

INTRODUCTION

How to Use This Manual

This manual contains information for the 1997 – 1999 PRELUDE and divided into 24 sections. The first page of each section is marked with a black tab that lines up with its corresponding thumb index tab on this page and the back cover. You can quickly find the first page of each section without looking through a full table of contents. The symbols printed at the top corner of each page can also be used as a quick reference system.

Each section includes:

1. A table of contents, or an exploded view index showing:
 - Parts disassembly sequence.
 - Bolt torques and thread sizes.
 - Page references to descriptions in text.
2. Disassembly/assembly procedures and tools.
3. Inspection.
4. Testing/troubleshooting.
5. Repair.
6. Adjustments.

Special Information

⚠ WARNING Indicates a strong possibility of severe personal injury or loss of life if instructions are not followed.

CAUTION: Indicates a possibility of personal injury or equipment damage if instructions are not followed.

NOTICE

The purpose of these messages is to help prevent damage to the vehicle, other property, or the environment.

NOTE: Gives helpful information.

CAUTION: Detailed descriptions of *standard workshop* procedures, safety principles and service operations are not included. Please note that this manual contains warnings and cautions against some specific service methods which could cause **PERSONAL INJURY**, damage a vehicle or make it unsafe. Please understand that these warnings cannot cover all conceivable ways in which service, whether or not recommended by HONDA, might be done, or of the possible hazardous consequences of every conceivable way, nor could HONDA investigate all such ways. Anyone using service procedures or tools, whether or not recommended by HONDA, *must satisfy himself thoroughly* that neither personal safety nor vehicle safety will be jeopardized.

General Info



Specifications

specs

Maintenance



Engine Electrical



Engine



Cooling



Fuel and Emissions



*Transaxle



*Steering



Suspension



*Brakes
(Including **ABS**)



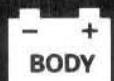
*Body



*Heater and
Air Conditioning



*Body Electrical



*Restraints



SUPPLEMENTAL RESTRAINT SYSTEM (SRS)

The Prelude SRS includes a driver's airbag located in the steering wheel hub and a passenger's airbag located in the dashboard above the glove box. Information necessary to safely service the SRS is included in this Service Manual. Items marked with an asterisk (*) on the contents page include, or are located near, SRS components. Servicing, disassembling or replacing these items will require special precautions and tools, and should therefore be done by an authorized Honda dealer.

⚠ WARNING

- To avoid rendering the SRS inoperative, which could lead to personal injury or death in the event of a severe frontal collision, all SRS service work must be performed by an authorized Honda dealer.
- Improper service procedures, including incorrect removal and installation of the SRS, could lead to personal injury caused by unintentional activation of the airbags.
- Do not bump the SRS unit. Otherwise, the system may fail in case of a collision, or the airbags may deploy when the ignition switch is ON (II).
- All SRS electrical wiring harnesses are covered with yellow insulation. Related components are located in the steering column, front console, dashboard, dashboard lower panel, and in the dashboard above the glove box. Do not use electrical test equipment on these circuits.



General Information

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the Introduction page](#)**

Chassis and Paint Codes

U.S. 1997 Model

Vehicle Identification Number

JHM BB6 1 4 * V C 000001

Manufacturer, Make and Type of Vehicle

JHM: HONDA MOTOR CO., LTD
HONDA, Passenger vehicle

Line, Body and Engine Type

BB6: PRELUDE/H22A4

Body Type and Transmission Type

- 1: 2-door Coupe/5-speed Manual
- 2: 2-door Coupe/4-speed Automatic

Vehicle Grade (Series)

- 4: Prelude
- 5: Prelude Type SH

Check Digit

Model Year

V: 1997

Factory Code

C: Saitama Factory in Japan (Sayama)

Serial Number

Engine Number

H22A4 - 1000001

Engine Type

H22A4: 2.2 l DOHC VTEC Sequential
Multiport Fuel-injected engine

Serial Number

Prelude: 1000001 -

Prelude Type SH: 1500001 -

Transmission Number

M2Y4 - 1000001

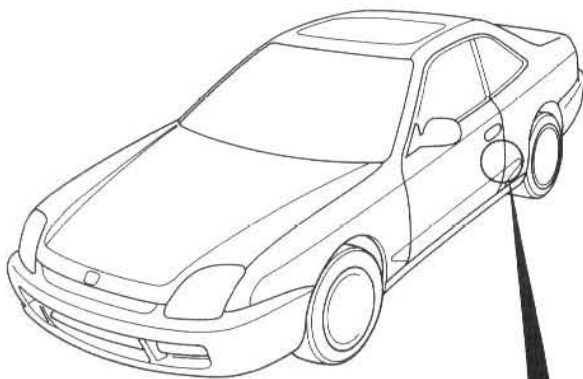
Transmission Type

M2Y4: 5-speed Manual
M6HA: 4-speed Automatic

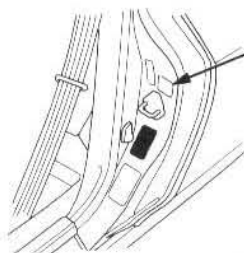
Serial Number

Paint Code

Paint Code	Color
B-83M	Nordic Mist Metallic
G-83P	Eucalyptus Green Pearl
NH-592P	Flamenco Black Pearl
R-94	San Marino Red



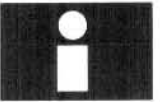
Vehicle Identification Number and Federal Motor Vehicle Safety Standard Certification.



COLOR LABEL

INT. COLOR
TYPE F
EXT. COLOR
B-83M
KA S30 A4 A

Paint Code



U.S. 1998 Model

Vehicle Identification Number

JHM BB6 1 4 *WC000001

Manufacturer, Make and

Type of Vehicle

JHM: HONDA MOTOR CO., LTD

HONDA, Passenger vehicle

Line, Body and Engine Type

BB6: PRELUDE/H22A4

Body Type and Transmission Type

1: 2-door Coupe/5-speed Manual

2: 2-door Coupe/4-speed Automatic

Vehicle Grade (Series)

4: Prelude

5: Prelude Type SH

Check Digit

Model Year

W: 1998

Factory Code

C: Saitama Factory in Japan (Sayama)

Serial Number

Engine Number

H22A4 - 2000001

Engine Type

H22A4: 2.2 l DOHC VTEC Sequential

Multiport Fuel-injected engine

Serial Number

Prelude: 2000001 -

Prelude Type SH: 2500001 -

Transmission Number

M2Y4 - 2000001

Transmission Type

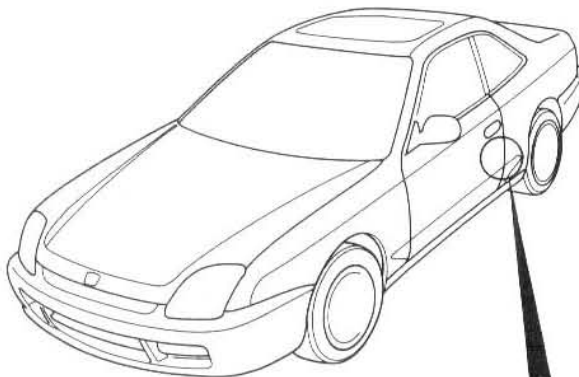
M2Y4, M2U4: 5-speed Manual

M6HA: 4-speed Automatic

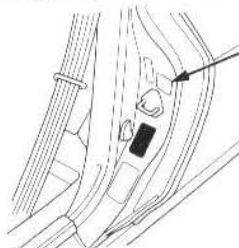
Serial Number

Paint Code

Paint Code	Color
B-83M	Nordic Mist Metallic
G-83P	Eucalyptus Green Pearl
NH-592P	Flamenco Black Pearl
NH603P	White Diamond Pearl
R-94	San Marino Red



Vehicle Identification Number
and Federal Motor Vehicle
Safety Standard Certification.



COLOR LABEL

INT. COLOR

TYPE F

EXT. COLOR

B-83M

KA S30 A4 A

Paint Code

Chassis and Paint Codes

U.S. 1999 Model

Vehicle Identification Number

JHM BB6 1 4 * X C 000001

Manufacturer, Make and Type of Vehicle

JHM: HONDA MOTOR CO., LTD
HONDA, Passenger vehicle

Line, Body and Engine Type

BB6: PRELUDE/H22A4

Body Type and Transmission Type

1: 2-door Coupe/5-speed Manual
2: 2-door Coupe/4-speed Automatic

Vehicle Grade (Series)

4: Prelude
5: Prelude Type SH

Check Digit

Model Year

X: 1999

Factory Code

C: Saitama Factory in Japan (Sayama)

Serial Number

Engine Number

H22A4 - 3000001

Engine Type

H22A4: 2.2 l DOHC VTEC Sequential
Multiport Fuel-injected engine

Serial Number

Prelude: 3000001 -
Prelude Type SH: 3500001 -

Transmission Number

M2Y4 - 3000001

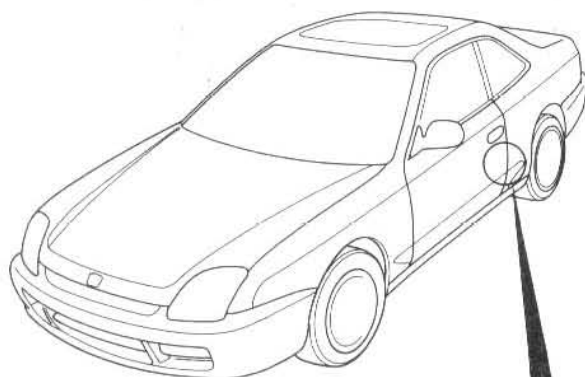
Transmission Type

M2Y4, M2U4: 5-speed Manual
M6HA: 4-speed Automatic

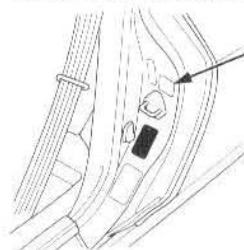
Serial Number

Paint Code

Paint Code	Color
B-91M	Crystal Blue Silver Metallic
B-92P	Nighthawk Black Pearl
G-98P	Ficus Green Pearl Metallic
NH-624P	Premium White Pearl
R-81	Milano Red



Vehicle Identification Number and Federal Motor Vehicle Safety Standard Certification.



COLOR LABEL

INT. COLOR
TYPE F
EXT. COLOR
B-91M
KA S30 A4 A

Paint Code



Canada 1997 Model

Vehicle Identification Number

JHM BB6 1 4 * V C 800001

Manufacturer, Make and Type of Vehicle

JHM: HONDA MOTOR CO., LTD
HONDA, Passenger vehicle

Line, Body and Engine Type

BB6: PRELUDE/H22A4

Body Type and Transmission Type

- 1: 2-door Coupe/5-speed Manual
- 2: 2-door Coupe/4-speed Automatic

Vehicle Grade (Series)

- 4: Prelude
- 5: Prelude Type SH

Check Digit

Model Year

V: 1997

Factory Code

C: Saitama Factory in Japan (Sayama)

Serial Number

Engine Number

H22A4 - 1000001

Engine Type

H22A4: 2.2 l DOHC VTEC Sequential
Multiport Fuel-injected engine

Serial Number

Prelude: 1000001 -
Prelude Type SH: 1500001 -

Transmission Number

M2Y4 - 1000001

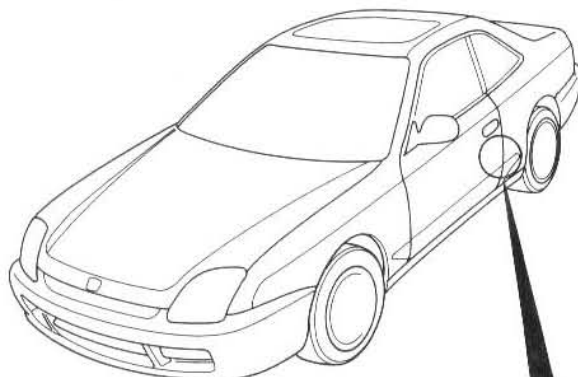
Transmission Type

M2Y4: 5-speed Manual
M6HA: 4-speed Automatic

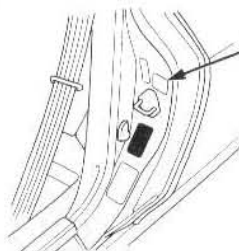
Serial Number

Paint Code

Paint Code	Color
B-83M	Nordic Mist Metallic
G-83P	Eucalyptus Green Pearl
NH-592P	Flamenco Black Pearl
R-94	San Marino Red



Vehicle Identification Number and Canadian Motor Vehicle Safety Standard Certification.



COLOR LABEL

INT. COLOR
TYPE F
EXT. COLOR
B-83M
KC S30 C4 C

Paint Code

Chassis and Paint Codes

Canada 1998 Model

Vehicle Identification Number

JHM BB6 1 4 * W C 800001

Manufacturer, Make and Type of Vehicle

JHM: HONDA MOTOR CO., LTD
HONDA, Passenger vehicle

Line, Body and Engine Type

BB6: PRELUDE/H22A4

Body Type and Transmission Type

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Vehicle Grade (Series)

4: Prelude
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Model Year

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Factory Code

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Engine Number

H22A4 - 2000001

Engine Type

H22A4: 2.2 l DOHC VTEC Sequential
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Serial Number

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Prelude Type SH: 2500001 -

Transmission Number

M2Y4 - 2000001

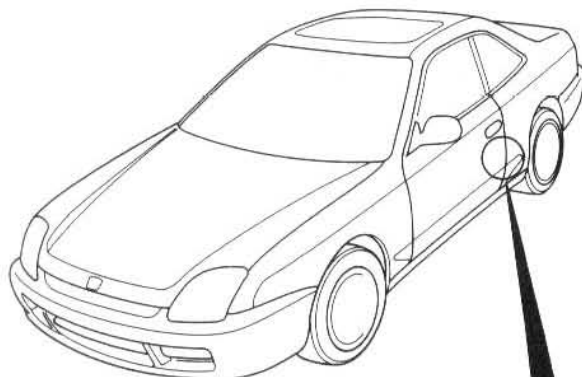
Transmission Type

M2Y4, M2U4: 5-speed Manual
M6HA: 4-speed Automatic

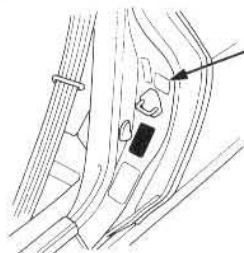
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Paint Code	Color
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NH-592P	Flamenco Black Pearl
NH603P	White Diamond Pearl
R-94	San Marino Red



Vehicle Identification Number and Canadian Motor Vehicle Safety Standard Certification.



COLOR LABEL

INT. COLOR
TYPE F
EXT. COLOR
B-83M
KC S30 C4 C

Paint Code



Canada 1999 Model

Vehicle Identification Number

JHM BB6 1 4 * X C 800001

Manufacturer, Make and Type of Vehicle

JHM: HONDA MOTOR CO., LTD
HONDA, Passenger vehicle

Line, Body and Engine Type

BB6: PRELUDE/H22A4

Body Type and Transmission Type

1: 2-door Coupe/5-speed Manual
2: 2-door Coupe/4-speed Automatic

Vehicle Grade (Series)

4: Prelude
5: Prelude Type SH

Check Digit

Model Year

X: 1999

Factory Code

C: Saitama Factory in Japan (Sayama)

Serial Number

Engine Number

H22A4 - 3000001

Engine Type

H22A4: 2.2 l DOHC VTEC Sequential
Multiport Fuel-injected engine

Serial Number

Prelude: 3000001 -
Prelude Type SH: 3500001 -

Transmission Number

M2Y4 - 3000001

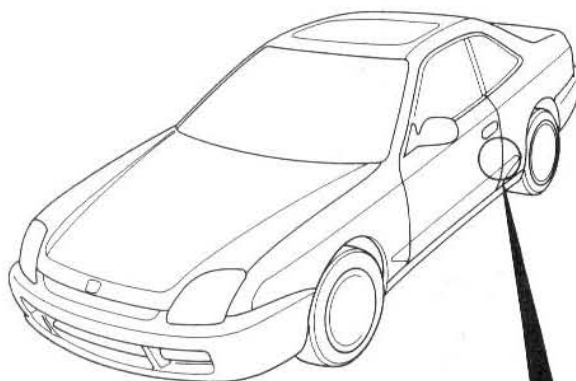
Transmission Type

M2Y4, M2U4: 5-speed Manual
M6HA: 4-speed Automatic

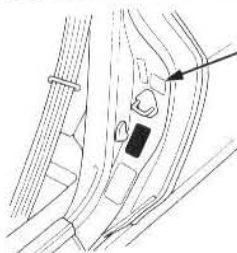
Serial Number

Paint Code

Paint Code	Color
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B-92P	Nighthawk Black Pearl
NH-624P	Premium White Pearl
R-81	Milano Red



Vehicle Identification Number and Canadian Motor Vehicle Safety Standard Certification.

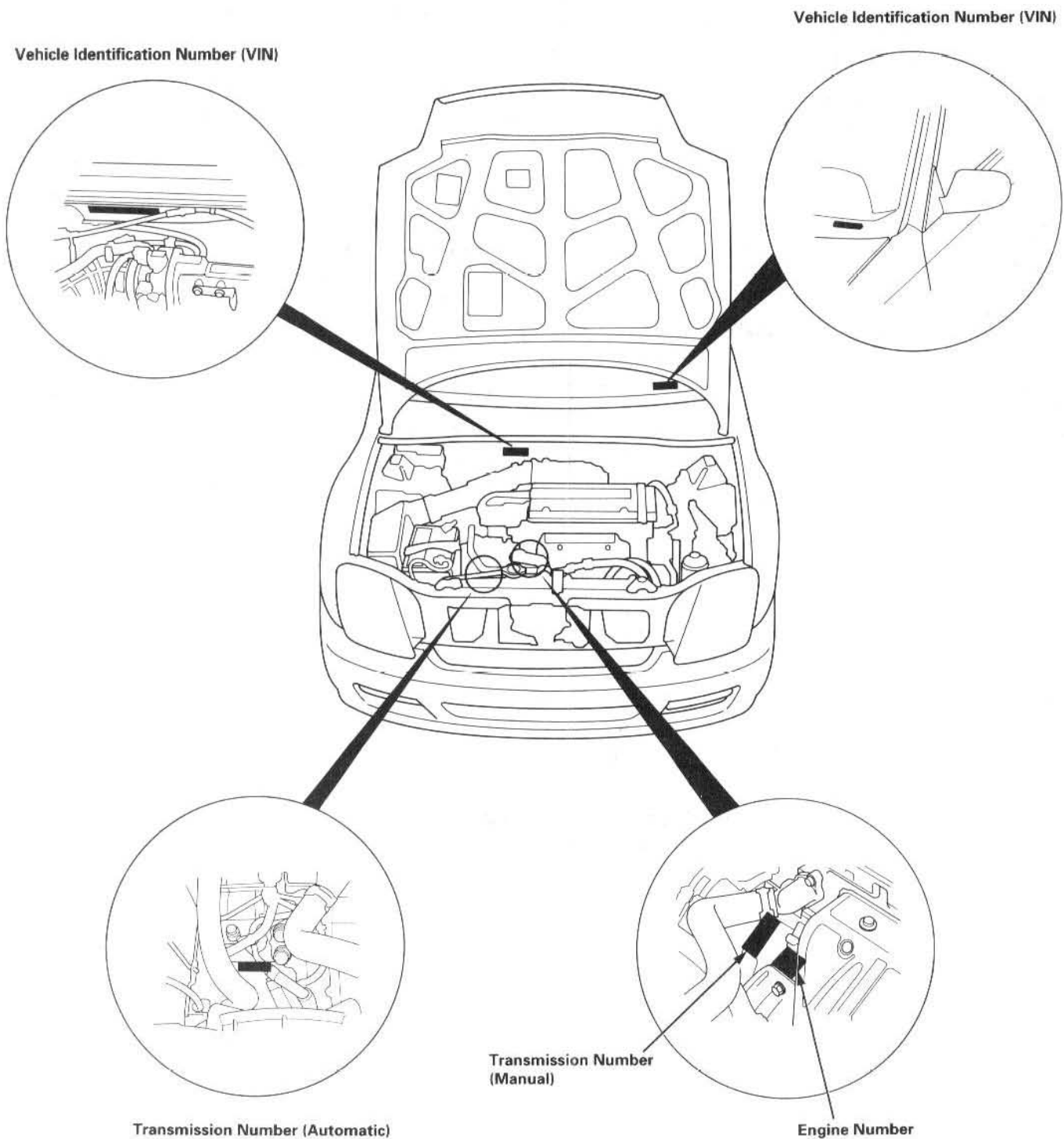


COLOR LABEL

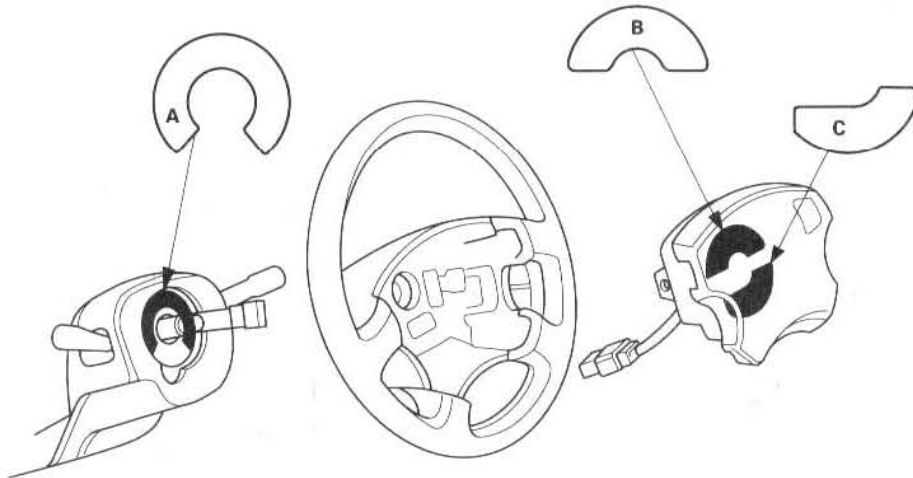
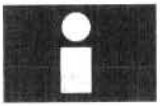
INT. COLOR
TYPE F
EXT. COLOR
B-91M
KC S30 C4 C

Paint Code

Identification Number Locations



Warning/Caution Label Locations



A: CABLE REEL CAUTION A

SRS

INSTALLATION OF THE SRS CABLE REEL IS CRITICAL TO THE PROPER OPERATION OF THE SRS SYSTEM. REFER TO THE SERVICE MANUAL FOR DETAILED INSTALLATION INSTRUCTIONS.

B: DRIVER MODULE DANGER

⚠ DANGER

EXPLOSIVE/FLAMMABLE

CONTACT WITH ACID, WATER OR HEAVY METALS SUCH AS COPPER, LEAD OR MERCURY MAY PRODUCE HARMFUL AND IRRITATING GASES OR EXPLOSIVE COMPOUNDS. STORAGE TEMPERATURES MUST NOT EXCEED 200°F (100°C). FOR PROPER HANDLING, STORAGE AND DISPOSAL PROCEDURES REFER TO SERVICE MANUAL, SRS SUPPLEMENT.

POISON

CONTAINS POISONOUS SODIUM AZIDE AND POTASSIUM NITRATE.

FIRST AID

IF CONTENTS ARE SWALLOWED, INDUCE VOMITING. FOR EYE CONTACT, FLUSH EYES WITH WATER FOR 15 MINUTES. IF GASES (FROM ACID OR WATER CONTACT) ARE INHALED, SEEK FRESH AIR. IN EVERY CASE, GET PROMPT MEDICAL ATTENTION. KEEP OUT OF REACH OF CHILDREN.

C: DRIVER MODULE WARNING

⚠ WARNING

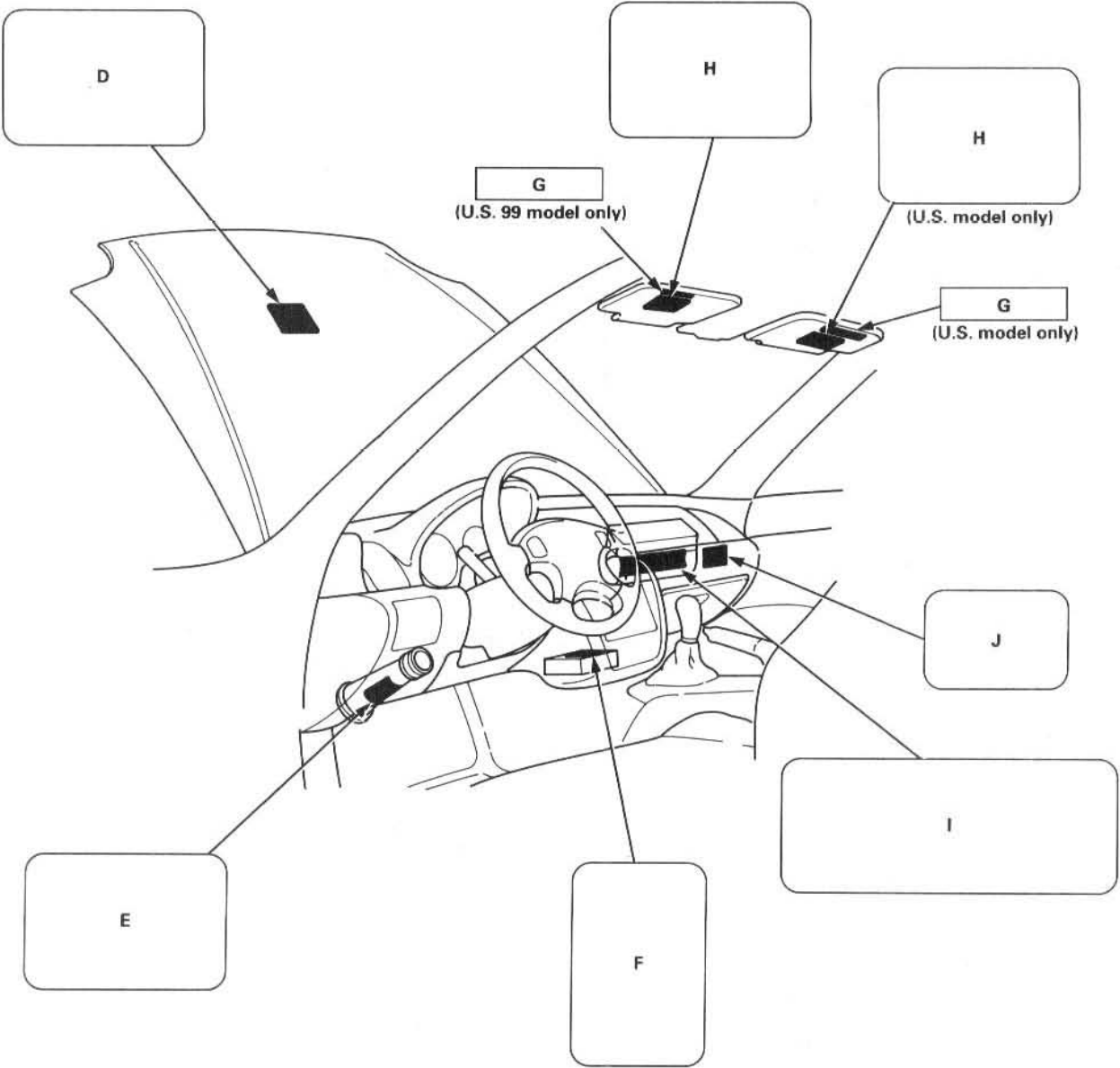
THE AIRBAG INFLATOR IS EXPLOSIVE AND, IF ACCIDENTALLY DEPLOYED, CAN SERIOUSLY HURT OR KILL YOU.

- DO NOT USE ELECTRICAL TEST EQUIPMENT OR PROBING DEVICES. THEY CAN CAUSE ACCIDENTAL DEPLOYMENT.
- NO SERVICEABLE PARTS INSIDE. DO NOT DISASSEMBLE.
- PLACE AIRBAG UPRIGHT WHEN REMOVED.
- FOLLOW SERVICE MANUAL INSTRUCTIONS CAREFULLY.

(cont'd)

Warning/Caution Label Locations

(cont'd)





D: SRS WARNING (HOOD)

SUPPLEMENTAL RESTRAINT SYSTEM (SRS)
THIS VEHICLE IS EQUIPPED WITH DRIVER AND FRONT SEAT PASSENGER AIRBAGS.
ALL SRS ELECTRICAL WIRING AND CONNECTORS ARE COLORED YELLOW.
TAMPERING WITH, DISCONNECTING OR USING ELECTRICAL TEST EQUIPMENT ON THE SRS WIRING CAN MAKE THE SYSTEM INOPERATIVE OR CAUSE ACCIDENTAL FIRING OF THE INFLATOR.

⚠ WARNING
THE AIRBAG INFLATOR IS EXPLOSIVE AND, IF ACCIDENTALLY DEPLOYED, CAN SERIOUSLY HURT YOU. FOLLOW SERVICE MANUAL INSTRUCTIONS CAREFULLY.

E: STEERING COLUMN NOTICE

NOTICE
TO PREVENT SRS DAMAGE, REMOVE STEERING WHEEL BEFORE REMOVING STEERING SHAFT CONNECTING BOLT.

F: MONITOR NOTICE

NOTICE **SRS**
• NO SERVICEABLE PARTS INSIDE.
• REFER TO SERVICE MANUAL FOR DETAILED INSTRUCTIONS.

G: PASSENGER INFORMATION (U.S. model) (97, 98 model)

AIRBAG SEE OTHER SIDE.

U.S. model (99 model)

AIRBAG WARNING FLIP VISOR OVER.

**H: SRS INFORMATION (U.S.A Canada model) (97 model)
(Canada model) (98 model)**

CAUTION
TO AVOID SERIOUS INJURY:
• FOR MAXIMUM SAFETY PROTECTION IN ALL TYPES OF CRASHES, YOU MUST ALWAYS WEAR YOUR SAFETY BELT.
• DO NOT INSTALL REARWARD-FACING CHILD SEATS IN ANY FRONT PASSENGER SEAT POSITION.
• DO NOT SIT OR LEAN UNNECESSARILY CLOSE TO THE AIRBAG.
• DO NOT PLACE ANY OBJECTS OVER THE AIRBAG OR BETWEEN THE AIRBAG AND YOURSELF.
• SEE THE OWNER'S MANUAL FOR FURTHER INFORMATION AND EXPLANATIONS.
• THE SRS MUST BE INSPECTED TEN YEARS AFTER IT IS INSTALLED.
• THE DATE OF INSTALLATION IS SHOWN ON THE DRIVER'S DOORJAMB.

U.S. model (98 model)

⚠ WARNING
DEATH OR SERIOUS INJURY CAN OCCUR.
• CHILDREN 12 AND UNDER CAN BE KILLED BY THE AIRBAG.
• THE BACK SEAT IS THE SAFEST PLACE FOR CHILDREN.
• NEVER PUT A REAR-FACING CHILD SEAT IN THE FRONT.
• SIT AS FAR BACK AS POSSIBLE FROM THE AIRBAG.
• ALWAYS USE SEAT BELTS AND CHILD RESTRAINTS.
• THE SRS MUST BE INSPECTED TEN YEARS AFTER IT IS INSTALLED.
• THE DATE OF INSTALLATION IS SHOWN ON THE DRIVER'S DOORJAMB.

Canada model (99 model)

CAUTION
TO AVOID SERIOUS INJURY:
• FOR MAXIMUM SAFETY PROTECTION IN ALL TYPES OF CRASHES, YOU MUST ALWAYS WEAR YOUR SAFETY BELT.
• DO NOT INSTALL REARWARD-FACING CHILD SEATS IN ANY FRONT PASSENGER SEAT POSITION.
• DO NOT SIT OR LEAN UNNECESSARILY CLOSE TO THE AIRBAG.
• DO NOT PLACE ANY OBJECTS OVER THE AIRBAG OR BETWEEN THE AIRBAG AND YOURSELF.
• SEE THE OWNER'S MANUAL FOR FURTHER INFORMATION AND EXPLANATIONS.

U.S. model (99 model)

⚠ WARNING
DEATH OR SERIOUS INJURY CAN OCCUR.
• CHILDREN 12 AND UNDER CAN BE KILLED BY THE AIRBAG.
• THE BACK SEAT IS THE SAFEST PLACE FOR CHILDREN.
• NEVER PUT A REAR-FACING CHILD SEAT IN THE FRONT.
• SIT AS FAR BACK AS POSSIBLE FROM THE AIRBAG.
• ALWAYS USE SEAT BELTS AND CHILD RESTRAINTS.

(cont'd)

Warning/Caution Label Locations

(cont'd)

I: FRONT SEAT PASSENGER AIRBAG MODULE DANGER (97 model)

⚠ DANGER

EXPLOSIVE/FLAMMABLE

CONTACT WITH ACID, WATER OR HEAVY METALS SUCH AS COPPER, LEAD OR MERCURY MAY PRODUCE HARMFUL AND IRRITATING GASES OR EXPLOSIVE COMPOUNDS. STORAGE TEMPERATURES MUST NOT EXCEED 200°F (100°C). FOR PROPER HANDLING, STORAGE AND DISPOSAL PROCEDURES REFER TO THE SERVICE MANUAL, SRS SUPPLEMENT.

POISON

CONTAINS POISONOUS SODIUM AZIDE AND POTASSIUM NITRATE.

FIRST AID

IF CONTENTS ARE SWALLOWED, INDUCE VOMITING. FOR EYE CONTACT, FLUSH EYES WITH WATER FOR 15 MINUTES. IF GASES (FROM ACID OR WATER CONTACT) ARE INHALED, SEEK FRESH AIR. IN EVERY CASE, GET PROMPT MEDICAL ATTENTION.

KEEP OUT OF REACH OF CHILDREN.

⚠ WARNING

THE AIRBAG INFLATOR IS EXPLOSIVE AND, IF ACCIDENTALLY DEPLOYED, CAN SERIOUSLY HURT OR KILL YOU.

- DO NOT USE ELECTRICAL TEST EQUIPMENT OR PROBING DEVICES.

THEY CAN CAUSE ACCIDENTAL DEPLOYMENT.

- NO SERVICEABLE PARTS INSIDE. DO NOT DISASSEMBLE.
- PLACE AIRBAG UPRIGHT WHEN REMOVED.
- FOLLOW SERVICE MANUAL INSTRUCTIONS CAREFULLY.

(98, 99 model)

⚠ DANGER

EXPLOSIVE/FLAMMABLE

STORAGE TEMPERATURES MUST NOT EXCEED 200°F (93°C). FOR PROPER HANDLING, STORAGE AND DISPOSAL PROCEDURES REFER TO THE SERVICE MANUAL, SRS SUPPLEMENT.

FIRST AID

IF CONTENTS ARE SWALLOWED, INDUCE VOMITING. FOR EYE CONTACT, FLUSH EYES WITH WATER FOR 15 MINUTES. IN EVERY CASE, GET PROMPT MEDICAL ATTENTION. KEEP OUT OF REACH OF CHILDREN.

⚠ WARNING

THE AIRBAG INFLATOR IS EXPLOSIVE AND, IF ACCIDENTALLY DEPLOYED, CAN SERIOUSLY HURT OR KILL YOU.

- DO NOT USE ELECTRICAL TEST EQUIPMENT OR PROBING DEVICES.

THEY CAN CAUSE ACCIDENTAL DEPLOYMENT.

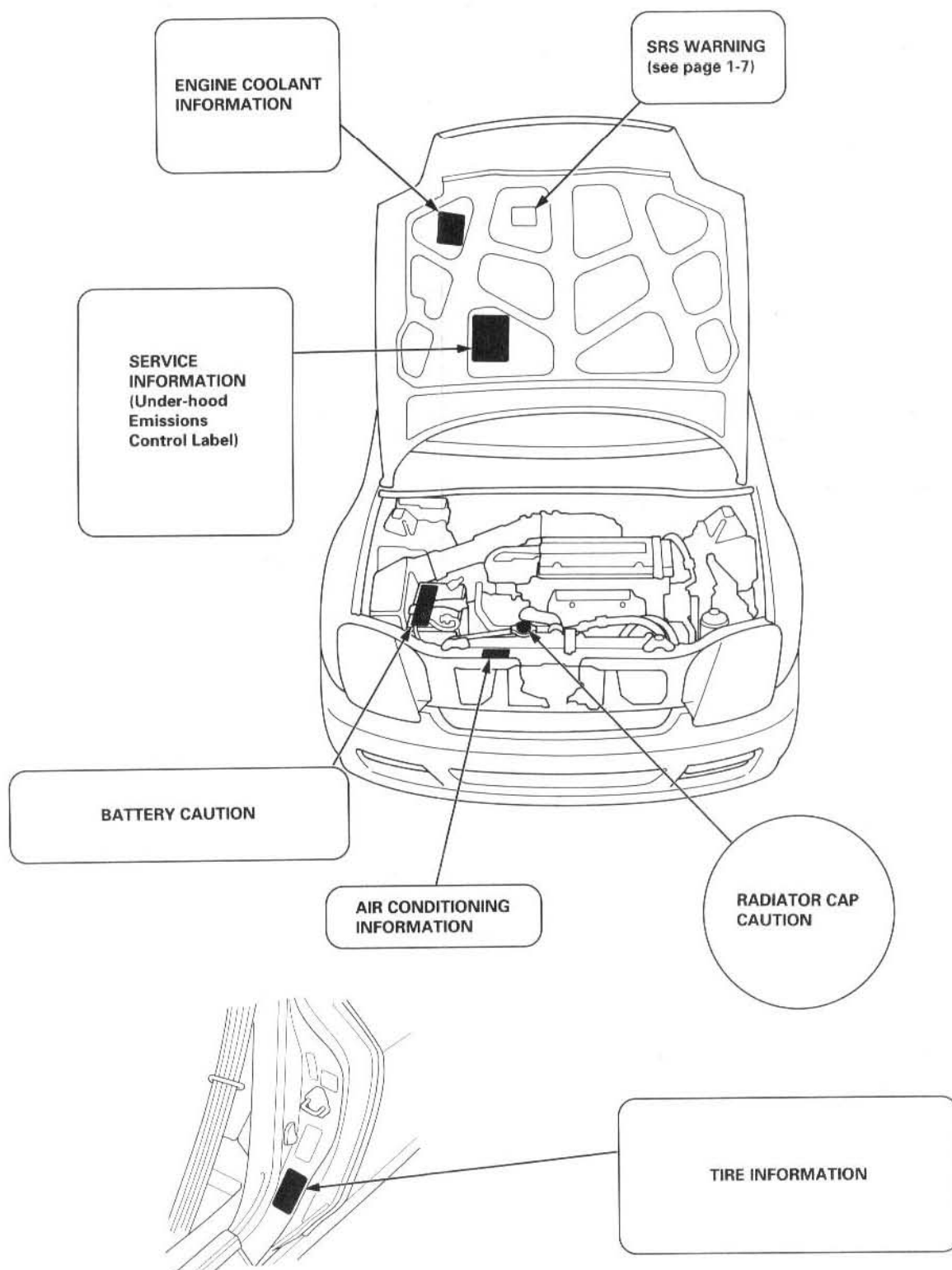
- NO SERVICEABLE PARTS INSIDE. DO NOT DISASSEMBLE.
- PLACE AIRBAG UPRIGHT WHEN REMOVED.
- FOLLOW SERVICE MANUAL INSTRUCTIONS CAREFULLY.

J: PASSENGER AIRBAG CAUTION U.S. model (98, 99 model)

⚠ WARNING

CHILDREN CAN BE KILLED OR INJURED BY PASSENGER AIRBAG.

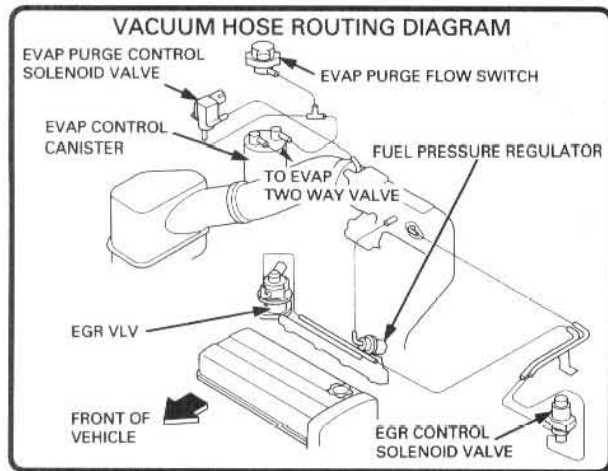
THE BACK SEAT IS THE SAFEST PLACE FOR CHILDREN 12 AND UNDER. MAKE SURE ALL CHILDREN USE SEAT BELTS OR CHILD SEATS.



Under-hood Emissions Control Label

Emission Group Identification (1997 model)

Example:



VEHICLE EMISSION CONTROL INFORMATION		(M•A)	
ENGINE FAMILY: VHN2.2VJGKHK DISPLACEMENT: 2.2 LITER			
EVAPORATIVE FAMILY: VHN1100BYMAP			
CATALYST			
REFER TO SERVICE MANUAL FOR ADDITIONAL INFORMATION. TUNE UP CONDITIONS: ENGINE AT NORMAL OPERATING TEMPERATURE. ALL ACCESSORIES TURNED OFF, COOLING FAN OFF, TRANSMISSION IN NEUTRAL. NO OTHER ADJUSTMENTS NEEDED.			
IDLE SPEED	MANUAL TRANSMISSION	700 ± 50 rpm	
	AUTOMATIC TRANSMISSION	700 ± 50 rpm	
VALVE LASH	IN	0.17 ± 0.02 mm COLD	
	EX	0.19 ± 0.02 mm COLD	
SPARK PLUG	TYPE	NGK: PZFR6F-11 ND: PKJ20CR-L11	GAP 1.1 -0.1 mm
THIS VEHICLE CONFORMS TO U.S. EPA REGULATIONS APPLICABLE TO 1997 MODEL YEAR NEW MOTOR VEHICLES.			22VJGKHG
17277-PSM-A00 HONDA MOTOR CO., LTD.			

50ST (50 States):

THIS VEHICLE CONFORMS TO U.S. EPA AND STATE OF CALIFORNIA REGULATIONS APPLICABLE TO 1997 MODEL YEAR NEW MOTOR VEHICLES.

49ST (49 States/Federal):

THIS VEHICLE CONFORMS TO U.S. EPA REGULATIONS APPLICABLE TO 1997 MODEL YEAR NEW MOTOR VEHICLES.

CAL (California):

THIS VEHICLE CONFORMS TO U.S. EPA AND STATE OF CALIFORNIA REGULATIONS APPLICABLE TO 1997 MODEL YEAR NEW PASSENGER CARS PROVIDED THAT THIS VEHICLE IS ONLY INTRODUCED INTO COMMERCE FOR SALE IN THE STATE OF CALIFORNIA.

Engine and Evaporative Families

Engine Family:

V HN 2.2 V J G K H K

Model Year

V: 1997

Manufacturer

HN: Honda

Displacement

Class

V: Light Duty Vehicle/Passenger Car

Fuel System and Number of Valves

J: Electronic Sequential Multiport

Injection (three or more valves per cylinder)

Fuel Type

G: Gasoline

Standard

F: 49 or 50 States Tier 1

K: 49 or 50 States Tier 1

1: California Tier 1

2: California TLEV

3: California LEV

4: California ULEV

Catalyst

E, F, G, H: Three Way Catalyst

OBD

K - T: OBD Equipped

Evaporative Family:

V HN 1 100 B Y M A P

Model Year

V: 1997

Manufacturer

HN: Honda

Storage System

1: Canister

Canister Working Capacity (grams)

Canister Configuration

A: Plastic Housing (Closed Bottom)

B: Plastic Housing (Open Bottom)

Fuel System

Y: Fuel Injection

Fuel Tank

M: Metal

Standard

A: Current Evap

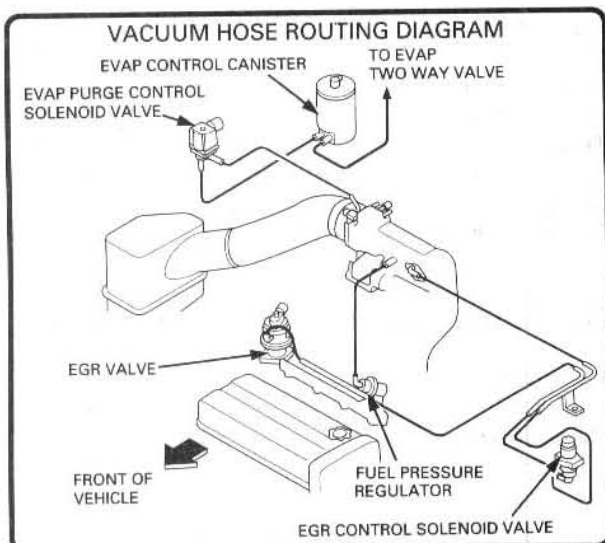
B: Enhanced Evap

Wild Card



Emission Group Identification (1998 model)

Example:



VEHICLE EMISSION CONTROL INFORMATION

ENGINE FAMILY-WHNXV02.25A1 DISPLACEMENT-2.2L
EVAPORATIVE FAMILY-WHNXE0090AAC (H86.130-96 PROCEDURES)

CATALYST

REFER TO SERVICE MANUAL FOR ADDITIONAL INFORMATION.

TWC HO2S(2)
EGR SFI



NO OTHER ADJUSTMENTS NEEDED.

VALVE LASH	IN	0.17 ± 0.02 mm COLD
	EX	0.19 ± 0.02 mm COLD

SPARK PLUG	TYPE	NGK PZFR6F-11	GAP	1.1 ± 0.1 mm
		ND: PKJ20CR-L11		

THIS VEHICLE CONFORMS TO U.S. EPA AND STATE OF CALIFORNIA REGULATIONS APPLICABLE TO 1998 MODEL YEAR NEW MOTOR VEHICLES.

22VHGBBG

17277-P5M-L01 HONDA MOTOR CO., LTD.

Engine and Evaporative Families

Engine Family:

W HNX V 02.2 SA1

Model Year

W: 1998

Manufacturer

HNX: Honda

Type

V: Light Duty Vehicle/Passenger Car

Displacement

Sequence Characters

Evaporative Family:

W HNX E 0090 AAC

Model Year

W: 1998

Manufacturer

HNX: Honda

Type

E: EVAP

Canister Work Capacity (grams)

Sequence Characters

50ST (50 States):

THIS VEHICLE CONFORMS TO U.S. EPA AND STATE OF CALIFORNIA REGULATIONS APPLICABLE TO 1998 MODEL YEAR NEW MOTOR VEHICLES.

49ST (49 States/Federal):

THIS VEHICLE CONFORMS TO U.S. EPA REGULATIONS APPLICABLE TO 1998 MODEL YEAR NEW MOTOR VEHICLES.

CAL (California):

THIS VEHICLE CONFORMS TO U.S. EPA AND STATE OF CALIFORNIA REGULATIONS APPLICABLE TO 1998 MODEL YEAR NEW PASSENGER CARS PROVIDED THAT THIS VEHICLE IS ONLY INTRODUCED INTO COMMERCE FOR SALE IN THE STATE OF CALIFORNIA.

Under-hood Emissions Control Label

Emission Group Identification (1999 model)

Example:

VACUUM HOSE ROUTING DIAGRAM

EVAP PURGE CONTROL SOLENOID VALVE

TO EVAP TWO WAY VALVE

EVAP CONTROL CANISTER

EGR VALVE

FRONT OF VEHICLE

FUEL PRESSURE REGULATOR

EGR CONTROL SOLENOID VALVE

VEHICLE EMISSION CONTROL INFORMATION

ENGINE FAMILY: XHNXV02.2SA1 DISPLACEMENT: 2.2L

EVAPORATIVE FAMILY: XHNXR0130AAF

CATALYST

REFER TO SERVICE MANUAL FOR ADDITIONAL INFORMATION.

NO OTHER ADJUSTMENTS NEEDED.

VALVE LASH	IN	0.17 ± 0.02 mm COLD
	EX	0.19 ± 0.02 mm COLD

SPARK PLUG	TYPE	NGK: PZFR6F-11	GAP	1.1 - 0.1 mm
		ND: PKJ20CR-L11		

THIS VEHICLE CONFORMS TO U.S. EPA AND STATE OF CALIFORNIA REGULATIONS APPLICABLE TO 1999 MODEL YEAR NEW MOTOR VEHICLES.

17277-P5M-L02 HONDA MOTOR CO., LTD.

22VHG88G

OBD II CERTIFIED

50ST (50 States):

THIS VEHICLE CONFORMS TO U.S. EPA AND STATE OF CALIFORNIA REGULATIONS APPLICABLE TO 1999 MODEL YEAR NEW MOTOR VEHICLES.

49ST (49 States/Federal):

THIS VEHICLE CONFORMS TO U.S. EPA REGULATIONS APPLICABLE TO 1999 MODEL YEAR NEW MOTOR VEHICLES.

CAL (California):

THIS VEHICLE CONFORMS TO U.S. EPA AND STATE OF CALIFORNIA REGULATIONS APPLICABLE TO 1999 MODEL YEAR NEW PASSENGER CARS PROVIDED THAT THIS VEHICLE IS ONLY INTRODUCED INTO COMMERCE FOR SALE IN THE STATE OF CALIFORNIA.

Engine and Evaporative Families

Engine Family: X HNX V 02.2 SA1

Model Year X: 1999

Manufacturer HNX: Honda

Type V: Light Duty Vehicle/Passenger Car

Displacement

Sequence Characters

Evaporative Family: X HNX R 0130 AAF

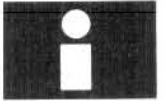
Model Year X: 1999

Manufacturer HNX: Honda

Type R: EVAP/ORVR

Canister Work Capacity (grams)

Sequence Characters



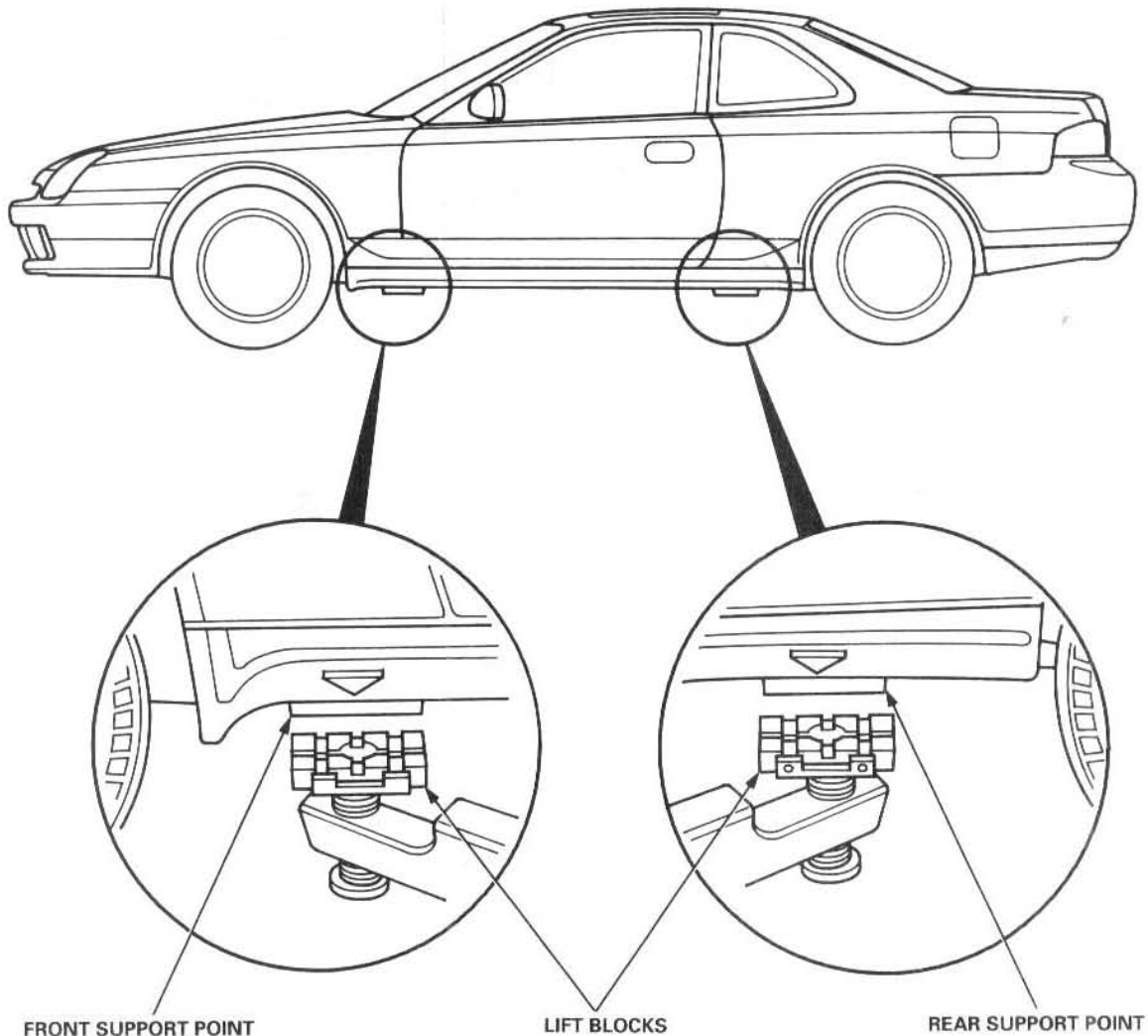
Lift and Safety Stands

⚠ WARNING When heavy rear components such as suspension, fuel tank, spare tire and trunk lid are to be removed, place additional weight in the trunk before hoisting. When substantial weight is removed from the rear of the vehicle, the center of gravity may change and can cause the vehicle to tip forward on the hoist.

NOTE: Since each tire/wheel assembly weighs approximately 30 lbs (14 kg), placing the front wheels in the trunk can assist with weight distribution.

1. Place the lift blocks as shown.
2. Raise the hoist a few inches (centimeters), and rock the vehicle to be sure it is firmly supported.
3. Raise the hoist to full height, and inspect the lift points for solid support.

NOTE: Use the same support points to support the vehicle on safety stands.



Lift and Support Points

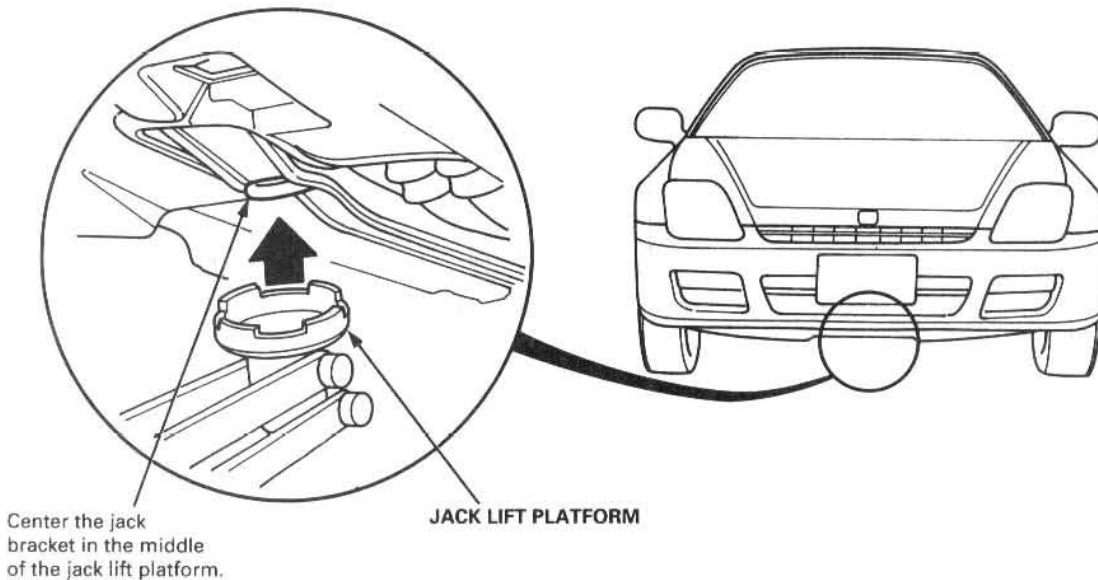
Floor Jack

1. Set the parking brake, and block the wheels that are not being lifted.
2. When lifting the rear of the vehicle, put the gearshift lever in reverse (Automatic in **P** position).
3. Raise the vehicle high enough to insert the safety stands.
4. Adjust and place the safety stands so the vehicle will be approximately level, then lower the vehicle onto them.

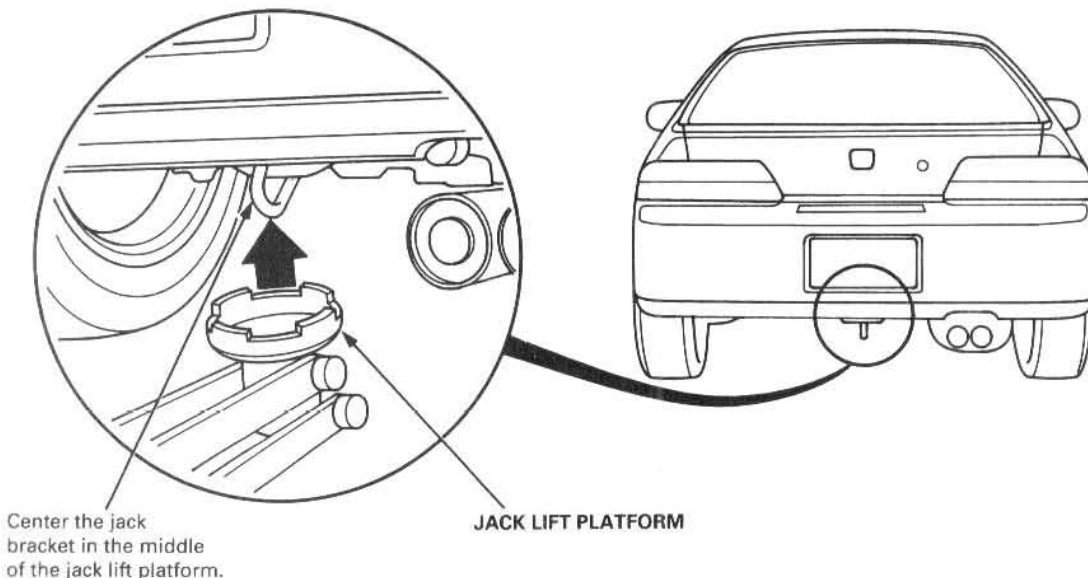
▲ WARNING

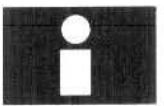
- Always use safety stands when working on or under any vehicle that is supported by only a jack.
- Never attempt to use a bumper jack for lifting or supporting the vehicle.

Front:



Rear:





If the vehicle needs to be towed, call a professional towing service. Never tow the vehicle behind another vehicle with just a rope or chain. It is very dangerous.

Emergency Towing

There are three popular methods of towing a vehicle.

Flat-bed Equipment — The operator loads the vehicle on the back of a truck. This is the best way of transporting the vehicle.

Wheel Lift Equipment — The tow truck uses two pivoting arms that go under the tires (front or rear) and lifts them off the ground. The other two wheels remain on the ground.

If the vehicle cannot be transported by flat-bed, it should be towed with the front wheels off the ground. If due to damage, the vehicle must be towed with the front wheels on the ground, do the following:

Manual Transmission

- Release the parking brake.
- Shift the transmission in Neutral.

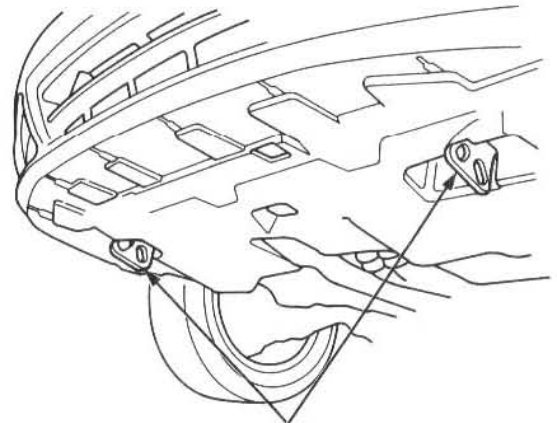
Automatic Transmission

- Release the parking brake.
- Start the engine.
- Shift to **D** position, then **N** position.
- Turn off the engine.

CAUTION:

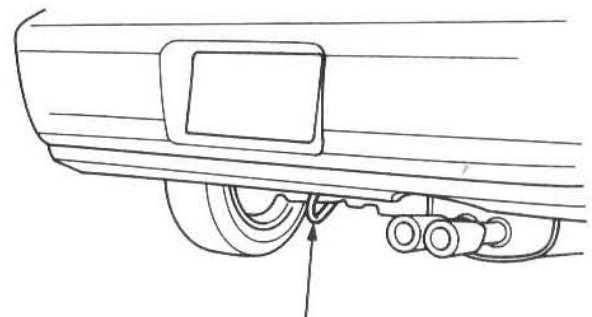
- Improper towing preparation will damage the transmission. Follow the above procedure exactly. If you cannot shift the transmission or start the engine (automatic transmission), the vehicle must be transported on a flat-bed.
- It is best to tow the vehicle no farther than 50 miles (80 km), and keep the speed below 35 mph (55 km/h).
- Trying to lift or tow the vehicle by the bumpers will cause serious damage. The bumpers are not designed to support the vehicle's weight.

Front:



TOWING HOOKS and
TIE DOWN BRACKETS

Rear:



TIE DOWN BRACKET

Service Precautions

Parts Marking Locations

To deter vehicle theft, certain major components are marked with the vehicle identification number (VIN). Original parts will have self-adhesive labels or labels attached with a break-off bolt. Replacement body parts will have self-adhesive labels, and replacement engine and transmission parts will be stamped with a code for spare parts.

NOTE:

- Be careful not to damage the parts marking labels during body repairs, and mask the labels before repainting.
- Label location letters without parenthesis indicate original parts. Letters with parenthesis indicate replacement parts.

Label Locations

A or (A): Engine

B or (B): Transmission

C or (C): Front Bumper

D or (D): Hood

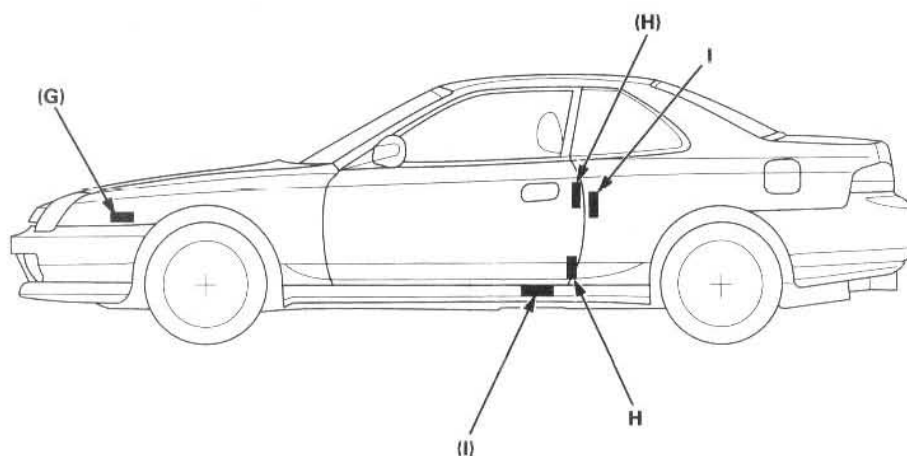
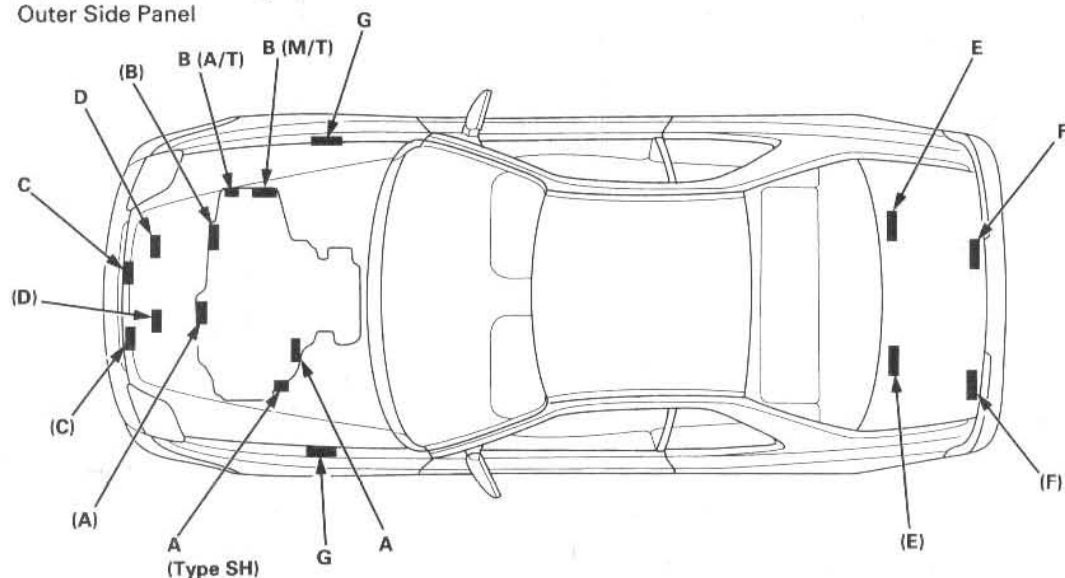
E or (E): Trunk Lid

F or (F): Rear Bumper

G or (G): Front Fender (Left and Right)

H or (H): Front Door (Left and Right)

I or (I): Outer Side Panel



Specifications

Standards and Service Limits	2-2
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Body Specifications	2-16

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Standards and Service Limits

Engine Electrical — Section 4

	MEASUREMENT	STANDARD (NEW)	
Ignition coil	Rated voltage V	12	
	Primary winding resistance at 68°F (20°C) Ω	0.64 – 0.78	
	Secondary winding resistance at 68°F (20°C) kΩ	14.4 – 21.6	
Ignition wire	Resistance at 68°F (20°C) kΩ	25 max.	
	Firing order	1 – 3 – 4 – 2	
Spark plug	Type Gap	STANDARD (NEW)	SERVICE LIMIT
		See Section 4 1.0 – 1.1 (0.039 – 0.043)	1.3 (0.051)*1
Ignition timing	At idle M/T	15 ± 2 (Neutral)	
	°BTDC (Red) A/T	15 ± 2 (N or P position)	
Alternator	Output 13.5 V at hot Coil resistance (rotor) at 68°F (20°C) kΩ Slip ring O.D. Brush length Brush spring tension N (kgf, lbf)	STANDARD (NEW)	SERVICE LIMIT
		100 A	
		2.8 – 3.0	
		14.4 (0.57)	14.0 (0.55)
		10.5 (0.41)	1.5 (0.06)
Starter	Manufacturer Output Commutator mica depth Commutator runout Commutator O.D. Brush length Brush spring tension (new) N (kgf, lbf)	MITSUBA	
		1.6 kW	
		0.4 – 0.5 (0.016 – 0.020)	0.15 (0.006)
		0 – 0.02 (0 – 0.001)	0.05 (0.002)
		28.0 – 28.1 (1.102 – 1.106)	27.5 (1.083)
		15.8 – 16.2 (0.62 – 0.64)	11.0 (0.43)
		16 – 18 (1.6 – 1.8, 3.5 – 4.0)	

*1: Do not adjust the gap, replace the spark plug if it is out of service limit.

Cylinder Head/Valve Train — Section 6

	MEASUREMENT			STANDARD (NEW)	SERVICE LIMIT
Compression	250 rpm and wide open throttle kPa (kgf/cm ² , psi)	Nominal Minimum Maximum variation		1,270 (13.0, 185) 930 (9.5, 135) 200 (2.0, 28)	
Cylinder head	Warpage Height			146.95 – 147.05 (5.785 – 5.789)	0.05 (0.002)
Camshaft	End play			0.05 – 0.15 (0.002 – 0.006)	0.5 (0.02)
	Camshaft-to-holder oil clearance			0.050 – 0.089 (0.0020 – 0.0035)	0.15 (0.006)
	Total runout			0.03 (0.001) max.	0.04 (0.002)
	Cam lobe height				
	Prelude	IN	Primary	34.041 (1.3402)	—
			Mid	36.856 (1.4510)	—
			Secondary	34.971 (1.3768)	—
		EX	Primary	33.745 (1.3285)	—
			Mid	36.323 (1.4300)	—
			Secondary	34.683 (1.3655)	—
	Prelude Type SH	IN	Primary	34.041 (1.3402)	—
			Mid	37.229 (1.4657)	—
			Secondary	34.971 (1.3768)	—
		EX	Primary	33.745 (1.3285)	—
			Mid	36.704 (1.4450)	—
			Secondary	34.683 (1.3655)	—
Valve	Valve clearance (Cold)	IN		0.15 – 0.19 (0.006 – 0.007)* ³	—
		EX		0.17 – 0.21 (0.007 – 0.008)* ³	—
	Valve stem O.D.	IN		5.475 – 5.485 (0.2156 – 0.2159)	5.445 (0.2144)
		EX		5.475 – 5.485 (0.2156 – 0.2159)	5.445 (0.2144)
	Stem-to-guide clearance	IN		0.025 – 0.055 (0.0010 – 0.0022)	0.08 (0.003)
		EX		0.050 – 0.080 (0.0020 – 0.0031)	0.11 (0.004)
Valve seat	Width	IN		1.30 – 1.50 (0.051 – 0.059)	2.00 (0.079)
		EX		1.25 – 1.55 (0.049 – 0.061)	2.00 (0.079)
	Stem installed height	IN		42.5 – 42.7 (1.673 – 1.681)	42.95 (1.691)
		EX		43.9 – 44.1 (1.728 – 1.736)	44.35 (1.746)
Valve spring	Free length				
	Prelude	IN	Outer	45.16 (1.778)* ¹	—
				45.76 (1.802)* ²	—
			Inner	41.78 (1.645)* ¹	—
				41.75 (1.644)* ²	—
		EX	Outer	46.72 (1.839)* ¹	—
				46.74 (1.840)* ²	—
			Inner	39.32 (1.548)* ¹	—
				39.28 (1.546)* ²	—
	Prelude Type SH	IN	Outer	40.01 (1.575)	—
			Inner	43.67 (1.719)	—
		EX	Outer	44.58 (1.755)	—
			Inner	41.07 (1.617)	—
Valve guide	I.D.	IN		5.510 – 5.530 (0.2169 – 0.2177)	5.55 (0.219)
		EX		5.535 – 5.555 (0.2179 – 0.2187)	5.60 (0.220)
	Installed height	IN		14.55 – 15.05 (0.573 – 0.593)	—
		EX		14.95 – 15.45 (0.589 – 0.608)	—
Rocker arm	Arm-to-shaft clearance	IN		0.025 – 0.052 (0.0010 – 0.0020)	0.08 (0.003)
		EX		0.025 – 0.052 (0.0010 – 0.0020)	0.08 (0.003)

*1: CHUO HATSUJO manufactured valve spring.

*2: NIHON HATSUJO manufactured valve spring.

*3: Measuring point between camshaft and rocker arm.

Standards and Service Limits

Engine Block — Section 7

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Cylinder block	Warpage of deck surface		0.07 (0.003) max.	0.10 (0.004)
	Bore diameter	A or I B or II	87.010 – 87.020 (3.4256 – 3.4260)	87.070 (3.4279)
	Bore taper		87.000 – 87.010 (3.4252 – 3.4256)	87.070 (3.4279)
	Reboring limit		—	0.05 (0.002) 0.25 (0.010)
Piston	Skirt O.D. [at 15 mm (0.6 in) from bottom of skirt]	No letter Letter B	86.993 – 87.006 (3.4249 – 3.4254) 86.983 – 86.996 (3.4245 – 3.4250)	86.980 (3.4244) 86.970 (3.4240)
	Clearance in cylinder		0.004 – 0.027 (0.0002 – 0.0011)	0.04 (0.002)
	Groove width (For ring)	Top Second Oil	1.240 – 1.255 (0.0488 – 0.0494) 1.230 – 1.245 (0.0484 – 0.0490) 2.805 – 2.825 (0.1104 – 0.1112)	1.275 (0.0502) 1.265 (0.0498) 2.85 (0.112)
Piston ring	Ring-to-groove clearance	Top Second	0.055 – 0.085 (0.0022 – 0.0033) 0.040 – 0.070 (0.0016 – 0.0028)	0.13 (0.005) 0.13 (0.005)
	Ring end gap	Top Second Oil	0.25 – 0.35 (0.010 – 0.014) 0.60 – 0.75 (0.024 – 0.030) 0.20 – 0.70 (0.008 – 0.028)*1 0.20 – 0.50 (0.008 – 0.020)*2	0.60 (0.024) 0.90 (0.035) 0.80 (0.031)*1 0.60 (0.024)*2
Piston pin	O.D. Pin-to-piston clearance		21.961 – 21.965 (0.8646 – 0.8648) –0.003 – 0.006 (–0.0001 – 0.0002)	21.953 (0.8643) 0.009 (0.0004)
Connecting rod	Pin-to-rod clearance		0.005 – 0.015 (0.0002 – 0.0006)	0.002 (0.0008)
	Small end bore diameter		21.970 – 21.976 (0.8649 – 0.8652)	—
	Large end bore diameter	Nominal	51.0 (2.01)	—
	End play installed on crankshaft		0.15 – 0.30 (0.006 – 0.012)	0.40 (0.016)
Crankshaft	Main journal diameter	No. 1 and No. 2 journals No. 3 journal No. 4 journal No. 5 journal	49.976 – 50.000 (1.9676 – 1.9685) 49.972 – 49.996 (1.9674 – 1.9683) 49.984 – 50.008 (1.9679 – 1.9688) 49.988 – 50.012 (1.9680 – 1.9690)	— — — —
	Rod journal diameter		47.976 – 48.000 (1.8888 – 1.8898)	—
	Taper		0.005 (0.0002) max.	0.006 (0.0002)
	Out-of-round		0.004 (0.0002) max.	0.006 (0.0002)
	End play		0.10 – 0.35 (0.004 – 0.014)	0.45 (0.018)
	Runout		0.03 (0.001) max.	0.04 (0.002)
Bearings	Main bearing-to-journal oil clearance	No. 1 and No. 2 journals No. 3 journal No. 4 journal No. 5 journal	0.021 – 0.045 (0.0008 – 0.0018) 0.025 – 0.049 (0.0010 – 0.0019) 0.013 – 0.037 (0.0005 – 0.0015) 0.009 – 0.033 (0.0004 – 0.0013)	0.050 (0.0020) 0.055 (0.0022) 0.050 (0.0020) 0.040 (0.0016)
	Rod bearing-to-journal oil clearance		0.027 – 0.055 (0.0011 – 0.0022)	0.06 (0.002)
Balancer shaft	Journal diameter	No. 1 front journal No. 1 rear journal No. 2 front and rear journals No. 3 front and rear journals	42.722 – 42.734 (1.6820 – 1.6824) 20.938 – 20.950 (0.8243 – 0.8248) 38.712 – 38.724 (1.5241 – 1.5246) 34.722 – 34.734 (1.3670 – 1.3675)	42.71 (1.681) 20.92 (0.824) 38.70 (1.524) 34.71 (1.367)
	Journal taper		0.005 (0.0002) max.	—
	End play	Front Rear	0.10 – 0.40 (0.004 – 0.016) 0.04 – 0.15 (0.002 – 0.006)	— —
	Total runout		0.02 (0.001)	0.03 (0.001)
	Shaft-to-bearing oil clearance	No. 1 front, No. 3 front and rear journals No. 1 rear journal No. 2 front and rear journals	0.066 – 0.098 (0.0026 – 0.0039) 0.050 – 0.075 (0.0020 – 0.0030) 0.076 – 0.108 (0.0030 – 0.0043)	0.12 (0.005) 0.09 (0.004) 0.13 (0.005)
Balancer shaft bearing	I.D.	No. 1 front journal No. 1 rear journal No. 2 front and rear journals No. 3 front and rear journals	42.800 – 42.820 (1.6850 – 1.6858) 21.000 – 21.013 (0.8268 – 0.8273) 38.800 – 38.820 (1.5276 – 1.5283) 34.800 – 34.820 (1.3701 – 1.3709)	42.83 (1.686) 21.02 (0.828) 38.83 (1.529) 34.83 (1.371)

*1: RIKEN manufactured piston ring.

*2: TEIKOKU PISTON RING manufactured piston ring.

Engine Lubrication — Section 8

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Engine oil	Capacity ℓ (US qt, Imp qt)	5.9 (6.2, 5.2) for engine overhaul 4.8 (5.1, 4.2) for oil change, including filter 4.5 (4.8, 4.0) for oil change, without filter	
Oil pump	Inner-to-outer rotor clearance Pump housing-to-outer rotor clearance Pump housing-to-rotor axial clearance	0.02 – 0.16 (0.001 – 0.006) 0.10 – 0.19 (0.004 – 0.007) 0.02 – 0.07 (0.001 – 0.003)	0.20 (0.008) 0.21 (0.008) 0.12 (0.005)
Relief valve	Pressure setting at engine oil temp. 176°F (80°C) kPa (kgf/cm ² , psi) at idle at 3,000 rpm	69 (0.7, 10) min. 340 (3.5, 50) min.	

Cooling — Section 10

	MEASUREMENT	STANDARD (NEW)
Radiator	Coolant capacity ℓ (US qt, Imp qt) [Including engine, heater,] [cooling line and reservoir] Reservoir capacity: 0.6 ℓ (0.6 US qt, 0.5 Imp qt)	M/T: Prelude 6.9 (7.3, 6.1) for overhaul 3.3 (3.5, 2.9) for coolant change M/T: Prelude Type SH 6.8 (7.2, 6.0) for overhaul 3.2 (3.4, 2.8) for coolant change A/T: 6.8 (7.2, 6.0) for overhaul 3.2 (3.4, 2.8) for coolant change
Radiator cap	Opening pressure kPa (kgf/cm ² , psi)	93 – 123 (0.95 – 1.25, 14 – 18)
Thermostat	Start to open °F (°C) Fully open °F (°C) Valve lift at fully open	169 – 176 (70 – 80) 194 (90) 10.0 (0.39) min.
Cooling fan	Thermoswitch A “ON” temperature °F (°C) Thermoswitch A “OFF” temperature °F (°C)	198 – 208 (92 – 98) Subtract 4 – 13 (2 – 7) from actual “ON” temperature

Fuel and Emissions — Section 11

	MEASUREMENT	STANDARD (NEW)
Pressure regulator	Pressure with regulator vacuum hose disconnected kPa (kgf/cm ² , psi)	320 – 370 (3.3 – 3.8, 47 – 54)
Fuel tank	Capacity ℓ (US gal, Imp gal)	60 (15.9, 13.2)
Engine	Idle speed with headlights and cooling fan off rpm (min ⁻¹)	M/T 700 ± 50
		A/T (N or P position) 700 ± 50
	Fast idle rpm	1,400 ± 200
	Idle CO %	0.1 max.

Standards and Service Limits

Clutch — Section 12

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Clutch pedal	Pedal height to floor	189 (7.44)	—
	Stroke	135 – 145 (5.31 – 5.71)	—
	Free play	9 – 15 (0.4 – 0.6)	—
	Pedal play	1.0 – 7.0 (0.04 – 0.28)	—
	Disengagement height to floor	93 (3.7) min.	—
Flywheel	Clutch surface runout	0.05 (0.002) max.	0.15 (0.006)
Clutch disc	Rivet head depth	1.2 – 1.7 (0.05 – 0.07)	0.2 (0.01)
	Thickness	8.3 – 9.0 (0.33 – 0.35)	6.0 (0.24)
Pressure plate	Warpage	0.03 (0.001) max.	0.15 (0.006)
	Diaphragm spring finger alignment	0.6 (0.02) max.	0.8 (0.03)

Manual Transmission — Section 13

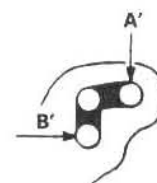
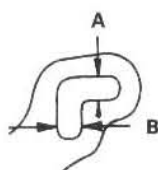
	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Transmission oil	Capacity ℓ (US qt, Imp qt)	M2Y4 Transmission	1.9 (2.0, 1.7) for oil change 2.0 (2.1, 1.8) for overhaul
		M2U4 Transmission	2.1 (2.2, 1.8) for oil change 2.2 (2.3, 1.9) for overhaul
Mainshaft	End play	0.10 – 0.16 (0.004 – 0.006)	Adjust
	Diameter of ball bearing contact area (clutch side)	27.977 – 27.990 (1.1015 – 1.1020)	27.94 (1.100)
	Diameter of needle bearing contact area	37.984 – 38.000 (1.4954 – 1.4961)	37.93 (1.493)
	Diameter of ball bearing contact area (transmission housing side)	27.987 – 28.000 (1.1018 – 1.1024)	27.94 (1.100)
	Runout	0.02 (0.001) max.	0.05 (0.002)
Mainshaft 3rd and 4th gears	I.D.	43.009 – 43.025 (1.6933 – 1.6939)	43.080 (1.6961)
	End play	0.06 – 0.21 (0.002 – 0.008)	0.30 (0.012)
	Thickness	3rd gear	34.92 – 34.97 (1.375 – 1.377)
		4th gear	31.42 – 31.47 (1.237 – 1.239)
Mainshaft 5th gear	I.D.	43.009 – 43.025 (1.6933 – 1.6939)	43.080 (1.6961)
	End play	0.06 – 0.21 (0.002 – 0.008)	0.3 (0.01)
	Thickness	30.92 – 30.97 (1.217 – 1.219)	30.8 (1.21)
Countershaft	Diameter of needle bearing contact area	38.000 – 38.015 (1.4961 – 1.4967)	37.95 (1.494)
	Diameter of ball bearing and needle bearing contact area	24.987 – 25.000 (0.9837 – 0.9843)	24.94 (0.982)
	Diameter of 1st gear contact area	39.984 – 40.000 (1.5742 – 1.5748)	39.93 (1.572)
	Runout	0.02 (0.001) max.	0.05 (0.002)

Manual Transmission — Section 13

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Countershaft 1st gear	I.D. End play Thickness	46.009 – 46.025 (1.8114 – 1.8120) 0.06 – 0.23 (0.002 – 0.009) 32.95 – 33.00 (1.297 – 1.299)	46.08 (1.814) 0.23 (0.009) —
Countershaft 2nd gear	I.D. End play Thickness	47.009 – 47.025 (1.8507 – 1.8514) 0.10 – 0.15 (0.004 – 0.006) 28.92 – 28.97 (1.139 – 1.141)	47.08 (1.854) 0.18 (0.007) —
Spacer collar (Mainshaft 4th and 5th gears)	I.D. O.D. Length	31.002 – 31.012 (1.2205 – 1.2209) 37.989 – 38.000 (1.4956 – 1.4961) 56.45 – 56.55 (2.222 – 2.226) 26.03 – 26.08 (1.025 – 1.027)	31.06 (1.223) 37.94 (1.494) — 26.01 (1.024)
Reverse idler gear	I.D. Gear-to-reverse gear shaft clearance	20.016 – 20.043 (0.7880 – 0.7891) 0.036 – 0.084 (0.0014 – 0.0033)	20.09 (0.7909) 0.160 (0.0063)
Synchro ring	Ring-to-gear clearance (ring pushed against gear)	0.85 – 1.10 (0.033 – 0.043)	0.4 (0.02)
Dual cone synchro	Clearance (ring pushed against gear) Outer synchro ring-to-synchro cone Synchro cone-to-gear Outer synchro ring-to-gear	0.5 – 1.0 (0.02 – 0.04) 0.5 – 1.0 (0.02 – 0.04) 0.95 – 1.68 (0.037 – 0.066)	0.3 (0.01) 0.3 (0.01) 0.6 (0.02)
Shift fork	Finger thickness Fork-to-synchro sleeve clearance	3rd/4th shift fork Except above 7.4 – 7.6 (0.29 – 0.30) 6.2 – 6.4 (0.24 – 0.25) 0.35 – 0.65 (0.014 – 0.026)	— — 1.0 (0.039)
Reverse shift fork	Pawl groove width Fork-to-reverse idler gear clearance Groove width*1 Fork-to-5th/reverse shift shaft clearance*2	13.0 – 13.3 (0.51 – 0.52) 0.5 – 1.1 (0.02 – 0.04) 7.05 – 7.25 (0.278 – 0.285) 7.4 – 7.7 (0.29 – 0.30) at A at B at A' at B'	— 1.8 (0.07) — — 0.5 (0.02) 1.0 (0.04)
Shift arm	I.D. Shift arm-to-shaft clearance Shift fork diameter at contact area Shift arm-to-shift fork shaft clearance	15.973 – 16.000 (0.6289 – 0.6299) 0.005 – 0.059 (0.0002 – 0.0023) 12.9 – 13.0 (0.508 – 0.512) 0.2 – 0.5 (0.008 – 0.020)	— — — 0.6 (0.024)
Select lever	Shaft outer diameter Shift arm cover clearance	15.941 – 15.968 (0.6276 – 0.6287) 0.032 – 0.102 (0.0013 – 0.0040)	— —
Shift lever	O.D. Transmission housing clearance Shift lever side Shift lever end	15.941 – 15.968 (0.6276 – 0.6287) 0.012 – 0.122 (0.0005 – 0.0048) 0.021 – 0.102 (0.0008 – 0.0040)	— — —
Interlock	Bore diameter Shift arm clearance	16.00 – 16.05 (0.630 – 0.632) 0.032 – 0.109 (0.0013 – 0.0043)	— —
Differential carrier	Pinion shaft contact area I.D. Carrier-to-pinion shaft clearance Driveshaft, intermediate shaft contact area I.D. Carrier-to-driveshaft clearance Carrier-to-intermediate shaft clearance	18.000 – 18.018 (0.7087 – 0.7094) 0.017 – 0.047 (0.0007 – 0.0019) 28.005 – 28.025 (1.1026 – 1.1033) 0.025 – 0.066 (0.0010 – 0.0026) 0.055 – 0.091 (0.0022 – 0.0036)	— 0.1 (0.004) — 0.12 (0.005) 0.15 (0.006)
Differential pinion gear	Backlash I.D. Pinion gear-to-pinion shaft clearance	0.05 – 0.15 (0.002 – 0.006) 18.042 – 18.066 (0.7103 – 0.7113) 0.055 – 0.095 (0.0022 – 0.0037)	— — 0.15 (0.006)
Differential tapered roller bearing preload	Starting torque N·m (kgf·cm, lbf·in)	1.4 – 2.5 (14 – 26, 12 – 23)	Adjust

*1: Measuring points

*2: Measuring points



Standards and Service Limits

Automatic Transmission — Section 14

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Transmission fluid	Capacity ℓ (US qt, Imp qt)	6.1 (6.4, 5.4) at overhaul 2.5 (2.6, 2.2) at fluid change	
Hydraulic pressure kPa (kgf/cm ² , psi)	Line pressure at 2,000 rpm in N or P position	850 – 910 (8.7 – 9.3, 120 – 130)	800 (8.2, 120)
	4th clutch pressure at 2,000 rpm in D₄ position	840 – 920 (8.6 – 9.4, 120 – 130)	790 (8.1, 120)
	3rd clutch pressure at 2,000 rpm in D₃ position		
	2nd clutch pressure at 2,000 rpm in 2 position		
	1st clutch pressure at 2,000 rpm in 1 position		
Stall speed rpm (Check with vehicle on level ground)		2,500	2,350 – 2,650
Clutch	Clutch initial clearance		
	1st	1.15 – 1.35 (0.045 – 0.053)	—
	2nd	1.0 – 1.2 (0.039 – 0.047)	—
	3rd	0.6 – 0.8 (0.024 – 0.031)	—
	4th	0.4 – 0.6 (0.016 – 0.024)	—
	Clutch return spring free length	1st, 2nd 45.7 (1.80) 3rd, 4th 33.5 (1.32)	43.7 (1.72) 31.5 (1.24)
	Clutch disc thickness	1.88 – 2.00 (0.074 – 0.079)	Until grooves worn out
	Clutch plate thickness		
	1st	1.95 – 2.05 (0.077 – 0.081)	Discoloration
	2nd	1.55 – 1.65 (0.061 – 0.065)	↑
	3rd	2.55 – 2.65 (0.100 – 0.104)	↑
	4th	2.25 – 2.35 (0.089 – 0.093)	Discoloration
	Clutch end plate thickness		
	1st, 2nd clutches	Mark 1 3.05 – 3.10 (0.120 – 0.122) Mark 2 3.15 – 3.20 (0.124 – 0.126) Mark 3 3.25 – 3.30 (0.128 – 0.130) Mark 4 3.35 – 3.40 (0.132 – 0.134) Mark 6 2.55 – 2.60 (0.100 – 0.102) Mark 7 2.65 – 2.70 (0.104 – 0.106) Mark 8 2.75 – 2.80 (0.108 – 0.110) Mark 9 2.85 – 2.90 (0.112 – 0.114) Mark 0 2.95 – 3.00 (0.116 – 0.118)	Discoloration
	Clutch end plate thickness		
	3rd, 4th clutches	Mark 1 2.05 – 2.10 (0.081 – 0.083) Mark 2 2.15 – 2.20 (0.085 – 0.087) Mark 3 2.25 – 2.30 (0.089 – 0.091) Mark 4 2.35 – 2.40 (0.093 – 0.094) Mark 5 2.45 – 2.50 (0.096 – 0.098) Mark 6 2.55 – 2.60 (0.100 – 0.102) Mark 7 2.65 – 2.70 (0.104 – 0.106) Mark 8 2.75 – 2.80 (0.108 – 0.110) Mark 9 2.85 – 2.90 (0.112 – 0.114)	Discoloration
Valve body	Stator shaft needle bearing contact I.D.		
	Torque converter side	27.000 – 27.021 (1.0630 – 1.0638)	Wear or damage
	ATF pump side	29.000 – 29.021 (1.1417 – 1.1426)	—
	ATF pump gear thrust clearance	0.03 – 0.05 (0.001 – 0.002)	0.07 (0.003)
	ATF pump gear-to-body clearance	0.210 – 0.265 (0.0083 – 0.0104)	—
	ATF pump driven gear I.D.	0.070 – 0.125 (0.0028 – 0.0049)	—
	ATF pump driven gear shaft O.D.	14.016 – 14.034 (0.5518 – 0.5525) 13.980 – 13.990 (0.5504 – 0.5508)	Wear or damage Wear or damage
Shifting device and parking brake	Reverse shift fork finger thickness	5.90 – 6.00 (0.232 – 0.236)	5.40 (0.213)
	Parking brake pawl	—	Wear or other defect
	Parking brake gear	—	
Servo body	Shift fork shaft bore I.D.	14.000 – 14.010 (0.5512 – 0.5516)	—
	Shift fork shaft valve bore I.D.	37.000 – 37.039 (1.4567 – 1.4582)	37.045 (1.4585)
Regulator valve body	Sealing ring contact I.D.	32.000 – 32.025 (1.2598 – 1.2608)	32.050 (1.2618)
Accumulator body	Sealing ring contact I.D.	35.000 – 35.025 (1.3780 – 1.3789)	35.05 (1.3799)
Stator shaft	Sealing ring contact I.D.	29.000 – 29.021 (1.1417 – 1.1426)	29.050 (1.1437)

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Standards and Service Limits

Automatic Transmission (cont'd) — Section 14

Automatic Transmission (cont'd) — Section 14					
	MEASUREMENT	STANDARD (NEW)		SERVICE LIMIT	
Transmission (cont'd)	End play				
	Mainshaft 3rd gear	0.03 – 0.11 (0.001 – 0.004)		_____	
	Mainshaft 4th gear	0.10 – 0.22 (0.004 – 0.009)		_____	
	Countershaft 1st gear	0.00 – 0.33 (0.000 – 0.013)		_____	
	Countershaft 4th gear	0.04 – 0.28 (0.002 – 0.011)		_____	
	Countershaft idler gear	0.015 – 0.045 (0.001 – 0.002)		_____	
	Countershaft reverse gear	0.10 – 0.25 (0.004 – 0.010)		_____	
	Reverse idler gear	0.20 – 0.55 (0.008 – 0.022)		_____	
	Secondary shaft 1st gear	0.07 – 0.15 (0.003 – 0.006)		_____	
	Secondary shaft 2nd gear	0.04 – 0.12 (0.002 – 0.005)		_____	
Differential carrier	Pinion shaft contact area I.D.	18.010 – 18.028 (0.709 – 0.710)		_____	
	Carrier-to-pinion shaft clearance	0.023 – 0.057 (0.001 – 0.002)		0.1 (0.004)	
	Driveshaft/intermediate shaft contact area I.D.	28.025 – 28.045 (1.103 – 1.104)		_____	
	Carrier-to-driveshaft clearance	0.045 – 0.086 (0.002 – 0.003)		0.12 (0.005)	
	Carrier-to-intermediate shaft clearance	0.065 – 0.111 (0.003 – 0.004)		0.12 (0.005)	
Differential pinion gear	Backlash	0.050 – 0.150 (0.002 – 0.006)		_____	
	I.D.	18.042 – 18.066 (0.710 – 0.711)		_____	
	Pinion gear-to-pinion shaft clearance	0.055 – 0.095 (0.002 – 0.004)		0.12 (0.005)	
Differential tapered roller bearing preload		For new bearing		2.7 – 3.9 (28 – 40, 24 – 35)	
Starting torque N·m (kgf·cm, lbf·in)		For used bearing		2.5 – 3.6 (25 – 37, 22 – 32)	
				Adjust	
	MEASUREMENT	STANDARD (NEW)			
		Wire Dia.	O.D.	Free Length	No. of Coils
Spring	Regulator valve spring A	1.9 (0.075)	14.7 (0.579)	77.4 (3.047)	15.2
	Regulator valve spring B '97 model	1.6 (0.063)	9.2 (0.362)	44.0 (1.732)	14.0
	'98 – '99 model	1.6 (0.063)	9.2 (0.362)	44.0 (1.732)	12.5
	Stator reaction spring	4.5 (0.177)	35.4 (1.394)	30.3 (1.193)	1.92
	Modulator valve spring	1.6 (0.063)	10.4 (0.409)	33.5 (1.319)	9.8
	Torque converter check valve spring	1.1 (0.043)	8.4 (0.331)	34.3 (1.350)	14.2
	Relief valve spring	0.9 (0.035)	6.6 (0.260)	39.8 (1.567)	20.4
	Cooler check valve spring	0.6 (0.024)	5.8 (0.228)	14.5 (0.571)	6.8
	Shift valve A spring	0.8 (0.031)	7.1 (0.280)	40.4 (1.591)	16.9
	Shift valve B spring	0.8 (0.031)	7.1 (0.280)	40.4 (1.591)	16.9
	Shift valve C spring	0.8 (0.031)	6.6 (0.260)	49.1 (1.933)	21.7
	Shift valve E spring	0.7 (0.028)	6.6 (0.260)	32.2 (1.268)	13.4
	Lock-up shift valve spring	0.9 (0.035)	7.6 (0.299)	63.0 (2.480)	22.4
	Lock-up timing valve spring	0.65 (0.026)	6.6 (0.260)	34.8 (1.370)	15.6
	Lock-up control valve spring	0.7 (0.028)	6.6 (0.260)	42.9 (1.689)	14.2
	Shift valve D spring	0.7 (0.028)	6.6 (0.260)	35.7 (1.406)	17.2
	Servo control valve spring	0.7 (0.028)	6.6 (0.260)	35.7 (1.406)	17.2
	Reverse CPC valve spring	0.7 (0.028)	6.1 (0.240)	17.8 (0.701)	7.9
	CPC valve spring A	0.7 (0.028)	6.1 (0.240)	17.8 (0.701)	7.9
	CPC valve spring B	0.7 (0.028)	6.1 (0.240)	17.8 (0.701)	7.9
	1st accumulator spring	3.5 (0.138)	19.6 (0.772)	61.7 (2.429)	9.6
	3rd accumulator spring	3.5 (0.138)	19.6 (0.772)	61.7 (2.429)	9.6
	4th accumulator spring	3.5 (0.138)	19.6 (0.772)	61.7 (2.429)	9.6
	2nd accumulator spring A	2.8 (0.110)	21.6 (0.850)	68.2 (2.685)	8.9
	2nd accumulator spring B	2.6 (0.102)	14.4 (0.567)	51.0 (2.008)	11.0

Active Torque Transfer System (ATTS) — Section 15

Active Torque Transfer System (ATTS) — Section 15		
	MEASUREMENT	STANDARD (NEW)
ATTS (moment control) unit fluid	Capacity ℓ (US qt, Imp qt)	1.4 (1.5, 1.2) at overhaul 0.95 (1.0, 0.84) at fluid change

Steering — Section 17

	MEASUREMENT	STANDARD (NEW)
Steering wheel	Rotational play at steering wheel circumference Starting load at steering wheel circumference N (kgf, lbf) Engine running	0 – 10 (0 – 0.39) 29 (3.0, 6.6)
Gearbox	Angle of rack-guide-screw loosened from locked position	20° ± 5°
Pump	Pump pressure with shut-off valve closed kPa (kgf/cm ² , psi)	6,900 – 7,600 (70 – 77, 1,000 – 1,100)
Power steering fluid	Recommended fluid Fluid capacity ℓ (US qt, Imp qt) For overhaul For fluid change	Honda Power Steering Fluid (V or S) 1.2 (1.27, 1.06) 0.4 (0.42, 0.35)
Power steering belt*	Deflection with 98 N (10 kgf, 22 lbf) between pulleys Belt tension N (kgf, lbf) Measured with belt tension gauge	13.0 – 16.5 (0.51 – 0.65) with used belt 8.5 – 11.0 (0.33 – 0.43) with new belt 390 – 540 (40 – 55, 88 – 120) with used belt 740 – 880 (75 – 90, 170 – 200) with new belt

*: When using a new belt, adjust deflection or tension to new values. Run the engine for 5 minutes then turn it off.

Readjust deflection or tension to used belt values.

Suspension — Section 18

	MEASUREMENT	STANDARD (NEW)
Wheel alignment Prelude	Camber Caster Total toe Front wheel turning angle	Front Rear Front Front Rear Inward wheel Outward wheel 0°00' ± 1° -0°45' ± 1° 2°40' ± 1° 0 ± 2 (0 ± 1/16) IN 2 ± 2 (1/16 ± 1/16) 36°20' ± 2° 29°40' (reference)
Wheel alignment Prelude Type SH	Camber Caster Total toe Front wheel turning angle	Front Rear Prelude Prelude Type SH Front Rear Inward wheel Outward wheel 0°00' ± 1° -0°45' ± 1° 2°40' ± 1° 4°20' ± 45' 0 ± 2 (0 ± 1/16) IN 2 ± 2 (1/16 ± 1/16) 34°50' ± 2° 28°50' (reference)
Wheel	Rim runout Aluminum wheel Axial Radial	STANDARD (NEW) 0 – 0.7 (0 – 0.03) 0 – 0.7 (0 – 0.03)
		SERVICE LIMIT 2.0 (0.08) 1.5 (0.06)

Standards and Service Limits

Brakes — Section 19

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Parking brake lever	Play in stroke at 196 N (20 kgf, 44 lbf) lever force	To be locked when pulled 6 – 10 notches	
Foot brake pedal	Pedal height (with carpet removed) M/T	161 (6 5/16)	_____
	A/T	166 (6 9/16)	_____
	Free play	1 – 5 (1/16 – 3/16)	_____
Master cylinder	Piston-to-pushrod clearance	0 – 0.2 (0 – 0.01)	_____
Disc brake	Disc thickness	Front	23.0 (0.91)
		Rear	21.0 (0.83)
	Disc runout	Front	8.0 (0.31)
		Rear	0.10 (0.004)
	Disc parallelism	Front and rear	0.10 (0.004)
	Pad thickness	Front	0.015 (0.0006)
		Rear	1.6 (0.06)
			1.6 (0.06)

Air Conditioning — Section 22

	MEASUREMENT	STANDARD (NEW)
Air conditioning system	Lubricant type:	
	SP-10 (P/N 38897 – P13 – A01AH or 38899 – P13 – A01)	
	Lubricant capacity	Condenser
	mℓ (fl oz, Imp oz)	Evaporator
		Line or hose
Compressor		Receiver
	Lubricant type:	
	SP-10 (P/N 38897 – P13 – A01AH or 38899 – P13 – A01)	
	Lubricant capacity mℓ (fl oz, Imp oz)	25 (5/6, 0.9)
	Stator coil resistance at 68°F (20°C) Ω	40 (1 1/3, 1.4)
Compressor belt*	Pulley-to-pressure plate clearance	10 (1/3, 0.4)
		10 (1/3, 0.4)
Compressor belt*	Deflection with 98 N (10 kgf, 22 lbf) between pulleys	130 ⁺²⁰ ₋₀ (4 1/3 ^{+2/3} ₋₀ , 4.6 ^{+0.7} ₋₀)
		3.25 – 3.55
		0.5 ± 0.15 (0.020 ± 0.006)
Compressor belt*	Belt tension N (kgf, lbf)	9.5 – 12.5 (0.37 – 0.49) with used belt
		5.5 – 7.5 (0.22 – 0.30) with new belt
	Measured with belt tension gauge	390 – 540 (40 – 55, 88 – 121) with used belt
		880 – 1,030 (90 – 105, 198 – 231) with new belt

*: When using a new belt, adjust deflection or tension to new values. Run the engine for 5 minutes then turn it off.
Readjust deflection or tension to used belt values.

Design Specifications

	ITEM		METRIC	ENGLISH	NOTES
DIMENSIONS	Overall Length		4,520 mm	178.0 in	
	Overall Width		1,750 mm	68.9 in	
	Overall Height		1,315 mm	51.8 in	
	Wheelbase		2,585 mm	101.8 in	
	Track	Front	1,525 mm	60.0 in	
		Rear	1,515 mm	59.6 in	
	Seating Capacity		Four (4)		
WEIGHT (USA)	Gross Vehicle Weight Rating (GVWR)		—	3,835 lbs	
WEIGHT (CANADA)	Gross Vehicle Weight Rating (GVWR)		1,740 kg	—	
ENGINE	Type		Water-cooled, 4-stroke DOHC VTEC gasoline engine		
	Cylinder Arrangement		Inline 4-cylinder, transverse		
	Bore and Stroke		87.0 x 90.7 mm	3.34 x 3.57 in	
	Displacement		2,157 cm ³ (mℓ)	132 cu-in	
	Compression Ratio		10.0		
	Valve Train		Belt driven, DOHC VTEC		
			4 valve per cylinder		
	Lubrication System		Forced and wet sump, trochoid pump		
	Oil Pump Displacement at 6,000 engine rpm		59.1 ℓ (62.5 US qt, 52.0 Imp qt)/minute		
	Water Pump Displacement at 6,000 engine rpm		142.5 ℓ (150.6 US qt, 125.4 Imp qt)/minute		
	Fuel Required		Premium UNLEADED gasoline with 91 Pump Octane Number or higher		
STARTER	Type		Gear Reduction		
	Normal Output		1.6 kW		
	Normal Voltage		12 V		
	Hour Rating		30 seconds		
	Direction of Rotation		Clockwise as viewed from gear end		
CLUTCH	Clutch Type	M/T	Single plate dry, diaphragm spring		
		A/T	Torque converter		
	Clutch Facing Area	M/T	352 cm ²	54.6 sq-in	
TRANSMISSION	Transmission Type	M/T	Synchronized 5-speed forward, 1 reverse		
		A/T	Electronically controlled		
			4-speed automatic, 1 reverse		
	Primary Reduction		Direct 1 : 1		
	Manual Transmission				
	Gear Ratio	1st	3.285		
		2nd	1.956		
		3rd	1.344		
		4th	1.304		
		5th	0.812		
		Reverse	3.000		
	Final Reduction	Gear type	Single helical gear		
		Gear ratio	4.266		
	Automatic Transmission				
	Gear Ratio	1st	2.528		
		2nd	1.427		
		3rd	0.976		
		4th	0.653		
		Reverse	1.863		
	Final Reduction	Gear type	Single helical gear		
		Gear ratio	4.785		

(cont'd)

Design Specifications

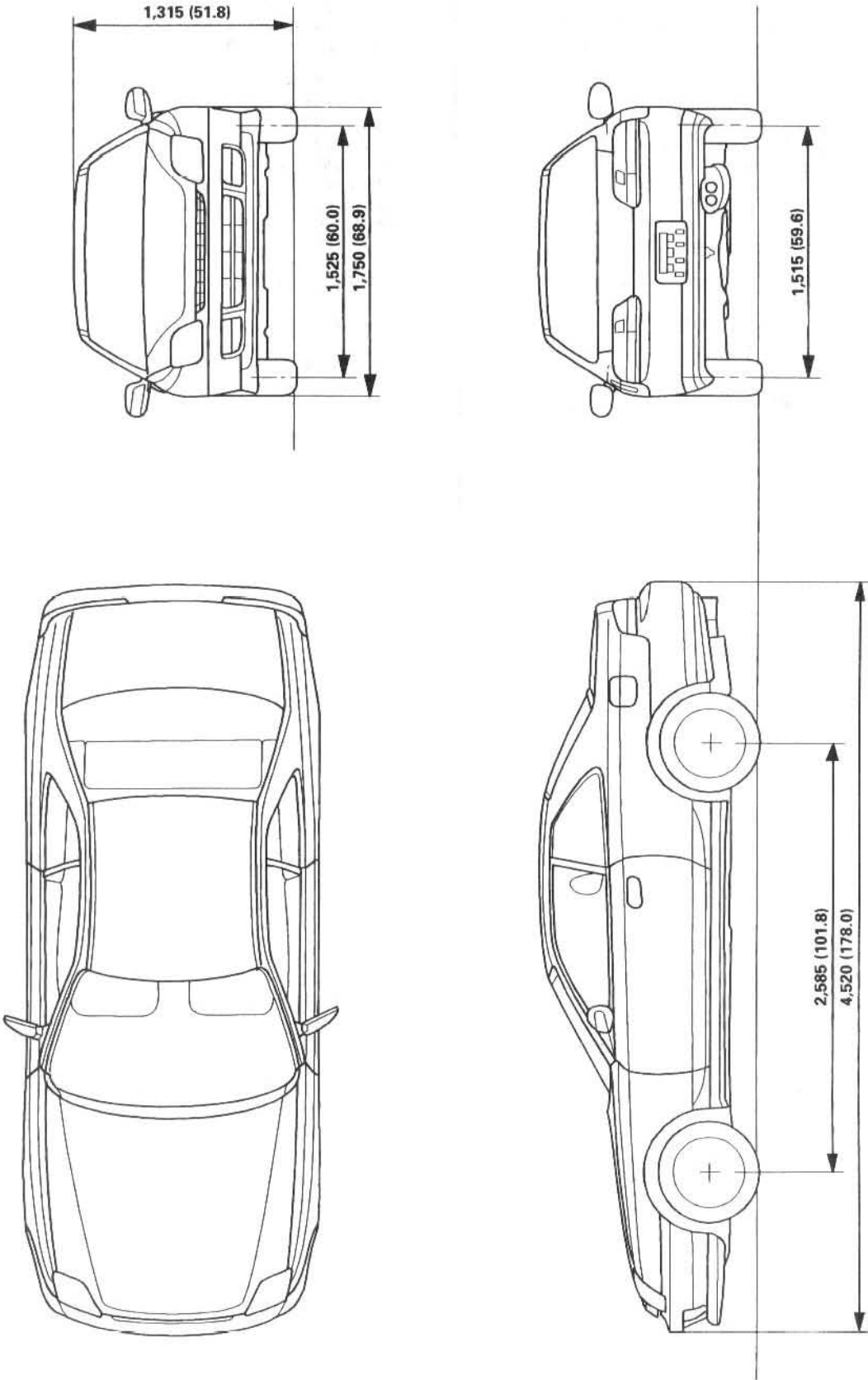
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	ITEM		METRIC	ENGLISH	NOTES
AIR CONDITIONING	Cooling Capacity		3,490 Kcal/h	13,850 BTU/h	
	Compressor	Type/Manufacturer No. of Cylinder Capacity Max. Speed Lubricant Capacity Lubricant Type	Scroll/KEIHIN 85.7 ml/rev 5.23 cu-in/rev 10,000 rpm 130 ml 4 1/3 fl oz SP-10 (P/N 38897-P13-A01AH or 38899-P13-A01)		
	Condenser	Type	Corrugated fin		
	Evaporator	Type	Corrugated fin		
	Blower	Type Motor Input Speed Control Max. Capacity	Sirocco fan 220 W/12 V 4-speed 480 m³/h 16,950 cu-ft/h		
	Temperature Control		Air-mix type		
	Compressor Clutch	Type Power Consumption	Dry, single plate, poly-V-belt drive 42 W max./12 V		
	Refrigerant	Type Quantity	HFC-134a (R-134a) 750 $\frac{0}{-50}$ g 26.5 $\frac{0}{-1.8}$ oz		
STEERING	Type		Power assisted, rack and pinion		
	Overall Ratio	Prelude Prelude Type SH	15.75 15.61		
	Turns, Lock-to-Lock	Prelude Prelude Type SH	2.89 2.76		
	Steering Wheel Diameter		380 mm	15.0 in	
SUSPENSION	Type	Front Rear	Independent double wishbone, coil spring with stabilizer Independent double wishbone coil spring with stabilizer		
	Shock Absorber	Front and Rear	Telescopic, hydraulic nitrogen gas-filled		
WHEEL ALIGNMENT	Camber	Front Rear	0°00' -0°45'		
	Caster	Front Prelude Prelude Type SH	2°40' 4°20'		
	Total Toe	Front Rear	0 mm In 2 mm	0 in In 1/16 in	
BRAKE SYSTEM	Type	Front	Power assisted self-adjusting ventilated disc		
	Pad Surface Area	Rear Front Rear	Power assisted self-adjusting solid disc 51 cm² x 2 7.91 sq-in x 2 27.9 cm² x 2 4.32 sq-in x 2		
	Parking Brake	Type	Mechanical actuating, rear two wheel brakes		
TIRE	Size and Pressure		See tire label		

	ITEM	STANDARD	NOTES
ELECTRICAL	Battery	12 V – 55 AH/5 HR	Bulb type LED type
	Starter	12 V – 1.6 kW	
	Alternator	12 V – 100 A	
	Fuses in under-dash fuse/relay box	7.5 A, 10 A, 15 A, 20 A, 30 A	
	Fuses in under-hood fuse/relay box	7.5 A, 10 A, 15 A, 20 A, 30 A, 40 A, 50 A, 100 A	
	Headlights	12 V – 55/55 W	
	Front Turn Signal Lights	12 V – 21 W	
	Front Parking Lights	12 V – 5 W	
	Front Side Marker Lights	12 V – 3CP	
	Rear Side Marker Lights	12 V – 5 W or 3CP	
	Rear Turn Signal Lights	12 V – 21 W	
	Brake/Taillights	12 V – 21/5 W	
	Taillights	12 V – 5 W or 3CP	
	Back-up Lights	12 V – 21 W	
	License Plate Light	12 V – 3CP	
	High Mount Brake Light	12 V – 21 W	
		12 V – LED	
	Ceiling Light/Spotlight	12 V – 5 W	
	Trunk Light	12 V – 5 W	
	Gauge Lights	12 V – 1.4 W, 3.0 W, 1.12 W	
	Indicator Lights	12 V – 0.56 W, 0.84 W	
	Illumination and Pilot Lights	12 V – 0.56 W, 0.84 W, 1.4 W, LED	

Body Specifications

Unit: mm (in)





Maintenance

Lubrication Points	3-2
Maintenance Schedule	3-4

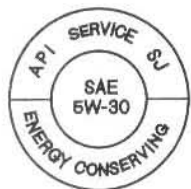
**Click here to go back to
the Introduction page**

Lubrication Points

For the details of lubrication points and type of lubricants to be applied, refer to the illustrated index and various work procedure (such as Assembly/Reassembly, Replacement, Overhaul, Installation, etc.) contained in each section.

NO.	LUBRICATION POINTS		LUBRICANT
1	Engine		API Service Grade: Use SJ “Energy Conserving” grade oil. The oil container may also display the API Certification seal shown below. Make sure it says “For Gasoline Engines.” SAE Viscosity: See chart below.
2	Transmission	Manual	Genuine Honda MTF*1
		Automatic Transmission	Genuine Honda Premium Formula Automatic Transmission Fluid (ATF)*2
3	ATTS unit		
4	Brake line (includes ABS line)		Genuine Honda DOT 3 Brake Fluid*3
5	Clutch line		Genuine Honda DOT 3 Brake Fluid*3
6	Power steering gearbox		Steering grease P/N 08733 – B070E
7	Release fork (Manual transmission)		Super High Temp Urea Grease (P/N 08798 – 9002)
8	Shift and select cable ends (Manual transmission)		
9	Throttle cable end (Dashboard lower panel hole)		Silicone grease
10	Throttle cable end (Throttle link)		Multi-purpose grease
11	Brake master cylinder pushrod		
12	Clutch master cylinder pushrod		
13	Battery terminals		
14	Fuel fill lid		
15	Hood hinges and hood latch		Honda White Lithium Grease
16	Trunk hinges and latch		
17	Door hinges, upper and lower		
18	Door opening detent		
19	Rear brake calipers		Silicone grease
20	Power steering system		Genuine Honda Power Steering Fluid V or S*4
21	Air conditioning compressor		Compressor oil: SP-10 (P/N 38897 – P13 – A01AH or 38899 – P13 – A01) For Refrigerant: HFC-134a (R-134a)

API SERVICE LABEL

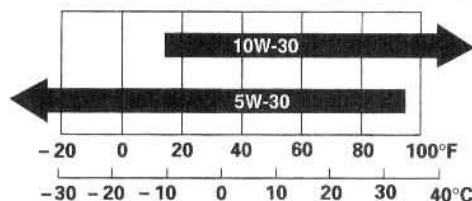


API CERTIFICATION SEAL



Recommended Engine Oil

Engine oil viscosity for ambient temperature ranges

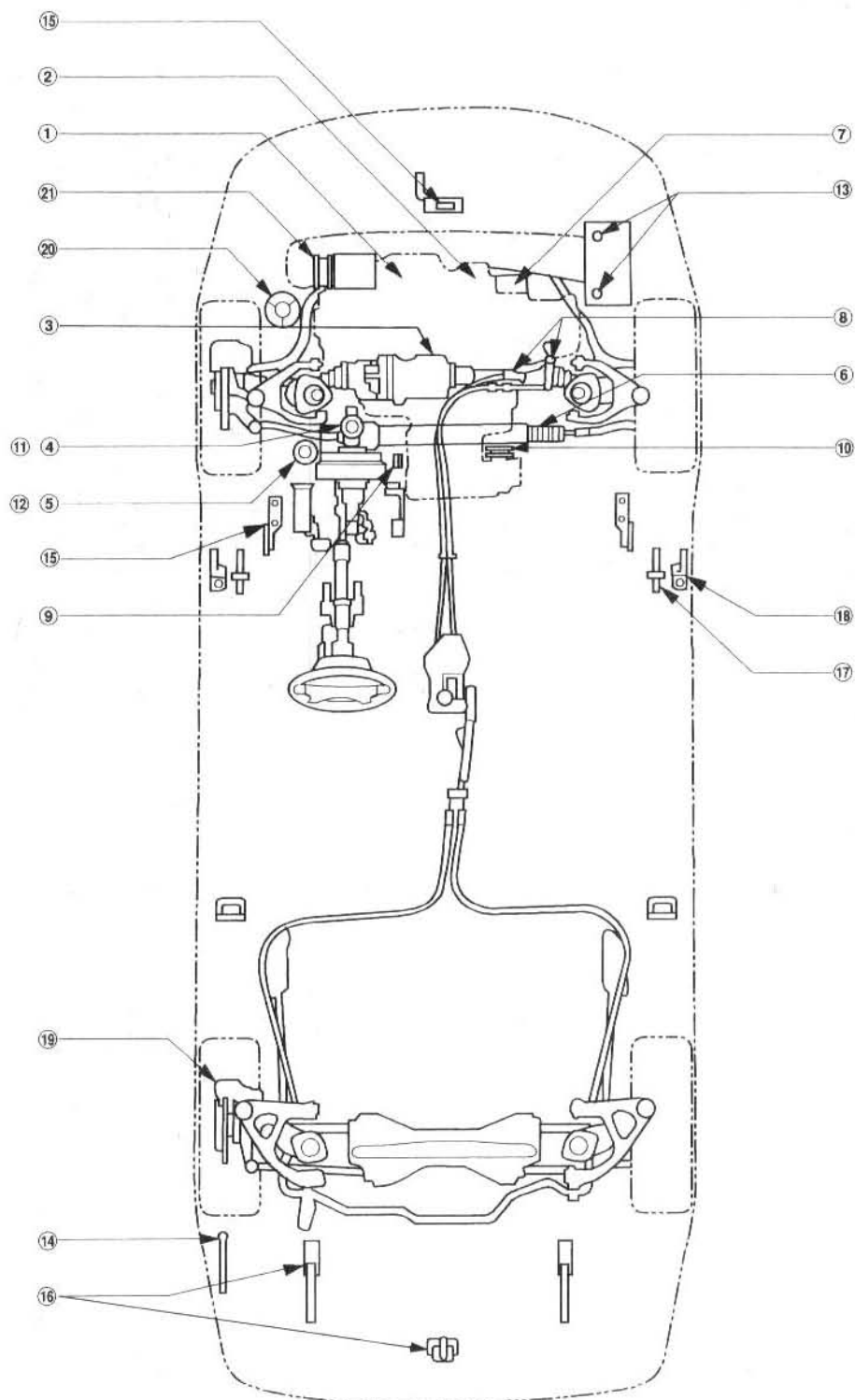


*1: Always use Genuine Honda Manual Transmission Fluid (MTF). Using motor oil can cause stiffer shifting because it does not contain the proper additives.

*2: Always use Genuine Honda Premium Formula Automatic Transmission Fluid (ATF). Using a non-Honda ATF can affect shift quality.

*3: Always use Genuine Honda DOT 3 Brake Fluid. Using a non-Honda brake fluid can cause corrosion and decrease the life of the system.

*4: Always use Genuine Honda Power Steering Fluid-V or S. Using any other type of power steering fluid or automatic transmission fluid can cause increased wear and poor steering in cold weather.



NOTE: Lubricate all hinges, latches, and locks once a year.
In corrosive areas, more frequent lubrication is necessary.
We recommend Honda White Lithium Grease.



Service at the indicated distance or time whichever comes first.	miles x 1,000		15	30	45	60	75	90	105	120	NOTE	SECTION and PAGE
	km x 1,000		24	48	72	96	120	144	168	192		
	months		12	24	36	48	60	72	84	96		
Visually inspect the following items:												
Tie rod ends, steering gear box, and boots												
Suspension components												
Driveshaft boots												
Brake hoses and lines (including ABS)												
All fluid levels and condition of fluid												
Cooling system hoses and connections												
Exhaust system *												
Fuel lines and connections *												
Inspect supplemental restraint system												
10 years after production											17-3	
											18-11, 12, 13, 23, 24, 25	
											16-3	
											19-4, 21	
											10-5, 13-3 14-122, 15-66 19-7, 9, 17	
											10-2	
											9-4, 5	
											11-116	
											—	

According to state and federal regulations, failure to perform maintenance on the items marked with an asterisk (*) will not void customer's emission warranties. However, Honda recommends that all maintenance services be performed at the recommended time or mileage period to ensure long-term reliability.

For Canada models: Follow the Severe Conditions Maintenance Schedule on pages 3-6 and 3-7.

Maintenance Schedule for 1997 Model

Severe Conditions

Follow the Severe Conditions Maintenance Schedule if the vehicle is driven MAINLY under one or more of the Severe Driving Conditions (page 3-7):

Service at the indicated distance or time whichever comes first.	Every 3,750 miles (6,000 km) or 6 months																SECTION and PAGE
	miles x 1,000								Check oil and coolant at each fuel stop								NOTE
	15	30	45	60	75	90	105	120	○	●	○	●	○	●	○	●	
Replace engine oil and oil filter	24	48	72	96	120	144	168	192									Capacity for change with filter: 4.8 ℓ (5.1 US qt, 4.2 Imp qt)
Check engine oil and coolant	12	24	36	48	60	72	84	96									Check levels and check for leaks.
Clean (○) or replace (●) air cleaner element — Use normal schedule except in dusty condition																	
Inspect valve clearance																	Intake 0.15 – 0.19 mm (0.006 – 0.007 in)*1 Exhaust 0.17 – 0.21 mm (0.007 – 0.008 in)*1 Measured when cold.
Replace spark plugs																	NGK: PZFR6F-11, DENSO: PKJ20CR-L11 Gap: 1.0 – 1.1 mm (0.039 – 0.043 in)*2
Replace timing belt*, timing balance belt*, and inspect water pump																	Check water pump for signs of seal leakage.
Inspect and adjust drive belts																	Check for cracks and damage. Check deflection and tension at center of following belts pressing with 98 N (10 kgf, 22 lbf) tension: P/S pump belt: 13.0 – 16.5 mm (0.51 – 0.65 in) A/C Compressor (alternator) belt: 9.5 – 12.5 mm (0.37 – 0.49 in)
Inspect idle speed																	Manual transmission: 700 ± 50 rpm Automatic transmission: 700 ± 50 rpm (in N or P position) Capacity for change: Manual transmission: Prelude: 3.3 ℓ (3.5 US qt, 2.9 Imp qt) Prelude Type SH: 3.2 ℓ (3.4 US qt, 2.8 Imp qt) Automatic transmission: 3.2 ℓ (3.4 US qt, 2.8 Imp qt) Check specific gravity for freezing point.
Replace engine coolant																	10-5
Replace transmission fluid																	Manual transmission: Genuine Honda MTF M2Y4 1.9 ℓ (2.0 US qt, 1.7 Imp qt) for change M2U4 (with ATTS) 2.1 ℓ (2.2 US qt, 1.8 Imp qt) for change Automatic transmission: 2.5 ℓ (2.6 US qt, 2.2 Imp qt) for change with Genuine Honda Premium Formula ATF
Replace ATTS unit fluid																	13-3 14-122
Inspect front and rear brakes																	0.95 ℓ (1.0 US qt, 0.84 Imp qt) for change with Genuine Honda Premium Formula ATF 15-66
Replace brake fluid																	• Check the brake pad, disc thickness and free movement. • Check the calipers for leakage. 19-4, 9, 11, 12, 17, 19, 20, 21
Check parking brake adjustment																	Use Genuine Honda DOT 3 brake fluid. Check that brake fluid level is between the upper and lower marks on the reservoir. Fully engaged 6 to 10 clicks. 19-7 19-6

*1: Measuring point between camshaft and rocker arm.

*2: Do not adjust the gap, replace the spark plug if it is out of standard gap.

*3: Replace the timing belt and balancer belt at 60,000 miles (U.S.) 100,000 km (Canada) if the vehicle regularly is driven in one or more of these conditions:

- In very high temperatures (over 110°F, 43°C).
- In very low temperatures (under -20°F, -29°C).



Service at the indicated distance or time whichever comes first.	miles x 1,000	15	30	45	60	75	90	105	120	NOTE	SECTION and PAGE
	km x 1,000	24	48	72	96	120	144	168	192		
	months	12	24	36	48	60	72	84	96		
Lubricate locks and hinges		●	●	●	●	●	●	●	●	Lubricate the door hinges and locks.	3-2, 3
Rotate tires (check tire inflation and condition at least once per month)		Rotate tires every 7,500 miles (12,000 km)								The suggested rotation method is shown in the diagram of the Owner's Manual.	—
Visually inspect the following items:											
Tie rod ends, steering gear box, and boots		Every 7,500 miles (12,000 km) or 6 months								Check steering linkage for looseness. Check condition of boots. Check for fluid leaks.	17-3
Suspension components										Check the bolts for tightness. Check condition of ball joint boots.	18-11, 12, 13 23, 24, 25
Driveshaft boots										Check condition of boots.	16-3
Brake hoses and lines (including ABS)										Check for damage or leakage.	19-4, 21
All fluid levels and condition of fluid										Check levels, condition of fluids, and check for leaks. If brake fluid is low, check brake pad thickness.	10-5, 13-3, 14-122, 15-65 19-7, 9, 17
Cooling system hoses and connections										Check all hoses for damage, leaks, and deterioration. Check for proper fan operation.	10-2
Exhaust system*		●	●	●	●	●	●	●	●	Check the catalytic converter heat shield, exhaust pipe, and muffler for damage, leaks, and tightness.	9-4, 5
Fuel lines and connections*										Check for leaks. Retighten loose connections and replace any damaged parts.	11-116
Lights and controls										Check all lighting functions.	23-77
Vehicle underbody										Check for damage and fluid leaks.	—
Inspect supplemental restraint system										10 years after production	—

According to state and federal regulations, failure to perform maintenance on the items marked with an asterisk (*) will not void customer's emission warranties. However, Honda recommends that all maintenance services be performed at the recommended time or mileage period to ensure long-term reliability.

Severe Driving Conditions:

- Driving less than 5 miles (8 km) per trip or, in freezing temperatures, driving less than 10 miles (16 km) per trip.
- Driving in extremely hot (over 90°F (32°C)) conditions.
- Extensive idling or long periods of stop-and-go driving.
- Trailer towing, driving with a roof-top carrier, or driving in mountainous conditions.
- Driving on muddy, dusty, or de-iced roads.

NOTE: If the car is driven OCCASIONALLY under a "severe" condition, you should follow the Normal Conditions Maintenance Schedule on pages 3-4 and 3-5.

Maintenance Schedule for 1998 Model

Normal Conditions

Follow the Normal Conditions Maintenance Schedule if the severe driving conditions specified in the Severe Conditions Maintenance Schedule on pages 3-10 and 3-11 do not apply.

Service at the indicated distance or time whichever comes first.		Every 7,500 miles (12,000 km) or 12 months												NOTE	SECTION and PAGE	
		miles x 1,000 km x 1,000 months														
Replace engine oil														Capacity for change with filter: 4.8 ℓ (5.1 US qt, 4.2 Imp qt)	8-6	
Replace engine oil filter														● ● ● ● ● ● ● ● ● ● ● ●	●	8-7
Check engine oil and coolant																
Replace air cleaner element														Check oil and coolant at each fuel stop	8-6, 10-5	
Inspect valve clearance														● ● ● ● ● ● ● ● ● ● ● ●	●	11-138
Replace spark plugs																Intake 0.15 – 0.19 mm (0.006 – 0.007 in)* Exhaust 0.17 – 0.21 mm (0.007 – 0.008 in)* Measured when cold.
Replace timing belt, balancer belt, and inspect water pump															●	NGK: PZER6F-11, DENSO: PKJ20CR-L11 Gap: 1.0 – 1.1 mm (0.039 – 0.043 in)* Check water pump for signs of seal leakage.
Inspect and adjust drive belts														● ● ● ● ● ● ● ● ● ● ● ●	●	4-33 17-14 22-62
Inspect idle speed															●	Manual transmission: 700 ± 50 rpm Automatic transmission: 700 ± 50 rpm (in N or P position)
Replace engine coolant														● ● ● ● ● ● ● ● ● ● ● ●	●	10-5
Replace transmission fluid																Capacity for change: Manual transmission: Prelude: 3.3 ℓ (3.5 US qt, 2.9 Imp qt) Prelude Type SH: 3.2 ℓ (3.4 US qt, 2.8 Imp qt) Automatic transmission: 3.2 ℓ (3.4 US qt, 2.8 Imp qt) Check specific gravity for freezing point.
Replace ATTS unit fluid																Manual transmission: Genuine Honda MTF M2Y4 1.9 ℓ (2.0 US qt, 1.7 Imp qt) for change M2U4 (with ATTS) 2.1 ℓ (2.2 US qt, 1.8 Imp qt) for change Automatic transmission: 2.5 ℓ (2.6 US qt, 2.2 Imp qt) for change with Genuine Honda Premium Formula ATF
Inspect front and rear brakes														● ● ● ● ● ● ● ● ● ● ● ●	●	15-65
Replace brake fluid																* Check the brake pad, disc thickness and free movement. * Check the calipers for leakage.
Check parking brake adjustment														● ● ● ● ● ● ● ● ● ● ● ●	●	19-4, 9, 11, 12, 17, 19, 20, 21
Rotate tires (Check tire inflation and condition at least once per month)														Rotate tires every 7,500 miles (12,000 km)		19-7
														Fully engaged 6 to 10 clicks.		19-6
														The suggested rotation method is shown in the diagram in the Owner's Manual		—

*1: Measuring point between camshaft and rocker arm.
*2: Do not adjust the gap, replace the spark plug if it is out of standard gap.



Service at the indicated distance or time whichever comes first.	miles x 1,000	15	30	45	60	75	90	105	120	NOTE	SECTION and PAGE
	km x 1,000	24	48	72	96	120	144	168	192		
	months	12	24	36	48	60	72	84	96		
Visually inspect the following items:											
Tie rod ends, steering gear box, and boots										Check steering linkage for looseness. Check condition of boots. Check for fluid leaks.	17-3
Suspension components										Check the bolts for tightness. Check condition of ball joint boots.	18-11, 12, 13, 23, 24, 25
Driveshaft boots										Check condition of boots.	16-3
Brake hoses and lines (including ABS)										Check for damage of leakage.	19-4, 21
All fluid levels and condition of fluid		●	●	●	●	●	●	●	●	Check levels, condition of fluids, and check for leaks. If brake fluid is low, check brake pad thickness.	10-5, 13-3 14-122, 15-65 19-7, 9, 17
										Check all hoses for damage, leaks, and deterioration. Check for proper fan operation.	10-2
Cooling system hoses and connections										Check the catalytic converter heat shield, exhaust pipe, and muffler for damage, leaks, and tightness.	9-4, 5
Exhaust system*										Check for leaks. Retighten loose connections and replace any damaged parts.	11-116

According to state and federal regulations, failure to perform maintenance on the items marked with an asterisk (*) will not void customer's emission warranties. However, Honda recommends that all maintenance services be performed at the recommended time or mileage period to ensure long-term reliability.

For Canada models: Follow the Severe Conditions Maintenance Schedule on pages 3-10 and 3-11.

Maintenance Schedule for 1998 Model

Severe Conditions

Follow the Severe Conditions Maintenance Schedule if the vehicle is driven MAINLY under one or more of the Severe Driving Conditions (page 3-11):

Service at the indicated distance or time whichever comes first.		miles x 1,000		km x 1,000		months		15	30	45	60	75	90	105	120	NOTE	SECTION and PAGE	
		24	48	72	96	120	144	168	192									
Replace engine oil and oil filter		Every 3,750 miles (6,000 km) or 6 months															Capacity for change with filter: 4.8 ℓ (5.1 US qt, 4.2 Imp qt)	8-6, 7
Check engine oil and coolant		Check oil and coolant at each fuel stop															Check levels and check for leaks.	8-6, 10-5
Clean (○) or replace (●) air cleaner element — Use normal schedule except in dusty condition		○	●	○	●	○	●	○	●	○	●	○	●	○	●	11-138		
Inspect valve clearance			●		●		●		●		●		●		●	6-9, 10		
Replace spark plugs																4-21		
Replace timing belt** ³ , balance belt** ³ , and inspect water pump																6-14, 10-10		
Inspect and adjust drive belts			●		●		●		●		●		●		●	4-33 17-14 22-62		
Inspect idle speed														●		11-115		
Replace engine coolant						●				●				●		10-5		
Replace transmission fluid																13-3 14-122		
Replace ATTS unit fluid																15-65		
Inspect front and rear brakes		Every 7,500 miles (12,000 km) or 6 months															• Check the brake pad, disc thickness and free movement. • Check the calipers for leakage.	19-4, 9, 11, 12, 17, 19, 20, 21
Replace brake fluid						●				●						19-7		
Check parking brake adjustment		●	●	●	●	●	●	●	●	●	●	●	●	●	●	19-6		
Fully engaged 6 to 10 clicks.																		

*1: Measuring point between camshaft and rocker arm.

*2: Do not adjust the gap, replace the spark plug if it is out of standard gap.

*3: Replace the timing belt and timing balance belt at 60,000 miles (U.S.) 100,000 km (Canada) if the vehicle regularly is driven in one or more of these conditions:

- In very high temperatures (over 110°F, 43°C).
- In very low temperatures (under -20°F, -29°C).



Service at the indicated distance or time whichever comes first.		miles x 1,000		15	30	45	60	75	90	105	120	NOTE	SECTION and PAGE
		km x 1,000		24	48	72	96	120	144	168	192		
months		12	24	36	48	60	72	84	96				
Lubricate locks and hinges		●	●	●	●	●	●	●	●	●	●	Lubricate all hinges, latches, and locks	3-2, 3
Rotate tires (check tire inflation and condition at least once per month)		Every 7,500 miles (12,000 km)										The suggested rotation method is shown in the diagram in the Owner's Manual.	—
Visually inspect the following items:													
Tie rod ends, steering gear box, and boots		Every 7,500 miles (12,000 km) or 6 months										• Check for correct installation and position, check for cracks, deterioration, rust, and leaks. • Check tightness of screws, nuts, and joints. If necessary, retighten.	—
Suspension components												Check steering linkage for looseness. Check condition of boots. Check for fluid leaks.	17-3
Driveshaft boots												Check the bolts for tightness. Check condition of ball joint boots. Check condition of boots.	18-11, 12, 13 23, 24, 25 16-3
Brake hoses and lines (including ABS)												Check for damage of leakage.	19-4, 21
All fluid levels and condition of fluid												Check levels, condition of fluids, and check for leaks. If brake fluid is low, check brake pad thickness.	10-5, 13-3, 14-122, 15-65 19-7, 9, 17
Cooling system hoses and connections												Check all hoses for damage, leaks, and deterioration. Check for proper fan operation.	10-2
Exhaust system*												Check the catalytic converter heat shield, exhaust pipe, and muffler for damage, leaks, and tightness.	9-4, 5
Fuel lines and connections*												Check for leaks. Retighten loose connections and replace any damaged parts.	11-116
Lights and controls												Check all lighting functions.	23-77
Vehicle underbody												Check for damage and fluid leaks.	—

According to state and federal regulations, failure to perform maintenance on the items marked with an asterisk (*) will not void customer's emission warranties. However, Honda recommends that all maintenance services be performed at the recommended time or mileage period to ensure long-term reliability.

Severe Driving Conditions:

- Driving less than 5 miles (8 km) per trip or, in freezing temperatures, driving less than 10 miles (16 km) per trip.
- Driving in extremely hot [over 90°F (32°C)] conditions.
- Extensive idling or long periods of stop-and-go driving.
- Trailer towing, driving with roof top carrier, or driving in mountainous conditions.
- Driving on muddy, dusty, or de-iced roads.

NOTE: If the car is driven OCCASIONALLY under a "severe" condition, you should follow the Normal Conditions Maintenance Schedule on pages 3-8 and 3-9.

Maintenance Schedule for 1999 Model

Normal Conditions

Follow the Normal Conditions Maintenance Schedule if the severe driving conditions specified in the Severe Conditions Maintenance Schedule on pages 3-14 and 3-15 do not apply.

Service at the indicated distance or time whichever comes first.	Every 7,500 miles (12,000 km) or 12 months																SECTION and PAGE
	15 miles x 1,000	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	
Replace engine oil	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	8-6
Replace engine oil filter	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	8-7
Check engine oil and coolant	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	8-6, 10-5
Replace air cleaner element	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	11-138
Inspect valve clearance	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	6-9, 10
Replace spark plugs	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	4-21
Replace timing belt, balancer belt, and inspect water pump	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	6-14, 10-10
Inspect and adjust drive belts	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	4-33 17-14 22-62
Inspect idle speed	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	11-115
Replace engine coolant	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	10-5
Replace transmission fluid	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	13-3 14-122
Replace ATTS unit fluid	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	15-65
Inspect front and rear brakes	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	19-4, 9, 11, 12, 17, 19, 20, 21
Replace brake fluid	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	19-7
Check parking brake adjustment	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	19-6
Replace air conditioning filter	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	22-38
Rotate tires (Check tire inflation and condition at least once per month)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	—

*1: Measuring point between camshaft and rocker arm.

*2: Do not adjust the gap, replace the spark plug if it is out of standard gap.



Service at the indicated distance or time whichever comes first.	miles x 1,000	15	30	45	60	75	90	105	120	NOTE	SECTION and PAGE
	km x 1,000	24	48	72	96	120	144	168	192		
	months	12	24	36	48	60	72	84	96		
Visually inspect the following items:											
Tie rod ends, steering gear box, and boots										Check steering linkage for looseness. Check condition of boots. Check for fluid leaks.	17-3
Suspension components										Check the bolts for tightness. Check condition of ball joint boots.	18-11, 12, 13, 23, 24, 25
Driveshaft boots										Check condition of boots.	16-3
Brake hoses and lines (including ABS)										Check for damage of leakage.	19-4, 21
All fluid levels and condition of fluid	●	●	●	●	●	●	●	●	●	Check levels, condition of fluids, and check for leaks. If brake fluid is low, check brake pad thickness.	10-5, 13-3 14-122, 15-65 19-7, 9, 17
Cooling system hoses and connections										Check all hoses for damage, leaks, and deterioration. Check for proper fan operation.	10-2
Exhaust system*										Check the catalytic converter heat shield, exhaust pipe, and muffler for damage, leaks, and tightness.	9-4, 5
Fuel lines and connections*										Check for leaks. Retighten loose connections and replace any damaged parts.	11-116

According to state and federal regulations, failure to perform maintenance on the items marked with an asterisk (*) will not void customer's emission warranties. However, Honda recommends that all maintenance services be performed at the recommended time or mileage period to ensure long-term reliability.

For Canada models: Follow the Severe Conditions Maintenance Schedule on pages 3-14 and 3-15.

Maintenance Schedule for 1999 Model

Severe Conditions

Follow the Severe Conditions Maintenance Schedule if the vehicle is driven MAINLY under one or more of the Severe Driving Conditions (page 3-15):

Service at the indicated distance or time whichever comes first.	miles x 1,000		15	30	45	60	75	90	105	120	NOTE	SECTION and PAGE	
	km x 1,000		24	48	72	96	120	144	168	192			
	months		12	24	36	48	60	72	84	96			
Replace engine oil and oil filter	Every 3,750 miles (6,000 km) or 6 months											Capacity for change with filter: 4.8 ℓ (5.1 US qt, 4.2 Imp qt)	8-6, 7
Check engine oil and coolant	Check oil and coolant at each fuel stop											Check levels and check for leaks.	8-6, 10-5
Clean (○) or replace (●) air cleaner element — Use normal schedule except in dusty condition	○	●	○	●	○	●	○	●	○	●		11-138	
Inspect valve clearance	Adjust only if noisy											Intake 0.15 – 0.19 mm (0.006 – 0.007 in)* Exhaust 0.17 – 0.21 mm (0.007 – 0.008 in)* Measured when cold.	6-9, 10
Replace spark plugs												4-21	
Replace timing belt*, balance belt*, and inspect water pump											Check water pump for signs of seal leakage.	6-14, 10-10	
Inspect and adjust drive belts		●		●		●		●		●	Check for cracks and damage. Check deflection and tension at center of following belts pressing with 98 N (10 kgf, 22 lbf) tension: P/S pump belt: 13.0 – 16.5 mm (0.51 – 0.65 in) A/C Compressor (alternator) belt: 9.5 – 12.5 mm (0.37 – 0.49 in)	4-33 17-14 22-62	
Inspect idle speed										●	Manual transmission: 700 ± 50 rpm Automatic transmission: 700 ± 50 rpm (in N or P position)	11-115	
Replace engine coolant				●			●			●	Capacity for change: Manual transmission: Prelude: 3.3 ℓ (3.5 US qt, 2.9 Imp qt) Prelude Type SH: 3.2 ℓ (3.4 US qt, 2.8 Imp qt) Automatic transmission: 3.2 ℓ (3.4 US qt, 2.8 Imp qt) Check specific gravity for freezing point.	10-5	
Replace transmission fluid		●		●		●		●		●	Manual transmission: Genuine Honda MTF M2Y4 1.9 ℓ (2.0 US qt, 1.7 Imp qt) for change M2U4 (with ATTS) 2.1 ℓ (2.2 US qt, 1.8 Imp qt) for change Automatic transmission: 2.5 ℓ (2.6 US qt, 2.2 Imp qt) for change with Genuine Honda Premium Formula ATF	13-3 14-122	
Replace ATTS unit fluid			●		●		●			●	0.95 ℓ (1.0 US qt, 0.84 Imp qt) for change with Genuine Honda Premium Formula ATF	15-65	
Inspect front and rear brakes	Every 7,500 miles (12,000 km) or 6 months											• Check the brake pad, disc thickness and free movement. • Check the calipers for leakage.	19-4, 9, 11, 12, 17, 19, 20, 21
Replace brake fluid				●				●			Use Genuine Honda DOT 3 brake fluid. Check that brake fluid level is between the upper and lower marks on the reservoir.	19-7	
Check parking brake adjustment	●		●		●		●		●		Fully engaged 6 to 10 clicks.	19-6	
Replace air conditioning filter**			●		●			●		●		22-38	

*1: Measuring point between camshaft and rocker arm.

*2: Do not adjust the gap, replace the spark plug if it is out of standard gap.

*3: Replace the timing belt and timing balancer belt at 60,000 miles (U.S.) 100,000 km (Canada) if the vehicle regularly is driven in one or more of these conditions:
• In very high temperatures (over 110°F, 43°C).

• In very low temperatures (under -20°F, -29°C).

*4: Air conditioning filter should be replaced every 24,000 miles (15,000 km) if you drive primarily in areas that have high concentrations of soot in the air from industry and diesel-powered vehicles.
It should be replaced more often if air flow from the climate control system becomes less than usual.



Service at the indicated distance or time whichever comes first.	miles x 1,000	15	30	45	60	75	90	105	120	NOTE	SECTION and PAGE
	km x 1,000	24	48	72	96	120	144	168	192		
	months	12	24	36	48	60	72	84	96		
Lubricate all locks and hinges, latches		●	●	●	●	●	●	●	●	Use Honda White Lithium Grease	3-2, 3
Rotate tires (check tire inflation and condition at least once per month)		Every 7,500 miles (12,000 km)								The suggested rotation method is shown in the diagram in the Owner's Manual.	—
Visually inspect the following items:											
Tie rod ends, steering gear box, and boots		Every 7,500 miles (12,000 km) or 6 months								• Check for correct installation and position, check for cracks, deterioration, rust, and leaks. • Check tightness of screws, nuts, and joints. If necessary, retighten.	—
Suspension components										Check steering linkage for looseness. Check condition of boots. Check for fluid leaks.	17-3
Driveshaft boots										Check the bolts for tightness. Check condition of ball joint boots.	18-11, 12, 13 23, 24, 25
Brake hoses and lines (including ABS)										Check condition of boots.	16-3
All fluid levels and condition of fluid										Check for damage of leakage.	19-4, 21
Cooling system hoses and connections										Check levels, condition of fluids, and check for leaks. If brake fluid is low, check brake pad thickness.	10-5, 13-3, 14-122, 15-65 19-7, 9, 17
Exhaust system*		●	●	●	●	●	●	●	●	Check all hoses for damage, leaks, and deterioration. Check for proper fan operation.	10-2
Fuel lines and connections*										Check the catalytic converter heat shield, exhaust pipe, and muffler for damage, leaks, and tightness.	9-4, 5
Lights and controls										Check for leaks. Retighten loose connections and replace any damaged parts.	11-116
Vehicle underbody										Check all lighting functions.	23-77
										Check for damage and fluid leaks.	—

According to state and federal regulations, failure to perform maintenance on the items marked with an asterisk (*) will not void customer's emission warranties. However, Honda recommends that all maintenance services be performed at the recommended time or mileage period to ensure long-term reliability.

Severe Driving Conditions:

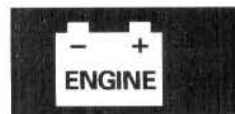
- Driving less than 5 miles (8 km) per trip or, in freezing temperatures, driving less than 10 miles (16 km) per trip.
- Driving in extremely hot (over 90°F (32°C)) conditions.
- Extensive idling or long periods of stop-and-go driving.
- Trailer towing, driving with roof top carrier, or driving in mountainous conditions.
- Driving on muddy, dusty, or de-iced roads.

NOTE: If the car is driven OCCASIONALLY under a "severe" condition, you should follow the Normal Conditions Maintenance Schedule on pages 3-12 and 3-13.

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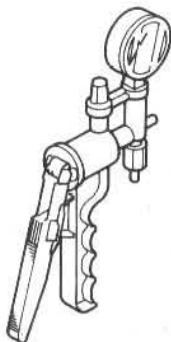


[Click here to go back to the Introduction page](#)

Special Tools

Ref. No.	Tool Number	Description	Qty	Page Reference
①	A973X – 041 – XXXXX	Vacuum Pump/Gauge, 0 – 30 in.Hg.	1	4-40
*②	07JGG – 001010A	Belt Tension Gauge	1	4-33
③	07PAZ – 0010100	SCS Service Connector	1	4-16

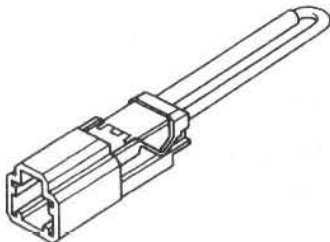
* Included in the Belt Tension Gauge Set, T/N 07JGG – 001000A



①

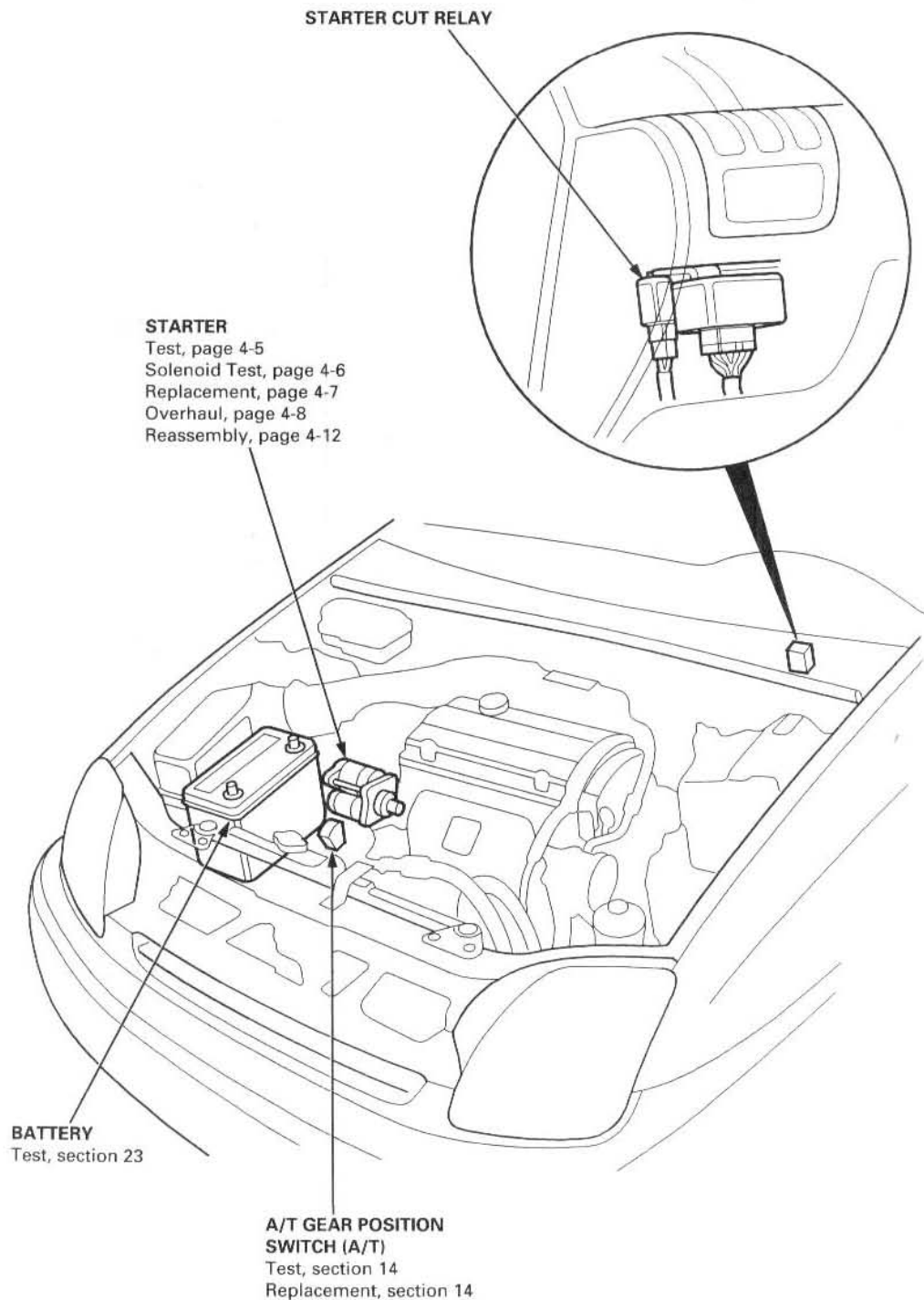


②



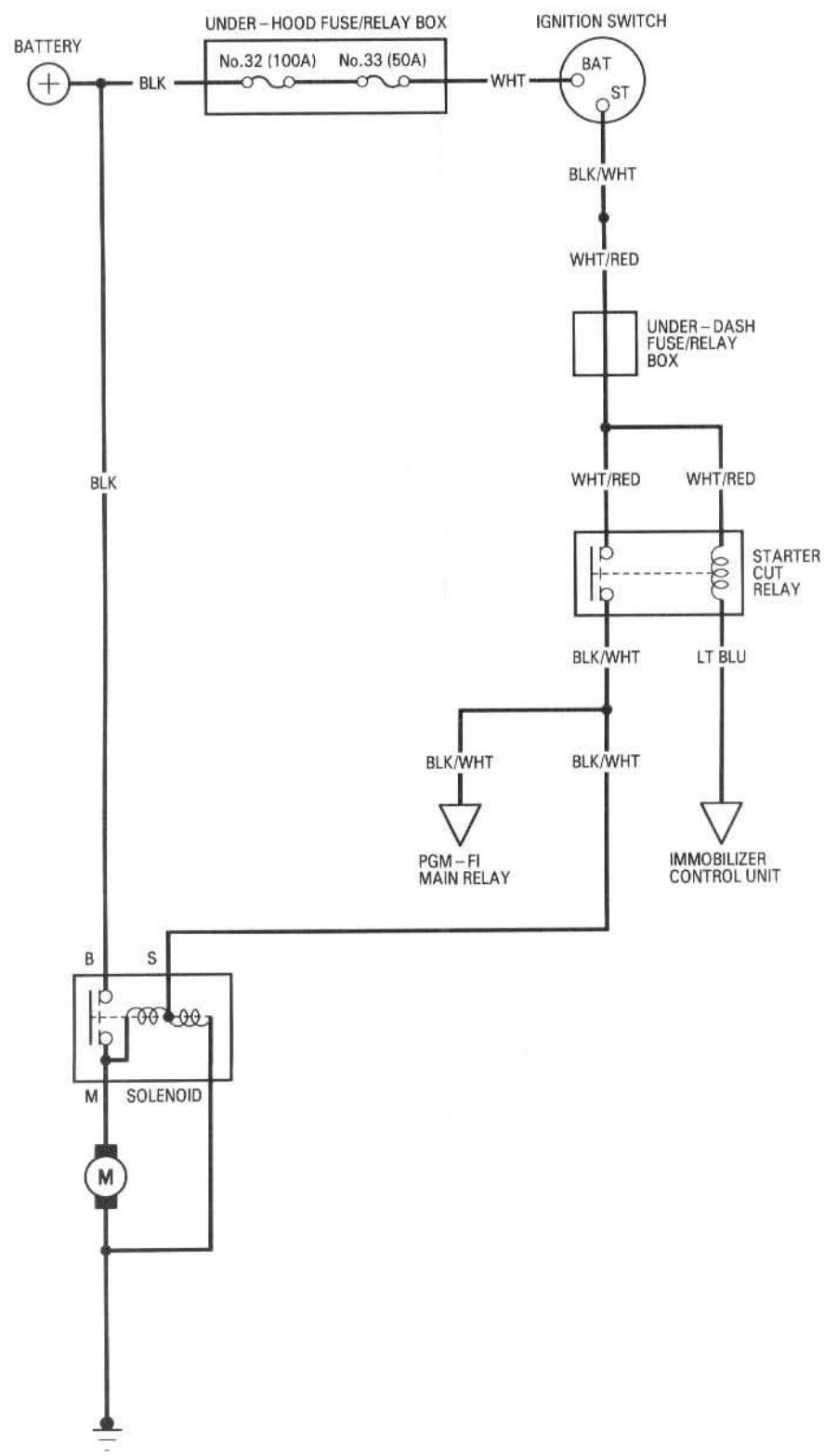
③

Component Location Index



Starting System

Circuit Diagram



Starter Test

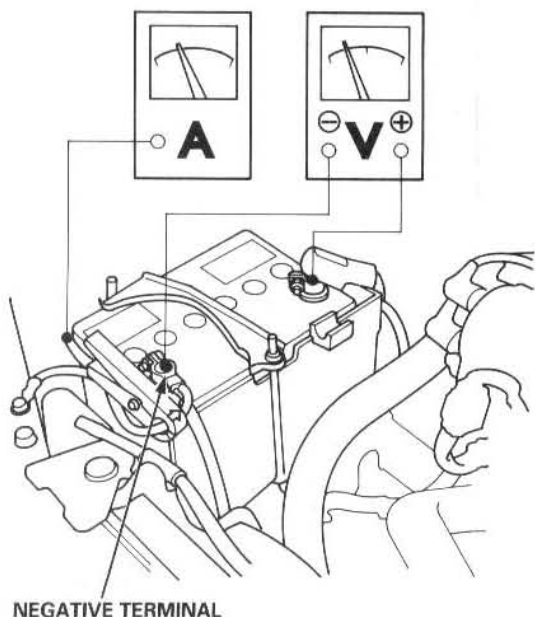
NOTE: The air temperature must be between 59 and 100°F (15 and 38°C) before testing.

Recommended Procedure:

- Use a starter system tester.
- Connect and operate the equipment in accordance with the manufacturer's instructions.
- Test and troubleshoot as described.

Alternate Procedure:

- Use the following equipment:
 - Ammeter, 0 – 400 A
 - Voltmeter, 0 – 20 V (accurate within 0.1 volt)
 - Tachometer, 0 – 1,200 rpm
- Hook up voltmeter and ammeter as shown.

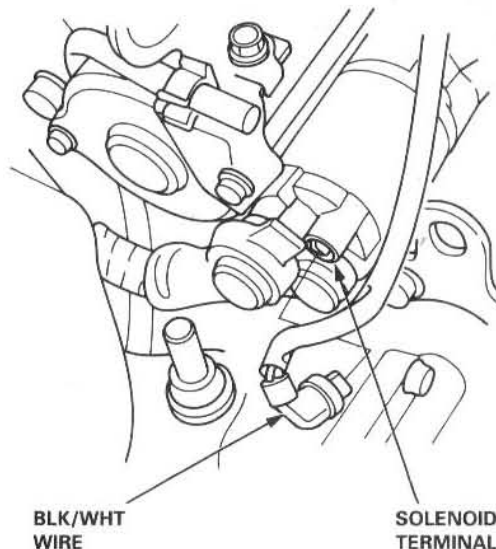


NOTE: After this test, or any subsequent repair, reset the ECM to clear any codes (see section 11).

Check Starter Engagement

1. Remove No. 4 (10 A) fuse from the under-dash fuse/relay box.

2. Turn the ignition switch to START (III) with the shift lever in **N** or **P** position (A/T) or with the clutch pedal depressed (M/T). The starter should crank the engine.
 - If the starter does not crank the engine, go to step 3.
 - If it cranks the engine erratically or too slowly, go to "Check for Wear and Damage" on the next page.
3. Check the battery, battery positive cable, ground, starter cut relay, and the wire connections for looseness and corrosion. Test again. If the starter still does not crank the engine, go to step 4.
4. Unplug the connector (BLK/WHT wire and solenoid terminal) from the starter.
5. Connect a jumper wire from the battery positive (+) terminal to the solenoid terminal. The starter should crank the engine.
 - If the starter still does not crank the engine, remove it, and diagnose its internal problem.
 - If the starter cranks the engine, go to step 6.



6. Check the ignition switch.
7. Check the starter cut relay.
8. Check the A/T gear position switch (A/T) or clutch interlock switch (M/T).
9. Check for an open in the WHT/RED wire between the ignition switch and starter cut relay, and check for an open in the BLK/WHT wire between the starter cut relay and starter.

(cont'd)

Starting System

Starter Test (cont'd)

Check for Wear and Damage

The starter should crank the engine smoothly and steadily. If the starter engages, but cranks the engine erratically, remove it, and inspect the starter drive gear and torque converter ring gear or flywheel ring gear for damage.

Check the drive gear overrunning clutch for binding or slipping when the armature is rotated with the drive gear held. If damaged, replace the gears.

Check Cranking Voltage and Current Draw

Cranking voltage should be no less than 8.5 volts. Current draw should be no more than 380 amperes.

If cranking voltage is too low, or current draw too high, check for:

- Dead or low battery
- Open circuit in starter armature commutator segments
- Starter armature dragging
- Shorted armature winding
- Excessive drag in engine

Check Cranking rpm

Engine speed during cranking should be above 100 rpm.

If speed is too low, check for:

- Loose battery or starter terminals
- Excessively worn starter brushes
- Open circuit in commutator segments
- Dirty or damaged helical spline or drive gear
- Defective drive gear overrunning clutch

Check Starter Disengagement

With the shift lever in **P** or **N** (A/T) or with the clutch pedal depressed (M/T), turn the ignition switch to "START (III)", and release to "ON (II)". The starter drive gear should disengage from the torque converter ring gear when you release the key.

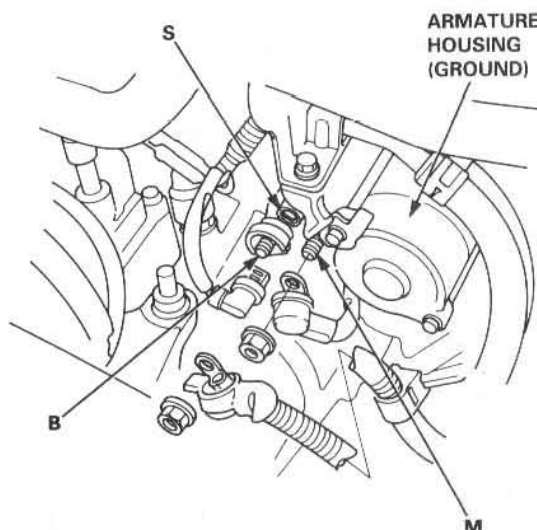
If the drive gear hangs up on the torque converter ring gear, check for:

- Solenoid plunger and switch malfunction
- Dirty drive gear assembly or damaged overrunning clutch

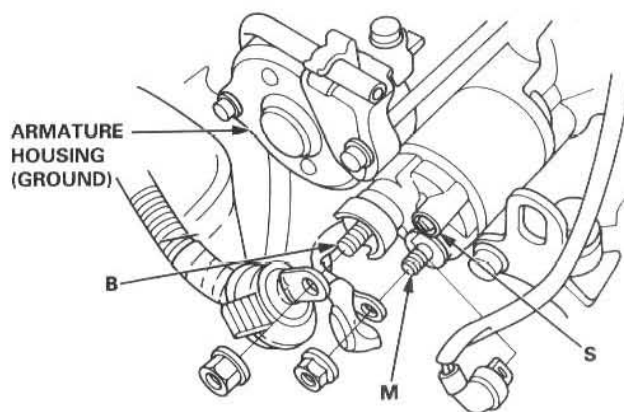
Starter Solenoid Test

1. Check the hold-in coil for continuity between the S terminal and the armature housing (ground). The coil is OK if there is continuity.

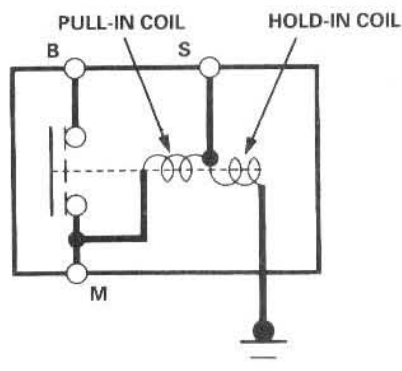
M/T:



A/T:



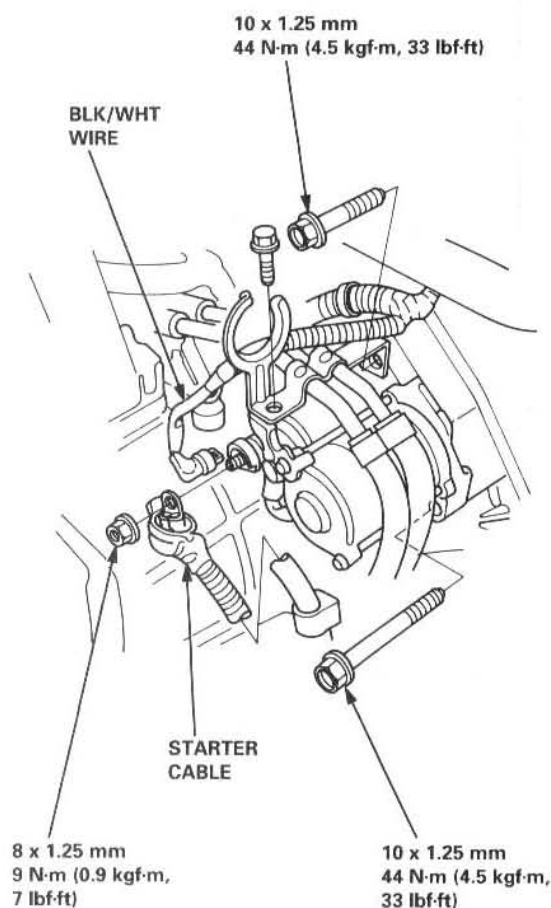
2. Check the pull-in coil for continuity between the S and M terminals. The coil is OK if there is continuity.



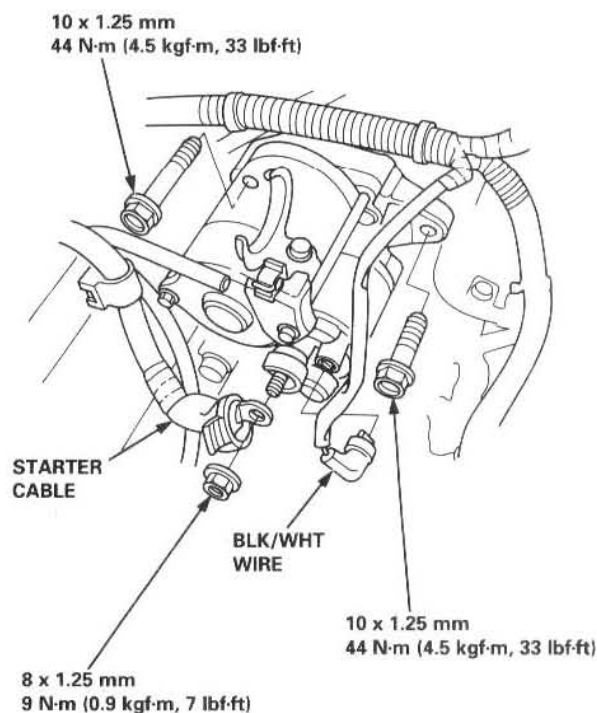
Starter Replacement

1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.
2. Disconnect the battery negative cable, then disconnect the positive cable, and wait at least three minutes.
3. Remove the engine wire harness and radiator lower hose from the bracket on the starter motor.
4. Disconnect the starter cable from the B terminal on the solenoid, then disconnect the BLK/WHT wire from the S terminal wire.

M/T:

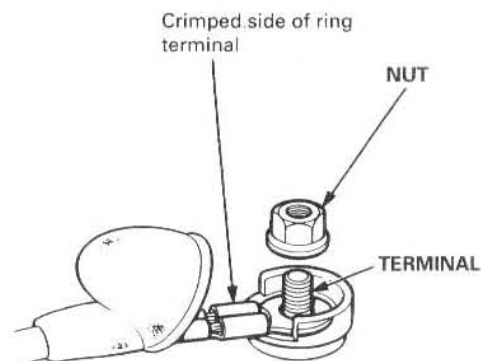


A/T:



5. Remove the two bolts holding the starter, then remove the starter.
6. Install in the reverse order of removal.

NOTE: When installing the starter cable, make sure that the crimped side of the ring terminal is facing out.

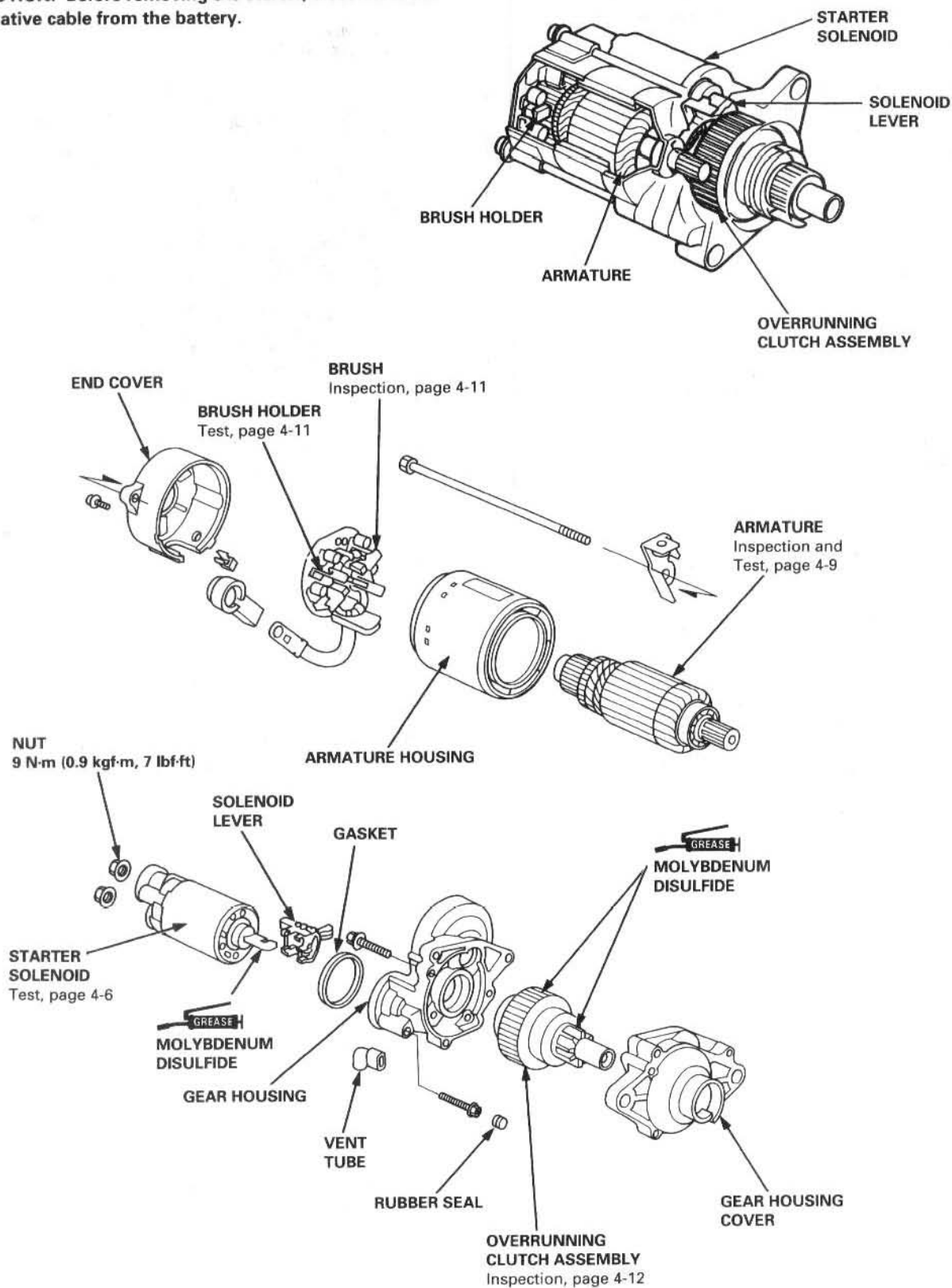


7. Connect the battery positive cable and negative cable to the battery.
8. Enter the anti-theft code for the radio, then enter the customer's radio station presets.

Starting System

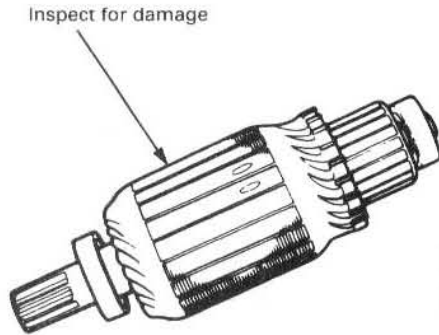
Starter Overhaul

CAUTION: Before removing the starter, disconnect the negative cable from the battery.

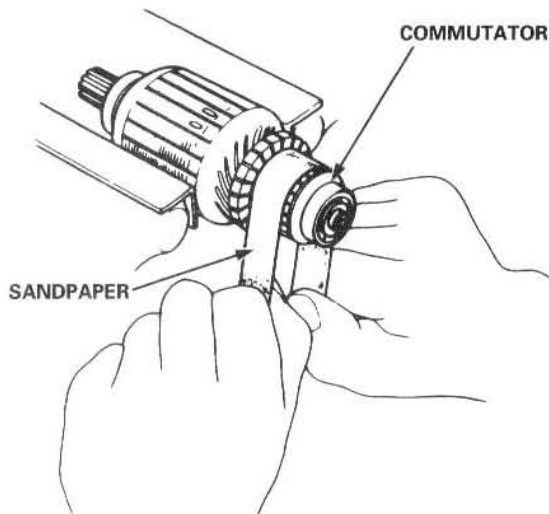


Armature Inspection and Test

1. Inspect the armature for wear or damage due to contact with the permanent magnet. If there is wear or damage, replace the armature.



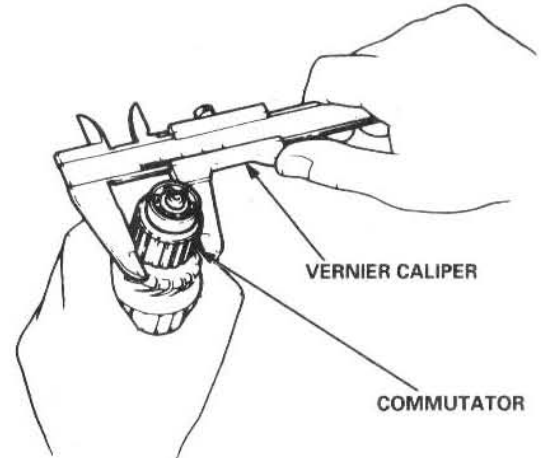
2. Check commutator surface and diameter.
 - If the surface is dirty or burnt, resurface with emery cloth or a lathe within the following specifications, or recondition with #500 or #600 sandpaper.



- If commutator diameter is below the service limit, replace the armature.

Commutator Diameter

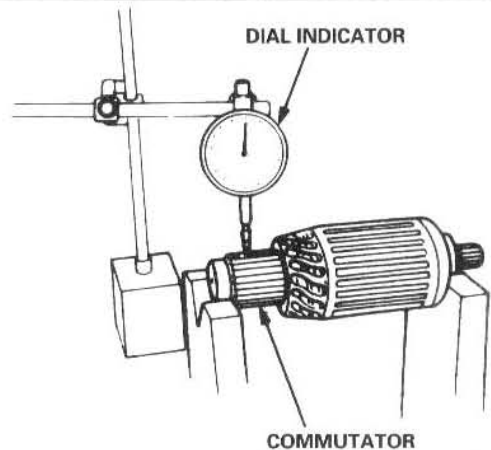
Standard (NEW)	Service Limit
28.0 – 28.1 mm (1.102 – 1.106 in)	27.5 mm (1.083 in)



3. Measure the commutator runout.
 - If the commutator runout is within the service limit, check the commutator for carbon dust or brass chips between the segments.
 - If the commutator runout is not within the service limit, replace the armature.

Commutator Runout

Standard (NEW)	Service Limit
0 – 0.02 mm (0 – 0.001 in)	0.05 mm (0.002 in)

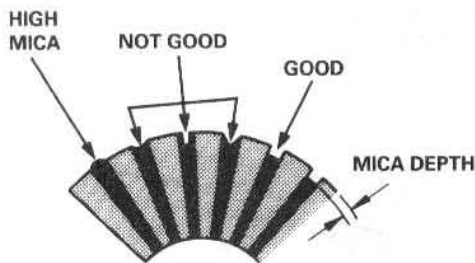


(cont'd)

Starting System

Armature Inspection and Test (cont'd)

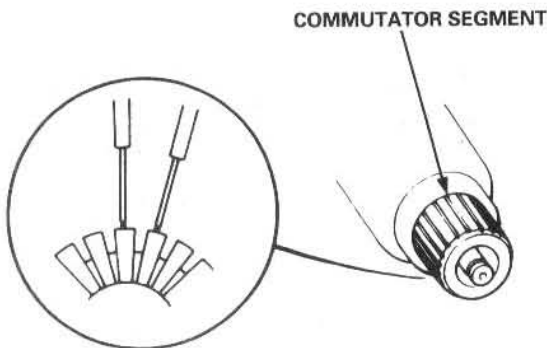
4. Check the mica depth. If necessary, undercut the mica with a hacksaw blade to achieve proper depth. If the service limit cannot be maintained, replace the armature.



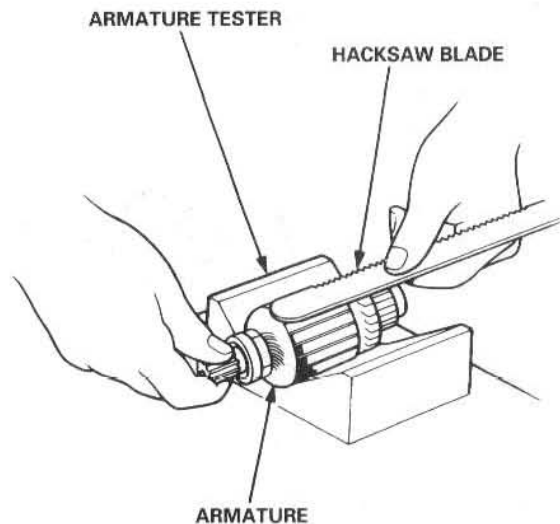
Commutator Mica Depth

Standard (NEW)	Service Limit
0.4 – 0.5 mm (0.016 – 0.02 in)	0.15 mm (0.006 in)

5. Check for continuity between the segments of the commutator. If an open circuit exists between any segments, replace the armature.

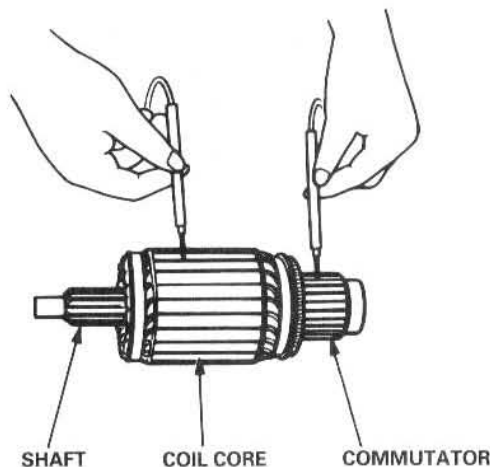


6. Place the armature on an armature tester. Hold a hacksaw blade on the armature core.



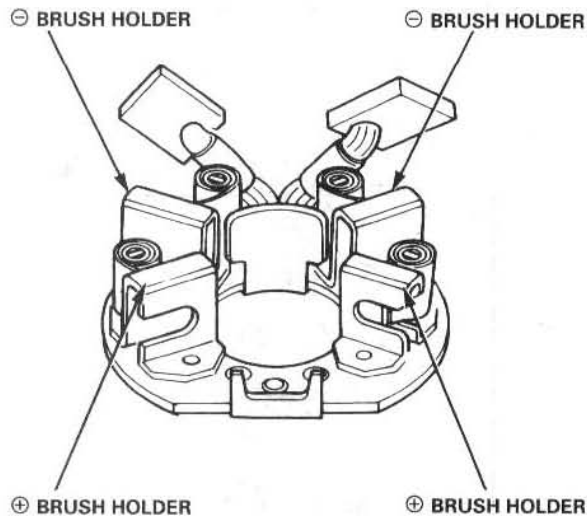
If the blade is attracted to the core or vibrates while the core is turned, the armature is shorted. Replace the armature.

7. Check with an ohmmeter that no continuity exists between the commutator and armature coil core, and between the commutator and armature shaft. If continuity exists, replace the armature.

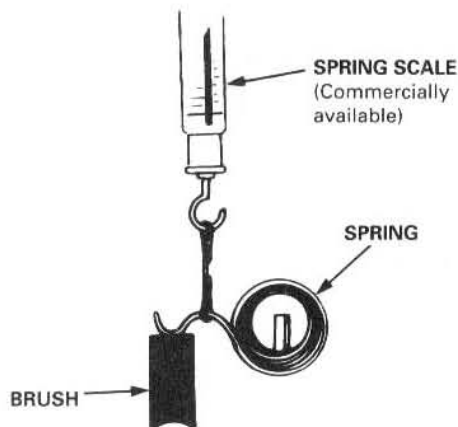


Starter Brush Holder Test

1. Check that there is no continuity between the ⊕ and ⊖ brush holders.
If there is continuity, replace the brush holder assembly.



2. Insert the brush into the brush holder, and bring the brush into contact with the commutator, then attach a spring scale to the spring. Measure the spring tension at the moment the spring lifts off the brush.



Spring Tension:

Spring Tension
15.7– 17.7 N (1.60 – 1.80 kgf, 3.53 – 3.97 lbf)

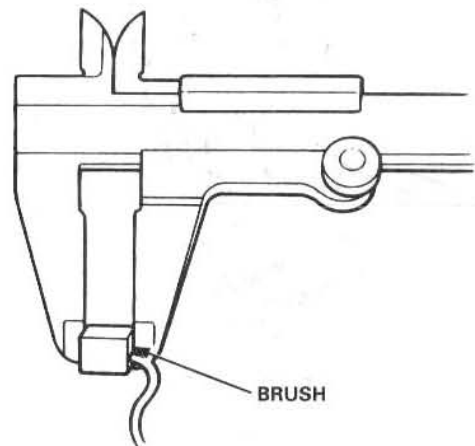
Starter Brush Inspection

Measure the brush length.

If it is not within the service limit, replace the brush holder assembly.

Brush Length

Standard (NEW)	Service Limit
15.8 – 16.2 mm (0.62 – 0.64 in)	11.0 mm (0.43 in)



NOTE: To seat new brushes after installing them in their holders, slip a strip of #500 or #600 sandpaper, with the grit side up, over the commutator, and smoothly rotate the armature. The contact surface of the brushes will be sanded to the same contour as the commutator.

Starting System

Overrunning Clutch Inspection

1. Slide the overrunning clutch along the shaft. Does it move freely? If not, replace it.
2. Rotate the overrunning clutch both ways. Does it lock in one direction and rotate smoothly in reverse? If it does not lock in either direction or it locks in both directions, replace it.

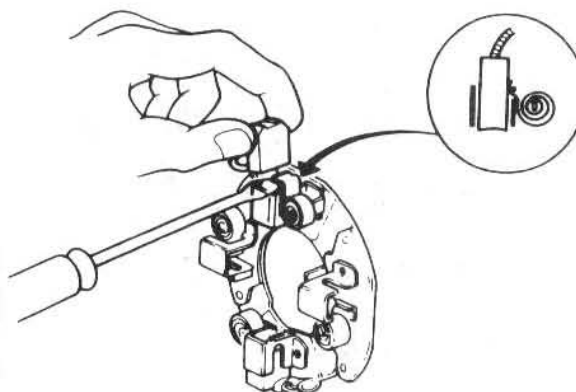


3. If the starter drive gear is worn or damaged, replace the overrunning clutch assembly; the gear is not available separately.
4. Check the condition of the flywheel or torque converter ring gear if the starter drive gear teeth are damaged.

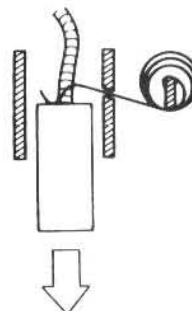
Starter Reassembly

NOTE: Use the illustration on page 4-8 as reference for reassembly.

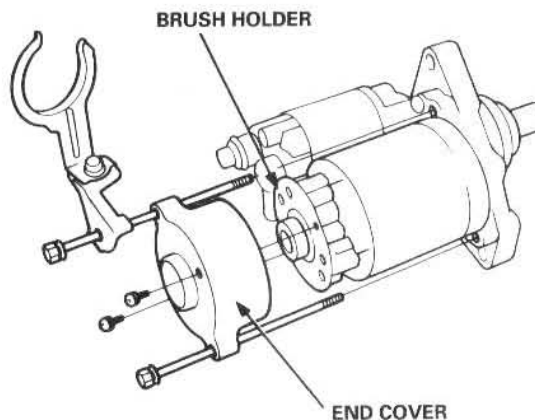
1. Pry back each brush spring with a screwdriver, then position the brush about halfway out of its holder, and release the spring to hold it there.



2. Install the armature in the housing. Next, pry back each brush spring again, and push the brush down until it seats against the commutator, then release the spring against the end of the brush.



3. Install the end cover on the brush holder.



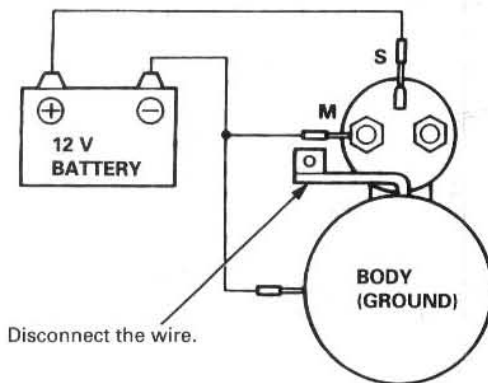
Performance Test

NOTE: Before starting the following checks, disconnect the wire from terminal M, and make a connection as described below using as heavy a wire as possible (preferably equivalent to the wire used for the vehicle).

Pull-in Coil Test:

Connect the battery as shown. If the starter pinion pops out, it is working properly.

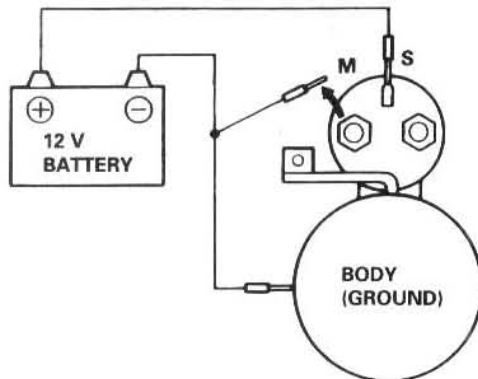
CAUTION: Do not leave the battery connected for more than 10 seconds.



Hold-in Coil Test:

Disconnect the battery from the M terminal. If the pinion does not retract, the hold-in coil is working properly.

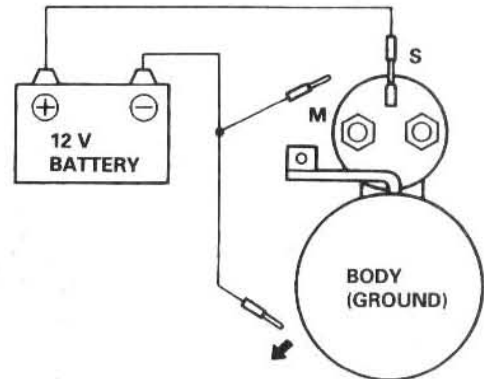
CAUTION: Do not leave the battery connected for more than 10 seconds.



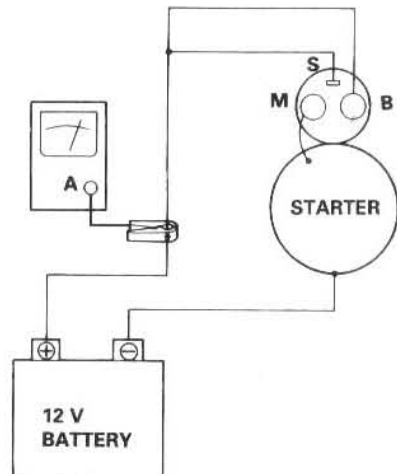
Retracting Test:

Disconnect the battery also from the body. If the pinion retracts immediately, it is working properly.

CAUTION: Do not leave the battery connected for more than 10 seconds.



1. Clamp the starter firmly in a vise.
2. Connect the starter to the battery as described in the diagram below, and confirm that the motor starts and keeps rotating.



3. If the electric current and motor speed meet the specifications when the battery voltage is at 11.5 V, the starter is working properly.

Specifications:

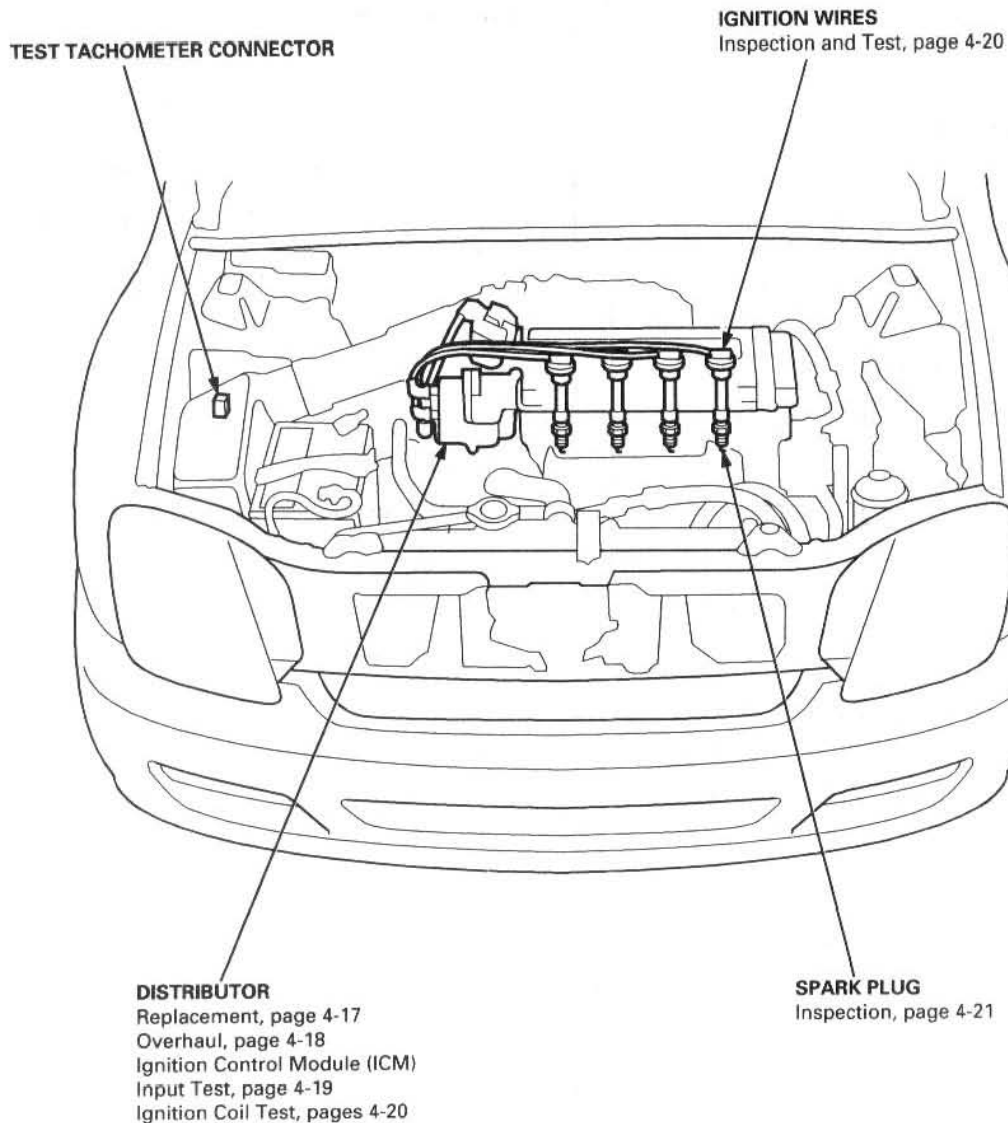
80 A or less (Electric current),
2,600 rpm or more (Motor- speed)

Ignition System

Component Location Index

IGNITION TIMING CONTROL SYSTEM

Inspection, page 4-16

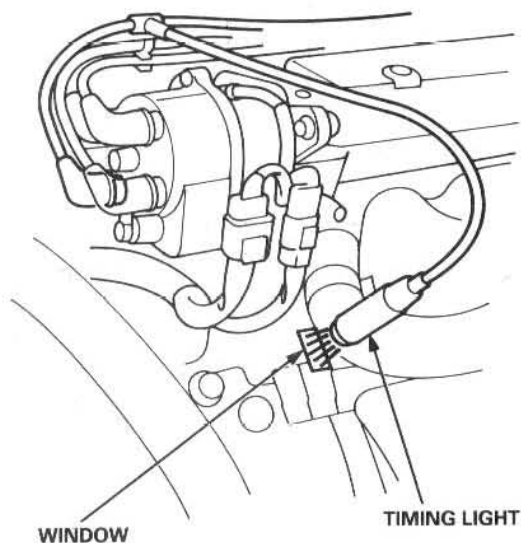




Ignition System

Ignition Timing Inspection

1. Check the idle speed, and adjust it if necessary (see section 11).
2. Pull out the service check connector 2P (GRN/BLK and RED/WHT wires) from the connector holder under the dash on the front passenger side, then connect the SCS service connector (T/N 07PAZ - 0010100) to it.
3. Start the engine. Hold the engine speed at 3,000 rpm with no load (A/T in **P** or **N** position, M/T in neutral) until the radiator fan comes on, then let it idle.
4. Connect a timing light to the No. 1 ignition wire. Remove the rubber plug from the "window" in the flywheel/drive plate housing. While the engine idles, point the timing light toward the pointer on the flywheel (M/T) or drive plate (A/T).

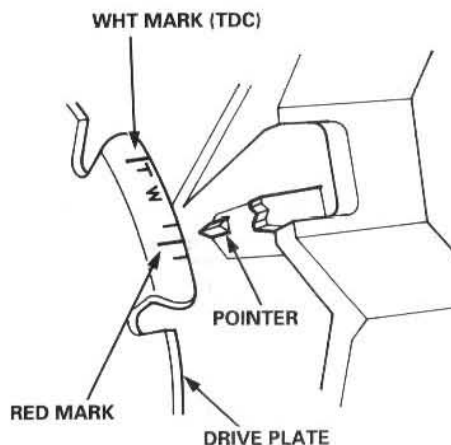


5. Check the ignition timing in no load conditions: headlights, blower fan, rear defogger, and air conditioner are not operating.

Ignition Timing:

M/T	15° ± 2° BTDC (RED) during idling in neutral
A/T	15° ± 2° BTDC (RED) during idling in N or P

NOTE: The illustration shows A/T.

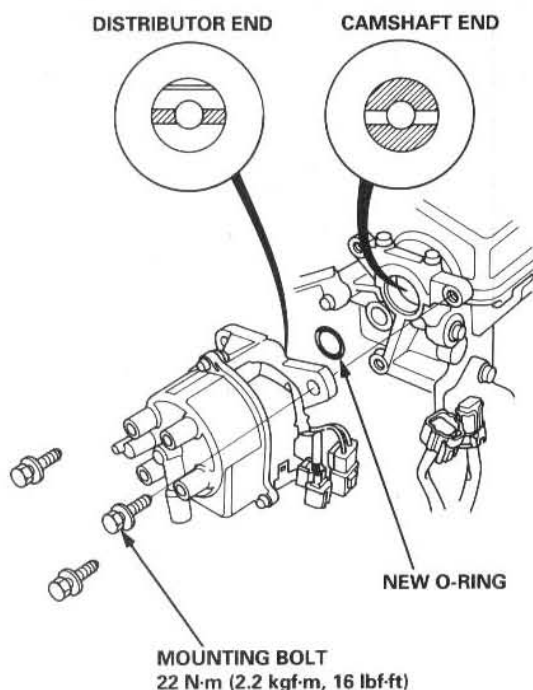


6. If the ignition timing is incorrect, replace the ECM (there is no way to adjust ignition timing).
7. Disconnect the special tool from the service check connector.

Distributor Replacement

Removal:

1. Disconnect the connector from the distributor.
2. Disconnect the ignition wires from the distributor ignition (DI) cap.
3. Remove the mounting bolts from the distributor, then remove the distributor from the cylinder head.



Installation:

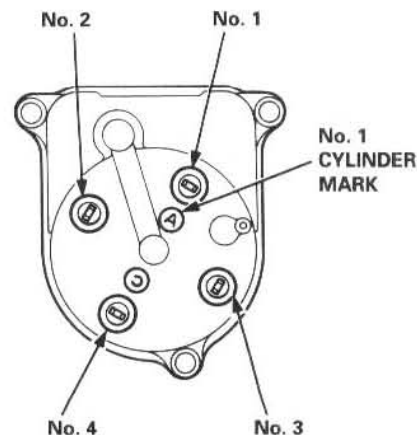
NOTE: Before you install the distributor, bring the No. 1 piston to compression stroke TDC.

1. Coat a new O-ring with engine oil, then install it.
2. Slip the distributor into position.

NOTE: The lug on the end of the distributor and its mating grooves in the camshaft end are both offset to eliminate the possibility of installing the distributor 180° out of time.

3. Install the mounting bolts, and tighten them lightly.

4. Connect the ignition wires to the distributor ignition (DI) cap as shown.

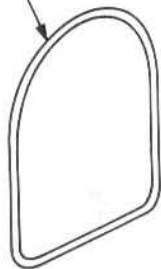


5. Connect the connector to the distributor.
6. Inspect the ignition timing (see previous page).
7. After inspecting the ignition timing, tighten the mounting bolts.

Ignition System

Distributor Overhaul

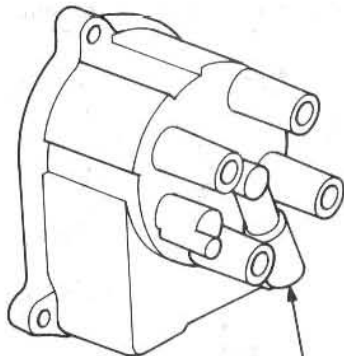
CAP SEAL
Check for damage.



LEAK COVER



**DISTRIBUTOR
IGNITION (DI)
ROTOR**

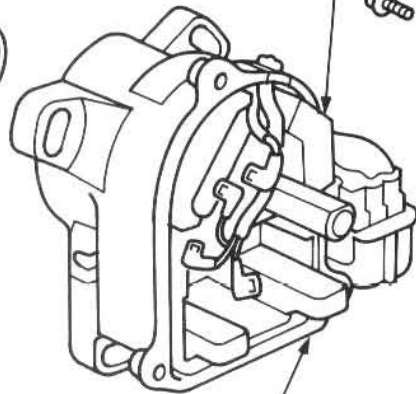
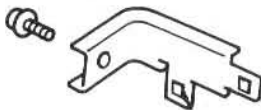


**DISTRIBUTOR IGNITION
(DI) CAP**
Check for cracks, wear,
damage, and fouling.
Clean or replace.

O-RING
Replace.

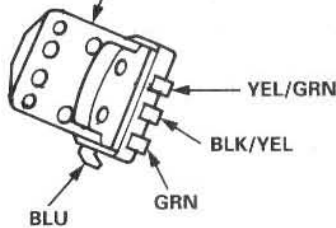


CYP SENSOR
Troubleshooting, section 11
Do not disassemble.



**DISTRIBUTOR
IGNITION (DI)
HOUSING**
Check for cracks
and damage.

**IGNITION CONTROL
MODULE (ICM)**
Troubleshooting, section 11
Input Test, page 4-19

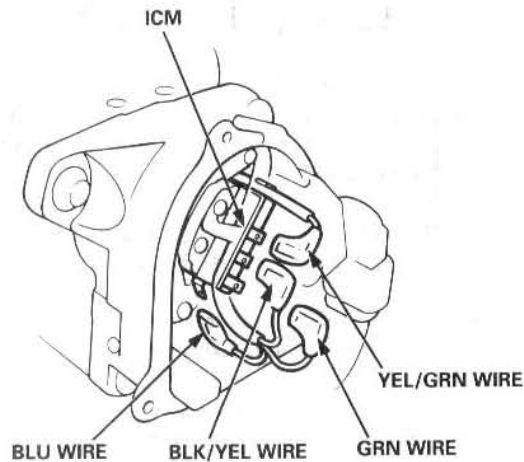


Ignition Control Module (ICM) Input Test

NOTE:

- See section 11 when the malfunction indicator lamp (MIL) comes on.
- Perform an input test for the ignition control module (ICM) after finishing the fundamental tests for the ignition system and the fuel and emissions systems.
- The tachometer should operate normally if the ICM is OK.

1. Remove the distributor ignition (DI) cap, the distributor ignition (DI) rotor, and the leak cover.
2. Disconnect the wires from the ICM.



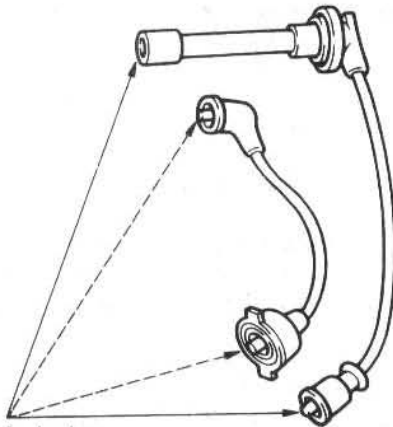
3. Turn the ignition switch ON (II). Check for voltage between the BLK/YEL wire and body ground. There should be battery voltage.
 - If there is no battery voltage, check the BLK/YEL wire between the ignition switch and the ICM.
 - If there is battery voltage, go to step 4.
4. Turn the ignition switch ON (II). Check for voltage between the GRN wire and body ground. There should be battery voltage.
 - If there is no battery voltage, check:
 - ignition coil.
 - GRN wire between the ICM and ignition coil.
 - If there is battery voltage, go to step 5.
5. Disconnect the A (32P) connector from the ECM, and check for continuity on the YEL/GRN wire between the ICM and ECM. There should be continuity.
6. Check for continuity on the YEL/GRN wire to body ground. There should be no continuity.
7. Reconnect the ECM A (32P) connector.
8. Disconnect the 16P connector from the gauge assembly, and check for continuity on the BLU wire between the ICM and tachometer. There should be continuity.
9. Check for continuity on the BLU wire to body ground. There should be no continuity.
10. If all the tests are normal, reconnect the 16P connector to the gauge, and replace the ICM.

Ignition System

Ignition Wire Inspection and Test

CAUTION: Carefully remove the ignition wires by pulling on the rubber boots. Do not bend the wires; you might break them inside.

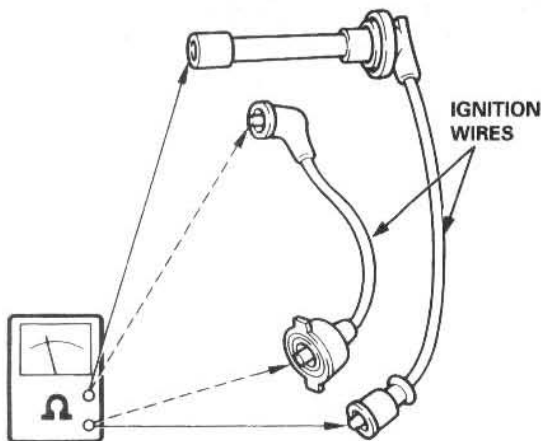
1. Check the condition of the wire terminals. If any terminal is corroded, clean it, and if it is broken or distorted, replace the wire.



Check for broken, corroded, or bent terminals.

2. Connect ohmmeter probes and measure resistance.

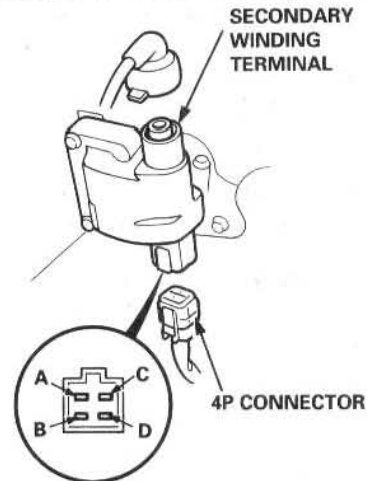
Ignition Wire Resistance:
25 k Ω max. at 68°F (20°C)



3. If resistance exceeds 25 k Ω , replace the ignition wire.

Ignition Coil Test

1. Turn the ignition switch OFF.
2. Disconnect the 4P connector and ignition coil wire.

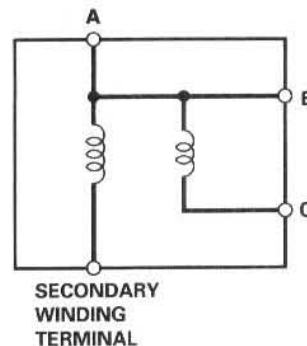


3. Using an ohmmeter, measure resistance between the terminals. Replace the coil if the resistance is not within specifications.

NOTE: Resistance will vary with the coil temperature; specifications are at 68°F (20°C)

Primary Winding Resistance
(Between the A and C terminals):
0.64 – 0.78 Ω

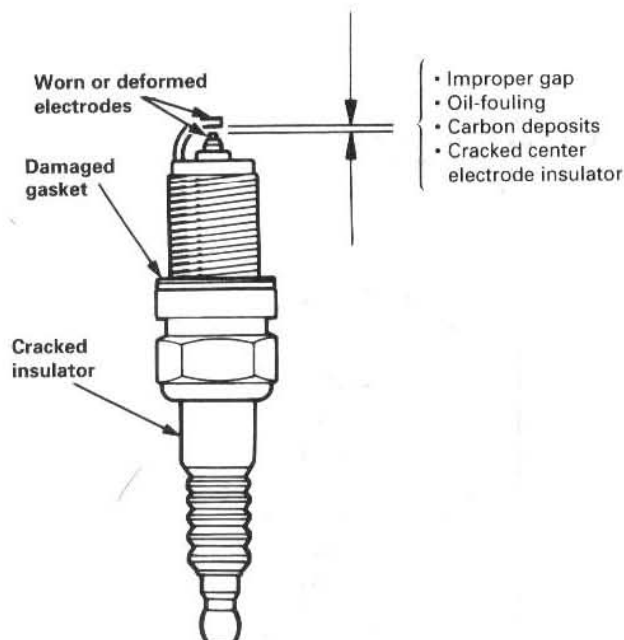
Secondary Winding Resistance
(Between the A and secondary winding terminals):
14.4 – 21.6 k Ω



4. Check for continuity between the A and B terminals. Replace the coil if there is no continuity.

Spark Plug Inspection

1. Inspect the electrodes and ceramic insulator for:



Burned or worn electrodes may be caused by:

- Advanced ignition timing
- Loose spark plug
- Plug heat range too hot
- Insufficient cooling

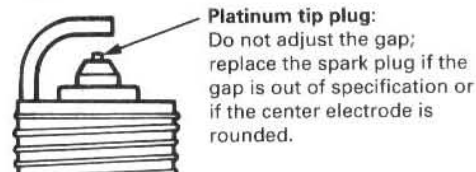
Fouled plug may be caused by:

- Retarded ignition timing
- Oil in combustion chamber
- Incorrect spark plug gap
- Plug heat range too cold
- Excessive idling/low speed running
- Clogged air cleaner element
- Deteriorated ignition coil or ignition wires

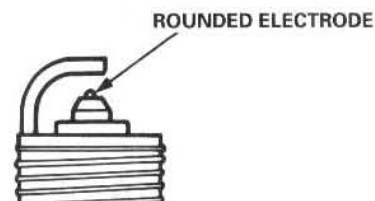
2. Do not adjust the gap of platinum tip plugs; replace the spark plug if the gap is out of specification or if the center electrode is rounded.

Electrode Gap:

Standard	1.1 $^{+0}_{-0.1}$ mm (0.043 $^{+0}_{-0.004}$ in)
Service Limit	1.3 mm (0.051 in)



3. Replace the plug at the specified interval, or if the center electrode is rounded as shown below:



NOTE: Use only the spark plugs listed below.

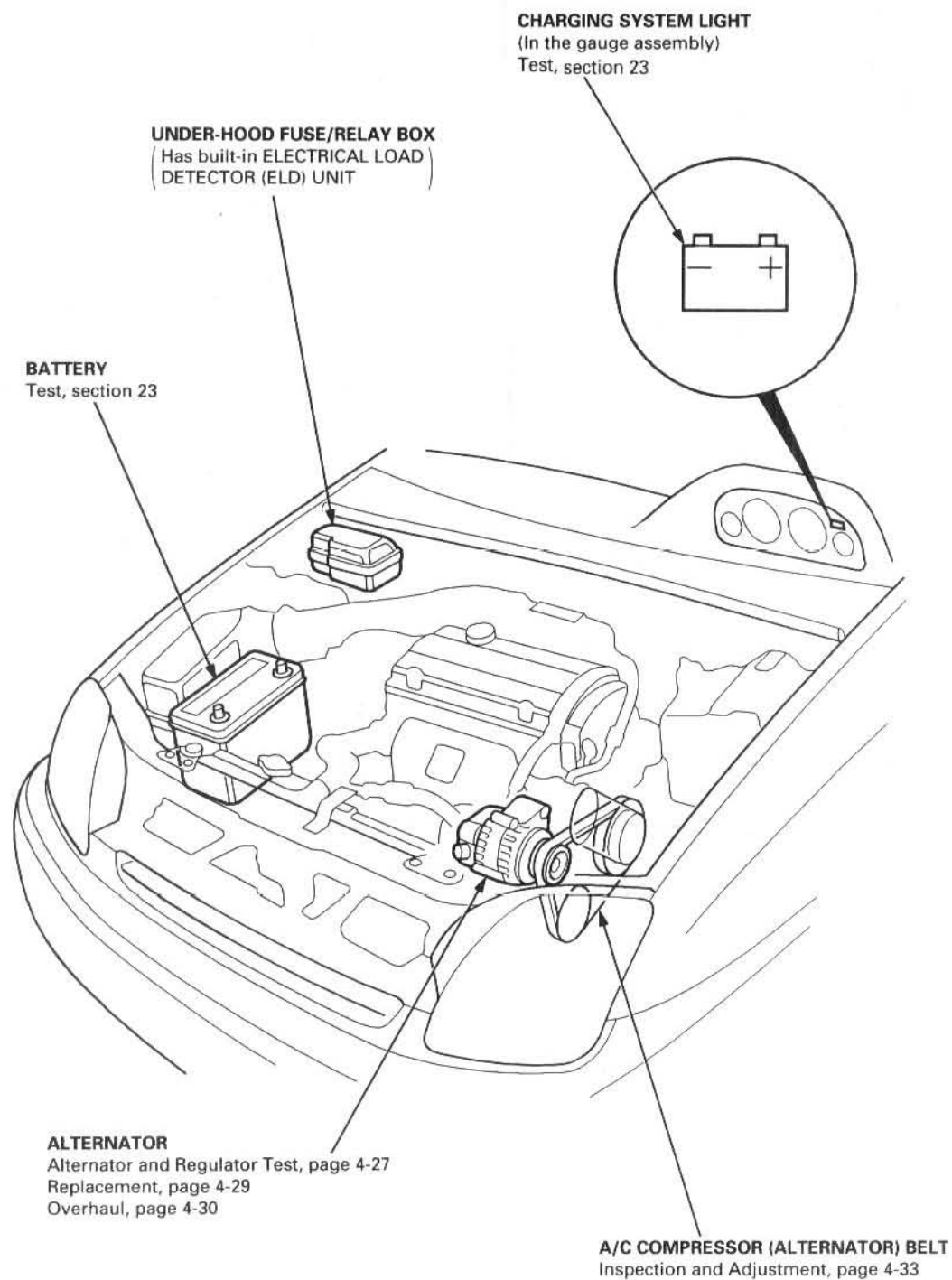
Spark Plugs

NGK	PZFR6F-11
DENSO	PKJ20CR-L11

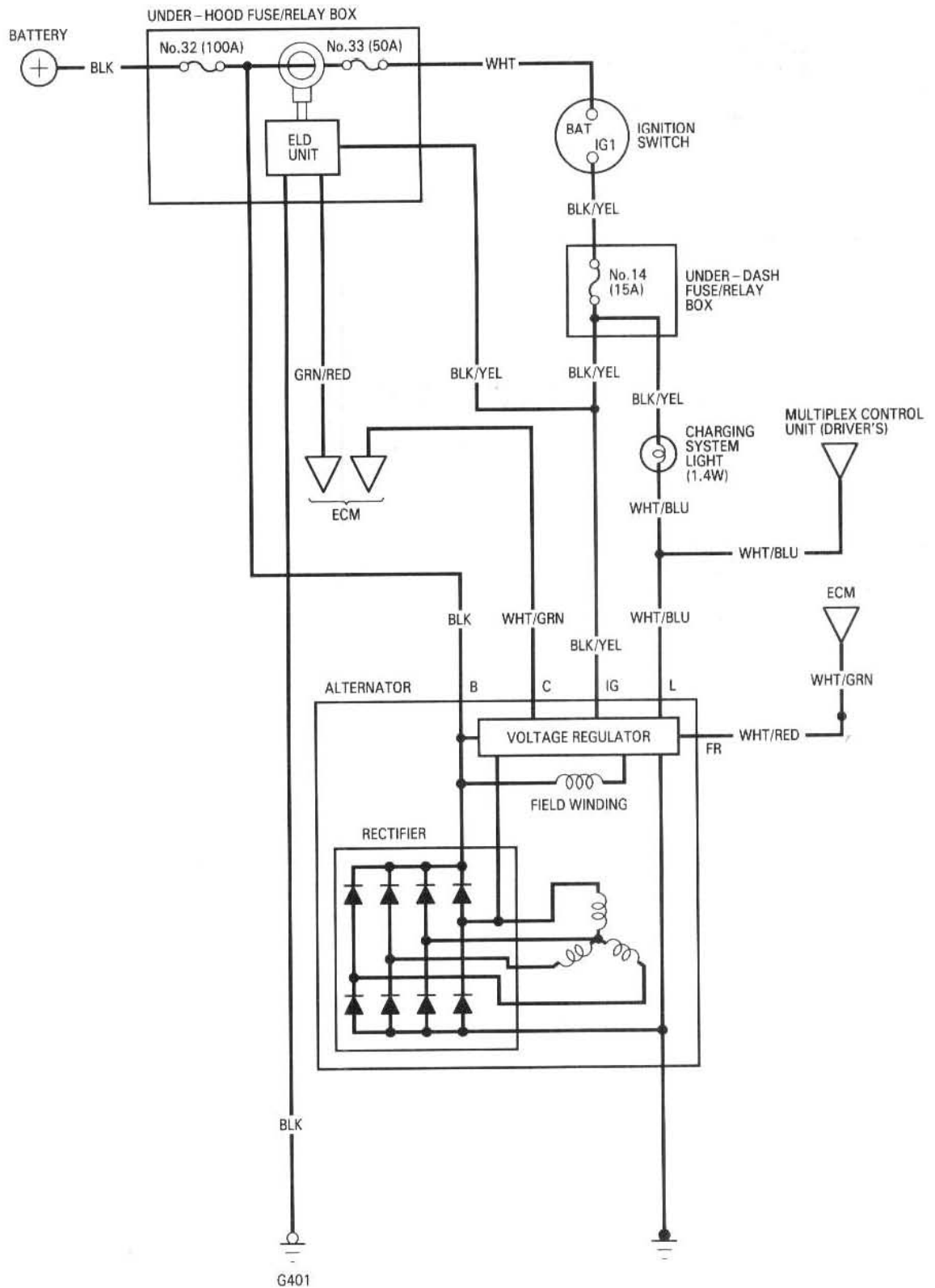
4. Apply a small quantity of anti-seize compound to the plug threads, and screw the plugs into the cylinder head finger-tight. Then torque them to 18 N·m (1.8 kgf·m, 13 lbf·ft).

Charging System

Component Location Index



Circuit Diagram



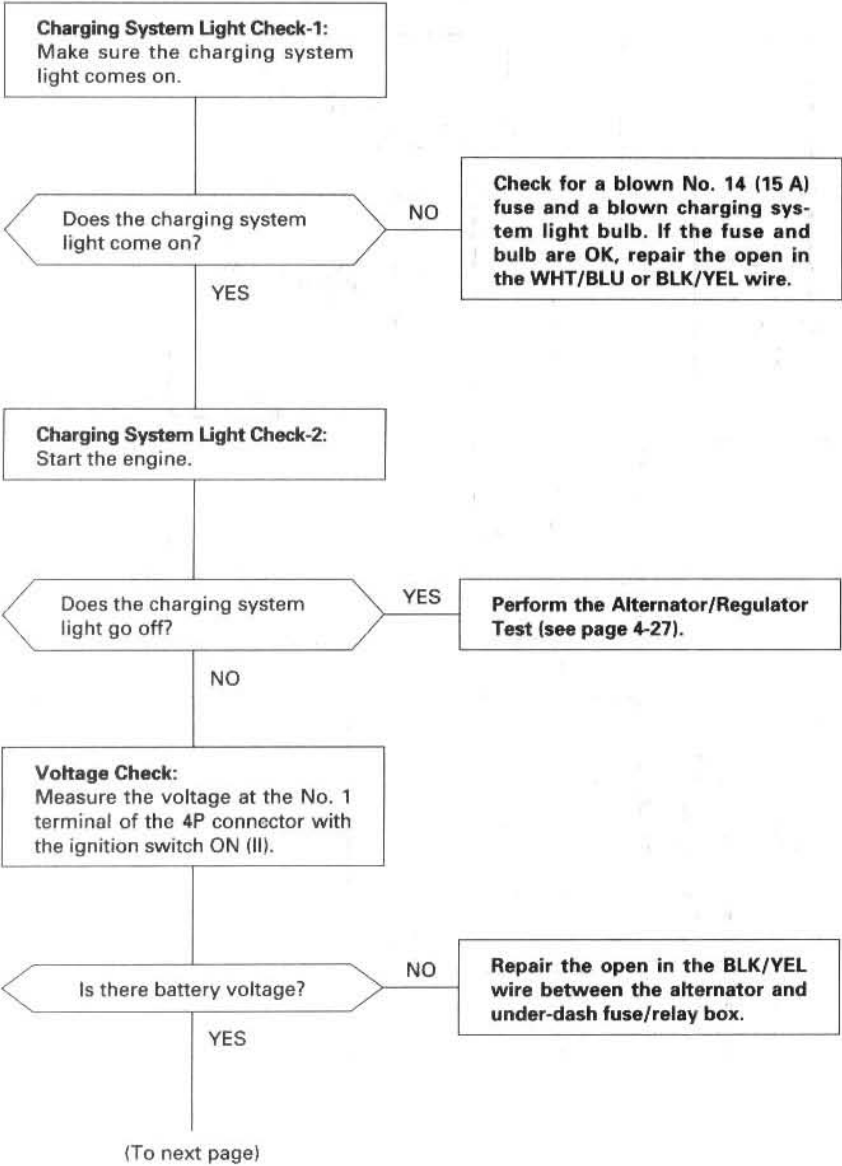
Charging System

Troubleshooting

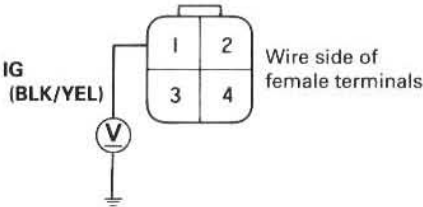
If the charging system light does not come on or does not go off, or the battery is dead or low, test the following items in the order listed below:

- 1. Battery (see section 23)
- 2. Charging system light
- 3. Voltage
- 4. Alternator control system
- 5. Alternator/regulator

Charging System Light Test



ALTERNATOR 4P CONNECTOR



(From previous page)

Check for an open in the L circuit-1:

1. Turn the ignition switch OFF.
2. Disconnect the 4P connector from the alternator.
3. Ground the No. 3 terminal of the 4P connector.
4. Turn the ignition switch ON (II).

Does the charging system light come on?

NO

Repair the open in the WHT/BLU wire.

YES

Check for a short in the L circuit-2:

Disconnect the No. 3 terminal of the 4P connector from the ground.

Does the charging system light go off?

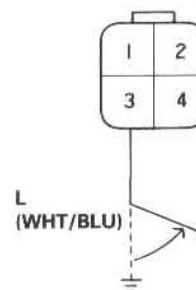
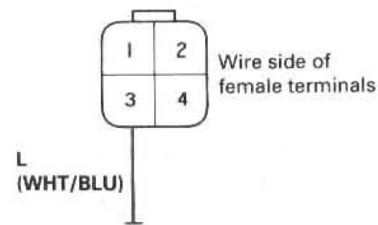
YES

Test and repair the alternator components.

NO

Repair the short to ground in the WHT/BLU wire.

ALTERNATOR 4P CONNECTOR



(cont'd)

Charging System

Troubleshooting (cont'd)

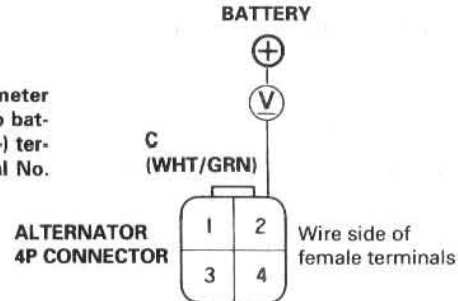
Alternator Control System Test

NOTE: Before testing, check proper operation of the ELD by confirming with the MIL (see section 11).

Check for a short in the circuit (ALTC line):

1. Disconnect the 4P connector from the alternator.
2. Start the engine, and turn the headlights (high beam) ON.
3. Measure voltage between the 4P connector terminal No. 2 and the positive terminal of the battery.

CAUTION: Be sure to use a voltmeter with its plus terminal connected to battery positive (+) and its negative (-) terminal to the 4P connector terminal No. 2.



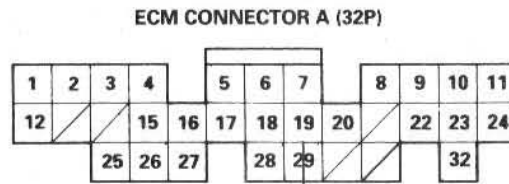
Is there 1 V or less?

YES

NO

Check for an open in the wire (ALTC line):

1. Turn the headlight and ignition switch OFF.
2. Disconnect the A (32P) connector from the ECM.
3. Check for continuity between the ECM connector A (32P) terminal No. 19 and alternator 4P connector terminal No. 2.



Wire side of female terminals

Wire side of female terminals

ECM CONNECTOR A (32P)

ALTC (WHT/GRN)

C (WHT/GRN)

ALTERNATOR 4P CONNECTOR

Is there continuity?

NO

YES

Test the alternator/regulator.

Repair open in the wire between the alternator and ECM.

Check for short in the wire (ALTC line):

1. Turn the headlight and ignition switch OFF.
2. Disconnect the A (32P) connector from the ECM.
3. Check for continuity between the ECM connector A (32P) terminal No. 19 and body ground.

Is there continuity?

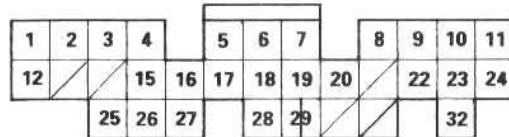
NO

YES

Repair short in the wire between the alternator and ECM.

Substitute a known-good ECM, and recheck. If prescribed voltage is now available, replace the original ECM.

ECM CONNECTOR A (32P)



ALTC (WHT/GRN)



Alternator/Regulator Test

NOTE: Be sure the battery is sufficiently charged (see section 23).

Alternator/Regulator Test-1:

1. Connect a Sun VAT-40 (or equivalent tester), and turn the selector switch to position 1 (starting).
2. Shift to neutral (A/T in **P** or **N**) position, and start the engine. Hold the engine at 3,000 rpm with no load until the radiator fan comes on, then let it idle.
3. Raise the engine speed to 2,000 rpm, and hold it there.

Is the voltage over 15.1 V?

NO

Alternator/Regulator Test-2 :

1. Release the accelerator pedal, and let the engine idle.
2. Make sure all accessories are turned off. Turn the selector switch to position 2 (charging).
3. Remove the inductive pick-up, and zero the ammeter.
4. Place the inductive pick-up over the B terminal wire of the alternator so that the arrow points away from the alternator.
5. Raise the engine speed to 2,000 rpm, and hold it there.

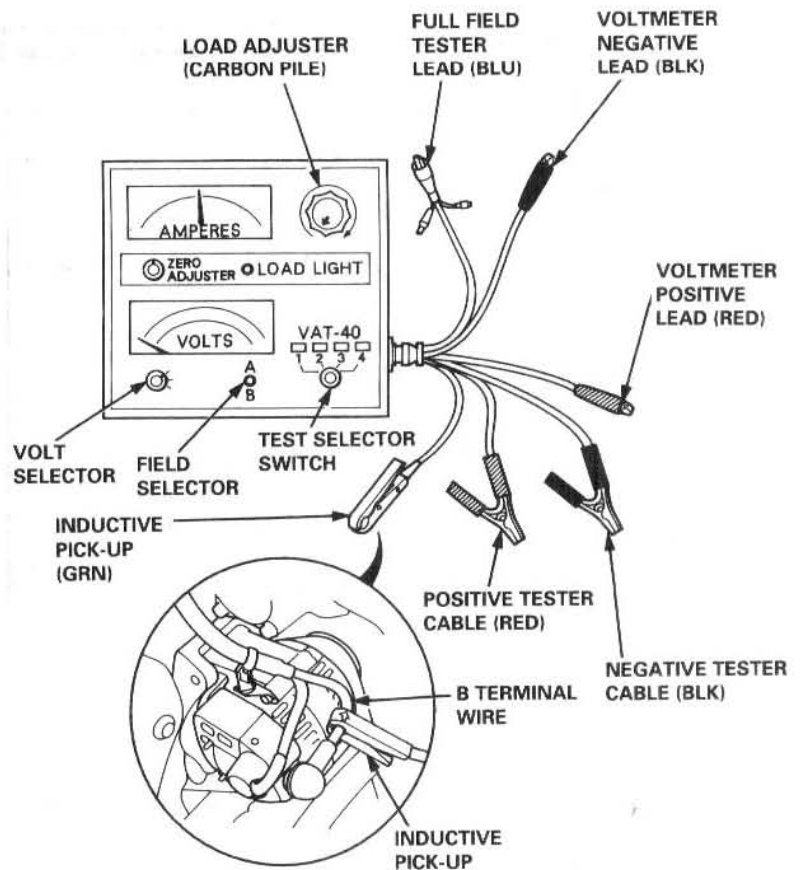
Is the voltage less than 13.5 V?

NO

Alternator/Regulator Test-3:

Apply a load with the VAT-40 until the battery voltage drops to between 12 – 13.5 V.

To next page



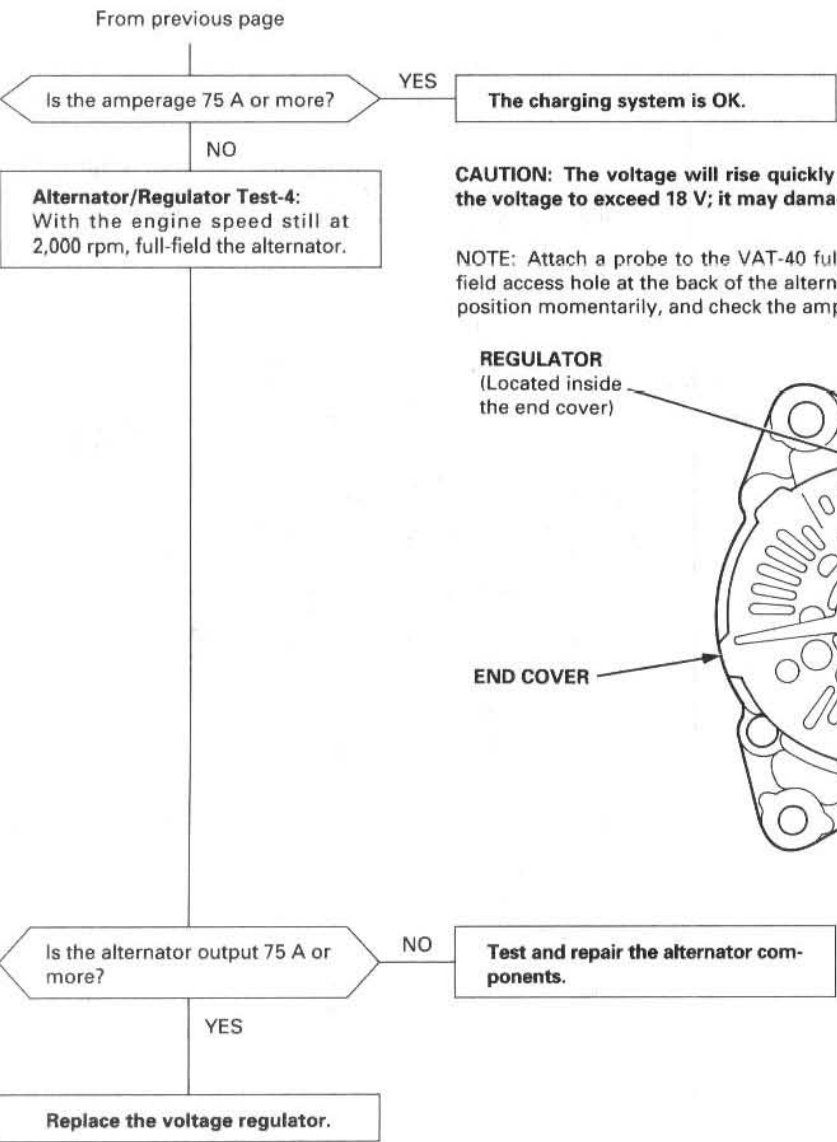
Replace the voltage regulator.

Test and repair the alternator components.

(cont'd)

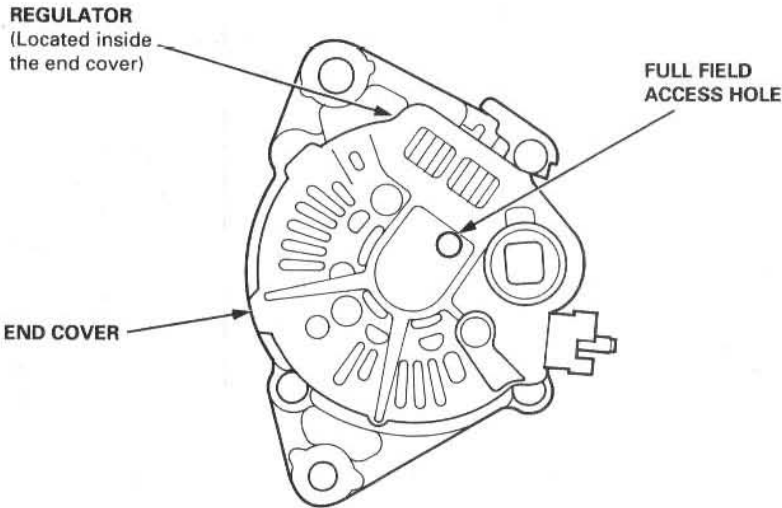
Charging System

Troubleshooting (cont'd)



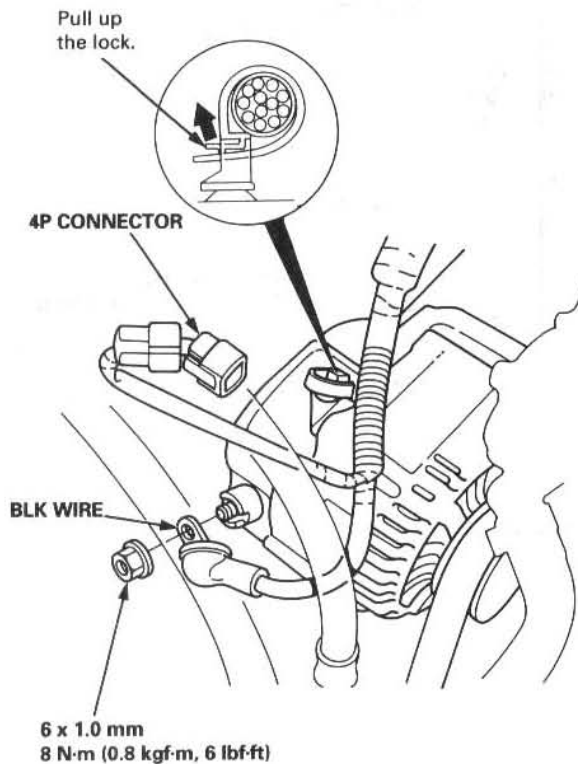
CAUTION: The voltage will rise quickly when the alternator is full-fielded. Do not allow the voltage to exceed 18 V; it may damage the electrical system.

NOTE: Attach a probe to the VAT-40 full field test lead, and insert the probe into the full field access hole at the back of the alternator. Switch the field selector to the "A (Ground)" position momentarily, and check the amperage reading.

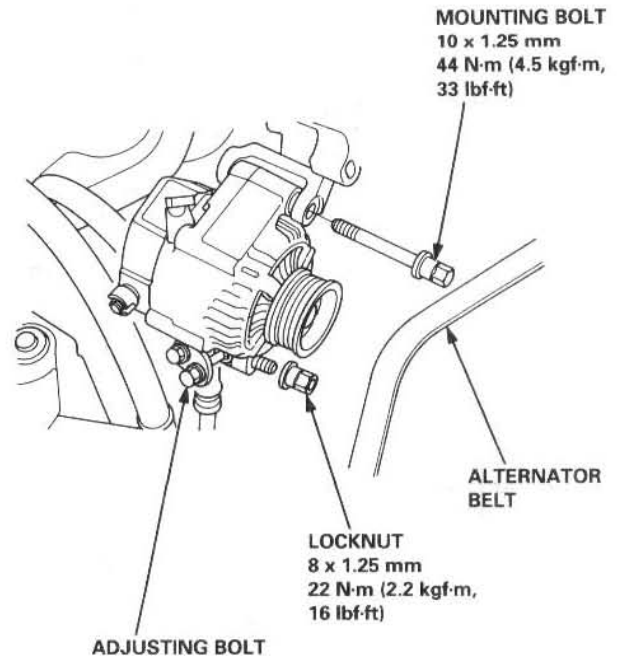


Alternator Replacement

1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's pre-set buttons.
2. Disconnect the battery cable, then disconnect the positive cable.
3. Disconnect the 4P connector and BLK wire from the alternator.



4. Remove the adjusting bolt, locknut and mounting bolt, then remove the alternator belt and alternator.



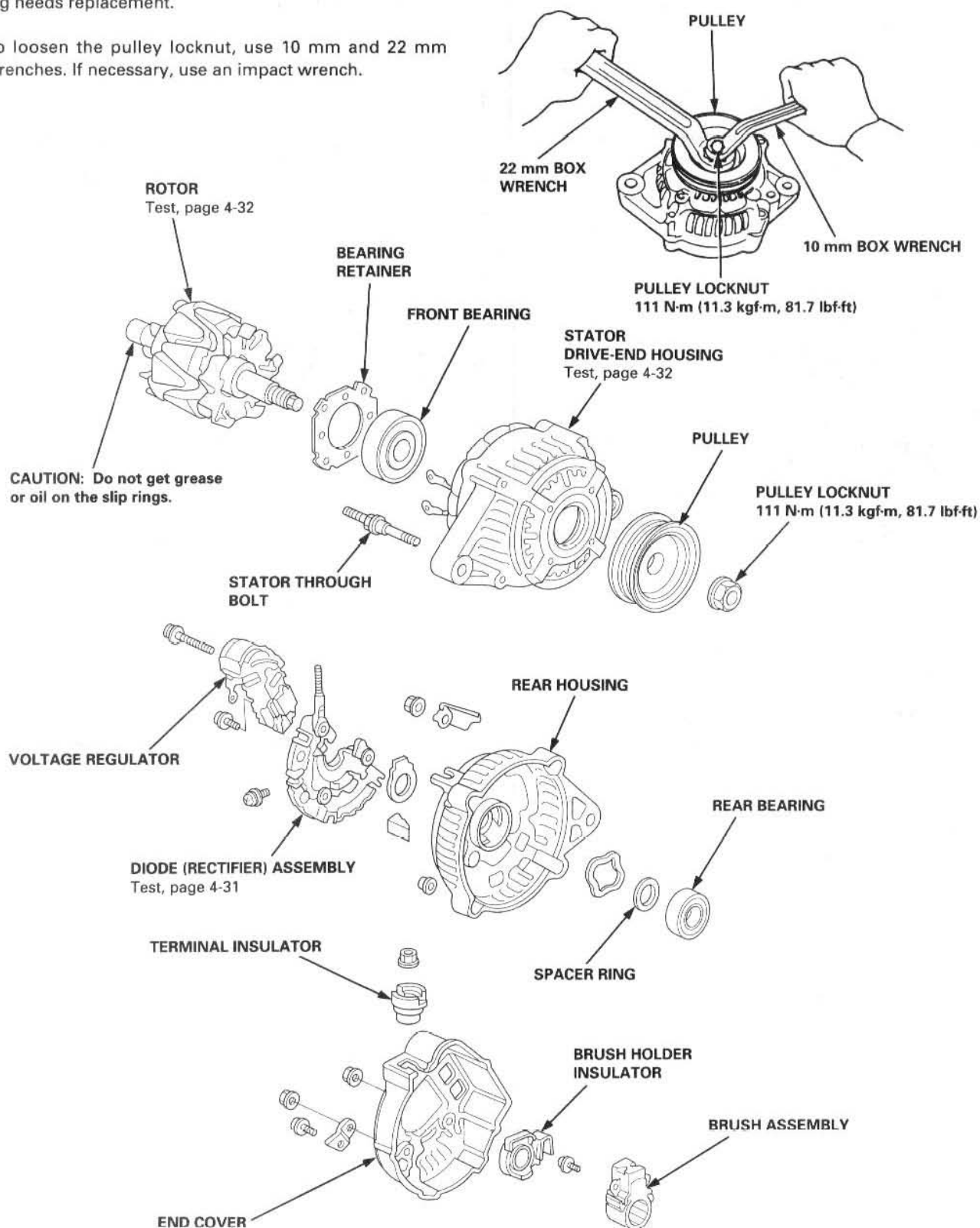
5. Install in the reverse order of removal.
6. Adjust the alternator belt tension (see page 4-33).
7. Enter the anti-theft code for the radio, then enter the customer's radio station presets.

Charging System

Alternator Overhaul

NOTE: Do not remove the pulley unless the front bearing needs replacement.

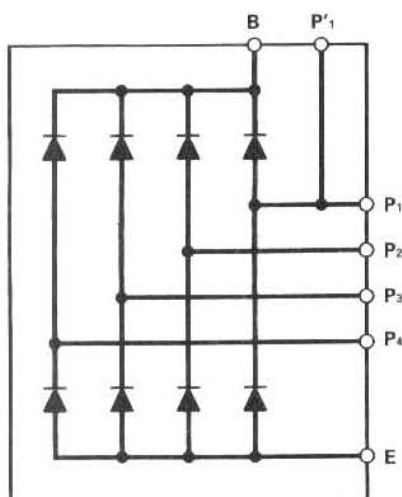
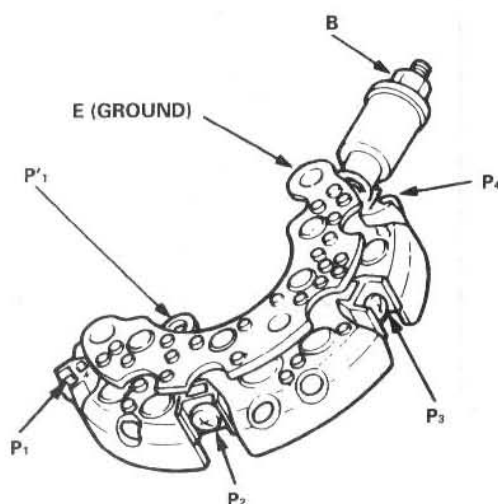
To loosen the pulley locknut, use 10 mm and 22 mm wrenches. If necessary, use an impact wrench.



Rectifier Test

NOTE: The diodes are designed to allow current to pass in one direction while blocking it in the opposite direction. Since the alternator rectifier is made up of eight diodes (four pairs), each diode must be tested for continuity in both directions with an ohmmeter that has diode checking capability; a total of 16 checks.

1. Check for continuity in each direction, between the B and P, and between the E (ground) and P terminals of each diode pair. All diodes should have continuity in only one direction.



2. If any of the eight diodes fail, replace the rectifier assembly. (Diodes are not available separately.)

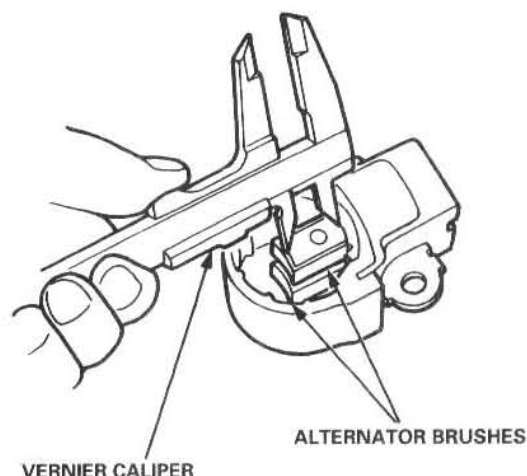
Alternator Brush Inspection

1. Remove the end cover, then take out the brush holder by removing its two screws.
2. Measure the length of the brushes with a vernier caliper.

Alternator Brush Length:

Standard: 10.5 mm (0.41 in)

Service Limit: 1.5 mm (0.06 in)

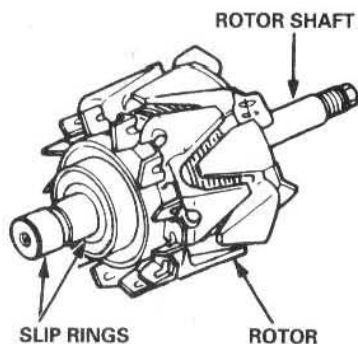


If the brushes are less than the service limit, replace the alternator brush assembly.

Charging System

Rotor Slip Ring Test

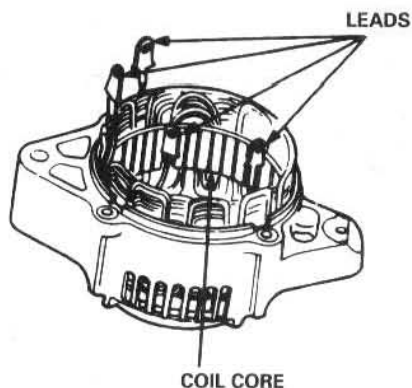
1. Check that there is continuity between the slip rings.



2. Check that there is no continuity between the slip rings and the rotor or rotor shaft.
3. If the rotor fails either continuity check, replace the alternator.

Stator Test

1. Check that there is continuity between each pair of leads.



2. Check that there is no continuity between each lead and the coil core.
3. If the coil fails either continuity check, replace the alternator.

A/C Compressor (Alternator) Belt Inspection and Adjustment

NOTE: When using a new belt, first adjust the deflection or tension to the values for the new belt, then readjust the deflection or tension to the values for the used belt after running the engine for five minutes.

Deflection method:

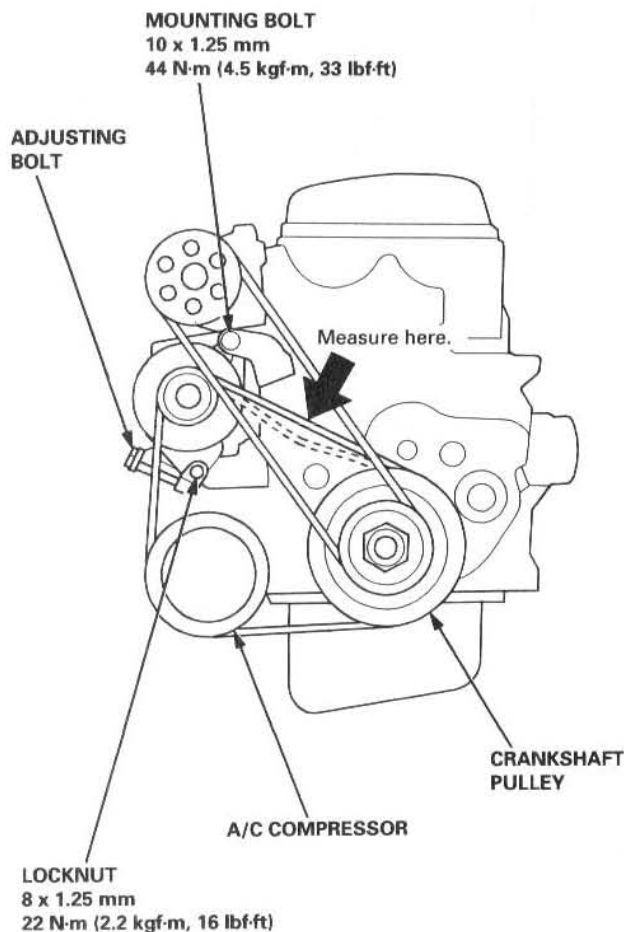
Apply a force of 98 N (10 kgf, 22 lbf), and measure the deflection between the alternator and the crankshaft pulley.

Deflection:

Used Belt: 9.5 – 12.5 mm (0.37 – 0.49 in)

New Belt: 5.5 – 7.5 mm (0.22 – 0.30 in)

NOTE: If the belt is worn or damaged, replace it.



Belt tension gauge method:

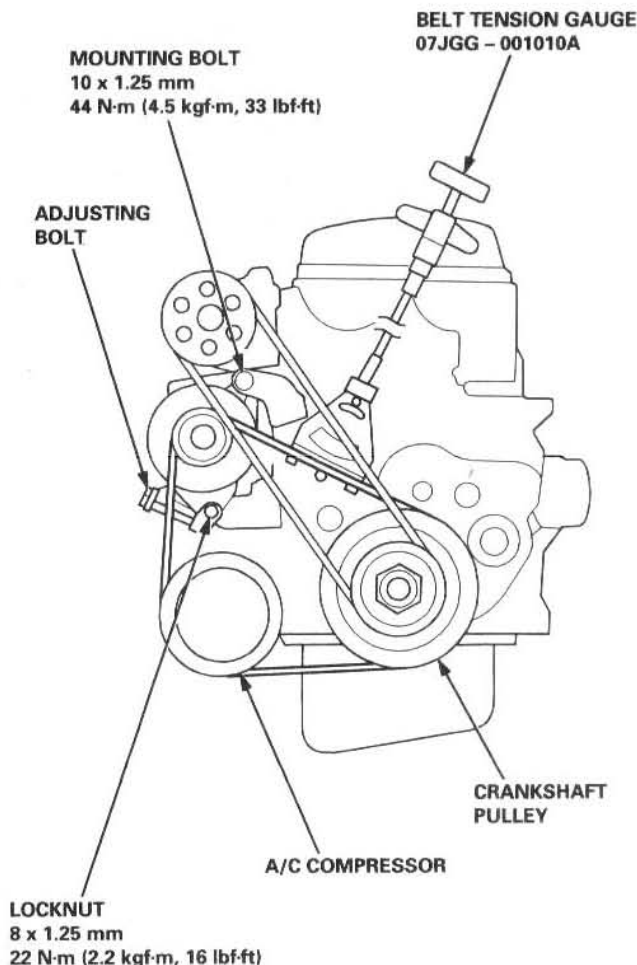
1. Attach the belt tension gauge to the belt and measure the tension. Follow the gauge manufacturer's instructions.

Tension:

Used Belt: 390 – 540 N (40 – 55 kgf, 88 – 120 lbf)

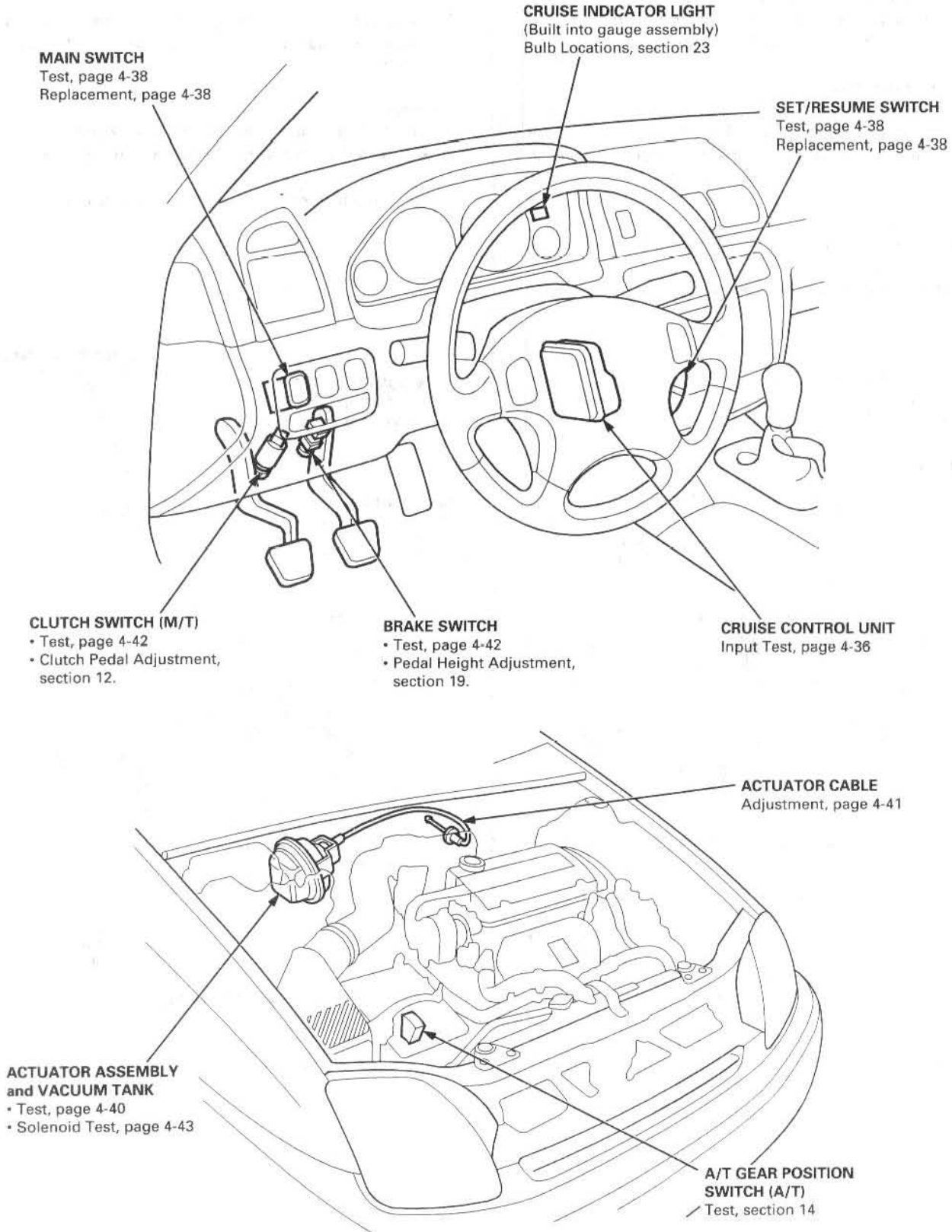
New Belt: 980 – 1,030 N (90 – 105 kgf, 200 – 231 lbf)

NOTE: If the belt is worn or damaged, replace it.



Cruise Control

Component Location Index



Cruise Control

Control Unit Input Test

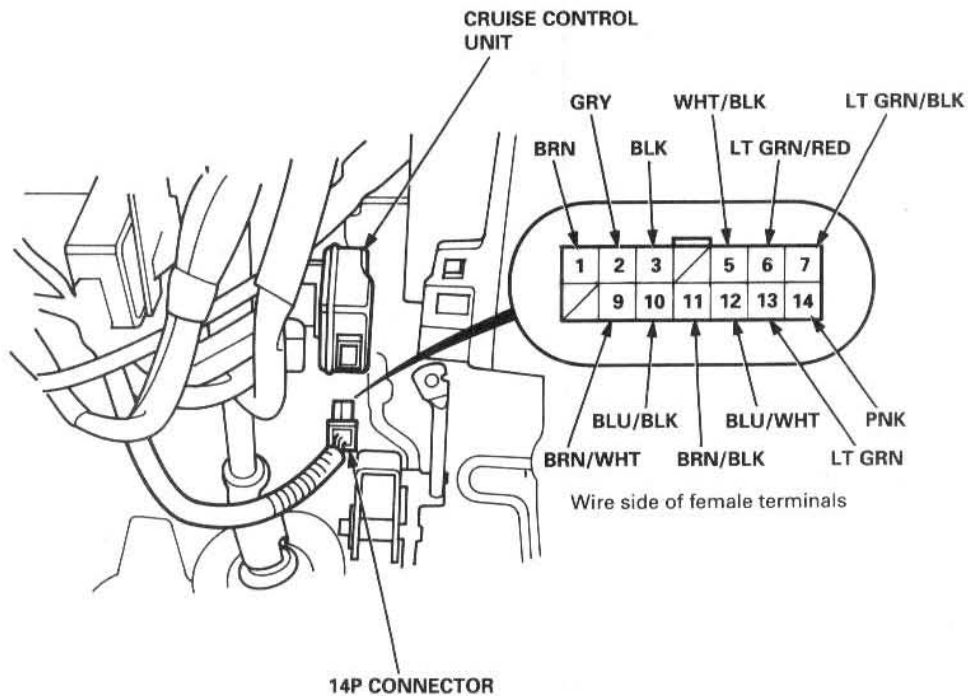
SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

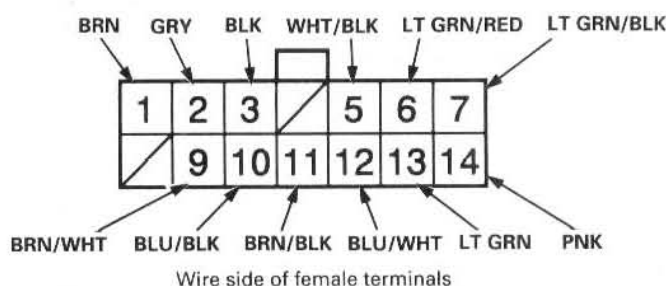
1. Remove the driver's dashboard lower cover (see section 20).
2. Disconnect the 14P connector from the control unit.
3. Inspect the connector and socket terminals to be sure they are all making good contact.

If the terminals are bent, loose, or corroded, repair them as necessary, and recheck the system.

If the terminals look OK, make the following input tests at the connector.

- If any test indicates a problem, find and correct the cause, then recheck the system.
- If all the input tests prove OK, the control unit must be faulty; replace it.



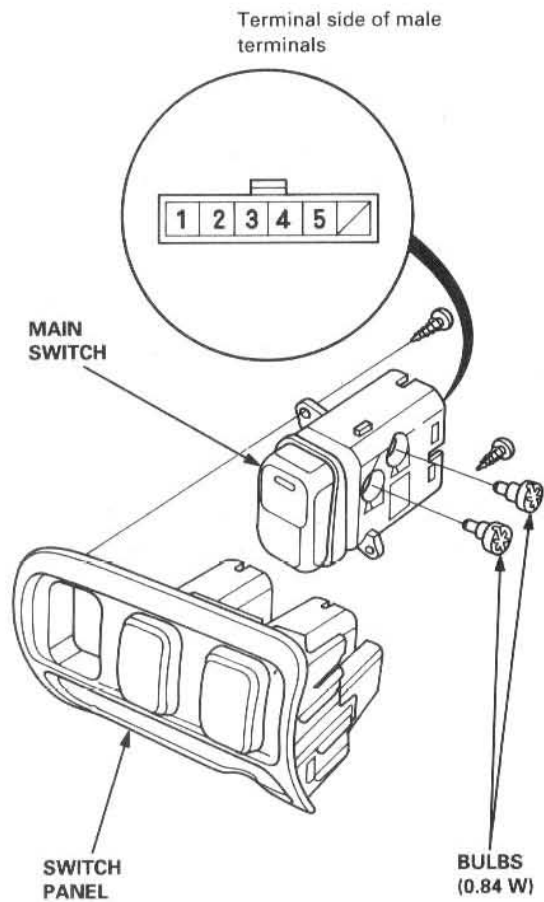


Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
9	BRN/WHT	Under all conditions	Check for resistance to ground: There should be 80 – 120 Ω .	<ul style="list-style-type: none"> Faulty actuator solenoid Poor ground (G471) An open in the wire
1	BRN	Under all conditions	Check for resistance to ground: There should be 40 – 60 Ω .	
11	BRN/BLK	Under all conditions	Check for resistance to ground: There should be 70 – 110 Ω .	
2	GRY	Ignition switch ON (II), main switch ON and brake pedal depressed, then released	Check for voltage to ground: There should be 0 V with the pedal depressed and battery voltage with the pedal released.	<ul style="list-style-type: none"> Faulty brake switch An open in the wire
3	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	<ul style="list-style-type: none"> Poor ground (G401, G402) An open in the wire
5	WHT/BLK	Brake pedal depressed, then released	Check for voltage to ground: There should be battery voltage with the pedal depressed, and 0 V with the pedal released.	<ul style="list-style-type: none"> Blown No. 41 (15 A) fuse in the under-hood fuse/relay box Faulty brake switch An open in the wire
6	LT GRN/ RED	Set button pushed	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> Blown No. 41 (15 A) fuse in the under-hood fuse/relay box Faulty horn relay Faulty set/resume switch Faulty cable reel An open in the wire
7	LT GRN/ BLK	Resume button pushed		
10	BLU/BLK	Ignition switch ON (II)	Attach to ground: Cruise indicator light in the gauge assembly should come on.	<ul style="list-style-type: none"> Blown bulb Blown No. 13 (15 A) fuse in the under-dash fuse/relay box Faulty dimming circuit in the gauge assembly An open in the wire
12	BLU/WHT	Ignition switch ON (II) and main switch ON; raise the front of the vehicle, and rotate one wheel slowly while holding the other wheel.	Check for voltage between the BLU/WHT \oplus and BLK \ominus terminals: There should be 0 – 5 V or more –0 – 5 V or more repeatedly.	<ul style="list-style-type: none"> Faulty vehicle speed sensor (VSS) An open in the wire
13	LT GRN	Ignition switch ON (II) and main switch ON	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> Blown No. 13 (15 A) fuse in the under-dash fuse/relay box Faulty main switch An open in the wire
14	PNK	A/T: Shift lever in 2 , D₃ or D₄ M/T: Clutch pedal released	Check for continuity to ground: There should be continuity. NOTE: There should be no conti- nuity when the clutch pedal is depressed or when the shift lever is in other positions.	<ul style="list-style-type: none"> Faulty A/T gear position switch Faulty or misadjusted clutch switch (M/T) Poor ground (G401, G402) An open in the wire

Cruise Control

Main Switch Test/Replacement

- 1. Carefully pry the switch panel out of the instrument panel.
- 2. Disconnect the 6P connector from the switch.



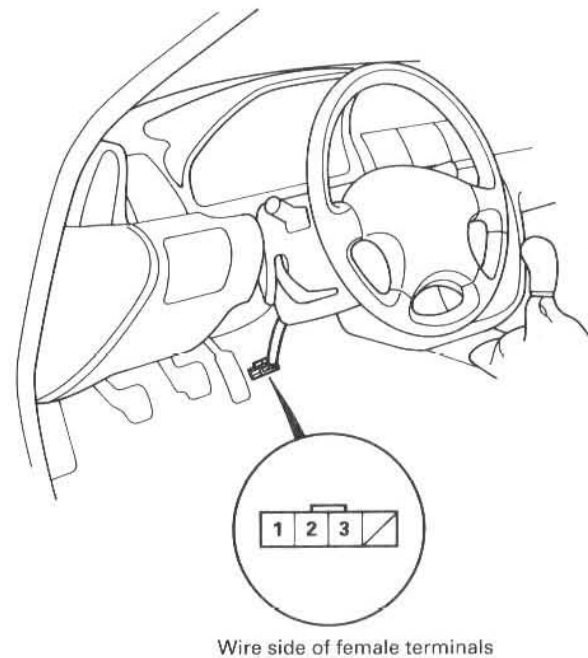
- 3. Check for continuity between the terminals in each switch position according to the table.

Terminal	1	2	4	3	5
Position					
OFF	○	⊗	○	○	⊗
ON	○	⊗	○	○	⊗

If there is no continuity, replace the switch as shown.

Set/Resume Switch Test/Replacement

- 1. Disconnect the battery negative cable, then disconnect the positive cable, and wait at least three minutes.
- 2. Disconnect the driver's airbag and front passenger's airbag connectors (see section 24).
- 3. Remove the dashboard lower cover.
- 4. Disconnect the 4P connector between the combination switch harness and main wire harness.

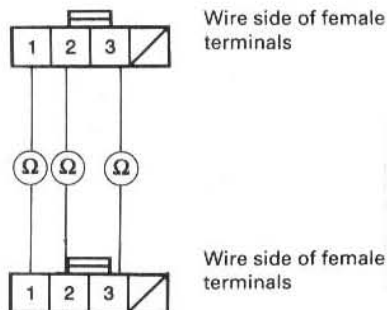


- 5. Check for continuity between the terminals of the 4P connector in each switch position according to the table.

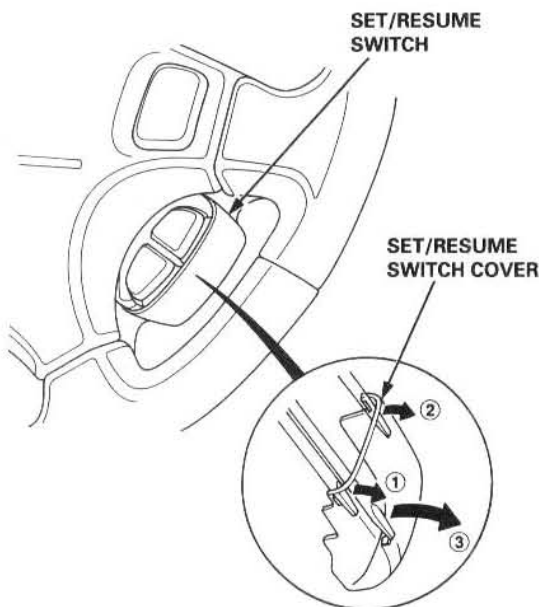
Terminal	1	2	3
Position			
SET (ON)		○	○
RESUME (ON)	○		○

- If there is continuity, and it matches the table, the switch is OK.
- If there is no continuity in one or both positions, go to step 6.

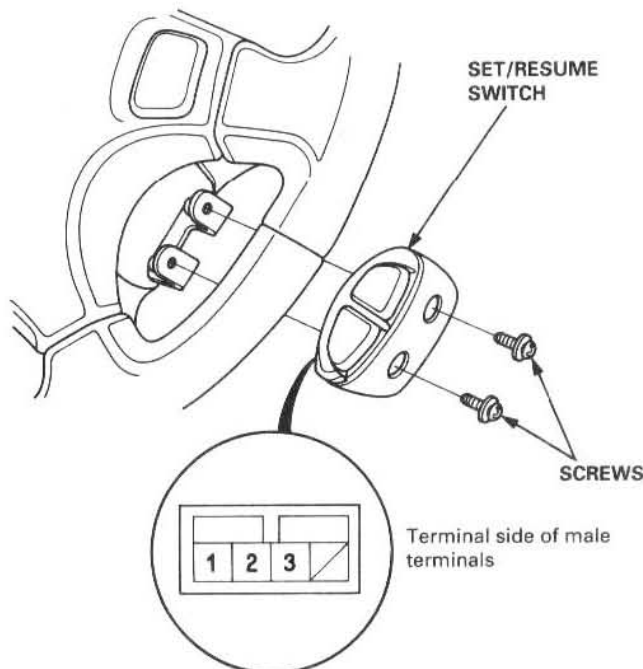
6. Remove the steering column covers.
7. Disconnect the combination switch harness 4P connector from the cable reel.
8. Check for continuity between the terminals as shown:



- If there is no continuity, replace the combination switch harness.
 - If there is continuity, go to step 9.
9. Carefully remove the set/resume switch cover by prying between the cover and the switch in the sequence shown.



10. Remove the two screws, then remove the switch.



11. Check for continuity between the terminals in switch position according to the table.

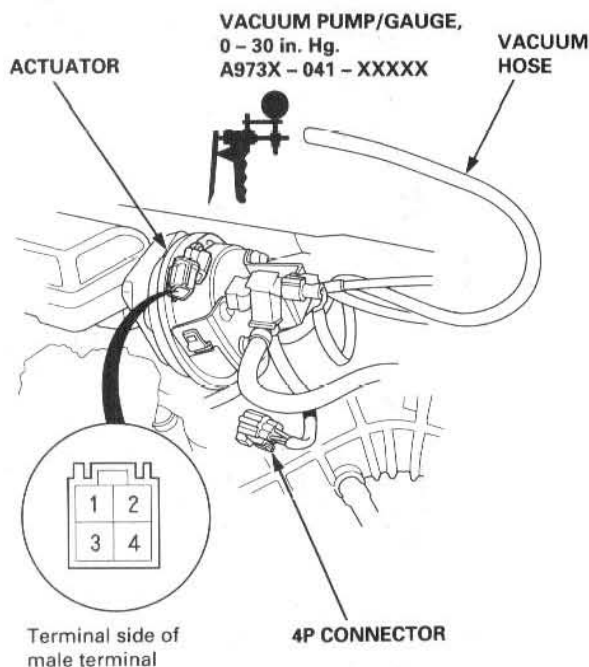
Terminal	1	2	3
Position			
SET (ON)	○		○
RESUME (ON)	○	○	

- If there is continuity, and it matches the table, replace the cable reel.
 - If there is no continuity in one or both positions, replace the switch.
12. If all tests prove OK, reconnect the cable reel and combination switch harness connector, then reinstall the steering column covers.
 13. Reconnect the driver's airbag and front passenger's airbag connectors, and reinstall the access panel on the steering wheel.
 14. Reconnect the battery positive cable, then the negative cable.
 15. After connecting the airbag connectors, confirm proper system operation: Turn the ignition switch ON (II); the SRS indicator light should come on for about six seconds and then go off.

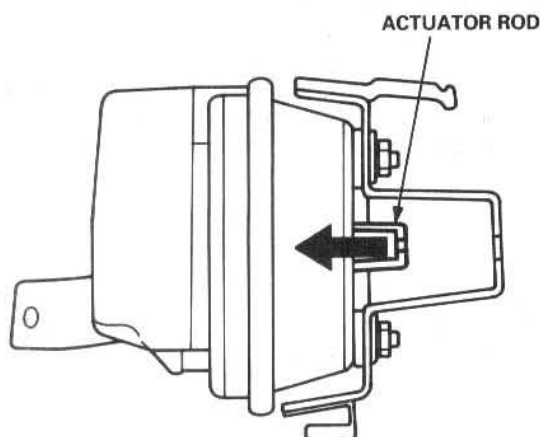
Cruise Control

Actuator Test

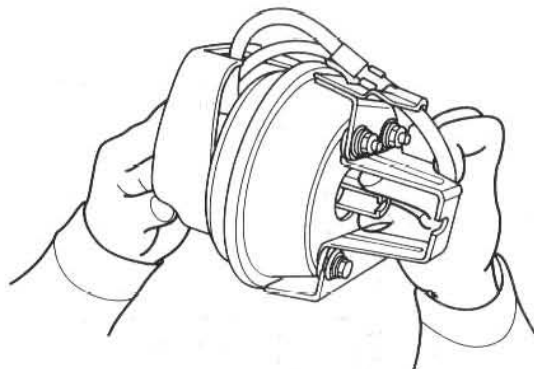
1. Disconnect the actuator cable from the actuator rod and the 4P connector.



2. Connect battery power to the No. 4 terminal and ground to the No. 1, No. 2 and No. 3 terminals.
3. Connect a vacuum pump to the vacuum hose. Then apply vacuum to the actuator.
4. The actuator rod should pull in completely. If the rod pulls in only part-way or not at all, check for a leaking vacuum line or defective solenoid.



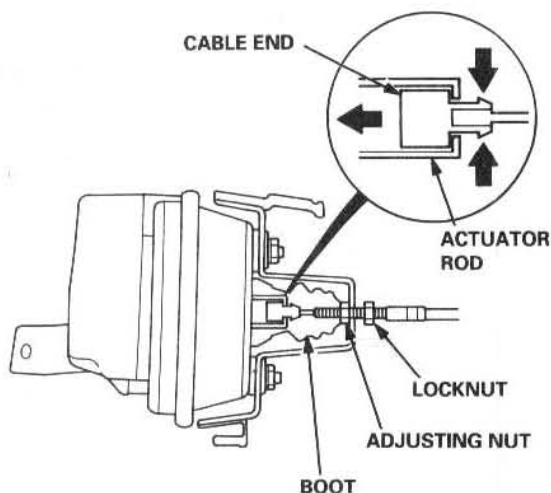
5. With voltage and vacuum still applied, try to pull the actuator rod out by hand. You should not be able to pull it out. If you can, it is defective.



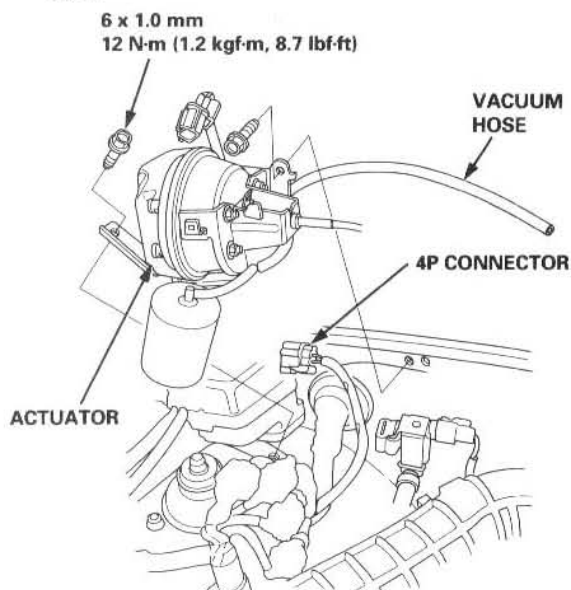
6. Disconnect ground from the No. 3 terminal. The actuator rod should return. If it does not return, and the vent hose and filter are not plugged, the solenoid valve assembly is defective.
7. Repeat steps 2 through 5, and disconnect ground from the No. 1 terminal. The actuator rod should return. If it does not return, and the vent hose and filter are not plugged, the solenoid valve assembly is defective.
8. If you replace the solenoid valve assembly, be sure to use new O-rings on each solenoid.
9. Disconnect power and ground from the 4P connector. Disconnect the vent hose from the actuator. Connect a vacuum pump to the actuator vent hose port, and apply vacuum. The actuator rod should pull in completely. If not, the vacuum valve is stuck open. Replace the actuator.

Actuator Replacement

1. Pull back the boot, and loosen the locknut. Then disconnect the cable from the bracket.



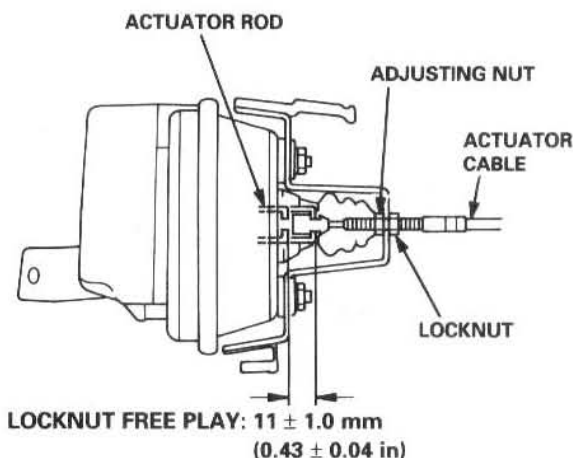
2. Disconnect the cable end from the actuator rod.
3. Disconnect the 4P connector from the actuator.
4. Disconnect the vacuum hose, then remove the actuator.



5. If necessary, disconnect the cable end from the linkage over the accelerator pedal, then turn the grommet 90° in the head bulk, and remove the cable.
6. Install in the reverse order of removal, and adjust free play at the actuator rod after connecting the cable (see next column).

Actuator Cable Adjustment

1. Check that the actuator cable operates smoothly with no binding or sticking.
2. Start the engine. Hold the engine at 3,000 rpm with no load (A/T in **N** or **P**, M/T in neutral) until the radiator fan comes on, then let it idle.
3. Measure the amount of movement of the actuator rod until the cable pulls on the accelerator lever (engine speed starts to increase). Free play should be 11 ± 1.0 mm (0.43 ± 0.04 in).



4. If free play is not within specs, loosen the locknut, and turn the adjusting nut as required.



NOTE: If necessary, check the throttle cable free play (see section 11), then recheck the actuator rod free play.

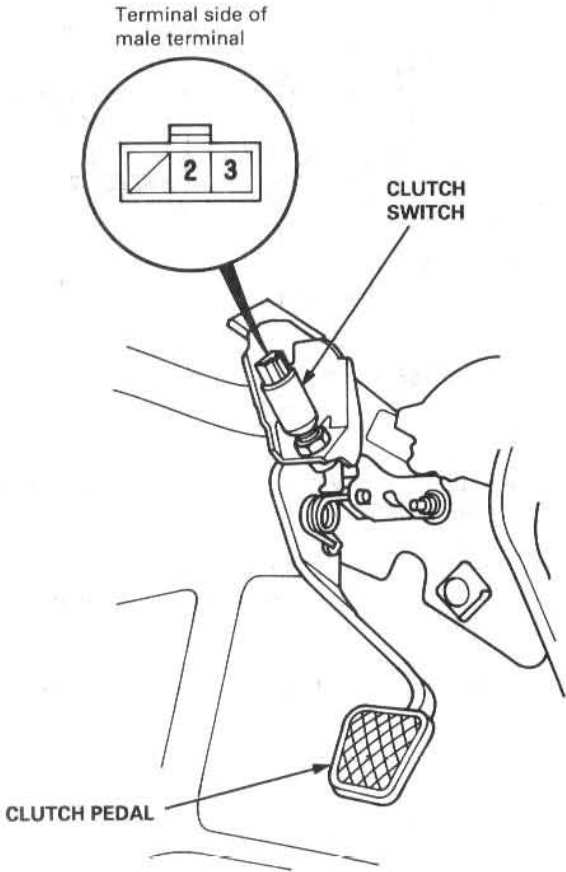
5. Retighten the locknut, and recheck the free play.

Cruise Control

Clutch Switch Test

- 1. Disconnect the 3P connector from the clutch switch.
- 2. Remove the clutch switch.
- 3. Check for continuity between the terminals according to the table.

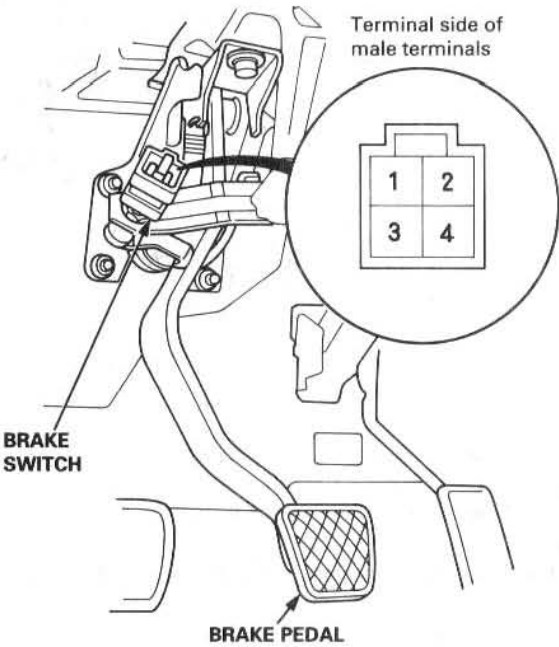
Terminal	2	3
Clutch Switch		
RELEASED		
PUSHED		







- 4. If necessary, replace the switch or adjust pedal height (see section 12).

Brake Switch Test

- 1. Disconnect the 4P connector from the switch.
- 2. Remove the brake switch.



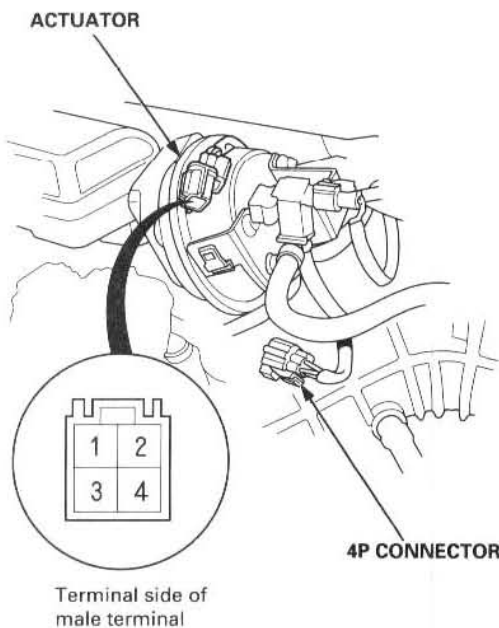
- 3. Check for continuity between the terminals according to the table.

Terminal	1	2	3	4
Brake Switch				
RELEASED				
PUSHED				

- 4. If necessary, replace the switch or adjust pedal height (see section 19).

Actuator Solenoid Test

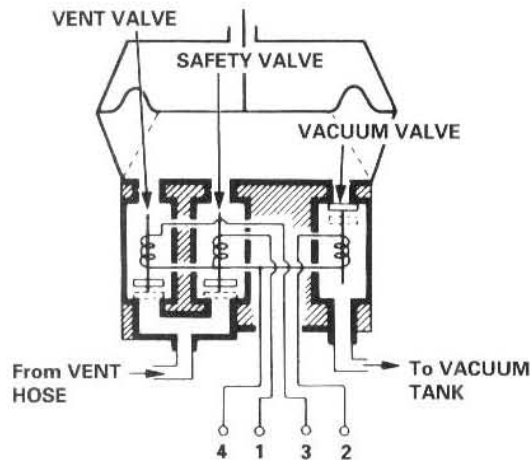
1. Disconnect the 4P connector from the actuator.



2. Check for resistance between the terminals according to the table.

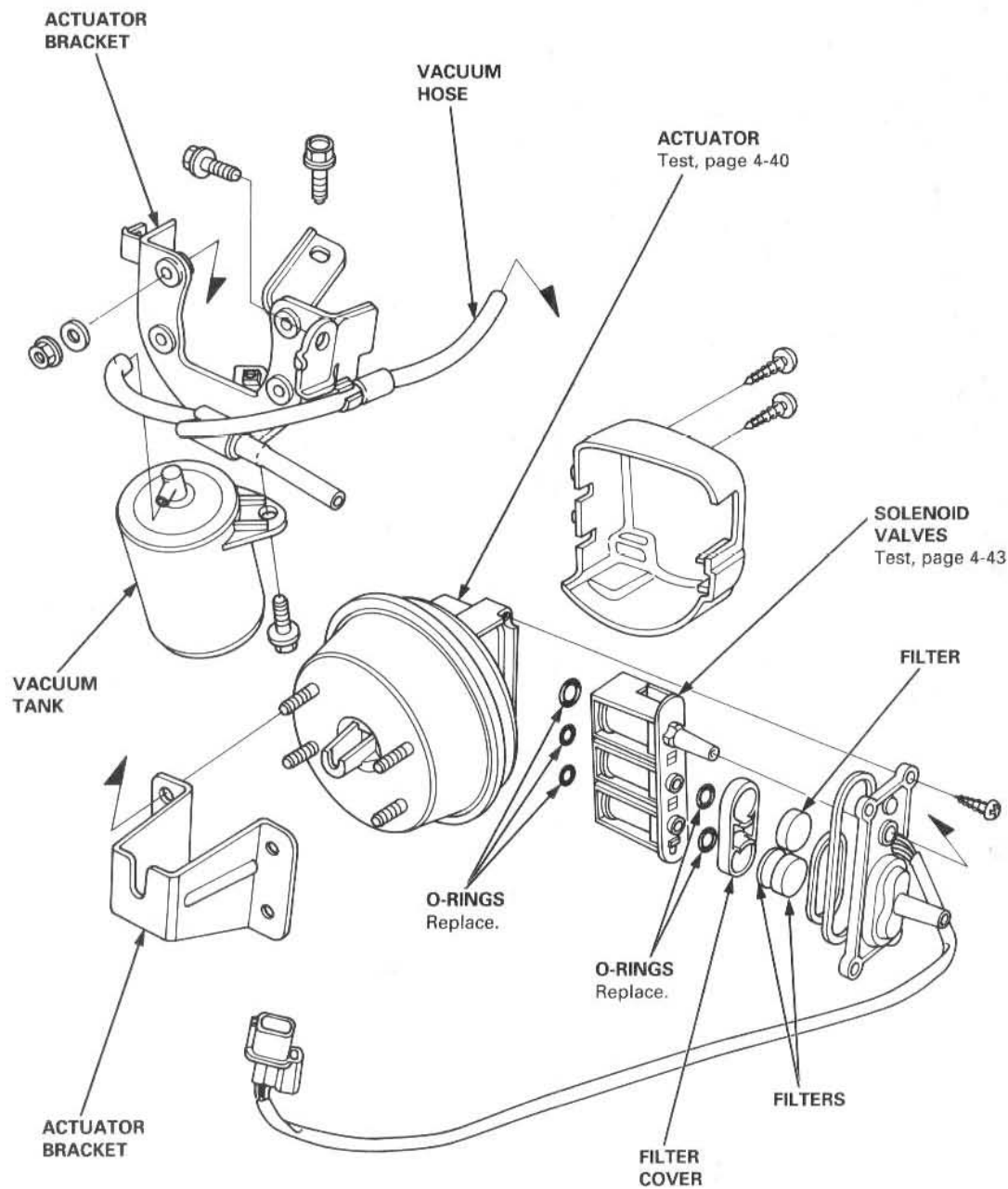
Terminal	1	2	3	4
Resistance (Ω)				
VENT SOLENOID 40 – 60 Ω			○ — ○	
VACUUM SOLENOID 30 – 50 Ω		○ — ○		○ — ○
SAFETY SOLENOID 40 – 60 Ω	○ — ○			○ — ○

NOTE: Resistance will vary slightly with temperature; specified resistance is at 68°F (20°C).



Cruise Control

Actuator Disassembly



Engine

Engine Removal/Installation	5-1
Cylinder Head/Valve Train	6-1
Engine Block	7-1
Engine Lubrication	8-1
Intake Manifold/Exhaust System	9-1
Cooling	10-1



[Click here to go back to
the Introduction page](#)

Engine Removal/Installation

Engine Removal/Installation

Removal	5-2
Installation	5-10



Engine Removal/Installation

Removal

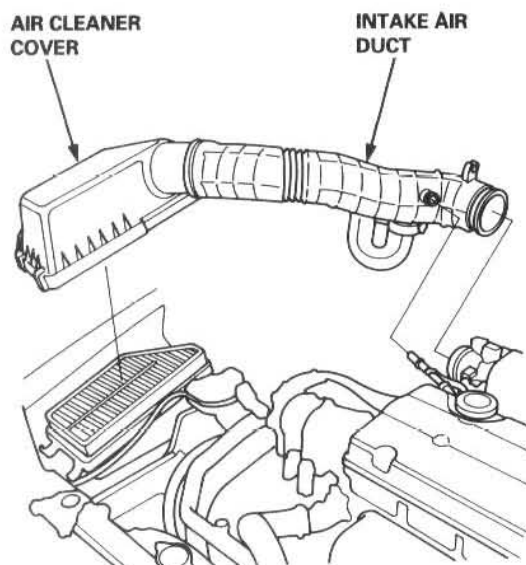
⚠ WARNING

- Make sure jacks and safety stands are placed properly and hoist brackets are attached to the correct positions on the engine.
- Make sure the vehicle will not roll off stands and fall while you are working under it.

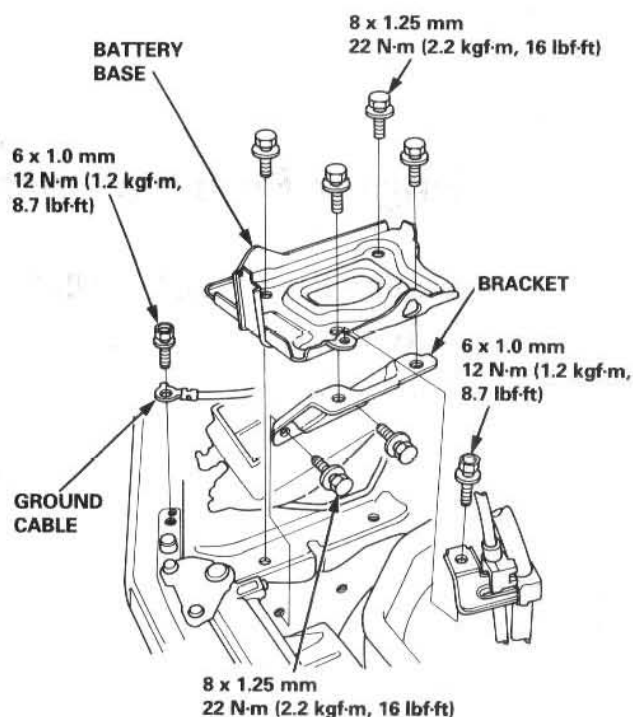
CAUTION:

- Use fender covers to avoid damaging painted surfaces.
- Unplug the wiring connectors carefully while holding the connector portion to avoid damage.
- Mark all wiring and hoses to avoid misconnection. Also, be sure that they do not contact other wiring or hoses or interfere with other parts.

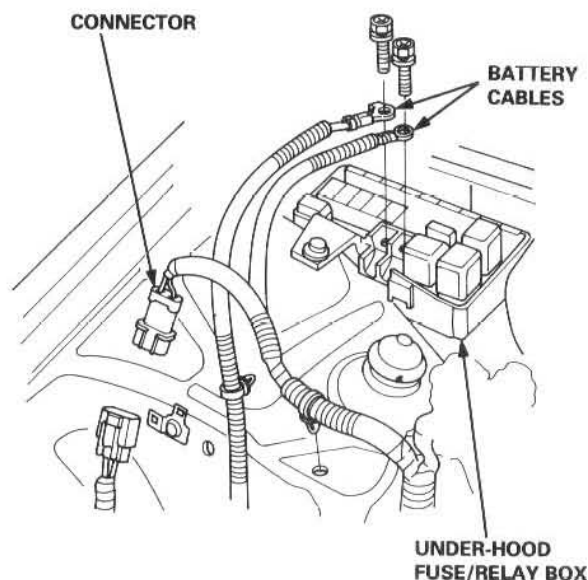
1. Secure the hood as open as possible.
2. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's pre-set buttons.
3. Disconnect the battery negative terminal first, then the positive terminal.
4. Remove the intake air duct and air cleaner cover.

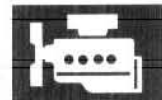


5. Remove the battery, battery base and ground cable.

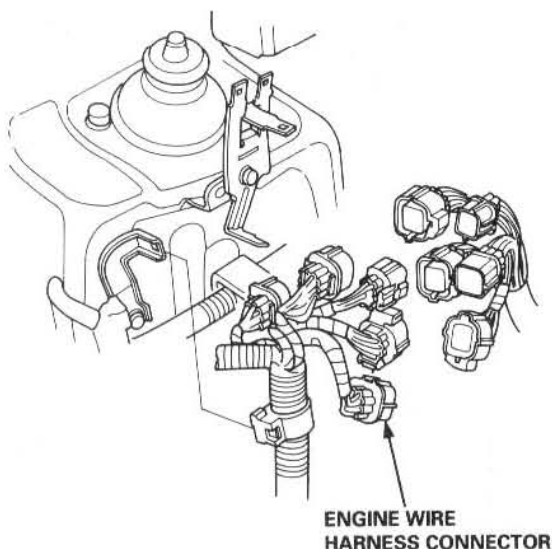


6. Disconnect the battery cables from the under-hood fuse/relay box, and disconnect the connector.

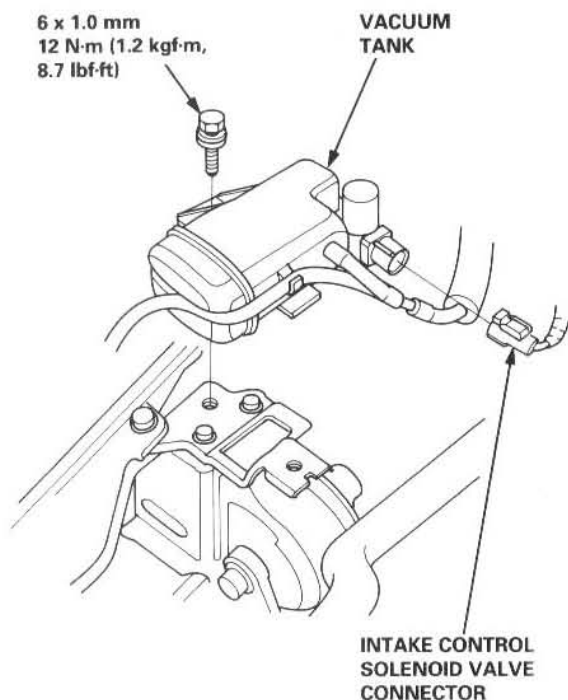




7. Disconnect the engine wire harness connector on the right side of the engine compartment.



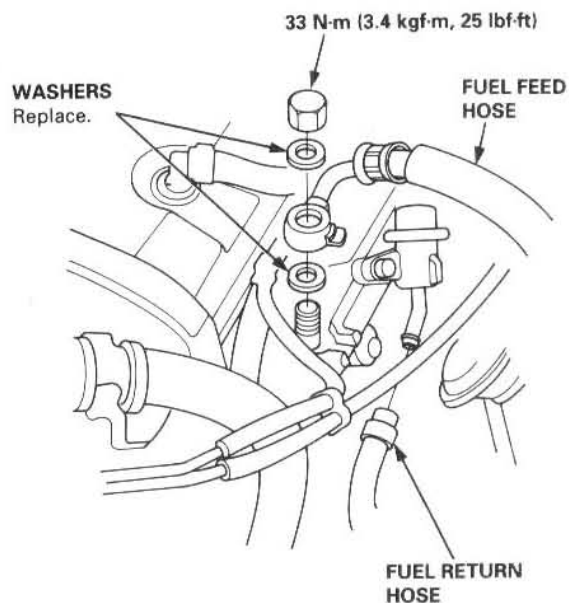
8. Disconnect the intake control solenoid valve connector, then remove the vacuum tank.



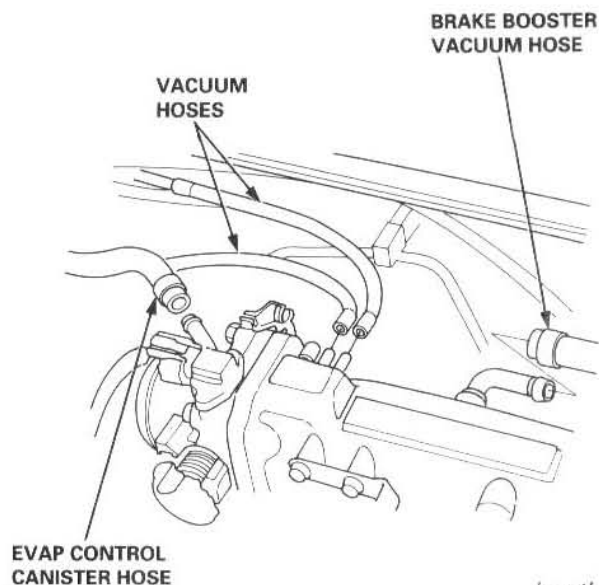
9. Relieve fuel pressure (see section 11).

⚠ WARNING Do not smoke while working on the fuel system. Keep open flame and sparks away from the work area. Drain fuel only into an approved container.

10. Remove the fuel feed hose and fuel return hose.



11. Remove the brake booster vacuum hose, evaporative emission (EVAP) control canister hose and vacuum hoses.



(cont'd)

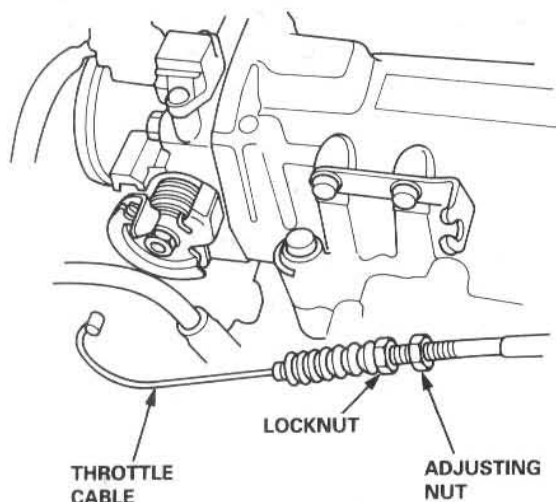
Engine Removal/Installation

Removal (cont'd)

12. Remove the throttle cable by loosening the locknut, then slip the cable end out of the accelerator linkage.

NOTE:

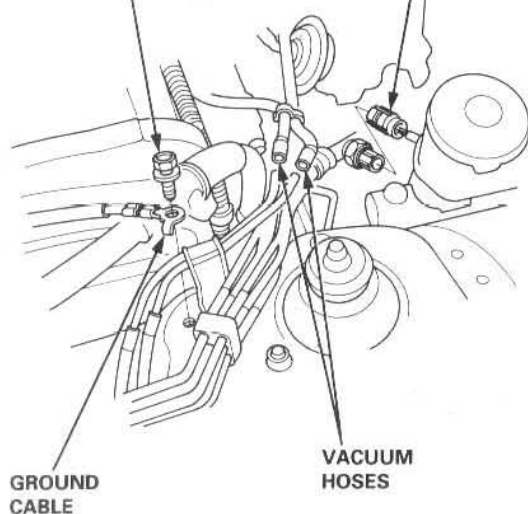
- Take care not to bend the cable when removing it. Always replace any kinked cable with a new one.
- Adjust the throttle cable when installing (see section 11).



13. Disconnect the power steering pressure (PSP) switch connector, and remove the vacuum hoses and ground cable.

6 x 1.0 mm
12 N·m (1.2 kgf·m, 8.7 lbf·ft)

PSP SWITCH
CONNECTOR



14. Remove the adjusting bolt, mounting bolt and locknut, then remove the P/S pump belt and pump.

LOCKNUT

8 x 1.25 mm
22 N·m (2.2 kgf·m,
16 lbf·ft)

MOUNTING BOLT

8 x 1.25 mm
22 N·m (2.2 kgf·m,
16 lbf·ft)

ADJUSTING
BOLT

P/S PUMP
BELT

15. Loosen the adjusting bolt, lock bolt and mounting bolt, then remove the alternator belt.

MOUNTING BOLT

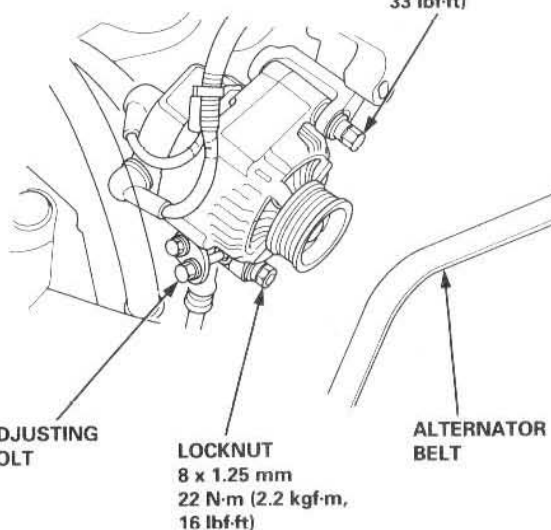
10 x 1.25 mm
44 N·m (4.5 kgf·m,
33 lbf·ft)

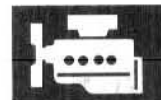
ADJUSTING
BOLT

LOCKNUT

8 x 1.25 mm
22 N·m (2.2 kgf·m,
16 lbf·ft)

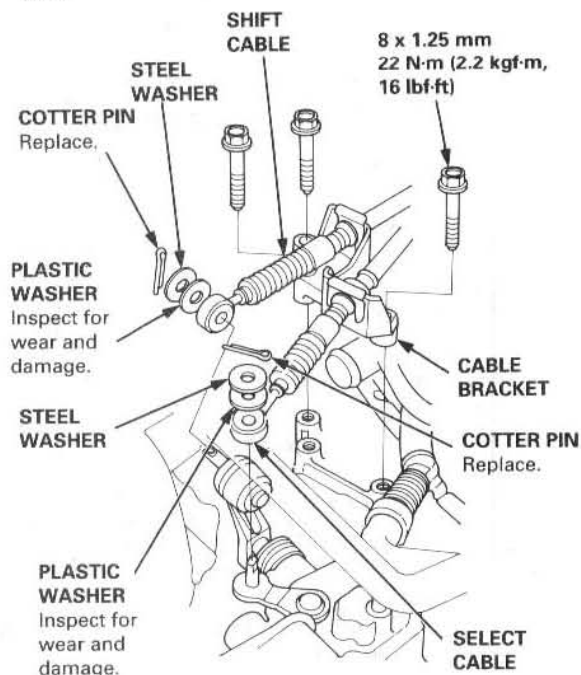
ALTERNATOR
BELT





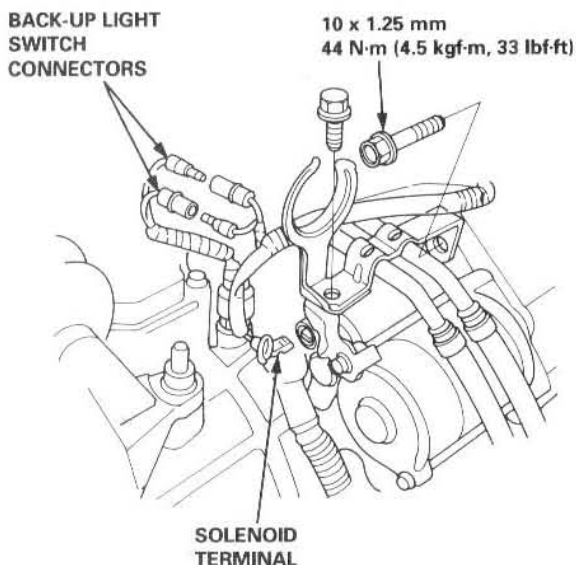
16. Remove the shift cable and select cable (M/T).

NOTE: Take care not to bend the cable when removing it. Always replace any kinked cable with a new one.



17. Disconnect the back-up light switch connectors and solenoid terminal connector (M/T).

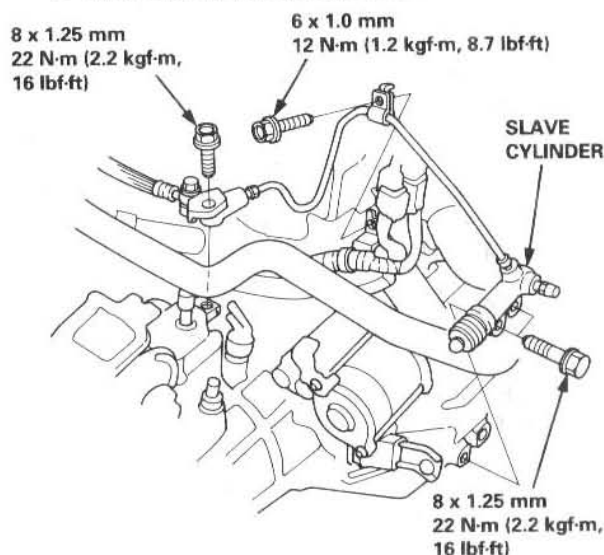
18. Remove the automatic transmission fluid (ATF) cooler pipes from the starter (M/T with active torque transfer system (ATTS)).



19. Remove the clutch slave cylinder and line/hose assembly (M/T).

NOTE:

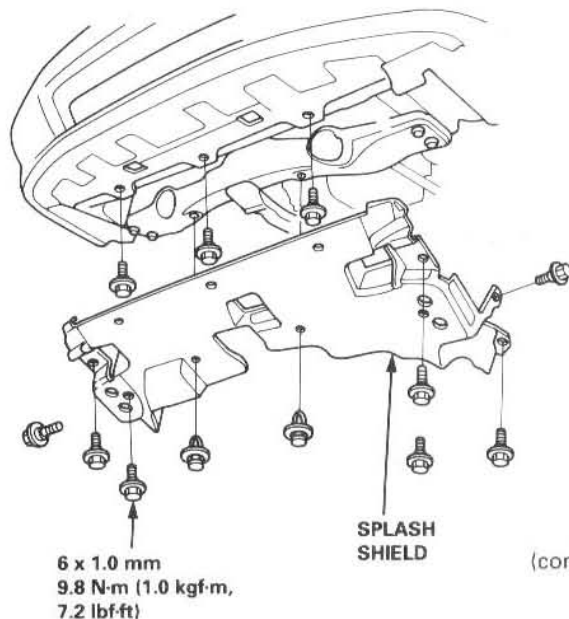
- Do not disconnect the line/hose assembly.
- Do not operate the clutch pedal once the slave cylinder has been removed.
- Take care not to bend the line.



20. Remove the radiator cap.

WARNING Use care when removing the radiator cap to avoid scalding by hot coolant or steam.

21. Raise the hoist to full height.
22. Remove the front tires/wheels.
23. Remove the splash shield.



(cont'd)

Engine Removal/Installation

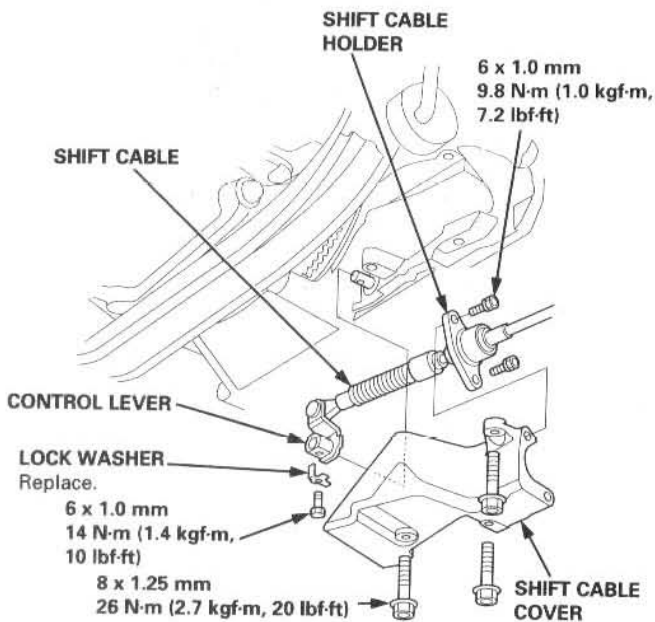
Removal (cont'd)

24. Loosen the drain plug in the radiator, and drain the engine coolant (see page 10-5).
25. Drain the transmission oil or fluid. Reinstall the drain plug using a new washer (see section 13 or 14).
26. Drain the engine oil. Reinstall the drain bolt using a new washer (see page 8-6).
27. Remove the bolts securing the shift cable holder, then remove the shift cable cover (A/T).

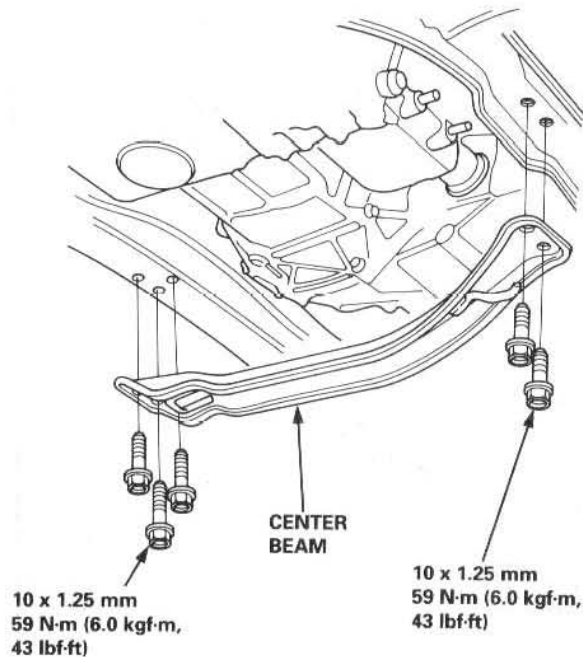
NOTE: To prevent damage to the control lever joint, be sure to remove the bolts securing the shift cable holder before removing the bolts securing the shift cable cover.

28. Remove the lock bolt securing the control lever, then remove the shift cable with control lever (A/T).

NOTE: Take care not to bend the shift cable while removing it.



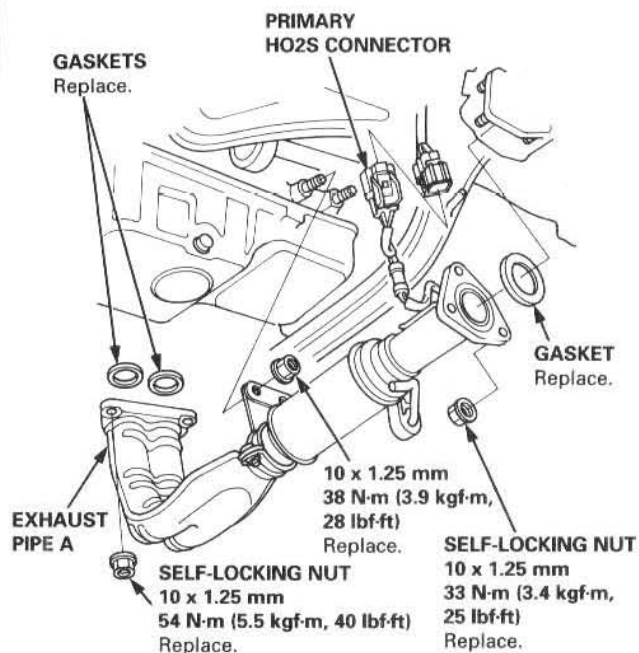
29. Remove the center beam.



30. Disconnect the primary heated oxygen sensor (primary HO2S) connector.

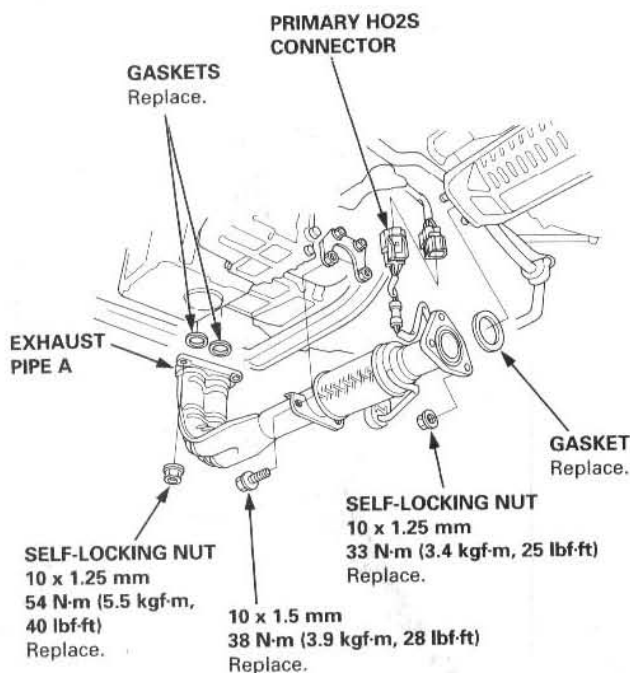
31. Remove exhaust pipe A.

Except M/T with ATTS:





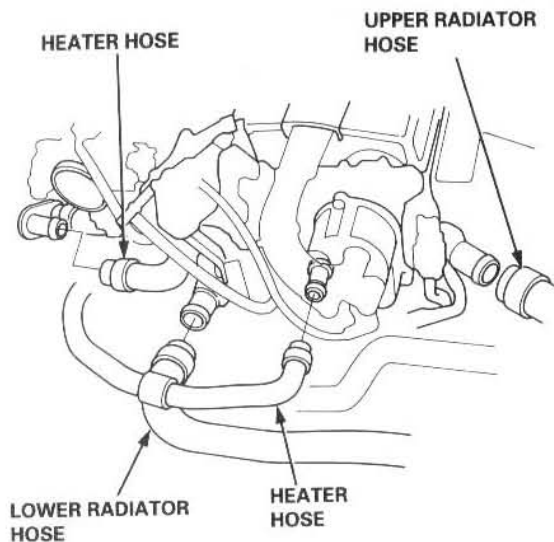
M/T with ATTS:



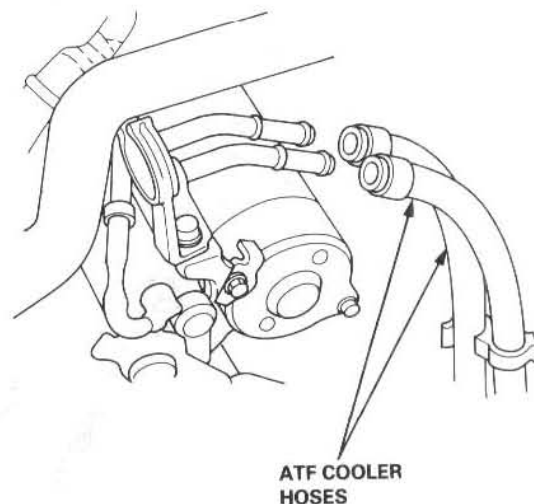
32. Remove the damper forks (see section 18).
33. Disconnect the suspension lower arm ball joints (see section 18).
34. Remove the driveshafts (see section 16).

NOTE: Coat all precision-finished sections with clean engine oil. Tie plastic bags over the driveshaft ends.

35. Lower the hoist.
36. Remove the upper and lower radiator hoses and heater hoses.

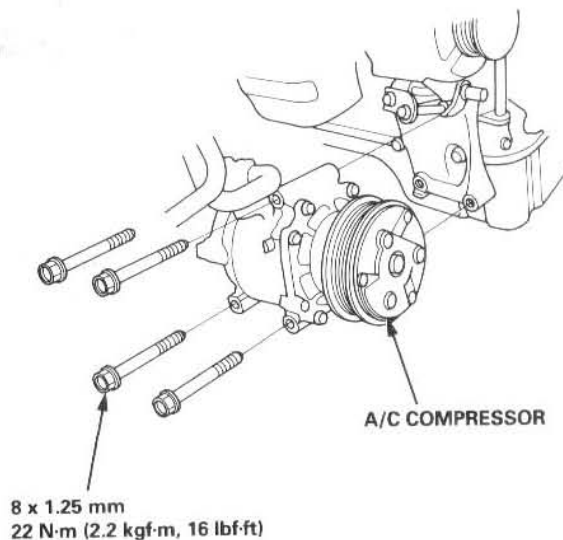


37. Remove the ATF cooler hoses, then plug the ATF cooler hoses and pipes.



38. Remove the radiator (see page 10-4).
39. Remove the A/C compressor.

NOTE: Do not disconnect the A/C hoses.

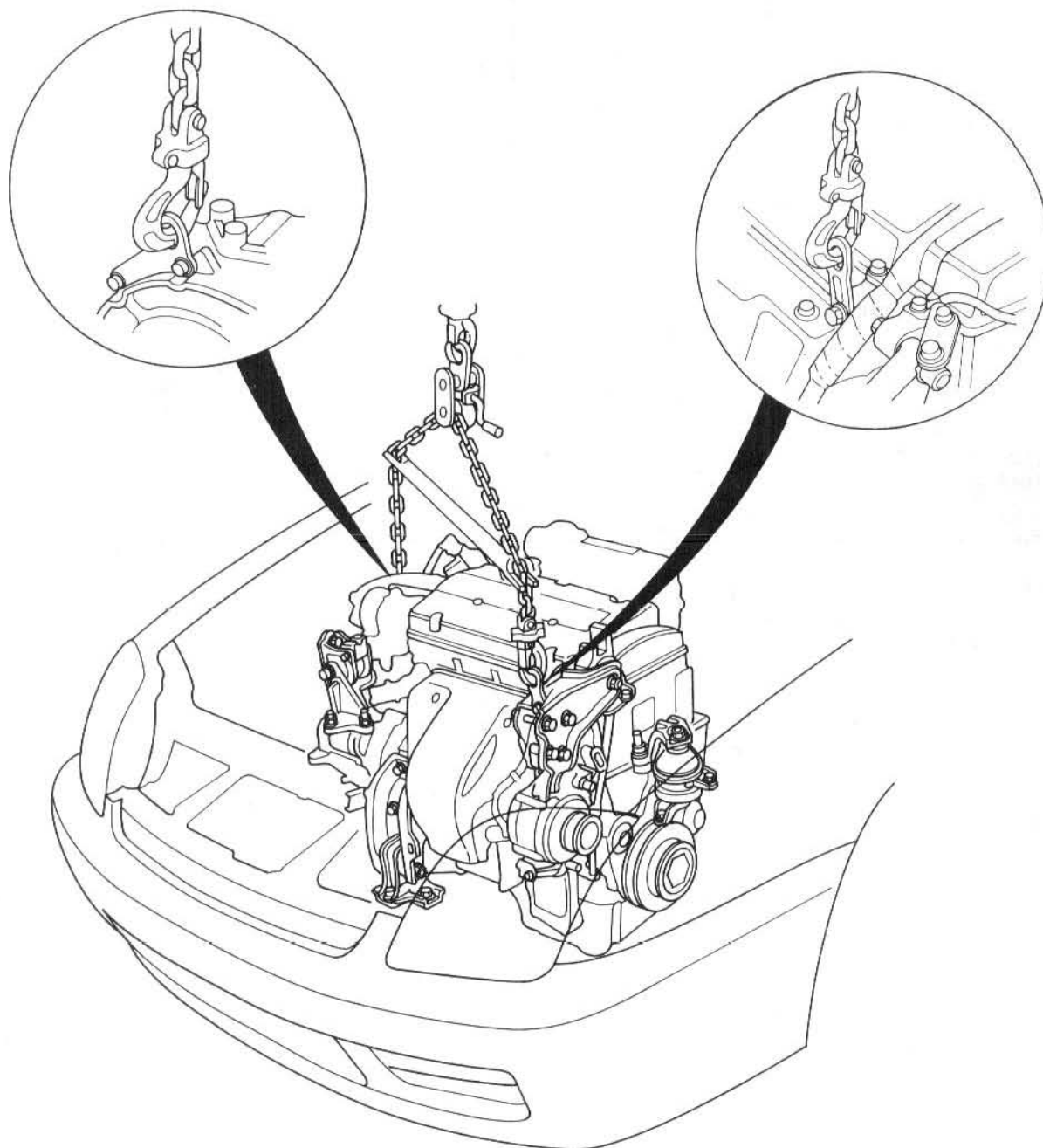


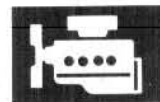
(cont'd)

Engine Removal/Installation

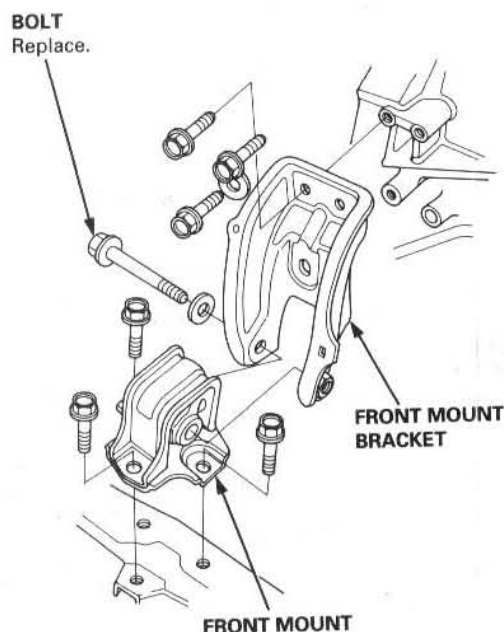
Removal (cont'd)

40. Attach the chain hoist to the engine.

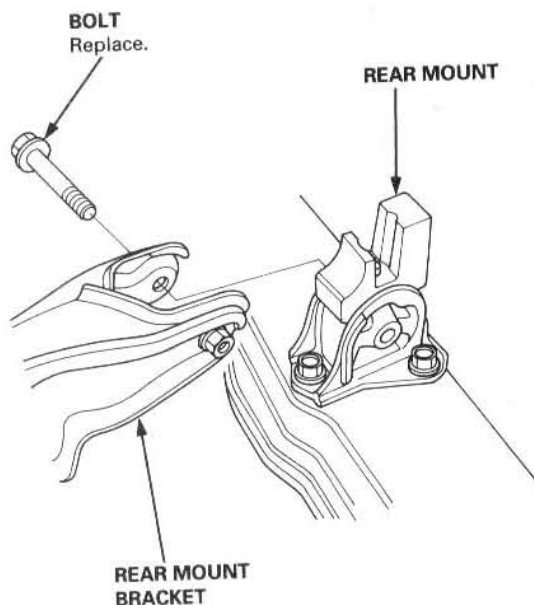




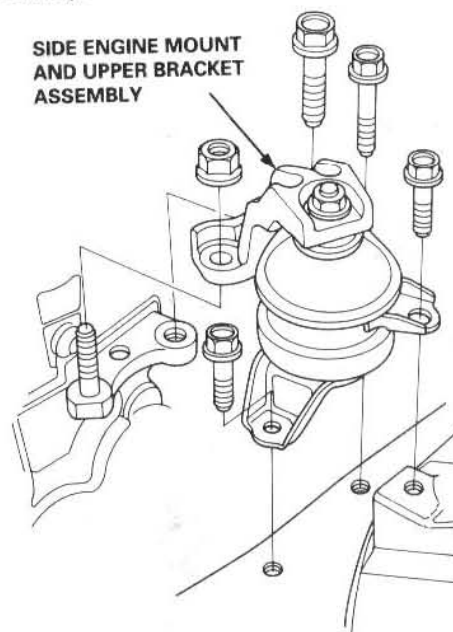
41. Remove the front mount bracket, then remove the front mount.



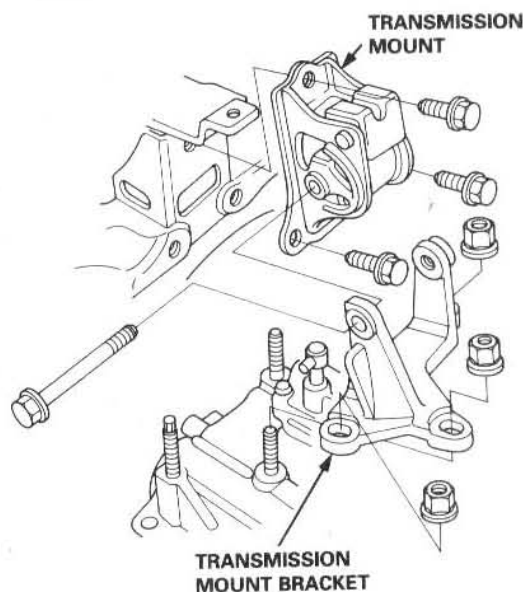
42. Separate the rear mount and rear mount bracket.



43. Remove the side engine mount and upper bracket assembly.



44. Remove the transmission mount bracket, then remove the transmission mount.

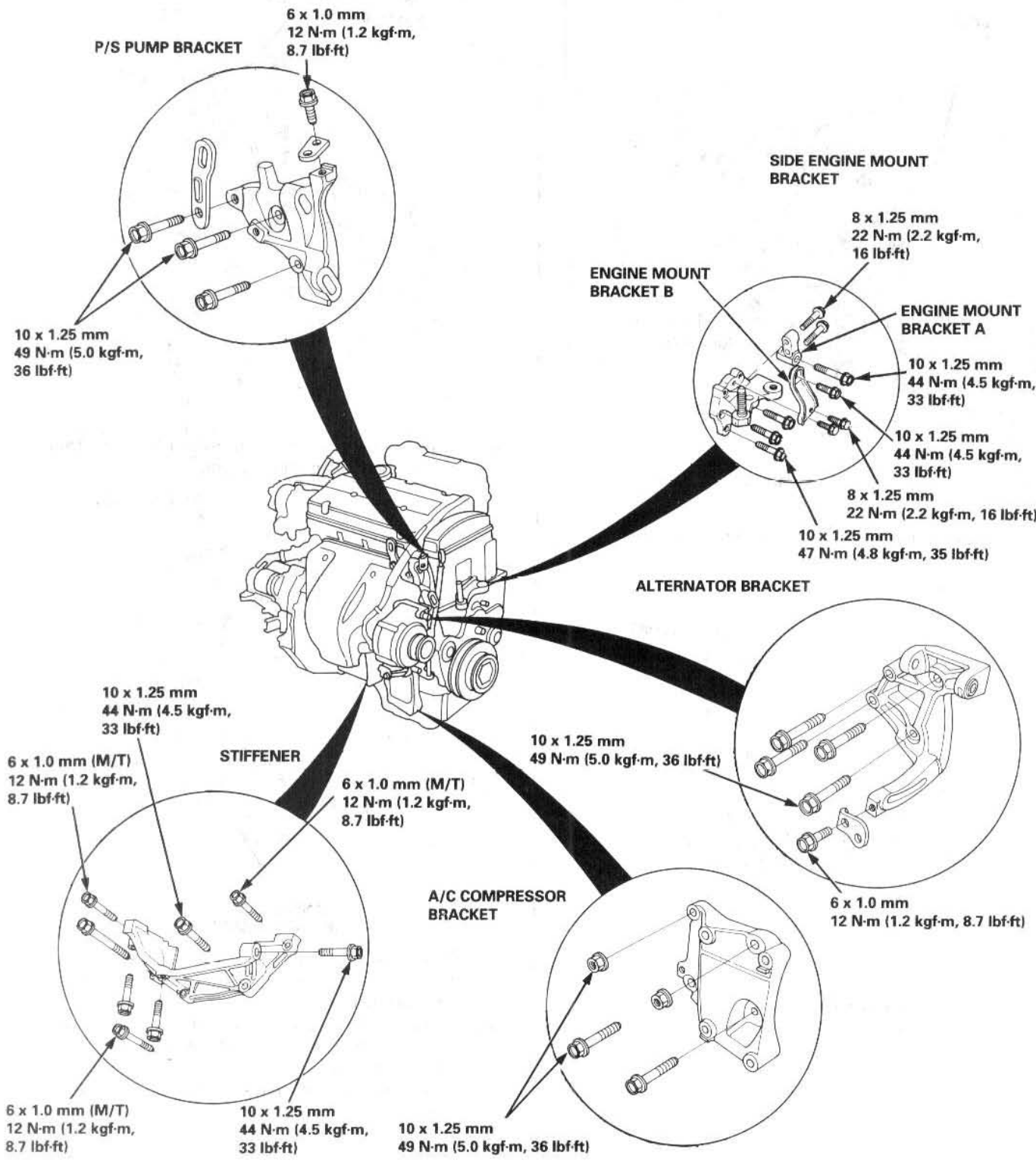


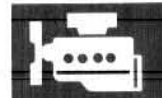
45. Check that the engine/transmission is completely free of vacuum hoses, fuel and coolant hoses and electrical wiring.
46. Slowly raise the engine approximately 150 mm (6 in). Check once again that all hoses and wires are disconnected from the engine/transmission.
47. Raise the engine all the way, and remove it from the vehicle.

Engine Removal/Installation

Installation

Bracket Bolts/Nuts Torque Specification:





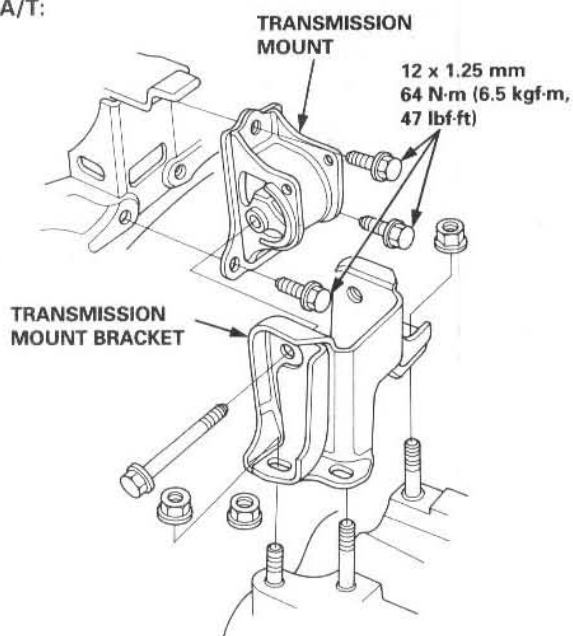
Engine Installation:

Install the engine in the reverse order of removal. Reinstall the mount bolts/nuts in the following sequence. Failure to follow these procedures may cause excessive noise and vibration, and reduce bushing life.

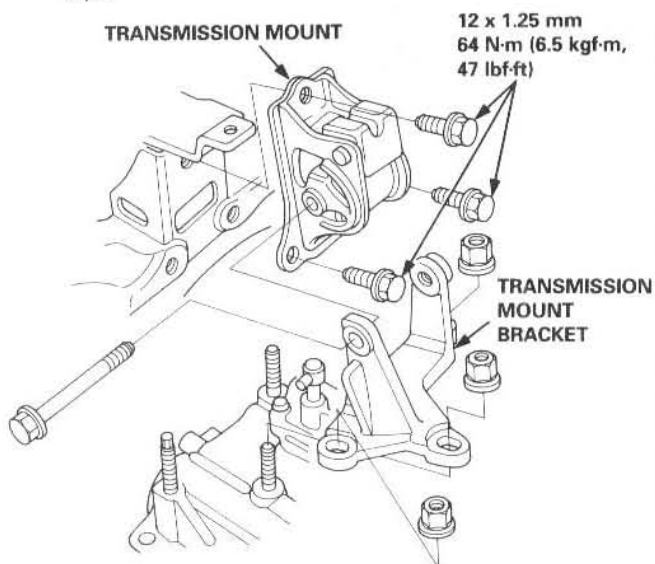
1. Install the transmission mount and bracket, then tighten the bolts on the frame side.

NOTE: Install, but do not tighten the bolt/nuts on the transmission side.

A/T:

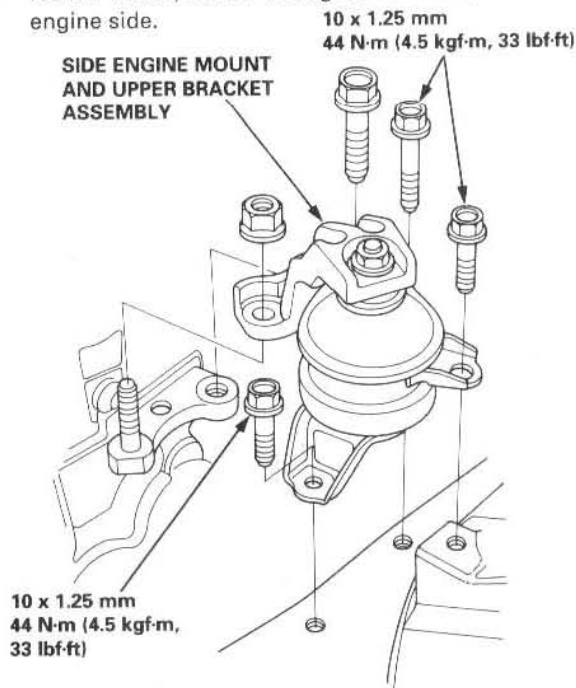


M/T:



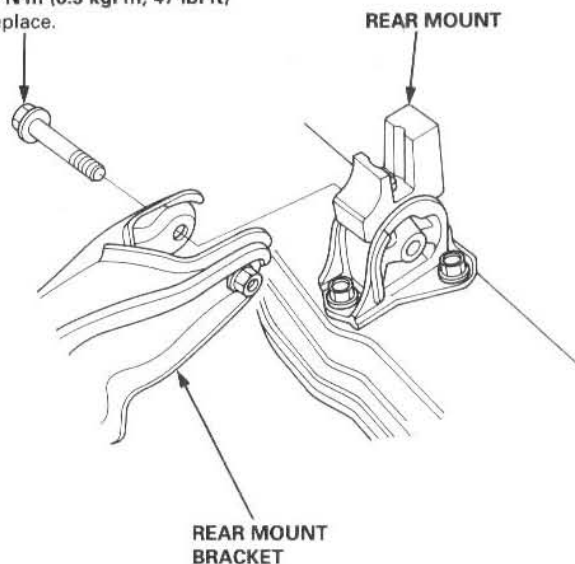
2. Install the side engine mount and upper bracket assembly, then tighten the bolts on the frame side.

NOTE: Install, but do not tighten the bolt/nut on the engine side.



3. Tighten the rear mount bracket mounting bolt.

12 x 1.25 mm
64 N-m (6.5 kgf-m, 47 lbf-ft)
Replace.



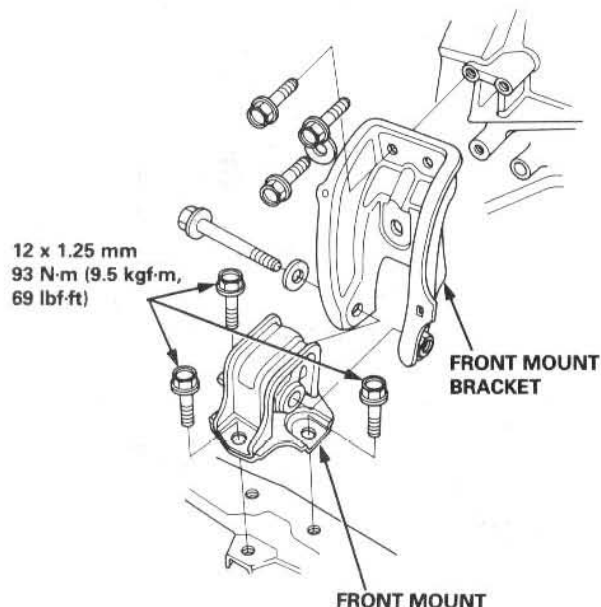
(cont'd)

Engine Removal/Installation

Installation (cont'd)

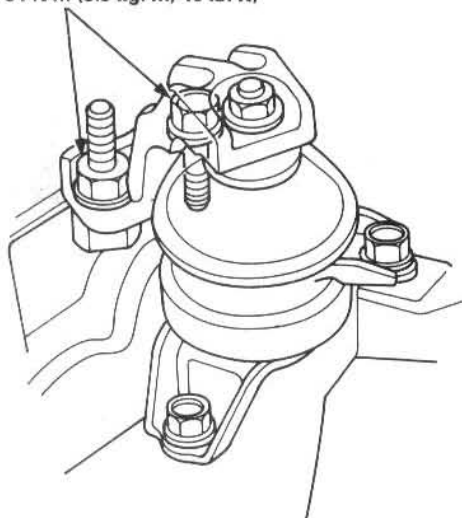
4. Install the front mount and front mount bracket, then tighten the bolts on the frame side.

NOTE: Install, but do not tighten the bolts on the engine side.



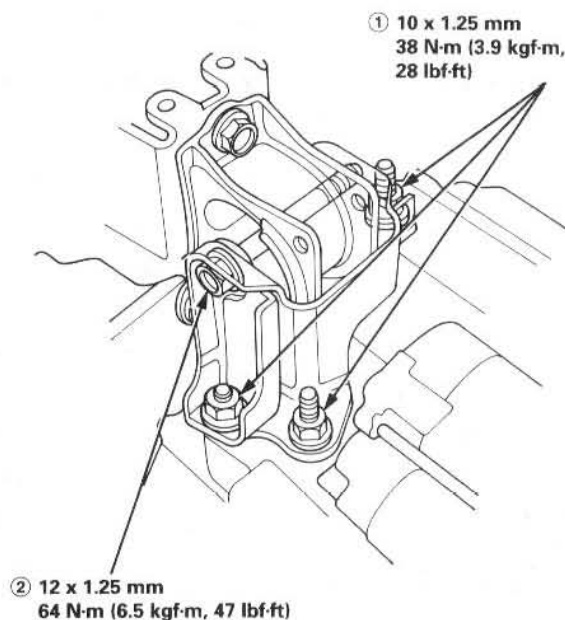
5. Tighten the bolt and nut on the side engine mount and upper bracket assembly.

12 x 1.25 mm
54 N-m (5.5 kgf-m, 40 lbf-ft)



6. Tighten the bolt and nuts in the numbered sequence as shown (① - ②).

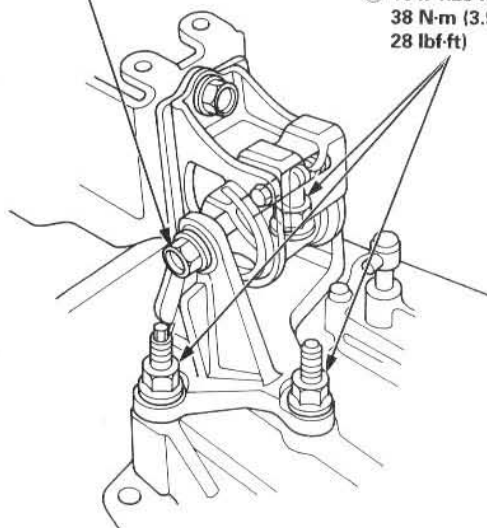
A/T:



M/T:

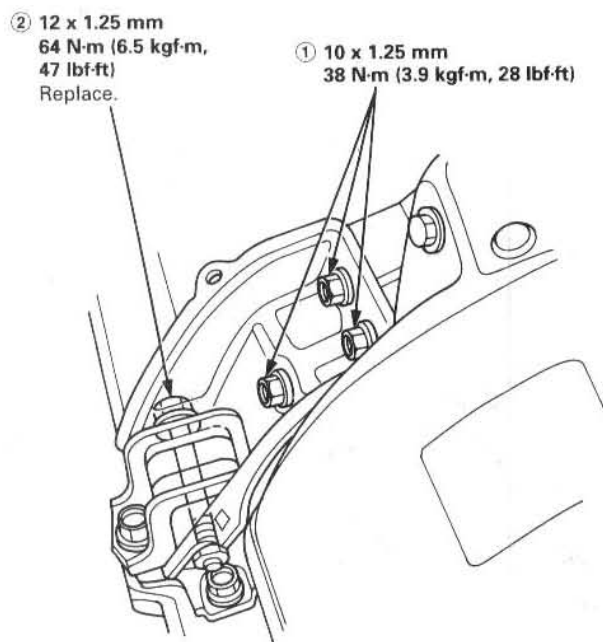
② 12 x 1.25 mm
64 N-m (6.5 kgf-m, 47 lbf-ft)

① 10 x 1.25 mm
38 N-m (3.9 kgf-m, 28 lbf-ft)





7. Tighten the bolt and nuts in the numbered sequence as shown (① – ②).



8. Perform the following:

- Check that spring clip on the ends of the drive-shaft and intermediate shaft clicks into place.
CAUTION: Use new spring clips.
- Adjust the shift cable (see section 14).
- Adjust the throttle cable (see section 11).
- Refill the engine with engine oil (see page 8-6).
- Refill the transmission with fluid (see section 13 or 14).
- Refill the ATTS with ATF (see section 15).
- Refill the radiator with engine coolant (see page 10-5).
- Bleed air from the cooling system at the bleed bolt with the heater valve open (see page 10-5).
- Clean the battery posts and cable terminals with sandpaper, assemble them, then apply grease to prevent corrosion.
- Inspect for fuel leakage (see section 11).
 - After assembling fuel line parts, turn on (II) the ignition switch (do not operate the starter) so that the fuel pump operates for approximately two seconds and the fuel line pressurizes.
Repeat this operation two or three times, and check for fuel leakage at any point in the fuel line.
- Enter the anti-theft code for the radio, then enter the customer's radio station preset.

(cont'd)

Engine Removal/Installation

Installation (cont'd)

Mount and Bracket Bolts/Nut Torque Value Specifications:

Torque Specifications:

A: 12 x 1.25 mm

93 N·m (9.5 kgf·m, 69 lbf·ft)

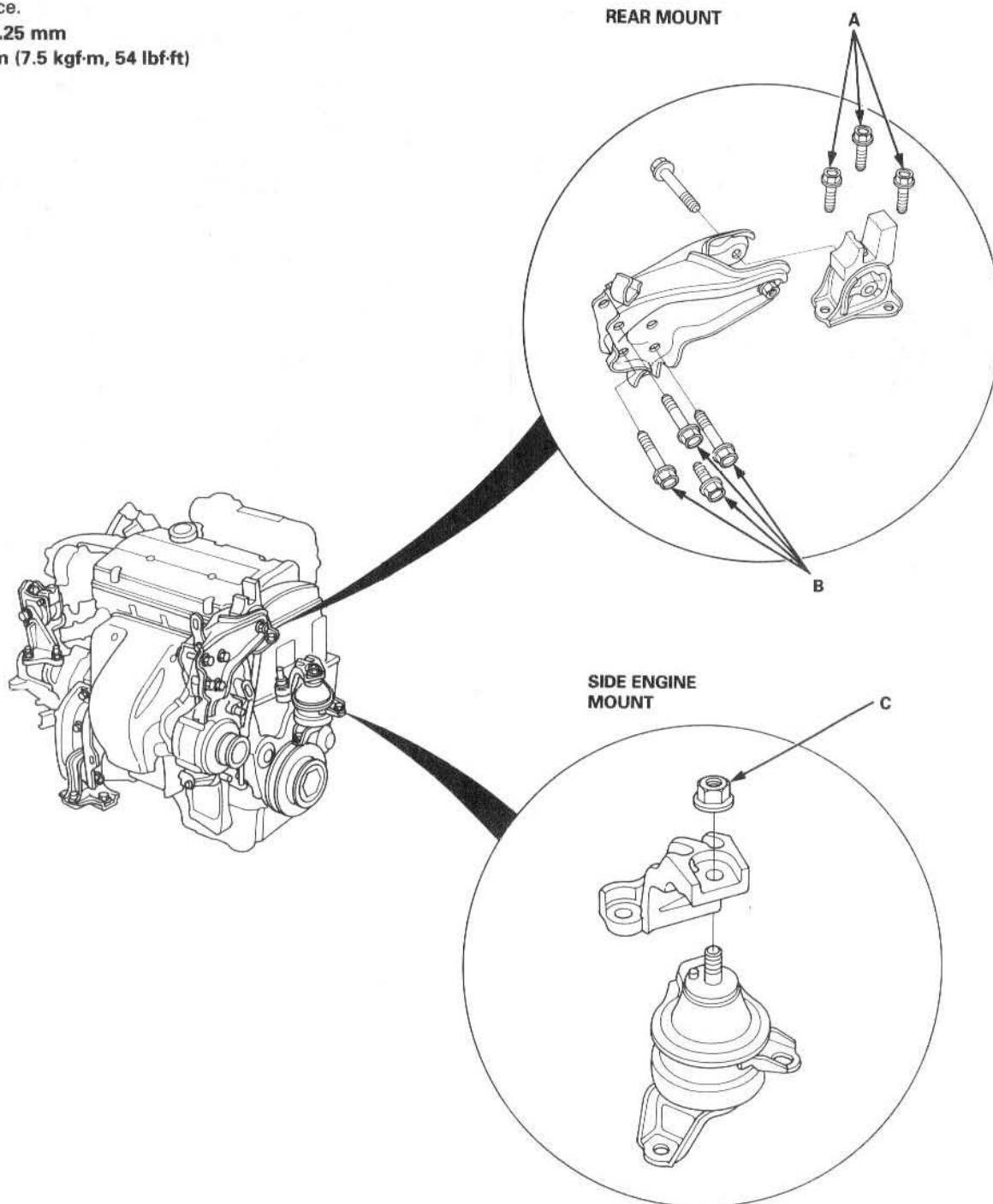
B: 12 x 1.25 mm

64 N·m (6.5 kgf·m, 47 lbf·ft)

Replace.

C: 12 x 1.25 mm

74 N·m (7.5 kgf·m, 54 lbf·ft)



Cylinder Head/Valve Train

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Special Tools

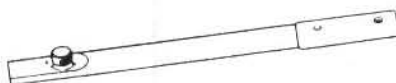
Ref. No.	Tool Number	Description	Qty	Page Reference
①	07HAH - PJ7010A	Valve Guide Reamer, 5.5 mm	1	6-40
②	07JAA - 001020A	Socket, 19 mm	1	6-11
③	07JAB - 001020A	Holder Handle	1	6-11
④	07LAJ - PR3020B	Air Stopper	1	6-7, 8
⑤	07MAA - PR70110	Tappet Adjuster	1	6-9
⑥	07MAA - PR70120	Tappet Locknut Wrench	1	6-9
⑦	07MAF - PR9010A	Valve Spring Compressor Attachment Extension	1	6-35, 41
⑧	07NAB - 001040A	Holder Attachment, 50 mm	1	6-11
⑨	07NAG - P130100	Timing Belt Slider	1	6-19
⑩	07742 - 0010100	Valve Guide Driver, 5.5 mm	1	6-39, 40
⑪	07757 - PJ1010A	Valve Spring Compressor Attachment	1	6-35, 41



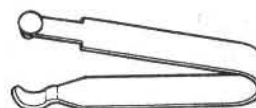
①



②



③



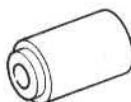
④



⑤



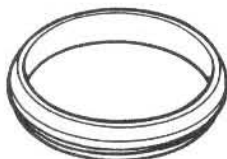
⑥



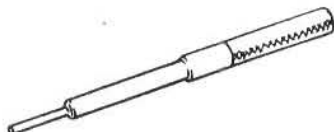
⑦



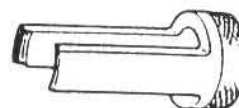
⑧



⑨



⑩



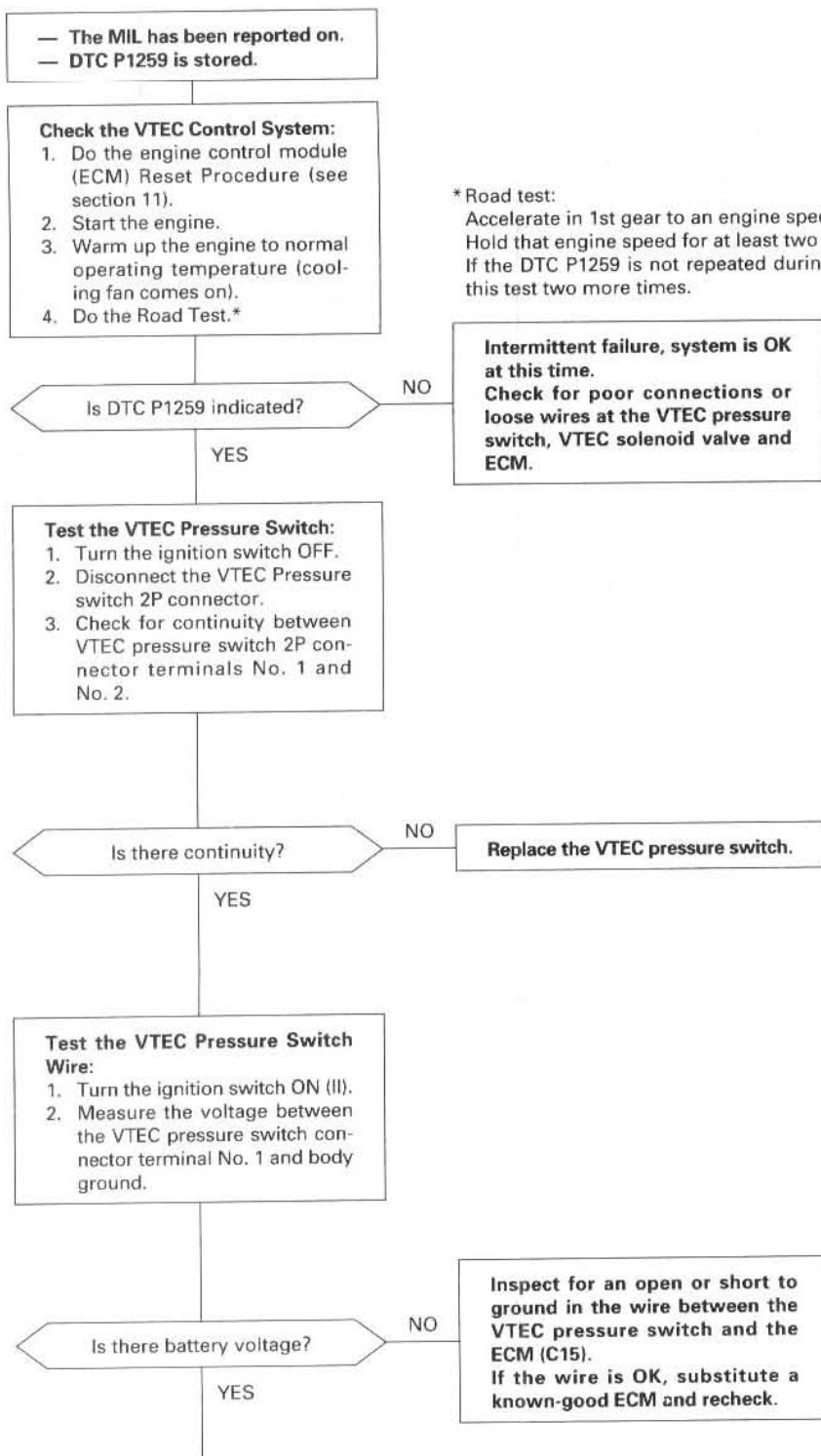
⑪



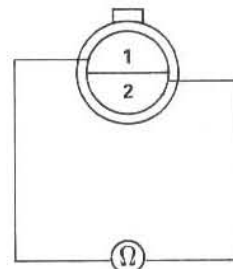
Troubleshooting Flowchart

P1259 The scan tool indicates Diagnostic Trouble Code (DTC) P1259: A problem in the VTEC Pressure Switch circuit or VTEC Solenoid Valve circuit.

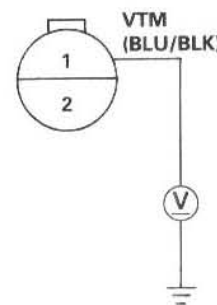
Refer to page 11-32 through 11-47 before troubleshooting.



VTEC PRESSURE SWITCH 2P CONNECTOR



Terminal side of male terminals



Wire side of female terminals

(cont'd)

VTEC Control System

Troubleshooting Flowchart (cont'd)

(From page 6-3)

Test the VTEC Pressure Switch Wire:
Measure voltage across the VTEC pressure switch 2P connector.

Is there battery voltage?

NO

- Repair open in the wire between VTEC pressure switch and G101.
- If the wire is OK, substitute a known-good ECM and recheck.

YES

Test the VTEC Solenoid Valve:
1. Turn the ignition switch OFF.
2. Disconnect the VTEC solenoid valve 1P connector.
3. Check for continuity between the VTEC solenoid valve 1P connector terminal No. 1 and body ground.

Is there 14 – 30 Ω ?

NO

Replace VTEC solenoid valve.

YES

Test the VTEC Solenoid Valve:
1. Remove the VTEC pressure switch and install the special tool as shown, then reinstall the VTEC pressure switch.
2. Reconnect the VTEC solenoid valve 1P connector and VTEC pressure switch 2P connector.
3. Connect the tachometer (see section 11).
4. Start the engine.
5. Warm up engine to normal operating temperature (cooling fan comes on).
6. Check oil pressure at engine speed of 1,000, 3,000 and 5,000 rpm.

Is pressure below 49 kPa (0.5 kgf/cm², 7 psi)?

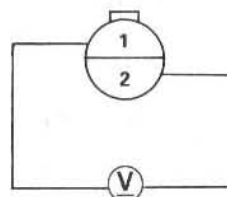
NO

Inspect the VTEC solenoid valve.

YES

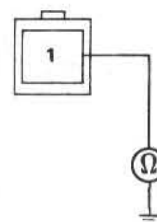
(To page 6-5)

VTEC PRESSURE SWITCH 2P CONNECTOR

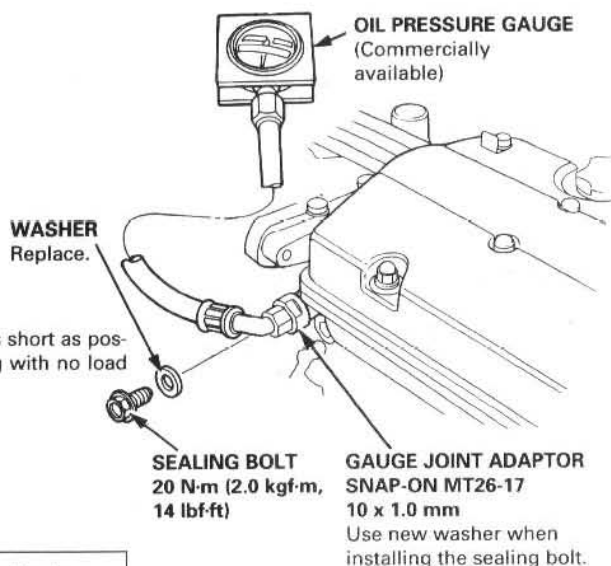


Wire side of female terminals

VTEC SOLENOID VALVE 1P CONNECTOR



Terminal side of male terminal



NOTE: Keep measuring time as short as possible because engine is running with no load (less than one minute).



(From page 6-4)

Test the VTEC Solenoid Valve:
 1. Turn the ignition switch OFF.
 2. Disconnect the VTEC solenoid valve 1P connector.
 3. Attach the battery positive terminal to the VTEC solenoid valve terminal.
 4. Start the engine and check the oil pressure at engine speed of 5,000 rpm.

Is the pressure above 390 kPa (4.0 kgf/cm², 57 psi)?

NO → **Inspect the VTEC solenoid valve.**

YES

Test the VTEC Pressure Switch:
 With the battery positive terminal connected to the VTEC solenoid valve, measure voltage between the ECM connector terminal C15 and body ground.

Is there battery voltage above 5,000 rpm?

NO → **Replace the VTEC pressure switch.**

YES

Test the VTEC Solenoid Valve Wire:
 1. Turn the ignition switch OFF.
 2. Check for continuity between the VTEC solenoid valve 1P connector terminal and the ECM connector terminal A8.

Is there continuity?

NO → **Repair open in the wire between the ECM (A8) and VTEC solenoid valve connector.**

YES

Test the VTEC Solenoid Valve Wire:
 Check for continuity between the VTEC solenoid valve 1P connector terminal and body ground.

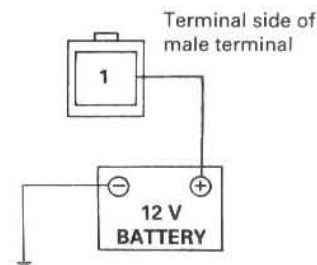
Is there continuity?

YES → **Repair short in the wire between the ECM (A8) and VTEC solenoid valve connector.**

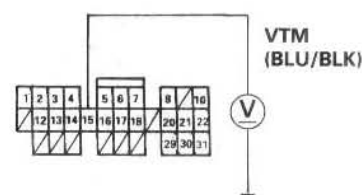
NO

Substitute a known-good ECM and recheck. If symptom/indication goes away, replace the original ECM.

VTEC SOLENOID VALVE 1P CONNECTOR

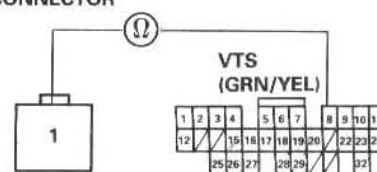


ECM CONNECTOR C (31P)



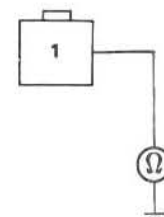
VTEC SOLENOID VALVE 1P CONNECTOR

ECM CONNECTOR A (32P)



Wire side of female terminals

VTEC SOLENOID VALVE 1P CONNECTOR



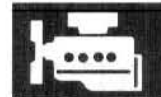
Wire side of female terminal

6-6

1. Disconnect the 1P connector from the VTEC solenoid valve.
2. Measure resistance between the terminal and body ground.

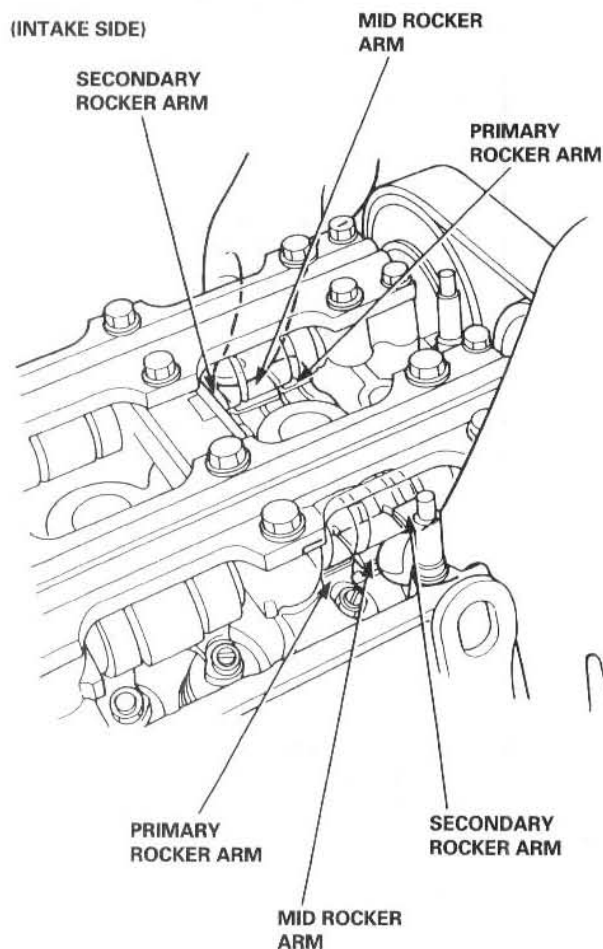
-
- VTEC SOLENOID VALVE ASSEMBLY**
- VTEC SOLENOID VALVE FILTER**
Replace.
- 6 x 1.0 mm**
12 N·m (1.2 kgf-m, 8.7 lbf-ft)

-
- 6 x 1.0 mm**
12 N·m (1.2 kgf·m, 8.7 lbf·ft)
- O-RING**
Replace.
- VTEC PRESSURE SWITCH**
22 N·m (2.2 kgf·m, 16 lbf·ft)



Manual Inspection

1. Set the No. 1 piston at TDC.
 2. Remove the cylinder head cover.
- NOTE: Refer to pages 6-45, 46 when installing the cylinder head cover.
3. Push the mid rocker arm on the No. 1 cylinder manually.
 4. Check that the mid rocker arm moves independently of the primary and secondary intake rocker arms.



(EXHAUST SIDE)

5. Check the mid rocker arm of each cylinder at TDC.
 - If the mid rocker arm does not move, remove the mid, primary and secondary rocker arms as an assembly and check that the pistons in the mid and primary rocker arms move smoothly.
 - If any rocker arm needs replacing, replace the primary, mid, and secondary rocker arms as an assembly.

Inspection Using Special Tools

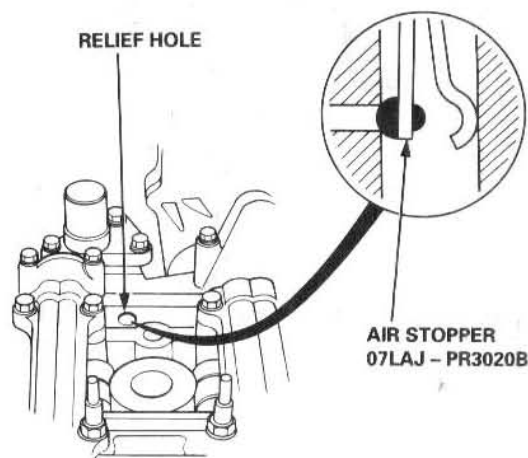
CAUTION:

- Before using the Valve Inspection Tool, make sure that the air pressure gauge on the air compressor indicates over 400 kPa (4 kgf/cm², 57 psi).
- Inspect the valve clearance before rocker arm inspection.
- Cover the timing belt with a shop towel to protect the belt from oil soaking.
- Check the mid rocker arm of each piston at TDC.

1. Remove the cylinder head cover.

NOTE: Refer to pages 6-45, 46 when installing the cylinder head cover.

2. Plug the relief hole with the special tool.



(cont'd)

VTEC Rocker Arms

Inspection Using Special Tools (cont'd)

3. Remove the bolt and washer from the inspection hole, and connect the special tool.

REGULATOR VALVE
Pull the knob and turn to adjust.

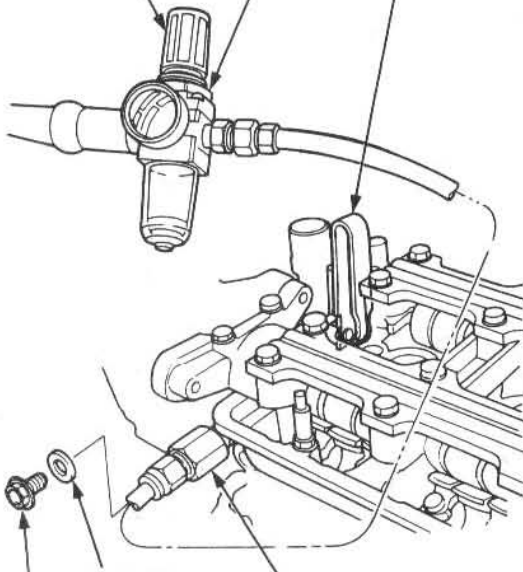
VALVE INSPECTION TOOL
(Commercially available)

AIR STOPPER
07LAJ - PR3020B

WASHER
Replace.

SEALING BOLT
10 x 1.0 mm
20 N·m (2.0 kgf·m, 14 lbf·ft)

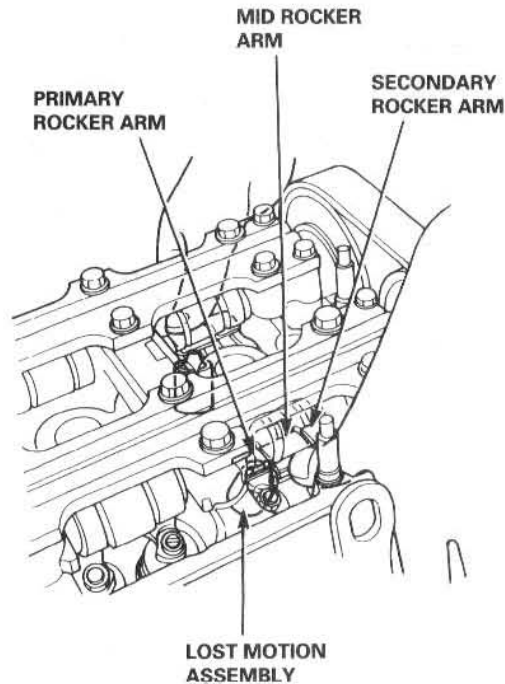
10 x 1.0 mm ADAPTER
SNAP-ON MT 26-17
or EQUIVALENT



4. Loosen the regulator valve on the valve inspection set, and apply the specified air pressure to the rocker arm pistons.

Specified Air Pressure:
250 kPa (2.5 kgf/cm², 36 psi)

5. Make sure that the intake primary and secondary rocker arms are mechanically connected by the pistons and that the mid rocker arms do not move when pushed manually.

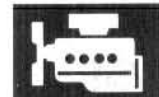


If any mid rocker arm moves independently of the primary and secondary rocker arms, replace the rocker arms, as a set.

6. Remove the tools.
7. Check for smooth operation of the lost motion assembly. It is compressed slightly when the mid rocker arm is pushed lightly and compressed deeply when the mid rocker arm is pushed firmly.

Replace the lost motion assembly if it does not move smoothly.

8. After inspection, check that the malfunction indicator lamp does not come on.



Valve Clearance

Adjustment

NOTE:

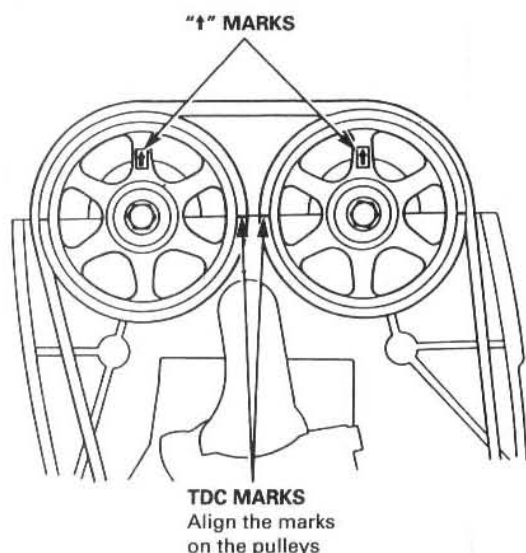
- Valves should be adjusted only when the cylinder head temperature is less than 100°F (38°C).
- After adjusting, retorque the crankshaft pulley bolt to 245 N·m (25.0 kgf·m, 181 lbf·ft).

1. Remove the cylinder head cover.

NOTE: Refer to pages 6-45, 46 when installing the cylinder head cover.

2. Set No. 1 piston at TDC. The "↑" marks on the pulleys should be at the top, and the TDC grooves on the pulleys should align with the cylinder head surface.

Number 1 piston at TDC:



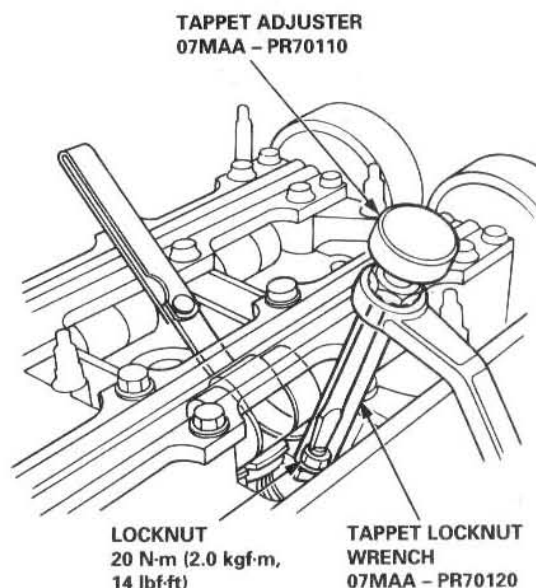
3. Adjust valves on No. 1 cylinder.

Valve Clearance:

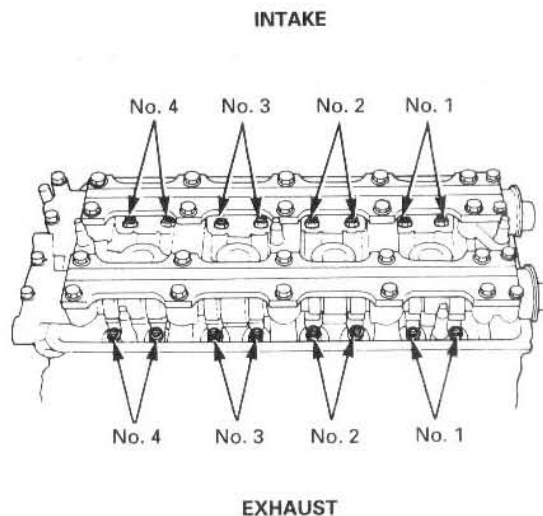
Intake: 0.15 – 0.19 mm (0.006 – 0.007 in)

Exhaust: 0.17 – 0.21 mm (0.007 – 0.008 in)

4. Loosen the locknut, and turn the adjusting screw until a feeler gauge slides back and forth with a slight amount of drag.



Adjusting screw locations:

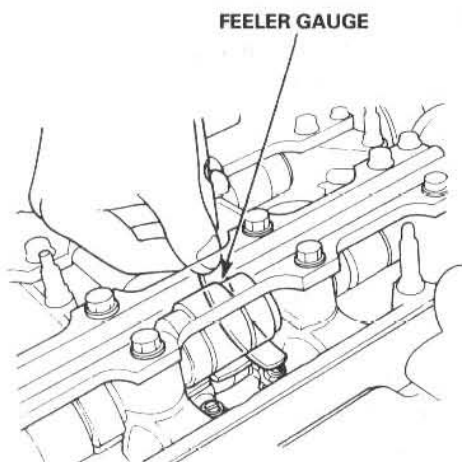


(cont'd)

Valve Clearance

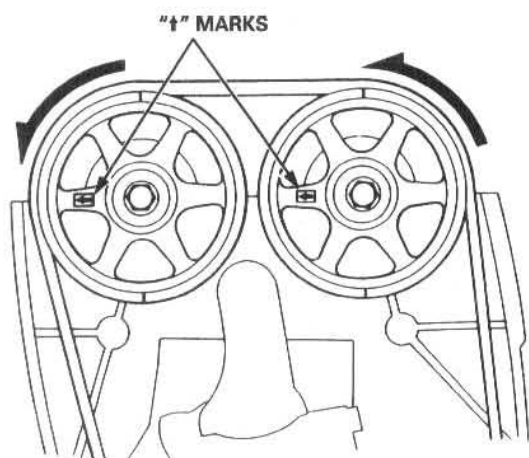
Adjustment (cont'd)

5. Tighten the locknut, and check the clearance again. Repeat the adjustment if necessary.



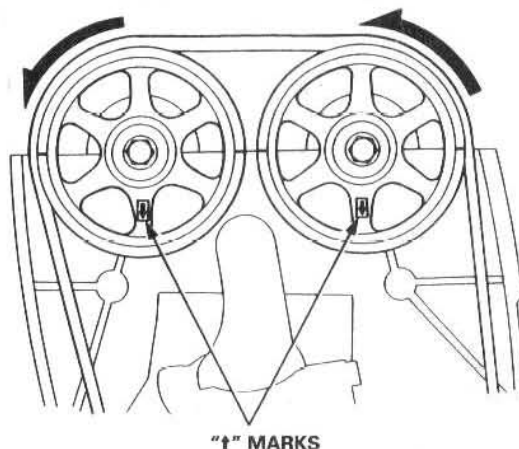
6. Rotate the crankshaft 180° counterclockwise (camshaft pulleys turn 90°). The "↑" marks should be on the exhaust side. Adjust the valves on No. 3 cylinder.

Number 3 piston at TDC:



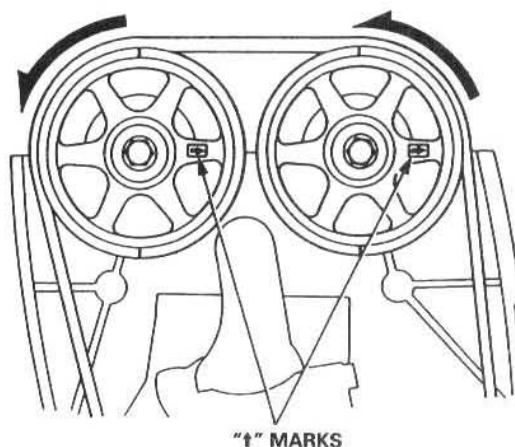
7. Rotate the crankshaft 180° counterclockwise to bring No. 4 piston to TDC. The TDC grooves are once again aligned. Adjust the valves on No. 4 cylinder.

Number 4 piston at TDC:



8. Rotate the crankshaft 180° counterclockwise to bring No. 2 piston to TDC. The "↑" marks should be on the intake side. Adjust the valves on No. 2 cylinder.

Number 2 piston at TDC:





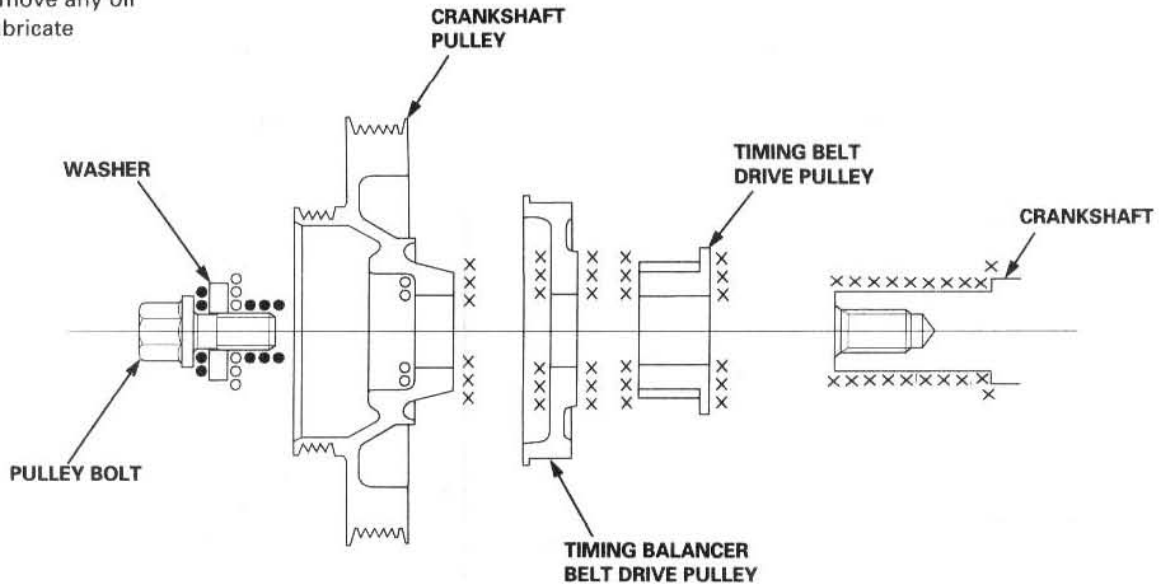
Crankshaft Pulley and Pulley Bolt

Replacement

When installing and tightening the pulley, follow the procedure below.

Clean, remove any oil and lubricate all the points shown below.

- : Clean
- ×: Remove any oil
- : Lubricate

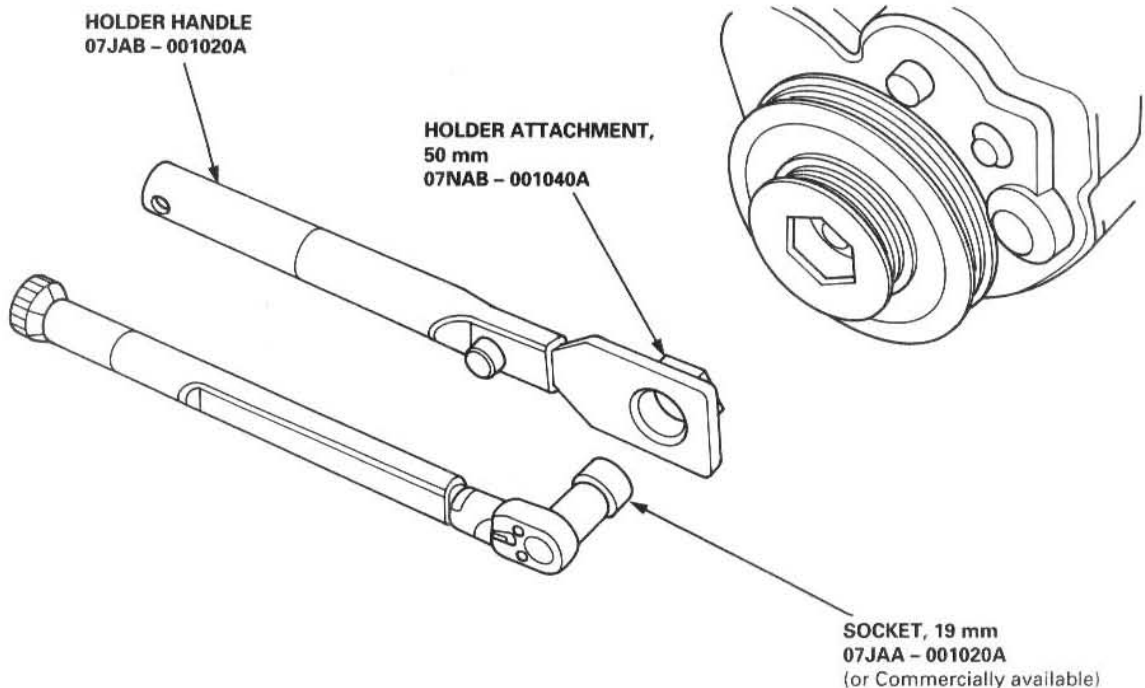


Crankshaft pulley bolt size and torque value:

16 x 1.5 mm

245 N·m (25.0 kgf·m, 181 lbf·ft)

NOTE: Do not use an impact wrench when installing.

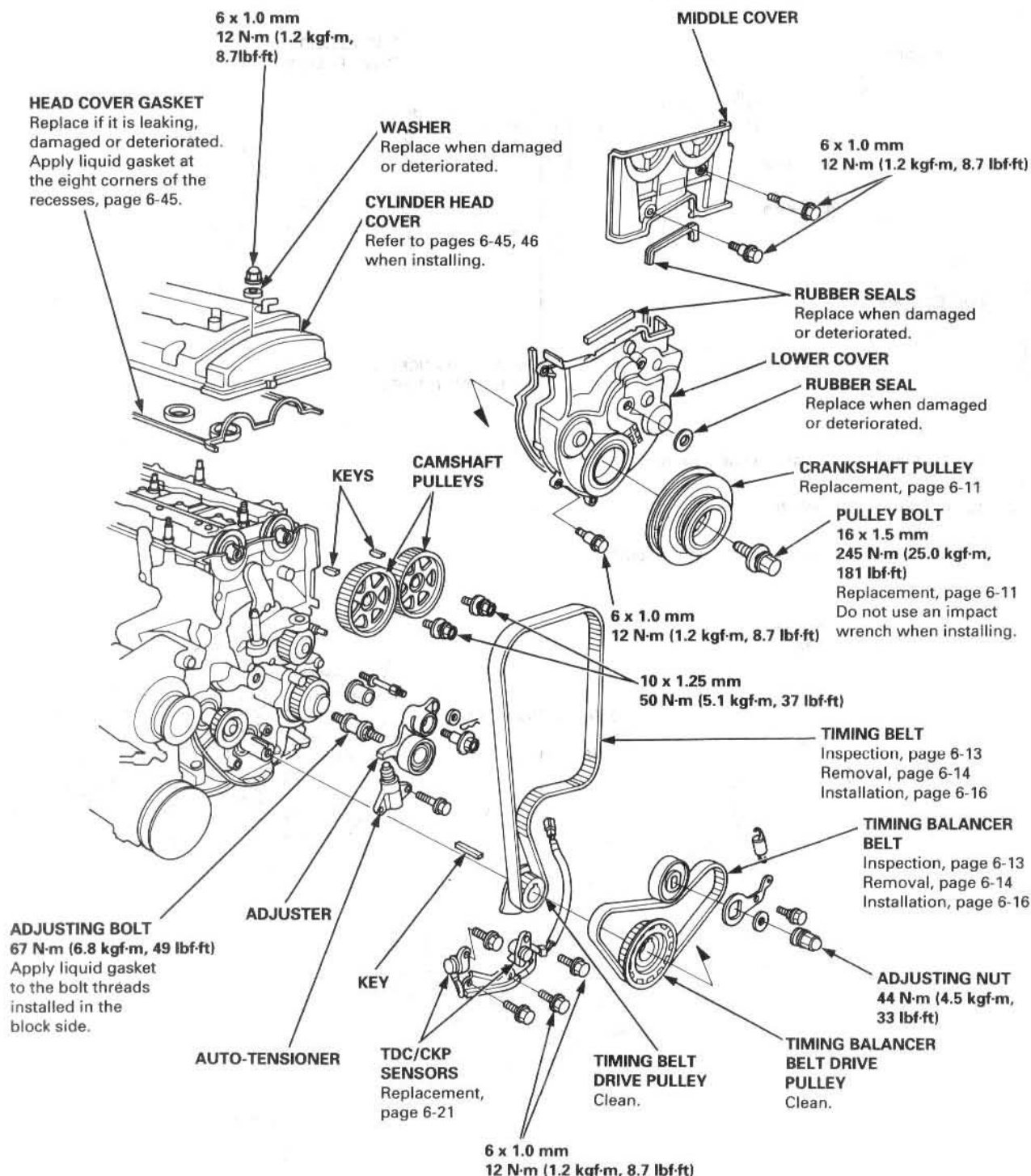


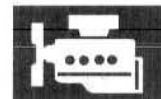
Timing Belt and Timing Balancer Belt

Illustrated Index

NOTE:

- Refer to page 6-16 for how to position the crankshaft and pulley before installing the belt.
- Mark the direction of rotation on the belt before removing it.
- Do not use the middle cover and lower cover to store removed items.
- Clean the middle cover and lower cover before installing them.
- Replace the camshaft seals and crankshaft seals if there is oil leakage.
- Refer to page 6-11 before installing the timing belt and timing balancer belt.





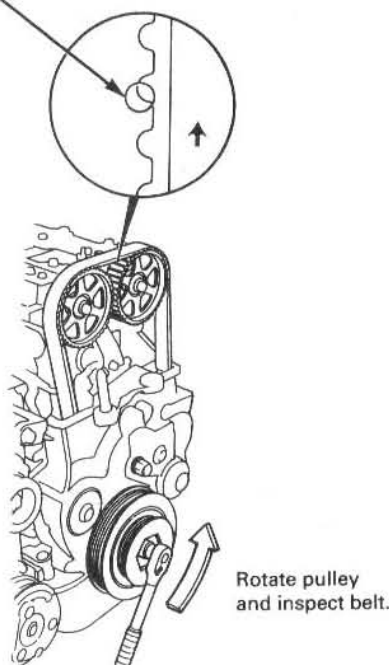
Timing Belt Inspection

1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.
2. Disconnect the battery negative terminal first, then the positive terminal.
3. Disconnect the alternator terminal and the connector, then remove the engine wire harness from the cylinder head cover.
4. Remove the cylinder head cover. Refer to pages 6-45, 46 when installing.
5. Remove the middle cover.
6. Inspect the timing belt for cracks and oil or coolant soaking.

NOTE:

- Replace the belt if oil or coolant soaked.
- Remove any oil or solvent that gets on the belt.

Inspect this area for wear.



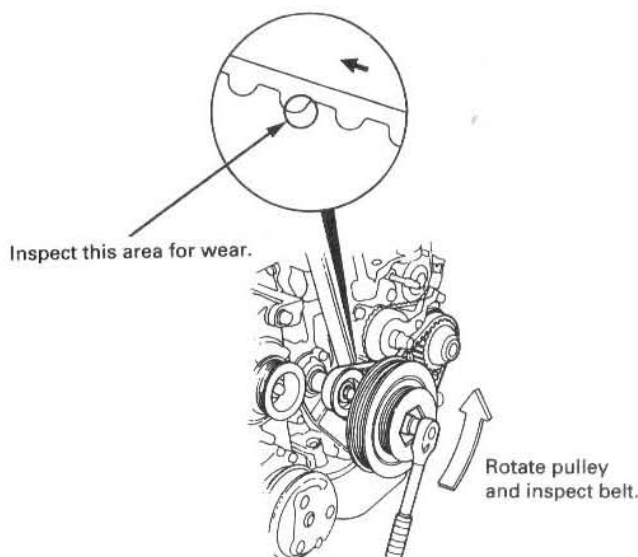
7. After inspecting, retorque the crankshaft pulley bolt to 245 N·m (25.0 kgf·m, 181 lbf·ft).
8. Enter the anti-theft code for the radio, then enter the customer's radio station presets.

Timing Balancer Belt Inspection

1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.
2. Disconnect the battery negative terminal first, then the positive terminal.
3. Disconnect the alternator terminal and the connector, then remove the engine wire harness from the cylinder head cover.
4. Remove the cylinder head cover. Refer to pages 6-45, 46 when installing.
5. Remove the middle cover.
6. Remove the crankshaft pulley.
7. Remove the lower cover.
8. Install the crankshaft pulley.
9. Inspect the timing balancer belt for cracks and oil or coolant soaking.

NOTE:

- Replace the belt if oil or coolant soaked.
- Remove any oil or solvent that gets on the belt.



10. After inspecting, retorque the crankshaft pulley bolt to 245 N·m (25.0 kgf·m, 181 lbf·ft).
11. Enter the anti-theft code for the radio, then enter the customer's radio station presets.

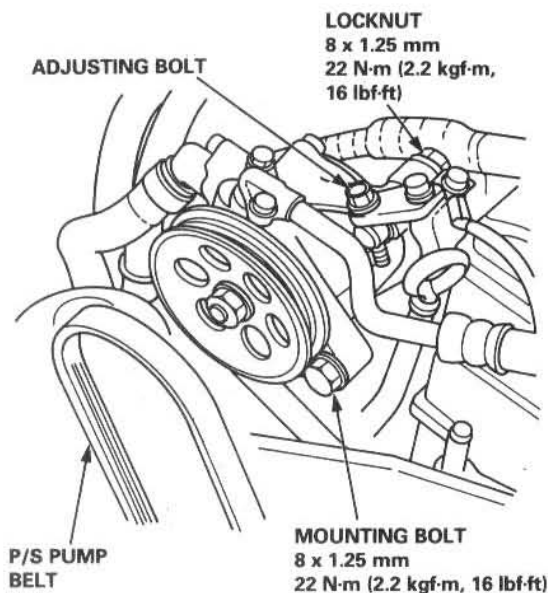
Timing Belt and Timing Balancer Belt

Removal

NOTE:

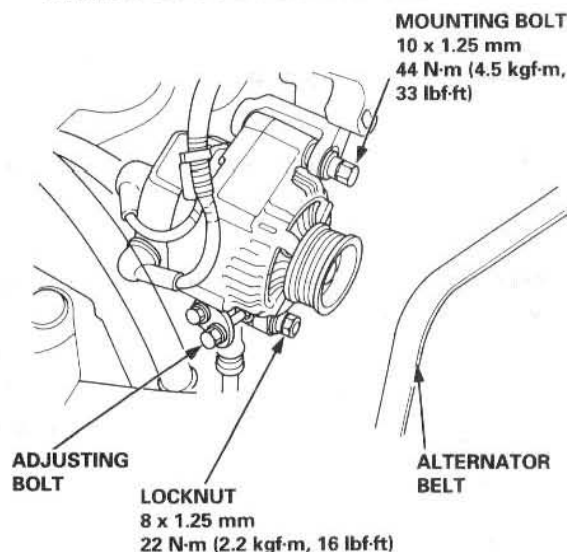
- Turn the crankshaft pulley so the No. 1 piston is at top dead center (TDC) before removing the belt (see page 6-17).
- Inspect the water pump after removing the timing belt (see page 10-10).
- Replace the timing belt and timing balancer belt at 105,000 miles (168,000 km) according to the maintenance schedule (normal conditions/severe conditions). If the vehicle is regularly driven in one or more of the following conditions, replace the timing belt and timing balancer belt at 60,000 miles (U.S.A.) 100,000 km (Canada).
 - In very high temperatures (over 110°F, 43°C).
 - In very low temperatures (under -20°F, -29°C).

1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's pre-set buttons.
2. Disconnect the battery negative terminal first, then the positive terminal.
3. Remove the wheelwell splash shield.
4. Loosen the adjusting bolt, locknut and mounting bolt, then remove the power steering (P/S) pump belt.



5. Remove the alternator terminal and connector (see page 6-25).

6. Loosen the adjusting bolt, mounting bolt and locknut, then remove the alternator belt.

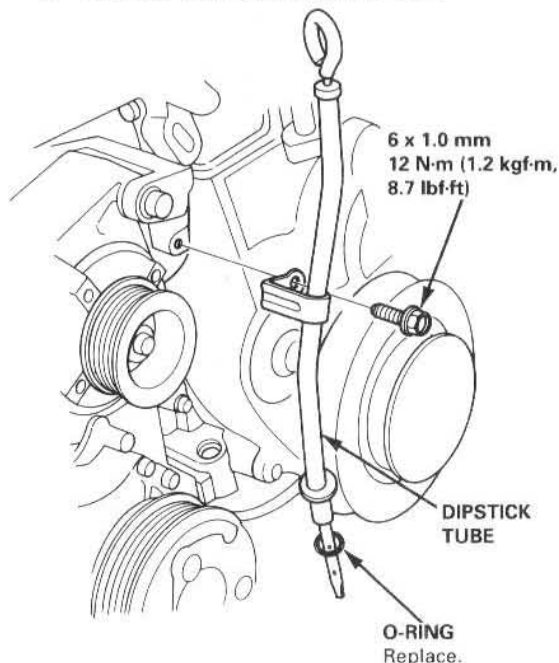


7. Remove the side engine mount.

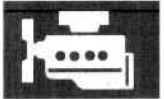
NOTE:

- Support the engine with a jack before removing the side engine mount and upper bracket assembly is removed.
- Make sure to place a cushion between the oil pan and the jack.

8. Remove the dipstick and the tube.



9. Remove the cylinder head cover. Refer to pages 6-45, 46 when installing.



NOTE: The procedures in steps 10 and 11 are for reusing the timing belt. For replacing the timing belt, skip these procedures and go to step 12.

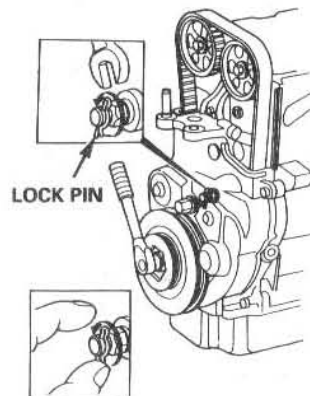
10. Use an open-end wrench to loosen the maintenance bolt. If it cannot be loosened with an open-end wrench, a box wrench can be used after removing the lock pin.

NOTE: Use of a tool should be limited to initial loosening only.

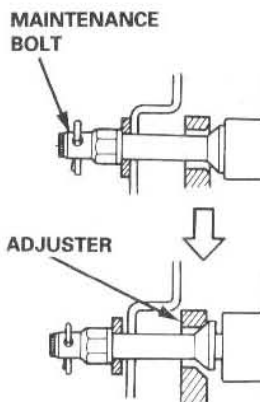
11. Unscrew the maintenance bolt by hand until it stops. The auto-tensioner bracket is now fixed.

NOTE:

- Never use a tool to unscrew the maintenance bolt after initial loosening it.
- If the auto-tensioner has been extended and the timing belt cannot be installed, remove the auto-tensioner, compress it and reinstall it (see page 6-16).



Auto-tensioner functional:



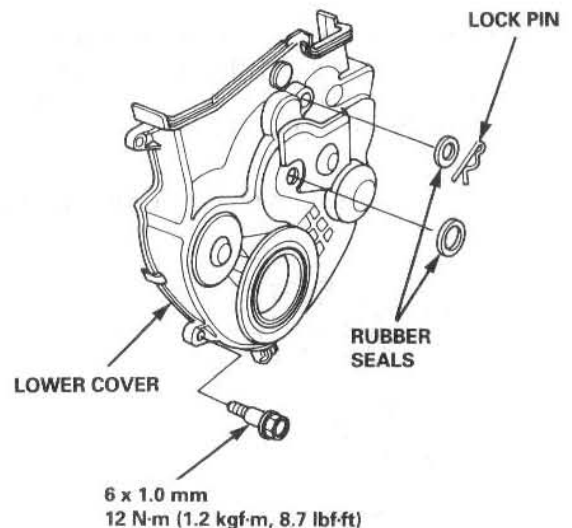
Auto-tensioner fixed in place:

12. Remove the middle cover.

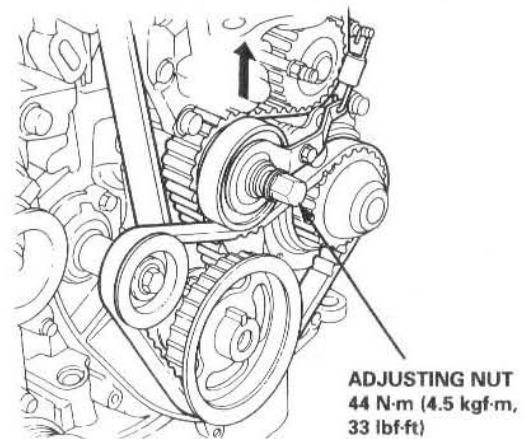
NOTE: Do not use the middle cover to store removed items.

13. Remove the pulley bolt and crankshaft pulley (see page 6-11).
14. Remove the lock pin and rubber seals, then remove the lower cover.

NOTE: Do not use the lower cover to store removed items.



15. Loosen the adjusting nut 2/3-1 turn. Push the tensioner to remove tension from the timing balancer belt, then retighten the adjusting nut.



16. Remove the timing balancer belt and timing belt.

Timing Belt and Timing Balancer Belt

Installation

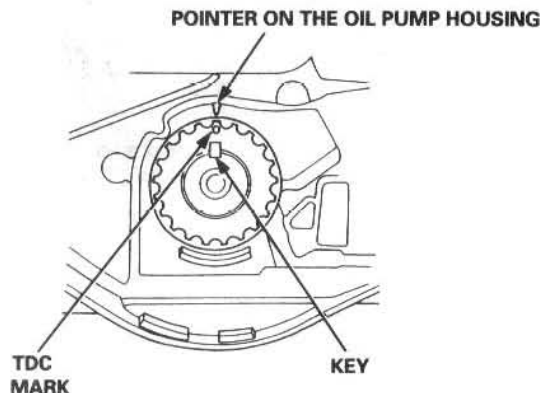
NOTE: This procedure is to replace the timing belt. If you are reusing the timing belt, go to page 6-19.

Install the timing belt and timing balancer belt in the reverse order of removal;

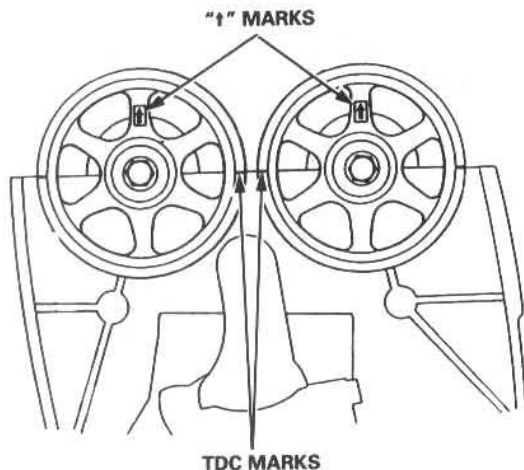
Only key points are described here.

NOTE: Clean the middle and lower covers before installation.

1. Remove the timing balancer belt drive pulley (see page 6-12).
2. Set the timing belt drive pulley so that the No. 1 piston is at top dead center (TDC). Align the dimple on the teeth of the timing belt drive pulley with the ▽ pointer on the oil pump.



3. The "↑" marks on the camshaft pulleys should be at the top, and the TDC grooves on the pulleys should align with the cylinder head surface.



4. Remove the auto-tensioner.
5. Hold the auto-tensioner with the maintenance bolt pointing up. Loosen and remove the maintenance bolt.

NOTE: Handle the auto-tensioner carefully so the oil inside does not spill or leak.

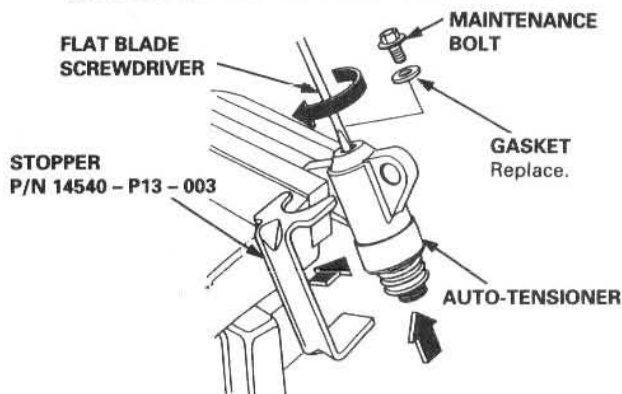
Replenish the auto-tensioner with oil if any spills or leaks. The total capacity is 8 ml (1/4 fl oz).

6. Clamp the boss of the auto-tensioner in a vise. Use pieces of wood or a cloth to protect the boss.

NOTE: Do not grip the housing of the auto-tensioner.

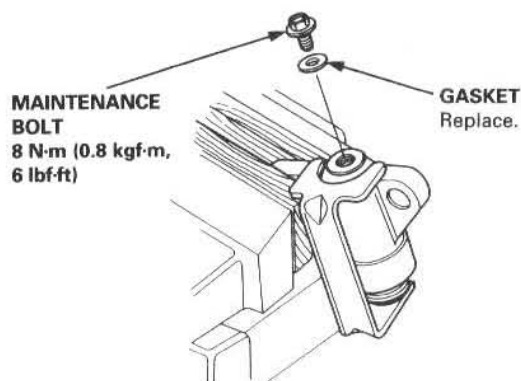
7. Insert a flat blade screwdriver into the maintenance hole. Place the stopper (P/N 14540 - P13 - 003) on the auto-tensioner while turning the screwdriver clockwise to compress the bottom.

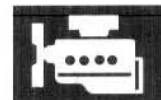
NOTE: Take care not to damage the threads or the gasket contact surface with the screwdriver.



8. Reinstall the maintenance bolt.

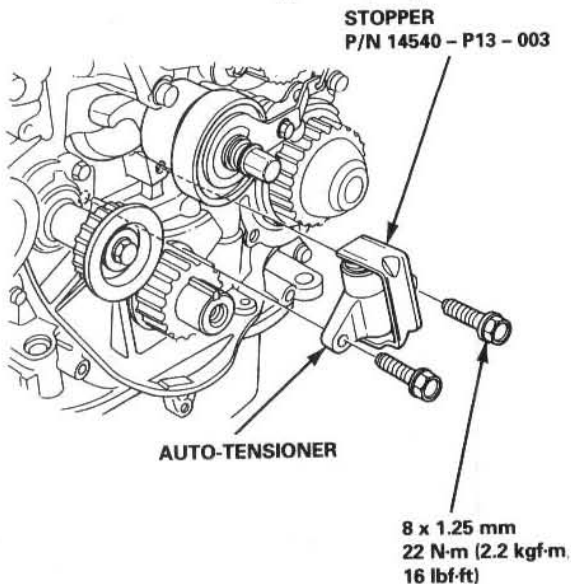
NOTE: Be sure to use a new gasket.





9. Make sure no oil is leaking around the maintenance bolt, then install the auto-tensioner.

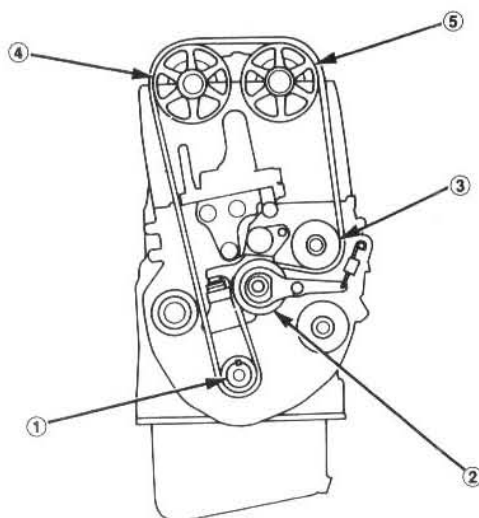
NOTE: Make sure the stopper stays in place.



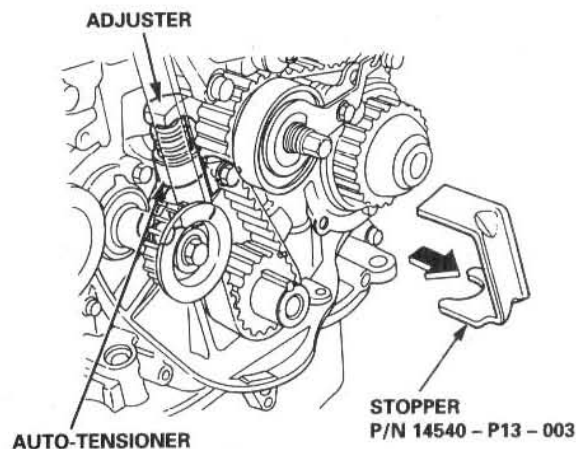
10. Install the timing belt tightly in the sequence shown.

① Timing belt drive pulley (crankshaft) → ② Adjusting pulley → ③ Water pump pulley → ④ Exhaust camshaft pulley → ⑤ Intake camshaft pulley.

NOTE: Make sure the timing belt drive pulley and camshaft pulleys are at TDC.



11. Remove the stopper.



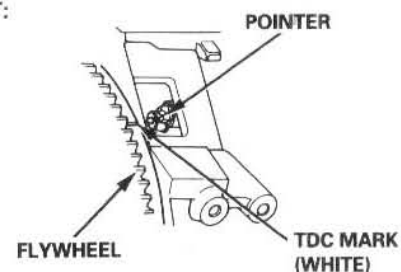
12. Install the timing balancer belt drive pulley and lower cover.

13. Install the crankshaft pulley, then tighten the pulley bolt (see page 6-11).

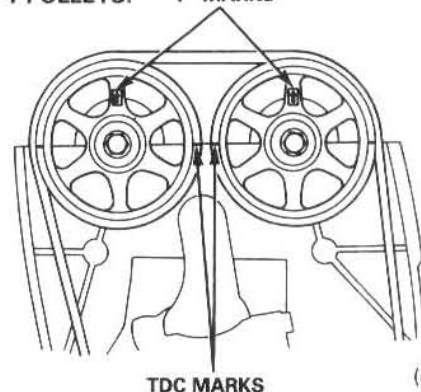
14. Rotate the crankshaft pulley about five or six turns counterclockwise so that the timing belt positions on the pulleys.

15. Make sure the crankshaft and camshaft pulleys are at TDC.

CRANKSHAFT:



CAMSHAFT PULLEYS: "f" MARKS

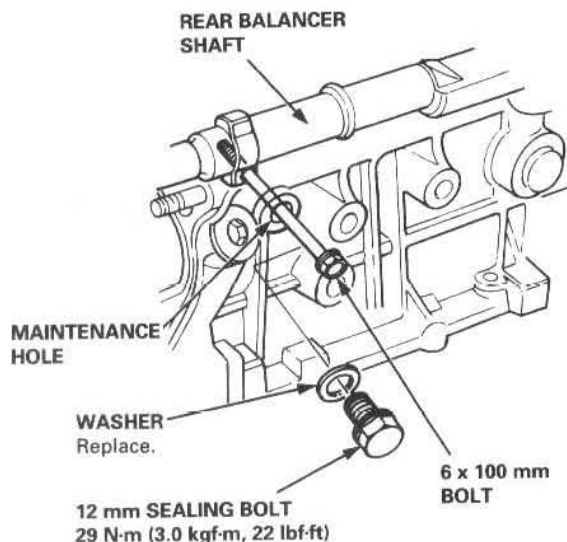
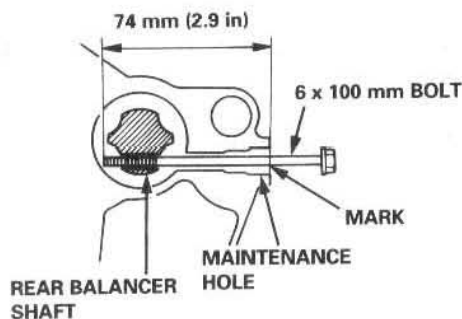


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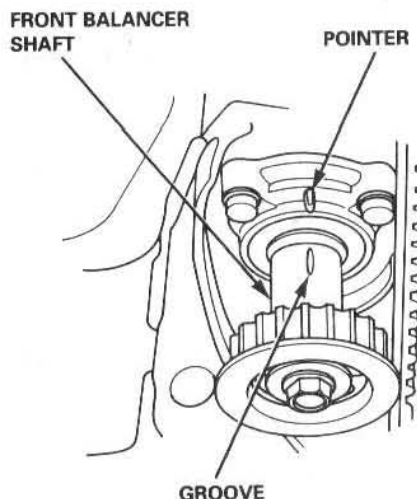
Timing Belt and Timing Balancer Belt

Installation (cont'd)

16. If either the camshaft or the crankshaft pulley is not positioned at TDC, remove the timing belt and adjust the positioning following the procedure on page 6-16, then reinstall the timing belt.
17. Set the crankshaft pulley so that the No. 1 piston is at TDC.
18. Remove the crankshaft pulley and lower cover.
19. Loosen the adjusting nut $2/3$ -1 turn, and verify that the timing balancer belt adjuster moves freely.
20. Retighten the adjusting nut.
21. Align the rear balancer shaft pulley by using a 6 x 100 mm bolt or equivalent as an tool. Scribe a line 74 mm (2.9 in) from the end of the bolt. Insert the bolt into the maintenance hole to the scribed line.



22. Align the groove on the front balancer shaft with the pointer on the oil pump housing as shown.



23. Install the timing balancer belt. Loosen the adjusting nut $2/3$ -1 turn to tension the timing balancer belt.
24. Remove the 6 x 100 mm bolt, then install the 12 mm sealing bolt.
25. Install the lower cover and crankshaft pulley, then tighten the pulley bolt (see page 6-11).
26. Turn the crankshaft pulley about one turn counter-clockwise, then tighten the adjusting nut.
27. Install the rubber seal around the adjusting nut.

NOTE: Do not loosen the adjusting nut.

28. After installation, adjust the tension of each belt.
 - See section 4 for alternator belt tension adjustment.
 - See section 17 for P/S pump belt tension adjustment.
29. Enter the anti-theft code for the radio, then enter the customer's radio station presets.



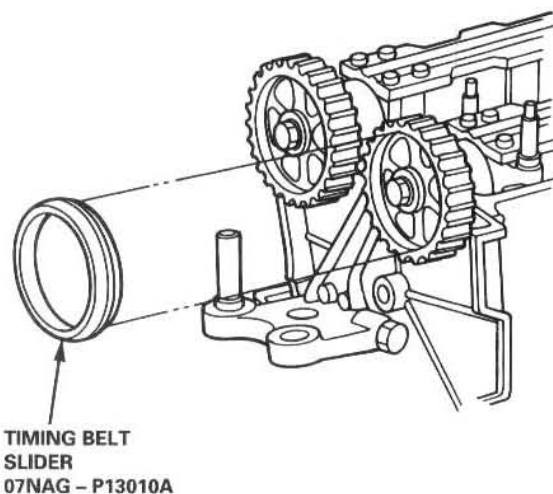
NOTE: Use this procedure when reusing the timing belt.

Install the timing belt and timing balancer belt in the reverse order of removal;

Only key points are described here.

NOTE: Clean the middle and lower covers before installation.

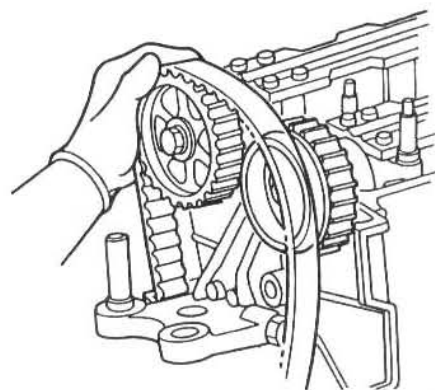
1. Remove the balancer belt drive pulley (see page 6-12).
2. Set the timing belt drive pulley so that the No. 1 piston is at TDC (see page 6-16).
3. Set the camshaft pulleys so that the No. 1 piston is at TDC (see page 6-16).
4. Install the special tool on the intake camshaft pulley.



5. Install the timing belt (see page 6-17).

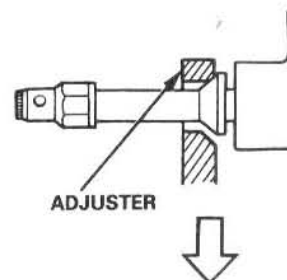
NOTE:

- If the auto-tensioner has extended and the timing belt cannot be installed, remove and compress the auto-tensioner (see page 6-16).
- Take care not to damage the timing belt when installing it.
- Make sure the timing belt drive pulley and camshaft pulleys are at TDC.

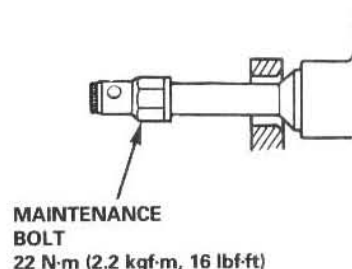


6. Remove the special tool.
7. Tighten the maintenance bolt to make the auto-tensioner functional.

Auto-tensioner fixed in place:



Auto-tensioner functional:



(cont'd)

Timing Belt and Timing Balancer Belt

Installation (cont'd)

8. Install the timing balancer belt drive pulley and lower cover.
9. Install the crankshaft pulley, then tighten the pulley bolt (see page 6-11).
10. Rotate the crankshaft pulley about five or six turns counterclockwise so that the timing belt positions on the pulleys.
11. Make sure the crankshaft pulley and camshaft pulleys are at TDC (see page 6-17).
12. If either camshaft and crankshaft pulley is not positioned at TDC, remove the timing belt and adjust the positioning following the procedure on page 6-16, then reinstall the timing belt.
13. Set the crankshaft pulley so that the No. 1 piston is at TDC.
14. Remove the crankshaft pulley and lower cover.
15. Loosen the adjusting nut 2/3-1 turn, and verify that the timing balancer belt adjuster moves freely.
16. Retighten the adjusting nut.
17. Align the rear balancer shaft pulley by using a 6 x 100 mm bolt or equivalent as a tool. Scribe a line 74 mm (2.9 in) from the end of the bolt. Insert the bolt into the maintenance hole to the scribed line (see page 6-18).
18. Align the groove on the front balancer shaft pulley with the pointer on the oil pump housing (see page 6-18).
19. Install the timing balancer belt. Loosen the adjusting nut 2/3-1 turn to tension the timing balancer belt.
20. Remove the 6 x 100 mm bolt, then install the 12 mm sealing bolt.
21. Install the lower cover and crankshaft pulley, then tighten the pulley bolt (see page 6-11).
22. Turn the crankshaft pulley about one turn counterclockwise, then tighten the adjusting nut.
23. Install the rubber seal around the adjusting nut.

NOTE: Do not loosen the adjusting nut.

24. After installation, adjust the tension of each belt.
 - See section 4 for alternator belt tension adjustment.
 - See section 17 for P/S pump belt tension adjustment.
25. Enter the anti-theft code for the radio, then enter the customer's radio station presets.

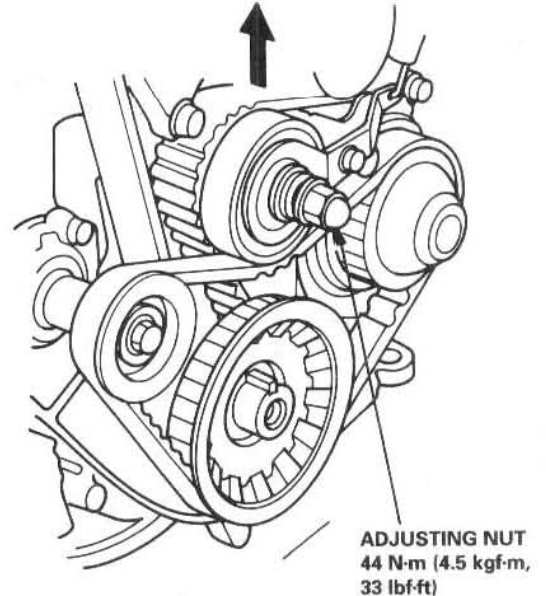


Replacement

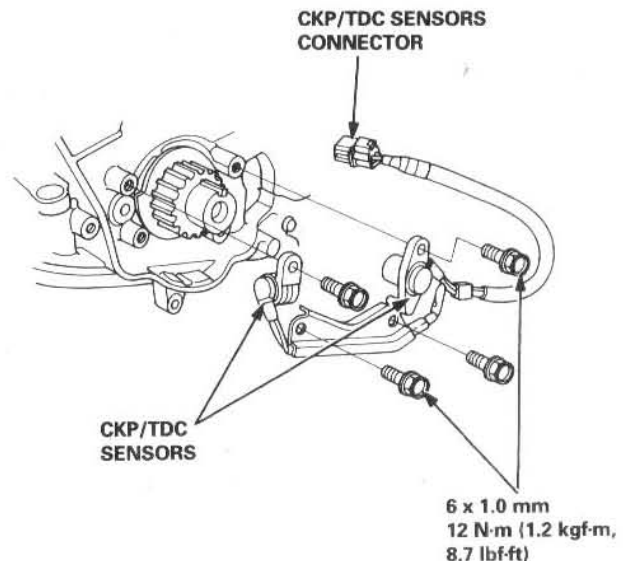
1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.
2. Disconnect the battery negative terminal first, then the positive terminal.
3. Remove the left front tire/wheel and the splash shield.
4. Loosen the adjusting bolt, locknut and mounting bolt, then remove the P/S pump belt.
5. Loosen the adjusting bolt, mounting bolt and locknut, then remove the alternator belt.
6. Remove the alternator terminal and connector.
7. Remove the dipstick and tube.
8. Remove the cylinder head cover.
9. Remove the pulley bolt and crankshaft pulley.
10. Remove the rubber seal from the adjusting nut, then remove the middle and lower covers.

NOTE: Do not use the middle and lower covers for storing removed items.

11. Loosen the adjusting nut 2/3-1 turn. Push the tensioner to remove tension from the timing balancer belt, then retighten the adjusting nut.



12. Remove the timing balancer belt and timing balancer belt drive pulley.
13. Disconnect the CKP/TDC sensors connector, then remove the CKP/TDC sensors.



14. Install the CKP/TDC sensors in the reverse order of removal.
15. Enter the anti-theft code for the radio, then enter the customer's radio station presets.

Cylinder Head

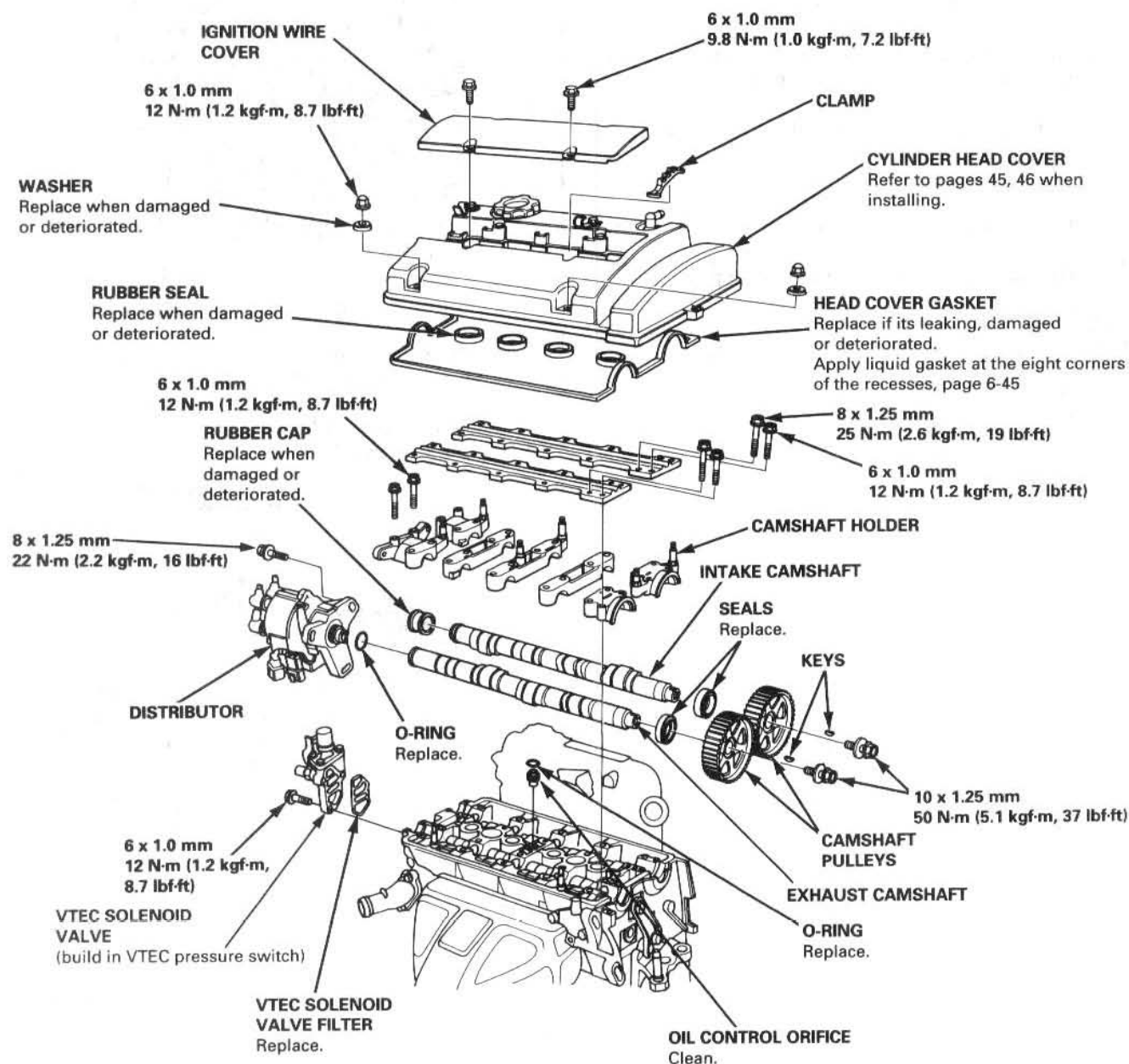
Illustrated Index

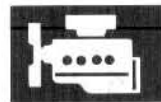
CAUTION:

- To avoid damaging the cylinder head, wait until the engine coolant temperature drops below 100°F (38°C) before removing it.
- In handling a metal gasket, take care not to fold it or damage the contact surface of the gasket.

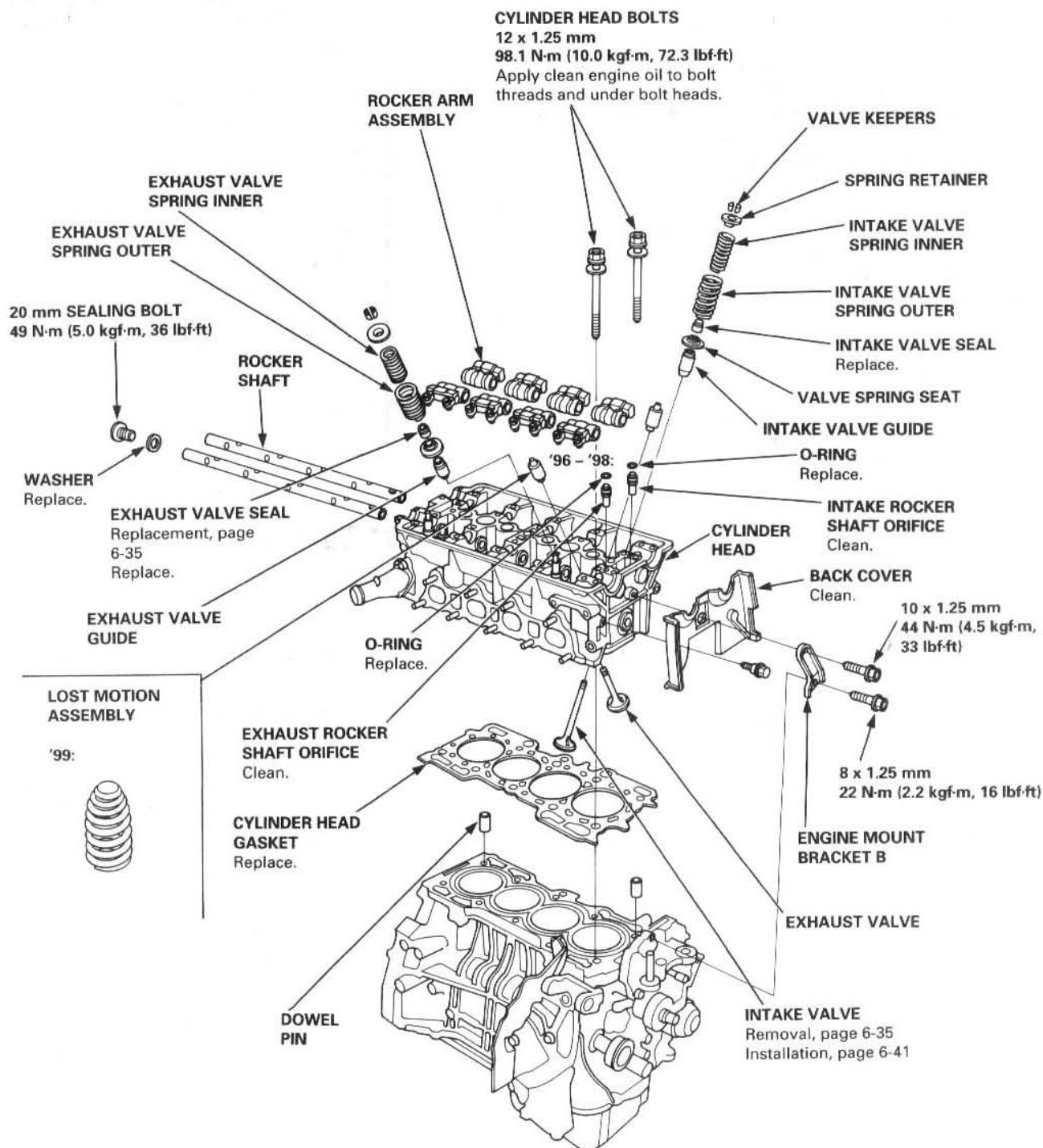
NOTE:

- Use new O-rings and gaskets when reassembling.
- Clean the oil control orifice before installing.





Prior to reassembling, clean all the parts in solvent, dry them and apply lubricant to any contact parts.



Cylinder Head

Removal

Engine-removal is not required for this procedure.

▲ WARNING Make sure jacks and safety stands are placed properly.

CAUTION:

- Use fender covers to avoid damaging painted surfaces.
- Unplug the wiring connectors carefully while holding the connector portion to avoid damage.
- To avoid damaging the cylinder head, wait until the engine coolant temperature drops below 100°F (38°C) before loosening the retaining bolts.

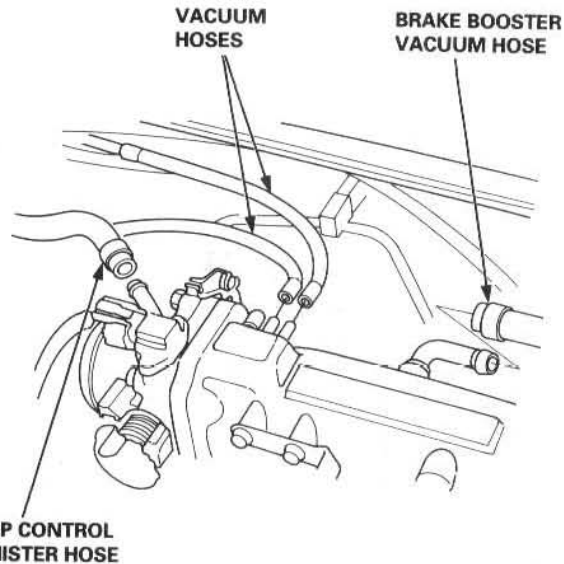
NOTE:

- Mark all wiring and hoses to avoid misconnection. Also, be sure that they do not contact other wiring or hoses, or interfere with other parts.
 - Inspect the timing belt before removing the cylinder head.
 - Turn the crankshaft pulley so that the No. 1 piston is at top dead center (see page 6-17).
1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.
 2. Disconnect the battery negative terminal first, then the positive terminal.
 3. Drain the engine coolant (see page 10-5). Remove the radiator cap to speed draining.
 4. Remove the intake air duct and air cleaner cover (see page 5-2).
 5. Remove the mounting bolt, locknut and adjusting bolt, then remove the power steering (P/S) pump belt and pump (see page 5-4).
 6. Loosen the mounting bolt, locknut and adjusting bolt, then remove the alternator belt (see page 5-4).
 7. Remove the throttle cable by loosening the locknut, then slip the cable end out of the throttle linkage (see page 5-4).

NOTE:

- Take care not to bend the cable when removing it. Always replace any kinked cable with a new one.
- Adjust the throttle cable when installing (see section 11).

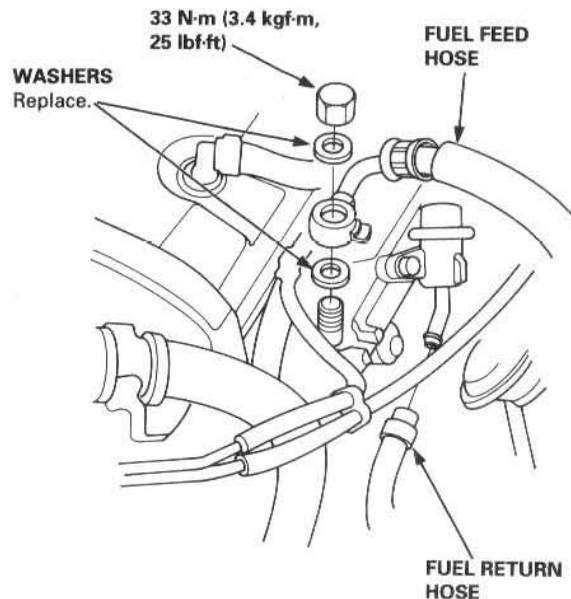
8. Remove the evaporative emission (EVAP) control canister hose, brake booster vacuum hose and vacuum hoses.



9. Relieve fuel pressure (see section 11).

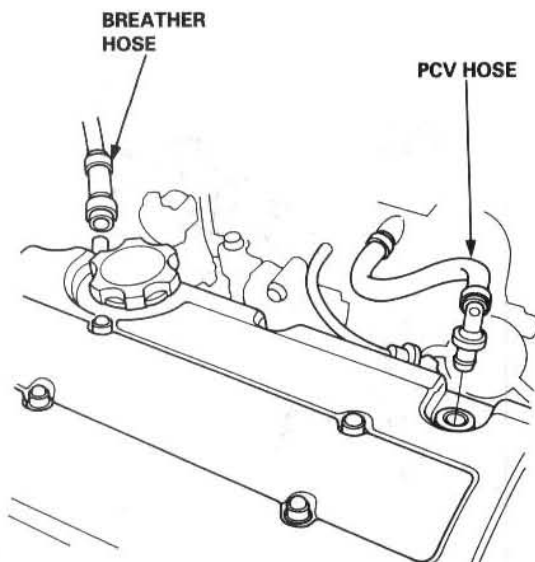
▲ WARNING Do not smoke while working on the fuel system, keep open flame or spark away from work area. Drain fuel only into an approved container.

10. Remove the fuel feed hose and fuel return hose.

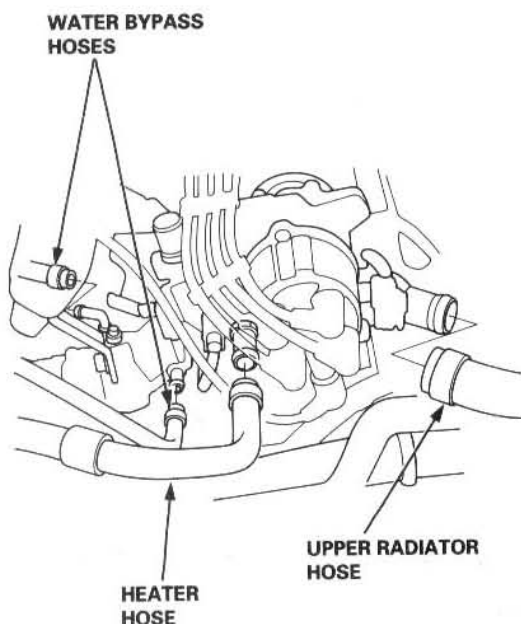




11. Remove the breather hose and positive crankcase ventilation (PCV) hose.



12. Remove the upper radiator hose, heater hose and water bypass hoses.



13. Remove the engine wire harness connectors and wire harness clamps from the cylinder head and the intake manifold.

- Four fuel injector connectors
- Engine coolant temperature (ECT) sensor connector
- Radiator fan switch connector
- Coolant temperature gauge sending unit connector
- Throttle position (TP) sensor connector
- Manifold absolute pressure (MAP) sensor connector
- Primary and secondary heated oxygen sensor (HO2S) connectors
- Idle air control (IAC) valve connector
- Distributor connector
- VTEC solenoid valve connector
- VTEC pressure switch connector
- CKP/TDC sensors connector

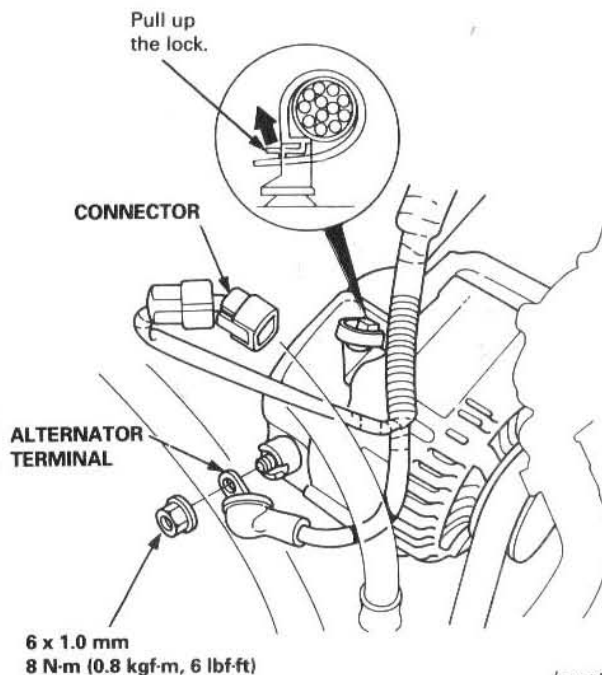
14. Remove the spark plug caps and distributor from the cylinder head.

15. Remove the side engine mount and upper bracket assembly (see page 5-9).

NOTE:

- Support the engine with a jack before removing the side engine mount.
- Make sure to place a cushion between the oil pan and the jack.

16. Remove the battery cable and alternator connector.

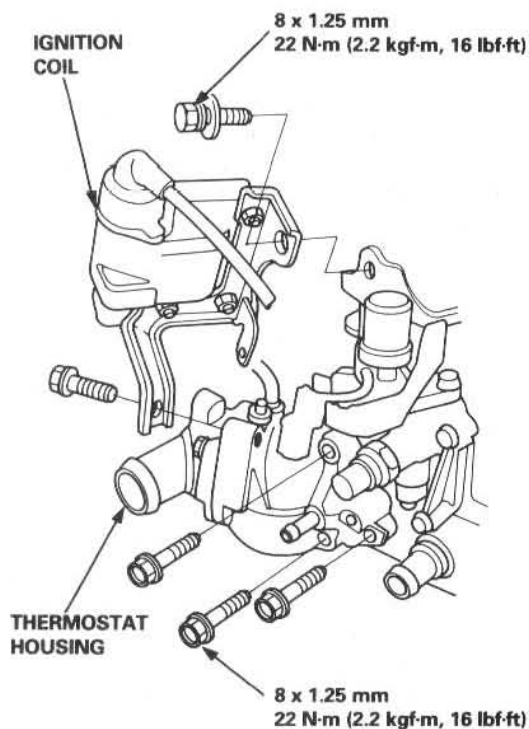


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Cylinder Head

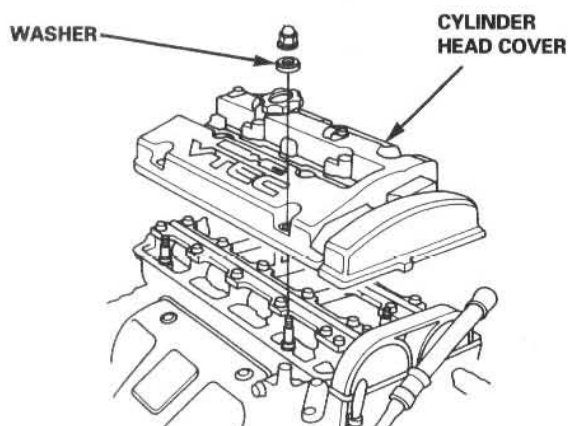
Removal (cont'd)

17. Remove the thermostat housing mounting bolts.



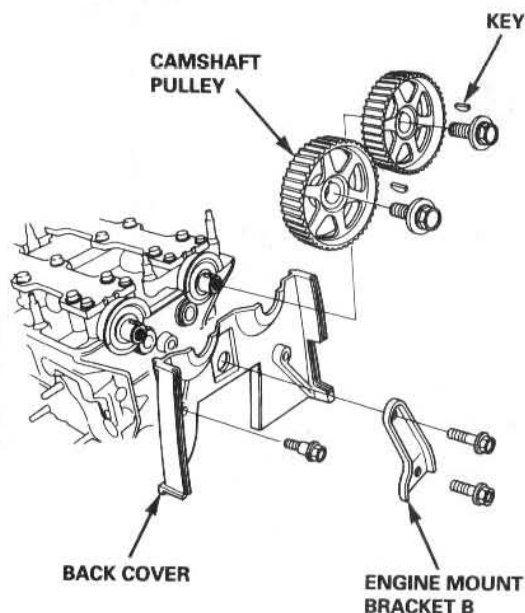
18. Remove the ignition coil.

19. Remove the cylinder head cover.

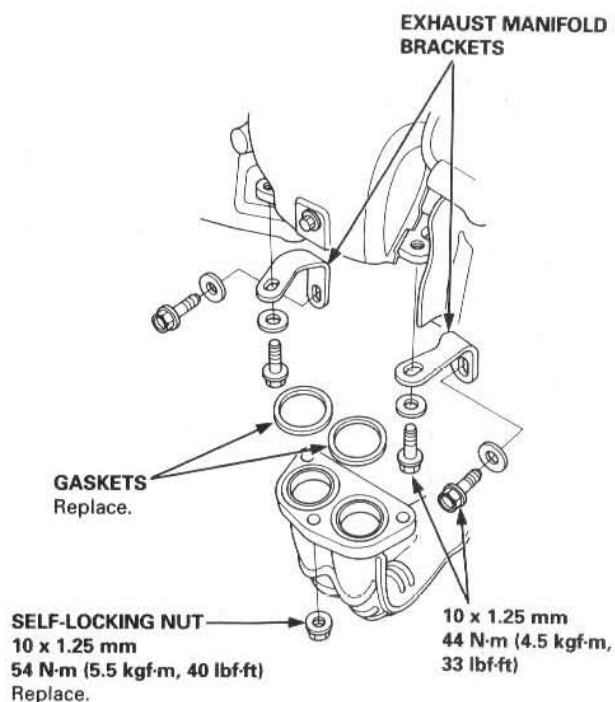


20. Remove the timing belt (see page 6-14).

21. Remove the engine mount bracket B and camshaft pulleys, then remove the back cover.

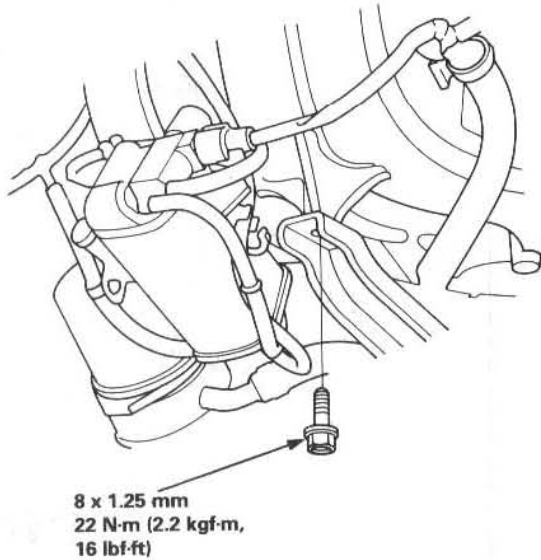


22. Remove the exhaust manifold brackets and self locking nuts.

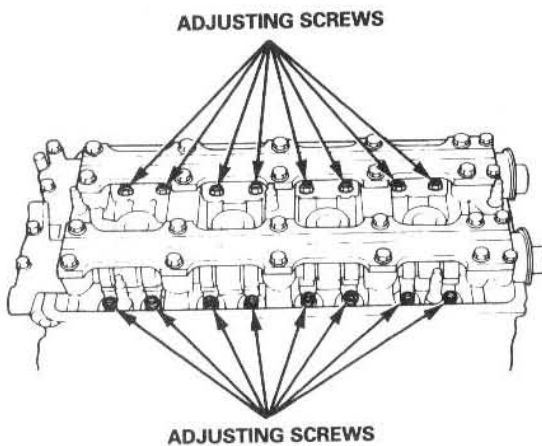




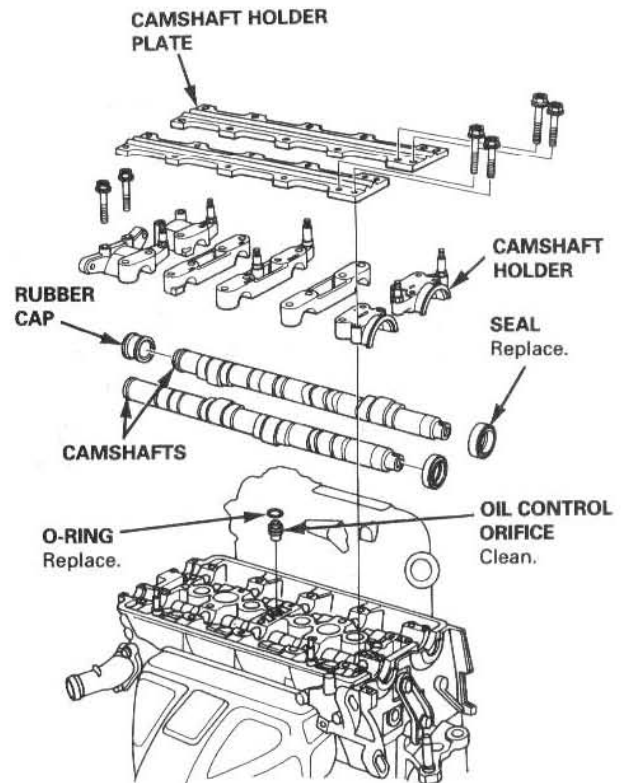
23. Remove the intake manifold mounting bolt.



24. Loosen the rocker arm adjusting screws.



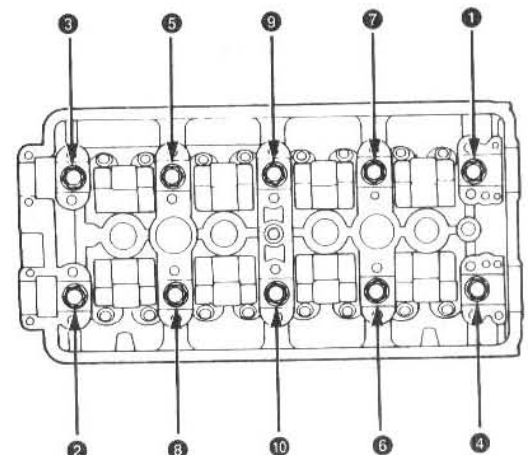
25. Remove the camshaft holder plates, camshaft holders and camshafts.



26. Remove the cylinder head bolts, then remove the cylinder head.

CAUTION: To prevent warpage, unscrew the bolts in sequence 1/3 turn at a time; repeat the sequence until all bolts are loosened.

CYLINDER HEAD BOLTS LOOSENING SEQUENCE:

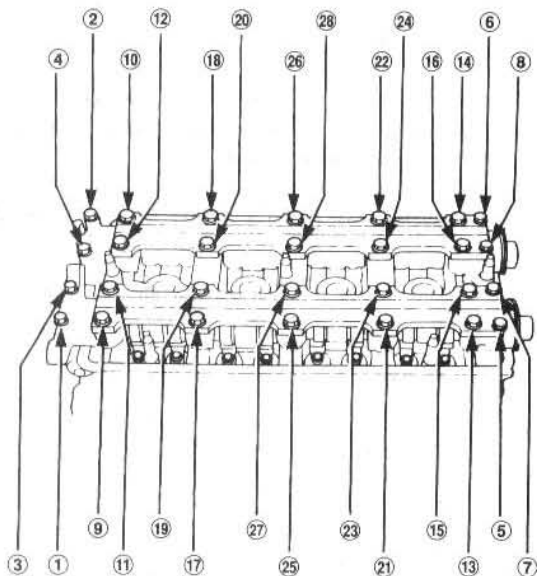
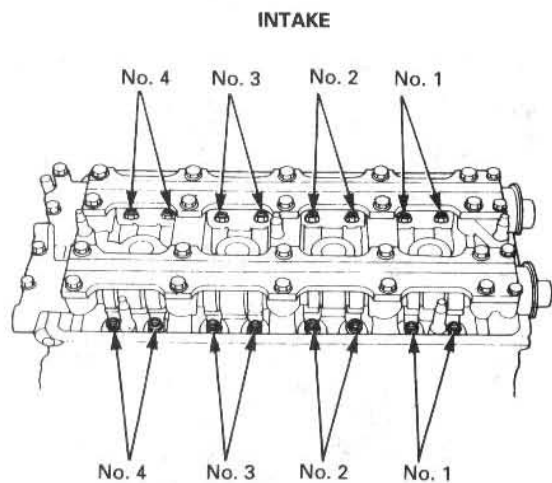


Rocker Arms and Shafts

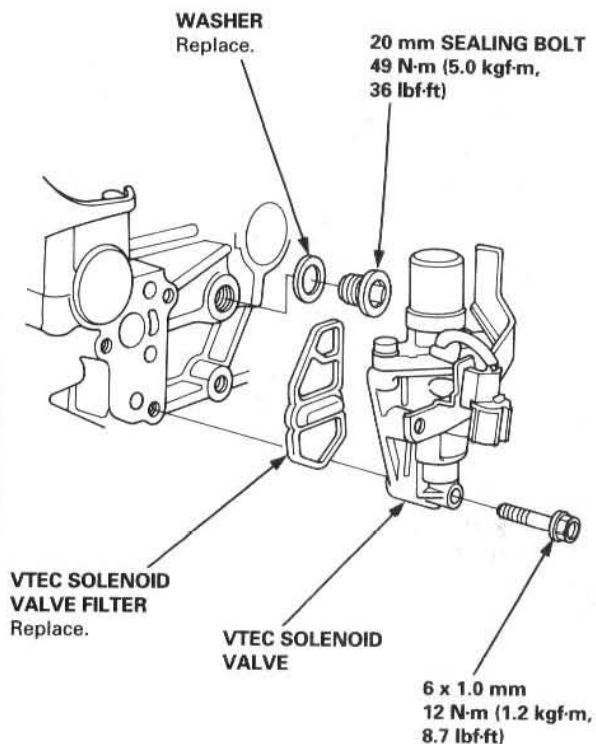
Removal

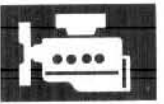
1. Loosen the adjusting screws, then remove the camshaft holder plates, camshaft holders and camshafts.

NOTE: Unscrew the camshaft holder bolts two turns at a time, in a crisscross pattern, to prevent damaging the valves or rocker arm assembly.

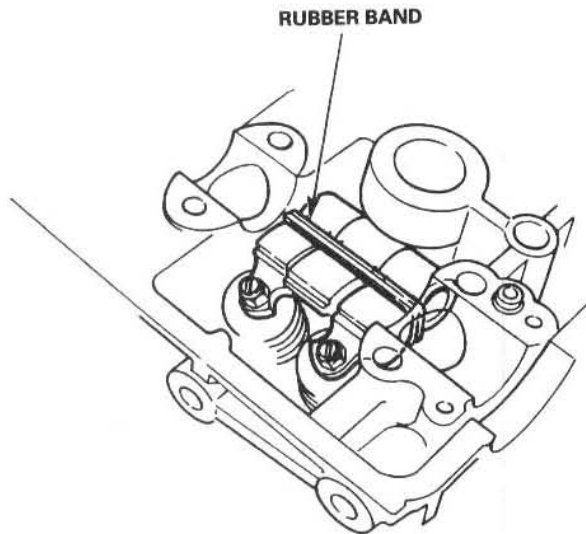


2. Remove the VTEC solenoid valve and 20 mm sealing bolt.



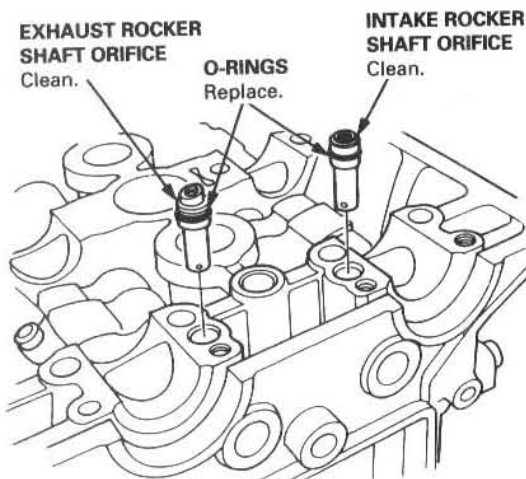


3. Hold the rocker arms together with a rubber band to prevent them from separating.

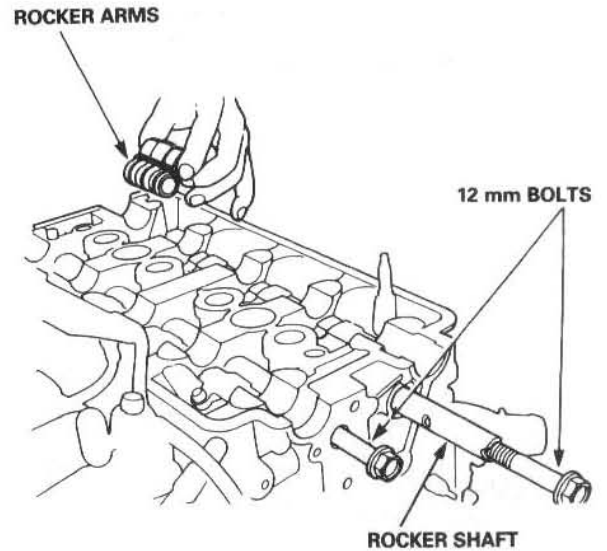


4. Remove the intake and exhaust rocker shaft orifices.

NOTE: The shapes of the rocker shaft orifices of the intake and exhaust are different. Identify the parts as they are removed to ensure reinstallation in the original locations.



5. Screw 12 mm bolts into the rocker arm shafts. Remove each rocker arm while slowly pulling out the intake and exhaust rocker arm shafts.




Rocker Arms and Shafts

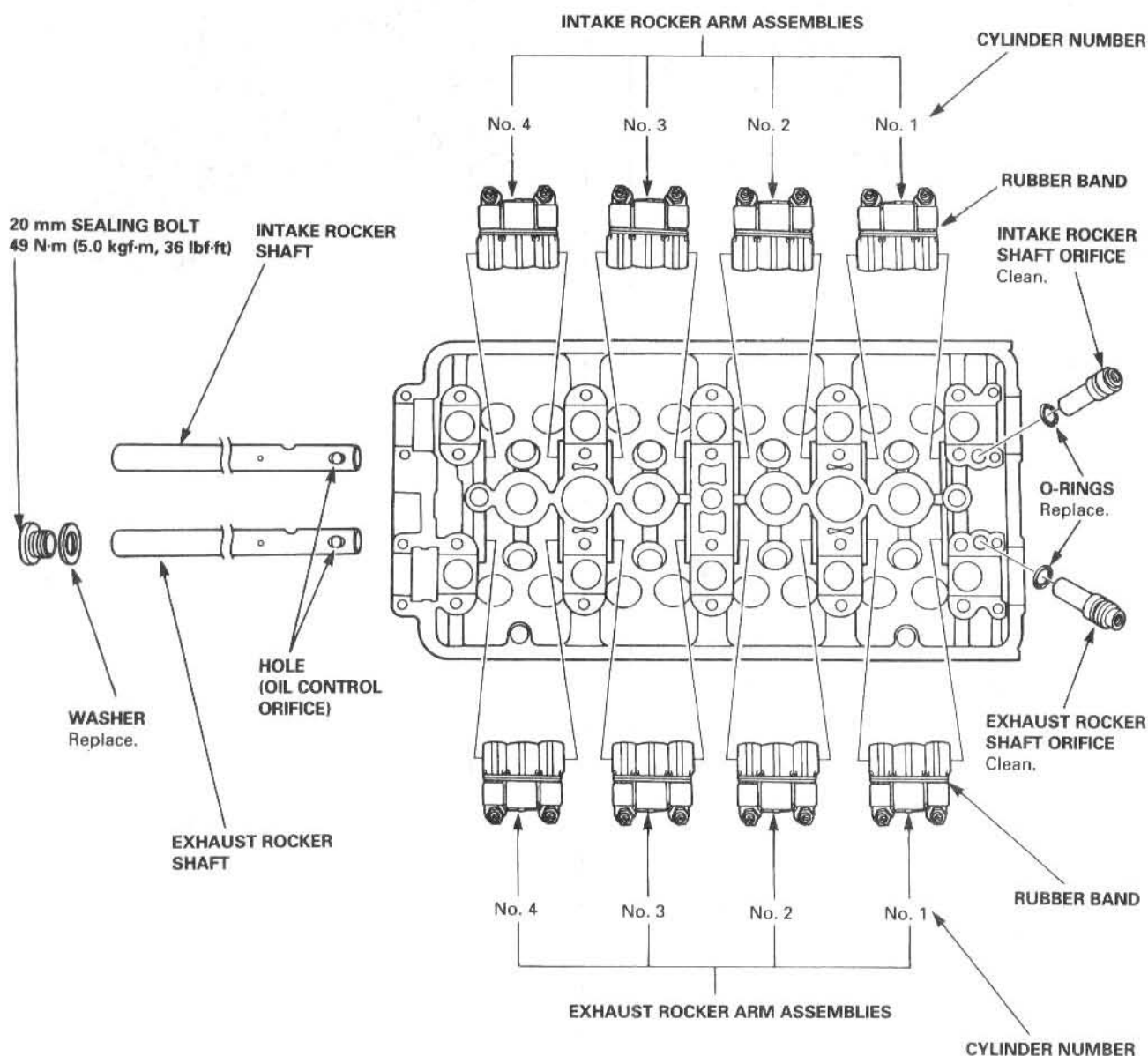
Disassembly/Reassembly

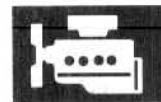
CAUTION: After installing the rocker shaft orifice, try to turn the rocker shaft to make sure that the orifice has been inserted in the hole of rocker shaft correctly. If the orifice is in place, it should not turn.

NOTE:

- Identify parts as they are removed to ensure reinstallation in original locations.
- Inspect rocker shafts and rocker arms (see pages 6-31 and 32).
- Rocker arms must be installed in the same position if reused.
- Clean the intake and exhaust rocker shaft orifices before installing.

 Prior to reinstalling, clean all the parts in solvent, dry them and apply lubricant to any contact surfaces.

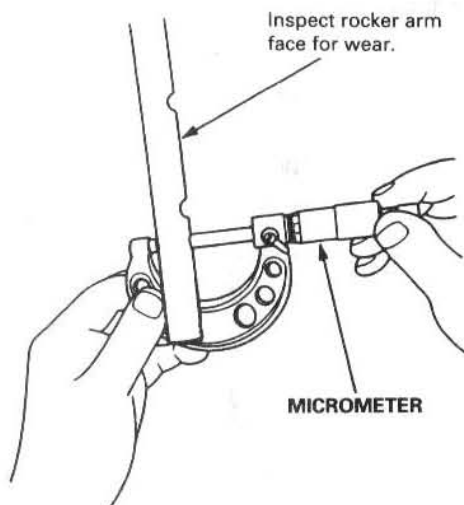




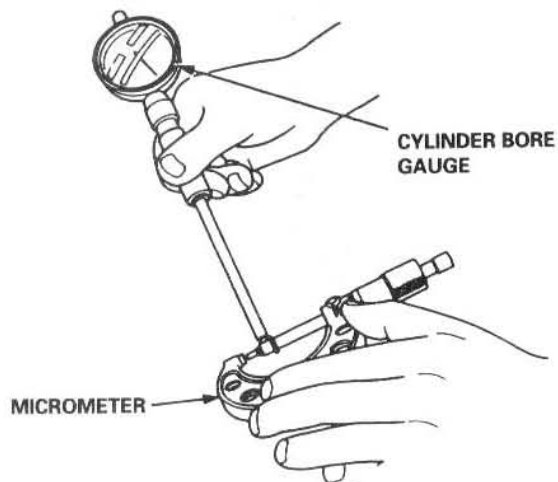
Clearance Inspection

Measure both the intake rocker shaft and exhaust rocker shaft.

1. Measure the diameter of each shaft at first the rocker location.



2. Zero the cylinder bore gauge to the shaft diameter.



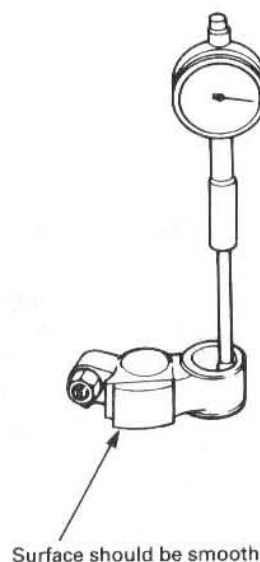
3. Measure the inside diameter of each rocker arm, and check for an out-of round condition.

Rocker Arm-to-Shaft Clearance:

Intake and Exhaust

Standard (New): 0.025 – 0.052 mm
(0.0010 – 0.0020 in)

Service Limit: 0.08 mm (0.003 in)



4. Repeat for all rockers. If over limit, replace the rocker shaft and all overtolerance rocker arms.

NOTE: If any rocker arm needs replacement, replace all three rocker arms in that set (primary, mid, and secondary).

Rocker Arms

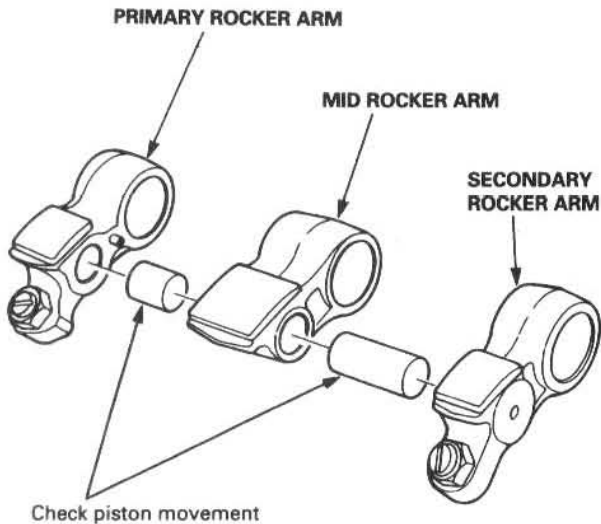
Lost Motion Assemblies

Inspection

NOTE: When reassembling the primary rocker arm, carefully apply air pressure to the oil passage of the rocker arm.

Inspect the rocker arm piston. Push it manually.

If it does not move smoothly, replace the rocker arm assembly.



NOTE:

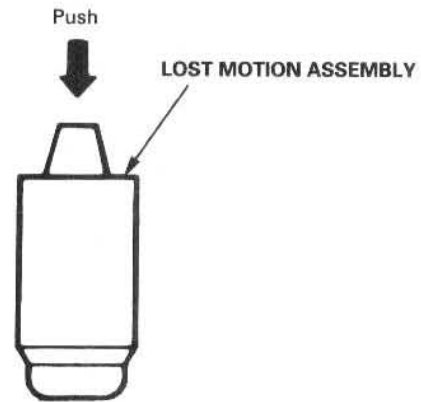
- Apply oil to the pistons when reassembling.
- Bundle the rocker arms with a rubber band to prevent them from separating.

Inspection

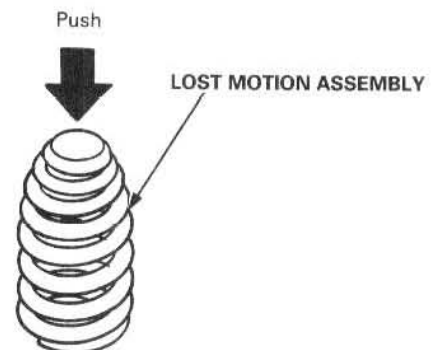
Remove the lost motion assembly from the cylinder head and inspect it. Pushing it gently with the finger will cause it to compress slightly. Increasing the force on it will cause it to compress further.

If the lost motion assembly does not move smoothly, replace it.

'97 - '98 models:



'99 model:





Inspection

NOTE: Do not rotate the camshaft during inspection.

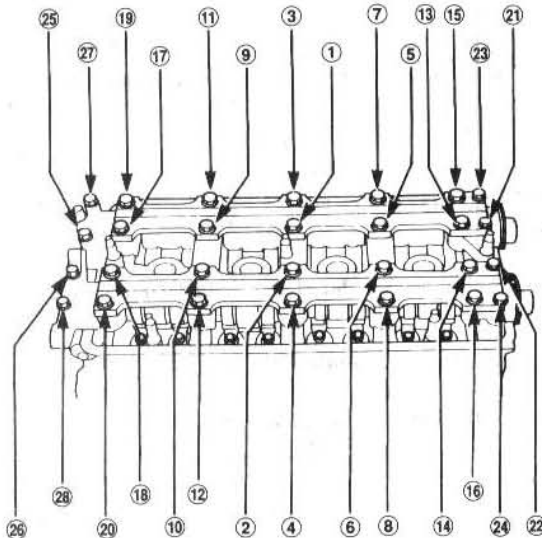
1. Remove the rocker arms and rocker shafts.

NOTE: Rocker arms must be installed in the same position if reused.

2. Put the camshafts, camshaft holders and holder plates on the cylinder head, then tighten the bolts to the specified torque.

Specified torque:

- ① - ②⑩: 8 x 1.25 mm
25 N·m (2.6 kgf·m, 19 lbf·ft)
- ②① - ②⑧: 6 x 1.0 mm
12 N·m (1.2 kgf·m, 8.7 lbf·ft)

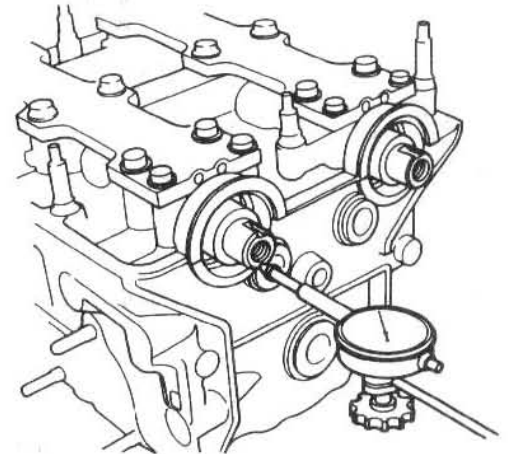


3. Seat the camshafts by pushing them toward the distributor end of the cylinder head.
4. Zero the dial indicator against the end of the camshaft, then push the camshaft back and forth. Read the end play.

Camshaft End Play:

Standard (New): 0.05 - 0.15 mm
(0.002 - 0.006 in)

Service Limit: 0.5 mm (0.02 in)



5. Remove the camshaft holders and holder plate bolts from the cylinder head.
6. Lift the camshaft out of the cylinder head, wipe it clean, then inspect the lift ramps. Replace the camshaft if any lobes are pitted, scored, or excessively worn.
7. Clean the camshaft holder surfaces in the cylinder head, then set the camshaft back in place.
8. Place a plastigage strip across each journal.
9. Install the camshaft holders and holder plates. Torque the bolts to the values and in the sequence shown in left column.

(cont'd)

Camshafts

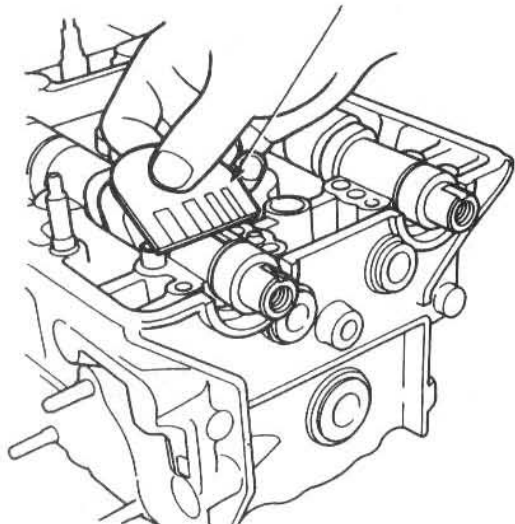
Inspection (cont'd)

10. Measure the widest the portion of the plastigage on each journal.

Camshaft-to-Holder Oil Clearance:

Standard (New): 0.050 – 0.089 mm
(0.0020 – 0.0035 in)

Service Limit: 0.15 mm (0.006 in)



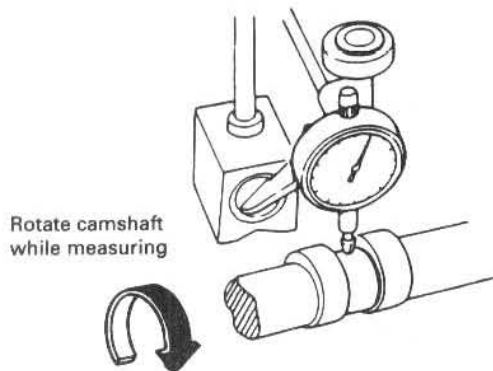
11. If the camshaft-to-holder oil clearance is out of tolerance:

- And the camshaft has already been replaced, you must replace the cylinder head.
- If the camshaft has not been replaced, first check the total runout with the camshaft supported on V-blocks.

Camshaft Total Runout:

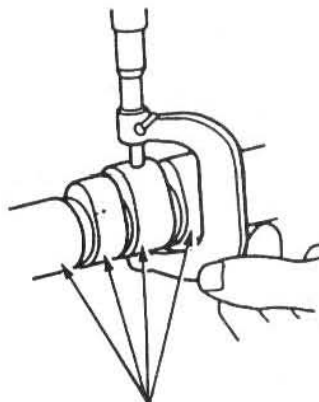
Standard (New): 0.03 mm (0.001 in) max.

Service Limit: 0.04 mm (0.002 in)

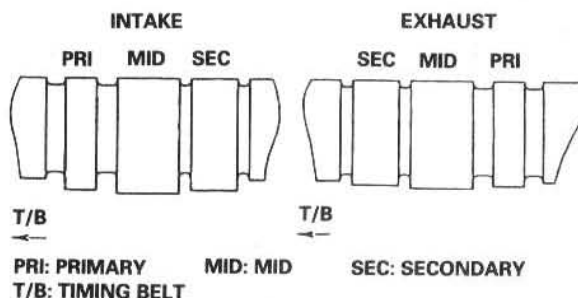


- If the total runout of the camshaft is within tolerance, replace the cylinder head.
- If the total runout is out of tolerance, replace the camshaft and recheck. If the bearing clearance is still out of tolerance, replace the cylinder head.

12. Measure cam lobe height.



Inspect this area for wear.



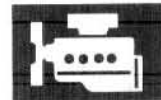
Cam Lobe Height Standard (New):

Except M/T with active torque transfer (ATTS)

	INTAKE	EXHAUST
PRIMARY	34.041 mm (1.3402 in)	33.745 mm (1.3285 in)
MID	36.856 mm (1.4510 in)	36.323 mm (1.4300 in)
SECONDARY	34.971 mm (1.3768 in)	34.683 mm (1.3655 in)

M/T with ATTS

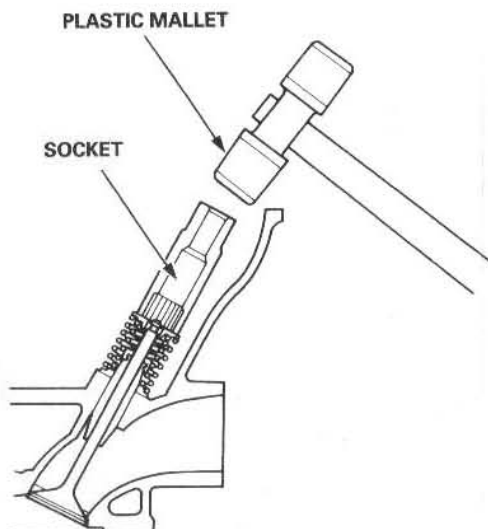
	INTAKE	EXHAUST
PRIMARY	34.041 mm (1.3402 in)	33.745 mm (1.3285 in)
MID	37.229 mm (1.4657 in)	36.704 mm (1.4450 in)
SECONDARY	34.971 mm (1.3768 in)	34.683 mm (1.3655 in)



Removal

NOTE: Identify valves and valve springs as they are removed so that each item can be reinstalled in its original position.

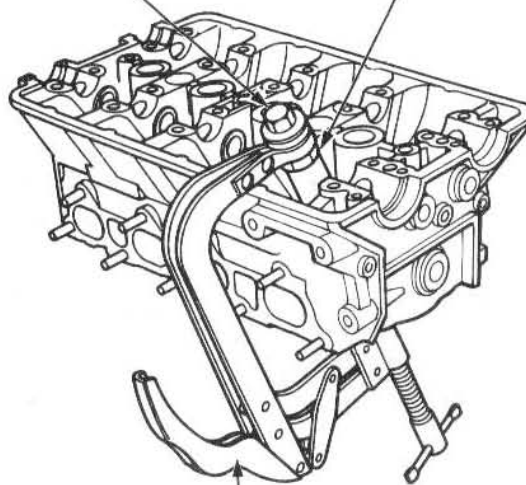
1. Using an appropriately-sized socket and plastic mallet, lightly tap the valve retainer to loosen the valve keepers before installing the valve spring compressor.



2. Install the valve spring compressor. Compress the spring and remove the valve keeper.

VALVE SPRING
COMPRESSOR ATTACHMENT
EXTENSION
07MAF - PR9010A

VALVE SPRING
COMPRESSOR
ATTACHMENT
07757 - PJ1010A



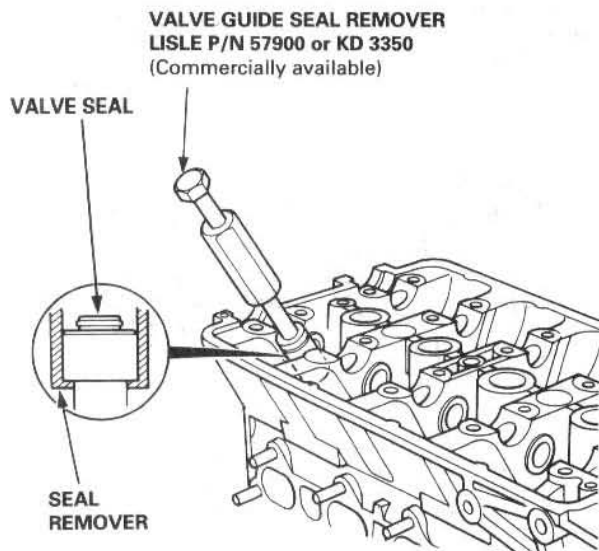
VALVE SPRING COMPRESSOR
SNAP-ON CF711 or KD383
with #32 jaws
(Commercially available)

(cont'd)

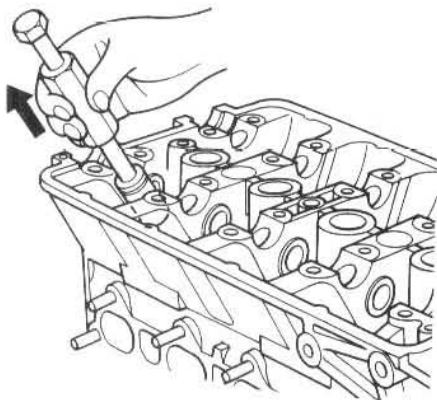
Valves, Valve Springs and Valve Seals

Removal (cont'd)

3. Install the special tool as shown.

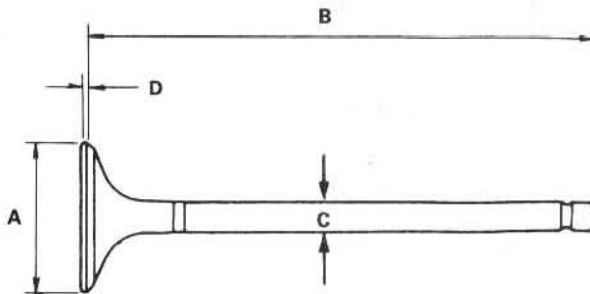


4. Remove the valve seal.



5. Measure the valves in the areas shown.

Valve Dimensions:



Intake Valve

A Standard (New): 34.90 – 35.10 mm

(1.374 – 1.382 in)

B Standard (New): 105.40 – 105.70 mm

(4.150 – 4.161 in)

C Standard (New): 5.475 – 5.485 mm

(0.2156 – 0.2159 in)

C Service Limit: 5.445 mm (0.2144 in)

D Standard (New): 1.05 – 1.35 mm

(0.041 – 0.053 in)

D Service Limit: 0.85 mm (0.034 in)

Exhaust Valve

A Standard (New): 29.90 – 30.10 mm

(1.177 – 1.185 in)

B Standard (New): 105.00 – 105.30 mm

(4.134 – 4.146 in)

C Standard (New): 5.475 – 5.485 mm

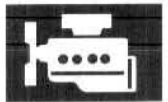
(0.2156 – 0.2159 in)

C Service Limit: 5.445 mm (0.2144 in)

D Standard (New): 1.65 – 1.95 mm

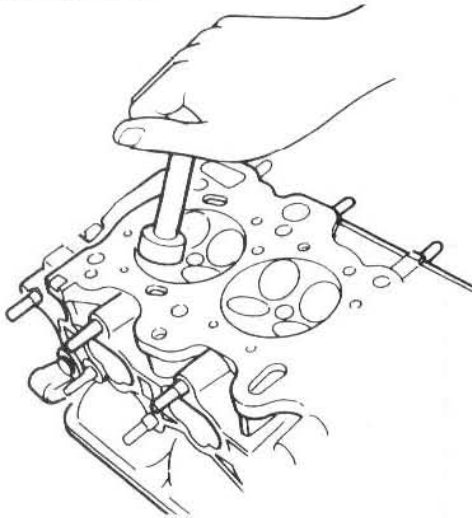
(0.065 – 0.078 in)

D Service Limit: 1.45 mm (0.057 in)



Reconditioning

1. Renew the valve seats in the cylinder head using a valve seat cutter.



NOTE: If guides are worn (see page 6-38), replace them (see page 6-39) before cutting the valve seats.

2. Carefully cut a 45° seat, removing only enough material to ensure a smooth and concentric seat.
3. Bevel the upper edge of the seat with the 30° cutter and the lower edge of the seat with the 60° cutter. Check the width of the seat and adjust accordingly.
4. Make one more very light pass with the 45° cutter to remove any possible burrs caused by the other cutters.

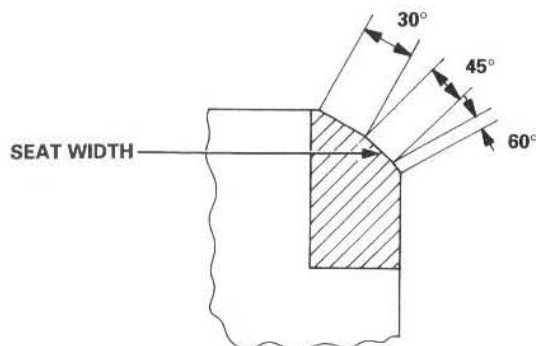
Valve Seat Width:

Standard (New):

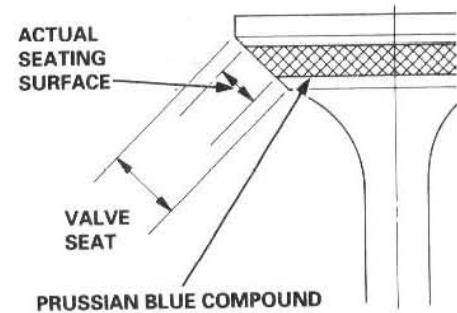
Intake: 1.30 – 1.50 mm (0.051 – 0.059 in)

Exhaust: 1.25 – 1.55 mm (0.049 – 0.061 in)

Service Limit: 2.00 mm (0.079 in)



5. After resurfacing the seat, inspect for even valve seating: Apply Prussian Blue compound to the valve face, and insert the valve in the original location in the head, then lift it and snap it closed against the seat several times.



6. The actual valve seating surface, as shown by the blue compound, should be centered on the seat.
 - If it is too high (closer to the valve stem), you must make a second cut with the 60° cutter to move it down, then one more cut with the 45° cutter to restore seat width.
 - If it is too low (close to the valve edge), you must make a second cut with the 30° cutter to move it up, then one more cut with the 45° cutter to restore seat width.

NOTE: The final cut should always be made with the 45° cutter.

7. Insert the intake and exhaust valves in the head and measure valve stem installed height.

Intake Valve Stem Installed Height:

Standard (New): 42.5 – 42.7 mm

(1.673 – 1.681 in)

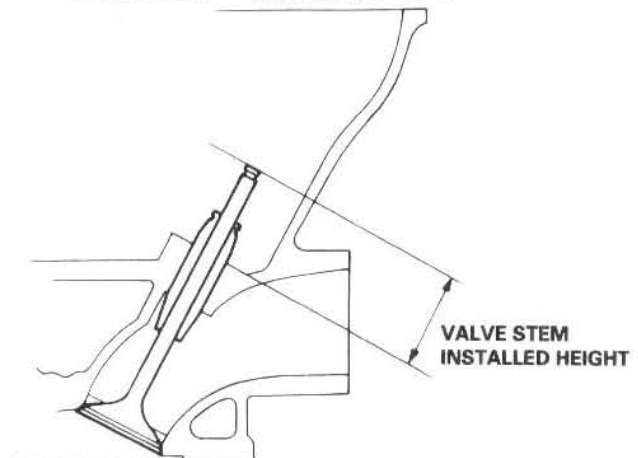
Service Limit: 42.95 mm (1.691 in)

Exhaust Valve Stem Installed Height:

Standard (New): 43.9 – 44.1 mm

(1.728 – 1.736 in)

Service Limit: 44.35 mm (1.746 in)



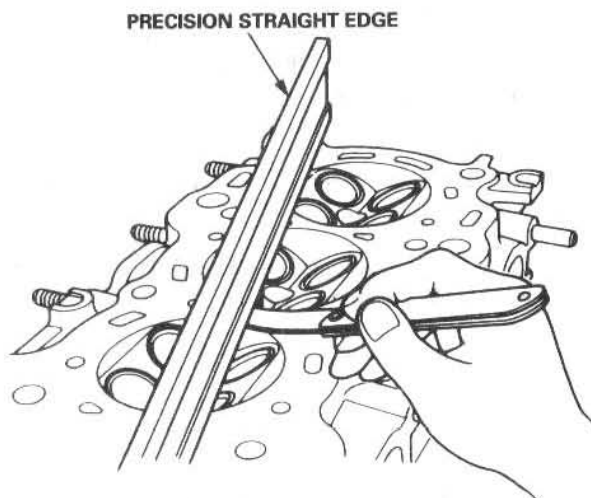
8. If valve stem installed height is over the service limit, replace the valve and recheck. If it is still over the service limit, replace the cylinder head; the valve seat in the head is too deep.

Warpage

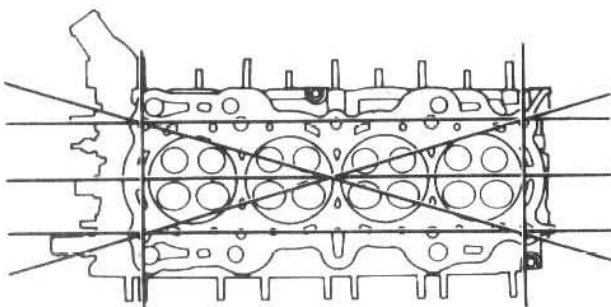
NOTE: If camshaft-to-holder oil clearances (see page 6-33) are not within specification, the head cannot be resurfaced.

If camshaft-to-holder oil clearances are within specifications, check the head for warpage.

- If warpage is less than 0.05 mm (0.002 in), cylinder head resurfacing is not required.
- If warpage is between 0.05 mm (0.002 in) and 0.2 mm (0.008 in), resurface the cylinder head.
- Maximum resurface limit is 0.2 mm (0.008 in) based on a height of 147 mm (5.79 in).



Measure along edges, and three ways across center.



Cylinder Head Height:
Standard (New): 146.95 – 147.05 mm
 (5.785 – 5.789 in)

Valve Movement

Measure the guide-to-stem clearance with a dial indicator while rocking the stem in the direction of normal thrust (wobble method).

Intake Valve Stem-to-Guide Clearance:

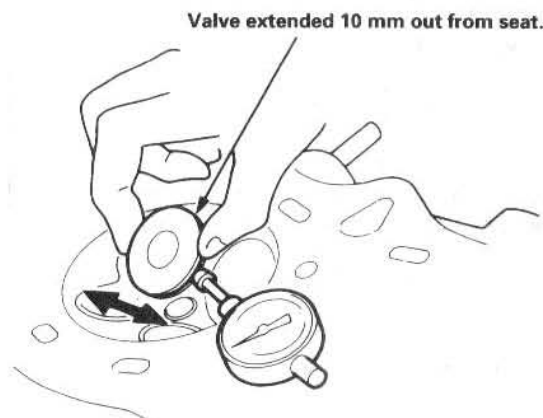
Standard (New): 0.05 – 0.11 mm
 (0.002 – 0.004 in)

Service Limit: 0.16 mm (0.006 in)

Exhaust Valve Stem-to-Guide Clearance:

Standard (New): 0.10 – 0.16 mm
 (0.004 – 0.006 in)

Service Limit: 0.22 mm (0.009 in)



- If the measurement exceeds the service limit, recheck it using a new valve.
- If the measurement is now within the service limit, reassemble with the new valve.
- If the measurement still exceeds the limit, recheck using the alternate method below, then replace the valve and guide, if necessary.

NOTE: An alternate method of checking guide to stem clearance is to subtract the O.D. of the valve stem, measured with a micrometer, from the I.D. of the valve guide, measured with an inside micrometer or ball gauge.

Take the measurements in three places along the valve stem and three places inside the valve guide.

The difference between the largest guide measurement and the smallest stem measurement should not exceed the service limit.

Intake Valve Stem-to-Guide Clearance:

Standard (New): 0.025 – 0.055 mm
 (0.0010 – 0.0022 in)

Service Limit: 0.08 mm (0.003 in)

Exhaust Valve Stem-to-Guide Clearance:

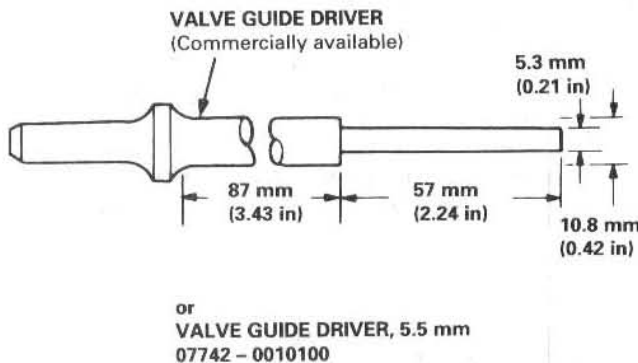
Standard (New): 0.050 – 0.080 mm
 (0.0020 – 0.0031 in)

Service Limit: 0.11 mm (0.004 in)

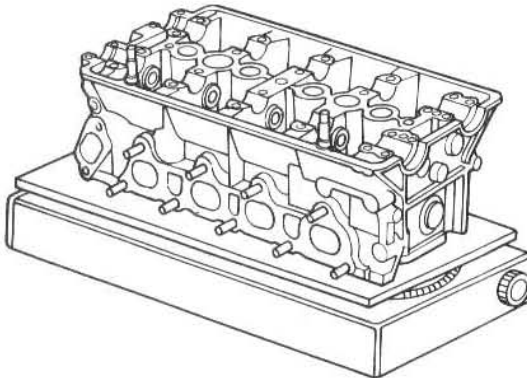


Replacement

1. As illustrated below, use a commercially available air-impact valve guide driver attachment modified to fit the diameter of the valve guides. In most cases, the same procedure can be done using the special tool and a conventional hammer.



2. Select the proper replacement guides, and chill them in the freezer section of a refrigerator for about an hour.
3. Use a hot plate or oven to evenly heat the cylinder head to 300°F (150°C). Monitor the temperature with a cooking thermometer.



CAUTION:

- Do not use a torch; it may warp the head.
- Do not get the head hotter than 300°F (150°C); excessive heat may loosen the valve seats.
- To avoid burns, use heavy gloves when handling the heated cylinder head.

4. Working from the camshaft side, use the driver and an air hammer to drive the guide about 2 mm (0.1 in) towards the combustion chamber. This will knock off some of the carbon and make removal easier.

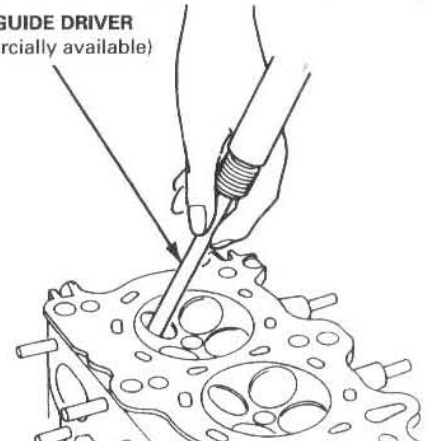
CAUTION:

- Always wear safety goggles or a face shield when driving valve guides.
- Hold the air hammer directly in line with the valve guide to prevent damaging the driver.

5. Turn the head over and drive the guide out toward the camshaft side of the head.



VALVE GUIDE DRIVER
(Commercially available)



If a valve guide still won't move, drill it out with a 8 mm (5/16 inch) bit, then try again.

CAUTION: Drill guides only in extreme cases; you could damage the cylinder head if the guide breaks.

6. Remove the new guide(s) from the freezer, one at a time, as you need them.

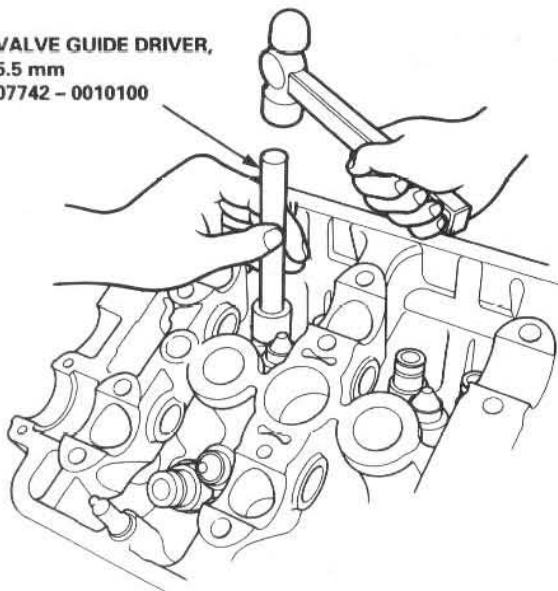
(cont'd)

Valve Guides

Replacement (cont'd)

7. Apply a thin coat of clean engine oil to the outside of the new valve guide. Install the guide from the camshaft side of the head; use the special tool to drive the guide in to the specified installed height. If you have all 16 guides to do, you may have to reheat the head.

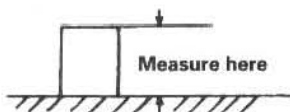
**VALVE GUIDE DRIVER,
5.5 mm
07742 - 0010100**



Valve Guide Installed Height:

Intake: 14.55 – 15.05 mm (0.573 – 0.593 in)

Exhaust: 14.95 – 15.45 mm (0.589 – 0.608 in)



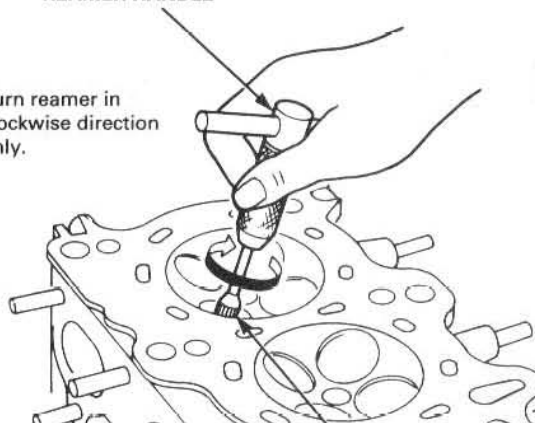
Reaming

NOTE: For new valve guides only.

1. Coat both reamer and valve guide with cutting oil.
2. Rotate the reamer clockwise the full length of the valve guide bore.
3. Continue to rotate the reamer clockwise while removing it from the bore.
4. Thoroughly wash the guide in detergent and water to remove any cutting residue.
5. Check the clearance with a valve (see page 6-38). Verify that the valve slides in the intake and exhaust valve guides without exerting pressure.

REAMER HANDLE

Turn reamer in
clockwise direction
only.



**VALVE GUIDE REAMER,
5.5 mm
07HAH - PJ7010B**

Valves, Valve Springs and Valve Seals



Installation

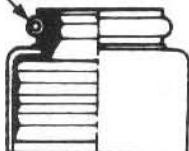
1. Coat the valve stems with engine oil. Install the valves in the valve guides.

NOTE: Make sure the valves move up and down smoothly.

2. Install the spring seats on the cylinder head.
3. Install the valve seals using the valve guide seal installer.

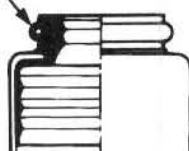
NOTE: Exhaust and intake valve seals are not interchangeable.

WHITE
SPRING



INTAKE VALVE SEAL

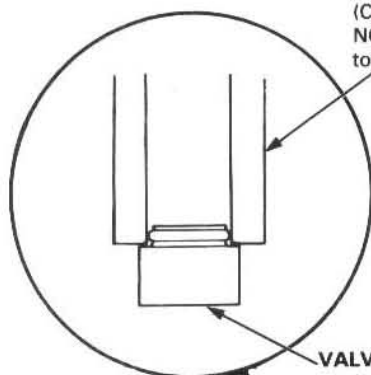
BLACK
SPRING



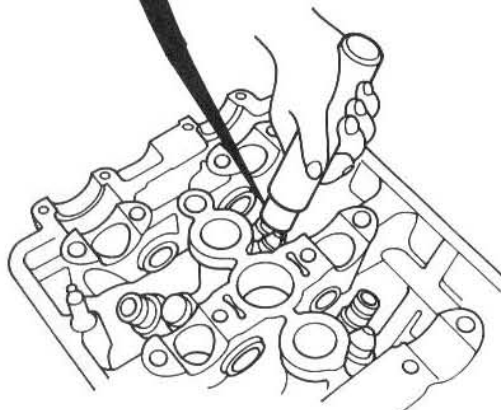
EXHAUST VALVE SEAL

VALVE GUIDE SEAL INSTALLER
KD-2899

(Commercially available)
NOTE: Use small ID end of
tool marked "C".



VALVE SEAL
Replace.

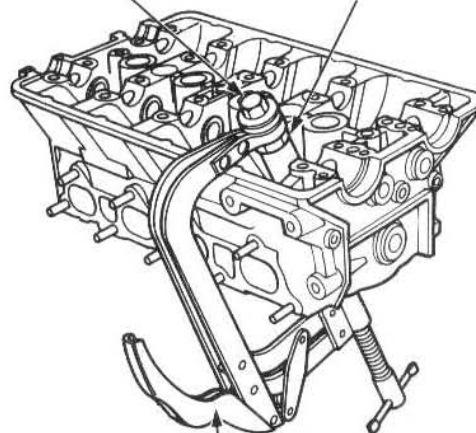


4. Install the valve spring and valve retainer, then install the valve spring compressor. Compress the spring and install the valve keepers.

NOTE: Place the end of the valve spring with closely wound coils toward the cylinder head.

VALVE SPRING
COMPRESSOR ATTACHMENT
EXTENSION
07MAF - PR9010A

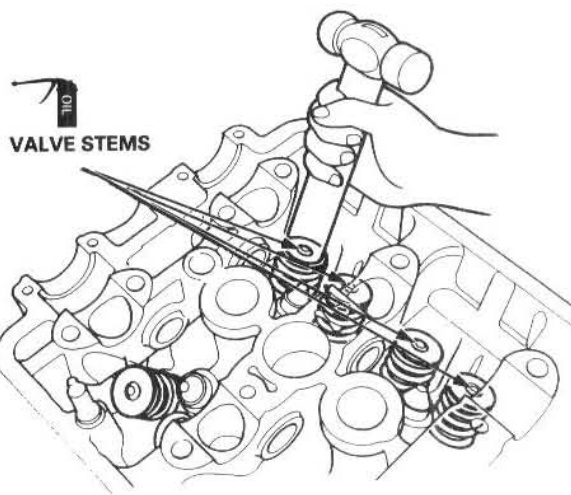
VALVE SPRING
COMPRESSOR
ATTACHMENT
07757 - PJ1010A



VALVE SPRING COMPRESSOR
SNAP-ON CF711 or KD383
with #32 jaws
(Commercially available)

5. Lightly tap the end of each valve stem two or three times with the wooden handle of a hammer to ensure proper seating of the valve and valve keepers.

NOTE: Tap the valve stem only along its axis so you do not bend the stem.

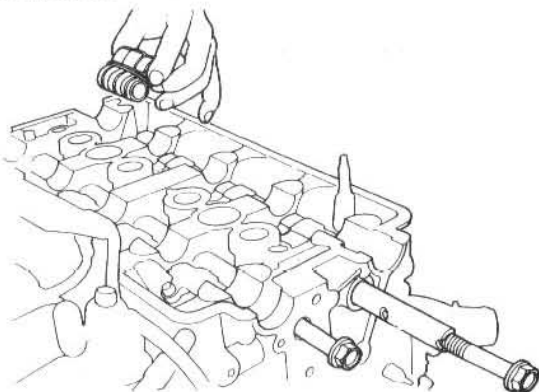


Rocker Arms

Installation

1. Install the lost motion assemblies.
2. Install the rocker arms while passing the rocker arm shaft through the cylinder head.
 - Valve adjusting locknuts should be loosened and adjusting screw backed off before installation.
 - The component parts must be reinstalled in the original locations.

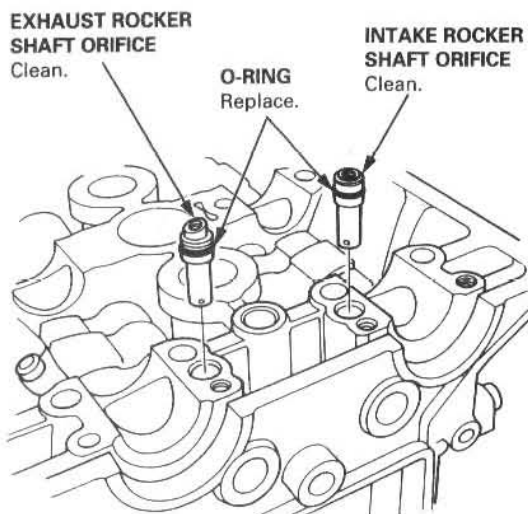
NOTE: Remove the rubber bands after installing the rocker arms.



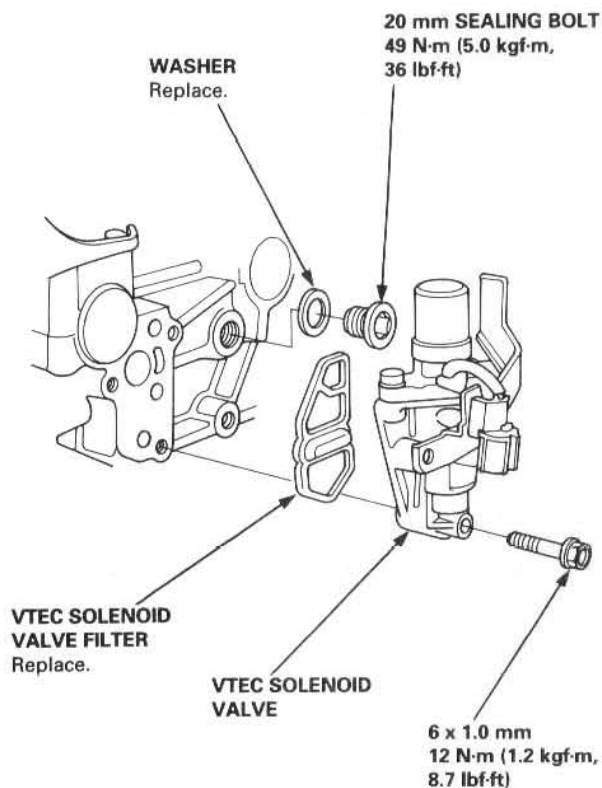
3. Install the rocker shaft orifices. If the holes in the rocker arm shaft and cylinder head are not in line with each other, thread a 12 mm bolt into the rocker arm shaft and rotate the shaft.

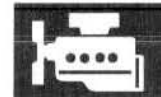
NOTE:

- The shapes of the rocker shaft orifices for the intake and exhaust are different. The orifices must be installed in the original locations.
- Clean the rocker shaft orifices, and install them with new O-rings.



4. Install the VTEC solenoid valve and 20 mm sealing bolt.





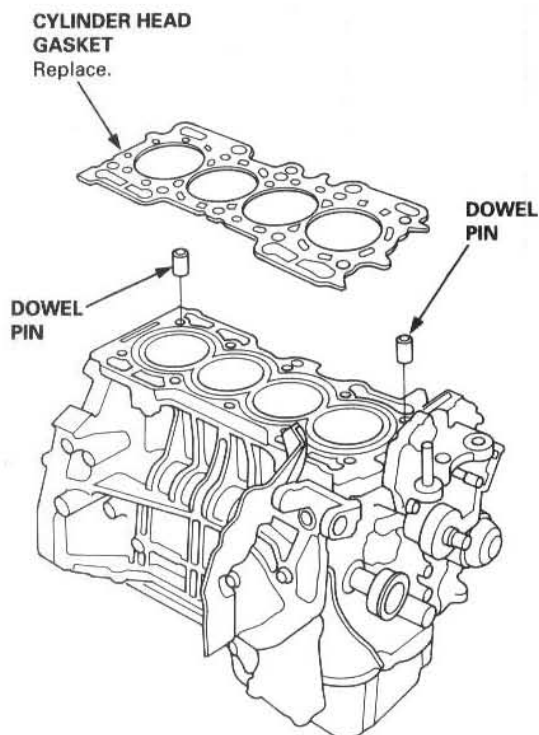
Installation

Install the cylinder head in the reverse order of removal:

NOTE:

- Always use a new head gasket.
- Cylinder head and cylinder block surface must be clean.
- Do not use the middle cover and lower cover to store removed items.
- Clean the middle cover and lower cover before installation.

1. Cylinder head dowel pins must be aligned.



2. Tighten the cylinder head bolts sequentially in three steps.

1st step torque: 39 N·m (4.0 kgf·m, 29 lbf·ft)

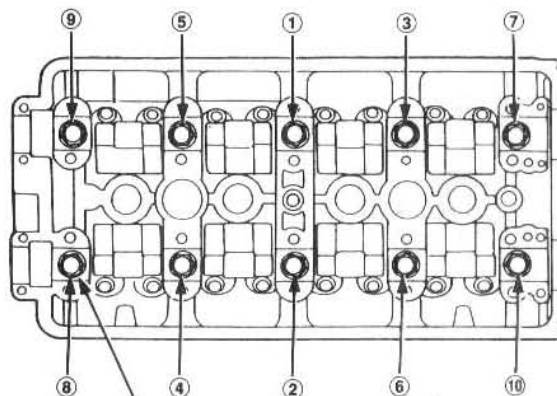
2nd step torque: 69 N·m (7.0 kgf·m, 51 lbf·ft)

3rd step torque: 98.1 N·m (10.0 kgf·m, 72.3 lbf·ft)

NOTE:

- We recommend using a beam-type torque wrench. When using a preset-type torque wrench, be sure to tighten slowly and not to overtighten.
- If a bolt makes any noise while you are torquing it, loosen the bolt, and retighten it from the 1st step.

CYLINDER HEAD BOLTS TORQUE SEQUENCE



CYLINDER HEAD BOLTS
12 x 1.25 mm
98.1 N·m (10.0 kgf·m, 72.3 lbf·ft)
Apply clean engine oil to bolt threads and under bolt heads.

(cont'd)

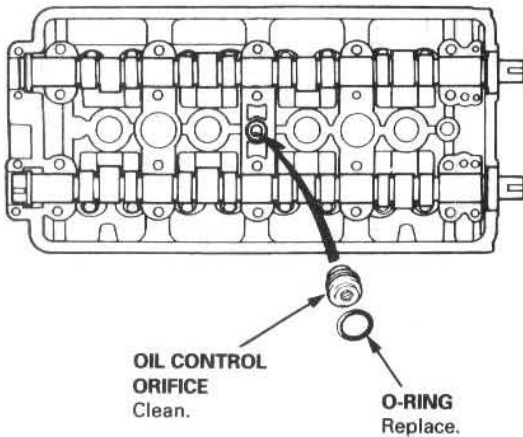
Cylinder Head

Installation (cont'd)

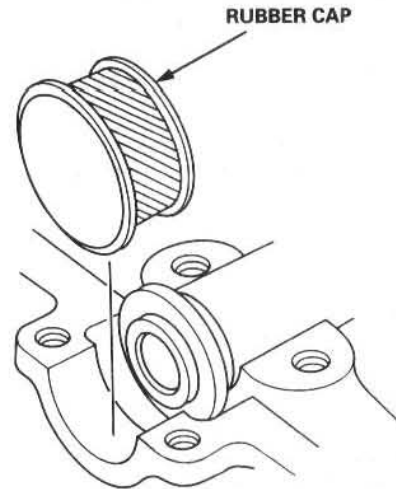
3. Tighten the intake manifold mounting bolts (see page 6-27).
4. Install the exhaust manifold bracket, and tighten the new self-locking nuts (see page 6-26).
5. Install the camshafts and camshaft oil seals.

NOTE:

- Install the camshafts with the keyways facing up.
 - Install the oil seal with the spring side facing in.
 - The oil seal housing surface should be dry.
6. Clean and install the oil control orifice with a new O-ring in the oil passage of the No. 3 camshaft holder.

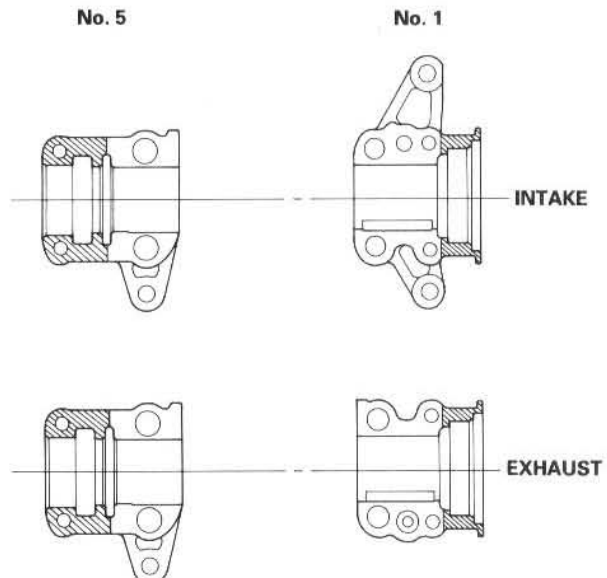


7. Apply liquid gasket around the rubber cap, then install the rubber cap.



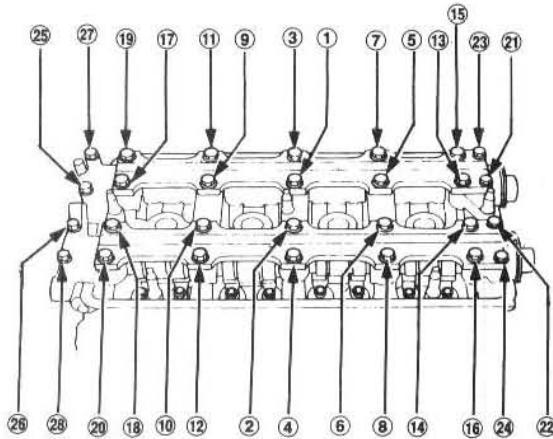
8. Apply liquid gasket to the shaded areas of the head mating surface of the No. 1 and No. 5 camshaft holders on both the intake and exhaust side. Confirm that the camshaft keyways face up, then place those holders, together with the No. 2, No. 3 and No. 4 camshaft holders, on the cylinder head.

NOTE: The arrows marked on the camshaft holders should point toward the timing belt.



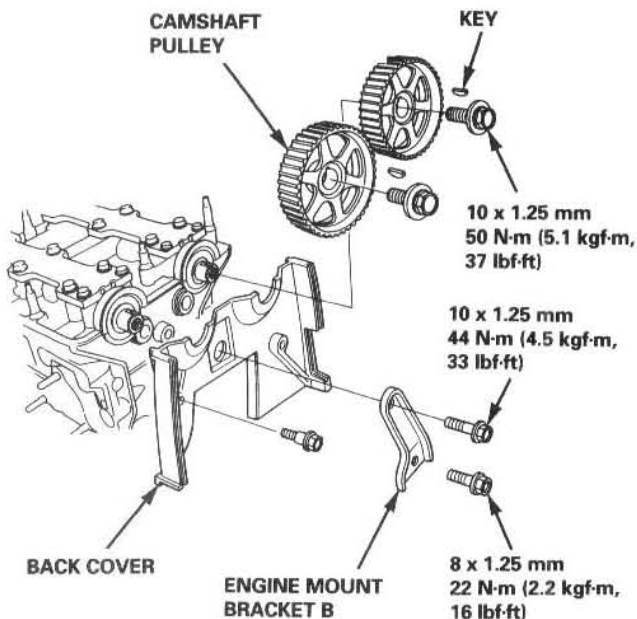


9. Tighten the bolts in the sequence shown below.



- ① - ②⑧: 8 x 1.25 mm
25 N·m (2.6 kgf·m, 19 lbf·ft)
②① - ②⑧: 6 x 1.0 mm
12 N·m (1.2 kgf·m, 8.7 lbf·ft)

10. Install the back cover, camshaft pulleys and engine mount bracket B.



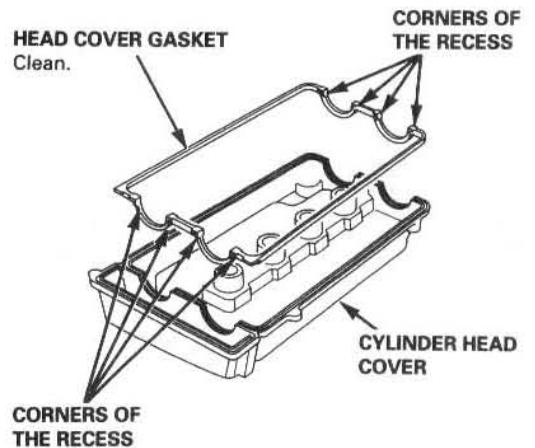
11. Install the timing belt (see page 6-16).

12. Adjust the valve clearance (see page 6-9).

13. Install the head cover gasket in the groove of the cylinder head cover. Seat the recesses for the camshaft first, then work it into the groove around the outside edges.

NOTE:

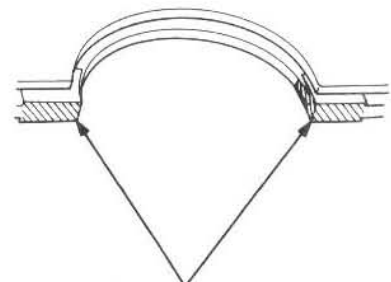
- Before installing the head cover gasket, thoroughly clean the seal and the groove.
- When installing, make sure the head cover gasket is seated securely in the corners of the recesses with no gap.



14. Apply liquid gasket to the head cover gasket at the eight corners of the recesses.

NOTE:

- Use liquid gasket, Part No. 08718 - 0001 or 08718 - 0003.
- Check that the mating surfaces are clean and dry before applying liquid gasket.
- Do not install the parts if five minutes or more have elapsed since applying liquid gasket. Instead, reapply liquid gasket after removing old residue.
- After assembly, wait at least 30 minutes before filling the engine with oil.



Apply liquid gasket to the shaded areas.

(cont'd)

Cylinder Head

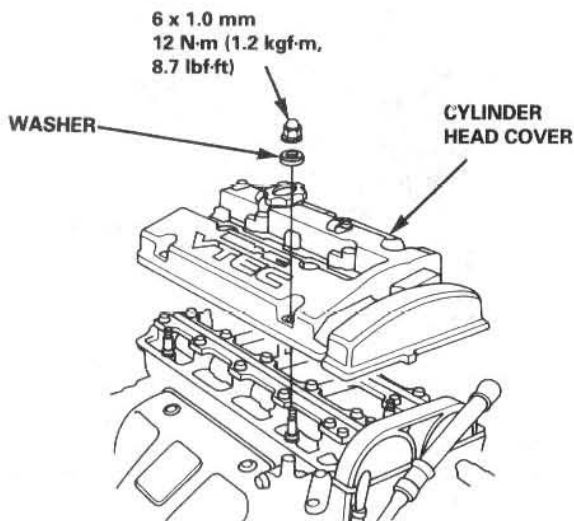
Installation (cont'd)

15. When installing the cylinder head cover, hold the head cover gasket in the groove by placing your fingers on the camshaft holder contacting surfaces (top of the semicircles).

Once the cylinder head cover is on the cylinder head, slide the cover slightly back and forth to seat the head cover gasket.

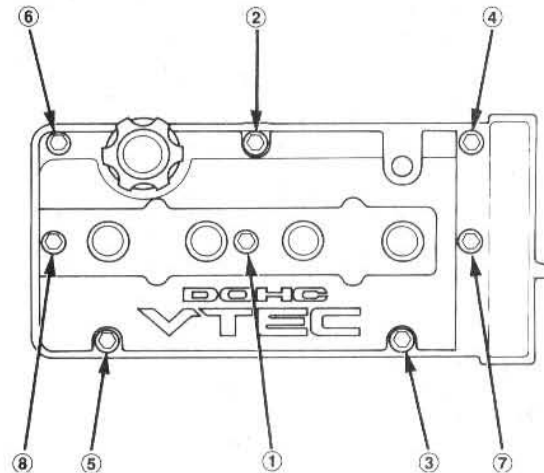
NOTE:

- Before installing the cylinder head cover, clean the cylinder head contacting surfaces with a shop towel.
- Do not touch the parts where liquid gasket was applied.
- Replace the washers when damaged or deteriorated.



16. Tighten the nuts in two or three steps. In the final step, tighten all nuts, in sequence, to 12 N·m (1.2 kgf-m, 8.7 lbf-ft).

NOTE: After assembly, wait at least 30 minutes before filling the engine with oil.



17. After installation, check that all tubes, hoses and connectors are installed correctly.
18. Enter the anti-theft code for the radio, then enter the customer's radio station presets.

Engine Block

Special Tools 7-2

Illustrated Index 7-3

Flywheel & Drive Plate

Replacement 7-7

Connecting Rod & Crankshaft

End Play 7-7

Main Bearings

Clearance 7-8

Selection 7-9

Connecting Rod Bearings

Clearance 7-10

Selection 7-11

Crankshaft, Balancer Shafts & Pistons

Removal 7-12

Crankshaft

Inspection 7-15

Pistons

Inspection 7-16

Installation 7-25

Cylinder Block

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Bore Honing 7-18

Piston Pins

Removal 7-19

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Replacement 7-23

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Crankshaft Oil Seal

Installation 7-25

Crankshaft and Balancer Shafts

Installation 7-26

Crankshaft and Balancer Shaft Oil Seal

Installation (engine removal is
not required) 7-31

Balancer Shafts

Inspection 7-32

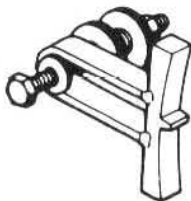


Special Tools

Ref. No.	Tool Number	Description	Qty	Page Reference
①	07GAF – SE00200	Hub Assembly Guide Attachment	1	7-31
②	07LAB – PV00100	Ring Gear Holder	1	7-7
③	07LAD – PT3010A	Seal Driver	1	7-31
④	07746 – 0030300	Attachment, 30 mm I.D.	1	7-31
⑤	07749 – 0010000	Driver	1	7-25, 31
⑥	07948 – SB00101	Driver Attachment	1	7-25, 31



①



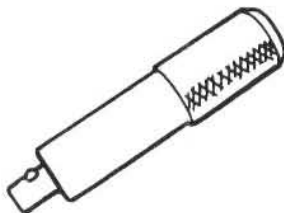
②



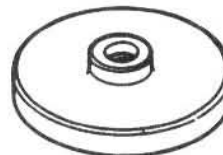
③



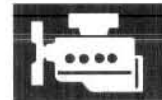
④




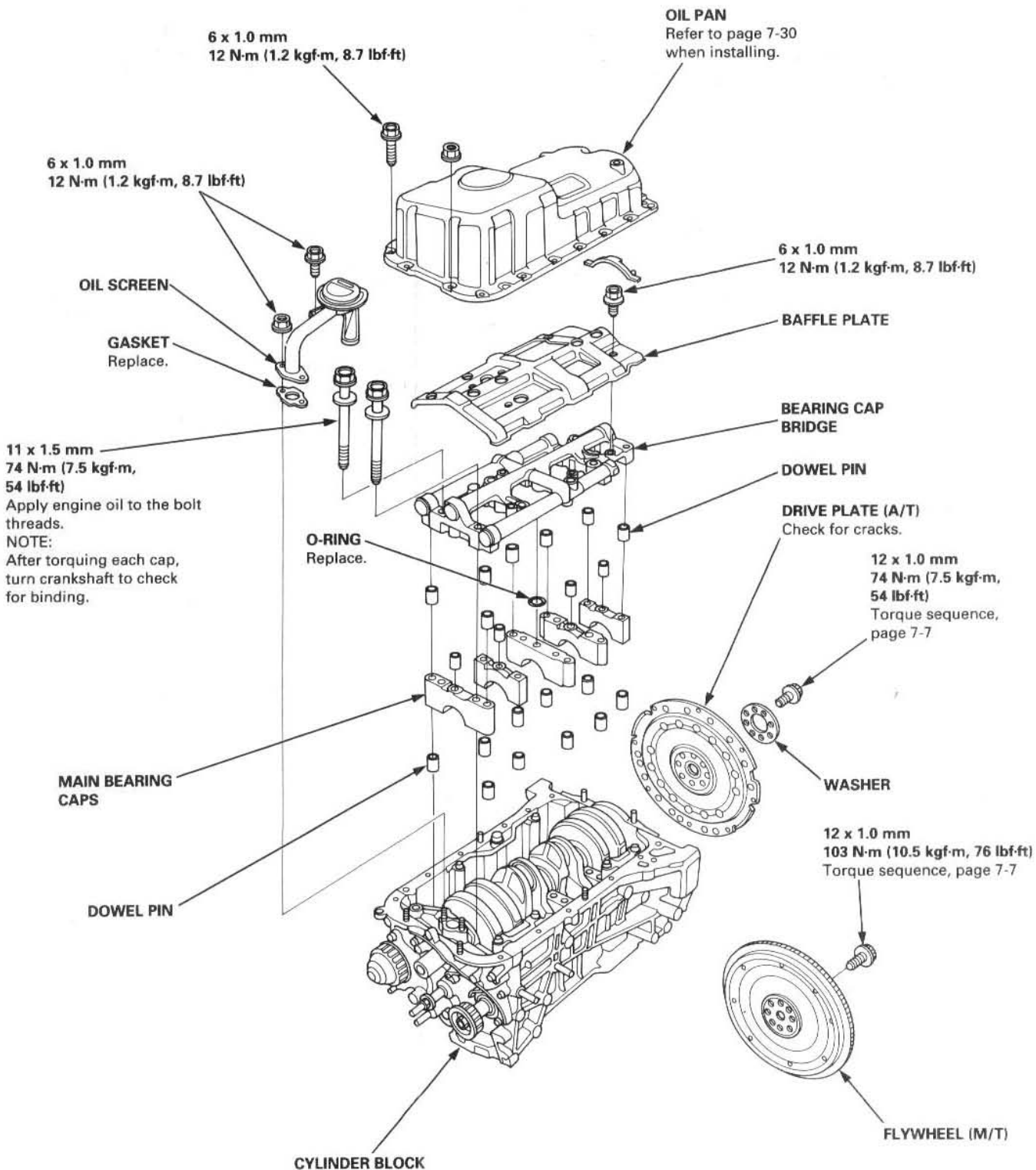
⑤



⑥



 Lubricate all internal parts with engine oil during reassembly.



(cont'd)

Illustrated Index

(cont'd)



Lubricate all internal parts with engine oil during reassembly.

NOTE:

- Apply liquid gasket to the mating surfaces of the right side cover and oil pump case before installing them.
- Use liquid gasket, part No. 08718 - 0001 or 08718 - 0003.

MAIN BEARING

Oil clearance, page 7-8

Selection, page 7-9

NOTE: New main bearings must be selected by matching crank and block identification markings.

CRANKSHAFT

End play, page 7-7

Runout, Taper and

Out-of-Round, page 7-15

Installation, page 7-26

CRANKSHAFT OIL SEAL

Installation, page 7-25

Replace.

THRUST WASHER

Grooved sides faces outward.

NOTE: Thrust washer thickness is fixed and must not be changed by grinding or shimming.

BALANCER GEAR CASE

8 x 1.25 mm
25 N·m (2.5 kgf·m,
18 lbf·ft)

O-RINGS
Replace.

CRANKSHAFT OIL SEAL
Installation, page 8-15
Replace.

THRUST WASHER

BALANCER DRIVEN GEAR

8 x 1.25 mm
25 N·m (2.5 kgf·m,
18 lbf·ft)

8 x 1.25 mm
29 N·m (3.0 kgf·m,
22 lbf·ft)

BALANCER SHAFT OIL SEAL
Installation, page 8-15
Replace.

TIMING BALANCER BELT DRIVEN PULLEY

DOWEL PIN

OIL PUMP
Overhaul, page 8-13
Apply liquid gasket to block mating surface.

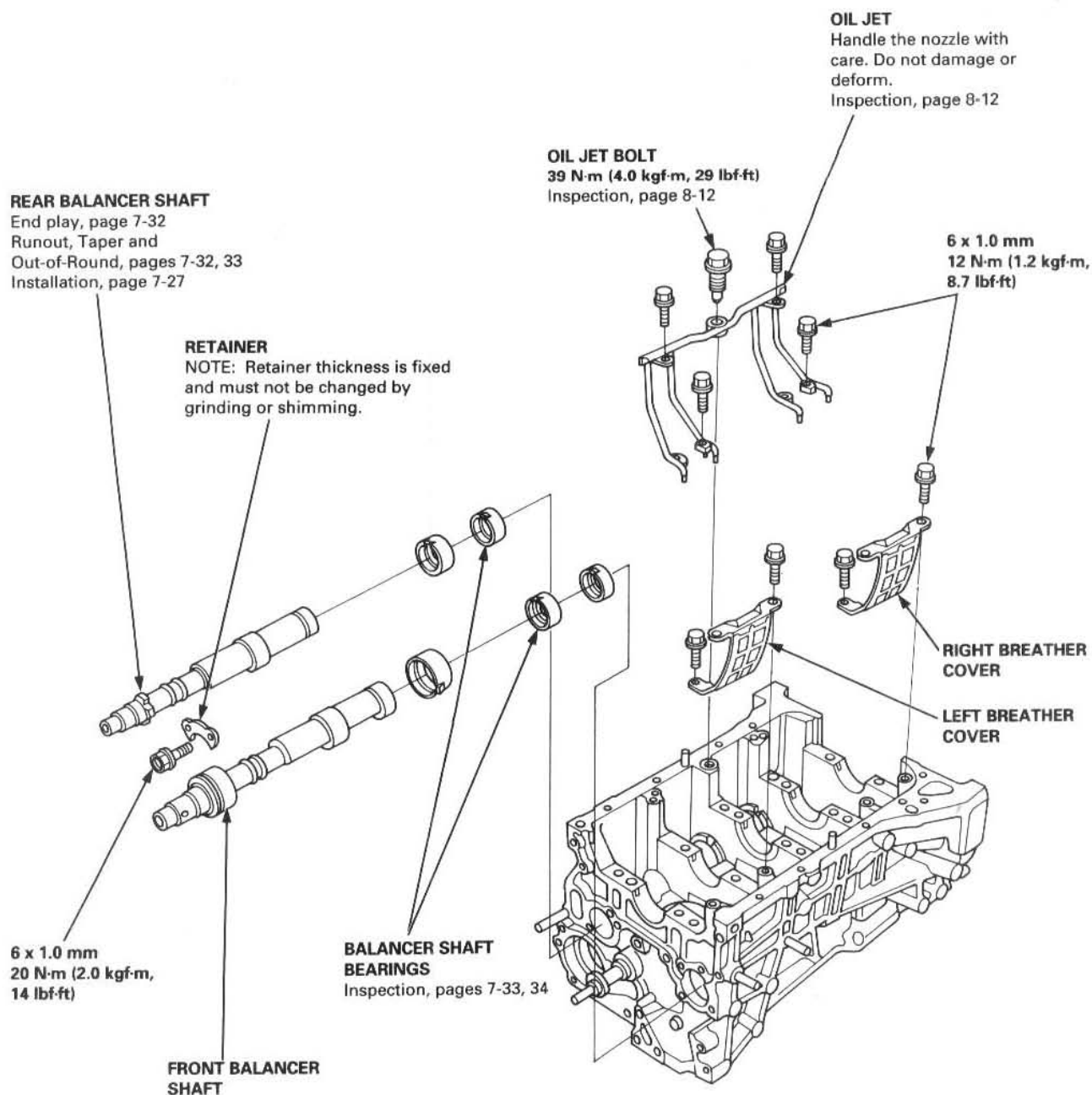
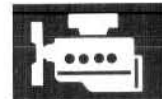
6 x 1.0 mm
12 N·m (1.2 kgf·m, 8.7 lbf·ft)
Apply liquid gasket to the bolt threads.

RIGHT SIDE COVER

Apply liquid gasket to block mating surface.

6 x 1.0 mm
12 N·m (1.2 kgf·m,
8.7 lbf·ft)

Apply liquid gasket to the bolt threads.



(cont'd)

Illustrated Index

(cont'd)

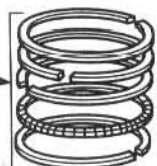


Lubricate all internal parts with engine oil during reassembly.

NOTE: New rod bearings must be selected by matching connecting rod and crankshaft identification markings (see page 7-11).

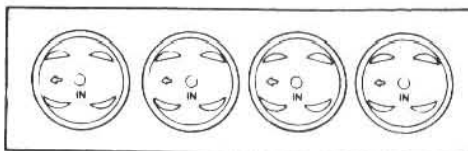
PISTON RINGS

Replacement, page 7-23
Measurement, pages 7-22, 24
Alignment, page 7-24



PISTON INSTALLATION DIRECTION

EXHAUST



INTAKE

SNAP RING

PISTON

Removal, page 7-12
Measurement, page 7-16
NOTE: To maintain proper clearance, match the letter on the piston top with the letter for each cylinder stamped on the block.

On the piston top	On the block
No letter	A or I
B	B or il

PISTON PIN

Removal, page 7-19
Installation, page 7-21
Inspection, page 7-20

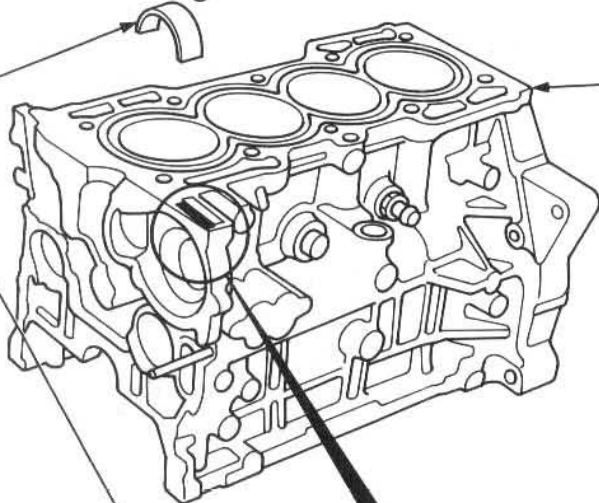
CONNECTING ROD

End play, page 7-7
Selection, page 7-21
Small end measurement, page 7-20



CONNECTING ROD BEARINGS

Clearance, page 7-10
Selection, page 7-11



CYLINDER BLOCK

Cylinder bore inspection, page 7-17
Warpage inspection, page 7-17
Cylinder bore honing, page 7-18
Inspect top of each cylinder bore for carbon build-up or ridge before removing piston.
Remove ridge if necessary, page 7-14

CONNECTING ROD BEARING CAP

Installation, page 7-26
NOTE: Install cap so the bearing recess is on the same side as the recess in the rod.



CONNECTING ROD NUT

9 x 0.75 mm
46 N·m (4.7 kgf·m, 34 lbf·ft)
After torquing each bearing cap, rotate crankshaft to check for binding.



CYLINDER BORE SIZES

(A or I, B or il)
NOTE: To maintain proper piston clearance, match these letters with the letters on the pistons. The letters on the block read from left to right, No.1 through No. 4 cylinders.
On the block On the piston top
A or I No letter
B or il B



No.1

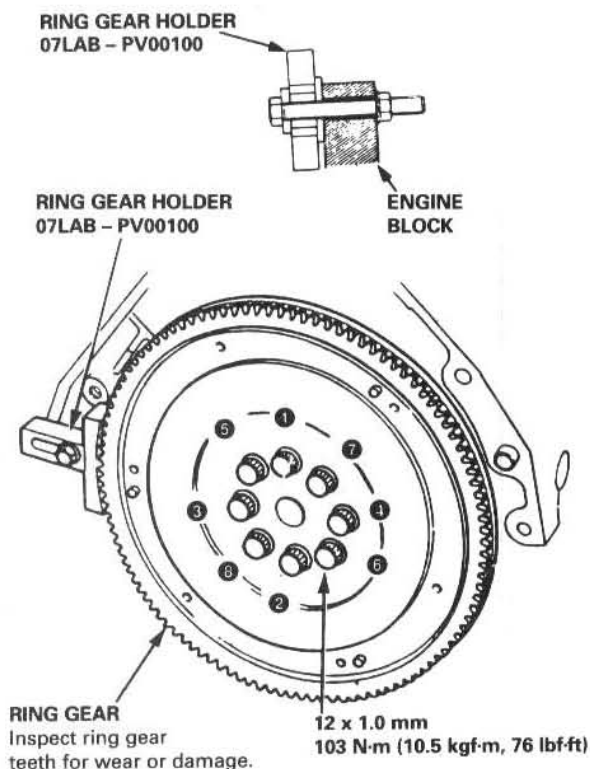
No.4



Replacement

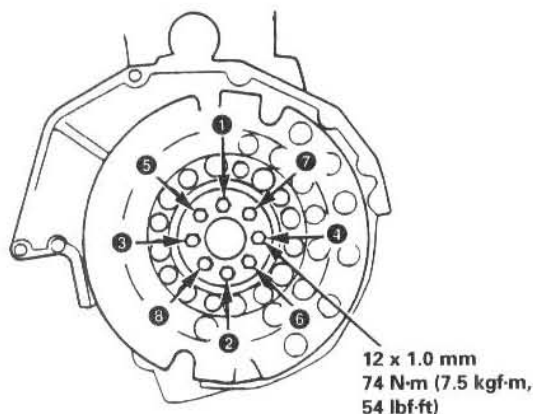
Manual Transmission:

Remove the eight flywheel bolts, then separate the flywheel from the crankshaft flange. After installation, tighten the bolts in the sequence shown.



Automatic Transmission:

Remove the eight drive plate bolts, then separate the drive plate from the crankshaft flange. After installation, tighten the bolts in the sequence shown.

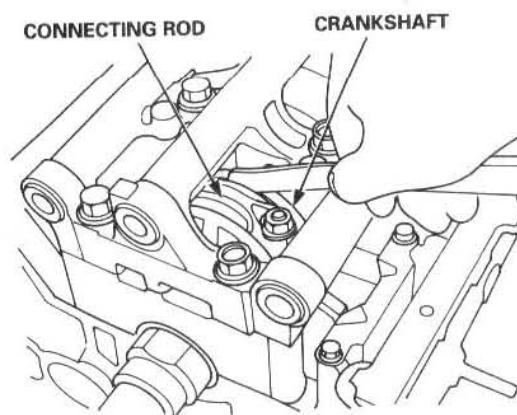


End Play

Connecting Rod End Play:

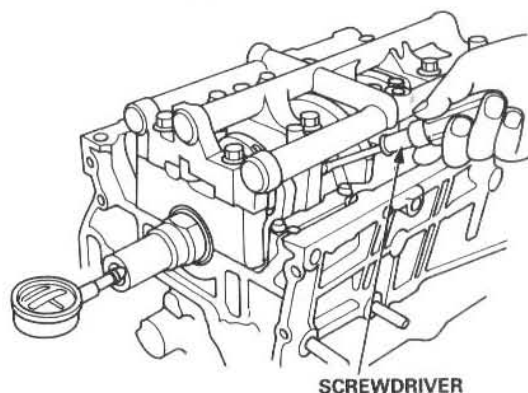
Standard (New): 0.15 – 0.30 mm
(0.006 – 0.012 in)

Service Limit: 0.40 mm (0.016 in)



- If out-of-tolerance, install a new connecting rod.
- If still out-of-tolerance, replace the crankshaft (see pages 7-12 and 7-26).

Push the crankshaft firmly away from the dial indicator, and zero the dial against the end of the crankshaft. Then pull the crankshaft firmly back toward the indicator; dial reading should not exceed service limit.



Crankshaft End Play:

Standard (New): 0.10 – 0.35 mm
(0.004 – 0.014 in)

Service Limit: 0.45 mm (0.018 in)

If end play is excessive, inspect the thrust washers and thrust surface on the crankshaft. Replace parts as necessary.

NOTE: Thrust washer thickness is fixed and must not be changed either by grinding or shimming. Thrust washers are installed with the grooved sides facing outward.

Main Bearings

Clearance

1. To check main bearing-to-journal oil clearance, remove the main caps and bearing halves.
2. Clean each main journal and bearing half with a clean shop towel.
3. Place one strip of plastigage across each main journal.

NOTE: If the engine is still in the vehicle when you bolt the main cap down to check clearance, the weight of the crankshaft and flywheel will flatten the plastigage further than just the torque on the cap bolt and give you an incorrect reading. For an accurate reading, support the crank with a jack under the counterweights, and check only one bearing at a time.

4. Reinstall the bearings and caps, then torque the bolts.

74 N·m (7.5 kgf·m, 54 lbf·ft)

NOTE: Do not rotate the crankshaft during inspection.

5. Remove the cap and bearings again, and measure the widest part of the plastigage.

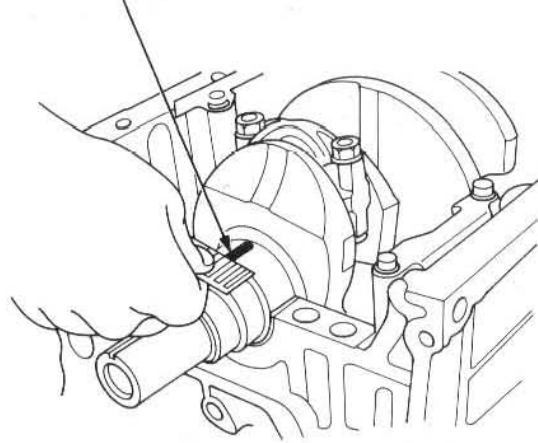
Main Bearing-to-Journal Oil Clearance: '97:

Journal	Standard (New)	Service Limit
No. 1, 2	0.021 – 0.045 mm (0.0008 – 0.0018 in)	0.050 mm (0.0020 in)
No. 3	0.025 – 0.049 mm (0.0010 – 0.0019 in)	0.055 mm (0.0022 in)
No. 4	0.013 – 0.037 mm (0.0005 – 0.0015 in)	0.050 mm (0.0020 in)
No. 5	0.009 – 0.033 mm (0.0004 – 0.0013 in)	0.040 mm (0.0016 in)

'98 – '99:

Journal	Standard (New)	Service Limit
No. 1, 4	0.024 – 0.037 mm (0.009 – 0.0015 in)	0.050 mm (0.0020 in)
No. 2	0.021 – 0.045 mm (0.0008 – 0.0018 in)	0.050 mm (0.0020 in)
No. 3	0.025 – 0.049 mm (0.0010 – 0.0019 in)	0.055 mm (0.0022 in)
No. 5	0.009 – 0.033 mm (0.0004 – 0.0013 in)	0.040 mm (0.0016 in)

PLASTIGAGE STRIP

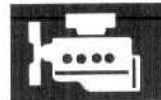


6. If the plastigage measures too wide or too narrow, remove the crankshaft, and remove the upper half of the bearing. Install a new, complete bearing with the same color code (select the color as shown on the next page), and recheck the clearance.

CAUTION: Do not file, shim, or scrape the bearings or the caps to adjust clearance.

7. If the plastigage shows the clearance is still incorrect, try the next larger or smaller bearing (the color listed above or below that one), and check again.

NOTE: If the proper clearance cannot be obtained by using the appropriate larger or smaller bearings, replace the crankshaft and start over.



Selection

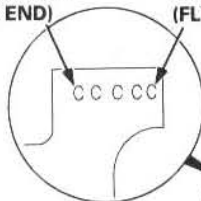
CAUTION: If the codes are unreadable because of an accumulation of dirt and dust, do not scrub them with a wire brush or scraper. Clean them only with solvent or detergent.

Crankshaft Bore Code Location

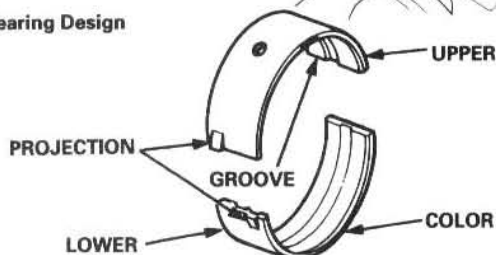
Numbers or Letters or Bars have been stamped on the end of the block as a code for the size of each of the 5 main journal bores.

Use them, and the numbers stamped on the crankshaft (codes for main journal size), to choose the correct bearings, No. 1 JOURNAL (PULLEY END)

No. 5 JOURNAL (FLYWHEEL END)



Bearing Design



'97: No. 1 – 5 journals

'98 – '99: No. 2, 3, 5 journals

Bearing Identification

Color code is on the edge of the bearing.

1 or I
2 or II
3 or III
4 or IIIL
5 or IIIL
6 or IIIL

Smaller main journal

Smaller bearing (Thicker)

1 or A or I	2 or B or II	3 or C or III	4 or D or IIIL
-------------	--------------	---------------	----------------

Pink	Pink/ Yellow	Yellow	Yellow/ Green
Pink/ Yellow	Yellow	Yellow/ Green	Green
Yellow	Yellow/ Green	Green	Green/ Brown
Yellow/ Green	Green	Green/ Brown	Brown
Green	Green/ Brown	Brown	Brown/ Black
Green/ Brown	Brown	Brown/ Black	Black

NOTE: When using bearing halves of different colors, it does not matter which color is used in the top or bottom.

'98 – '99: No. 1, 4 journals

Bearing Identification

Color code is on the edge of the bearing.

1 or I
2 or II
3 or III
4 or IIIL
5 or IIIL
6 or IIIL

Smaller main journal

Smaller bearing (Thicker)

1 or A or I	2 or B or II	3 or C or III	4 or D or IIIL
-------------	--------------	---------------	----------------

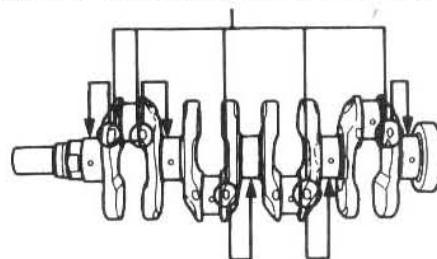
Yellow	Yellow/ Green	Green	Green/ Brown
Yellow/ Green	Green	Green/ Brown	Brown
Green	Green/ Brown	Brown	Brown/ Black
Green/ Brown	Brown	Brown/ Black	Black
Brown	Brown/ Black	Black	Black/ Blue
Brown/ Black	Black	Black/ Blue	Blue

NOTE: When using bearing halves of different colors, it does not matter which color is used in the top or bottom.

Main Journal Code Locations (Numbers or Bars)

The Main Journal Codes are stamped in the following locations.

Main Journal Code Locations (Numbers or Bars)



Connecting Rod Bearings

Clearance

1. Remove the connecting rod cap and bearing half.
2. Clean the crankshaft rod journal and bearing half with a clean shop towel.
3. Place plastigage across the rod journal.
4. Reinstall the bearing half and cap, and torque the nuts to:

46 N·m (4.7 kgf·m, 34 lbf·ft)

NOTE: Do not rotate the crankshaft during inspection.

5. Remove the rod cap and bearing half, and measure the widest part of the plastigage.

Connecting Rod Bearing-to-Journal Oil Clearance:

Standard (New): 0.027 – 0.055 mm
(0.0011 – 0.0022 in)

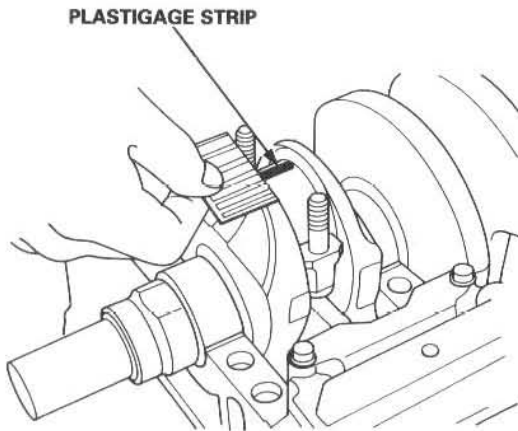
Service Limit: 0.06 mm (0.002 in)

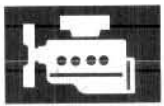
6. If the plastigage measures too wide or too narrow, remove the upper half of the bearing, install a new, complete bearing with the same color code (select the color as shown on the next page), and recheck the clearance.

CAUTION: Do not file, shim, or scrape the bearings or the caps to adjust clearance.

7. If the plastigage shows the clearance is still incorrect, try the next larger or smaller bearing (the color listed above or below that one), and check clearance again.

NOTE: If the proper clearance cannot be obtained by using the appropriate larger or smaller bearings, replace the crankshaft and start over.



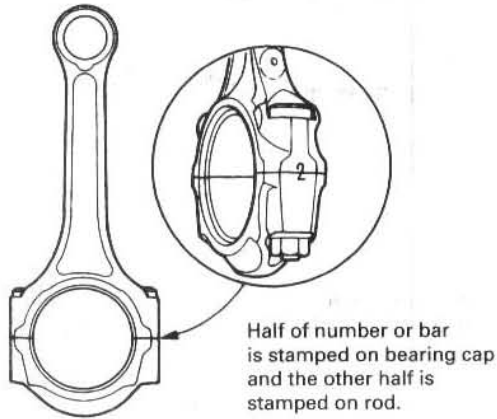


Selection

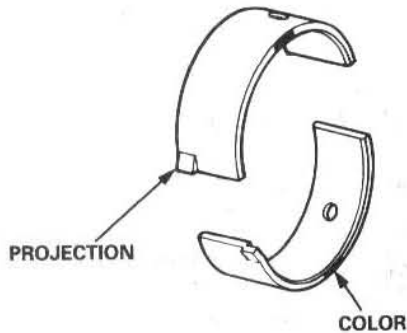
CAUTION: If the codes are unreadable because of an accumulation of dirt and dust, do not scrub them with a wire brush or scraper. Clean them only with solvent or detergent.

Connecting Rod Journal Code Locations

Numbers or Bars have been stamped on the side of each connecting rod as a code for the size of the big end. Use them, and the letters or bars stamped on the crank (codes for rod journal size), to choose the correct bearings.



Bearing Design



Bearing Identification
Color code is on the edge of the bearing.

A or I	Smaller rod journal
B or II	
C or III	
D or IIII	Smaller bearing (Thicker)

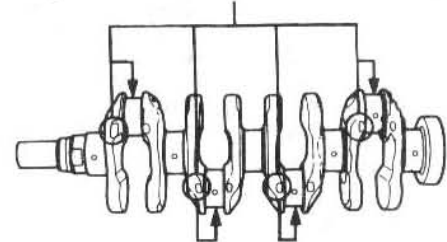
→ Larger big end bore			
1 or I	2 or II	3 or III	4 or IIII

→ Smaller bearing (Thicker)			
Red	Pink	Yellow	Green
Pink	Yellow	Green	Brown
Yellow	Green	Brown	Black
Green	Brown	Black	Blue

Connecting Rod Journal Code Locations (Letters or Bars)

The Connecting Rod Journal Codes are stamped in the following locations.

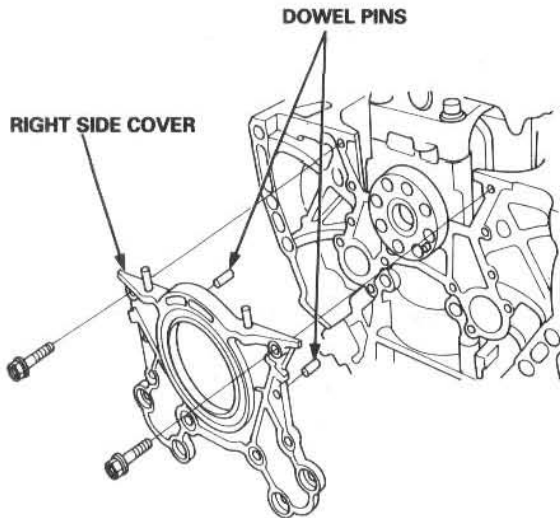
Connecting Rod Journal Code Locations (Letters or Bars)



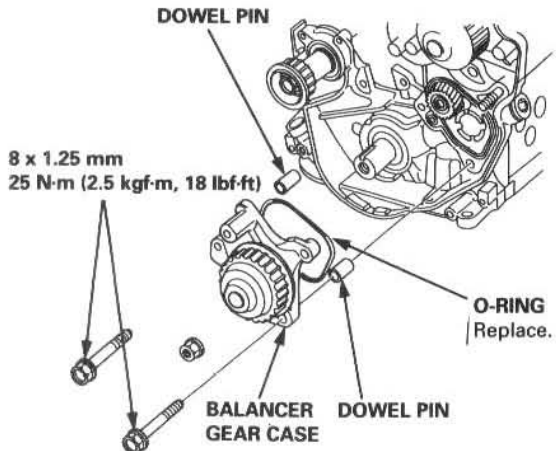
Crankshaft, Balancer Shafts and Pistons

Removal

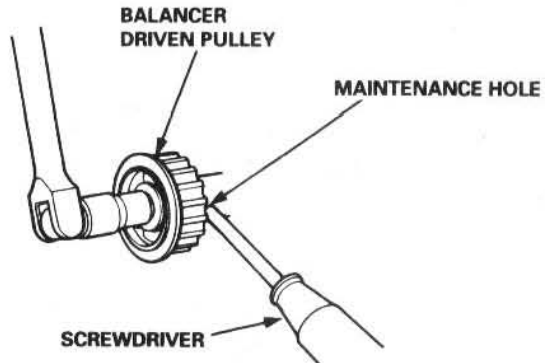
1. Remove the right side cover.



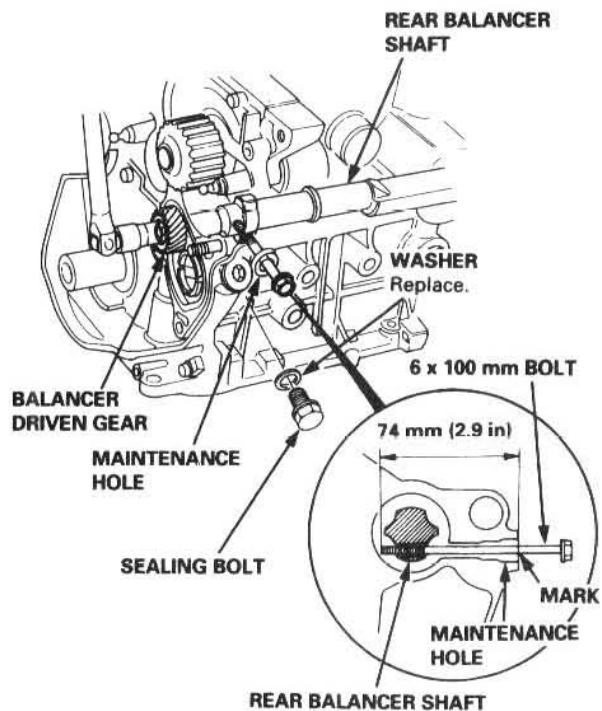
2. Remove the CKP/TDC sensors, then remove the timing belt drive pulley (see page 6-14).
3. Remove the balancer gear case.



4. Remove the front balancer driven pulley as shown.

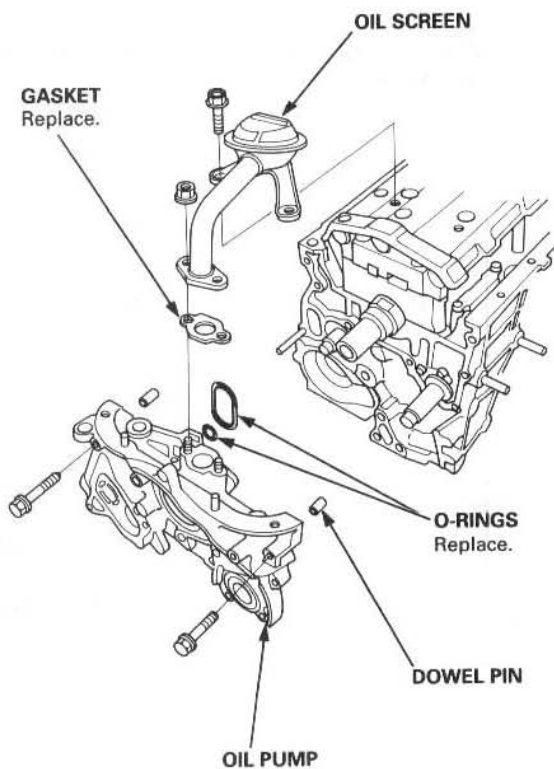


5. Align the bolt hole and the balancer shaft hole, then insert a 6 x 100 mm bolt to hold the rear balancer shaft.
6. Remove the bolt and the balancer driven gear.





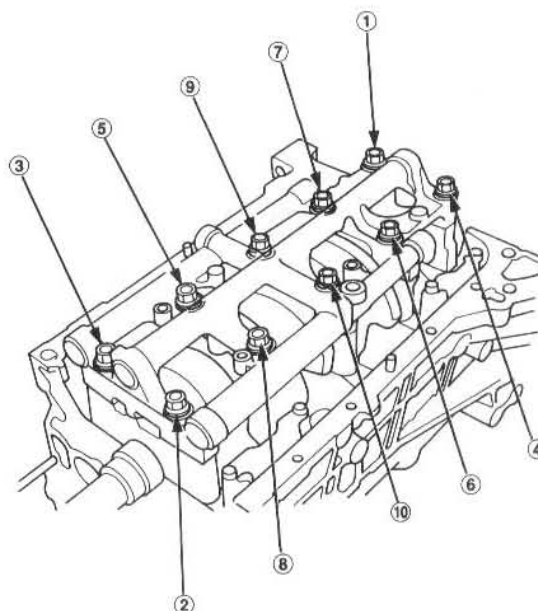
7. Remove the oil screen and the oil pump.
8. Remove the baffle plate.



9. Remove the bolts and the bearing cap bridge, then remove the bearing caps.

CAUTION: To prevent warpage, unscrew the bolts in sequence 1/3 turn at a time; repeat the sequence until all bolts are loosened.

MAIN BEARING CAP BOLTS LOOSENING SEQUENCE

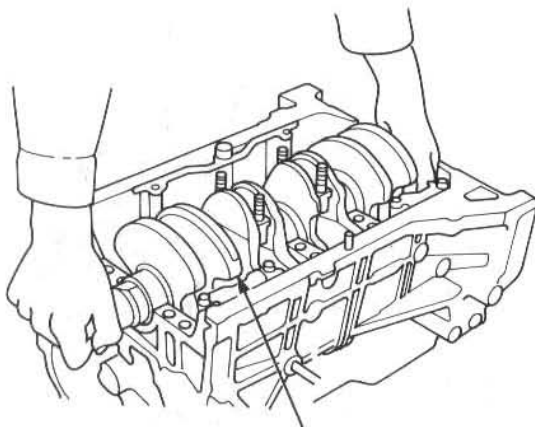


(cont'd)

Crankshaft, Balancer Shafts and Pistons

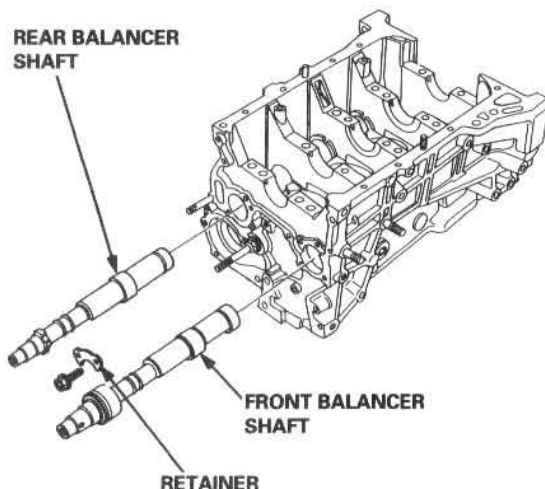
Removal (cont'd)

10. Turn the crankshaft so No. 2 and 3 crankpins are at the top.
11. Remove the rod caps/bearings and main caps/bearings. Keep all caps/bearings in order.
12. Lift the crankshaft out of the engine, being careful not to damage the journals.



CRANKSHAFT

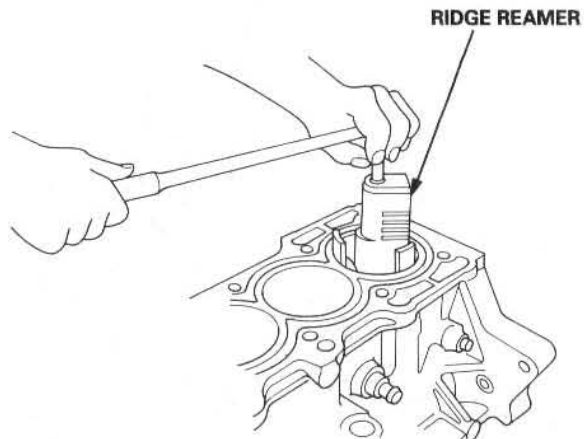
13. Remove the bolts and the retainer, then remove the front balancer shaft and the rear balancer shaft.



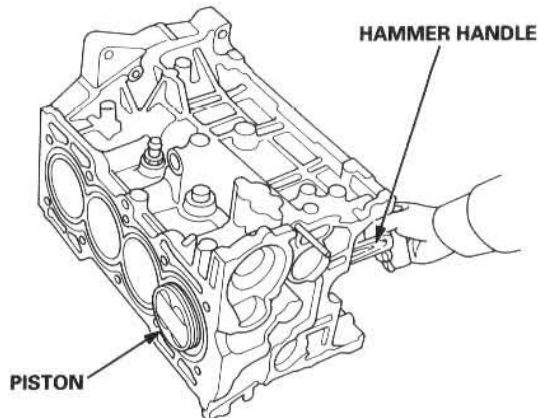
14. Remove the upper bearing halves from the connecting rods, and set them aside with their respective caps.
15. Reinstall the main caps and bearings on the engine in proper order.

16. If you can feel a ridge of metal or hard carbon around the top of each cylinder, remove it with a ridge reamer. Follow the reamer manufacturer's instructions.

CAUTION: If the ridge is not removed, it may damage the pistons as they are pushed out.



17. Use the wooden handle of a hammer to drive the pistons out.



18. Reinstall the connecting rod bearings and caps after removing each piston/connecting rod assembly.
19. Mark each piston/connecting rod assembly with its cylinder number to avoid mixup on reassembly.

NOTE: The existing number on the connecting rod does not indicate its position in the engine, it indicates the rod bore size.



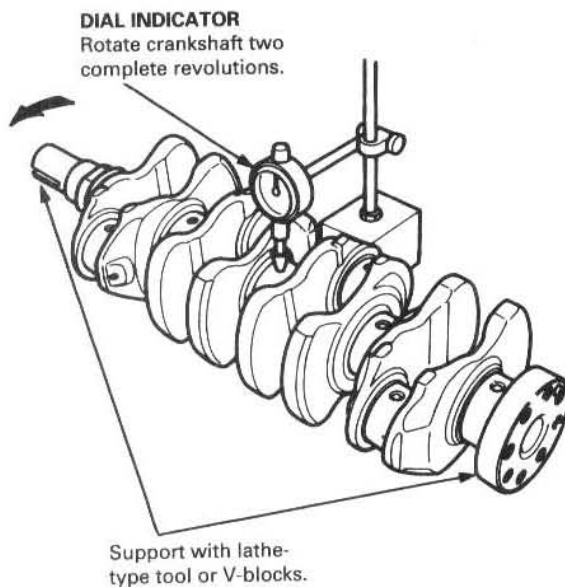
Inspection

- Clean the crankshaft oil passages with pipe cleaners or a suitable brush.
- Check the keyway and threads.

Alignment

- Measure runout on all main journals to make sure the crank is not bent.
- The difference between measurements on each journal must not be more than the service limit.

Crankshaft Total Indicated Runout:
Standard (New): 0.03 mm (0.001 in) max.
Service Limit: 0.04 mm (0.002 in)

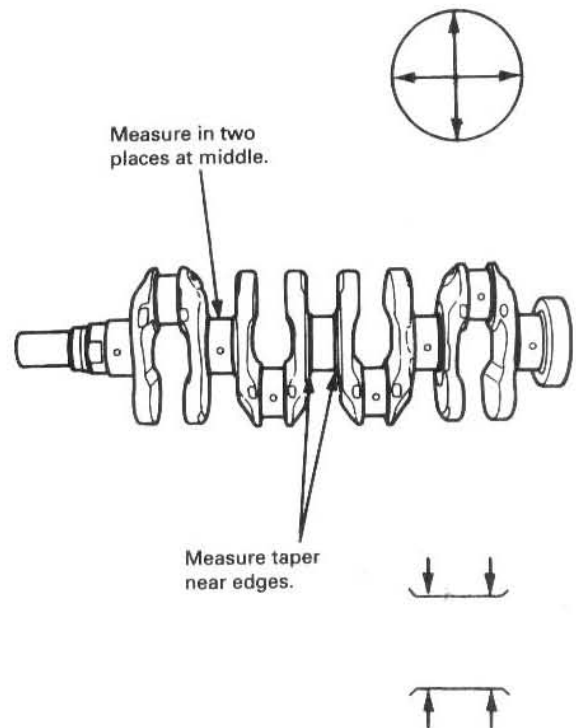


Out-of-Round and Taper

- Measure out-of-round at the middle of each rod and main journal in two places.
- The difference between measurements on each journal must not be more than the service limit.

Journal Out-of-Round:

Standard (New): 0.004 mm (0.0002 in) max.
Service Limit: 0.006 mm (0.0002 in)



- Measure taper at the edge of each rod and main journal.
- The difference between measurements on each journal must not be more than the service limit.

Journal Taper:

Standard (New): 0.005 mm (0.0002 in) max.
Service Limit: 0.006 mm (0.0002 in)

Pistons

Inspection

1. Check the piston for distortion or cracks.
2. Measure the piston diameter at a point 15 mm (0.6 in) from the bottom of the skirt.

NOTE: There are two standard-size pistons (No Letter or A, and B). The letter is stamped on the top of the piston. Letters are also stamped on the block as cylinder bore sizes.

Piston Diameter:

Standard (New):

No Letter (or A): 86.993 – 87.006 mm
(3.4249 – 3.4254 in)

B: 86.983 – 86.996 mm
(3.4245 – 3.4250 in)

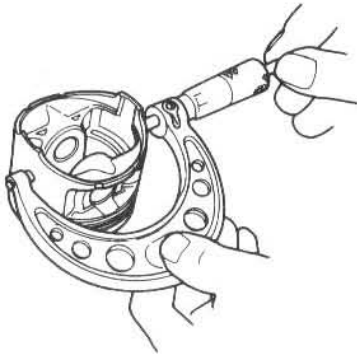
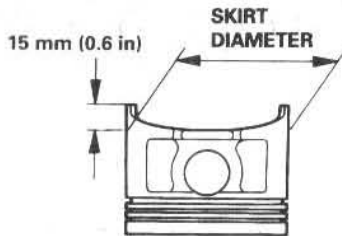
Service Limit:

No Letter (or A): 86.980 mm (3.4244 in)

B: 86.970 mm (3.4240 in)

Oversize Piston Diameter:

0.25: 87.233 – 87.256 mm (3.4344 – 3.4353 in)

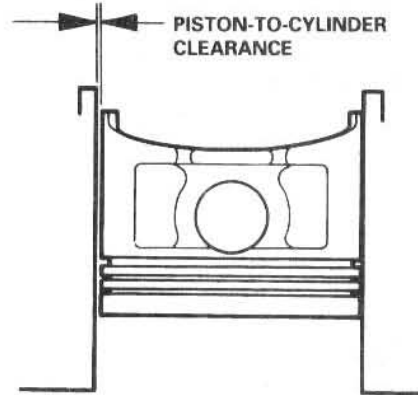


3. Calculate the difference between the cylinder bore diameter (see page 7-17) and piston diameter.

Piston-to-Cylinder Clearance:

Standard (New): 0.004 – 0.027 mm
(0.0002 – 0.0011 in)

Service Limit: 0.04 mm (0.002 in)

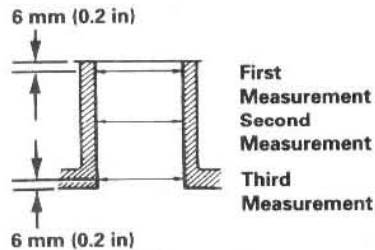


If the clearance is near or exceeds the service limit, inspect the piston and cylinder block for excessive wear.



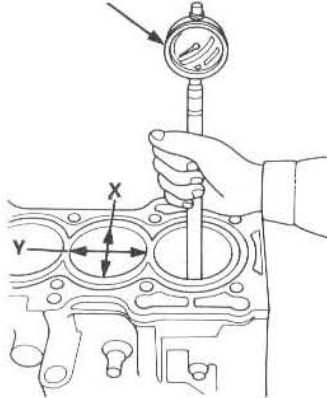
Inspection

1. Measure wear and taper in direction X and Y at three levels in each cylinder as shown.



CYLINDER BORE SIZES
(A or I, B or II)
Read the letters from left-to-right
for No. 1 through No. 4 cylinders.

CYLINDER BORE GAUGE



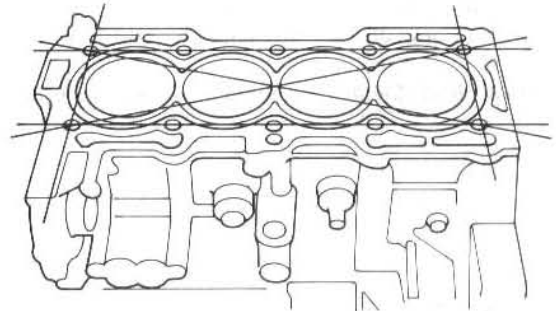
Cylinder Bore Size:
Standard (New):
A or I: 87.010 – 87.020 mm (3.4256 – 3.4260 in)
B or II: 87.000 – 87.010 mm (3.4252 – 3.4256 in)
Service Limit: 87.070 mm (3.4279 in)
Oversize:
0.25: 87.250 – 87.260 mm (3.4350 – 3.4354 in)
Bore Taper:
Limit: (Difference between first and third measurement) 0.05 mm (0.002 in)
Reboring Limit: 0.25 mm (0.010 in) max.

- If the measurements in any cylinder are beyond the Oversize Bore Service Limit, replace the block.
- If the block is to be rebored, refer to Piston Clearance Inspection (see page 7-16) after reboring.

NOTE: Scored or scratched cylinder bores must be honed.

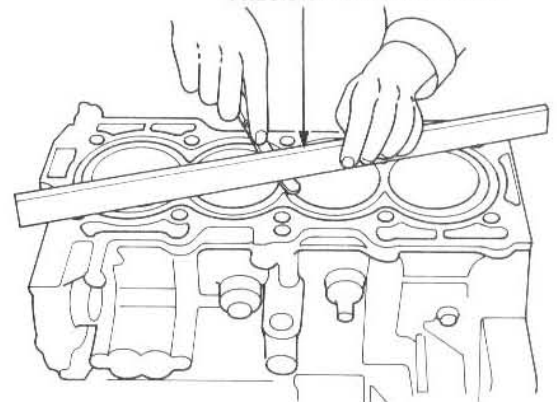
2. Check the top of the block for warpage. Measure along the edges and across the center as shown.

SURFACES TO BE MEASURED



Engine Block Warpage:
Standard (New): below 0.07 mm (0.003 in) max.
Service Limit: 0.10 mm (0.004 in)

PRECISION STRAIGHT EDGE



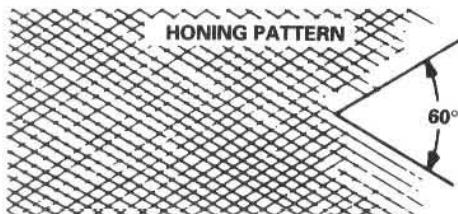
Cylinder Block

Bore Honing

CAUTION: This cylinder liner uses FRM (Fiber Reinforced Metal). Hone only as directed below.

1. Measure the cylinder bores.
If the block is to be reused, hone the cylinders and remeasure the bores.
2. To hone the cylinder bores:
 - Use only a rigid hone.
 - Honing stone: GC – 600 – J or finer stone (for nonferrous metals)
 - Pressure: 200 – 300 kPa (2 – 3 kgf/cm², 28 – 43 psi)
 - Honing rpm: 45 – 50 rpm
 - Honing thickness: Less than 0.02 mm (0.0008 in)
Do not hone more than 20 cycles
 - Honing lubricant: Oil type
 - Honing pattern: 60 degree cross-hatch

CAUTION: Clean the honing stone every 5 cycles.

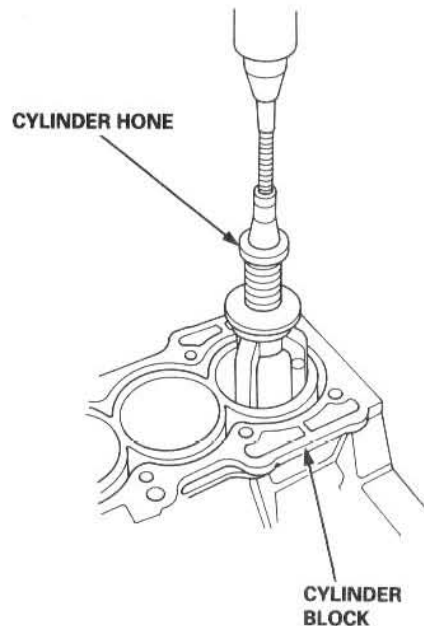


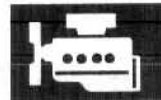
3. When honing is complete, thoroughly clean the cylinder block of all metal particles. Wash the cylinder bores with hot soapy water, then dry and oil immediately to prevent rusting.

NOTE: Never use solvent, it will only redistribute the grit on the cylinder walls.

4. If scoring or scratches are still present in the cylinder bores after honing to the service limit, rebore the cylinder block.

NOTE: Some light vertical scoring and scratching is acceptable if it is not deep enough to catch your fingernail and does not run the full length of the bore.

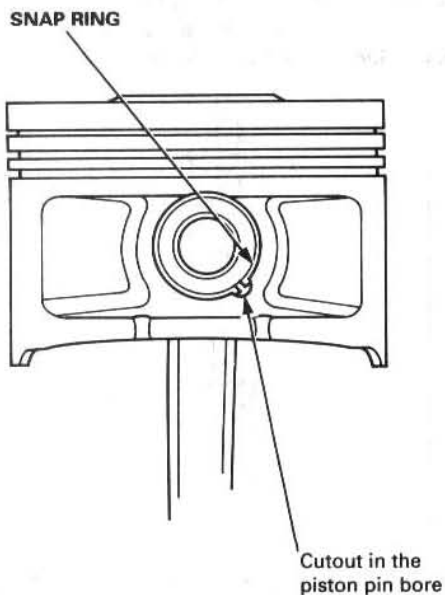




Removal

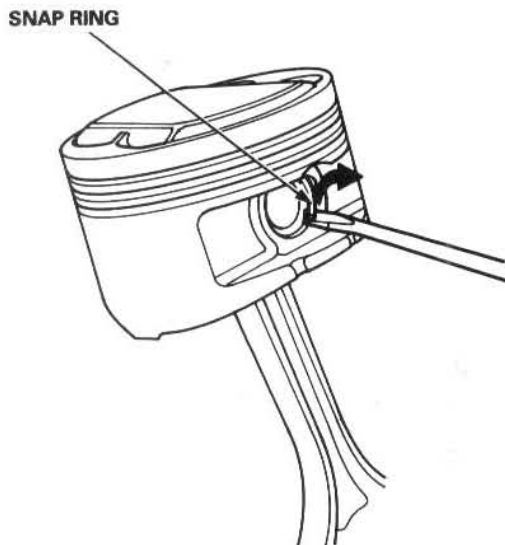
1. Apply engine oil to the piston pin snap rings, and turn them in the ring grooves until the end gaps are lined up with the cutouts in the piston pin bores.

NOTE: Take care not to damage the ring grooves.



2. Remove both snap rings. Start at the cutout in the piston pin bore.

NOTE: Remove the snap rings carefully so they do not go flying or get lost. Wear eye protection.



3. Heat the piston and connecting rod assembly to approximately 70°C (158°F), then remove the piston pin.

⚠ WARNING Work carefully to prevent getting burned.



Piston Pins

Inspection

NOTE: Inspect the piston, piston pin and connecting rod when they are at room temperature.

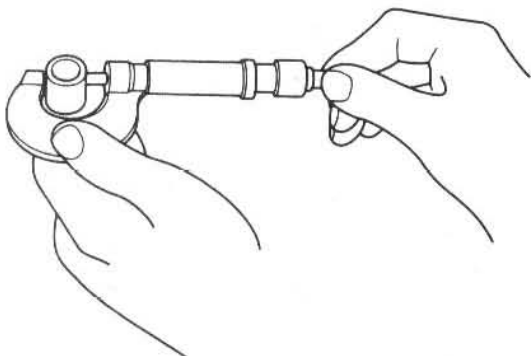
1. Measure the diameter of the piston pin

Piston Pin Diameter:

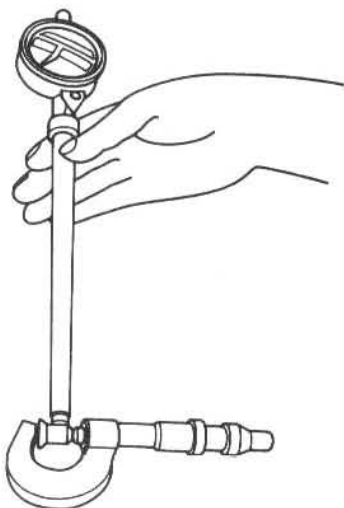
Standard (New): 21.961 – 21.965 mm

(0.8646 – 0.8648 in)

Service Limit: 21.953 mm (0.8643 in)



2. Zero the dial indicator to the piston pin diameter.



3. Check the difference between the piston pin diameter and piston pin hole diameter on the piston.

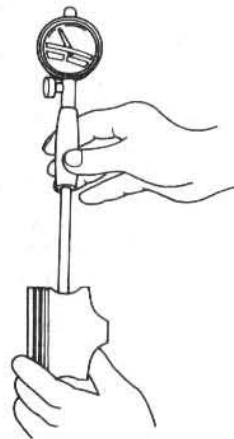
NOTE: Check the piston for distortion or cracks.

Piston Pin-to-Piston Clearance:

Standard (New): -0.003 to +0.006 mm

(-0.0001 to +0.0002 in)

Service Limit: 0.009 mm (0.0003 in)



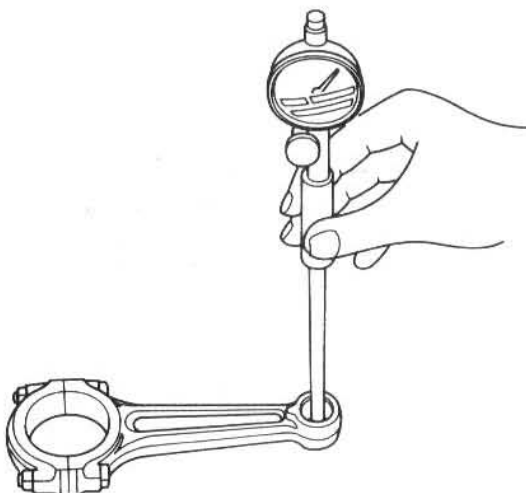
4. Measure the piston pin-to-connecting rod clearance.

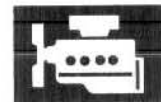
Piston Pin-to-Connecting Rod Clearance:

Standard (New): 0.005 – 0.015 mm

(0.0002 – 0.0006 in)

Service Limit: 0.002 mm (0.0008 in)





Selection

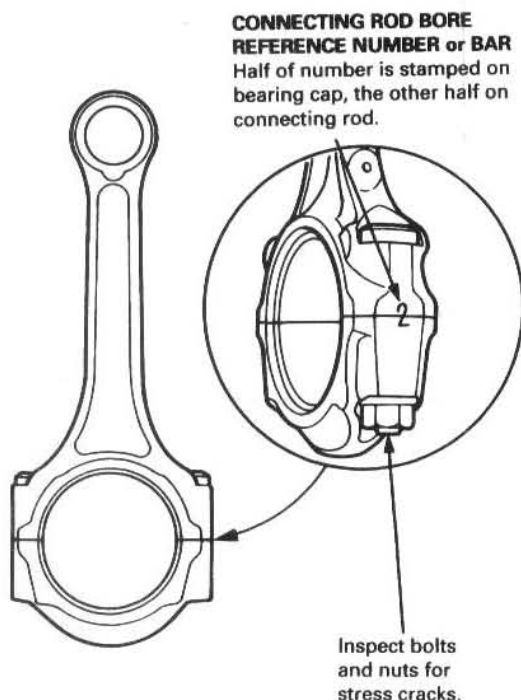
Each rod falls into one of four tolerance ranges (from 0 to 0.024 mm (0.0009 in), in 0.006 mm (0.0002 in) increments) depending on the size of its big end bore. It's then stamped with a number or bar (1, 2, 3, or 4/l, il, iil, or iil) indicating the range.

You may find any combination of 1, 2, 3, or 4/l, il, iil, or iil in any engine.

Normal Bore Size: 51.0 mm (2.01 in)

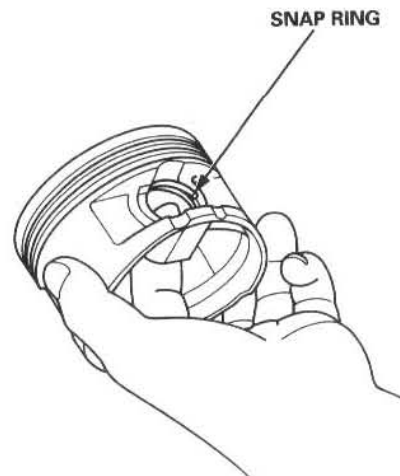
NOTE:

- Reference numbers or bars are for big end bore size and do not indicate the position of the rod in the engine.
- Inspect the connecting rod for cracks and heat damage.



Installation

1. Install a piston pin snap ring.



2. Heat the piston to approximately 158°F (70°C).

⚠ WARNING Work carefully to prevent getting burned.



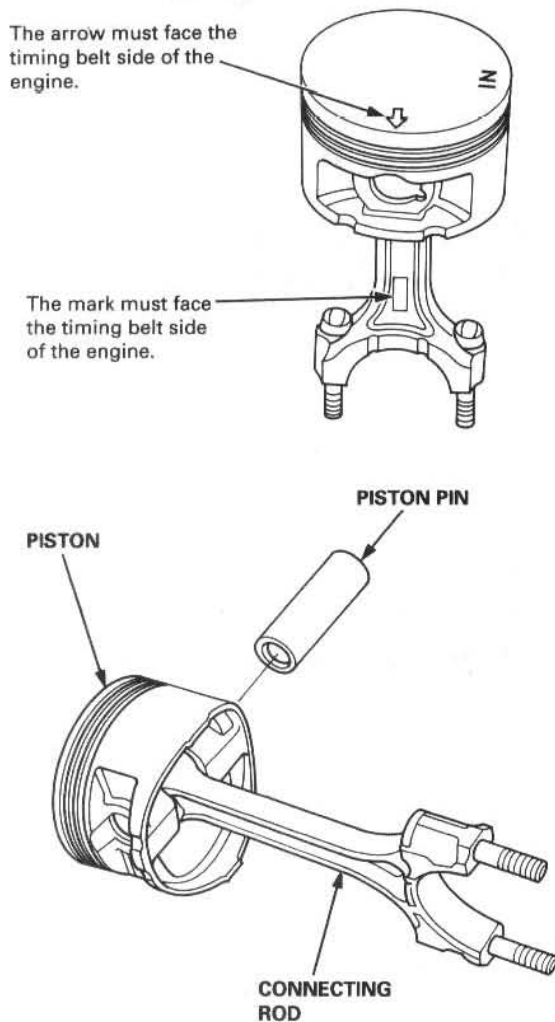
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Piston Pins

Piston Rings

Installation (cont'd)

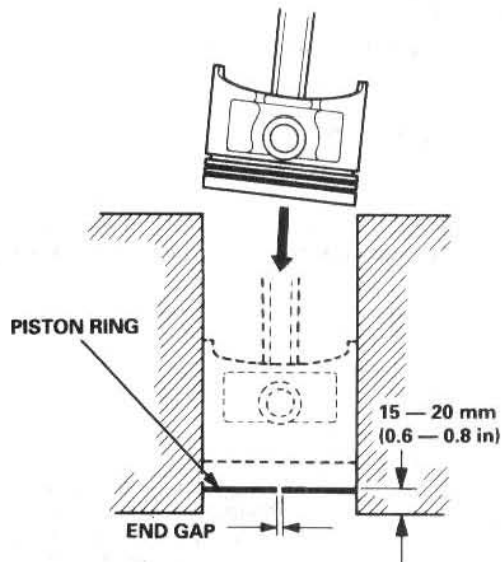
3. Coat the piston pin bore in the piston, the bore in the connecting rod, and the piston pin with engine oil. Install the piston pin.



4. Install the remaining snap ring.

End Gap

1. Using a piston, push a new ring into the cylinder bore 15 – 20 mm (0.6 – 0.8 in) from the bottom.



2. Measure the piston ring end-gap with a feeler gauge:
 - If the gap is too small, check to see if you have the proper rings for your engine.
 - If the gap is too large, recheck the cylinder bore diameter against the wear limits on page 7-17. If the bore is over the service limit, the cylinder block must be rebored.

Piston Ring End-Gap:

Top Ring

Standard (New): 0.25 – 0.35 mm
(0.010 – 0.014 in)

Service Limit: 0.60 mm (0.024 in)

Second Ring

Standard (New): 0.60 – 0.75 mm
(0.024 – 0.030 in)

Service Limit: 0.90 mm (0.035 in)

Oil Ring

Standard (New): 0.20 – 0.70 mm*1
(0.008 – 0.028 in)

0.20 – 0.50 mm*2
(0.008 – 0.020 in)

Service Limit: 0.80 mm (0.031 in)*1
0.60 mm (0.024 in)*2

*1: RIKEN manufactured piston ring.

*2: TEIKOKU PISTON RING manufactured piston ring.



Replacement

1. Using a ring expander, remove the old piston rings.



2. Clean all ring grooves thoroughly.

NOTE:

- Use a squared-off broken ring or ring groove cleaner with a blade to fit the piston grooves.
- The top and 2nd ring grooves are 1.2 mm (0.05 in) wide. The oil ring groove is 2.8 mm (0.11 in) wide.
- File down a blade if necessary.

CAUTION: Do not use a wire brush to clean the ring grooves, or cut the ring grooves deeper with cleaning tools.

NOTE: If the piston is to be separated from the connecting rod, do not install new rings yet.

3. Install new rings in the proper sequence and position (see page 7-24).

NOTE: Do not use old piston rings.

Ring-to-Groove Clearance

After installing a new set of rings, measure the ring-to-groove clearances:

Top Ring Clearance

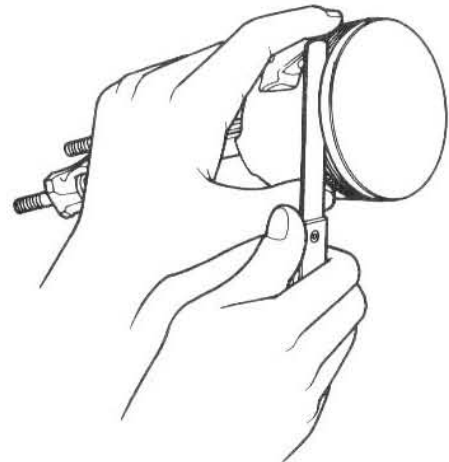
Standard (New): 0.055 – 0.085 mm
(0.0022 – 0.0033 in)

Service Limit: 0.13 mm (0.005 in)

Second Ring Clearance

Standard (New): 0.040 – 0.070 mm
(0.0016 – 0.0028 in)

Service Limit: 0.13 mm (0.005 in)



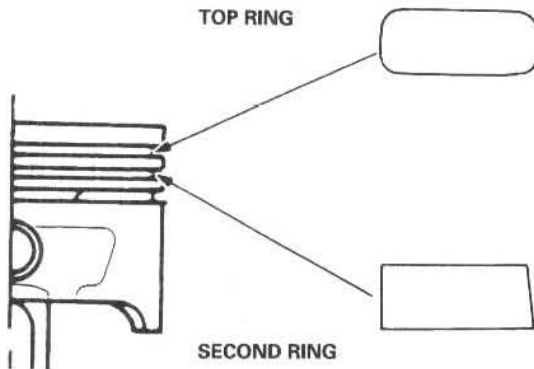
Piston Rings

Alignment

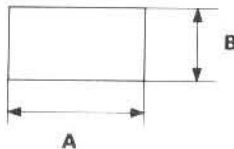
1. Install the rings as shown.

NOTE:

- The top ring has an R1 or T1 mark.
- The second ring has an R2 or 2T mark.



Piston Ring Dimensions:



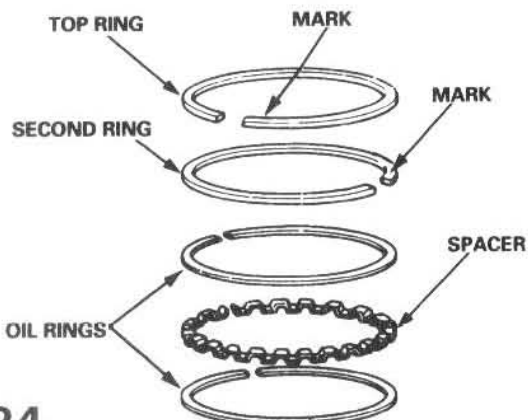
Top Ring (Standard):

- A: 3.1 mm (0.12 in)
- B: 1.2 mm (0.05 in)

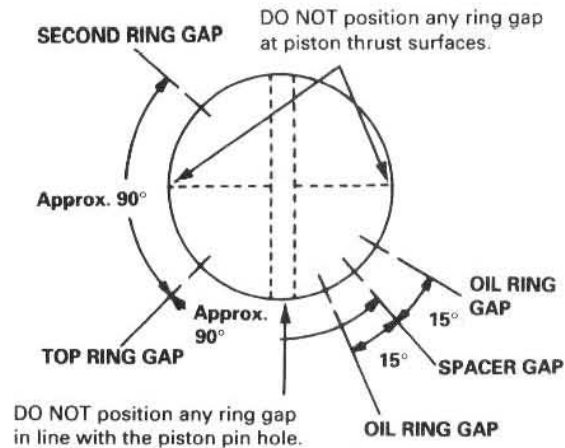
Second Ring (Standard):

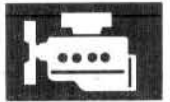
- A: 3.2 mm (0.13 in)
- B: 1.2 mm (0.05 in)

NOTE: The manufacturing marks must be facing upward.




2. Rotate the rings in their grooves to make sure they do not bind.
3. Position the ring end gaps as shown:



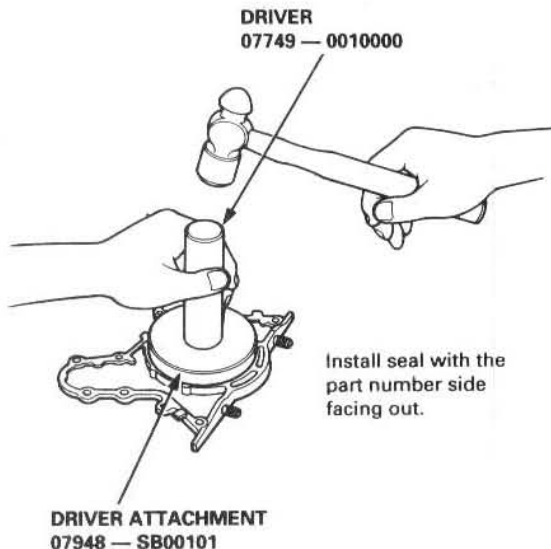


Installation

-  The seal surface on the block should be dry. Apply a light coat of oil to the crankshaft and to the lip of the seal.

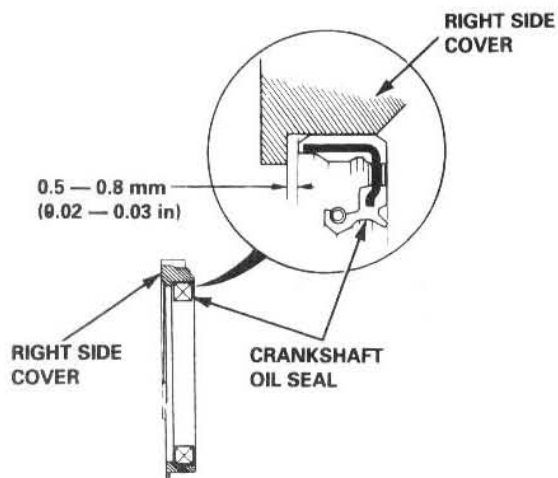
1. Drive in the crankshaft oil seal against the right side cover.

NOTE: Drive the crankshaft oil seal in squarely.




2. Confirm that the clearance is equal all the way around with a feeler gauge.

Clearance: 0.5 – 0.8 mm (0.02 – 0.03 in)



NOTE: Refer to pages 7-31 and 8-15 for installation of the oil pump side crankshaft oil seal.

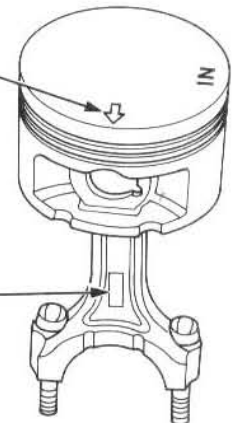
Installation

-  Before installing the pistons, apply a coat of engine oil to the ring grooves and cylinder bores.

1. If the crankshaft is already installed:
 - Set the crankshaft to BDC for each cylinder.
 - Remove the connecting rod caps, and slip short sections of rubber hose over the threaded ends of the connecting rod bolts.
 - Install the ring compressor, check that the bearing is securely in place, then position the piston in the cylinder and tap it in using the wooden handle of a hammer.
 - Stop after the ring compressor pops free, and check the connecting rod-to-crank journal alignment before pushing the piston into place.
 - Install the rod caps with bearings, and torque the nuts to:
46 N·m (4.7 kgf·m, 34 lbf·ft)
2. If the crankshaft is not installed:
 - Remove the rod caps and bearings, install the ring compressor, then position the piston in the cylinder and tap it in using the wooden handle of a hammer.
 - Position all pistons at top dead center.

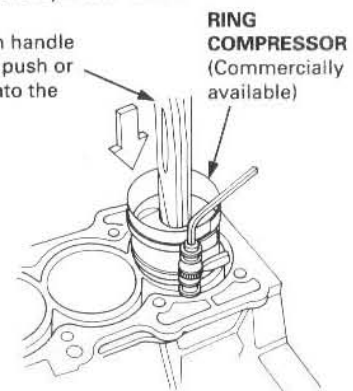
The arrow must face the timing belt side of the engine.

The mark must face the timing belt, side of the engine.




NOTE: Maintain downward force on the ring compressor to prevent the rings from expanding before entering the cylinder bore.

Use the wooden handle of a hammer to push or tap the piston into the cylinder bore.

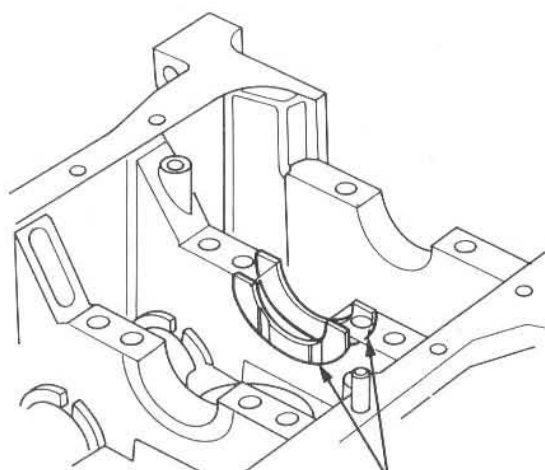


Crankshaft and Balancer Shafts

Installation

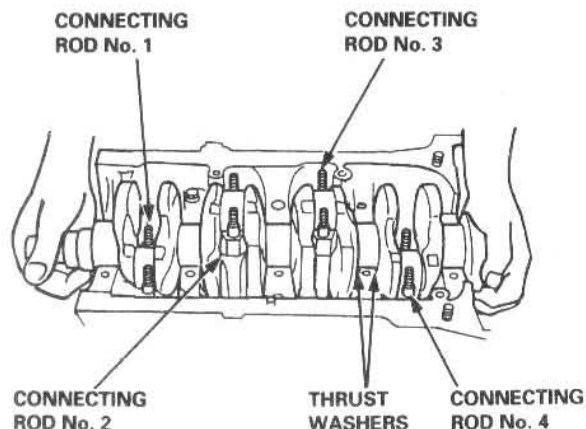
 Before installing the crankshaft, apply a coat of engine oil to the main bearings, rod bearings and balancer shaft bearings.

1. Install the thrust washers in the No. 4 journal of the cylinder block.



THRUST WASHERS
Grooved side facing outward.

2. Insert the bearing halves in the cylinder block and connecting rods.
3. Hold the crankshaft so the rod journals for cylinders No. 2 and No. 3 are straight up.
4. Lower the crankshaft into the block, seating the rod journals into connecting rods No. 1 and No. 4. Install the rod caps and nuts finger tight.



5. Rotate the crankshaft clockwise, seat the journals into connecting rods No. 2 and No. 3, and install the rod caps and nuts finger tight.

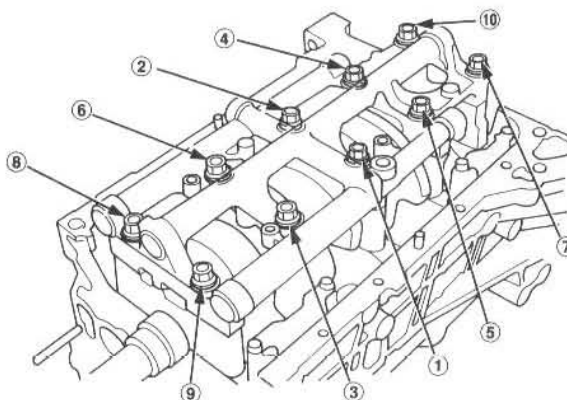
NOTE: Install the caps so the bearing recess is on the same side as the recess in the rod.

6. Check rod bearing clearance with plastigage (see page 7-10), then torque the capnuts.
46 N·m (4.7 kgf·m, 34 lbf·ft)

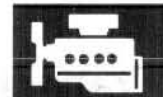
NOTE: Reference numbers on the connecting rods are for big-end bore tolerance and do not indicate the position of the piston in the engine.

7. Install the main bearing caps and bearing cap bridge.
8. Check clearance with plastigage (see page 7-8), then tighten the bearing cap bolts in two steps. In the first step, tighten all bolts in sequence to about 29 N·m (3.0 kgf·m, 22 lbf·ft); in the final step, tighten them in the same sequence, to 74 N·m (7.5 kgf·m, 54 lbf·ft).

NOTE: Coat the bolt threads with engine oil.



CAUTION: Whenever any crankshaft bearing or connecting rod bearing is replaced, it is necessary after reassembly to run the engine at idling speed until it reaches normal operating temperature, then continue to run it for approximately 15 minutes.

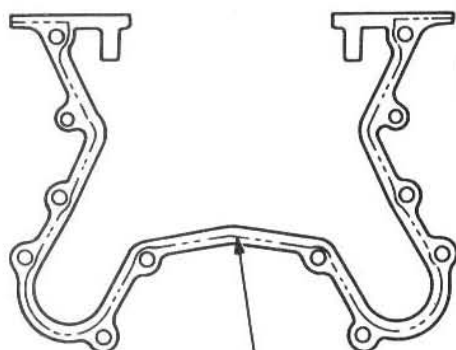


9. Apply liquid gasket to the block mating surface of the right side cover, then install it on the cylinder block.

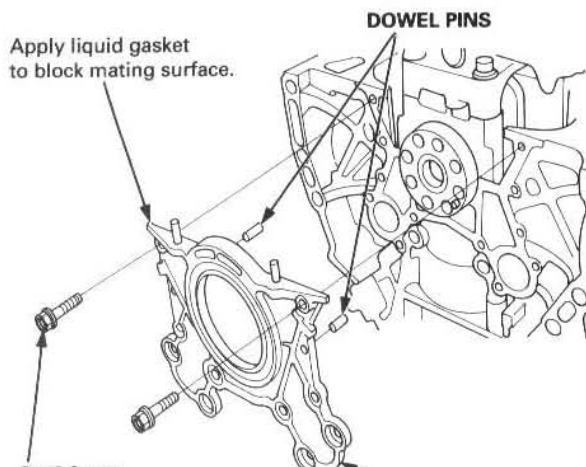
NOTE:

- Use liquid gasket, part No. 08718 – 0001 or 08718 – 0003.
- Check that the mating surfaces are clean and dry before applying liquid gasket.
- Apply liquid gasket evenly, being careful to cover all the mating surface.
- To prevent leakage of oil, apply liquid gasket to the inner threads of the bolt holes.
- Do not install the parts if five minutes or more have elapsed since applying the liquid gasket. Instead, reapply liquid gasket after removing the old residue.
- After assembly, wait at least 30 minutes before filling the engine with oil.

RIGHT SIDE COVER:

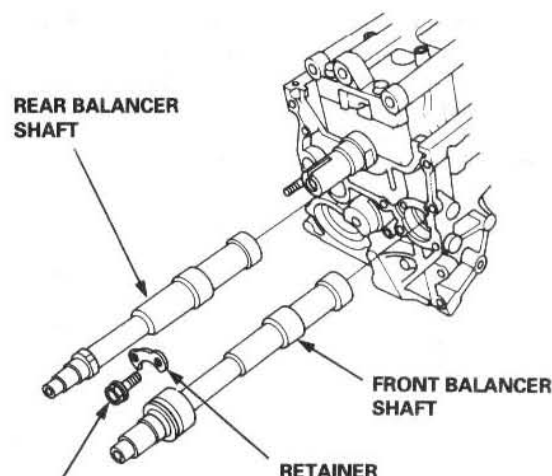


Apply liquid gasket along the broken line.



6 x 1.0 mm
12 N·m (1.2 kgf-m, 8.7 lbf-ft)
Apply liquid gasket to the bolt threads.

10. Insert the balancer shafts into the block, then install the retainer to the front balancer shaft and block.



6 x 1.0 mm
20 N·m (2.0 kgf-m, 14 lbf-ft)

(cont'd)

Crankshaft and Balancer Shafts

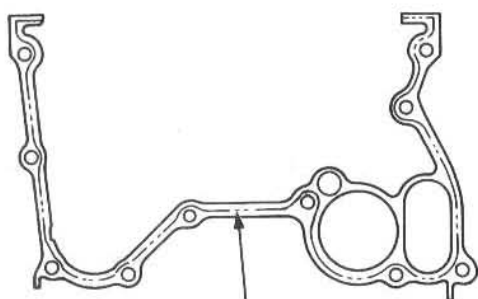
Installation (cont'd)

11. Apply liquid gasket to the oil pump mating surface of the block, then install the oil pump on the cylinder block.

Apply grease to the lips of the oil seals.

Then, install the oil pump while aligning the inner rotor with the crankshaft. When the pump is in place, clean any excess grease off the crankshaft and the balancer shaft, then check that the oil seal lips are not distorted.

OIL PUMP:



Apply liquid gasket along the broken line.

6 x 1.0 mm
12 N·m (1.2 kgf·m, 8.7 lbf·ft)

GASKET
Replace.

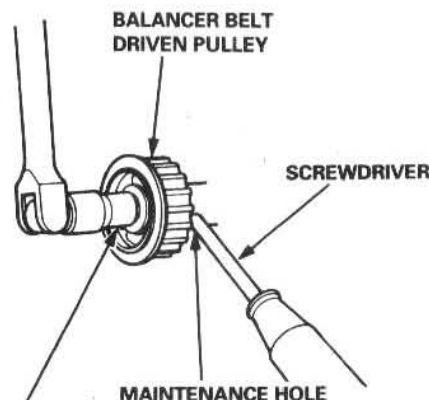
O-RINGS
Apply engine oil.
Replace.

6 x 1.0 mm
12 N·m (1.2 kgf·m, 8.7 lbf·ft)
Apply liquid gasket to the bolt threads.

OIL PUMP
Apply liquid gasket to block mating surface.

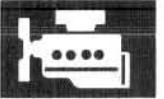
13. Hold the front balancer shaft with a screwdriver, then install the balancer belt driven pulley.

FRONT BALANCER SHAFT:

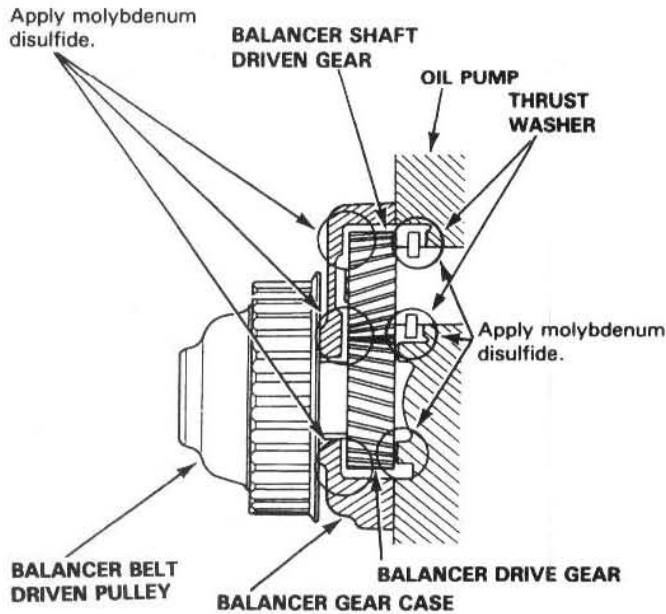


8 x 1.25 mm
29 N·m (3.0 kgf·m, 22 lbf·ft)

12. Install the oil screen.

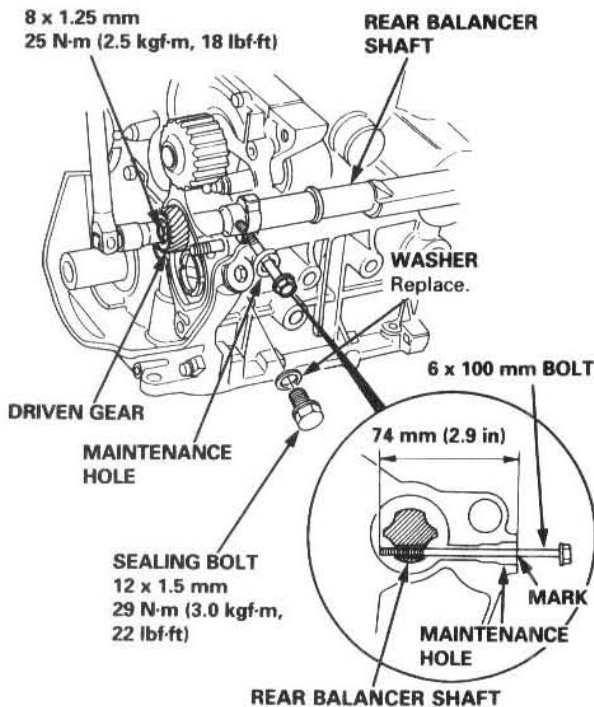


14. Before installing the balancer driven gear and the balancer gear case, apply molybdenum disulfide to the thrust surfaces of the balancer gears as shown.



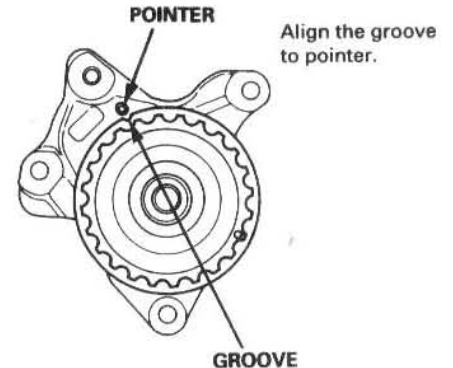
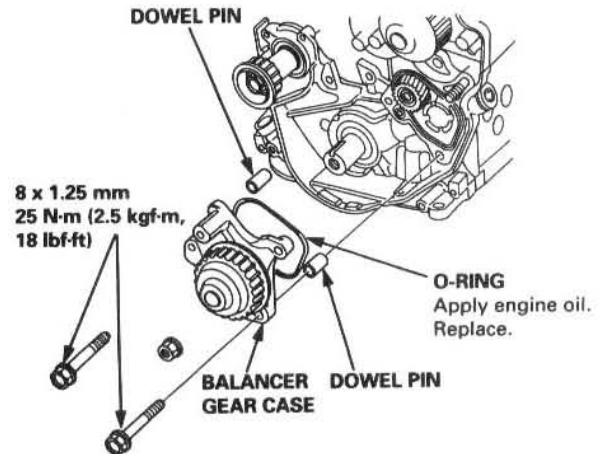
15. Hold the rear balancer shaft with a 6 x 100 mm bolt, then install the balancer driven gear.

REAR BALANCER SHAFT:

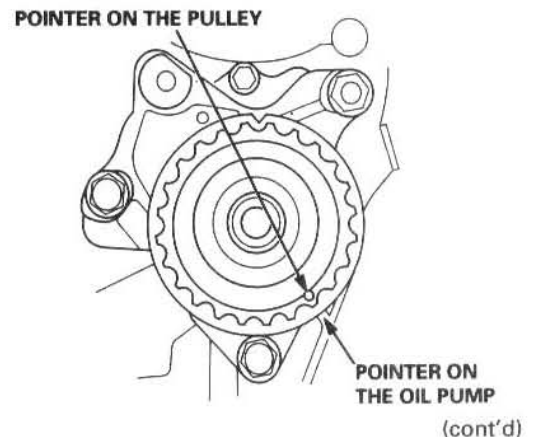


16. Install the balancer gear case to the oil pump.

NOTE: Align the groove on the pulley edge to the pointer on the gear case while holding the rear balancer with 6 x 100 mm bolt, then install the gear case.



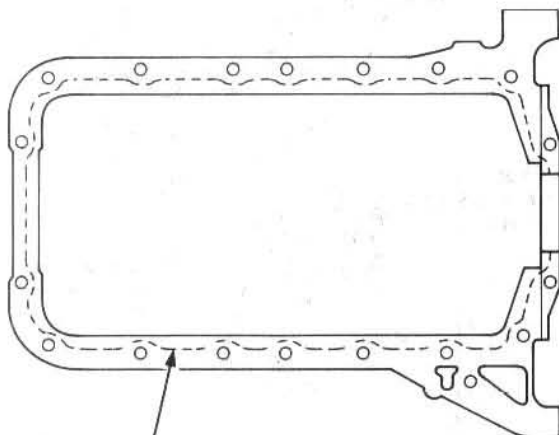
17. Check the alignment of the pointers after installing the gear case.



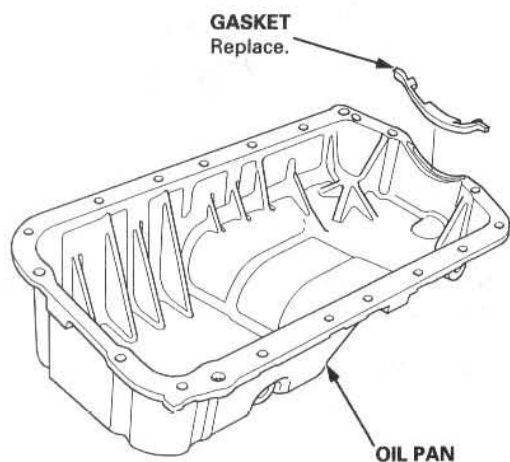
Crankshaft and Balancer Shafts

Installation (cont'd)

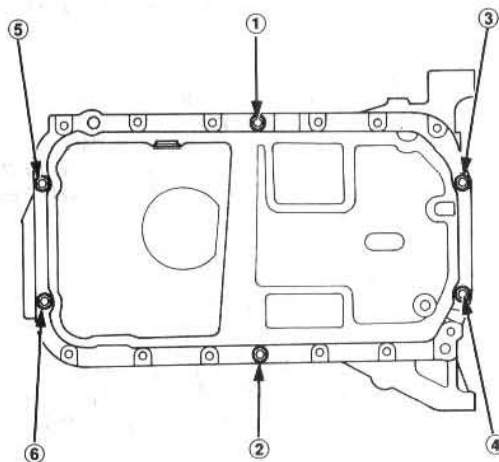
18. Apply liquid gasket to the oil pan mating surface of the block, then install the oil pan on the cylinder block.



Apply liquid gasket
along the broken line.



19. Tighten nuts finger-tight at six points as shown below.

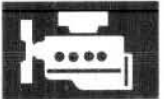


20. Tighten all bolts and nuts, starting from nut ①, clockwise in three steps.

NOTE: Excessive tightening can cause distortion of oil pan gasket and oil leakage.

Torque: 12 N·m (1.2 kgf·m, 8.7 lbf·ft)

Crankshaft and Balancer Shaft Oil Seals

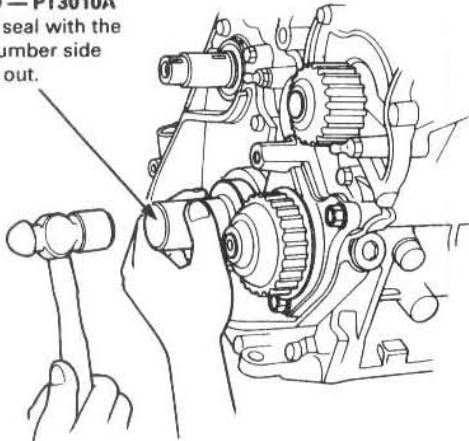


Installation (engine removal not required)

NOTE: The crankshaft and front balancer shaft oil seal housing surface should be dry.
Apply a light coat of grease to the crankshaft, the balancer shaft and to the lips of the seals.

1. Using the special tool, drive in the crankshaft oil seal until the driver bottoms against the oil pump. When the seal is in place, clean any excess grease off the crankshaft, and check that the oil seal lip is not distorted.

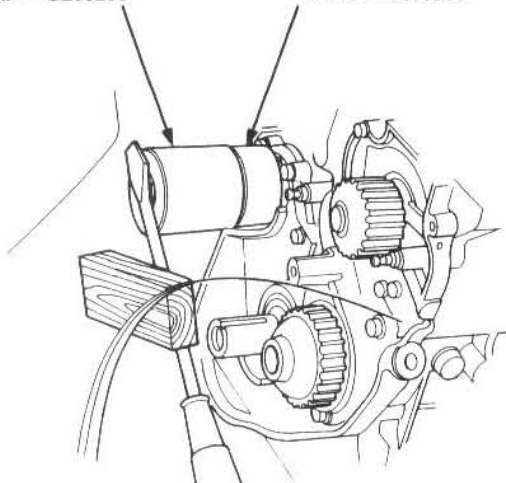
SEAL DRIVER
07LAD — PT3010A
Install seal with the
part number side
facing out.



2. Using the special tool, press in the front balancer shaft oil seal until the driver bottoms against the oil pump. When the seal is in place, clean any excess grease off the balancer shaft, and check that the oil seal lip is not distorted.

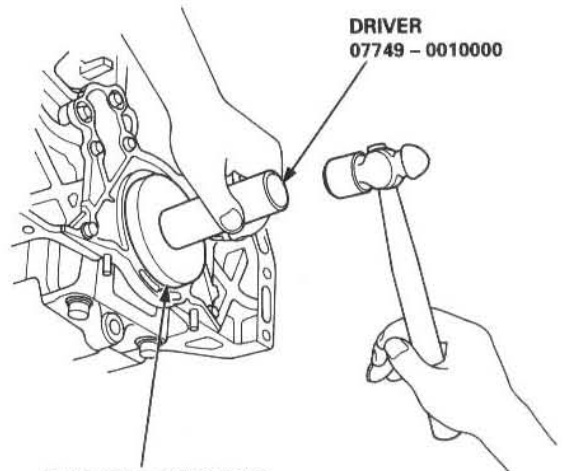
HUB ASSEMBLY GUIDE
ATTACHMENT
07GAF — SE00200

ATTACHMENT,
30 mm I.D.
07746 — 0030300



3. Using the special tool, drive the crankshaft oil seal into the right side cover to the point where the clearance between the bottom of the crankshaft oil seal and right side cover is 0.5 – 0.8 mm (0.02 – 0.03 in) (see page 7-25).

NOTE: Align the hole in the driver attachment with the pin on the crankshaft.



DRIVER ATTACHMENT
07948 — SB00101
Install seal with the
part number side
facing out.

Balancer Shafts

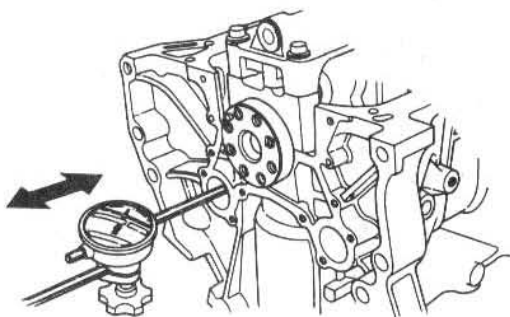
Inspection

NOTE: Inspect the balancer shafts before removing the right side cover and the balancer gear case (see page 7-12).

1. Push the balancer shaft firmly away from the dial indicator, and zero the dial against the front end of the balancer shaft, then pull the balancer shaft firmly back toward the indicator.

Front Balancer Shaft End Play

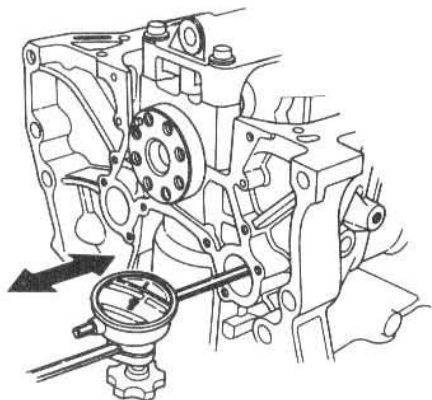
Standard (New): 0.10 – 0.40 mm
(0.004 – 0.016 in)



- If end play is excessive, inspect the retainer and thrust surfaces on the balancer shaft.

Rear Balancer Shaft End Play

Standard (New): 0.04 – 0.15 mm
(0.002 – 0.006 in)



- If end play is excessive, inspect the thrust washer and thrust surfaces on the driven gear and oil pump body.

NOTE: The thickness of the retainer (front) and thrust washer (rear) are fixed and must not be changed either by grinding or shimming.

2. Remove the balancer shafts (see page 7-14).

NOTE: Clean the balancer shafts.

3. Inspect the surface of the balancer shaft journal and balancer bearing.
4. Replace the bearing or balancer shaft if there is wear, damage or discoloration on the surface of the bearing or the balancer shaft journal. When replacing the rear No. 1 bearing, be sure to replace the oil pump housing with a new one.

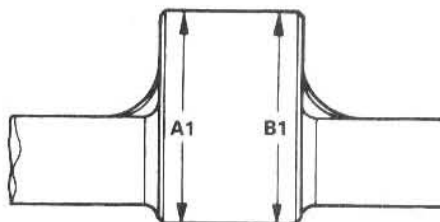
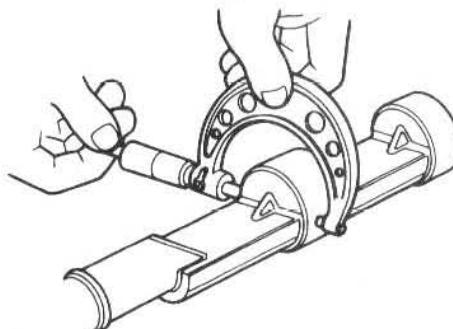
NOTE: A mirror-like surface is normal.

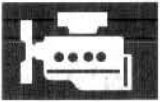
5. Measure taper at the edges of each journal.

The difference between measurements on each journal must not exceed the standard.

Journal Taper

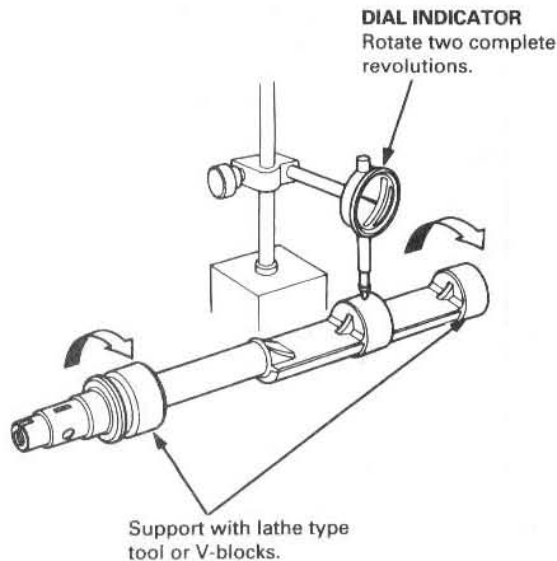
Standard (New): 0.005 mm (0.0002 in) max





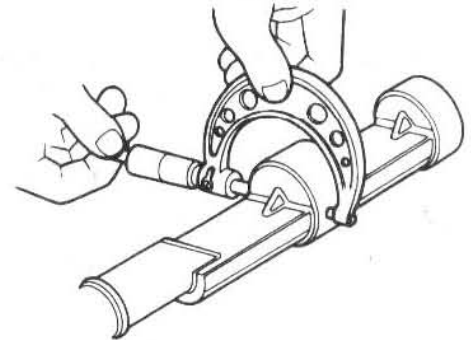
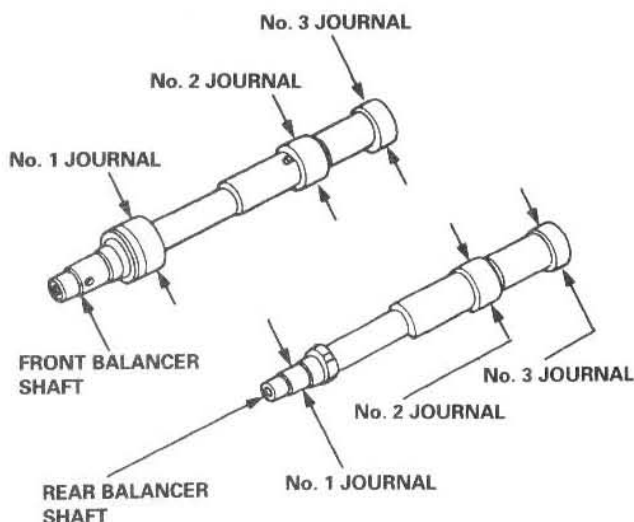
6. Measure runout on the No. 2 journal of each balancer shaft to make sure the balancer shafts are not bent.

Balancer Shaft Total Indicated Runout
Standard (New): 0.02 mm (0.001 in) max
Service Limit: 0.03 mm (0.001 in)



7. Measure the diameters of the balancer shaft journals.

MEASURING POINTS



Journal Diameter

Standard (New):

No. 1 journals:

Front: 42.722 – 42.734 mm
 (1.6820 – 1.6824 in)

Rear: 20.938 – 20.950 mm
 (0.8243 – 0.8248 in)

No. 2 front and rear journals:

38.712 – 38.724 mm
 (1.5241 – 1.5246 in)

No. 3 front and rear journals:

34.722 – 34.734 mm
 (1.3670 – 1.3675 in)

Service Limit:

No. 1 journals:

Front: 42.71 mm (1.681 in)
 Rear: 20.92 mm (0.824 in)

No. 2 front and rear journals:

38.70 mm (1.524 in)

No. 3 front and rear journals:

34.71 mm (1.367 in)

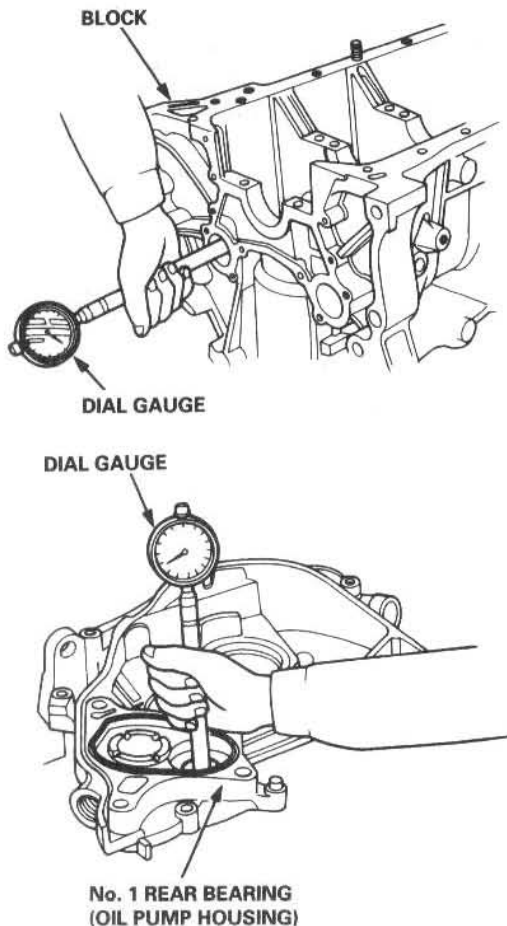
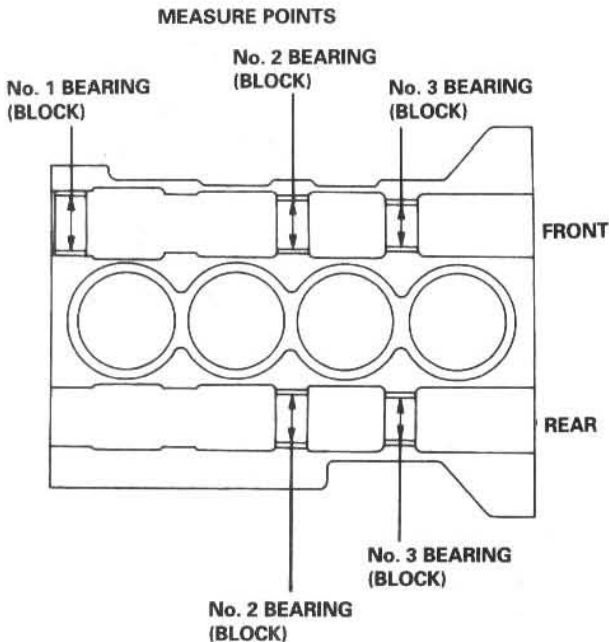
8. Remove the crankshaft, the pistons and the other parts from the block, then clean the balancer shaft journal bearings in the block and the oil pump housing with a clean shop towel.
9. Check the surface of the bearings; if there is wear, damage or discoloration, replace the bearings or the oil pump housing.

(cont'd)

Balancer Shafts

Inspection (cont'd)

10. Measure the inner diameters of the balancer shaft journal bearings.



Bearing Inner Diameter

Standard (New):

No. 1 journals:

Front: 42.800 – 42.820 mm
(1.6850 – 1.6858 in)
Rear: 21.000 – 21.013 mm
(0.8268 – 0.8273 in)

No. 2 front and rear journals:

38.800 – 38.820 mm
(1.5276 – 1.5283 in)

No. 3 front and rear journals:

34.800 – 34.820 mm
(1.3701 – 1.3709 in)

Service Limit:

No. 1 journals:

Front: 42.83 mm (1.686 in)
Rear: 21.02 mm (0.828 in)

No. 2 front and rear journals:

38.83 mm (1.529 in)

No. 3 front and rear journals:

34.83 mm (1.371 in)

11. Calculate the shaft-to-bearings oil clearances.

$$\text{BEARING I.D.} - \text{JOURNAL O.D.} = \text{OIL CLEARANCE}$$

Bearing-to-Shaft Oil Clearance

Standard (New):

No. 1 front journal, No. 3 front and rear journals:

0.066 – 0.098 mm (0.0026 – 0.0039 in)

No. 2 front and rear journals:

0.076 – 0.108 mm (0.0030 – 0.0043 in)

No. 1 rear journal:

0.050 – 0.075 mm (0.0020 – 0.0030 in)

Service Limit:

No. 1 front journal, No. 3 front and rear journals:

0.12 mm (0.005 in)

No. 2 front and rear journals:

0.13 mm (0.005 in)

No. 1 rear journal:

0.09 mm (0.004 in)

Engine Lubrication

Special Tools	8-2
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Engine Oil	
Inspection	8-6
Replacement	8-6
Oil Filter	
Replacement	8-7
Oil Pressure Switch	
Testing	8-10
Oil Pressure	
Testing	8-10
Oil Jet	
Inspection	8-12
Oil Pump	
Overhaul	8-13
Removal/Inspection/Installation	8-14



Special Tools

Ref. No.	Tool Number	Description	Qty	Page Reference
①	07LAD – PT3010A	Seal Driver	1	8-15
②	07746 – 0010300	Attachment, 42 x 47 mm	1	8-15
③	07749 – 0010000	Driver	1	8-15
④	07912 – 6110001	Oil Filter Wrench	1	8-8, 9



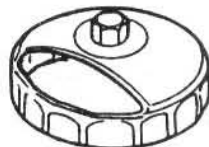
①



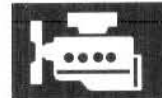
②



③



④

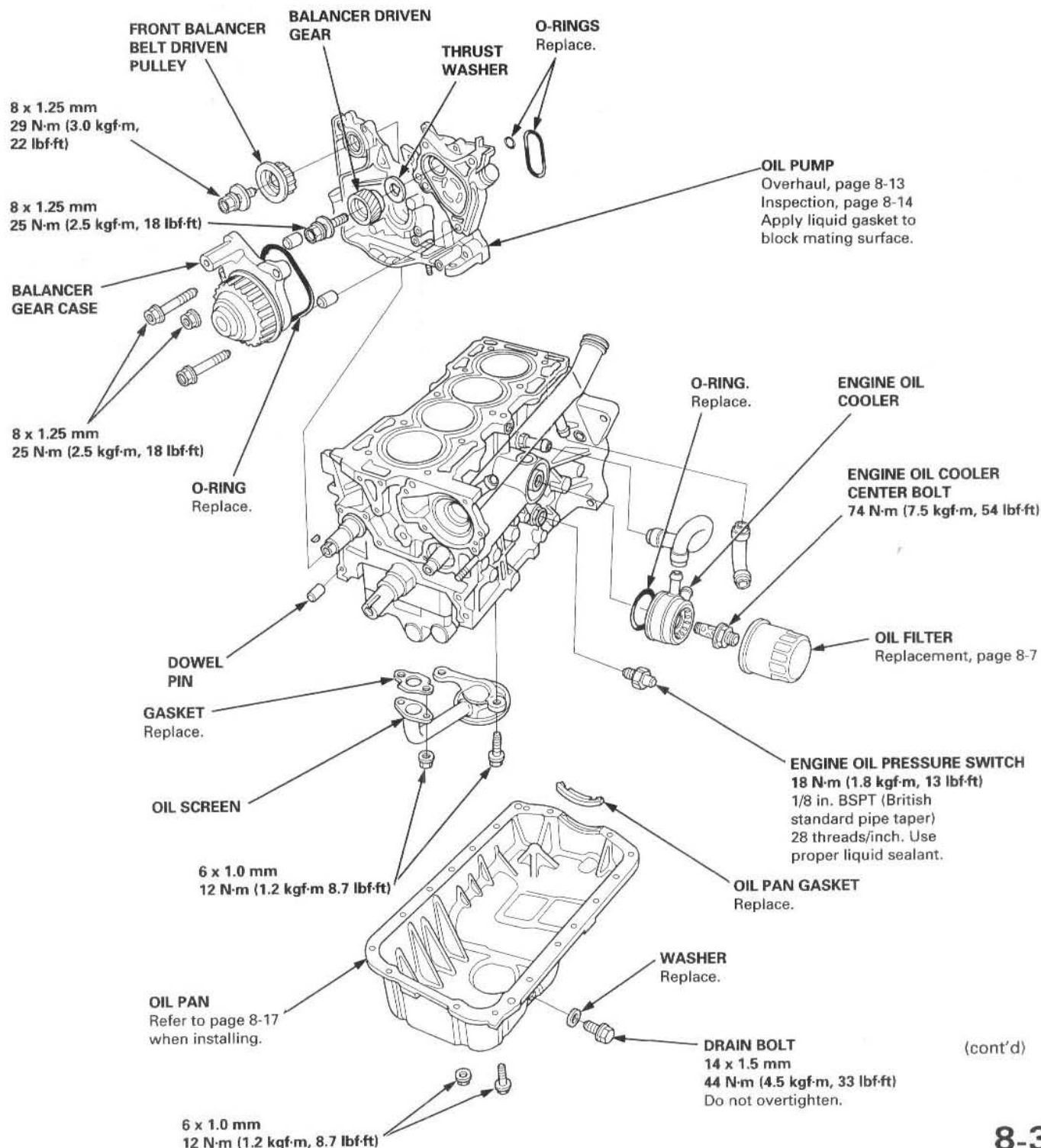


NOTE:

- Use new O-rings when reassembling.
- Apply oil to O-rings before installation.
- Use liquid gasket, Part No. 08718 – 0001 or 08718 – 0003.
- Clean the oil control orifice before installing.

CAUTION: Do not overtighten the drain bolt.

Except M/T with active torque transfer system (ATTS):



(cont'd)

Illustrated Index

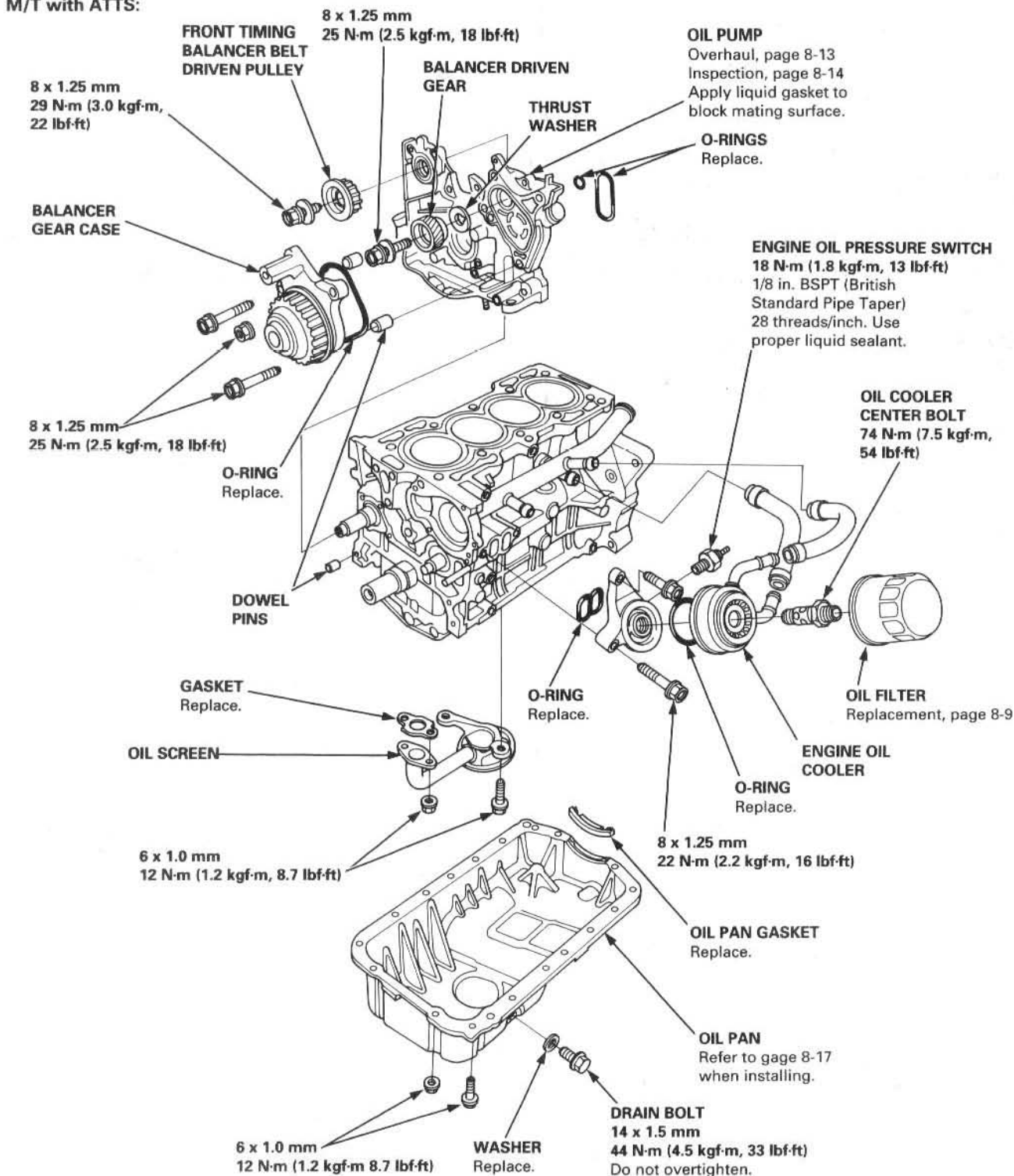
(cont'd)

NOTE:

- Use new O-rings when reassembling.
- Apply oil to O-rings before installation.
- Use liquid gasket, Part No. 08718 - 0001 or 08718 - 0003.

CAUTION: Do not overtighten the drain bolt.

M/T with ATTS:





11 x 1.5 mm
74 N-m (7.5 kgf-m,
54 lbf-ft)

Apply engine oil to the bolt
threads.

NOTE:

After torquing each cap,
turn crankshaft to check
for binding.

6 x 1.0 mm
12 N-m (1.2 kgf-m, 8.7 lbf-ft)

BAFFLE PLATE

BEARING CAP
BRIDGE

DOWEL
PIN

O-RING
Replace.

MAIN BEARING
CAP

DOWEL PIN

CRANKSHAFT

MAIN BEARING

LEFT BREATHER
COVER

THRUST WASHERS
Grooved side faces
outward.

OIL JET BOLT
39 N-m (4.0 kgf-m, 29 lbf-ft)
Inspection, page 8-12

OIL JET
Handle the nozzle with
care. Do not damage or
deform.
Inspection, page 8-12

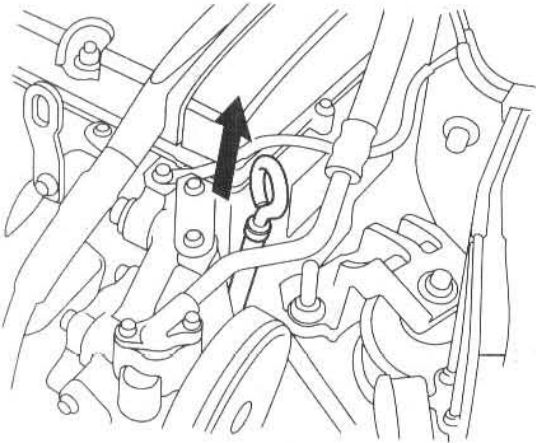
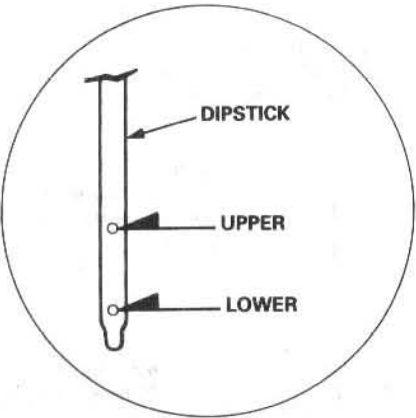
6 x 1.0 mm
12 N-m (1.2 kgf-m,
8.7 lbf-ft)

RIGHT BREATHER
COVER

Engine Oil

Inspection

1. Park the vehicle on level ground, and turn off the engine. Allow the oil a few minutes to drain back into the oil pan so the dipstick will show the actual level.
2. Make certain that the oil level indicated on the dipstick is between the upper and lower marks.



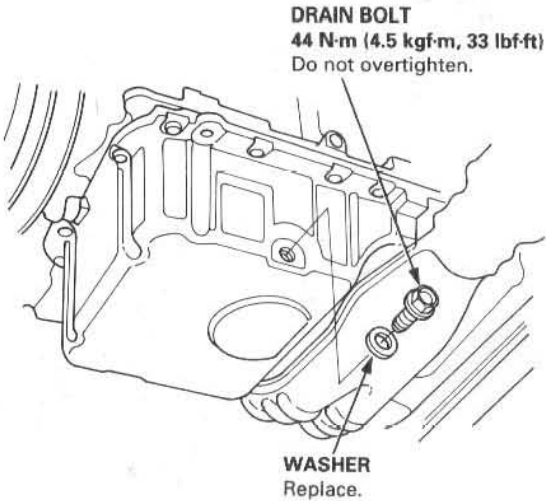
3. If the level has dropped close to the lower mark, add oil until it reaches the upper mark.

CAUTION: Insert the dipstick carefully to avoid bending it.

Replacement

CAUTION: Remove the drain bolt carefully while the engine is hot; the hot oil may cause scalding.

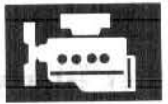
1. Warm up the engine.
2. Drain the engine oil.



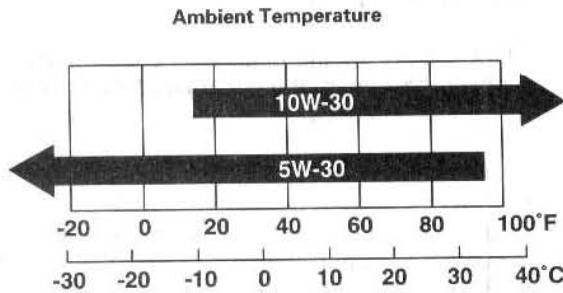
3. Reinstall the drain plug with a new washer, and refill with the recommended oil.

Requirement	API Service Grade: Use an "Energy Conserving" SJ grade oil or an "Energy Conserving II" SH grade oil, SAE 5 W – 30 preferred. You can also use an oil that bears the API CERTIFICATION seal.
Capacity	4.5 ℓ (4.7 US qt, 4.0 Imp qt) at oil change. 4.8 ℓ (5.1 US qt, 4.2 Imp qt) at oil change including filter. 5.9 ℓ (6.2 US qt, 5.2 Imp qt) after engine overhaul.
Change interval	Every 7,500 miles (12,000 km) or 12 months(Normal conditions) Every 3,750 miles (6,000 km) or 6 months (Severe conditions).

NOTE: Under normal conditions, the oil filter should be replaced at every other oil change. Under severe conditions, the oil filter should be replaced at each oil change.



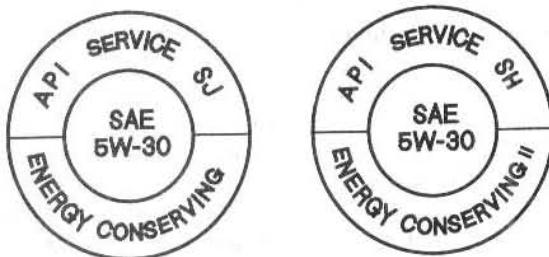
The numbers in the middle of the API Service label tell you the oil's SAE viscosity or weight. Select the oil for your vehicle according to this chart:



An oil with a viscosity of 5 W – 30 is preferred for improved fuel economy and year-round protection in the vehicle. You may use a 10 W – 30 oil if the climate in your area is limited to the temperature range shown on the chart.



API CERTIFICATION SEAL



API SERVICE LABEL

4. Run the engine for more than three minutes, then check for oil leakage.

Replacement

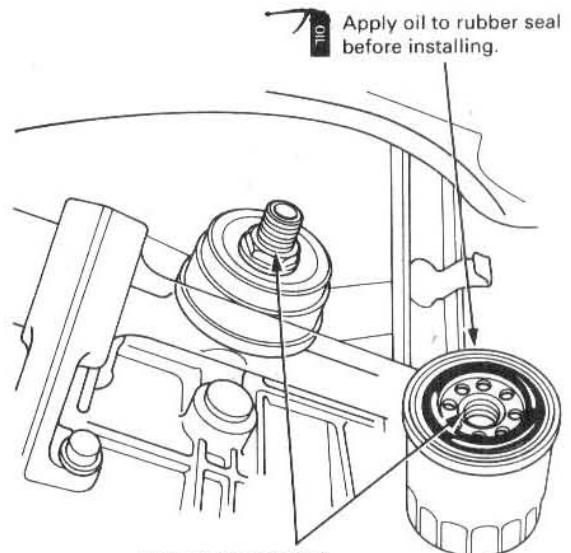
Except M/T with ATTS:

⚠ WARNING

- After the engine has been run, the exhaust pipe will be hot; be careful when working around the exhaust pipe.
- Be careful when loosening the drain bolt while the engine is hot. Burns can result because the oil temperature is very high.

1. Remove the oil filter with the special oil filter wrench.
2. Inspect the threads and rubber seal on the new filter. Wipe off the seat on the engine block, then apply a light coat of oil to the filter rubber seal.

NOTE: Use only filters with a built-in bypass system.



Inspect threads and rubber seal surface.

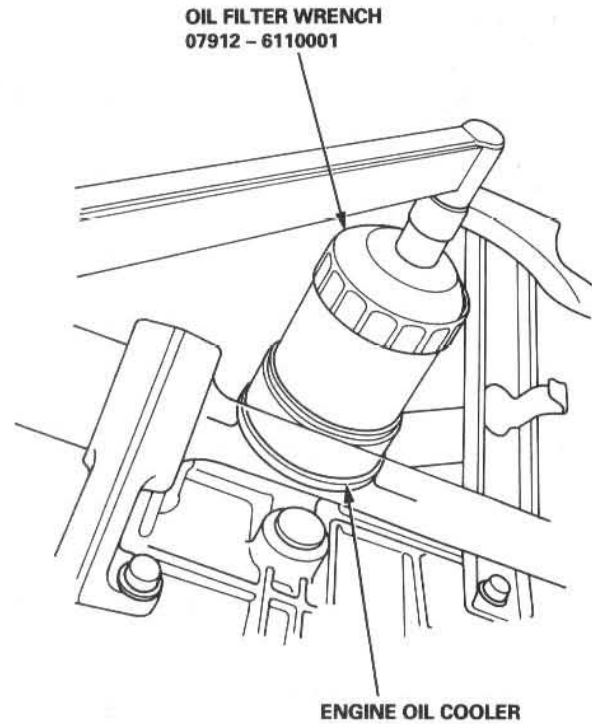
(cont'd)

Oil Filter

Replacement (cont'd)

- 3. Install the oil filter by hand.
- 4. After the rubber seal seats, tighten the oil filter three quarter turn, then torque it with the special tool.

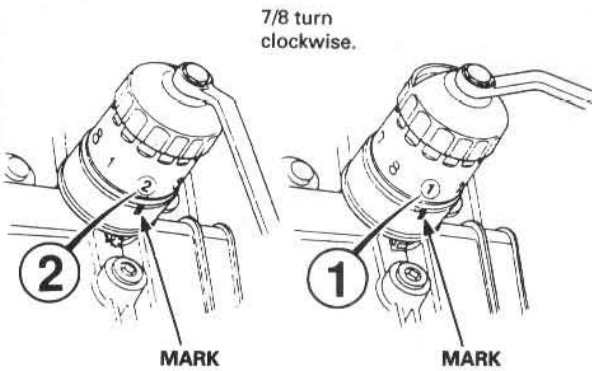
Tighten: three quarter turn clockwise.
Tightening torque: 22 N·m (2.2 kgf·m, 16 lbf·ft)



Eight numbers (1 to 8) are printed on the surface of the filter.

The following explains the procedure for tightening filters using these numbers.

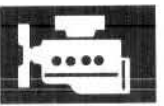
- 1) Make a mark on the engine oil cooler under the number that shows at the bottom of the filter when the rubber seal is seated.
- 2) Tighten the filter by turning it clockwise seven numbers from the marked point. For example, if a mark is made under the number 2 when the rubber seal is seated, the filter should be tightened until the number 1 comes up to the marked point.



Number when rubber seal is seated	1	2	3	4	5	6	7	8
Number after tightening	8	1	2	3	4	5	6	7

- 5. After installation, fill the engine with oil up to the specified level, run the engine for more than three minutes, then check for oil leakage.

CAUTION: Using any procedure other than those shown could result in serious engine damage due to oil leakage.

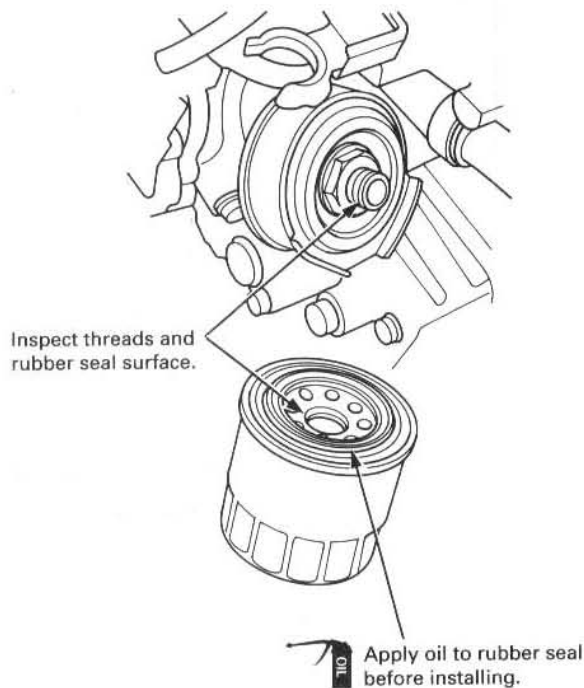


M/T with ATTS:

⚠ WARNING Be careful when loosening the drain bolt while the engine is hot. Burns can result because the oil temperature is very high.

1. Remove the oil filter with the special tool.
2. Inspect the threads and rubber seal on the new filter. Wipe off seat on the engine block. Apply a light coat of oil to the filter rubber seal.

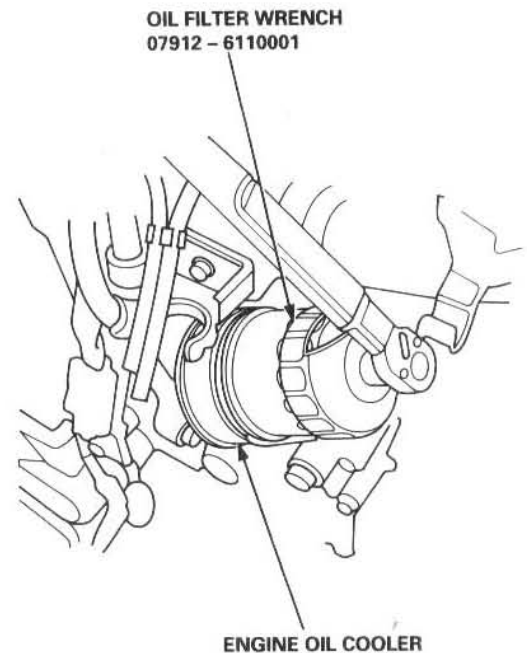
NOTE: Use only filters with a built-in bypass system.



3. Install the oil filter by hand.
4. After the rubber seal seats, tighten the oil filter clockwise with the tool.

Tightening torque: 22 N·m (2.2 kgf·m, 16 lbf·ft)

CAUTION: Using any procedure other than shown could result in serious engine damage due to oil leakage.



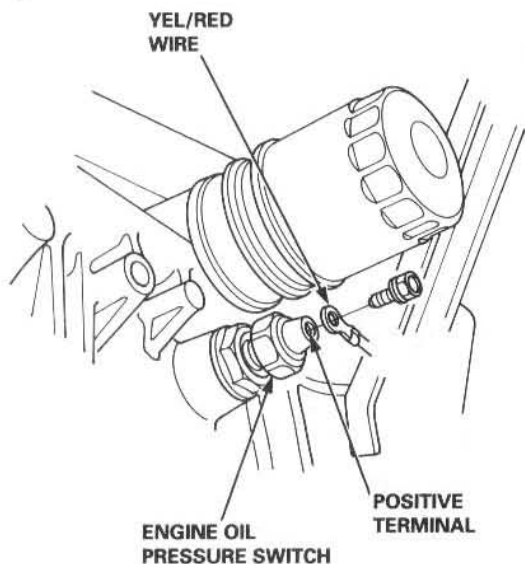
5. After installation, fill the engine with oil up to the specified level, run the engine for more than three minutes, then check for oil leakage.

Oil Pressure Switch

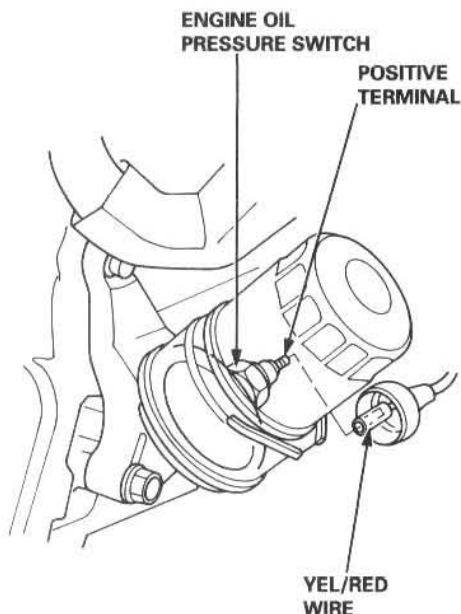
Testing

1. Remove the YEL/RED wire from the engine oil pressure switch.
2. Check for continuity between the positive terminal and the engine (ground).
 - There should be continuity with the engine stopped.
 - There should be no continuity with the engine running.

Except M/T with ATTS:



M/T with ATTS:



3. If the switch fails to operate, check the engine oil level. If the engine oil level is OK, check the engine oil pressure.

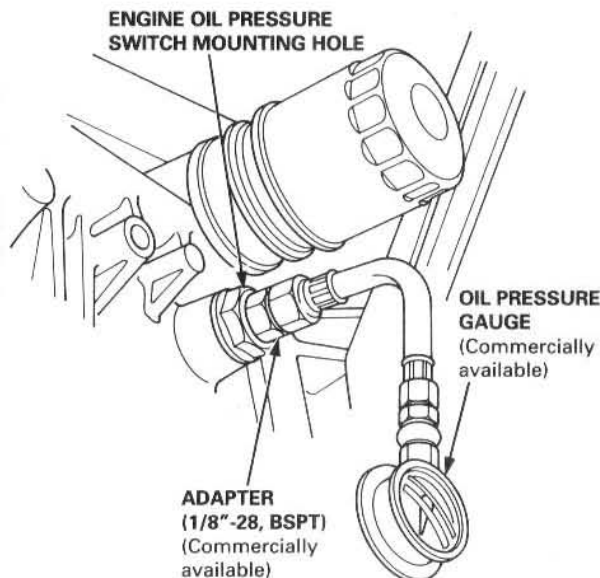
Oil Pressure

Testing

Except M/T with ATTS:

If the oil pressure warning light stays on with the engine running, check the engine oil level. If the oil level is correct:

1. Connect a tachometer.
2. Remove the engine oil pressure switch, and install an oil pressure gauge.



3. Start the engine. Shut it off immediately if the gauge registers no oil pressure. Repair the problem before continuing.
4. Allow the engine to reach operating temperature (fan comes on at least twice). The pressure should be:

Engine Oil Temperature: 176°F (80°C)

Engine Oil Pressure:

At Idle: 70 kPa (0.7 kgf/cm², 10 psi) minimum

At 3,000 rpm: 340 kPa (3.5 kgf/cm², 50 psi) minimum

If oil pressure is not within specifications, inspect the oil pump (see page 8-14).



M/T with ATTS:

If the oil pressure warning light stays on with the engine running, check the engine oil level. If the oil level is correct:

1. Raise the hoist.
2. Remove the center beam (see page 5-6).
3. Disconnect the primary heated oxygen sensor (primary HO2S) connector (see page 5-7).
4. Remove exhaust pipe A (see page 5-7).
5. Remove the left side damper fork (see section 18).
6. Disconnect the left side suspension lower arm ball joint (see section 18).
7. Remove the left side driveshaft (see section 16).
8. Remove the ATTS (see section 15).
9. Connect the tachometer.
10. Remove the engine oil pressure switch, and install an oil pressure gauge.
11. Reinstall exhaust pipe A, and reconnect the primary HO2S.
12. Start the engine. Shut it off immediately if the gauge registers no oil pressure. Repair the problem before continuing.
13. Allow the engine to reach operating temperature (fan comes on at least twice). The pressure should be:

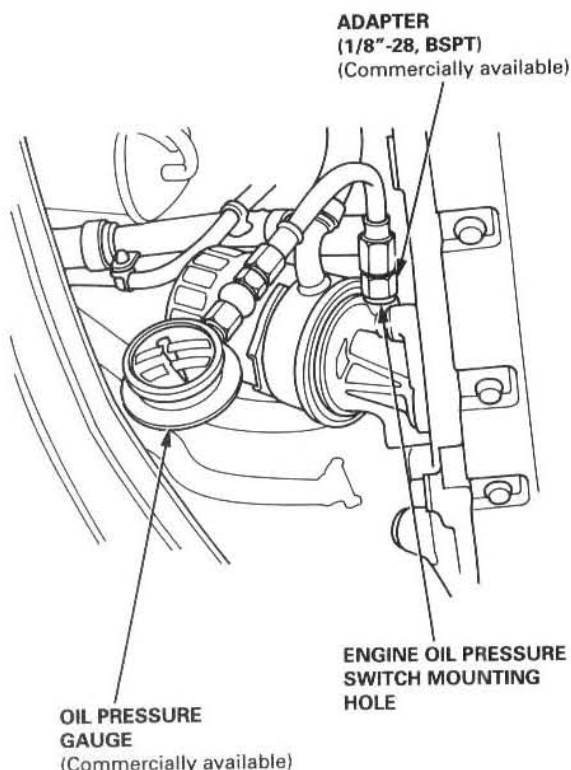
Engine Oil Temperature: 176°F (80°C)

Engine Oil Pressure:

**At Idle: 69 kPa (0.7 kgf/cm², 10 psi)
minimum**

**At 3,000 rpm: 340 kPa (3.5 kgf/cm², 50 psi)
minimum**

If oil pressure is not within specifications, inspect the oil pump (see page 8-14).

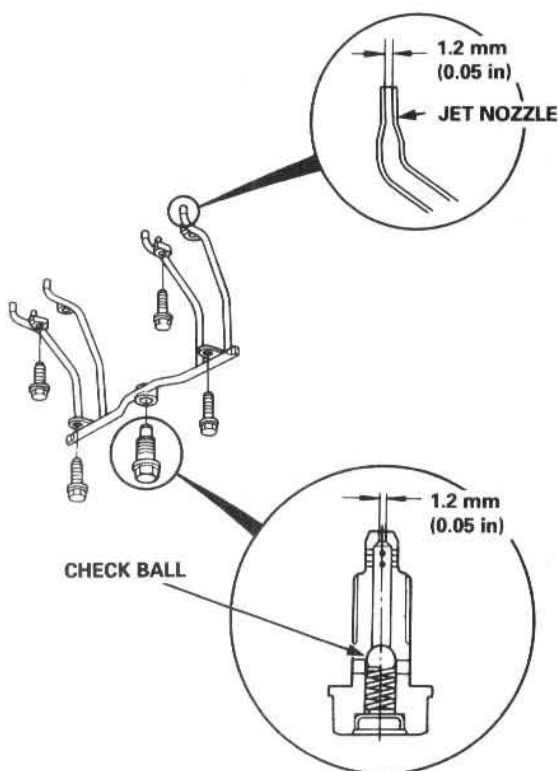


Inspection

1. Remove the oil jet (see page 8-5), and inspect it as follows.

- Make sure that a 1.1 mm (0.04 in) diameter drill will go through the nozzle hole (1.2 mm (0.05 in) diameter).
- Insert the other end of the same 1.1 mm (0.04 in) drill into the oil intake (1.2 mm (0.05 in) diameter). Make sure the check ball moves smoothly and has a stroke of approximately 4.0 mm (0.16 in).
- Check the oil jet operation with an air nozzle. It should take at least 200 kPa (2.0 kgf/cm², 28 psi) to unseat the check ball.

NOTE: Replace the oil jet assembly if the nozzle is damaged or bent.



2. Mounting torque is critical. Be very precise when installing.

Torque: 39 N·m (4.0 kgf·m, 29 lbf·ft)

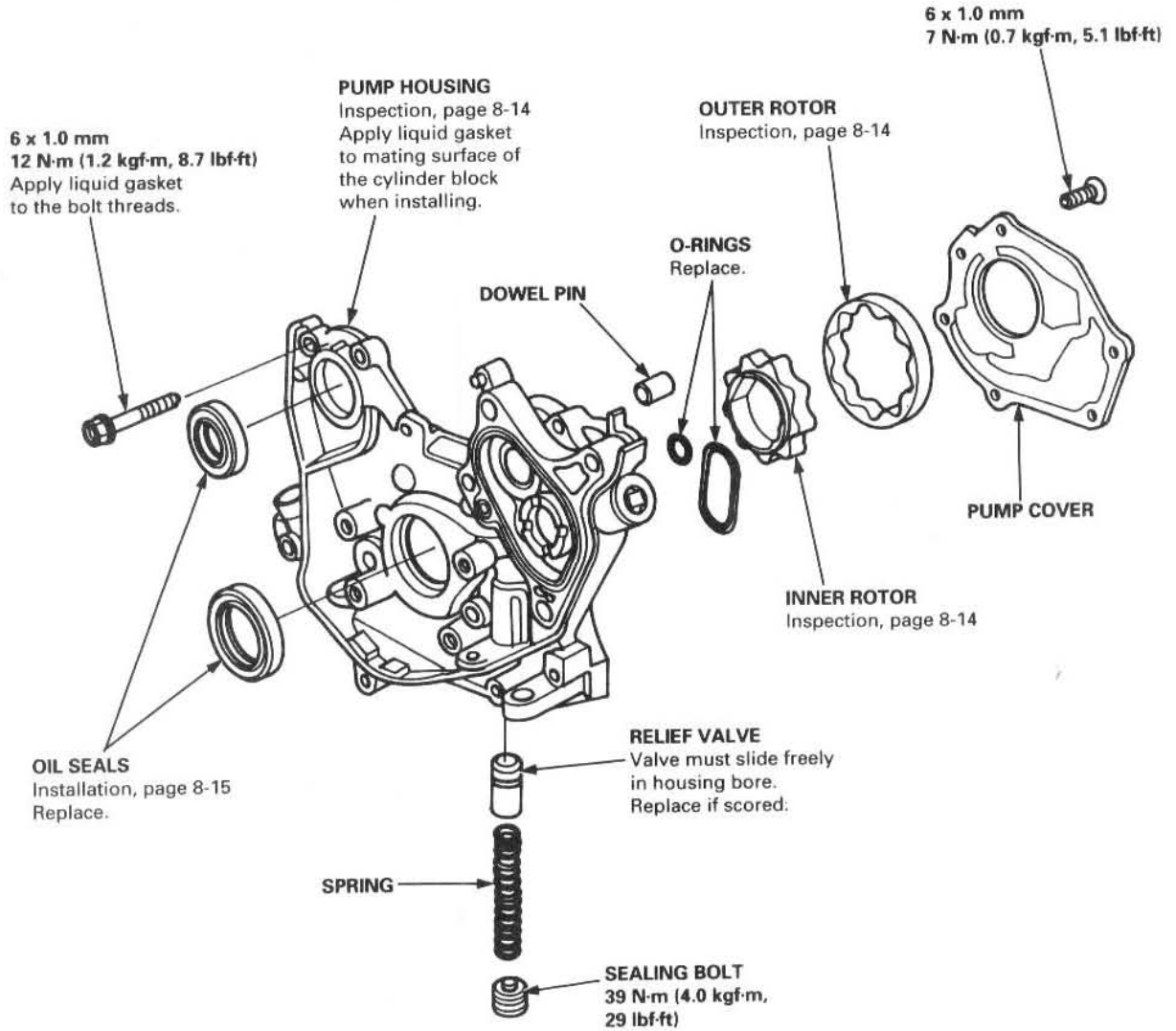


Oil Pump

Overhaul

NOTE:

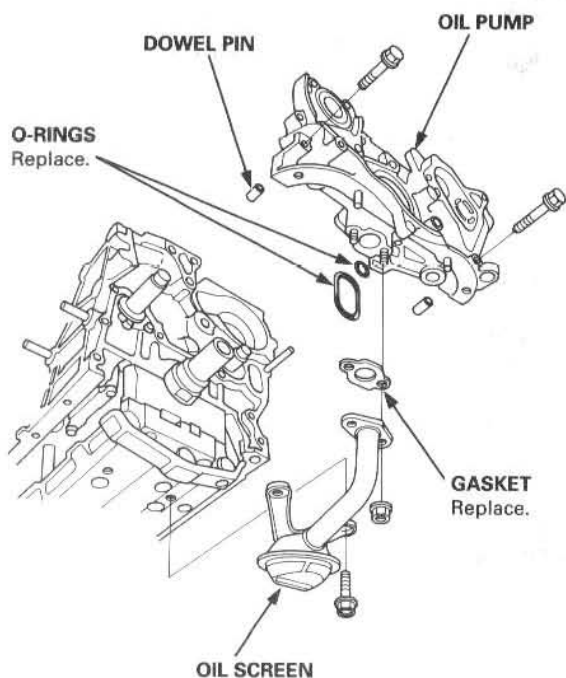
- Use new O-rings when reassembling.
- Apply oil to O-rings before installation.
- Use liquid gasket, Part No. 08718 – 0001 or 08718 – 0003.
- The rotors must be installed in the same direction.
- After reassembly, check that the rotors move without binding.



Oil Pump

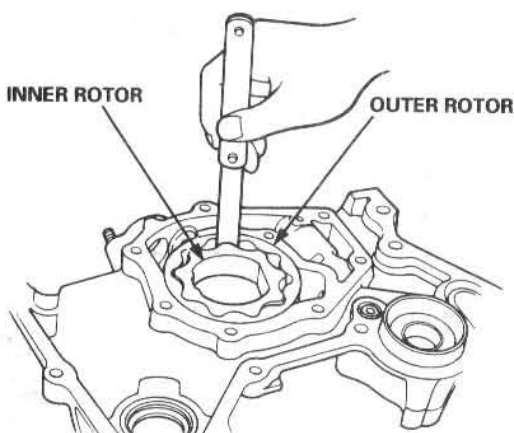
Removal/Inspection/Installation

1. Drain the engine oil.
2. Turn the crankshaft so that the No. 1 piston is at top dead center (see page 6-17).
3. Remove the timing belt and the balancer belt (see page 6-14).
4. Remove the timing belt tensioner and the balancer belt tensioner.
5. Remove the CKP/TDC sensors, then remove the timing belt drive pulley (see page 6-21).
6. Remove the balancer belt driven pulley (see page 7-12).
7. Remove the balancer gear case and the balancer driven gear (see page 7-12).
8. Remove the oil pan and the oil screen.
9. Remove the mounting bolts and the oil pump assembly.



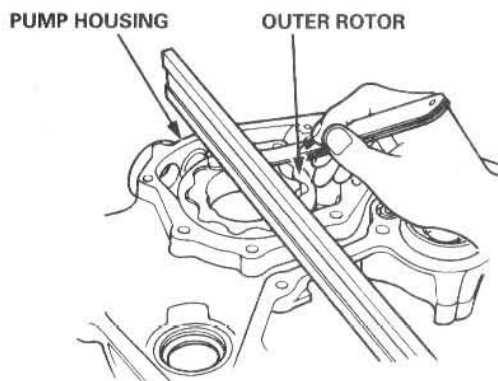
10. Remove the screws from the pump housing, then separate the housing and cover.
11. Check the inner-to-outer rotor radial clearance on the pump rotor. If the inner-to-outer rotor clearance exceeds the service limit, replace the inner and outer rotors.

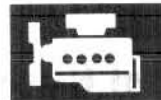
Inner Rotor-to-Outer Rotor Radial Clearance
Standard (New): 0.02 – 0.16 mm (0.001 – 0.006 in)
Service Limit: 0.20 mm (0.008 in)



12. Check the housing-to-rotor axial clearance on the pump rotor. If the housing-to-rotor axial clearance exceeds the service limit, replace the set of inner and outer rotors and/or the pump housing.

Housing-to-Rotor Axial Clearance
Standard (New): 0.02 – 0.07 mm (0.001 – 0.003 in)
Service Limit: 0.12 mm (0.005 in)



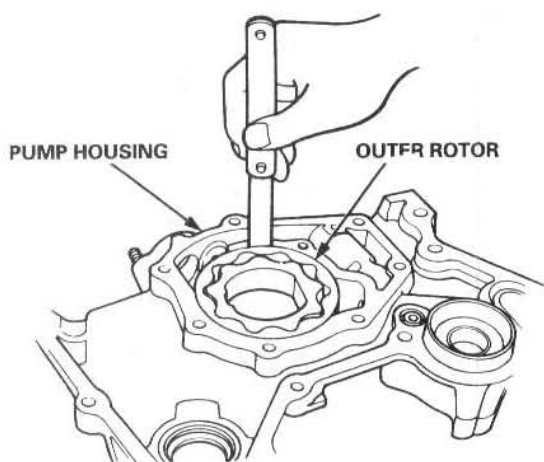


13. Check the housing-to-outer rotor radial clearance. If the housing-to-outer rotor radial clearance exceeds the service limit, replace the set of inner and outer rotors and/or the pump housing.

Housing-to-Outer Rotor Radial Clearance

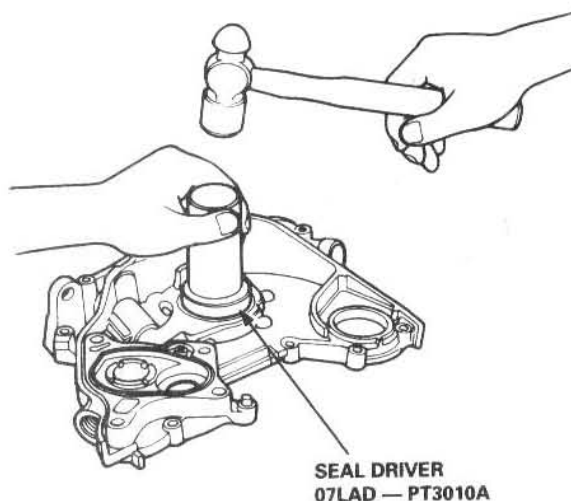
Standard (New): 0.10 – 0.19 mm (0.004 – 0.007 in)

Service Limit: 0.21 mm (0.008 in)

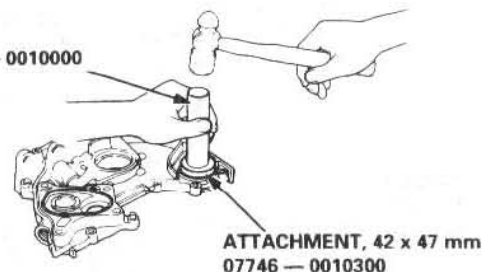


14. Inspect both rotors and the pump housing for scoring or other damage. Replace parts if necessary.
15. Remove the old oil seals from the oil pump.
16. Gently tap in the new oil seals until the special tool bottoms on the pump.

NOTE: The oil seals alone can be replaced without removing the oil pump by using the special tools.



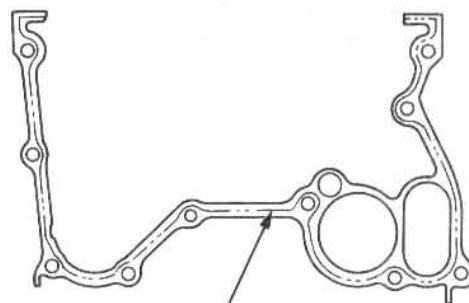
DRIVER
07749 — 0010000



17. Reassemble the oil pump, applying liquid thread lock to the pump housing screws.
18. Check that the oil pump turns freely.
19. Install a dowel pin and a new O-ring on the pump.
20. Apply liquid gasket to the oil pump and install it.

NOTE:

- Use liquid gasket, Part No. 08718 – 0001 or 08718 – 0003.
- Check that the mating surfaces are clean and dry before applying liquid gasket.
- Apply liquid gasket evenly, in a narrow bead centered on the mating surface.
- To prevent leakage of oil, apply liquid gasket to the inner threads of the bolt holes.
- Do not install the parts if five minutes or more have elapsed since applying liquid gasket. Instead, reapply liquid gasket after removing the old residue.
- After assembly, wait at least 30 minutes before filling the engine with oil.
- Apply grease to the lips of the crankshaft oil seal and the balancer shaft seal. Then, install the oil pump inner rotor onto the crankshaft. When the pump is in place, clean any excess grease off the crankshaft and the balancer shaft, then check that the oil seal lips are not distorted.

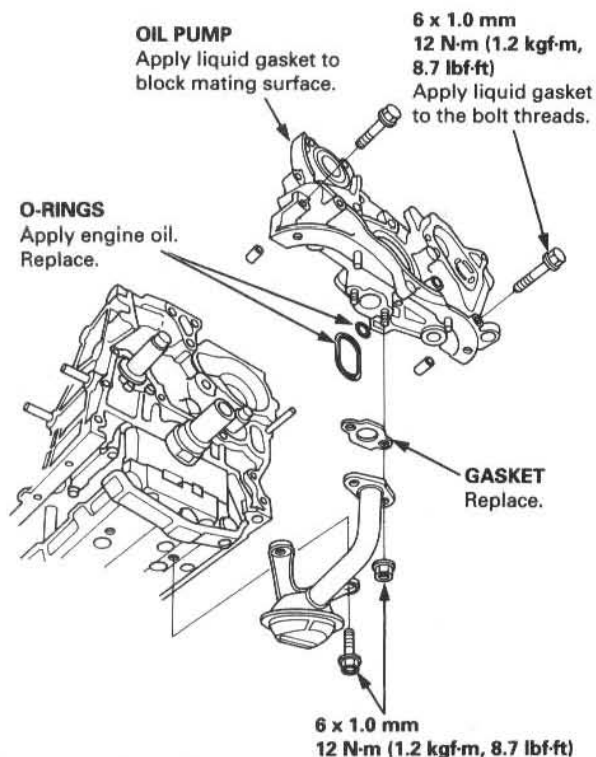


Apply liquid gasket
along the broken line.

(cont'd)

Oil Pump

Removal/Inspection/Installation (cont'd)

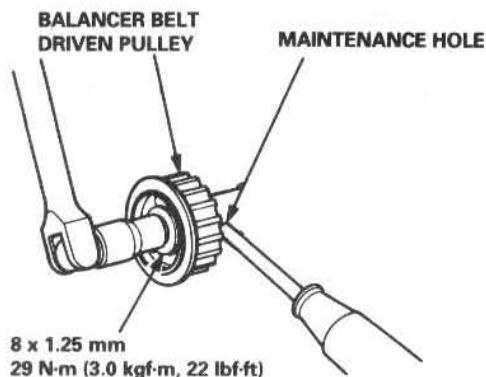


21. Install the baffle plate.

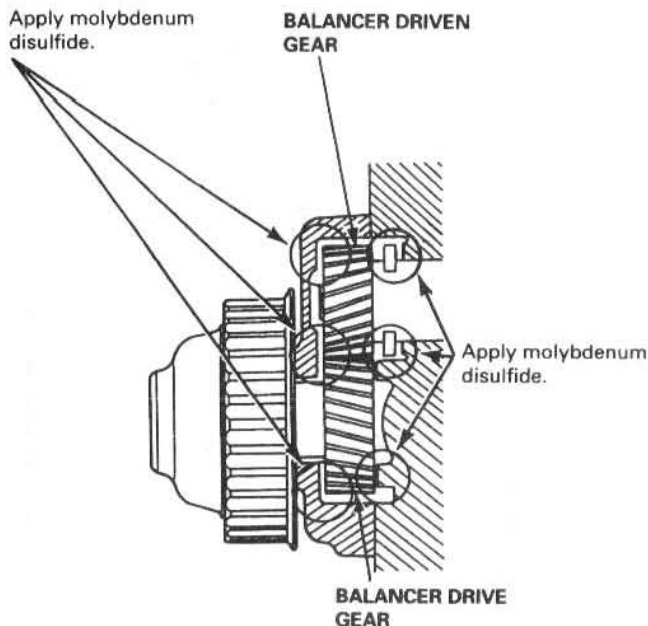
22. Install the oil screen.

23. Hold the front balancer shaft with a screwdriver, then install the balancer belt driven pulley.

FRONT BALANCER:

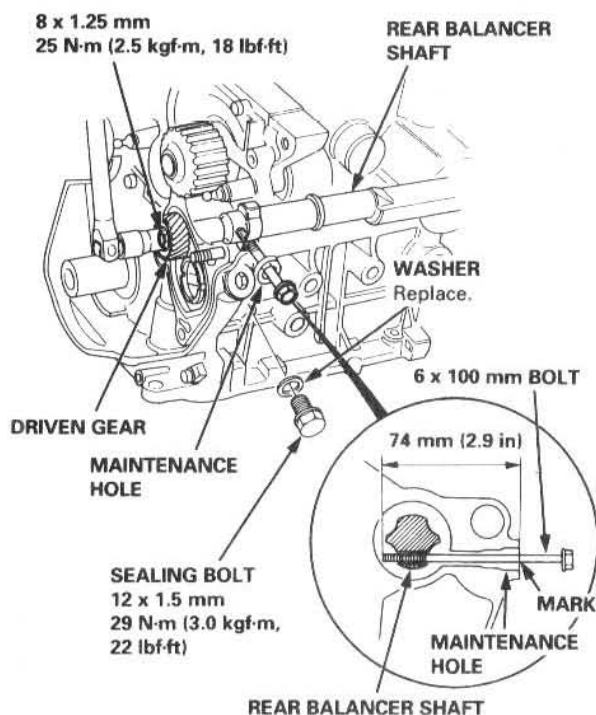


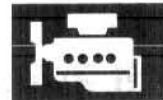
24. Before installing the balancer driven gear and the balancer gear case, apply molybdenum disulfide to the thrust surfaces of the balancer gears, as shown.



25. Hold the rear balancer shaft with a 6 x 100 mm bolt, then install the balancer driven gear.

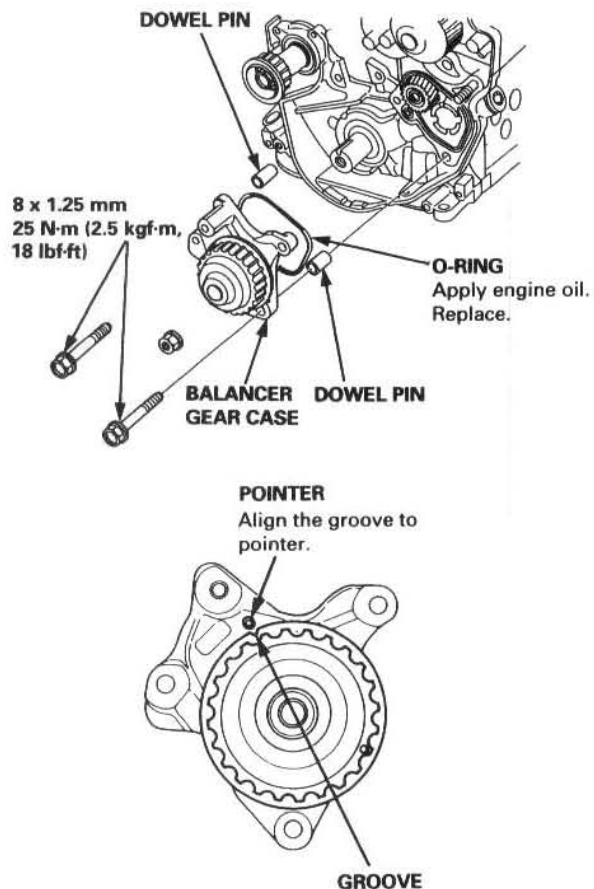
REAR BALANCER:



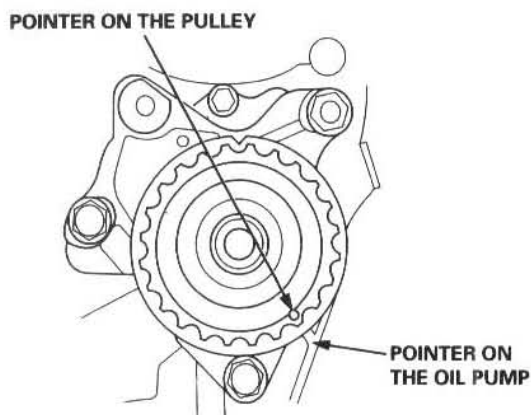


26. Install the balancer gear case on the oil pump.

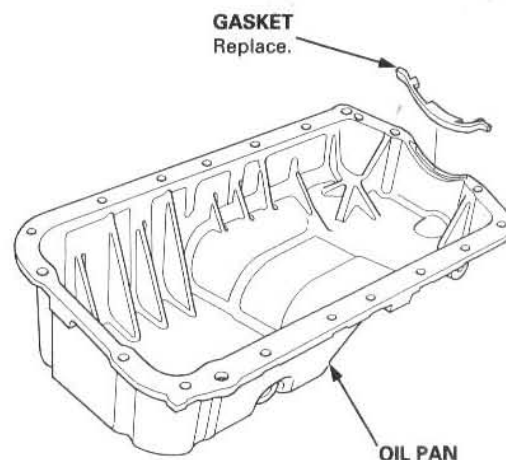
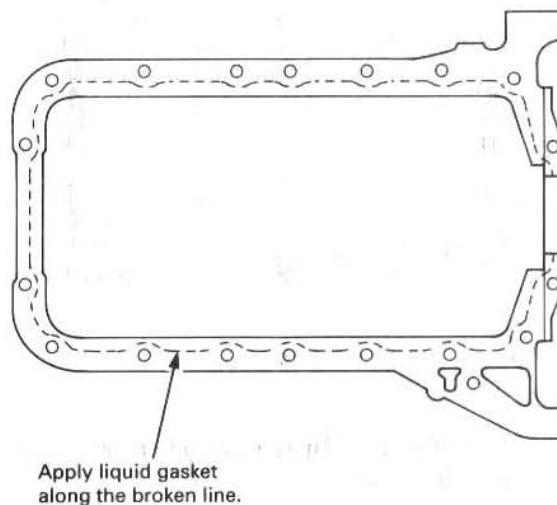
NOTE: Align the groove on the pulley edge to the pointer on the gear case while holding the rear balancer with a 6 x 100 mm bolt, then install the gear case.



27. Check the alignment of the pointers after installing the gear case.



28. Apply liquid gasket to the oil pan mating surface of the block, then install the oil pan on the engine block.

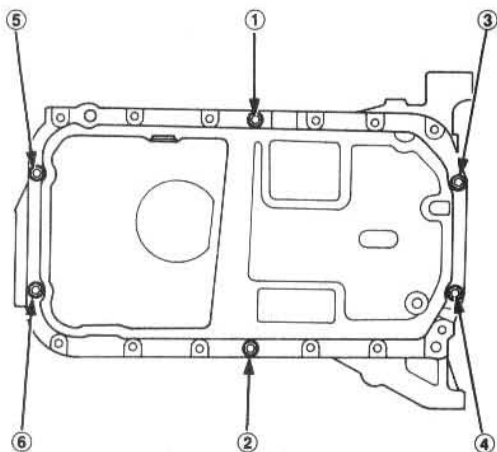


(cont'd)

Oil Pump

Removal/Inspection/Installation (cont'd)

29. Tighten nuts finger-tight at six points as shown below.



30. Tighten all bolts and nuts, starting from nut ①, clockwise in three steps.

NOTE: Excessive tightening can cause distortion of the oil pan gasket and oil leakage.

Torque: 12 N·m (1.2 kgf·m, 8.7 lbf·ft)

Intake Manifold/Exhaust System

Intake Manifold

Replacement 9-2

Exhaust Manifold

Replacement 9-3

Exhaust Pipe and Muffler

Replacement 9-4



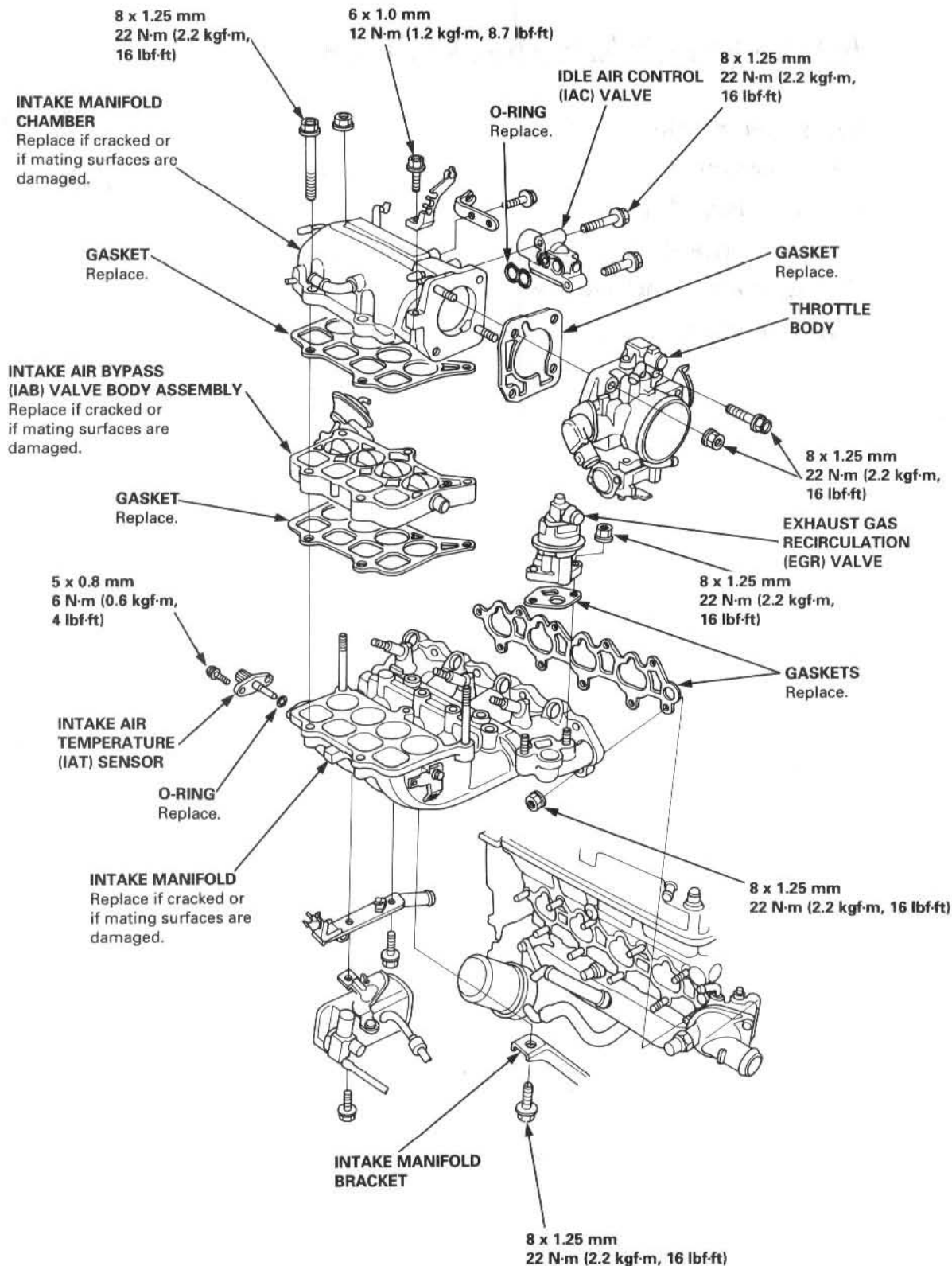
Intake Manifold

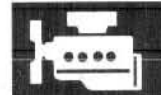
Replacement

NOTE: Use new O-rings and gaskets when reassembling.

CAUTION:

- Check for folds or scratches on the surface of the gasket.
- Replace with a new gasket if damaged.





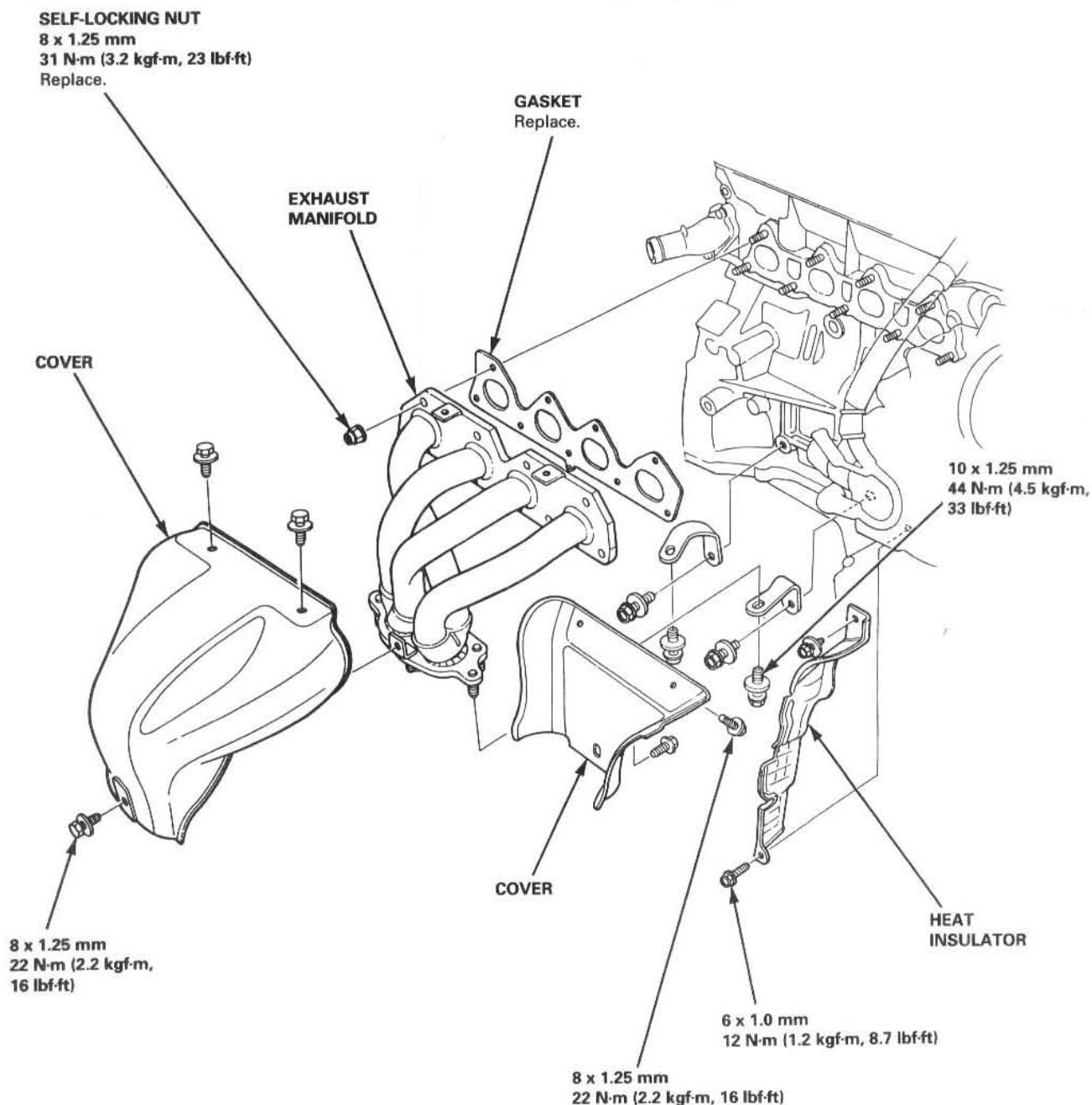
Exhaust Manifold

Replacement

NOTE: Use new gaskets and self-locking nuts when reassembling.

CAUTION:

- Check for folds or scratches on the surface of the gasket.
- Replace with a new gasket if damaged.

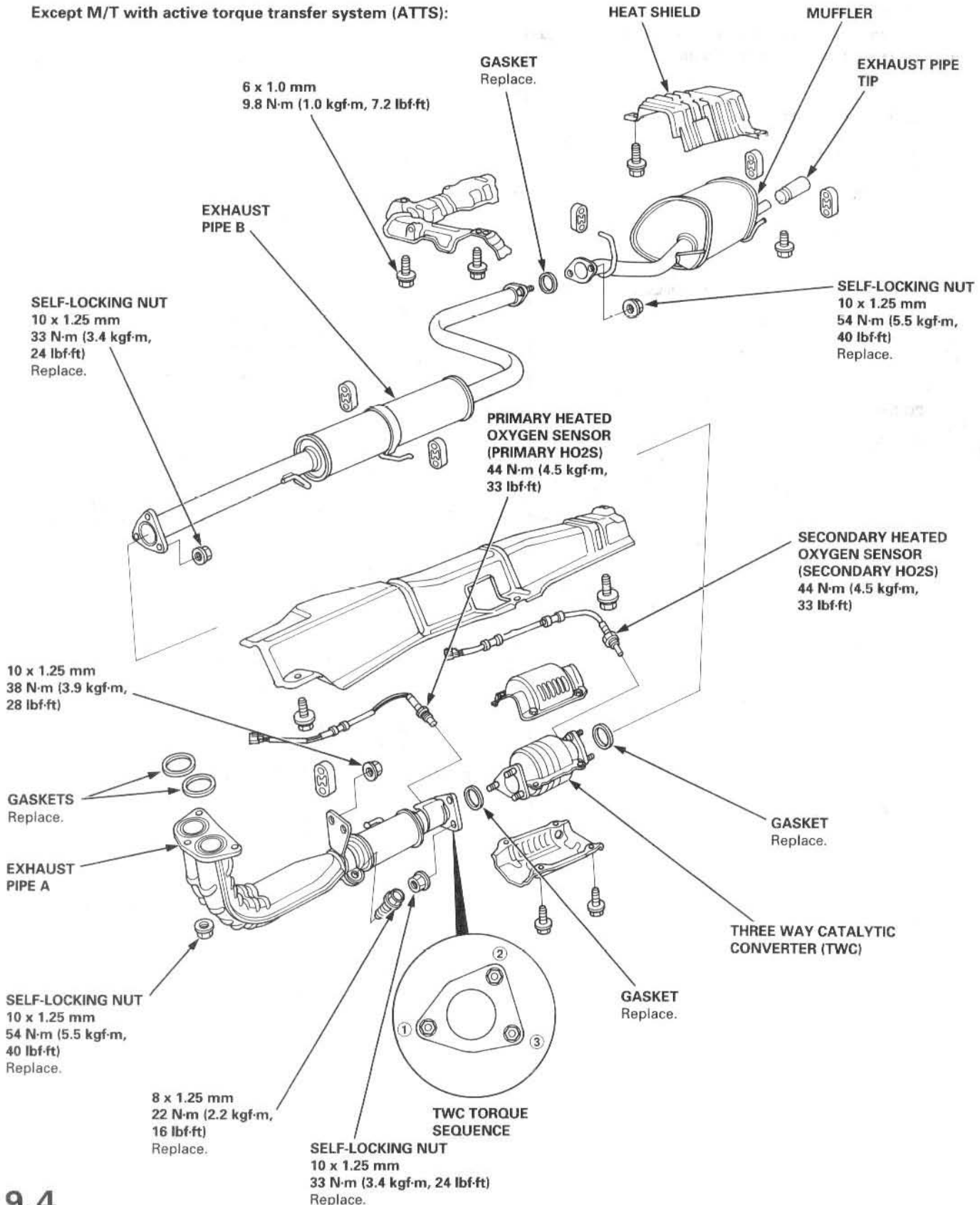


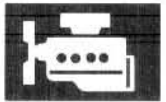
Exhaust Pipe and Muffler

Replacement

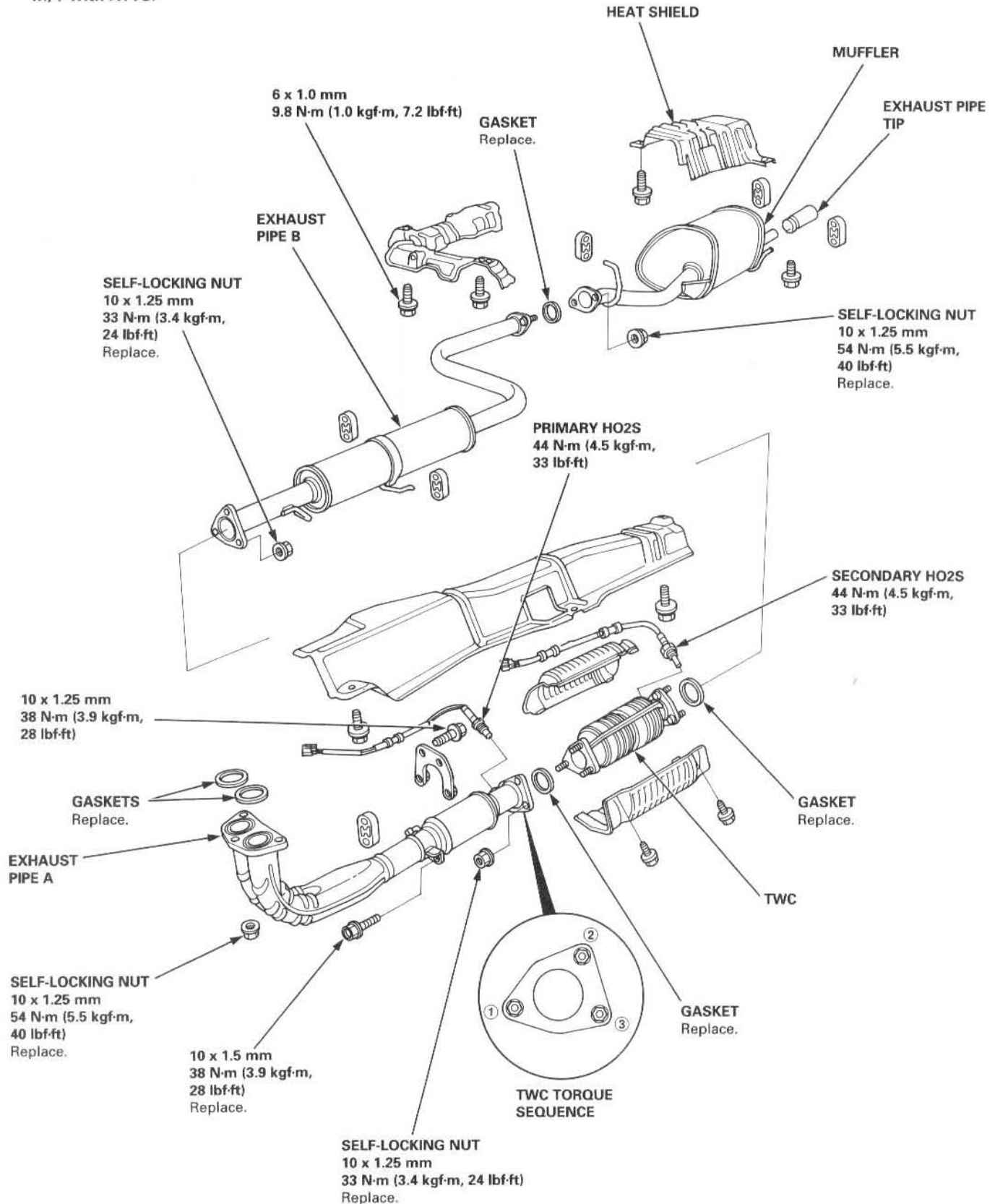
NOTE: Use new gaskets and self-locking nuts when reassembling.

Except M/T with active torque transfer system (ATTS):





M/T with ATTS:



Cooling

Radiator

Illustrated Index	10-2
Replacement	10-4
Engine Coolant Refilling and Bleeding	10-5
Cap Testing	10-6
Testing	10-6

Thermostat

Replacement	10-7
Testing	10-8

Water Pump

Illustrated Index	10-9
Inspection	10-10
Replacement	10-10

Fan Controls

Component Location Index	10-11
Circuit Diagram	10-12
Fan Motor Testing	10-13
Radiator Fan Switch Testing	10-13

Coolant Temperature Gauge

Gauge Testing	10-14
Coolant Temperature Gauge Sending Unit Testing	10-14



**Click here to go back to
the Introduction page**

Radiator

Illustrated Index

⚠ WARNING System is under high pressure when the engine is hot. To avoid the danger of releasing scalding coolant, remove the cap only when the engine is cool.

Total Cooling System Capacity (Including heater and reservoir)

M/T:

Without active torque transfer system (ATTS):

6.9 ℓ (7.3 US qt, 6.1 Imp qt)

With ATTS:

6.8 ℓ (7.2 US qt, 6.0 Imp qt)

A/T:

6.8 ℓ (7.2 US qt, 6.0 Imp qt)

Reservoir capacity: 0.6 ℓ (0.6 US qt, 0.5 Imp qt)

CAUTION: When pouring engine coolant, be sure to shut the relay box lid and not to spill coolant on the electrical parts or the paint. If any coolant spills, rinse it off immediately.

NOTE:

- Check all cooling system hoses for damage, leaks or deterioration and replace if necessary.
- Check all hose clamps and retighten if necessary.
- Use new O-rings when reassembling.

RADIATOR

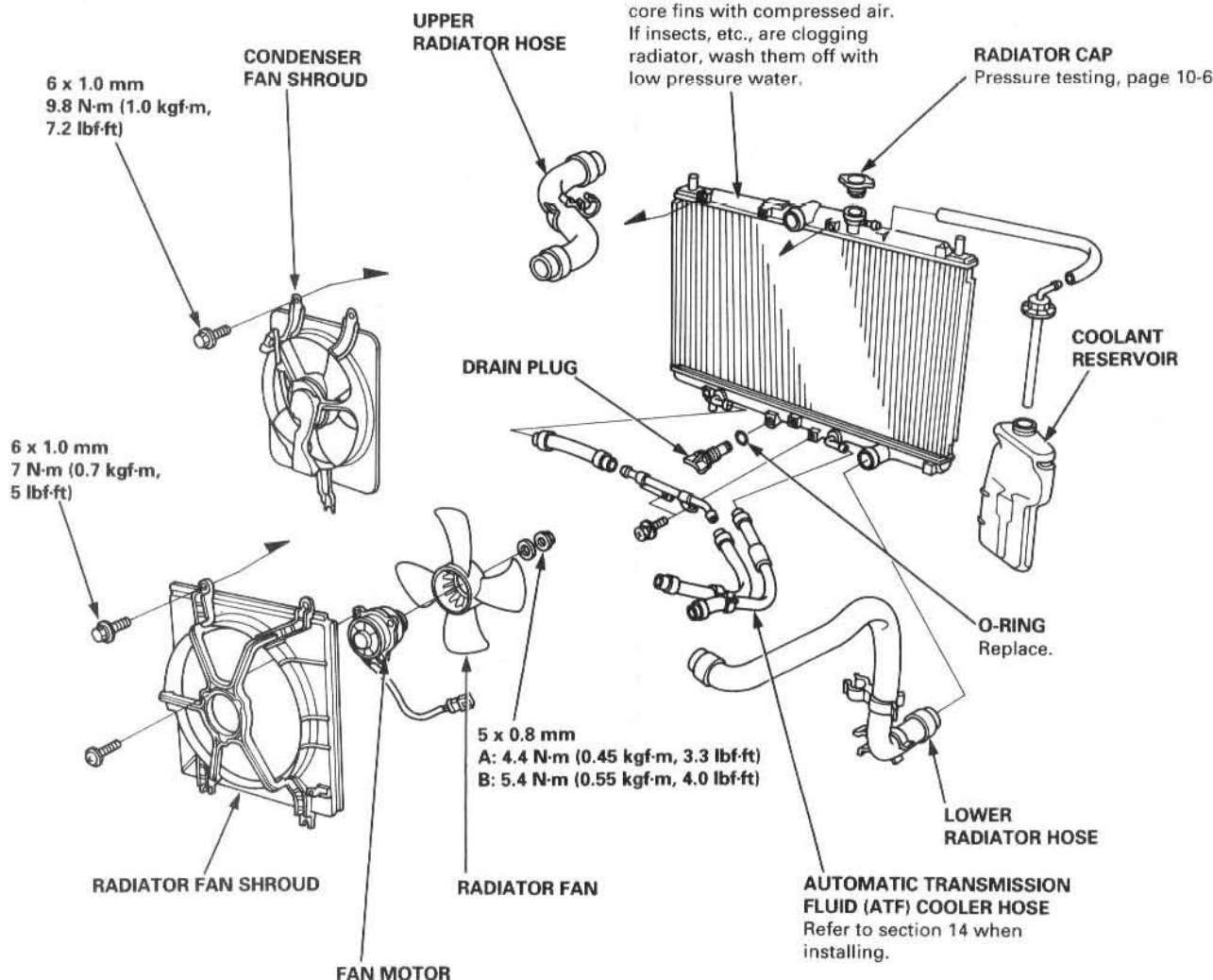
Engine coolant

Refilling and bleeding, page 10-5

Leak test, page 10-6

Inspect soldered joints and seams for leaks.

Blow out dirt from between core fins with compressed air. If insects, etc., are clogging radiator, wash them off with low pressure water.



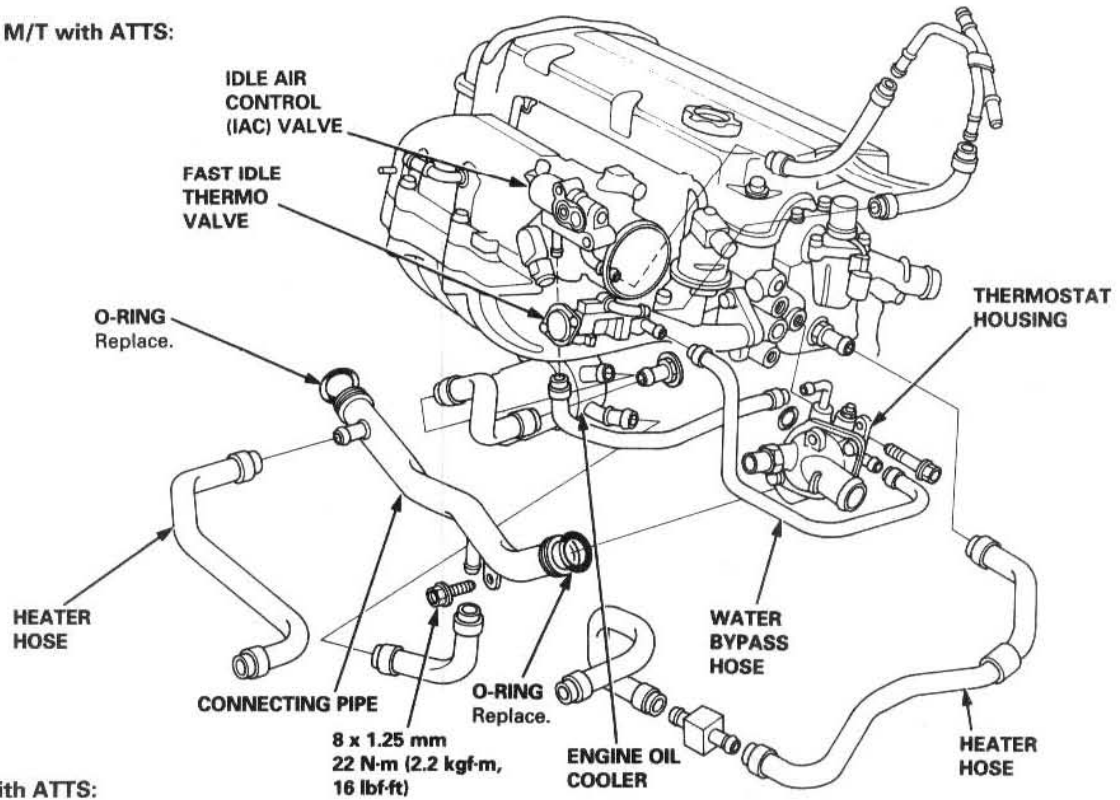
A: TOYO RADIATOR manufactured radiator.

B: DENSO manufactured radiator.

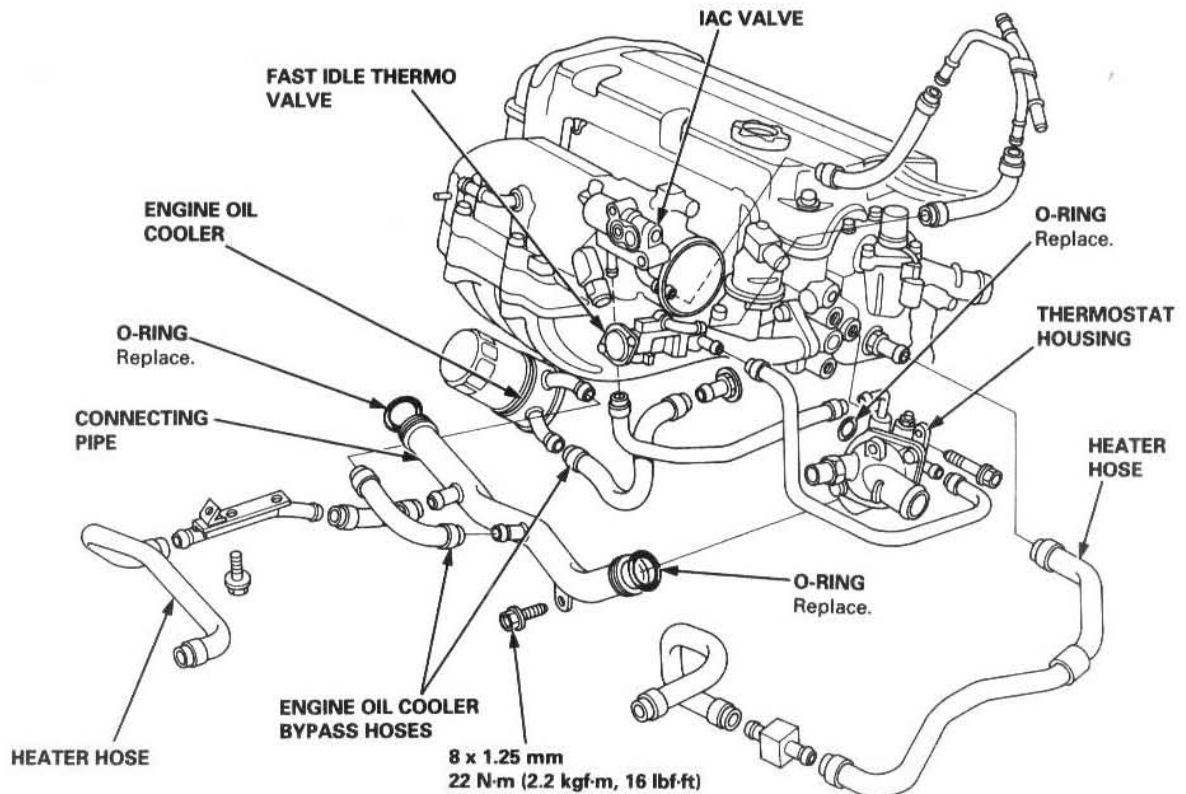


Engine Hose Connections:

Except M/T with ATTS:



M/T with ATTS:



Radiator

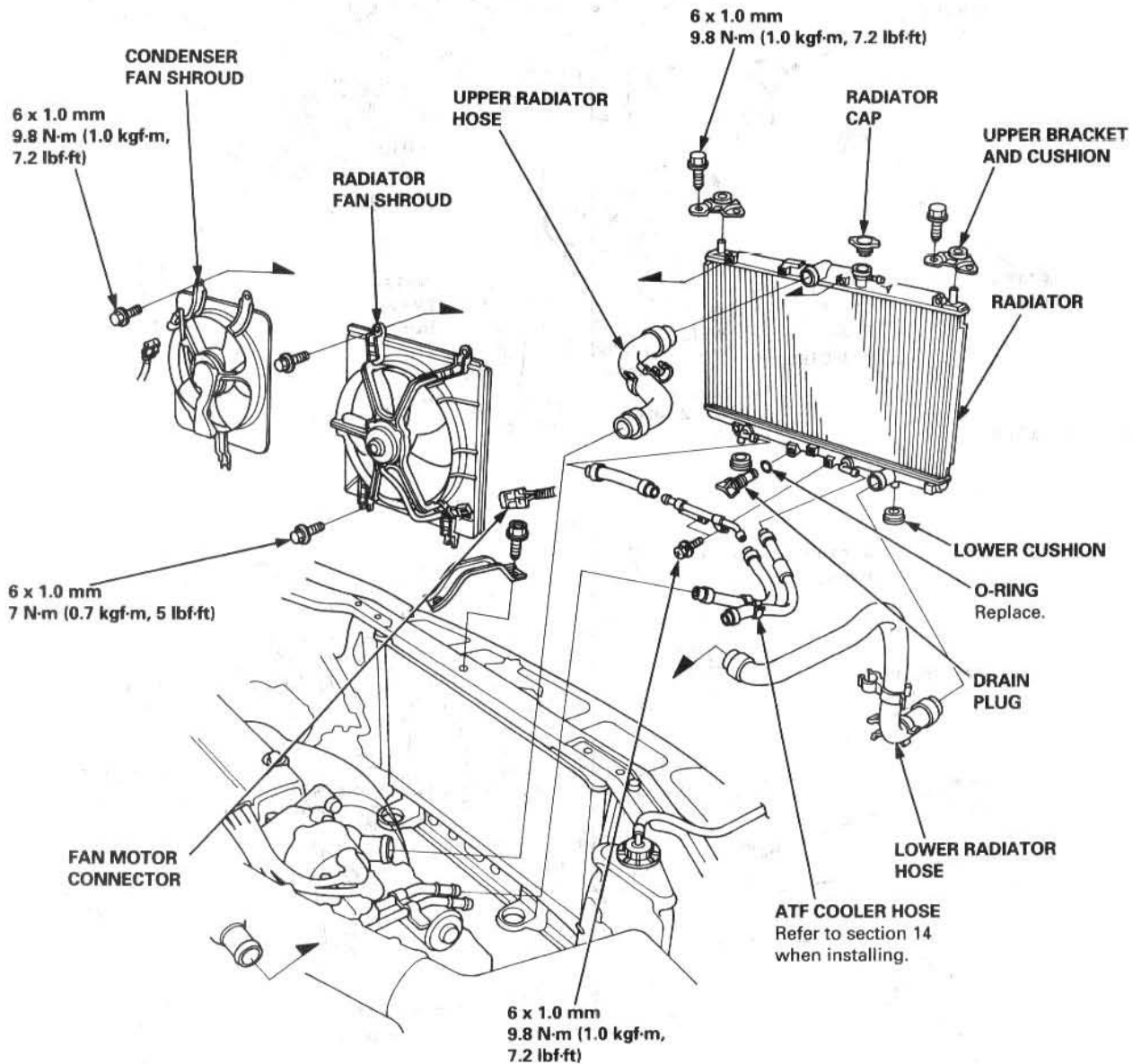
Replacement

1. Drain engine coolant.
2. Remove the upper and lower radiator hoses, and ATF cooler hoses.
3. Disconnect the fan motor connectors.
4. Remove the radiator upper brackets, then pull up the radiator.

5. Remove the fan shroud assemblies and other parts from the radiator.
6. Install the radiator in the reverse order of removal:

NOTE:

- Set the upper and lower cushions securely.
- Fill the radiator with engine coolant and bleed the air.

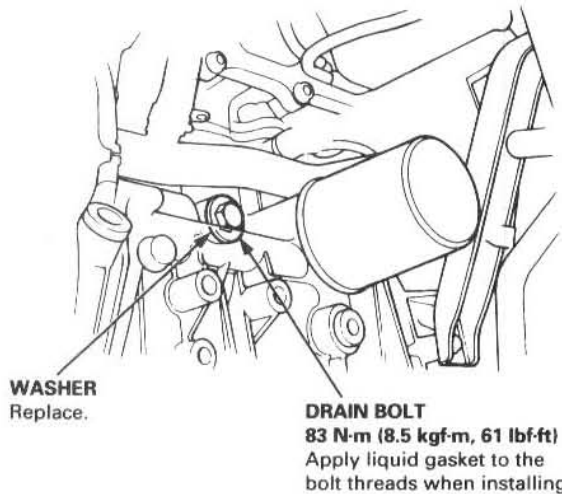




Engine Coolant Refilling and Bleeding

CAUTION: When pouring engine coolant, be sure to shut the relay box lid and not to let coolant spill on the electrical parts or the paint. If any coolant spills, rinse it off immediately.

1. Set the heater temperature lever or control dial to maximum heat.
2. When the radiator is cool, remove the radiator cap. Loosen the drain plug, and drain the coolant.
3. Remove the drain bolt from the rear side of the cylinder block to drain the block (except with ATTS).



4. Apply liquid gasket to the drain bolt threads, then reinstall the bolt with a new washer and tighten it securely.
5. Tighten the radiator drain plug securely.
6. Remove, drain and reinstall the reservoir. Fill the tank halfway to the MAX mark with water, then up to the MAX mark with antifreeze.
7. Mix the recommended antifreeze with an equal amount of water in a clean container.

NOTE:

- Always use Genuine Honda Antifreeze/Coolant. Using a non-Honda coolant can result in corrosion, causing the cooling system to malfunction or fail.
- For best corrosion protection, the coolant concentration must be maintained year-round at 50% minimum. Coolant concentrations less than 50% may not provide sufficient protection against corrosion or freezing.
- Coolant concentrations greater than 60% will impair cooling efficiency and are not recommended.

CAUTION:

- Do not mix different brands of antifreeze/coolants.
- Do not use additional rust inhibitors or anti-rust products; they may not be compatible with the genuine coolant.

Engine Coolant Refill Capacity: including reservoir (0.6 ℓ (0.6 US qt, 0.5 Imp qt)).

M/T:

Without ATTS:

3.3 ℓ (3.5 US qt, 2.9 Imp qt)

With ATTS:

3.2 ℓ (3.4 US qt, 2.8 Imp qt)

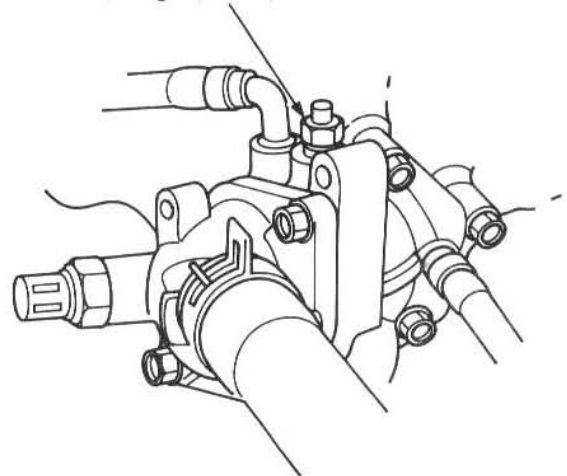
A/T:

3.2 ℓ (3.4 US qt, 2.8 Imp qt)

8. Loosen the air bleed bolt in the thermostat housing, then fill the radiator to the bottom of the filler neck with the coolant mixture. Tighten the bleed bolt as soon as coolant starts to run out in a steady stream without bubbles.

BLEED BOLT

9.8 N·m (1.0 kgf·m, 7 lbf·ft)

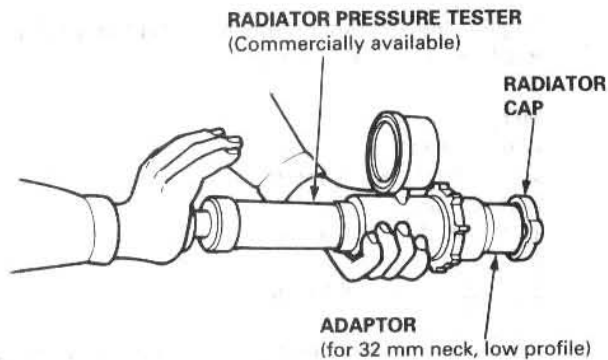


9. With the radiator cap off, start the engine and let it run until warmed up (the radiator fan comes on at least twice). Then, if necessary, add more coolant mix to bring the level back up to the bottom of the filler neck.
10. Put the radiator cap on tightly, then run the engine again and check for leaks.

Radiator

Cap Testing

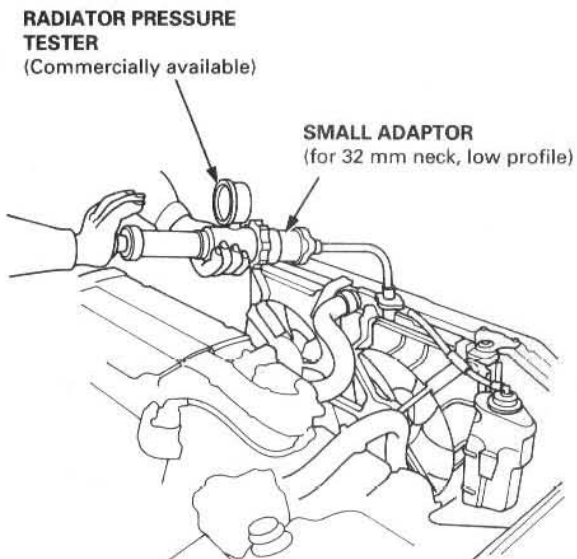
1. Remove the radiator cap, wet its seal with engine coolant, then install it on the pressure tester.



2. Apply a pressure of 93 – 123 kPa (0.95 – 1.25 kgf/cm², 14 – 18 psi).
3. Check for a drop in pressure.
4. If the pressure drops, replace the cap.

Testing

1. Wait until the engine is cool, then carefully remove the radiator cap and fill the radiator with engine coolant to the top of the filler neck.
2. Attach the pressure tester to the radiator, and apply a pressure of 93 – 123 kPa (0.95 – 1.25 kgf/cm², 14 – 18 psi).



3. Inspect for engine coolant leaks and a drop in pressure.
4. Remove the tester and, reinstall the radiator cap.

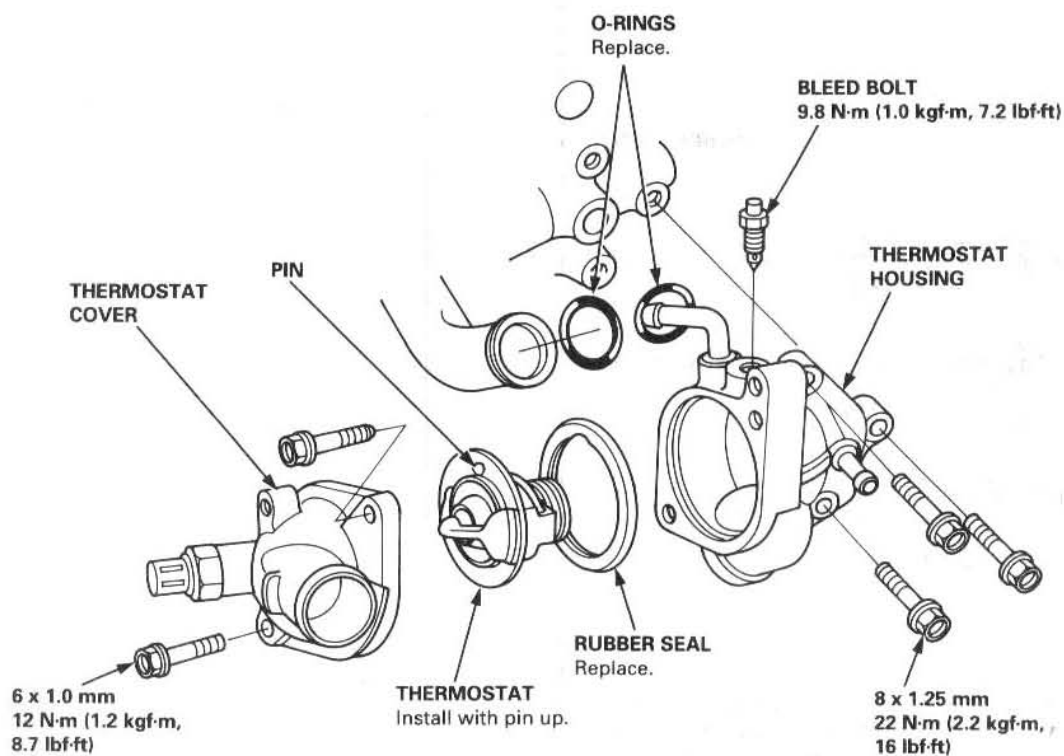
NOTE: Check for engine oil in the coolant and/or coolant in engine oil.

Thermostat



Replacement

NOTE: Use new O-rings when reassembling.



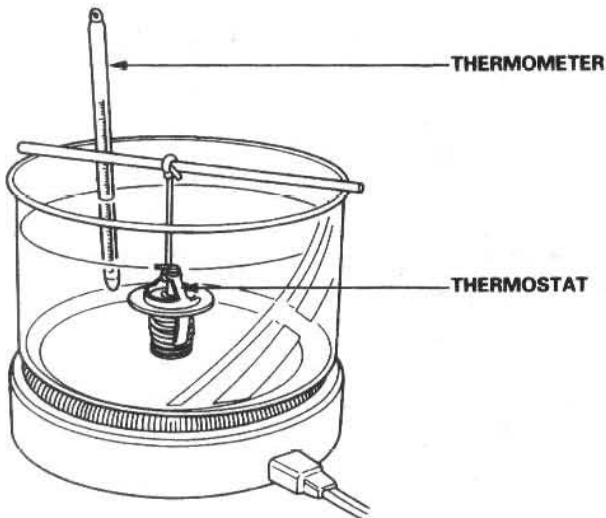
Thermostat

Testing

Replace the thermostat if it is open at room temperature.

To test a closed thermostat:

1. Suspend the thermostat in a container of water as shown.



2. Heat the water and check the temperature with a thermometer. Check the temperature at which the thermostat first opens, and at which it is fully open.

CAUTION: Do not let the thermometer touch the bottom of the hot container.

3. Measure lift height of the thermostat when it is fully open.

STANDARD THERMOSTAT

Lift height: above 10.0 mm (0.39 in)

Starts opening: 169 – 176°F (76 – 80°C)

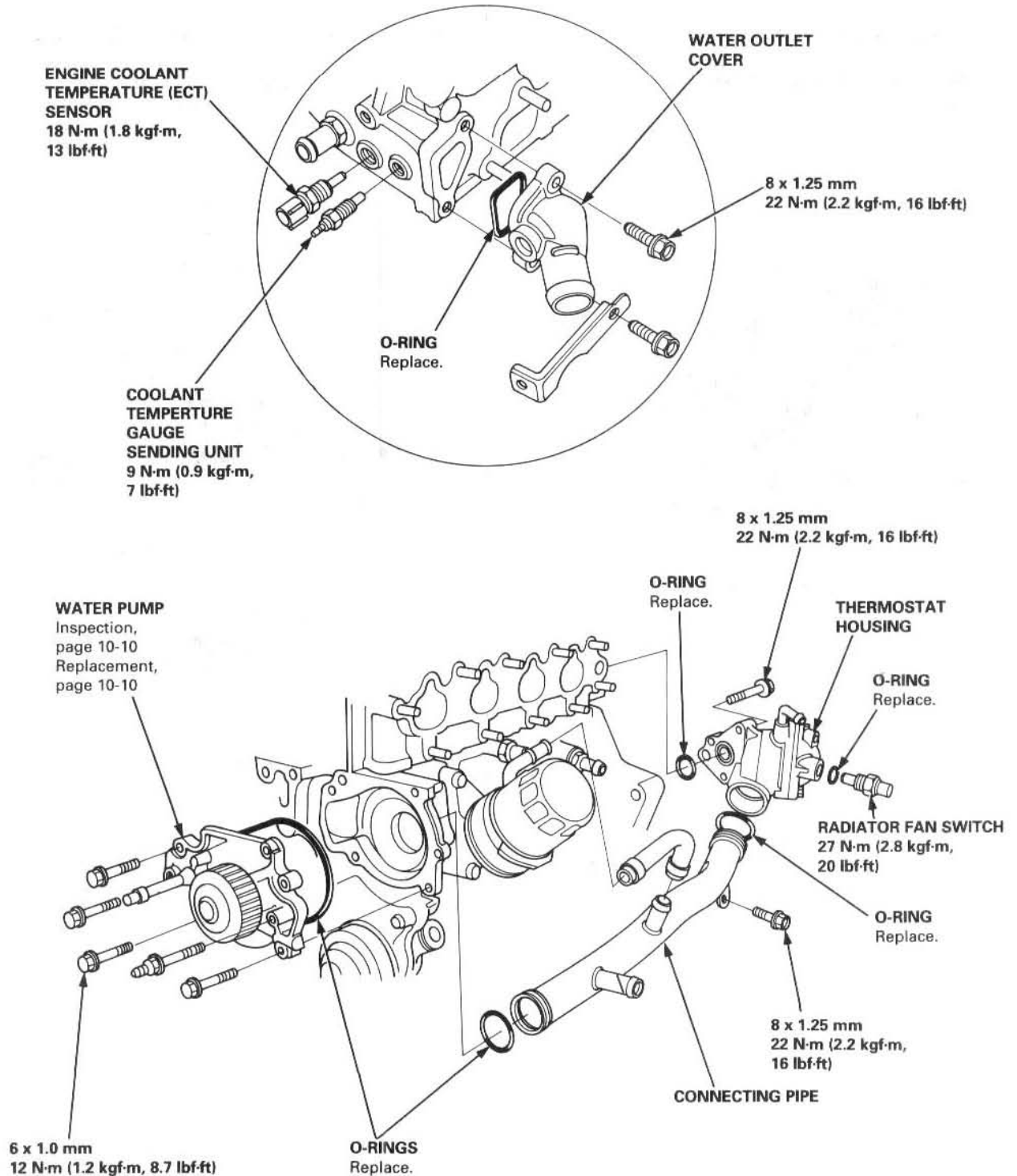
Fully open: 194°F (90°C)



Water Pump

Illustrated Index

NOTE: Use new O-rings when reassembling.

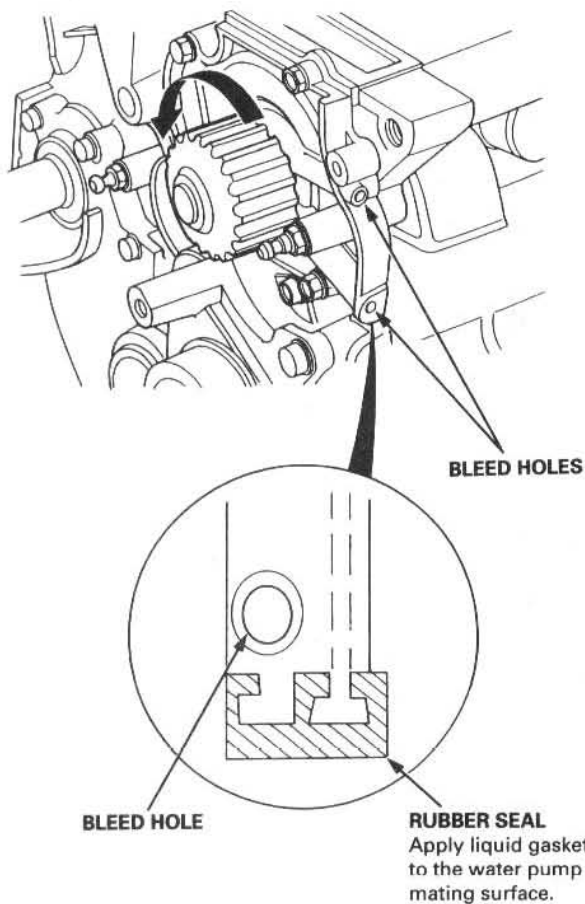


Water Pump

Inspection

1. Remove the timing belt (see section 6).
2. Turn the water pump pulley counterclockwise. Check that it turns freely.
3. Check for signs of seal leakage.

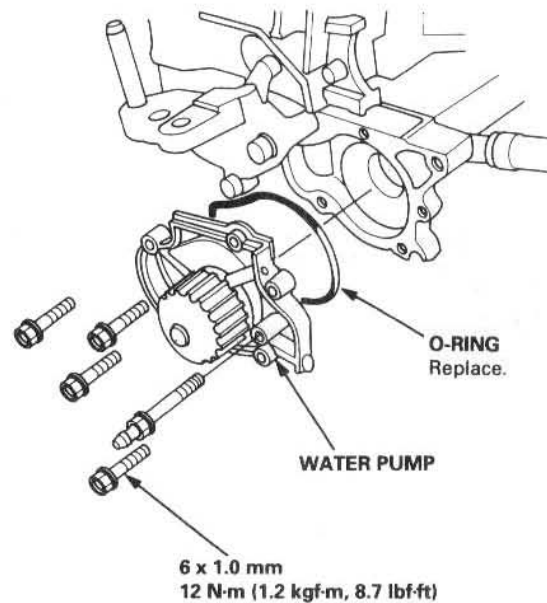
NOTE: A small amount of "weeping" from the bleed hole is normal.



Replacement

1. Remove the timing belt (see section 6).
2. Remove the camshaft pulleys and the back cover (see section 6).
3. Remove the water pump by removing five bolts.

NOTE: Inspect, repair and clean the O-ring groove and mating surface with the engine block.



4. Install the water pump in the reverse order of removal.

NOTE:

- Keep the O-ring in position when installing.
- Clean the spilled engine coolant.



Component Location Index

UNDER-HOOD
FUSE/RELAY BOX

RADIATOR FAN RELAY
Test, section 23

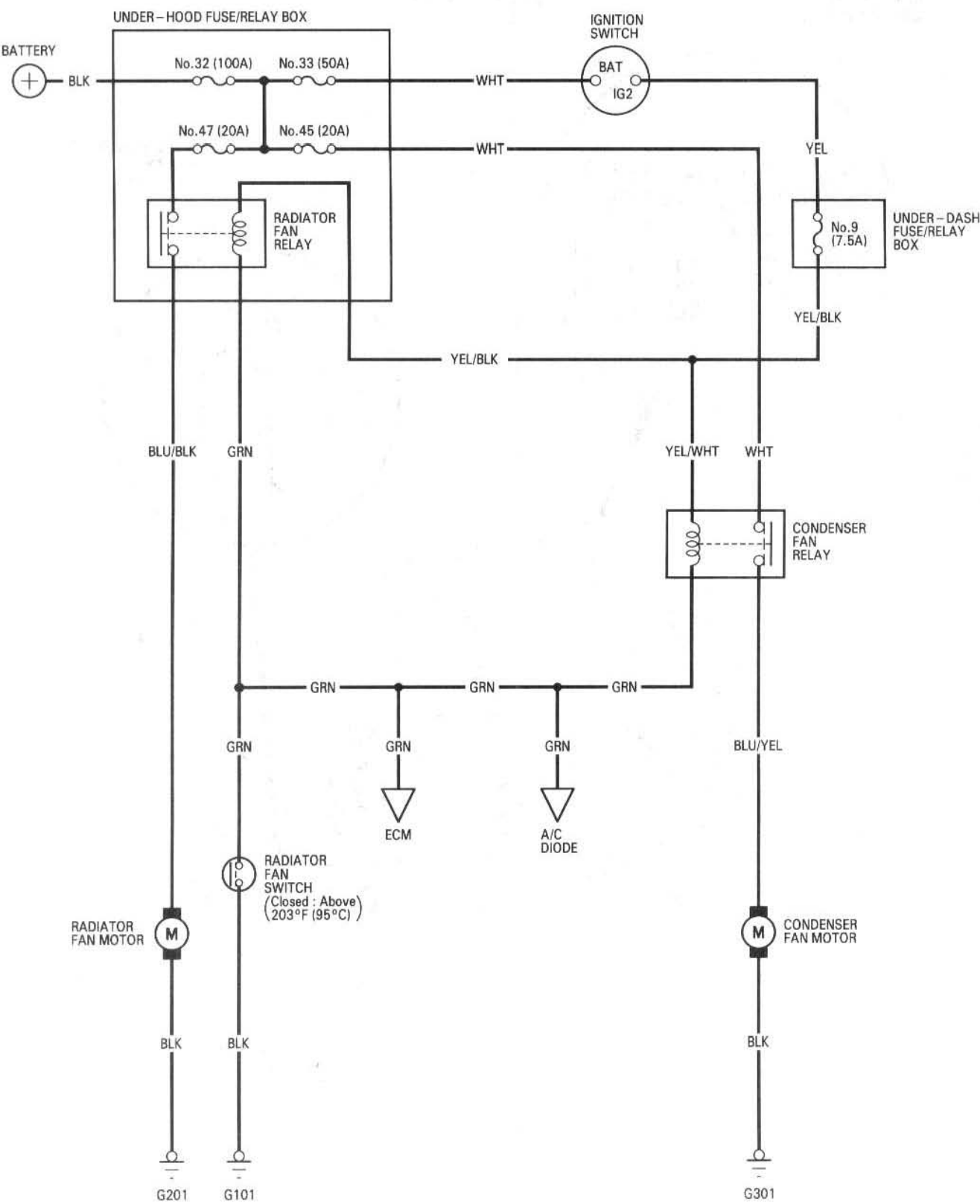
CONDENSER FAN
RELAY
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RADIATOR FAN
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RADIATOR FAN
SWITCH
Test, page 10-13

Fan Controls

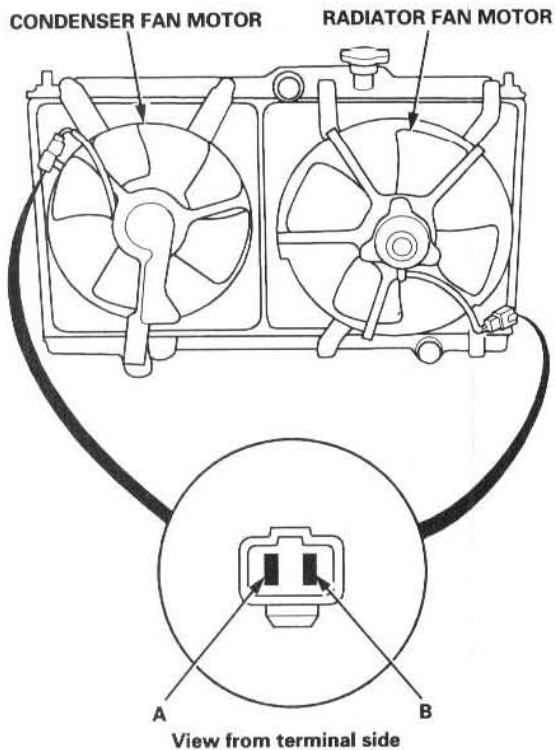
Circuit Diagram





Fan Motor Testing

1. Disconnect the 2P connectors from each fan motor.



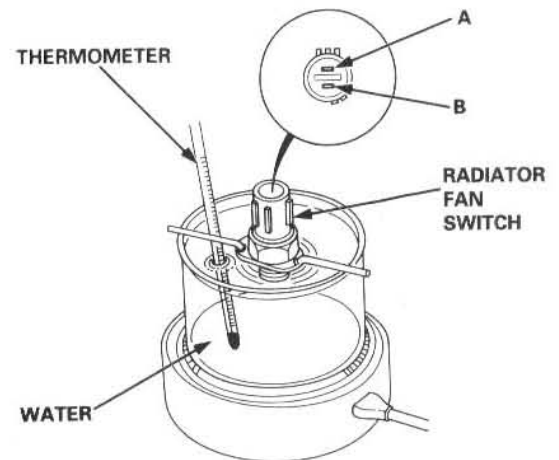
2. Test the motor by connecting battery power to the B terminal and ground to the A terminal.
3. If the motor fails to run or does not run smoothly, replace it.

Radiator Fan Switch Testing

⚠ WARNING Removing the radiator fan switch while the engine is hot can cause the coolant to spray out, seriously scalding you. Always let the engine and radiator cool down before removing the radiator fan switch.

NOTE: Bleed air from the cooling system after installing the radiator fan switch (see page 10-5).

1. Remove radiator fan switch from the thermostat cover (see page 10-9).
2. Suspend the radiator fan switch in a container of water as shown.



3. Heat the water, and check the temperature with a thermometer.

CAUTION: Do not let the thermometer touch the bottom of the hot container.

4. Measure the continuity between the A and B terminals according to the table.

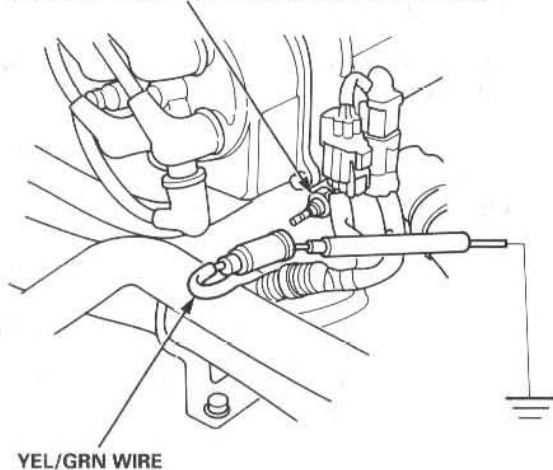
		Terminal	
Operation		Temperature	
SWITCH A	ON	198 – 208°F (92 – 98°C)	
	OFF	4 – 13°F (2 – 7°C) lower than the temperature when it goes on	

Engine Coolant Temperature Gauge

Gauge Testing

1. Check the No. 13 (15 A) fuse in the under-dash fuse/relay box before testing.
2. Make sure the ignition switch is OFF, then disconnect the YEL/GRN wire from the coolant temperature gauge sending unit, and ground it with a jumper wire.

COOLANT TEMPERATURE GAUGE SENDING UNIT



3. Turn the ignition switch ON (II). Check that the pointer of the coolant temperature gauge starts moving toward the "H" mark.

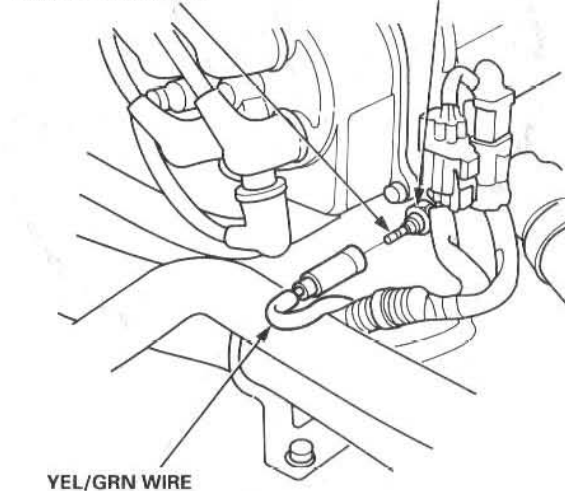
CAUTION: Turn the ignition switch OFF before the pointer reaches "H" on the gauge dial. Failure to do so may damage the gauge.

- If the pointer of the gauge does not move at all, check for an open in the YEL/GRN wire. If the wires are OK, replace the coolant temperature gauge.
- If the coolant temperature gauge works, test the coolant temperature sending unit.

Coolant Temperature Sending Unit Testing

1. Disconnect the YEL/GRN wire from the coolant temperature sending unit.

COOLANT TEMPERATURE SENDING UNIT
POSITIVE TERMINAL



2. Using an ohmmeter, measure the change in resistance between the positive terminal and the engine (ground) with the engine cold and with the engine at operating temperature.

Temperature	133°F (56°C)	185°F (85°C) – 212°F (100°C)
Resistance (Ω)	137	46 – 30

3. If the obtained readings are substantially different from the specifications above, replace the sending unit.

Fuel and Emissions

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Emission Control System

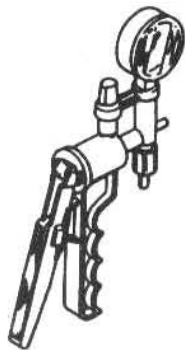
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Special Tools

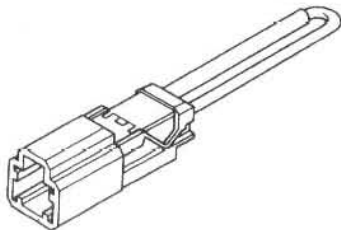
Ref. No.	Tool Number	Description	Qty	Page Reference
①	A973X - 041 - XXXXX	Vacuum Pump/Gauge, 0 - 30 in.Hg	1	11-140, 143, 145, 147, 154, 155, 164, 169, 170, 171, 172, 175, 176, 177, 179, 180, 181, 182, 183, 184, 185, 186, 189, 193, 194, 195
②	07JAZ - 001000B	Vacuum/Pressure Gauge, 0 - 4 in.Hg	1	11-193
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④	07SAZ - 001000A	Backprobe Set	2	11-39
⑤	07406 - 0040001	Fuel Pressure Gauge	1	11-123, 126



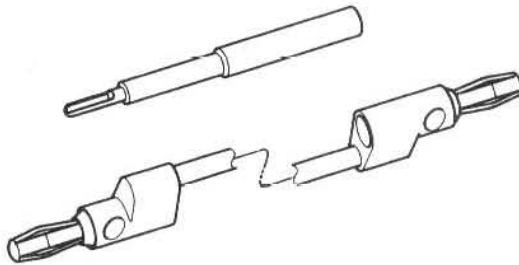
①



②



③



④

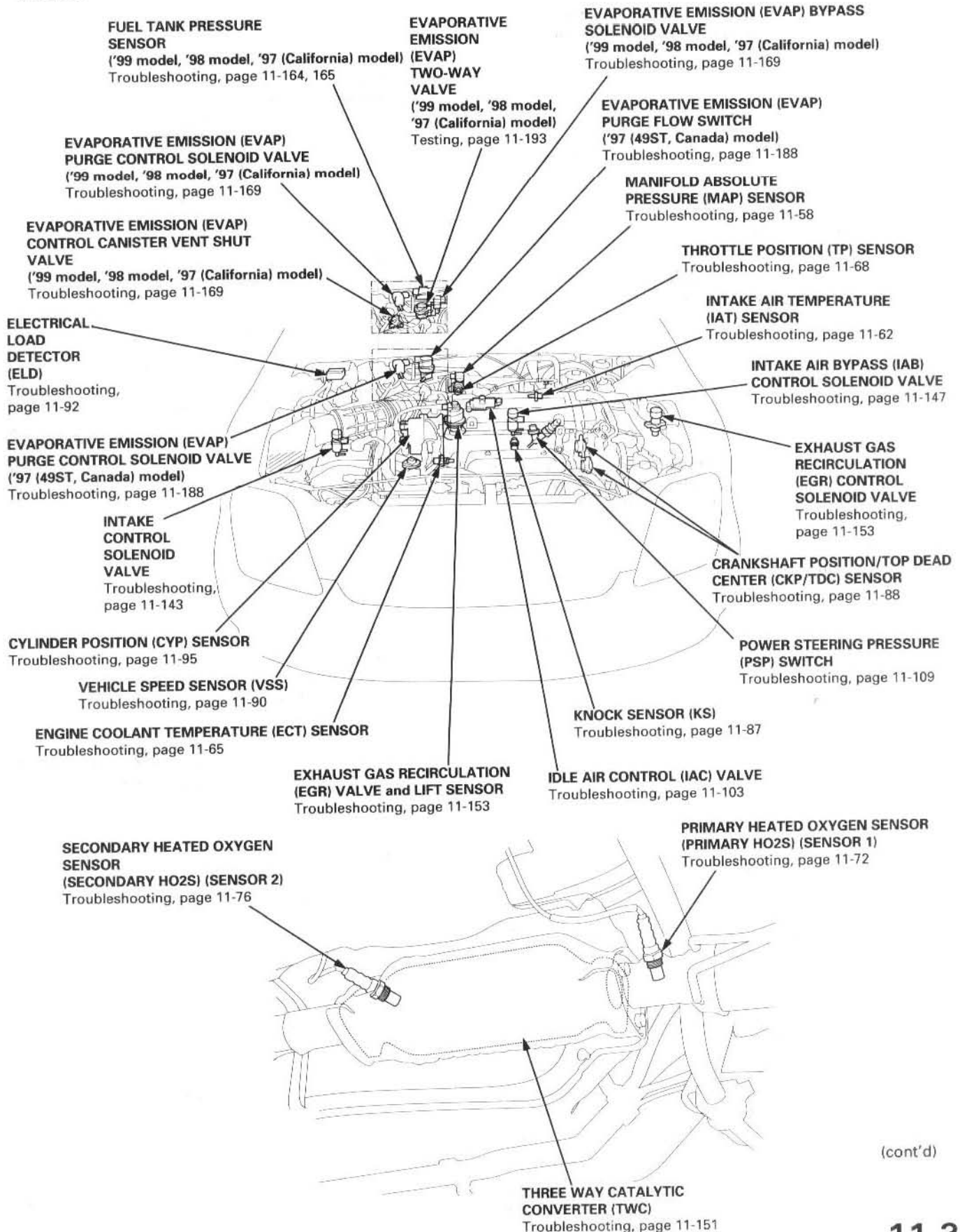


⑤

Component Locations



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(cont'd)

Component Locations

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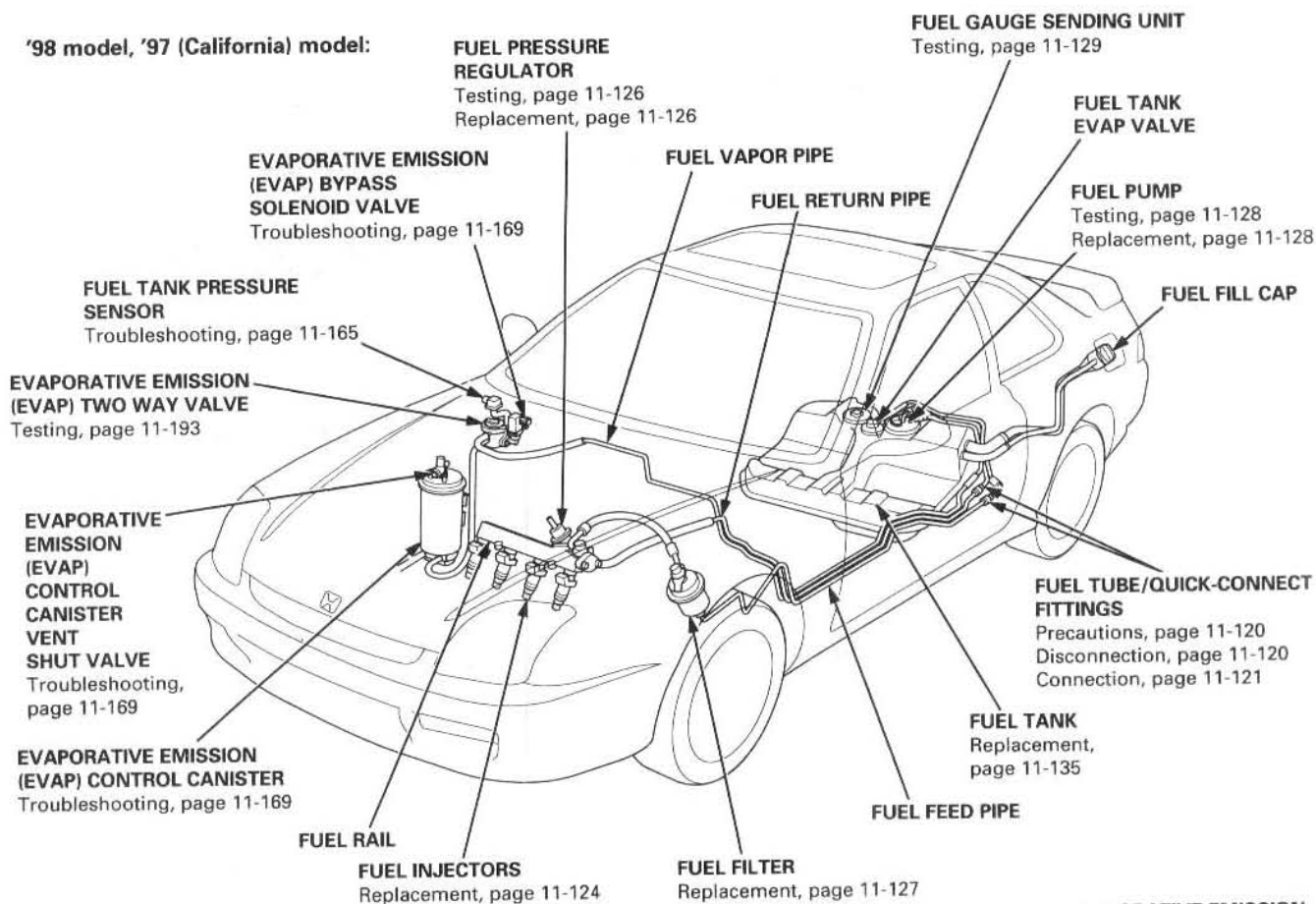
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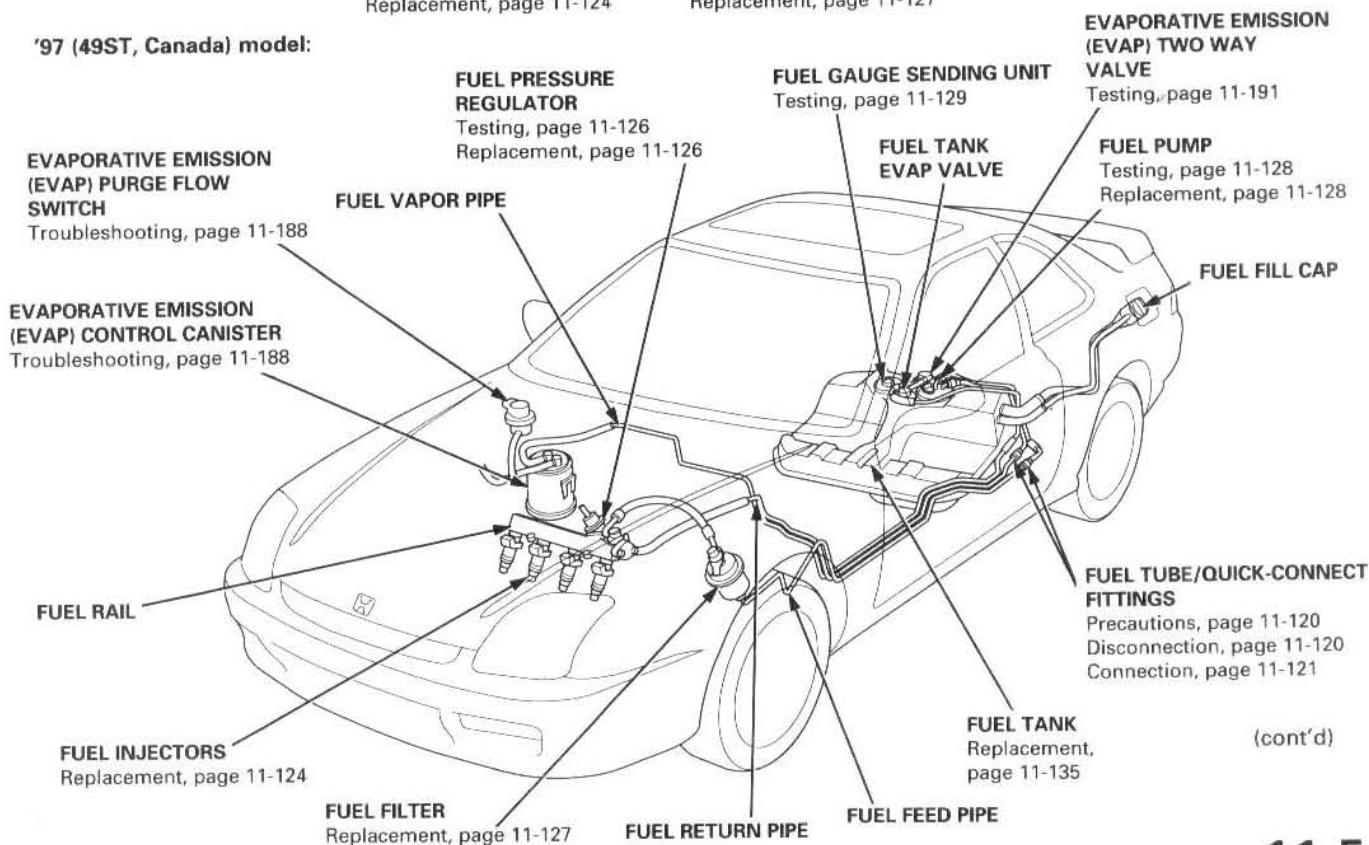
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'98 model, '97 (California) model:



'97 (49ST, Canada) model:

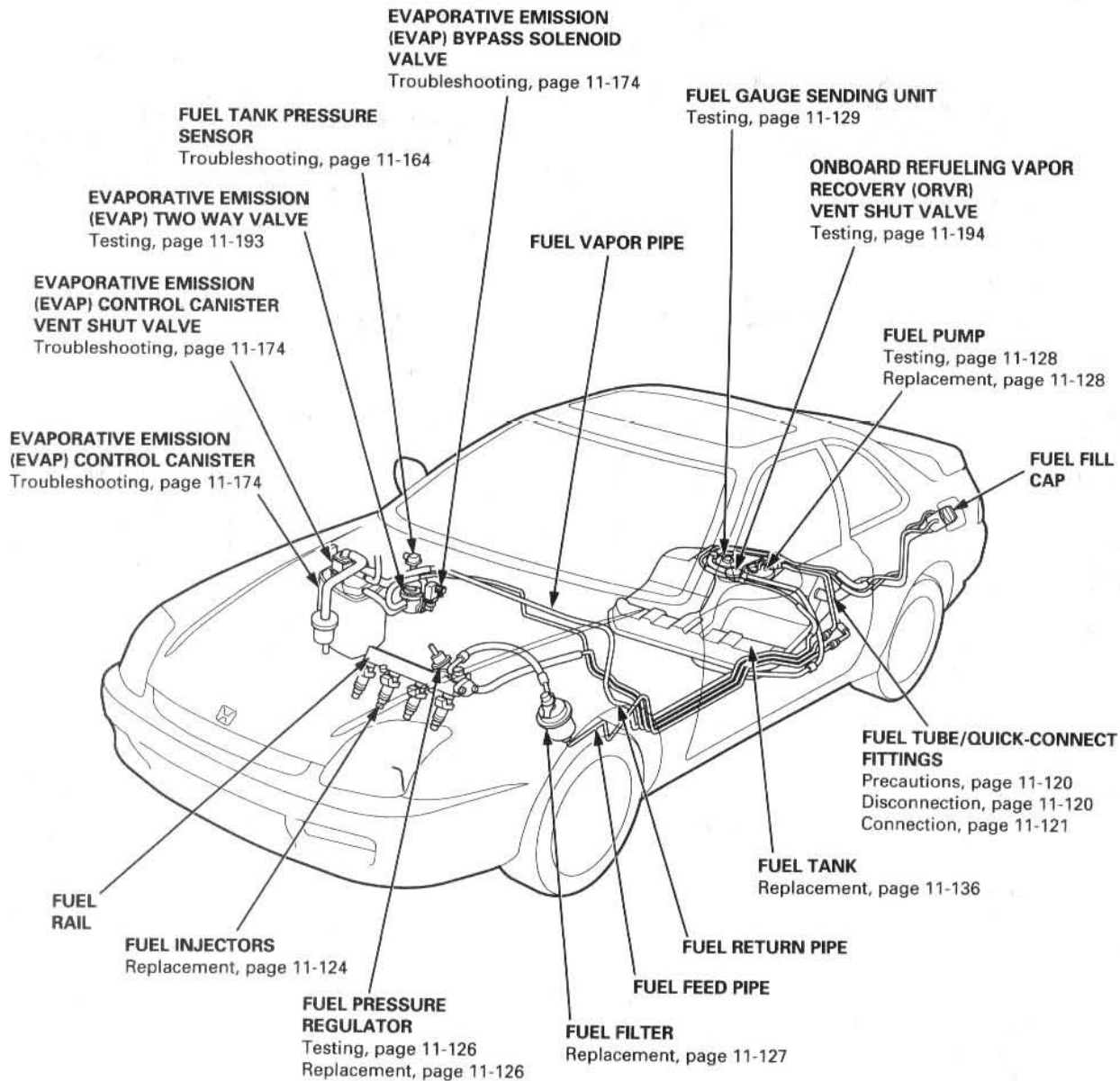


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Component Locations

Index (cont'd)

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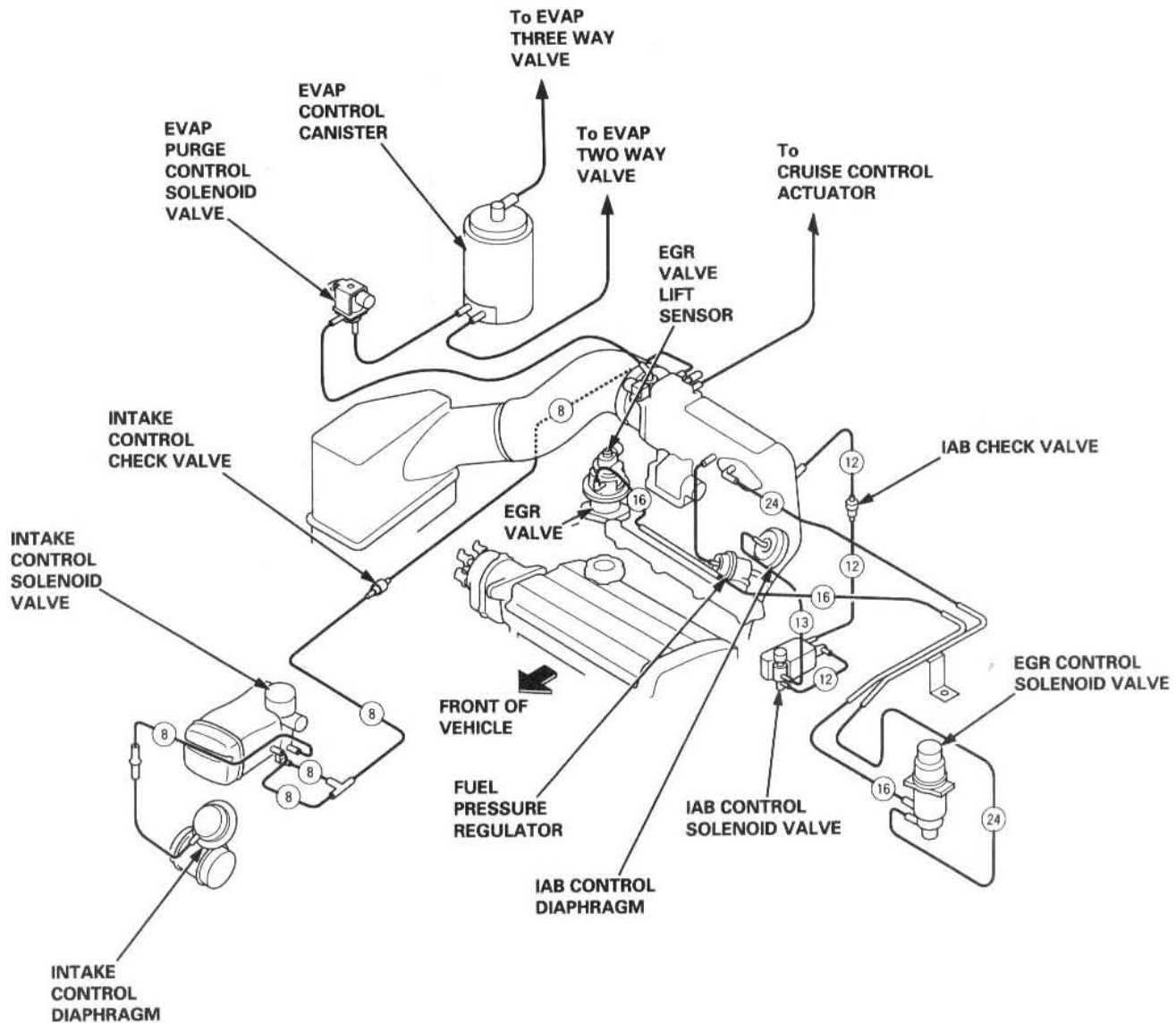


System Description



Vacuum Connections

'98 model, '97 (California) model:

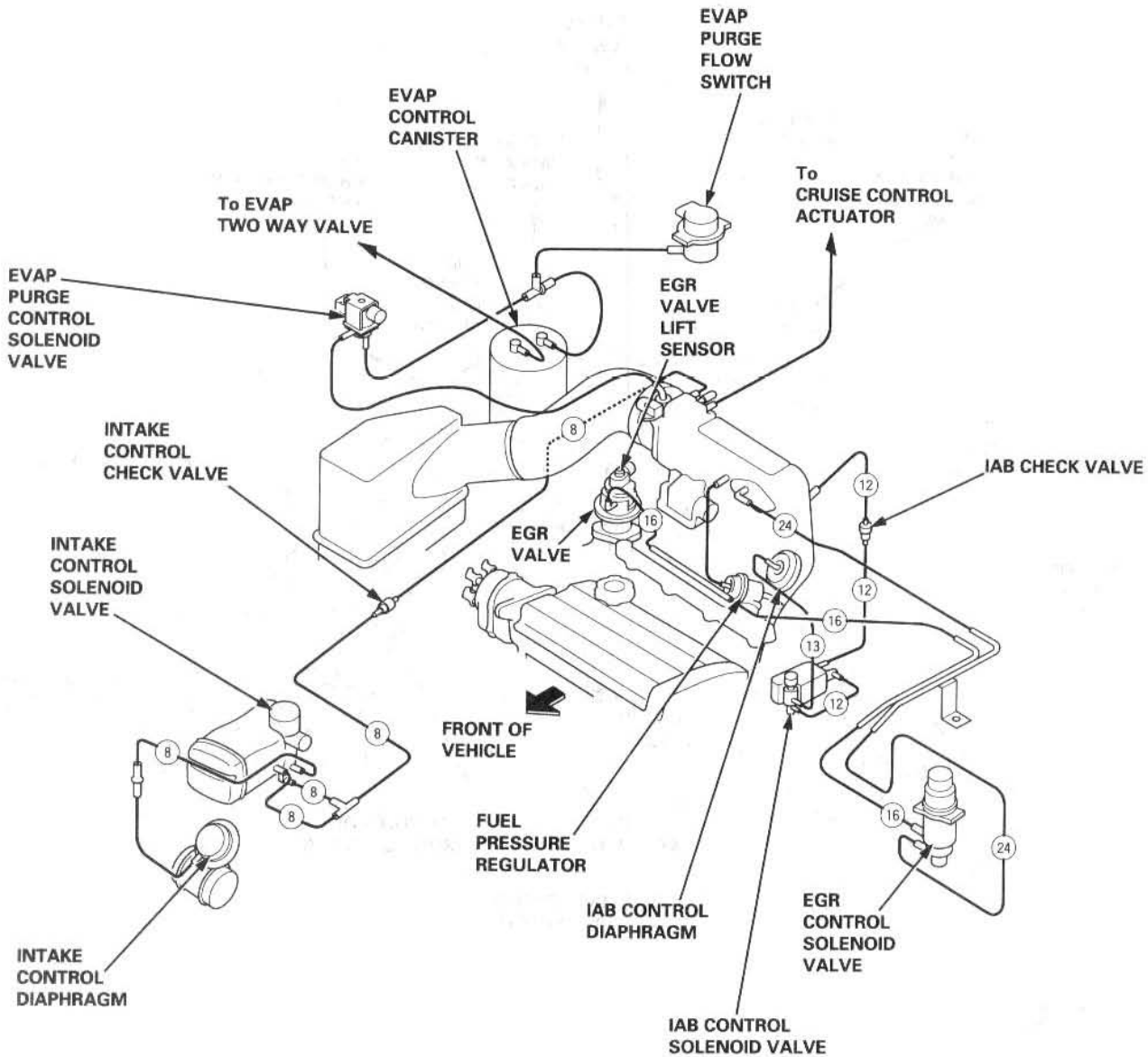


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System Description

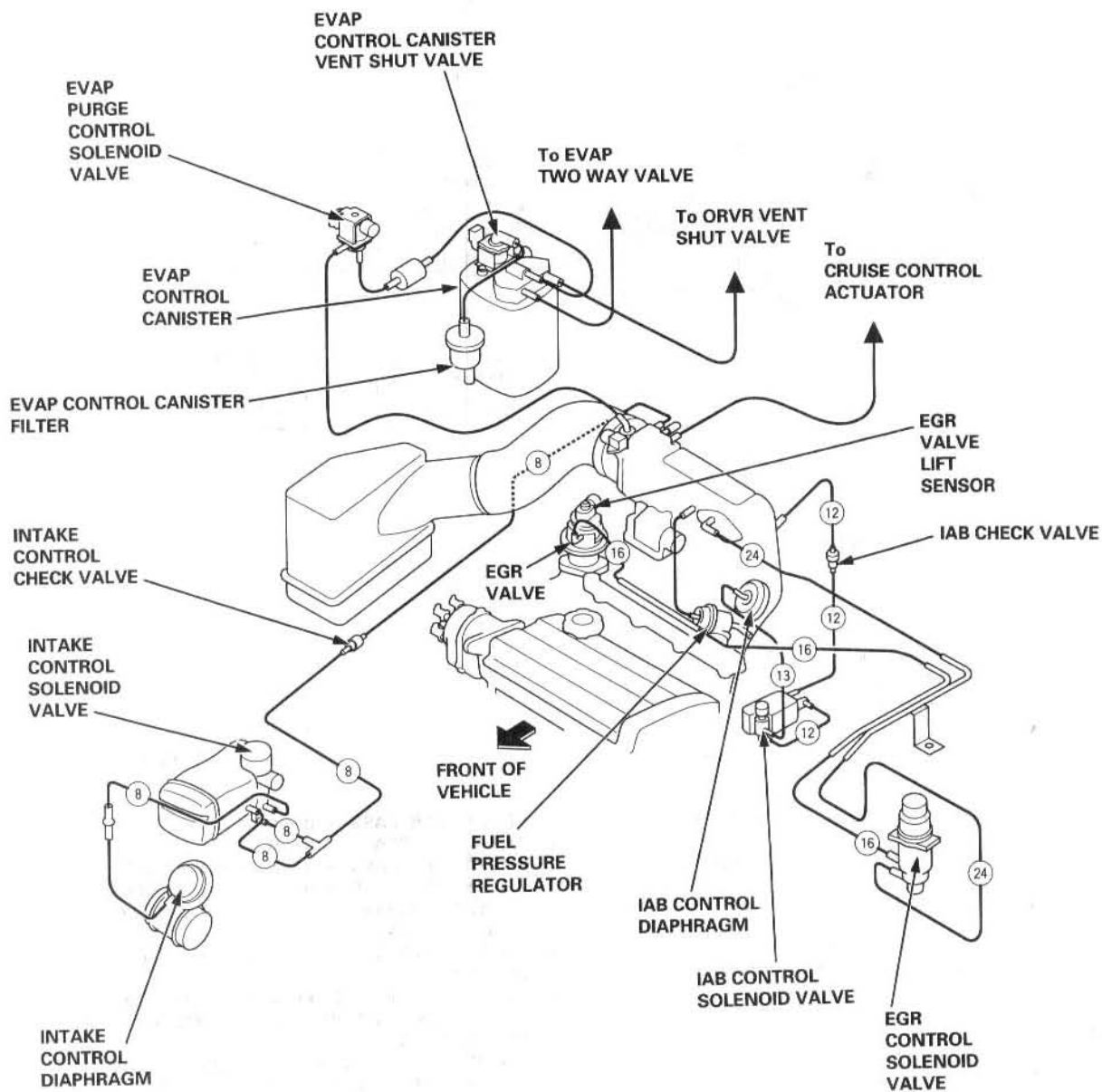
Vacuum Connections (cont'd)

'97 (49ST, Canada) model:





'99 model:

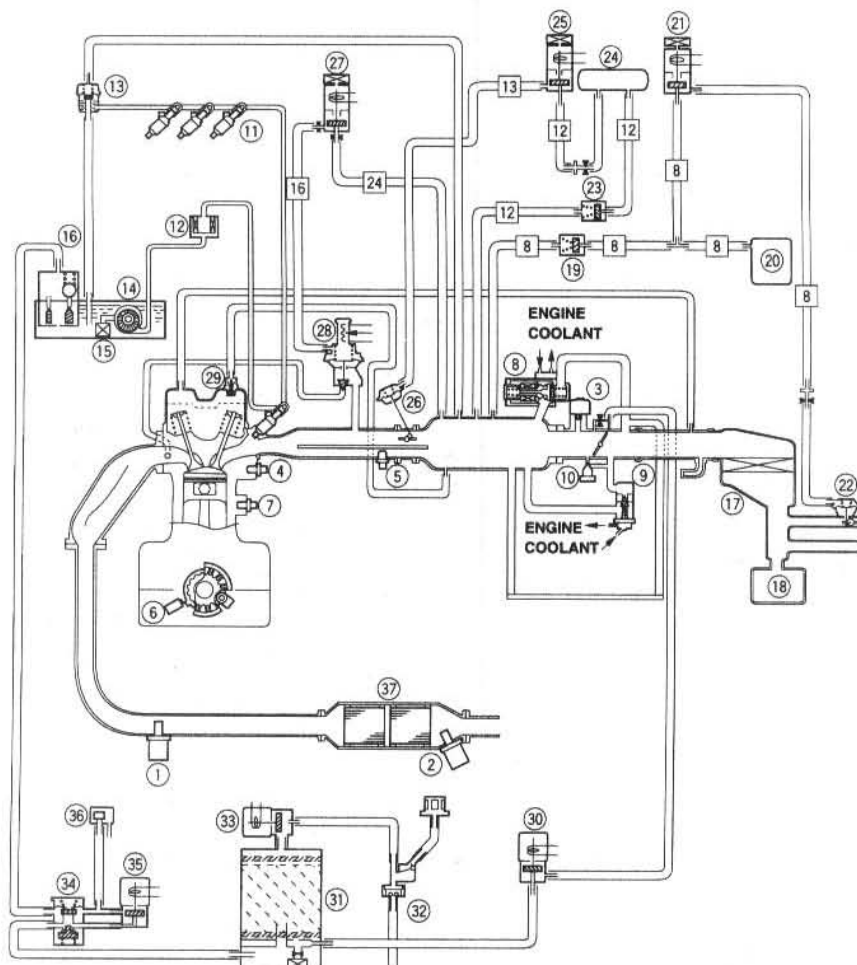


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System Description

Vacuum Connections (cont'd)

'98 model, '97 (California) model:

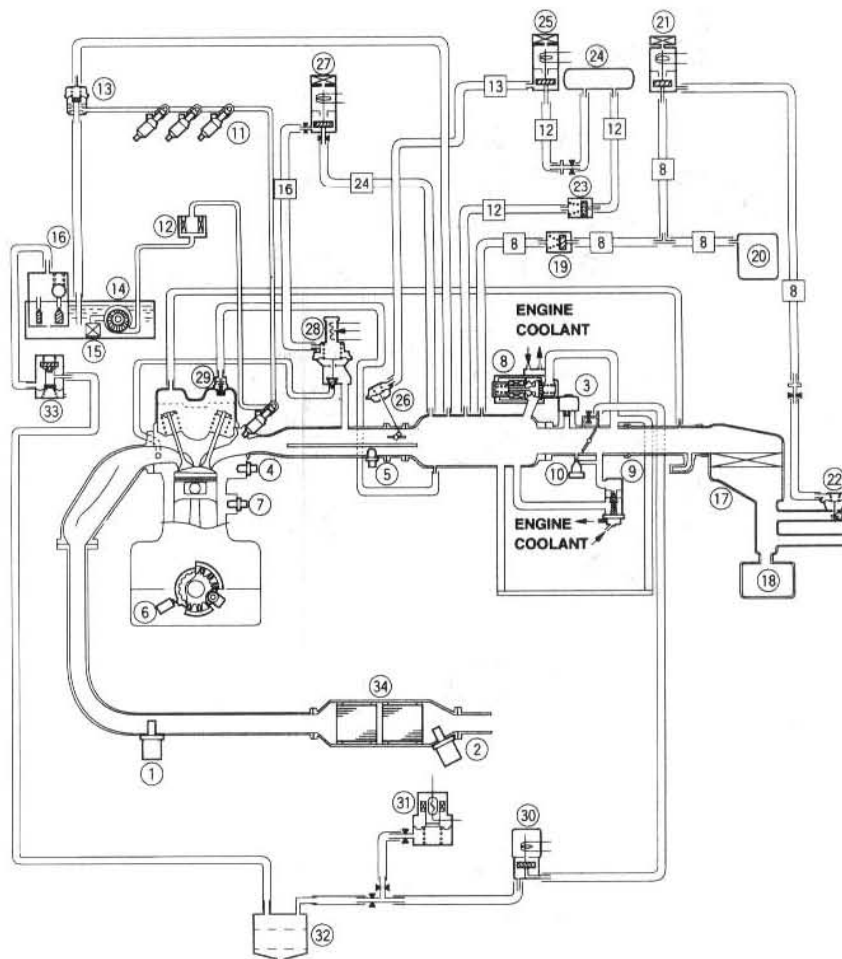


□: Vacuum hose No.

- | | |
|---|---|
| ① PRIMARY HEATED OXYGEN SENSOR (PRIMARY HO ₂ S) (SENSOR 1) | ②③ INTAKE AIR BYPASS (IAB) CHECK VALVE |
| ② SECONDARY HEATED OXYGEN SENSOR (SECONDARY HO ₂ S) (SENSOR 2) | ②④ INTAKE AIR BYPASS (IAB) VACUUM TANK |
| ③ MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR | ②⑤ INTAKE AIR BYPASS (IAB) CONTROL SOLENOID VALVE |
| ④ ENGINE COOLANT TEMPERATURE (ECT) SENSOR | ②⑥ INTAKE AIR BYPASS (IAB) CONTROL DIAPHRAGM |
| ⑤ INTAKE AIR TEMPERATURE (IAT) SENSOR | ②⑦ EXHAUST GAS RECIRCULATION (EGR) CONTROL SOLENOID VALVE |
| ⑥ CRANKSHAFT POSITION/TOP DEAD CENTER (CKP/TDC) SENSOR | ②⑧ EXHAUST GAS RECIRCULATION (EGR) VALVE and LIFT SENSOR |
| ⑦ KNOCK SENSOR (KS) | ②⑨ POSITIVE CRANKCASE VENTILATION (PCV) VALVE |
| ⑧ IDLE AIR CONTROL (IAC) VALVE | ②⑩ EVAPORATIVE EMISSION (EVAP) PURGE CONTROL SOLENOID VALVE |
| ⑨ FAST IDLE THERMO VALVE | ②⑪ EVAPORATIVE EMISSION (EVAP) CONTROL CANISTER |
| ⑩ IDLE ADJUSTING SCREW | ②⑫ EVAPORATIVE EMISSION (EVAP) THREE WAY VALVE |
| ⑪ FUEL INJECTOR | ②⑬ EVAPORATIVE EMISSION (EVAP) CONTROL CANISTER VENT SHUT VALVE |
| ⑫ FUEL FILTER | ②⑭ EVAPORATIVE EMISSION (EVAP) TWO WAY VALVE |
| ⑬ FUEL PRESSURE REGULATOR | ②⑮ EVAPORATIVE EMISSION (EVAP) BYPASS SOLENOID VALVE |
| ⑭ FUEL PUMP (FP) | ②⑯ FUEL TANK PRESSURE SENSOR |
| ⑮ FUEL TANK | ②⑰ THREE WAY CATALYTIC CONVERTER (TWC) |
| ⑯ FUEL TANK EVAPORATIVE EMISSION (EVAP) VALVE | |
| ⑰ AIR CLEANER | |
| ⑱ RESONATOR | |
| ⑲ INTAKE CONTROL CHECK VALVE | |
| ⑳ INTAKE CONTROL VACUUM TANK | |
| ㉑ INTAKE CONTROL SOLENOID VALVE | |
| ㉒ INTAKE CONTROL DIAPHRAGM | |



'97 (49ST, Canada) model:



□: Vacuum hose No.

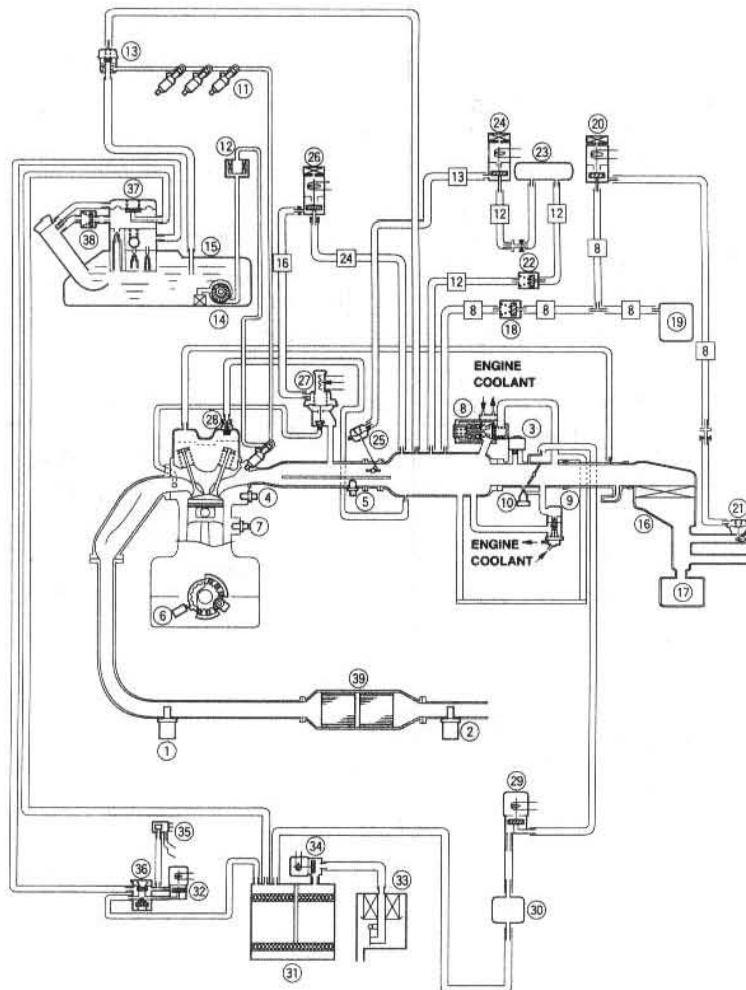
- | | |
|---|---|
| ① PRIMARY HEATED OXYGEN SENSOR (PRIMARY HO ₂ S) (SENSOR 1) | ②③ INTAKE AIR BYPASS (IAB) CHECK VALVE |
| ② SECONDARY HEATED OXYGEN SENSOR (SECONDARY HO ₂ S) (SENSOR 2) | ②④ INTAKE AIR BYPASS (IAB) VACUUM TANK |
| ③ MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR | ②⑤ INTAKE AIR BYPASS (IAB) CONTROL SOLENOID VALVE |
| ④ ENGINE COOLANT TEMPERATURE (ECT) SENSOR | ②⑥ INTAKE AIR BYPASS (IAB) CONTROL DIAPHRAGM |
| ⑤ INTAKE AIR TEMPERATURE (IAT) SENSOR | ②⑦ EXHAUST GAS RECIRCULATION (EGR) CONTROL SOLENOID VALVE |
| ⑥ CRANKSHAFT POSITION/TOP DEAD CENTER (CKP/TDC) SENSOR | ②⑧ EXHAUST GAS RECIRCULATION (EGR) VALVE and LIFT SENSOR |
| ⑦ KNOCK SENSOR (KS) | ②⑨ POSITIVE CRANKCASE VENTILATION (PCV) VALVE |
| ⑧ IDLE AIR CONTROL (IAC) VALVE | ③① EVAPORATIVE EMISSION (EVAP) PURGE CONTROL SOLENOID VALVE |
| ⑨ FAST IDLE THERMO VALVE | ③② EVAPORATIVE EMISSION (EVAP) PURGE FLOW SWITCH |
| ⑩ IDLE ADJUSTING SCREW | ③③ EVAPORATIVE EMISSION (EVAP) CONTROL CANISTER |
| ⑪ FUEL INJECTOR | ③④ EVAPORATIVE EMISSION (EVAP) TWO WAY VALVE |
| ⑫ FUEL FILTER | ③⑤ THREE WAY CATALYTIC CONVERTER (TWC) |
| ⑬ FUEL PRESSURE REGULATOR | |
| ⑭ FUEL PUMP (FP) | |
| ⑮ FUEL TANK | |
| ⑯ FUEL TANK EVAPORATIVE EMISSION (EVAP) VALVE | |
| ⑰ AIR CLEANER | |
| ⑱ RESONATOR | |
| ⑲ INTAKE CONTROL CHECK VALVE | |
| ⑳ INTAKE CONTROL VACUUM TANK | |
| ㉑ INTAKE CONTROL SOLENOID VALVE | |
| ㉒ INTAKE CONTROL DIAPHRAGM | |

(cont'd)

System Description

Vacuum Connections (cont'd)

'99 model:

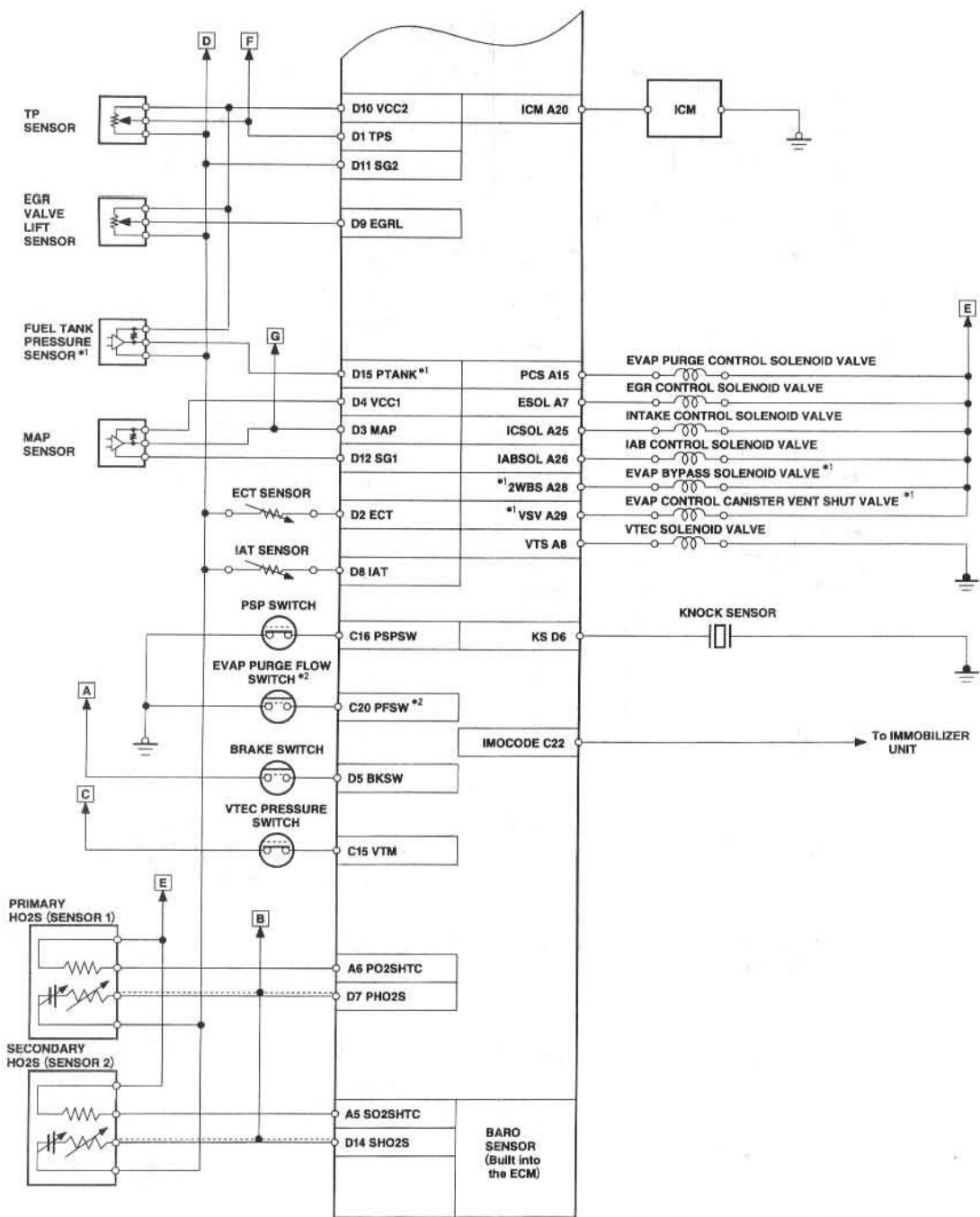


□: Vacuum hose No.

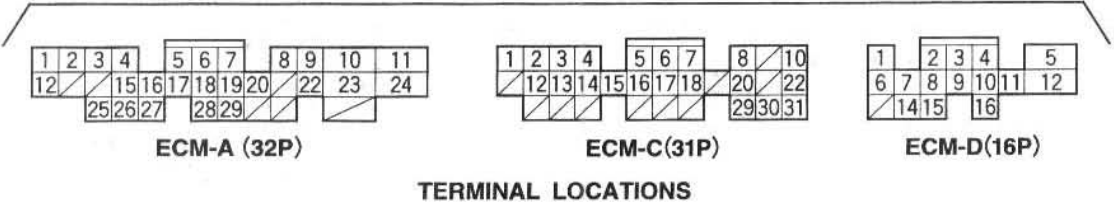
- | | |
|---|--|
| ① PRIMARY HEATED OXYGEN SENSOR (PRIMARY HO ₂ S) (SENSOR 1) | ②③ INTAKE AIR BYPASS (IAB) VACUUM TANK |
| ② SECONDARY HEATED OXYGEN SENSOR (SECONDARY HO ₂ S) (SENSOR 2) | ②④ INTAKE AIR BYPASS (IAB) CONTROL SOLENOID VALVE |
| ③ MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR | ②⑤ INTAKE AIR BYPASS (IAB) CONTROL DIAPHRAGM |
| ④ ENGINE COOLANT TEMPERATURE (ECT) SENSOR | ②⑥ EXHAUST GAS RECIRCULATION (EGR) CONTROL SOLENOID VALVE |
| ⑤ INTAKE AIR TEMPERATURE (IAT) SENSOR | ②⑦ EXHAUST GAS RECIRCULATION (EGR) VALVE and LIFT SENSOR |
| ⑥ CRANKSHAFT POSITION/TOP DEAD CENTER (CKP/TDC) SENSOR | ②⑧ POSITIVE CRANKCASE VENTILATION (PCV) VALVE |
| ⑦ KNOCK SENSOR (KS) | ②⑨ EVAPORATIVE EMISSION (EVAP) PURGE CONTROL SOLENOID VALVE |
| ⑧ IDLE AIR CONTROL (IAC) VALVE | ③① PURGE JOINT |
| ⑨ FAST IDLE THERMO VALVE | ③② EVAPORATIVE EMISSION (EVAP) CONTROL CANISTER |
| ⑩ IDLE ADJUSTING SCREW | ③③ EVAPORATIVE EMISSION (EVAP) BYPASS SOLENOID VALVE |
| ⑪ FUEL INJECTOR | ③④ EVAPORATIVE EMISSION (EVAP) CONTROL CANISTER FILTER |
| ⑫ FUEL FILTER | ③⑤ EVAPORATIVE EMISSION (EVAP) CONTROL CANISTER VENT SHUT VALVE |
| ⑬ FUEL PRESSURE REGULATOR | ③⑥ FUEL TANK PRESSURE SENSOR |
| ⑭ FUEL PUMP (FP) | ③⑦ EVAPORATIVE EMISSION (EVAP) TWO WAY VALVE |
| ⑮ FUEL TANK | ③⑧ ONBOARD REFUELING VAPOR RECOVERY (ORVR) VENT SHUT VALVE |
| ⑯ AIR CLEANER | ③⑨ ONBOARD REFUELING VAPOR RECOVERY (ORVR) VAPOR RECIRCULATION VALVE |
| ⑰ RESONATOR | ③⑩ THREE WAY CATALYTIC CONVERTER (TWC) |
| ⑱ INTAKE CONTROL CHECK VALVE | |
| ⑲ INTAKE CONTROL VACUUM TANK | |
| ⑳ INTAKE CONTROL SOLENOID VALVE | |
| ㉑ INTAKE CONTROL DIAPHRAGM | |
| ㉒ INTAKE AIR BYPASS (IAB) CHECK VALVE | |

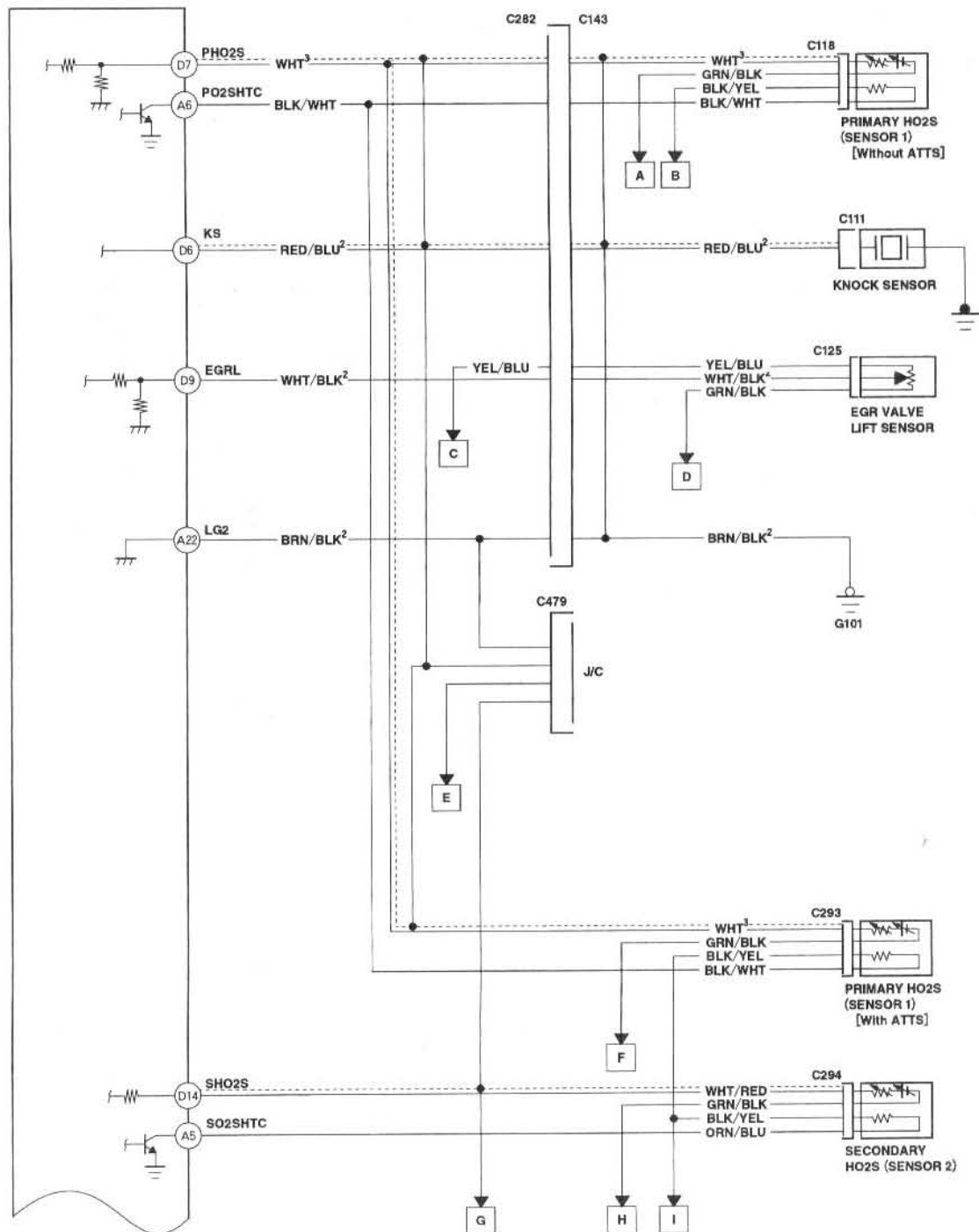
System Description

Electrical Connections (cont'd)



*1: '99 model, '98 model, '97 (California) model
*2: (49ST, Canada) model

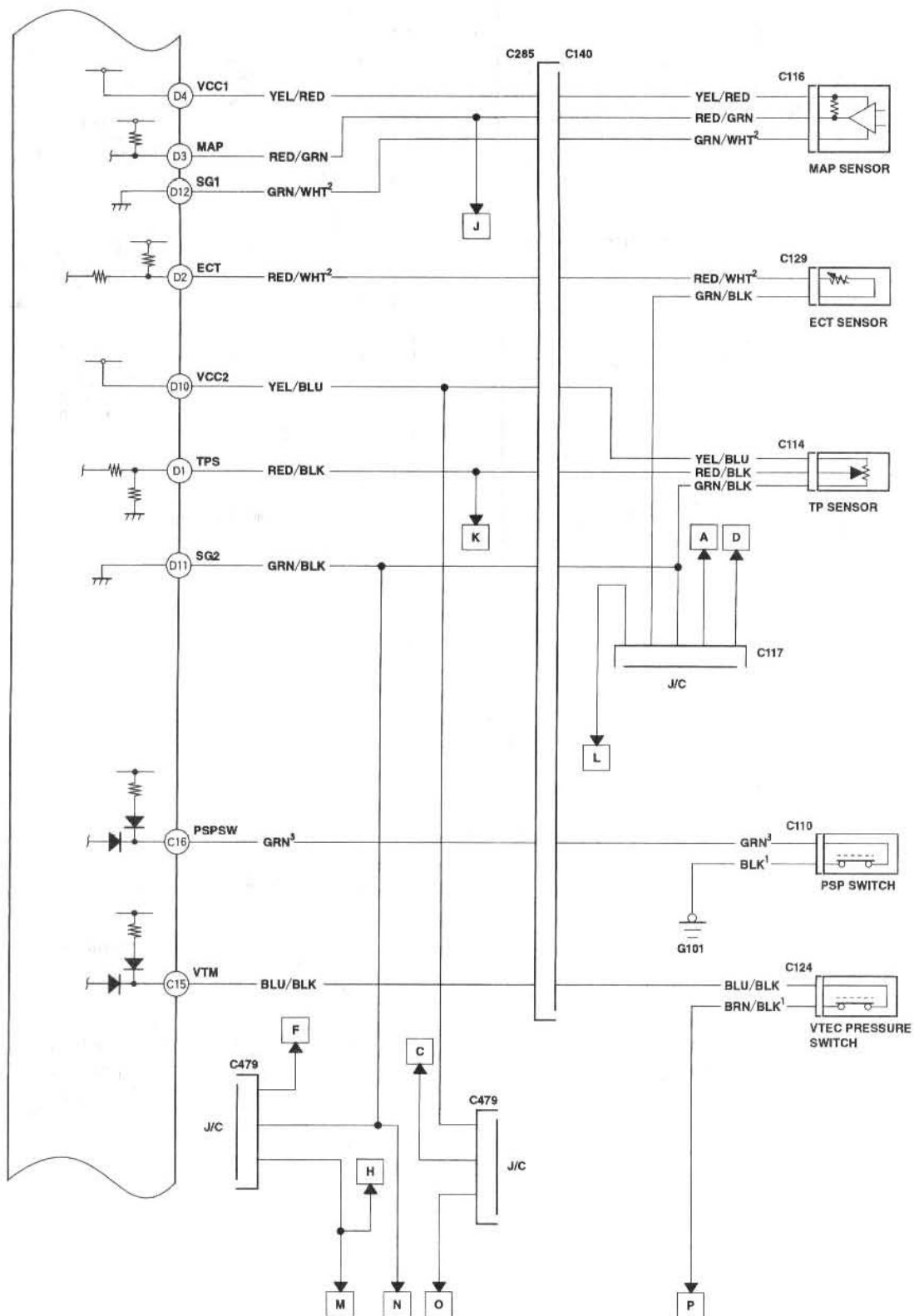


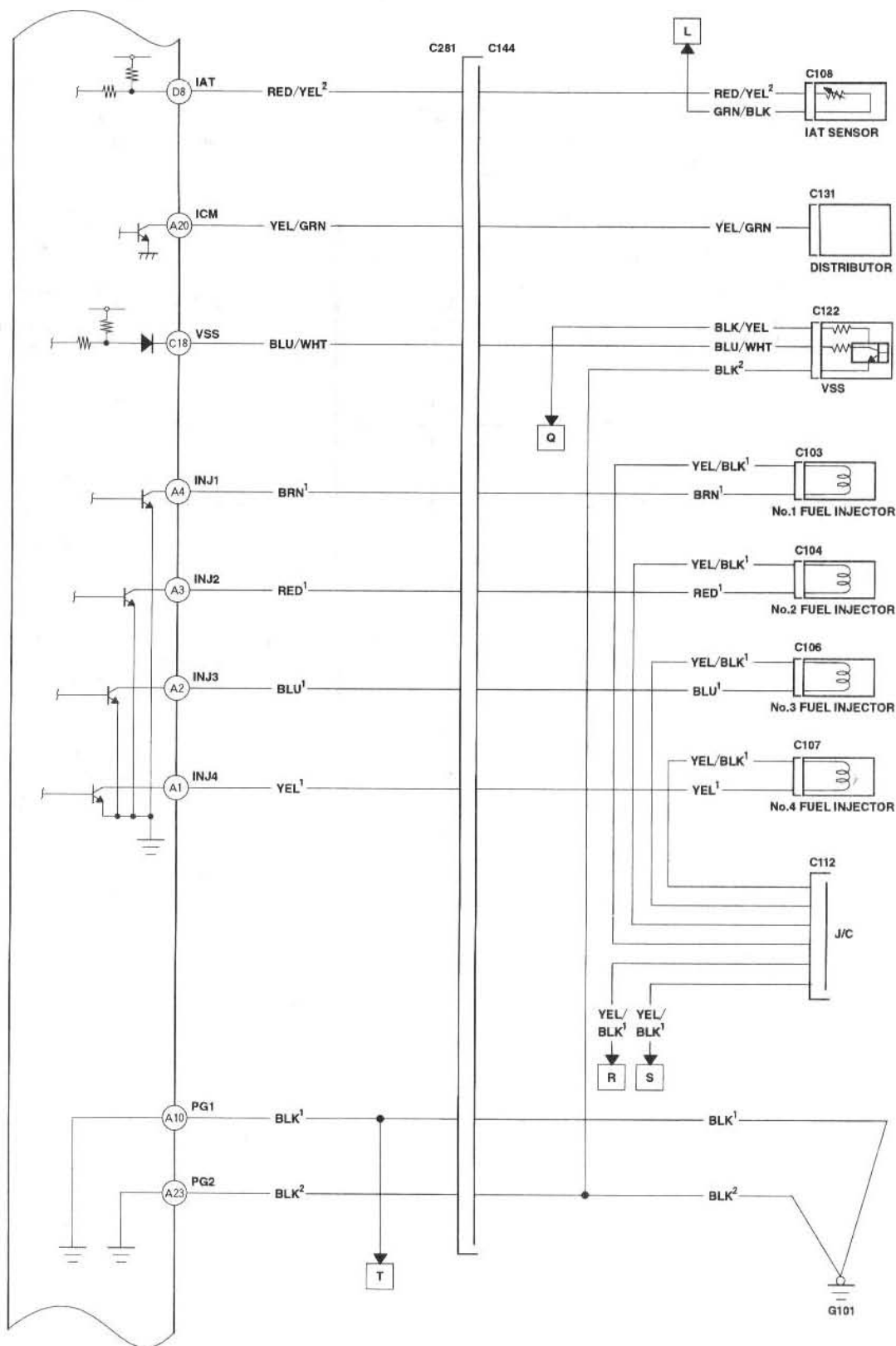


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System Description

Electrical Connections (cont'd)

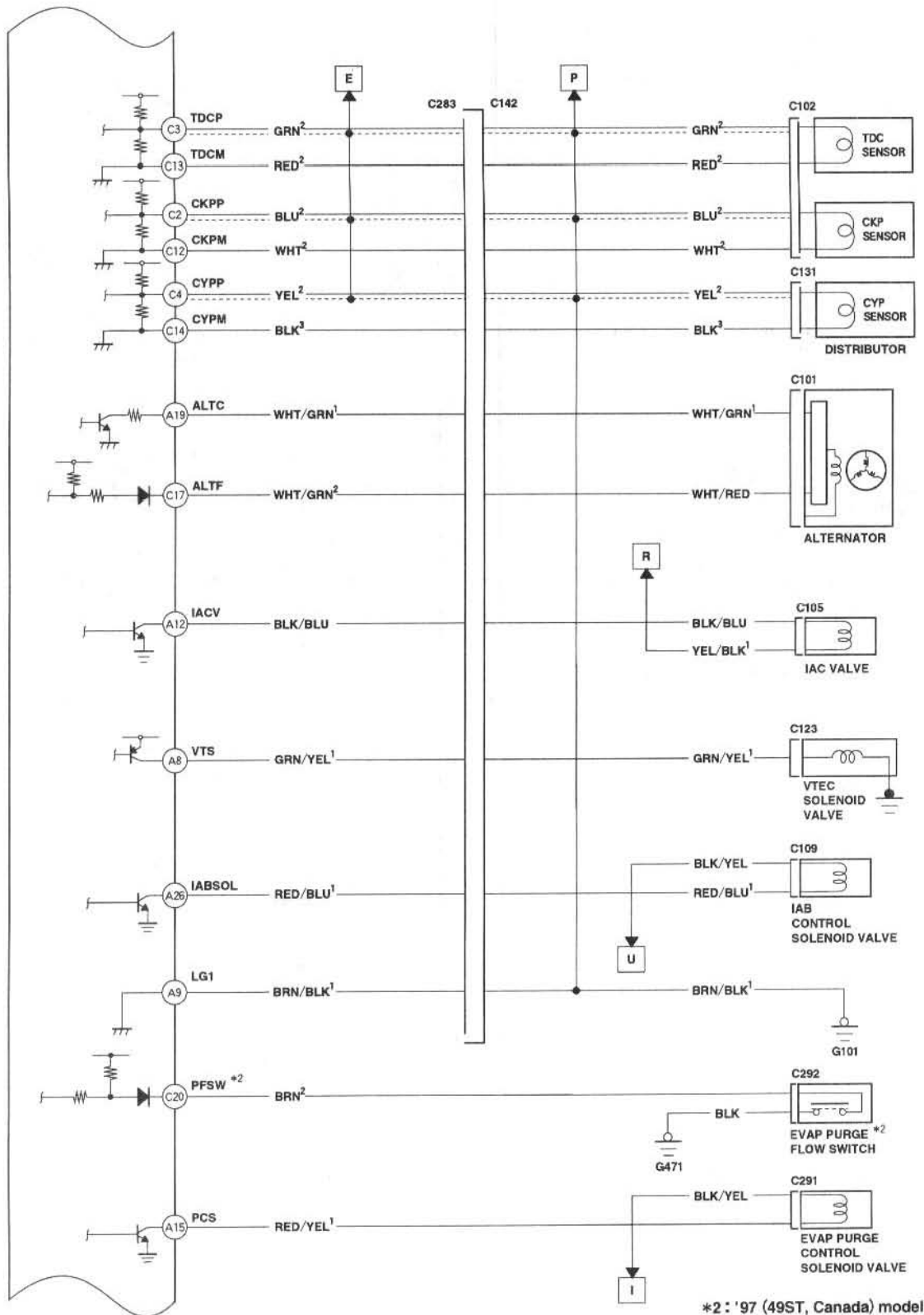


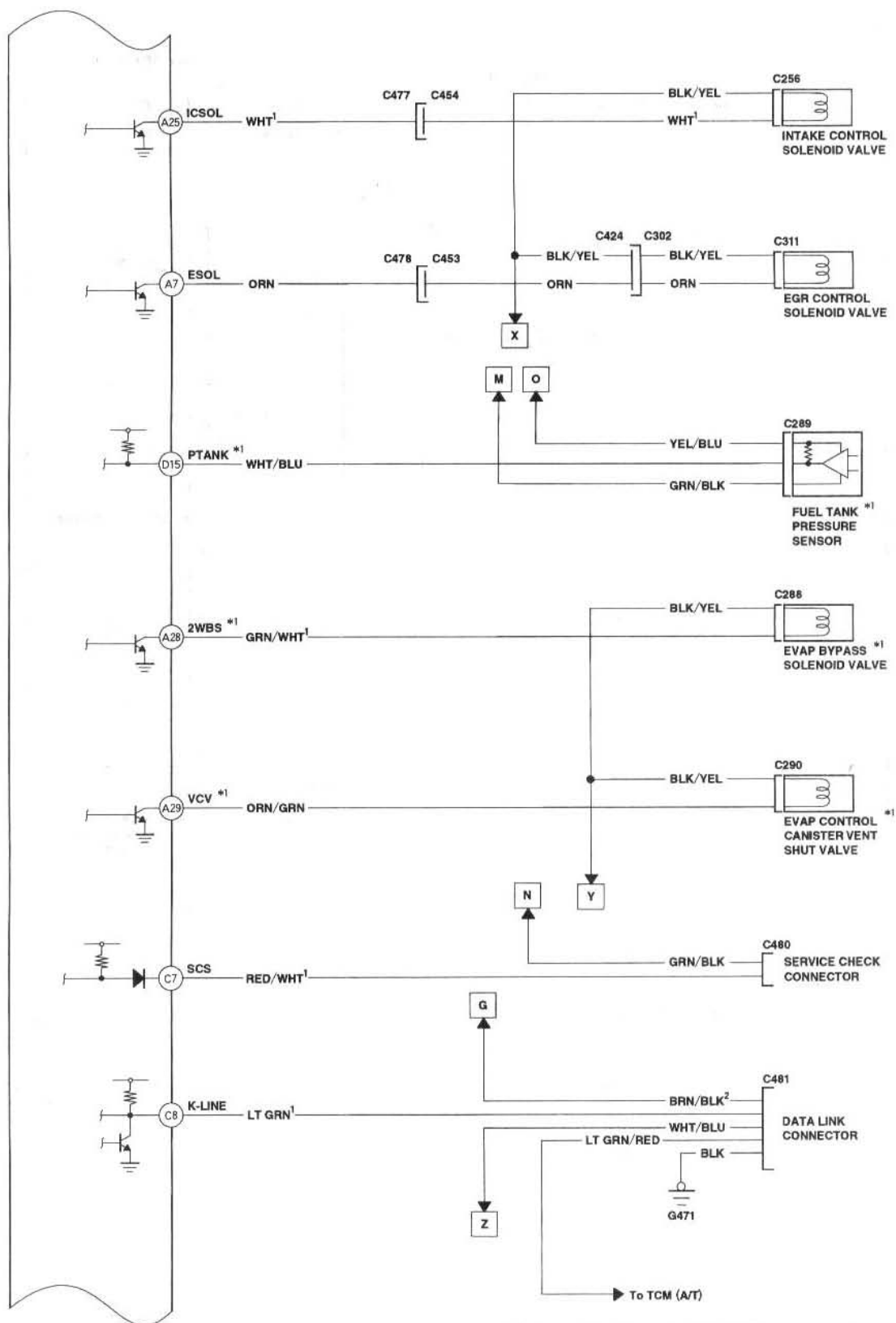


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System Description

Electrical Connections (cont'd)



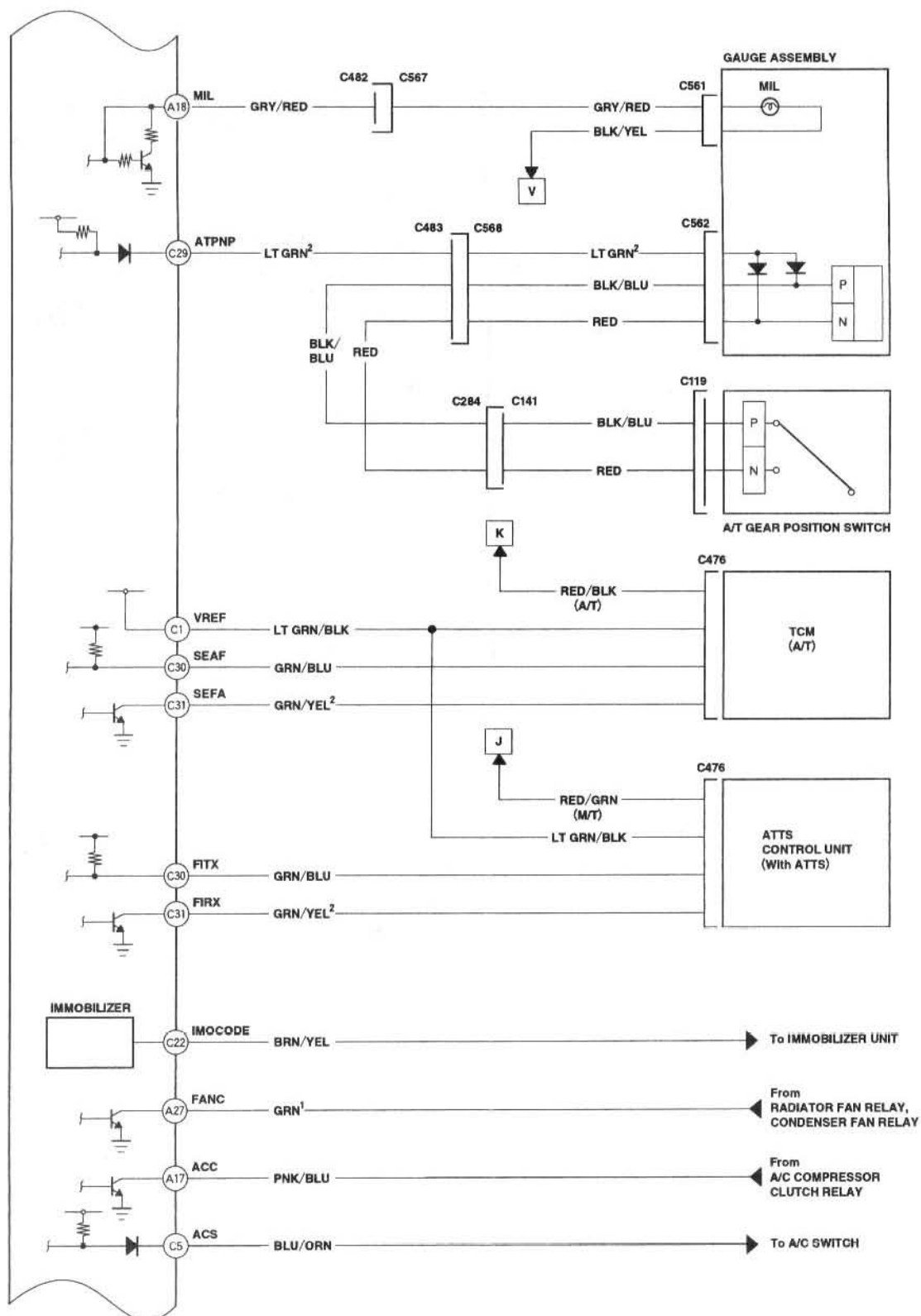


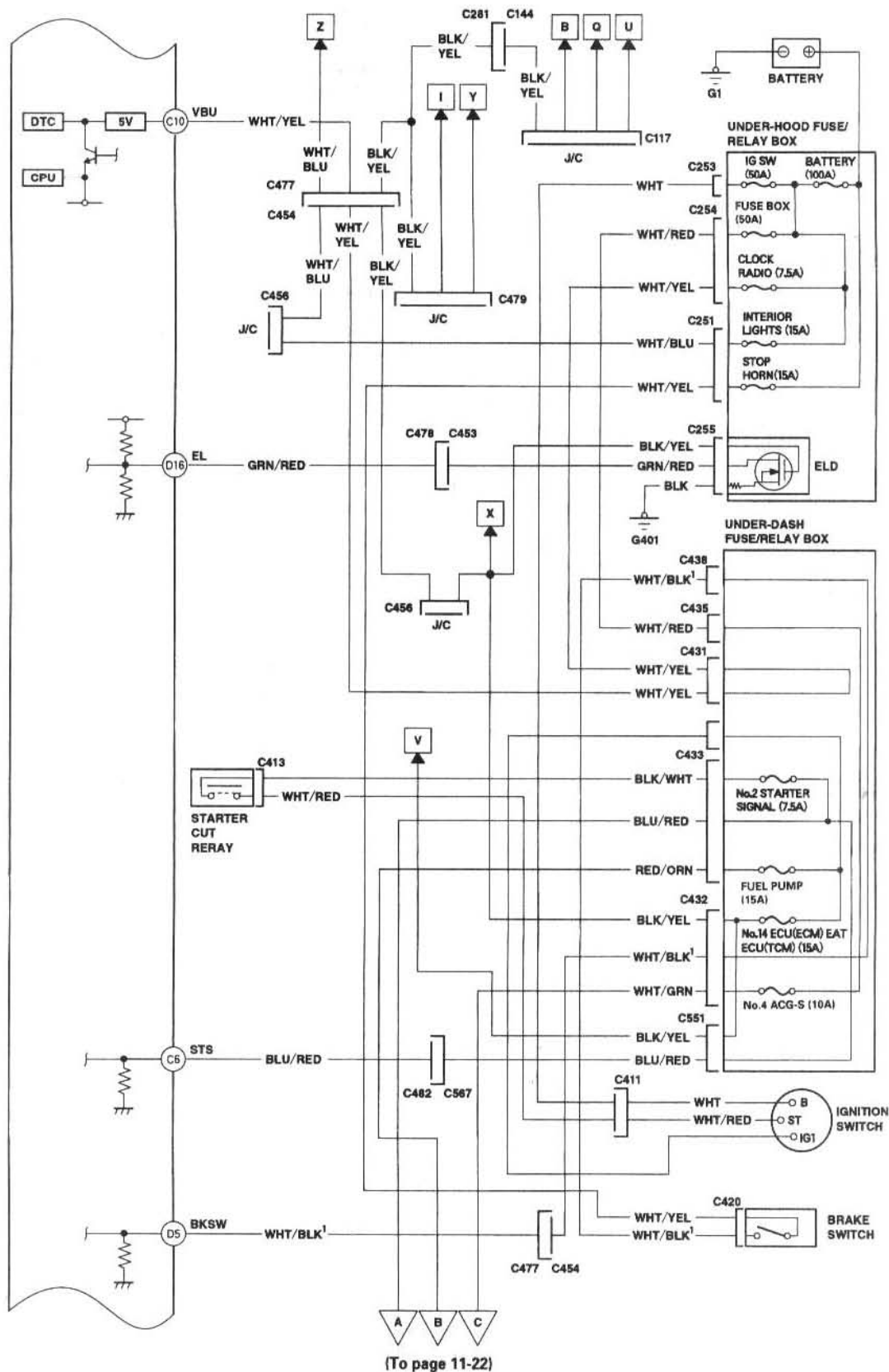
*1: '99 model, '98 model, '97 (California) model

(cont'd)

System Description

Electrical Connections (cont'd)

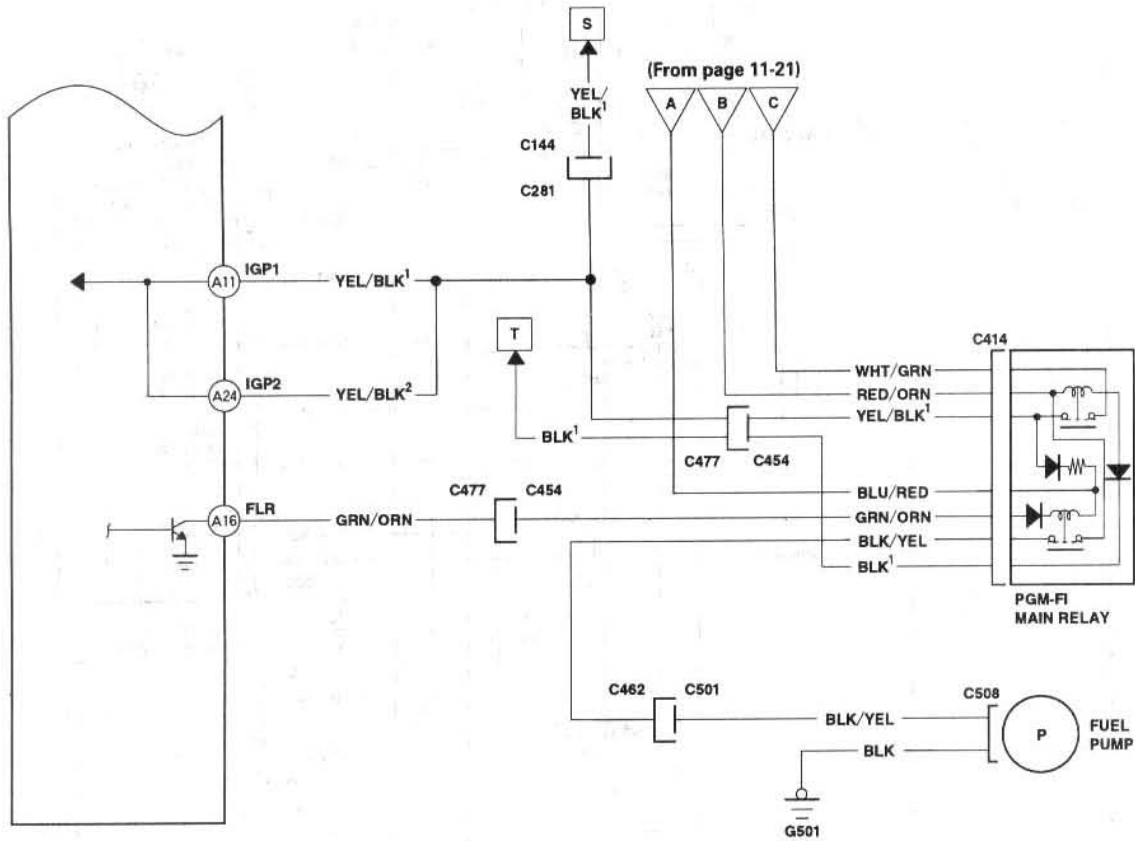




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System Description

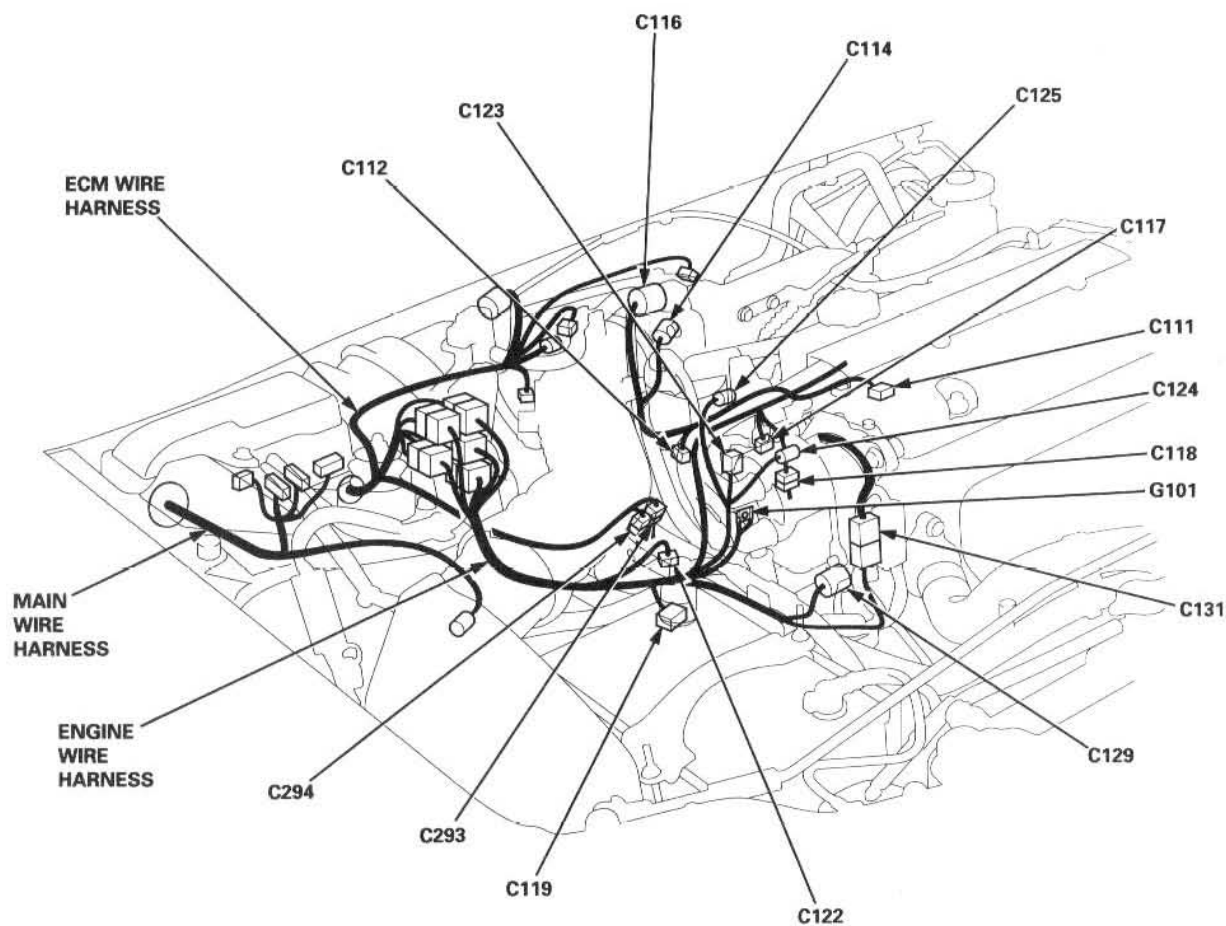
Electrical Connections (cont'd)





System Description

System Connectors [Engine Compartment]



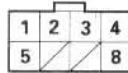


C111



①	RED/BLU ²
---	----------------------

C112



①	YEL/BLK ¹	⑤	YEL/BLK ¹
②	YEL/BLK ¹	6	—
③	YEL/BLK ¹	7	—
④	YEL/BLK ¹	⑧	YEL/BLK ¹

C114



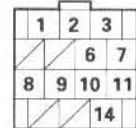
①	GRN/BLK
②	RED/BLK
③	YEL/BLU

C116



①	YEL/RED
②	GRN/WHT ²
③	RED/GRN

C117



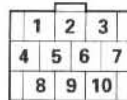
1	BLK/YEL	⑧	GRN/BLK
②	BLK/YEL	⑨	GRN/BLK
③	BLK/YEL	⑩	GRN/BLK
4	—	⑪	GRN/BLK
5	—	12	—
⑥	BLK/YEL	13	—
⑦	BLK/YEL	⑭	GRN/BLK

C118
(Without ATTS)



①	GRN/BLK
②	WHT ²
③	BLK/WHT
④	BLK/YEL

C119
(A/T)



1	GRY	6	GRN
2	PNK	7	YEL
3	RED/WHT	⑧	RED
4	BRN	9	WHT
5	BLU	⑩	BLK/BLU

C122



①	BLK ²
②	BLK/YEL
③	BLU/WHT

C123



①	GRN/YEL ¹
---	----------------------

C124



①	BLU/BLK
②	BRN/BLK ¹

C125



①	WHT/BLK
②	GRN/BLK
③	YEL/BLU

C129



①	GRN/BLK
②	RED/WHT ²

C131



①	YEL/GRN
②	YEL ²
3	GRN
④	BLK ³

C293
(With ATTS)



①	GRN/BLK
②	WHT ²
③	BLK/WHT
④	BLK/YEL

C294



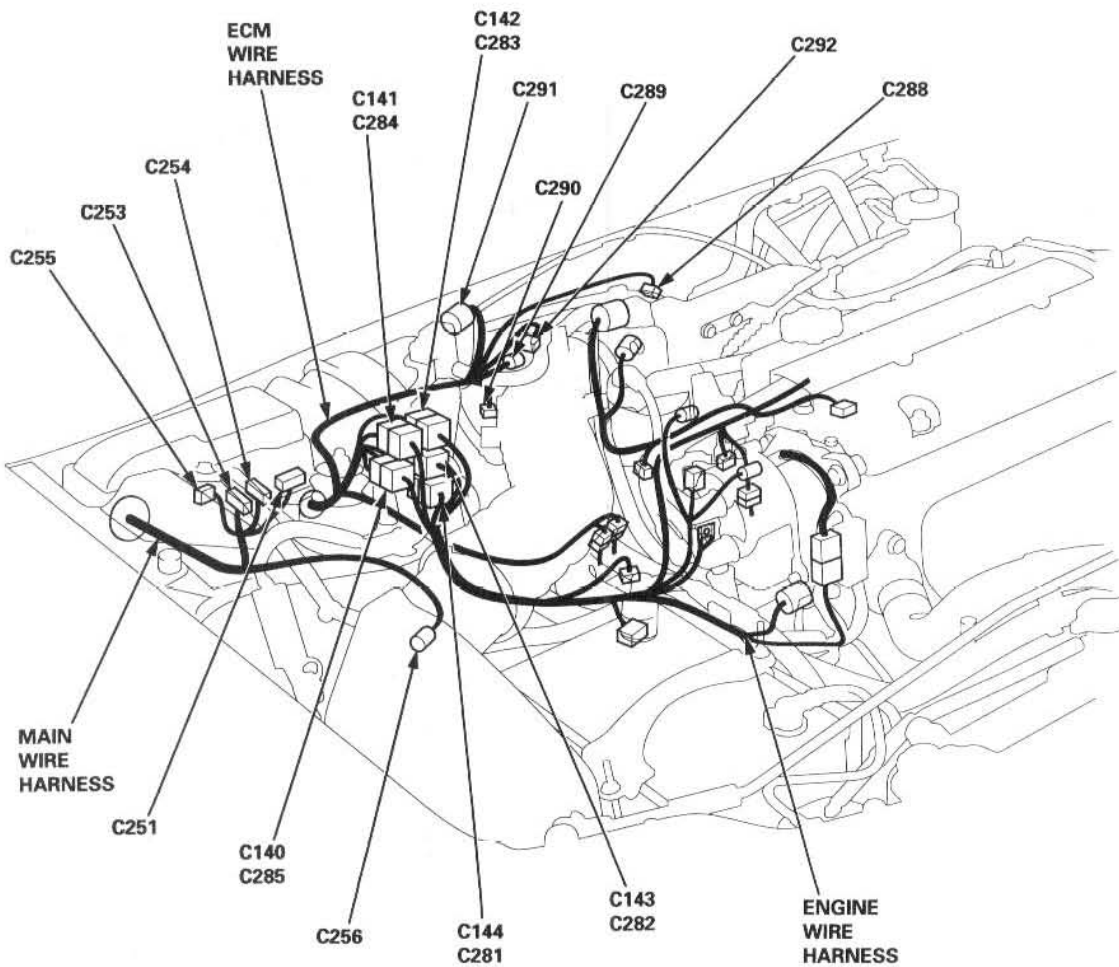
①	GRN/BLK
②	WHT/RED
③	ORN/BLU
④	BLK/YEL

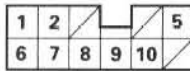
- NOTE: • Different wires with the same color have been given a number suffix to distinguish them (for example, YEL/BLK¹ and YEL/BLK² are not the same).
○: Related to Fuel and Emissions System.
- Connector with male terminals (double outline): View from terminal side
 - Connector with female terminals (single outline): View from wire side

(cont'd)

System Description

System Connectors [Engine Compartment] (cont'd)

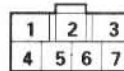


**C251**

1	WHT	7	WHT/GRN
2	RED/GRN	8	BRN/BLK
3	—	9	GRN/ORN
4	—	10	WHT/YEL
5	RED/BLU	11	—
6	WHT/BLU		

C253

①	WHT
2	WHT/GRN
3	WHT/BLK

C254

①	WHT/RED
2	WHT/BLU
3	WHT/BLU
④	WHT/YEL
5	WHT
6	GRN
7	BLK

C255

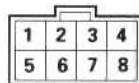
①	BLK
②	GRN/RED
③	BLK/YEL

C256

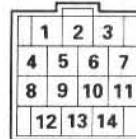
①	WHT ¹
②	BLK/YEL

C281

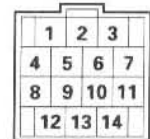
1	GRN	⑧	YEL/GRN
2	YEL/RED	⑨	BLU/WHT
③	BLK/YEL	⑩	BLK ²
④	BRN ¹	⑪	BLK ¹
⑤	RED ¹	⑫	RED/YEL ²
⑥	BLU ¹	13	BLU/BLK
⑦	YEL ¹	⑭	YEL/BLK ¹

C282 (M/T)

1	YEL	5	GRN/BLK
②	BLK/WHT	⑥	YEL/BLU
③	WHT ²	⑦	WHT/BLK ²
④	BRN/BLK ²	⑧	RED/BLU ²

C282 (A/T)

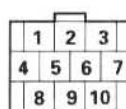
1	GRN/BLK	8	RED
2	GRN/WHT	9	BLU
3	BLU/YEL	10	WHT
④	YEL/BLU	11	GRN
⑤	WHT/BLK ²	⑫	BRN/BLK ²
⑥	BLK/WHT	⑬	WHT ³
7	YEL	⑭	RED/BLU ³

C283

①	BLU ²	8	YEL/GRN
②	GRN ²	9	WHT/BLU
③	YEL ²	⑩	WHT/GRN ²
④	BRN/BLK ¹	⑪	WHT/GRN ¹
⑤	BLK/BLU	⑫	WHT ²
⑥	RED/BLU ¹	⑬	RED ²
⑦	GRN/YEL ¹	⑭	BLK ³

C284 (A/T)

1	BRN	8	GRY
2	BLU	9	PNK
3	GRN	10	BLK
4	YEL	11	RED
⑤	RED	12	WHT
6	WHT	13	BLU/RED
⑦	BLK/BLU	14	WHT/RED

C285

①	GRN/WHT ²	⑥	YEL/BLU
②	RED/GRN	⑦	RED/WHT ²
③	YEL/RED	⑧	BLU/BLK
④	GRN/BLK	⑨	GRN ³
⑤	RED/BLK	10	BLU

C288*1

①	BLK/YEL
②	GRN/WHT ¹

C289*1

①	YEL/BLU
②	GRN/BLK ²
③	WHT/BLU

C290*1

①	BLK/YEL
②	ORN/GRN

C291

①	RED/YEL ¹
②	BLK/YEL

C291*3

①	BLK/YEL
②	RED/YEL ¹

C292*2

①	BRN ²
②	BLK

*1: '99 model, '98 model, '97 (California) model

*2: '97 (49ST, Canada) model

*3: '99 model

NOTE: • Different wires with the same color have been given a number suffix to distinguish them (for example, YEL/BLK¹ and YEL/BLK² are not the same).

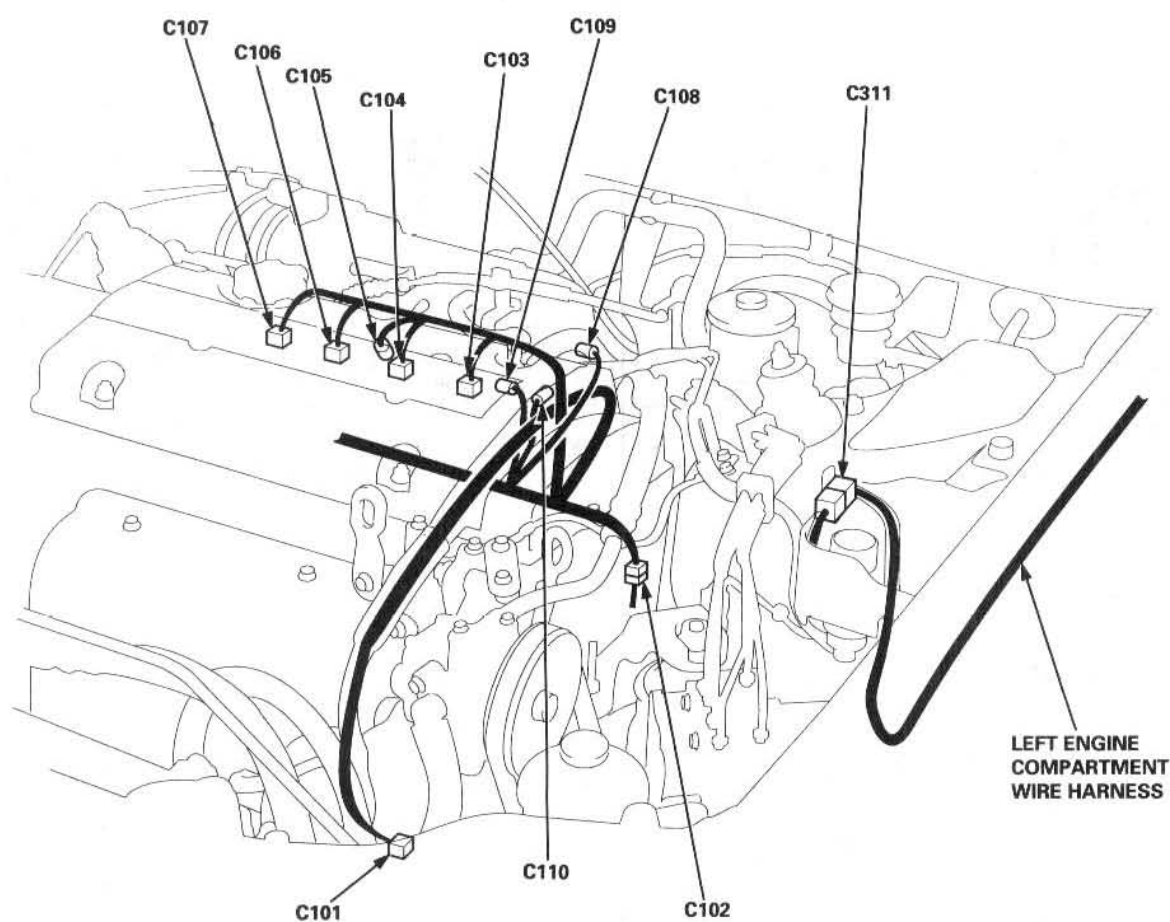
○: Related to Fuel and Emissions System.

- Connector with male terminals (double outline): View from terminal side
- Connector with female terminals (single outline): View from wire side

(cont'd)

System Description

System Connectors [Engine Compartment] (cont'd)





C101



1	BLK/YEL
2	WHT/GRN ¹
3	WHT/BLU
4	WHT/RED

C102



1	GRN ²
2	RED ²
3	BLU ²
4	WHT ²

C103



1	BRN ¹
2	YEL/BLK ¹

C104



1	RED ¹
2	YEL/BLK ¹

C105



1	BLK/BLU
2	YEL/BLK ¹

C106



1	BLU ¹
2	YEL/BLK ¹

C107



1	YEL ¹
2	YEL/BLK ¹

C108



1	GRN/BLK
2	RED/YEL ²

C109



1	BLK/YEL
2	RED/BLU ¹

C110



1	GRN ²
2	BLK ¹

C311

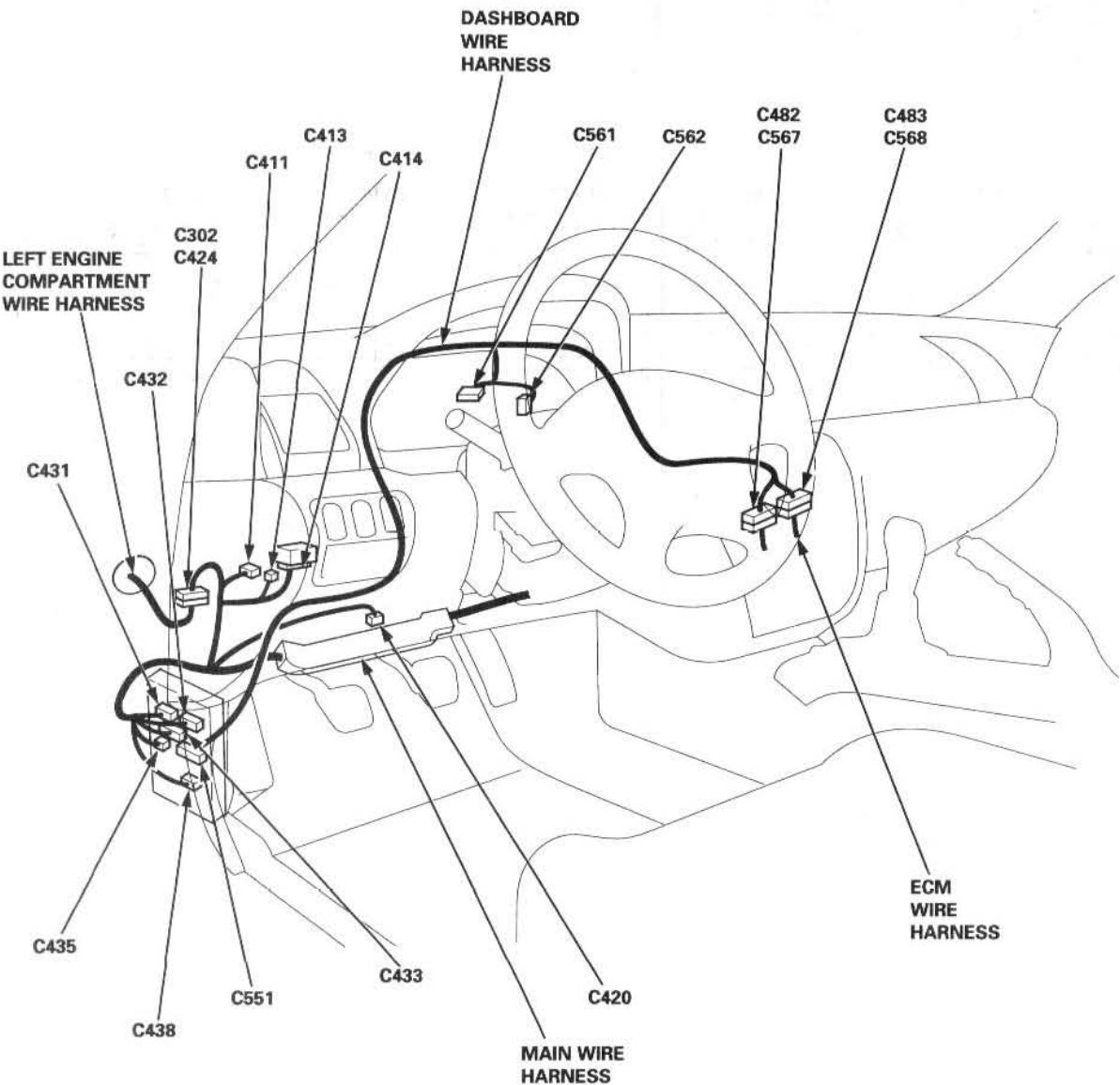


1	ORN
2	BLK/YEL

- NOTE: • Different wires with the same color have been given a number suffix to distinguish them (for example, YEL/BLK¹ and YEL/BLK² are not the same).
 ○: Related to Fuel and Emissions System.
- Connector with male terminals (double outline): View from terminal side
 - Connector with female terminals (single outline): View from wire side

System Description

System Connectors [Dash and Floor]





C411



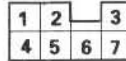
①	WHT/RED
2	—
③	WHT

C413



①	BLK/WHT
2	LT BLU
③	WHT/GRN
4	WHT/GRN

C414



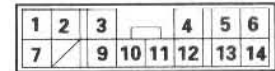
①	GRN/ORN
②	BLU/RED
③	BLK¹
④	BLK/YEL
⑤	RED/ORN
⑥	YEL/BLK¹
⑦	WHT/GRN

C420



1	LT GRN
2	GRY
③	WHT/BLK¹
④	WHT/YEL

C424



①	ORN	8	—
②	BLK/YEL	9	GRN/BLU
3	RED/BLK	10	YEL/WHT
4	ORN/WHT	11	YEL/BLK
5	RED/YEL	12	GRN
6	RFD/YEL	13	WHT
7	RED/WHT*	14	PNK/BLU
7	GRN/RED		

*: Canada

C431



1	WHT/RED	8	BRN/YEL
2	WHT/BLK	9	—
3	YEL	10	—
4	RED/BLU	11	WHT/GRN
⑤	WHT/YEL	12	RED/BLK
⑥	WHT/YEL	13	—
7	BLU/BLK	14	RED/BLK

C432



1	YEL	8	YEL/BLK
2	BLK	9	BLU
3	—	10	WHT/BLU
4	—	11	YEL/BLK
⑤	WHT/GRN	12	—
6	—	13	—
⑦	BLK/YEL	⑭	WHT/BLK¹

C433



1	—	12	YEL
2	GRN/BLU	13	GRN/WHT
3	YEL/RED	14	—
4	YEL/WHT	15	BLK/YEL
5	—	16	BLK
6	GRN/YEL	17	—
⑦	RED/ORN	⑱	BLK/WHT
8	—	⑳	BLU/RED
9	—	20	—
10	BLK	21	—
11	—	22	—

C435



①	WHT/RED
2	BLK/YEL
3	WHT/BLU

C438



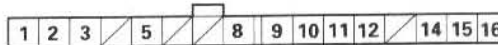
1	YEL/BLK
2	—
3	—
④	WHT/BLK¹

C551



1	GRY/YEL	9	BLU
2	GRY/RED	10	BLK
③	BLU/RED	11	—
4	YEL	12	—
5	—	13	—
6	—	14	—
7	RED/BLK	15	GRN/YEL
⑧	BLK/YEL	16	—

C561



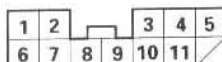
1	RED/YEL	⑨	BLK/YEL
2	ORN/WHT	10	RED
3	BLU/WHT	11	RED/BLK
4	—	12	ORN
5	BLU	13	—
6	—	14	GRN
7	—	15	GRN/ORN
8	BLK	⑩	GRY/RED

C562



1	BLU	9	YEL
2	GRN	10	BLU/BLK
3	BLU/RED	11	BLU/GRN
④	RED	12	BLU/YEL
5	WHT	13	RED
⑥	BLK/BLU	14	RED/BLK
⑦	LT GRN²	15	BLK
8	—	16	BRN

**C567
(With ATTS)**



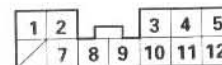
1	YEL/RED	7	WHT/RED
②	BLU/RED	8	BLU/WHT
③	GRY/RED	9	WHT/BLU
4	PNK	10	YEL/GRN
5	YEL/RED	11	YEL
6	RED/BLK	12	—

**C567
(Without ATTS)**



1	YEL/RED	6	WHT/RED
②	BLU/RED	7	BLU/WHT
③	GRY/RED	8	WHT/BLU
4	RED	9	YEL/GRN
5	RED/BLK	10	YEL

C568



1	BLU/RED	7	BLU/YEL
2	BLU	8	BLU/GRN
3	BRN	9	BLU/BLK
4	GRN	⑩	LT GRN²
⑤	RED	⑪	BLK/BLU
6	—	12	WHT

NOTE: ● Different wires with the same color have been given a number suffix to distinguish them (for example, YEL/BLK¹ and YEL/BLK² are not the same).

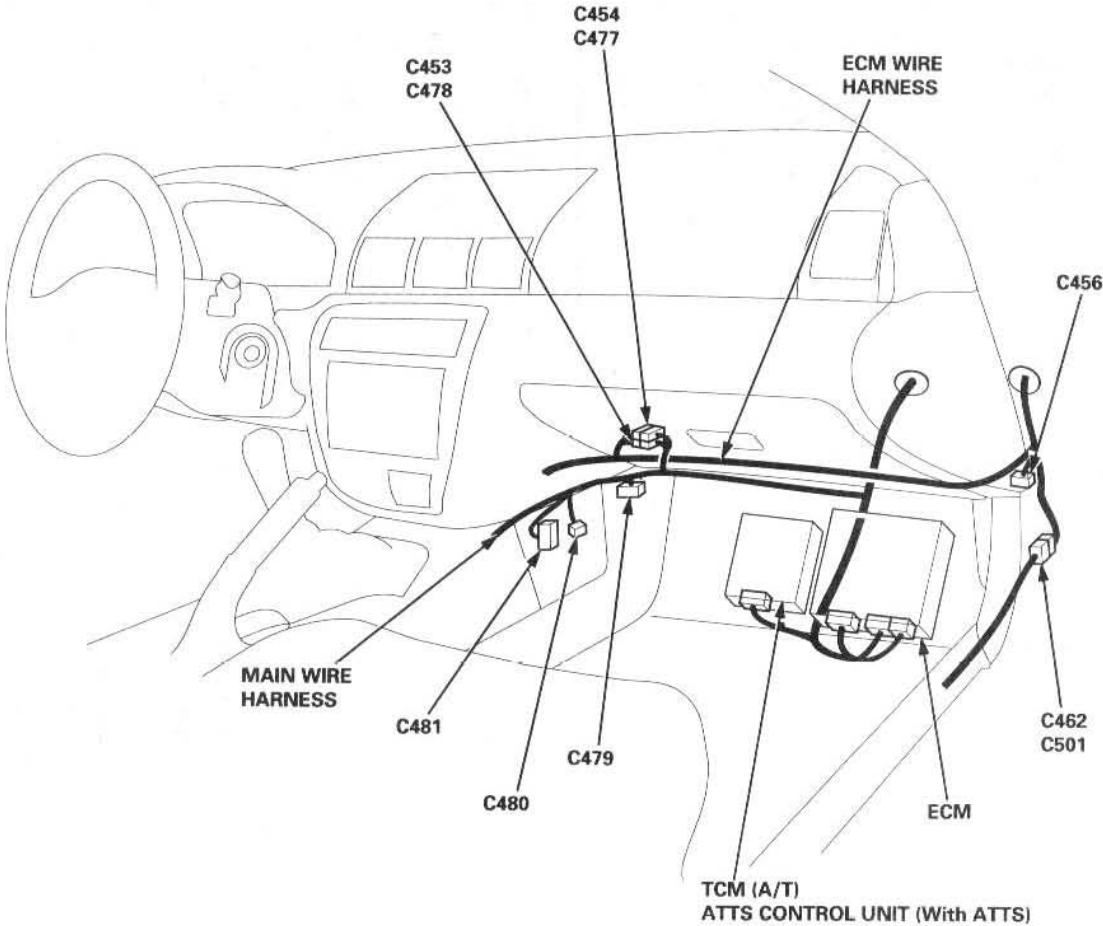
○: Related to Fuel and Emissions System.

- Connector with male terminals (double outline): View from terminal side
- Connector with female terminals (single outline): View from wire side

(cont'd)

System Description

System Connectors [Dash and Floor] (cont'd)





C456

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20

1	YEL/BLK	⑪	WHT/BLU
2	YEL/BLK	⑫	WHT/BLU
3	YEL/BLK	13	WHT/BLU
4	ORN/WHT	⑭	BLK/YEL
5	ORN/WHT	⑮	BLK/YEL
6	ORN/WHT	16	BLK/YEL
7	GRN/RED	17	WHT/YEL
8	GRN/RED	18	WHT/YEL
9	GRN/RED	19	WHT/YEL
10	GRN/RED	20	WHT/YEL

C462

1	2	3	4	5	6	7	8	9	10	11
12	13	14	15	16	17	18	19	20	21	22

1	—	⑫	BLK/YEL
2	RED/YEL	13	BRN/WHT
3	WHT/BLU	14	GRN
4	WHT/BLK	15	BLK/GRN
5	GRN/ORN	16	BLU/YEL
6	LT GRN/RED	17	GRY/WHT
7	YEL/BLU	18	GRN/YEL
8	ORN	19	GRN/BLU
9	RED/BLK	20	—
10	LT BLU	21	GRY
11	GRN/YEL	22	BLU/YEL

C477

1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18

1	BLU/WHT	11	BLU
2	RED/WHT	⑫	WHT¹
3	BLU/ORN	⑬	WHT/BLK¹
4	PNK/BLU	⑭	GRN/ORN
⑤	WHT/YEL	15	GRN
6	YEL/RED	⑮	BLK¹
7	BRN/BLK	⑯	YEL/BLK¹
8	BRN/WHT	18	WHT/RED
9	BRN	⑰	WHT/BLU
⑩	BLK/YEL	20	GRN/RED

C478
(M/T: Without ATTS)

1	2	3	4	5	6
3	4	5	6		

1	—
2	LT GRN/RED
3	BRN/YEL
4	GRN/BLK
⑤	GRN/RED
⑥	ORN

C478
(M/T: With ATTS)

1	2	3	4	5	6	7	8	9	10	11
12	13	14	15	16	17	18	19	20	21	22

1	RED/BLU	12	GRN/BLK
2	ORN/GRN	⑬	ORN
3	GRN/RED	14	LT GRN/RED
4	BLU/GRN	⑮	GRN/RED
5	YEL/WHT	16	YEL/RED
6	BLU/ORN	17	YEL
7	GRY/RED	18	GRN/BLK
8	GRY/WHT	19	YEL/BLU
9	WHT/BLU	20	BRN/YEL
10	WHT/RED	21	YEL/BLK
11	YEL/RED	22	GRN

C478
(A/T)

1	2	3	4	5	6	7	8	9	10	11
14	13	14	15	16	17	18	19	20	21	22

1	—	12	PNK
2	—	⑬	ORN
3	—	14	LT GRN/RED
4	BLK/BLU	⑮	GRN/RED
5	WHT	16	—
6	GRY	17	—
7	—	18	—
8	WHT/RED	19	—
9	WHT/GRN	20	BRN/YEL
10	GRN/YEL	21	—
11	YEL/RED	22	—

C479

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20

1	BLK/YEL	11	YEL/BLU
②	BLK/YEL	⑫	YEL/BLU
③	BLK/YEL	⑬	YEL/BLU
④	BLK/YEL	⑭	YEL/BLU
5	BLU/WHT	⑮	BRN/BLK²
6	BLU/WHT	⑯	BRN/BLK²
7	BLU/WHT	17	BRN/BLK
⑧	GRN/BLK	⑰	BRN/BLK²
⑨	GRN/BLK	19	BRN/BLK
⑩	GRN/BLK	⑳	BRN/BLK²

C480

1	2
---	---

①	RED/WHT¹
②	GRN/BLK

C481

1	2	3	4	5	6	7	8
12	13	14	15	16	17	18	19

1	—	9	—
2	—	10	—
3	—	11	—
4	—	⑫	BLK
5	—	⑬	BRN/BLK²
⑥	LT GRN/RED	14	—
7	—	⑮	LT GRN¹
⑧	WHT/BLU	16	—

NOTE: • Different wires with the same color have been given a number suffix to distinguish them (for example, YEL/BLK¹ and YEL/BLK² are not the same).

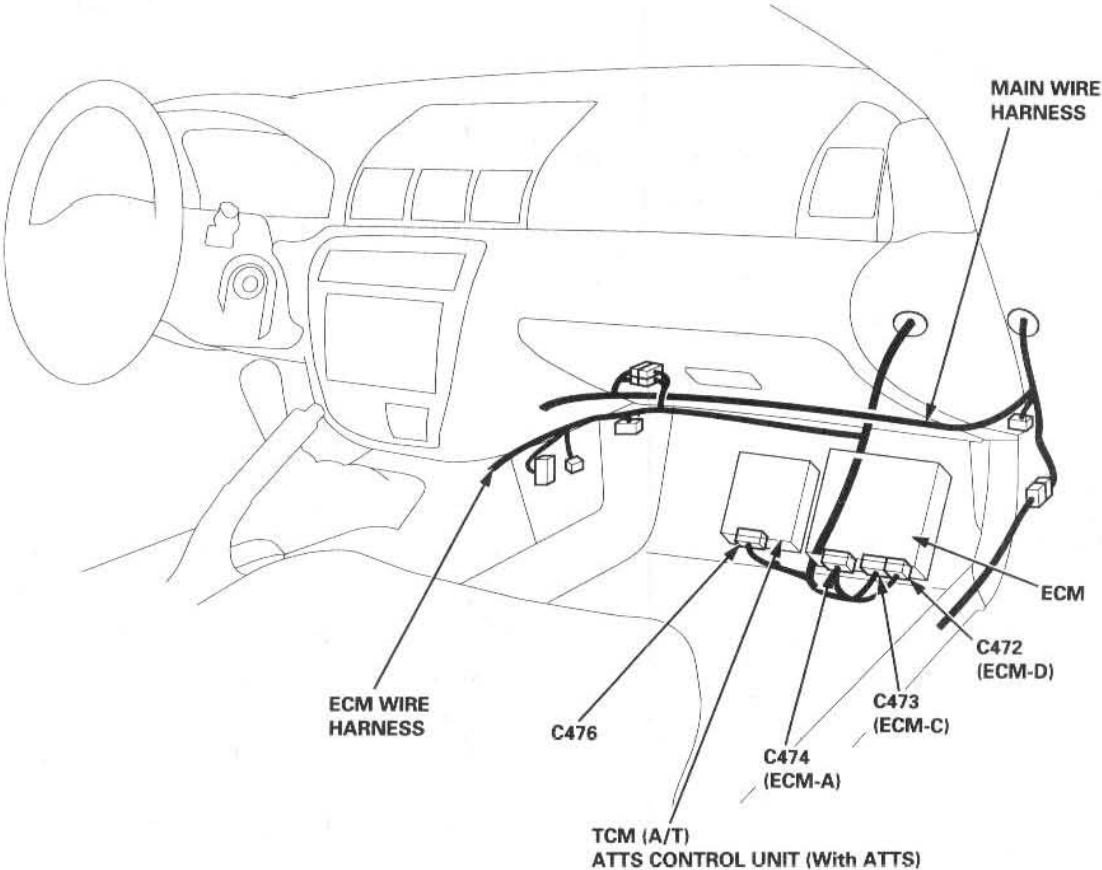
○: Related to Fuel and Emissions System.

- Connector with male terminals (double outline): View from terminal side
- Connector with female terminals (single outline): View from wire side

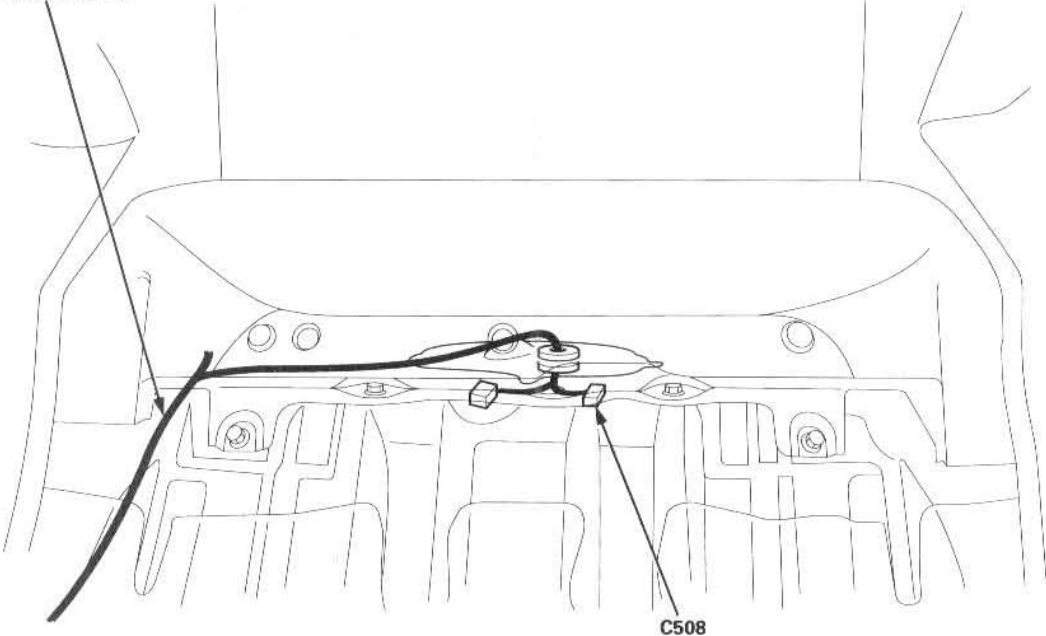
(cont'd)

System Description

System Connectors [Dash and Floor] (cont'd)



RIGHT SIDE
WIRE HARNESS





C472 (ECM-D)

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20

① RED/BLK	⑨ WHT/BLK ²
② RED/WHT ²	⑩ YEL/BLU
③ RED/GRN	⑪ GRN/BLK
④ YEL/RED	⑫ GRN/WHT ²
⑤ WHT/BLK ¹	⑬ —
⑥ RED/BLU ²	⑭ WHT/RED
⑦ WHT ²	⑮ WHT/BLU ^{*1}
⑧ RED/YEL ²	⑯ GRN/RED

*1: '98 model, '97 (California) model

C473 (ECM-C)

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40

① LT GRN/BLK	⑫ WHT ²	⑬ —
② BLU ²	⑭ RED ²	⑮ —
③ GRN ²	⑯ BLK ²	⑰ —
④ YEL ²	⑱ BLU/BLK	⑲ —
⑤ BLU/ORN	⑳ GRN ³	㉑ —
⑥ BLU/RED	㉒ WHT/GRN	㉓ —
⑦ RED/WHT ¹	㉔ BLU/WHT	㉕ LT GRN ²
⑧ LT GRN ¹	㉖ —	㉗ GRN/BLU
⑨ —	㉘ BRN ²	㉙ GRN/YEL ²
⑩ WHT/YEL	㉚ —	
⑪ —	㉛ BRN/YEL	

C474 (ECM-A)

1	2	3	4	5	6	7	8	9	10	11
12	13	14	15	16	17	18	19	20	21	22
23	24	25	26	27	28	29	30	31	32	33
34	35	36	37	38	39	40	41	42	43	44

① YEL ¹	⑫ BLK/BLU	⑬ BLK ²
② BLU ¹	⑭ —	⑮ YEL/BLK ²
③ RED ¹	⑯ —	⑰ WHT ¹
④ BRN ¹	⑱ RED/YEL ¹	⑲ RED/BLU ¹
⑤ ORN/BLU	⑳ GRN/ORN	㉑ GRN ¹
⑥ BLK/WHT	㉒ PNK/BLU	㉓ GRN/WHT ^{*1}
⑦ ORN	㉔ GRY/RED	㉕ ORN/GRN ^{*1}
⑧ GRN/YEL ¹	㉖ WHT/GRN ¹	㉗ —
⑨ BRN/BLK ¹	㉘ YEL/GRN	㉙ —
⑩ BLK ¹	㉚ —	㉛ —
⑪ YEL/BLK ¹	㉜ BRN/BLK ²	

*1: '98 model, '97 (California) model

C476 (A/T)

1	2	3	4	5	6	7	8	9	10	11
12	13	14	15	16	17	18	19	20	21	22

1 RED	12 WHT/BLK
2 —	13 BLK/RED
3 —	14 BLU/BLK
④ RED/BLK	15 BLU/YEL
5 BLU/WHT	16 WHT/BLU
6 —	17 WHT
7 LT GRN/RED	⑱ GRN/BLU
8 GRN	⑲ GRN/YEL ²
9 BLU	㉑ LT GRN/BLK
10 RED	21 WHT
11 BLU/RED	22 WHT/RED

C476 (M/T: With ATTS)

1	2	3	4	5	6	7	8	9	10	11
12	13	14	15	16	17	18	19	20	21	22

1 YEL/RED	12 BRN/BLK
2 GRY	13 BRN
3 PNK	14 —
4 —	15 RED/GRN
5 RED/BLK	16 —
6 GRN/RED	⑱ LT GRN/BLK
7 —	18 YEL
8 GRN	⑲ GRN/YEL ²
⑨ GRN/BLU	㉑ RED/GRN
10 ORN/GRN	21 BLK
11 —	22 YEL/BLK

C508

1
2

① BLK
② BLK/YEL

NOTE: • Different wires with the same color have been given a number suffix to distinguish them (for example, YEL/BLK¹ and YEL/BLK² are not the same).

○: Related to Fuel and Emissions System.

- Connector with male terminals (double outline): View from terminal side
- Connector with female terminals (single outline): View from wire side

Troubleshooting

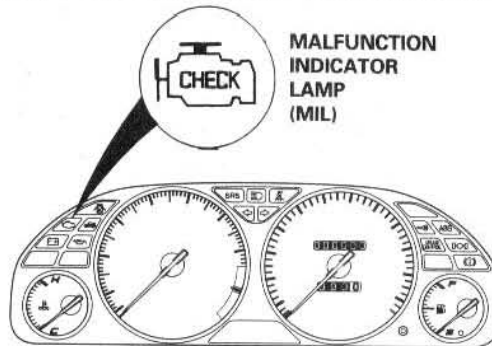
Troubleshooting Procedures

I. How To Begin Troubleshooting

When the Malfunction indicator Lamp (MIL) has been reported on, or there is a driveability problem, use the appropriate procedure below to diagnose and repair the problem.

A. When the MIL has come on:

1. Connect the Honda PGM Tester or an OBD II scan tool to the 16P Data Link Connector (DLC) located on the right side of the center console behind the access cover.
2. Turn the ignition switch ON (II).
3. Check the DTC and note it. Also check and note the freeze frame data.
Refer to the Diagnostic Trouble Code Chart and begin troubleshooting.



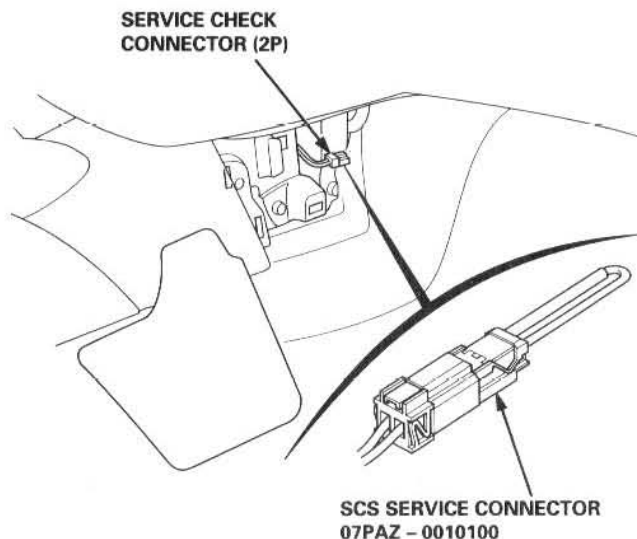
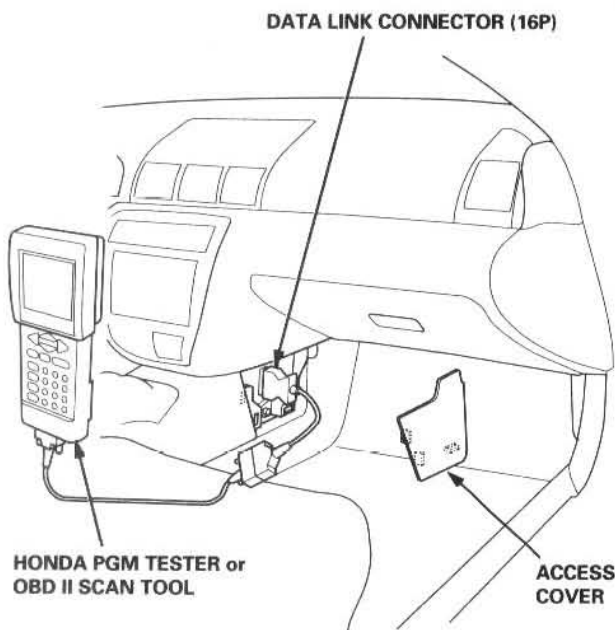
NOTE:

- See the OBD II scan tool or Honda PGM Tester user's manuals for specific operating instructions.
- The scan tool or tester can read the Diagnostic Trouble Codes (DTC), freeze frame data, current data, and other Engine Control Module (ECM) data.
- Freeze frame data indicates the engine conditions when the first malfunction, misfire or fuel trim malfunction was detected. It can be useful information when troubleshooting.

B. When the MIL has not come on, but there is a driveability problem, refer to the Symptom Chart on page 11-40.

C. DTCs will be indicated by the blinking of the Malfunction Indicator Lamp (MIL) with the SCS service connector connected.

Connect the SCS service connector to Service Check Connector as shown. (The 2P Service Check Connector is located on the right side of the center console under the access cover.) Turn the ignition switch ON (II).





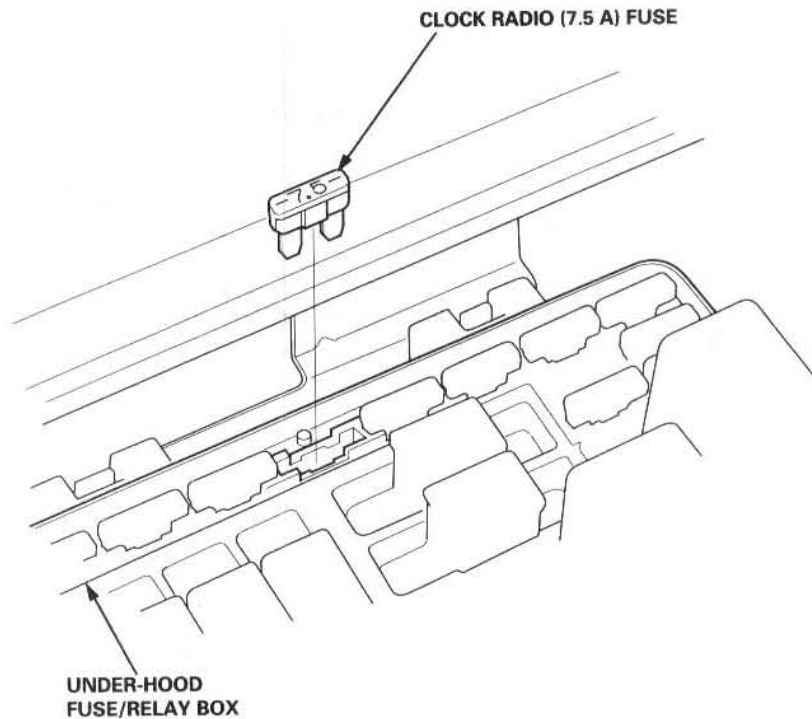
II. Engine Control Module (ECM) Reset Procedure

Either of the following actions will reset the ECM.

- Use the OBD II scan tool or Honda PGM Tester to clear the ECM's memory.

NOTE: See the OBD II scan tool or Honda PGM Tester user's manuals for specific operating instructions.

- Turn the ignition switch OFF. Remove the CLOCK RADIO (7.5 A) fuse from the under-hood fuse/relay box for 10 seconds.



III. Final Procedure (this procedure must be done after any troubleshooting)

1. Remove the SCS Service Connector if it is connected.

NOTE: If the SCS service connector is connected, and there are no DTCs stored in the ECM, the MIL will stay on when the ignition switch is turned ON (II).

2. Do the ECM Reset Procedure.
3. Turn the ignition switch OFF.
4. Disconnect the OBD II scan tool or Honda PGM Tester from the Data Link Connector (16P).

IV. Known-Good ECM Substitution

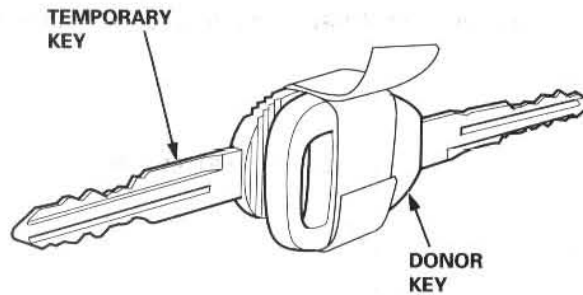
Use the following procedure if you need a known-good ECM to test a vehicle. It allows you to swap an ECM from a "donor" vehicle without having to program it to the test vehicle's ignition key.

(cont'd)

Troubleshooting

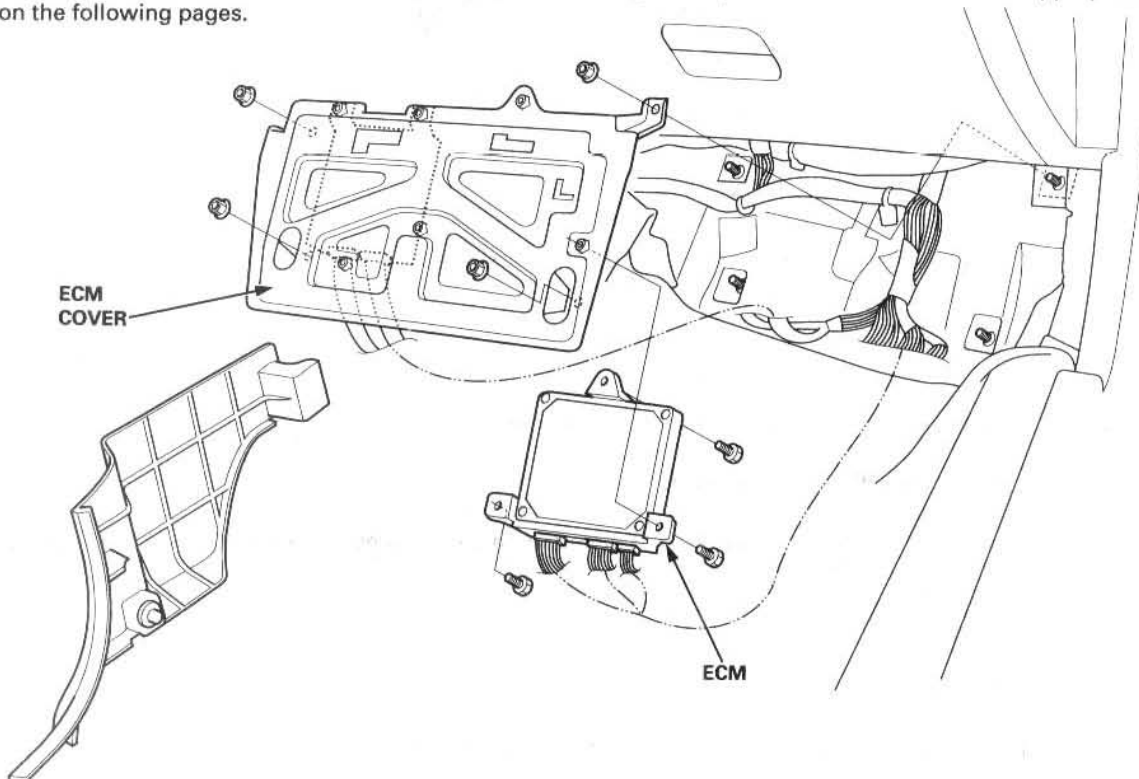
Troubleshooting Procedures (cont'd)

1. Cut a temporary ignition key for the test vehicle with a non-immobilizer key blank.
2. Remove the ECM from the test vehicle.
3. Write the test vehicle's VIN on the ECM you just removed to avoid confusing it with the donor vehicle's ECM.
4. Remove the known-good ECM from the donor vehicle, and install it in the test vehicle.
5. Tape the donor vehicle's ignition key head-to-head to the test vehicle's temporary key. The ECM will recognize the code from the donor vehicle's key and allow you to start the engine with the temporary key.



6. After completing your tests reinstall both ECMs, and destroy the temporary key.

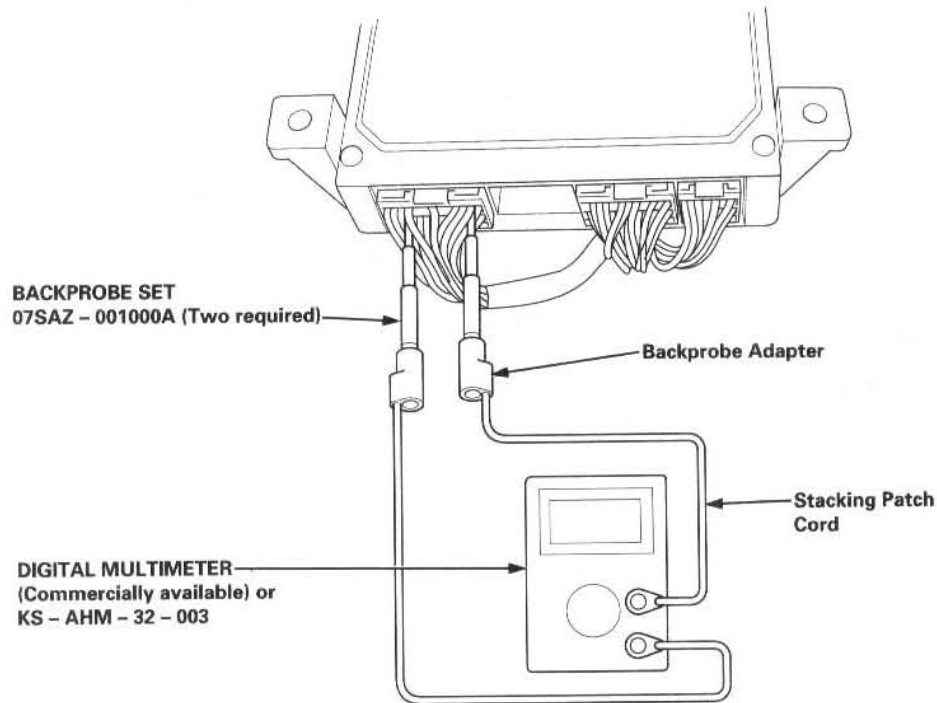
If the inspection for a particular code requires voltage or resistance checks at the ECM connectors, remove the right door sill molding. Pull the carpet back to expose the ECM. Unbolt the ECM cover, and connect the backprobe sets and a digital multimeter as described below. Check the system according to the procedure described for the appropriate code(s) listed on the following pages.





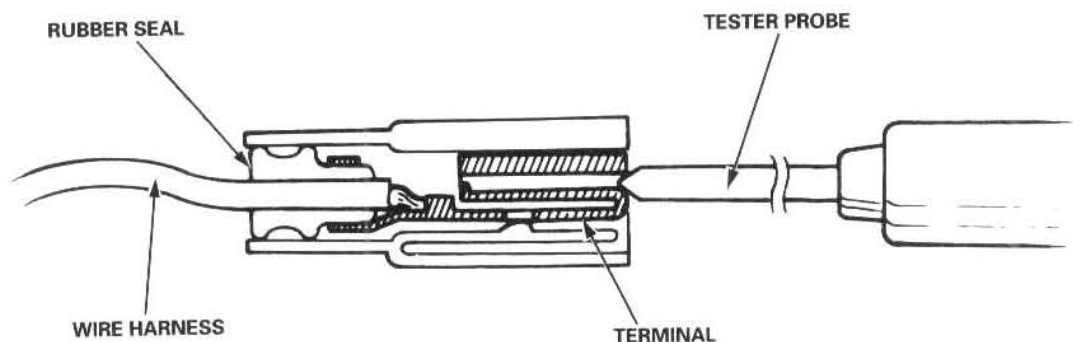
How to Use the Backprobe Sets

Connect the backprobe adapters to the stacking patch cords, and connect the cords to a multimeter. Using the wire insulation as a guide for the contoured tip of the backprobe adapter, gently slide the tip into the connector from the wire side until it comes in contact with terminal end of the wire.



CAUTION:

- Puncturing the insulation on a wire can cause poor or intermittent electrical connections.
- Bring the tester probe into contact with the terminal from the terminal side of wire harness connectors in the engine compartment. For female connectors, just touch lightly with the tester probe and do not insert the probe.



(cont'd)

Troubleshooting

Troubleshooting Procedures (cont'd)

Symptom Chart

Listed below are symptoms and probable causes for problems that DO NOT cause the Malfunction indicator Lamp (MIL) to come on. If the MIL was reported on, go to page 11-36.

Troubleshoot each probable cause in the order listed (from left to right) until the symptom is eliminated.

The probable cause and troubleshooting page reference can be found below.

*: '99 model

SYMPTOM	PROBABLE CAUSE
Engine will not start	4, 2, 3, 5, 21, 15, 1
Hard starting	2, 4, 12, 17, 14, 20
Cold fast idle too low	7, 8, 9, 6, 17
Cold fast idle too high	7, 8, 9, 11, 10
Idle speed fluctuates	9, 7, 8, 11, 10
Misfire or rough running	Troubleshoot for misfire on pages 11-83, 86
Low power	2, 10, 11, 13, 18, 17, 19, 21
Engine stalls	2, 4, 12, 7, 21, 9, 5, 16
Difficult to refuel*	20, 22
Fuel overflows during refueling*	20, 22

Other Probable Causes for an engine that will not start:

- Intake air leakage
- Engine locked up
- Timing belt
- Starting system
- Overheating
- Battery

Probable Cause List (For the DTC Chart, see page 11-46.)

*: '99 model

Probable Cause	Page	System
1	11-54	Engine Control Module (ECM)
2	11-123	Fuel pressure
3	11-134	PGM-FI main relay
4	Section 4	Ignition system
5	11-88, 95	Crankshaft Position/Top Dead Center/Cylinder Position sensor circuit
6	11-62	Intake Air Temperature (IAT) sensor circuit
7	11-103	Idle Air Control (IAC) Valve
8	11-114	Fast idle thermo valve
9	11-115	Idle speed adjustment
10	11-140	Throttle body
11	11-139	Throttle cable
12	11-58	Manifold Absolute Pressure (MAP) sensor
13	11-68	Throttle Position (TP) sensor
14	11-91	Barometric pressure (BARO) sensor
15	11-112	A/T gear position signal
16	11-111	Brake switch signal
17	11-138	Air Cleaner
18	11-142	Intake control system, intake air pipe
19	11-150	Three Way Catalytic Converter (TWC)
20	11-161	Evaporative emission (EVAP) control
21	—	Contaminated fuel
22*	11-194	ORVR vent shut valve



ECM Data

By connecting the OBD II scan tool or the Honda PGM Tester to the 16P data link connector (DLC), various data can be retrieved from the ECM. The items listed in the table below conform to the SAE recommended practice.

The Honda PGM Tester also reads data beyond that recommended by SAE.

Understanding this data will help to find the causes of intermittent failures or engine problems.

NOTE:

- The “operating values” given below are approximate values and may be different depending on the environment and the individual vehicle.
- Unless noted otherwise, “at idle speed” means idling with the engine completely warmed up, A/T in position **P** or **N**, M/T in neutral, and the A/C and all accessories turned off.

Data	Description	Operating Value	Freeze Data
Diagnostic Trouble Code (DTC)	If the ECM detects a problem, it will store it as a code consisting of one letter and four numbers. Depending on the problem, an SAE-defined code (P0xxx) or a Honda-defined code (P1xxx) will be output to the tester.	If no problem is detected, there is no output.	YES
Engine Speed	The ECM computes engine speed from the signals sent from the Crankshaft Position sensor. This data is used for determining the time and amount of fuel injection.	Nearly the same as tachometer indication At idle speed: 700 ± 50 rpm	YES
Vehicle Speed	The ECM converts pulse signals from the Vehicle Speed Sensor (VSS) into speed data.	Nearly the same as speedometer indication	YES
Manifold Absolute Pressure (MAP)	The absolute pressure caused in the intake manifold by engine load and speed.	With engine stopped: Nearly the same as atmospheric pressure At idle speed: 21 – 41 kPa (160 – 310 mmHg, 6.3 – 12.2 inHg)	YES
Engine Coolant Temperature (ECT)	The ECT sensor converts coolant temperature into voltage and signals the ECM. The sensor is a thermistor whose internal resistance changes with coolant temperature. The ECM uses the voltage signals from the ECT sensor to determine the amount of injected fuel.	With cold engine: Same as ambient temperature and IAT With engine warmed up: approx. 158 – 212°F (70 – 100°C)	YES
Heated Oxygen Sensor (HO2S) (Primary, Sensor 1) (Secondary Sensor 2)	The Heated Oxygen Sensor detects the oxygen content in the exhaust gas and sends voltage signals to the ECM. Based on these signals, the ECM controls the air/fuel ratio. When the oxygen content is high (that is, when the ratio is leaner than the stoichiometric ratio), the voltage signal is lower. When the oxygen content is low (that is, when the ratio is richer than the stoichiometric ratio), the voltage signal is higher.	0.0 – 1.25 V At idle speed: about 0.1 – 0.9 V	YES (Sensor 1)

(cont'd)

Troubleshooting

Troubleshooting Procedures (cont'd)

Data	Description	Operating Value	Freeze Data
HO2S Feedback Loop Status	Loop status is indicated as "open" or "closed". Closed: Based on the HO2S output, the ECM determines the air/fuel ratio and controls the amount of injected fuel. Open: ignoring HO2S output, the ECM refers to signals from the TP, MAP, and ECT sensors to control the amount of injected fuel.	At idle speed: closed	YES
Short Term Fuel Trim	The air/fuel ratio correction coefficient for correcting the amount of injected fuel when HO2S feedback is in the closed loop status. When the signal from the HO2S is weak, short term fuel trim gets higher, and the ECM increases the amount of injected fuel. The air/fuel ratio gradually gets richer, causing a higher HO2S output. Consequently, the short term fuel trim is lowered, and the ECM reduces the amount of injected fuel. This cycle keeps the air/fuel ratio close to the stoichiometric ratio when in closed loop status.	$\pm 20\%$	YES
Long Term Fuel Trim	Long term fuel trim is computed from short term fuel trim and indicates changes occurring in the fuel supply system over a long period. If long term fuel trim is higher than 1.00, the amount of injected fuel must be increased. If it is lower than 1.00, the amount of injected fuel must be reduced.	$\pm 20\%$	YES
Intake Air Temperature (IAT)	The IAT sensor converts intake air temperature into voltage and signals the ECM. When intake air temperature is low, the internal resistance of the sensor increases, and the voltage signal is higher.	With cold engine: Same as ambient temperature and ECT	YES
Throttle Position	Based on the accelerator pedal position, the opening angle of the throttle valve is indicated.	At idle speed: approx. 10 %	YES
Ignition Timing	Ignition timing is the ignition advance angle set by the ECM. The ECM matches ignition timing to the driving conditions.	At idle speed: $15^\circ \pm 2^\circ$ BTDC with the SCS service connector connected.	NO
Calculated Load Value (CLV)	CLV is the engine load calculated from the MAP data.	At idle speed: 21 – 41 % At 2,500 rpm with no load: 13 – 26%	YES



Engine Control Module Terminal Arrangement

ECM CONNECTOR A (32P)

1	2	3	4	5	6	7	8	9	10	11
INJ4	INJ3	INJ2	INJ1	SO2S HTC	PO2S HTC	ESOL	VTS	LG1	PG1	IGP1
12			15	16	17	18	19	20	22	23
IACV			PCS	FLR	ACC	MIL	ALTC	ICM	LG2	PG2
			25	26	27	28	29			24
			IC SOL	IAB SOL	FANC	2WBS	VSV			IGP2

ECM CONNECTOR A (32P)

Wire side of female terminals

NOTE: Standard battery voltage is 12 V.

Terminal number	Wire color	Terminal name	Description	Signal
1	YEL	INJ4 (No. 4 FUEL INJECTOR)	Drives No. 4 fuel injector.	With engine running: duty controlled
2	BLU	INJ3 (No. 3 FUEL INJECTOR)	Drives No. 3 fuel injector.	
3	RED	INJ2 (No. 2 FUEL INJECTOR)	Drives No. 2 fuel injector.	
4	BRN	INJ1 (No. 1 FUEL INJECTOR)	Drives No. 1 fuel injector.	
5	ORN/BLU	SO2SHTC (SECONDARY HEATED OXYGEN SENSOR HEATER CONTROL)	Drives secondary heated oxygen sensor heater.	With ignition switch ON (II): battery voltage With fully warmed up engine running: 0 V
6	BLK/WHT	PO2SHTC (PRIMARY HEATED OXYGEN SENSOR HEATER CONTROL)	Drives primary heated oxygen sensor heater.	With ignition switch ON (II): battery voltage With fully warmed up engine running: 0 V
7	ORN	ESOL (EGR CONTROL SOLENOID VALVE)	Drives EGR control solenoid valve.	With EGR operating during driving with fully warmed up engine: duty controlled With EGR not operating: battery voltage
8	GRN/YEL	VTS (VTEC SOLENOID VALVE)	Drives VTEC solenoid valve.	With engine at low rpm: 0 V With engine at high rpm: battery voltage
9	BRN/BLK	LG1 (LOGIC GROUND)	Ground for the ECM control circuit.	Less than 1.0 V at all times
10	BLK	PG1 (POWER GROUND)	Ground for the ECM power circuit.	
11	YEL/BLK	IGP1 (POWER SOURCE)	Power source for the ECM control circuit.	With ignition switch ON (II): battery voltage With ignition switch OFF: 0 V
12	BLK/BLU	IACV (IDLE AIR CONTROL VALVE)	Drives IACV.	With engine running: duty controlled
15	RED/YEL	PCS (EVAP PURGE CONTROL SOLENOID VALVE)	Drives EVAP purge control solenoid valve.	With engine running, engine coolant below 167°F (75°C) [122°F (50°C)]*: battery voltage With engine running, engine coolant above 167°F (75°C) [122°F (50°C)]*: 0 V
16	GRN/ORN	FLR (FUEL PUMP RELAY)	Drives fuel pump relay.	0 V for two seconds after turning ignition switch ON (II), then battery voltage
17	PNK/BLU	ACC (A/C CLUTCH RELAY)	Drives A/C clutch relay.	With compressor ON: 0 V With compressor OFF: battery voltage
18	GRY/RED	MIL (MALFUNCTION INDICATOR LAMP)	Drives MIL.	With MIL turned ON: 0 V With MIL turned OFF: battery voltage
19	WHT/GRN	ALTC (ALTERNATOR CONTROL)	Sends alternator control signal.	With fully warmed-up engine running: battery voltage During driving with small electrical load: 0 V
20	YEL/GRN	ICM (IGNITION CONTROL MODULE)	Sends ignition pulse.	With ignition switch ON (II): battery voltage With engine running: about 10 V (depending on engine speed)
22	BRN/BLK	LG2 (LOGIC GROUND)	Ground for the ECM control circuit.	Less than 1.0 V at all times
23	BLK	PG2 (POWER GROUND)	Ground for the ECM power circuit.	
24	YEL/BLK	IGP2 (POWER SOURCE)	Power source for the ECM control circuit.	With ignition switch ON (II): battery voltage With engine switch OFF: 0 V
25	WHT	ICSOL (INTAKE CONTROL SOLENOID VALVE)	Drives intake control solenoid valve.	With engine running, engine speed above 3,000 rpm: 0 V With engine running, engine speed below 3,000 rpm: battery voltage
26	RED/BLU	IABSOL (INTAKE AIR BYPASS CONTROL SOLENOID VALVE)	Drives IAB control solenoid valve.	With engine running, engine speed below 4,900 rpm: battery voltage With engine running, engine speed above 4,900 rpm: 0 V
27	GRN	FANC (RADIATOR FAN CONTROL)	Drives radiator fan relay.	With radiator fan running: 0 V With radiator fan stopped: battery voltage
28*1	GRN/WHT	2WBS (EVAP BYPASS SOLENOID VALVE)	Drives EVAP bypass solenoid valve.	With ignition switch ON (II): battery voltage
29*1	ORN/GRN	VSV (EVAP CONTROL CANISTER VENT SHUT VALVE)	Drives EVAP control canister vent shut valve.	With ignition switch ON (II): battery voltage

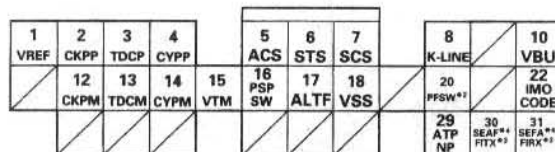
*1: '99 model, '98 model, '97 (California) model

(cont'd)

Troubleshooting

Engine Control Module Terminal Arrangement (cont'd)

ECM CONNECTOR C (31P)



ECM CONNECTOR C (31P)

Wire side of female terminals

NOTE: Standard battery voltage is 12 V.

Terminal number	Wire color	Terminal name	Description	Signal
1	LT GRN/BLK	VREF (REFERENCE VOLTAGE)	Provides reference voltage to TCM or ATTS control unit.	With ignition switch ON (II): about 5 V With ignition switch OFF: 0 V
2	BLU	CKPP (CKP SENSOR SIDE)	Detects CKP sensor.	With engine running: pulses
3	GRN	TDCP (TDC SENSOR SIDE)	Detects TDC sensor.	With engine running: pulses
4	YEL	CYPP (CYP SENSOR SIDE)	Detects CYP sensor.	With engine running pulses
5	BLU/ORN	ACS (A/C SWITCH SIGNAL)	Detects A/C switch signal.	With A/C switch ON: 0 V With A/C switch OFF: battery voltage
6	BLU/RED	STS (STARTER SWITCH SIGNAL)	Detects starter switch signal.	With starter switch ON (III): battery voltage With starter switch OFF: 0 V
7	RED/WHT	SCS (SERVICE CHECK SIGNAL)	Detects service check connector signal (the signal causing a DTC indication)	With the connector connected: 0 V With the connector disconnected: 5 V or battery voltage
8	LT GRN	K-LINE	Sends and receives scan tool signal.	With ignition switch ON (II): about 5 V
10	WHT/YEL	VBU (VOLTAGE BACK UP)	Power source for the ECM control circuit. Power source for the DTC memory	Battery voltage at all times
12	WHT	CKPM (CKP SENSOR M SIDE)	Ground for CKP sensor signal.	
13	RED	TDCM (TDC SENSOR M SIDE)	Ground for TDC sensor signal.	
14	BLK	CYPM (CKP SENSOR M SIDE)	Ground for CYP sensor signal.	
15	BLU/BLK	VTM (VTEC PRESSURE SWITCH)	Detects VTEC pressure switch signal.	With engine at low engine speed: 0 V With engine at high engine speed: battery voltage
16	GRN	PSPSW (P/S PRESSURE SWITCH)	Detects PSP switch signal.	At idle with steering wheel in straight ahead position: 0 V At idle with steering wheel at full lock: battery voltage
17	WHT/GRN	ALTF (ALTERNATOR FR SIGNAL)	Detects alternator FR signal.	With fully warmed up engine running: 0 V- battery voltage (depending on electrical load)
18	BLU/WHT	VSS (VEHICLE SPEED SENSOR)	Detects VSS signal.	With ignition switch ON (II) and front wheels rotating: cycles 0 V – 5 V
20*2	BRN	PFSW (EVAP PURGE FLOW SWITCH)	Detects EVAP purge flow switch signal.	Purge flowing: 0 V Purge not flowing: about 5 V
22	BRN/YEL	IMO CODE (IMMOBILIZER CODE)	Detects immobilizer signal	
29	LT GRN	ATPNP (A/T GEAR POSITION SWITCH)	Detects A/T gear position switch signal.	In N or P position: 0 V In any other position: battery voltage
30*4	GRN/BLU	SEAF	Data communication with TCM: ECM control data input	With ignition switch ON (II): pulses
30*3	GRN/BLU	FITX	Data communication with ATTS control unit: ECM control data input	With ignition switch ON (II): pulses
31*4	GRN/YEL	SEFA	Data communication with TCM: ECM control data output	With ignition switch ON (II): pulses
31*3	GRN/YEL	FIRX	Data communication with ATTS control unit: control data output	With ignition switch ON (II): pulses

*1: '99 model, '98 model, '97 (California) model

*2: '97 (49ST, Canada) model

*3: With ATTS

*4: A/T



ECM CONNECTOR D (16P)

1		2	3	4		5
TPS		ECT	MAP	VCC1		BKSW
6	7	8	9	10	11	12
KS	PHO 2S	IAT	EGRL	VCC2	SG2	SG1
	14	15		16		
	SHO 2S	PTA NK		EL		

Wire side of female terminals

ECM CONNECTOR D (16P)

NOTE: Standard battery voltage is 12 V.

Terminal number	Wire color	Terminal name	Description	Signal
1	RED/BLK	TPS (THROTTLE POSITION SENSOR)	Detects TP sensor signal.	With throttle fully open: about 4.8 V With throttle fully closed: about 0.5 V
2	RED/WHT	ECT (ENGINE COOLANT TEMPERATURE SENSOR)	Detects ECT sensor signal.	With ignition switch ON (II): about 0.1 – 4.8 V (depending on engine coolant temperature)
3	RED/GRN	MAP (MANIFOLD ABSOLUTE PRESSURE SENSOR)	Detects MAP sensor signal.	With ignition switch ON (II): about 3 V At idle: about 1.0 V (depending on engine speed)
4	YEL/RED	VCC1 (SENSOR VOLTAGE)	Power source for MAP sensor.	With ignition switch ON (II): about 5 V With ignition switch OFF: 0 V
5	WHT/BLK	BKSW (BRAKE SWITCH)	Detects brake switch signal.	With brake pedal released: 0 V With brake pedal depressed: battery voltage
6	RED/BLU	KS (KNOCK SENSOR)	Detects KS signal.	With engine knocking: pulses
7	WHT	PHO2S (PRIMARY HEATED OXYGEN SENSOR 1)	Detects heated primary oxygen sensor (sensor 1) signal.	With throttle fully opened from idle with fully warmed up engine: above 0.6 V With throttle quickly closed: below 0.4 V
8	RED/YEL	IAT (INTAKE AIR TEMPERATURE SENSOR)	Detects IAT sensor signal.	With ignition switch ON (II): about 0.1 – 4.8 V (depending on intake air temperature)
9	WHT/BLK	EGRL (EGR VALVE LIFT SENSOR)	Detects EGR valve lift sensor signal.	At idle without vacuum: about 1.2 V With 27 kPa (200 mmHg, 8 in. Hg): about 4.3 V
10	YEL/BLU	VCC2 (SENSOR VOLTAGE)	Provides sensor voltage.	With ignition switch ON (II): about 5 V With ignition switch OFF: 0 V
11	GRN/BLK	SG2 (SENSOR GROUND)	Sensor ground.	Less than 1.0 V at all times
12	GRN/WHT	SG1 (SENSOR GROUND)	Ground for MAP sensor.	Less than 1.0 V at all times
14	WHT/RED	SHO2S (SECONDARY HEATED OXYGEN SENSOR, SENSOR 2)	Detects secondary heated oxygen sensor (sensor 2) signal.	With throttle fully opened from idle with fully warmed up engine: above 0.6 V With throttle quickly closed: below 0.4 V
15*1	WHT/BLU	PTANK (FUEL TANK PRESSURE SENSOR)	Detects fuel tank pressure sensor signal.	With fuel fill cap opened: about 2.5 V
16	GRN/RED	EL (ELD)	Detects ELD signal.	With parking lights turned on at idle: about 2.5 – 3.5 V With low beam headlights turned on at idle: about 1.5 – 2.5 V

*1: '99 model, '98 model, '97 (California) model

Troubleshooting

Diagnostic Trouble Code (DTC) Chart

DTC (MIL indication*)	Detection Item	Probable Cause	Page
P0107 (3)	Manifold Absolute Pressure Circuit Low Input	<ul style="list-style-type: none"> • Open or short in MAP sensor circuit • MAP sensor • ECM 	11-58
P0108 (3)	Manifold Absolute Pressure Circuit High Input	<ul style="list-style-type: none"> • Open in MAP sensor circuit • MAP sensor • ECM 	11-60
P0111*5 (10)	Intake Air Temperature Circuit Range/Performance Problem	<ul style="list-style-type: none"> • IAT sensor 	11-62
P0112 (10)	Intake Air Temperature Circuit Low Input	<ul style="list-style-type: none"> • Short in IAT sensor circuit • IAT sensor • ECM 	11-63
P0113 (10)	Intake Air Temperature Circuit High Input	<ul style="list-style-type: none"> • Open in IAT sensor circuit • IAT sensor • ECM 	11-64
P0116 (86)	Engine Coolant Temperature Circuit Range/Performance Problem	<ul style="list-style-type: none"> • ECT sensor • Cooling system 	11-65
P0117 (6)	Engine Coolant Temperature Circuit Low Input	<ul style="list-style-type: none"> • Short in ECT sensor circuit • ECT sensor • ECM 	11-66
P0118 (6)	Engine Coolant Temperature Circuit High Input	<ul style="list-style-type: none"> • Open in ECT sensor circuit • ECT sensor • ECM 	11-67
P0122 (7)	Throttle Position Circuit Low Input	<ul style="list-style-type: none"> • Open or short in TP sensor circuit • TP sensor • ECM 	11-68
P0123 (7)	Throttle Position Circuit High Input	<ul style="list-style-type: none"> • Open in TP sensor circuit • TP sensor • ECM 	11-70
P0131 (1)	Primary Heated Oxygen Sensor Circuit Low Voltage (Sensor 1)	<ul style="list-style-type: none"> • Short in Primary HO2S (Sensor1) circuit • Primary HO2S (Sensor 1) • Fuel supply system • ECM 	11-72
P0132 (1)	Primary Heated Oxygen Sensor Circuit High Voltage (Sensor 1)	<ul style="list-style-type: none"> • Open in Primary HO2S (Sensor 1) circuit • Primary HO2S (Sensor 1) • ECM 	11-74
P0133 (61)	Primary Heated Oxygen Sensor Slow Response (Sensor 1)	<ul style="list-style-type: none"> • Primary HO2S (Sensor1) • Exhaust system 	11-75
P0135 (41)	Primary Heated Oxygen Sensor Heater Circuit Malfunction (Sensor 1)	<ul style="list-style-type: none"> • Open or short in Primary HO2S (Sensor 1) heater circuit • ECM 	11-79

*: These DTCs will be indicated by the blinking of the Malfunction Indicator Lamp (MIL) with the SCS service connector connected

*5: '97 model



DTC (MIL indication)	Detection Item	Probable Cause	Page
P0137 (63)	Secondary Heated Oxygen Sensor Circuit Low Voltage (Sensor 2)	<ul style="list-style-type: none"> • Short in Secondary HO2S (Sensor 2) circuit • Secondary HO2S (Sensor 2) • ECM 	11-76
P0138 (63)	Secondary Heated Oxygen Sensor Circuit High Voltage (Sensor 2)	<ul style="list-style-type: none"> • Open in Secondary HO2S (Sensor 2) circuit • Secondary HO2S (Sensor 2) • ECM 	11-77
P0139 (63)	Secondary Heated Oxygen Sensor Slow Response (Sensor 2)	<ul style="list-style-type: none"> • Secondary HO2S (Sensor 2) 	11-78
P0141 (65)	Secondary Heated Oxygen Sensor Heater Circuit Malfunction (Sensor 2)	<ul style="list-style-type: none"> • Open or short in Secondary HO2S (Sensor 2) heater circuit • ECM 	11-79
P0171 (45)	System Too Lean	<ul style="list-style-type: none"> • Fuel supply system • Primary HO2S (Sensor 1) • Contaminated fuel • Valve clearance • Exhaust leakage 	11-81
P0172 (45)	System Too Rich	<ul style="list-style-type: none"> • Fuel supply system • Primary HO2S (Sensor 1) • Contaminated fuel • Valve clearance 	11-81
P0300*4 or P1300*5 and some of P0301 (71) P0302 (72) P0303 (73) P0304 (74)	Random Misfire	<ul style="list-style-type: none"> • Ignition system • Fuel supply system • EGR system • IAC valve • Contaminated fuel • Lack of fuel 	11-86
P0301 (71) P0302 (72) P0303 (73) P0304 (74)	<ul style="list-style-type: none"> — Cylinder 1 — Cylinder 2 — Cylinder 3 — Cylinder 4 Misfire Detected	<ul style="list-style-type: none"> • Fuel injector • Fuel injector circuit • Ignition system • Low compression • Valve clearance 	11-83
P0325 (23)	Knock Sensor (KS) Circuit Malfunction	<ul style="list-style-type: none"> • Open or short in Knock Sensor (KS) circuit • Knock Sensor (KS) • ECM 	11-87
P0335 (4)	Crankshaft Position Sensor Circuit Malfunction	<ul style="list-style-type: none"> • Crankshaft Position Sensor • Crankshaft Position Sensor circuit • ECM 	11-88
P0336 (4)	Crankshaft Position Sensor Range/Performance	<ul style="list-style-type: none"> • Crankshaft Position Sensor • Timing belt skipped teeth 	11-88

*4: '99 model, '98 model

*5: '97 model

(cont'd)

Troubleshooting

Diagnostic Trouble Code (DTC) Chart (cont'd)

DTC (MIL indication)	Detection Item	Probable Cause	Page
P0401 (80)	Exhaust Gas Recirculation Insufficient Flow Detected	<ul style="list-style-type: none"> • EGR valve • EGR line 	11-153
P0420 (67)	Catalyst System Efficiency Below Threshold	<ul style="list-style-type: none"> • Three Way Catalytic converter • Secondary HO2S (Sensor 2) 	11-151
P0441 (92)*2	Evaporative Emission Control System Insufficient Purge Flow	<ul style="list-style-type: none"> • EVAP Purge Control Solenoid valve • EVAP Purge Control Solenoid valve circuit • EVAP Purge Flow Switch • EVAP Purge Flow Switch circuit • Throttle Body (purge port) • Tubing • ECM 	11-188
P0451*6 (91)	Fuel Tank Pressure Sensor Circuit Range/Performance	<ul style="list-style-type: none"> • Fuel Tank Pressure Sensor • ECM 	11-164
P0452 (91)*1	Fuel Tank Pressure sensor Circuit Low Input	<ul style="list-style-type: none"> • Open or short in Fuel tank pressure sensor circuit • Fuel tank pressure sensor • ECM 	11-165
P0453 (91)*1	Fuel Tank Pressure Sensor Circuit High Input	<ul style="list-style-type: none"> • Open in Fuel tank pressure sensor circuit • Fuel tank pressure sensor • ECM 	11-167
P0500 (17)	Vehicle Speed Sensor Circuit Malfunction	<ul style="list-style-type: none"> • Vehicle Speed Sensor • Vehicle Speed Sensor circuit • ECM 	11-90
P0505 (14)	Idle Control System Malfunction	<ul style="list-style-type: none"> • IAC valve • Fast idle thermo valve • Throttle Body 	11-101
P0700 P0715 P0720 P0725 P0730 P0740 P0753 P0758 P0763 (70)*3**	Automatic Transaxle	—	Section 14

** : The  indicator light and the Malfunction Indicator Lamp (MIL) may come on simultaneously.

*1: '99 model, '98 model, '97 (California) model

*2: '97 (49ST, Canada) model

*3: A/T

*6: '99 model



DTC (MIL indication)		Detection Item	Probable Cause	Page
P1106	(13)	Barometric Pressure Circuit Range/Performance Problem	• ECM (Baro sensor)	11-91
P1107	(13)	Barometric Pressure Circuit Low Input	• ECM (Baro sensor)	11-91
P1108	(13)	Barometric Pressure Circuit High Input	• ECM (Baro sensor)	11-91
P1121	(7)	Throttle Position Lower Than Expected	• TP sensor	11-71
P1122	(7)	Throttle Position Higher Than Expected	• TP sensor	11-71
P1128	(5)	Manifold Absolute Pressure Lower Than Expected	• MAP sensor	11-61
P1129	(5)	Manifold Absolute Pressure Higher Than Expected	• MAP sensor	11-61
P1259	(22)	VTEC System Malfunction	<ul style="list-style-type: none"> • VTEC Solenoid Valve • Open or short in VTEC Solenoid Valve circuit • VTEC Pressure Switch • Open or short in VTEC Pressure Switch circuit • ECM 	Section 6
P1297	(20)	Electrical Load Detector Circuit Low Input	<ul style="list-style-type: none"> • Electrical Load Detector • Electrical Load Detector circuit • ECM 	11-92
P1298	(20)	Electrical Load Detector Circuit High Input	<ul style="list-style-type: none"> • Electrical Load Detector • Electrical Load Detector circuit • ECM 	11-93
P1359	(8)	Crankshaft Position/Top Dead Center Sensor Connector Disconnection	• CKP/TDC sensor circuit	11-94
P1361	(8)	Top Dead Center Sensor Intermittent Interruption	• TDC sensor	11-88
P1362	(8)	Top Dead Center Sensor No Signal	<ul style="list-style-type: none"> • TDC sensor • TDC sensor circuit • ECM 	11-88
P1381	(9)	Cylinder Position Sensor Intermittent Interruption	• CYP sensor	11-95
P1382	(9)	Cylinder Position Sensor No Signal	<ul style="list-style-type: none"> • CYP sensor • CYP sensor circuit • ECM 	11-95
P1456	(90)*1	Evaporative Emission Control System Leak Detected (Fuel Tank System)	<ul style="list-style-type: none"> • Fuel fill cap • Vacuum connection • Fuel tank • Fuel tank pressure sensor • EVAP bypass solenoid valve • EVAP two way valve • EVAP control canister vent shut valve • EVAP control canister • EVAP purge control solenoid valve 	11-169

*1: '99 model, '98 model, '97 (California) model

*2: '97 (49ST, Canada) model

*3: A/T

(cont'd)

Troubleshooting

Diagnostic Trouble Code (DTC) Chart (cont'd)

DTC (MIL indication)	Detection Item	Probable Cause	Page
P1457 (90)*1	Evaporative Emission Control System Leak Detected (EVAP Control Canister System)	<ul style="list-style-type: none"> • Vacuum connection • EVAP control canister • Fuel tank pressure sensor • EVAP bypass solenoid valve • EVAP two way valve • EVAP control canister vent shut valve • Fuel tank • EVAP purge control solenoid valve 	11-177
P1459 (92)*2	Evaporative Emission Purge Flow Switch Malfunction	<ul style="list-style-type: none"> • EVAP Purge Flow Switch • EVAP Purge Flow Switch circuit • Vacuum Connections • ECM 	11-191
P1491 (12)	EGR Valve Lift Insufficient Detected	<ul style="list-style-type: none"> • EGR valve (with lift sensor) • EGR valve lift sensor circuit • EGR control solenoid valve • EGR control solenoid valve circuit • EGR line • ECM 	11-154
P1498 (12)	EGR Valve Lift Sensor High Voltage	<ul style="list-style-type: none"> • EGR valve (with lift sensor) • EGR valve lift sensor circuit • ECM 	11-159
P1508 (14)	Idle Air Control Valve Circuit Failure	<ul style="list-style-type: none"> • IAC valve • IAC valve circuit • ECM 	11-103
P1607 (-)	Engine Control Module Internal Circuit Failure A	• ECM	11-97
P1655 (30)	SEAF/SEFA Signal Line Failure	• Open or short in SEAF/SEFA circuit	11-98
P1705 P1706 P1753 P1768 P1773 P1790 P1791	Automatic Transaxle	—	Section 14

** : The  indicator light and the Malfunction Indicator Lamp (MIL) may come on simultaneously.

*1: '99 model, '98 model, '97 (California) model

*2: '97 (49ST, Canada) model

*3: A/T



How to Read Flowcharts

A flowchart is designed to be used from start to final repair. It's like a map showing you the shortest distance. But beware: If you go off the "map" anywhere but a "stop" symbol, you can easily get lost.

START

(bold type)

Describes the conditions or situation to start a troubleshooting flowchart.

ACTION

Asks you to do something; perform a test, set up a condition etc.

DECISION

Asks you about the result of an action, then sends you in the appropriate troubleshooting direction.

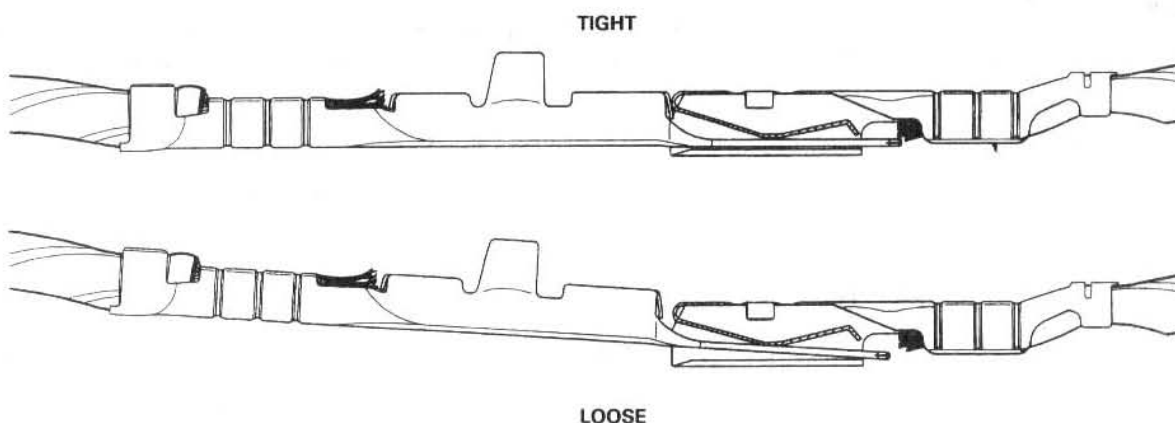
STOP

(bold type)

The end of a series of actions and decisions, describes a final repair action and sometimes directs you to an earlier part of the flowchart to confirm your repair.

NOTE:

- The term "Intermittent Failure" is used in these charts. It simply means a system may have had a failure, but it checks out OK at this time. If the Malfunction Indicator Lamp (MIL) on the dash does not come on, check for poor connections or loose wires at all connectors related to the circuit that you are troubleshooting (see illustration below).
- Most of the troubleshooting flowcharts have you reset the Engine Control Module (ECM) and try to duplicate the Diagnostic Trouble Code (DTC). If the problem is intermittent and you can't duplicate the code, do not continue through the flowchart. To do so will only result in confusion and, possibly, a needlessly replaced ECM.
- "Open" and "Short" are common electrical terms. An open is a break in a wire or at a connection. A short is an accidental connection of a wire to ground or to another wire. In simple electronics, this usually means something won't work at all. In complex electronics (like ECM's), this can sometimes mean something works, but not the way it's supposed to.



PGM-FI System

System Description

INPUTS

CKP/TDC/CYP Sensor
MAP Sensor
ECT Sensor
IAT Sensor
TP Sensor
EGR Valve Lift Sensor
Primary HO2S
Secondary HO2S
VSS
BARO Sensor
ELD
Starter Signal
ALT FR Signal
Air Conditioning Signal
A/T Gear Position Signal
Battery Voltage (IGN.1)
Brake Switch Signal
PSP Switch Signal
VTEC Pressure Switch
EVAP Purge Flow Switch*2
Fuel Tank Pressure Sensor*1

ENGINE CONTROL MODULE (ECM)

Fuel Injector Timing and Duration
Electronic Idle Control
Other Control Functions
Ignition Timing Control
ECM Back-up Functions

OUTPUTS

Fuel Injectors
PGM-FI Main Relay (Fuel Pump)
MIL
IAC Valve
A/C Compressor Clutch Relay
Radiator Fan Relay
Condenser Fan Relay
ALT
ICM
EVAP Purge Control Solenoid Valve
Primary HO2S Heater
Secondary HO2S Heater
EGR Control Solenoid Valve
Intake Control Solenoid Valve
IAB Control Solenoid Valve
EVAP Bypass Solenoid Valve*1
EVAP Control Canister Vent Shut Valve*1
VTEC Solenoid Valve

*1: '99 model, '98 model, '97 (California) model

*2: '97 (49ST, Canada) model

PGM-FI System

The PGM-FI system on this model is a sequential multiport fuel injection system.

Fuel injector Timing and Duration

The ECM contains memories for the basic discharge durations at various engine speeds and manifold pressure. The basic discharge duration, after being read out from the memory, is further modified by signals sent from various sensors to obtain the final discharge duration.

Idle Air Control

Idle Air Control Valve (IAC Valve)

When the engine is cold, the A/C compressor is on, the transmission is in gear, the brake pedal is depressed, the P/S load is high, or the alternator is charging, the ECM controls current to the IAC Valve to maintain the correct idle speed.

Ignition Timing Control

- The ECM contains memories for basic ignition timing at various engine speeds and manifold air flow rates. Ignition timing is also adjusted for engine coolant temperature.
- The knock control system sets the ideal ignition timing for the octane rating of the gasoline used.

Other Control Functions

1. Starting Control
When the engine is started, the ECM provides a rich mixture by increasing fuel injector duration.
2. Fuel Pump Control
 - When the ignition switch is initially turned on, the ECM supplies ground to the PGM-FI main relay that supplies current to the fuel pump for two seconds to pressurize the fuel system.
 - When the engine is running, the ECM supplies ground to the PGM-FI main relay that supplies current to the fuel pump.
 - When the engine is not running and the ignition is on, the ECM cuts ground to the PGM-FI main relay which cuts current to the fuel pump.



3. Fuel Cut-off Control
 - During deceleration with the throttle valve closed, current to the fuel injectors is cut off to improve fuel economy at speeds over 1,050 rpm.
 - Fuel cut-off action also takes place when engine speed exceeds 7,700 rpm, regardless of the position of the throttle valve, to protect the engine from over-revving. The ECM cuts the fuel at engine speeds over 6,500 rpm (A/T model: 5,500 rpm) when the vehicle is not moving.
4. A/C Compressor Clutch Relay

When the ECM receives a demand for cooling from the air conditioning system, it delays the compressor from being energized, and enriches the mixture to assure a smooth transition to the A/C mode.
5. Evaporative Emission (EVAP) Purge Control Solenoid Valve

When the engine coolant temperature is above 167°F (75°C) [122°F (50°C)]*¹, the ECM controls the EVAP purge control solenoid valve which controls vacuum to the EVAP purge control canister. *¹: California model
6. Intake Control Solenoid Valve

When the engine speed is below 3,970 rpm, the ECM supplies ground to the intake control solenoid valve. This opens the solenoid valve, sending intake manifold vacuum to the intake control diaphragm.
7. Intake Air Bypass (IAB) Control Solenoid Valve

When the engine speed is below 4,900 rpm, the IAB control solenoid valve is activated by a signal from the ECM, intake air flows through the long intake path, then high torque is delivered. At speeds higher than 4,900 rpm, the solenoid valve is deactivated by the ECM, and intake air flows through the short intake path in order to reduce the resistance in airflow.
8. Exhaust Gas Recirculation (EGR) Control Solenoid Valve

When EGR is required for control of oxides of nitrogen (NOx) emissions, the ECM controls the EGR control solenoid valve which supplies regulated vacuum to the EGR valve.
9. Alternator Control

The system controls the voltage generated at the alternator in accordance with the electrical load and driving mode, which reduces the engine load to improve the fuel economy.

ECM Fail-safe/Back-up Functions

1. Fail-safe Function

When an abnormality occurs in a signal from a sensor, the ECM ignores that signal and assumes a pre-programmed value for that sensor that allows the engine to continue to run.
2. Back-up Function

When an abnormality occurs in the ECM itself, the fuel injectors are controlled by a back-up circuit independent of the system in order to permit minimal driving.
3. Self-diagnosis Function [Malfunction Indicator Lamp (MIL)]

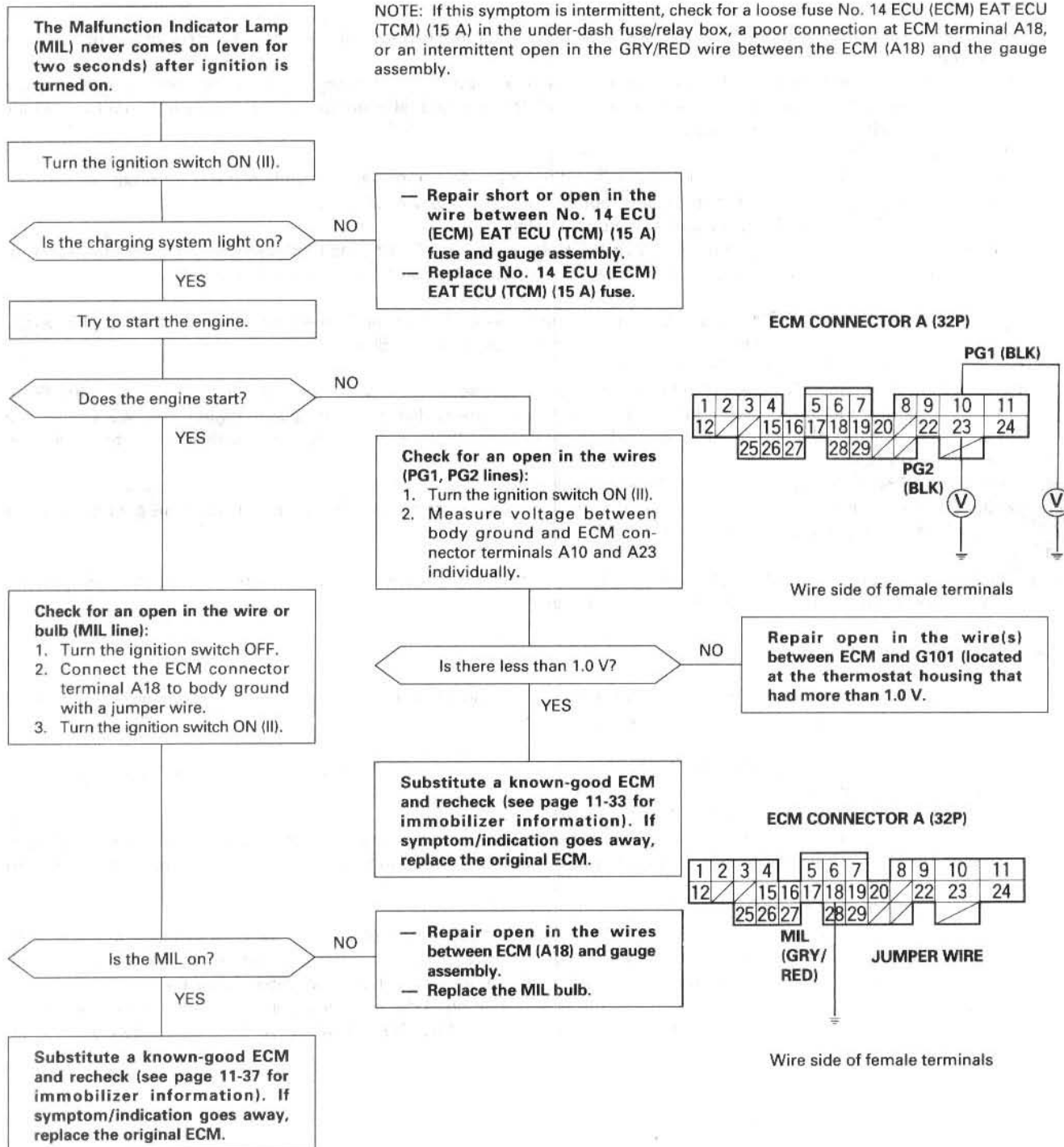
When an abnormality occurs in a signal from a sensor, the ECM supplies ground for the MIL and stores the DTC in erasable memory. When the ignition is initially turned on, the ECM supplies ground for the MIL for two seconds to check the MIL bulb condition.
4. Two Driving Cycle Detection Method

To prevent false indications, the two driving cycle detection method is used for the HO₂S, fuel metering-related, idle control system, ECT sensor, EGR system, TWC EVAP control system and other self-diagnostic functions. When an abnormality occurs, the ECM stores it in its memory. When the same abnormality recurs after the ignition switch is turned OFF and ON (II) again, the ECM informs the driver by lighting the MIL. However, to ease troubleshooting, this function is cancelled when you jump the service check connector. The MIL will then blink immediately when an abnormality occurs.

PGM-FI System

Engine Control Module (ECM)

NOTE: If this symptom is intermittent, check for a loose fuse No. 14 ECU (ECM) EAT ECU (TCM) (15 A) in the under-dash fuse/relay box, a poor connection at ECM terminal A18, or an intermittent open in the GRY/RED wire between the ECM (A18) and the gauge assembly.





The Malfunction Indicator Lamp (MIL) stays on or comes on after two seconds.

Check the Diagnostic Trouble Code (DTC):

1. Connect an OBD II scan tool or Honda PGM Tester.
2. Turn the ignition switch ON (II).
3. Read the DTC with the scan tool or Honda PGM Tester.

Are any DTC(s) indicated?

YES

Go to troubleshooting procedures (see page 11-36).

NO

Check the DTC by MIL indication:

1. Turn the ignition switch OFF.
2. Connect the SCS service connector to the service check connector.
3. Turn the ignition switch ON (II).

Does the MIL indicate any DTC?

YES

- Repair open or short in wire between the ECM (C8) and Data Link Connector.
- Go to troubleshooting procedures (see page 11-36).

NO

Try to start the engine.

Does the engine start?

NO



(To page 11-56)

Check for a short in the wire (SCS line):

1. Stop the engine and turn the ignition switch ON (II).
2. Measure voltage between the ECM connector terminal C7 and D11.

Is there approx. 5 V?

NO

Repair short to body ground in the wire between ECM (C7) and service check connector.

YES

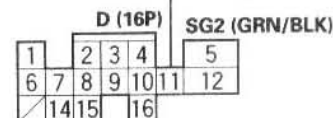
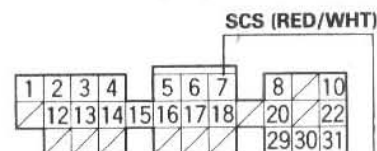
(To page 11-56)

NOTE:

- When there is no Diagnostic Trouble Code (DTC) stored, the MIL will stay on if the SCS service connector is connected and the ignition switch is on.
- If this symptom is intermittent, check for:
 - A loose No. 4 ACG-S (10 A) fuse in the under-dash fuse/relay box
 - A loose FUEL PUMP fuse (15 A) in the under-dash fuse/relay box
 - An intermittent short in the wire between the ECM (C7) and the service check connector
 - An intermittent short in the wire between the ECM (A18) and the gauge assembly
 - An intermittent short in the wire between the ECM (D4) and the MAP sensor
 - An intermittent short in the wire between the ECM (D10), the TP sensor, EGR valve lift sensor and/or Fuel tank pressure sensor ('98 model, '97 (California) model)
 - PGM-FI main relay.
- See the OBD II scan tool or Honda PGM Tester user's manuals for specific operating instructions.

NOTE: An open or short in the wire between the ECM (C8) and the DLC will keep the scan tool or PGM Tester from communicating with the ECM. You should interpret this as no DTCs are indicated.

ECM CONNECTORS C (31P)



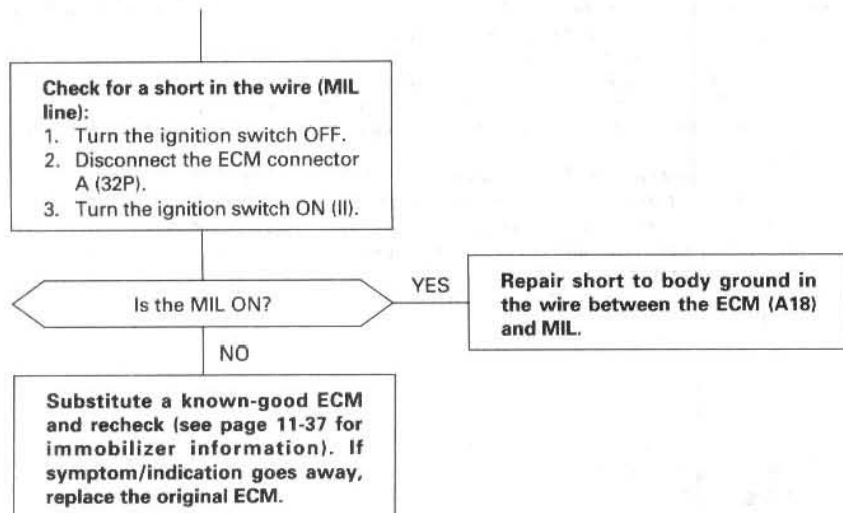
Wire side of female terminals

(cont'd)

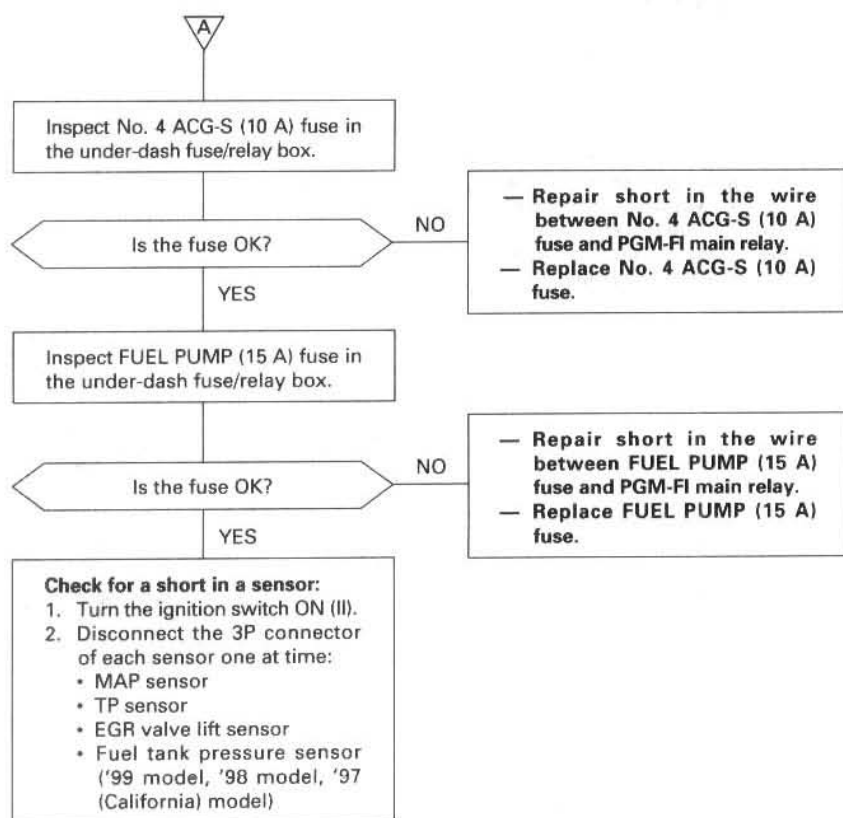
PGM-FI System

Engine Control Module (ECM) (cont'd)

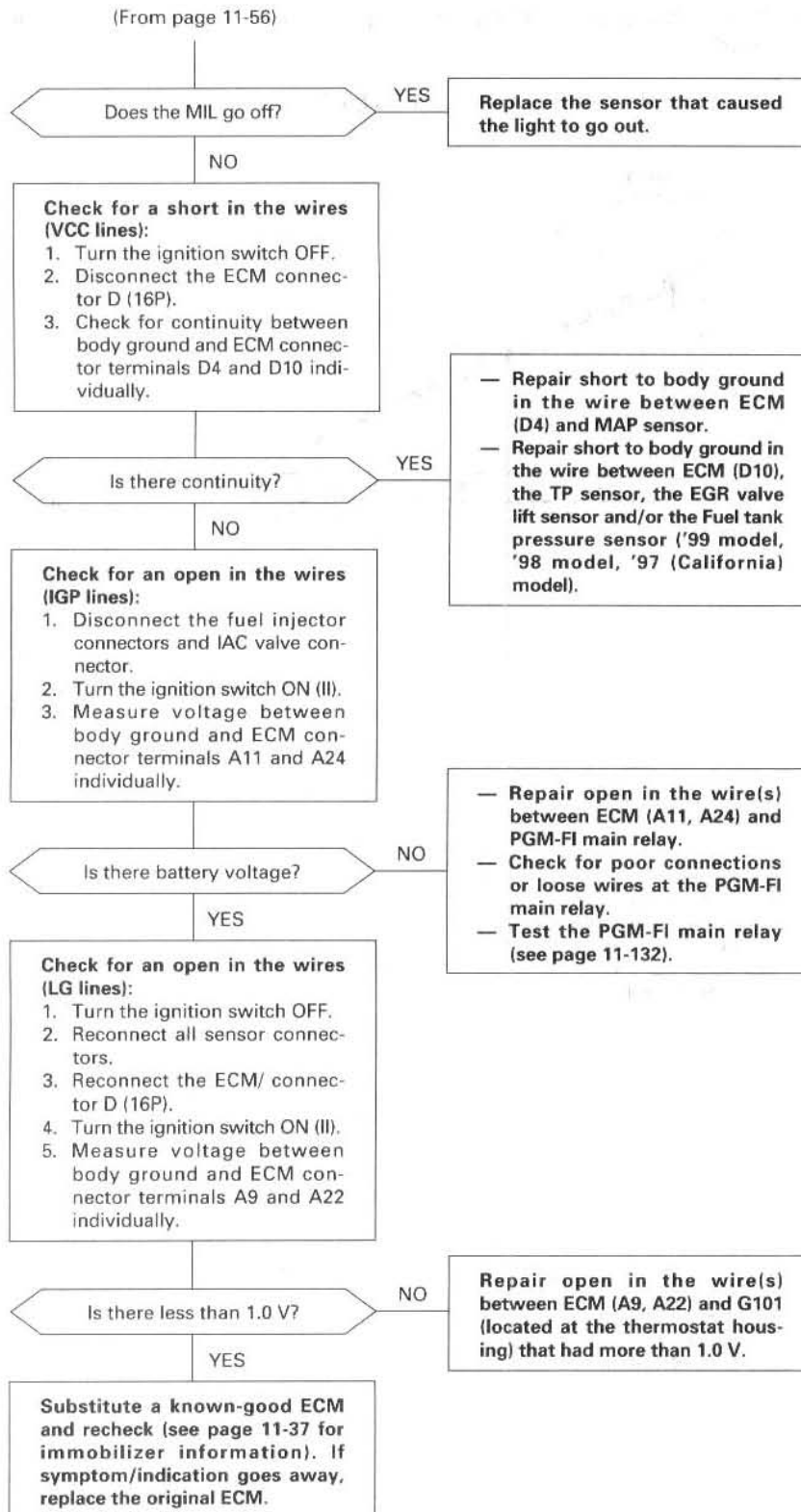
(From page 11-55)



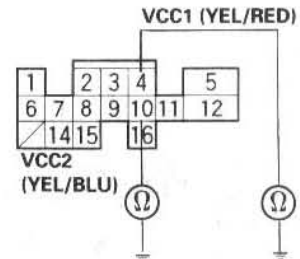
(From page 11-55)



(To page 11-57)

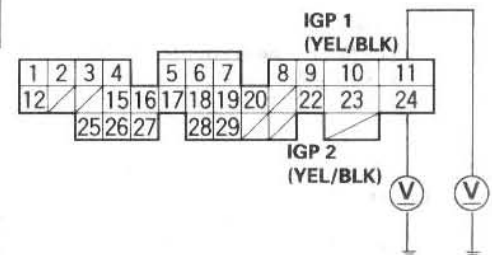


ECM CONNECTOR D (16P)

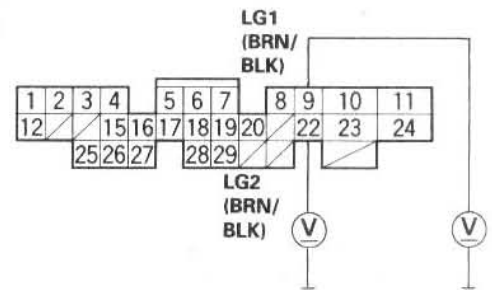


Wire side of female terminals

ECM CONNECTOR A (32P)



Wire side of female terminals

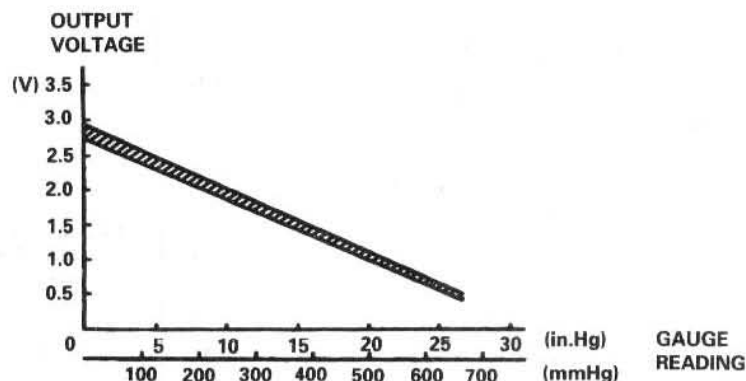
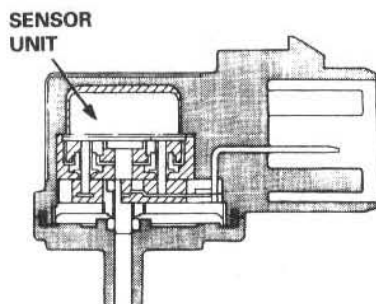


PGM-FI System

Manifold Absolute Pressure (MAP) Sensor

P0107 The scan tool indicates Diagnostic Trouble Code (DTC) P0107: A low input (high vacuum) problem in the Manifold Absolute Pressure (MAP) sensor.

The MAP sensor converts manifold absolute pressure into electrical signals and inputs the ECM.



— The MIL has been reported on.
— DTC P0107 is stored.

Problem verification:

1. Turn the ignition switch ON (II).
2. Check the MAP with the scan tool.

Is approx. 101 kPa (760 mmHg, 30 in.Hg) indicated?

YES

Intermittent failure, system is OK at this time. Check for poor connections or loose wires at C285 (located at right shock tower), C116 (MAP sensor) and ECM.

NO

Check for an open in wire (VCC1 line):

1. Turn the ignition switch OFF.
2. Disconnect the MAP sensor connector.
3. Turn the ignition switch ON (II).
4. Measure voltage between the MAP sensor connector No. 1 terminal and No. 2 terminal.

Is there approx. 5 V?

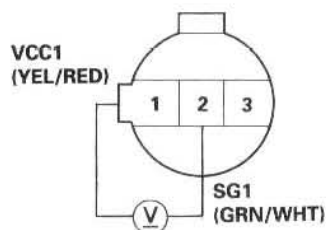
NO

Repair open in the wire between ECM (D4) and MAP sensor.

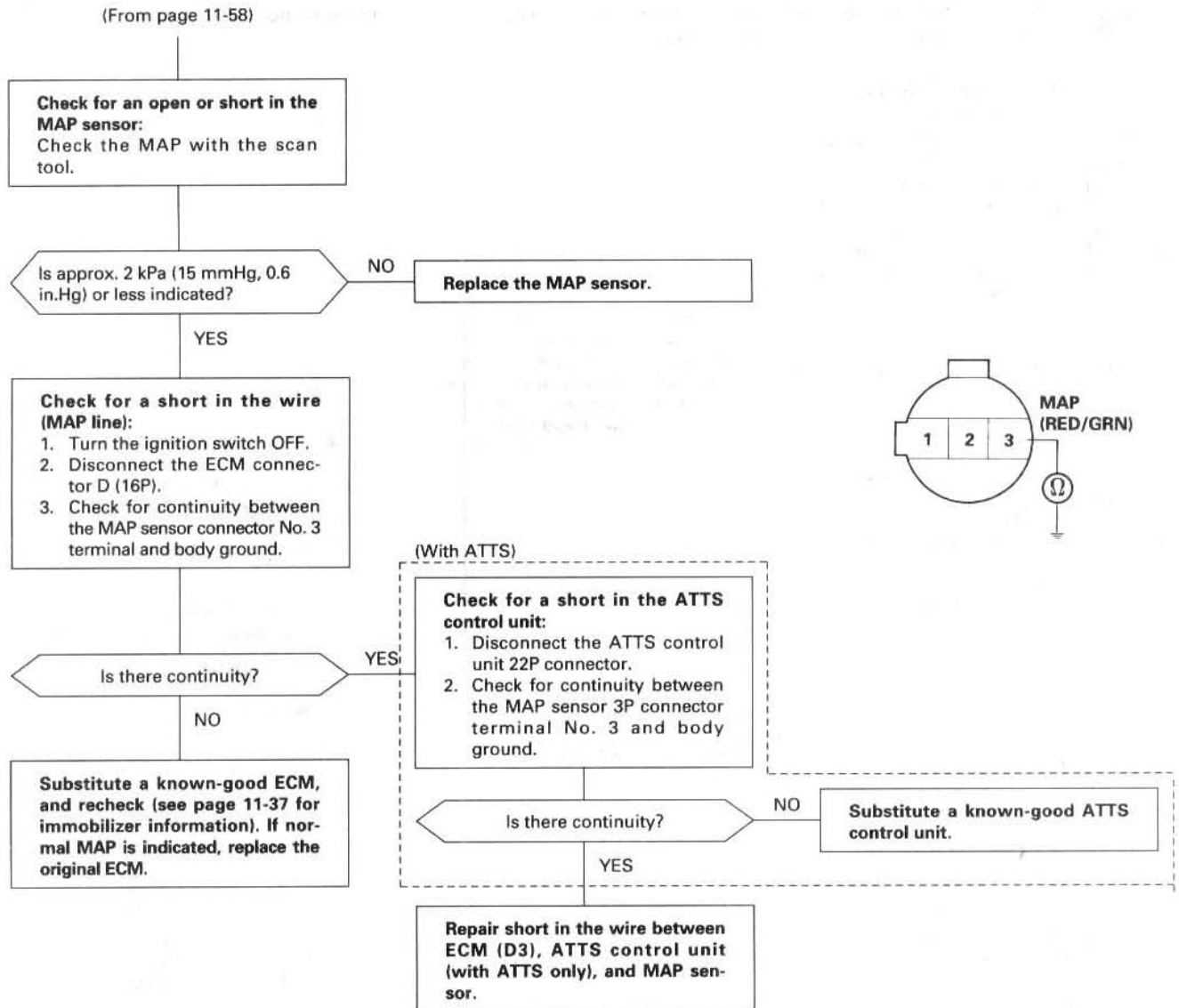
YES

(To page 11-59)

MAP SENSOR 3P CONNECTOR (C116)



Wire side of female terminals



(cont'd)

Manifold Absolute Pressure (MAP) Sensor (cont'd)

P0108 The scan tool indicates Diagnostic Trouble Code (DTC) P0108: A high input (low vacuum) problem in the Manifold Absolute Pressure (MAP) sensor.

- The MIL has been reported on.
- DTC P0108 is stored.

Problem verification:

1. Start the engine. Hold the engine at 3,000 rpm with no load (A/T in **N** or **P** position, M/T in neutral) until the radiator fan comes on, then let it idle.
2. Check the MAP with the scan tool.

Is 101 kPa (760 mmHg, 30 in.Hg) or higher indicated?

NO

Intermittent failure, system is OK at this time. Check for poor connections or loose wires at C285 (located at right shock tower), C116 (MAP sensor) and ECM.

YES

Check for an open in the MAP sensor:

1. Turn the ignition switch OFF.
2. Disconnect the MAP sensor connector.
3. Install a jumper wire between the MAP sensor 3P connector terminals No. 3 and No. 2.
4. Turn the ignition switch ON (II).
5. Check the MAP with the scan tool.

Is 101 kPa (760 mmHg, 30 in.Hg) or higher indicated?

NO

Replace the MAP sensor.

YES

Check for an open in wire (SG1 line):

1. Remove the jumper wire.
2. Measure voltage between the MAP sensor 3P connector terminals No. 1 and No. 2.

Is there approx. 5 V?

NO

Repair open in the wire between ECM (D12) and MAP sensor.

YES

Check for an open in the wire (MAP line):

1. Turn the ignition switch OFF.
2. Install a jumper wire on the ECM connectors between D3 and D12.
3. Turn the ignition switch ON (II).
4. Check the MAP with the scan tool.

Is 101 kPa (760 mmHg, 30 in.Hg) or higher indicated?

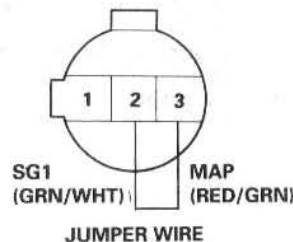
NO

Repair open in the wire between ECM (D3) and MAP sensor.

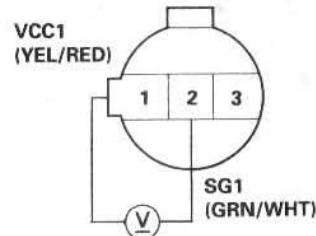
YES

Substitute a known-good ECM and recheck (see page 11-37 for immobilizer information). If normal MAP is indicated, replace the original ECM.

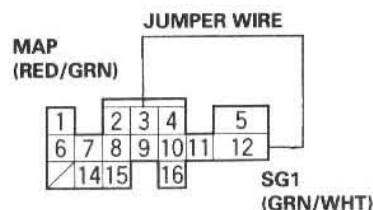
MAP SENSOR 3P CONNECTOR (C116)



Wire side of female terminals



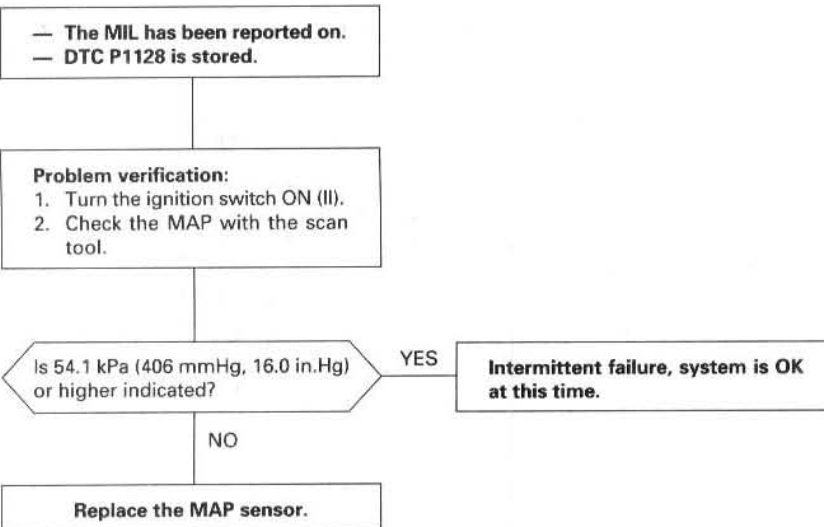
ECM CONNECTOR D (16P)



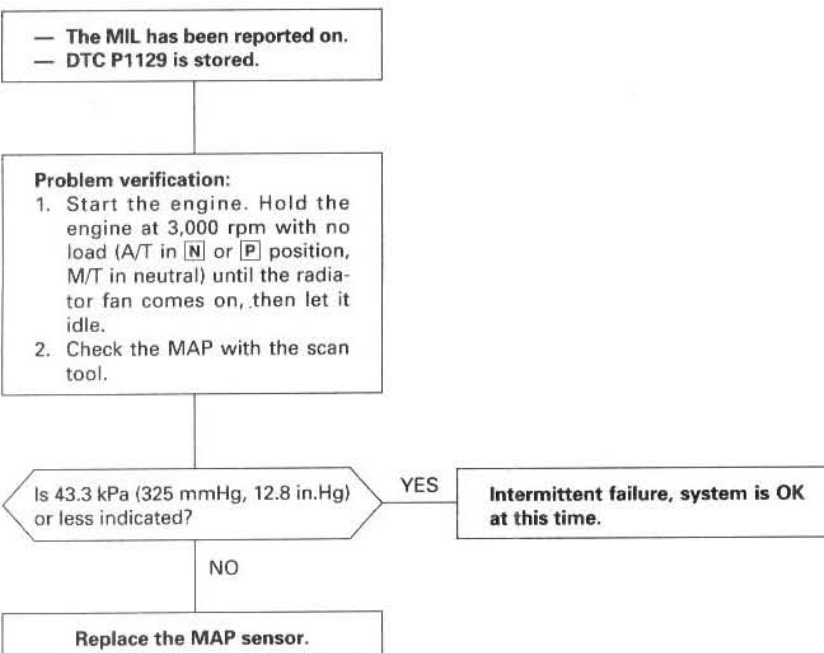
Wire side of female terminals



P1128 The scan tool indicates Diagnostic Trouble Code (DTC) P1128: Manifold Absolute Pressure (MAP) lower than expected.



P1129 The scan tool indicates Diagnostic Trouble Code (DTC) P1129: Manifold Absolute Pressure (MAP) higher than expected.



Intake Air Temperature (IAT) Sensor

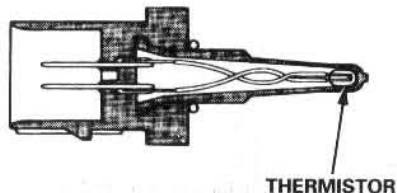
P0111 The scan tool indicates Diagnostic Trouble Code (DTC) P0111: A range/performance problem in the Intake Air Temperature (IAT) Sensor circuit. ('97 model)

The IAT Sensor is a temperature dependant resistor (thermistor). The resistance of the thermistor decreases as the intake air temperature increases as shown below.

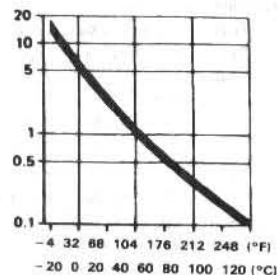
- The MIL has been reported on.
- DTC P0111 is stored.
- Or from Probable Cause List.

Problem verification:

1. Turn the ignition switch OFF.
2. Disconnect the IAT sensor 2P connector.
3. Remove the IAT sensor.
4. Reconnect the IAT sensor 2P connector.
5. Leave the IAT sensor exposed to ambient temperature.
6. Turn the ignition switch ON (II).
7. Check the IAT with the scan tool.



RESISTANCE (k Ω)



INTAKE AIR TEMPERATURE

Is ambient temperature indicated?

NO

Replace the IAT sensor.

YES

Check the IAT sensor output:

1. Warm the IAT sensor with a hair dryer.
2. Check the IAT with the scan tool.

Did the IAT rise 2.0°F (1.0°C) or more from the ambient temperature?

YES

Intermittent failure, system is OK at this time.

NO

Replace the IAT sensor.



P0112 The scan tool indicates Diagnostic Trouble Code (DTC) P0112: A low voltage (high temperature) problem in the Intake Air Temperature (IAT) sensor circuit.

- The MIL has been reported on.
- DTC P0112 is stored.

Problem verification:

1. Turn the ignition switch ON (II).
2. Check the IAT with the scan tool.

NOTE: If you are using a Honda PGM Tester, you must select the OBDII Generic mode to obtain the correct temperature reading.

Is 302°F (150°C) or higher (or H-Limit in Honda mode of PGM Tester) or 0 V indicated?

NO

Is the correct ambient temperature indicated*?

NO

Replace the IAT sensor.

*: If the engine is warm, it will be higher than ambient temperature.

YES

Intermittent failure, system is OK at this time. Check for poor connections or loose wires at C281 (located at right shock tower), C108 (IAT sensor) and ECM.

YES

Check for a short in the IAT sensor:

1. Disconnect the IAT sensor connector.
2. Check the IAT with the scan tool.

Is 302°F (150°C) or higher (or H-Limit in Honda mode of PGM Tester) or 0 V indicated?

NO

Replace the IAT sensor.

YES

Check for a short in the wire (IAT line):

1. Turn the ignition switch OFF.
2. Disconnect the ECM connector D (16P).
3. Check for continuity between the IAT sensor 2P connector terminal No. 2 and body ground.

Is there continuity?

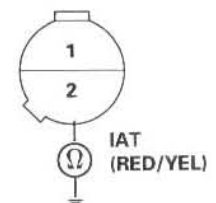
YES

Repair short in the wire between ECM (D8) and IAT sensor.

NO

Substitute a known-good ECM and recheck (see page 11-37 for immobilizer information). If normal IAT is indicated, replace the original ECM.

IAT SENSOR 2P CONNECTOR (C108)



Wire side of female terminals

(cont'd)

Intake Air Temperature (IAT) Sensor (cont'd)

P0113

The scan tool indicates Diagnostic Trouble Code (DTC) P0113: A high voltage (low temperature) problem in the Intake Air Temperature (IAT) sensor circuit.

- The MIL has been reported on.
- DTC P0113 is stored.

Problem verification:

1. Turn the ignition switch ON (II).
2. Check the IAT with the scan tool.

NOTE: If you are using a Honda PGM Tester, you must select the OBDII Generic mode to obtain the correct temperature reading.

Is -4°F (-20°C) or less (or L-Limit in Honda mode of PGM Tester) or 5 V indicated?

NO

Intermittent failure, system is OK at this time. Check for poor connections or loose wires at C281 (located at right shock tower), C108 (IAT sensor) and ECM.

YES

Check for an open in the IAT sensor:

1. Disconnect the IAT sensor connector.
2. Connect the IAT sensor 2P connector terminals No. 1 and No. 2 with a jumper wire.
3. Check the IAT with the scan tool.

Is -4°F (-20°C) or less (or L-Limit in Honda mode of PGM Tester) or 5 V indicated?

NO

Replace the IAT sensor.

YES

Check for an open in the wires (IAT, SG2 lines):

1. Turn the ignition switch OFF.
2. Connect ECM connector terminals D8 and D11 with a jumper wire.
3. Turn the ignition switch ON (II).
4. Check the IAT with the scan tool.

Is -4°F (-20°C) or less (or L-Limit in Honda mode of PGM Tester) or 5 V indicated?

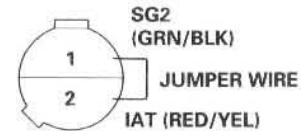
NO

Repair open in the wires between ECM (D8, D11) and IAT sensor.

YES

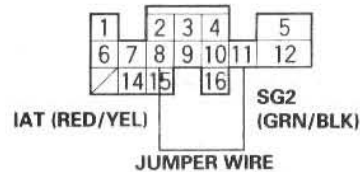
Substitute a known-good ECM and recheck (see page 11-37 for immobilizer information). If normal IAT is indicated, replace the original ECM.

IAT SENSOR 2P CONNECTOR (C108)



Wire side of female terminals

ECM CONNECTOR D (16P)



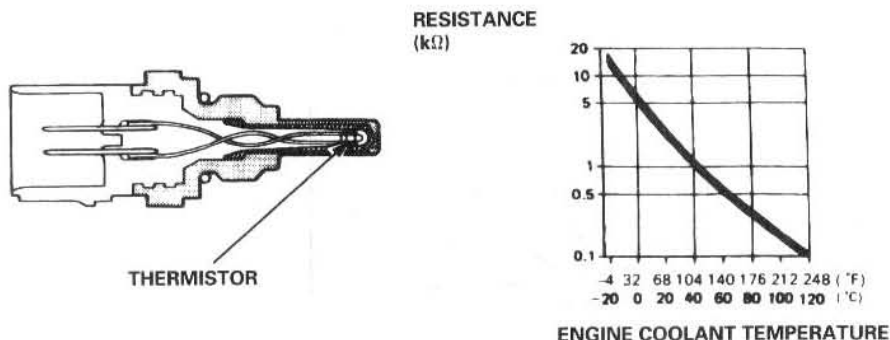
Wire side of female terminals



Engine Coolant Temperature (ECT) Sensor

P0116 The scan tool indicates Diagnostic Trouble Code (DTC) P0116: A range/performance problem in the Engine Coolant Temperature (ECT) Sensor circuit.

The ECT Sensor is a temperature dependant resistor (thermistor). The resistance of the thermistor decreases as the engine coolant temperature increases as shown below.

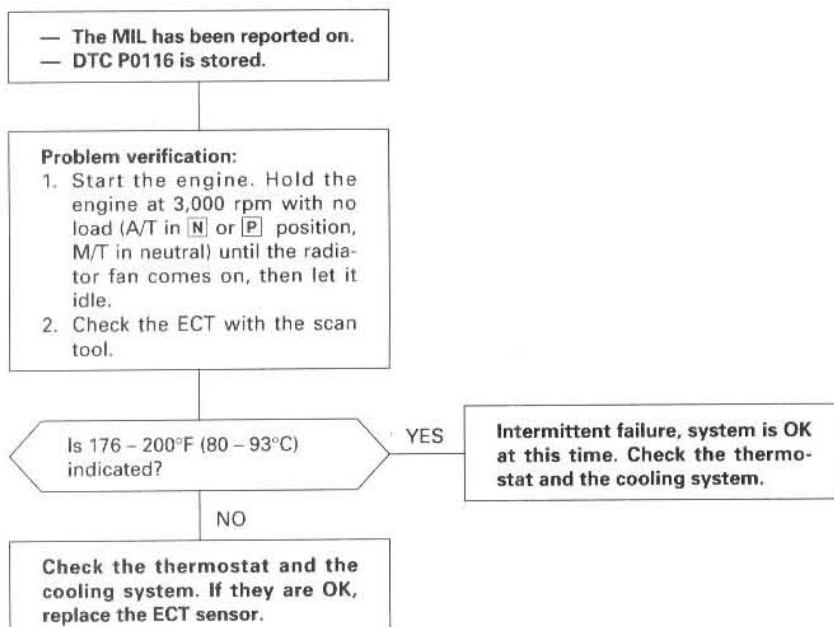


NOTE: If DTC P0117 and/or P0118 are stored at the same time as DTC P0116, troubleshoot those DTCs first, then troubleshoot DTC P0116.

Possible Cause

- ECT sensor deterioration
- Malfunction in the thermostat and the cooling system

Troubleshooting Flowchart



(cont'd)

Engine Coolant Temperature (ECT) Sensor (cont'd)

P0117 The scan tool indicates Diagnostic Trouble Code (DTC) P0117: A low input (high temperature) problem in the Engine Coolant Temperature (ECT) sensor circuit.

- The MIL has been reported on.
- DTC P0117 is stored.

Problem verification:

1. Turn the ignition switch ON (II).
2. Check the ECT with the scan tool.

NOTE: If you are using a Honda PGM Tester, you must select the OBDII Generic mode to obtain the correct temperature reading.

Is 302°F (150°C) or higher (or H-Limit in Honda mode of PGM Tester) or 0 V indicated?

NO

Intermittent failure, system is OK at this time. Check for poor connections or loose wires at C285 (located at right shock tower), C129 (ECT sensor) and ECM.

YES

Check for a short in the ECT sensor:

1. Disconnect the ECT sensor 2P connector.
2. Check the ECT with the scan tool.

Is 302°F (150°C) or higher (or H-Limit in Honda mode of PGM Tester) or 0 V indicated?

NO

Replace the ECT sensor.

YES

Check for a short in the wire (ECT line):

1. Turn the ignition switch OFF.
2. Disconnect the ECM connector D (16P).
3. Check for continuity between the ECT sensor 2P connector terminal No. 2 and body ground.

Is there continuity?

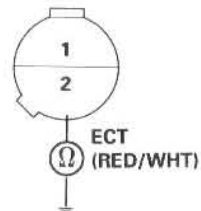
YES

Repair short in the wire between ECM (D2) and ECT sensor.

NO

Substitute a known-good ECM and recheck (see page 11-37 for immobilizer information). If normal ECT is indicated, replace the original ECM.

ECT SENSOR 2P CONNECTOR (C129)



Wire side of female terminals



P0118 The scan tool indicates Diagnostic Trouble Code (DTC) P0118: A high input (low temperature) problem in the Engine Coolant Temperature (ECT) sensor circuit.

- The MIL has been reported on.
- DTC P0118 is stored.

Problem verification:

1. Turn the ignition switch ON (II).
2. Check the ECT with the scan tool.

NOTE: If you are using a Honda PGM Tester, you must select the OBDII Generic mode to obtain the correct temperature reading.

Is -4°F (-20°C) or less (or L-Limit in Honda mode of PGM Tester) or 5 V indicated?

NO

Intermittent failure, system is OK at this time. Check for poor connections or loose wires at C285 (located at right shock tower), C129 (ECT sensor) and ECM.

YES

Check for an open in the ECT sensor:

1. Disconnect the ECT sensor connector.
2. Connect the ECT sensor 2P connector terminals No. 1 and No. 2 with a jumper wire.
3. Check the ECT with the scan tool.

Is -4°F (-20°C) or less (or L-Limit in Honda mode of PGM Tester) or 5 V indicated?

NO

Replace the ECT sensor.

YES

Check for an open in the wires (ECT, SG2 lines):

1. Turn the ignition switch OFF.
2. Connect ECM connector terminals D2 and D11 with a jumper wire.
3. Turn the ignition switch ON (II).
4. Check the ECT with the scan tool.

Is -4°F (-20°C) or less (or L-Limit in Honda mode of PGM Tester) or 5 V indicated?

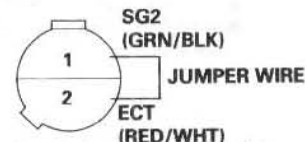
NO

Repair open in the wires between ECM (D2, D11) and ECT sensor.

YES

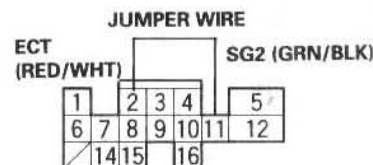
Substitute a known-good ECM and recheck (see page 11-37 for immobilizer information). If normal ECT is indicated, replace the original ECM.

ECT SENSOR 2P CONNECTOR (C129)



Wire side of female terminals

ECM CONNECTOR D (16P)



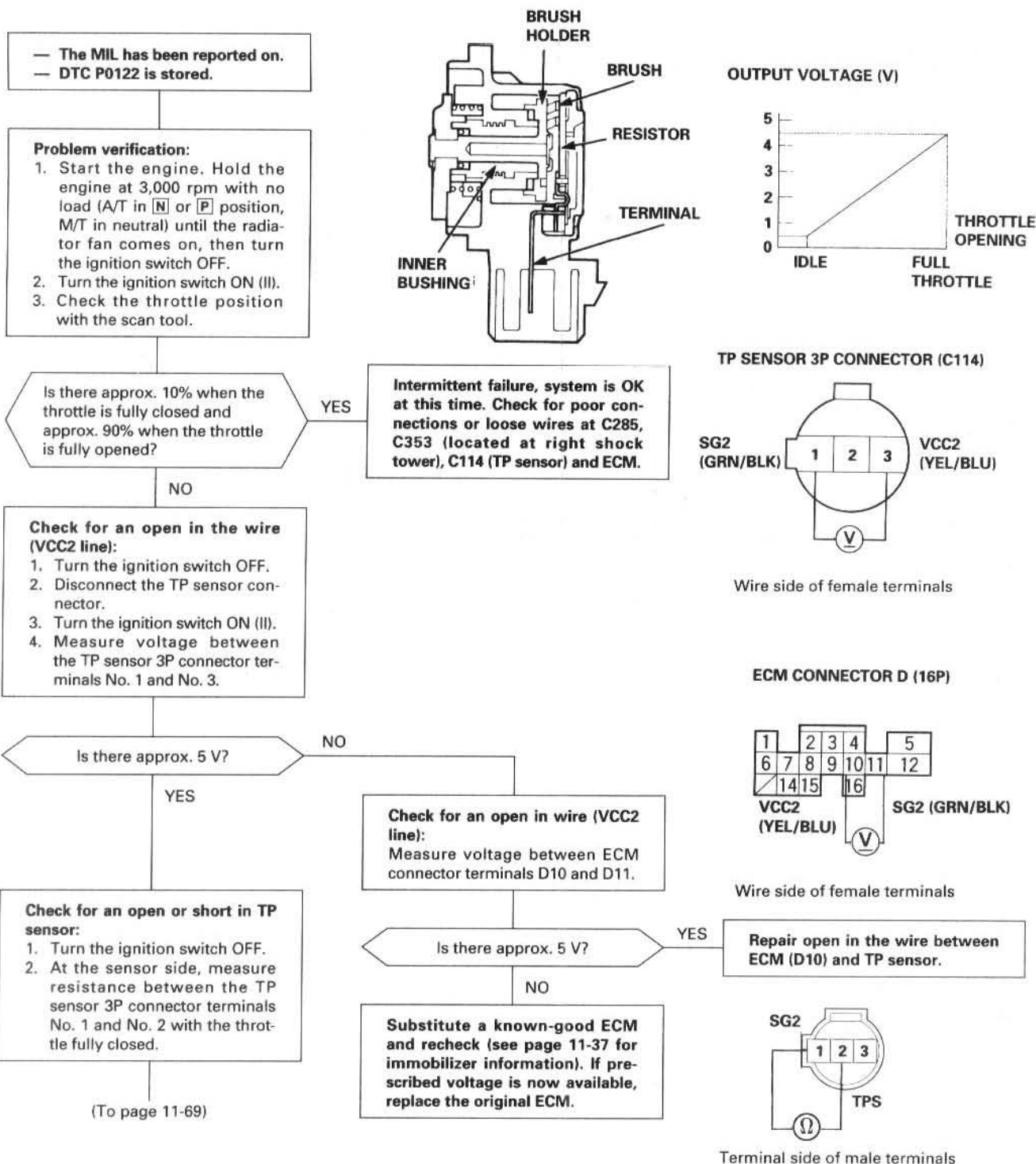
Wire side of female terminals

PGM-FI System

Throttle Position (TP) Sensor

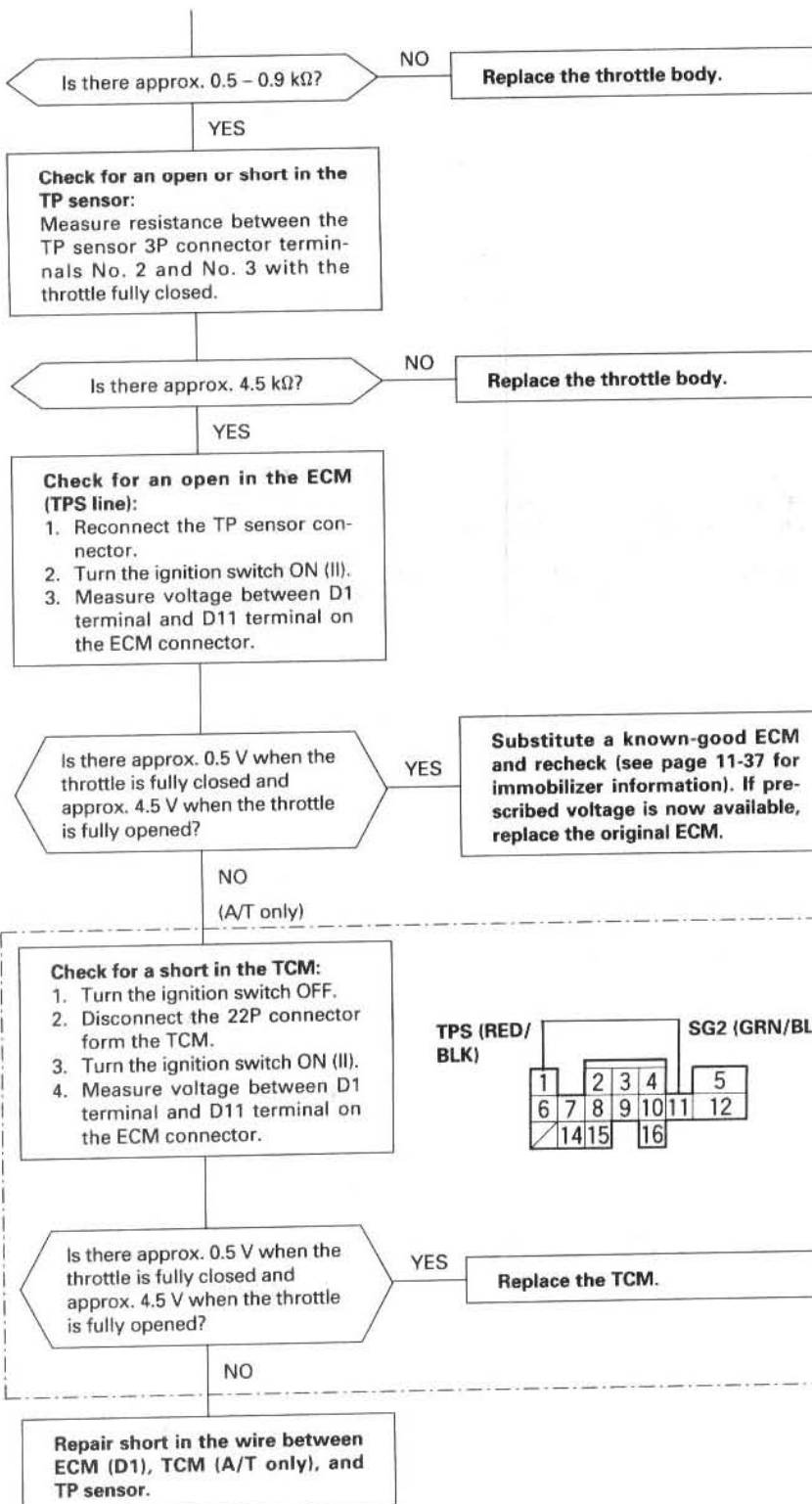
P0122 The scan tool indicates Diagnostic Trouble Code (DTC) P0122: A low input (voltage) problem in the Throttle Position (TP) sensor circuit.

The TP Sensor is a potentiometer. It is connected to the throttle valve shaft. As the throttle position changes, the throttle position sensor varies the voltage signal to the ECM.

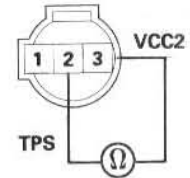




(From page 11-68)

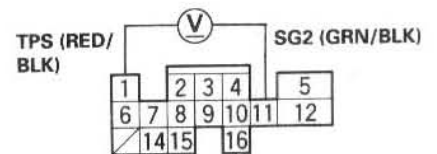


TP SENSOR 3P CONNECTOR



Terminal side of male terminals

ECM CONNECTOR D (16P)



Wire side of female terminals

(cont'd)

PGM-FI System

Throttle Position (TP) Sensor (cont'd)

P0123 The scan tool indicates Diagnostic Trouble Code (DTC) P0123: A high input (voltage) problem in the Throttle Position (TP) sensor circuit.

- The MIL has been reported on.
- DTC P0123 is stored.

Problem verification:

1. Start the engine. Hold the engine at 3,000 rpm with no load (A/T in **N** or **P** position, M/T in neutral) until the radiator fan comes on, then turn the ignition switch OFF.
2. Turn the ignition switch ON (II).
3. Check the throttle position with the scan tool.

Is there approx. 10% when the throttle is fully closed and approx. 90% when the throttle is fully opened?

YES

Intermittent failure, system is OK at this time. Check for poor connections or loose wires at C285, C353 (located at right shock tower), C114 (TP sensor) and ECM.

NO

Check for an open in the TP sensor:

1. Turn the ignition switch OFF.
2. Disconnect the TP sensor connector.
3. Turn the ignition switch ON (II).
4. At the harness side, measure voltage between the TP sensor 3P connector terminals No. 1 and No. 3.

Is there approx. 5 V?

YES

Replace the throttle body.

NO

Check for an open in the wire (SG2 line):

Measure voltage between ECM connector terminals D10 and D11.

Is there approx. 5 V?

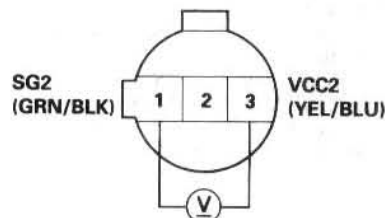
YES

Repair open in the wire between ECM (D11) and TP sensor.

NO

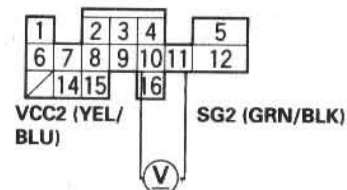
Substitute a known-good ECM and recheck (see page 11-37 for immobilizer information). If prescribed voltage is now available, replace the original ECM.

TP SENSOR 3P CONNECTOR (C114)



Wire side of female terminals

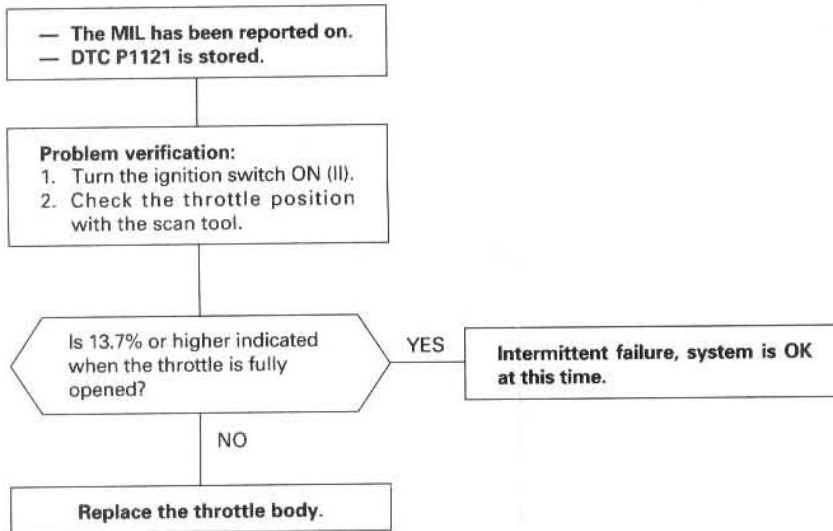
ECM CONNECTOR D (16P)



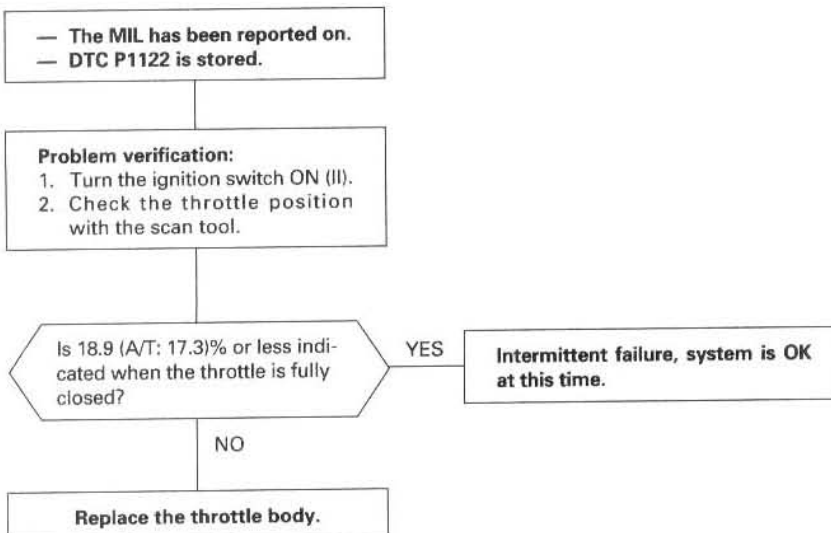
Wire side of female terminals



P1121 The scan tool indicates Diagnostic Trouble Code (DTC) P1121: Throttle Position (TP) lower than expected.



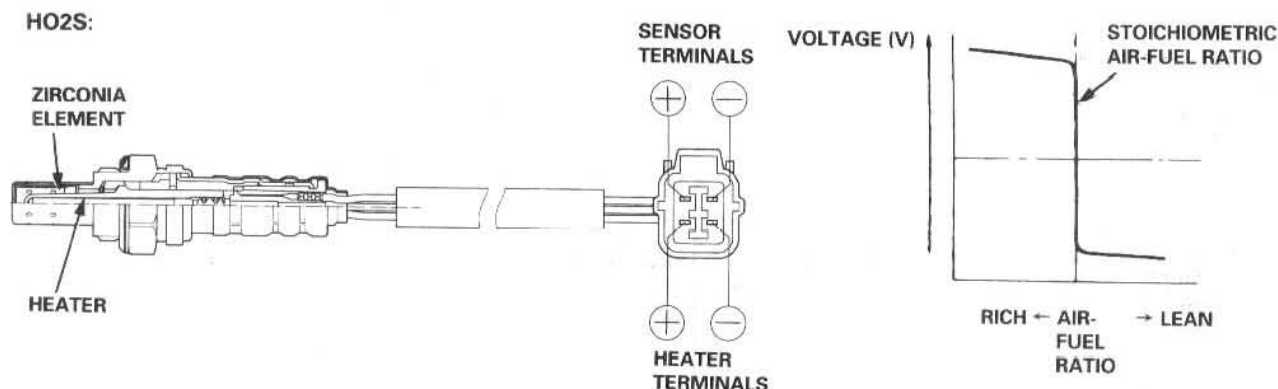
P1122 The scan tool indicates Diagnostic Trouble Code (DTC) P1122: Throttle Position (TP) higher than expected.



PGM-FI System

Primary Heated Oxygen Sensor (Primary HO2S) (Sensor 1)

The Heated Oxygen Sensor (HO2S) detects the oxygen content in the exhaust gas and signals the ECM. In operation, the ECM receives the signals from the sensor and varies the duration during which fuel is injected. To stabilize the sensor's output, the sensor has an internal heater. The Primary HO2S (Sensor 1) is installed in exhaust pipe A.



P0131 The scan tool indicates Diagnostic Trouble Code (DTC) P0131: A low voltage problem in the Primary Heated Oxygen Sensor (HO2S) (Sensor 1) circuit.

- The MIL has been reported on.
- DTC P0131 is stored.

Problem verification:

1. Do the ECM Reset Procedure.
2. Start the engine. Hold the engine at 3,000 rpm with no load (A/T in **N** or **P** position, M/T in neutral) until the radiator fan comes on.
3. Test-drive with the A/T in **2** position (M/T in 4th gear)
4. Check the Primary HO2S (Sensor 1) output voltage with the scan tool during acceleration using wide open throttle.

Does the voltage stay at 0.1 V or less?

NO

YES

Check the fuel pressure.

Is it normal?

NO

YES

Intermittent failure, system is OK at this time. Check for poor connections or loose wires at C282 (located at right shock tower) C118, C293*1 (Primary HO2S, sensor 1) and ECM.

*1: with ATTS

Repair fuel supply system.

(To page 11-73)



(From page 11-72)

Check for a short in the Primary HO2S:
1. Turn the ignition switch OFF.
2. Disconnect the Primary HO2S (Sensor 1) 4P connector.
3. Start the engine and let it idle.
4. Check the Primary HO2S (Sensor 1) output voltage with the scan tool.

Does it stay at 0.1 V or less?

NO

Replace the HO2S.

YES

Check for a short in the wire (PHO2S line):
1. Turn the ignition switch OFF.
2. Disconnect the ECM connector D (16P).
3. Check for continuity between the Primary HO2S (Sensor 1) 4P connector terminal No. 2 and body ground.

Is there continuity?

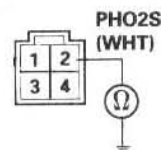
YES

Repair short in the wire between ECM (D7) and Primary HO2S (Sensor 1).

NO

Substitute a known-good ECM and recheck (see page 11-37 for immobilizer information). If symptom/indication goes away, replace the original ECM.

PRIMARY HO2S (Sensor 1) 4P CONNECTOR (C118, C293*1)



Terminal side of male terminals

*1: with ATTS

(cont'd)

Primary Heated Oxygen Sensor (Primary HO2S) (Sensor 1) (cont'd)

P0132 The scan tool indicates Diagnostic Trouble Code (DTC) P0132: A high voltage problem in the Primary Heated Oxygen Sensor (Primary HO2S) (Sensor 1) circuit.

- The MIL has been reported on.
- DTC P0132 is stored.

Problem verification:

1. Do the ECM Reset Procedure.
2. Start the engine. Hold the engine at 3,000 rpm with no load (A/T in **N** or **P** position, M/T in neutral) until the radiator fan comes on.
3. Test-drive with the A/T in **2** position (M/T in 4th gear).
4. Check the Primary HO2S (Sensor 1) output voltage with the scan tool during deceleration using completely closed throttle.

Does the voltage stay at 1.0 V or more?

NO

Intermittent failure, system is OK at this time. Check for poor connections or loose wires at C282 (located at right shock tower), C118, C293*1 (Primary HO2S, Sensor 1) and ECM.

YES

Check for an open in the Primary HO2S:

1. Turn the ignition switch OFF.
2. Disconnect the Primary HO2S (Sensor 1) connector.
3. Connect the Primary HO2S (Sensor 1) 4P connector terminals No. 1 and No. 2 with a jumper wire.
4. Turn the ignition switch ON (II).
5. Check the Primary HO2S (Sensor 1) output voltage with the scan tool.

Is there 1.0 V or more?

NO

Replace the Primary HO2S.

YES

Check for an open in the wires (PHO2S, SG2 lines):

1. Turn the ignition switch OFF.
2. Connect ECM connector terminals D7 and D11 with a jumper wire.
3. Turn the ignition switch ON (II).
4. Check the Primary HO2S (Sensor 1) output voltage with the scan tool.

Is there 1.0 V or more?

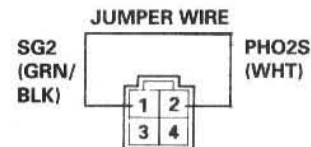
NO

Repair open in the wire between ECM (D7 or D11) and Primary HO2S (Sensor 1).

YES

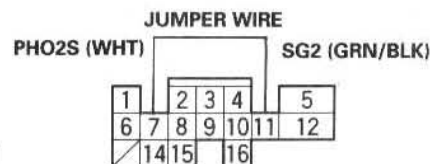
Substitute a known-good ECM and recheck (see page 11-37 for immobilizer information). If symptom/indication goes away, replace the original ECM.

PRIMARY HO2S (Sensor 1) 4P CONNECTOR (C118, C293*1)



Terminal side of male terminals

ECM CONNECTOR D (16P)



Wire side of female terminals

*1: with ATTS



P0133 The scan tool indicates Diagnostic Trouble Code (DTC) P0133: A slow response problem in the Primary Heated Oxygen Sensor (Primary HO2S) (Sensor 1) circuit.

Description

By controlling the air/fuel ratio with a Primary HO2S (Sensor 1) and a Secondary HO2S (Sensor 2), the deterioration of the Primary HO2S (Sensor 1) can be evaluated by its feedback period. When the feedback period of the HO2S exceeds a certain value during stable driving conditions, the sensor will be judged as deteriorated.

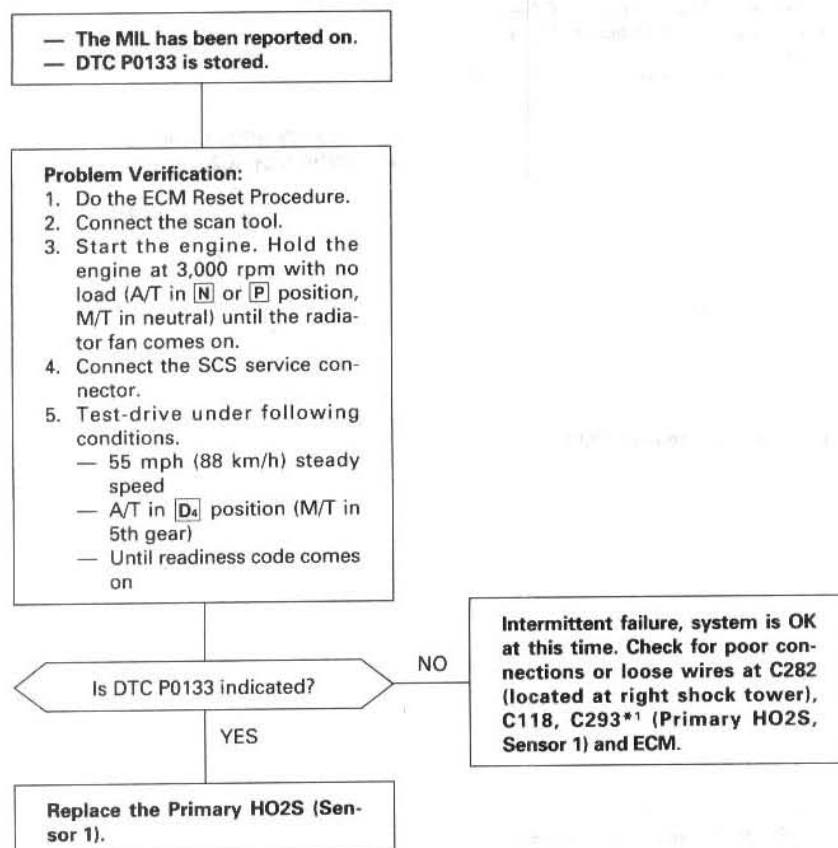
When deterioration has been detected during two consecutive trips, the MIL comes on and DTC P0133 will be stored.

NOTE: If DTC P0131, P0132 and/or P0135 are stored at the same time as DTC P0133, troubleshoot those DTCs first, then troubleshoot DTC P0133.

Possible Cause

- Primary HO2S (Sensor 1) Deterioration
- Primary HO2S Heater (Sensor 1) Deterioration
- Exhaust system leakage

Troubleshooting Flowchart



*1: with ATTS

PGM-FI System

Secondary Heated Oxygen Sensor (Secondary HO2S) (Sensor 2)

P0137 The scan tool indicates Diagnostic Trouble Code (DTC) P0137: A low voltage problem in the Secondary Heated Oxygen Sensor (Secondary HO2S) (Sensor 2) circuit.

- The MIL has been reported on.
- DTC P0137 is stored.

Problem verification:

1. Do the ECM Reset Procedure.
2. Start the engine. Hold the engine at 3,000 rpm with no load (A/T in **N** or **P** position, M/T in neutral) until the radiator fan comes on.
3. Check the Secondary HO2S (Sensor 2) output voltage at 3,000 rpm with the scan tool.

Does the voltage stay at 0.3 V or less?

NO

Intermittent failure, system is OK at this time. Check for poor connections or loose wires at C294 (Secondary HO2S) (Sensor 2) and ECM.

YES

Check for a short in the Secondary HO2S:

1. Turn the ignition switch OFF.
2. Disconnect the Secondary HO2S (Sensor 2) 4P connector.
3. Start the engine and let it idle.
4. Check the Secondary HO2S (Sensor 2) output with the scan tool.

Does the voltage stay at 0.3 V or less?

NO

Replace the Secondary HO2S.

YES

Check for a short in the wire (SHO2S line):

1. Turn the ignition switch OFF.
2. Disconnect the ECM connector D (16P).
3. Check for continuity between the Secondary HO2S (Sensor 2) 4P connector terminal No. 2 and body ground.

Is there continuity?

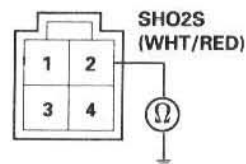
YES

Repair short in the wire between ECM (D14) and Secondary HO2S (Sensor 2).

NO

Substitute a known-good ECM and recheck (see page 11-37 for immobilizer information). If symptom/indication goes away, replace the original ECM.

SECONDARY HO2S (Sensor 2)
4P CONNECTOR (C294)



Terminal side of male terminals

**P0138**

The scan tool indicates Diagnostic Trouble Code (DTC) P0138: A high voltage problem in the Secondary Heated Oxygen Sensor (Secondary HO2S) (Sensor 2) circuit.

- The MIL has been reported on.
- DTC P0138 is stored.

Problem verification:

1. Do the ECM Reset Procedure.
2. Start the engine. Hold the engine at 3,000 rpm with no load (A/T in **N** or **P** position, M/T in neutral) until the radiator fan comes on.
3. Check the Secondary HO2S (Sensor 2) output voltage at 3,000 rpm with the scan tool.

Does the voltage stay at 0.6 V or more?

NO

Intermittent failure, system is OK at this time. Check for poor connections or loose wires at C294 (Secondary HO2S Sensor 2) and ECM.

YES

Check for an open in the Secondary HO2S:

1. Turn the ignition switch OFF.
2. Disconnect the Secondary HO2S (Sensor 2) 4P connector.
3. Connect the Secondary HO2S (Sensor 2) 4P connector terminals No. 1 and No. 2 with a jumper wire.
4. Turn the ignition switch ON (II).
5. Check the Secondary HO2S (Sensor 2) output voltage with the scan tool.

Is there 0.6 V or more?

NO

Replace the Secondary HO2S (Sensor 2).

YES

Check for an open in the wires (SHO2S, SG2 lines):

1. Turn the ignition switch OFF.
2. Connect ECM connector terminals D14 and D11 with a jumper wire.
3. Turn the ignition switch ON (II).
4. Check the Secondary HO2S (Sensor 2) output voltage with the scan tool.

Is there 0.6 V or more?

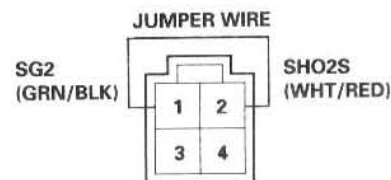
NO

Repair open in the wire between ECM (D14 or D11) and Secondary HO2S (Sensor 2).

YES

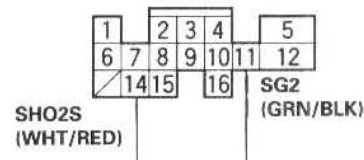
Substitute a known-good ECM and recheck (see page 11-37 for immobilizer information). If symptom/indication goes away, replace the original ECM.

SECONDARY HO2S (Sensor 2)
4P CONNECTOR (C294)



Terminal side of male terminals

ECM CONNECTOR D (16P)



JUMPER WIRE

Wire side of female terminals

(cont'd)

Secondary Heated Oxygen Sensor (Secondary HO2S) (Sensor 2) (cont'd)

P0139 The scan tool indicates Diagnostic Trouble Code (DTC) P0139: A slow response problem in the Secondary Heated Oxygen Sensor (HO2S) (Sensor 2) circuit.

- The MIL has been reported on.
- DTC P0139 is stored.

Problem verification:

1. Do the ECM Reset Procedure.
2. Start the engine. Hold the engine at 3,000 rpm with no load (A/T in **N** or **P** position, M/T in neutral) until the radiator fan comes on.
3. Check the Secondary HO2S (Sensor 2) output voltage at 3,000 rpm with the scan tool.

Does the voltage stay within 0.3 – 0.6 V for two minutes?

NO

Intermittent failure, system is OK at this time. Check for poor connections or loose wires at C294 (Secondary HO2S) (Sensor 2) and ECM.

YES

Replace the Secondary HO2S (Sensor 2).



Heated Oxygen Sensor (HO2S) Heater

P0135

The scan tool indicates Diagnostic Trouble Code (DTC) P0135: A problem in the Primary Heated Oxygen Sensor (Primary HO2S) (Sensor 1) Heater circuit.

P0141

The scan tool indicates Diagnostic Trouble Code (DTC) P0141: A problem in the Secondary Heated Oxygen Sensor (Secondary HO2S) (Sensor 2) Heater circuit.

- The MIL has been reported on.
- DTC P0135, and/or P0141 are stored.

Problem verification:

1. Do the ECM Reset Procedure.
2. Start the engine.

Is DTC P0135 or P0141 indicated?

NO

Intermittent failure, system is OK at this time. Check for poor connections or loose wires at C282 (located at right shock tower), C118, C293*¹ (Primary HO2S, Sensor 1), C294 (Secondary HO2S, Sensor 2)* and ECM.

YES

Check for an open or short in the HO2S:

1. Turn the ignition switch OFF.
2. Disconnect the HO2S (Primary or Secondary*) (Sensor 1 or Sensor 2) 4P connector.
3. At the HO2S side, measure resistance between the HO2S 4P connector terminals No.3 and No. 4.

Is there 10 – 40 Ω ?

NO

Replace the HO2S (Primary or Secondary*).

YES

Check for continuity between body ground and the HO2S 4P connector terminals No. 3 and No. 4 individually.

Is there continuity?

YES

Replace the HO2S (Primary or Secondary*).

NO

Check for an open or short in the wire (PO2SHTC, SO2SHTC* line):

1. Turn the ignition switch ON (II).
2. Measure voltage between the HO2S 4P connector terminals No. 3 and No. 4.

Is there battery voltage?

YES

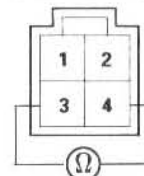
*: P0141
*1: With ATTS

NO

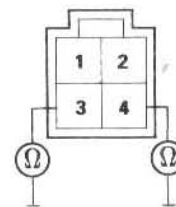
(To page 11-80)

(To page 11-80)

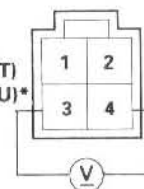
PRIMARY HO2S (Sensor 1) 4P CONNECTOR (C118, C293*¹), SECONDARY HO2S (Sensor 2) 4P CONNECTOR (C294)*



Terminal side of male terminals



PO2SHTC (BLK/WHT)
SO2SHTC (ORN/BLU)*

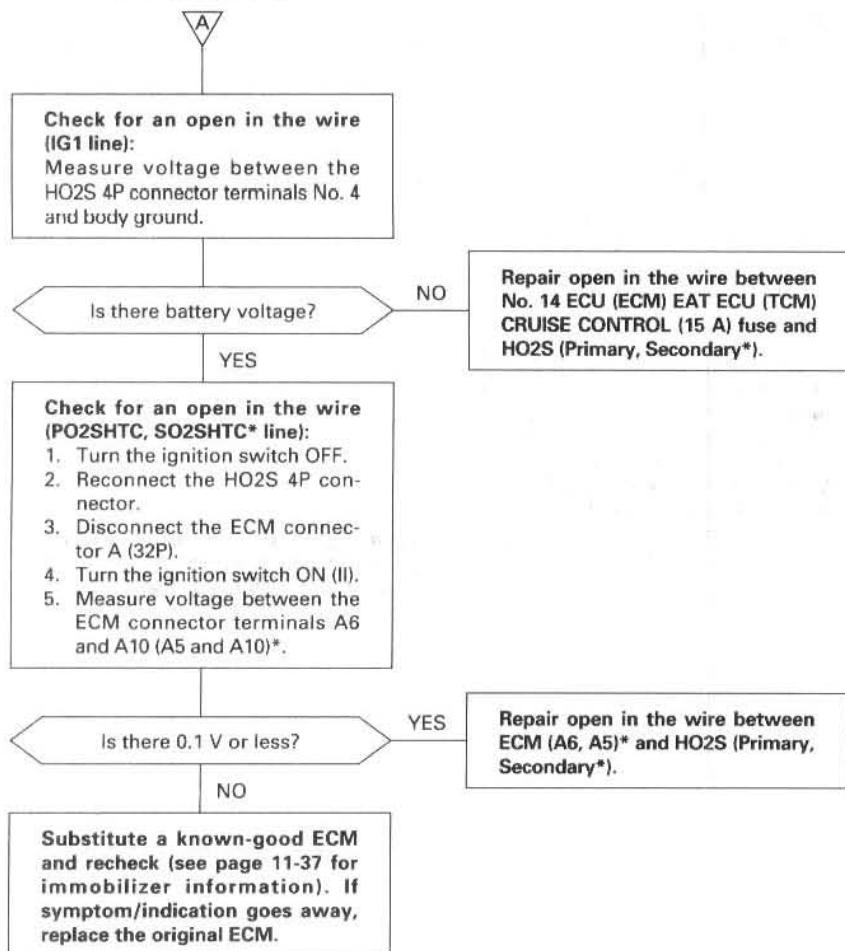


IG1 (BLK/YEL)

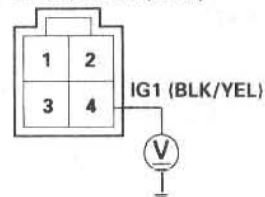
(cont'd)

Heated Oxygen Sensor (HO2S) Heater (cont'd)

(From page 11-79)

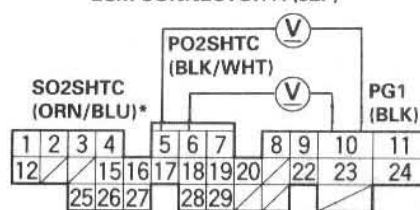


PRIMARY HO2S (Sensor 1) 4P CONNECTOR (C118, C293*), SECONDARY HO2S (Sensor 2) 4P CONNECTOR (C294)*



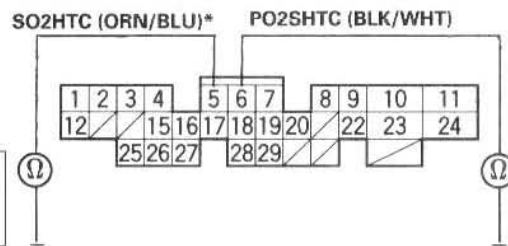
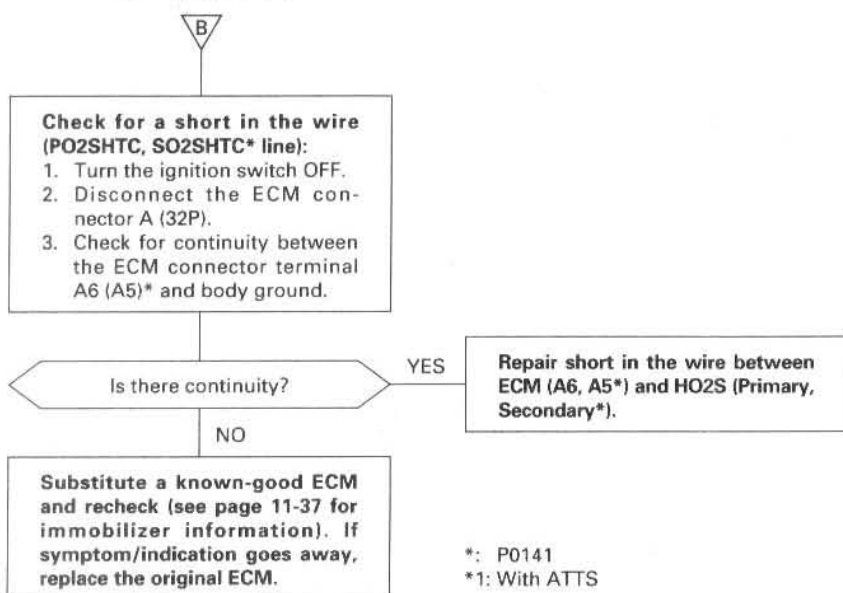
Terminal side of male terminals

ECM CONNECTOR A (32P)



Wire side of female terminals

(From page 11-79)



*: P0141

*1: With ATTS



Fuel Supply System

P0171 The scan tool indicates Diagnostic Trouble Code (DTC) P0171: The fuel system is too lean.

P0172 The scan tool indicates Diagnostic Trouble Code (DTC) P0172: The fuel system is too rich.

Description

By monitoring the Long Term Fuel Trim, long term malfunctions in the fuel system will be detected.

If a malfunction has been detected during two consecutive trips, the MIL will come on and DTC P0171 and/or P0172 will be stored.

NOTE: If some of the DTCs listed below are stored at the same time as DTC P0171 and/or P0172, troubleshoot those DTCs first, then troubleshoot DTC P0171 and/or P0172.

P0107-8, P1128-9: MAP Sensor

P0135: Primary HO2S (Sensor 1) Heater

P0137-8: Secondary HO2S (Sensor 2)

P0141: Secondary HO2S (Sensor 2) Heater

P0401: EGR Flow Insufficient

P0441: EVAP System Insufficient Purge Flow*

P1259: VTEC System

P1491: EGR Valve Lift Insufficient

P1498: EGR Valve Lift Sensor High Voltage

*: '97 (49ST, Canada) model

Possible Cause

DTC P0171
System too lean

- Fuel Pump insufficient flow/pressure
- Fuel Feed Line clogged, leaking
- Fuel Pressure Regulator stuck open
- Fuel Filter clogged
- Fuel Injector clogged, air inclusion
- Gasoline doesn't meet Owner's Manual spec.
- Primary HO2S (Sensor 1) deteriorated
- EGR System malfunction (too much flow)
- Valve Clearance
- Exhaust leak

DTC P0172
System too rich

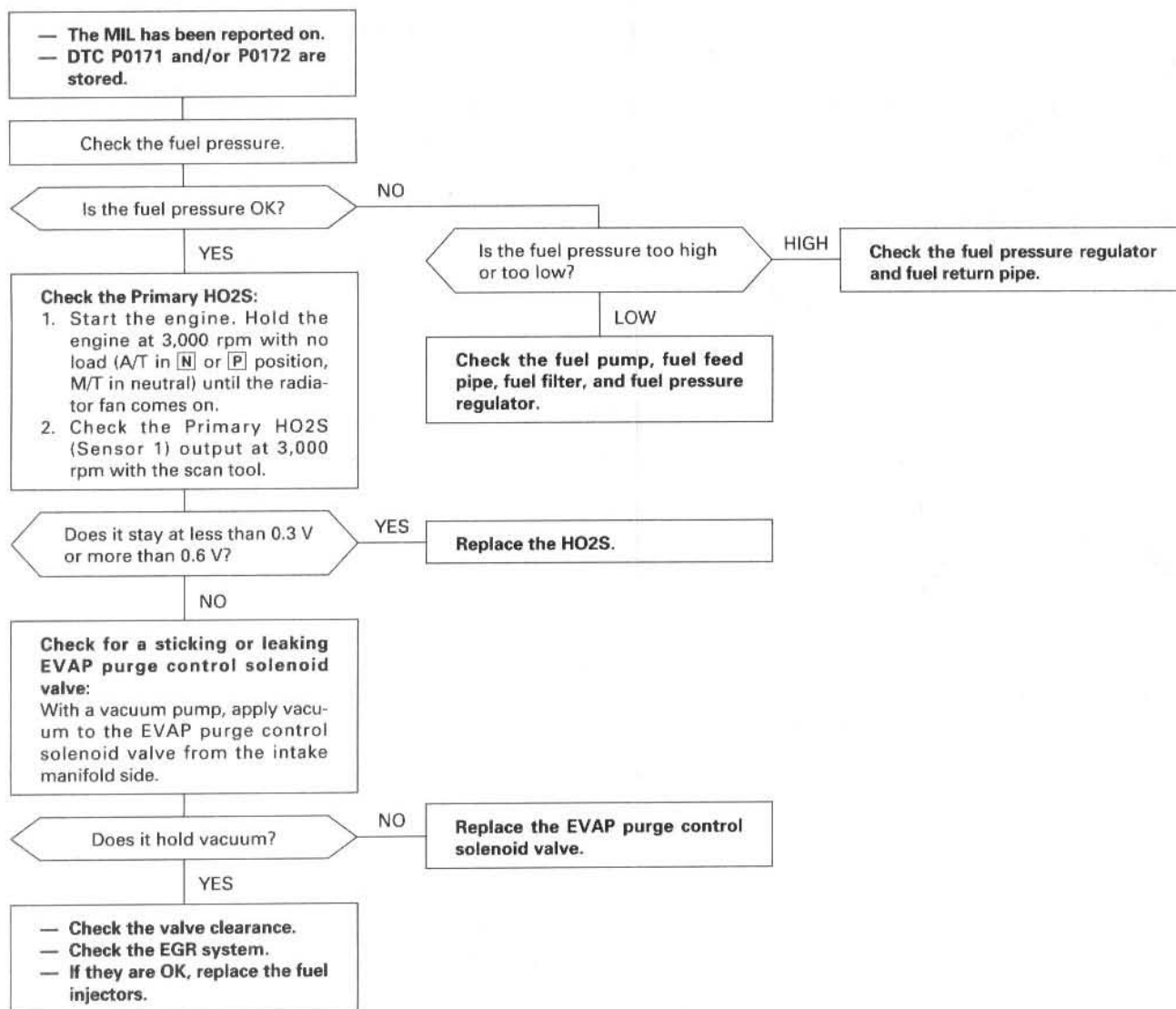
- Fuel Pressure Regulator clogged, stuck closed
- Fuel Return Pipe clogged
- Fuel Injector leaking
- Gasoline doesn't meet Owner's Manual spec.
- Primary HO2S (Sensor 1) deteriorated
- EGR System insufficient flow
- EVAP Purge Control Solenoid Valve leaking, stuck opened
- Valve Clearance

(cont'd)

PGM-FI System

Fuel Supply System (cont'd)

Troubleshooting Flowchart





Misfire Detected in One Cylinder

P0301 The scan tool indicates Diagnostic Trouble Code (DTC) P0301: Cylinder 1 misfire detected.

P0302 The scan tool indicates Diagnostic Trouble Code (DTC) P0302: Cylinder 2 misfire detected.

P0303 The scan tool indicates Diagnostic Trouble Code (DTC) P0303: Cylinder 3 misfire detected.

P0304 The scan tool indicates Diagnostic Trouble Code (DTC) P0304: Cylinder 4 misfire detected.

Description

Misfire detection is accomplished by monitoring the crankshaft speed with the crankshaft position (CKP) sensor which is attached to the crankshaft.

If misfiring strong enough to damage the catalyst is detected, the MIL will blink during the time of its occurrence, and DTC P0301, P0302, P0303 and/or P0304 will be stored. Then, after the misfire has ceased, the MIL will come on.

If misfiring that increases emissions is detected during two consecutive driving cycles, the MIL will come on, and DTC P0301, P0302, P0303 and/or P0304 will be stored.

NOTE: If some of the DTCs listed below are stored at the same time as a misfire DTC, troubleshoot those DTCs first, then troubleshoot the misfire DTC.

P0171, P0172: Fuel supply system

P0401, P1491, P1498: EGR system

P0441: EVAP incorrect purge flow*

P1359, P1361, P1362: TDC sensor

P1381, P1382: CYP sensor

*: '97 (49ST, Canada) model

Possible Cause

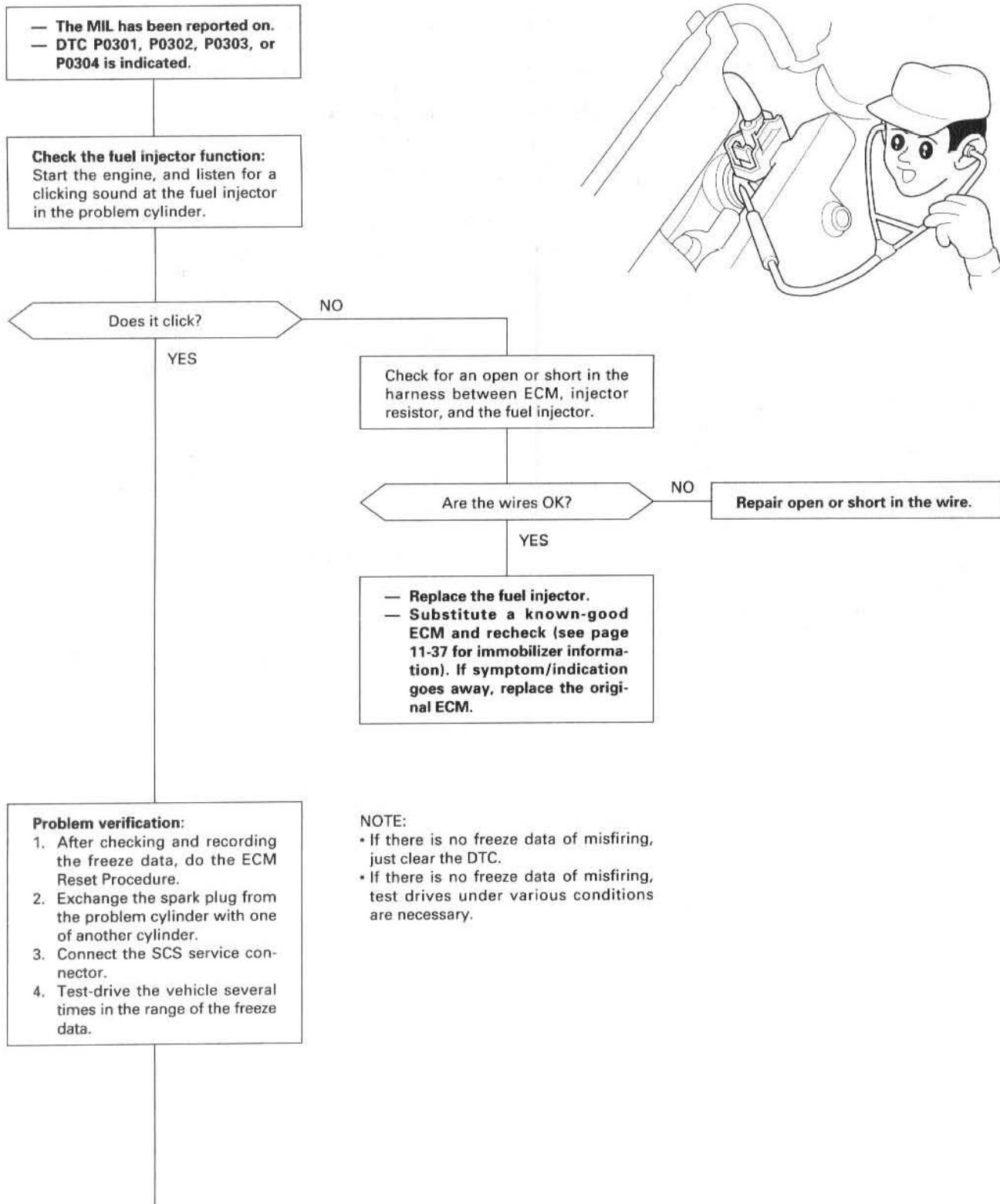
- Fuel injector clogging, fuel leakage, air leakage
- Fuel injector circuit open or shorted
- Injector resistor malfunction
- Spark plug carbon deposits, fouling, malfunction
- Ignition wires open, leaking
- Distributor malfunction
- Compression low
- Valve clearance out of specification

(cont'd)

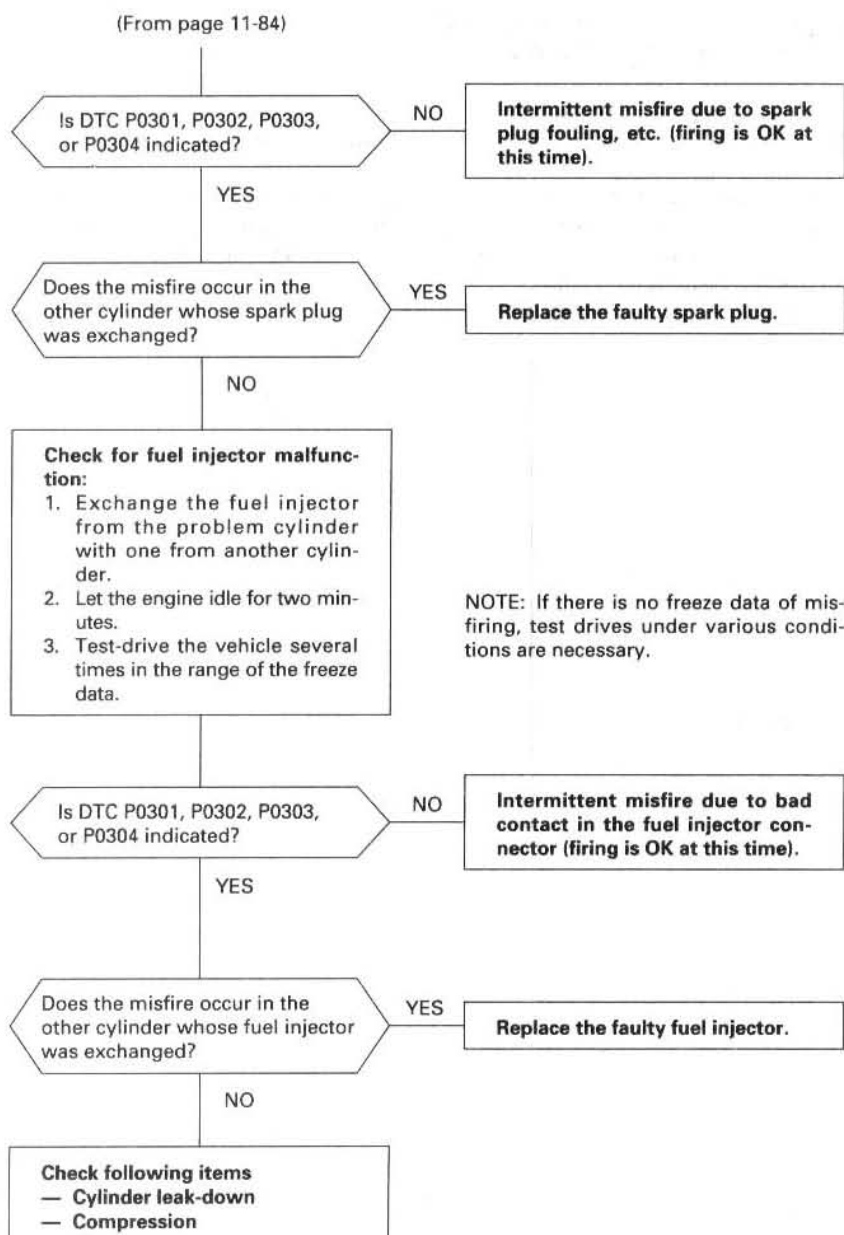
PGM-FI System

Misfire Detected in One Cylinder (cont'd)

Troubleshooting Flowchart



(To page 11-85)



PGM-FI System

Random Misfire

P0300*1 **P1300***2 and **P0301 through P0304** The scan tool indicates Diagnostic Trouble Code (DTC) P0300*1 or P1300*2 and some of P0301 – P0304: Random misfire.

Description

Misfire detection is accomplished by monitoring the crankshaft speed with the crankshaft position (CKP) sensor which is attached to the crankshaft.

If misfiring strong enough to damage the catalyst is detected, the MIL will blink during the time of its occurrence, and DTC P0300*1 or P1300*2 and some of DTCs P0301 through P0304 will be stored. Then, after misfire has ceased, the MIL will come on.

If misfiring that increases emissions is detected during two consecutive driving cycles, the MIL will come on, and DTC P0300*1 or P1300*2 and some of DTCs P0301 through P0304 will be stored.

NOTE: If some of the DTCs listed below are stored at the same time as a misfire DTC, troubleshoot those DTCs first, then troubleshoot the misfire DTC.

P1128, P1129: MAP sensor
P0171, P0172: Fuel metering
P0401, P1491, P1498: EGR system
P0505: Idle Control System
P1253: VTEC System
P1361, P1362: TDC sensor
P1381, P1382: CYP sensor
P1508: IAC valve

*1: '99 model, '98 model

*2: '97 model

Possible Cause

- Fuel pump insufficient fuel pressure, amount of flow
- Fuel line clogging, blockage, leakage
- Fuel filter clogging
- Fuel pressure regulator stuck open
- EGR system malfunction
- Distributor malfunction
- Ignition coil wire open, leakage
- Ignition control module malfunction
- Valves carbon deposit
- Compression low
- VTEC system malfunction
- Fuel does not meet Owner's Manual spec., lack of fuel

Troubleshooting

By test-driving, determine the conditions during which misfire occurs. Depending on these conditions, test in the order described in the table below.

Possible cause Page	EGR system	Crankshaft position sensor	Fuel pressure	Distributor and Ignition wires	ICM	Valve Clearance
Condition	11-152	section 6	11-123	section 23	section 23	section 6
Only low rpm and load	①	④	②			③
Only accelerating			②	①	③	
Only high rpm and load		⑤	①	②	③	④
Not specification		⑤	①	②	③	④

NOTE: If misfire doesn't recur, some possible causes are fuel that doesn't meet owner's manual spec, lack of fuel, carbon deposits on spark plug, etc.



Knock Sensor (KS)

P0325 The scan tool indicates Diagnostic Trouble Code (DTC) P0325: A malfunction in the circuit of the Knock Sensor (KS).

- The MIL has been reported on.
- DTC P0325 is stored.

Problem verification:

1. Do the ECM Reset Procedure.
2. Start the engine. Hold the engine at 3,000 rpm with no load (A/T in **N** or **P** position, M/T in neutral) until the radiator fan comes on, then let it idle.
3. Hold the engine at 3,000 – 4,000 rpm for at least 60 seconds.

Is DTC P0325 indicated?

NO

Intermittent failure, system is OK at this time (test drive may be necessary).
Check for poor connections or loose wires at C282 (located at right shock tower), C111 (knock sensor (KS)) and ECM.

YES

Check for a short in the wire (KS line):

1. Turn the ignition switch OFF.
2. Disconnect the knock sensor 1P connector.
3. Check for continuity between ECM connector terminals D6 and body ground.

Is there continuity?

YES

Repair short in the wire between ECM (D6) and knock sensor.

NO

Check for an open in the wire (KS line):

Check for continuity between ECM connector terminal D6 and knock sensor connector terminal No. 1.

Is there continuity?

NO

Repair open in the wire between ECM (D6) and knock sensor.

YES

Substitute a known-good knock sensor and recheck.

Knock sensor torque:
31 N·m (3.2 kg·m, 23 lb·ft)

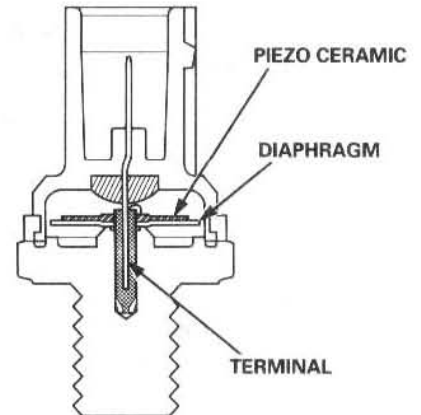
Is DTC P0325 indicated?

NO

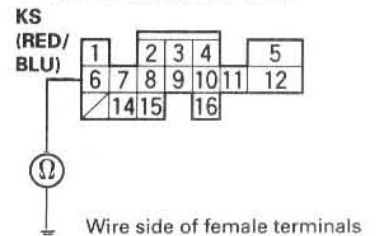
Replace the original knock sensor.

YES

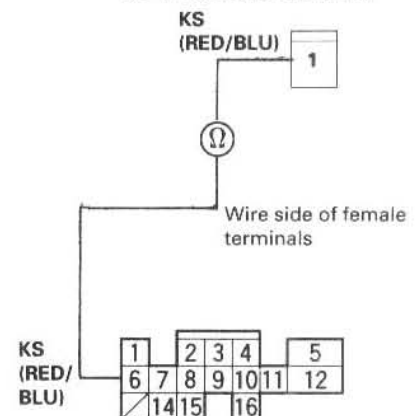
Substitute a known-good ECM and recheck (see page 11-37 for immobilizer information). If symptom/indication goes away, replace the original ECM.



ECM CONNECTOR D (16P)



KS 1P CONNECTOR (C111)



Crankshaft Position/Top Dead Center (CKP/TDC) Sensor

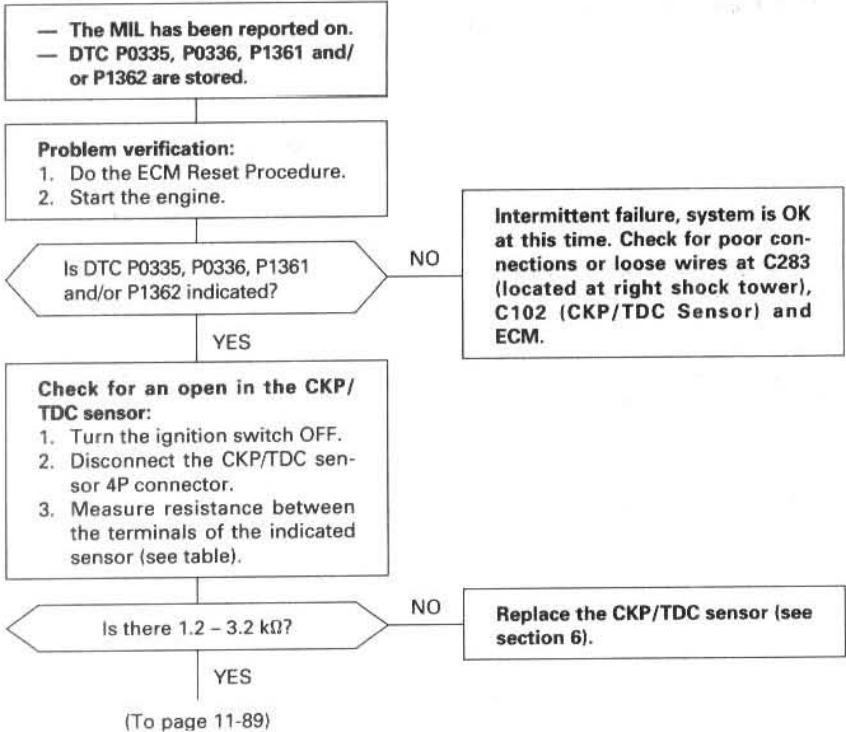
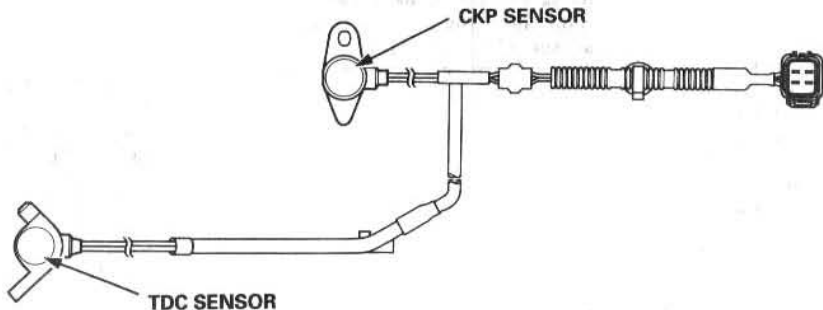
- P0335** The scan tool indicates Diagnostic Trouble Code (DTC) P0335: A malfunction in the Crankshaft Position (CKP) sensor circuit.
- P0336** The scan tool indicates Diagnostic Trouble Code (DTC) P0336: A range/performance problem in the Crankshaft Position (CKP) sensor circuit.
- P1361** The scan tool indicates Diagnostic Trouble Code (DTC) P1361: Intermittent interruption in the Top Dead Center (TDC) sensor circuit.
- P1362** The scan tool indicates Diagnostic Trouble Code (DTC) P1362: No signal in the Top Dead Center (TDC) sensor circuit.

Description

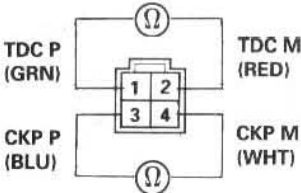
The CKP Sensor determines timing for fuel injection and ignition of each cylinder and also detects engine speed. The TDC Sensor determines ignition timing at start-up (cranking) and when crank angle is abnormal.

NOTE:

- If DTC P1359 is stored at the same time as DTC P0335, P0336, P1361 and/or P1362, troubleshoot DTC P1359 first, then troubleshoot those DTCs.
- If the circuit checks out OK electrically, check the timing belt and cam timing.



CKP/TDC SENSOR
4P CONNECTOR (C102)

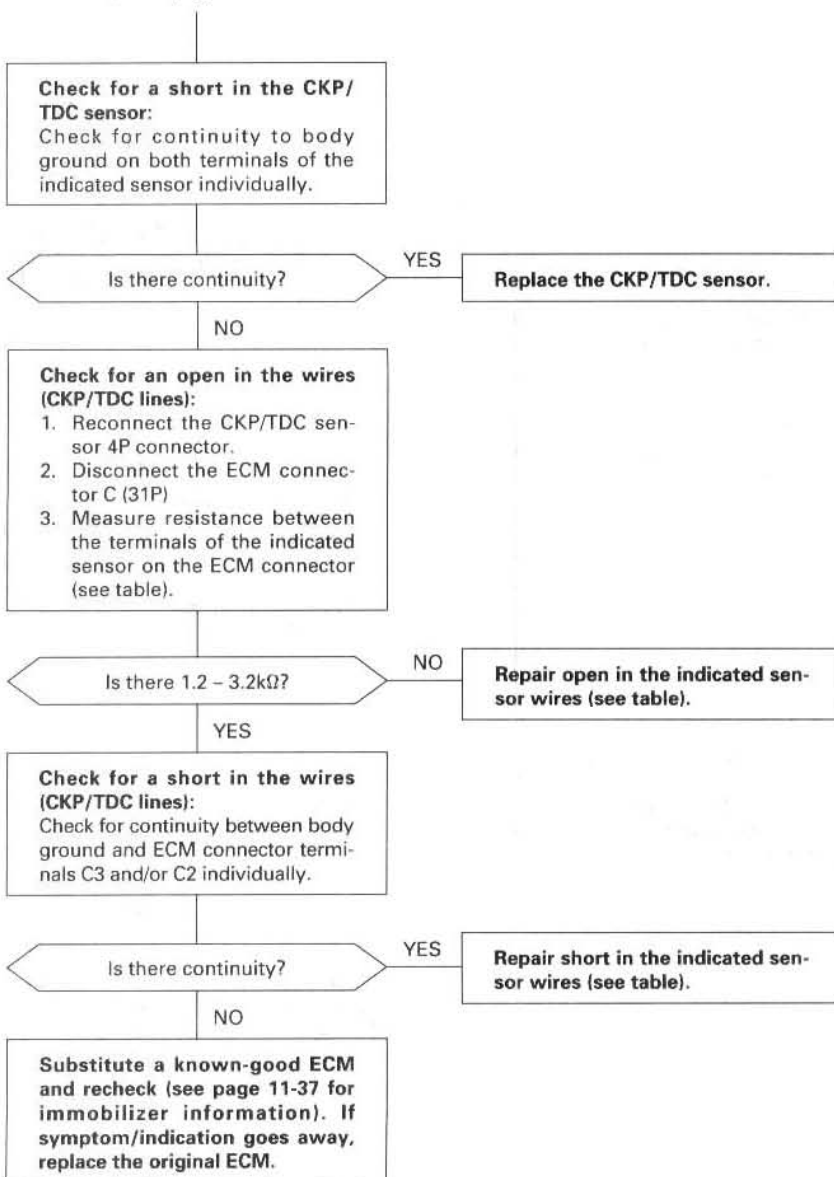


Terminal side of male terminals

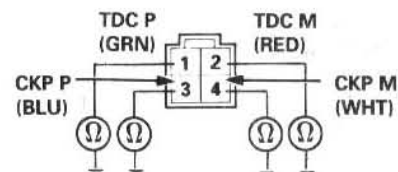
SENSOR	DTC	SENSOR TERMINAL	ECM TERMINAL	WIRE COLOR
TDC	P1361	1	C3	GRN
	P1362	2	C13	RED
CKP	P0335	3	C2	BLU
	P0336	4	C12	WHT



(From page 11-88)

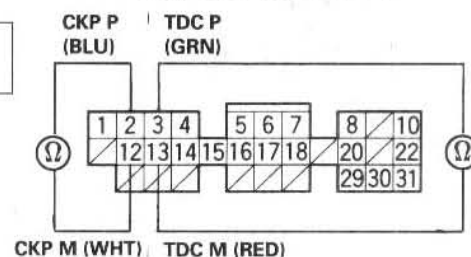


CKP/TDC SENSOR 4P CONNECTOR

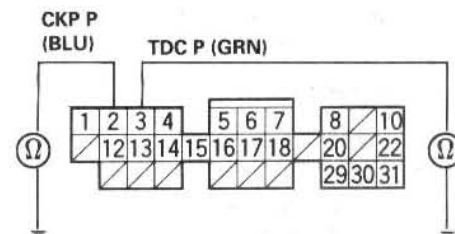


Terminal side of male terminals

ECM CONNECTOR C (31P)



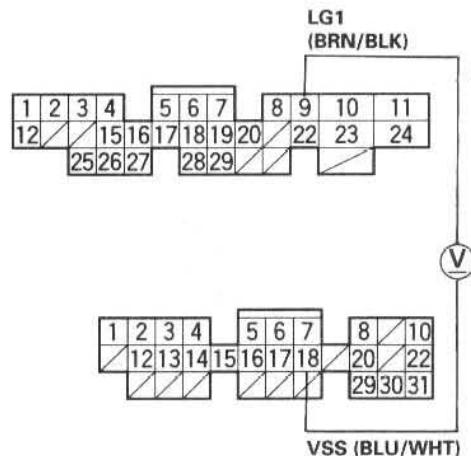
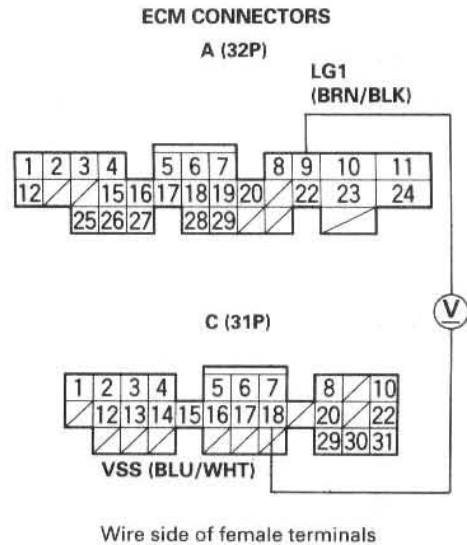
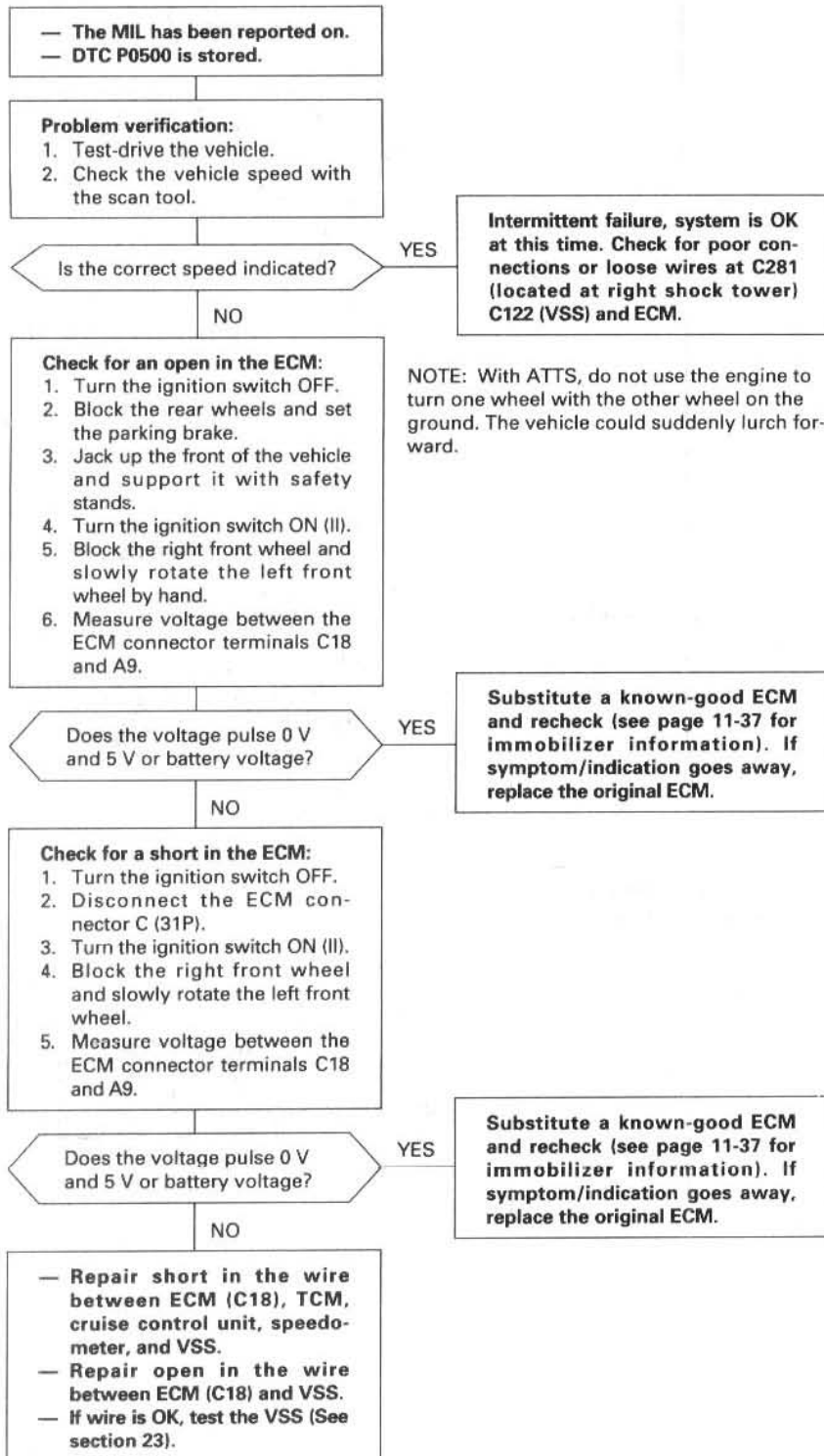
Wire side of female terminals



PGM-FI System

Vehicle Speed Sensor (VSS)

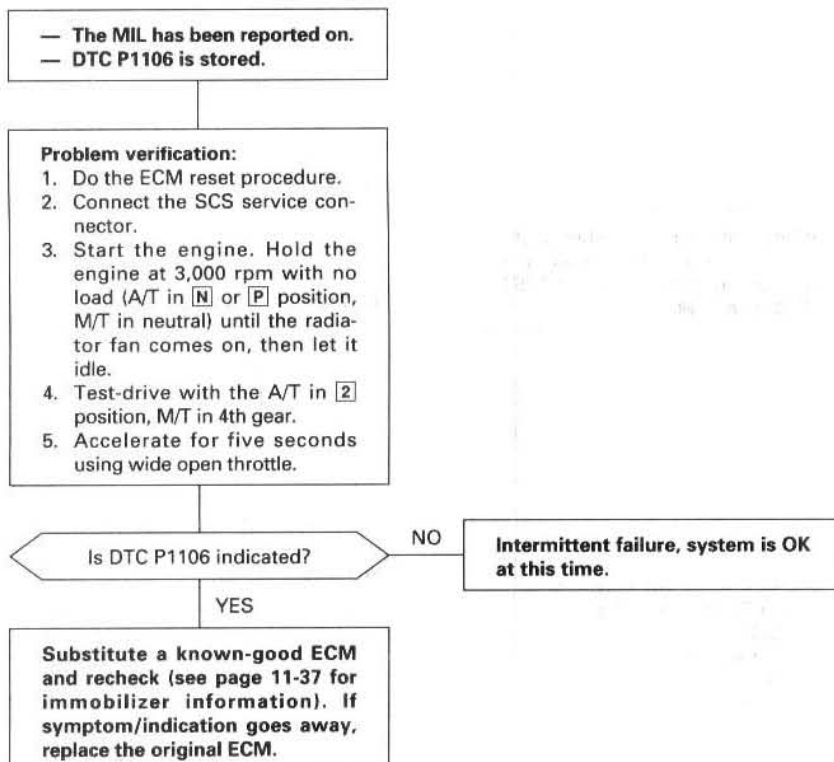
P0500 The scan tool indicates Diagnostic Trouble Code (DTC) P0500: A malfunction in the Vehicle Speed Sensor (VSS) circuit.





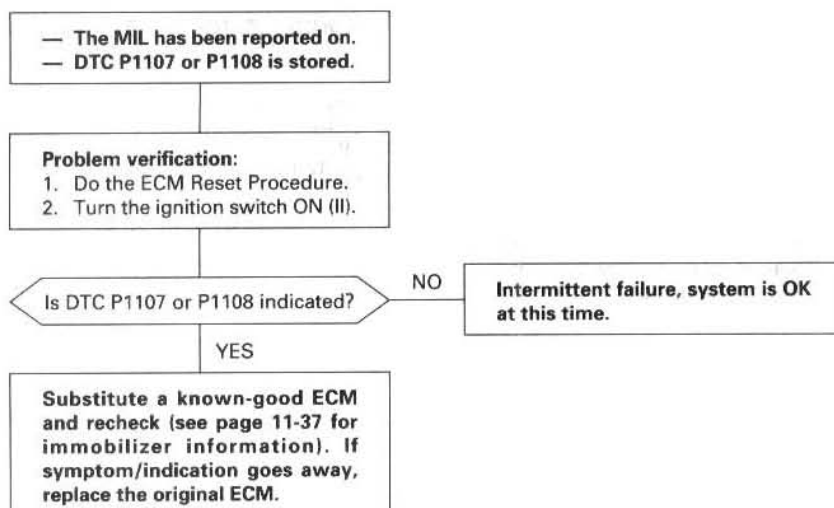
Barometric Pressure (BARO) Sensor

P1106 The scan tool indicates Diagnostic Trouble Code (DTC) P1106: A range/performance problem in the Barometric Pressure (BARO) Sensor circuit.



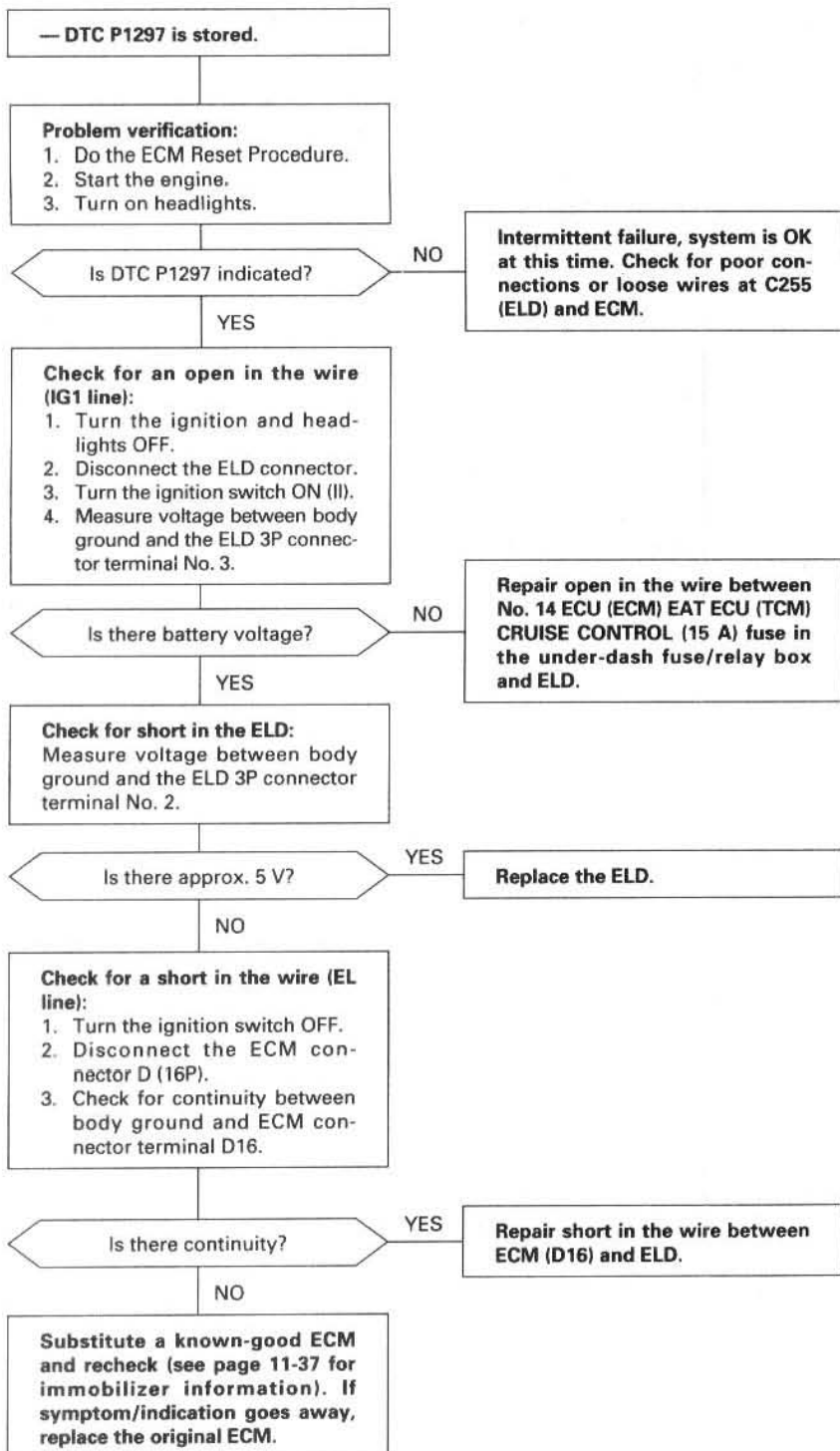
P1107 The scan tool indicates Diagnostic Trouble Code (DTC) P1107: A low voltage problem in the Baro sensor circuit.

P1108 The scan tool indicates Diagnostic Trouble Code (DTC) P1108: A high voltage problem in the Baro sensor circuit.

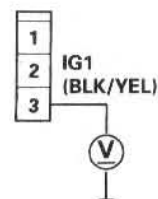


Electrical Load Detector (ELD)

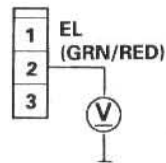
P1297 The scan tool indicates Diagnostic Trouble Code (DTC) P1297: A low voltage problem in the Electrical Load Detector (ELD) circuit.



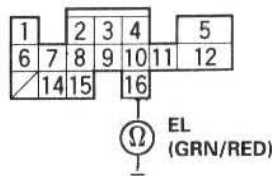
ELD 3P CONNECTOR (C255)



Wire side of female terminals



ECM CONNECTOR D (16P)



Wire side of female terminals

**P1298**

The scan tool indicates Diagnostic Trouble Code (DTC) P1298: A high voltage problem in the Electrical Load Detector (ELD) circuit.

— DTC P1298 is stored.

Problem verification:

1. Do the ECM Reset Procedure.
2. Start the engine.
3. Turn on headlights.

Is DTC P1298 indicated?

NO

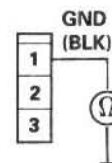
Intermittent failure, system is OK at this time. Check for poor connections or loose wires at C255 (ELD) and ECM.

YES

Check for an open in the wire (GND line):

1. Turn the ignition switch and headlights OFF.
2. Disconnect the ELD connector.
3. Check for continuity between body ground and the ELD 3P connector terminal No. 1.

ELD 3P CONNECTOR (C255)



Wire side of female terminals

Is there continuity?

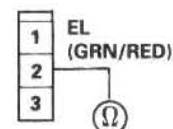
NO

Repair open in the wire between ELD connector and G401.

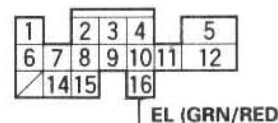
YES

Check for an open in the wire (EL line):

Check for continuity between the ELD 3P connector terminal No. 2 and ECM connector terminal D16.



ECM CONNECTOR D (16P)



Wire side of female terminals

Is there continuity?

NO

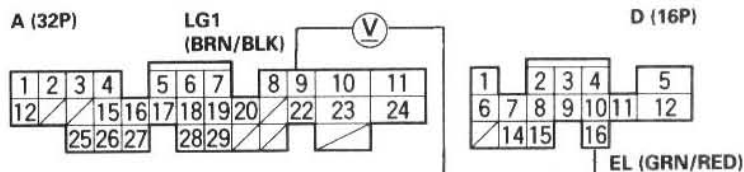
Repair open in the wire between ECM (D16) and the ELD.

YES

Check for a malfunction in the ELD:

1. Reconnect the ELD connector.
2. Start the engine and allow it to idle.
3. While measuring voltage between ECM connector terminals D16 and A9, turn the headlights on (low).

ECM CONNECTORS



Wire side of female terminals

Does the voltage drop?

NO

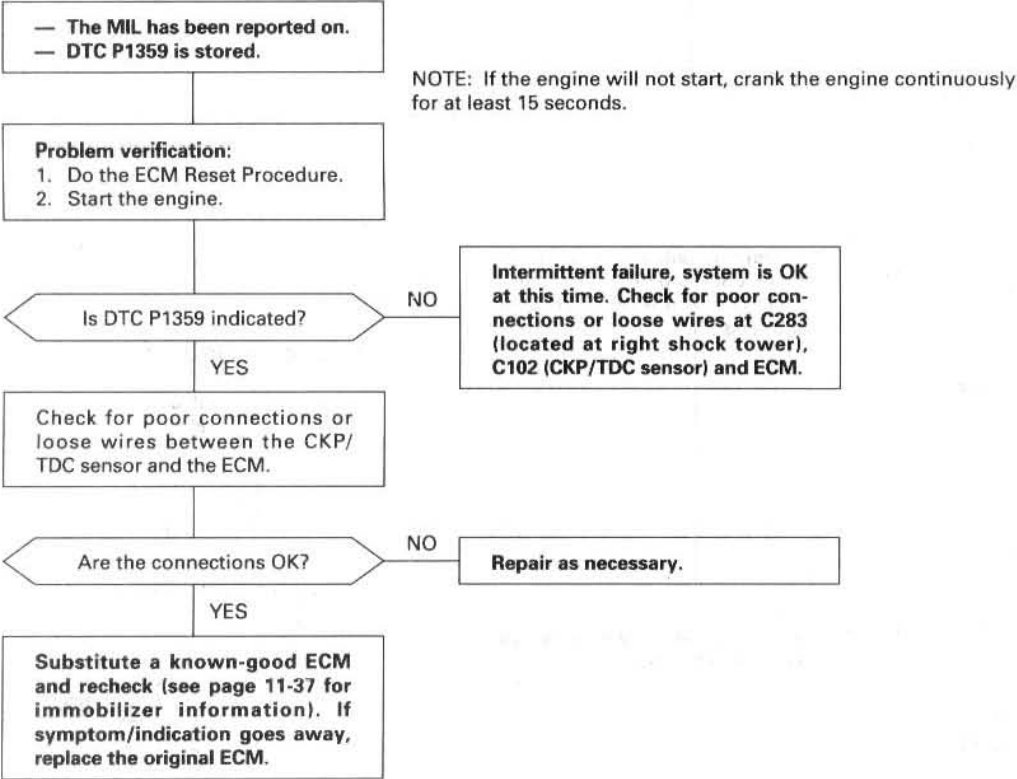
Replace the ELD.

YES

Substitute a known-good ECM and recheck (see page 11-37 for immobilizer information). If symptom/indication goes away, replace the original ECM.

Crankshaft Position/Top Dead Center (CKP/TDC) Sensor

P1359 The scan tool indicates Diagnostic Trouble Code (DTC) P1359: A problem in the Crankshaft Position/Top Dead Center (CKP/TDC) sensor circuit (poor connection).





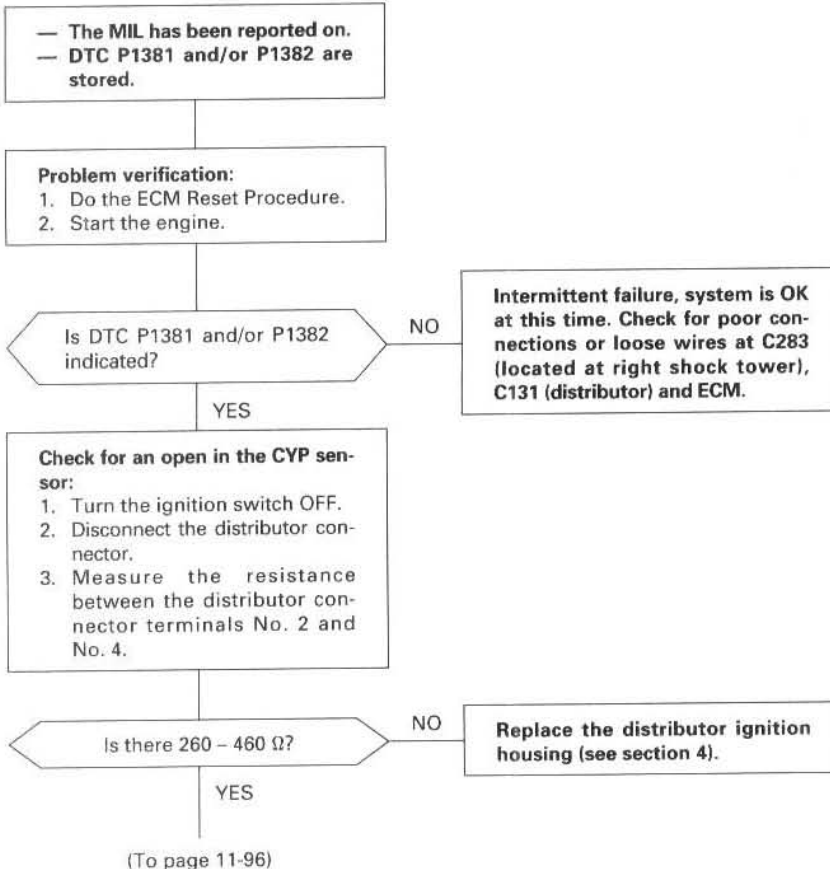
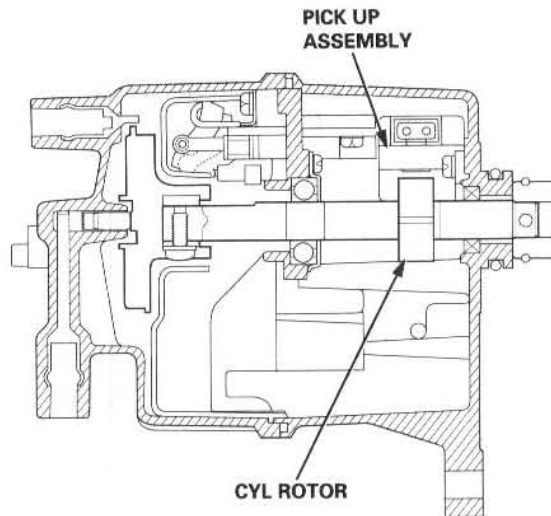
Cylinder Position (CYP) Sensor

P1381 The scan tool indicates Diagnostic Trouble Code (DTC) P1381: Intermittent interruption in the Cylinder Position (CYP) sensor circuit.

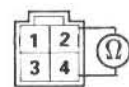
P1382 The scan tool indicates Diagnostic Trouble Code (DTC) P1382: No signal in the Cylinder Position (CYP) sensor circuit.

Description

The CYP Sensor detects the position of No. 1 cylinder for sequential fuel injection to each cylinder.



DISTRIBUTOR CONNECTOR (C131)



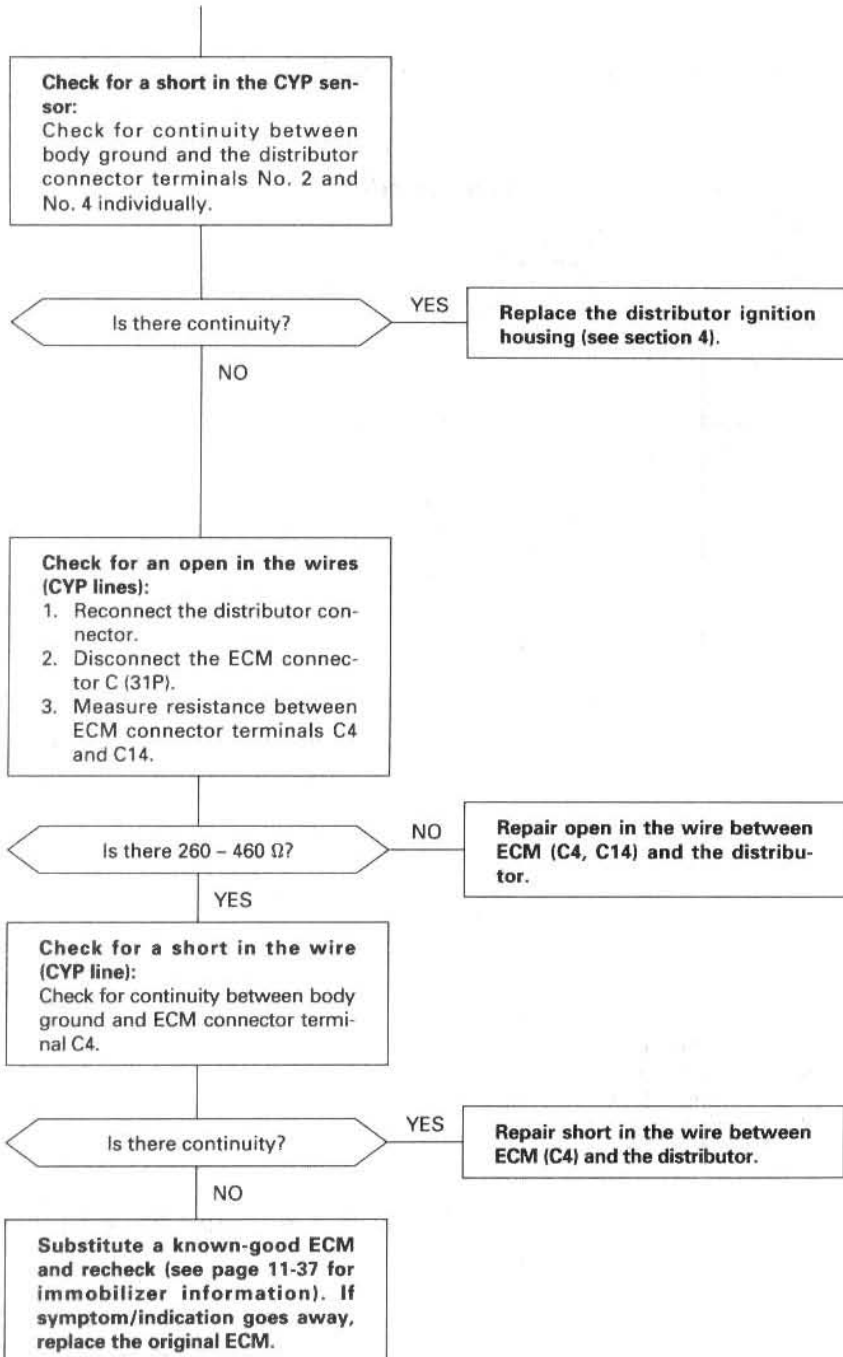
CYP P
(YEL)
CYP M
(BLK)

Terminal side of male terminals

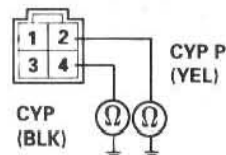
(cont'd)

Cylinder Position (CYP) Sensor (cont'd)

(From page 11-95)

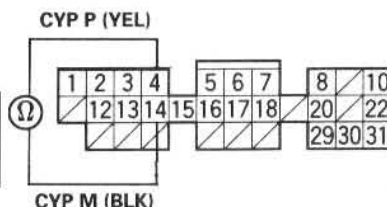


DISTRIBUTOR CONNECTOR

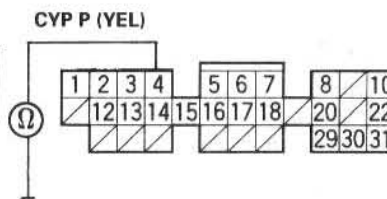


Terminal side of male terminals

ECM CONNECTOR C (31P)



Wire side of female terminals





ECM Internal Circuit

P1607 The scan tool indicates Diagnostic Trouble Code (DTC) P1607: An ECM Internal Circuit Problem.

- The MIL has been reported on.
- DTC P1607 is stored.

Problem verification:

1. Do the ECM Reset Procedure.
2. Turn the ignition switch ON (II).
3. Wait three seconds.

Is DTC P1607 indicated?

NO

Intermittent failure, system is OK this time.

YES

Substitute a known-good ECM and recheck (see page 11-37 for immobilizer information). If symptom/indication goes away, replace the original ECM.

PGM-FI System

A/T Signal (SEFA/SEAF)

P1655 The scan tool indicates Diagnostic Trouble Code (DTC) P1655: SEFA/SEAF signal line failure.

— DTC P1655 is stored.

Problem verification:

1. Do the ECM Reset Procedure.
2. Drive the vehicle for several miles at varying speeds.

Is DTC P1655 indicated?

NO

Intermittent failure, system is OK at this time. Check for poor connections or loose wires at C476 (TCM) and ECM.

YES

Check for a short in the wires (SEAF, SEFA lines):

1. Turn the ignition switch OFF.
2. Disconnect ECM connector C (31P) from the ECM.
3. Disconnect 22P connector from the TCM.
4. Check for continuity between ECM connector terminals C30 and/or C31* and body ground.

Is there continuity?

NO

Check for an open in the wires (SEAF, SEFA lines):

Check for continuity wire between ECM connector terminals C30 and/or C31 and the TCM 22P connector terminals No. 18 and/or No. 19*.

Is there continuity?

NO

Repair open in the wire between the ECM (C30, C31*) and the TCM.

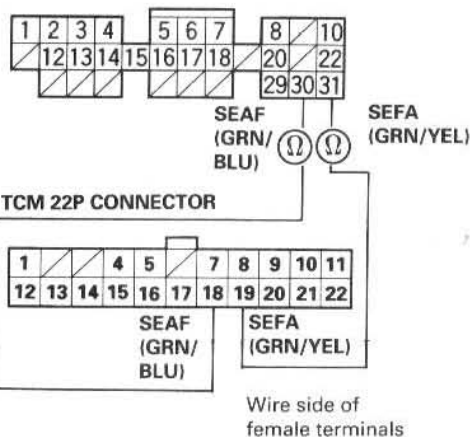
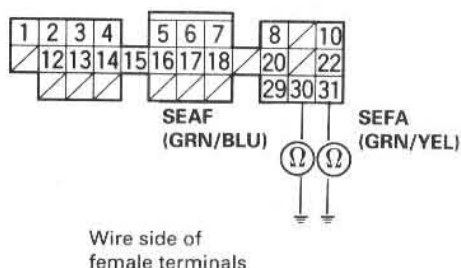
YES

Substitute a known-good ECM and recheck (see page 11-37 for immobilizer information). If symptom/indication goes away, replace the original ECM.

Repair short in the wire between the ECM (C30, C31*) and the TCM.

*: SEFA line

ECM CONNECTOR C (31P)

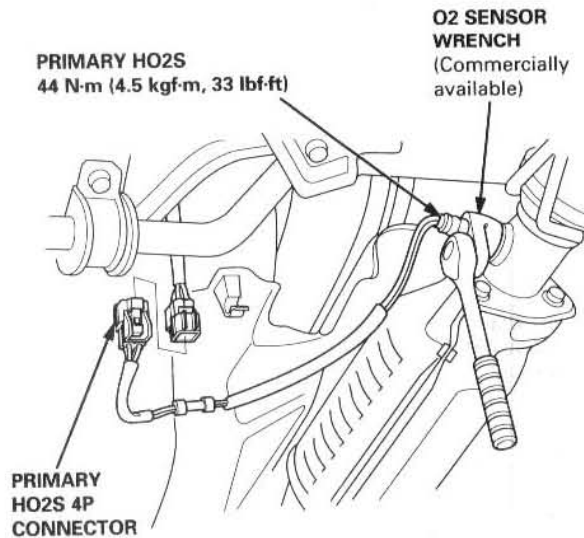




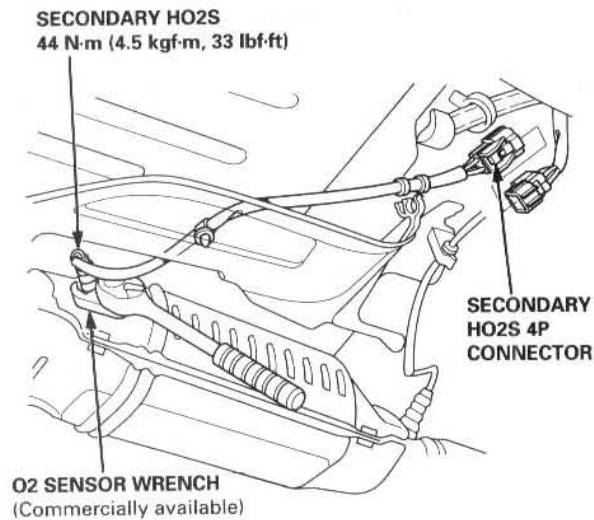
HO2S Replacement

1. Disconnect the HO2S 4P connector and remove the HO2S.

PRIMARY HO2S:



SECONDARY HO2S:



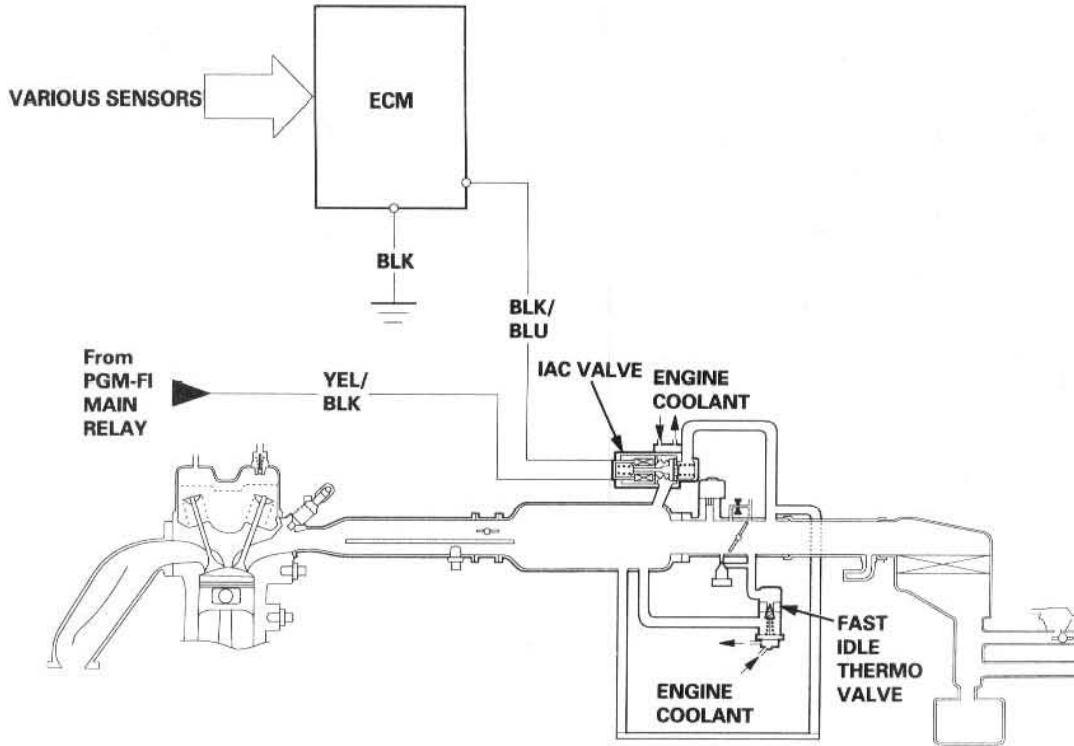
2. Install the HO2S in reverse order of removal.

Idle Control System

System Description

The idle speed of the engine is controlled by the Idle Air Control (IAC) Valve.

The valve changes the amount of air bypassing into the intake manifold in response to electric current controlled by the ECM. When the IAC Valve is activated, the valve opens to maintain the proper idle speed.



1. After the engine starts, the IAC valve opens for a certain time. The amount of air is increased to raise the idle speed about 150 – 300 rpm.
2. When the coolant temperature is low, the IAC valve is opened to obtain the proper fast idle speed. The amount of bypassed air is thus controlled in relation to the engine coolant temperature.
3. When the idle speed is out of specification and the scan tool does not indicate Diagnostic Trouble Code (DTC) P0505 or P1508, check the following items:
 - Adjust the idle speed (see page 11-115)
 - Air conditioning signal (see page 11-105)
 - ALT FR signal (see page 11-107)
 - Starter switch signal (see page 11-108)
 - PSP switch signal (see page 11-109)
 - Brake switch signal (see page 11-111)
 - A/T gear position signal (see page 11-112)
 - Fast idle thermo valve (see page 11-114)
 - Hoses and connections
 - IAC valve and its mounting O-rings
4. If the above items are normal, substitute a known-good IAC valve and readjust the idle speed (see page 11-115).

If the idle speed still cannot be adjusted to specification (and the scan tool does not indicate DTC P0505 or P1508) after IAC valve replacement, substitute a known-good ECM and recheck. If symptom goes away, replace the original ECM.



Idle Control System

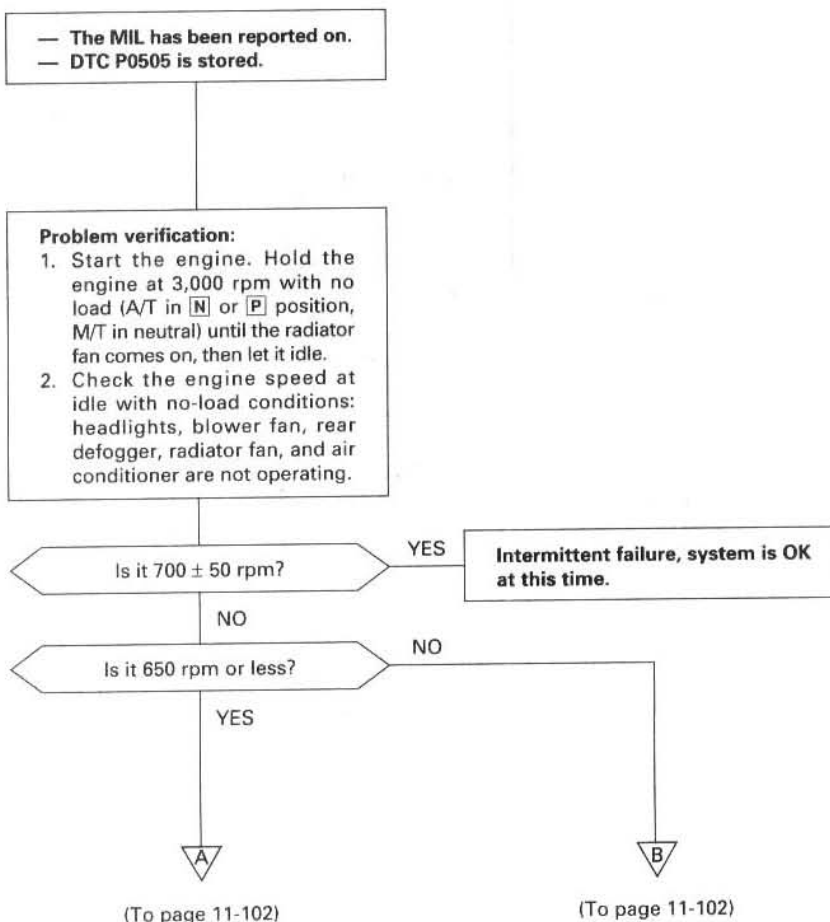
P0505 The scan tool indicates Diagnostic Trouble Code (DTC) P0505: Idle control system malfunction.

NOTE: If DTC P1508 is stored at the same time as DTC P0505, troubleshoot DTC P1508 first, then troubleshoot DTC P0505.

Possible Cause

- IAC valve mechanical malfunction
- Fast idle thermo valve malfunction
- Throttle body clogged port, improper adjustment
- Intake manifold gasket leakage
- Intake air hose loose, leakage
- Vacuum hose leakage
- ECT sensor incorrect output

Troubleshooting Flowchart

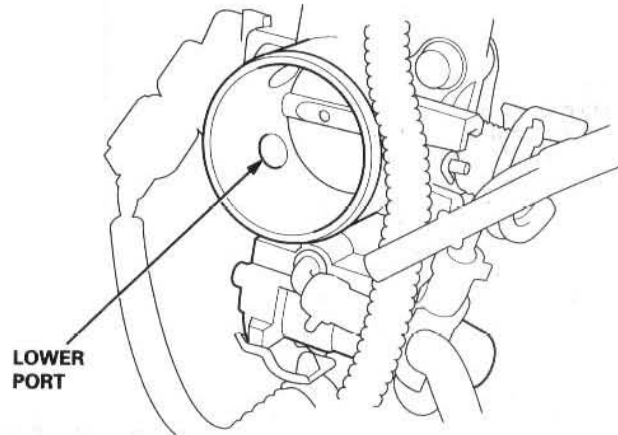
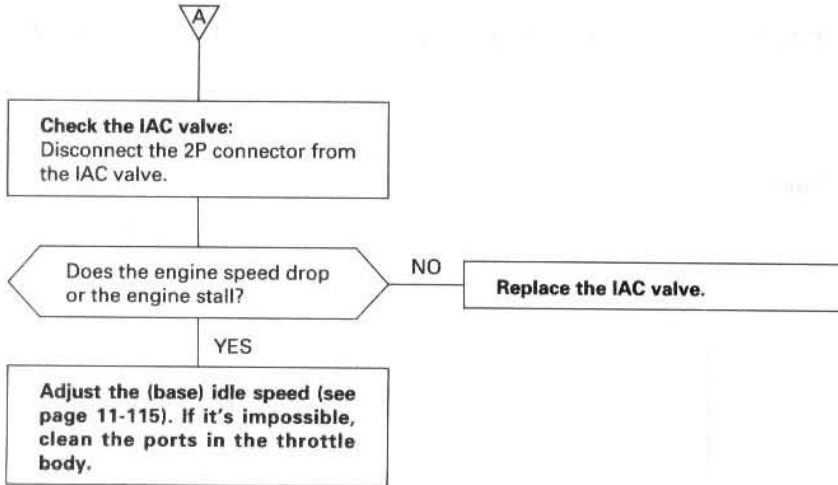


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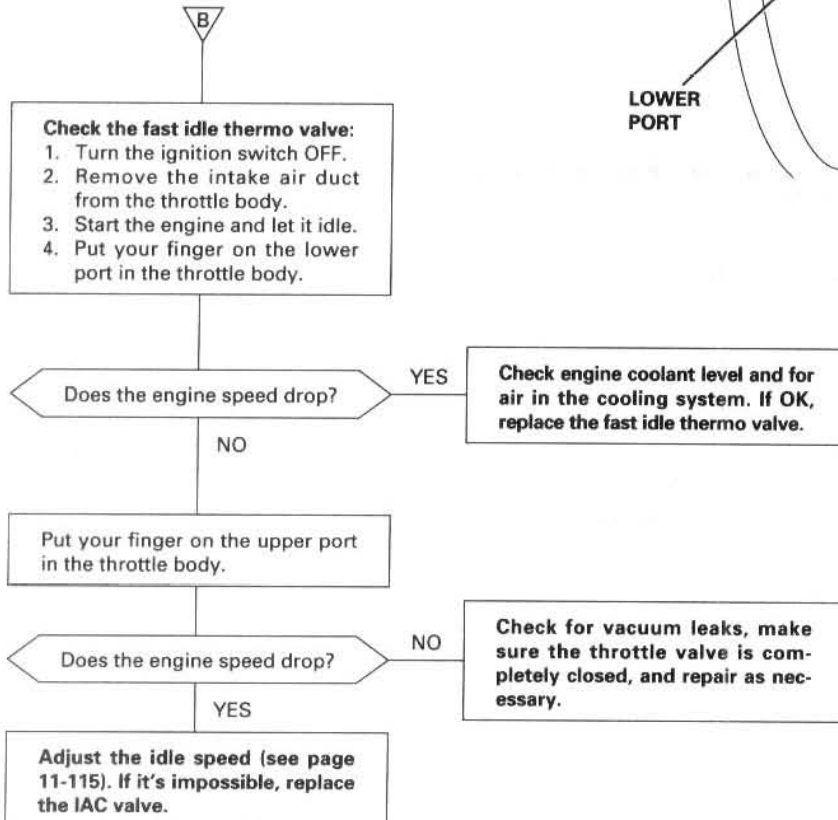
Idle Control System

Idle Control System (cont'd)

(From page 11-101)



(From page 11-101)

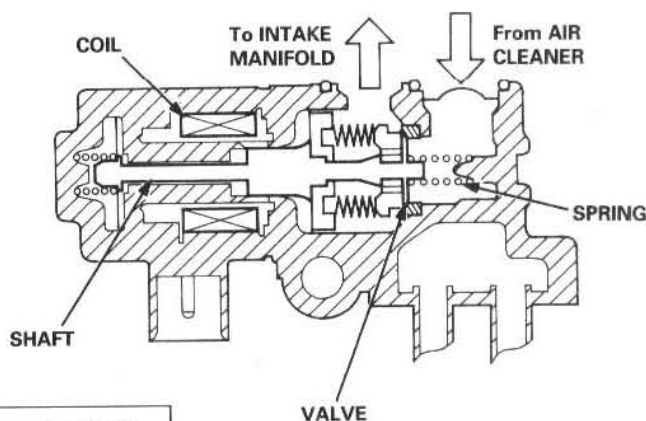




Idle Air Control (IAC) Valve

P1508 The scan tool indicates Diagnostic Trouble Code (DTC) P1508: A problem in the Idle Air Control (IAC) valve circuit.

The IAC Valve changes the amount of air bypassing the throttle body in response to a current signal from the ECM in order to maintain the proper idle speed.



— The MIL has been reported on.
— DTC P1508 is stored.

Problem verification:

1. Do the ECM Reset Procedure.
2. Start the engine, and warm it up to normal operating temperature.

Is DTC P1508 indicated?

NO

Intermittent failure, system is OK at this time. Check for poor connections or loose wires at C283 (located at right shock tower), C105 (IAC valve) and ECM.

YES

Check for an open in the wire (IGP1 line):

1. Turn the ignition switch OFF.
2. Disconnect the IAC valve connector.
3. Turn the ignition switch ON (II).
4. Measure voltage between body ground and the IAC valve 2P connector terminal No. 2.

Is there battery voltage?

NO

Repair open in the wire between IAC valve and PGM-FI main relay.

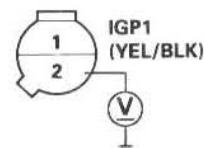
YES

Check for an open or short in the wire (IACV line):

1. Turn the ignition switch OFF and reconnect the IAC valve connector.
2. Disconnect the ECM connector A (32P).
3. Turn the ignition switch ON (II).
4. Measure voltage between body ground and ECM connector terminal A12.

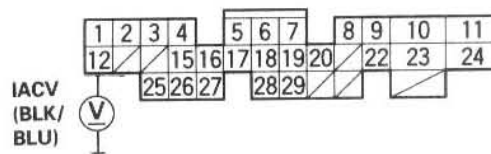
(To page 11-104)

IAC VALVE 2P CONNECTOR (C105)



Wire side of female terminals

ECM CONNECTOR A (32P)

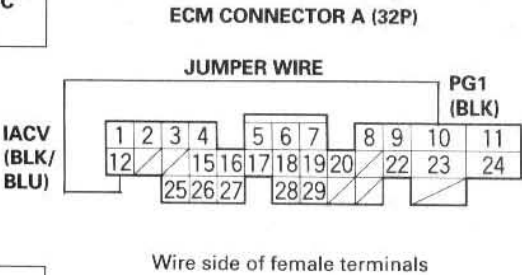
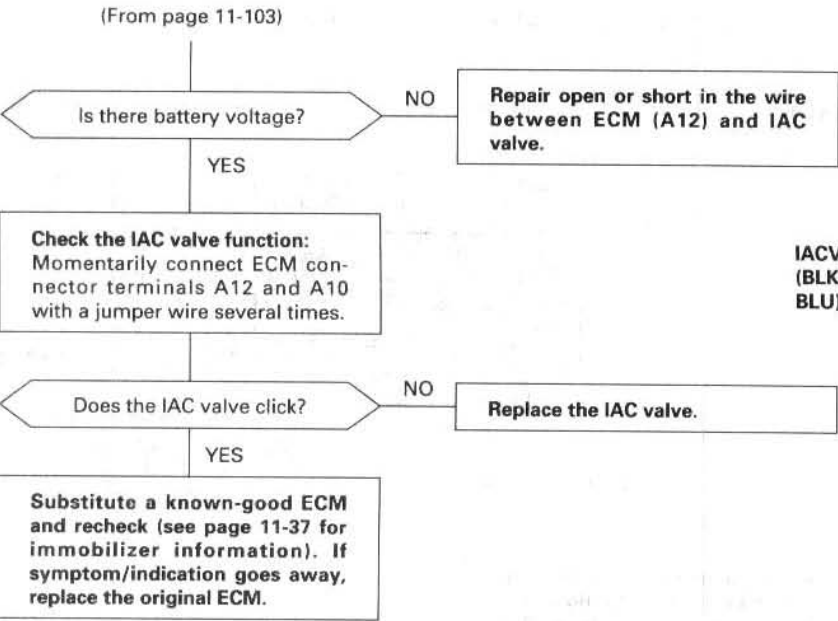


Wire side of female terminals

(cont'd)

Idle Control System

Idle Air Control (IAC) Valve (cont'd)





Air Conditioning Signal

This signals the ECM when there is a demand for cooling from the air conditioning system.

Inspection of Air Conditioning Signal.

Check for a short in the wire (ACS line):

1. Turn the ignition switch OFF.
2. Disconnect the A/C pressure switch and A/C diode connector.
3. Turn the ignition switch ON (II).
4. Measure voltage between ECM connector terminals C5 and A9.

Is there battery voltage?

YES

NO

Check for a short in the wire (ACS line):

1. Turn the ignition switch OFF.
2. Disconnect the ECM connector C (31P).
3. Check for continuity between body ground and ECM connector terminal C5.

Is there continuity?

NO

YES

Repair short in the wire between the ECM (C5) and the A/C pressure switch.

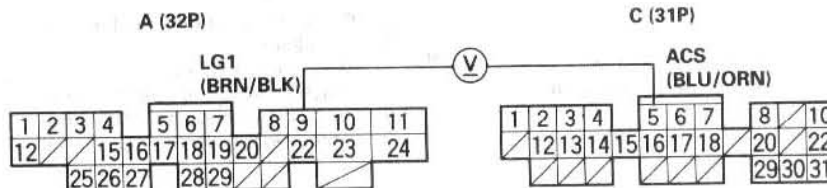
Check for an open in the wire (ACC line):

1. Turn the ignition switch OFF.
2. Reconnect the A/C pressure switch and A/C diode connector.
3. Turn the ignition switch ON (II).
4. Momentarily connect ECM connector terminals A9 and A17 with a jumper wire several times.

(To page 11-106)

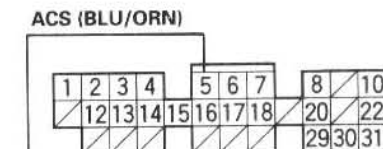
- Substitute a known-good ECM and recheck (see page 11-37 for immobilizer information). If prescribed voltage is now available, replace the original ECM.
- See the air conditioner inspection (see section 22).

ECM CONNECTORS



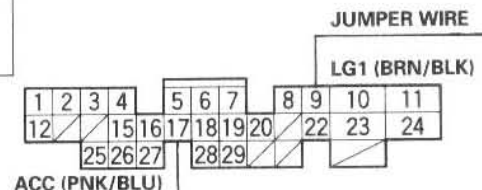
Wire side of female terminals

ECM CONNECTOR C (31P)



Wire side of female terminals

ECM CONNECTOR A (32P)



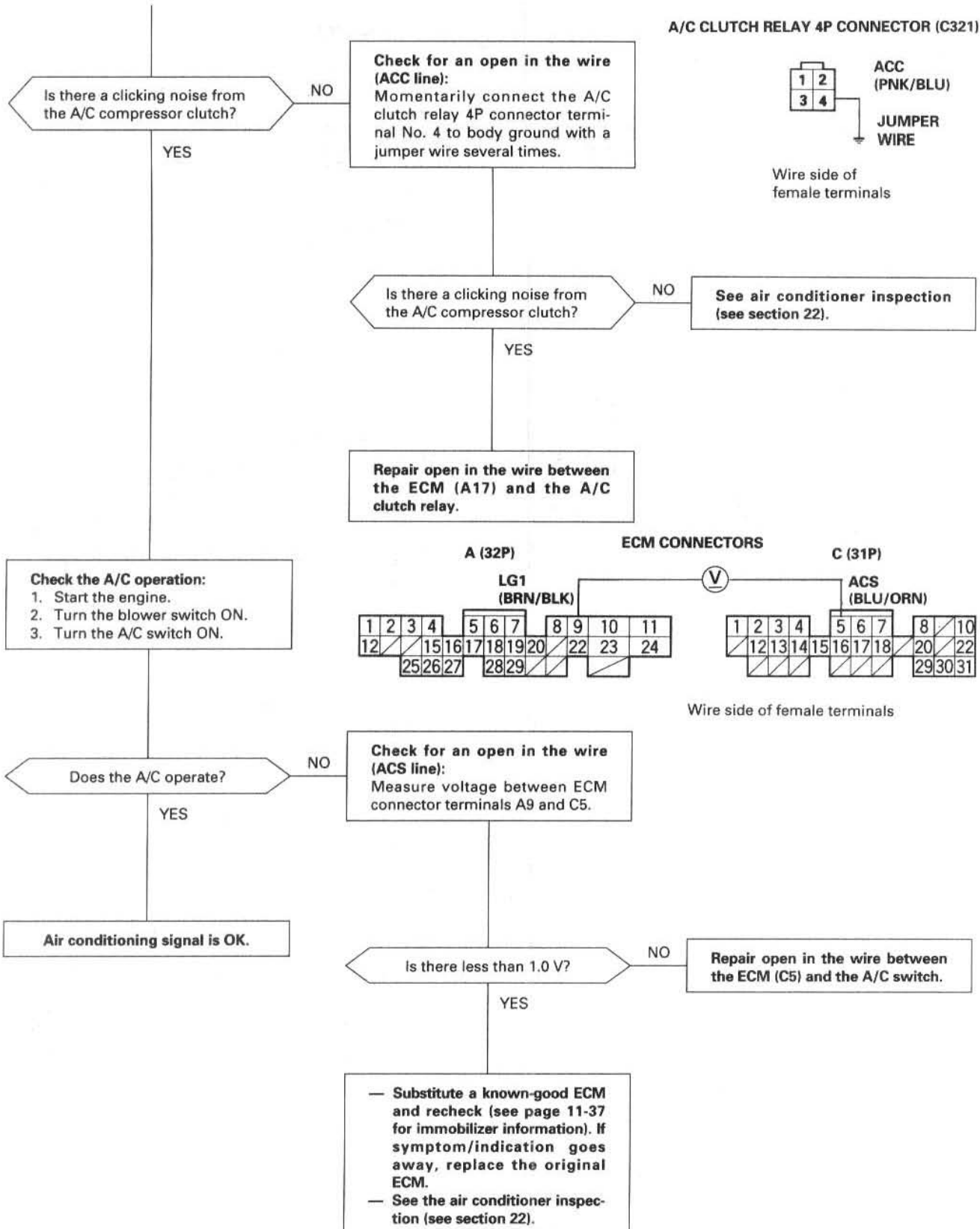
Wire side of female terminals

(cont'd)

Idle Control System

Air Conditioning Signal (cont'd)

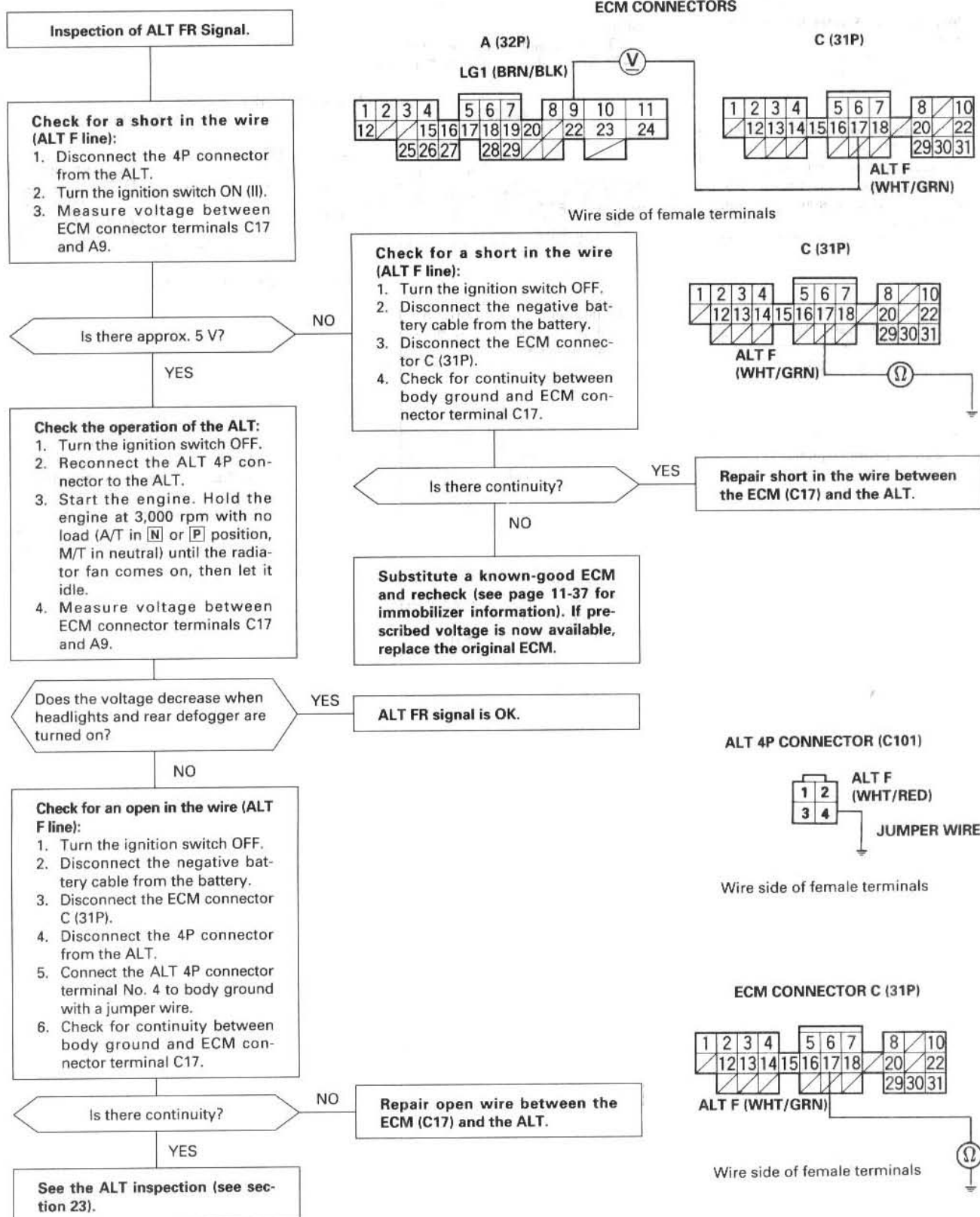
(From page 11-105)





Alternator (ALT) FR Signal

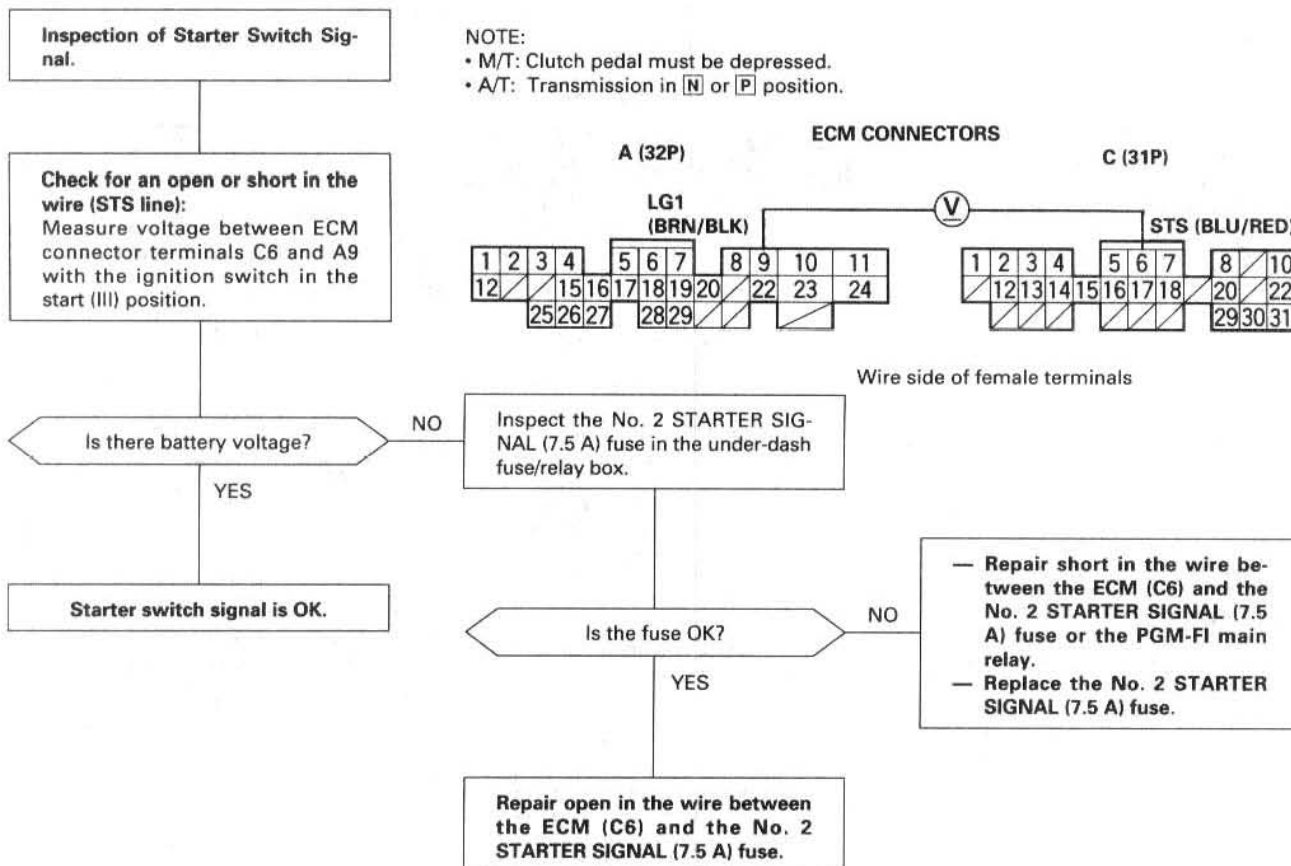
This signals the ECM when the Alternator (ALT) is charging.



Idle Control System

Starter Switch Signal

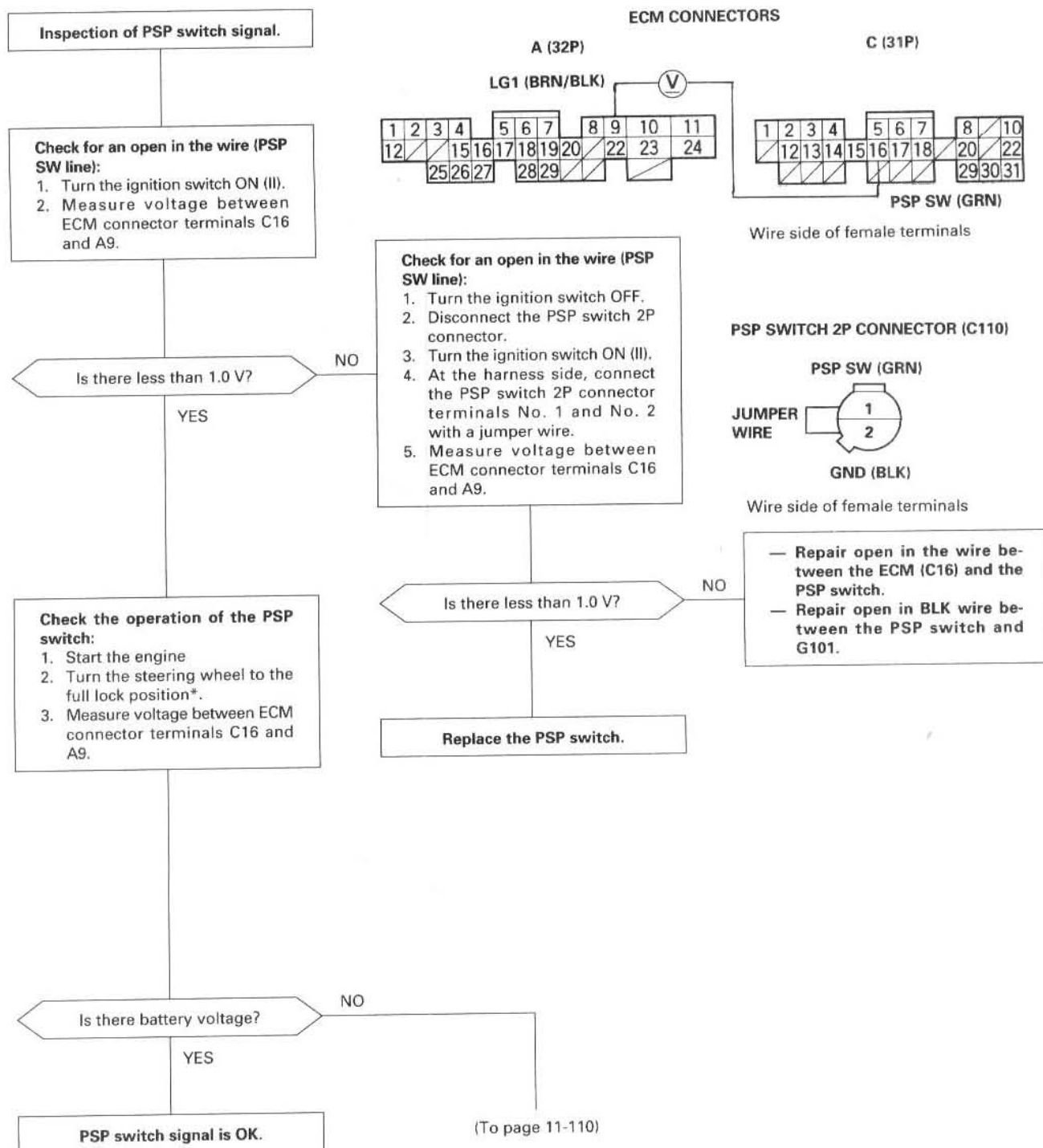
This signals the ECM when the engine is cranking.





Power Steering Pressure (PSP) Switch Signal

This signals the ECM when the power steering load is high.



*: Do not hold the steering wheel at full lock for more than five seconds.

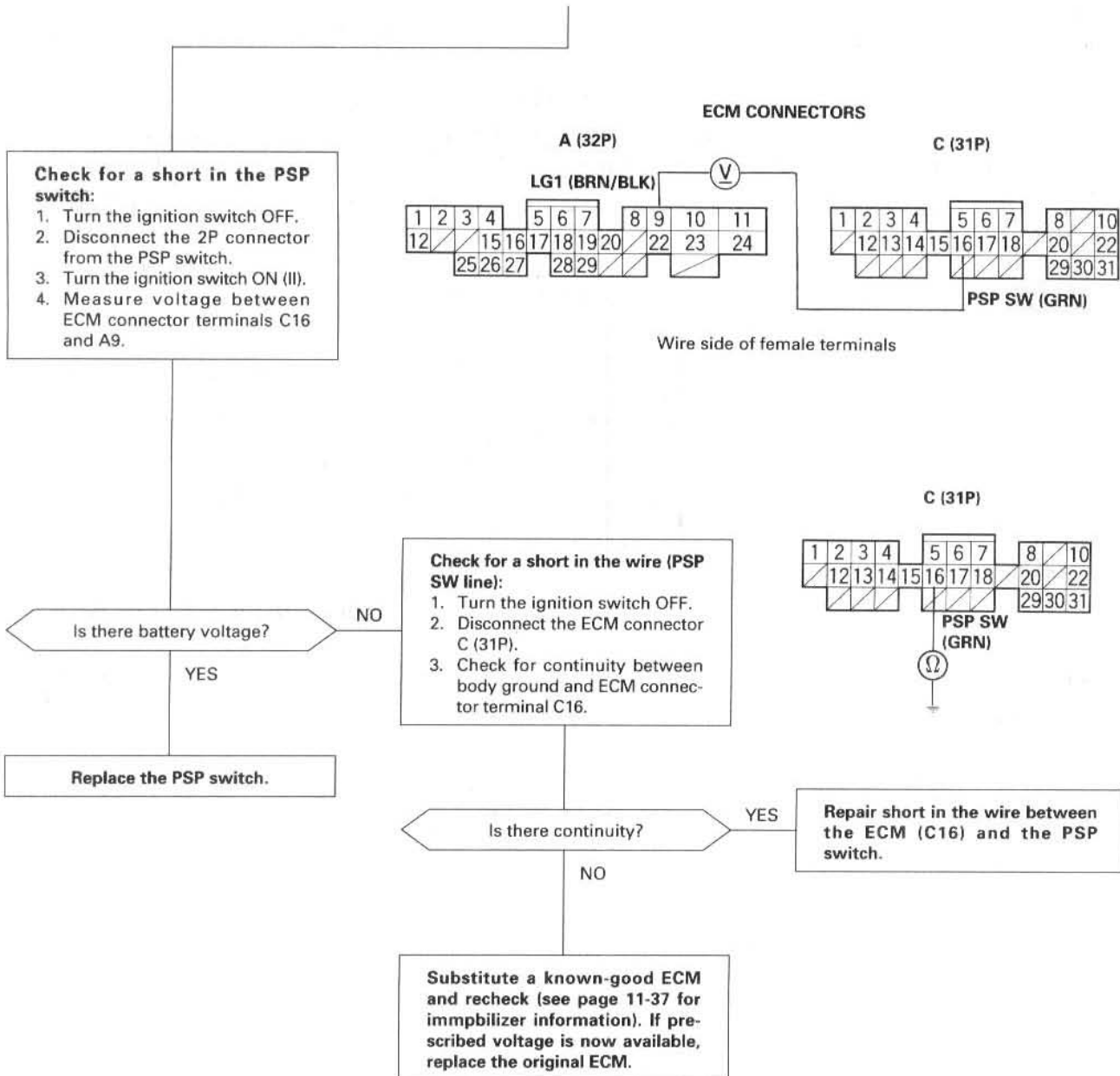
(To page 11-110)

(cont'd)

Idle Control System

Power Steering Pressure (PSP) Switch Signal (cont'd)

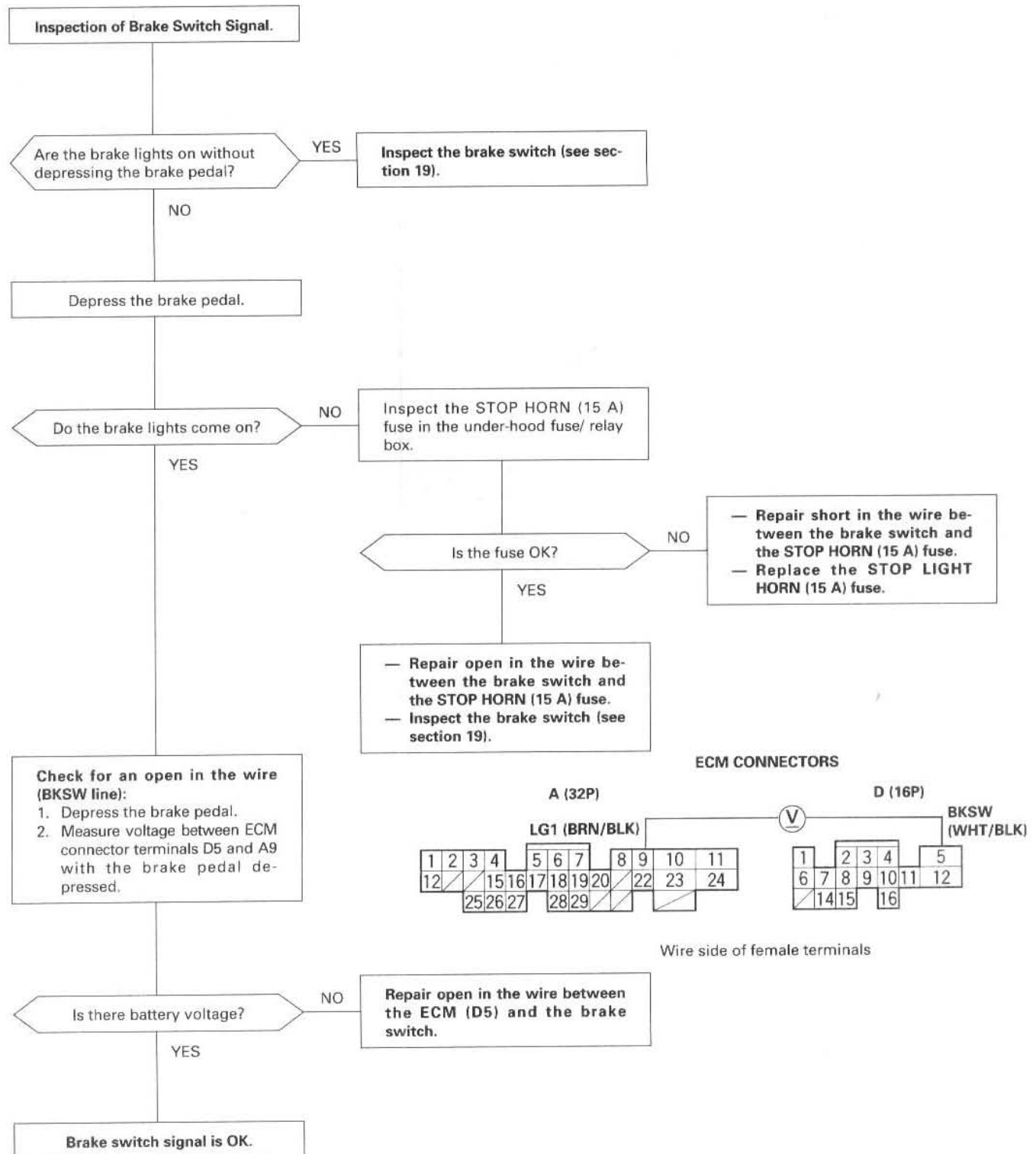
(From page 11-109)





Brake Switch Signal

This signals the ECM when the brake pedal is depressed.



Idle Control System

Automatic Transaxle (A/T) Gear Position Signal

This signals the ECM when the transmission is in **N** or **P** position.

Inspection of A/T Gear Position Signal.

Check the operation of the A/T gear position switch:

1. Turn the ignition switch ON (II).
2. Observe the A/T shift position indicator and select each position separately.

Does the indicator light properly?

NO

See the A/T gear position indicator inspection (see section 14).

YES

Check for a short in the wire (ATP NP line):

1. Turn the ignition switch OFF.
2. Disconnect the 16P connector (C562) from the gauge assembly.
3. Disconnect the 26P connector from the TCM.
4. Turn the ignition switch ON (II).
5. Measure voltage between ECM connector terminals A9 and C29.

Is there approx. 5 V or more?

NO

Check for a short in the wire (ATP NP line):

1. Turn the ignition switch OFF.
2. Disconnect the ECM connector C (31P).
3. Check for continuity between body ground and ECM connector terminal C29.

Is there continuity?

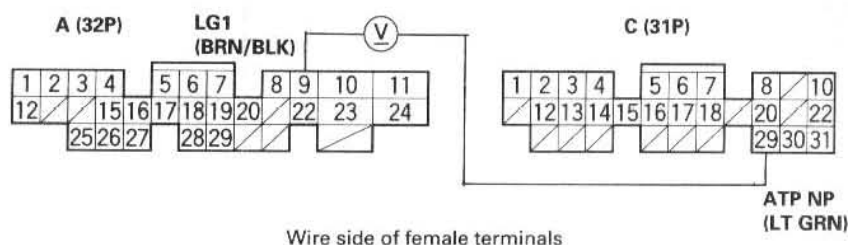
YES

Repair short in the wire between the ECM (C29) and the gauge assembly.

NO

Substitute a known-good ECM and recheck (see page 11-37 for immobilizer information). If prescribed voltage is now available, replace the original ECM.

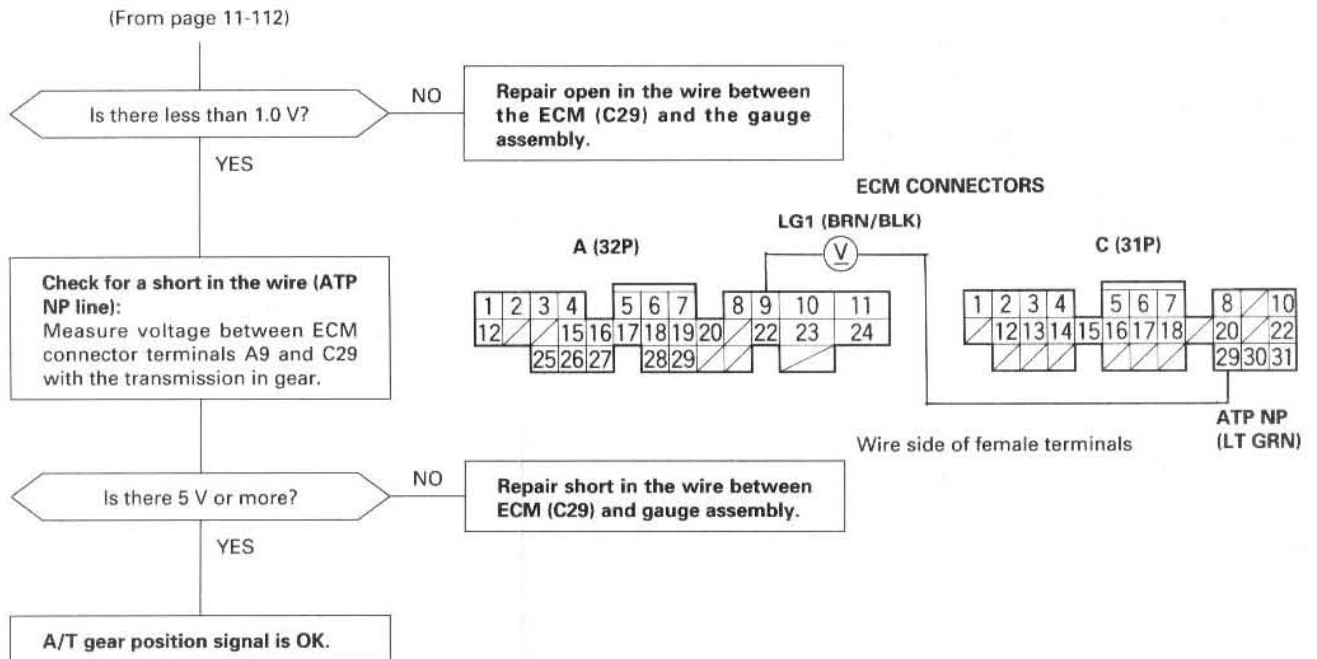
ECM CONNECTORS



Check for an open in the wire (ATP NP line):

1. Turn the ignition switch OFF.
2. Reconnect the 16P connector to the gauge assembly.
3. Reconnect the 26P connector to the TCM.
4. Start the engine.
5. Measure voltage between ECM connector terminals A9 and C29 with the transmission in **N** and **P** position.

(To page 11-113)

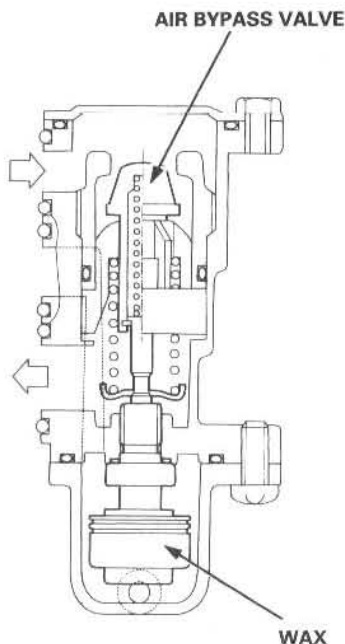
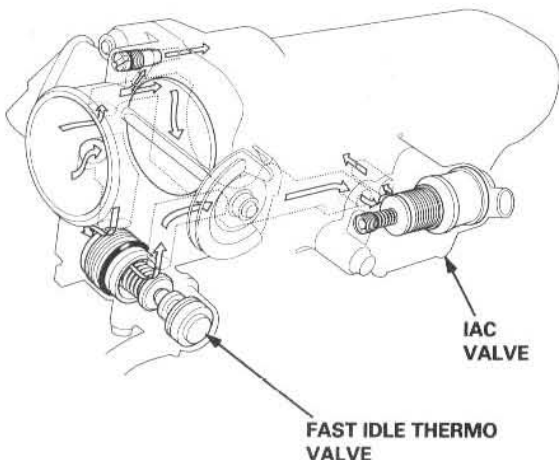


Idle Control System

Fast Idle Thermo Valve

Description

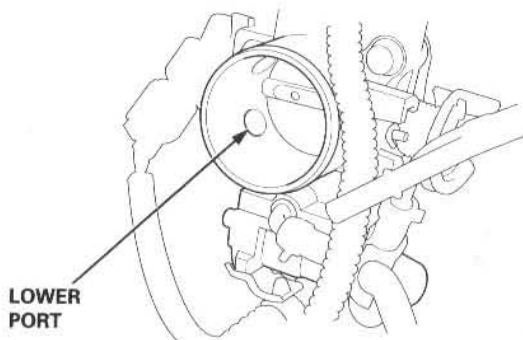
To prevent erratic running when the engine is warming up, it is necessary to raise the idle speed. The fast idle thermo valve is controlled by a thermowax plunger. When the engine is cold, the engine coolant surrounding the thermowax contracts the plunger, allowing additional air to be bypassed into the intake manifold so that the engine idles faster. When the engine reaches operating temperature, the valve closes, reducing the amount of air bypassing into the intake manifold.



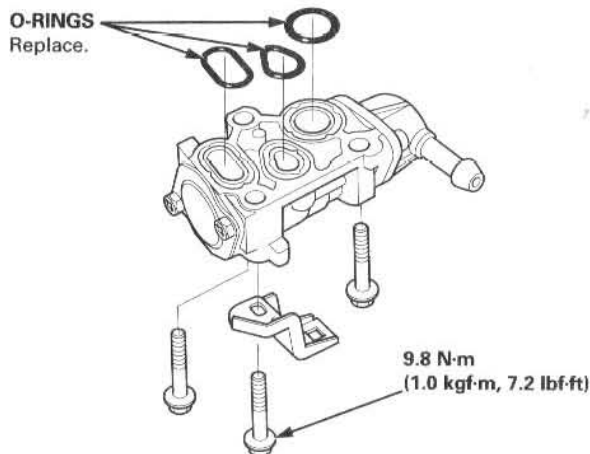
Inspection

NOTE: The fast idle thermo valve is factory adjusted; it should not be disassembled.

1. Remove the intake air duct from the throttle body.
2. Start the engine.
3. Put your finger over the lower port in throttle body, and make sure that there is air flow with the engine cold (engine coolant temperature below 86°F, 30°C).



If there is no air flow, replace the fast idle thermo valve and retest.



4. Start the engine. Hold the engine at 3,000 rpm with no load (A/T in **N** or **P** position, M/T in neutral) until the radiator fan comes on, then let it idle.
5. Check that valve is completely closed. If the valve is leaking, the idle speed will drop when you cover the lower port. Check engine coolant level and for air in the engine cooling system (see section 10). If the cooling system is OK, replace the fast idle thermo valve and recheck.

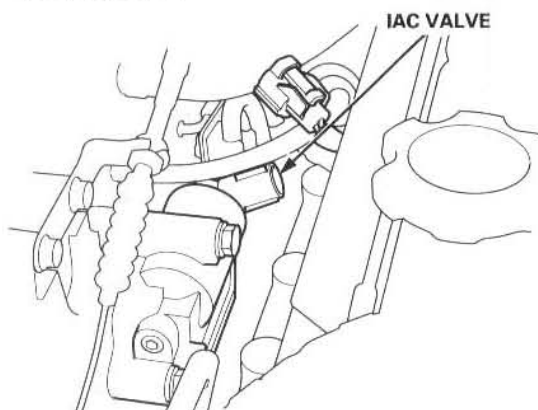


Idle Speed Setting

Inspection/Adjustment

NOTE:

- Before setting the idle speed, check the following items:
 - The MIL has not been reported on.
 - Ignition timing
 - Spark plugs
 - Air cleaner
 - PCV system
 - (Canada) Pull the parking brake lever up. Start the engine, then check that the headlights are off.
1. Start the engine. Hold the engine at 3,000 rpm with no load (A/T in **N** or **P** position, M/T in neutral) until the radiator fan comes on, then let it idle.
 2. Connect a tachometer or Honda PGM Tester.
 3. Disconnect the 2P connector from the Idle Air Control (IAC) valve.

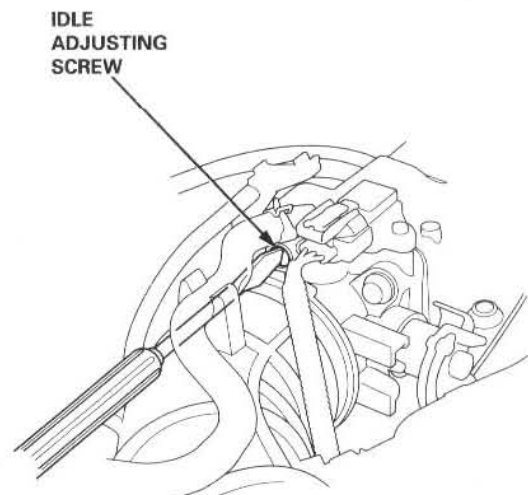


4. If the engine stalls, restart the engine with the accelerator pedal slightly depressed. Stabilize the rpm at 1,000, then slowly release the pedal until the engine idles.
5. Check idling in no-load conditions: headlights, blower fan, rear defogger, radiator fan, and air conditioner are not operating.

Idle speed should be:

M/T	550 ± 50 rpm
A/T	550 ± 50 rpm (in N or P position)

Adjust the idle speed, if necessary, by turning the idle adjusting screw.



6. Turn the ignition switch OFF.
7. Reconnect the 2P connector to the IAC valve, then remove the (CLOCK RADIO) (7.5 A) fuse in the under-hood fuse/relay box for 10 seconds to reset the ECM.
8. Restart and idle the engine with no-load conditions for one minute, then check the idle speed.
NOTE: (Canada) Pull the parking brake lever up. Start the engine, then check that the headlights are off.

Idle speed should be:

M/T	700 ± 50 rpm
A/T	700 ± 50 rpm (in N or P position)

9. Idle the engine for one minute with headlights (Low) ON, and check the idle speed.

Idle speed should be:

M/T	790 ± 50 rpm
A/T	790 ± 50 rpm (in N or P position)

10. Turn the headlights off. Idle the engine for one minute with heater fan switch at HI and air conditioner on, then check the idle speed.

Idle speed should be:

M/T	790 ± 50 rpm
A/T	790 ± 50 rpm (in N or P position)

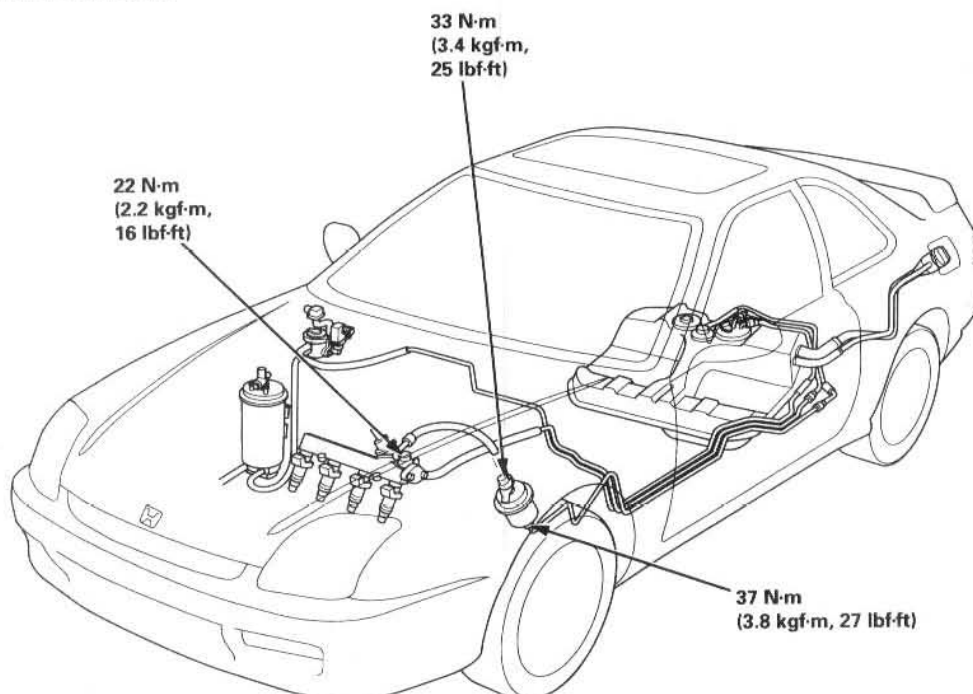
NOTE: If the idle speed is not within specification, see symptom chart on page 11-40.

Fuel Supply System

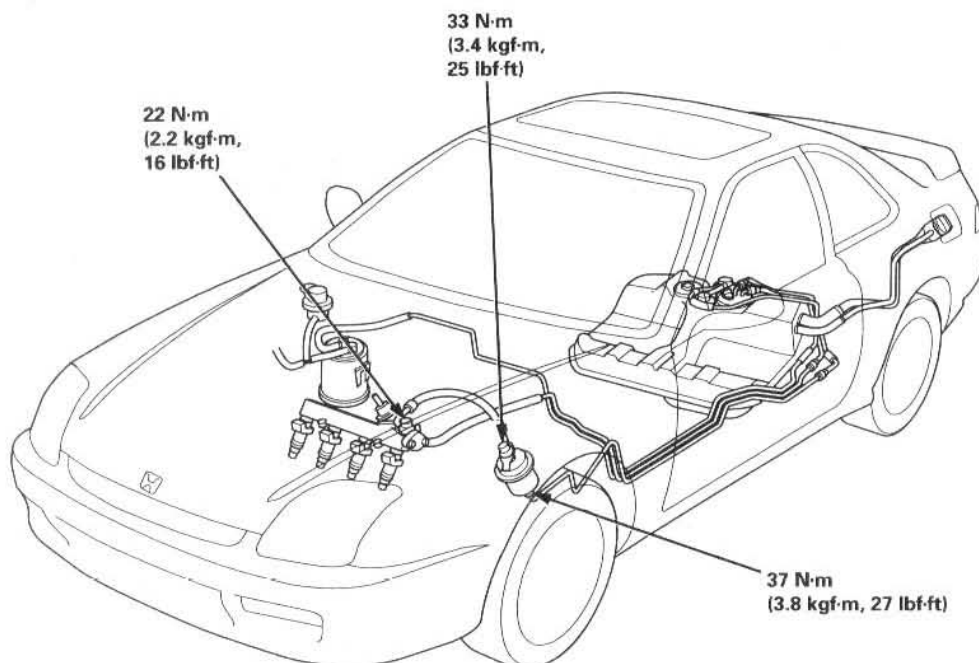
Fuel Lines

NOTE: Check fuel system lines, hoses, fuel filter and other components for damage, leaks or deterioration, and replace if necessary.

'98 model, '97 (California) model:

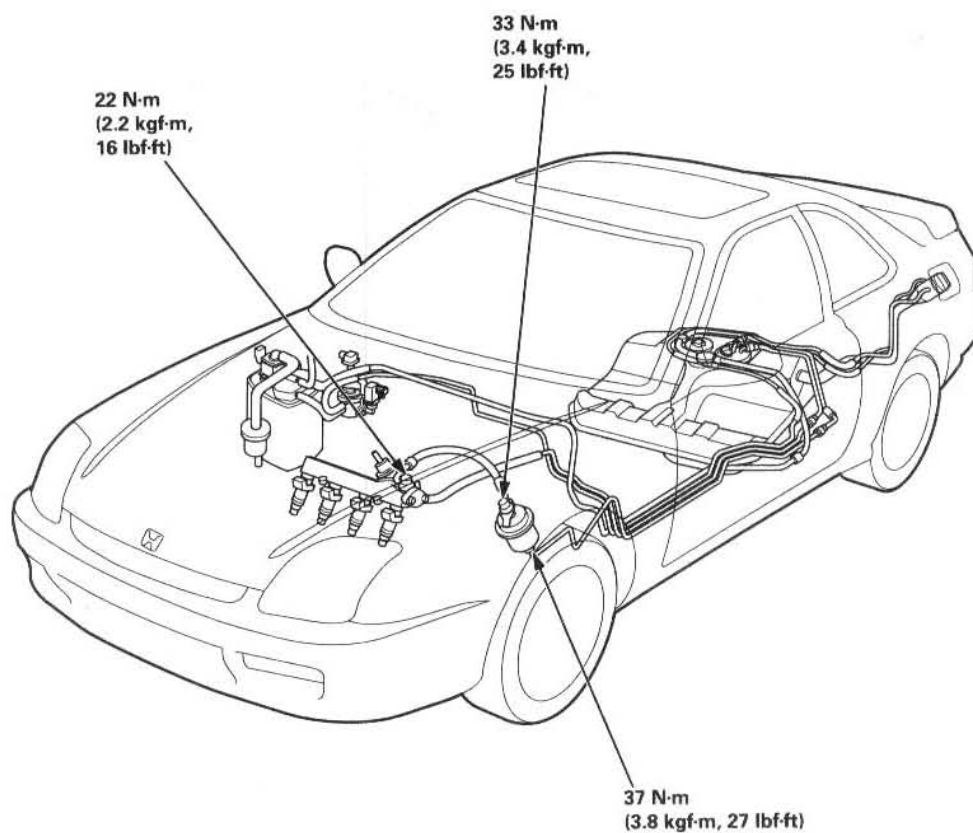


'97 (49ST, Canada) model:





'99 model:



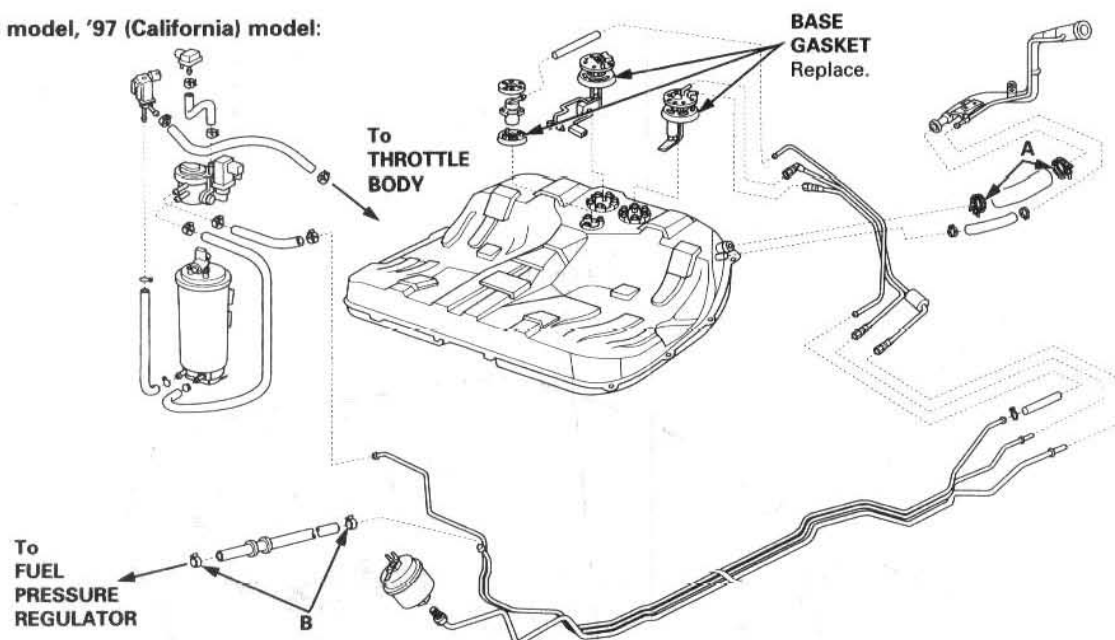
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Fuel Supply System

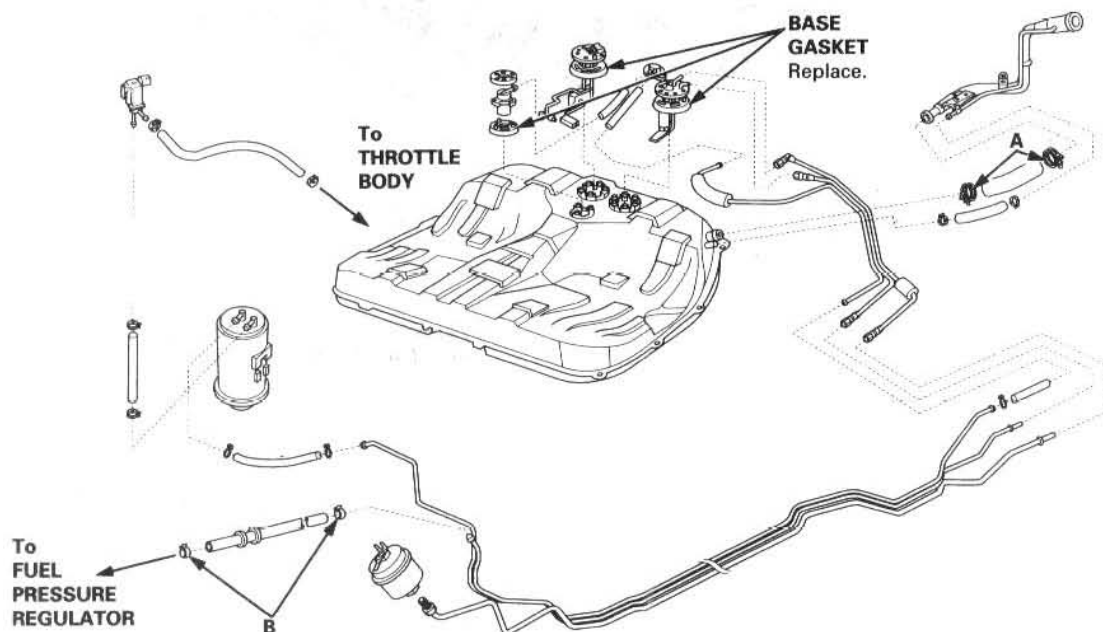
Fuel Lines (cont'd)

NOTE: Check all hose clamps and retighten if necessary.

'98 model, '97 (California) model:

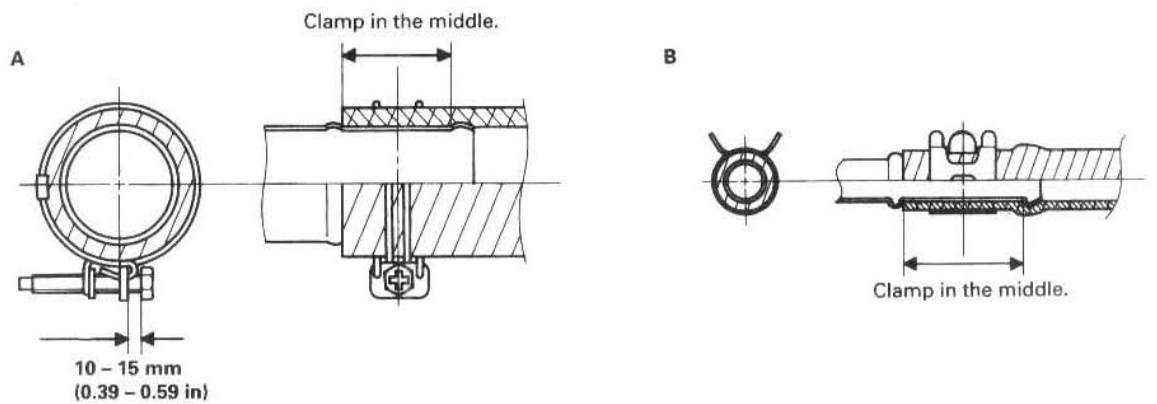
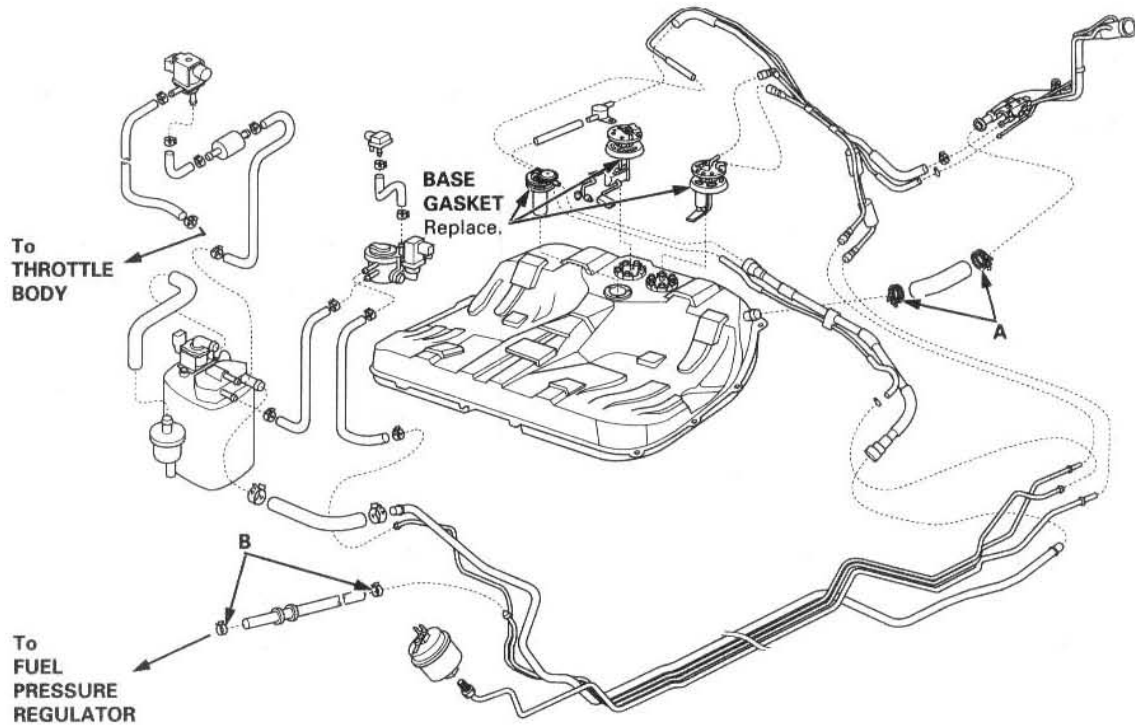


'97 (49ST, Canada) model:





'99 model:



Fuel Supply System

Fuel Tube/Quick-Connect Fittings

Precautions

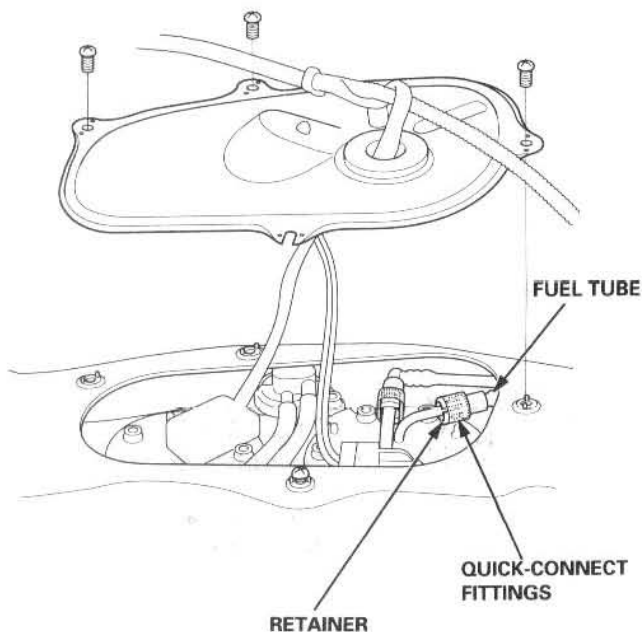
⚠ WARNING Do not smoke while working on the fuel system. Keep open flames away from your work area.

The fuel tube/quick-connect fittings assembly connects the in-tank fuel pump with the fuel feed pipe. For removing or installing the fuel pump and fuel tank, it is necessary to disconnect or connect the quick-connect fittings. Pay attention to following:

- The fuel tube/quick-connect fittings assembly is not heat-resistant; be careful not to damage it during welding or other heat-generating procedures.
- The fuel tube/quick-connect fittings assembly is not acid-proof; do not touch it with a shop towel which was used for wiping battery electrolyte. Replace the fuel tube/quick-connect fittings assembly if it came into contact with electrolyte or something similar.
- When connecting or disconnecting the fuel tube/quick-connect fittings assembly, be careful not to bend or twist it excessively. Replace it if damaged.

A disconnected quick-connect fitting can be reconnected, but the retainer on the mating pipe cannot be reused once it has been removed from the pipe. Replace the retainer when

- Replacing the fuel pump.
- Replacing the fuel feed pipe.
- It has been removed from the pipe.
- It is damaged.



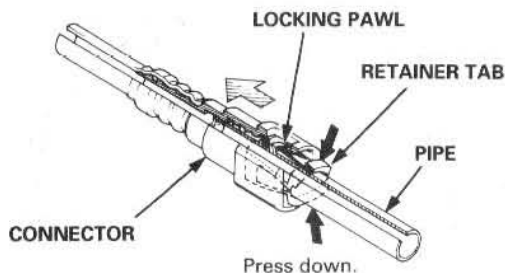
Disconnection

⚠ WARNING Do not smoke while working on the fuel system. Keep open flames away from your work area.

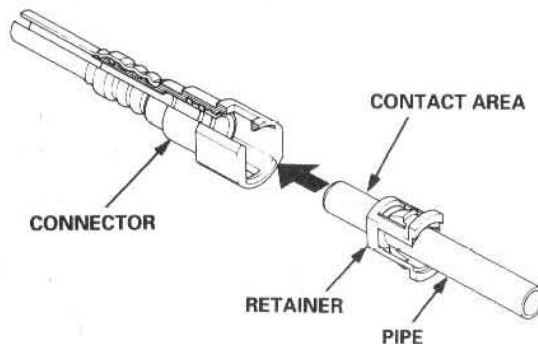
1. Relieve fuel pressure (see page 11-123).
2. Check the fuel quick-connect fittings for dirt, and clean if necessary.
3. Hold the connector with one hand and press down the retainer tabs with the other hand, then pull the connector off.

NOTE:

- Be careful not to damage the pipe or other parts. Do not use tools.
- If the connector does not move, keep the retainer tabs pressed down, and alternately pull and push the connector until it comes off easily.
- Do not remove the retainer from the pipe; once removed, the retainer must be replaced with a new one.

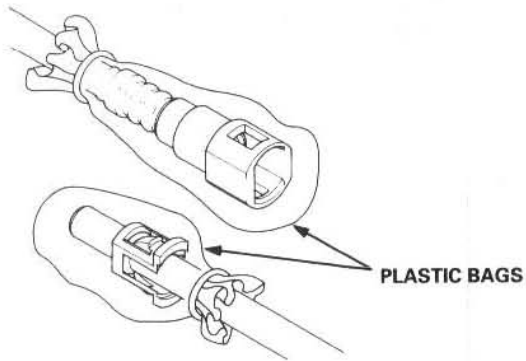


4. Check the contact area of the pipe for dirt and damage.
 - If the surface is dirty, clean it.
 - If the surface is rusty or damaged, replace the fuel pump or fuel feed pipe.





5. To prevent damage and keep out foreign matter, cover the disconnected connector and pipe end with plastic bags.



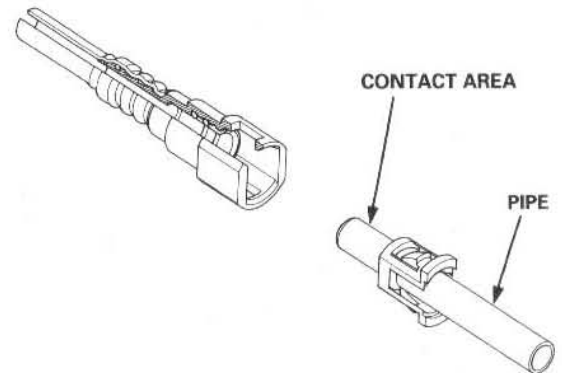
NOTE:

- The retainer cannot be reused once it has been removed from the pipe.
- Replace the retainer when
 - replacing the fuel pump.
 - replacing the fuel feed pipe.
 - it has been removed from the pipe.
 - it is damaged.

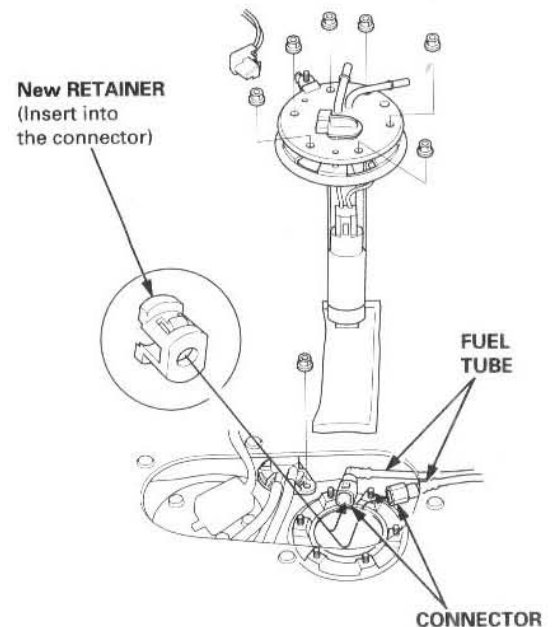
Connection

⚠ WARNING Do not smoke while working on the fuel system. Keep open flames away from your work area.

1. Check the pipe contact area for dirt and damage, and clean if necessary.



2. Insert a new retainer into the connector if the retainer is damaged, or after
 - replacing the fuel pump.
 - replacing the fuel feed pipe.
 - removing the retainer from the pipe.

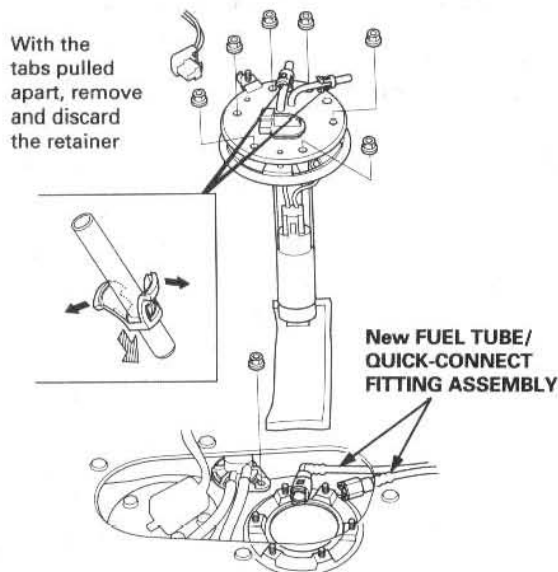


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Fuel Supply System

Fuel Tube/Quick-Connect Fittings (cont'd)

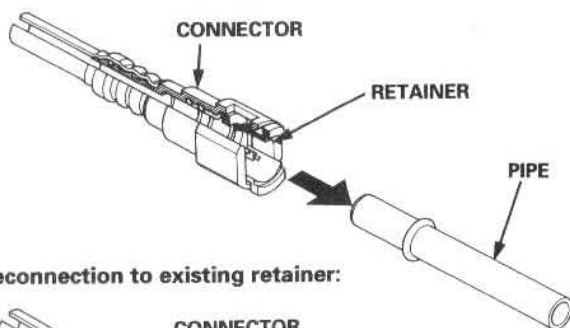
3. Before connecting a new fuel tube/quick-connect fitting assembly, remove the old retainer from the fitting.



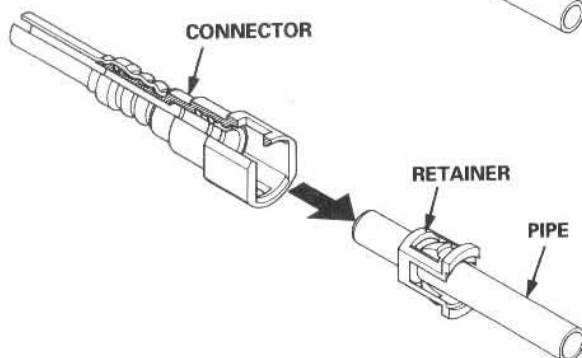
4. Align the quick-connect fittings with the pipe, and align the retainer locking pawls with the connector grooves. Then press the quick-connect fittings onto the pipe until both retainer pawls lock with a clicking sound.

NOTE: If it is hard to connect, put a small amount of new engine oil on the pipe end.

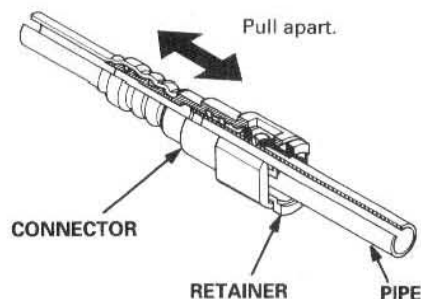
Connection with new retainer:



Reconnection to existing retainer:



5. Make sure the connection is secure and the pawls are firmly locked into place; check visually and by pulling the connector.



6. Reconnect the battery negative cable, and turn the ignition switch ON (II). The fuel pump will run for about two seconds, and fuel pressure will rise. Repeat two or three times, and check that there is no leakage in the fuel supply system.



System Description

The fuel supply system consists of a fuel tank, in-tank high pressure fuel pump, PGM-FI main relay, fuel filter, fuel pressure regulator, fuel injectors, and fuel delivery and return lines. This system delivers pressure-regulated fuel to the fuel injectors and cuts the fuel delivery when the engine is not running.

Fuel Pressure

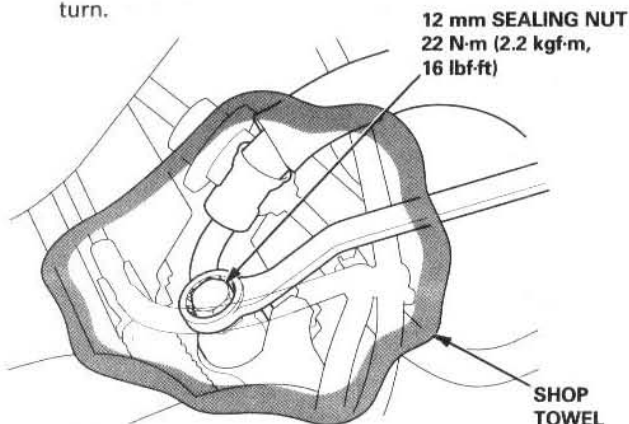
Relieving

Before disconnecting fuel pipes or hoses, release pressure from the system by loosening the 12 mm sealing nut on the side of the fuel rail.

⚠ WARNING

- Do not smoke while working on the fuel system. Keep open flames or sparks away from your work area.
- Be sure to relieve fuel pressure while the ignition switch is off.

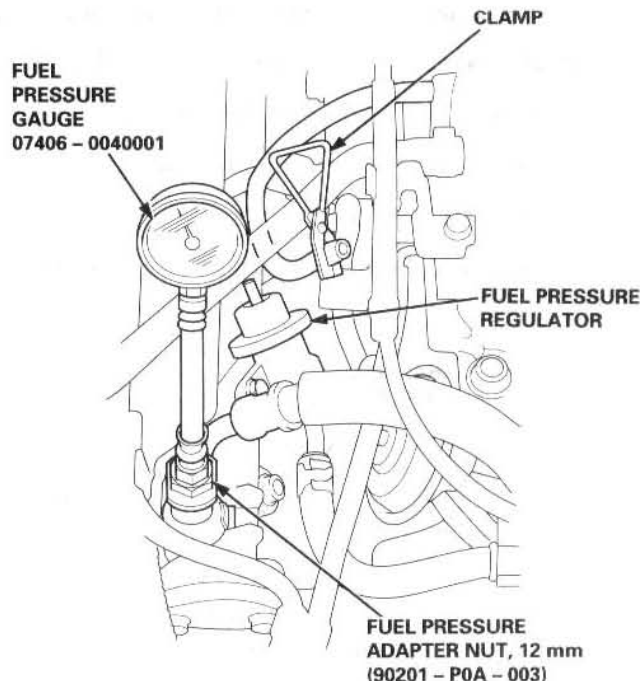
1. Write down the frequencies for the radio's preset buttons.
2. Disconnect the battery negative cable from the battery negative terminal.
3. Remove the fuel fill cap.
4. Use a box end wrench on the 12 mm sealing nut at the fuel rail.
5. Place a rag or shop towel over the 12 mm banjo bolt.
6. Slowly loosen the 12 mm banjo bolt one complete turn.



NOTE: Replace the washers whenever the 12 mm sealing nut is loosened or removed.

Inspection

1. Relieve fuel pressure.
2. Remove the 12 mm sealing nut from the fuel rail. Attach the 12 mm fuel pressure adapter nut and the special tool.



3. Start the engine. Measure the fuel pressure with the engine idling and the vacuum hose of the fuel pressure regulator disconnected from the fuel pressure regulator and pinched. If the engine will not start, turn the ignition switch on, wait for two seconds, turn it off, then back on again and read the fuel pressure.

Pressure should be:

270 – 320 kPa (2.8 – 3.3 kgf/cm², 40 – 47psi)

4. Reconnect vacuum hose to the fuel pressure regulator.

Pressure should be:

200 – 250 kPa (2.1 – 2.6 kgf/cm², 30 – 37 psi)

If the fuel pressure is not as specified, first check the fuel pump (see page 11-128). If the fuel pump is OK, check the following:

- If the fuel pressure is higher than specified, inspect for:
 - Pinched or clogged fuel return hose or line.
 - Faulty fuel pressure regulator (see page 11-126).
- If the fuel pressure is lower than specified, inspect for:
 - Clogged fuel filter.
 - Faulty fuel pressure regulator (see page 11-126).
 - Fuel line leakage.

Fuel Supply System

Fuel Injectors

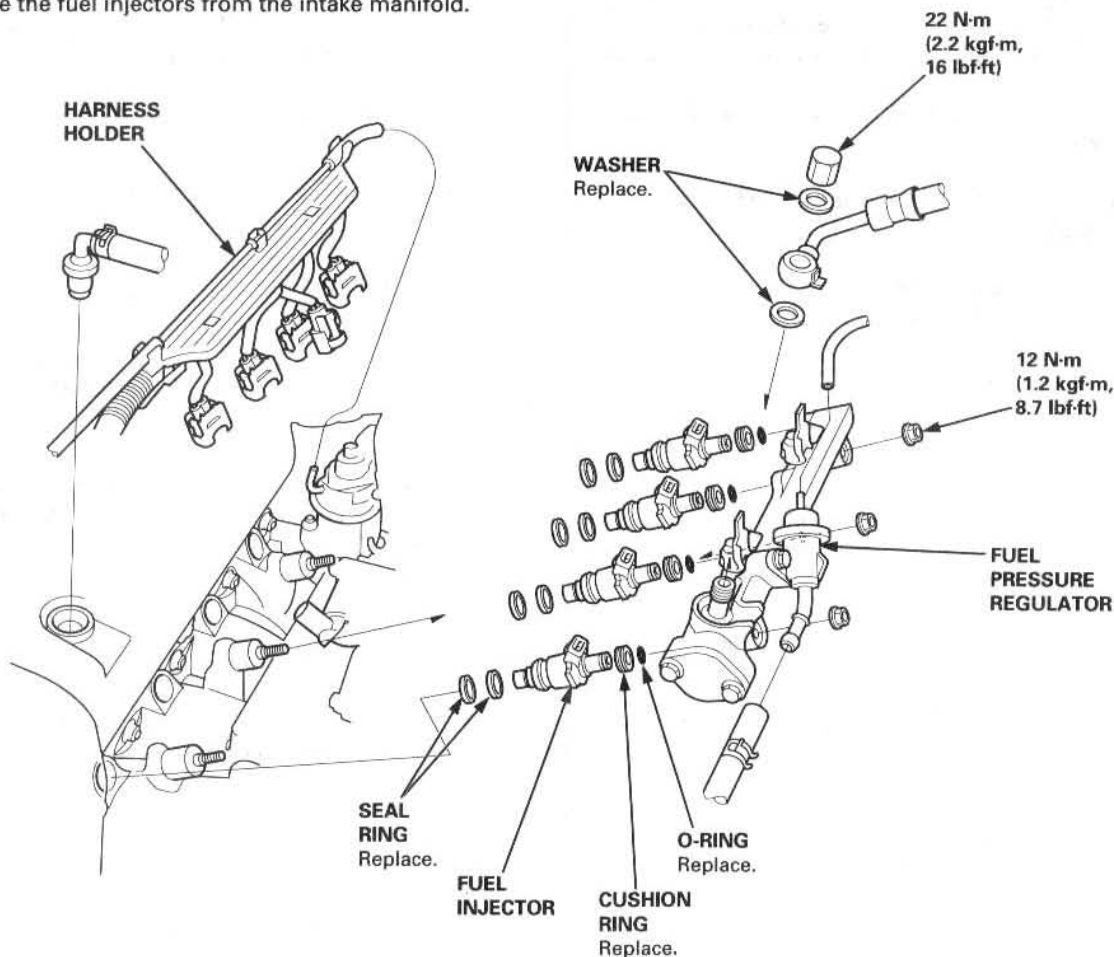
Replacement

⚠ WARNING Do not smoke when working on the fuel system. Keep open flames away from your work area.

1. Relieve fuel pressure (see page 11-123).
2. Disconnect the connectors from the fuel injectors.
3. Disconnect the vacuum hose and fuel return hose from the fuel pressure regulator.

NOTE: Place a rag or shop towel over the hoses before disconnecting them.

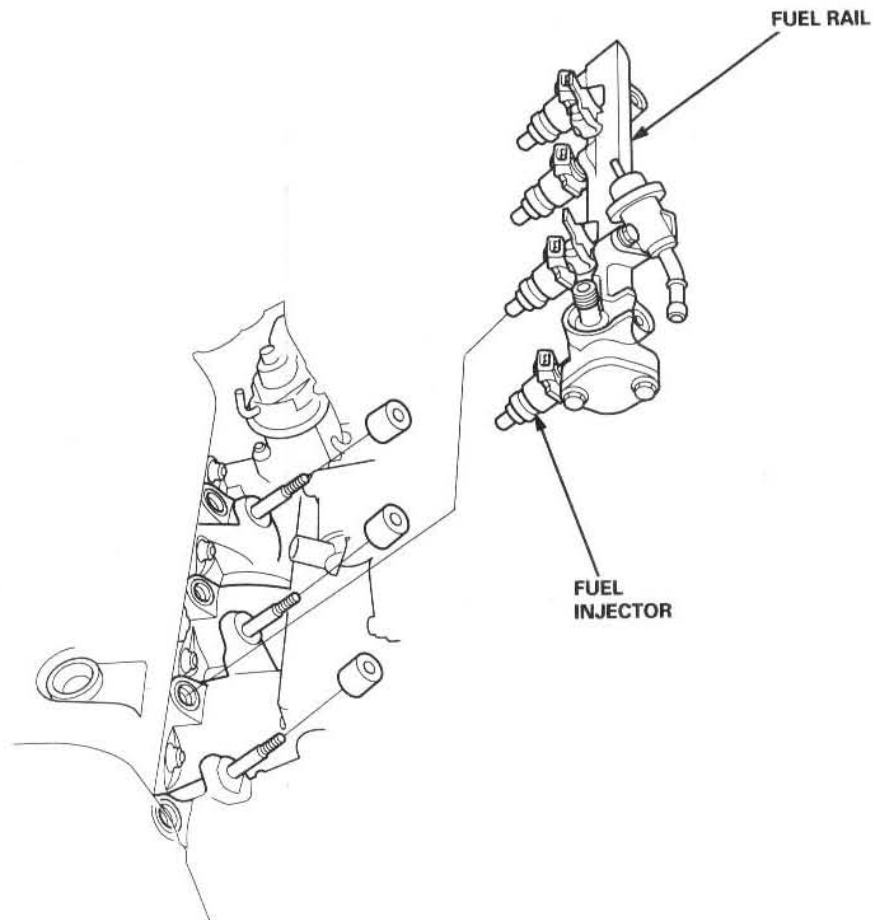
4. Disconnect the fuel hose from the fuel rail.
5. Remove the retainer nuts on the fuel rail.
6. Disconnect the fuel rail.
7. Remove the fuel injectors from the intake manifold.



8. Slide new cushion rings onto the fuel injectors.
9. Coat new O-rings with clean engine oil, and put them on the fuel injectors.
10. Insert the fuel injectors into the fuel rail first.
11. Coat new seal rings with clean engine oil, and press them into the intake manifold.



12. To prevent damage to the O-rings, install the fuel injectors in the fuel rail first, then install them in the intake manifold.



13. Install and tighten the retainer nuts.
14. Connect the fuel hose to the fuel rail with new washers.
15. Connect the vacuum hose and fuel return hose to the fuel pressure regulator.
16. Install the connectors on the fuel injectors.
17. Turn the ignition switch ON (II), but do not operate the starter. After the fuel pump runs for approximately two seconds, the fuel pressure in the fuel line rises. Repeat this two or three times, then check whether there is any fuel leakage.

Fuel Supply System

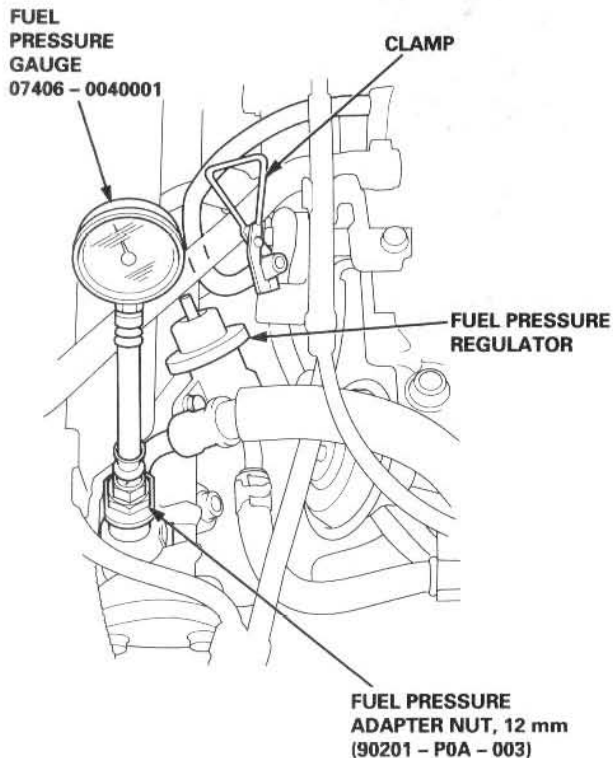
Fuel Pressure Regulator

Testing

⚠ WARNING Do not smoke during the test. Keep open flames away from your work area.

1. Attach the special tool to the 12 mm fuel Pressure adapter nut, (90201 - P0A - 003) on the fuel rail (see page 11-123).
2. Start the engine.

Pressure should be:
270 - 320 kPa (2.8 - 3.3 kgf/cm², 40 - 47 psi)
(with the fuel pressure regulator vacuum hose disconnected and pinched)



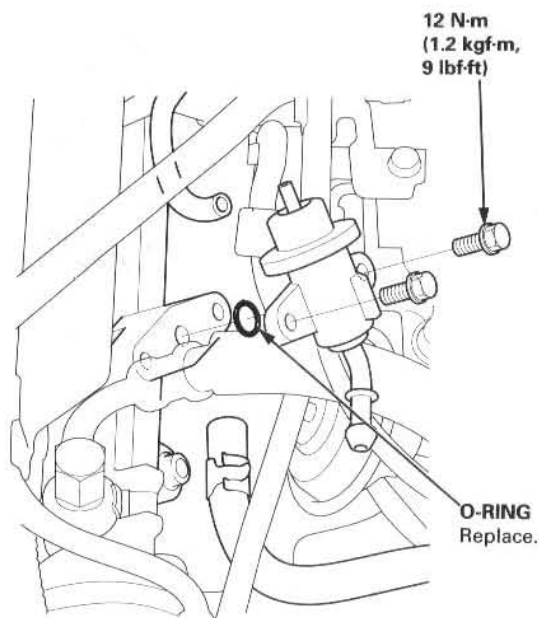
3. Reconnect the vacuum hose to the fuel pressure regulator.
4. Check that the fuel pressure rises when the vacuum hose from the fuel pressure regulator is disconnected again.

If the fuel pressure did not rise, replace the fuel pressure regulator.

Replacement

⚠ WARNING Do not smoke while working on the fuel system. Keep open flame away from your work area.

1. Place a shop towel under the fuel pressure regulator, then relieve fuel pressure (see page 11-123).
2. Disconnect the vacuum hose and fuel return hose.
3. Remove the two 6 mm retainer bolts.



NOTE:

- Replace the O-ring.
- When assembling the fuel pressure regulator, apply clean engine oil to the O-ring and assemble it into its proper position, taking care not to damage the O-ring.



Fuel Filter

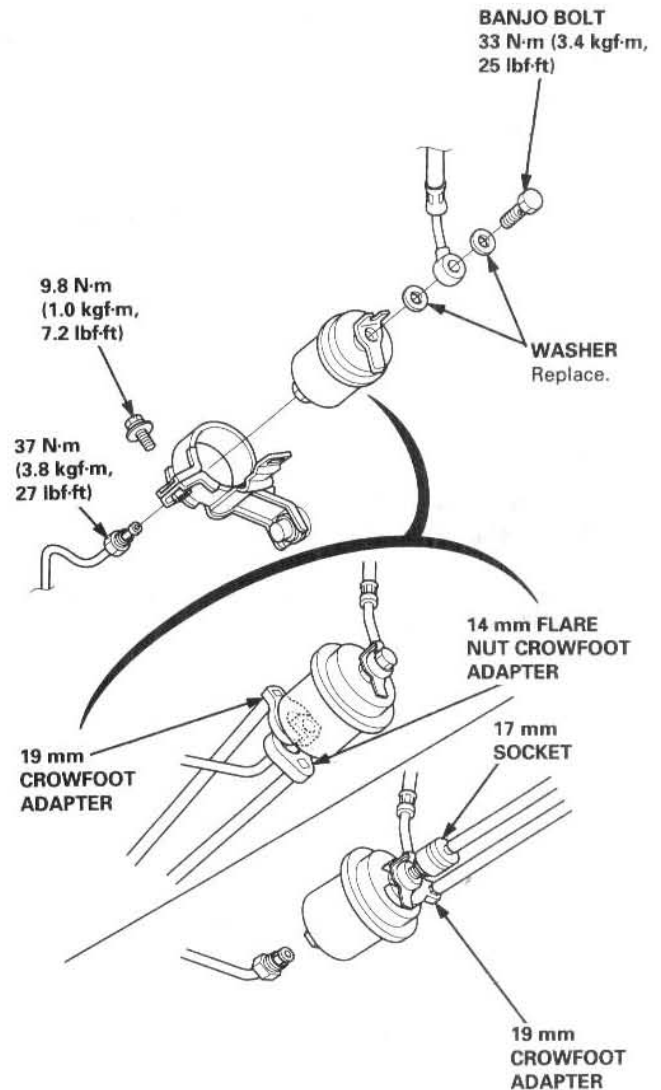
Replacement

⚠ WARNING

- Do not smoke while working on fuel system. Keep open flame away from your work area.
- While replacing the fuel filter, be careful to keep a safe distance between battery terminals and any tools.

The fuel filter should be replaced whenever the fuel pressure drops below the specified value [270 – 320 kPa, 2.8 – 3.3 kgf/cm², 40 – 47 psi with the fuel pressure regulator vacuum hose disconnected and pinched] after making sure that the fuel pump and the fuel pressure regulator are OK.

1. Place a shop towel under and around the fuel filter.
2. Relieve fuel pressure (see page 11-123).
3. Remove the engine wire harness bracket and power steering feed hose clamp.
4. Remove the banjo bolt and the fuel feed pipe while supporting the fuel filter with another wrench, as shown.
5. Remove the fuel filter clamp and fuel filter.
6. Install the new fuel filter in the reverse order of removal, and note these items:
 - When assembling, use new washers as shown.
 - Clean the flared joint of high pressure hoses thoroughly before reconnecting them.



Fuel Supply System

Fuel Pump

Testing

⚠ WARNING Do not smoke during the test. Keep open flame away from your work area.

If you suspect a problem with the fuel pump, check that the fuel pump actually runs; when it is ON, you will hear some noise if you hold your ear to the fuel fill port with the fuel fill cap removed. The fuel pump should run for two seconds when ignition switch is first turned on. If the fuel pump does not make noise, check as follows:

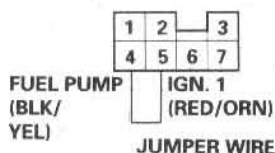
1. Remove the seat cushion, and pull up the carpet (see section 20).
2. Remove the access panel from the floor.

Disconnect the 2P connector (C508) from the fuel pump.

CAUTION: Be sure to turn the ignition switch OFF before disconnecting the wires.

3. Connect the PGM-FI main relay 7P connector terminals No. 4 and No. 5 with a jumper wire.

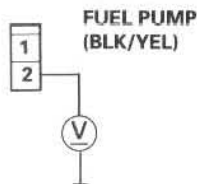
PGM-FI MAIN RELAY 7P CONNECTOR (C414)



Wire side of male terminals

4. Check that battery voltage is available between the fuel unit wire harness connector (harness side) connector terminal No. 2 and body ground when the ignition switch is turned ON (II).

2P CONNECTOR (C508)



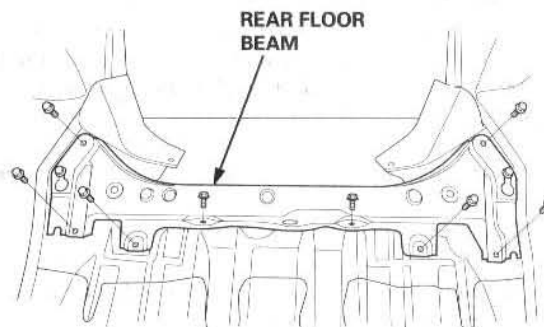
Terminal side of male terminals

- If battery voltage is available, check the fuel pump ground. If the ground is OK, replace the fuel pump.
- If there is no voltage, check the wire harness (see page 11-133).

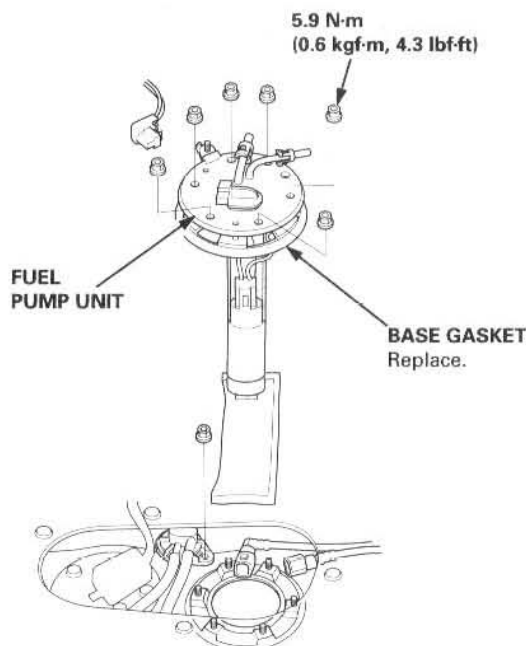
Replacement

⚠ WARNING Do not smoke while working on fuel system. Keep open flames away from your work area.

1. Remove the seat cushion, and pull up the carpet (see section 20).
2. Remove the rear floor beam.



3. Remove the access panel from the floor.
4. With the ignition switch OFF, disconnect the 2P connector (C508) from the fuel pump.
5. Remove the fuel pump mounting nuts.
6. Remove the fuel pump from the fuel tank.
7. Install parts in the reverse order of removal.



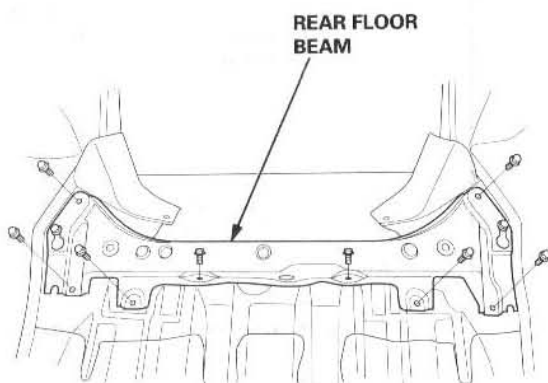


Fuel Gauge

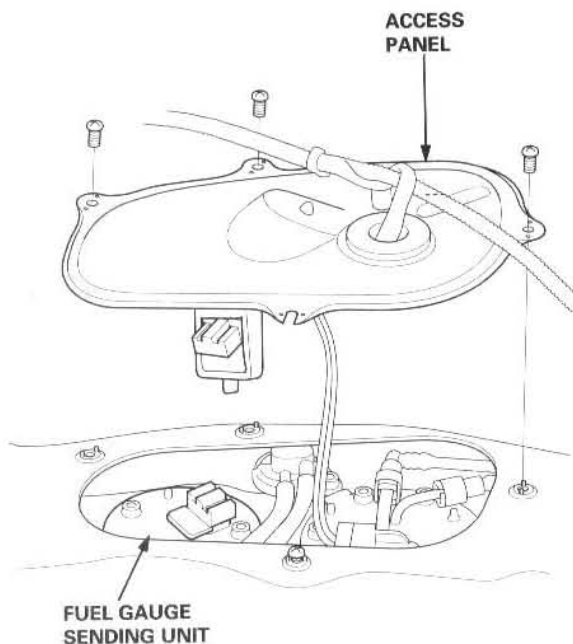
Testing

NOTE: Refer to section 23 for the fuel gauge system circuit diagram.

1. Check the No. 13 METER (10 A) fuse in the underdash fuse/relay box before testing.
2. Remove the seat cushion, and pull up the carpet (see section 20).
3. Remove the rear floor beam.

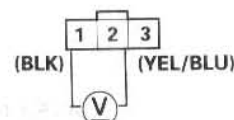


4. Remove the access panel from the floor.
5. With the ignition switch OFF, disconnect the 3P connector (C509) from the fuel gauge sending unit.



6. Measure voltage between the 3P connector terminals No. 1 and No. 2 with the ignition switch ON (II). There should be between 5 and 8 V.

FUEL GAUGE SENDING UNIT 3P CONNECTOR (C509)



Wire side of female terminals

- If the voltage is as specified, go to step 7.
 - If the voltage is not as specified, check for:
 - an open in the YEL/BLU or BLK wire.
 - poor ground (G501).
7. Turn the ignition switch OFF.
 8. Attach a jumper wire between the No. 1 and No. 2 terminals, then turn the ignition switch ON (II).
 9. Check that the pointer of the fuel gauge starts moving toward the "F" mark.

CAUTION: Turn the ignition switch OFF before the pointer reaches "F" on the gauge dial. Failure to do so may damage the fuel gauge.

NOTE: The fuel gauge is a bobbin (cross-coil) type, hence the fuel level is continuously indicated even when the ignition switch is OFF, and the pointer moves more slowly than that of a bimetal type.

- If the pointer of the fuel gauge does not move at all, replace the gauge.
- If the gauge is OK, inspect the fuel gauge sending unit.

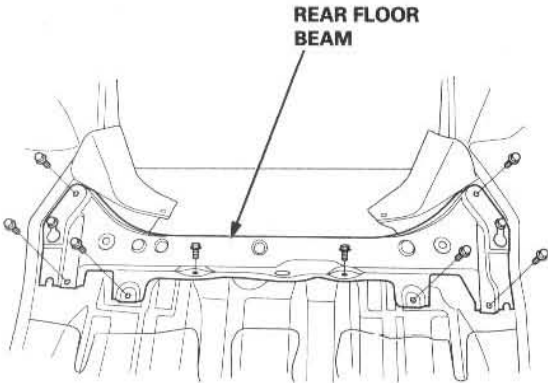
Fuel Supply System

Fuel Gauge Sending Unit

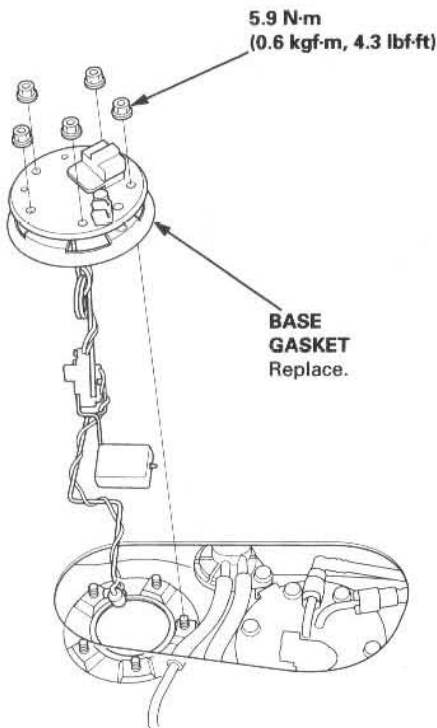
Testing

⚠ WARNING Do not smoke while working on the fuel system. Keep open flame away from your work area.

- 1. Remove the seat cushion, and pull up the carpet (see section 20).
- 2. Remove the rear floor beam.

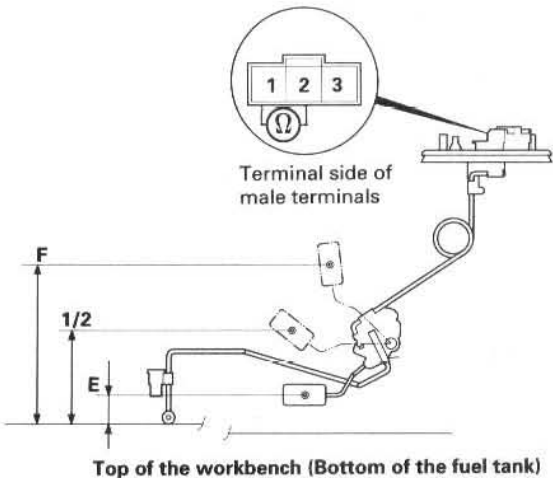


- 3. Remove the access panel.
- 4. With the ignition switch OFF, disconnect the 3P connector from the fuel gauge sending unit.
- 5. Remove the fuel gauge sending unit.



- 6. Measure the resistance between the No. 1 and No. 2 terminals at E (EMPTY), 1/2 (HALF FULL) and F (FULL) by moving the float.

Float Position	E	1/2	F
Resistance (Ω)	105 – 108	29.5 – 35.5	3.5 – 5



If you do not get the above readings, replace the fuel gauge sending unit.



Low Fuel Indicator System

Indicator Light Testing

NOTE: Refer to section 23 for the low fuel indicator circuit diagram.

1. Check the No. 13 METER (10 A) fuse in the under-dash fuse/relay box before testing.
2. Park the vehicle on level ground.

⚠ WARNING Do not smoke while working on the fuel system. Keep open flame away from the work area. Drain fuel only into an approved container.

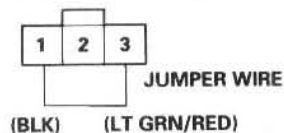
3. Drain the fuel into an approved container. Then install the drain bolt with a new washer.
4. Add less than 8.5 ℓ (2.2 U.S. Gal, 1.8 Imp. Gal) of fuel, and turn the ignition switch ON (II). The low fuel indicator light should come on within four minutes.



LOW FUEL INDICATOR LIGHT

- If the light comes on within four minutes, go to step 8.
 - If the light does not come on within four minutes, go to step 5.
5. Remove the seat cushion (see section 20).
 6. Remove the fuel tank access panel from the floor, and disconnect the 3P connector from the fuel gauge sending unit.
 7. Connect the No. 1 and No. 3 terminals with a jumper wire.
 - If the light comes on, check the sending unit.
 - If the light does not come on, check for:
 - an open in the LT GRN/RED wire between the fuel unit and fuel gauge assembly.
 - blown bulb.
 - poor ground (G501).

FUEL GAUGE SENDING UNIT CONNECTOR



Wire side of female terminals

8. Add 4 ℓ of fuel (1.1 U.S. Gal, 0.9 Imp. Gal). The light should go off within four minutes.

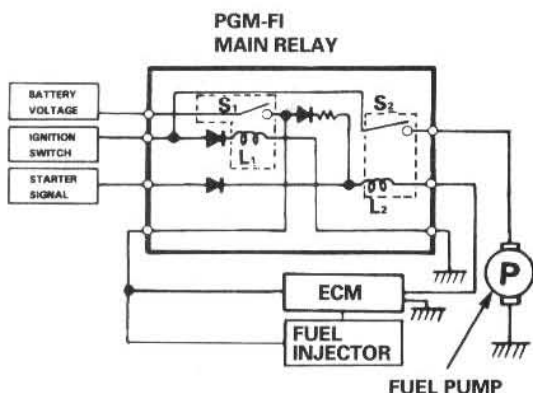
- If the light does not go off, check for:
 - a short in the LT GRN/RED wire between the fuel gauge sending unit and gauge assembly.
 - a faulty gauge assembly.
- If the light goes off, low fuel indicator light is OK.

Fuel Supply System

PGM-FI Main Relay

Description

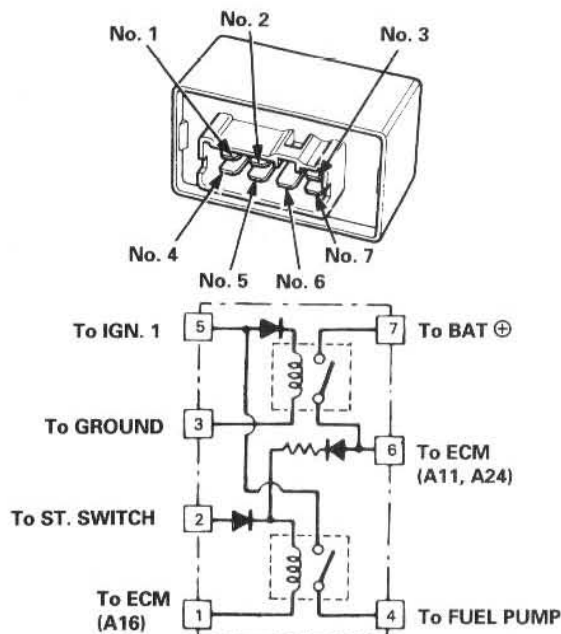
The PGM-FI main relay actually contains two individual relays. This relay is located at the left side of the cowl. One relay is energized whenever the ignition is on which supplies the battery voltage to the ECM, power to the fuel injectors, and power for the second relay. The second relay is energized for two seconds when the ignition is switched ON (II), and when the engine is running, to supply power to the fuel pump.



Relay Testing

NOTE: If the engine starts and continues to run, the PGM-FI main relay is OK.

1. Remove the PGM-FI main relay.
2. Attach the battery positive terminal to the No. 2 terminal and the battery negative terminal to the No. 1 terminal of the PGM-FI main relay. Then check for continuity between the No. 5 terminal and No. 4 terminal of the PGM-FI main relay.
 - If there is no continuity, replace the PGM-FI main relay and retest.
 - If there is continuity, go on to step 3.



3. Attach the battery positive terminal to the No. 5 terminal and the battery negative terminal to the No. 3 terminal of the PGM-FI main relay. Then check that there is continuity between the No. 7 terminal and No. 6 terminal of the PGM-FI main relay.
 - If there is no continuity, replace the PGM-FI main relay and retest.
 - If there is continuity, go on to step 4.
4. Attach the battery positive terminal to the No. 6 terminal and the battery negative terminal to the No. 1 terminal of the PGM-FI main relay. Then check that there is continuity between the No. 5 terminal and No. 4 terminal of the PGM-FI main relay.
 - If there is no continuity, replace the PGM-FI main relay and retest.
 - If there is continuity, the PGM-FI main relay is OK. If the fuel pump still does not work, go to Harness Testing on the next page.



Troubleshooting

- Engine will not start.
- Inspection of PGM-FI main relay and relay harness.

Check for an open in the wire (GND line):

1. Turn the ignition switch OFF.
2. Disconnect the PGM-FI main relay connector.
3. Check for continuity between the PGM-FI main relay 7P connector terminal No. 3 and body ground.

Is there continuity?

NO

Repair open in the wire between the PGM-FI main relay and G101.

YES

Check for an open or short in the wire (BAT line):

Measure voltage between the PGM-FI main relay 7P connector terminal No. 7 and body ground.

Is there battery voltage?

NO

- Repair open or short in the wire between the PGM-FI main relay and the No. 4 ACG-S (10 A) fuse.
- Replace the No. 4 ACG-S (10 A) fuse in the under-dash fuse/relay box.

YES

Check for an open or short in the wire (IG1 line):

1. Turn the ignition switch ON (II).
2. Measure the voltage between the PGM-FI main relay 7P connector terminal No. 5 and body ground.

Is there battery voltage?

NO

- Repair open or short in the wire between the PGM-FI main relay and the FUEL PUMP (15 A) fuse.
- Replace the FUEL PUMP (15 A) fuse in the under-dash fuse/relay box.

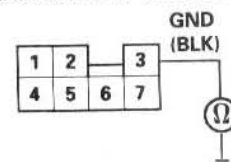
YES

Check for an open or short in the wire (STS line):

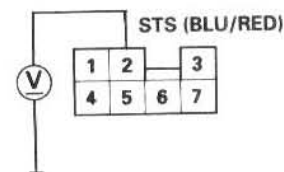
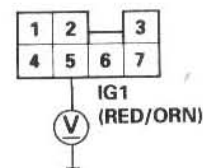
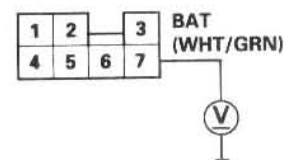
1. Turn the ignition switch to the START (III) position.
NOTE:
 - M/T: Clutch pedal must be depressed.
 - A/T: Transmission in **N** or **P** position.
2. Measure the voltage between the PGM-FI main relay 7P connector terminal No. 2 and body ground.

(To page 11-134)

PGM-FI MAIN RELAY 7P CONNECTOR (C414)



Wire side of female terminals

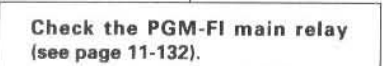
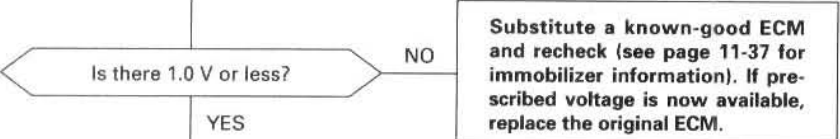
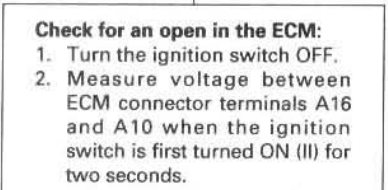
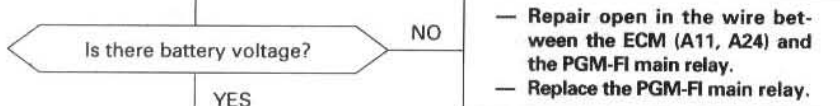
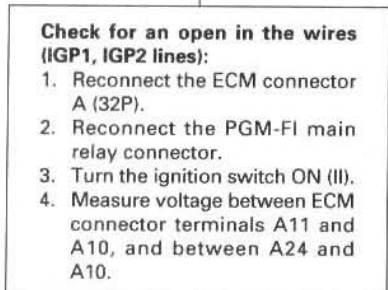
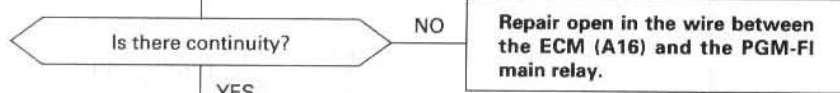
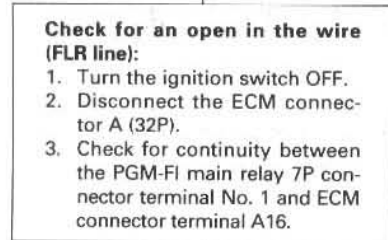
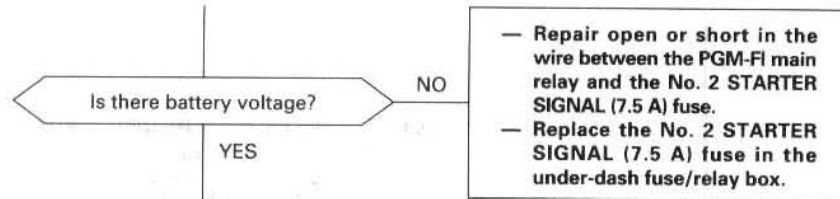


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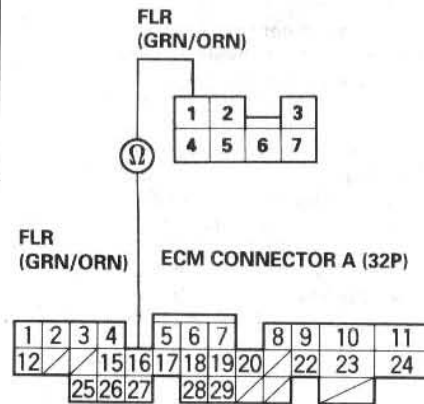
Fuel Supply System

PGM-FI Main Relay (cont'd)

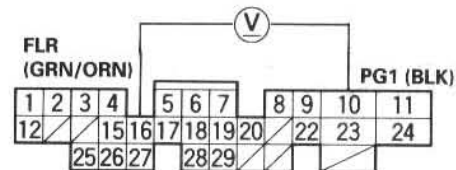
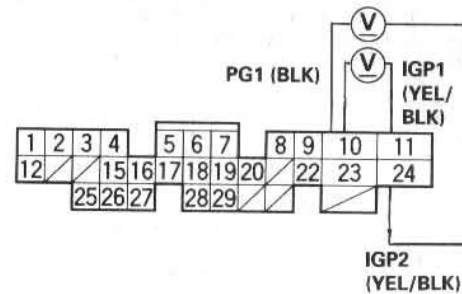
(From page 11-133)



PGM-FI MAIN RELAY 7P CONNECTOR (C430)



Wire side of female terminals



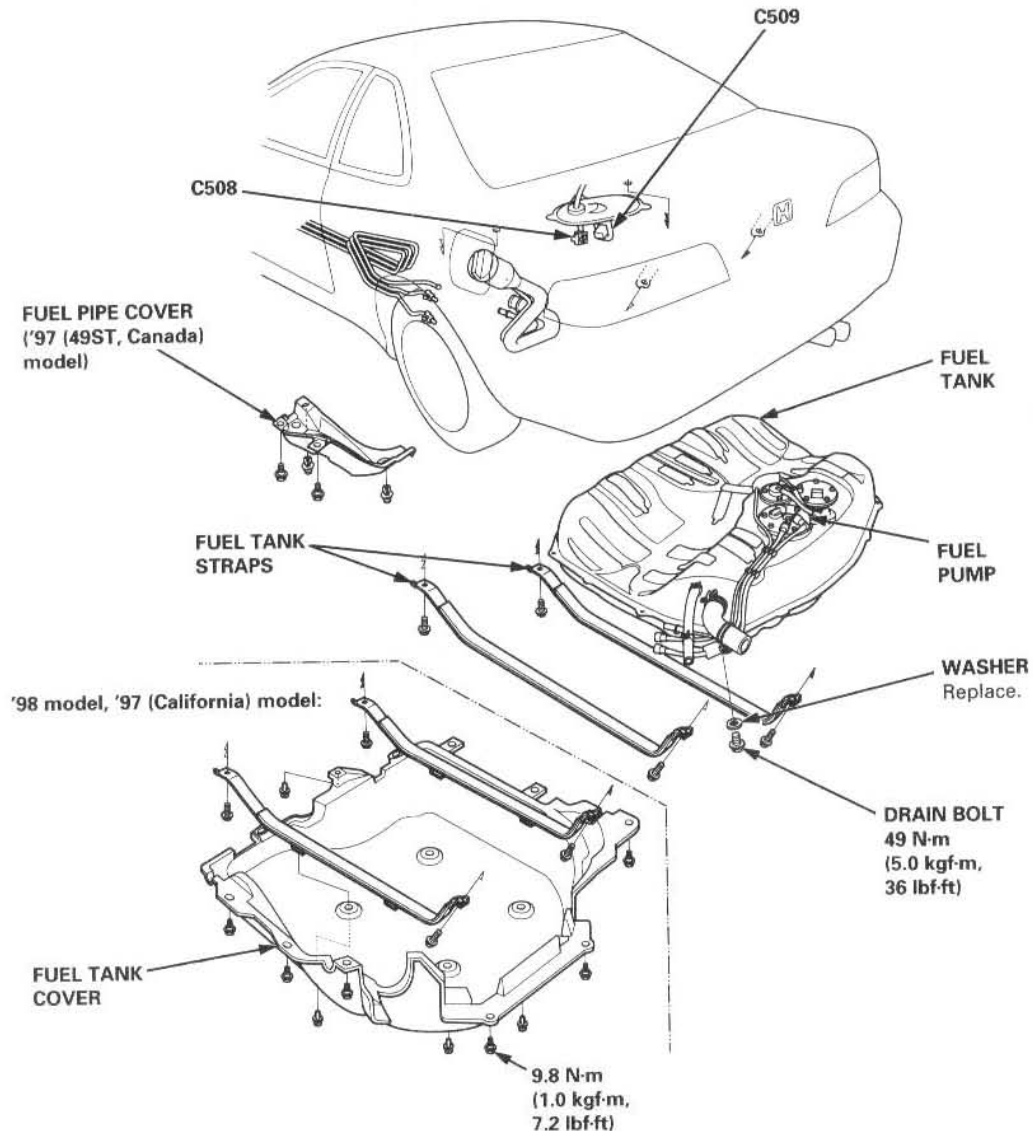


Fuel Tank

'97 model, '98 model:

▲ WARNING Do not smoke while working on fuel system. Keep open flame away from your work area.

1. Relieve the fuel pressure (see page 11-123).
 2. Jack up the vehicle, and support it with jackstands.
 3. Remove the fuel tank cover ('98 model, '97 (California) model only) and fuel pipe cover.
 4. Remove the drain bolt, and drain the fuel into an approved container.
 5. Disconnect the hoses (see page 11-118). Slide back the clamps, then twist hoses as you pull, to avoid damaging them.
 6. Place a jack, or other support, under the tank.
 7. Remove the strap nuts, and let the straps fall free.
 8. Disconnect the 2P (C508) and 3P (C509) connectors.
 9. Remove the fuel tank.
- NOTE: The tank may stick on the undercoat applied to its mount. To remove, carefully pry it off the mount.
10. Install the drain bolt with a new washer, then coat the drain bolt with Noxrust 124B. Allow the Noxrust to dry for 20 minutes.
 11. Install the remaining parts in the reverse order of removal.



(cont'd)

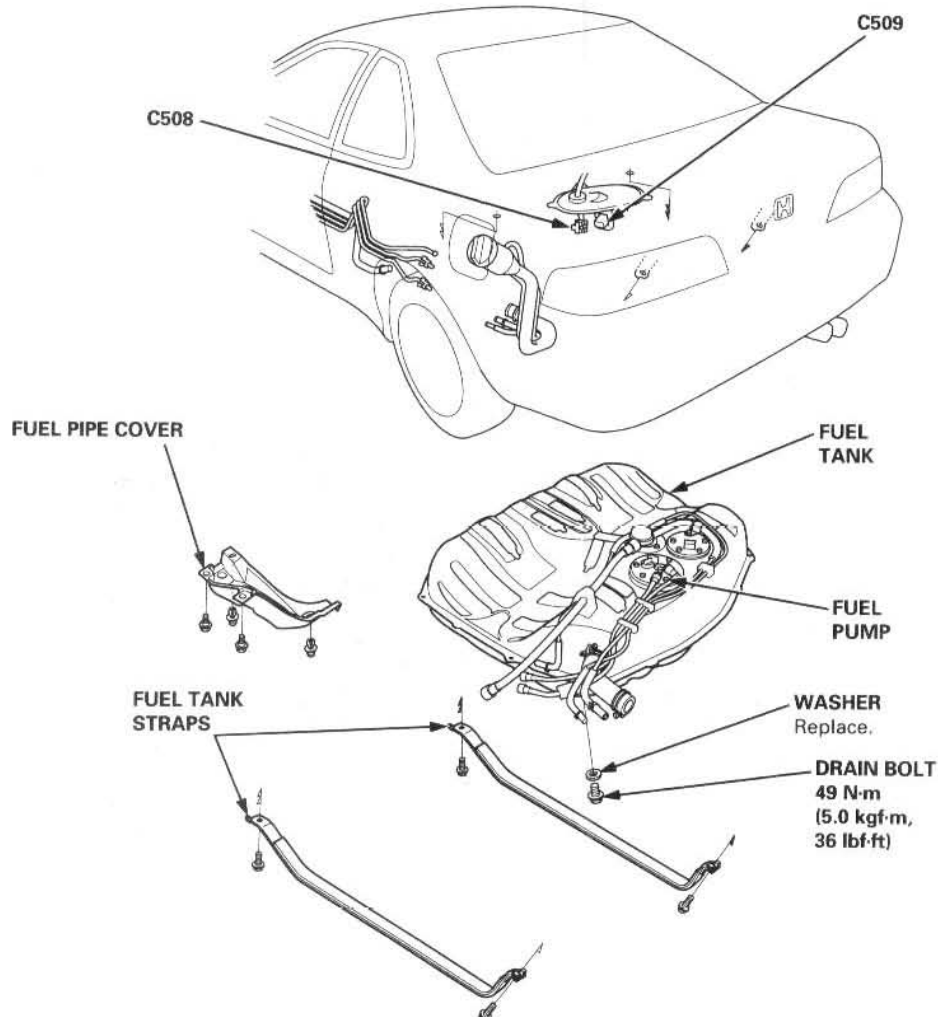
Fuel Supply System

Fuel Tank (cont'd)

'99 model:

⚠ WARNING Do not smoke while working on fuel system. Keep open flame away from your work area.

1. Relieve the fuel pressure (see page 11-123).
 2. Jack up the vehicle, and support it with jackstands.
 3. Remove the fuel pipe cover.
 4. Remove the drain bolt, and drain the fuel into an approved container.
 5. Disconnect the hoses (see page 11-119). Slide back the clamps, then twist hoses as you pull, to avoid damaging them.
 6. Place a jack, or other support, under the tank.
 7. Remove the strap nuts, and let the straps fall free.
 8. Disconnect the 2P (C508) and 3P (C509) connectors.
 9. Remove the fuel tank.
- NOTE: The tank may stick on the undercoat applied to its mount. To remove, carefully pry it off the mount.
10. Install the drain bolt with a new washer, then coat the drain bolt with Noxrust 124B. Allow the Noxrust to dry for 20 minutes.
 11. Install the remaining parts in the reverse order of removal.

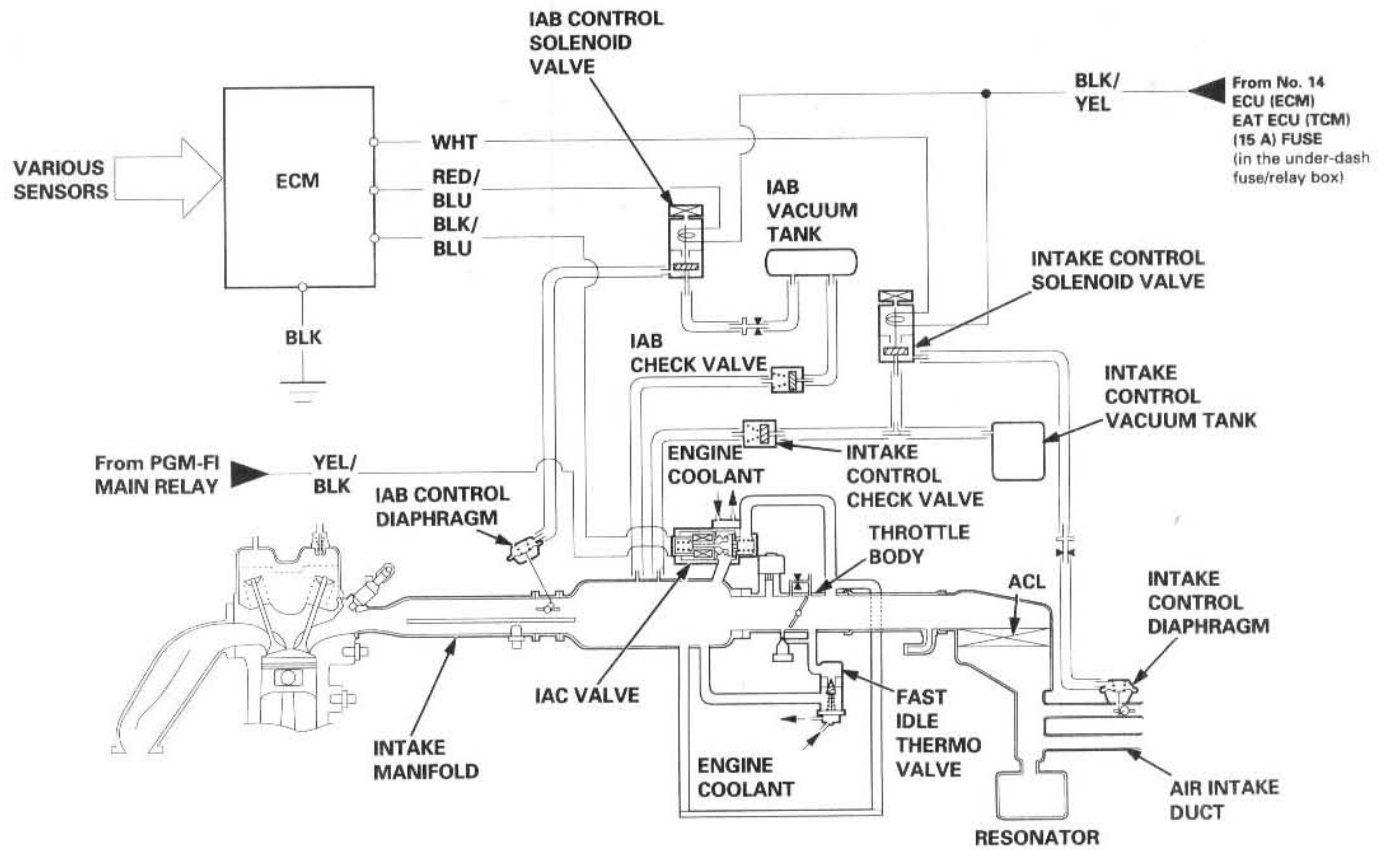


Intake Air System

System Description

The system supplies air for all engine needs. It consists of the intake air pipe, Air Cleaner (ACL), intake air duct, Throttle Body (TB), Idle Air Control (IAC) Valve, fast idle thermo valve, and intake manifold.

A resonator in the intake air pipe provides additional silencing as air is drawn into the system.



Intake Air System

Air Cleaner (ACL)

ACL Element Replacement

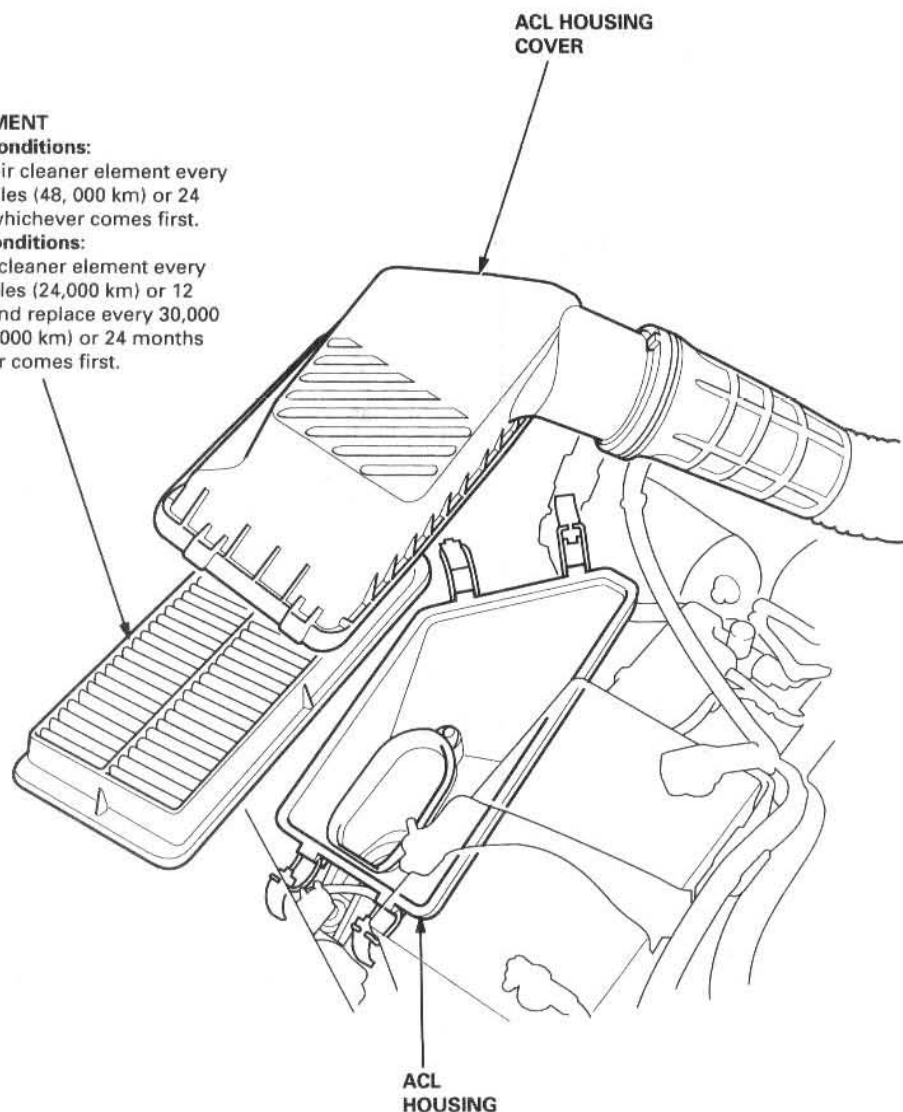
ACL ELEMENT

Normal conditions:

Replace air cleaner element every 30,000 miles (48,000 km) or 24 months whichever comes first.

Severe conditions:

Clean air cleaner element every 15,000 miles (24,000 km) or 12 months and replace every 30,000 miles (48,000 km) or 24 months whichever comes first.

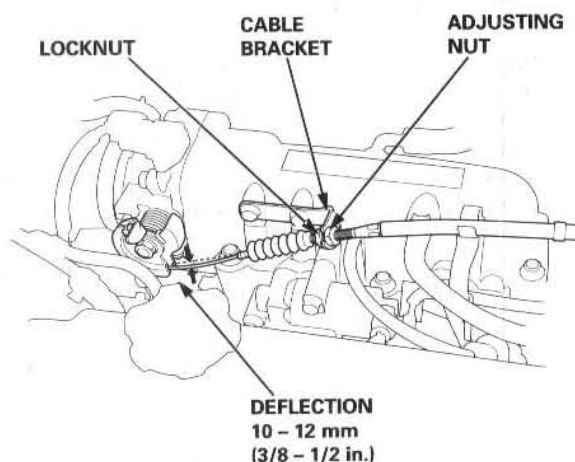




Throttle Cable

Inspection/Adjustment

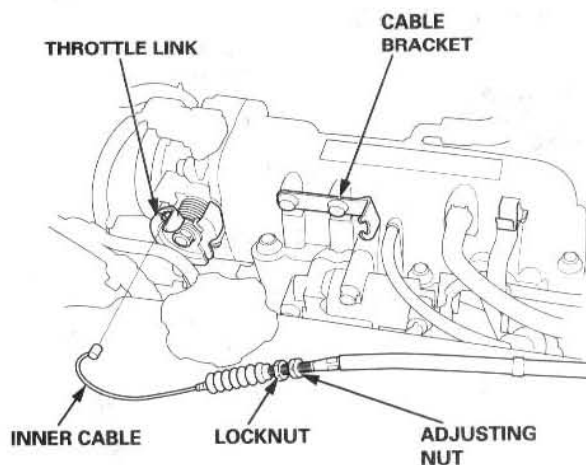
1. Start the engine. Hold the engine at 3,000 rpm with no load (A/T in **N** or **P** position, M/T in neutral) until the radiator fan comes on, then let it idle.
2. Check that the throttle cable operates smoothly with no binding or sticking. Repair as necessary.
3. Check cable free play at the throttle linkage. Cable deflection should be 10 – 12 mm (3/8 – 1/2 in.)



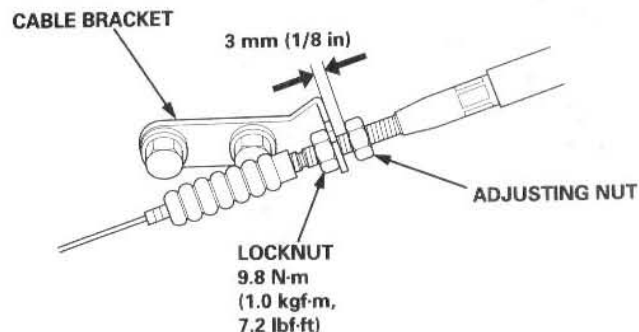
4. If deflection is not within specs, loosen the locknut, turn the adjusting nut until the deflection is as specified, then retighten the locknut.
5. With the cable properly adjusted, check the throttle valve to be sure it opens fully when you push the accelerator pedal to the floor. Also check the throttle valve to be sure it returns to the idle position whenever you release the accelerator pedal.

Installation

1. Open the throttle valve fully, then install the throttle cable in the throttle linkage, and install the cable housing in the cable bracket.



2. Start the engine. Hold the engine at 3,000 rpm with no load (A/T in **N** or **P** position, M/T in neutral) until the radiator fan comes on, then let it idle.
3. Adjust the cruise control cable (see section 4).
4. Hold the throttle link to the throttle lever; there should be no clearance.
5. Hold the cable sheath, removing all slack from the cable.
6. Turn the adjusting nut until it is 3 mm (1/8 in.) away from the cable bracket.



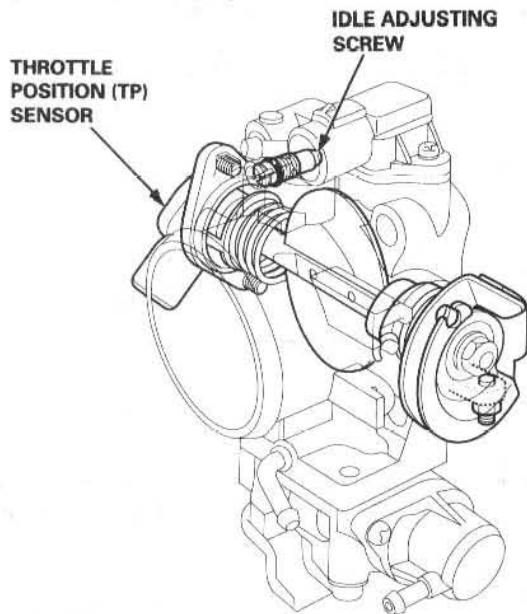
7. Tighten the locknut. The cable deflection should now be 10 – 12 mm (3/8 – 1/2 in.). If not, see Inspection/Adjustment.

Intake Air System

Throttle Body

Description

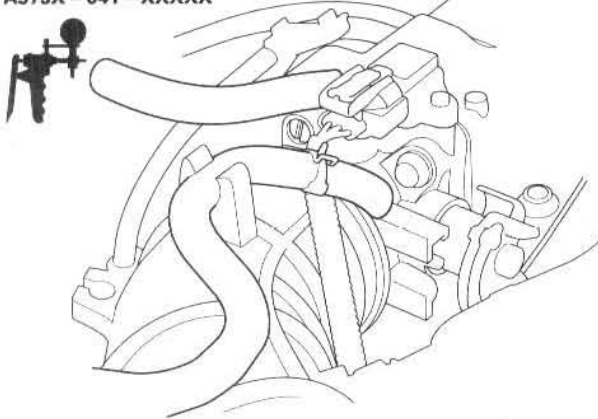
The throttle body is a single-barrel side-draft type. The lower portion of the throttle valve is heated by engine coolant from the cylinder head. The idle adjusting screw, which increases/decreases bypass air, and the Evaporative Emission (EVAP) Control Canister port are located on the top of the throttle body.



Inspection

1. Start the engine. Hold the engine at 3,000 rpm with no load (A/T in **N** or **P** position, M/T in neutral) until the radiator fan comes on, then let it idle.
2. Disconnect the vacuum hose (to the EVAP control canister) from the top of the throttle body; connect a vacuum gauge to the throttle body.

**VACUUM PUMP
GAUGE, 0 - 30 in.Hg.
A973X - 041 - XXXXX**



3. Allow the engine to idle, and check that the gauge indicates no vacuum.

If there is vacuum, check the throttle cable (see page 11-139).

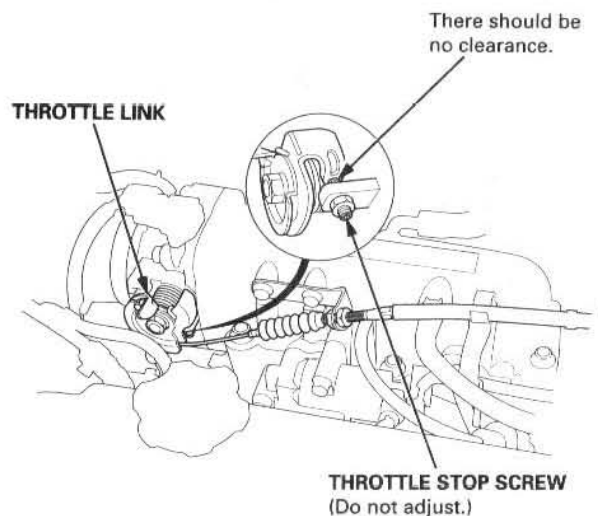
4. Check that vacuum is indicated on the gauge when the throttle is opened slightly from idle.

If the gauge indicates no vacuum, check the throttle body port. If the throttle body port is clogged, clean it with carburetor cleaner.

5. Stop the engine, and check that the throttle cable operates smoothly without binding or sticking.

If there are any abnormalities check for:

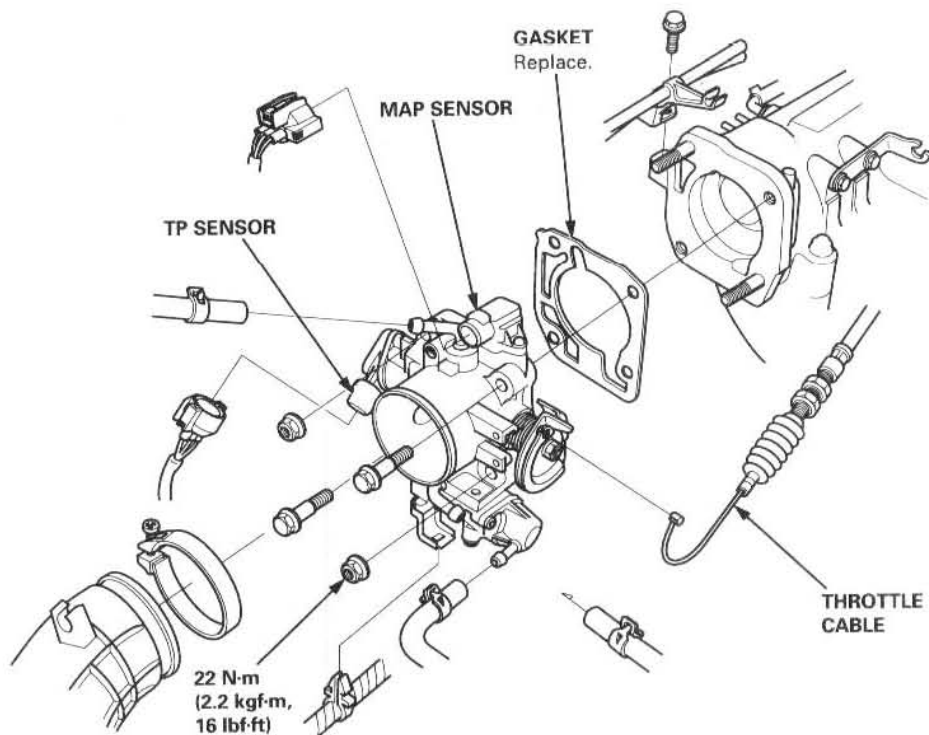
- Excessive wear or play in the throttle valve shaft.
- Sticky or binding throttle lever at the fully closed position.
- Clearance between throttle stop screw and throttle lever at the fully closed position.



Replace the throttle body if there is excessive play in the throttle valve shaft or if the shaft is binding or sticking.



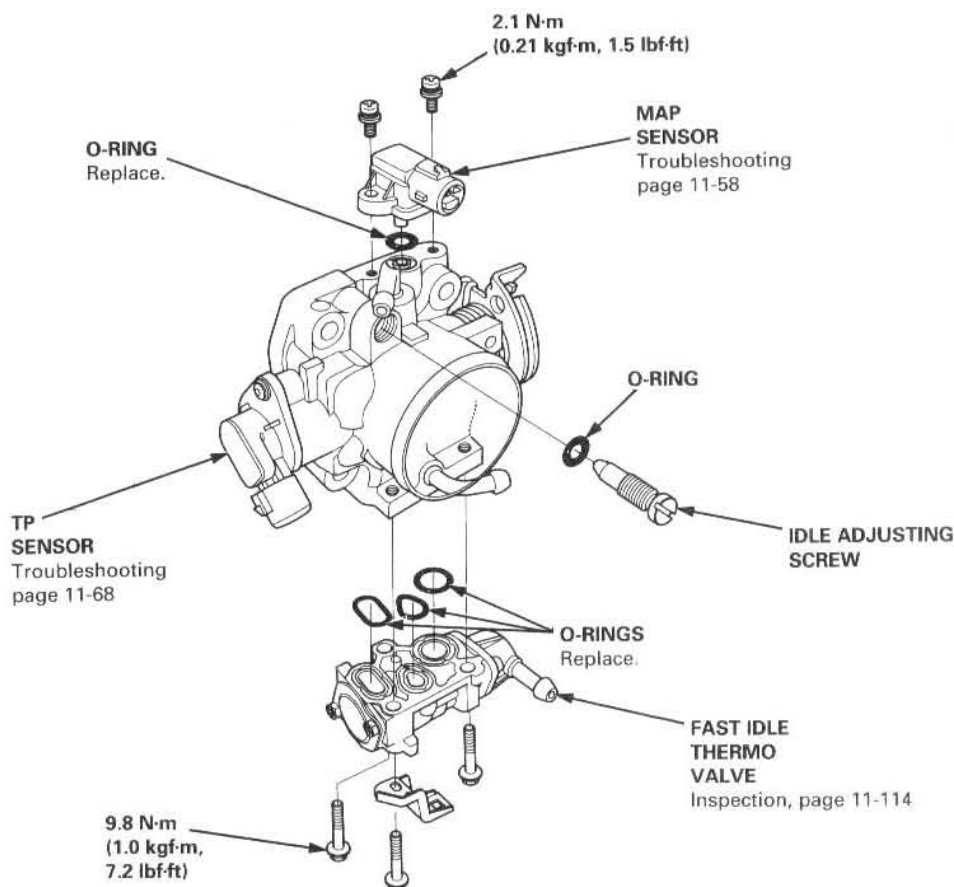
Removal



NOTE:

- Do not adjust the throttle stop screw.
- After reassembly, adjust the throttle cable (page 11-139).
- The TP sensor is not removable.

Disassembly

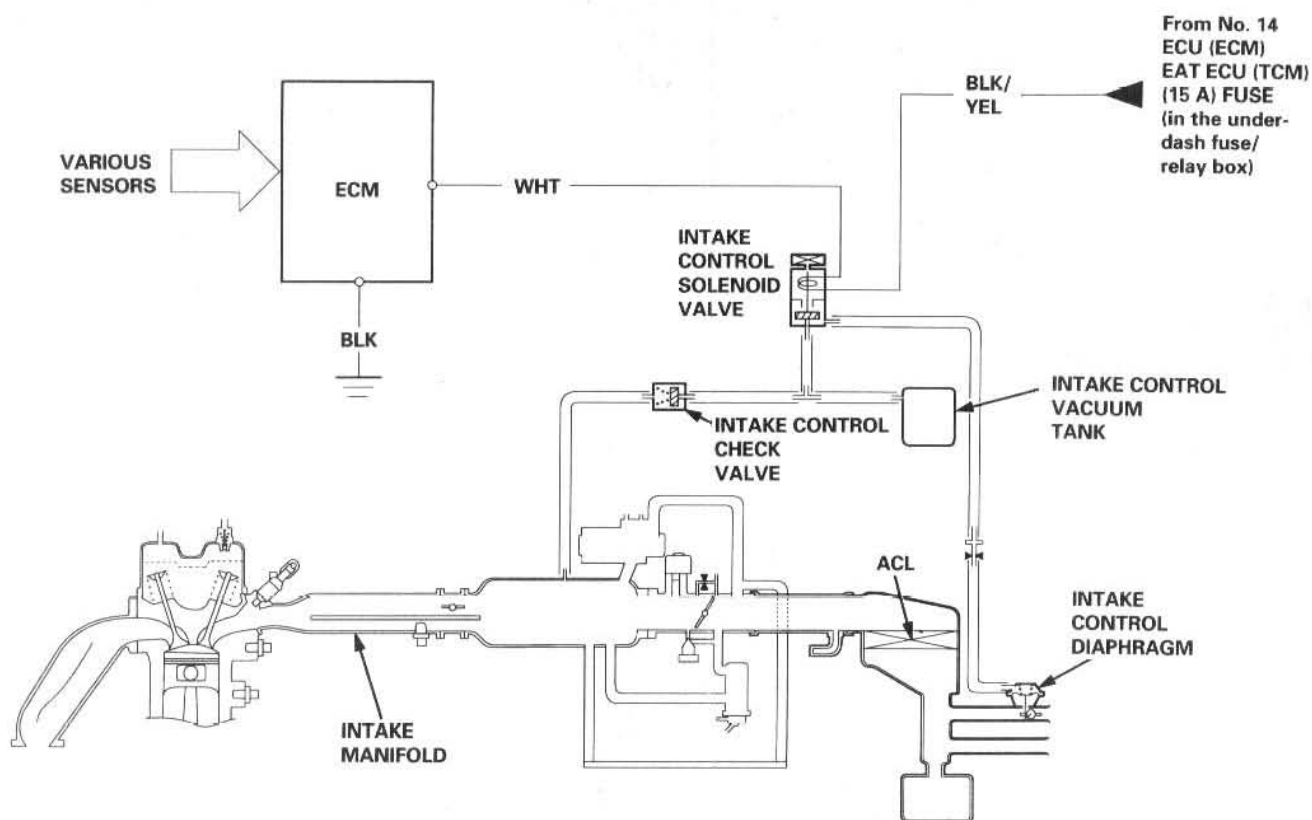


Intake Air System

Intake Control System

Description

When the engine speed is below 3,970 rpm, the ECM supplies ground to the intake control solenoid valve. This opens the solenoid valve sending intake manifold vacuum to the intake control diaphragm.





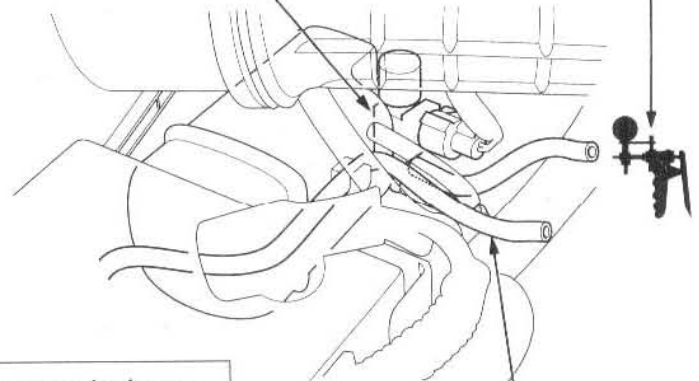
Inspection of Intake Control System.

Check for vacuum at idle:

1. Start the engine and allow it to idle.
2. Remove the No. 8 vacuum hose from the upper port on the intake control solenoid valve and connect a vacuum gauge to the solenoid valve.

INTAKE CONTROL SOLENOID VALVE

VACUUM PUMP/
GAUGE, 0 – 30 in.Hg.
A973X-041-XXXXX



No. 8 VACUUM HOSE

Is there vacuum?

NO

YES

Check for vacuum at intake control vacuum tank:

Remove No. 8 vacuum hose from the intake control vacuum tank, then check for vacuum at the intake control vacuum tank.

Is there vacuum?

NO

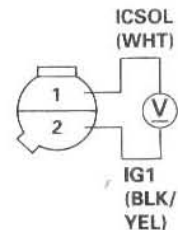
YES

Repair the blockage or vacuum leak between the intake control vacuum tank and the intake manifold.

Check for an open in the wire (ICSOL line):

1. Turn the ignition switch OFF.
2. Disconnect the intake control solenoid valve 2P connector.
3. Turn the ignition switch ON (II).
4. Measure voltage between the intake control solenoid valve 2P connector terminals No. 1 and No. 2.

INTAKE CONTROL SOLENOID VALVE 2P CONNECTOR (C256)



Wire side of female terminals

Is there battery voltage?

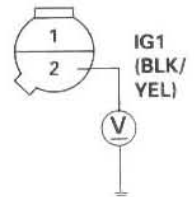
YES

NO

Replace the intake control solenoid valve.

Check for an open in the wire (IG1 line):

Measure voltage between body ground and the intake control solenoid valve 2P connector terminal No. 2.



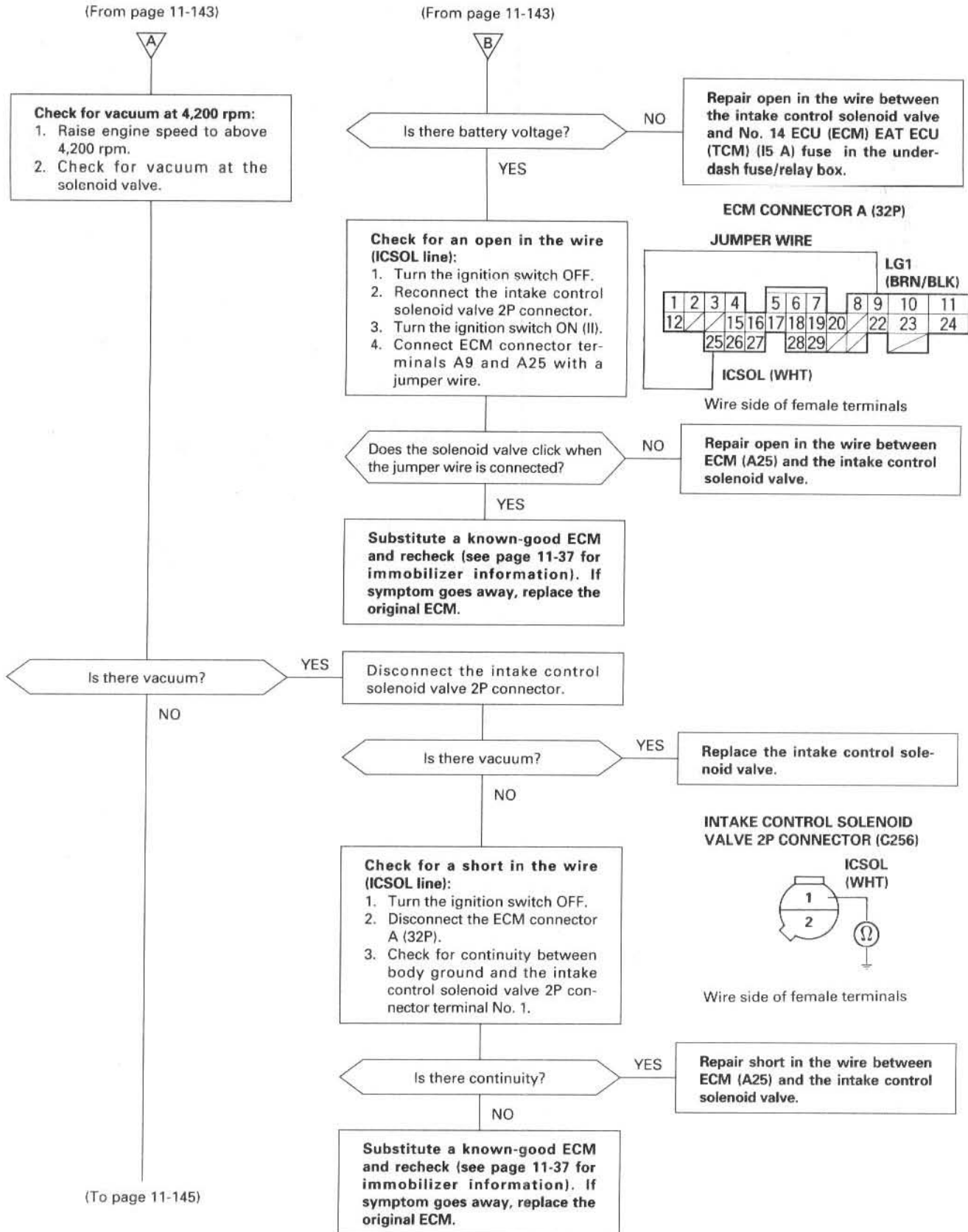
(To page 11-145)

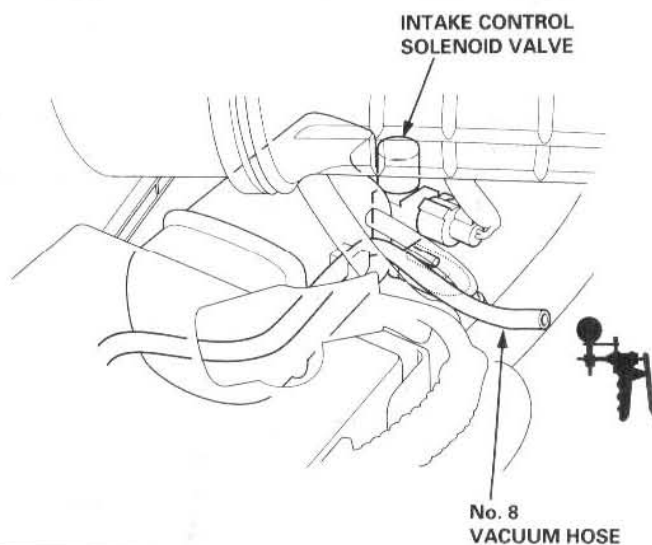
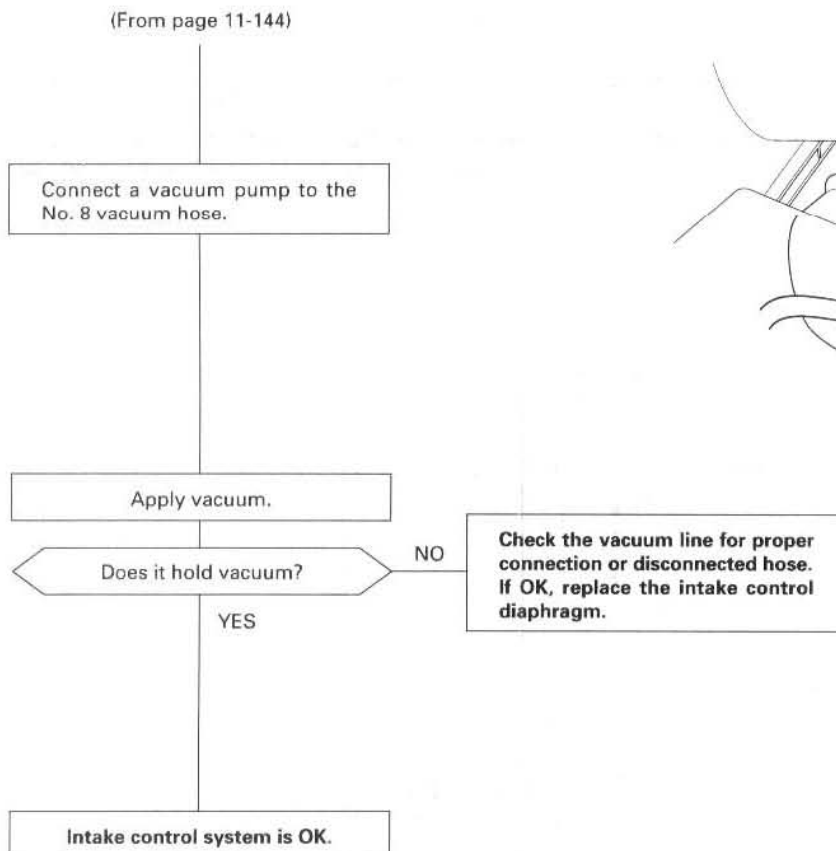
(To page 11-145)

(cont'd)

Intake Air System

Intake Control System (cont'd)





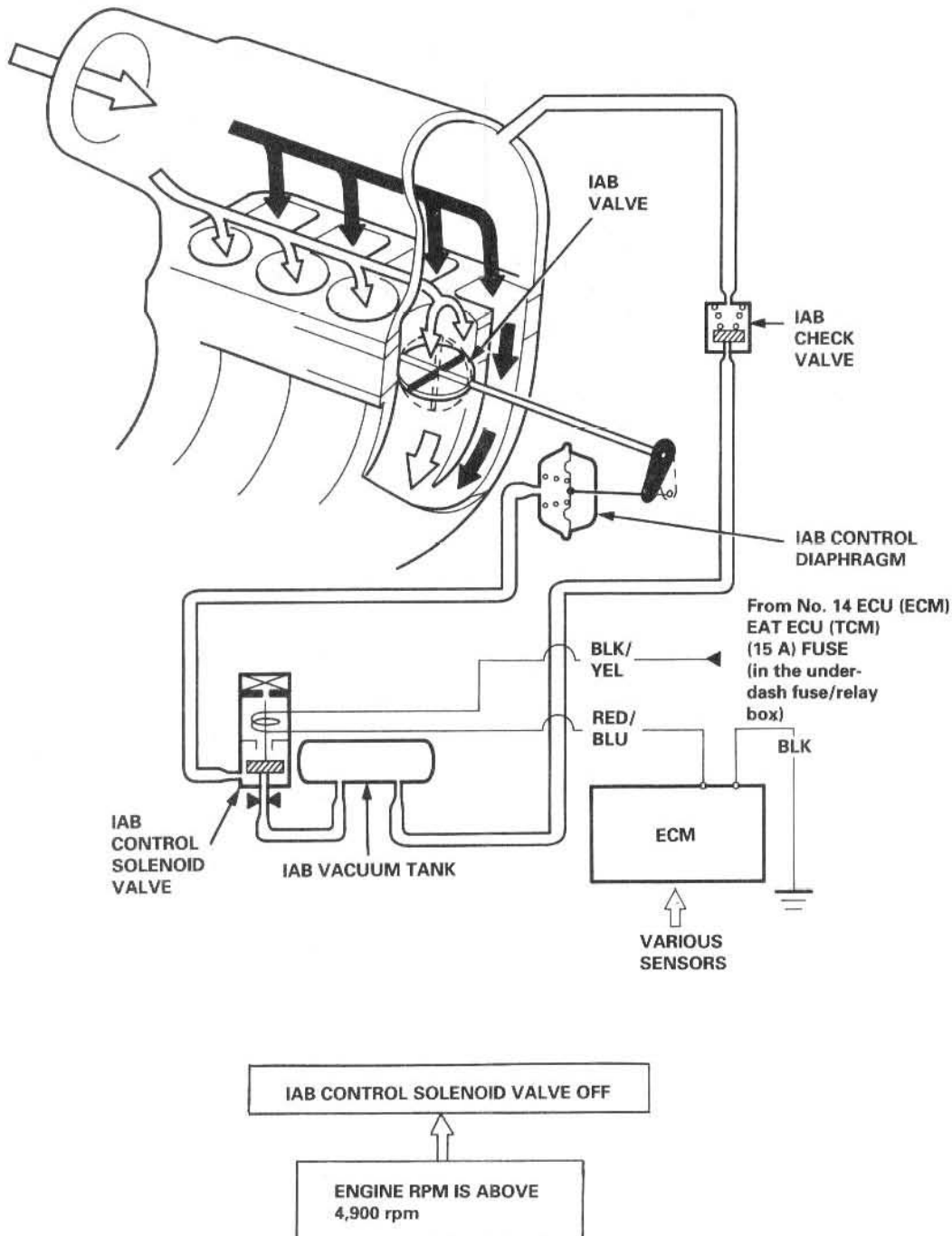
Intake Air System

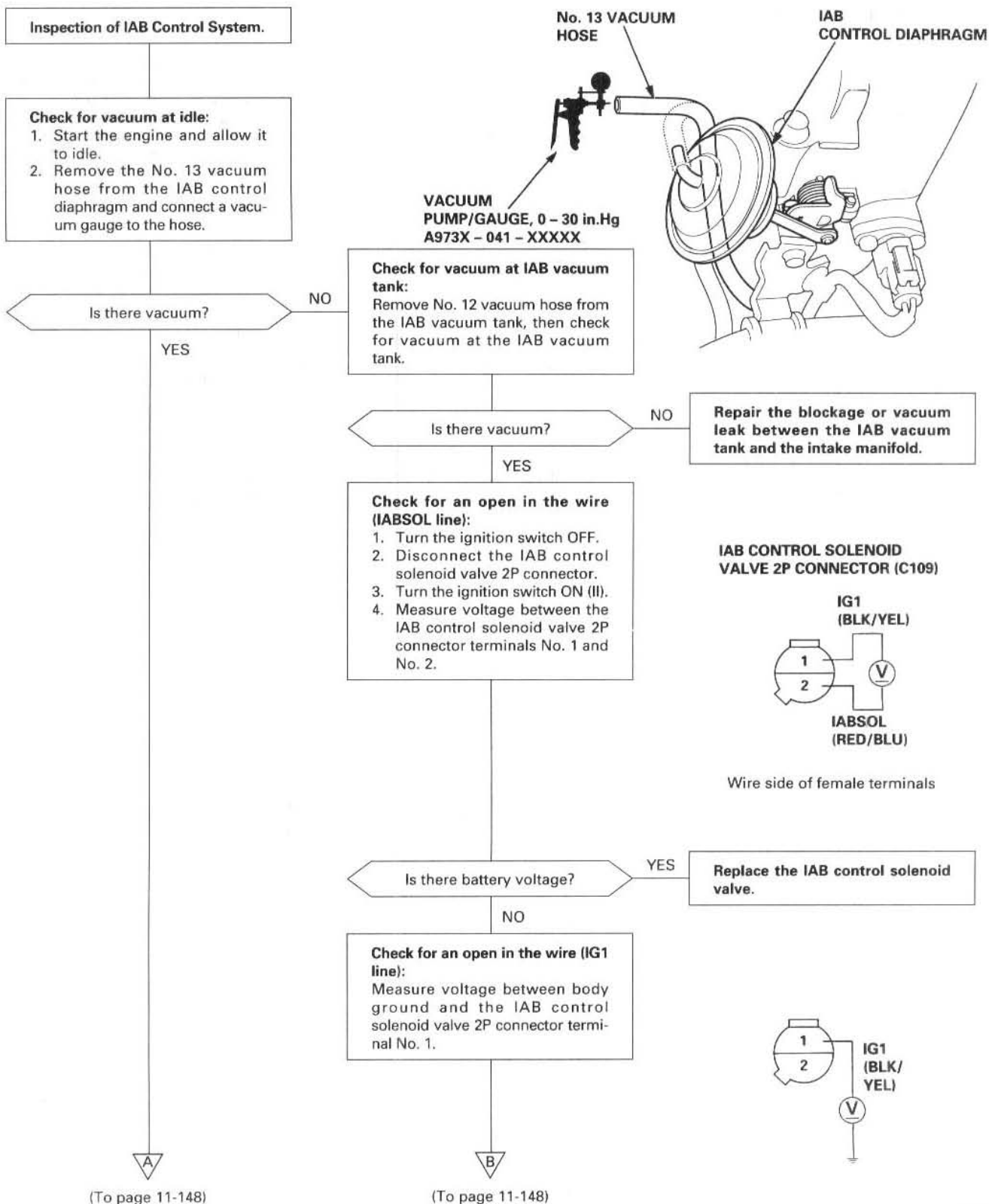
Intake Air Bypass (IAB) Control System

Description

Two air intake paths are provided in the intake manifold to allow the selection of the intake path most favorable for a given engine speed.

Optimum performance at any rpm is achieved by closing and opening the Intake Air Bypass (IAB) valves. High torque at low rpm is achieved when the IAB valves are closed, whereas high power at high rpm is achieved when the IAB valves are opened.

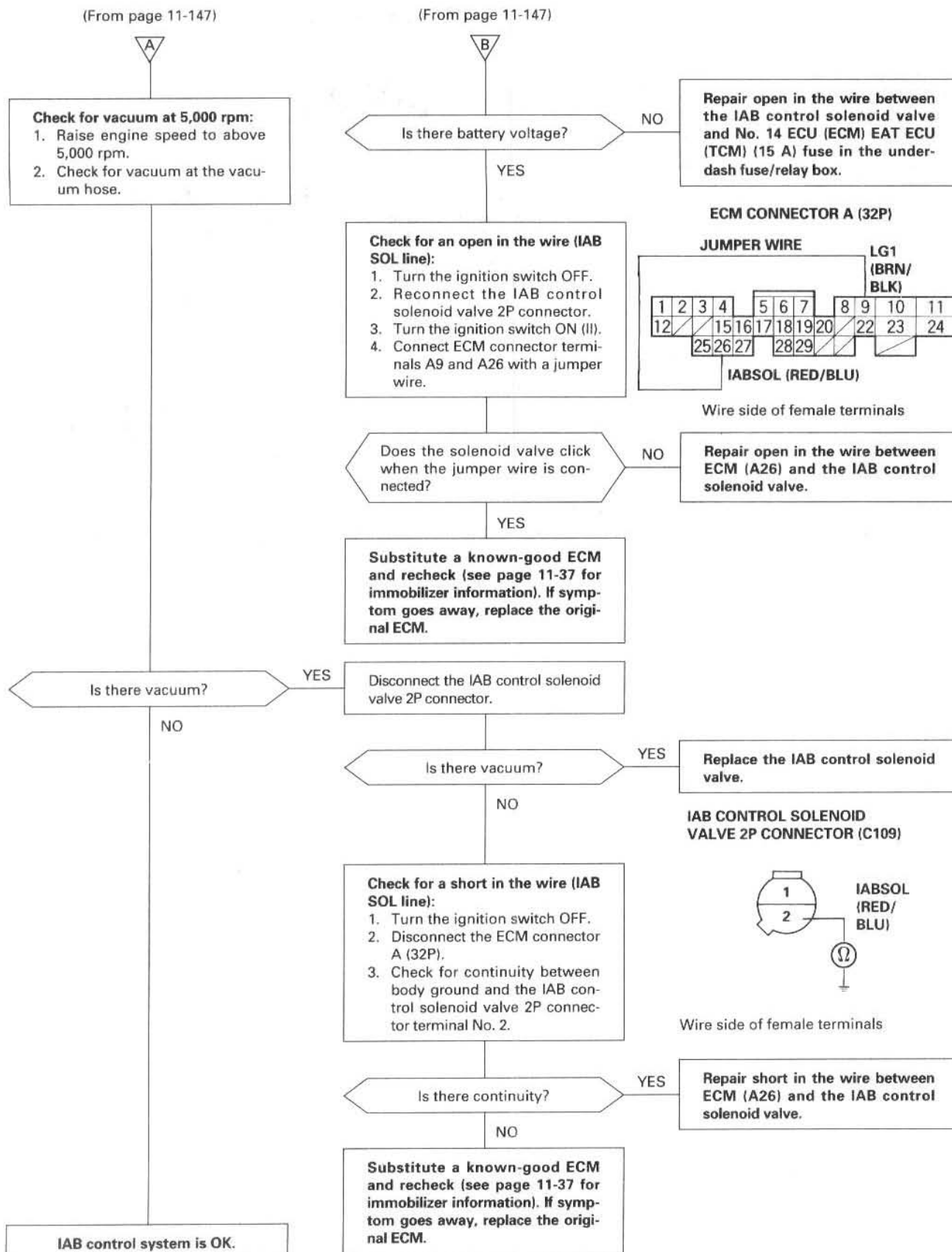




(cont'd)

Intake Air System

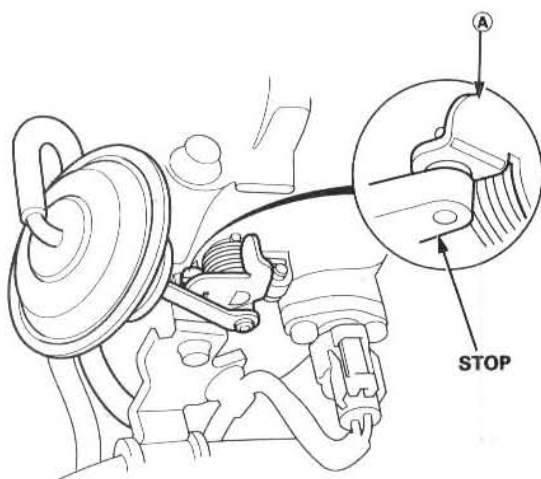
Intake Air Bypass (IAB) Control System (cont'd)



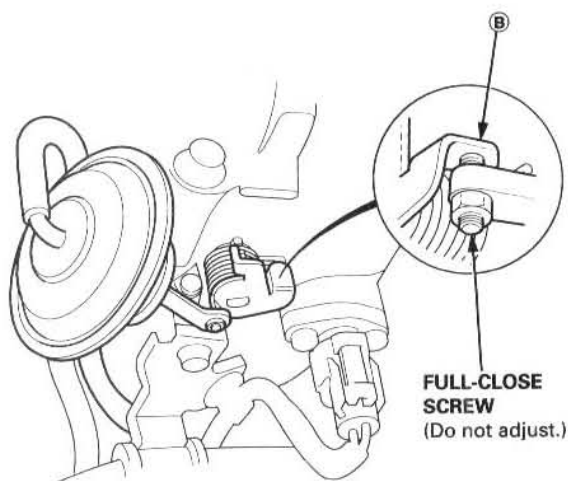


IAB Valve Testing

1. Check the IAB valve shaft for binding or sticking.
2. Check the IAB valve for smooth movement.
3. With the engine OFF, check that **(A)** of the bypass valve is in close contact with the stop.



4. With the engine at idle, check that **(B)** of the IAB valve is in close contact with the full-close screw.



If any fault is found, clean the linkage and shafts with carburetor cleaner.

If the problem still exists after cleaning, disassemble the intake manifold and check the IAB valve (see section 5).

Emission Control System

System Description

The emission control system includes, a Three Way Catalytic Converter (TWC), Exhaust Gas Recirculation (EGR) system, Positive Crankcase Ventilation (PCV) system and Evaporative Emission (EVAP) Control system. The emission control system is designed to meet federal and state emission standards.

Tailpipe Emission

Inspection

⚠ WARNING Do not smoke during this procedure. Keep any open flame away from your work area.

1. Start the engine. Hold the engine at 3,000 rpm with no load (A/T in **N** or **P** position, M/T in neutral) until the radiator fan comes on, then let it idle.
2. Connect a tachometer.
3. Check and, if necessary, adjust the idle speed, (see page 11-115).
4. Warm up and calibrate the CO meter according to the meter manufacturer's instructions.
5. Check idle CO with the headlights, heater blower, rear window defogger, cooling fan, and air conditioner off.

NOTE: (Canada) Pull the parking brake lever up. Start the engine, then check that the headlights are off.

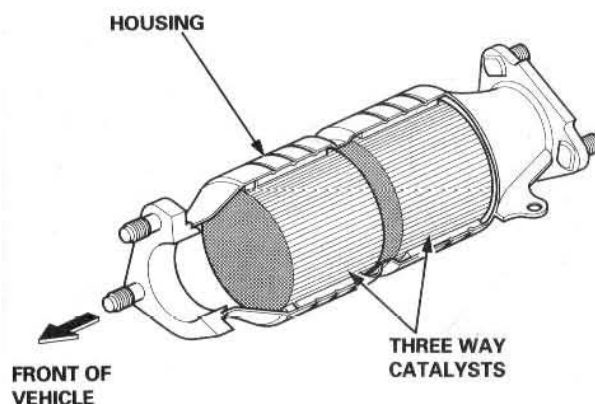
CO meter should indicate 0.1% maximum.

Three Way Catalytic Converter (TWC)

Description

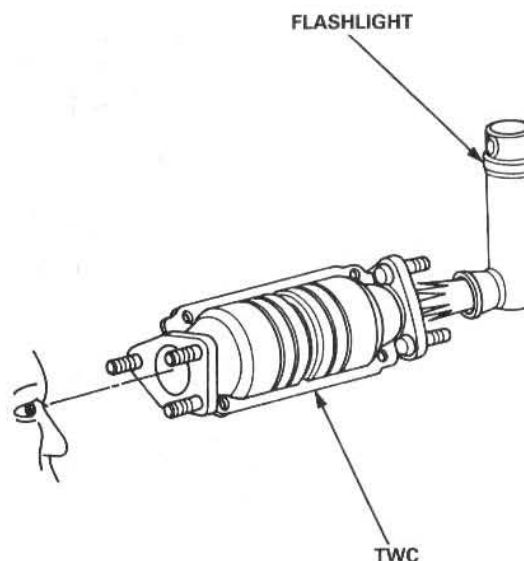
Three Way Catalytic Converter (TWC):

The Three Way Catalytic Converter (TWC) is used to convert hydrocarbons (HC), carbon monoxide (CO), and oxides of nitrogen (NO_x) in the exhaust gas to carbon dioxide (CO₂), dinitrogen (N₂) and water vapor.



Inspection

Using a flashlight, make a visual check for plugging, melting and cracking of the catalyst.





P0420 The scan tool indicates Diagnostic Trouble Code (DTC) P0420: Catalyst system efficiency below threshold.

Description

This system evaluates the catalyst's capacity by means of the HO₂S (Primary and Secondary) output during stable driving conditions. If deterioration has been detected during three consecutive driving cycles, the MIL comes on and DTC P0420 will be stored.

NOTE: If some of the DTCs listed below are stored at the same time as DTC P0420, troubleshoot those DTCs first, then troubleshoot DTC P0420.

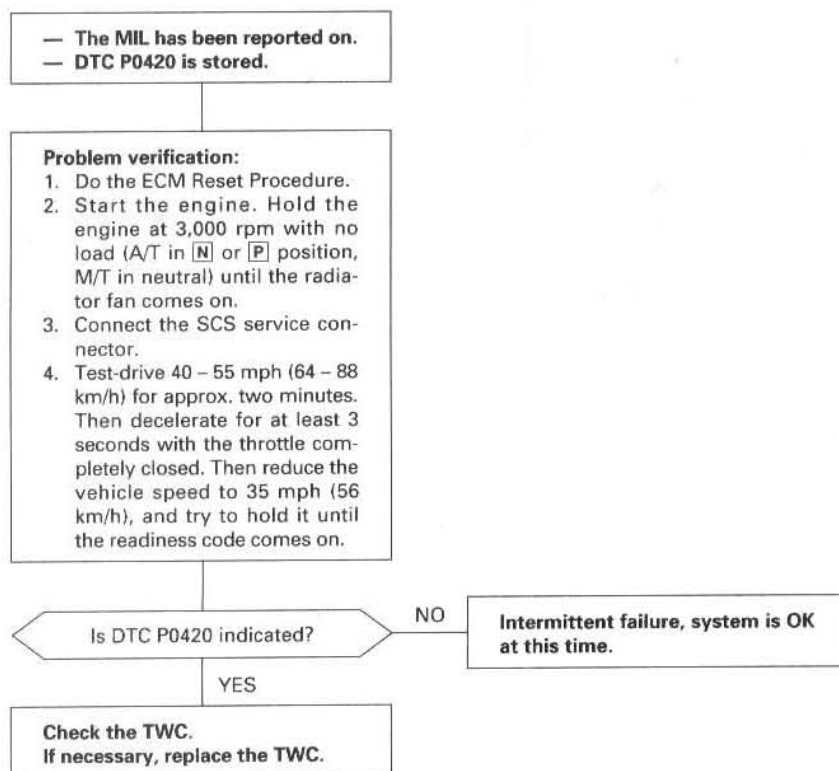
P0137, P0138: Secondary HO₂S (Sensor 2)

P0141: Secondary HO₂S (Sensor 2) Heater

Possible Cause

- TWC Deterioration
- Exhaust system leakage

Troubleshooting Flowchart



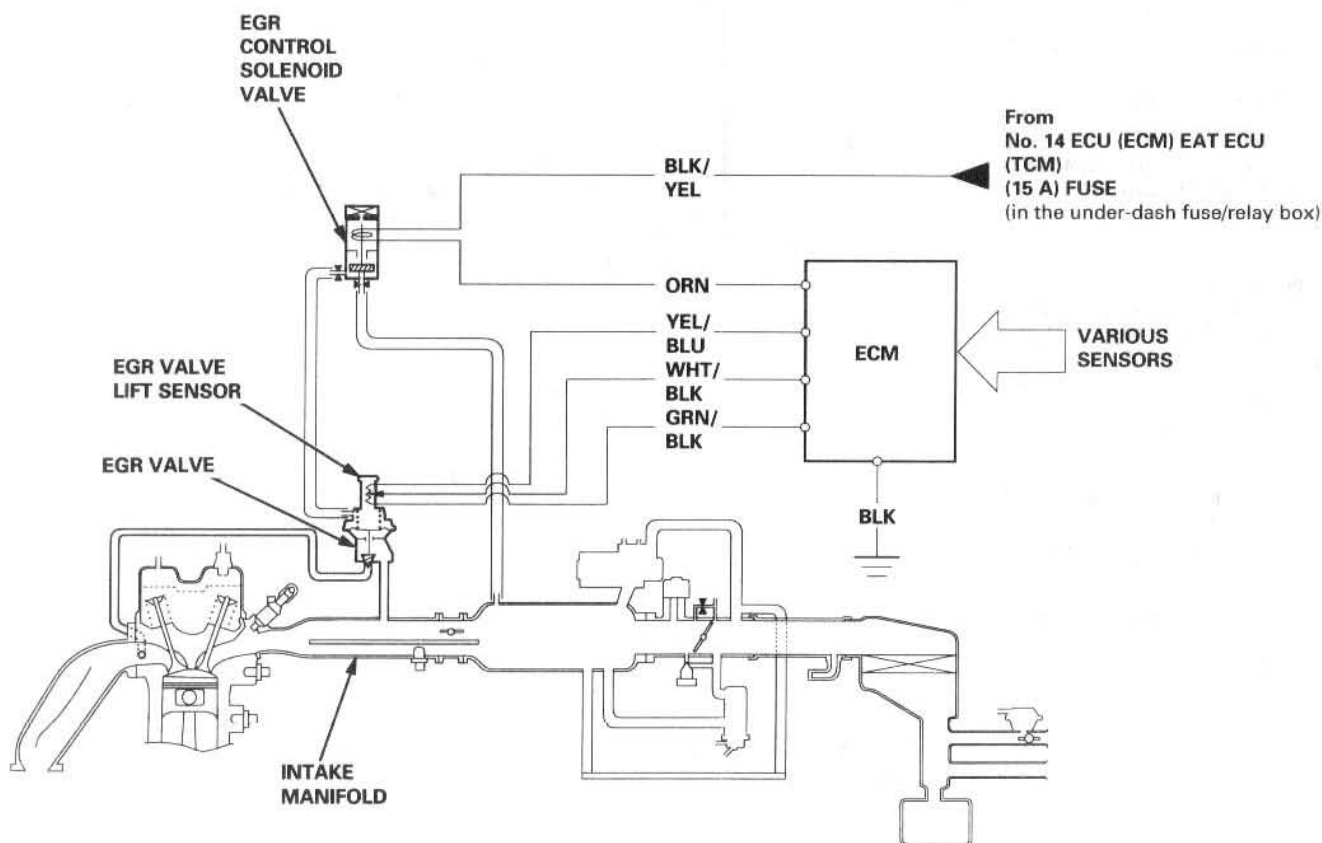
Emission Control System

Exhaust Gas Recirculation (EGR) System

Description

The EGR system is designed to reduce oxides of nitrogen emissions (NO_x) by recirculating exhaust gas through the EGR valve and the intake manifold into the combustion chambers. It is composed of the EGR valve, EGR control solenoid valve, ECM and various sensors.

The ECM contains memories for ideal EGR valve lifts for varying operating conditions. The EGR valve lift sensor detects the amount of EGR valve lift and sends the information to the ECM. The ECM then compares it with the ideal EGR valve lift which is determined by signals sent from the other sensors. If there is any difference between the two, the ECM cuts current to the EGR control solenoid valve to reduce vacuum applied to the EGR valve.





P0401 The scan tool indicates Diagnostic Trouble Code (DTC) P0401: Insufficient flow in the Exhaust Gas Recirculation (EGR) system.

Description

Deterioration (clogging, leakage, etc.) in the EGR line or EGR valve is detected by means of monitoring the changes in MAP before and after the operation of the EGR valve.

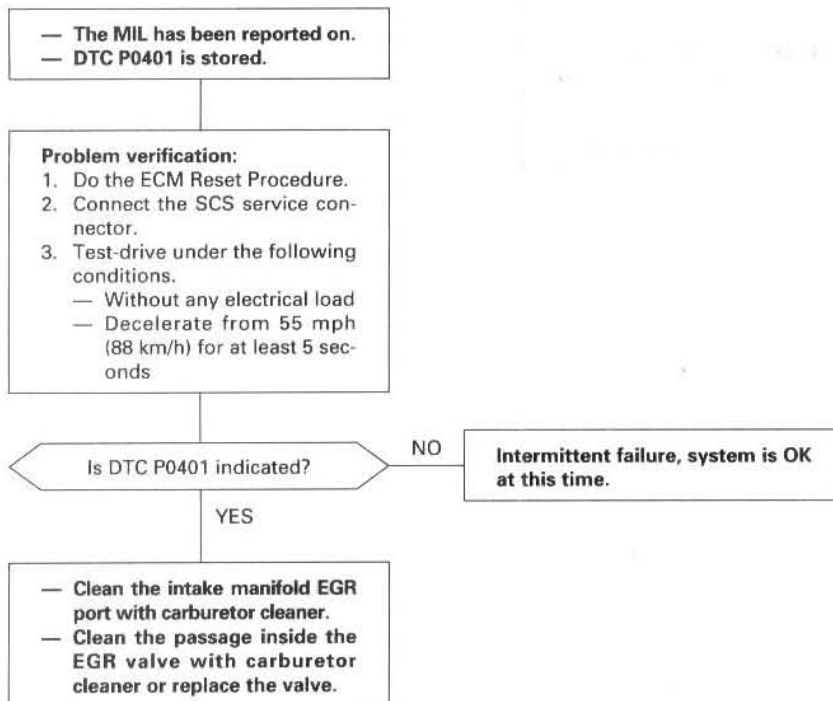
If deterioration has been detected during two consecutive driving cycles, the MIL will come on and DTC P0401 will be stored.

NOTE: If DTC P1491 is stored at the same time as DTC P0401, troubleshoot DTC P1491 first, then reset the ECM and recheck for DTC P0401.

Possible Causes

- Clogging, leakage in the EGR line
- Faulty EGR valve

Troubleshooting Flowchart



(cont'd)

Emission Control System

Exhaust Gas Recirculation (EGR) System (cont'd)

P1491

The scan tool indicates Diagnostic Trouble Code (DTC) P1491: A malfunction in the Exhaust Gas Recirculation (EGR) system.

- The MIL has been reported on.
- DTC P1491 is stored.

Problem verification:

1. Do the ECM Reset Procedure.
2. Connect the SCS service connector.
3. Start the engine. Hold the engine at 3,000 rpm with no load (A/T in **N** or **P** position, M/T in neutral) until the radiator fan comes on.
4. Drive the vehicle on the road for approx. 10 minutes. Try to keep the engine speed in the 1,700 – 2,500 rpm range.

Is DTC P1491 indicated?

NO

Intermittent failure, system is OK at this time. Check for poor connections or loose wires at C282 (located at right shock tower) C125 (EGR valve) and ECM.

YES

Check for vacuum to the EGR valve:

1. Disconnect the No. 16 hose from the EGR valve.
2. Connect a vacuum pump/gauge to the hose.
3. Start the engine and let it idle.

Is there any vacuum?

NO

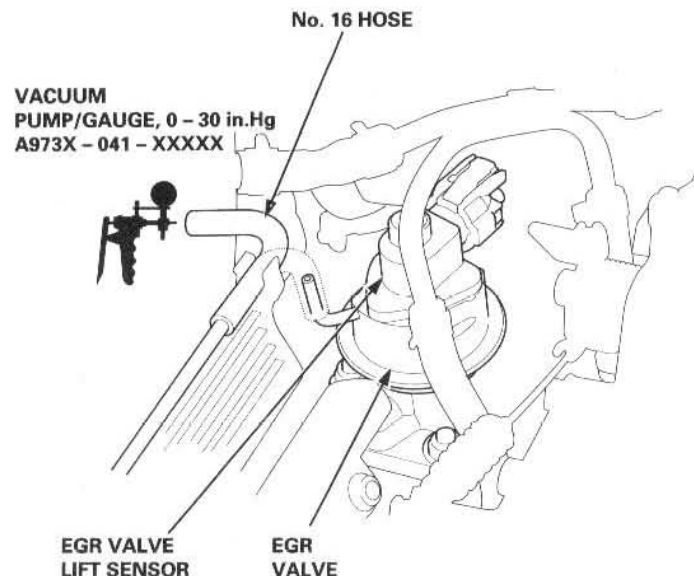
YES

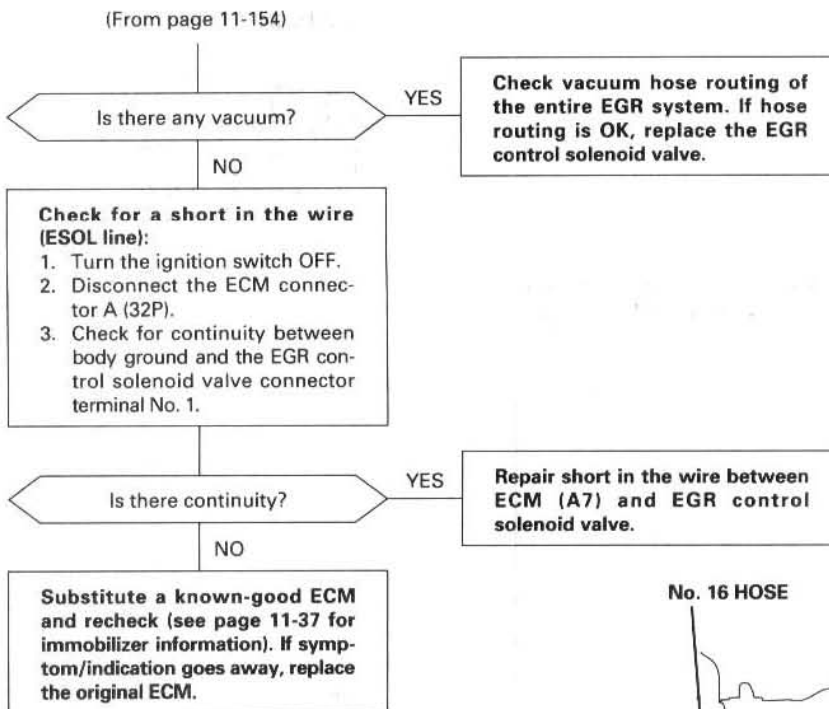
Check for a malfunction in the EGR control solenoid valve:

1. Disconnect the EGR control solenoid valve connector.
2. Recheck the No. 16 hose for vacuum.

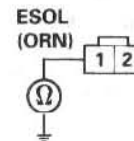
(To page 11-155)

(To page 11-155)

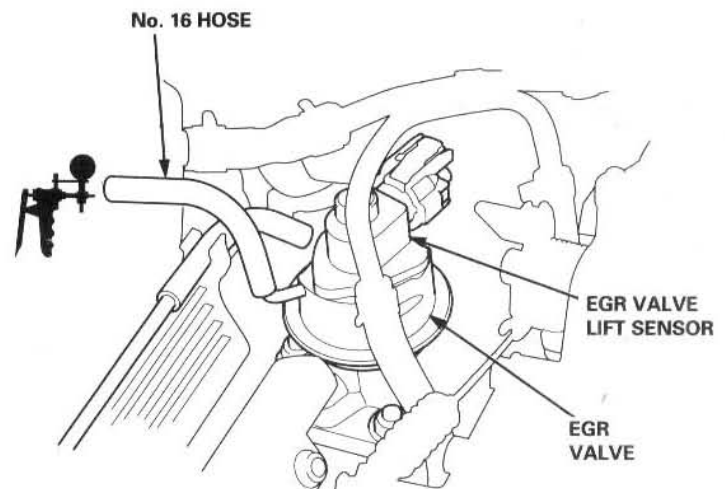
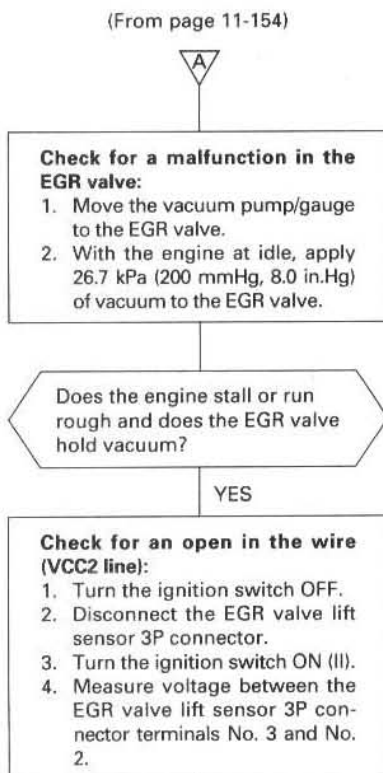




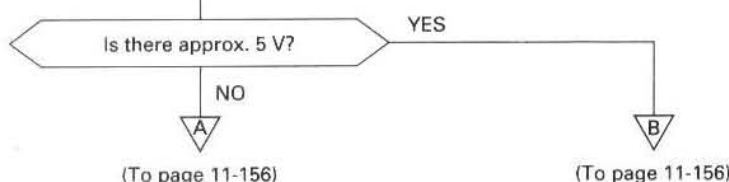
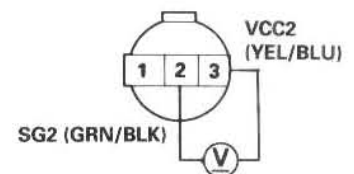
EGR CONTROL SOLENOID VALVE 2P CONNECTOR (C311)



Wire side of female terminals



EGR VALVE LIFT SENSOR 3P CONNECTOR (C125)

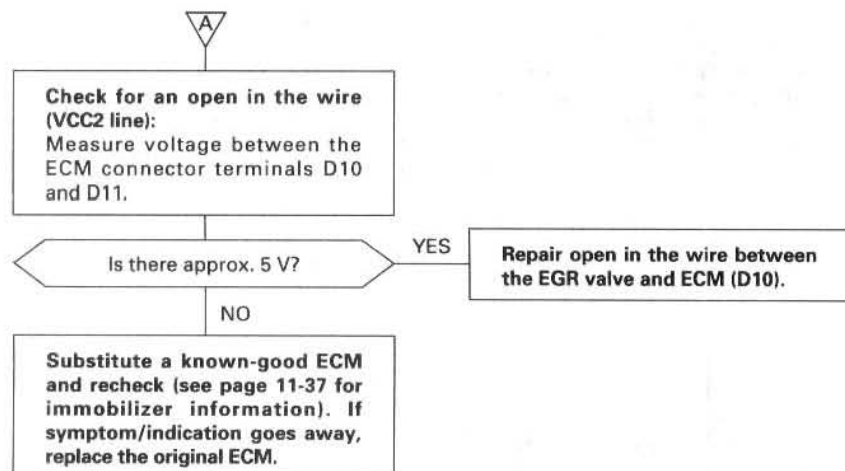


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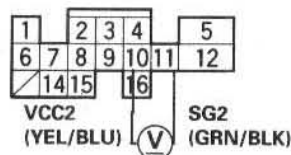
Emission Control System

Exhaust Gas Recirculation (EGR) System (cont'd)

(From page 11-155)

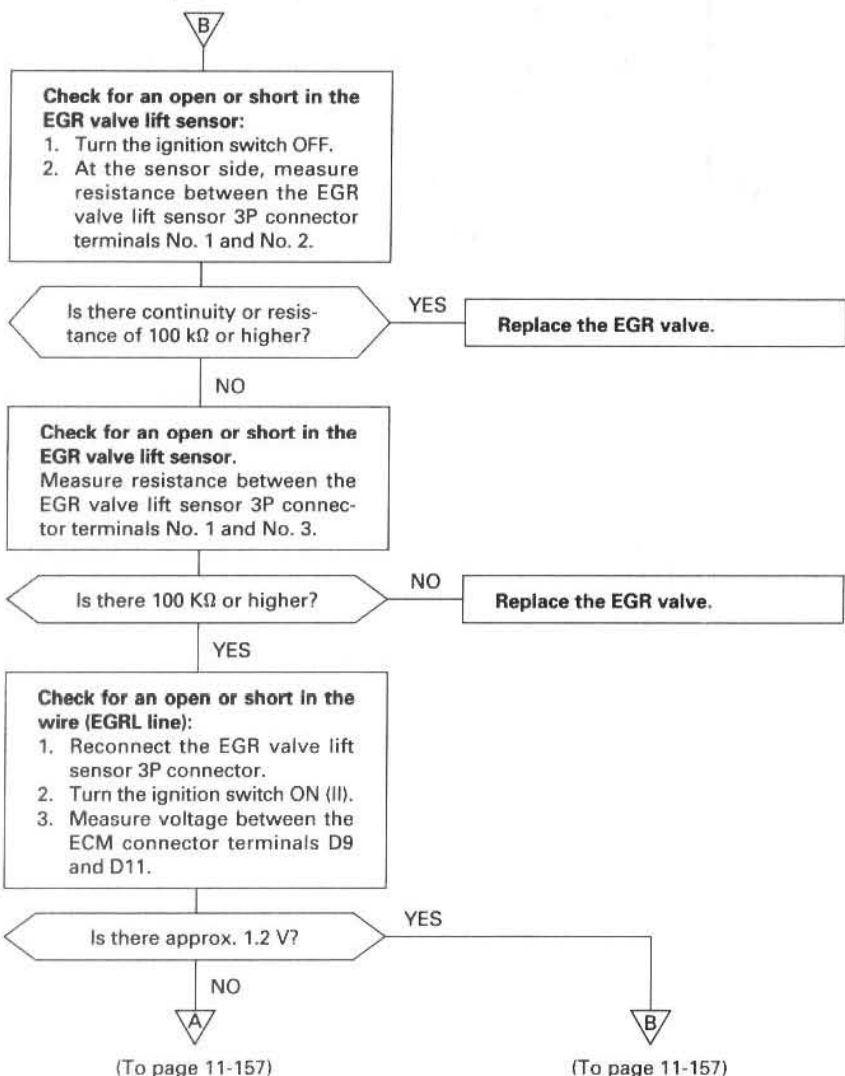


ECM CONNECTOR D (16P)

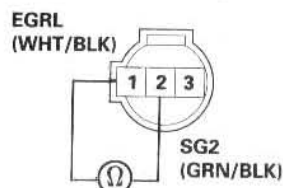


Wire side of female terminals

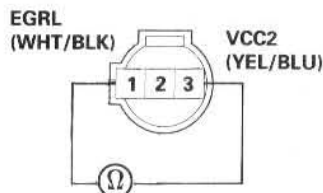
(From page 11-155)



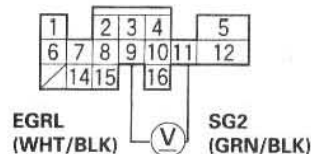
EGR VALVE LIFT SENSOR
3P CONNECTOR (C125)



Terminal side of male terminal



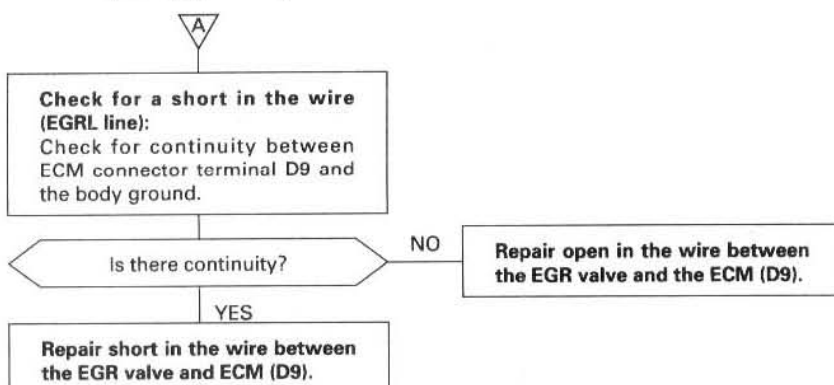
ECM CONNECTOR D (16P)



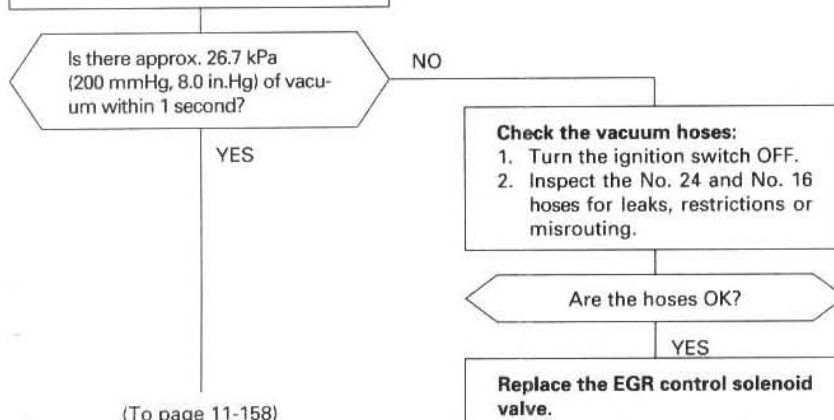
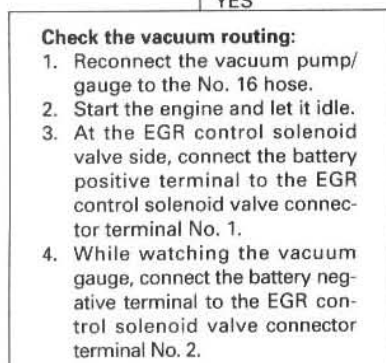
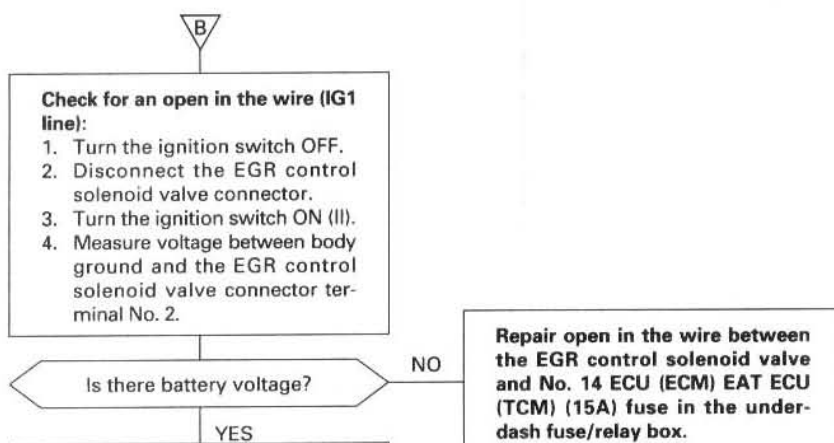
Wire side of female terminals



(From page 11-156)

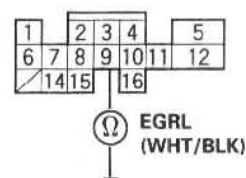


(From page 11-156)



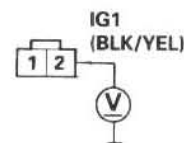
(To page 11-158)

ECM CONNECTOR D (16P)



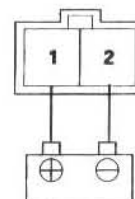
Wire side of female terminals

EGR CONTROL SOLENOID VALVE 2P CONNECTOR (C311)



Wire side of female terminals

EGR CONTROL SOLENOID VALVE 2P CONNECTOR



Terminal side of male terminals

(cont'd)

Emission Control System

Exhaust Gas Recirculation (EGR) System (cont'd)

(From page 11-157)

Check for an open in the wire (ES line):

1. Turn the ignition switch OFF and reconnect the EGR control solenoid valve connector.
2. Reconnect the No. 16 hose to the EGR valve.
3. Start the engine and let it idle.
4. Connect ECM connector terminals A7 and A10 with a jumper wire.

Does the engine stall or run rough?

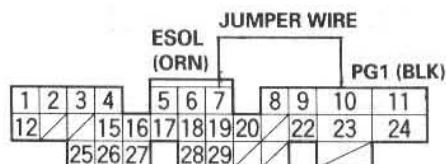
NO

Repair open in the wire between ECM (A7) and EGR control solenoid valve.

YES

Substitute a known-good ECM and recheck (see page 11-37 for immobilizer information). If symptom/indication goes away, replace the original ECM.

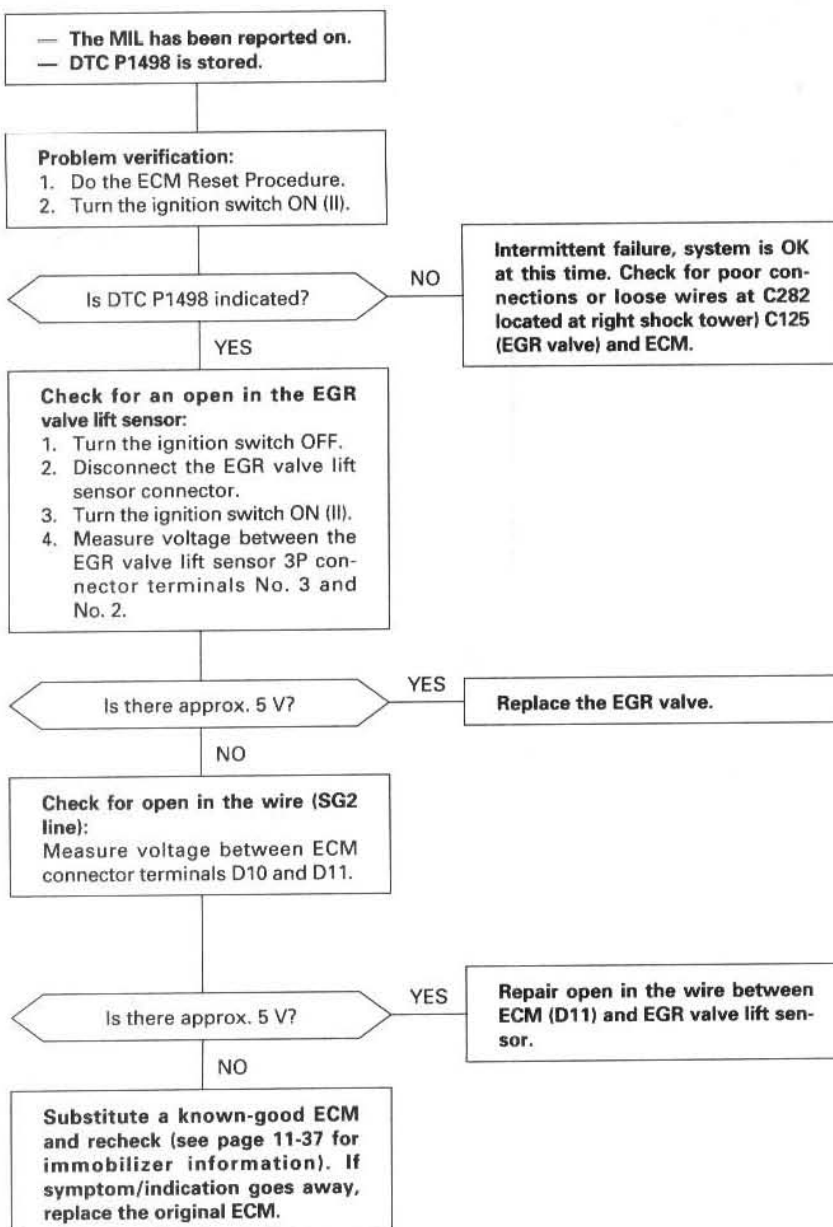
ECM CONNECTOR A (32P)



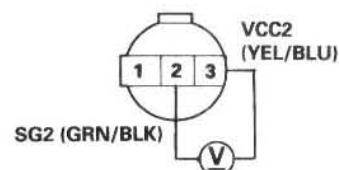
Wire side of female terminals



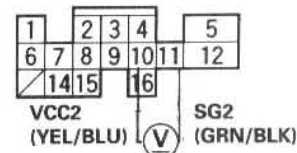
P1498 The scan tool indicates Diagnostic Trouble Code (DTC) P1498: A high voltage problem in the Exhaust Gas Recirculation (EGR) valve lift sensor circuit.



EGR VALVE LIFT SENSOR
3P CONNECTOR (C125)



ECM CONNECTOR D (16P)



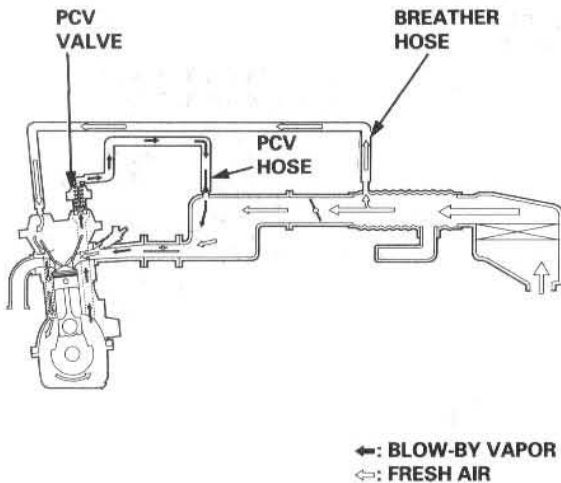
Wire side of female terminals

Emission Control System

Positive Crankcase Ventilation (PCV) System

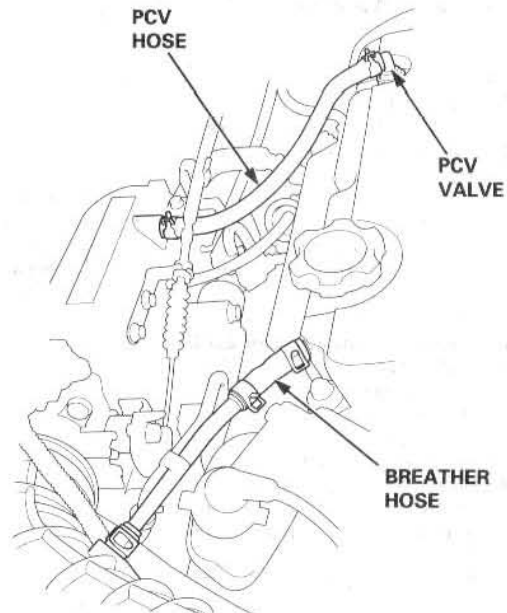
Description

The Positive Crankcase Ventilation (PCV) system is designed to prevent blow-by gas from escaping to the atmosphere. The PCV valve contains a spring-loaded plunger. When the engine starts, the plunger in the PCV valve is lifted in proportion to intake manifold vacuum and the blow-by gas is drawn directly into the intake manifold.

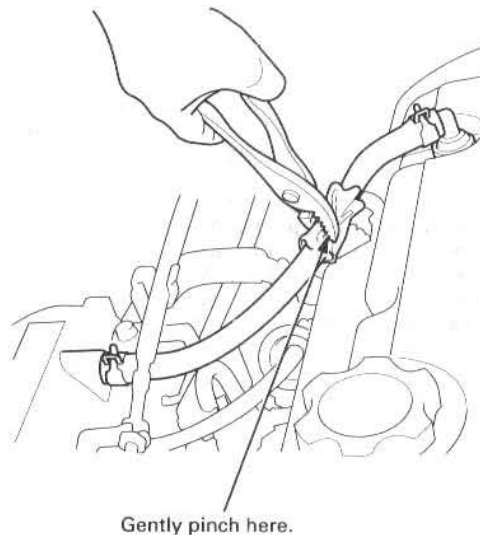


Inspection

1. Check the PCV hoses and connections for leaks and clogging.



2. At idle, make sure there is a clicking sound from the PCV valve when the hose between the PCV valve and intake manifold is lightly pinched with your fingers or pliers.

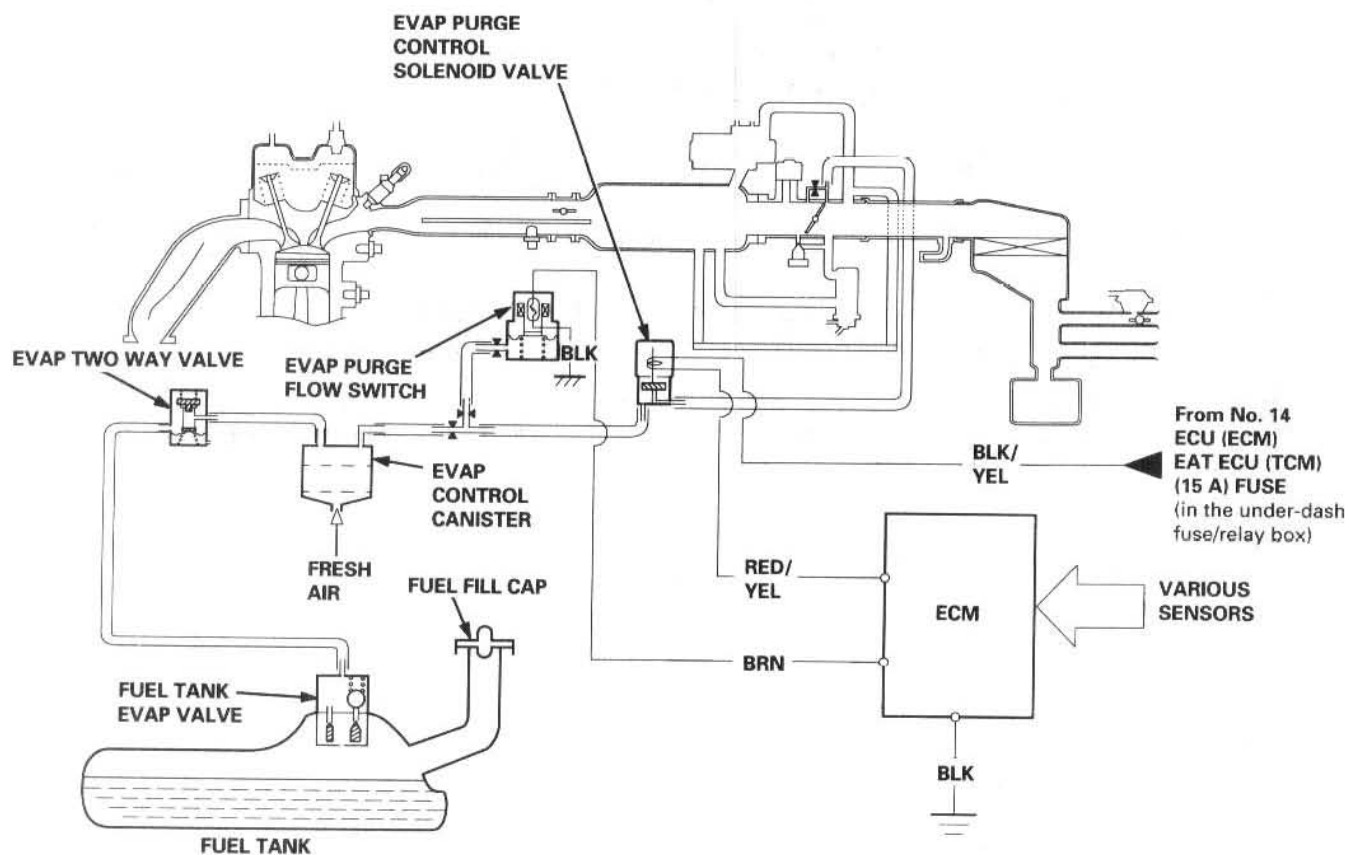


If there is no clicking sound, check the PCV valve grommet for cracks or damage. If the grommet is OK, replace the PCV valve and recheck.

Emission Control System

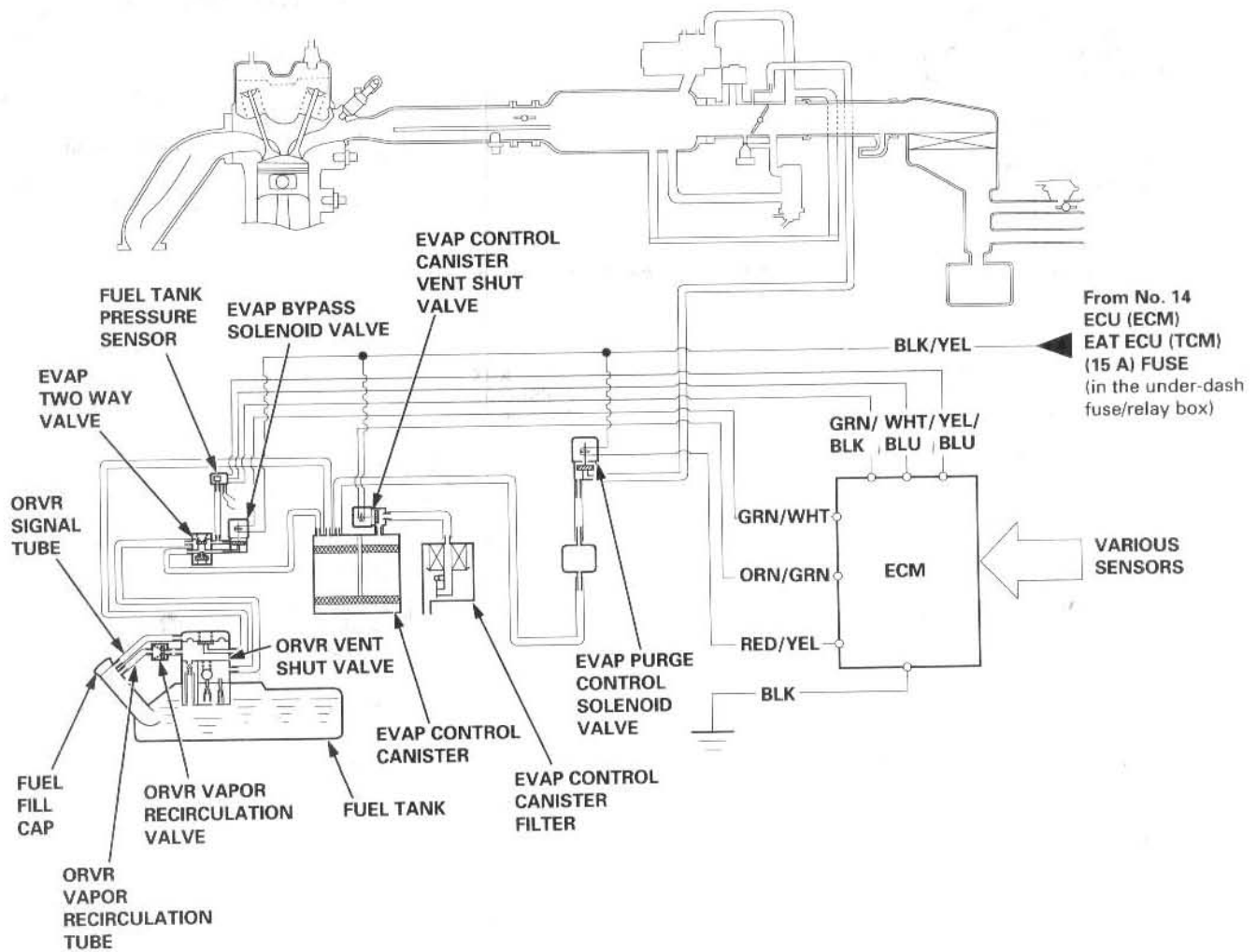
Evaporative Emission (EVAP) Controls (cont'd)

'97 (49ST, Canada) model:





'99 model:



(cont'd)

Emission Control System

Evaporative Emission (EVAP) Controls (cont'd)

'99 model:

P0451

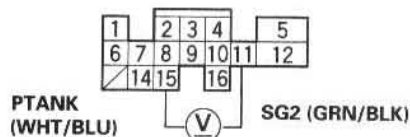
The scan tool indicates Diagnostic Trouble Code (DTC) P0451: The Fuel Tank Pressure sensor circuit range/performance problem.

- The MIL has been reported on.
- DTC P0451 is stored.

Check for the fuel tank pressure sensor:

1. Do the ECM Reset Procedure.
2. Remove the fuel fill cap.
3. Turn the ignition switch ON (II).
4. Monitor the FTP Sensor voltage with the Honda PGM Tester, or measure voltage between body ground and ECM connector terminals D15 and D11.

ECM CONNECTOR D (16P)



Wire side of female terminals

Is there approx. 2.5 V?

YES

Replace the fuel tank pressure sensor.

NO

Check for the fuel tank pressure sensor:

1. Disconnect the hose between the EVAP two way valve and the fuel tank pressure sensor at the EVAP two way valve end.
2. Connect a vacuum pump to the open end of that hose.
3. Turn the ignition switch ON (II).
4. Monitor the FTP Sensor voltage with the Honda PGM Tester, or measure voltage between ECM connector terminals D15 and D11, and carefully pump vacuum on the hose one stroke at a time.
5. The voltage should smoothly drop from the starting approx. 2.5 V down to approx. 1.5 V. STOP applying vacuum when the voltage drops to approx. 1.5 V or damage to the fuel tank pressure sensor may occur.

Does the voltage drop to approx. 1.5 V and hold?

NO

Replace the fuel tank pressure sensor.

YES

Substitute a known-good ECM and recheck (see page 11-37 for immobilizer information). If symptom goes away, replace the original ECM.

FUEL TANK PRESSURE SENSOR

EVAP TWO WAY VALVE

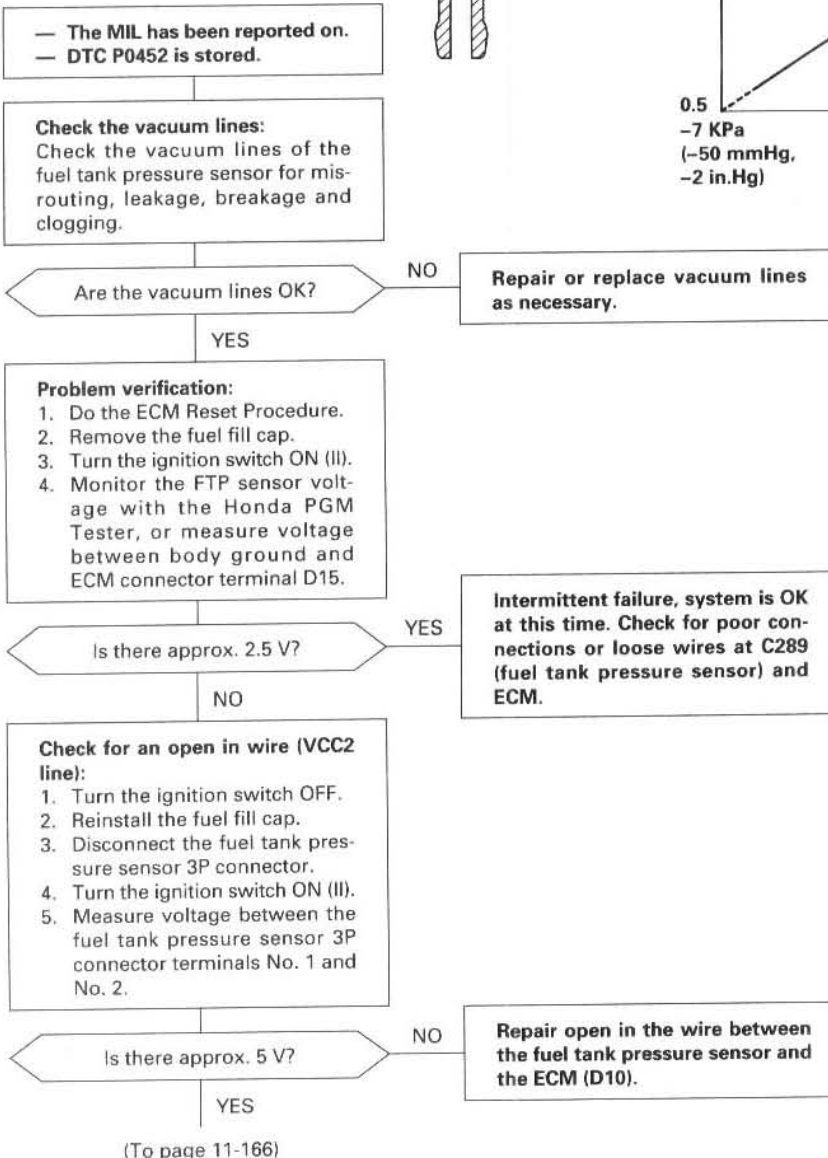
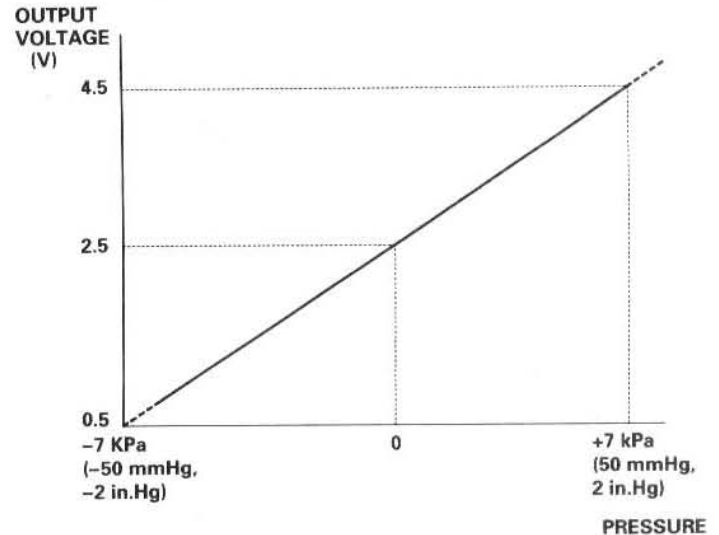
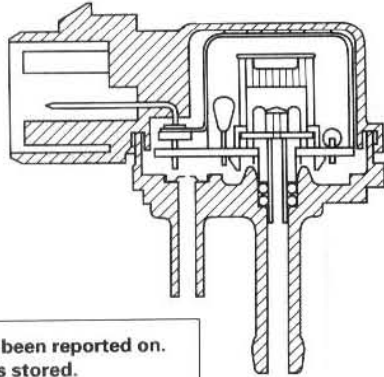
**VACUUM PUMP/GAUGE, 0 - 30 in.Hg
A973X - 041 -
XXXXXX**



Fuel Tank Pressure Sensor ['99 model, '98 model, '97 (California) model]:

P0452 The scan tool indicates Diagnostic Trouble Code (DTC) P0452: A low voltage problem in the Fuel Tank Pressure sensor.

The fuel tank pressure sensor converts fuel tank absolute pressure into electrical signals and inputs the ECM.



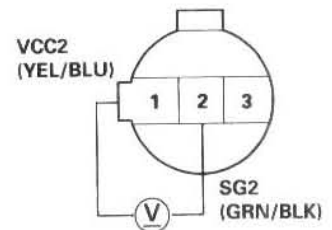
ECM CONNECTOR D (16P)



PTANK
(WHT/BLU)

Wire side of female terminals

FUEL TANK PRESSURE SENSOR 3P CONNECTOR (C289)



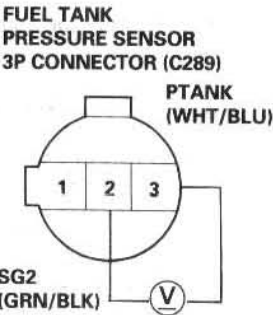
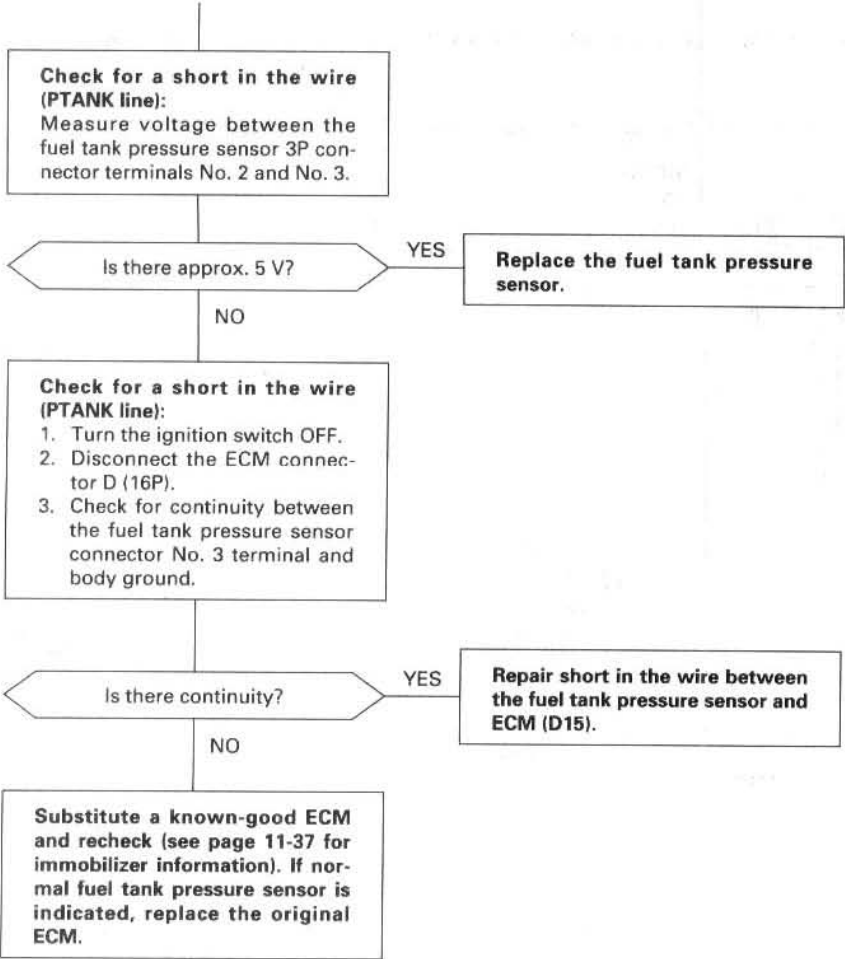
Wire side of female terminals

(cont'd)

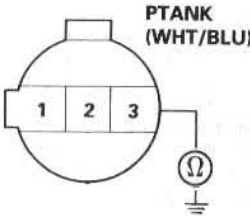
Emission Control System

Evaporative Emission (EVAP) Controls (cont'd)

(From page 11-165)



Wire side of female terminals





Fuel Tank Pressure Sensor ['99 model, '98 model, '97 (California) model]:

P0453 The scan tool indicates Diagnostic Trouble Code (DTC) P0453: A high voltage problem in the Fuel Tank Pressure sensor.

- The MIL has been reported on.
- DTC P0453 is stored.

Check the vacuum lines:

Check the vacuum lines of the fuel tank pressure sensor for misrouting, leakage, breakage and clogging.

Are the vacuum lines OK?

NO

Repair or replace vacuum lines as necessary.

YES

Problem verification:

1. Do the ECM Reset Procedure.
2. Remove the fuel fill cap.
3. Turn the ignition switch ON (II).
4. Monitor the FTP sensor voltage with the Honda PGM Tester, or measure voltage between body ground and ECM connector terminal D15.

Is there approx. 2.5 V?

YES

Intermittent failure, system is OK at this time. Check for poor connections or loose wires at C289 (fuel tank pressure sensor) and ECM.

NO

Check for an open in the wire (SG2 line):

1. Turn the ignition switch OFF.
2. Reinstall the fuel fill cap.
3. Disconnect the fuel tank pressure sensor 3P connector.
4. Turn the ignition switch ON (II).
5. Measure voltage between the fuel tank pressure sensor 3P connector terminals No. 1 and No. 2.

Is there approx. 5 V?

NO

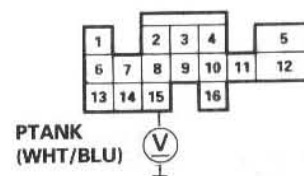
Repair open in the wire between the fuel tank pressure sensor and ECM (D11).

YES

Check for a short in the wire (PTANK line):

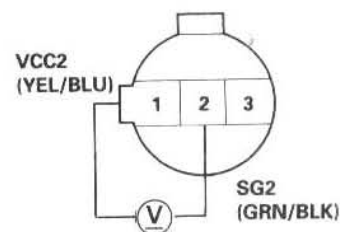
Measure voltage between the fuel tank pressure sensor 3P connector terminals No. 2 and No. 3.

ECM CONNECTOR D (16P)

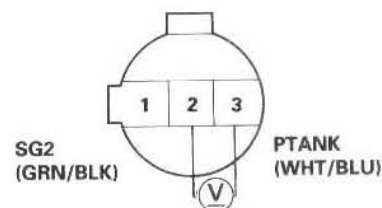


Wire side of female terminals

FUEL TANK PRESSURE SENSOR 3P CONNECTOR (C289)



Wire side of female terminals



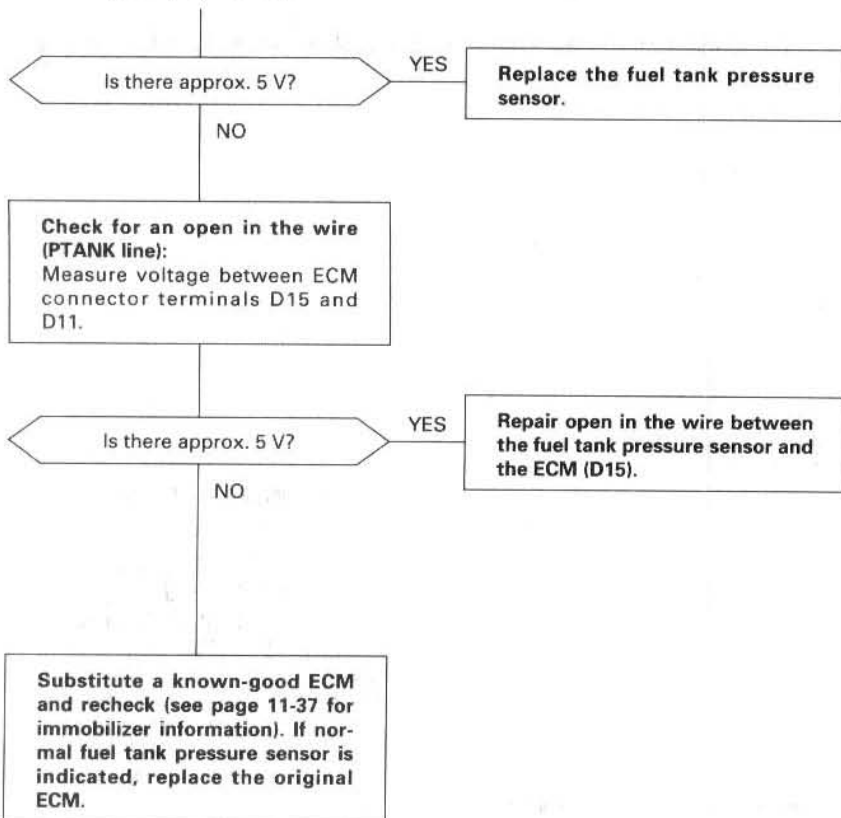
(cont'd)

(To page 11-168)

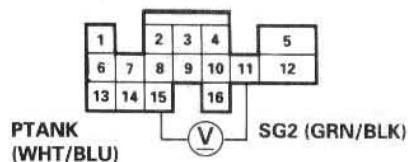
Emission Control System

Evaporative Emission (EVAP) Controls (cont'd)

(From page 11-167)



ECM CONNECTOR D (16P)



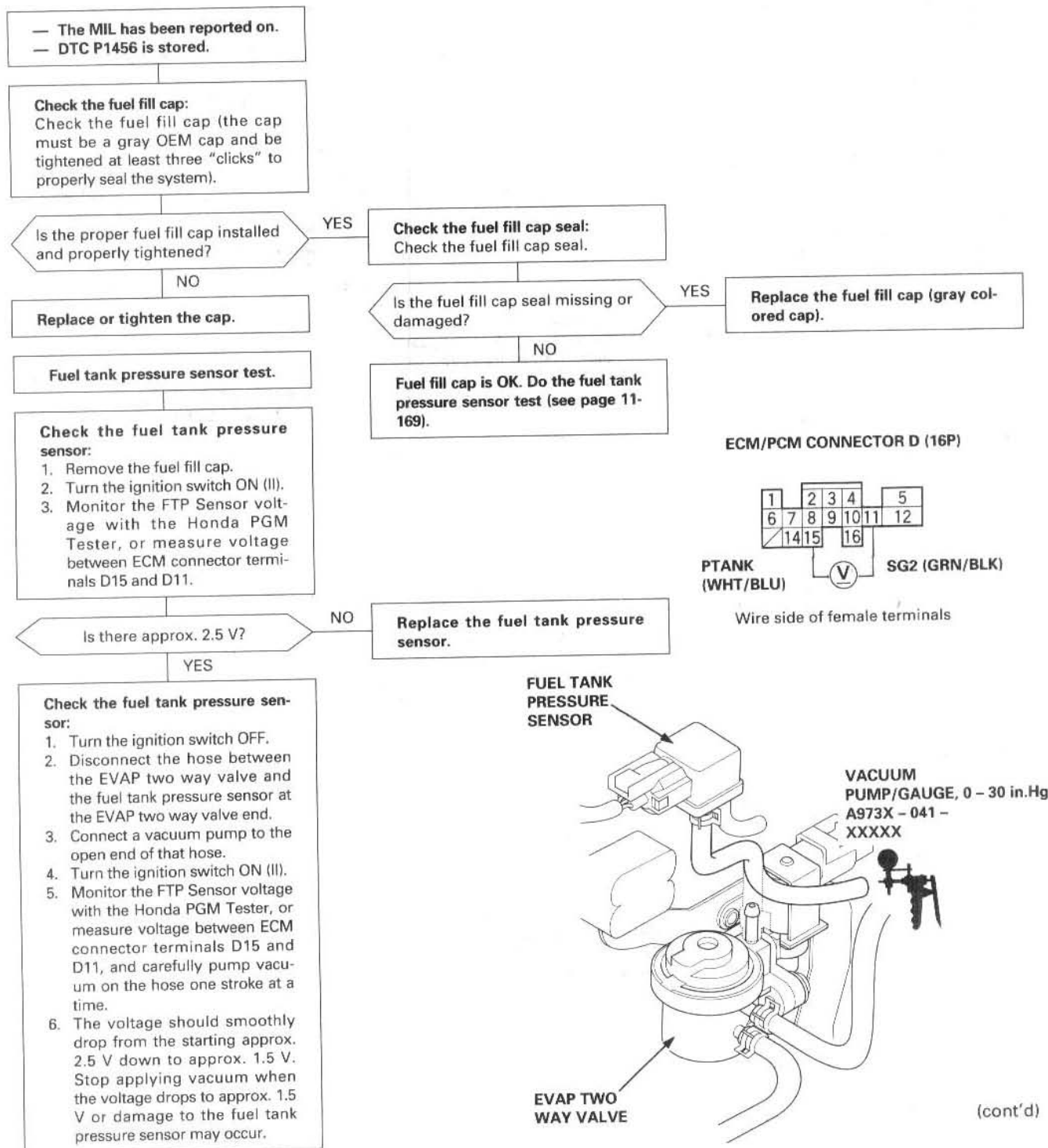
Wire side of female terminals



'98 model, '97 (California) model:

P1456 The scan tool indicates Diagnostic Trouble Code (DTC) P1456: Evaporative Emission (EVAP) control system leak detected (fuel tank system).

Troubleshooting Flowchart



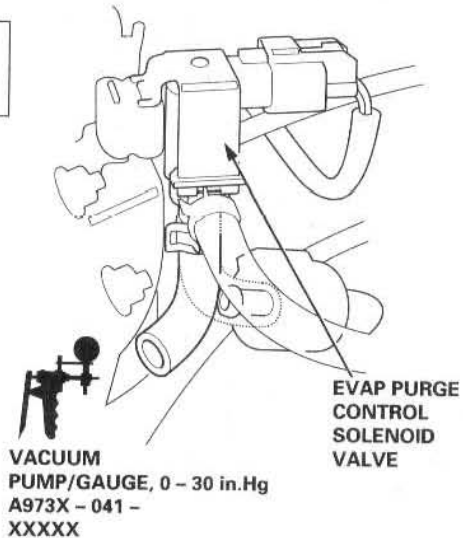
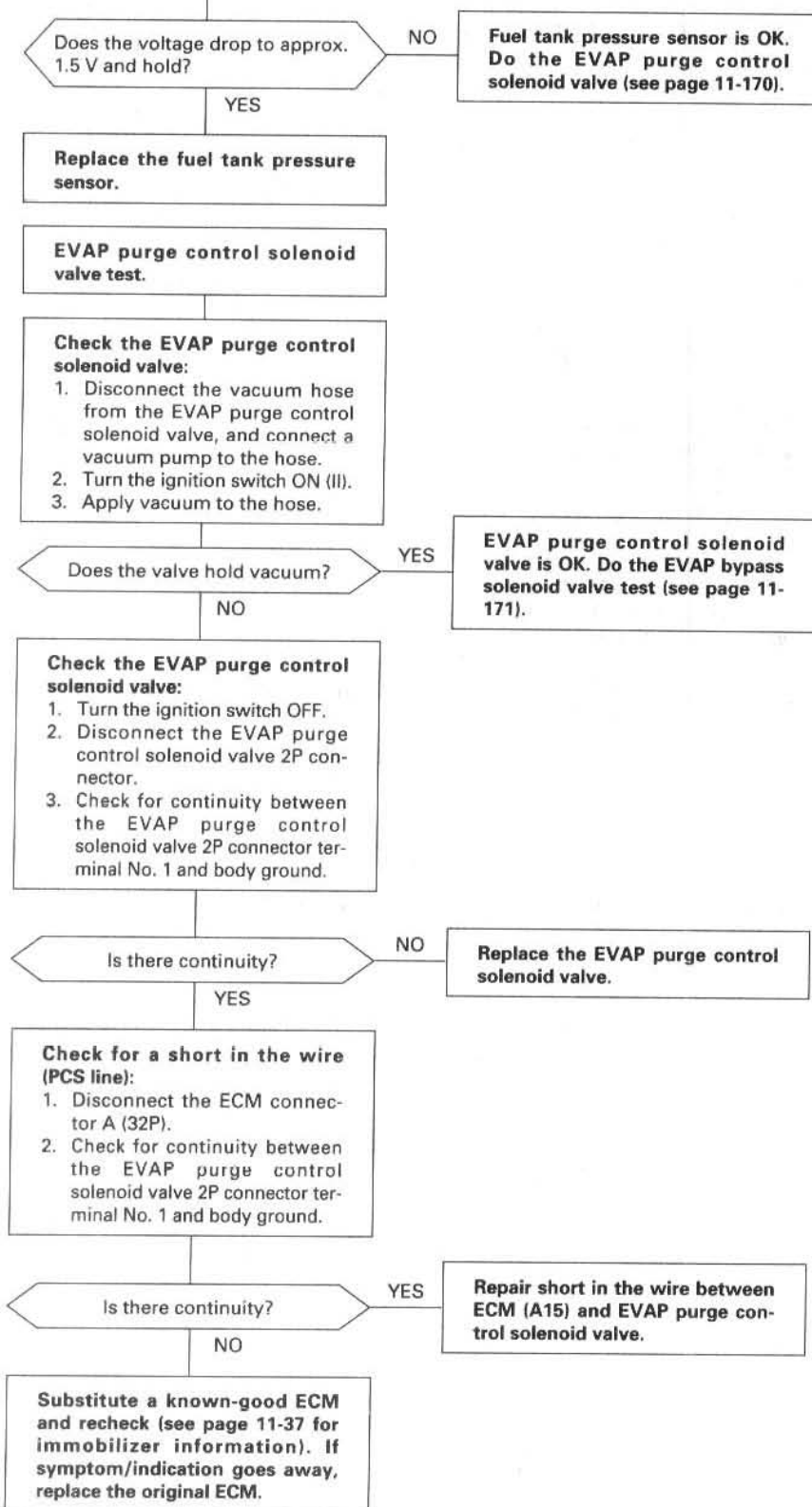
(To page 11-170)

(cont'd)

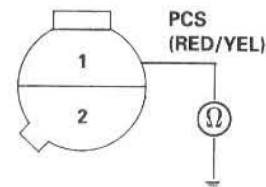
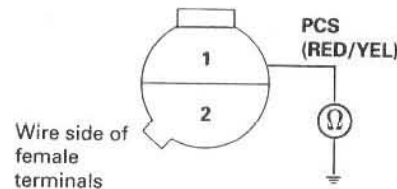
Emission Control System

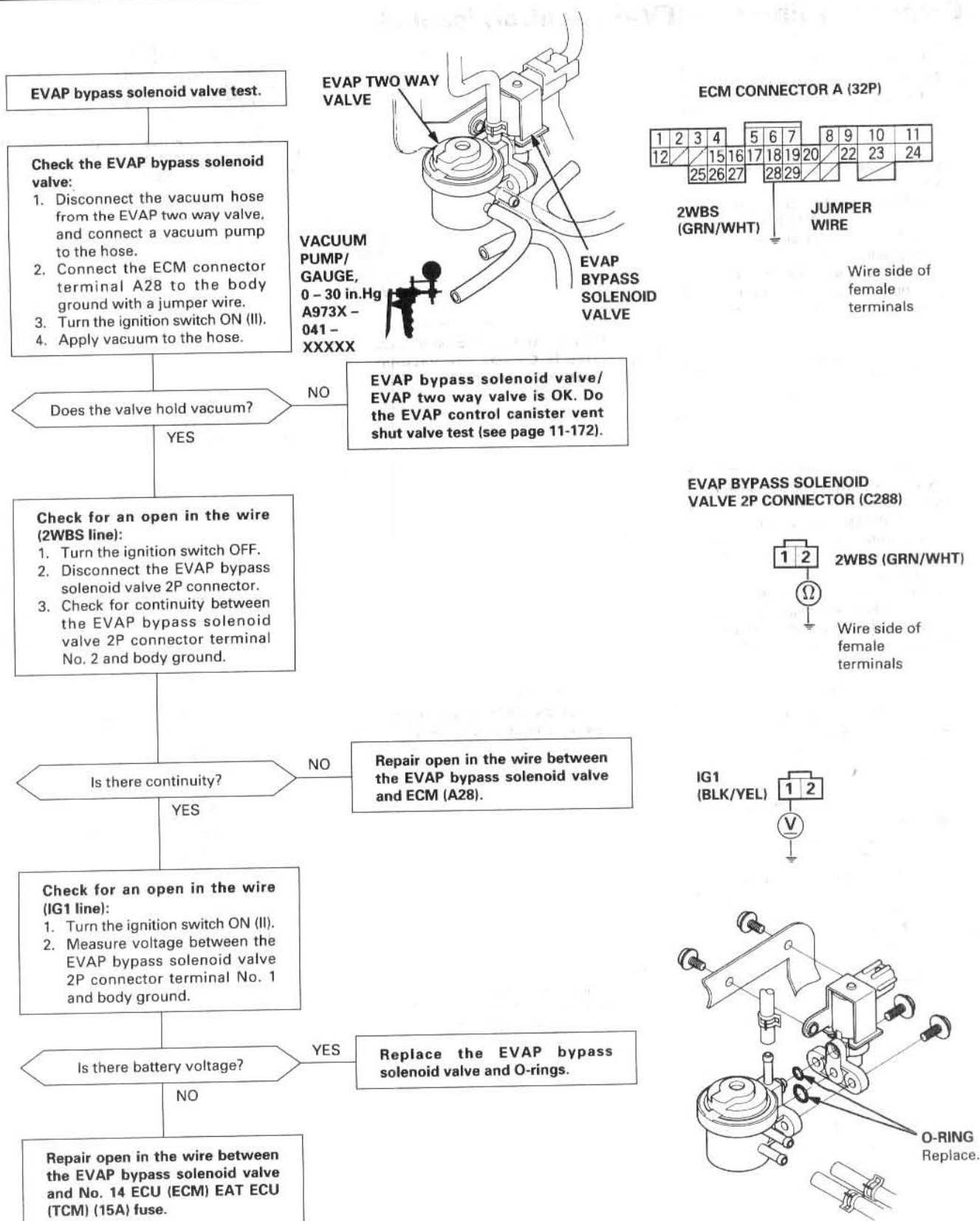
Evaporative Emission (EVAP) Controls (cont'd)

(From page 11-169)



EVAP PURGE CONTROL SOLENOID VALVE 2P CONNECTOR (C291)





(cont'd)

Emission Control System

Evaporative Emission (EVAP) Controls (cont'd)

EVAP control canister vent shut valve test.

Check the EVAP control canister vent shut valve:

1. Disconnect the vacuum hose from the EVAP three way valve, and connect a vacuum pump to the hose.
2. Turn the ignition switch ON (III).
3. Apply vacuum to the hose.

Does the valve hold vacuum?

NO

EVAP control canister vent shut valve is OK. Do the vacuum hoses and connections test (see page 11-173).

YES

Check the EVAP control canister vent shut valve:

1. Turn the ignition switch OFF.
2. Disconnect the EVAP control canister vent shut valve 2P connector.
3. Check for continuity between the EVAP control canister vent shut valve 2P connector terminal No. 2 and body ground.

Is there continuity?

NO

Replace the EVAP control canister vent shut valve and O-ring.

YES

Check for a short in the wire (VSV line):

1. Disconnect the ECM connector A (32P).
2. Check for continuity between the EVAP control canister vent shut valve 2P connector terminal No. 2 and body ground.

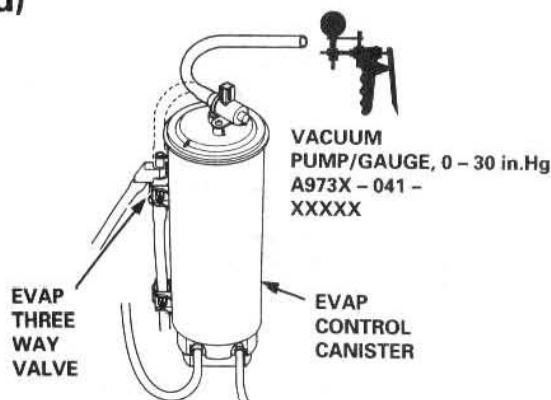
Is there continuity?

YES

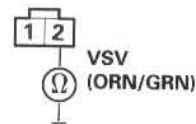
Repair short in the wire between ECM (A29) and EVAP control canister vent shut valve.

NO

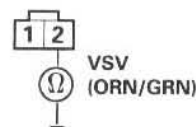
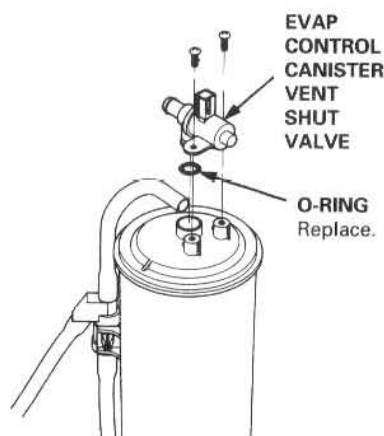
Substitute a known-good ECM and recheck (see page 11-37 for immobilizer information). If symptom/indication goes away, replace the original ECM.

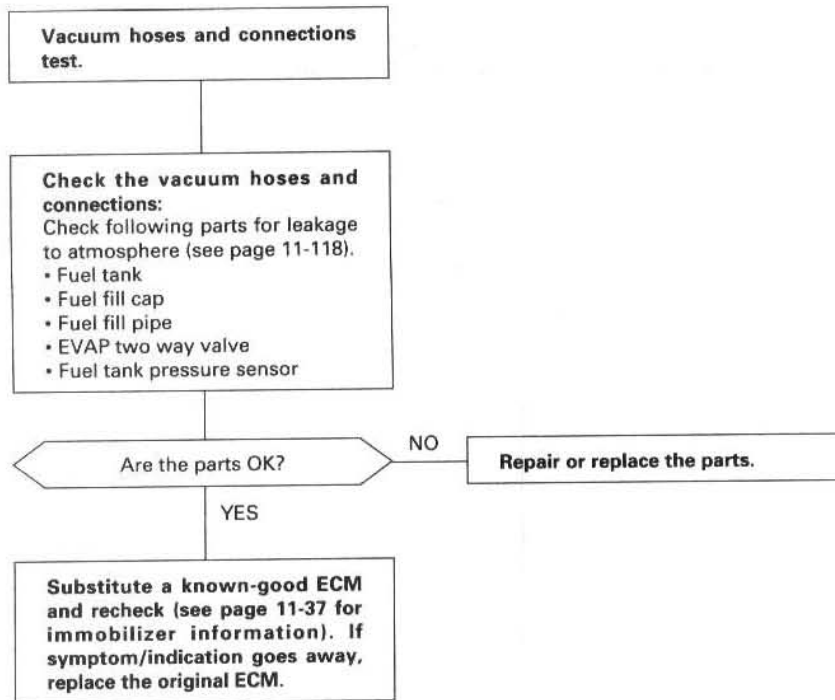


EVAP CONTROL CANISTER VENT SHUT VALVE 2P CONNECTOR (C290)



Wire side of female terminals





(cont'd)

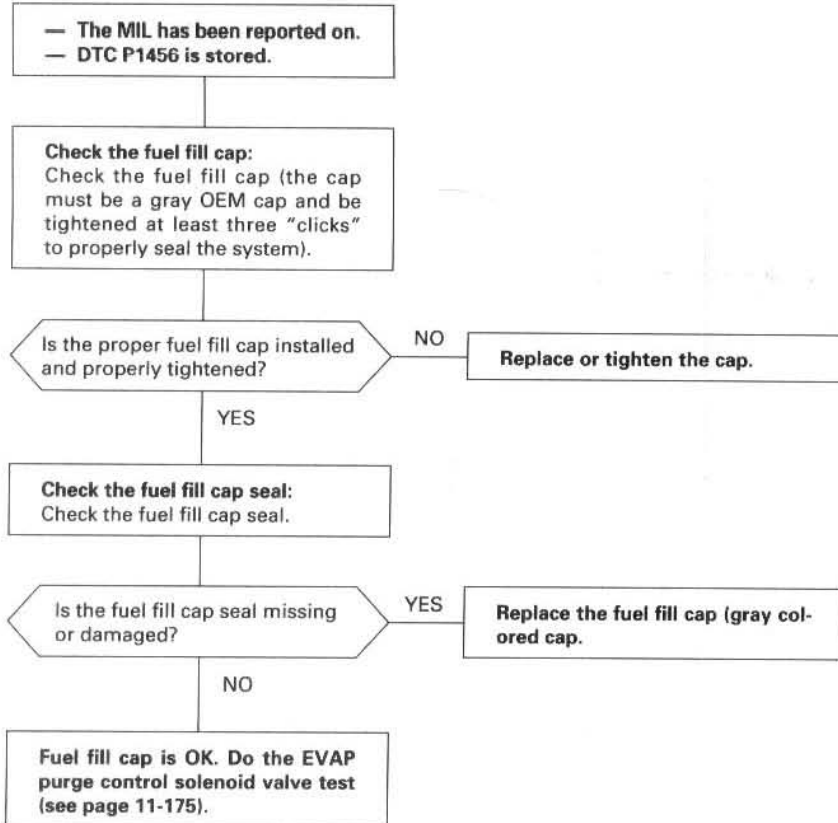
Emission Control System

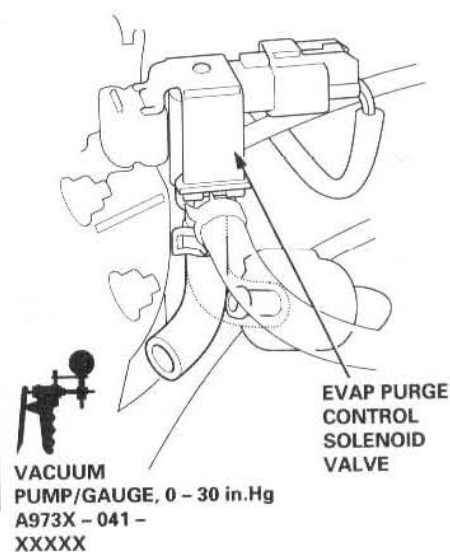
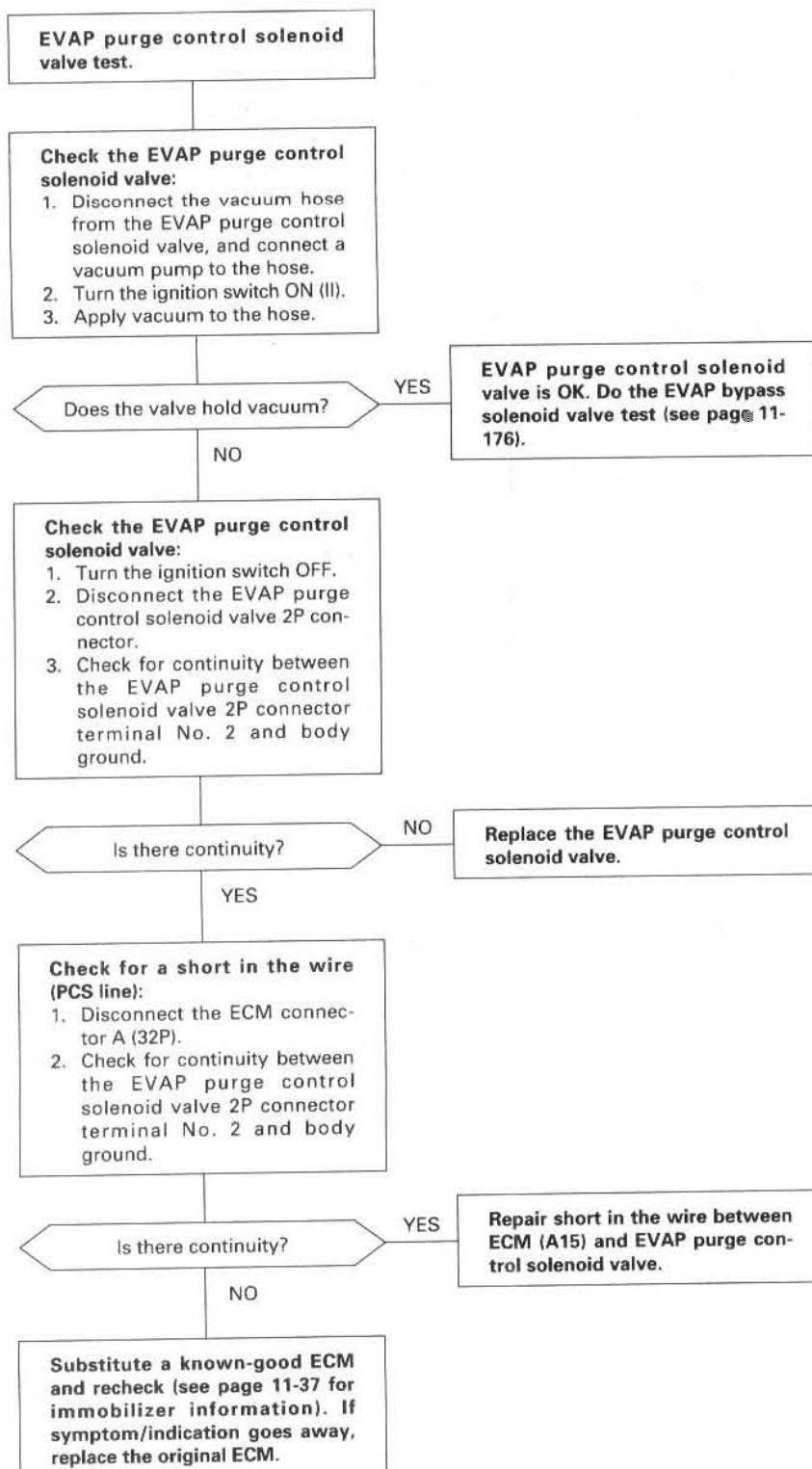
Evaporative Emission (EVAP) Controls (cont'd)

'99 model:

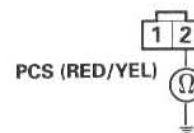
P1456 The scan tool indicates Diagnostic Trouble Code (DTC) P1456: Evaporative Emission (EVAP) control system leak detected (fuel tank system).

Troubleshooting Flowchart

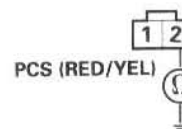




EVAP PURGE CONTROL SOLENOID VALVE 2P CONNECTOR (C291)



Wire side of female terminals



(cont'd)

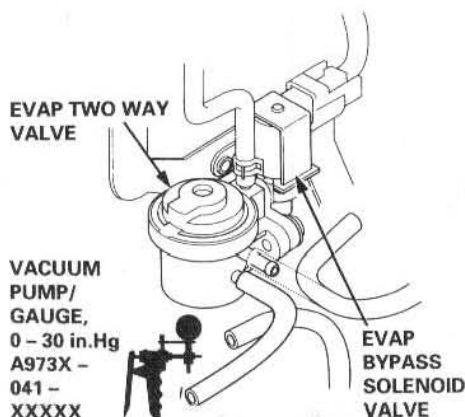
Emission Control System

Evaporative Emission (EVAP) Controls (cont'd)

EVAP bypass solenoid valve test.

Check the EVAP bypass solenoid valve:

1. Disconnect the vacuum hose from the EVAP two way valve, and connect a vacuum pump to the hose.
2. Connect the ECM connector terminal A28 to the body ground with a jumper wire.
3. Turn the ignition switch ON (II).
4. Apply vacuum to the hose.



ECM CONNECTOR A (32P)

1	2	3	4	5	6	7	8	9	10	11
12	13	14	15	16	17	18	19	20	22	23
24	25	26	27	28	29	30	31	32		

2WBS
(GRN/WHT)

JUMPER
WIRE

Wire side of
female
terminals

Does the valve hold vacuum?

NO

EVAP bypass solenoid valve/
EVAP two way valve is OK. Do
the EVAP control canister vent
shut valve test (see page 11-177).

YES

Check for an open in the wire (2WBS line):

1. Turn the ignition switch OFF.
2. Disconnect the EVAP bypass solenoid valve 2P connector.
3. Check for continuity between the EVAP bypass solenoid valve 2P connector terminal No. 2 and body ground.

EVAP BYPASS SOLENOID VALVE 2P CONNECTOR (C288)

1 2 2WBS (GRN/WHT)



Wire side of
female
terminals

Is there continuity?

NO

Repair open in the wire between
the EVAP bypass solenoid valve
and ECM (A28).

YES

Check for an open in the wire (IG1 line):

1. Turn the ignition switch ON (II).
2. Measure voltage between the EVAP bypass solenoid valve 2P connector terminal No. 1 and body ground.

IG1
(BLK/YEL)

1 2



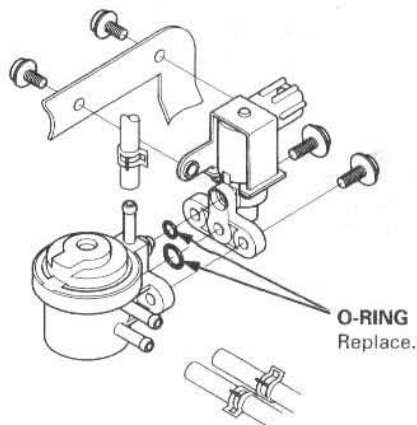
Is there battery voltage?

YES

Replace the EVAP bypass
solenoid valve and O-rings.

NO

Repair open in the wire between
the EVAP bypass solenoid valve
and No. 14 ECU (ECM) EAT ECU
(TCM) (15 A) fuse.

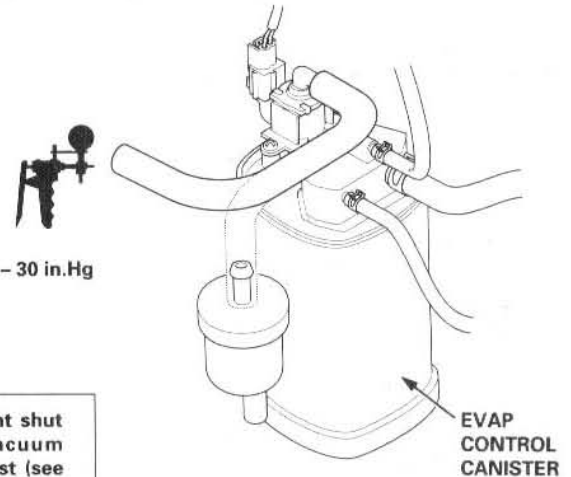
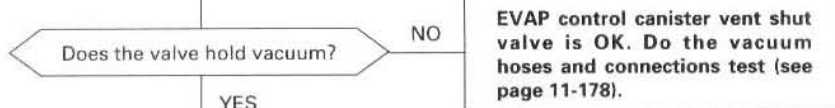




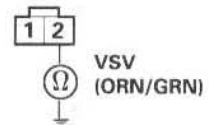
EVAP control canister vent shut valve test.

Check the EVAP control canister vent shut valve:

1. Disconnect the vacuum hose from the EVAP control canister filter, and connect a vacuum pump to the hose.
2. Turn the ignition switch ON (II).
3. Apply vacuum to the hose.

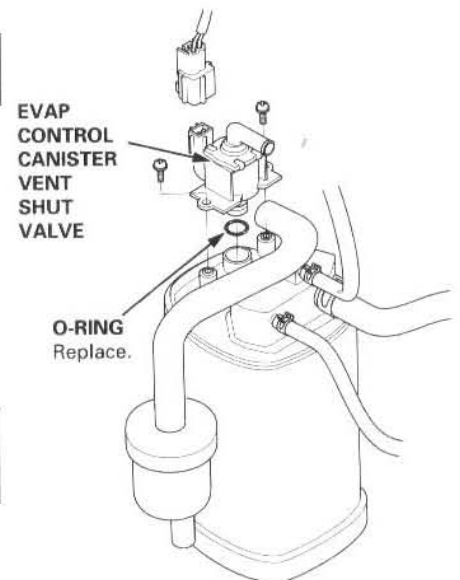
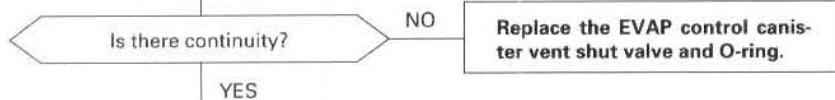


EVAP CONTROL CANISTER VENT SHUT VALVE 2P CONNECTOR (C290)

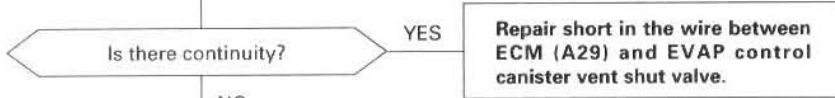


Wire side of female terminals

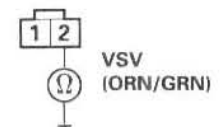
- Check the EVAP control canister vent shut valve:**
1. Turn the ignition switch OFF.
 2. Disconnect the EVAP control canister vent shut valve 2P connector.
 3. Check for continuity between the EVAP control canister vent shut valve 2P connector terminal No. 2 and body ground.



- Check for a short in the wire (VSV line):**
1. Disconnect the ECM connector A (32P).
 2. Check for continuity between the EVAP control canister vent shut valve 2P connector terminal No. 2 and body ground.



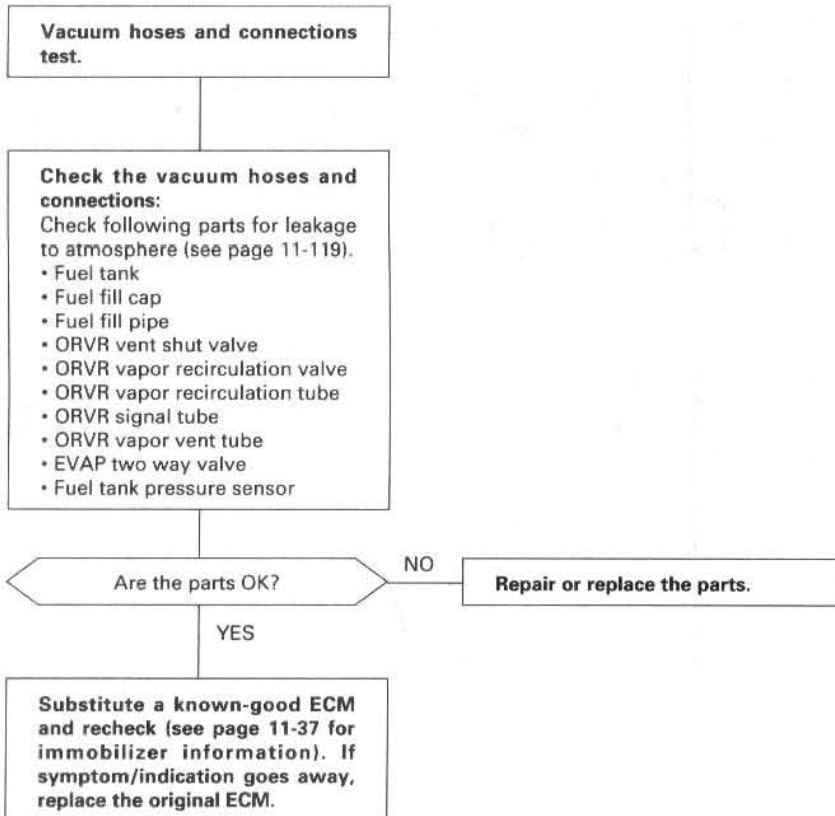
Substitute a known-good ECM and recheck (see page 11-37 for immobilizer information). If symptom/indication goes away, replace the original ECM.



(cont'd)

Emission Control System

Evaporative Emission (EVAP) Controls (cont'd)

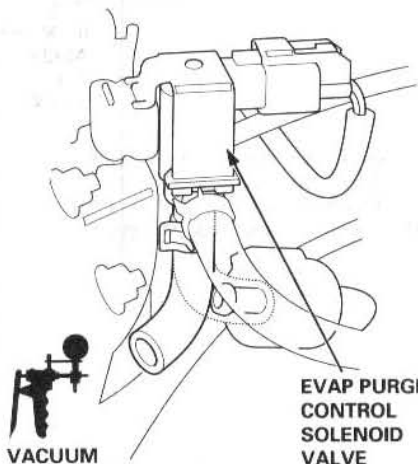
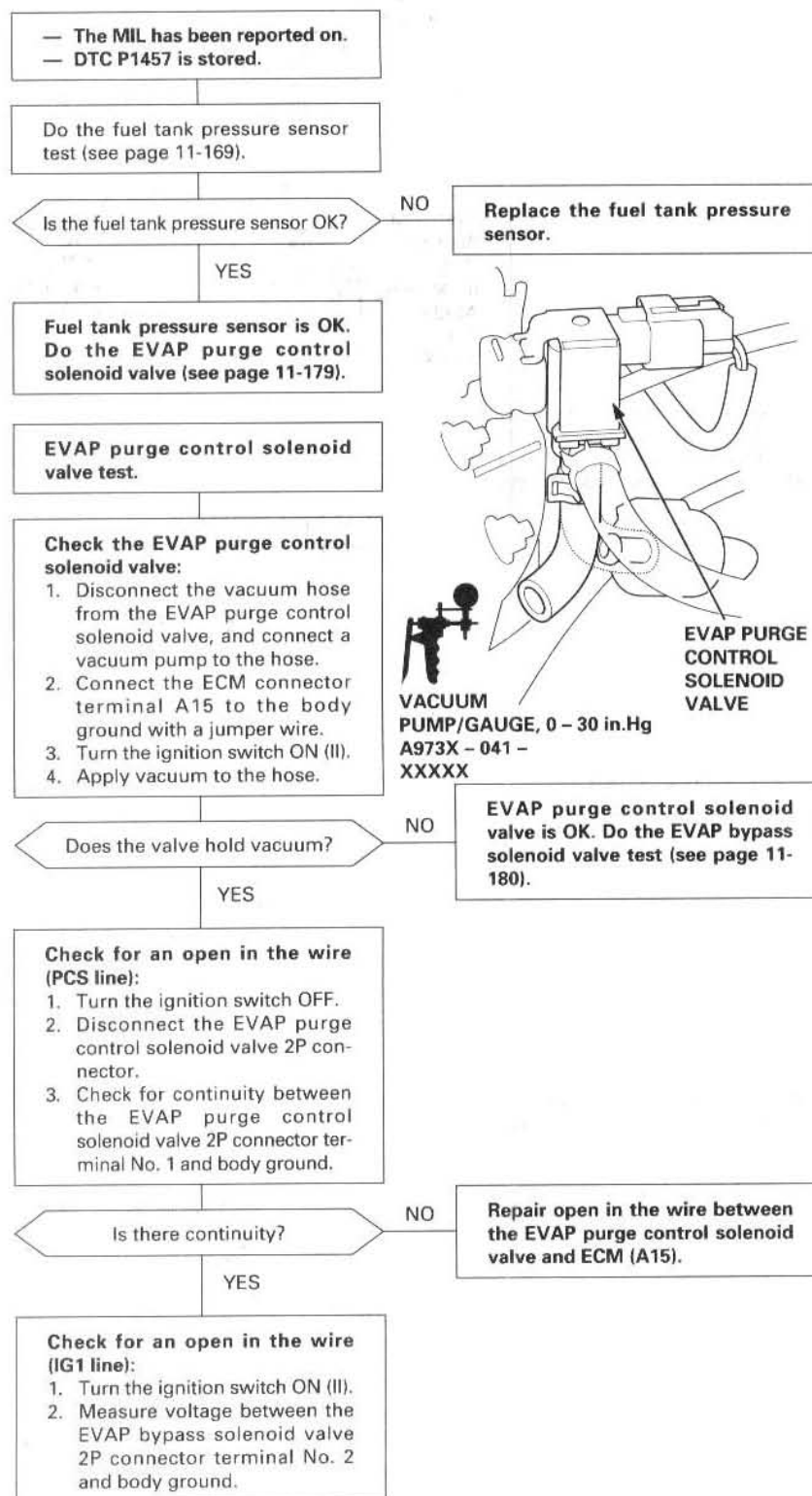




'98 model, '97 (California) model:

P1457 The scan tool indicates Diagnostic Trouble Code (DTC) P1457: Evaporative Emission (EVAP) control system leak detected (EVAP control canister system).

Troubleshooting Flowchart



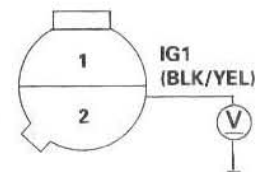
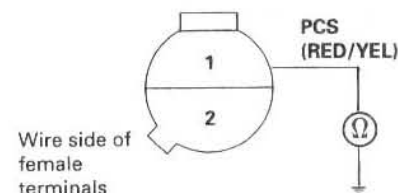
ECM CONNECTOR A (32P)

1	2	3	4	5	6	7	8	9	10	11
12	13	14	15	16	17	18	19	20	22	23
24	25	26	27	28	29	30	31	32		

JUMPER WIRE
PCS (RED/YEL)

Wire side of female terminals

EVAP PURGE CONTROL SOLENOID VALVE 2P CONNECTOR (C291)



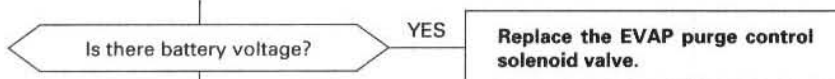
(cont'd)

(To page 11-180)

Emission Control System

Evaporative Emission (EVAP) Controls (cont'd)

(From page 11-179)



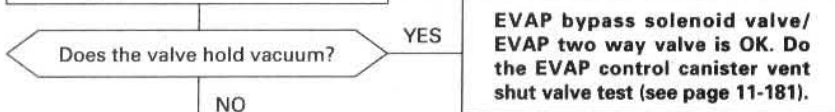
NO

Repair open in the wire between the EVAP purge control solenoid valve and No. 14 ECU (ECM) EAT ECU (TCM) (15 A) fuse.

EVAP bypass solenoid valve test.

Check the EVAP bypass solenoid valve:

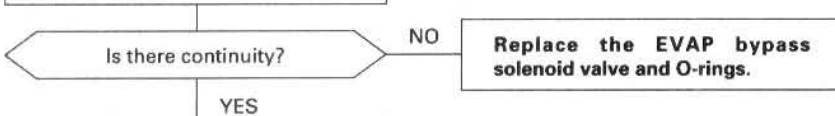
1. Disconnect the vacuum hose from the EVAP two way valve, and connect a vacuum pump to the hose.
2. Turn the ignition switch ON (II).
3. Apply vacuum to the hose.



NO

Check the EVAP bypass solenoid valve:

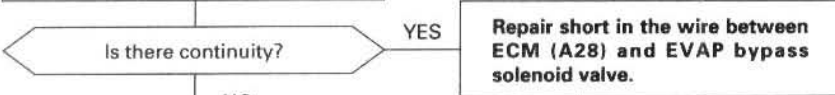
1. Turn the ignition switch OFF.
2. Disconnect the EVAP bypass solenoid valve 2P connector.
3. Check for continuity between the EVAP bypass solenoid valve 2P connector terminal No. 2 and body ground.



YES

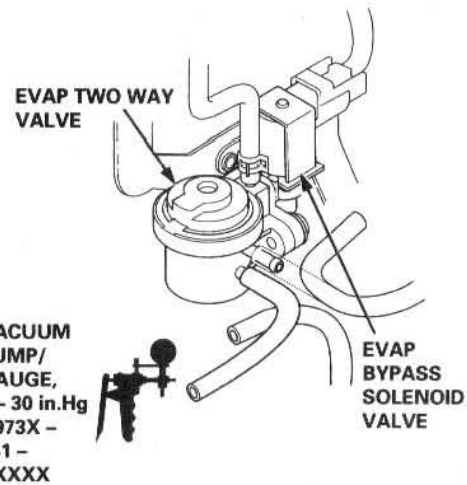
Check for a short in the wire (2WBS line):

1. Disconnect the ECM connector A (32P).
2. Check for continuity between the EVAP bypass solenoid valve 2P connector terminal No. 2 and body ground.

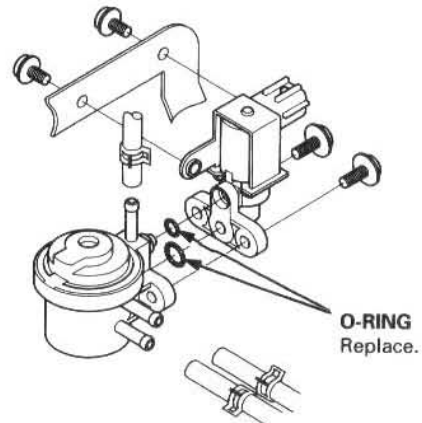
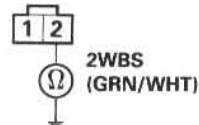
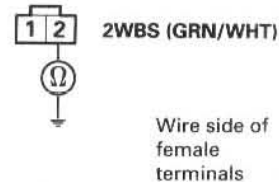


NO

Substitute a known-good ECM and recheck (see page 11-37 for immobilizer information). If symptom/indication goes away, replace the original ECM.



EVAP BYPASS SOLENOID VALVE 2P CONNECTOR (C288)

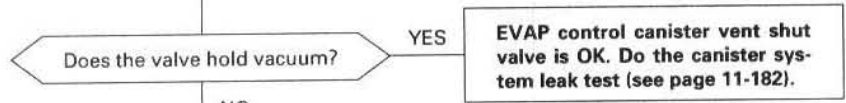




EVAP control canister vent shut valve test.

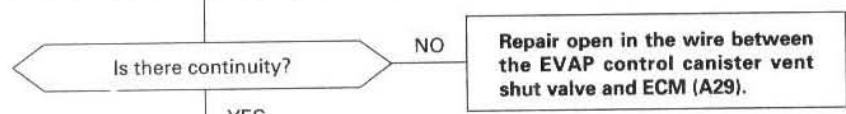
Check the EVAP control canister vent shut valve:

1. Disconnect the vacuum hose from the EVAP three way valve, and connect a vacuum pump to the hose.
2. Connect the ECM connector terminal A29 to the body ground with a jumper wire.
3. Turn the ignition switch ON (II).
4. Apply vacuum to the hose.



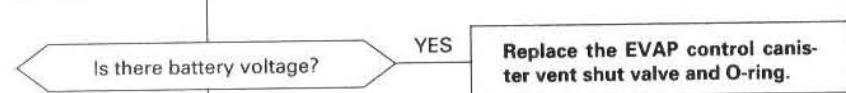
Check for an open in the wire (VSV line):

1. Turn the ignition switch OFF.
2. Disconnect the EVAP control canister vent shut valve 2P connector.
3. Check for continuity between the EVAP control canister vent shut valve 2P connector terminal No. 2 and body ground.

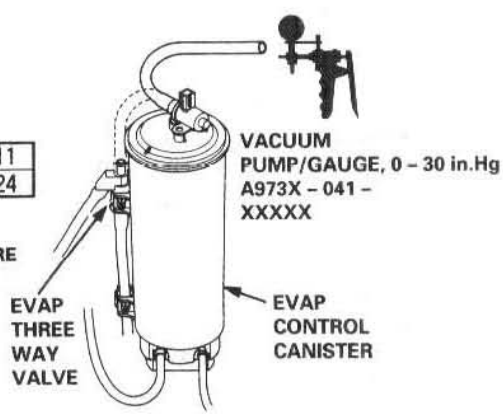
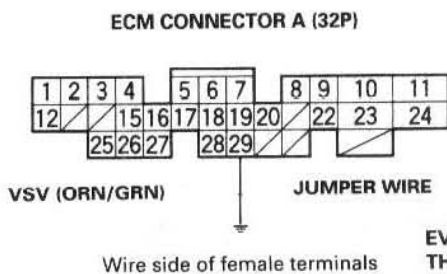


Check for an open in the wire (IG1 line):

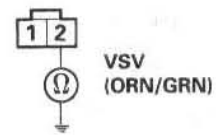
1. Turn the ignition switch ON (II).
2. Measure voltage between the EVAP control canister vent shut valve 2P connector terminal No. 1 and body ground.



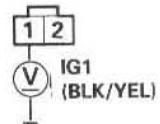
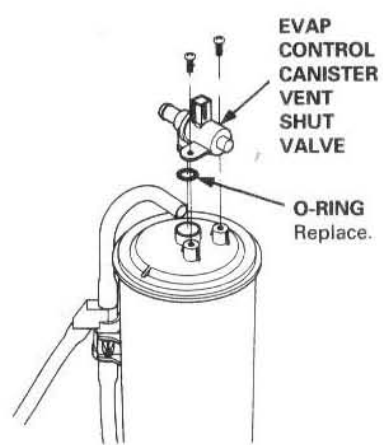
Repair open in the wire between the EVAP control canister vent shut valve and No. 14 ECU (ECM) EAT ECU (TCM) (15 A) fuse.



EVAP CONTROL CANISTER VENT SHUT VALVE 2P CONNECTOR (C290)



Wire side of female terminals



(cont'd)

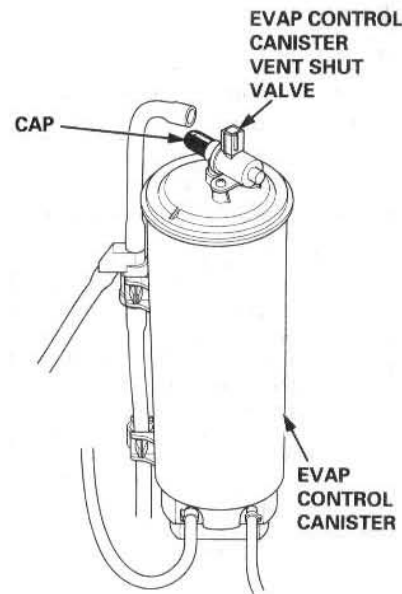
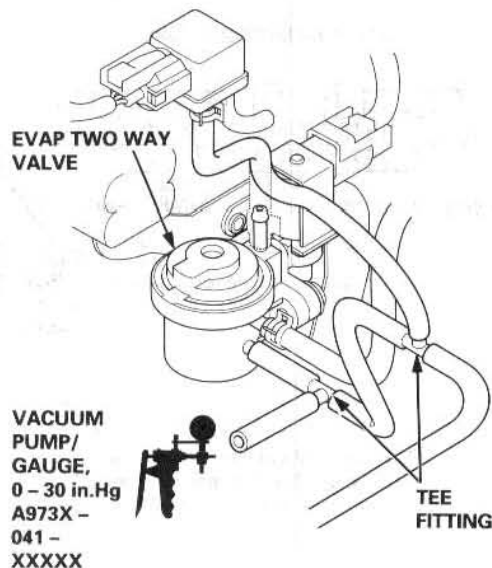
Emission Control System

Evaporative Emission (EVAP) Controls (cont'd)

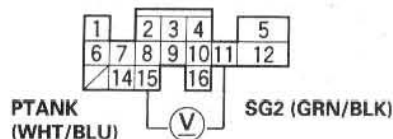
Canister system leak test.

Check the EVAP control canister vent shut valve line and connections:

1. Turn the ignition switch OFF.
2. Connect two three-way tee fittings into the hose from the EVAP control canister to the EVAP two way valve. Connect the fuel tank pressure sensor to one of the tee fittings and the vacuum pump to the other.
3. Remove the vent hose from the EVAP control canister vent shut valve and cap the port to seal the fresh air vent for the EVAP control canister.
4. Turn the ignition switch ON (II).
5. While monitoring the FTP Sensor voltage with the Honda PGM Tester, or measuring voltage between ECM connector terminals D15 and D11 slowly pump the vacuum pump using a stroke every 1-2 seconds.
6. Continue to pump vacuum until that voltage drops to approx. 1.5 V.
NOTE: Make sure that the engine coolant temperature still above 95°F (35°C) and your vacuum pump has no leak.
7. Monitor that voltage for 20 seconds.



ECM CONNECTOR D (16P)



Wire side of female terminals

Does the voltage drop to 1.5 V and holds at least 20 seconds?

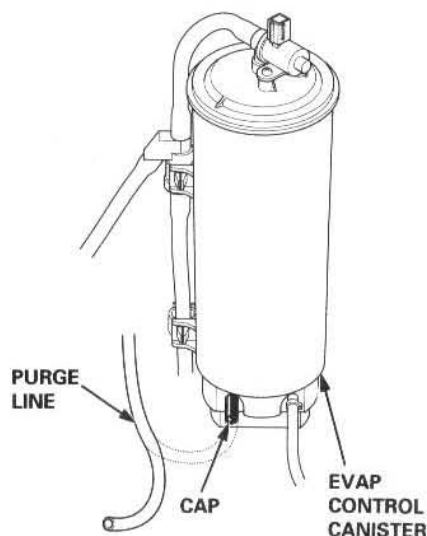
NO

YES

Inspect the EVAP control canister vent shut valve line and connections.

Check the EVAP purge control solenoid valve line and connections:

1. Turn the ignition switch OFF.
2. Disconnect the purge line hose from the EVAP control canister and plug the port.
3. Turn the ignition switch ON (II).
4. While monitoring the FTP Sensor voltage with the Honda PGM Tester, or measuring voltage between ECM connector terminals D15 and D11 slowly pump the vacuum pump using a stroke every 1-2 seconds.
5. Continue to pump vacuum until that voltage drops to approx. 1.5 V.
NOTE: Make sure that the engine coolant temperature still above 95°F (35°C) and your vacuum pump has no leak.
6. Monitor that voltage for 20 seconds.



Does the voltage drop to 1.5 V and holds at least 20 seconds?

YES

NO

Replace the EVAP control canister.

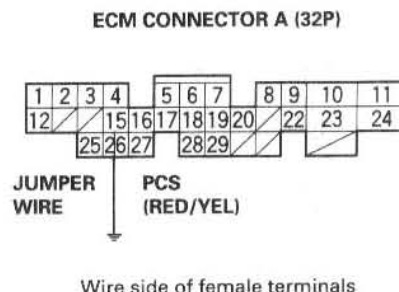
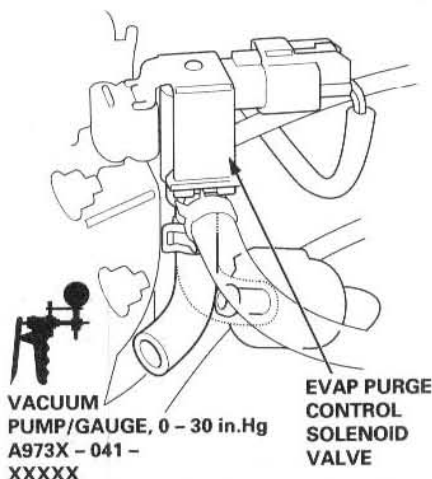
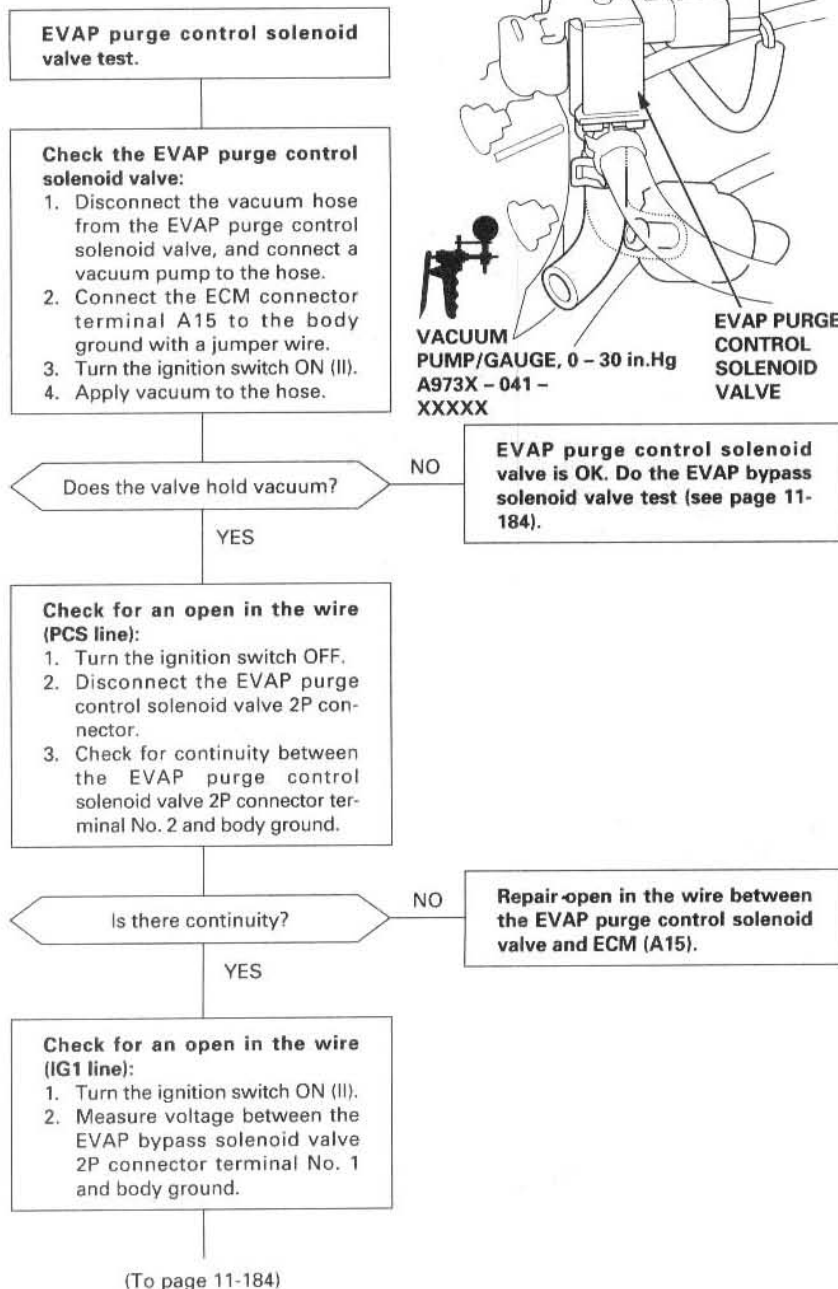
Inspect the EVAP purge control solenoid valve line and connections. If they are OK, do the EVAP two way valve test (see page 11-193).



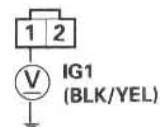
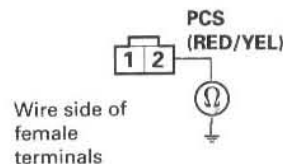
'99 model:

P1457 The scan tool indicates Diagnostic Trouble Code (DTC) P1457: Evaporative Emission (EVAP) control system leak detected (EVAP control canister system).

Troubleshooting Flowchart



EVAP PURGE CONTROL SOLENOID VALVE 2P CONNECTOR (C291)

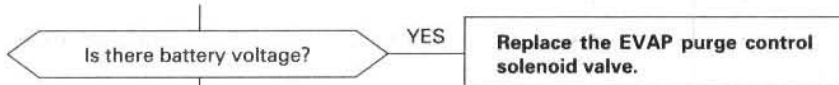


(cont'd)

Emission Control System

Evaporative Emission (EVAP) Controls (cont'd)

(From page 11-183)



NO

Repair open in the wire between the EVAP purge control solenoid valve and No. 14 ECU (ECM) EAT ECU (TCM) (15A) fuse.

EVAP bypass solenoid valve test.

Check the EVAP bypass solenoid valve:

1. Disconnect the vacuum hose from the EVAP two way valve, and connect a vacuum pump to the hose.
2. Turn the ignition switch ON (II).
3. Apply vacuum to the hose.

Does the valve hold vacuum?

YES

EVAP bypass solenoid valve/EVAP two way valve is OK. Do the EVAP control canister vent shut valve test (see page 11-185).

NO

Check the EVAP bypass solenoid valve:

1. Turn the ignition switch OFF.
2. Disconnect the EVAP bypass solenoid valve 2P connector.
3. Check for continuity between the EVAP bypass solenoid valve 2P connector terminal No. 2 and body ground.

Is there continuity?

NO

Replace the EVAP bypass solenoid valve and O-rings.

YES

Check for a short in the wire (2WBS line):

1. Disconnect the ECM connector A (32P).
2. Check for continuity between the EVAP bypass solenoid valve 2P connector terminal No. 2 and body ground.

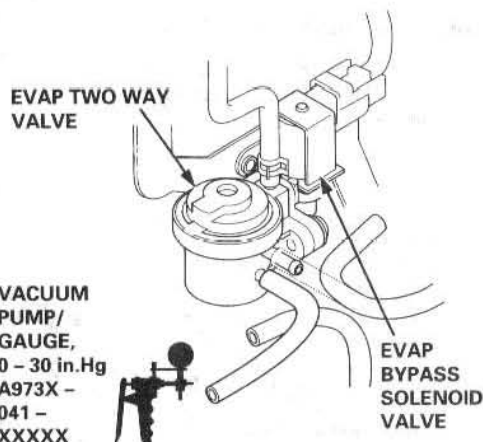
Is there continuity?

YES

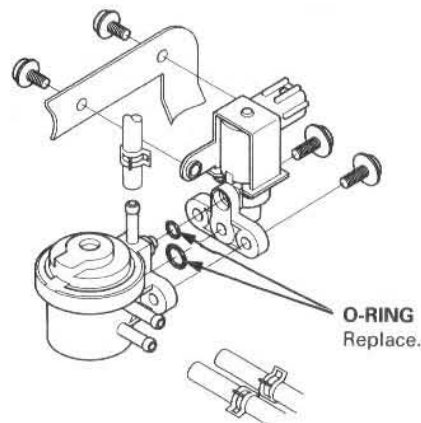
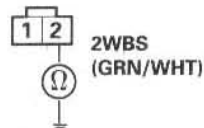
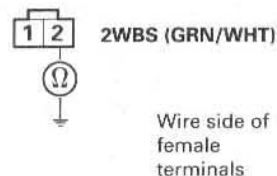
Repair short in the wire between ECM (A28) and EVAP bypass solenoid valve.

NO

Substitute a known-good ECM and recheck (see page 11-37 for immobilizer information). If symptom/indication goes away, replace the original ECM.



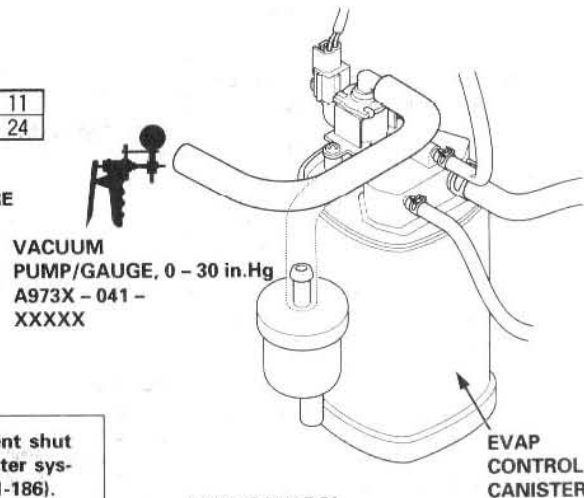
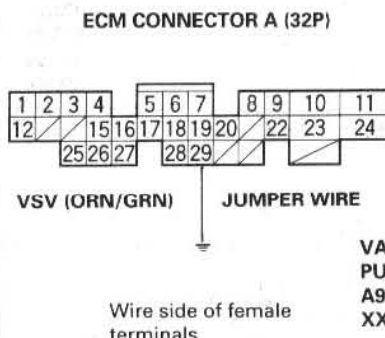
EVAP BYPASS SOLENOID VALVE 2P CONNECTOR (C288)





EVAP control canister vent shut valve test.

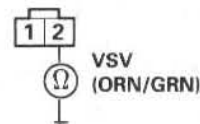
- Check the EVAP control canister vent shut valve:**
1. Disconnect the vacuum hose from the EVAP control canister filter, and connect a vacuum pump to the hose.
 2. Connect the ECM connector terminal A29 to the body ground with a jumper wire.
 3. Turn the ignition switch ON (II).
 4. Apply vacuum to the hose.



Does the valve hold vacuum? **YES** → **EVAP control canister vent shut valve is OK. Do the canister system leak test (see page 11-186).**

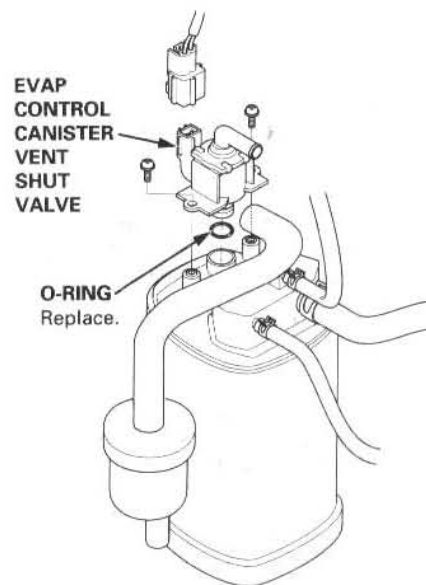
- NO**
- Check for an open in the wire (VSV line):**
1. Turn the ignition switch OFF.
 2. Disconnect the EVAP control canister vent shut valve 2P connector.
 3. Check for continuity between the EVAP control canister vent shut valve 2P connector terminal No. 2 and body ground.

EVAP CONTROL CANISTER VENT SHUT VALVE 2P CONNECTOR (C290)



Is there continuity? **NO** → **Repair open in the wire between the EVAP control canister vent shut valve and ECM (A29).**

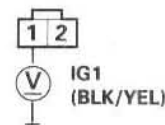
- YES**
- Check for an open in the wire (IG1 line):**
1. Turn the ignition switch ON (II).
 2. Measure voltage between the EVAP control canister vent shut valve 2P connector terminal No. 1 and body ground.



Is there battery voltage? **YES** → **Replace the EVAP control canister vent shut valve and O-ring.**

NO

Repair open in the wire between the EVAP control canister vent shut valve and No. 14 ECU (ECM) EAT ECU (TCM) (15 A) fuse.



(cont'd)

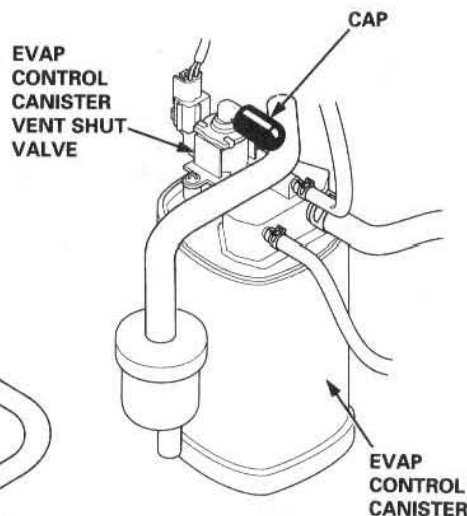
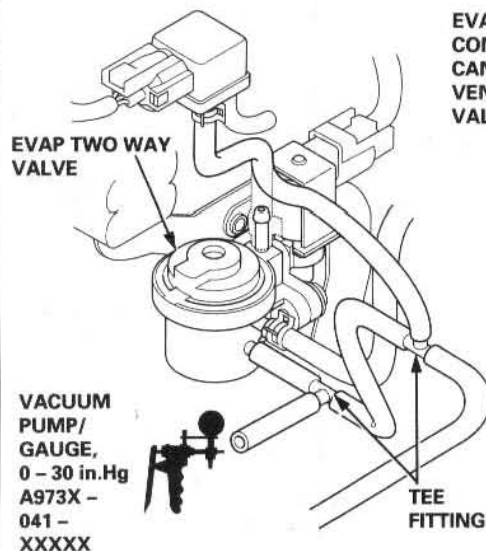
Emission Control System

Evaporative Emission (EVAP) Controls (cont'd)

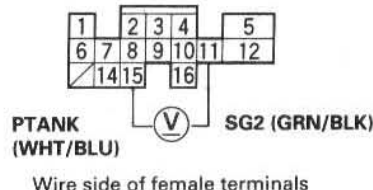
Canister system leak test.

Check the EVAP control canister vent shut valve line and connections:

1. Turn the ignition switch OFF.
2. Connect two three-way tee fittings into the hose from the EVAP control canister to the EVAP two way valve. Connect the fuel tank pressure sensor to one of the tee fittings and the vacuum pump to the other.
3. Remove the vent hose from the EVAP control canister vent shut valve and cap the port to seal the fresh air vent for the EVAP control canister.
4. Turn the ignition switch ON (II).
5. While monitoring the FTP Sensor voltage with the Honda PGM Tester, or measuring voltage between ECM connector terminals D15 and D11 slowly pump the vacuum pump using a stroke every 1-2 seconds.
6. Continue to pump vacuum until that voltage drops to approx. 1.5 V.
NOTE: Make sure that the engine coolant temperature still above 95°F (35°C) and your vacuum pump has no leak.
7. Monitor that voltage for 20 seconds.



ECM CONNECTOR D (16P)



Does the voltage drop to 1.5 V and holds at least 20 seconds?

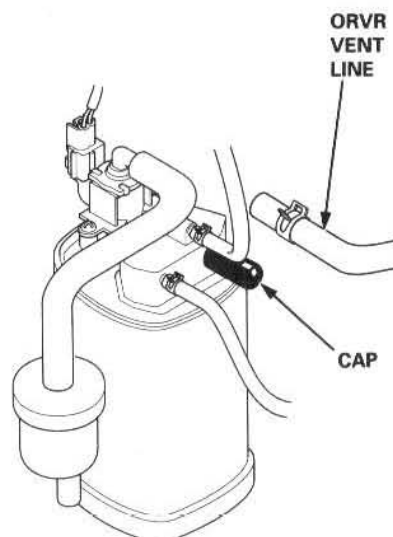
YES

Inspect the EVAP control canister vent shut valve line and connections.

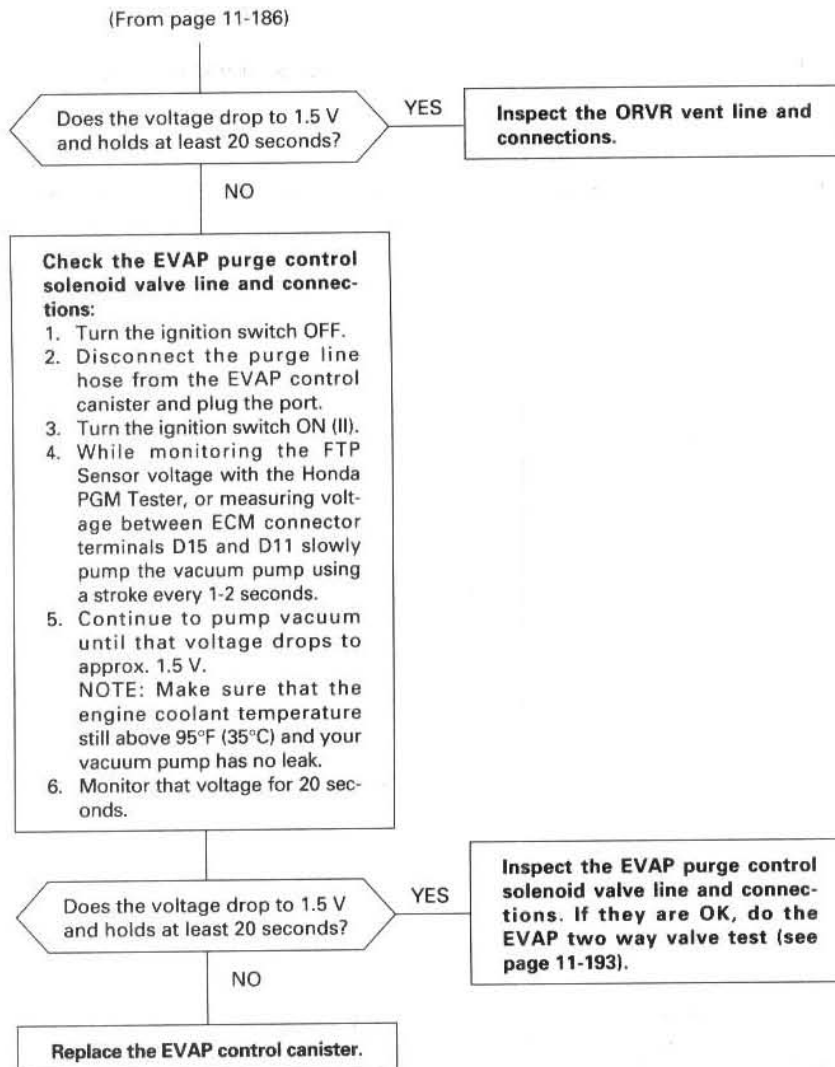
NO

Check the EVAP purge control ORVR vent line and connections:

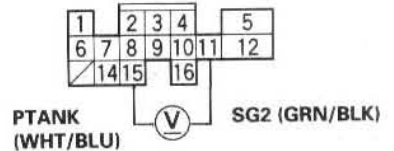
1. Turn the ignition switch OFF.
2. Disconnect the ORVR vent line hose from the EVAP control canister and plug the port.
3. Turn the ignition switch ON (II).
4. While monitoring the FTP Sensor voltage with the Honda PGM Tester, or measuring voltage between ECM connector terminals D15 and D11 slowly pump the vacuum pump using a stroke every 1-2 seconds.
5. Continue to pump vacuum until that voltage drops to approx. 1.5 V.
NOTE: Make sure that the engine coolant temperature still above 95°F (35°C) and your vacuum pump has no leak.
6. Monitor that voltage for 20 seconds.



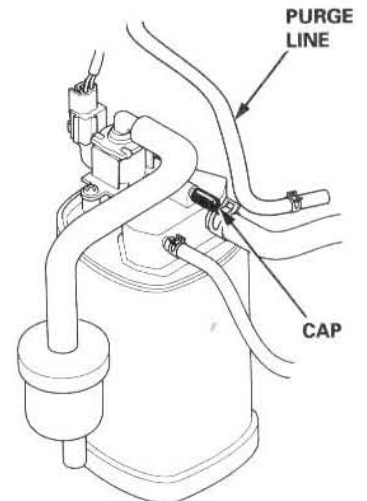
(To page 11-187)



ECM CONNECTOR D (16P)



Wire side of female terminals



(cont'd)

Emission Control System

Evaporative Emission (EVAP) Controls (cont'd)

'97 (49ST, Canada) model:

P0441 The scan tool indicates Diagnostic Trouble Code (DTC) P0441: Evaporative Emission (EVAP) control system insufficient purge flow.

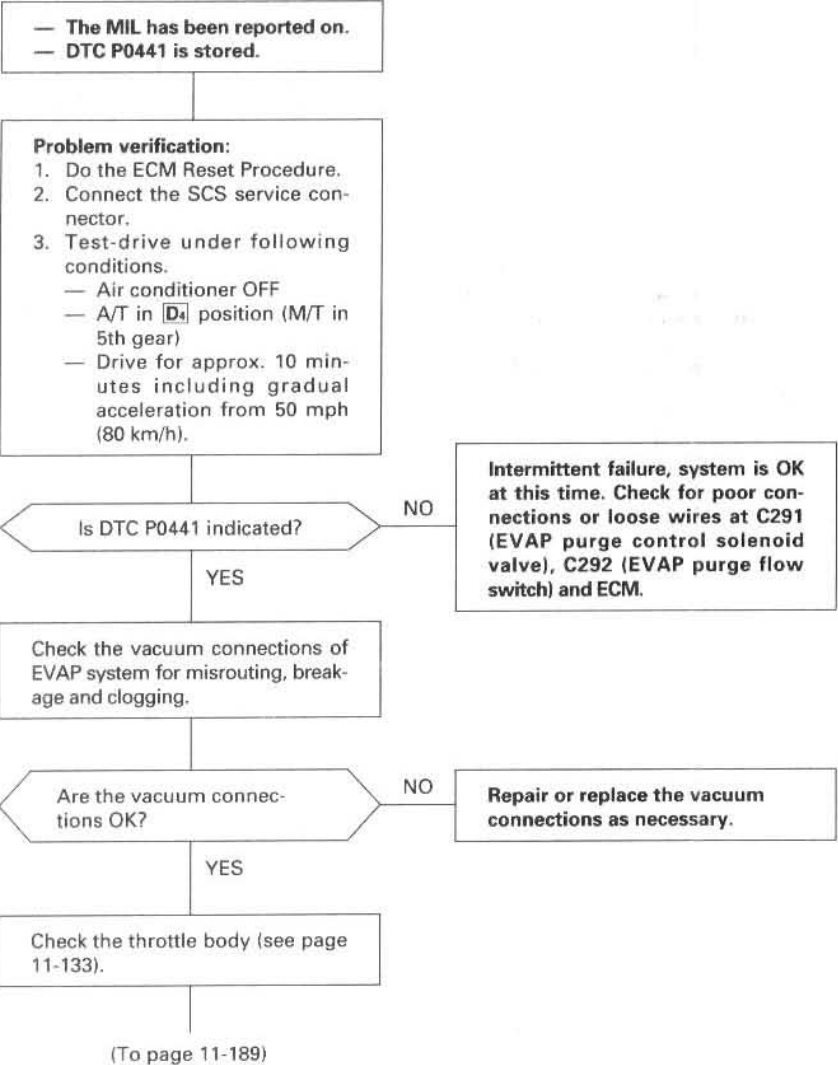
Description

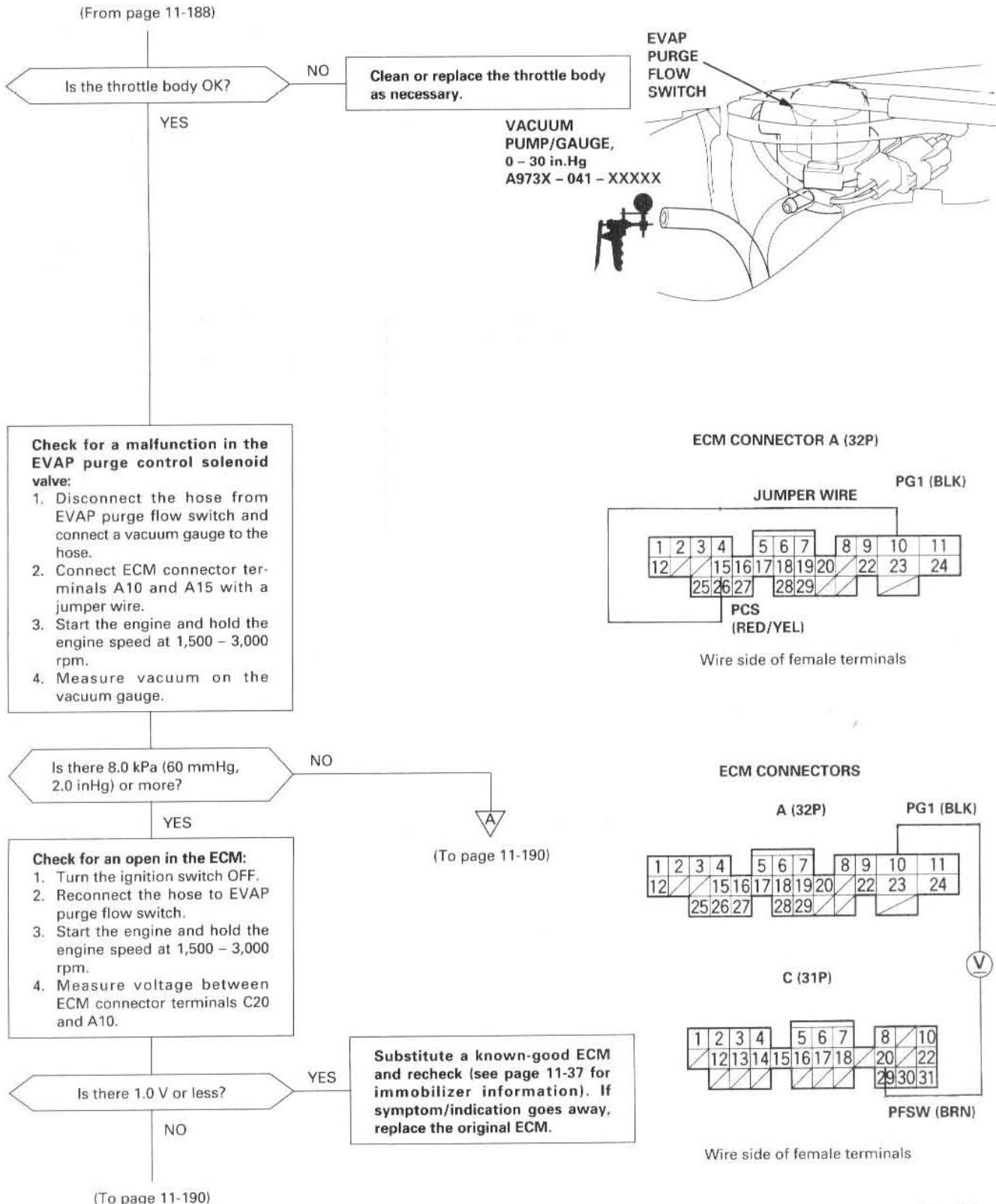
By monitoring the vacuum of the purge line with the EVAP purge flow switch, the ECM can detect insufficient EVAP control system surge flow.

Possible Cause

- EVAP Purge Control Solenoid Valve
- EVAP Purge Control Solenoid Valve Circuit
- EVAP Purge Flow Switch
- EVAP Purge Flow Switch Circuit
- Throttle Body (purge port)
- Tubing
- ECM

Troubleshooting Flowchart





(cont'd)

Emission Control System

Evaporative Emission (EVAP) Controls (cont'd)

(From page 11-189)

Check for an open in the wire (PFSW line):

1. Turn the ignition switch OFF.
2. Disconnect the EVAP purge flow switch connector and connect the EVAP purge flow switch connector terminals No. 1 and No. 2 with a jumper wire.
3. Turn the ignition switch ON (II).
4. Measure voltage between ECM connector terminals C20 and A10.

Is there 1.0 V or less?

NO

Repair open in the wire between ECM (C20) and EVAP purge flow switch.

YES

Replace the EVAP purge flow switch.

(From page 11-189)



Check for an open or short in the wire (IG1 line):

1. Turn the ignition switch OFF.
2. Disconnect the EVAP purge control solenoid valve connector.
3. Turn the ignition switch ON (II).
4. Measure voltage between EVAP purge control solenoid valve connector terminal No. 2 and body ground.

Is there battery voltage?

NO

Repair open or short in the wire between EVAP purge control solenoid valve and No. 14 ECU (ECM) EAT ECU (TCM) CRUISE CONTROL (15 A) fuse.

YES

Check for an open in the wire (PCS line):

1. Turn the ignition switch OFF.
2. Connect the EVAP purge control solenoid valve connector terminals No. 1 and No. 2 with a jumper wire.
3. Turn the ignition switch ON (II).
4. Measure voltage between ECM connector terminals A10 and A15.

Is there battery voltage?

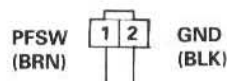
NO

Repair open in the wire between ECM (A15) and EVAP purge control solenoid valve.

YES

Replace the EVAP purge control solenoid valve.

EVAP PURGE FLOW SWITCH 2P CONNECTOR (C292)



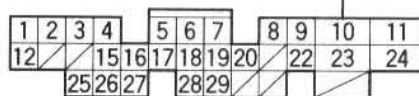
JUMPER WIRE

Wire side of female terminals

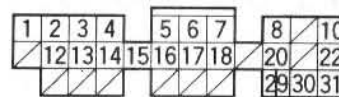
ECM CONNECTORS

A (32P)

PG1 (BLK)



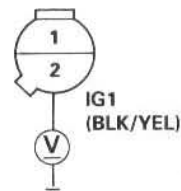
C (31P)



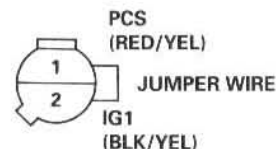
PFSW (BRN)

Wire side of female terminals

EVAP PURGE CONTROL SOLENOID VALVE 2P CONNECTOR (C291)



Wire side of female terminals



ECM CONNECTOR A (32P)

PCS (RED/YEL)

PG1 (BLK)



Wire side of female terminals



'97 (49ST, Canada) model:

P1459

The scan tool indicates Diagnostic Trouble Code (DTC) P1459: Evaporative emission (EVAP) purge flow switch malfunction.

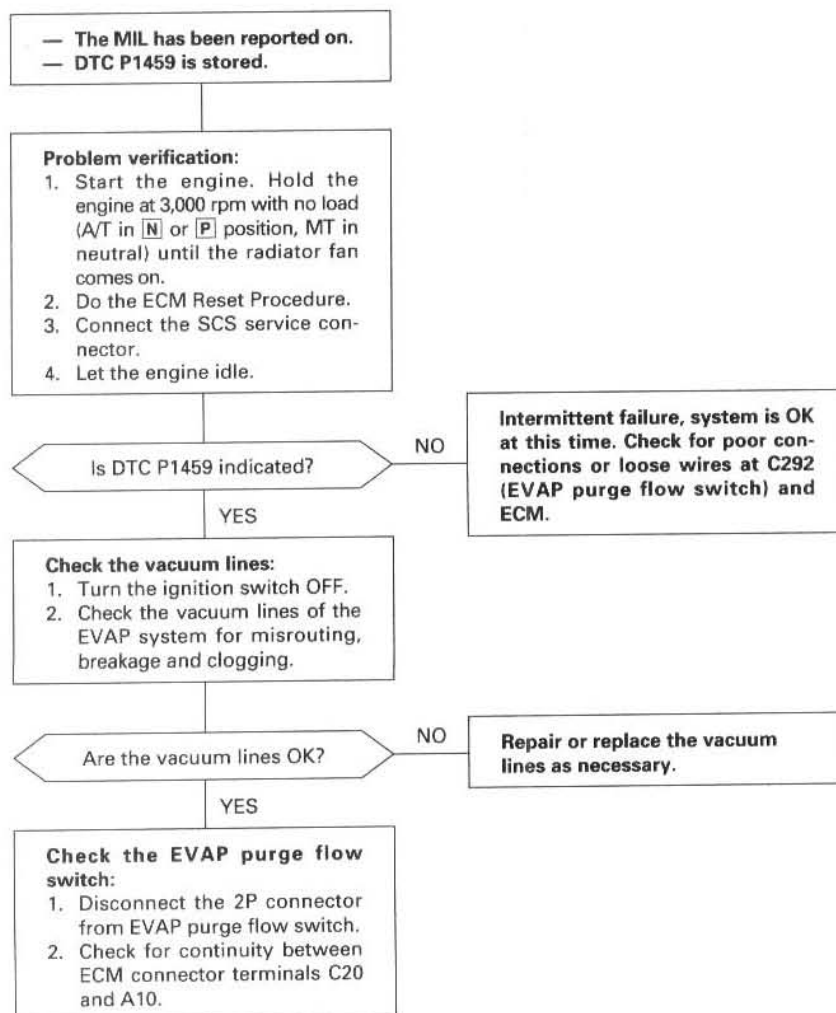
Description

By monitoring the output of the EVAP purge flow switch at idle, the ECM detects malfunctions in the EVAP purge flow switch circuit.

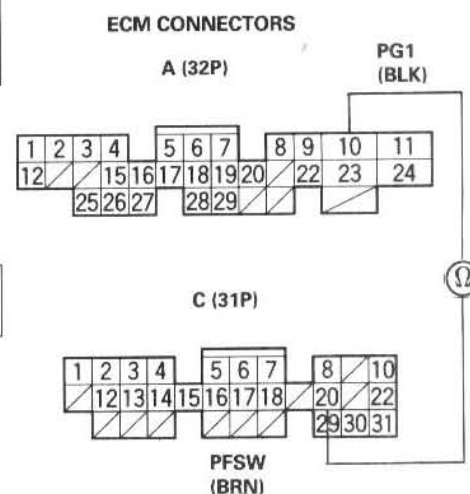
Possible Causes

- EVAP Purge Flow Switch
- EVAP Purge Flow Switch Circuit
- Vacuum lines
- ECM

Troubleshooting Flowchart



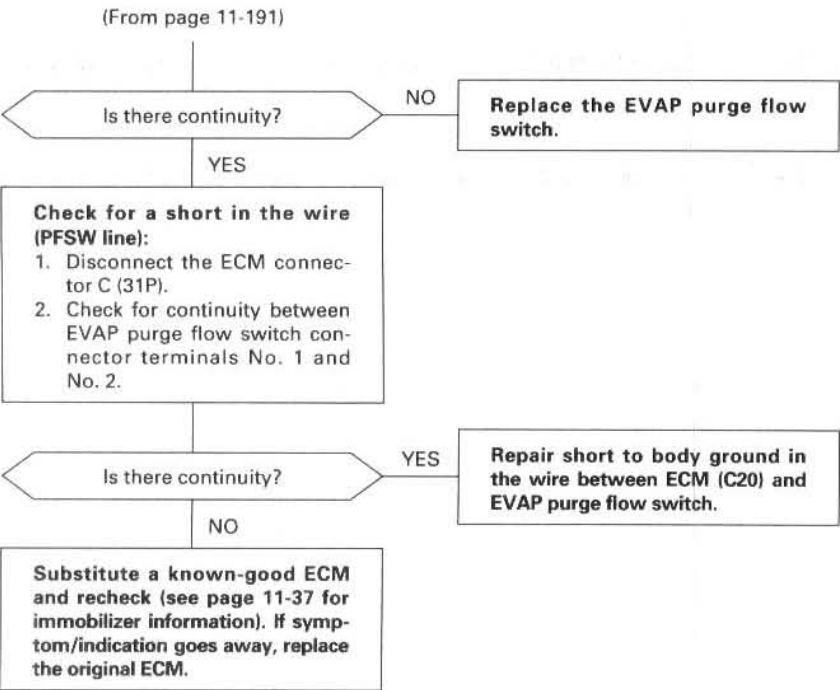
(To page 11-192)



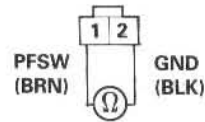
(cont'd)

Emission Control System

Evaporative Emission (EVAP) Controls (cont'd)



EVAP PURGE FLOW SWITCH
2P CONNECTOR (C292)

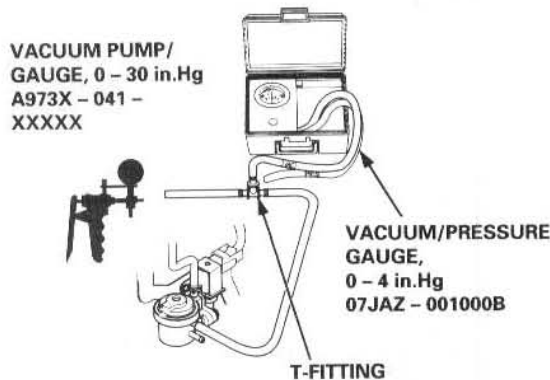


Wire side of female terminals

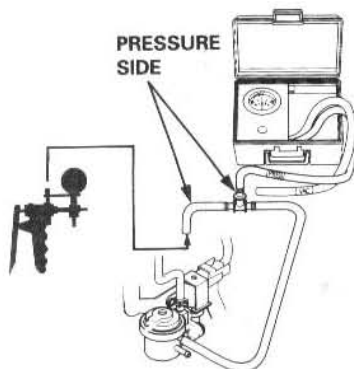


Evaporative Emission (EVAP) Two Way Valve Testing
'99 model, '98 model, '97 (California) model:

1. Remove the fuel fill cap.
2. Remove the vapor line from the EVAP two way valve (located above the EVAP control canister), and connect it to a T-fitting from vacuum gauge and vacuum pump as shown.



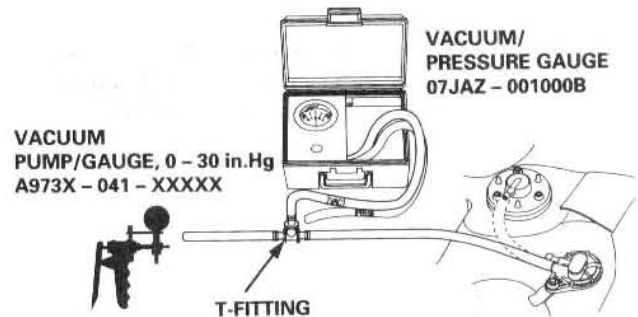
3. Apply vacuum slowly and continuously while watching the gauge.
The vacuum should stabilize momentarily at 0.8 – 2.1 kPa (6 – 16 mmHg, 0.2 – 0.6 in.Hg).
If the vacuum stabilizes (valve opens) below 0.8 kPa (6 mmHg, 0.2 in.Hg) or above 2.1 kPa (16 mmHg, 0.6 in.Hg), install a new valve and retest.
4. Move the vacuum pump hose from the vacuum fitting to the pressure fitting, and move the vacuum gauge hose from the vacuum side to the pressure side as shown.



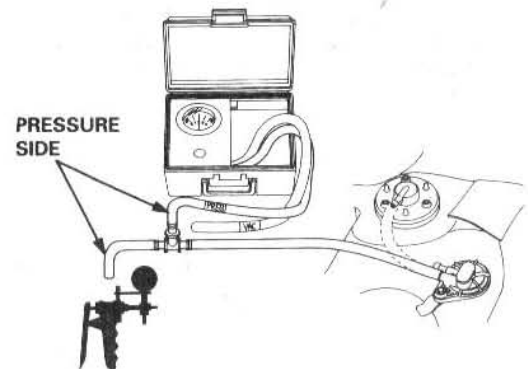
5. Slowly pressurize the vapor line while watching the gauge.
The pressure should stabilize momentarily above 1.0 kPa (8 mmHg, 0.3 in.Hg).
 - If the pressure momentarily stabilizes (valve opens) above 1.0 kPa (8 mmHg, 0.3 in.Hg), the valve is OK.
 - If the pressure stabilizes below 1.0 kPa (8 mmHg, 0.3 in.Hg), install a new valve and retest.

'97 (49ST, Canada) model:

1. Remove the fuel fill cap.
2. Remove the vapor line from the EVAP two way valve on the fuel tank, and connect it to a T-fitting from vacuum gauge and vacuum pump as shown.



3. Apply vacuum slowly and continuously while watching the gauge.
The vacuum should stabilize momentarily at 0.7 – 2.0 kPa (5 – 15 mmHg, 0.2 – 0.6 in.Hg).
If the vacuum stabilizes (valve opens) below 0.7 kPa (5 mmHg, 0.2 in.Hg) or above 2.0 kPa (15 mmHg, 0.6 in.Hg), install a new valve and retest.
4. Move the vacuum pump hose from the vacuum fitting to the pressure fitting, and move the vacuum gauge hose from the vacuum side to the pressure side as shown.



5. Slowly pressurize the vapor line while watching the gauge.
The pressure should stabilize at 1.3 – 4.7 kPa (10 – 35 mmHg, 0.4 – 1.4 in.Hg).
 - If the pressure momentarily stabilizes (valve opens) at 1.3 – 4.7 kPa (10 – 35 mmHg, 0.4 – 1.4 in. Hg), the valve is OK.
 - If the pressure stabilizes below 1.3 kPa (10 mmHg, 0.4 in.Hg) or above 4.7 kPa (35 mmHg, 1.4 in.Hg), install a new valve and retest.

(cont'd)

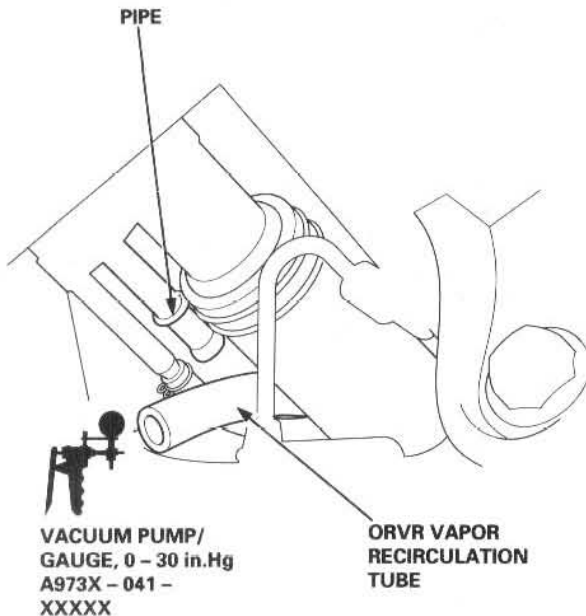
Emission Control System

Evaporative Emission (EVAP) Controls (cont'd)

ORVR Vent Shut Valve Test ('99 model)

Float Test

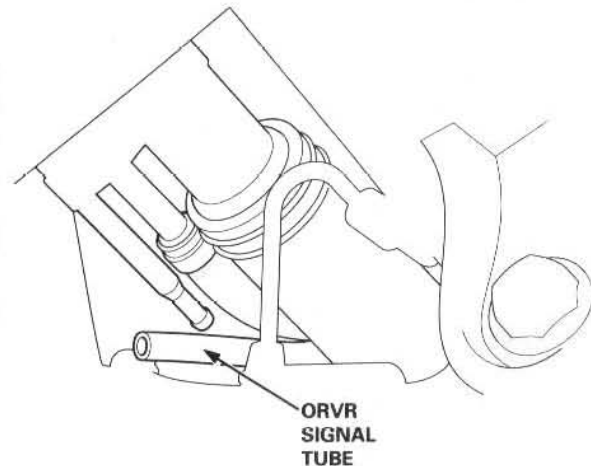
1. Make sure the fuel tank is less than half full.
2. Remove the fuel fill cap to relieve the fuel tank pressure, then reinstall the cap.
3. Remove the fuel hose joint protector. Disconnect the ORVR vapor recirculation tube, and connect a vacuum pump to the vapor recirculation tube.



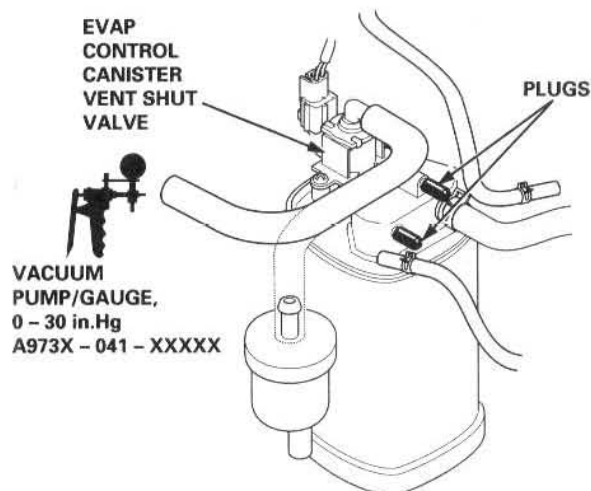
4. Plug the pipe.
5. Apply vacuum to the ORVR vapor recirculation tube.
 - If the vacuum holds, replace the ORVR vent shut valve (see page 11-193).
 - If the vacuum does not hold, the float is OK.

Valve Test

1. Make sure the fuel tank is less than half full.
2. Remove the fuel fill cap.
3. Remove the fuel hose joint protector. Disconnect the ORVR signal tube.



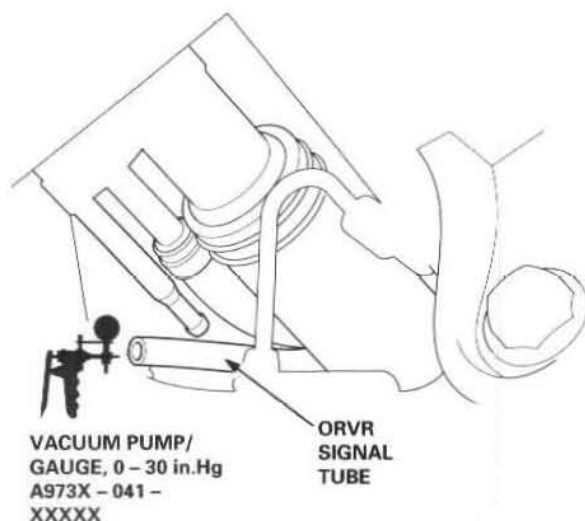
4. Disconnect the vacuum hose from the EVAP control canister, and then plug the ports with plugs.



5. Disconnect the vacuum hose from the EVAP control canister vent shut valve, and connect a vacuum pump to the vacuum hose.
6. Pump the vacuum pump 80 times.
 - If the vacuum holds, go to step 7.
 - If the vacuum does not hold, go to step 9.



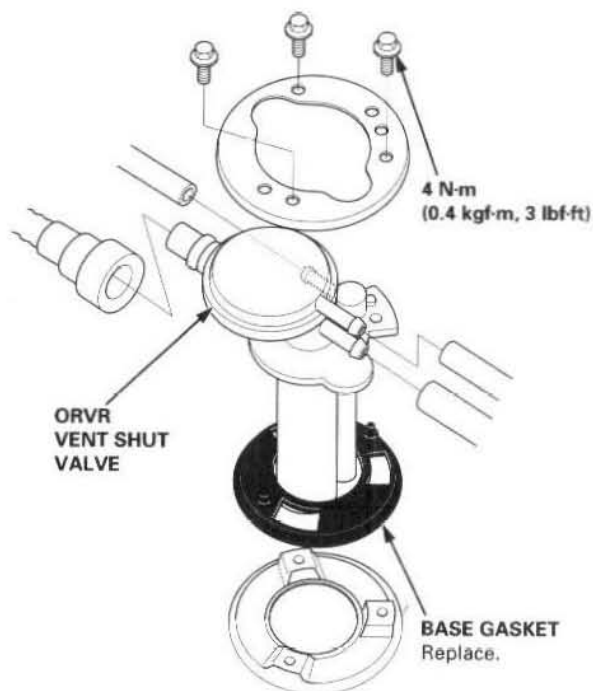
7. Connect a second vacuum pump to the ORVR signal tube.



8. Apply vacuum (1 pump) to the ORVR signal tube, then check the vacuum on the pump in step 6.
 - If the vacuum holds, replace the ORVR vent shut valve (see page 11-193).
 - If the vacuum is released, the ORVR vent shut valve is OK.
9. Disconnect the ORVR quick disconnect from the EVAP canister, then plug the port on the canister. Reapply vacuum (80 pumps).
 - If the vacuum holds, replace the ORVR vent shut valve (see page 11-193).
 - If the vacuum does not hold, inspect the EVAP canister vent shut valve O-ring. If the O-ring is OK, replace the EVAP canister and repeat step 4.

ORVR Vent Shut Valve Replacement

1. Remove the fuel tank (see page 11-136).
2. Remove the ORVR vent shut valve from the fuel tank.
3. Install parts in the reverse order of removal.



Transaxle

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Manual Transmission	13-1
Automatic Transmission	14-1
Differential	15-1
Driveshafts	16-1

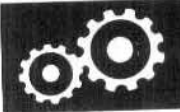


**Click here to go back to
the Introduction page**



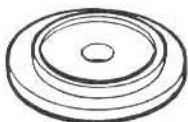
Clutch

Special Tools	12-2
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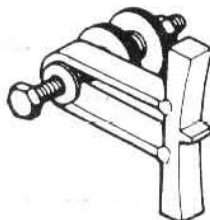


Special Tools

Ref. No.	Tool Number	Description	Qty	Page Reference
①	07JAF – PM7011A	Clutch Alignment Disc	1	12-7
②	07LAB – PV00100 or 07924 – PD20003	Ring Gear Holder	1	12-7, 9, 10
③	07LAF – PT00110	Clutch Alignment Shaft	1	12-7, 10
④	07936 – 3710100	Handle	1	12-7, 10



①



②



③



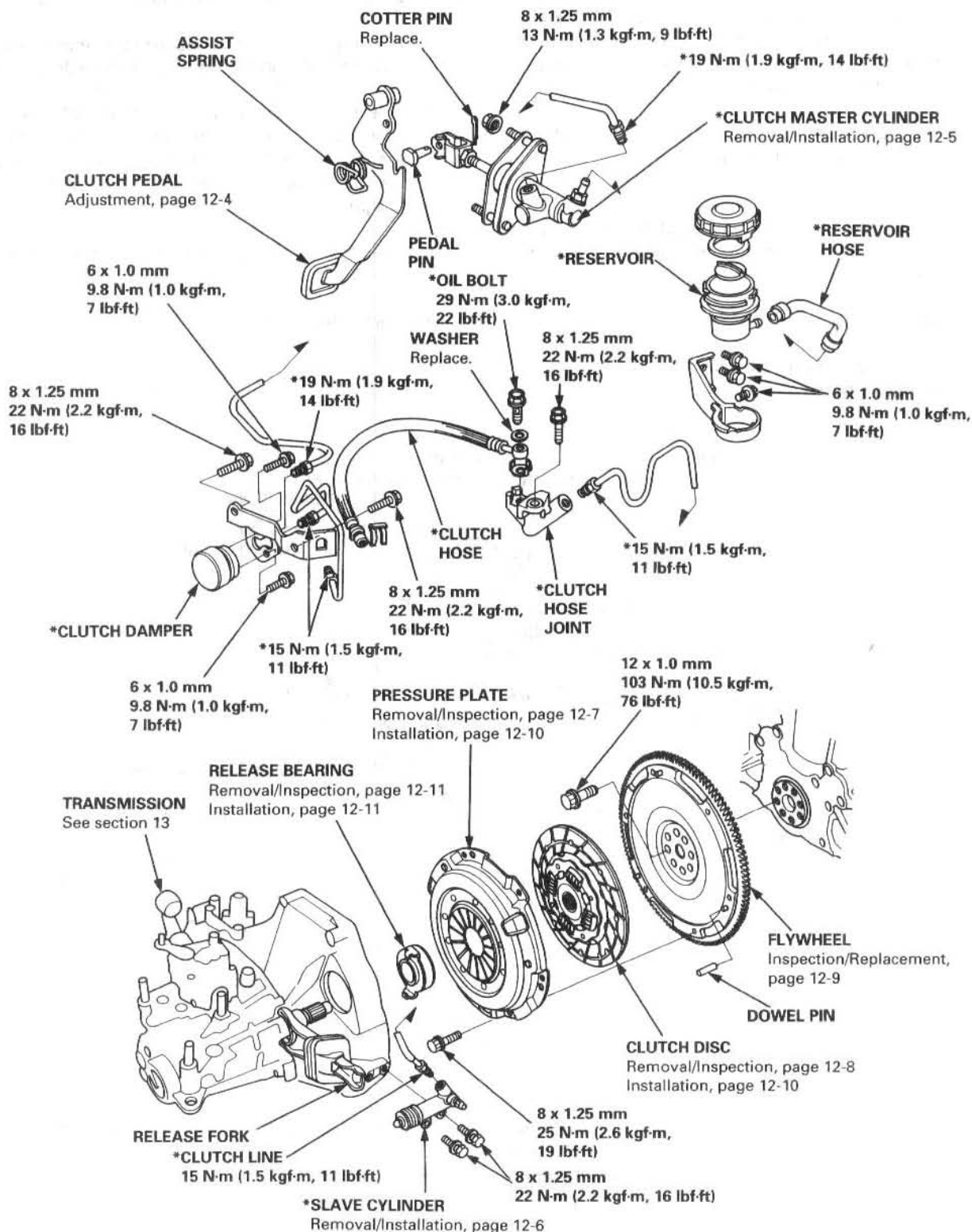
④

Illustrated Index



NOTE:

- Whenever the transmission is removed, clean and grease the release bearing sliding surface.
- If the parts marked * are removed, the clutch hydraulic system must be bled (see page 12-6).
- Inspect the hoses for damage, leaks, interference, and twisting.



Clutch Pedal

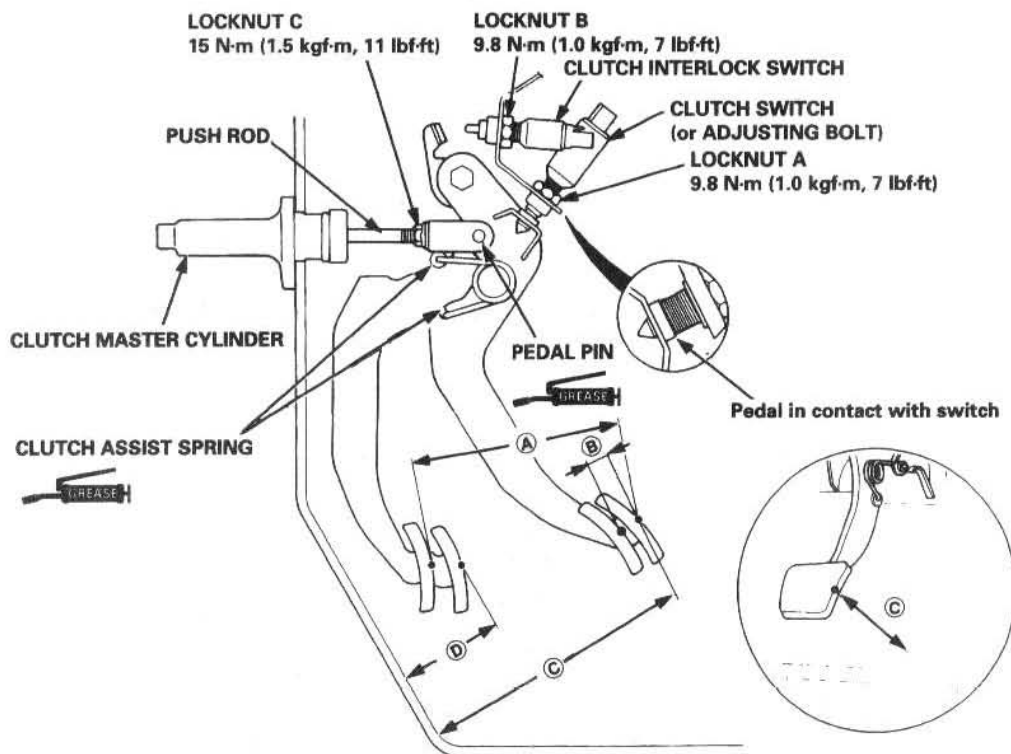
Adjustment

NOTE:

- To check the clutch interlock switch and clutch switch, see section 4.
- The clutch is self-adjusting to compensate for wear.

CAUTION: If there is no clearance between the master cylinder piston and push rod, the release bearing is held against the diaphragm spring, which can result in clutch slippage or other clutch problems.

1. Loosen locknut A, and back off the clutch switch (or adjusting bolt) until it no longer touches the clutch pedal.
2. Loosen locknut C, and turn the push rod in or out to get the specified stroke (A) and height (C) at the clutch pedal.
3. Tighten locknut C.
4. Turn the clutch switch (or adjusting bolt) in until it contacts the clutch pedal.
5. Turn the clutch switch in an additional 1/4 – 1/2 turn.
6. Tighten locknut A.
7. Loosen locknut B and the clutch interlock switch.
8. Measure the clearance between the floor board and clutch pedal with the clutch pedal fully depressed.
9. Release the clutch pedal 15 – 20 mm (0.59 – 0.79 in) from the fully depressed position and hold it there. Adjust the position of the clutch interlock switch so that the engine will start with the clutch pedal in this position.
10. Turn the clutch interlock switch in an additional 1/4 – 1/2 turn.
11. Tighten locknut B.



- (A) (STROKE at PEDAL): 135 – 145 mm (5.31 – 5.71 in)
(B) (TOTAL CLUTCH PEDAL FREE PLAY): 9.0 – 15.0 mm (0.35 – 0.59 in) includes the pedal play 1 – 7 mm (0.04 – 0.28 in)
(C) (CLUTCH PEDAL HEIGHT): 189 mm (7.44 in) to the floor
(D) (CLUTCH PEDAL DISENGAGEMENT HEIGHT): 93 mm (3.7 in) minimum to the floor

Clutch Master Cylinder



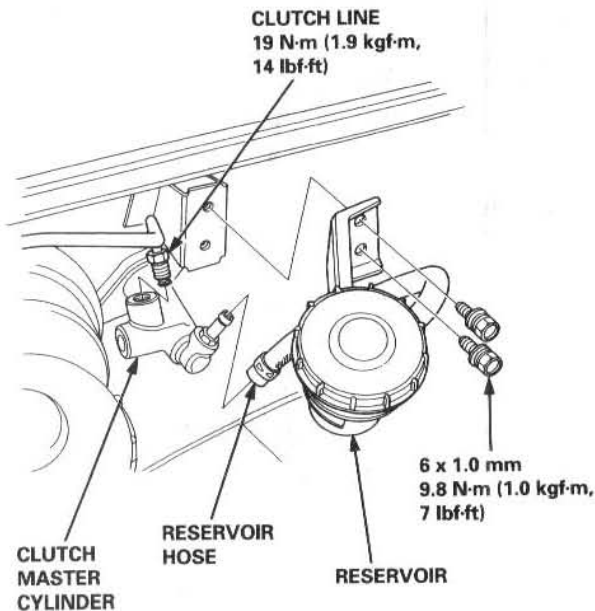
Removal/Installation

CAUTION:

- Do not spill brake fluid on the vehicle; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- Plug the end of the clutch line and reservoir hose with a shop towel to prevent brake fluid from coming out.

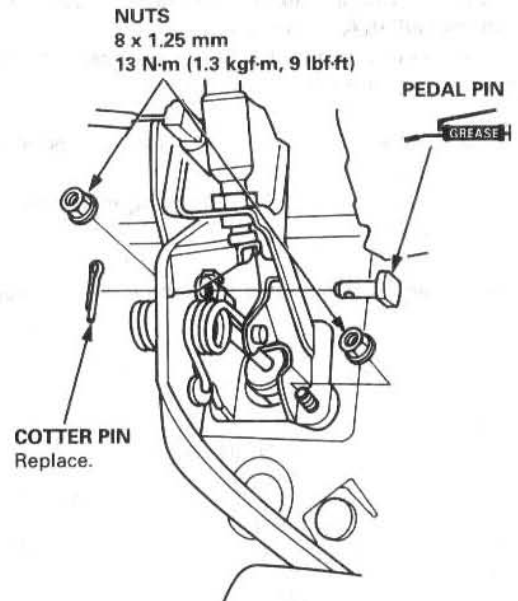
1. Remove the reservoir hose from the clutch master cylinder, and drain the brake fluid into a suitable container.

NOTE: The brake fluid can be sucked out through the top of the reservoir with a syringe.

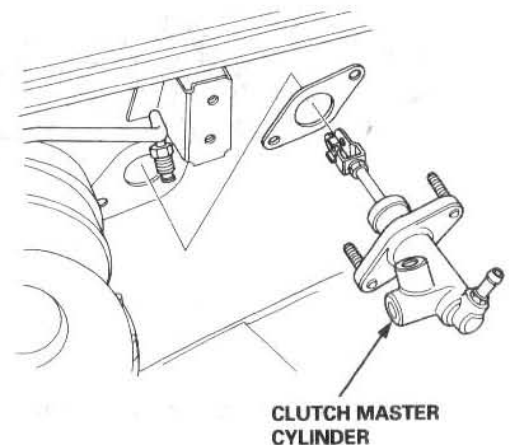


2. Remove the reservoir from the engine compartment bulkhead.
3. Disconnect the clutch line from the clutch master cylinder.

4. Pry out the cotter pin, and pull the pedal pin out of the yoke. Remove the nuts.



5. Remove the clutch master cylinder.



6. Install the clutch master cylinder in the reverse order of removal.

NOTE: Bleed the clutch hydraulic system (see page 12-6).


Slave Cylinder

Removal/Installation

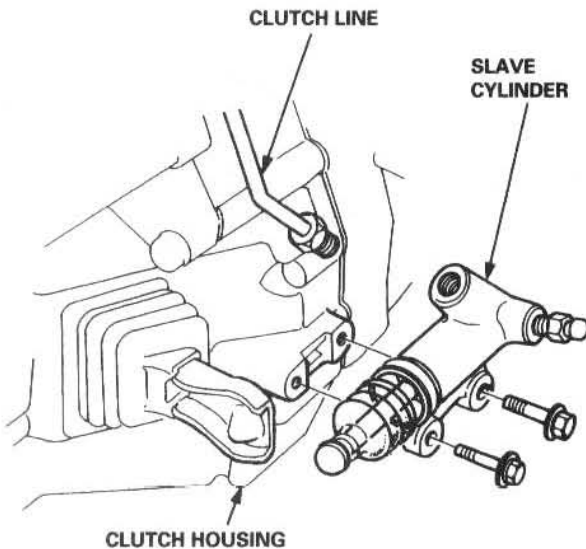
CAUTION:

- Do not spill brake fluid on the vehicle; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- Plug the end of the clutch line with a shop towel to prevent brake fluid from coming out.

 **GREASE**: Super High Temp Urea Grease (P/N 08798 - 9002).

 **GREASE**: Brake Assembly Lube or equivalent rubber grease.

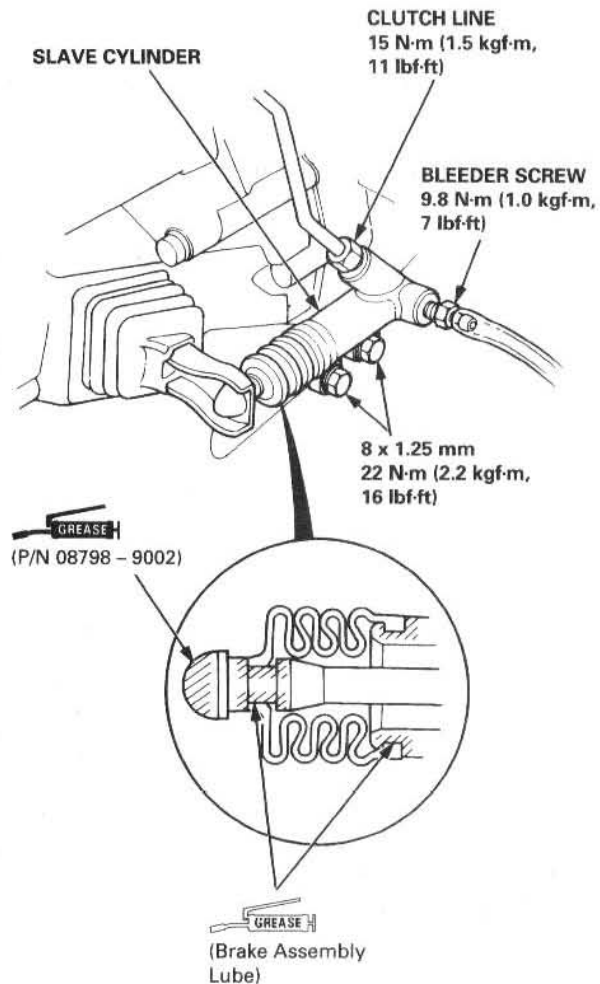
1. Disconnect the clutch line from the slave cylinder.



2. Remove the slave cylinder from the clutch housing.

3. Install the slave cylinder in the reverse order of removal.

NOTE: Make sure the boot is installed on the slave cylinder.



4. Bleed the clutch hydraulic system.

- Attach a hose to the bleeder screw, and suspend the hose in a container of brake fluid.
- Make sure there is an adequate supply of fluid at the clutch master cylinder, then slowly pump the clutch pedal until no more bubbles appear at the bleeder hose.
- Refill the clutch master cylinder with fluid when done.
- Always use Genuine Honda DOT 3 Brake Fluid. Using a non-Honda brake fluid can cause corrosion and decrease the life of the system.

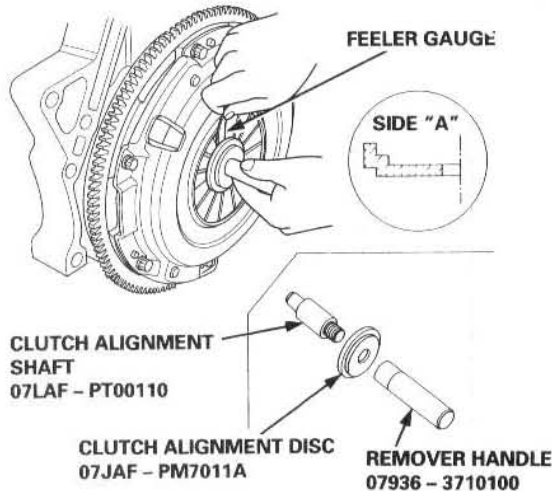


Removal/Inspection

1. Assemble the special tools with the "A" side of the Clutch Alignment Disc with side "A" facing the diaphragm spring.
2. Check the diaphragm spring fingers for height using the special tools and a feeler gauge.

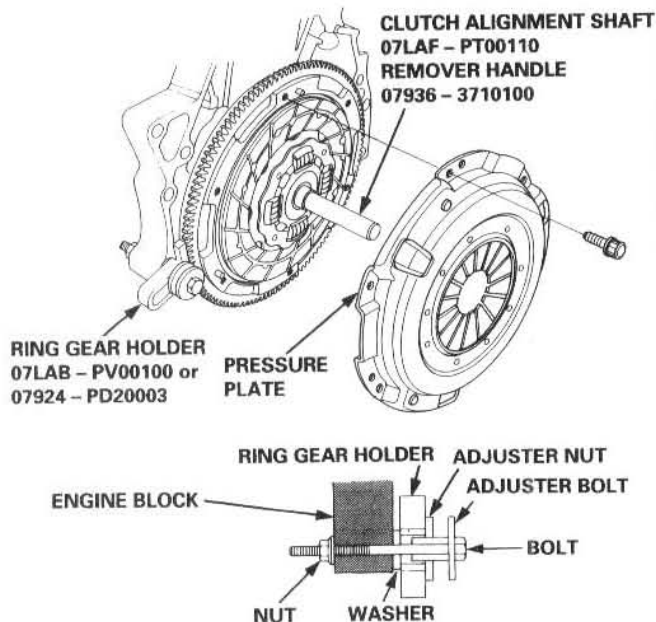
Standard (New): 0.6 mm (0.02 in) max.

Service Limit: 0.8 mm (0.03 in)



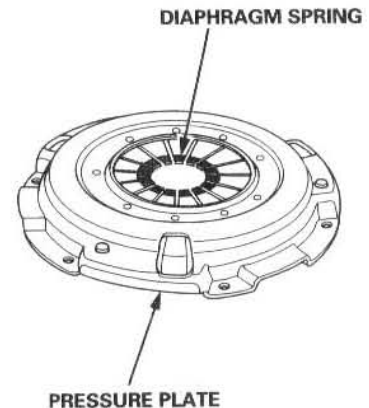
If the height is more than the service limit, replace the pressure plate.

3. Install the special tools as shown.



4. To prevent warping, unscrew the pressure plate mounting bolts in a crisscross pattern in several steps, then remove the pressure plate.

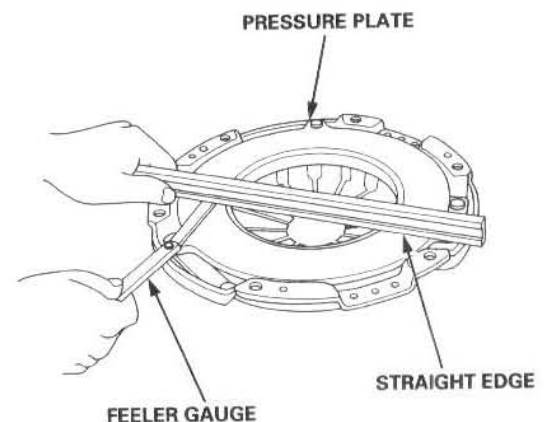
5. Inspect the pressure plate surface for wear, cracks, and burning.
6. Inspect the fingers of the diaphragm spring for wear at the release bearing contact area.



7. Inspect for warpage using a straight edge and feeler gauge. Measure across the pressure plate.

Standard (New): 0.03 mm (0.001 in) max.

Service Limit: 0.15 mm (0.006 in)

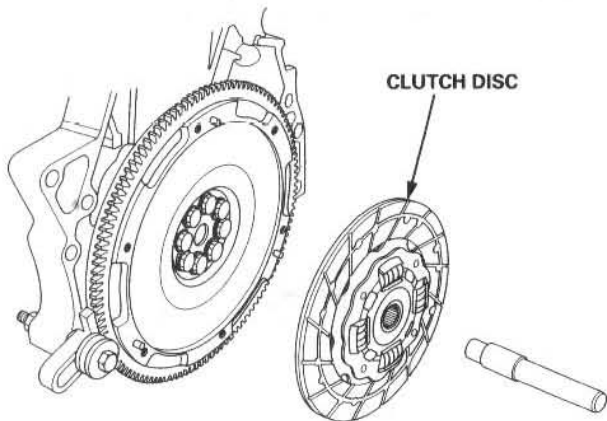


If the warpage is more than the service limit, replace the pressure plate.

Clutch Disc

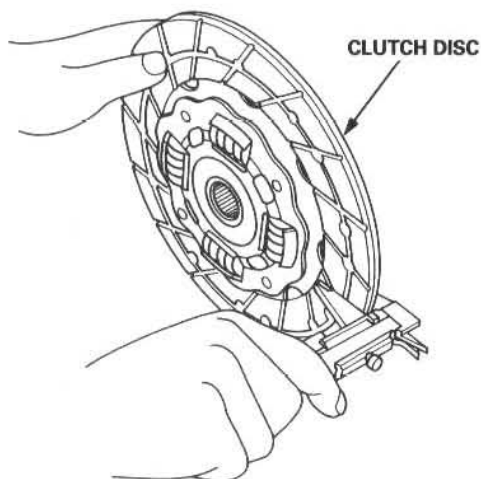
Removal/Inspection

1. Remove the clutch disc.



2. Inspect the lining of the clutch disc for signs of slipping or oil. If the clutch disc is burned black or oil soaked, replace it.
3. Measure the clutch disc thickness.

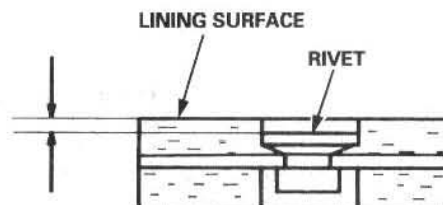
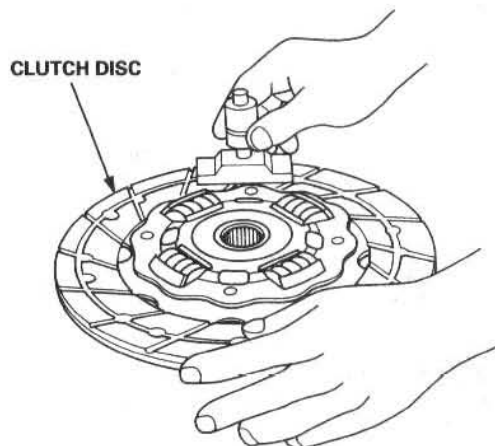
Standard (New): 8.3 – 9.0 mm (0.33 – 0.35 in)
Service Limit: 6.0 mm (0.24 in)



If the thickness is less than the service limit, replace the clutch disc.

4. Measure the rivet depth from the lining surface to the rivets, on both sides.

Standard (New): 1.2 – 1.7 mm (0.05 – 0.07 in)
Service Limit: 0.2 mm (0.008 in)



If the rivet depth is less than the service limit, replace the clutch disc.

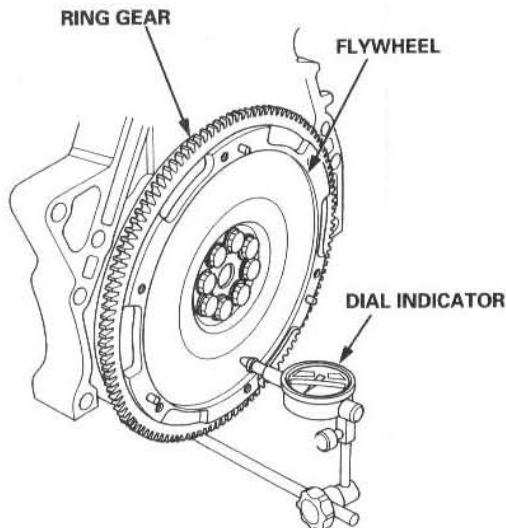


Inspection/Replacement

1. Inspect the ring gear teeth for wear and damage.
2. Inspect the clutch disc mating surface on the flywheel for wear, cracks, and burning.
3. Measure the flywheel runout using a dial indicator through at least two full turns. Push against the flywheel each time you turn it to take up the crankshaft thrust washer clearance.

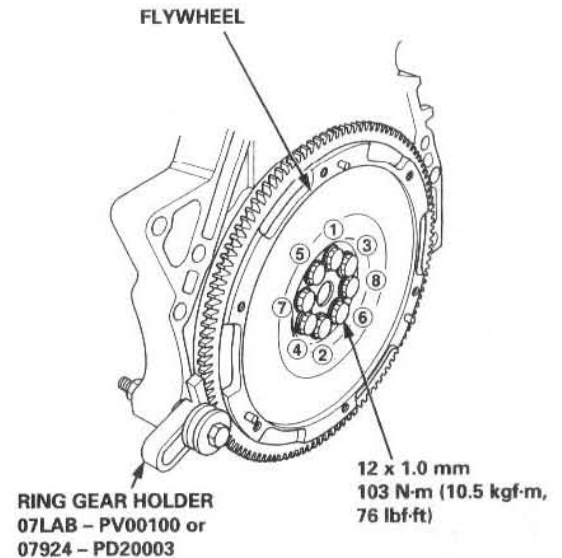
NOTE: The runout can be measured with the engine installed.

Standard (New): 0.05 mm (0.002 in) max.
Service Limit: 0.15 mm (0.006 in)



If the runout is more than the service limit, replace the flywheel and recheck the runout.

4. Install the special tool as shown.

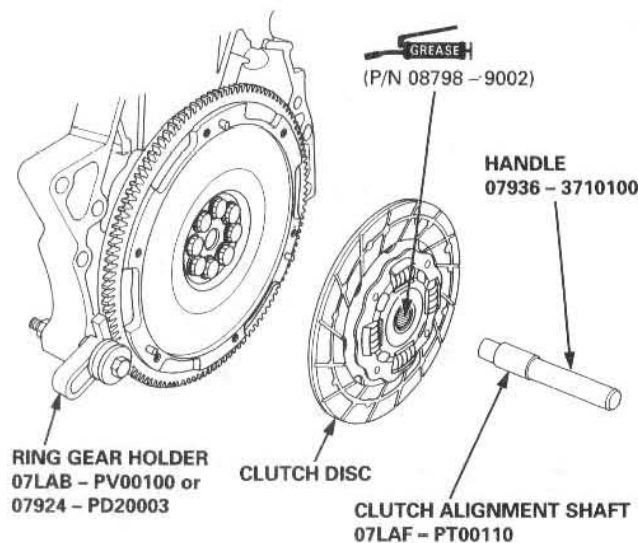


5. Remove the flywheel mounting bolts in a crisscross pattern in several steps as shown, then remove the flywheel.
6. Align the hole in the flywheel with the crankshaft dowel pin, and install the flywheel. Install the mounting bolts finger-tight.
7. Install the special tool, then torque the flywheel mounting bolts in a crisscross pattern in several steps.

Clutch Disc, Pressure Plate

Installation

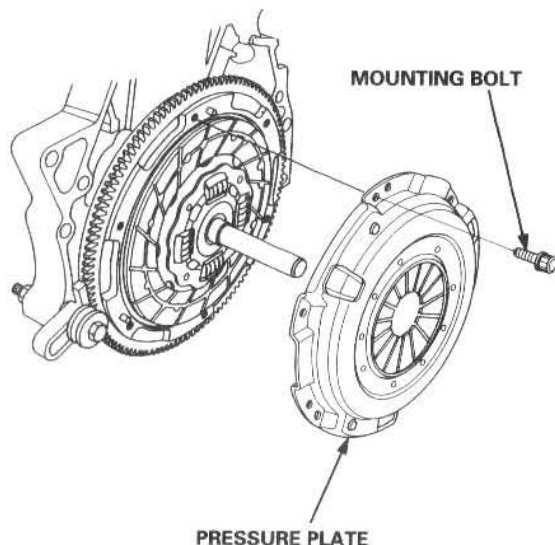
1. Install the ring gear holder.



2. Apply grease to the splines of the clutch disc, then install the clutch disc using the special tools.

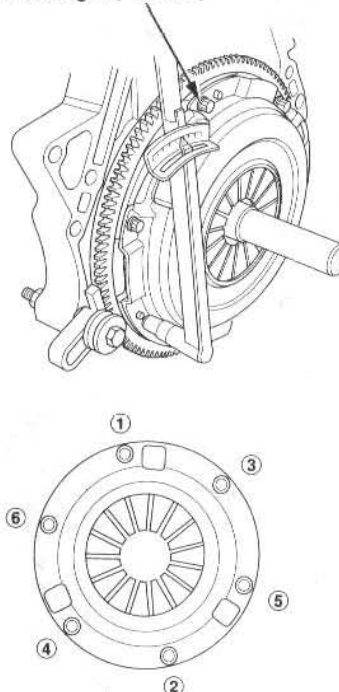
NOTE: Use Super High Temp Urea Grease (P/N 08798 - 9002).

3. Install the pressure plate and the mounting bolts finger-tight.



4. Torque the mounting bolts in a crisscross pattern as shown. Tighten the bolts in several steps to prevent warping the diaphragm spring.

8 x 1.25 mm
25 N-m (2.6 kgf-m, 19 lbf-ft)



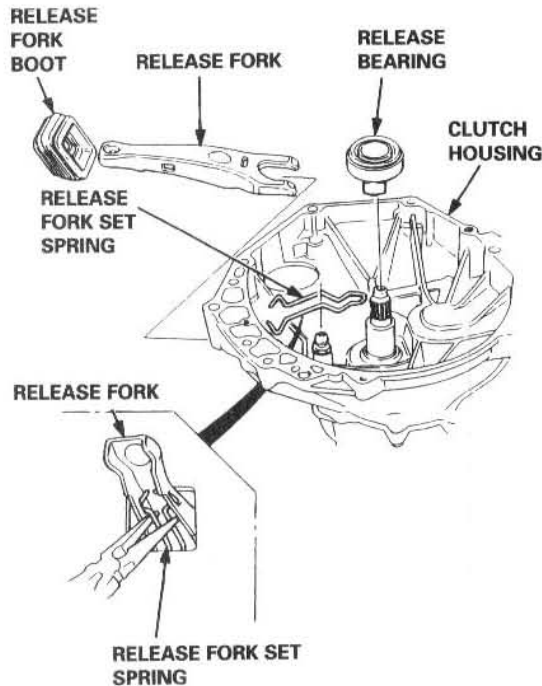
5. Remove the special tools.
6. Check the diaphragm spring fingers for height (see page 12-7).



Release Bearing

Removal/Inspection

1. Remove the release fork boot from the clutch housing.



2. Remove the release fork from the clutch housing by squeezing the release fork set spring with pliers. Remove the release bearing.
3. Check the release bearing for play by spinning it by hand.

CAUTION: The release bearing is packed with grease. Do not wash it in solvent.

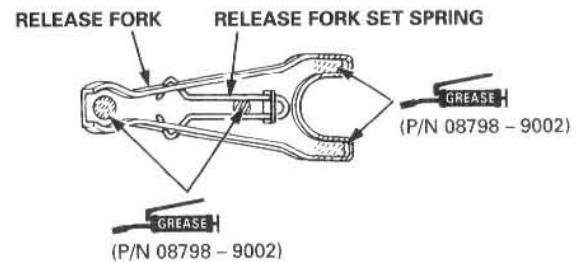


If there is excessive play, replace the release bearing with a new one.

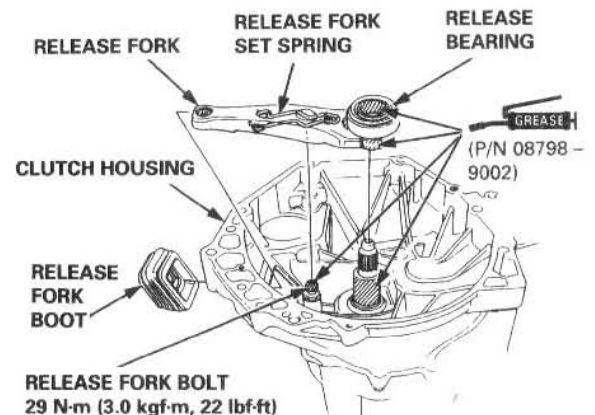
Installation

NOTE: Use Super High Temp Urea Grease (P/N 08798 - 9002).

1. Install the release fork set spring on the release fork.



2. With the release fork slid between the release bearing pawls, install the release bearing on the mainshaft while inserting the release fork through the hole in the clutch housing.



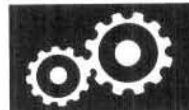
RELEASE FORK BOLT
29 N·m (3.0 kgf-m, 22 lbf-ft)

3. Align the detent of the release fork with the release fork bolt, then press the release fork over the release fork bolt squarely.
4. Install the release fork boot; make sure the boot seals around the release fork and clutch housing.
5. Move the release fork right and left to make sure that it fits properly against the release bearing, and that the release bearing slides smoothly.



Manual Transmission

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Clearance Inspection	13-28		
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Inspection	13-31		
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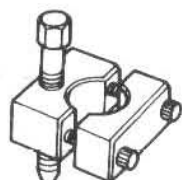
Special Tools

Special Tools

Ref. No.	Tool Number	Description	Qty	Page Reference
** ①	07GAJ - PG20110	Mainshaft Holder	1	13-47, 48
** ②	07GAJ - PG20130	Mainshaft Base	1	13-47
③	07HAD - SF10100	Driver Attachment	1	13-39
④	07HAJ - PK40201	Preload Inspection Tool	1	13-40
⑤	07JAD - PH80101	Oil Seal Driver Attachment	1	13-42
⑥	07JAD - PH80400	Pilot, 28 x 30 mm	1	13-42
⑦	07LAD - SM40100	Seal Driver Attachment	1	13-42
⑧	07LGC - 0010100	Snap Ring Pliers	1	13-19, 50
* ⑨	07736 - A01000B	Adjustable Bearing Puller, 25 - 40 mm	1	13-43, 44
⑩	07746 - 0010300	Attachment, 42 x 47 mm	1	13-26, 32
⑪	07746 - 0010400	Attachment, 52 x 55 mm	1	13-39
⑫	07746 - 0010500	Attachment, 62 x 68 mm	1	13-39, 43, 44
⑬	07746 - 0010700	Attachment, 24 x 26 mm	1	13-30
⑭	07746 - 0030100	Driver, 40 mm I.D.	1	13-26, 38
⑮	07746 - 0030400	Attachment, 35 mm I.D.	1	13-26
⑯	07749 - 0010000	Driver	1	13-26, 32, 39, 42, 43, 44
⑰	07947 - 6890100	Oil Seal Driver	1	13-32

* Must be used with commercially available 3/8" - 16 Slide Hammer.

** Part of Mainshaft Inspection Tool Set, 07GAJ - PG2010A.



①



②



③



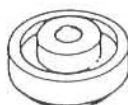
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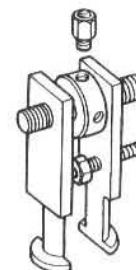
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⑨



⑩ ⑪ ⑫ ⑬



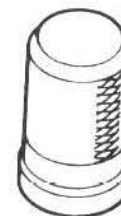
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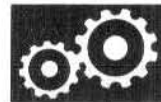
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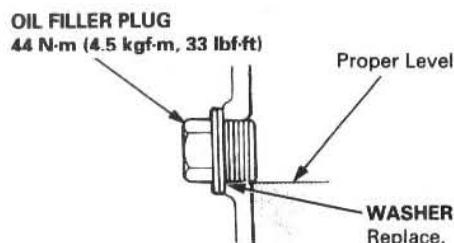
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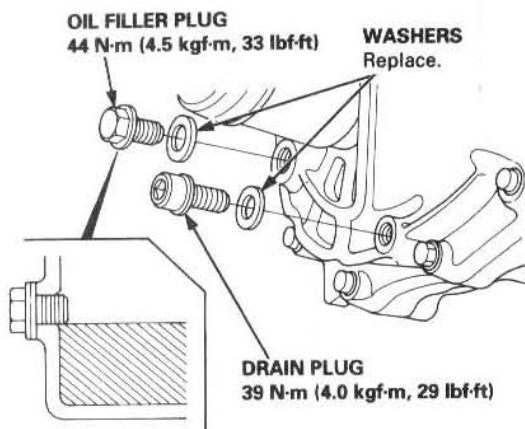
Transmission Oil

NOTE: Check the oil with the engine OFF and the vehicle on level ground.

1. Remove the oil filler plug, then check the level and condition of the oil.



2. The oil level must be up to the filler hole. If it is below the hole, add oil until it runs out, then reinstall the oil filler plug with a new washer.
3. If the transmission oil is dirty, remove the drain plug and drain the oil.



4. Reinstall the drain plug with a new washer, and refill the transmission oil to the proper level.

NOTE: The drain plug washer should be replaced at every oil change.

5. Reinstall the oil filler plug with a new washer.

Oil Capacity

M2U4 Transmission:

- 2.1 ℓ (2.2 US qt, 1.8 Imp qt) at oil change
- 2.2 ℓ (2.3 US qt, 1.9 Imp qt) at overhaul

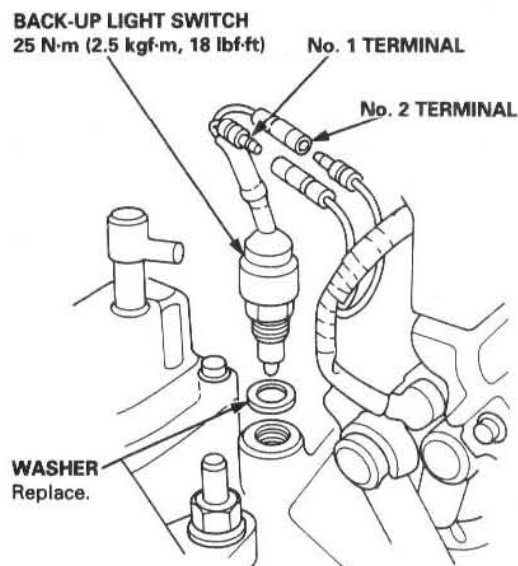
M2Y4 Transmission:

- 1.9 ℓ (2.0 US qt, 1.7 Imp qt) at oil change
- 2.0 ℓ (2.1 US qt, 1.8 Imp qt) at overhaul

Always use genuine Honda Manual Transmission Fluid (MTF). Using motor oil can cause stiffer shifting because it does not contain the proper additives.

Test/Replacement

1. Disconnect the connectors from the switch.



2. Check for continuity between the No. 1 and No. 2 terminals.

- There should be continuity when the shift lever is in reverse.
- There should be no continuity when the shift lever is in any position except reverse.

3. If necessary, replace the back-up light switch and washer.

Transmission Assembly

Removal

⚠ WARNING

- Make sure jacks and safety stands are placed properly, and hoist brackets are attached to correct position on the engine.
- Apply parking brake and block rear wheels so the vehicle will not roll off stands and fall on you while working under it.

CAUTION: Use fender covers to avoid damaging painted surfaces.

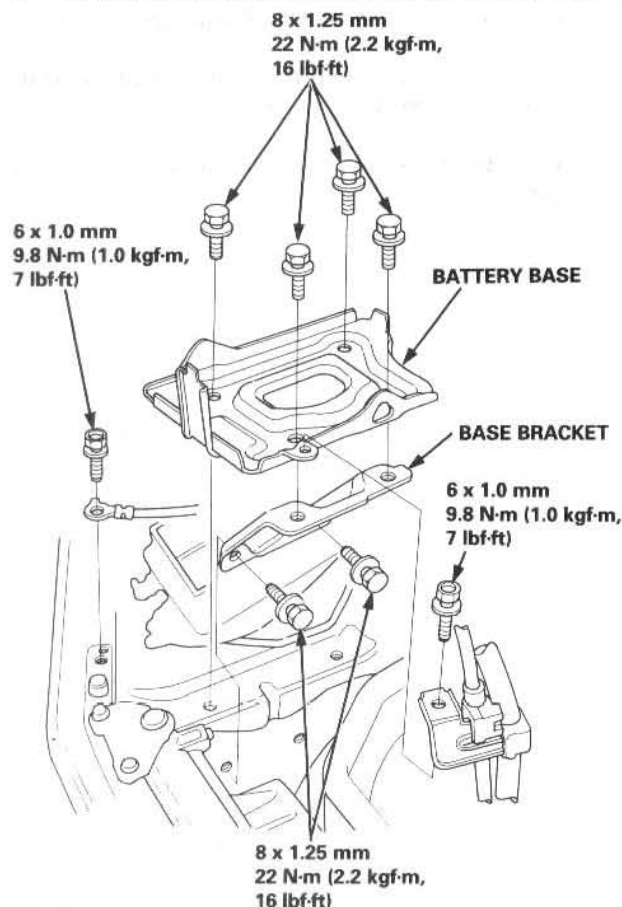
NOTE: The radio may have a coded theft protection circuit. Be sure to get the customer's code number before

- Disconnecting the battery.
- Removing the No. 43 (7.5 A) fuse.
(Under-hood fuse/relay box)
- Removing the radio.

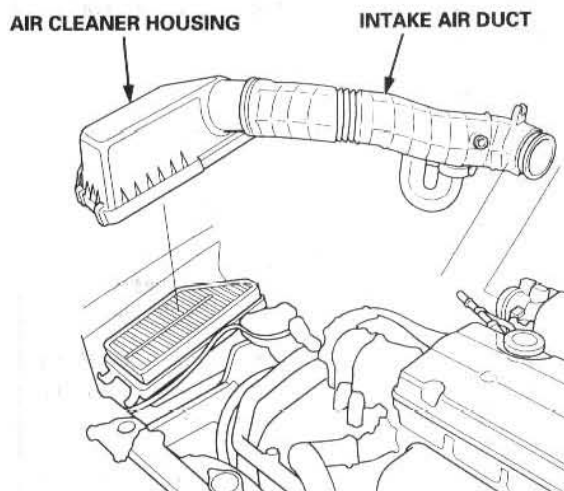
After service, reconnect power to the radio and turn it on.

When the word "CODE" is displayed, enter the customer's 5-digit code to restore radio operation.

1. Disconnect the negative (–) cable first, then the positive (+) cable from the battery.
2. Drain transmission oil (see page 13-3).
3. Remove the battery, battery base, and base bracket.

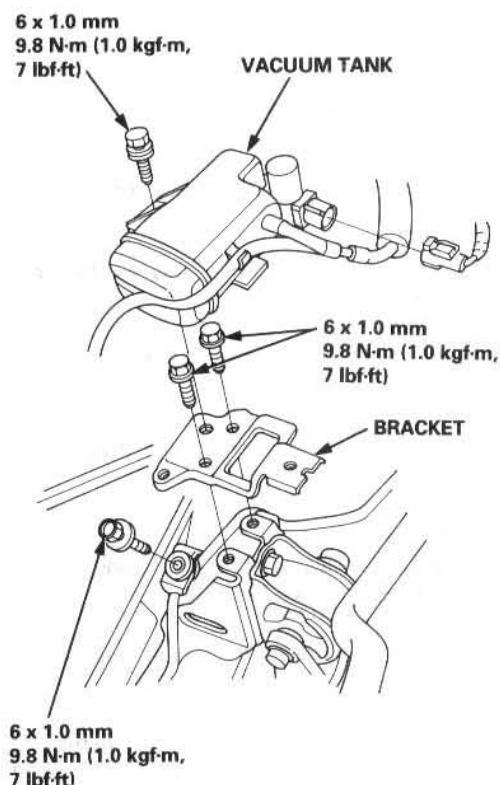


4. Remove the intake air duct and air cleaner housing.



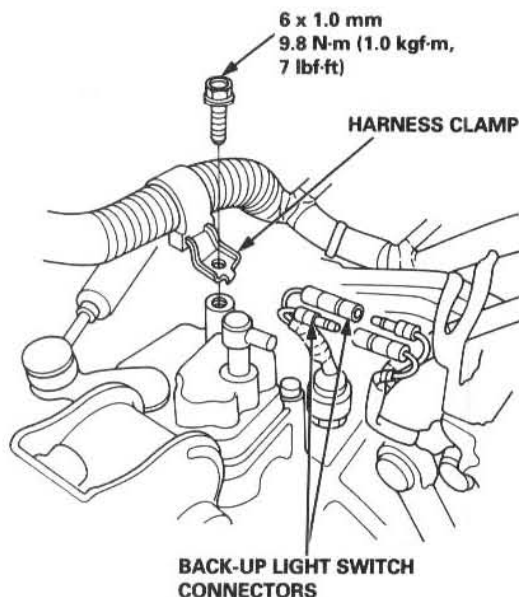
5. Remove the vacuum tank and bracket.

NOTE: Do not disconnect the hoses.

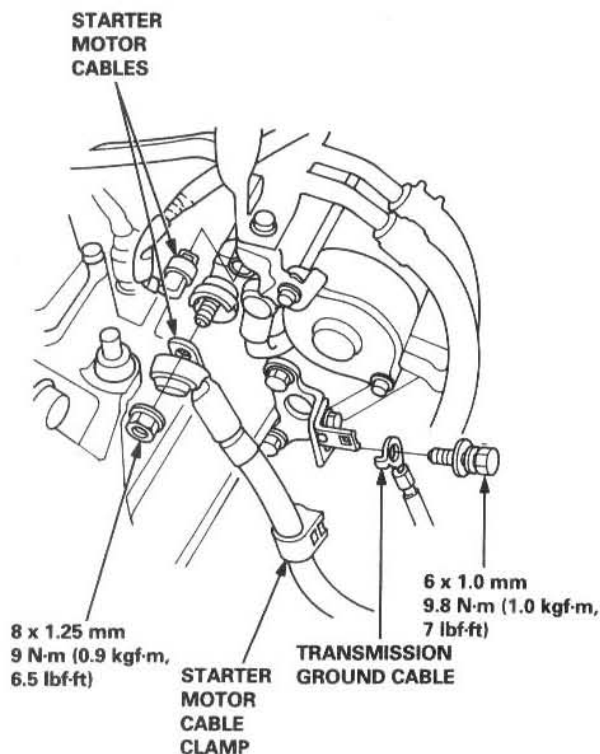




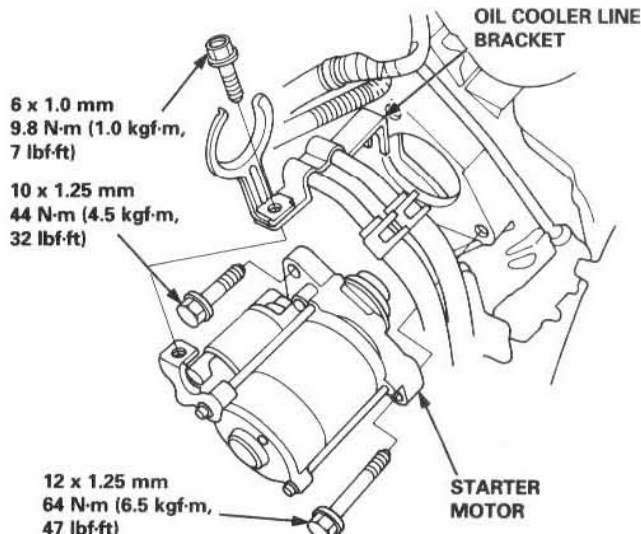
6. Remove the harness clamp.
7. Disconnect the back-up light switch connectors.



8. Disconnect the starter cables and transmission ground cable.



9. Remove the oil cooler line bracket bolt (with ATTS).

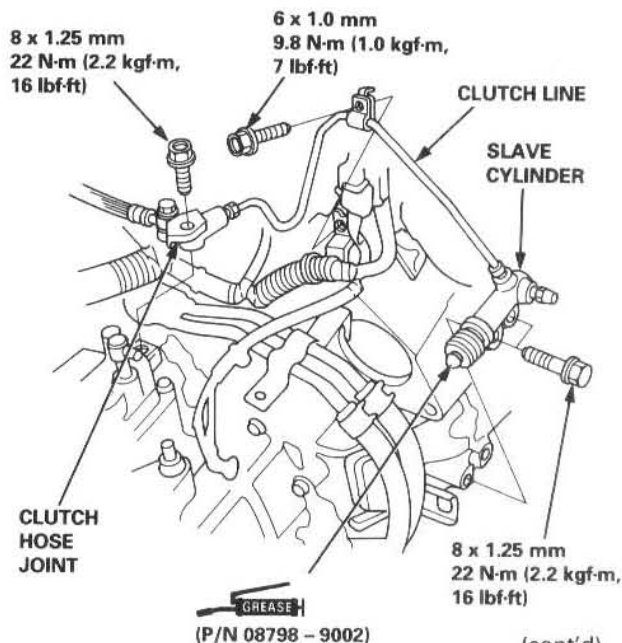


10. Remove the two mounting bolts, then remove the starter motor.
11. Remove the clutch hose joint, clutch line, and slave cylinder assembly.

CAUTION:

- Do not operate the clutch pedal once the slave cylinder has been removed.
- Take care not to bend the clutch line.

NOTE: Use Super High Temp Urea Grease (P/N 08798 - 9002).



(cont'd)

Transmission Assembly

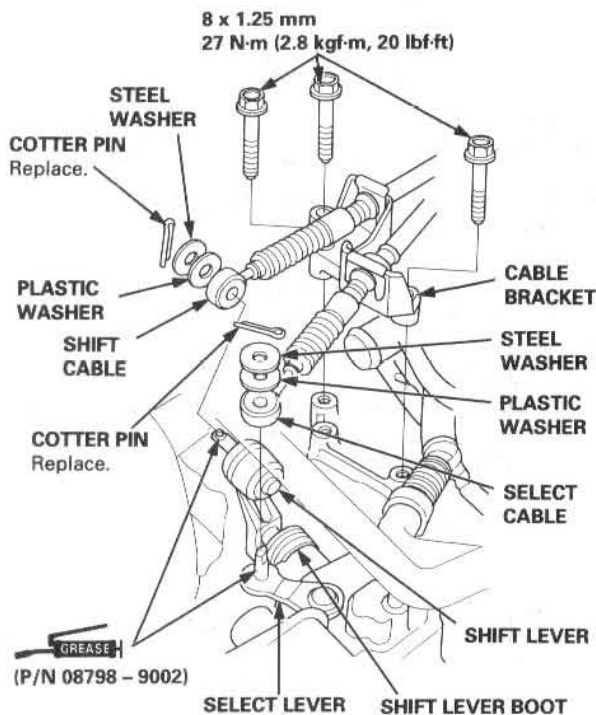
Removal (cont'd)

12. Shift the transmission into reverse.
13. First remove the cable bracket, then disconnect the cables from the levers.

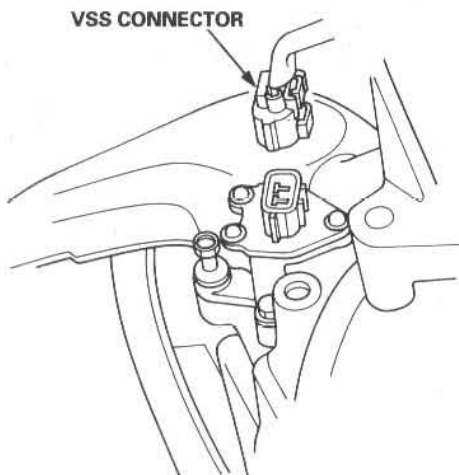
CAUTION:

- Take care not to bend the cables.
- Be careful not to damage the guide pipe when removing the cables.
- Turn the shift lever boot so the hole is facing down.

NOTE: Remove both cables and the bracket together.

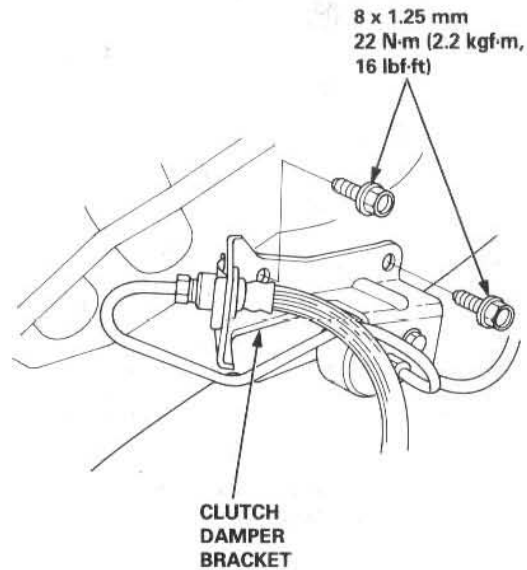


14. Disconnect the vehicle speed sensor (VSS) connector.



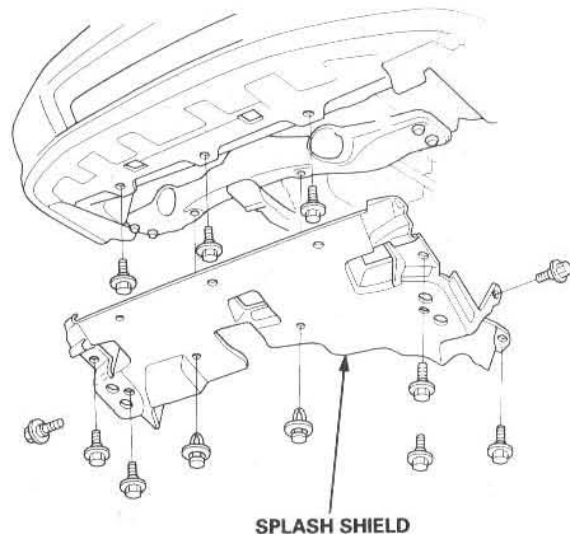
15. Remove the clutch damper bracket, then support it with a piece of wire.

CAUTION: Do not disconnect the clutch lines.



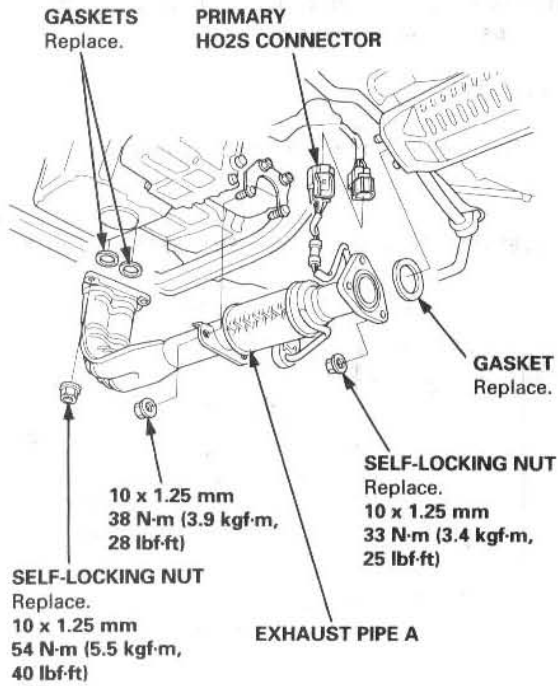
16. Remove the front wheels.

17. Remove the splash shield.



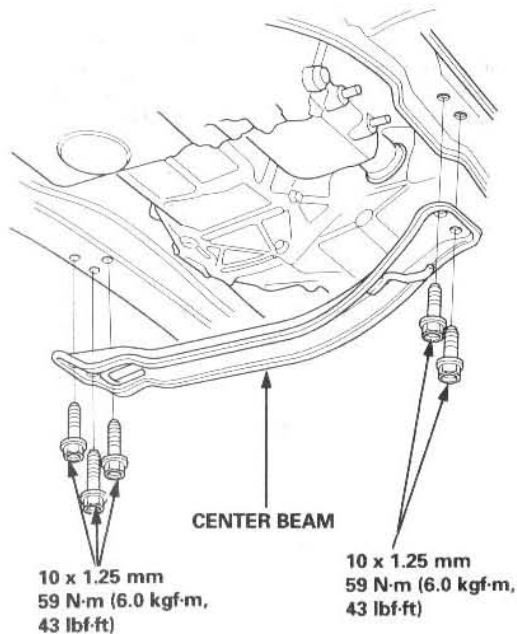


18. Disconnect the primary heated oxygen sensor (Primary HO2S) connector.



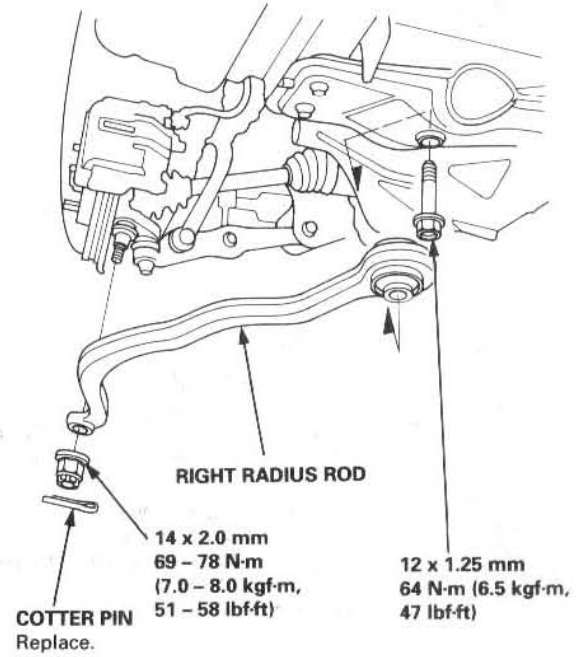
19. Remove the exhaust pipe A.

20. Remove the center beam.

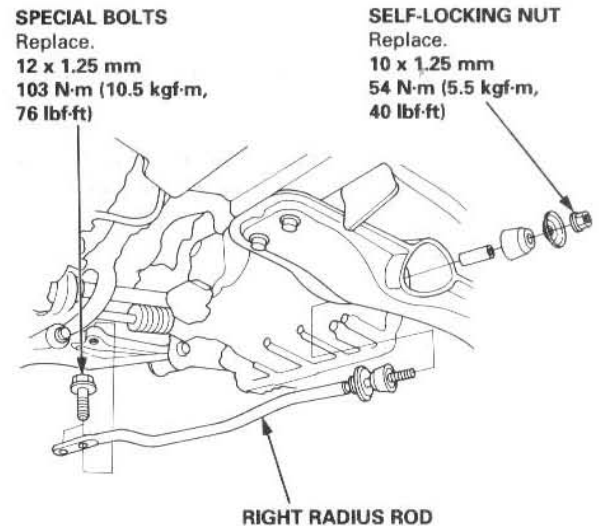


21. Remove the right radius rod (see section 18).

With ATTS:



Without ATTS:



(cont'd)

Transmission Assembly

Removal (cont'd)

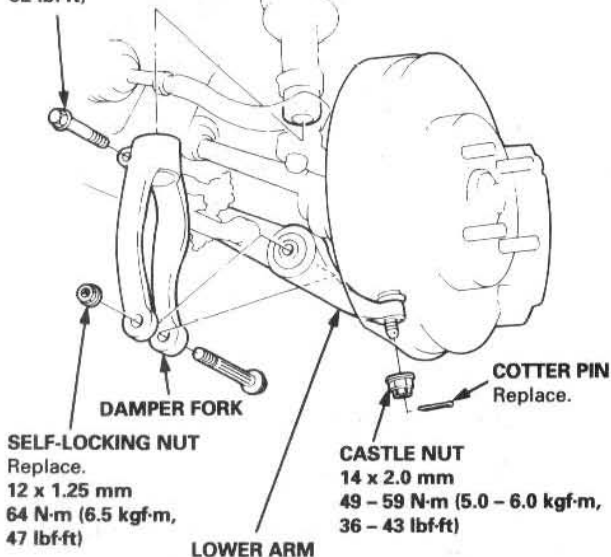
22. Remove the cotter pins, and loosen the castle nuts, then separate the ball joints and lower arms on both sides (see section 18).

FLANGE BOLT

10 x 1.25 mm

43 N-m (4.4 kgf-m,

32 lbf-ft)



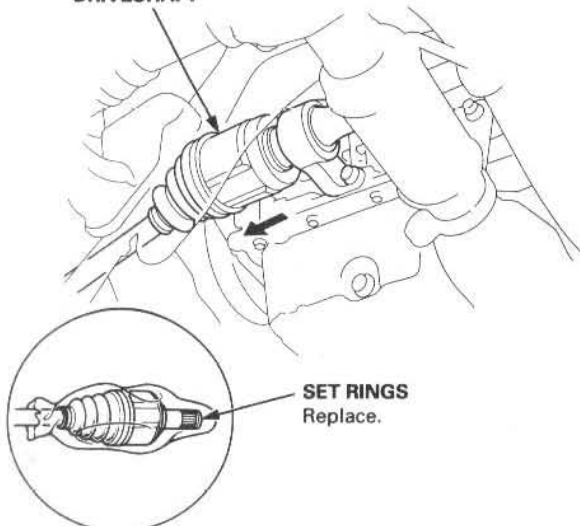
23. Remove the damper fork bolts, then separate the damper fork and lower arm.

24. Pry the both driveshafts from the differential or from the ATTS unit (see section 15).

25. Pull on the inboard joint, then remove the both driveshafts.

CAUTION: Coat all the precision finished surfaces with clean engine oil or grease. Tie bags over the driveshaft ends.

DRIVESHAFT

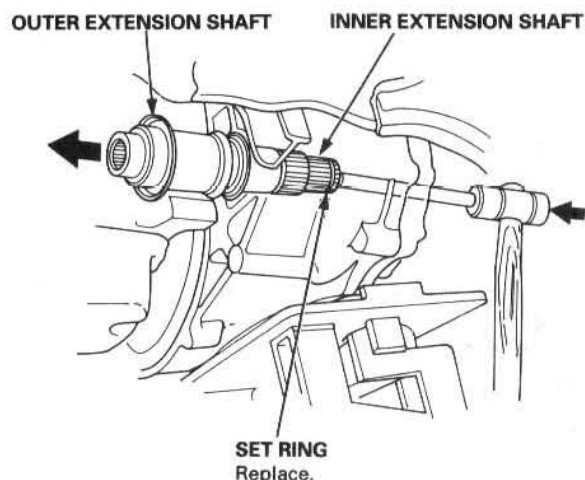


26. For vehicles equipped with ATTS, remove the ATTS unit (see section 15).

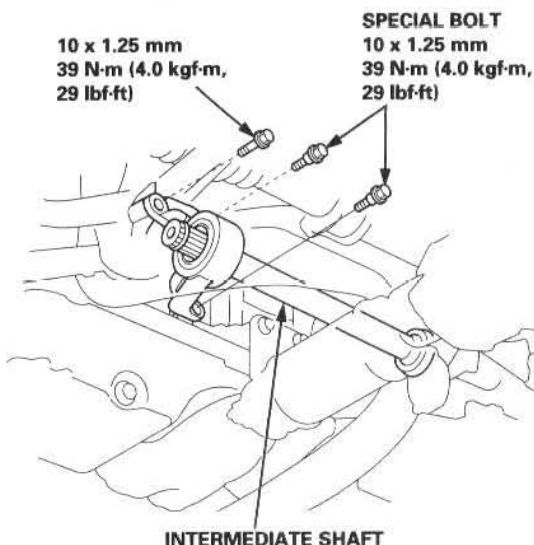
27. Remove the outer and inner extension shafts, or intermediate shaft as shown.

With ATTS:

NOTE: Be careful not to damage to the oil seal.



Without ATTS:



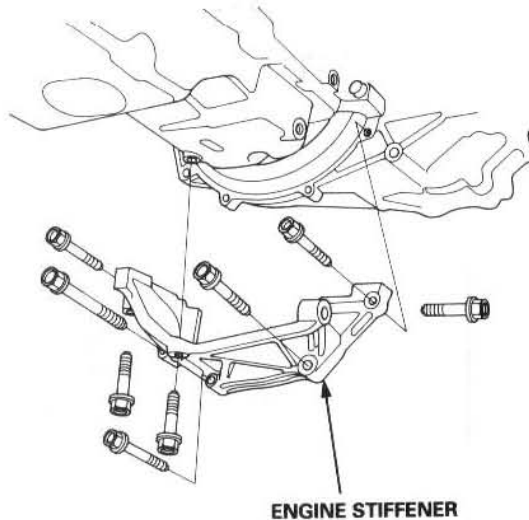


28. Remove the engine stiffener.

Torque specification:

10 x 1.25 mm 44 N-m (4.5 kgf-m, 33 lbf-ft)

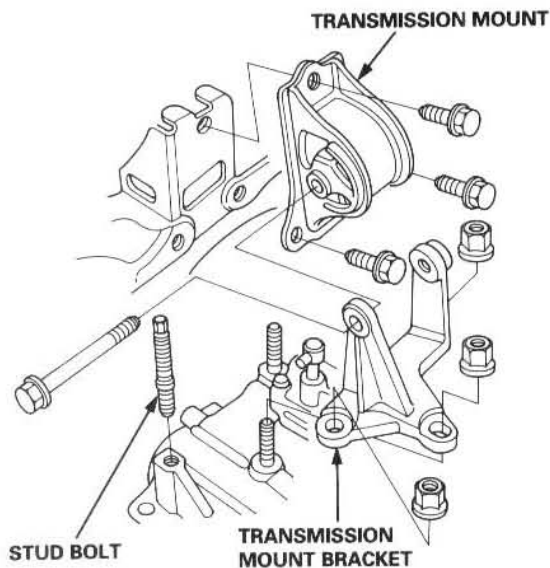
6 x 1.0 mm 12 N-m (1.2 kgf-m, 9 lbf-ft)



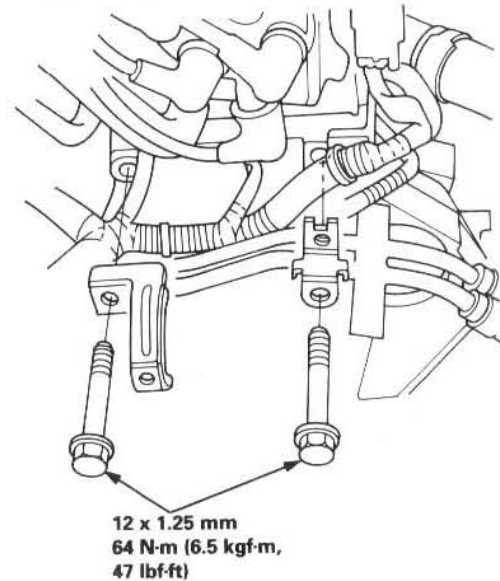
29. Place a jack under the transmission, and raise the transmission just enough to take weight off of the mounts.

30. Remove the transmission mount and mount bracket.

31. Remove the transmission mount stud bolt from the transmission housing as shown.



32. Remove the two upper transmission mounting bolts.



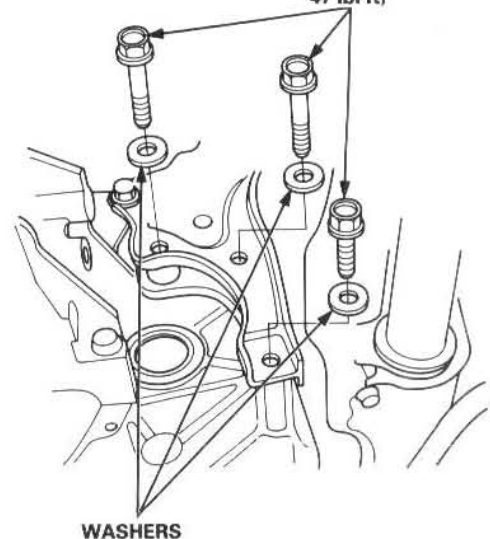
33. Remove the three rear engine mount bracket mounting bolts.

SPECIAL BOLTS

Replace.

12 x 1.25 mm

64 N-m (6.5 kgf-m,
47 lbf-ft)

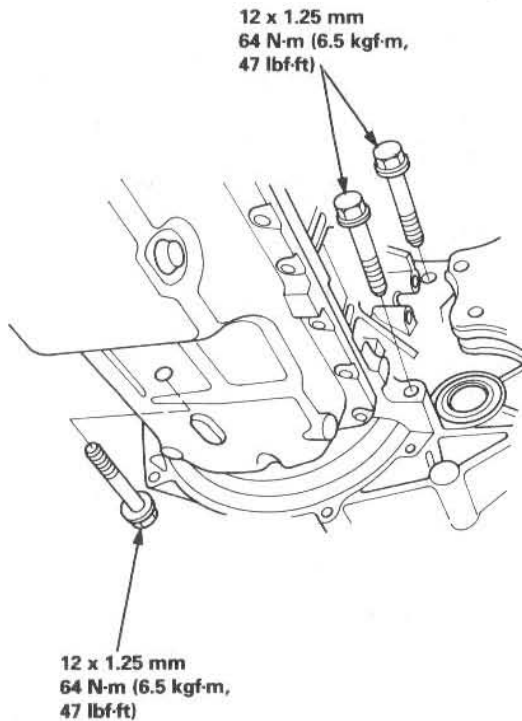


(cont'd)

Transmission Assembly

Removal (cont'd)

34. Remove the three lower transmission mounting bolts.



35. Pull the transmission away from the engine until it clears the mainshaft, then lower it on the transmission jack.

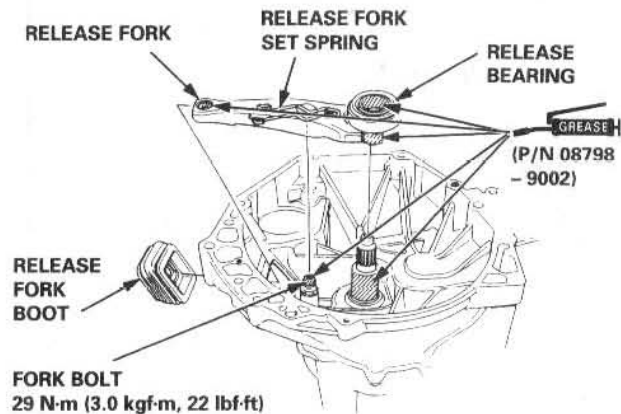
CAUTION: Take care not to bend the clutch line.

Installation

Install the transmission assembly in the reverse order of removal.

- Before installing, check that the two dowel pins are installed in the clutch housing.
- Apply grease to the parts as shown, then install the release fork and release bearing.

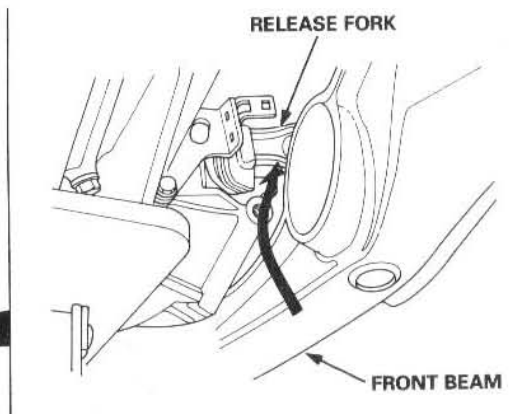
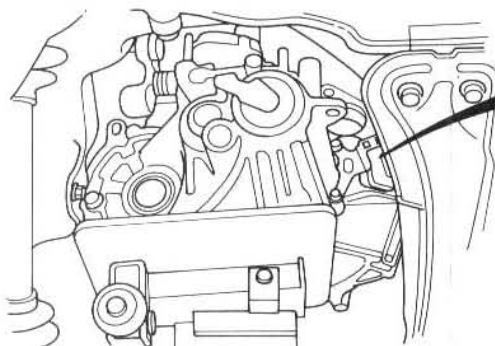
NOTE: Use Super High Temp Urea Grease (P/N 08798 - 9002).



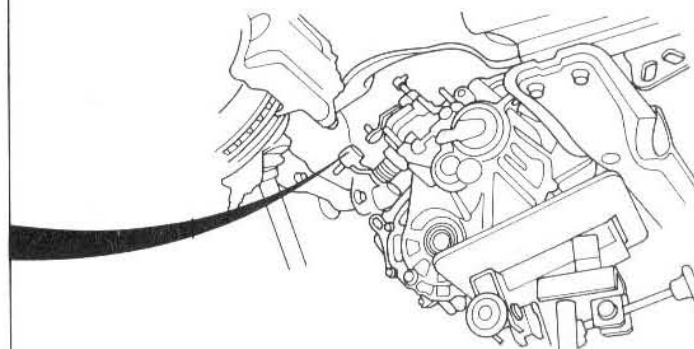
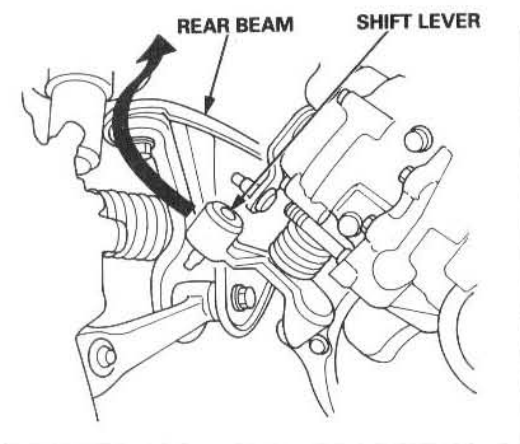


- Install the transmission assembly to the engine as shown.

- Place the transmission on a jack.
- Raise the front side of the transmission until the release fork clears the front beam.



- Raise the rear side of the transmission until the shift lever clears the rear beam.



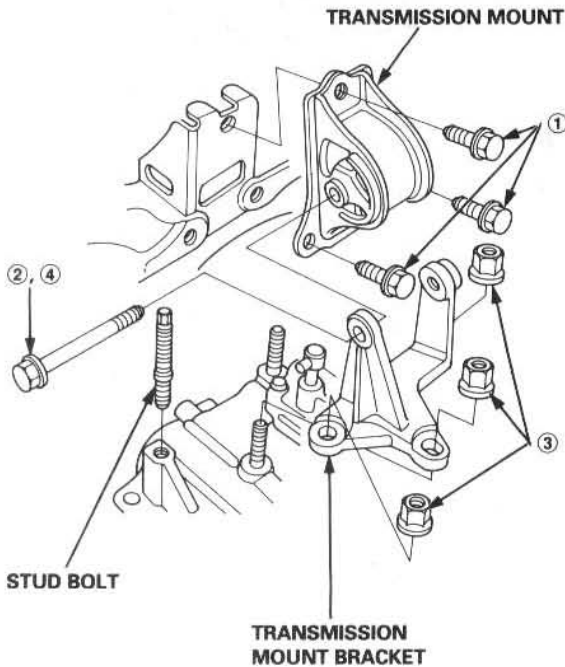
(cont'd)

Transmission Assembly

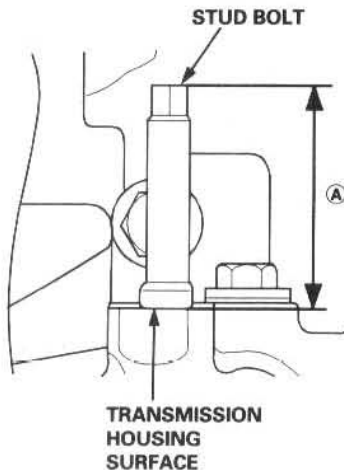
Installation (cont'd)

- Torque the mounting bolts and nuts in the sequence shown.
- Check that the bushing is not twisted or offset.

- ③: 10 x 1.25 mm
38 N·m (3.9 kgf·m, 28 lbf·ft)
- ①, ④: 12 x 1.25 mm
64 N·m (6.5 kgf·m, 47 lbf·ft)
- ②: Temporary tightening

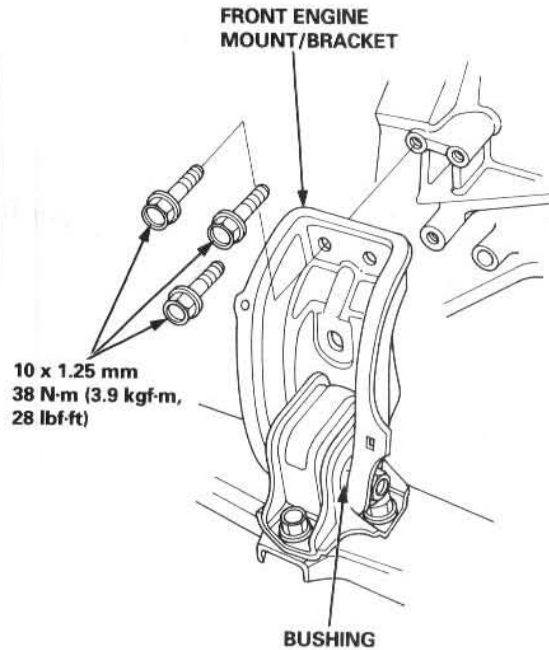


Dimension (A) as installed: 50 mm (127 in)



- Loosen the three mounting bolts on the front engine mount/bracket, then torque the three mounting bolts.

CAUTION: Make sure the bushings are not twisted or offset.



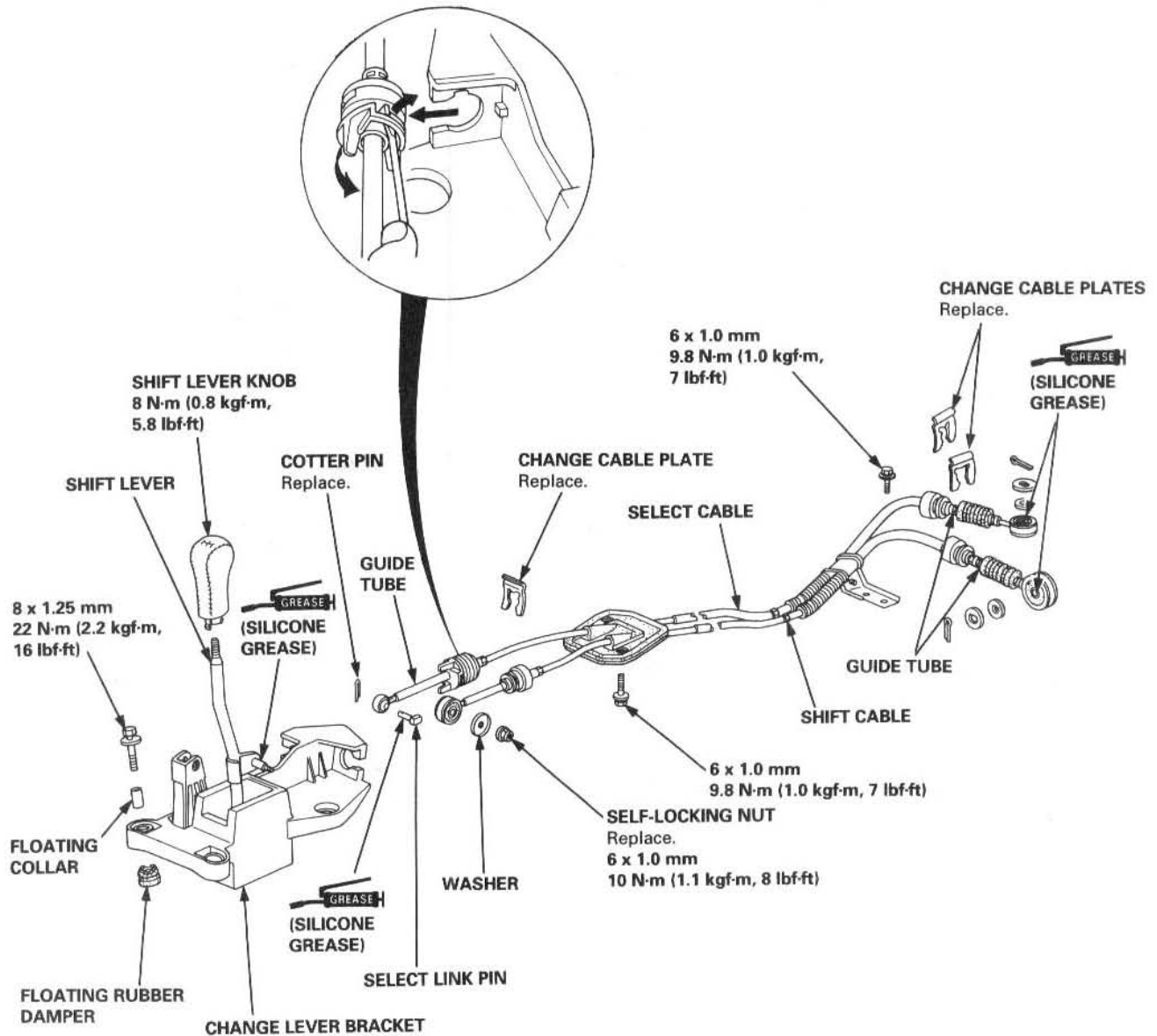
- When installing the starter cable, make sure that the crimped side of the ring terminal is facing out (see section 4).
- Refill the transmission with oil (see page 13-3).
- Connect the positive (+) cable first, then the negative (-) cable to the battery.
- Check the clutch operation.
- Shift the transmission and check for smooth operation.
- Check the front wheel alignment (see section 18).
- Enter the anti-theft code for the radio, then enter the customer's radio station presets.



Overhaul


NOTE:

- Inspect rubber parts for wear and damage when disassembling.
- Check that the new cotter pin is seated firmly.
- Be careful not to damage the guide tubes when removing the cables.



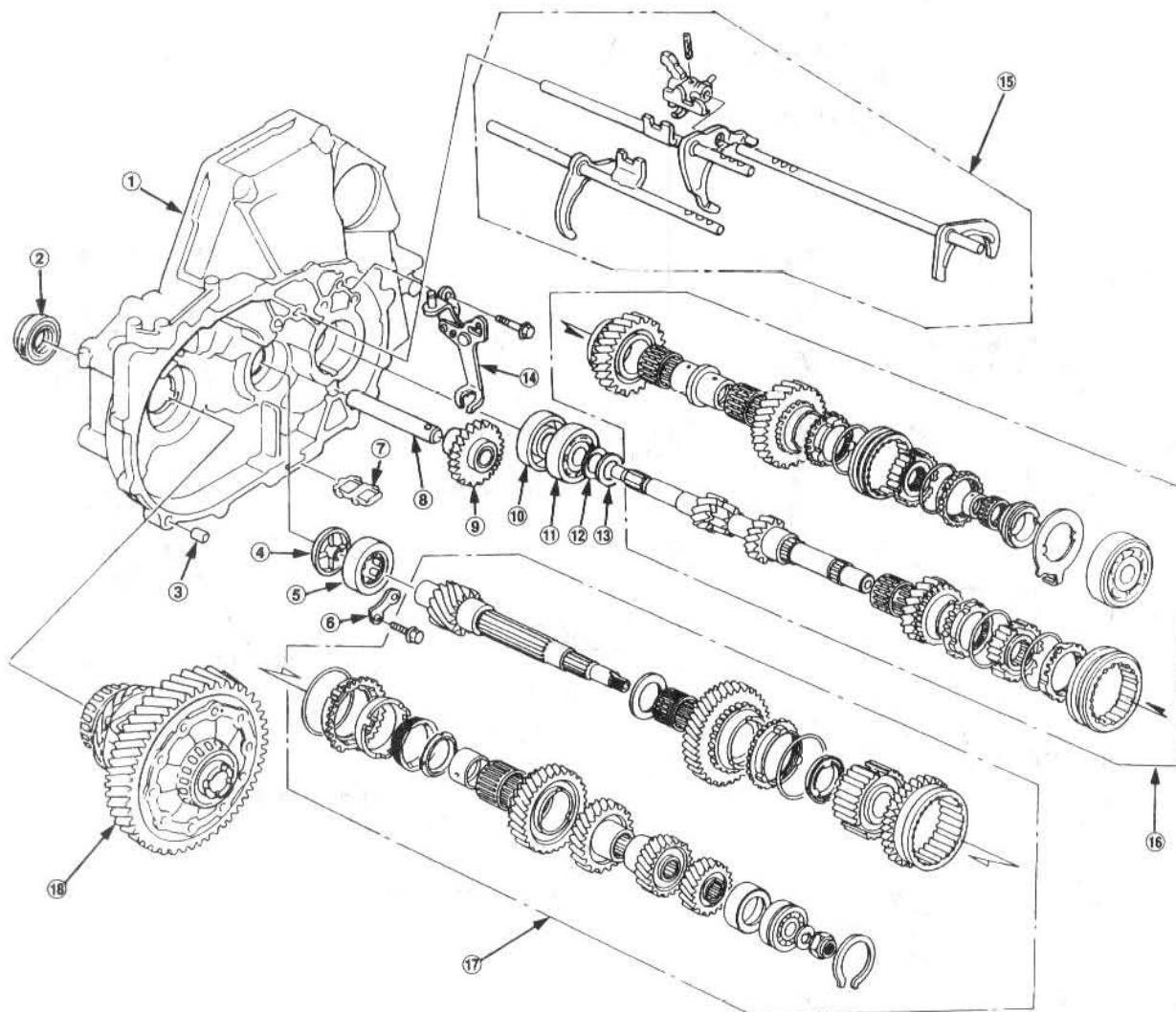
Illustrated Index

Refer to the drawing below for the transmission disassembly/reassembly.
Clean all the parts thoroughly in solvent, and dry with compressed air.

 Lubricate all the parts with oil before reassembly.

NOTE:

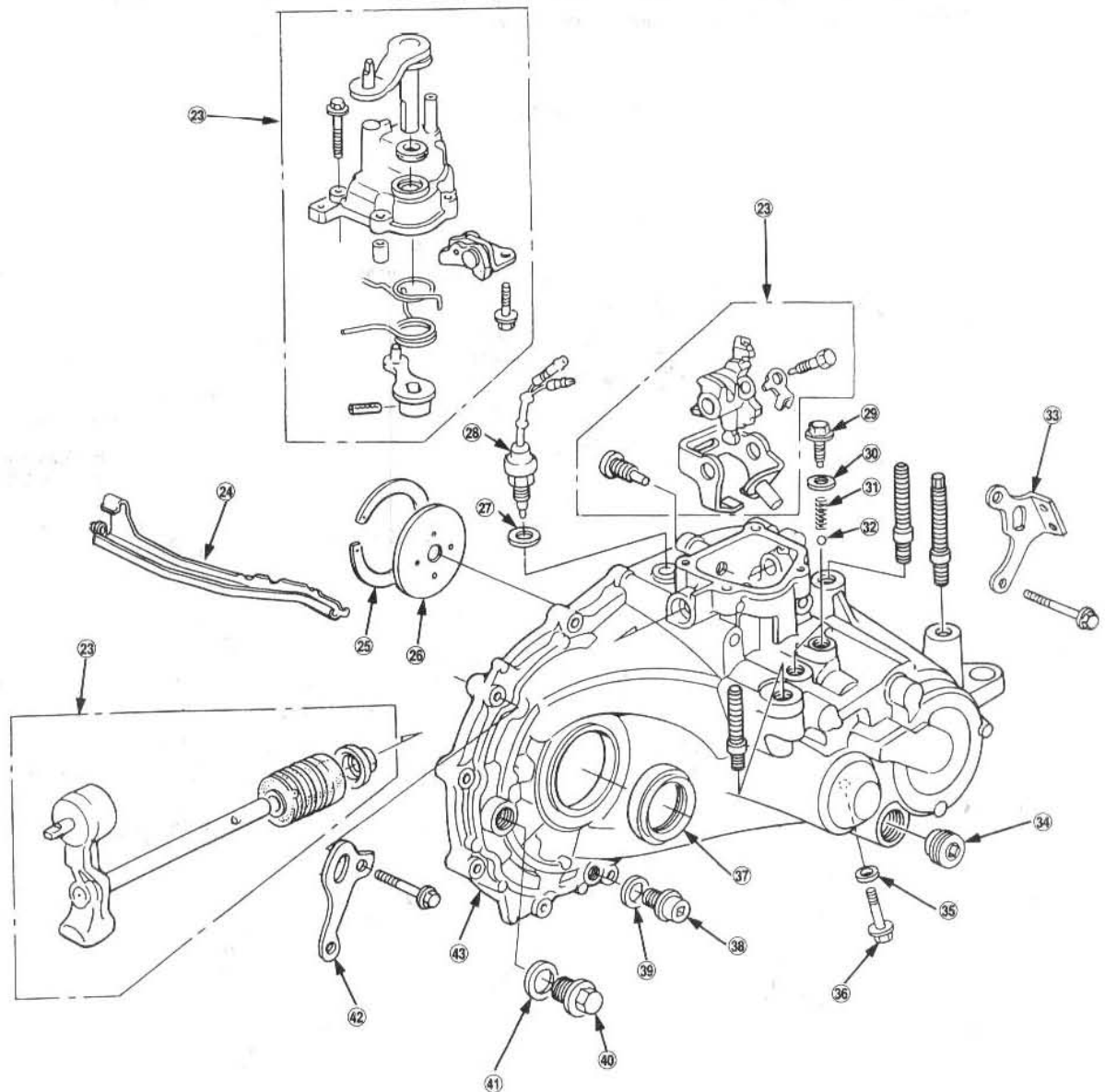
- This transmission uses no gaskets between the major housings; use liquid gasket (P/N 08718 – 0001 or 08718 – 0003) (see page 13-18, 50).
- Always clean the magnet ⑦ whenever the transmission housing is disassembled.
- Inspect all the bearings for wear and operation.



- ① CLUTCH HOUSING
- ② OIL SEAL Replace.
- ③ 14 x 20 mm DOWEL PIN
- ④ OIL GUIDE PLATE
- ⑤ NEEDLE BEARING
- ⑥ RETAINING PLATE
- ⑦ MAGNET

- ⑧ REVERSE IDLER GEAR SHAFT
- ⑨ REVERSE IDLER GEAR
- ⑩ OIL SEAL Replace.
- ⑪ BALL BEARING
- ⑫ SPRING WASHER
- ⑬ WASHER
- ⑭ REVERSE SHIFT FORK

- ⑮ SHIFT FORK ASSEMBLY
• Index, page 13-33
- ⑯ MAINSHAFT ASSEMBLY
• Index, page 13-22
- ⑰ COUNTERSHAFT ASSEMBLY
• Index, page 13-27
- ⑱ DIFFERENTIAL ASSEMBLY
• Index, page 13-37



- 23 **SHIFT ARM ASSEMBLY**
 - Index, page 13-16
- 24 **OIL GUTTER PLATE**
- 25 **78 mm SHIM**
 - Selection, page 13-45
- 26 **OIL GUIDE PLATE**
- 27 **WASHER Replace.**
- 28 **BACK-UP LIGHT SWITCH**
- 29 **SETTING SCREW**

- 30 **WASHER Replace.**
- 31 **SPRING L. 26 mm (1.02 in)**
- 32 **STEEL BALL D. 5/16 in**
- 33 **TRANSMISSION HANGER A**
- 34 **32 mm SEALING BOLT**
- 35 **WASHER Replace.**
- 36 **REVERSE IDLER GEAR SHAFT BOLT**
- 37 **OIL SEAL Replace.**

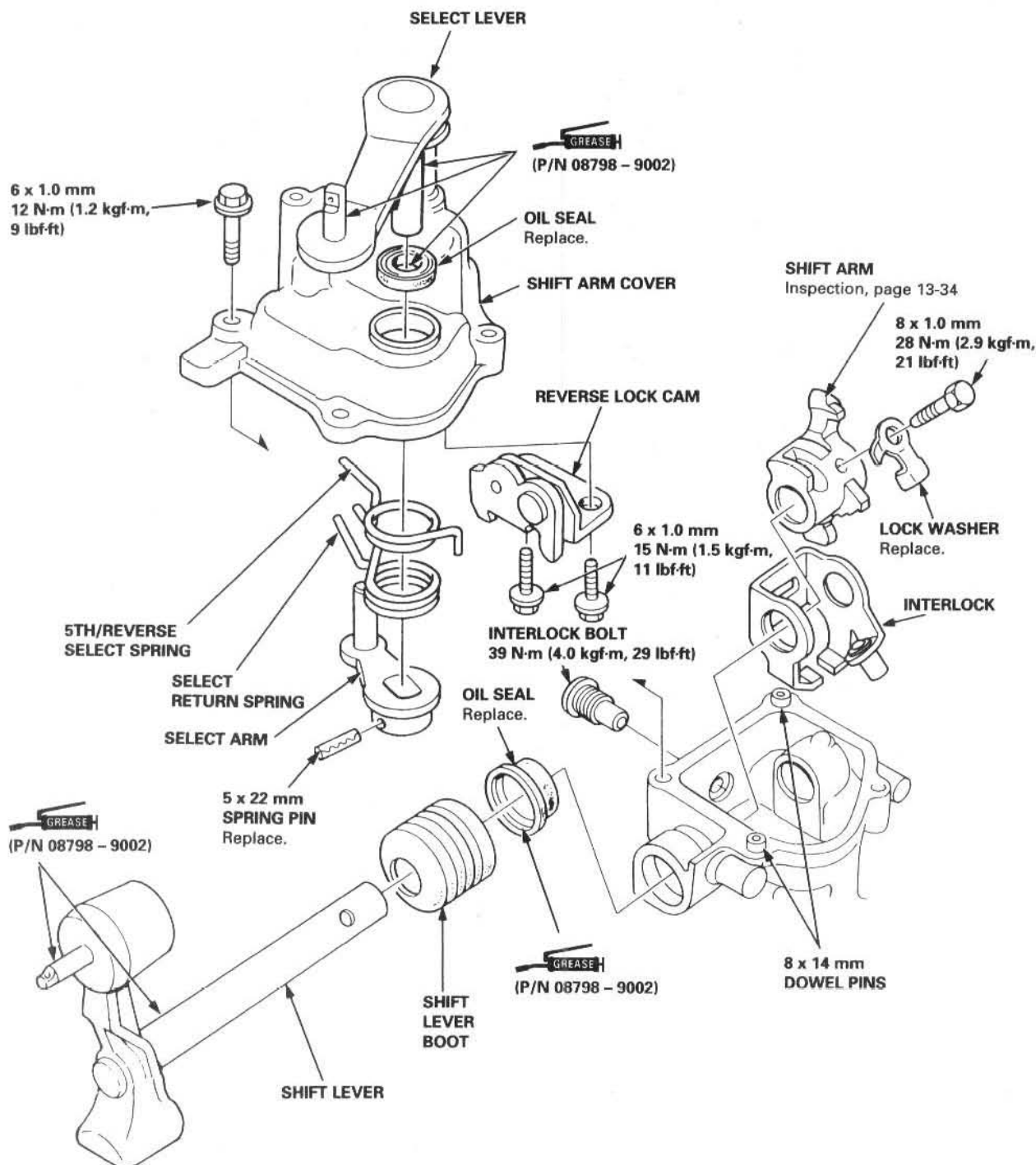
- 38 **DRAIN PLUG**
- 39 **WASHER Replace.**
- 40 **OIL FILLER PLUG**
- 41 **WASHER Replace.**
- 42 **TRANSMISSION HANGER B**
- 43 **TRANSMISSION HOUSING**

Shift Arm Assembly

Index

NOTE:

- The shift arm cover can be removed and installed with the transmission in the vehicle.
- Lubricate all moving and sliding surfaces with the specified grease, Super High Temp Urea Grease (P/N 08798 – 9002).
- Turn the shift lever boot so the hole in the boot is facing down.



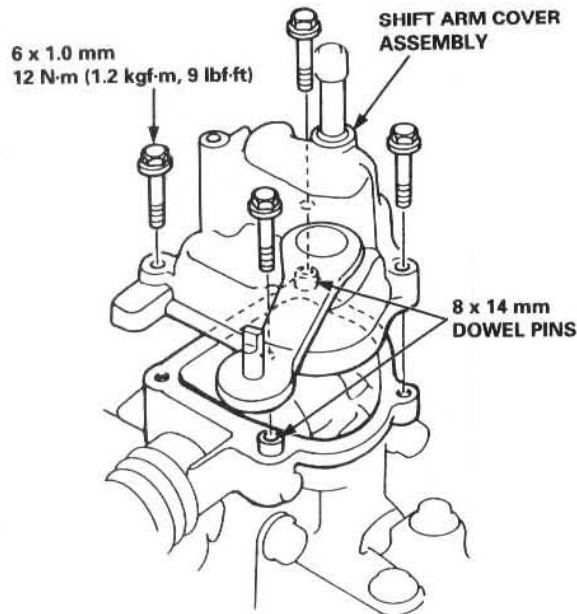


Disassembly/Reassembly

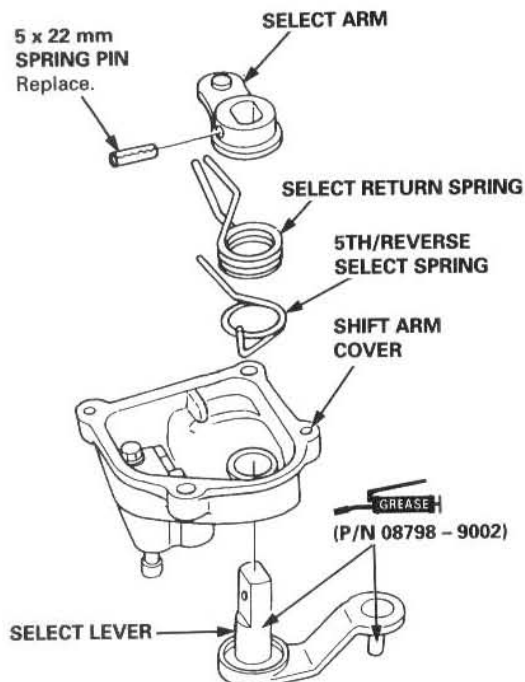
NOTE:

- During reassembly, grease all sliding parts.
- Use Super High Temp Urea Grease (P/N 08798 – 9002).

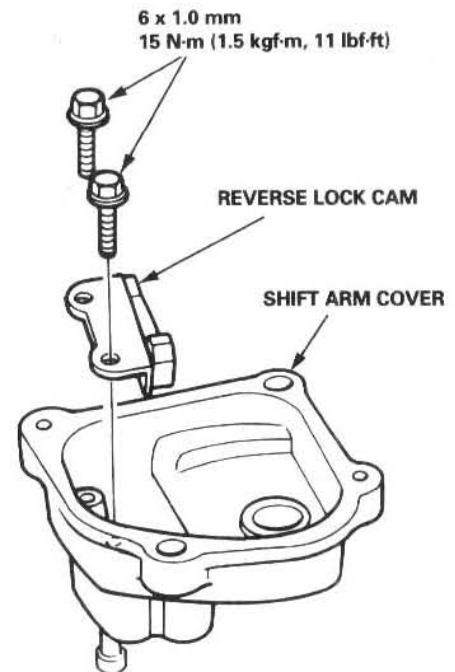
1. Remove the shift arm cover assembly.



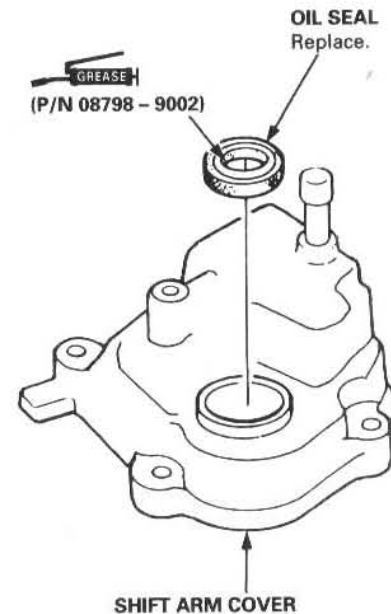
2. Remove the spring pin, then remove the select lever, select arm and springs.



3. Remove the reverse lock cam.



4. Remove the oil seal.

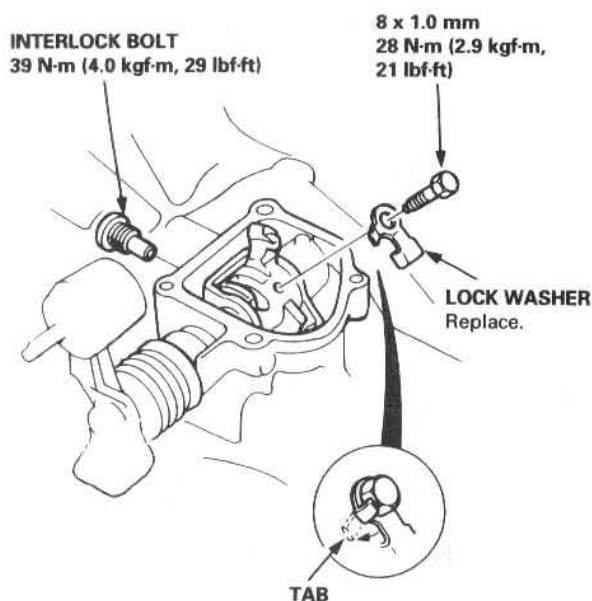


(cont'd)

Shift Arm Assembly

Disassembly/Reassembly (cont'd)

5. Bend the tab of the lock washer, then remove the bolt.

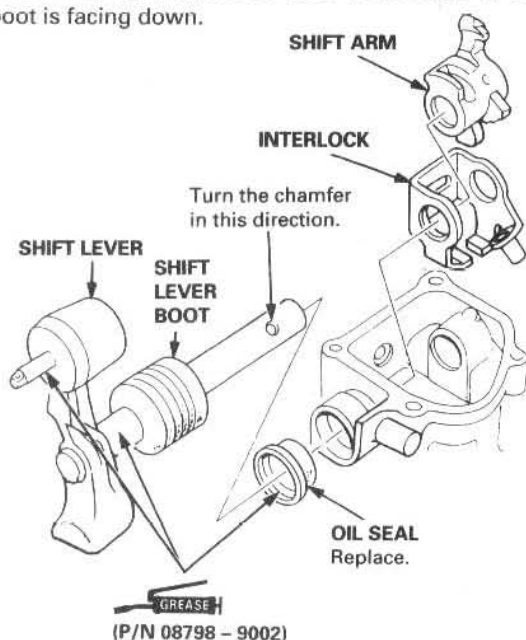


6. Remove the interlock bolt.

NOTE: Apply liquid gasket (P/N 08718 - 0001 or 08798 - 0003) to the threads before reassembly.

7. Remove the shift lever, shift arm, and interlock.

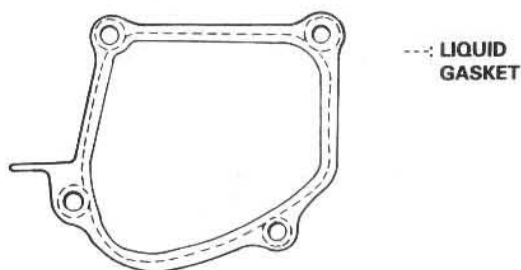
NOTE: Turn the shift lever boot so the hole in the boot is facing down.



8. Install the shift arm assembly in the reverse order of removal.

NOTE:

- Use liquid gasket (P/N 08718 - 0001 or 08718 - 0003).
- Remove the dirty oil from the sealing surface.
- Seal the entire circumference of the bolt holes to prevent oil leakage.
- If 20 minutes have passed after applying liquid gasket, reapply it and assemble the housings.
- Allow it to cure at least 20 minutes after assembly before filling the transmission with oil.





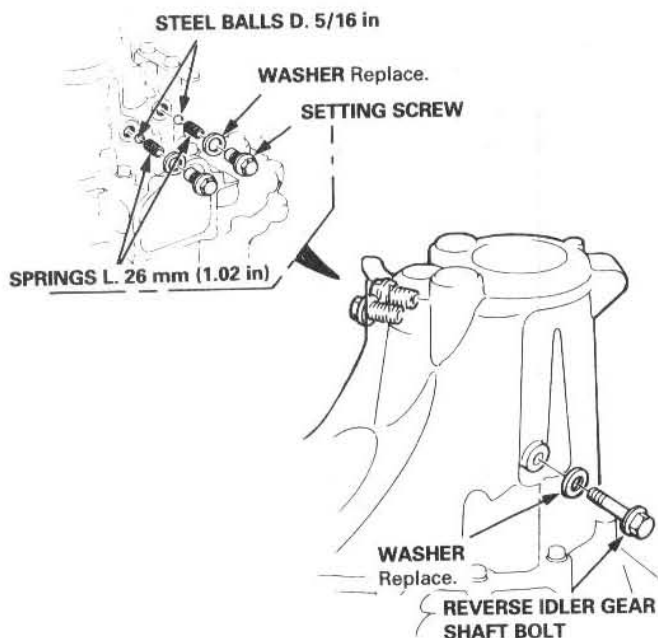
Transmission Housing

Removal

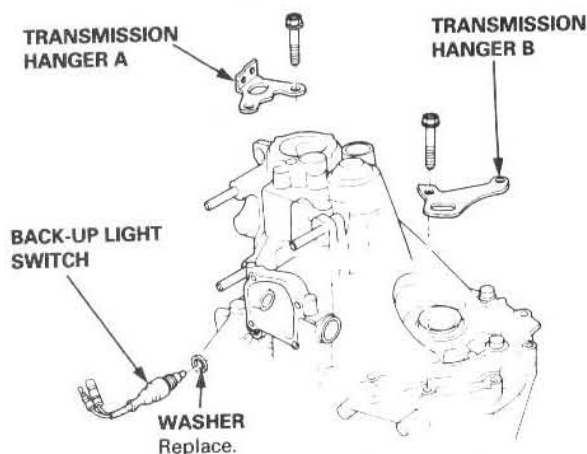
NOTE:

- If the transmission housing or clutch housing are replaced, the bearing preload must be adjusted.
- Place the clutch housing on two pieces of wood thick enough to keep the mainshaft from hitting the workbench.

1. Remove the shift arm cover assembly (see page 13-17).
2. Remove the reverse idler gear shaft bolt.

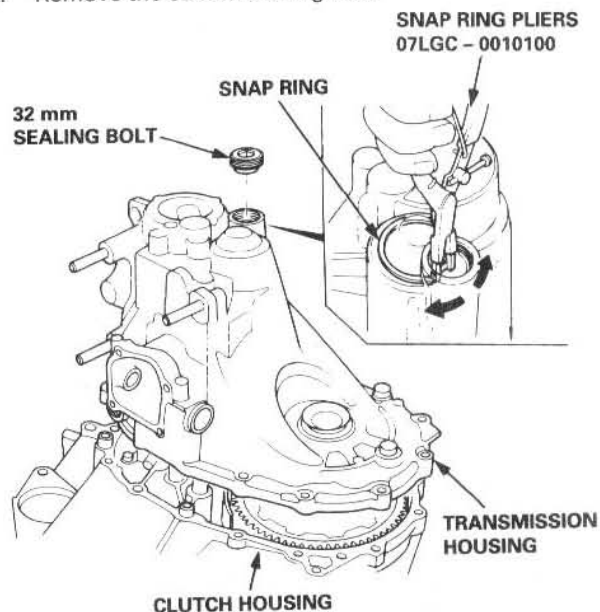


3. Remove the setting screws, then remove the washers, springs, and steel balls.
4. Remove the back-up light switch.

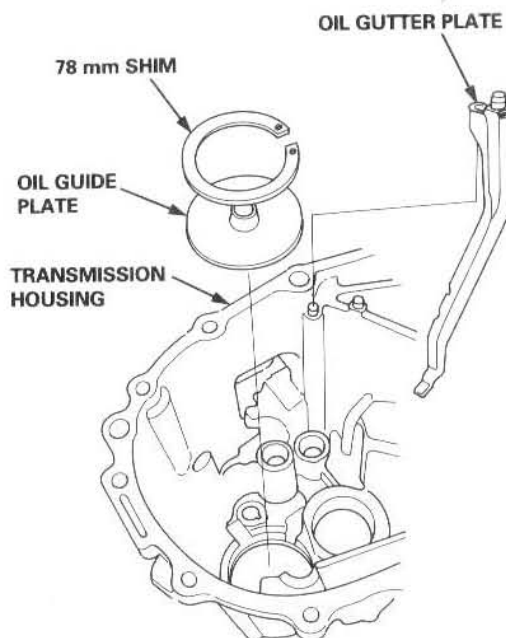


5. Remove the 10 mm bolts and 8 mm bolts in a criss-cross pattern in several steps.

6. Remove the 32 mm sealing bolt.



7. Expand the snap ring on the countershaft ball bearing, and remove it from the groove using a pair of snap ring pliers.
8. Separate the transmission housing from the clutch housing, and wipe it clean of the sealant.
9. Remove the 78 mm shim and oil guide plate, then remove the oil gutter plate.



Reverse Shift Fork

Clearance Inspection

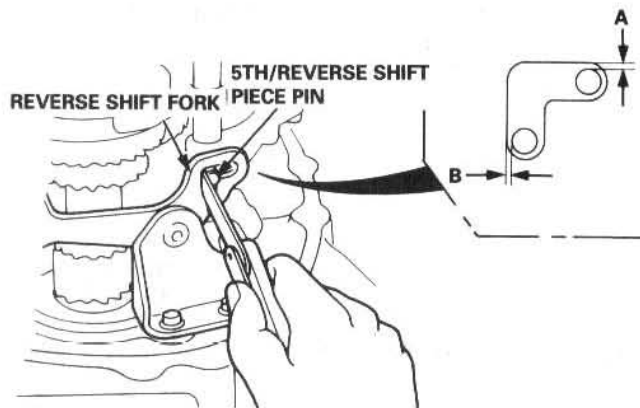
1. Measure the clearances between the reverse shift fork and 5th/reverse shift piece pin.

Standard: A: 0.05 – 0.35 mm (0.002 – 0.014 in)

B: 0.4 – 0.8 mm (0.02 – 0.03 in)

Service Limit: A: 0.5 mm (0.02 in)

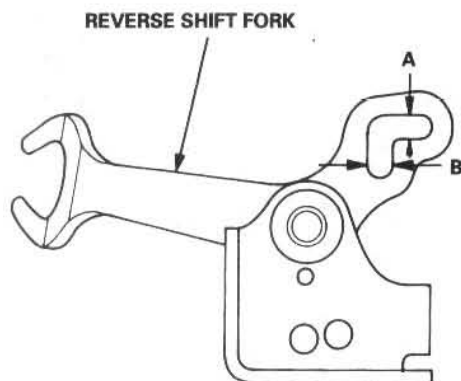
B: 1.0 mm (0.04 in)



2. If the clearances are more than the service limit, measure the widths of the groove in the reverse shift fork.

Standard: A: 7.05 – 7.25 mm (0.278 – 0.285 in)

B: 7.4 – 7.7 mm (0.29 – 0.30 in)

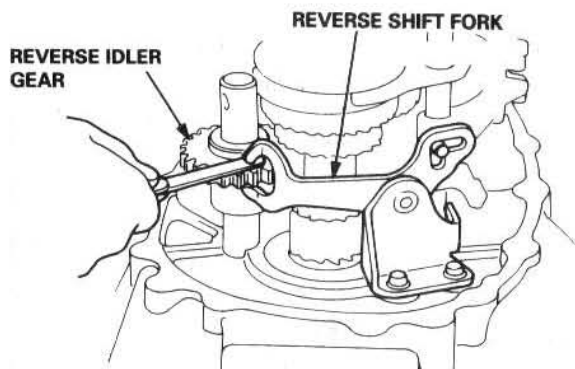


- If the widths of the grooves are not within the standard, replace the reverse shift fork with a new one.
- If the widths of the grooves are within the standard, replace the 5th/reverse shift piece with a new one.

3. Measure the clearance between the reverse idler gear and reverse shift fork.

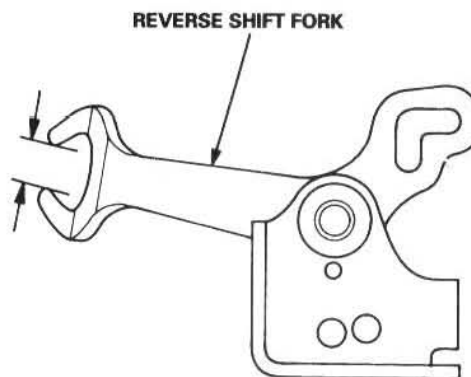
Standard: 0.5 – 1.1 mm (0.02 – 0.04 in)

Service Limit: 1.8 mm (0.07 in)

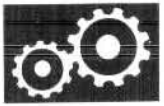


4. If the clearance is more than the service limit, measure the width of the reverse shift fork.

Standard: 13.0 – 13.3 mm (0.512 – 0.524 in)

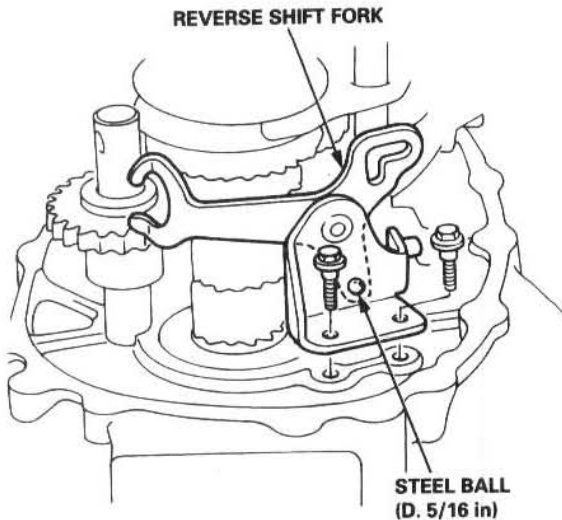


- If the width is not within the standard, replace the reverse shift fork with a new one.
- If the width is within the standard, replace the reverse idler gear with a new one.

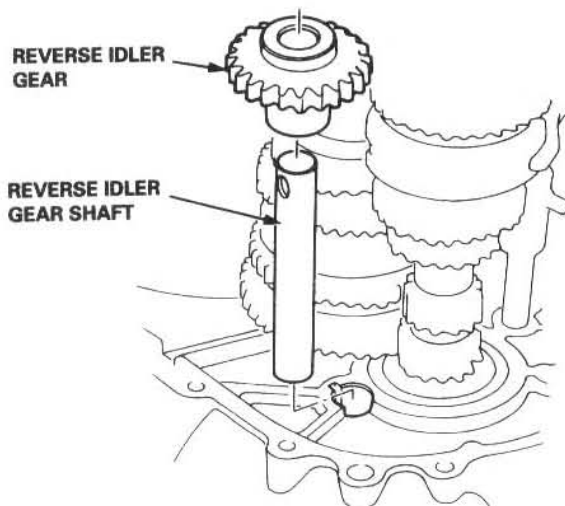


Removal

1. Remove the reverse shift fork.



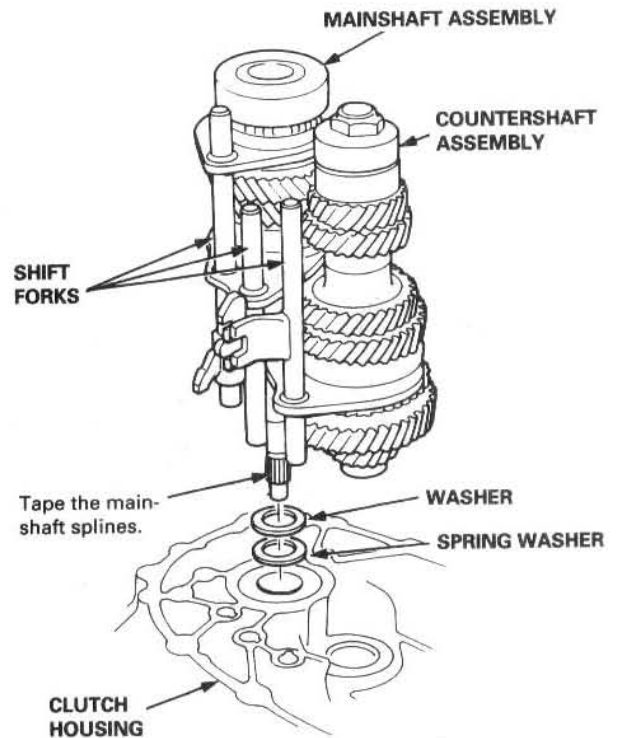
2. Remove the reverse idler gear shaft and the reverse idler gear.



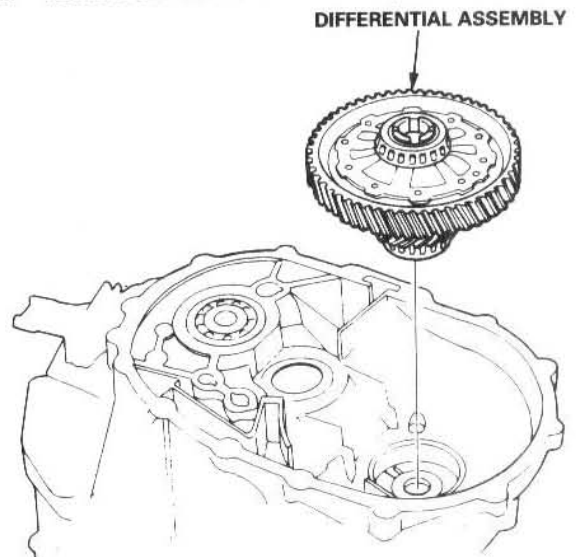
Removal

1. Remove the mainshaft and countershaft assemblies with the shift forks from the clutch housing.

NOTE: Before removing the mainshaft and countershaft assemblies, tape the mainshaft splines to protect them.



2. Remove the differential assembly.




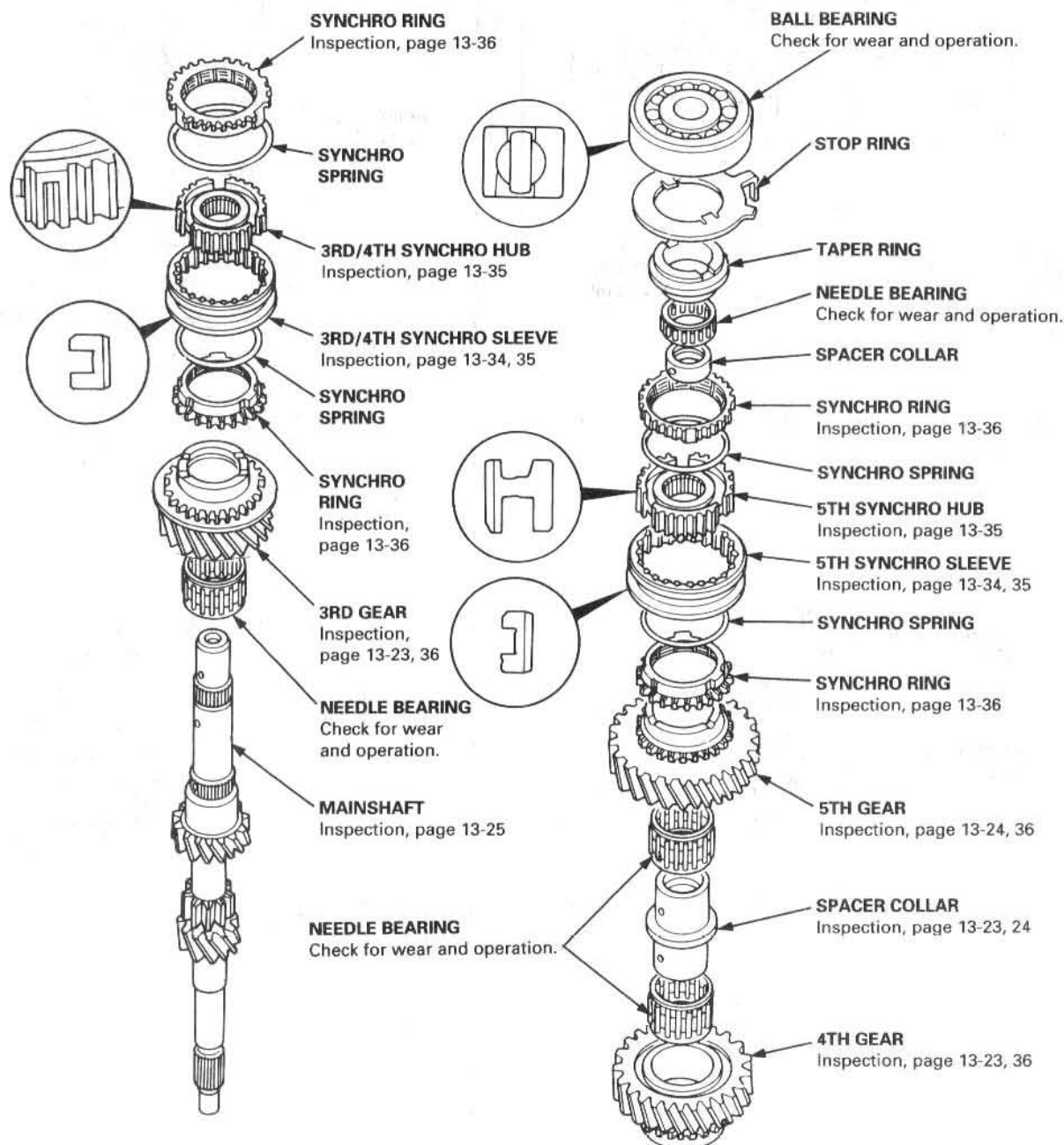
Mainshaft Assembly

Index

NOTE:

- The 3rd/4th, and 5th synchro hubs, and the ball bearing are installed with a press.
- Install the angular ball bearing with the thin-edge outer race facing the taper ring.

 Prior to reassembling, clean all the parts in solvent, dry them, and apply lubricant to any contact surfaces. The 3rd/4th and 5th synchro hubs, however, should be installed with a press before lubricating them.



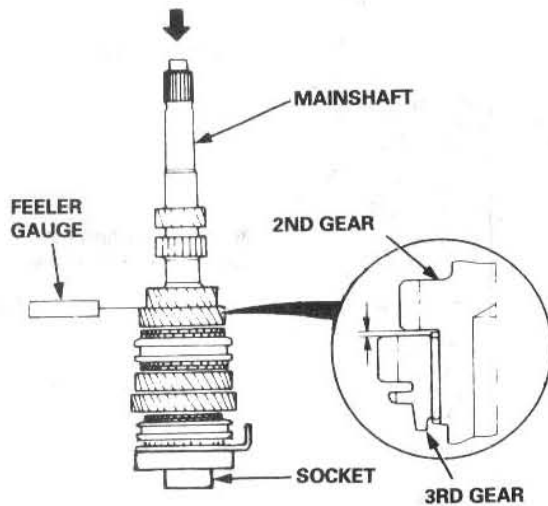


Clearance Inspection

NOTE: If replacement is required, always replace the synchro sleeve and hub as a set.

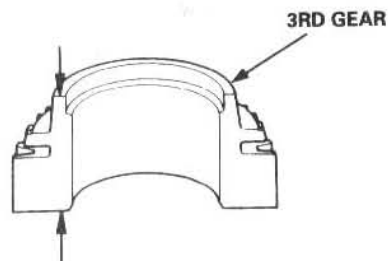
1. Support the bearing inner race with a socket, and push down on the mainshaft.
2. Measure the clearance between 2nd and 3rd gears.

Standard: 0.06 – 0.21 mm (0.002 – 0.008 in)
Service Limit: 0.3 mm (0.01 in)



3. If the clearance is more than the service limit, measure the thickness of 3rd gear.

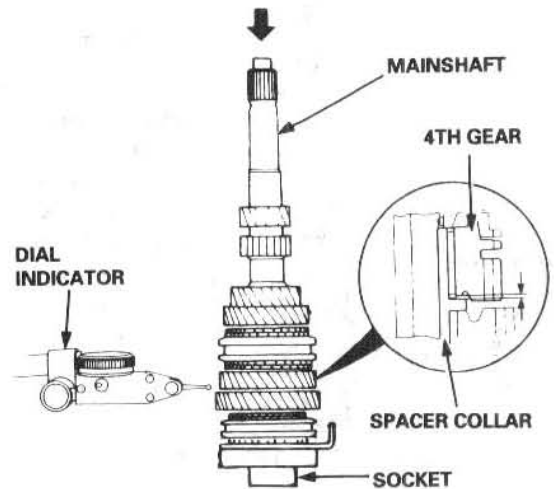
Standard: 34.92 – 34.97 mm (1.375 – 1.377 in)
Service Limit: 34.8 mm (1.370 in)



- If the thickness of 3rd gear is less than the service limit, replace 3rd gear with a new one.
- If the thickness of 3rd gear is within the service limit, replace the 3rd/4th synchro hub with a new one.

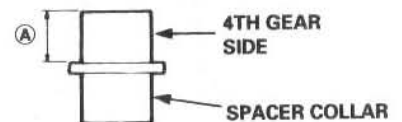
4. Measure the clearance between 4th gear and the spacer collar.

Standard: 0.06 – 0.21 mm (0.002 – 0.008 in)
Service Limit: 0.3 mm (0.01 in)



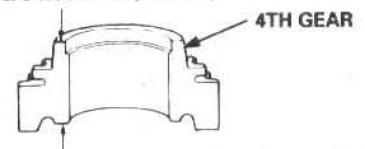
5. If the clearance is more than the service limit, measure distance A on the spacer collar.

Standard: 26.03 – 26.08 mm (1.025 – 1.027 in)
Service Limit: 26.01 mm (1.024 in)



6. If distance A is less than the service limit, replace the spacer collar with a new one. If distance A is within the service limit, measure the thickness of 4th gear.

Standard: 31.42 – 31.47 mm (1.237 – 1.339 in)
Service Limit: 31.30 mm (1.23 in)



- If the thickness of 4th gear is less than the service limit, replace 4th gear with a new one.
- If the thickness of 4th gear is within the service limit, replace the 3rd/4th synchro hub with a new one.

(cont'd)

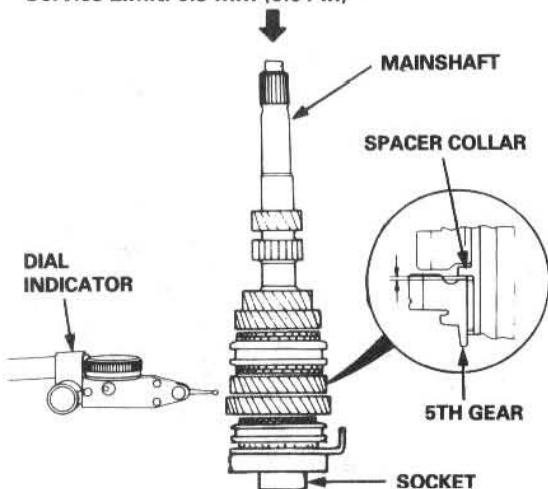
Mainshaft Assembly

Clearance Inspection (cont'd)

- Measure the clearance between the spacer collar and 5th gear.

Standard: 0.06 – 0.21 mm (0.002 – 0.008 in)

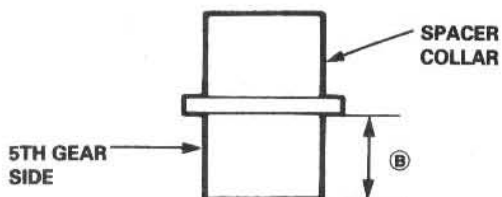
Service Limit: 0.3 mm (0.01 in)



- If the clearance is more than the service limit, measure distance (B) on the spacer collar.

Standard: 26.03 – 26.08 mm (1.025 – 1.027 in)

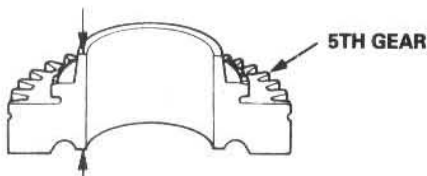
Service Limit: 26.01 mm (1.024 in)



- If distance (B) is less than the service limit, replace the spacer collar with a new one. If distance (B) is within the service limit, measure the thickness of 5th gear.

Standard: 30.92 – 30.97 mm (1.217 – 1.219 in)

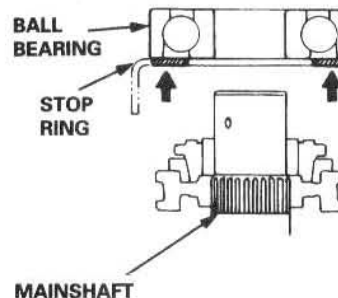
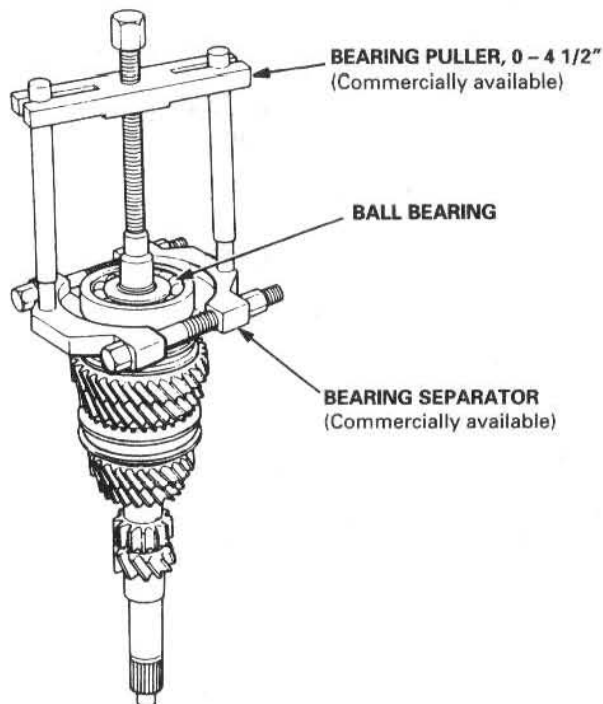
Service Limit: 30.8 mm (1.21 in)



- If the thickness of 5th gear is less than the service limit, replace 5th gear with a new one.
- If the thickness of 5th gear is within the service limit, replace the 5th synchro hub with a new one.

Disassembly

- Remove the ball bearing and the stop ring using a bearing separator and a bearing puller. Be sure the bearing separator is under the stop ring.

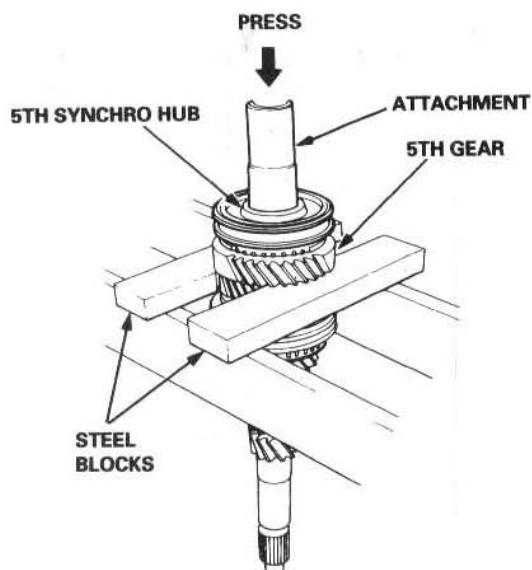




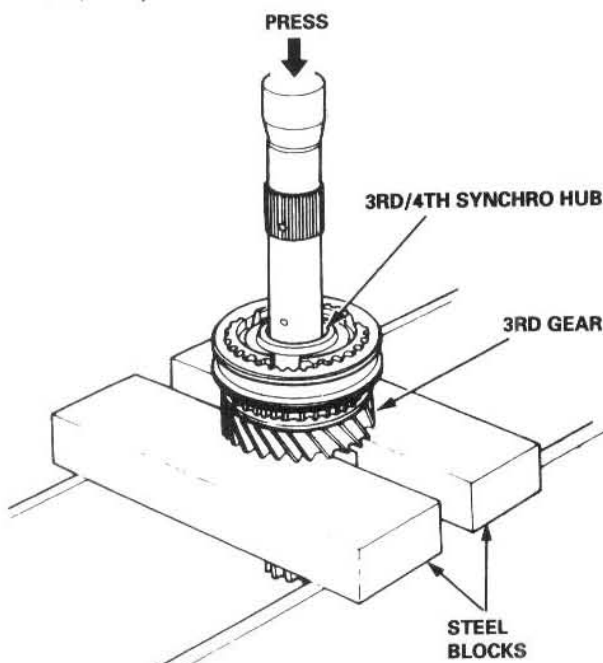
Inspection

CAUTION: Remove the synchro hubs using a press and steel blocks as shown. Use of a jaw-type puller can cause damage to the gear teeth.

- Support 5th gear on steel blocks, and press the mainshaft out of the 5th synchro hub.



- In the same manner as above, support the 3rd gear on steel blocks, and press the mainshaft out of the 3rd/4th synchro hub.



- Inspect the gear surface and bearing surface for wear and damage, then measure the mainshaft at points A, B, and C.

Standard:

A (Ball bearing surface): 27.987 – 28.000 mm
(1.1018 – 1.1024 in)

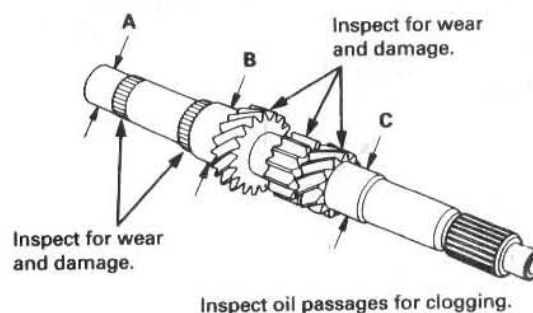
B (Needle bearing surface): 37.984 – 38.000 mm
(1.4954 – 1.4961 in)

C (Ball bearing surface): 27.977 – 27.990 mm
(1.1015 – 1.1020 in)

Service Limit: A: 27.940 mm (1.1000 in)

B: 37.930 mm (1.4933 in)

C: 27.940 mm (1.1000 in)



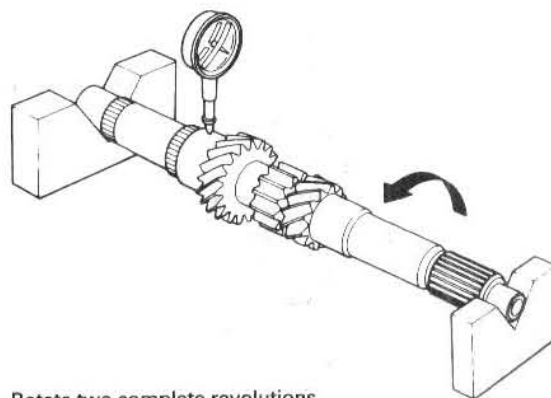
If any part of the mainshaft is less than the service limit, replace it with a new one.

- Inspect for runout.

Standard: 0.02 mm (0.0008 in) max.

Service Limit: 0.05 mm (0.002 in)

NOTE: Support the mainshaft at both ends as shown.



If the runout is more than the service limit, replace the mainshaft with a new one.

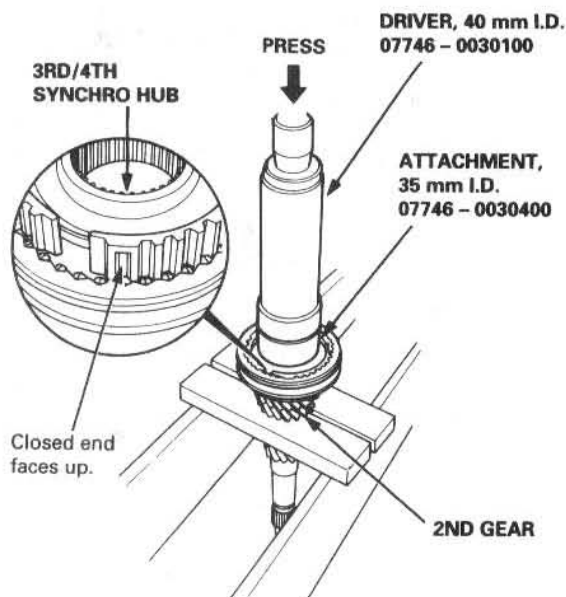
Mainshaft Assembly

Reassembly

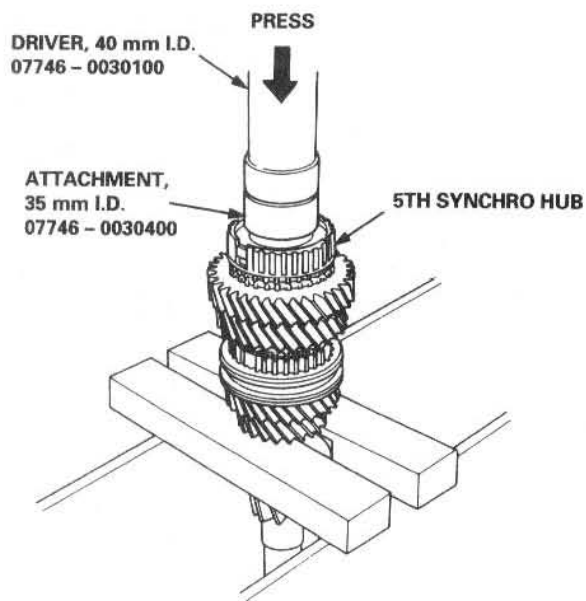
NOTE: Refer to page 13-22 for reassembly sequence.

1. Support 2nd gear on steel blocks as shown, then install the 3rd/4th synchro hub dry (no lubricant) using the special tools and a press.

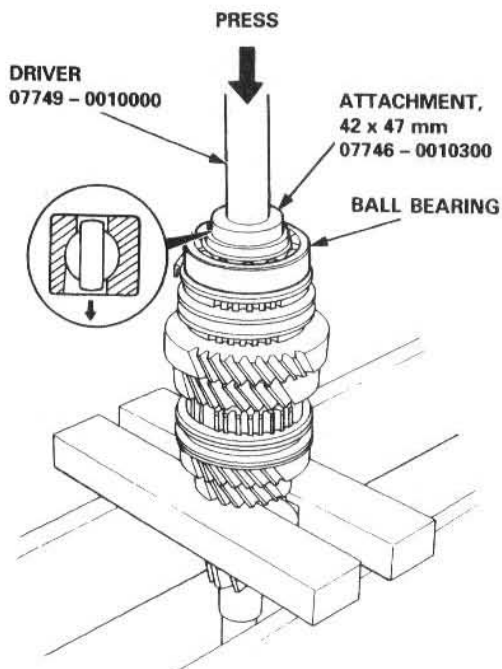
NOTE: After installing, inspect the operation of the 3rd/4th synchro hub set.



2. Install the 5th synchro hub dry (no lubricant) using the special tools and a press.



3. Install the angular ball bearing in the direction shown using the special tools and a press.



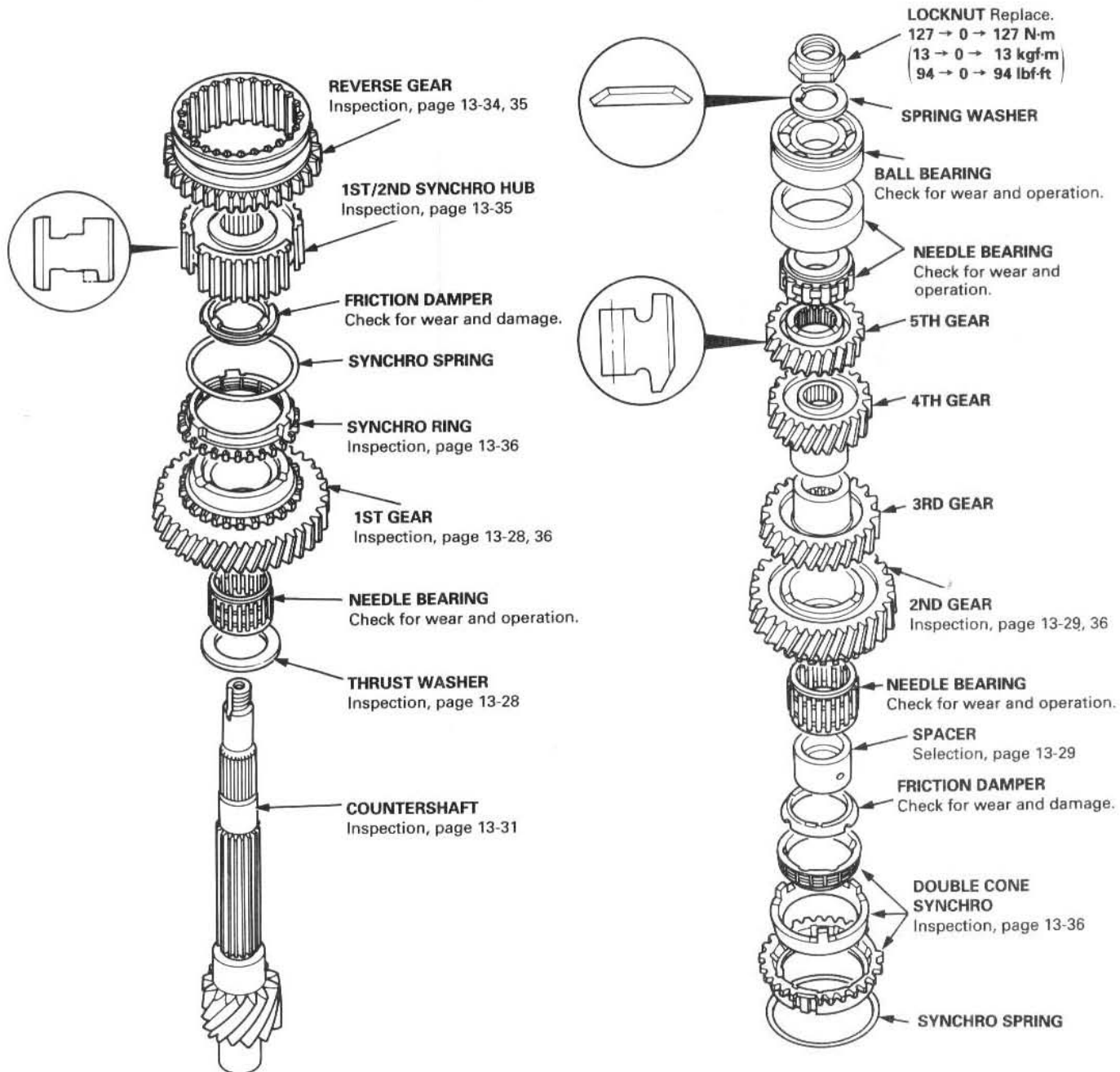


Countershaft Assembly

Index



Prior to reassembling, clean all the parts in solvent, dry them, and apply lubricant to any contact surfaces.



Countershaft Assembly

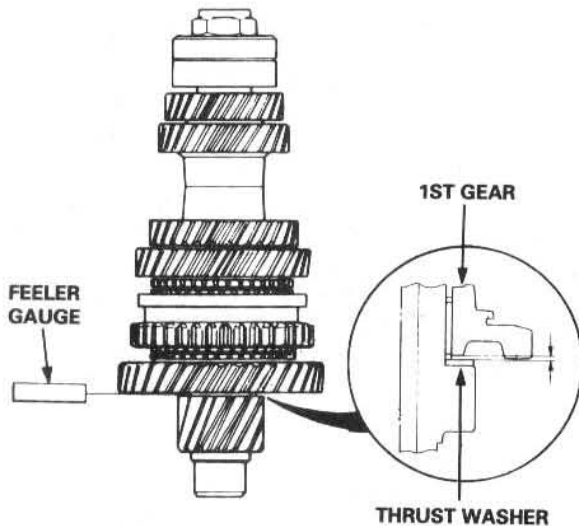
Clearance Inspection

NOTE: If replacement is required, always replace the synchro sleeve and hub as a set.

1. Measure the clearance between the 1st gear and thrust washer.

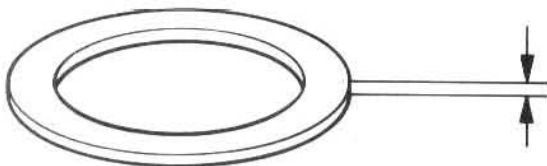
Standard: 0.06 – 0.23 mm (0.002 – 0.009 in)

Service Limit: 0.23 mm (0.009 in)



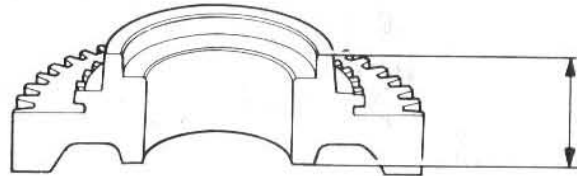
2. If the clearance is more than the service limit, measure the thickness of the thrust washer.

Standard: 1.95 – 1.97 mm (0.077 – 0.078 in)



3. If the thickness is less than the standard, replace the thrust washer with a new one. If the thickness is within the service limit, measure the thickness of the 1st gear.

Standard: 32.95 – 33.00 mm (1.297 – 1.299 in)



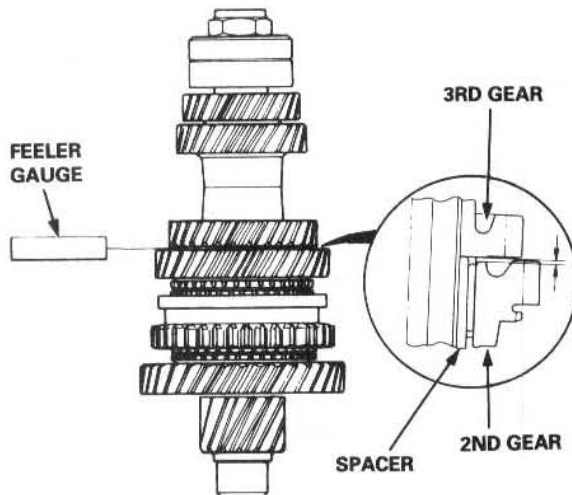
- If the thickness of 1st gear is less than the standard, replace 1st gear with a new one.
- If the thickness of 1st gear is within the standard, replace 1st/2nd synchro hub with a new one.



4. Measure the clearance between the 2nd gear and 3rd gear.

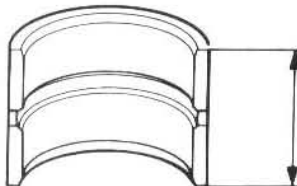
Standard: 0.10 – 0.15 mm (0.004 – 0.006 in)

Service Limit: 0.18 mm (0.007 in)



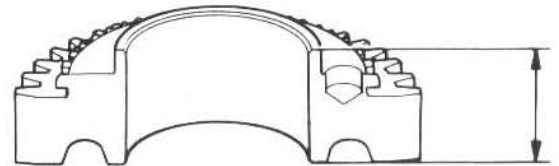
5. If the clearance is more than the service limit, measure the thickness of the spacer.

Standard: 29.07 – 29.09 mm (1.144 – 1.145 in)



6. If the thickness is less than the standard, replace the spacer with a new one.
If the thickness is within the standard, measure the thickness of the 2nd gear.

Standard: 28.92 – 28.97 mm (1.139 – 1.141 in)

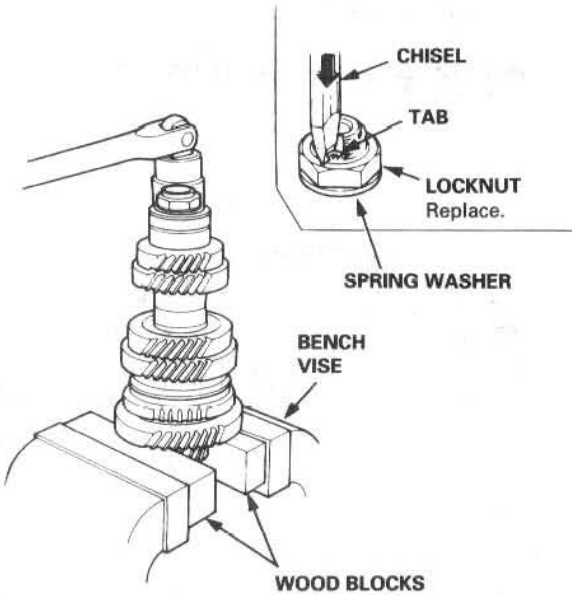


- If the thickness of 2nd gear is less than the standard, replace 2nd gear with a new one.
- If the thickness of 1st gear is within the standard, replace 1st/2nd synchro hub with a new one.

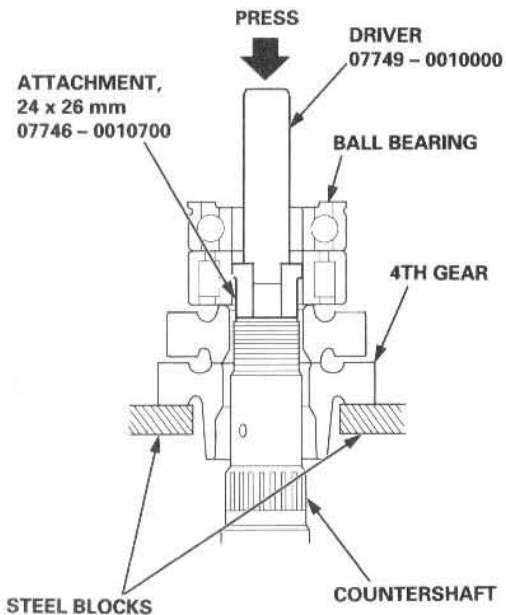
Countershaft Assembly

Disassembly

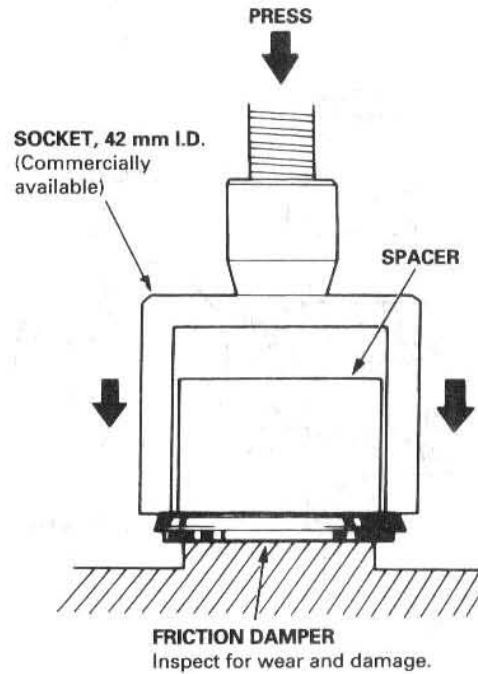
1. Securely clamp the countershaft assembly in a bench vise with wood blocks.



2. Raise the locknut tab from the groove in the countershaft, then remove the locknut and the spring washer.
3. Remove the ball bearing using a press.



4. Remove the friction damper from the spacer using a press and a socket.





Inspection

1. Inspect the gear surface and bearing surface for wear and damage, then measure the countershaft at points A, B, and C.

Standard: A: 38.000 – 38.015 mm
(1.4961 – 1.4967 in)

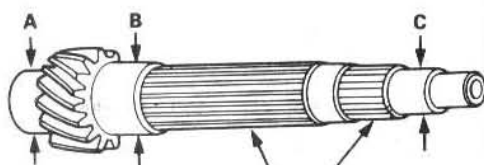
B: 39.984 – 40.000 mm
(1.5742 – 1.5748 in)

C: 24.987 – 25.000 mm
(0.9837 – 0.9843 in)

Service Limit: A: 37.950 mm (1.4941 in)

B: 39.930 mm (1.5720 in)

C: 24.940 mm (0.9819 in)



Inspect for wear and damage.

If any part of the countershaft is less than the service limit, replace it with a new one.

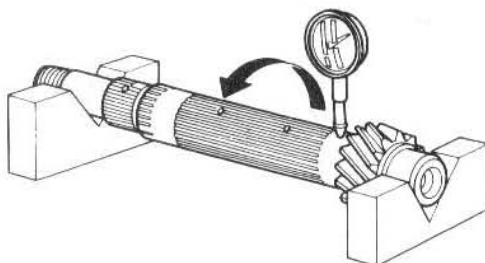
2. Inspect for runout.

Standard: 0.02 mm (0.0008 in) max.

Service Limit: 0.05 mm (0.002 in)

NOTE: Support the countershaft at both ends as shown.

Rotate two complete revolutions.



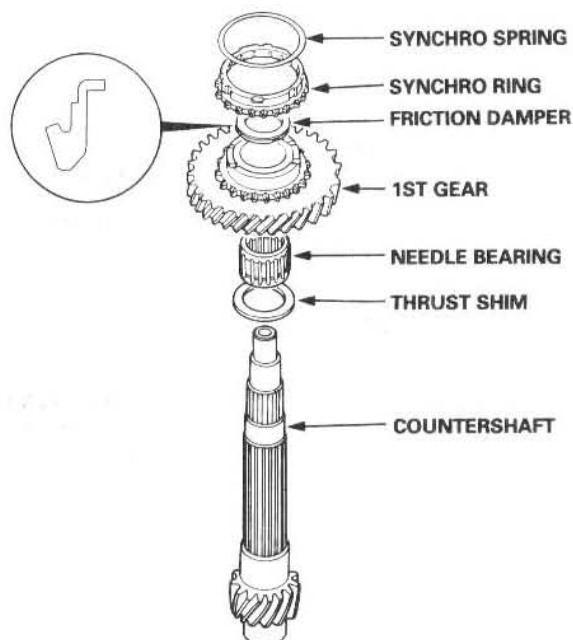
If the runout exceeds the service limit, replace the countershaft with a new one.

Reassembly

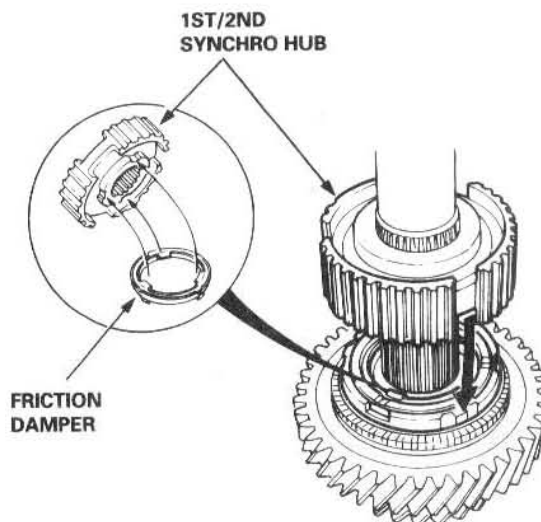
NOTE: Refer to page 13-28 for reassembly sequence.

1. Install the thrust shim, needle bearing, 1st gear, friction damper, synchro ring, and synchro spring.

NOTE: Reassemble the 1st gear and friction damper before installation.



2. Install the 1st/2nd synchro hub by aligning the friction damper fingers with 1st/2nd synchro hub grooves.

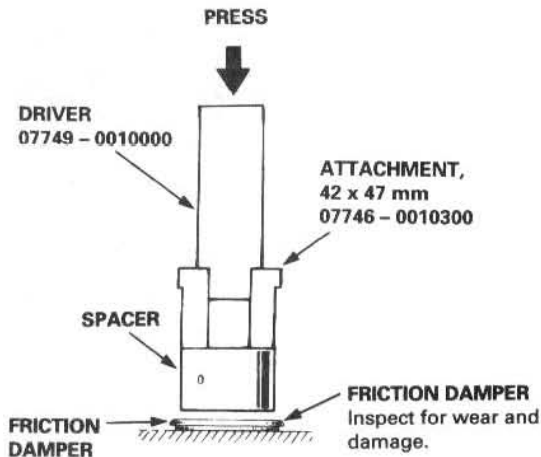


(cont'd)

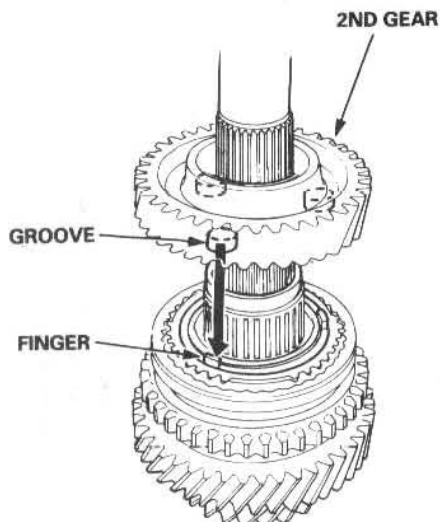
Countershaft Assembly

Reassembly (cont'd)

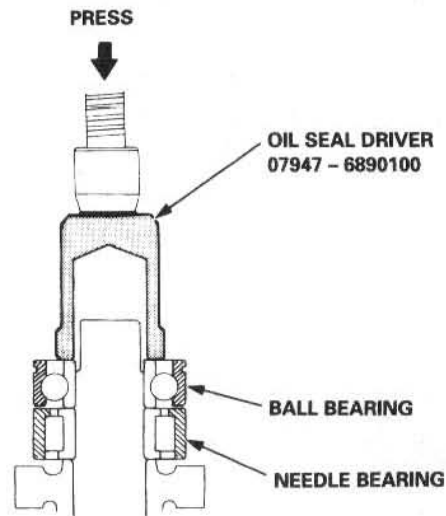
3. Install the friction damper on the spacer using the special tools and a press.



4. Install the 2nd gear by aligning the synchro cone fingers with 2nd gear grooves.

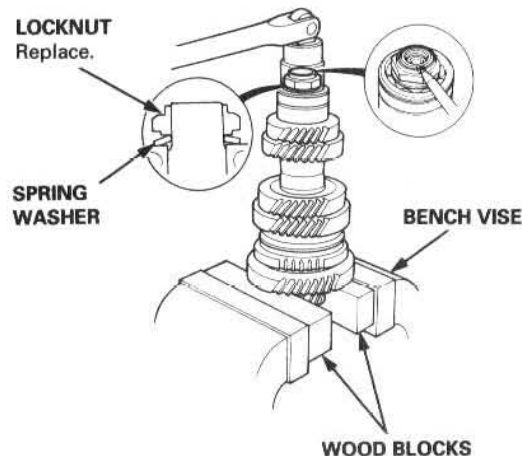


5. Install the needle bearing and the ball bearing using a special tool and a press.



6. Securely clamp the countershaft assembly in a bench vise with wood blocks.
7. Install the spring washer.
8. Tighten the new locknut to the correct torque, then stake the locknut tab into the groove.

Torque: 127 → 0 → 127 N·m (13 → 0 → 13 kgf·m, 94 → 0 → 94 lbf·ft)



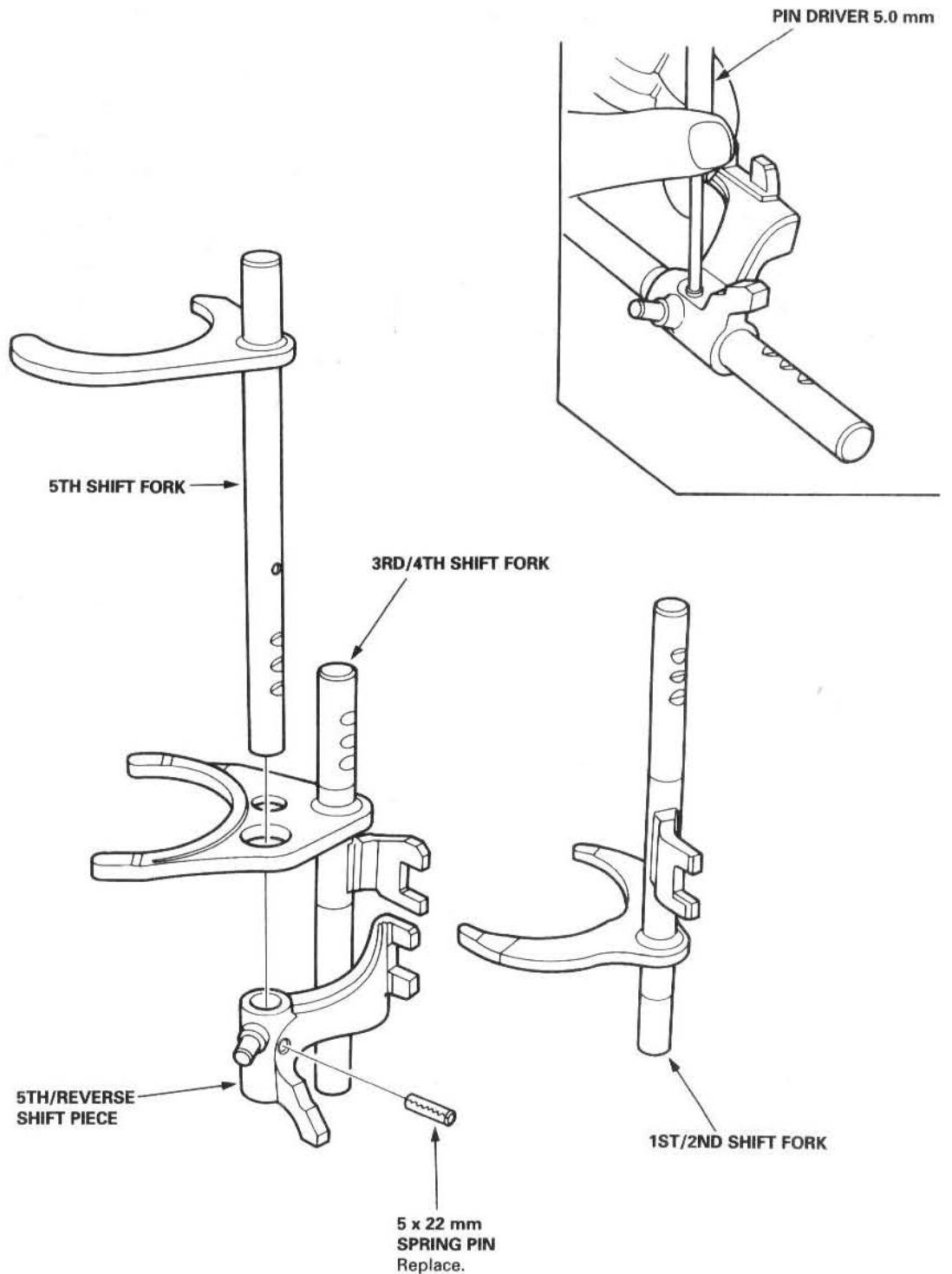
Shift Fork Assembly



Disassembly/Reassembly



Prior to reassembling, clean all the parts in solvent, dry them, and apply lubricant to any contact parts.



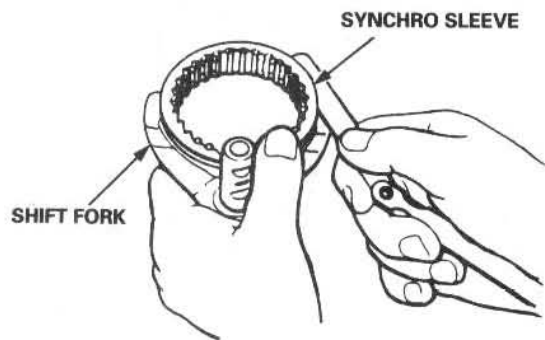
Shift Fork Assembly

Clearance Inspection

NOTE: The synchro sleeve and synchro hub should be replaced as a set.

- 1. Measure the clearance between each shift fork and its matching synchro sleeve.

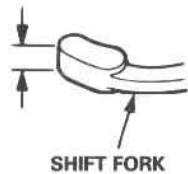
Standard: 0.35 – 0.65 mm (0.014 – 0.026 in)
Service Limit: 1.00 mm (0.039 in)



- 2. If the clearance exceeds the service limit, measure the thickness of the shift fork fingers.

Standard:

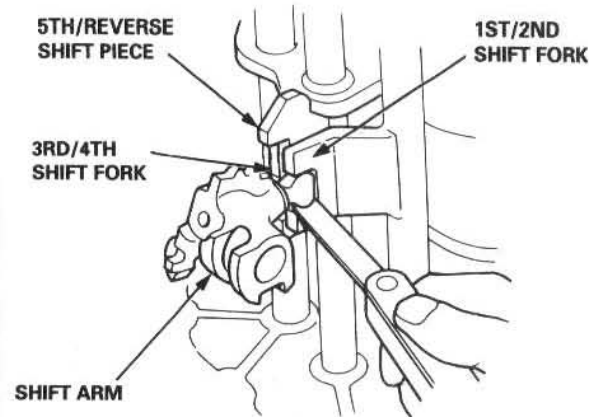
3rd/4th shift fork	7.4 – 7.6 mm (0.291 – 0.299 in)
1st/2nd shift fork	6.2 – 6.4 mm
5th shift fork	(0.244 – 0.252 in)



- If the thickness of the shift fork finger is less than the standard, replace the shift fork with a new one.
- If the thickness of the shift fork finger is within the standard, replace the synchro sleeve with a new one.

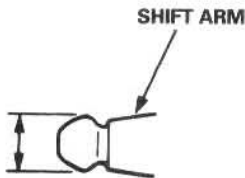
- 3. Measure the clearance between the shift fork and the shift arm.

Standard: 0.2 – 0.5 mm (0.008-0.019 in)
Service Limit: 0.6 mm (0.024 in)



- 4. If the clearance exceeds the service limit, measure the width of the shift arm.

Standard: 12.9 – 13.0 mm (0.508 – 0.512 in)



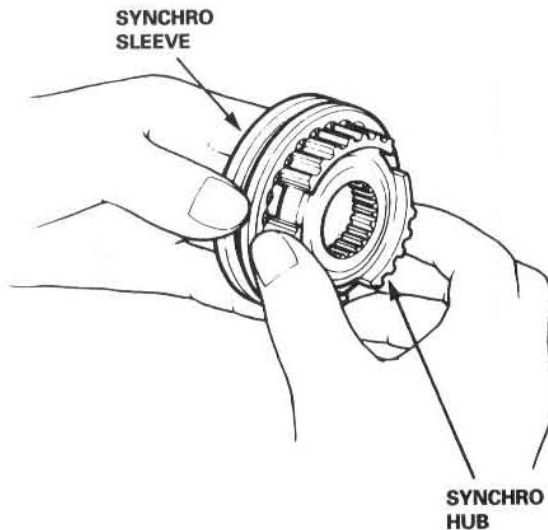
- If the width of the shift arm is less than the standard, replace the shift arm with a new one.
- If the width of the shift arm is within the standard, replace the shift fork or shift piece with a new one.



Inspection

1. Inspect gear teeth on all synchro hubs and synchro sleeves for rounded off corners, which indicate wear.
2. Install each synchro hub in its mating synchro sleeve, and check for freedom of movement.

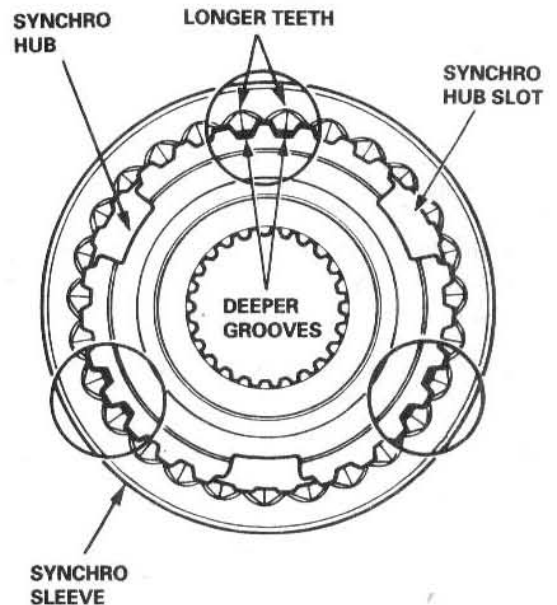
NOTE: If replacement is required, always replace the synchro sleeve and synchro hub as a set.



Installation

When assembling the synchro sleeve and synchro hub, be sure to match the three sets of longer teeth (120 degrees apart) on the synchro sleeve with the three sets of deeper grooves in the synchro hub.

CAUTION: Do not install the synchro sleeve with its longer teeth in the 1st/2nd synchro hub slots because it will damage the spring ring.



Synchro Ring, Gear

Inspection

1. Inspect the synchro ring and gear.

A: Inspect the inside of the synchro ring for wear.

B: Inspect the synchro sleeve teeth and matching teeth on the synchro ring for wear (rounded off).



C: Inspect the synchro sleeve teeth and matching teeth on the gear for wear (rounded off).



D: Inspect the gear hub thrust surface for wear.

E: Inspect the cone surface for wear and roughness.

F: Inspect the teeth on all gears for uneven wear, scoring, galling, and cracks.

2. Coat the cone surface of the gear with oil, and place the synchro ring on the matching gear. Rotate the synchro ring, making sure that it does not slip.

Measure the clearance between the synchro ring and gear all the way around.

NOTE: Hold the synchro ring against the gear evenly while measuring the clearance.

Synchro Ring-to-Gear Clearance

Standard: 0.85 – 1.10 mm (0.033 – 0.043 in)

Service Limit: 0.4 mm (0.02 in)

Double Cone Synchro-to-Gear Clearance

Standard:

(A): (Outer Synchro Ring to Synchro Cone)
0.5 – 1.0 mm (0.02 – 0.04 in)

(B): (Synchro Cone to Gear)
0.5 – 1.0 mm (0.02 – 0.04 in)

(C): (Outer Synchro Ring to Gear)
0.95 – 1.68 mm (0.037 – 0.066 in)

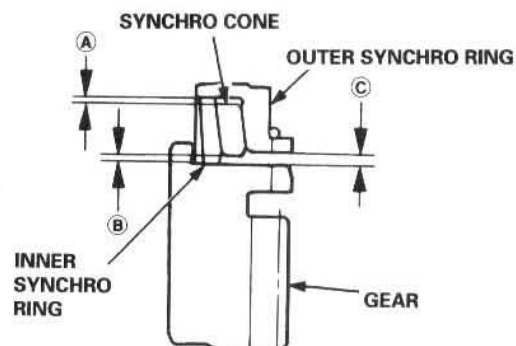
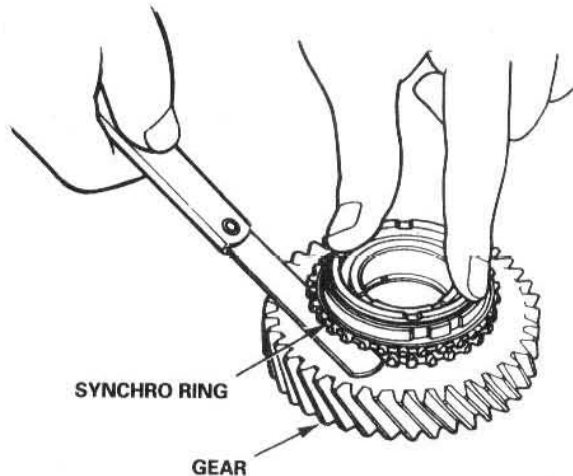
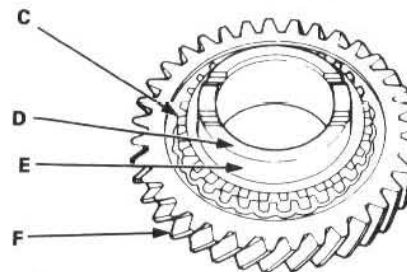
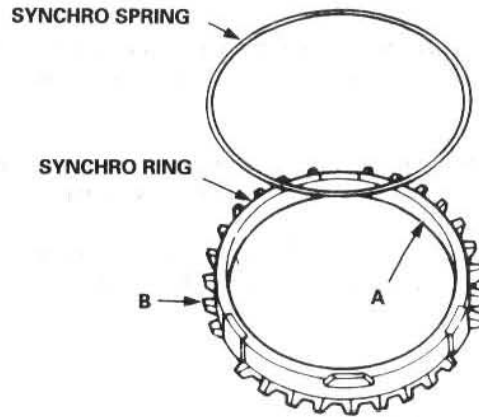
Service Limit:

(A): 0.3 mm (0.01 in)

(B): 0.3 mm (0.01 in)

(C): 0.6 mm (0.02 in)

If the clearance is less than the service limit, replace the synchro ring and synchro cone.

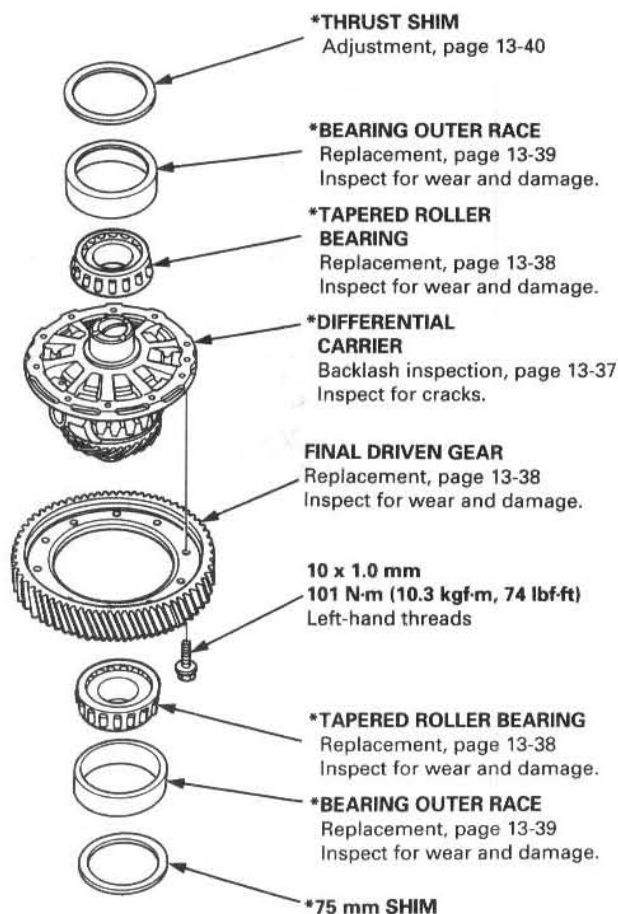




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NOTE:

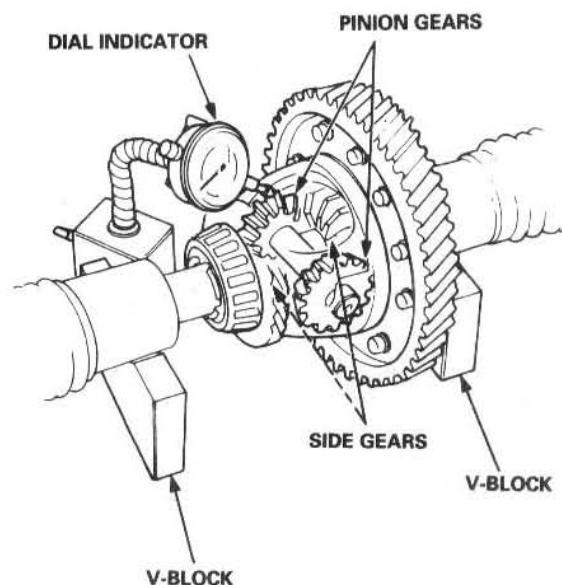
- If the parts marked with an asterisk (*) were replaced, the tapered roller bearing preload must be adjusted (see page 13-40).
- Do not disassemble the ring gear from the differential assembly with ATTS.



Backlash Inspection (without ATTS)

1. Place the differential assembly on V-blocks, and install both axles.
2. Measure the backlash of both pinion gears.

Standard (New): 0.05 – 0.15 mm (0.002 – 0.006 in)



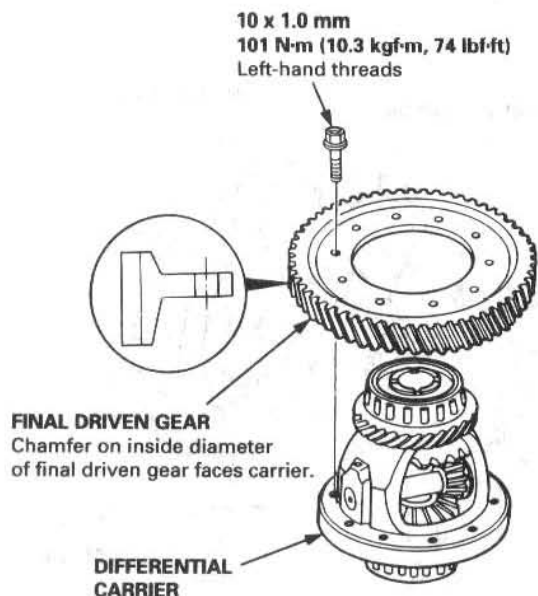
If the backlash is not within the standard, replace the differential carrier.

Differential

Final Driven Gear Replacement (without ATTS)

1. Remove the bolts in a crisscross pattern in several steps, and remove the final driven gear from the differential carrier.

NOTE: The final driven gear bolts have left-hand threads.



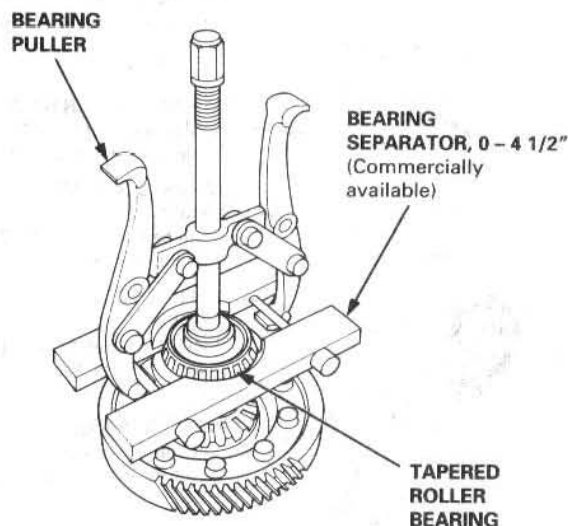
2. Install the final driven gear by tightening the bolts in a crisscross pattern in several steps.

Tapered Roller Bearing Replacement

NOTE:

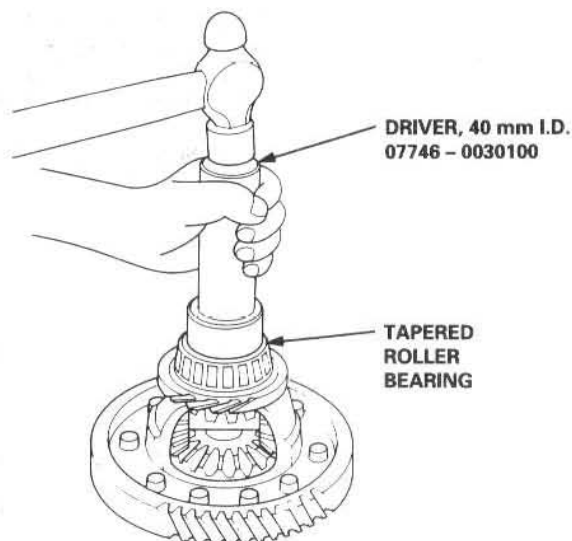
- The tapered roller bearing and bearing outer race should be replaced as a set.
- Inspect and adjust the tapered roller bearing preload whenever the tapered roller bearing is replaced.
- Check the tapered roller bearings for wear and rough rotation. If the tapered roller bearings are OK, removal is not necessary.

1. Remove the tapered roller bearings using a bearing puller and a bearing separator.



2. Install new tapered roller bearings using the special tool.

NOTE: Drive the tapered roller bearings on until they bottom against the differential carrier.





Bearing Outer Race Replacement

NOTE:

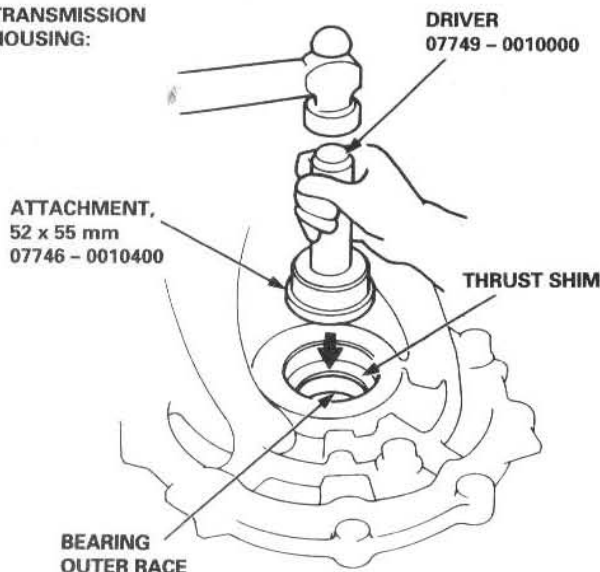
- The bearing outer race and tapered roller bearing should be replaced as a set.
- Inspect and adjust the tapered roller bearing preload whenever the tapered roller bearing is replaced.

1. Remove the oil seals from the transmission housing and clutch housing (see page 13-42).
2. Drive the bearing outer race and thrust shim out of the transmission housing, or remove the bearing outer race and 75 mm shim from the clutch housing by heating the clutch housing to about 212°F (100°C) with a heat gun.

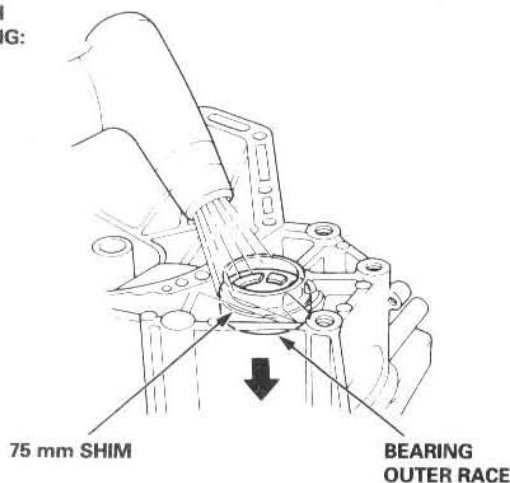
CAUTION: Do not reuse the thrust shim if the outer race was driven out.

NOTE: Do not heat the clutch housing in excess of 212°F (100°C).

TRANSMISSION HOUSING:



CLUTCH HOUSING:

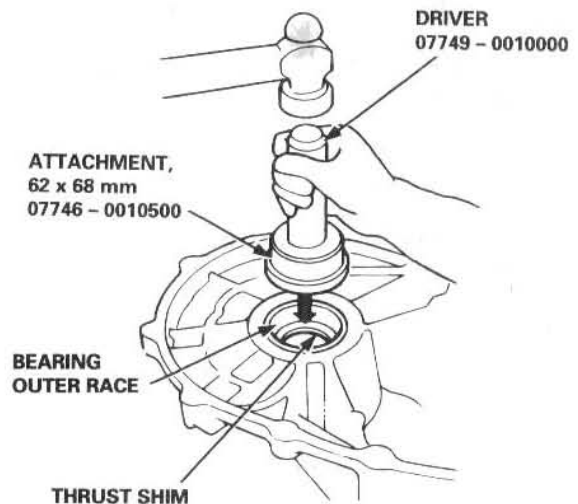


3. Install the thrust shim or 75 mm shim and the bearing outer race in the transmission housing and clutch housing using the special tools.

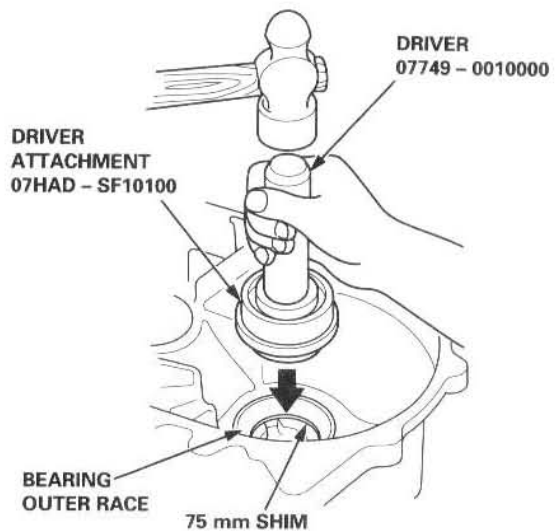
NOTE:

- Install the bearing outer race squarely.
- Check that there is no clearance between the bearing outer race, thrust shim or 75 mm shim, and housing.

TRANSMISSION HOUSING:



CLUTCH HOUSING:



4. Install the oil seal (see page 13-42).

Tapered Roller Bearing Preload Adjustment

NOTE: If any of the items listed below were replaced, the tapered roller bearing preload must be adjusted.

- Transmission housing
- Clutch housing
- Differential carrier
- Tapered roller bearing and bearing outer race
- Thrust shim
- 75 mm shim

1. Remove the bearing outer race and thrust shim from the transmission housing (see page 13-39).

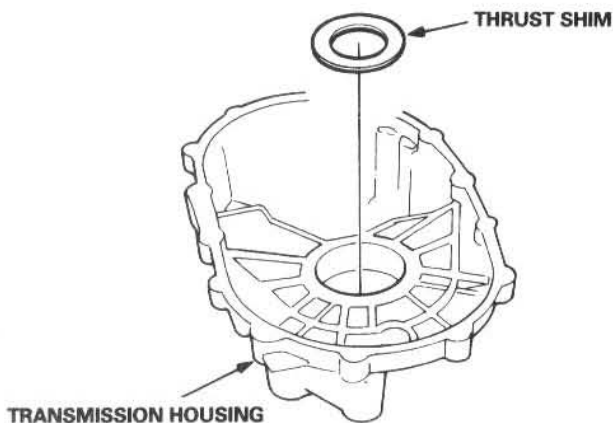
NOTE: Install the thrust shim only on the transmission housing side.

CAUTION: Do not reuse the thrust shim if the bearing outer race was driven out.

NOTE: Before adjusting the tapered roller bearing preload, let the transmission cool to room temperature if the bearing outer race was removed by heating the clutch housing.

2. First try the same size thrust shim that was removed.

CAUTION: Use only one thrust shim.



3. After installing the thrust shim, install the bearing outer race in the transmission housing (see page 13-39).

NOTE:

- Install the bearing outer race squarely.
- Check that there is no clearance between the bearing outer race, thrust shim and transmission housing.

4. With the mainshaft and countershaft removed, install the differential assembly, and torque the clutch housing and transmission housing.

NOTE: It is not necessary to use sealing agent between the housings.

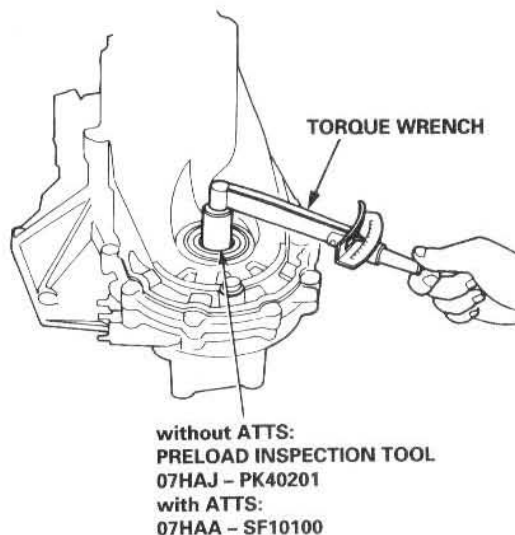
TORQUE: 10 x 1.25 mm: 47 N·m
(4.8 kgf·m, 35 lbf·ft)
8 x 1.25 mm: 27 N·m
(2.8 kgf·m, 20 lbf·ft)

5. Rotate the differential assembly in both directions to seat the tapered roller bearings.
6. Measure the starting torque of the differential assembly with the special tool and a torque wrench.

STANDARD: 1.4 – 2.5 N·m
(14 – 26 kgf·cm, 12 – 23 lbf·in)

NOTE:

- Measure the tapered roller bearing preload at normal room temperature.
- Measure the tapered roller bearing preload in both directions.





7. If the tapered roller bearing preload is not within the standard, select the thrust shim which will give the correct tapered roller bearing preload from the following table.

NOTE: Changing the thrust shim to the next size will increase or decrease tapered roller bearing preload about 0.3 – 0.4 N·m (3 – 4 kgf·cm, 2.6 – 3.5 lbf·in).

THRUST SHIM

	Part Number	Thickness
A	41381 – PX5 – 000	1.90 mm (0.0748 in)
B	41382 – PX5 – 000	1.93 mm (0.0760 in)
C	41383 – PX5 – 000	1.96 mm (0.0772 in)
D	41384 – PX5 – 000	1.99 mm (0.0783 in)
E	41385 – PX5 – 000	2.02 mm (0.0795 in)
F	41386 – PX5 – 000	2.05 mm (0.0807 in)
G	41387 – PX5 – 000	2.08 mm (0.0819 in)
H	41388 – PX5 – 000	2.11 mm (0.0831 in)
I	41389 – PX5 – 000	2.14 mm (0.0843 in)
J	41390 – PX5 – 000	2.17 mm (0.0854 in)
K	41391 – PX5 – 000	2.20 mm (0.0866 in)
L	41392 – PX5 – 000	2.23 mm (0.0878 in)
M	41393 – PX5 – 000	2.26 mm (0.0890 in)
N	41394 – PX5 – 000	2.29 mm (0.0902 in)
O	41395 – PX5 – 000	2.32 mm (0.0913 in)
P	41396 – PX5 – 000	2.35 mm (0.0925 in)
Q	41397 – PX5 – 000	2.38 mm (0.0937 in)
R	41398 – PX5 – 000	2.41 mm (0.0949 in)
S	41399 – PX5 – 000	2.44 mm (0.0961 in)
T	41400 – PX5 – 000	2.47 mm (0.0972 in)
AA	41873 – P16 – 000	1.66 mm (0.0654 in)
AB	41874 – P16 – 000	1.69 mm (0.0665 in)
AC	41875 – P16 – 000	1.72 mm (0.0677 in)
AD	41876 – P16 – 000	1.75 mm (0.0689 in)
AE	41877 – P16 – 000	1.78 mm (0.0701 in)
AF	41878 – P16 – 000	1.81 mm (0.0713 in)
AG	41879 – P16 – 000	1.84 mm (0.0724 in)
AH	41880 – P16 – 000	1.87 mm (0.0736 in)

8. Recheck the tapered roller bearing preload.

9. How to select the correct thrust shim:

- Compare the tapered roller bearing preload you get with the thrust shim that was removed, with the specified preload of 1.4 – 2.5 N·m (14 – 26 kgf·cm, 12 – 23 lbf·in).
- If your measured tapered roller bearing preload is less than specified, subtract yours from the specified.
If yours is more than specified, subtract the specified from your measurement.

For example with a 2.17 mm (0.0854 in) thrust shim:

- Ⓐ specified 2.5 N·m (26 kgf·cm, 23 lbf·in)
– you measure 0.6 N·m (6 kgf·cm, 5 lbf·in)
1.9 N·m (20 kgf·cm, 18 lbf·in) less
- Ⓑ you measure 3.3 N·m (34 kgf·cm, 30 lbf·in)
– specified 2.5 N·m (26 kgf·cm, 23 lbf·in)
0.8 N·m (8 kgf·cm, 7 lbf·in) more

- Each shim size up or down from standard makes about 0.3 – 0.4 N·m (3 – 4 kgf·cm, 2.6 – 3.5 lbf·in) difference in tapered roller bearing preload.

In example Ⓐ, your measured tapered roller bearing preload was 1.9 N·m (20 kgf·cm, 18 lbf·in) less than standard, so you need a thrust shim five sizes thicker than standard (try the 2.32 mm (0.0913 in) thrust shim, and recheck).

In example Ⓑ, your measurement was 0.8 N·m (8 kgf·cm, 7 lbf·in) more than standard, so you need a thrust shim two sizes thinner (try the 2.11 mm (0.0831 in) thrust shim, and recheck).

10. After adjusting the tapered roller bearing preload, assemble the transmission and install the transmission housing (see page 13-51).

TORQUE:

10 x 1.25 mm: 47 N·m (4.8 kgf·m, 35 lbf·ft)
8 x 1.25 mm: 27 N·m (2.8 kgf·m, 20 lbf·ft)

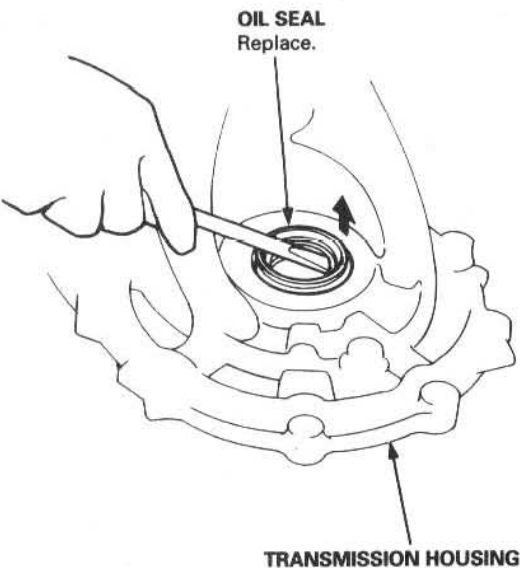
11. Rotate the differential assembly in both directions to seat the tapered roller bearings.

Differential

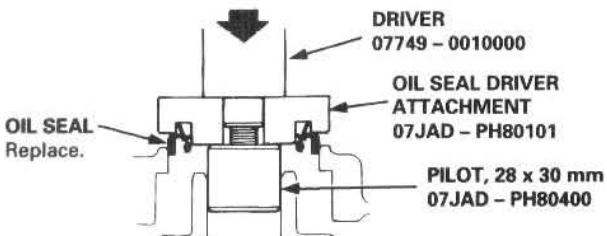
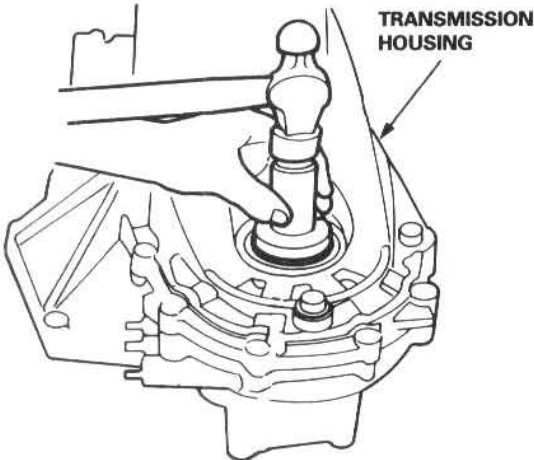
Oil Seal Replacement

Transmission Housing:

- 1. Remove the oil seal from the transmission housing.

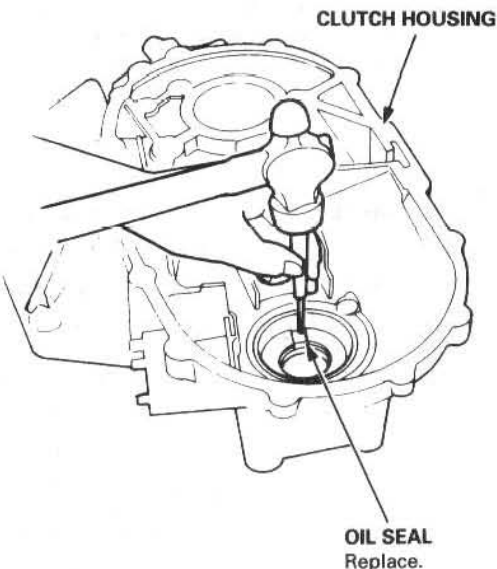


- 2. Install the new oil seal into the transmission housing using the special tools.

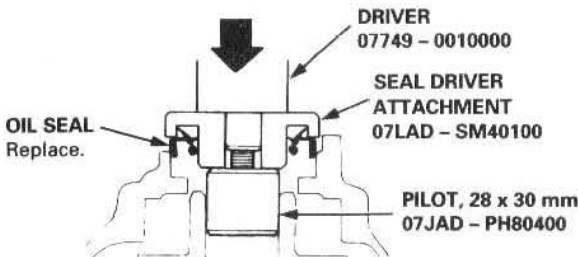
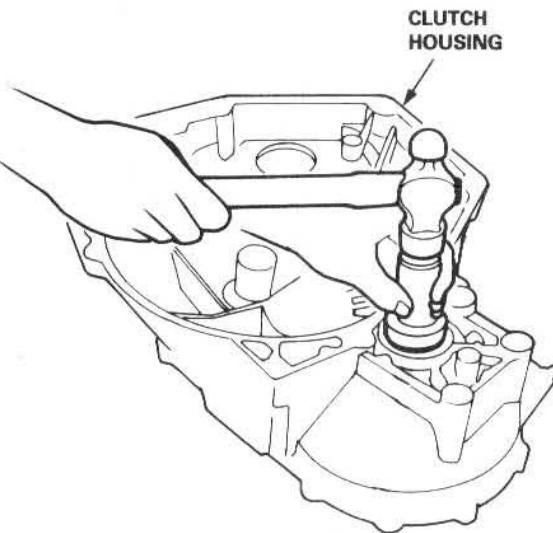


Clutch Housing:

- 1. Remove the oil seal from the clutch housing.



- 2. Install the new oil seal into the clutch housing using the special tools.

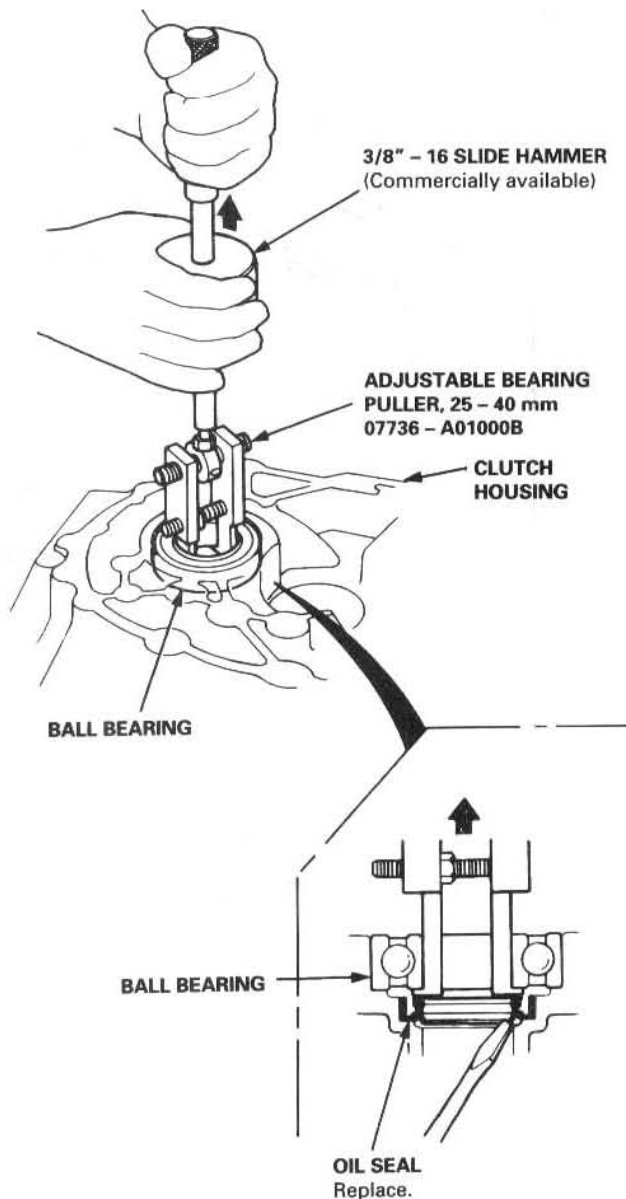




Mainshaft Bearing/Oil Seal

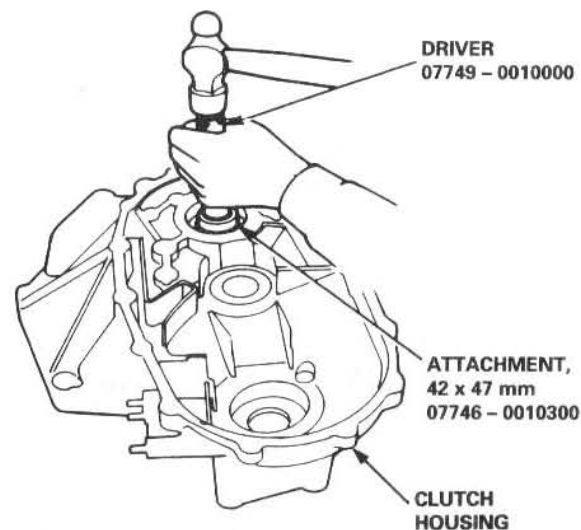
Replacement

1. Remove the differential assembly.
2. Remove the ball bearing using the special tool.

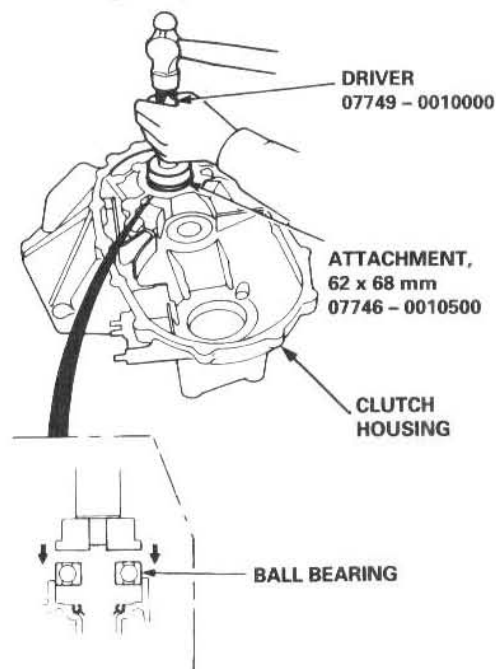


3. Remove the oil seal from the clutch side.

4. Drive the new oil seal in from the transmission side using the special tools.



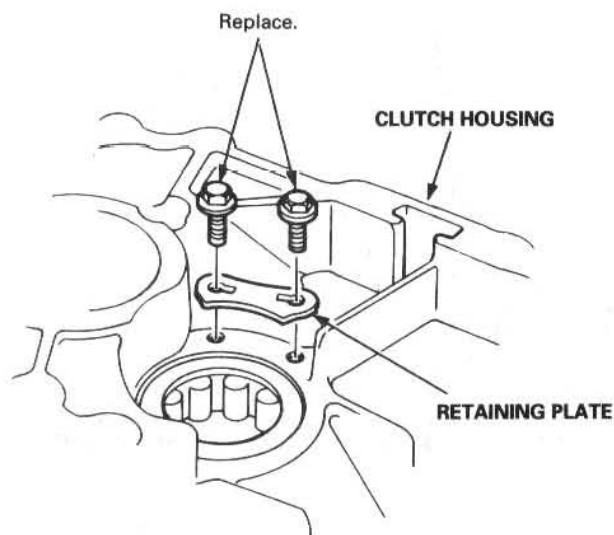
5. Drive the new ball bearing in from the transmission side using the special tools.



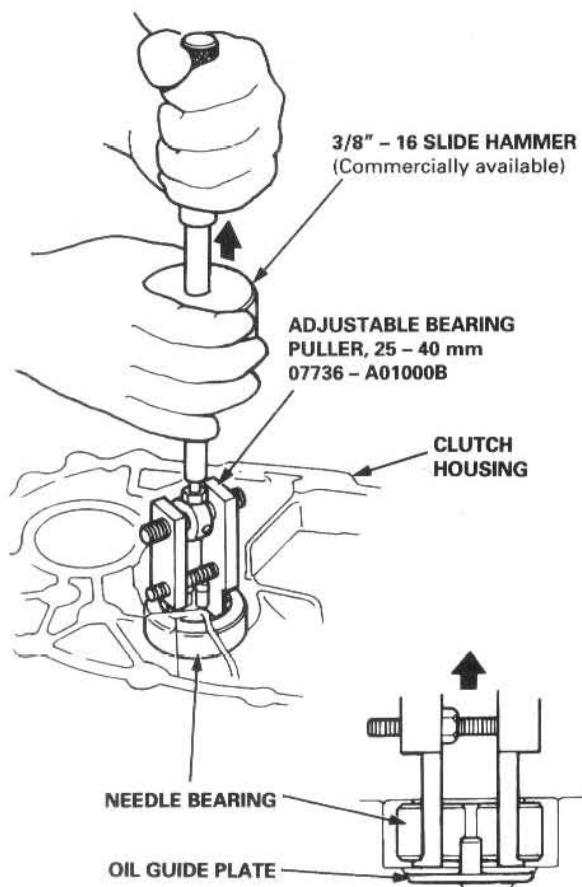
Countershaft Bearing

Replacement

1. Remove the retaining plate from the clutch housing.

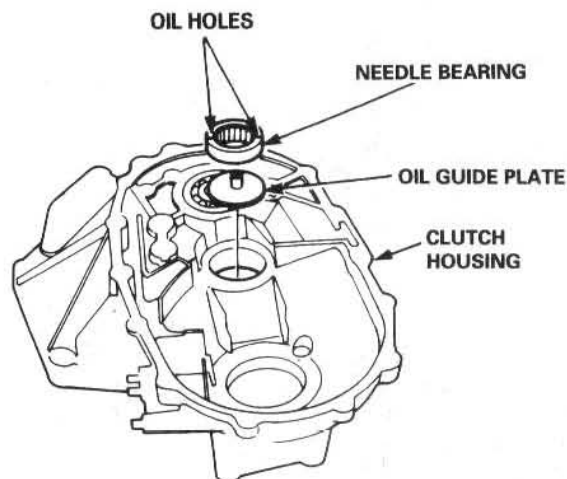


2. Remove the needle bearing using the special tool, then remove the oil guide plate.

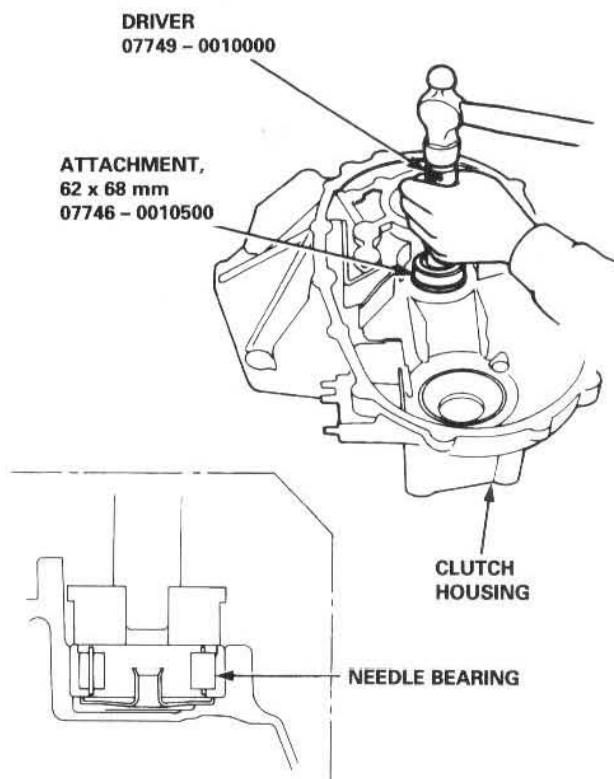


3. Position the oil guide plate and new needle bearing in the bore of the clutch housing.

NOTE: Position the needle bearing with the oil hole facing up.



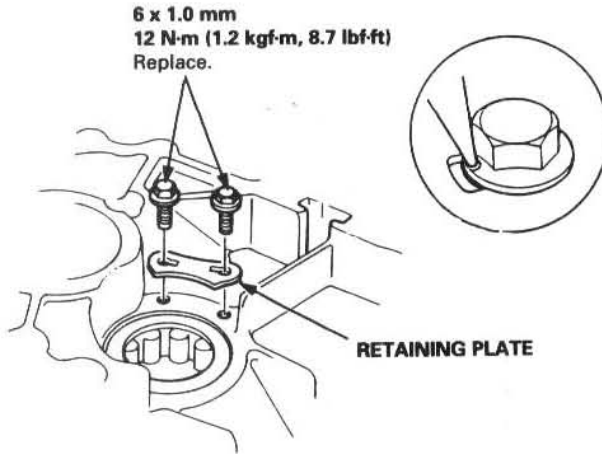
4. Install the needle bearing using the special tools.



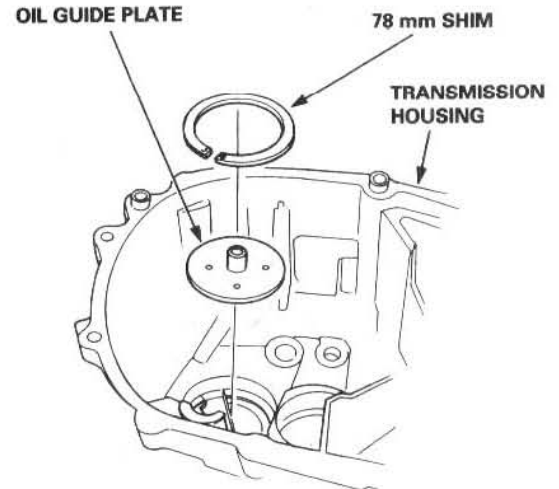


Adjustment

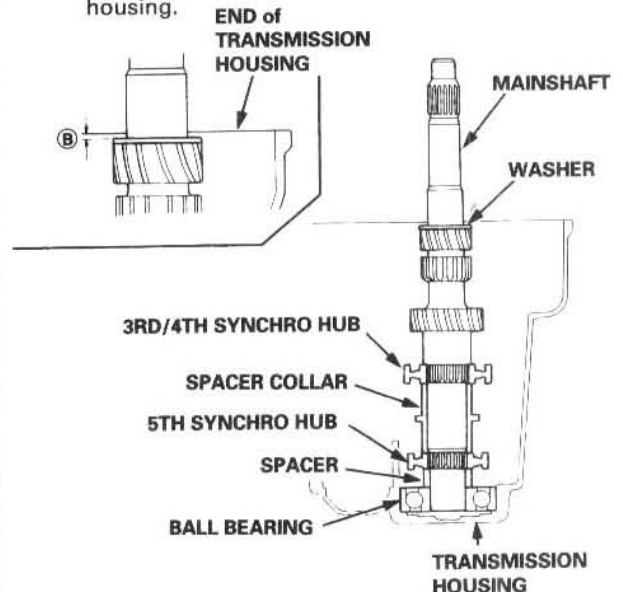
5. Install the retaining plate, and stake the bolt heads into the groove in the retaining plate.



1. Remove the 78 mm shim and oil guide plate from the transmission housing.



2. Install the 3rd/4th synchro hub, spacer collar, 5th synchro hub, spacer, and ball bearing on the mainshaft, then install the assembly in the transmission housing.



3. Install the washer on the mainshaft.
4. Measure distance **B** between the end of the transmission housing and washer.

NOTE:

- Use a straight edge and vernier caliper.
- Measure at three locations and average the reading.

(cont'd)

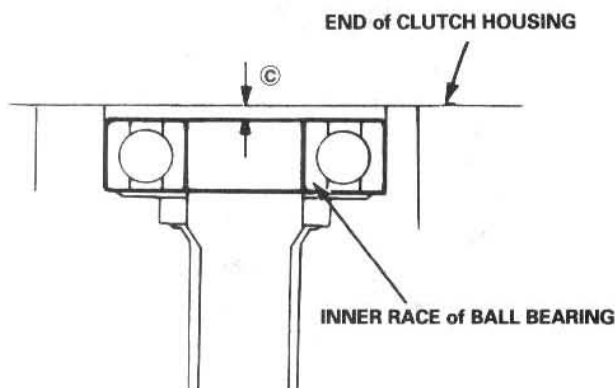
Mainshaft Thrust Clearance

Adjustment (cont'd)

5. Measure distance © between the end of the clutch housing and bearing inner race.

NOTE:

- Use a straight edge and depth gauge.
- Measure at three locations and average the readings.



6. Select the proper 78 mm shim from the chart by using the formula below.

Shim Selection Formula:

From the measurements you made in steps 4 and 5:

- Add distance © (step 5) to distance ② (step 4).
- From this number, subtract 0.93 (which is the midpoint of the flex range of the clutch housing bearing spring washer).
- Take this number and compare it to the available shim sizes in the chart.

(For example)

$$\begin{array}{r} \text{B: } 2.39 \\ + \text{C: } 0.22 \\ \hline = 2.61 \end{array} \quad \begin{array}{r} 2.61 \\ - 0.93 \\ \hline = 1.68 \end{array}$$

Try the 1.68 mm (0.0661 in) shim.

78 mm SHIM

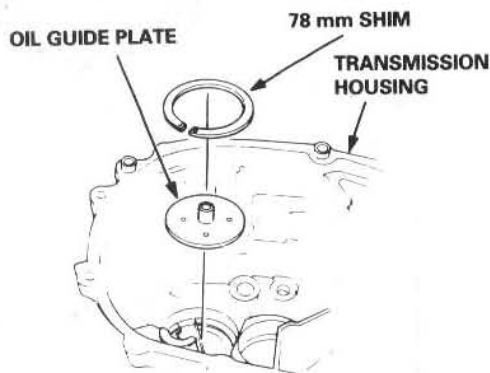
	Part Number	Thickness
A	23941 - P16 - 000	1.20 mm (0.0472 in)
B	23942 - P16 - 000	1.23 mm (0.0484 in)
C	23943 - P16 - 000	1.26 mm (0.0496 in)
D	23944 - P16 - 000	1.29 mm (0.0508 in)
E	23945 - P16 - 000	1.32 mm (0.0520 in)
F	23946 - P16 - 000	1.35 mm (0.0531 in)
G	23947 - P16 - 000	1.38 mm (0.0543 in)
H	23948 - P16 - 000	1.41 mm (0.0555 in)
I	23949 - P16 - 000	1.44 mm (0.0567 in)
J	23950 - P16 - 000	1.47 mm (0.0579 in)
K	23951 - P16 - 000	1.50 mm (0.0591 in)
L	23952 - P16 - 000	1.53 mm (0.0602 in)
M	23953 - P16 - 000	1.56 mm (0.0614 in)
N	23954 - P16 - 000	1.59 mm (0.0626 in)
O	23955 - P16 - 000	1.62 mm (0.0638 in)
P	23956 - P16 - 000	1.65 mm (0.0650 in)
Q	23957 - P16 - 000	1.68 mm (0.0661 in)
R	23958 - P16 - 000	1.71 mm (0.0673 in)
S	23959 - P16 - 000	1.74 mm (0.0685 in)
T	23960 - P16 - 000	1.77 mm (0.0697 in)
U	23961 - P16 - 000	1.80 mm (0.0709 in)
V	23962 - P16 - 000	1.83 mm (0.0720 in)
W	23963 - P16 - 000	1.86 mm (0.0732 in)
X	23964 - P16 - 000	1.89 mm (0.0744 in)
Y	23965 - P16 - 000	1.92 mm (0.0756 in)
Z	23966 - P16 - 000	1.95 mm (0.0768 in)
AA	23967 - P16 - 000	1.98 mm (0.0780 in)
AB	23968 - P16 - 000	2.01 mm (0.0791 in)
AC	23969 - P16 - 000	2.04 mm (0.0803 in)
AD	23970 - P16 - 000	2.07 mm (0.0815 in)
AE	23971 - P16 - 000	2.10 mm (0.0827 in)
AF	23972 - P16 - 000	2.13 mm (0.0839 in)
AG	23973 - P16 - 000	2.16 mm (0.0850 in)
AH	23974 - P16 - 000	2.19 mm (0.0862 in)
AI	23975 - P16 - 000	2.22 mm (0.0874 in)
AJ	23976 - P16 - 000	2.25 mm (0.0886 in)
AK	23977 - P16 - 000	2.28 mm (0.0898 in)
AL	23978 - P16 - 000	2.31 mm (0.0909 in)
AM	23979 - P16 - 000	2.34 mm (0.0921 in)
AN	23980 - P16 - 000	2.37 mm (0.0933 in)



7. Check the thrust clearance in the manner described below.

NOTE: Measurement should be made at normal room temperature.

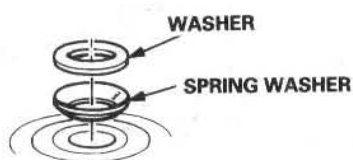
- a. Install the 78 mm shim selected and oil guide plate in the transmission housing.



- b. Install the spring washer and washer on the ball bearing.

NOTE:

- Clean the spring washer, washer and thrust shim thoroughly before installation.
- Install the spring washer, washer and thrust shim properly.

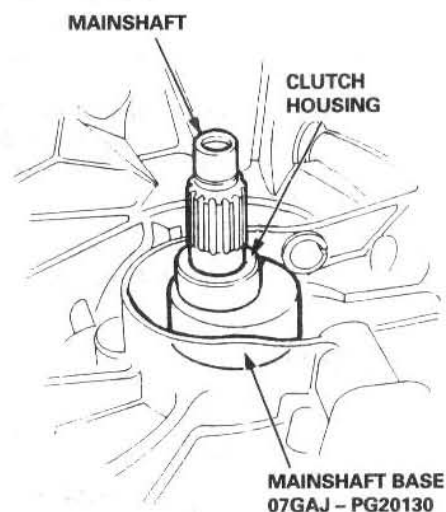


- c. Install the mainshaft in the clutch housing.
- d. Place the transmission housing over the mainshaft and onto the clutch housing.
- e. Tighten the clutch and transmission housings with several 8 mm and 10 mm bolts.

NOTE: It is not necessary to use sealing agent between the housings.

- f. Tap the mainshaft with a plastic hammer.

- g. Slide the special tool over the mainshaft.

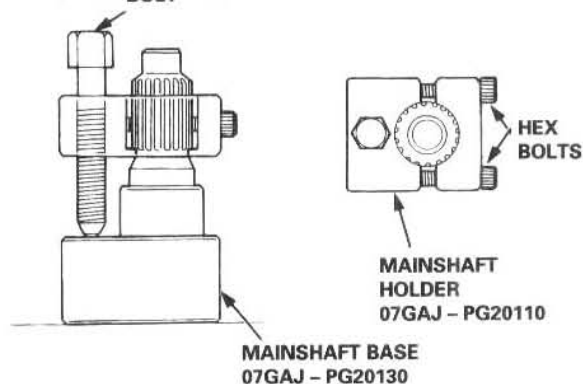


- h. Attach the special tool to the mainshaft as follows:

NOTE:

- Back-out the mainshaft holder bolt and loosen the two hex bolts.
- Fit the holder over the mainshaft so its lip is towards the transmission.
- Align the mainshaft holder's lip around the groove at the inside of the mainshaft splines, then tighten the hex bolts.

MAINSHAFT HOLDER BOLT



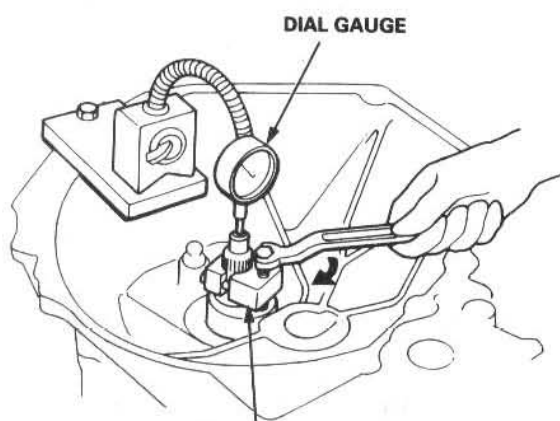
- i. Seat the mainshaft fully by tapping its end with a plastic hammer.
- j. Thread the mainshaft holder bolt in until it just contacts the wide surface of the mainshaft base.
- k. Zero a dial gauge on the end of the mainshaft.

(cont'd)

Adjustment (cont'd)

- l. Turn the mainshaft holder bolt clockwise; stop turning when the dial gauge has reached its maximum movement. The reading on the dial gauge is the amount of mainshaft end play.

CAUTION: Turning the mainshaft holder bolt more than 60 degrees after the needle of the dial gauge stops moving may damage the transmission.



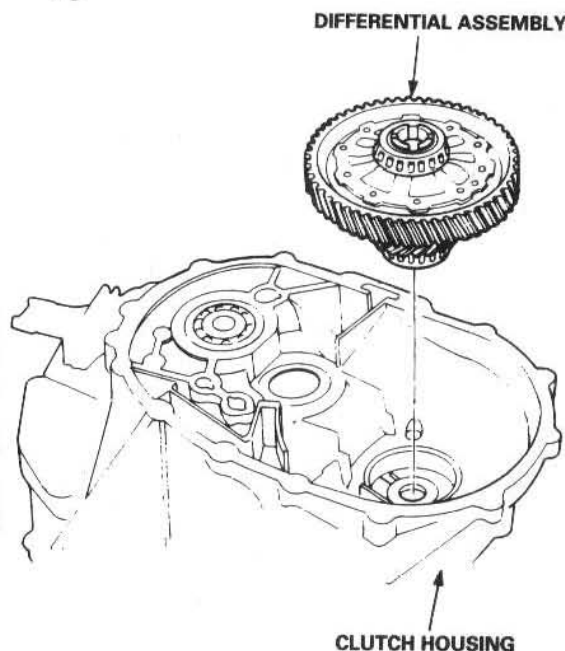
MAINSHAFT HOLDER
07GAJ - PG20110

- m. If the reading is within the standard, the clearance is correct.
If the reading is not within the standard, recheck the shim thickness.

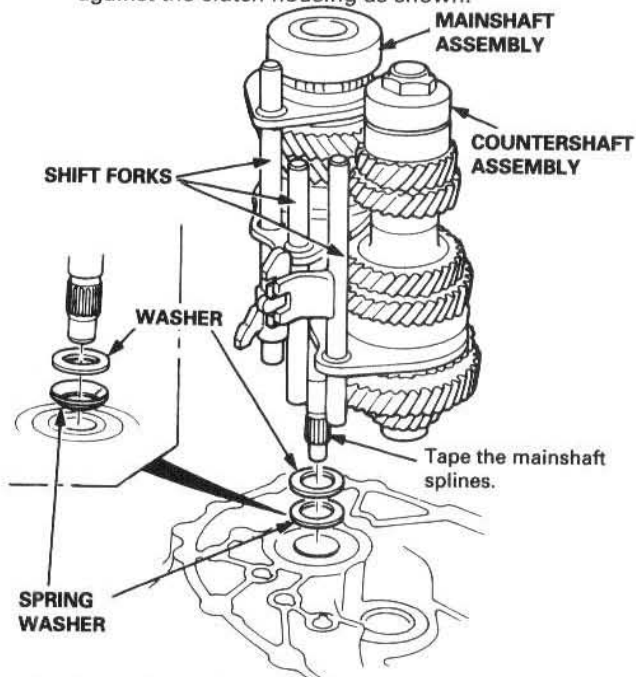
Standard: 0.10 - 0.16 mm (0.004 - 0.006 in)

Reassembly

1. Install the differential assembly in the clutch housing.



2. Install the spring washer and washer with the angle against the clutch housing as shown.

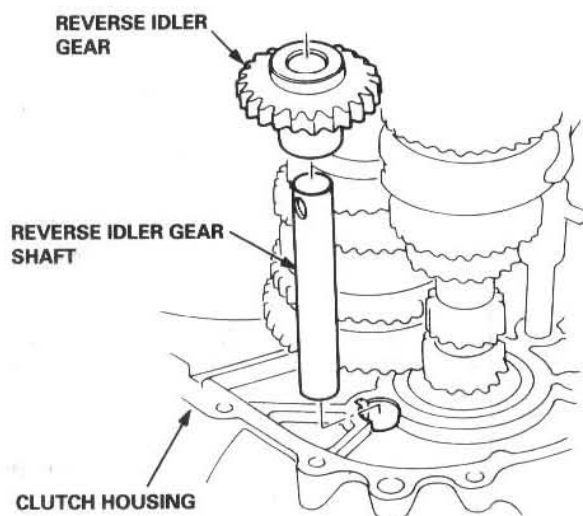


3. Insert the mainshaft and countershaft into the shift forks, and install them as an assembly.

NOTE: Before installing the mainshaft and countershaft assemblies, tape the mainshaft splines to protect them.

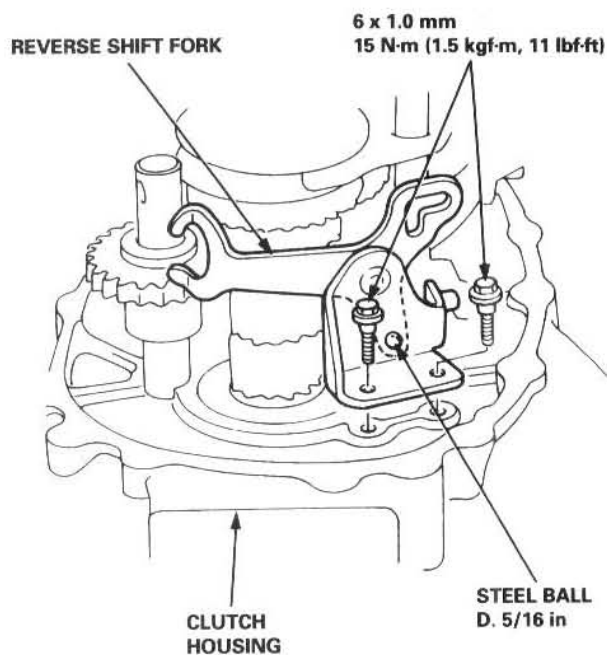


4. Install the reverse idler gear and reverse idler gear shaft in the clutch housing.

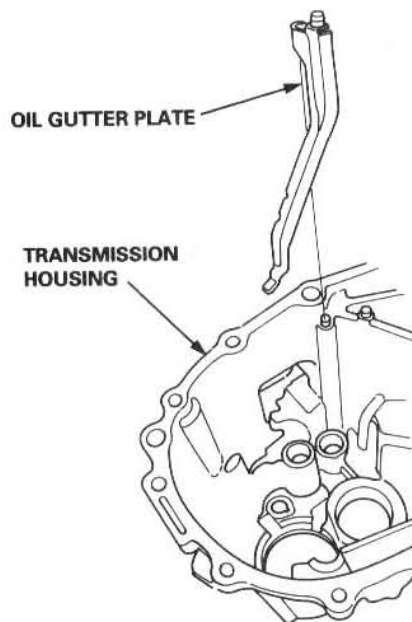


5. Install the reverse shift fork in the clutch housing with the 5th/reverse shift piece pin positioned in the slot of the reverse shift fork.

NOTE: Check that the steel ball is in the proper position.

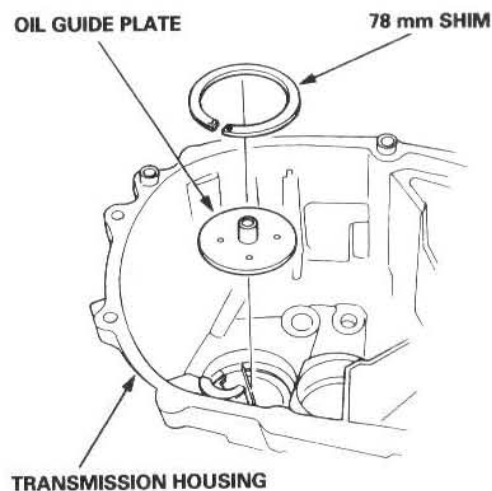


6. Install the oil gutter plate in the transmission housing.



NOTE: Select the 78 mm shim according to the measurements made on page 13-45.

7. Install the oil guide plate and 78 mm shim into the transmission housing.



(cont'd)

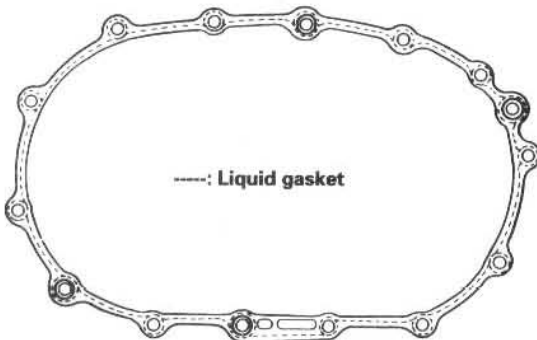
Transmission

Reassembly (cont'd)

8. Apply liquid gasket to the surface of the transmission housing as shown.

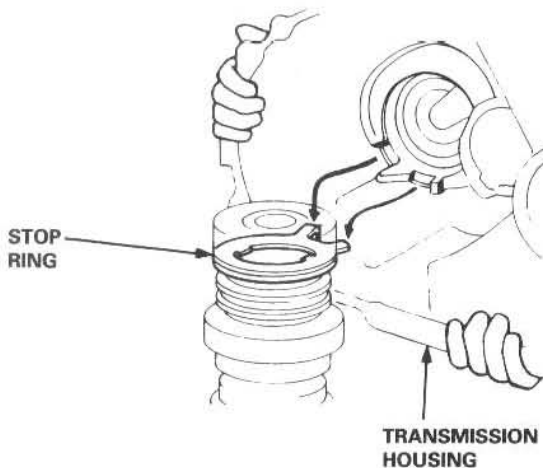
NOTE:

- Use liquid gasket (P/N 08718 - 0001 or 08718 - 0003).
- Remove the dirty oil from the sealing surface.
- Seal the entire circumference of the bolt holes to prevent oil leakage.
- If 20 minutes have passed after applying liquid gasket, reapply it and assemble the housings.
- Allow it to cure at least 20 minutes after assembly before filling the transmission with oil.

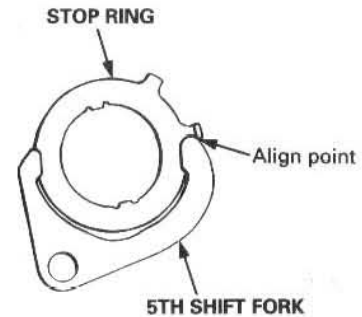


9. Install the 14 x 20 mm dowel pins.

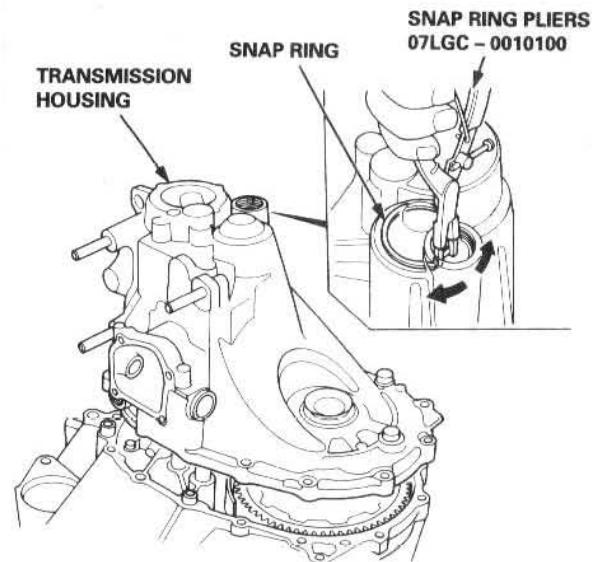
10. Set the stop ring as shown. Place the transmission housing over the clutch housing, being careful to line up the shafts.



NOTE: Align the stop ring with the 5th shift fork.



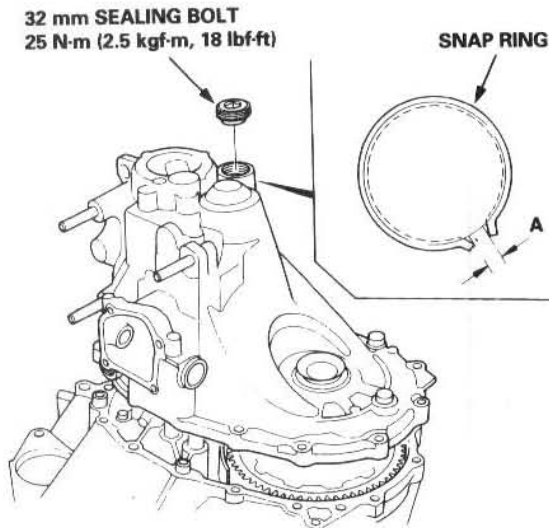
11. Lower the transmission housing with the special tool, and set the snap ring into the groove of the countershaft bearing.





12. Check that the snap ring is securely seated in the groove of the countershaft bearing.

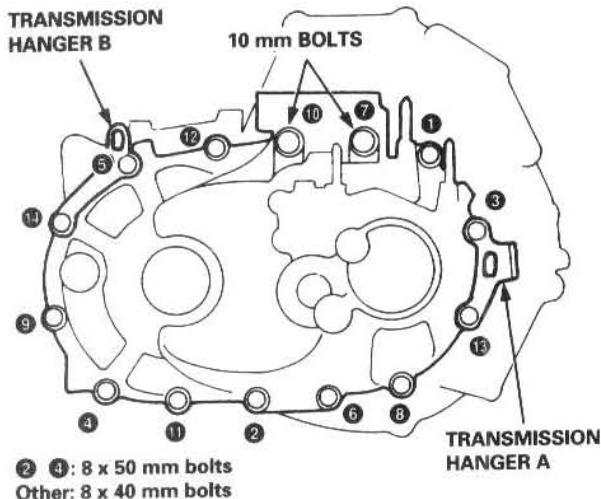
**Dimension A as installed: 3.6 – 6.3 mm
(0.142 – 0.248 in)**



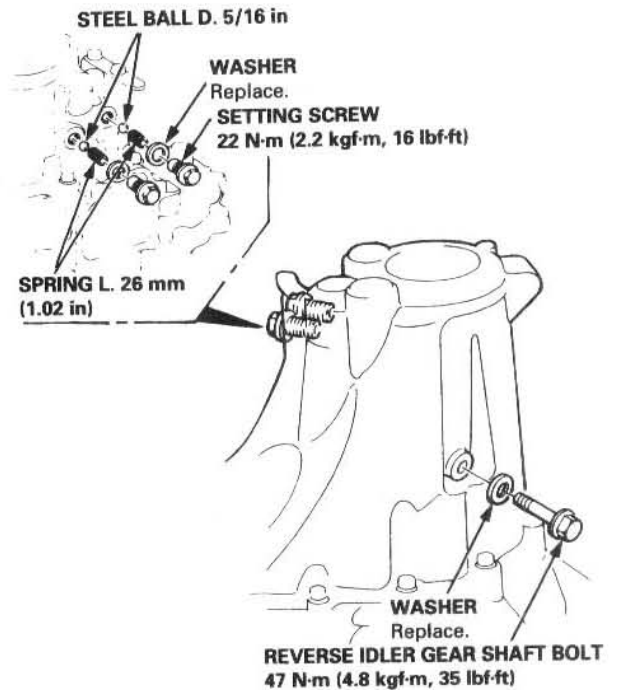
13. Apply liquid gasket (P/N 08718 – 0001) to the threads of the 32 mm sealing bolt, then install it on the transmission housing.

14. Install transmission hangers A and B, then tighten the bolts in a crisscross pattern in several steps as shown.

**8 x 1.25 mm bolts: 27 N-m (2.8 kgf-m, 20 lbf-ft)
10 x 1.25 mm bolts: 47 N-m (4.8 kgf-m, 35 lbf-ft)**



15. Install the reverse idler gear shaft bolt.



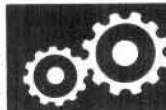
16. Install the steel balls, springs, washers and setting screws.

17. Install the shift arm cover assembly (see page 13-17).

18. Shift the transmission through all the gears before installing it.

Automatic Transmission

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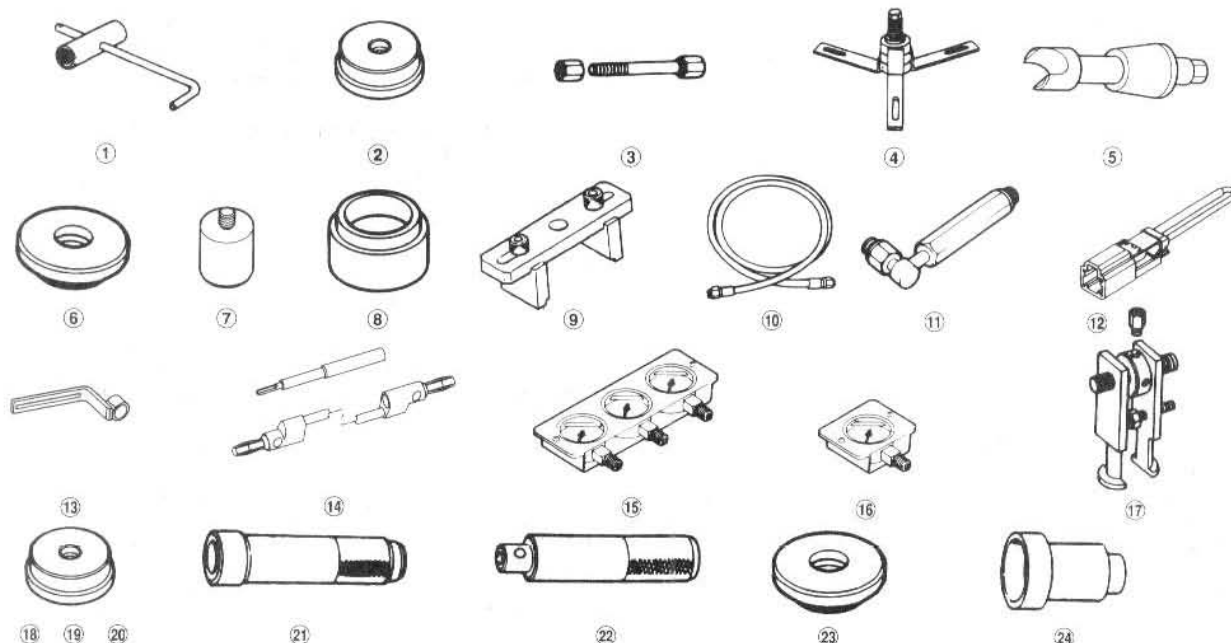


Special Tools

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①	07GAB – PF50101 or 07GAB – PF50100	Mainshaft Holder	1	14-137, 188
②	07GAD – SD40101	Attachment, 78 x 90 mm	1	14-176
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④	07HAC – PK40102	Housing Puller	1	14-139
⑤	07HAJ – PK40201	Preload Inspection Tool	1	14-175
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*⑨	07LAE – PX40100	Clutch Spring Compressor Attachment	2	14-164, 168
⑩	07MAJ – PY4011A	A/T Pressure Hose, 2210 mm	4	14-123
⑪	07MAJ – PY40120	A/T Pressure Hose Adapter	4	14-123
⑫	07PAZ – 0010100	SCS Service Connector	1	14-55
⑬	07SAC – P0Z0101	Housing Puller Arm, 205 mm	1	14-139
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⑮	07406 – 0020400	A/T Oil Pressure Gauge Set w/Panel	1	14-123
⑯	07406 – 0070300	A/T Low Pressure Gauge w/Panel	1	14-123
**⑰	07736 – A01000B or 07736 – A01000A	Adjustable Bearing Puller, 25 – 40 mm	1	14-161, 178, 179
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⑳	07746 – 0010600	Attachment, 72 x 75 mm	1	14-175, 176, 178, 180
㉑	07746 – 0030100	Driver 40 mm I.D.	1	14-156
㉒	07749 – 0010000	Driver	1	14-157, 161, 175, 176 14-177, 178, 179, 180
㉓	07947 – SD90101	Drive Attachment, 57 mm	1	14-177
㉔	07947 – 6340500	Driver Attachment	1	14-165, 169, 179

* 07HAE-PL50101 may be used to substitute one of these tools.

** Must be used with commercially available 3/8" – 16 slide hammer.





The automatic transmission is a 3-element torque converter and triple-shaft electronically controlled unit which provides 4 speeds forward and 1 reverse. The entire unit is positioned in line with the engine.

Torque Converter, Gears, and Clutches

The torque converter consists of a pump, turbine, and stator assembly in a single unit. They are connected to the engine crankshaft so they turn together as a unit as the engine turns. Around the outside of the torque converter is a ring gear which meshes with the starter pinion when the engine is being started. The torque converter assembly serves as a fly-wheel while transmitting power to the transmission mainshaft. The transmission has three parallel shafts: the mainshaft, the countershaft, and the secondary shaft. The mainshaft is in line with the engine crankshaft. The mainshaft includes the 3rd and 4th clutches, and gears for 3rd, 4th, reverse, and idler (reverse gear is integral with the 4th gear). The countershaft includes the final drive, 1st, 3rd, 4th, reverse, 2nd, parking, and idler gears (the final drive gear is integral with the countershaft). The secondary shaft includes the 1st and 2nd clutches, and gears for 1st, 2nd, and idler. The countershaft 4th gear and the countershaft reverse gear can be locked to the countershaft at its center, providing 4th gear or reverse, depending on which way the selector moved. The gears on the mainshaft and the secondary shaft are in constant mesh with those on the countershaft. When certain combinations of gears in the transmission are engaged by the clutches, power is transmitted from the mainshaft and the secondary shaft to the countershaft to provide **D₄**, **D₃**, **2**, **1**, and **R** positions.

Electronic Control

The electronic control system consists of the Transmission Control Module (TCM), sensors, and six solenoid valves. Shifting and lock-up are electronically controlled for comfortable driving under all conditions. The TCM is located below the dashboard, under the front lower panel on the passenger's side.

Hydraulic Control

The valve bodies include the main valve body, the regulator valve body, the servo body, and the accumulator body. They are bolted on the torque converter housing. The main valve body contains the manual valve, the modulator valve, the shift valve C, the shift valve D, the shift valve E, the servo control valve, the torque converter check valve, the reverse CPC valve, the lock-up shift valve, the lock-up control valve, the cooler check valve, and the ATF pump gears. The regulator valve body contains the regulator valve, the lock-up timing valve, and the relief valve. The servo body contains the servo valve, the shift valve A, the shift valve B, the CPC valves A and B, and the 3rd and 4th accumulators. The accumulator body contains the 1st and 2nd accumulators and the lubrication check valve. Fluid from the regulator passes through the manual valve to the various control valves. The 1st, 3rd, and 4th clutches receive fluid from their respective feed pipes, and the 2nd clutch receives fluid from the internal hydraulic circuit.

Shift Control Mechanism

The TCM controls shift control solenoid valves A, B, and C, and A/T clutch pressure control solenoid valves A and B, while receiving input signals from various sensors located throughout the vehicle. The shift control solenoid valves shift the positions of the shift valves to switch the port leading hydraulic pressure to the clutch. The A/T clutch pressure control solenoid valves A and B control the CPC valves A and B to shift smoothly between lower gear and higher gear. This pressurizes a line to one of the clutches, engaging the clutch and its corresponding gear.

Lock-up Mechanism

In **D₄** position, and sequential sportshift mode (2nd, 3rd and 4th), and **D₃** position (2nd and 3rd), pressurized fluid is drained from the back of the torque converter through a fluid passage, causing the lock-up piston to be held against the torque converter cover. As this takes place, the mainshaft rotates at the same speed as the engine crankshaft. Together with hydraulic control, the TCM optimizes the timing of the lock-up mechanism. When the lock-up control solenoid valve activates, modulator pressure changes to switch lock-up on and off. The lock-up control valve and the lock-up timing valve control the range of lock-up according to A/T clutch pressure control solenoid valves A and B. The lock-up control solenoid valve is mounted on the torque converter housing, and A/T clutch pressure control solenoid valves A and B are mounted on the transmission housing. They are all controlled by the TCM.

(cont'd)

Description

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Gear Selection

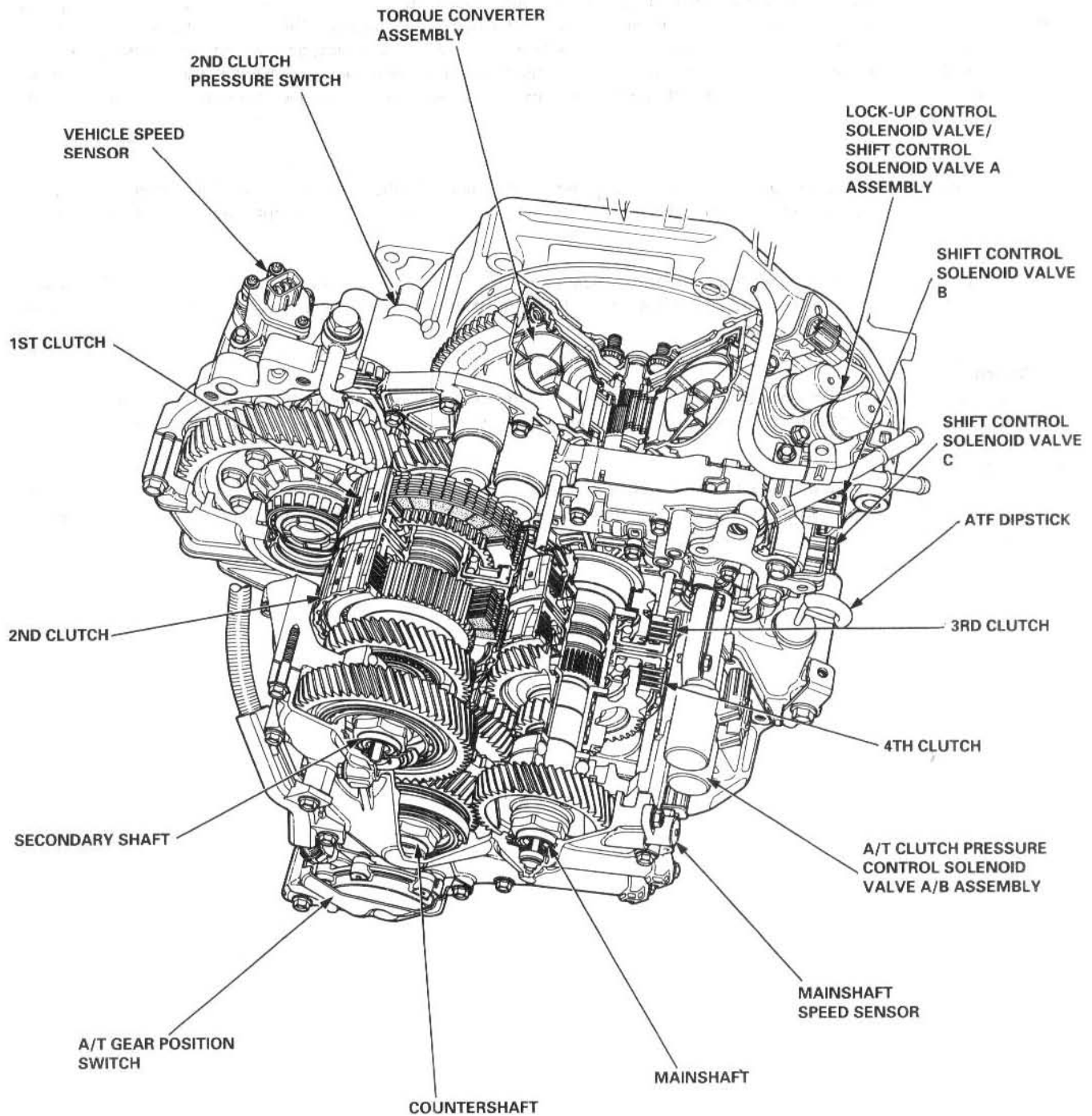
The shift lever has eight positions: **P** PARK, **R** REVERSE, **N** NEUTRAL, **D₄** 1st through 4th gear ranges, **D₃** 1st through 3rd gear ranges, **2** 2nd gear, and **1** 1st gear. Also sequential sportshift mode has been adopted in **D₄** position.

Position	Description
P PARK	Front wheels locked; park pawl engaged with the park gear on the countershaft. All clutches released.
R REVERSE	Reverse; reverse selector engaged with countershaft reverse gear and 4th clutch engaged.
N NEUTRAL	All clutches released.
D₄ DRIVE (1st through 4th: automatic shifting)	General driving; starts off in 1st, shifts automatically to 2nd, 3rd, then 4th, depending on vehicle speed and throttle position. Downshifts through 3rd, 2nd, and 1st on deceleration to stop. The lock-up mechanism comes into operation in 2nd, 3rd, and 4th gears.
(1st through 4th: sequential sport- shifting) 1 or 2 or 3 or 4 DRIVE	Sequential sportshift driving; shifts between 1st and 4th with the shift lever, much like a manual transmission. The transmission will automatically downshift from 4th gear to 3rd gear to get more power when climbing or to provide engine braking when going down a steep hill. When the vehicle decelerates to a stop, the transmission shifts to 1st gear automatically. The lock-up mechanism comes into operation in 2nd, 3rd, and 4th gears.
D₃ DRIVE (1st through 3rd)	For rapid acceleration at highway speeds and general driving; up-hill and down-hill driving; starts off in 1st, shifts automatically to 2nd, then 3rd, depending on vehicle speed and throttle position. Downshifts through 2nd to 1st on deceleration to a stop. The lock-up mechanism comes into operation in 2nd and 3rd gears.
2 SECOND	Driving in 2nd gear; stays in 2nd gear, does not shift up and down. For engine braking or better traction starting off on loose slippery surface.
1 FIRST	Driving in 1st gear; stays in 1st gear, does not shift up. For engine braking.

Starting is possible only in **P** and **N** positions through use of a slide-type, neutral-safety switch.

Automatic Transaxle (A/T) Gear Position Indicator

The A/T gear position indicator in the instrument panel shows what gear has been selected without looking down at the console. With the shift lever in the **D₄** position (Sequential sportshift mode), the indicator light next to the **D₄** indicator light in the instrument panel will display the gear selected.



Description

Clutches

The four-speed automatic transmission uses hydraulically-actuated clutches to engage or disengage the transmission gears. When hydraulic pressure is introduced into the clutch drum, the clutch piston moves. This presses the friction discs and steel plates together, locking them so they don't slip. Power is then transmitted through the engaged clutch pack to its hub-mounted gear. Likewise, when the hydraulic pressure is bled from the clutch pack, the piston releases the friction discs and the steel plates, and they are free to slide past each other. This allows the gear to spin independently on its shaft, transmitting no power.

1st Clutch

The 1st clutch engages/disengages 1st gear, and is located at the middle of the secondary shaft. The 1st clutch is joined back-to-back to the 2nd clutch. The 1st clutch is supplied hydraulic pressure by its ATF feed pipe within the secondary shaft.

2nd Clutch

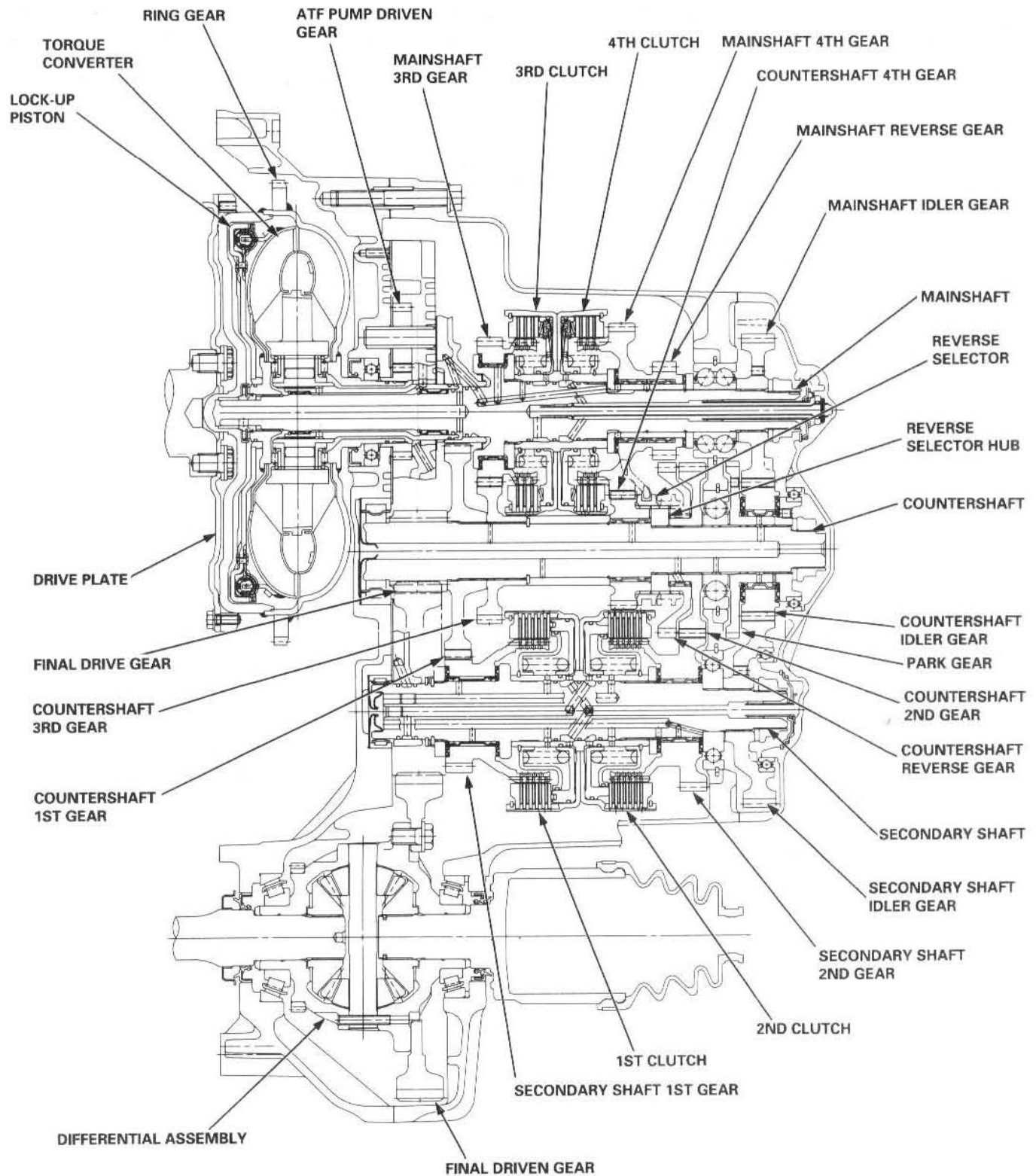
The 2nd clutch engages/disengages 2nd gear, and is located at the middle of the secondary shaft. The 2nd clutch is joined back-to-back to the 1st clutch. The 2nd clutch is supplied hydraulic pressure through the secondary shaft by a circuit connected to the internal hydraulic circuit.

3rd Clutch

The 3rd clutch engages/disengages 3rd gear, and is located at the middle of the mainshaft. The 3rd clutch is joined back-to-back to the 4th clutch. The 3rd clutch is supplied hydraulic pressure by its ATF feed pipe within the mainshaft.

4th Clutch

The 4th clutch engages/disengages 4th gear, as well as reverse gear, and is located at the middle of the mainshaft. The 4th clutch is joined back-to-back to the 3rd clutch. The 4th clutch is supplied hydraulic pressure by its ATF feed pipe within the mainshaft.



Description

Power Flow

POSITION	PART	TORQUE CONVERTER	1ST GEAR 1ST CLUTCH	2ND GEAR 2ND CLUTCH	3RD GEAR 3RD CLUTCH	4TH		REVERSE GEAR	PARK GEAR
						GEAR	CLUTCH		
P		○	×	×	×	×	×	×	○
R		○	×	×	×	×	○	○	×
N		○	×	×	×	×	×	×	×
D₄	1ST	○	○	×	×	×	×	×	×
	2ND	○	×	○	×	×	×	×	×
	3RD	○	×	×	○	×	×	×	×
	4TH	○	×	×	×	○	○	×	×
D₃	1ST	○	○	×	×	×	×	×	×
	2ND	○	×	○	×	×	×	×	×
	3RD	○	×	×	○	×	×	×	×
2		○	×	○	×	×	×	×	×
1		○	○	×	×	×	×	×	×

○: Operates

×: Doesn't operate

Gear Operation

Gears on the mainshaft:

- The 3rd gear is engaged/disengaged with the mainshaft by the 3rd clutch.
- The 4th gear is engaged/disengaged with the mainshaft by the 4th clutch.
- The reverse gear is engaged/disengaged with the mainshaft by the 4th clutch.
- The idler gear is splined to the mainshaft and rotates with the mainshaft.

Gears on the countershaft:

- The final drive gear is integral with the countershaft.
- The 1st gear, 3rd gear, 2nd gear, and park gear are splined to the countershaft, and rotate with the countershaft.
- The 4th gear and reverse gear rotate freely from the countershaft. The reverse selector engages the 4th gear or the reverse gear with the reverse selector hub. The reverse selector hub is splined with the countershaft so that the 4th gear or reverse gear engage with the countershaft.
- The idler gear rotates freely from the countershaft.

Gears on the secondary shaft:

- The 1st gear is engaged/disengaged with the secondary shaft by the 1st clutch.
- The 2nd gear is engaged/disengaged with the secondary shaft by the 2nd clutch.
- The idler gear is splined to the secondary shaft and rotates with the secondary shaft.

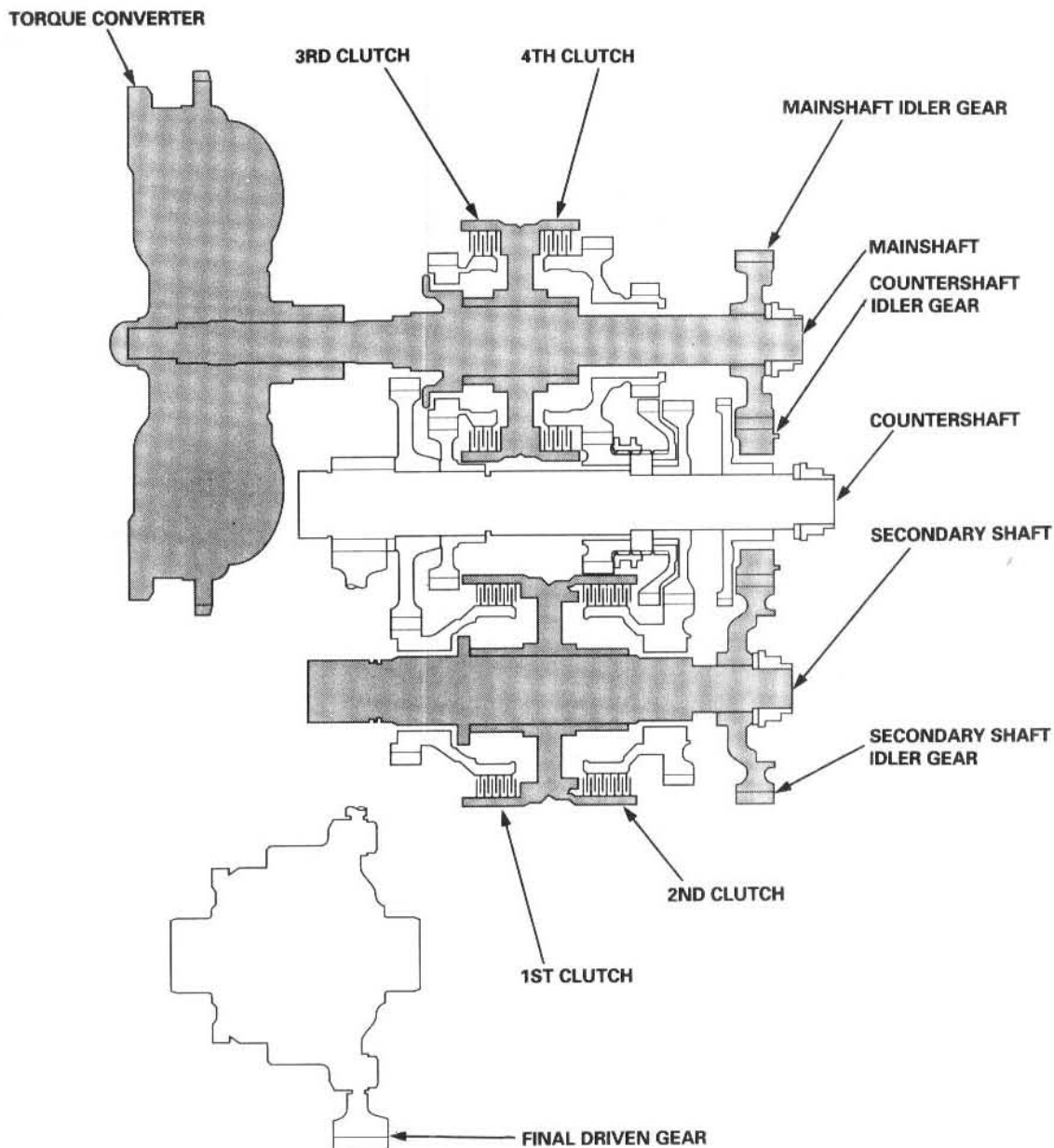


[P] Position

Hydraulic pressure is not applied to the clutches. Power is not transmitted to the countershaft. The countershaft is locked by the park pawl interlocking the park gear.

[N] Position

Engine power transmitted from the torque converter drives the mainshaft idler gear, the countershaft idler gear, and the secondary shaft idler gear, but hydraulic pressure is not applied to the clutches. Power is not transmitted to the countershaft. The countershaft 4th gear is engaged with the reverse selector hub and the countershaft by the reverse selector, when the shift lever is shifted in **[N]** position from **[D₄]** position. The countershaft reverse gear is engaged when shifted from **[R]** position.



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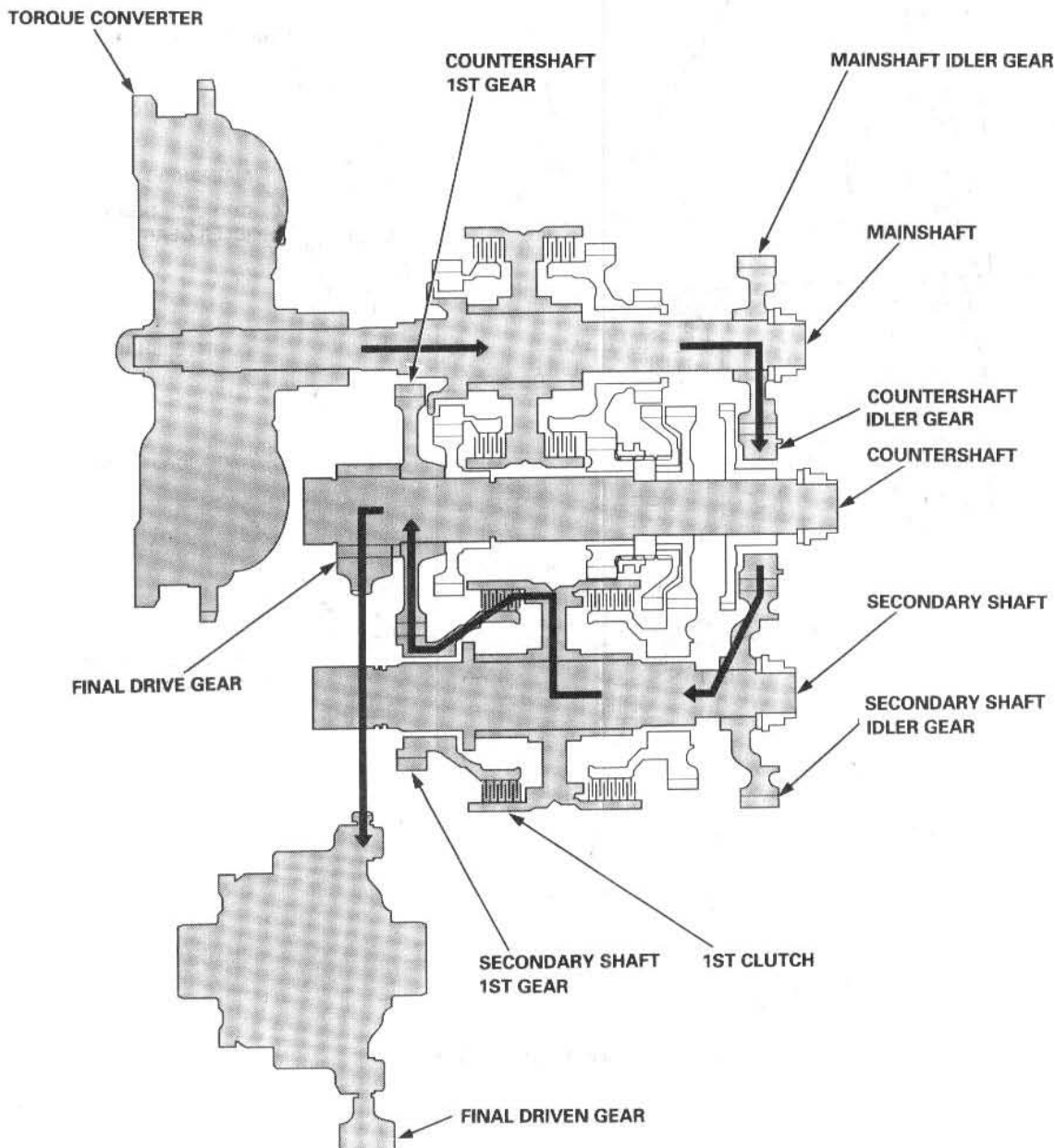
Description

Power Flow (cont'd)

In **D₄** or **D₃** position, the optimum gear is automatically selected from 1st, 2nd, 3rd, and 4th gears, according to conditions such as the balance between the throttle opening (engine loading) and vehicle speed.

D₄ or **D₃** Position in 1st gear and **1** Position

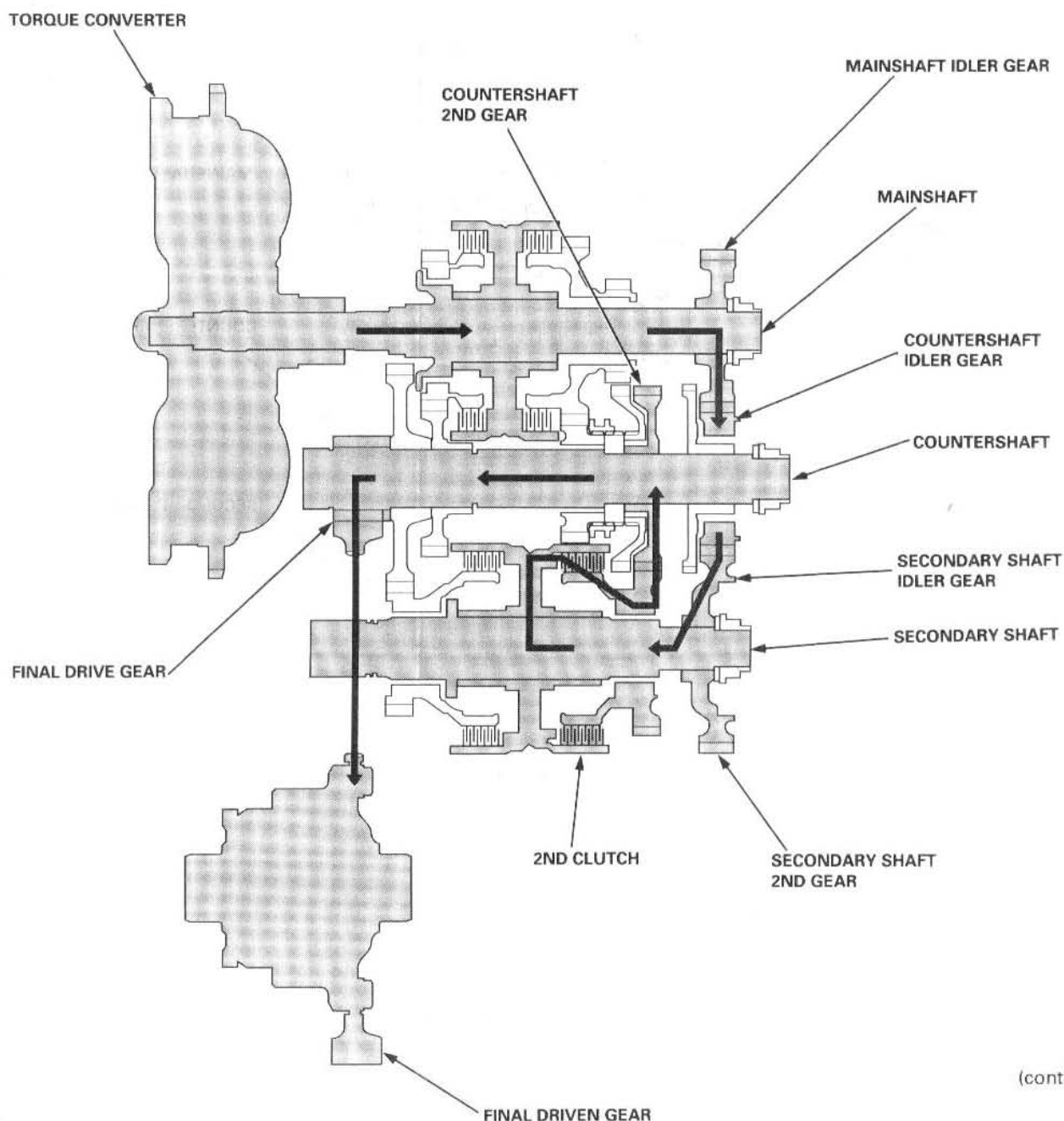
1. Hydraulic pressure is applied to the 1st clutch, then the 1st clutch engages the secondary shaft 1st gear with the secondary shaft.
2. The mainshaft idler gear drives the secondary shaft via the countershaft idler gear and secondary shaft idler gear.
3. The secondary shaft 1st gear drives the countershaft 1st gear and the countershaft.
4. Power is transmitted to the final drive gear, which in turn drives the final driven gear.





D₄ or D₅ Position in 2nd gear and 2 Position

1. Hydraulic pressure is applied to the 2nd clutch, then the 2nd clutch engages the secondary shaft 2nd gear with the secondary shaft.
2. The mainshaft idler gear drives the secondary shaft via the countershaft idler gear and secondary shaft idler gear.
3. The secondary shaft 2nd gear drives the countershaft 2nd gear and the countershaft.
4. Power is transmitted to the final drive gear, which in turn drives the final driven gear.



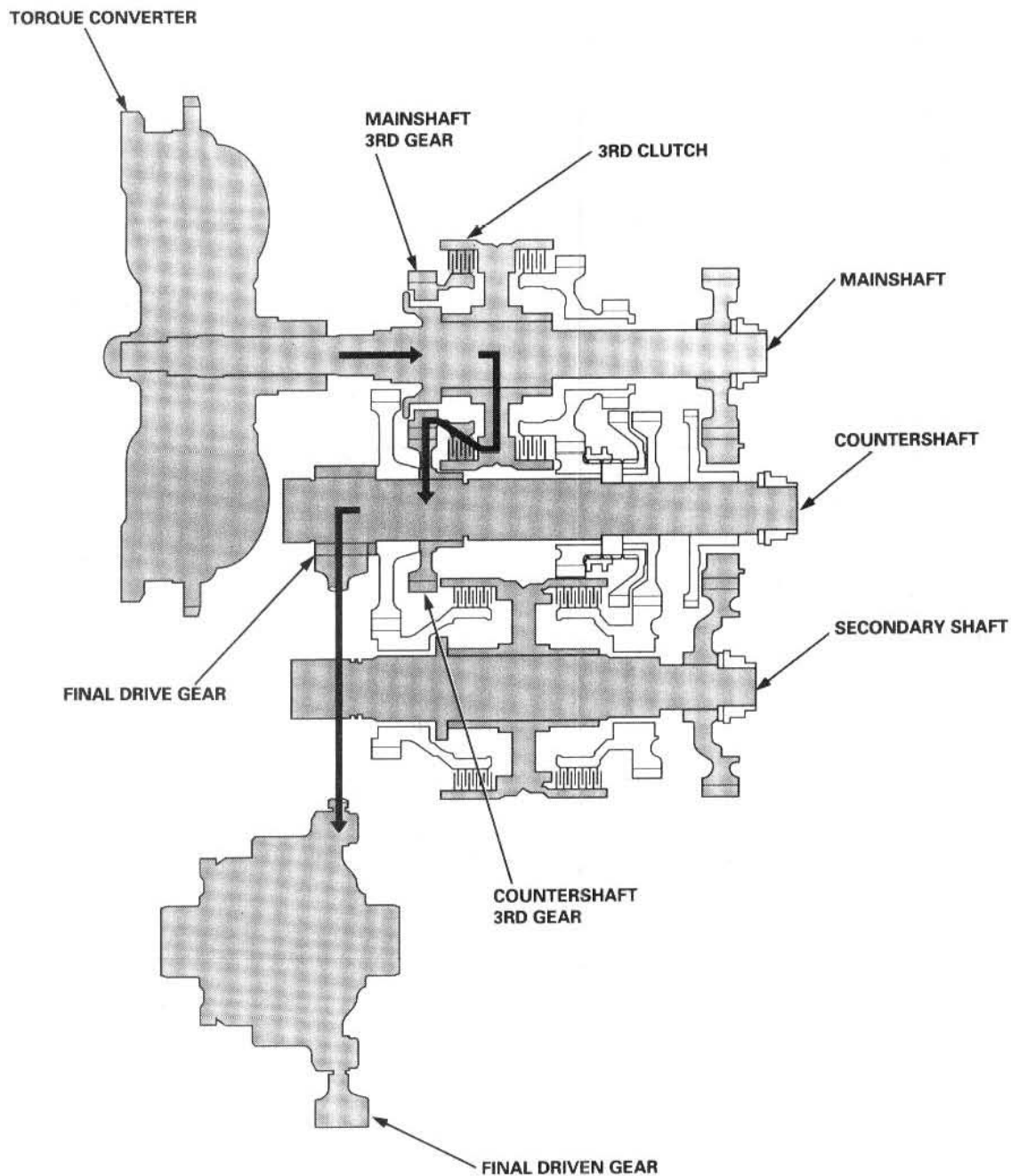
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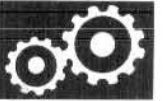
Description

Power Flow (cont'd)

D₄ or **D₃** Position in 3rd gear

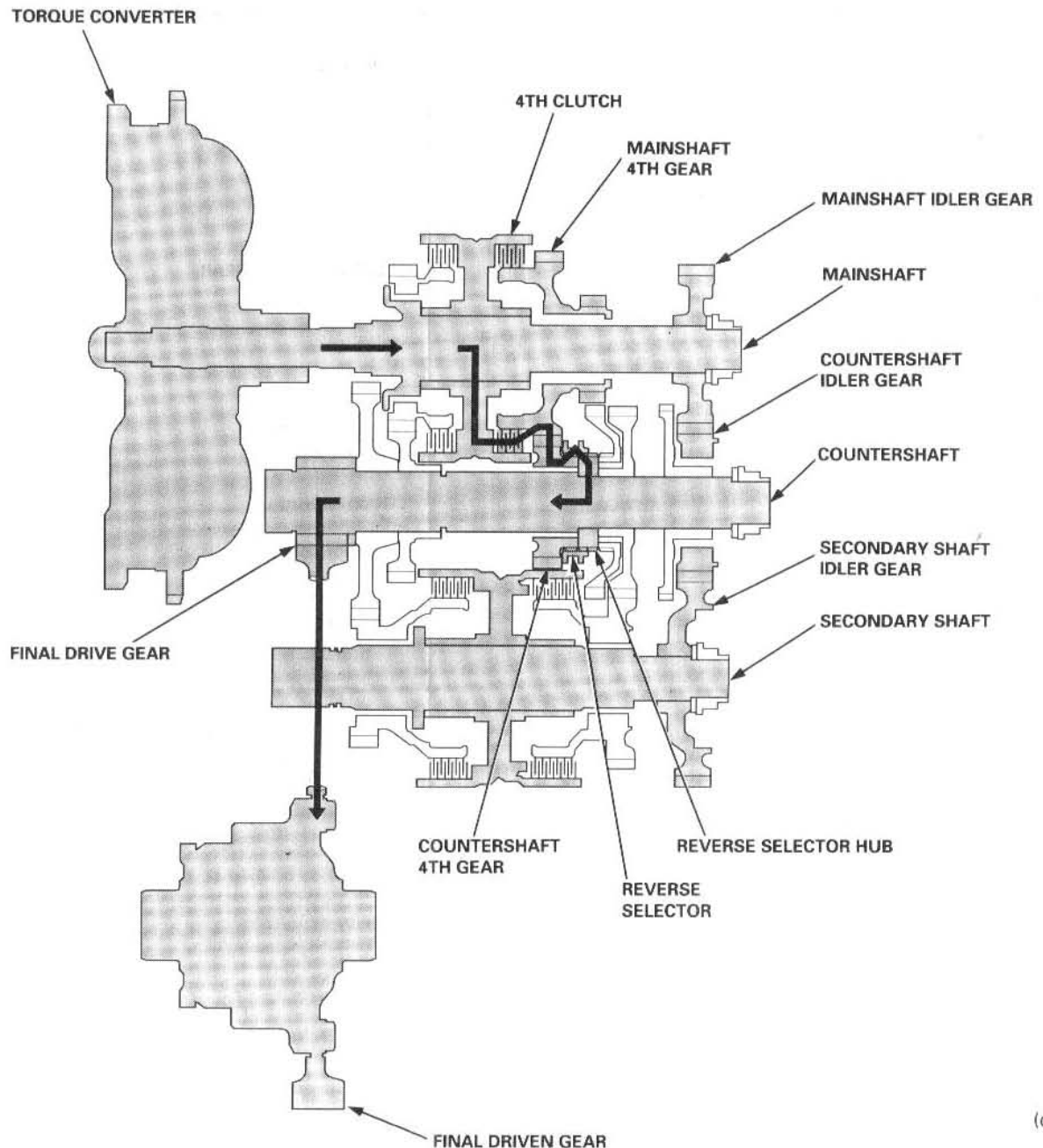
1. Hydraulic pressure is applied to the 3rd clutch, then the 3rd clutch engages the mainshaft 3rd gear with the mainshaft.
2. The mainshaft 3rd gear drives the countershaft 3rd gear and the countershaft.
3. Power is transmitted to the final drive gear, which in turn drives the final driven gear.





D₄ Position in 4th gear

1. Hydraulic pressure is applied to the servo valve to engage the reverse selector with the countershaft 4th gear while the shift lever is in the forward range (**D₄**, **D₃**, **2** and **1** position).
2. Hydraulic pressure is also applied to the 4th clutch, then the 4th clutch engages the mainshaft 4th gear with the mainshaft.
3. The mainshaft 4th gear drives the countershaft 4th gear, which drives the reverse selector hub and the countershaft.
4. Power is transmitted to the final drive gear, which in turn drives the final driven gear.



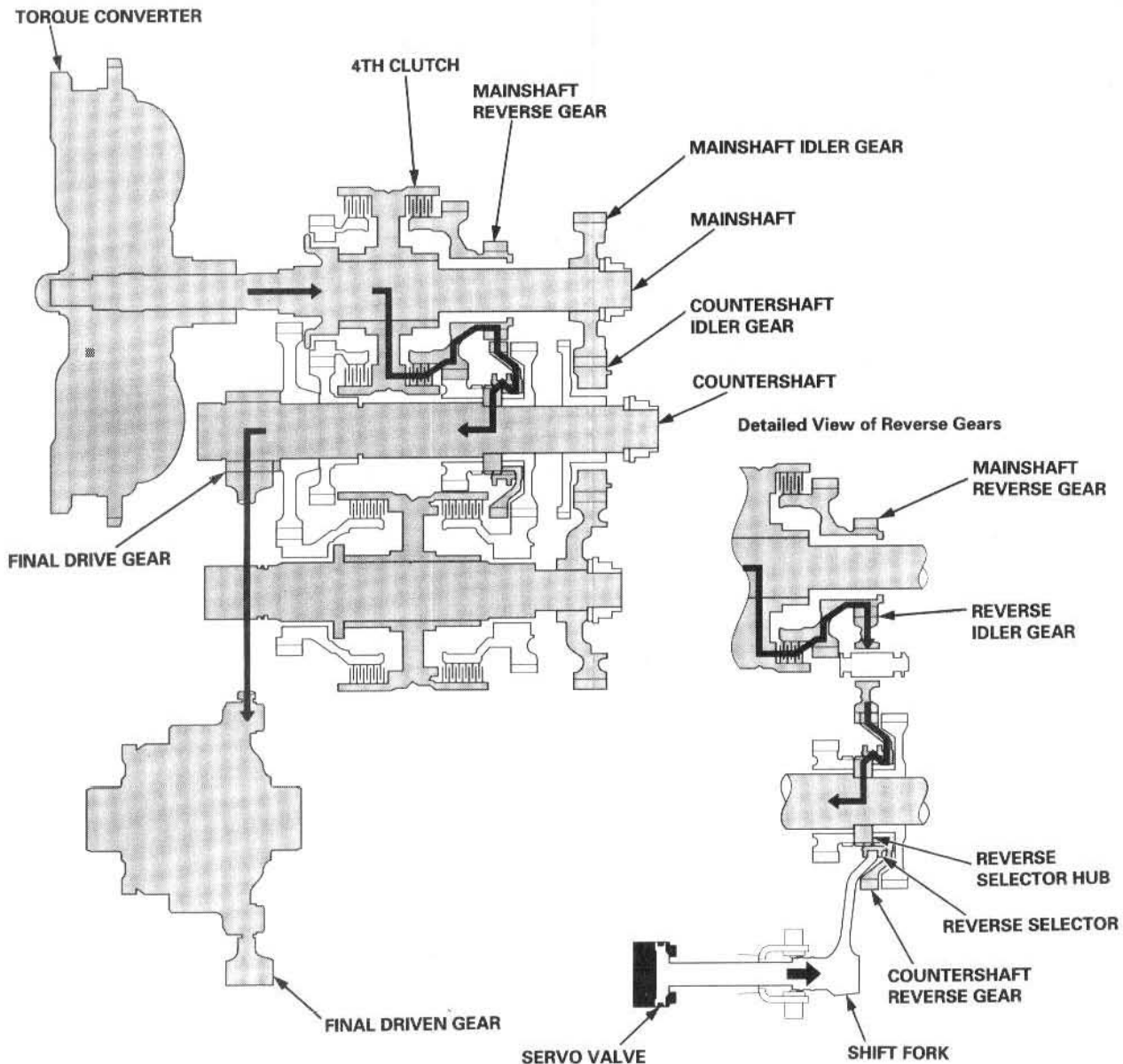
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Description

Power Flow (cont'd)

R Position

1. Hydraulic pressure is applied to the servo valve to engage the reverse selector with the countershaft reverse gear while the shift lever is in the **R** position.
2. Hydraulic pressure is also applied to the 4th clutch, then the 4th clutch engages the mainshaft reverse gear with the mainshaft.
3. The mainshaft reverse gear drives the countershaft reverse gear via the reverse idler gear.
4. The rotation direction of the countershaft reverse gear is changed via the reverse idler gear.
5. The countershaft reverse gear drives the countershaft via the reverse selector, which drives the reverse selector hub.
6. Power is transmitted to the final drive gear, which in turn drives the final driven gear.

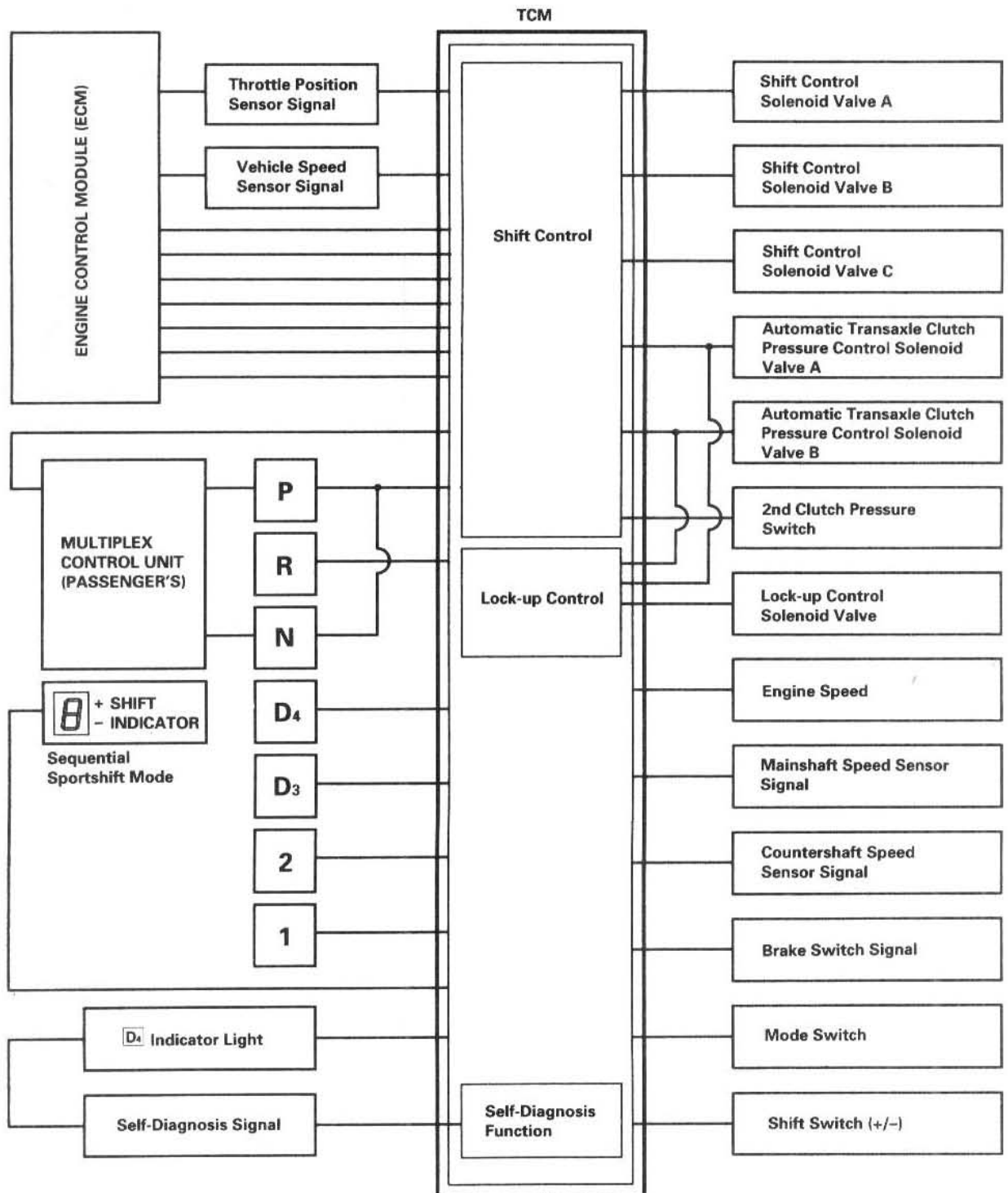




Electronic Control System

Electronic Control

The electronic control system consists of the Transmission Control Module (TCM), sensors, and six solenoid valves. Shifting and lock-up are electronically controlled for comfortable driving under all conditions. The TCM is located below the dashboard, under the front lower panel on the passenger's side.



(cont'd)

Description

Electronic Control System (cont'd)

Shift Control

Shifting is related to engine torque through the A/T clutch pressure control solenoids, which are controlled by the TCM. The TCM instantly determines which gear should be selected, by various signals sent from sensors, and actuates the shift control solenoid valves A, B, and C to control shifting. Also, a sequential sportshift mode has been adopted to shift gears up and down manually in **D_s** position while using the shift lever.

The combination of driving signals to shift control solenoid valves A, B, and C are shown in the table below.

Position	Gear position	Shift control solenoid valves		
		A	B	C
D_s , D₃	Shifting from N position	ON	ON	ON
	Stays in 1st	OFF	ON	ON
	Shifting gears between 1st and 2nd	ON	ON	ON
	Stays in 2nd	ON	ON	OFF
	Shifting gears between 2nd and 3rd	ON	OFF	OFF
	Stays in 3rd	ON	OFF	ON
D₄	Shifting gears between 3rd and 4th	OFF	OFF	ON
	Stays in 4th	OFF	OFF	OFF
2	2nd	ON	ON	OFF
1	1st	OFF	ON	ON
R	Shifting from P and N position	OFF	ON	ON
	Stays in reverse	OFF	ON	OFF
P	Park	OFF	ON	OFF
N	Neutral	OFF	ON	OFF

Sequential SportShift mode

In **D_s** position while sliding the shift lever to the sequential sportshift mode position, the driver can use the shift lever to shift gears up and down, much like a manual transmission.

- Pushing the shift lever toward the "+" mark: Transmission upshifts to the next higher gear.
- Pulling the shift lever toward the "-" mark: Transmission downshifts.

The number of the selected gear is displayed in the shift indicator next to the **D_s** indicator.

The transmission does not automatically upshift and downshift, and remains in the selected gear position (4th, 3rd 2nd and 1st). However, the transmission will automatically downshift as follows:

- Downshift from 4th gear to 3rd gear to get more power when climbing or to provide engine braking when going down a steep hill.
- Downshift to 1st gear when the vehicle comes to stop.

To prevent engine over-revving, the transmission has 4-3, 3-2 and 2-1 downshift allowable speeds. When the vehicle is coasting over the 4-3 downshift allowable speed, 3-2 downshift allowable speed, and 2-1 downshift allowable speed, the TCM does not input the downshift signal from the shift switch, and the transmission does not downshift. When the vehicle is coasting over the 4-3 downshift allowable speed in 4th gear, and the 3-2 downshift allowable speed in 3rd gear, the TCM inputs the signal to wait until it reaches the downshift allowable speed, then the shift indicator blinks several times to indicate the lower gear position.



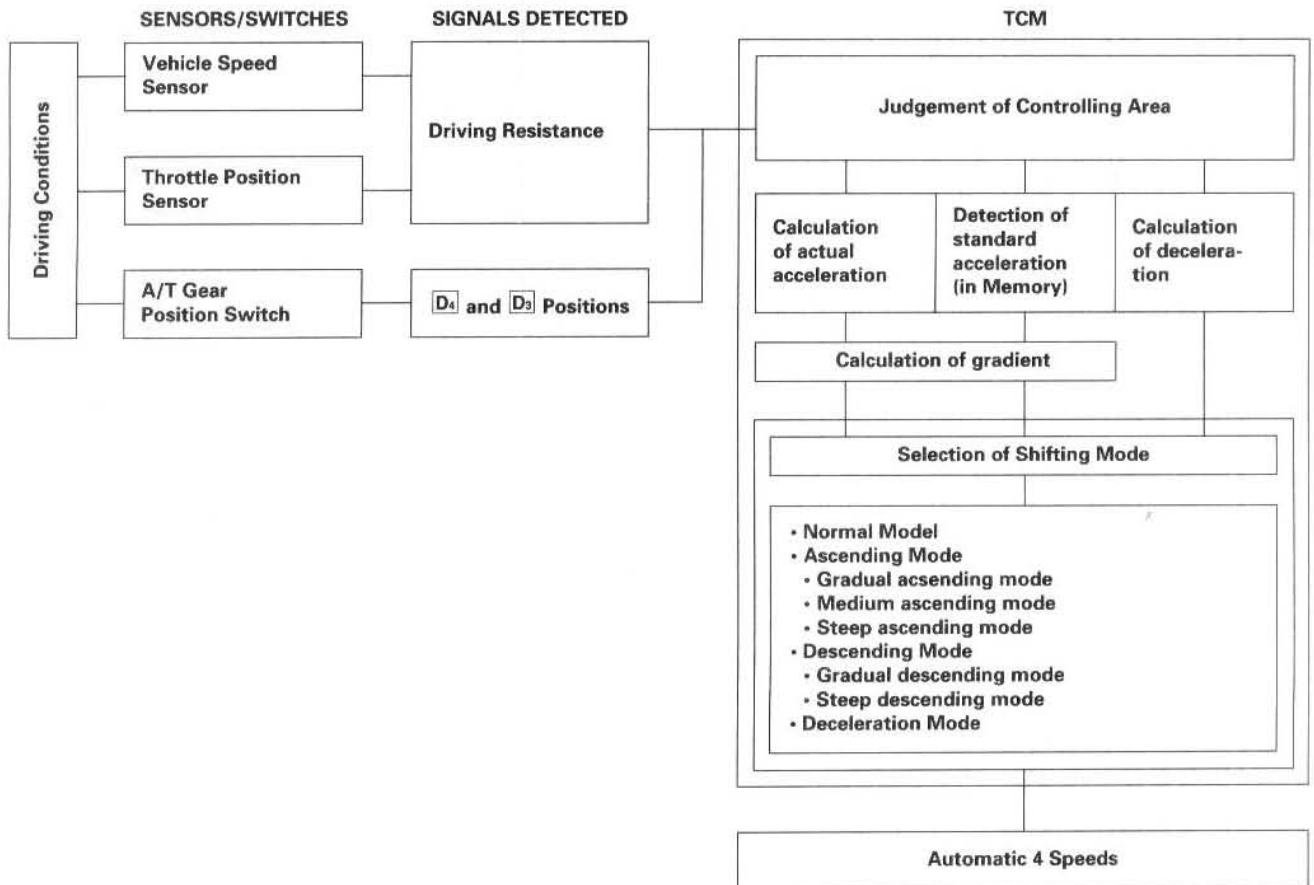
Lock-up Control

The lock-up control solenoid valve controls modulator pressure to switch the lock-up shift valve and lock-up on and off. The TCM controls the lock-up control solenoid valve and the A/T clutch pressure control solenoid valves A and B. When the lock-up control solenoid valve is turned on, the condition of lock-up starts. The A/T clutch pressure control solenoid valves A and B regulate A/T clutch pressure control solenoid pressure, and apply pressure to the lock-up control valve and the lock-up timing valve; those of the lock-up control mechanism come into operation in 2nd, 3rd, and 4th gear in **D₄** and sequential sportshift mode, and in 2nd and 3rd gear in **D₃** positions.

Grade Logic Control System

How it works:

The TCM compares actual driving conditions with driving conditions memorized in the TCM, based on the input from the vehicle speed sensor, the throttle position sensor, the brake switch signal, and the shift lever position signal, to control shifting while the vehicle is ascending or descending a slope, or reducing speed.



(cont'd)

Description

Electronic Control System (cont'd)

Ascending Control

When the TCM determines that the vehicle is climbing a hill in **D₄** position, the shift-up speed from 3rd to 4th gear becomes faster than the set speed for normal mode (flat road) driving to widen the 3rd gear driving area, so the vehicle can run smooth and have more power when needed. There are three ascending modes with different 3rd gear driving areas. The modes are based on information stored in the TCM.

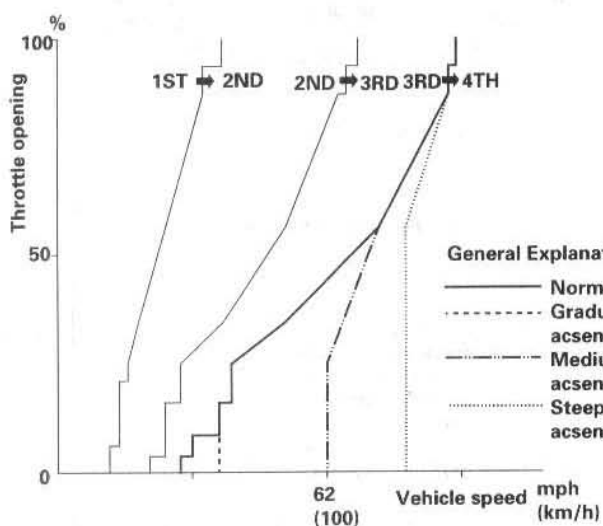
Descending Control

When the TCM determines that the vehicle is going down a hill in **D₄** position, the shift-up speed from 3rd to 4th gear when the throttle is closed becomes faster than the set speed for normal mode (flat road) driving to widen the 3rd gear driving area. This, in combination with engine braking from the deceleration lock-up, achieves smooth driving when the vehicle is descending. There are two descending modes with different 3rd gear driving areas. The modes are based on information stored in the TCM. When the vehicle is in 4th gear, and you are decelerating on a gradual hill, or when you are applying the brakes on a steep hill, the transmission will downshift to 3rd gear. When you accelerate, the transmission will then return to 4th gear.

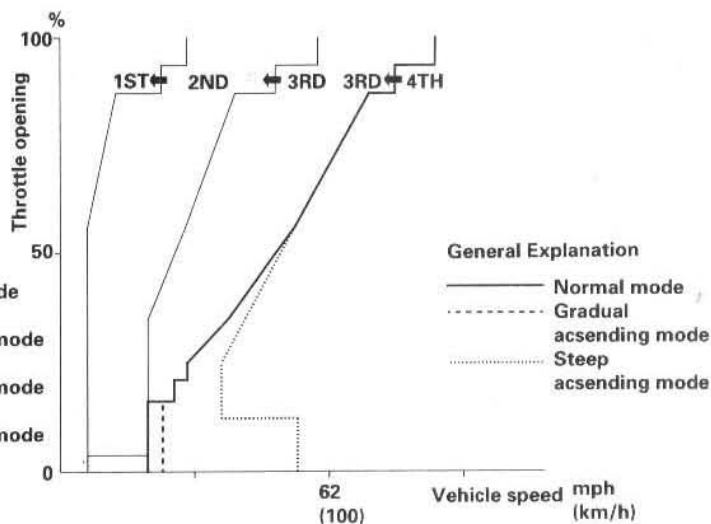
Deceleration Control

When the vehicle goes around a corner, and needs to decelerate first and then accelerate, the TCM sets the data for deceleration control to reduce the number of times the transmission shifts. When the vehicle is decelerating from speeds above 30 mph (48 km/h), the TCM shifts the transmission from 4th to 2nd earlier than normal to cope with upcoming acceleration.

Upshift Schedule



Downshift Schedule



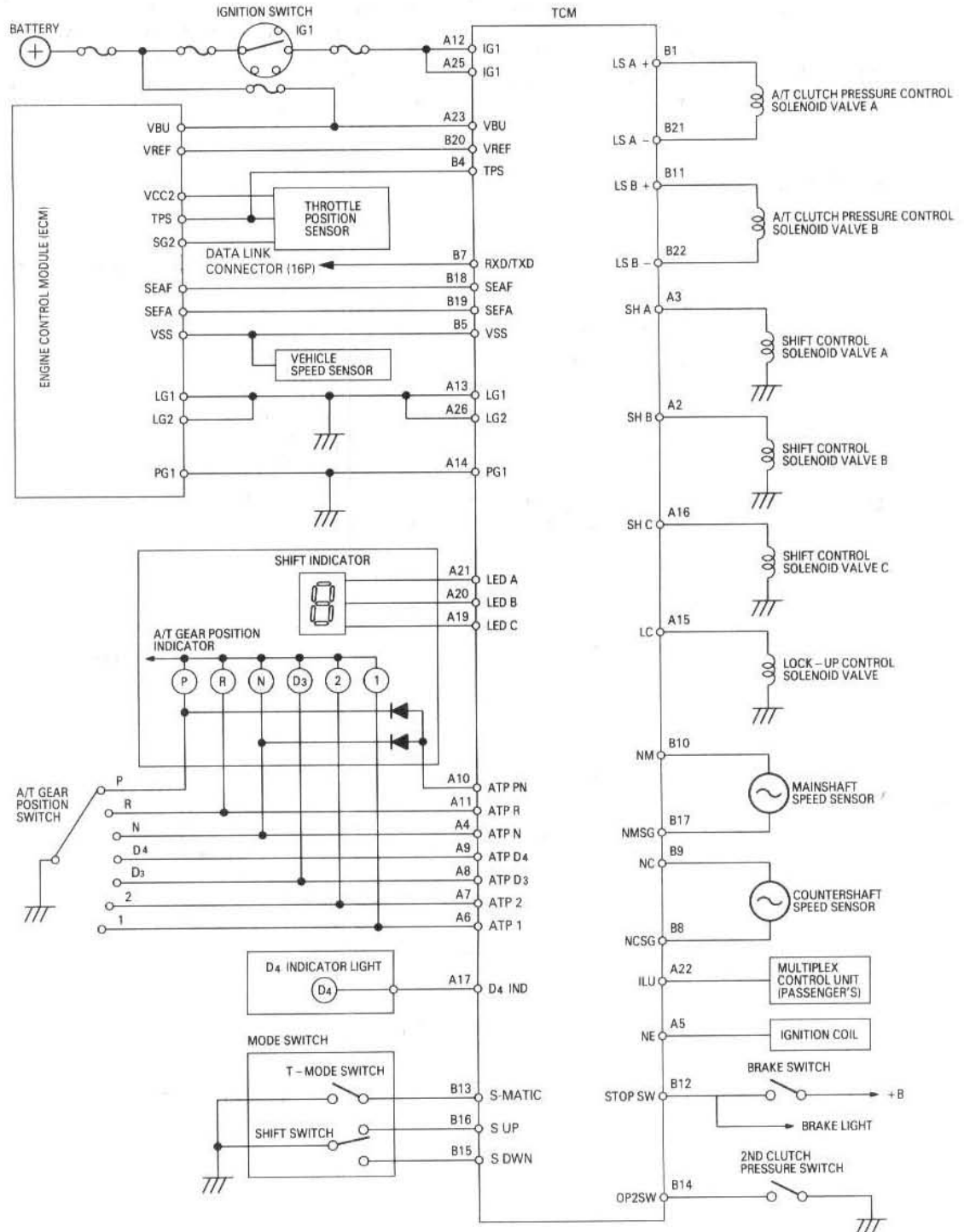
Engine Control in Cooperation with ECM

The TCM also sends signals of the following transmission conditions to the ECM which controls the engine.

- When the transmission shifts gears, the TCM causes the ECM to control the engine ignition timing.
- When the transmission is in **N** position, the TCM causes the ECM to control engine rpm.
- When the transmission shifts into **D₄**, **D₃**, **2**, **1** or **R** position at high rpm, the TCM causes the ECM to control the engine ignition timing.
- During a stall test, the TCM causes the ECM to control engine torque.



TCM Circuit Diagram and Terminal Locations



Description

Hydraulic Control

The valve body includes the main valve body, the regulator valve body, the servo body, and the accumulator body. The ATF pump is driven by splines on the right end of the torque converter which is attached to the engine. Fluid flows through the regulator valve to maintain specified pressure, through the main valve body, to the manual valve, directing pressure to each of the clutches. The shift control solenoid valves B and C are mounted on the outside of the torque converter housing. The shift control solenoid valve A and the lock-up control solenoid valve are mounted on the torque converter housing as an assembly. The A/T clutch pressure control solenoid valves A and B are mounted on the transmission housing.

A/T CLUTCH PRESSURE CONTROL
SOLENOID VALVE A/B
ASSEMBLY

SERVO BODY

REGULATOR VALVE BODY

MAIN VALVE BODY

SHIFT CONTROL SOLENOID
VALVE C

SHIFT CONTROL SOLENOID
VALVE B

ACCUMULATOR BODY

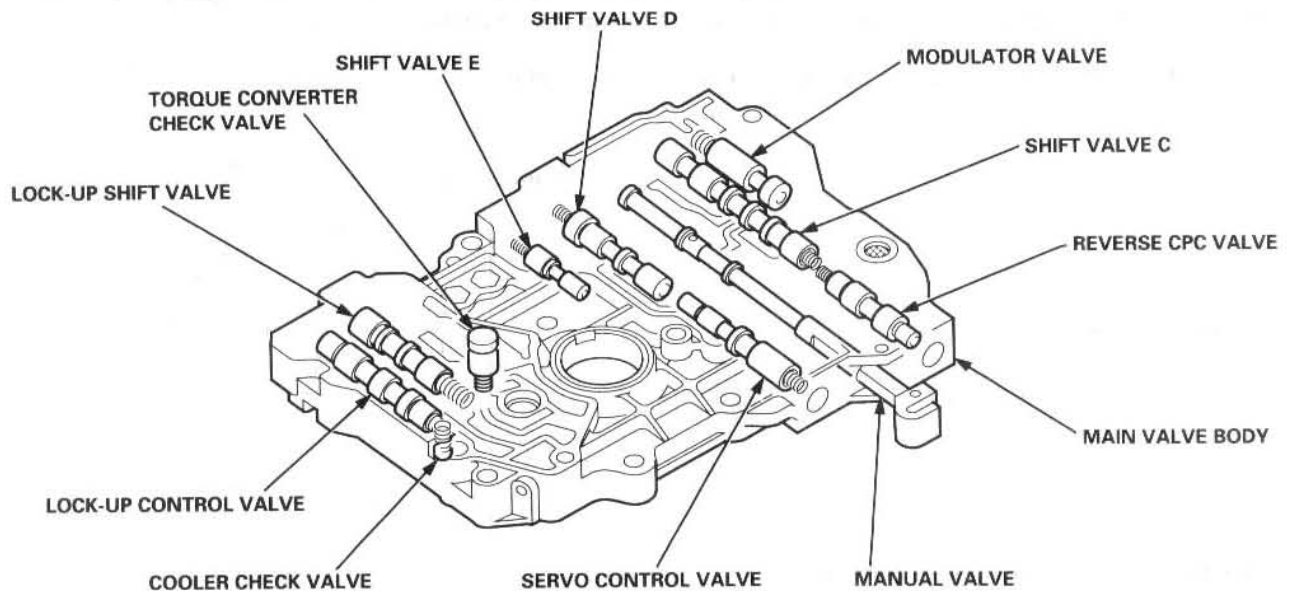
LOCK-UP CONTROL SOLENOID
VALVE/SHIFT CONTROL SOLENOID
VALVE A ASSEMBLY

2ND CLUTCH
PRESSURE SWITCH



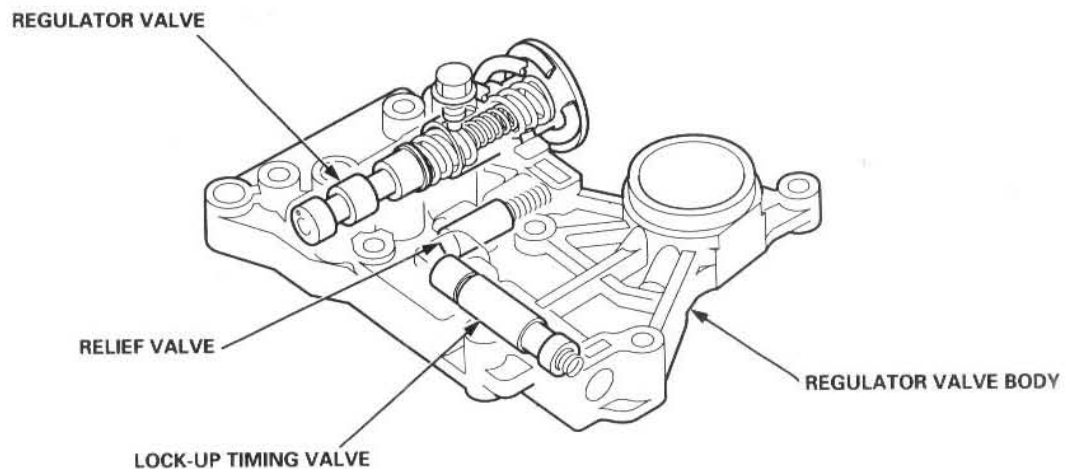
Main Valve Body

The main valve body contains the manual valve, the modulator valve, the shift valve C, the shift valve D, the shift valve E, the servo control valve, the torque converter check valve, the reverse CPC valve, the lock-up shift valve, the lock-up control valve, the cooler check valve, and the ATF pump gears. The primary function of the main valve body is to switch fluid pressure on and off and to control hydraulic pressure going to the hydraulic control system.



Regulator Valve Body

The regulator valve body is located on the main valve body. The regulator valve body contains the regulator valve, the lock-up timing valve, and the relief valve.



(cont'd)

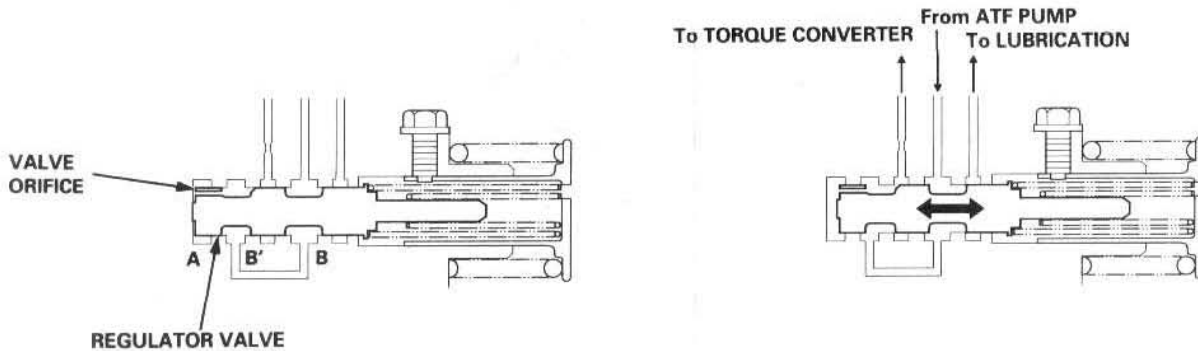
Description

Hydraulic Control (cont'd)

Regulator Valve

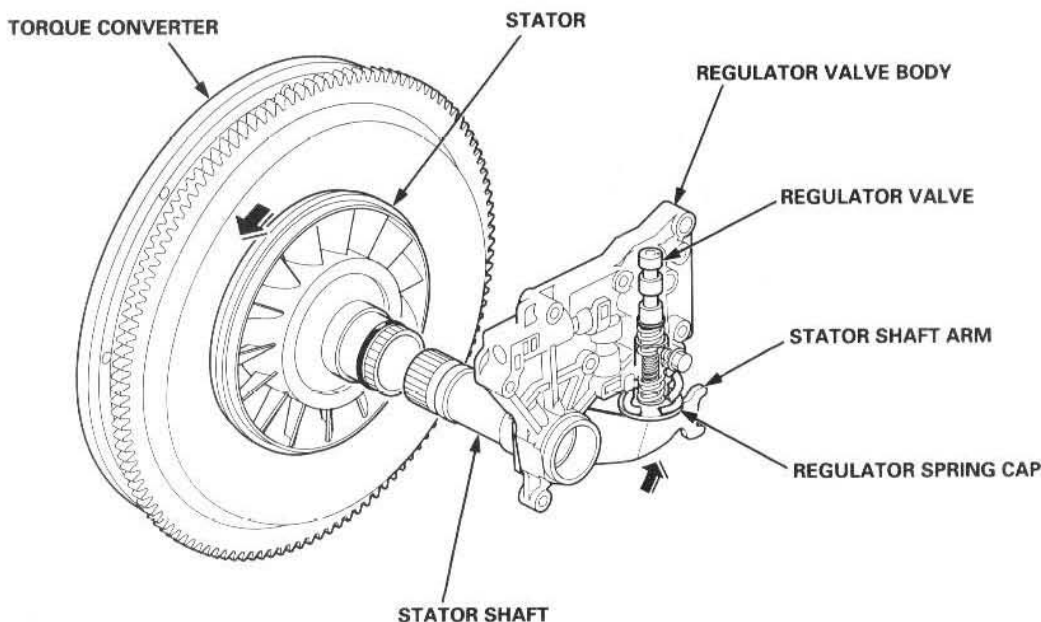
The regulator valve maintains constant hydraulic pressure from the ATF pump to the hydraulic control system, while also furnishing fluid to the lubricating system and torque converter. The fluid from the ATF pump flows through B and B'. Fluid entering from B flows through the valve orifice to the A cavity. This pressure of the A cavity pushes the regulator valve to the right side, and this movement of the regulator valve uncovers the fluid port to the torque converter and the relief valve. The fluid flows out to the torque converter and the relief valve, and the regulator valve moves to the left side. According to the level of the hydraulic pressure through B, the position of the regulator valve changes and the amount of the fluid from B' through torque converter also changes. This operation is continued, maintaining the line pressure.

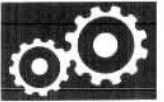
NOTE: When used, "left" or "right" indicates direction on the illustration below.



Stator Reaction Hydraulic Pressure Control

Increases in hydraulic pressure according to torque are performed by the regulator valve using stator torque reaction. The stator shaft is splined with the stator in the torque converter, and its arm end contacts the regulator spring cap. When the vehicle is accelerating or climbing (Torque Converter Range), the stator torque reaction acts on the stator shaft, and the stator arm pushes the regulator spring cap in the direction of the arrow in proportion to the reaction. The stator reaction spring compresses, and the regulator valve moves to increase the line pressure which is regulated by the regulator valve. The line pressure reaches its maximum when the stator torque reaction reaches its maximum.



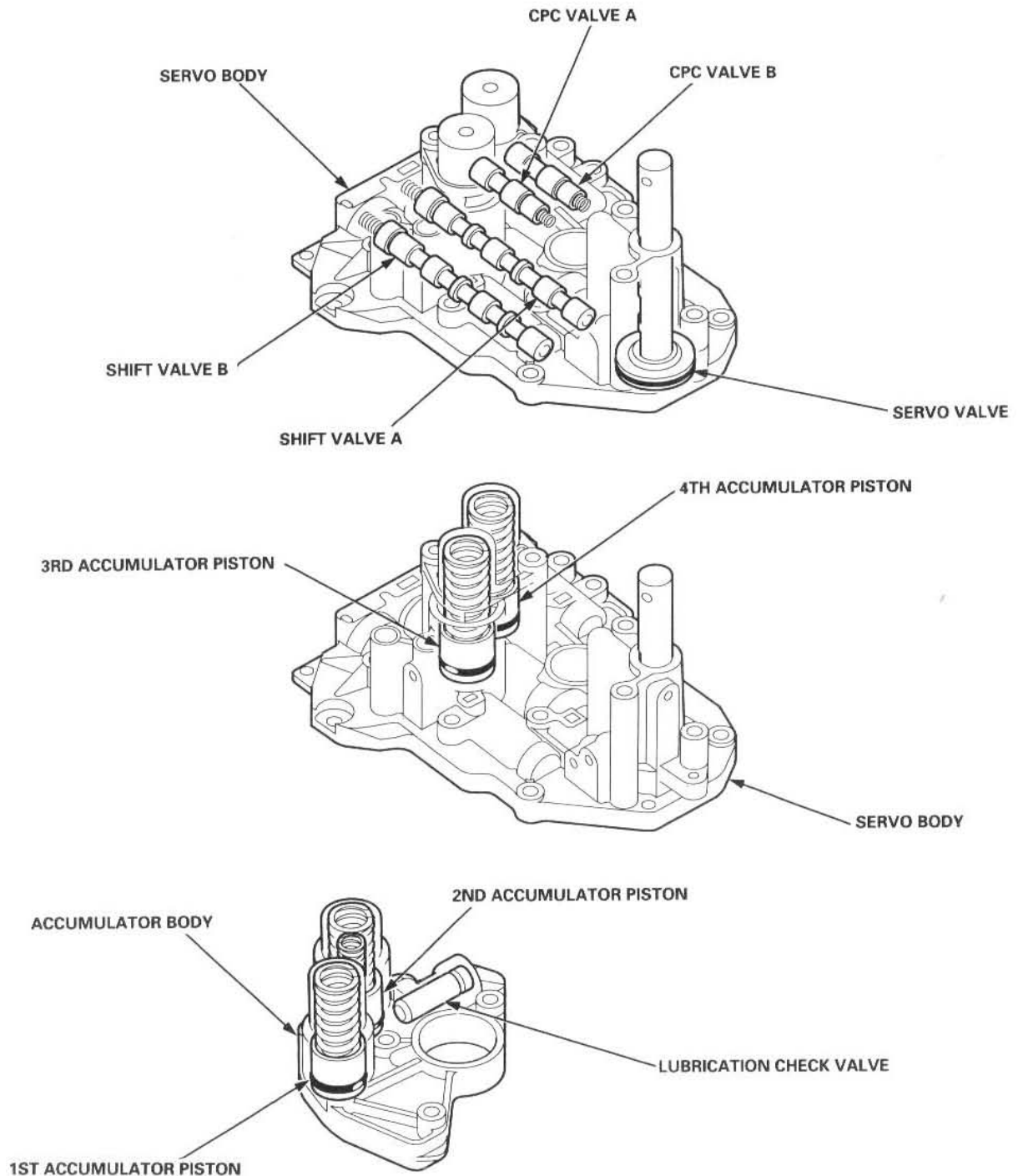


Servo Body

The servo body is on the main valve body. It contains the servo valve, the shift valve A, the shift valve B, the CPC valves A and B, and the 3rd and 4th accumulators.

Accumulator Body

The accumulator body is on the torque converter housing, next to the main valve body. It contains the 1st and 2nd accumulators, and the lubrication check valve.



Description

Hydraulic Flow

As the engine turns, the ATF pump also starts to operate. Automatic transmission fluid (ATF) is drawn through the ATF strainer (filter) and discharged into the hydraulic circuit. Then, ATF flowing from the ATF pump becomes line pressure that's regulated by the regulator valve. Torque converter pressure from the regulator valve enters the torque converter through the lock-up shift valve, and it is discharged from the torque converter. The torque converter check valve prevents torque converter pressure from rising.

The TCM controls the shift control solenoid valves on and off, and the shift control solenoid valves apply shift control solenoid pressure to the shift valves. Applying shift control solenoid pressure to the shift valves moves the position of the shift valve and switches the port of hydraulic pressure. The TCM also controls the A/T clutch pressure control solenoid valves A and B. The A/T clutch pressure control solenoid valves regulate A/T clutch solenoid pressure and apply A/T clutch pressure control solenoid pressure to the CPC valves A and B.

When shifting between upper gear and lower gear, the clutch is engaged by pressure from the CPC pressure mode. The TCM controls one of the shift control solenoid valves to move the position of the shift valve. This movement switches the port of the CPC and line pressure. Line pressure is then applied to the clutch, and CPC pressure is intercepted. Engaging the clutch with line pressure happens when shifting is completed.

Hydraulic pressure at the ports is as follows:

PORT NO.	DESCRIPTION OF PRESSURE	PORT NO.	DESCRIPTION OF PRESSURE	PORT NO.	DESCRIPTION OF PRESSURE
1	LINE	5H	CPC B or LINE	57	LS B
3	LINE	5J	CPC B or LINE	58	LS A or LS B
3'	LINE	5K	CPC B or LINE	90	TORQUE CONVERTER
3''	LINE	5K'	CPC B or LINE	90'	TORQUE CONVERTER
4	LINE	6	MODULATE	91	TORQUE CONVERTER
4'	LINE	SA	SH A	91'	TORQUE CONVERTER
4''	LINE	SB	SH B	92	TORQUE CONVERTER
4A	CPC A	SC	SH C	93	ATF COOLER
4B	CPC B	LA	LC	94	TORQUE CONVERTER
5A	CPC A	9	LINE	95	LUBRICATION
5D	CPC B	10	1ST CLUTCH	95'	LUBRICATION
5B	CPC A or LINE	20	2ND CLUTCH	96	TORQUE CONVERTER
5E	CPC A or LINE	25	LINE	97	TORQUE CONVERTER
5F	CPC A or LINE	30	3RD CLUTCH	99	SUCTION
5F'	CPC A or LINE	40	4TH CLUTCH	X	DRAIN
5C	CPC B or LINE	41	4TH CLUTCH	HX	HIGH POSITION DRAIN
5G	CPC B or LINE	56	LS A	AX	AIR DRAIN

NOTE:

- CPC: Clutch Pressure Control pressure
- SH: Shift Control Solenoid pressure
- LS: A/T Clutch Pressure Control Solenoid pressure
- LC: Lock-up Control Solenoid pressure



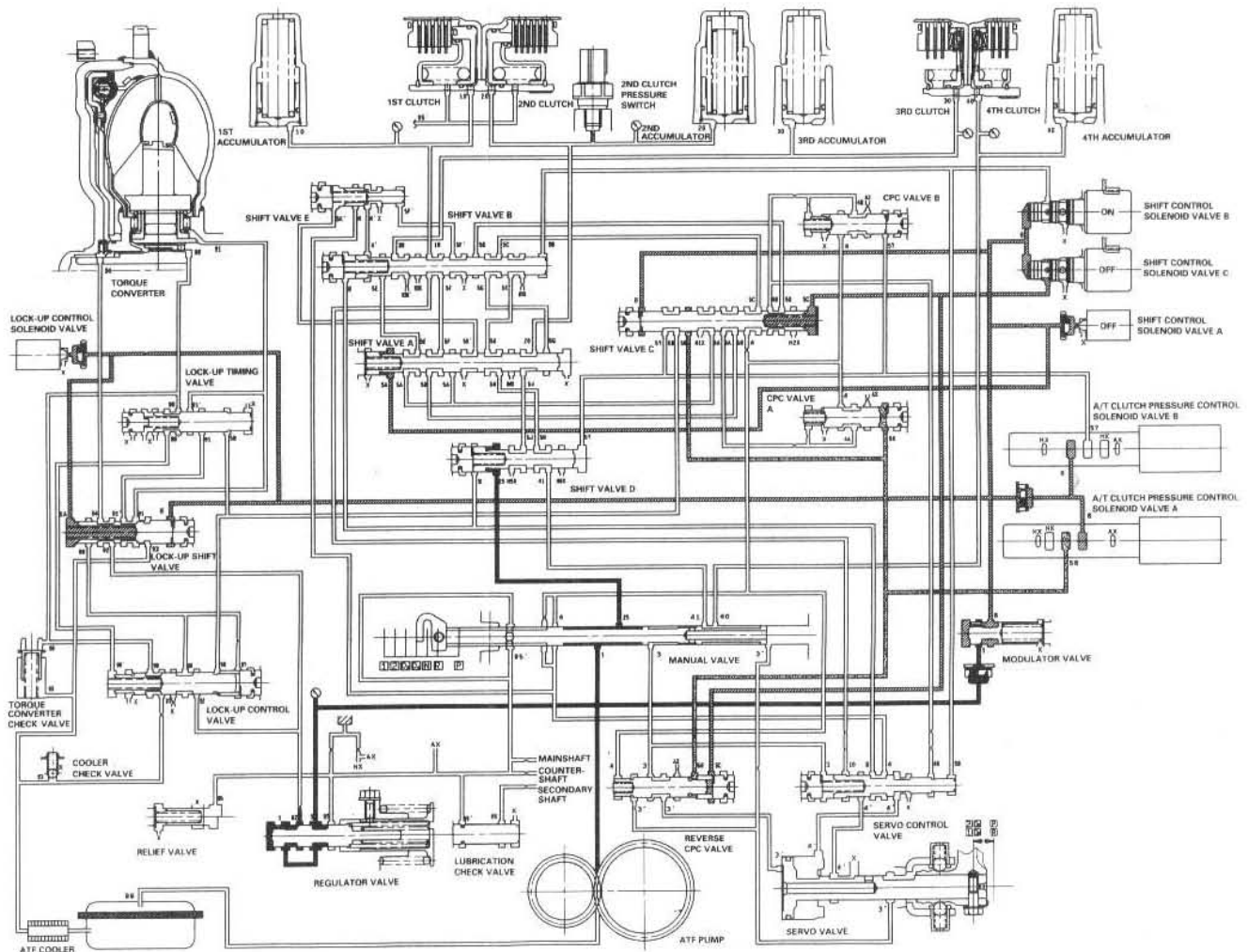
N Position

The TCM controls the shift control solenoid valves. The conditions of the shift control solenoid valve and positions of the shift valve are as follows:

- Shift control solenoid valve A is turned off, and the shift valve A is moved to the left side.
- Shift control solenoid valve B is turned on, and the shift valve B remains in the right side.
- Shift control solenoid valve C is turned off, and the shift valve C remains in the left side.

Line pressure (1) passes through the manual valve and stops at the shift valve D. Line pressure (1) also flows to the modulator valve, and becomes modulator pressure (6). Modulator pressure (6) flows to the shift control solenoid valves and the A/T clutch pressure control solenoid valves. Under this condition, hydraulic pressure is not applied to the clutches.

NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.



(cont'd)

Description

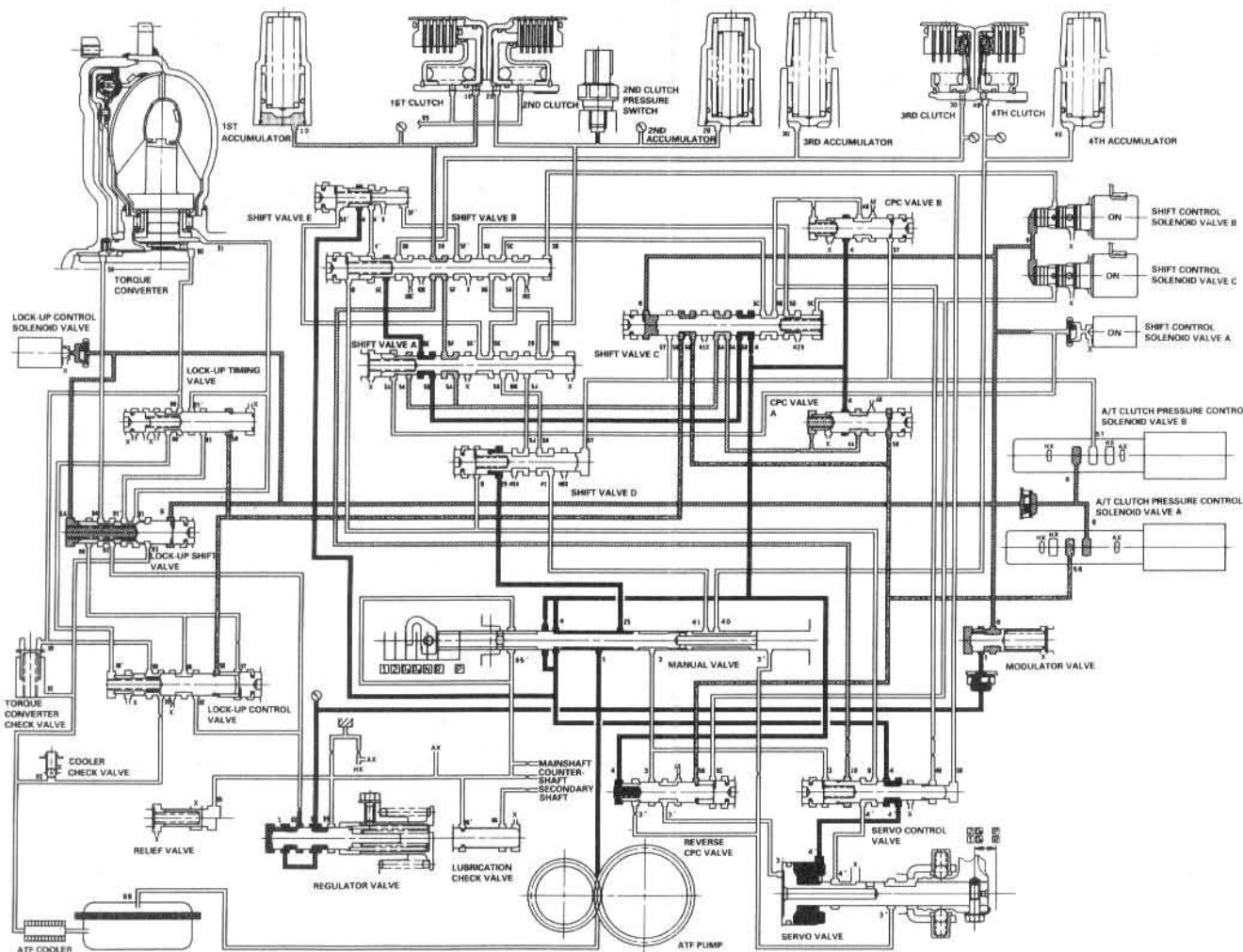
Hydraulic Flow (cont'd)

D₄ Position

1. 1st gear shifting from N position

The TCM turns shift control solenoid valves A and C on when shifting to **D₄** position from **N**. Shift control solenoid valve B remains on. Shift control solenoid valve C is turned on, and SH C pressure (SC) in the right side of shift valve C is released, then shift valve C is moved to the right side. The shift control solenoid valve A is turned on, and SH A pressure (SA) in the left side of shift valve A is released, then shift valve A is moved to the right side. The A/T clutch pressure control solenoid valve A regulates LS A pressure (56), and applies it to the CPC valve A. Line pressure (1) becomes line pressure (4) at the manual valve, and flows to the shift valve C and the CPC valve A. Line pressure (4A) becomes CPC A pressure (4A) and passes through the shift valve C, A and B, then CPC A pressure (4A) becomes 1st clutch pressure (10) at shift valve B. 1st clutch pressure (10) is applied to the 1st clutch, then the 1st clutch is engaged with pressure of the CPC pressure mode. Line pressure (4) passes through shift valve A and B, and stops at shift valve B.

NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.

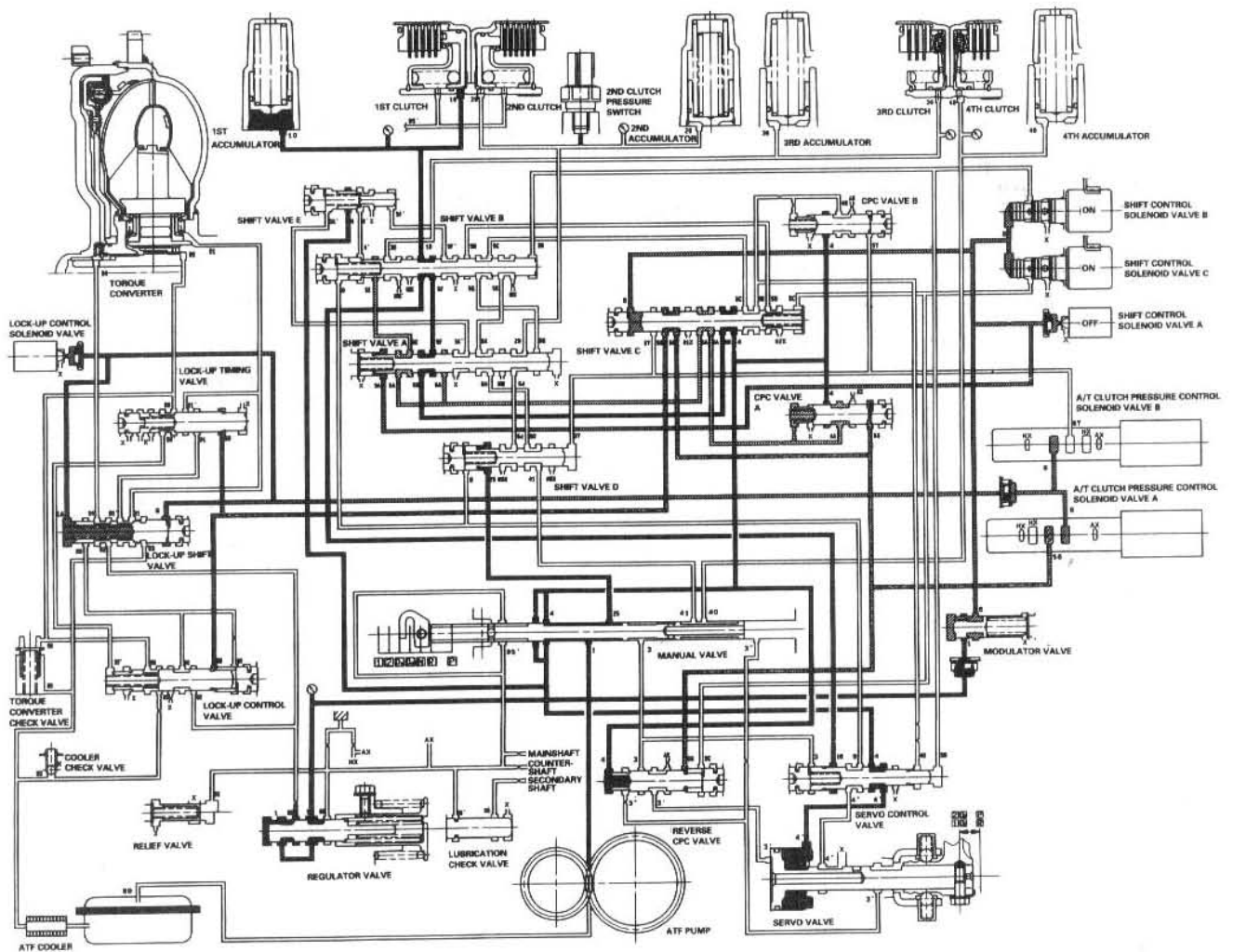




2. Driving in 1st gear

The TCM turns shift control solenoid valve A off, but shift control solenoid valves B and C remain on. SH A pressure (SA) is applied to the left side of shift valve A, then shift valve A is moved to the left side. This movement switches the port of line pressure and CPC pressure on shift valve A. The 1st clutch pressure is changed to line pressure mode, and the 1st clutch is engaged securely. The CPC A pressure (5E) stops at shift valve B.

NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.



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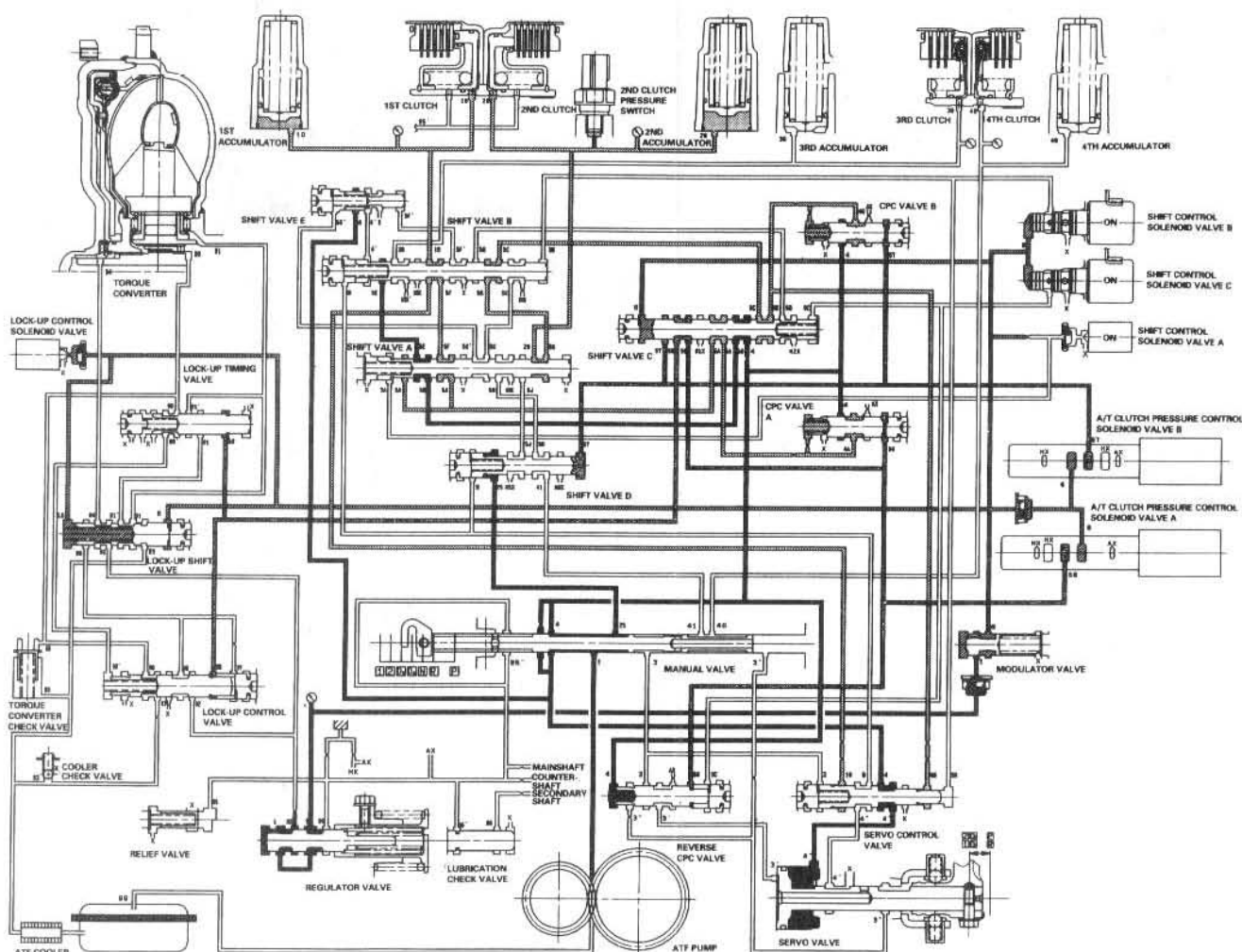
Description

Hydraulic Flow (cont'd)

3. Shifting between 1st gear and 2nd gear

As the speed of the vehicle reaches the prescribed value, the TCM turns shift control solenoid valve A off. Shift control solenoid valves B and C remain on. Then shift control solenoid valve A is turned on, and SH A pressure (SA) in the left side of the shift valve A is released. Shift valve A is moved to the right side to switch the port of line pressure and CPC pressure. The TCM also controls the A/T clutch pressure control solenoid valves. The A/T clutch pressure control solenoid valves A and B apply their pressure to the CPC valves A and B. Line pressure (4) becomes CPC B pressure (4B) at the CPC valve B, and CPC B pressure passes through shift valves C, B, and A, to become 2nd clutch pressure. The 1st and 2nd clutches are engaged with the CPC pressure mode.

NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.

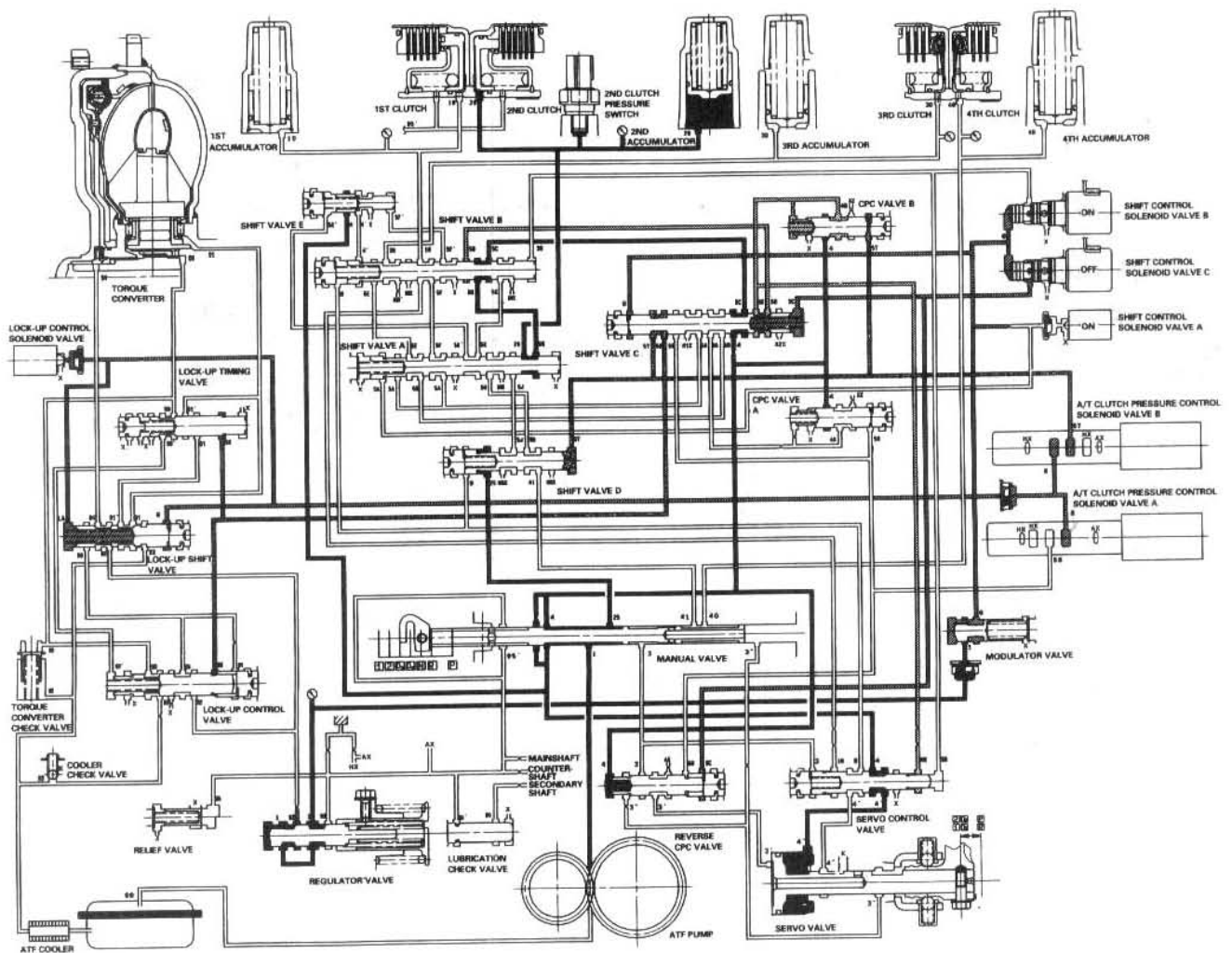




4. Driving in 2nd gear

The TCM turns shift control solenoid valve C off, and controls A/T clutch pressure control solenoid valve A to release LS A pressure (56). The shift control solenoid valves A and B remain on. Releasing LS A pressure in the CPC valve A releases CPC A pressure in the 1st clutch pressure circuit. Shift control solenoid valve C is turned off, and SH C pressure (SC) is applied to the right side of it. Then shift valve C is moved to the left side to switch the port of line pressure and CPC pressure. The 2nd clutch pressure is changed to line pressure mode, and the 2nd clutch is engaged securely. The CPC B pressure (5D) stops at shift valve B.

NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.



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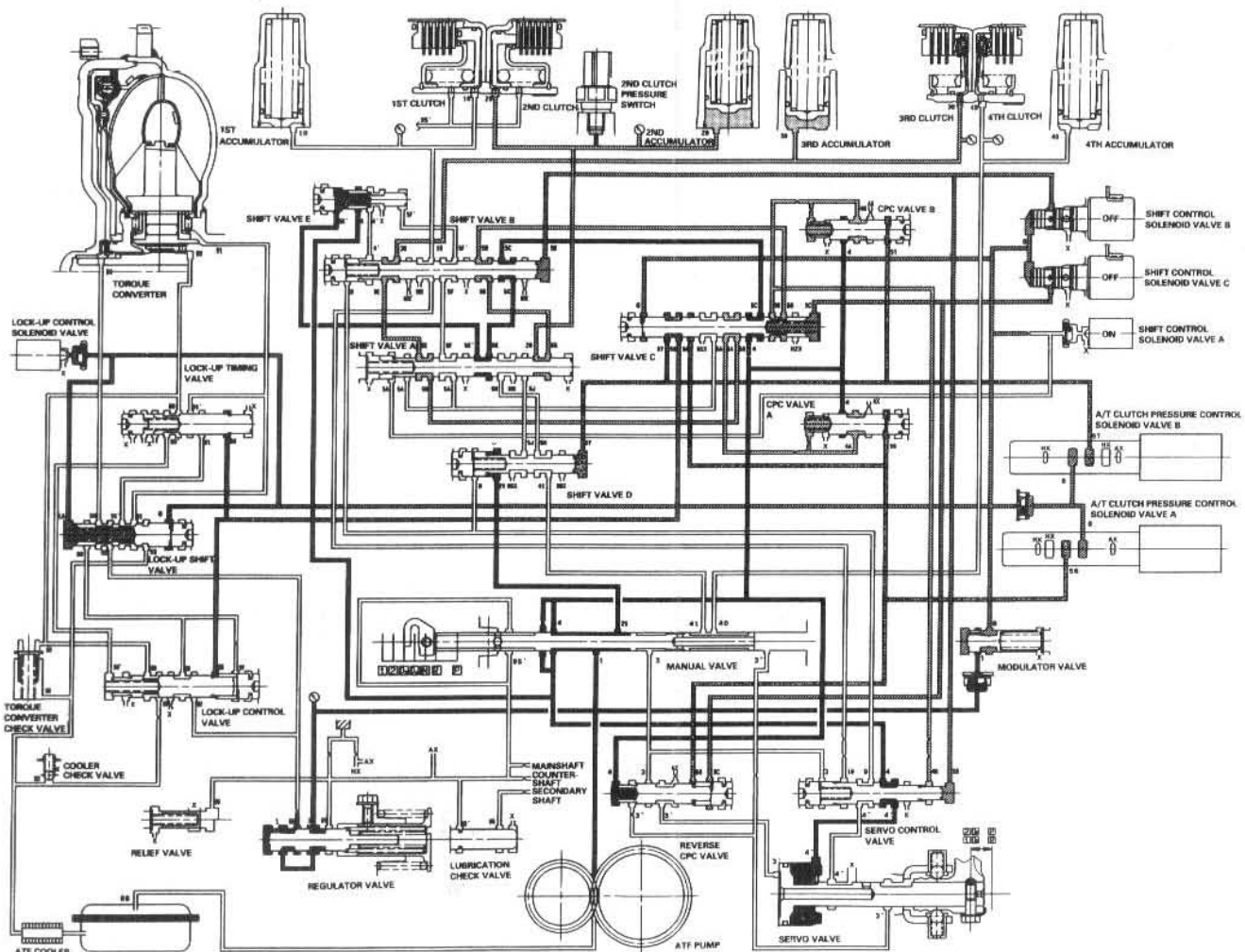
Description

Hydraulic Flow (cont'd)

5. Shifting between 2nd gear and 3rd gear

As the speed of the vehicle reaches the prescribed value, the TCM turns shift control solenoid valve B off. The TCM also controls A/T clutch pressure control solenoid valve A to apply LS A pressure (56) to the CPC valve A. Shift control solenoid valve A remains on, and C remains off. Shift control solenoid valve B is turned off, and SH B pressure (SB) is applied to the right side of shift valve B. Then shift valve B is moved to the left side to switch the port of line pressure and CPC pressure. Line pressure (4) becomes CPC A pressure (4A) at the CPC valve A. The CPC A pressure (4A) becomes 3rd clutch pressure (30) at shift valve B, and flows to the 3rd clutch. The 2nd clutch pressure is changed to CPC pressure mode by switching the position of shift valve B.

NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.

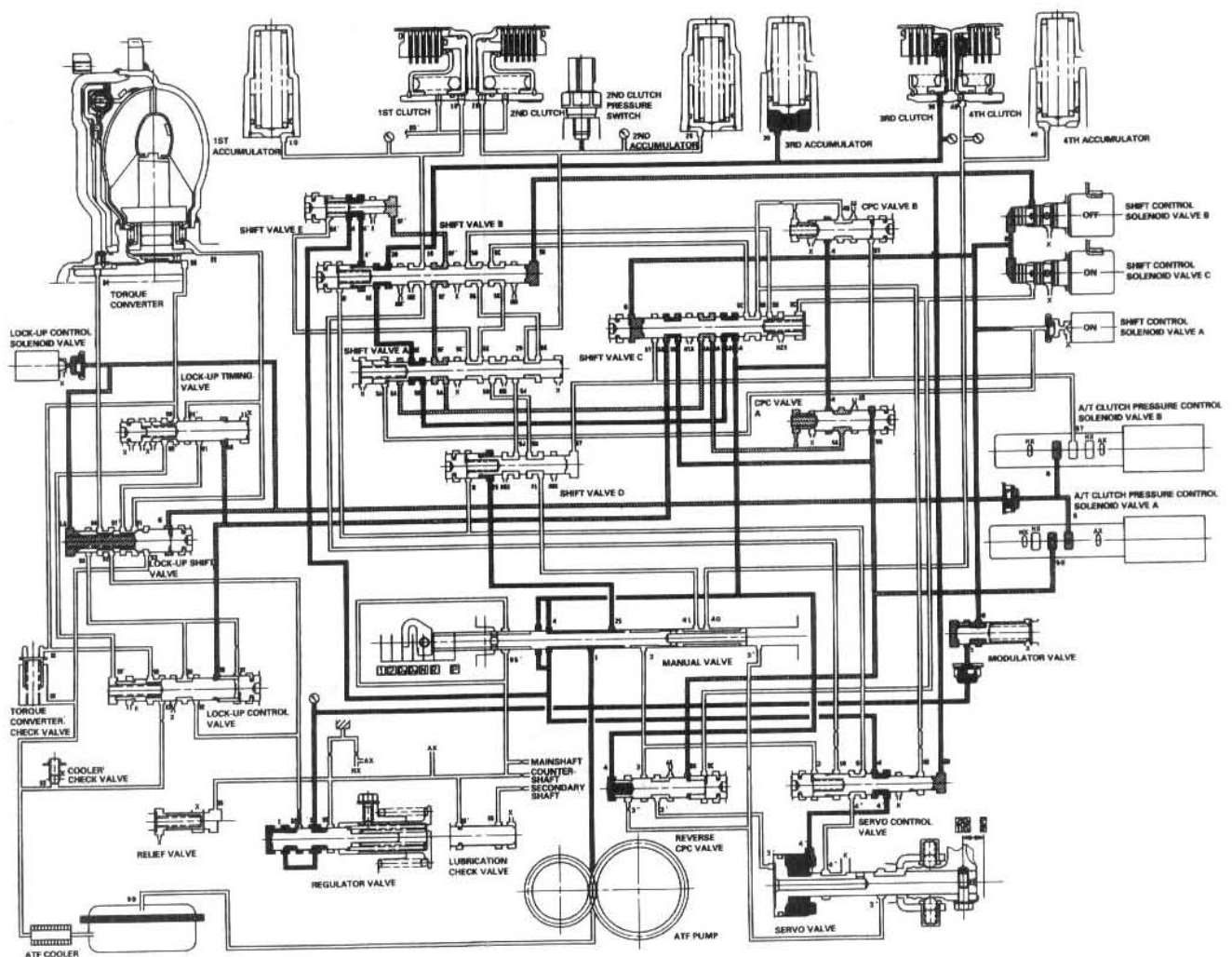




6. Driving in 3rd gear

The TCM turns shift control solenoid valve C on, and controls A/T clutch pressure control solenoid valve B to release LS B pressure (57). Shift control solenoid valve A remains on, and B remains off. Releasing LS B pressure in the CPC valve B releases CPC B pressure in the 2nd clutch pressure circuit. Shift control solenoid valve C is turned on, and SH C pressure (SC) in the right side of shift valve C is released. Then shift valve C is moved to the right side to switch the port of line pressure and CPC pressure. 3rd clutch pressure is changed to line pressure mode, and the 3rd clutch is engaged securely. The CPC A pressure (4A) stops at shift valve E.

NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.



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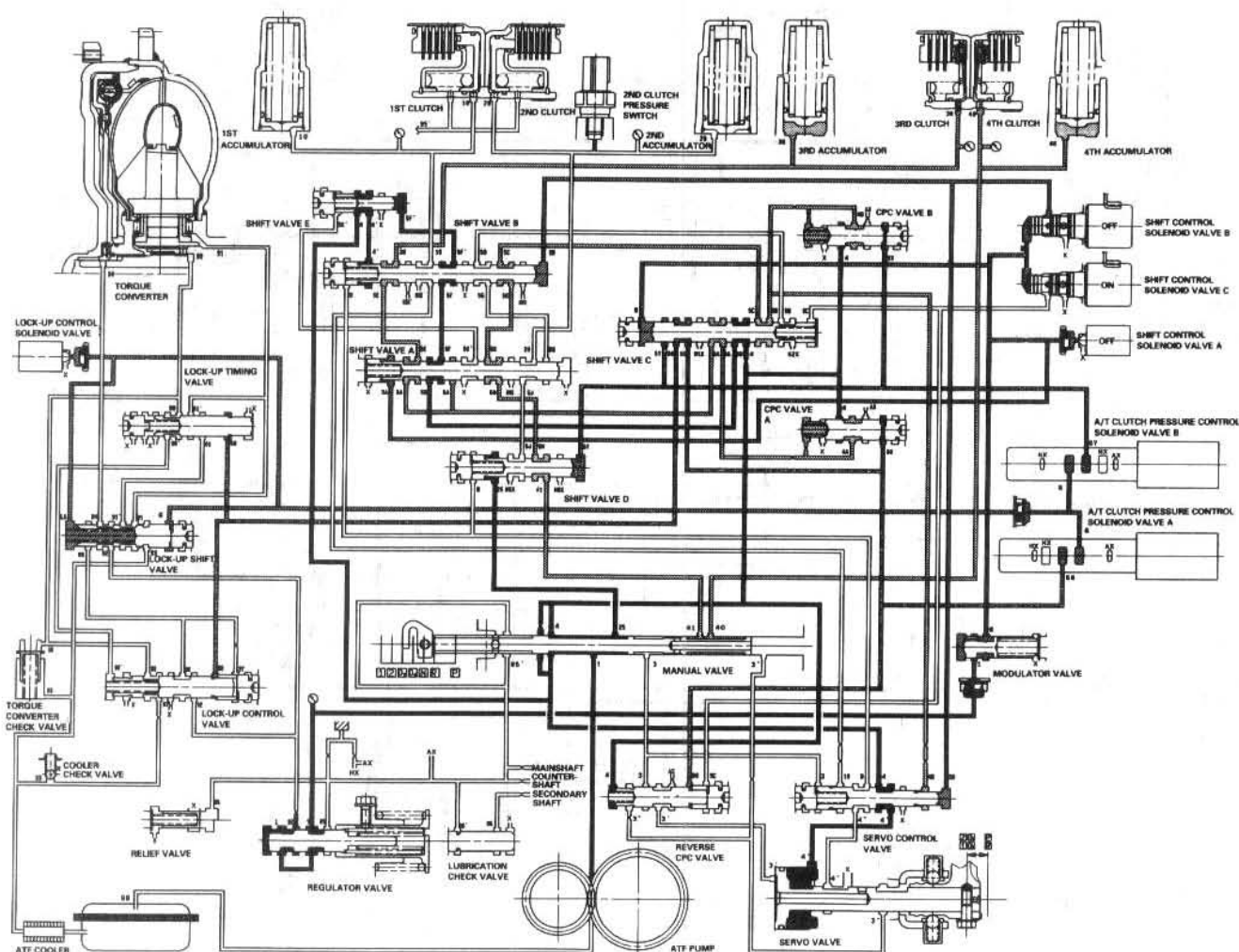
Description

Hydraulic Flow (cont'd)

7. Shifting between 3rd gear and 4th gear

As the speed of the vehicle reaches the prescribed value, the TCM turns shift control solenoid valve A off. The TCM also controls A/T clutch pressure control solenoid valve B to apply LS B pressure (57) to CPC valve B. Shift control solenoid valve B remains off, and C remains on. Shift control solenoid valve A is turned off, and SH A pressure (SA) is applied to the left side of shift valve A. Then shift valve A is moved to the left side to switch the port of line pressure and CPC pressure. Line pressure (4) becomes CPC B pressure (4B) at CPC valve B. The CPC B pressure (4B) becomes 4th clutch pressure (41) at shift valve D, and flows to the 4th clutch via the manual valve. The 3rd clutch pressure is changed to CPC pressure mode by switching the position of shift valve A.

NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.

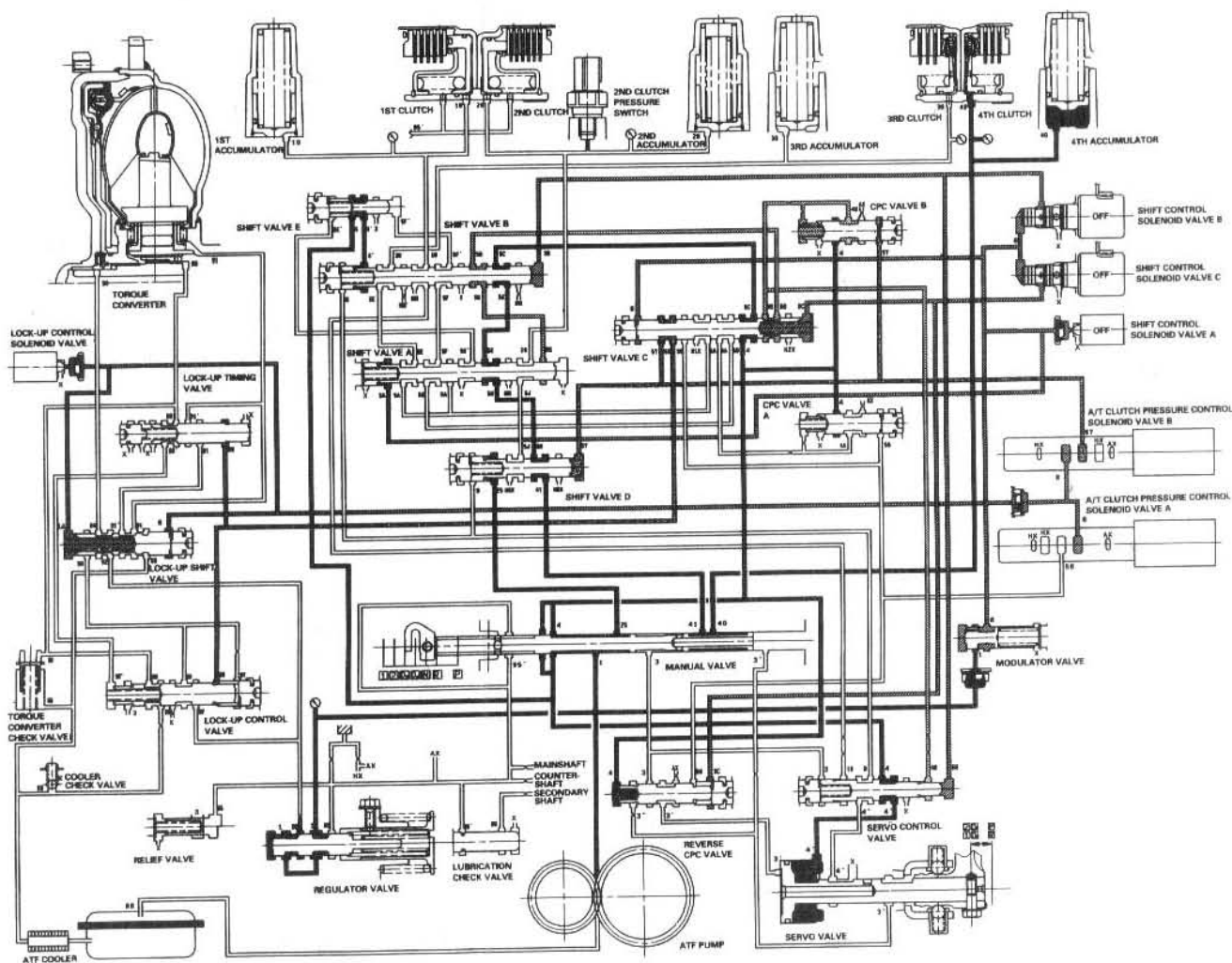




8. Driving in 4th gear

The TCM turns shift control solenoid valve C off, and controls A/T clutch pressure control solenoid valve A to release LS A pressure (56). Shift control solenoid valves A and B remain off. Releasing LS A pressure (56) releases CPC A pressure in the 3rd clutch pressure circuit. Shift control solenoid valve C is turned off, and SH C pressure (SC) is applied to the right side of shift valve C. Then shift valve C is moved to the left side to switch the port of line pressure and CPC pressure. The CPC B pressure (5B) changes to line pressure (5B) at shift valve C, and flows to the 4th clutch via shift valve C, shift valve B, shift valve D, and the manual valve. The 4th clutch pressure is changed to line pressure mode by switching the position of shift valve A, shift valve C, and 4th clutch is engaged securely. The CPC B pressure (5D) stops at shift valve A.

NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.



(cont'd)

Description

Hydraulic Flow (cont'd)

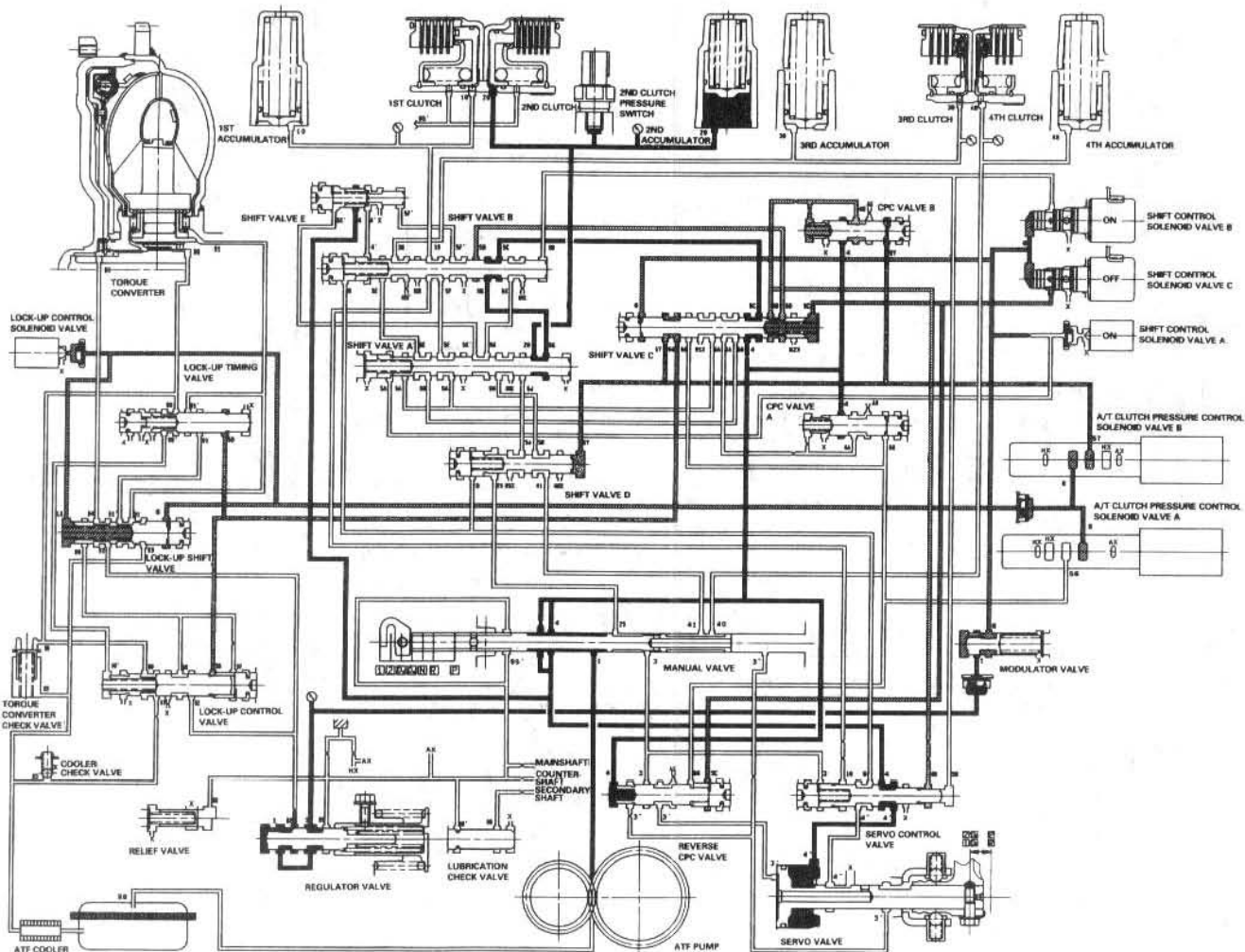
2 Position

The TCM controls the shift control solenoid valves and the A/T clutch pressure control solenoid valves. The conditions of the shift control solenoid valves and the positions of the shift valves are as follows:

- Shift control solenoid valve A is turned on, and shift valve A is in the right side.
- Shift control solenoid valve B is turned on, and shift valve B is in the right side.
- Shift control solenoid valve C is turned off, and shift valve C is moved to the left side.

The TCM also controls A/T clutch pressure control solenoid valve B to apply LS B pressure (57) to CPC valve B. Line pressure (4) from the manual valve becomes line pressure (5C) at shift valve C. Line pressure (5C) flows to shift valve A via shift valve B, and becomes 2nd clutch pressure (20). The 2nd clutch pressure is applied to the 2nd clutch, and 2nd clutch is engaged securely.

NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.





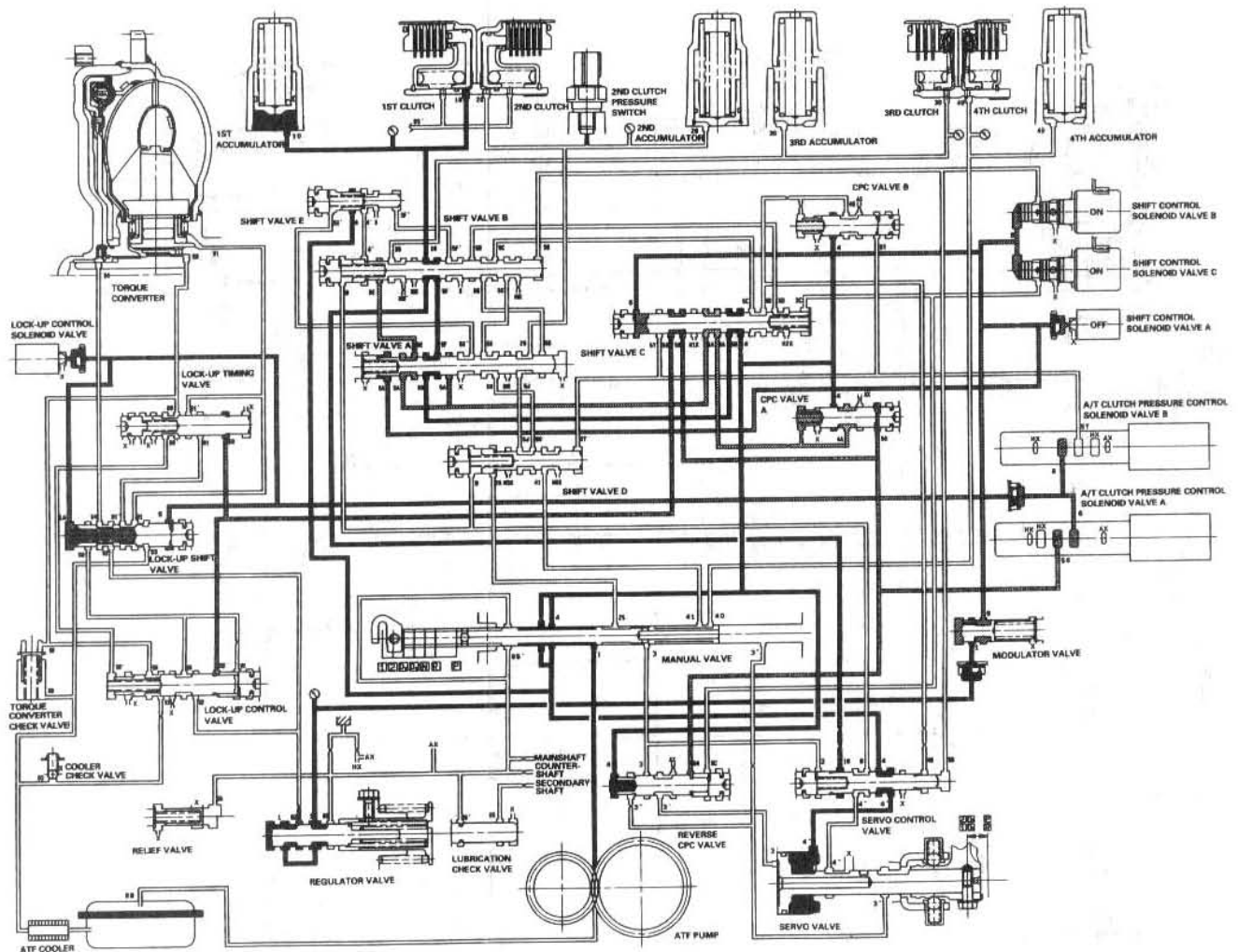
1 Position

The TCM controls the shift control solenoid valves and the A/T clutch pressure control solenoid valves. The conditions of the shift control solenoid valves and the positions of the shift valves are as follows:

- Shift control solenoid valve A is turned off, and shift valve A is moved to the left side.
- Shift control solenoid valve B is turned on, and shift valve B is in the right side.
- Shift control solenoid valve C is turned on, and shift valve C is in the right side.

Line pressure (4) becomes line pressure (5B) at shift valve C. Line pressure (5C) flows to shift valve B via shift valve A, and becomes 1st clutch pressure (10). 1st clutch pressure (10) is applied to the 1st clutch, and 1st clutch is engaged securely.

NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.



(cont'd)

Description

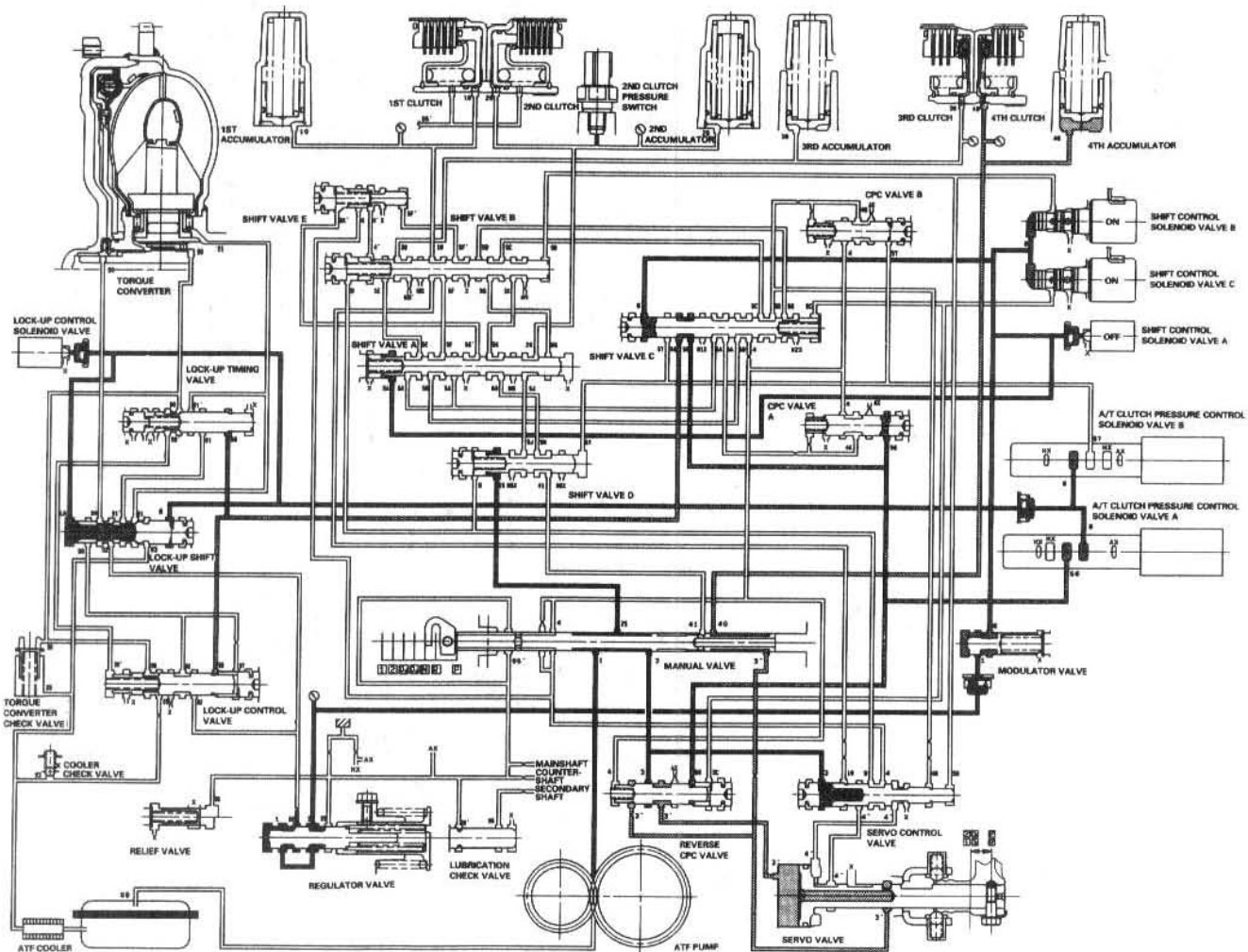
Hydraulic Flow (cont'd)

R Position

1. Shifting to **R** position from **P** or **N** position

Line pressure (1) becomes line pressure (3) at the manual valve, and flows to the reverse CPC valve. Line pressure (3) is regulated by the reverse CPC valve and becomes line pressure (3'). Line pressure (3') pushes the servo valve to the reverse position, passes through the servo valve, and flows to the manual valve. Line pressure (3') becomes 4th clutch pressure (40). The 4th clutch pressure (40) is applied to the 4th clutch, and 4th clutch is engaged with the reverse CPC pressure mode.

NOTE: When used, "left" or "right" indicates direction on hydraulic circuit.

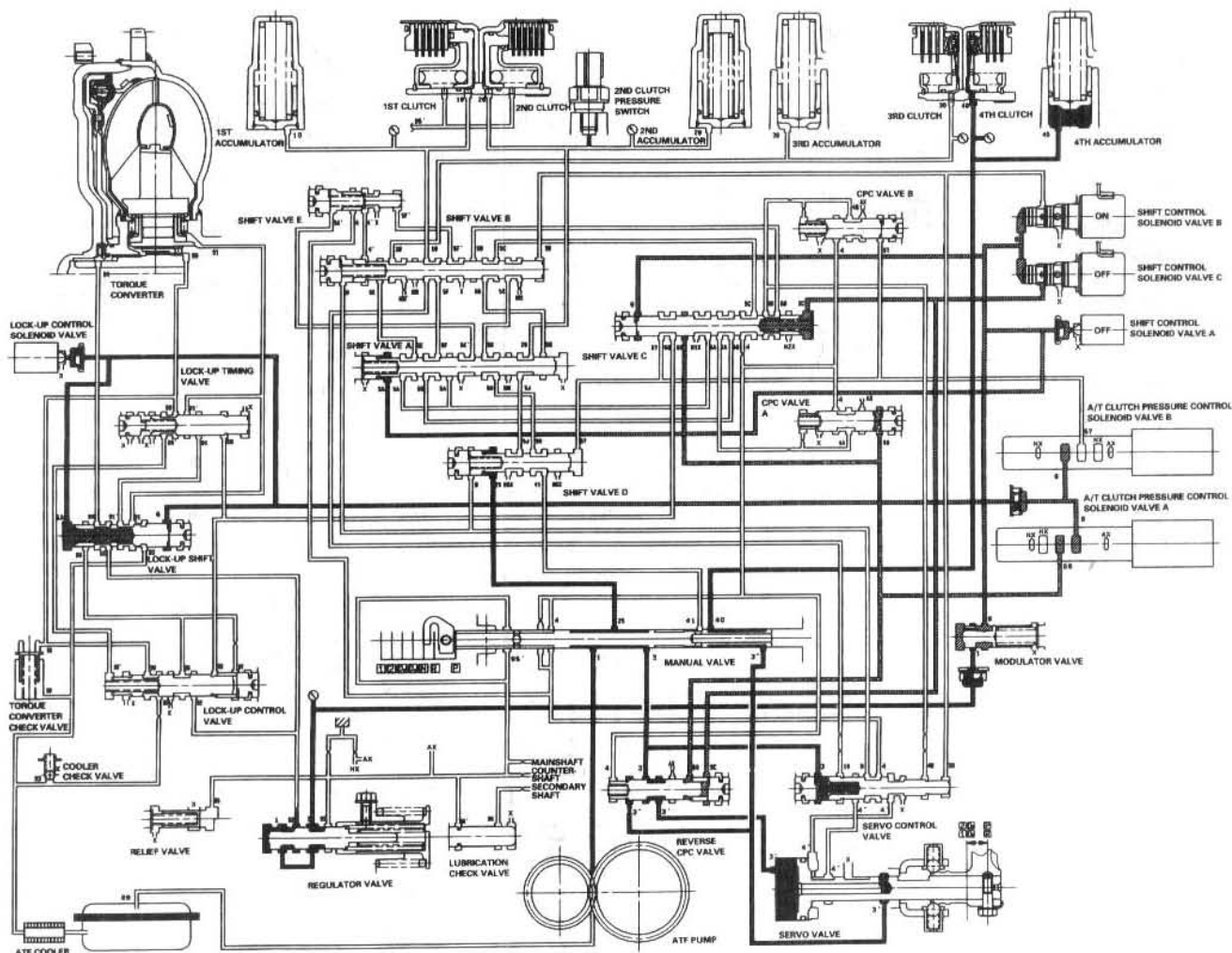




2. Driving in reverse gear

The TCM turns shift control solenoid valve C off. Shift control solenoid valve A remains off, and B remains on. Shift control solenoid valve C is turned off, and SH C pressure (SC) is applied to the right side of the reverse CPC valve. Then the reverse CPC valve moves to the left side and full the port leading to line pressure. Line pressure to the 4th clutch is the same as in **R** position, and 4th clutch pressure increases. The 4th clutch is engaged with line pressure mode.

NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.



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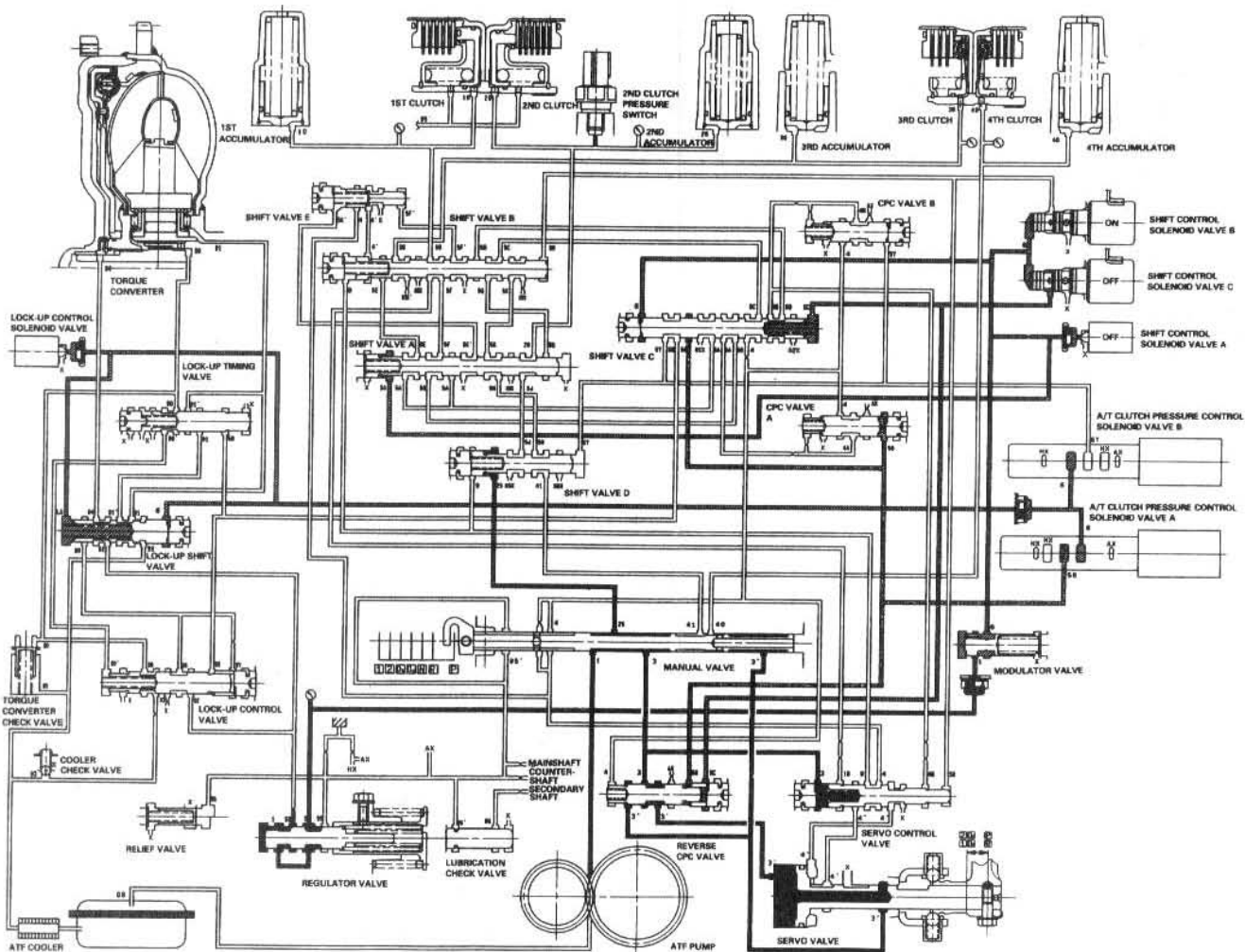
Description

Hydraulic Flow (cont'd)

P Position

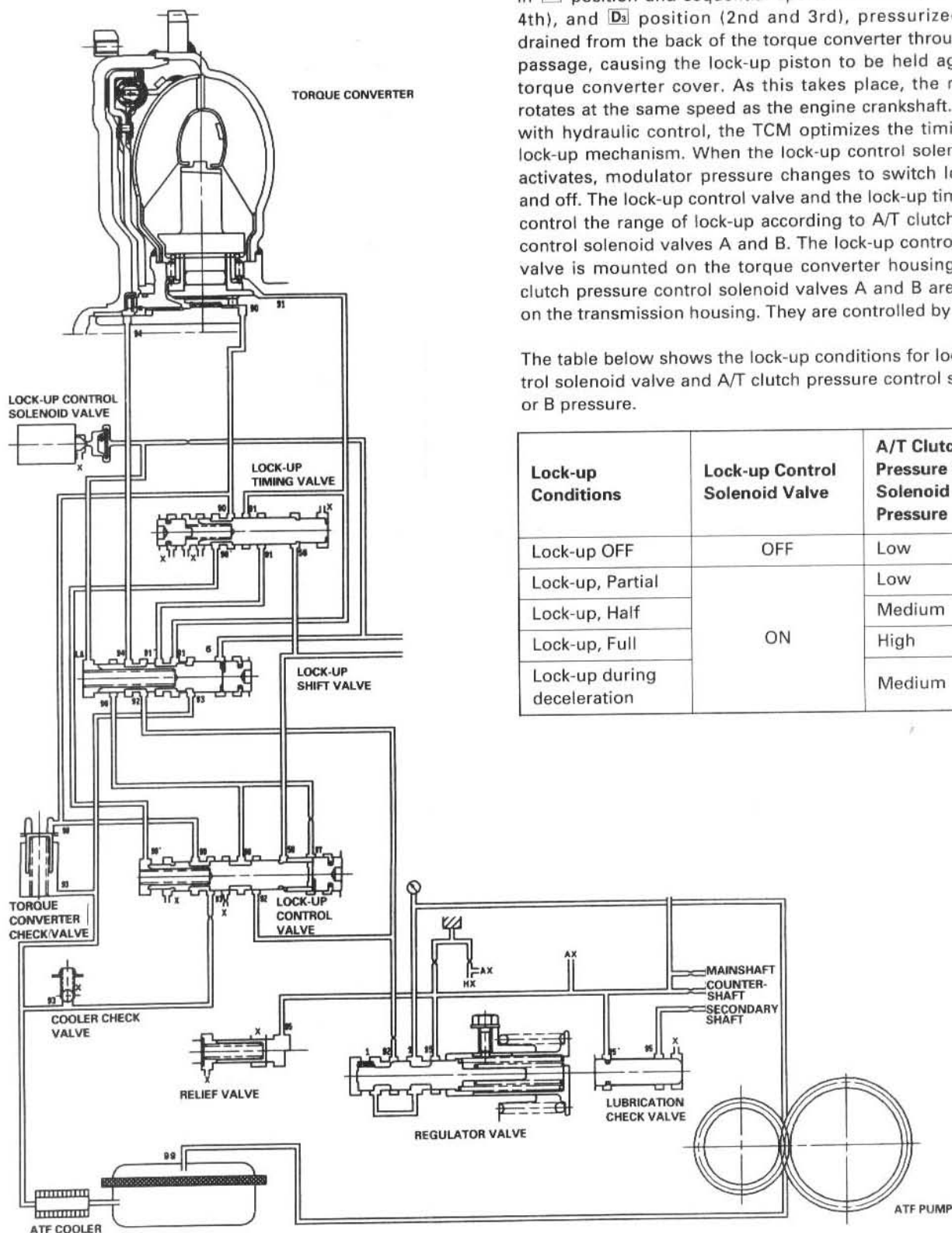
Shift control solenoid valve C is turned off by the TCM, and SH C pressure (SC) is applied to the right side of the reverse CPC valve. Then the reverse CPC valve is moved to the left side to uncover the port leading line pressure (3) to the servo valve. Line pressure (3') passes through the servo valve and flows to the manual valve. Line pressure (3') is intercepted at the manual valve, and is not applied to the clutches.

NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.





Lock-up System



In **D₄** position and sequential sportshift mode (2nd, 3rd and 4th), and **D₃** position (2nd and 3rd), pressurized fluid is drained from the back of the torque converter through a fluid passage, causing the lock-up piston to be held against the torque converter cover. As this takes place, the mainshaft rotates at the same speed as the engine crankshaft. Together with hydraulic control, the TCM optimizes the timing of the lock-up mechanism. When the lock-up control solenoid valve activates, modulator pressure changes to switch lock-up on and off. The lock-up control valve and the lock-up timing valve control the range of lock-up according to A/T clutch pressure control solenoid valves A and B. The lock-up control solenoid valve is mounted on the torque converter housing, and A/T clutch pressure control solenoid valves A and B are mounted on the transmission housing. They are controlled by the TCM.

The table below shows the lock-up conditions for lock-up control solenoid valve and A/T clutch pressure control solenoid A or B pressure.

Lock-up Conditions	Lock-up Control Solenoid Valve	A/T Clutch Pressure Control Solenoid A or B Pressure
Lock-up OFF	OFF	Low
Lock-up, Partial	ON	Low
Lock-up, Half		Medium
Lock-up, Full		High
Lock-up during deceleration		Medium

(cont'd)

Description

Lock-up System (cont'd)

Lock-up Clutch

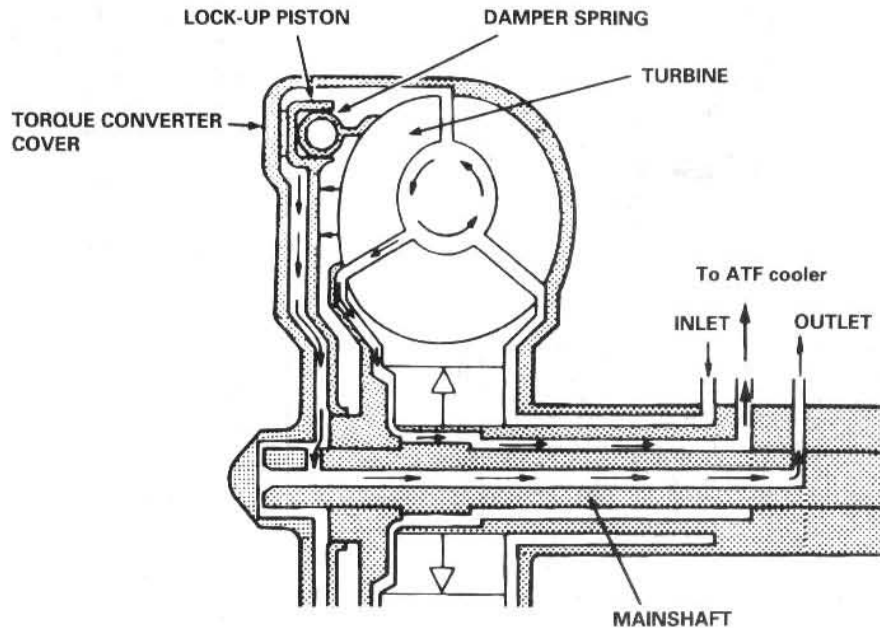
1. Operation (clutch on)

With the lock-up clutch on, fluid in the chamber between the torque converter cover and the lock-up piston is drained off, and the converter fluid exerts pressure through the piston against the torque converter cover. As a result, the converter turbine is locked to the converter cover. The effect is to bypass the converter, placing the vehicle in direct drive.

Power flow

The power flows by way of:

Engine
↓
Drive plate
↓
Torque converter cover
↓
Lock-up piston
↓
Damper spring
↓
Turbine
↓
Mainshaft

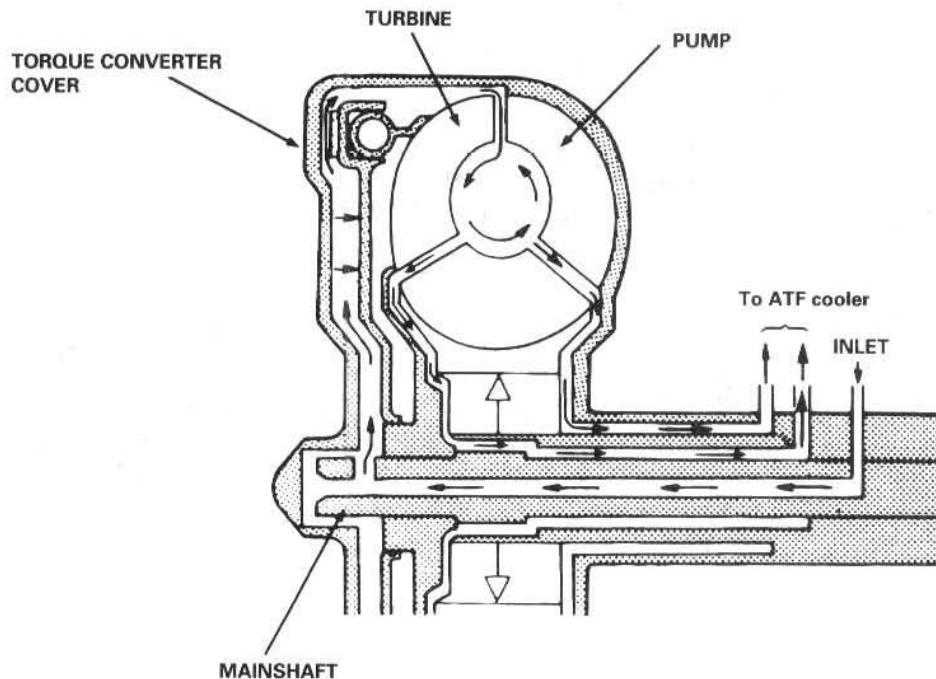


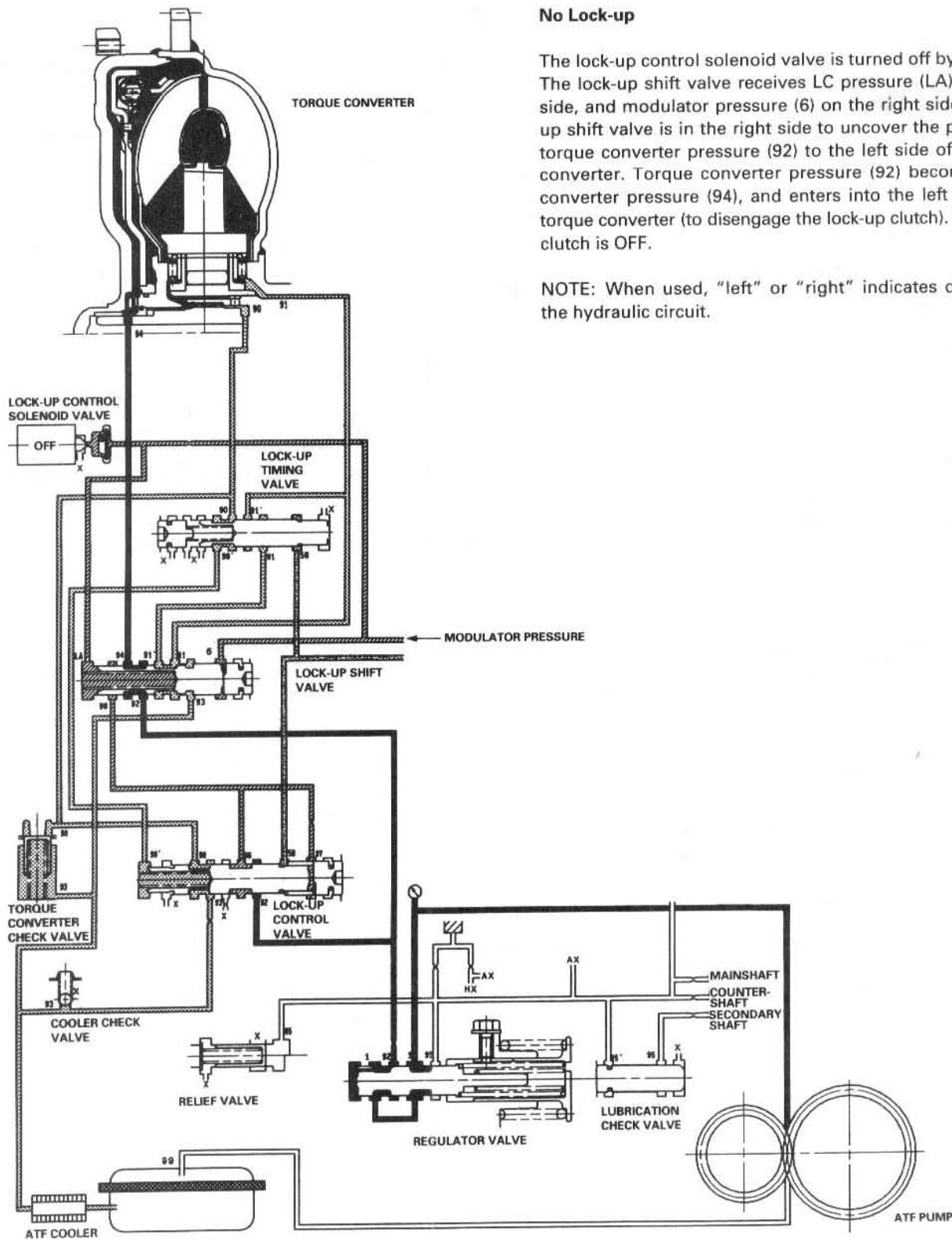
2. Operation (clutch off)

With the lock-up clutch off, fluid flows in the reverse of CLUTCH ON. As a result, the lock-up piston moves away from the converter cover, and torque converter lock-up is released.

Power flow

Engine
↓
Drive plate
↓
Torque converter cover
↓
Pump
↓
Turbine
↓
Mainshaft





No Lock-up

The lock-up control solenoid valve is turned off by the TCM. The lock-up shift valve receives LC pressure (LA) on the left side, and modulator pressure (6) on the right side. The lock-up shift valve is in the right side to uncover the port leading torque converter pressure (92) to the left side of the torque converter. Torque converter pressure (92) becomes torque converter pressure (94), and enters into the left side of the torque converter (to disengage the lock-up clutch). The lock-up clutch is OFF.

NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.

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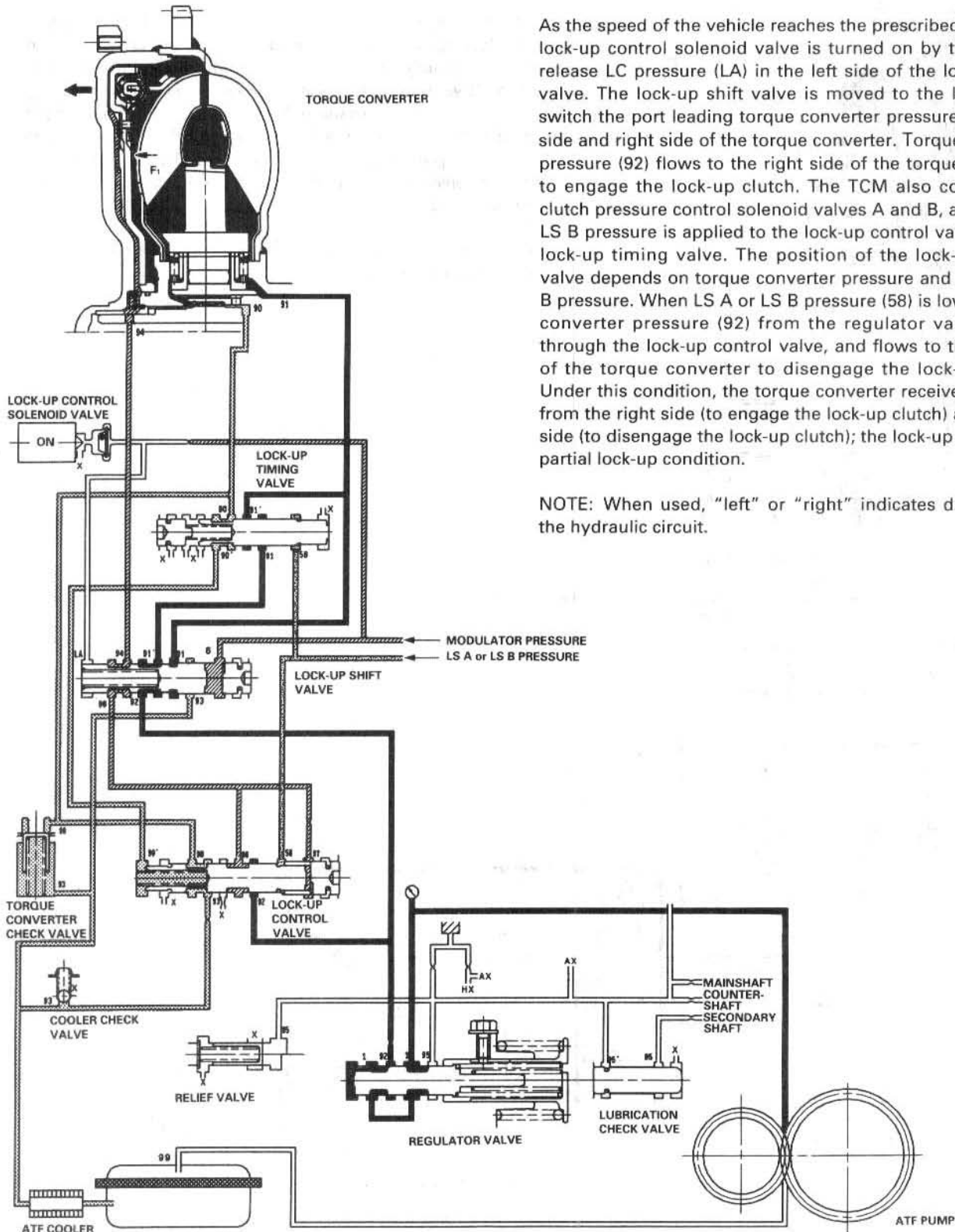
Description

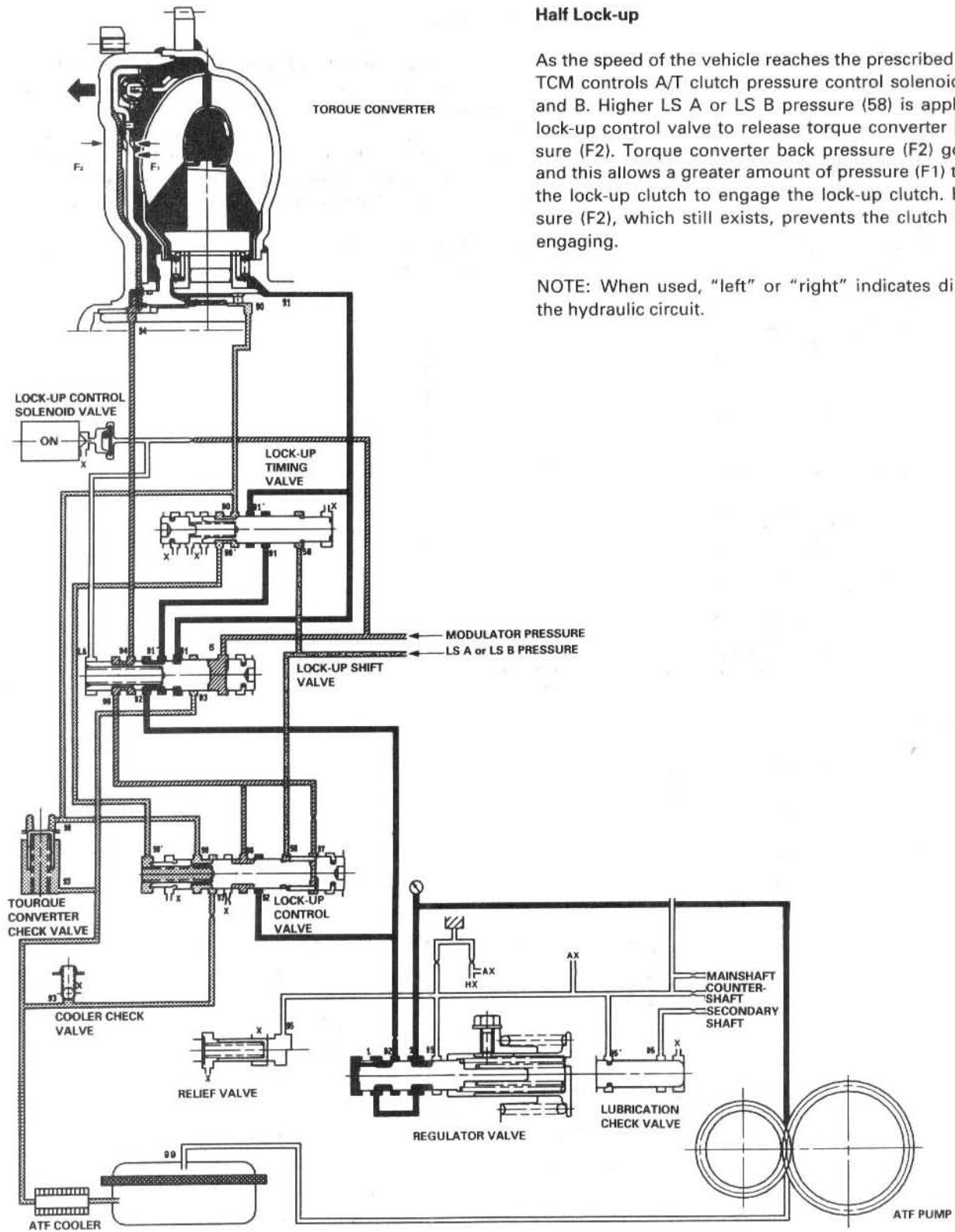
Lock-up System (cont'd)

Partial Lock-up

As the speed of the vehicle reaches the prescribed value, the lock-up control solenoid valve is turned on by the TCM to release LC pressure (LA) in the left side of the lock-up shift valve. The lock-up shift valve is moved to the left side to switch the port leading torque converter pressure to the left side and right side of the torque converter. Torque converter pressure (92) flows to the right side of the torque converter to engage the lock-up clutch. The TCM also controls A/T clutch pressure control solenoid valves A and B, and LS A or LS B pressure is applied to the lock-up control valve and the lock-up timing valve. The position of the lock-up control valve depends on torque converter pressure and LS A or LS B pressure. When LS A or LS B pressure (58) is lower, torque converter pressure (92) from the regulator valve passes through the lock-up control valve, and flows to the left side of the torque converter to disengage the lock-up clutch. Under this condition, the torque converter receives pressure from the right side (to engage the lock-up clutch) and the left side (to disengage the lock-up clutch); the lock-up clutch is in partial lock-up condition.

NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.





Half Lock-up

As the speed of the vehicle reaches the prescribed value, the TCM controls A/T clutch pressure control solenoid valves A and B. Higher LS A or LS B pressure (58) is applied to the lock-up control valve to release torque converter back pressure (F2). Torque converter back pressure (F2) goes lower, and this allows a greater amount of pressure (F1) to work on the lock-up clutch to engage the lock-up clutch. Back pressure (F2), which still exists, prevents the clutch from fully engaging.

NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.

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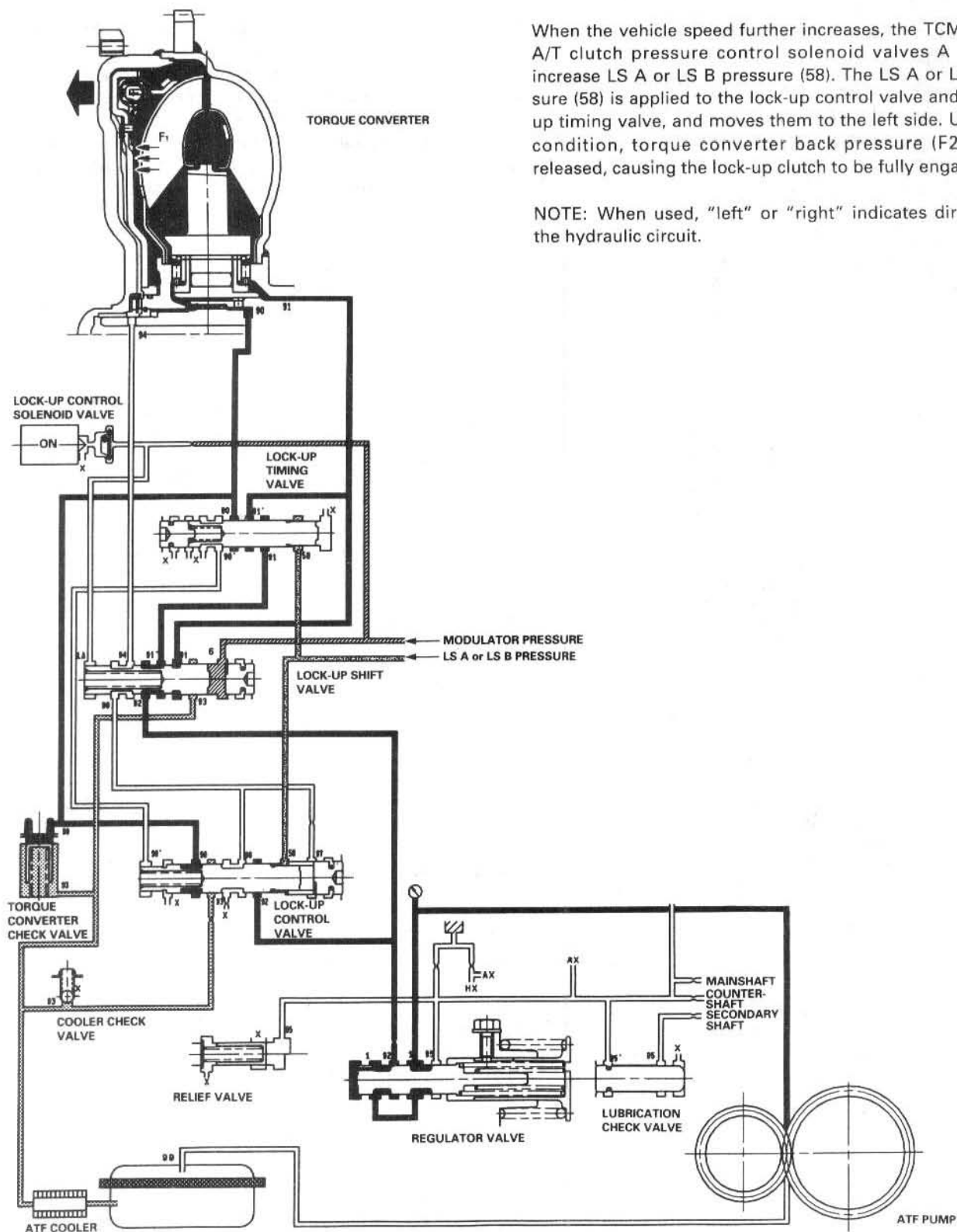
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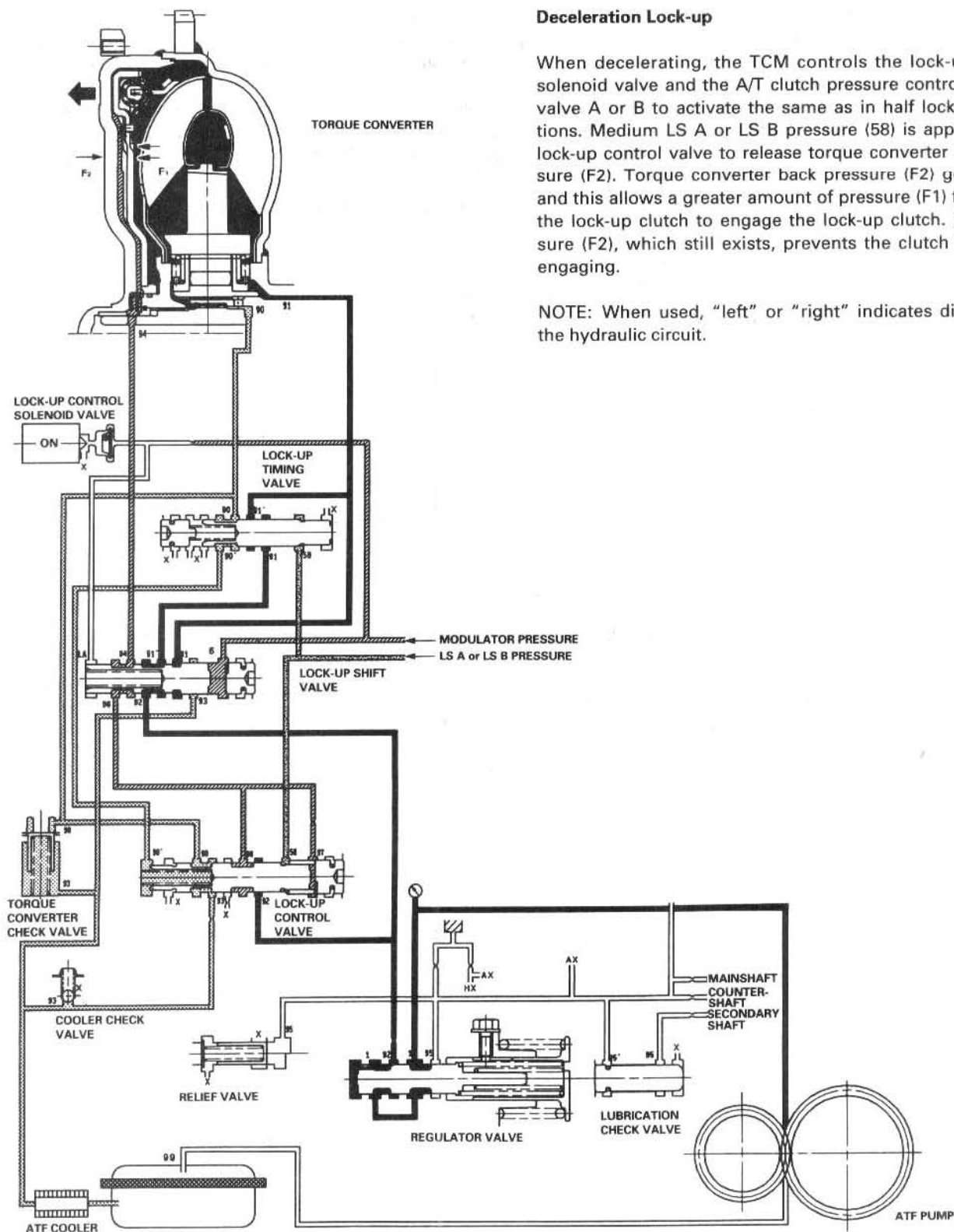
Lock-up System (cont'd)

Full Lock-up

When the vehicle speed further increases, the TCM controls A/T clutch pressure control solenoid valves A and B to increase LS A or LS B pressure (58). The LS A or LS B pressure (58) is applied to the lock-up control valve and the lock-up timing valve, and moves them to the left side. Under this condition, torque converter back pressure (F2) is fully released, causing the lock-up clutch to be fully engaged.

NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.





Deceleration Lock-up

When decelerating, the TCM controls the lock-up control solenoid valve and the A/T clutch pressure control solenoid valve A or B to activate the same as in half lock-up conditions. Medium LS A or LS B pressure (58) is applied to the lock-up control valve to release torque converter back pressure (F2). Torque converter back pressure (F2) goes lower, and this allows a greater amount of pressure (F1) to work on the lock-up clutch to engage the lock-up clutch. Back pressure (F2), which still exists, prevents the clutch from fully engaging.

NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.

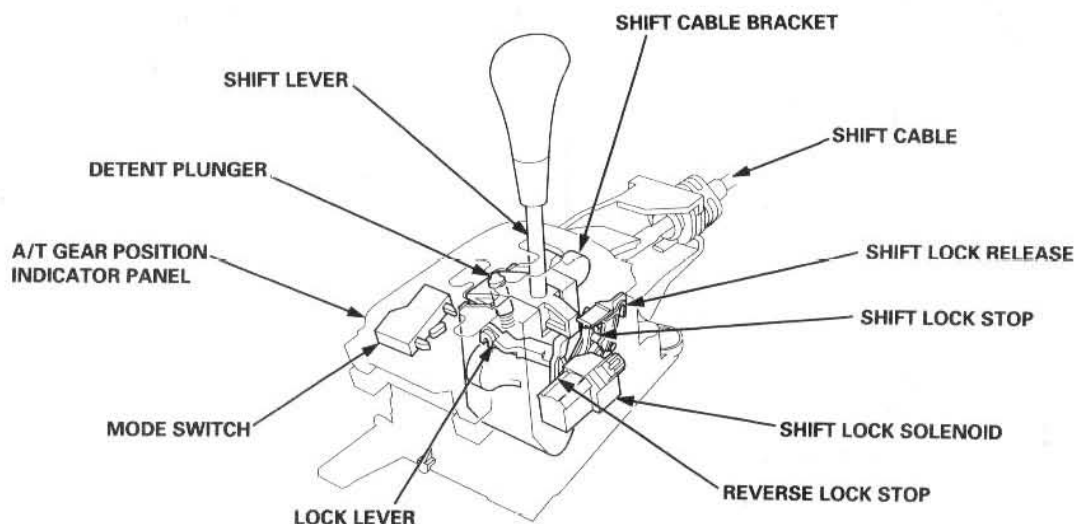
Description

Shift Lever/Sequential Sportshift Mode Mechanism

The shift lever has eight positions: **P**, **R**, **N**, **D₄**, **D₃**, **2**, **1** positions, and the sequential sportshift mode position. The shift lever shifts between positions along the gate in the A/T gear position indicator panel. The shift lever can shift out of **P** position and in to **R** position without depressing the shift lever. The shift lock/reverse lock mechanism is an additional shift lever lockout mechanism.

The shift lever is engaged with the shift cable bracket in **P**, **R**, **N**, **D₄**, **D₃**, **2** and **1** positions. This unit shifts the transmission using the shift cable connected between the shift cable bracket and the transmission control shaft.

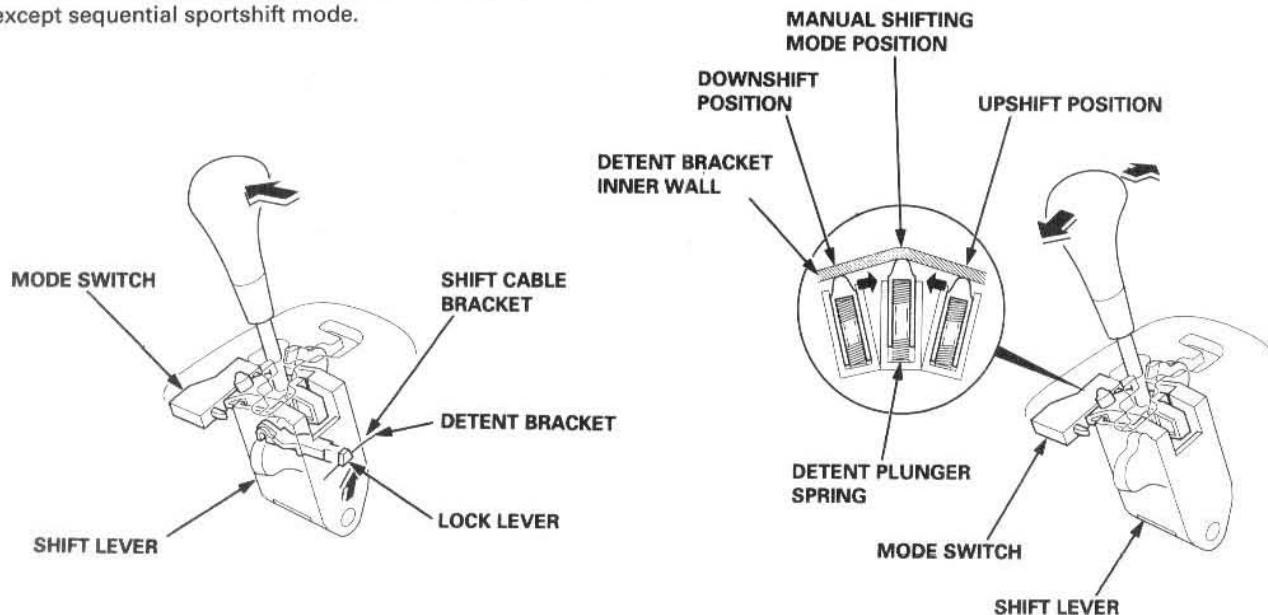
In the sequential sportshift mode position, the shift lever is disengaged from the shift cable bracket, and the shift lever can be used to shift gears electronically with the mode switch between 1st through 4th, much like a manual transmission.



When the shift lever shifts to the sequential sportshift mode position, the shift lever releases the lock lever, and the lock lever pops up to engage the shift cable bracket to the detent bracket; the shift cable bracket and the shifting positions in the transmission are held in **D₄** position.

The lock lever receives its spring load, pops up in the sequential sportshift mode position, and is depressed by the shift lever and does not engage the shift cable bracket to the shift lever base bracket in any position except sequential sportshift mode.

The shift lever has a detent plunger which receives the detent plunger spring load to fit in the sequential sportshift mode position. When shifting to upshift or downshift positions, the detent plunger is depressed by the detent bracket inner wall, and the detent plunger spring puts the shift lever back into the position. The detent plunger also works in **P** position.





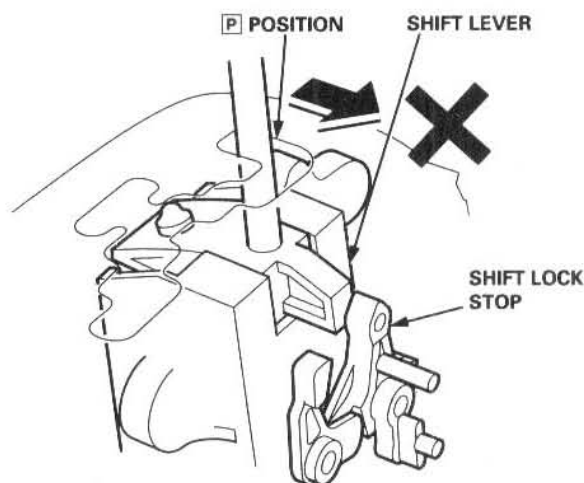
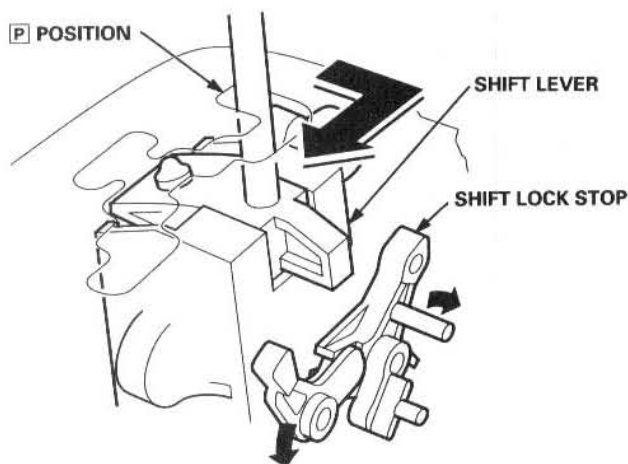
Shift Lock/Reverse Lock Mechanism

The shift lock system reduces the risk of unintentional engine starting. Starting the engine is possible only in the **P** and **N** positions. The shift lock system and the key interlock system are the interlock control system. The key interlock mechanism is located in the steering lock assembly.

The shift lock mechanism consists of the shift lock solenoid, shift lock stop, shift lock release and related parts. The reverse lock mechanism shares the shift lock solenoid with the shift lock mechanism, and the reverse lock stop and the shift lock stop are interlocked with the shift lock solenoid operation. The shift lock solenoid is electronically controlled by these shift lock control system signals: brake switch signal, interlock control signal, and A/T gear position switch **P** position signal. If the shift lock solenoid does not operate, the shift lock/reverse lock mechanism can be released by depressing the shift lock release.

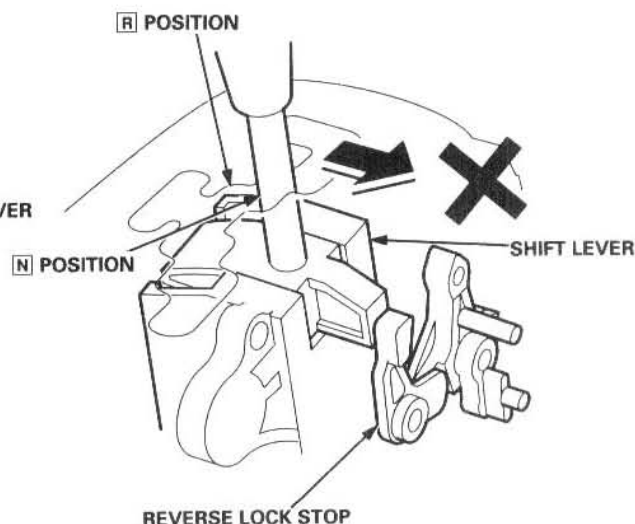
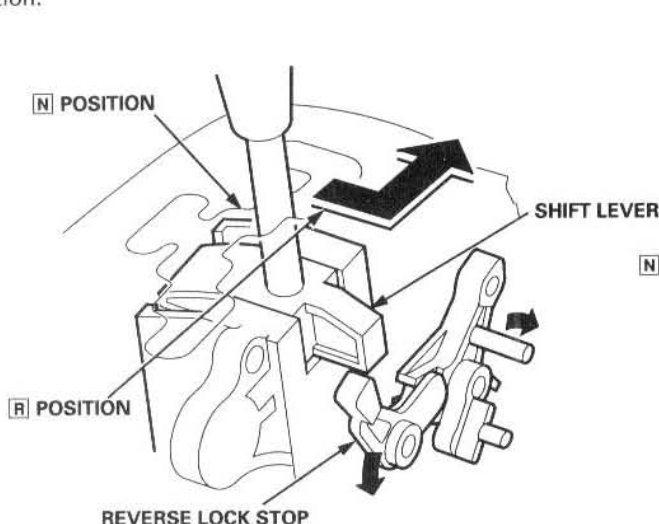
In **P** position while depressing the brake pedal, the shift lock solenoid is turned ON, and the shift lock solenoid plunger is retracted to release the shift lock stop. This allows the shift lever to be moved from **P** position.

When the brake pedal is released, the shift lock solenoid remains OFF, and the shift lock stop locks to block the shift lever in the **P** position.

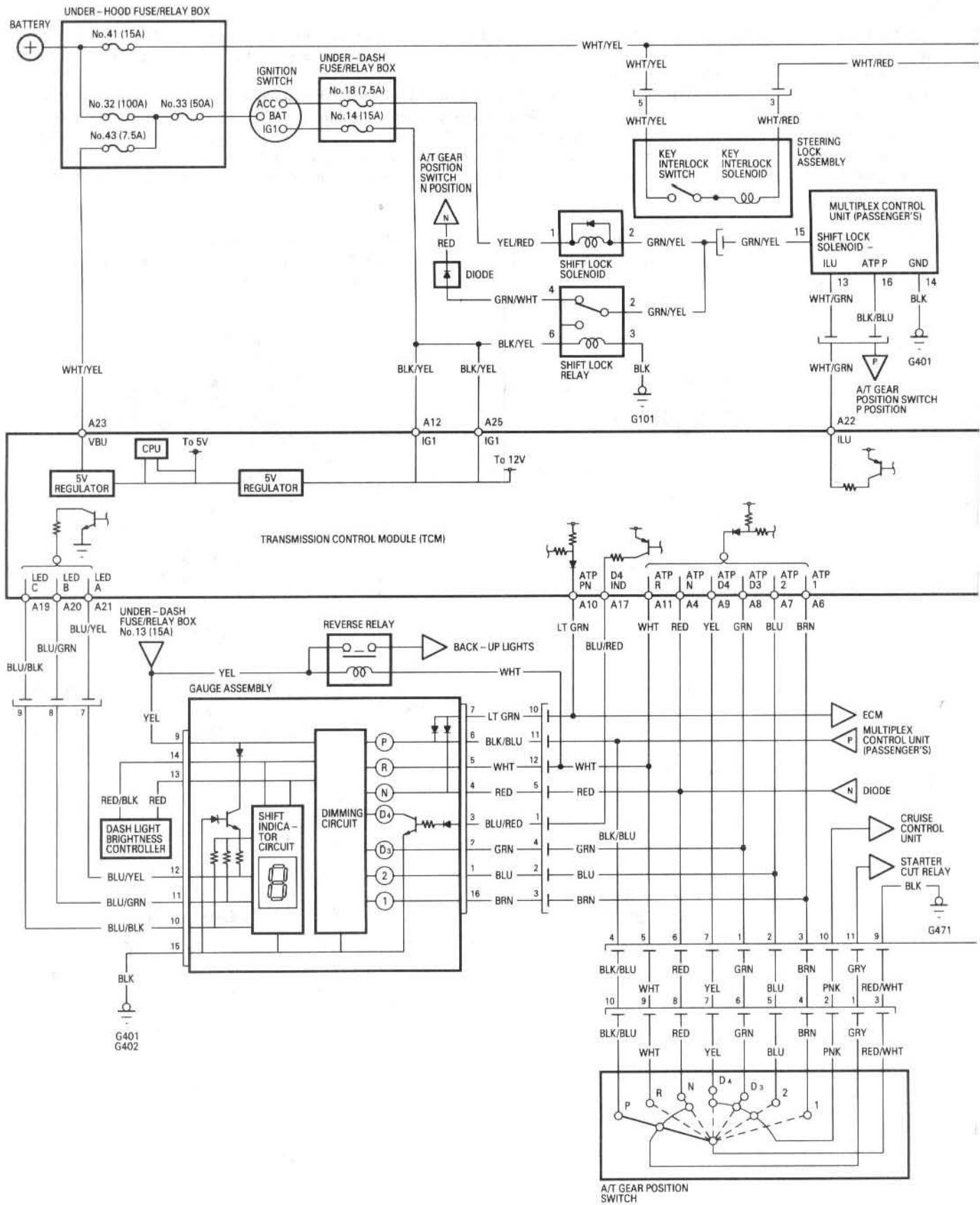


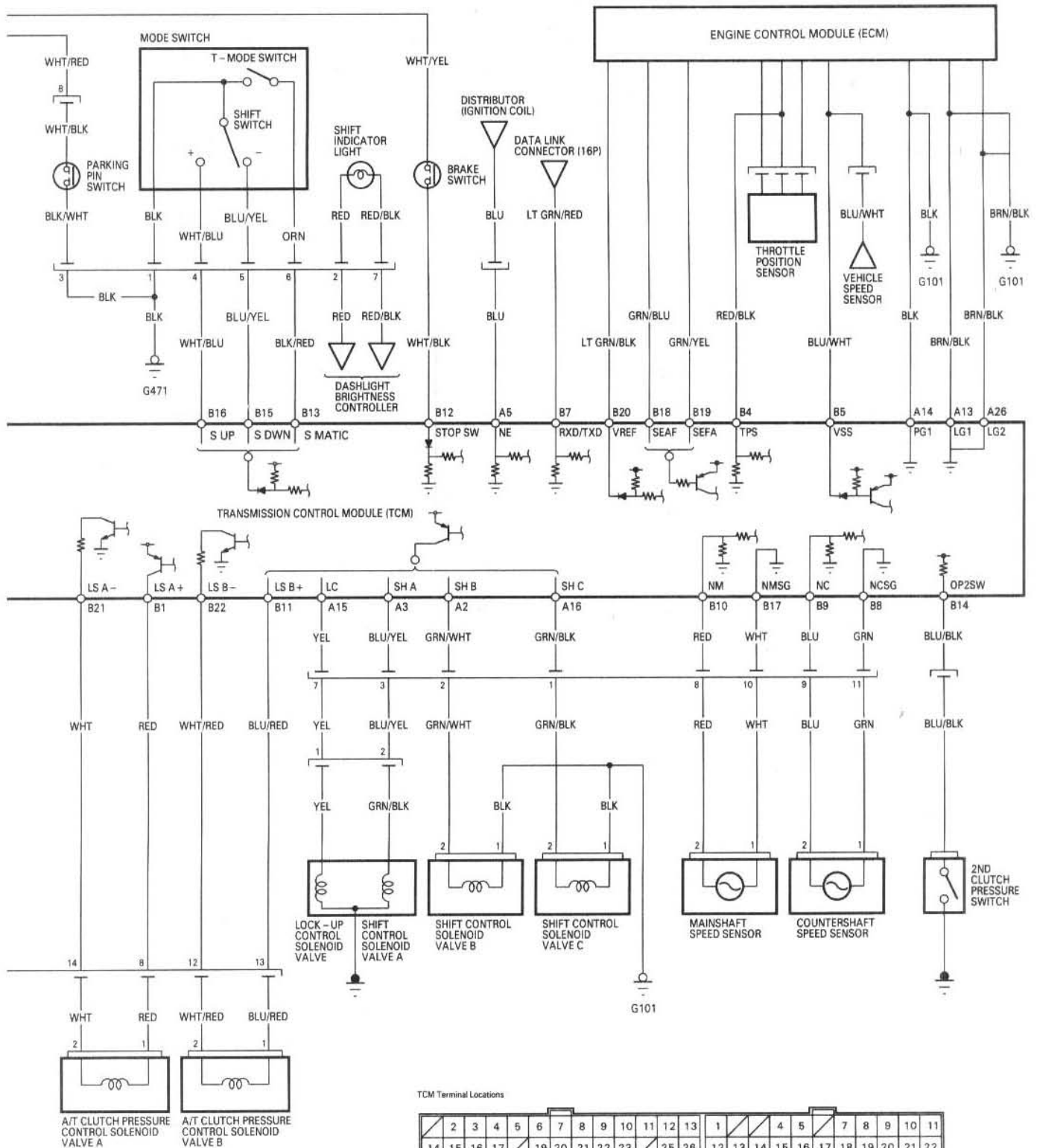
When the shift lever is shifted to **R** position from **D** position and **N** position (under certain conditions), the shift lock solenoid is turned ON, and the shift lock solenoid plunger is retracted to release the reverse lock stop. This allows the shift lever to be moved to **R** position.

If the allowable conditions of turning ON the solenoid are not met, the shift lock solenoid remains OFF, and the reverse lock stop locks to block the shift lever in the **N** position.



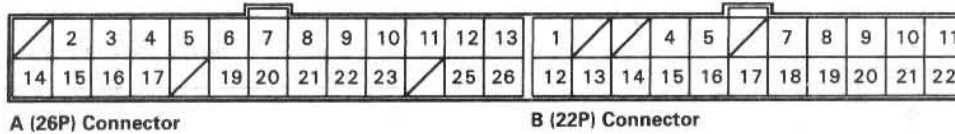
TCM Circuit Diagram





TCM Terminal Voltage/Measuring Conditions

TCM Terminal Locations



A (26P) Connector

B (22P) Connector

Terminal Number	Signal	Description	Measuring Conditions/Terminal Voltage
A1	—	Not used	
A2	SH B	Shift control solenoid valve B control	Battery voltage in following positions: <ul style="list-style-type: none"> • 1 and 2 position • D₂ and D₃ positions in 1st and 2nd gear • P, R, and N positions 0 V in following positions: <ul style="list-style-type: none"> • D₂ and D₃ positions in 3rd gear • D₄ position in 4th gear
A3	SH A	Shift control solenoid valve A control	Battery voltage in following positions: <ul style="list-style-type: none"> • 2 position • D₂ and D₃ positions in 2nd and 3rd gear 0 V in following positions: <ul style="list-style-type: none"> • 1 position • D₂ and D₃ positions in 1st gear • D₄ position in 4th gear
A4	ATP N	A/T gear position switch N position input	In N position: 0 V In other than N position: Battery voltage
A5	NE	Engine speed input	When engine is running: Battery voltage
A6	ATP 1	A/T gear position switch 1 position input	In 1 position: 0 V In other than 1 position: Battery voltage
A7	ATP 2	A/T gear position switch 2 position input	In 2 position: 0 V In other than 2 position: Battery voltage
A8	ATP D3	A/T gear position switch D₃ position input	In D₃ position: 0 V In other than D₃ position: Battery voltage
A9	ATP D4	A/T gear position switch D₄ position input	In D₄ position: 0 V In other than D₄ position: Battery voltage
A10	ATP PN	A/T gear position switch P and N position input	In P and N position: 0 V In other than P and N position: Battery voltage
A11	ATP R	A/T gear position switch R position input	In R position: 0 V In other than R position: Battery voltage
A12	IG1	Power supply system	With ignition switch ON (II): Battery voltage
A13	LG1	Ground	
A14	PG1	Ground	
A15	LC	Lock-up control solenoid valve control	During half and full lock-up conditions, and during deceleration condition: Battery voltage During no lock-up condition: 0 V



Terminal Number	Signal	Description	Measuring Conditions/Terminal Voltage
A16	SH C	Shift control solenoid valve C control	Battery voltage in following positions: <ul style="list-style-type: none"> • 1 position • D₂ and D₃ positions in 1st and 3rd gear 0 V in following positions: <ul style="list-style-type: none"> • 2 position • D₂ and D₃ positions in 2nd gear • D₄ position in 4th gear
A17	D4 IND	D4 indicator light control	When ignition switch is first turned ON (II): Battery voltage for two seconds In D₄ position: Battery voltage
A18	—	Not used	
A19	LED C	Shift indicator light control	In sequential sportshift mode <ul style="list-style-type: none"> • In 1st and 3rd gear positions: Battery voltage • In 2nd and 4th gear positions: 0 V
A20	LED B	Shift indicator light control	In sequential sportshift mode <ul style="list-style-type: none"> • In 1st and 4th gear positions: 0 V • In 2nd and 3rd gear positions: Battery voltage
A21	LED A	Shift indicator light control	In sequential sportshift mode <ul style="list-style-type: none"> • In 4th gear position: Battery voltage • In 1st, 2nd and 3rd gear positions: 0 V
A22	ILU	Interlock control	When ignition switch ON (II), brake pedal depressed, and accelerator pedal released: Battery voltage
A23	VBU	Back-up power system	Always battery voltage
A24	—	Not used	
A25	IG1	Power supply system	With ignition switch ON (II): Battery voltage
A26	LG2	Ground	
B1	LS A+	A/T clutch pressure control solenoid valve A power supply positive electrode	With ignition switch ON (II): Pulsed signal
B2	—	Not used	
B3	—	Not used	
B4	TPS	Throttle position sensor signal input	With ignition switch ON (II) and throttle fully open: 4.14 – 4.82 V With ignition switch ON (II) and throttle fully closed: 0.44 – 0.56 V
B5	VSS	Vehicle speed input	With ignition switch ON (II) and rotating front wheels: Pulsed signal
B6	—	Not used	
B7	RXD/TXD (DIAG-H)	Data communication: Diagnostic trouble code output	With ignition switch ON (II): Approx. 5 V
B8	NC SG	Countershaft speed sensor ground	Always: 0 V
B9	NC	Countershaft speed sensor input	Depending on vehicle speed: Pulsed signal When vehicle is stopped: 0 V
B10	NM	Mainshaft speed sensor input	Depending on vehicle speed: Pulsed signal When engine is stopped: 0 V

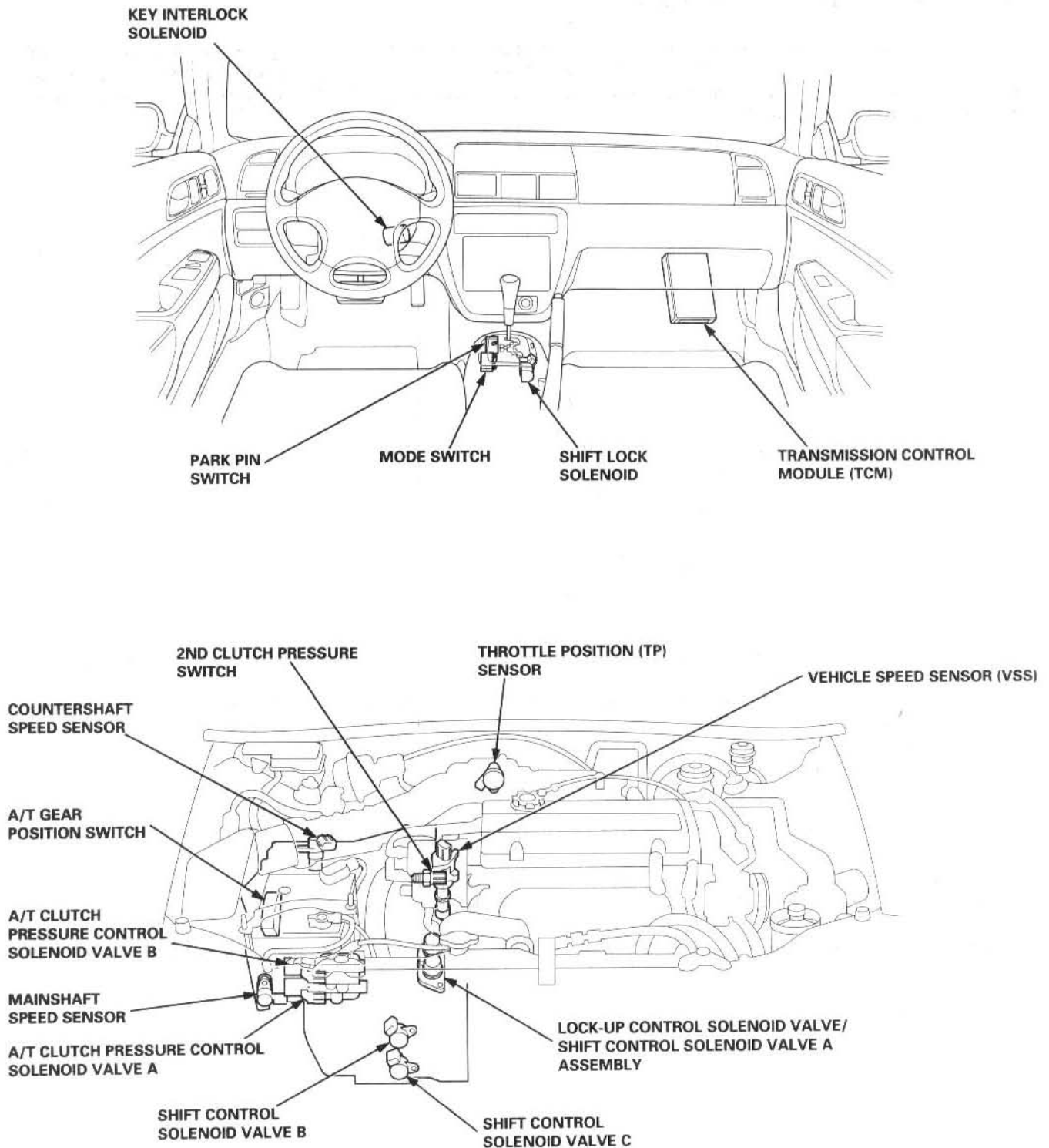
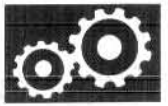
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TCM Terminal Voltage/Measuring Conditions

(cont'd)

Terminal Number	Signal	Description	Measuring Conditions/Terminal Voltage
B11	LS B+	A/T clutch pressure control solenoid valve B power supply positive electrode	With ignition switch ON (II): Pulsed signal
B12	STOP SW	Brake switch signal input	Brake pedal depressed: Battery voltage With ignition switch ON (II) and brake pedal released: 0 V
B13	S MATIC	S-mode switch signal input	In sequential sportshift mode (shift lever is in sequential sportshift mode position): 0 V In other than sequential sportshift mode: Battery voltage
B14	OP2SW	2nd clutch pressure switch signal input	With ignition switch ON (II): Approx. 5 V
B15	S DWN	Downshift switch signal input	In sequential sportshift mode and shift lever pulled toward downshift position (marked with "-"): 0 V In sequential sportshift mode and shift lever in neutral position: Battery voltage
B16	S UP	Upshift switch signal input	In sequential sportshift mode and shift lever pushed toward upshift position (marked with "+"): 0 V In sequential sportshift mode and shift lever in neutral position: Battery voltage
B17	NM SG	Mainshaft speed sensor ground	Always: 0 V
B18	SEAF	Data communication with ECM: Transmission control data output	With ignition switch ON (II): Pulsed signal
B19	SEFA	Data communication with ECM: PGM-FI control data input	With ignition switch ON (II): Pulsed signal
B20	VREF	+5 V reference	With ignition switch ON (II): Approx. 5 V
B21	LS A-	A/T clutch pressure control solenoid valve A power supply negative electrode	With ignition switch ON (II): Pulsed signal
B22	LS B-	A/T clutch pressure control solenoid valve B power supply negative electrode	With ignition switch ON (II): Pulsed signal

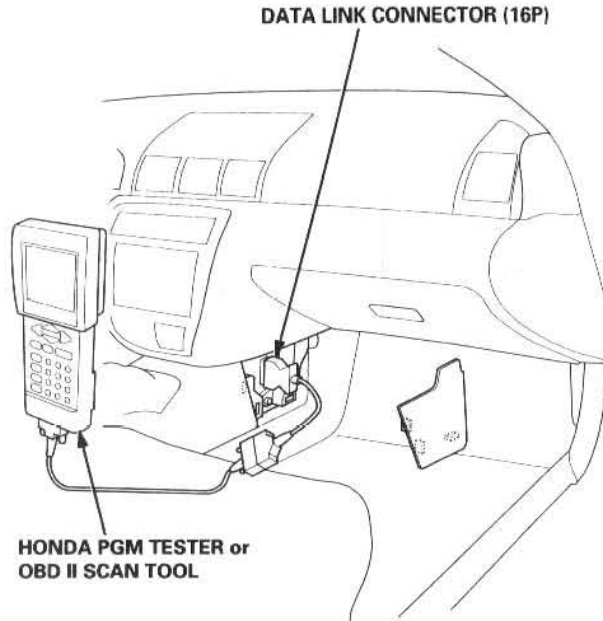
Component Locations



Troubleshooting Procedures

Checking the Diagnostic Trouble Code (DTC) with an OBD II Scan Tool or the Honda PGM Tester

When the TCM senses an abnormality in the input or output systems, the **D4** indicator light in the gauge assembly will blink. When the 16P Data Link Connector (DLC) (located behind the right console front cover) is connected to the OBD II Scan Tool or Honda PGM Tester as shown, the scan tool or tester will indicate the Diagnostic Trouble Code (DTC) when the ignition switch is turned ON (II).



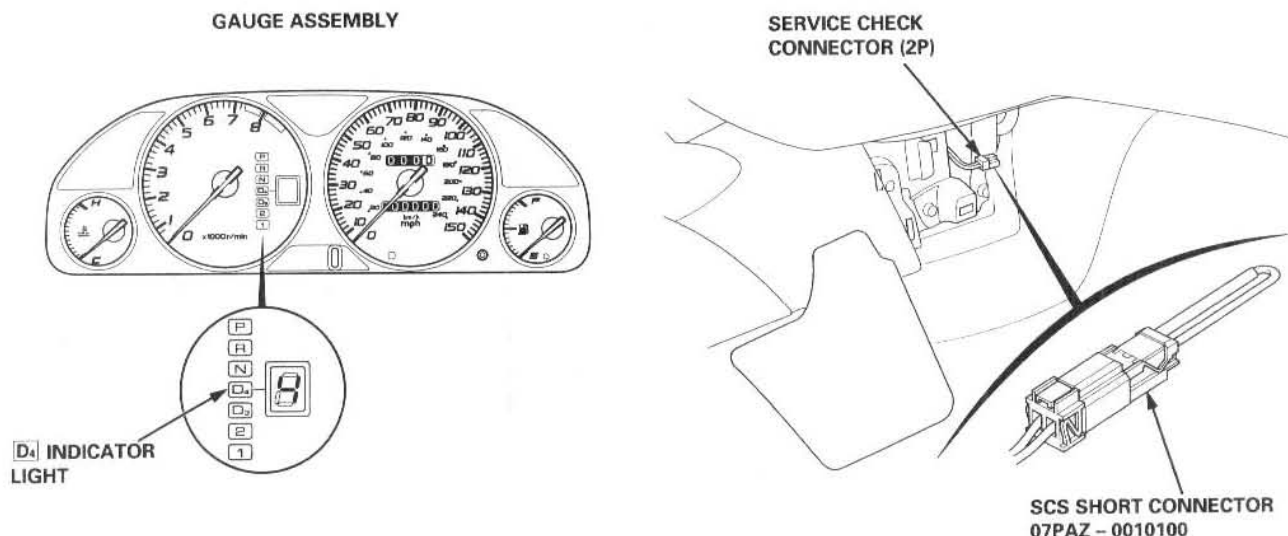
If the **D4** indicator light or the MIL has been reported on, or if a driveability problem is suspected, follow this procedure;

1. Connect the OBD II Scan Tool (conforming to SAE J1978) or Honda PGM Tester to the 16P DLC. (See the OBD II Scan Tool or Honda PGM Tester user's manual for specific instructions. If you are using the Honda PGM Tester, make sure it is set to the SAE DTC type.)
2. Turn the ignition switch ON (II), and observe the DTC on the screen.
3. Record all fuel and emission DTCs, A/T DTCs, and freeze data.
4. If there is a fuel and emissions DTC, first check the fuel and emissions system as indicated by the DTC (except for DTC P0700), DTC P0700 means there is one or more A/T DTC, and no problems were detected in the fuel and emissions circuit of the TCM.
5. Get the anti-theft code for the radio, then write down the radio station presets.
6. Reset the memory with the PGM Tester or by removing the BACK UP fuse in the passenger's under-dash fuse/relay box for more than 10 seconds.
7. Drive the vehicle for several minutes at speeds over 30 mph (50 km/hr), and then recheck for DTCs. If the A/T DTC returns, go to the Symptom-to Component Chart on pages 14-57 thru 14-59. If the DTC does not return, there was an Intermittent problem within the circuit. Make sure all pins and terminals in the circuit are tight, and then go to step 8.
8. Enter the anti-theft code for the radio, reset the radio preset stations, and set the clock.

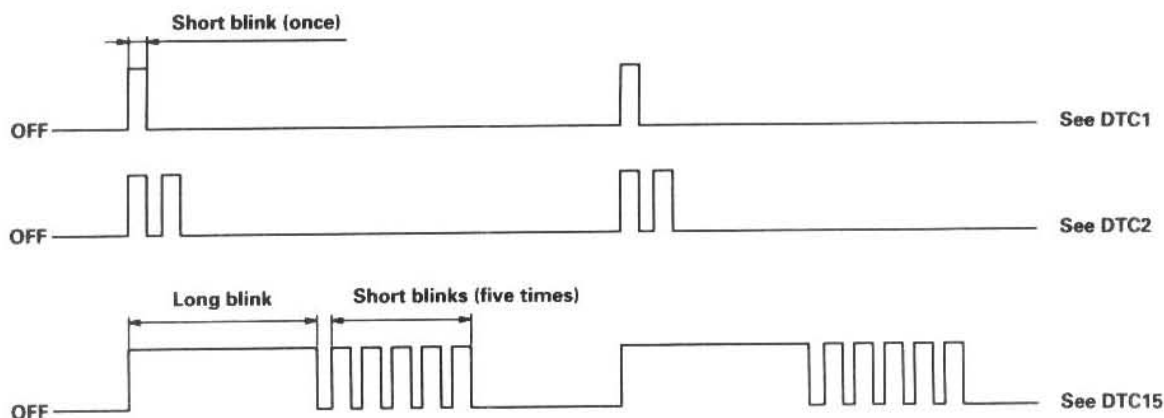


Checking the Diagnostic Trouble Code (DTC) with the Service Check Connector and Special Tool

When the TCM senses an abnormality in the input or output systems, the **D₄** indicator light in the gauge assembly will blink. When the Service Check Connector (2P) (located under the dash on the passenger side) is connected with the special tool as shown, the **D₄** indicator light will blink the Diagnostic Trouble Code (DTC) when the ignition switch is turned on (II). When the **D₄** indicator light has been reported on, connect the Service Check Connector (2P) to the special tool. Then turn on (II) the ignition switch and observe the **D₄** indicator light.



Codes 1 through 9 are indicated by individual short blinks. Codes 10 and above are indicated by a series of long and short blinks. One long blink equals 10 short blinks. Add the long and short blinks together to determine the code. After determining the code, refer to the electrical system Symptom-to-Component Chart on pages 14-57 thru 14-59.



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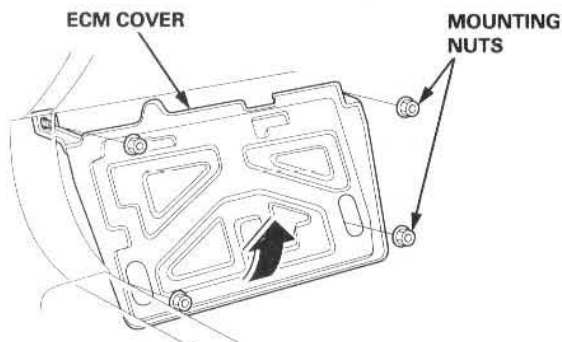
Troubleshooting Procedures

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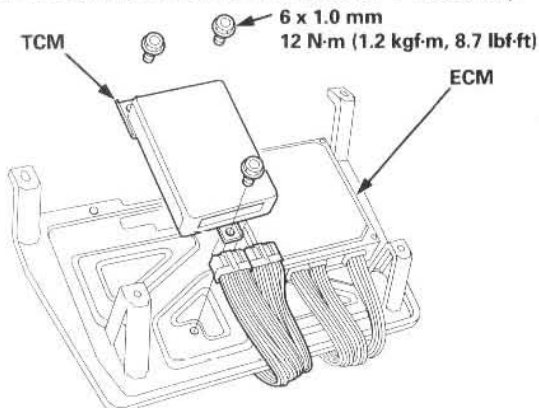
NOTE:

- Check the Malfunction Indicator Lamp (MIL) and repair the PGM-FI control system before repairing the A/T control system under these conditions:
 - When the MIL and the **D₄** indicator light come on simultaneously.
 - When the **D₄** indicator light does not indicate the DTC with the ignition switch is turned on (II) even though the **D₄** indicator light has been reported on and the service check connector is connected with the special tool.
- After repairing the PGM-FI control system, disconnect the BACK UP fuse (7.5 A) in the under-hood fuse/relay box for more than 10 seconds to reset the TCM memory, then recheck.
- Disconnecting the BACK UP fuse also cancels the radio anti-theft code, preset stations and the clock setting. Get the customer's code number, and make note of the radio presets before removing the fuse so you can reset them.

1. Remove the door sill molding on the passenger side (see section 20).
2. Pull the carpet back to expose the ECM cover.



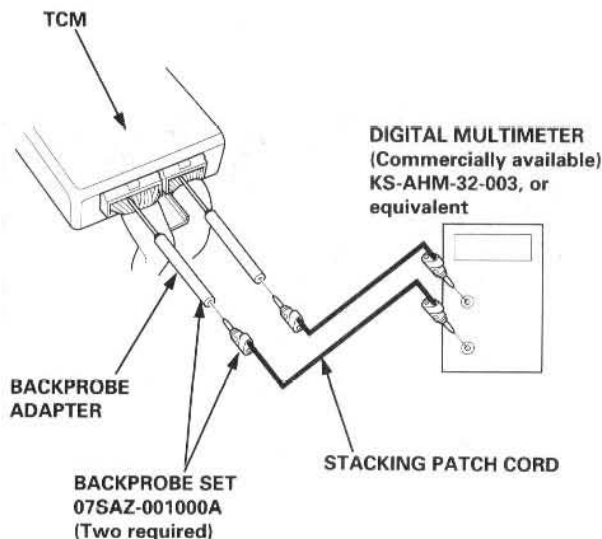
3. Remove the ECM cover mounting nuts, then turn the ECM over.
4. Remove the TCM from the ECM cover if necessary.



5. Inspect the circuit on the TCM according to the troubleshooting flowchart with the special tools and a digital multimeter.

How to use the Backprobe Set

Connect the backprobe adapters to the patch codes, and connect the cords to a multimeter. Using the wire insulation as a guide for the contoured tip of the backprobe adapter, gently slide the tip into the connector from the wire side until it comes in contact with the terminal end of the wire.



TCM Reset Procedure

1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.
2. Turn the ignition switch OFF.
3. Remove the BACK UP fuse (7.5 A) from the under-hood fuse/relay box for 10 seconds to reset the TCM.

NOTE: The A/T control system memory can also be cleared by using the OBD II Scan Tool or the Honda PGM Tester.

Final Procedure


NOTE: This procedure must be done after any troubleshooting.


1. Turn the ignition switch OFF.
2. Disconnect the OBD II Scan Tool or Honda PGM Tester from the Data Link Connector (16P), or remove the special tool from the Service Check Connector (2P).
3. Reset the TCM.
4. Turn the ignition switch ON (II).
5. Enter the anti-theft code for the radio, then enter the customer's radio station presets.

Symptom-to-Component Chart



Electrical System


Diagnostic Trouble Code (DTC)*	 Indicator Light	Symptom	Possible Cause	Refer to Page
P1753 (1)	Blinks	<ul style="list-style-type: none"> Lock-up clutch does not engage. Fails to shift (stuck in 4th gear). 	<ul style="list-style-type: none"> Disconnected lock-up control solenoid valve/shift control solenoid valve A assembly connector Short or open in lock-up control solenoid valve wire Faulty lock-up control solenoid valve 	14-60
P1790 (3)	Blinks	Lock-up clutch does not engage.	<ul style="list-style-type: none"> Disconnected throttle position (TP) sensor connector Short or open in TP sensor wire Faulty TP sensor 	14-62
P1791 (4)	Blinks	Lock-up clutch does not engage.	<ul style="list-style-type: none"> Disconnected vehicle speed sensor (VSS) connector Short or open in VSS wire Faulty VSS 	14-63
P1705 (5)	Blinks	<ul style="list-style-type: none"> Fails to shift other than 2nd – 3rd gears. Lock-up clutch does not engage. 	<ul style="list-style-type: none"> Short in A/T gear position switch wire Faulty A/T gear position switch 	14-64
P1706 (6)	OFF	Lock-up clutch does not engage.	<ul style="list-style-type: none"> Disconnected A/T gear position switch connector Open in A/T gear position switch wire Faulty A/T gear position switch 	14-66
P0753 (7)	Blinks	Fails to shift (stuck in 4th gear).	<ul style="list-style-type: none"> Disconnected lock-up control solenoid valve/shift control solenoid valve A assembly connector Short or open in shift control solenoid valve A wire Faulty shift control solenoid valve A 	14-68
P0758 (8)	Blinks	Fails to shift (stuck in 4th gear).	<ul style="list-style-type: none"> Disconnected shift control solenoid valve B connector Short or open in shift control solenoid valve B wire Faulty shift control solenoid valve B 	14-70
P0720 (9)	Blinks	Lock-up clutch does not engage.	<ul style="list-style-type: none"> Disconnected countershaft speed sensor connector Short or open in countershaft speed sensor wire Faulty countershaft speed sensor 	14-72
P0725 (11)	OFF	Lock-up clutch does not engage.	<ul style="list-style-type: none"> Disconnected distributor (ignition coil) connector Short or open in ignition coil wire Faulty ignition coil 	14-73
P0715 (15)	Blinks	Lock-up clutch does not engage.	<ul style="list-style-type: none"> Disconnected mainshaft speed sensor connector Short or open in mainshaft speed sensor wire Faulty mainshaft speed sensor 	14-74
P1768 (16)	Blinks	<ul style="list-style-type: none"> Fails to shift (stuck in 4th gear). Lock-up clutch does not engage. 	<ul style="list-style-type: none"> Disconnected A/T clutch pressure control solenoid valve A connector Short or open in A/T clutch pressure control solenoid valve A wire Faulty A/T clutch pressure control solenoid valve A Faulty PG line 	14-76


(DTC)*: The DTC in parentheses is the code the  indicator light indicates when the service check connector is connected to the special tool (SCS service connector).


(cont'd)

Symptom-to-Component Chart

Electrical System (cont'd)

Diagnostic Trouble Code (DTC)*	 Indicator Light	Symptom	Possible Cause	Refer to Page
P0763 (22)	Blinks	Fails to shift (stuck in 4th gear).	<ul style="list-style-type: none"> • Disconnected shift control solenoid valve C connector. • Short or open in shift control solenoid valve C wire • Faulty shift control solenoid valve C 	14-78
P1773 (23)	Blinks	<ul style="list-style-type: none"> • Fails to shift (stuck in 4th gear). • Lock-up clutch does not engage. 	<ul style="list-style-type: none"> • Disconnected A/T clutch pressure control solenoid valve B connector • Short or open in A/T clutch pressure control solenoid valve B wire • Faulty A/T clutch pressure control solenoid valve B • Faulty PG line 	14-80
P1709 (24)	Blinks	Transmission does not shift into sequential sportshift mode.	<ul style="list-style-type: none"> • Disconnected mode switch connector • Short or open in mode switch wire • Faulty mode switch 	14-82
P1738 (25)	OFF	No specific symptom appears.	<ul style="list-style-type: none"> • Disconnected 2nd clutch pressure switch connector • Short or open in 2nd clutch pressure switch wire • Faulty 2nd clutch pressure switch 	14-84
P1655 (37)**	Blinks	Lock-up clutch does not engage.	<ul style="list-style-type: none"> • Short or open in SEAF wire between B18 terminal and ECM • Short or open in SEFA wire between B19 terminal and ECM • Faulty ECM 	14-86
P0740 (40)	OFF	Lock-up clutch does not engage.	Faulty lock-up control system	14-88
P0730 (41)	OFF	<ul style="list-style-type: none"> • Fails to shift (between 1st – 2nd, 1st – 2nd – 3rd, 2nd – 3rd – 4th or 1st – 3rd – 4th gears). • Fails to shift (stuck in 2nd gear). 	Faulty shift control system	14-89

(DTC)*: The DTC in parentheses is the code the  indicator light indicates when the service check connector is connected to the special tool (SCS service Connector).

(37)**: Code 37 is caused by a faulty SEAF or SEFA wire between the TCM and the ECM, or a faulty ECM. The  indicator light cannot indicate code 37 even though the service check connector is connected with the special tool.



If the self-diagnostic **D4** indicator light does not blink, perform an inspection according to the table below.

Symptom	Inspection	Ref. page
D4 indicator light is on constantly (not blinking) whenever the ignition switch is on (II).	————	14-90
D4 indicator light does not come on for two seconds after ignition switch is first turn on (II).	————	14-91
Transmission does not shift up and down when operating the shift lever in the sequential sportshift mode position.	Check shift switch	14-93
Shift indicator does not indicate selected gear while shift lever is in sequential sportshift mode position.	Check shift indicator circuit.	14-96
Shift lever cannot be moved from P position with brake pedal depressed.	Check interlock system –Shift lock system	14-97
Shift lever cannot pass through R position from N position.	Check interlock system –Reverse lock system	14-99
Ignition key cannot be moved from ACC (I) position to LOCK (0) position with the shift lever in P position.	Check interlock system –Key interlock system	14-101

NOTE:

- If a customer describes the symptom for code P1706 (6) or P0725 (11), it will be necessary to recreate the symptom by test driving, then rechecking the DTC.
- Check the Malfunction Indicator Lamp (MIL) and repair the PGM-FI control system before repairing the A/T control system under conditions:
 - When the MIL and the **D4** indicator light come on simultaneously.
 - When the **D4** indicator light does not indicate the DTC with the ignition switch turned on (II), even though the **D4** indicator light has been reported on and the service check connector is connector with the special tool.
- After repairing the PGM-FI control system, disconnect the BACK UP fuse (7.5 A) in the under-hood fuse/relay box for more than 10 seconds to reset the TCM memory. Drive the vehicle for several minutes at a speed over 30 mph (50 km/h), then recheck the DTC.
- Disconnecting the BACK UP fuse also cancels the radio anti-theft code, preset stations, and the clock setting. Get the customer's code number, and make note of the radio presets before removing the fuse so you can reset them.

14-60

• OBD II Scan Tool indicates Code P1753.
• Self-diagnosis **D₄** indicator light blinks once.

Check for a Short to Power:

1. Disconnect the A (26P) connector from the TCM.
2. Turn the ignition switch ON (II).
3. Measure the voltage between the A15 and A13 or A26 terminals.

Is there voltage?

YES → Repair short to power in the wire between the A15 terminal and the lock-up control solenoid valve.

NO → Measure Lock-up Control Solenoid Valve Resistance:

1. Turn the ignition switch OFF.
2. Measure the resistance between the A15 and A13 or A26 terminals.

Is the resistance 12 – 25 Ω ?

YES → Check for loose TCM connectors. If necessary, substitute a known-good solenoid valve assembly or TCM and recheck.

NO → To page 14-61

Possible Cause

- Disconnected lock-up control solenoid valve/shift control solenoid valve A assembly connector
- Short or open in lock-up control solenoid valve wire
- Faulty lock-up control solenoid valve

TCM CONNECTOR A (26P)

Wire side of female terminals



From page 14-60

Check Lock-up Control Solenoid Valve for a Short Circuit:

1. Disconnect the 2P connector from the lock-up control solenoid valve/shift control solenoid valve A assembly.
2. Check for continuity between the A15 and A13 or A26 terminals.

Is there continuity?

YES

Repair short to ground in the wire between the A15 terminal and the lock-up control solenoid valve.

NO

Measure Lock-up Control Solenoid Valve Resistance at the Solenoid Connector:

Measure the resistance between the No. 1 terminal of the lock-up control solenoid valve/shift control solenoid valve A assembly connector and body ground.

Is the resistance 12 – 25 Ω ?

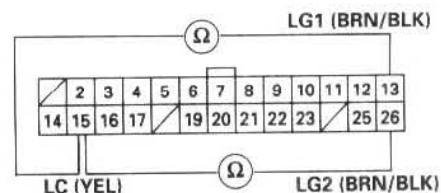
YES

Check for open in the wire between the A15 terminal and the lock-up control solenoid valve.

NO

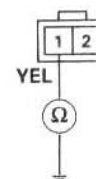
Replace the lock-up control solenoid valve/shift control solenoid valve A assembly.

TCM CONNECTOR A (26P)



Wire side of female terminals

LOCK-UP CONTROL SOLENOID VALVE/
SHIFT CONTROL SOLENOID
VALVE A ASSEMBLY CONNECTOR



Terminal side of male terminals

Electrical Troubleshooting

Troubleshooting Flowchart — Throttle Position (TP) Sensor

• OBD II Scan Tool indicates Code P1790.
• Self-diagnosis **D4** indicator light blinks three times.

Possible Cause

- Disconnected throttle position (TP) sensor connector
- Short or open in TP sensor wire
- Faulty TP sensor

Check for MIL Blinking:

1. Turn the ignition switch ON (II).
2. Check whether the Malfunction Indicator Lamp (MIL) blinks (see section 11).

Is the MIL blinking?

YES

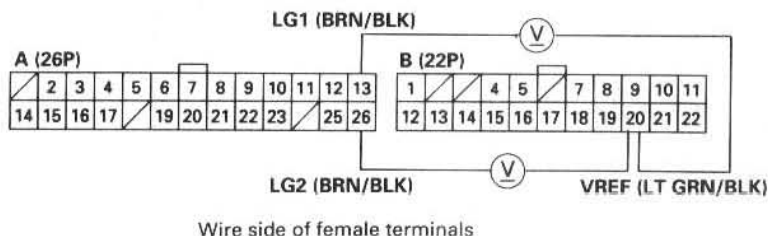
Repair the PGM-FI system (see section 11).

NO

Measure VREF Voltage:

1. Turn the ignition switch OFF.
2. Disconnect the A (26P) and B (22P) connectors from the TCM.
3. Turn the ignition switch ON (II).
4. Measure the voltage between the B20 and A13 or A26 terminals.

TCM CONNECTORS



Is there approx. 5 V?

NO

Repair open or short in the wire between the B20 terminal and the ECM.

YES

Measure TPS Voltage:

Measure the voltage between the B4 and A13 or A26 terminals.

TPS (RED/BLK)



Is there 0.4 – 0.6 V?

NO

Repair open in the wire between the B4 terminal and the TP sensor.

YES

Check for loose TCM connectors. If necessary, substitute a known-good TCM and recheck.



Troubleshooting Flowchart — Vehicle Speed Sensor (VSS)

- OBD II Scan Tool indicates Code P1791.
- Self-diagnosis **D4** indicator light blinks four times.

Possible Cause

- Disconnected vehicle speed sensor (VSS) connector
- Short or open in VSS wire
- Faulty VSS

Check that the speedometer operates correctly.

Does the speedometer operate?

NO

Refer to section 23 for vehicle speed sensor (VSS) test.

YES

Check the VSS Voltage:

1. Raise the vehicle.
2. Shift the transmission to **N** position.
3. Disconnect the A (26P) and B (22P) connectors from the TCM.
4. Turn the ignition switch ON (II).
5. Rotate the front wheel and check for the voltage between the B5 and A13 or A26 terminals. Block the other wheel so it does not turn.

⚠ WARNING

- Make sure lifts, jacks, and safety stands are placed properly (see section 1).
- Set the parking brake securely, and block the rear wheels.
- Jack up the front of the vehicle, and support it with safety stands.

Does 0 V and approx. 5 V or more appear alternately?

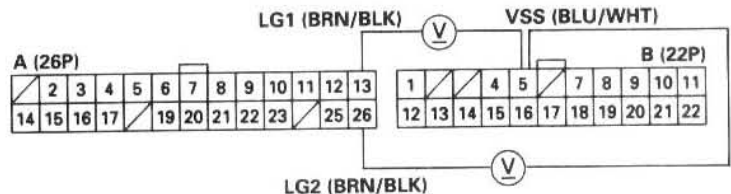
NO

Check for open in the wire between the B5 terminal and the vehicle speed sensor (VSS). If wire is OK, check the VSS (see section 23).

YES

Check for loose TCM connectors. If necessary, substitute a known-good TCM and recheck.

TCM CONNECTORS



Wire side of female terminals

Electrical Troubleshooting

Troubleshooting Flowchart — A/T Gear Position Switch (Short)

- OBD II Scan Tool indicates Code P1705.
- Self-diagnosis **D4** indicator light blinks five times.

Possible Cause

- Short in A/T gear position switch wire
- Faulty A/T gear position switch

NOTE: Code 1705 (5) is caused when the TCM receives two gear position inputs at the same time.

Observe the A/T Gear Position Indicator:

1. Turn the ignition switch ON (II).
2. Observe the A/T gear position indicator, and shift each position separately.

Does any indicator stay on when the shift lever is not in that position?

NO

**The system is OK at this time.
Check the wire harness for damage.**

YES

Disconnect the A/T gear position switch connector.

Do all gear position indicators go out?

YES

Replace the A/T gear position switch.

NO

Connect the A/T gear position switch connector.

Measure ATP R Voltage:

1. Shift to all positions other than **R**.
2. Measure the voltage between the A11 and A13 or A26 terminals.

Is there battery voltage?

NO

Check for short in the wire between the A11 terminal and the A/T gear position switch or A/T gear position indicator. If wire is OK, check for loose TCM connectors. If necessary, substitute a known-good TCM and recheck.

YES

Measure ATP PN Voltage:

1. Shift to all positions other than **N** or **P**.
2. Measure the voltage between the A10 and A13 or A26 terminals.

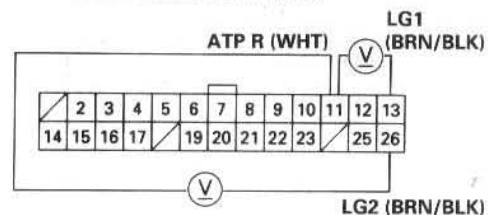
Is there battery voltage?

NO

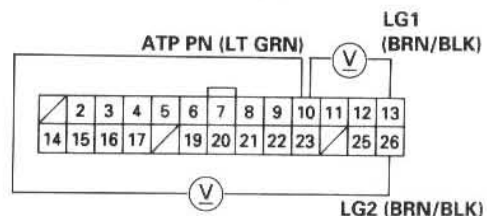
Check for short in the wire between the A10 terminal and the A/T gear position indicator, or a short in the wires between the A/T gear position indicator and the A/T gear position switch. If wires are OK, check for loose TCM connectors. If necessary, substitute a known-good TCM and recheck.

YES

To page 14-65



Wire side of female terminals





From page 14-64

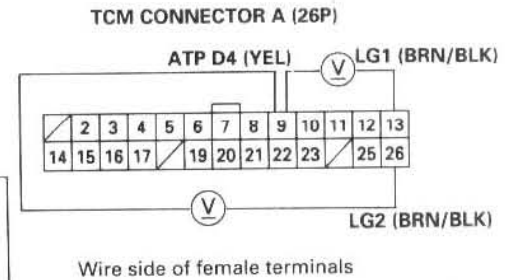
Measure ATP D4 Voltage:
1. Shift to all positions other than **D₃**.
2. Measure the voltage between the A9 and A13 or A26 terminals.

Is there battery voltage?

NO

YES

Check for short in the wire between the A9 terminal and the A/T gear position switch. If wire is OK, check for loose TCM connectors. If necessary, substitute a known-good TCM and recheck.



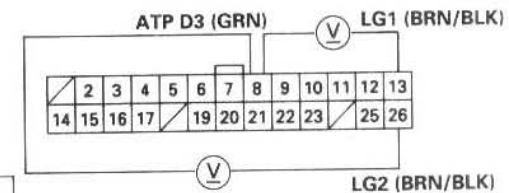
Measure ATP D3 Voltage:
1. Shift to all positions other than **D₃**.
2. Measure the voltage between the A8 and A13 or A26 terminals.

Is there battery voltage?

NO

YES

Check for short in the wire between the A8 terminal and the A/T gear position switch or A/T gear position indicator. If wire is OK, check for loose TCM connectors. If necessary, substitute a known-good TCM and recheck.



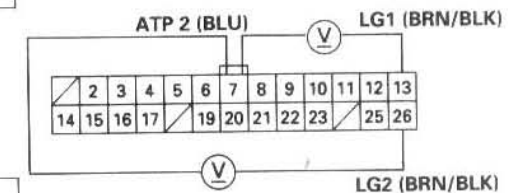
Measure ATP 2 Voltage:
1. Shift to all positions other than **2**.
2. Measure the voltage between the A7 and A13 or A26 terminals.

Is there battery voltage?

NO

YES

Check for short in the wire between the A7 terminal and the A/T gear position switch or A/T gear position indicator. If wire is OK, check for loose TCM connectors. If necessary, substitute a known-good TCM and recheck.



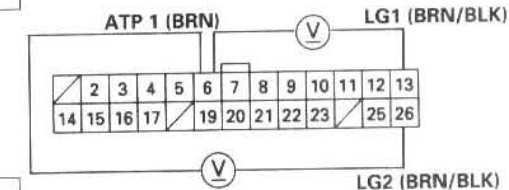
Measure ATP 1 Voltage:
1. Shift to all positions other than **1**.
2. Measure the voltage between the A6 and A13 or A26 terminals.

Is there battery voltage?

NO

YES

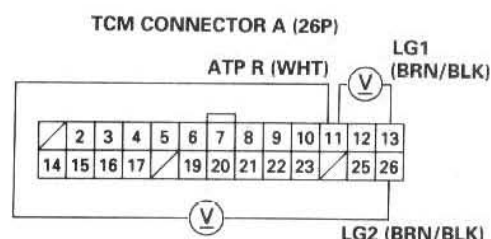
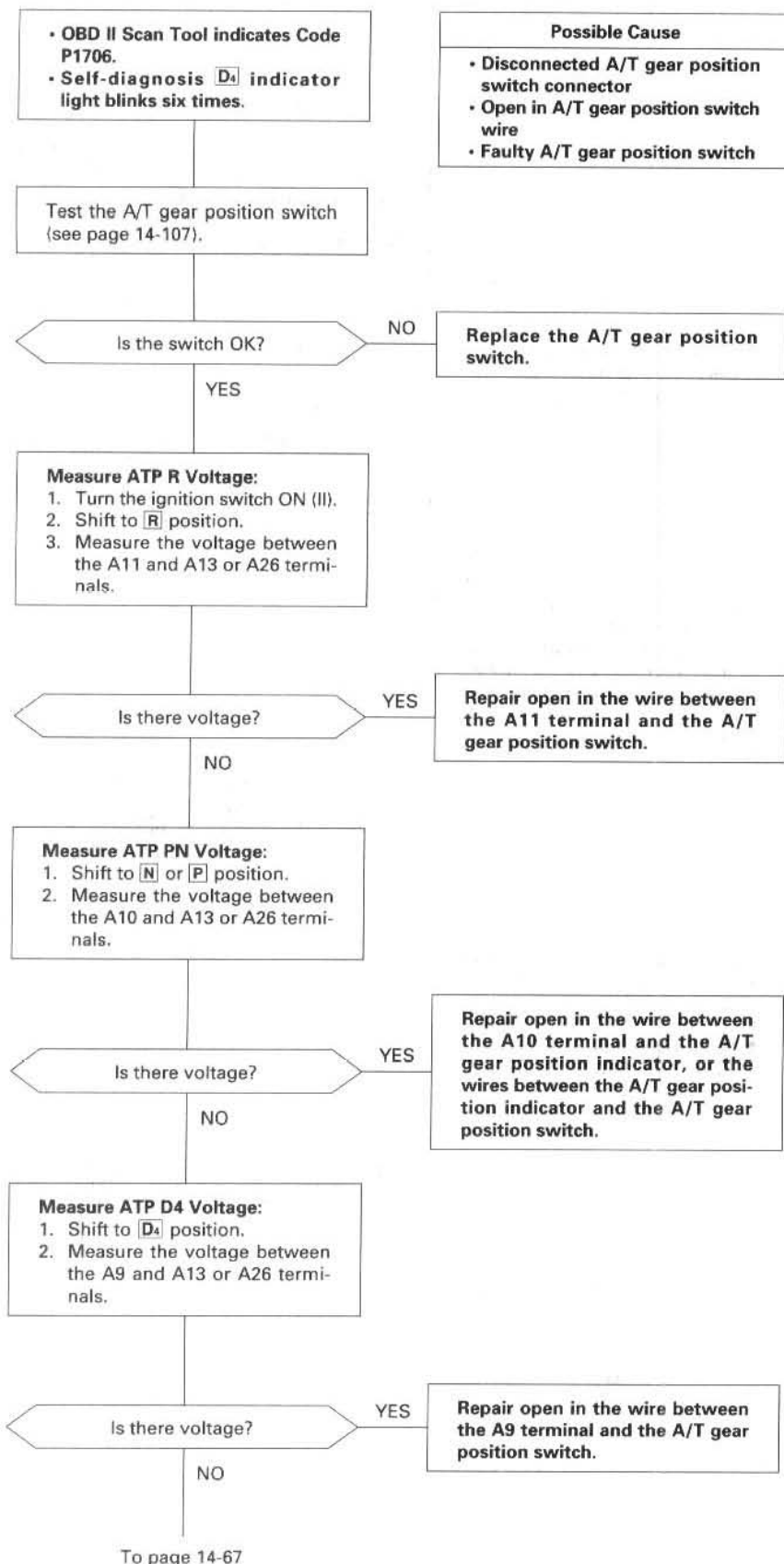
Check for short in the wire between the A6 terminal and the A/T gear position switch or A/T gear position indicator. If wire is OK, check for loose TCM connectors. If necessary, substitute a known-good TCM and recheck.



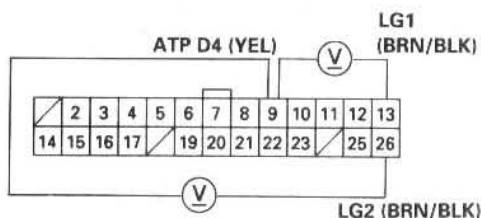
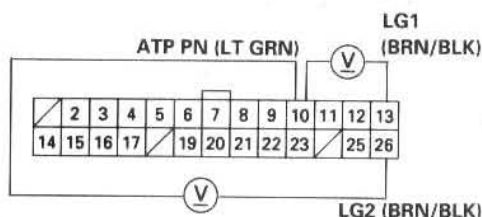
Check for loose TCM connectors. If necessary, substitute a known-good TCM and recheck.

Electrical Troubleshooting

Troubleshooting Flowchart — A/T Gear Position Switch (Open)



Wire side of female terminals





From page 14-66

Measure ATP D3 Voltage:
1. Shift to **D₃** position.
2. Measure the voltage between the A8 and A13 or A26 terminals.

Is there voltage? YES

Repair open in the wire between the A8 terminal and the A/T gear position switch.

NO

Measure ATP 2 Voltage:
1. Shift to **2** position.
2. Measure the voltage between the A7 and A13 or A26 terminals.

Is there voltage? YES

Repair open in the wire between the A7 terminal and the A/T gear position switch.

NO

Measure ATP1 Voltage:
1. Shift to **1** position.
2. Measure the voltage between the A6 and A13 or A26 terminals.

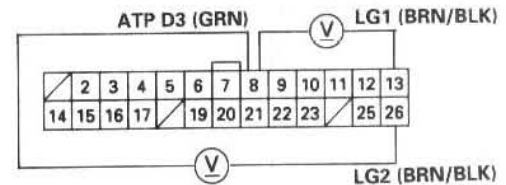
Is there voltage? YES

Repair open in the wire between the A6 terminal and the A/T gear position switch.

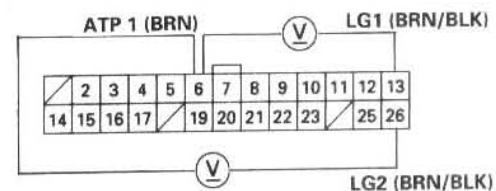
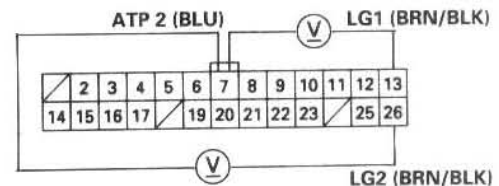
NO

Check for loose TCM connectors.
If necessary, substitute a known-good TCM and recheck.

TCM CONNECTOR A (26P)



Wire side of female terminals



14-68

Troubleshooting Flowchart — Shift Control Solenoid Valve A

- OBD II Scan Tool indicates Code P0753.
- Self-diagnosis **D4** indicator light blinks seven times.

Possible Cause

- Disconnected lock-up control solenoid valve/shift control solenoid valve A assembly connector
- Short or open in shift control solenoid valve A wire
- Faulty shift control solenoid valve A

Check for a Short to Power:

1. Disconnect the A (26P) connector from the TCM.
2. Turn the ignition switch ON (II).
3. Measure the voltage between the A3 and A13 or A26 terminals.

Is there voltage?

YES

Repair short to power in the wire between the A3 terminal and the shift control solenoid valve A.

NO

Measure Shift Control Solenoid Valve A Resistance:

1. Turn the ignition switch OFF.
2. Measure the resistance between the A3 and A13 or A26 terminals.

Is the resistance 12 – 25 Ω ?

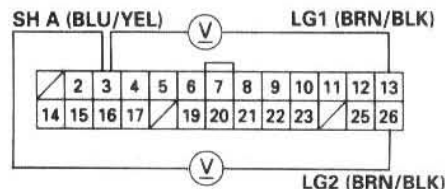
YES

Check for loose TCM connectors. If necessary, substitute a known-good solenoid valve assembly or TCM and recheck.

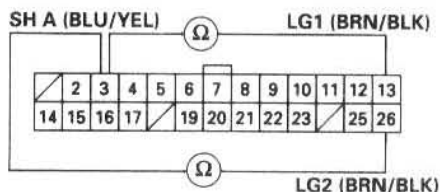
NO

To page 14-69

TCM CONNECTOR A (26P)



Wire side of female terminals





From page 14-68

Check Shift Control Solenoid Valve A for a Short Circuit:

1. Disconnect the 2P connector from the lock-up control solenoid valve/shift control solenoid valve A assembly.
2. Check for continuity between the A3 and A13 or A26 terminals.

Is there continuity?

YES

Repair short to ground in the wire between the A3 terminal and the shift control solenoid valve A.

NO

Measure Shift Control Solenoid Valve A Resistance at the Solenoid Connector:

Measure the resistance between the No. 2 terminal of the lock-up control solenoid valve/shift control solenoid valve A assembly connector and body ground.

Is the resistance 12 – 25 Ω ?

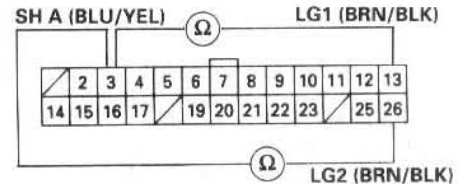
YES

Check for open in the wire between the A3 terminal and the shift control solenoid valve A.

NO

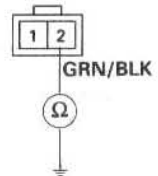
Replace the lock-up control solenoid valve/shift control solenoid valve A assembly.

TCM CONNECTOR A (26P)



Wire side of female terminals

LOCK-UP CONTROL SOLENOID VALVE/
SHIFT CONTROL SOLENOID
VALVE A ASSEMBLY CONNECTOR



Terminal side of male terminals

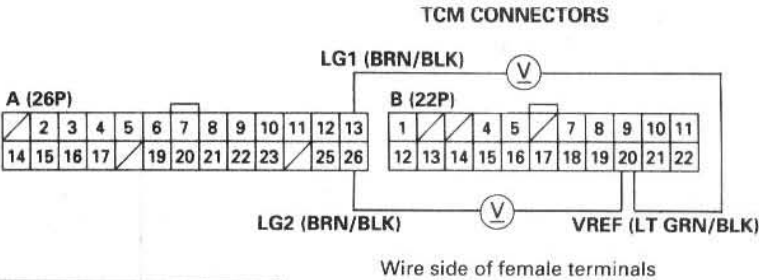
Electrical Troubleshooting

Troubleshooting Flowchart — Shift Control Solenoid Valve B

- OBD II Scan Tool indicates Code P0758.
- Self-diagnosis **D_a** indicator light blinks eight times.

- Possible Cause**
- Disconnected shift control solenoid valve B connector
 - Short or open in shift control solenoid valve B wire
 - Faulty shift control solenoid valve B

- Measure VREF Voltage:**
1. Disconnect the A (26P) and B (22P) connectors from the TCM.
 2. Turn the ignition switch ON (II).
 3. Measure the voltage between the B20 and A13 or A26 terminals.



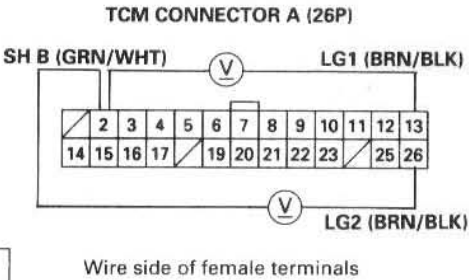
Is there approx. 5 V?

NO

YES

Repair open or short in the wire between the B20 terminal and the ECM.

- Check for a Short to Power:**
- Measure the voltage between the A2 and A13 or A26 terminals.



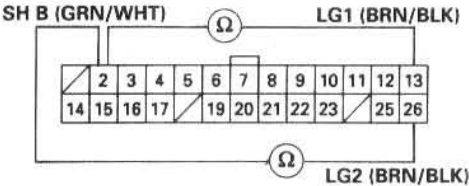
Is there voltage?

YES

NO

Repair short to power in the wire between the A2 terminal and the shift control solenoid valve B.

- Measure Shift Control Solenoid Valve B Resistance:**
1. Turn the ignition switch OFF.
 2. Measure the resistance between the A2 and A13 or A26 terminals.



Is the resistance 12 – 25 Ω?

YES

NO

Check for loose TCM connectors. If necessary, substitute a known-good solenoid valve B or TCM and recheck.

To page 14-71



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Check Shift Control Solenoid Valve B for a Short Circuit:

1. Disconnect the 2P connector from the shift control solenoid valve B.
2. Check for continuity between the A2 and A13 or A26 terminals.

Is there continuity?

YES

Repair short to ground in the wire between the A2 terminal and the shift control solenoid valve B.

NO

Measure Shift Control Solenoid Valve B Resistance at the Solenoid Connector.

Is the resistance 12 – 25 Ω ?

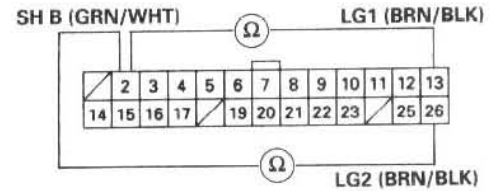
YES

Check for open in the wires between the A2 terminal and the shift control solenoid valve B and between the No. 1 terminal of the shift control solenoid valve B connector and body ground (G101).

NO

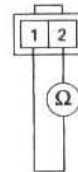
Replace the shift control solenoid valve B.

TCM CONNECTOR A (26P)



Wire side of female terminals

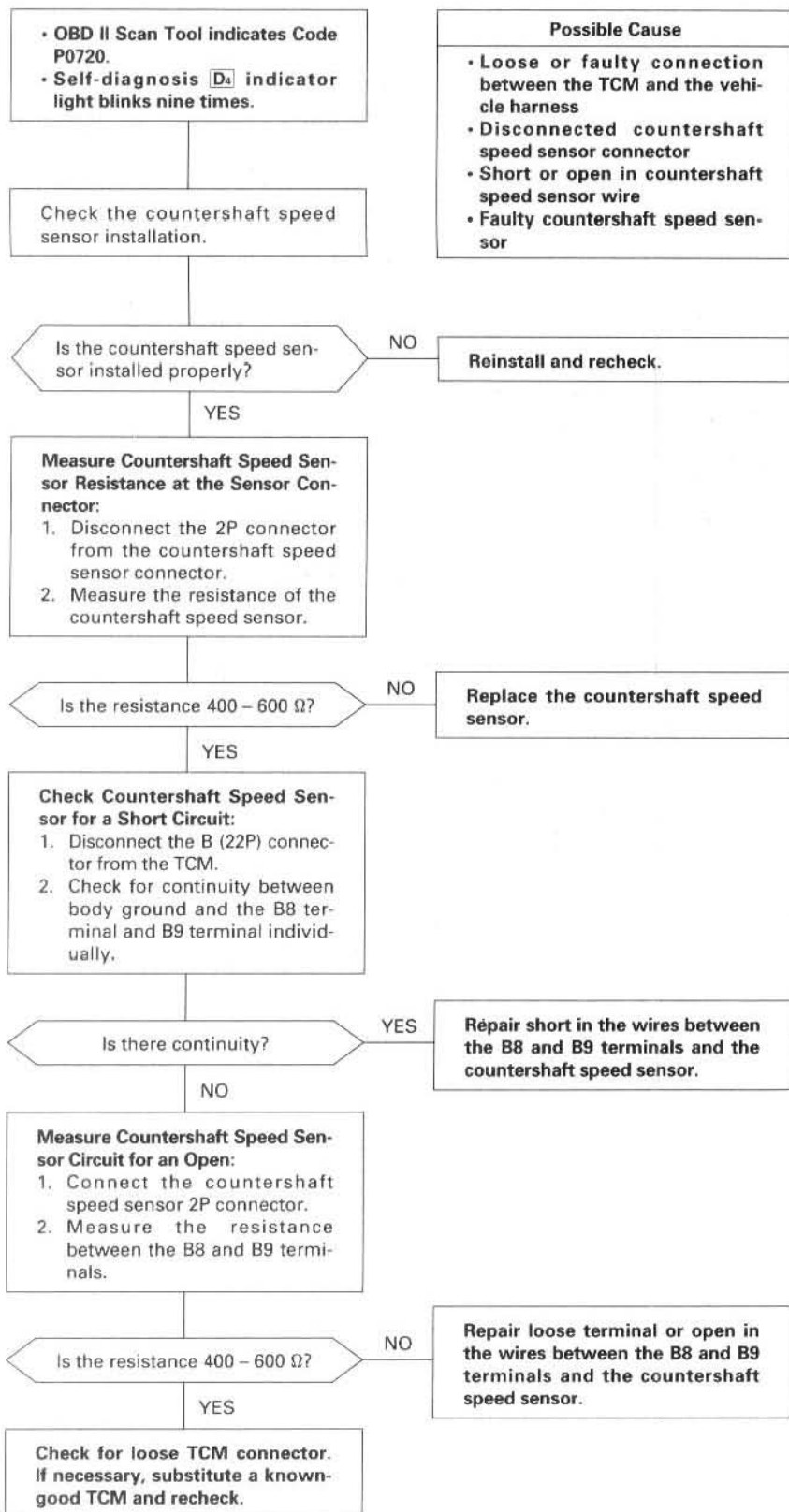
SHIFT CONTROL SOLENOID VALVE B CONNECTOR



Terminal side of male terminals

Electrical Troubleshooting

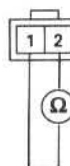
Troubleshooting Flowchart — Countershaft Speed Sensor



Possible Cause

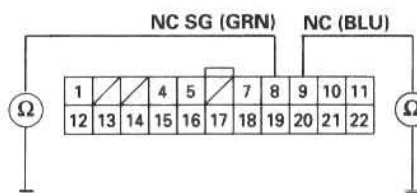
- Loose or faulty connection between the TCM and the vehicle harness
- Disconnected countershaft speed sensor connector
- Short or open in countershaft speed sensor wire
- Faulty countershaft speed sensor

COUNTERSHAFT SPEED SENSOR CONNECTOR



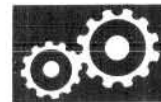
Terminal side of male terminals

TCM CONNECTOR B (22P)



Wire side of female terminals





Troubleshooting Flowchart — Ignition Coil

- OBD II Scan Tool indicates Code P0725.
- Self-diagnosis **D₄** indicator light indicates Code 11.

Possible Cause

- Disconnected distributor (ignition coil) connector
- Short or open ignition coil wire
- Faulty ignition coil

Measure NE Voltage:

1. Disconnect the A (26P) connector from the TCM.
2. Start the engine.
3. Measure the voltage between the A5 and A13 or A26 terminals.

Is there battery voltage?

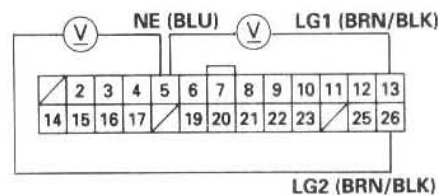
NO

Repair open or short in the wire between the A5 terminal and the ignition coil. If wire is OK, test the ignition coil (see section 4).

YES

Check for loose TCM connector. If necessary, substitute a known-good TCM and recheck.

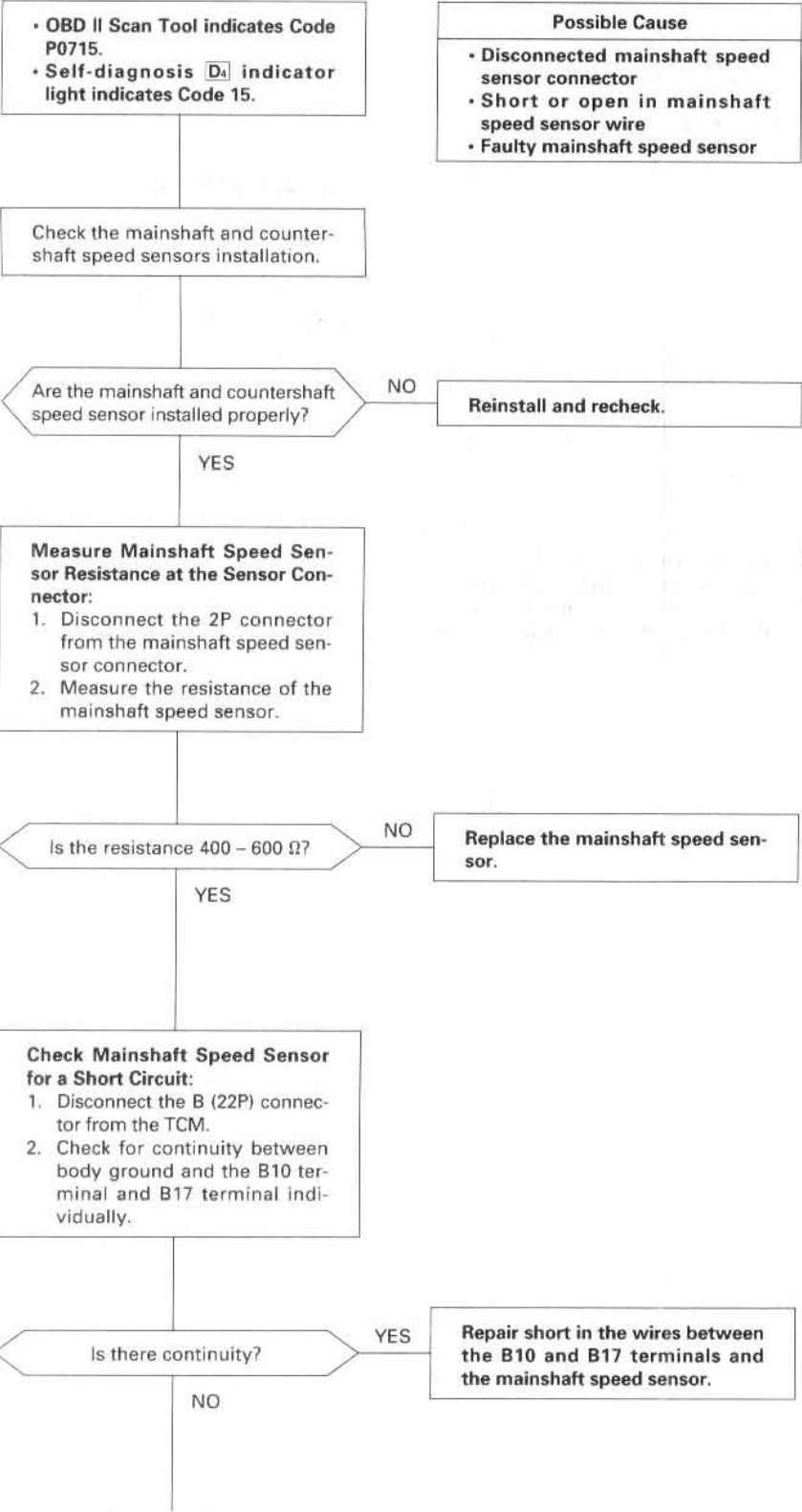
TCM CONNECTOR A (26P)



Wire side of female terminals

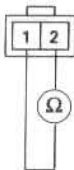
Electrical Troubleshooting

Troubleshooting Flowchart — Mainshaft Speed Sensor



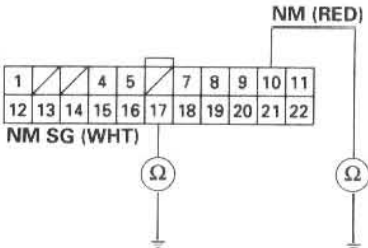
NOTE: Code 0715 (15) on the TCM doesn't always mean there's an electrical problem in the mainshaft or countershaft speed sensor circuit; code 0715 (15) may also indicate a mechanical problem in the transmission. Check the freeze data with a Honda PGM Tester. If the mainshaft speed sensor rpm was 0, proceed with this troubleshooting. If not, the probable cause is a mechanical problem.

MAINSHAFT SPEED SENSOR CONENCTOR

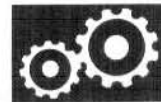


Terminal side of male terminals

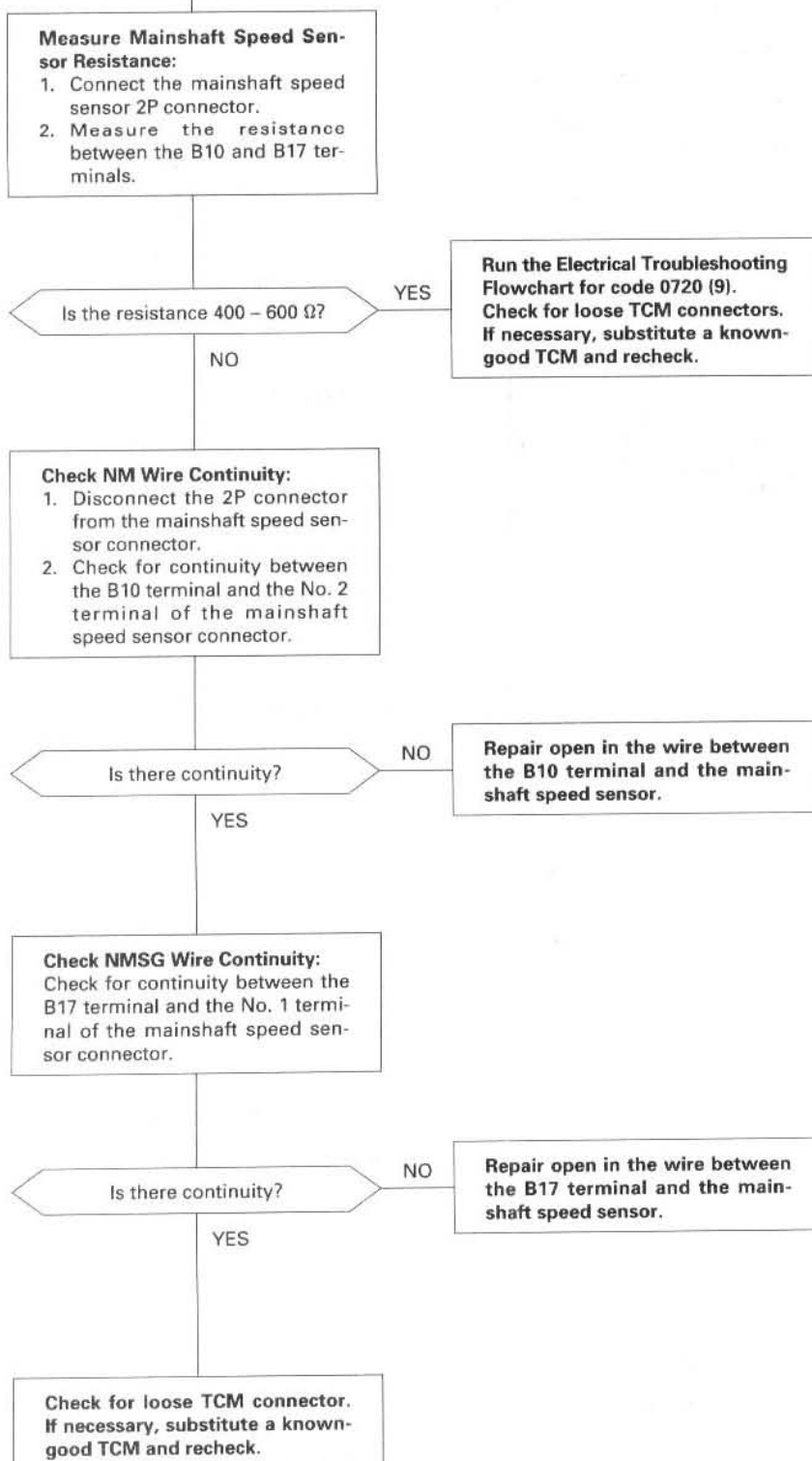
TCM CONNECTOR B (22P)



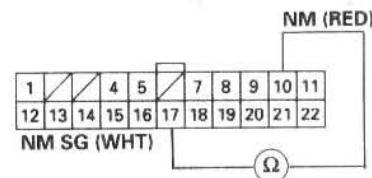
Wire side of female terminals



From page 14-74

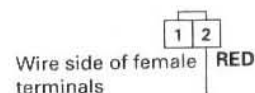


TCM CONNECTOR B (22P)

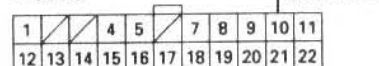


Wire side of female terminals

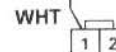
MAINSHAFT SPEED SENSOR CONNECTOR



TCM CONNECTOR B (22P)

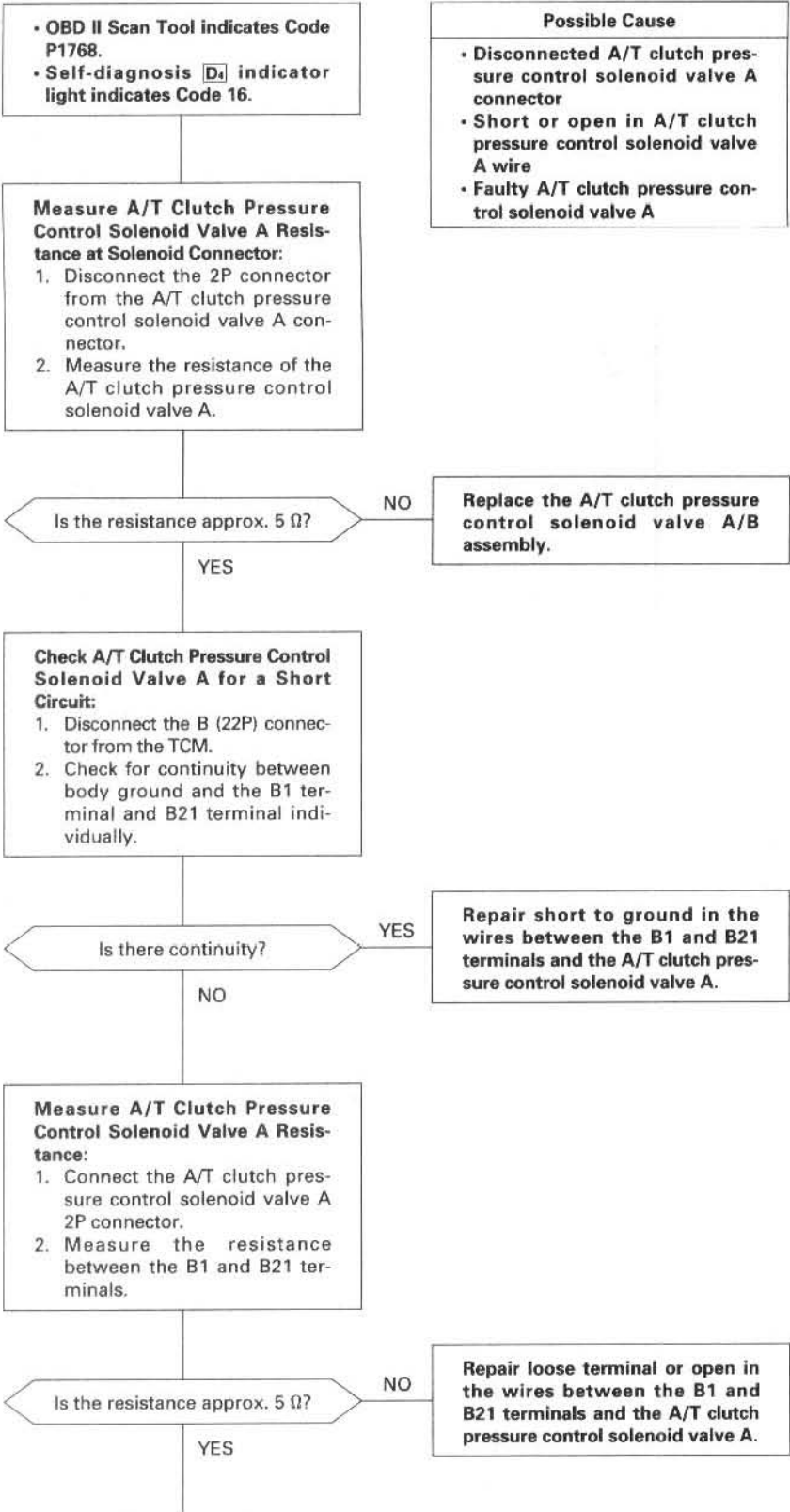


Wire side of female terminals



Electrical Troubleshooting

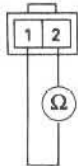
Troubleshooting Flowchart — A/T Clutch Pressure Control Solenoid Valve A



Possible Cause

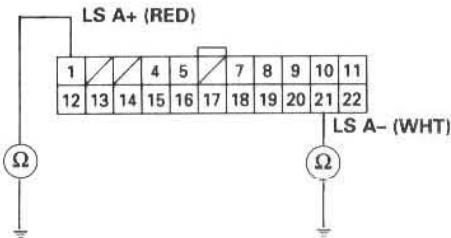
- Disconnected A/T clutch pressure control solenoid valve A connector
- Short or open in A/T clutch pressure control solenoid valve A wire
- Faulty A/T clutch pressure control solenoid valve A

A/T CLUTCH PRESSURE CONTROL SOLENOID VALVE A CONNECTOR

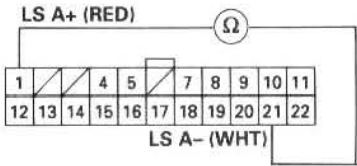


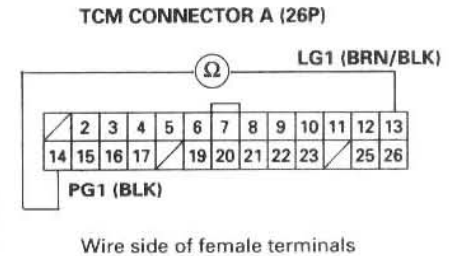
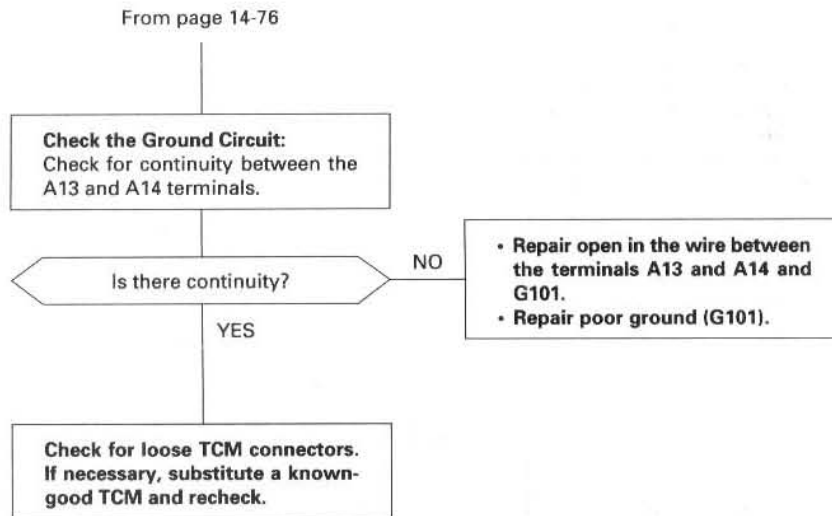
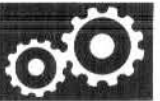
Wire side of male terminals

TCM CONNECTOR B (22P)



Wire side of female terminals





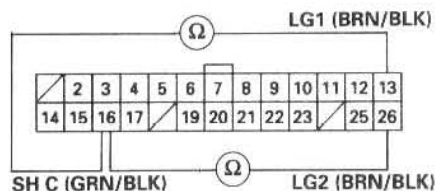
14-78

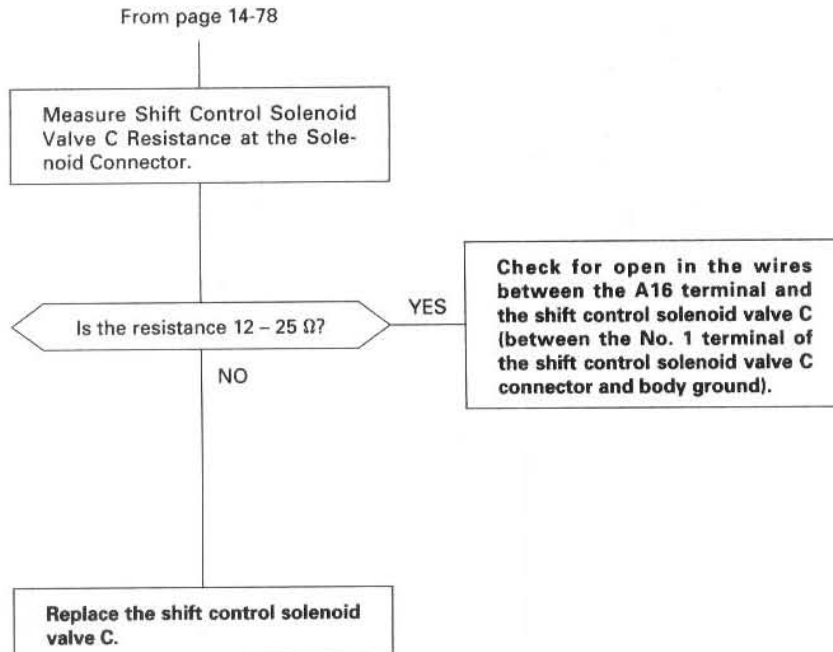
```

graph TD
    Start([Start]) --> Step1[• OBD II Scan Tool indicates Code P0763.  
• Self-diagnosis D4 indicator light indicates Code 22.]
    Step1 --> Step2[Check for a Short to Power:  
1. Disconnect the A (26P) connector from the TCM.  
2. Turn the ignition switch ON (II).  
3. Measure the voltage between the A16 and A13 or A26 terminals.]
    Step2 --> Dec1{Is there voltage?}
    Dec1 -- YES --> Box1[Repair short to power in the wire between the A16 terminal and the shift control solenoid valve C.]
    Dec1 -- NO --> Step3[Measure Shift Control Solenoid Valve C Resistance:  
1. Turn the ignition switch OFF.  
2. Measure the resistance between the A16 and A13 or A26 terminals.]
    Step3 --> Dec2{Is the resistance 12 – 25 Ω?}
    Dec2 -- YES --> Box2[Check for loose TCM connectors. If necessary, substitute a known-good solenoid valve C or TCM and recheck.]
    Dec2 -- NO --> Step4[Check Shift Control Solenoid Valve C for a Short Circuit:  
1. Disconnect the 2P connector from the shift control solenoid valve C.  
2. Check for continuity between the A16 and A13 or A26 terminals.]
    Step4 --> Dec3{Is there continuity?}
    Dec3 -- YES --> Box3[Repair short to ground in the wire between the A16 terminal and the shift control solenoid valve C.]
    Dec3 -- NO --> End([End])
  
```

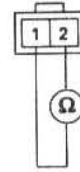
Possible Cause

- Disconnected shift control solenoid valve C connector
- Short or open in shift control solenoid valve C wire
- Faulty shift control solenoid valve C





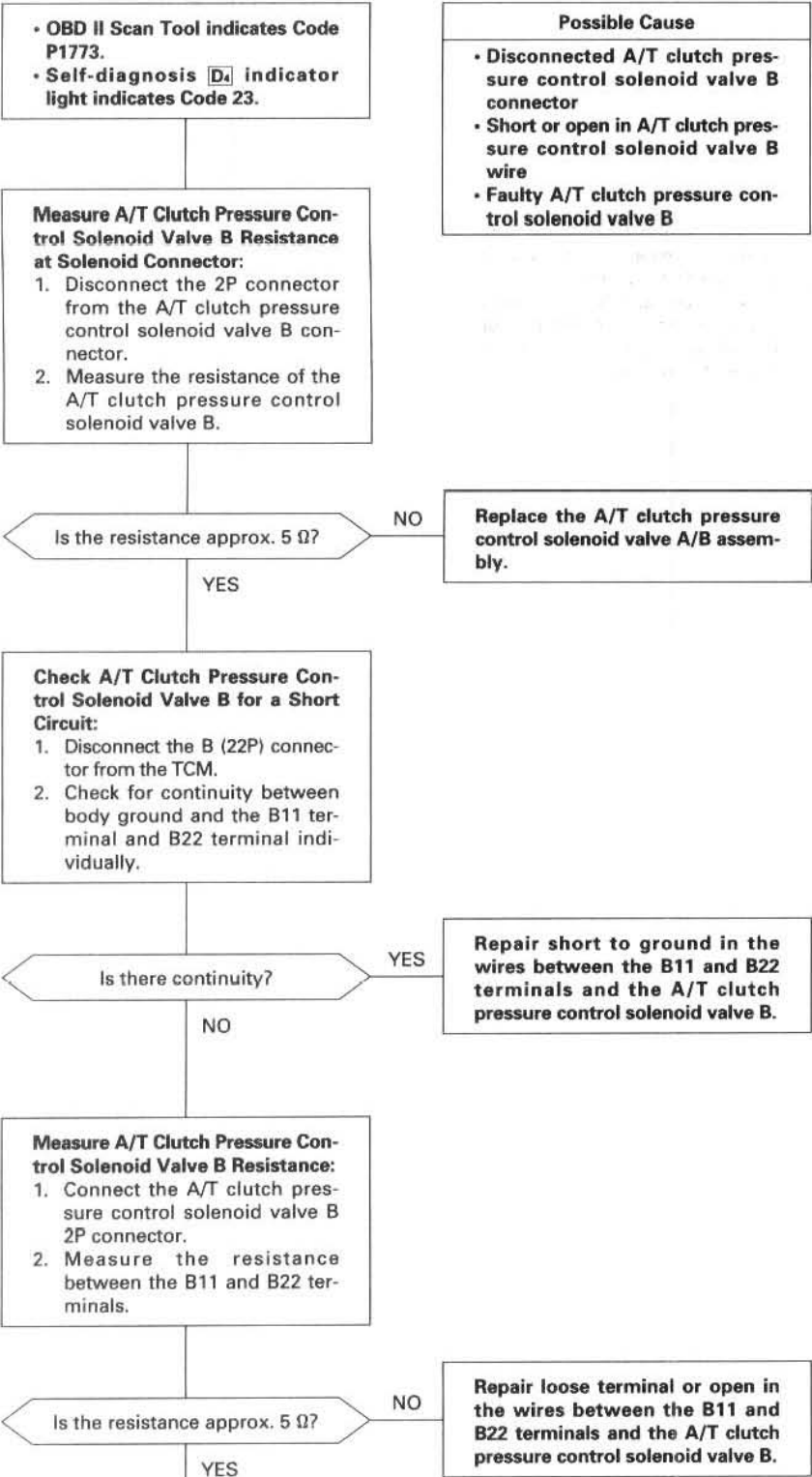
SHIFT CONTROL SOLENOID VALVE C CONNECTOR



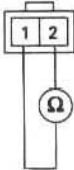
Terminal side of male terminals

Electrical Troubleshooting

Troubleshooting Flowchart — A/T Clutch Pressure Control Solenoid Valve B

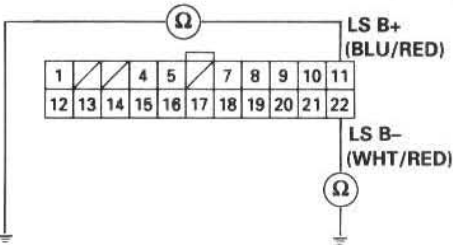


A/T CLUTCH PRESSURE CONTROL SOLENOID VALVE B CONNECTOR

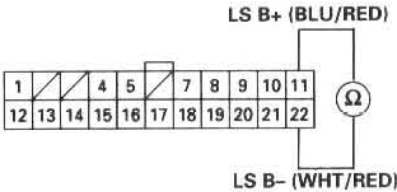


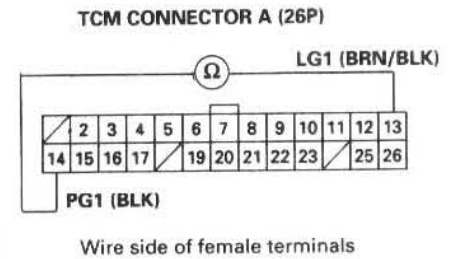
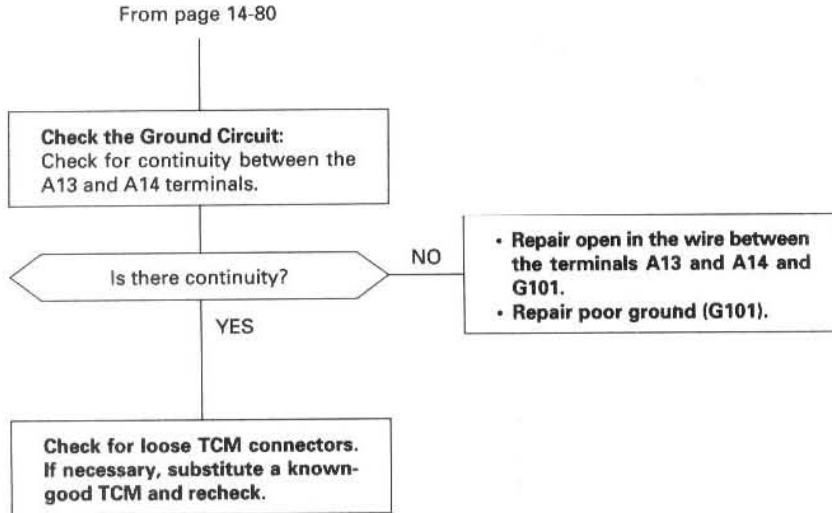
Terminal side of male terminals

TCM CONNECTOR B (22P)



Wire side of female terminals





Electrical Troubleshooting

Troubleshooting Flowchart — Mode Switch

- OBD II Scan Tool indicates Code P1709.
- Self-diagnosis **D4** indicator light indicates Code 24.

Symptom

Transmission does not shift into the sequential sportshift mode position.

Check T-MODE Voltage at Mode Switch Connector:

1. Turn the ignition switch OFF.
2. Disconnect the mode switch connector.
3. Turn the ignition switch ON (II).
4. Measure the voltage between the No. 6 terminal of the mode switch connector and body ground.

Is there battery voltage?

NO

YES

Repair open or short in the wire between the No. 5 or No. 6 terminal of the mode switch connector and the B13 terminal of the TCM.

Measure the voltage between the No. 1 and No. 6 terminals of the mode switch connector.

Is there battery voltage?

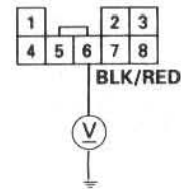
NO

YES

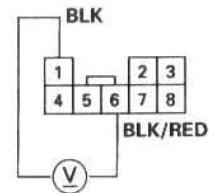
Repair open in the wire between the No.1 terminal of the mode switch connector and G471. If wire is OK, repair poor ground.

To page 14-83

MODE SWITCH CONNECTOR



Wire side of female terminals





From page 14-82

Check Mode Switch:

Check continuity between the No. 1 and No. 6 terminals of the mode switch connector while moving the shift lever back and forth between the **D_s** position and the sportshift gate.

Does the reading change from continuity to no continuity?

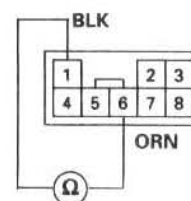
NO

Replace the mode switch.

YES

Check for loose TCM and mode switch connectors. If necessary, substitute a known-good TCM or mode switch and recheck.

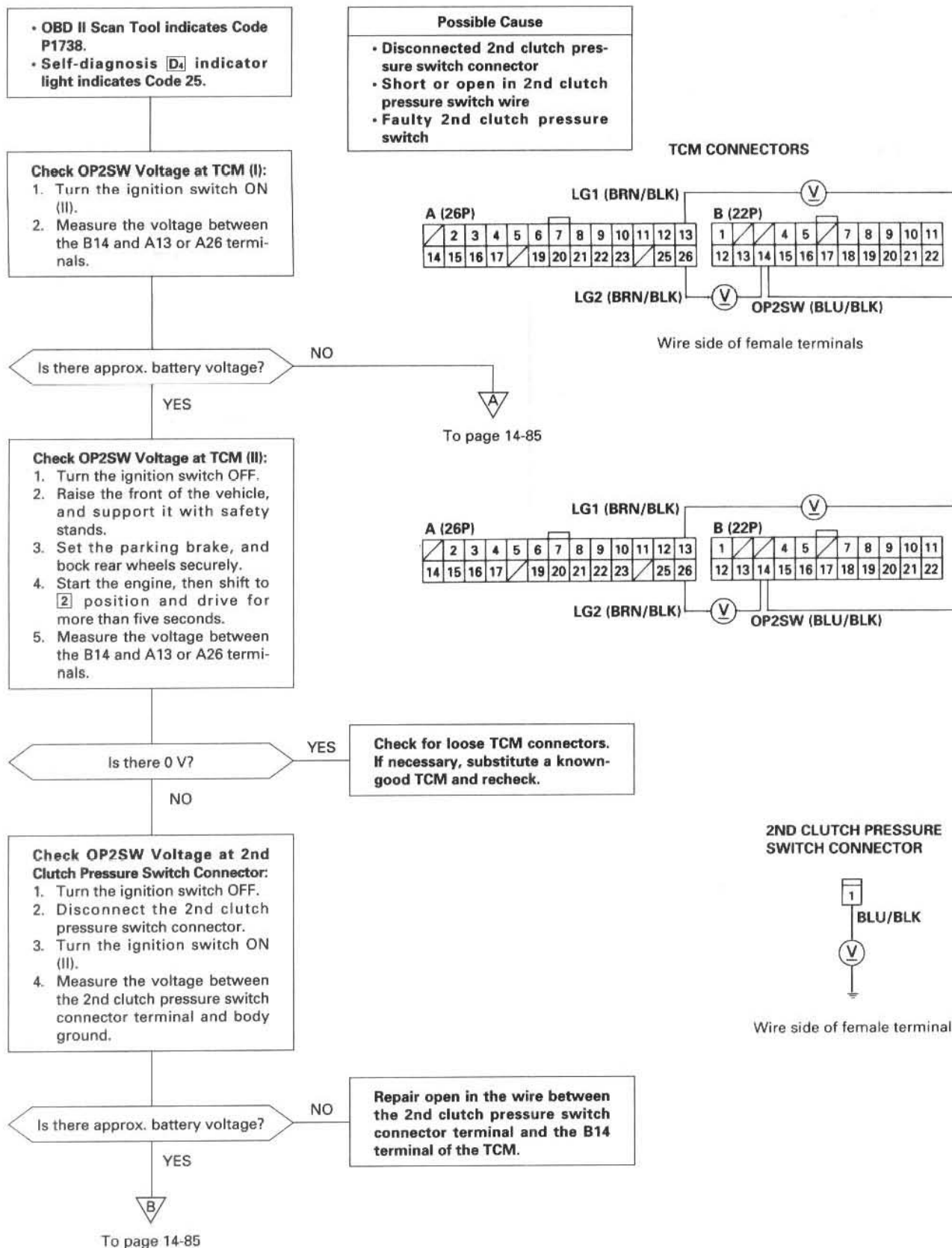
MODE SWITCH CONNECTOR



Terminal side of male terminals

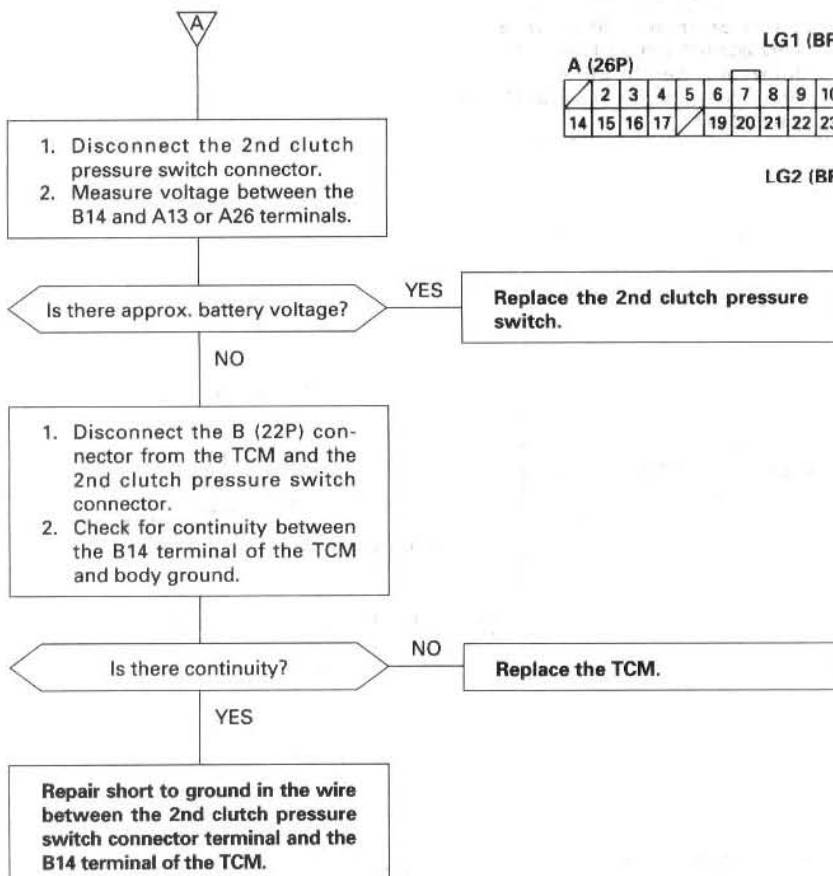
Electrical Troubleshooting

Troubleshooting Flowchart — 2nd Clutch Pressure Switch

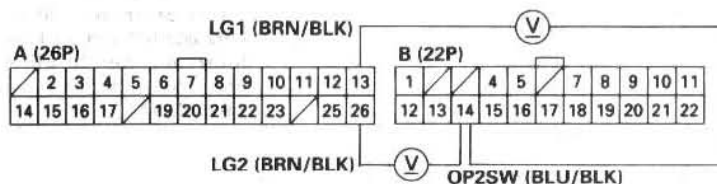




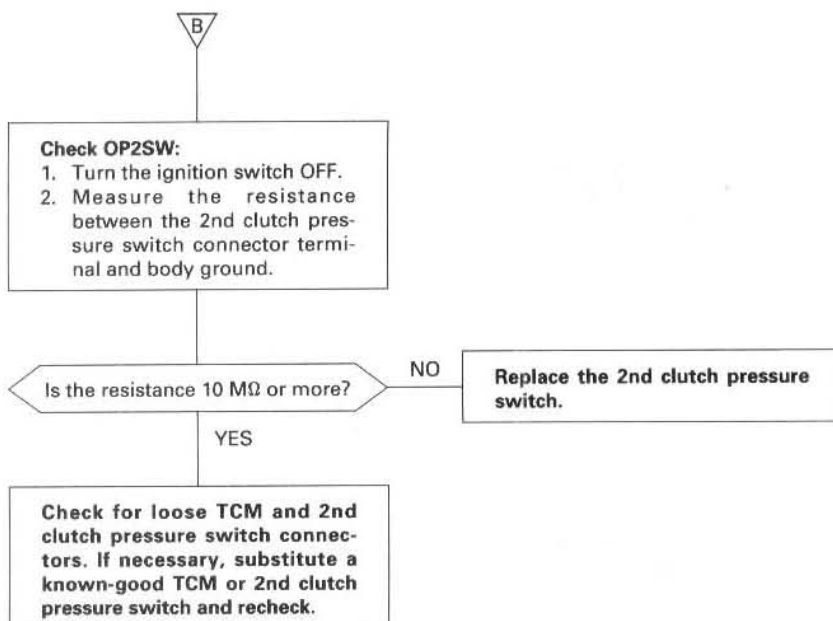
From page 14-84



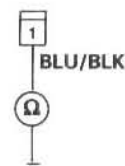
TCM CONNECTORS



From page 14-84

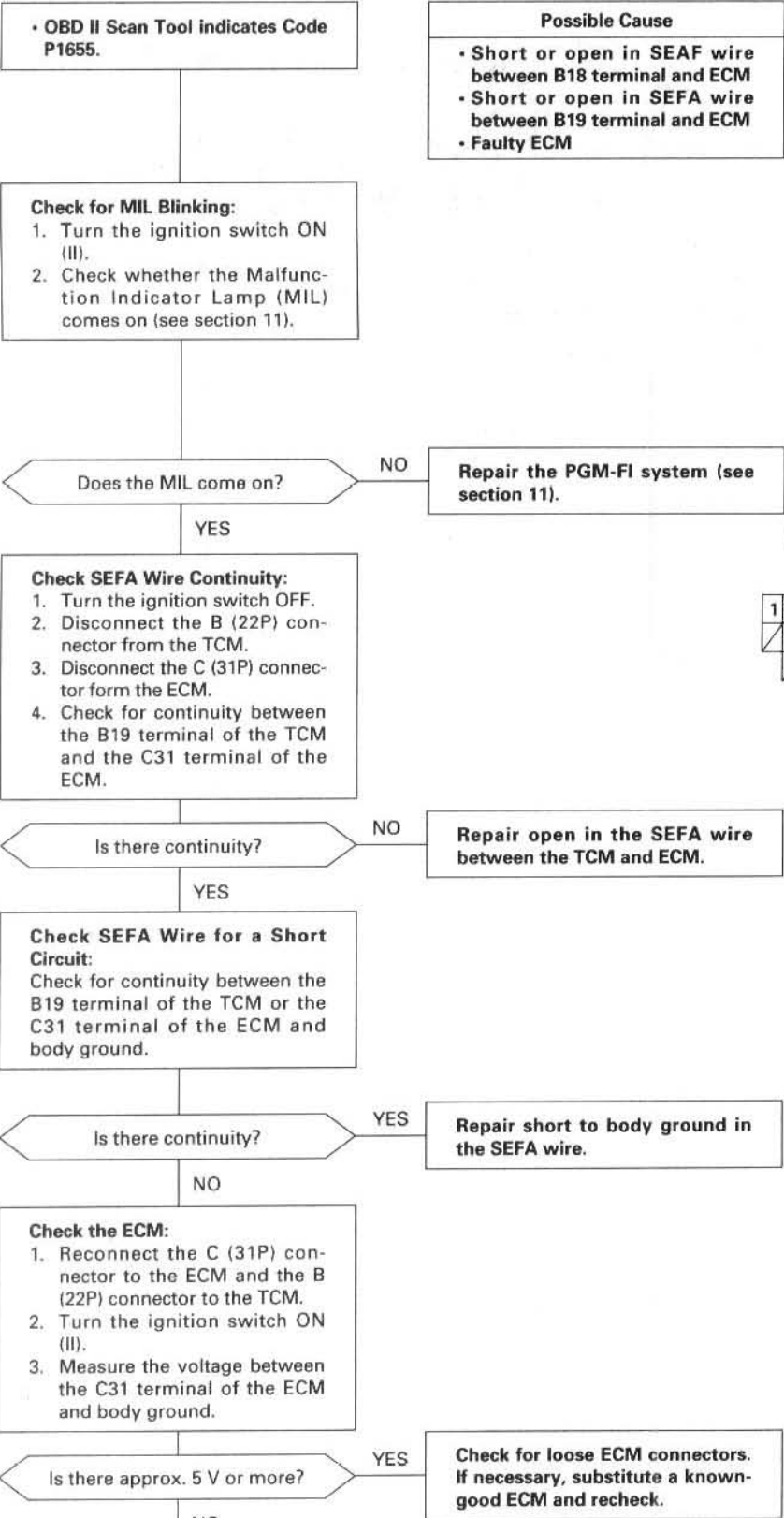


2ND CLUTCH PRESSURE SWITCH CONNECTOR



Electrical Troubleshooting

Troubleshooting Flowchart — SEFA and SEAF Signals



TCM CONNECTOR B (22P)

1	2	3	4	5	6	7	8	9	10	11
12	13	14	15	16	17	18	19	20	21	22

ECM CONNECTOR C (31P)

1	2	3	4	5	6	7	8	9	10
12	13	14	15	16	17	18	19	20	22
29	30	31							

SEFA (GRN/YEL)

Wire side of female terminals

1	2	3	4	5	6	7	8	9	10	11
12	13	14	15	16	17	18	19	20	21	22

SEFA (GRN/YEL)

1	2	3	4	5	6	7	8	9	10
12	13	14	15	16	17	18	19	20	22
29	30	31							

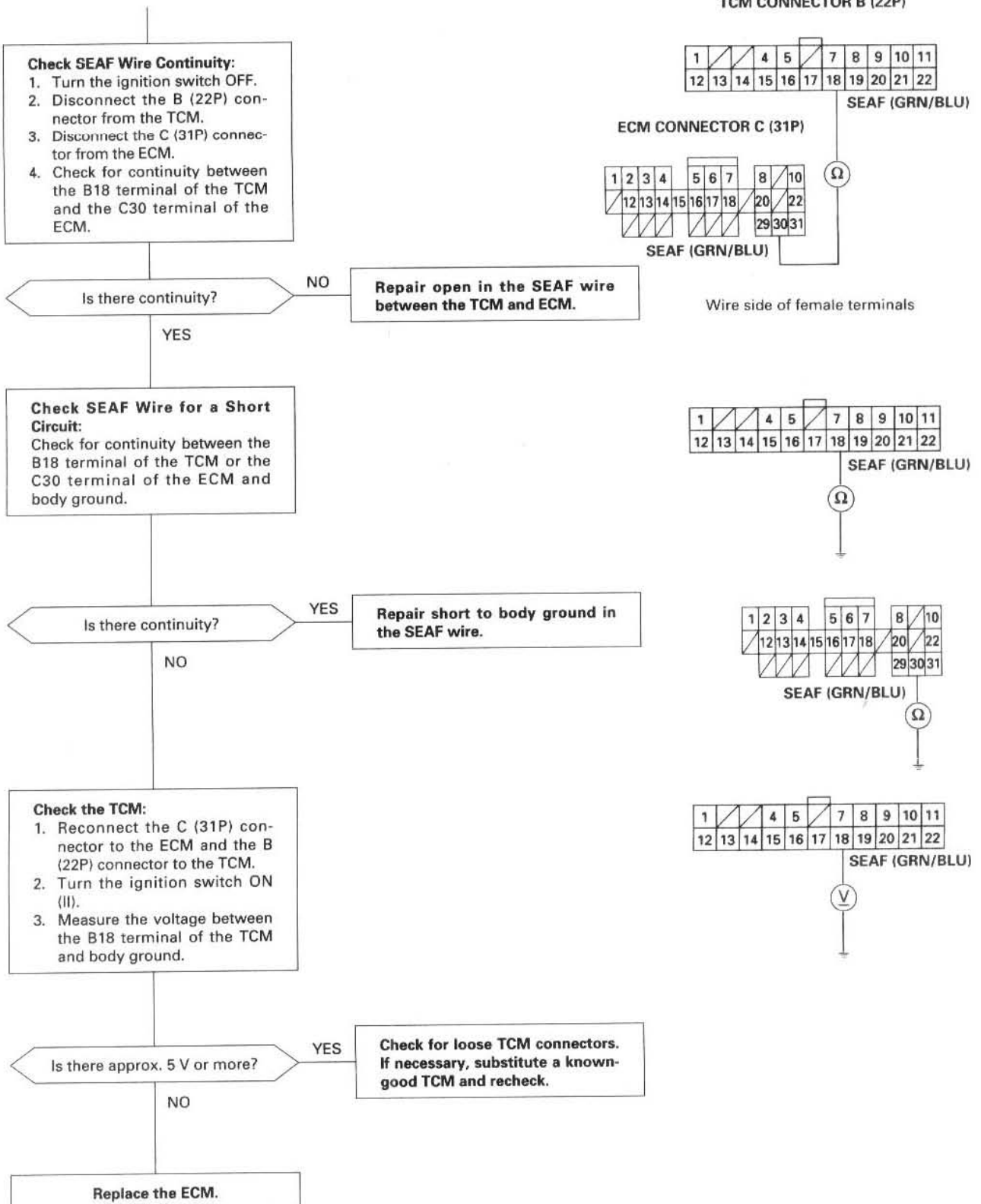
SEFA (GRN/YEL)

1	2	3	4	5	6	7	8	9	10
12	13	14	15	16	17	18	19	20	22
29	30	31							

SEFA (GRN/YEL)

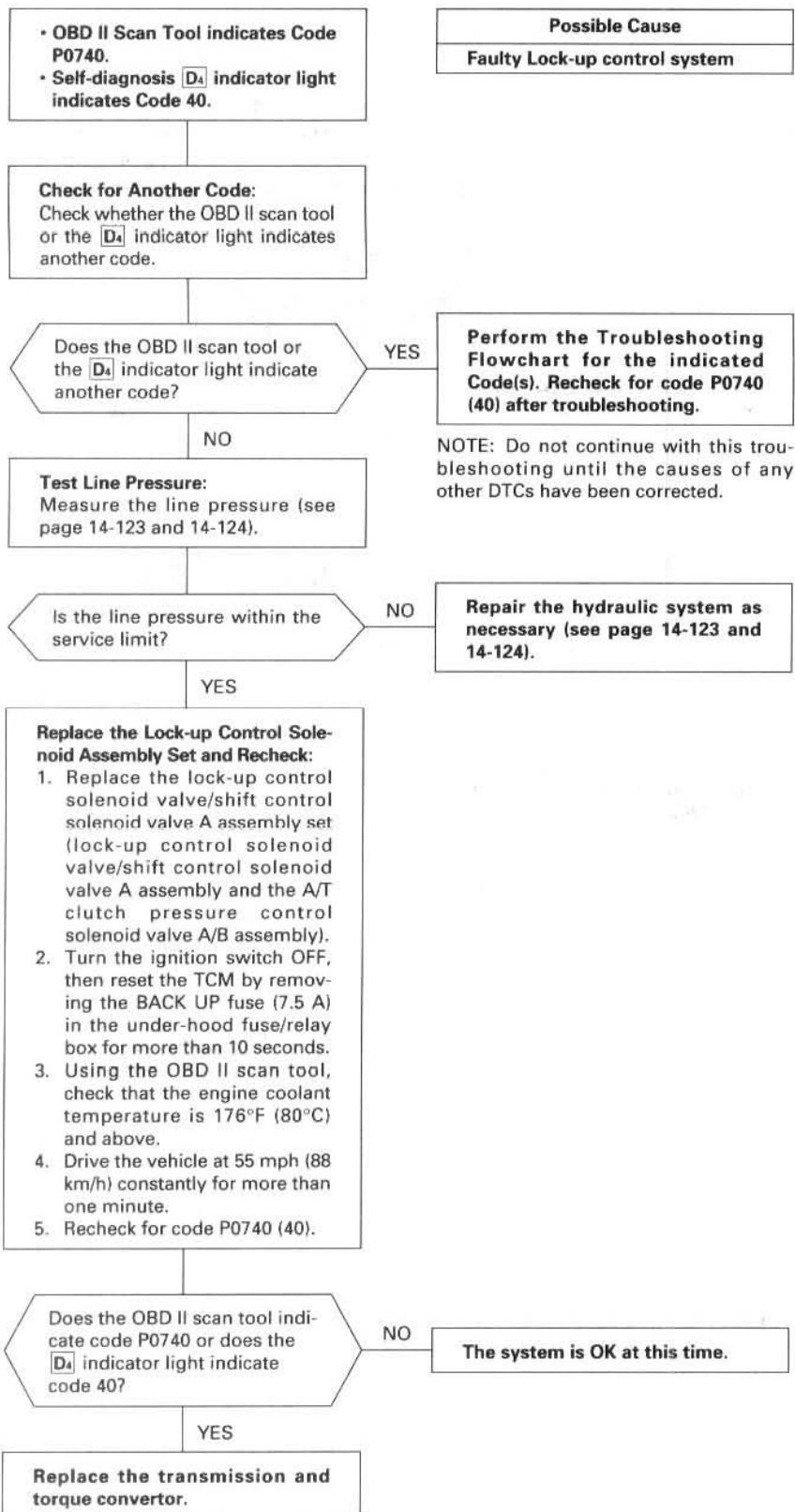


From page 14-86



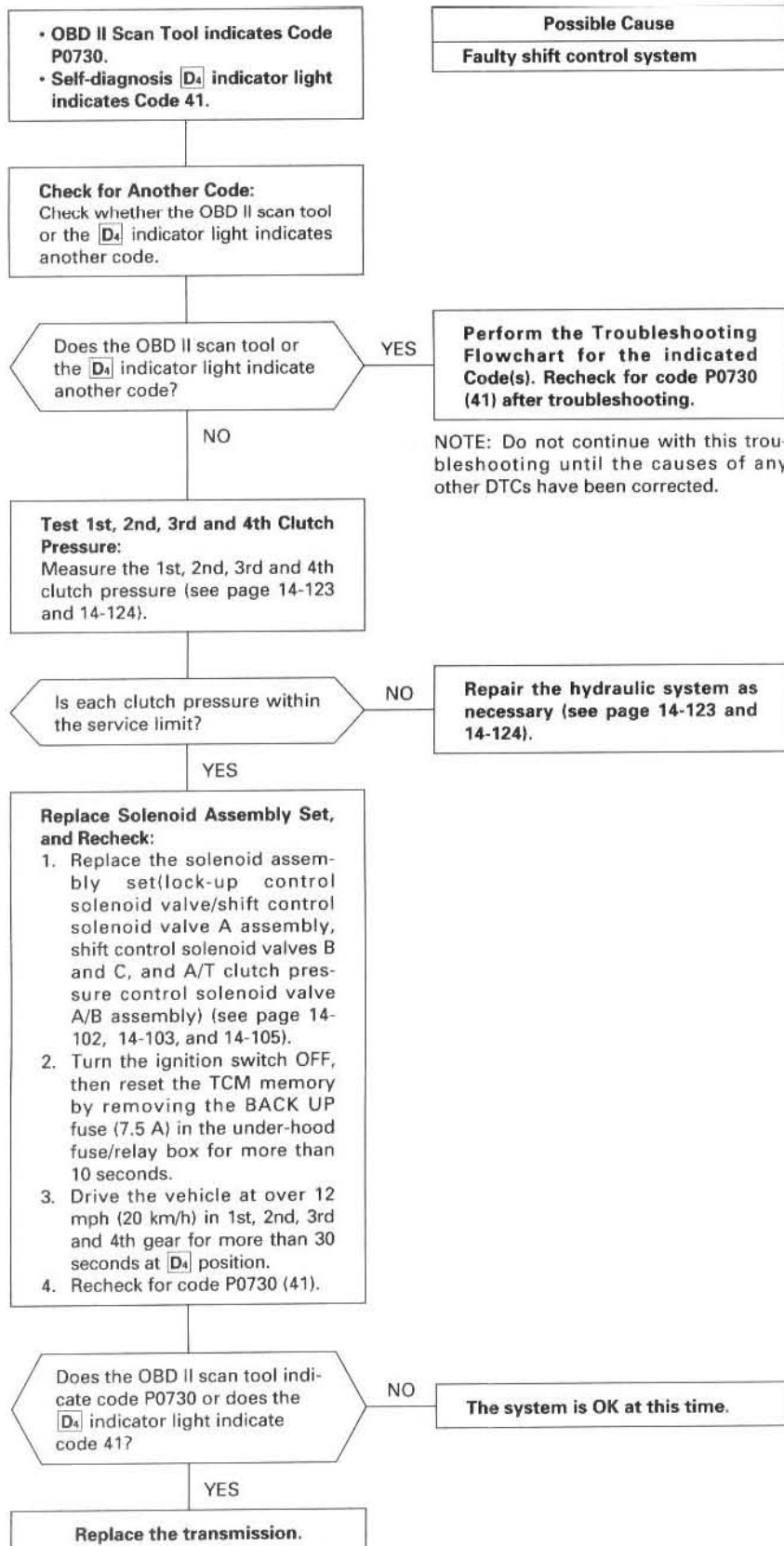
Electrical Troubleshooting

Troubleshooting Flowchart — Lock-up Control System





Troubleshooting Flowchart — Shift Control System



Electrical Troubleshooting

Troubleshooting Flowchart — **D4** Indicator Light On Constantly

The **D4** indicator light is on constantly (not blinking) whenever the ignition switch is ON (II).

Measure D4 IND Voltage:

1. Turn the ignition switch OFF.
2. Disconnect the A (26P) connector from the TCM.
3. Turn the ignition switch ON (II).
4. Measure the voltage between the A17 terminal and body ground.

Is there voltage?

YES

Repair short to power in the wire between the A17 terminal and the gauge assembly.

Measure ATP D4 Voltage:

1. Turn the ignition switch OFF.
2. Connect the A (26P) connector to the TCM.
3. Turn the ignition switch ON (II).
4. Shift to any position other than **D4**.
5. Measure the voltage between the A9 terminal and body ground.

Is there battery voltage?

YES

Replace the TCM.

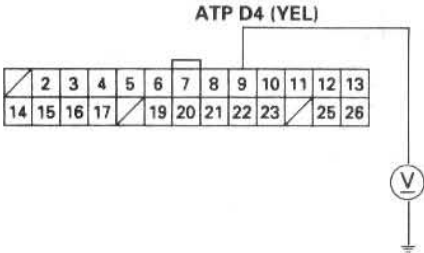
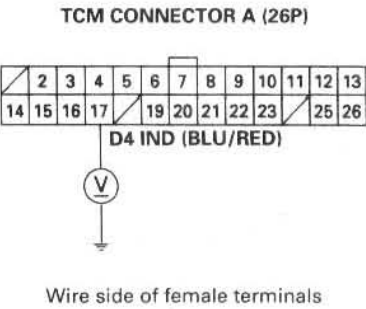
Test the A/T gear position switch (see page 14-107).

Is the switch OK?

NO

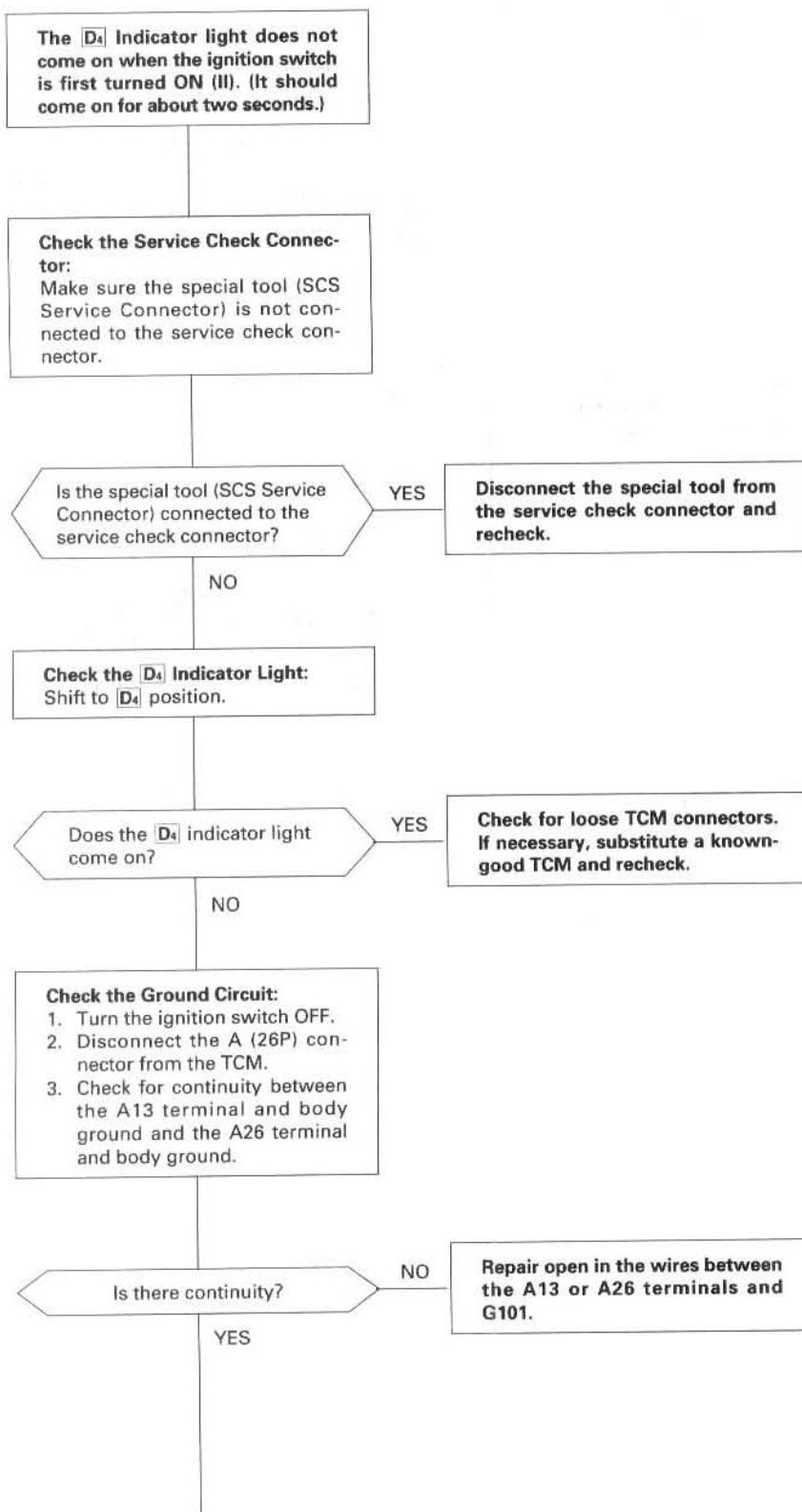
Replace the A/T gear position switch.

Check for a short to ground in the wire between the A9 terminal and G471. If the wire is OK, substitute a known-good TCM and recheck.

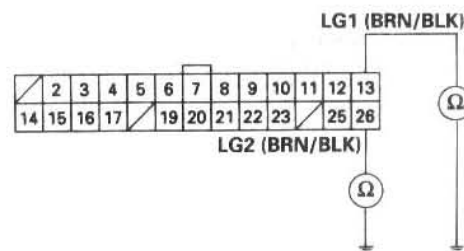




Troubleshooting Flowchart — **D₄** Indicator Light Does Not Come On



TCM CONNECTOR A (26P)



Wire side of female terminals

(cont'd)

Electrical Troubleshooting

Troubleshooting Flowchart — **D₄** Indicator Light Does Not Come On (cont'd)

From page 14-91

Measure Power Supply Circuit Voltage:

1. Turn the ignition switch ON (II).
2. Measure the voltage between the A12 and A13 terminals and between the A25 and A26 terminals.

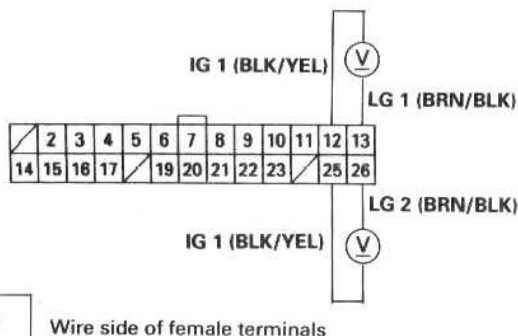
Is there battery voltage?

YES

NO

Repair open or short in the wire between the A12 and/or A25 terminals and the fuse box.

TCM CONNECTOR A (26P)



Measure D₄ IND Voltage:

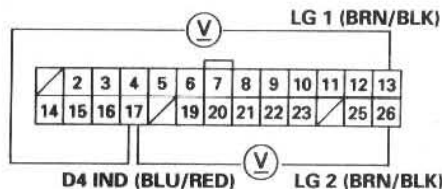
1. Turn the ignition switch OFF.
2. Connect the A (26P) connector to the TCM.
3. Connect a digital multimeter to the A17 and A13 or A26 terminals.
4. Turn the ignition switch ON (II) and make sure that the voltage is available for 2 seconds.

Is there voltage?

YES

NO

Check for open in the wire between the A17 terminal and the gauge assembly. If the wire is OK, check for a faulty **D₄** indicator light bulb or a faulty gauge assembly printed circuit board.



Check D₄ IND for a Short Circuit:

Check for continuity between the A17 terminal and body ground.

Is there continuity?

YES

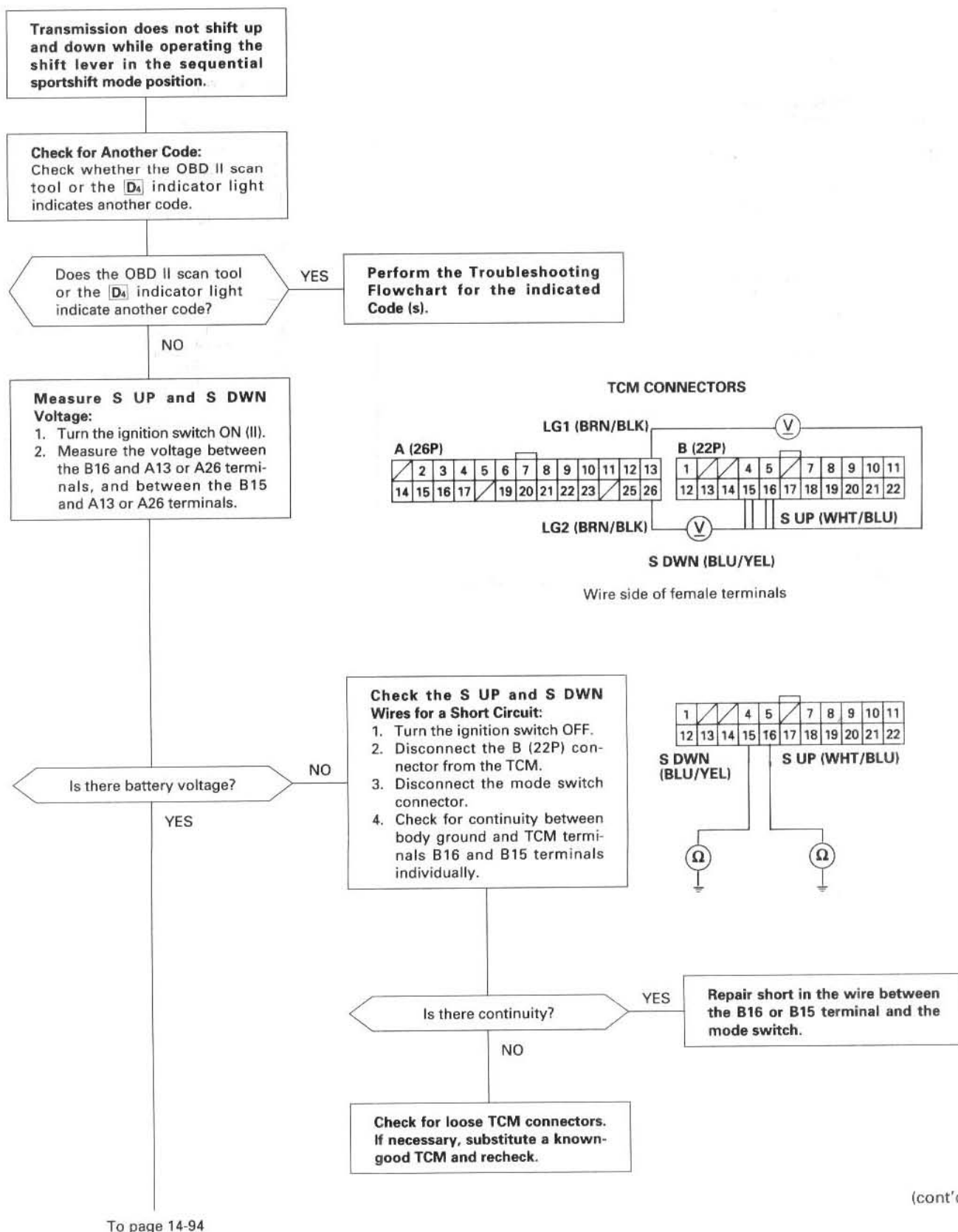
NO

Repair short in the wire between the A17 terminal and the gauge assembly.

Check for loose TCM connectors. Check the A/T gear position switch. If necessary, substitute a known-good TCM and recheck.



Troubleshooting Flowchart — Shift Switch Does Not Operate



Electrical Troubleshooting

Troubleshooting Flowchart — Shift Switch Does Not Operate (cont'd)

From page 14-93

Check Shift Switch Wire Continuity at Mode Switch Connector:

1. Turn the ignition switch OFF.
2. Disconnect the mode switch connector.
3. Shift the shift lever into the sequential sportshift mode position.
4. Check for continuity between the No. 4 and No. 1 terminals of the mode switch connector while pushing the shift lever toward the "+" mark on the A/T gear position indicator panel; then check for continuity between the No. 5 and No. 1 terminals while pulling the shift lever toward the "-" mark.

Is there continuity?

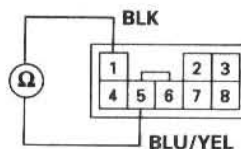
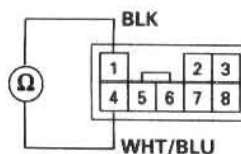
NO

Replace the mode switch.

YES

To page 14-95

MODE SWITCH CONNECTOR



Terminal side of male terminals



From page 14-94

Check S UP Wire for an Open Circuit:

1. Connect the mode switch connector.
2. Disconnect the B (22P) connector from the TCM.
3. Check for continuity between the B16 and B13 terminals while pushing the shift lever toward "+" mark.

Is there continuity with the shift lever pushed toward the "+" mark, and no continuity with it released?

NO

Repair open in the S UP wire between the B16 terminal and the mode switch connector.

YES

Check S DWN Wire for an Open Circuit:

Check for continuity between the B15 and B13 terminals while pulling the shift lever toward "-" mark.

Is there continuity with the shift lever pulled toward the "-" mark, and no continuity with it released?

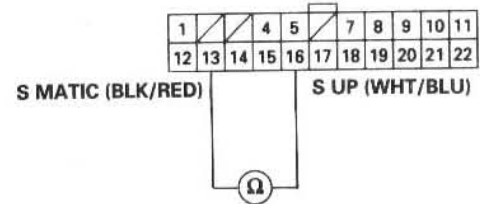
NO

Repair open in the S DWN wire between the B15 terminal and the mode switch connector.

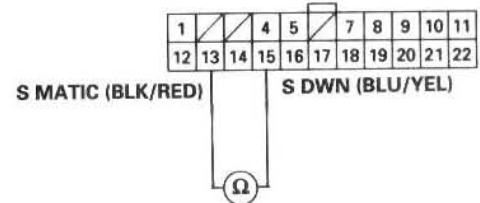
YES

Check for loose TCM connectors. If necessary, substitute a known-good TCM and recheck.

TCM CONNECTOR B (22P)

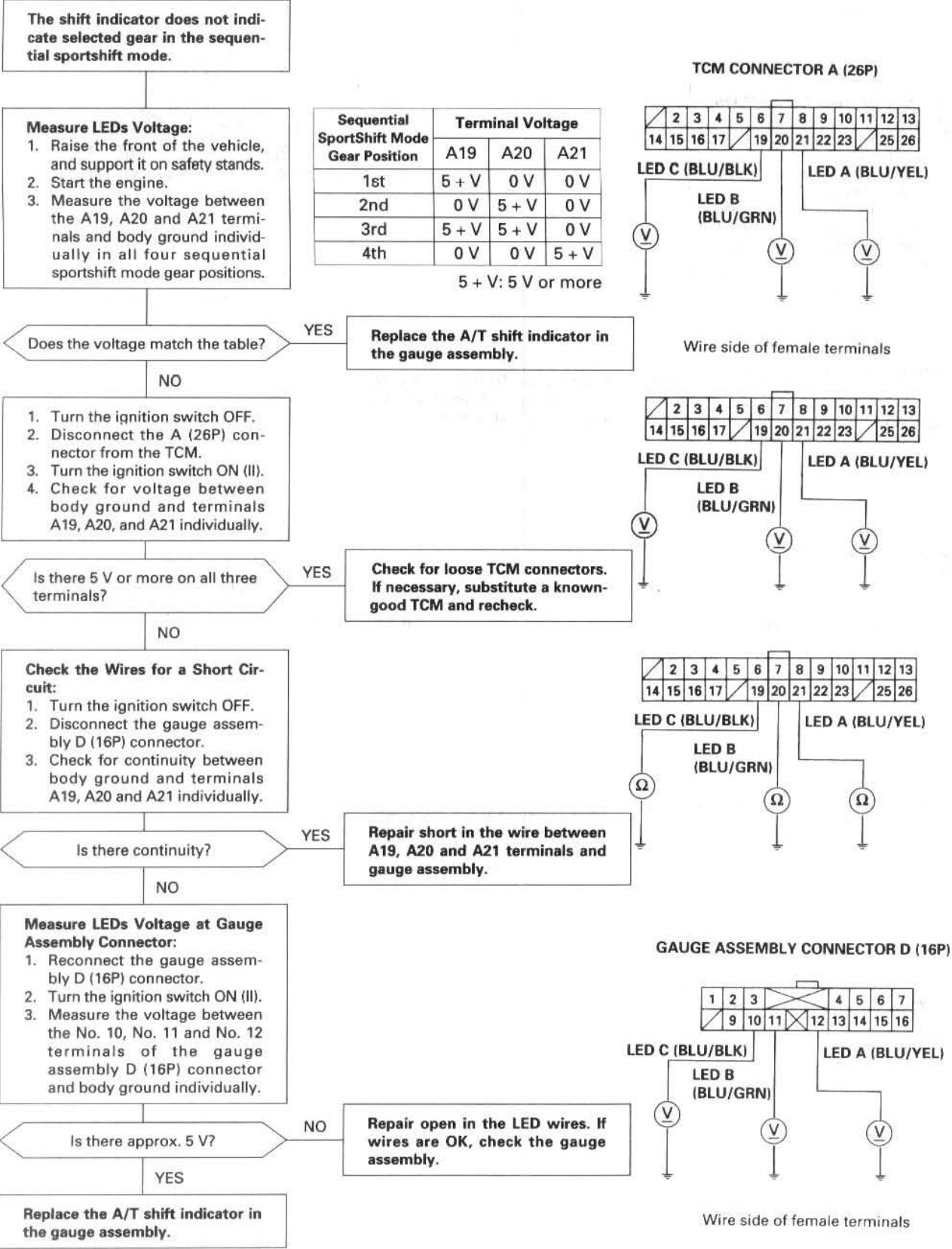


Wire side of female terminals



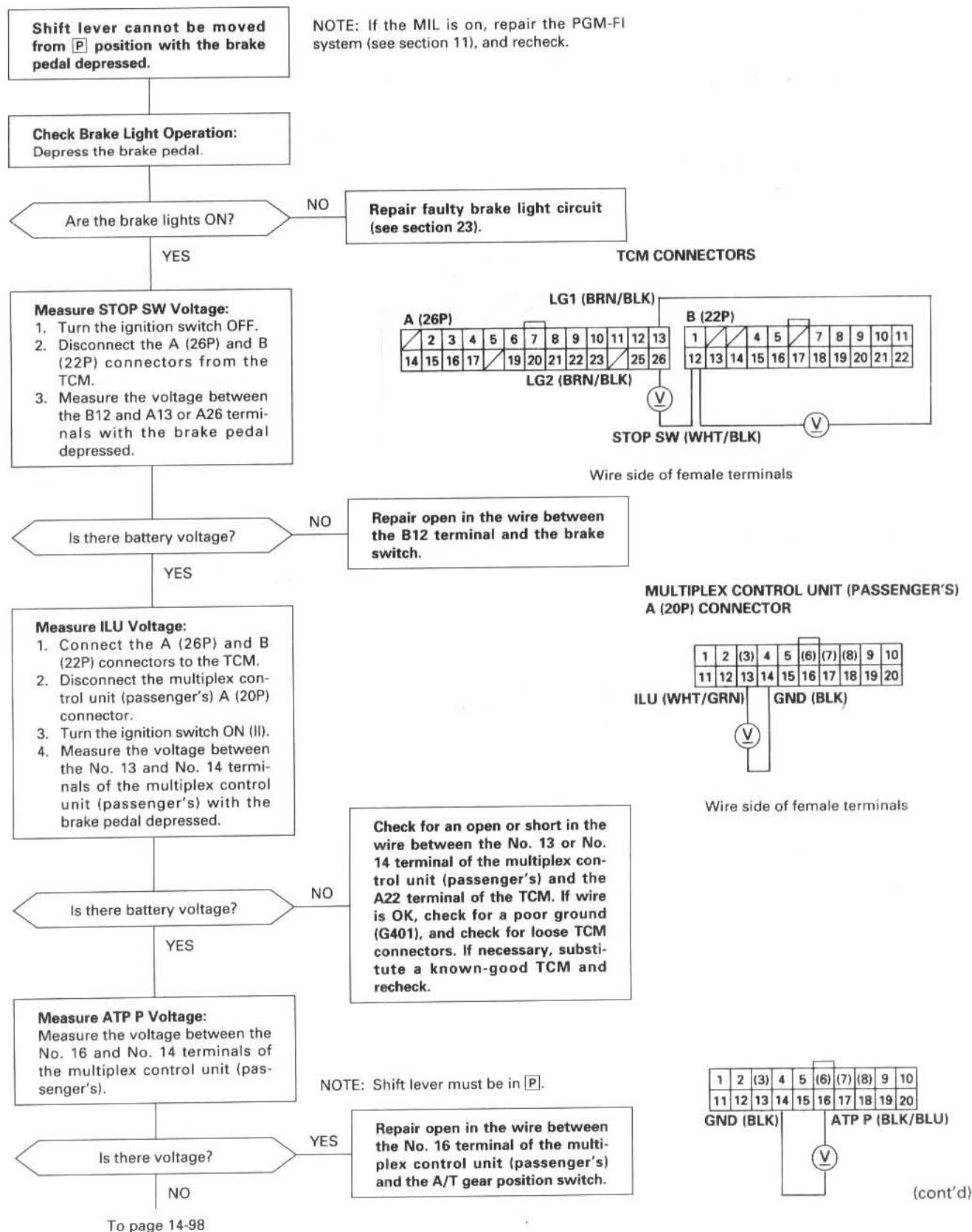
Electrical Troubleshooting

Troubleshooting Flowchart — Shift Indicator Does Not Indicate Selected Gear





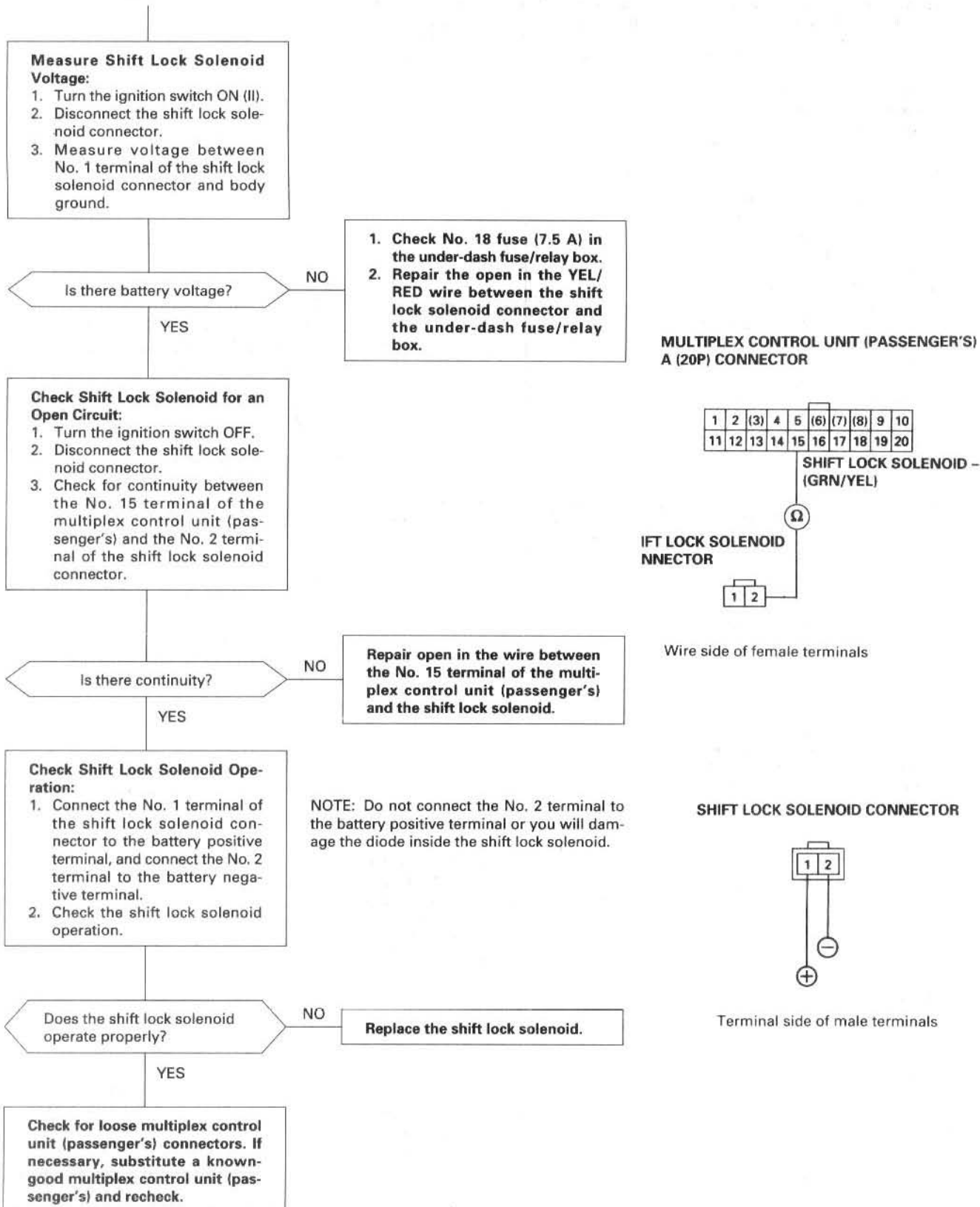
Troubleshooting Flowchart — Interlock System – Shift Lock System



Electrical Troubleshooting

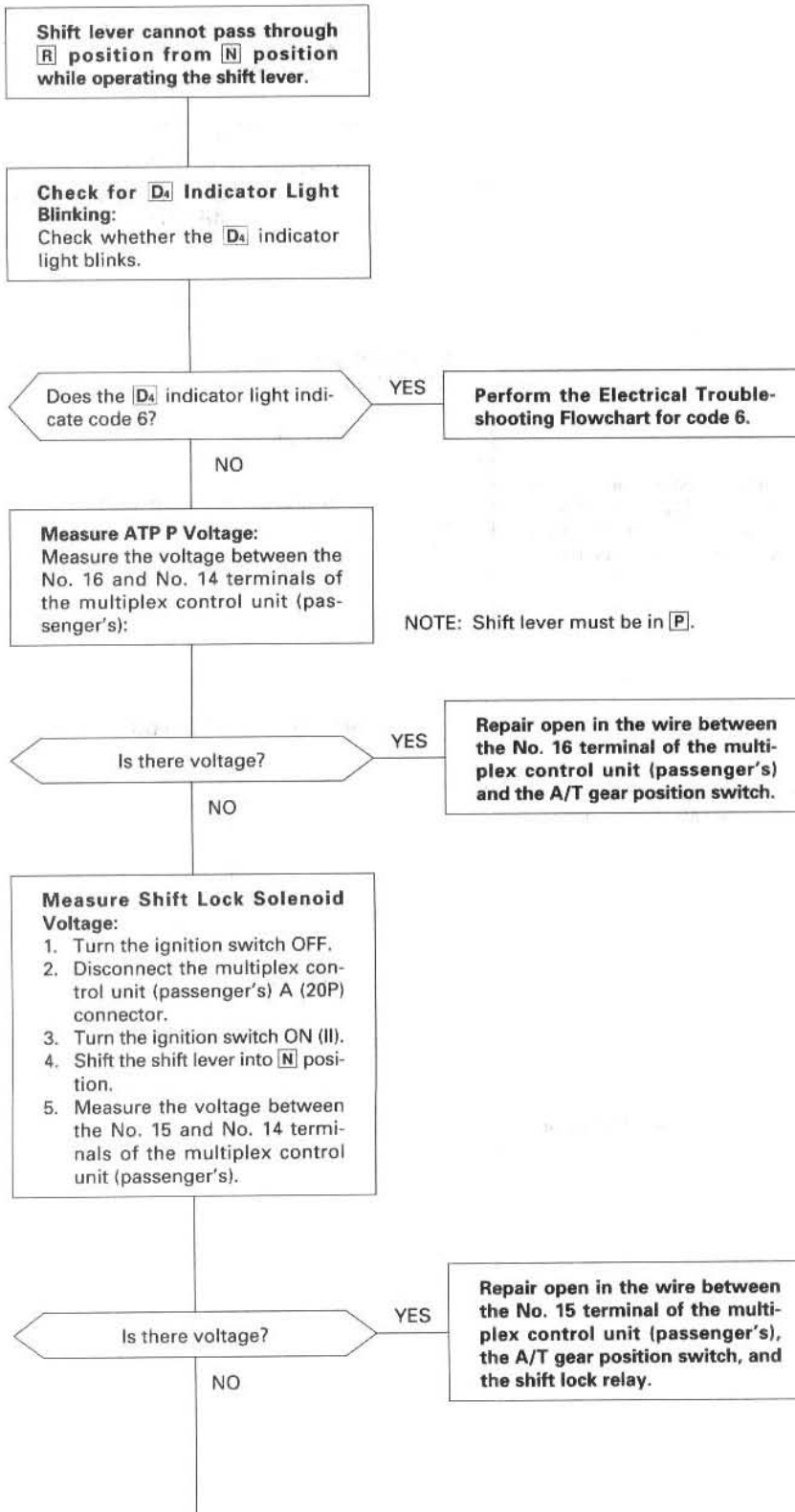
Troubleshooting Flowchart — Interlock System – Shift Lock System (cont'd)

From page 14-97

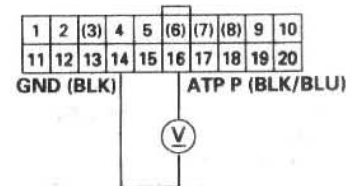




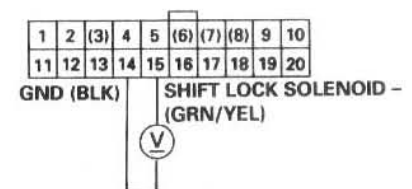
Troubleshooting Flowchart — Interlock System – Reverse Lock System



**MULTIPLEX CONTROL UNIT (PASSENGER'S)
A (20P) CONNECTOR**



Wire side of female terminals



To page 14-100

(cont'd)

Electrical Troubleshooting

Troubleshooting Flowchart — Interlock System – Reverse Lock System (cont'd)

From page 14-99

Check Shift Lock Solenoid for an Open Circuit:

1. Turn the ignition switch OFF.
2. Disconnect the shift lock solenoid connector.
3. Check for continuity between the No. 15 terminal of the multiplex control unit (passenger's) and the No. 2 terminal of the shift lock solenoid connector.

Is there continuity?

NO

Repair open in the wire between the No. 15 terminal of the multiplex control unit (passenger's) and the shift lock solenoid.

Check Shift Lock Solenoid Operation:

1. Connect the No. 1 terminal of the shift lock solenoid connector to the battery positive terminal, and connect the No. 2 terminal to the battery negative terminal.
2. Check the shift lock solenoid operation.

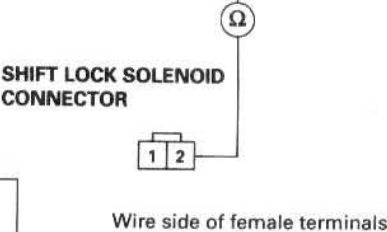
Does the shift lock solenoid operate properly?

NO

Replace the shift lock solenoid.

Check for loose multiplex control unit (passenger's) connectors. If necessary, substitute a known-good multiplex control unit (passenger's) and recheck.

MULTIPLEX CONTROL UNIT (PASSENGER'S) A (20P) CONNECTOR



SHIFT LOCK SOLENOID CONNECTOR



Terminal side of male terminals

NOTE: Do not connect the No. 2 terminal to the battery positive terminal or you will damage the diode inside the shift lock solenoid.



Troubleshooting Flowchart — Interlock System – Key Interlock System

Ignition key cannot be moved from ACC (I) position to LOCK (0) position with the shift lever in P position.

Check Key Interlock Solenoid and Switch Operation:

1. Disconnect the steering lock assembly connector (6P).
2. Connect the No. 5 terminal of the steering lock assembly connector to the battery positive terminal, and connect the No. 3 terminal to the battery negative terminal.
3. Turn the ignition key to ACC (I) position, then push it.
4. Check the key interlock solenoid and switch operation. A clicking sound should be heard while pushing the ignition key, and no sound should be heard when releasing the ignition key.

Do the key interlock solenoid and switch operate properly?

NO

Faulty key interlock solenoid or switch. Replace the ignition key cylinder/steering lock assembly.

YES

Check for an Open Circuit:

1. Connect the steering lock assembly connector.
2. Disconnect the mode switch connector (8P).
3. Turn the ignition key to ACC (I) position.
4. Measure the voltage between the No. 8 terminal of the mode switch connector and body ground while pushing the ignition key.

Is there voltage?

NO

Repair open in the wire between the No. 8 terminal of the mode switch connector and the steering lock assembly connector.

YES

Check Parking Pin Switch Ground Circuit:

Check for continuity between the No. 3 terminal of the mode switch connector and body ground.

Is there continuity?

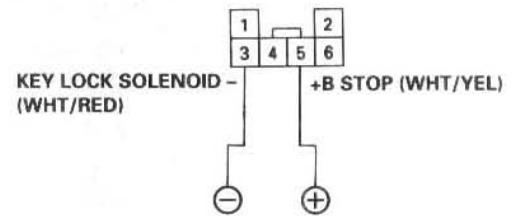
NO

Repair open in the wire between the No. 3 terminal of the mode switch connector and G471.

YES

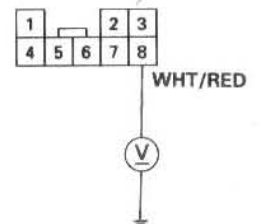
Faulty the parking pin switch. Replace the mode switch/parking pin switch assembly.

STEERING LOCK ASSEMBLY CONNECTOR



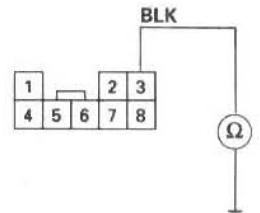
Wire side of female terminals

MODE SWITCH CONNECTOR



Wire side of female terminals

MODE SWITCH CONNECTOR



Wire side of female terminals

Lock-up Control Solenoid Valve/Shift Control Solenoid Valve A Assembly

Test

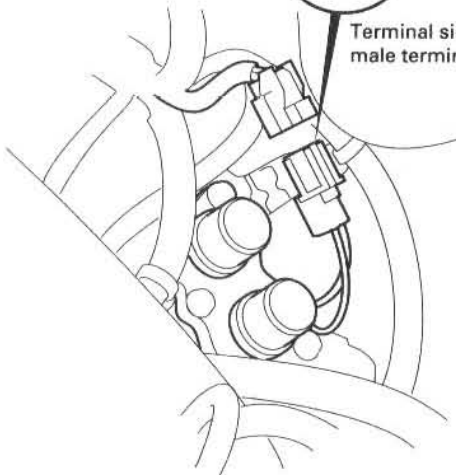
1. Disconnect the 2P connector from the lock-up control solenoid valve/shift control solenoid valve A assembly.
2. Measure the resistance of the lock-up control solenoid valve between the No. 1 terminal of the 2P connector and body ground.

STANDARD: 12 – 25 Ω

LOCK-UP CONTROL
SOLENOID VALVE/
SHIFT CONTROL
SOLENOID VALVE A
ASSEMBLY CONNECTOR



Terminal side of
male terminals



3. Measure the resistance of the shift control solenoid valve A between the No. 2 terminal of the 2P connector and body ground.

STANDARD: 12 – 25 Ω

4. Replace the lock-up control solenoid valve/shift control solenoid valve A assembly if either resistance is out of specification.
5. If the resistance is within the standard, connect the No. 1 terminal of the 2P connector to the battery positive terminal. A clicking sound should be heard. Connect the No. 2 terminal to the battery positive terminal. A clicking sound should be heard. Replace the lock-up control solenoid valve/shift control solenoid valve A assembly if no clicking sound is heard when connecting either terminal to the battery positive terminal.

Replacement

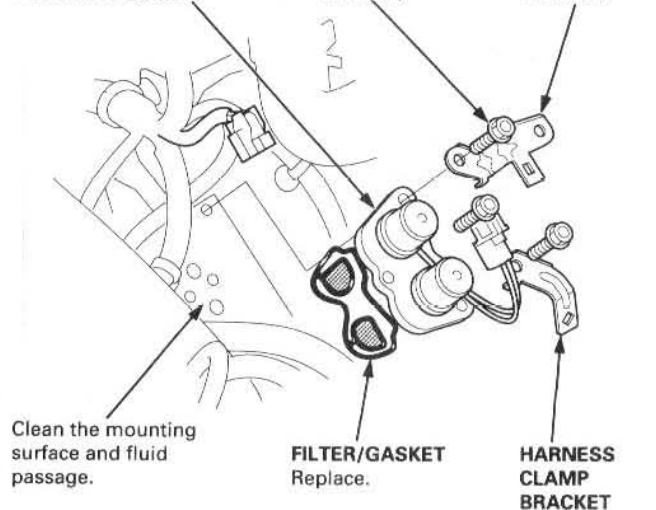
NOTE: Lock-up control solenoid valve/shift control solenoid valve A must be removed/replaced as an assembly.

1. Remove the mounting bolts and lock-up control solenoid valve/shift control solenoid valve A assembly.

LOCK-UP CONTROL
SOLENOID VALVE/
SHIFT CONTROL SOLENOID
VALVE A ASSEMBLY

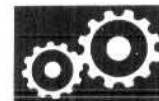
6 x 1.0 mm
12 N·m (1.2 kgf·m,
8.7 lbf·ft)

CONNECTOR
BRACKET



2. Clean the mounting surface and fluid passage of the lock-up control solenoid valve/shift control solenoid valve A assembly, and install a new lock-up control solenoid valve/shift control solenoid valve A assembly with a new filter/gasket.
3. Install the bolts with the connector bracket and the clamp bracket, and tighten the bolts.
4. Check the connector for rust, dirt or oil, then reconnect the connector securely.

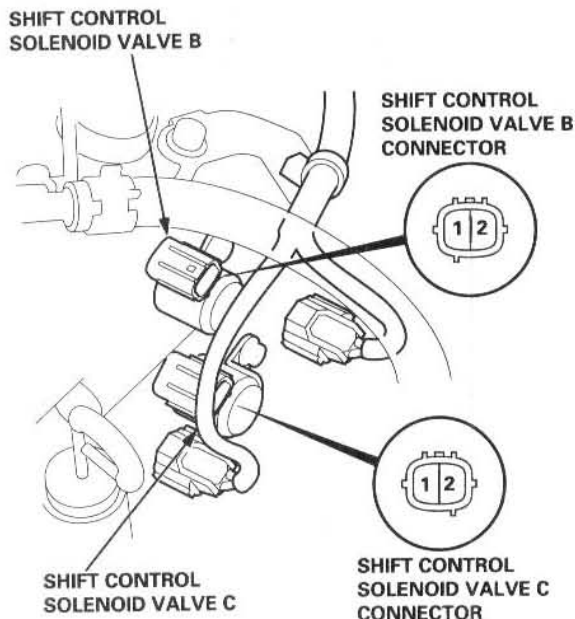
Shift Control Solenoid Valve B/C



Test

1. Disconnect the shift control solenoid valve B or C connector.
2. Measure the resistance between the No. 1 terminal and No. 2 terminal of the shift control solenoid valve B or C.

STANDARD: 12 – 25 Ω

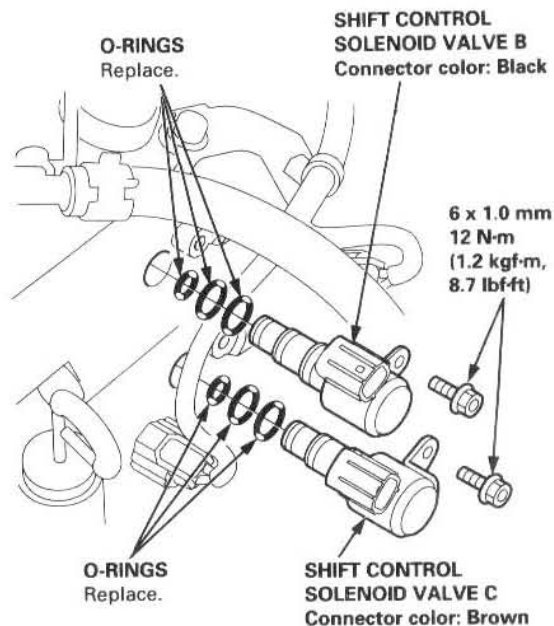


3. Replace the shift control solenoid valve B or C if the resistance is out of specification.
4. If the resistance is within the standard, connect the No. 2 terminal of the shift control solenoid valve B or C connector to the battery positive terminal individually. A clicking sound should be heard. Replace the shift control solenoid valve B or C if no clicking sound is heard.

Replacement

NOTE: If shift control solenoid valves B and C are replaced or removed at the same time, be sure to reinstall them correctly. The connector color of shift control solenoid valve B is black, and the connector color of shift control solenoid valve C is brown.

1. Remove the mounting bolt and the shift control solenoid valve B or C.



2. Install a new shift control solenoid valve B or C with new O-rings.

CAUTION: While installing shift control solenoid valve B or C, do not allow dust or other foreign particles to enter the transmission.

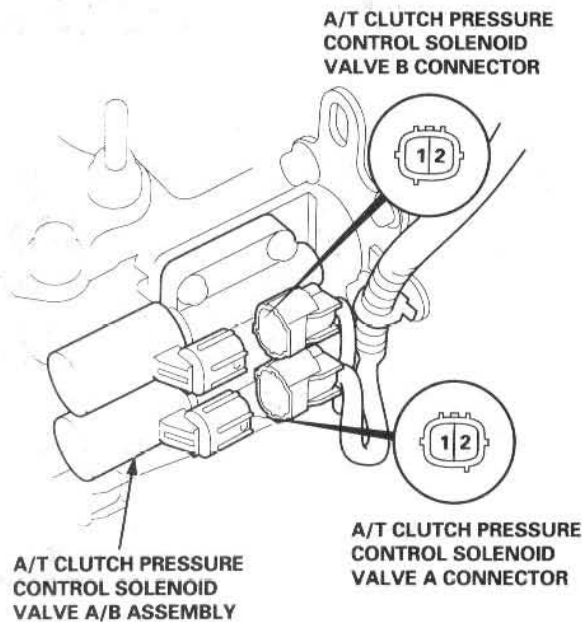
3. Check the connector for rust, dirt, or oil, then reconnect the connector securely.

A/T Clutch Pressure Control Solenoid Valve A/B Assembly

Test

1. Disconnect the A/T clutch pressure control solenoid valve A and B connectors.
2. Measure the resistance of the No. 1 terminal and the No. 2 terminal of A/T clutch pressure control solenoid valve A and B.

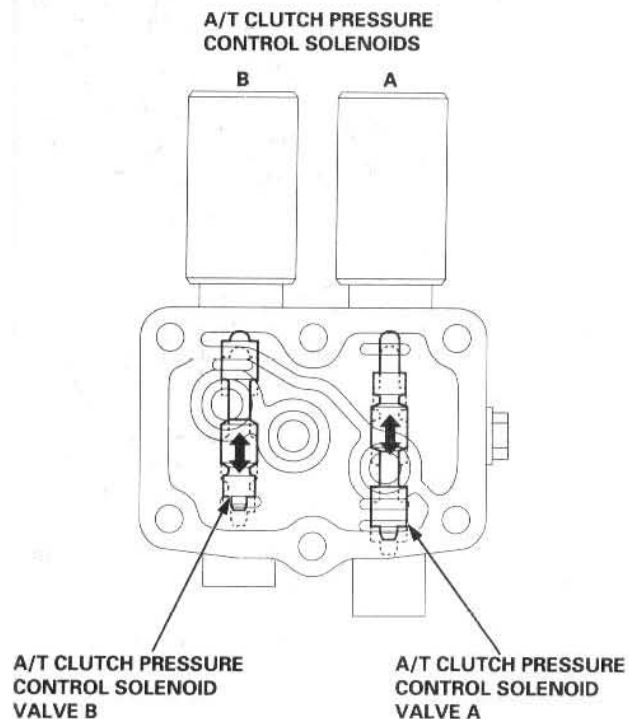
STANDARD: 4.0 – 9.0 Ω



3. If the resistance of either A/T clutch pressure control solenoid is out of specification, replace the A/T clutch pressure control solenoid valve A/B assembly.
4. Connect the No. 1 terminal of A/T clutch pressure control solenoid valve A (and B) to the battery positive terminal, and connect the No. 2 terminal to the battery negative terminal. A clicking sound should be heard.
5. If not, remove the A/T clutch pressure control solenoid valve A/B assembly.
6. Check the fluid passage of the A/T clutch pressure control solenoid valves for dust and dirt.

7. Connect the No. 1 terminal of A/T clutch pressure control solenoid valve A and B to the battery positive terminal, and connect the No. 2 terminal to the battery negative terminal. Make sure both valves move.
8. Disconnect one of the battery terminals and check valve movement.

NOTE: You can see valve movement through the fluid passage in the mounting surface of the A/T clutch pressure control solenoid valve A/B assembly.



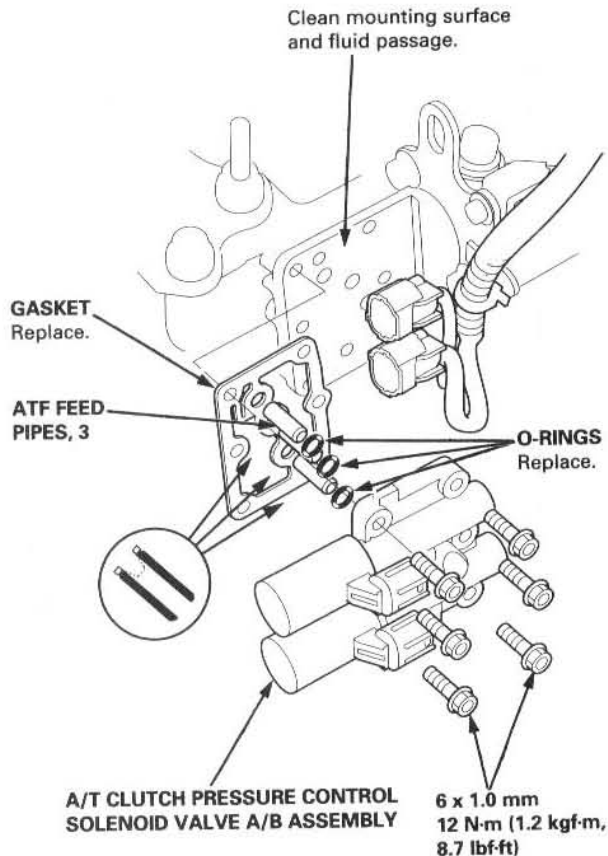
9. If either valve binds, or moves sluggishly, or if the A/T clutch pressure control solenoid does not operate, replace the A/T clutch pressure control solenoid valve A/B assembly.



Mode Switch

Replacement

1. Remove the mounting bolts and the A/T clutch pressure control solenoid valve A/B assembly.



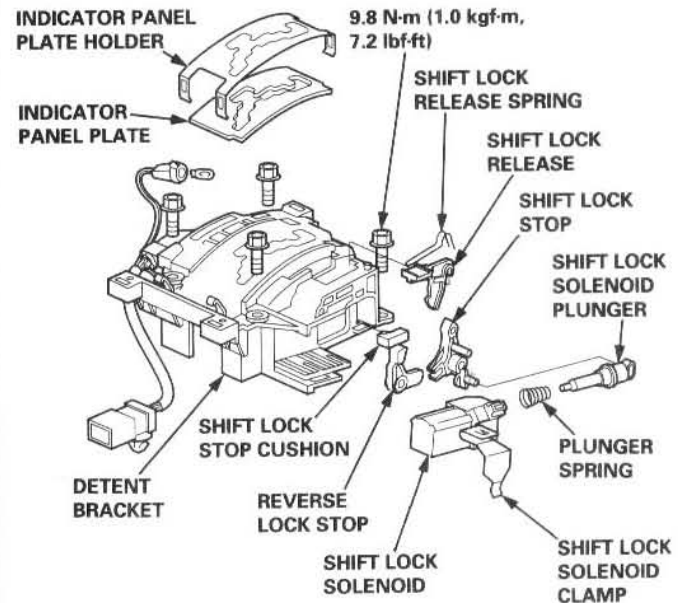
2. Clean the mounting surface and fluid passage of the A/T clutch pressure control solenoid valve A/B assembly and transmission housing.
3. Install a new A/T clutch pressure control solenoid valve A/B assembly with a new gasket. Reuse the ATF feed pipes.
4. Check the A/T clutch pressure control solenoid valve connectors for rust, dirt, or oil, then connect it securely.

Replacement

NOTE:

- Replace the mode switch, parking pin switch, and detent bracket as a set, if mode switch replacement is required.
- Refer to shift lever disassembly on page 14-201.

1. Remove the A/T gear position indicator panel light.
2. Remove the shift lever knob, then remove the A/T gear position indicator panel.
3. Disconnect the mode switch/parking pin switch connector, then remove the connector from the connector bracket.
4. Disconnect the shift lock solenoid connector.
5. Remove the detent bracket from the shift lever bracket base.

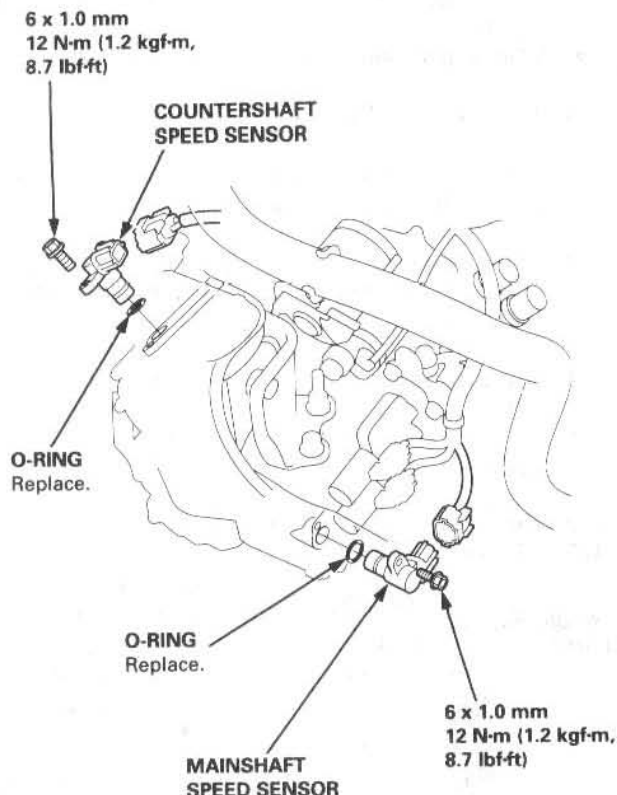


6. Remove the indicator panel plate holder and indicator panel plate from the detent bracket.
7. Remove the shift lock solenoid and the related parts of the shift lock/reverse lock mechanism from the detent bracket.
8. Replace the new detent bracket, then install the removed parts on it.
9. Install the detent bracket in the reverse order of removal procedures.
10. Check the shift lever operation and the shift lock/reverse lock mechanism operation.

Mainshaft/Countershaft Speed Sensors

Replacement

1. Remove the 6 mm bolt and the mainshaft speed sensor from the right side cover.

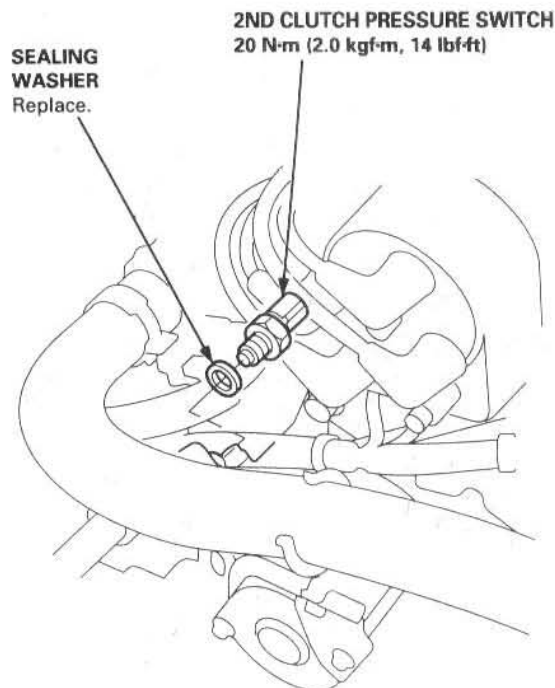


2. Remove the 6 mm bolt and the countershaft speed sensor from the transmission housing.
3. Replace the O-ring with a new one before installing the countershaft speed sensor or the mainshaft speed sensor.

2nd Clutch Pressure Switch

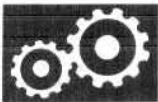
Replacement

1. Disconnect the connector from the 2nd clutch pressure switch.
2. Replace the 2nd clutch pressure switch, then install a new one with a new sealing washer.



3. Tighten the 2nd clutch pressure switch on the metal part of the switch, not the plastic part. Do not allow water, fluid, oil, dust, or other foreign particles to get inside the connector.

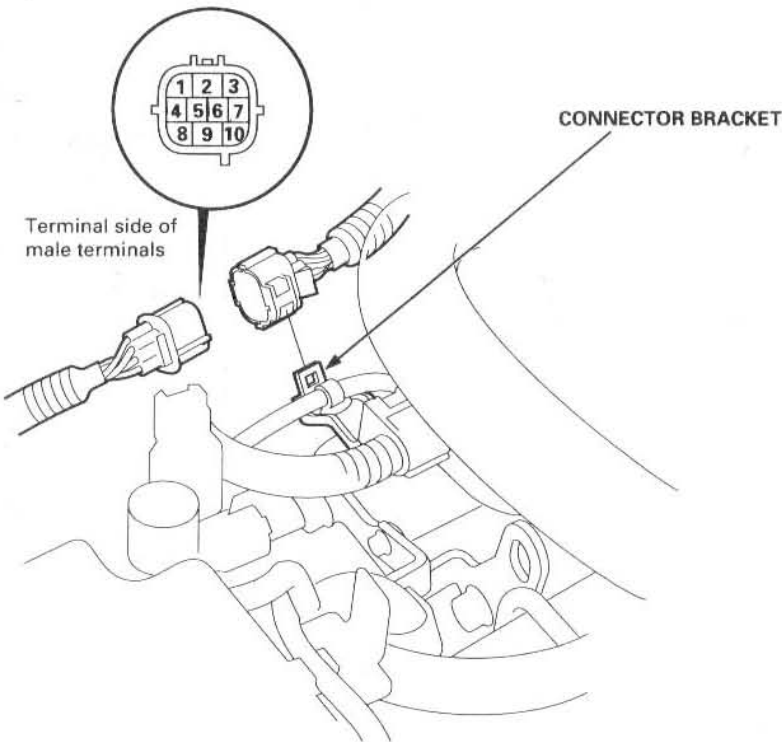
A/T Gear Position Switch



Test

1. Remove the A/T gear position switch connector from the connector bracket, then disconnect the A/T gear position switch connector.
2. Check for continuity between the terminals in each switch position according to the table below.

A/T GEAR POSITION SWITCH CONNECTOR



A/T Gear Position Switch Continuity check

Terminal Position	1	2	3	4	5	6	7	8	9	10
P	○		○							○
R			○						○	
N	○		○					○		
D ₄		○	○				○			
D ₃		○	○			○				
2		○	○		○					
1			○	○						

A/T Gear Position Switch

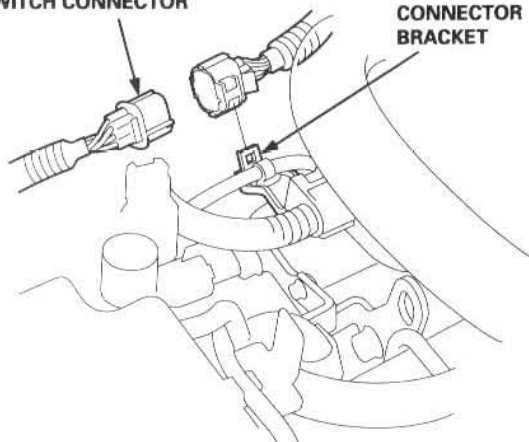
Replacement

⚠ WARNING Make sure lifts, jacks, and safety stands are placed properly (see section 1).

1. Raise the front of the vehicle, and support it with safety stands (see section 1).
2. Set the parking brake, and block both rear wheels securely.
3. Shift to **N** position.
4. Remove the A/T gear position switch connector from the connector bracket, then disconnect the A/T gear position switch connector.

A/T GEAR POSITION SWITCH CONNECTOR

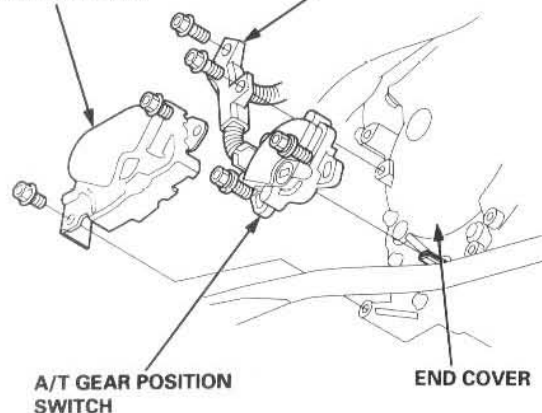
CONNECTOR BRACKET



5. Remove the clamp from clamp bracket on the transmission housing, and remove the harness clamp from the end cover.
6. Remove the A/T gear position switch cover, then remove the A/T gear position switch from the end cover.

A/T GEAR POSITION SWITCH COVER

HARNESS CLAMP

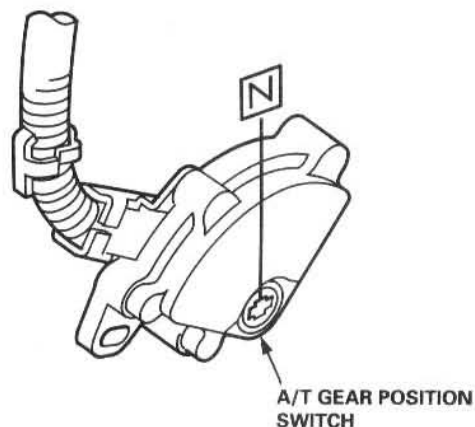


A/T GEAR POSITION SWITCH

END COVER

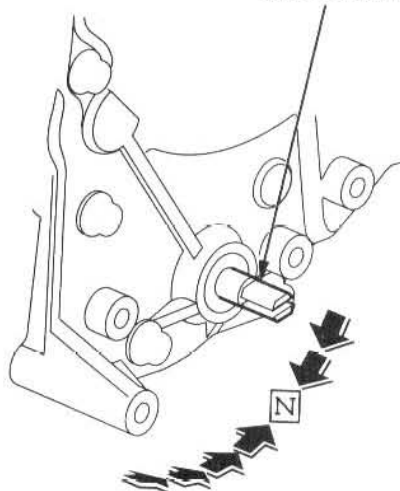
7. Set the A/T gear position switch to **N** position.

NOTE: The A/T gear position switch clicks in **N** position.



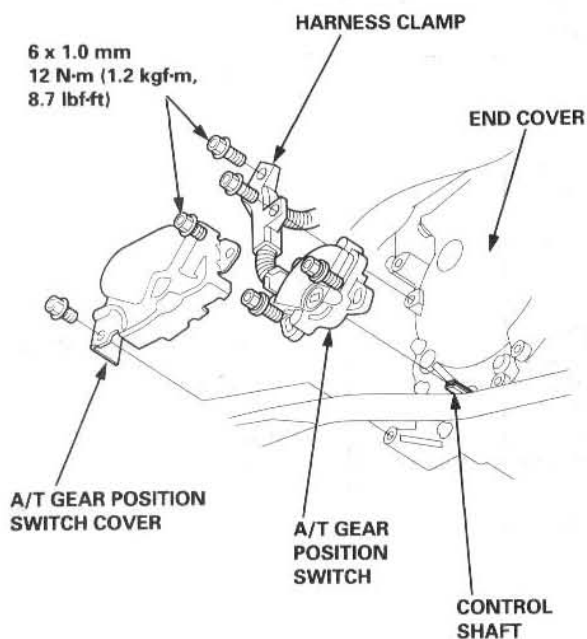
8. Set the control shaft to **N** position.

CONTROL SHAFT

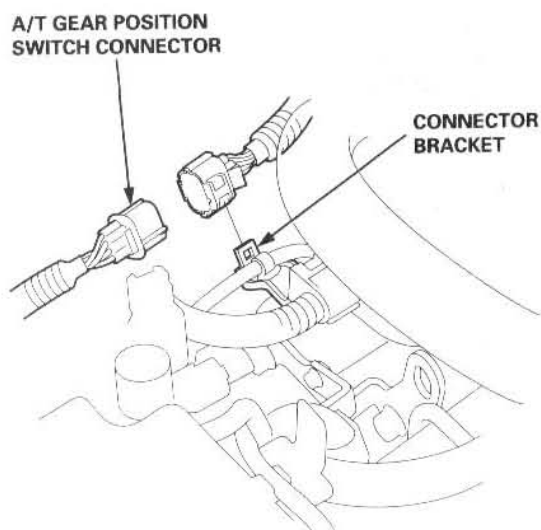




9. Install the A/T gear position switch on the control shaft.
10. Install the A/T gear position switch cover and the harness clamp on the end cover.
11. Clamp the harness on the harness bracket to the transmission housing.

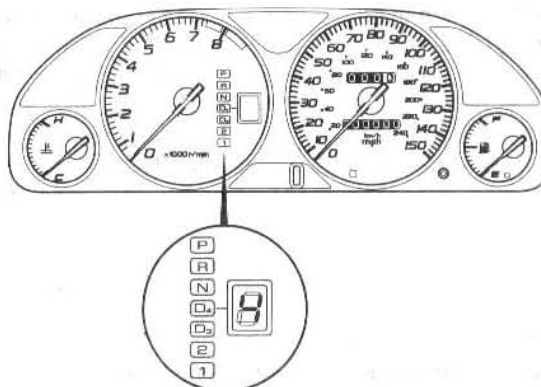


12. Connect the A/T gear position switch connector, then install it on the connector bracket.



13. Turn the ignition switch ON (II). Move the shift lever through all gears, and check the A/T gear position switch synchronization with the A/T gear position indicator.

GAUGE ASSEMBLY



A/T GEAR POSITION INDICATOR

14. Start the engine. Move the shift lever through all gears, and verify the following:
 - The engine will not start in any position other than **N** or **P**.
 - The back-up lights come on when the shift lever is in **R** position.

A/T Gear Position Indicator

Input Test

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

1. Remove the gauge assembly from the dashboard (see section 20), then disconnect the gauge assembly D (16P) connector.
2. Inspect the connector and connector terminals to be sure they are all making good contact.
 - If the terminals are bent, loose, or corroded, repair them as necessary, and recheck the system.
 - If the terminals look OK, make the following input test at the gauge assembly D (16P) connector.
 - If a test indicates a problem, find and correct the cause, then recheck the system.
 - If all the input tests prove OK, but the indicator is faulty, replace the printed circuit board.

GAUGE ASSEMBLY D (16P) CONNECTOR



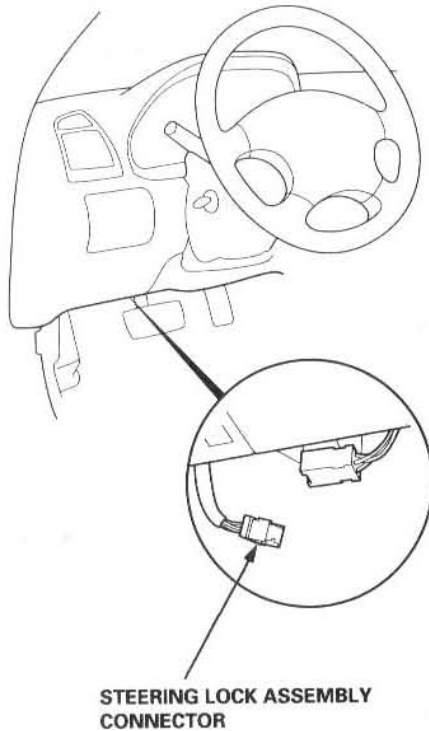
Wire side of female terminals

Cavity	Wire color	Test Condition	Test: Desired Result	Possible Cause (If result is not obtained)
1	BLU	Ignition switch ON (II) and shift lever in [2]	Check for voltage to ground: There should be 1 V or less.	<ul style="list-style-type: none"> • Faulty A/T gear position switch • An open in the wire
2	GRN	Ignition switch ON (II) and shift lever in [D ₃]	NOTE: There should be battery voltage in any other shift lever position.	
3	BLU/RED	Ignition switch ON (II) and shift lever in [D ₄]	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> • Faulty A/T gear position switch • Faulty TCM • An open in the wire
4	RED	Ignition switch ON (II) and shift lever in [N]	Check for voltage to ground: There should be 1 V or less.	<ul style="list-style-type: none"> • Faulty A/T gear position switch • An open in the wire
5	WHT	Ignition switch ON (II) and shift lever in [R]	NOTE: There should be no battery voltage in any other shift lever position.	
6	BLK/BLU	Shift lever in [P]	Check for continuity to ground: There should be continuity. NOTE: There should be no continuity in any other shift lever position.	
7	LT GRN	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> • Faulty TCM • An open in the wire
9	YEL	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> • Blown No. 13 (15 A) fuse in the under-dash fuse/relay box • An open in the wire
10	BLU/BLK	Start the engine and shift the lever to manual 1st shifting mode position	Check for voltage to ground: There should be 5 V.	<ul style="list-style-type: none"> • Faulty TCM • Faulty mode switch • An open in the wire
11	BLU/GRN		Check for voltage to ground: There should be 0 V.	
12	BLU/YEL			
15	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	<ul style="list-style-type: none"> • Poor ground (G401, 402) • An open in the wire
16	BRN	Shift lever in [1]	Check for voltage to ground: There should be 1 V or less. NOTE: There should be no battery voltage in any other shift lever position.	<ul style="list-style-type: none"> • Faulty A/T gear position switch • An open in the wire



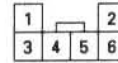
Key Interlock Solenoid Test

1. Remove the dashboard lower cover (see section 20).
2. Disconnect the steering lock assembly connector from the wire harness.



3. Check for continuity between the terminals in each position according to the table below.

STEERING LOCK ASSEMBLY CONNECTOR



Wire side of female terminals

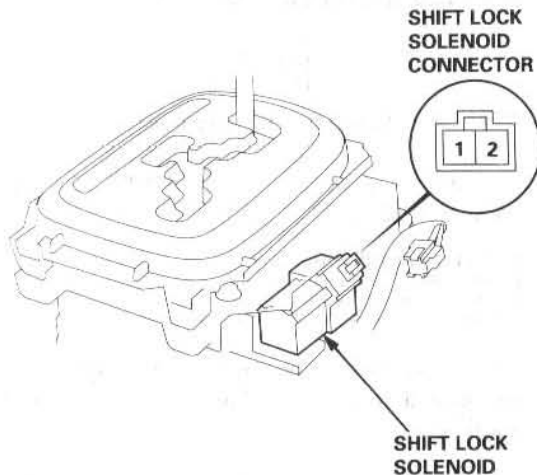
Position in ignition switch ACC (I)	Terminals	
	3	5
Ignition key pushed in	○	○
Ignition key released		

4. Check that the ignition key cannot be removed with power and ground connected to the No. 3 and No. 5 terminals.
 - If the ignition key cannot be removed, the key interlock solenoid is OK.
 - If the ignition key can be removed, replace the steering lock assembly (the interlock solenoid is not available separately).

Interlock System

Shift Lock Solenoid Test

1. Remove the center console (see section 20).
2. Disconnect the shift lock solenoid connector.



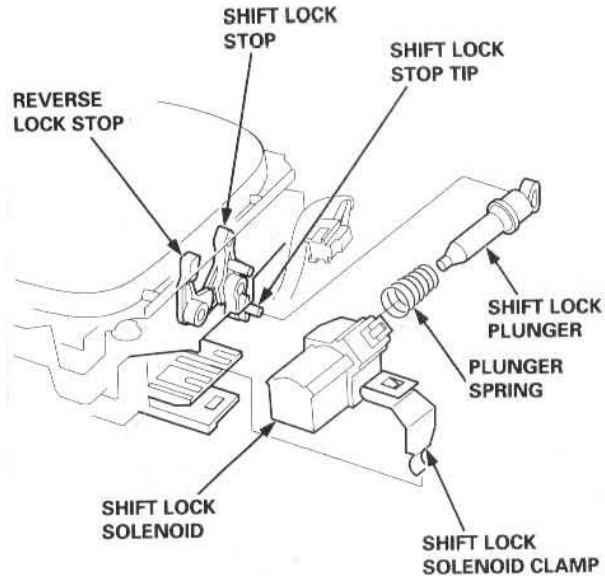
3. Connect the No.1 terminal to the battery positive terminal and connect the No. 2 terminal to the negative terminal momentarily.

NOTE: Do not connect the battery positive terminal to the No. 2 terminal, you will damage the diode inside the solenoid.

4. Check that the shift lock solenoid releases when the release lever is pushed, and that it locks when the release lever is released.
5. If the solenoid does not work, replace it.

Shift Lock Solenoid Replacement

1. Remove the center console (see section 20).
2. Disconnect the shift lock solenoid connector.
3. Pry the shift lock solenoid clamp with a screwdriver, then remove the shift lock solenoid.

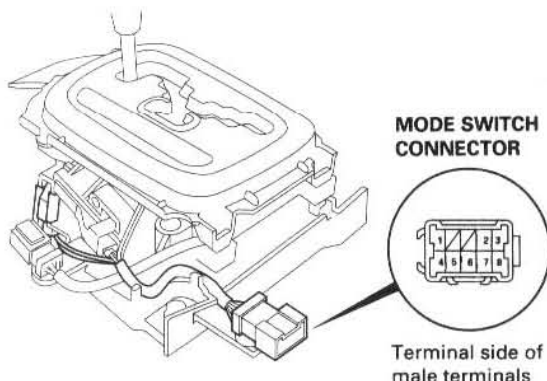


4. Install the new shift lock solenoid by aligning the joint of the shift lock solenoid with the tip of the shift lock stop.
5. Secure the shift lock solenoid with the clamp, then connect the shift lock solenoid connector.



Park Pin Switch Test

1. Remove the center console (see section 20).
2. Disconnect the mode switch connector.

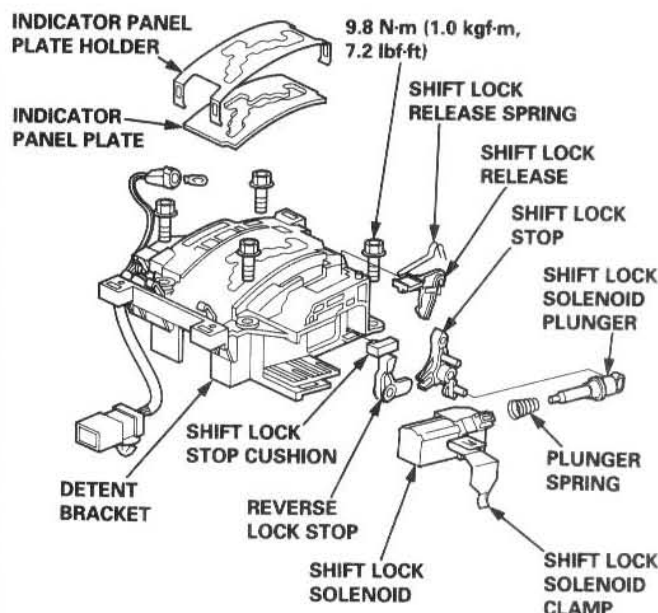


3. Shift the shift lever into the **P** position, then check for continuity between the No. 8 terminal and No. 3 terminal. There should be continuity.
4. Shift the shift lever out of the **P** position, and check for continuity between the terminals in step 3. There should be no continuity.
5. If the park pin switch is faulty, replace the mode switch/A/T gear position indicator panel light/park pin switch assembly.

Park Pin Switch Replacement

NOTE:

- Replace the park pin switch, mode switch, and the detent bracket as a set, if park pin switch replacement is required.
 - Refer to detailed shift lever disassembly on page 14-201.
1. Remove the A/T gear position indicator panel light.
 2. Remove the shift lever knob, then remove the A/T gear position indicator panel.
 3. Disconnect the park pin switch/mode switch connector, then remove the connector from the connector bracket.
 4. Disconnect the shift lock solenoid connector.
 5. Remove the detent bracket from the shift lever bracket base.



6. Remove the indicator panel plate holder and indicator panel plate from the detent bracket.
7. Remove the shift lock solenoid and related parts from the detent bracket.
8. Replace the new detent bracket, then install the removed parts on it.
9. Install the detent bracket in the reverse order of removal.
10. Check the shift lever operation and the shift lock/reverse lock mechanism operation.

Symptom-to-Component Chart

Hydraulic System

SYMPTOM	Check these items on the PROBABLE CAUSE List	Check these items on the NOTES List
Engine runs, but vehicle does not move in any gear.	1, 11, 12, A, B, U, a, b	A, C, H, I, J, M, N, O, R, S
Vehicle moves in [2] , [R] , but not in [D₄] , [D₃] , [1] positions.	O, d, e	P, T
Vehicle moves in [D₄] , [D₃] , [1] , [R] , but not in [2] position.	3, H, P, f, g	D, P, T
Vehicle moves in [D₄] , [D₃] , [2] , [1] , but not in [R] position.	C, D, N, R, i, j	J, K, L, Q, T
Poor acceleration; flares on starting off in [D₄] , [D₃] positions:		
Stall speed high in [D₄] , [D₃] , [2] , [1] positions.	1, 11, A, B, U, V	A, C, H, I, R
Stall speed high in [D₄] , [D₃] , [1] positions.	11, e	H, T
Stall speed high in [2] position.	11, g	H, T
Stall speed is in specification in [D₄] , [D₃] , [2] , [1] positions, but high in [R] position.	i	T
Stall speed low.	6, T1, T3, T4, W	
Vehicle can accelerate, but stall speed high in [D₄] , [D₃] , [2] , [1] and [R] positions.	15	W
Engine idle vibration.	1, 6, T2, T3, T4, A, W	B, C
Vehicle moves in [N] position.	2, G, e, g, h, i, l, m, n	A, C, T
Late shift from [N] position to [D₄] , [D₃] positions.	5, 7, 11, 12, C, E, G, J, M, O, e	D, E, H, L
Late shift from [N] position to [R] position.	5, 7, 11, 12, C, G, N, R, i	D, E, H, L, T
No shift.	D	J
Erratic shifting gears:		
Fails to shift in [D₄] position; from 1st to 3rd.	3, H, K	D
Fails to shift in [D₄] , [D₃] positions; between 1st and 2nd.	4, C, I, M	D, K
Fails to shift in [D₄] , [D₃] , [1] positions; starts off in 3rd.	4, I, L	D
Excessive shock or flares in all shift lever position.	7, E, F, G	E, L
Excessive shock or flares on 1-2 upshift or 2-1 downshift.	5, 9, G, J, O, P, e, g	D, G, T
Excessive shock or flares on 2-3 upshift or 3-2 downshift.	5, G, J, P, Q, g, h	D, T
Excessive shock or flares on 3-4 upshift or 4-3 downshift.	5, G, J, Q, R, h, i	D, L, T
Noise from transmission in all shift lever positions.	A, p	I, U
Vehicle does not accelerate more than 31 mph (50 km/h).	T1	
Vibration in all shift lever positions.	T2	B
Shift lever does not operate smoothly.	8, 11, 12	F, H
Transmission does not shift into [P] position.	11, 12, r	H, V
Lock-up clutch does not disengage.	6, 7, T4, W, X, Y	E
Lock-up clutch does not operate smoothly.	6, 7, T4, V, W, X, Y	E
Lock-up clutch does not engage.	6, 7, 13, 14, T4, V, W, X	E
A/T gear position indicator does not indicate shift lever positions.	8, 11, 12	F, H



PROBABLE CAUSE			
Electrical		Torque Converter	
1	Low ATF	T1	Torque converter one-way clutch defective
2	Excessive ATF	T2	Drive plate defective or transmission is misassembled
3	Shift control solenoid valve A defective		
4	Shift control solenoid valve B defective	T3	Engine output low
5	Shift control solenoid valve C defective	T4	Lock-up clutch piston defective
6	Lock-up control solenoid valve defective	Mechanical	
7	A/T clutch pressure control solenoid valves A/B defective	a	Mainshaft worn/damaged
		b	Final gears worn/damaged (2 gears)
8	A/T gear position switch defective or out of adjustment	d	1st gears worn/damaged (2 gears)
		e	1st clutch defective
9	2nd clutch pressure switch defective	f	2nd gears worn/damaged (2 gears)
11	Shift cable broken/out of adjustment	g	2nd clutch defective
12	Joint in shift cable and transmission or body worn	h	3rd clutch defective
		i	4th clutch defective
13	Mainshaft speed sensor defective	j	Reverse gears worn/damaged (3 gears)
14	Countershaft speed sensor defective	l	Clutch clearance incorrect
15	Stop switch signal failure	m	Needle bearing seized up or worn/damaged
Hydraulic		n	Thrust washer seized up or worn/damaged
A	ATF pump worn or binding		
B	Regulator valve stuck or spring worn	p	Torque converter housing or transmission housing bearing worn/damaged
C	Shift fork shaft stuck		
D	Modulator valve defective	r	Park mechanism defective
E	CPC valve A defective		
F	CPC valve B defective		
G	Foreign material in separator plate orifice		
H	Shift valve A defective		
I	Shift valve B defective		
J	Shift valve C defective		
K	Shift valve D defective		
L	Shift valve E defective		
M	Servo control valve defective		
N	Reverse CPC valve defective		
O	1st accumulator defective		
P	2nd accumulator defective		
Q	3rd accumulator defective		
R	4th accumulator defective		
U	ATF strainer clogged		
V	Torque converter check valve defective		
W	Lock-up shift valve defective		
X	Lock-up control valve defective		
Y	Lock-up timing valve defective		

(cont'd)

Symptom-to-Component Chart

Hydraulic System (cont'd)

The following symptoms can be caused by improper repair or assembly	Check these items on the PROBABLE CAUSE DUE TO IMPROPER REPAIR List	Items on the NOTES List
Vehicle creeps in [N] position	R1, R2	
Transmission locks up in [R] position	R1	
Excessive drag in transmission	R6	K, R
Excessive vibration, rpm related	R7	
Main seal pops out	R8	S
Various shifting problems	R9, R10	

PROBABLE CAUSE DUE TO IMPROPER REPAIR	
R1	Improper clutch clearance
R2	Improper gear clearance
R6	ATF pump binding
R7	Torque converter not fully seated in ATF pump
R8	Main seal improperly installed
R9	Springs improperly installed
R10	Valves improperly installed

NOTES	
A	See flushing procedure, pages 14-199 and 14-200.
B	Set idle rpm in gear to specified idle speed. If still no good, adjust the engine mounts as outlined in the engine section of service manual.
C	Check ATF level and check ATF cooler lines for leakage and loose connections. If necessary, flush ATF cooler lines.
D	Check the [D₄] indicator light indication, and check for loose connectors. Inspect the O-ring, and the shift control solenoid valve for seizure.
E	Check the [D₄] indicator light indication, and check for loose connectors. Inspect the A/T clutch pressure control solenoid valve body gasket and ATF feed pipes for wear and damage. If the A/T clutch pressure control solenoid valve is stuck, inspect the CPC valves.
F	Check the [D₄] indicator light indication, and check for loose connectors. Inspect the A/T gear position switch. If the A/T gear position switch is faulty, replace it. If the A/T gear position switch is out of adjustment, adjust it and the shift cable.
G	Check the [D₄] indicator light indication, and check for loose connectors. Check that the outlet is not clogged inside of the connector.
H	Check for a loose shift cable on the shift lever and the transmission control shaft.
I	Improper alignment of ATF pump and torque converter housing may cause ATF pump seizure. The symptoms are mostly and rpm-related ticking noise or a high pitched squeak.
J	Measure line pressure.
K	Check for a missing shift fork bolt on the shift fork shaft.
L	If the ATF strainer is clogged with particles of steel or aluminum, inspect the ATF pump. If the ATF pump is OK, and no cause for the contamination is found, replace the torque converter.

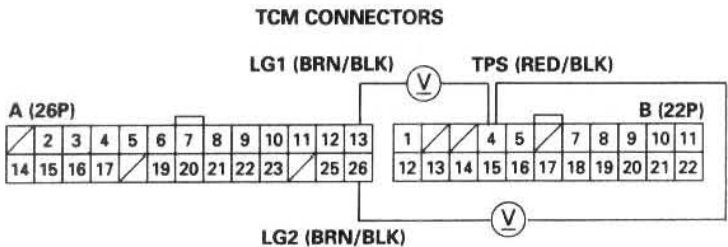
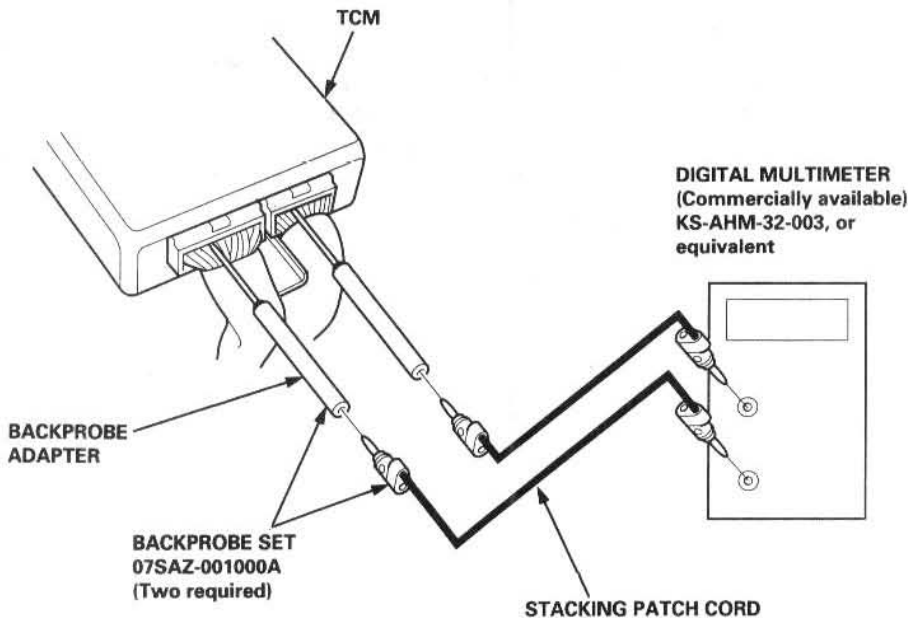


NOTES	
M	If the 4th clutch feed pipe guide in the end cover is scored by the mainshaft, inspect the ball bearing for excessive movement in the transmission housing. If the ball bearing is OK, replace the right side cover as it is dented. The O-ring under the guide is probably worn.
N	Replace the mainshaft if the bushings for the 3rd and 4th clutch feed pipes are loose or damaged. If the 4th clutch feed pipe is damaged or out of round, replace it. If the 3rd clutch feed pipe is damaged or out of round, replace the end cover.
O	Inspect the differential pinion shaft for wear under the pinion gears. If the differential pinion shaft is worn, overhaul the differential assembly, replace the ATF strainer, thoroughly clean the transmission, and flush torque converter, cooler, and lines.
P	Inspect the secondary shaft and 1st/2nd clutch assembly for wear and damage.
Q	Inspect the reverse selector gear teeth chamfers, and inspect engagement teeth chamfers of the countershaft 4th gear and reverse gear. Replace the reverse gears and the reverse selector if they are worn or damaged. If the transmission makes clicking, grinding, or whirring noises, also replace the mainshaft 4th gear, reverse idler gear, and countershaft 4th gear.
R	Be careful not to damage the torque converter housing when replacing the main ball bearing. You may also damage the ATF pump when you torque down the main valve body. This will result in ATF pump seizure if not detected. Use the proper tools.
S	Install the main seal flush with the torque converter housing. If you push it into the torque converter housing until it bottoms out, it will block the fluid return passage and result in damage.
T	Inspect the clutch piston, clutch piston check valve, and O-rings. Check the spring retainer for wear and damage. Inspect the clutch end plate-to-top disc clearance. If the clearance is out of tolerance, inspect the clutch discs and plates for wear and damage. If the discs and plates are worn and damaged, replace them as a set. If they are OK, adjust the clearance with the clutch end plate.
U	Inspect the contact area of the countershaft and secondary shaft with the bearings. Check the ATF guide plates for damage and wear. Inspect the 1st clutch feed pipe for damage and out of round. If the 1st clutch feed pipe is damaged or out of round, replace it. Replace the secondary shaft if the bushing for the 1st clutch feed pipe is damaged or out of round.
V	Check the park pawl spring installation and the park lever spring installation. If installation is incorrect, install the springs correctly. Make sure the park stop is not installed upside down. Check the distance between the park pawl and the park roller pin. If the distance is out of tolerance, adjust it.
W	Check the stop switch voltage between the stop switch and the TCM with the brake pedal depressed. If there is no voltage, repair open in the wire between the stop switch and the TCM, or repair faulty brake switch and light circuit.

Road Test

NOTE: Warm up the engine to normal operating temperature (the radiator fan comes on).

1. Apply the parking brake and block the wheels. Start the engine, then shift to **D₄** position while depressing the brake pedal. Depress the accelerator pedal and release it suddenly. The engine should not stall.
2. Repeat the same test in **D₃** position.
3. Test-drive the vehicle on the flat road in **D₄** position. Check that the shift points occur at the approximate speeds shown. Also check for abnormal noise and clutch slippage.
Throttle position sensor voltage indicates the throttle opening. Monitor it as follows:
 - a. Remove the ECM cover to expose the TCM for road testing; refer to page 14-56.
 - b. Set the digital multimeter to check voltage between B4 (+) terminal and A13 or A26 (-) terminal of the TCM for the throttle position sensor.



Wire side of female terminals



D₄ and D₃ Positions

• Upshift

Throttle Opening	Unit of speed	1st → 2nd	2nd → 3rd	3rd → 4th (D ₄ Position)
Throttle position sensor voltage: 0.772 – 0.828 V	mph	13 – 16	24 – 27	29 – 34
	km/h	22 – 26	38 – 43	47 – 54
Throttle position sensor voltage: 2.175 – 2.325 V	mph	20 – 24	43 – 48	61 – 66
	km/h	32 – 38	69 – 77	97 – 106
Fully-opened throttle	mph	36 – 41	68 – 76	92 – 103
	km/h	58 – 66	109 – 122	147 – 164

• Downshift

Throttle Opening	Unit of speed	4th → 3rd (D ₄ Position)	3rd → 2nd	2nd → 1st
Throttle position sensor voltage: 0.822 – 0.878 V	mph	6 – 9	13 – 16	13 – 16
	km/h	9 – 14	20 – 25	20 – 25
Fully-opened throttle	mph	28 – 33	58 – 65	86 – 96
	km/h	44 – 52	93 – 104	137 – 153

• Lock-up

Throttle Opening	Unit of speed	D ₃ D ₄ Position and Sequential Sportshift Mode in 4th gear		Sequential Sportshift Mode in 2nd and 3rd gears	
		Lock-up ON	Lock-up OFF	Lock-up ON	Lock-up OFF
Throttle position sensor voltage: 0.675 – 0.725 V	mph	19 – 23	18 – 21	41 – 46	24 – 29
	km/h	31 – 36	29 – 34	65 – 73	38 – 46
Throttle position sensor voltage: 2.175 – 2.325 V	mph	73 – 79	62 – 68	108 – 113	104 – 110
	km/h	117 – 126	99 – 108	172 – 181	167 – 176
Fully-opened throttle	mph	93 – 104	87 – 97	108 – 118	104 – 114
	km/h	149 – 166	139 – 155	172 – 189	167 – 183

NOTE:

- Lock-up ON: Lock-up control solenoid valve turns on.
- Lock-up OFF: Lock-up control solenoid valve turns off.

(cont'd)

Road Test

(cont'd)

4. Accelerate to about 35 mph (57 km/h) so the transmission is in 4th, then shift from **D₄** position to **2** position. The vehicle should immediately begin slowing down from engine braking.

CAUTION: Do not shift from **D₄ or **D₃** position to **2** or **1** position at speeds over 63 mph (100 km/h); you may damage the transmission.**

5. Check for abnormal noise and clutch slippage in the following positions.

1 (1st Gear) Position

- a. Accelerate from a stop at full throttle. Check that there is no abnormal noise or clutch slippage.
- b. Upshifts should not occur with the shift lever in this position.

2 (2nd Gear) Position

- a. Accelerate from a stop at full throttle. Check that there is no abnormal noise or clutch slippage.
- b. Upshifts and downshifts should not occur with the shift lever in this position.

R (Reverse) Position

Accelerate from a stop at full throttle, and check for abnormal noise and clutch slippage.

6. Test in **P** (Park) Position

Park the vehicle on slope (approx. 16°), apply the parking brake, and shift into **P** position. Release the brake; the vehicle should not move.



Stall Speed

Test

CAUTION:

- To prevent transmission damage, do not test stall speed for more than 10 seconds at a time.
- Do not move the shift lever while raising engine speed.
- Be sure to remove the pressure gauge before testing stall speed.

1. Engage the parking brake, and block the front wheels.
2. Connect a tachometer to the engine, and start the engine.
3. Make sure the A/C switch is OFF.
4. After the engine has warmed up to normal operating temperature (the radiator fan comes on), shift into **[2]** position.
5. Fully depress the brake pedal and the accelerator for 6 to 8 seconds, and note engine speed.
6. Allow two minutes for cooling, then repeat the test in **[D₄]**, **[1]**, and **[R]** positions.

NOTE:

- Stall speed tests should be used for diagnostic purposes only.
- Stall speed should be the same in **[D₄]**, **[2]**, **[1]**, and **[R]** positions.

Stall Speed rpm:

Specification: 2,500 rpm

Service Limit: 2,350 – 2,650 rpm

TROUBLE	PROBABLE CAUSE
Stall rpm high in [D₄] , [2] , [1] and [R] positions	<ul style="list-style-type: none">• Low fluid level or ATF pump output• Clogged ATF strainer• Pressure regulator valve stuck closed• Slipping clutch
Stall rpm high in [1] position	Slippage of 1st clutch
Stall rpm high in [2] position	Slippage of 2nd clutch
Stall rpm high in [D₄] position	Slippage of 1st clutch
Stall rpm high in [R] position	Slippage of 4th clutch
Stall rpm low in [D₄] , [2] , [1] , and [R] positions	<ul style="list-style-type: none">• Engine output low• Torque converter one-way clutch slipping

Fluid Level

Checking/Changing

Checking

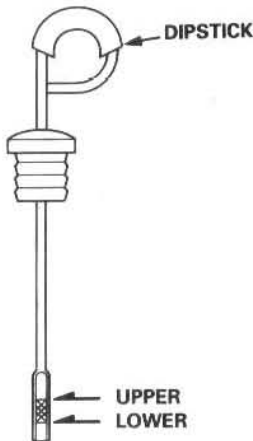
NOTE: Check the fluid level with the engine at normal operating temperature (the radiator fan comes on).

1. Park the vehicle on level ground. Turn off the engine.
2. Remove the dipstick (yellow loop) from the transmission, and wipe it with a clean cloth.
3. Insert the dipstick into the transmission.

DIPSTICK (YELLOW LOOP)



4. Remove the dipstick and check the fluid level. It should be between the upper and lower marks.

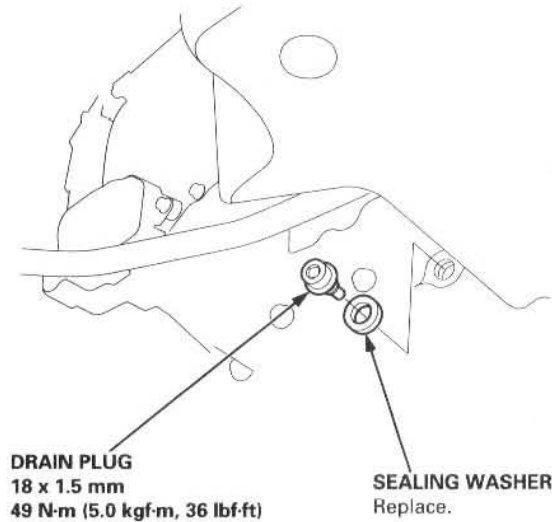


5. If the level is below the lower mark, pour the recommended fluid into the filler hole to bring it to the upper mark. Always use Genuine Honda Premium Formula Automatic Transmission Fluid (ATF). Using a non-Honda ATF can affect shift quality.
6. Insert the dipstick back into the transmission.

Changing

1. Bring the transmission up to normal operating temperature (the radiator fan comes on) by driving the vehicle. Park the vehicle on level ground, turn the engine off, and then remove the drain plug.

NOTE: If a cooler flusher is to be used, see pages 14-199 and 14-200.



2. Reinstall the drain plug with a new sealing washer, then refill the transmission with the recommended fluid to the upper mark on the dipstick.

Automatic Transmission Fluid Capacity:

2.5 l (2.6 US qt, 2.2 Imp qt) at changing

6.1 l (6.4 US qt, 5.4 Imp qt) at overhaul

Recommended Automatic Transmission Fluid:

Genuine Honda Premium Formula Automatic Transmission Fluid

NOTE: Always use Genuine Honda Premium Formula Automatic Transmission Fluid (ATF). Using a non-Honda ATF can affect shift quality.



⚠ WARNING

- While testing, be careful of the rotating front wheels.
- Make sure lifts, jacks, and safety stands are placed properly (see section 1).

CAUTION:

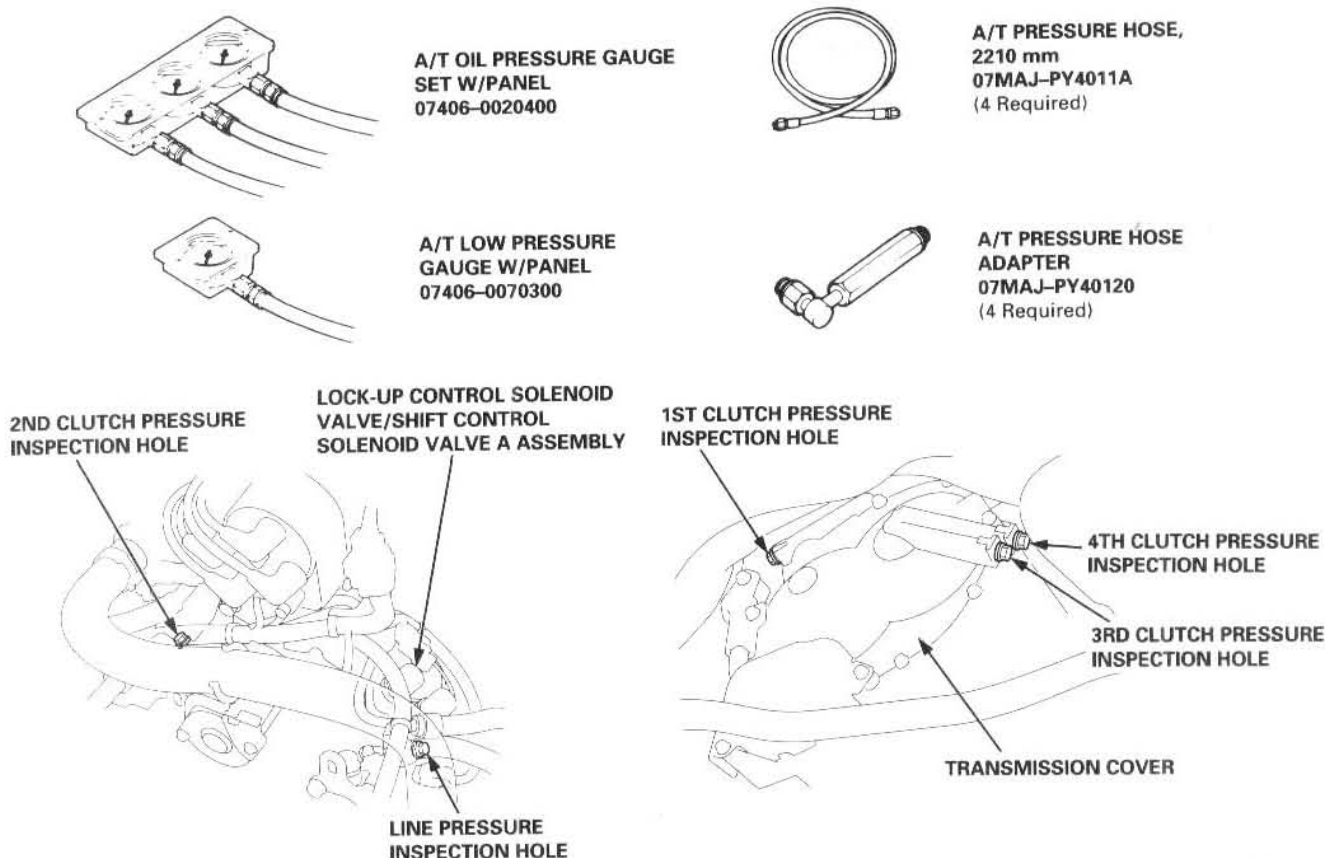
- Before testing, be sure the transmission is filled to the proper level.
- Warm up the engine before testing.

1. Raise the front of the vehicle, and support it with safety stands.
2. Set the parking brake, and block rear wheels securely.
3. Allow the front wheels to rotate freely.
4. Warm up the engine (the radiator fan comes on), then turn off the engine and connect a tachometer.
5. Connect the special tool to the line pressure and clutch pressure inspection holes.

TORQUE: 18 N-m (1.8 kgf-m, 13 lbf-ft)

NOTE: Remove the harness clamps from the harness clamp brackets to expose the 2nd clutch pressure inspection hole when connecting the oil pressure gauge to the 2nd clutch pressure inspection hole.

CAUTION: Connect the oil pressure gauge set securely, be sure not to allow dust or other foreign particles to enter the inspection holes.



(cont'd)

Pressure Testing

(cont'd)

- 6. Start the engine, and run it at 2,000 rpm.
- 7. Shift to **N** or **P** position, and measure line pressure.

NOTE: Higher pressure may be indicated if measurements are made in shift lever positions other than **N** or **P** position.

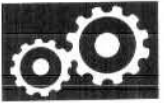
- 8. Shift to the respective shift lever position, and measure clutch pressure as shown.

PRESSURE	SHIFT LEVER POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE	
				Standard	Service Limit
Line	N or P	No (or low) line pressure	Torque converter, ATF pump, pressure regulator, torque converter check valve	850 – 910 kPa (8.7 – 9.3 kgf/cm ² , 120 – 130 psi)	800 kPa (8.2 kgf/cm ² , 120 psi)
1st clutch	1	No or low 1st pressure	1st clutch	840 – 920 kPa (8.6 – 9.4 kgf/cm ² , 120 – 130 psi)	790 kPa (8.1 kgf/cm ² , 120 psi)
2nd clutch	2	No or low 2nd pressure	2nd clutch		
3rd clutch	D₃	No or low 3rd pressure	3rd clutch		
4th clutch	D₄	No or low 4th pressure	4th clutch		
	R	No or low reverse pressure	Servo valve or 4th clutch		

- 9. Install the sealing bolts with new sealing washers, and tighten the bolts to the specified torque.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)

NOTE: Do not reuse old sealing washers.



Transmission

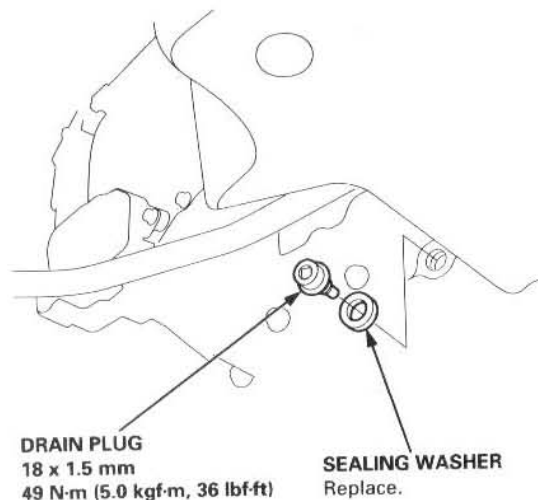
Removal

⚠ WARNING

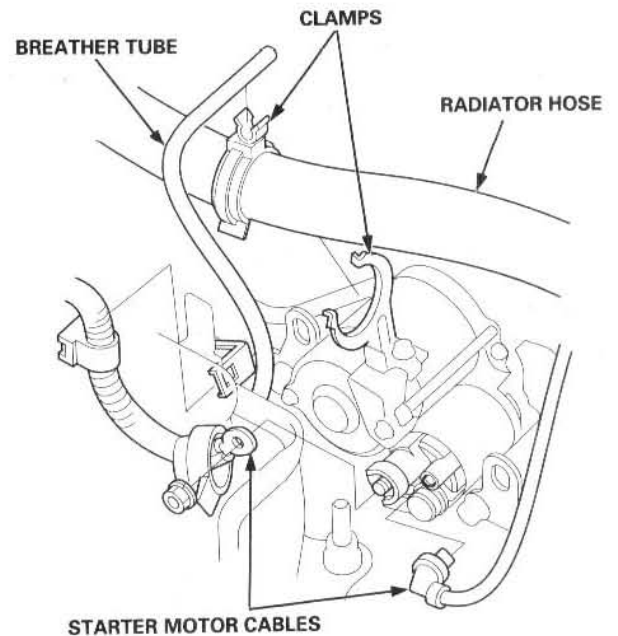
- Make sure lifts, jacks, and safety stands are placed properly, and hoist brackets are attached to correct positions on the engine and the transmission (see section 1).
- Apply the parking brake, and block the rear wheels so the vehicle will not roll off the stands and fall on you while working under it.

CAUTION: Use fender covers on painted surfaces.

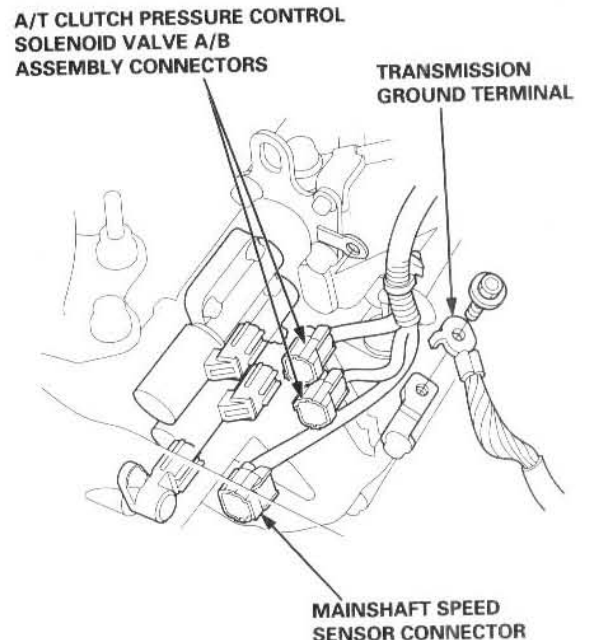
1. Before disconnecting power, make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.
2. Disconnect the battery negative (-) terminal from the battery, then disconnect the positive (+) terminal.
3. Remove the battery hold-down bracket, then remove the battery and battery tray.
4. Remove the intake air duct and air cleaner housing assembly.
5. Remove the battery cable bracket from the battery base, and remove the ground terminal from the body.
6. Remove the battery base and battery base bracket.
7. Remove the drain plug, and drain the automatic transmission fluid (ATF). Reinstall the drain plug with a new sealing washer.



8. Remove the starter motor cables, and remove the breather tube and radiator hose from the clamps.



9. Remove the transmission ground terminal, and disconnect the A/T clutch pressure control solenoid valve A and B connectors and the mainshaft speed sensor connector.



(cont'd)

Transmission

Removal (cont'd)

10. Disconnect the lock-up control solenoid valve/shift control solenoid valve A assembly connector.

11. Remove the ATF cooler hoses from the ATF cooler lines. Turn the ends of the ATF cooler hoses up to prevent ATF from flowing out, then plug the ATF cooler hoses and lines.

NOTE: Check for any sign of leakage at the hose joints.

12. Disconnect the shift control solenoid valve B and C connectors.

LOCK-UP CONTROL SOLENOID VALVE/SHIFT CONTROL SOLENOID VALVE A ASSEMBLY CONNECTOR

ATF COOLER LINES

ATF COOLER HOSES

SHIFT CONTROL SOLENOID VALVE B CONNECTOR

SHIFT CONTROL SOLENOID VALVE C CONNECTOR

13. Disconnect the vehicle speed sensor connector and the 2nd clutch pressure switch connector.

CAUTION: Be sure not to allow water, fluid, oil, dust, or other foreign particles to enter the connectors.

VEHICLE SPEED SENSOR

2ND CLUTCH PRESSURE SWITCH CONNECTOR

2ND CLUTCH PRESSURE SWITCH

14. Disconnect the countershaft speed sensor connector.

15. Remove the A/T gear position switch connector from the connector bracket, then disconnect the connector.

A/T GEAR POSITION SWITCH CONNECTOR

COUNTERSHAFT SPEED SENSOR CONNECTOR

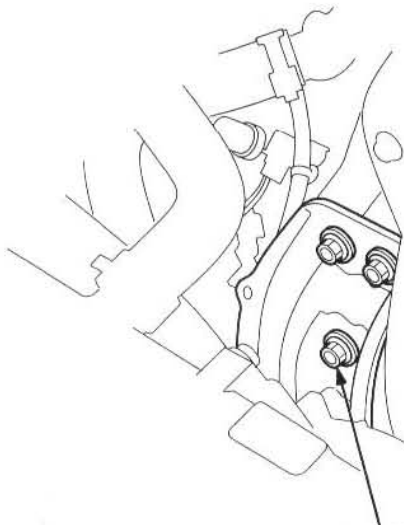
CONNECTOR BRACKET

16. Remove the transmission housing mounting bolts.

TRANSMISSION HOUSING MOUNTING BOLTS
12 x 1.25 mm

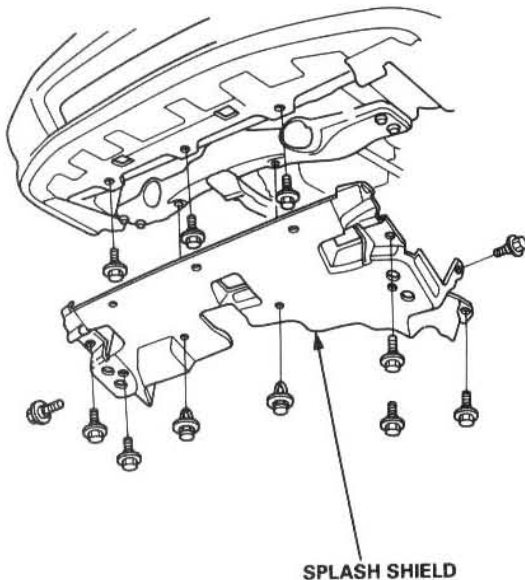


17. Loosen the front engine mount bracket bolts.



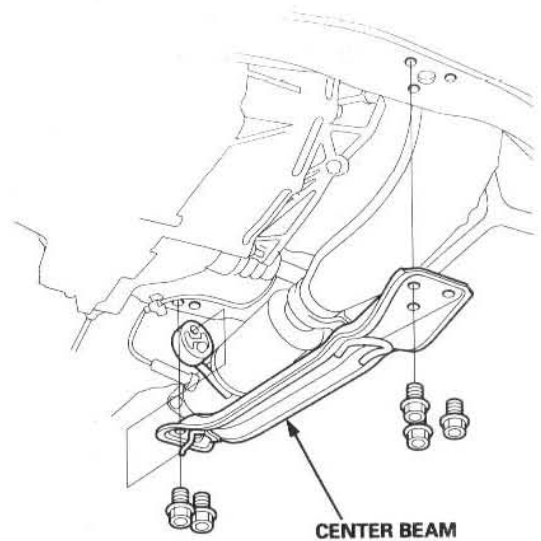
**FRONT ENGINE MOUNT
BRACKET BOLTS**

18. Remove the splash shield.



SPLASH SHIELD

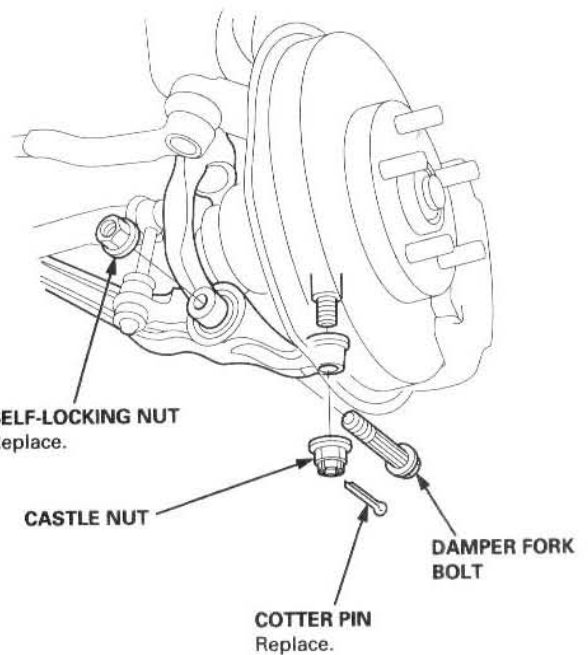
19. Remove the center beam.



CENTER BEAM

20. Remove the cotter pins and castle nuts, then separate the ball joints from the lower arms using the special tool (see section 18).

21. Remove the damper fork bolts, then separate the damper forks and lower arms.



SELF-LOCKING NUT
Replace.

CASTLE NUT

COTTER PIN
Replace.

**DAMPER FORK
BOLT**

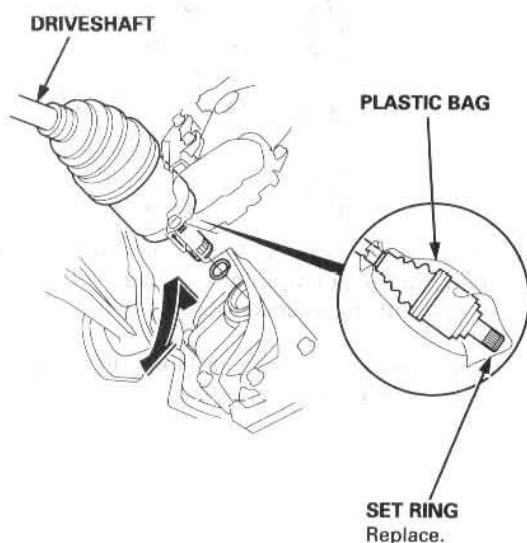
(cont'd)

Transmission

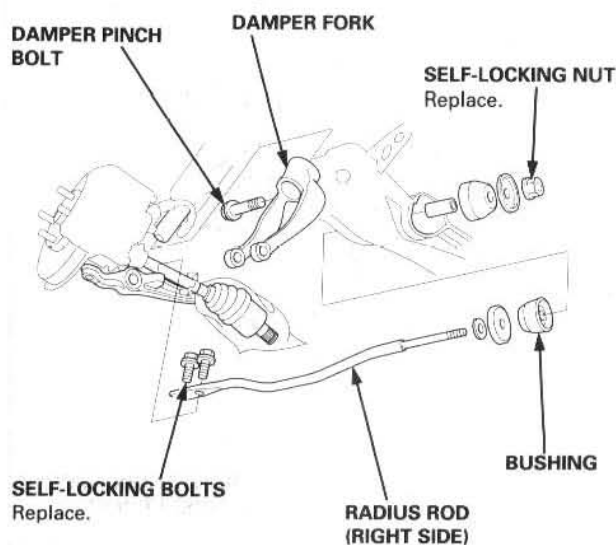
Removal (cont'd)

22. Pry the right driveshaft out of the differential and the left driveshaft out of the intermediate shaft.
23. Pull on the inboard joint to remove the right driveshaft from the differential and to remove the left driveshaft from the intermediate shaft (see section 16).
24. Tie plastic bags over the driveshaft ends.

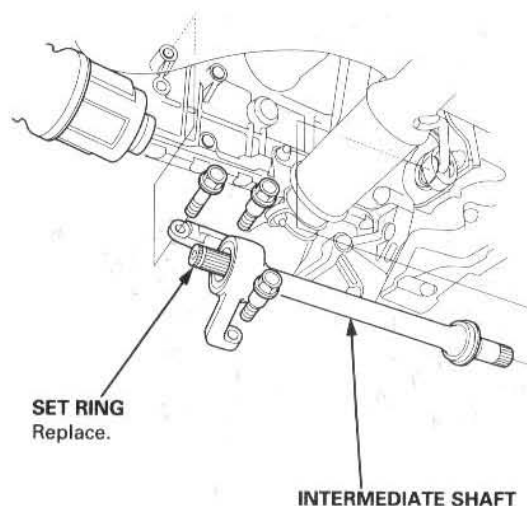
NOTE: Coat all precision finished surfaces with clean engine oil.



25. Remove the right damper pinch bolt, then separate the damper fork and damper.
26. Remove the self-locking bolt and self-locking nut, then remove the right radius rod.



27. Remove the intermediate shaft.





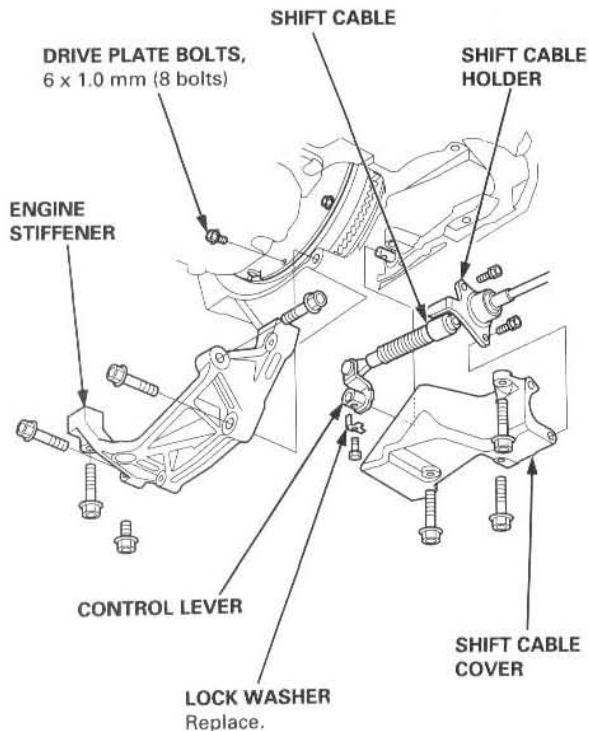
28. Remove the bolts securing the shift cable holder, then remove the shift cable cover.

NOTE: To prevent damage to the control lever joint, be sure to remove the bolts securing the shift cable holder before removing the bolts securing the shift cable cover.

29. Remove the lock bolt securing the control lever, then remove the shift cable with control lever.

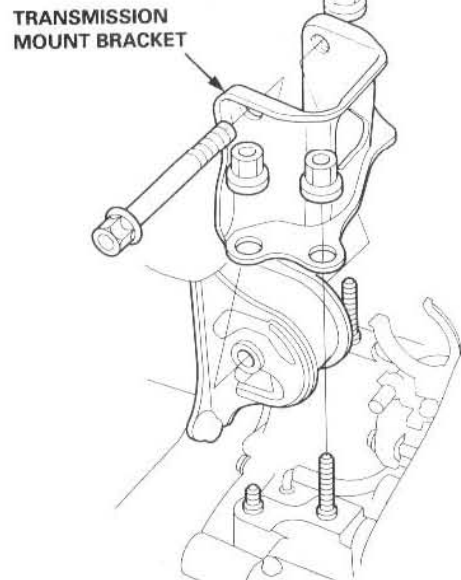
NOTE: Take care not to bend the shift cable excessively while removing it.

30. Remove the engine stiffener, then remove the eight drive plate bolts, one at a time, while rotating the crankshaft pulley.



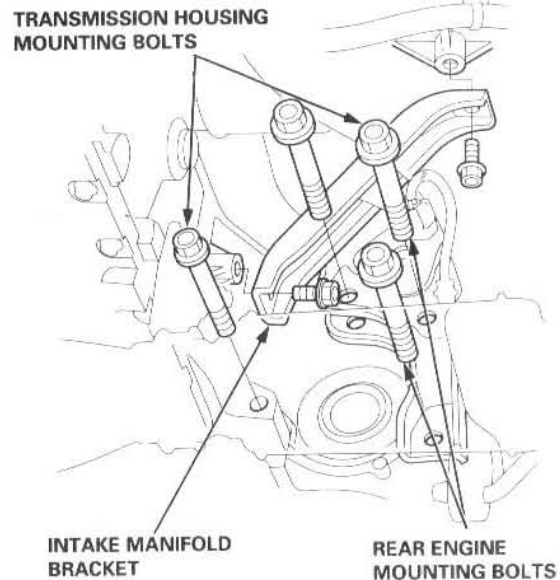
31. Place a jack under the transmission, and raise the transmission just enough to take it off of the mount.

32. Remove the transmission mount bracket.



33. Remove the intake manifold bracket.

34. Remove the transmission housing mounting bolts and rear engine mount bolts.



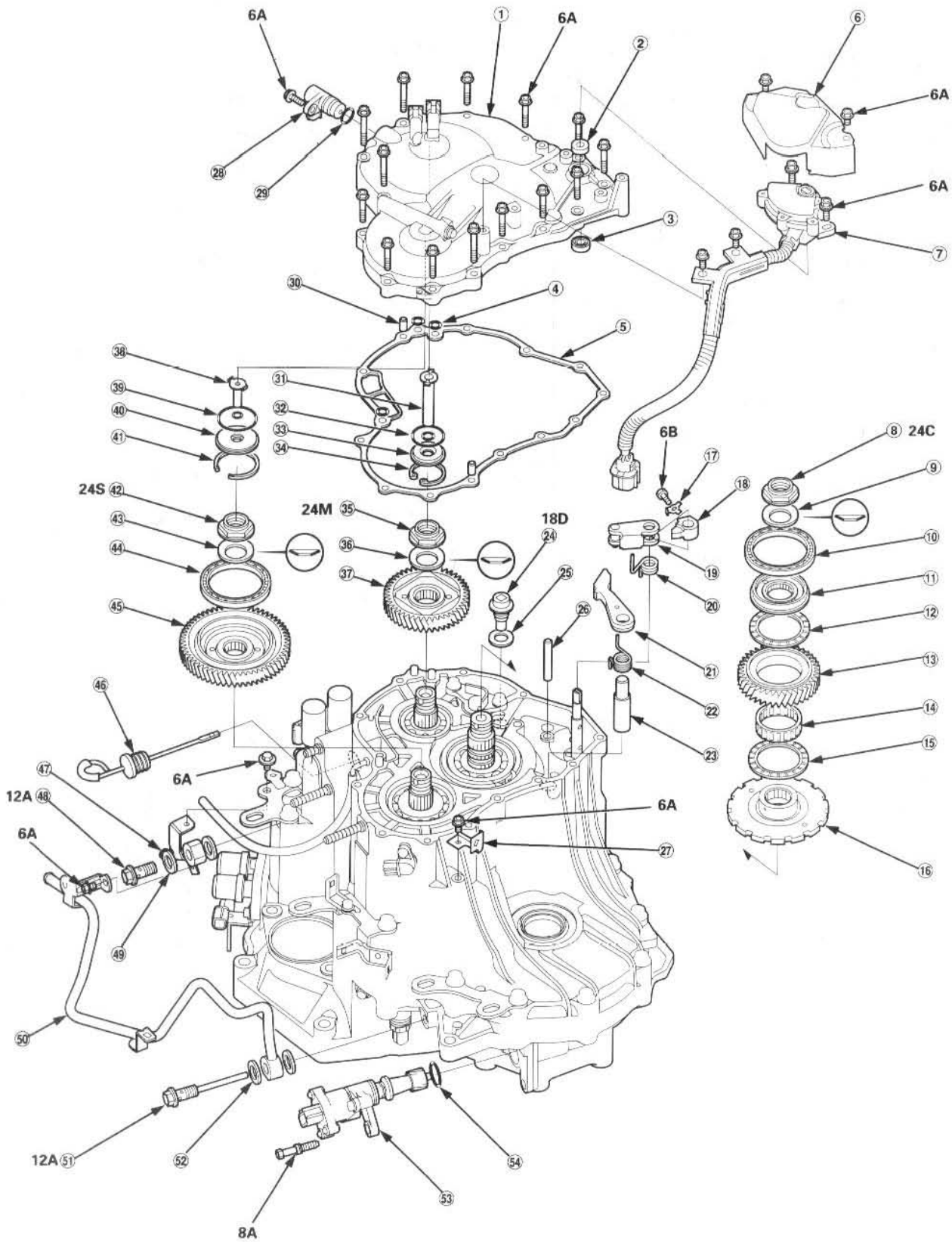
35. Pull the transmission away from the engine until it clears the 14 mm dowel pins, then lower it on the transmission jack.

36. Remove the torque converter assembly from the torque converter housing.

37. Remove the starter motor from the transmission housing.

Illustrated Index

End Cover





- ① END COVER
- ② OIL SEAL Replace.
- ③ BALL BEARING
- ④ O-RINGS Replace.
- ⑤ END COVER GASKET Replace.
- ⑥ A/T GEAR POSITION SWITCH COVER
- ⑦ A/T GEAR POSITION SWITCH
- ⑧ COUNTERSHAFT LOCKNUT 24 x 1.25 mm
(Flange nut) Replace.
- ⑨ CONICAL SPRING WASHER Replace.
- ⑩ BALL BEARING
- ⑪ BEARING HUB Selective part
- ⑫ THRUST NEEDLE BEARING
- ⑬ COUNTERSHAFT IDLER GEAR
- ⑭ NEEDLE BEARING
- ⑮ THRUST NEEDLE BEARING
- ⑯ PARK GEAR
- ⑰ LOCK WASHER Replace.
- ⑱ PARK STOP Selective part
- ⑲ PARK LEVER
- ⑳ PARK LEVER SPRING
- ㉑ PARK PAWL
- ㉒ PARK PAWL SPRING
- ㉓ PARK PAWL SHAFT
- ㉔ DRAIN PLUG
- ㉕ SEALING WASHER Replace.
- ㉖ PARK PAWL STOP
- ㉗ HARNESS CLAMP
- ㉘ MAINSHAFT SPEED SENSOR
- ㉙ O-RING Replace.
- ㉚ DOWEL PIN

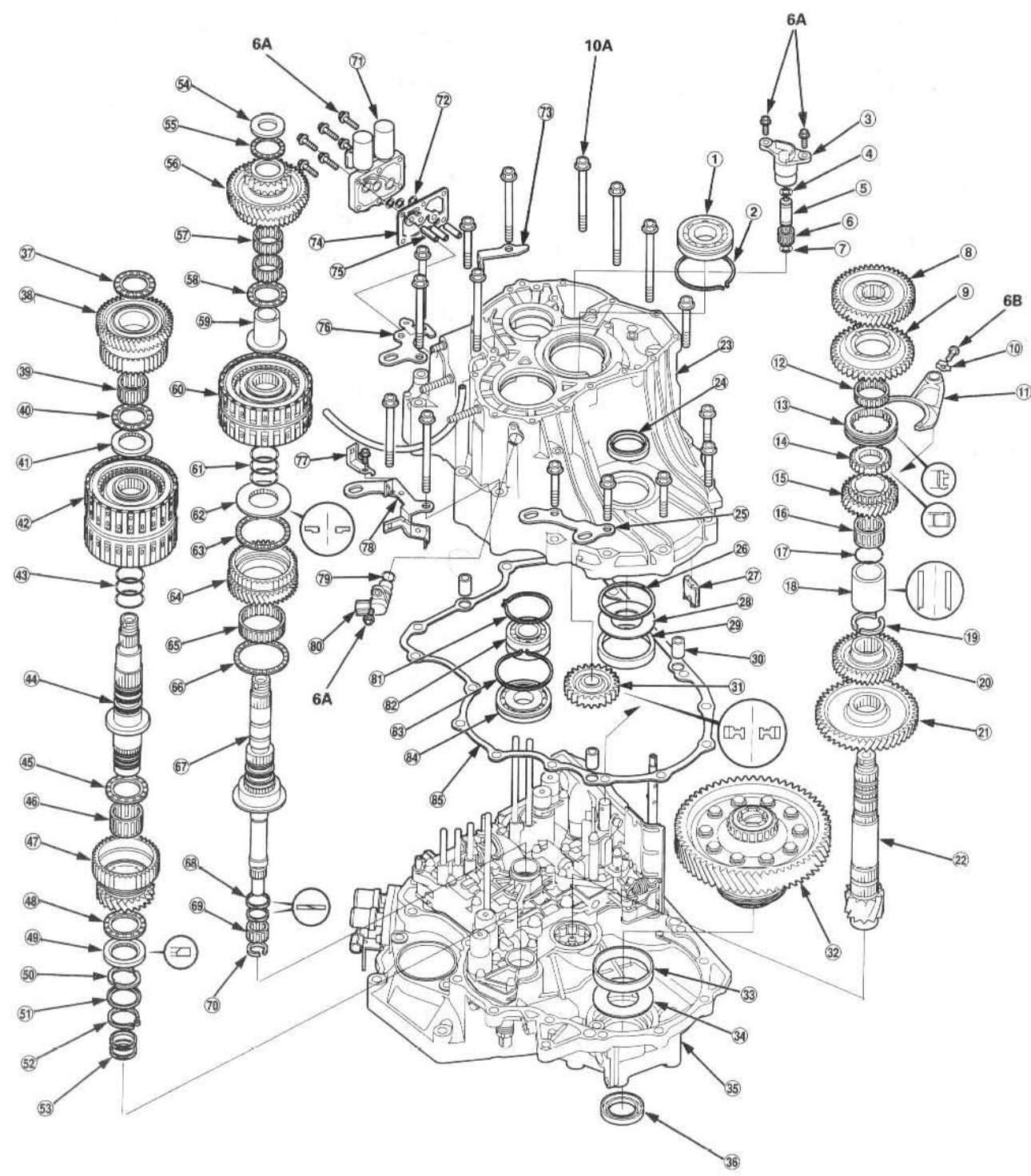
- ㉛ 4TH CLUTCH FEED PIPE
- ㉜ O-RINGS Replace.
- ㉝ FEED PIPE GUIDE
- ㉞ SNAP RING
- ㉟ MAINSHAFT LOCKNUT 24 x 1.25 mm Left-hand threads
(Flange nut) Replace.
- ㊱ CONICAL SPRING WASHER Replace.
- ㊲ MAINSHAFT IDLER GEAR
- ㊳ 1ST CLUTCH FEED PIPE
- ㊴ O-RINGS Replace.
- ㊵ FEED PIPE GUIDE
- ㊶ SNAP RING
- ㊷ SECONDARY SHAFT LOCKNUT 24 x 1.25 mm
(Flange nut) Replace.
- ㊸ CONICAL SPRING WASHER Replace.
- ㊹ BALL BEARING
- ㊺ SECONDARY SHAFT IDLER GEAR
- ㊻ ATF DIPSTICK
- ㊼ ATF COOLER PIPE (OUTLET)
- ㊽ LINE BOLT
- ㊾ SEALING WASHERS Replace.
- ㊿ ATF COOLER PIPE (INLET)
- ① LINE BOLT
- ② SEALING WASHERS Replace.
- ③ VEHICLE SPEED SENSOR
- ④ O-RING Replace.

TORQUE SPECIFICATIONS

Ref. No.	Torque Value	Bolt Size	Remarks
6A	12 N·m (1.2 kgf·m, 8.7 lbf·ft)	6 x 1.0 mm	
6B	14 N·m (1.4 kgf·m, 10 lbf·ft)	6 x 1.0 mm	
8A	18 N·m (1.8 kgf·m, 13 lbf·ft)	8 x 1.25 mm	
12A	28 N·m (2.9 kgf·m, 21 lbf·ft)	12 x 1.25 mm	Line bolt
18D	49 N·m (5.0 kgf·m, 36 lbf·ft)	18 x 1.5 mm	Drain plug
24M	226 N·m (23.0 kgf·m, 166 lbf·ft) → 0 → 167 N·m (17.0 kgf·m, 123 lbf·ft)	24 x 1.25 mm	Mainshaft locknut Left-hand threads
24C	226 N·m (23.0 kgf·m, 166 lbf·ft) → 0 → 167 N·m (17.0 kgf·m, 123 lbf·ft)	24 x 1.25 mm	Countershaft locknut
24S	226 N·m (23.0 kgf·m, 166 lbf·ft) → 0 → 167 N·m (17.0 kgf·m, 123 lbf·ft)	24 x 1.25 mm	Secondary shaft locknut

Illustrated Index

Transmission Housing





- ① COUNTERSHAFT TRANSMISSION HOUSING BEARING
- ② SNAP RING
- ③ REVERSE IDLER GEAR SHAFT HOLDER
- ④ O-RING Replace.
- ⑤ REVERSE IDLER GEAR SHAFT
- ⑥ NEEDLE BEARING
- ⑦ O-RING Replace.
- ⑧ COUNTERSHAFT 2ND GEAR
- ⑨ COUNTERSHAFT REVERSE GEAR
- ⑩ LOCK WASHER Replace.
- ⑪ REVERSE SHIFT FORK
- ⑫ NEEDLE BEARING
- ⑬ REVERSE SELECTOR
- ⑭ REVERSE SELECTOR HUB
- ⑮ COUNTERSHAFT 4TH GEAR
- ⑯ NEEDLE BEARING
- ⑰ SNAP RING
- ⑱ DISTANCE COLLAR
- ⑲ COTTERS, 31 mm
- ⑳ COUNTERSHAFT 3RD GEAR
- ㉑ COUNTERSHAFT 1ST GEAR
- ㉒ COUNTERSHAFT
- ㉓ TRANSMISSION HOUSING
- ㉔ OIL SEAL Replace.
- ㉕ TRANSMISSION HANGER
- ㉖ THRUST SHIM, 76 mm Selective part
- ㉗ TRANSMISSION MAGNET
- ㉘ SPACER, 76.2 mm ('98 - '99 models)
- ㉙ TAPERED ROLLER BEARING OUTER RACE
- ㉚ DOWEL PIN
- ㉛ REVERSE IDLER GEAR
- ㉜ DIFFERENTIAL ASSEMBLY
- ㉝ TAPERED ROLLER BEARING OUTER RACE
- ㉞ SPACER, 80 mm ('98 - '99 models)
- ㉟ TORQUE CONVERTER HOUSING
- ㊱ OIL SEAL Replace.
- ㊲ THRUST NEEDLE BEARING
- ㊳ SECONDARY SHAFT 2ND GEAR
- ㊴ NEEDLE BEARING
- ㊵ THRUST NEEDLE BEARING
- ㊶ THRUST SHIM, 37 x 55 mm Selective part
- ㊷ 1ST/2ND CLUTCH ASSEMBLY
- ㊸ O-RINGS Replace.
- ㊹ SECONDARY SHAFT
- ㊺ THRUST NEEDLE BEARING

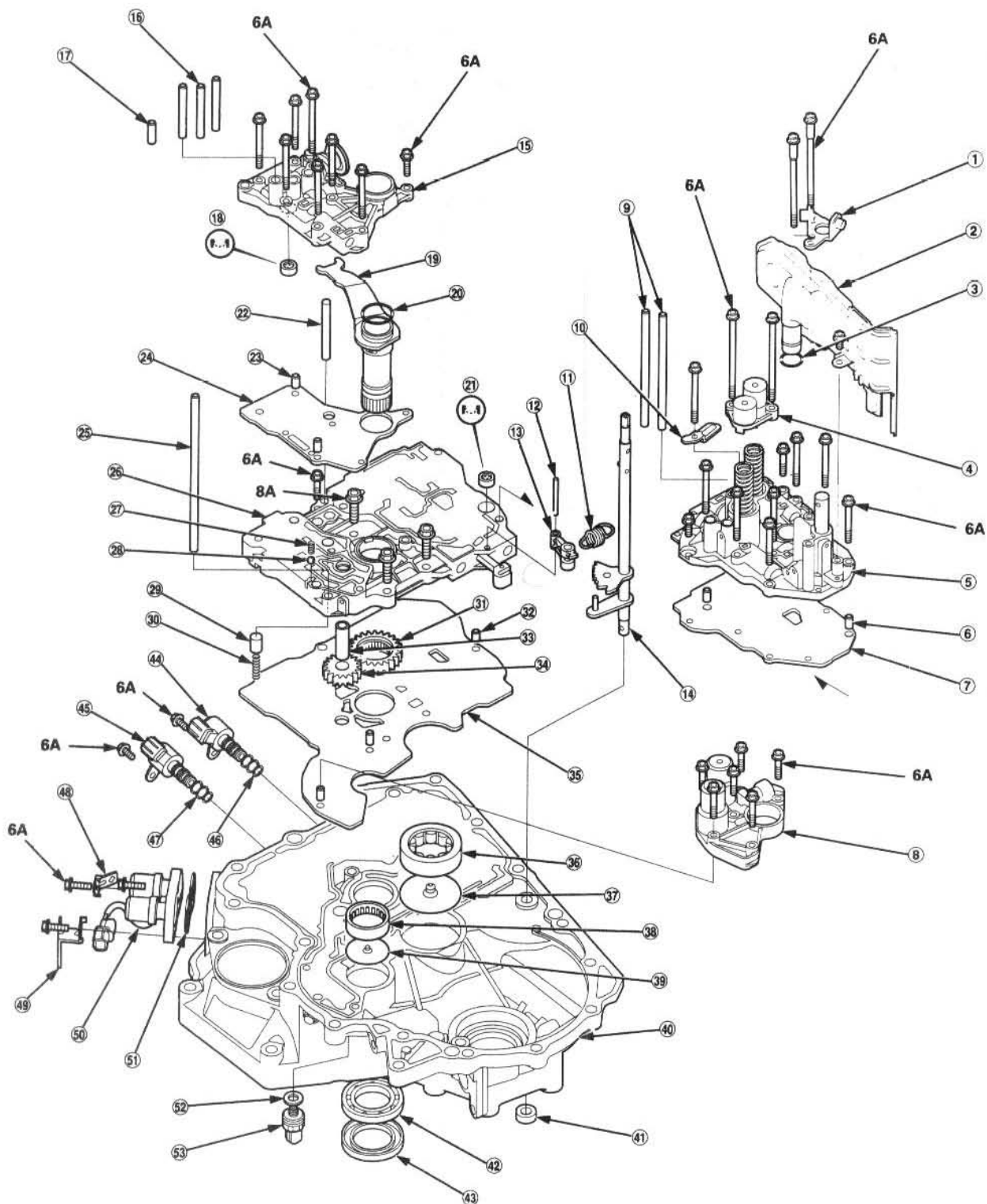
- ㊻ NEEDLE BEARING
- ㊼ SECONDARY SHAFT 1ST GEAR
- ㊽ THRUST NEEDLE BEARING
- ㊾ SPLINED WASHER, 38 x 56.5 mm Selective part
- ㊿ COTTERS, 32 mm
- 1 COTTER RETAINER
- 2 SNAP RING
- 3 SEALING RINGS
- 4 THRUST WASHER, 27 x 47 x 5 mm
- 5 THRUST NEEDLE BEARING
- 6 MAINSHAFT 4TH GEAR
- 7 NEEDLE BEARINGS
- 8 THRUST NEEDLE BEARING
- 9 4TH GEAR COLLAR
- 10 3RD/4TH CLUTCH ASSEMBLY
- 11 O-RINGS Replace.
- 12 THRUST SHIM, 41 x 72 mm Selective part
- 13 THRUST NEEDLE BEARING
- 14 MAINSHAFT 3RD GEAR
- 15 NEEDLE BEARING
- 16 THRUST NEEDLE BEARING
- 17 MAINSHAFT
- 18 SEALING RINGS
- 19 NEEDLE BEARING
- 20 SET RING
- 21 A/T CLUTCH PRESSURE CONTROL SOLENOID VALVE A/B ASSEMBLY
- 22 O-RINGS Replace.
- 23 TRANSMISSION GROUND TERMINAL BRACKET
- 24 A/T CLUTCH PRESSURE CONTROL SOLENOID VALVE GASKET Replace.
- 25 ATF FEED PIPES
- 26 TRANSMISSION HANGER
- 27 CONNECTOR BRACKET
- 28 TRANSMISSION HANGER/CONNECTOR BRACKET
- 29 O-RING Replace.
- 30 COUNTERSHAFT SPEED SENSOR
- 31 SNAP RING
- 32 MAINSHAFT TRANSMISSION HOUSING BEARING
- 33 SNAP RING
- 34 SECONDARY SHAFT TRANSMISSION HOUSING BEARING
- 35 TRANSMISSION HOUSING GASKET Replace.

TORQUE SPECIFICATIONS

Ref. No.	Torque Value	Bolt Size	Remarks
6A	12 N·m (1.2 kgf-m, 8.7 lbf-ft)	6 x 1.0 mm	
6B	14 N·m (1.4 kgf-m, 10 lbf-ft)	6 x 1.0 mm	
10A	44 N·m (4.5 kgf-m, 33 lbf-ft)	10 x 1.25 mm	

Illustrated Index

Torque Converter Housing/Valve Body





- ① SERVO DETENT BASE
- ② ATF STRAINER
- ③ O-RING Replace.
- ④ ACCUMULATOR COVER
- ⑤ SERVO BODY
- ⑥ DOWEL PINS
- ⑦ SERVO SEPARATOR PLATE
- ⑧ ACCUMULATOR BODY
- ⑨ ATF FEED PIPES
- ⑩ VALVE CAP CLIP COVER ('97 model)
- ⑪ DETENT ARM SPRING
- ⑫ DETENT ARM SHAFT
- ⑬ DETENT ARM
- ⑭ CONTROL SHAFT
- ⑮ REGULATOR VALVE BODY
- ⑯ ATF FEED PIPES, 8 x 71 mm
- ⑰ ATF FEED PIPE, 8 x 27 mm
- ⑱ FILTER Replace.
- ⑲ STATOR SHAFT
- ⑳ O-RING Replace.
- ㉑ FILTER Replace.
- ㉒ STATOR SHAFT STOP
- ㉓ DOWEL PINS
- ㉔ REGULATOR SEPARATOR PLATE
- ㉕ ATF FEED PIPE
- ㉖ MAIN VALVE BODY
- ㉗ COOLER CHECK VALVE SPRING
- ㉘ COOLER CHECK VALVE (Steel ball)
- ㉙ TORQUE CONVERTER CHECK VALVE
- ㉚ TORQUE CONVERTER CHECK VALVE SPRING
- ㉛ ATF PUMP DRIVE GEAR

- ㉜ DOWEL PINS
- ㉝ ATF PUMP DRIVEN GEAR SHAFT
- ㉞ ATF PUMP DRIVEN GEAR
- ㉟ MAIN SEPARATOR PLATE
- ㊱ COUNTERSHAFT TORQUE CONVERTER HOUSING BEARING
- ㊲ ATF GUIDE PLATE
- ㊳ SECONDARY SHAFT TORQUE CONVERTER HOUSING BEARING
- ㊴ ATF GUIDE PLATE
- ㊵ TORQUE CONVERTER HOUSING
- ㊶ OIL SEAL Replace.
- ㊷ MAINSHAFT TORQUE CONVERTER HOUSING BEARING
- ㊸ MAINSHAFT OIL SEAL Replace.
- ㊹ SHIFT CONTROL SOLENOID VALVE C
- ㊺ SHIFT CONTROL SOLENOID VALVE B
- ㊻ O-RINGS Replace.
- ㊼ O-RINGS Replace.
- ㊽ HARNESS CLAMP BRACKET
- ㊾ CONNECTOR BRACKET
- ㊿ LOCK-UP CONTROL SOLENOID VALVE/SHIFT CONTROL SOLENOID VALVE A ASSEMBLY
- ① LOCK-UP CONTROL SOLENOID VALVE/SHIFT CONTROL SOLENOID VALVE A FILTER/GASKET Replace.
- ② SEALING WASHER Replace.
- ③ 2ND CLUTCH PRESSURE SWITCH

TORQUE SPECIFICATIONS

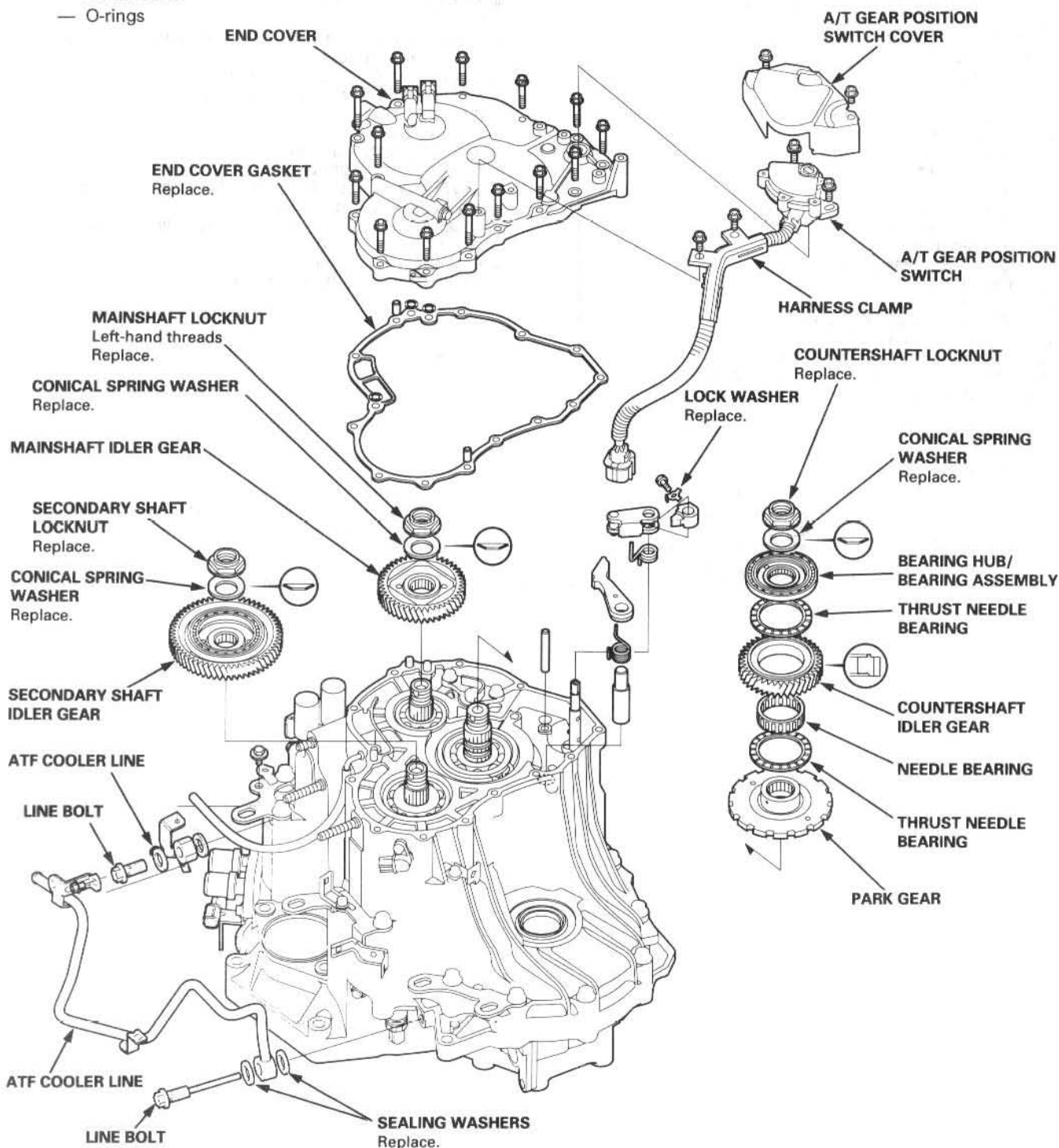
Ref. No.	Torque Value	Bolt Size	Remarks
6A	12 N·m (1.2 kgf·m, 8.7 lbf·ft)	6 x 1.0 mm	
8A	18 N·m (1.8 kgf·m, 13 lbf·ft)	8 x 1.25 mm	

End Cover

Removal

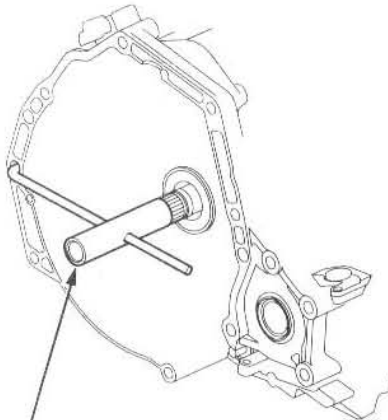
NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- When removing the transmission end cover, replace the following:
 - End cover gasket
 - Each shaft locknut and conical spring washer
 - Sealing washer
 - Lock washer
 - O-rings





1. Remove the A/T gear position switch cover.
2. Remove the bolts securing the harness clamp (two bolts), then remove the A/T gear position switch.
3. Remove the bolts securing the end cover (fourteen bolts), then remove the cover.
4. Slip the special tool onto the mainshaft as shown.



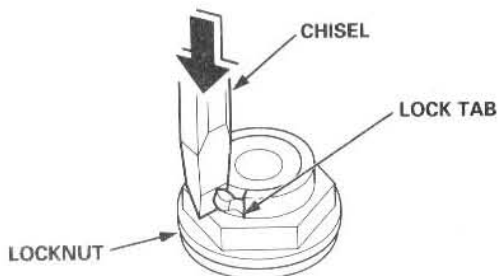
MAINSHAFT HOLDER
07GAB – PF50101 or
07GAB – PF50100

5. Engage the park pawl with the park gear.
6. Cut the lock tabs of each shaft locknut using a chisel as shown. Then remove the locknuts and conical spring washers from each shaft.

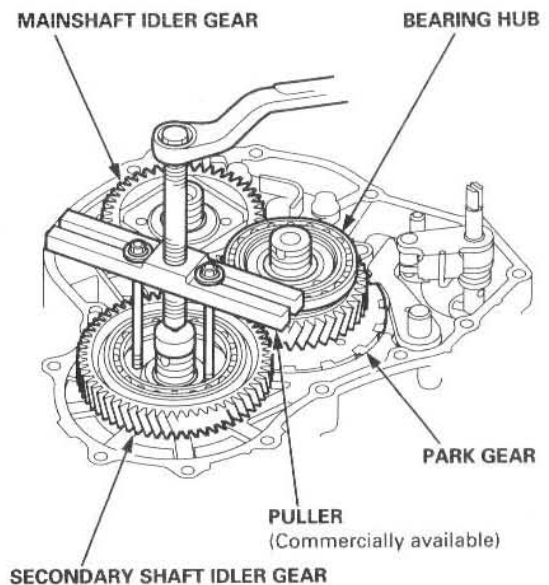
NOTE:

- Mainshaft locknut has left-hand threads.
- Clean the old locknuts; they are used to install the press fit idler gears on the mainshaft and secondary shaft, and the park gear and bearing hub on the countershaft.

CAUTION: Keep all of the chiseled particles out of the transmission.



7. Remove the special tool (mainshaft holder) from the mainshaft.
8. Remove the mainshaft idler gear and the secondary shaft idler gear using a puller as shown.
9. Remove the bearing hub using the puller from the countershaft, then remove the countershaft idler gear and bearings.
10. Remove the park gear using the puller.



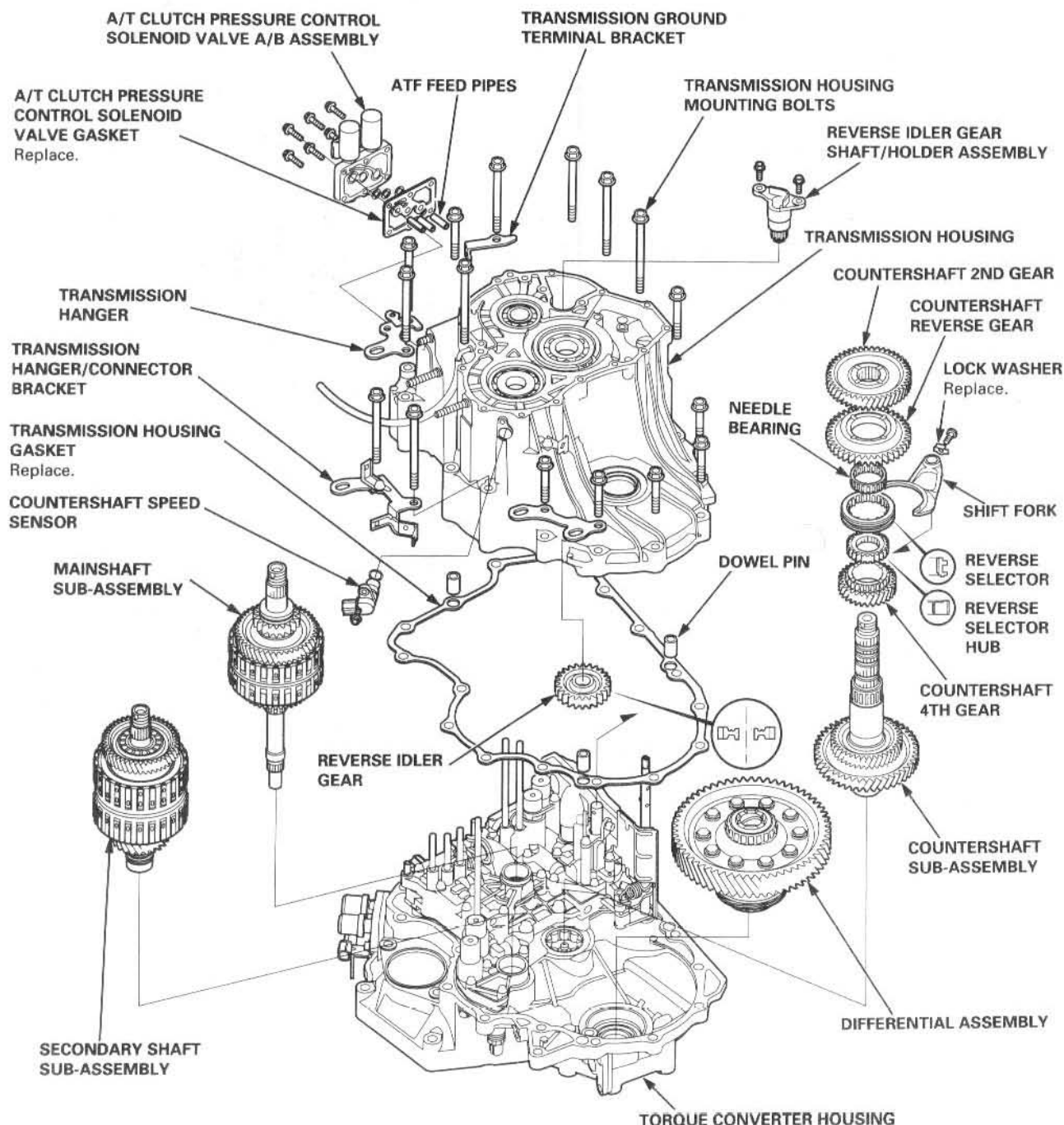
11. Remove the park pawl, spring, shaft, and shaft stop.
12. Remove the park lever from the control shaft.
13. Remove the line bolts, then remove the ATF cooler lines.

Transmission Housing

Removal

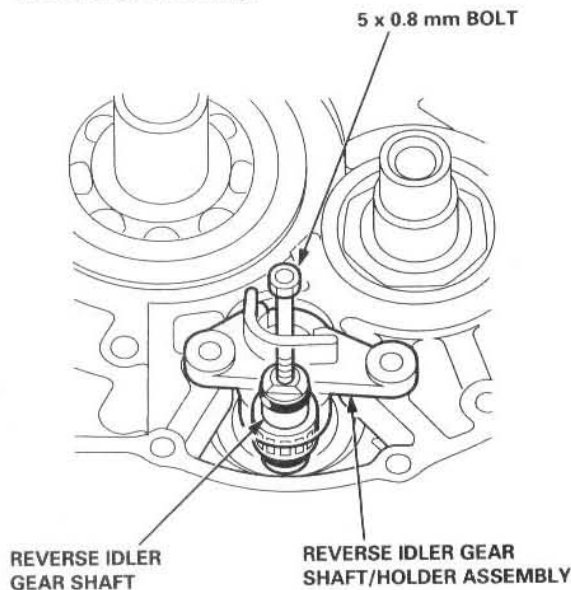
NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- When removing the transmission housing, replace the following:
 - Transmission housing gasket
 - A/T clutch pressure control solenoid valve gasket
 - Lock washer
 - O-rings





1. Remove the A/T clutch pressure control solenoid valve A/B assembly.
2. Remove the countershaft speed sensor.
3. Remove the transmission housing mounting bolts (fifteen bolts), hangers, and brackets.
4. Install a 5 x 0.8 mm bolt in the reverse idler gear shaft as shown, then remove the reverse idler gear shaft/holder assembly.



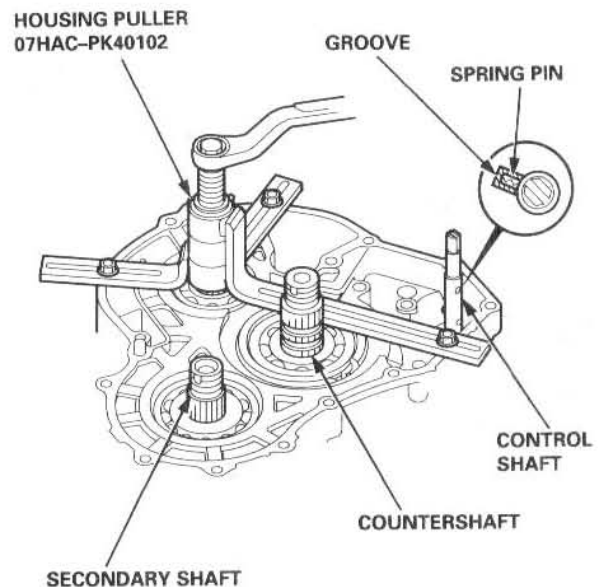
5. When removing the transmission housing from the torque converter housing, move the reverse idler gear out of way of the countershaft 2nd gear in the direction shown.

NOTE: The transmission housing will not separate from the torque converter housing if the reverse idler gear is not moved.



6. Align the spring pin on the control shaft with the transmission housing groove by turning the control shaft.
7. Install the special tool over the mainshaft, then remove the transmission housing as shown.

NOTE: If the top arm of your housing puller is too short, replace it with Housing Puller Arm, 205 mm, 07SAC - P0Z0101.



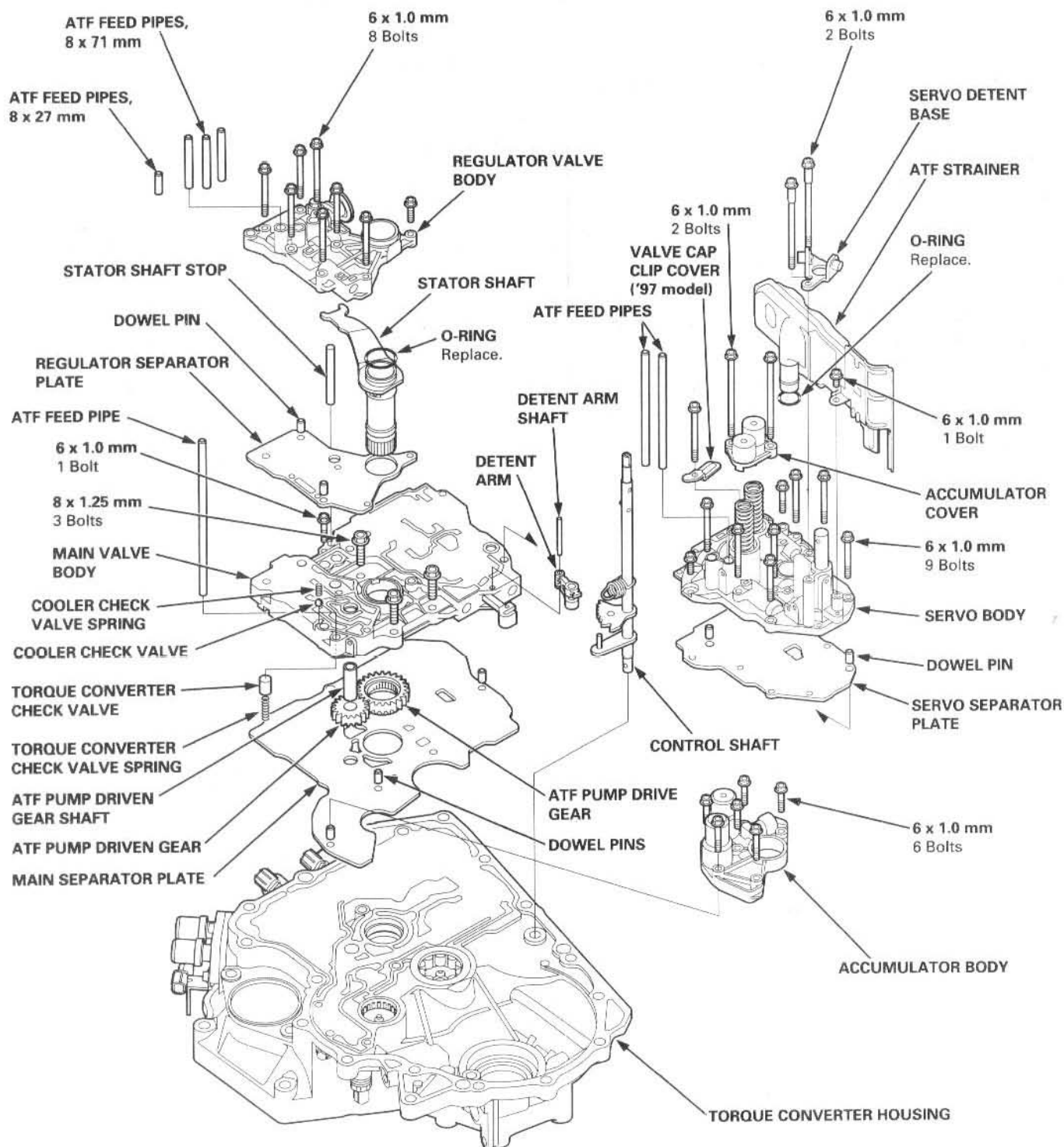
8. Remove the reverse idler gear from the transmission housing.
9. Remove the countershaft 2nd gear, then slide and remove the countershaft reverse gear and the needle bearing.
10. Remove the bolt securing the shift fork, then remove the shift fork, reverse selector, reverse selector hub, and countershaft 4th gear.
11. Remove the secondary shaft sub-assembly.
12. Remove the mainshaft sub-assembly.
13. Remove the countershaft sub-assembly.
14. Remove the differential assembly.

Torque Converter Housing/Valve Body

Removal

NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- When removing the valve body, replace the O-rings.



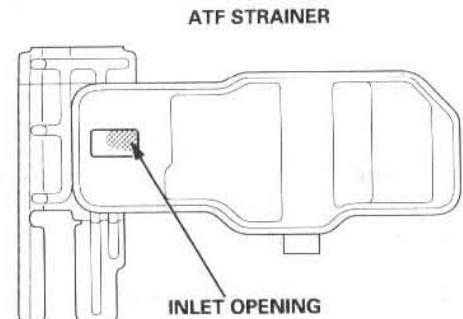


1. Remove the ATF feed pipes from the main valve body, regulator valve body, and servo body.
2. Remove the servo detent base (two bolts).
3. Remove the ATF strainer (one bolt).
4. Remove the accumulator cover (two bolts).

NOTE: The accumulator cover is spring loaded. To prevent stripping the threads in the servo body, press down on the accumulator cover while unscrewing the bolts in a crisscross pattern.

5. Remove the bolts securing the servo body (nine bolts), then remove the servo body, valve cap clip cover ('97 model), and servo separator plate.
6. Remove the accumulator body (six bolts).
7. Remove the regulator valve body (eight bolts).
8. Remove the stator shaft and stator shaft stop.
9. Unhook the detent spring from the detent arm, then remove the detent arm shaft, detent arm, and control shaft.
10. Remove the cooler check valve spring and cooler check valve (steel ball).
11. Remove the main valve body (four bolts).
12. Remove the torque converter check valve and spring.
13. Remove the ATF pump driven gear shaft, then remove the ATF pump gears.
14. Remove the main separator plate and dowel pins (three).

15. Clean the inlet opening of the ATF strainer thoroughly with compressed air, then check that it is in good condition, and the inlet opening is not clogged or damaged.



16. Test the ATF strainer by pouring clean ATF through the inlet opening. Replace the strainer if it is clogged or damaged.

Valve Body

Repair

NOTE: This repair is only necessary if one or more of the valves in a valve body do not slide smoothly in their bores. Use this procedure to free the valves.

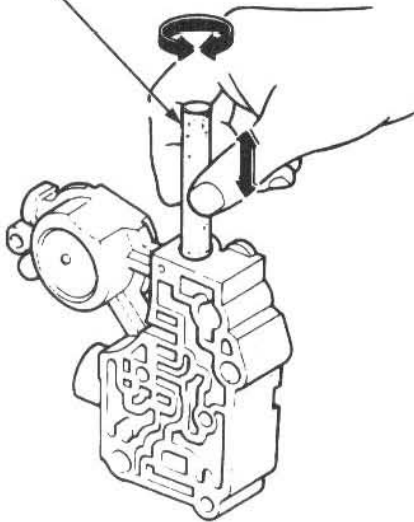
1. Soak a sheet of #600 abrasive paper in ATF for about 30 minutes.
2. Carefully tap the valve body so the sticking valve drops out of its bore.

CAUTION: It may be necessary to use a small screwdriver to pry the valve free. Be careful not to scratch the bore with the screwdriver.

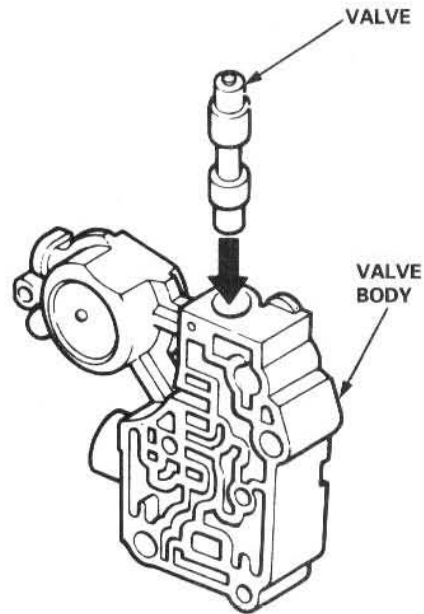
3. Inspect the valve for any scuff marks. Use the ATF-soaked #600 paper to polish off any burrs that are on the valve, then wash the valve in solvent and dry it with compressed air.
4. Roll up half a sheet of ATF-soaked #600 paper and insert it in the valve bore of the sticking valve. Twist the paper slightly, so that it unrolls and fits the bore tightly, then polish the bore by twisting the paper as you push it in and out.

CAUTION: The valve body is aluminum and doesn't require much polishing to remove any burrs.

ATF-soaked
#600 abrasive
paper



5. Remove the #600 paper. Thoroughly wash the entire valve body in solvent, then dry with compressed air.
6. Coat the valve with ATF, then drop it into its bore. It should drop to the bottom of the bore under its own weight. If not, repeat step 4, then retest. If the valve still sticks, replace the valve body.



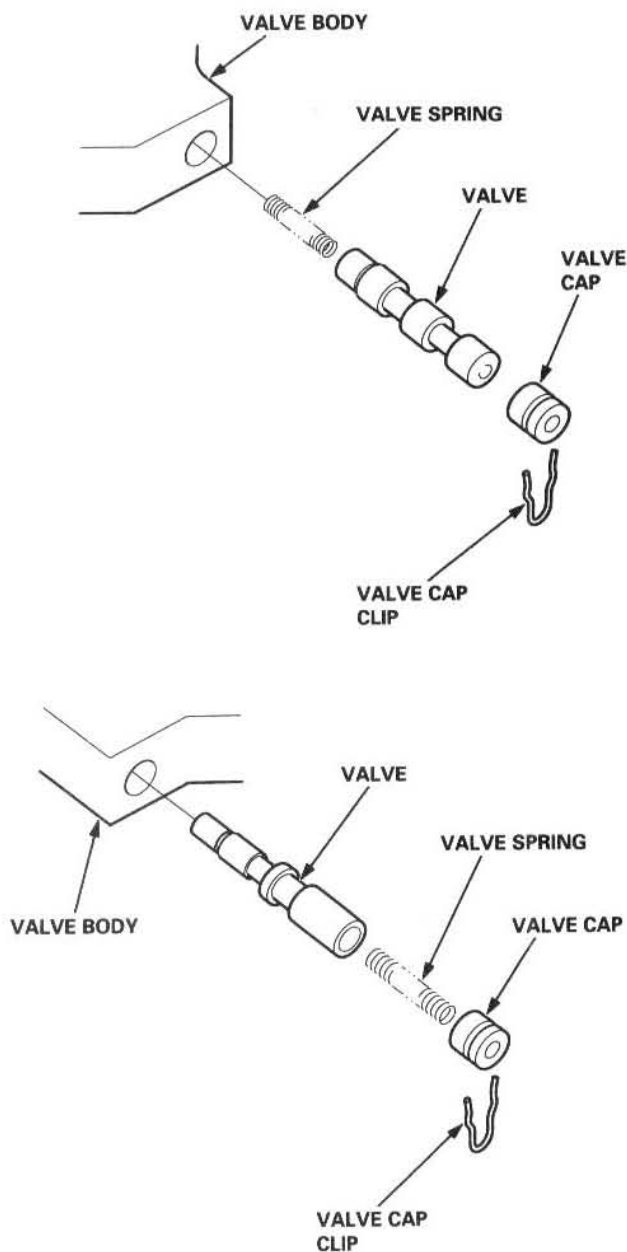
7. Remove the valve, and thoroughly clean it and the valve body with solvent. Dry all parts with compressed air, then reassemble using ATF as a lubricant.



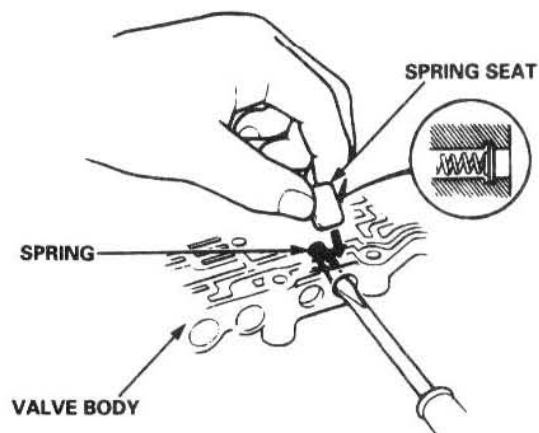
Assembly

NOTE: Coat all parts with ATF before assembly.

Install the valve, valve spring, and valve cap in the valve body, then secure them with the valve cap clip.



Set the spring in the valve, then install it in the valve body. Push the spring in with a screwdriver, then install the spring seat.



Valve Caps

Description

- Caps with one projected tip and one flat end are installed with the flat end toward the inside of the valve body.
- Caps with a projected tip on each end are installed with the smaller tip toward the inside of the valve body. The small tip is a spring guide.

TOWARD OUTSIDE OF VALVE BODY



TOWARD INSIDE OF VALVE BODY

- Caps with one projected tip and a hollow end are installed with the tip toward the inside of the valve body. The tip is a spring guide.
- Caps with one projected tip and flat end are installed with the tip toward the inside of the valve body. The tip is a spring guide. The groove is a valve cap clip guide.

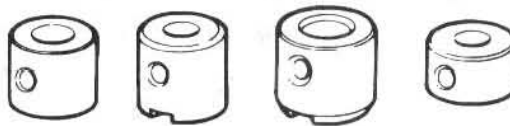
TOWARD OUTSIDE OF VALVE BODY



TOWARD INSIDE OF VALVE BODY

- Caps with hollow ends are installed with the hollow end away from the inside of the valve body.
- Caps with notched ends are installed with the notch toward the inside of the valve body.
- Caps with flat ends and a hole through the center are installed with the smaller hole toward the inside of the valve body.

TOWARD OUTSIDE OF VALVE BODY



TOWARD INSIDE OF VALVE BODY

- Caps with flat ends and a groove around the cap are installed with the grooved side toward the outside of the valve body.

TOWARD OUTSIDE OF VALVE BODY



TOWARD INSIDE OF VALVE BODY

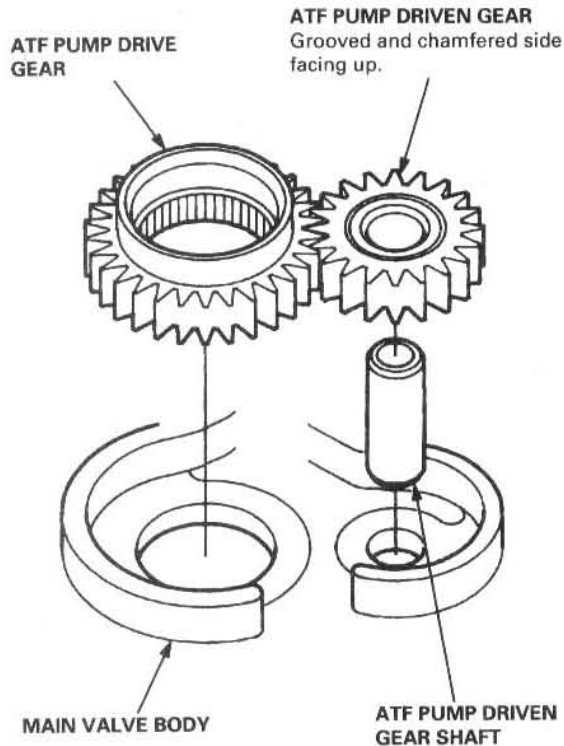


Inspection

1. Install the ATF pump gears and ATF pump driven gear shaft in the main valve body.

NOTE:

- Lubricate all parts with ATF during inspection.
- Install the ATF pump driven gear with its grooved and chamfered side facing up as shown.



2. Measure the side clearance of the ATF pump drive and driven gears.

ATF Pump Gears Side (Radial) Clearance:

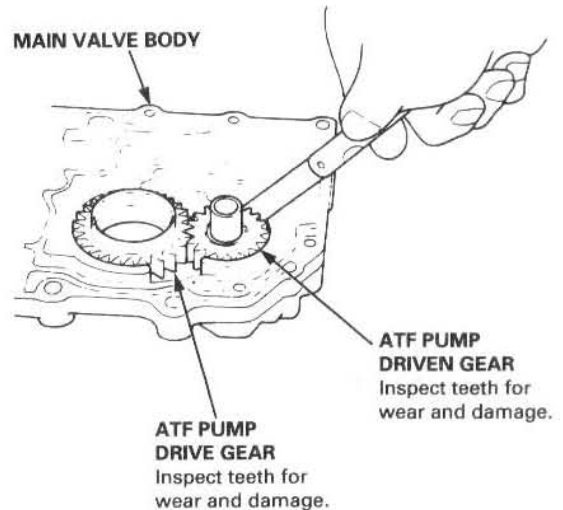
Standard (New):

ATF Pump Drive Gear

0.210 – 0.265 mm (0.0083 – 0.0104 in)

ATF Pump Driven Gear

0.070 – 0.125 mm (0.0028 – 0.0049 in)

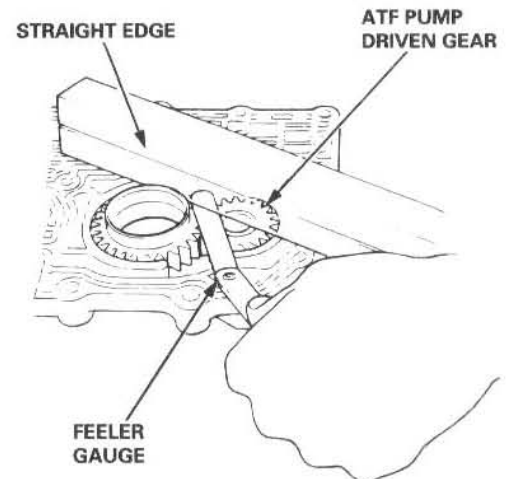


3. Remove the ATF pump driven gear shaft. Measure the thrust clearance of the ATF pump driven gear-to-valve body, with a straight edge and a feeler gauge.

ATF Pump Drive/Driven Gear Thrust (Axial) Clearance:

Standard (New): 0.03 – 0.05 mm (0.001 – 0.002 in)

Service Limit: 0.07 mm (0.003 in)



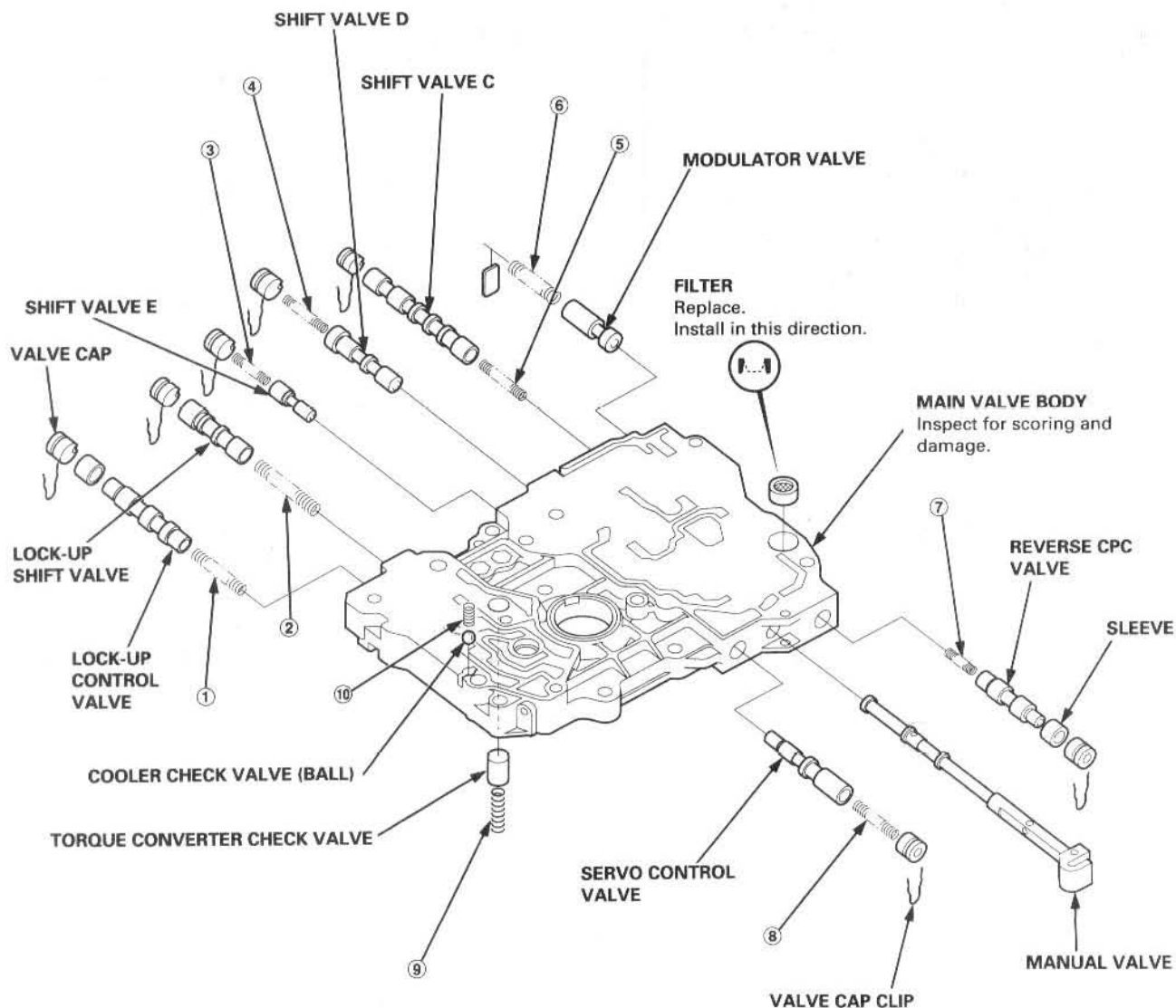
Main Valve Body

Disassembly/Inspection/Reassembly

NOTE:

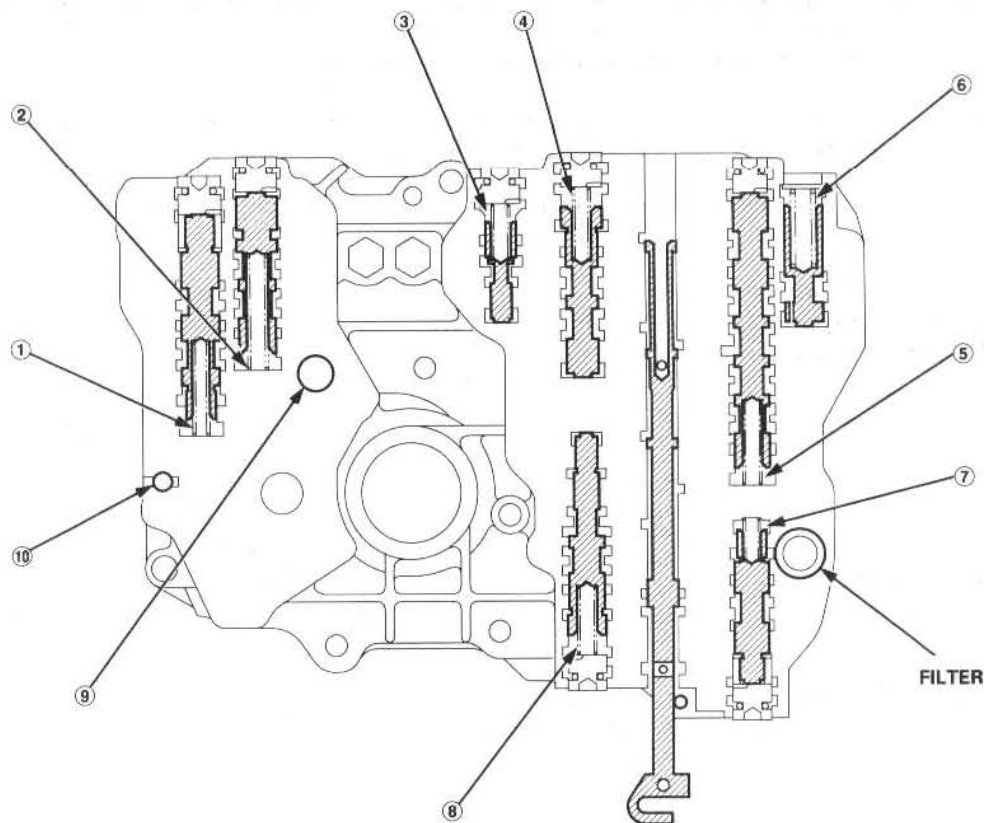
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air. Blow out all passages.
- Check all valves for free movement. If any fail to slide freely, see Valve Body Repair on page 14-142.
- Replace the valve body as an assembly if any parts worn or damaged.
- Coat all parts with ATF during assembly.
- Install the filter in the direction shown.

CAUTION: Do not use a magnet to remove the check valve ball; it may magnetize the ball.





Sectional View



SPRING SPECIFICATIONS

Unit: mm (in)

No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	Lock-up control valve spring	0.7 (0.028)	6.6 (0.260)	42.9 (1.689)	14.2
②	Lock-up shift valve spring	0.9 (0.035)	7.6 (0.299)	63.0 (2.480)	22.4
③	Shift valve E spring	0.7 (0.028)	6.6 (0.260)	32.2 (1.268)	13.4
④	Shift valve D spring	0.7 (0.028)	6.6 (0.260)	35.7 (1.406)	17.2
⑤	Shift valve C spring	0.8 (0.031)	6.6 (0.260)	49.1 (1.933)	21.7
⑥	Modulator valve spring	1.6 (0.063)	10.4 (0.409)	33.5 (1.319)	9.8
⑦	Reverse CPC valve spring	0.7 (0.028)	6.1 (0.240)	17.8 (0.701)	7.9
⑧	Servo control valve spring	0.7 (0.028)	6.6 (0.260)	35.7 (1.406)	17.2
⑨	Torque converter check valve spring	1.1 (0.043)	8.4 (0.331)	34.3 (1.350)	14.2
⑩	Cooler check valve spring	0.6 (0.024)	5.8 (0.228)	14.5 (0.571)	6.8

Regulator Valve Body

Disassembly/Inspection/Reassembly

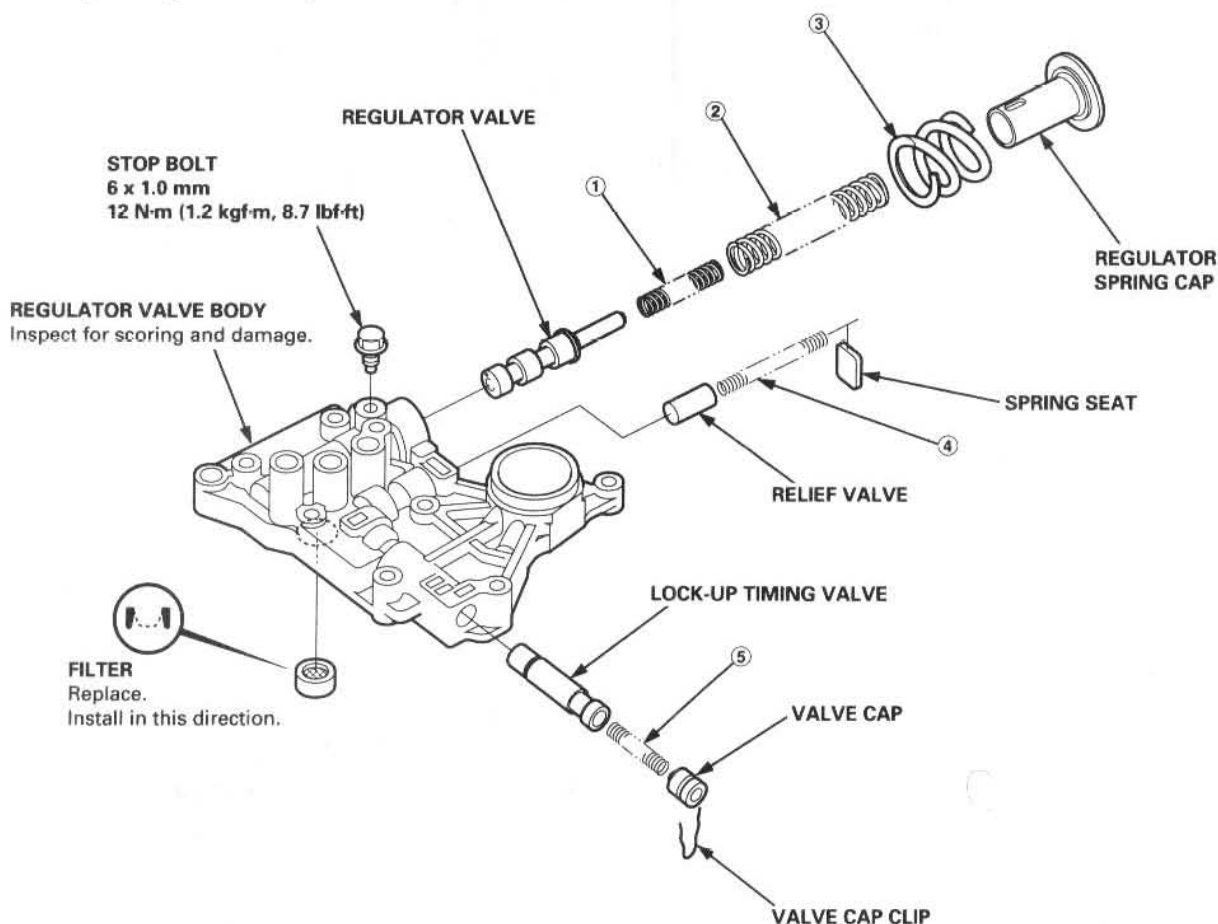
NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air. Blow out all passages.
- Check all valves for free movement. If any fail to slide freely, see Valve Body Repair on page 14-142.
- Replace the valve body as an assembly if any parts are worn or damaged.

1. Hold the regulator spring cap in place while removing the stop bolt. The regulator spring cap is spring loaded. Once the stop bolt is removed, release the spring cap slowly so it does not pop out.
2. Reassembly is the reverse of the disassembly procedure. Install the filter in the direction shown.

NOTE:

- Coat all parts with ATF during assembly.
- Align the hole in the regulator spring cap with the hole in the valve body, then press the spring cap into the valve body, and tighten the stop bolt.



SPRING SPECIFICATIONS

Unit: mm (in)

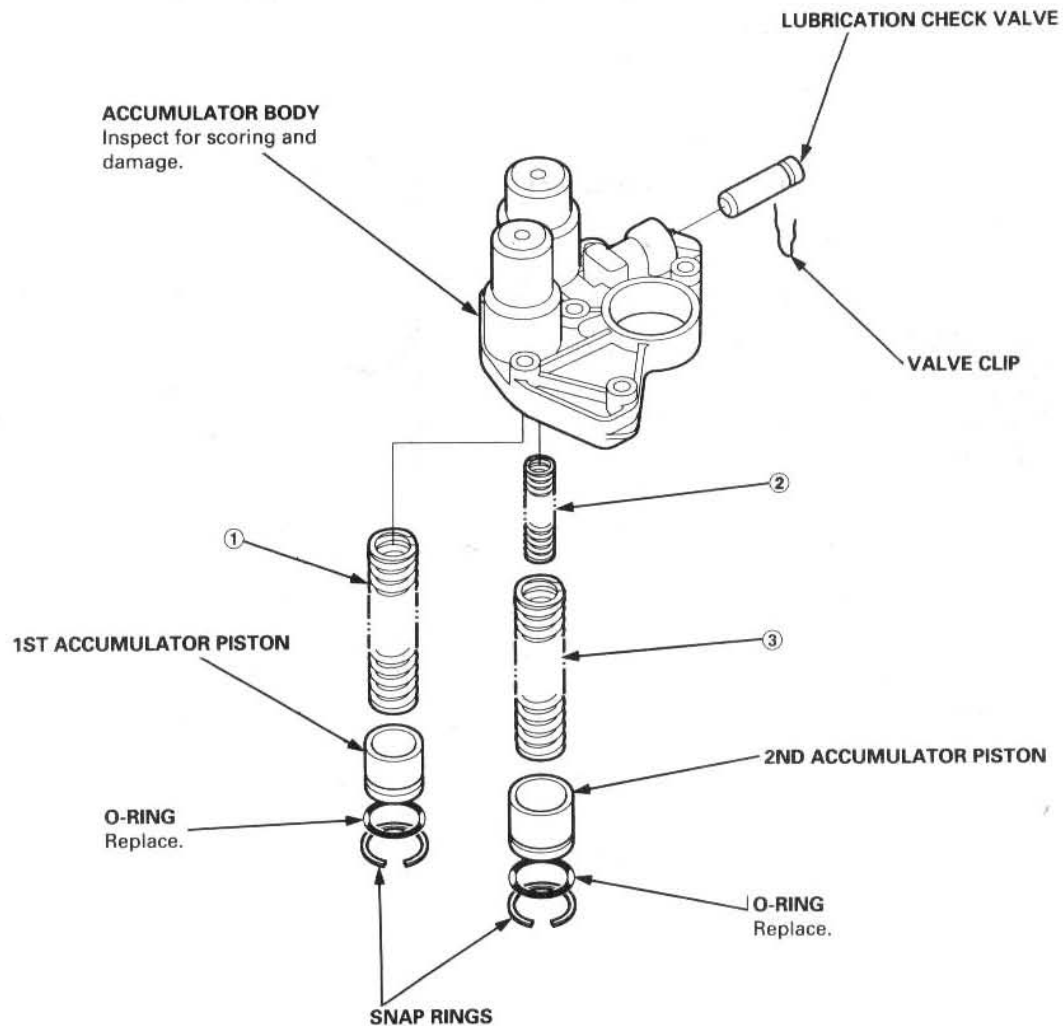
No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	Regulator valve spring B '97 model '98 - '99 models	1.6 (0.063)	9.2 (0.362)	44.0 (1.732)	14.0
		1.6 (0.063)	9.2 (0.362)	44.0 (1.732)	12.5
②	Regulator valve spring A	1.9 (0.075)	14.7 (0.579)	77.4 (3.047)	15.2
③	Stator reaction spring	4.5 (0.177)	35.4 (1.394)	30.3 (1.193)	1.92
④	Relief valve spring	0.9 (0.035)	6.6 (0.260)	39.8 (1.567)	20.4
⑤	Lock-up timing valve spring	0.65 (0.026)	6.6 (0.260)	34.8 (1.370)	15.6



Disassembly/Inspection/Reassembly

NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air. Blow out all passages.
- Coat all parts with ATF during assembly.



SPRING SPECIFICATIONS

Unit: mm (in)

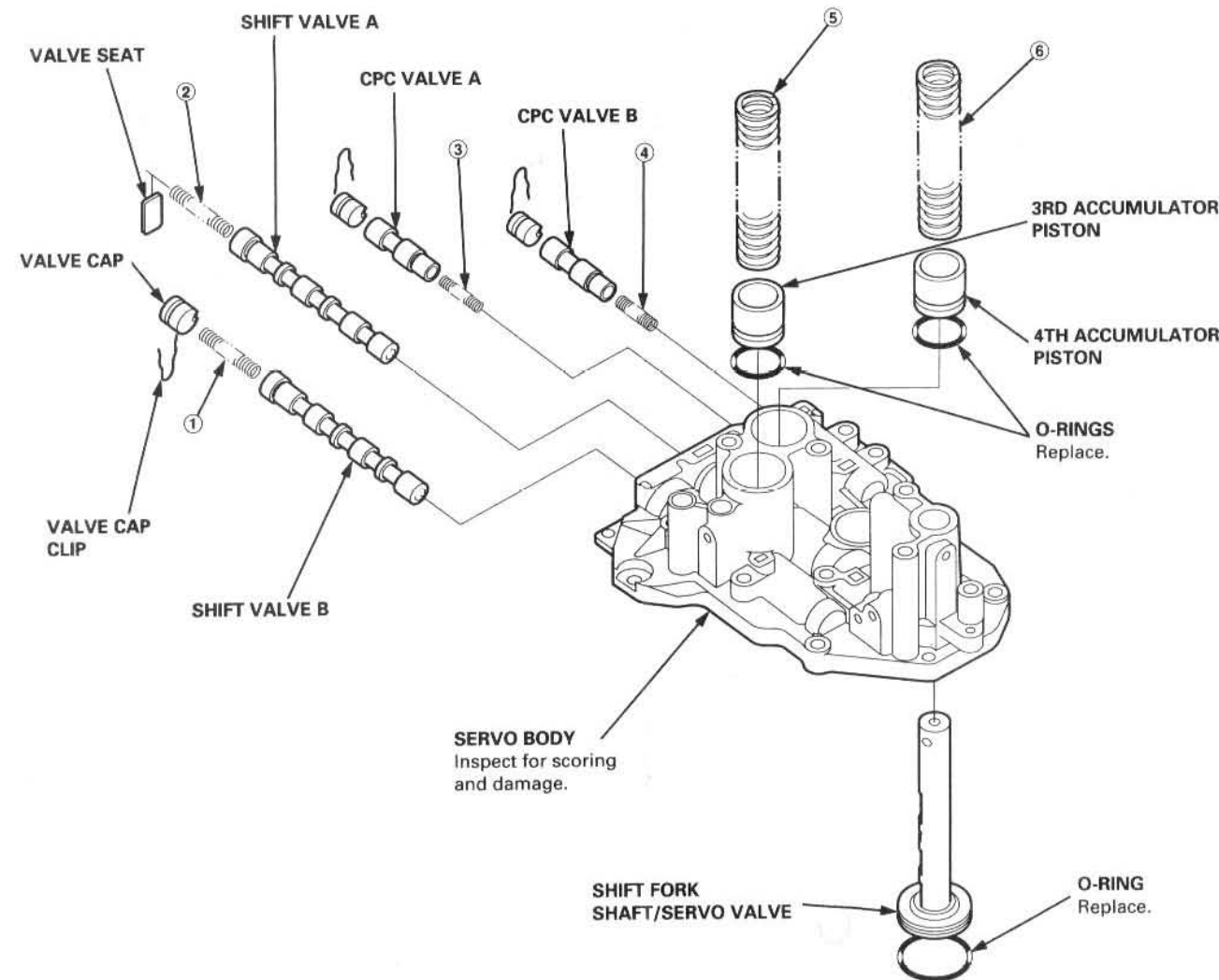
No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	1st accumulator spring	3.5 (0.138)	19.6 (0.772)	61.7 (2.429)	9.6
②	2nd accumulator spring B	2.6 (0.102)	14.4 (0.567)	51.0 (2.008)	11.0
③	2nd accumulator spring A	2.8 (0.110)	21.6 (0.850)	68.2 (2.685)	8.9

Servo Body

Disassembly/Inspection/Reassembly

NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air. Blow out all passages.
- Check all valves for free movement. If any fail to slide freely, see Valve Body Repair on page 14-142.
- Replace the valve body as an assembly if any parts are worn or damaged.
- Coat all parts with ATF during assembly.
- Replace the CPC valve springs A and B, and the A/T clutch pressure control solenoid valve A/B assembly as a set, if replacement of either CPC valve spring is required.



SPRING SPECIFICATIONS

Unit: mm (in)

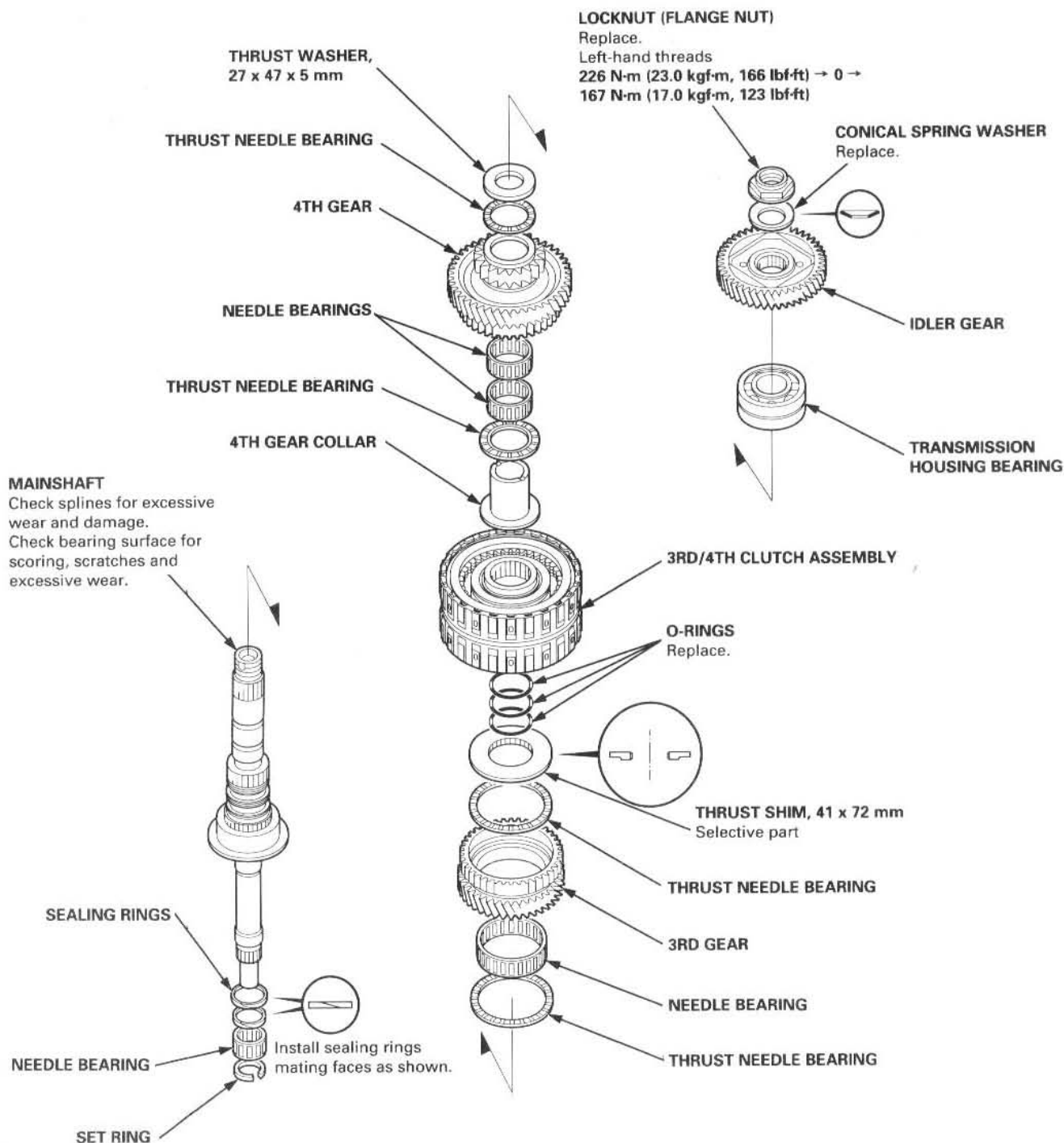
No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	Shift valve B spring	0.8 (0.031)	7.1 (0.280)	40.4 (1.591)	16.9
②	Shift valve A spring	0.8 (0.031)	7.1 (0.280)	40.4 (1.591)	16.9
③	CPC valve A spring	0.7 (0.028)	6.1 (0.240)	17.8 (0.701)	7.9
④	CPC valve B spring	0.7 (0.028)	6.1 (0.240)	17.8 (0.701)	7.9
⑤	3rd accumulator spring	3.5 (0.138)	19.6 (0.772)	61.7 (2.429)	9.6
⑥	4th accumulator spring	3.5 (0.138)	19.6 (0.772)	61.7 (2.429)	9.6



Disassembly/Inspection/Reassembly

NOTE:

- Lubricate all parts with ATF during reassembly.
- Inspect the thrust needle bearing and the needle bearing for galling and rough movement.
- Before installing the O-rings, wrap the shaft splines with tape to prevent damage to the O-rings.
- Locknut has left-hand threads.
- Install the conical spring washer and thrust shim in the direction shown.
- Inspect the condition of the sealing rings. If the sealing rings are worn, distorted, or damaged, replace them (see page 14-153).



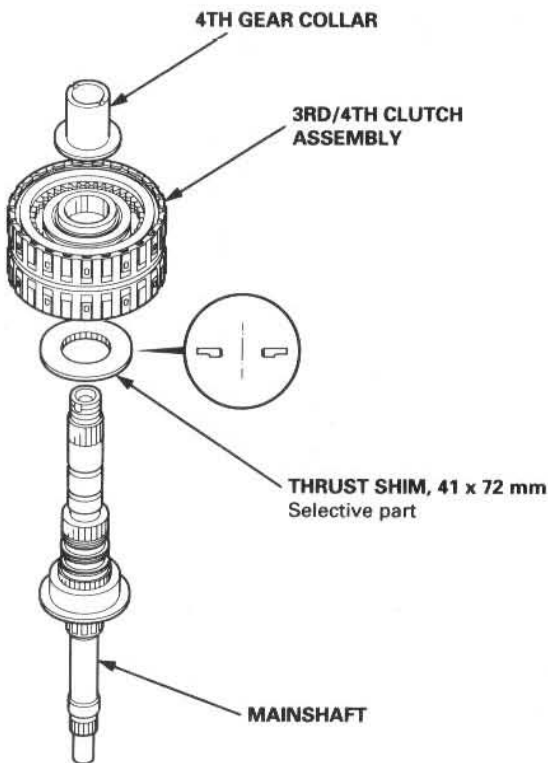
Mainshaft

Inspection

NOTE: Lubricate all parts with ATF during assembly.

1. Assemble the parts below on the mainshaft.

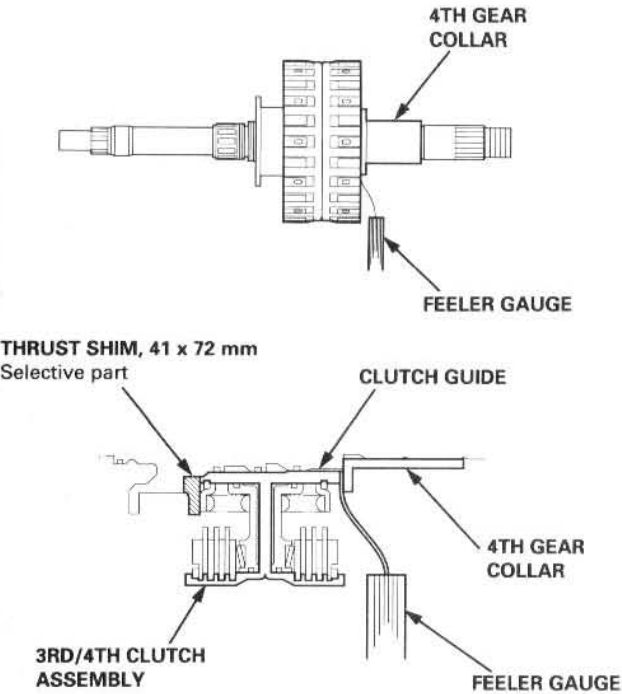
NOTE: Do not assemble the O-rings during inspection.



2. Hold the 4th gear collar against the clutch assembly, then measure the clearance between the clutch guide and the 4th gear collar with a feeler gauge as shown.

STANDARD: 0.03 – 0.11 mm (0.001 – 0.004 in)

NOTE: Take measurement in at least three places, and use the average as the actual clearance.



3. If the clearance is out of tolerance, remove the thrust shim and measure the thickness.
4. Select and install a new shim, then recheck.

THRUST SHIM, 41 x 72 mm

No.	Part Number	Thickness
1	90414 – P6H – 010	6.35 mm (0.250 in)
2	90415 – P6H – 010	6.40 mm (0.252 in)
3	90416 – P6H – 010	6.45 mm (0.254 in)
4	90417 – P6H – 010	6.50 mm (0.256 in)
5	90418 – P6H – 010	6.55 mm (0.258 in)
6	90419 – P6H – 010	6.60 mm (0.260 in)

5. After replacing the thrust shim, make sure the clearance is within tolerance.



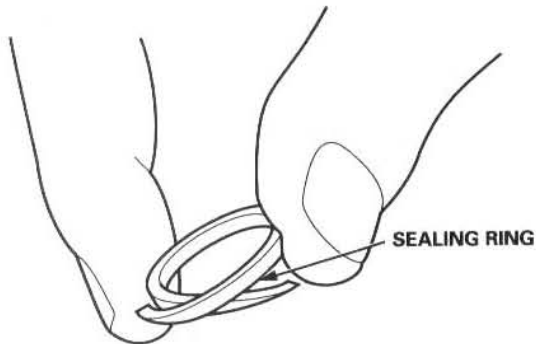
Sealing Rings

Replacement

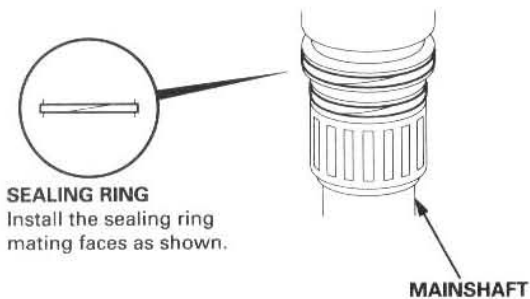
The sealing rings on the mainshaft are synthetic resin with chamfered ends. Check the condition of the sealing rings and replace them only if they are worn, distorted, or damaged.

NOTE: Lubricate all parts with ATF during assembly.

1. Squeeze the sealing ring together slightly before installing, for better fit.



2. Install new sealing rings on the mainshaft.
3. After installing the sealing rings, verify the following:
 - The sealing rings are fully seated in the groove.
 - The sealing rings are not twisted.
 - The chamfered ends of the sealing rings are properly joined.

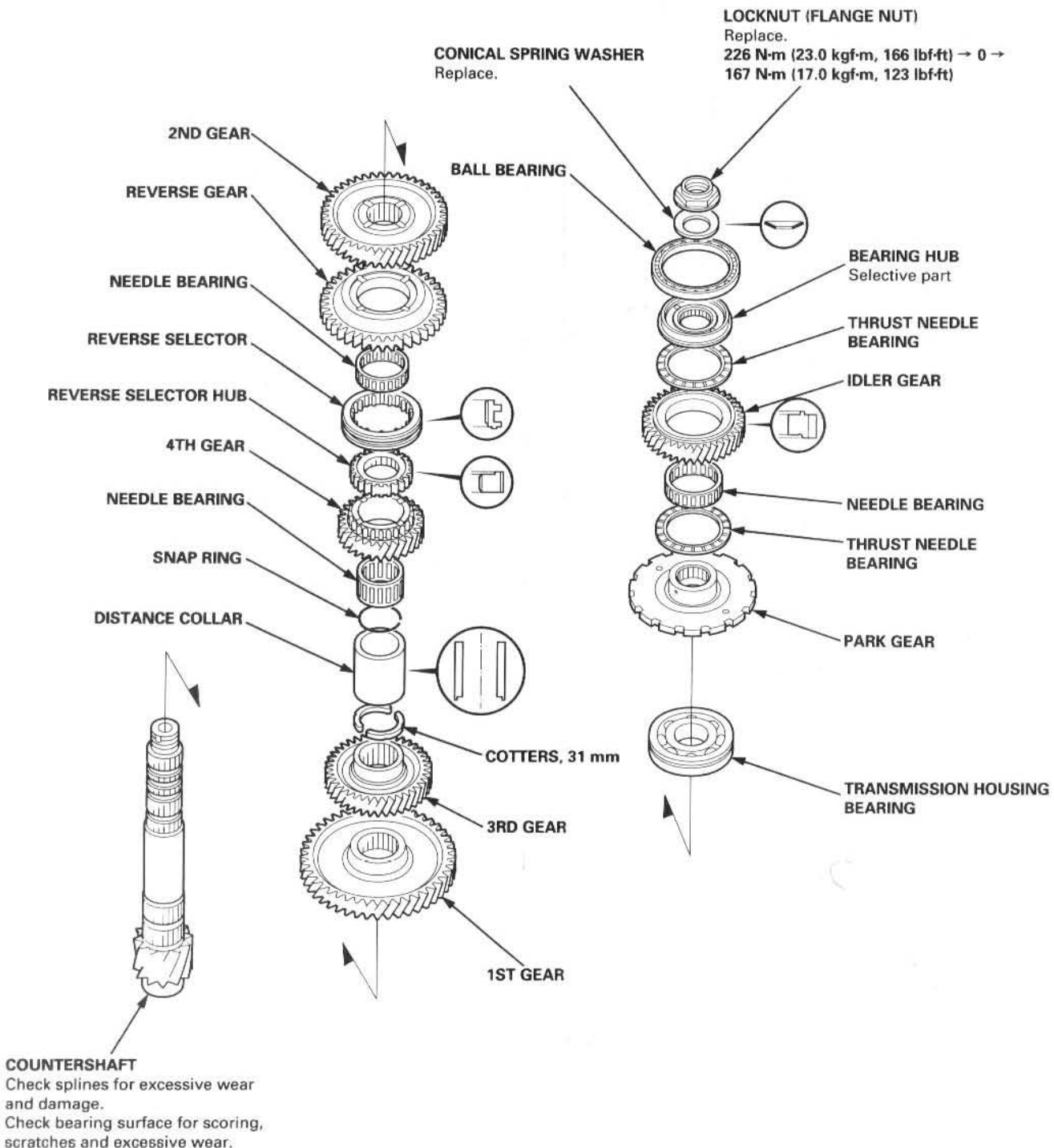


Countershaft

Disassembly/Inspection/Reassembly

NOTE:

- Lubricate all parts with ATF during reassembly.
- Inspect the thrust needle bearing and the needle bearing for galling and rough movement.
- Install the conical spring washer, idler gear, reverse selector, reverse selector hub, and distance collar in the direction shown.



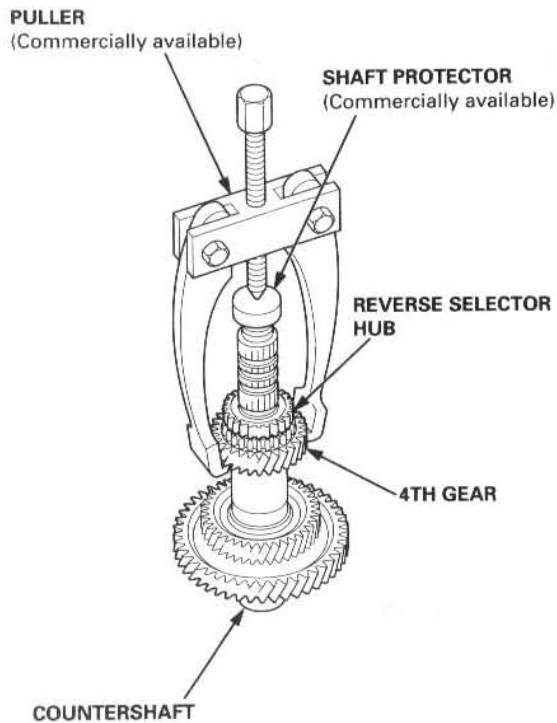


Disassembly

1. Remove the reverse selector hub and the 4th gear using a universal two-jaw (or three-jaw) puller as shown.

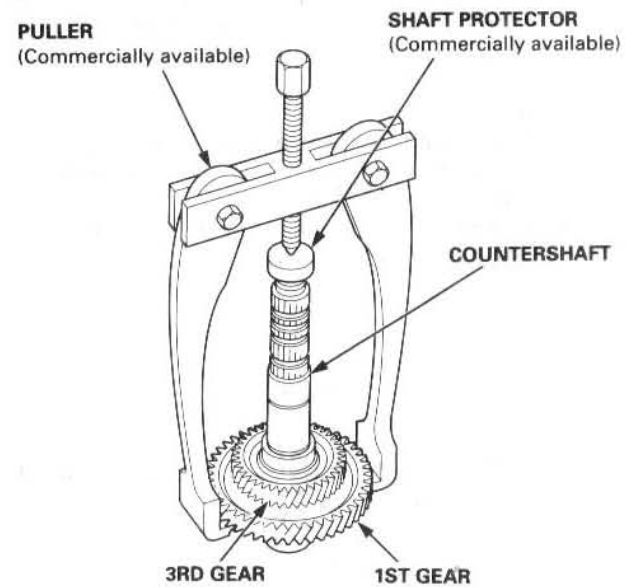
NOTE:

- Some of the reverse selector hubs are not press-fitted and can be removed without using a puller.
- Place a shaft protector between the puller and countershaft to prevent damage to the countershaft.



2. Remove the needle bearing, snap ring, distance collar, and 31 mm cotters from the countershaft.
3. Remove the 1st gear and 3rd gear together from the countershaft using a puller as shown.

NOTE: Place a shaft protector between the puller and countershaft to prevent damage to the countershaft.



Countershaft

Reassembly

NOTE: Lubricate all parts with ATF during assembly.

1. Align the shaft splines with those on 1st gear, then press the countershaft into the 1st gear using a press as shown.

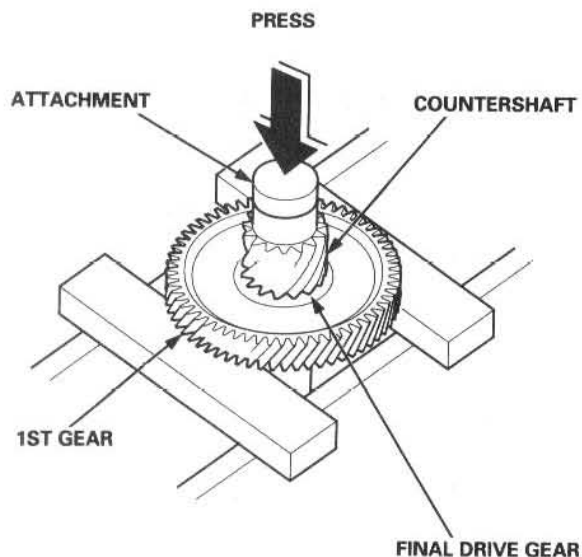
NOTE:

- Place an attachment between the press and countershaft to prevent damage to the countershaft.
- Stop pressing the countershaft when the 1st gear contacts the final drive gear.

2. Align the shaft splines with those on 3rd gear, then press the countershaft into the 3rd gear using a press as shown.

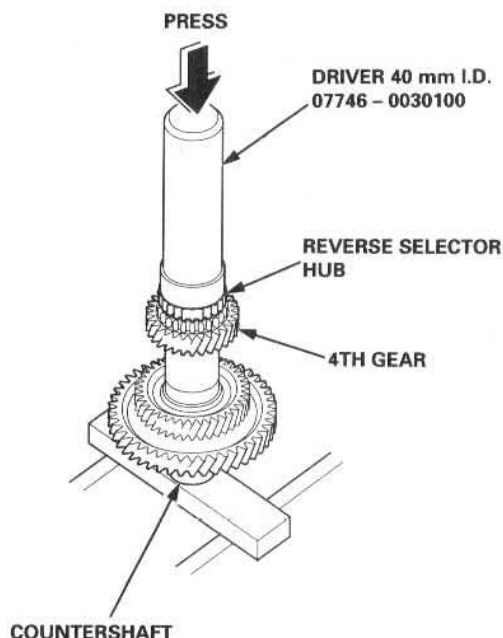
NOTE:

- Place an attachment between the press and countershaft to prevent damage to the countershaft.
- Stop pressing the countershaft when the 3rd gear contacts the 1st gear.



3. Install the 31 mm cotters, distance collar, snap ring, needle bearing, and 4th gear on the countershaft.
4. Install the reverse selector hub on the countershaft, and then press the reverse selector hub using the special tool and a press as shown.

NOTE: Some of the reverse selector hubs are not press-fitted and can be installed without using the special tool and a press.



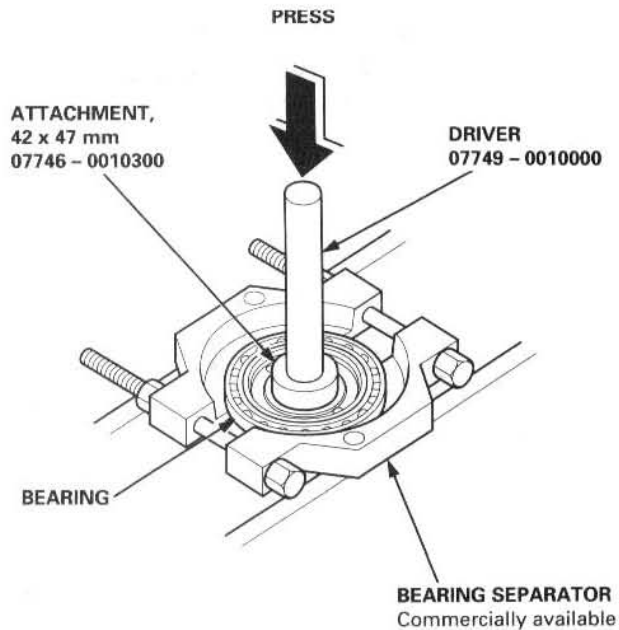


Bearing Hub

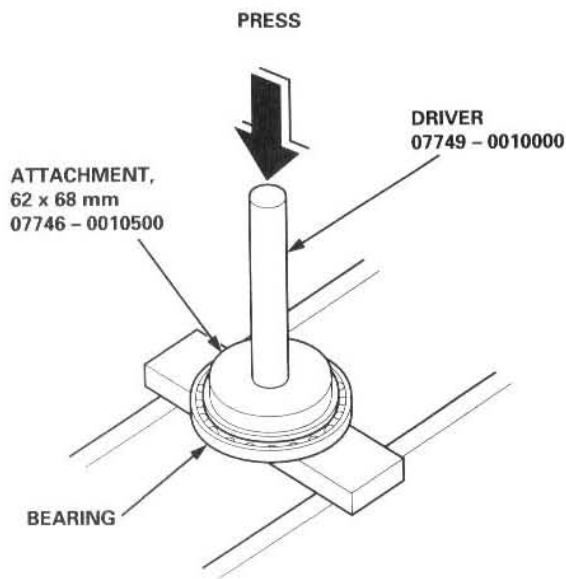
Bearing Replacement

NOTE: Check the bearing for wear, damage, and rough movement. If the bearing is worn or damaged, replace it.

1. Remove the bearing from the bearing hub using a bearing separator and a press as shown.



2. Install the new bearing on the bearing hub using the special tool and a press as shown.



Secondary Shaft

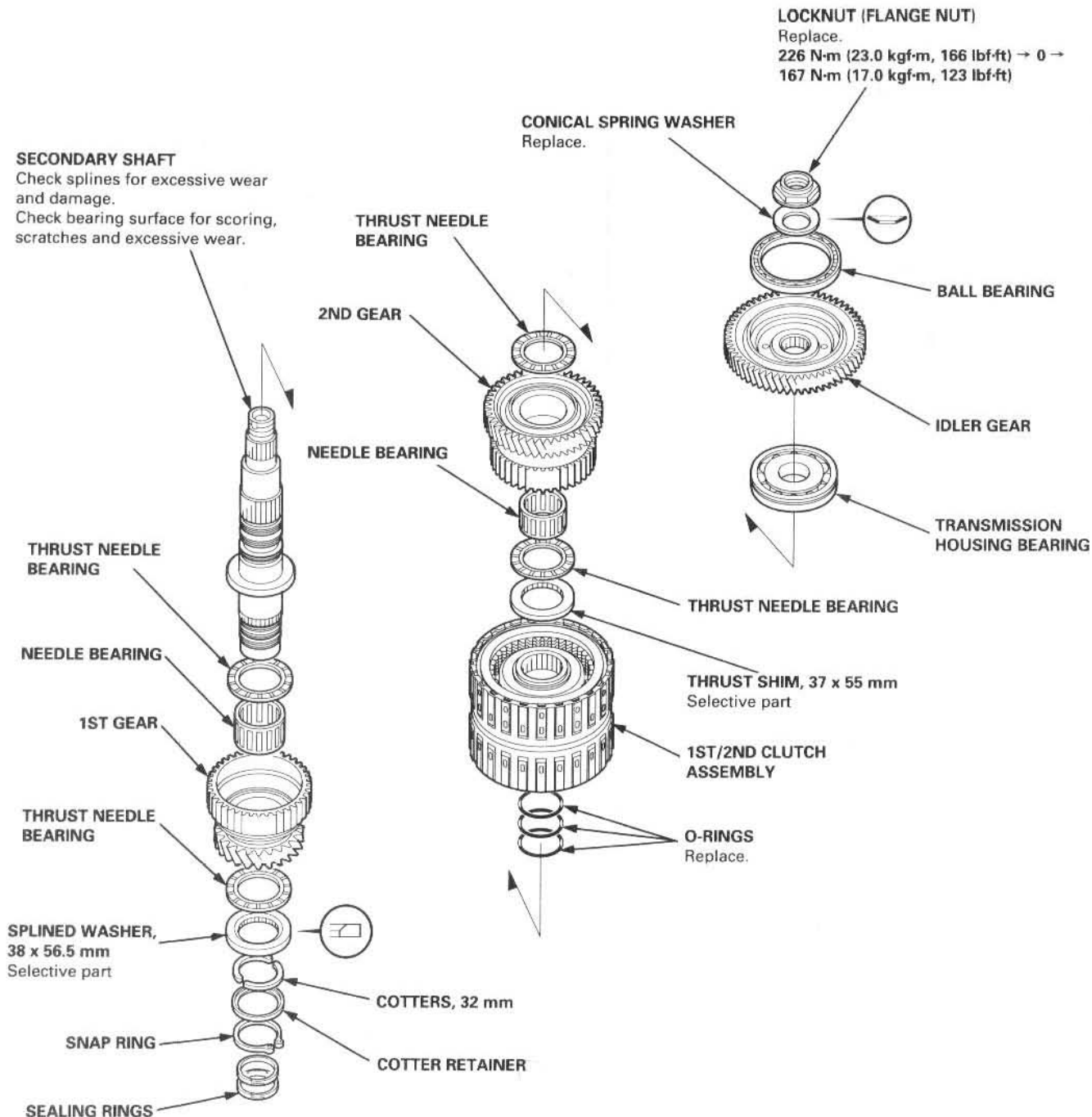
Disassembly/Inspection/Reassembly

NOTE:

- Lubricate all parts with ATF during reassembly.
- Inspect the thrust needle bearing and the needle bearing for galling and rough movement.
- Before installing the O-rings, wrap the shaft splines with tape to prevent damage to the O-rings.
- Install the conical spring washer and splined washer in the direction shown.

SECONDARY SHAFT

Check splines for excessive wear and damage.
Check bearing surface for scoring, scratches and excessive wear.

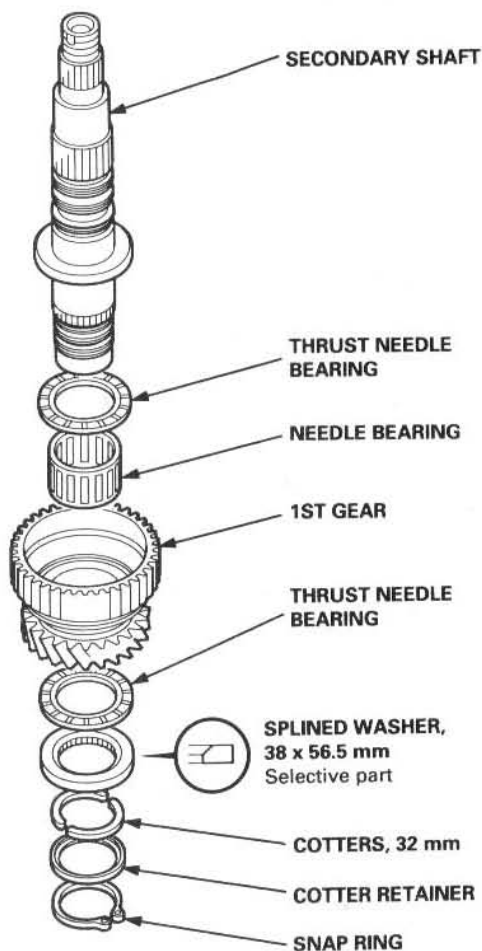




Inspection

NOTE: Lubricate all parts with ATF during assembly.

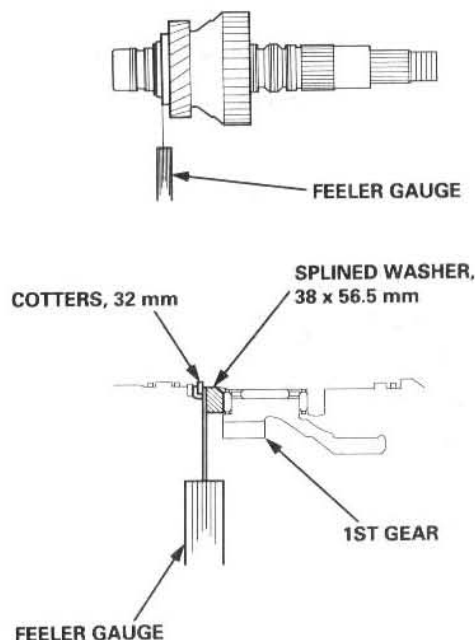
1. Assemble the parts below on the secondary shaft.



2. Measure the clearance between the 38 x 56.5 mm splined washer and cotters with a feeler gauge.

STANDARD: 0.07 – 0.15 mm (0.003 – 0.006 in)

NOTE: Take measurements in at least three places, and use the average as the actual clearance.



3. If the clearance is out of tolerance, remove the splined washer, and measure the thickness.
4. Select and install a new splined washer, then recheck.

SPLINED WASHER, 38 x 56.5 mm

No.	Part Number	Thickness
1	90502 – P0Z – 000	6.85 mm (0.270 in)
2	90503 – P0Z – 000	6.90 mm (0.272 in)
3	90504 – P0Z – 000	6.95 mm (0.274 in)
4	90505 – P0Z – 000	7.00 mm (0.276 in)
5	90506 – P0Z – 000	7.05 mm (0.278 in)
6	90507 – P0Z – 000	7.10 mm (0.280 in)

5. After replacing the splined washer, make sure that the clearance is within tolerance.

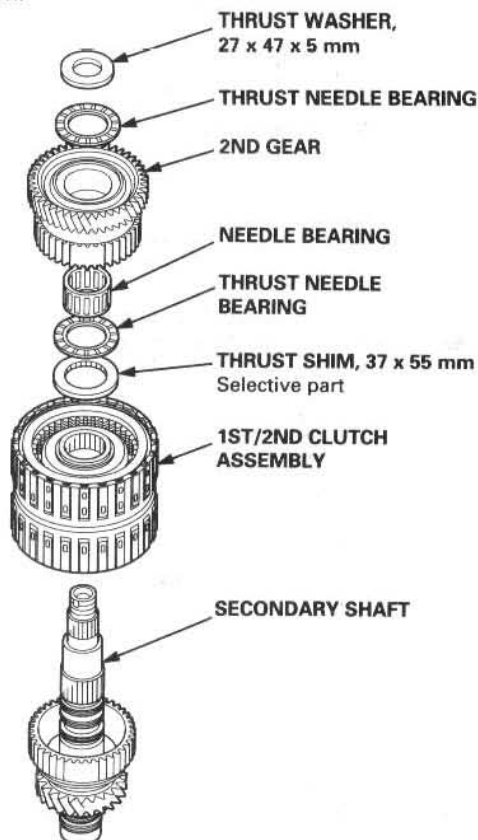
(cont'd)

Secondary Shaft

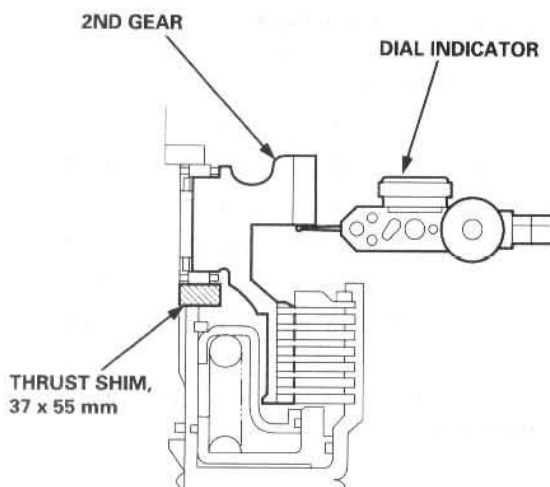
Inspection (cont'd)

6. Remove the 27 x 47 x 5 mm thrust washer from the mainshaft.
7. Assemble the parts below on the secondary shaft.

NOTE: Do not assemble the O-rings during inspection.



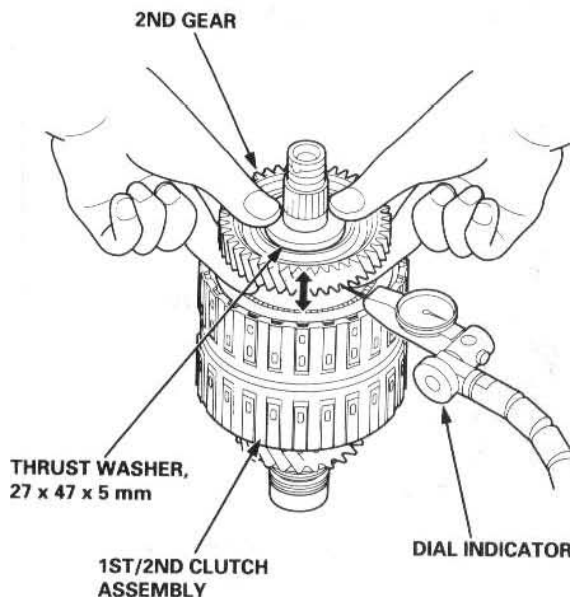
8. Set the dial indicator to the 2nd gear as shown.



9. Hold the 27 x 47 x 5 mm thrust washer against the clutch assembly, and measure the 2nd gear axial clearance while moving the 2nd gear.

STANDARD: 0.07 – 0.15 mm (0.003 – 0.006 in)

NOTE: Take measurements in at least three places, and use the average as the actual clearance.



10. If the clearance is out of tolerance, remove the 37 x 55 mm thrust shim and measure the thickness.
11. Select and install a new thrust shim, then recheck.

THRUST SHIM, 37 x 55 mm

No.	Part Number	Thickness
1	90406 – P6H – 000	4.90 mm (0.193 in)
2	90407 – P6H – 000	4.95 mm (0.195 in)
3	90408 – P6H – 000	5.00 mm (0.197 in)
4	90409 – P6H – 000	5.05 mm (0.199 in)
5	90410 – P6H – 000	5.10 mm (0.201 in)
6	90411 – P6H – 000	5.15 mm (0.203 in)
7	90412 – P6H – 000	5.20 mm (0.205 in)

12. After replacing the thrust shim, make sure that the clearance is within tolerance.
13. Be sure to install the 27 x 47 x 5 mm thrust washer on the mainshaft.

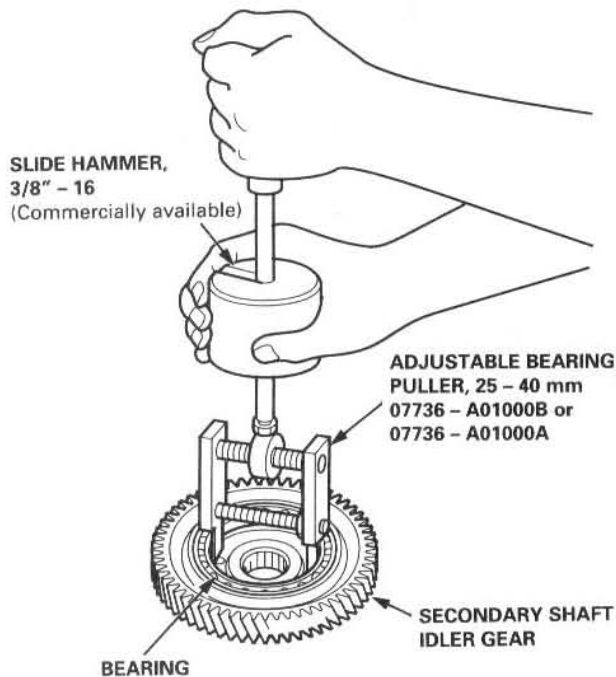


Secondary Shaft Idler Gear

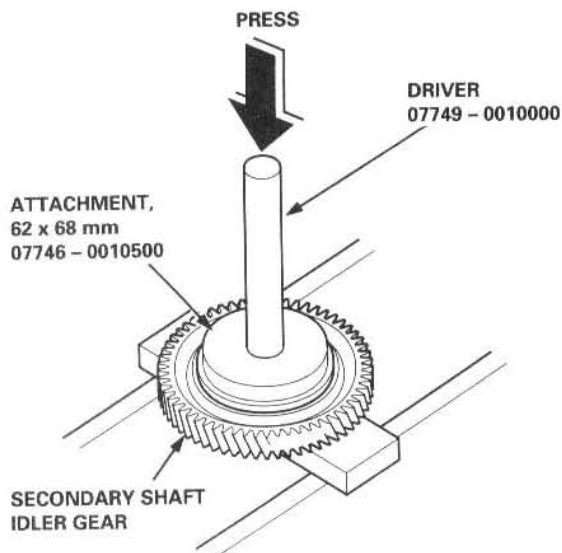
Bearing Replacement

NOTE: Check the bearing for wear, damage, and rough movement. If the bearing is worn or damaged, replace it.

1. Place the secondary shaft idler gear in a vise with soft jaws.
2. Remove the bearing from the secondary shaft idler gear using the special tool as shown.



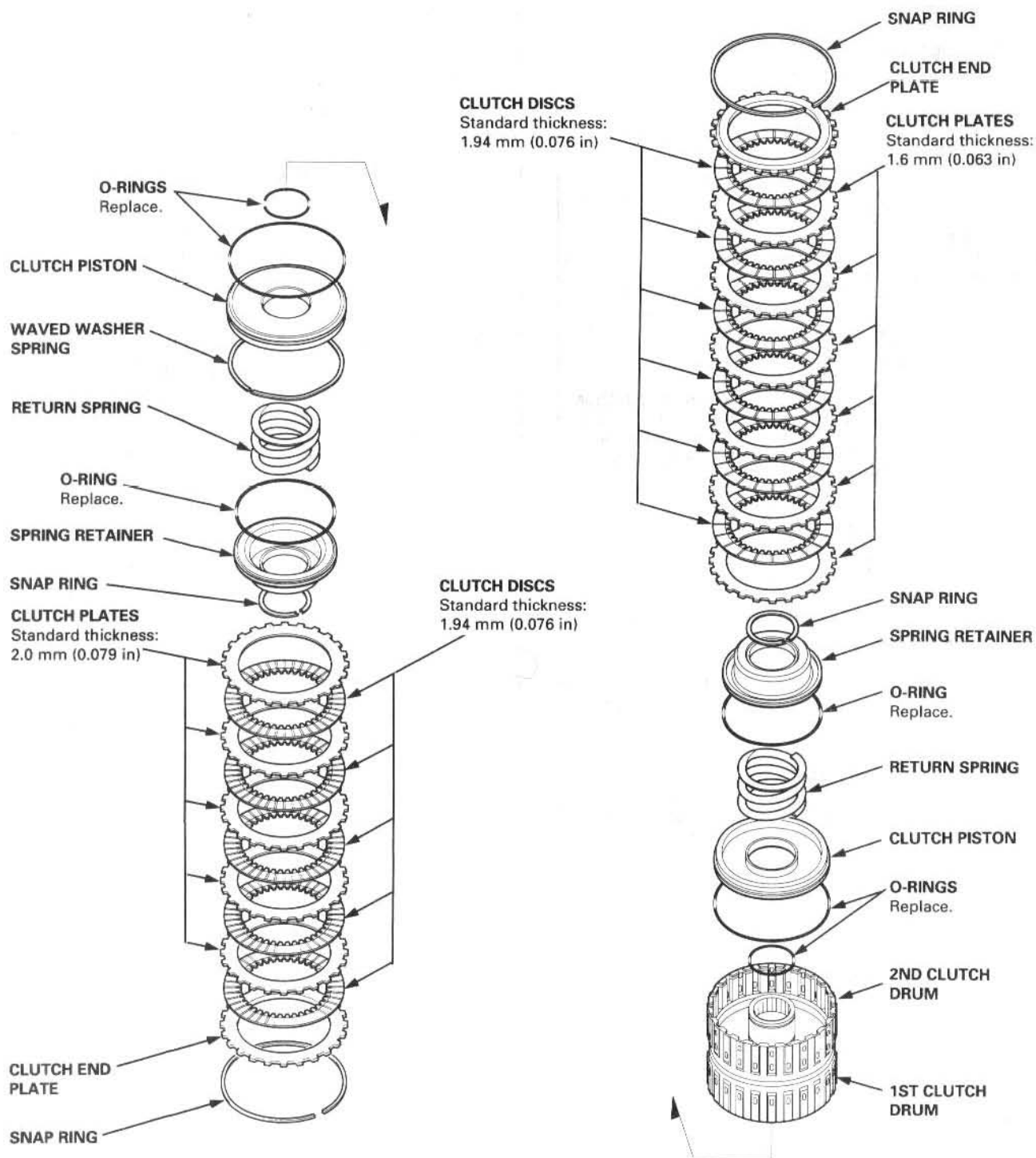
3. Install the new bearing on the secondary shaft idler gear using the special tool and a press as shown.



Clutch

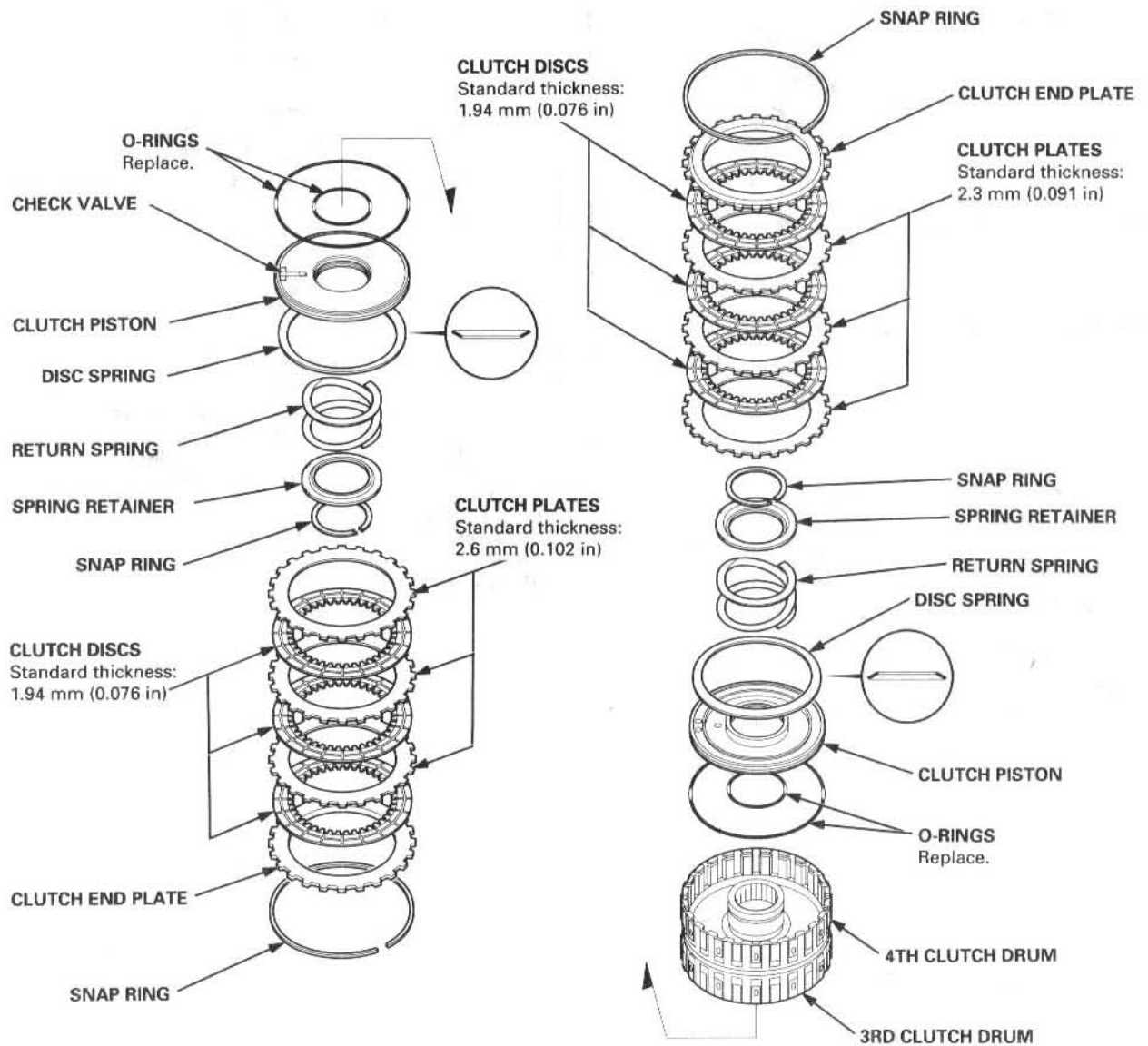
Illustrated Index

1ST/2ND CLUTCH





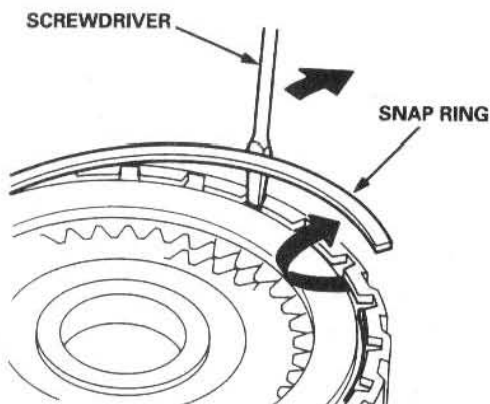
3RD/4TH CLUTCH



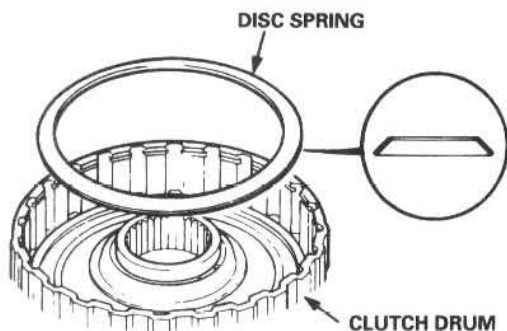
Clutch

Disassembly

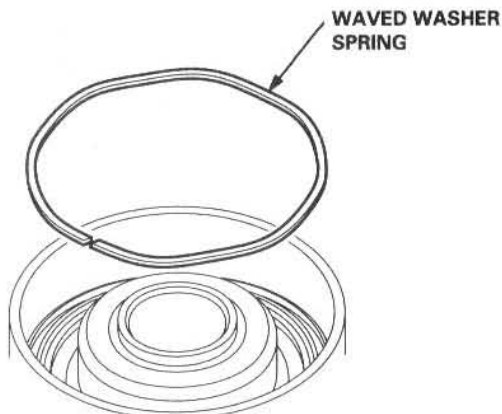
1. Remove the snap ring, then remove the clutch end plate, clutch discs, and plates.



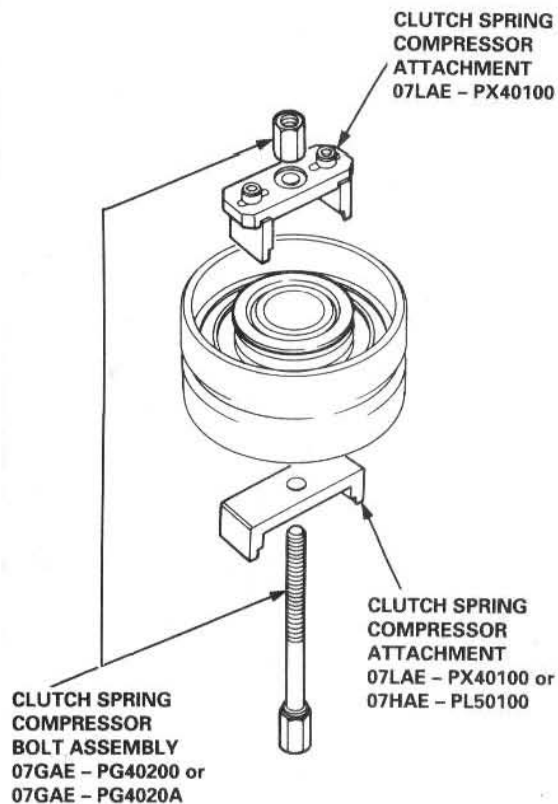
2. Remove the disc spring from the 3rd and 4th clutches.

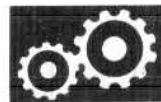


3. Remove the waved washer spring from the 1st clutch.

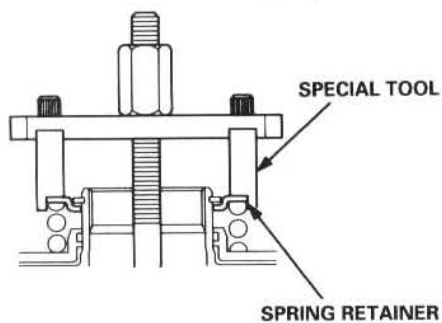


4. Install the special tools as shown.

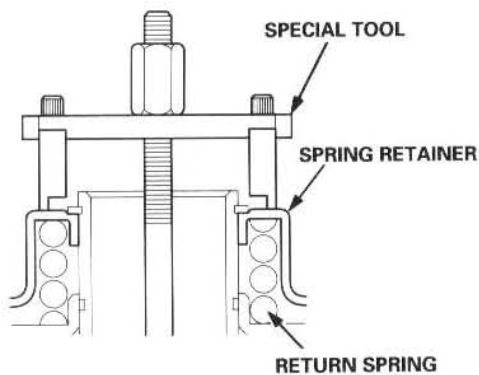




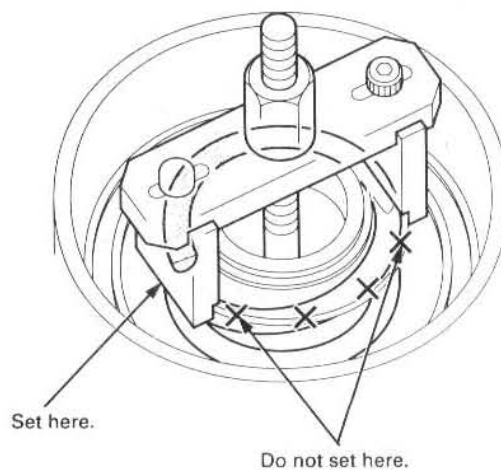
5. Be sure the special tool is adjusted to have full contact with the spring retainer, on the 3rd and 4th clutches.



6. Set the special tool on the spring retainer of the 1st and 2nd clutches in such a way that the special tool works on the clutch return spring.



7. If either end of the special tool is set over an area of the spring retainer which is unsupported by the return spring, the retainer may be damaged.

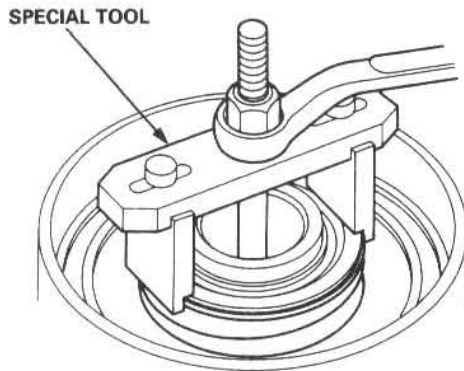


(cont'd)

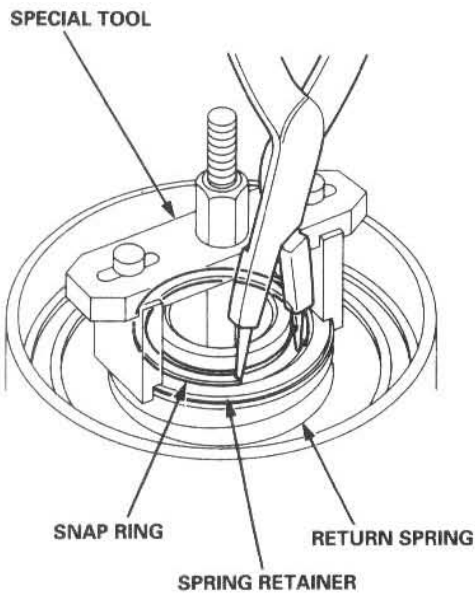
Clutch

Disassembly (cont'd)

8. Compress the spring until the snap ring can be removed.

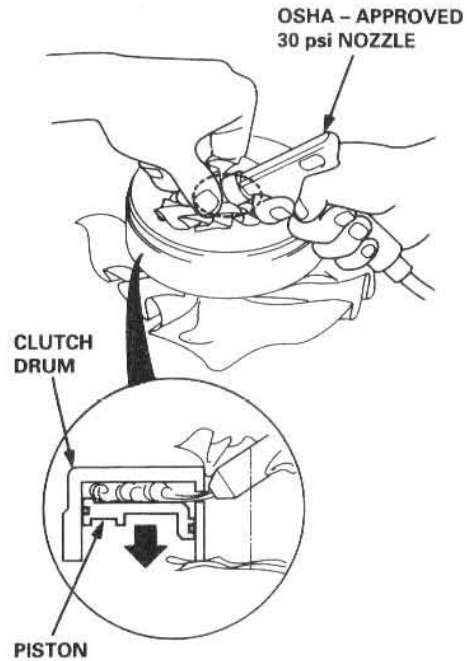


9. Remove the snap ring. Then remove the special tools, spring retainer, and return spring.



10. For 3rd and 4th clutch:

Wrap a shop rag around the clutch drum, and apply air pressure to the fluid passage to remove the piston. Place a finger tip on the other end while applying air pressure.



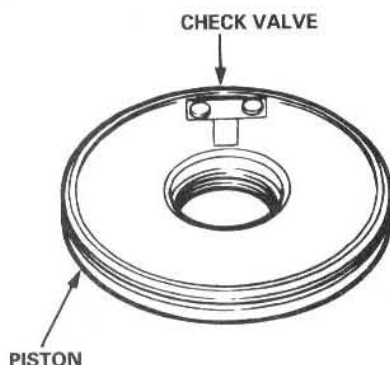


Reassembly

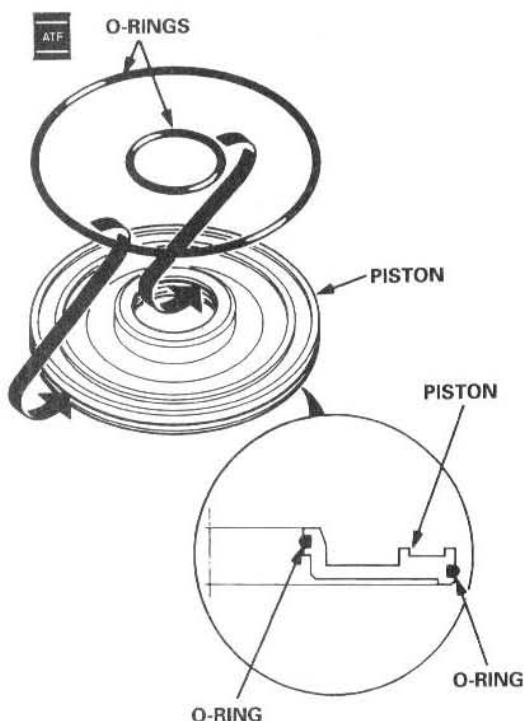
NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner, and dry them with compressed air.
- Blow out all passages.
- Lubricate all parts with ATF before assembly.

1. Inspect the check valve on the 3rd and 4th clutches; if it's loose, replace the piston.



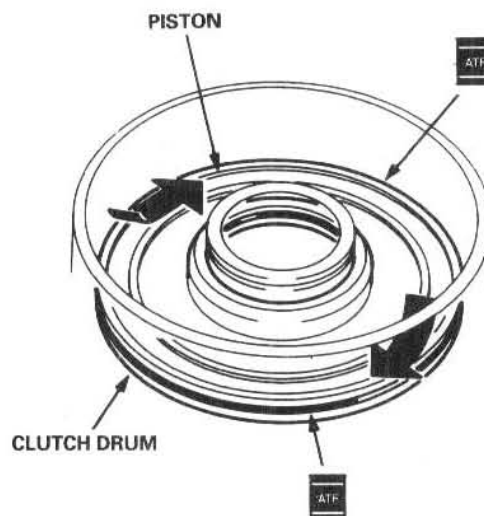
2. Install new O-rings on the piston and the spring retainer (1st and 2nd clutches).



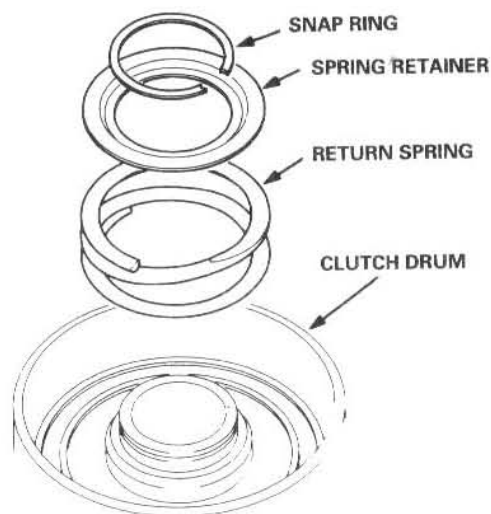
3. Install the piston in the clutch drum. Apply pressure and rotate to ensure proper seating.

NOTE: Lubricate the piston O-ring with ATF before installing.

CAUTION: Do not pinch the O-ring by installing the piston with too much force.



4. Install the return spring and spring retainer, and position the snap ring on the retainer.

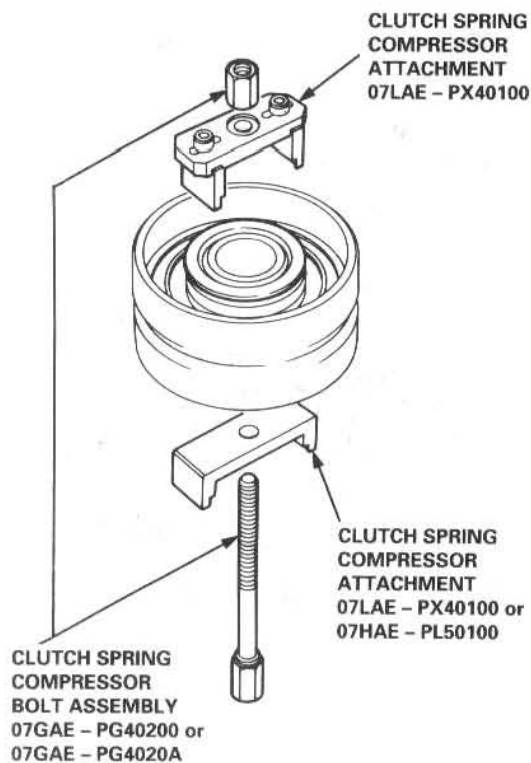


(cont'd)

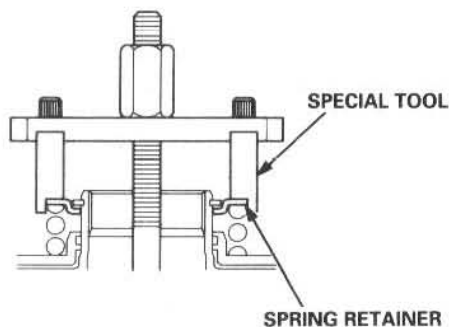
Clutch

Reassembly (cont'd)

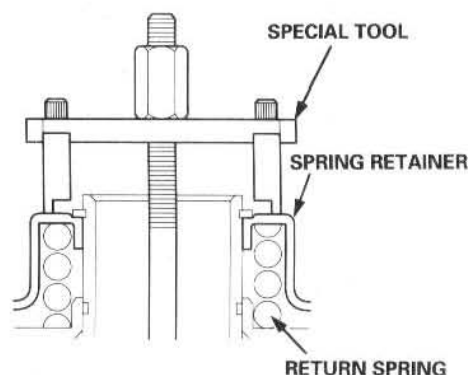
5. Install the special tools as shown.



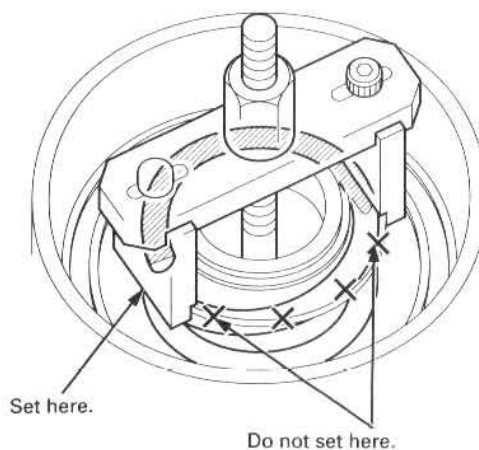
6. Be sure the special tool is adjusted to have full contact with the spring retainer on the 3rd and 4th clutches.



7. Set the special tool on the spring retainer of the 1st and 2nd clutches in such a way that the special tool work on the clutch return spring.

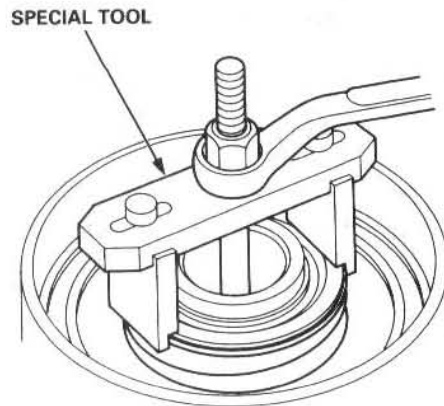


8. If either end of the special tool is set over an area of the spring retainer which is unsupported by the return spring, the retainer may be damaged.

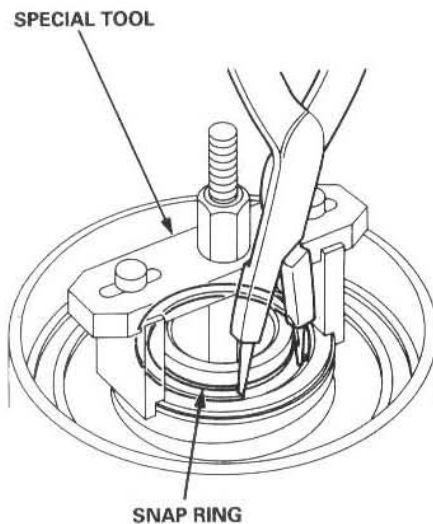




9. Compress the return spring with the special tools.

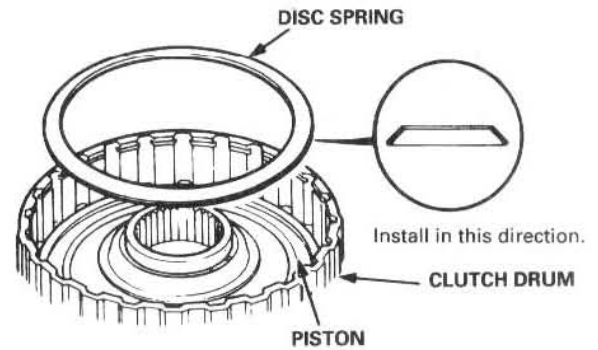


10. Install the snap ring.

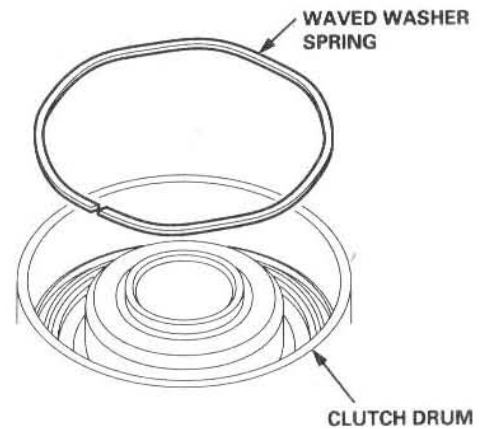


11. Remove the special tools.

12. Install the disc spring in the 3rd, and 4th clutches in the direction shown.



13. Install the waved washer spring in the 1st clutch.



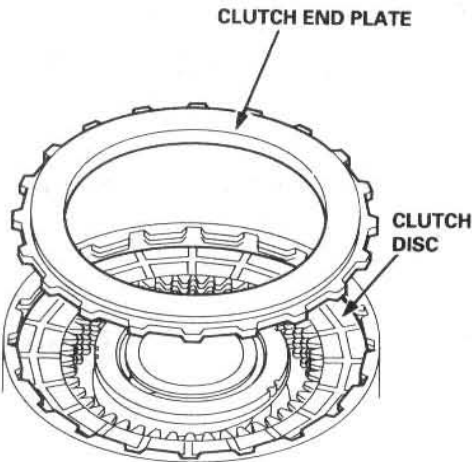
(cont'd)

Clutch

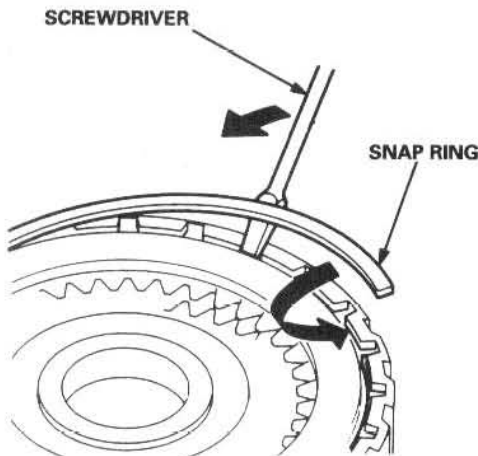
Reassembly (cont'd)

- 14. Soak the clutch discs thoroughly in ATF for a minimum of 30 minutes.
- 15. Starting with a clutch plate, alternately install the clutch plates and discs. Install the clutch end plate with the flat side toward the disc.

NOTE: Before installing the plates and discs, make sure the inside of the clutch drum is free of dirt and other foreign matter.



- 16. Install the snap ring.

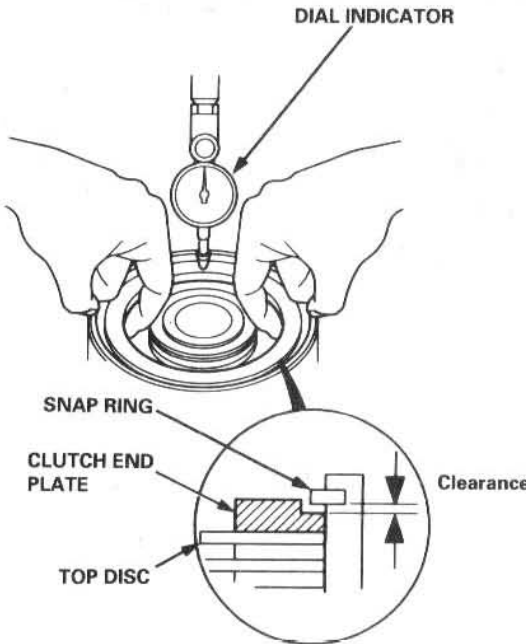


- 17. Measure the clearance between the clutch end plate and top disc with a dial indicator. Zero the dial indicator with the clutch end plate lowered, and lift it up to the snap ring. The distance that the clutch end plate moves is the clearance between the clutch end plate and top disc.

NOTE: Measure at three locations.

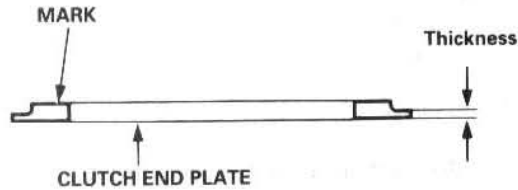
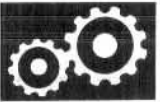
Clutch End Plate-to-Top Disc Clearance:

Clutch	Service Limit
1st	1.15 – 1.35 mm (0.045 – 0.053 in)
2nd	1.0 – 1.2 mm (0.039 – 0.047 in)
3rd	0.6 – 0.8 mm (0.024 – 0.031 in)
4th	0.4 – 0.6 mm (0.016 – 0.024 in)



- 18. If the clearance is not within the service limits, select a new clutch end plate from the following table.

NOTE: If the thickest clutch end plate is installed, but the clearance is still over the standard, replace the clutch discs and clutch plates.



1ST and 2ND CLUTCH END PLATES

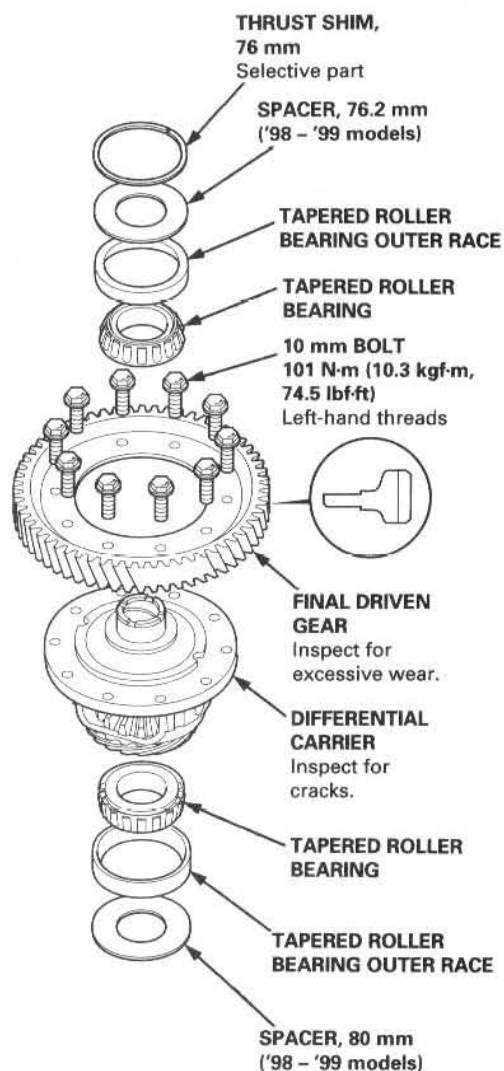
Mark	Part Number	Thickness
6	22551 – P6H – 003	2.6 mm (0.102 in)
7	22552 – P6H – 003	2.7 mm (0.106 in)
8	22553 – P6H – 003	2.8 mm (0.110 in)
9	22554 – P6H – 003	2.9 mm (0.114 in)
0	22555 – P6H – 003	3.0 mm (0.118 in)
1	22556 – P6H – 003	3.1 mm (0.122 in)
2	22557 – P6H – 003	3.2 mm (0.126 in)
3	22558 – P6H – 003	3.3 mm (0.130 in)
4	22559 – P6H – 003	3.4 mm (0.134 in)

3RD and 4TH CLUTCH END PLATES

Mark	Part Number	Thickness
1	22551 – PX4 – 003	2.1 mm (0.083 in)
2	22552 – PX4 – 003	2.2 mm (0.087 in)
3	22553 – PX4 – 003	2.3 mm (0.091 in)
4	22554 – PX4 – 003	2.4 mm (0.094 in)
5	22555 – PX4 – 003	2.5 mm (0.098 in)
6	22556 – PX4 – 003	2.6 mm (0.102 in)
7	22557 – PX4 – 003	2.7 mm (0.106 in)
8	22558 – PX4 – 003	2.8 mm (0.110 in)
9	22559 – PX4 – 003	2.9 mm (0.114 in)

Differential

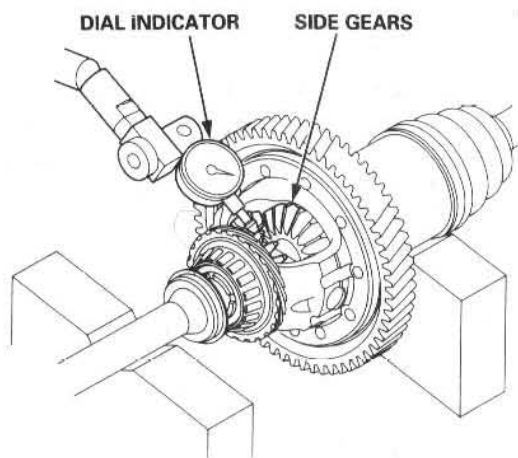
Components



Backlash Inspection

1. Place the differential assembly on V-blocks, and install both axles.
2. Check the backlash of both side gears.

**Standard (New): 0.05 – 0.15 mm
(0.002 – 0.006 in)**



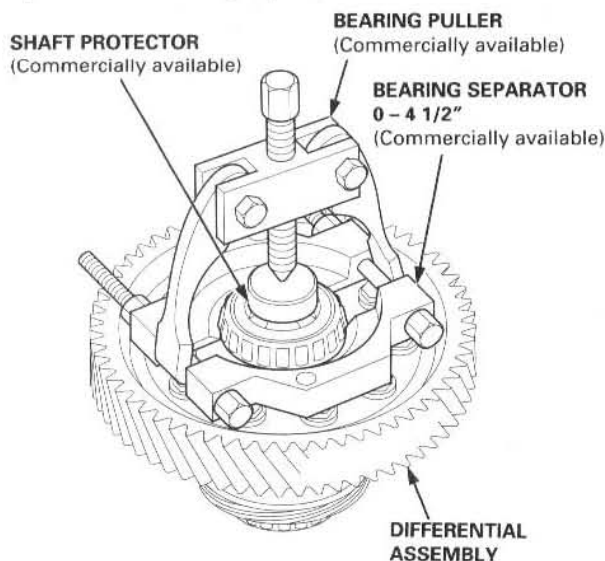
3. If the backlash is out of tolerance, replace the differential carrier.



Bearing Replacement

NOTE: Check the bearings for wear and rough rotation. If the bearings are OK, removal is not necessary.

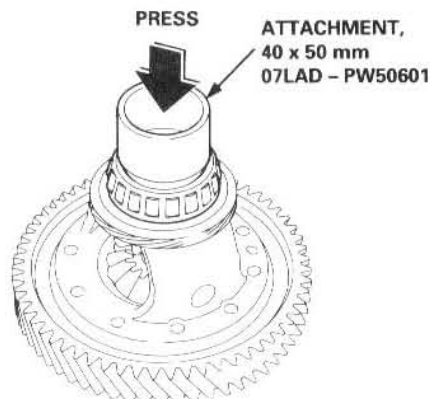
1. Remove the tapered roller bearings using a bearing puller and a bearing separator as shown.



2. Install the new tapered roller bearings using the special tool and a press as shown.

NOTE:

- Press the bearings on until they bottom.
- Use the small end of the special tool to install the bearings.



NOTE:

- The bearing and outer race should be replaced as a set.
- Inspect and adjust the bearing preload whenever a bearing is replaced.
- Press the bearings on securely so there is no clearance between the bearings and the differential carrier.

Differential Carrier Replacement

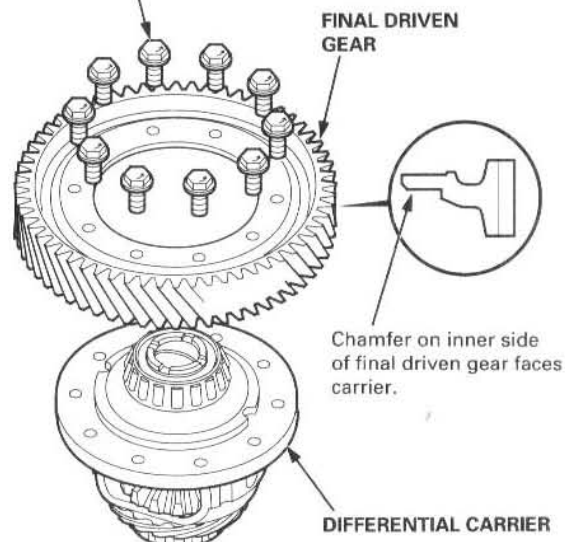
1. Remove the final driven gear from the differential carrier.

NOTE: The final driven gear bolts have left-hand threads.

2. Install the final driven gear with the chamfered side on the inner bore facing the differential carrier.
3. Tighten the bolts to the specified torque in a criss-cross pattern.

TORQUE: 101 N-m (10.3 kgf-m, 74.5 lbf-ft)

10 mm BOLT
101 N-m (10.3 kgf-m, 74.5 lbf-ft)
Left-hand threads



Tapered Roller Bearing Preload Adjustment

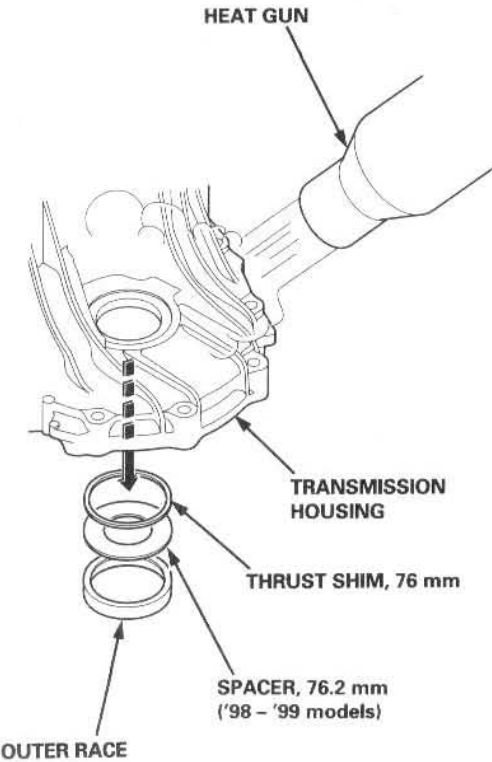
NOTE: If the transmission housing, torque converter housing, differential carrier, tapered roller bearing, outer race, spacer ('98 - '99 models), or thrust shim were replaced, the bearing preload must be adjusted.

CAUTION:

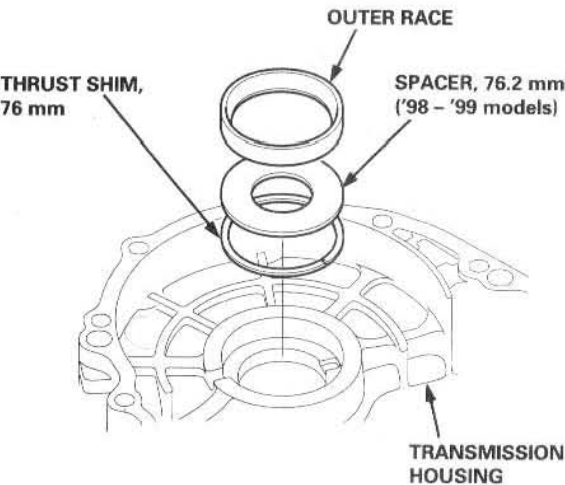
- Do not heat the housing in excess of 212°F (100°C).
- Replace the tapered roller bearing when the outer race is to be replaced.
- Do not use a shim on the torque converter housing side.

1. Remove the bearing outer race, spacer ('98 - '99 models) and thrust shim from the transmission housing by heating the housing to about 212°F (100°C) with a heat gun.

NOTE: Let the transmission housing cool to room temperature before adjusting the bearing preload.



2. Select the 2.60 mm (1.102 in) thrust shim from the middle of the table below.



THRUST SHIM, 76 mm

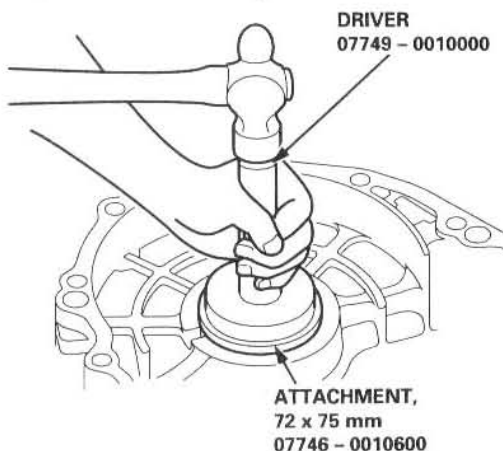
No.	Part Number	Thickness
A	41438 - PX4 - 700	2.05 mm (0.081 in)
B	41439 - PX4 - 700	2.10 mm (0.083 in)
C	41440 - PX4 - 700	2.15 mm (0.085 in)
D	41441 - PK4 - 000	2.20 mm (0.087 in)
E	41442 - PK4 - 000	2.25 mm (0.089 in)
F	41443 - PK4 - 000	2.30 mm (0.091 in)
G	41444 - PK4 - 000	2.35 mm (0.093 in)
H	41445 - PK4 - 000	2.40 mm (0.094 in)
I	41446 - PK4 - 000	2.45 mm (0.096 in)
J	41447 - PK4 - 000	2.50 mm (0.098 in)
K	41448 - PK4 - 000	2.55 mm (0.100 in)
L	41449 - PK4 - 000	2.60 mm (0.102 in)
M	41450 - PK4 - 000	2.65 mm (0.104 in)
N	41451 - PK4 - 000	2.70 mm (0.106 in)
O	41452 - PK4 - 000	2.75 mm (0.108 in)
P	41453 - PK4 - 000	2.80 mm (0.110 in)
Q	41454 - PK4 - 000	2.85 mm (0.112 in)
R	41455 - PK4 - 000	2.90 mm (0.114 in)
S	41456 - PK4 - 000	2.95 mm (0.116 in)
T	41457 - PK4 - 000	3.00 mm (0.118 in)
U	41458 - PK4 - 000	3.05 mm (0.120 in)



3. Install the thrust shim and spacer ('98 - '99 models) in the transmission housing, then install the outer race using the special tools as shown.

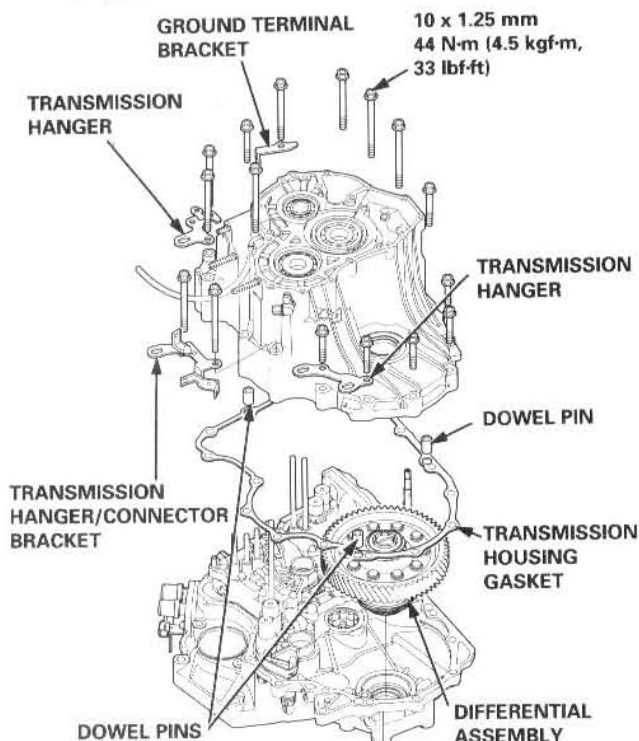
NOTE:

- Install the outer race securely in the transmission housing.
- Check that there is no clearance between the outer race, shim, spacer ('98 - '99 models), and transmission housing.



4. With the mainshaft, countershaft, and secondary shaft removed, install the differential assembly, and torque the transmission housing bolts.

NOTE: Install the gasket when checking starting torque.



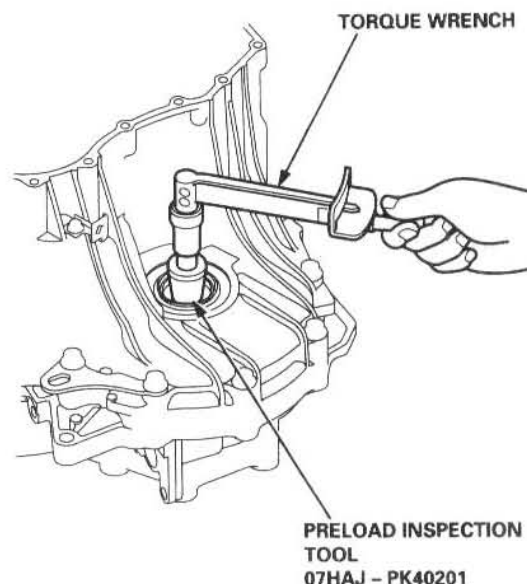
5. Rotate the differential assembly in both directions to seat the bearings.

6. Measure the starting torque of the differential assembly with the special tool and a torque wrench.

STANDARD:

New bearings: 2.7 - 3.9 N·m
(28 - 40 kgf·cm, 24 - 35 lbf·in)

Reused bearings: 2.5 - 3.6 N·m
(25 - 37 kgf·cm, 22 - 32 lbf·in)



NOTE:

- Measure the starting torque at normal room temperature in both directions.
- Changing the shim to the next size will increase or decrease starting torque about 0.3 - 0.4 N·m (3 - 4 kgf·cm, 3 - 3 lbf·in).
- To increase the starting torque, increase the thickness of the shim. To decrease the starting torque, decrease the thickness of the shim.

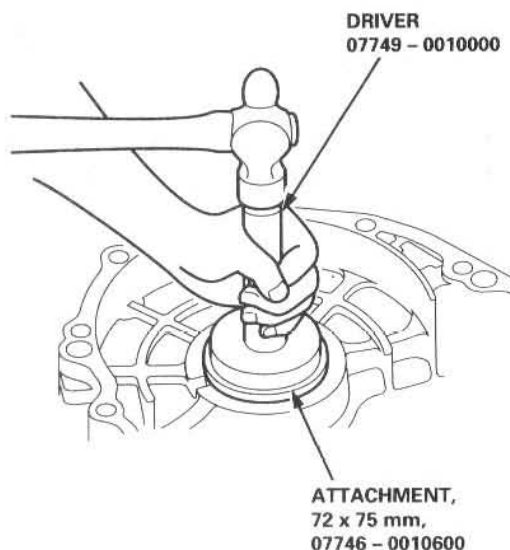
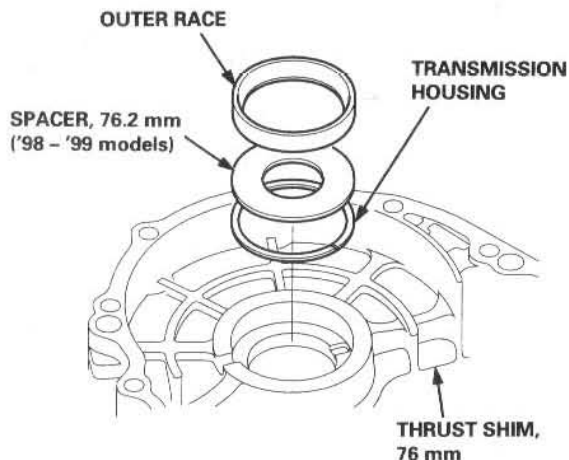
Tapered Roller Bearing Outer Race

Replacement

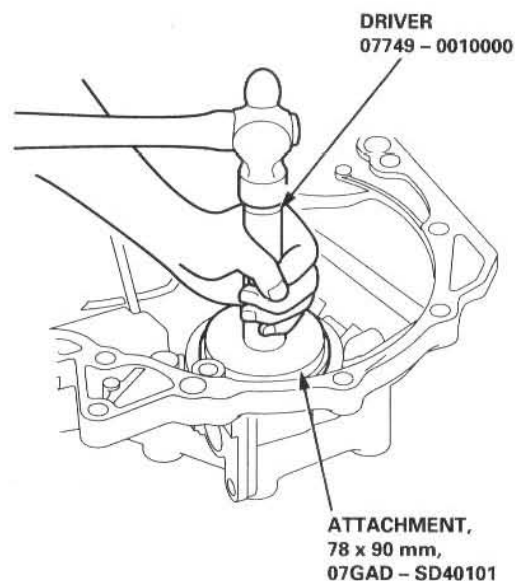
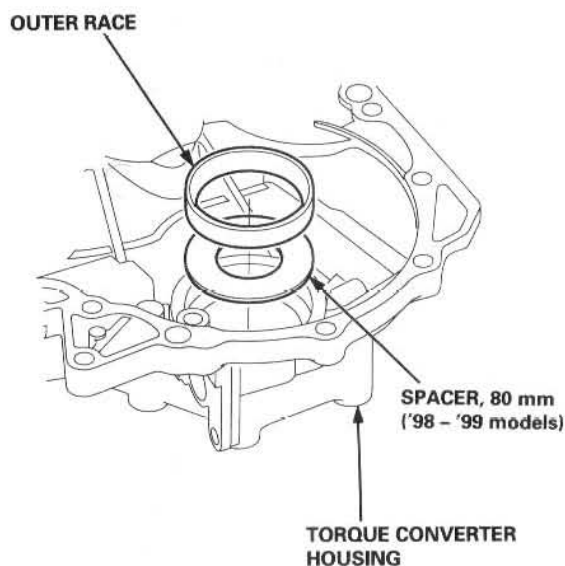
NOTE:

- Replace the bearing with a new one whenever the outer race is to be replaced.
- Do not use shim(s) on the torque converter housing side.
- Adjust preload after replacing the bearing and outer race.
- Coat all parts with ATF during installation.

1. Remove the bearing outer race from the transmission housing by heating the housing to about 212°F (100°C) with a heat gun.
2. Remove the bearing outer race from the torque converter housing.
3. Install the thrust shim, spacer ('98 - '99 models), and outer race in the transmission housing using the special tools as shown.



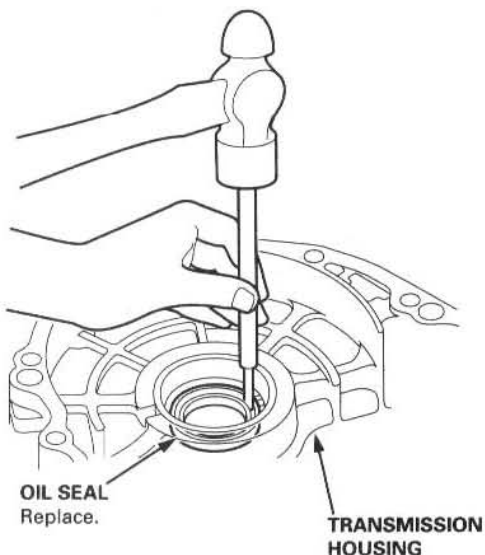
4. Install the outer race and the spacer ('98 - '99 models) in the torque converter housing, and be sure to install the outer race until it bottoms in the housing using the special tools as shown.



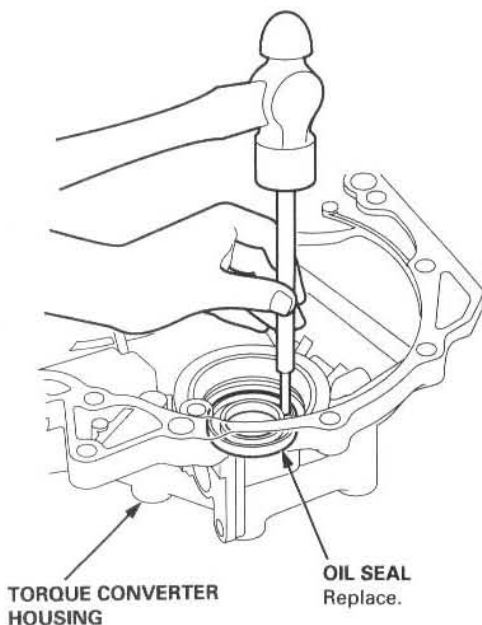


Removal

1. Remove the oil seal from the transmission housing.

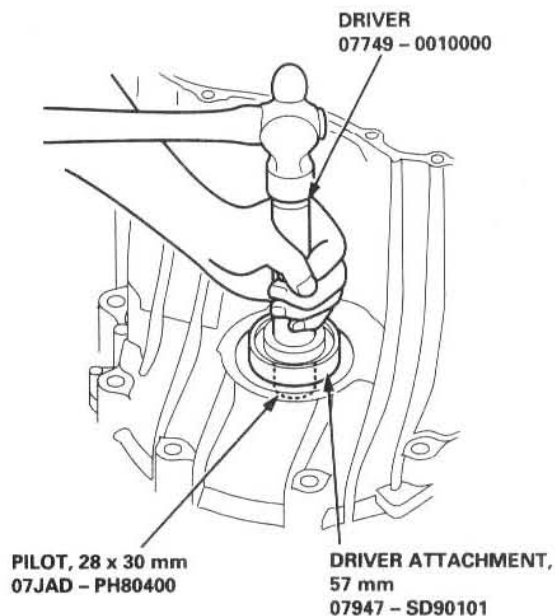


2. Remove the oil seal from the torque converter housing.

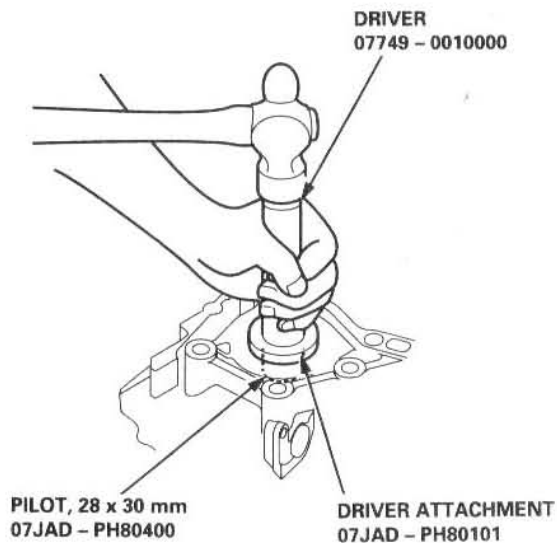


Installation

1. Install the oil seal in the transmission housing using the special tools as shown.



2. Drive the oil seal into the torque converter housing using the special tools as shown.

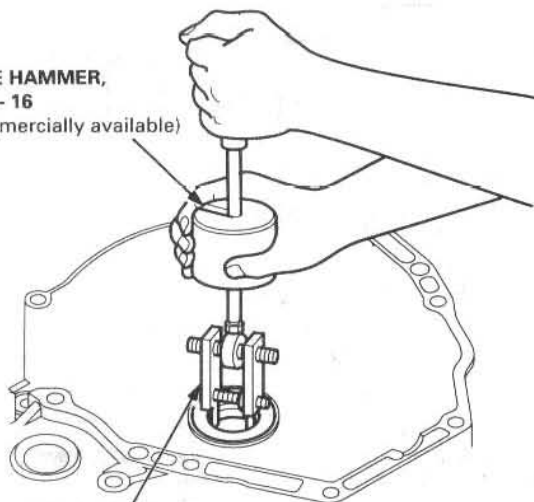


Torque Converter Housing Bearings

Mainshaft Bearing/Oil Seal Replacement

1. Remove the mainshaft bearing and oil seal using the special tools as shown.

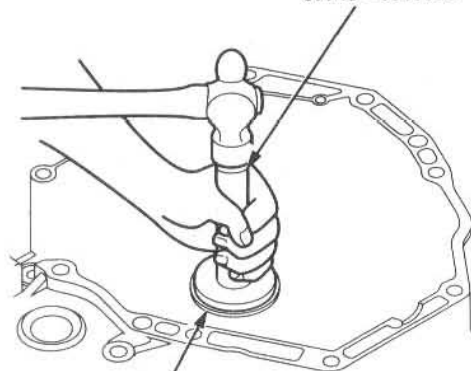
SLIDE HAMMER,
3/8" - 16
(Commercially available)



**ADJUSTABLE BEARING
PULLER, 25 - 40 mm**
07736 - A01000B or
07736 - A01000A

2. Drive in the new mainshaft bearing until it bottoms in the housing using the special tools as shown.

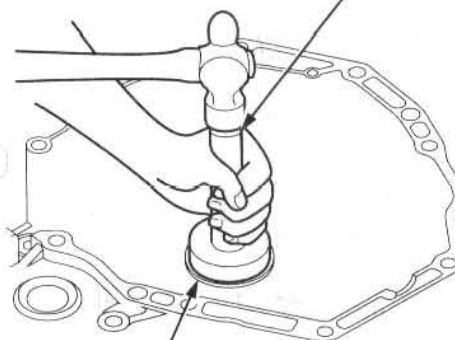
DRIVER -
07749 - 0010000



ATTACHMENT,
62 x 68 mm
07746 - 0010500

3. Install the new oil seal flush with the housing using the special tools as shown.

DRIVER
07749 - 0010000

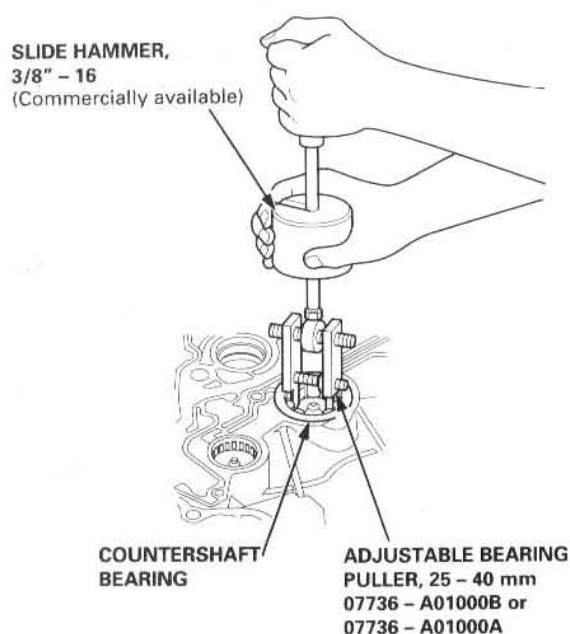


ATTACHMENT,
72 x 75 mm
07746 - 0010600

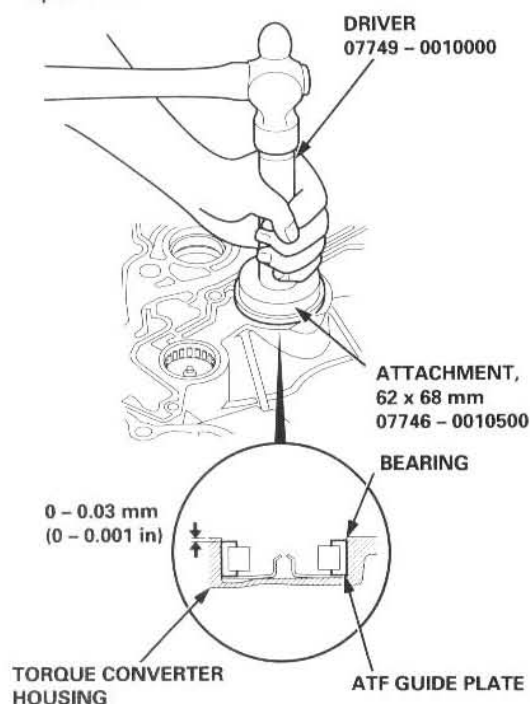


Countershaft Bearing Replacement

1. Remove the countershaft bearing using the special tool as shown.

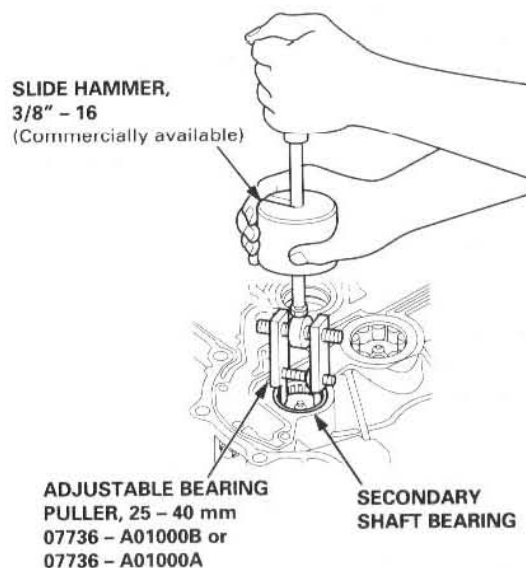


2. Install the ATF guide plate.
3. Install the new bearing into the housing using the special tools as shown.

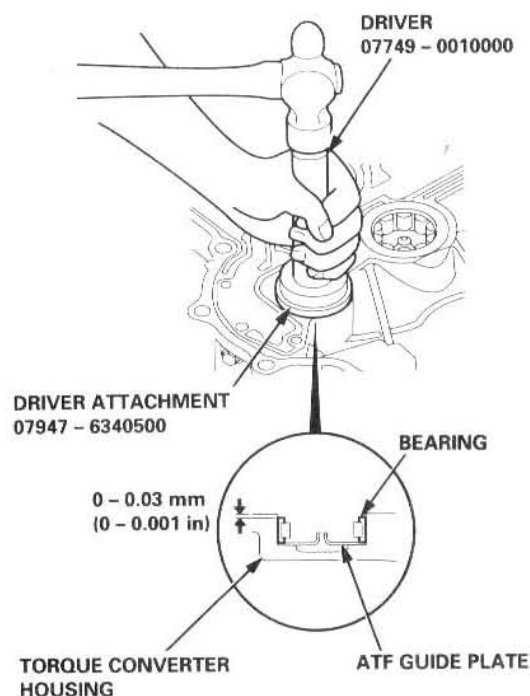


Secondary Shaft Bearing Replacement

1. Remove the secondary shaft bearing using the special tool as shown.



2. Install the ATF guide plate.
3. Install the new bearing into the housing using the special tools as shown.



Transmission Housing Bearings

Removal/Installation

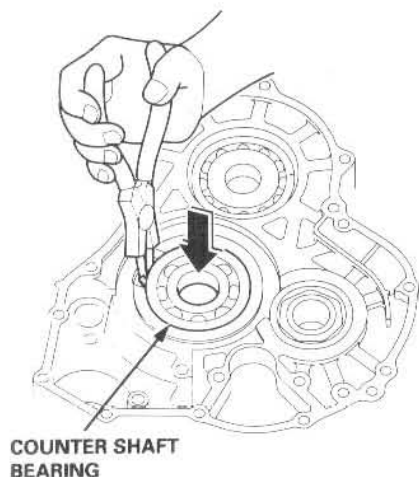
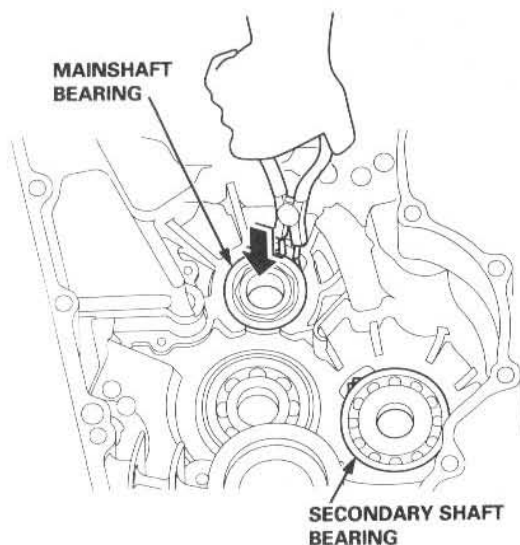
NOTE: Coat all parts with ATF before assembly.

1. To remove the mainshaft, countershaft, and secondary shaft bearings from the transmission housing, expand each snap ring with the snap ring pliers, then push the bearing out using the following special tools and a press.

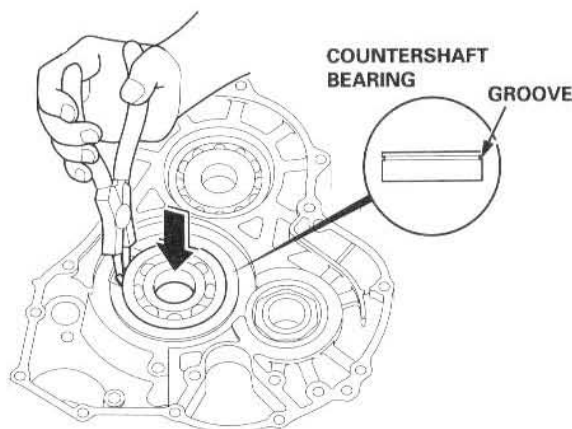
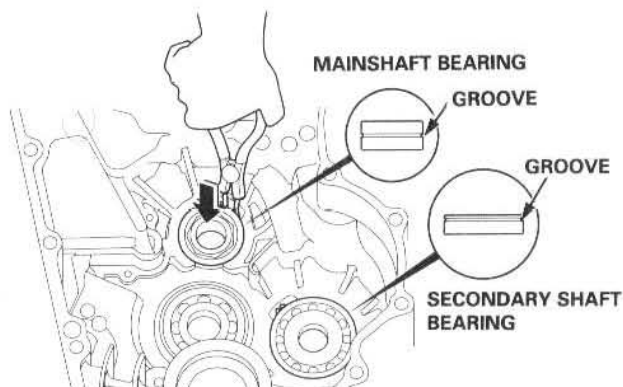
NOTE: Do not remove the snap rings unless it's necessary to clean the grooves in the housing.

Special Tools Required:

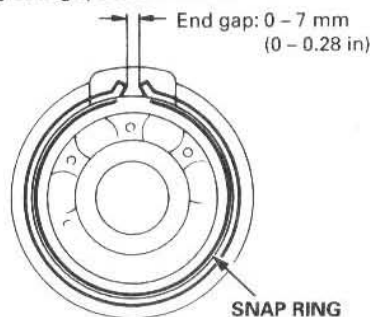
- Driver (07749 - 0010000)
- Mainshaft:
Driver Attachment, 58 mm (07JAD-PH80101)
- Countershaft and Secondary Shaft:
Attachment, 72 x 75 mm (07746 - 0010600)



2. Install the bearings in the direction shown.
3. Expand each snap ring with the snap ring pliers, and insert the bearing part-way into the housing using the special tools and a press.
4. Release the pliers, then push the bearing down into the housing until the snap ring snaps in place around it.



5. After installing the bearings verify the following:
 - The snap rings are seated in the bearing and housing grooves.
 - The ring end gaps are correct.



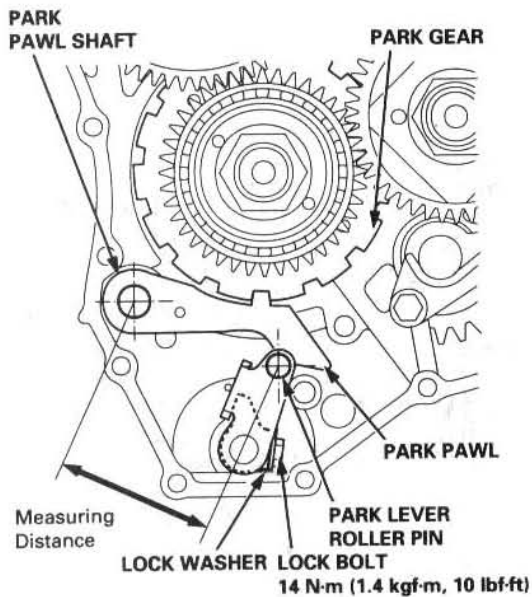


Park Stop

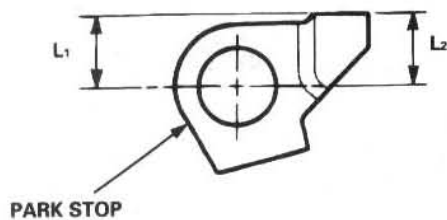
Inspection/Adjustment

1. Set the park lever in the **P** position.
2. Measure the distance between the park pawl shaft and the park lever roller pin as shown.

STANDARD: 69.5 – 70.5 mm (2.74 – 2.78 in)



3. If the measurement is out of tolerance, select and install the appropriate park stop from the table below.



PARK STOP

Mark	Part Number	L ₁	L ₂
1	24537 – PA9 – 003	11.00 mm (0.433 in)	11.00 mm (0.433 in)
2	24538 – PA9 – 003	10.80 mm (0.425 in)	10.65 mm (0.419 in)
3	24539 – PA9 – 003	10.60 mm (0.417 in)	10.30 mm (0.406 in)

4. After replacing the park stop, make sure the distance is within tolerance.

Transmission

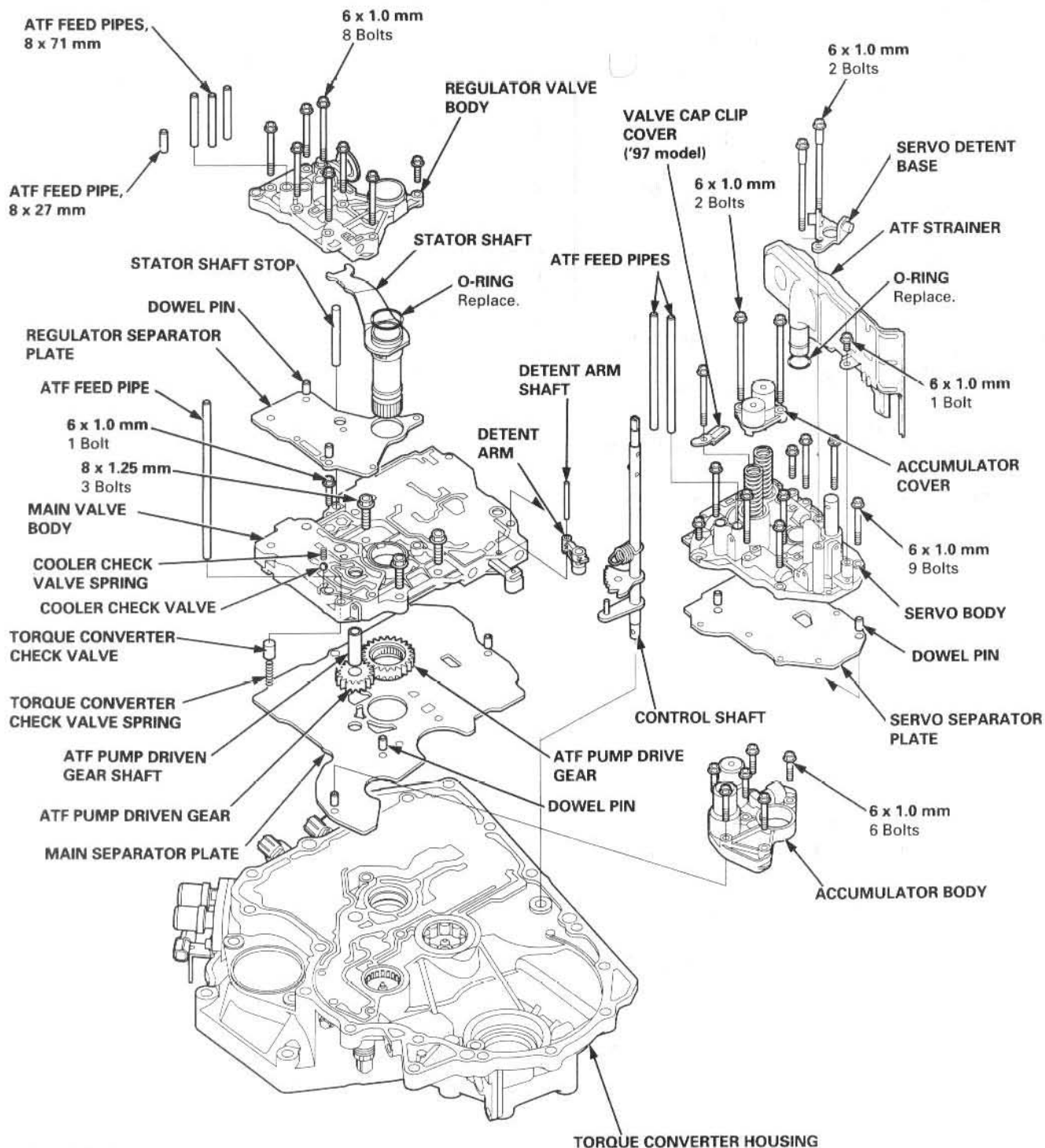
Reassembly

NOTE:

- Coat all parts with ATF.
- Replace the following parts:
 - O-rings
 - Lock washers
 - Gaskets
 - Locknuts and conical spring washers
 - Sealing washer

Torque:

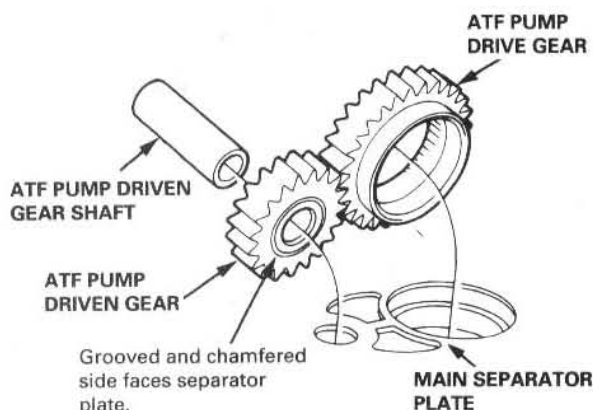
- 6 x 1.0 mm: 12 N·m (1.2 kgf-m, 8.7 lbf-ft)
- 8 x 1.25 mm: 18 N·m (1.8 kgf-m, 13 lbf-ft)



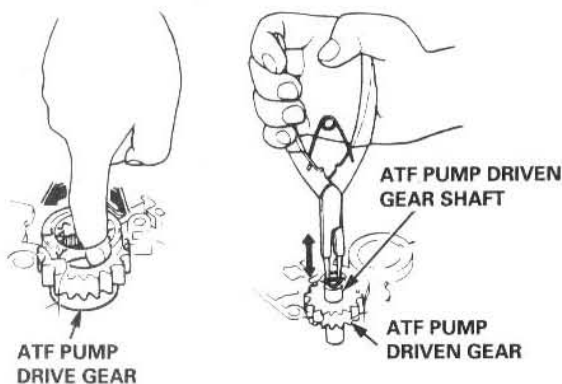


1. Install the main separator plate and three dowel pins on the torque converter housing. Then install the ATF pump gears and ATF pump driven gear shaft.

NOTE: Install the ATF pump driven gear with its grooved and chamfered side faces separator plate.



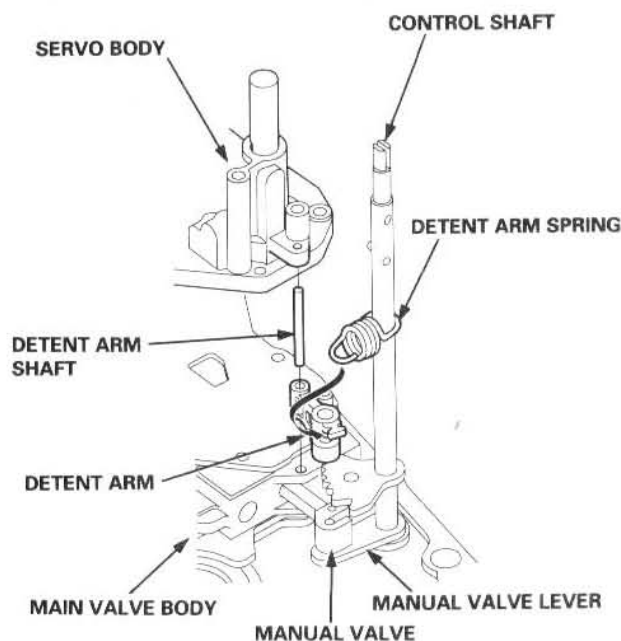
2. Install the torque converter check valve and spring, then install the main valve body (one 6 mm bolt and three 8 mm bolts). Make sure the ATF pump drive gear rotates smoothly in the normal operating direction, and the ATF pump driven gear shaft moves smoothly in the axial and normal operating direction.



3. If the ATF pump drive gear and ATF pump driven gear shaft do not move smoothly, loosen the main valve body bolts. Realign the ATF pump driven gear shaft, and retighten the bolts to the specified torque, then recheck.

CAUTION: Failure to align the ATF pump driven gear shaft correctly will result in a seized ATF pump drive gear or ATF pump driven gear shaft.

4. Install the cooler check valve and spring on the main valve body, then install the two dowel pins and the regulator separator plate.
5. Install the stator shaft and stator shaft stop.
6. Install the regulator valve body (eight bolts).
7. Install the two dowel pins and the servo separator plate on the main valve body.
8. Install the control shaft in the torque converter housing, then align the manual valve lever of the control shaft to the manual valve guide.
9. Install the detent arm and arm shaft in the main valve body, then hook the detent arm spring to the detent arm.

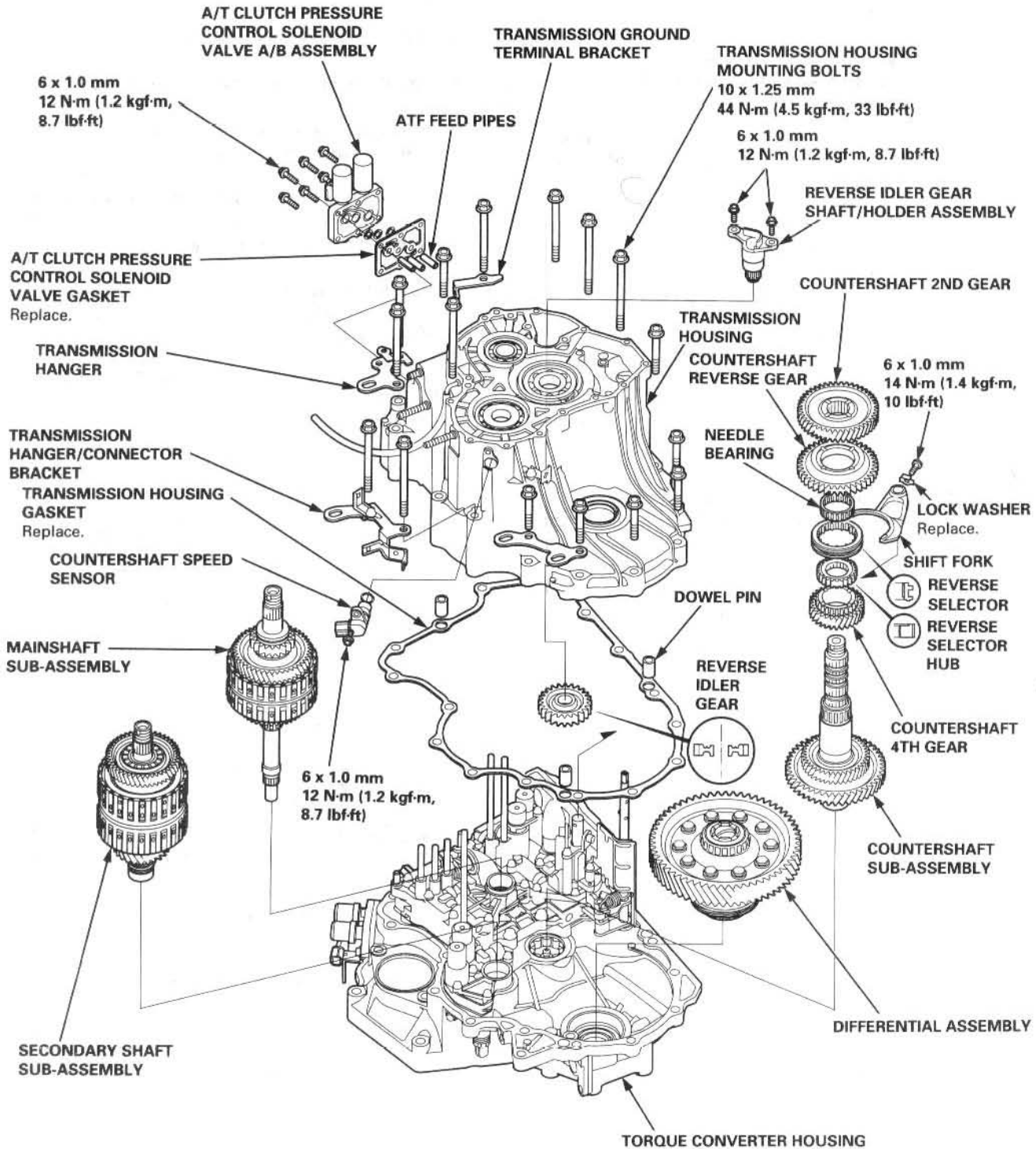


10. Install the servo body and valve cap clip cover ('97 model) (nine bolts).
11. Install the accumulator cover (two bolts).
12. Install the ATF strainer (one bolt).
13. Install the servo detent base (two bolts).
14. Install the accumulator body (six bolts).
15. Install the two ATF feed pipes in the servo body, four pipes in the regulator valve body, and one pipe in the main valve body.

(cont'd)

Transmission

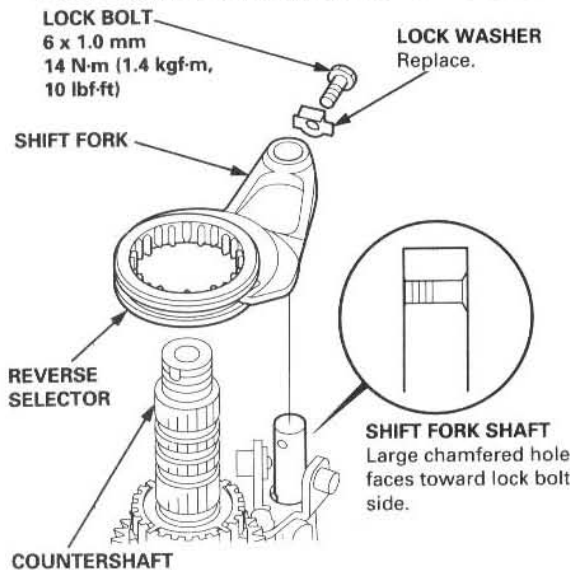
Reassembly (cont'd)



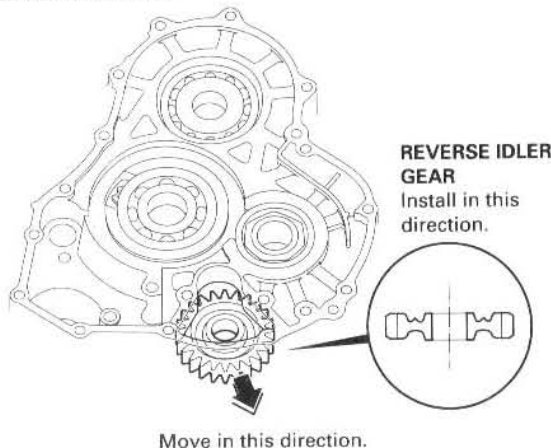


16. Install the differential assembly, countershaft sub-assembly, mainshaft sub-assembly, and secondary shaft sub-assembly in the torque converter housing.
17. Install the countershaft 4th gear and reverse selector hub on the countershaft.

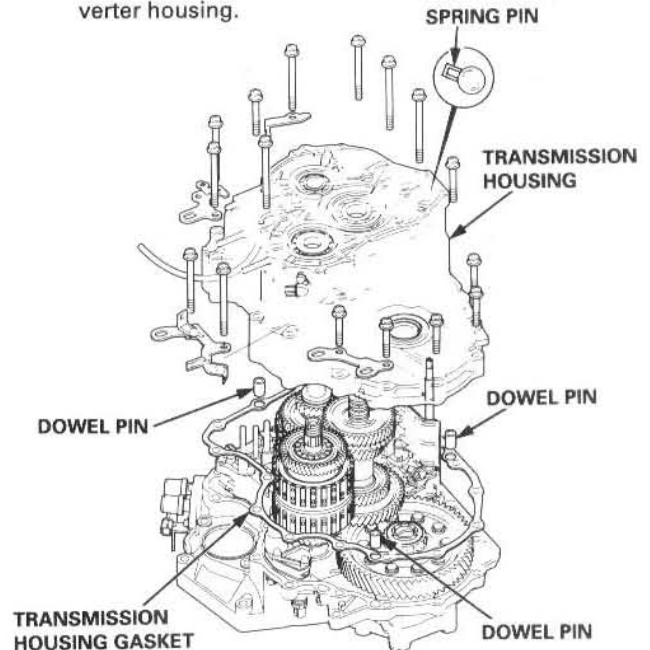
18. Turn the shift fork shaft so the large chamfered hole is facing the fork bolt hole. Then install the shift fork and reverse selector together on the shift fork shaft and countershaft. Secure the shift fork to the shift fork shaft with the lock bolt and a new lock washer, then bend the lock washer against the bolt head.



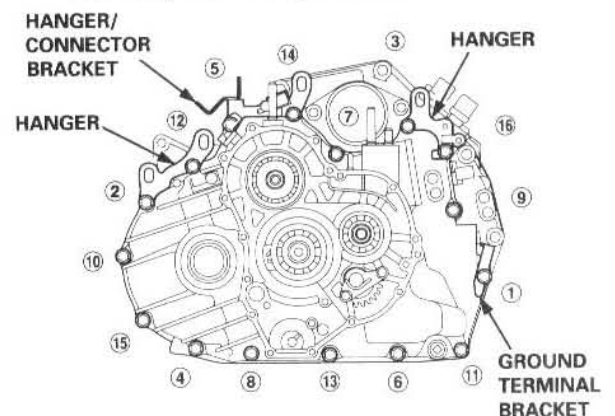
19. Install the needle bearing, countershaft reverse gear, and countershaft 2nd gear on the countershaft.
20. Install the reverse idler gear in the transmission housing in the direction shown, then move it the direction shown.



21. Align the spring pin of the control shaft with the transmission housing groove by turning the control shaft.
22. Install three dowel pins and a new gasket on the torque converter housing.
23. Place the transmission housing on the torque converter housing.



24. Install the transmission housing mounting bolts along with the transmission hanger/connector bracket, transmission hangers, and transmission ground terminal bracket. Tighten the bolts in two or more steps in the sequence shown.



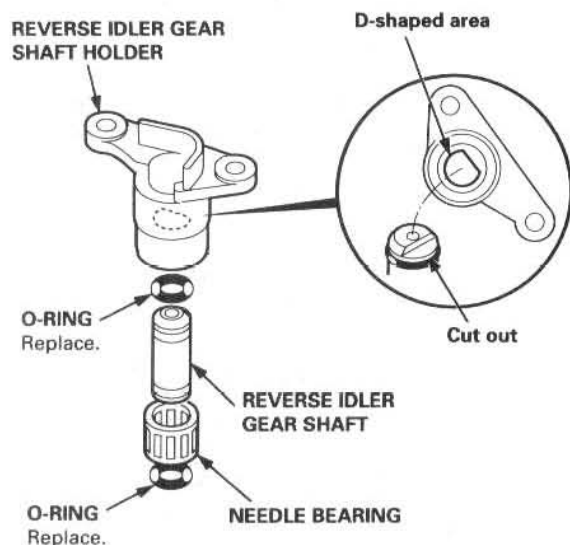
25. Install the countershaft speed sensor on the transmission housing.
26. Install the A/T clutch pressure control solenoid valve A/B assembly, three ATF feed pipes, new O-rings, and a new gasket on the transmission housing (see page 14-105).

(cont'd)

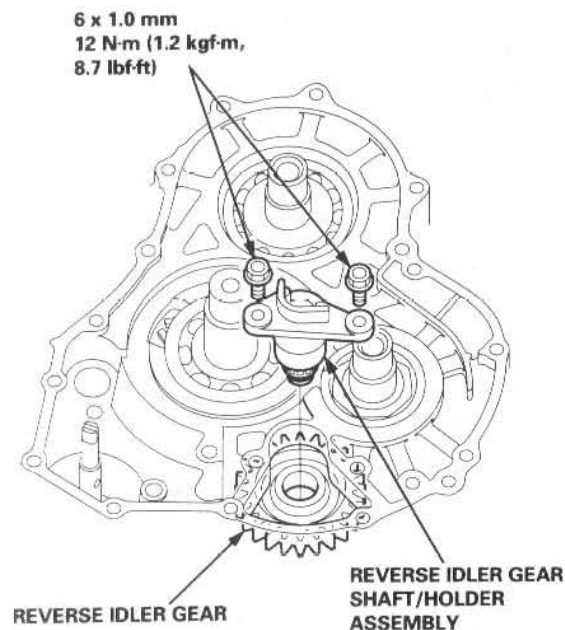
Transmission

Reassembly (cont'd)

27. Coat the reverse idler gear shaft, needle bearing, and new O-rings with lithium grease lightly. Assemble the new O-rings and needle bearing on the reverse idler gear shaft, then install the reverse idler gear shaft in the reverse idler gear shaft holder, aligning the D-shaped cut out of the shaft with the D-shaped area of the holder.

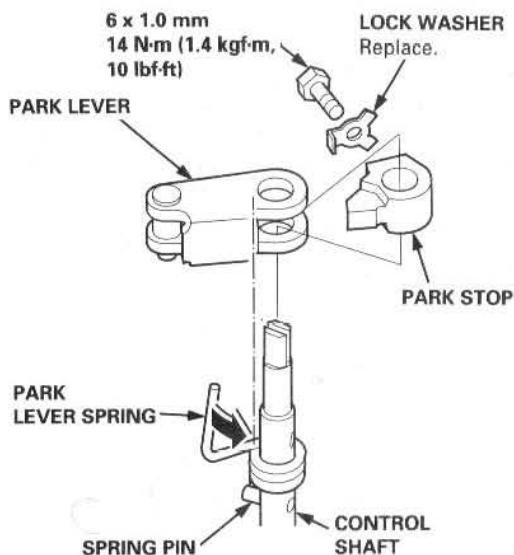


28. Engage the reverse idler gear with the countershaft reverse gear and mainshaft reverse gear, then install the reverse idler gear shaft/holder assembly on the transmission housing.



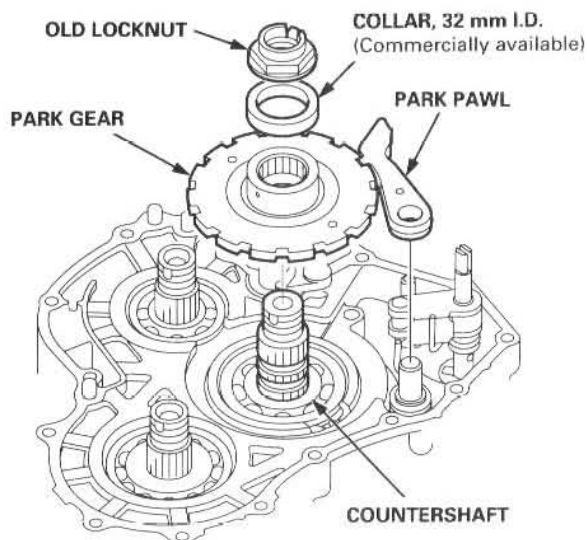
29. Install the park lever on the control shaft, then install the lock bolt with a new lock washer.

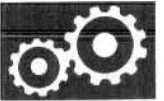
NOTE: Do not bend the lock tab of the lock washer in this step; bend it after checking the park pawl engagement in step 50.



30. Coat the following parts with ATF:
- Splines of the countershaft, the park gear, and the old locknut.
 - Threads of the countershaft and the old locknut.
 - Old conical spring washer.
31. Install the park gear using the old locknut and a collar. Hold the park pawl to engage with the park gear, then tighten the old locknut until the shaft splines come out slightly over the park gear splines.

NOTE: Do not use an impact wrench.

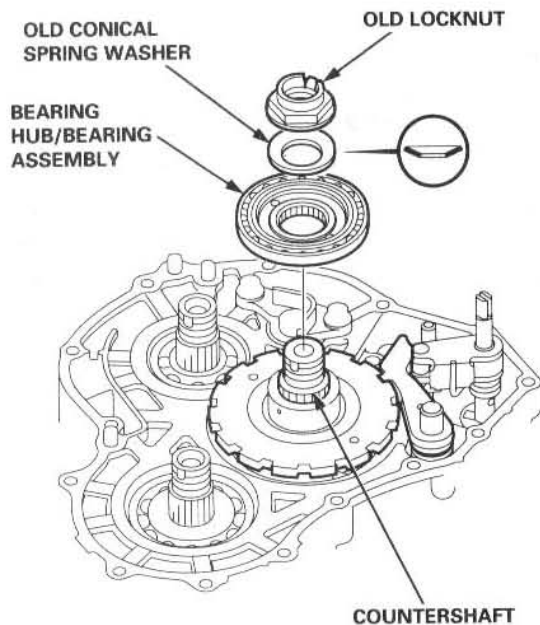




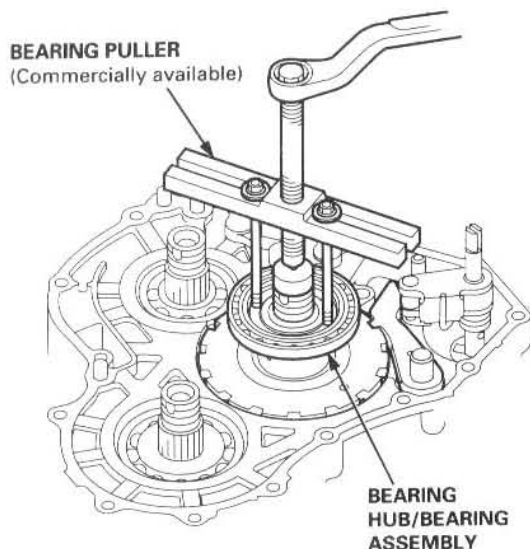
32. Remove the locknut and the collar, then install only the bearing hub/bearing assembly and old conical spring washer. Tighten the old locknut to seat the park gear to the specified torque, then remove the locknut and conical spring washer.

TORQUE: 226 N-m (23.0 kgf-m, 166 lbf-ft)

NOTE: Do not use an impact wrench. Always use a torque wrench to tighten the locknut.



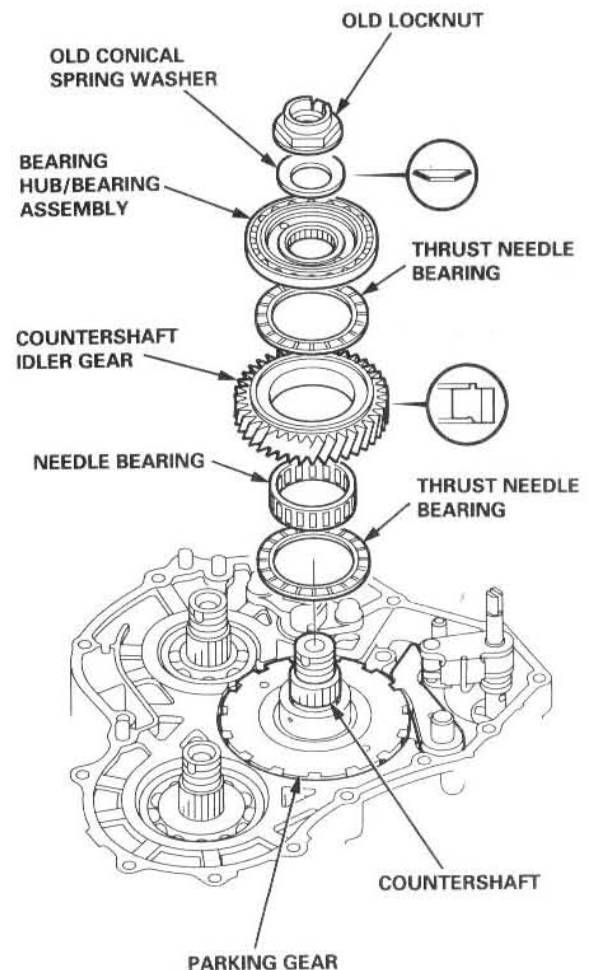
33. Remove the bearing hub/bearing assembly using a puller as shown.



34. Install the thrust needle bearing, needle bearing, countershaft idler gear, thrust needle bearing, bearing hub/bearing assembly, and the old conical spring washer. Then tighten the old locknut to seat the bearing hub/bearing assembly to the specified torque.

TORQUE: 167 N-m (17.0 kgf-m, 123 lbf-ft)

NOTE: Do not use an impact wrench. Always use a torque wrench to tighten the locknut.

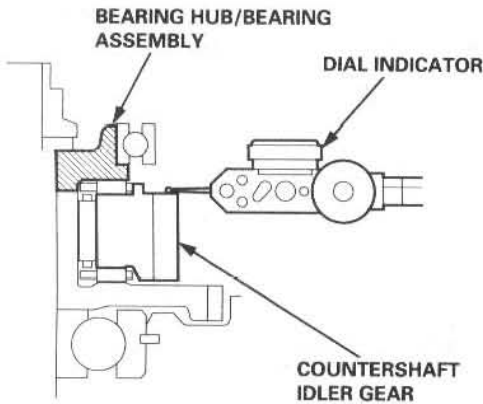


(cont'd)

Transmission

Reassembly (cont'd)

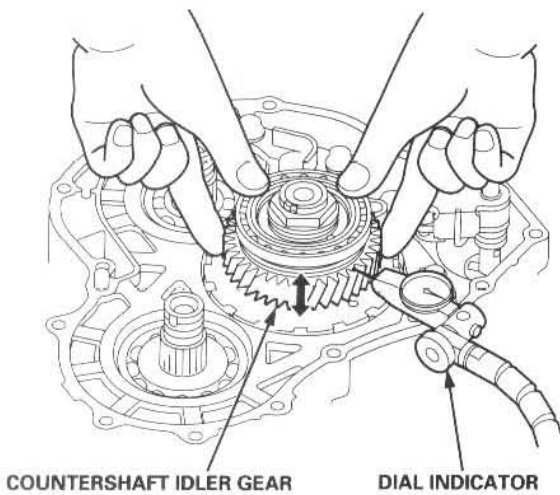
35. Set the dial indicator to the countershaft idler gear as shown.



36. Measure the countershaft idler gear axial clearance while moving the countershaft idler gear.

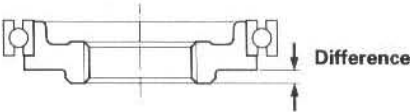
STANDARD: 0.015 – 0.045 mm (0.0006 – 0.0018 in)

NOTE: Take measurements in at least three places, and use the average as the actual clearance.



37. If the clearance is out of tolerance, remove the bearing hub/bearing assembly using a puller as shown on page 14-187.
38. Select and install the new bearing hub/bearing assembly, then recheck.

BEARING HUB/BEARING ASSEMBLY

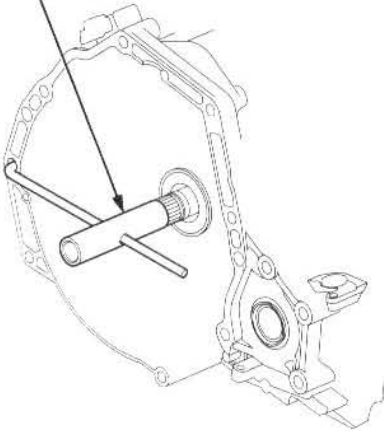


BEARING HUB

Mark	Part Number	Difference
A	90520 – P6H-000	3.503 mm (0.1379 in)
B	90521 – P6H-000	3.490 mm (0.1374 in)
C	90522 – P6H-000	3.477 mm (0.1369 in)
D	90523 – P6H-000	3.464 mm (0.1364 in)

39. After replacing the bearing hub/bearing assembly, make sure the clearance is within tolerance.
40. Remove the old locknut and old conical spring washer from the countershaft.
41. Install the special tool onto the mainshaft as shown.

MAINSHAFT HOLDER 07GAB – PF50101 or 07GAB – PF50100

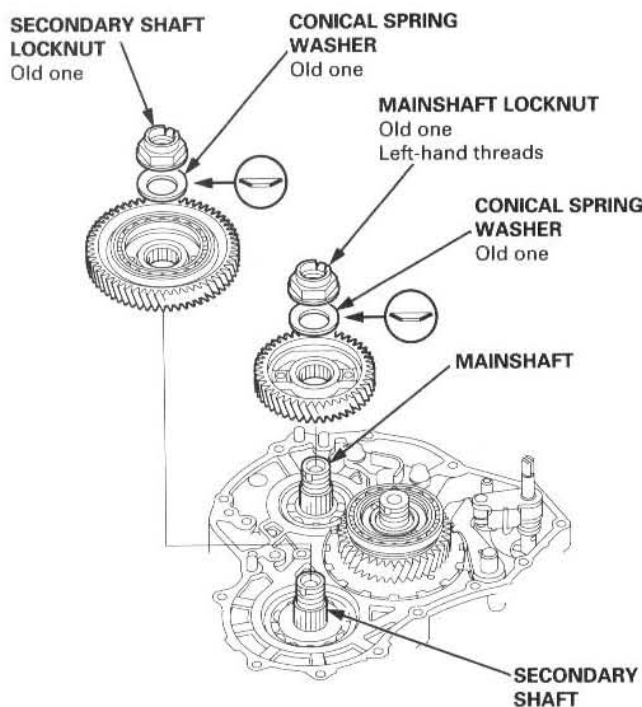




42. Lubricate the following parts with ATF:
 - Splines of the mainshaft, secondary shaft, and idler gears.
 - Threads of the mainshaft and secondary shaft.
 - Threads of the old mainshaft and secondary shaft locknuts.
 - Old conical spring washers.
43. Install the mainshaft idler gear and the old conical spring washer on the mainshaft. Tighten the old locknut to seat the mainshaft idler gear to 226 N·m (23.0 kgf·m, 166 lbf·ft).

NOTE:

- Do not use an impact wrench; always use a torque wrench to tighten the locknut.
- Mainshaft locknut has left-hand threads.

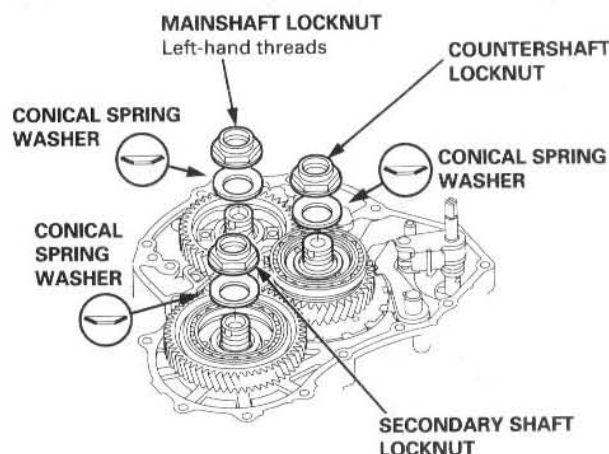


44. Install the secondary shaft idler gear and the old conical spring washer on the secondary shaft. Tighten the old locknut to seat the secondary shaft idler gear to 226 N·m (23.0 kgf·m, 166 lbf·ft).

NOTE: Do not use an impact wrench; always use a torque wrench to tighten the locknut.

45. Remove the old locknuts and old conical spring washers from the mainshaft and secondary shaft.

46. Lubricate the threads of the each shaft, new locknuts, and new conical spring washers with ATF.
47. Install the new conical spring washers in the direction shown, and install the new locknuts.

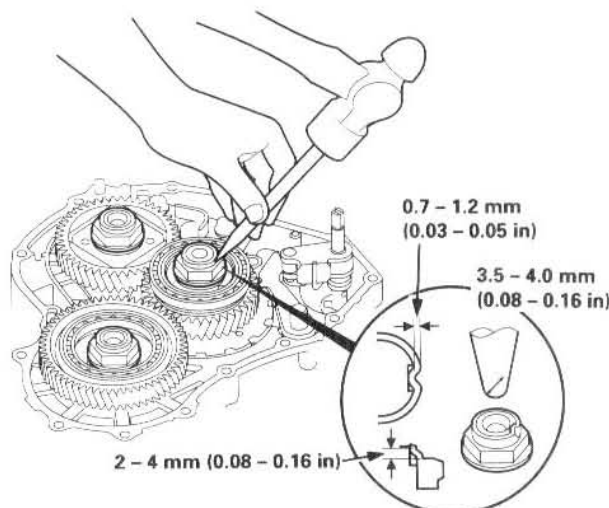


48. Tighten the locknuts to 167 N·m (17.0 kgf·m, 123 lbf·ft).

NOTE:

- Do not use an impact wrench; always use a torque wrench to tighten the locknut.
- Mainshaft locknut has left-hand threads.

49. Stake each locknut into its shaft using a 3.5 mm punch as shown.

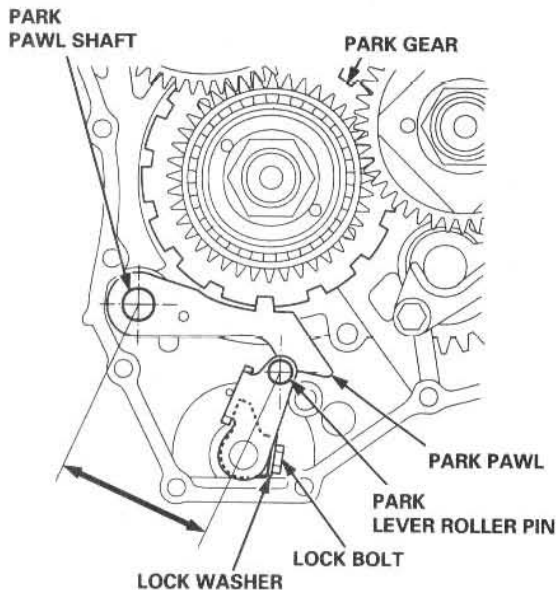


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Transmission

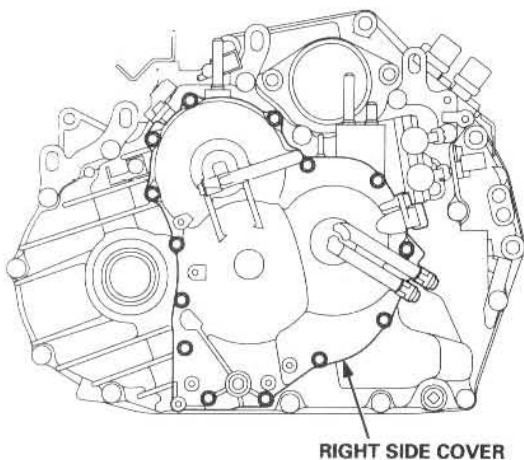
Reassembly (cont'd)

50. Set the park lever in the **P** position, then verify that the park pawl engages the park gear.
51. If the park pawl does not engage fully, check the distance between the park pawl shaft and the park lever roller pin as described on page 14-181.
52. Tighten the lock bolt, and bend the lock tab against the lock bolt head.

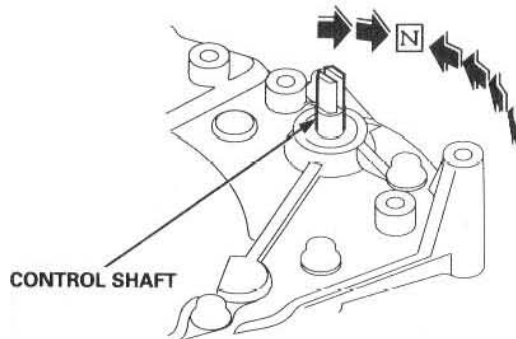


53. Install the end cover.

TORQUE: 12 N·m (1.2 kgf·m, 8.7 lbf·ft)

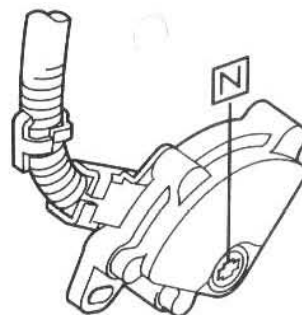


54. Set the control shaft in the **N** position by turning it.



55. Set the A/T gear position switch to **N** position.

NOTE: The A/T gear position switch clicks in **N** position.



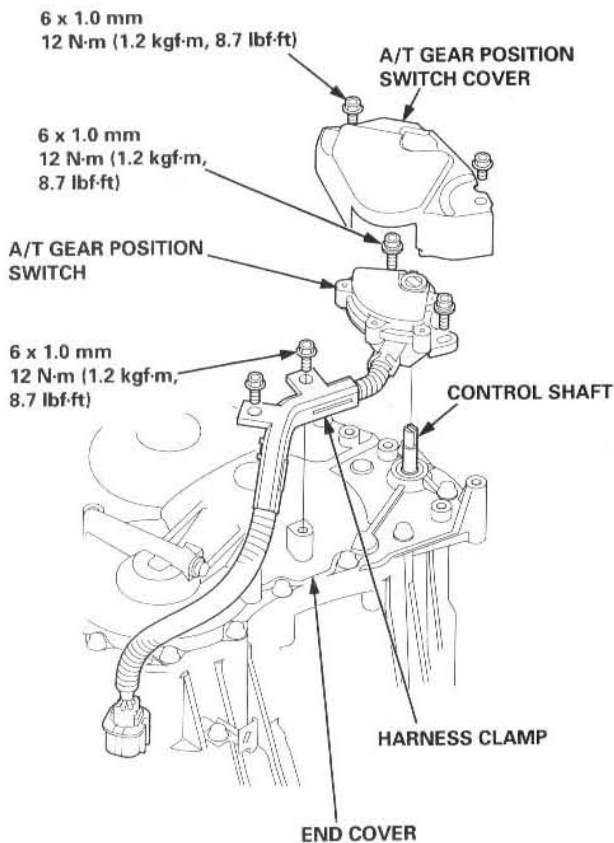
A/T GEAR POSITION SWITCH



56. Install the A/T gear position switch on the control shaft, then secure it with the bolts.

NOTE: Take care not to move the A/T gear position switch when tightening the bolts.

57. Install the A/T gear position switch cover, and secure the harness clamp on the end cover with the bolts.



58. Install the ATF cooler lines with new sealing washers.

TORQUE: 28 N·m (2.9 kgf·m, 21 lbf·ft)

59. Install the ATF dipstick.

Torque Converter/Drive Plate

6 x 1.0 mm
12 N·m (1.2 kgf·m, 8.7 lbf·ft)

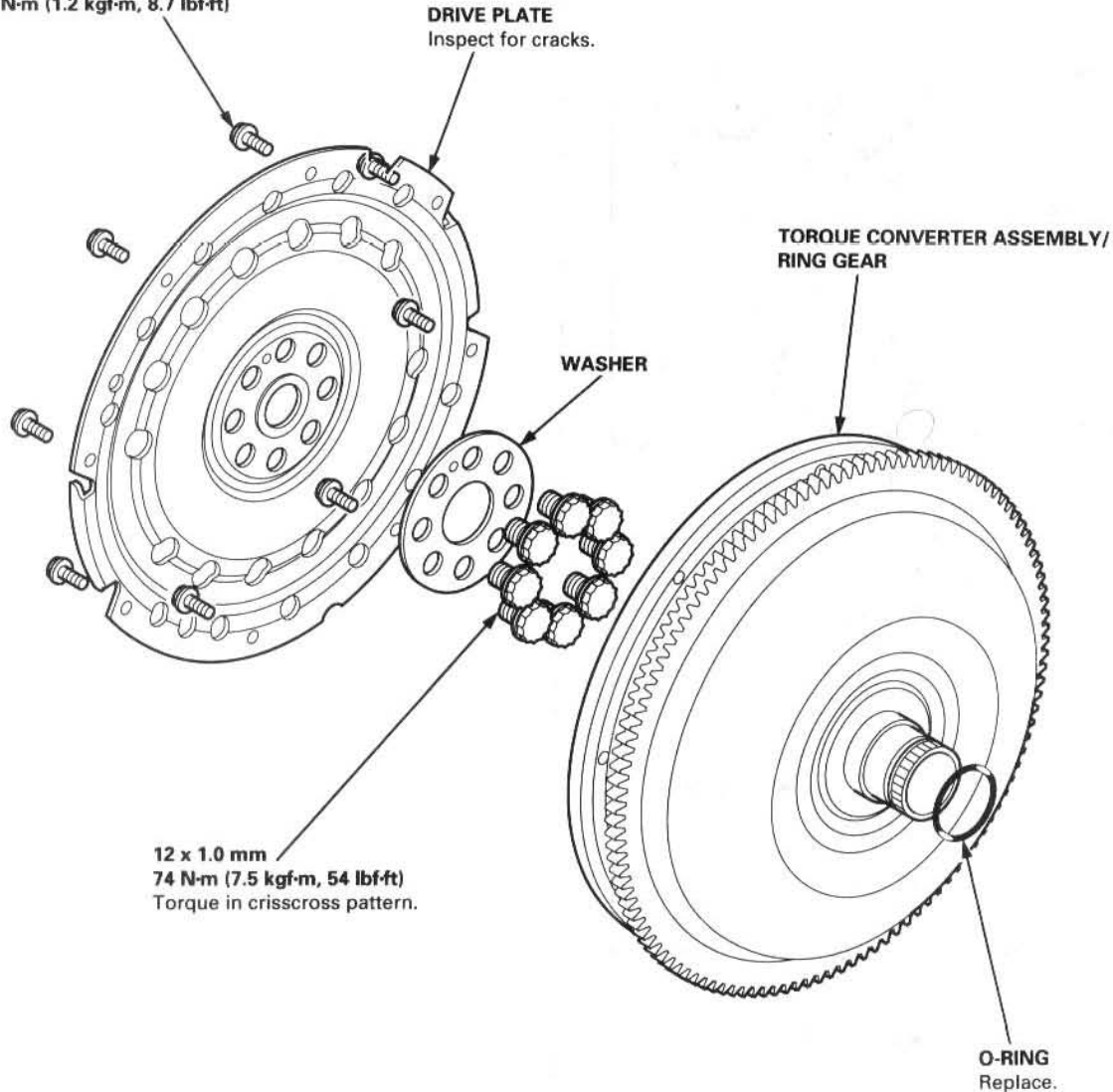
DRIVE PLATE
Inspect for cracks.

**TORQUE CONVERTER ASSEMBLY/
RING GEAR**

WASHER

12 x 1.0 mm
74 N·m (7.5 kgf·m, 54 lbf·ft)
Torque in crisscross pattern.

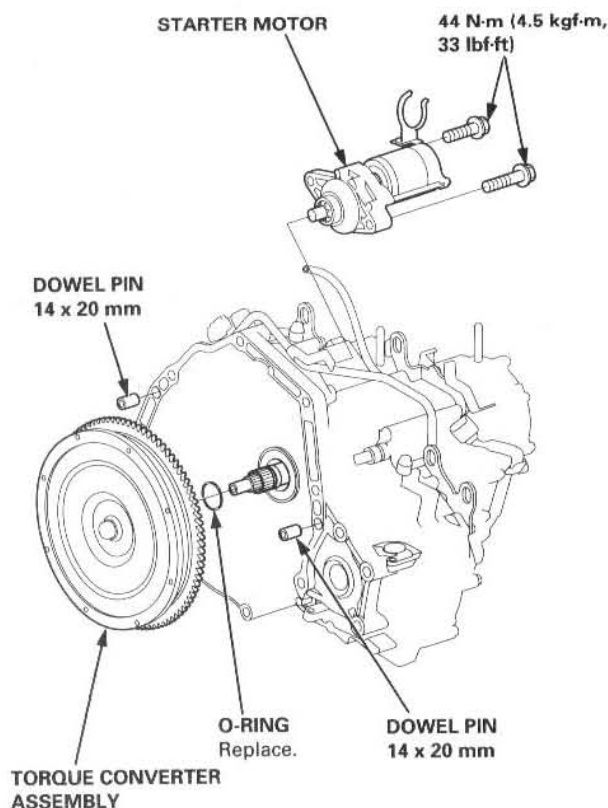
O-RING
Replace.





Installation

1. Flush the ATF cooler as described on pages 14-198 and 14-199.
2. Install the starter motor and the two 14 x 20 mm dowel pins on the torque converter housing.



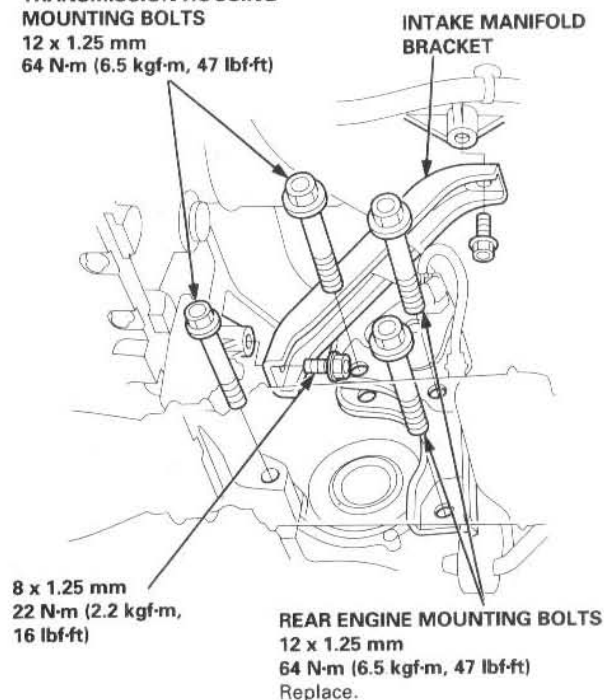
3. Install the torque converter assembly securely in the torque converter housing, over the mainshaft, with a new O-ring.

CAUTION: While installing the torque converter assembly in the torque converter housing, be sure not to allow dust or other foreign particles to enter the transmission.

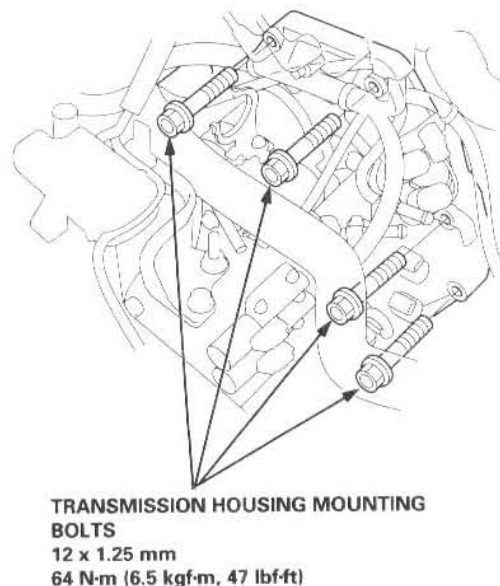
4. Place the transmission on a jack, and raise it to the engine assembly level.

5. Attach the transmission to the engine, then install the transmission housing mounting bolts, rear engine mounting bolts, and the intake manifold bracket bolts.

TRANSMISSION HOUSING MOUNTING BOLTS
12 x 1.25 mm
64 N-m (6.5 kgf-m, 47 lbf-ft)



6. Install the remaining transmission housing mounting bolts.

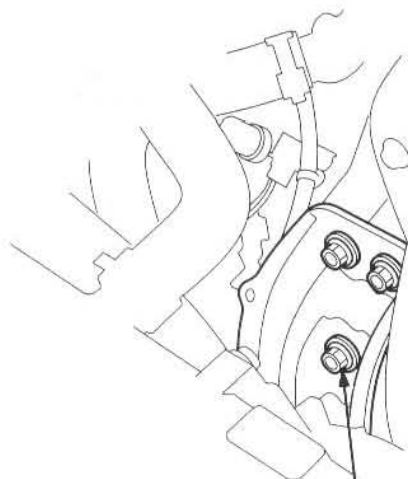


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Transmission

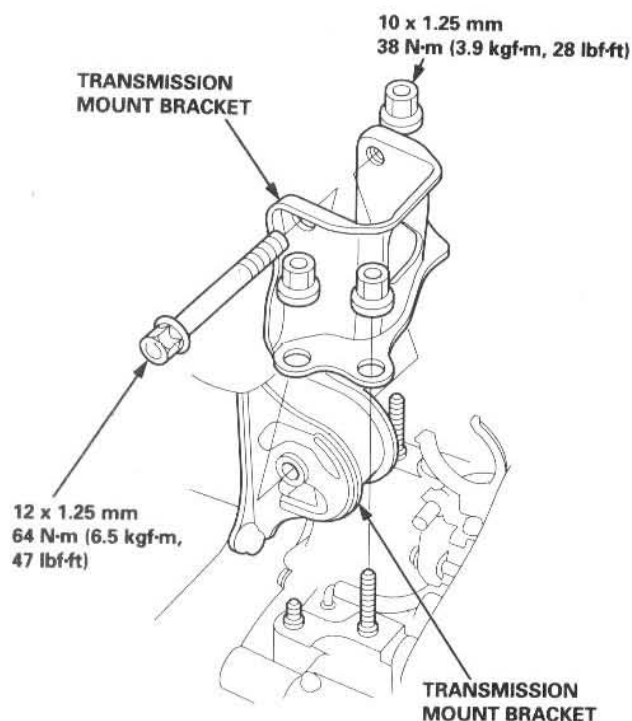
Installation (cont'd)

7. Tighten the front engine mount bracket bolts to the specified torque.



**FRONT ENGINE MOUNT
BRACKET BOLTS**
38 N·m (3.9 kgf·m, 28 lbf·ft)

8. Install the transmission mount bracket. Tighten the bolt loosely, tighten the nuts to the specified torque, then tighten the bolt to the specified torque.



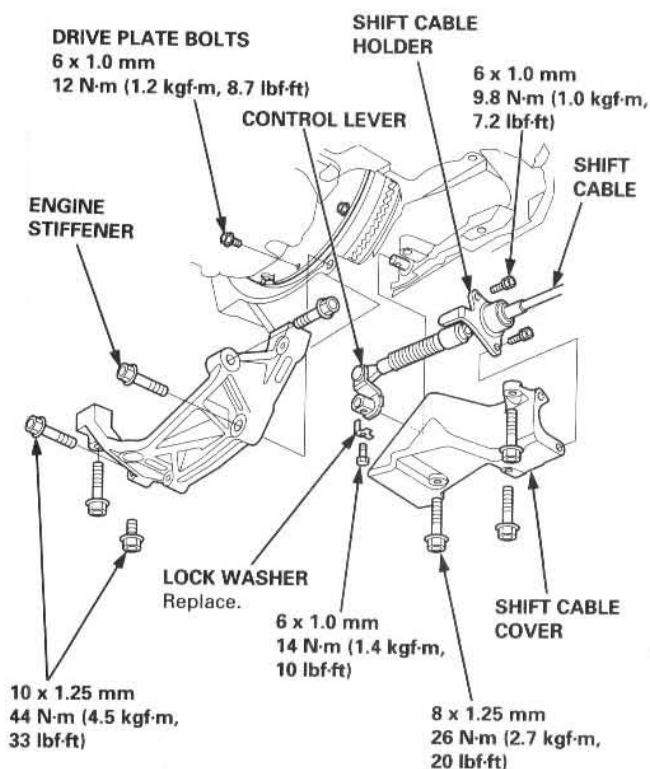
9. Remove the transmission jack.

10. Attach the torque converter to the drive plate with eight drive plate bolts and torque:

Rotate the crankshaft pulley as necessary to tighten the bolts to 1/2 of the specified torque, then to the final torque, in a crisscross pattern. After tightening the last bolt, check that the crankshaft rotates freely.

11. Tighten the crankshaft pulley bolt (see section 6).

12. Install the engine stiffener.



13. Install the control lever with the shift cable on the control shaft.

NOTE: Do not bend the shift cable excessively when installing the control lever.

14. Install the lock bolt with a new lock washer, then bend the lock washer tab against the bolt.

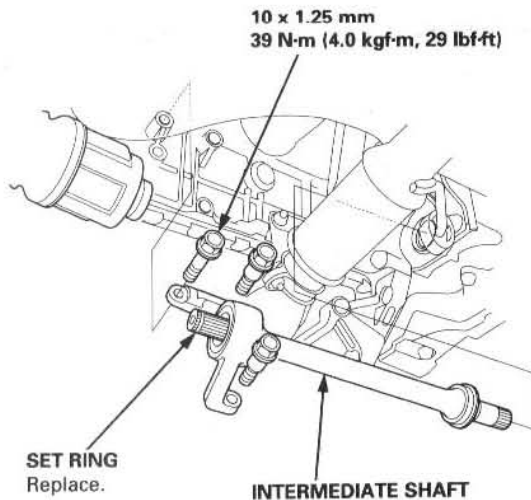
15. Install the shift cable cover, then install the shift cable holder on the shift cable cover.

NOTE: To prevent damage to the control lever joint, be sure to install the shift cable holder after installing the shift cable cover.

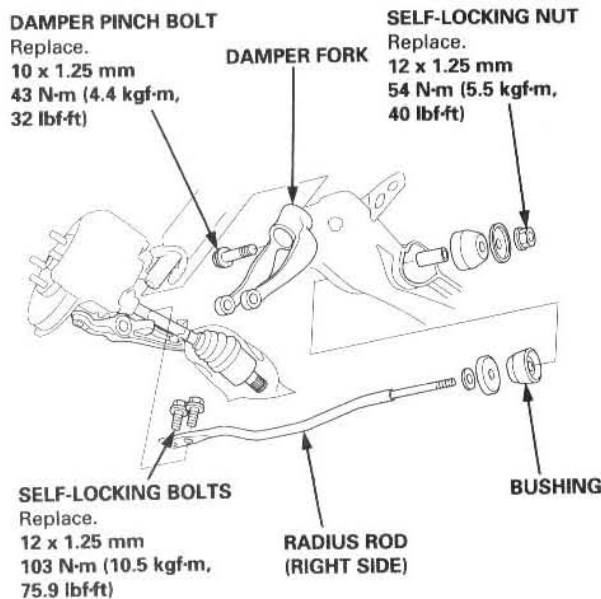


16. Install the intermediate shaft with a new set ring.

CAUTION: While installing the intermediate shaft in the differential, be sure not to allow dust or other foreign particles to enter the transmission.



17. Install the right radius rod and damper fork. If the radius rods bushings are worn or damaged, replace them.



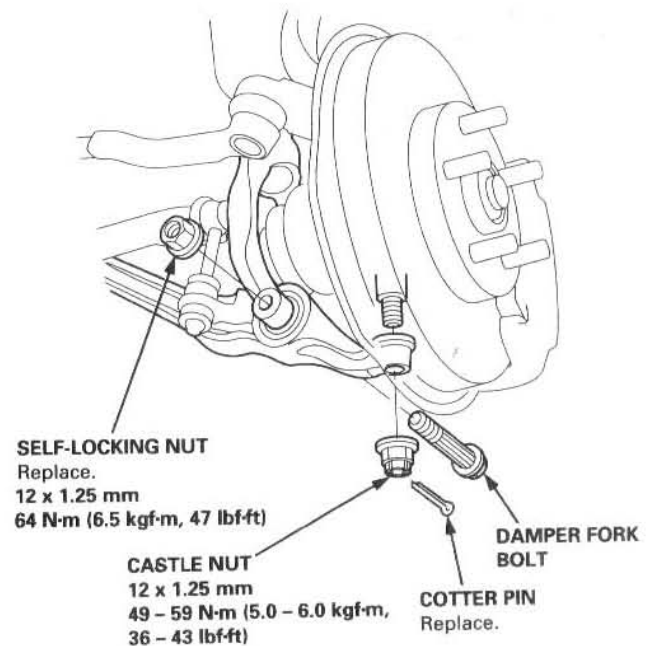
18. Install new set ring on the right driveshaft.

19. Install the right and left driveshafts.

CAUTION: While installing the driveshaft(s) in the differential, be sure not to allow dust or other foreign particles to enter the transmission.

NOTE: Turn the right and left steering knuckles fully outward, and slide the driveshafts into the differential and intermediate shaft until you feel the set rings engage the side gear and the intermediate shaft.

20. Install the damper fork to the lower arm. Then install the ball joint to the lower arm. Use the castle nuts with new cotter pins.

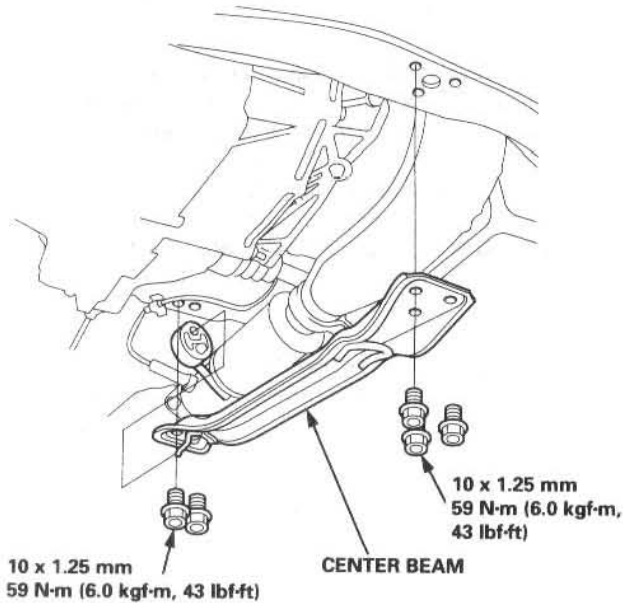


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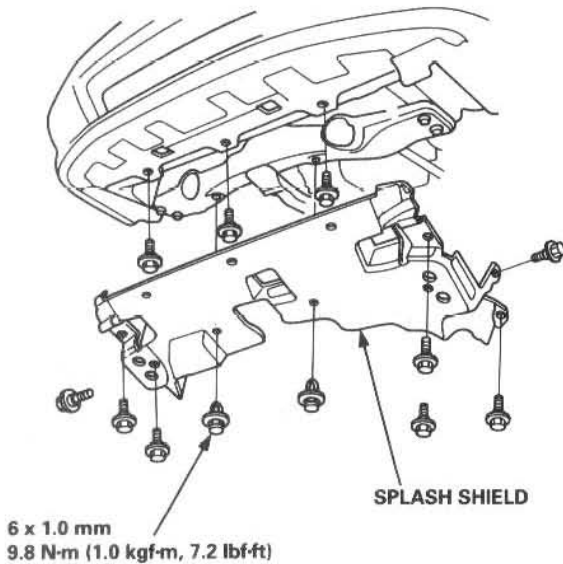
Transmission

Installation (cont'd)

21. Install the center beam.

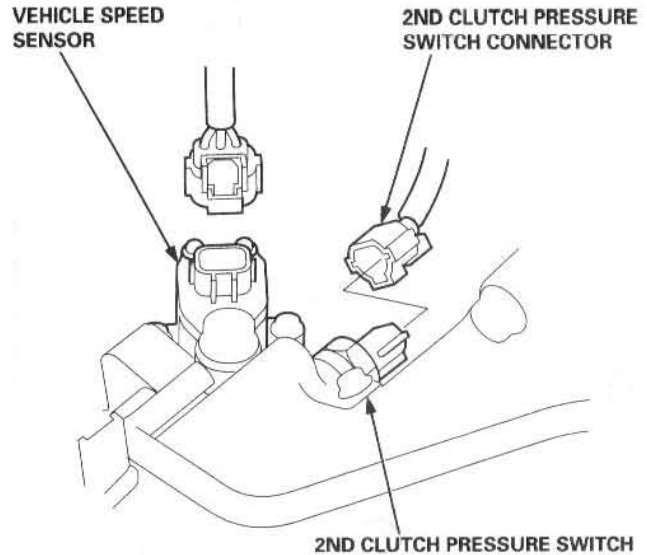


22. Install the splash shield.

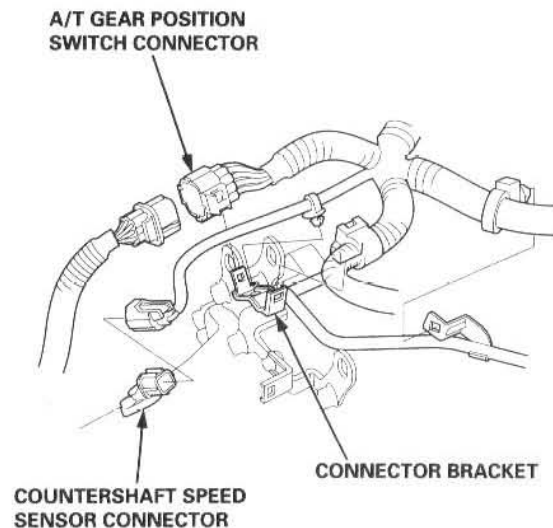


23. Connect the vehicle speed sensor connector and the 2nd clutch pressure switch connector.

NOTE: Do not allow water, fluid, oil, dust, or other foreign particles to enter the connectors.



24. Connect the countershaft speed sensor connector, and the A/T gear position switch connector, then install the connector and clamps on the connector bracket.





25. Connect the shift control solenoid valve B and C connectors.

LOCK-UP CONTROL SOLENOID VALVE/SHIFT CONTROL SOLENOID VALVE A ASSEMBLY CONNECTOR

ATF COOLER LINES

ATF COOLER HOSES

SHIFT CONTROL SOLENOID VALVE B CONNECTOR

SHIFT CONTROL SOLENOID VALVE C CONNECTOR

26. Connect the ATF cooler hoses to the ATF cooler lines (see page 14-198).
27. Connect the lock-up control solenoid valve/shift control solenoid valve A assembly connector.
28. Install the transmission ground cable terminal on the terminal bracket.

A/T CLUTCH PRESSURE CONTROL SOLENOID VALVE A/B ASSEMBLY CONNECTORS

**6 x 1.0 mm
9.8 N·m (1.0 kgf·m,
7.2 lbf·ft)**

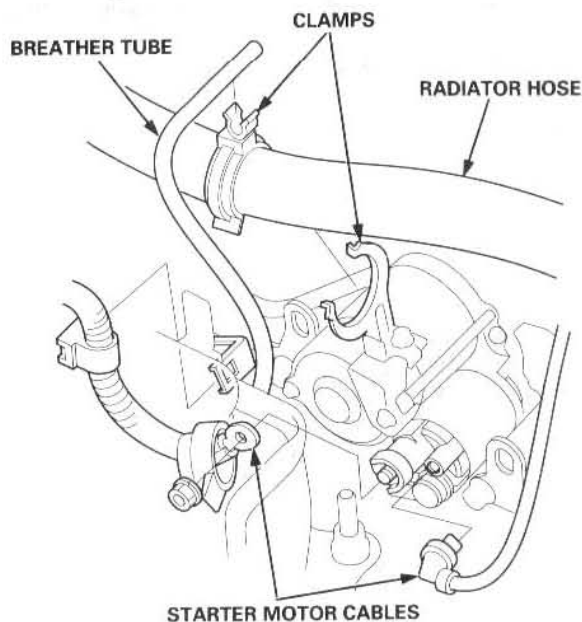
MAINSHAFT SPEED SENSOR CONNECTOR

TRANSMISSION GROUND TERMINAL

29. Connect the mainshaft speed sensor connector, and connect the A/T clutch pressure control solenoid valve A and B connectors.

30. Connect the starter motor cables.

NOTE: When installing the starter motor cables, make sure the crimped side of the ring terminal is facing out (see section 4).

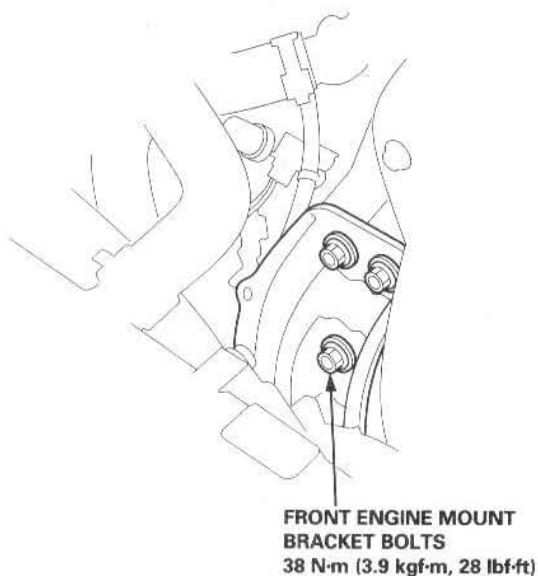


31. Install the breather tube and radiator hose on their clamps.
32. Install the battery base bracket and battery base.
33. Install the battery cable bracket on the battery base, and install the ground terminal on the body.
34. Install the battery tray and battery, then secure the battery with its hold-down bracket.
35. Install the intake air duct and air cleaner housing assembly.
36. Refill the transmission with ATF (see page 14-122).
37. Connect the battery positive and negative cables to the battery terminals.
38. Set the parking brake. Start the engine, and shift the transmission through all gears three times. Check the shift lever operation and the A/T gear position indicator operation.
39. Check and adjust the front wheel alignment (see section 18).

(cont'd)

Installation (cont'd)

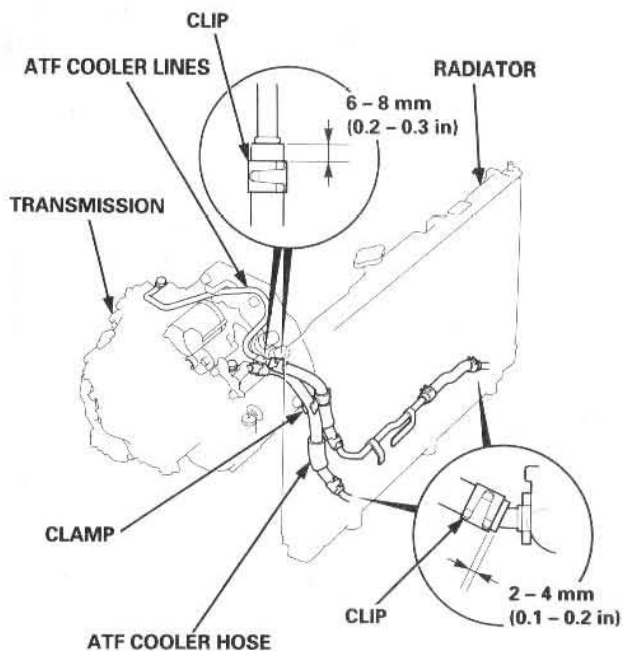
40. Let the engine reach normal operating temperature (the radiator fan comes on) with the transmission in **N** or **P** position, then turn it off and check the ATF level.
41. Road test as described on pages 14-118 thru 14-120.
42. Loosen the front engine mount bracket bolts after the road test, and retighten them to the specified torque.



43. Enter the anti-theft code for the radio, then enter the customer's radio station presets.

Connection

Connect the cooler hoses to the lines and the ATF cooler, and secure them with the clips as shown.





Cooler Flushing

⚠ WARNING To prevent injury to face and eyes, always wear safety glasses or a face shield when using the transmission flusher.

NOTE: This procedure should be performed before re-installing the transmission.

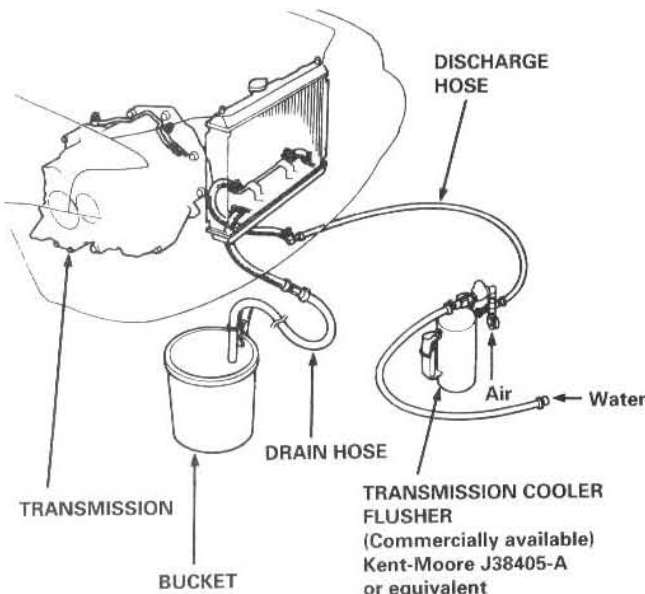
1. Check the tool's hoses for wear or cracks before using. If wear or cracks are found, replace the hoses.
2. Using the measuring cup, fill the tank with 21 ounces (approximately 2/3 full) of biodegradable flushing fluid (J35944 – 20). Do not substitute with any other fluid. Follow the handling procedure on the fluid container.
3. Secure the flusher filler cap, and pressurize the tank with compressed air to between 550 – 829 kpa (5.6 – 8.45 kgf/cm², 80 – 120 psi).

NOTE: The air line should be equipped with a water trap to ensure a dry air system.

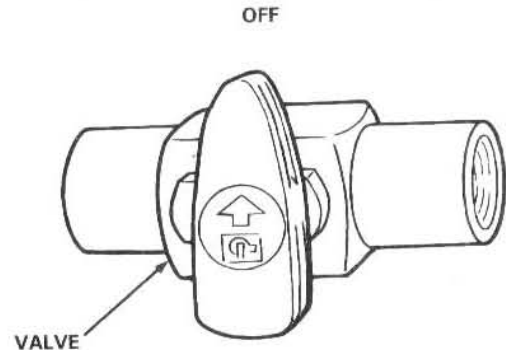
4. Hang the tool under the vehicle.
5. Attach the discharge hose of the tank to the return line of the transmission cooler using a clamp.
6. Connect the drain hose to the inlet line of the transmission cooler using a clamp.

IMPORTANT:

Securely clamp the opposite end of the drain hose to a bucket or floor drain.



7. With the water and air valves off, attach the water and air supplies to the flusher. (Use hot water if available.)



8. Turn on the flusher water valve so water will flow through the cooler for 10 seconds.

NOTE: If water does not flow through the cooler, it is completely plugged, cannot be flushed, and must be replaced.

9. Depress the trigger to mix the flushing fluid into the water flow. Use the wire clip to hold the trigger down.
10. After 2 minutes, turn the air valve on for 5 seconds every 15 – 20 seconds to create a surging action. AIR PRESSURE: MAX 845 kpa (8.45 kgf/cm², 120 psi)
11. Turn the water valve off. Release the trigger, then reverse the hoses to the cooler so you can flush in the opposite direction. Repeat steps 8 through 10.
12. Release the trigger, and rinse the cooler with water for one minute.
13. Turn the water valve off, and turn off the water supply.
14. Turn the air valve on and dry the system out with air for two full minutes, or until no moisture is visible leaving the drain hose.

CAUTION: Residual moisture in the cooler or pipes can damage the transmission.

15. Remove the flusher from the cooler line. Attach the drain hose to a container.
16. Install the transmission, and leave the drain hose attached to the cooler line.

(cont'd)

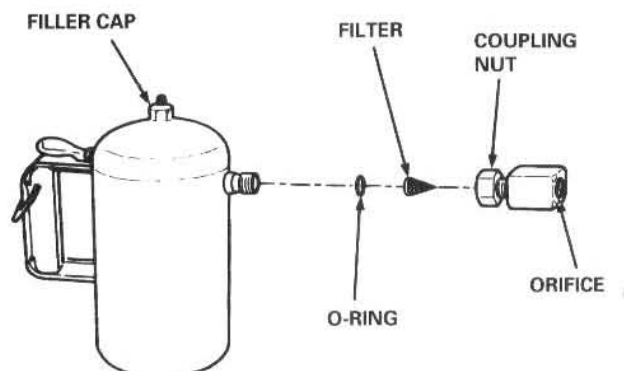
Transmission

Cooler Flushing (cont'd)

17. Make sure the transmission is in **P** position. Then fill the transmission with ATF, and run the engine for 30 seconds or until approximately 0.95 l (1.0 US qt., 0.8 Imp qt.) is discharged.
18. Remove the drain hose, and reconnect the cooler return hose to the transmission (see page 14-197).
19. Refill the transmission with ATF to the proper level (see page 14-122).

TOOL MAINTENANCE

1. Empty and rinse after each use. Fill the can with water and pressurize the can. Flush the discharge line to ensure that the unit is clean.
2. If discharge liquid does not foam, the orifice may be blocked.
3. To clean, disconnect the plumbing from the tank at the large coupling nut.
4. Remove the in-line filter from the discharge side and clean if necessary.
5. The fluid orifice is located behind the filter. Clean it with the pick stored in the bottom of the tank handle, or blow it clean with air. Securely reassemble all parts.

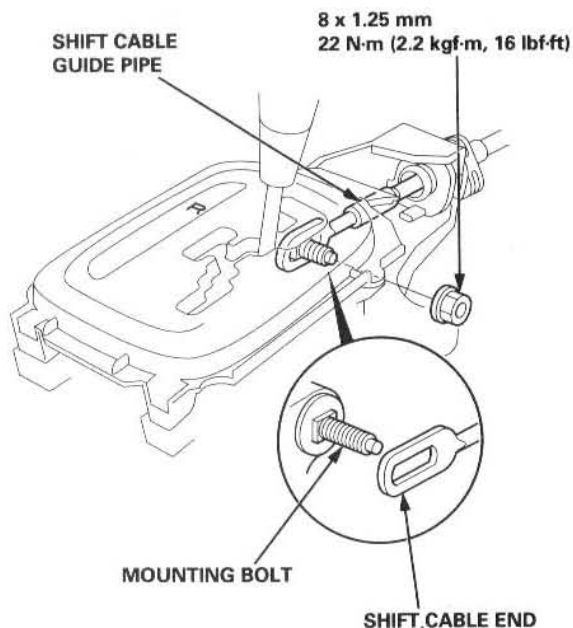




Removal/Installation

1. Shift the transmission into the **R** position.
2. Remove the center console (see section 20).
3. Remove the nut securing the shift cable end, then separate the shift cable from the shift lever assembly.

NOTE: Do not remove the shift cable by the shift cable guide pipe.



4. Remove the shift lever knob.
5. Remove the A/T gear position indicator panel light from the A/T gear position indicator panel.
6. Remove the A/T gear position indicator panel assembly from the detent bracket.
7. Disconnect the shift lock solenoid connector, reverse relay connector, and mode switch connector.
8. Remove the four bolts securing the shift lever bracket base, then remove the shift lever sub-assembly.
9. Install the shift lever in the reverse order of removal.

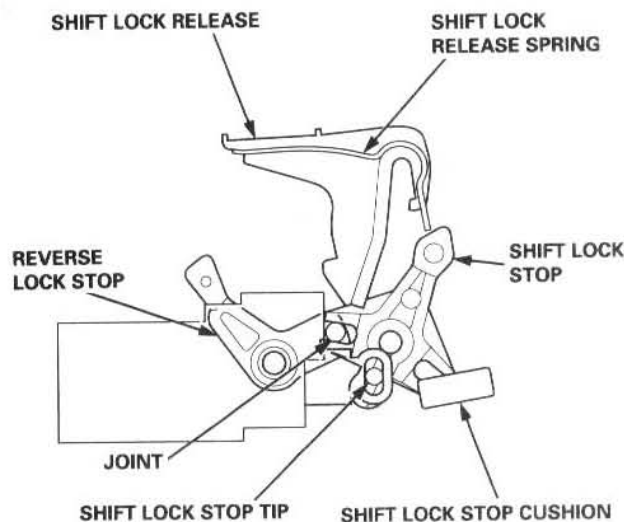
NOTE:

- Align the flat surfaces of the mounting bolt with the shift cable end hole, then install the cable end on the mounting bolt.
- Do not install the shift cable by the shift cable guide pipe.

Shift Lock/Reverse Lock Mechanism

NOTE: If the shift lock/reverse lock mechanism is assembled incorrectly, the shift lever will not operate normally.

1. Install the shift lock stop and reverse lock stop together by aligning their joint.
2. Install the shift lock release spring on the shift lock release.



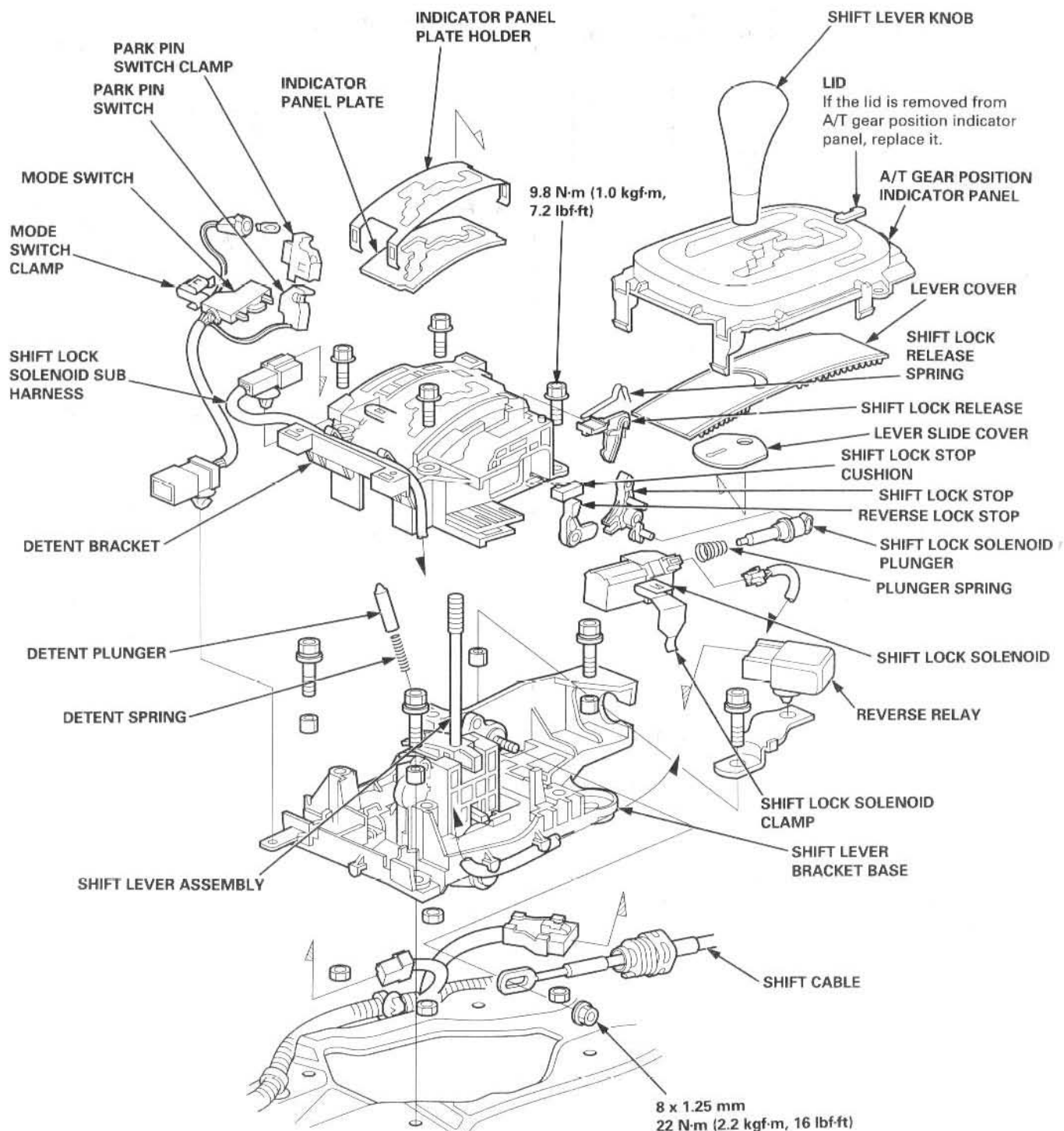
3. Make sure the shift lock stop cushion is installed in the direction shown.
4. Install the shift lock solenoid by aligning the shift lock solenoid plunger with the tip of the shift lock stop.

Shift Lever

Disassembly/Reassembly

NOTE: Apply silicone grease to the following parts:

- Movable parts of the shift lever.
- Movable parts of the shift lock/reverse lock mechanism.
- Sliding surfaces on the opening of the indicator panel and panel holder.
- Sliding surfaces of the detent plunger.
- Contacting surfaces of the shift lever assembly with the shift lock stop.
- Detent plunger and detent spring.

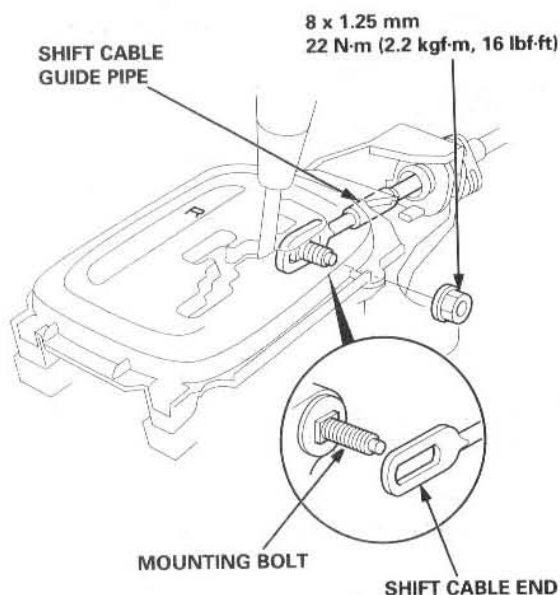




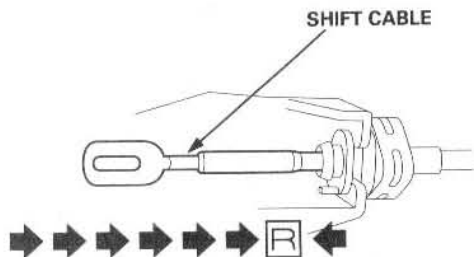
Adjustment

1. Shift the transmission into **R** position.
2. Remove the center console (see section 20).
3. Remove the nut securing the shift cable end, then separate the shift cable from the shift lever assembly.

NOTE: Do not remove the shift cable by the shift cable guide pipe.

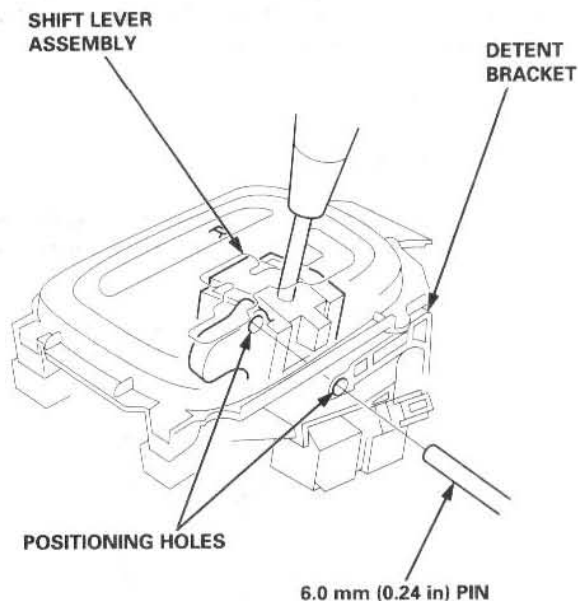


4. Push the shift cable until it stops, then release your hand. Pull the shift cable back one step so that the shift position is in **R**.



5. Turn the ignition switch on (II), and verify that the **R** position indicator light comes on.

6. Insert a 6.0 mm (0.24 in) pin into the positioning hole on the detent bracket through the positioning hole on the shift lever assembly.



7. Align the flat surfaces of the shift cable mounting bolt with the shift cable end hole, then install the cable end on the mounting bolt.
8. Install and tighten the nut to the specified torque.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)

9. Move the shift lever to each gear, and verify that the A/T gear position indicator follows the A/T gear position switch.
10. Start the engine, and check the shift lever in all gears. If any gear does not work properly, refer to troubleshooting on pages 14-114 thru 117.
11. Remove the A/T gear position indicator panel, and rotate it to expose the shift lock release. Push the shift lock release, and verify that it operates correctly.

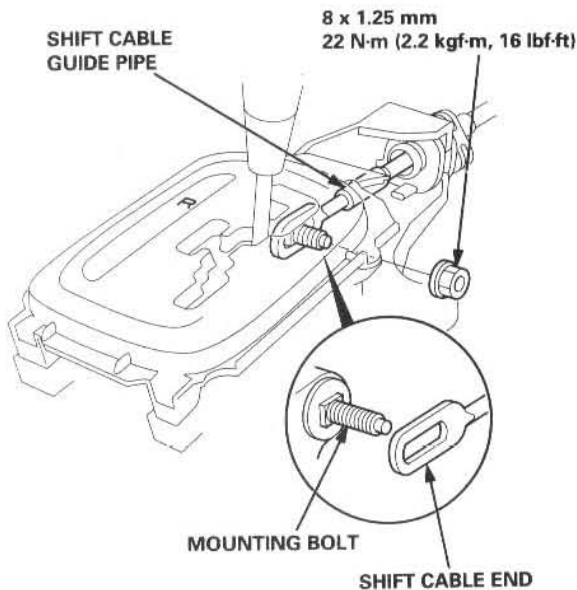
Shift Cable

Replacement

⚠ WARNING

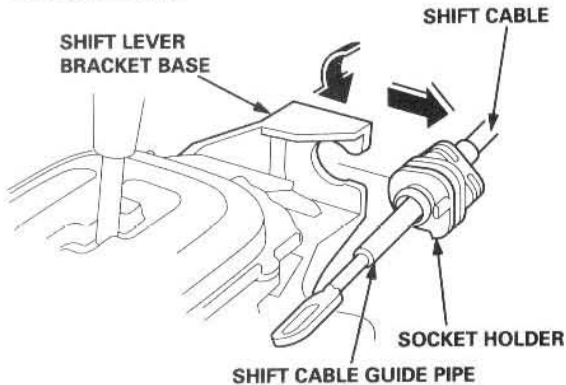
- Make sure lifts, jacks, and safety stands are placed properly (see section 1).
- Apply the parking brake, and block the rear wheels securely so vehicle will not roll off the stands and fall on you while working under it.

1. Shift the transmission into **R**.
2. Remove the center console (see section 20).
3. Remove the nut securing the shift cable end, then separate the shift cable from the shift lever assembly.

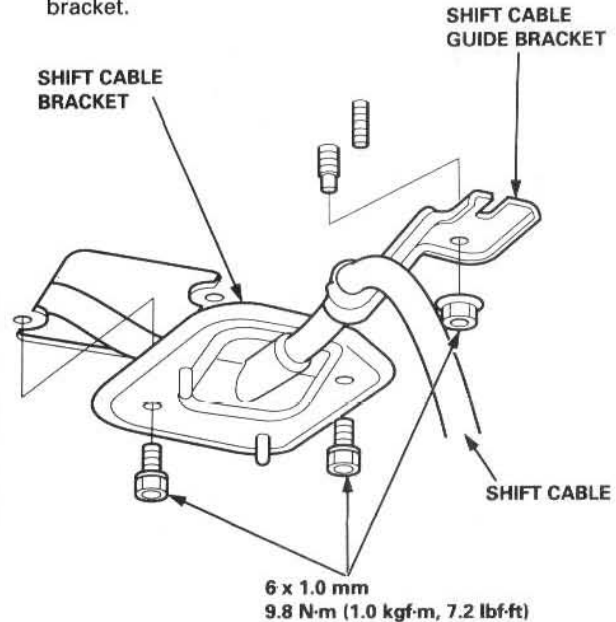


4. Rotate the socket holder on the shift cable counter-clockwise a quarter turn, then slide the holder to remove the shift cable from the shift lever bracket base.

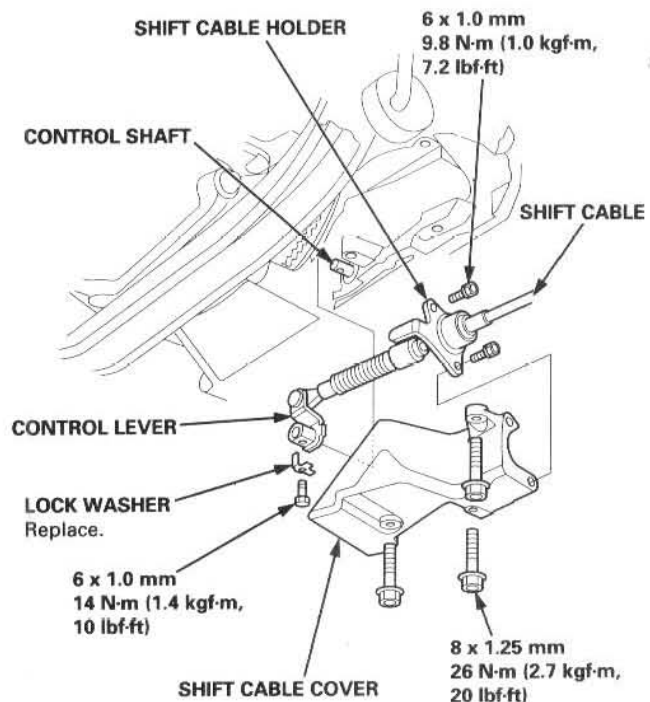
NOTE: Do not remove the shift cable by the shift cable guide pipe.

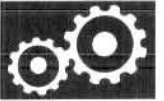


5. Remove the floor heat shield.
6. Remove the shift cable bracket and shift cable guide bracket.



7. Remove the bolts securing the shift cable holder, then remove the shift cable cover.
8. Remove the control lever from the control shaft, then replace the new shift cable.





9. Verify that the transmission is in the **R** position on the control shaft.
10. Install the shift cable bracket and shift cable guide bracket.
11. Install the control lever on the control shaft.

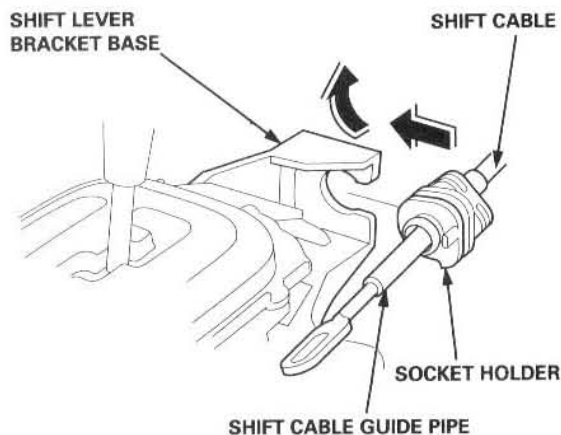
NOTE: Do not bend the shift cable excessively when installing the control lever.

12. Install the lock bolt with a new lock washer, then bend the lock washer tab against the bolt.
13. Install the shift cable cover, then install the shift cable holder on the shift cable cover.

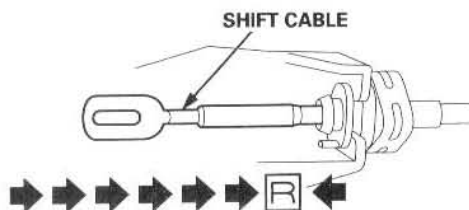
NOTE: To prevent damage to the control lever joint, be sure to install the shift cable holder after installing the shift cable cover.

14. Install the floor heat shield.
15. Rotate the socket holder on the shift cable counter clockwise a quarter turn, then slide the holder to install the shift cable on the shift lever bracket base. Rotate the socket holder clockwise a quarter turn to secure the shift cable.

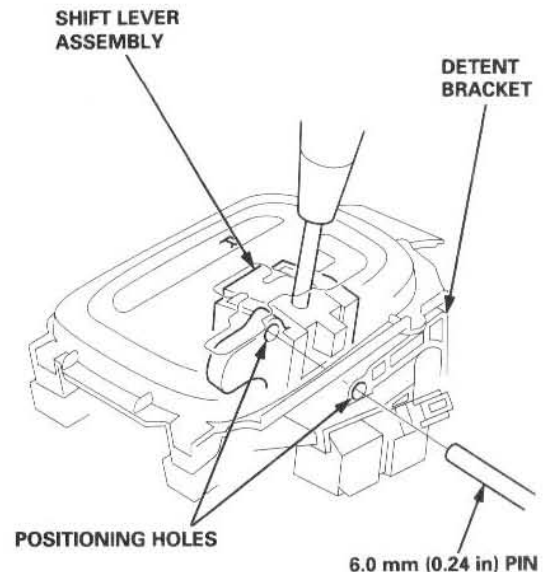
NOTE: Do not install the shift cable by the shift cable guide pipe.



16. Turn the ignition switch ON (II), and verify that the **R** position indicator light comes on.
17. If necessary, push the shift cable until it stops, then release your hand. Pull the shift cable back one step so that the shift position is in the **R** position.



18. Insert a 6.0 mm (0.24 in) pin into the positioning hole on the detent bracket through the positioning hole on the shift lever assembly.



19. Align the flat surfaces of the shift cable mounting bolt with the shift cable end hole, then install the cable end on the mounting bolt.

20. Install and tighten the nut to the specified torque.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)

21. Move the shift lever to each gear, and verify that the A/T gear position indicator follows the A/T gear position switch.
22. Start the engine, and check the shift lever operation in all gears. If any gear does not work properly, refer to troubleshooting on pages 14-114 thru 117.
23. Remove the A/T gear position indicator panel, and rotate it to expose the shift lock release. Push the shift lock release, and verify that it operates correctly.

Differential

Manual Transmission section 13

Automatic Transmission section 14

Active Torque Transfer System (ATTS) ... 15-1





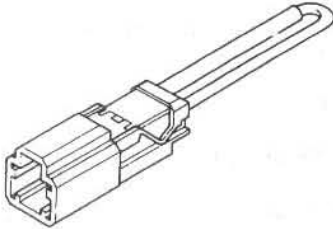
Active Torque Transfer System (ATTS)

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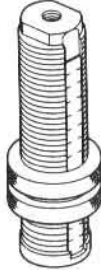


Special Tools

Ref. No.	Tool Number	Description	Qty	Page Reference
①	07PAZ – 0010100	SCS Service Connector	1	15-14
②	07VGD – 0030100	Adjustment Driver, 43 mm	1	15-72



①

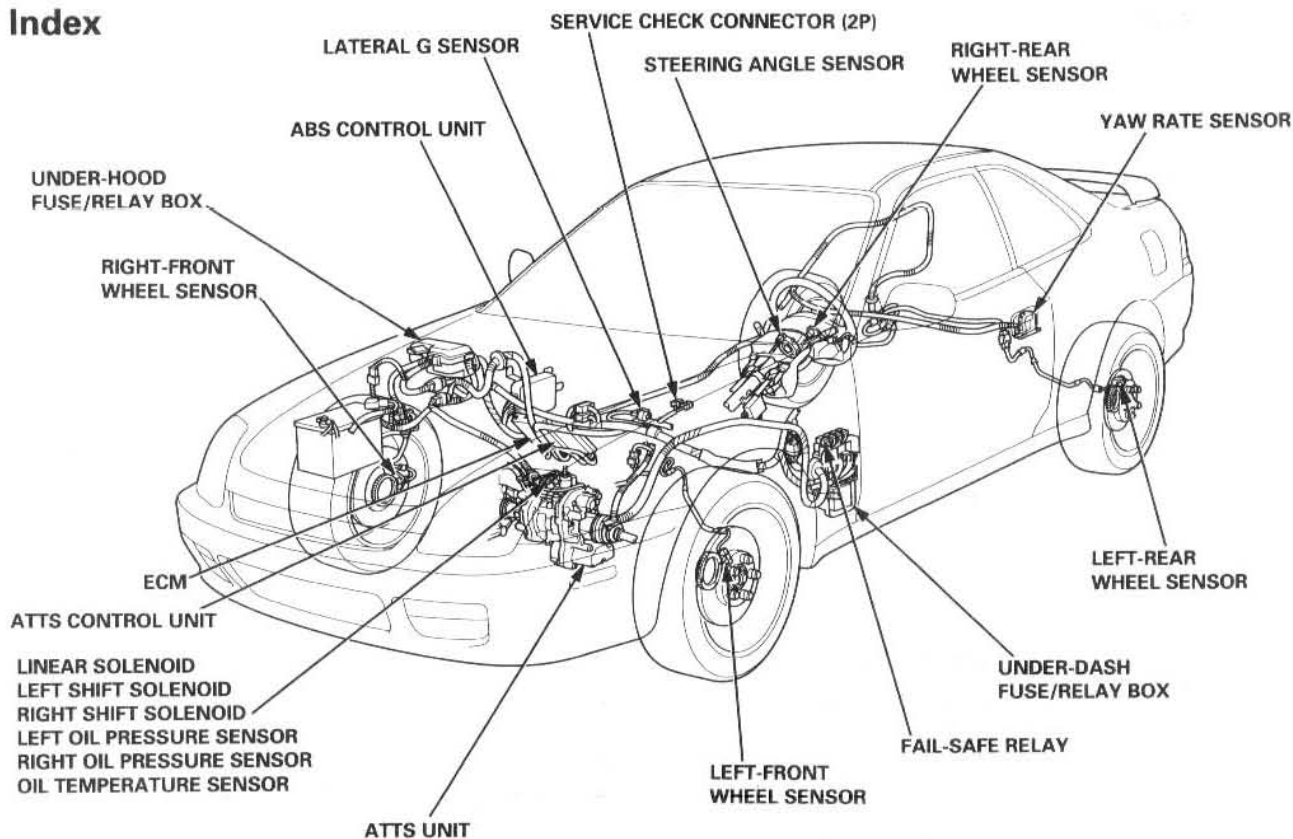


②

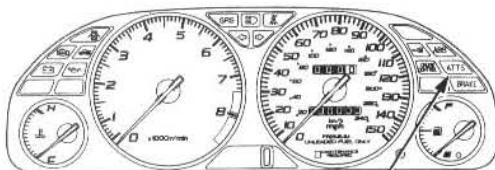
Component Locations



Index

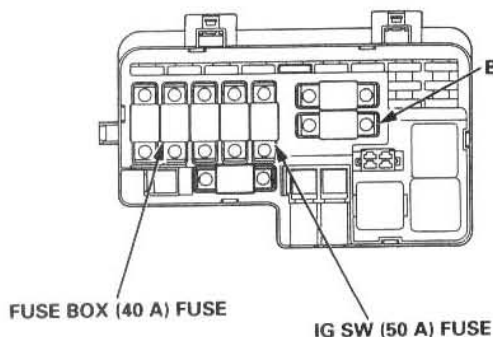


GAUGE ASSEMBLY

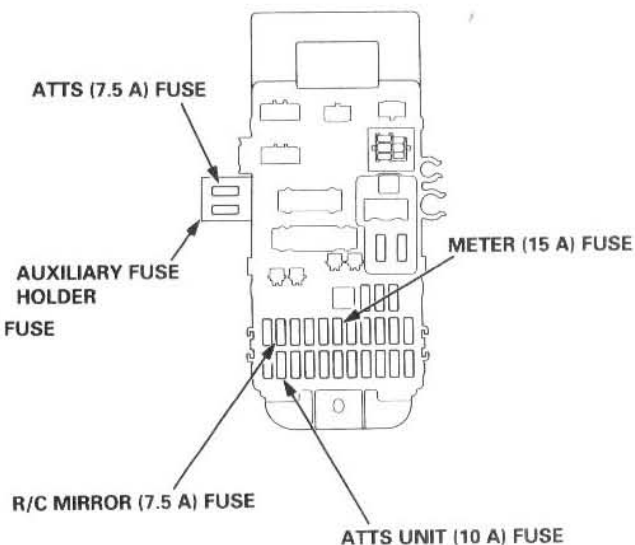


ATTS INDICATOR LIGHT

UNDER-HOOD FUSE/RELAY BOX



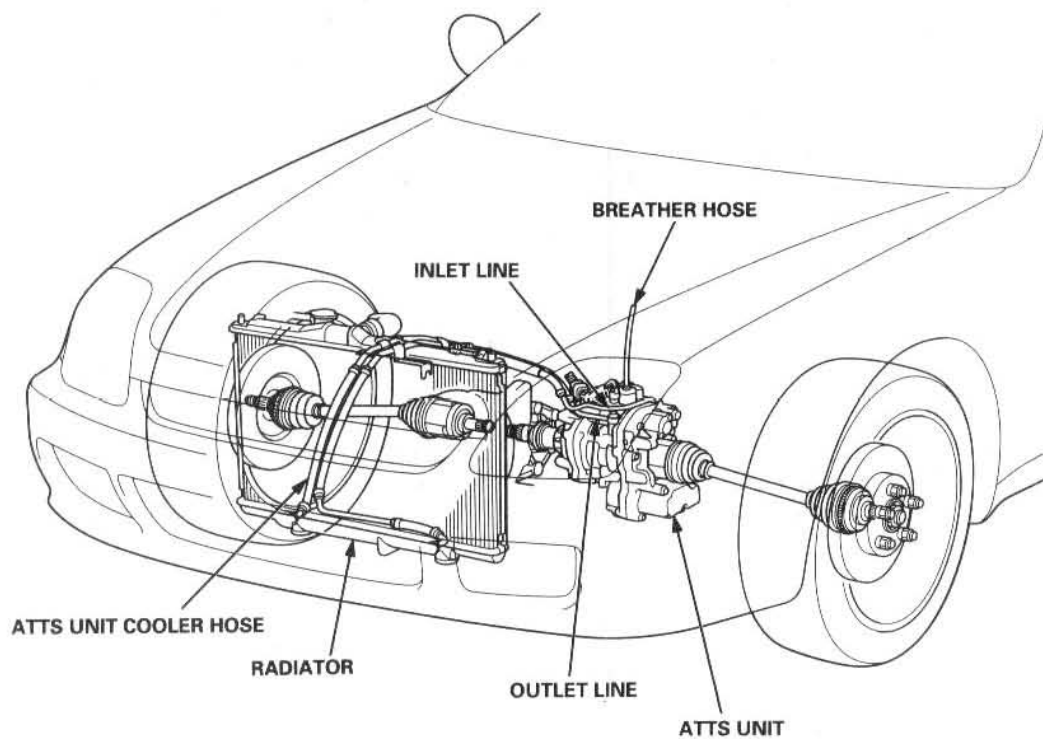
UNDER-DASH FUSE/RELAY BOX

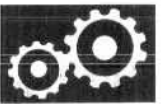


(cont'd)

Component Locations

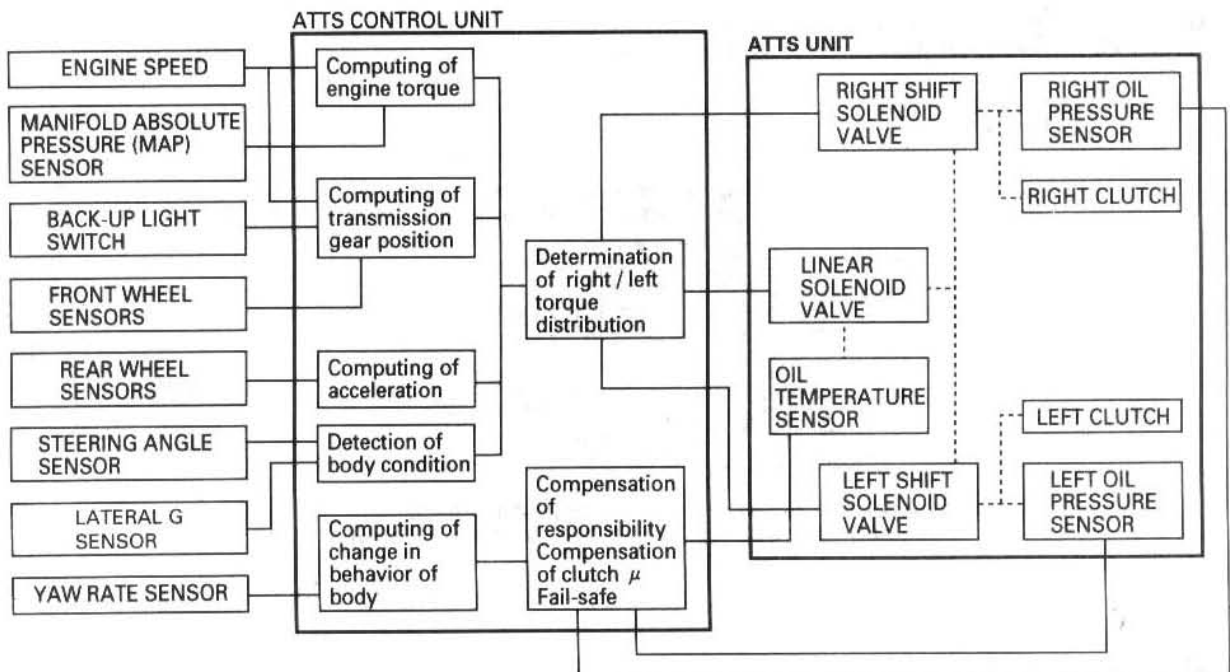
Index (cont'd)





Outline

The active torque transfer system (ATTS) detects the engine torque, transmission gear position, acceleration and cornering condition of the vehicle. This is done by means of the engine speed, manifold absolute pressure (MAP) sensor, back-up light switch, front and rear wheel sensors, steering angle sensor, lateral G sensor and the yaw rate sensor. As these data are put in the ATTS control unit, it determines the driving force of the right and left wheels. The system then controls the right and left clutch pressure according to the determined driving force by transmitting the signal to the ATTS unit and thereby distributes the driving force to the right and left wheels.



Acceleration rate and distribution ratio

The driving force distribution rate is set as 8:2 between the outer wheels and inner wheels. The vehicle is equipped with an acceleration mechanism to distribute the driving force with wet clutches (torque is transmitted from the high-speed side to the low-speed side), where the acceleration ratio is set at 15%.

(cont'd)

Description

Outline (cont'd)

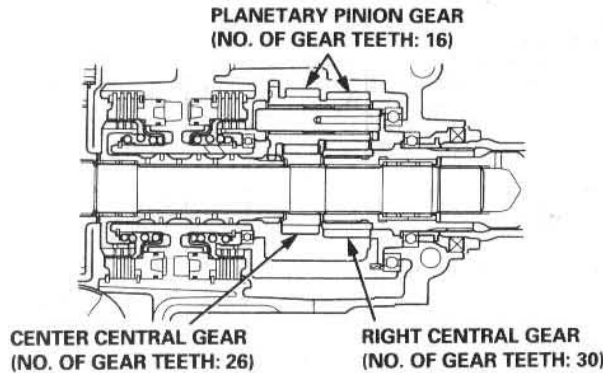
When driving straight forward (ATTS not activated):

- Right and left clutches are OFF.
- The planetary pinion gears, center central gear, right central gear, and left central gear engage each other and rotate as an assembly. Therefore, there is no difference in acceleration between the right and left wheels.

When turning to the right (ATTS activated):

- The right clutch is ON.
- Because the center central gear and right central gear are turning, the rotation speed from the right central gear to the planetary pinion gear increases at a ratio of 30/16, while the speed from the planetary pinion gear to the center central gear decreases at a ratio of 16/26. See the following formula that shows the rotation speed of the center central gear increases at a ratio of approximately 1.15.

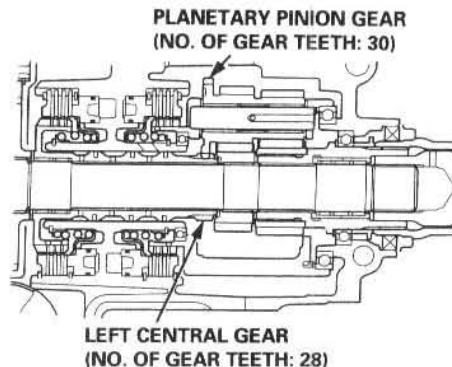
$$\begin{aligned} \text{Left wheel acceleration ratio} &= \frac{\text{Planetary pinion gear}}{\text{Right central gear}} \times \frac{\text{Center central gear}}{\text{Planetary pinion gear}} \\ &= \frac{30}{16} \times \frac{16}{26} = 1.1538 \end{aligned}$$



When turning to the left (ATTS activated):

- The left clutch is ON.
- The left central gear is fixed.
- Because the planetary pinion gear is engaged with the left central gear, it rotates around the central gears while rotating on its axis.
- When the planetary pinion shaft makes one full turn, the planetary pinion gear turns around the left central gear at a ratio of 32/28. It also turns around the center central gear at a ratio of 16/30. Therefore, the following formula shows that the rotation speed of the right central gear increases at a ratio of approximately 1.15.

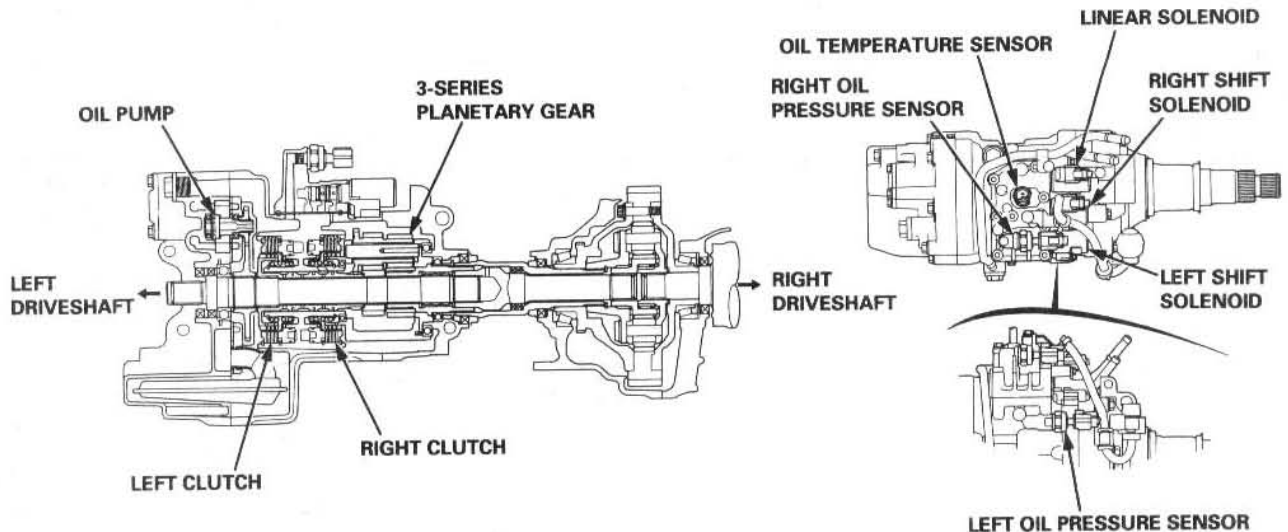
$$\begin{aligned} \text{Right wheel acceleration ratio} &= \frac{\frac{\text{Planetary pinion gear}}{\text{Left central gear}} - \frac{\text{Planetary pinion gear}}{\text{Right central gear}}}{\frac{\text{Planetary pinion gear}}{\text{Left central gear}} - \frac{\text{Planetary pinion gear}}{\text{Center central gear}}} \\ &= \frac{\frac{32}{28} - \frac{16}{30}}{\frac{32}{28} - \frac{16}{26}} = 1.1555 \end{aligned}$$





ATTS unit

The ATTS unit is the right/left driving force distribution unit. It consists of a 3-series planetary gear, the right and left clutches, the oil pump, the linear solenoid valve, the right and left shift solenoid valves, the right and left oil pressure sensors, and the oil temperature sensor.



3-series planetary gear

The 3-series planetary gear is a set of planetary gears and a carrier with gear ratios that set the speed ratio between the right and left wheels at approximately 1.15. It is not equipped with a ring gear but features a 3-phase parallel layout with a sun gear and a planetary gear.

Right/left clutch

The right and left clutches are a plate-fixing wet multi-plate clutch. They are a pair of clutches that fixes the 3-series planetary gear carrier (when turning to right) or the left central gear (when turning to left) to distribute the torque to the right and left wheels.

Oil pump

The oil pump is driven by the left driveshaft.

It is a trochoid pump located above the oil level to prevent cavitation caused by air trapped by the oil pump drive gear, and it is designed to produce oil pressure to control the right and left wheels and to feed pressurized lubrication oil to each part.

Linear solenoid valve

The linear solenoid valve regulates the primarily controlled oil pressure from the oil pump to an adequate pressure, in accordance with the driving torque, that is distributed to the right and left wheels.

Right/left shift solenoid valve

The right and left shift solenoid valves are provided for the right and left clutches. They are designed to select the 3-series planetary gear fixing shaft for deceleration, and they supply the oil pressure governed by the linear solenoid valve to the clutch by turning ON or OFF.

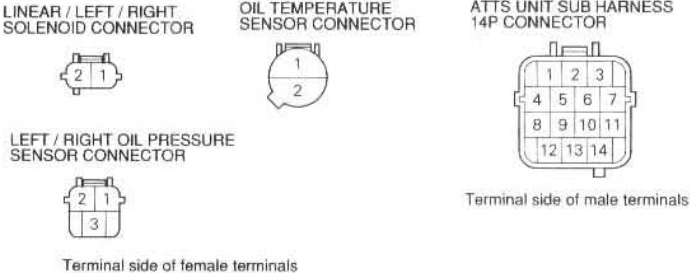
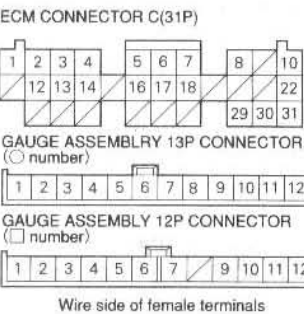
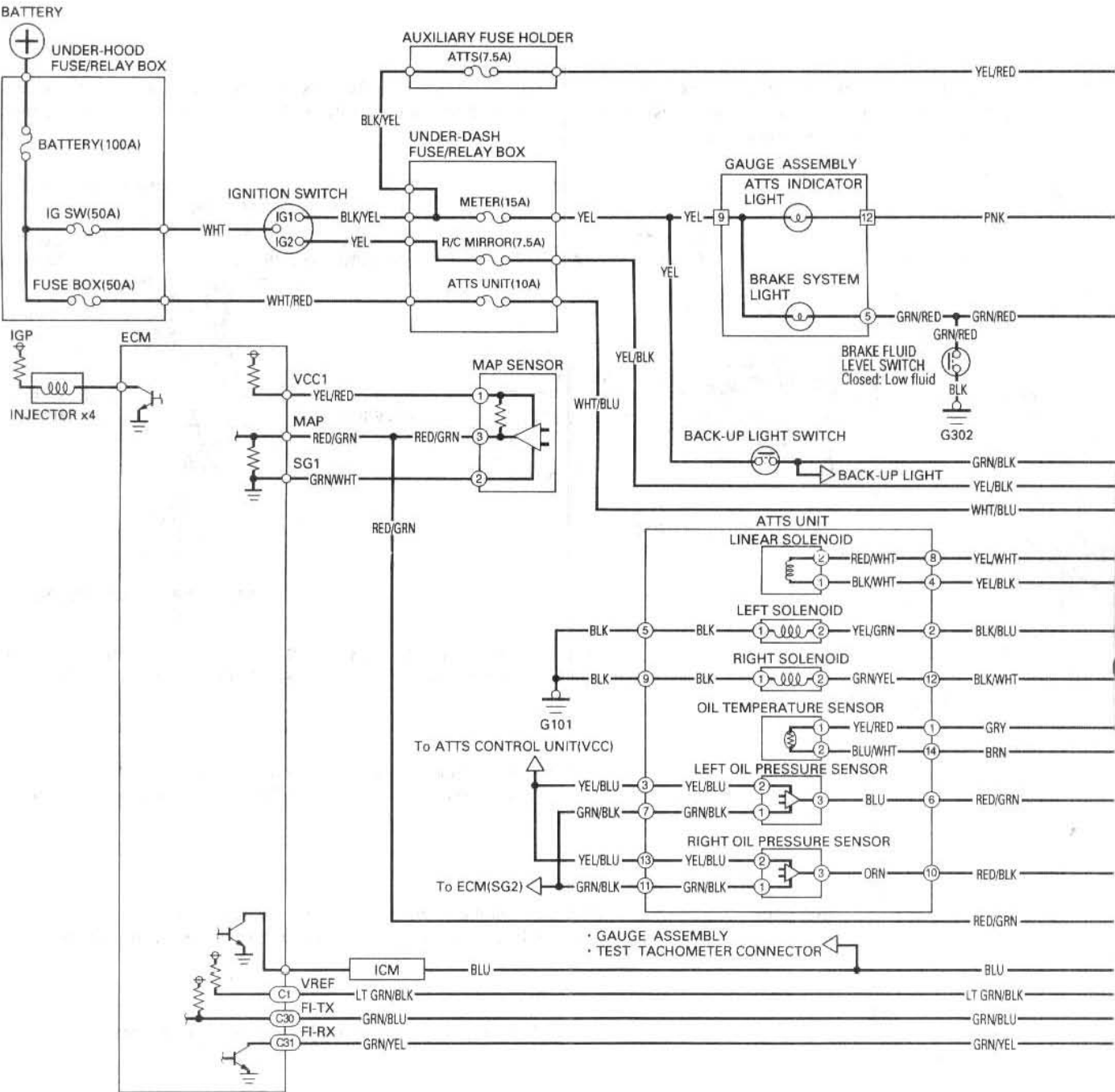
Right/left oil pressure sensor

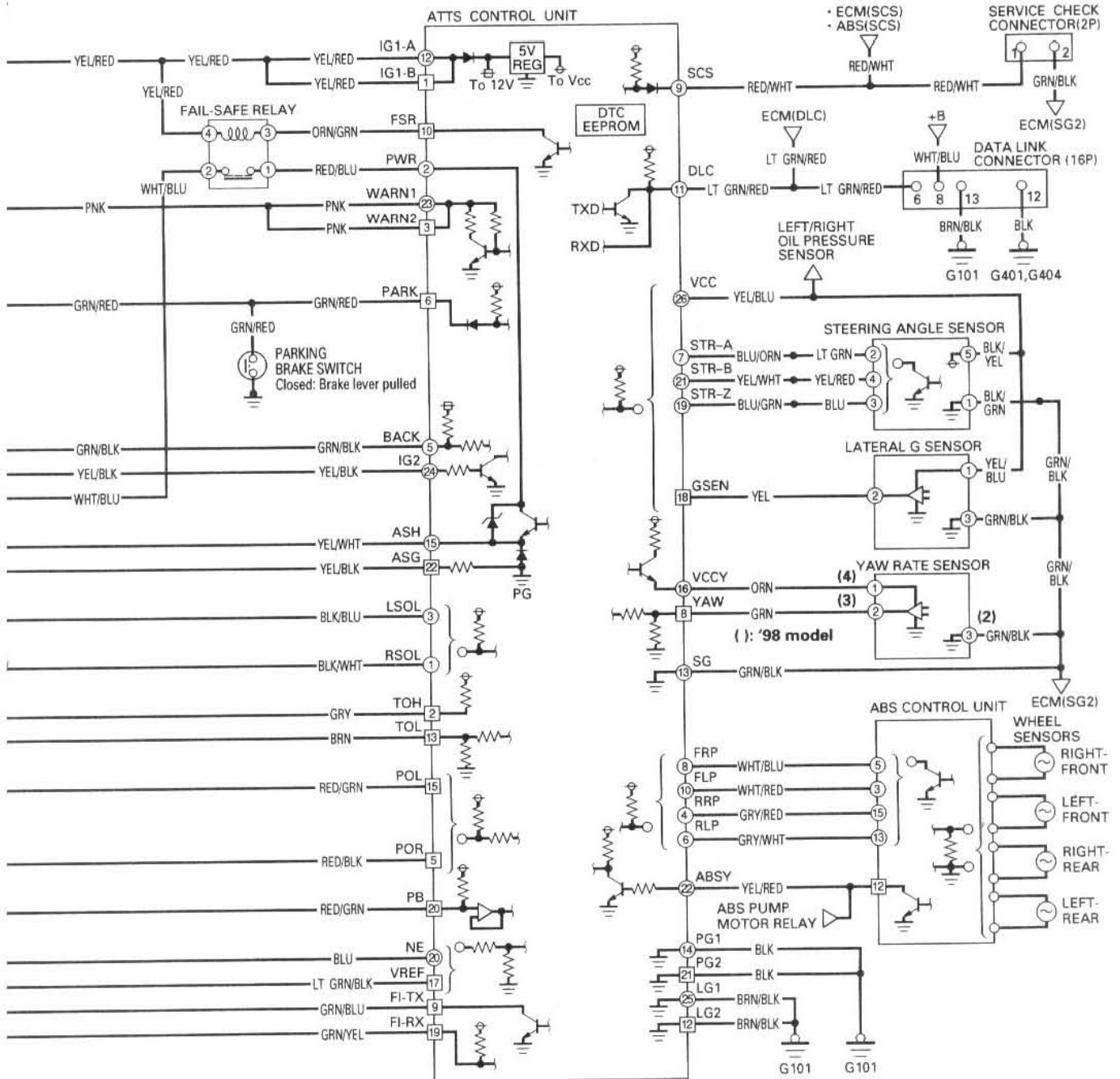
The right and left oil pressure sensors are in the right and left clutch oil lines. After detecting the oil pressure, the sensors transmit the signal to the ATTS control unit.

Oil temperature sensor

After detecting the ATF temperature in the ATTS unit, the oil temperature sensor transmits the signal to the ATTS control unit.

Circuit Diagram

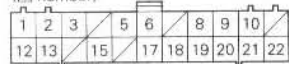




ATTS CONTROL UNIT 26P CONNECTOR
(○ number)



ATTS CONTROL UNIT 22P CONNECTOR
(□ number)



ABS CONTROL UNIT 22P CONNECTOR



Wire side of female terminals

SERVICE CHECK CONNECTOR (2P)



DATA LINK CONNECTOR (16P)



STEERING ANGLE SENSOR CONNECTOR

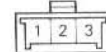


FAIL-SAFE RELAY CONNECTOR



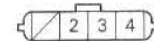
Terminal side of female terminals

LATERAL G SENSOR / YAW RATE SENSOR CONNECTOR



Terminal side of male terminals

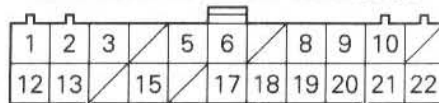
YAW RATE SENSOR CONNECTOR ('98 - '99 models)



Wire side of female terminals

Terminal Arrangement

ATTS CONTROL UNIT 22P CONNECTOR

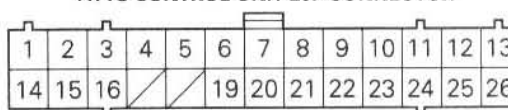


Wire side of female terminals

Terminal number	Wire color	Terminal sign (Terminal name)	Description	Measurement		
				Terminal	Conditions (Ignition switch ON (II))	Voltage
1	YEL/ RED	IG1-B (Ignition 1-B)	Detects ignition switch IG1 signal	1-GND		Battery Voltage
2	GRY	TOH (Temperature oil high)	Detects oil temperature sensor signal	2-GND		0 ↔ 5 V
3	PNK	WARN 2 (Warning 2)	Drives ATTS indicator light (The indicator light comes on by the self-bias)	3-GND	ATTS indicator light	ON: 0 V OFF: Battery Voltage
5	RED/ BLU	POR (Pressure oil sensor right)	Detects right oil pressure sensor signal	5-GND	Vehicle	Stops: Approx. 0.5 V Turns right: 0.5 ↔ 4.5 V
6	GRN/ RED	PARK (Parking)	Detects parking brake switch signal	6-GND	Parking brake lever	Pulled: 0 V Released: Above 4.7 V
8	GRN	YAW (Yaw)	Detects yaw rate sensor signal	8-GND	Vehicle	Stops: Approx. 2.5 V Turns: 0.5 ↔ 4.5 V
9	GRN/ BLU	FI-TX (Fuel injection transmission)	ECM → ATTS Data communication line	9-GND		Battery Voltage
10	ORN/ GRN	FSR (Fail-safe relay)	Drives fail-safe relay	10-GND	ATTS indicator light	ON: Battery Voltage OFF: 0 V
12	BRN/ BLK	LG2 (Logic ground 2)	Ground for the logic circuit	12-GND		Below 0.3 V
13	BRN	TOL (Temperature oil low)	Detects oil temperature sensor signal	13-GND		0.5 ↔ 4.5 V
15	RED/ BLU	POL (Pressure oil left)	Detects left oil pressure sensor signal	15-GND	Vehicle	Stops: Approx. 0.5 V Turns left: 0.5 ↔ 4.5 V
17	LT GRN/ BLK	VREF (Voltage reference)	Reference voltage for the sensors of the PGM-FI system	17-GND		Approx. 5 V
18	YEL	GSEN (Lateral G sensor)	Detects lateral G sensor	18-GND	Vehicle	Stops: Approx. 2.5 V Turns: 0.5 ↔ 4.5 V
19	GRN/ YEL	FI-RX (Fuel injection receiving)	ATTS → ECM Data communication line	19-GND		Battery Voltage
20	RED/ GRN	PB (Manifold absolute pressure)	Detects engine load signal	20-GND	Engine idling	Approx. 3 V Approx. 1 V
21	BLK	PG 2 (Power ground 2)	Ground for the power circuit	21-GND		Below 0.3 V
22	YEL/ BLK	ASG (Linear solenoid ground)	Ground for the linear solenoid	22-GND		0 ↔ 0.5 V



ATTS CONTROL UNIT 26P CONNECTOR



Wire side of female terminals

Terminal number	Wire color	Terminal sign (Terminal name)	Description	Measurement			
				Terminal	Conditions (Ignition switch ON (II))		Voltage
1	BLK/ WHT	RSOL (Right shift solenoid)	Drives right solenoid valve	1-GND	Vehicle	Turns right	Battery Voltage
						Stops and turns left	0 V
2	RED/ BLU	PWR (Power)	Power source for power system	2-GND	ATTS indicator light	ON	0 V
						OFF	Battery Voltage
3	BLK/ BLU	LSOL (Left shift solenoid)	Drives left solenoid valve	3-GND	Vehicle	Turns left	Battery Voltage
						Stops and turns right	0 V
4	GRY/ RED	RRP (Rear right pulse)	Detects right-rear wheel sensor pulse	4-GND	Rotate the right-rear wheel		0 ↔ 5 V
5	GRN/ BLK	BACK (Back)	Detects shift lever reverse signal	5-GND	Shift lever position	Reverse	Battery Voltage
						Except reverse	0 V
6	GRY/ WHT	RLP (Rear left pulse)	Detects left-rear wheel sensor pulse	6-GND	Rotate the left-rear wheel		0 ↔ 5 V
7	BLU/ ORN	STR-A (Steering A)	Detects steering angle sensor signal A	7-GND	Rotate the steering wheel		0 ↔ 5 V
8	WHT/ BLU	FRP (Front right pulse)	Detects right-front wheel sensor pulse	8-GND	Rotate the right-front wheel		0 ↔ 5 V
9	RED/ WHT	SCS (Service check signal)	Detects service check connector signal (DTC indication/erasure)	9-GND	SCS service connector	Connected	0 V
						Disconnected	Approx. 5 V
10	WHT/ RED	FLP (Front left pulse)	Detects left-front wheel sensor pulse	10-GND	Rotate the left-front wheel		0 ↔ 5 V
11	LT GRN/ RED	DLC (Data link connector)	Communicates with Honda PGM Tester	11-GND	—		—
12	YEL/ RED	IG1-A (Ignition 1-A)	Detects ignition switch IG1 signal	12-GND			Battery Voltage
13	GRN/ BLK	SG (Sensor ground)	Ground for the sensors	13-GND			Below 0.3 V

(cont'd)

Terminal Arrangement

(cont'd)

Terminal number	Wire color	Terminal sign (Terminal name)	Description	Measurement		
				Terminal	Conditions (Ignition switch ON (II))	Voltage
14	BLK	PG1 (Power ground 1)	Ground for the power circuit	14-GND		Below 0.3 V
15	YEL/ WHT	ASH (Linear solenoid high)	Drives linear solenoid valve	15-GND		0 ↔ 12 V
16	ORN	VCCY (VCC yaw)	Power source for the yaw rate sensor	16-GND		Battery Voltage*1 Approx. 5 V*2
19	BLU/ GRN	STR-Z (Steering Z)	Detects steering angle sensor signal Z	19-GND	Steering wheel position	Neutral
						Except neutral
20	BLU	NE (Engine speed pulse)	Detects engine speed signal	20-GND	Engine idling	0 V
21	YEL/ WHT	STR-B (Steering B)	Detects steering angle sensor signal B	21-GND	Rotate the steering wheel	Approx. 6 V (0 ↔ 12 V)
22	YEL/ RED	ABSY (ABS busy)	Detects ABS operation signal	22-GND	ABS pump motor	0 ↔ 5 V
						ON
23	PNK	WARN1 (Warning 1)	Drives ATTS indicator light (The indicator light comes on by the self-bias)	23-GND	ATTS indicator light	OFF
						ON
24	YEL/ BLK	IG2 (Ignition 2)	Detects ignition switch IG2 signal	24-GND		0 V
25	BRN/ BLK	LG1 (Logic ground 1)	Ground for the logic circuit	25-GND		Battery Voltage
26	YEL/ BLU	VCC (VCC)	Power source for the sensors	26-GND		Below 0.3 V
						Approx. 5 V

*1: '97 model

*2: '98 – '99 models



Troubleshooting Precautions

1. Under any of the following conditions, the ATTS indicator light will come on or stay on even if the ATTS system is normal.
 - The coolant temperature is 32°F (0°C) or below.
 - The tires are not inflated to the specified pressure.
 - The wheel sensor signal is interrupted during driving at speeds of 6 mph (10 km/h) or above due to, for example, a vehicle spin.
 - The BARO, ECT, IAT, or TP sensors in the PGM-FI system are faulty.
2. ATTS does not function when the ATTS indicator light is ON.
3. When both the ATTS indicator light and the MIL are ON, troubleshoot the PGM-FI system first.
4. When both the ATTS indicator light and the ABS indicator light are ON, troubleshoot the ABS first.

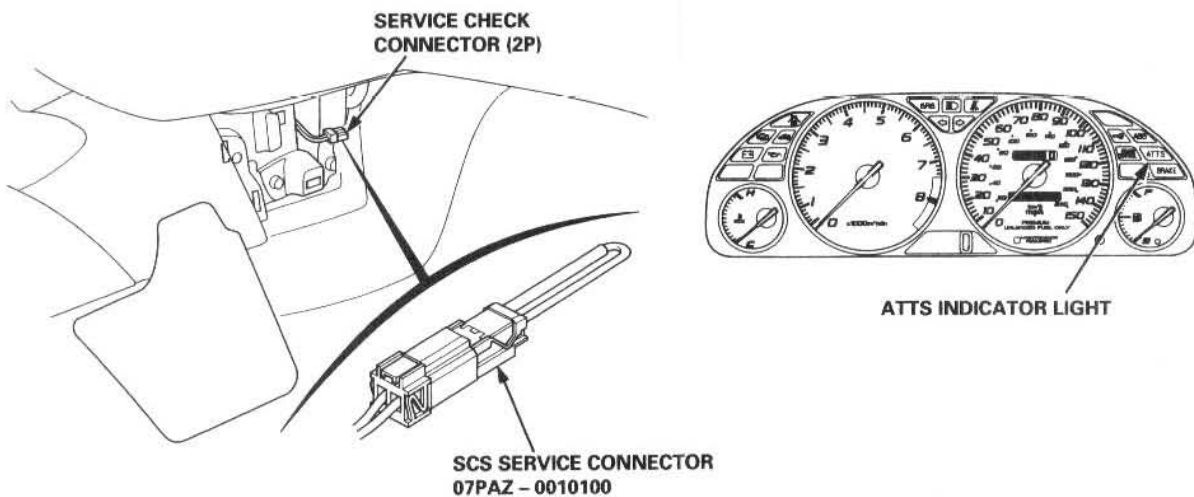
Diagnostic Trouble Code (DTC)

Diagnostic Trouble Code (DTC) Indication

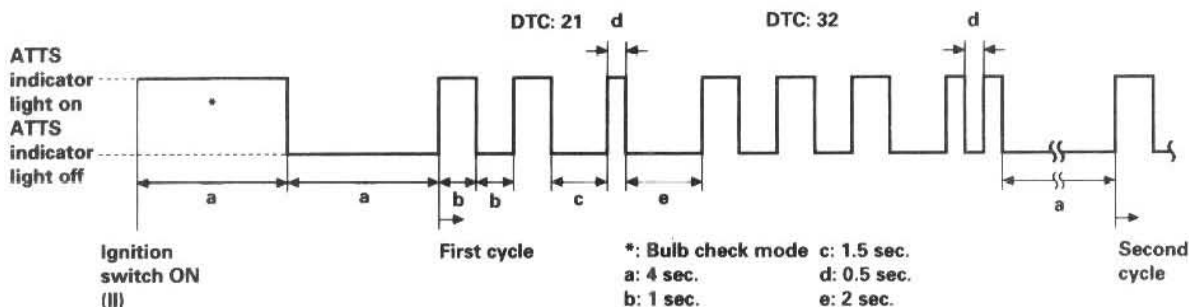
NOTE: The DTC can also be read with a Honda PGM Tester.

1. Connect the SCS service connector to the service check connector (2P) located on the right side of the center console.
 2. Release the parking brake.
 3. Turn the ignition switch ON (II), but do not start the engine.
 4. Record the blinking frequency of the ATTS indicator light. The blinking frequency indicates the diagnostic trouble code (DTC).
- NOTE: If a DTC is not memorized, the ATTS indicator light comes back ON.

5. Turn the ignition switch OFF, and remove the SCS service connector.
NOTE: The Malfunction Indicator Lamp (MIL) will stay on after the engine is started if the SCS service connector is connected.
6. Erase the DTC.



DTC Indication Pattern



- Turn the ignition switch ON (II). The ATTS indicator light comes on to check the bulb.
- The ATTS control unit can memorize up to seven DTCs.
- A new DTC is not memorized when the ATTS control unit has already memorized the same DTC.
- The ATTS control unit indicates the DTC repeatedly at intervals of 4 seconds.
- If you miscount the blinking frequency or to recheck the blinking frequency, turn the ignition switch OFF, then turn it ON (II) to cycle the ATTS indicator light again.



Erasing the DTC

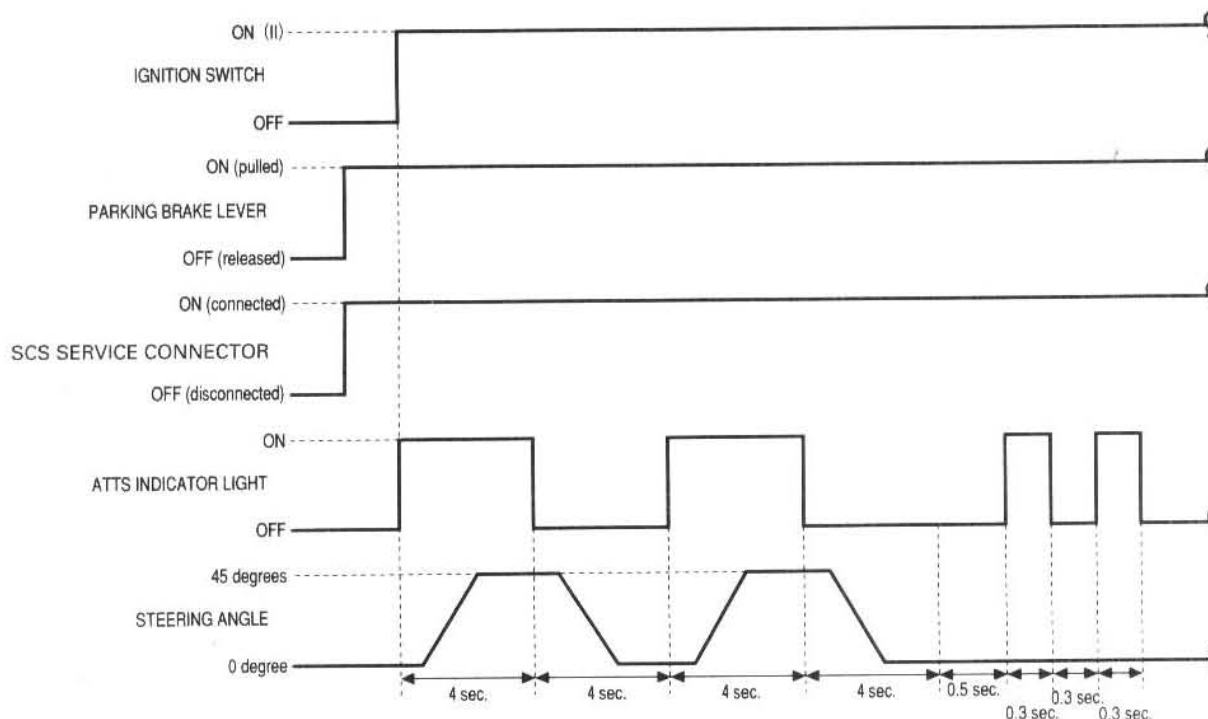
NOTE: The DTC can also be erased with a Honda PGM Tester.

1. Connect the SCS service connector to the service check connector (2P) located on the right side of the center console.
2. Pull the parking brake lever up.
3. Turn the steering wheel to the neutral (straight ahead) position.
4. Turn the ignition switch ON (II), but do not start the engine.
5. Within 4 seconds after the light comes on, turn the steering wheel to the right at least 45 degrees but not more than 90 degrees; the ATTS indicator light will go off.
6. Within 4 seconds after the light goes off, return the steering wheel to the straight-ahead driving position; the ATTS indicator light will come on.
7. Repeat step 5 and 6 one more time.
8. After few seconds, the indicator light should blink twice, then stay off. This means that the DTC is erased.

NOTE:

- Always follow these steps exactly or the DTC is not erased.
- If the ATTS indicator light blinks repeatedly, replace the ATTS control unit.

9. Turn the ignition switch OFF, and disconnect the SCS service connector.



Diagnostic Trouble Code (DTC)

Troubleshooting Index

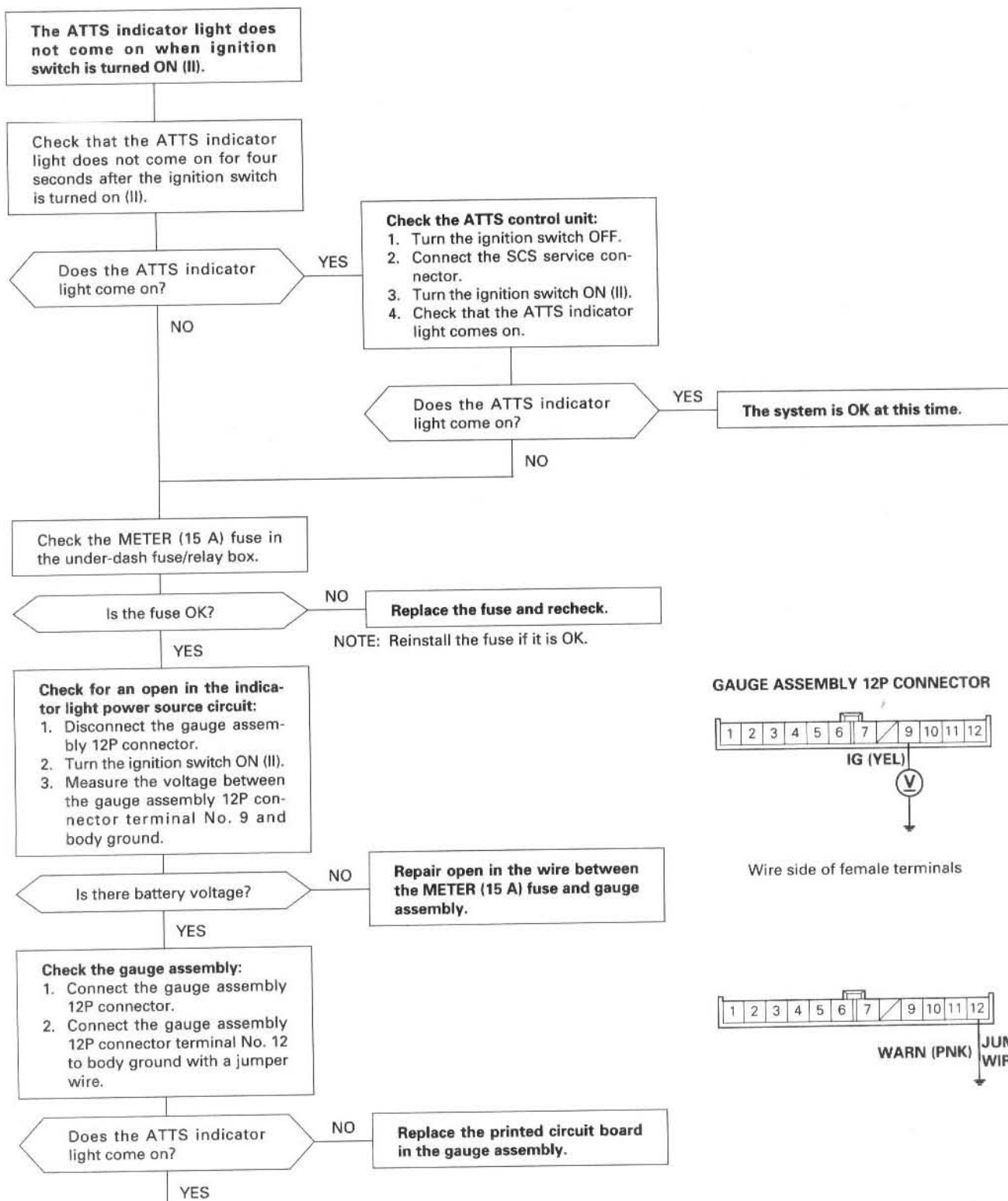
DTC	SYSTEM INDICATED	REFER TO PAGE
—	The ATTS indicator light does not come on when the ignition switch is turned ON (II).	15-17
—	The ATTS indicator light does not go off after the engine is started. (No DTC)	15-19
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13		
14		
16	Steering angle sensor	15-23
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18		15-26
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21	Wheel sensor	15-27
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29	Data link connector	15-31
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35	Reference voltage	15-34
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45	ABS down	15-38
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55	Linear solenoid	15-43
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61	Oil pressure sensor	15-49
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67	ATTS unit (These codes are detected only in the ATTS function test.)	15-51
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71	Steering angle sensor	15-52
72	Different diameter tire	15-53
73	Yaw rate sensor	15-54
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77	Ignition voltage	15-56
78	ATTS control unit	15-57
79	ATTS control inhibition	15-58



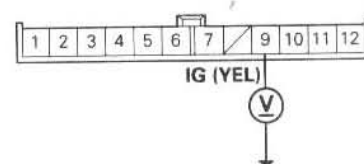
Troubleshooting

ATTS Indicator Light Does Not Come On

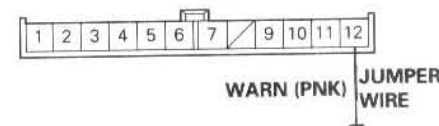
The ATTS indicator light does not come on when ignition switch is turned ON (II).



GAUGE ASSEMBLY 12P CONNECTOR



Wire side of female terminals



(cont'd)

Troubleshooting

ATTS Indicator Light Does Not Come On (cont'd)

From page 15-17

Check for an open in the WARN circuit:

1. Remove the jumper wire from the gauge assembly 12P connector.
2. Connect the ATTS control unit 22P connector terminal No. 3 to body ground with a jumper wire.

Does the ATTS indicator light come ON?

NO

Repair open in the wire between the gauge assembly and ATTS control unit.

YES

Check for an open in the PG circuit:

1. Remove the jumper wire from the ATTS control unit 22P connector.
2. Connect the ATTS control unit 22P connector terminal No. 21 to body ground with a jumper wire.

Does the ATTS indicator light come ON?

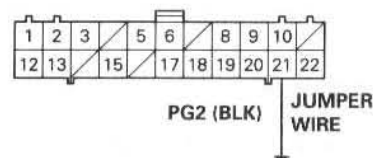
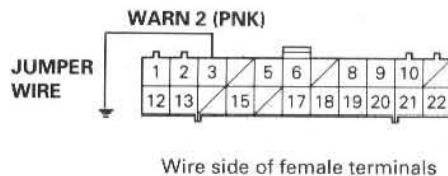
YES

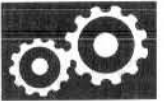
Repair open in the wire between the ATTS control unit and body ground.

NO

Check for loose ATTS control unit connectors. If necessary, substitute a known-good ATTS control unit and recheck.

ATTS CONTROL UNIT 22P CONNECTOR





ATTS indicator Light Does Not Go Off (No DTC)

The ATTS indicator light does not go off after the engine is started.

- With the engine running, the ATTS indicator light does not go off.
- With the SCS service connector connected (see page 15-14), no DTC is indicated.

NOTE: When testing the ATTS system with the PGM tester, the ATTS indicator will remain lit until the ignition is turned off and the tester is disconnected.

Check the ATTS (7.5 A) fuse in the auxiliary fuse holder.

Is the fuse OK?

NO

Replace the fuse and recheck.

YES
NOTE: Reinstall the fuse if it is OK.

Check for an open in the IG1 circuit:

1. Turn the ignition switch ON (II).
2. Measure the voltage between the ATTS control unit 22P connector terminal No. 1 and body ground.

Is there battery voltage?

NO

Repair open in the wire between the ATTS (7.5 A) fuse and ATTS control unit.

YES

Check for an open to body ground in the LG circuit:

1. Turn the ignition switch OFF.
2. Disconnect the 22P and 26P connectors from the ATTS control unit.
3. Check for continuity between the ATTS control unit 22P connector terminal No. 12 and body ground.

Is there continuity?

NO

Repair open in the wire between the ATTS control unit and body ground.

YES

Check for a short to body ground in the WARN circuit:

Turn the ignition switch ON (II) and check the ATTS indicator light.

Does the ATTS indicator come on?

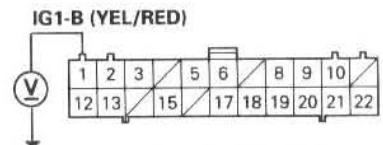
YES

Repair short to ground in the PNK wire between the ATTS control unit and the ATTS indicator light.

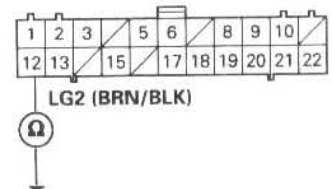
NO

To page 15-20

ATTS CONTROL UNIT 22P CONNECTOR



Wire side of female terminals



(cont'd)

Troubleshooting

ATTS indicator Light Does Not Go Off (No DTC) (cont'd)

From page 15-19

Check for a short/open in the VCC circuit:
1. Turn the ignition switch ON (II).
2. Measure the voltage between the ATTS control unit 26P connector terminal No. 26 and body ground.

Is there approx. 5 V?

YES

Check for loose ATTS control unit connector. If necessary, substitute a known-good ATTS control unit and recheck.

NO

Disconnect the left and right oil pressure sensor connectors, and the lateral G sensor connector. Remeasure the voltage between terminal No. 26 and body ground.

Is there approx. 5 V?

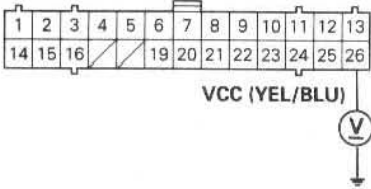
YES

Reconnect the sensors one at a time to isolate the shorted sensor. Replace the shorted sensor.

NO

Repair short to ground in the YEL/BLU wire between the ATTS control unit and the sensors.

ATTS CONTROL UNIT 26P CONNECTOR



Wire side of female terminals



DTC 11, 12, 13, 14: Lateral G Sensor

- With the engine running, the ATTS indicator light is ON.
- With the SCS service connector connected (see page 15-14), DTC 11, 12, 13, or 14 is indicated.

Problem verification:

1. Erase the DTC.
2. Test-drive the vehicle.

Does the ATTS indicator light come on and DTC 11, 12, 13, or 14 is indicated?

NO

Intermittent failure, system is OK at this time. Check for poor connections or loose wires in the lateral G sensor circuit.

YES

Check the VCC circuit:

1. Disconnect the lateral G sensor connector.
2. Turn the ignition switch ON (II).
3. Measure the voltage between the lateral G sensor connector terminal No. 1 and body ground.

Is there approx. 5 V?

NO

Check for a short/open in the VCC circuit:
Measure the voltage between the ATTS control unit 26P connector terminal No. 26 and body ground.

Is there approx. 5 V?

NO

Repair short to body ground in the VCC circuit wire. If not shorted to ground, try a known good ATTS control unit and retest.

YES

Repair open in the wire between the ATTS control unit and the lateral G sensor.

Check for an open in the lateral G sensor GND circuit:

Check for continuity between the lateral G sensor connector terminal No. 3 and body ground.

Is there continuity?

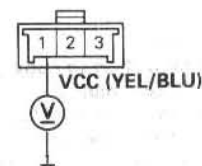
NO

Repair open in the wire between the lateral G sensor and body ground.

YES

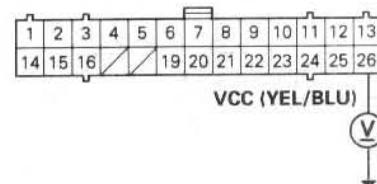
To page 15-22

LATERAL G SENSOR CONNECTOR



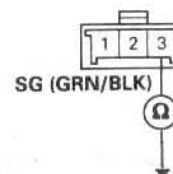
Terminal side of male terminal

ATTS CONTROL UNIT 26P CONNECTOR



Wire side of female terminals

LATERAL G SENSOR CONNECTOR

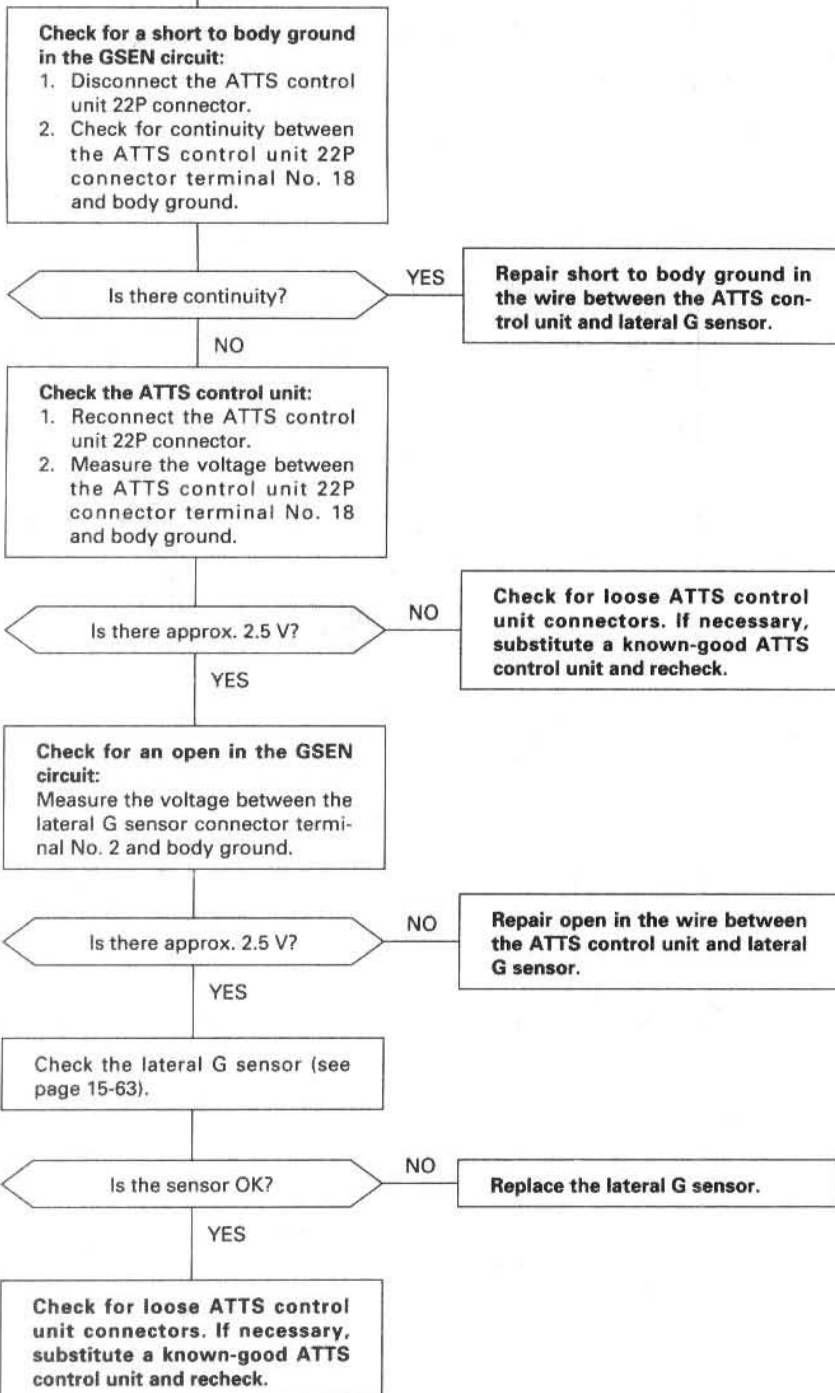


(cont'd)

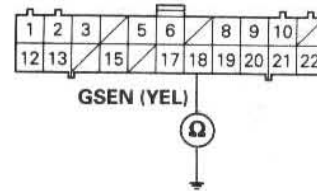
Troubleshooting

DTC 11, 12, 13, 14: Lateral G Sensor (cont'd)

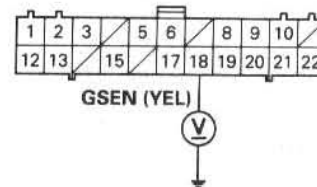
From page 15-21



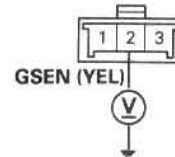
ATTS CONTROL UNIT 22P CONNECTOR



Wire side of female terminals



LATERAL G SENSOR CONNECTOR



Terminal side of male terminals



DTC 16, 17, 18: Steering Angle Sensor

- With the ignition switch ON (II), the ATTS indicator light goes off after four seconds.
- With the SCS service connector connected (see page 15-14), DTC 16, 17, or 18 is indicated.
- The tire size is correct.
- The tire pressure is correct.

Problem verification:

1. Erase the DTC.
2. Test-drive the vehicle.

Does the ATTS indicator light come on and DTC 16, 17, or 18 is indicated?

NO

Intermittent failure, system is OK at this time. Check for poor connections or loose wires in the steering angle sensor circuit.

YES

Check the VCC circuit:

1. Turn the ignition switch ON (II).
2. Measure the voltage between the steering angle sensor connector terminal No. 5 and body ground.

Is there approx. 5 V?

NO

Check for a short/open in the VCC circuit:
Measure the voltage between the ATTS control unit 26P connector terminal No. 26 and body ground.

Is there approx. 5 V?

NO

Repair short to body ground in the VCC circuit wire. If not shorted to ground, try a known good ATTS control unit and retest.

YES

Repair open in the wire between the ATTS control unit and steering angle sensor.

Check for a short to body ground in the wires between the ATTS control unit and steering angle sensor:

1. Disconnect the ATTS control unit 26P and steering angle sensor connectors.
2. Check for continuity between body ground and the ATTS control unit 26P connector terminal No. 7, No. 19 and No. 21 individually.

Is there continuity?

YES

Repair short to body ground in the wire(s) between the ATTS control unit and steering angle sensor.

NO

Check the ATTS control unit:

1. Connect the ATTS control unit 26P connector.
2. Measure the voltage between body ground and the ATTS control unit 26P connector terminal No. 7, No. 19 and No. 21 individually.

Is there approx. 5 V?

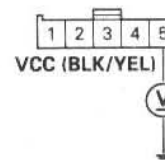
NO

Replace the ATTS control unit.

YES

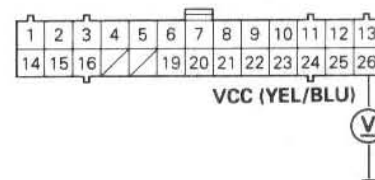
To page 15-24

STEERING ANGLE SENSOR CONNECTOR

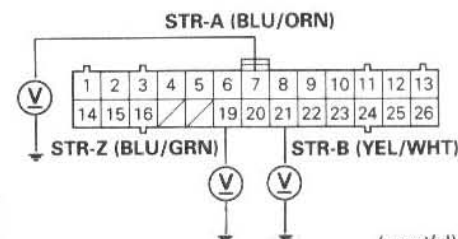
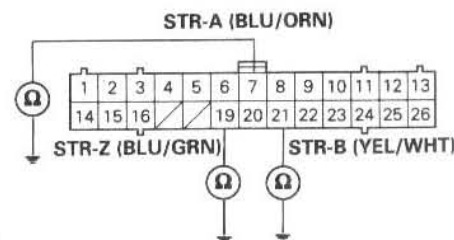


Wire side of female terminals

ATTS CONTROL UNIT 26P CONNECTOR



Wire side of female terminals

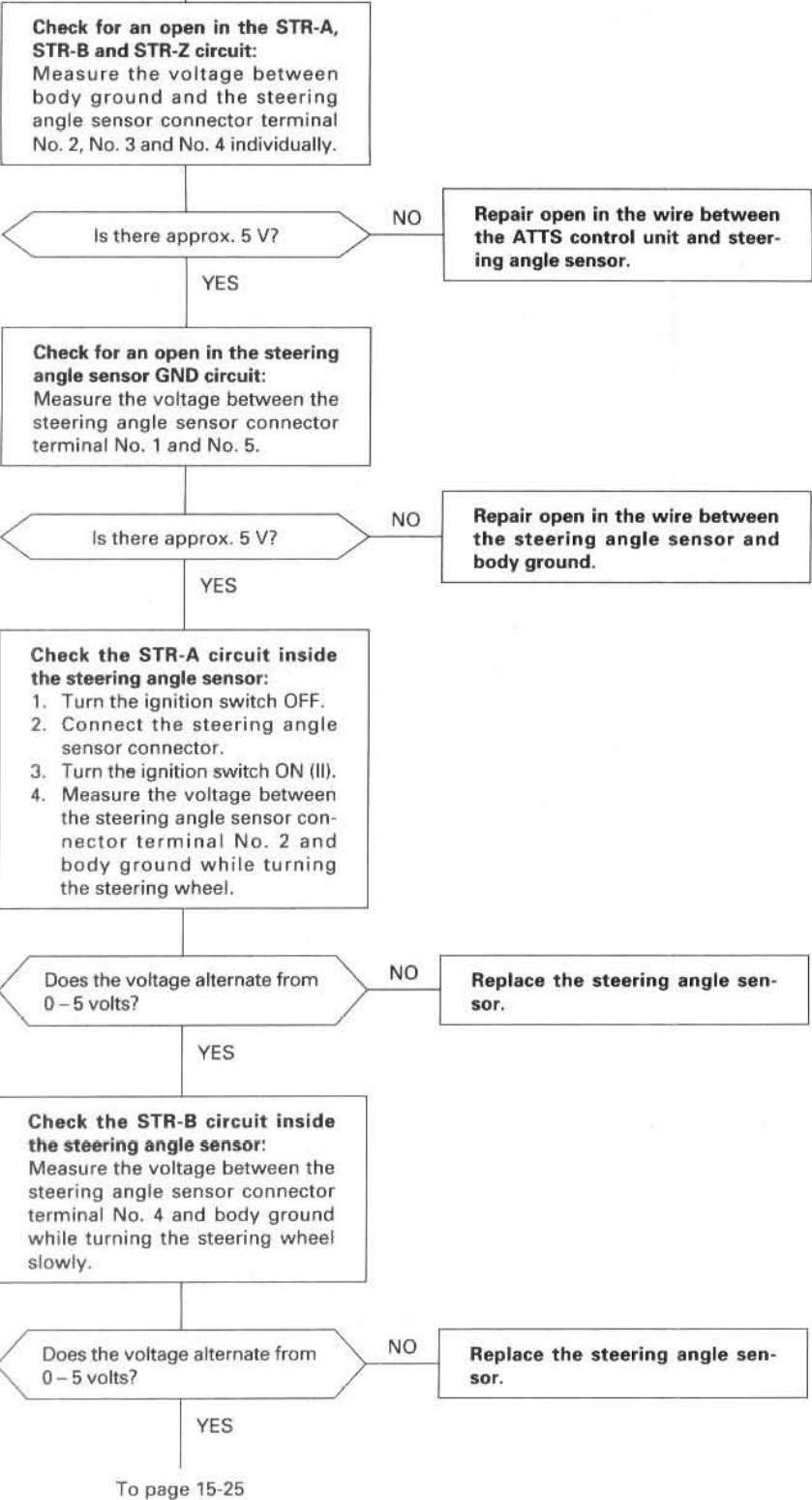


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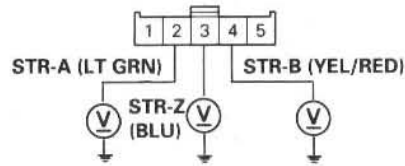
Troubleshooting

DTC 16, 17, 18: Steering Angle Sensor (cont'd)

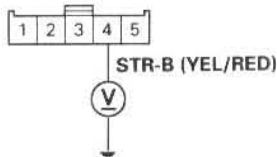
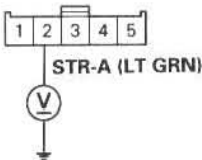
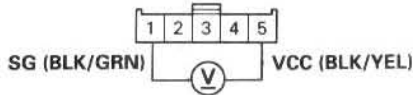
From page 15-23



STEERING ANGLE SENSOR CONNECTOR

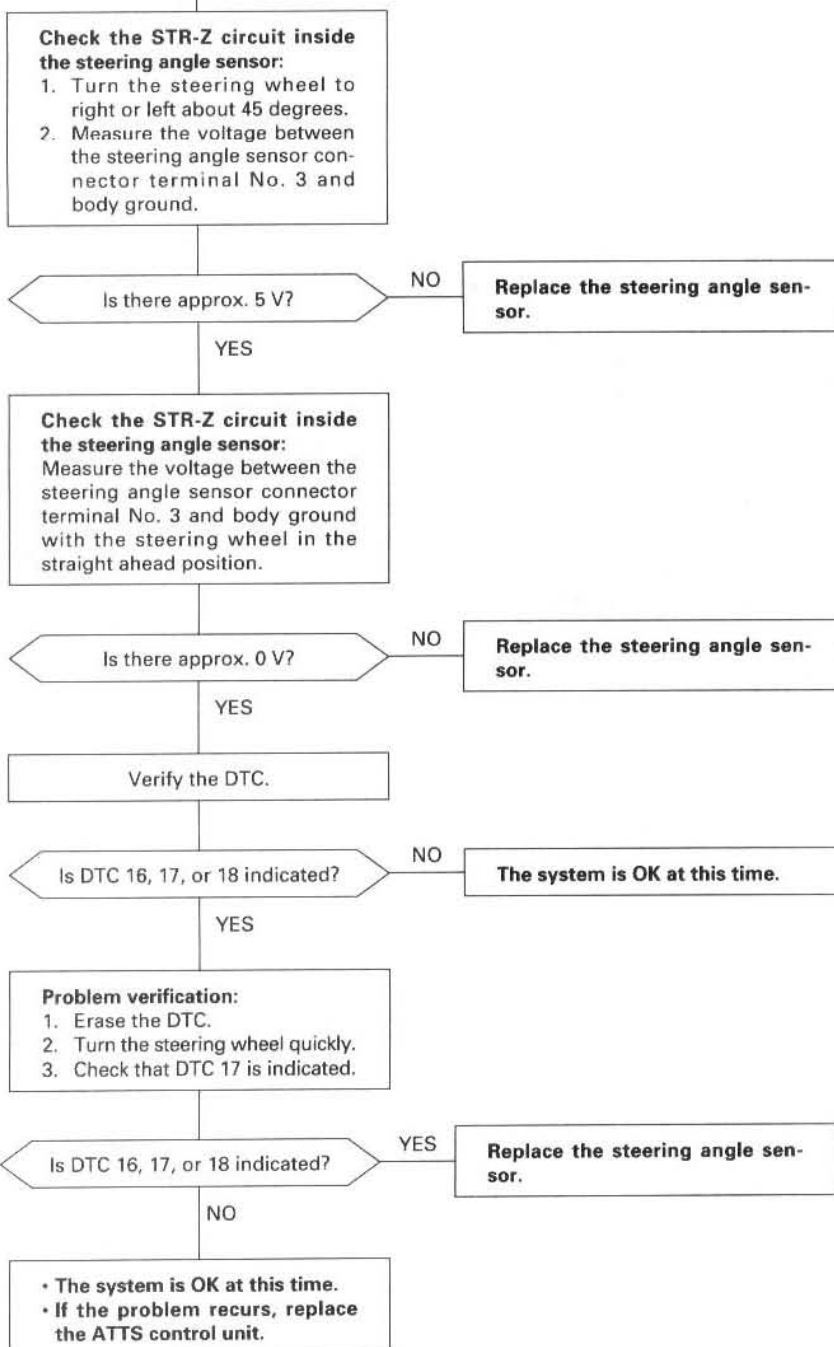


Wire side of female terminals

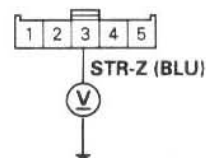




From page 15-24



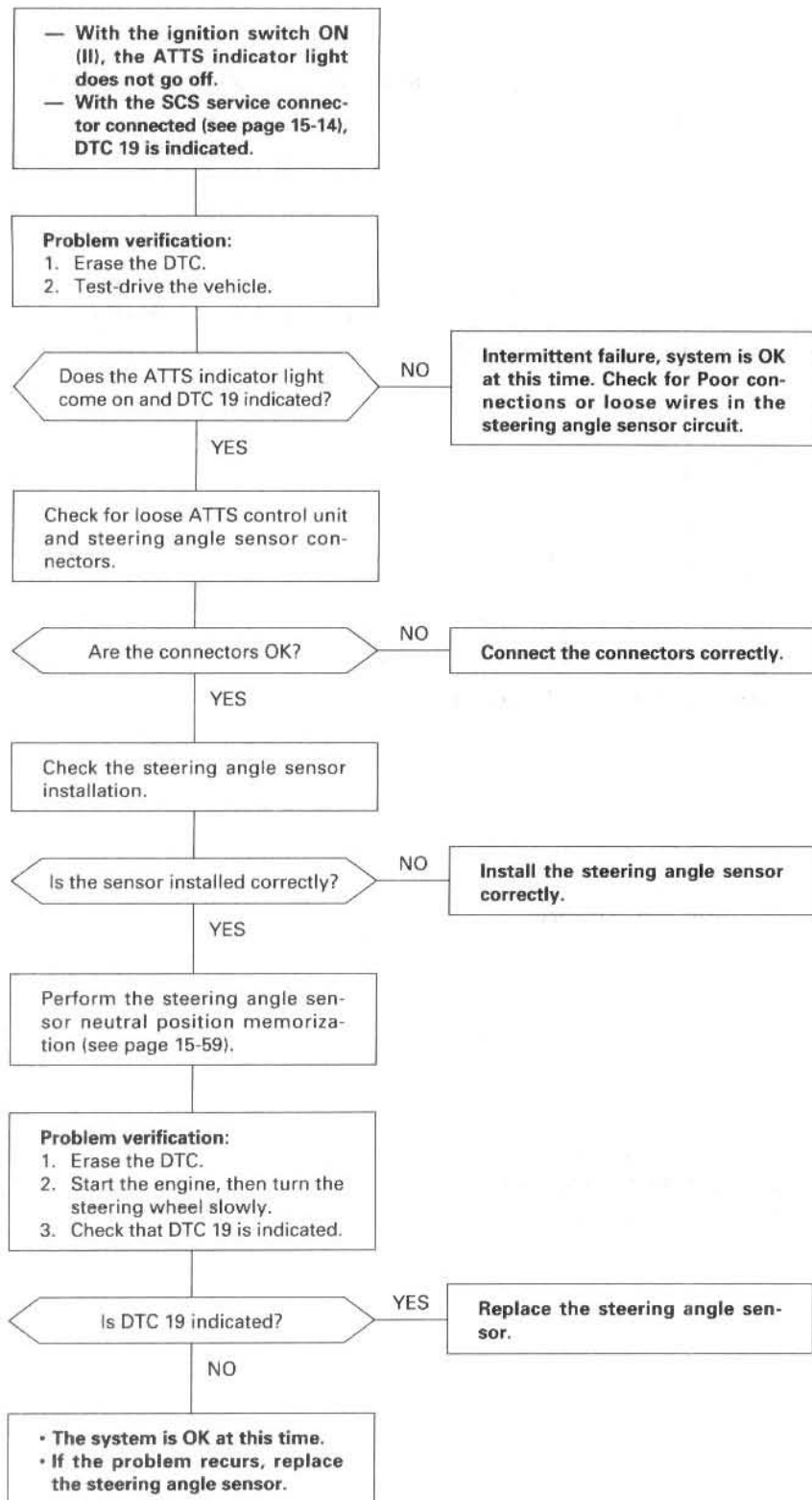
STEERING ANGLE SENSOR CONNECTOR



Wire side of female terminals

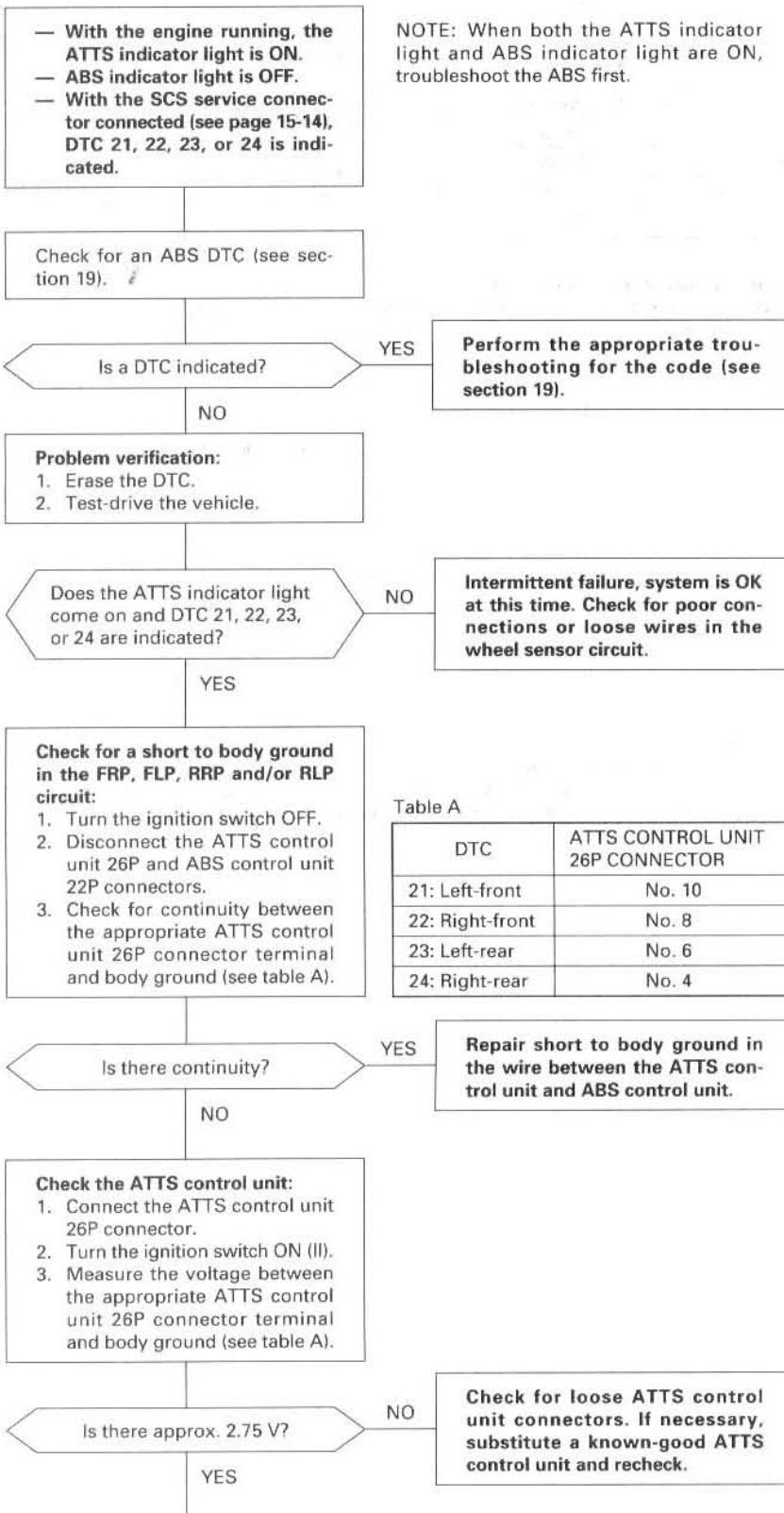
Troubleshooting

DTC 19: Steering Angle Sensor

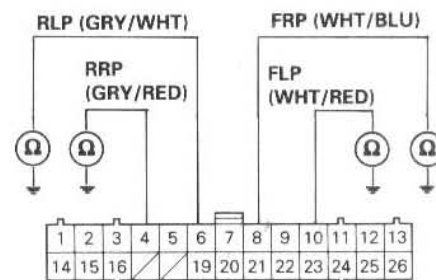




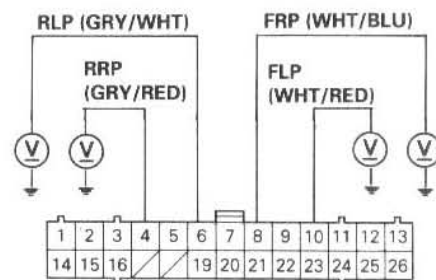
DTC 21, 22, 23, 24: Wheel Sensor



ATTS CONTROL UNIT 26P CONNECTOR



Wire side of female terminals

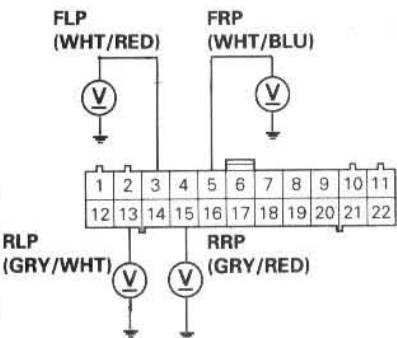
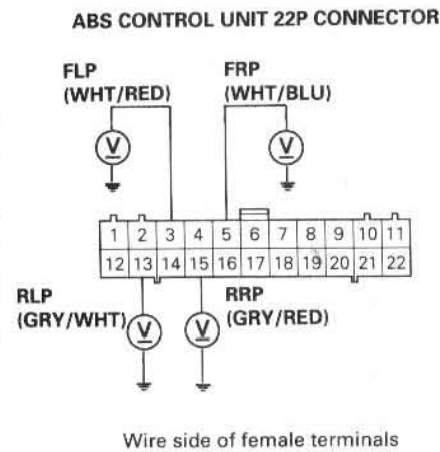
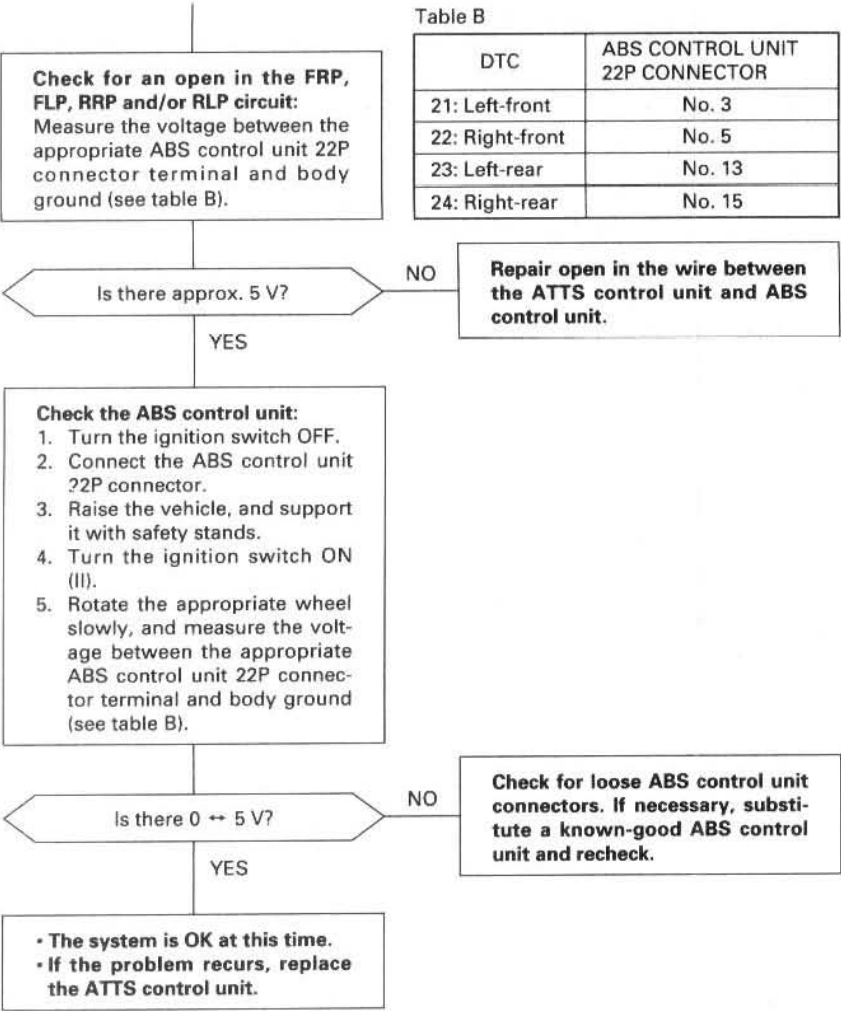


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Troubleshooting

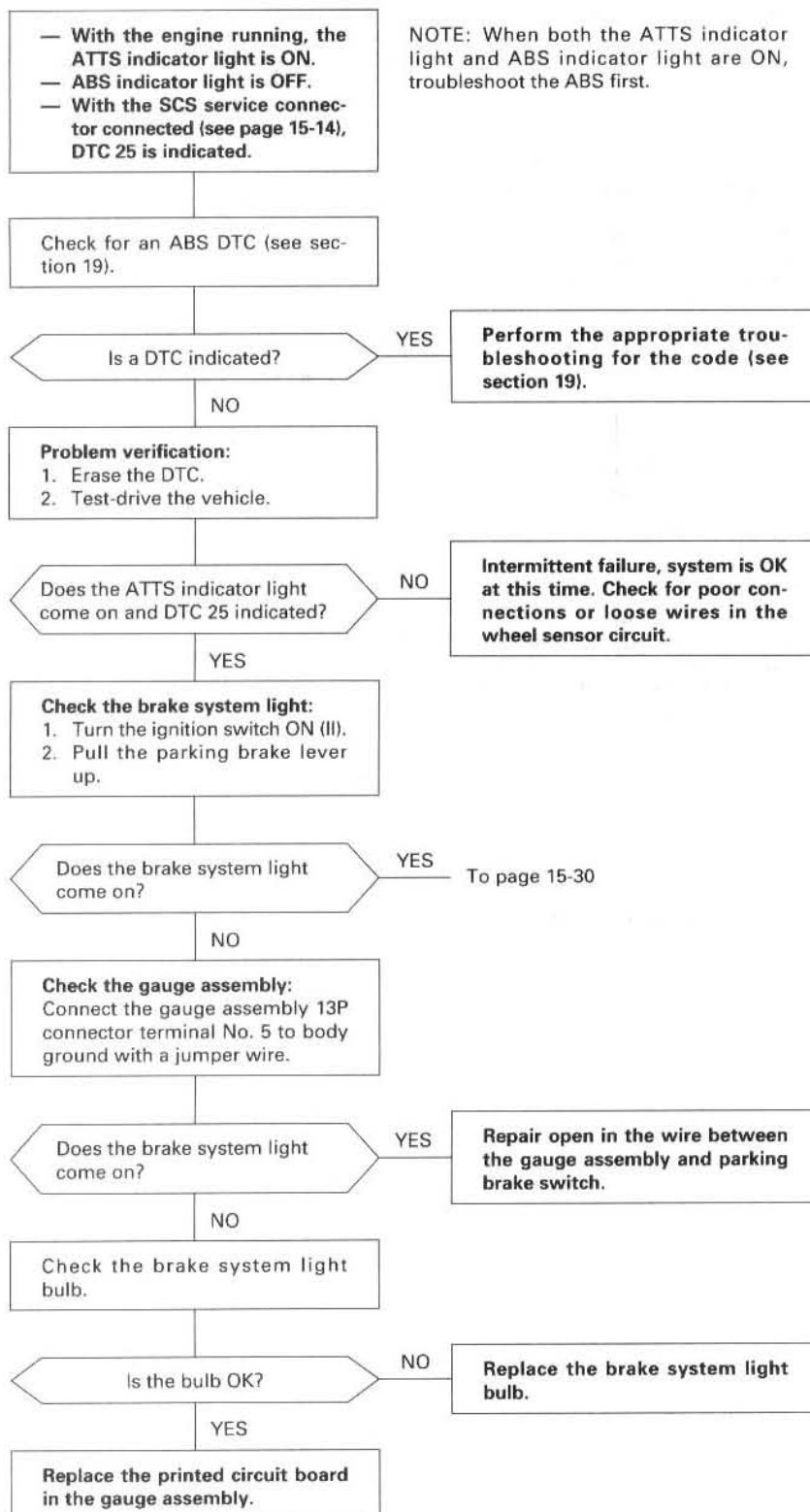
DTC 21, 22, 23, 24: Wheel Sensor (cont'd)

From page 15-27

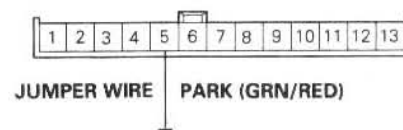




DTC 25: Wheel Sensor



GAUGE ASSEMBLY 13P CONNECTOR



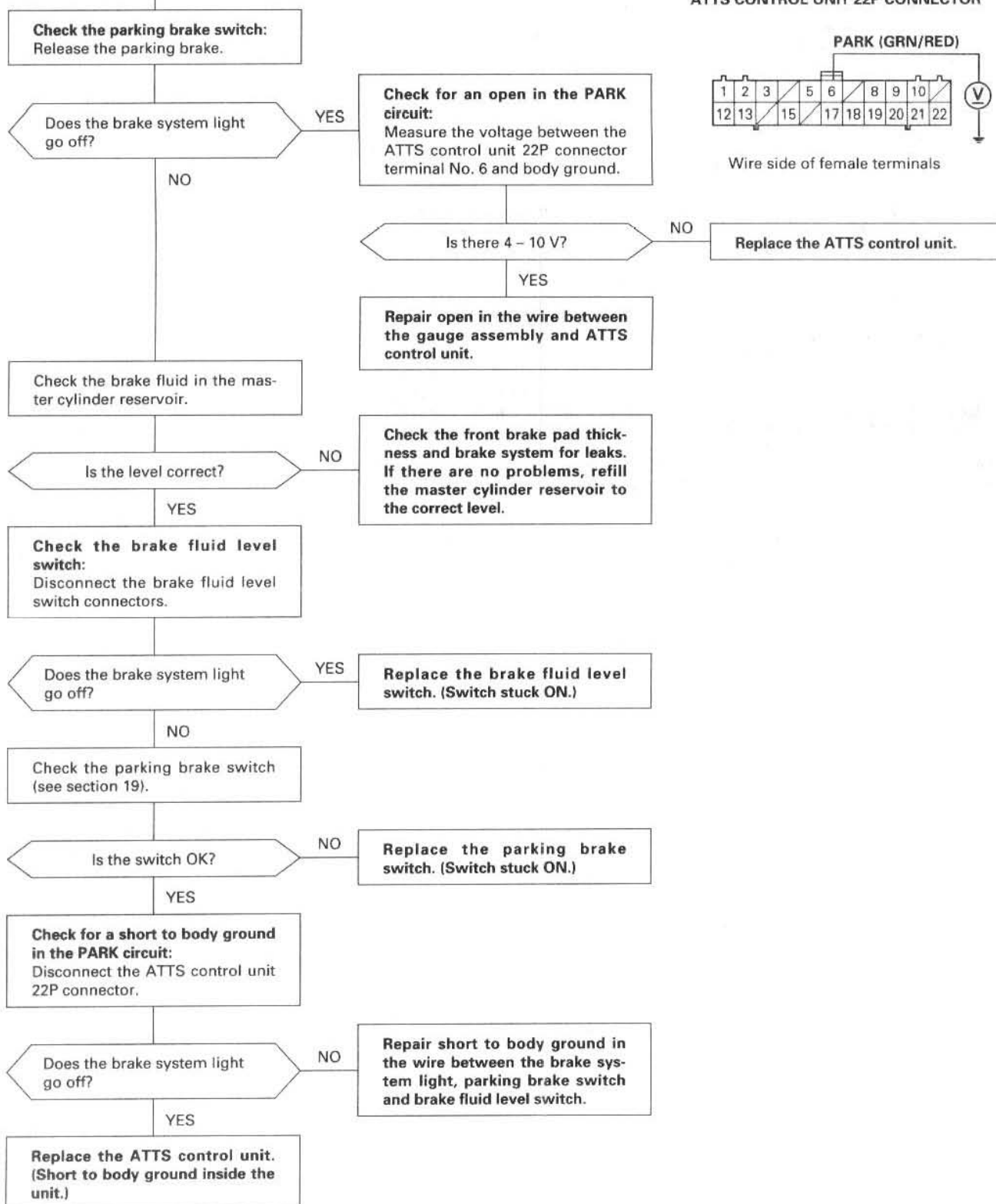
Wire side of female terminals

(cont'd)

Troubleshooting

DTC 25: Wheel Sensor (cont'd)

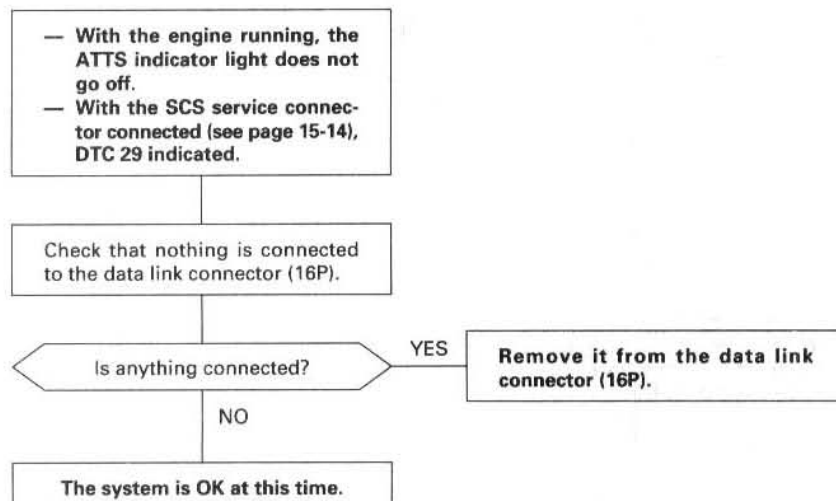
From page 15-29





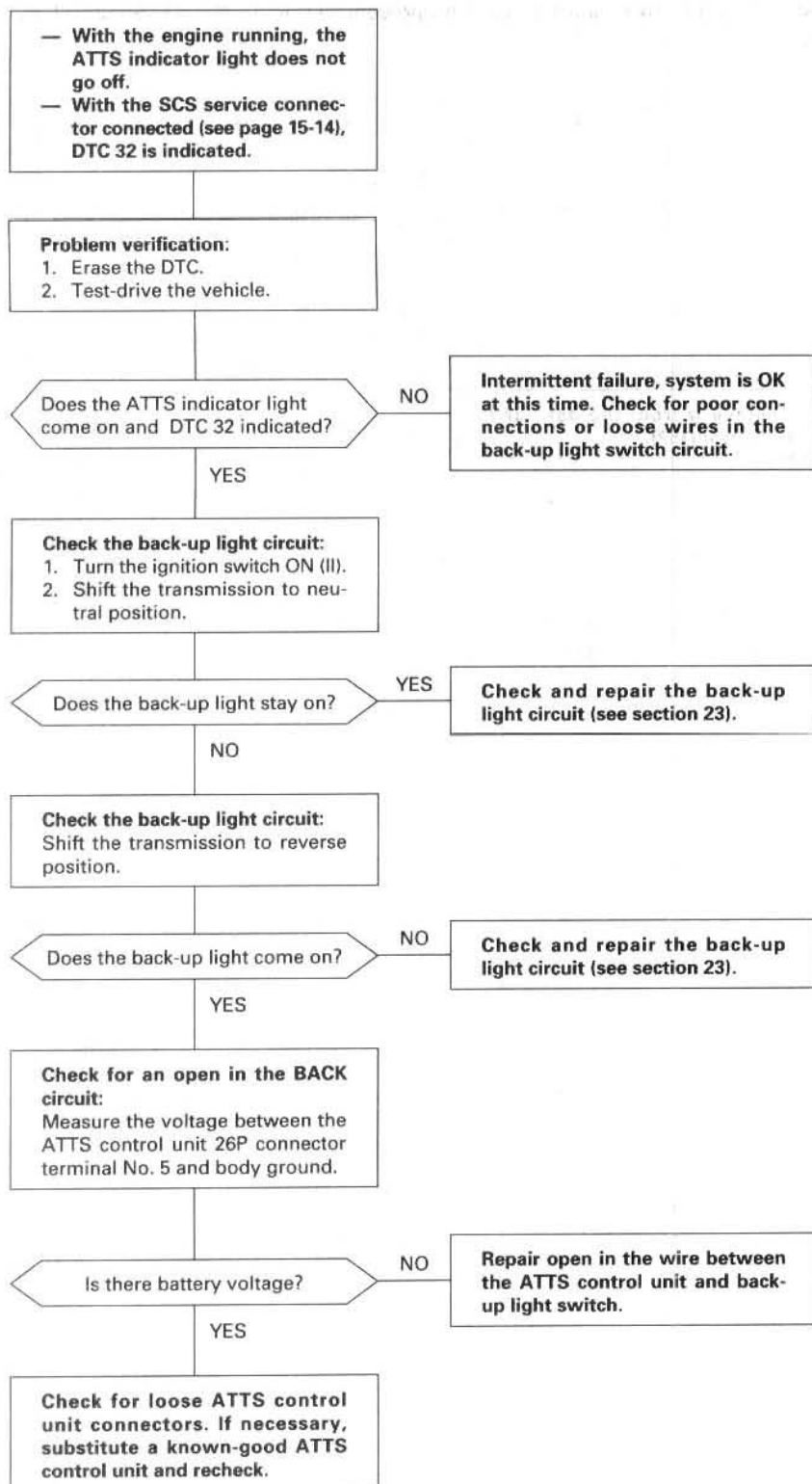
DTC 29: Data Link Connector

NOTE: If the Honda PGM Tester is connected to the data link connector (16P) during vehicle driving, the ATTS control unit stops functioning, and DTC 29 is memorized.

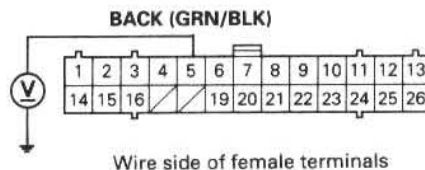


Troubleshooting

DTC 32: Back-up Light Switch



ATTS CONTROL UNIT 26P CONNECTOR





DTC 33, 34: Manifold Absolute Pressure (MAP) Sensor

- With the engine running, the ATTS indicator light does not go off.
- The MIL stays off.
- With the SCS service connector connected (see page 15-14), DTC 33 or 34 is indicated.

NOTE: When both the ATTS indicator light and MIL are ON, troubleshoot the PGM-FI system first.

Problem verification:

1. Erase the DTC.
2. Test-drive the vehicle.

Does the ATTS indicator light come on and DTC 33 or 34 are indicated?

NO

Intermittent failure, system is OK at this time. Check for poor connections or loose wires in the MAP sensor circuit.

YES

Check for an open in the PB circuit:

1. Turn the ignition switch ON (II).
2. Measure the voltage between the ATTS control unit 22P connector terminal No. 20 and body ground.

Is there approx. 3 V?

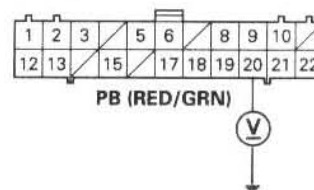
YES

Check for loose ATTS control unit connectors. If necessary, substitute a known-good ATTS control unit.

NO

Repair open in the wire between the ATTS control unit and MAP sensor.

ATTS CONTROL UNIT 22P CONNECTOR



Wire side of female terminals

Troubleshooting

DTC 35: Reference Voltage

- With the engine running, the ATTS indicator light is ON.
- With the SCS service connector connected (see page 15-14), DTC 35 is indicated.

Problem verification:

1. Erase the DTC.
2. Test-drive the vehicle.

Does the ATTS indicator light come on and DTC 35 indicated?

NO

Intermittent failure, system is OK at this time. Check for poor connections or loose wires in the reference voltage circuit.

YES

Check for a short to body ground in the VREF circuit:

1. Disconnect the ECM connector C (31P) and ATTS control unit 22P connectors.
2. Check for continuity between the ECM connector C (31P) terminal No. 1 and body ground.

Is there continuity?

YES

Repair short to body ground in the wire between the ECM and ATTS control unit.

NO

Check the VREF circuit inside the ECM:

1. Connect the ECM connector C (31P).
2. Turn the ignition switch ON (II).
3. Measure the voltage between the ECM connector C (31P) terminal No. 1 and body ground.

Is there approx. 5 V?

NO

Check for loose ECM connectors. If necessary, substitute a known-good ECM and recheck.

YES

Check for an open in the VREF circuit:

Measure the voltage between the ATTS control unit 22P connector terminal No. 17 and body ground.

Is there approx. 5 V?

NO

Repair open in the wire between the ECM and ATTS control unit.

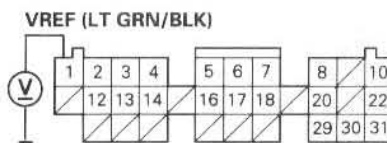
YES

- The system is OK at this time.
- If the problem recurs, replace the ATTS control unit.

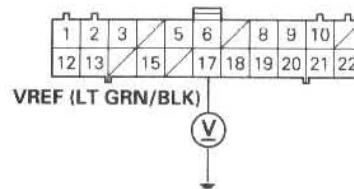
ECM CONNECTOR C (31P)



Wire side of female terminals



ATTS CONTROL UNIT 22P CONNECTOR



Wire side of female terminals



DTC 36: Engine Speed Pulse

- With the ignition switch ON (II), the ATTS indicator light is ON (DTC 37).
- The MIL stays OFF.
- With the SCS service connector connected (see page 15-14), DTC 36 is indicated.

NOTE: When both the ATTS indicator light and the MIL are ON, troubleshoot the PGM-FI system first.

Problem verification:

1. Erase the DTC.
2. Test-drive the vehicle.

Does the ATTS indicator light come on and DTC 36 indicated?

NO

Intermittent failure, system is OK at this time. Check for poor connections or loose wires in the engine speed pulse circuit.

YES

Check for an open in the NEP circuit:

1. Disconnect the ATTS control unit 26P connector.
2. Turn the ignition switch ON (II).
3. Measure the voltage between the ATTS control unit 26P connector terminal No. 20 and body ground.

Is there 5 V or more?

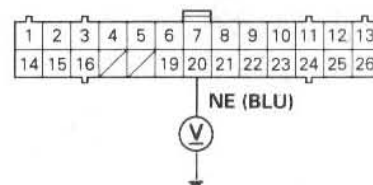
NO

Repair open in the wire between the ICM and ATTS control unit.

YES

Check for loose ATTS control unit connectors. If necessary, substitute a known-good ATTS control unit and recheck.

ATTS CONTROL UNIT 26P CONNECTOR



Wire side of female terminals

Troubleshooting

DTC 41, 42, 43: PGM-FI Communication Line

- With the engine running, the ATTS indicator light is ON.
- The MIL stays OFF.
- With the SCS service connector connected (see page 15-14), DTC 41, 42, or 43 is indicated.

NOTE: When both the ATTS indicator light and MIL are ON, troubleshoot the PGM-FI system first.

Problem verification:

1. Erase the DTC.
2. Test-drive the vehicle.

Does the ATTS indicator light come on and DTC 41, 42, or 43 are indicated?

NO

Intermittent failure, system is OK at this time. Check for poor connections or loose wires in the PGM-FI communication line circuit.

YES

Check for a short to body ground in the FI-TX and FI-RX circuits:

1. Disconnect the ECM connector C (31P) and ATTS control unit 22P connector.
2. Check for continuity between body ground and the ECM connector C (31P) terminal No. 30 and No. 31 individually.

Is there continuity?

YES

Repair short to body ground in the wire between the ECM and ATTS control unit.

NO

Check the FI-TX circuit inside the ECM:

1. Connect the ECM connector C (31P).
2. Turn the ignition switch ON (II).
3. Measure the voltage between the ECM connector C (31P) terminal No. 30 and body ground.

Is there 5 V or more?

NO

Check for loose ECM connectors. If necessary, substitute a known-good ECM and recheck.

YES

Check for an open in the FI-TX circuit:

Measure the voltage between the ATTS control unit 22P connector terminal No. 9 and body ground.

Is there 5 V or more?

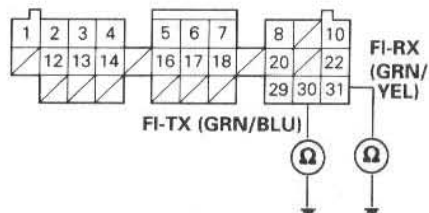
NO

Repair open in the wire between the ECM and ATTS control unit.

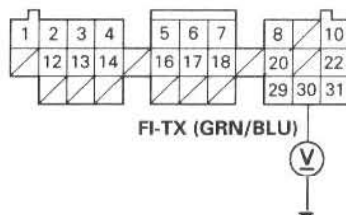
YES

To page 15-37

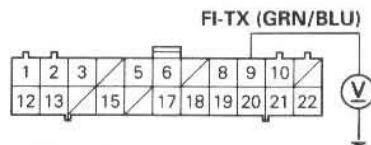
ECM CONNECTOR C (31P)



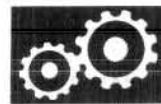
Wire side of female terminals



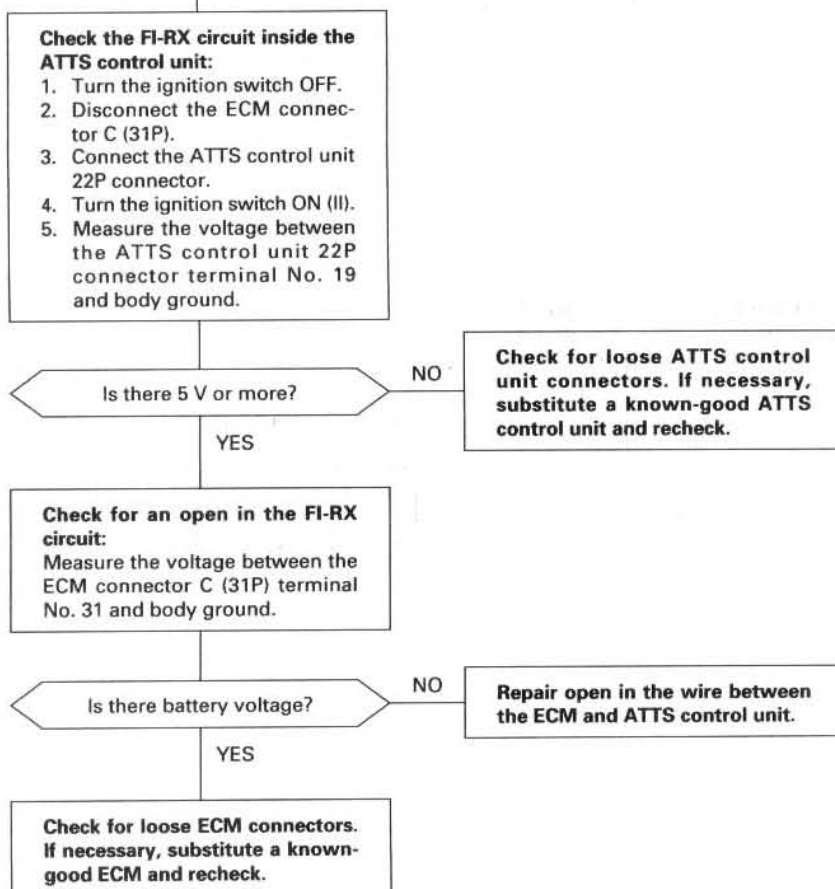
ATTS CONTROL UNIT 22P CONNECTOR



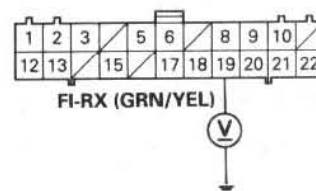
Wire side of female terminals



From page 15-36

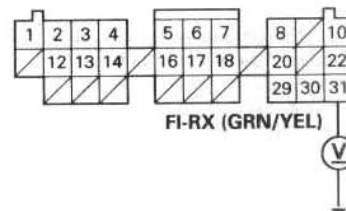


ATTS CONTROL UNIT 22P CONNECTOR



Wire side of female terminals

ECM CONNECTOR C (31P)



Wire side of female terminals

Troubleshooting

DTC 45: ABS Down

- With the engine running, the ATTS indicator light is ON.
- The ABS indicator light stays OFF.
- With the SCS service connector connected (see page 15-14), DTC 45 is indicated.

NOTE: When both the ATTS indicator light and ABS indicator light are ON, troubleshoot the ABS first.

Problem verification:

1. Erase the DTC.
2. Test-drive the vehicle.

Does the ATTS indicator light come on and DTC 45 indicated?

NO

Intermittent failure, system is OK at this time. Check for poor connections or loose wires in the IG2 circuit.

YES

Check for an open in the IG2 circuit:

1. Turn the ignition switch ON (II).
2. Measure the voltage between the ATTS control unit 26P connector terminal No. 24 and body ground.

Is there battery voltage?

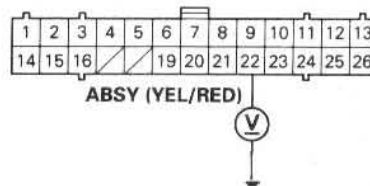
NO

Repair open in the wire between the R/C MIRROR (7.5 A) fuse and ATTS control unit.

YES

Check for loose ATTS control unit connectors. If necessary, substitute a known-good ATTS control unit and recheck.

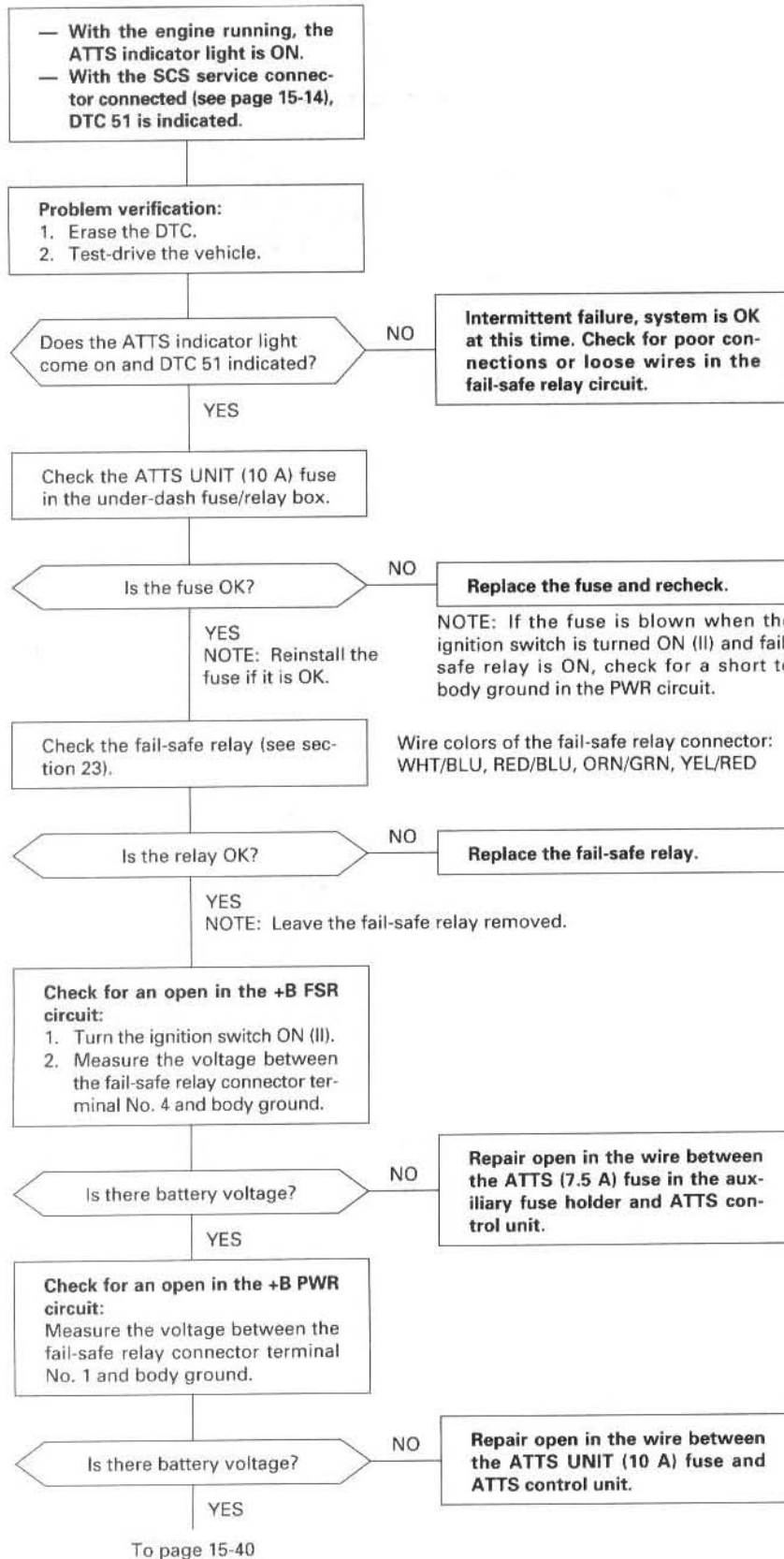
ATTS CONTROL UNIT 26P CONNECTOR



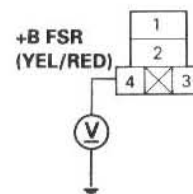
Wire side of female terminals



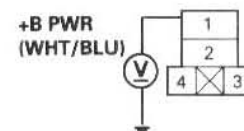
DTC 51: Fail-safe Relay



FAIL-SAFE RELAY CONNECTOR



Terminal side of female terminals



(cont'd)

Troubleshooting

DTC 51: Fail-safe Relay (cont'd)

From page 15-39

Check for a short to body ground in the FSR circuit:

1. Turn the ignition switch OFF.
2. Disconnect the ATTS control unit 22P connector.
3. Check for continuity between the ATTS control unit 22P connector terminal No. 10 and body ground.

Is there continuity?

YES

Repair short to body ground in the wire between the ATTS control unit and fail-safe relay.

NO

Check for an open in the FSR circuit:

1. Install the fail-safe relay.
2. Turn the ignition switch ON (II).
3. Measure the voltage between the ATTS control unit 22P connector terminal No. 10 and body ground.

Is there battery voltage?

NO

Repair open in the wire between the ATTS control unit and fail-safe relay.

YES

Check for an open in the PWR circuit:

1. Turn the ignition switch OFF.
2. Disconnect the ATTS control unit 26P connector.
3. Remove the fail-safe relay.
4. Connect the fail-safe relay connector terminal No. 1 and No. 2 with a jumper wire.
5. Measure the voltage between the ATTS control unit 26P connector terminal No. 2 and body ground.

Is there battery voltage?

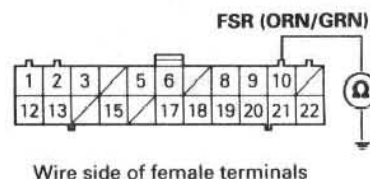
NO

Repair open in the wire between the ATTS control unit and fail-safe relay.

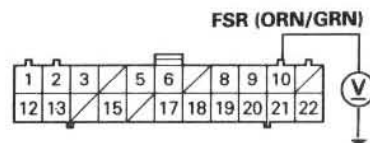
YES

- The system is OK at this time.
- If the problem recurs, replace the ATTS control unit.

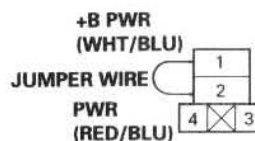
ATTS CONTROL UNIT 22P CONNECTOR



Wire side of female terminals

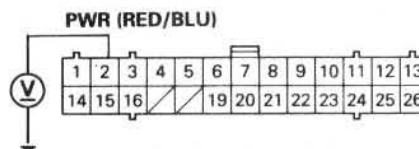


FAIL-SAFE RELAY CONNECTOR



Terminal side of female terminals

ATTS CONTROL UNIT 26P CONNECTOR



Wire side of female terminals



DTC 52, 53: Left and Right Shift Solenoids

DTC 52: Left shift solenoid

DTC 53: Right shift solenoid

- With the engine running, the ATTS indicator light is ON.
- With the SCS service connector connected (see page 15-14), DTC 52 or 53 is indicated.

Problem verification:

1. Erase the DTC.
2. Test-drive the vehicle and accelerate through left and right turns.

Does the ATTS indicator light come on and is DTC 52 or 53 indicated?

NO

- The system is OK at this time.
- Probable cause was loose solenoid connectors.

YES

Check for a short to body ground in the solenoid circuit:

1. Disconnect the ATTS control unit 26P connector.
2. Measure the resistance between the appropriate ATTS control unit 26P connector terminal and body ground (see table A).

Table A

DTC	ATTS CONTROL UNIT 26P CONNECTOR
52: Left shift solenoid	No. 3
53: Right shift solenoid	No. 1

Is there less than 18 Ω ?

YES

Repair short to body ground in the wire between the ATTS control unit and solenoid.

NO

Check for an open in the solenoid circuit:

1. Disconnect the ATTS unit sub harness 14P connector.
2. Connect the appropriate ATTS unit sub harness 14P connector terminal and body ground with a jumper wire.
3. Check for continuity between the appropriate ATTS control unit 26P connector terminal and body ground (see table B).

Table B

DTC	ATTS UNIT SUB HARNESS 14P CONNECTOR	ATTS CONTROL UNIT 26P CONNECTOR
52	No. 2	No. 3
53	No. 12	No. 1

Is there continuity?

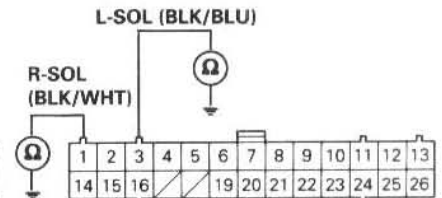
NO

Repair open in the wire between the ATTS control unit and ATTS unit sub harness 14P connector.

YES

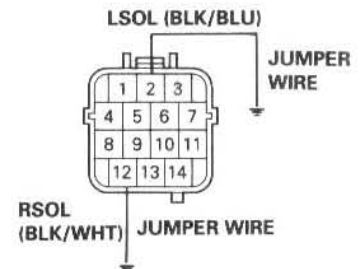
To page 15-42

ATTS CONTROL UNIT 26P CONNECTOR



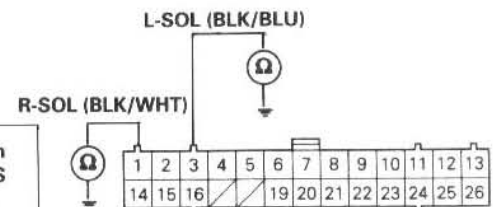
Wire side of female terminals

ATTS UNIT SUB HARNESS 14P CONNECTOR



Terminal side of male terminals

ATTS CONTROL UNIT 26P CONNECTOR



Wire side of female terminals

(cont'd)

Troubleshooting

DTC 52, 53: Left and Right Shift Solenoids (cont'd)

From page 15-41

Check the solenoid:
Measure the resistance between the appropriate ATTS unit sub harness connector terminals (see table).

DTC	ATTS UNIT SUB HAR- NESS 14P CONNECTOR
52: Left shift solenoid	No. 2 and No. 5
53: Right shift solenoid	No. 12 and No. 9

Is there 10 – 18 Ω?

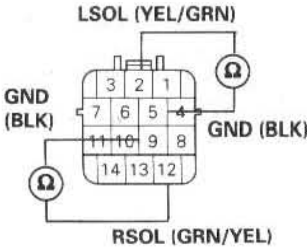
NO

- Repair open in the wire between the ATTS unit sub harness 14P connector and solenoid.
- Repair open in the wire between the solenoid and body ground.
- Repair poor ground (G101).
- Replace the solenoid.

YES

Check for loose ATTS control unit connectors. If necessary, substitute a known-good ATTS control unit and recheck.

ATTS UNIT SUB HARNESS 14P CONNECTOR



Terminal side of female terminals



DTC 54, 55, 56: Linear Solenoid

- With the engine running, the ATTS indicator light is ON.
- With the SCS service connector connected (see page 15-14), DTC 54, 55, or 56 is indicated.

Problem verification:

1. Erase the DTC.
2. Test-drive the vehicle.

Does the ATTS indicator light come on and DTC 54, 55, or 56 are indicated?

NO

Intermittent failure, system is OK at this time. Check for poor connections or loose wires in the linear solenoid circuit.

YES

Check for an open in the linear solenoid circuit:

1. Disconnect the ATTS control unit 22P and 26P connectors.
2. Measure the resistance between the ATTS control unit 22P connector terminal No. 22 and 26P connector terminal No. 15.

Is there 4 – 9 Ω ?

NO

To page 15-45

YES

Check for a short to body ground in the ASH circuit:

Check for continuity between the ATTS control unit 26P connector terminal No. 15 and body ground.

Is there continuity?

YES

Check the ASH circuit:

1. Disconnect the ATTS unit sub harness 14P connector.
2. Check for continuity between the ATTS control unit 26P connector terminal No. 15 and body ground.

Is there continuity?

YES

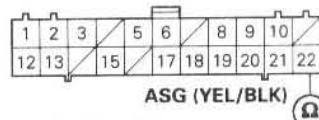
Repair short to body ground in the wire between the ATTS control unit and ATTS unit sub harness 14P connector.

NO

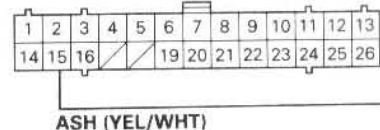
Repair short to body ground in the wire between the ATTS unit sub harness 14P connector and linear solenoid.

To page 15-44

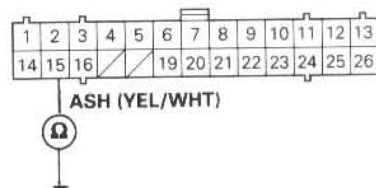
ATTS CONTROL UNIT 22P CONNECTOR



ATTS CONTROL UNIT 26P CONNECTOR



Wire side of female terminals



(cont'd)

Troubleshooting

DTC 54, 55, 56: Linear Solenoid (cont'd)

From page 15-43

Check for a short to body ground in the ASG circuit:
Check for continuity between the ATTS control unit 22P connector terminal No. 22 and body ground.

Is there continuity?

NO

YES

Check the ASG circuit:
1. Disconnect the ATTS unit sub harness 14P connector.
2. Check for continuity between the ATTS control unit 22P connector terminal No. 22 and body ground.

Is there continuity?

NO

YES

Repair short to body ground in the wire between the ATTS control unit and ATTS unit sub harness 14P connector.

Repair short to body ground in the wire between the ATTS unit sub harness 14P connector and linear solenoid.

Problem verification:
1. Reconnect the removed connectors.
2. Perform the ATTS function test (see page 15-59 or 60).

Is the system OK?

NO

YES

The system is OK at this time.

Verify the DTC.

Is DTC 54, 55, or 56 indicated?

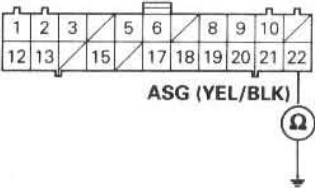
YES

NO

Perform the appropriate troubleshooting for the code.

Replace the linear solenoid.

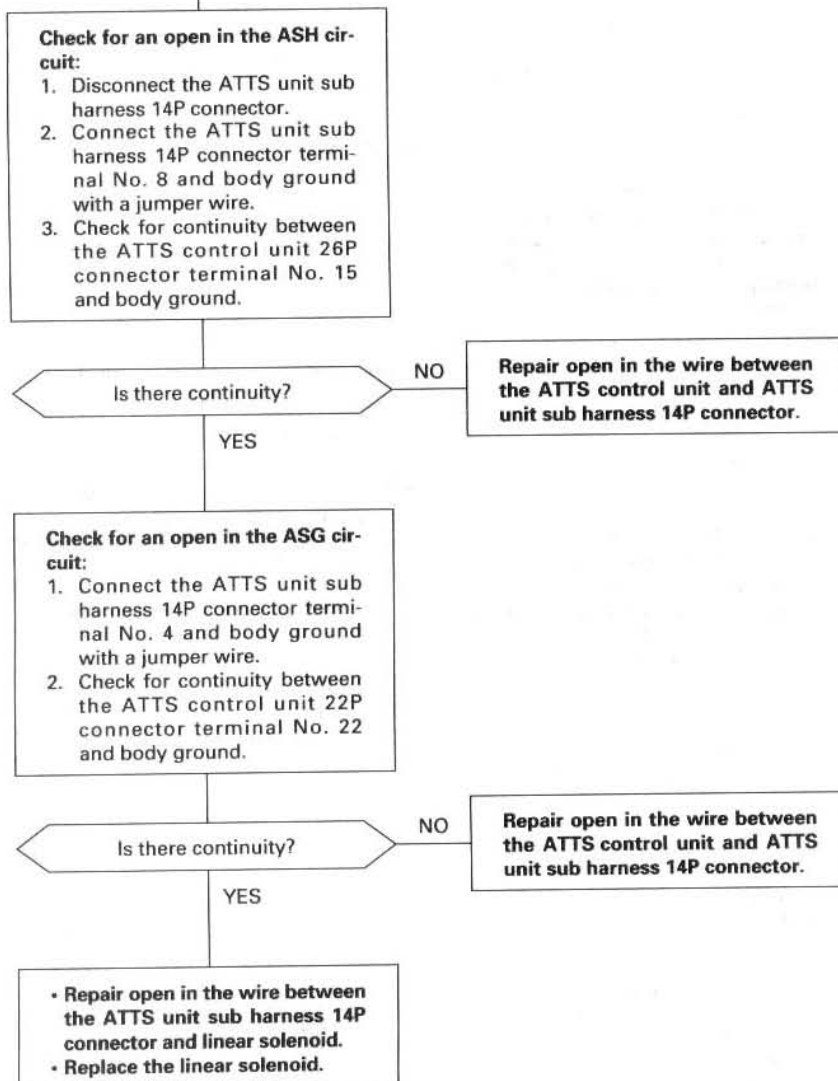
ATTS CONTROL UNIT 22P CONNECTOR



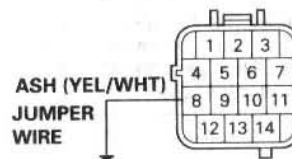
Wire side of female terminals



From page 15-43

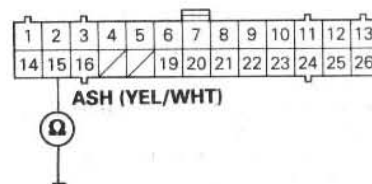


ATTS UNIT SUB HARNESS 14P CONNECTOR

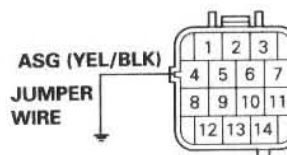


Terminal side of male terminals

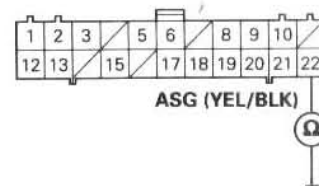
ATTS CONTROL UNIT 26P CONNECTOR



Wire side of female terminals



ATTS CONTROL UNIT 22P CONNECTOR



Wire side of female terminals

Troubleshooting

DTC 57, 58: Oil Temperature Sensor

- With the engine running, the ATTS indicator light is ON.
- With the SCS service connector connected (see page 15-14), DTC 57 or 58 is indicated.

Problem verification:

1. Erase the DTC.
2. Test-drive the vehicle.

Does the ATTS indicator light come on and DTC 57, 58 are indicated?

NO

Intermittent failure, system is OK at this time. Check for poor connections or loose wires in the oil temperature sensor circuit.

YES

Check for a short to body ground in the TOH circuit:

1. Disconnect the ATTS control unit 22P connector.
2. Check for continuity between the ATTS control unit 22P connector terminal No. 2 and body ground.

Is there less than 10 ohms?

YES

Check the TOH circuit:

1. Disconnect the ATTS unit sub harness 14P connector.
2. Check for continuity between the ATTS control unit 22P connector terminal No. 2 and body ground.

Is there continuity?

YES

Repair short to body ground in the wire between the ATTS control unit and ATTS unit sub harness 14P connector.

NO

Check for a short to body ground in the TOL circuit:

Check for continuity between the ATTS control unit 22P connector terminal No. 13 and body ground.

Is there continuity?

YES

Repair short to body ground in the wire between the oil temperature sensor and MCU sub harness 14P connector.

NO

Check for an open in the oil temperature sensor circuit:

Measure the resistance between the ATTS control unit 22P connector terminal No. 2 and No. 13.

Does the resistance match the graph (see page 15-47)?

NO

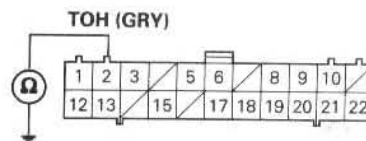
Repair short to body ground in the wire between the oil temperature sensor and ATTS unit sub harness 14P connector.

YES

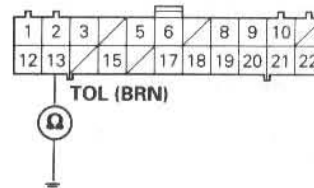
Check for loose ATTS control unit connectors. If necessary, substitute a known-good ATTS control unit and recheck.

To page 15-47

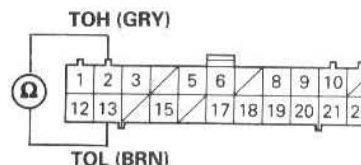
ATTS CONTROL UNIT 22P CONNECTOR



Wire side of female terminals



Repair short to body ground in the wire between the ATTS control unit and ATTS unit sub harness 14P connector.





From page 15-46

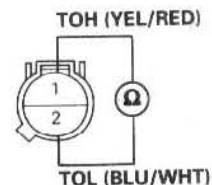
Check the oil temperature sensor:

1. Remove the oil temperature sensor.
2. Measure the resistance between the oil temperature sensor connector terminal No. 1 and No. 2.

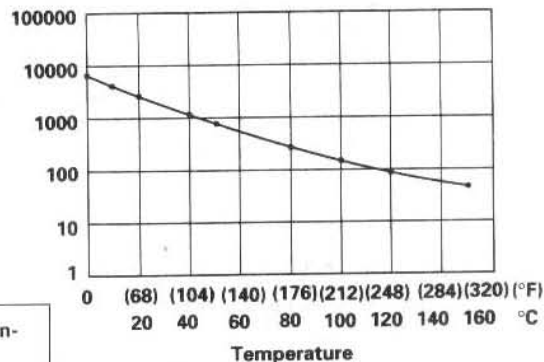
NOTE: Dip the sensor in ice water, and measure resistance. Then pour hot water on the sensor, and check for change in resistance.

CAUTION: The sensor uses a thermister which can be damaged if high current is applied during testing. Therefore, use a digital multimeter with an output of 1 mA or less at the 20 k Ω range.

OIL TEMPERATURE SENSOR CONNECTOR



Terminal side of male terminals



Is the resistance within the specifications shown on the graph?

NO

Replace the oil temperature sensor.

YES

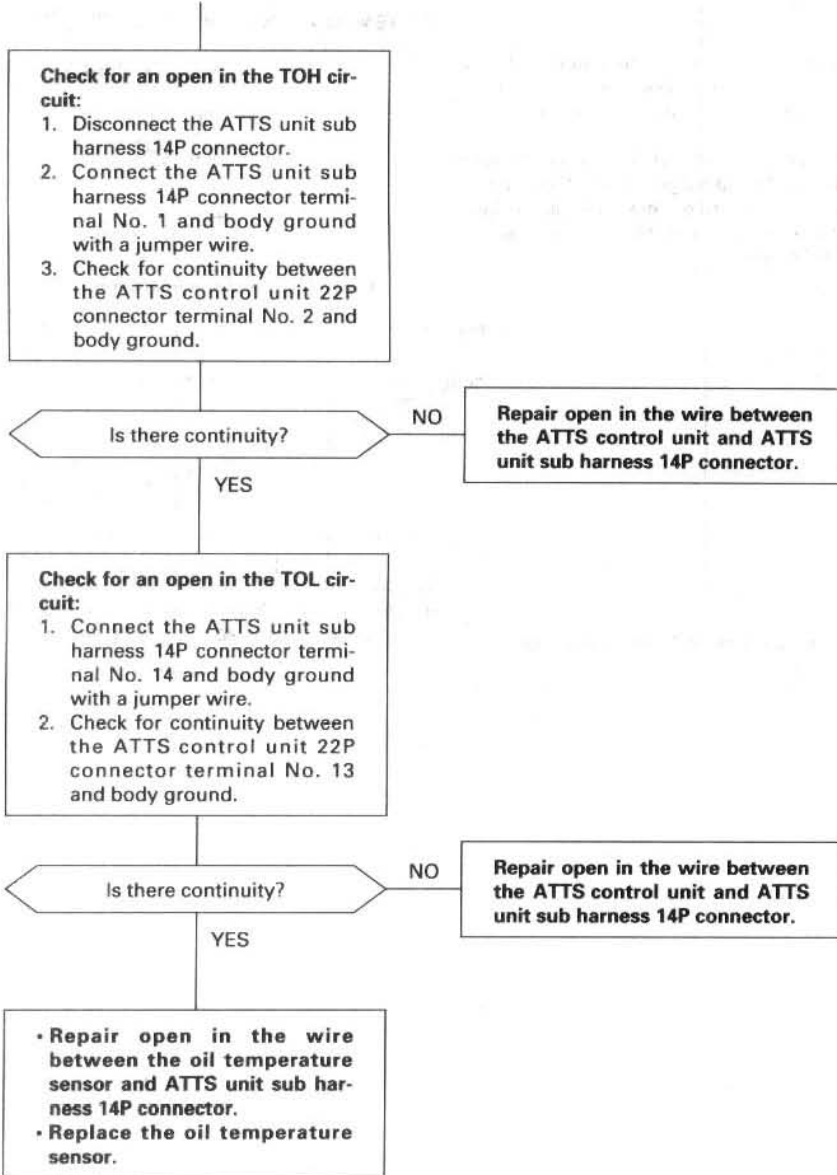
To page 15-48

(cont'd)

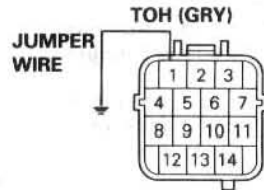
Troubleshooting

DTC 57, 58: Oil Temperature Sensor (cont'd)

From page 15-47

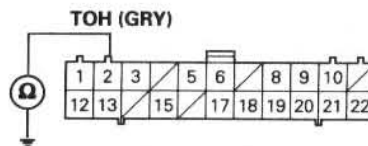


ATTS UNIT SUB HARNESS 14P CONNECTOR

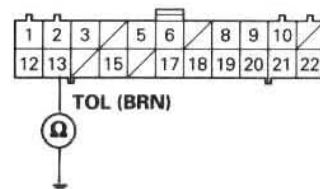
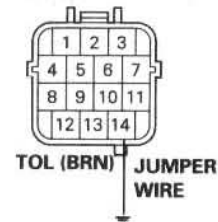


Terminal side of male terminals

ATTS CONTROL UNIT 22P CONNECTOR



Wire side of female terminals





DTC 61, 62, 63, 64, 65, 66: Oil Pressure Sensor

- With the engine running, the ATTS indicator light is ON.
- With the SCS service connector connected (see page 15-14), DTC 61, 62, 63, 64, 65, or 66 is indicated.

Problem verification:

1. Erase the DTC.
2. Test-drive the vehicle.

Does the ATTS indicator light come on and DTC 61, 62, 63, 64, 65, or 66 are indicated?

NO

Intermittent failure, system is OK at this time. Check for poor connections or loose wires in the oil pressure sensor circuit.

YES

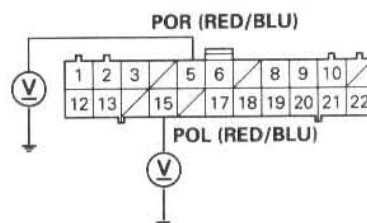
Check the oil pressure sensor circuit:

1. Turn the ignition switch ON (II).
2. Measure the voltage between the appropriate ATTS control unit 22P connector terminal and body ground (see table A).

Table A

DTC	ATTS CONTROL UNIT 22P CONNECTOR
61-63: Left	No. 15
64-66: Right	No. 5

ATTS CONTROL UNIT 22P CONNECTOR



Wire side of female terminals

Is there approx. 0.5 V?

YES

To page 15-51

NO

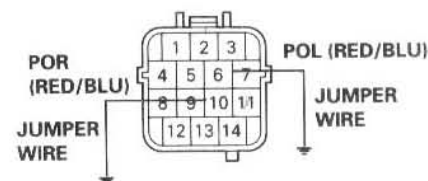
Check for an open in the POL and POR circuits:

1. Turn the ignition switch OFF.
2. Disconnect the ATTS control unit 22P and ATTS unit sub harness 14P connectors.
3. Connect the appropriate ATTS unit sub harness 14P connector terminal and body ground with a jumper wire (see table B).
4. Check for continuity between the appropriate ATTS control unit 22P connector terminal and body ground (see table C).

Table B

DTC	ATTS UNIT SUB HARNESS 14P CONNECTOR	ATTS CONTROL UNIT 22P CONNECTOR
61-63	No. 6	No. 15
64-66	No. 10	No. 5

ATTS UNIT SUB HARNESS 14P CONNECTOR



Terminal side of male terminals

Is there continuity?

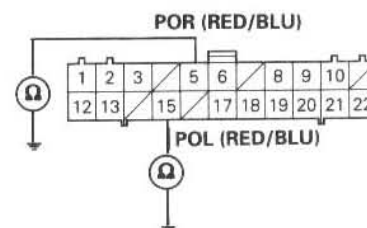
NO

Repair open in the wire between the ATTS control unit and ATTS unit sub harness 14P connector.

YES

Table C

DTC	ATTS UNIT SUB HARNESS 14P CONNECTOR
61-63: Left	No. 3
64-66: Right	No. 13



To page 15-50

(cont'd)

Troubleshooting

DTC 61, 62, 63, 64, 65, 66: Oil Pressure Sensor (cont'd)

From page 15-49

Check for an open in the VCC circuit:

1. Disconnect the ATTS control unit 26P connector.
2. Connect the appropriate ATTS unit sub harness 14P connector terminal and body ground with a jumper wire.
3. Check for continuity between the ATTS control unit 26P connector terminal No. 26 and body ground.

Is there continuity?

NO

Repair open in the wire between the ATTS control unit and ATTS unit sub harness 14P connector.

YES

Check for an open in the oil pressure sensor GND circuit:

Check for continuity between the ATTS control unit 26P connector terminal No. 13 and appropriate ATTS unit sub harness 14P connector terminal (see table).

Is there continuity?

NO

Repair open in the wire between the ATTS control unit and ATTS unit sub harness 14P connector.

YES

ATTS function test:

1. Connect the removed connectors.
2. Perform the ATTS function test (see page 15-59 or 60).

Is the system OK?

YES

The system is OK at this time.

NO

Verify the DTC.

Is DTC 61, 62, 63, 64, 65, or 66 indicated?

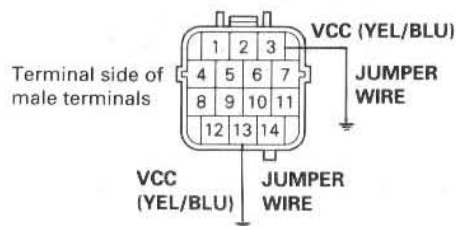
NO

Perform the appropriate troubleshooting for the code.

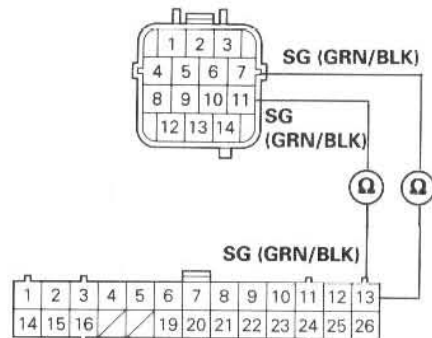
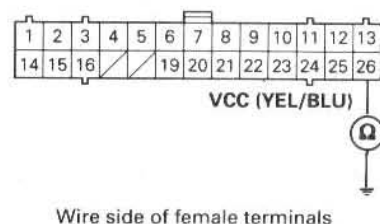
YES

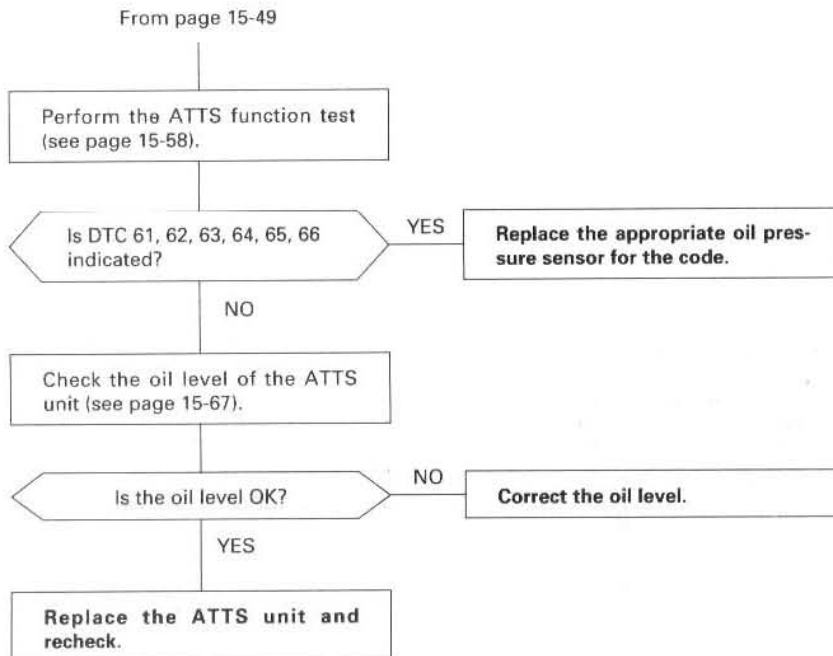
- Repair open in the wire between the oil pressure sensor and ATTS unit sub harness 14P connector.
- Replace the oil pressure sensor.

ATTS UNIT SUB HARNESS 14P CONNECTOR



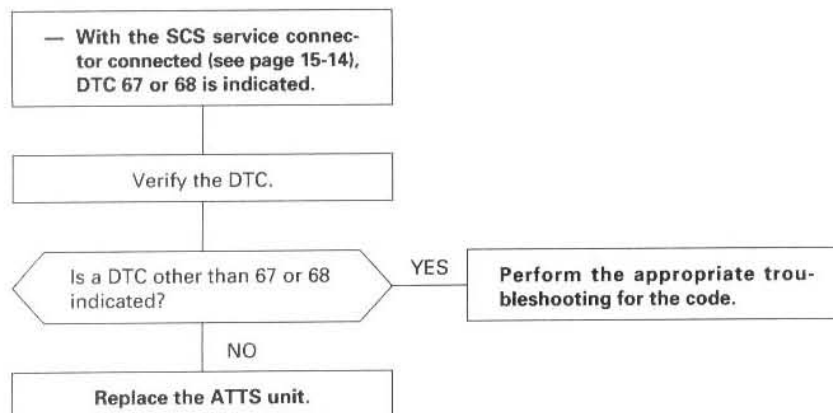
ATTS CONTROL UNIT 26P CONNECTOR





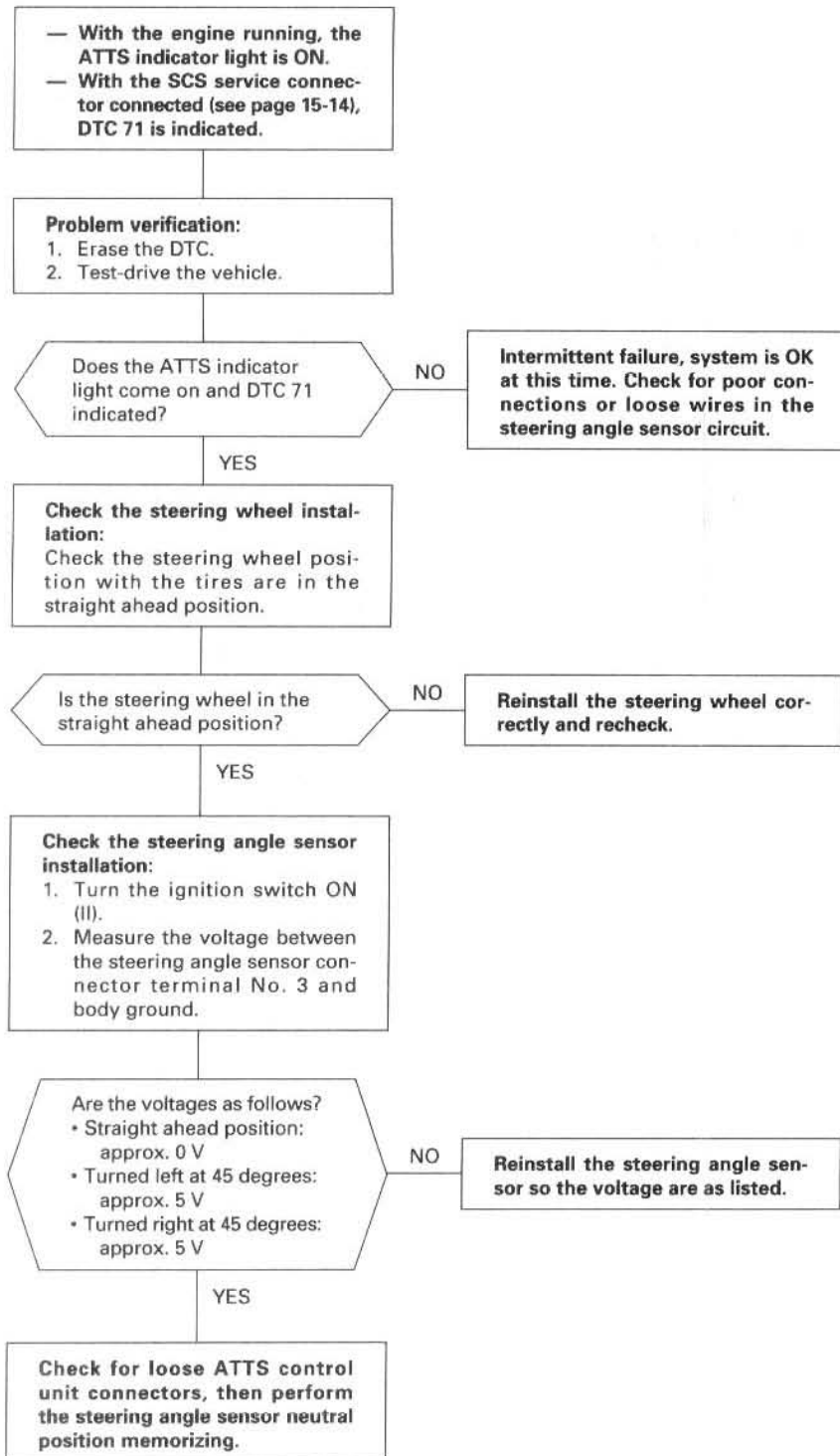
DTC 67, 68: ATTS Unit

NOTE: This code is detected only in the ATTS function test.

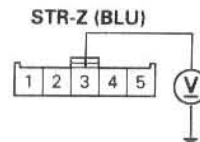


Troubleshooting

DTC 71: Steering Angle Sensor



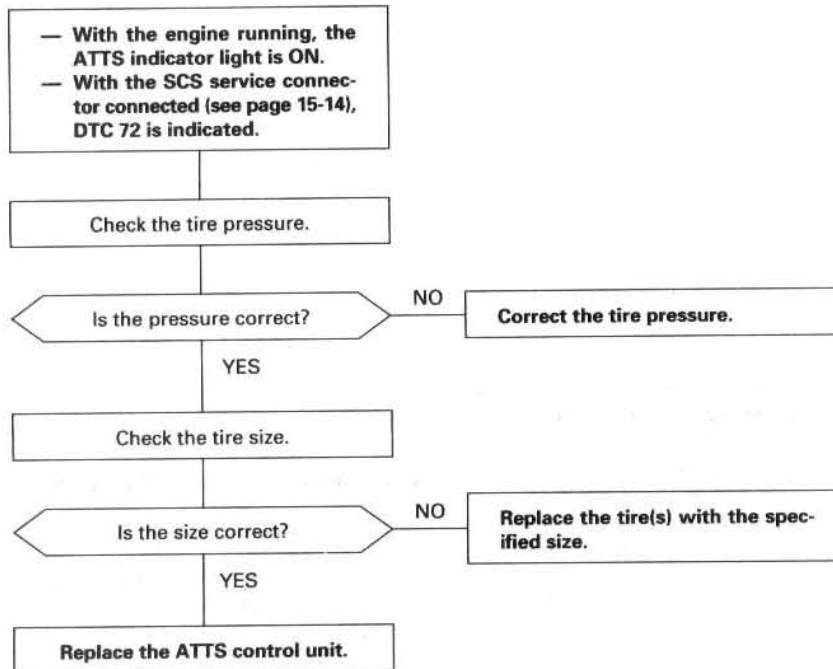
STEERING ANGLE SENSOR CONNECTOR



Wire side of female terminals



DTC 72: Different Diameter Tire



Troubleshooting

DTC 73, 74, 75, 76: Yaw Rate Sensor

- With the engine running, the ATTS indicator light is ON.
- With the SCS service connector connected (see page 15-14), DTC 73, 74, 75, or 76 is indicated.

Problem verification:

1. Test-drive the vehicle through several turns.
2. Verify the DTC.

Is DTC 73, 74, 75, or 76 indicated?

NO

The system is OK at this time.

YES

Check for a short to body ground in the VCCY circuit:

1. Turn the ignition switch OFF.
2. Disconnect the ATTS control unit 26P and yaw rate sensor connectors.
3. Check for continuity between the ATTS control unit 26P connector terminal No. 16 and body ground.

Is there continuity?

YES

Repair short to body ground in the wire between the ATTS control unit and yaw rate sensor.

NO

Check the VCCY circuit inside the ATTS control unit:

1. Connect the ATTS control unit 26P connector.
2. Turn the ignition switch ON (II).
3. Measure the voltage between the ATTS control unit 26P connector terminal No. 16 and body ground.

Is there 8 V or more?^{*1}
Is there approx. 5 V?^{*2}

NO

Replace the ATTS control unit.

YES

Check for an open in the VCCY circuit:

Measure the voltage between the yaw rate sensor connector terminal No. 1^{*1} or No. 4^{*2} and body ground.

Is there 8 V or more?^{*1}
Is there approx. 5 V?^{*2}

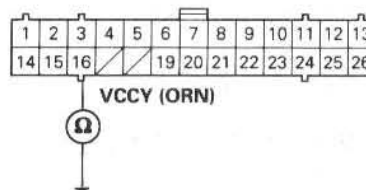
NO

Repair open in the wire between the ATTS control unit and yaw rate sensor.

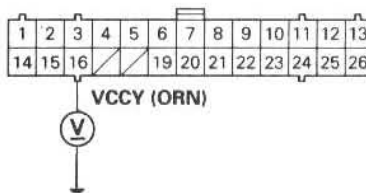
YES

To page 15-55

ATTS CONTROL UNIT 26P CONNECTOR



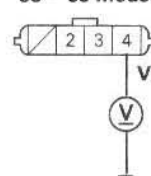
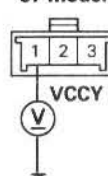
Wire side of female terminals



YAW RATE SENSOR CONNECTOR

'97 model

'98 - '99 models

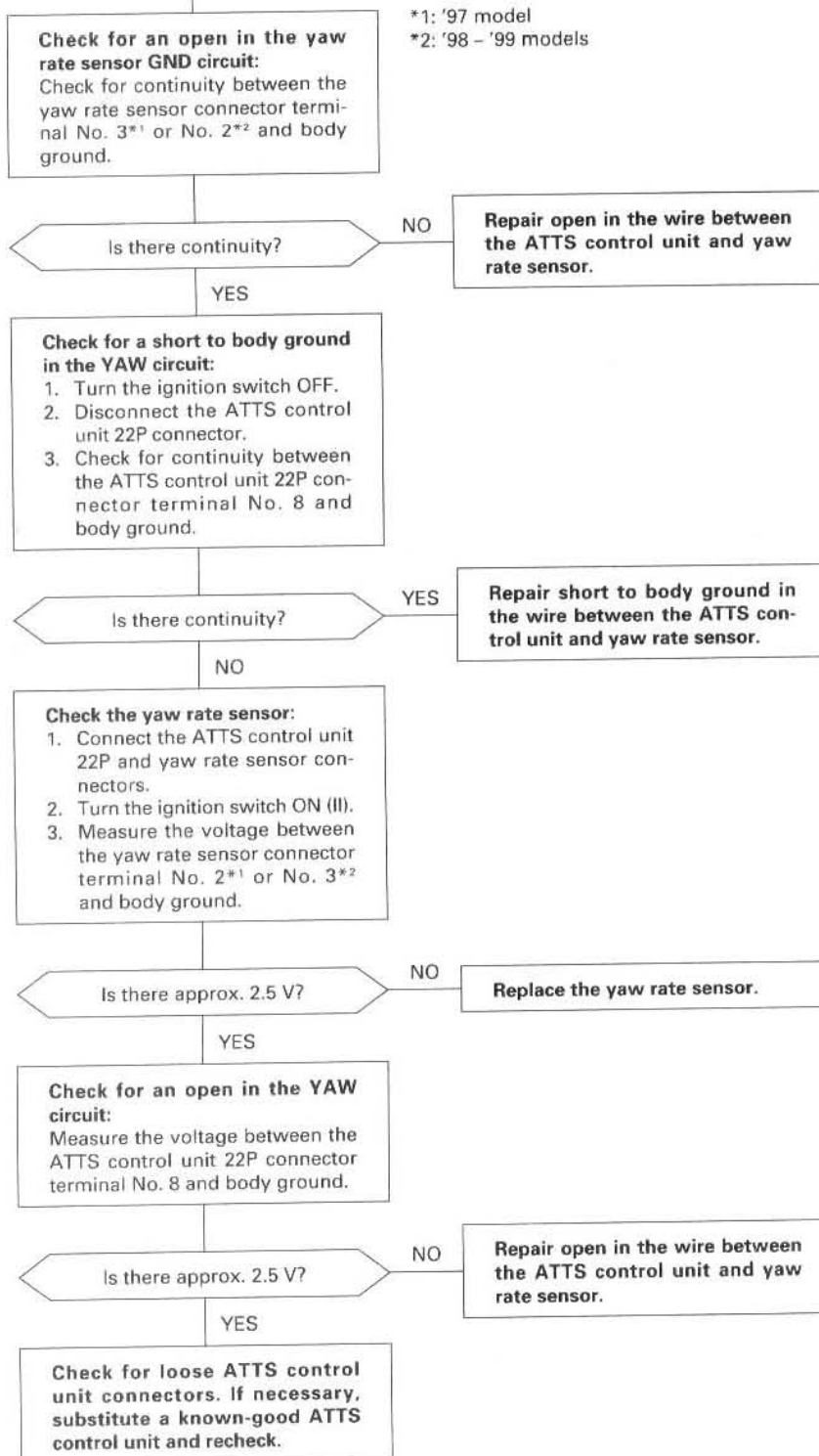


Terminal side of male terminals

Wire side of female terminals



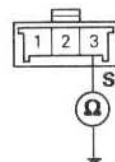
From page 15-54



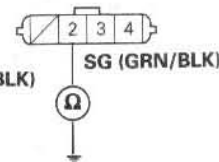
*1: '97 model
*2: '98 - '99 models

YAW RATE SENSOR CONNECTOR

'97 model



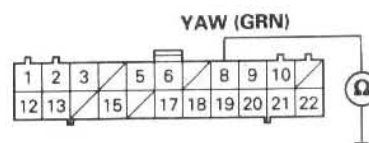
'98 - '99 models



Terminal side of male terminals

Wire side of female terminals

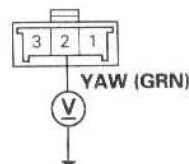
ATTS CONTROL UNIT 22P CONNECTOR



Wire side of female terminals

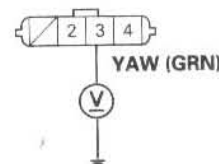
YAW RATE SENSOR CONNECTOR

'97 model



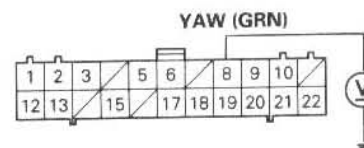
Terminal side of male terminals

'98 - '99 models



Wire side of female terminals

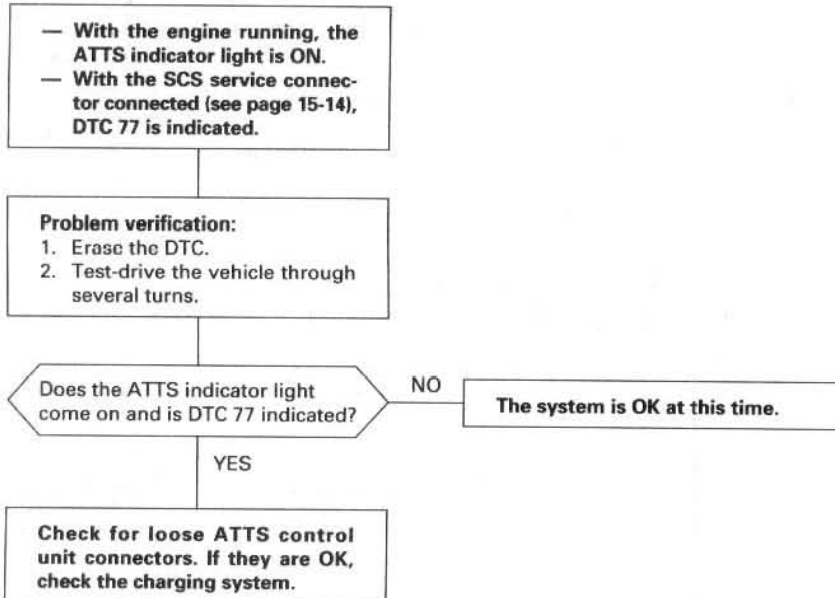
ATTS CONTROL UNIT 22P CONNECTOR



Wire side of female terminals

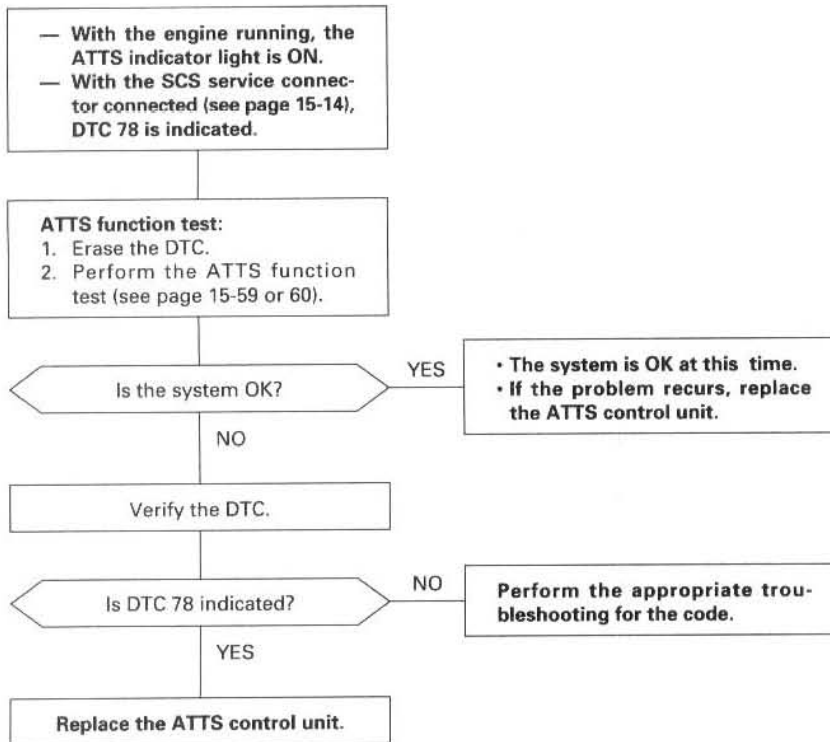
Troubleshooting

DTC 77: Ignition Voltage



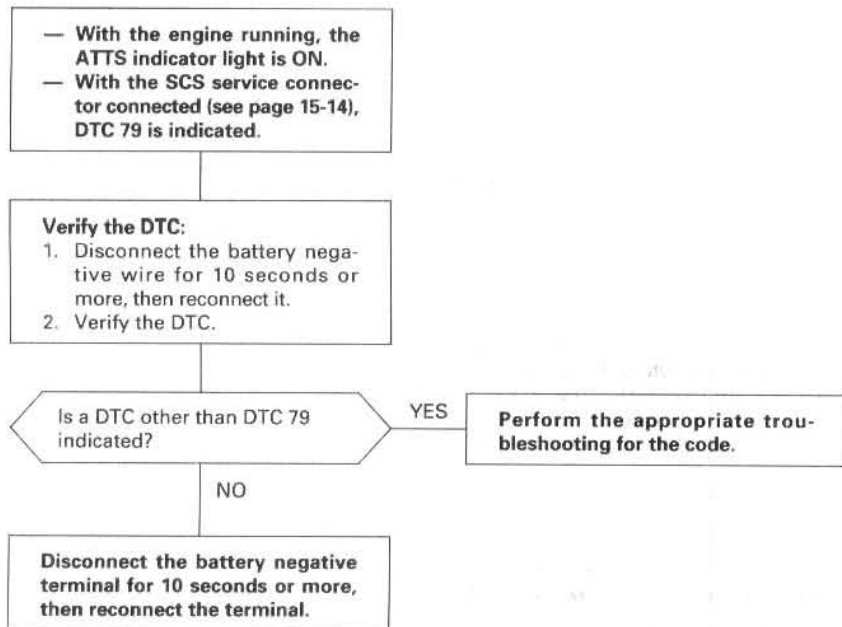


DTC 78: ATTS Control Unit



Troubleshooting

DTC 79: ATTS Control Inhibition



ATTS Function Test without PGM Tester



Perform the function test whenever the ATTS control unit or any ATTS system component has been replaced.

CAUTION: Rotate the front wheels only with the engine. If you rotate only one front wheel by something other than the engine, the ATTS unit will be damaged.

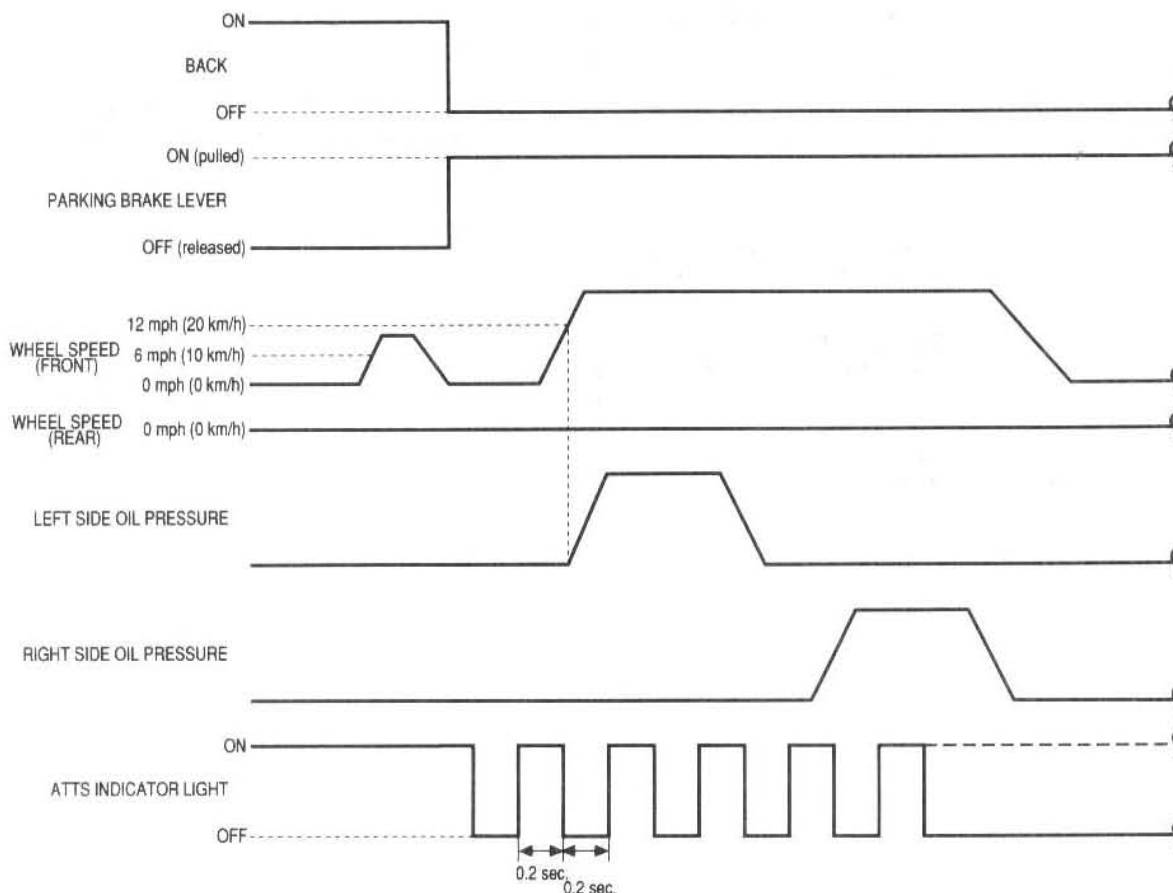
NOTE: The ATTS function test can also be done with the Honda PGM Tester (see page 15-60).

1. Connect the SCS service connector to the service check connector (2P) located on the right side of the center console.
2. Raise the front of vehicle, and support it with safety stands in the proper locations (see section 1).
3. Start the engine, then shift the transmission to reverse position.
4. Accelerate to 6 mph (10 km/h).
5. Shift the transmission to neutral position, and apply the foot brake to gently decelerate to 0 mph (0 km/h), then pull the parking brake lever up within 10 seconds.
6. The ATTS indicator light starts blinking.
7. Shift the transmission to low, and gently accelerate to 12 mph (20 km/h) within 10 seconds, then the ATTS control unit shifts to test mode.
8. You should feel vibration twice on the steering wheel, then the indicator light goes off.

NOTE:

- If the indicator light stays on, verify the DTC.
- If the indicator light continues blinking, repeat steps 2 through 8.
- DTC 67 and 68 are detected only in the ATTS function test.
 - DTC 67 is detected when the difference of right and left wheels is less than 0.6 mph (1 km/h) during left side oil pressure output.
 - DTC 68 is detected when the difference of right and left wheels is less than 0.6 mph (1 km/h) during right side oil pressure output.

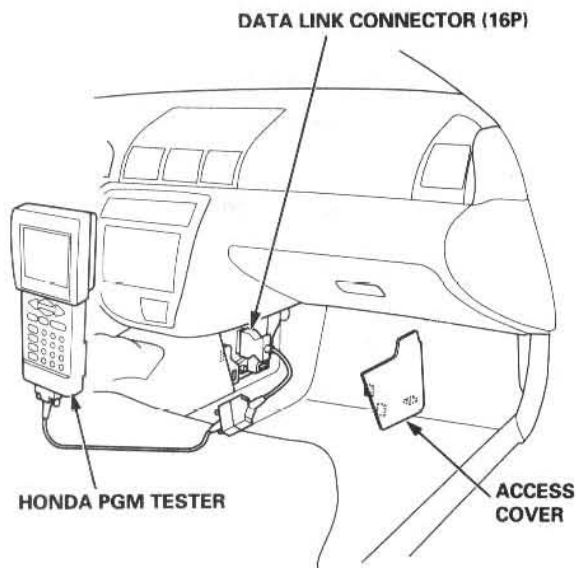
9. Turn the ignition switch OFF, and disconnect the SCS service connector.



ATTS Function Test with PGM Tester

Perform the function test whenever the ATTS control unit or any ATTS system component has been replaced.

1. Connect the PGM Tester to the 16P Data Link Connector.



2. Turn the ignition switch ON (II), and follow the Tester screen prompts until you get to the Test Mode Menu.
3. Press 6: Misc Test.
4. Press 1: ATTS Test.
5. Press 2: Short Time. Follow the Tester instructions and screen prompts to run the ATTS function test.
6. When the function test is completed, disconnect the tester from the 16P Data Link Connector, and turn ignition switch OFF.

NOTE: The ATTS indicator will stay on until the tester is disconnected and the ignition switch is turned OFF.

Memorizing the Steering Angle Sensor Neutral Position with PGM Tester

Memorizing the steering angle sensor neutral position function must be performed whenever the ATTS control unit or any ATTS system component has been replaced.

1. Connect the PGM Tester to the 16P Data Link Connector.
2. Turn the ignition switch ON (II), and follow the Tester screen prompts until you get to the System Select Menu.
3. Press 7: ATTS. This takes you to the Test Mode Menu.
4. Press 6: Misc Test.
5. Press 2: Neutral.
6. Press 3: All Sensors.
7. Press 1: Rewriting. Follow the Tester instructions and screen prompts to memorize the neutral position of the steering angle sensor.
8. When memorizing the steering angle sensor neutral position is completed, disconnect the tester from the 16P Data Link Connector, and turn ignition switch OFF.

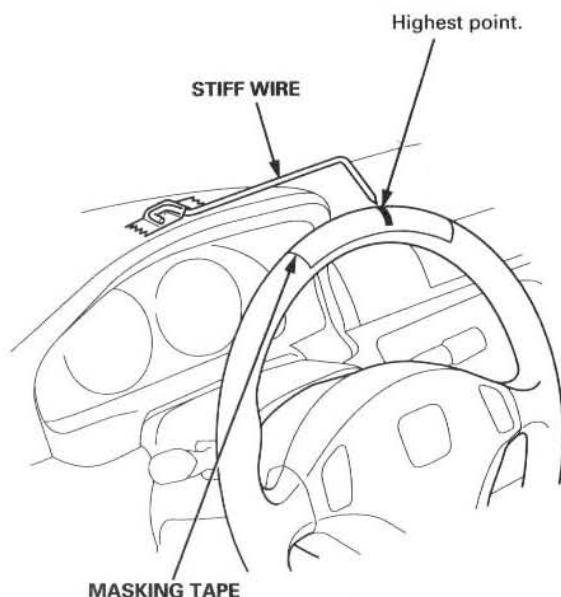
NOTE: The ATTS indicator will stay on until the tester is disconnected and the ignition switch is turned OFF.

Memorizing the Steering Angle Sensor Neutral Position without PGM Tester



NOTE: Memorizing the steering angle sensor neutral position function can also be done with the Honda PGM tester (see page 15-60).

1. Perform the toe inspection/adjustment for ATTS (for wheel alignment, refer to section 18).
2. Set the steering wheel in the straight ahead position.
3. Attach a piece of masking tape to the top of the steering wheel as shown.



4. Secure a piece of stiff wire (coat hanger) to the top of the dashboard as shown so the wire end points at the highest point of the steering wheel.
5. Start the engine, and drive the vehicle straight ahead.
6. When the vehicle is running straight ahead, mark the point on the steering wheel where the wire end is pointing.
7. Stop the vehicle and turn the ignition switch off.

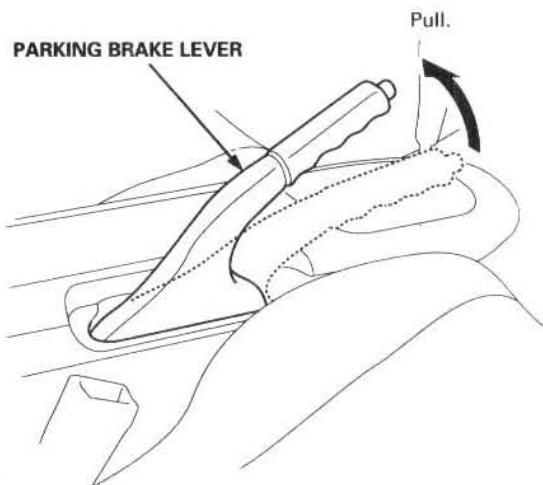
NOTE: The point where the marked point on the steering wheel aligns with the wire end is the straight driving position of the steering wheel. This position should be the reference for inspection and adjustment of the ATTS.

8. Perform the DTC indication (see page 15-14). Be sure that no DTC is memorized in the ATTS control unit.

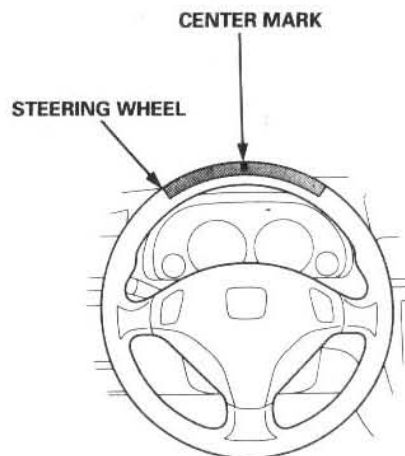
NOTE:

- Erase a DTC if it is indicated.
- Be sure to hold the SCS service connector connected.

9. Apply parking brake firmly.



10. Set the steering wheel in the straight driving position.

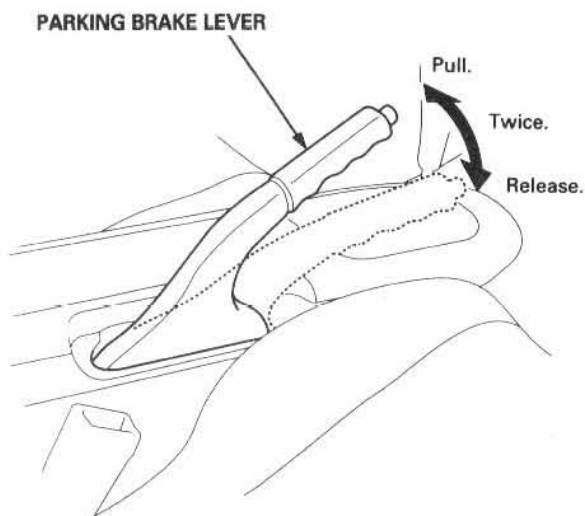


(cont'd)

Memorizing the Steering Angle Sensor Neutral Position without PGM Tester

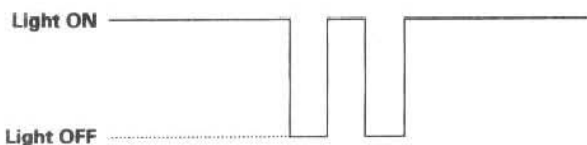
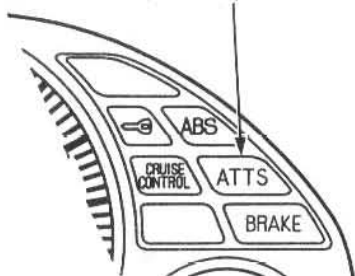
(cont'd)

11. Turn the ignition switch ON (II), but do not start the engine. Release the parking brake, then apply the parking brake again. Repeat this procedure twice within 4 seconds.

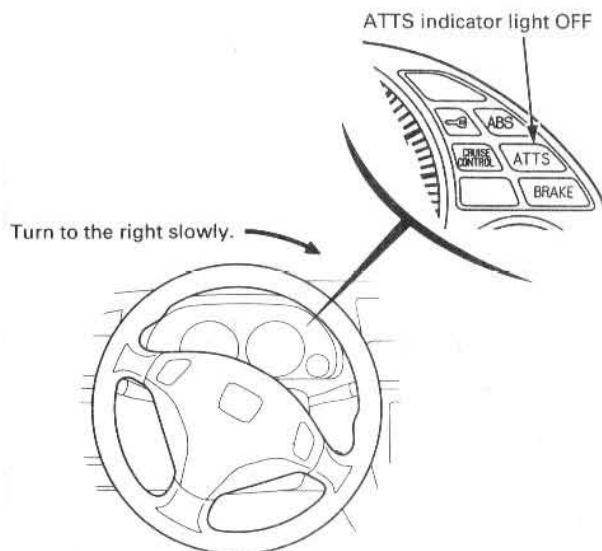


12. Be sure that the ATTS indicator blinks twice, then stays on.

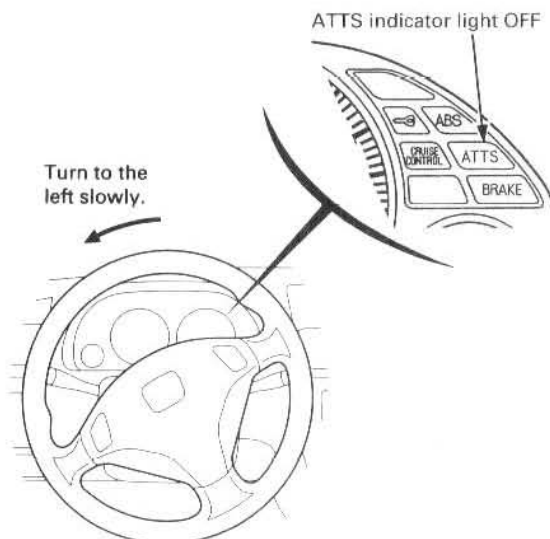
ATTS indicator light blinks twice, then stays ON.



13. Turn the steering wheel slowly from the straight driving position to the right until the ATTS indicator light goes off. Be sure that the indicator light went off, and return the steering wheel to the straight driving position. The ATTS indicator light should come on when the steering wheel returns to the straight driving position.

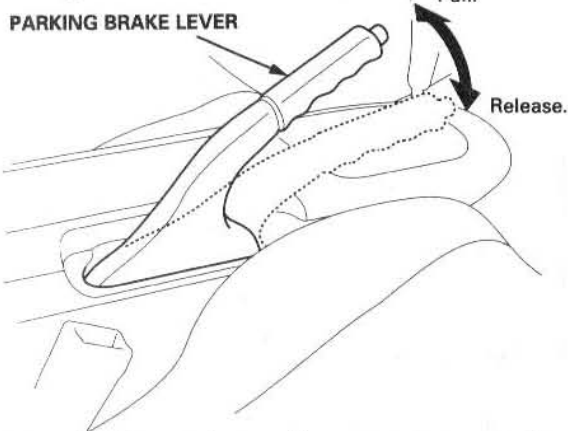


14. Turn the steering wheel slowly from the straight driving position to the left until the ATTS indicator light goes off. Be sure that the indicator light went off, and return the steering wheel to the straight driving position.



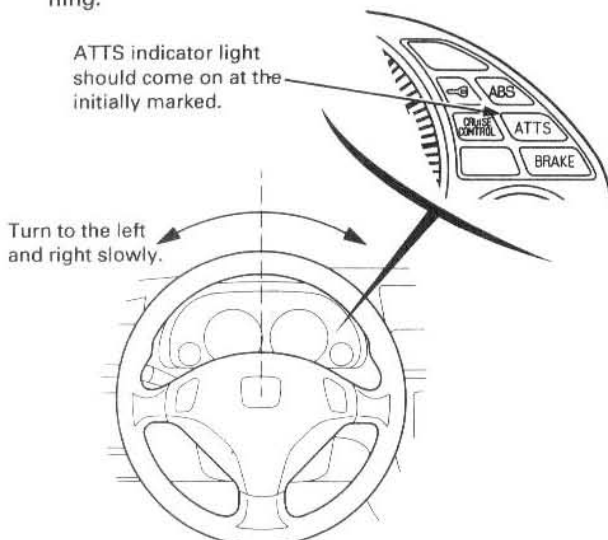


15. Perform the steps 13 and 14 again. The ATTS indicator light does not come on after step 14 is repeated.
16. Hold the steering wheel in the straight driving position securely. This is the position the ATTS control unit will memorize.
17. Release the parking brake, then apply the parking brake again.



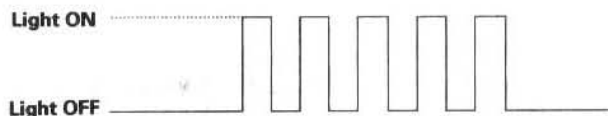
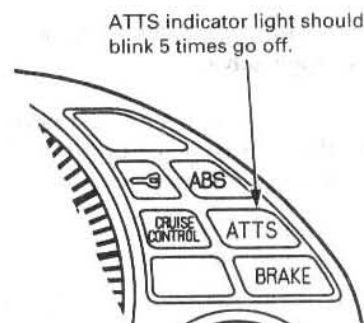
18. Make sure the steering angle sensor neutral position was is memorized in the control unit.

Turn the steering wheel to the right and left. The ATTS indicator light should come on at the memorized neutral position. The ATTS system is normal if the ATTS indicator light comes on at the straight driving position initially marked on the steering wheel. If the light does come on at the straight driving position, turn the ignition switch off and on, and repeat the memorization procedure from the beginning.



19. Release the parking brake. The ATTS indicator light should blink 5 times indicating that memorization of the neutral position is completed.

If the ATTS indicator light blinks quickly while performing this procedure, repeat the procedure from the step 9.



20. Turn the ignition switch OFF.
21. Disconnect the SCS service connector, and remove the masking tape and stiff wire.

Steering Angle Sensor

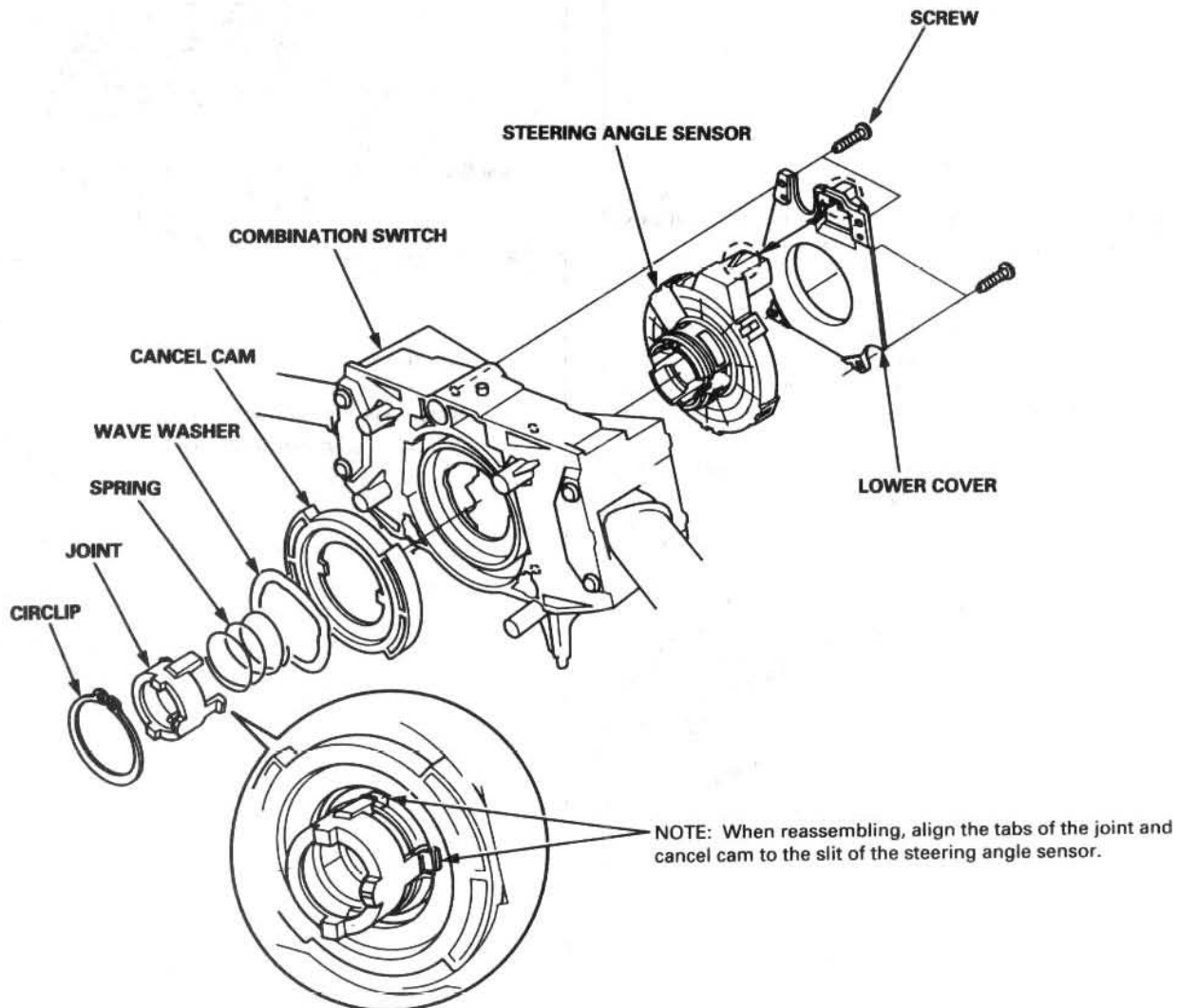
Replacement

CAUTION: Handle the steering angle sensor with care; it is sensitive.

1. Remove the combination switch (see section 17).
2. Remove the circlip and screw, then remove the steering angle sensor from the combination switch.
3. Installation is in the reverse order of removal.

CAUTION: Do not apply any grease or oil to the steering angle sensor.

4. After installation, memorize the new neutral position for the steering angle sensor in the ATTS control unit (see page 15-60 or 61).





Inspection

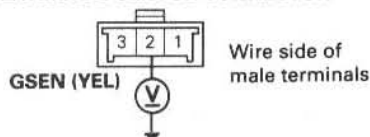
CAUTION: Be careful not to drop or bump the sensor, and don't remove or install it with an impact wrench; the sensor may be damaged.

NOTE: For accurate readings, the vehicle must be level.

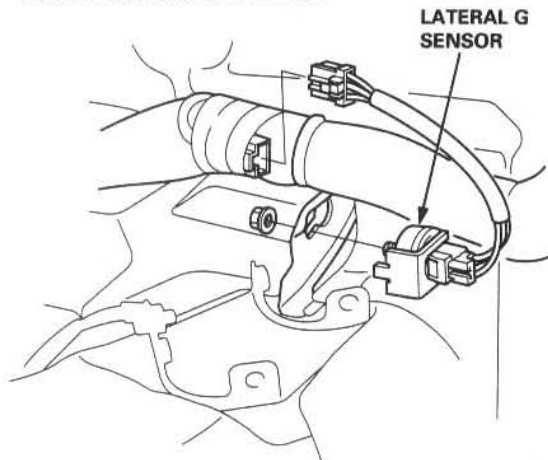
1. Remove the SRS unit (see section 24).
2. Turn the ignition switch ON (II).
3. Measure the voltage between the lateral G sensor connector terminal No. 2 and body ground.

There should be approx. 2.5 V.

LATERAL G SENSOR CONNECTOR



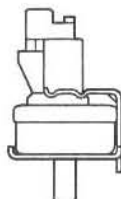
4. Remove the lateral G sensor.



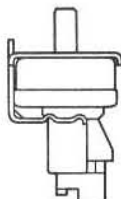
5. Measure the voltage between the lateral G sensor connector terminal No. 2 and body ground with the connector connected.

- There should be approx. 1.5 V when the connector side facing up.
- There should be approx. 3.5 V when the connector side facing down.

**CONNECTOR SIDE
FACING UP**



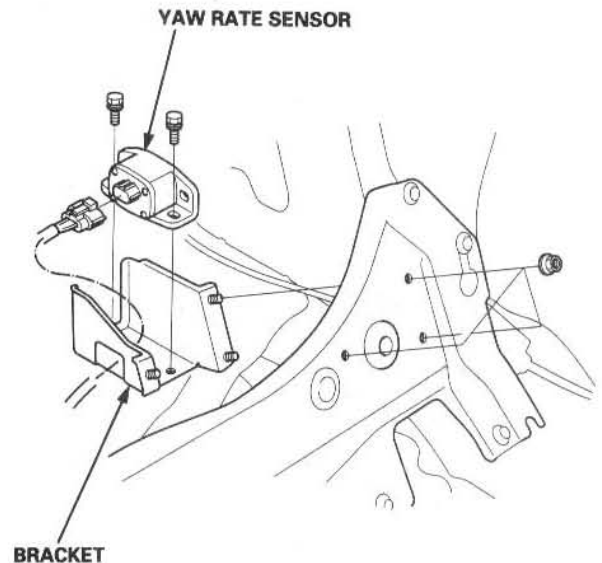
**CONNECTOR SIDE
FACING DOWN**



Replacement

CAUTION: Be careful not to drop or bump the sensor, and don't remove or install it with an impact wrench; the sensor may be damaged.

1. Remove the rear seat-back (see section 20).
2. Remove the bracket and yaw rate sensor.

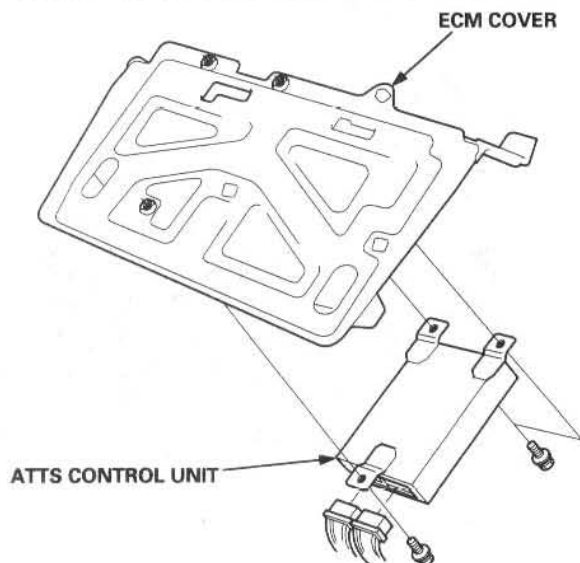


3. Install the yaw rate sensor in the reverse order of removal.
4. After replacement, perform the writing of steering angle sensor neutral position.

ATTS Control Unit

Replacement

1. Make sure you have the anti-theft codes for the audio unit, then record the radio station presets.
2. Disconnect the negative battery cable from the battery.
3. Remove the ECM cover (see section 11).
4. Remove the ATTS control unit from the ECM cover.



5. Install the new ATTS control unit in reverse order of removal. Make note of the following:

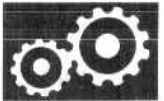
Without PGM Tester:

- Perform the writing of steering angle sensor neutral position (see page 15-60 or 61).
- Perform the ATTS function test (see page 15-59 or 60).

With PGM Tester:

1. Connect the PGM Tester to the 16P Data Link Connector.
2. Turn the ignition switch ON (II), and follow the Tester screen prompts until you get to the System Select Menu.
3. Press 7: ATTS. This takes you to the Test Mode Menu.
4. Press 6: Misc Test.
5. Press 2: Neutral.
6. Press 1: Steering Angle.
7. Press 1: Rewriting. Follow the Tester instructions and screen prompts to memorize the neutral position of the steering angle sensor.
8. Go back to the Misc Test Menu by pressing the Exit button twice.
9. Press 1: ATTS Test.
10. Press 2: Short Time. Follow the Tester instructions and screen prompts to run the ATTS function test.
11. When the function test is completed, disconnect the tester from the 16P Data Link Connector, and turn ignition switch OFF.

NOTE: The ATTS indicator will stay on until the tester is disconnected and the ignition switch is turned OFF.



Inspection

NOTE: Perform this service when the ATTS unit is cool.

1. Raise the vehicle, and support it with safety stands in the proper locations.

NOTE: For accurate readings, the vehicle must be level.

2. Start the engine, then shift the transmission to 2nd or 3rd position.
3. Keep the speed at 31 mph (50 km/h) for one minute.
4. After one minute, shift the transmission to neutral position.
5. Wait until the wheels stop by themselves, then turn off the engine.
6. Wait for one minute, then remove the check bolt (see page 15-71).
7. Check that the oil flows (or oozes out) within six minutes.
If the oil does not flow, pour in a little automatic transmission fluid (ATF), wait until the ATTS unit becomes cool, then repeat steps 3 through 8.

NOTE: Always use Genuine Honda Premium Formula ATF. Using a non-Honda ATF can affect shift quality.

8. Install and tighten the check bolt (see page 15-71).

Oil Filling

NOTE:

- This service is necessary after you disassemble or replace the ATTS unit.
- Perform this service when the ATTS unit is cool.

1. Raise the vehicle, and support it with safety stands in the proper locations. For accurate readings, the vehicle must be level.
2. Remove the filler plug (see page 15-71).
3. Fill with the recommended oil.

Recommended oil:

Genuine Honda Premium Formula Automatic Transmission Fluid (ATF)

Quantity: 1.4 l (1.5 US-qt, 1.3 Imp-qt)

4. Replace the washer, and loosely install the filler plug.
5. Perform the ATTS function test (see page 15-59 or 60).
6. Check that the system is OK, then perform the ATTS unit oil inspection.
7. After inspection, tighten the filler plug (see page 15-71).

ATTS Unit Oil

Oil Replacement

NOTE:

- This service is for oil replacement only.
- Perform this service when the ATTS unit is cool.

1. Raise the vehicle, and support it with safety stands in the proper locations. For accurate readings, the vehicle must be level.
2. Remove the drain plug (see page 15-71), then drain the oil.
3. After draining the oil, install and tighten the drain plug (see page 15-71).
4. Remove the filler plug (see page 15-71).
5. Fill with the recommended oil.

Recommended oil:

Genuine Honda Premium Formula Automatic Transmission Fluid (ATF)

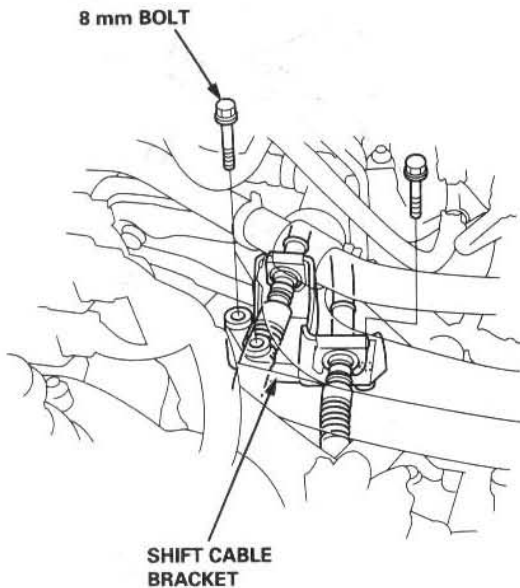
Quantity: 0.95 ℓ (1.00 US-qt, 0.84 Imp-qt)

6. Replace the washer, and loosely install the filler plug.
7. Perform the ATTS unit oil inspection (see page 15-67).
8. After inspection, tighten the filler plug (see page 15-71).

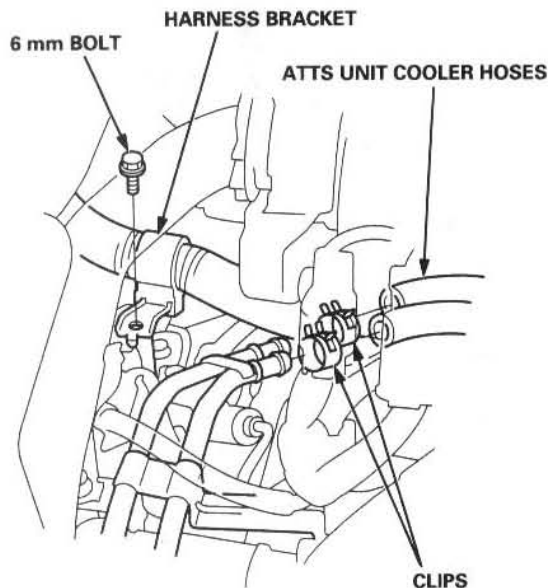


Removal

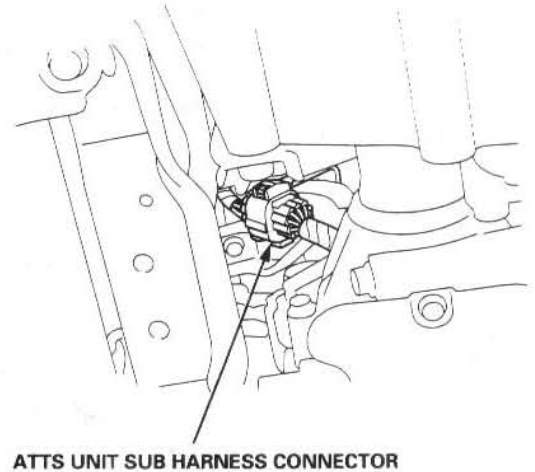
1. Remove the left driveshaft (see section 16).
2. Remove the exhaust pipe (see section 9).
3. Disconnect the air cleaner duct, and move it toward the shock tower side.
4. Remove the distributor cover.
5. Remove the shift cable bracket.



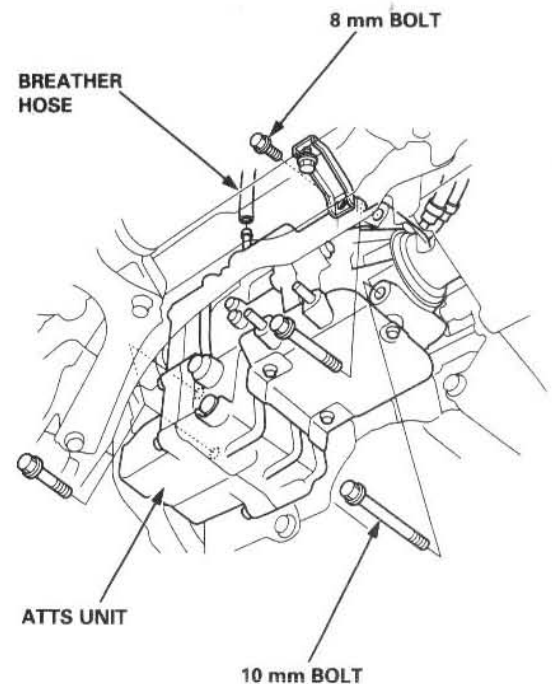
6. Remove the harness bracket, then disconnect the ATTS unit cooler hoses.



7. Disconnect the ATTS unit sub harness connector.



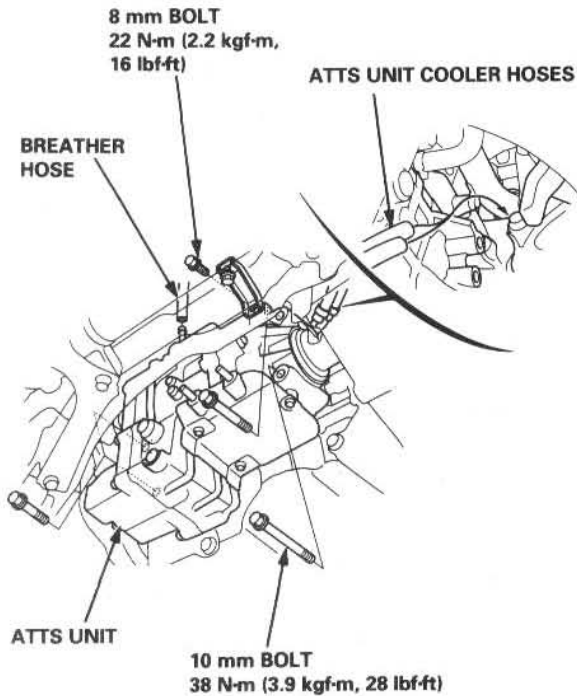
8. Support the ATTS unit with the jack.
9. Loosen the flange bolt.
10. Remove the flange bolts, then lower the ATTS unit a little.
11. Disconnect the breather hose, then remove the ATTS unit.
12. Remove the extension tube and shaft (see section 13).



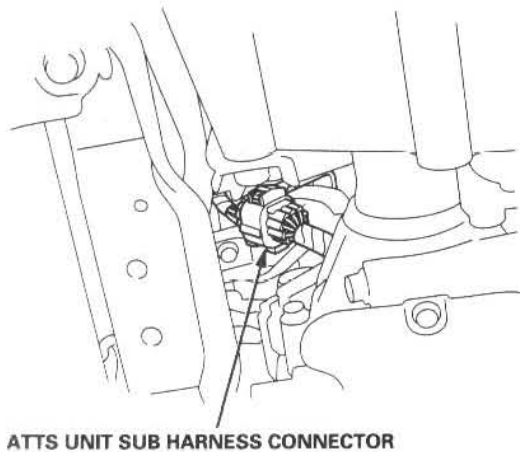
ATTS Unit

Installation

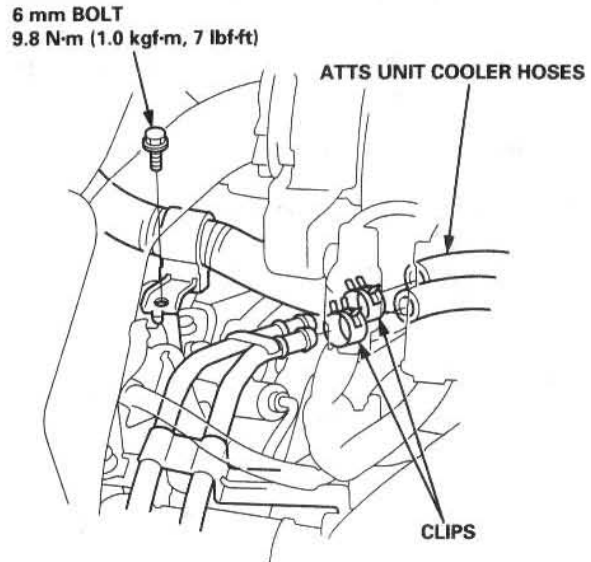
1. Install the extension tube and shaft (see section 13).
2. Raise the ATTS unit with a jack.
3. Connect the breather hose and to the ATTS unit.
4. Route the ATTS unit cooler hoses as described below, and install the ATTS unit.



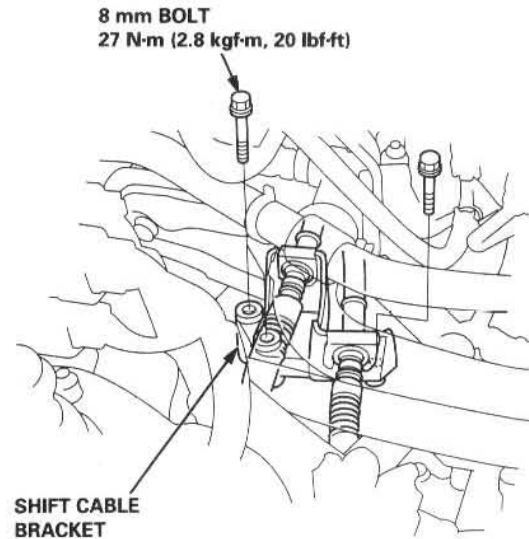
5. Connect the ATTS unit sub harness connector.



6. Connect the ATTS unit cooler hoses, then install the harness bracket.



7. Install the shift cable bracket.

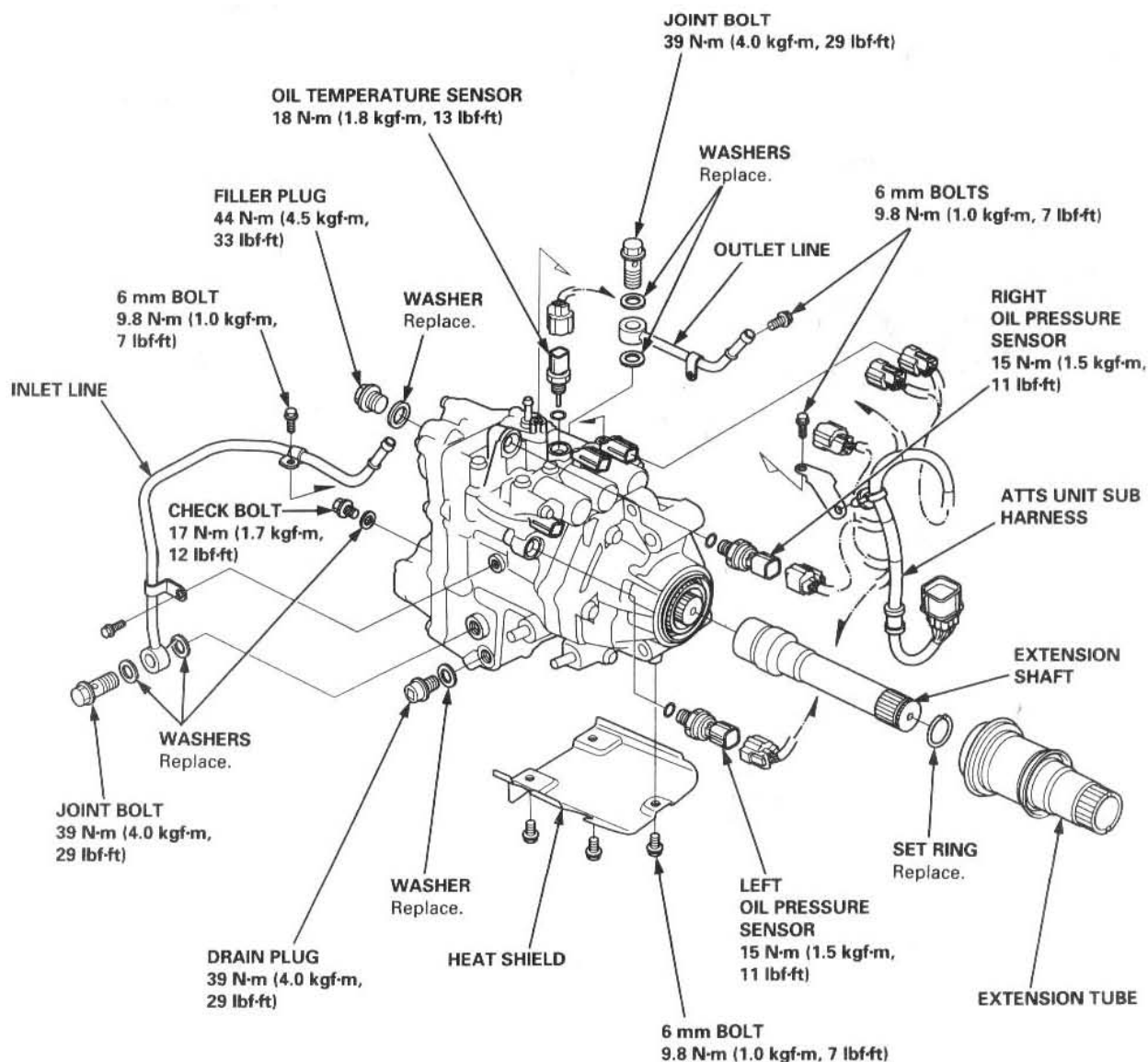


8. Install the distributor cover.
9. Connect the air cleaner duct.
10. Install the exhaust pipe (see section 9).
11. Install the left driveshaft (see section 16).
12. Perform the ATTS function test (see page 15-59 or 60).



Disassembly/Reassembly

Disassemble and reassemble the ATTS unit as shown. Replace all washers and O-rings during reassembly.

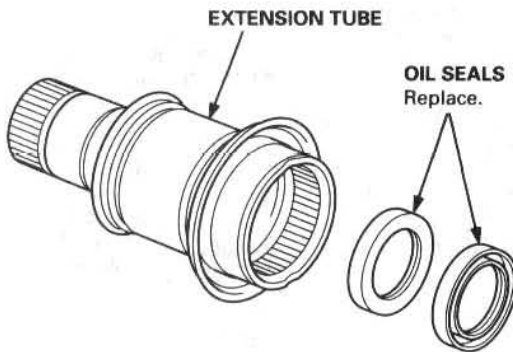


Extension Tube

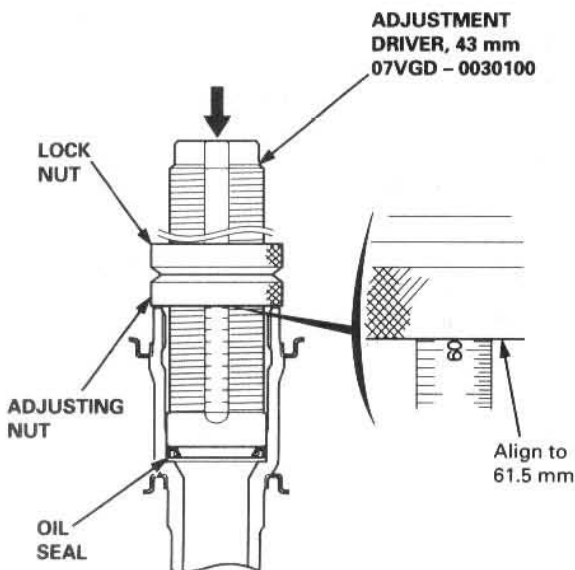
Oil Seal Replacement

NOTE: Be careful not to damage the metal rings during replacement.

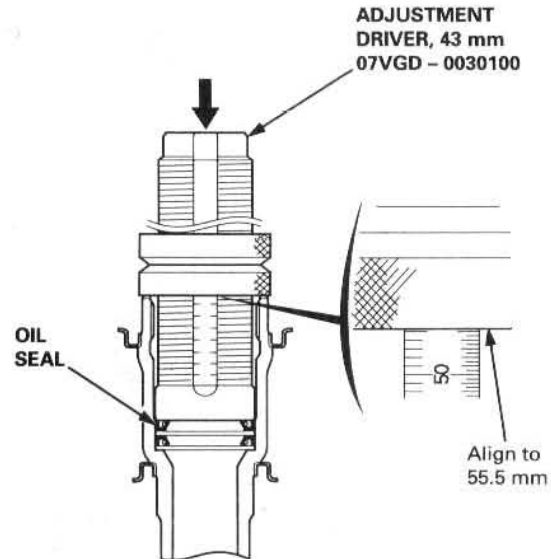
1. Remove the ATTS unit (see page 15-69).
2. Remove the extension tube and shaft (see section 13).
3. Remove the oil seals from the extension tube.



4. Loosely install a oil seal as shown.
5. Align the bottom of the adjusting nut on the special tool to 61.5 mm (2.42 in), then secure the adjusting nut by tightening the lock nut as shown.
6. Install the oil seal using the special tool and a press.



7. Loosely install a oil seal as shown.
8. Align the bottom of the adjusting nut on the special tool to 55.5 mm (2.19 in), then secure the adjusting nut by tightening the lock nut as shown.
9. Install the oil seal using the special tool and a press.



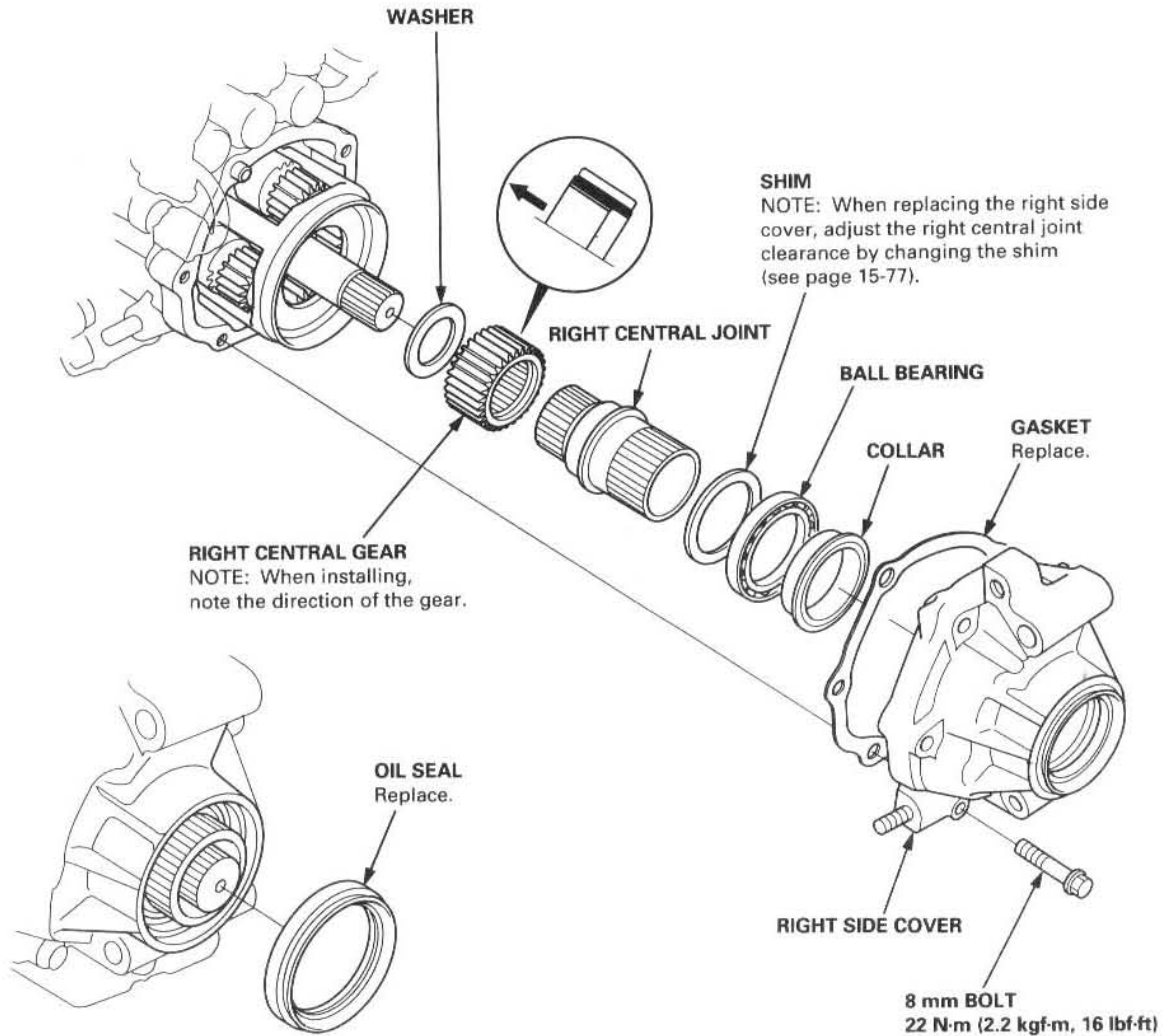


Right Side Cover

Disassembly/Reassembly

Disassemble and reassemble the right side cover as shown, and note these items:

- Clean the disassembled parts with solvent, and dry them thoroughly with compressed air. Do not wash the bearing with solvent.
- If you replace the right side cover, inspect the right central joint shaft clearance.

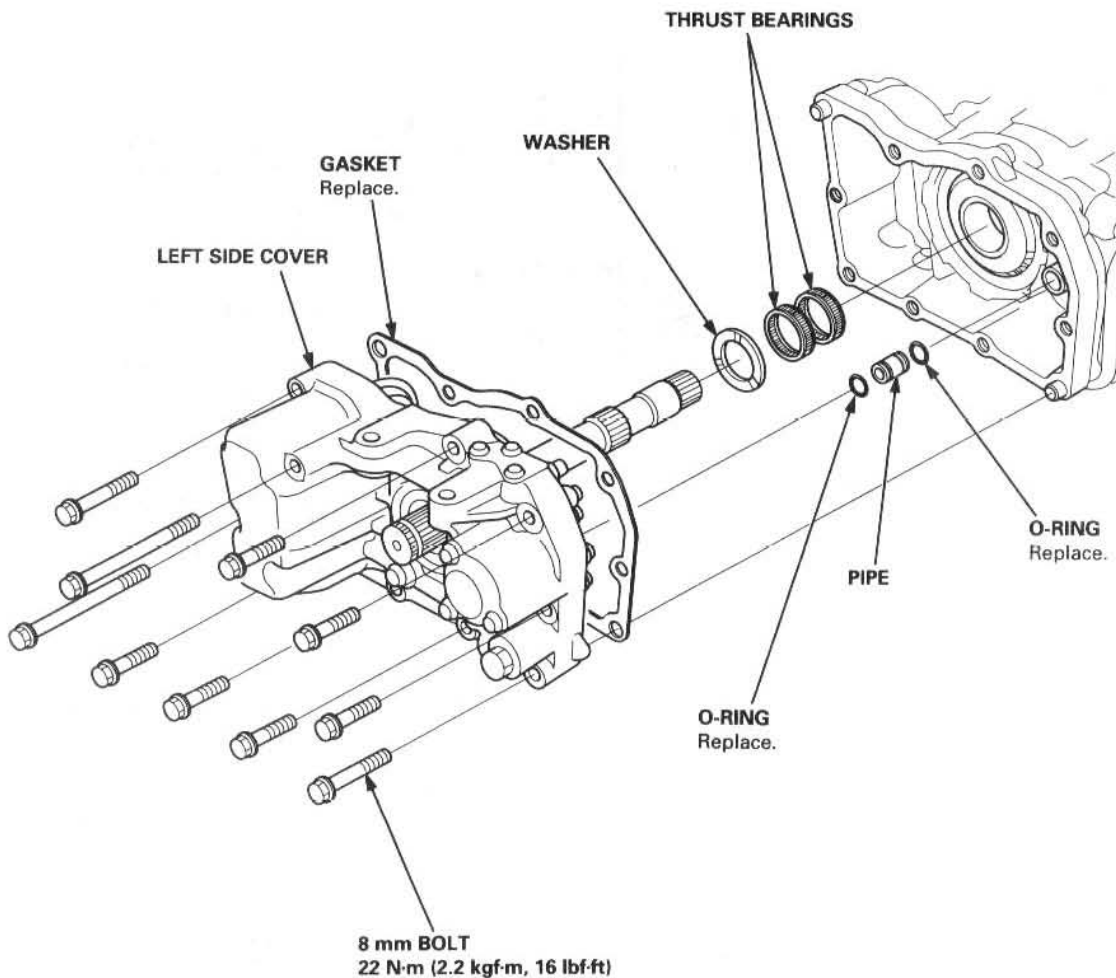


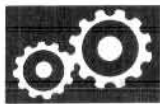
Left Side Cover

Disassembly/Reassembly

NOTE: Clean the disassembled parts with solvent, and dry them thoroughly with compressed air.

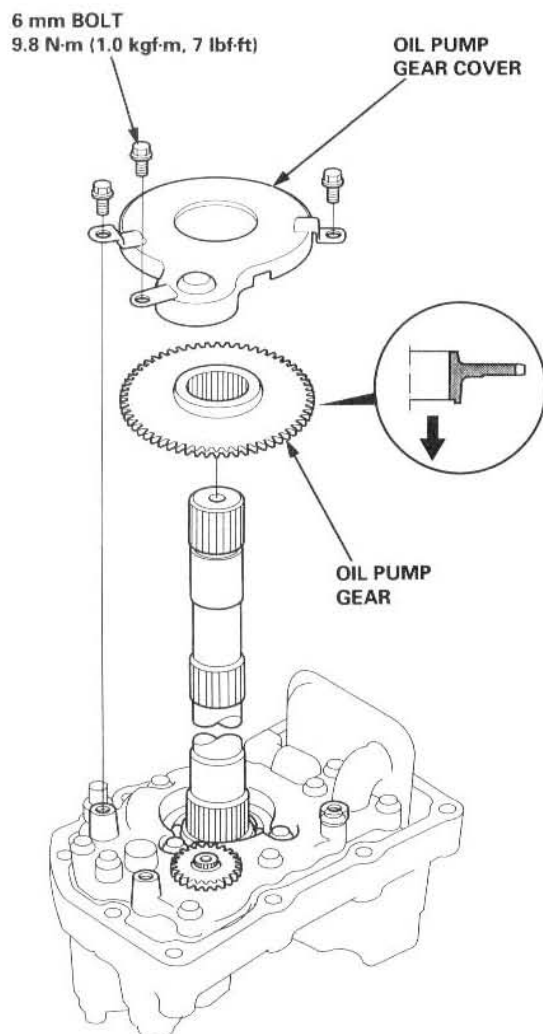
1. Remove the left side cover and gasket.
2. Remove the washer and thrust bearings.
3. Remove the pipe and O-rings.



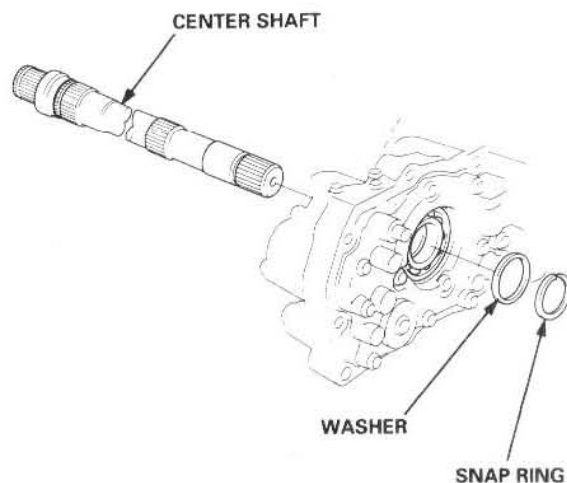


4. Remove the oil pump gear cover.
5. Remove the oil pump gear.

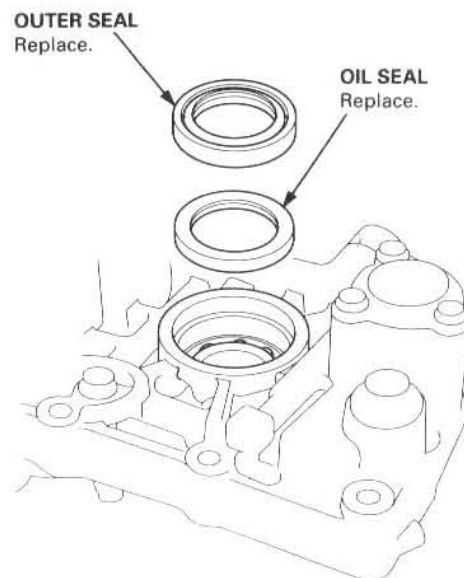
NOTE: When installing the oil pump gear, note the direction of the gear.



6. Remove the snap ring and washer, then remove the center shaft.



7. Remove the outer seal and oil seal.

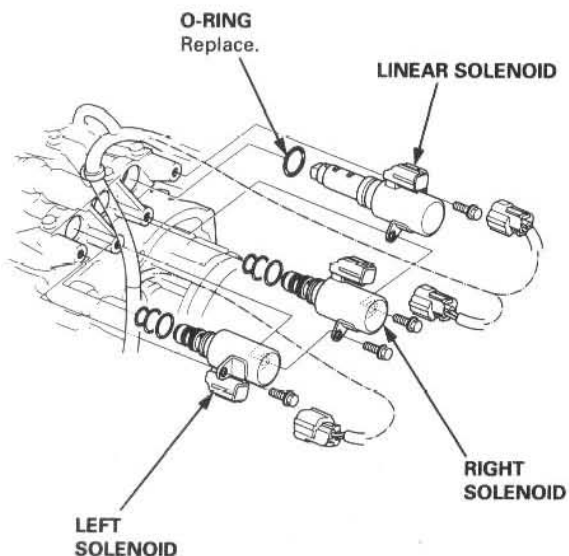


8. Reassembly is in the reverse order of disassembly.

NOTE: Be careful to keep foreign material out of the ATTS unit during reassembly.

Removal/Installation

1. Remove the right side cover (see page 15-73).
2. Remove the solenoids.

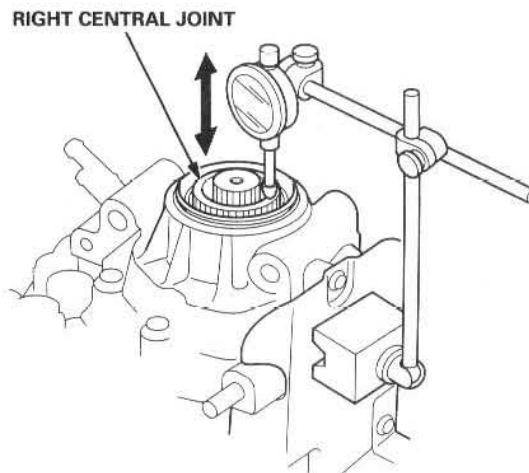


3. Install the solenoids.
4. Install the right side cover (see page 15-73).

Inspection/Adjustment

1. Using the dial gauge, measure the clearance by moving the right central joint.

Clearance: 0.2 – 0.5 mm (0.008 – 0.020 in)



2. If the clearance is out of specification, continue with this procedure.
3. Remove the right side cover (see page 15-73).
4. Measure the old shim thickness.
5. If the clearance value is more than specification, calculate the thickness of the new shim as described below.

Clearance value – 0.3 mm (0.012 in) = Plus value

Old shim thickness + Plus value = New shim thickness

Example 1:

Clearance value: 0.7 mm (0.028 in)

Old shim thickness: 2.3 mm (0.091 in)

$0.7 \text{ mm} - 0.3 \text{ mm} = 0.4 \text{ mm}$

$2.3 \text{ mm} + 0.4 \text{ mm} = 2.7 \text{ mm (0.106 in)}$

Select shim I.



If the clearance value is less than specification, calculate the thickness of the new shim as described below.

0.3 mm (0.012 in) – Clearance value = Minus value

Old shim thickness – Minus value = New shim thickness

Example 2:

Clearance value: 0.1 mm (0.004 in)

Old shim thickness: 2.3 mm (0.091 in)

0.3 mm – 0.1 mm = 0.2 mm

2.3 mm – 0.2 mm = 2.1 mm (0.083 in)

Select shim F.

SHIM

	Part Number	Thickness
A	90415 – P6K – 000	1.1 mm (0.043 in)
B	90416 – P6K – 000	1.3 mm (0.051 in)
C	90417 – P6K – 000	1.5 mm (0.059 in)
D	90418 – P6K – 000	1.7 mm (0.067 in)
E	90419 – P6K – 000	1.9 mm (0.075 in)
F	90420 – P6K – 000	2.1 mm (0.083 in)
G	90421 – P6K – 000	2.3 mm (0.091 in)
H	90422 – P6K – 000	2.5 mm (0.098 in)
I	90423 – P6K – 000	2.7 mm (0.106 in)
J	90424 – P6K – 000	2.9 mm (0.114 in)
K	90425 – P6K – 000	3.1 mm (0.122 in)

6. Install the right side cover (see page 15-73).

Driveshafts

Special Tools	16-2
Driveshafts	
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Disassembly	16-6
Reassembly	16-9
Installation	16-15
Intermediate Shaft	
Removal	16-17
Disassembly	16-18
Reassembly	16-19
Installation	16-21

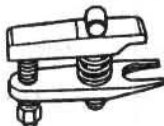


Special Tools

Ref. No.	Tool Number	Description	Qty	Page Reference
①	07GAD – PH70201	Oil Seal Driver	1	16-20
②	07MAC – SL00200	Ball Joint Remover, 28 mm	1	16-4
③	07746 – 0010200	Attachment, 37 x 40 mm	1	16-18
④	07746 – 0010400	Attachment, 52 x 55 mm	1	16-20
⑤	07746 – 0030400	Attachment, 35 mm I.D.	1	16-20
⑥	07749 – 0010000	Driver	1	16-18, 20
⑦	07965 – 6340301	Hub Dis/Assembly Base	2	16-18, 20
⑧	07XAC – 0010200	Threaded Adapter, 24 x 1.5 mm	1	16-8



①



②



③



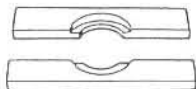
④



⑤



⑥



⑦



⑧



Inspection

Driveshaft Boot

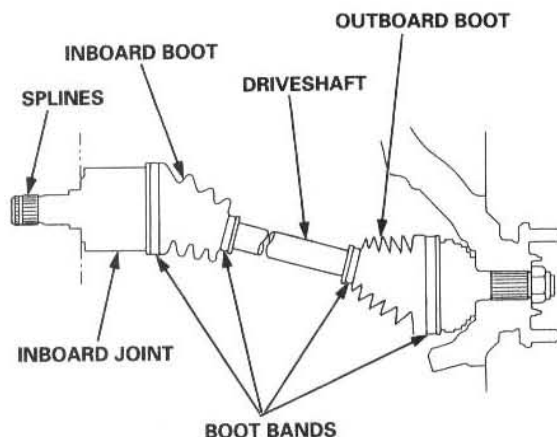
Check the boots on the driveshaft for cracks, damage, leaking grease or loose boot bands. If any damage is found, replace the boot and boot bands.

Loose Splines

Turn the driveshaft by hand, and make sure the splines and joint are not excessively loose. If damage is found, replace the inboard joint.

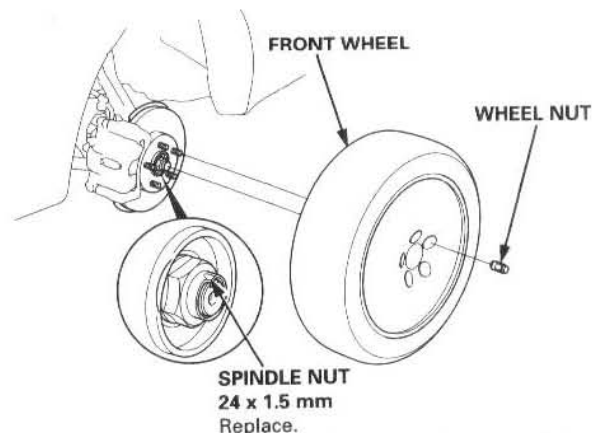
Twisted or Cracked

Make sure the driveshaft is not twisted or cracked. Replace it if necessary.



Removal

1. Loosen the wheel nuts slightly.
2. Raise the front of vehicle, and support it with safety stands in the proper locations (see section 1).
3. Remove the wheel nuts and front wheels.



4. Drain the transmission fluid (see section 13 or 14).

NOTE: On a vehicle with an intermediate shaft, it is not necessary to drain the fluid when the left drive-shaft is removed.

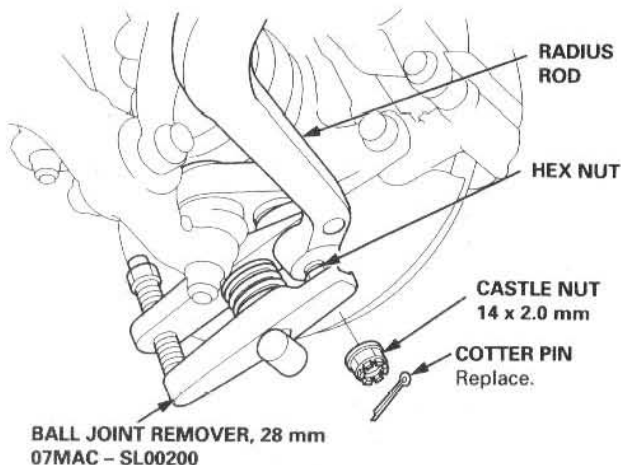
5. Raise the locking tab on the spindle nut, then remove the nut.

(cont'd)

Removal (cont'd)

6. Vehicles equipped with ATTS:

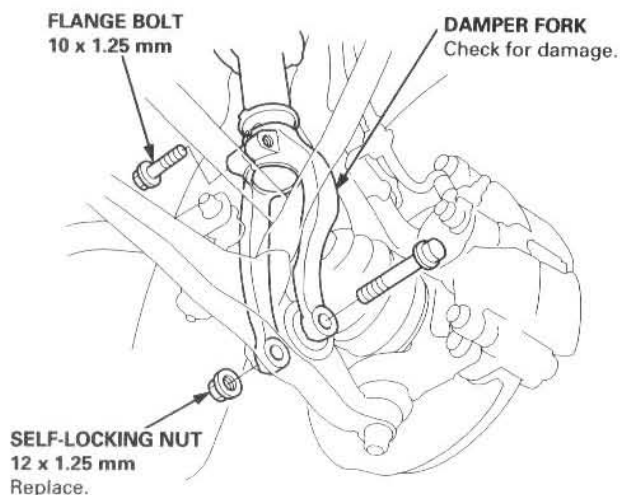
- Remove the cotter pin from the radius rod ball joint castle nut, and remove the nut.



- Install a 14 mm hex nut on the ball joint. Be sure that the hex nut is flush with the ball joint pin end, or the threaded section of the ball joint pin might be damaged by the special tool.
- Use the special tool, as shown in section 18, to separate the ball joint and radius rod. Be careful not to damage the ball joint boot.

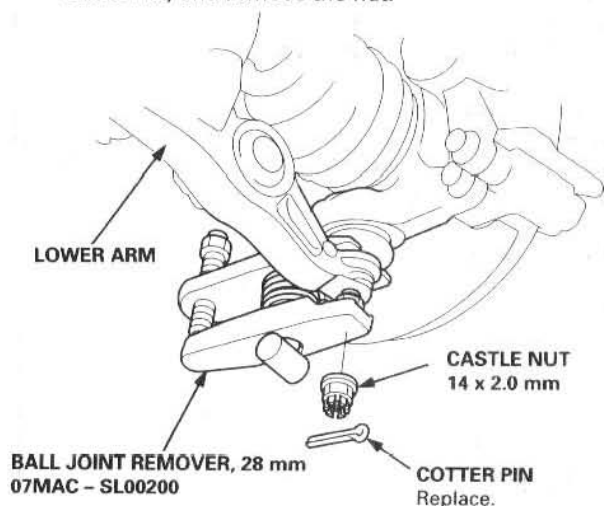
NOTE: If necessary, apply penetrating type lubricant to loosen the ball joint.

7. Remove the self-locking nut and flange bolts from the damper fork.



8. Remove the damper fork.

9. Remove the cotter pin from the lower arm ball joint castle nut, and remove the nut.

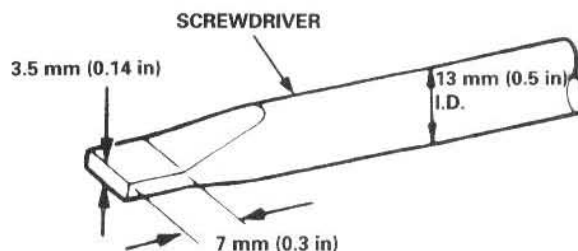


10. Install a 14 mm hex nut on the ball joint. Be sure that the hex nut is flush with the ball joint pin end, or the threaded section of the ball joint pin might be damaged by the special tool.

11. Use the special tool, as shown in section 18, to separate the ball joint and lower arm. Be careful not to damage the ball joint boot.

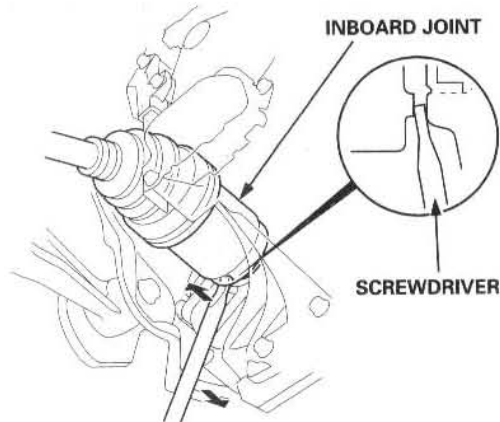
NOTE: If necessary, apply penetrating type lubricant to loosen the ball joint.

12. Pry the driveshaft assembly with a screwdriver, as shown, to force the set ring at the driveshaft end past the groove. Be careful not to damage the oil seals when prying with the screwdriver.

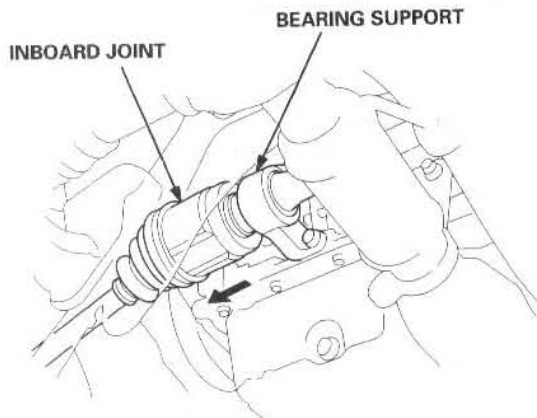




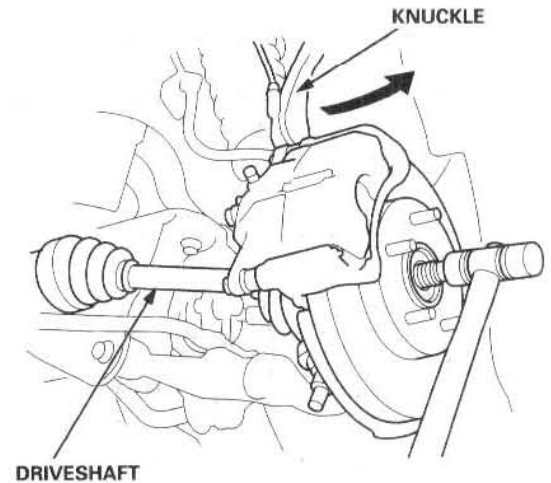
13. Pull the inboard joint, and remove the right driveshaft from the differential case as an assembly. Do not pull on the driveshaft; the inboard joint may come apart. Use care when prying out the assembly, and pull it straight to avoid damaging the differential oil seal or the intermediate shaft outer seal.



Remove the left driveshaft from the bearing support or from the ATTS unit by tapping on the inboard joint of the driveshaft with a plastic hammer.



14. Pull the knuckle outward, and remove the driveshaft outboard joint from the front wheel hub using a plastic hammer.

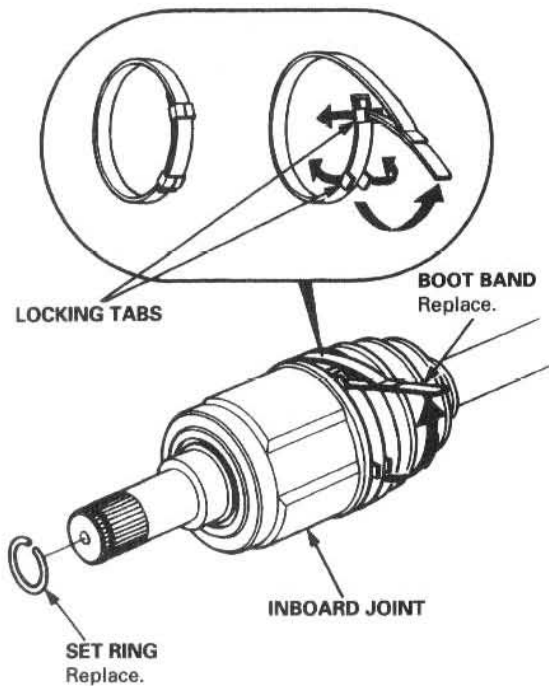


Driveshafts

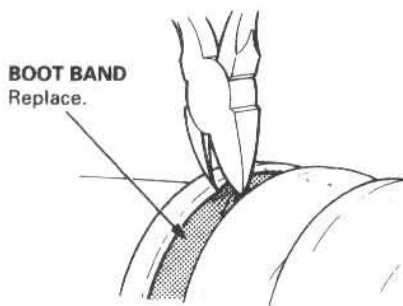
Disassembly

Inboard Joint Side:

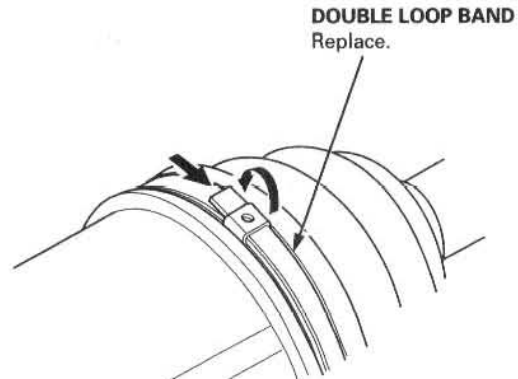
1. Carefully clamp the driveshaft in a vise with soft jaws, then remove the set ring from the inboard joint.
2. Remove the boot bands on the inboard joint.
 - If the boot band is a locking tab type, pry up the locking tabs with a screwdriver and raise the end of the band.



- If the boot band is a welded type or a low profile type boot band, carefully cut it off with a pair of diagonal cutters. Take care not to damage the boot.

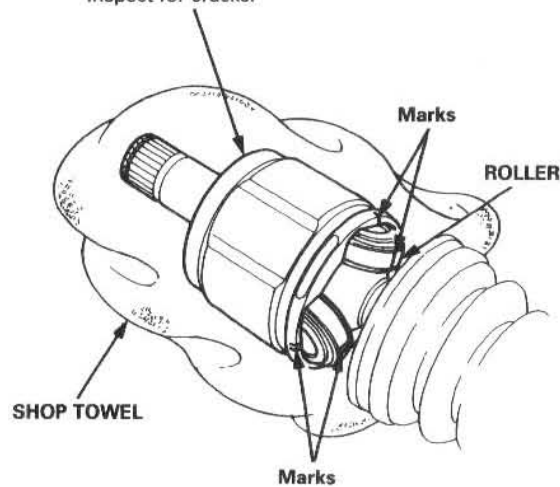


- If the boot band is a double loop band type, raise the band bend as shown.



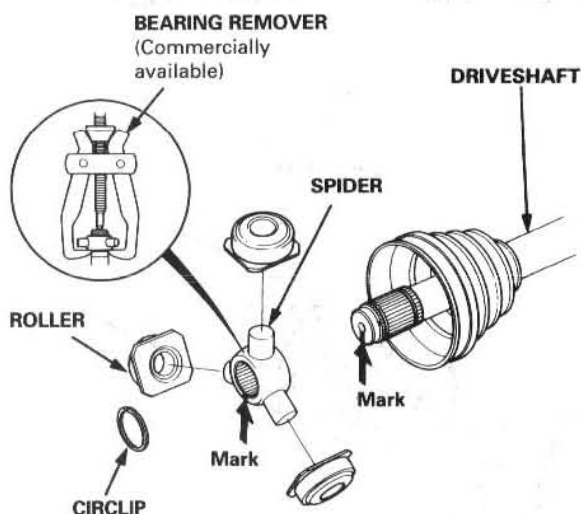
3. Mark each roller and inboard joint to identify the locations of rollers and grooves in the inboard joint. Then remove the inboard joint on the shop towel. Be careful not to drop the rollers when separating them from the inboard joint.

INBOARD JOINT
Check splines for wear or damage.
Check inside bore for wear.
Inspect for cracks.

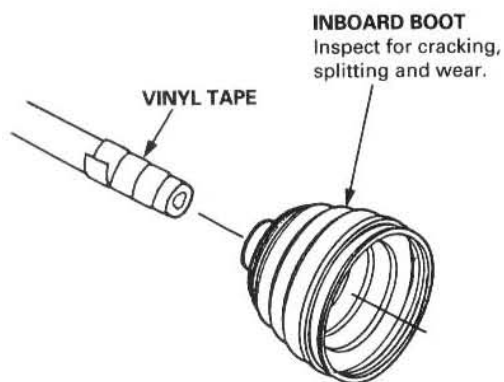




4. Mark the rollers and spider to identify the locations of rollers on the spider, then remove the rollers.



5. Remove the circlip.
6. Mark the spider and driveshaft to identify the position of the spider on the shaft.
7. Remove the spider using a bearing remover.
8. Wrap the splines on the driveshaft with vinyl tape to prevent damage to the boots.



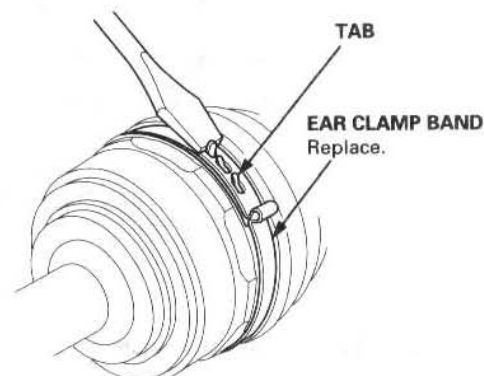
9. Remove the inboard boot. Take care not to damage the boot.

Outboard Joint Side:

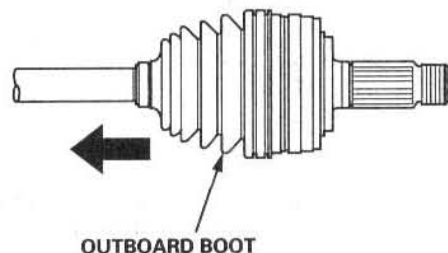
1. Lift up the three tabs with a screwdriver, then remove the boot bands. Take care not to damage the boot.

NOTE:

- If the boot band is a double loop type, lift up the band bend.
- If the boot band is a welded type, cut the boot band.
- If the boot band is the locking tabs type, pry up the tabs with a screwdriver and lift up the end of the band.



2. Slide the outboard boot to the inboard joint side.

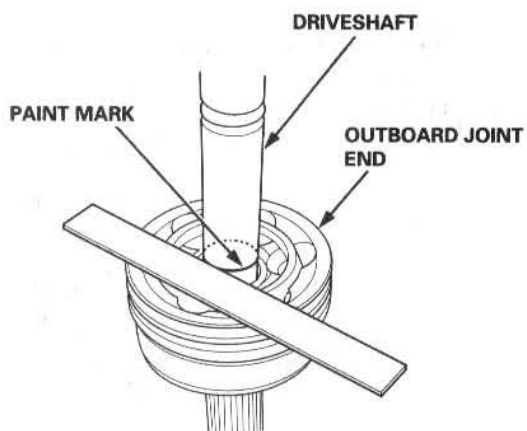


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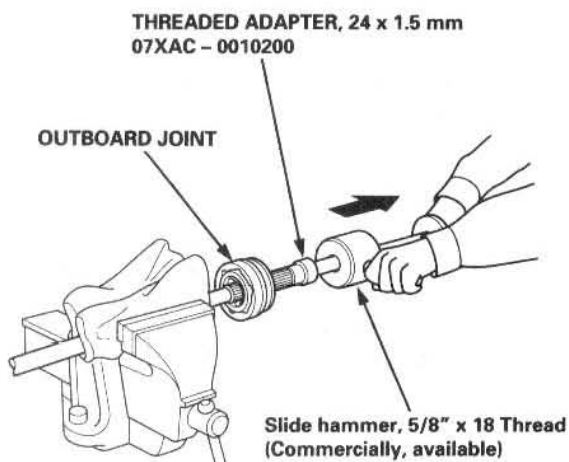
Driveshafts

Disassembly (cont'd)

3. Wipe off the grease to expose the driveshaft and the outboard joint inner race.
4. Mark the driveshaft at the same position of the outboard joint end with paint.

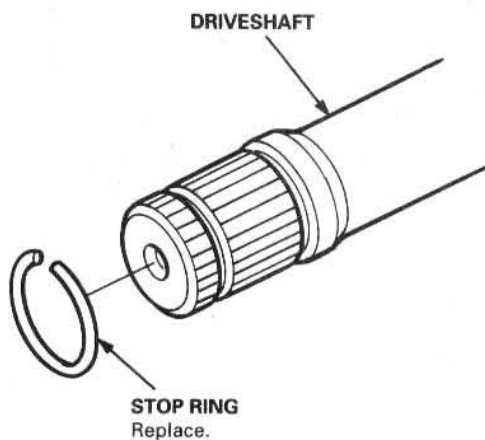


5. Carefully clamp the driveshaft in a vise.



6. Remove the outboard joint using a special tool as shown.


7. Remove the driveshaft from the vise.
8. Remove the stop ring from the driveshaft.





Reassembly

NOTE:

- Clean the disassembled parts with solvent, and dry them thoroughly with compressed air. Do not wash the rubber parts with solvent.
-  **GREASE** : Thoroughly pack the inboard joint and both joint boots with the joints boots with the joint grease included in the new driveshaft set.

Grease quantity:

Inboard Joint

Without ATTS: 120 – 130 g (4.2 – 4.6 oz)

With ATTS: 130 – 140 g (4.6 – 4.9 oz)

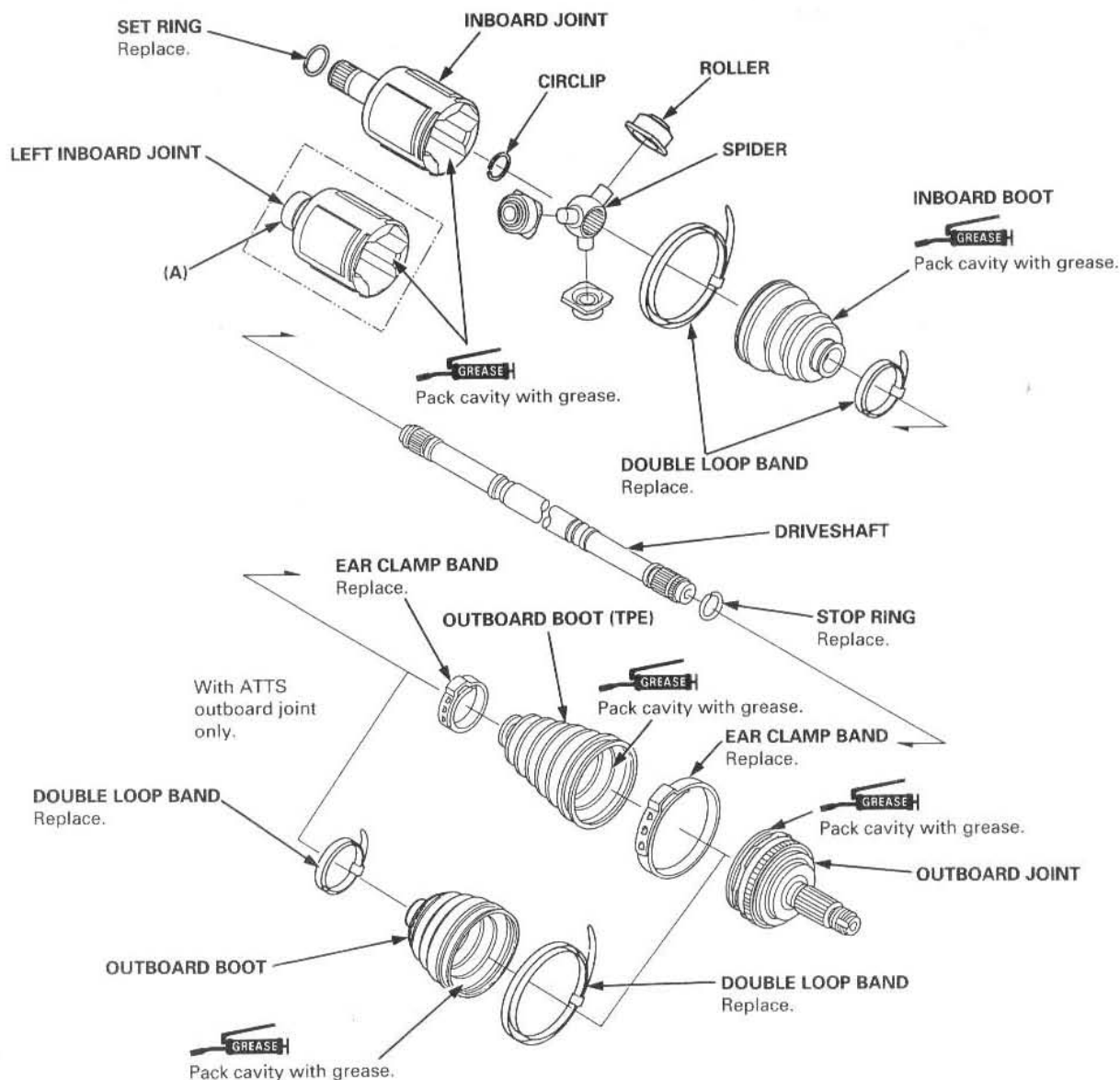
Left inboard joint spline (A): 0.5 – 1.0 g (0.018 – 0.035 oz)

Outboard Joint

Without ATTS: 140 – 150 g (4.9 – 5.3 oz)

With ATTS: 130 – 140 g (4.6 – 4.9 oz)

- The '98 Canada model (without ATTS) and all '99 models (without ATTS) uses a TPE (Thermoplastic Polyester Elastomer) outboard joint boot. Use the ear clamp type boot band in the outboard joint boot set.

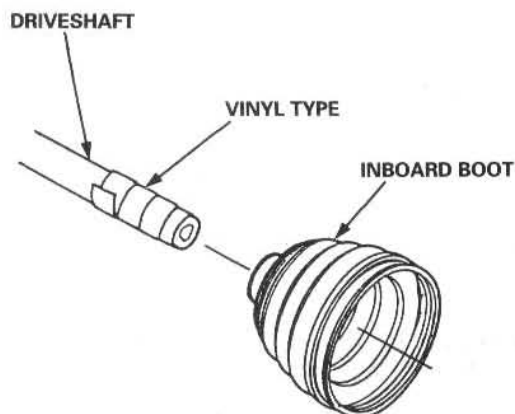


Driveshafts

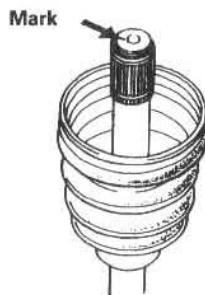
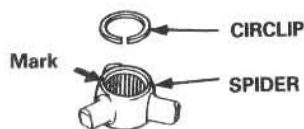
Reassembly

Inboard Joint Side:

1. Wrap the splines with vinyl tape to prevent damage to the boot.



2. Install the inboard boot to the driveshaft, then remove the vinyl tape. Take care not to damage the boots.
3. Install the spider onto the driveshaft by aligning the marks on the spider and the end of the driveshaft.

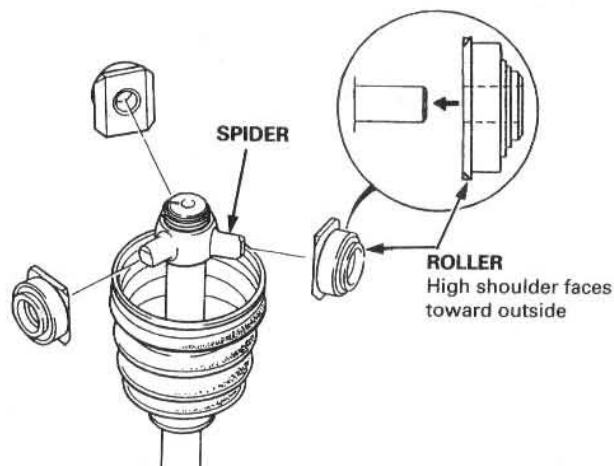


4. Fit the circlip into the driveshaft groove. Always rotate the circlip in its groove to be sure it is fully seated.

5. Fit the rollers to the spider.

NOTE:

- Reinstall the rollers onto their original positions on the spider by aligning the marks.
- Hold the driveshaft pointed up to prevent the rollers from falling off.

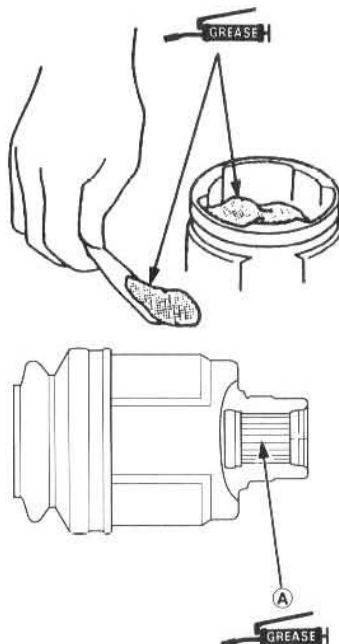


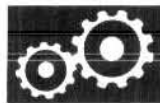
6. Pack the inboard joint with the joint grease included in the new driveshaft set.

Without ATTS: 120 – 130 g (4.2 – 4.6 oz)

With ATTS: 130 – 140 g (4.6 – 4.9 oz)

Left inboard joint splines (A): 0.5 – 1.0 g (0.018 – 0.035 oz)

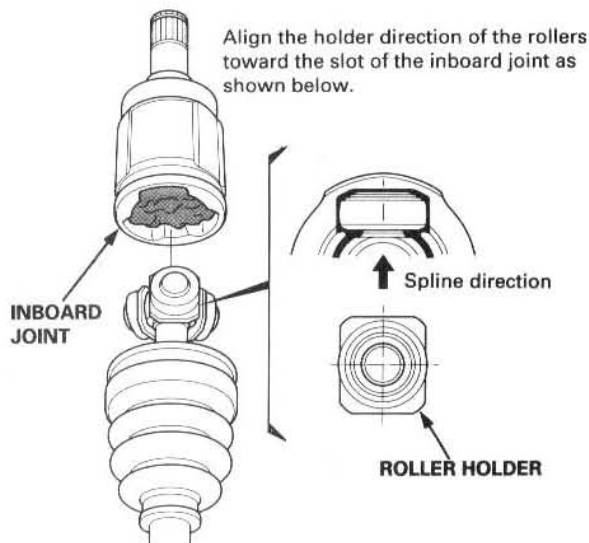




7. Fit the inboard joint onto the driveshaft.

NOTE:

- Reinstall the inboard joint onto the driveshaft by aligning the marks on the inboard joint with the marks on the rollers.
- Hold the driveshaft so the inboard joint points up to prevent it from falling off.

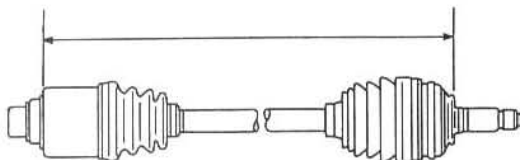


8. Adjust the length of the driveshafts to the specifications below, then adjust the boots to halfway between full compression and full extension. Make sure the ends of the boots seat in the groove of the driveshaft and joint.

Left driveshaft:

Without ATTS: 484 – 484.5 mm (19.1 – 19.1 in)

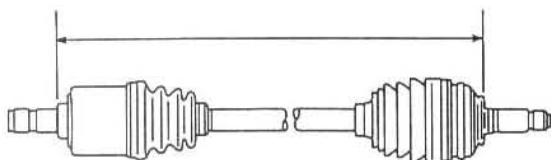
With ATTS: 485 – 486 mm (19.1 – 19.1 in)



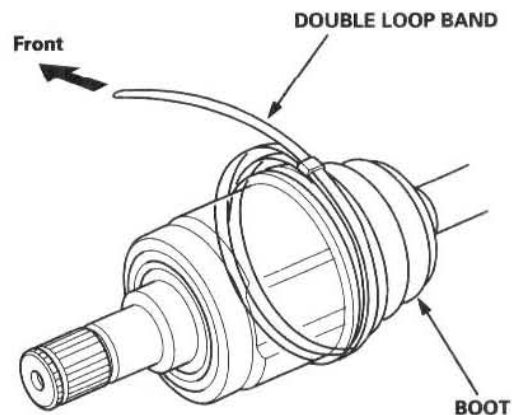
Right driveshaft:

Without ATTS: 505 – 510 mm (19.9 – 20.1 in)

With ATTS: 497 – 497.5 mm (19.5 – 19.6 in)

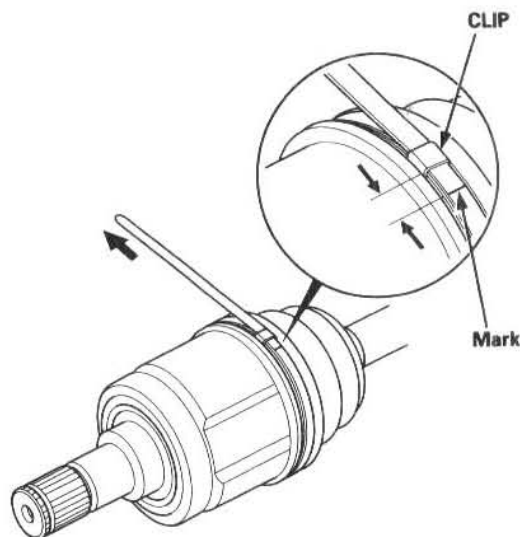


9. Set the double loop band onto the boot with the band end toward the front of the vehicle.



10. Pull up the slack in the band by hand.

11. Make a mark on the band 10 – 14 mm (0.4 – 0.6 in) from the clip.



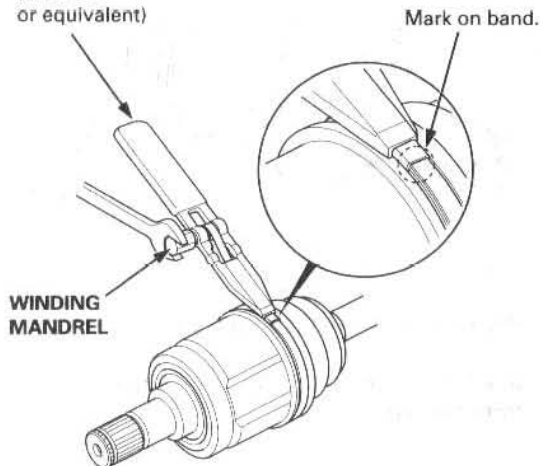
(cont'd)

Driveshafts

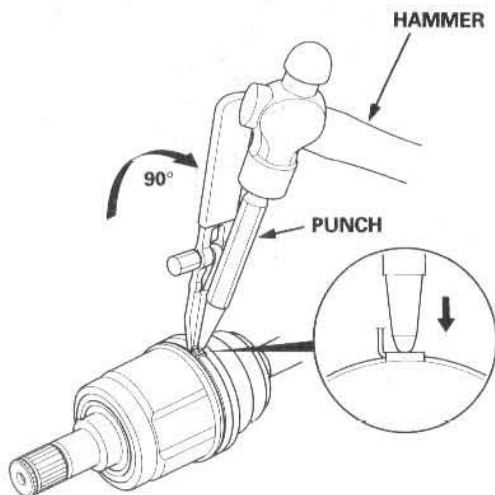
Reassembly (cont'd)

12. Thread the free end of the band through the nose section of the commercially available boot band tool (KD-3191 or equivalent), and into the slot on the winding mandrel.
13. Place a wrench on the winding mandrel of the boot band tool, and tighten the band until the marked spot on the band meets the edge of the clip.

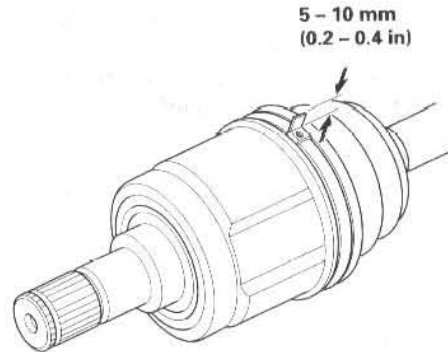
BOOT BAND TOOL
(KD-3191
or equivalent)



14. Lift up the boot band tool to bend the free end of the band 90 degrees to the clip. Center punch the clip, then fold over the remaining tail onto the clip.



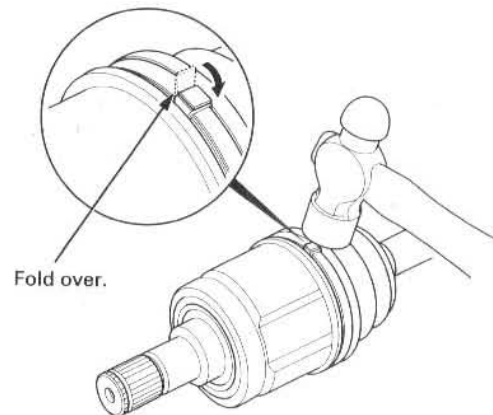
15. Unwind the boot band tool, and cut off the excess free end of the band to leave a 5 – 10 mm (0.2 – 0.4 in) tail protruding from the clip.



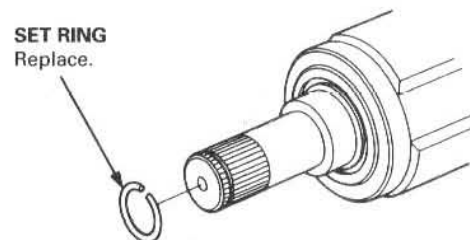
16. Bend the band end by tapping it down with a hammer.

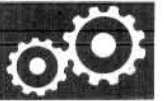
NOTE:

- Make sure the band does not move.
- Remove any grease remaining on the surrounding surfaces.



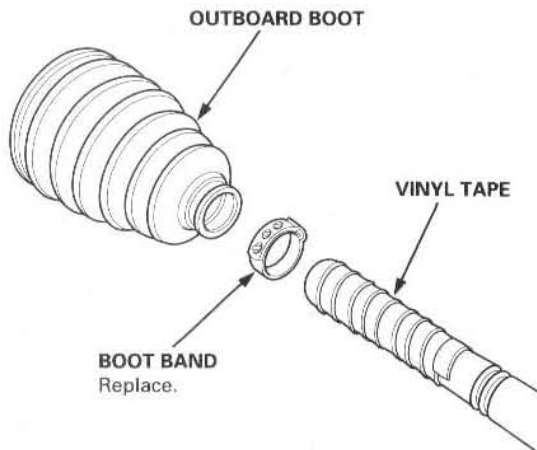
17. Install the new set ring.



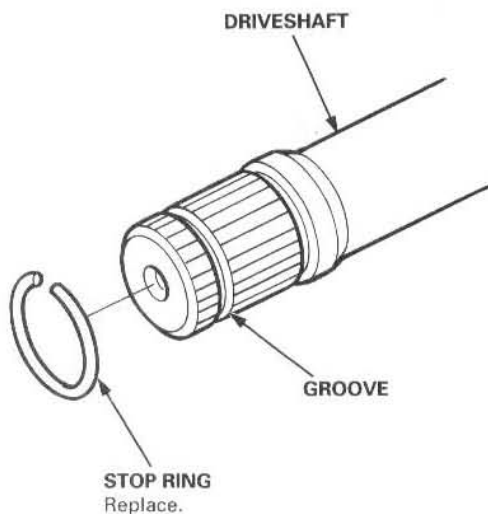


Outboard Joint Side:

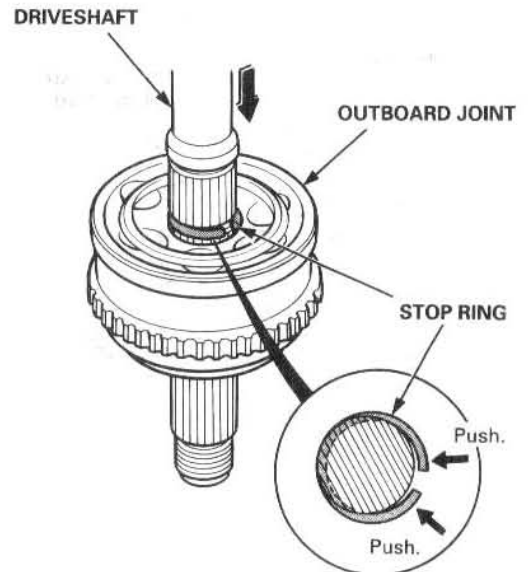
1. Wrap the splines with vinyl tape to prevent damage to the boot.



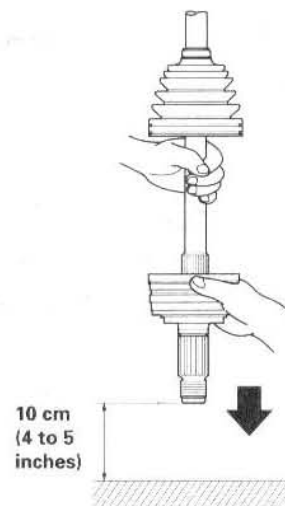
2. Install the boot band and outboard boot, then remove the vinyl tape. Take care not to damage the boot.
3. Install the stop ring into the driveshaft groove.



4. Insert the driveshaft into the outboard joint until the stop ring is close on the joint.



5. To completely seat the outboard joint, pick up the driveshaft and joint, and drop then from about 10 cm (4 to 5 inches) onto a hard surface. Do not use a hammer as excessive force may damage the driveshaft.

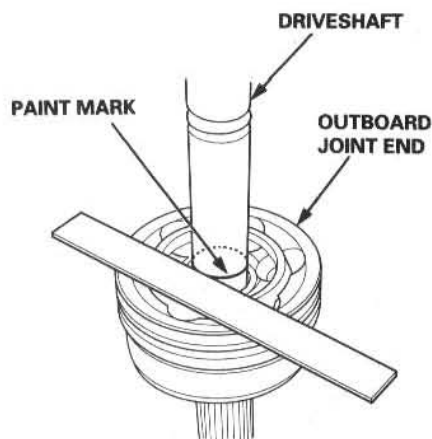


(cont'd)

Driveshafts

Reassembly (cont'd)

6. Check the alignment of the paint mark with the outboard joint end.



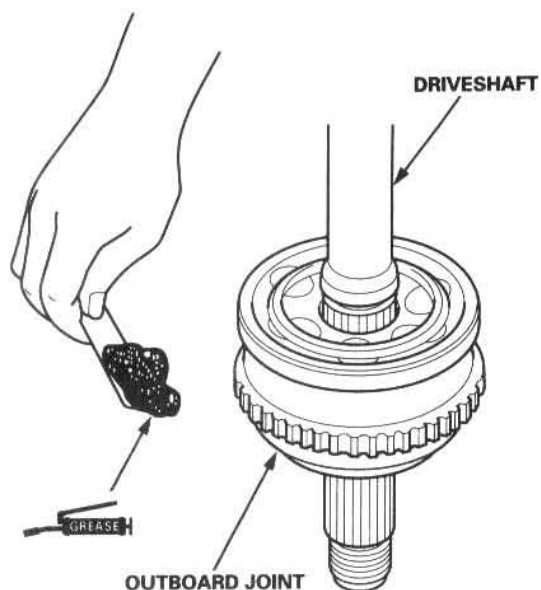
7. Pack the outboard joint with the joint grease included in the new joint boot set.

Grease quantity

Outboard joint:

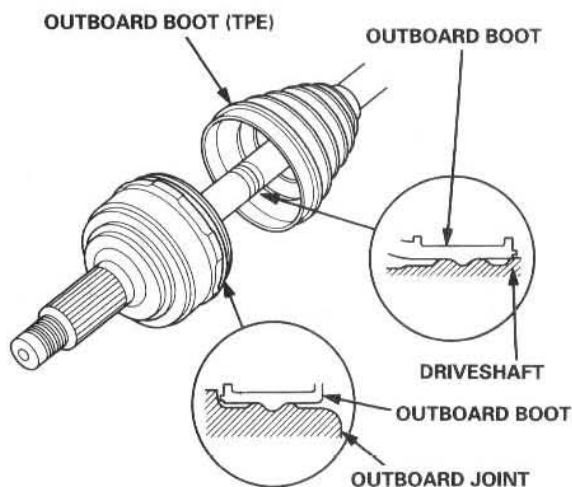
Without ATTS: 140 – 150 g (4.9 – 5.3 oz)

With ATTS: 130 – 140 g (4.6 – 4.9 oz)

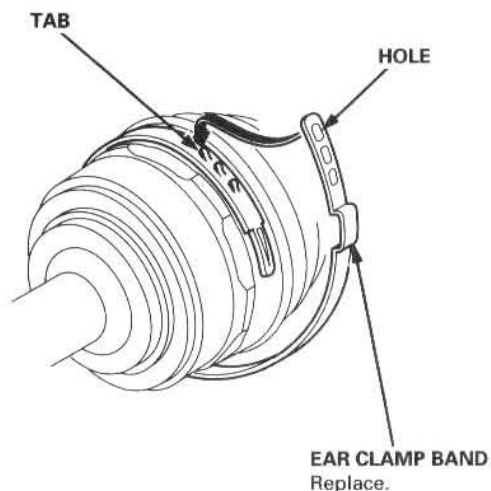


8. Fit the boot ends onto the driveshaft and outboard joint.

NOTE: The driveshafts for vehicles with ATTS must use double loop bands for the rubber boots (reference page 16-11, 12).



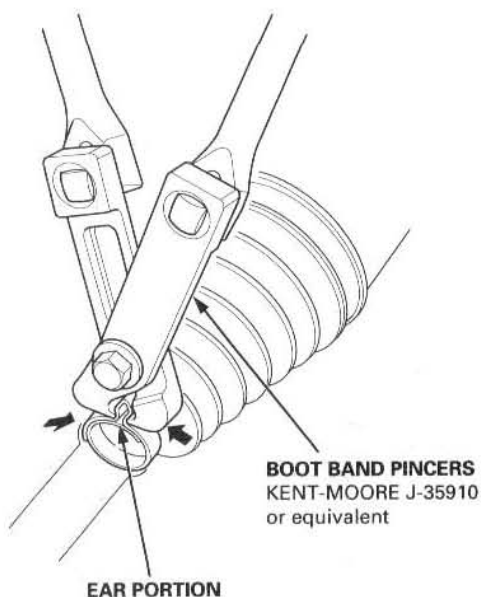
9. Set the ear clamp band by threading the tab into the holes of the band.



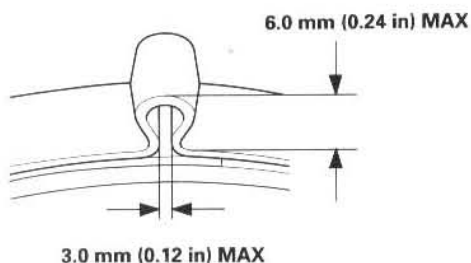


Installation

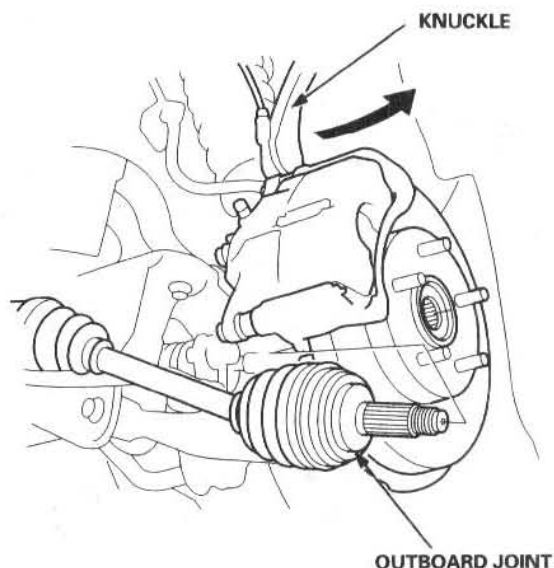
10. Close the ear portion of the band with a commercially available boot band pincers.



11. Check the clearance between the closed ear portion of the band. If the clearance is not within the standard, close the ear portion of the band further.

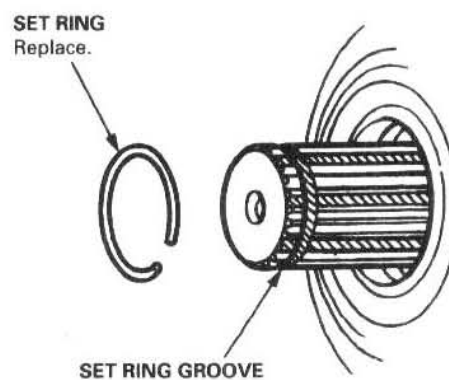


1. Install the outboard joint into the knuckle.



2. Apply 0.5 – 1.0 g (0.02 – 0.04 oz) of specified grease to the whole splined surface of the intermediate shaft.

NOTE: After applying grease, remove the grease from the splined grooves at intervals of 2 – 3 splines and from the set ring groove so that air can bleed from the inboard joint.



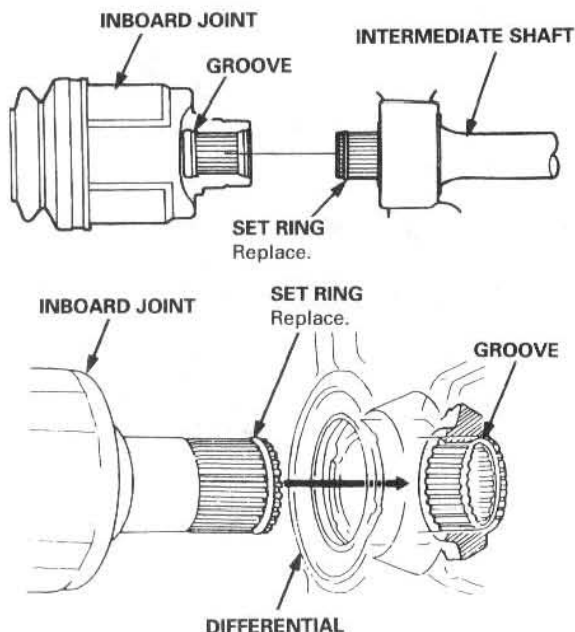
3. Install the new set ring onto the driveshaft or intermediate shaft groove. Always use a new set ring whenever the driveshaft is being installed.

(cont'd)

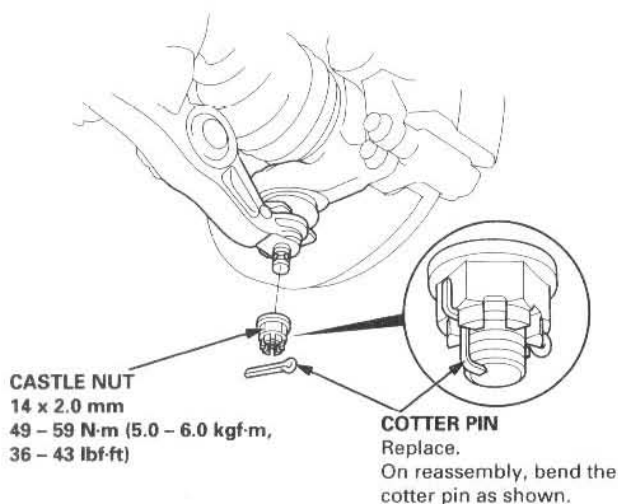
Driveshafts

Installation (cont'd)

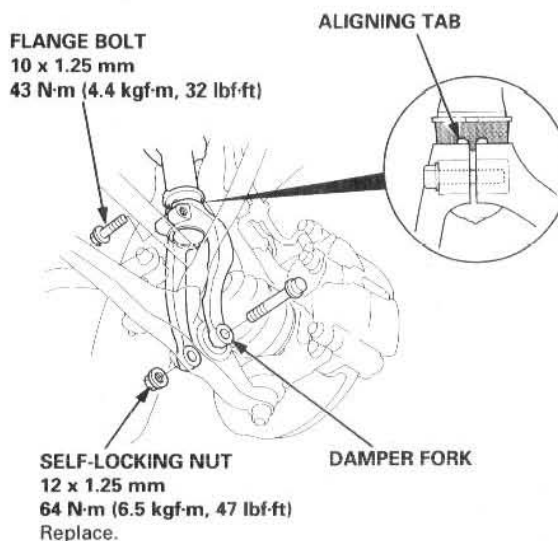
- Insert the inboard end of the driveshaft into the differential or intermediate shaft until the set ring locks in the groove.



- Install the knuckle onto the lower arm. Be careful not damage the ball joint boot. Wipe off the grease before tightening the nut at the ball joint. Torque the castle nut to the lower torque specification, then tighten it only far enough to align the slot with the pin hole. Do not align the nut by loosening.



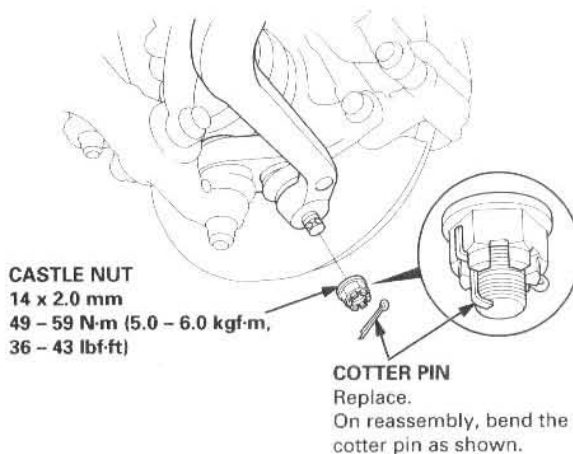
- Install the damper fork over the driveshaft and onto the lower arm. Install the damper in the damper fork so that the aligning tab is aligned with the slot in the damper fork.



- Loosely install the flange bolt and the new self-locking nut.

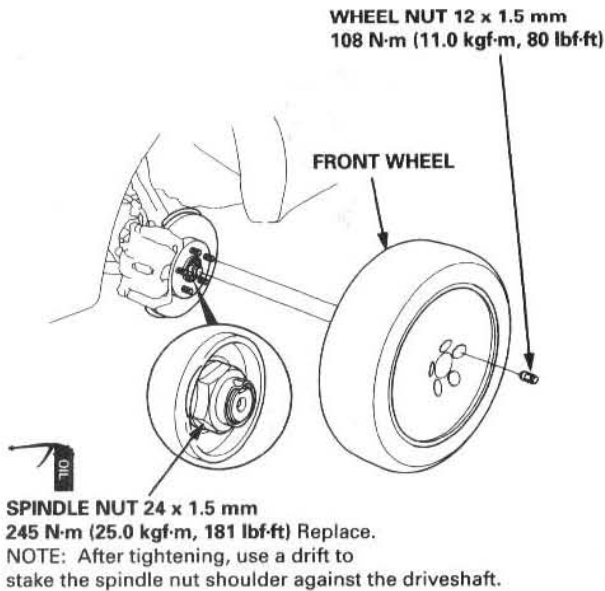
NOTE: The bolts and nut should be tightened with the vehicle's weight on the damper.

- Vehicles equipped with ATTS, install the radius rod onto the knuckle. Be careful not damage the ball joint boot. Wipe off the grease before tightening the nut at the ball joint. Torque the castle nut to the lower torque specification, then tighten it only far enough to align the slot with the pin hole. Do not align the nut by loosening.





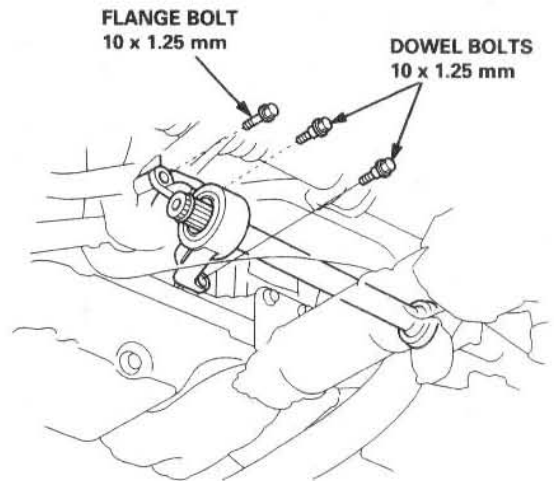
9. Apply oil to the seating surface and the threaded section of the new spindle nut.



10. Install a new spindle nut, then tighten the nut.
11. Rotate the driveshaft by hand to make sure the closed portion of the outboard boot band does not interfere with the knuckle or ABS wheel sensor.
12. Clean the mating surfaces of the brake disc and the wheel, then install the front wheel with the wheel nuts.
13. Tighten the flange bolts and the new self-locking nut with the vehicle's weight on the damper.
14. Refill the transmission with the recommended fluid (see section 13 or 14).
15. Check the front wheel alignment, and adjust if necessary (see section 18).

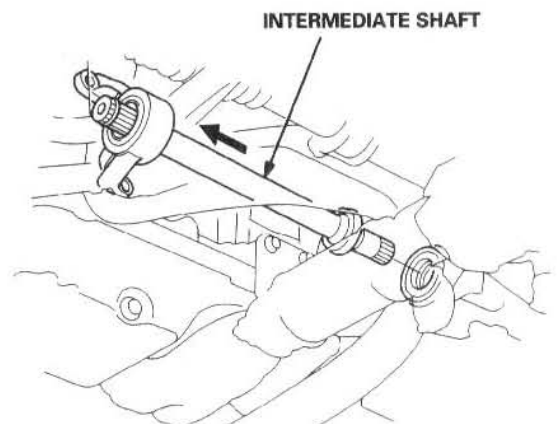
Removal

1. Drain the transmission fluid (see section 13 or 14).
2. Remove the left driveshaft (see page 16-3).
3. Remove the flange bolt and dowel bolts.



4. Remove the intermediate shaft from the differential.

CAUTION: Hold the intermediate shaft horizontal until it is clear of the differential to prevent damage to the differential oil seal.

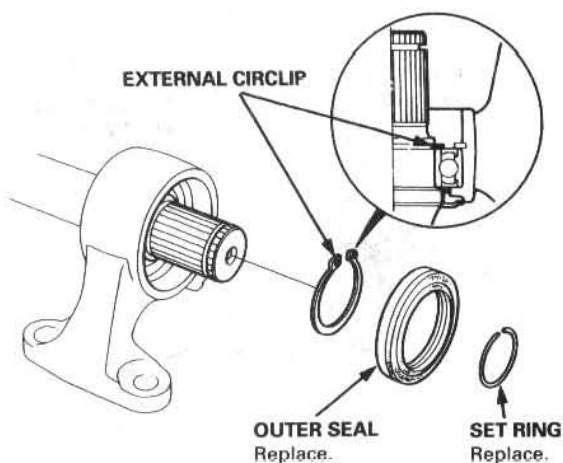


Intermediate Shaft

Disassembly

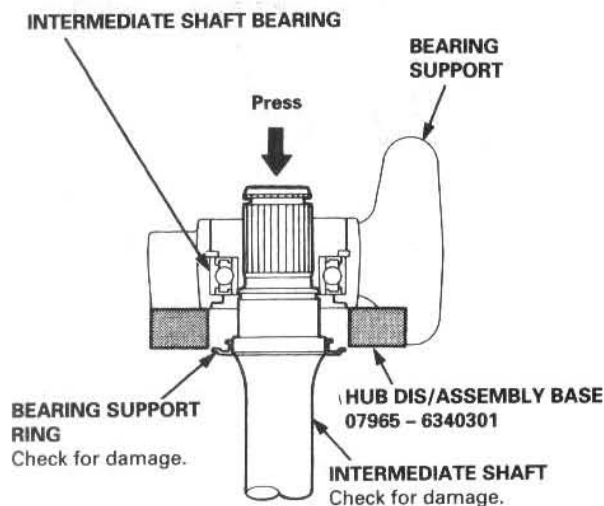
NOTE: Be careful not to damage the bearing support rings on the intermediate shaft during disassembly.

1. Remove the set ring.

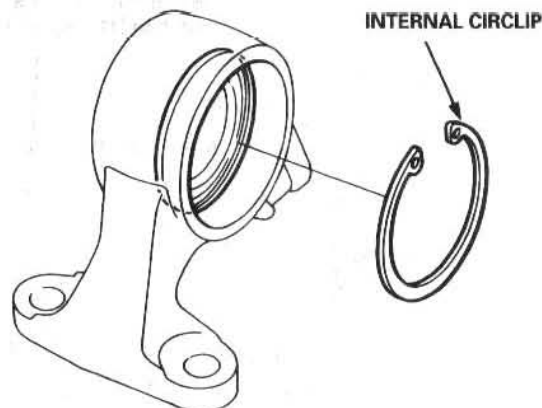


2. Remove the intermediate shaft outer seal from the bearing support.
3. Remove the external circlip.
4. Press the intermediate shaft out of the shaft bearing using the special tools and a press.

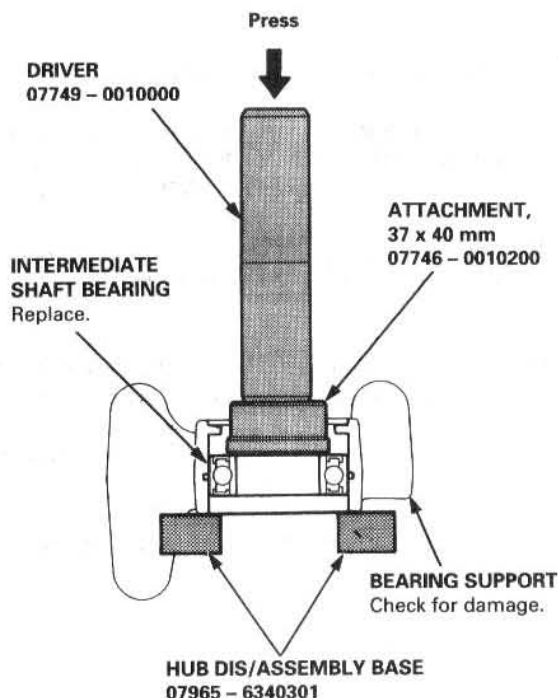
NOTE: Position the special tools so they do not damage the bearing support ring on the shaft.



5. Remove the internal circlip.



6. Press the intermediate shaft bearing out of the bearing support using the special tools and a press.



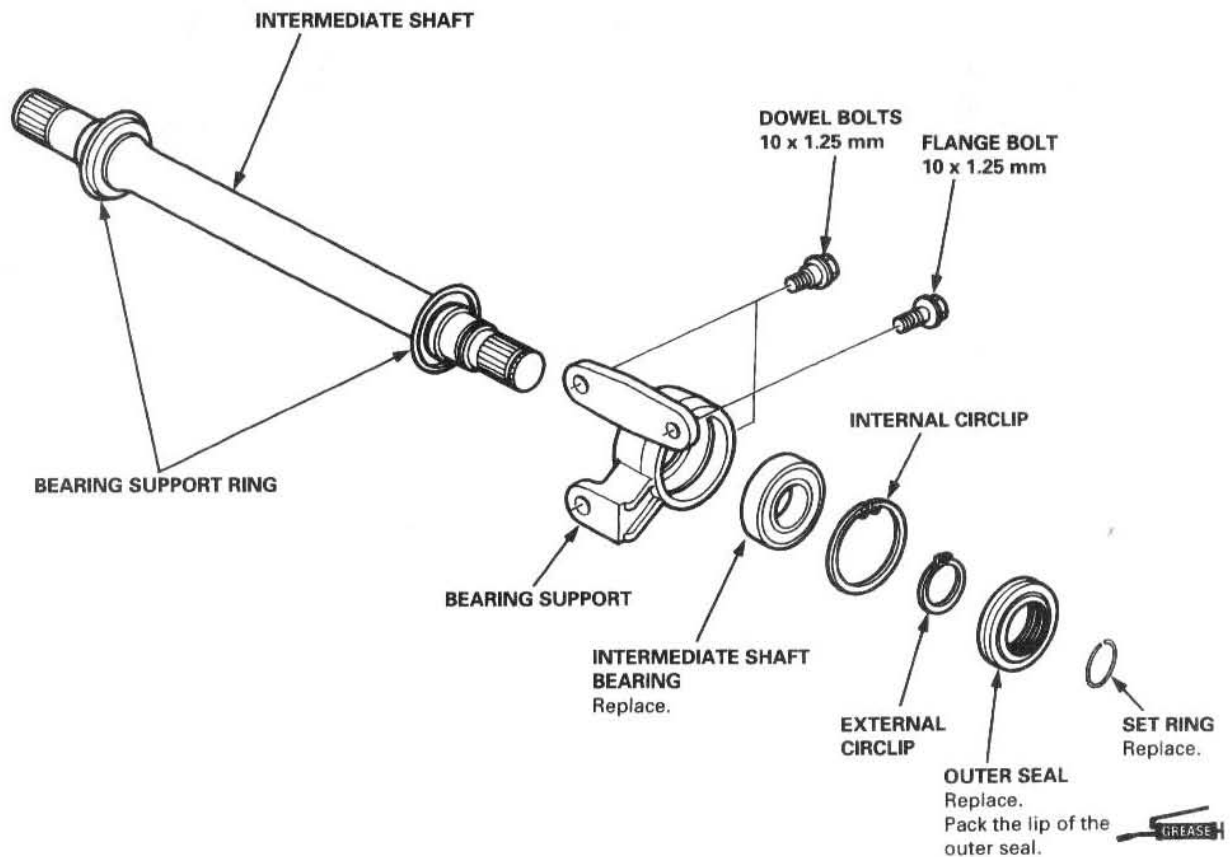


Reassembly

CAUTION: Do not damage the lip on the outer seal during installation.

NOTE:

- Clean the disassembled parts with solvent, and dry them thoroughly with compressed air. Do not wash the rubber parts with solvent.
- Be careful not to damage the bearing support rings on the intermediate shaft during reassembly.



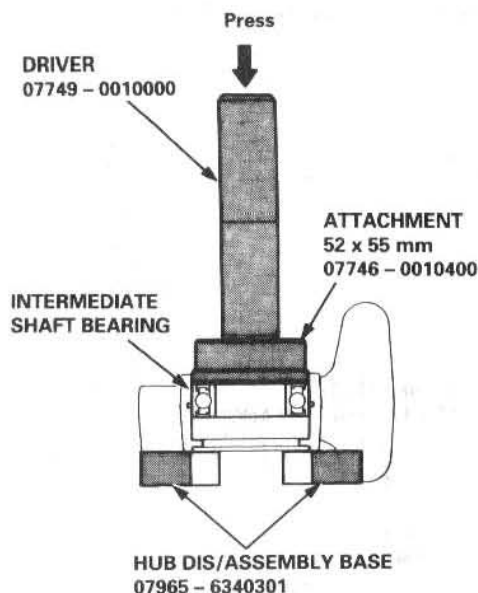
(cont'd)

Intermediate Shaft

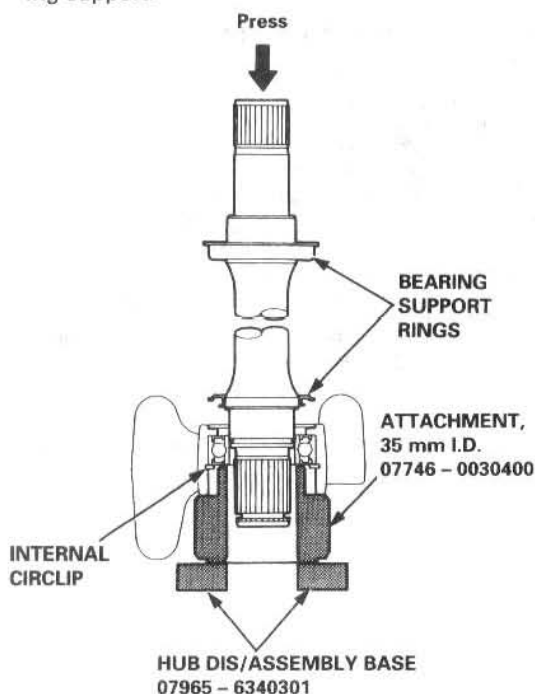
Reassembly (cont'd)

NOTE: Be careful not to damage the bearing support rings on the intermediate shaft during reassembly.

1. Press the intermediate shaft bearing into the bearing support using the special tools and a press.

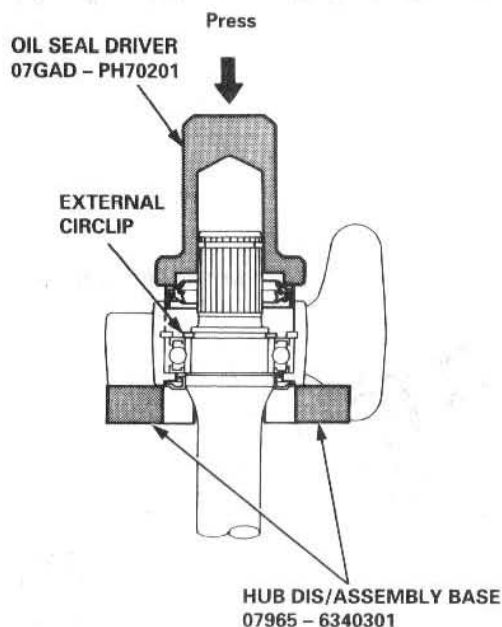


2. Seat the internal circlip into the groove of the bearing support.



3. Press the intermediate shaft into the shaft bearing using the special tool and a press.

4. Seat the external circlip into the groove of the intermediate shaft.



5. Press the outer seal into the bearing support using the special tools and a press.

CAUTION: Do not damage the lip on the outer seal during installation.

NOTE: Press the seal flush with the bearing support.

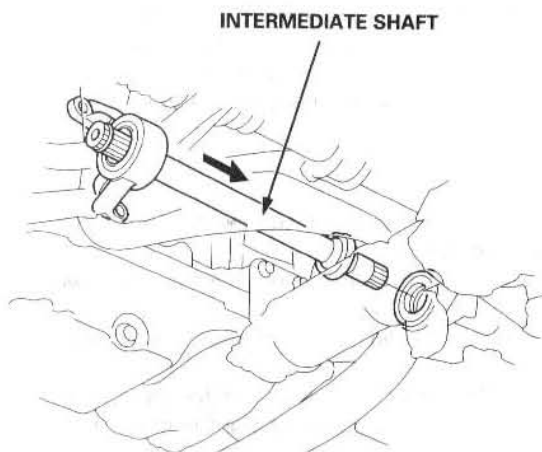
6. Install the new set ring into the intermediate shaft groove.



Installation

1. Insert the intermediate shaft assembly into the differential.

CAUTION: Hold the intermediate shaft horizontal to prevent damage to the differential oil seal.



2. Install the flange bolt and dowel bolts, then tighten them.

FLANGE BOLT

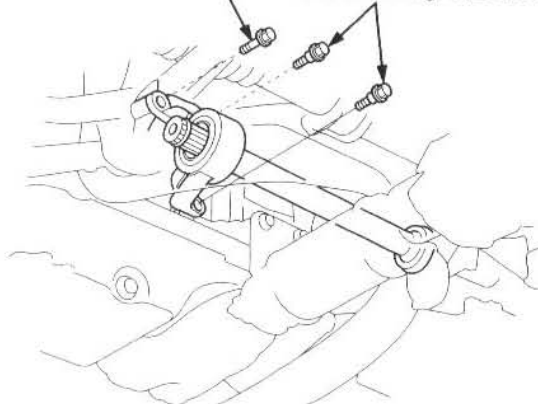
10 x 1.25 mm

39 N·m (4.0 kgf·m, 29 lbf·ft)

DOWEL BOLTS

10 x 1.25 mm

39 N·m (4.0 kgf·m, 29 lbf·ft)



Power Steering

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Noise and Vibration	17-8	Fluid Leakage Inspection	17-24
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Steering Operation	17-12	Replacement	17-25
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With Vehicle Parked	17-12	Inspection	17-27
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[Click here to go back to the Introduction page](#)

SUPPLEMENTAL RESTRAINT SYSTEM (SRS)

(If the steering wheel, column and gearbox maintenance are required)

The Prelude SRS includes a driver's airbag located in the steering wheel hub and a passenger's airbag located in the dashboard above the glove box. Information necessary to safely service the SRS is included in this Service Manual. Items marked with an asterisk (*) on the contents page include, or are located near, SRS components. Servicing, disassembling or replacing these items will require special precautions and tools, and should therefore be done by an authorized Honda dealer.

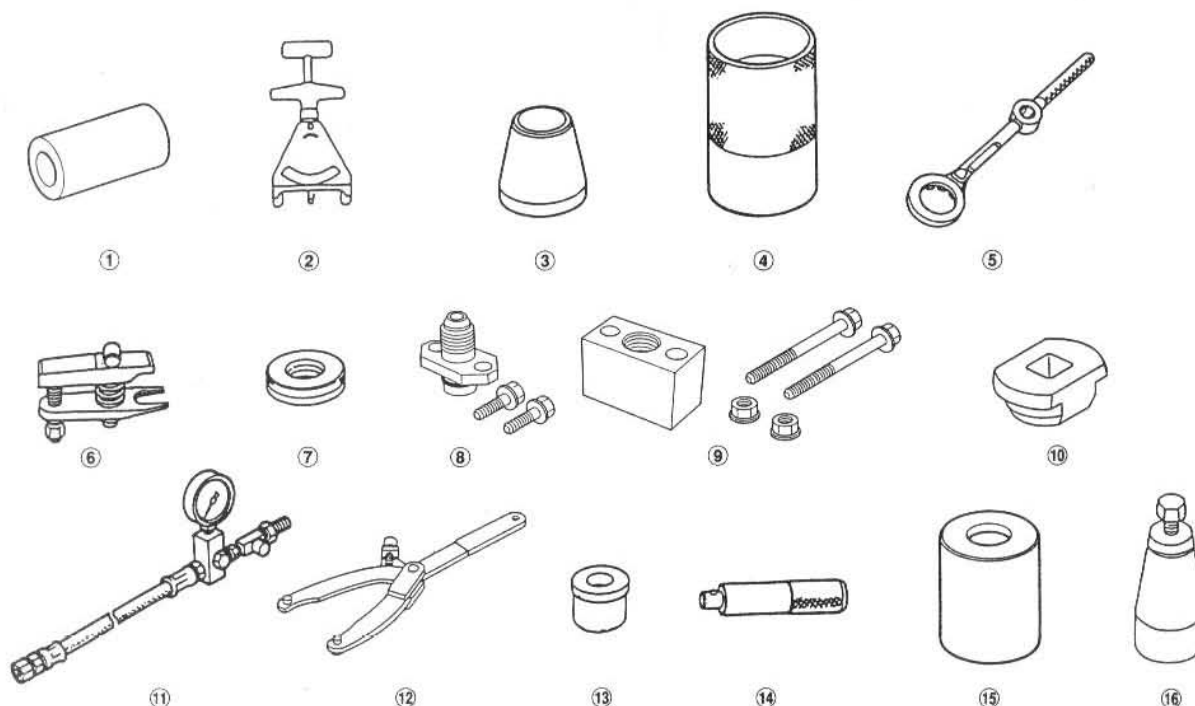
▲ WARNING

- To avoid rendering the SRS inoperative, which could lead to personal injury or death in the event of a severe frontal collision, all SRS service work must be performed by an authorized Honda dealer.
- Improper service procedures, including incorrect removal and installation of the SRS, could lead to personal injury caused by unintentional activation of the airbags.
- Do not bump the SRS unit. Otherwise, the system may fail in case of a collision, or the airbags may deploy when the ignition switch is ON (II).
- All SRS electrical wiring harnesses are covered with yellow insulation. Related components are located in the steering column, front console, dashboard, dashboard lower panel, and in the dashboard above the glove box. Do not use electrical test equipment on these circuits.

Special Tools

Ref. No	Tool Number	Description	Qty	Page Reference
①	07GAF – PH70100	Pilot Collar	1	17-38
②	*07JGG – 001010A	Belt Tension Gauge	1	17-14
③	07LAG – SM4010A	Piston Seal Ring Guide	1	17-43
④	07LAG – SM4020A	Piston Seal Ring Sizing Tool	1	17-43
⑤	07MAA – SL0020A	Locknut Wrench, 43 mm	1	17-15
⑥	07MAC – SL00200	Ball Joint Remover, 28 mm	1	17-32
⑦	07NAG – SR3090A	Piston Seal Ring Sizing Tool	1	17-40
⑧	07RAK – S04011A	P/S Joint Adaptor (Pump)	1	17-16, 17
⑨	07RAK – S04012A	P/S Joint Adaptor (Hose)	1	17-16, 17
⑩	07TAF – SZ50100	Cylinder End Seal Remover Attachment	1	17-35, 36
⑪	07406 – 0010001 or 07406 – 001000A	P/S Pressure Gauge	1	17-16, 17
⑫	07725 – 0030000	Universal Holder	1	17-27, 31
⑬	07746 – 0010100	Attachment, 32 x 35 mm	1	17-41, 42, 43
⑭	07749 – 0010000	Driver	1	17-41, 42, 43
⑮	07974 – SA50200 or 07974 – SA5020A	Sleeve Seal Ring Sizing Tool	1	17-41
⑯	07974 – SA50800	Ball Joint Boot Clip Guide	1	17-41

* Included in the Belt Tension Gauge Set 07TGG – 001000A.





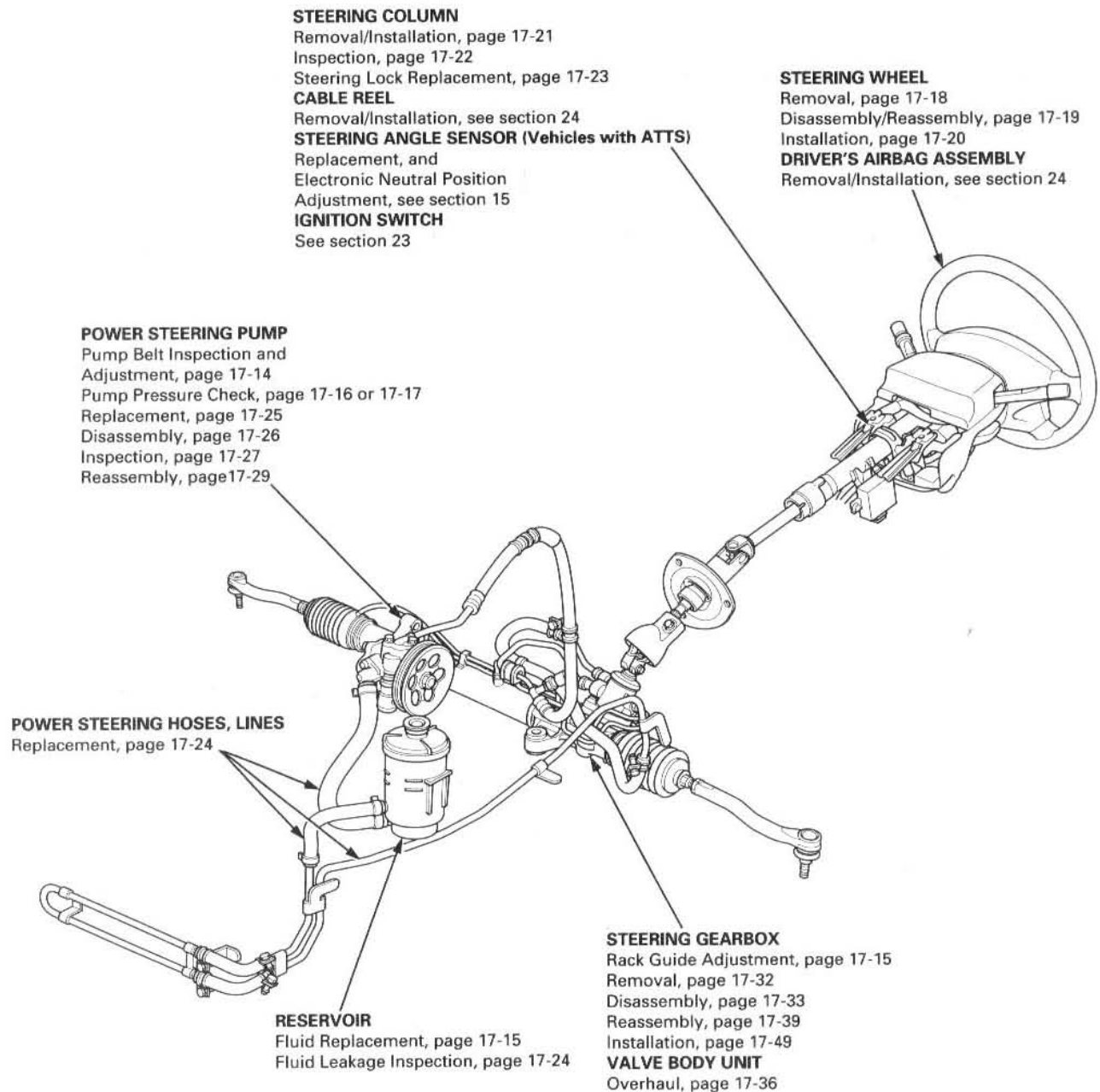
Component Locations

Index

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

Note the following special precautions when the steering gearbox removal/installation.

- Before removing the steering gearbox, remove the driver's airbag assembly and steering wheel.
- After installing the steering gearbox, check the wheel alignment and adjust if necessary.



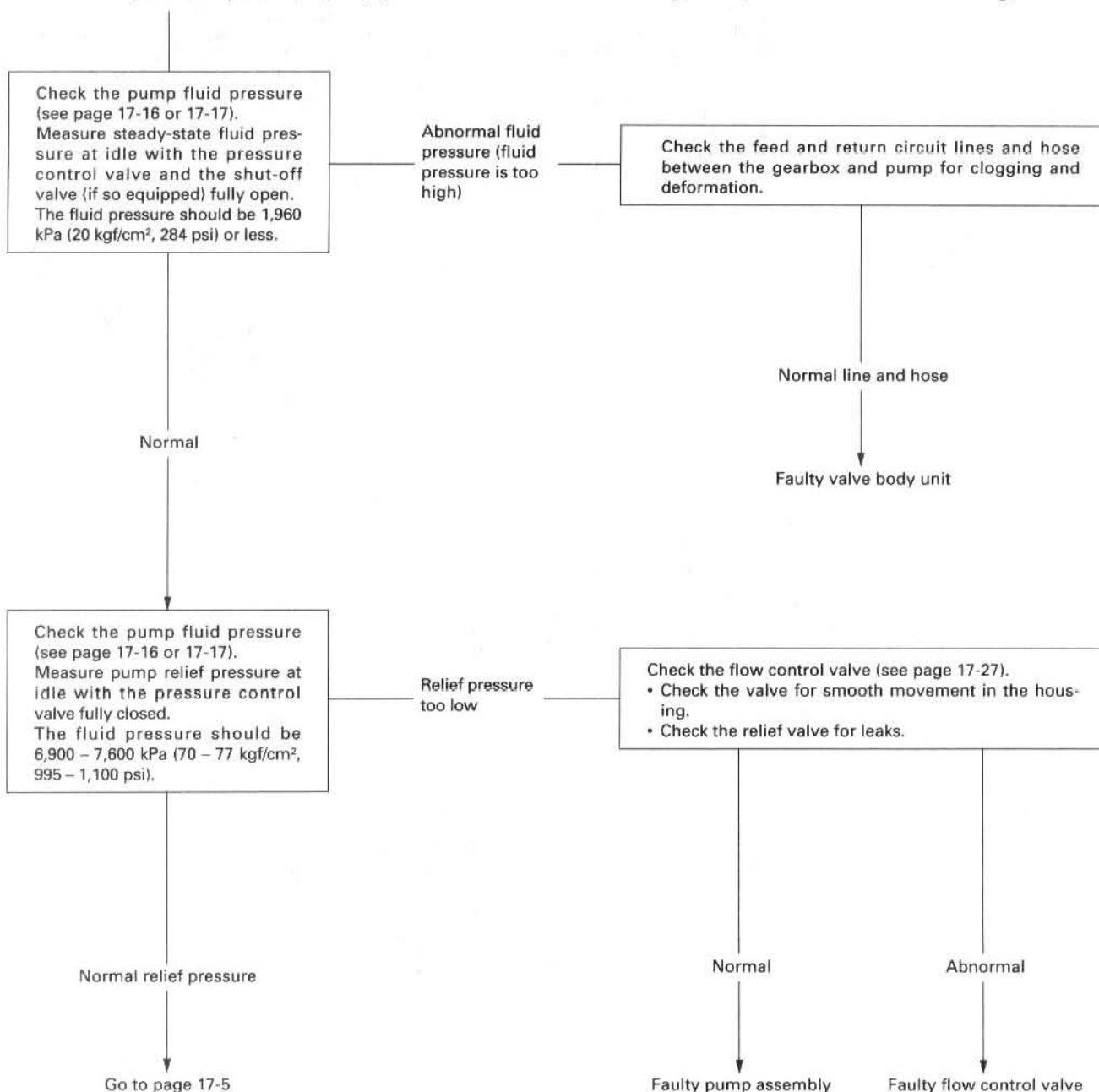
Troubleshooting

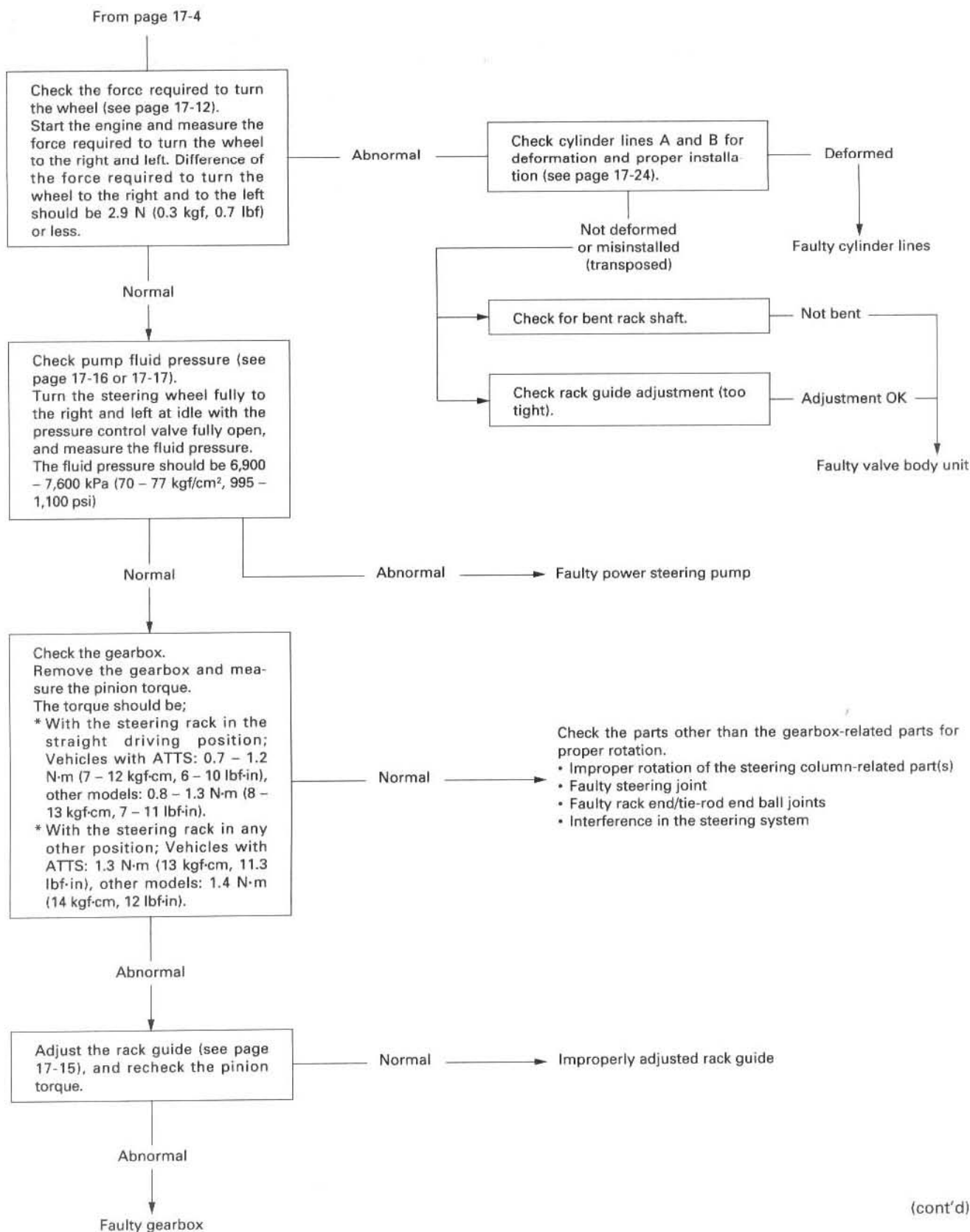
General Troubleshooting

Check the following before you begin:

- Has the suspension been modified in a way that would affect steering?
- Are tire sizes, tire variety and air pressure correct?
- Is the steering wheel original equipment?
- Is the power steering pump belt properly adjusted?
- Is steering fluid reservoir filled to proper level?
- Is the engine idle speed correct and steady?

Hard Steering (Check the power assist, see page 17-12. If the force is over 29 N (3.0 kgf, 6.6 lbf), Proceed with this troubleshooting.)





(cont'd)

Troubleshooting

General Troubleshooting (cont'd)

Assist (excessively light steering) at high speed.

Check the rack guide for proper adjustment (see page 17-15).

If the problem is not corrected by adjusting the rack guide, adjust the front wheel alignment (see section 18).

Shock or vibration when wheel is turned to full lock.

Check the rack guide for proper adjustment (see page 17-15).

Rack guide was backed off excessively.

Adjust the rack guide.

Rack guide is adjusted properly.

If the problem is not corrected by adjusting the rack guide, replace the gearbox.

Check the belt for slippage and adjust as necessary (see page 17-14).

Steering wheel will not return smoothly.

Check cylinder lines A and B for deformation.

A or B cylinder line is deformed; replace it.

A and B cylinder lines are normal, check wheel alignment (see section 18).

Wheel alignment is abnormal, adjust as needed.

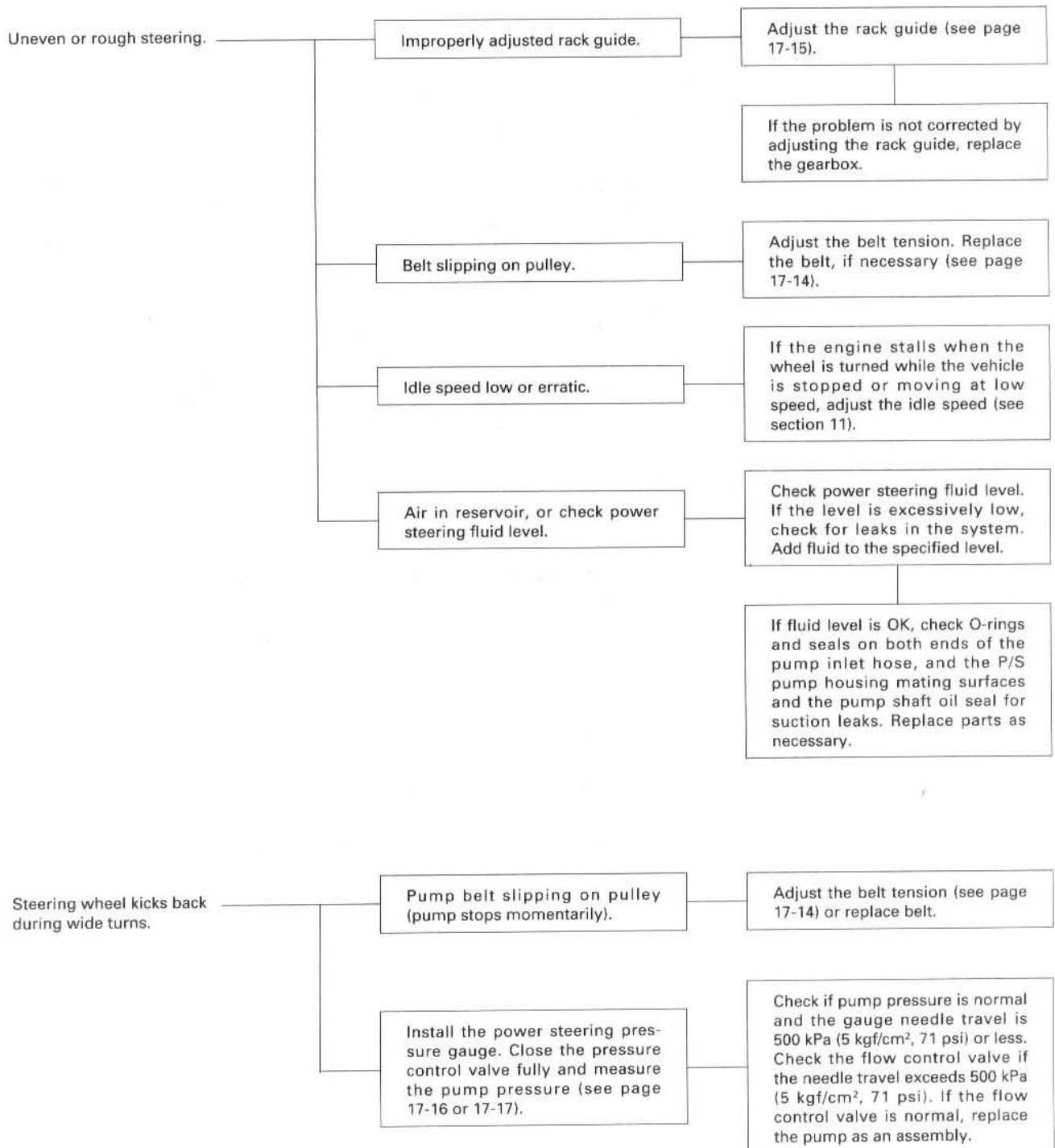
Wheel alignment is normal. Remove the gearbox from the frame and measure the pinion torque on the gearbox.

* It should be; With the steering rack in the straight ahead driving position; Vehicles with ATTS: 0.7 – 1.2 N·m (7 – 12 kgf·cm, 6 – 10 lbf·in), other models: 0.8 – 1.3 N·m (8 – 13 kgf·cm, 7 – 11 lbf·in) or less.

* With the steering rack in any other position; Vehicles with ATTS: 1.3 N·m (13 kgf·cm, 11.3 lbf·in), other models: 1.4 N·m (14 kgf·cm, 12 lbf·in)

If the measurements are out of specifications, adjust the rack guide.

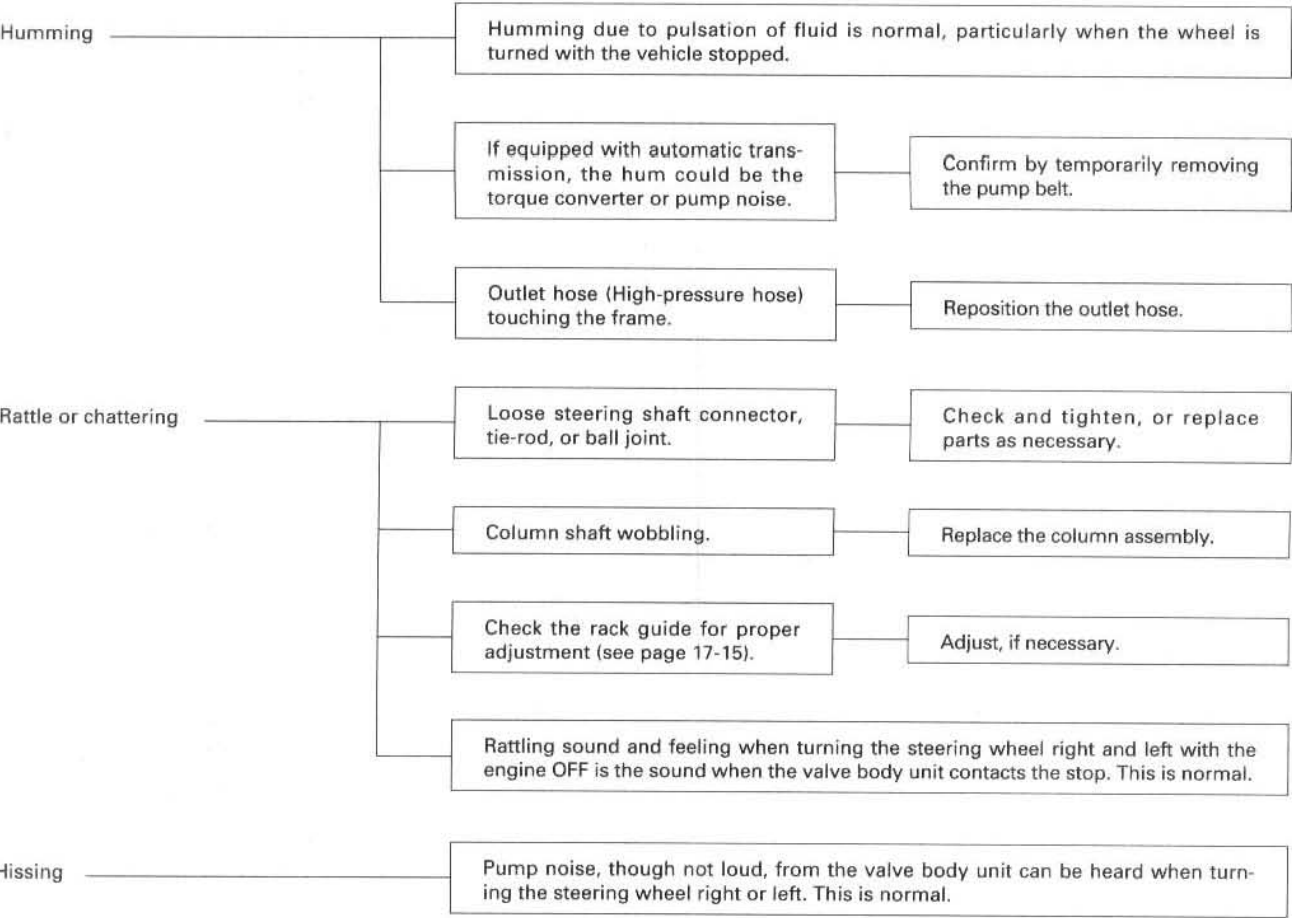
If the problem is not corrected by adjusting the rack guide, replace the gearbox.



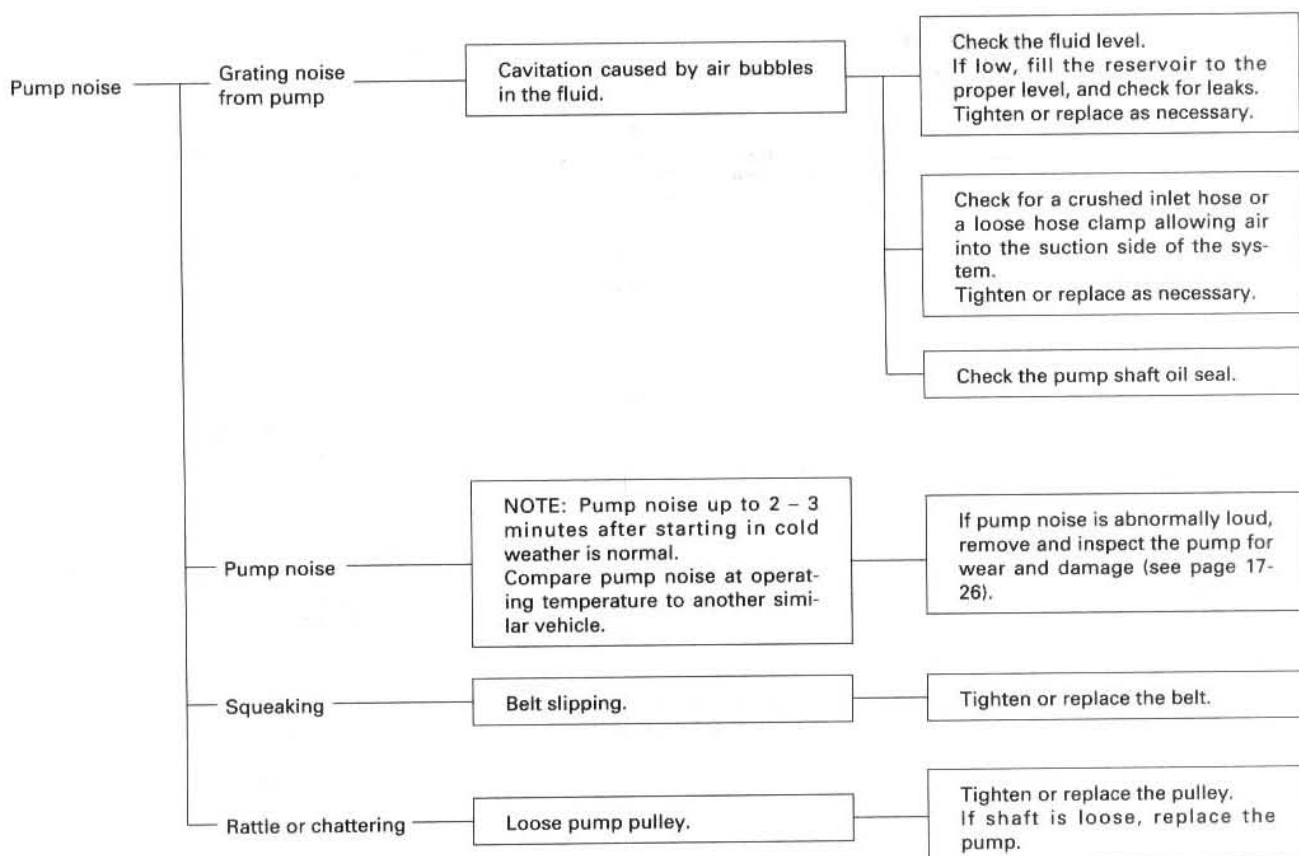
Troubleshooting

Noise and Vibration

NOTE: Pump noise in first 2 – 3 minutes after starting in cold weather is normal.



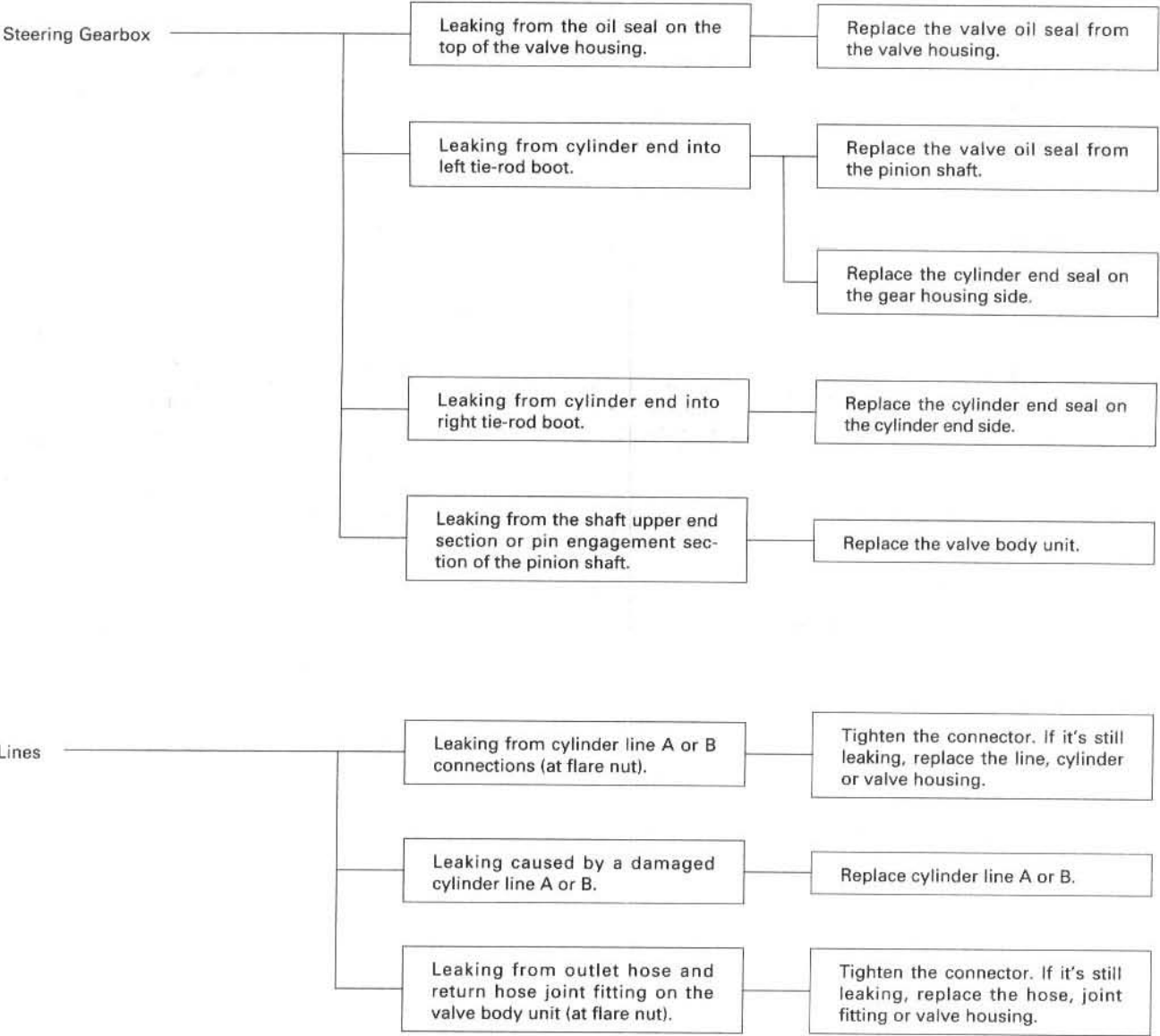
CAUTION: When inspecting, do not hold the steering wheel all the way to the right or the left.

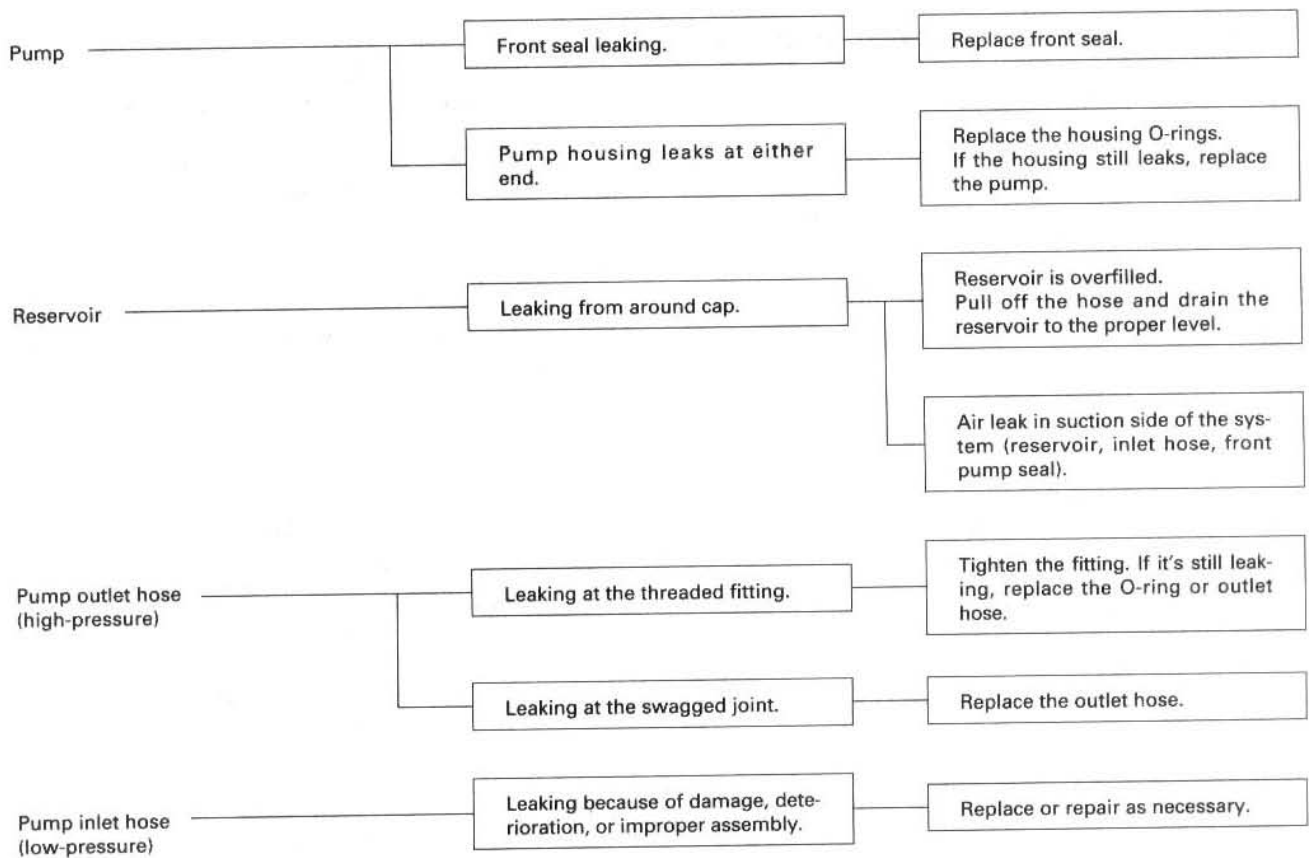


Troubleshooting

Fluid Leaks

Check the gearbox assembly for oil leaks carefully. Oil can leak out of various points, depending on location of the faulty oil seals/seal rings. Check the following before removing the gearbox from the frame.





Inspection and Adjustment

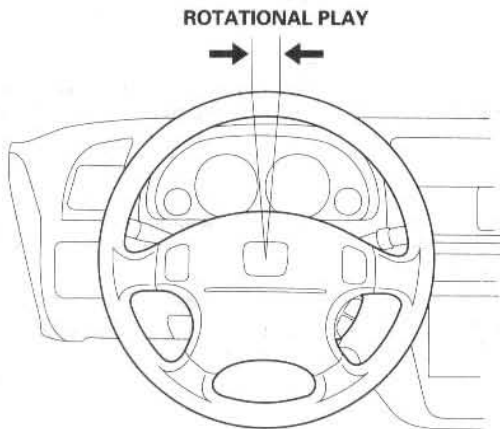
Steering Operation

Place the front wheels in the straight ahead position, and measure the distance the steering wheel can be turned without moving the front wheels.

ROTATIONAL PLAY: 0 – 10 mm (0 – 0.39 in)

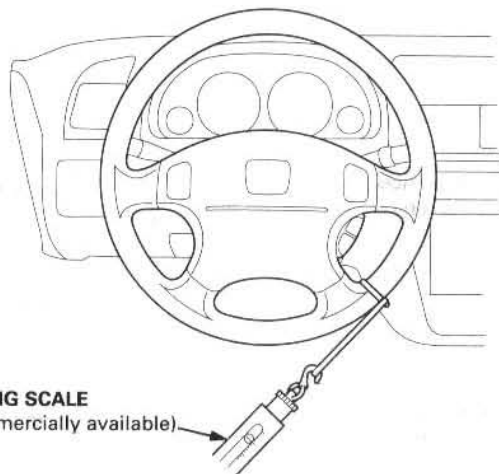
If the play exceeds the limit, perform rack guide adjustment (see page 17-15).

If the play is still excessive after rack guide adjustment, inspect the steering linkage and gearbox as described on the next page.



Power Assist Check With Vehicle Parked

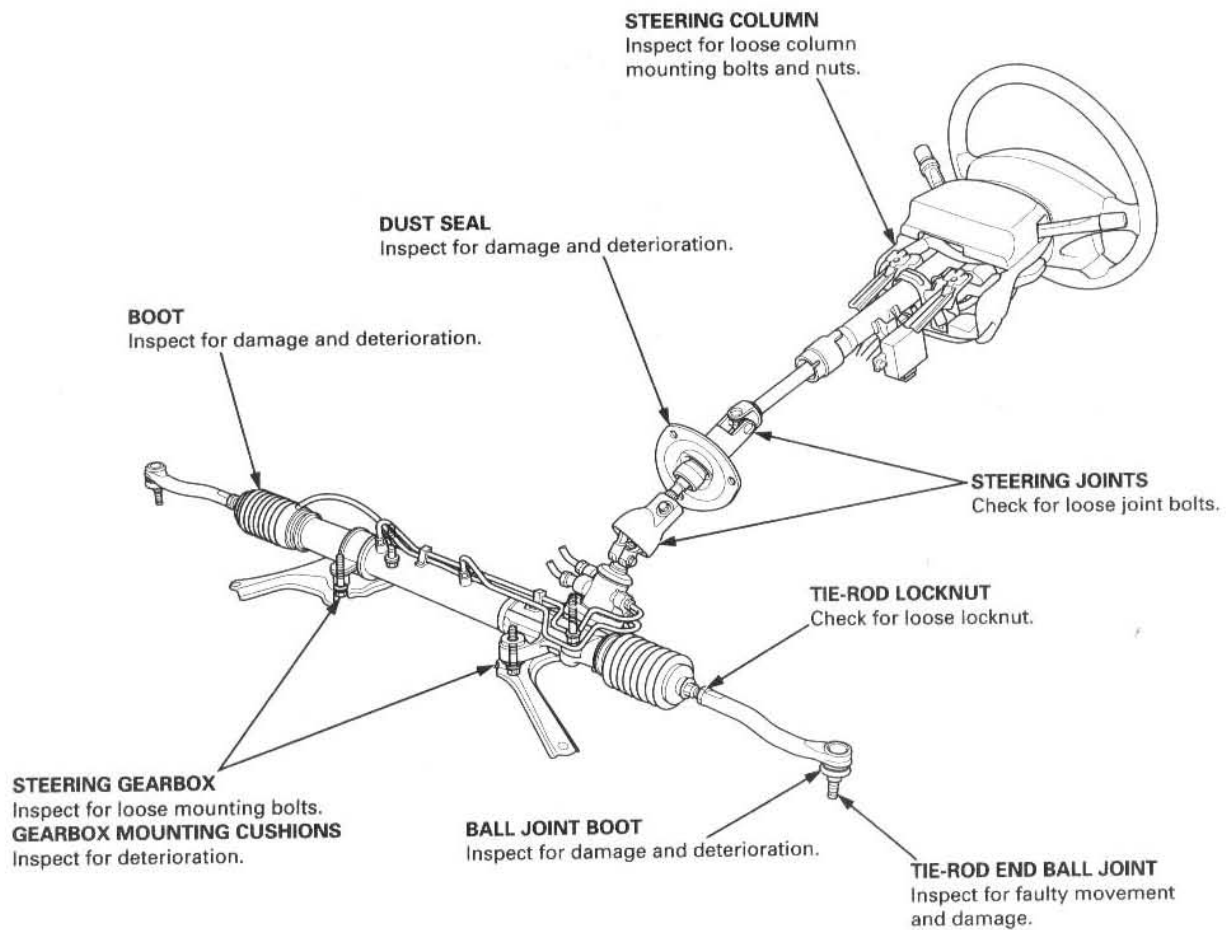
1. Check the power steering fluid level (see page 17-15) and pump belt tension (see page 17-14).
2. Start the engine, allow it to idle, and turn the steering wheel from lock-to-lock several times to warm up the fluid.
3. Attach a spring scale to the steering wheel. With the engine idling and the vehicle on a clean, dry floor, pull the scale as shown and read it as soon as the tires begin to turn.



4. The scale should read no more than 29 N (3.0 kgf, 6.6 lbf). If it reads more, check the gearbox and pump.



Steering Linkage and Gearbox



Inspection and Adjustment

Pump Belt

NOTE: When using a new belt, first adjust the deflection or tension to the values for the new belt, then readjust the deflection or tension to the values for the used belt after running engine for five minutes.

Inspection

NOTE:

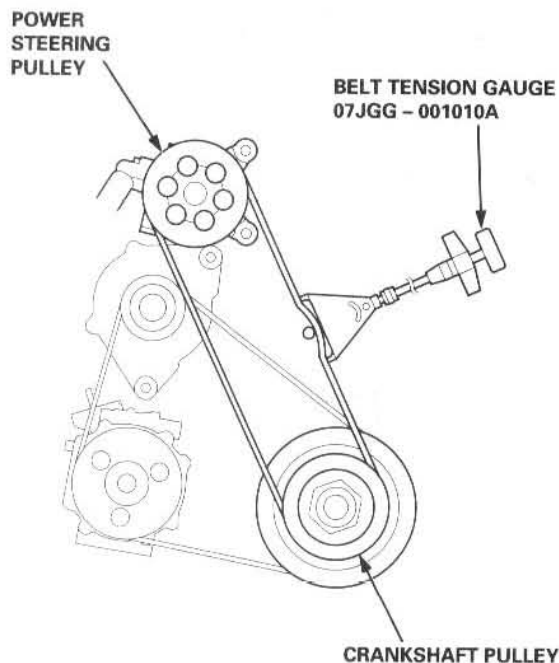
- If there are cracks or any damage evident on the belt, replace it with a new one.
- Follow the manufacturer's instructions for the tension gauge.

1. Remove the P/S reservoir from the bracket, and set it aside.
2. Attach the belt tension gauge to the belt with the gauge face toward the engine, and measure the tension of the belt.
3. Remove the belt tension gauge carefully to avoid hitting the gauge reset lever.

Tension:

Used Belt: 390 – 540 N (40 – 55 kgf, 88 – 120 lbf)

New Belt: 740 – 880 N (75 – 90 kgf, 170 – 200 lbf)



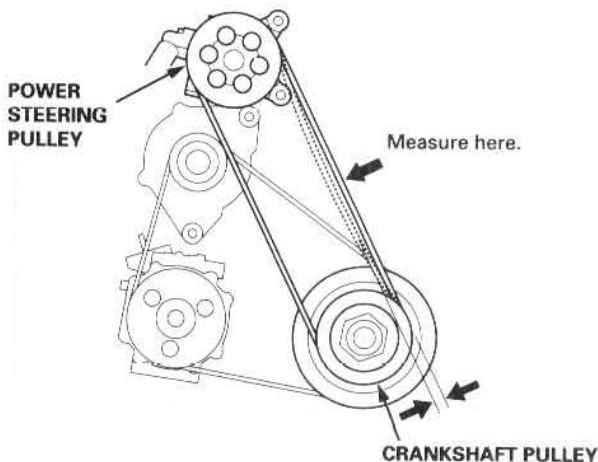
Measurement without Belt Tension Gauge:

Apply a force of 98 N (10 kgf, 22 lbf) and measure the deflection between the power steering pump and the crankshaft pulleys.

Deflection:

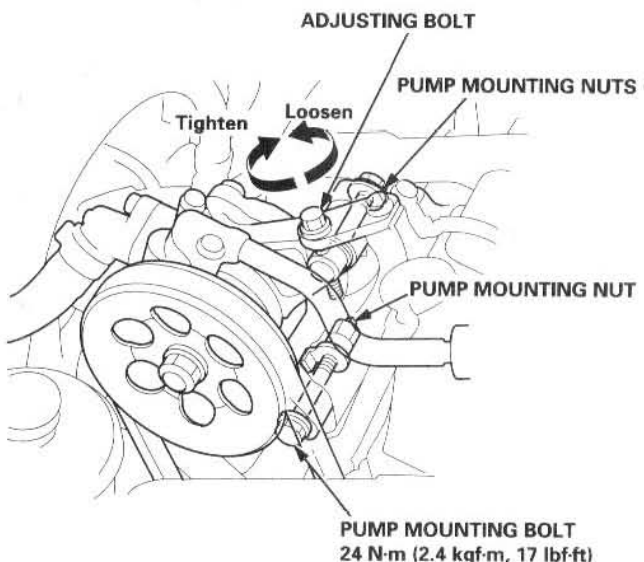
Used Belt: 13.0 – 16.5 mm (0.51 – 0.65 in)

New Belt: 8.5 – 11.0 mm (0.33 – 0.43 in)



Adjustment

1. Loosen the power steering pump mounting nuts.



2. Turn the adjusting bolt to get the proper belt tension, then retighten the nuts.
3. Start the engine and turn the steering wheel from lock-to-lock several times, then stop the engine and recheck the deflection of the belt.



Rack Guide Adjustment

NOTE: Perform the rack guide adjustment with the wheels in the straight ahead position.

1. Loosen the rack guide screw locknut with the special tool.

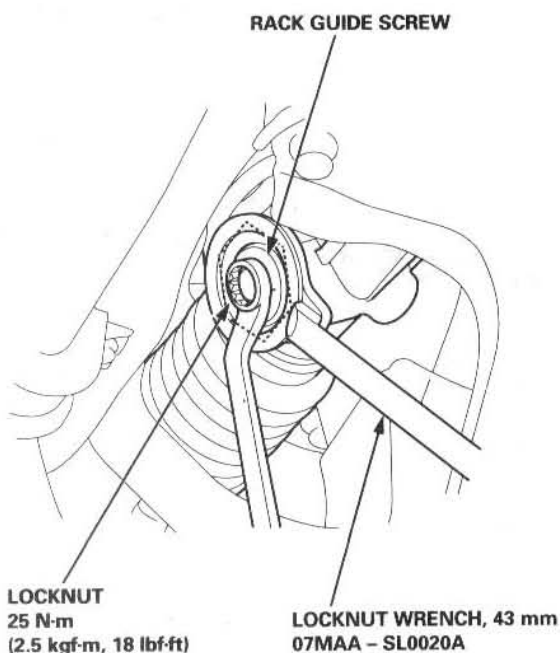
'97 - '98 models:

Loosen the rack guide screw.

'99 model:

Remove the rack guide screw and remove the old sealant off of the threaded section.

Apply new sealant all around. Loosely install the rack guide screw on the steering gearbox.



2. Tighten the rack guide screw to 25 N-m (2.5 kgf-m, 18 lbf-ft), then loosen it.
3. Retighten the rack guide screw to 3.9 N-m (0.4 kgf-m, 2.9 lbf-ft), then back it off to specified angle.

Specified Return Angle: $20 \pm 5^\circ$

4. Tighten the locknut while holding the rack guide screw.
5. Check for tight or loose steering through the complete turning travel.
6. Perform following inspections:
 - Steering operation (see page 17-12).
 - Power assist with vehicle parked.

Fluid Level Check

The fluid level should be between the upper and lower level lines. Check the reservoir at regular intervals, and add the recommended fluid as necessary.

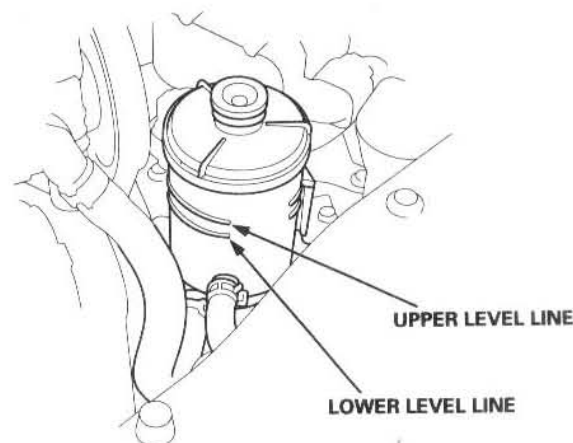
Always use Genuine Honda Power steering fluid-V or S. Using any other type of power steering fluid or automatic transmission fluid can cause increased wear and poor steering in cold weather.

SYSTEM CAPACITY:

**1.2 liter (1.27 US. qt, 1.06 Imp.qt)
at disassembly**

RESERVOIR CAPACITY:

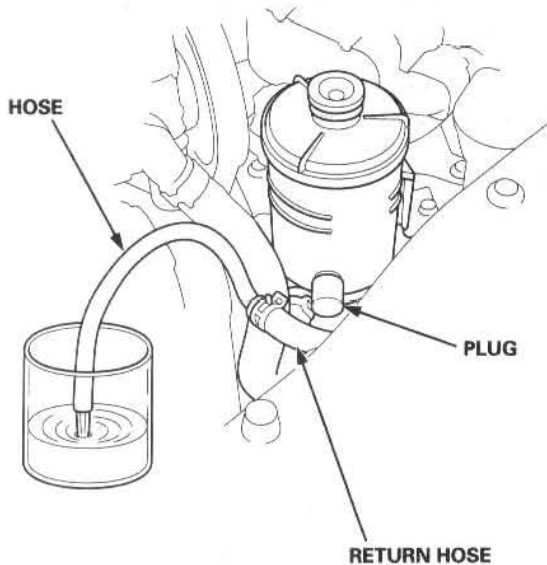
0.4 liter (0.42 US. qt, 0.35 Imp.qt)



Inspection and Adjustment

Fluid Replacement

1. Raise the reservoir, then disconnect the return hose to drain the reservoir.



2. Connect a hose of suitable diameter to the disconnected return hose, and put the hose end in a suitable container.

CAUTION: Take care not to spill the fluid on the body and parts. Wipe off any spilled fluid at once.

3. Start the engine, let it run at idle, and turn the steering wheel from lock-to-lock several times. When fluid stops running out of the hose, shut off the engine. Discard the fluid.
4. Reinstall the return hose on the reservoir.
5. Fill the reservoir to the upper level line.
6. Start the engine and run it at fast idle, then turn the steering from lock-to-lock several times to bleed air from the system.
7. Recheck the fluid level and add some if necessary.

CAUTION: Do not fill the reservoir beyond the upper level line.

Pump Pressure Check

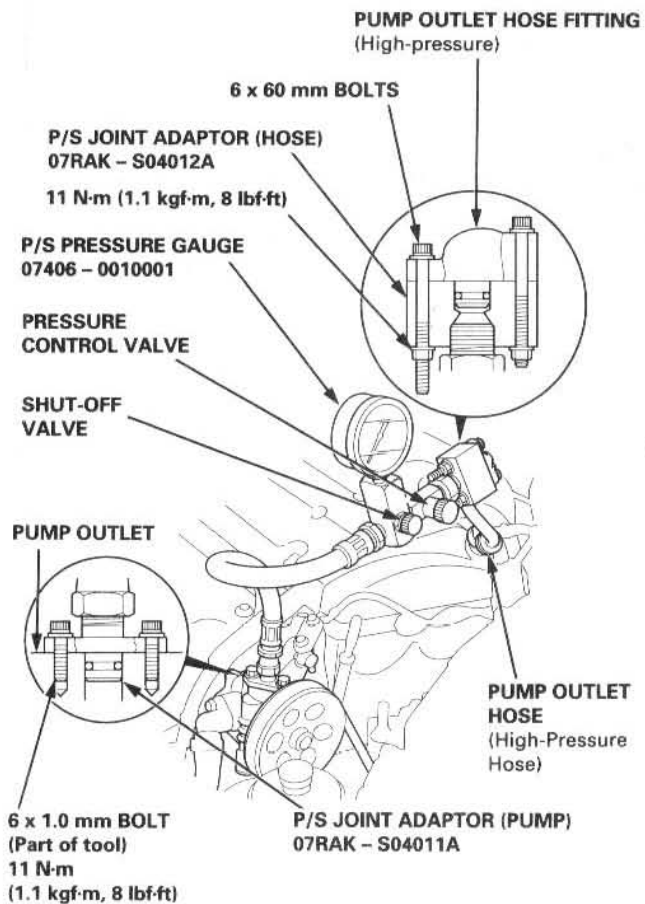
With T/N 07406 - 0010001

Check the fluid pressure as follows to determine whether the trouble is in the pump or gearbox.

NOTE: First check the power steering fluid level and pump belt tension.

CAUTION: Disconnect the pump outlet hose (high-pressure) with care so as not to spill the power steering fluid on the frame and other parts.

1. Disconnect the pump outlet hose from the pump outlet, then install the P/S joint adaptor (pump) on the pump outlet.



2. Connect the P/S joint adaptor (hose) to the P/S pressure gauge, then connect the outlet hose to the P/S joint adaptor (hose).
3. Install the P/S pressure gauge to the P/S joint adaptor (pump).



Pump Pressure Check

With T/N 07406 – 001000A

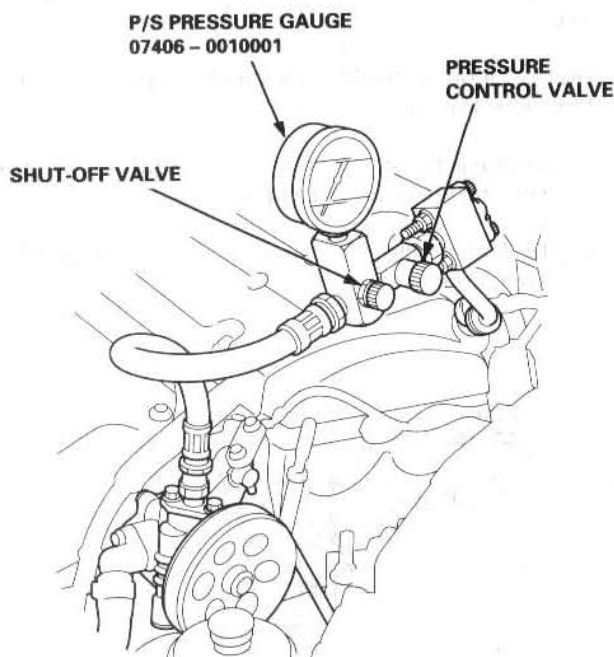
Check the fluid pressure as follows to determine whether the trouble is in the pump or gearbox.

NOTE: First check the power steering fluid level and pump belt tension.

CAUTION: Disconnect the pump outlet hose (high-pressure) with care so as not to spill the power steering fluid on the frame and other parts.

1. Disconnect the pump outlet hose from the pump outlet, then install the P/S joint adaptor (pump) on the pump outlet.

4. Fully open the shut-off valve.



5. Fully open the pressure control valve.
6. Start the engine and let it idle.
7. Turn the steering wheel from lock-to-lock several times to warm the fluid to operating temperature.
8. Measure steady-state fluid pressure at idle. If the pump is in good condition, the gauge should read less than 1,960 kPa (20 kgf/cm², 284 psi). If it reads high, check the outlet hose or valve body unit (see General Troubleshooting 17-4).

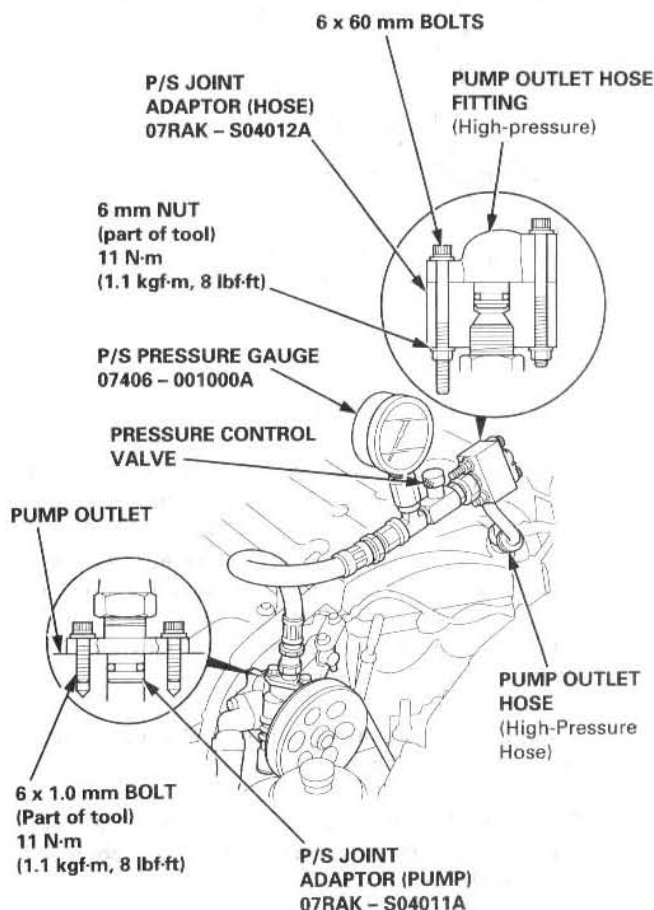
9. Close the pressure control valve, then close the shut-off valve gradually until the pressure gauge needle is stable. Read the pressure.

CAUTION: Do not keep the pressure control valve closed more than 5 seconds or the pump could be damaged by over-heating.

10. Immediately open the pressure control valve fully.

If the pump is in good condition, the gauge should read at least 6,900 – 7,600 kPa (70 – 77 kgf/cm², 995 – 1,100 psi).

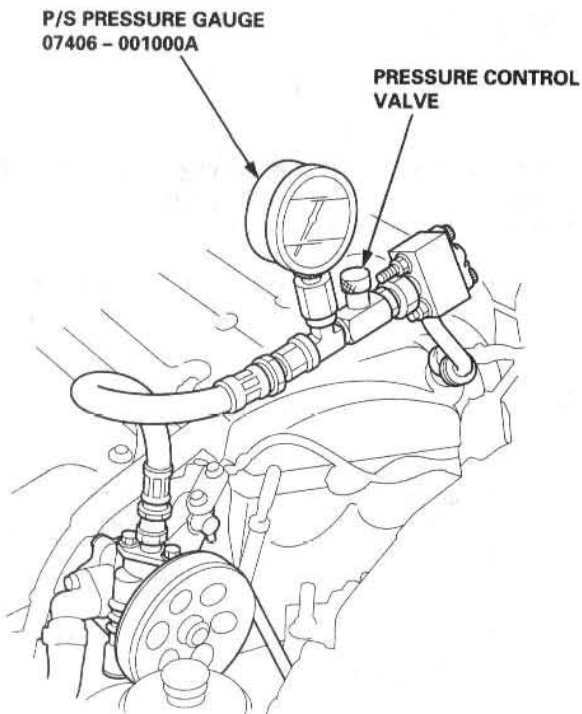
A low reading means pump output is too low for full assist. Repair or replace the pump.



2. Connect the P/S joint adaptor (hose) to the P/S pressure gauge, then connect the outlet hose to the P/S joint adaptor (hose).
3. Install the P/S pressure gauge to the P/S joint adaptor (pump). (cont'd)

Pump Pressure Check (cont'd)

4. Fully open the pressure control valve.



5. Start the engine and let it idle.
6. Turn the steering wheel from lock-to-lock several times to warm the fluid to operating temperature.
7. Measure steady-state fluid pressure at idle. If the pump is in good condition, the gauge should read 1,960 kPa (20 kgf/cm², 284 psi). If it reads high, check the pump outlet hose or valve body unit (see General Troubleshooting 17-4).
8. Gradually close the pressure control valve, and immediately read the pressure.

CAUTION: Do not keep the pressure control valve closed more than 5 seconds or the pump could be damaged by overheating.

9. Within 5 seconds, fully open the pressure control valve.

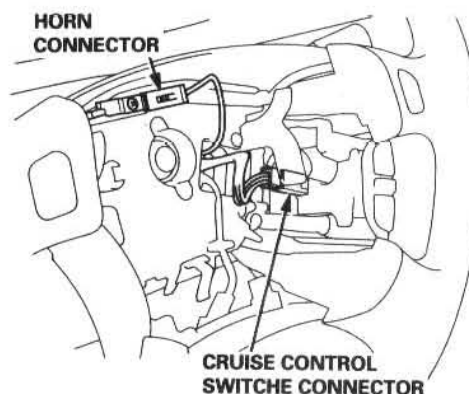
If the pump is in good condition, the gauge should read at least 6,900 – 7,600 kPa (70 – 77 kgf/cm², 995 – 1,100 psi). A low reading means pump output is too low for full assist. Repair or replace the pump.

Removal

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

NOTE: Before removing the steering wheel, align the front wheels straight ahead.

1. Remove the driver's airbag assembly from the steering wheel (see section 24).
2. Disconnect the horn connector, and cruise control switch connector.

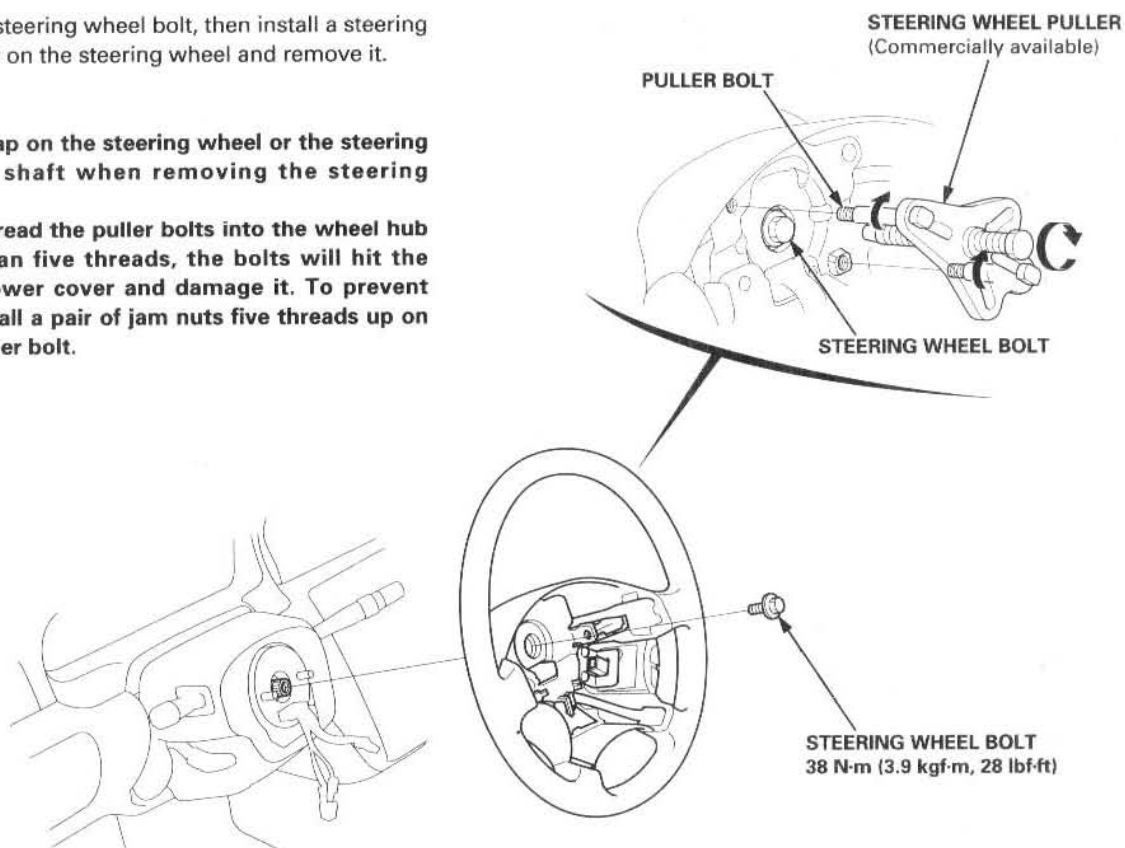




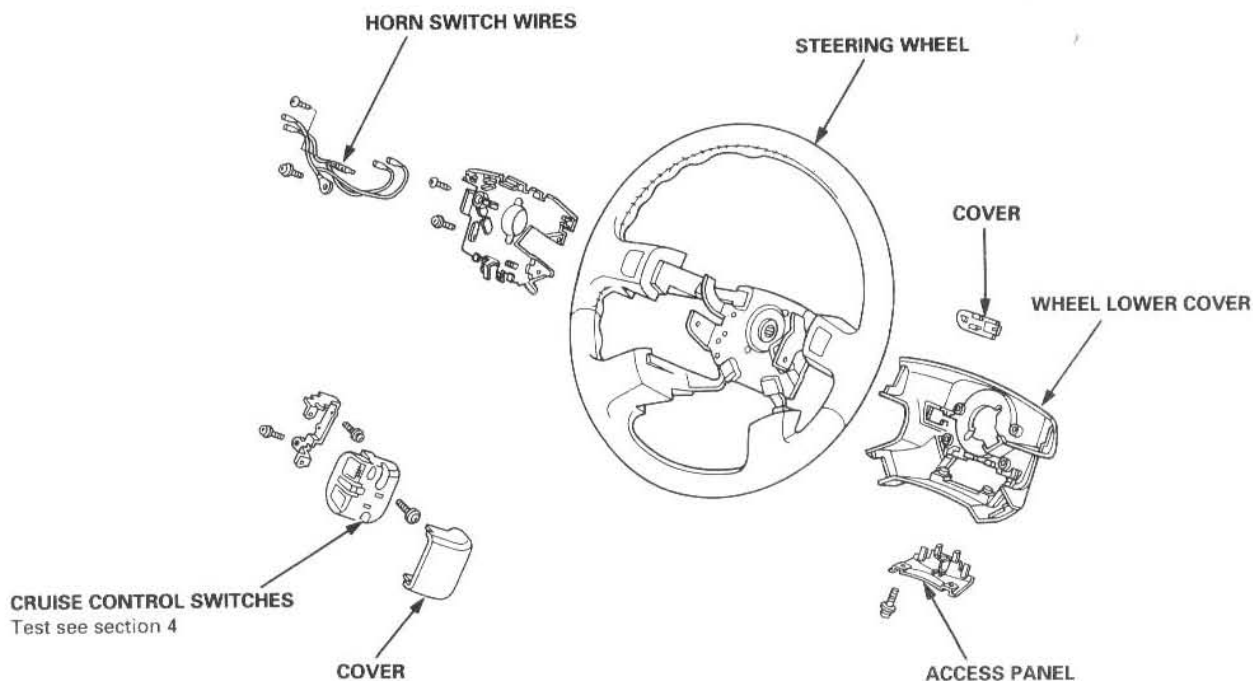
3. Loosen the steering wheel bolt, then install a steering wheel puller on the steering wheel and remove it.

CAUTION:

- Do not tap on the steering wheel or the steering column shaft when removing the steering wheel.
- If you thread the puller bolts into the wheel hub more than five threads, the bolts will hit the wheel lower cover and damage it. To prevent this, install a pair of jam nuts five threads up on each puller bolt.



Disassembly/Reassembly



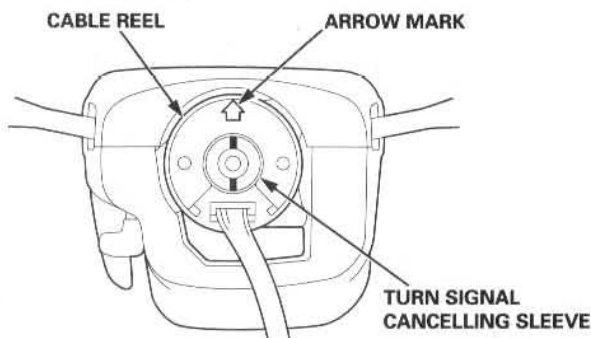
Steering Wheel

Installation

CAUTION: Do not tap on the steering wheel or steering column shaft when installing the steering wheel.

NOTE: Before removing the steering wheel, align the front wheels straight ahead.

1. Before installing the steering wheel, center the cable reel. Do this by first rotating the cable reel clockwise until it stops. Then rotate it counterclockwise approximately two and half turns. The arrow mark on the cable reel label point should point straight up.

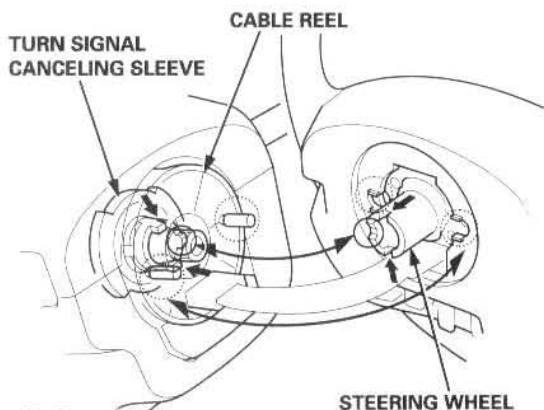
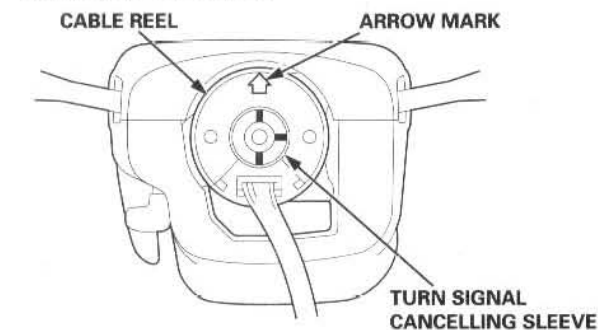


2. Position the turn signal cancelling sleeve as shown, and install the steering wheel by aligning the two tabs.

NOTE:

- Be sure the steering wheel engages with the cable reel and turn signal cancelling sleeve.
- Before installing the steering wheel bolt, check the turn signal cancelling operation.

Vehicles with ATTS: Position the turn signal cancelling sleeve as shown, and install the steering by aligning the three tabs.



3. Install the steering wheel bolt, and tighten it to 38 N·m (3.9 kgf·m, 28 lbf·ft).
4. Connect the horn connector and cruise control switch connector.
5. Install the driver's airbag assembly, and confirm proper system operation (see section 24).
6. On vehicles with ATTS: With the front wheels in the straight ahead (mechanical neutral position), let the ATTS control unit memorize the steering angle sensor neutral position (see section 15).
7. Check the horn and cruise control set/resume switches for proper operations.



Removal/Installation

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

NOTE: Before removing the steering column, remove the driver's airbag assembly and cable reel (see section 24).

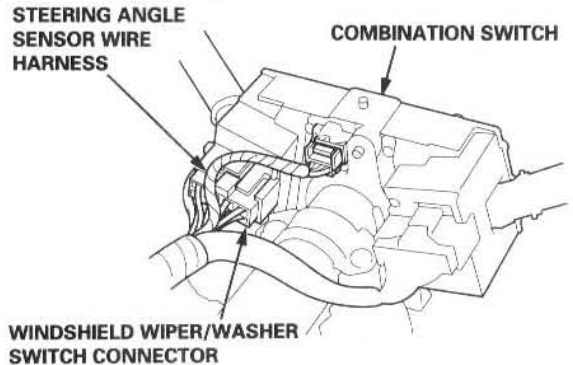
CAUTION:

- On vehicles with ATTS, do not remove the steering angle sensor from the combination switch.
- When removing and installing the combination switch, keep grease, oil, dirt, and foreign objects out of the steering angle sensor.

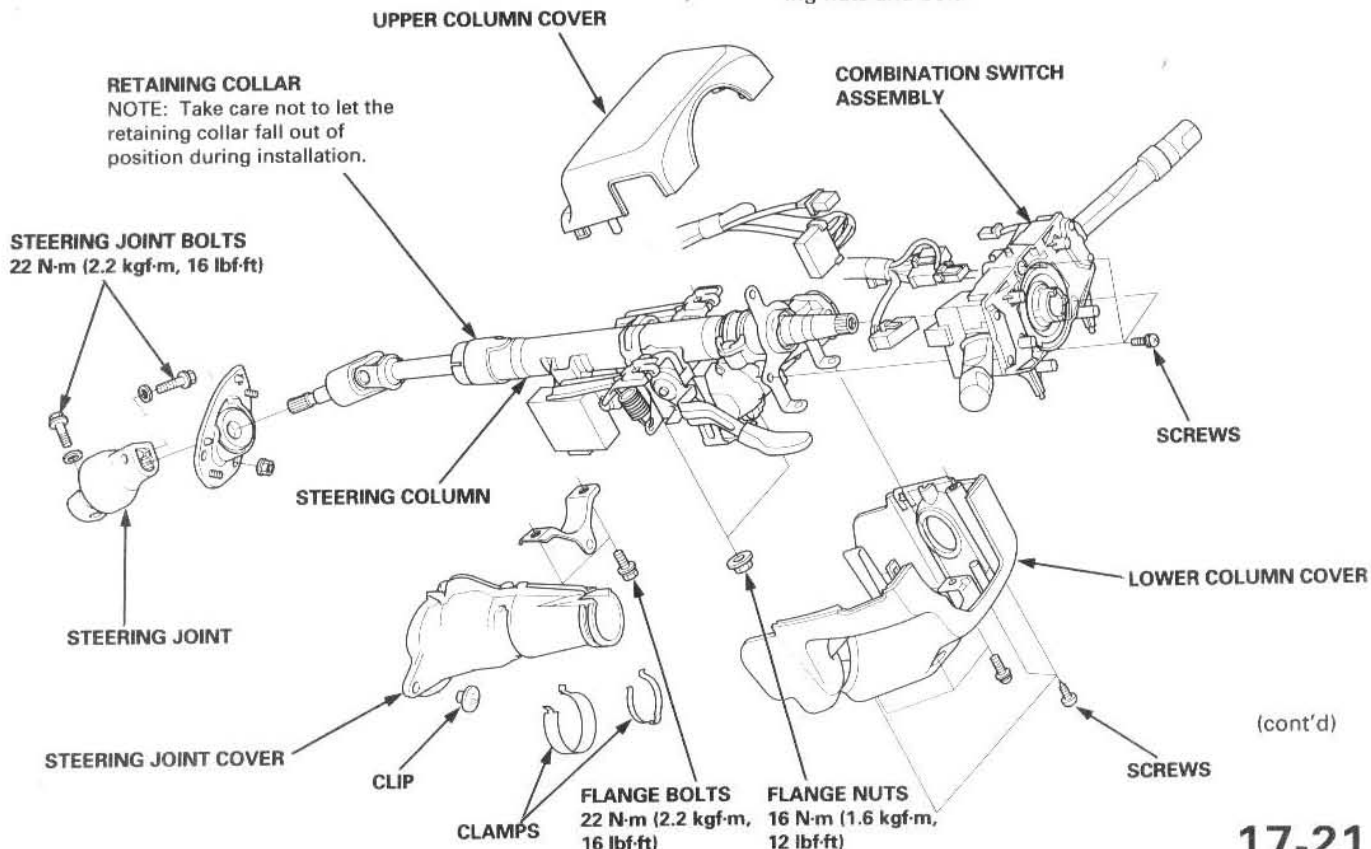
1. Remove the steering wheel (see page 17-17).
2. Remove the driver's side dashboard lower cover and knee bolster. (see section 20).
3. Remove the column covers.

4. Remove the combination switch assembly from the steering column shaft by disconnecting the connectors.

NOTE: On vehicles with ATTS, when installing the combination switch, route the steering angle sensor harness over the windshield wiper/washer switch connector, as shown, so that the harness will not contact the upper column cover.



5. Disconnect the ignition switch connectors.
6. Remove the steering joint cover.
7. Disconnect the steering joint, and remove it from the column shaft.
8. Remove the steering column by removing the attaching nuts and bolt.



(cont'd)

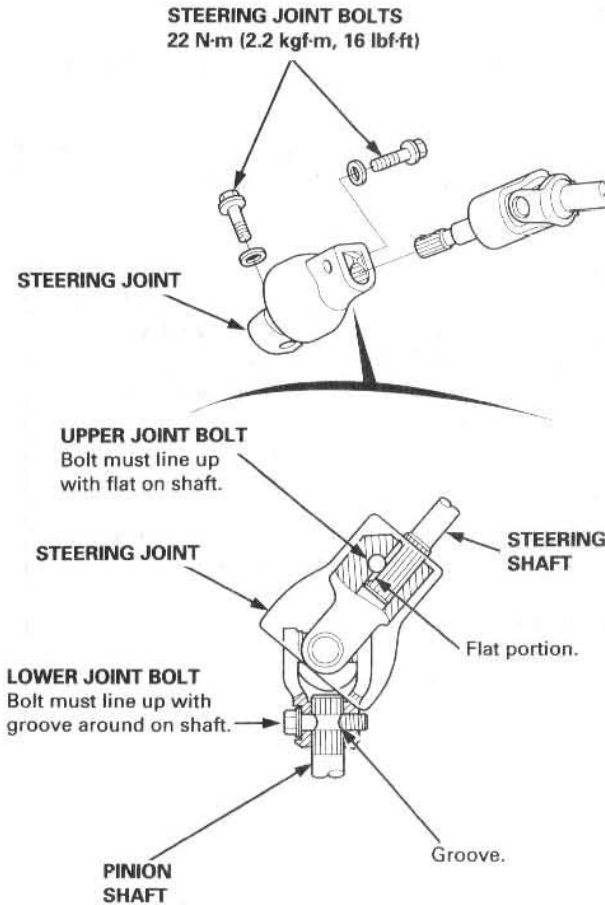
Steering Column

Removal/Installation (cont'd)

9. Installation is the reverse of the removal procedure.

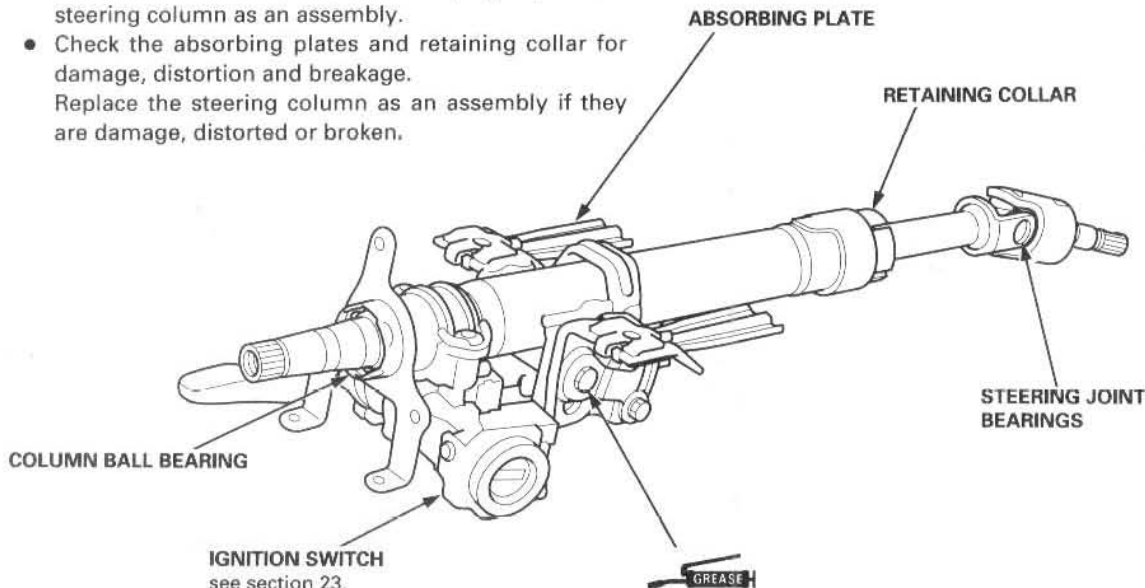
NOTE:

- Make sure the steering joint is connected as follows:
 - a. Insert the upper end of the steering joint onto the steering shaft (line up the bolt hole with the flat on the shaft).
 - b. Slip the lower end of the steering joint onto the pinion shaft (line up the bolt hole with the groove around the shaft), and loosely install the lower joint bolt and washer. Be sure that the lower joint bolt is securely in the groove in the pinion shaft.
 - c. Loosely install the upper joint bolt and washer.
 - d. Pull on the steering joint to make sure that the steering joint is fully seated. Then tighten the joint bolts.
- Be sure the wires are not caught or pinched by any parts when installing the column.
- Make sure the wire harness is routed and fastened properly.
- Make sure the connectors are properly connected.
- On vehicles with ATTS: Make sure the front wheels are in the straight ahead (mechanical neutral position), then let the ATTS control unit memorize the steering angle sensor neutral position (see section 15).



Inspection

- Check the steering column ball bearing and the steering joint bearings for play and proper movement. If there is noise or if there is excessive play, replace the steering column as an assembly.
- Check the absorbing plates and retaining collar for damage, distortion and breakage. Replace the steering column as an assembly if they are damage, distorted or broken.





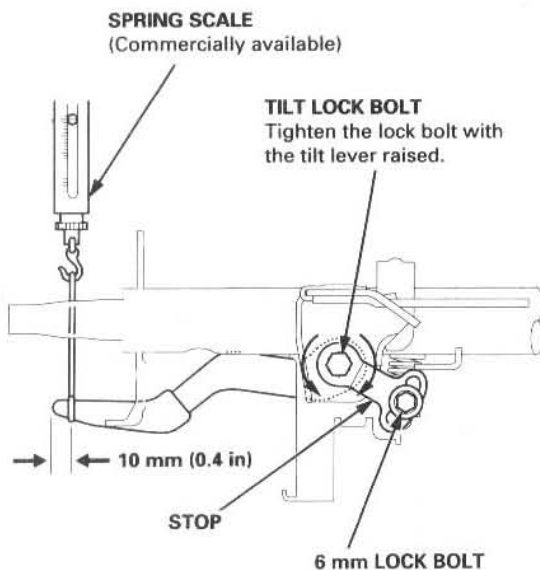
Steering Lock Replacement

1. Move the tilt lever from the loose position to the lock position 3 to 5 times; then measure the tilt lever preload 10 mm (0.4 in) from the end of the tilt lever.

Preload: 70 – 90 N (7 – 9 kgf, 15 – 20 lbf)

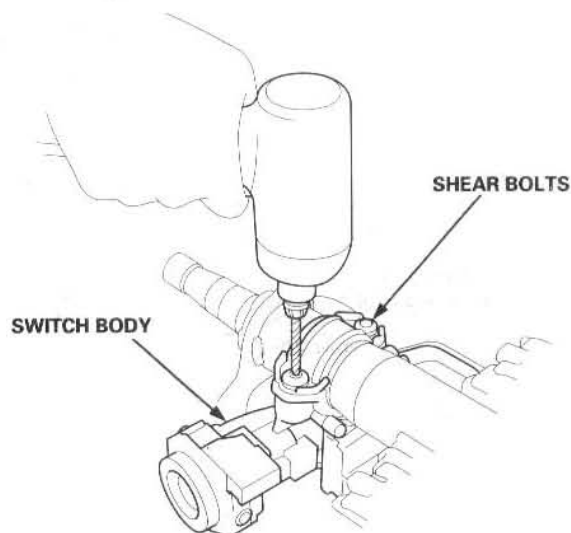
2. If the measurement is out of the specification, adjust the preload using the following procedures.
 - a. Loosen the tilt lever, and set the steering column in the neutral position.
 - b. Remove the 6 mm lock bolt and remove the stop.
 - c. Adjust the preload by turning the tilt lock bolt left or right.
 - d. Pull up the tilt lever to the uppermost position, and install the stop. Check the preload again. If the measurement is still out of specification, repeat the above procedures (a) through (c) to adjust.

CAUTION: Be careful not to loosen the tilt lever when installing the stop or tightening the 6 mm lock bolt.

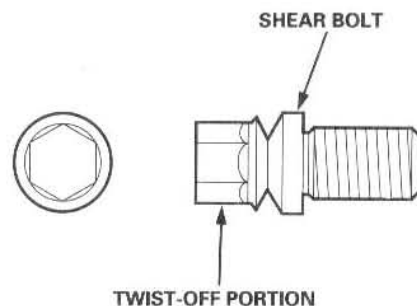


1. Remove the steering column (see page 17-21).
2. Center punch each of the two shear bolts, and drill their heads off with a 5 mm (3/16 in) drill bit.

CAUTION: Do not damage the switch body when removing the shear bolts.



3. Remove the shear bolts from the switch body.
4. Install the switch body without the key inserted.
5. Loosely tighten the new shear bolts.
6. Insert the ignition key, and check for proper operation of the steering wheel lock and that the ignition key turns freely.
7. Tighten the shear bolts until the hex heads twist off.

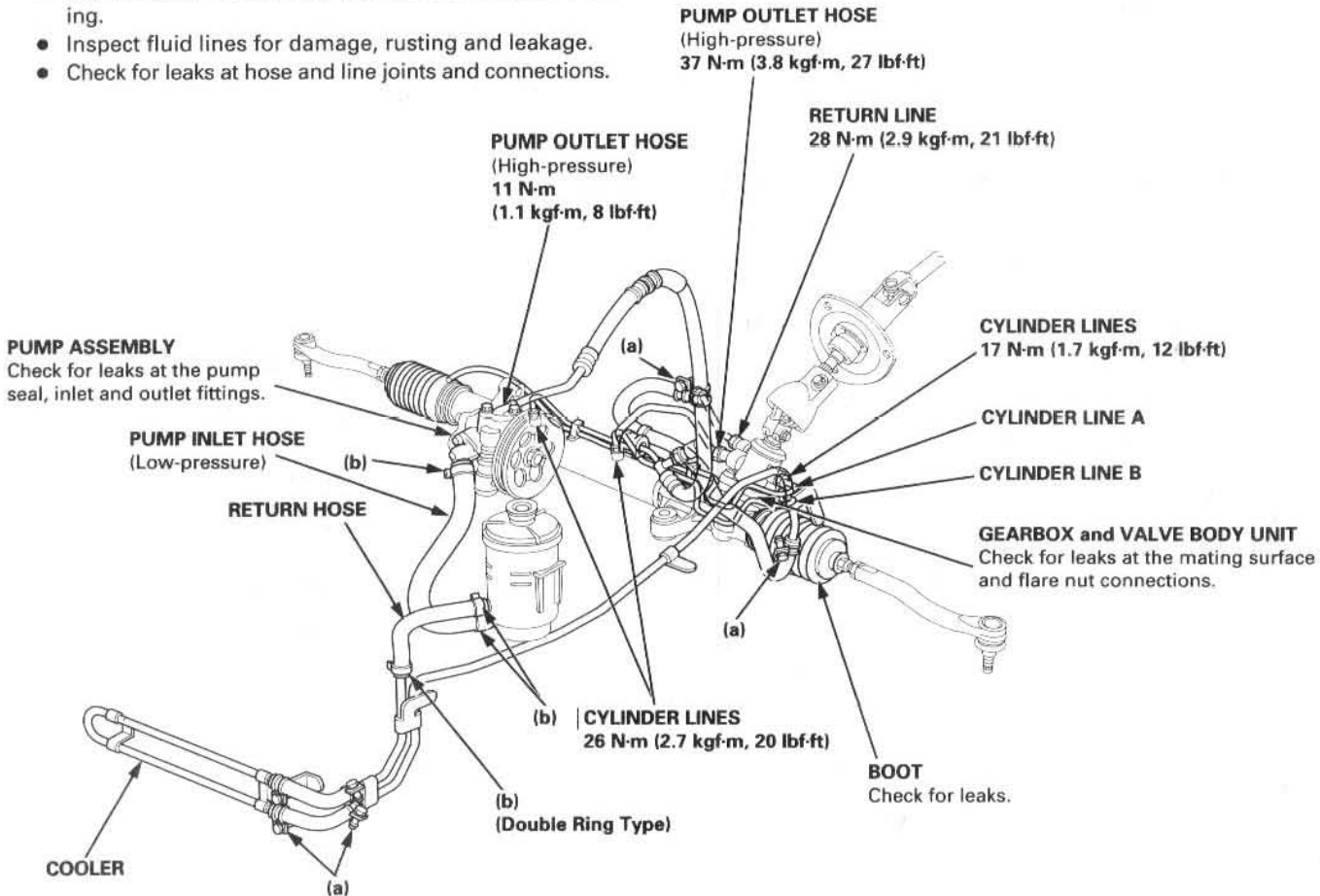


Power Steering Hoses, Lines

Fluid Leakage Inspection

HOSES and LINES

- Inspect hoses for damage, leaks, interference and twisting.
- Inspect fluid lines for damage, rusting and leakage.
- Check for leaks at hose and line joints and connections.



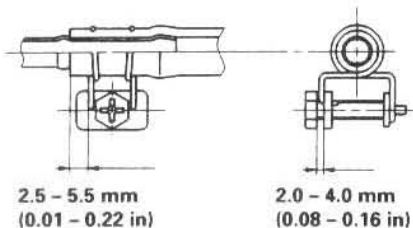
Replacement

NOTE:

- Connect each hose to the corresponding line securely until it contacts the stop on the line. Install the clamp or adjustable clamp at the specified distance from the hose end as shown.
- Add the recommended power steering fluid to the specified level on the reservoir and check for leaks.

ADJUSTABLE HOSE CLAMP: (a)

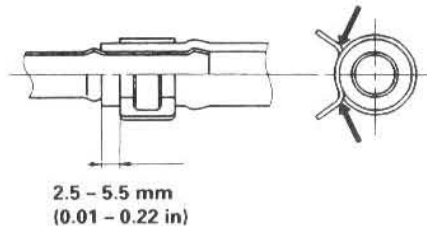
- Position the adjustable hose clamps at the points indicated by (a) in the drawing above.
- Slide the hose over the line until it contacts the stop.



CAUTION: Check all clamps for deterioration or deformation; replace with the clamps new ones if necessary.

HOSE CLAMP: (b)

- Position the hose clamps at the points indicated by (b) in the drawing above.
- Slide the hose over the line until it contacts the stop.



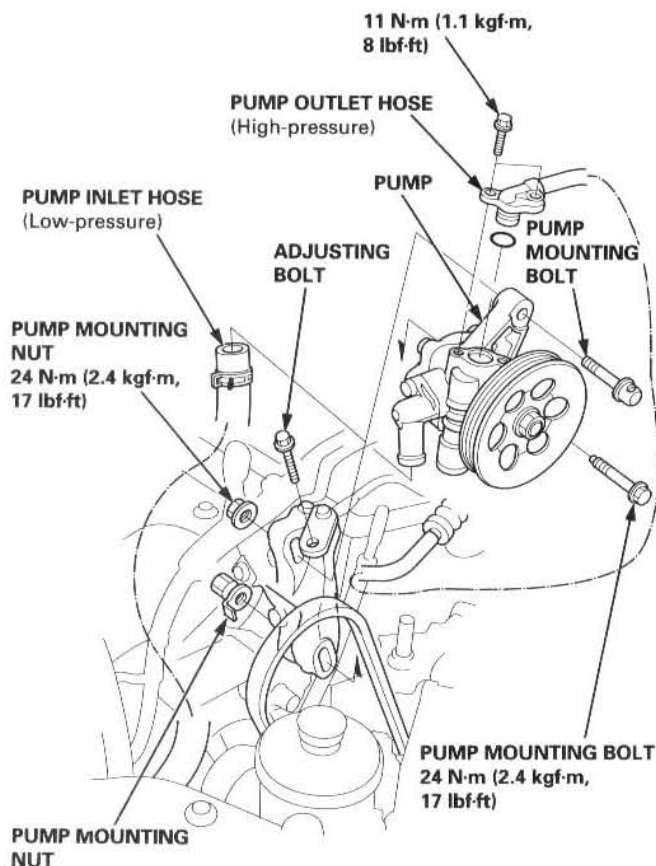
Power Steering Pump



Replacement

NOTE: Before disconnecting the hoses from the pump, place a suitable container under the vehicle.

1. Remove the belt by loosening the pump adjusting bolt, mounting bolts and nuts.



2. Cover the alternator with several shop towels to protect it from spilled power steering fluid.

3. Disconnect the pump inlet hose and the pump outlet hose from the pump, and plug them.

NOTE: Take care not to spill the fluid on the body or parts. Wipe off any spilled fluid at once.

4. Remove the pump mounting bolts, then remove the pump.

NOTE:

- Do not turn the steering wheel with the pump removed.
- Cover the opening of the pump with a piece of tape to prevent foreign material from entering the pump.

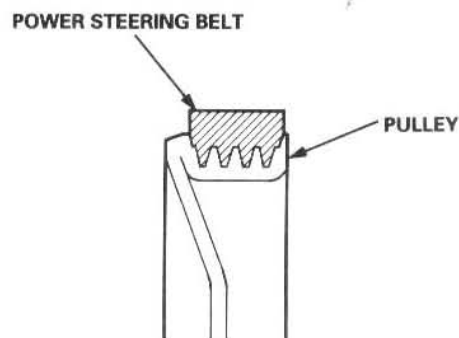
5. Connect the pump inlet hose and the pump outlet hose. Tighten the pump fittings securely.

6. Loosely install the pump in the pump bracket with the mounting bolts, nuts and adjusting bolt.

7. Install the pump belt.

CAUTION:

- Make sure that the power steering belt is properly positioned on the pulleys.
- Do not get power steering fluid or grease on the power steering belt or pulley faces. Clean off any fluid or grease before installation.



8. Adjust the pump belt (see page 17-14).

9. Fill the reservoir to the upper level line (see page 17-15).

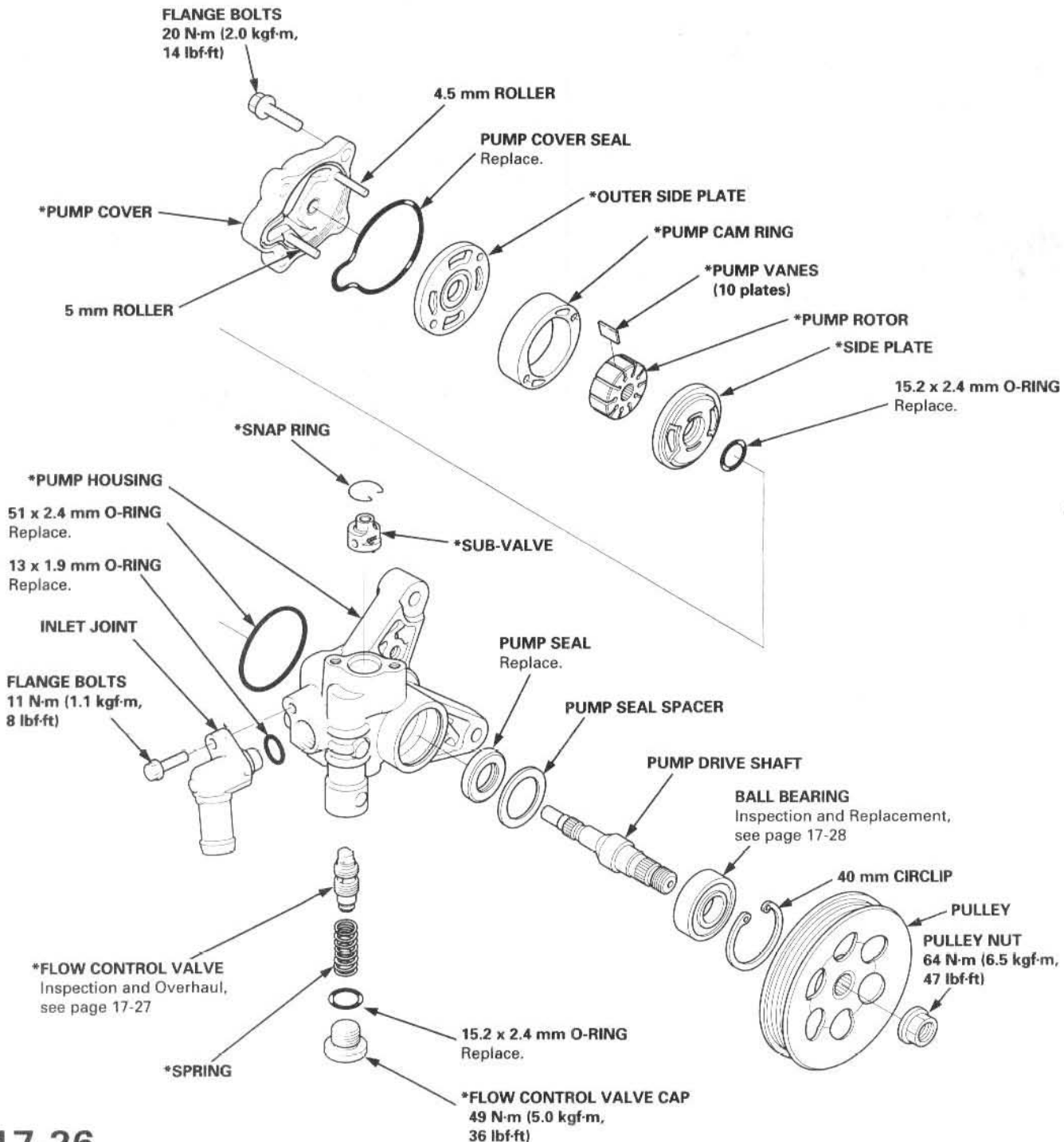
Power Steering Pump

Disassembly

CAUTION: The power steering components are made of aluminum. Avoid damaging the components during assembly.

NOTE:

- Clean the disassembled parts with a solvent, and dry them with compressed air. Do not dip the rubber parts in a solvent.
- Always replace the O-rings and rubber seals with new ones before assembly.
- Apply recommended power steering fluid to the parts indicated in the assembly procedures.
- Do not allow dust, dirt, or other foreign materials to enter the power steering system.
- Replace the pump as an assembly if the parts indicated with asterisk (*) are worn or damaged.

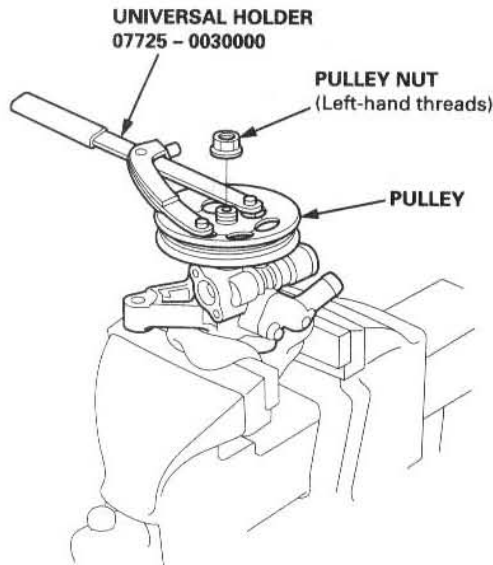




Inspection

1. Drain the fluid from the pump.
2. Hold the steering pump in a vise with soft jaws, hold the pulley with the special tool, and remove the pulley nut and pulley.

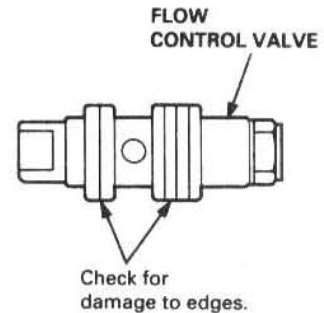
CAUTION: Be careful not to damage the pump housing with the jaws of the vise.



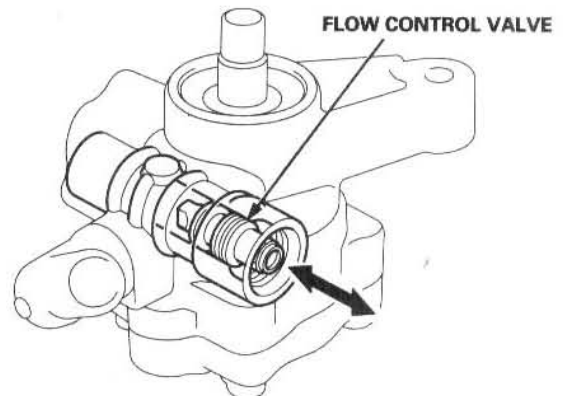
3. Loosen the flow control valve cap with a hex wrench and remove it.
4. Remove the O-ring, flow control valve and spring.
5. Remove the inlet joint and O-ring.
6. Remove the pump cover and pump cover seal.
7. Remove the outer side plate, pump cam ring, pump rotor, pump vanes, side plate and O-rings.
8. Remove the snap ring, then remove the sub-valve from the pump housing.
9. Remove the circlip, then remove the pump drive shaft by tapping the shaft end with the plastic hammer.
10. Remove the pump seal spacer and pump seal.

Flow Control Valve:

1. Check the flow control valve for wear, burrs, and other damage to the edges of the grooves in the valve.

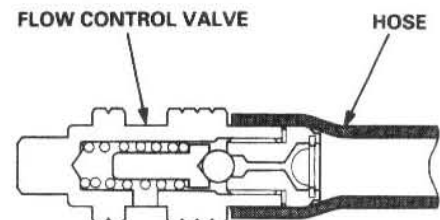


2. Inspect the bore the flow control valve for scratches or wear.
3. Slip the valve back in the pump, and check that it moves in and out smoothly.



If OK, go on step 4; if not, replace the pump as an assembly. The flow control valve is not available separately.

4. Attach a hose to the end of the valve as shown.

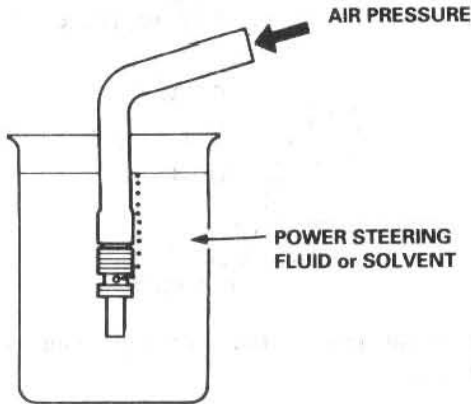


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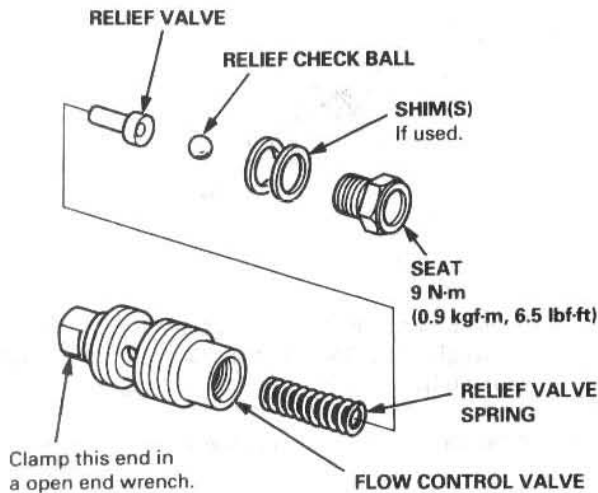
Power Steering Pump

Inspection (cont'd)

- Submerge the valve in a container of power steering fluid or solvent, and blow in the hose. If air bubbles leak through the valve at less than 98 kPa (1.0 kgf/cm², 14.2 psi), repair it as follows.



- Hold the bottom end of the valve with a open end wrench.
- Unscrew the seat in the top end of the valve, and remove any shims, the relief check ball, relief valve and relief valve spring.

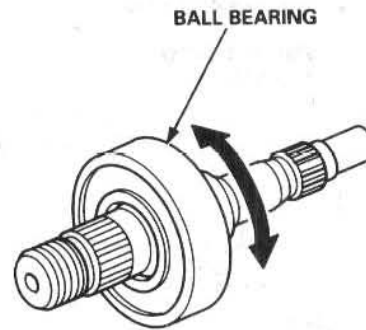


- Clean all the parts in solvent, dry them off, then reassemble and retest the valve. If the flow control valve tests OK, reinstall it in the pump. If the flow control valve still leaks air, replace the pump as an assembly. The flow control valve is not available separately.

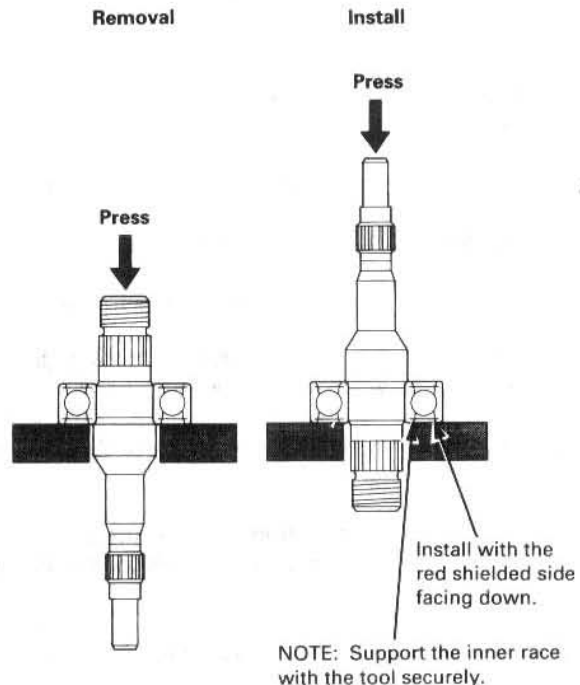
NOTE: If necessary, relief pressure is adjusted at the factory by adding shims under the check ball seat. If you found shims in your valve, be sure you reinstall as many as you took out.

Ball Bearing:

- Inspect the ball bearing by rotating the outer race slowly. If any play or roughness is felt, replace the ball bearing.



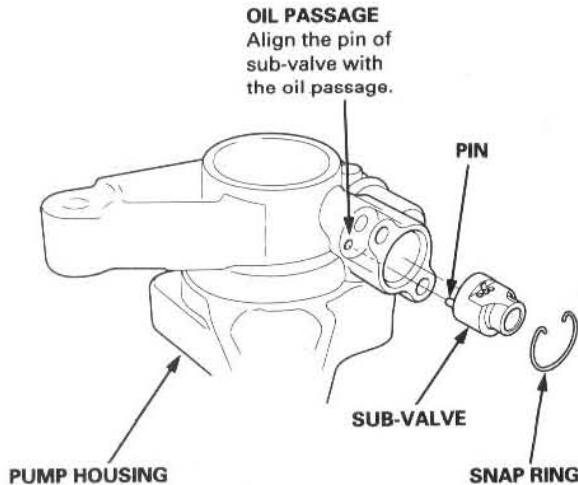
- Replace the ball bearing using a press.





Reassembly

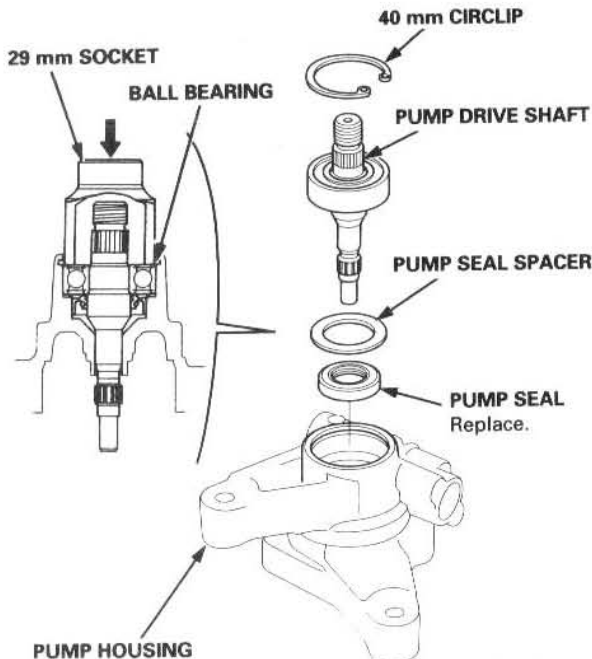
1. Align the pin of the sub-valve with the oil passage in pump housing, and push down the sub-valve. Fix the sub-valve with the snap ring.



2. Install the new pump seal in the pump housing by hand, then install the pump seal spacer.

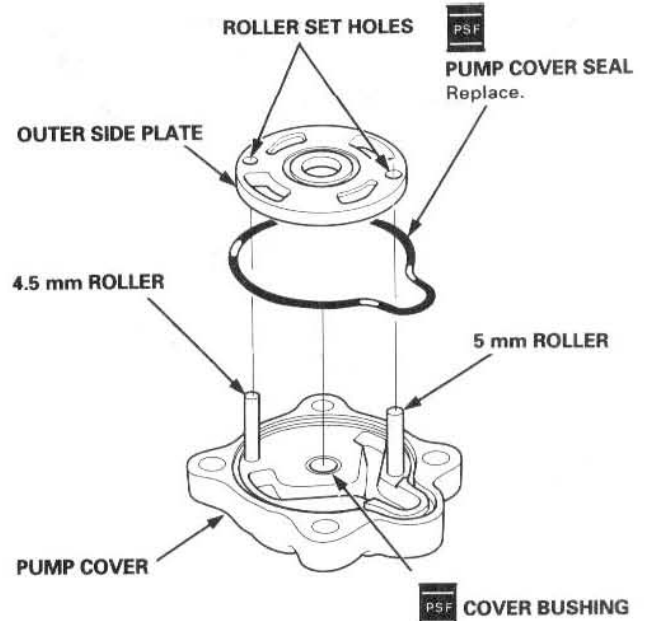
NOTE: Insert the pump seal with its grooved side facing in.

3. Position the pump drive shaft in the pump housing, then drive it in using a 29 mm socket as shown.

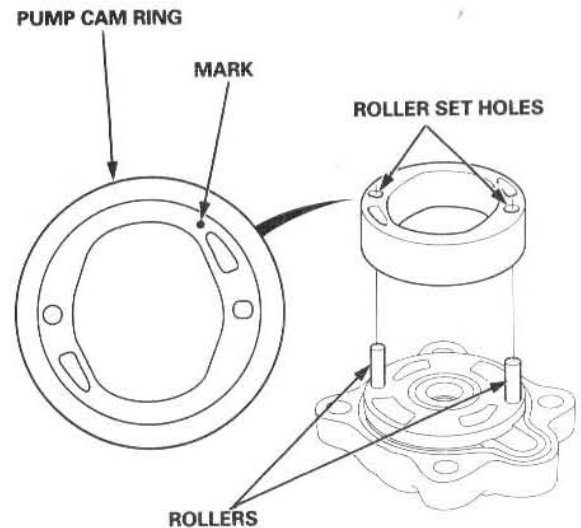


4. Install the 40 mm circlip with its radiused side facing out.

5. Coat the pump cover seal and the cover bushing with the power steering fluid, and install it into the groove in the pump cover.



6. Install the outer side plate over the two rollers.
7. Set the pump cam ring over the two rollers with the "•" mark on the cam ring upward.



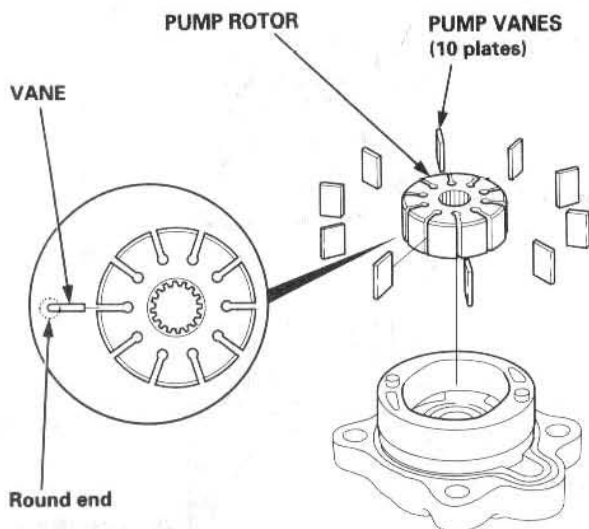
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Power Steering Pump

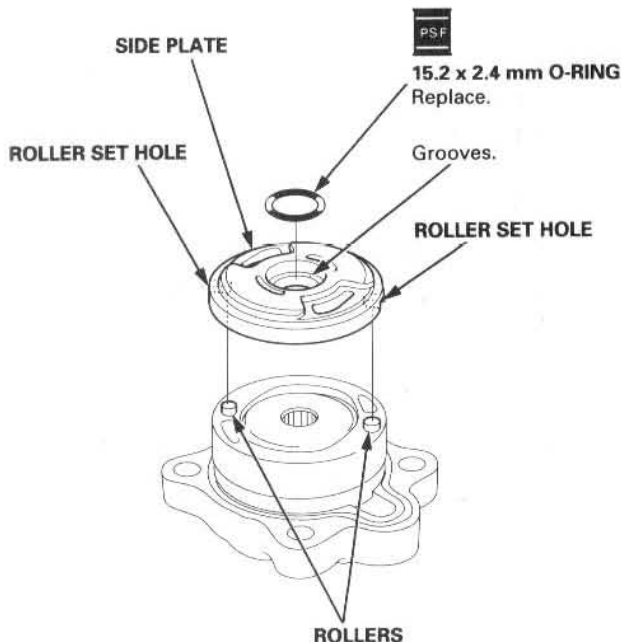
Reassembly (cont'd)

8. Assemble pump rotor to the pump cover.
9. Set the 10 vanes in the grooves in the rotor.

NOTE: Be sure that the round ends of the vanes are in contact with the sliding surface of the cam ring.

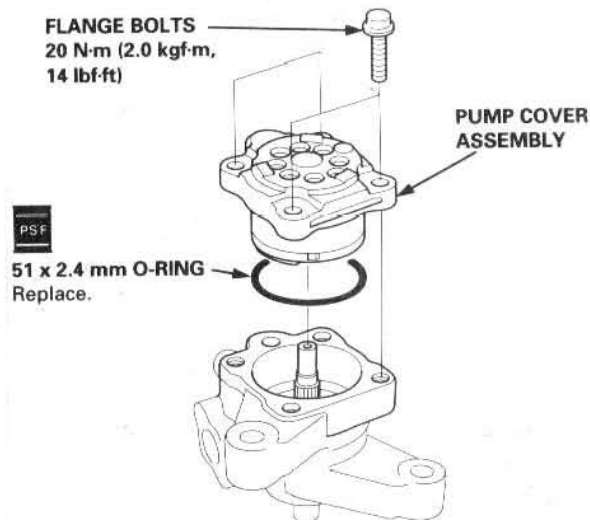


10. Coat the O-ring with power steering fluid, and install it into the grooves in the side plate.

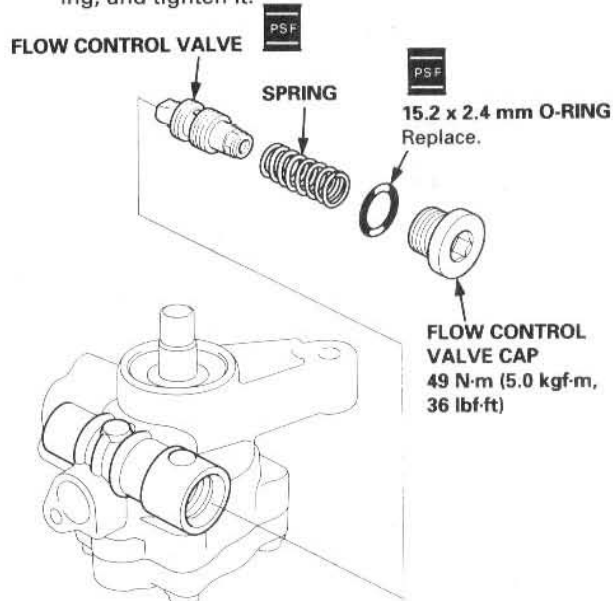


11. Install the side plate on the cam ring by aligning the roller set holes in the side plate with the rollers.

12. Coat the O-ring with power steering fluid, and position it into the pump housing.
13. Install the pump cover assembly in the pump housing.

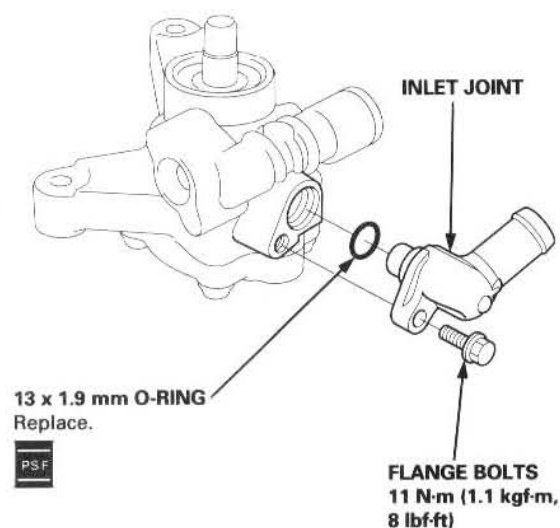


14. Coat the flow control valve with power steering fluid.
15. Install the flow control valve and spring on the pump housing.
16. Coat the O-ring with power steering fluid, and install it on the flow control valve cap.
17. Install the flow control valve cap on the pump housing, and tighten it.



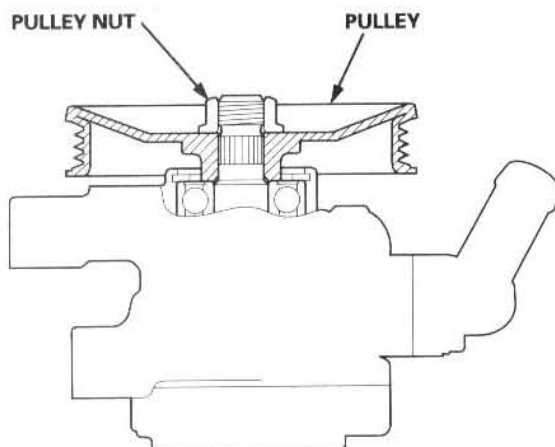


18. Coat the O-ring with power steering fluid, and install it into the grooves in the inlet joint.

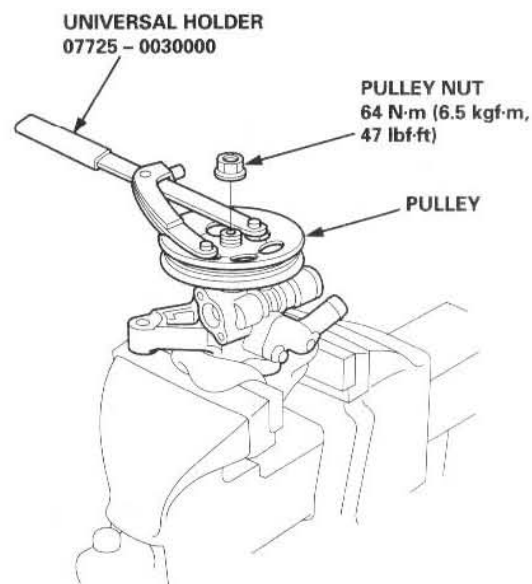


19. Install the inlet joint on the pump housing.
20. Install the pulley as shown below, then loosely install the pulley nut. Hold the steering pump in a vise with soft jaws.

CAUTION: Be careful not to damage the pump housing with the jaws of the vise.



21. Hold the pulley with the special tool, and tighten the pulley nut.



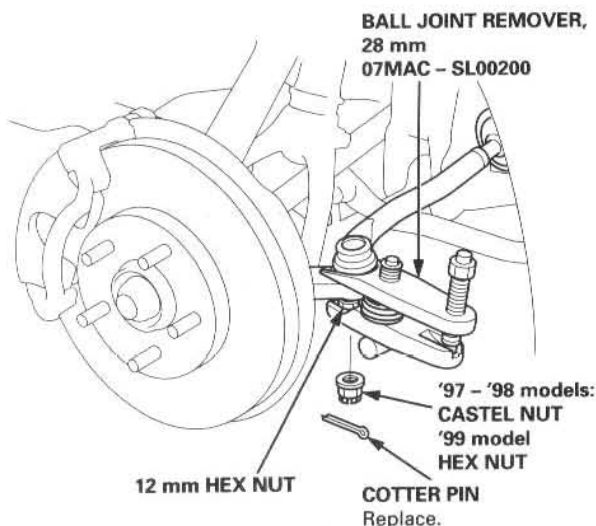
22. Check that the pump turns smoothly by turning the pulley.

Power Steering Gearbox

Removal

NOTE: Using solvent and a brush, wash any oil and dirt off the valve body unit its lines, and the end if the gearbox. Blow dry with compressed air.

1. Drain the power steering fluid as described on page 17-16.
2. Raise the front of vehicle, and support it on safety stands in the proper locations (see section 1).
3. Remove the front wheels.
4. Remove the driver's airbag assembly (see section 24), and steering wheel (see page 17-18).
5. Remove the cotter pin from the castle nut ('97 - '98 models) or hex nut ('99 model) and remove the nut.



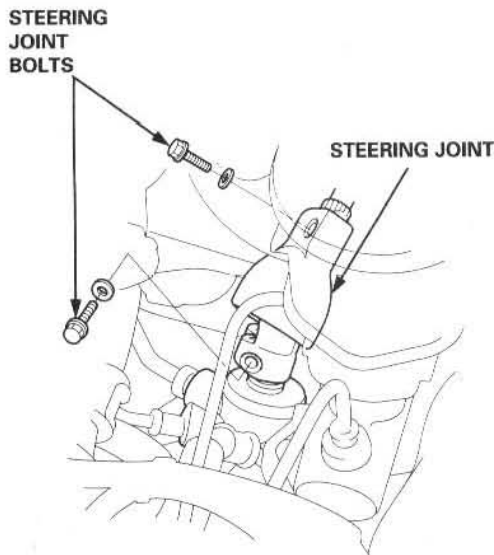
6. Install the 12 mm hex nut on the ball joint. Be sure that the 12 mm hex nut is flush with the ball joint pin end, or the threaded section of the ball joint pin might be damaged by the special tool.

NOTE: Remove the ball joint using the special tool. Refer to section 18 for ball joint remover usage instructions.

CAUTION: Avoid damaging the ball joint boot.

7. Separate the tie-rod ball joint and knuckle using the special tool.
8. Slide the rack all the way to the right.

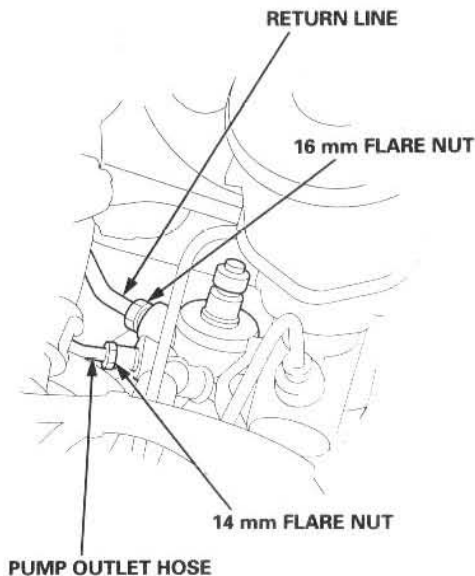
9. Remove the steering joint bolts, then disconnect the steering joint by moving the joint toward the column side.



10. Disconnect the pump outlet hose and return line from the valve body unit on the steering gearbox.

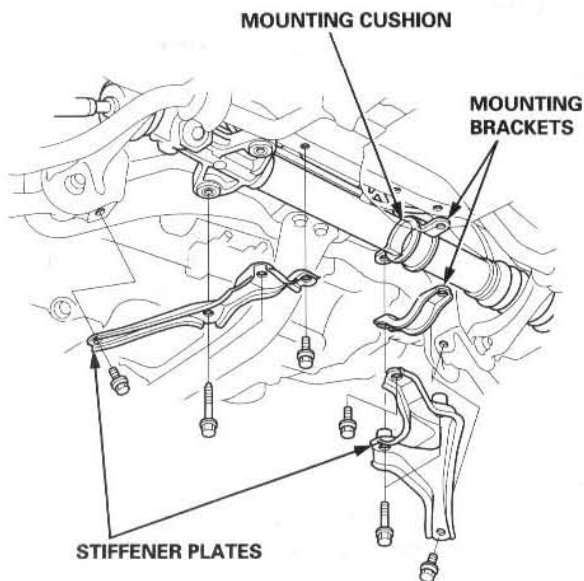
CAUTION: After disconnecting the lines, plug or seal the lines fitting with a piece of tape or equivalent to prevent foreign materials from entering the valve body unit.

NOTE: Do not loosen the cylinder lines A and B between the valve body unit and cylinder.



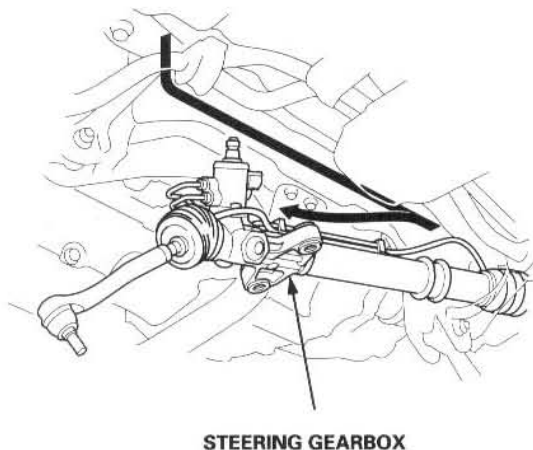


11. Remove the exhaust pipe A (see section 9).
12. Disconnect the shift linkage (see section 13 or see section 14).
13. Remove the stiffener plates first, then remove the mounting brackets and mounting cushion.



14. Move the steering gearbox to the right so the left tie-rod end clears the rear beam, then move the steering gearbox to the left, and tilt the left side down to remove it from the vehicle.

CAUTION: Be careful not to bend or damage the two power steering lines and cylinder lines when removing the gearbox.



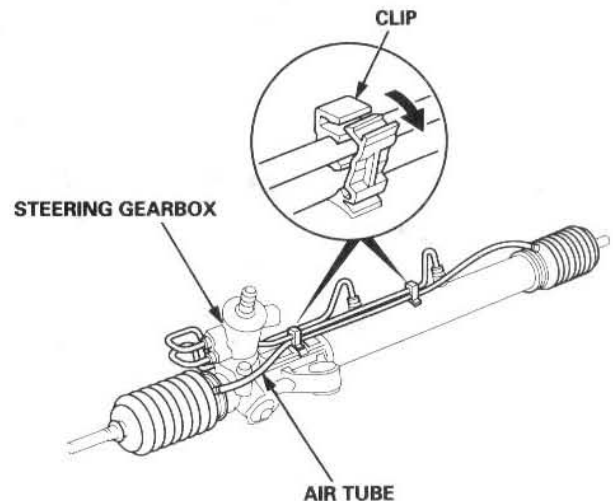
Disassembly

Steering Rack Disassembly

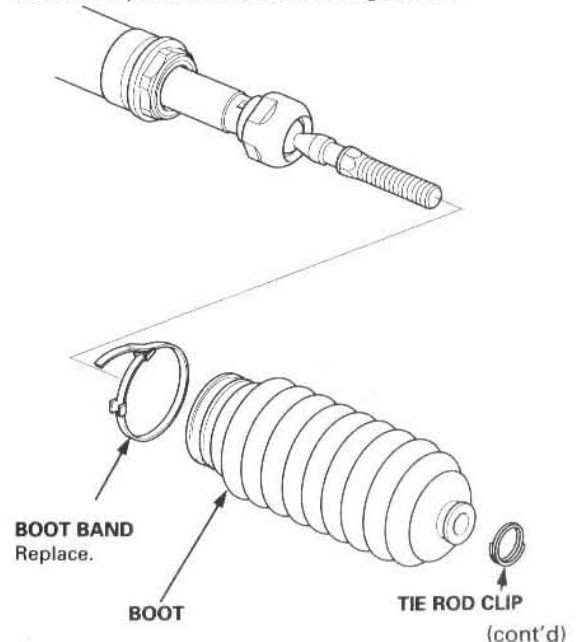
NOTE:

- Before disassembling the steering gearbox, wash it off with solvent and a brush.
- Do not dip seals and O-rings in solvent.

1. Remove the steering gearbox (see page 17-32).
2. Remove the tie-rod end and locknut.
3. Remove the air tube and clips.



4. Remove the boot bands and tie rod clips. Pull the boots away from the ends of the gearbox.



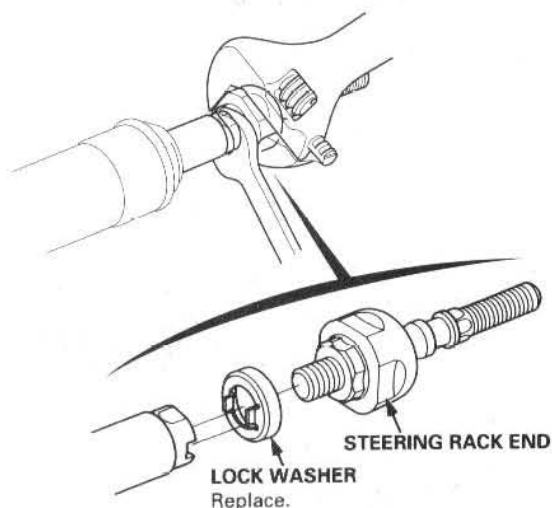
Power Steering Gearbox

Disassembly (cont'd)

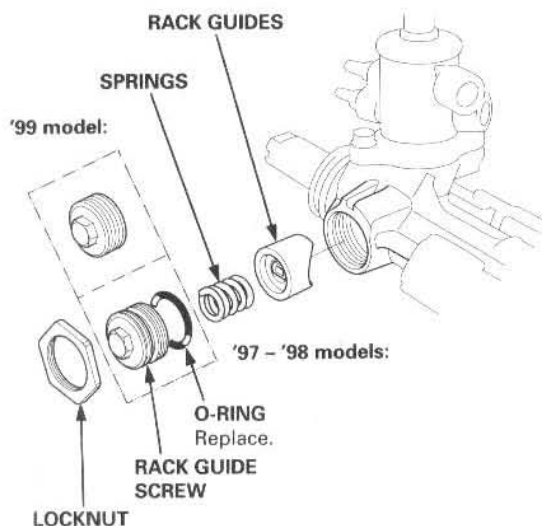
5. Hold the steering rack with a wrench ('99 model: left end only), and unscrew the rack end with another wrench.

CAUTION: Be careful not to damage the rack surface with a wrench.

NOTE: '97 - '98 models is shown.

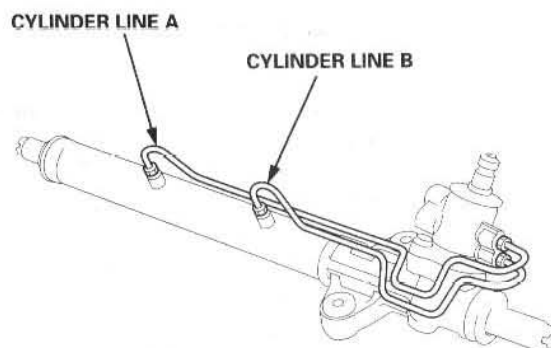


6. Loosen the locknut, then remove the rack guide screw and O-ring ('97 - '98 models only).

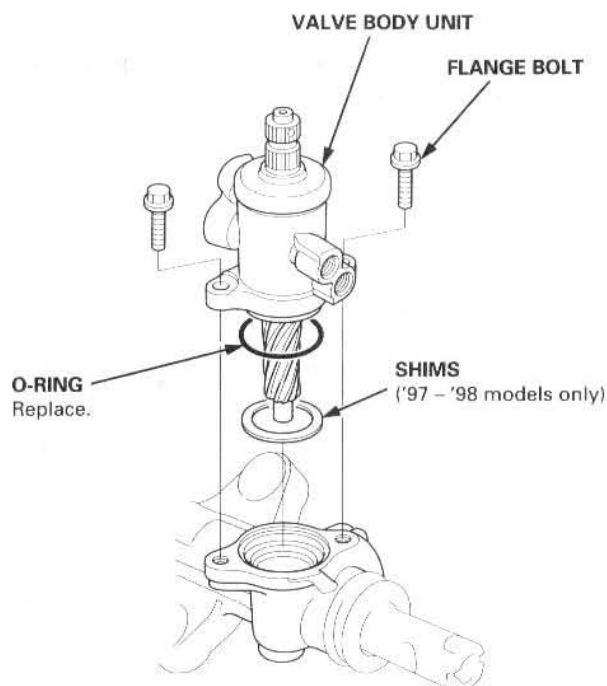


7. Remove the spring and the rack guide from the gearbox housing.

8. Remove the cylinder lines A and B from the gearbox.



9. Drain the fluid from the cylinder fittings by slowly moving the steering rack back and forth.
10. Remove the two flange bolts, then remove the valve body unit from the gearbox. (See page 17-36 for valve body unit disassembly.)

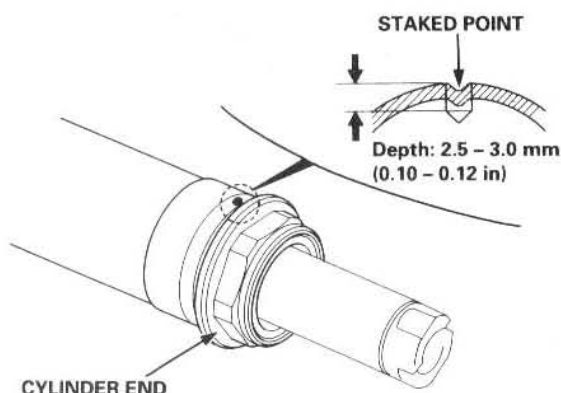




11. Drill a 3 mm (0.12 in) diameter hole approximately 2.5 – 3.0 mm (0.10 – 0.12 in) in depth in the staked point on the cylinder.

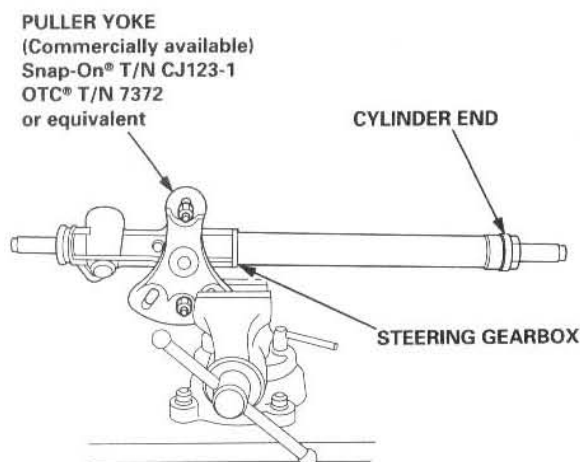
NOTE:

- Do not allow metal shavings to enter the cylinder housing.
- After removing the cylinder end, remove any burrs at the staked point.



12. Install a puller yoke to the steering gearbox. Clamp the puller yoke in a vise with soft jaws as shown, then loosen and remove the cylinder end.

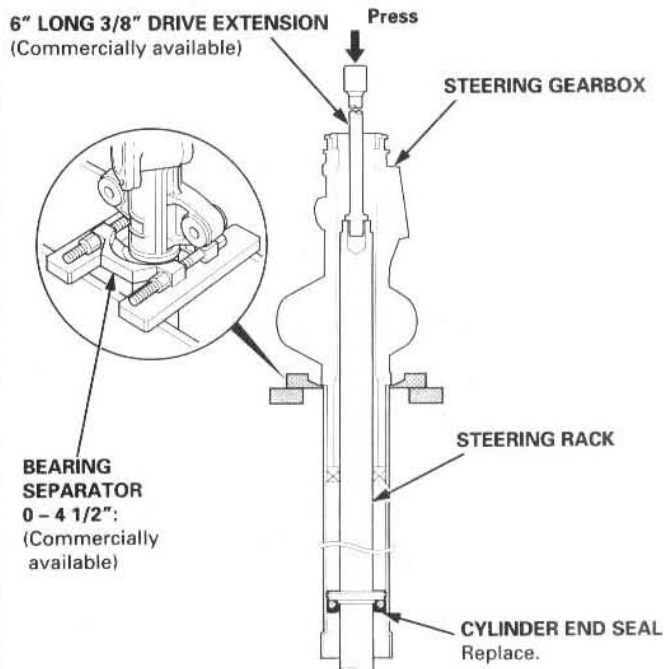
CAUTION: Do not clamp the cylinder housing.



13. Set the steering gearbox in a press so the gearbox housing points upward.
14. Place a 6" long, 3/8" drive extension in the steering rack, and press the cylinder end and steering rack out of the gearbox.

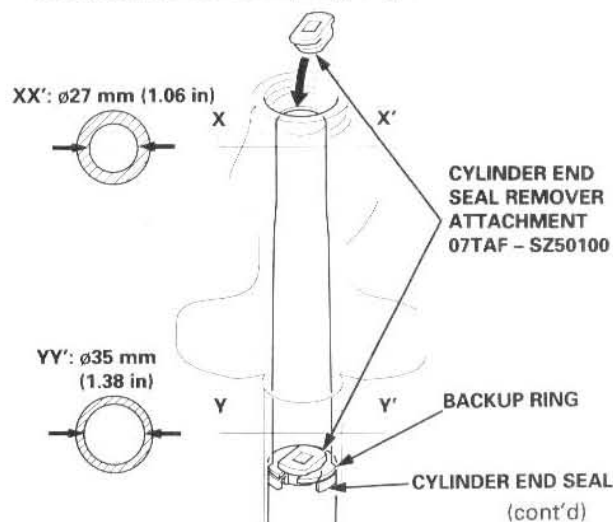
NOTE: Hold the steering rack to keep it from falling when pressed clear.

CAUTION: Be careful not to damage to inner surface of the cylinder housing with the tool.



15. Turn the special tool so it will fit through the end of the gearbox housing, then position special tool on the backup ring as shown below.

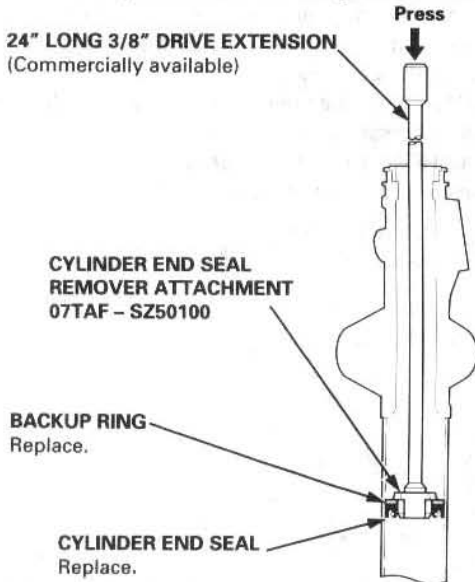
NOTE: Make sure that the special tool is securely positioned on the backup ring edges.



Power Steering Gearbox

Disassembly (cont'd)

16. Insert a 24" long 3/8" drive extension into the cylinder and the special tool from the gearbox side.



17. Set the gearbox housing in a press, then press out the cylinder end seal and backup ring from the gearbox housing.

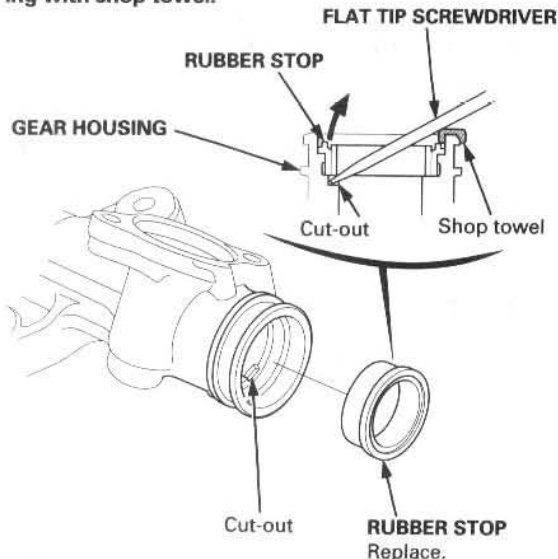
CAUTION:

- Keep the tool straight to avoid damaging the cylinder wall. Check the tool angle, and correct it if necessary, when removing the cylinder end seal.
- Use a press to remove the cylinder end seal. Do not try to remove the seal by striking the tool. It will break the backup ring, and the cylinder end seal will remain in the gearbox.

18. Check the rubber stop for damage or deterioration. If it is OK, go on step 20; if not, replace the rubber stop as shown below:

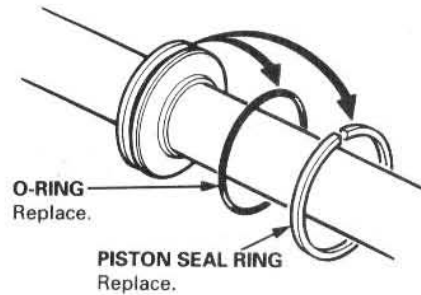
19. Remove the rubber stop by prying it out of the gearbox housing with a flat tip screwdriver.

CAUTION: Protect the pry point on the gearbox housing with shop towel.



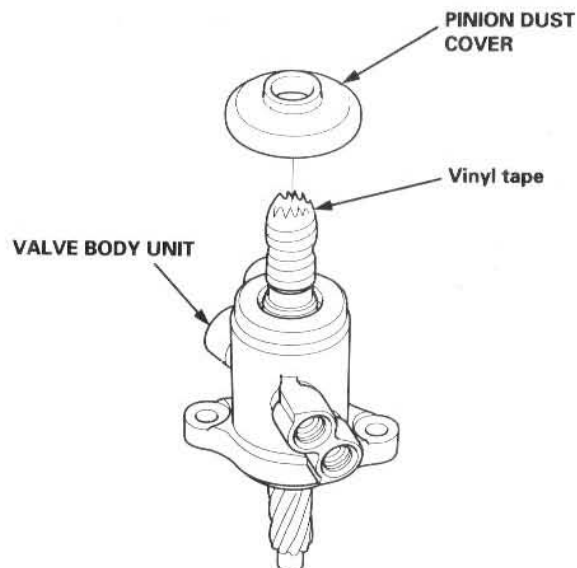
20. Carefully pry the piston seal ring and O-ring off the rack piston.

CAUTION: Be careful not to damage the inside of seal ring groove and piston edges when removing the seal ring.



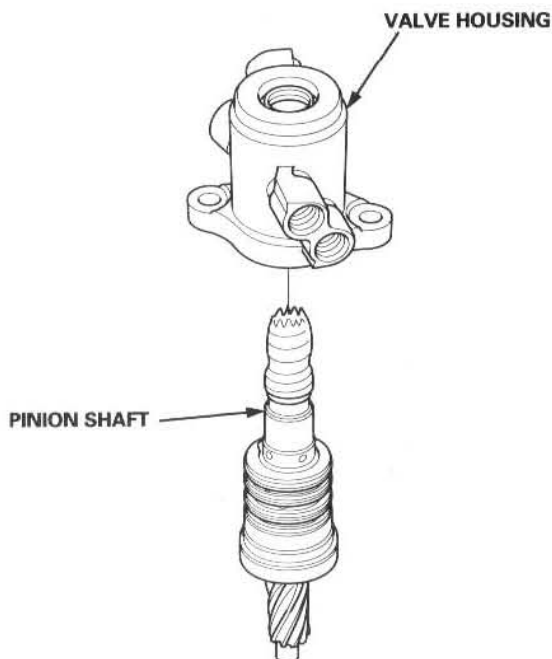
Valve body unit

1. Before disassembly the valve body unit, apply vinyl tape to splines of the pinion shaft. Remove the pinion dust cover.





2. Separate the valve housing from the pinion shaft/valve using a press.

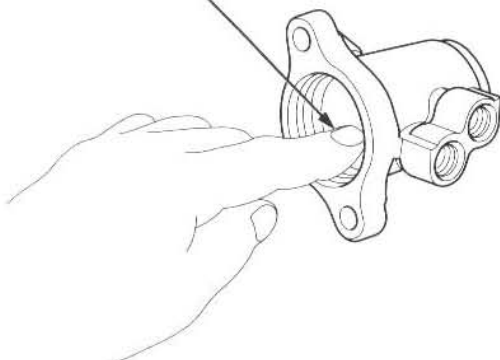


3. Check the inner wall of the valve housing where the seal ring slides with your finger. If there is a step in the wall, the valve housing is worn. Replace the valve housing.

NOTE:

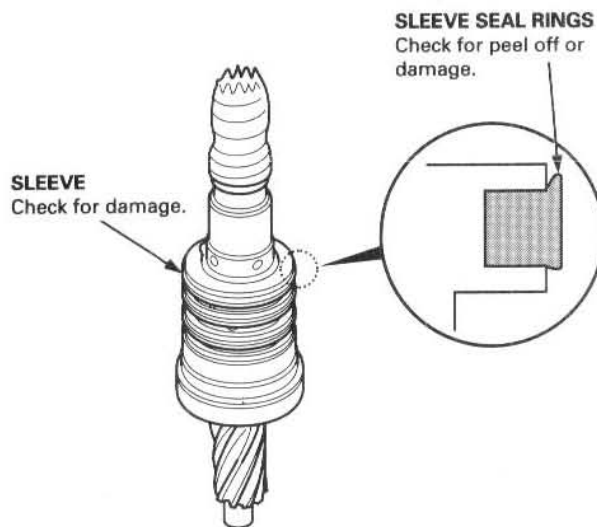
- There may be the sliding marks from the seal ring on the wall of the valve housing. Replace the valve housing only if the wall is stepped.
- When the valve housing is replaced, install new 32 mm shim(s) on the bearing surface of the housing to adjust the thickness.

Check the inside of valve housing whether the wall is stepped.

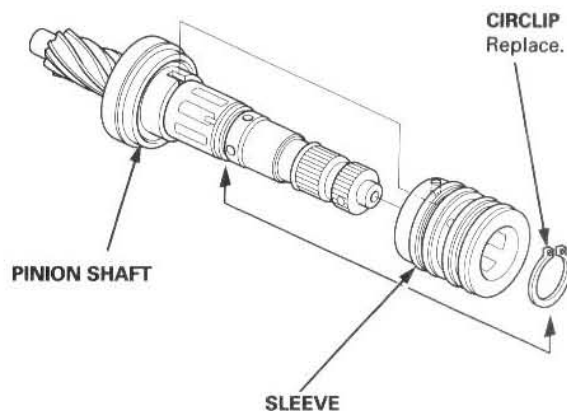


4. Check for wear, burrs and other damage to the edges of the grooves in the sleeve.

NOTE: The pinion shaft and sleeve are a precision matched set. If either the pinion shaft or sleeve must be replaced, replace both parts as a set.



5. Remove the circlip and sleeve from the pinion shaft.



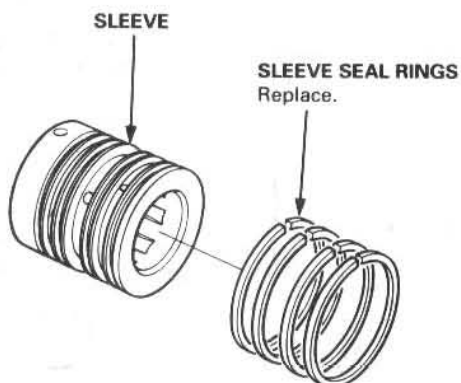
(cont'd)

Power Steering Gearbox

Disassembly (cont'd)

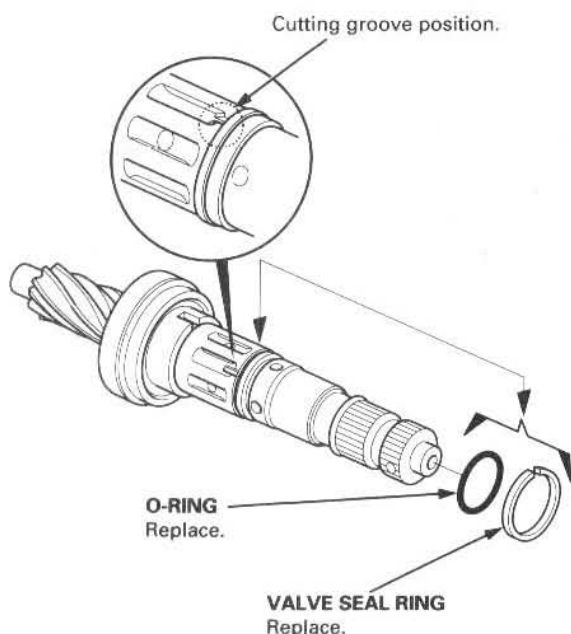
6. Using a cutter or an equivalent tool, cut and remove the four seal rings from the sleeve.

CAUTION: Be careful not to damage the edges of the sleeve grooves and outer surfaces when removing the seal rings.



7. Using a cutter or an equivalent tool, cut the valve seal ring and O-ring at the cutting groove position on the pinion shaft. Remove the valve seal ring and O-ring.

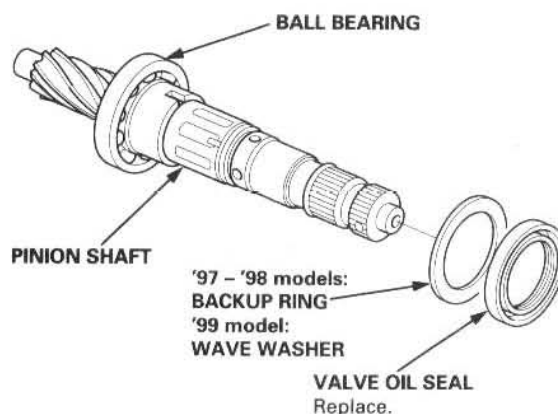
CAUTION: Be careful not to damage the edges of the pinion shaft groove and outer surfaces when removing the valve seal ring and O-ring.



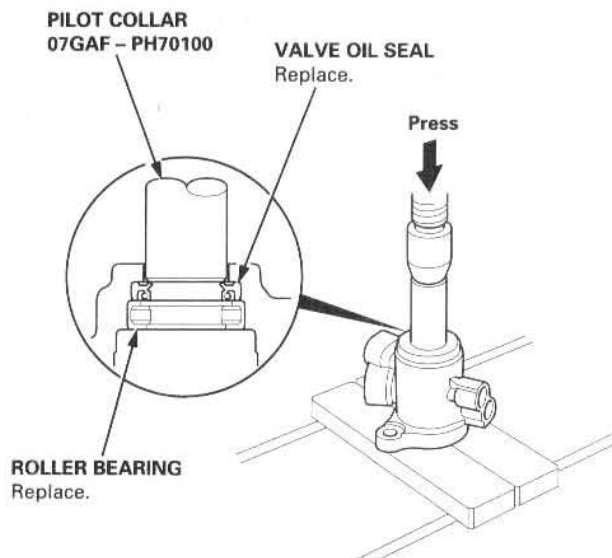
8. Remove the valve oil seal and backup ring ('97 - '98 models) or wave washer ('99 model) from the pinion shaft.

NOTE:

- Inspect the ball bearing by rotating the outer race slowly. If there is any excessive play or wear replace the pinion shaft and sleeve as an assembly.
- The pinion shaft and sleeve are a precise fit; do not intermix old and new pinion shafts and sleeves.



9. Press the valve oil seal and roller bearing out of the valve housing using a hydraulic press and the special tool shown below.

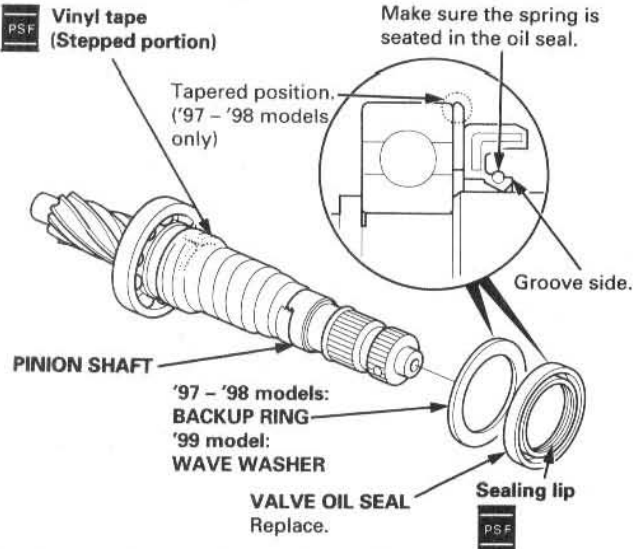


Power Steering Gearbox

Reassembly (cont'd)

Valve Body Unit Reassembly

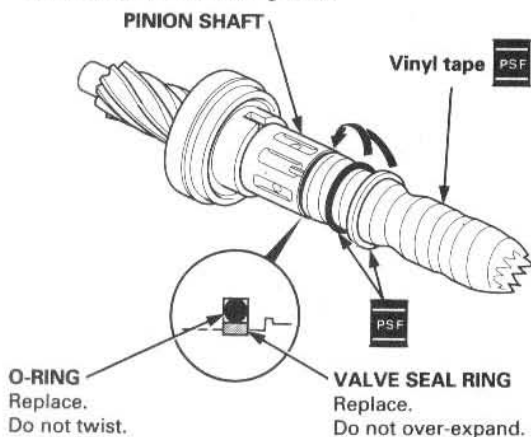
1. Apply vinyl tape to the stepped portion of the pinion shaft, and coat the surface of the vinyl tape with the power steering fluid.



2. Install the backup ring with its tapered side as shown above.
3. Coat the inside surface of the new valve oil seal with power steering fluid.
4. Slide the valve oil seal over the pinion shaft, being careful not to damage the sealing lip.

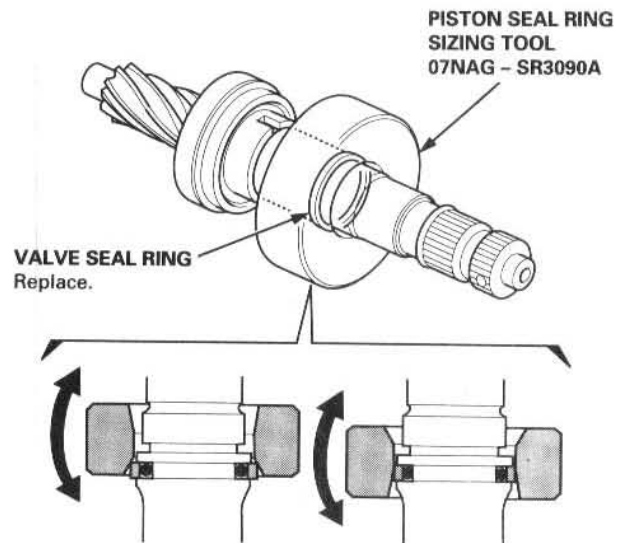
CAUTION: Install the valve oil seal with its grooved side facing opposite the bearing.

5. Apply vinyl tape to the splines and stepped portion of the shaft, and coat the surface of the vinyl tape with the power steering fluid.



6. Fit the new O-ring in the groove of the pinion shaft. Then slide the new valve seal ring over the shaft and the groove in on the pinion shaft.
7. Remove the vinyl tape from the pinion shaft.

8. Apply power steering fluid to the surface of the valve seal ring that was installed on the pinion shaft.
9. Apply power steering fluid to the inside of the special tool. Set the larger diameter end of the special tool over the valve seal ring.
10. Move the special tool up and down several times to make the valve seal ring fit in the pinion shaft.



11. Remove the special tool.
12. Turn the special tool over, and set the smaller diameter end of the special tool over the valve seal ring. Move the special tool up and down several times to make the valve seal ring fit snugly in the pinion shaft.



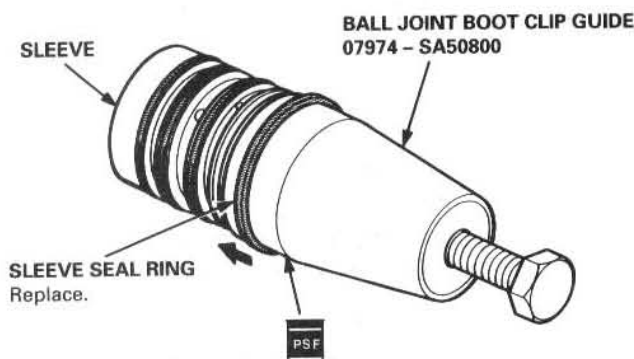
13. Apply power steering fluid to the surface of the special tool. Set the new seal rings over the special tool from the smaller diameter end of the tool, and expand the seal rings. Do two rings at a time from each end of the sleeve.

NOTE:

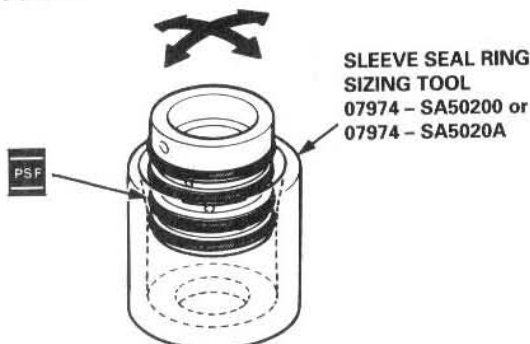
- Do not over-expand the seal ring. Install the resin seal rings with care so as not to damage them. After installation, be sure to contract the seal rings using the special tool (sizing tool).
- There are two types of sleeve seal rings: black and brown. Do not mix the different types of sleeve seal rings as they are not compatible.

14. Align the special tool with each groove in the sleeve, and slide a sleeve seal ring into each groove.

NOTE: After installation, compress the seal rings with your fingers temporarily.



15. Apply power steering fluid to the seal rings on the sleeve, and to the entire inside surface of the special tool.



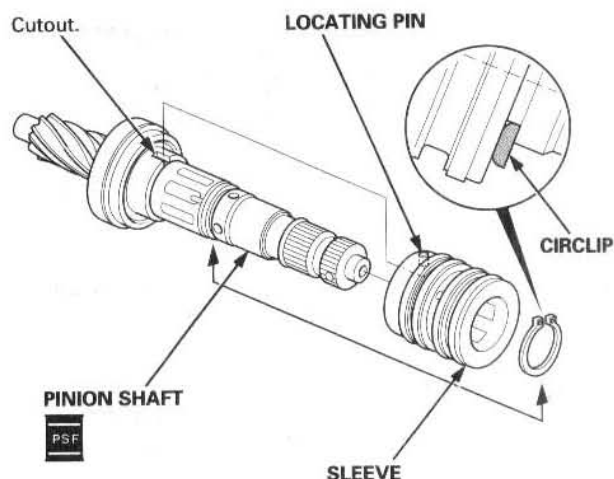
16. Insert the sleeve into the special tool slowly.
17. Move the sleeve each direction several times to make the seal rings snugly fit in the sleeve.

NOTE: Be sure that the seal rings are not turned up.

18. Apply power steering fluid to the surface of the pinion shaft. Assemble the sleeve over the pinion shaft by aligning the locating pin on the inside of the sleeve with the cutout in the shaft. Then install the new circlip securely in the pinion shaft groove.

NOTE:

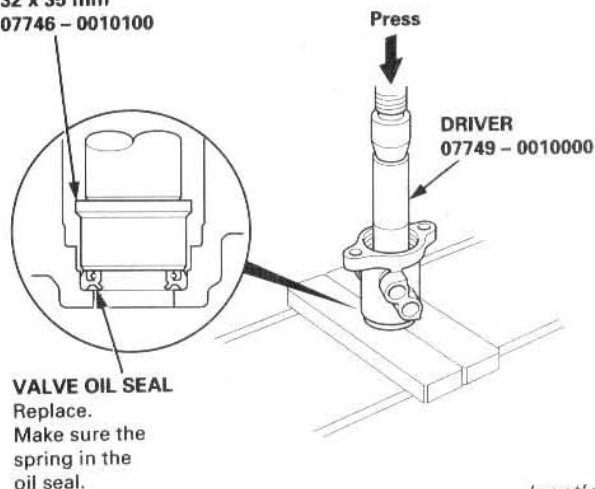
- Be careful not to damage the valve seal ring when inserting the sleeve.
- Install the circlip with its radiused side facing in.



19. Apply power steering fluid to the seal ring lip of the valve oil seal, then install the seal in the valve housing using a hydraulic press and special tools as shown.

CAUTION: Install the valve oil seal with its grooved side facing the tool.

ATTACHMENT,
32 x 35 mm
07746 - 0010100



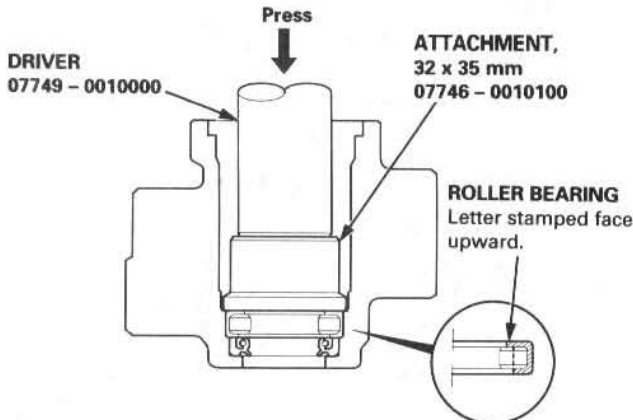
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Power Steering Gearbox

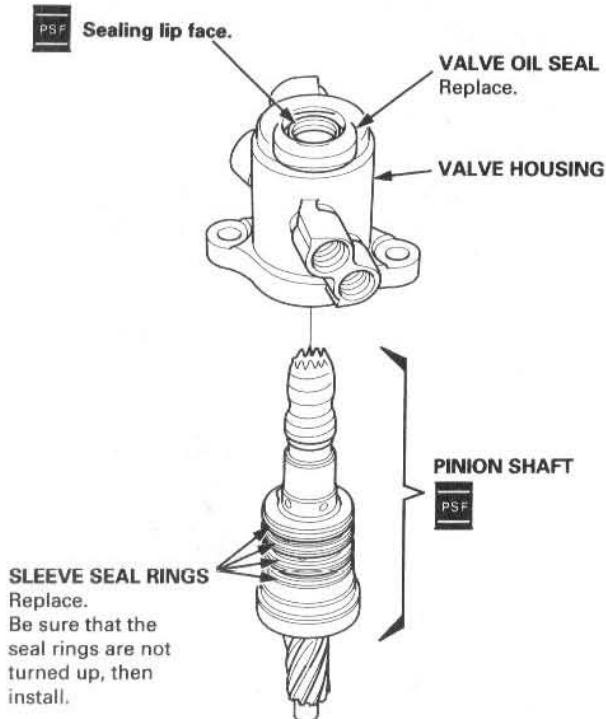
Reassembly (cont'd)

20. Press the new roller bearing into the valve housing using a hydraulic press and special tools as shown.

NOTE: Place the roller bearing on the valve housing with the stamped letter facing up towards the valve side.



21. Apply vinyl tape to the pinion shaft, then coat the vinyl tape with power steering fluid.



22. Insert the pinion shaft into the valve housing.

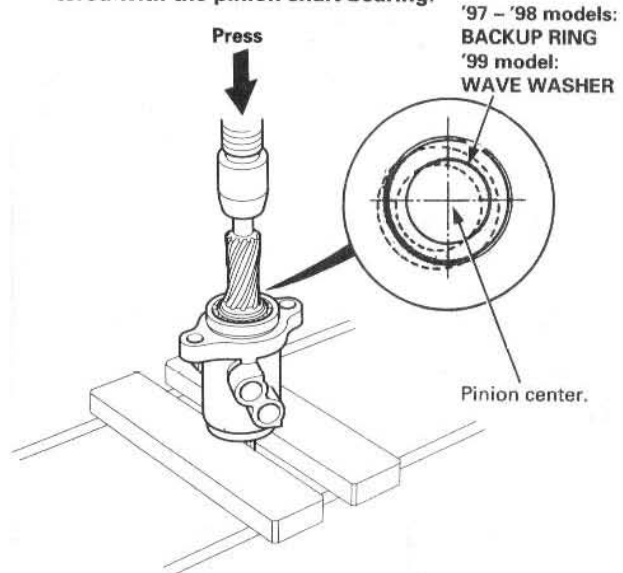
CAUTION: Be careful not to damage the valve seal rings.

23. Remove the vinyl tape from the pinion shaft.

24. Press the pinion shaft/sleeve into the valve housing using a hydraulic press as shown.

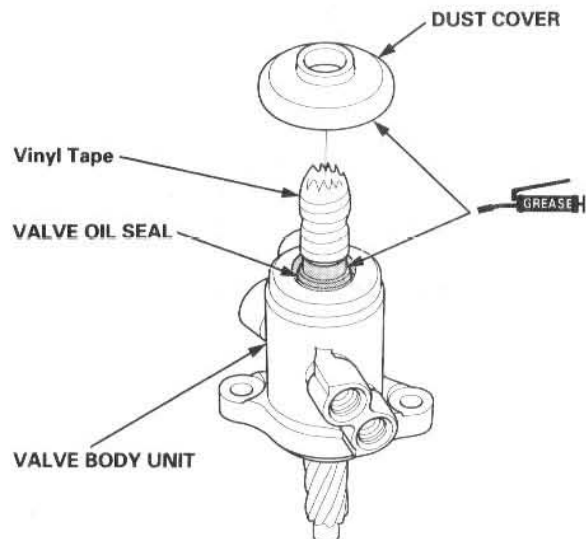
NOTE: Check that the pinion shaft/sleeve turns smoothly by turning the pinion shaft.

CAUTION: Before inserting the pinion shaft, be sure that the backup ring or wave washer is centered with the pinion shaft bearing.



25. Apply vinyl tape to around the pinion shaft, and coat the surface of the tape with grease.

26. Pack the interior of the dust cover and lip with grease, then install dust cover on the valve body unit.



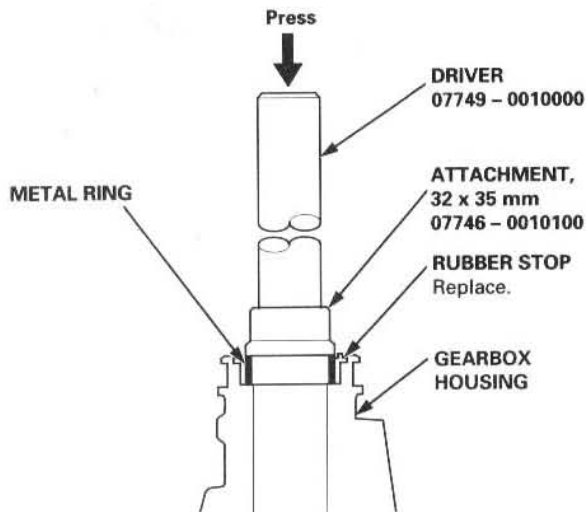
27. Remove the vinyl tape from the pinion shaft.



Steering Rack Installation

1. If you removed the rubber stop, position the new rubber stop in the gearbox housing, then press it in using a hydraulic press and the special tools as shown.

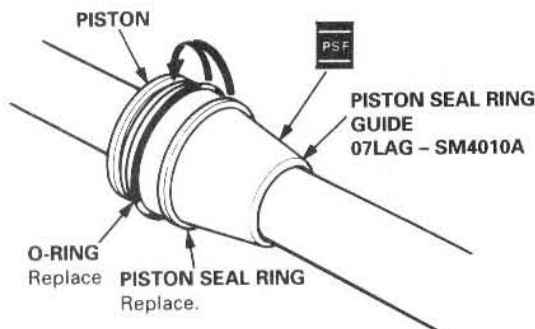
NOTE: Make sure that the special tool presses against the metal portion of the rubber stop.



2. Coat the piston seal ring guide with power steering fluid, and slide it onto the rack, big end first.
3. Position the new O-ring and new piston seal ring on the special tool, then slide them down toward the big end of the tool.

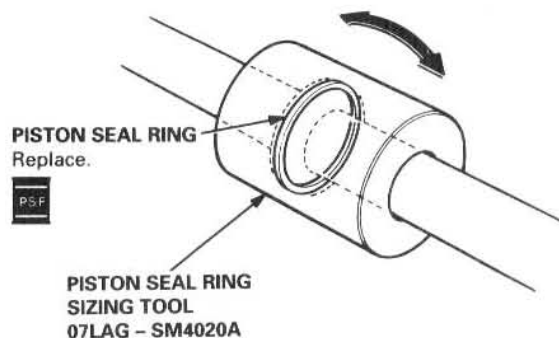
NOTE:

- Do not over expand the resin seal rings. Install the resin seal rings with care so as not to damage them. After installation, be sure to contract the seal ring using the special tool (sizing tool).
- Replace piston's O-ring and seal ring as a set.



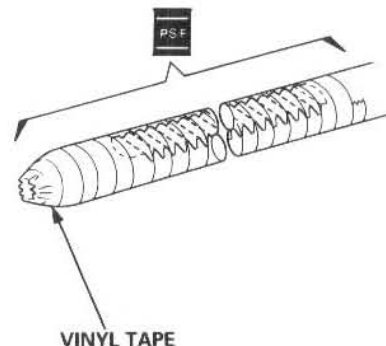
4. Pull the O-ring off into the piston groove, then pull the piston seal ring off into the piston groove on top of the O-ring.

5. Coat the piston seal ring and the inside of the special tool with power steering fluid.
6. Carefully slide the tool onto the rack and over the piston seal ring.
7. Move the special tool back and forth several times to make the piston seal ring fit snugly in the piston.



8. Wrap vinyl tape around the rack teeth and rack end edges, and coat the surface of the tape with the power steering fluid.

NOTE: Make sure that the vinyl tape is wrapped carefully so that there is no stepped portion.



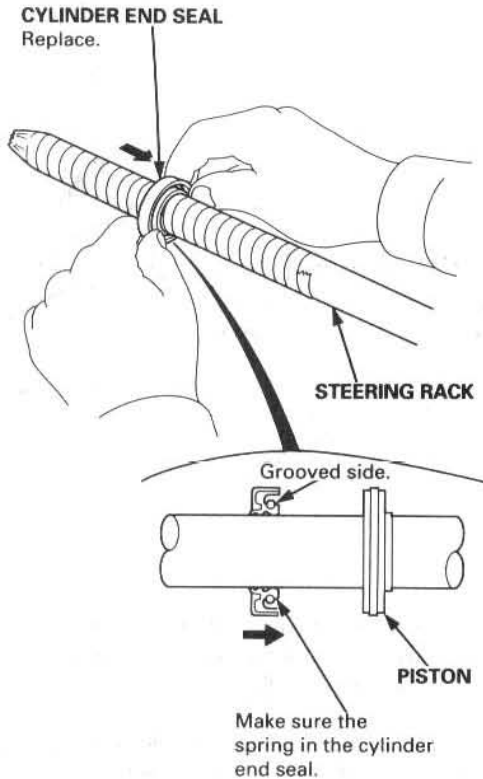
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Power Steering Gearbox

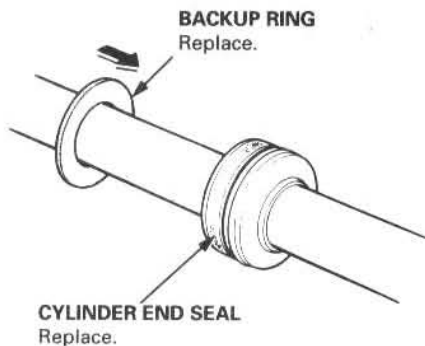
Reassembly (cont'd)

9. Coat the inside surface of the new cylinder end seal with power steering fluid.
10. Install the cylinder end seal onto the steering rack with its grooved side toward the piston.

CAUTION: When installing the cylinder end seal, be careful not to damage the sealing lip face of the seal with the edges or teeth of the steering rack.

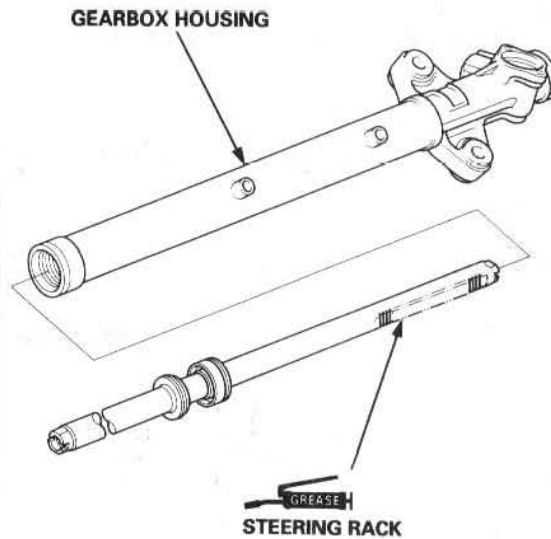


11. Remove the vinyl tape from the steering rack. Remove any residue of tape adhesive.
12. Install the new backup ring on the steering rack, then place the cylinder end seal to piston.



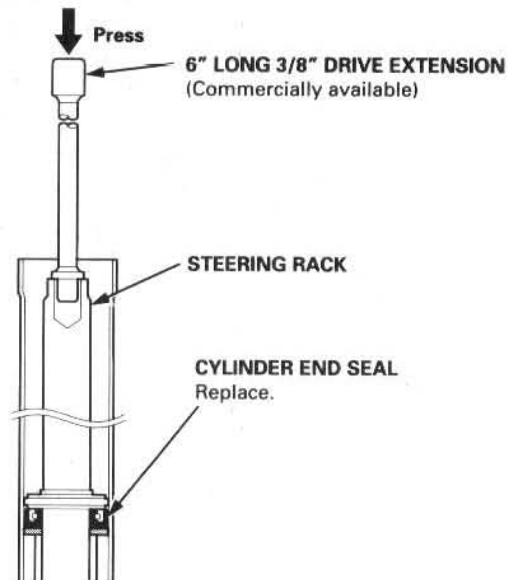
13. Grease the steering rack teeth, then insert the steering rack into the gearbox housing.

CAUTION: Be careful not to damage to inner surface of the cylinder with the rack edges.



14. Insert 6" long 3/8" drive extension into the steering rack as shown.
15. Install the cylinder end seal into the bottom of the cylinder by pressing on the tool with a press as shown.

CAUTION: Do not push on the tool with excessive force as it may damage the cylinder end seal.





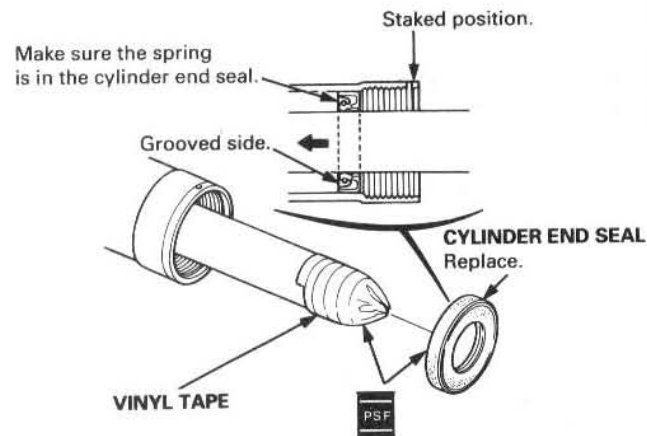
16. Wrap vinyl tape around the rack end edges, and coat the surface of the tape with the power steering fluid.

NOTE: Make sure that the vinyl tape is wrapped carefully so that there is no stepped portion.

17. Coat the inside surface of the new cylinder end seal with power steering fluid.

18. Install the cylinder end seal onto the steering rack with its grooved side toward the piston.

CAUTION: When installing the cylinder end seal, be careful not to damage the sealing lip face of the seal with the edges of the steering rack.



19. Remove the vinyl tape from the steering rack, then push in the cylinder end seal with your finger.

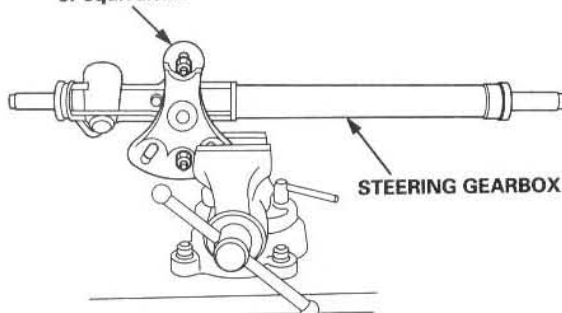
NOTE:

- Remove any residue of tape adhesive.
- Take care not to damage the cylinder end seal with the threads and burrs at the staked position of the gearbox.

20. Install a puller yoke to the steering gearbox, then clamp the puller yoke in a vise with soft jaws as shown.

CAUTION: Do not clamp the cylinder housing.

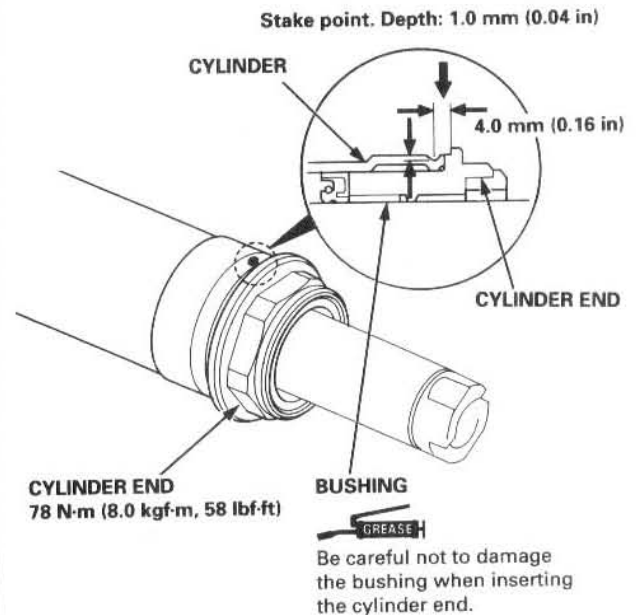
PULLER YOKE
(Commercially available)
Snap-On® T/N CJ123-1
OTC® T/N 7372
or equivalent



21. Grease the inside surface of the cylinder end, then install the cylinder end by screwing it into the cylinder.

22. After tightening the cylinder end, stake the point of the cylinder shown below.

NOTE: Stake the cylinder in the position opposite from where the stake was removed during disassembly.



23. Remove the puller yoke from the steering gearbox.

24. Select the 32 mm shim(s) ('97 - '98 models only), if '99 model; go on step 26.

NOTE: Only reinstall the original 32 mm shim(s) when the steering gearbox is reassembled without replacing the pinion shaft, valve housing, and gearbox housing with new ones. If the pinion shaft, valve housing, and gearbox housing are replaced, select the new shim(s) as follows.

Shim selection:

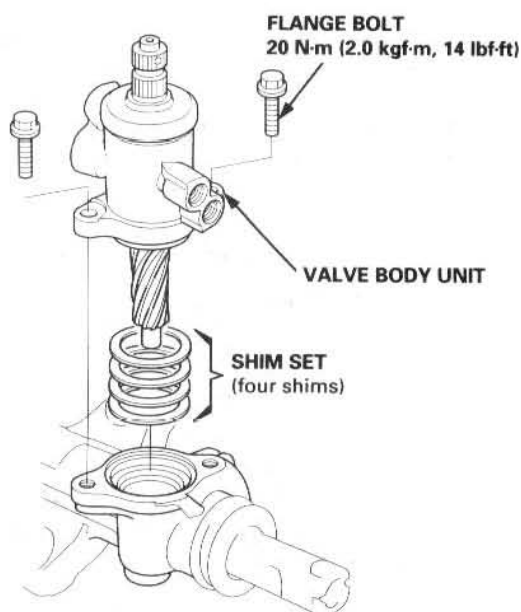
- a. Set the four 32 mm shims on the bearing surface of the gearbox housing. Total thickness of the four shims should equal no more than 0.70 mm. Shim set: four 32 mm shims (Thickness: 0.10 mm, 0.15 mm, 0.20 mm, 0.25 mm respectively)

CAUTION: The four 32 mm shims do not have thickness identification marks. Measure the thickness of each shim using a micrometer, and mark the shim for identification. (cont'd)

Power Steering Gearbox

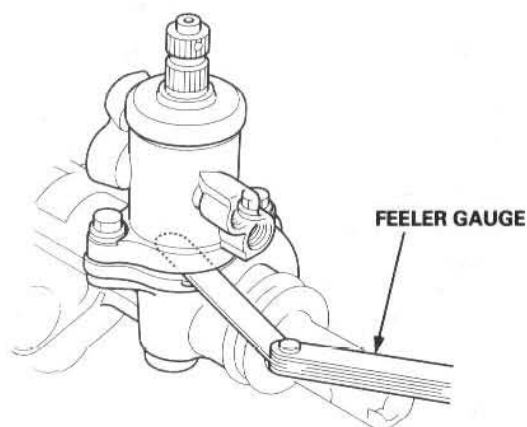
Reassembly (cont'd)

- b. Install the valve body unit on the gearbox housing, and tighten the flange bolts to the specified torque.



- c. Measure the clearance between the gearbox housing and valve body unit using a feeler gauge as shown.

NOTE: Measure the clearance at the point midway between the two mounting bolts.



- d. Determine the required thickness of the 32 mm shims by subtracting the clearance obtained in the step "c" from the total thickness of the four shims. (Total thickness of the 4 shims) - (Clearance) = Required thickness of the shims

NOTE: Select the shims so that the total thickness is close to, but less than, the required thickness.

Example:

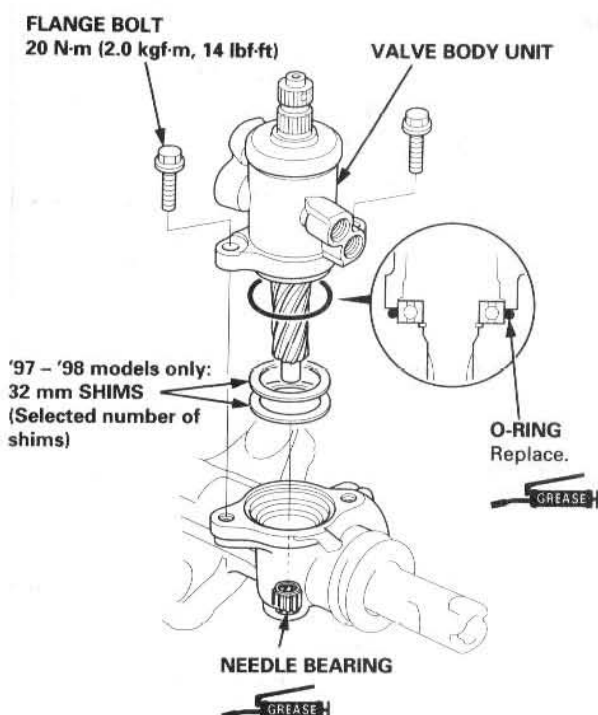
Measurement is 0.28 mm (0.011 in):

$$0.70 - 0.28 = 0.42 \text{ mm } (0.028 - 0.011 = 0.017 \text{ in})$$

The selected shims should be 0.25 mm (0.010 in) and 0.15 mm (0.006 in) in thickness.

If the required shim thickness is 0.10 mm or less, no shims are necessary.

25. Set the selected 32 mm shims on the bearing surface of the gearbox housing.



26. Coat the new O-ring with grease, and carefully fit it on the valve housing.
27. Apply grease to the needle bearing in the gearbox housing.
28. Install the valve body unit on the gearbox housing by engaging the gears.

NOTE: Note the valve body unit installation position (direction of line connection).

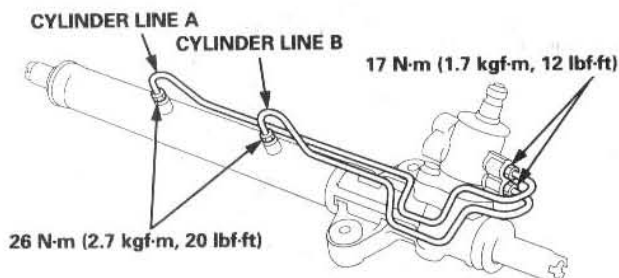
29. Tighten the flange bolts to the specified torque.



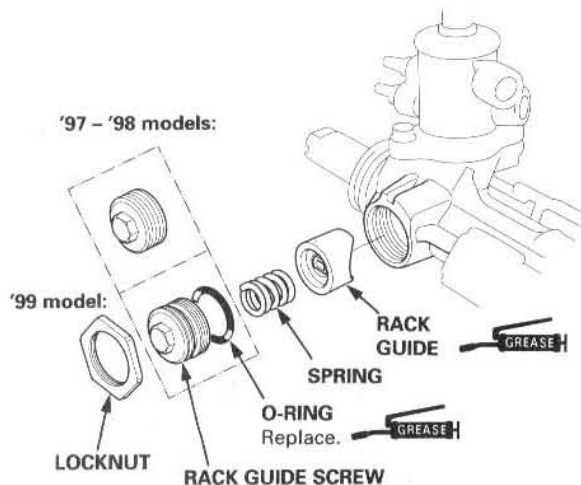
30. Install the cylinder lines A and B.

NOTE:

- Clean the joints of the cylinder lines A and B thoroughly. The joints must be free of foreign material.
- Install the cylinder lines A and B, tighten the flare nuts by hand first, then tighten the flare nuts to the specified torque.



31. Grease the sliding surface of the rack guide, and install it onto the gearbox housing.



32. **'97 - '98 models:**
Apply a thin coat of grease to the new O-ring, and install it on the rack guide screw.
'99 model:
Remove the old sealant off of the threaded section, then apply new sealant to the first three threads.
33. Install the spring, rack guide screw and locknut on the gear housing.
34. Adjust the rack guide screw (see page 17-15).

NOTE: After adjusting, check that the rack moves smoothly by sliding the rack right and left.

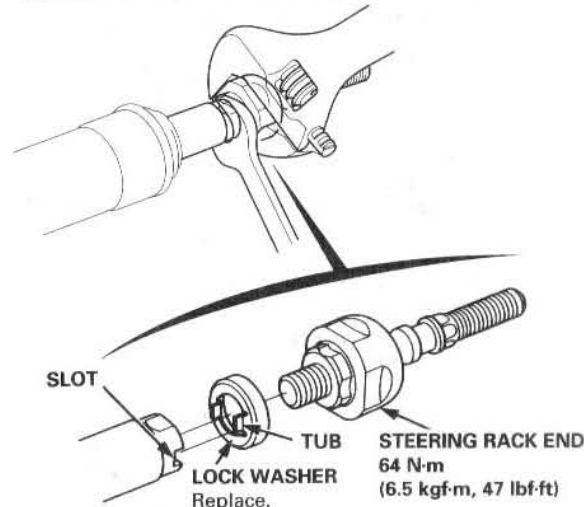
35. Install the new lock washer in the groove in the steering rack.

36. Screw each rack end into the rack.

37. Hold the steering rack with a wrench ('99 model: left end only) and tighten the rack end with another.

CAUTION: Be careful not to damage the rack surface with a wrench.

NOTE: '97 - '98 models is shown.



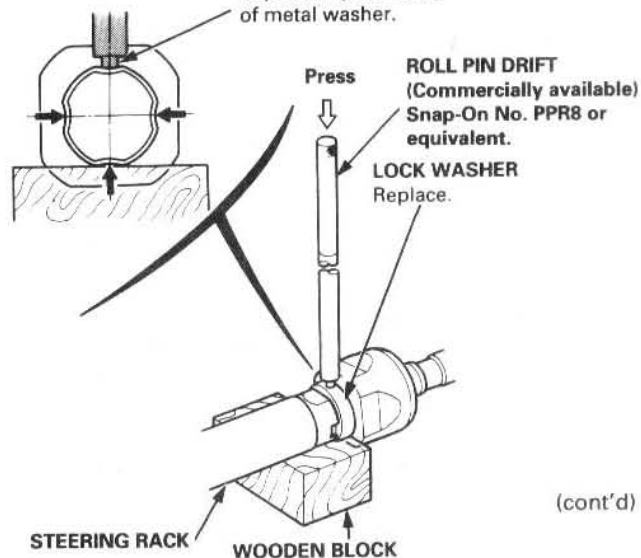
38. After tightening the rack end. Stake the four section of lock washer with the tool and hydraulic press.

NOTE:

- Place the wood block on the press table, then set the lock washer section of the rack end on the wood block securely.
- Be sure the tool is aligned with the flat sections of the steering rack end before pressing.
- Stake the lock washer in the center of the flat section of the steering rack end.

STAKE POINT "←"

NOTE: This drift has a flat, to prevent puncturing of metal washer.

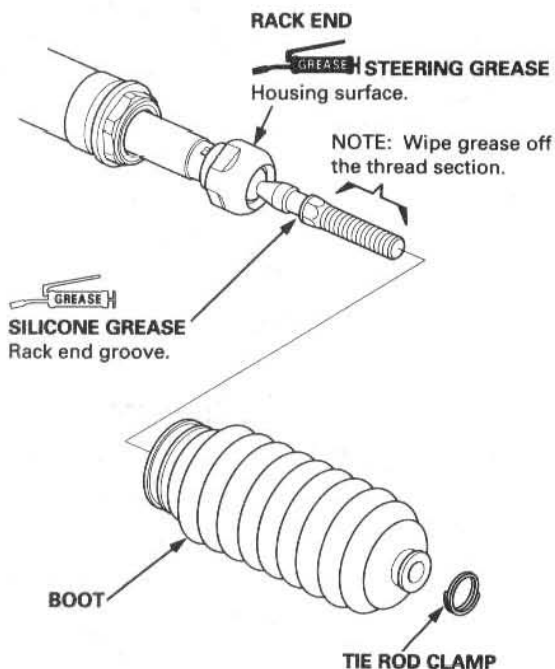


(cont'd)

Power Steering Gearbox

Reassembly (cont'd)

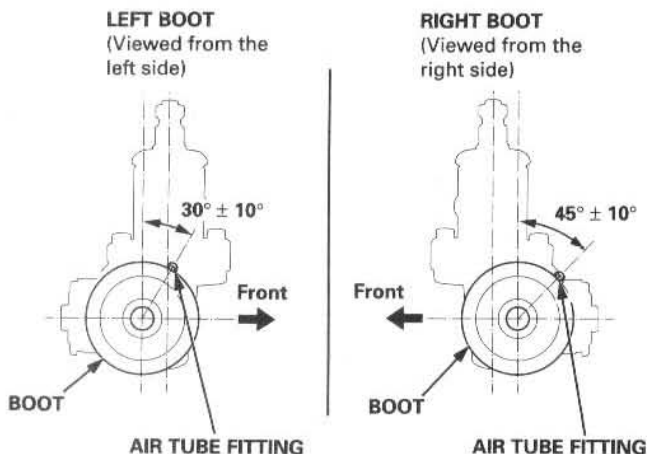
39. Apply steering grease to the circumference of the rack end housing.



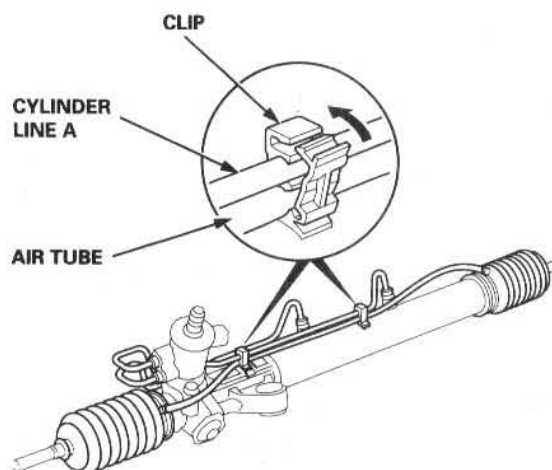
40. Coat the rack end groove and inside of the boot with silicone grease.
41. Install the boots in the rack end with the tie rod clamps.

NOTE: Install the boots with the rack, in the straight ahead position (right and left tie-rods are equal in length).

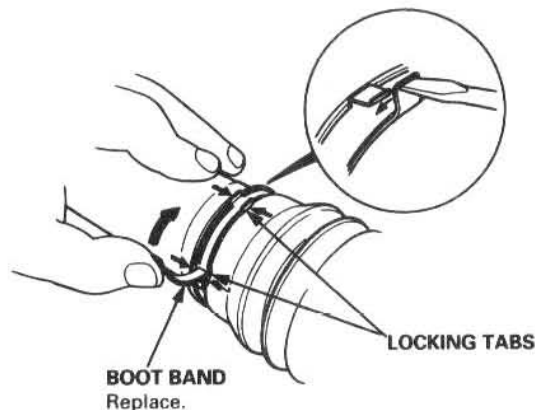
42. Adjust the air tube fitting position of the boots by turning it as shown below.



43. Connect the air tube between the right and left boot, then install the clips on the cylinder line A as shown.



44. Install new boot bands on the boot, and bend both sets of locking tabs.



45. Lightly tap on the doubled-over portions to reduce their height.

CAUTION: Stake the band locking tabs firmly.

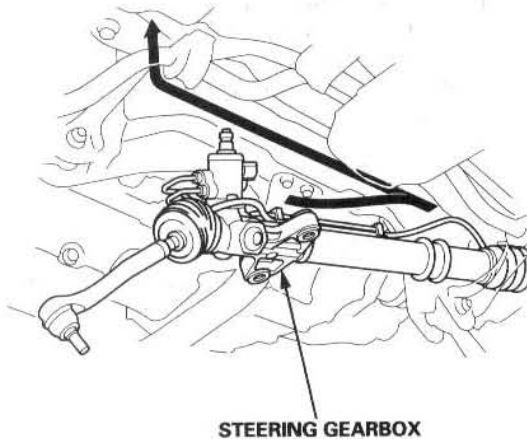
46. Slide the rack right and left to be certain that the boots are not deformed or twisted.



Installation

CAUTION: Be careful not to bend or damage the power steering lines when installing the gearbox.

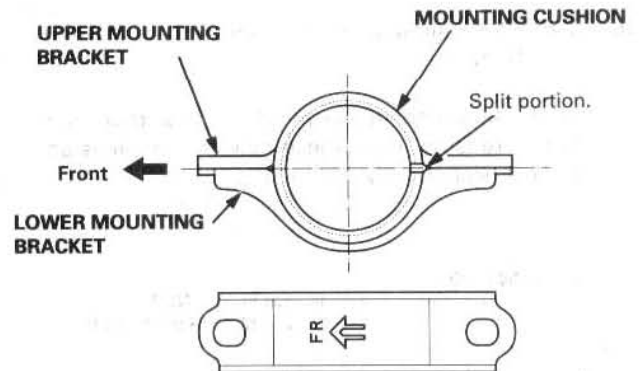
1. Before installing the gearbox, slide the rack all the way to right.
2. Pass the right side of the steering gearbox above and through the right side of the rear beam.
3. Raise the left side of the steering gearbox above and through the left side of the rear beam.



STEERING GEARBOX

4. Install the mounting cushion.

NOTE: Position the split portion of the mounting cushion as shown.



LEFT STIFFENER PLATE

RIGHT STIFFENER PLATE

10 mm
FLANGE BOLTS
38 N·m (3.9 kgf·m,
28 lbf·ft)

GEARBOX MOUNTING
BOLTS
43 N·m (4.4 kgf·m,
32 lbf·ft)

GEARBOX MOUNTING
BOLTS
38 N·m (3.9 kgf·m,
28 lbf·ft)

10 mm
FLANGE BOLTS
38 N·m (3.9 kgf·m,
28 lbf·ft)

5. Install the mounting brackets over the mounting cushion, then loosely install the right stiffener plate and left stiffener plate.
6. Tighten the mounting bolts on the stiffener plate first, then tighten the mounting bolts on the mounting brackets.

NOTE: Make sure that there is no interference between the cylinder lines and rear beam.

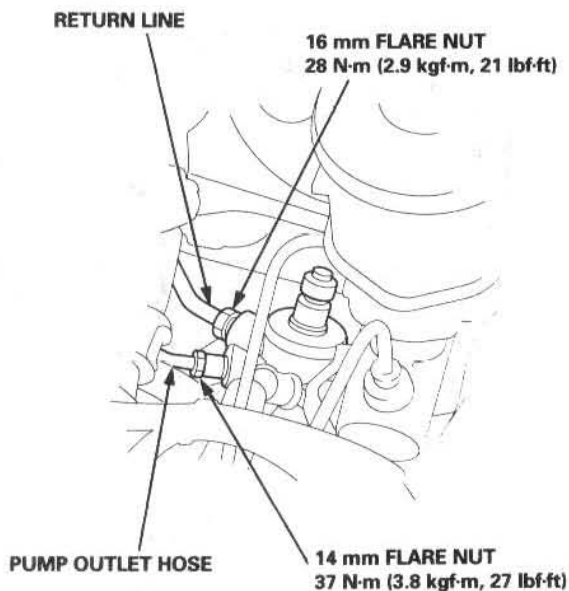
(cont'd)

Power Steering Gearbox

Installation (cont'd)

7. Install the exhaust pipe A (see section 9).
8. Reconnect the shift linkage (see section 13 or see section 14).
9. Connect the pump outlet hose and return line to the valve body unit.

NOTE: After connecting the fluid lines, make sure that there is no interference between the lines and the rear beam or any other parts.



10. Center the steering rack within its stroke.
11. Install the steering joint, and connect the steering shaft and pinion shaft.

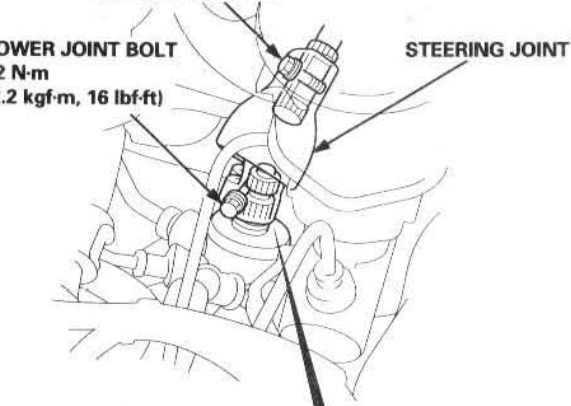
NOTE: Make sure the steering joint is connected as follows.

- Insert the upper end of the steering joint onto the steering shaft (line up the bolt hole with the flat on the shaft).
- Slip the lower end of the steering joint onto the pinion shaft.
If the steering wheel and rack are not centered, reposition the serrations at lower end of the steering joint.
- Install the lower joint bolt (line up the bolt hole with the groove around the shaft) and washer. Be sure that the lower joint bolt is securely in the groove in the pinion shaft.
- Pull on the steering joint to make sure that the steering joint is fully seated.
- Install upper joint bolt and washer, and tighten the upper joint bolt.

UPPER JOINT BOLT
22 N·m
(2.2 kgf·m, 16 lbf·ft)

LOWER JOINT BOLT
22 N·m
(2.2 kgf·m, 16 lbf·ft)

STEERING JOINT



UPPER JOINT BOLT
Bolt must line up
with flat on shaft.

Flat portion.

COLUMN
SHAFT

STEERING JOINT

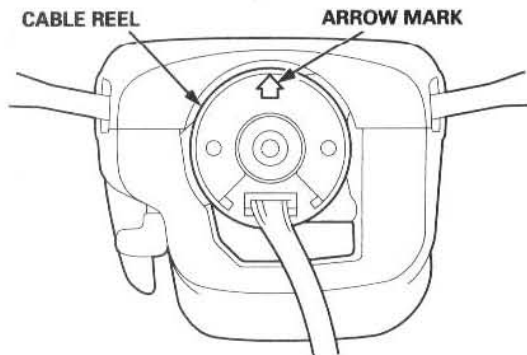
PINION SHAFT

LOWER JOINT BOLT
Bolt must line up with groove around on shaft.

Groove.



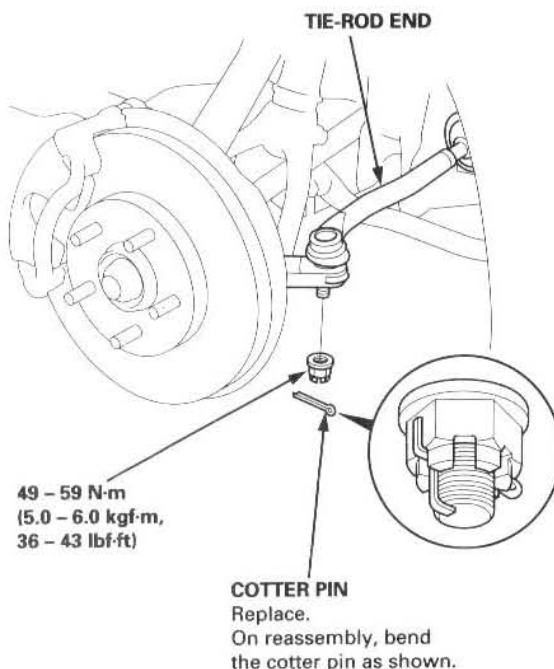
12. Center the cable reel by first rotating it clockwise until it stops. Then rotate it counter-clockwise (approximately two and a half turns) until the arrow mark on the label point straight up. Reinstall the steering wheel (see page 17-20).



13. Reconnect the tie-rod ends to the steering knuckles, tighten the castle nut to the specified torque, and install new cotter pins.

NOTE: Before connecting the tie-rod ends, wipe off any grease contamination from the ball joint tapered section and threads.

CAUTION: Torque the castle nut to the lower torque specification, then tighten it only far enough to align the slot with the pin hole. Do not align the nut by loosening.



14. Install the front wheels.

15. Fill the system with power steering fluid, and bleed air from the system (see page 17-15).

16. After installation, perform the following checks.

- Start the engine, allow it to idle, and turn the steering wheel from lock-to-lock several times to warm up the fluid. Check the gearbox for leaks (see page 17-24).
- Adjust the front toe (see section 18).
- Check the steering wheel spoke angle. Adjust by turning the right and left tie-rods, if necessary.

NOTE: Turn the right and left tie-rods equally.

17. On vehicles with ATTS: Make sure the front wheels are in the straight ahead (mechanical neutral position), then let the ATTS control unit memorize the steering angle sensor neutral position (see section 15).

Suspension

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		Reassembly	18-29
		Installation	18-30



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Special Tools

Ref. No.	Tool Number	Description	Qty	Page Reference
①	07GAF – SE00100	Hub Dis/Assembly Tool	1	18-16, 17
②	07GAF – SD40310	Ball Joint Remover Base	1	18-19
③	07GAF – SD40320	Ball Joint Installer Base	1	18-19
④	07GAF – SD40330	Ball Joint Remover/Installer	1	18-19
⑤	07HAF – SF10110	Installer Remover	1	18-20
⑥	07MAC – SL00200	Ball Joint Remover, 28 mm	1	18-15, 16
⑦	07MAD – PR90100	Attachment, 45 x 55 mm	1	18-20
⑧	07749 – 0010000	Driver	1	18-17, 18
⑨	07947 – 6340400	Attachment, 62 x 64 mm	1	18-17
⑩	07965 – SA00600	Attachment, 64 x 69 mm	1	18-18
⑪	07965 – SD90100	Support Base	1	18-17, 18
⑫	07974 – SA50700	Ball Joint Boot Clip Guide	1	18-19
⑬	07974 – SA50800	Ball Joint Boot Clip Guide	1	18-28



①



②

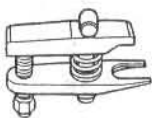


③



④

⑤



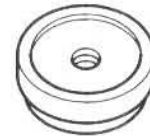
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⑦



⑧



⑨

⑩



⑪



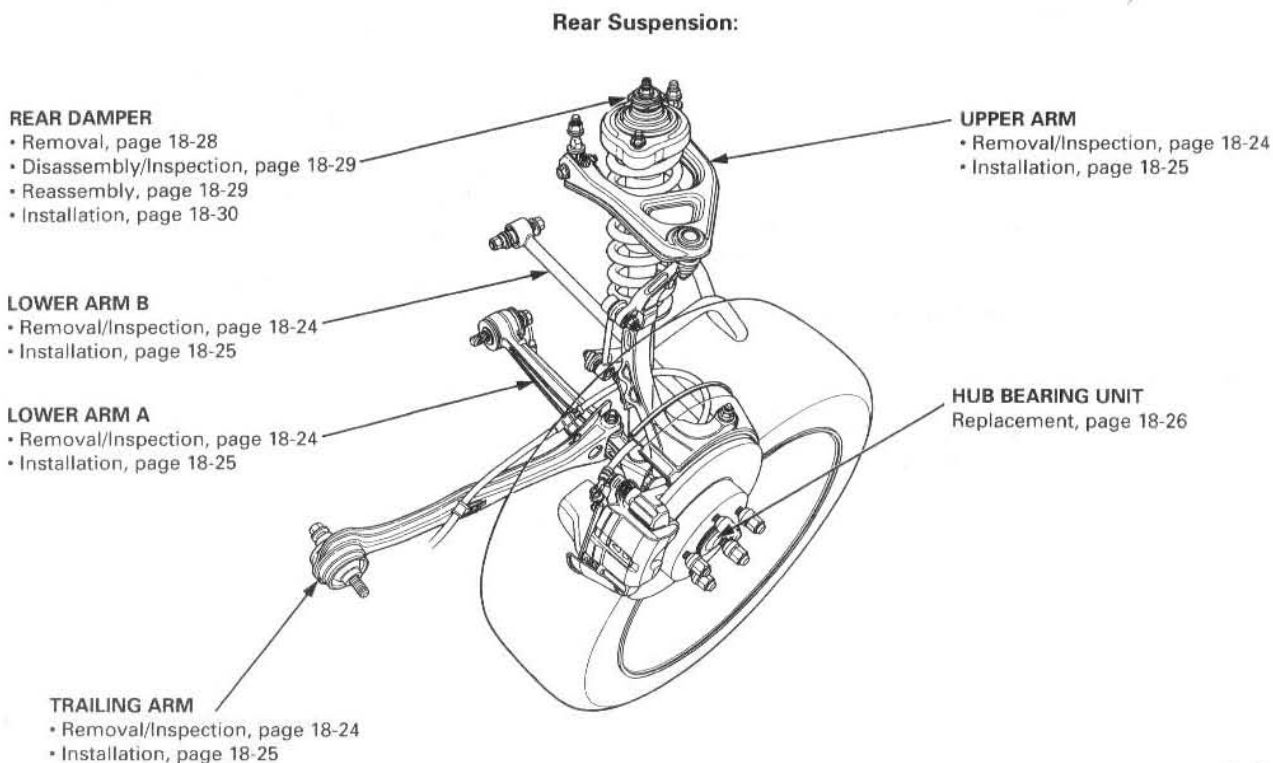
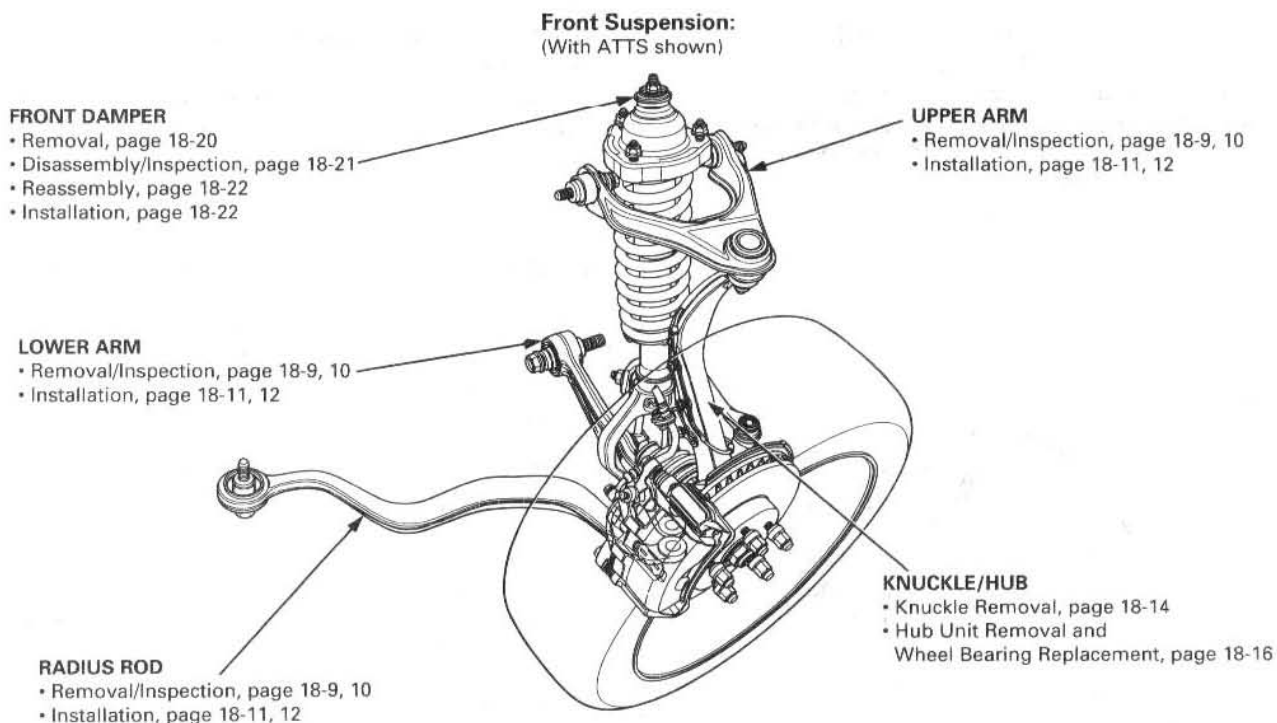
⑫

⑬



Index

Wheel Alignment, page 18-4

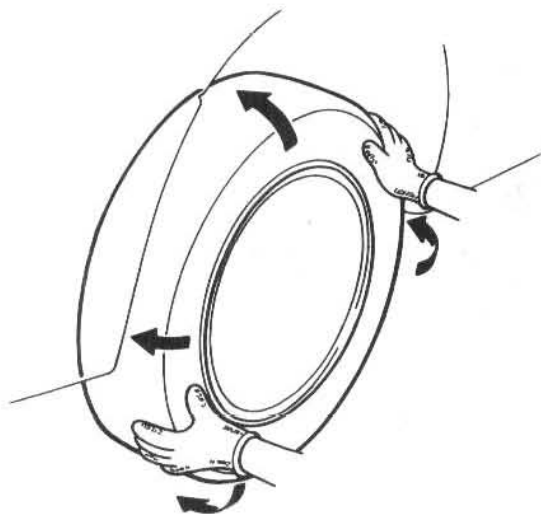


Wheel Alignment

Caster

NOTE: For proper inspection/adjustment of the wheel alignment, check and adjust the following before checking the alignment.

- Check that the suspension is not modified.
- Check the tire size and tire pressure.
- Check the runout of the wheels and tires.
- Check the suspension ball joints. (Hold a wheel with your hands and move it up and down and right and left to check for wobbling.)



Inspection

NOTE: Use commercially-available computerized four wheel alignment equipment to measure wheel alignment (caster, camber, toe, and/or turning angle). Follow the equipment manufacturer's instructions.

1. Check the caster angle.

**Caster angle: $4^{\circ}20' \pm 45'$ (With ATTS)
 $2^{\circ}40' \pm 1^{\circ}$ (Without ATTS)**

2. If out of specification, record the caster reading, then adjust the caster.

Adjustment

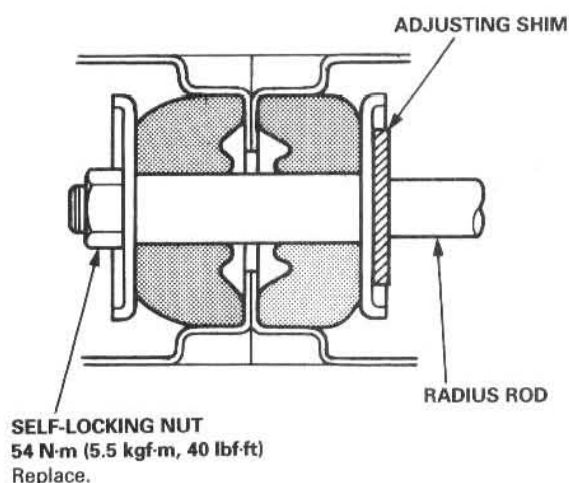
Without ATTS:

NOTE: Caster angle can be adjusted by increasing or decreasing the number of the adjusting shims. Remove and install the radius rod each time the caster angle is adjusted.

1. Raise the front of the vehicle, and support it with safety stands in the proper locations (see section 1).
2. Remove the self-locking nut on the end of the radius rod.
3. Remove the flange bolts at the radius rod on the lower arm, and remove the radius rod (see page 18-9).
4. Adjust the caster angle by increasing or decreasing the adjusting shims.

NOTE:

- Do not use more than two adjusting shims.
- One adjusting shim changes the caster angle by $40'$ and the caster angle can be adjusted by $1^{\circ}20'$ maximum.
- One adjusting shim is 3.2 mm (0.13 in) in thickness



5. After the adjustment, install the radius rod onto the lower arm, and tighten the flange bolts (see page 18-11)
6. Tighten the new self-locking nut to the specified torque.

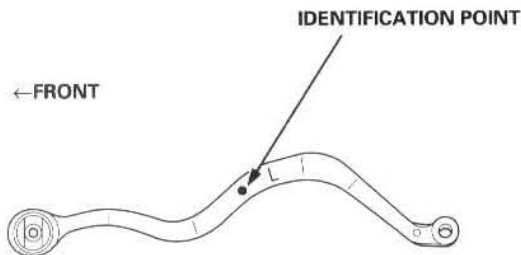


With ATTS:

NOTE: Caster angle adjustment on vehicles with ATTS system is made by substituting radius rods of different lengths.

1. Raise the front of the vehicle, and support it with safety stands in the proper locations (see section 1).
2. Remove the radius rod from the knuckle (see page 18-18).
3. Install the appropriate length radius rod to adjust the caster angle.
 - Increasing/decreasing the radius rod length by 2.5 mm changes the caster angle by 25'.
 - If there is excessive gap between the measured caster angle and the standard, check for a bent sub frame and knuckle.

RADIUS ROD SIZE	IDENTIFICATION	
	MARK	PAINT
+2.5 mm	+	BLUE
STANDARD	●	ORANGE
-2.5 mm	-	WHITE



Camber

Inspection

NOTE: Use commercially-available computerized four wheel alignment equipment to measure wheel alignment (caster, camber, toe, and/or turning angle). Follow the equipment manufacturer's instructions.

1. Check the camber angle.

Camber angle:

Front: $0^{\circ}00' \pm 1^{\circ}$

Rear: $-0^{\circ}45' \pm 1^{\circ}$

2. If out of specification, check for bent or damaged suspension components.

Wheel Alignment

Front Toe Inspection/Adjustment

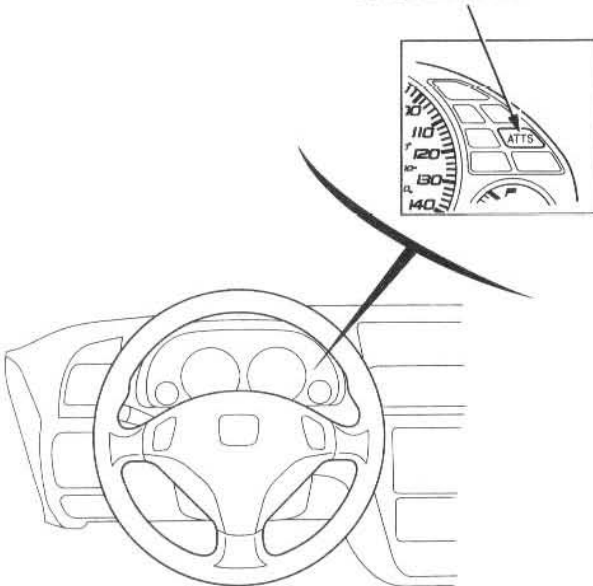
NOTE:

- Use commercially available computerized four wheel alignment equipment to measure wheel alignment (caster, camber, toe, and turning angle). Follow the equipment manufacturer's instructions.
- For vehicles equipped with ATTS: After wheel alignment, make sure the front wheels are straight ahead (mechanical neutral position), then let the ATTS control unit memorize the neutral position (see section 15).

1. Check the tire pressure.
2. Without ATTS: Set the front wheels to the straight ahead position.
With ATTS: Set the front main steering angle sensor in the neutral position, and jump the service check connector to turn the ATTS indicator ON (see section 15).

NOTE: Maintain this condition during inspection and adjustment.

ATTS INDICATOR



3. Check the front toe.

Front toe: 0 ± 2.0 mm (0 ± 0.08 in)

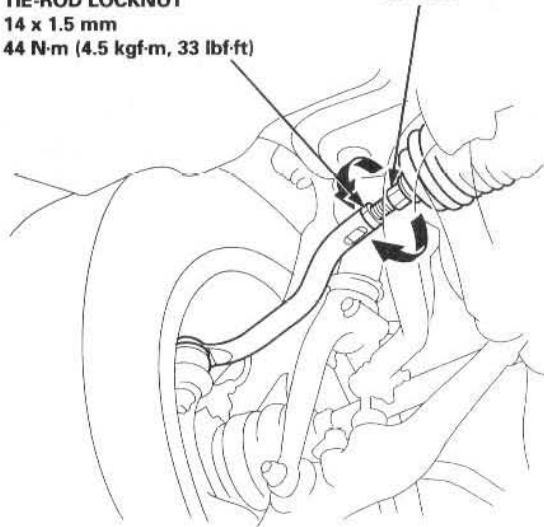
- If adjustment is required, go on to step 5.
- If no adjustment is required, remove alignment equipment.

4. Loosen the tie-rod locknuts and turn both tie-rods in the same direction until the front wheels are in straight ahead position.
5. Turn both tie-rods equally until the toe is correct.
6. After adjusting, tighten the tie-rod locknuts.

NOTE: Reposition the tie-rod boot if it is twisted or displaced.

TIE-ROD LOCKNUT
14 x 1.5 mm
44 N·m (4.5 kgf·m, 33 lbf·ft)

TIE-ROD





Rear Toe Inspection/Adjustment

NOTE:

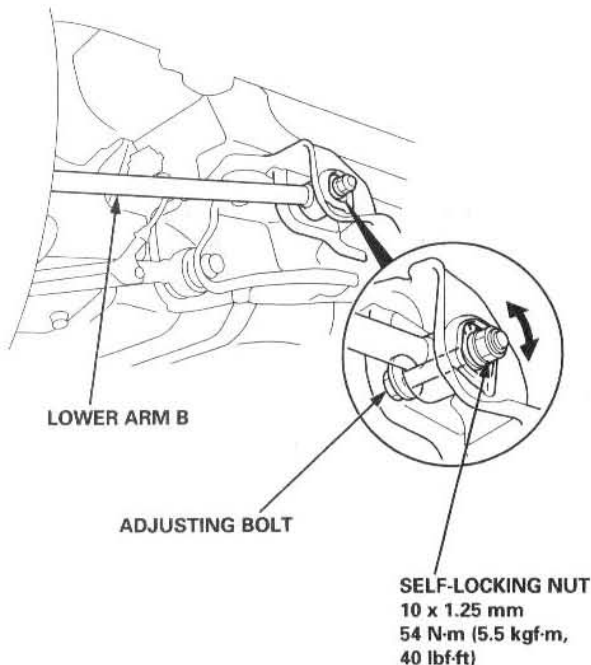
- Use commercially available computerized four wheel alignment equipment to measure wheel alignment (caster, camber, toe, and turning angle). Follow the equipment manufacturer's instructions.
- For vehicles equipped with ATTS: After wheel alignment, make sure the front wheels are straight ahead (mechanical neutral position), then let the ATTS control unit memorize the neutral position (see section 15).

1. Release the parking brake.

NOTE: If the parking brake is engaged, you may get an incorrect reading.

Rear toe-in: 2 ± 2 mm (0.08 ± 0.08 in)

- If adjustment is required, go to step 2.
 - If no adjustment is required, remove alignment equipment.
2. Hold the adjusting bolt on the rear lower arm B and loosen the self-locking nut.



3. Adjust the rear toe by turning the adjusting bolt until toe is correct.
4. Install the self-locking nut, and tighten it while holding the adjusting bolt.

Turning Angle Inspection

NOTE: Use commercially-available computerized four wheel alignment equipment to measure wheel alignment (caster, camber, toe, and/or turning angle). Follow the equipment manufacturer's instructions.

1. Turn the wheel right and left while applying the brake, and measure the turning angle of both wheels.

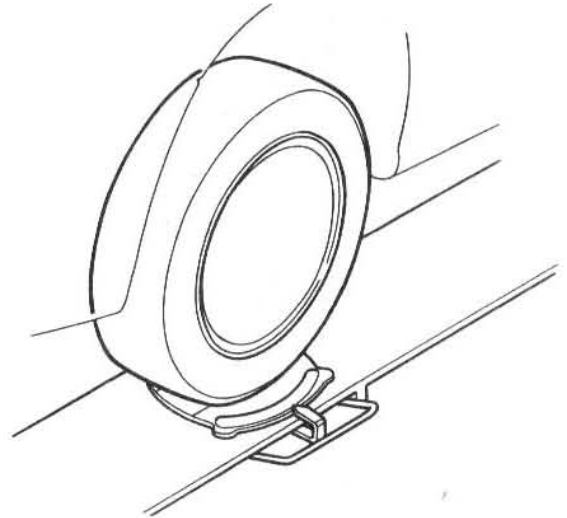
Turning angle:

Inward wheel: $34^{\circ}50' \pm 2^{\circ}$ (With ATTS)

$36^{\circ}20' \pm 2^{\circ}$ (Without ATTS)

Outward wheel (reference): $28^{\circ}50'$ (With ATTS)

$29^{\circ}40'$ (Without ATTS)



2. If the turning angle is not within the specifications, check for bent or damaged suspension components.

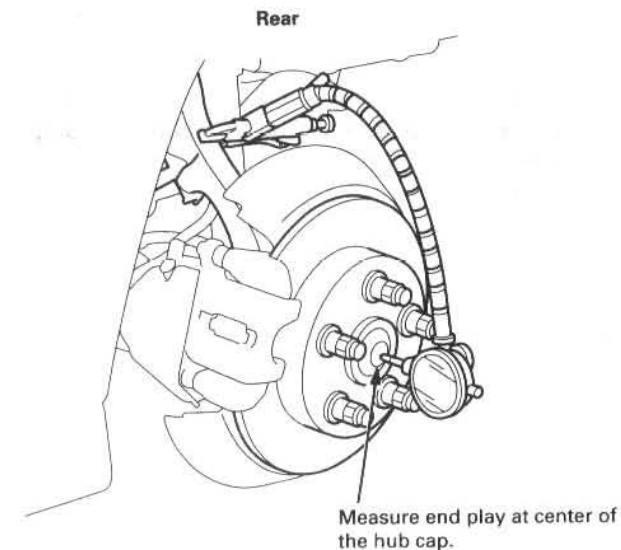
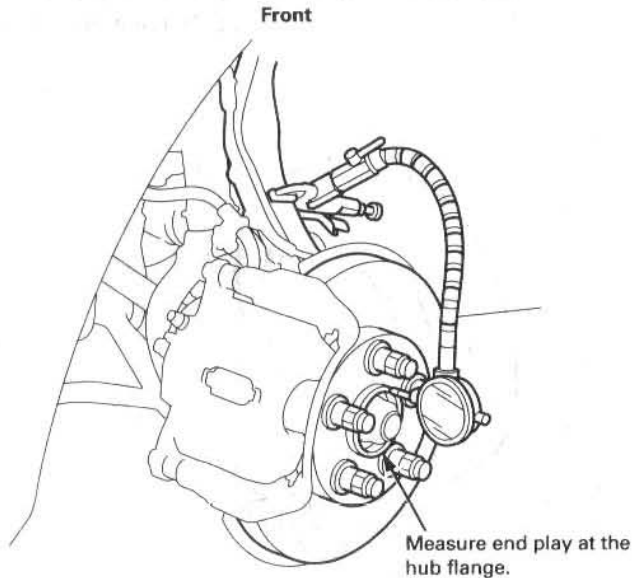
Wheel/Hub Inspection

Bearing End Play

1. Raise the vehicle off the ground, and support it with safety stands in the proper locations (see section 1).
2. Remove the wheels, then reinstall the wheel nuts.
3. Attach the dial gauge as shown.
4. Measure the bearing end play by moving the disc in or outward.

Front/Rear:

Standard: 0 – 0.05 mm (0 – 0.002 in)



5. If the bearing end play measurement is more than the standard, replace the wheel bearing.

Wheel Runout

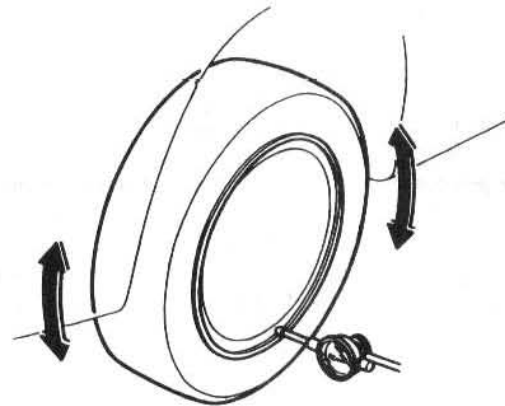
1. Raise the vehicle off the ground, and support it with safety stands in the proper locations (see section 1).
2. Check for bent or deformed wheels.
3. Attach the dial gauge as shown.
4. Measure the wheel runout by turning the wheel.

Axial Runout

Standard:

Aluminum Wheel: 0 – 0.7 mm (0 – 0.03 in)

Service Limit: 2.0 mm (0.08 in)

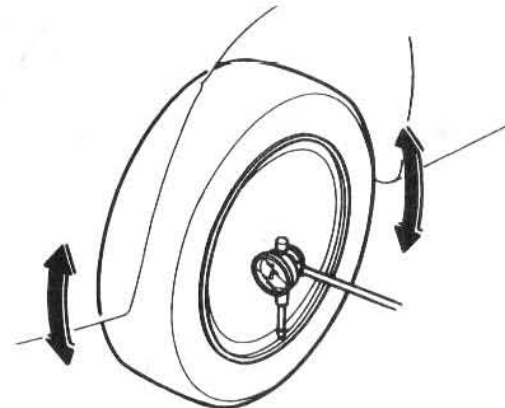


Radial Runout

Standard:

Aluminum Wheel: 0 – 0.7 mm (0 – 0.03 in)

Service Limit: 1.5 mm (0.06 in)



5. If the wheel runout is more than the service limit, replace the wheel.

Front Suspension



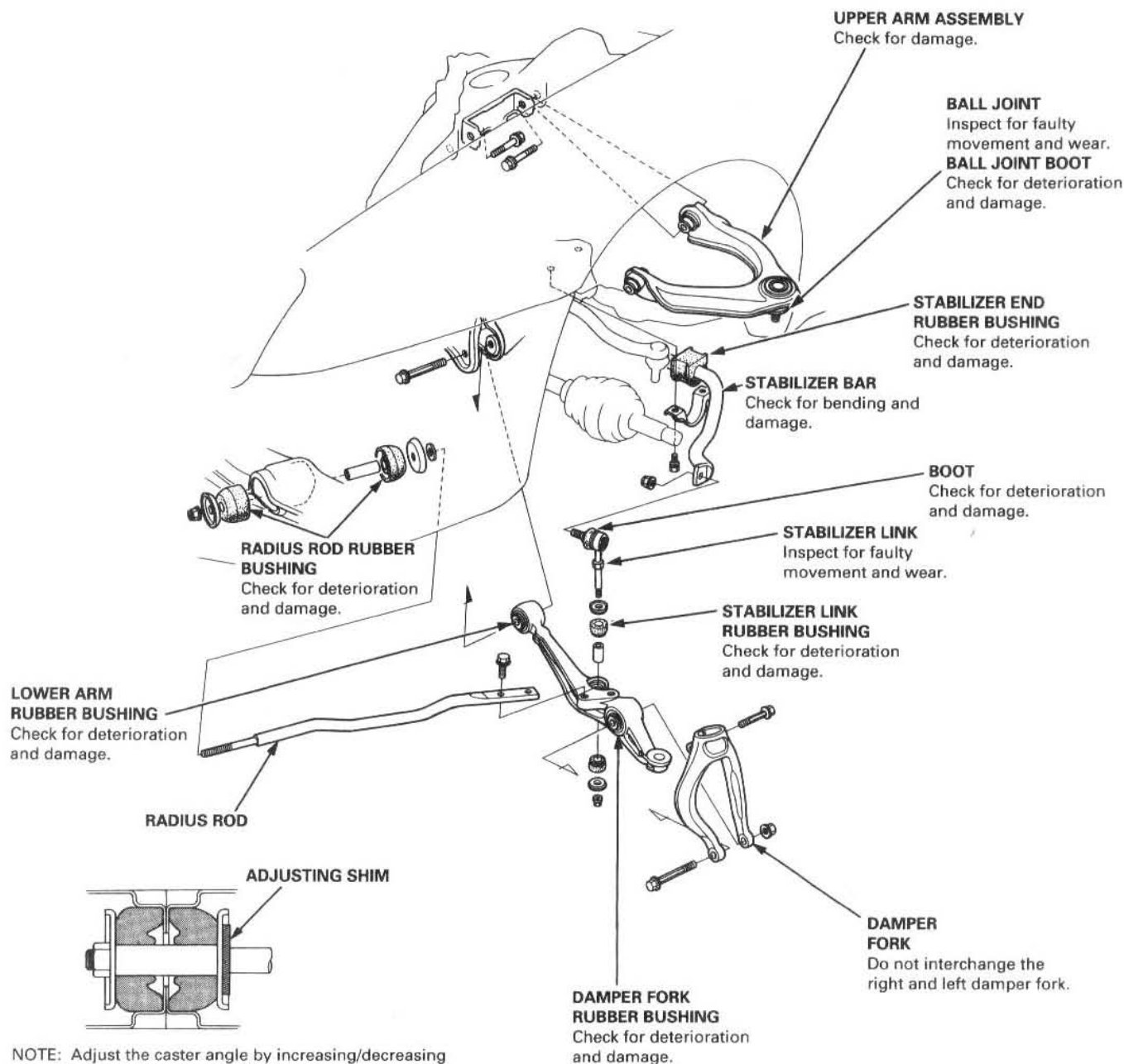
Suspension Arms

Removal/Inspection (Without ATTS)

CAUTION:

- Replace the self-locking nuts after removal.
- Be careful not to damage the ball joint boot.

NOTE: The front damper must be removed before you remove the front upper arm.



(cont'd)

Front Suspension

Suspension Arms (cont'd)

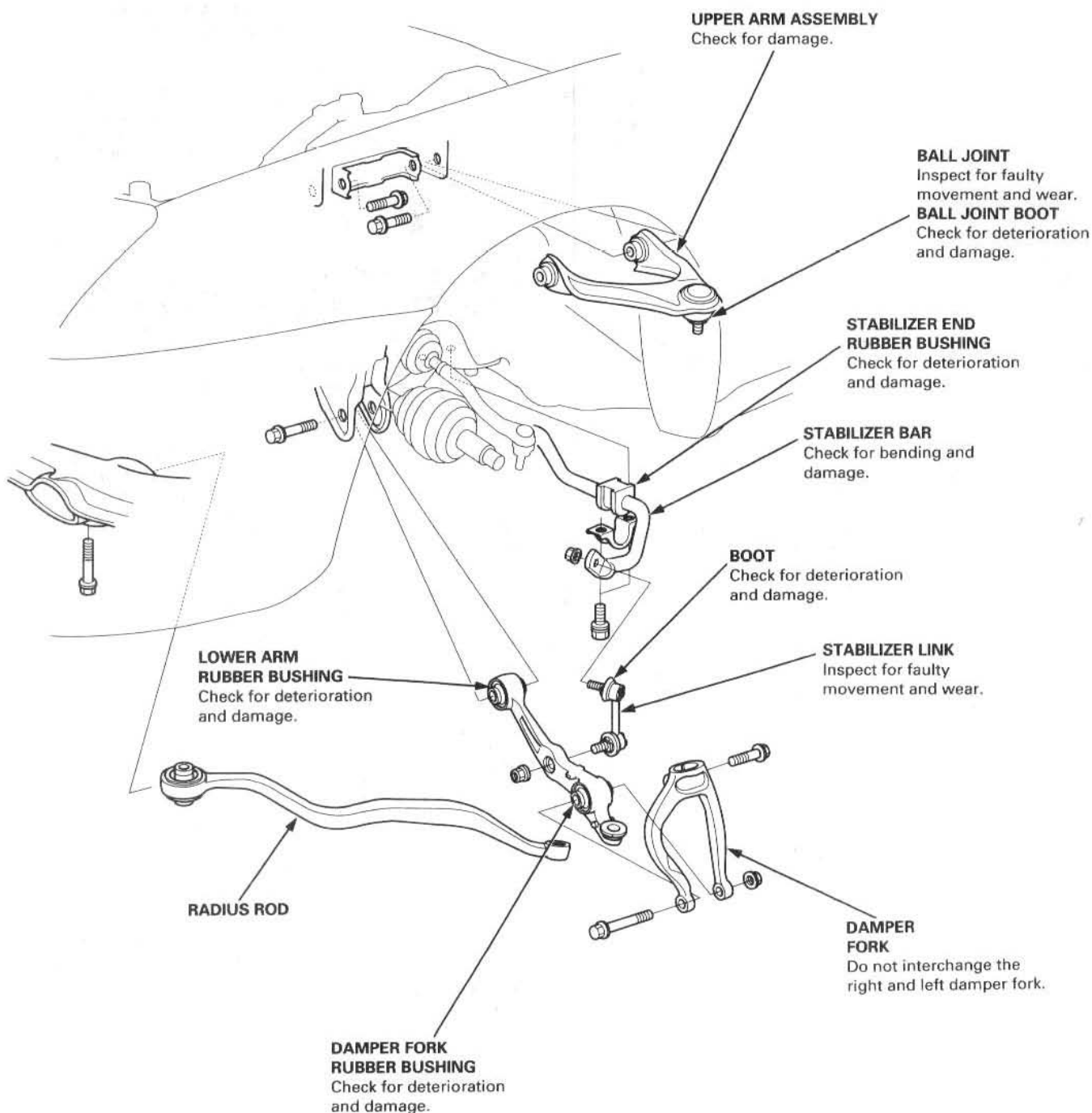
Removal/Inspection (With ATTS)

CAUTION:

- Replace the self-locking nuts after removal.
- Be careful not to damage the ball joint boot.

NOTE:

- The front damper must be removed before you remove the front upper arm.
- When removing the radius rod, remove the ball joint side first.





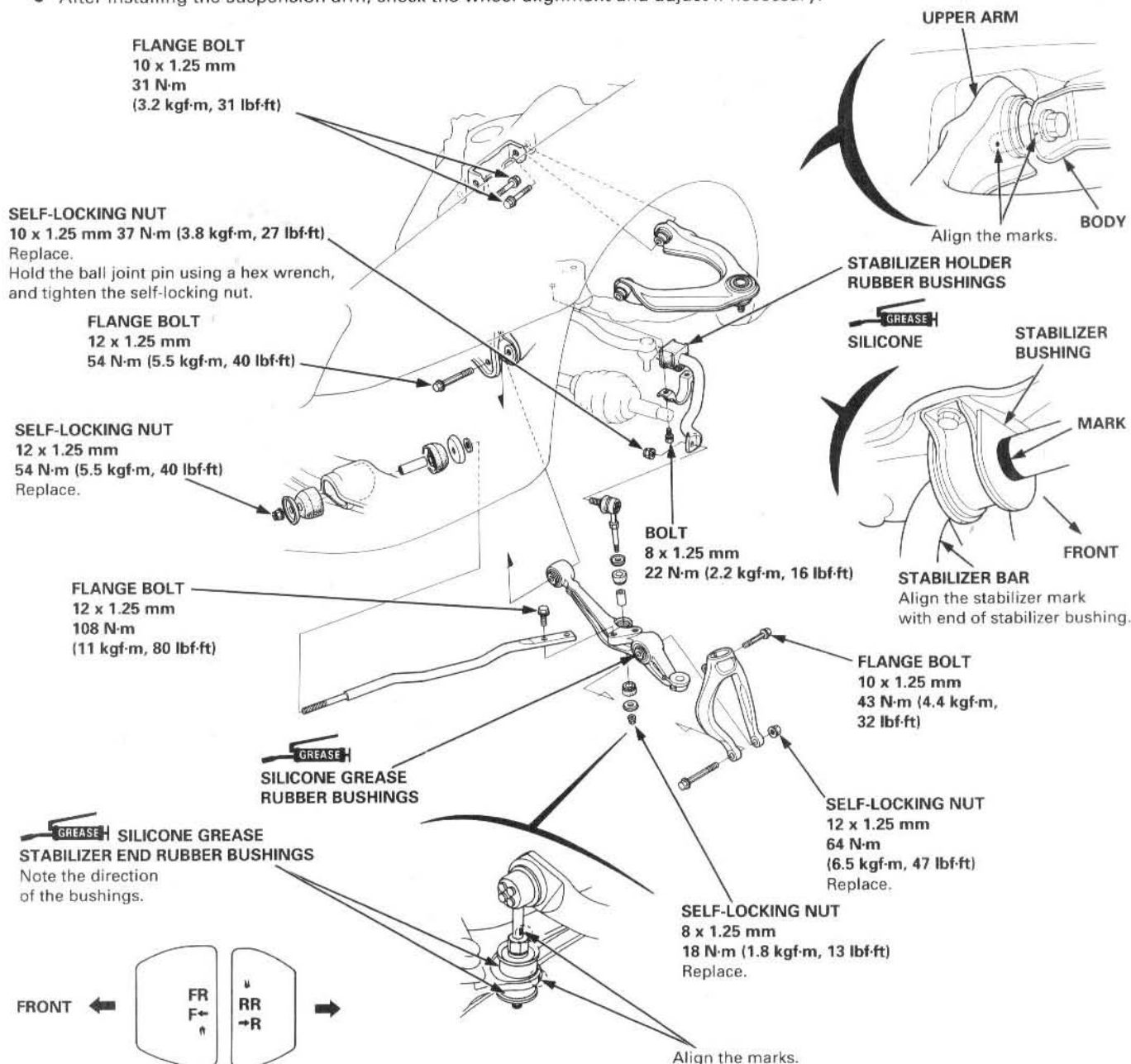
Installation (Without ATTS)

CAUTION:

- Install the upper arm by aligning the upper arm mark with the body mark as shown. Tighten the upper arm mounting bolts with the front wheels raised off the ground.
- Torque the castle nut to the lower torque specification, then tighten it only far enough to align the slot with the pin hole. Do not align the nut by loosening.

NOTE:

- Wipe off the grease before tightening the nut at the ball joint.
- After installing the suspension arm, check the wheel alignment and adjust if necessary.



CAUTION: Do not interchange the radius rod rubber bushings.

(cont'd)

Front Suspension

Suspension Arms (cont'd)

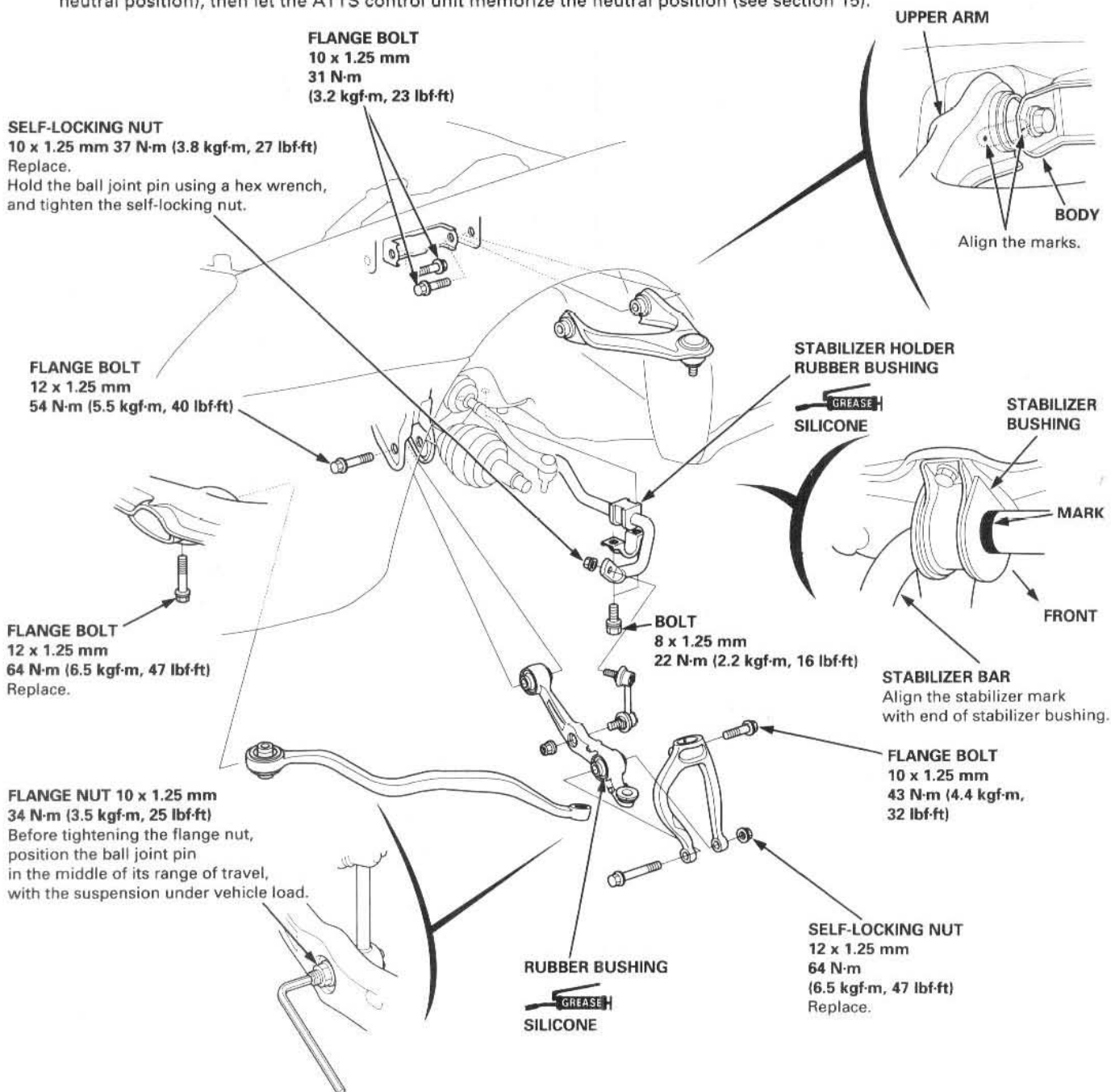
Installation (With ATTS)

CAUTION:

- Install the upper arm by aligning the upper arm mark with the body mark as shown. Tighten the upper arm mounting bolts with the front wheels raised off the ground.
- Torque the castle nut to the lower torque specification, then tighten it only far enough to align the slot with the pin hole. Do not align the nut by loosening.

NOTE:

- Wipe off the grease before tightening the nut at the ball joint.
- After installing the suspension arm, check the wheel alignment and adjust if necessary.
- For vehicles equipped with ATTS: After wheel alignment, make sure the front wheels are straight ahead (mechanical neutral position), then let the ATTS control unit memorize the neutral position (see section 15).





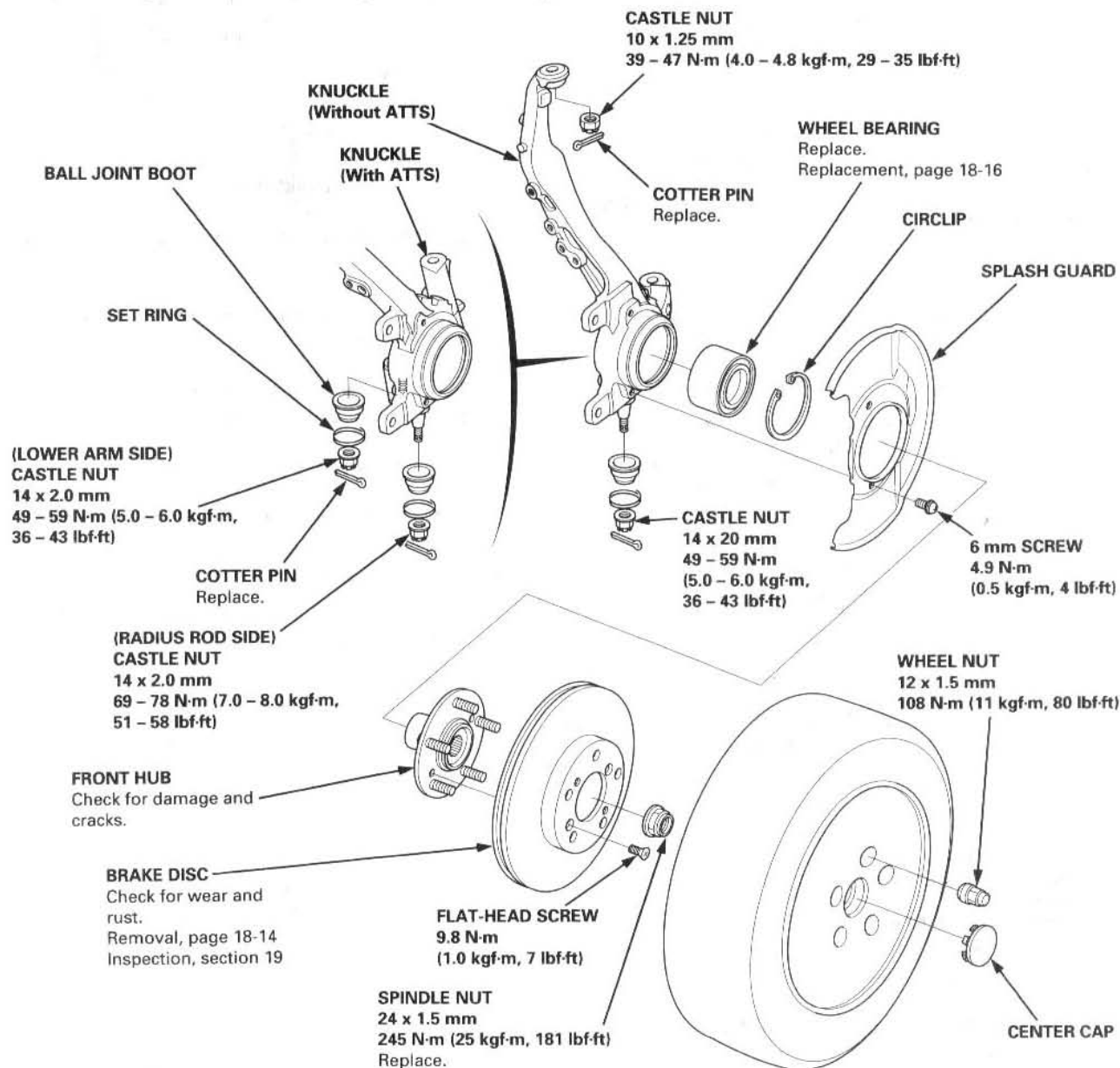
Knuckle/Hub Replacement

CAUTION:

- The vehicle should be on the ground before any bolts or nuts connected to rubber mounts or bushings are tightened.
- Torque the castle nut to the lower torque specification, then tighten it only far enough to align the slot with the pin hole. Do not align the nut by loosening.

NOTE:

- Use only genuine Honda wheel weights for aluminum wheels. Non-genuine wheel weights may corrode and damage the aluminum wheels.
- On the aluminum wheels, remove the center cap from the inside of the wheel after removing the wheel.
- Before installing the brake disc, clean the mating surfaces of the front hub and brake disc.
- Before installing the wheel, clean the mating surfaces of the brake disc and wheel.
- Wipe off the grease before tightening the nut at the ball joint.

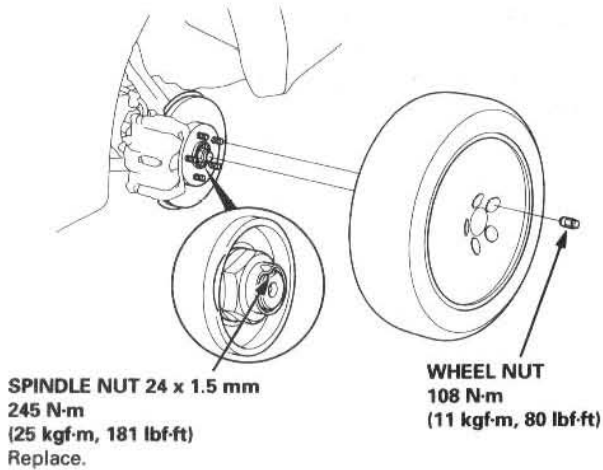


(cont'd)

Front Suspension

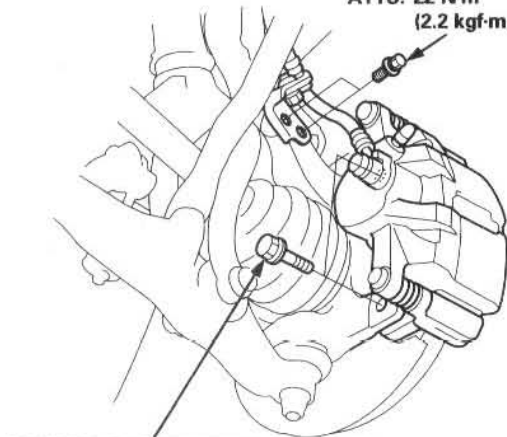
Knuckle/Hub Replacement (cont'd)

1. Loosen the wheel nuts slightly.
2. Raise the front of the vehicle, and support it with safety stands in the proper locations (see section 1).
3. Remove the wheel nuts and front wheel.



4. Raise the locking tab on the spindle nut, then remove the nut.
5. Remove the mounting bolts for the brake hose bracket.

BRAKE HOSE MOUNTING BOLTS
WITHOUT ATTS: 9.8 N-m
(1.0 kgf-m, 7 lbf-ft)
ATTS: 22 N-m
(2.2 kgf-m, 16 lbf-ft)

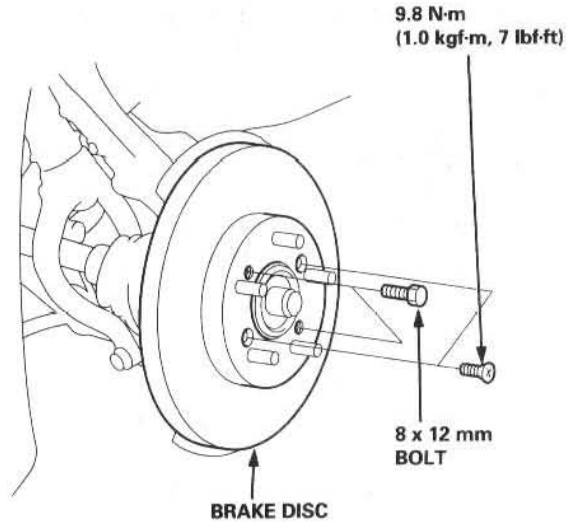


CALIPER BRACKET MOUNTING BOLTS
12 x 1.25 mm
108 N-m (11 kgf-m, 80 lbf-ft)

6. Remove the caliper mounting bolts and hang the caliper assembly to one side.

CAUTION: To prevent accidental damage to the caliper assembly or brake hose, use a short piece of wire to hang the caliper assembly from the under-carriage.

7. Remove the 6 mm brake disc retaining screws.



CAUTION: Be careful not to damage the ball joint boot.

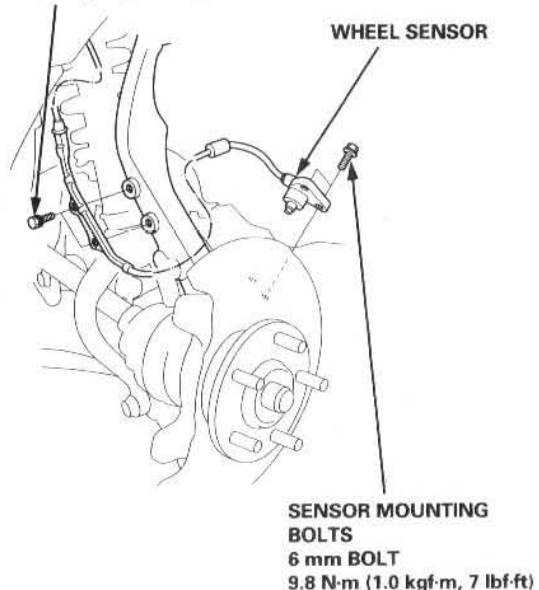
8. Screw two 8 x 12 mm bolts into the disc to push it away from the hub.

NOTE: Turn each bolt two turns at a time to prevent cocking the disc excessively.

9. Remove the wheel sensor from the knuckle.

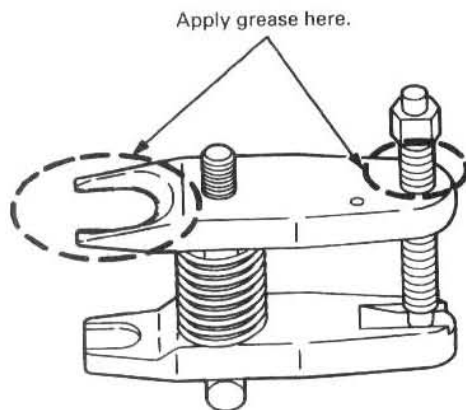
NOTE: Do not disconnect the wheel sensor connector.

9.8 N-m (1.0 kgf-m, 7 lbf-ft)



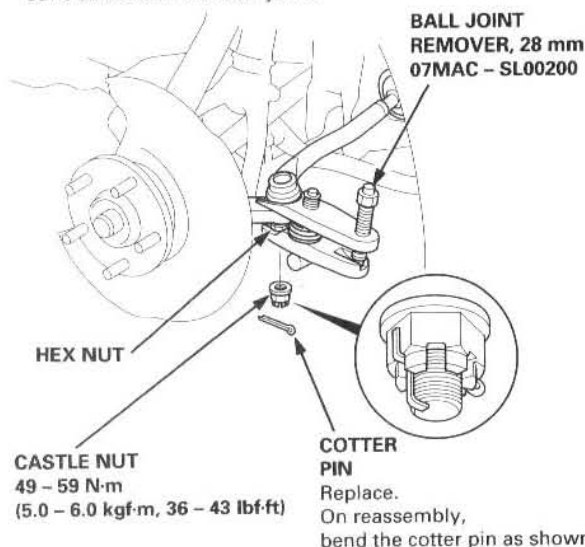


10. Clean any dirt or grease off the ball joint.
11. Remove the cotter pin from the ball joint castle nut, and remove the nut.
12. Install a 12 mm hex nut on the ball joint. Be sure that the 12 mm hex nut is flush with the ball joint pin end to prevent damage to the threaded end of the ball joint.
13. Apply grease to the special tool on the areas shown. This will ease installation of the tool and prevent damage to the pressure bolt threads.

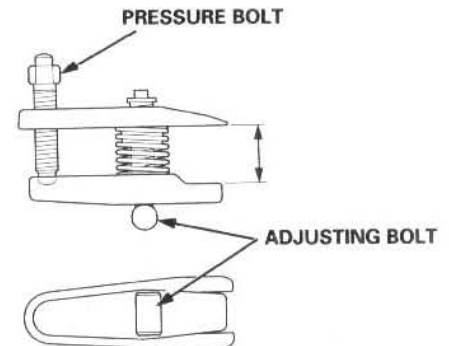


14. Install the special tool as shown. Insert the jaws carefully, making sure you do not damage the ball joint boot. Adjust the jaw spacing by turning the pressure bolt.

NOTE: If necessary, apply penetrating type lubricant to loosen the ball joint.



15. Once the tool is in place, turn the adjusting bolt as necessary to make the jaws parallel. Then hand tighten the pressure bolt, and recheck the jaws to make sure they are still parallel.



NOTE: After making the adjustment to the adjusting bolt, be sure the head of the adjusting bolt is in this position to allow the jaw to pivot.

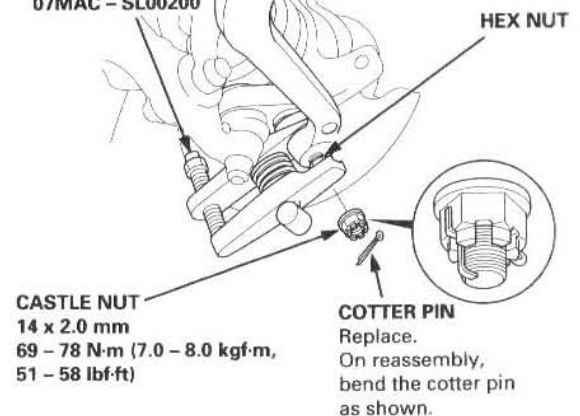
16. With a wrench, tighten the pressure bolt until the ball joint shaft pops loose from the steering arm.

⚠ WARNING Wear eye protection. The ball joint can break loose suddenly and scatter dirt or other debris in your eyes.

17. Remove the tool, then remove the nut from the end of the ball joint, and pull the ball joint out of the steering/suspension arm. Inspect the ball joint boot, and replace it if damaged.

18. Remove the cotter pin and radius rod ball joint nut (ATTS only).

**BALL JOINT REMOVER, 28 mm
07MAC - SL00200**



19. Install a 14 mm hex nut on the ball joint. Be sure that the hex nut is flush with the ball joint pin end, or the threaded section of the ball joint pin might be damaged by the ball joint remover.
20. Use the ball joint remover as shown on step 15 to separate the ball joint and radius rod.

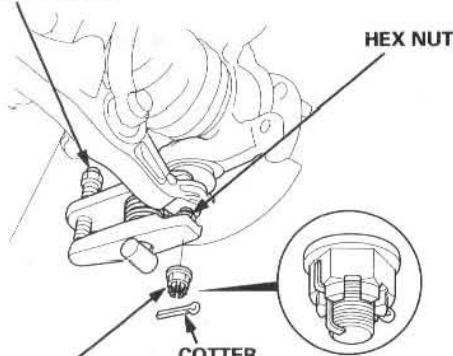
NOTE: If necessary, apply penetrating type lubricant to loosen the ball joint. (cont'd)

Front Suspension

Knuckle/Hub Replacement (cont'd)

21. Remove the cotter pin and lower arm ball joint nut.

BALL JOINT REMOVER, 28 mm
07MAC - SL00200



CASTLE NUT
49 - 59 N·m
(5.0 - 6.0 kgf·m,
36 - 43 lbf·ft)

COTTER PIN
Replace.
On reassembly,
bend the cotter pin as shown.

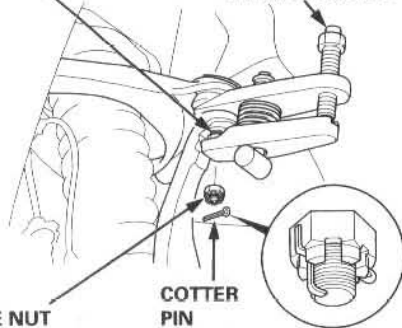
22. Install a 14 mm hex nut on the ball joint. Be sure that the 14 mm hex nut is flush with the ball joint pin end, or the threaded section of the ball joint pin might be damaged by the ball joint remover.
23. Use the special tool as shown on page 18-15 to separate the ball joint and lower arm.

NOTE: If necessary, apply penetrating type lubricant to loosen the ball joint.

24. Remove the cotter pin and the upper ball joint nut.

HEX NUT

BALL JOINT REMOVER, 28 mm
07MAC - SL00200



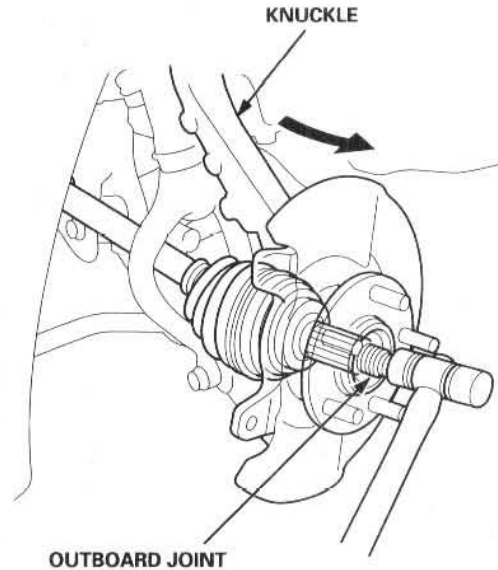
CASTLE NUT
39 - 47 N·m
(4.0 - 4.8 kgf·m,
29 - 35 lbf·ft)

COTTER PIN
Replace.
On reassembly, bend
the cotter pin as shown.

25. Install a 10 mm hex nut on the ball joint. Be sure that the 10 mm hex nut is flush with the ball joint pin end, or the threaded section of the ball joint pin might be damaged by the ball joint remover.
26. Use the special tool as shown on page 18-15 to separate the ball joint and knuckle.

NOTE: If necessary, apply penetrating type lubricant to loosen the ball joint.

27. Pull the knuckle outward, and remove the driveshaft outboard joint from the knuckle by tapping the driveshaft end with a plastic hammer, then remove the knuckle.



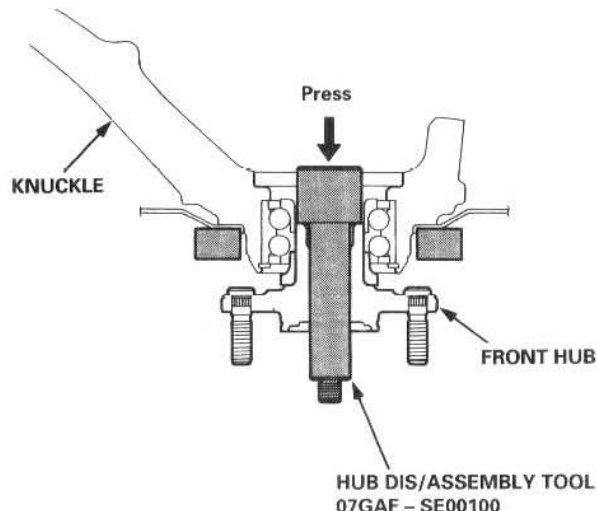
Wheel Bearing Replacement

NOTE: Replace the bearing with a new one after removal.

28. Separate the hub from the knuckle using the special tool and a hydraulic press.

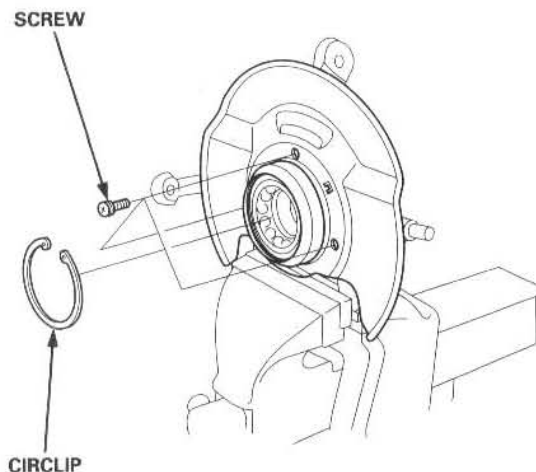
CAUTION:

- Take care not to distort the splash guard.
- Hold onto the hub to keep it from falling when pressed clear.

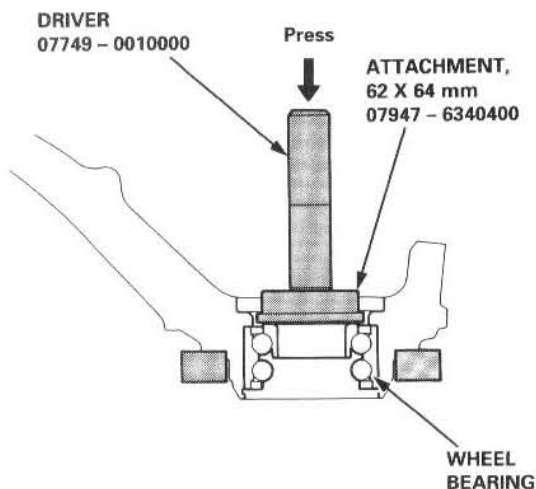




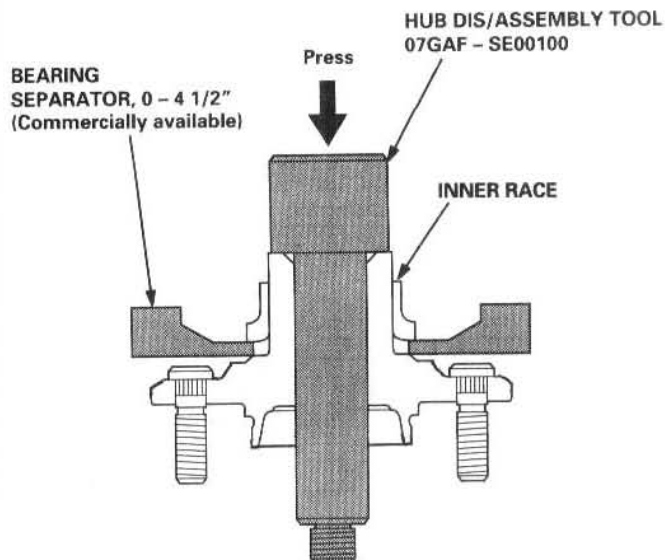
29. Remove the circlip and the splash guard from the knuckle.



30. Press the wheel bearing out of the knuckle using a hydraulic press and the special tools shown below.

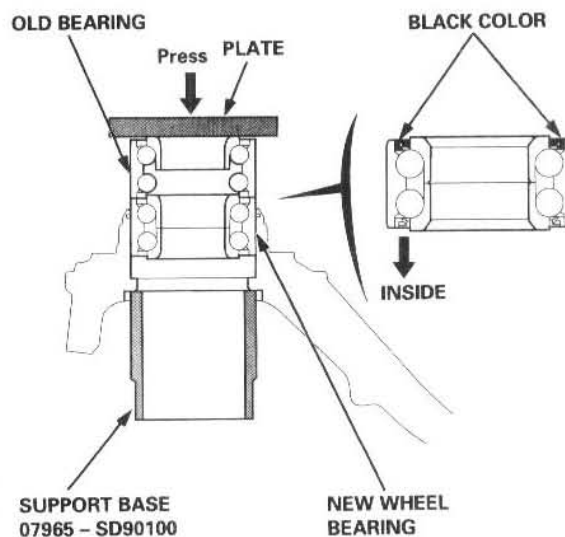


31. Remove the outboard bearing inner race from the hub using the tools shown.



NOTE: Wash the knuckle and hub thoroughly in high flash point solvent before reassembly.

32. Press a new wheel bearing into the knuckle using the old bearing, a plate, the special tool and a press.

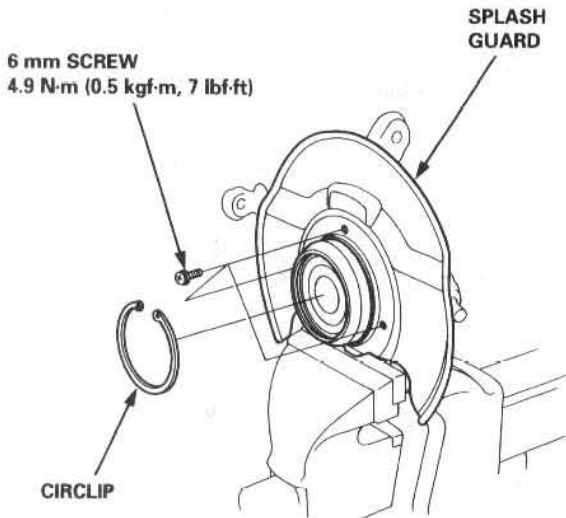


(cont'd)

Front Suspension

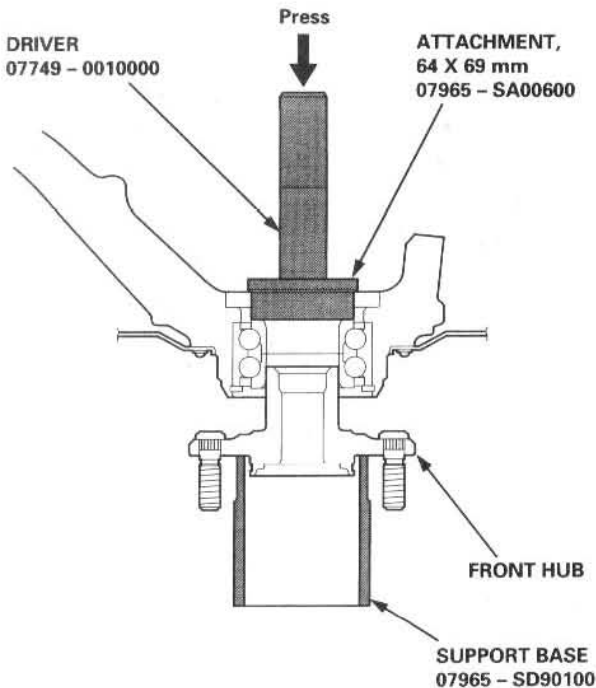
Knuckle/Hub Replacement (cont'd)

33. Install the circlip securely in the knuckle groove.
34. Install the splash guard and tighten the screws.



35. Install the hub on the knuckle using the special tools shown and a hydraulic press.

CAUTION: Take care not to distort the splash guard.



36. Install the knuckle in the reverse order of removal, and pay particular attention to the following items:

- Be careful not to damage the ball joint boots when installing the knuckle.
- Torque all mounting hardware to the specified torque values.
- Torque the castle nuts to the lower torque specifications, then tighten them only far enough to align the slot with the pin hole. Do not align the castle nut by loosening.
- Install new cotter pins on the castle nuts after torquing.
- Avoid twisting the sensor wires when installing the wheel sensor.
- Before installing the brake disc, clean the mating surfaces of the front hub and the inside of the brake disc.
- Before installing the wheel, clean the mating surface of the brake disc and the inside of the wheel.
- Check the front wheel alignment, and adjust it if necessary (see page 18-4).

NOTE: For vehicles equipped with ATTS, make sure the front wheels are in the straight ahead position (mechanical neutral) after the wheel alignment, then let the ATTS control unit memorize the neutral position (see section 15).

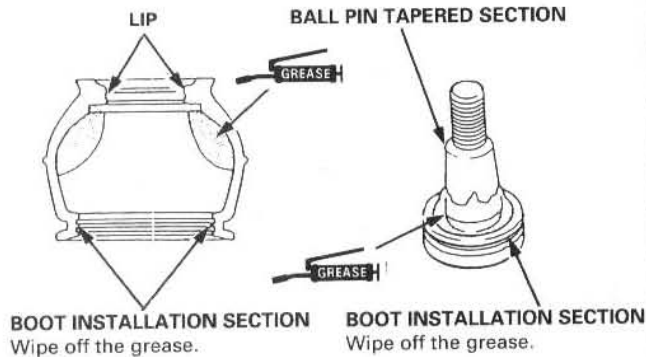


Ball Joint Boot Replacement

1. Remove the set ring and the boot.

CAUTION: Do not contaminate the boot installation section with grease.

2. Pack the interior of the boot and lip with grease.



3. Wipe the grease off the sliding surface of the ball pin and pack with fresh grease.

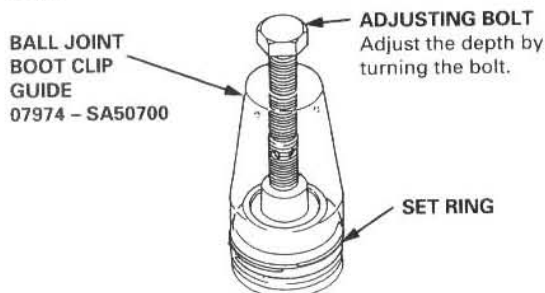
CAUTION:

- Keep grease off the boot installation section and the tapered section of the ball pin.
- Do not allow dust, dirt, or other foreign materials to enter the boot.

4. Install the boot in the groove of the boot installation section securely, then bleed air.
5. Install the upper and lower ball joint boot set rings using the special tools as follows:

Lower ball joint: Adjust the special tool with the adjusting bolt until the end of the tool aligns with the groove on the boot. Slide the set ring over the tool and into position.

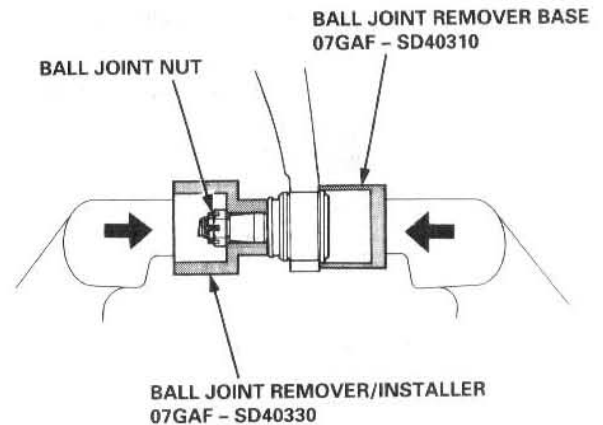
Upper ball joint: Hold the tool over the ball joint, then slide the set ring over the tool and into position.



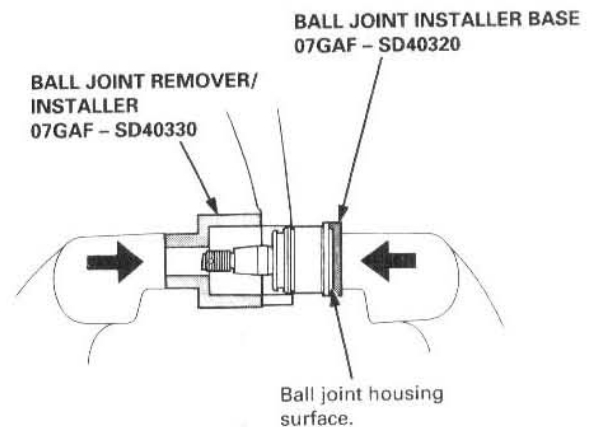
CAUTION: After installing the boot, check the ball pin tapered section for grease contamination and wipe it if necessary.

Lower Ball Joint Replacement (ATTS only)

1. Remove the lower arm from the knuckle.
2. Remove the boot by prying the circlip off.
3. Install the special tool on the ball joint and tighten the ball joint nut.
4. Position the special tool over the ball joint as shown, then set the assembly in a vise. Press the ball joint out of the knuckle.



5. Place the ball joint in position by hand.
6. Install the special tools over the ball joint as shown, then press the ball joint in.

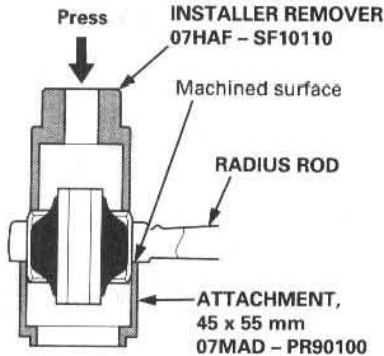


Radius Rod Bushing Replacement (ATTS only)

1. Remove the bushing.

CAUTION:

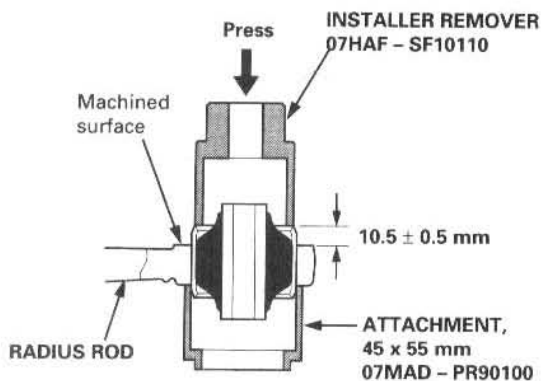
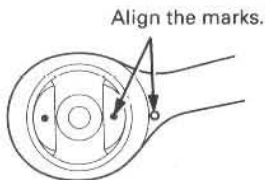
- Support the machined surface of the radius rod securely with the special tool.
- Take care not to damage the inner wall of the bushing hole with the special tool.



2. Press the bushing into the radius rod.

CAUTION:

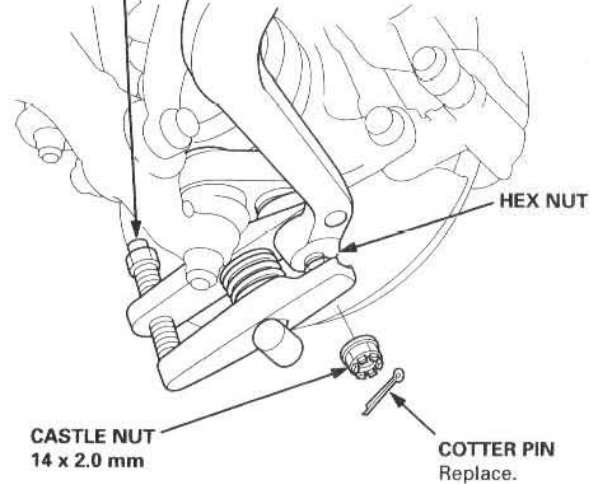
- Align the marks on the radius rod and bushing before pressing.
- Press the bushing to the specified depth.



Removal

1. Remove the cotter pin and radius rod ball joint nut. (ATTS only)

BALL JOINT REMOVER, 28 mm
07MAC - SL00200



2. Install a 14 mm hex nut on the ball joint. Be sure that the hex nut is flush with the ball joint pin end, or the threaded section of the ball joint pin might be damaged by the ball joint remover.

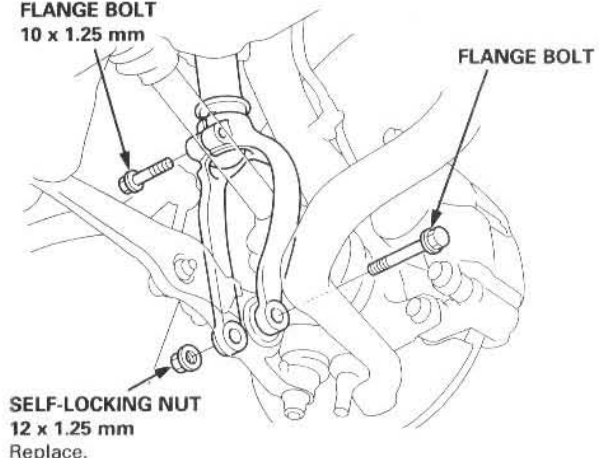
3. Use the ball joint remover as shown on page 18-15 to separate the ball joint and lower arm.

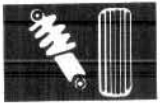
NOTE: If necessary, apply penetrating type lubricant to loosen the ball joint.

4. Remove the flange bolt.
5. Remove the flange bolt and self-locking nut, then remove the damper fork.

With ATTS:

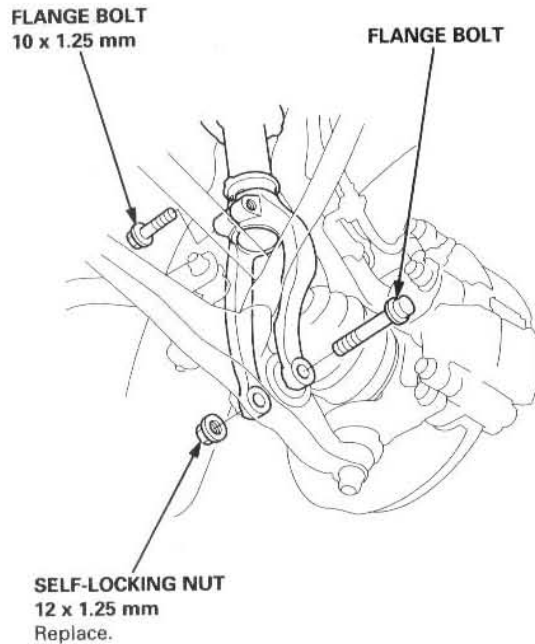
FLANGE BOLT
10 x 1.25 mm



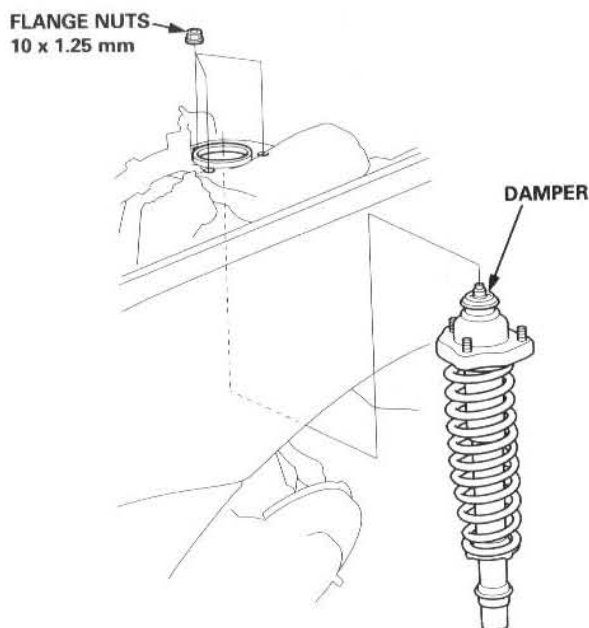


Disassembly/Inspection

Without ATTS:



6. Remove the damper by removing the three flange nuts.

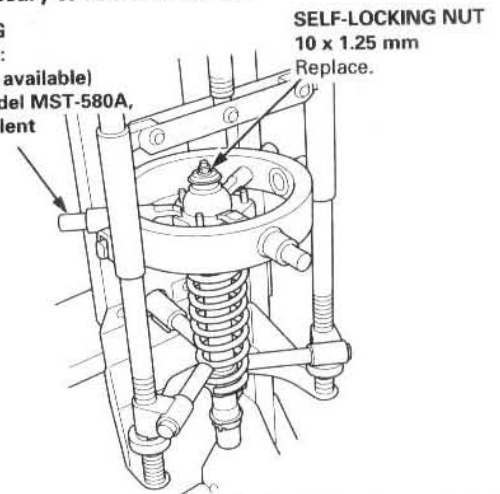


Disassembly

1. Compress the damper spring with the spring compressor according to the manufacturer's instructions, then remove the self-locking nut.

CAUTION: Do not compress the spring more than necessary to remove the nut.

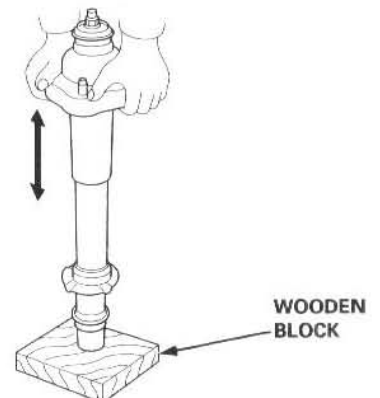
STRUT SPRING
COMPRESSOR:
(Commercially available)
BRANICK® Model MST-580A,
7200 or equivalent



2. Release the pressure from the spring compressor, then disassemble the damper.

Inspection

1. Reassemble all parts, except the spring.
2. Push on the damper as shown.



3. Check for smooth operation through a full stroke, both compression and extension.

NOTE: The damper should move smoothly. If it does not (no compression or no extension), the gas is leaking, and the damper should be replaced.

4. Check for oil leaks, abnormal noises or binding during these tests.

Front Damper

Reassembly

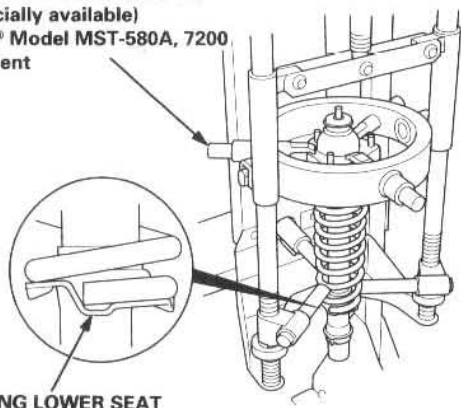
1. Install the damper unit on a spring compressor.

NOTE: Follow the manufacturer's instructions.

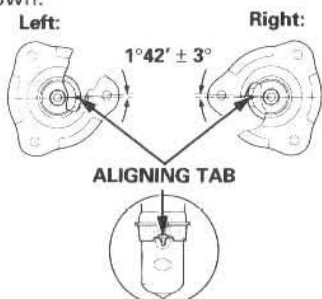
2. Assemble the damper in reverse order of disassembly except the damper mounting washer and self-locking nut.

NOTE: Align the bottom of damper spring and spring lower seat as shown.

STRUT SPRING COMPRESSOR:
(Commercially available)
BRANICK® Model MST-580A, 7200
or equivalent

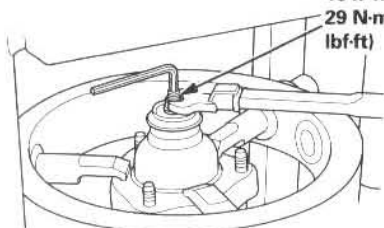


3. Position the damper mounting base on the damper unit as shown.



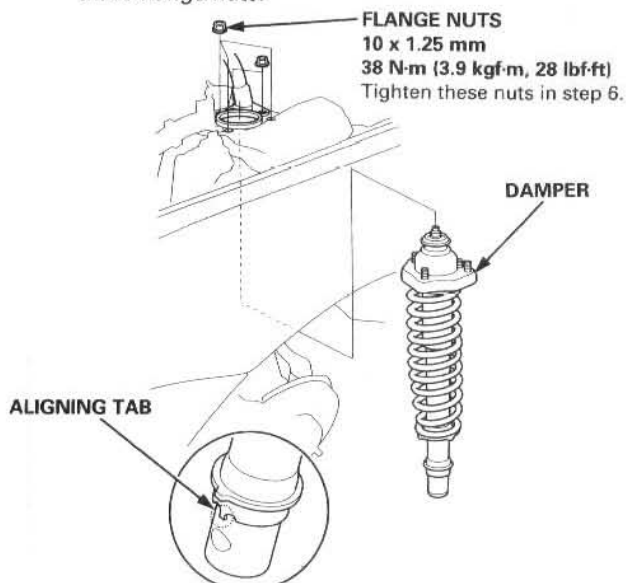
4. Compress the damper spring with the spring compressor.
5. Install the damper mounting washer, then loosely install a new self-locking nut.
6. Hold the damper shaft with a hex wrench, and tighten the self-locking nut.

SELF-LOCKING NUT
Replace.
10 x 1.25 mm
29 N-m (3.0 kgf-m, 22 lbf-ft)



Installation

1. Loosely install the damper on the frame with the aligning tab facing inside, then loosely install the three flange nuts.



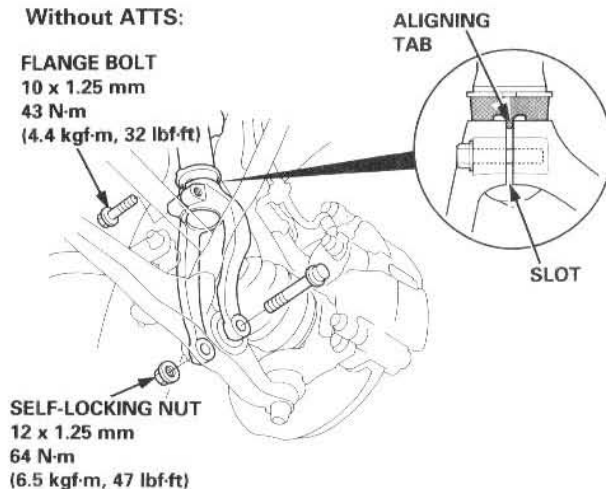
2. Install the damper fork over the driveshaft and onto the lower arm. Install the damper in the damper fork so the aligning tab is aligned with the slot in the damper fork.
3. Hand-tighten the bolts and nuts.
4. Raise the knuckle with a floor jack until the vehicle just lifts off the safety stand.

NOTE: The bolts and nuts should be tightened with the vehicle's weight on the damper.

⚠ WARNING The floor jack must be securely positioned or personal injury may result.

Without ATTS:

FLANGE BOLT
10 x 1.25 mm
43 N-m
(4.4 kgf-m, 32 lbf-ft)

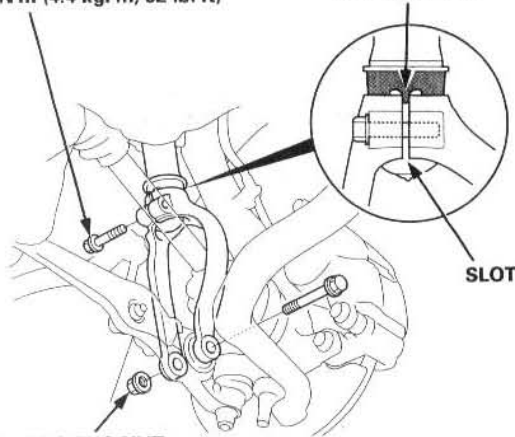




With ATTS:

FLANGE BOLT
10 x 1.25 mm
43 N·m (4.4 kgf·m, 32 lbf·ft)

ALIGNING TAB



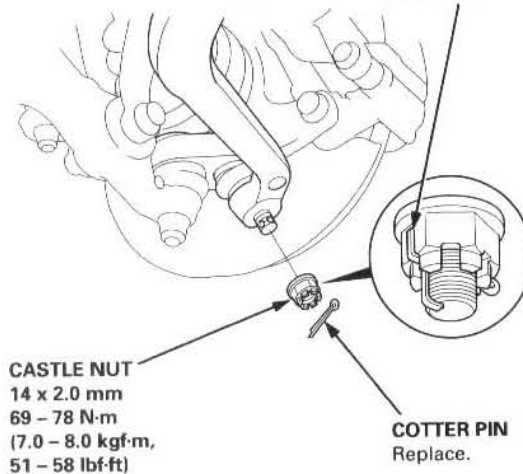
SLOT

SELF-LOCKING NUT
12 x 1.25 mm
64 N·m (6.5 kgf·m, 47 lbf·ft)
Replace.

5. Install the knuckle on the radius rod, then tighten the castle nut and install the new cotter pin (ATTS only).

CAUTION: Torque the castle nut to the lower torque specification, then tighten it only far enough to align the slot with the pin hole. Do not align the nut by loosening.

COTTER PIN
Replace.
On reassembly,
bend the cotter pin
as shown.



CASTLE NUT
14 x 2.0 mm
69 – 78 N·m
(7.0 – 8.0 kgf·m,
51 – 58 lbf·ft)

COTTER PIN
Replace.

6. Tighten the flange bolt.
7. Tighten the flange bolt with a new self-locking nut.
8. Tighten the three damper flange nuts.
9. Check the front wheel alignment, and adjust if necessary (see page 18-4).

NOTE: For vehicles equipped with ATTS, make sure the front wheels are in the straight ahead position (mechanical neutral) after the wheel alignment, then let the ATTS control unit memorize the neutral position (see section 15).

Rear Suspension

Suspension Arms

Removal/Inspection

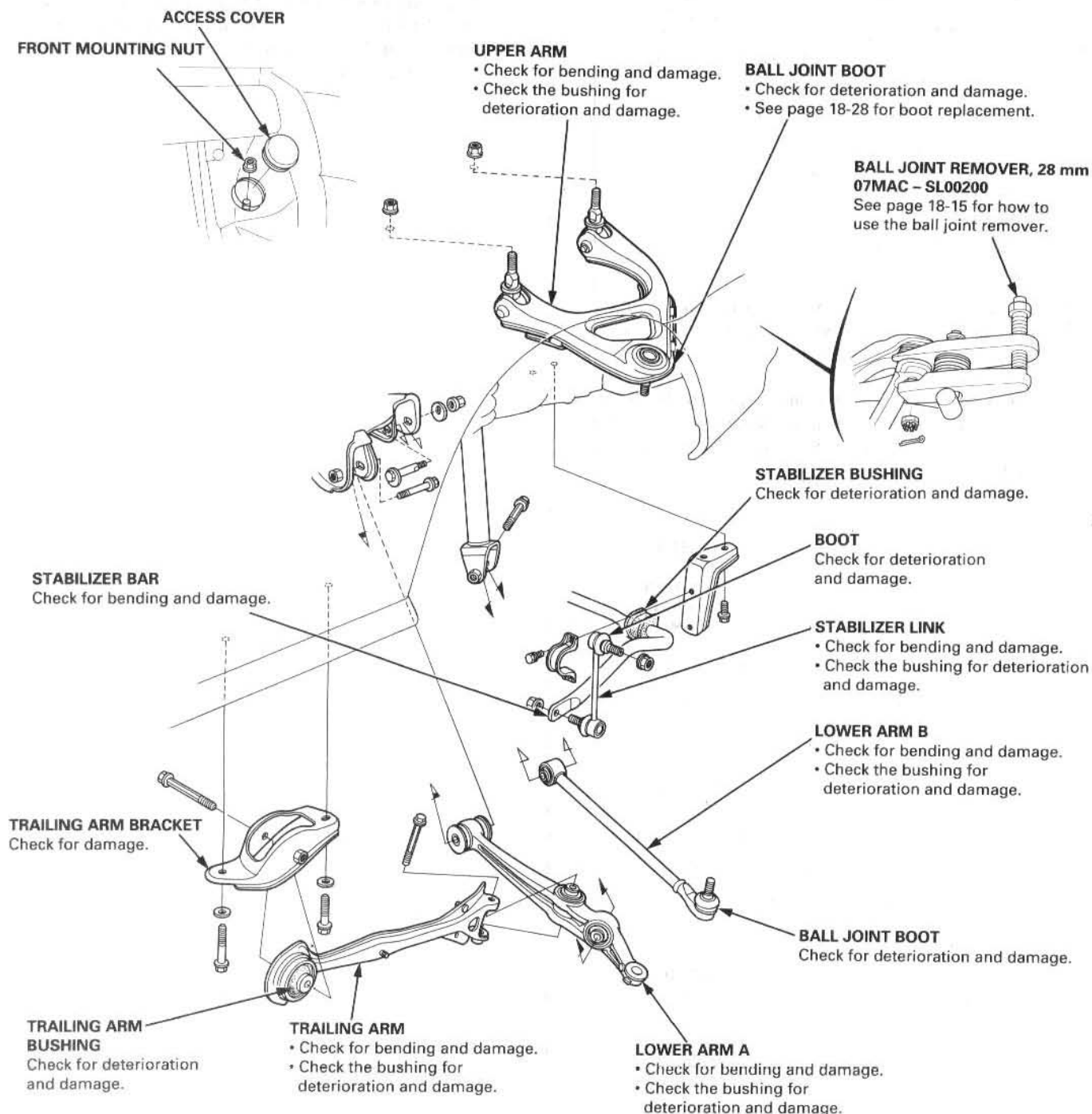
CAUTION:

- Replace the self-locking nuts after removal.
- Be careful not to damage the ball joint boot.

NOTE: Rear upper arm mounting nut removal.

Front mounting nut: From inside of the vehicle; lower the rear seat-back, and remove the access cover and the front mounting nut.

Rear mounting nut: Front inside the trunk; pull the trunk side trim to one side, and remove the rear mounting nut.





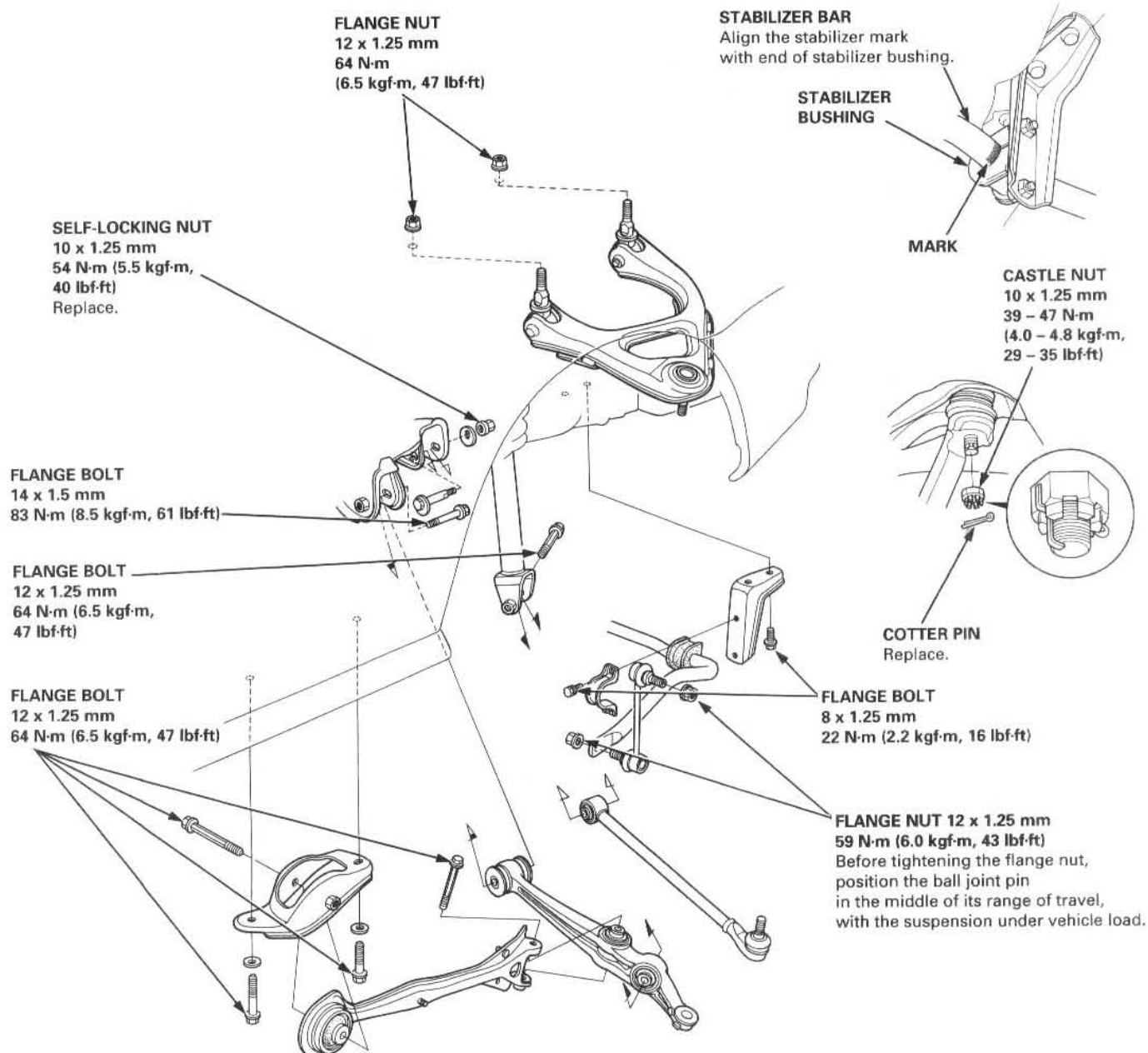
Installation

CAUTION:

- Any bolts or nuts connected to rubber mounts or bushings should be tightened with the vehicle on the ground.
- Torque the castle nut to the lower torque specification, then tighten it only far enough to align the slot with the pin hole. Do not align the nut by loosening.

NOTE:

- Wipe off the oil, dirt or grease from the threads before tightening the fasteners.
- Make sure the toe adjuster cams on lower arm B are installed in the same direction.
- After installing the suspension arm, check the rear wheel alignment, and adjust if necessary (see page 18-4).

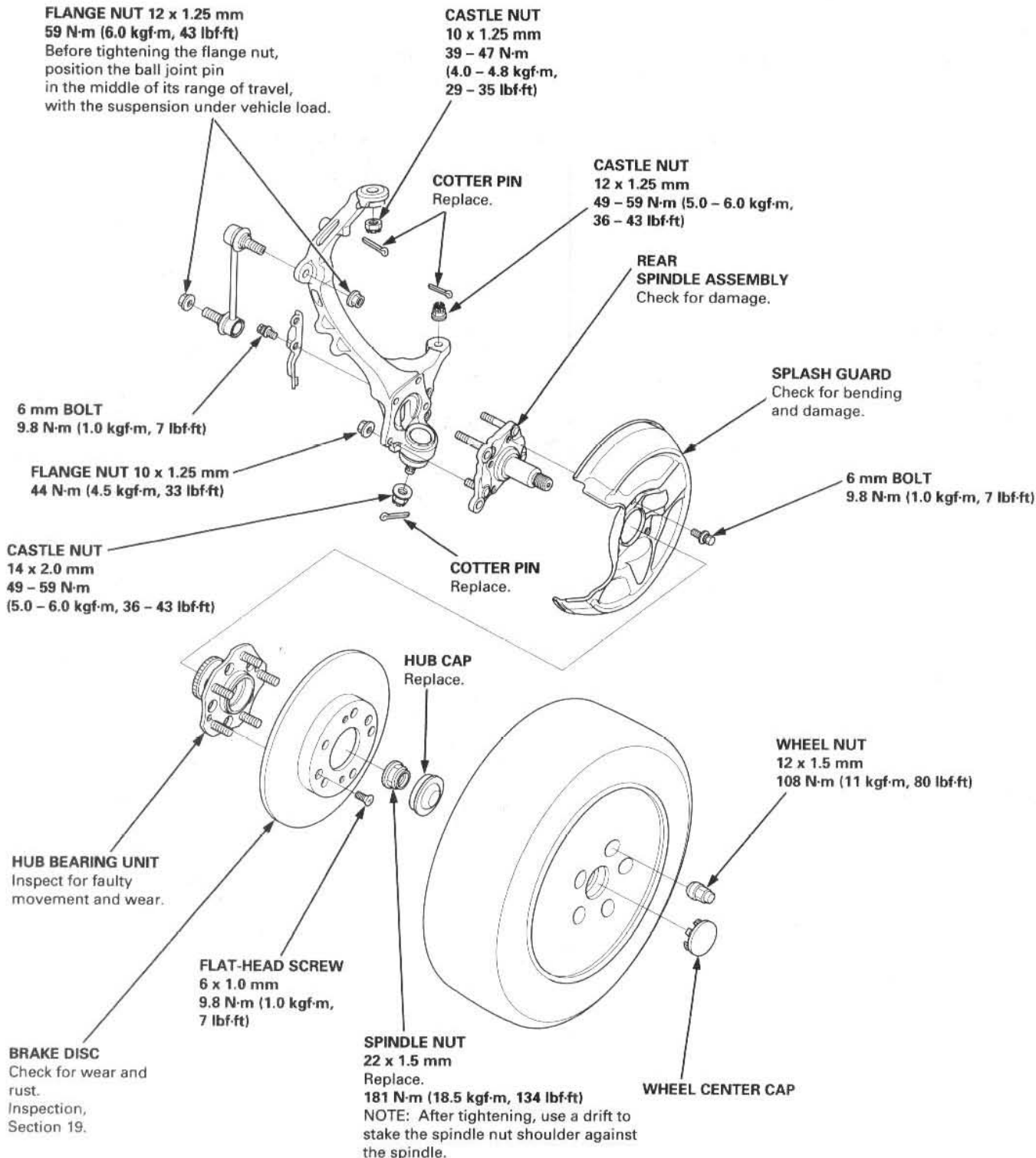


Rear Suspension

Hub Bearing Unit Replacement

NOTE:

- Use only genuine Honda wheel weights for aluminum wheels. Non-genuine wheel weights may corrode and damage aluminum wheels.
- Before installing the wheel, clean the mating surfaces of the brake disc and inside of the wheel.



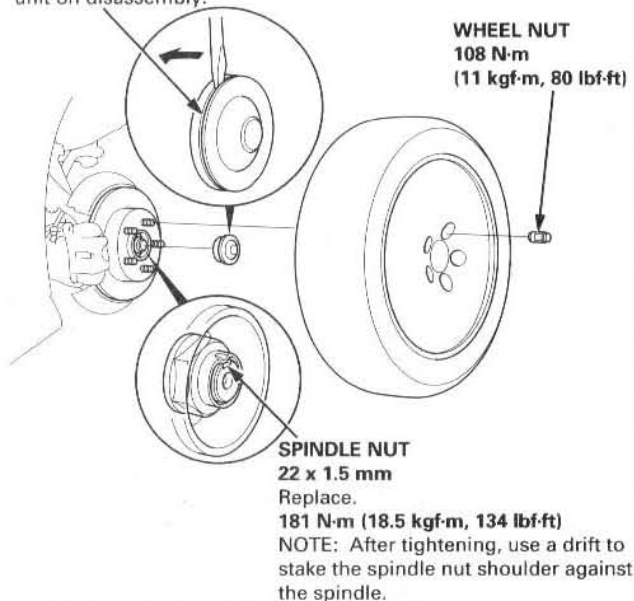


1. Raise the rear of the vehicle, and support it with safety stands in proper locations (see section 1).
2. Remove the rear wheel.
3. Remove the hub cap, then pry the spindle nut lock tab away from the spindle and loosen nut.

HUB CAP

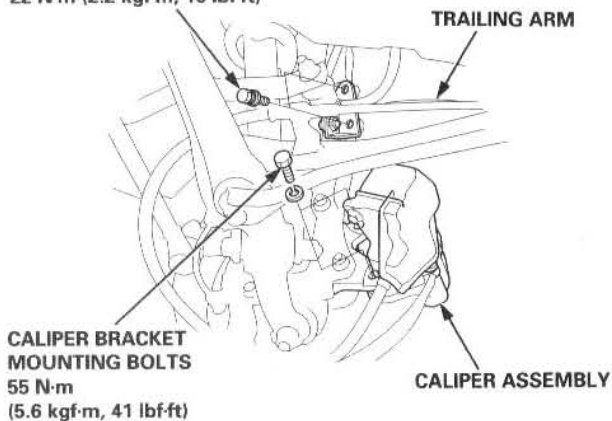
Replace.

NOTE: Take care not to damage the hub unit on disassembly.



4. Remove the brake hose mounting bolt.

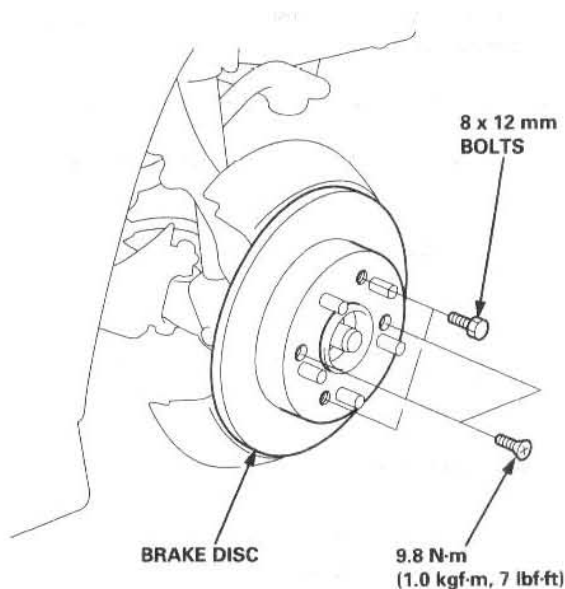
BRAKE HOUSE MOUNTING BOLT
22 N-m (2.2 kgf-m, 16 lbf-ft)



5. Remove the caliper bracket mounting bolts and hang the caliper assembly to one side.

CAUTION: To prevent accidental damage to the caliper assembly or brake hose, use a short piece of wire to hang the caliper assembly from the under-carriage.

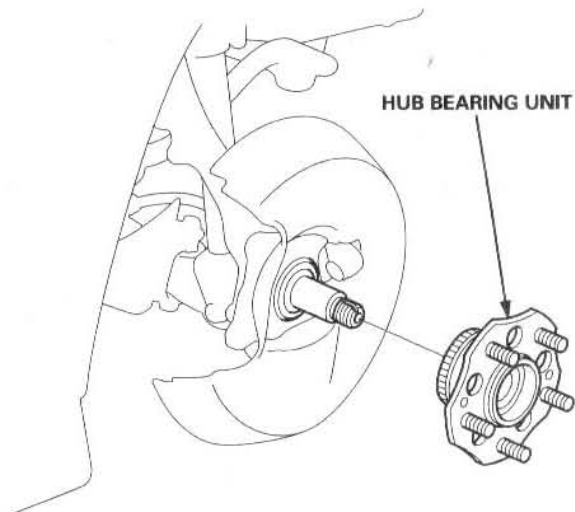
6. Remove the 6 mm brake disc retaining screws.



7. Screw two 8 x 12 mm bolts into the disc to push it away from the hub. Remove the brake disc.

NOTE: Turn each bolt two turns at a time to prevent cocking the disc excessively.

8. Remove the hub bearing unit from the knuckle.



NOTE: Wash the bearing and spindle thoroughly in high flash point solvent before reassembly.

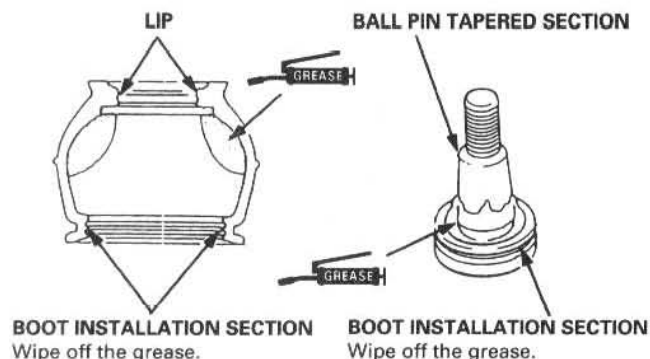
9. Install in reverse order of removal. Tighten the new spindle nut to specified torque, then stake the spindle nut shoulder against the spindle.

Ball Joint Boot Replacement

1. Remove the set ring and the boot.

CAUTION: Do not contaminate the boot installation section with grease.

2. Pack the interior of the boot and lip with grease.



3. Wipe the grease off the sliding surface of the ball pin and pack with fresh grease.

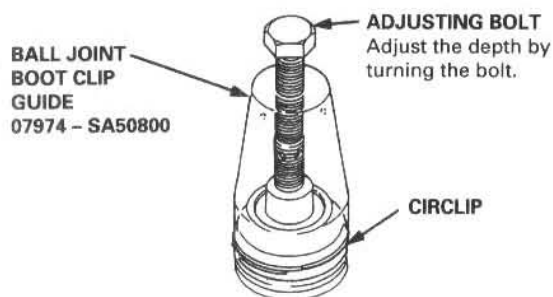
CAUTION:

- Keep grease off the boot installation section and the tapered section of the ball pin.
- Do not allow dust, dirt, or other foreign materials to enter the boot.

4. Install the boot in the groove of the boot installation section securely, then bleed air.

5. Install the upper ball joint boot set ring using the special tool as follows:

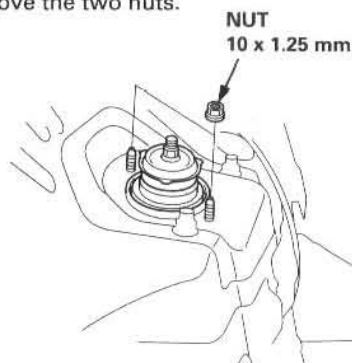
Adjust the special tool with the adjusting bolt until the end of the tool aligns with the groove on the boot. Slide the set ring over the tool and into position.



CAUTION: After installing the boot, check the ball pin tapered section for grease contamination and wipe it if necessary.

Removal

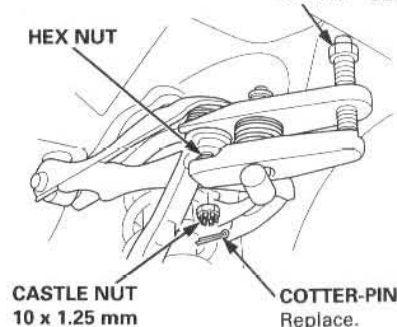
1. Jack up the rear of vehicle, and support it on safety stands in proper locations.
2. Remove the rear wheel.
3. Lower the rear seat-back, and remove the trunk side trim.
4. Remove the two nuts.



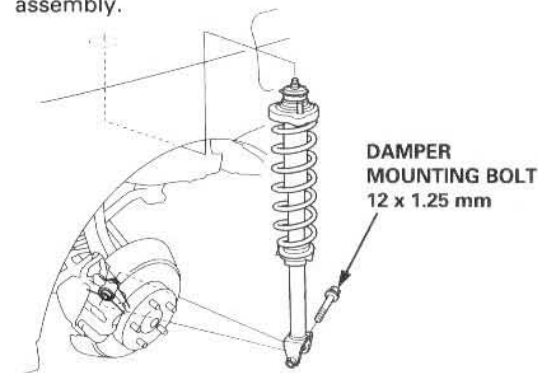
5. Remove the cotter pin and the upper ball joint nut.
6. Install a 10 mm hex nut on the ball joint. Be sure that the hex nut is flush with the ball joint pin end, or the threaded section of the ball joint pin might be damaged by the ball joint remover.
7. Use the ball joint remover as shown on page 18-15 to separate the ball joint and knuckle.

NOTE: If necessary, apply penetrating type lubricant to loosen the ball joint.

BALL JOINT REMOVER, 28 mm
07MAC-SL00200



8. Remove the damper mounting bolt.
9. Lower the rear suspension, and remove the damper assembly.



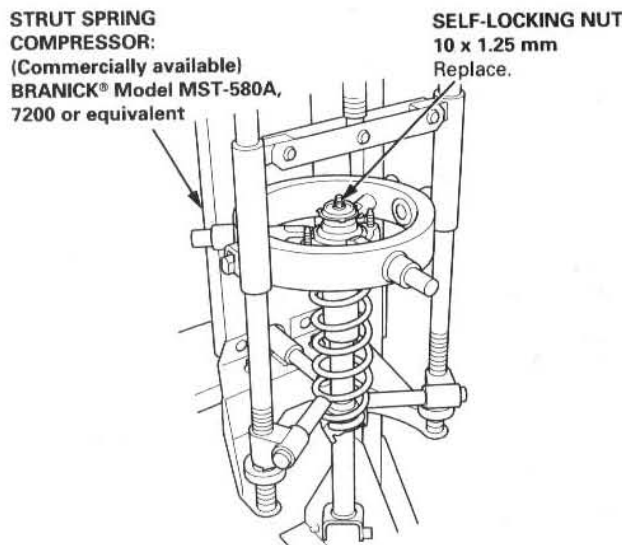


Disassembly/Inspection

Disassembly

1. Compress the damper spring with the spring compressor according to the manufacturer's instructions, then remove the self-locking nut.

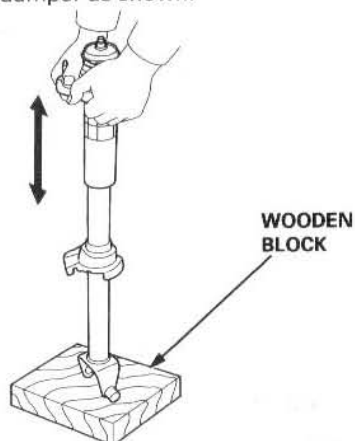
CAUTION: Do not compress the spring more than necessary to remove the nut.



2. Remove the damper from the spring compressor, then disassemble the damper.

Inspection

1. Reassemble all parts, except the spring.
2. Push on the damper as shown.



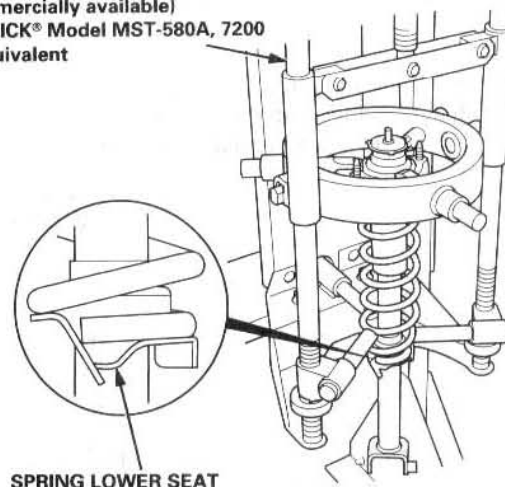
3. Check for smooth operation through a full stroke, both compression and extension.
NOTE: The damper should move smoothly. If it does not (no compression or no extension), the gas is leaking and the damper should be replaced.
4. Check for oil leaks, abnormal noises or binding during these tests.

Reassembly

1. Install the damper unit on a spring compressor.

NOTE: Follow the manufacturer's instructions.

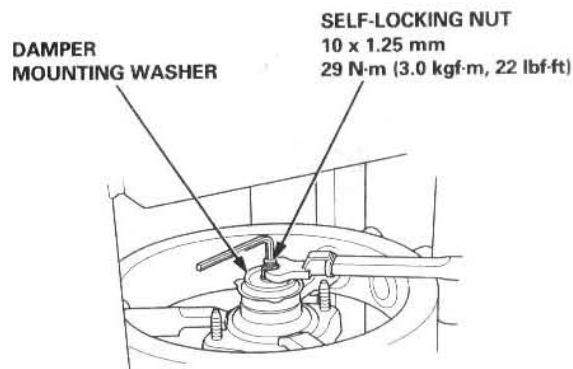
STRUT SPRING COMPRESSOR:
(Commercially available)
BRANICK® Model MST-580A, 7200 or equivalent



2. Assemble the damper in the reverse order of disassembly except the damper mounting washer and self-locking nut.

NOTE: Align the bottom of damper spring and spring lower seat as shown.

3. Compress the damper spring.
4. Install the damper mounting washer and a new self-locking nut.
5. Hold the damper shaft and tighten the self-locking nut.



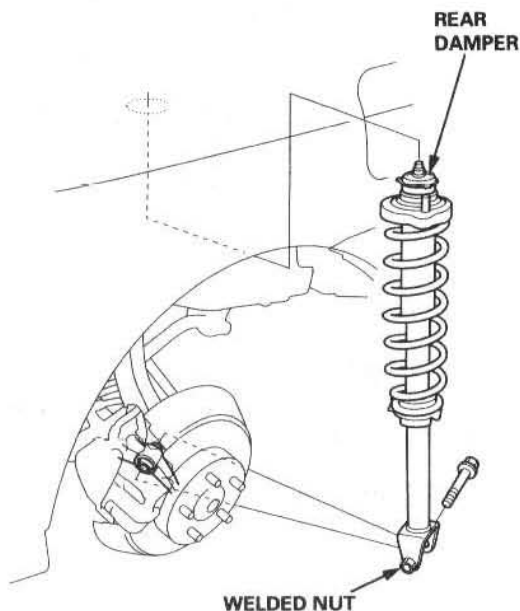
Rear Damper

Installation

1. Lower the rear suspension, and set the damper assembly in place.
2. Connect the damper assembly and the lower arm, then loosely install the damper mounting bolt.

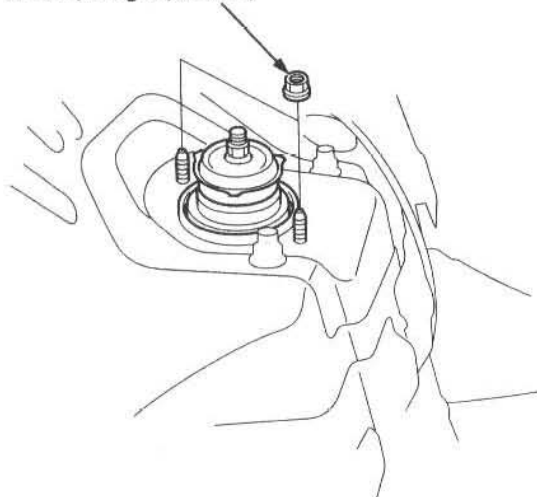
NOTE:

- The damper mounting bolts should be tightened with the damper under vehicle load.
- Do not interchange the right and left dampers.

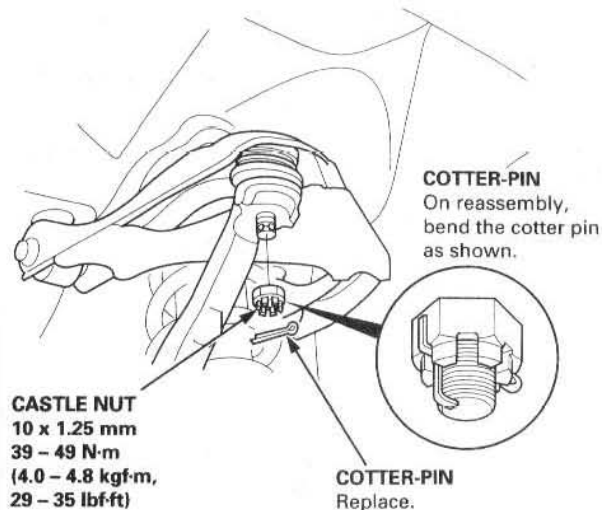


3. Tighten the damper mounting nuts.

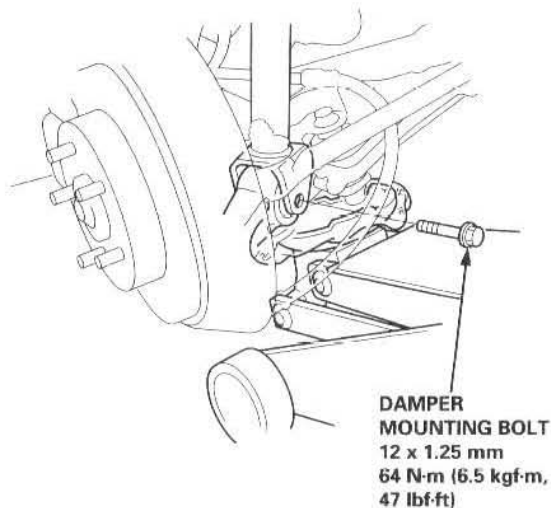
DAMPER MOUNTING NUTS
10 x 1.25 mm
38 N·m (3.9 kgf-m, 28 lbf-ft)



4. Connect the upper arm and knuckle, then tighten the castle nut.



5. Raise the rear suspension with a floor jack until the weight of the vehicle is on the damper.
6. Tighten the damper mounting bolt.



7. Install the trunk side trim.
8. Check the rear wheel alignment and adjust if necessary (see page 18-4).

NOTE: For vehicles equipped with ATTS, make sure the front wheels are in the straight ahead position (mechanical neutral) after the wheel alignment, then let the ATTS control unit memorize the neutral position (see section 15).

Brakes

Conventional Brakes	19-1
Anti-lock Brake System (ABS)	19-25



**Click here to go back to
the Introduction page**




Brakes

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Special Tools

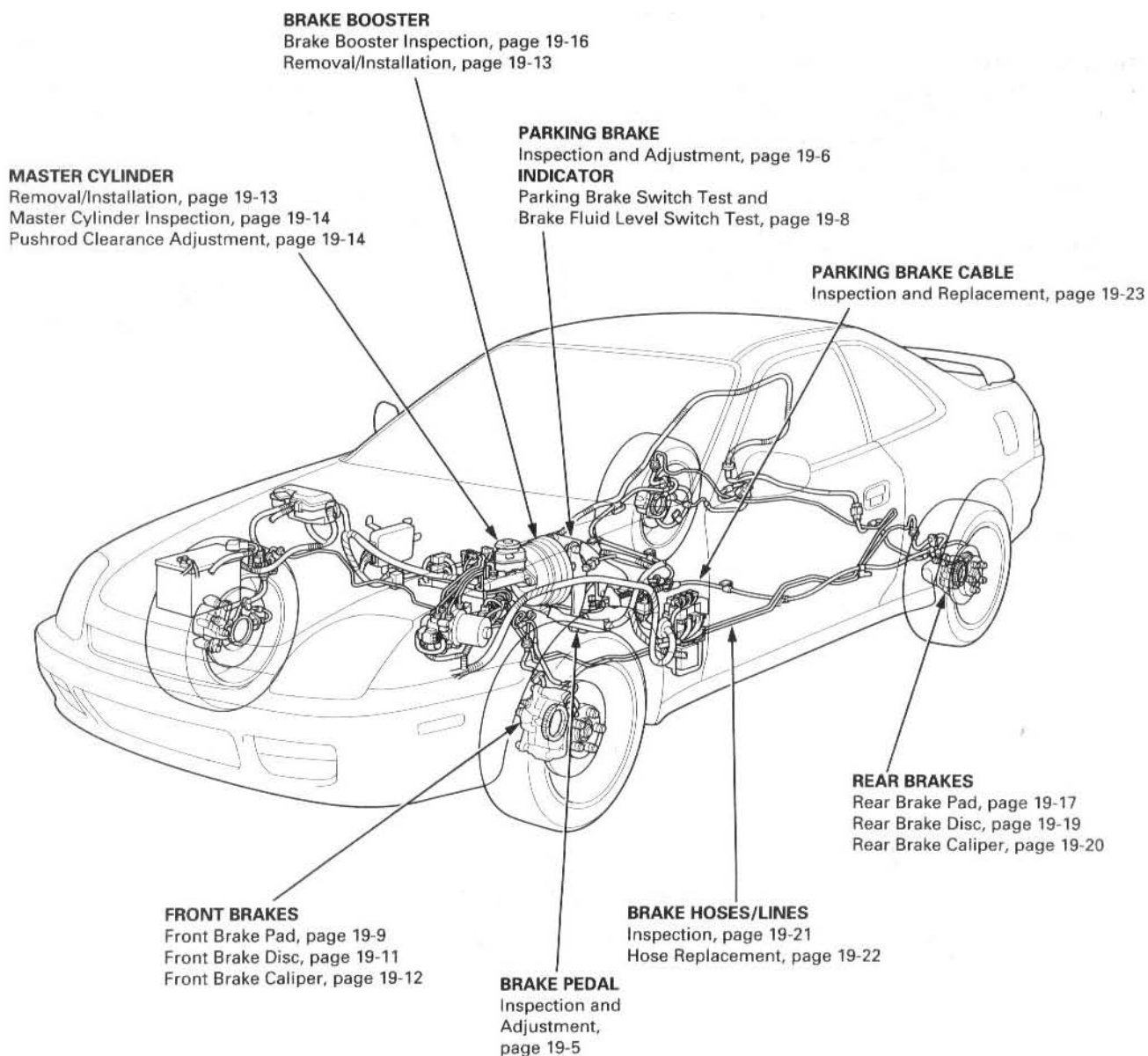
Ref. No.	Tool Number	Description	Qty	Page Reference
①	07JAG – SD40100	Pushrod Adjustment Gauge	1	19-14



①



Index



Inspection and Adjustment

Brake System Rubber Parts and Brake Booster

Ⓐ Brake Booster

Check brake operation by applying the brakes. If the brakes do not work properly, check the brake booster. Replace the brake booster as an assembly if it does not work properly or if there are signs of leakage.

Ⓑ Piston Cup and Pressure Cup Inspection

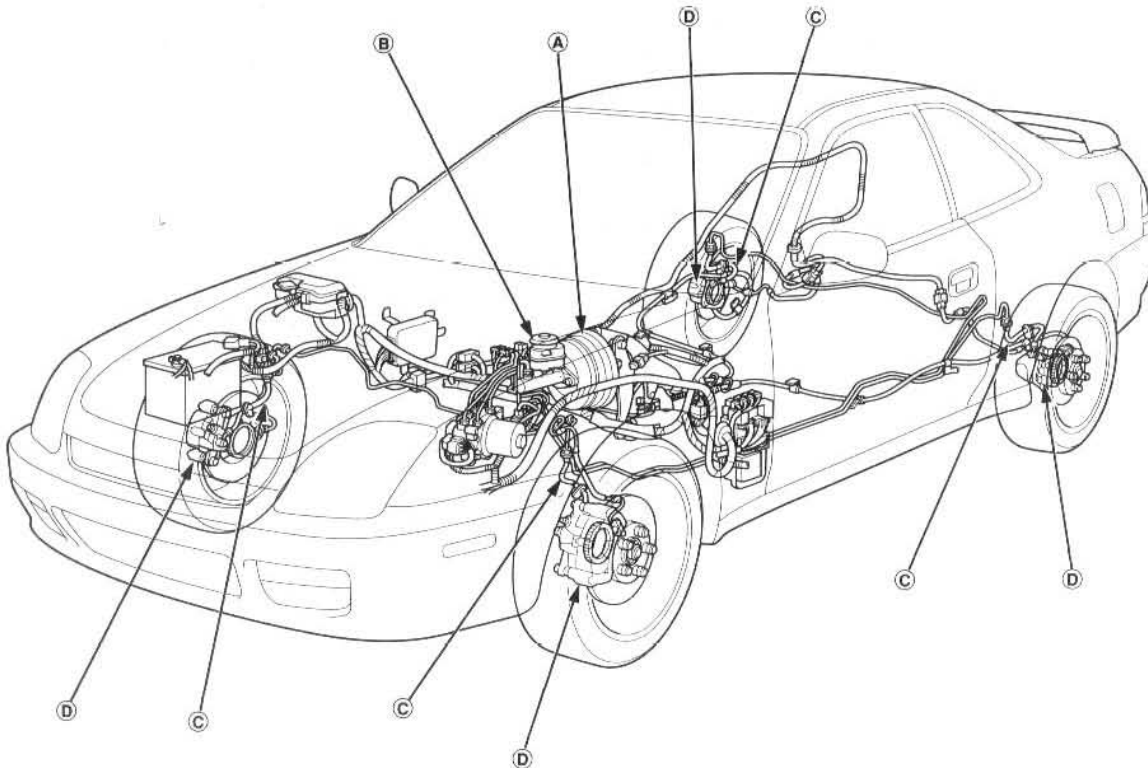
- Check brake operation by applying the brakes. Visually check for damage or signs of fluid leakage. Replace the master cylinder as an assembly if the pedal does not work properly or if there is damage or signs of fluid leakage.
- Check for a difference in brake pedal stroke between quick and slow brake applications. Replace the master cylinder if there is a difference in pedal stroke.

Ⓒ Brake Hoses

Visually check for damage or signs of fluid leakage. Replace the brake hose with a new one if it is damaged or leaking.

Ⓓ Caliper Piston Seal and Piston Boots

Check brake operation by applying the brakes. Visually check for damage or signs of fluid leakage. If the pedal does not operate properly, the brakes drag, or there is damage or signs of fluid leakage, disassemble and inspect the brake caliper. Replace the boots and seals with new ones whenever the brake caliper is disassembled.

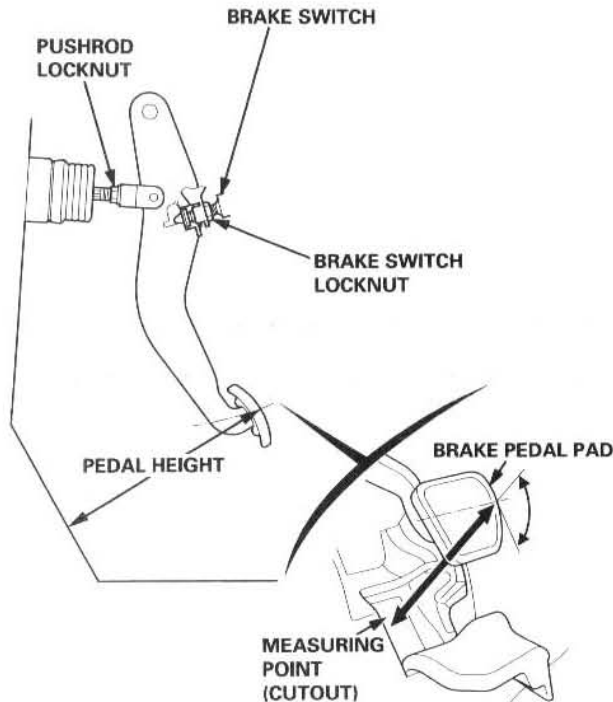




Brake Pedal

Pedal Height

1. Disconnect the brake switch connector, loosen the brake switch locknut, and back off the brake switch until it is no longer touching the brake pedal.
2. Turn up the carpet. At the insulator cutout, measure the pedal height from the middle of the right side of the pedal pad.

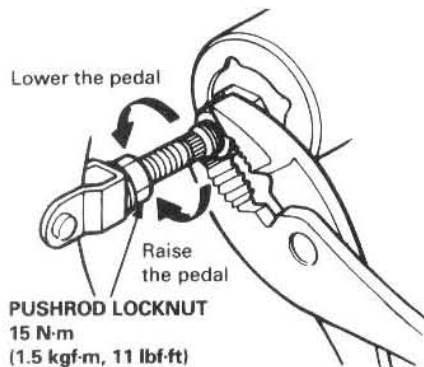


Standard Pedal Height (with carpet removed):

M/T: 161 mm (6 5/16 in)

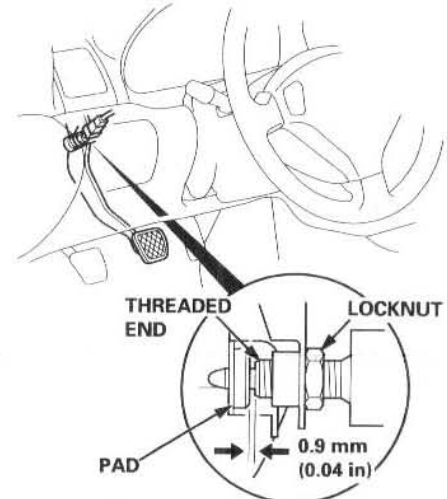
A/T: 166 mm (6 9/16 in)

3. Loosen the pushrod locknut, and screw the pushrod in or out with pliers until the standard pedal height from the floor is reached. After adjustment, tighten the locknut firmly. Do not adjust the pedal height with the pushrod depressed.



PUSHROD LOCKNUT
15 N·m
(1.5 kgf·m, 11 lbf·ft)

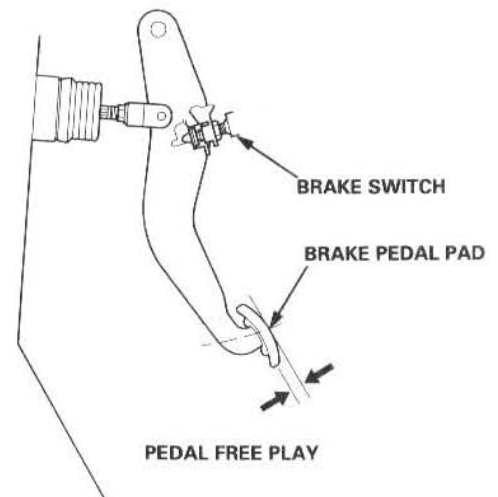
4. Screw in the brake switch until its plunger is fully depressed (threaded end touching the pad on the pedal arm). Then back off the switch 3/4 turn to make 0.9 mm (0.04 in) of clearance between the threaded end and pad. Tighten the locknut firmly. Connect the brake switch connector. Make sure that the brake lights go off when the pedal is released.



5. Check the brake pedal free play as described below.

Pedal Free Play

1. With the engine off, inspect the play on the pedal pad by pushing the pedal by hand.
Free Play: 1 – 5 mm (1/16 – 3/16 in)
2. If the pedal free play is out of specification, adjust the brake switch. If the pedal free play is insufficient, it may result in brake drag.



Inspection and Adjustment

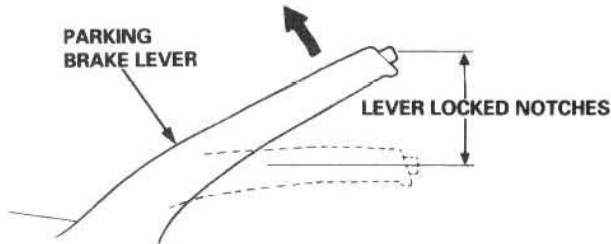
Parking Brake

Inspection

1. Pull the parking brake lever with 196 N (20 kgf, 44 lbf) force to fully apply the parking brake. The parking brake lever should be locked within the specified notches.

Lever Locked Notches: 6 – 10

Pulled up with 196 N (20 kgf, 44 lbf)



2. Adjust the parking brake if the lever notches are out of specification.

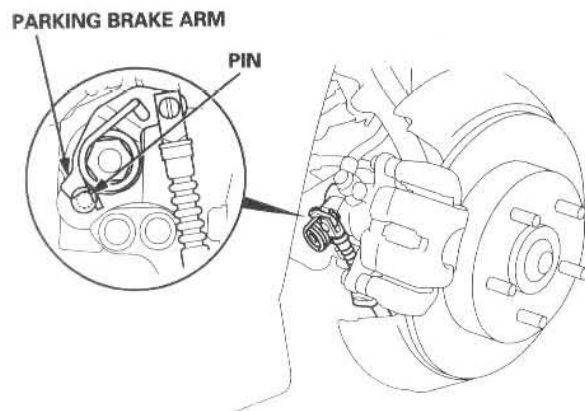
Adjustment

NOTE: After rear brake caliper servicing, loosen the parking brake adjusting nut, start the engine and depress the brake pedal several times to set the self-adjusting brake before adjusting the parking brake.

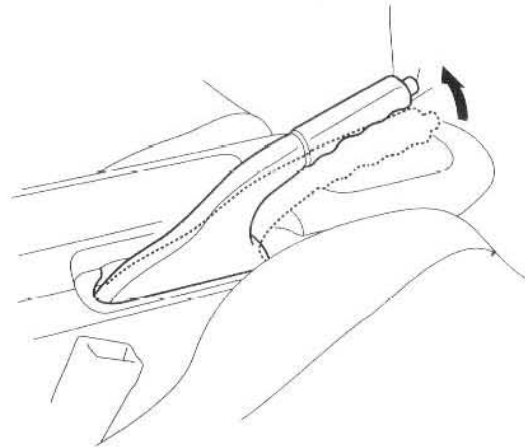
1. Raise the rear wheels off the ground, and support the vehicle on safety stands.

⚠ WARNING Block the front wheels before jacking up the rear of the vehicle.

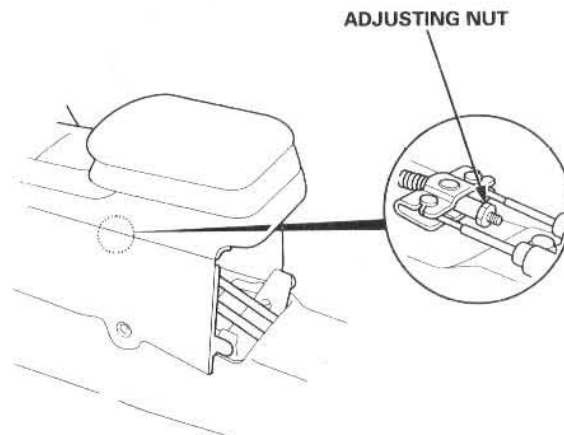
2. Make sure the parking brake arm on the rear brake caliper contacts the brake caliper pin.



3. Pull the parking brake lever up one notch.



4. Remove the rear console end cover (see section 20).
5. Tighten the adjusting nut until the parking brakes drag slightly when the rear wheels are turned.



6. Release the parking brake lever fully, and check that the parking brakes do not drag when the rear wheels are turned. Readjust if necessary.
7. Make sure that the parking brakes are fully applied when the parking brake lever is pulled up fully.
8. Reinstall the rear console end cover.



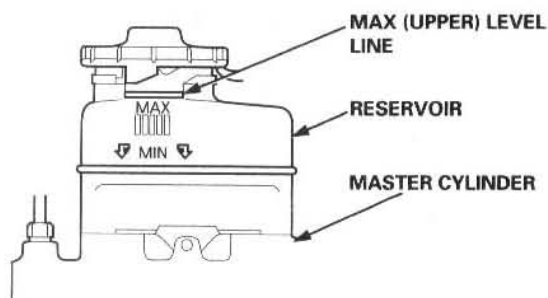
Bleeding

CAUTION:

- Do not reuse the drained fluid.
- Always use Genuine Honda DOT 3 Brake Fluid. Using a non-Honda brake fluid can cause corrosion and decrease the life of the system.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- Do not spill brake fluid on the vehicle, it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.

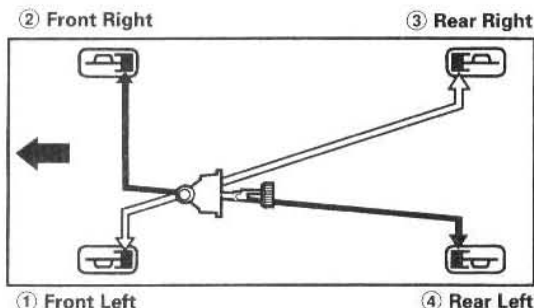
NOTE: The reservoir on the master cylinder must be at the MAX (upper) level mark at the start of bleeding procedure and checked after bleeding each brake caliper. Add fluid as required.

1. Make sure the brake fluid level in the reservoir is at the MAX (upper) level line.

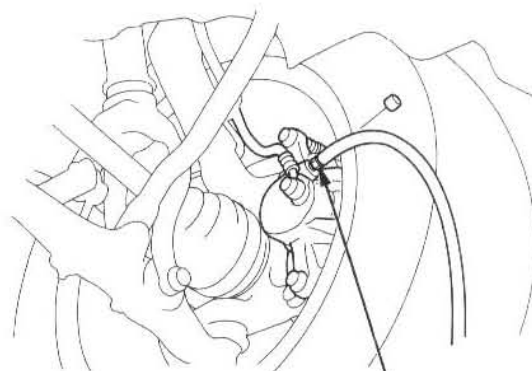


2. Have someone slowly pump the brake pedal several times, then apply steady pressure.
3. Loosen the left-front brake bleed screw to allow air to escape from the system. Then tighten the bleed screw securely.
4. Repeat the procedure for each wheel in the sequence shown below until air bubbles no longer appear in the fluid.
5. Refill the master cylinder reservoir to the MAX (upper) level line.

BLEEDING SEQUENCE:

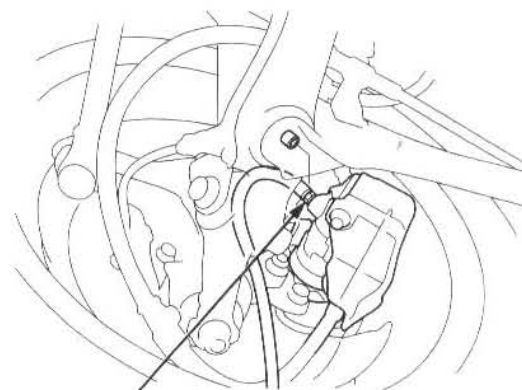


FRONT:



BLEED SCREW
9 N·m (0.9 kgf-m, 6.5 lbf-ft)

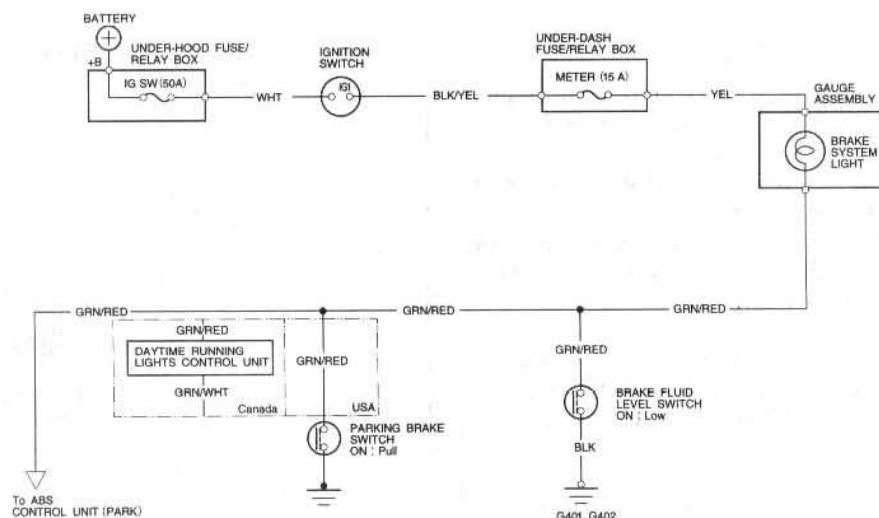
REAR:



BLEED SCREW
9 N·m (0.9 kgf-m, 6.5 lbf-ft)

Inspection and Adjustment

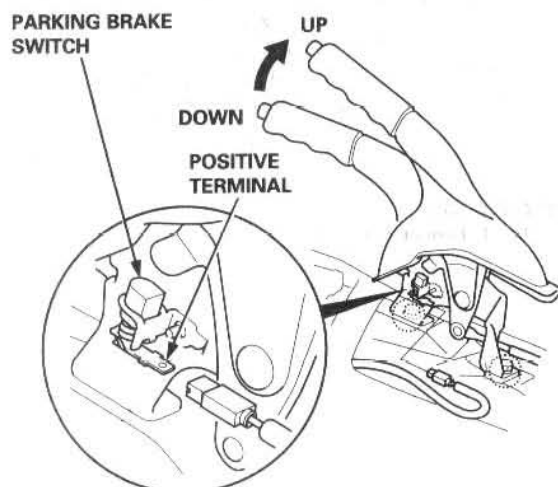
Brake System Indicator



Parking Brake Switch Test

1. Remove the rear console, and disconnect the connector from the switch.
2. Check for continuity between the terminals in each switch position according to the table.

Terminal Position	Positive Terminal	Body Ground
BRAKE LEVER UP		
BRAKE LEVER DOWN		

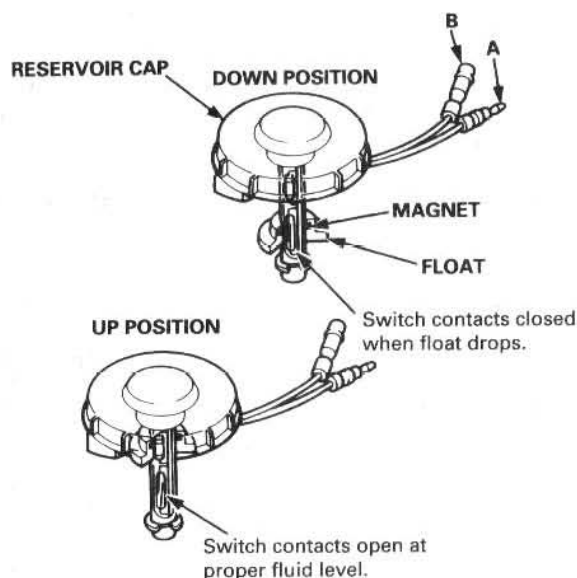


NOTE (Canada): If the parking brake switch is OK, but the brake system indicator does not function, perform the input test for the daytime running lights control unit (see section 23).

Brake Fluid Level Switch Test

1. Remove the reservoir cap. Check that the float moves up and down freely; if it doesn't, replace the reservoir cap assembly.
2. Check for continuity between the terminals in each switch position according to the table.

Terminal Position	A	B
FLOAT UP		
FLOAT DOWN		



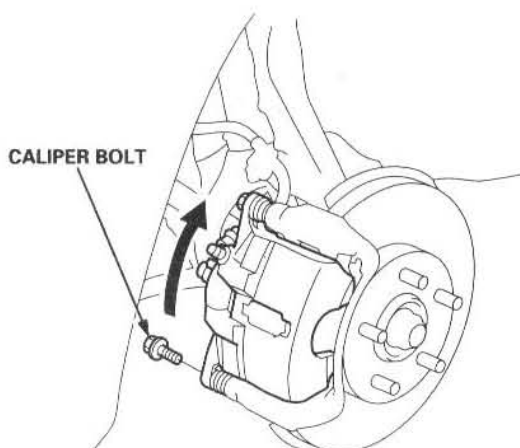


Inspection and Replacement

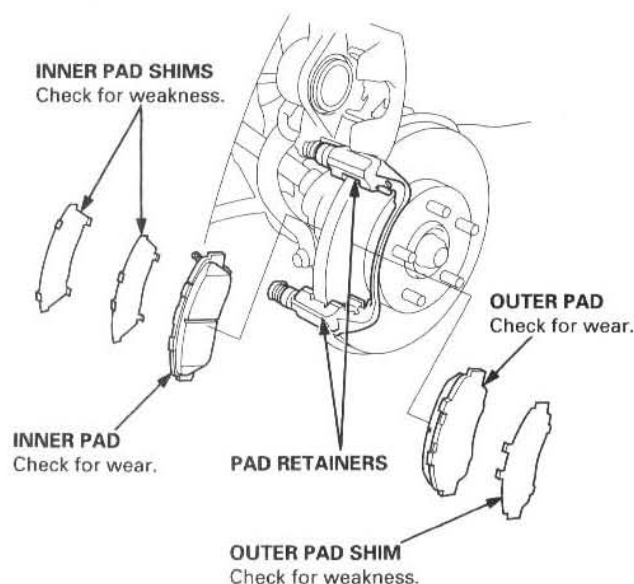
⚠ WARNING

- **Never use an air hose or dry brush to clean brake assemblies.**
- **Use an OSHA-approved vacuum cleaner to avoid breathing brake dust.**

1. Loosen the front wheel nuts slightly, then raise the vehicle and support it on safety stands. Remove the front wheels.
2. Remove the caliper bolt, and pivot the caliper up out of the way. Check the hoses and pin boots for damage and deterioration.



3. Remove the pad shims, pad retainers and pads.

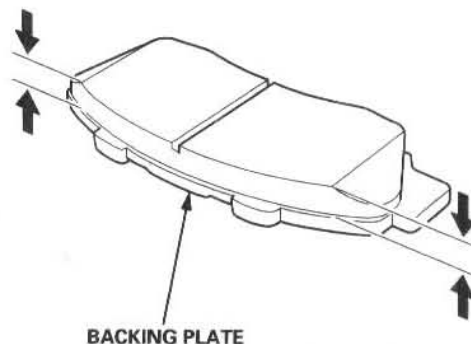


4. Using vernier calipers, measure the thickness of each brake pad lining. The measurement does not include the pad backing plate thickness.

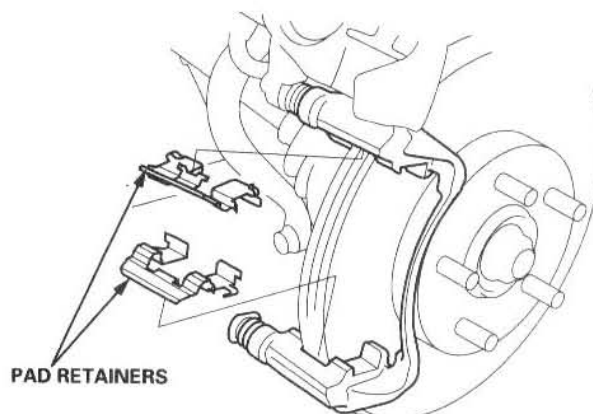
Brake Pad Thickness:

Standard: 10.5 – 11.2 mm (0.41 – 0.44 in)

Service Limit: 1.6 mm (0.06 in)



5. If the brake pad thickness is less than the service limit, replace the front pads and shims together as a set.
6. Clean the caliper thoroughly; remove any rust, and check for grooves and cracks.
7. Check the brake disc for damage and cracks.
8. Install the pad retainers.

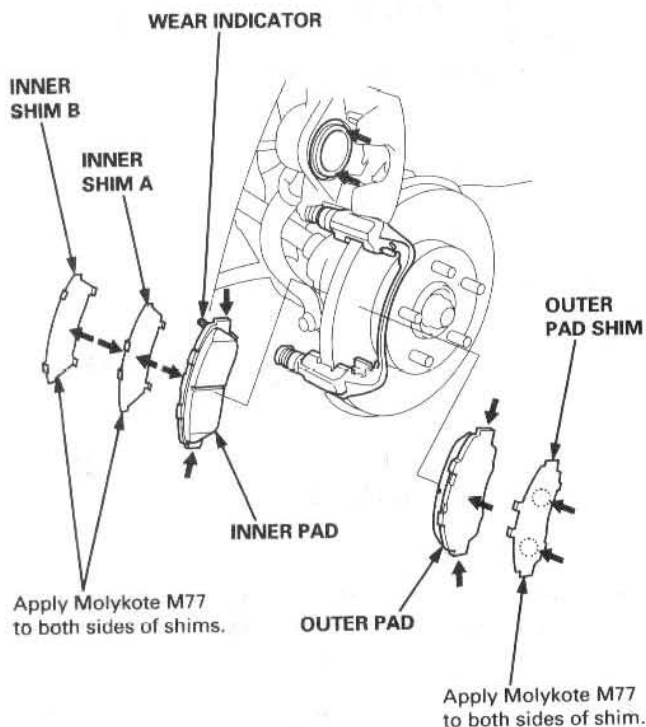


(cont'd)

Front Brake Pads

Inspection and Replacement (cont'd)

9. Apply Molykote M77 grease to both sides of the pad shims and the back of the pads. Wipe excess grease off the shim.



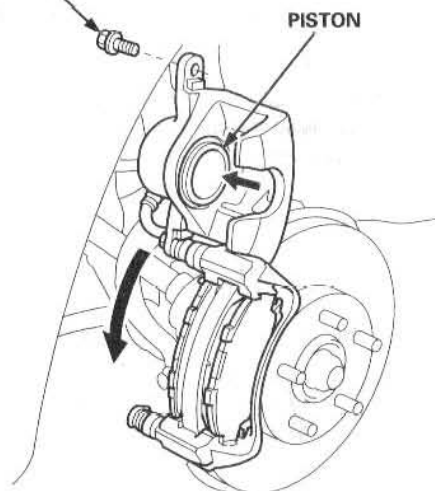
10. Install the brake pads and pad shims correctly. Install the pad with the wear indicator on the inside.

⚠ WARNING

- When reusing the pads, always reinstall the brake pads in their original positions to prevent loss of braking efficiency.
- Contaminated brake discs or pads reduce stopping ability. Keep grease off the discs and pads.

11. Push in the piston so that the caliper will fit over the pads. Make sure that the piston boot is in position to prevent damaging it when pivoting the caliper down.

CALIPER BOLT
49 N·m (5.0 kgf·m, 36 lbf·ft)



12. Pivot the caliper down into position, then install caliper bolt and tighten it. Be careful not to damage the pin boot when pivoting the caliper down.
13. Depress the brake pedal several times to make sure the brakes work, then road-test.

NOTE: Engagement of the brake may require a greater pedal stroke immediately after the brake pads have been replaced as a set. Several applications of the brake pedal will restore the normal pedal stroke.

14. After installation, check for leaks at hose and line joints and connections, and retighten if necessary.

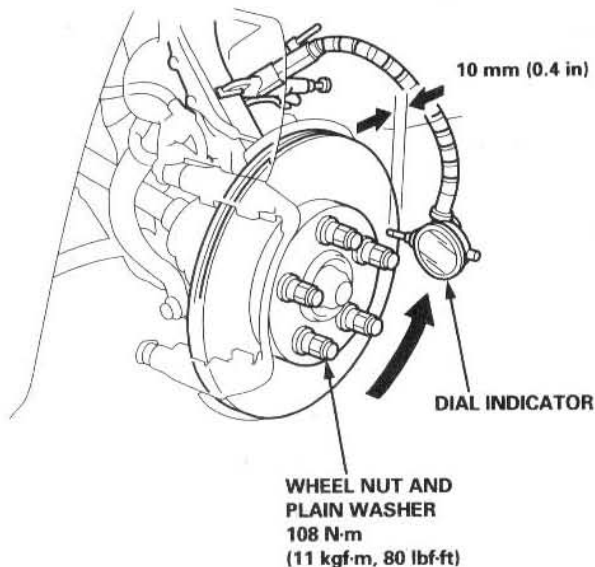


Disc Runout Inspection

1. Loosen the front wheel nuts slightly, then raise the vehicle and support it on safety stands. Remove the front wheels.
2. Remove the brake pads (see page 19-9).
3. Inspect the disc surface for damage and cracks. Clean the disc thoroughly and remove all rust.
4. Use wheel nuts and suitable plain washers to hold the disc securely against the hub, then mount a dial indicator as shown, and measure the runout at 10 mm (0.4 in) from the outer edge of the disc.

Brake Disc Runout:

Service Limit: 0.10 mm (0.004 in)



5. If the disc is beyond the service limit, refinish the brake disc with an on-car brake lathe. The Kwik-Lathe produced by Kwik-way manufacturing Co. and the "Front Brake Disc Lathe" offered by Snap-on Tools Co. are approved for this operation.

NOTE:

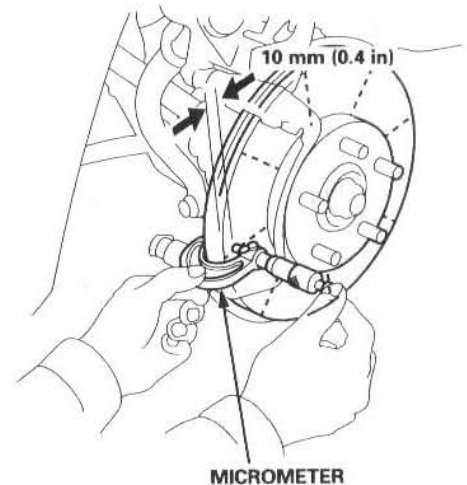
- See section 18 for brake disc replacement.
- When the vehicle is equipped with ATTS, do not use an engine-driven on-car brake lathe. Use only a motor-driven on-car brake lathe.

Max. Refinish Limit: 21.0 mm (0.83 in)

NOTE: A new disc should be refinished if its runout is greater than 0.10 mm (0.004 in).

Disc Thickness and Parallelism Inspection

1. Loosen the front wheel nuts slightly, then raise the vehicle and support it on safety stands. Remove the front wheels.
2. Remove the brake pads (see page 19-9).
3. Using a micrometer, measure disc thickness at eight points, approximately 45° apart and 10 mm (0.4 in) in from the outer edge of the disc. Replace the brake disc if the smallest measurement is less than the max. refinishing limit.



Brake Disc Thickness:

Standard: 22.9 – 23.1 mm (0.90 – 0.91 in)

Max. Refinishing Limit: 21.0 mm (0.83 in)

Brake Disc Parallelism: 0.015 mm (0.0006 in) max.

NOTE: This is the maximum allowable difference between the thickness measurements.

4. If the disc is beyond the service limit for parallelism, refinish the brake disc with an on-car brake lathe. The Kwik-Lathe produced by Kwik-Way Manufacturing Co. and the "Front Brake Disc Lathe" offered by Snap-on Tools Co. are approved for this operation.

NOTE:

- See section 18 for brake disc replacement.
- When refinishing a front brake disc on a vehicle equipped with ATTS, follow this procedure:
 - keep the transmission in second gear.
 - keep both front wheels off the ground.
 - let the disc on the opposite side turn freely; do not prevent it from turning.

Front Brake Caliper

Disassembly/Reassembly

⚠ WARNING

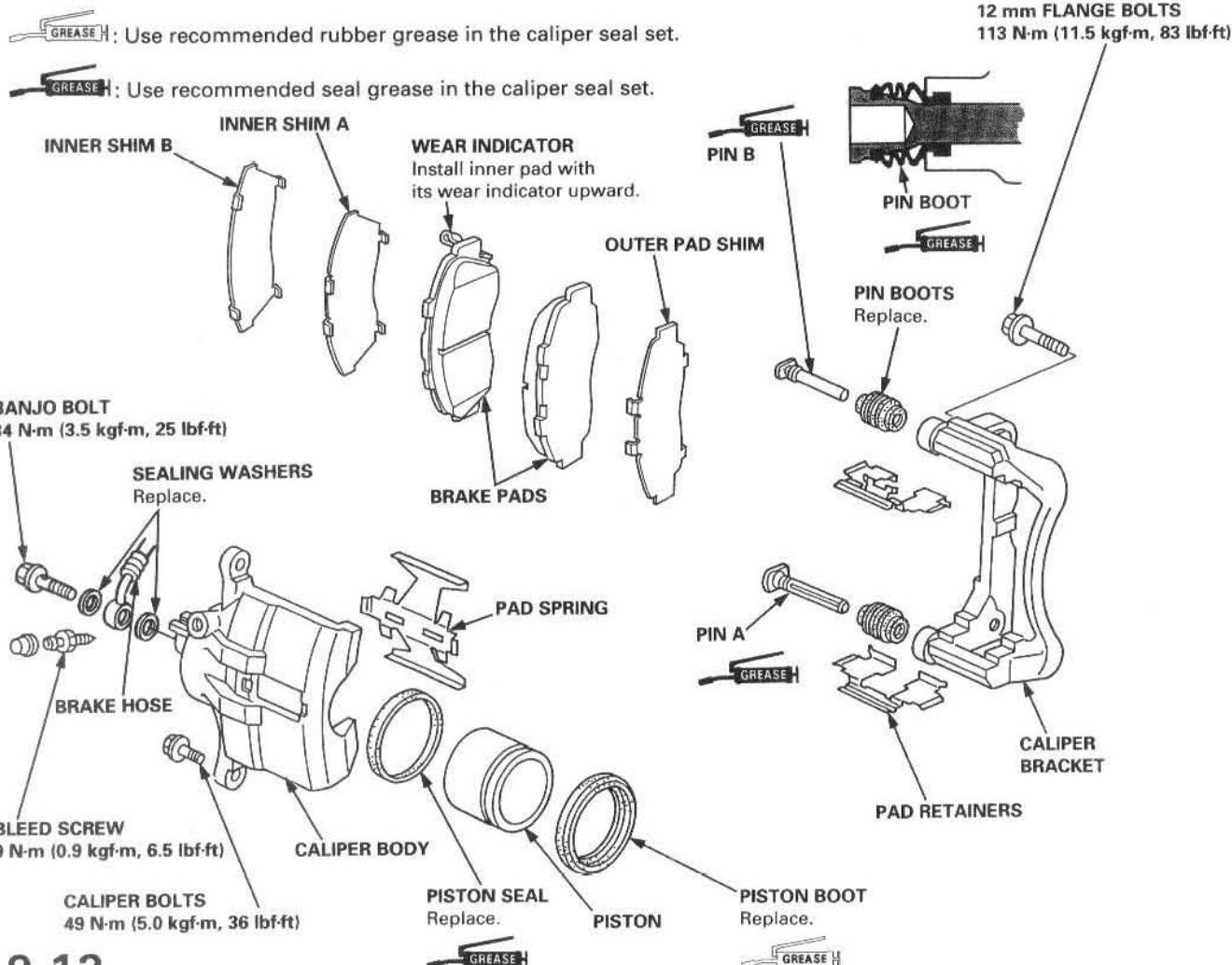
- Never use an air hose or dry brush to clean brake assemblies.
- Use an OSHA-approved vacuum cleaner to avoid breathing brake dust.
- Contaminated brake discs or pads reduce stopping ability.
- When reusing the pads, always reinstall the brake pads in their original positions to prevent loss of braking efficiency.

CAUTION:

- Do not spill brake fluid on the vehicle; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- Clean all parts in brake fluid and air dry; blow out all passages with compressed air.
- Before reassembling, check that all parts are free of dust and other foreign particles.
- Replace parts with new ones whenever specified to do so.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- Do not reuse the drained fluid.
- Always use Genuine Honda DOT 3 Brake Fluid. Using a non-Honda brake fluid can cause corrosion and decrease the life of the system.

NOTE:

- Coat the piston, piston seal, and caliper bore with clean brake fluid.
- Replace all rubber parts with new ones whenever disassembled.
- After installing the front brake caliper.
 - Check for leaks at hose and line joints and connections, and retighten if necessary.
 - Check the brake hoses for interference and twisting.



Master Cylinder/Brake Booster



Removal/Installation

CAUTION:

- Be careful not to bend or damage the brake lines when removing the master cylinder and brake booster.
- Do not spill brake fluid on the vehicle; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- To prevent spills, cover the hose joints with rags or shop towels.

Master Cylinder

1. Disconnect the brake fluid level switch connectors.
2. Remove the reservoir cap from the master cylinder.
3. Remove the brake fluid from the master cylinder reservoir with a syringe.
4. Disconnect the brake lines from the master cylinder.
5. Remove the master cylinder mounting nuts and washers.
6. Remove the master cylinder from the brake booster.

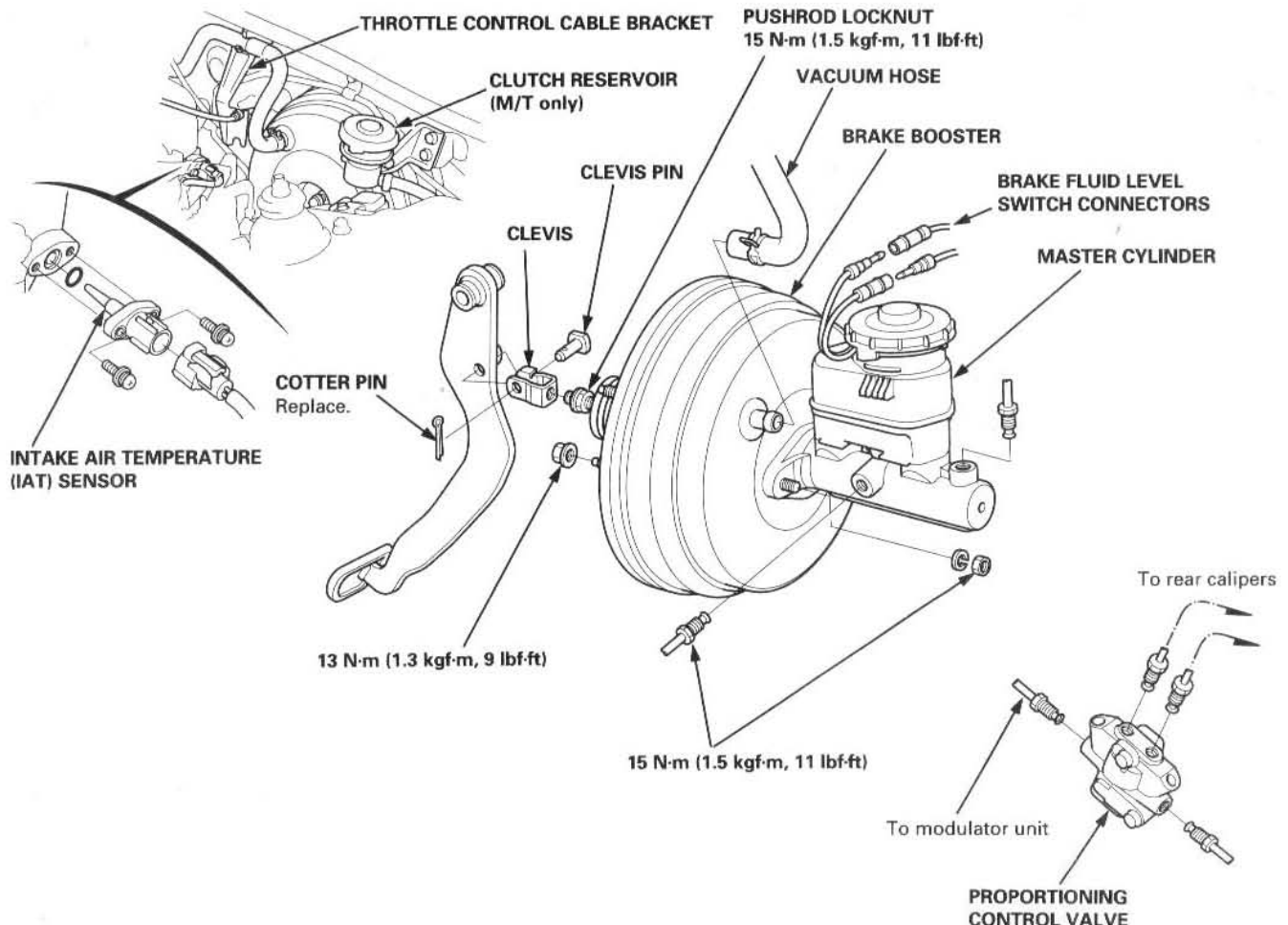
Brake Booster

7. Disconnect the vacuum hose from the brake booster.
8. Remove the throttle control cable bracket.
9. M/T only: Remove the clutch reservoir and reservoir bracket. Do not disconnect the clutch hose from the reservoir.

10. Remove the intake air temperature (IAT) sensor.
11. Loosen the pushrod locknut, then remove the cotter pin and clevis pin from the clevis.
12. Remove the clevis from the operating rod of the brake booster.
13. Remove the four booster mounting nuts.
14. Pull the brake booster forward until the operating rod is clear of the bulkhead.
15. Remove the brake booster from the engine compartment.
16. Install the brake booster and master cylinder in the reverse order of removal.

NOTE:

- If replacing the master cylinder or brake booster, check and adjust the pushrod clearance before installing the master cylinder (see page 19-14).
 - Adjust the pushrod length before installing the brake booster (see page 19-15).
17. Fill the master cylinder reservoir, and bleed the brake system (see page 19-7).
 18. After installation, check the brake pedal height and brake pedal free play (see page 19-5).

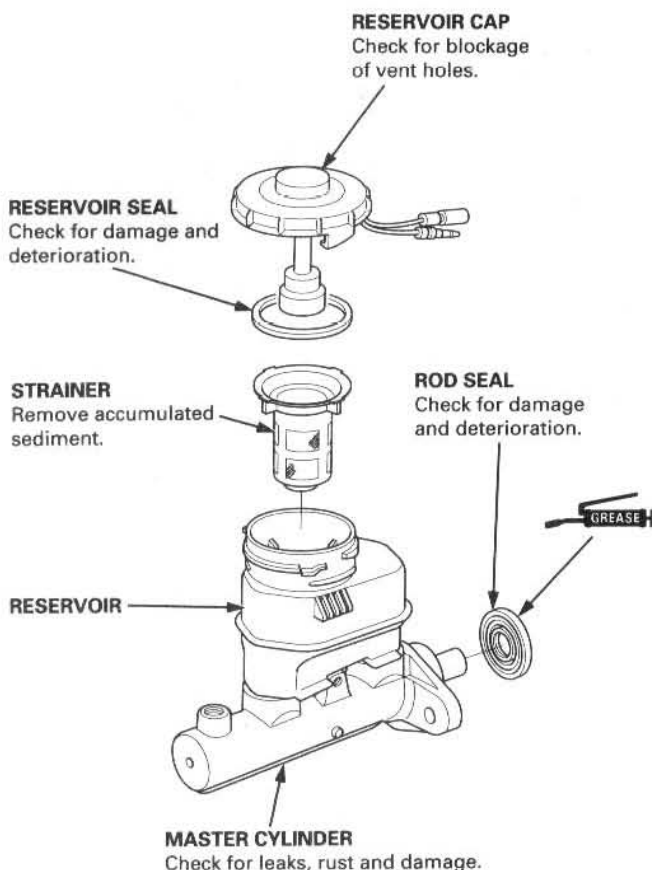


Master Cylinder/Brake Booster

Master Cylinder Inspection

CAUTION:

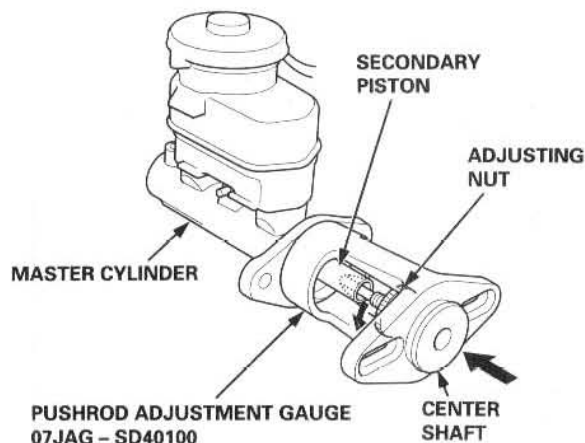
- Do not spill brake fluid on the vehicle; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- Before reassembling, check that all parts are free of dust and other foreign particles.
- Do not try to disassemble the master cylinder assembly. Replace the master cylinder assembly with a new part if necessary.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.



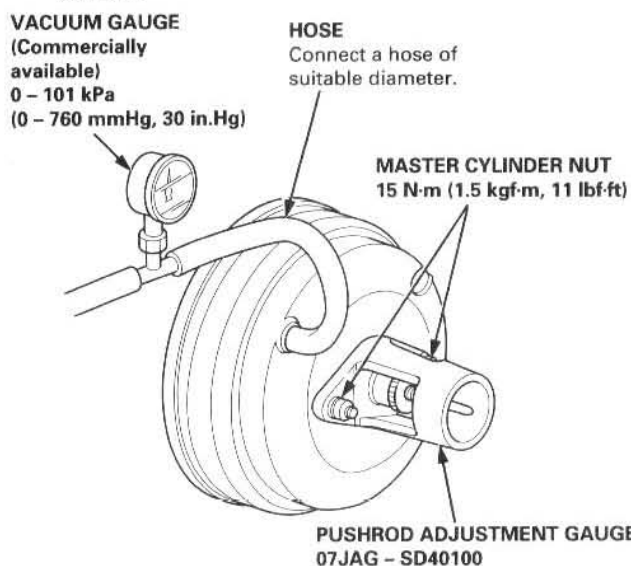
Pushrod Clearance Adjustment

NOTE: Master cylinder pushrod-to-piston clearance must be checked and adjustments made, if necessary, before installing master cylinder.

1. Set the special tool on the master cylinder body; push in the center shaft until the top of it contacts the end of the secondary piston by turning the adjusting nut.



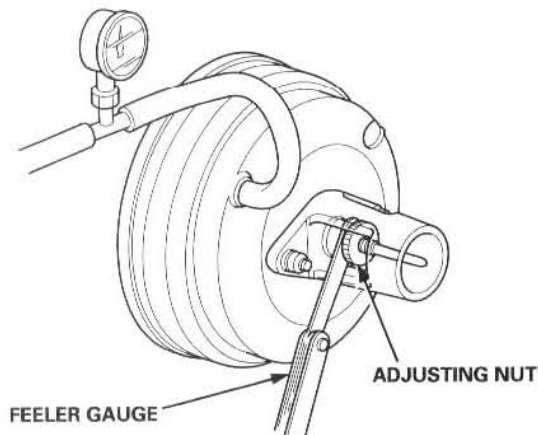
2. Without disturbing the center shaft's position, install the special tool upside down on the booster.
3. Install the master cylinder nuts and tighten to the specified torque.
4. Connect the booster in-line with a vacuum gauge 0 – 101 kPa (0 – 760 mmHg, 30 in.Hg) to the booster's engine vacuum supply, and maintain an engine speed that will deliver 66 kPa (500 mmHg, 20 in.Hg) vacuum.





5. With a feeler gauge, measure the clearance between the gauge body and the adjusting nut as shown.

Clearance: 0 – 0.2 mm (0 – 0.008 in)

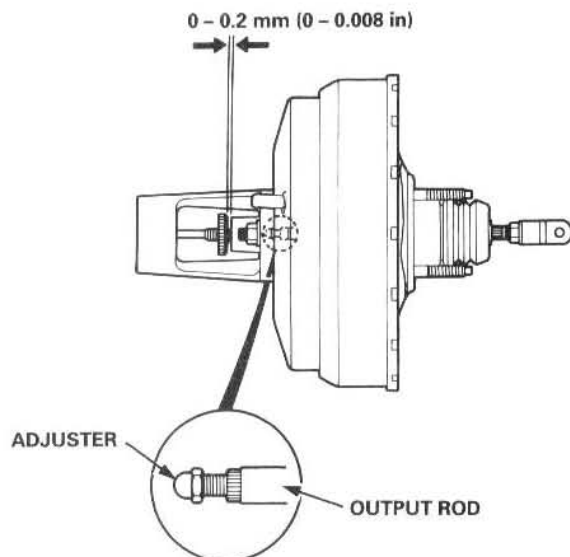


NOTE: If the clearance between the gauge body and adjusting nut is 0.2 mm (0.008 in), the pushrod-to-piston clearance is 0 mm. However, if the clearance between the gauge body and adjusting nut is 0 mm, the pushrod-to-piston clearance is 0.2 mm (0.008 in) or more. Therefore it must be adjusted and rechecked.

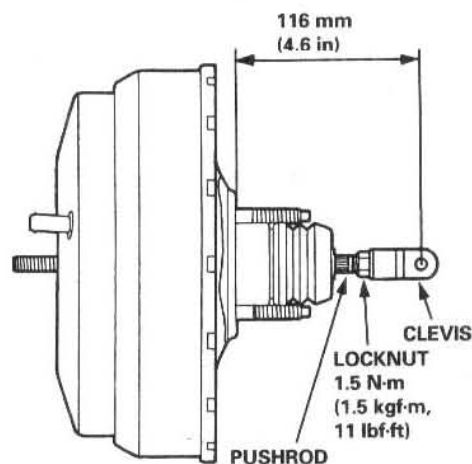
6. If the clearance is incorrect, remove the tool, and adjust the clearance by holding the pushrod and turning the adjuster in or out.

CAUTION: Do not pull the pushrod out of the brake booster.

NOTE: Adjust the clearance while the specified vacuum is applied to the booster.



7. Adjust the pushrod length as shown if the booster is removed.



8. Install the master cylinder (see page 19-13).

Master Cylinder/Brake Booster

Brake Booster Inspection

Functional Test

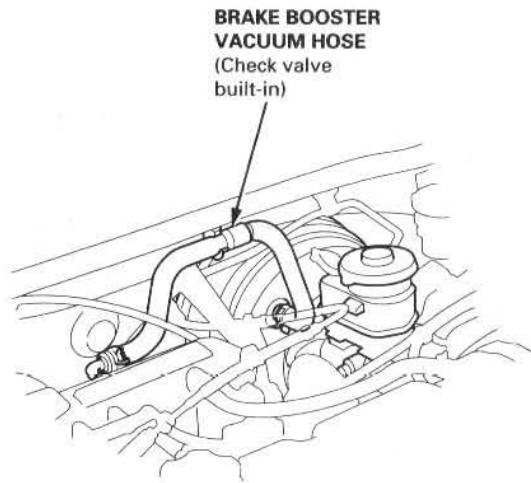
1. With the engine stopped, depress the brake pedal several times to deplete the vacuum reservoir, then depress the pedal hard and hold it for 15 seconds. If the pedal sinks, either the master cylinder is bypassing internally, or the brake system (master cylinder, lines, modulator, proportioning valve, or caliper) is leaking.
2. Start the engine with the brake pedal depressed. If the pedal sinks slightly, the vacuum booster is operating normally. If the pedal height does not vary, the booster or check valve is faulty.
3. With the engine running, depress the brake pedal lightly. Apply just enough pressure to hold back automatic transmission creep. If the brake pedal sinks more than 10 mm (3/8 in.) in three minutes, the master cylinder is faulty. A slight change in pedal height when the A/C compressor cycles on and off is normal. (The A/C compressor load changes the vacuum available to the booster.)

Leak Test

1. Depress the brake pedal with the engine running, then stop the engine. If the pedal height does not vary while depressed for 30 seconds, the vacuum booster is OK. If the pedal rises, the booster is faulty.
2. With the engine stopped, depress the brake pedal several times using normal pressure. When the pedal is first depressed, it should be low. On consecutive applications, the pedal height should gradually rise. If the pedal position does not vary, check the booster check valve.

Booster Check Valve Test

1. Disconnect the brake booster vacuum hose at the booster.
2. Start the engine and let it idle. There should be vacuum available. If no vacuum is available, the check valve is not working properly. Replace the brake booster vacuum hose and check valve, and retest.



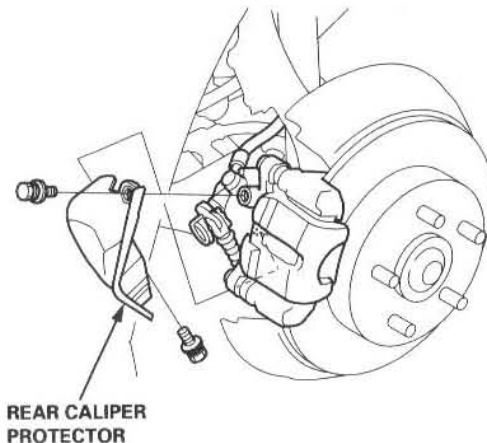


Inspection and Replacement

⚠ WARNING

- Never use an air hose or dry brush to clean brake assemblies.
- Use an OSHA-approved vacuum cleaner to avoid breathing brake dust.
- Block the front wheels before jacking up the rear of the vehicle.

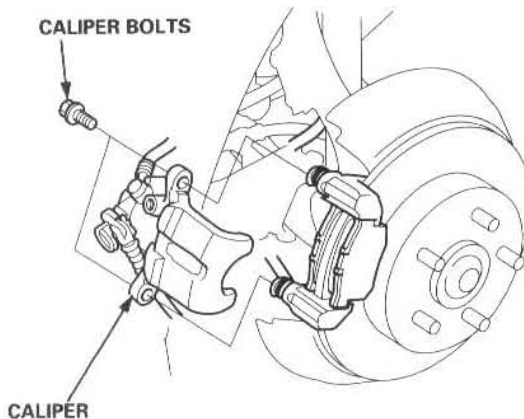
1. Block the front wheels, loosen the rear wheel nuts slightly, support the rear of vehicle on safety stands, then remove the rear wheels.
2. Release the parking brake.
3. Remove the rear caliper protector.



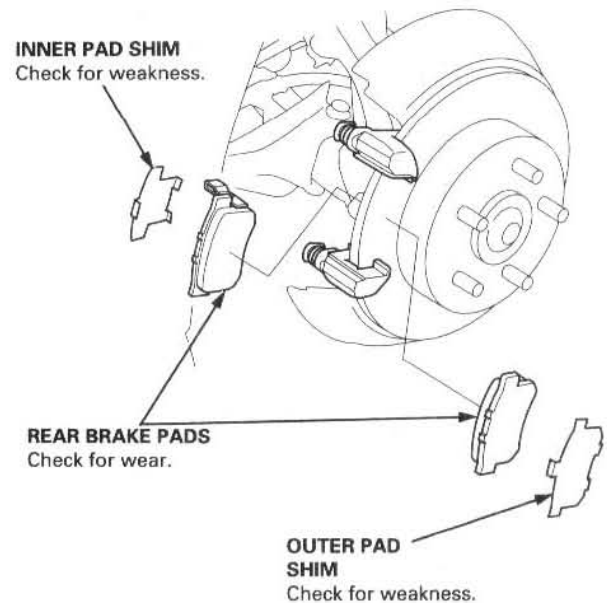
4. Hold the caliper pins with a thin, open-end wrench, and remove the two caliper bolts and the caliper from the bracket.

CAUTION:

- Thoroughly clean the outside of the caliper to prevent dust and dirt from entering inside.
- Support the caliper with a piece of wire so that it does not hang from the brake hose.



5. Remove the pad shims and brake pads.

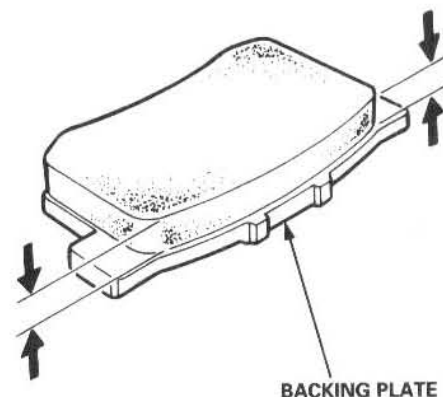


6. Using vernier calipers, measure the thickness of each brake pad lining. The measurement does not include the pad backing plate thickness.

Brake Pad Thickness:

Standard: 8.3 – 9.0 mm (0.33 – 0.35 in)

Service Limit: 1.6 mm (0.06 in)



7. If the pad thickness is less than the service limit, replace the pads and shims together as a set.

(cont'd)

Rear Brake Pads

Inspection and Replacement (cont'd)

8. Remove the pad retainers.
9. Clean the caliper thoroughly; remove any rust, and check for grooves and cracks.
10. Check the brake disc for damage and cracks.
11. Make sure that the pad retainers are installed in the correct positions.

PAD RETAINERS

Check for weakness.

CALIPER BRACKET

Check for cracks.

12. Apply Molykote M77 grease to both sides of the shims. Wipe excess grease off the shims.

WEAR INDICATOR

INNER PAD SHIM

Apply Molykote M77 Grease to both sides of shim.

OUTER PAD SHIM

Apply Molykote M77 grease to both sides of shim.

REAR BRAKE PADS

13. Install the brake pads and pad shims on the caliper bracket. Install the pad with the wear indicator on the inside.

⚠ WARNING

- When reusing the pads, always reinstall the brake pads in their original positions to prevent loss of braking efficiency.
- Contaminated brake discs or pads reduce stopping ability. Keep grease off the discs and pads.

14. Rotate the caliper piston clockwise into the cylinder, then align the cutout in the piston with the tab on the inner pad by turning the piston back.

CAUTION: Lubricate the boot with rubber grease to avoid twisting the piston boot. If the piston boot is twisted, back it out so it sits properly.

CALIPER BOLTS

23 N·m (2.3 kgf·m, 17 lbf·ft)

CALIPER

CUTOUT

Align

TAB

15. Install the brake caliper.
16. Install and tighten the caliper bolts while holding the caliper pins with a thin, open-end wrench.
17. Install the rear caliper protector.

REAR CALIPER PROTECTOR

18. After installation, check for leaks at hose and line joints and connections, and retighten if necessary.
19. Depress the brake pedal several times to make sure the brakes work, then road-test.

NOTE: Engagement of the brake may require a greater pedal stroke immediately after the brake pads have been replaced as a set. Several applications of the brake pedal will restore the normal pedal stroke.

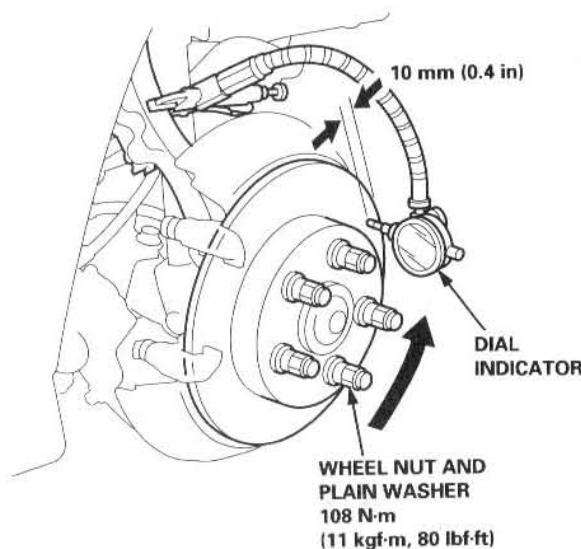


Disc Runout Inspection

1. Loosen the rear wheel nuts slightly, then raise the vehicle and support it on safety stands. Remove the rear wheels.
2. Remove the brake pads (see page 19-17).
3. Inspect the disc surface for damage and cracks. Clean the disc thoroughly and remove all rust.
4. Use wheel nuts and suitable plain washers to hold the disc securely against the hub, then mount a dial indicator as shown and measure the runout at 10 mm (0.4 in) from the outer edge of the disc.

Brake Disc Runout:

Service Limit: 0.10 mm (0.004 in)



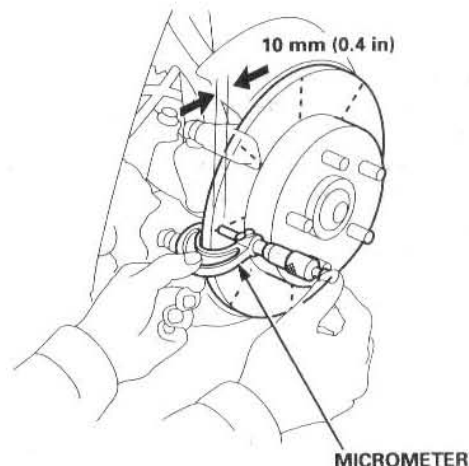
5. If the disc is beyond the service limit, refinish the brake disc.

Max. Refinishing Limit: 8.0 mm (0.31 in)

NOTE: A new disc should be refinished if its runout is greater than 0.10 mm (0.004 in).

Disc Thickness and Parallelism Inspection

1. Loosen the rear wheel nuts slightly, then raise the vehicle and support it on safety stands. Remove the rear wheels.
2. Remove the brake pads (see page 19-17).
3. Using a micrometer, measure disc thickness at eight points, approximately 45° apart and 10 mm (0.4 in) in from the outer edge of the disc. Replace the brake disc if the smallest measurement is less than the max. refinishing limit.



Brake Disc Thickness:

Standard: 8.9 – 9.1 mm (0.35 – 0.36 in)

Max. Refinishing Limit: 8.0 mm (0.31 in)

Brake Disc Parallelism: 0.015 mm (0.0006 in) max.

NOTE: This is the maximum allowable difference between the thickness measurements.

4. If the disc is beyond the service limit for parallelism, refinish the brake disc.

NOTE: See section 18 for brake disc replacement.

Rear Brake Caliper

Disassembly/Reassembly

⚠ WARNING

- Never use an air hose or dry brush to clean brake assemblies.
- Use an OSHA-approved vacuum cleaner to avoid breathing brake dust.
- Contaminated brake discs or pads reduce stopping ability.
- When reusing the pads, install them in their original positions to prevent loss of braking efficiency.

CAUTION:

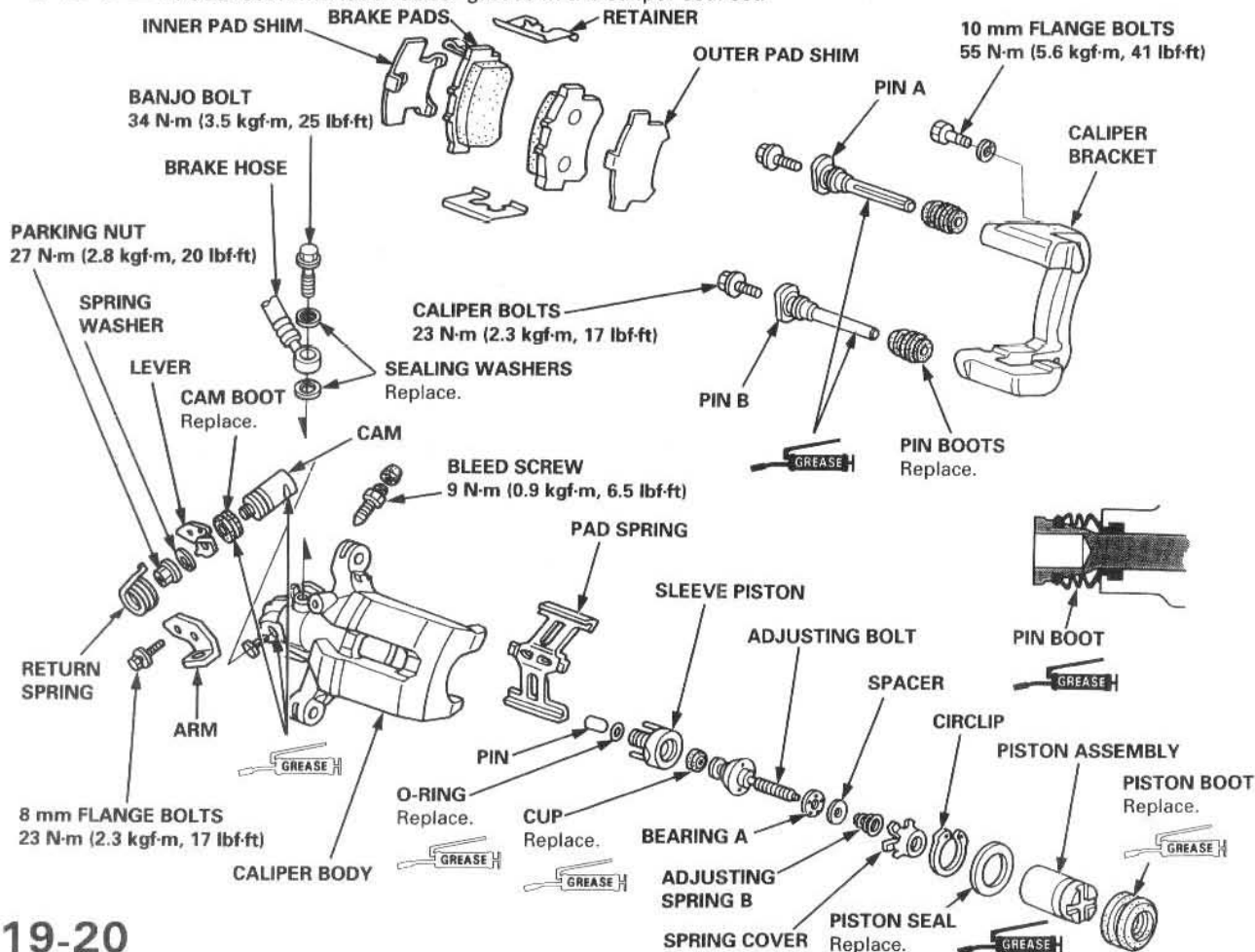
- Do not spill brake fluid on the vehicle; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- Clean all parts in brake fluid and air dry; blow out all passages with compressed air.
- Before reassembling, check that all parts are free of dust and other foreign particles.
- Replace parts with new ones whenever specified to do so.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- Do not reuse the drained fluid.
- Always use Genuine Honda DOT 3 Brake Fluid. Using a non-Honda brake fluid can cause corrosion and decrease the life of the system.

NOTE:

- Coat the piston, piston seal groove, and caliper bore with clean brake fluid.
- Replace all rubber parts with new ones whenever disassembled.
- After installing the rear brake caliper.
 - Check for leaks at hose and line joints and connections, and retighten if necessary.
 - Check the brake hoses for interference and twisting.

-  GREASE: Use recommended silicone greases in the caliper seal set.

-  GREASE: Use recommended rubber grease in the caliper seal set.

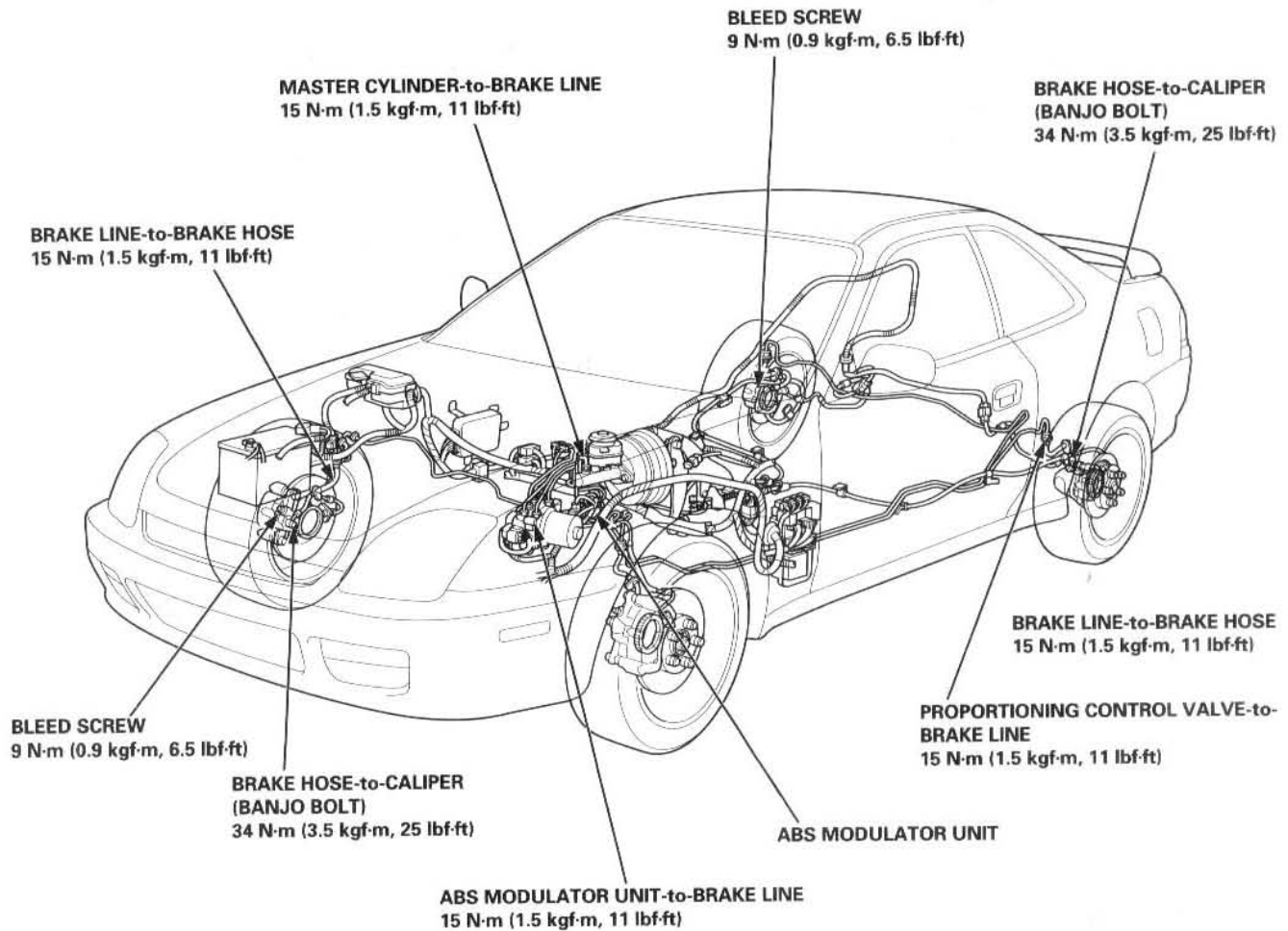




Inspection/Torque Specifications

1. Inspect the brake hoses for damage, deterioration, leaks, interference and twisting.
2. Check the brake lines for damage, rusting and leakage. Also check for bent brake lines.
3. Check for leaks at hose and line joints or connections, and retighten if necessary.
4. Check the master cylinder and ABS modulator unit for damage and leakage.

CAUTION: Replace the brake hose clip whenever the brake hose is serviced.



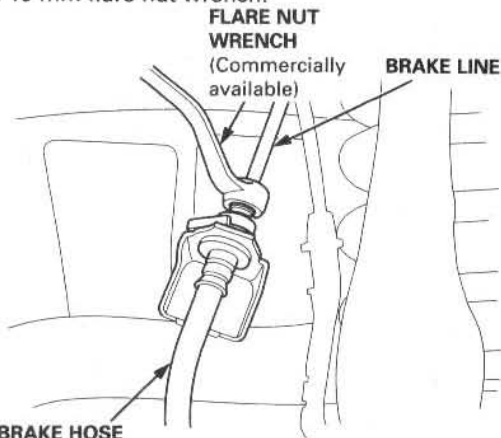
Brake Hoses/Lines

Hose Replacement

CAUTION:

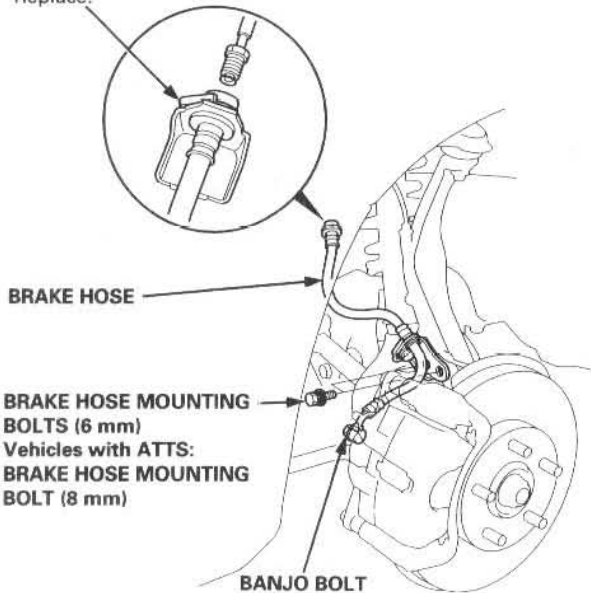
- Before reassembling, check that all parts are free of dust and other foreign particles.
- Replace parts with new ones whenever specified to do so.
- Do not spill brake fluid on the vehicle; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.

1. Replace the brake hose if the hose is twisted, cracked, or if it leaks.
2. Disconnect the brake hose from the brake line using a 10 mm flare nut wrench.



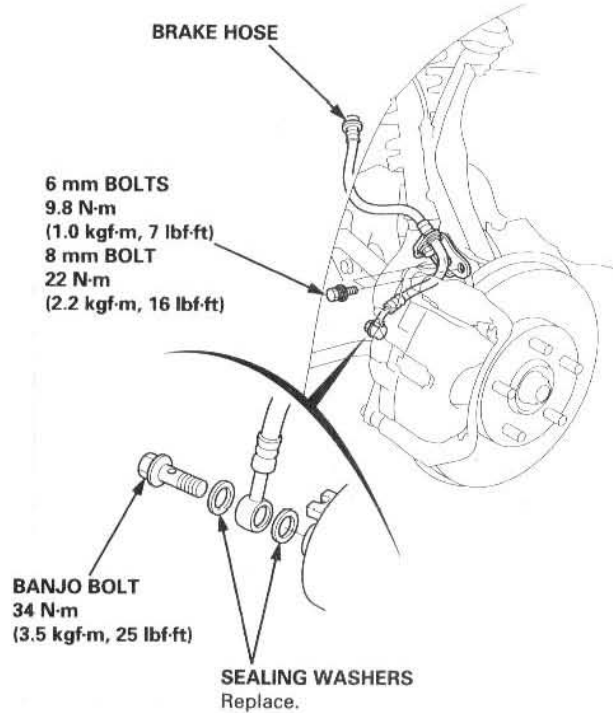
3. Remove and discard the brake hose clip from the brake hose.

BRAKE HOSE CLIP
Replace.

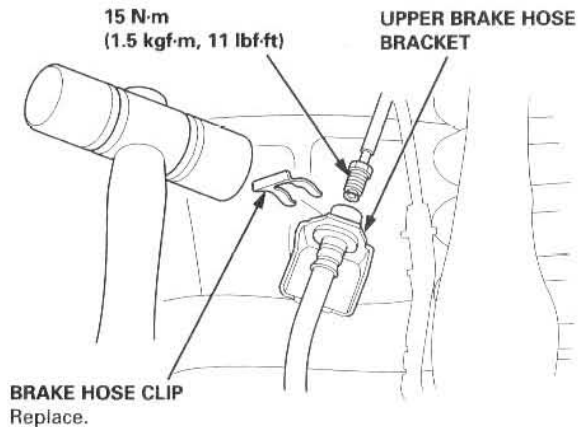


4. Remove the banjo bolt, and disconnect the brake hose from the caliper.

5. Install the brake hose on the knuckle and damper first, then connect the brake hose to the caliper with the banjo bolt and new sealing washers.



6. Install the brake hose on the upper brake hose bracket with a new brake hose clip.
7. Connect the brake line to the brake hose.



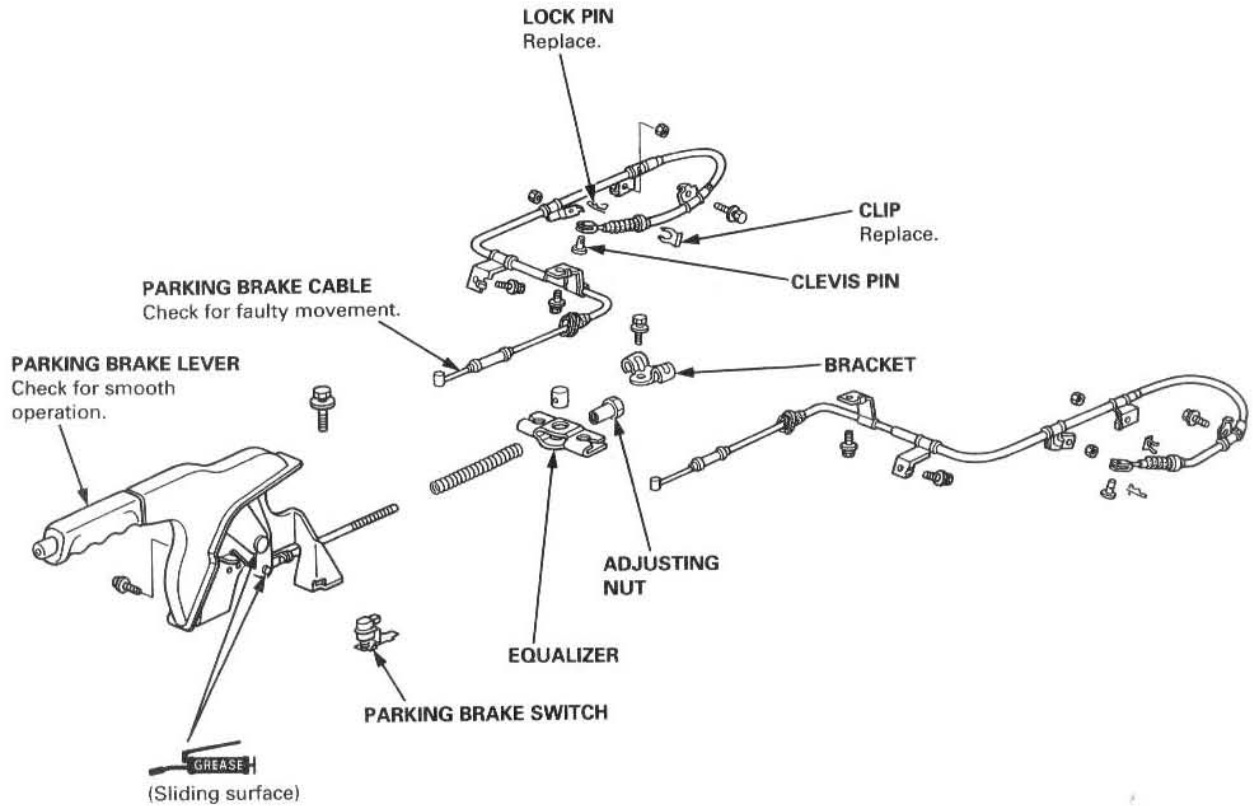
8. After installing the brake hose, bleed the brake system (see page 19-7).
9. Perform the following checks.
 - Check the brake hose and line joint for leaks, and tighten if necessary.
 - Check the brake hoses for interference and twisting.



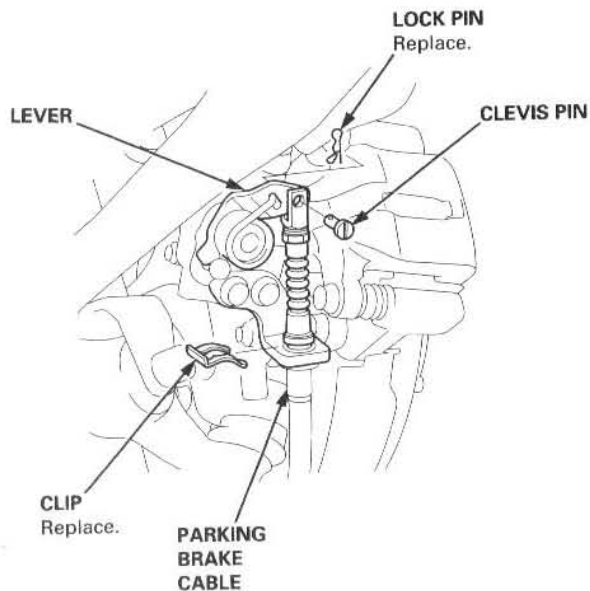
Parking Brake Cable

Inspection and Replacement

CAUTION: The parking brake cables must not be bent or distorted. This will lead to stiff operation and premature cable failure.



Disconnect the parking brake cable from the lever on the caliper by removing the lock pin and clevis pin, and remove the cable from the arm by removing the clip.





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Anti-lock Brake System (ABS)

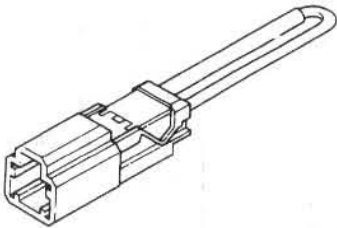
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ABS

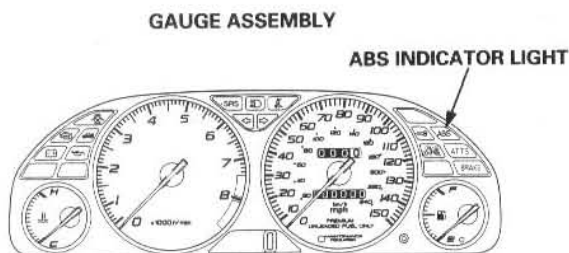
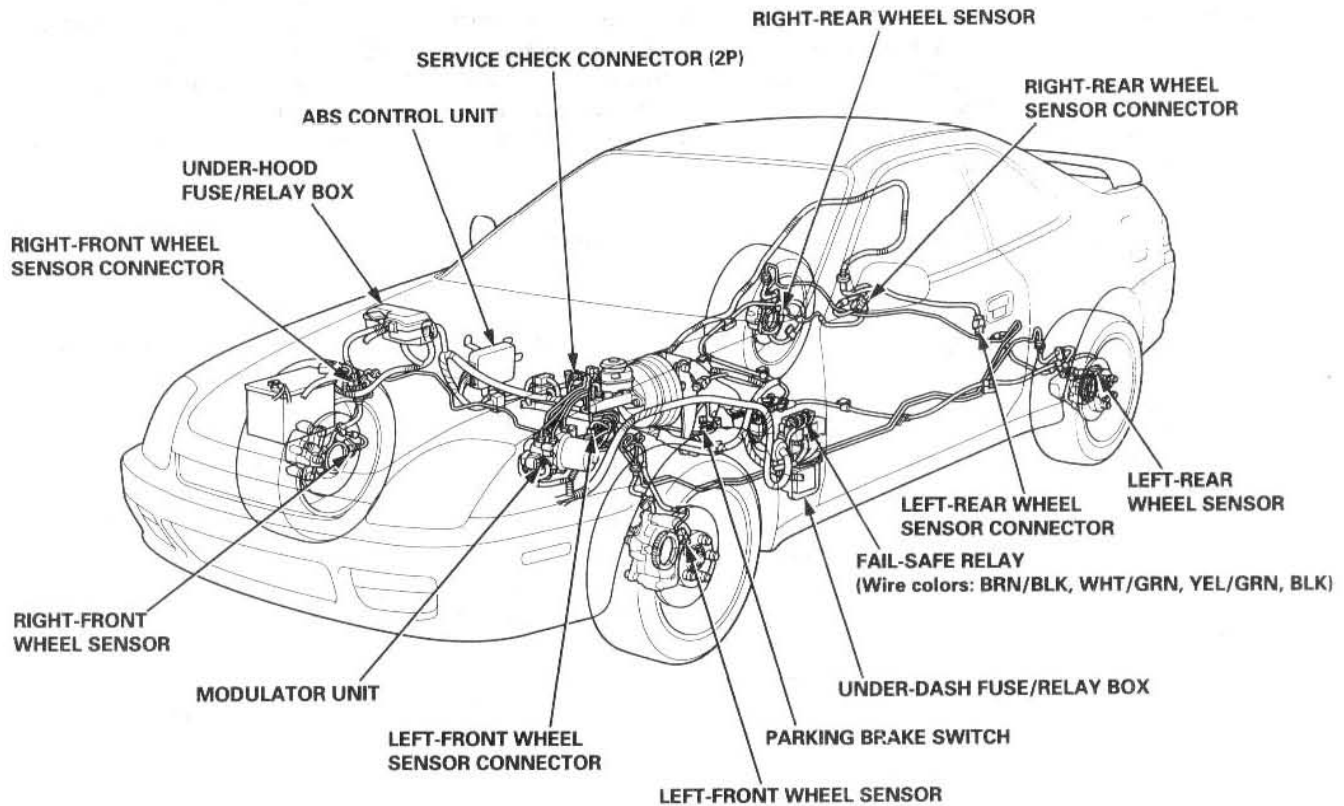
Special Tools

Ref. No.	Tool Number	Description	Qty	Page Reference
①	07PAZ – 0010100	SCS Service Connector	1	19-39

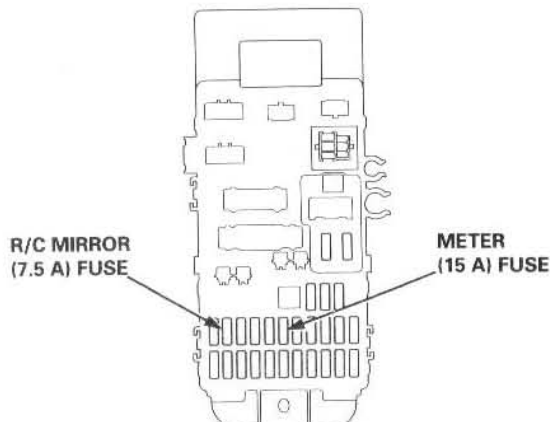


①

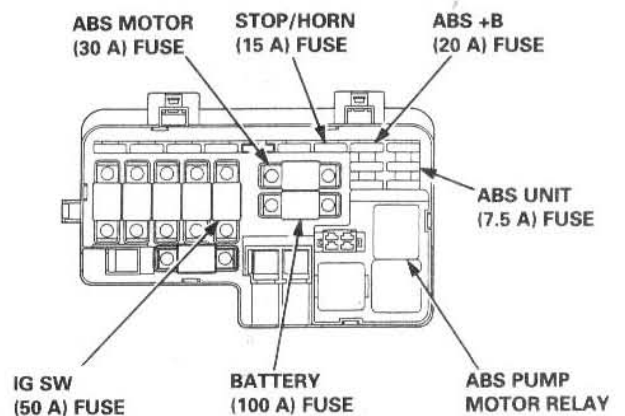
Component Locations



UNDER-DASH FUSE/RELAY BOX



UNDER-HOOD FUSE/RELAY BOX



Anti-lock Brake System (ABS)

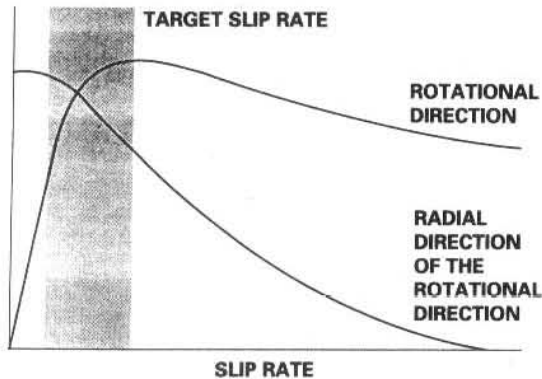
Features/Construction

When the brake pedal is depressed during driving, the wheels can lock before the vehicle comes to a stop. In such an event, the maneuverability of the vehicle is reduced if the front wheels are locked, and the stability of the vehicle is reduced if the rear wheels are locked, creating an extremely unstable condition. The ABS precisely controls the slip rate of the wheels to ensure the grip force of the tires, and it thereby ensures maneuverability and stability of the vehicle.

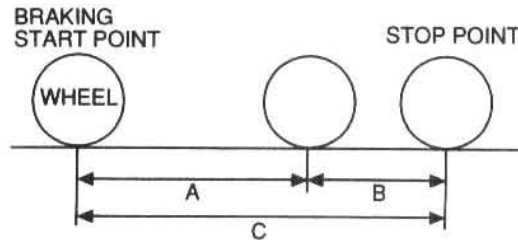
The ABS calculates the slip rate of the wheels based on the vehicle speed and the wheel speed, then it controls the brake fluid pressure to attain the target slip rate.

Grip Force of Tire and Road Surface

COEFFICIENT OF FRICTION

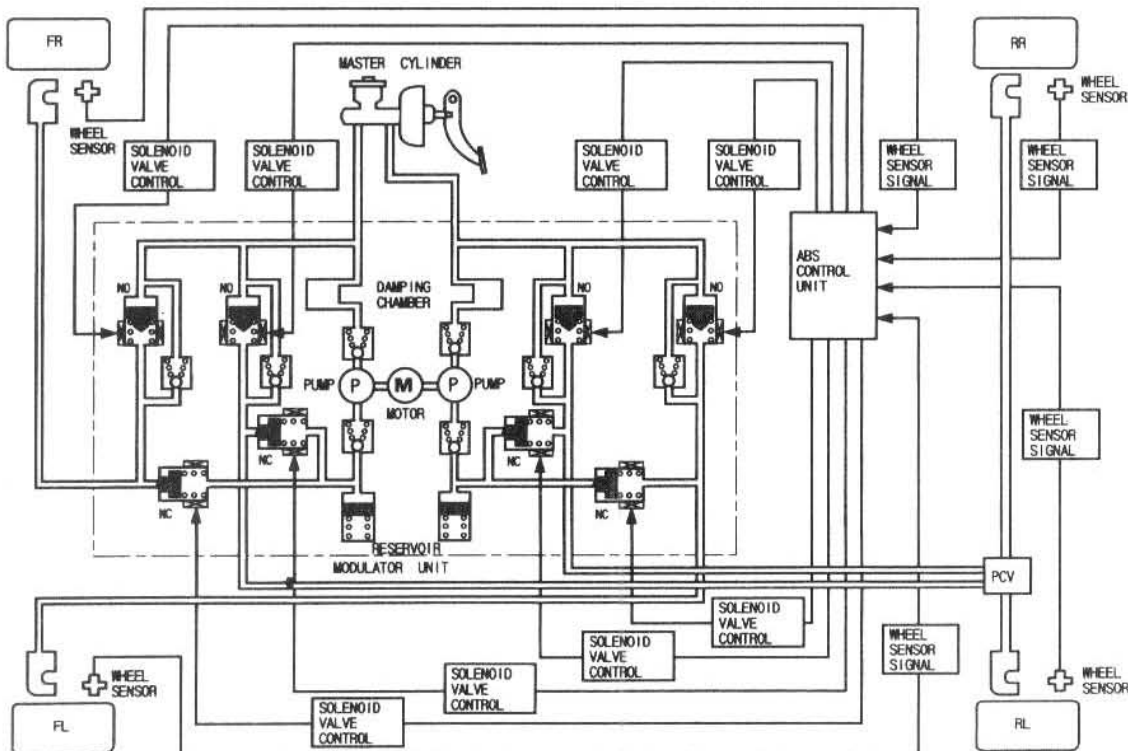


Slip Rate



A: Distance without slip
B: Slipped distance
C: Actual distance to stop

$$\text{SLIP RATE} = \frac{B}{C} = \frac{\text{VEHICLE SPEED} - \text{WHEEL SPEED}}{\text{VEHICLE SPEED}}$$



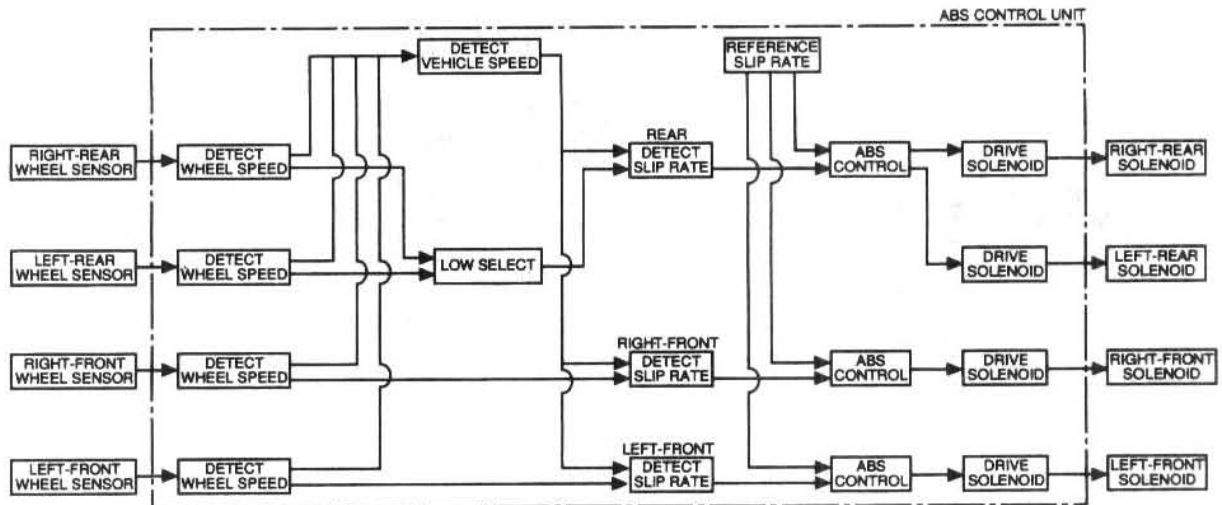
NO: Normally Open
NC: Normally Closed

ABS Control

The ABS control unit detects the wheel speed based on the wheel sensor signal it received, then it calculates the vehicle speed based on the detected wheel speed. The control unit detects the vehicle speed during deceleration based on the rate of deceleration.

The ABS control unit calculates the slip rate of each wheel, and it transmits the control signal to the modulator unit solenoid valve when the slip rate is high.

The pressure reduction control has three-modes: pressure reduction, pressure retaining and pressure intensifying.



Self-diagnosis

1. The ABS control unit is equipped with a main CPU and a sub CPU, that check each other for problems.
2. The CPUs check the circuit of the system.
3. Self-diagnosis can be classified into two categories.
 - Initial diagnosis: Performed right after the engine starts and until the ABS indicator goes off.
 - Regular diagnosis: Performed right after the initial diagnosis until the ignition switch is turned OFF.
4. When a problem is detected by self-diagnosis, the system:
 - Turns the fail-safe relay OFF
 - Turns the solenoid valve OFF
 - Turns the pump motor OFF
 - Turns the ABS indicator ON

On-board Diagnosis Function

The ABS control unit is connected to the 16P data link connector.

The ABS system can be diagnosed with the Honda PGM Tester.

The ALB Checker cannot be used with this system. For air bleeding and checking wheel sensor signals, use the Honda PGM Tester. See the Honda PGM Tester user's manuals for specific operating instructions.

(cont'd)

Anti-lock Brake System (ABS)

Features/Construction (cont'd)

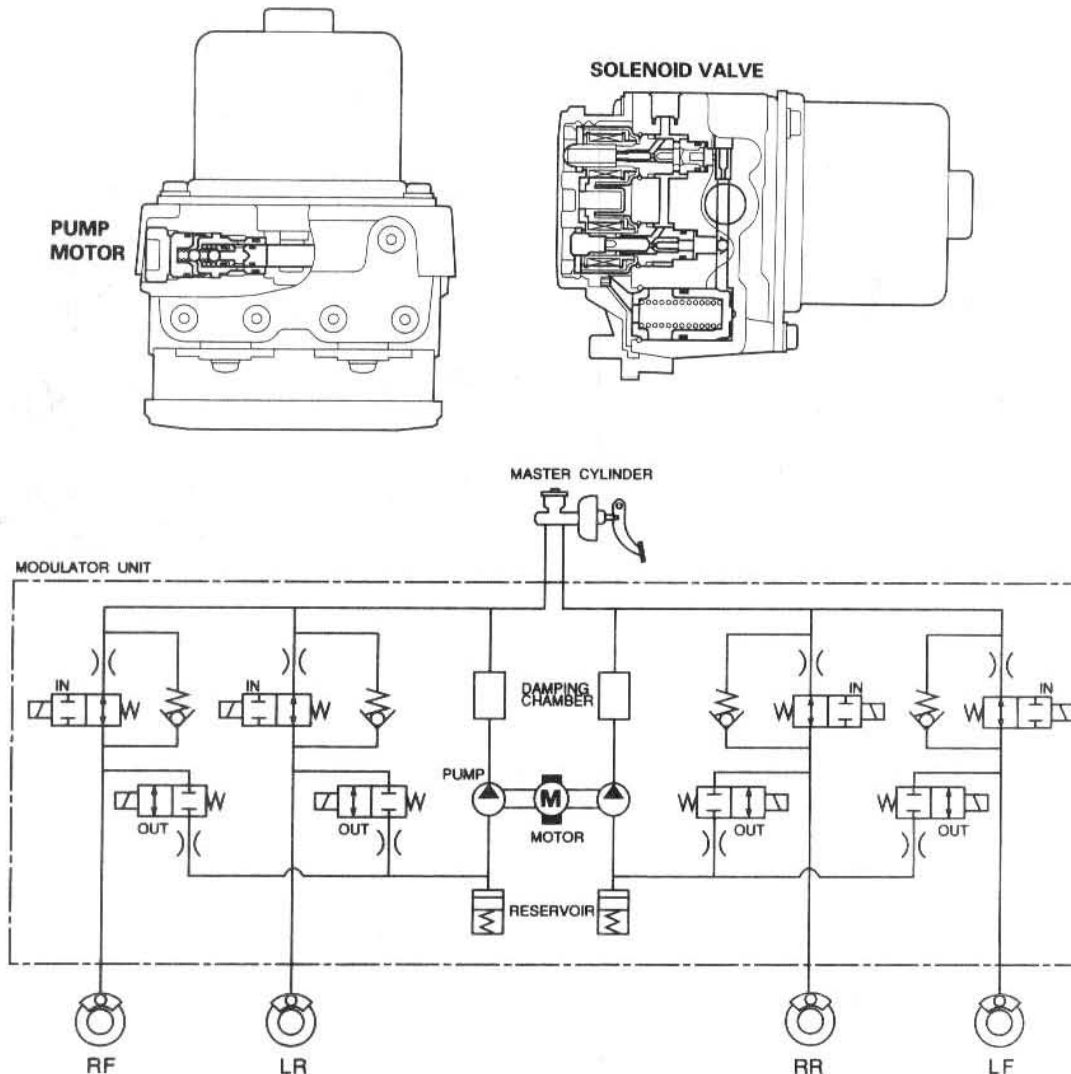
ABS Modulator

The ABS modulator consists of the inlet solenoid valve, outlet solenoid valve, reservoir, pump, pump motor and the damping chamber.

The modulator reduces the caliper fluid pressure directly. It is a circulating-type modulator because the brake fluid circulates through the caliper, reservoir and the master cylinder.

The hydraulic control has three modes: pressure reduction, pressure retaining and pressure intensifying.

The hydraulic circuit is the independent four channel-type, one channel for each wheel.



Pressure intensifying mode: Inlet valve open, outlet valve closed

Master cylinder fluid is pumped out to the caliper.

Pressure retaining mode: Inlet valve closed, outlet valve closed

Caliper fluid is retained by the inlet valve and outlet valve.

Pressure reduction mode: Inlet valve closed, outlet valve open

Caliper fluid flows through the outlet valve to the reservoir.

Motor operation mode:

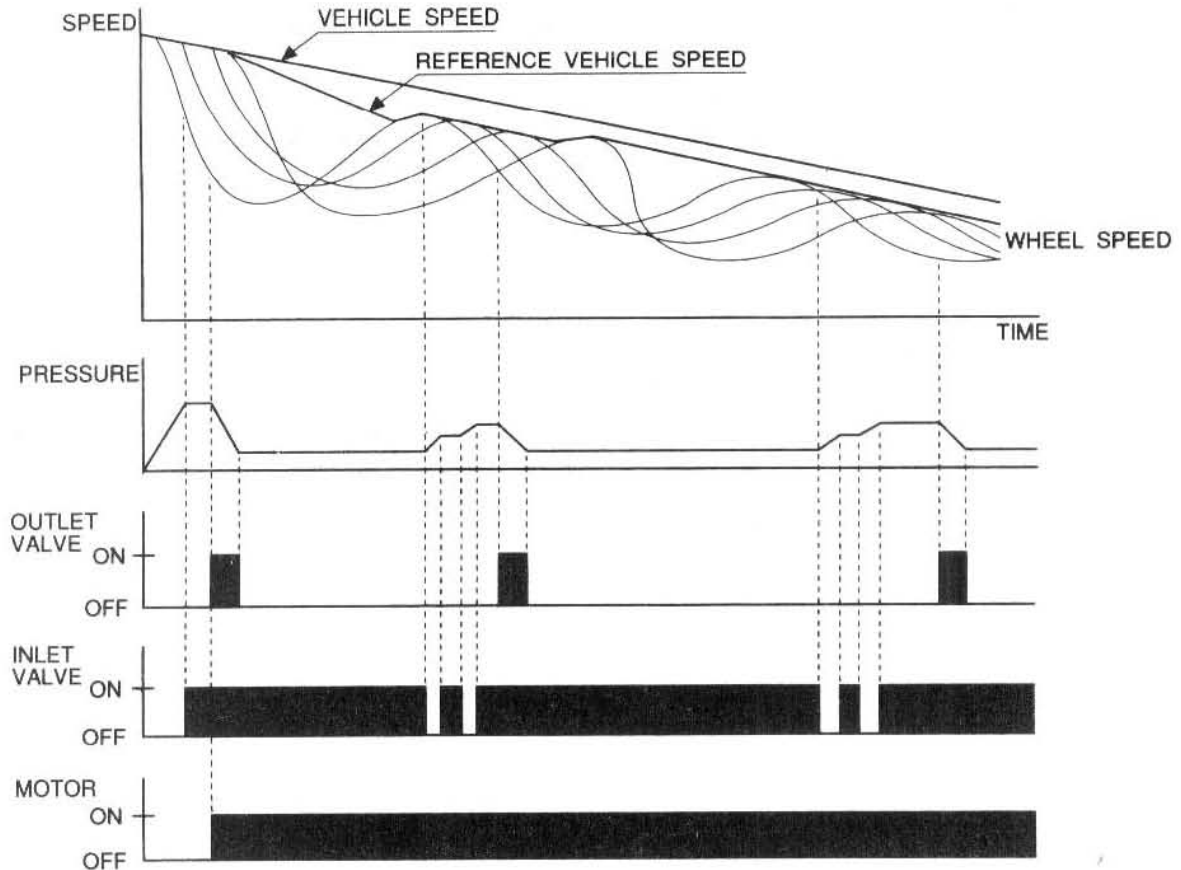
When starting the pressure reduction mode, the pump motor is ON.

When stopping ABS operation, the pump motor is OFF.

The reservoir fluid is pumped out by the pump, through the damping chamber, to the master cylinder.

IN: INLET VALVE (NORMALLY OPEN)
OUT: OUTLET VALVE (NORMALLY CLOSED)

Wheel Speed and Modulator Control



When the wheel speed drops sharply below the vehicle speed, the inlet valve closes to retain the caliper fluid pressure. When the wheel speed drops further, the outlet valve opens momentarily to reduce the caliper fluid pressure. The pump motor starts at this time.

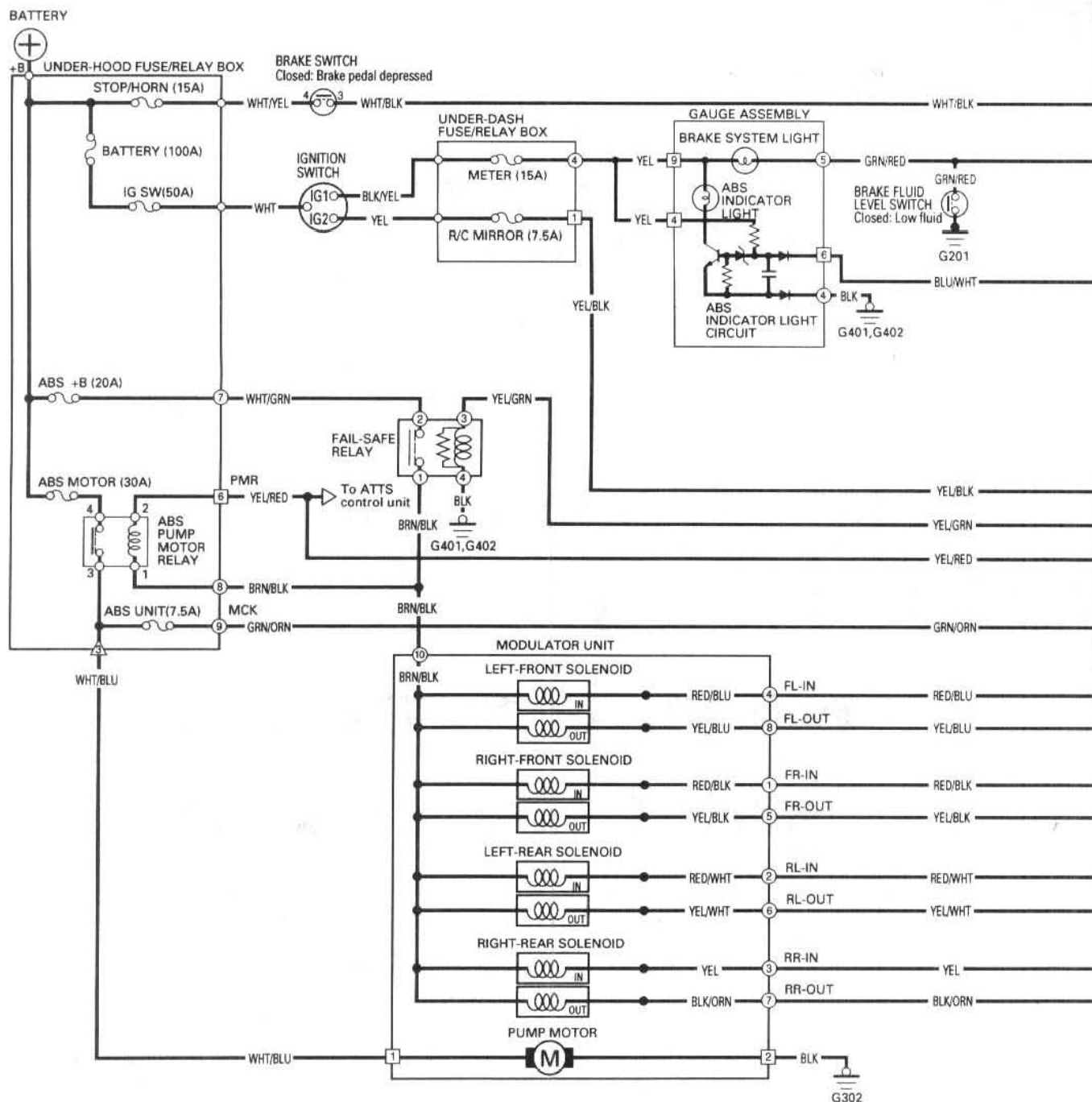
As the wheel speed is restored, the inlet valve opens momentarily to increase the caliper fluid pressure.

Wheel Sensor

The wheel sensors are the magnetic contactless type. As the gear pulser teeth rotate past the wheel sensor's magnetic coil, AC current is generated. The AC frequency changes in accordance with the wheel speed. The ABS control unit detects the wheel sensor signal frequency and thereby detects the wheel speed.



Circuit Diagram

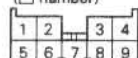


UNDER-HOOD FUSE/RELAY BOX CONNECTORS

11P CONNECTOR (○ number)



9P CONNECTOR (○ number)



7P CONNECTOR (△ number)

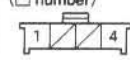


UNDER-DASH FUSE/RELAY BOX CONNECTORS

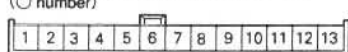
16P CONNECTOR (○ number)



4P CONNECTOR (□ number)



GAUGE ASSEMBLY 13P CONNECTOR (○ number)



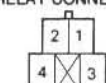
GAUGE ASSEMBLY 12P CONNECTOR (□ number)



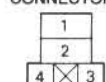
BRAKE SWITCH CONNECTOR



ABS PUMP MOTOR RELAY CONNECTOR

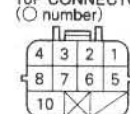


FAIL-SAFE RELAY CONNECTOR



Terminal side of female terminals

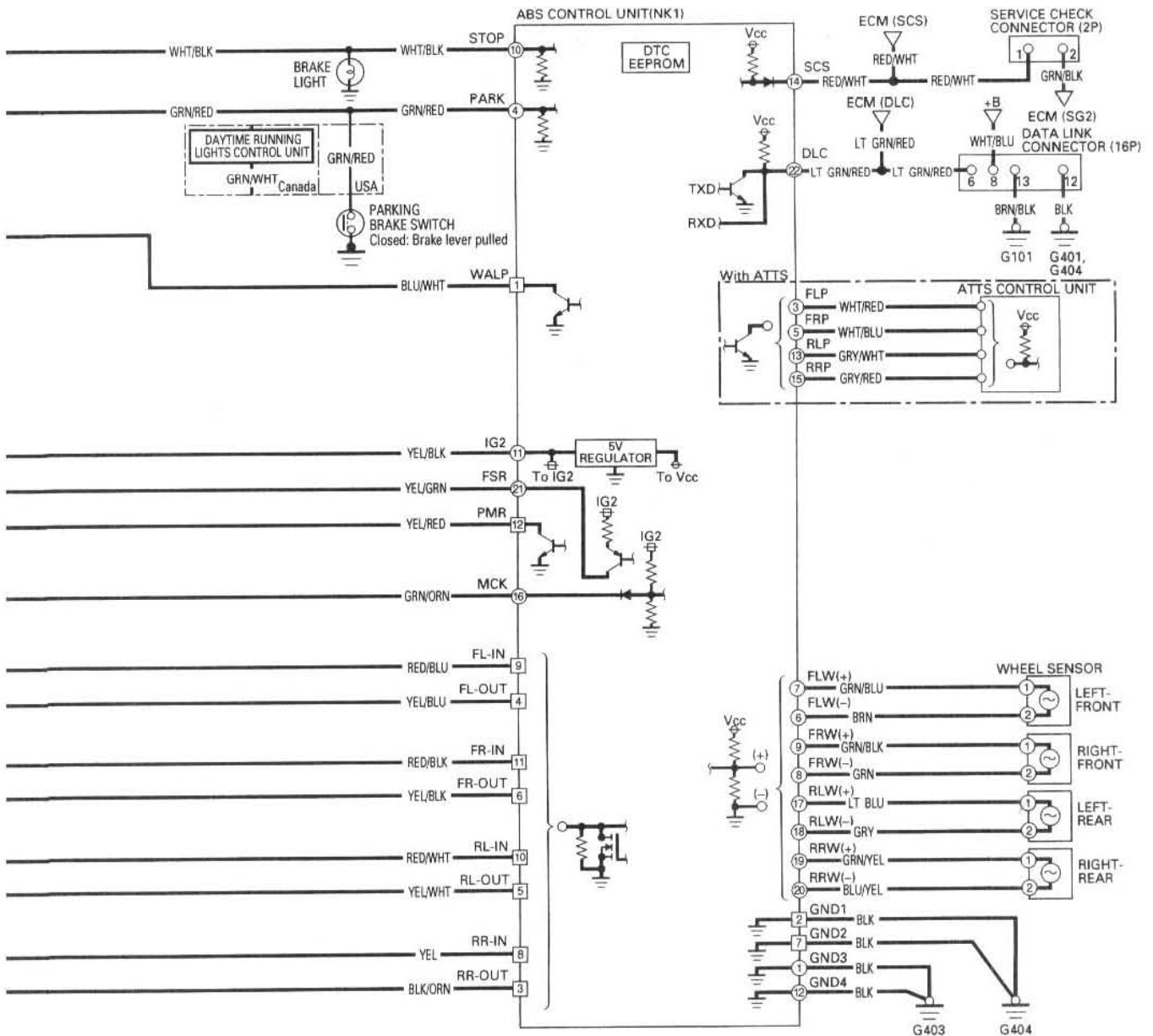
MODULATOR UNIT 10P CONNECTOR (○ number)



PUMP MOTOR 2P CONNECTOR (□ number)



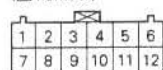
Wire side of female terminals



ABS CONTROL UNIT 22P CONNECTOR
(○ number)



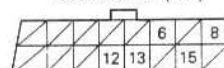
ABS CONTROL UNIT 12P CONNECTOR
(□ number)



SERVICE CHECK CONNECTOR (2P)



DATA LINK CONNECTOR (16P)



WHEEL SENSOR 2P CONNECTOR

FRONT/REAR

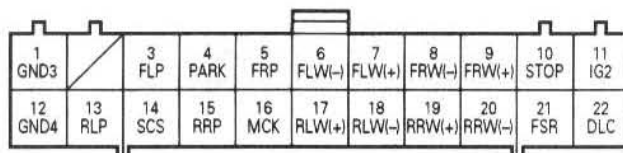


Terminal side of male terminals

Wire side of female terminals

ABS Control Unit Terminal Arrangement

ABS CONTROL UNIT 22P CONNECTOR



Wire side of female terminals

VB: Battery Voltage

Terminal number	Wire color	Terminal sign (Terminal name)	Description	Measurement		
				Terminal	Conditions (Ignition switch ON (II))	Voltage
1	BLK	GND3 (Ground 3)	Ground	1-GND		Below 0.3 V
3	WHT/RED*	FLP (Front-left pulse)	Outputs left-front wheel sensor signal	3-GND	Turns wheel slowly	5 V ↔ 0 V
4	GRN/RED	PARK (Parking)	Detects parking brake switch signal	4-GND	Parking brake	Pull Below 0.3 V Release VB
5	WHT/BLU*	FRP (Front-right pulse)	Outputs right-front wheel sensor signal	5-GND	Turns wheel slowly	5 V ↔ 0 V
6	BRN	FLW (-) (Front-left wheel negative)	Detects left-front wheel sensor signal	6-7	Wheel Turns slowly	AC: 0.053 V or above (Reference) Oscilloscope: 0.15 Vp-p or above
7	GRN/BLU	FLW (+) (Front-left wheel positive)				
8	GRN	FRW (-) (Front-right wheel negative)	Detects right-front wheel sensor signal	8-9	Wheel Stopped	0.25 – 1.15 V
9	GRN/BLK	FRW (+) (Front-right wheel positive)				
10	WHT/BLK	STOP	Detects brake switch signal	10-GND	Brake pedal	Depressed VB Released Below 0.3 V
11	YEL/BLK	IG2 (Ignition 2)	Power source for activating the system	11-GND	Ignition switch	ON (II) VB Start (III) Below 0.3 V

*: With ATTS only

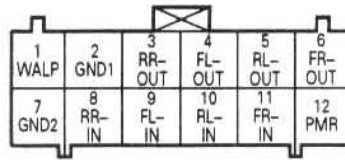
VB: Battery Voltage

Terminal number	Wire color	Terminal sign (Terminal name)	Description	Measurement			
				Terminal	Conditions (Ignition switch ON (II))		Voltage
12	BLK	GND4 (Ground 4)	Ground	12-GND			Below 0.3 V
13	GRY/WHT*	RLP (Rear-left pulse)	Outputs left-rear wheel sensor signal	13-GND	Turns wheel slowly		5 V ↔ 0 V
14	RED/WHT	SCS (Service check signal)	Detects service check connector signal (DTC indication or DTC erasure)	14-GND	SCS service connector	Connected	Below 0.3 V
						Disconnected	Approx. 5 V
15	GRY/BLK*	RRP (Rear-right pulse)	Outputs right-rear wheel sensor signal	15-GND	Turns wheel slowly		5 V ↔ 0 V
16	GRN/ORN	MCK (Motor check)	Detects pump motor drive signal	16-GND	Pump motor	ON	VB
						OFF	Below 0.3 V
17	LT BLU	RLW (+) (Rear-left wheel positive)	Detects left-rear wheel sensor signal	17-18	Wheel	Turns slowly	AC: 0.053 V or above (Reference) Oscilloscope: 0.15 Vp-p or above
18	GRY	RLW (–) (Rear-left wheel negative)					
19	GRN/YEL	RRW (+) (Rear-right wheel positive)	Detects right-rear wheel sensor signal	19-20			
20	BLU/YEL	RRW (–) (Rear-right wheel negative)					
						Stopped	0.25 – 1.15 V
21	YEL/GRN	FSR (Fail-safe relay)	Drives fail-safe relay (Fail-safe relay is turned OFF to shut off the power source to the solenoid and pump motor relay when problem occurs.)	21-GND	ABS indicator light	ON	Below 0.3 V
						OFF	VB
22	LT GRN/ RED	DLC (Data link connector)	Communicates with Honda PGM Tester	22-GND	———		———

*: With ATTS only

ABS Control Unit Terminal Arrangement

ABS CONTROL UNIT 12P CONNECTOR



Wire side of female terminals

VB: Battery Voltage

Terminal number	Wire color	Terminal sign (Terminal name)	Description	Measurement			
				Terminal	Conditions (Ignition switch ON (III))		Voltage
1	BLU/WHT	WALP (Warning lamp)	Drives ABS indicator light (Turns the indicator light drive transistor to ON, then turns off the indicator light)	1-GND	ABS indicator light	ON	3 – 6 V
						OFF	Below 0.3 V
2	BLK	GND1 (Ground 1)	Ground	2-GND			Below 0.3 V
3	BLK/ORN	RR-OUT (Rear-right outlet)	Drives right-rear outlet solenoid valve	3-GND	ABS indicator light	OFF	VB
4	YEL/BLU	FL-OUT (Front-left outlet)	Drives left-front outlet solenoid valve	4-GND			
5	YEL/WHT	RL-OUT (Rear-left outlet)	Drives left-rear outlet solenoid valve	5-GND		ON	Below 0.3 V
6	YEL/BLK	FR-OUT (Front-right outlet)	Drives right-front outlet solenoid valve	6-GND			
7	BLK	GND2 (Ground 2)	Ground	7-GND			Below 0.3 V
8	YEL	RR-IN (Rear-right inlet)	Drives right-rear inlet solenoid valve	8-GND	ABS indicator light	OFF	VB
9	RED/BLU	FL-IN (Front-left inlet)	Drives left-front inlet solenoid valve	9-GND			
10	RED/WHT	RL-IN (Rear-left inlet)	Drives left-rear inlet solenoid valve	10-GND		ON	Below 0.3 V
11	RED/BLK	FR-IN (Front-right inlet)	Drives right-front inlet solenoid valve	11-GND			
12	YEL/RED	PMR (Pump motor relay)	Drives pump motor relay	12-GND	ABS indicator light	OFF	Below 0.3 V
						Pump motor	ON
						OFF	VB
						ON	Below 0.3 V

Troubleshooting Precautions

ABS Indicator Light

1. If the system is OK, the ABS indicator light goes off two seconds after turning the ignition switch ON (II) without starting the engine. After starting the engine, the ABS indicator light comes on again and goes off after two seconds. This occurs because the ABS control unit is activated by the IG2 power source.
2. The ABS indicator light comes on when the ABS control unit detects a problem in the system. However, even though the system is normal, the ABS indicator light comes on, too, under the following conditions. To determine the actual cause of problem, question the customer about the problem, taking the following conditions into consideration.
 - Only drive wheels rotate
 - One drive wheel is stuck
 - Vehicle spin
 - ABS continues to operate for a long time
 - Signal disturbance
3. When a problem is detected and the ABS indicator light comes on, there are cases when the indicator light stays on until the ignition switch is turned OFF, and cases when the indicator light goes off automatically when the system returns normal. For the DTC 61 and 62, the indicator light goes off automatically when the system returns normal. For all other codes, the indicator light stays on until the ignition switch is turned OFF.
4. For DTCs 12, 14, 16, 18, 21, 22, 23, 24, 51, 52 and 53, the indicator light goes off when the vehicle is driven again and the signals are OK after the ignition switch is turned from OFF to ON (II). However, if the DTC is erased, the CPU is reset and the indicator light goes off right after the engine is started if the signals are OK.

Diagnostic Trouble Code (DTC)

1. The DTC is not memorized if the CPU cannot be activated or the CPU fails and the indicator light comes on.
2. The memory can hold any number of DTCs. However, when the same DTC is detected more than once, the later one is written over the old one. Therefore, when the same problem is detected repeatedly, it is memorized as one DTC.
3. The DTCs are indicated in the order of ascending number, not in the order they occur.
4. The DTCs are memorized in the EEPROM (non-volatile memory). Therefore, the memorized DTCs cannot be canceled by disconnecting the battery. Perform the specified procedures to erase the DTCs.

Self-diagnosis

1. The self-diagnosis can be classified into two categories.
 - Initial diagnosis: Performed right after the engine starts and until the ABS indicator light goes off.
 - Regular diagnosis: Performed right after the initial diagnosis until the ignition switch is turned OFF.
2. When a problem is detected by self-diagnosis, the system.
 - Turns the ABS indicator light ON
 - Memorizes the DTC
 - Turns the fail-safe relay OFF
 - Stops ABS control

Troubleshooting Precautions

Kickback

1. The motor operates when the ABS is functioning, and the fluid in the reservoir is forced out to the master cylinder causing kickback at the brake pedal.

Pump Motor

1. The pump motor operates when the ABS is functioning.
2. The ABS control unit checks the pump motor operation during initial diagnosis and vehicle starts. You may hear the faint operation sound at this time, but it is normal.

Brake Fluid Replacement/Air Bleeding

1. Brake fluid replacement and air bleeding procedures are the same as vehicles without ABS. To ease bleeding, start with the front wheels.

Troubleshooting

1. The troubleshooting flowcharts procedures assume that the cause of the problem is still present and the ABS indicator light is still on. Following the flowchart when the ABS indicator light does not come on can result in incorrect judgment.
2. Question the customer about the conditions when the problem occurred, and try to reproduce the same conditions for troubleshooting.
Find out when the ABS indicator light came on, such as during initial diagnosis, during ABS control, after ABS control, when the vehicle started, when vehicle speed was at 19 mph (30 km/h), when the problem continued for a few seconds or a few minutes, etc.
3. When the ABS indicator light does not come on during the test-drive, but the troubleshooting is performed based on the DTC, check for the loose connectors, poor contact of the terminals, etc. before troubleshooting.
4. After troubleshooting, erase the DTC and test-drive the vehicle. Be sure that the ABS indicator light does not come on.
5. The connector illustrations show the female connectors with a single outline and the male connectors with a double outline.

Diagnostic Trouble Code (DTC) Indication (SCS Mode)

NOTE: This operation can also be done with the Honda PGM Tester.

1. Connect the SCS service connector to the service check connector (2P) located passenger's side of center console.
2. Turn the ignition switch ON (II) without the brake pedal depressed.

NOTE: If the brake pedal is depressed when turning the ignition switch ON (II), the system shifts to the MES mode.

3. The blinking frequency indicates the DTC.

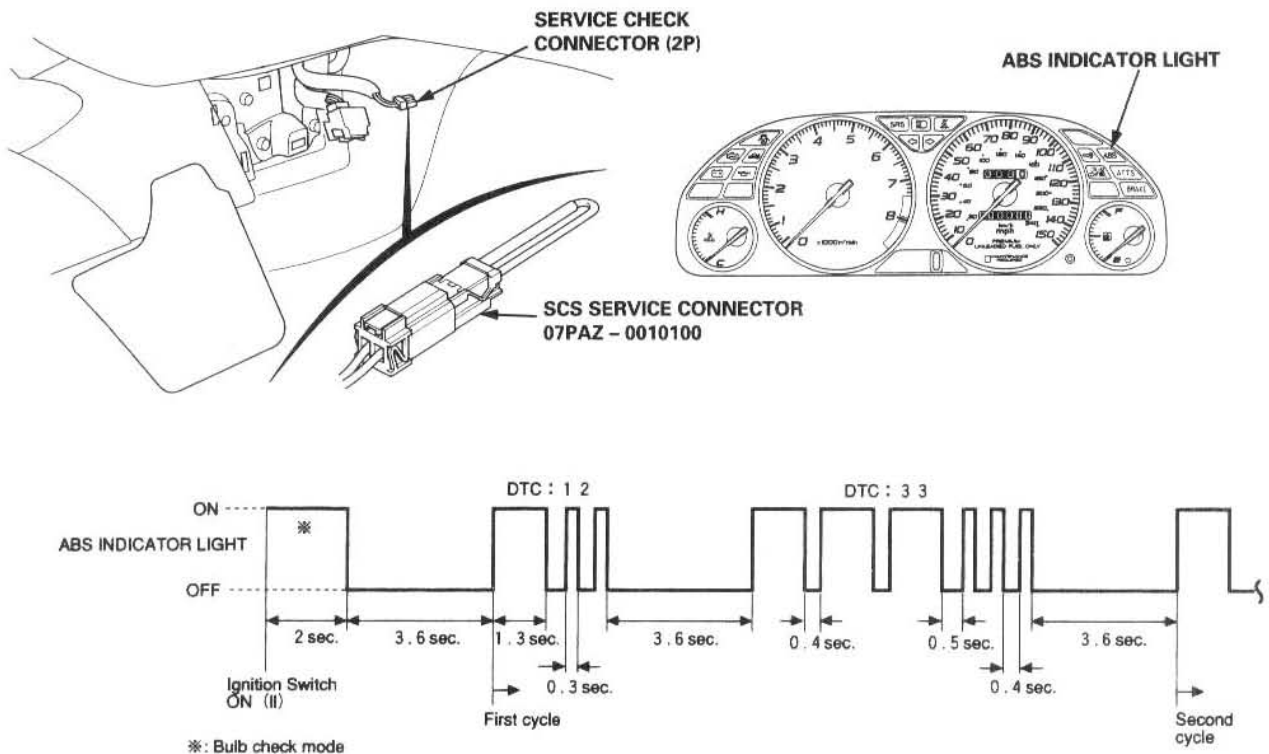
NOTE: If the DTC is not memorized, the ABS indicator light goes off for 3.6 seconds and then stays on.

4. Turn the ignition switch OFF, and remove the SCS service connector.

NOTE: The Malfunction Indicator Lamp (MIL) will stay on after the engine is started if the SCS service connector is connected.

Conditions for DTC indication

- Vehicle speed is at 6 mph (10 km/h) or less.
- The SCS service connector is connected before the ignition switch is turned ON (II).
- The brake pedal is released.



Diagnostic Trouble Code (DTC)

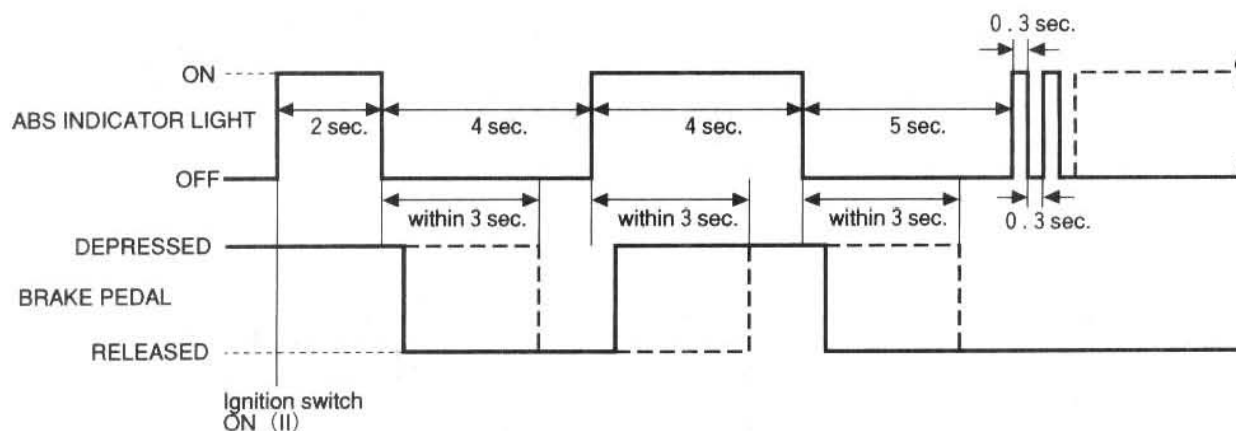
DTC Erasure (MES Mode)

NOTE: This operation can also be done with the Honda PGM Tester.

1. Connect the SCS service connector to the service check connector (2P) located at the passenger's side of center console.
2. Depress the brake pedal.
3. Turn the ignition switch ON (II) while keeping the brake pedal depressed.
4. After the ABS indicator light goes off, release the brake pedal.
5. After the indicator light comes on, depress the brake pedal again.
6. After the indicator light goes off, release the brake pedal again.
7. After few seconds, the indicator light blinks twice and the DTC is erased. If the indicator light does not blink twice, repeat steps 1 through 6. If the indicator light stays ON after the indicator light blinks twice, check the DTC because a problem was detected during initial diagnosis before shifting to MES mode.
8. Turn the ignition switch OFF, and remove the SCS service connector.

Conditions for DTC erasure

- Vehicle speed is at 6 mph (10 km/h) or less.
- The SCS service connector is connected before the ignition switch is turned ON (II).
- The brake pedal is depressed before the ignition switch is turned ON (II).



Troubleshooting Index

DTC	ABS INDICATOR LIGHT	DIAGNOSIS/SYMPTOM	DETECTION TIMING		PROBLEM LOCATION	REFER TO PAGE
			INITIAL DIAGNOSIS	REGULAR DIAGNOSIS		
NO DTC	OFF	ABS indicator light does not come on when ignition switch is turned ON (II).				19-42
	ON	ABS indicator light does not go off after engine is started (No DTC).				19-44
11	ON	Wheel sensor (open/short to body ground/short to power)	○	○	FR	19-46
13					FL	
15					RR	
17					RL	
12	ON*1	Wheel sensor (electrical noise/intermittent interruption)		○	FR	19-47
14					FL	
16					RR	
18					RL	
21	ON*1	Pulser		○	FR	19-48
22					FL	
23					RR	
24					RL	
31	ON	Solenoid (short to body ground/short to wire)	○	○	FR-IN	19-49
32					FR-OUT	
33					FL-IN	
34					FL-OUT	
35					RR-IN	
36					RR-OUT	
37					RL-IN	
38					RL-OUT	
41	ON	Wheel lock		○	FR	19-52
42					FL	
43					RR	
44					RL	
51	ON*1	Motor lock		○		19-53
52	ON*1	Motor stuck OFF		○		19-54
53	ON*1	Motor stuck ON	○	○		19-57
54	ON	Fail-safe relay	○	○		19-59
61	ON*2	Ignition voltage		○		19-61
62						
71	ON	Different diameter tire		○		19-62
81	ON	CPU	○	○		19-62

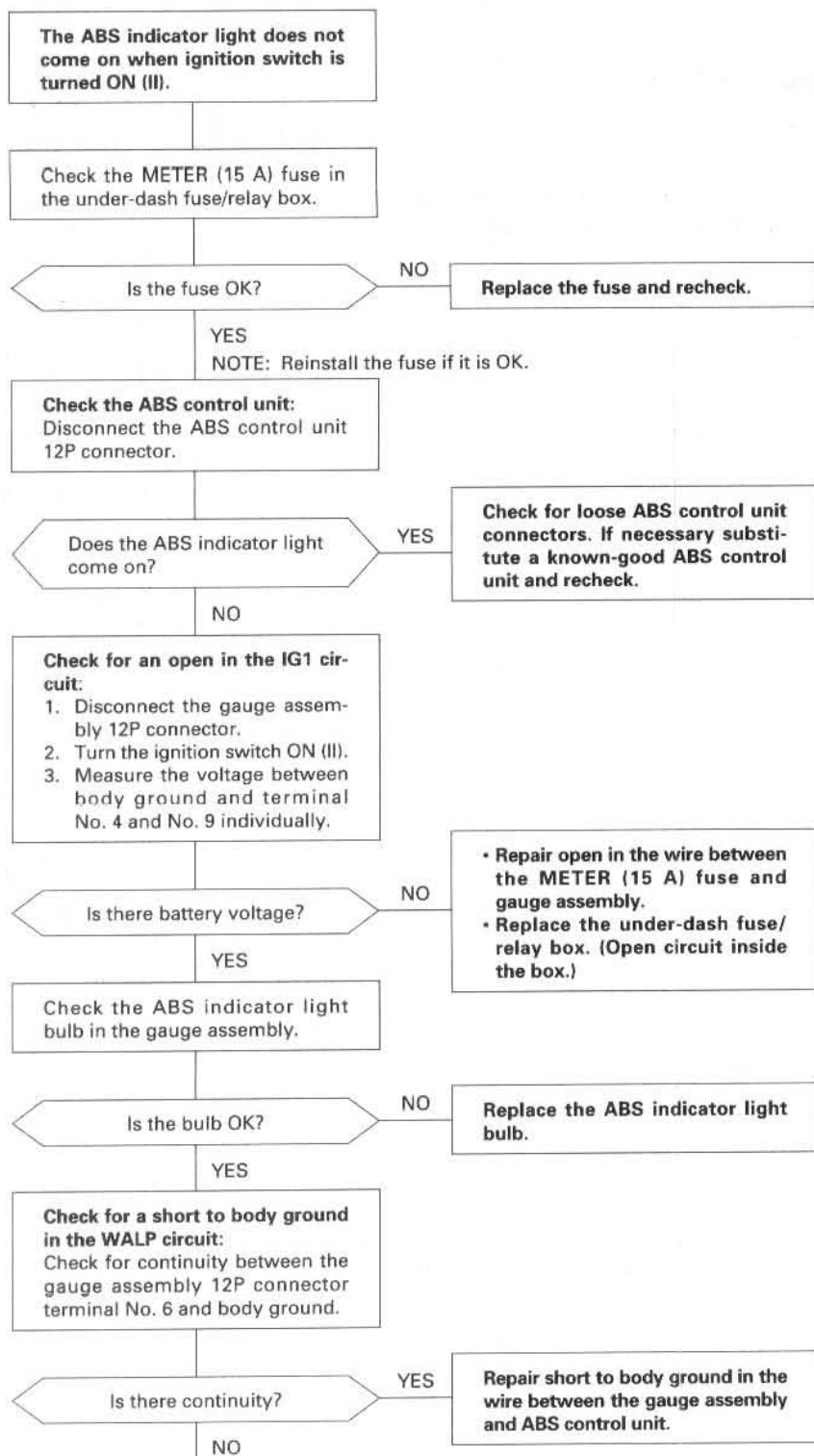
*1: When the problem is detected and ABS indicator light comes on, the indicator light will stay on until the ignition switch is turned from OFF to ON (II), and the control unit confirms that the system is OK when the vehicle starts.

*2: When voltage returns normal, the ABS indicator light goes off.

Troubleshooting

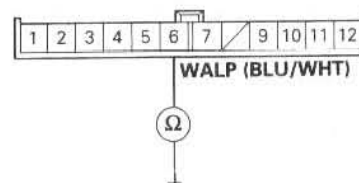
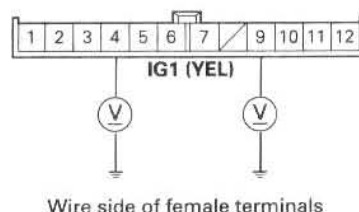
ABS Indicator Light Does Not Come On

The ABS indicator light does not come on when ignition switch is turned ON (II).



(To page 19-43)

GAUGE ASSEMBLY 12P CONNECTOR



(From page 19-42)

Check for an open in the indicator light GND circuit:

1. Turn the ignition switch OFF.
2. Connect the gauge assembly 12P connector.
3. Connect the gauge assembly 13P connector terminal No. 4 to body ground with a jumper wire.

Does the ABS indicator light come on?

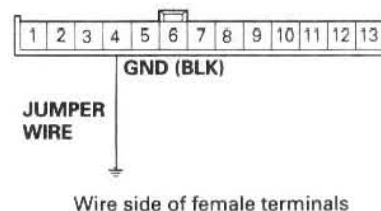
YES

- Repair open in the wire between the gauge assembly and body ground.
- Repair poor ground (G401, G402).

NO

Replace the printed circuit board in the gauge assembly.

GAUGE ASSEMBLY 13P CONNECTOR



Troubleshooting

ABS Indicator Light Does Not Go Off

The ABS indicator light does not go off after the engine is started.

- With engine running, the ABS indicator light is ON.
- With the SCS service connector connected (see page 19-39), no DTC is indicated.

Check the R/C MIRROR (7.5 A) fuse in the under-dash fuse/relay box.

Is the fuse OK?

NO

Replace the fuse and recheck.

YES

NOTE: Reinstall the fuse if it is OK.

Check for an open GND circuit:

1. Connect the ABS control unit 22P connector terminal No. 1 to body ground with a jumper wire.
2. Turn the ignition switch ON (II).

Does the ABS indicator light go off?

YES

- Repair open in the wire between the ABS control unit and body ground.
- Repair poor ground (G403).

NO

Check for an open in the IG2 circuit:

Measure the voltage between the ABS control unit 22P connector terminal No. 11 and body ground.

Is there battery voltage?

NO

Repair open in the wire between the R/C MIRROR (7.5 A) fuse and ABS control unit.

YES

Check the ABS control unit:

Connect the ABS control unit 12P connector terminal No. 1 to body ground with a jumper wire.

Does the ABS indicator light go off?

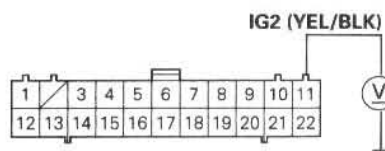
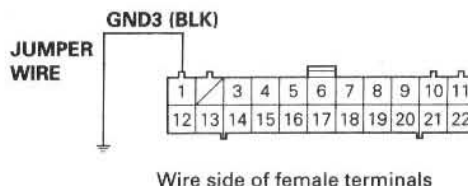
YES

Check for loose ABS control unit connectors. If necessary, substitute a known-good ABS control unit and recheck.

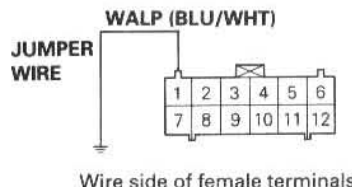
NO

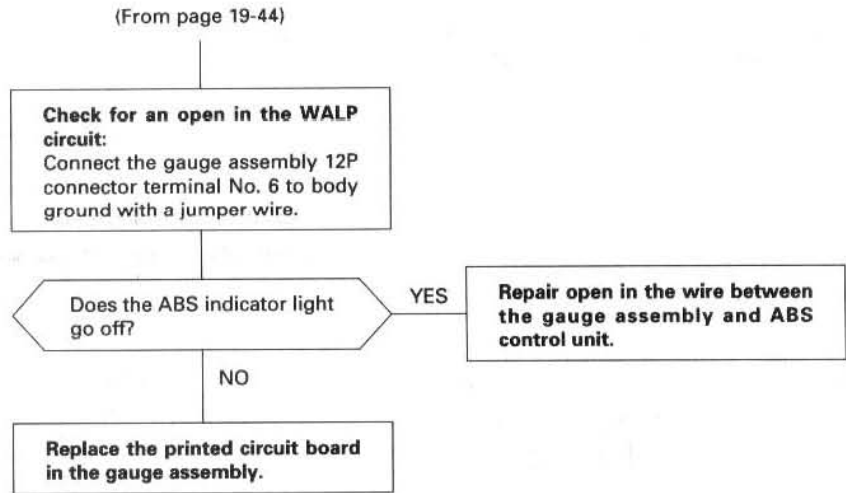
(To page 19-45)

ABS CONTROL UNIT 22P CONNECTOR

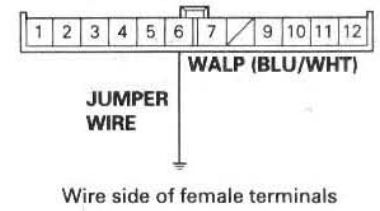


ABS CONTROL UNIT 12P CONNECTOR





GAUGE ASSEMBLY 12P CONNECTOR



Troubleshooting

DTC 11, 13, 15, 17: Wheel Sensor (Open/Short to Body Ground/Short to Power)

- With the ignition switch ON (II), the ABS indicator light does not go off.
- With the SCS service connector connected (see page 19-39), DTCs 11, 13, 15, 17 are indicated.

NOTE: If you does not erase the DTC, the ABS indicator light does not go off until vehicle speed exceeds 6 mph (10 km/h).

Check for a short to power in the wheel sensor circuit:

1. Disconnect the ABS control unit 22P connector.
2. Start the engine.
3. Measure the voltage between the ABS control unit 22P connector appropriate wheel sensor (+) circuit terminal and body ground (see table).

DTC	Appropriate Terminal	
	(+) Side	(-) Side
11 (Right-front)	No. 9: FRW (+)	No. 8: FRW (-)
13 (Left-front)	No. 7: FLW (+)	No. 6: FLW (-)
15 (Right-rear)	No. 19: RRW (+)	No. 20: RRW (-)
17 (Left-rear)	No. 17: RLW (+)	No. 18: RLW (-)

Is there 2 V or more?

YES

Repair short to power in the (+) circuit wire between the ABS control unit and appropriate wheel sensor.

NO

NOTE: Judgement value for short to power is 2 V.

Check for a short to body ground in the wheel sensor circuit:

Check for continuity between the ABS control unit 22P connector appropriate wheel sensor (+) circuit terminal and body ground (see table).

Is there continuity?

YES

- Repair short to body ground in the (+) or (-) circuit wire between the ABS control unit and appropriate wheel sensor.
- Replace the appropriate wheel sensor.

NO

Check for an open in the wheel sensor circuit:

Check the resistance between the appropriate wheel sensor (+) and (-) circuit terminals (see table).

Is the resistance OK?
Front/Rear: 400 – 2,050 Ω /
20°C, 68°F.

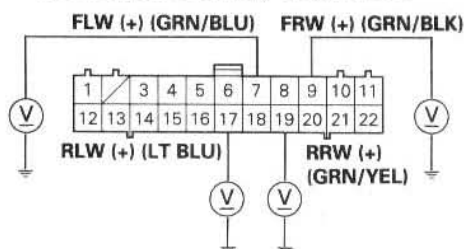
NO

- Repair open in the (+) or (-) circuit wire, or short to the (+) circuit wire in the (-) circuit wire between the ABS control unit and appropriate wheel sensor.
- Replace the appropriate wheel sensor.

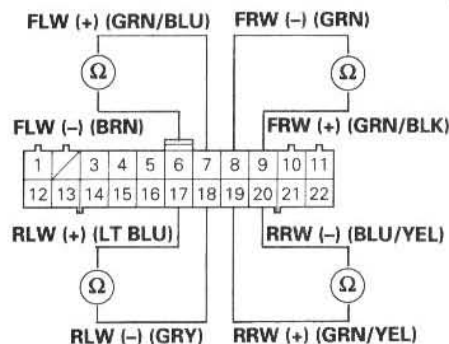
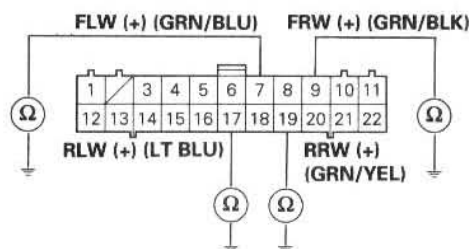
YES

Check for loose ABS control unit connectors, if necessary, substitute a known-good ABS control unit and recheck.

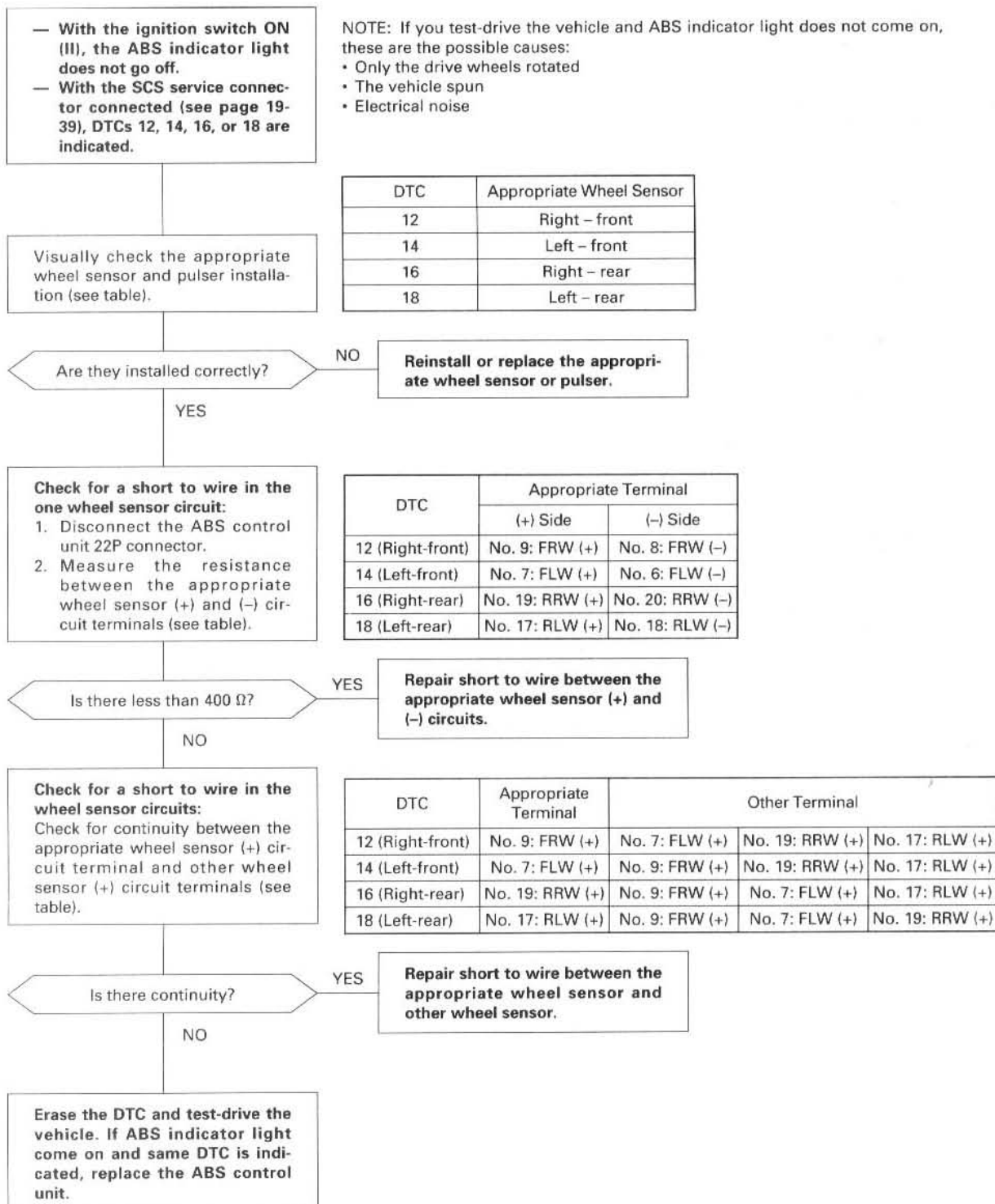
ABS CONTROL UNIT 22P CONNECTOR



Wire side of female terminals

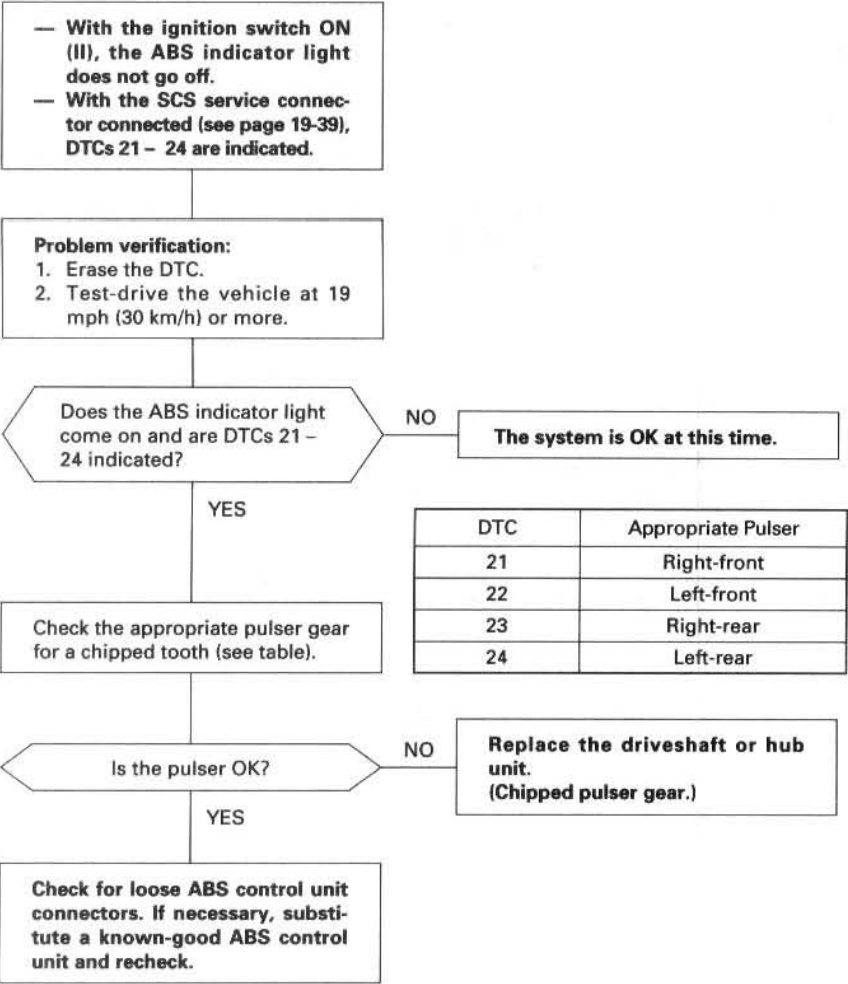


DTC 12, 14, 16, 18: Wheel Sensor (Electrical Noise/Intermittent Interruption)



Troubleshooting

DTC 21 – 24: Pulser



DTC 31 – 38: Solenoid

- With the ignition switch ON (II), the ABS indicator light does not go off.
- With the SCS service connector connected (see page 19-39), DTCs 31 – 38 are indicated.

Problem verification:

1. Turn the ignition switch OFF, then turn the ignition switch ON (II) again.
2. Verify the DTC.

Is DTC 54 indicated?

YES

Perform the appropriate troubleshooting for DTC 54.

NO

Check for a short to body ground in the solenoid circuit:

1. Turn the ignition switch OFF.
2. Disconnect the modulator unit 10P connector and the ABS control unit 12P connector.
3. Check for continuity between the appropriate ABS control unit 12P connector solenoid circuit terminal and body ground (see table).

DTC	Appropriate Terminal
31: FR-IN	No. 11
32: FR-OUT	No. 6
33: FL-IN	No. 9
34: FL-OUT	No. 4
35: RR-IN	No. 8
36: RR-OUT	No. 3
37: RL-IN	No. 10
38: RL-OUT	No. 5

Is there continuity?

YES

Repair short to body ground in the appropriate solenoid circuit wire between the ABS control unit and modulator unit.

NO

Check for a short to body ground in the solenoid:

1. Connect the modulator unit 10P connector.
2. Check for continuity between the appropriate ABS control unit 12P connector solenoid circuit terminal and body ground (see table).

Is there continuity?

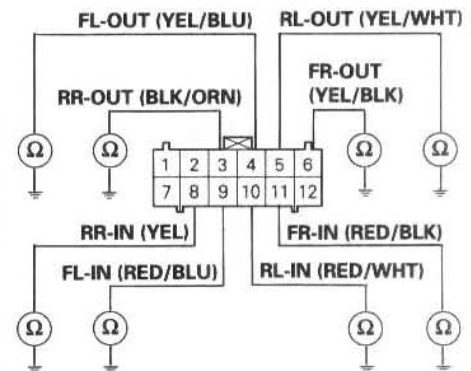
YES

Replace the modulator unit.

NO

(To page 19-50)

ABS CONTROL UNIT 12P CONNECTOR



Wire side of female terminals

(cont'd)

Troubleshooting

DTC 31 – 38: Solenoid (cont'd)

(From page 19-49)

Check for an open in the solenoid circuit:

1. Disconnect the modulator unit 10P connector.
2. Connect the appropriate solenoid circuit terminal to body ground with a jumper wire (see table).
3. Check for continuity between the appropriate ABS control unit 12P connector terminal and body ground (see table).

DTC	Appropriate Terminal	
	ABS control unit 12P connector	Modulator unit 10P connector
31: FR-IN	No. 11	No. 1
32: FR-OUT	No. 6	No. 5
33: FL-IN	No. 9	No. 4
34: FL-OUT	No. 4	No. 8
35: RR-IN	No. 8	No. 3
36: RR-OUT	No. 3	No. 7
37: RL-IN	No. 10	No. 2
38: RL-OUT	No. 5	No. 6

Is there continuity?

NO
Repair open in the appropriate solenoid circuit wire between the ABS control unit and modulator unit.

YES

Check for an open in the solenoid:

1. Remove a jumper wire from the modulator unit 10P connector.
2. Connect the modulator unit 10P connector.
3. Connect the fail-safe relay connector terminal No. 1 to body ground with a jumper wire.
4. Check the resistance between the appropriate ABS control unit 12P connector terminal and body ground (see table).

Wire colors of fail-safe relay connector:
BRN/BLK, WHT/GRN, YEL/GRN, BLK

Is the resistance OK?
IN: 8 – 10 Ω
OUT: 3 – 5 Ω

NO
Replace the modulator unit.

YES

Check for a short to another wire in the solenoid circuit:

1. Disconnect the modulator unit 10P connector.
2. Check for continuity between the appropriate ABS control unit 12P connector terminal and all other solenoid circuit terminals (see table).

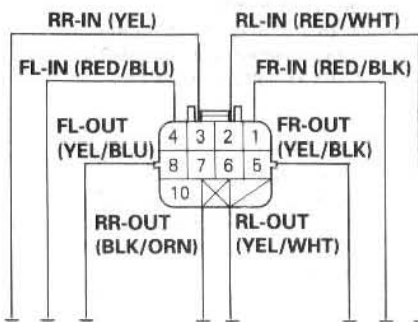
Is there continuity?

YES
Replace the modulator unit.

NO

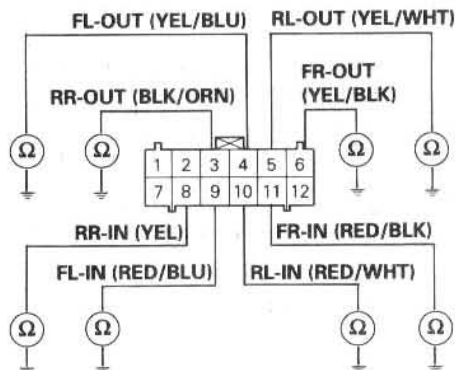
(To page 19-51)

MODULATOR UNIT 10P CONNECTOR



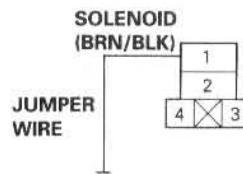
JUMPER WIRE
Terminal side of female terminals

ABS CONTROL UNIT 12P CONNECTOR



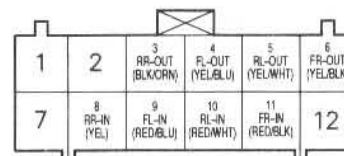
Wire side of female terminals

FAIL-SAFE RELAY CONNECTOR



Terminal side of female terminals

ABS CONTROL UNIT 12P CONNECTOR



Wire side of female terminals

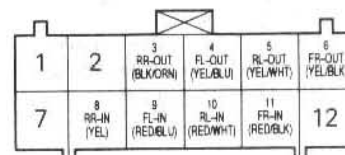
(From page 19-50)

Check for a short to another wire in the solenoid:

1. Connect the modulator unit 10P connector.
2. Check for continuity between the appropriate ABS control unit 12P connector terminal and all other solenoid circuit terminals (see table).

DTC	Appropriate Terminal
31: FR-IN	No. 11
32: FR-OUT	No. 6
33: FL-IN	No. 9
34: FL-OUT	No. 4
35: RR-IN	No. 8
36: RR-OUT	No. 3
37: RL-IN	No. 10
38: RL-OUT	No. 5

ABS CONTROL UNIT 12P CONNECTOR



Wire side of female terminals

Is there less than 12 Ω ?

YES

Replace the modulator unit.

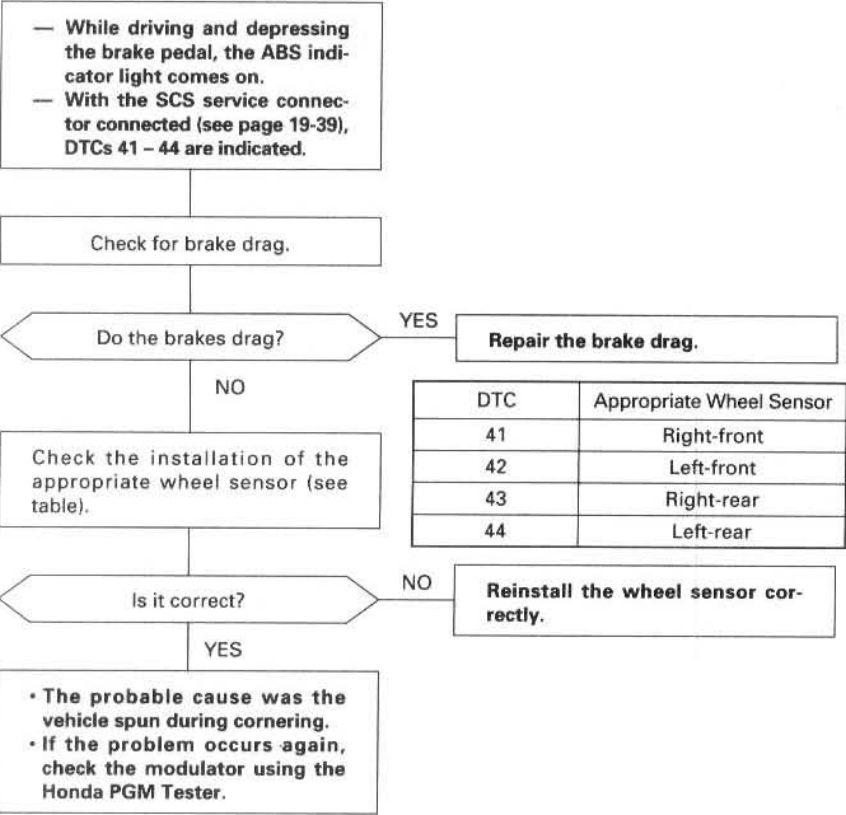
NO

NOTE: Normal resistance is 12.2 – 13.3 Ω . Measure carefully because the difference of normal resistance and abnormal resistance is very small.

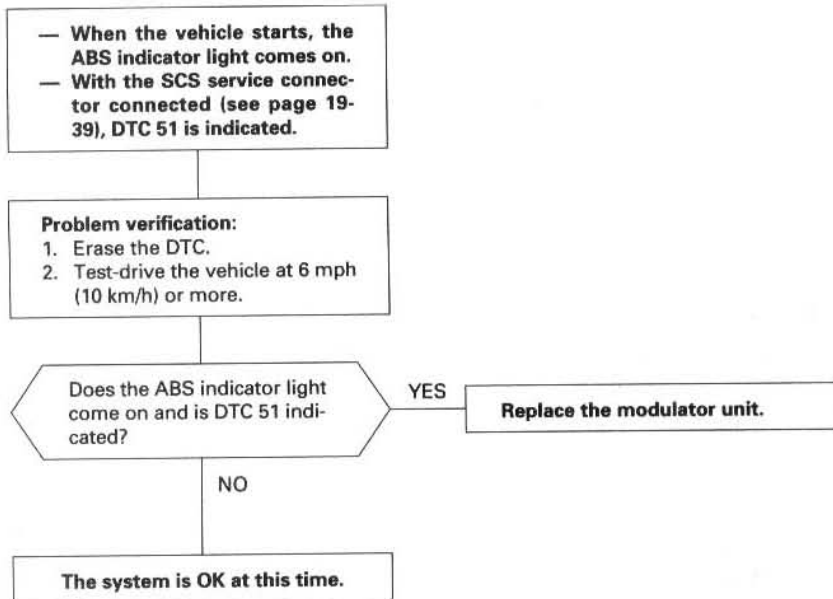
Check for loose ABS control unit connectors. If necessary, substitute a known-good ABS control unit and recheck.

Troubleshooting

DTC 41 – 44: Wheel Lock

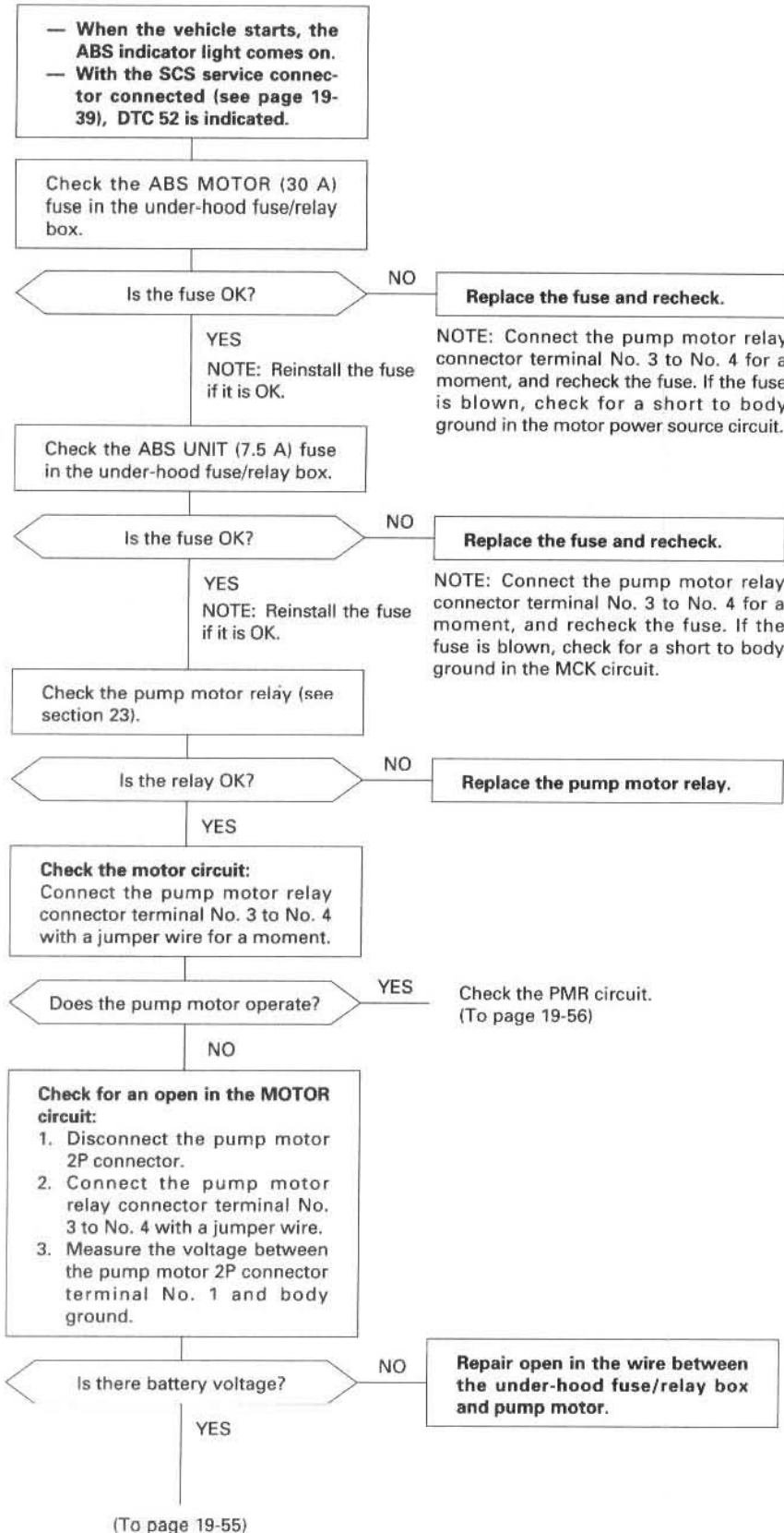


DTC 51: Motor Lock

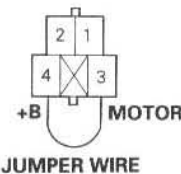


Troubleshooting

DTC 52: Motor Stuck OFF

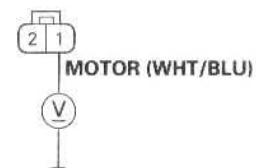


PUMP MOTOR RELAY CONNECTOR



Terminal side of female terminals

PUMP MOTOR 2P CONNECTOR



Terminal side of female terminals

(From page 19-54)

Check for an open in the MOTOR GND circuit:
Measure the voltage between the pump motor 2P connector terminal No. 1 and No. 2.

Is there battery voltage?

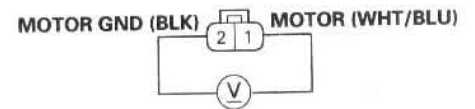
NO

- Repair open in the wire between the pump motor and body ground.
- Repair poor ground (G302).

YES

Replace the modulator unit.

PUMP MOTOR 2P CONNECTOR



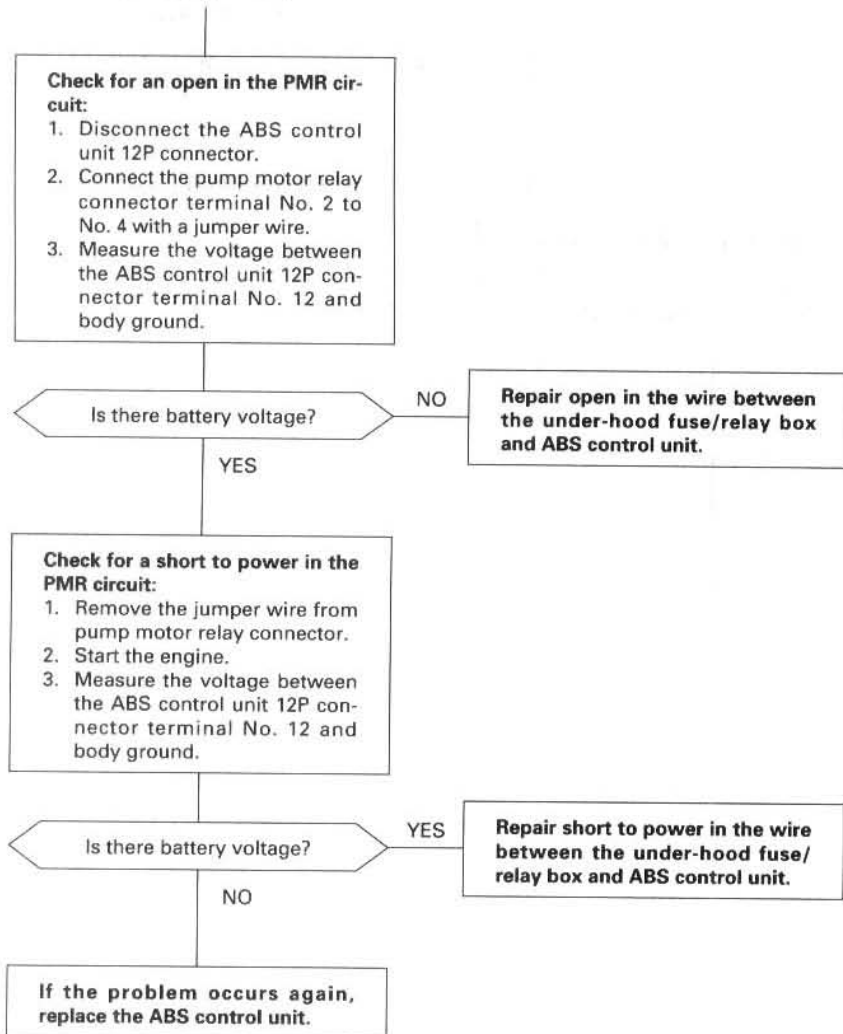
Terminal side of female terminals

(cont'd)

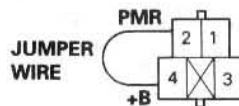
Troubleshooting

DTC 52: Motor Stuck OFF (cont'd)

(From page 19-54)

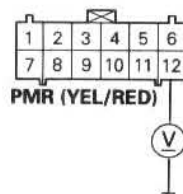


PUMP MOTOR RELAY CONNECTOR



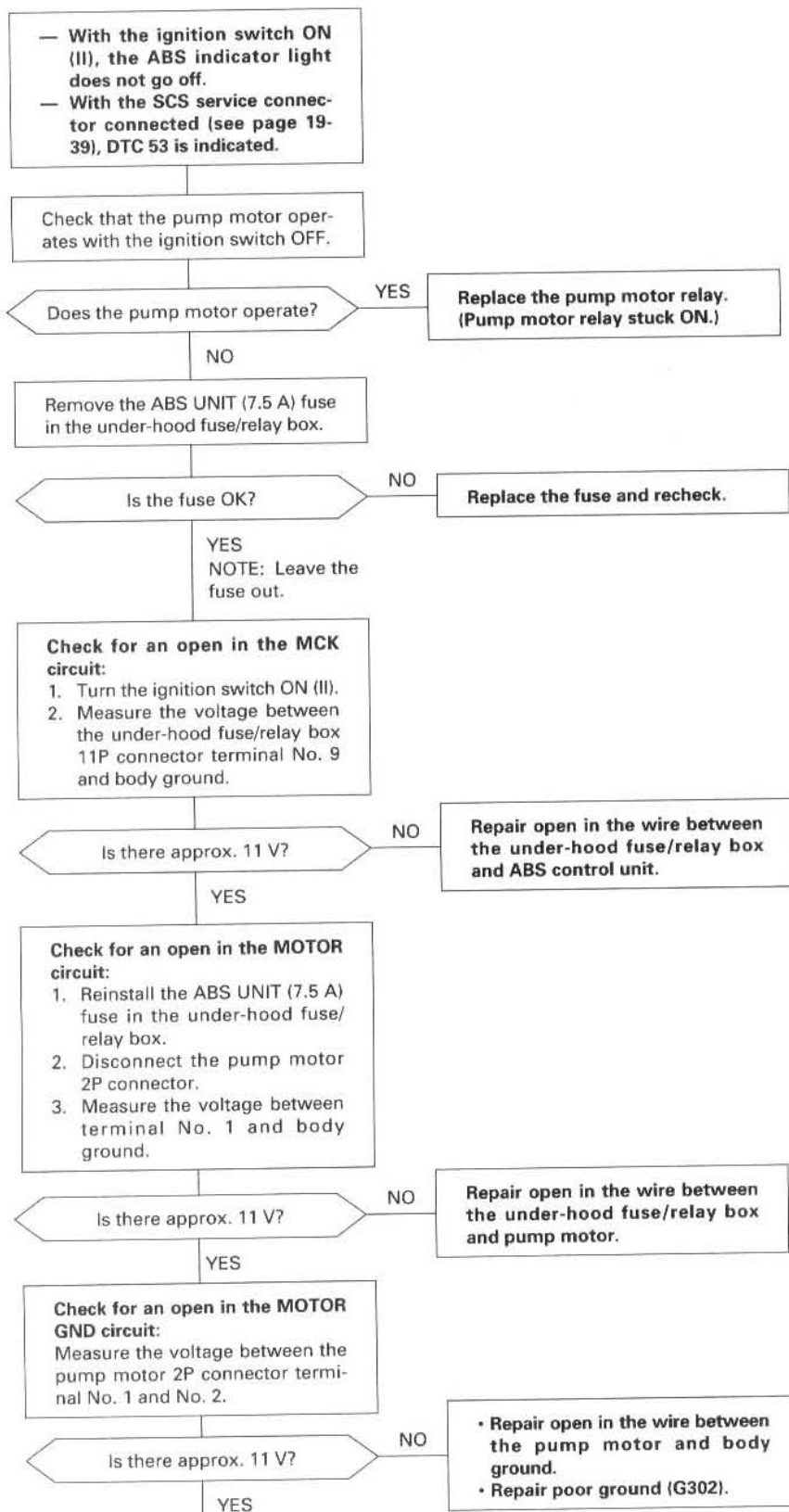
Terminal side of female terminals

ABS CONTROL UNIT 12P CONNECTOR

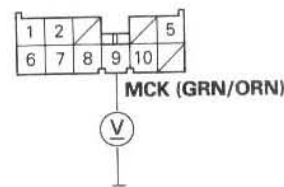


Wire side of female terminals

DTC 53: Motor Stuck ON

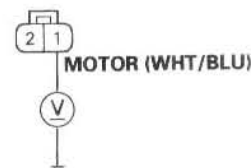


UNDER-HOOD FUSE/RELAY BOX 11P CONNECTOR

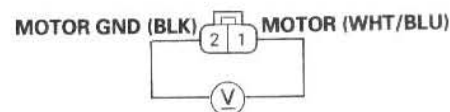


Wire side of female terminals

PUMP MOTOR 2P CONNECTOR



Terminal side of female terminals



(cont'd)

(To page 19-58)

Troubleshooting

DTC 53: Motor Stuck ON (cont'd)

(From page 19-57)

Check for a short to body ground in the PMR circuit:

1. Remove the pump motor relay.
2. Disconnect the ABS control unit 12P connector.
3. Check for continuity between terminal No. 12 and body ground.

Is there continuity?

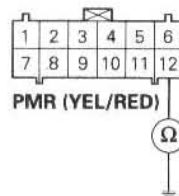
YES

Repair short to body ground between the under-hood fuse/relay box and ABS control unit.

NO

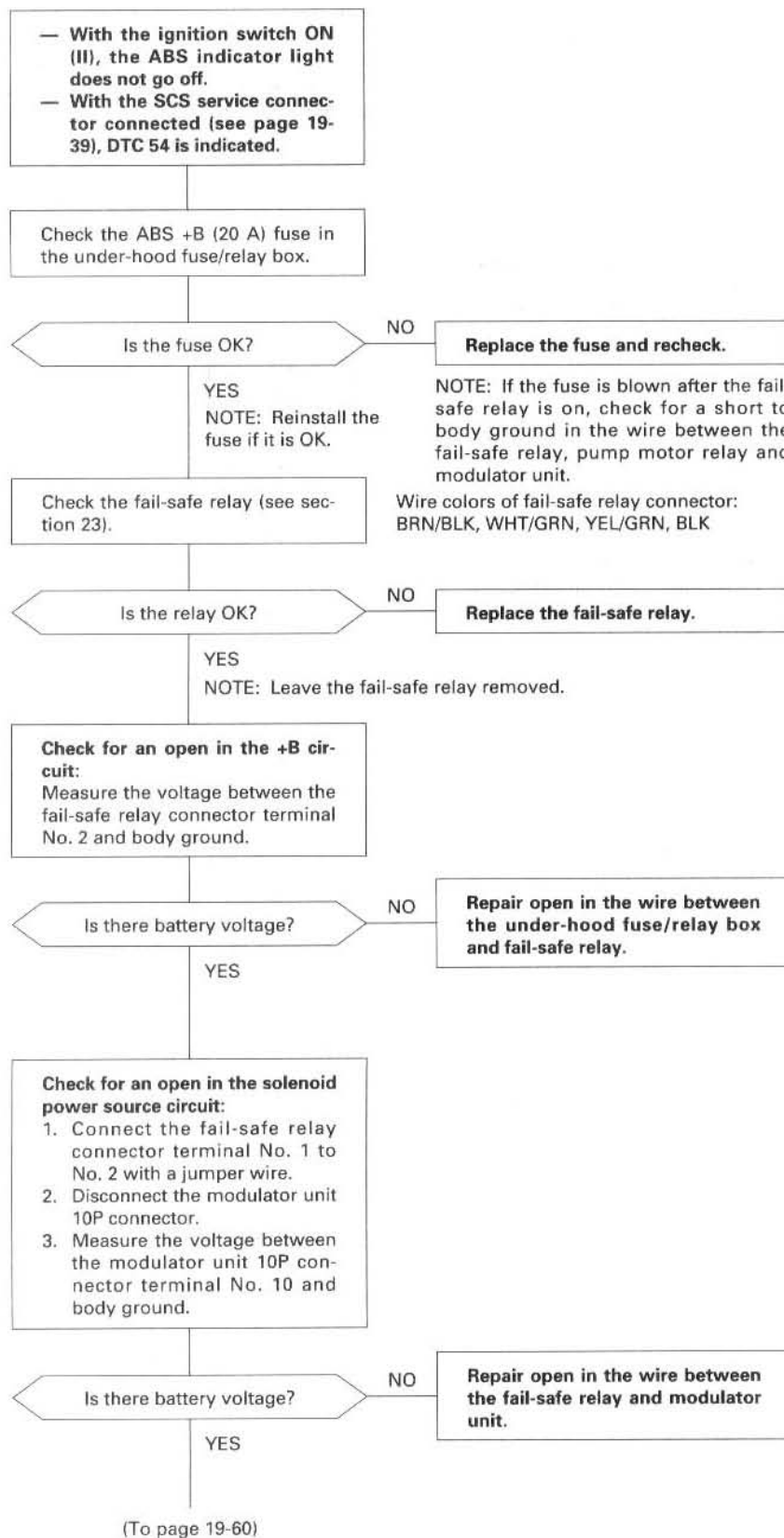
If the problem occurs again, replace the ABS control unit.

ABS CONTROL UNIT 12P CONNECTOR

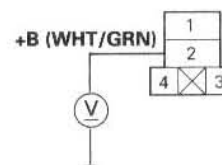


Wire side of female terminals

DTC 54: Fail-safe Relay



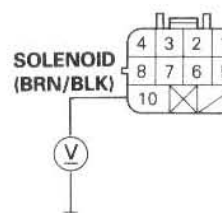
FAIL-SAFE RELAY CONNECTOR



Terminal side of female terminals



MODULATOR UNIT 10P CONNECTOR



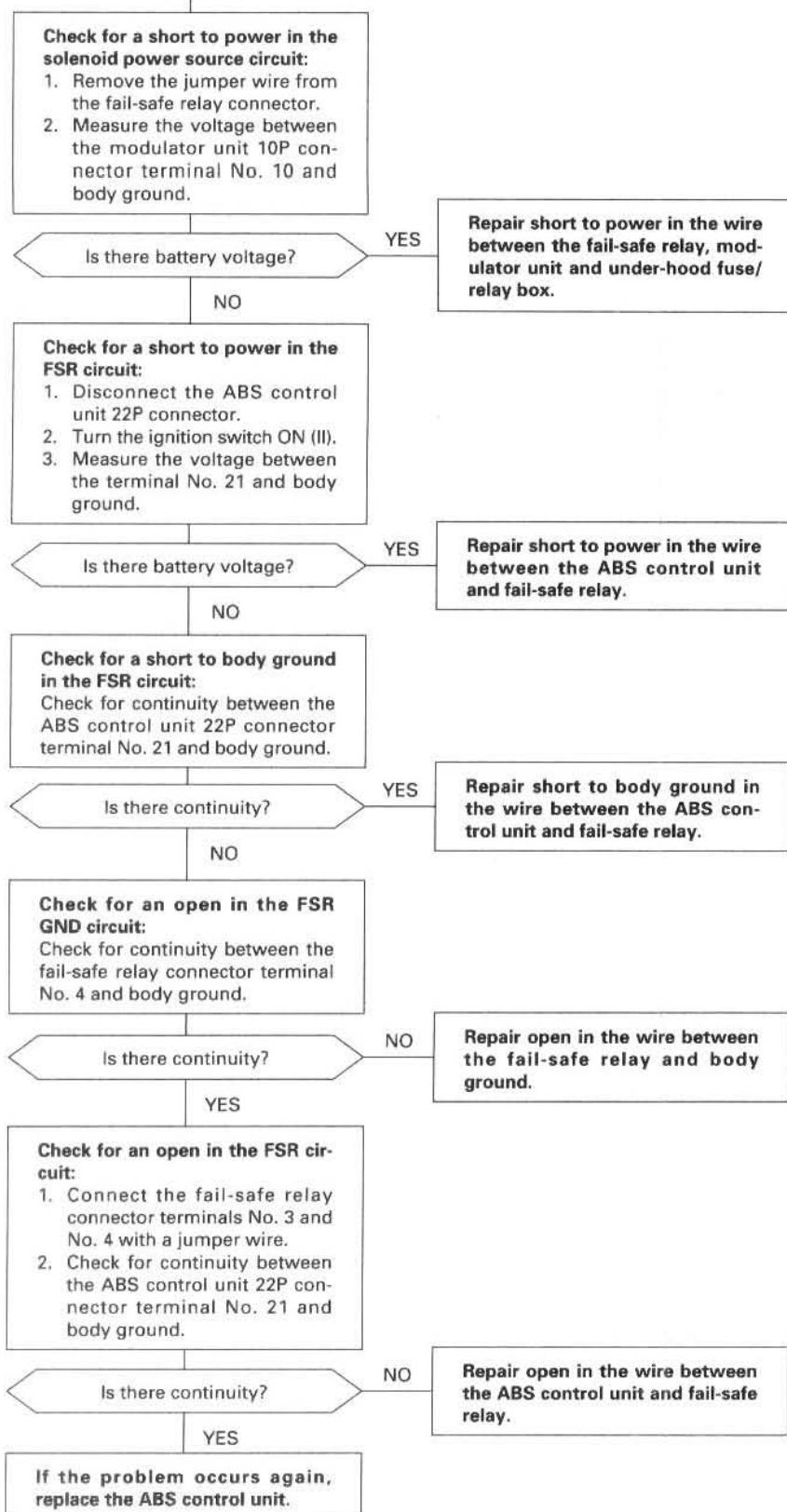
Terminal side of female terminals

(cont'd)

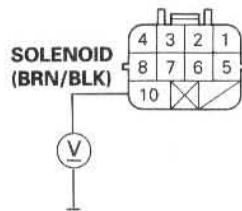
Troubleshooting

DTC 54: Fail-safe Relay (cont'd)

(From page 19-59)

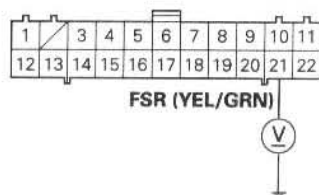


MODULATOR UNIT 10P CONNECTOR

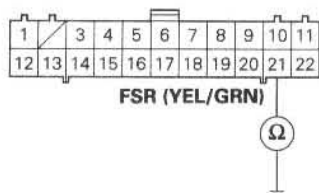


Terminal side of female terminals

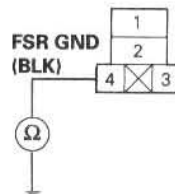
ABS CONTROL UNIT 22P CONNECTOR



Wire side of female terminals

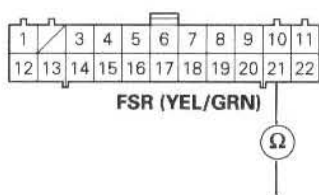


FAIL-SAFE RELAY CONNECTOR



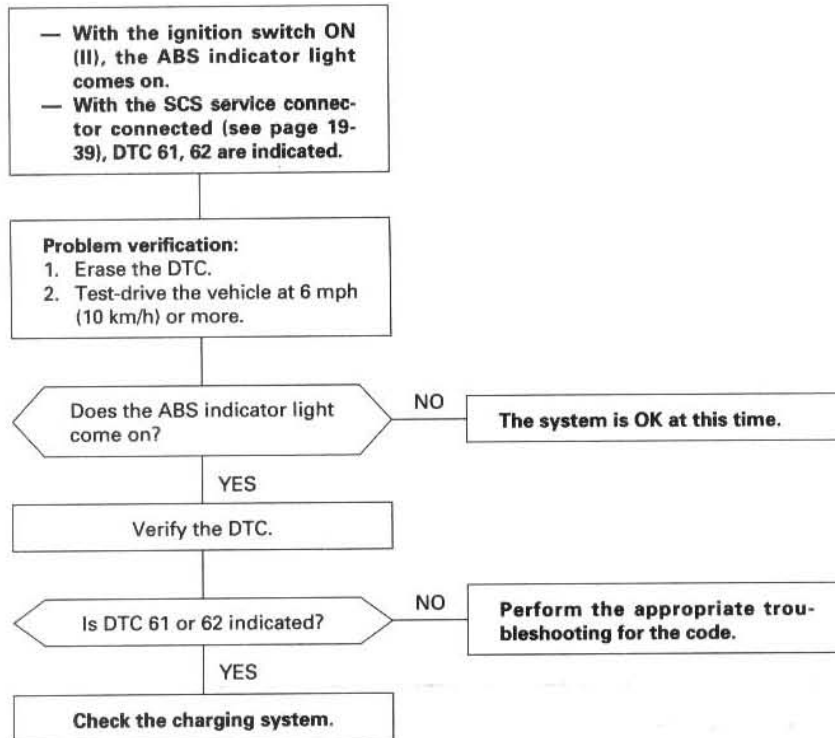
Terminal side of female terminals

ABS CONTROL UNIT 22P CONNECTOR



Wire side of female terminals

DTC 61, 62: Ignition Voltage



Troubleshooting

DTC 71: Different Diameter tire

- With driving the vehicle, the ABS indicator light comes on.
- With the SCS service connector connected (see page 19-39), DTC 71 is indicated.

Replace the tire(s) with the specified size.

DTC 81: Central Processing Unit (CPU)

- With the ignition switch ON (II), the ABS indicator light does not go off.
- With the SCS service connector connected (see page 19-39), DTC 81 is indicated.

Problem verification:

1. Erase the DTC.
2. Test-drive the vehicle.

Does the ABS indicator light come on and is DTC 81 indicated?

YES

Replace the ABS control unit.

NO

Intermittent failure; the vehicle is OK at this time.

Removal/Installation

CAUTION:

- Do not spill brake fluid on the vehicle; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- Take care not to damage or deform the brake lines during removal and installation.
- To prevent the brake fluid from flowing, plug and cover the hose ends and joints with a shop towel or equivalent material.

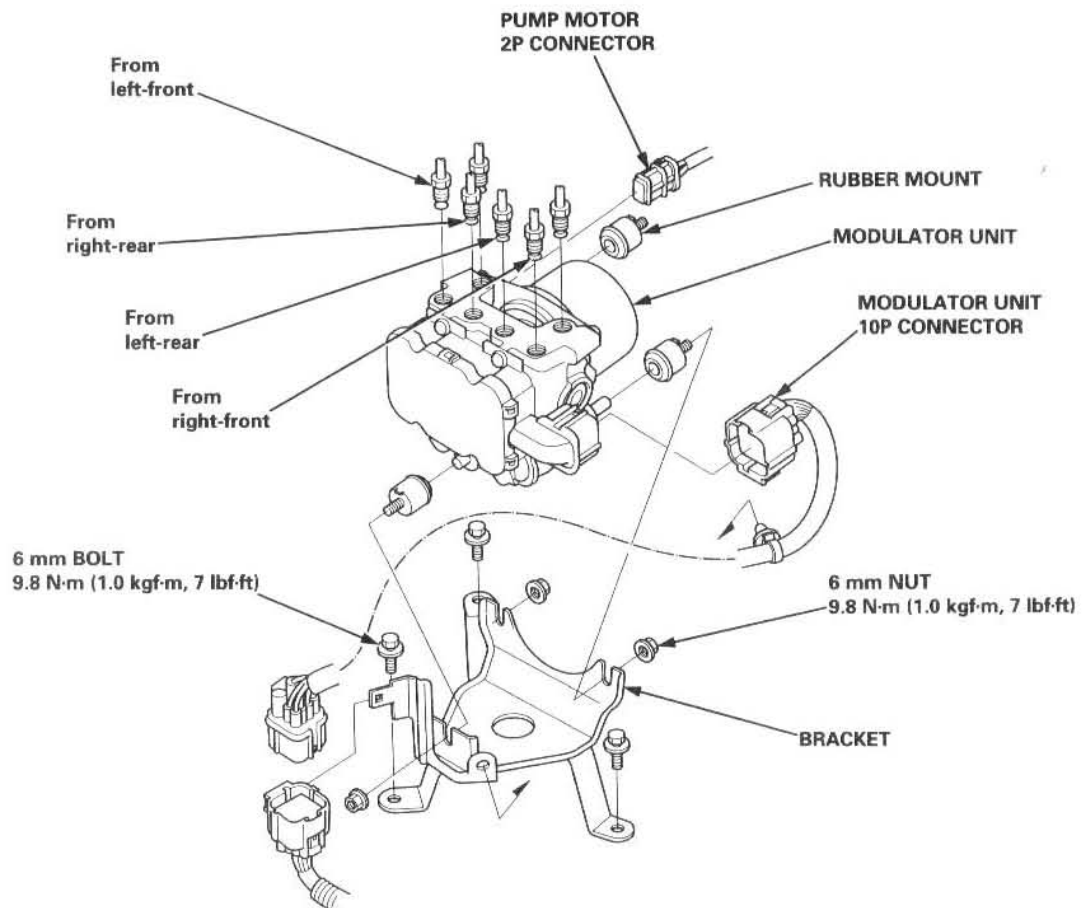
NOTE: Tighten the flare nuts to 15 N·m (1.5 kgf·m, 11 lbf·ft).

Removal

1. Disconnect the modulator unit 10P and pump motor 2P connectors.
2. Disconnect the brake lines, then remove the modulator unit.

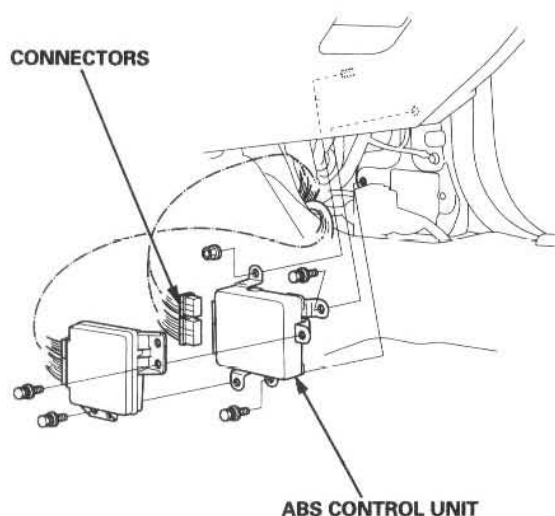
Installation

1. Install the modulator unit, then connect the brake lines.
2. Connect the modulator unit 10P and pump motor 2P connectors.
3. Bleed the brake system, starting with the front wheels.
4. Start the engine, and check that the ABS indicator light goes off.
5. Test-drive the vehicle, and check that the ABS indicator light does not come on.



Replacement

1. Remove the passenger's side kick panel.
2. Disconnect the ABS control unit connectors.
3. Remove the ABS control unit.
4. Install the ABS control unit in the reverse order of removal.

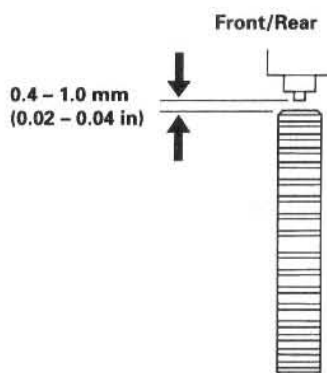


Inspection

1. Check the front and rear pulser for chipped or damaged teeth.
2. Measure the air gap between the wheel sensor and pulser all the way around while rotating the pulser.

Standard: 0.4 – 1.0 mm (0.02 – 0.04 in)

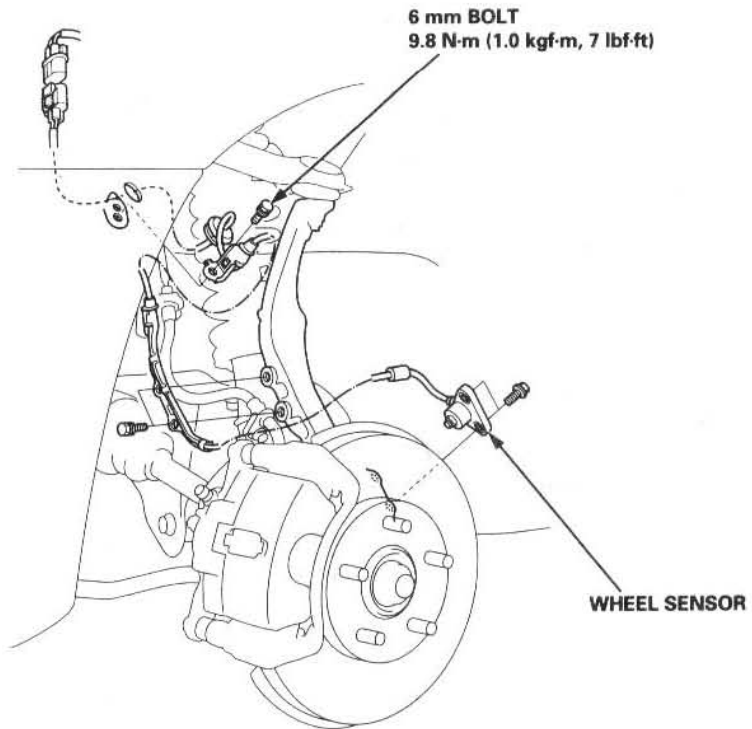
NOTE: If the gap exceeds 1.0 mm (0.04 in), the probability is a distorted suspension arm which should be replaced.



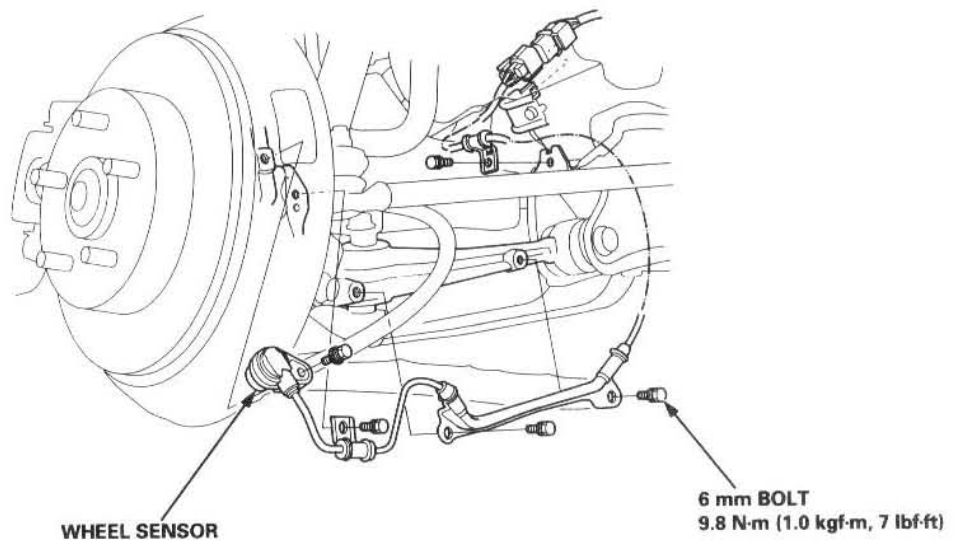
Wheel Sensor Replacement

NOTE: Be careful when installing the sensors to avoid twisting the wires.

Front



Rear



Body

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Component Location Index 20-63

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***Interior**

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Opener Cable/Opener and Latch/ Wiper and Washer

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Windshield/Rear Window/Quarter Glass

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**Click here to go back to
the Introduction page**

SUPPLEMENTAL RESTRAINT SYSTEM (SRS) (If body maintenance is required)

The Prelude SRS includes a driver's airbag located in the steering wheel hub and a passenger's airbag located in the dashboard above the glove box. Information necessary to safely service the SRS is included in this Service Manual. Items marked with an asterisk (*) on the contents page include, or are located near, SRS components. Servicing, disassembling or replacing these items will require special precautions and tools, and should therefore be done by an authorized Honda dealer.

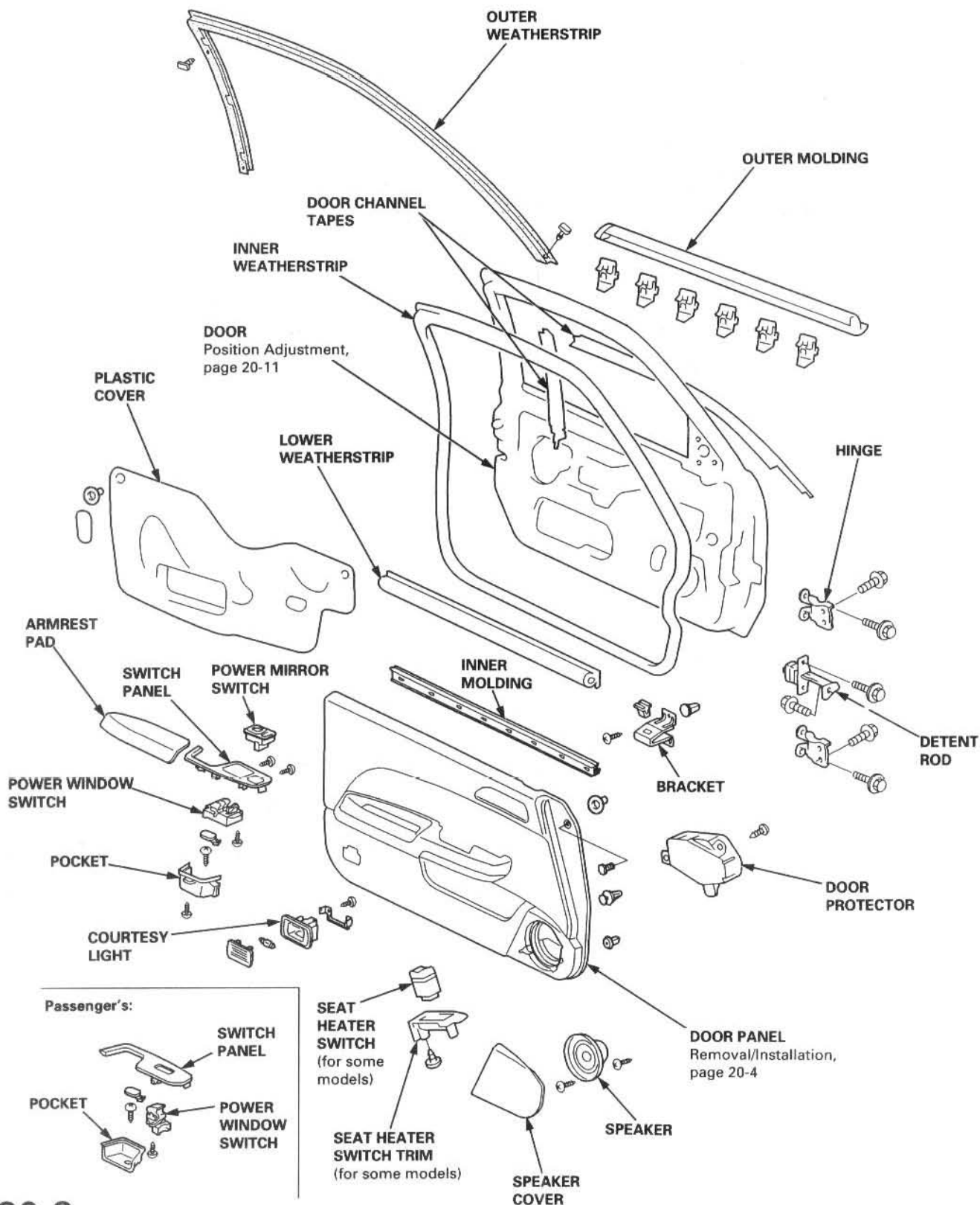
⚠ WARNING

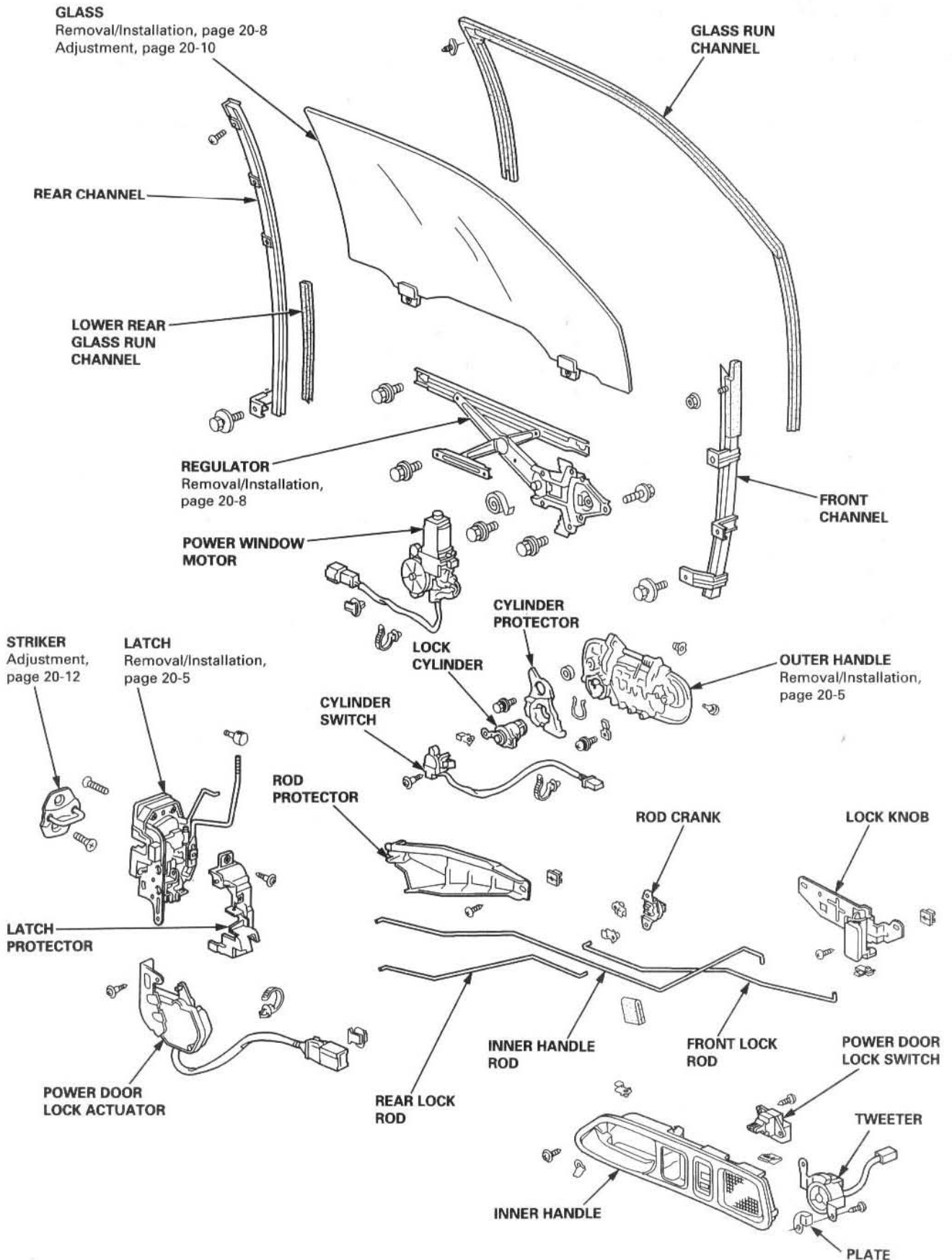
- To avoid rendering the SRS inoperative, which could lead to personal injury or death in the event of a severe frontal collision, all SRS service work must be performed by an authorized Honda dealer.
- Improper service procedures, including incorrect removal and installation of the SRS, could lead to personal injury caused by unintentional activation of the airbags.
- Do not bump the SRS unit. Otherwise, the system may fail in case of a collision, or the airbags may deploy when the ignition switch is ON (II).
- All SRS electrical wiring harnesses are covered with yellow insulation. Related components are located in the steering column, front console, dashboard, dashboard lower panel, and in the dashboard above the glove box. Do not use electrical test equipment on these circuits.

Doors

Index

NOTE: Refer to the 1997 Prelude Body Repair Manual (P/N 61S3030) for the door removal.





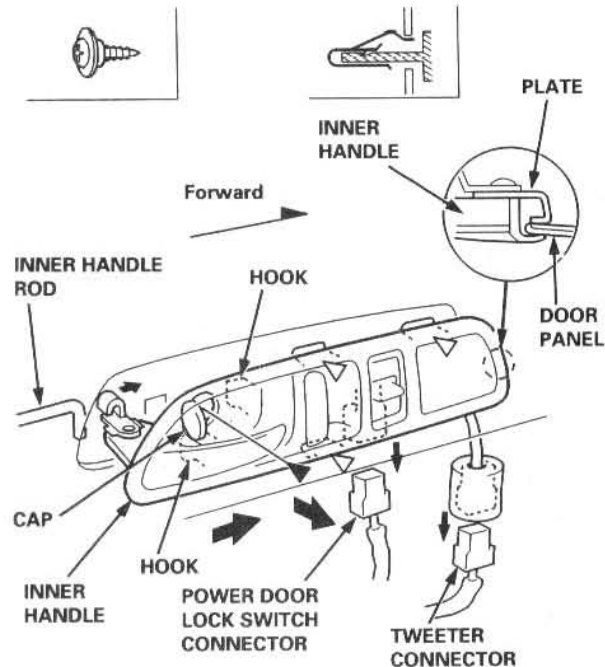
Door Panel Removal/Installation

NOTE: Take care not to scratch the door panel and other parts.

1. Remove the inner handle. Disconnect the inner handle rod, and disconnect the connectors.

►: Screw location, 1

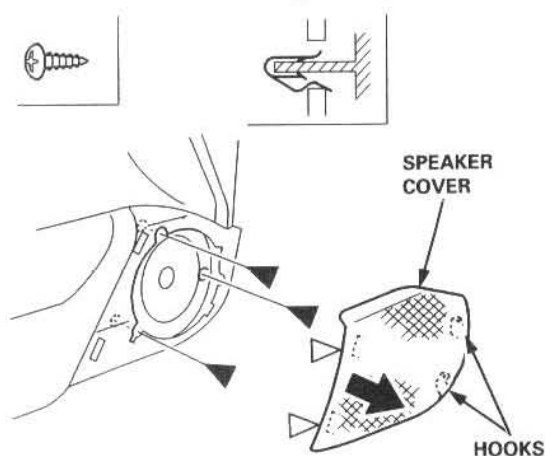
▷: Clip locations, 3



2. Remove the speaker cover, then remove the screws concealed under the cover.

►: Screw locations, 3

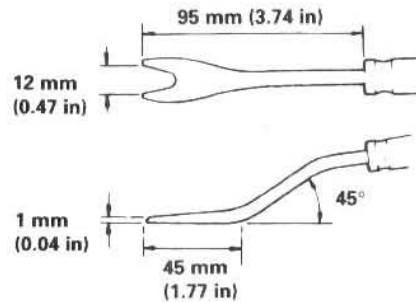
▷: Clip locations, 2



3. Remove the mirror mount cover (see page 20-14).
4. Remove the screw from the armrest pocket. Release the clips that hold the door panel, then remove the door panel by pulling it upward.

NOTE: Remove the door panel with as little bending as possible to avoid creasing or breaking it.

TRIM PAD REMOVER
(Commercially available)
Snap-on #A177, or equivalent

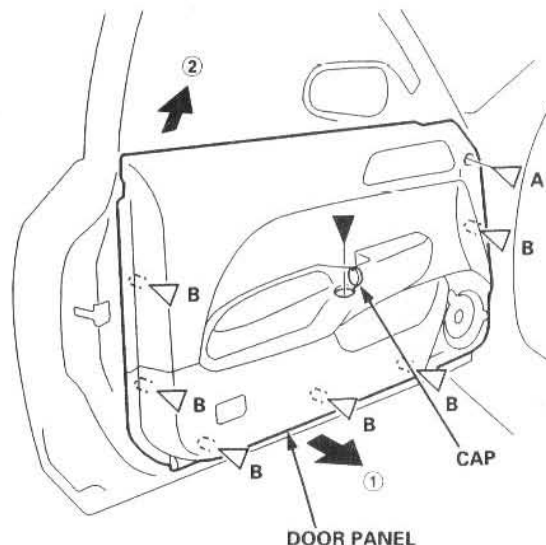
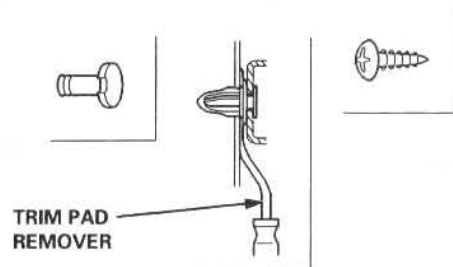


▷: Clip locations

►: Screw location, 1

A ▷, 1

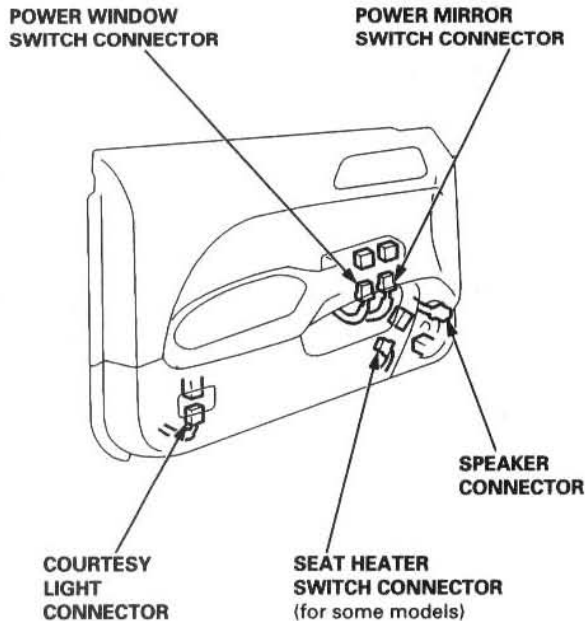
B ▷, 6





5. Disconnect the connectors.

NOTE: Remove the door panel with as little bending as possible to avoid creasing or breaking it.



6. Installation is the reverse of the removal procedure.

NOTE: Make sure the connectors are connected properly.

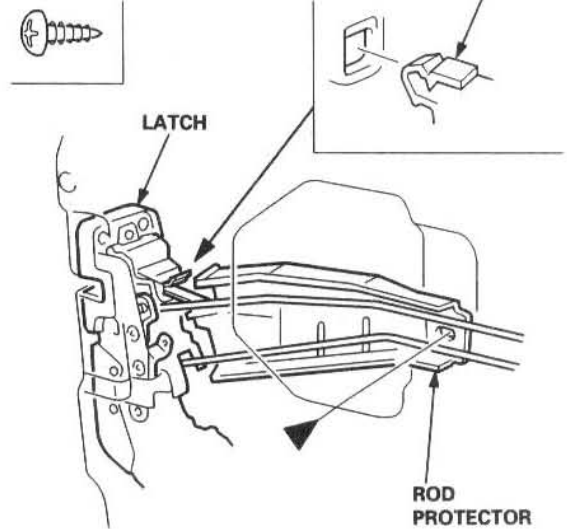
Outer Handle and Latch Removal/Installation

NOTE: Raise the glass fully.

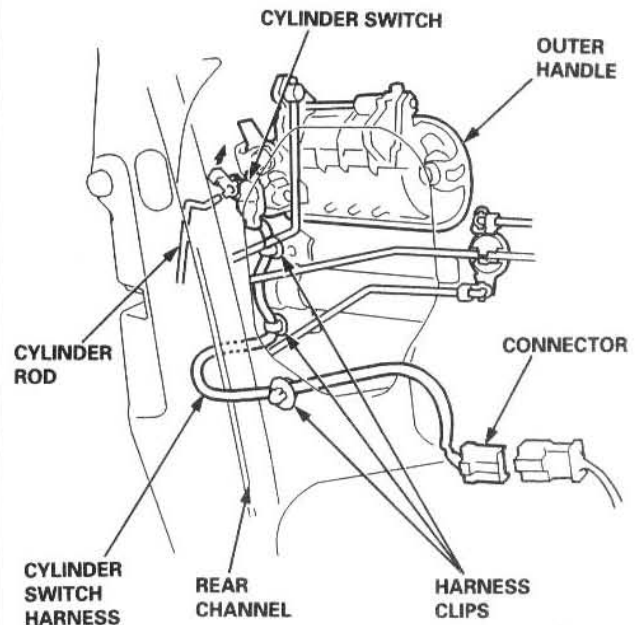
1. Remove:
 - Door panel (see page 20-4)
 - Plastic cover (see page 20-2)

2. Remove the rod protector.

►: Screw location, 1



3. Disconnect the cylinder rod, the cylinder switch connector, and detach the harness clips.



(cont'd)

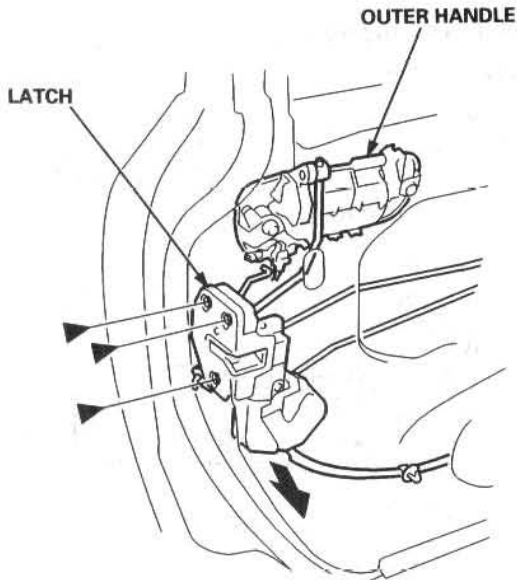
Outer Handle and Latch Removal/Installation (cont'd)

4. Remove the latch mounting screws.

►: Screw locations, 3

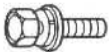


6 x 1.0 mm
6 N-m (0.6 kgf-m,
4 lbf-ft)

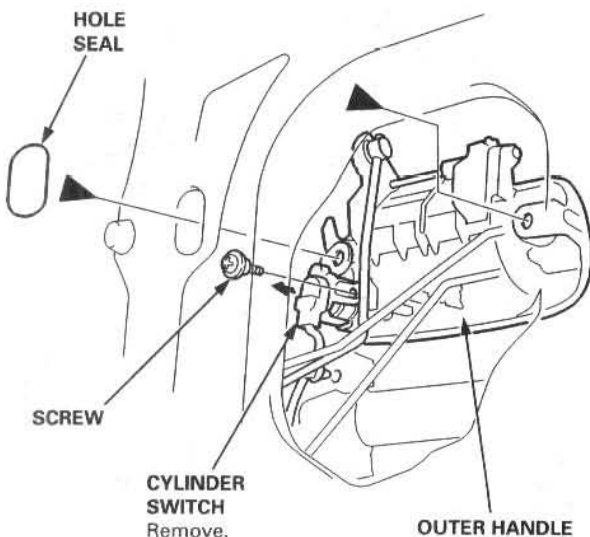


5. Remove the cylinder switch screw, then remove the cylinder switch. Remove the outer handle mounting bolts.

►: Bolt locations, 2



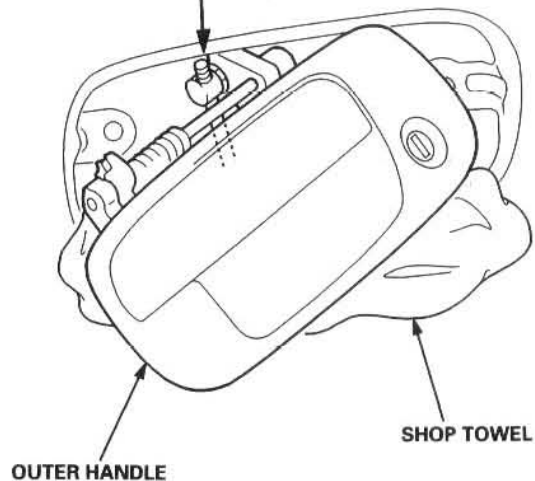
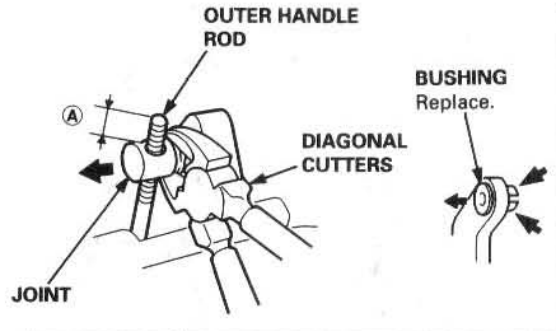
6 x 1.0 mm
5 N-m (0.5 kgf-m,
3.6 lbf-ft)



6. Pull out the outer handle. Pry the outer handle rod out of its joint using diagonal cutters.

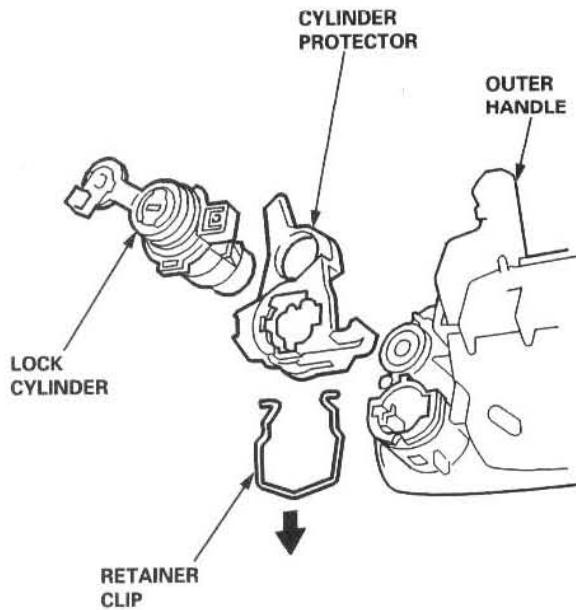
NOTE:

- To ease reassembly, note distance (A) of the outer handle rod on the joint before disconnecting it.
- Take care not to bend the outer handle rod.
- Use a shop towel to protect the opening in the door.

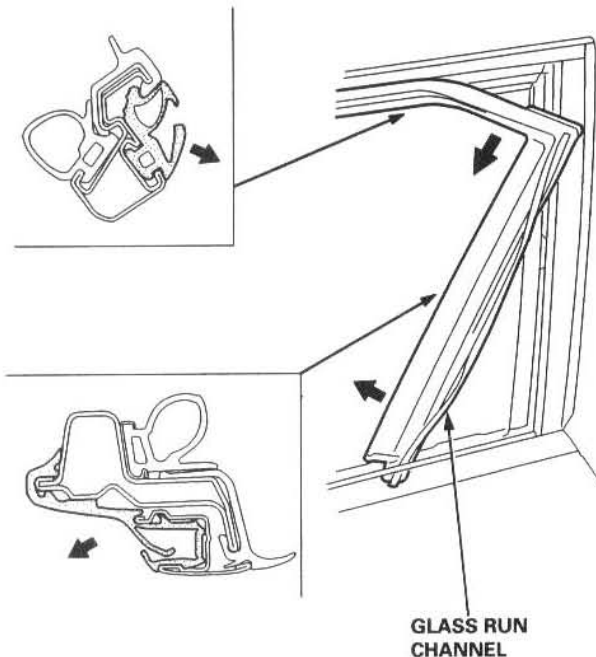




7. If necessary, remove the retainer clip, then separate the lock cylinder and cylinder protector from the outer handle.



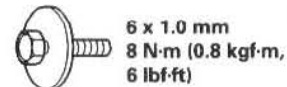
8. Remove the glass (see page 20-9).
9. Remove the center upper portion of the glass run channel.



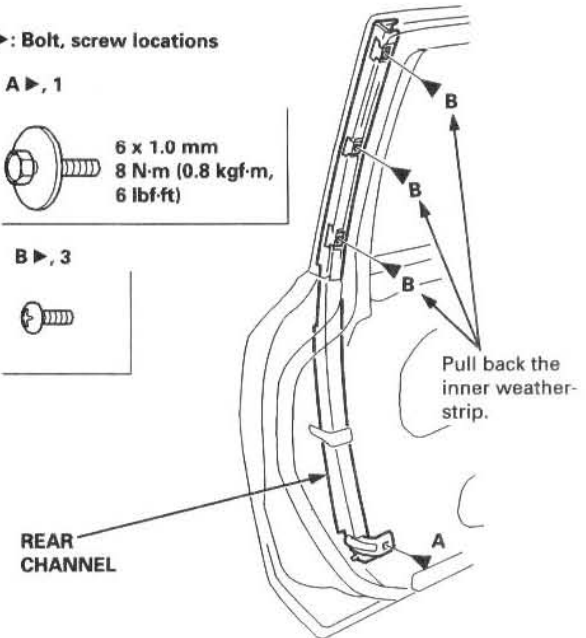
10. Remove the screws and bolts, then remove the rear channel.

►: Bolt, screw locations

A ►, 1

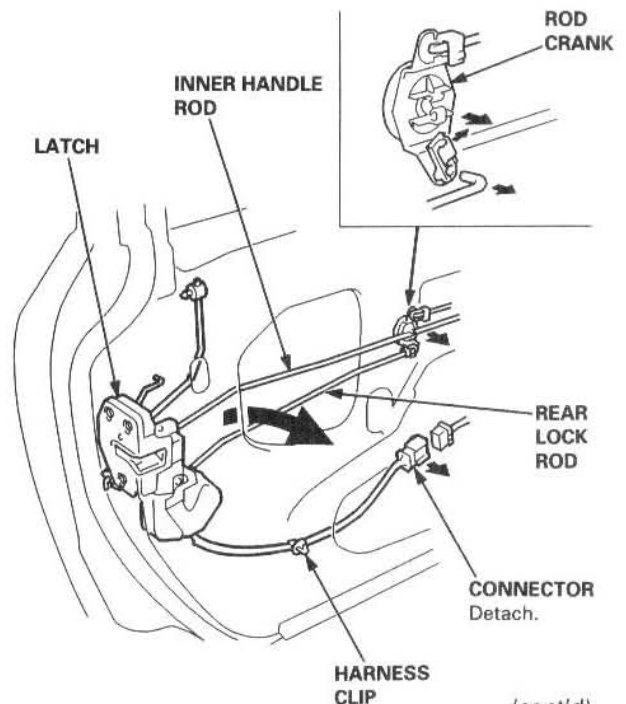


B ►, 3



11. Disconnect the connector, and detach the harness clip. Disconnect the rear lock rod, and detach the inner handle rod from the rod crank. Remove the latch through the hole in the door.

NOTE: Take care not to bend any of the rods.



(cont'd)

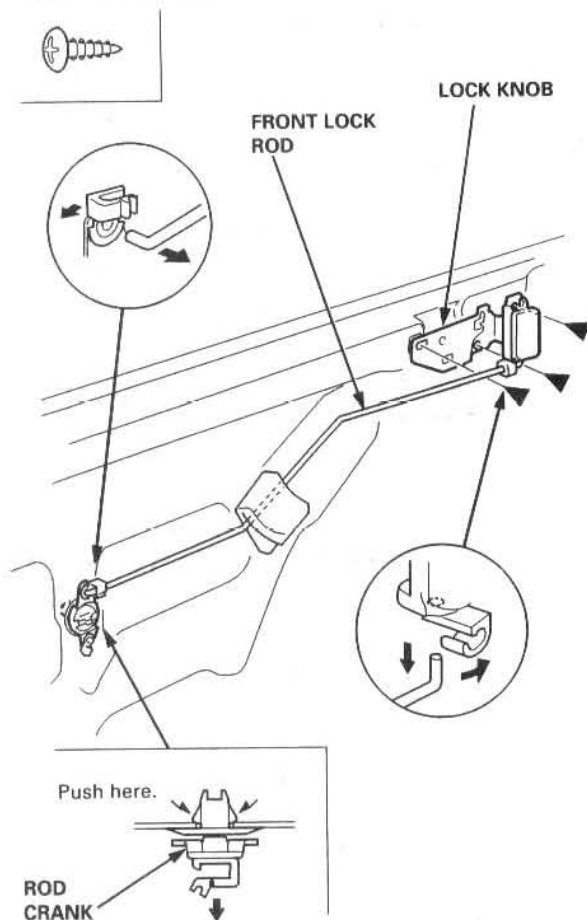
Doors

Outer Handle and Latch Removal/Installation (cont'd)

12. Remove the screws, then remove the lock knob, and detach the rod crank.

NOTE: Take care not to bend the front lock rod.

►: Screw locations, 3



13. Installation is the reverse of the removal procedure.

NOTE:

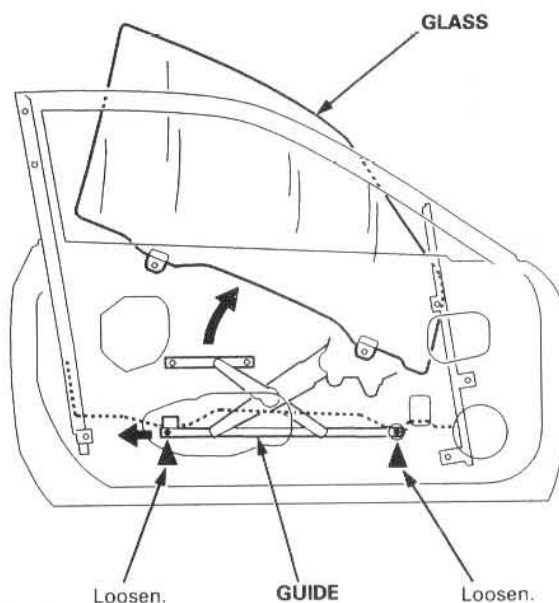
- Before reinstalling the glass, make sure the glass run channel is installed properly.
- Make sure the connectors are plugged in properly, and each rod is connected securely.
- Make sure the cylinder switch harness is routed securely.
- Make sure the door locks and opens properly.

Glass and Regulator Removal/Installation

1. Remove:
 - Door panel (see page 20-4)
 - Plastic cover (see page 20-2)
2. Carefully move the glass until you can see the bolts, then loosen them. Slide the guide back, and remove the glass from the guide, then carefully pull the glass out through the window slot.

NOTE: Take care not to drop the glass inside the door.

►: Bolt locations, 2



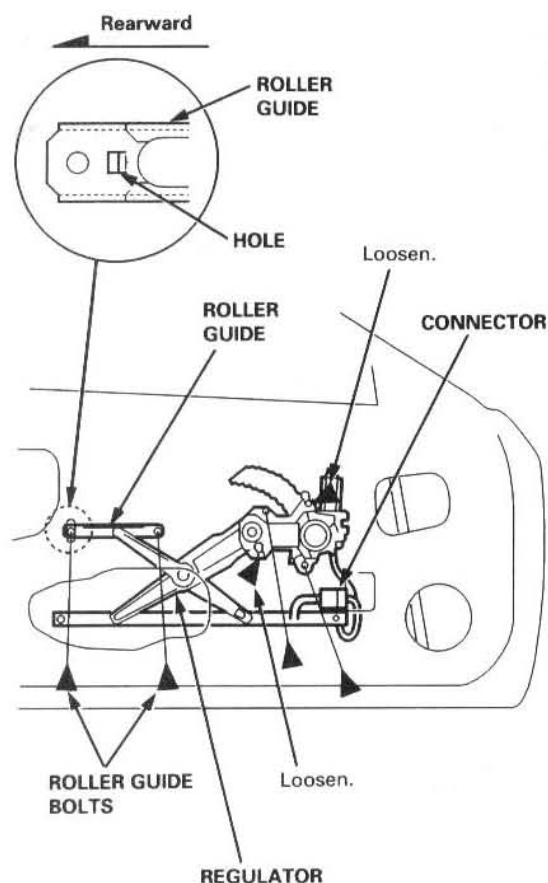
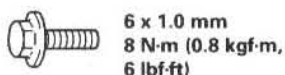


3. Disconnect the connector, and detach the harness clip, then remove the regulator through the hole in the door.

NOTE:

- Scribe a line around the rear roller guide bolt to show the original adjustment.
- When installing the regulator, align the hole of the roller guide toward the rear.

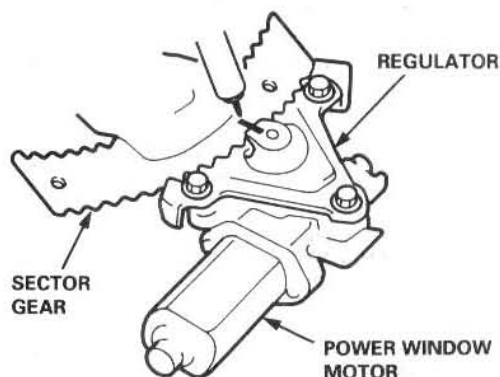
►: Bolt locations



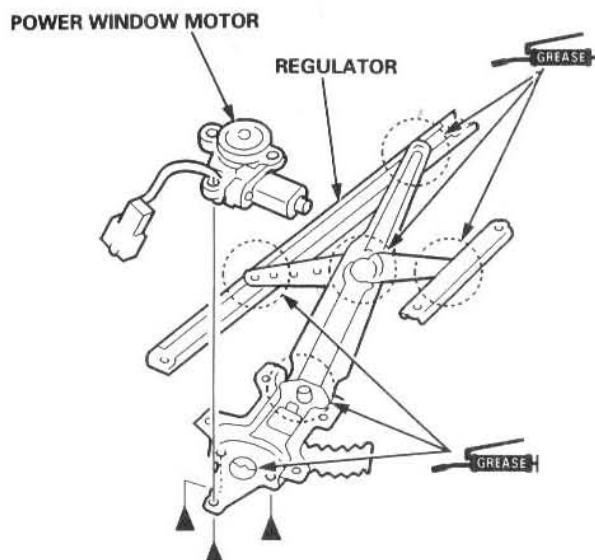
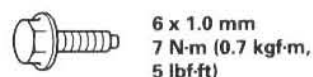
4. Grease all the sliding surfaces of the regulator where shown.

NOTE:

- If necessary, remove the power window motor from the regulator.
- Before removing the power window motor, scribe a line across the sector gear and regulator.



►: Bolt locations, 3



5. Installation is the reverse of the removal procedure.

NOTE: Roll the glass up and down to see if it moves freely without binding. Also make sure that there is no clearance between the glass and glass run channel when the glass is closed. Adjust the position of the glass as necessary.

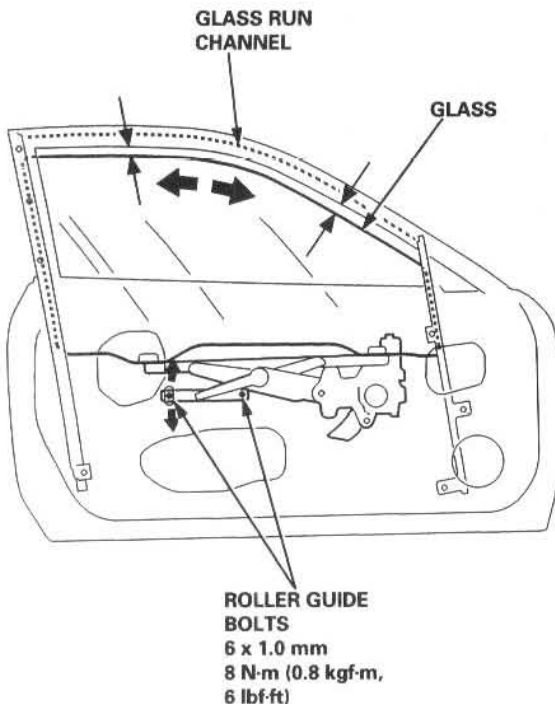
Doors

Glass Adjustment

NOTE:

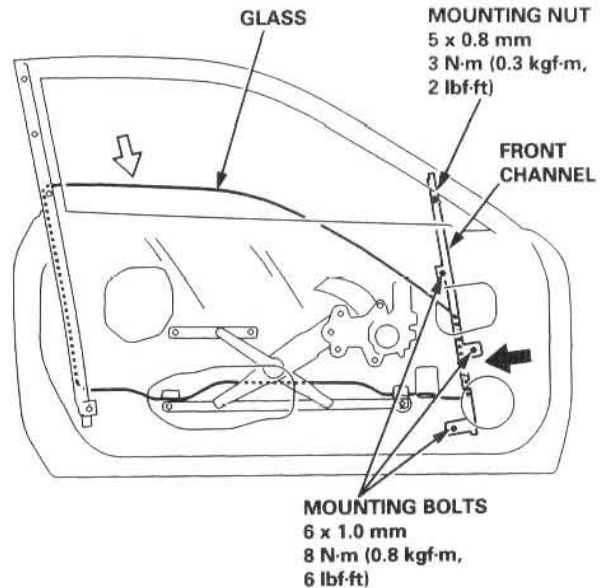
- Place the vehicle on a firm, level surface when adjusting the glass.
- Check the weatherstrips and glass run channel for damage or deterioration, and replace them if necessary.

1. Remove:
 - Door panel (see page 20-4)
 - Plastic cover (see page 20-2)
2. Raise the glass up as far as possible, and hold it against the glass run channel.
3. Loosen the roller guide bolts, and adjust the glass so it is parallel with the glass run channel.



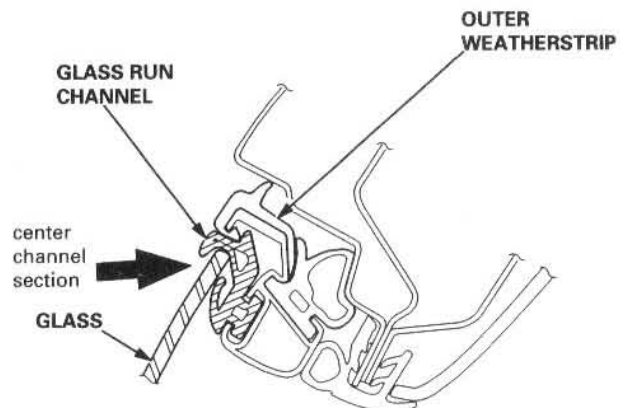
4. Tighten the roller guide bolts.
5. Loosen the front channel mounting bolts and nut, then lower the glass.

6. Push the front channel against the glass while you tighten the mounting bolts and nut.



7. Check that the glass moves smoothly.
8. Raise the glass fully and check for gaps.
9. Check the glass operation.

NOTE: Check that the glass contacts the glass run channel evenly.



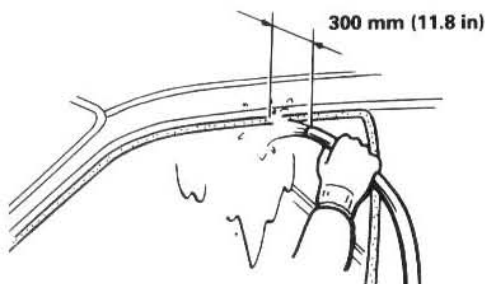
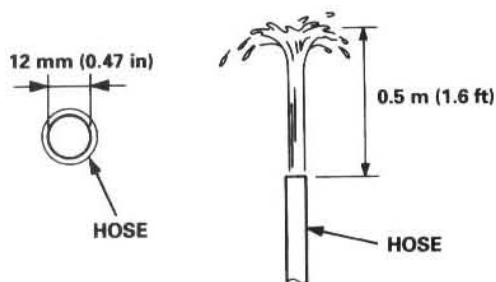


10. Check for water leaks.

Spray water over the roof and on the sealing area as shown.

NOTE:

- Adjust the water pressure as shown.
- Do not squeeze the tip of the hose.



11. Reattach the plastic cover, then reinstall the door panel (see page 20-4).

Position Adjustment

NOTE: Place the vehicle on a firm, level surface when adjusting the doors.

After installing the door, check for a flush fit with the body, then check for equal gaps between the front, rear, and bottom door edges and the body. The door and body edges should also be parallel. Adjust at the hinges as shown.

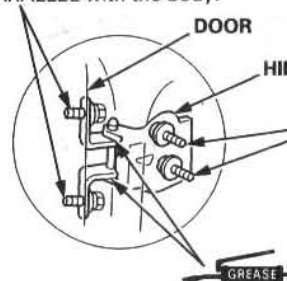
CAUTION: Place a shop towel on the jack to prevent damage to the door when loosening the door and hinge mounting bolts for adjustment.

DOOR MOUNTING BOLTS

8 x 1.25 mm

29 N·m (3.0 kgf·m, 22 lbf·ft)

Loosen the door mounting bolts slightly to move the door IN or OUT until it's flush with the body. If necessary, you can install a shim behind one hinge to make the door edges PARALLEL with the body.

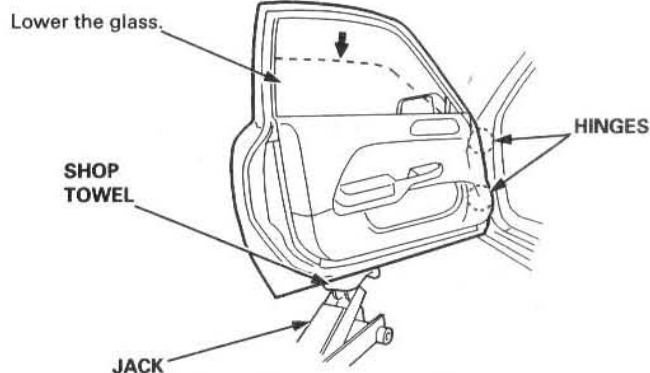


HINGE MOUNTING BOLTS

8 x 1.25 mm

29 N·m (3.0 kgf·m, 22 lbf·ft)

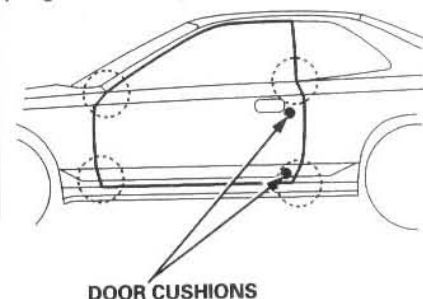
Remove the inner fender, loosen the hinge mounting bolts, and move the door BACKWARD or FORWARD, UP or DOWN as necessary to equalize the gaps.



The door and body edges should be parallel.



If necessary, adjust the door cushions.



NOTE: Check for water leaks.

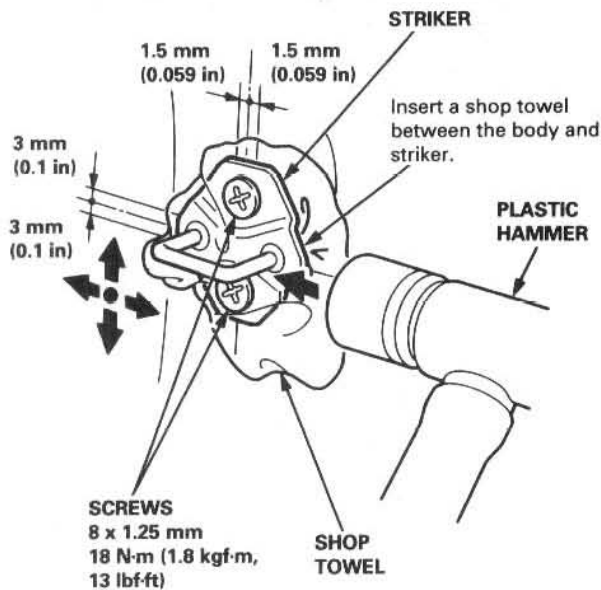
Doors

Striker Adjustment

Make sure the door latches securely without slamming.
If it needs adjustment:

NOTE: The striker nuts are fixed. The striker can be adjusted 1.5 mm (0.059 in) up or down, and 3 mm (0.1 in) in or out.

1. Loosen the screws, then insert a shop towel between the body and striker.



2. Lightly tighten the screws.
3. Wrap the striker with a shop towel, then adjust the striker by tapping it with a plastic hammer.

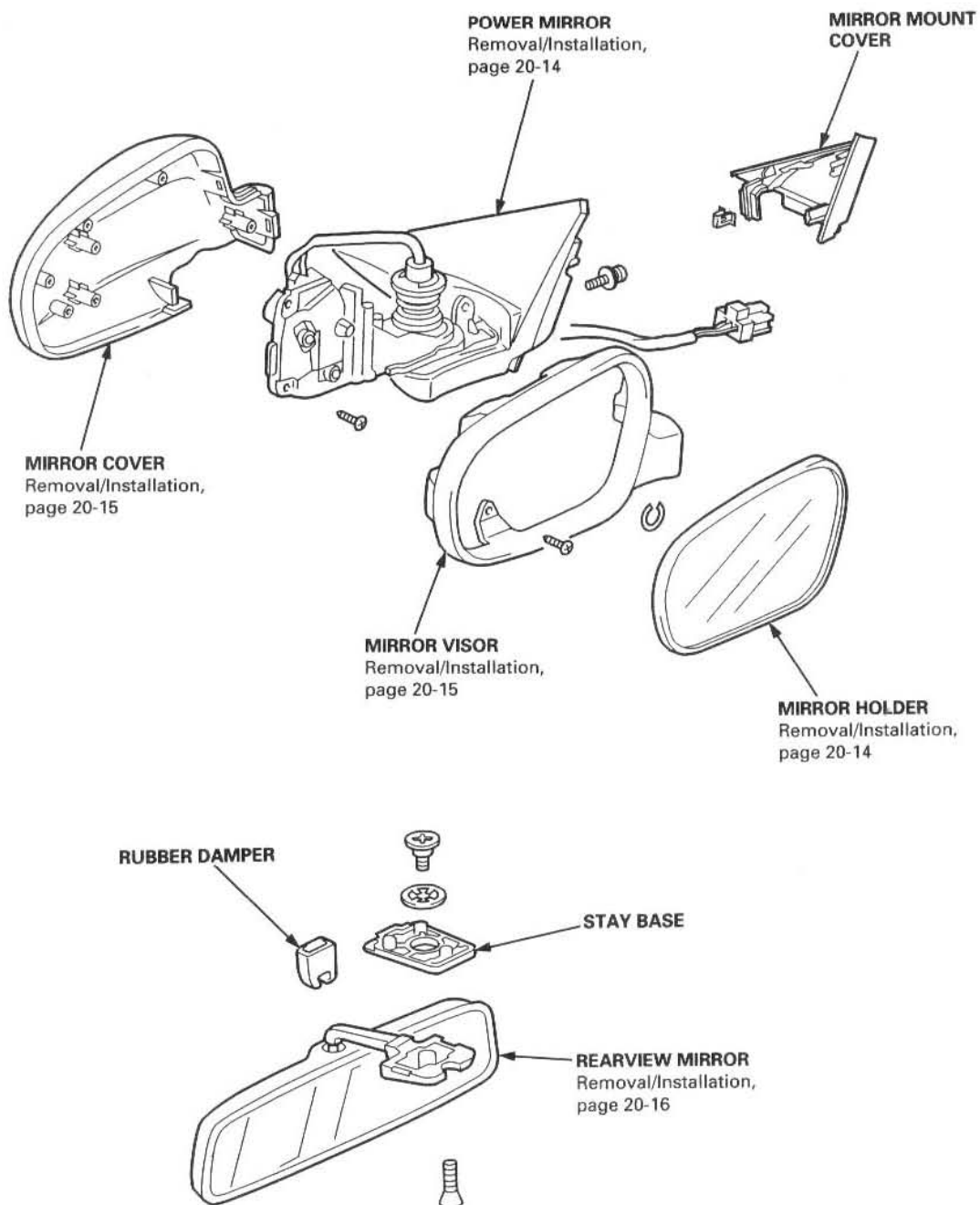
CAUTION: Do not tap the striker too hard.

NOTE: Hold the outer handle out, and push the door against the body to be sure the striker allows a flush fit.

4. If the door latches properly, loosen the screws, then remove a shop towel. Tighten the screws and recheck.



Index



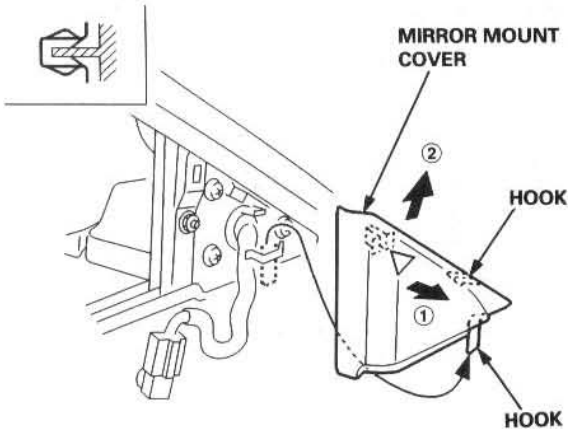
Mirrors

Power Mirror Removal/Installation

NOTE: Take care not to scratch the mirror or the door.

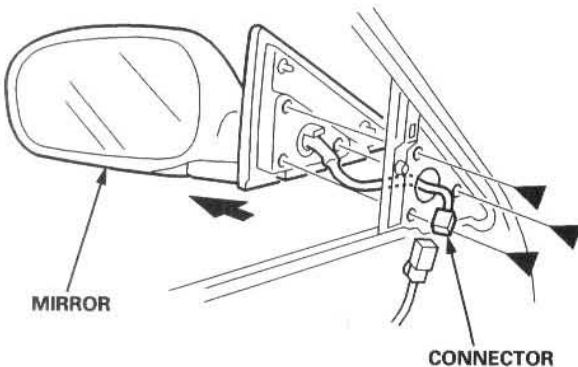
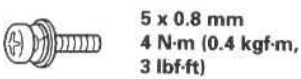
1. Lower the door glass.
2. Carefully remove the mirror mount cover by hand.

▷: Clip location, 1



3. Remove the door panel (see page 20-4).
4. Disconnect the mirror connector. While holding the mirror, remove the three screws and remove the mirror.

▷: Screw locations, 3



5. Installation is the reverse of the removal procedure.

NOTE: Make sure the connector is connected properly.

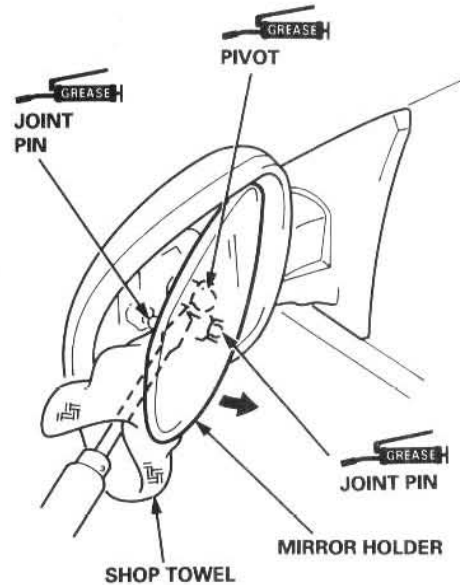
Mirror Holder Removal/Installation

CAUTION:

- Wear gloves to remove and install the mirror holder.
- When prying with a flat tip screwdriver, wrap it with a shop towel to prevent damage.

NOTE: If the vehicle is equipped with a mirror defogger, you cannot separate the actuator and mirror holder. Replace the mirror as an assembly.

1. Carefully pry out the mirror holder with a flat tip screwdriver as shown.



2. Installation is the reverse of the removal procedure.

NOTE: Apply grease to the locations indicated by the arrows.



Mirror Visor and Mirror Cover Removal/Installation

NOTE: Take care not to scratch the mirror or the door.

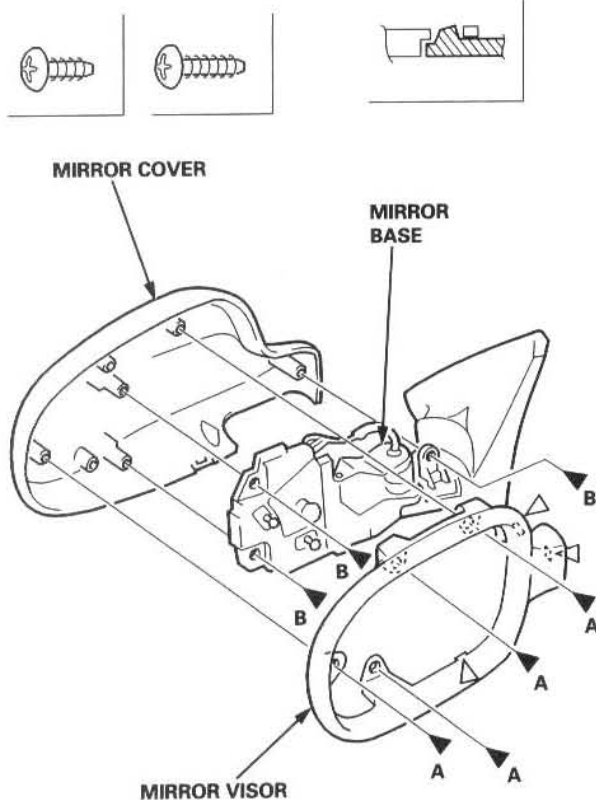
1. Remove the mirror holder.
2. Remove the screws, then remove the mirror visor and mirror cover from the mirror base.

►: Screw locations

▷: Hook locations, 3

A ►, 4

B ►, 3



3. Installation is the reverse of the removal procedure.

Rearview Mirror Removal/Installation

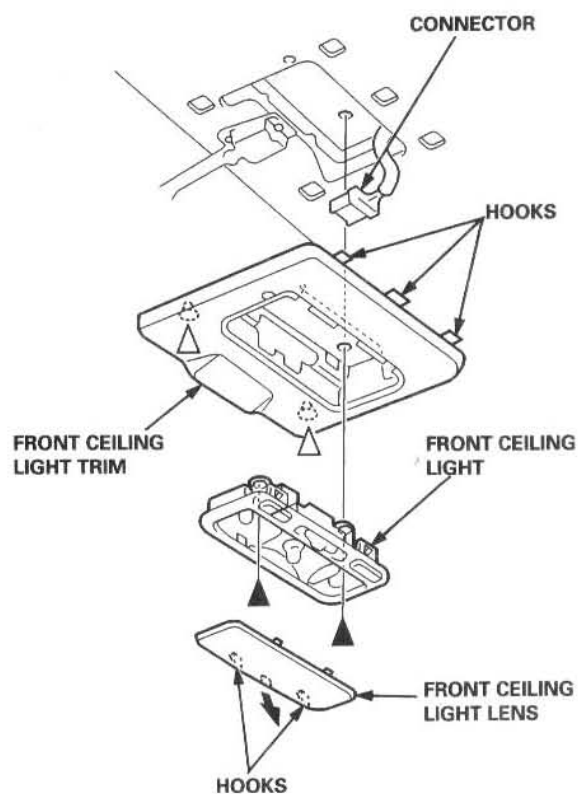
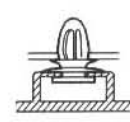
NOTE: Take care not to scratch the headliner.

1. Remove the front ceiling light lens.
2. Remove the front ceiling light and front ceiling light trim.

►: Bolt locations, 2

▷: Clip locations, 2

6 x 1.0 mm
9.8 N·m (1.0 kgf·m,
7.2 lbf·ft)



(cont'd)

Mirrors

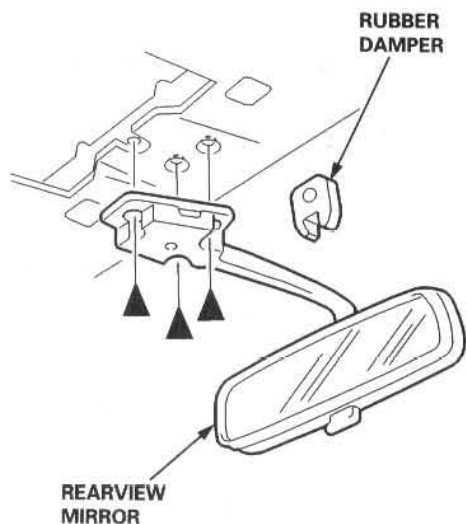
Rearview Mirror Removal/ Installation (cont'd)

3. Remove the rubber damper.

►: Screw locations, 3



5 x 0.8 mm
4 N·m (0.4 kgf·m,
3 lbf·ft)



4. Remove the rearview mirror.
5. Installation is the reverse of the removal procedure.

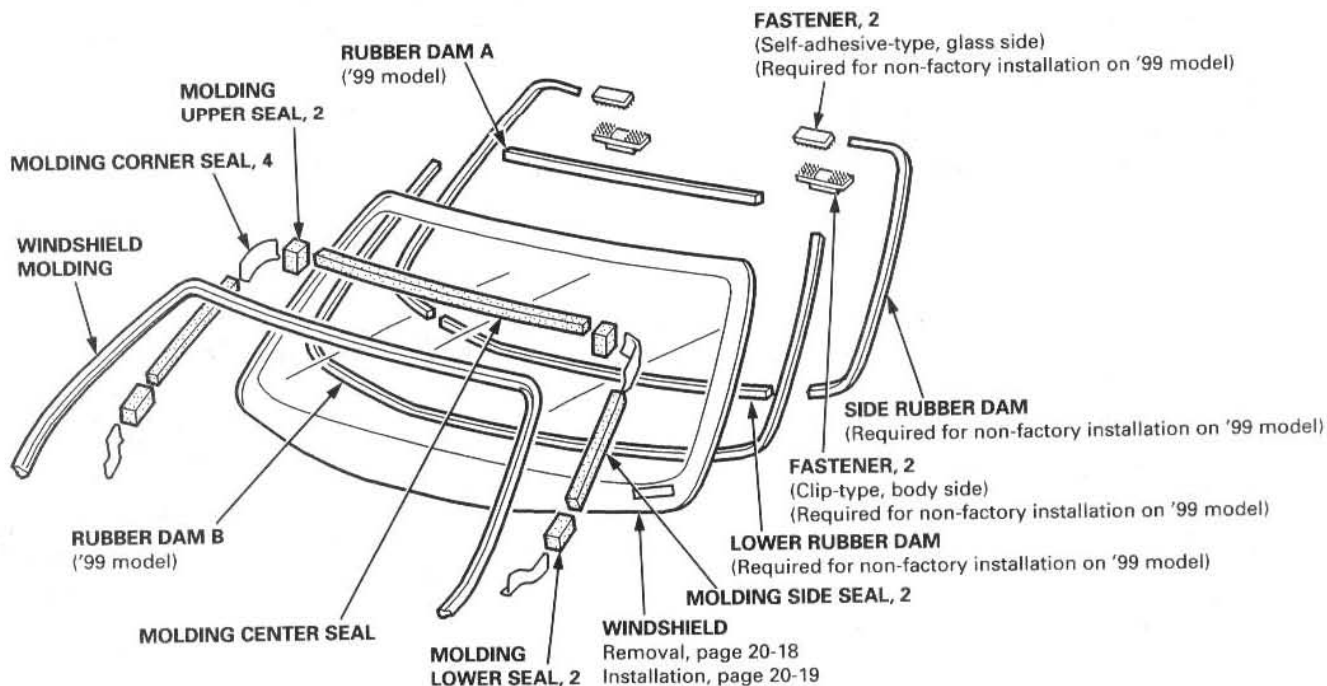


Windshield/Rear Window/Quarter Glass

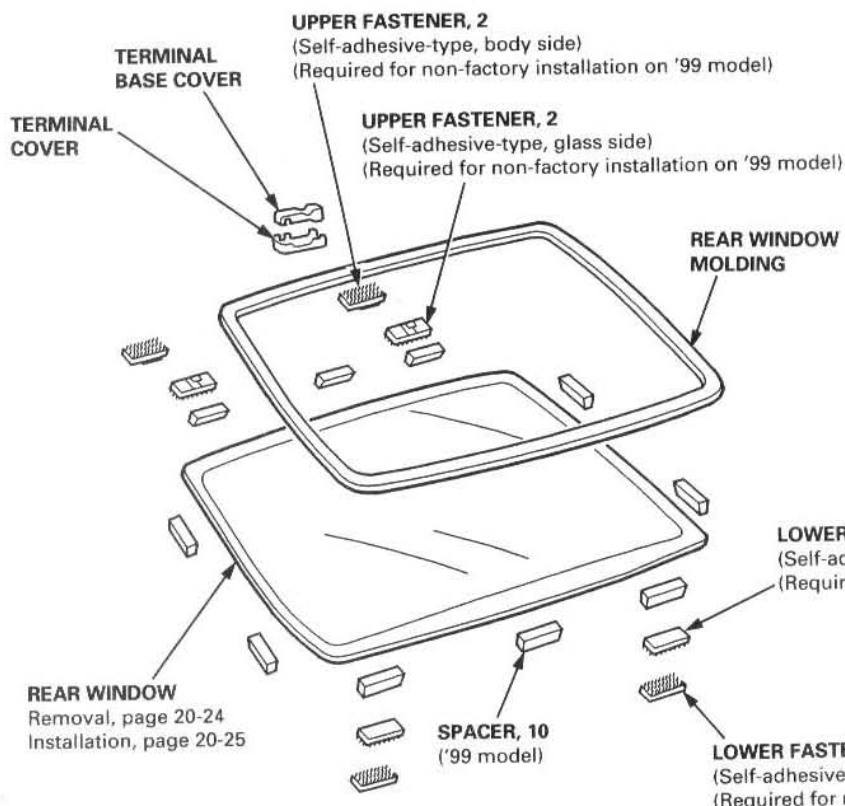
Index

NOTE: The numbers after the part names show the quantities of the parts used.

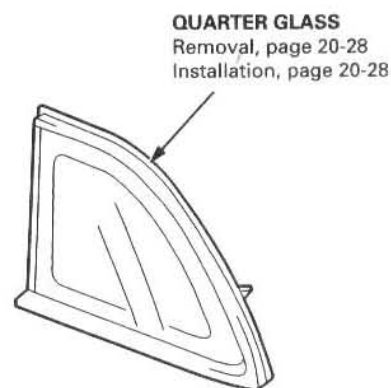
Windshield:



Rear Window:



Quarter Glass:



Windshield

Removal

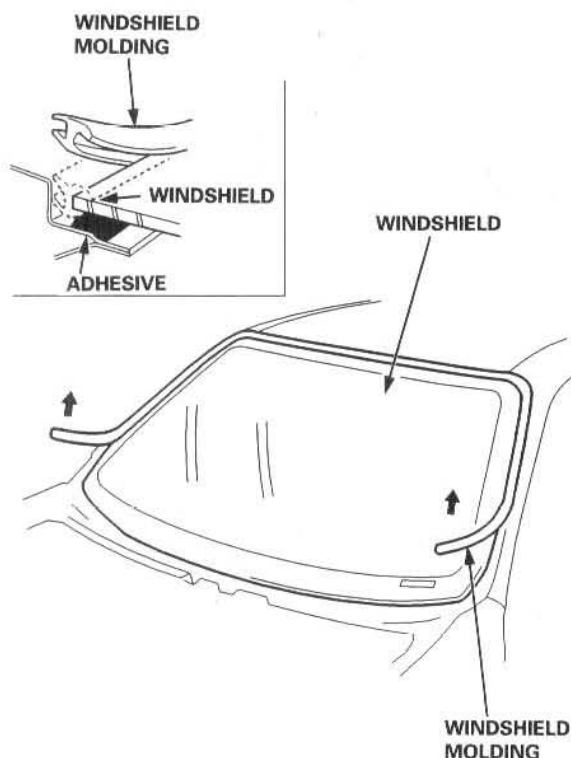
CAUTION:

- Wear gloves to remove and install the windshield.
- Use seat covers to avoid damaging any surfaces.

1. To remove the windshield, first remove the:
 - Front ceiling light and trim (see page 20-15)
 - Rearview mirror (see page 20-16)
 - Sunvisors and holders (see page 20-43)
 - Front pillar trim (see page 20-41)
 - Windshield wiper arms and cowl cover (see page 20-81)

2. Remove off the windshield molding.

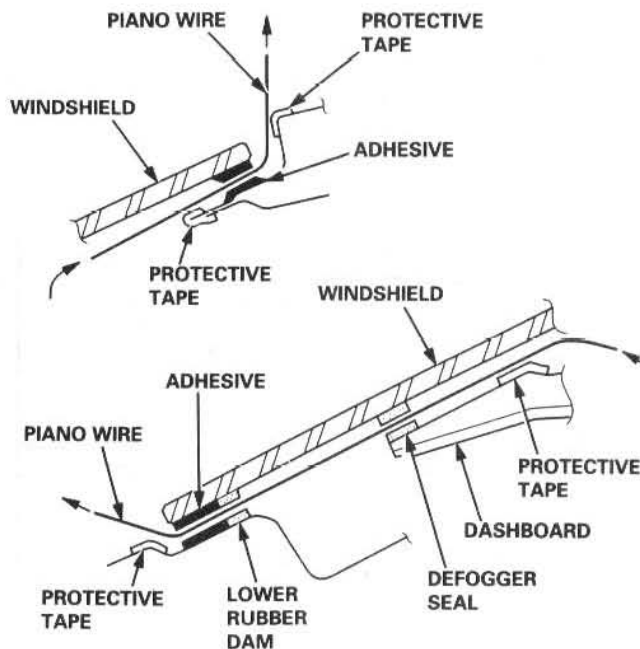
NOTE: If removing the windshield molding is difficult, cut the molding with a utility knife.



3. Pull down the front portion of the headliner (see page 20-43).

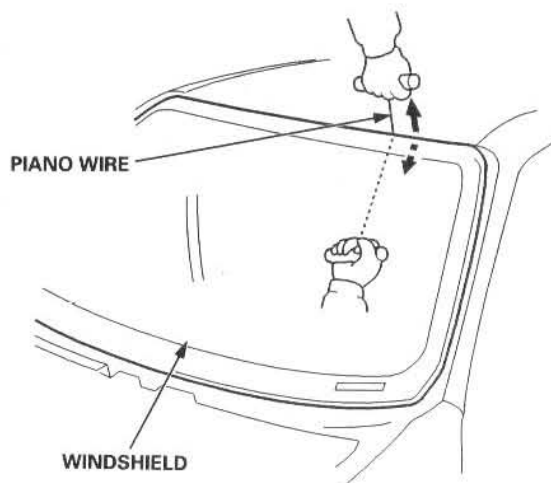
CAUTION: Take care not to bend the headliner excessively, or you may break it.

4. Apply protective tape to along the edge of the dashboard and body as shown. Using an awl, make a hole through the rubber dams and adhesive from inside the vehicle. Push a piece of piano wire through the hole, and wrap each end around a piece of wood.

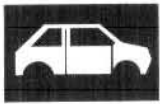


CAUTION: Hold the piano wire as close to the windshield as possible to prevent damage to the body and dashboard.

5. With a helper on the outside, pull the piano wire back and forth in a sawing motion, and carefully cut through the rubber dams and adhesive around the entire windshield.



6. Carefully remove the windshield.



Installation

- Using a putty knife, scrape the old adhesive smooth to a thickness of about 2 mm (0.08 in) on the bonding surface around the entire windshield opening flange.

NOTE:

- Do not scrape down to the painted surface of the body; damaged paint will interfere with proper bonding.
- Remove the rubber dams and fasteners from the body.
- Mask off surrounding surfaces before painting.

- Clean the body bonding surface with a sponge dampened in alcohol.

NOTE: After cleaning, keep oil, grease and water from getting on the surface.

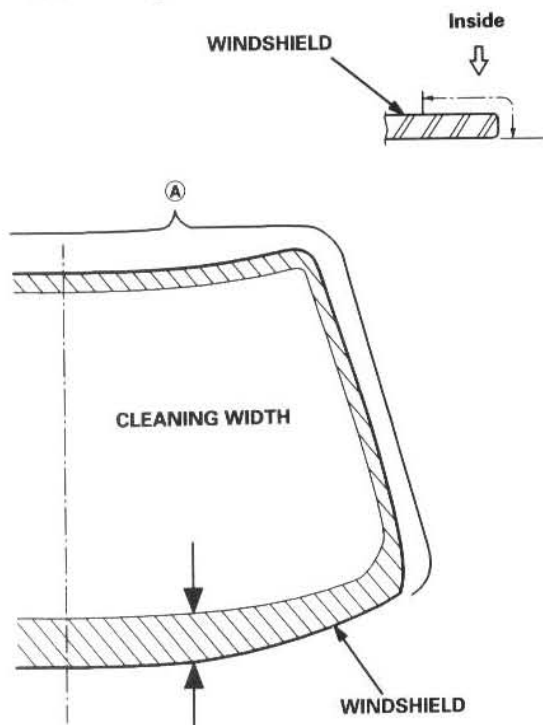
- If the old windshield is to be reinstalled, use a putty knife to scrape off all traces of old adhesive and the rubber dams, then clean the windshield surface with alcohol where new adhesive is to be applied.

NOTE: Make sure the bonding surface is kept free of water, oil and grease.

CAUTION: Avoid setting the windshield on its edges; small chips may later develop into cracks.

NOTE:

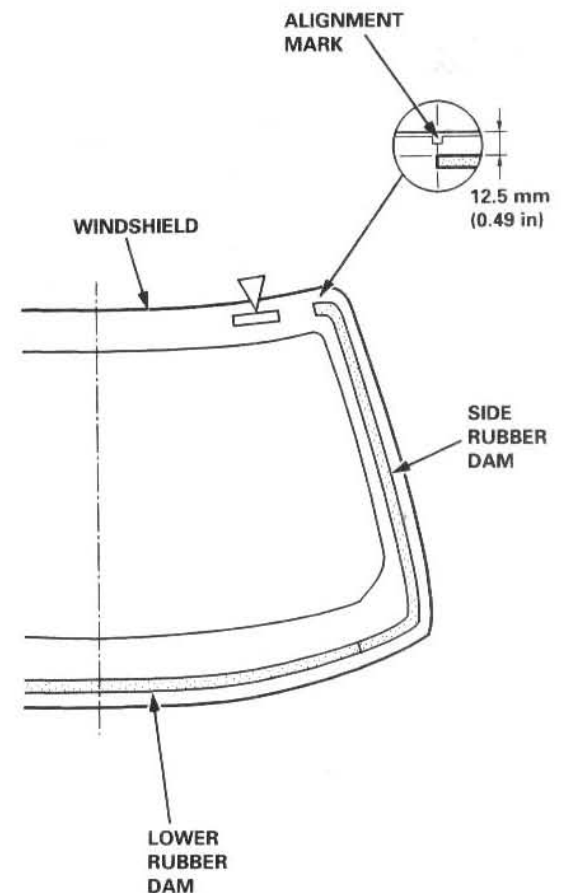
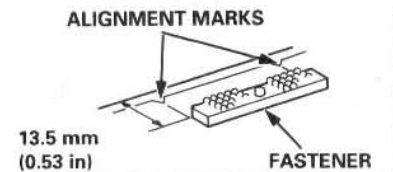
- Clean the shadowed area.
- Clean area (A) as shown.



- Glue the rubber dams and fasteners to the inside face of the windshields as shown.

NOTE: Be careful not to touch the windshield where adhesive will be applied.

▷ Fastener locations, 2



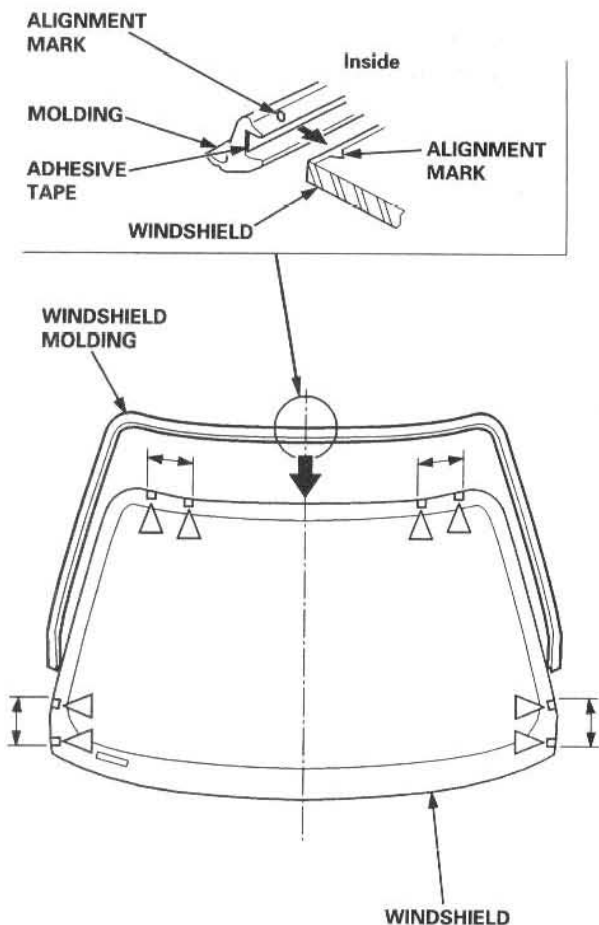
(cont'd)

Windshield

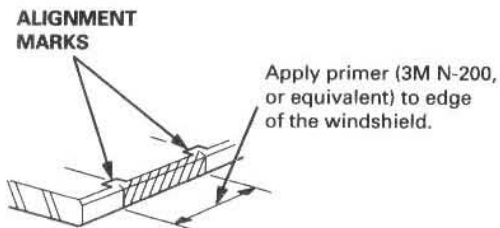
Installation (cont'd)

5. Align and glue the windshield molding to the edge of the windshield.

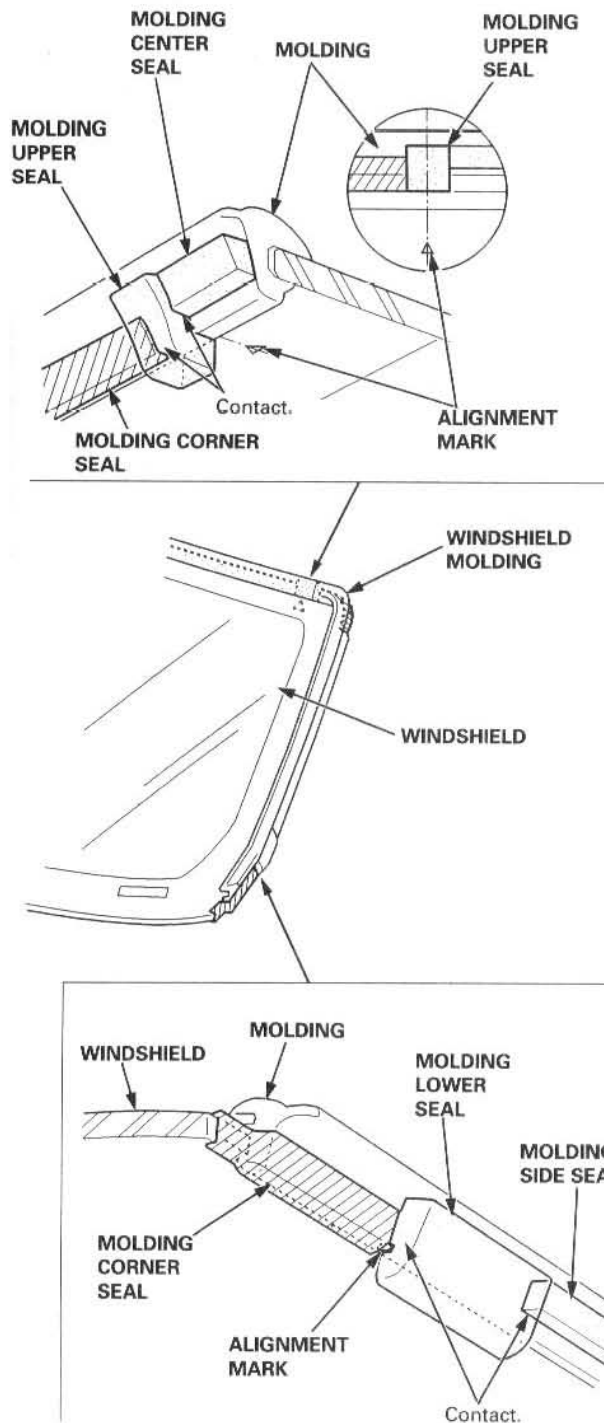
NOTE: Be careful not to touch the windshield where adhesive will be applied.



▷: Alignment mark locations



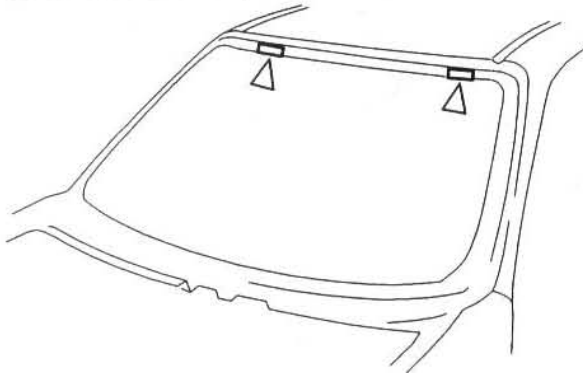
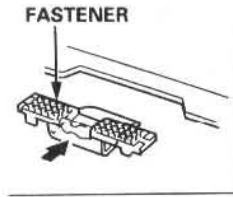
6. Glue the windshield molding seals.





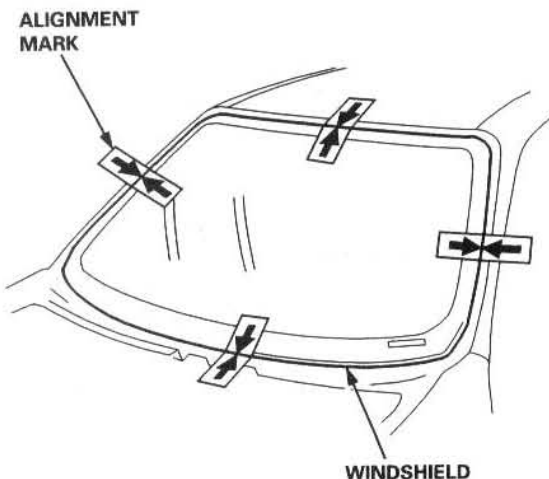
7. Install the fasteners to the body as shown.

▷: Fastener locations, 2



8. Set the windshield in the opening, then center it. Make alignment marks across the windshield and body with a grease pencil at the four points shown.

NOTE: Be careful not to touch the windshield where adhesive will be applied.



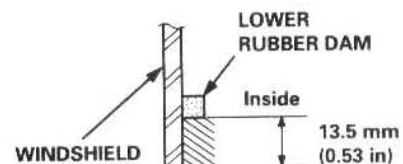
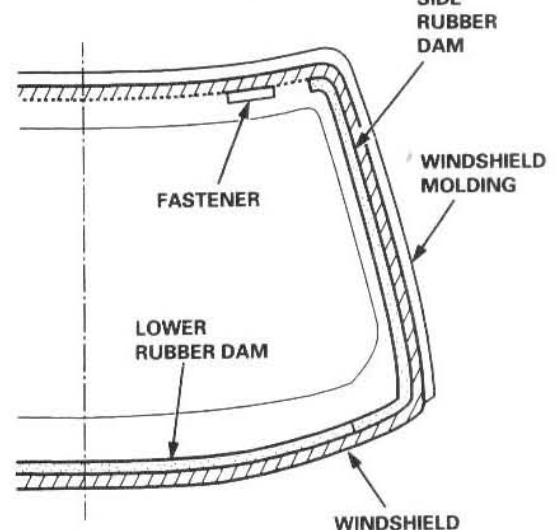
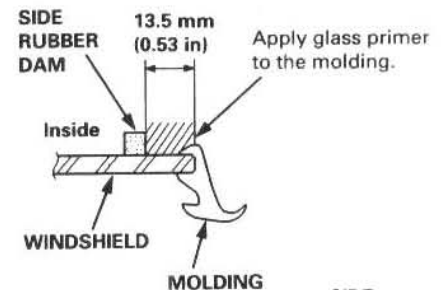
9. Remove the windshield.

10. With a sponge, apply a light coat of glass primer around the edge of the windshield as shown, then lightly wipe it off with gauze or cheesecloth.

NOTE:

- Do not apply body primer to the windshield, and do not get body and glass primer sponges mixed up.
- Never touch the primed surfaces with your hands. If you do, the adhesive may not bond to the windshield properly, causing a leak after the windshield is installed.
- Keep water, dust, and abrasive materials away from the primed surface.

/// : Apply glass primer here.



(cont'd)

Windshield

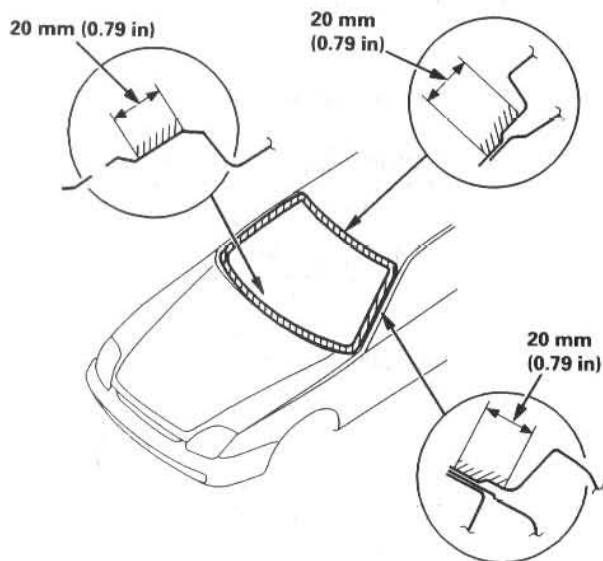
Installation (cont'd)

11. With a sponge, apply a light coat of body primer to the original adhesive remaining around the windshield opening flange. Let the body primer dry for at least 10 minutes.

NOTE:

- Do not apply glass primer to the body, and be careful not to mix up glass and body primer sponges.
- Never touch the primed surfaces with your hands.
- Mask off the dashboard before painting the flange.

 : Apply body primer here.



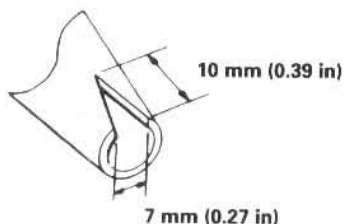
12. Thoroughly mix the adhesive and hardener together on a glass or metal plate with a putty knife.

NOTE:

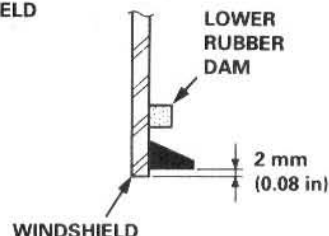
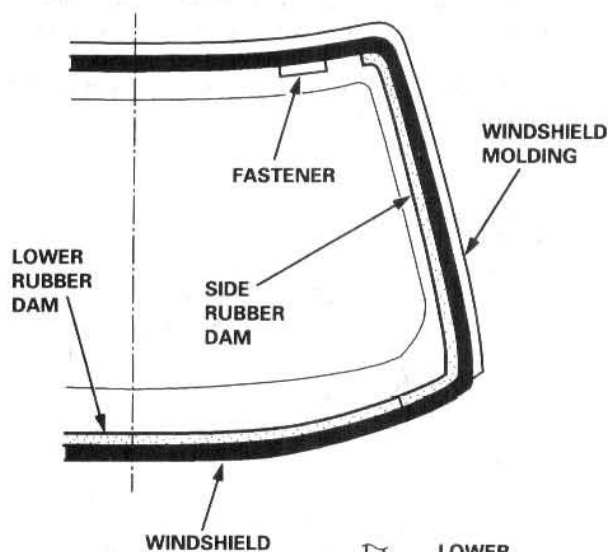
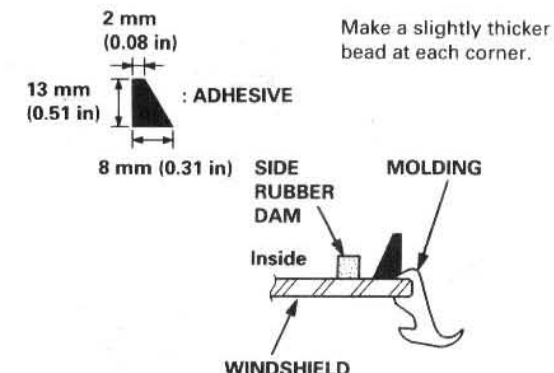
- Clean the plate with a sponge and alcohol before mixing.
- Follow the instructions that come with the adhesive.

13. Before filling a cartridge, cut the end of the nozzle as shown.

Cut nozzle end as shown.



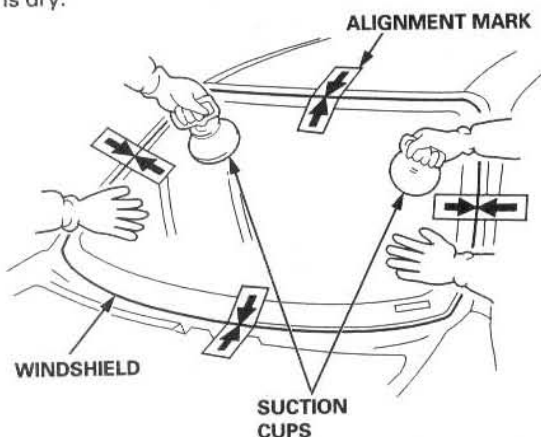
14. Pack adhesive into the cartridge without air pockets to ensure continuous delivery. Put the cartridge in a caulking gun, and run a bead of adhesive around the edge of the windshield as shown.





15. Use suction cups to hold the windshield over the opening, align it with the alignment marks made in step 8, and set it down on the adhesive. Lightly push on the windshield until its edge is fully seated on the adhesive all the way around.

NOTE: Do not open or close the doors until adhesive is dry.



16. Scrape or wipe the excess adhesive off with a putty knife or towel.

NOTE: To remove adhesive from a painted surface or the windshield, wipe with a soft shop towel dampened with alcohol.

17. Let the adhesive dry for at least one hour, then spray water over the windshield and check for leaks. Mark the leaking areas, let the windshield dry, then seal with sealant.

NOTE:

- Let the adhesive dry for at least four hours after windshield installation. If the vehicle has to be used within the first four hours, it must be driven slowly.
- Keep the windshield dry for the first hour after installation.
- Check that the ends of the windshield molding are set under the cowl cover.

18. Reinstall all remaining removed parts.

NOTE:

- Install the rearview mirror rubber damper after the adhesive has dried thoroughly.
- Advise the customer not to do the following things for two to three days:
 - Slam the doors with all the windows rolled up.
 - Twist the body excessively (such as when going in and out of driveways at an angle or driving over rough, uneven roads).

Rear Window

Removal

CAUTION:

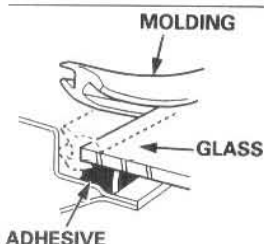
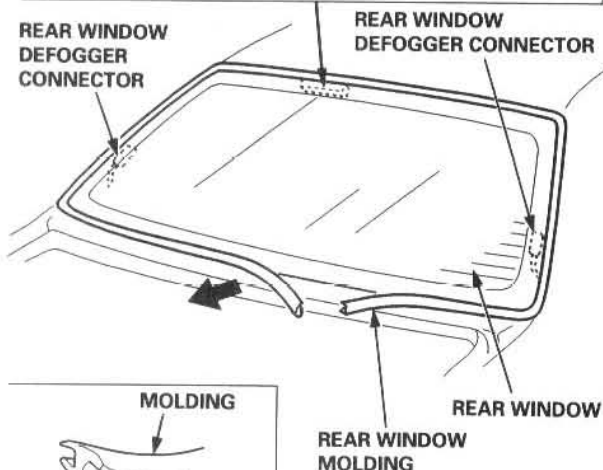
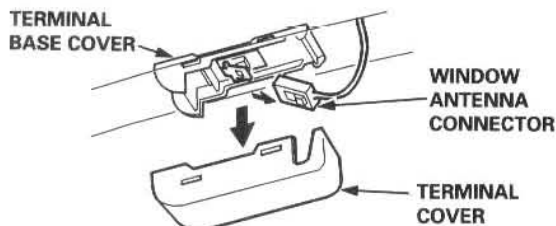
- Wear gloves to remove and install the rear window.
- Use seat covers to avoid damaging any surfaces.
- Do not damage the rear window defogger grid lines, window antenna grid lines, and terminals.

1. To remove the rear window, first remove the:
 - Trunk lid (see body repair manual P/N 61S3030)
 - Rear seat cushion (see page 20-60)
 - Rear seat-back (see page 20-60)
 - Door sill molding (see page 20-41)
 - Door trim (as necessary, see page 20-41)
 - Rear pillar trim (see page 20-41)
 - Rear bulkhead upper trim (see page 20-41)
 - Quarter trim panel (see page 20-41)
 - Rear shelf (see page 20-41)

2. Partially pull down the rear of the headliner (see page 20-43).

CAUTION: Take care not to bend the headliner excessively because you can break it.

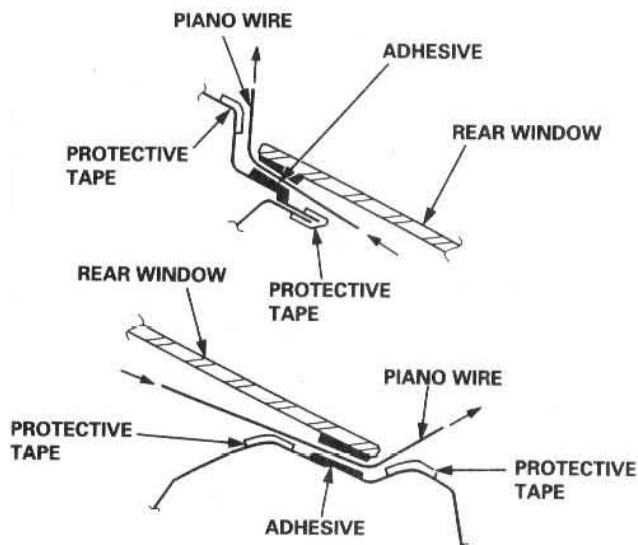
3. Disconnect the rear window defogger connectors and window antenna connectors.



4. Remove off the rear window molding.

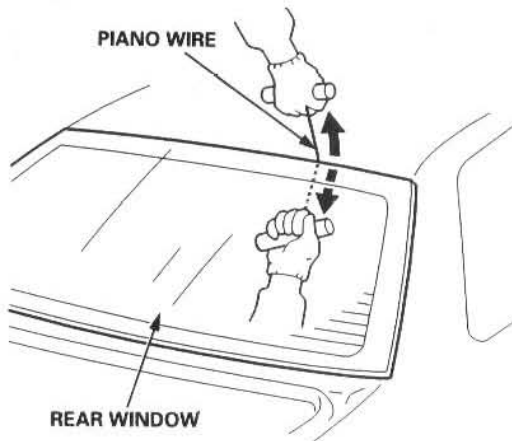
NOTE: If removing the rear window molding is difficult, cut the molding with a utility knife.

5. Apply protective tape along the edge of the body as shown. Using an awl, make a hole through the adhesive from inside the vehicle. Push a piece of piano wire through the hole, and wrap each end around a piece of wood.



6. With a helper on the outside, pull the piano wire back and forth in a sawing motion, and carefully cut through the adhesive around the entire rear window.

CAUTION: Hold the piano wire as close to the rear window as possible to prevent damage to the body.



7. Carefully remove the rear window.



Installation

1. Using a putty knife, scrape the old adhesive smooth to a thickness of about 2 mm (0.08 in) on the bonding surface around the entire rear window opening flange.

NOTE:

- Do not scrape down to the painted surface of the body; damaged paint will interfere with proper bonding.
- Mask off surrounding surfaces before painting.
- Remove the fasteners and spacers from the body.

2. Clean the body bonding surface with a sponge dampened in alcohol.

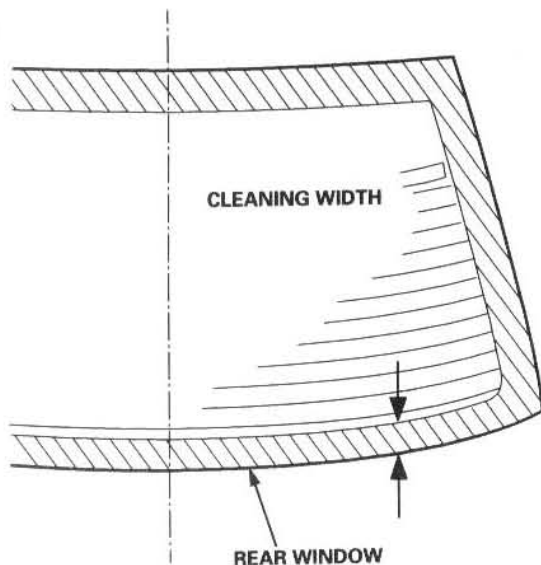
NOTE: After cleaning, keep oil, grease and water from getting on the surface.

3. If the old rear window is to be reinstalled, use a putty knife to scrape off all traces of old adhesive, then clean the rear window surface with alcohol where new adhesive is to be applied.

NOTE: Make sure the bonding surface is kept free of water, oil and grease.

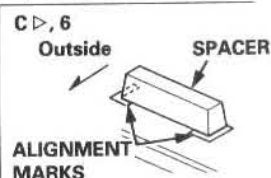
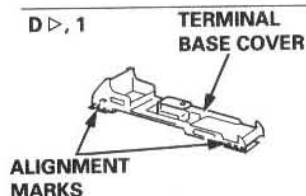
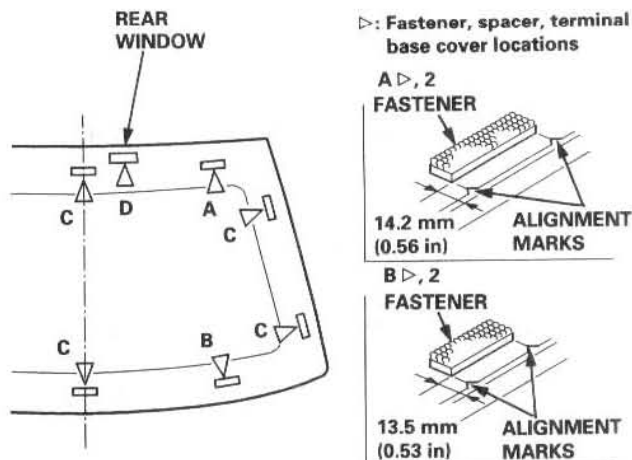
CAUTION: Avoid setting the rear window on its edges; small chips may later develop into cracks.

NOTE: Clean the shadowed area.



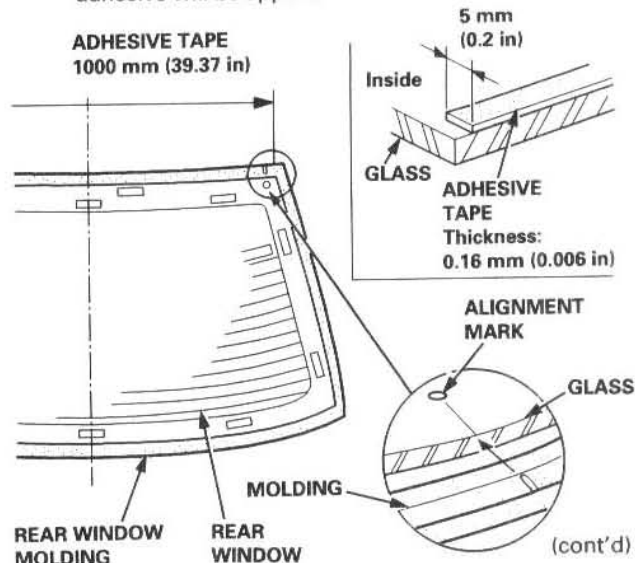
4. Glue the fasteners and spacers to the inside face of the rear window as shown. If necessary, glue the terminal base cover to the rear window.

NOTE: Be careful not to touch the rear window where adhesive will be applied.



5. Apply the double-faced adhesive tape (NITTO 501, or equivalent) to the inside face of the rear window, then install the rear window molding around the edge of the rear windshield as shown.

NOTE: Be careful not to touch the rear window where adhesive will be applied.

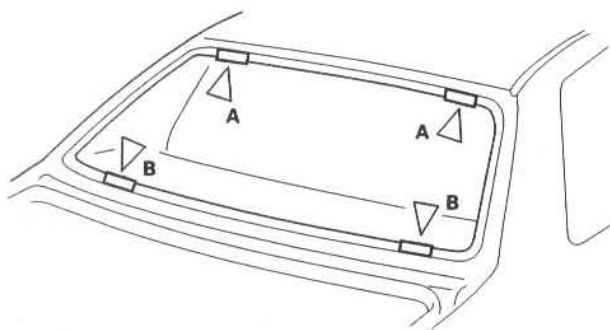
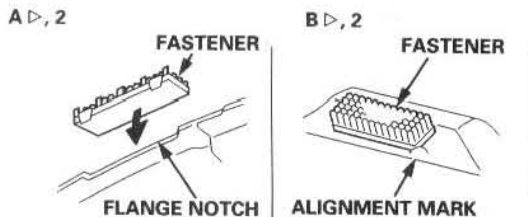


Rear Window

Installation (cont'd)

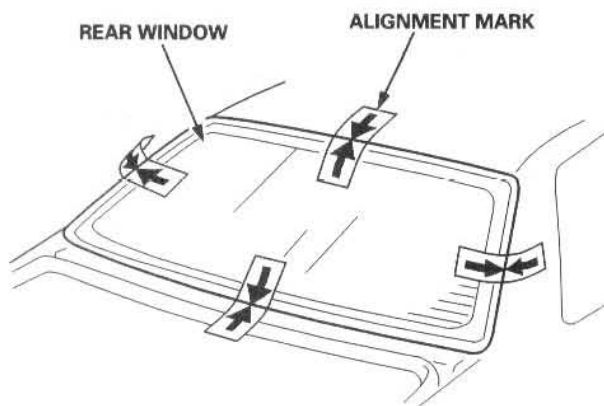
6. Glue the fasteners to the body as shown.

▷: Fastener locations



7. Set the rear window in the window opening and center it. Make alignment marks across the rear window and body with a grease pencil at the four points shown.

NOTE: Be careful not to touch the rear window where adhesive will be applied.



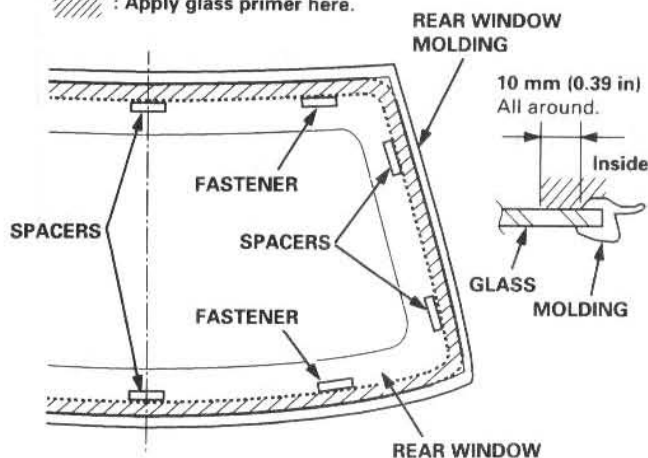
8. Remove the rear window.

9. With a sponge, apply a light coat of glass primer around the edge of the rear window as shown, then lightly wipe it off with gauze or cheesecloth.

NOTE:

- Do not apply body primer to the rear window, and do not get body and glass primer sponges mixed up.
- Never touch the primed surfaces with your hands. If you do, the adhesive may not bond to the rear window properly, causing a leak after the rear window is installed.
- Keep water, dust, and abrasive materials away from the primed surface.

/// : Apply glass primer here.

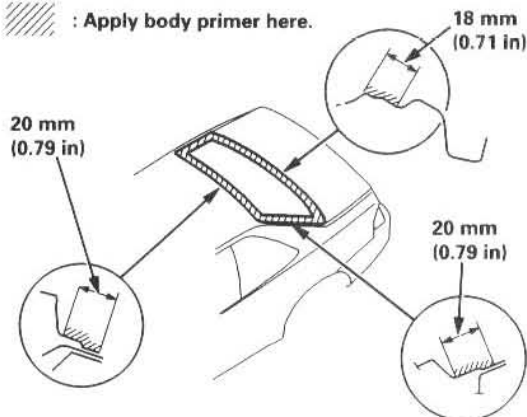


10. With a sponge, apply a light coat of body primer to the original adhesive remaining around the rear window opening flange. Let the body primer dry for at least 10 minutes.

NOTE:

- Do not apply glass primer to the body, and be careful not to mix up glass and body primer sponges.
- Never touch the primed surfaces with your hands.

/// : Apply body primer here.





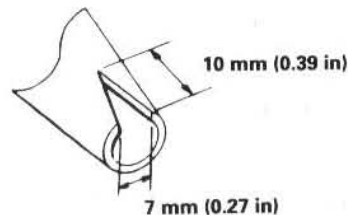
11. Thoroughly mix the adhesive and hardener together on a glass or metal plate with a putty knife.

NOTE:

- Clean the plate with a sponge and alcohol before mixing.
- Follow the instructions that came with the adhesive.

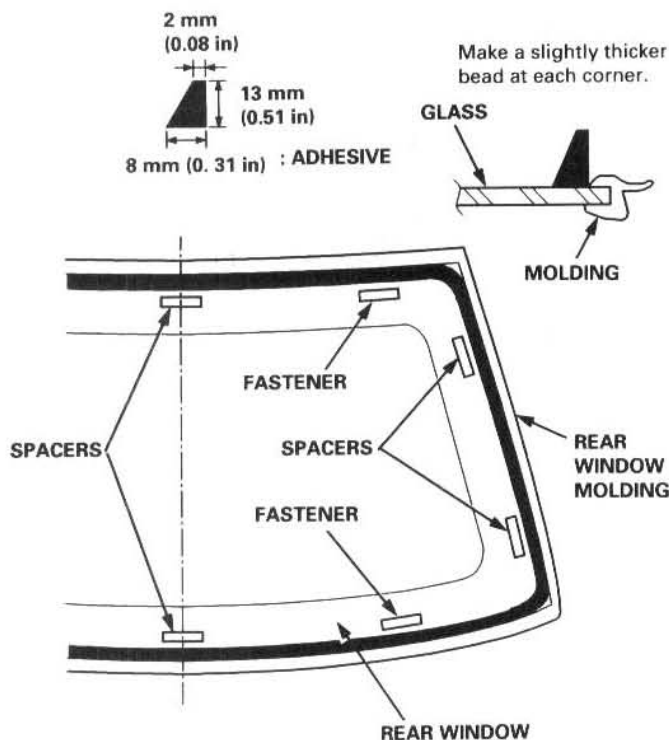
12. Before filling a cartridge, cut the end of the nozzle as shown.

Cut nozzle end as shown.



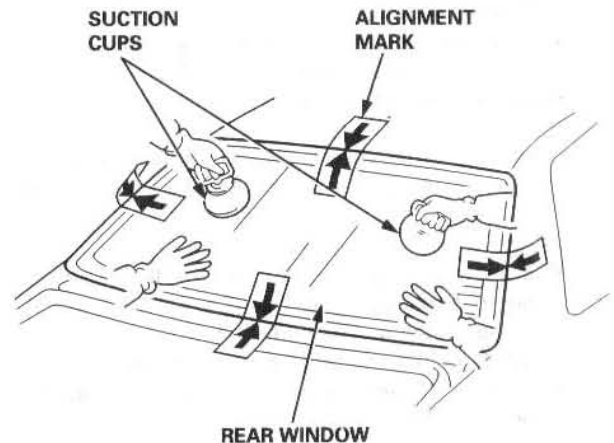
13. Pack adhesive into the cartridge without air pockets to ensure continuous delivery. Put the cartridge in a caulking gun, and run a bead of adhesive around the edge of the rear window as shown.

NOTE: Apply the adhesive within 30 minutes after applying the glass primer.



14. Use suction cups to hold the rear window over the opening, align it with the alignment marks you made in step 7, and set it down on the adhesive. Lightly push on the rear window until its edges are fully seated on the adhesive all the way around.

NOTE: Do not open or close the doors until the adhesive is dry.



15. Scrape or wipe the excess adhesive off with a putty knife or towel.

NOTE: To remove adhesive from a painted surface or the rear window, use a soft shop towel dampened with alcohol.

16. Let the adhesive dry for at least one hour, then spray water over the rear window and check for leaks. Mark the leaking areas, let the rear window dry, then seal with sealant.

NOTE: Let the adhesive dry for at least four hours after rear window installation. If the vehicle has to be used within the first four hours, it must be driven slowly.

17. Reinstall all remaining removed parts.

NOTE: Advise the customer not to do the following things for two to three days:

- Slam the doors with all the windows rolled up.
- Twist the body excessively (such as when going in and out of driveways at an angle or driving over rough, uneven roads).

Quarter Glass

Removal

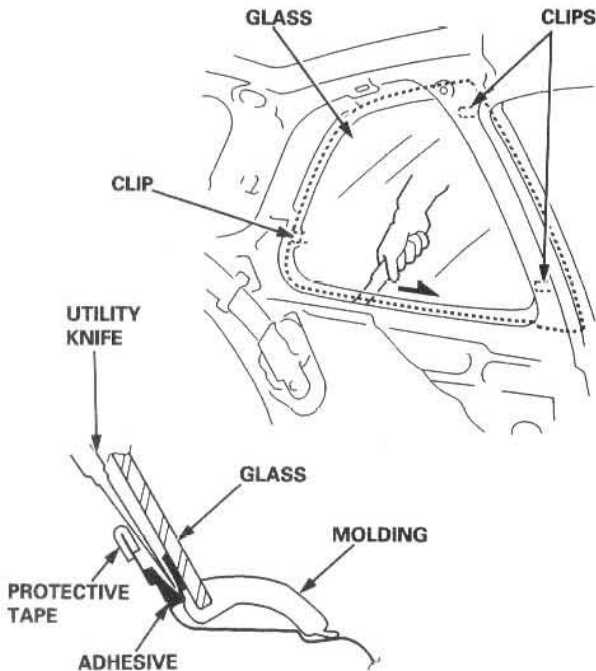
CAUTION:

- Wear gloves to remove and install the quarter glass.
- Use seat covers to avoid damaging any surfaces.

1. To remove the quarter glass, first remove the:
 - Rear seat cushion (see page 20-60)
 - Rear seat-back (see page 20-60)
 - Door sill molding (see page 20-41)
 - Door trim (as necessary, see page 20-41)
 - Rear pillar trim (see page 20-41)
 - Rear bulkhead upper trim (see page 20-41)
 - Quarter trim panel (see page 20-41)
 - Front pillar trim (see page 20-41)
2. From inside the vehicle, use a utility knife to cut through the quarter glass adhesive all the way around.

NOTE:

- If the quarter glass is to be reinstalled, take care not to damage the molding.
- If the molding is damaged, replace the quarter glass, molding and clips as an assembly.
- If any of the clips are broken, the quarter glass can be reinstalled using butyl tape.



3. Carefully remove the quarter glass.

NOTE:

- Check the molding for damage, and replace the quarter glass if necessary.
- Remove any broken clips from the body.

Installation

1. Using a utility knife scrape the old adhesive smooth to a thickness of about 2 mm (0.08 in) on the bonding surface around the entire quarter glass opening flange.

NOTE:

- Do not scrape down to the painted surface of the body; damaged paint will interfere with proper bonding.
- Mask off surrounding surfaces before applying primer.

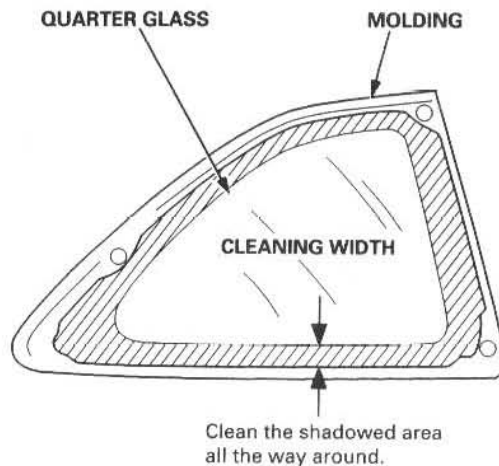
2. Clean the body bonding surface with a sponge dampened in alcohol.

NOTE: After cleaning, keep oil, grease and water from getting on the surface.

3. If the old quarter glass is to be reinstalled, use a putty knife to scrape off all traces of old adhesive, then clean the quarter glass surface with alcohol where new adhesive is to be applied.

NOTE: Make sure the bonding surface is kept free of water, oil and grease.

CAUTION: Avoid setting the quarter glass on its edges; the molding can be permanently deformed.



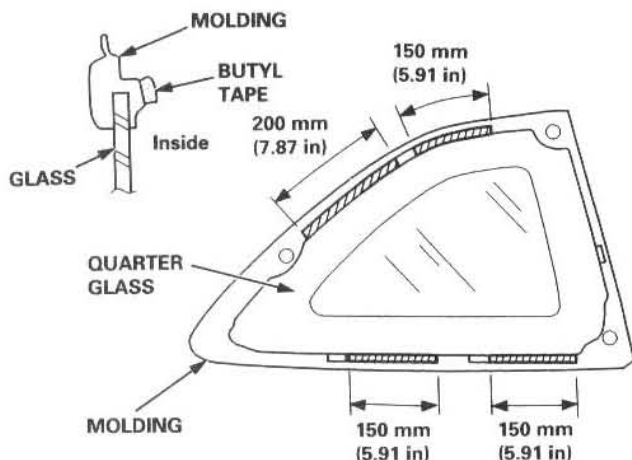


4. If the old quarter glass is to be reinstalled (and either of the clips are broken off the molding), apply a light coat of primer (C-100, or equivalent), then apply the butyl tape to the molding as shown.

NOTE:

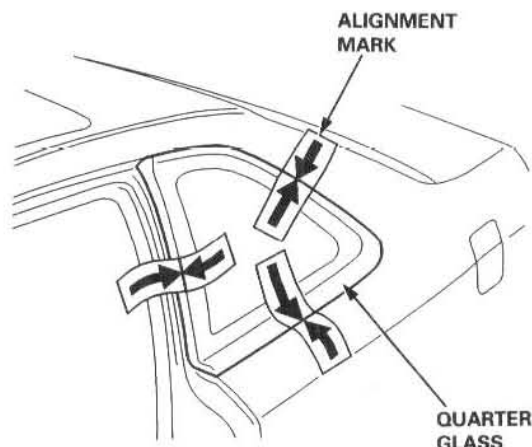
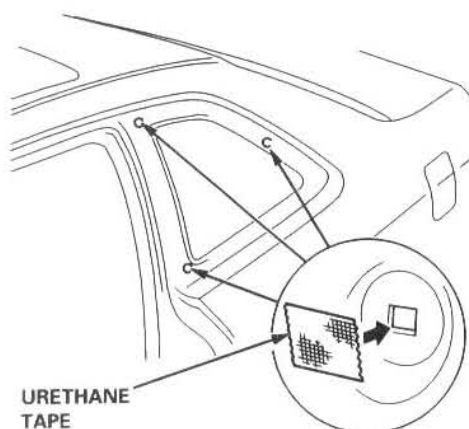
- Be careful not to touch the quarter glass where adhesive will be applied.
- Do not peel the separator off the butyl tape.

 : Butyl tape locations (8628, or equivalent)
 Thickness: 3.2 mm (0.13 in)
 Width: 6.4 mm (0.25 in)



5. If the old quarter glass is to be reinstalled (and either of the clips are broken off the molding), seal the body holes with pieces of urethane tape. Set the quarter glass upright in the opening, make alignment marks across the quarter glass and body with a grease pencil at the three points shown, then remove the quarter glass.

NOTE: Be careful not to touch the quarter glass where adhesive will be applied.

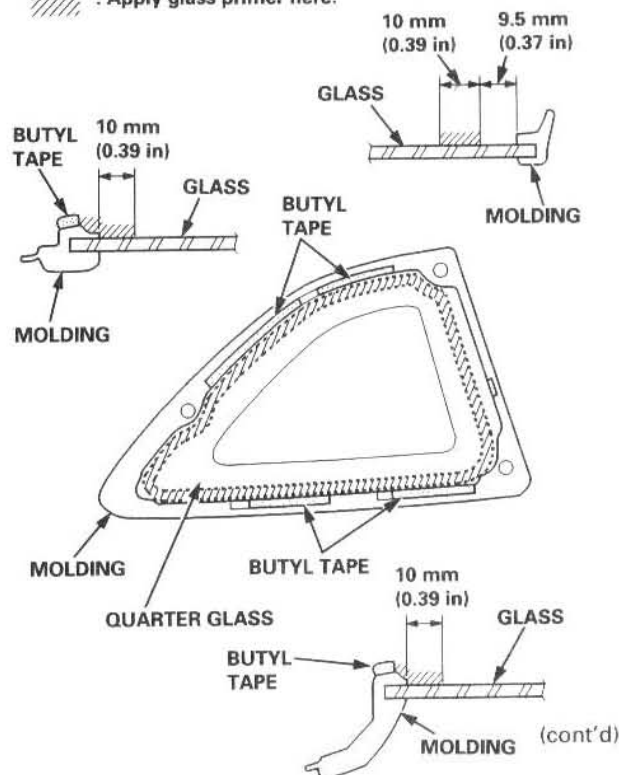


6. With a sponge, apply a light coat of glass primer to the inside face of the quarter glass as shown, then lightly wipe it off with gauze or cheesecloth.

NOTE:

- Do not apply body primer to the quarter glass, and do not get body and glass primer sponges mixed up.
- Never touch the primed surfaces with your hands. If you do, the adhesive may not bond to the quarter glass properly, causing a leak after the quarter glass is installed.
- Keep water, dust, and abrasive materials away from the primed surface.

 : Apply glass primer here.




Quarter Glass

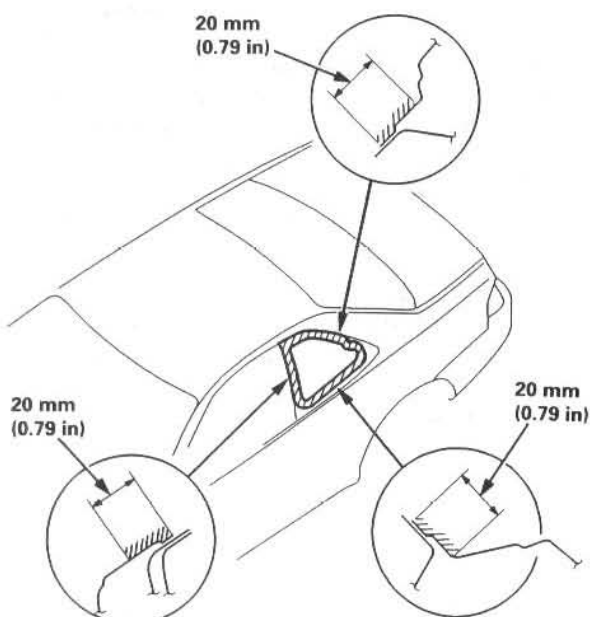
Installation (cont'd)

7. With a sponge, apply a light coat of body primer to the original adhesive remaining around the quarter glass opening flange. Let the body primer dry for at least 10 minutes.

NOTE:

- Do not apply glass primer to the body, and be careful not to mix up glass and body primer sponges.
- Never touch the primed surfaces with your hands.

 : Apply body primer here.



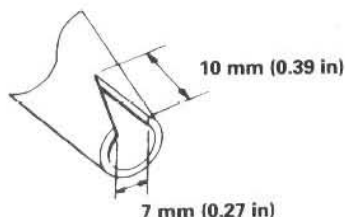
8. Thoroughly mix the adhesive and hardener together on a glass or metal plate with a putty knife.

NOTE:

- Clean the plate with a sponge and alcohol before mixing.
- Follow the instructions that come with the adhesive.

9. Before filling a cartridge, cut the end of the nozzle as shown.

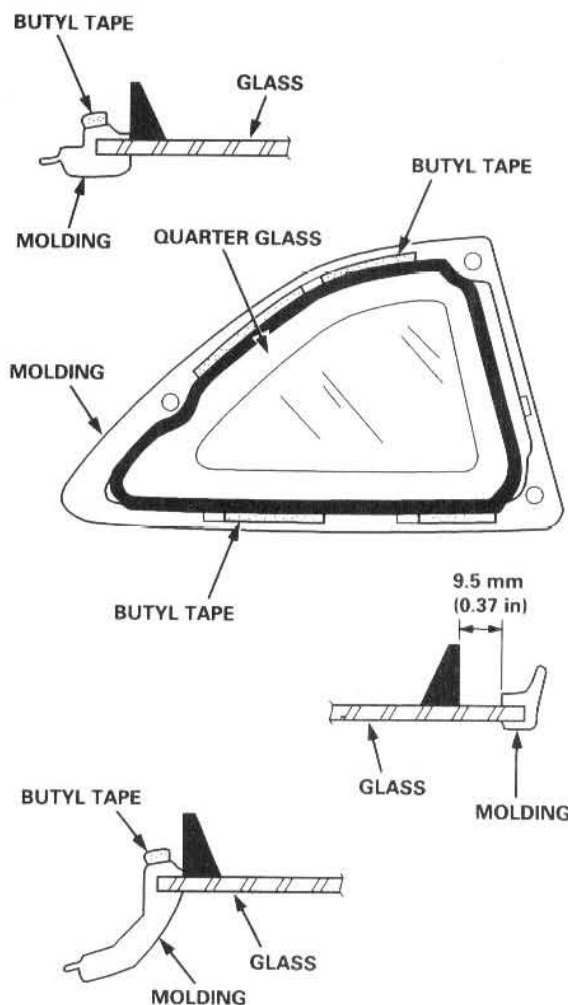
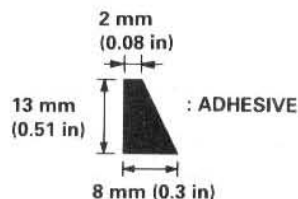
Cut nozzle end as shown.



10. Pack adhesive into the cartridge without air pockets to ensure continuous delivery. Put the cartridge in a caulking gun, and run a bead of adhesive around the edge of the quarter glass as shown.

NOTE:

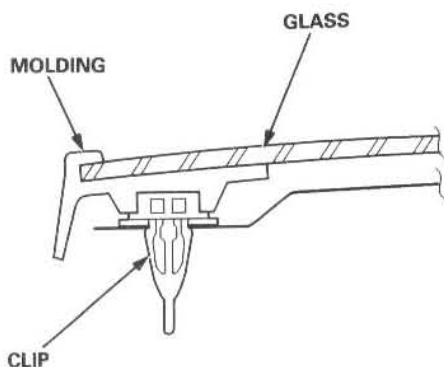
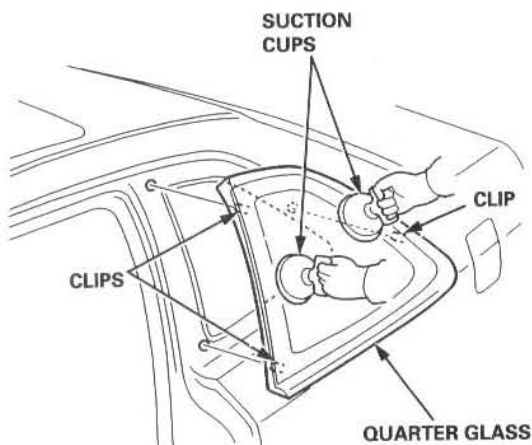
- If the old quarter glass is to be reinstalled, peel the separator off the butyl tape after applying the adhesive.
- Apply the adhesive within 30 minutes after applying the glass primer.





11. Use suction cups to hold the quarter glass over the opening, align the clips or the alignment marks you made in step 5, and set it down on the adhesive. Lightly push on the quarter glass until its edges are fully seated on the adhesive all the way around.

NOTE: Do not open or close the doors until the adhesive is dry.



12. Scrape or wipe the excess adhesive off with a putty knife or towel.

NOTE: Use a soft shop towel dampened with alcohol to remove adhesive from a painted surface or the quarter glass.

13. Let the adhesive dry for at least one hour, then spray water over the quarter glass and check for leaks. Mark leaking areas, and let the quarter glass dry, then seal with sealant.

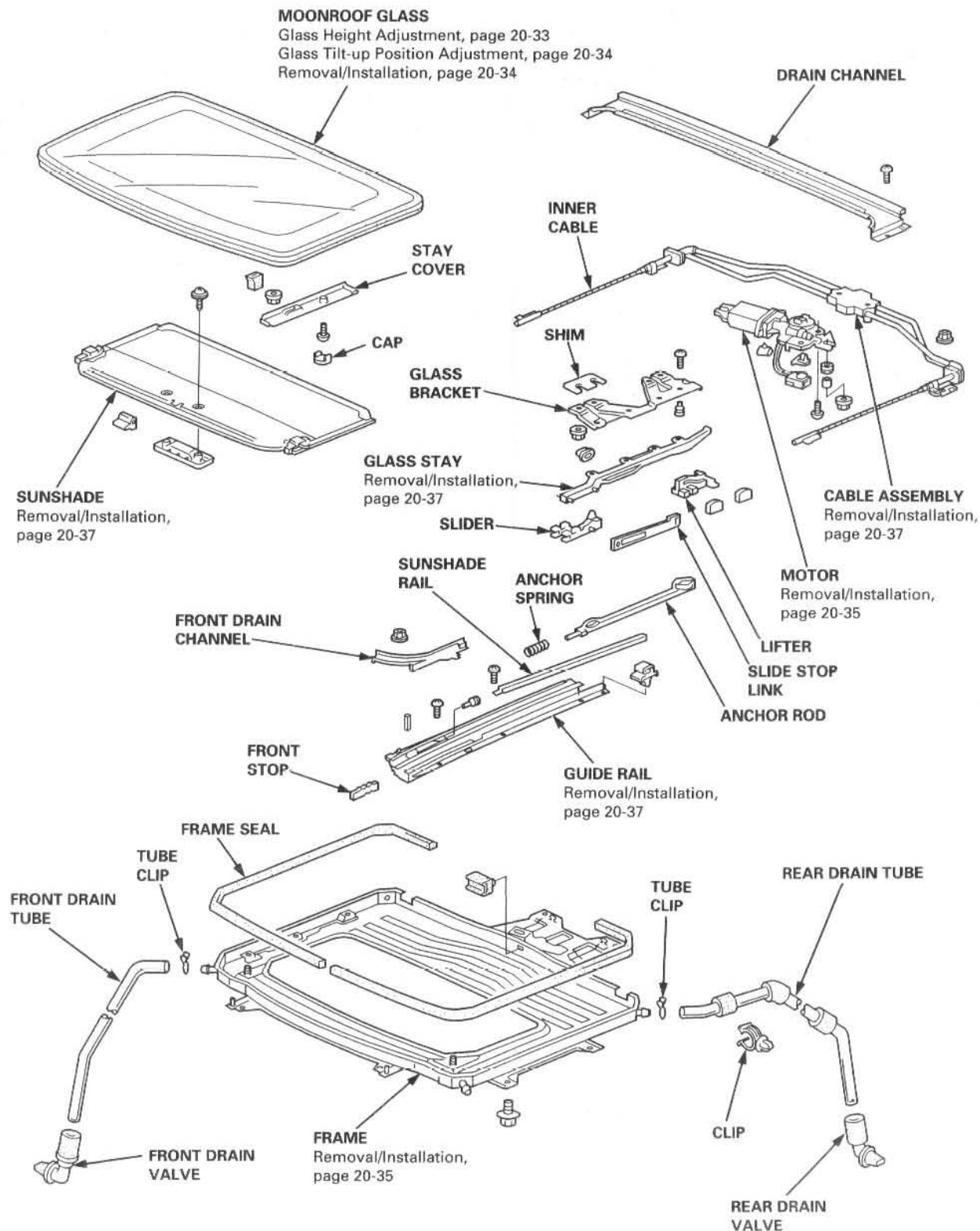
NOTE: Let the adhesive dry for at least four hours after quarter glass installation. If the vehicle has to be used within the first four hours, it must be driven slowly.

14. Reinstall all remaining removed parts.

NOTE: Advise the customer not to do the following things for two to three days:

- Slam the doors with all the windows rolled up.
- Twist the body excessively (such as when going in and out of driveways at an angle or driving over rough, uneven roads).

Index



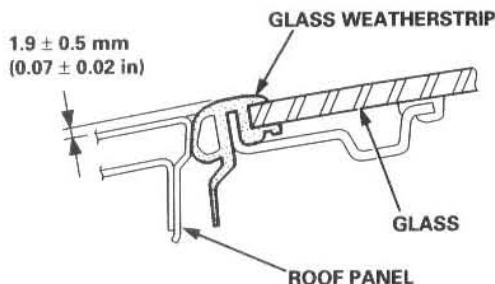


Moonroof Troubleshooting

Symptom	Probable Cause
Water leaks	<ol style="list-style-type: none"> 1. Clogged drain tube. 2. Gap between glass weatherstrip and roof panel. 3. Defective or improperly installed glass weatherstrip. 4. Gap between drain seal and roof panel.
Wind noise	<ol style="list-style-type: none"> 1. Excessive clearance between glass weatherstrip and roof panel.
Motor noise	<ol style="list-style-type: none"> 1. Loose motor. 2. Worn gear or bearing. 3. Cable assembly deformed.
Glass does not move, but motor turns	<ol style="list-style-type: none"> 1. Defective gear or inner cable. 2. Foreign matter stuck between guide rail and slider. 3. Inner cable loose. 4. Cable assembly not attached properly.
Glass does not move and motor does not turn (glass can be moved with moonroof wrench)	<ol style="list-style-type: none"> 1. Blown fuse. 2. Faulty switch. 3. Battery run down. 4. Defective motor. 5. Faulty relay.

Glass Height Adjustment

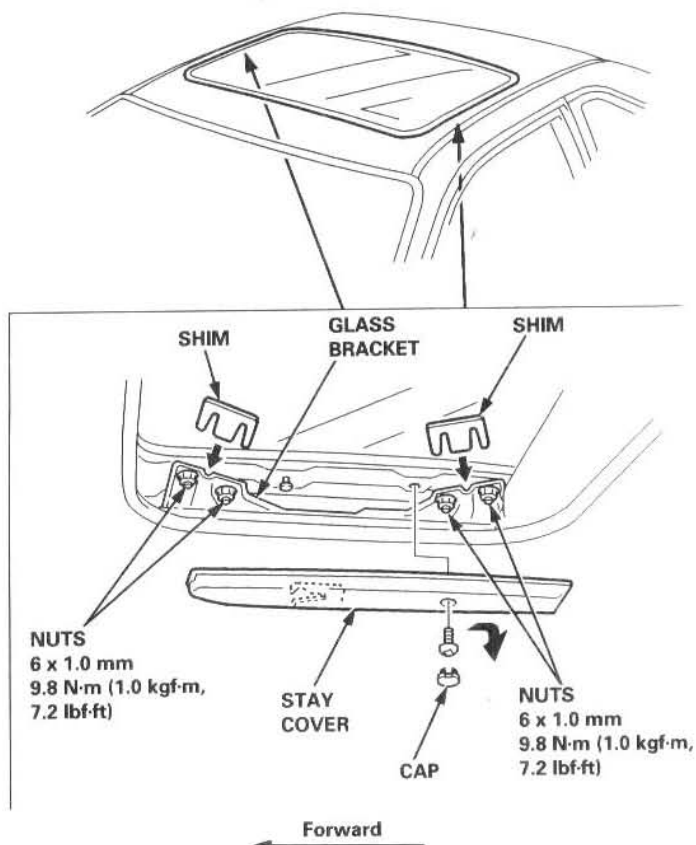
The roof panel should be even with the glass weatherstrip, to within 1.9 ± 0.5 mm (0.07 ± 0.02 in) all the way around. If not, open the glass fully, and:



1. Remove the stay cover.
2. Loosen the nuts, and install the shims between the glass frame and glass bracket as shown.

Shim thickness: Max. 2 mm (0.08 in)

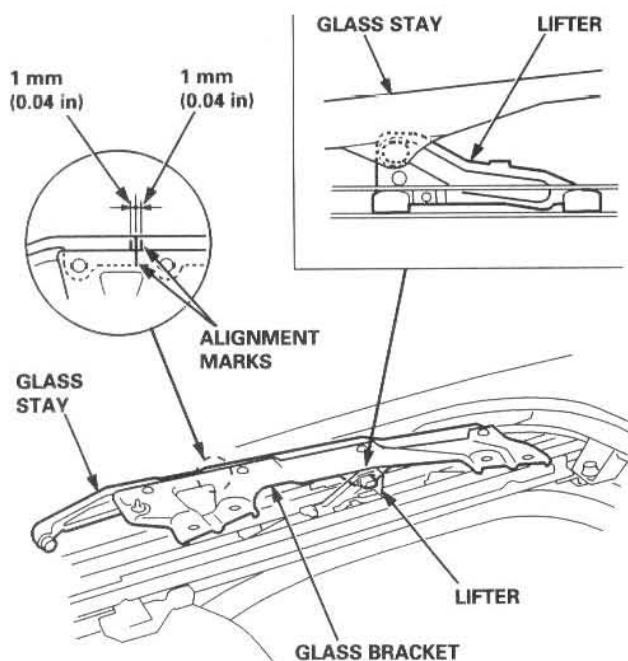
3. Repeat on opposite side if necessary.



Glass Tilt-up Position Adjustment

Open the glass about one half of its travel distance, then close it and check where the rear edge begins to rise. If the rear edge rises too soon, or too late, adjust it. If the glass seats too tight, or too loose against the roof panel, adjust it.

1. Remove the headliner (see page 20-43).
2. Remove the glass.
3. Remove the motor (see page 20-35).
4. Align the tilt-up position of the lifter on each side.



5. Align the glass bracket to the same position on each side with the alignment marks.
6. Check the lifters are parallel with each other, then reinstall the motor.
7. Reinstall the glass, and check for water leaks.

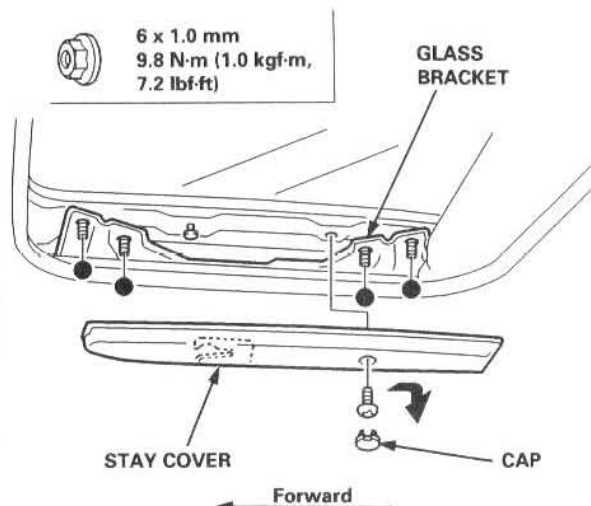
NOTE: Do not use high-pressure water.

8. Reinstall the headliner.

Glass Removal/Installation

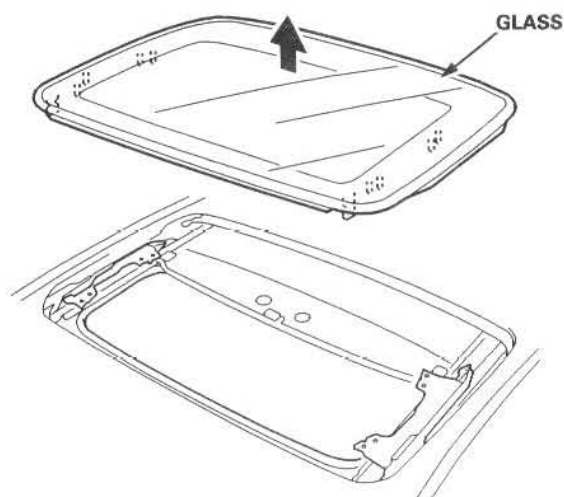
1. Close the glass fully.
2. Slide the sunshade all the way back.
3. Remove both stay covers, then remove the nuts from both glass brackets.

●: Nut locations, 8



4. Remove the glass by lifting it up and pulling it forward as shown.

NOTE: Do not damage the roof panel.



5. Installation is the reverse of the removal procedure.

NOTE: Adjust the glass height alignment (see page 20-33).

6. Check for water leaks.

NOTE: Do not use high-pressure water.



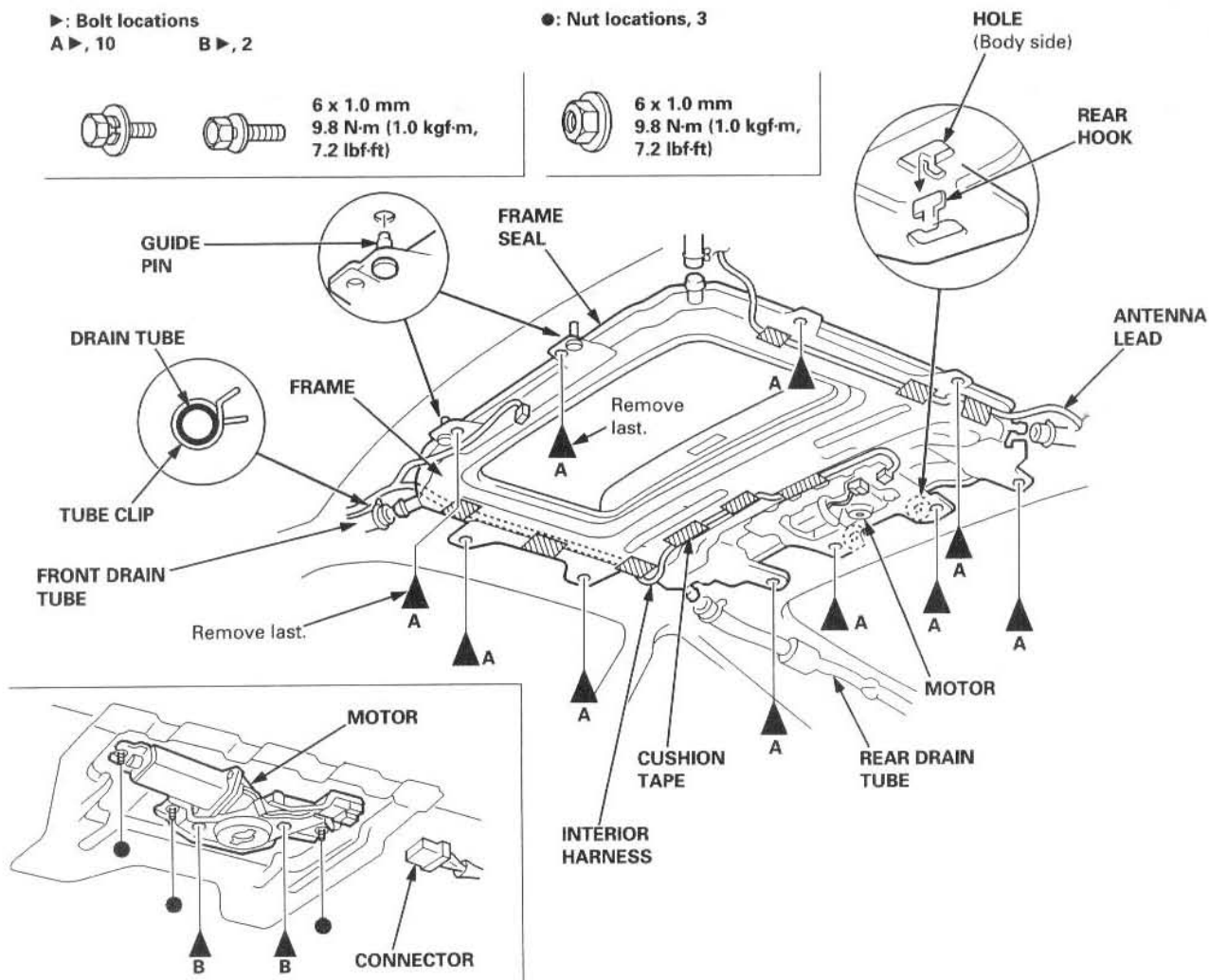
Motor, Drain Tube and Frame Removal/Installation

CAUTION:

- Wear gloves to remove and install the frame.
- Be careful not to damage the seats, the dashboard or any other interior trim panels.

1. Remove the headliner (see page 20-43).
2. Disconnect the motor connector, then remove the bolts and nuts, and remove the motor.
3. Remove the moonroof glass (see page 20-34).
4. Disconnect the drain tubes. Remove the interior harness, and remove the antenna lead from the frame.
5. With an assistant holding the moonroof frame, remove the bolts. Detach the rear hooks by moving the frame forward, and remove the frame.

NOTE: Remove the front bolts last.



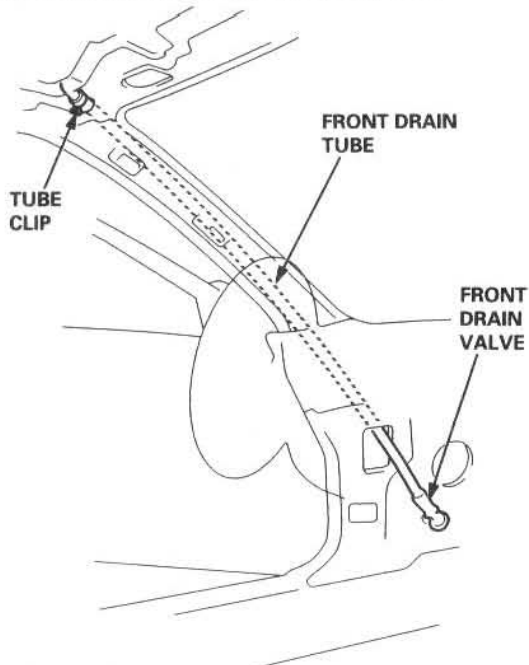
(cont'd)

Motor, Drain Tube and Frame Removal/Installation (cont'd)

6. Remove the drain tubes from the front and rear pillars.

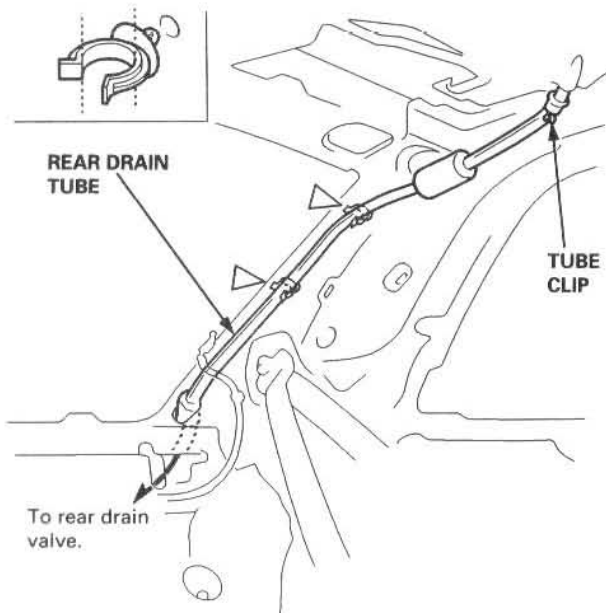
Front drain tube:

NOTE: Before removing out the drain tube, tie a string to the end of it so it can be reinstalled.

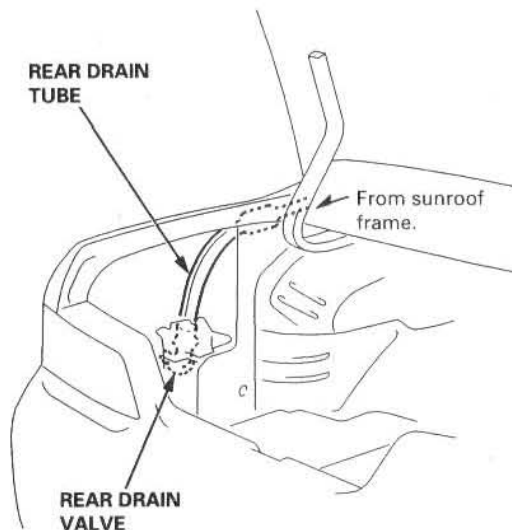


Rear drain tube:

▷: Clip locations, 2



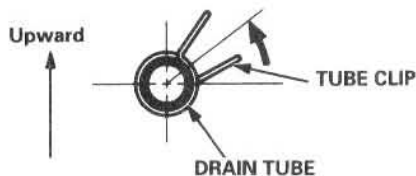
NOTE: Remove the left trunk side trim (see page 20-42).



7. Installation is the reverse of the removal procedure.

NOTE:

- Before installing the frame, clear the drain tubes and drain valves using compressed air.
- Check the frame seal.
- Clean the surface of the frame.
- When installing the frame, first attach the rear hooks into the body holes.
- When connecting the drain tube, slide it over the frame nozzle at least 10 mm (0.39 in).
- Install the tube clip as shown.



8. Check for water leaks.

NOTE: Do not use high-pressure water.



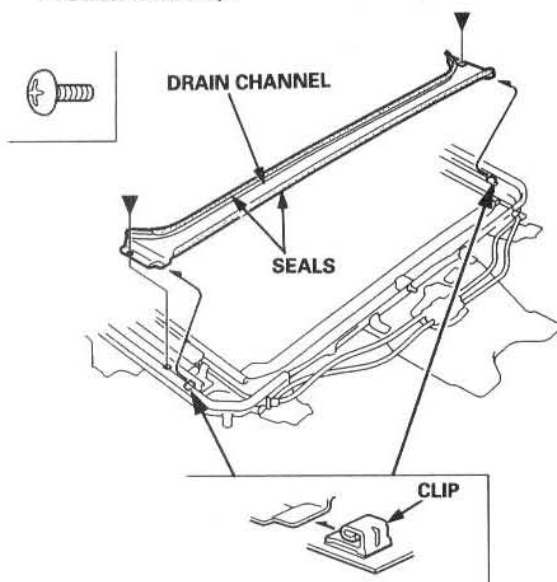
Glass Stay, Slider, Lifter, Guide Rails, Cable Assembly, and Sunshade Removal/Installation

CAUTION: Wear gloves to remove and install the glass stay, slider, lifter, guide rails, cable assembly, and sunshade.

1. Remove the frame (see page 20-35).
2. Remove the motor (see page 20-35).
3. Remove the drain channel.

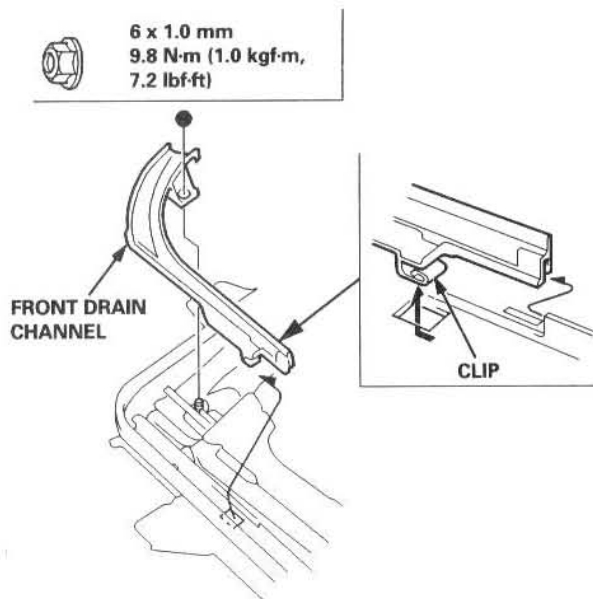
NOTE: Take care not to twist or lift up on the seals.

►: Screw locations, 2



4. Remove the front drain channel on each side.

●: Nut locations, 2



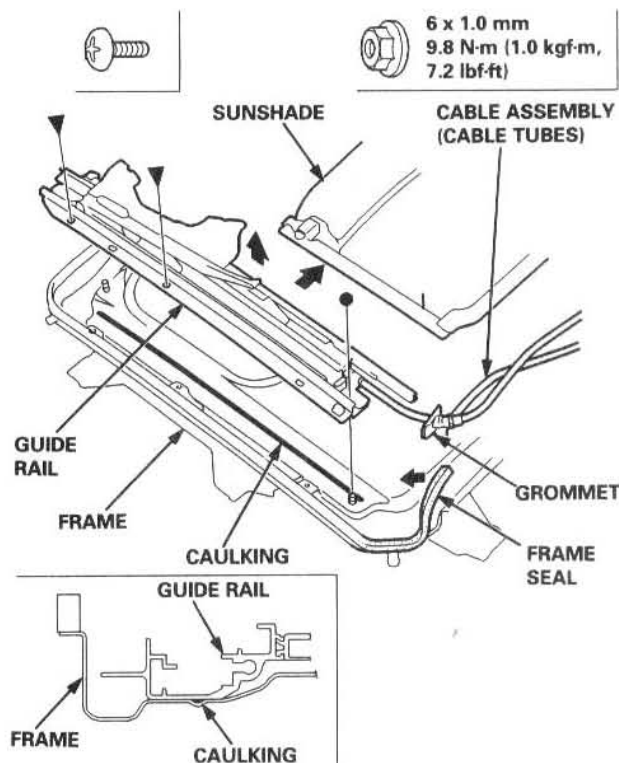
5. Remove the two screws and one nut securing each guide rail, then lift and remove both guide rails with the cable assembly. Remove the sunshade.

NOTE:

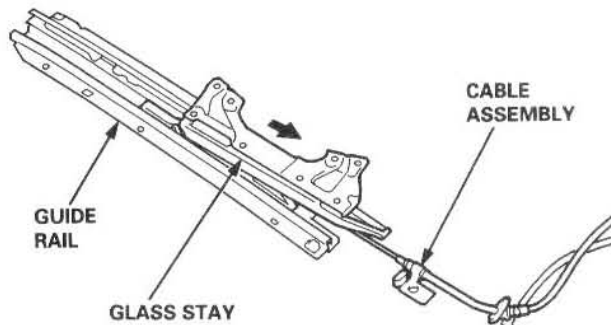
- When removing the grommet from the frame, take care not to cut or tear the frame seal.
- Take care not to bend the cable tubes.

►: Screw locations, 4

●: Nut locations, 2



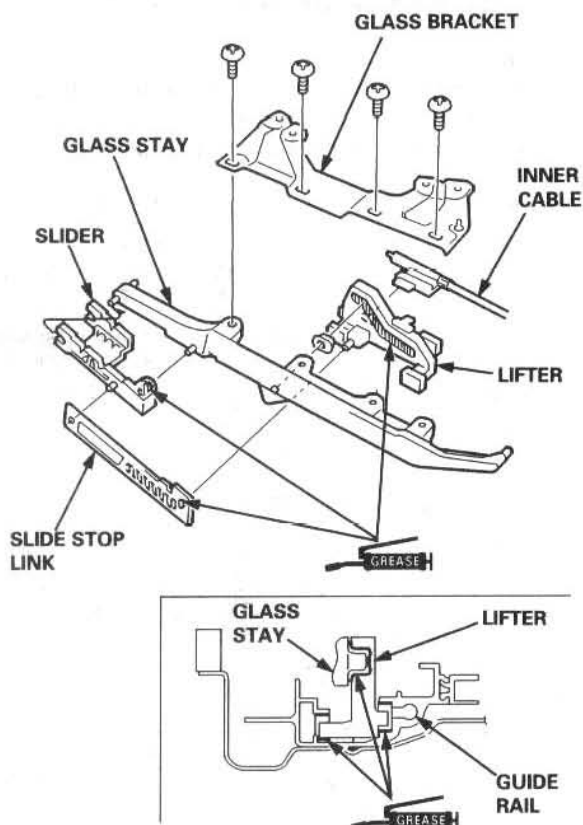
6. Slide the glass stay back, and remove it from the guide rail.



(cont'd)

Glass Stay, Slider, Lifter, Guide Rails, Cable Assembly, and Sunshade Removal/Installation (cont'd)

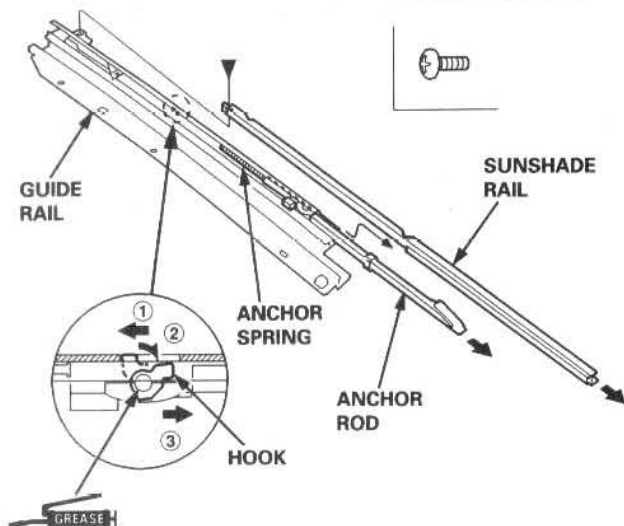
7. Separate the glass stay, slider, lifter and slide stop link.



8. Remove the anchor rod, anchor spring and sunshade rail from the guide rail.

NOTE: When removing the anchor rod, turn the hook of the anchor rod with a flat tip screwdriver.

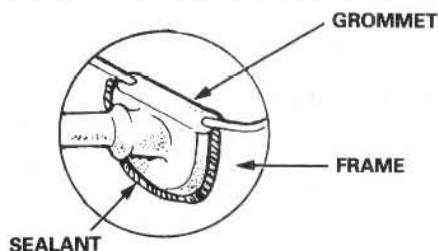
►: Screw location, 1



9. Installation is the reverse of the removal procedure.

NOTE:

- Damaged parts should be replaced.
- Apply multipurpose grease to each location indicated by the arrows throughout each step.
- Apply caulking to the guide rail mounting surface of the frame shown in step 5.
- Fill the groove in each grommet with sealant.



- Glue the frame seal securely.
- Before reinstalling the motor, make sure both sliders are parallel.
- Before reinstalling the motor, install the frame and glass, then check the opening drag (see page 20-39).

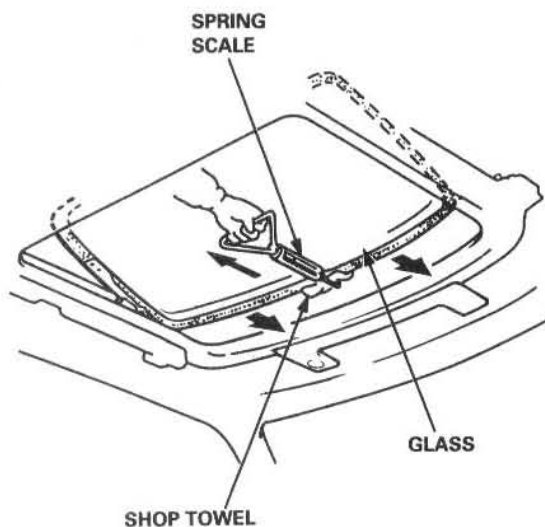


Closing Force and Opening Drag Check

1. Remove the headliner (see page 20-43).
2. Closing force check: Have an assistant hold the switch to close the glass while you measure force required to stop it. Attach a spring scale as shown. Read the force as soon as the glass stops moving, then immediately release the switch and spring scale.

CAUTION: When using a spring scale, protect the leading edge of the glass with a shop towel.

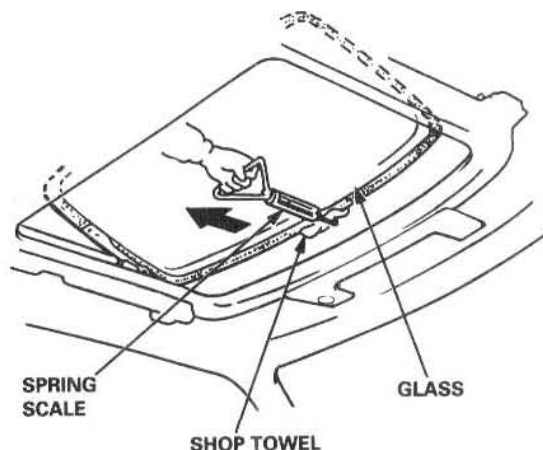
Closing Force: 200 – 290 N
(20 – 30 kgf, 44 – 66 lbf)



3. If the force is not within specification, remove the moonroof motor (see page 20-35), then check the following:
 - The gear portion and the inner cable for breakage and damage. If the gear portion is broken, replace the motor. If the inner cable is damaged, remove the frame (see page 20-35), and replace the cable assembly (see page 20-37).
 - The moonroof motor (see section 23). If the motor fails to run or doesn't turn smoothly, replace it.
 - The opening drag.

4. Opening drag check: Measure the effort required to open the glass using a spring scale as shown.

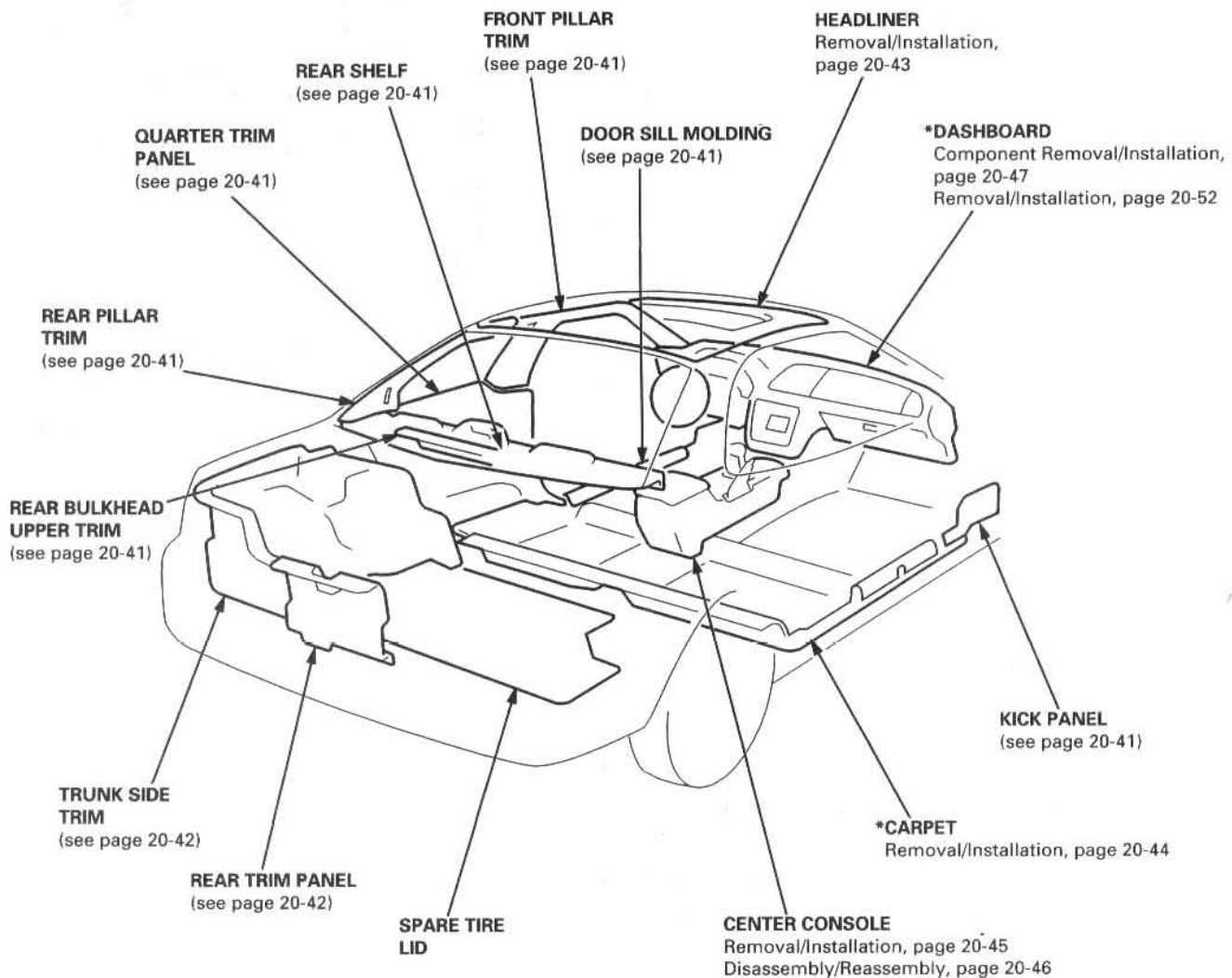
CAUTION: When using a spring scale, protect the leading edge of the glass with a shop towel.



5. If the load is over 40 N (4 kgf, 9 lbf), check:
 - The side clearance and glass height adjustment (see page 20-33).
 - For broken or damaged sliding parts (see page 20-37). If any sliding parts are damaged, replace them.

Component Location Index

SRS components are located in the parts areas marked with an asterisk (*). Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.



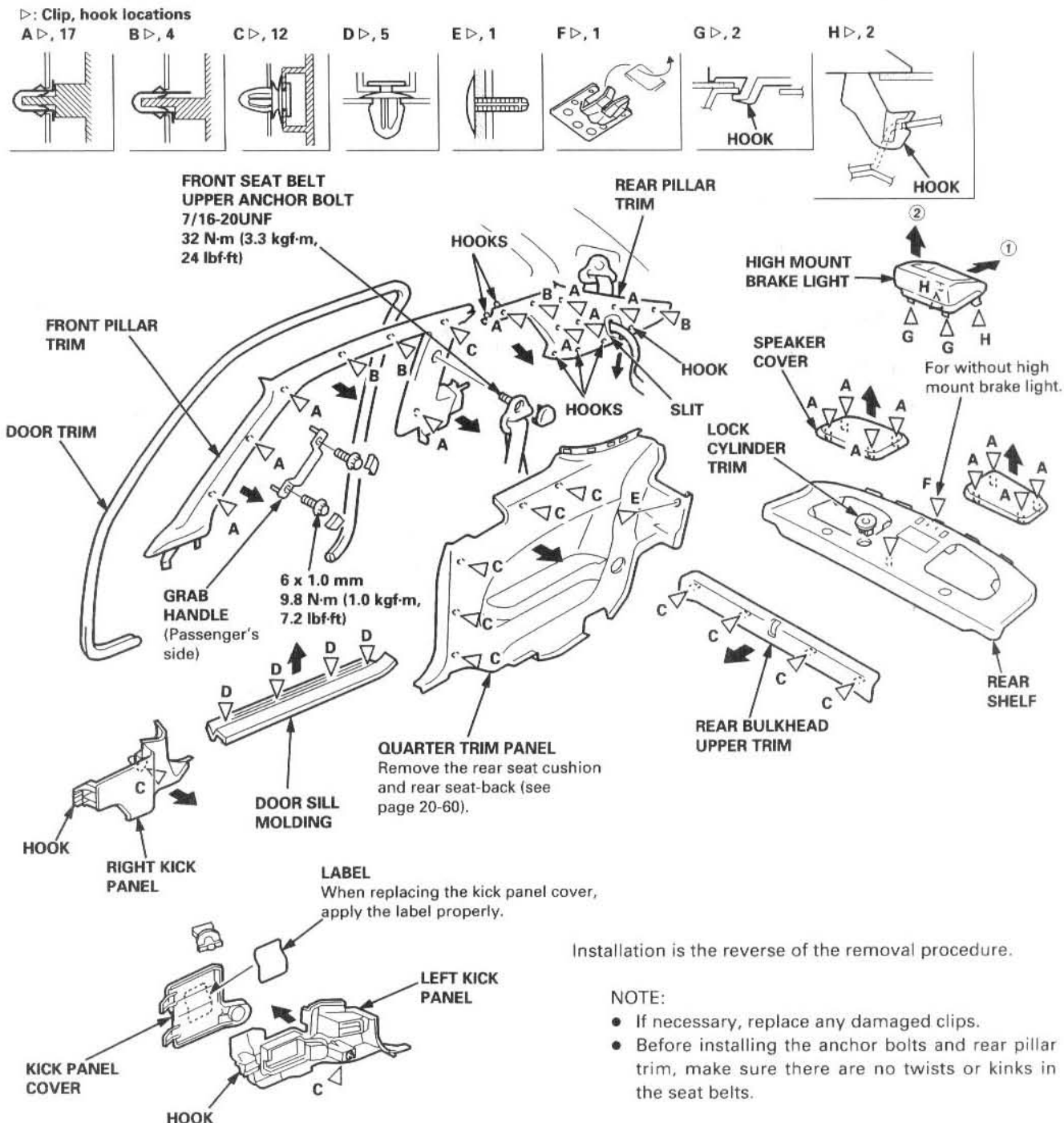


Interior Trim Removal/Installation

CAUTION:

- Wear gloves to remove and install the trim and panels.
- When prying with a flat tip screwdriver, wrap it with protective tape to prevent damage.

NOTE: Take care not to bend or scratch the trim and panels.

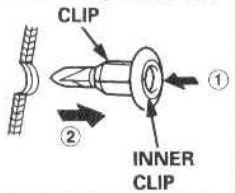


Trunk Trim Removal/Installation

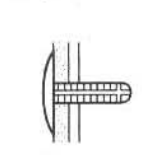
▷: Clip locations

A ▷, 5

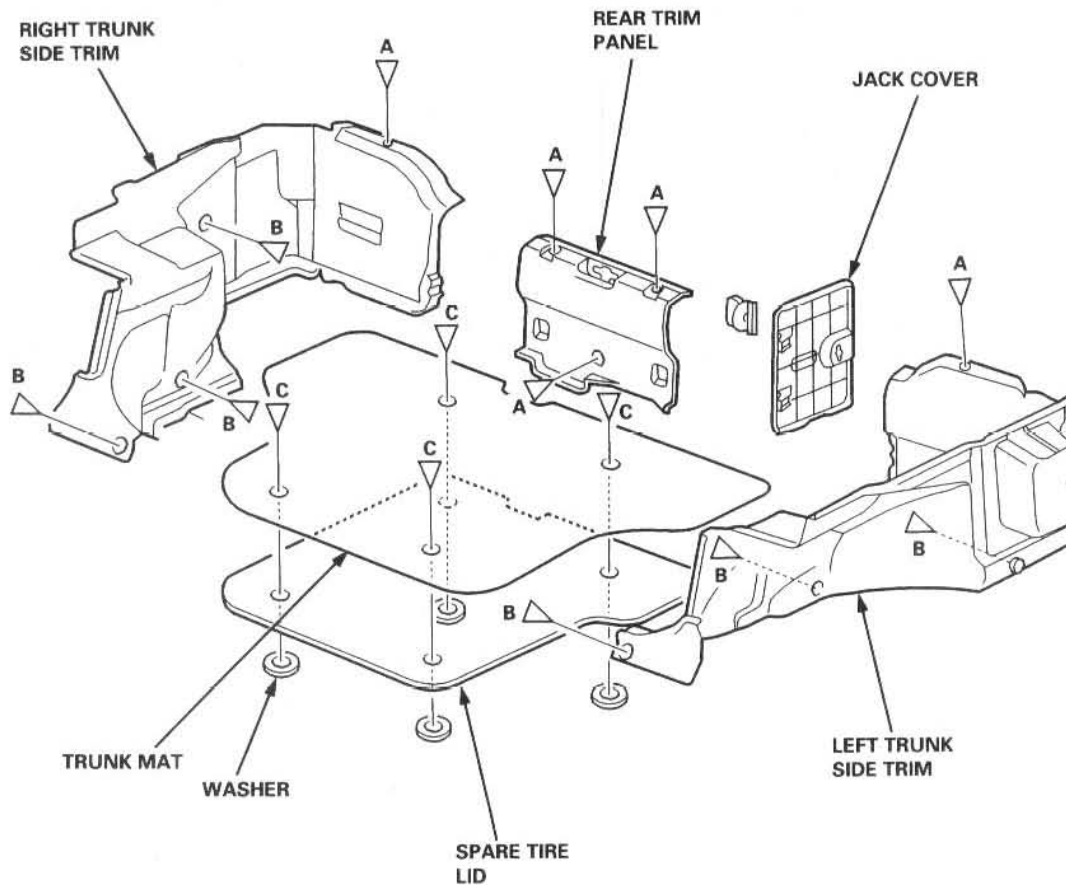
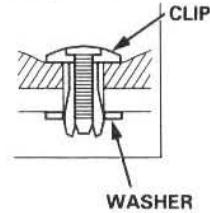
NOTE: Do not push the inner clip in too far.



B ▷, 6



C ▷, 4



Installation is the reverse of the removal procedure.

NOTE:

- If necessary, replace any damaged clips.
- To install the A clips, pull the inner clip up, install the clip, then push the inner clip until it's flush.



Headliner Removal/Installation

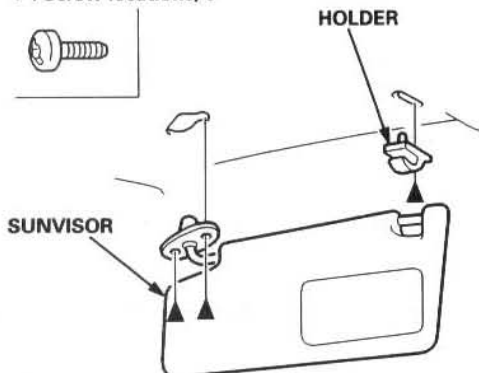
CAUTION: When prying with a flat tip screwdriver, wrap it with protective tape to prevent damage.

NOTE:

- Take care not to bend and scratch the headliner.
- Be careful not to damage the dashboard or other interior trim panels.

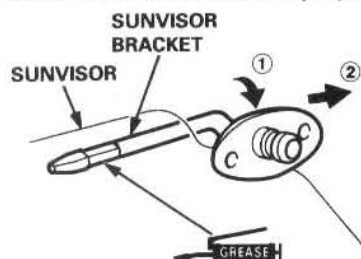
1. Remove the sunvisor and holder from each side.

►: Screw locations, 6



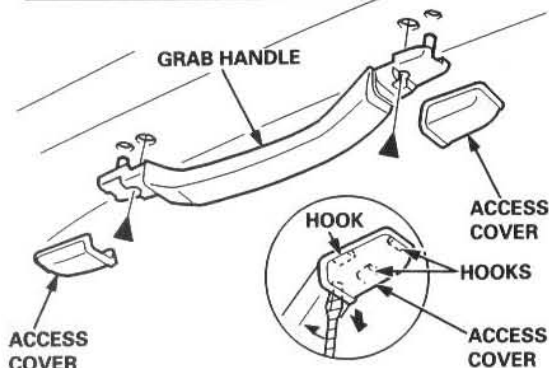
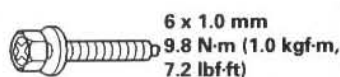
NOTE:

- If necessary, remove the sunvisor bracket as shown.
- When installing the sunvisor bracket, apply grease and make sure it's installed properly.



2. Remove the passenger's side grab handle.

►: Bolt locations, 2

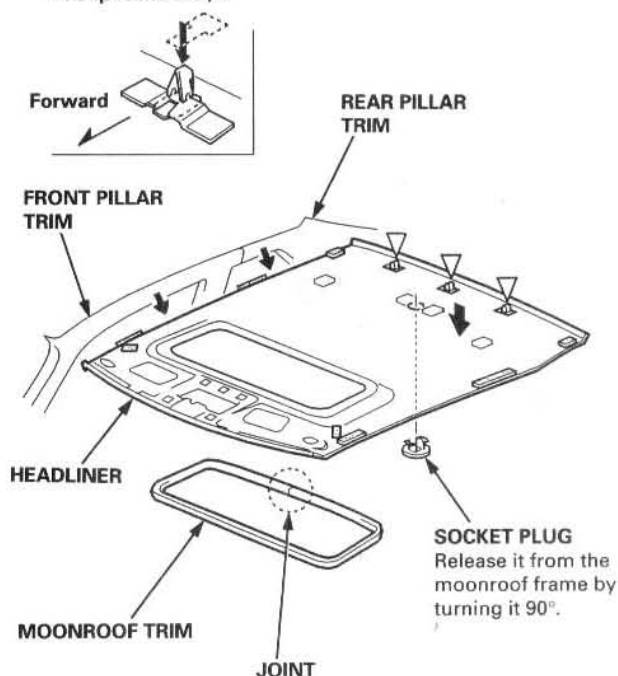


3. Remove:

- Front ceiling light and trim (see page 20-15)
- Rearview mirror (see page 20-16)
- Front pillar trim (one side, see page 20-41)
- Door trim (one side, see page 20-41)
- Rear pillar trim (one side, see page 20-41)

4. Remove the moonroof trim and the socket plug, detach the clips, and remove the headliner.

►: Clip locations, 3



5. Remove the headliner through the passenger's door opening.

6. Installation is the reverse of the removal procedure.

NOTE:

- When inserting the headliner through the door opening, be careful not to fold or bend it. Also, be careful not to scratch the body.
- Check that both sides of the headliner are securely attached to the trim.
- When installing the moonroof trim, install the joint toward the rear.

Carpet Removal/Installation

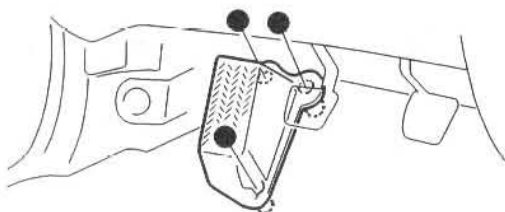
SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

1. Remove:

- Front seat (see page 20-54)
- Rear seat cushion (see page 20-60)
- Door sill molding (see page 20-41)
- Kick panel (see page 20-41)
- Center console (see page 20-45)
- Opener cover (see page 20-79)

2. Remove the footrest.

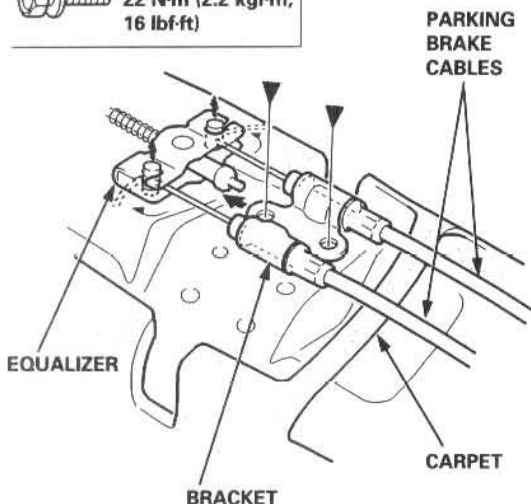
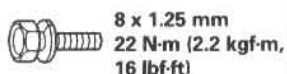
●: Nut locations, 3



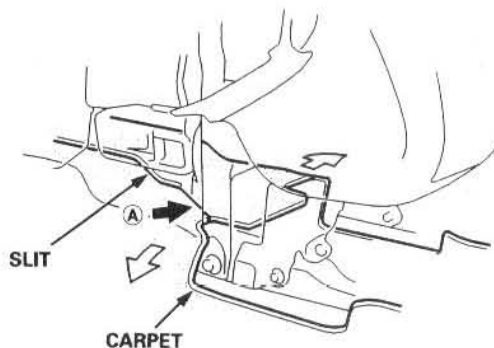
3. Disconnect the parking brake cables.

NOTE: Take care not to bend the parking brake cables.

►: Bolt locations, 2



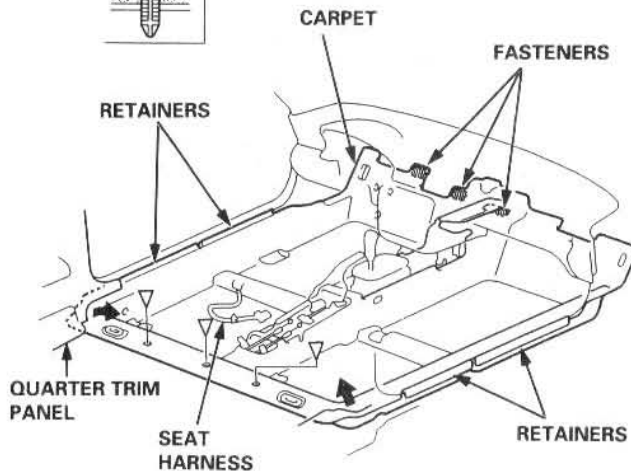
4. Cut areas (A) in the carpet at the driver's side, then pull it back as shown.



5. Detach the retainers and clips, then remove the carpet.

NOTE: Take care not to damage, wrinkle or twist the carpet.

▷: Clip locations, 3



6. Installation is the reverse of the removal procedure.

NOTE:

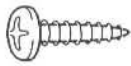
- Take care not to damage, wrinkle or twist the carpet.
- Make sure the seat harness is routed correctly.
- Make sure the parking brake cables are connected properly.
- If necessary, replace any damaged clips.
- Slip the carpet under the quarter trim panel on each side properly.
- Reattach the cut area (A) in the carpet with a wire tie.



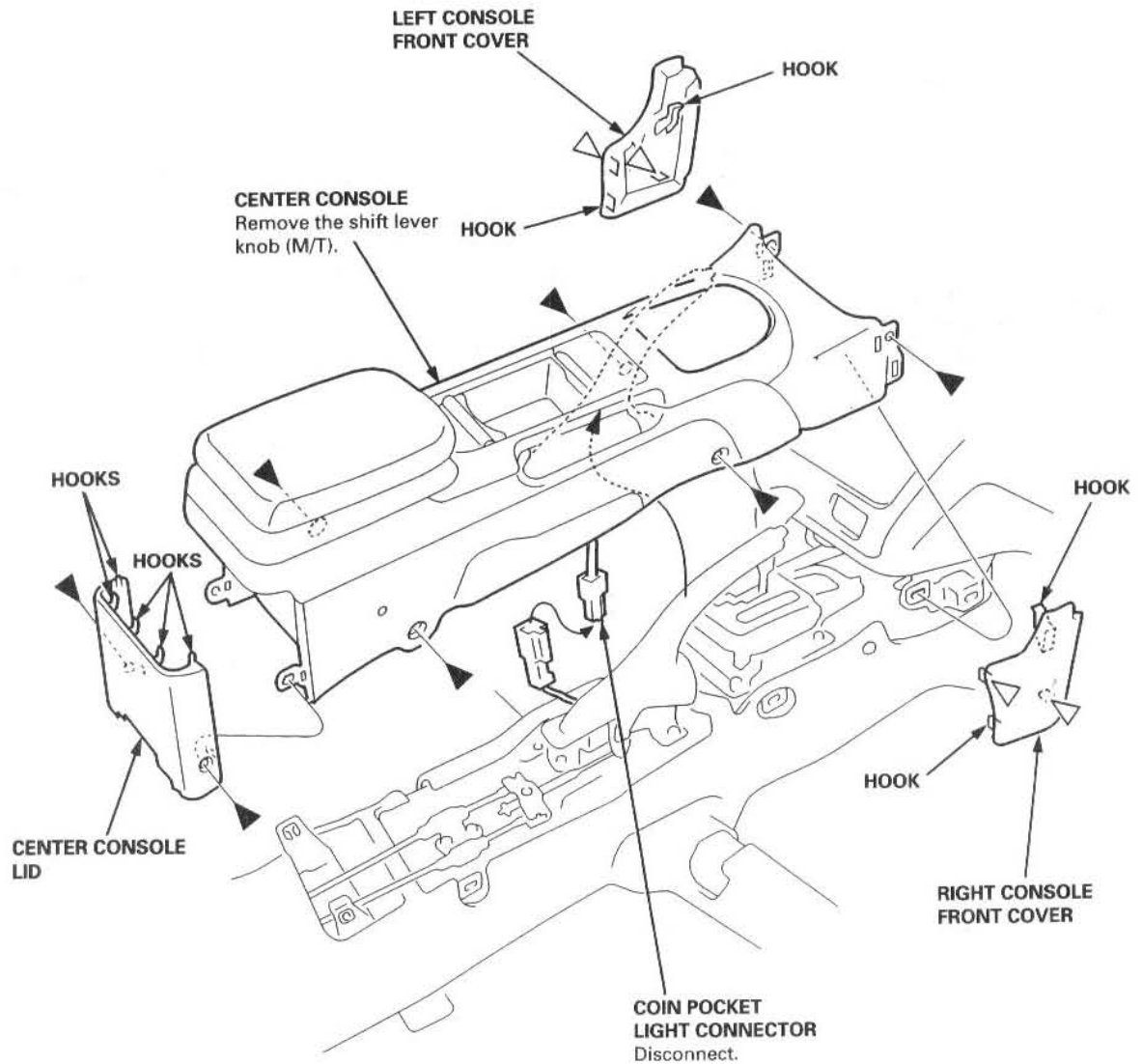
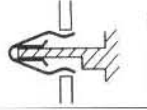
Center Console Removal/Installation

NOTE: Take care not to scratch the center console, front seat and related parts.

►: Screw locations, 8



▷: Clip locations, 4



Installation is the reverse of the removal procedure.

NOTE:

- If necessary, replace any damaged clips.
- Make sure the wire harnesses are not pinched.

Center Console Disassembly/Reassembly

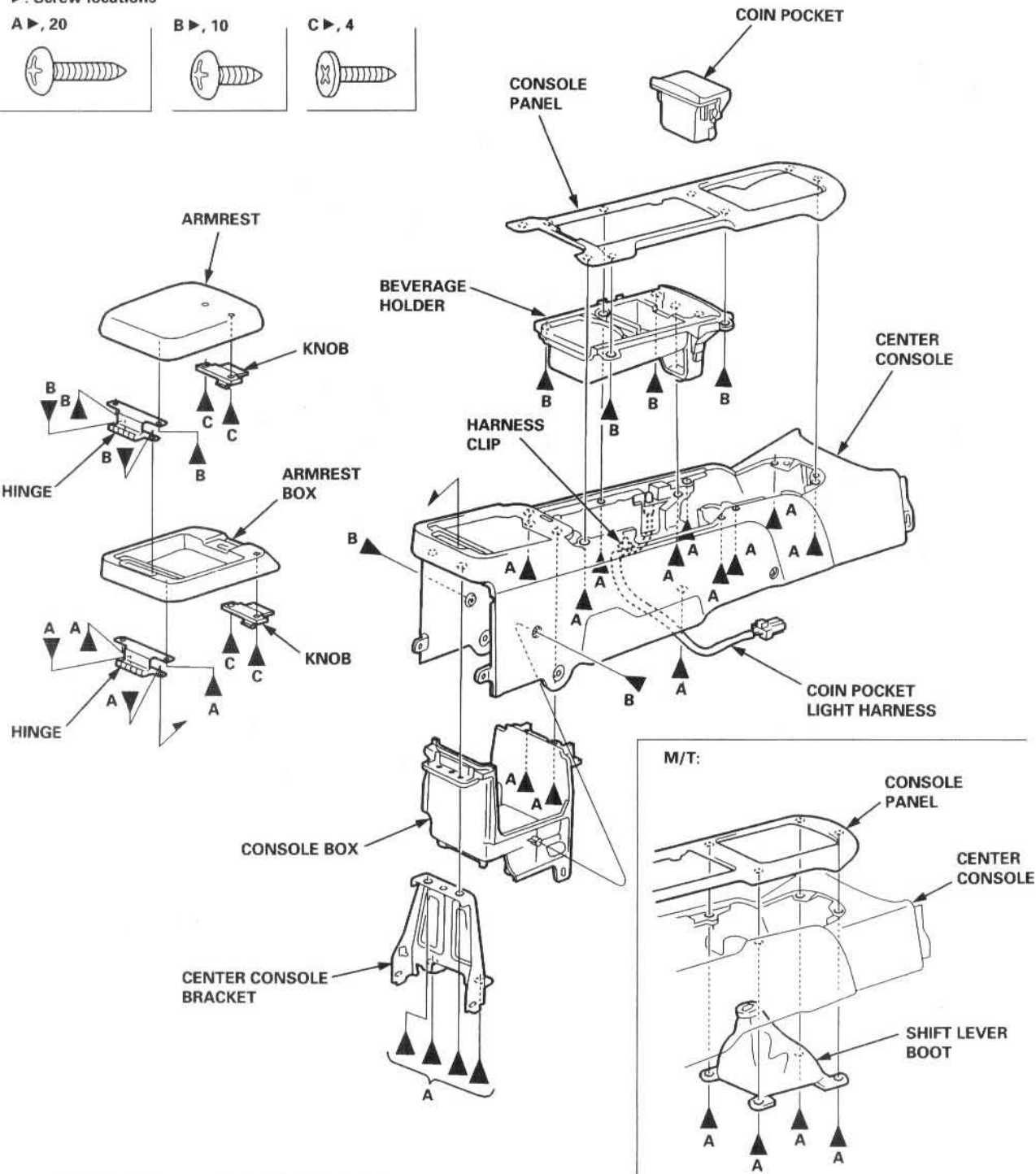
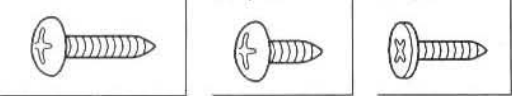
NOTE: Take care not to scratch the component parts.

►: Screw locations

A ►, 20

B ►, 10

C ►, 4



Reassemble in the reverse order of disassembly.



Dashboard Component Removal/Installation

CAUTION:

- Wear gloves to remove and install the dashboard component parts.
- When prying with a flat tip screwdriver, wrap it with protective tape, and apply protective tape around the related parts, to prevent damage.

NOTE: Take care not to scratch the dashboard and related parts.

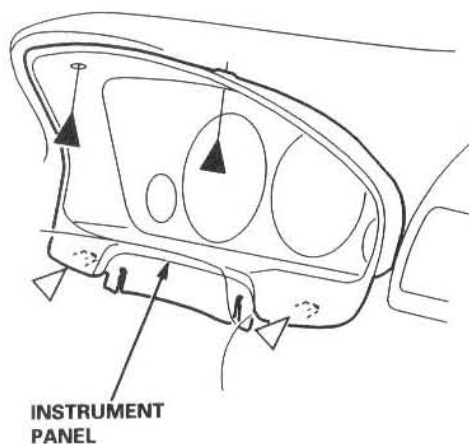
Instrument panel:

1. Tilt the steering column down.
2. Remove the screws, and detach the clips, then carefully remove the instrument panel.

▷: Screw locations, 2



▷: Clip locations, 2



3. Installation is the reverse of the removal procedure.

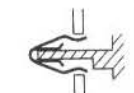
Dashboard lower cover:

1. Remove the screw, and detach the clips, then remove the dashboard lower cover.

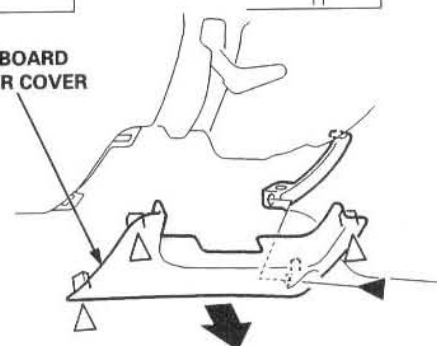
▷: Screw location, 1



▷: Clip locations, 3



DASHBOARD LOWER COVER

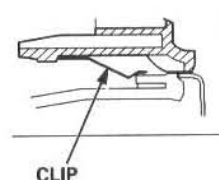


2. Installation is the reverse of the removal procedure.

Switch trim:

1. Carefully detach the clips, and pull out the switch trim. Disconnect the switch connectors, and remove the switch trim.

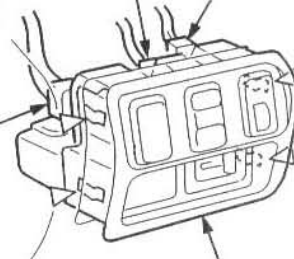
▷: Clip locations, 4



MOONROOF SWITCH CONNECTOR

PANEL BRIGHTNESS CONTROLLER CONNECTOR

CRUISE CONTROL MASTER SWITCH CONNECTOR



SWITCH TRIM

2. Installation is the reverse of the removal procedure.

NOTE: Make sure the connectors are connected properly.

(cont'd)

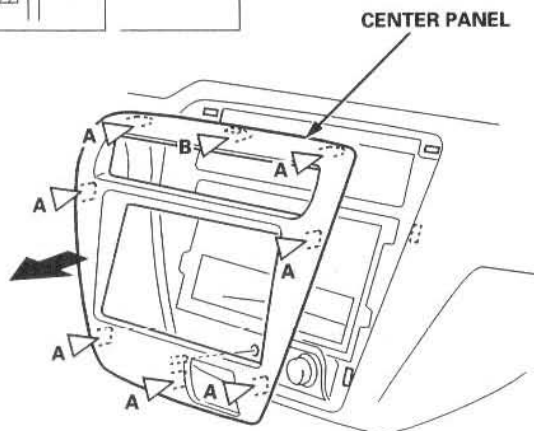
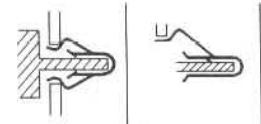
Dashboard Component Removal/Installation (cont'd)

Center panel, audio unit and heater control unit:

1. Detach the clips, and remove the center panel.

▷: Clip locations

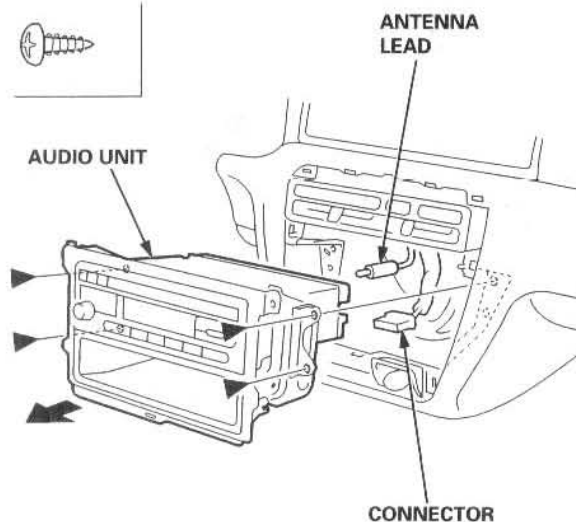
A ▷, 7 B ▷, 1



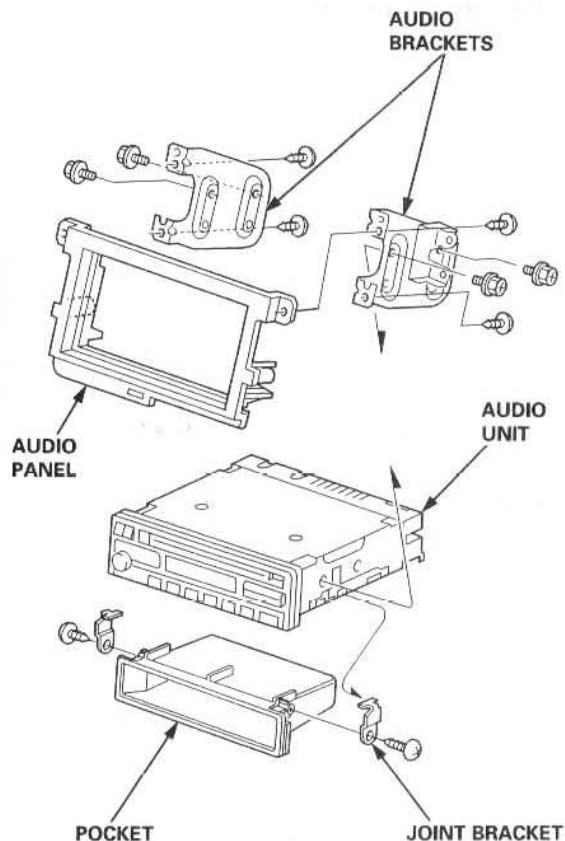
2. Remove the screws, and pull out the audio unit. Disconnect the connector and antenna lead, and remove the audio unit.

NOTE: Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.

▷: Screw locations, 4



3. If necessary, separate the audio unit, pocket and audio panel.

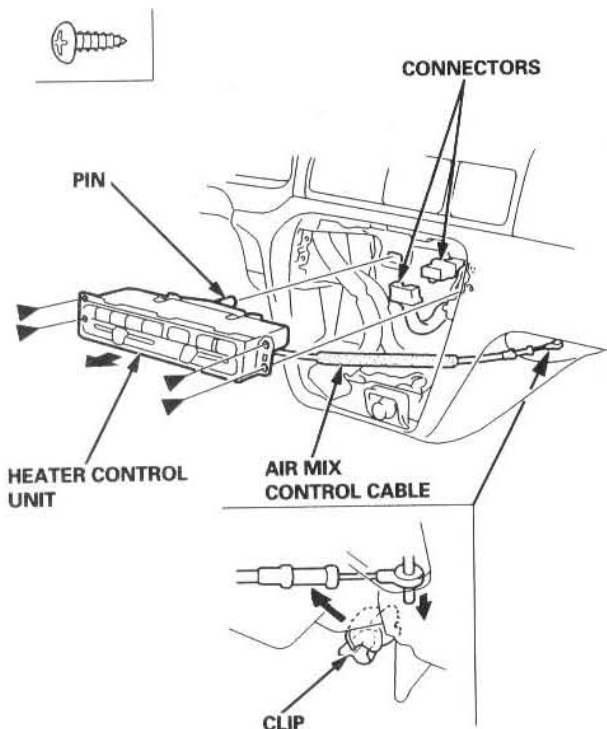




4. Disconnect the air mix control cable, and remove the screws, then pull out the heater control unit. Disconnect the connectors, then remove the heater control unit.

NOTE: Take care not to bend the air mix control cable.

►: Screw locations, 4



5. Installation is the reverse of the removal procedure.

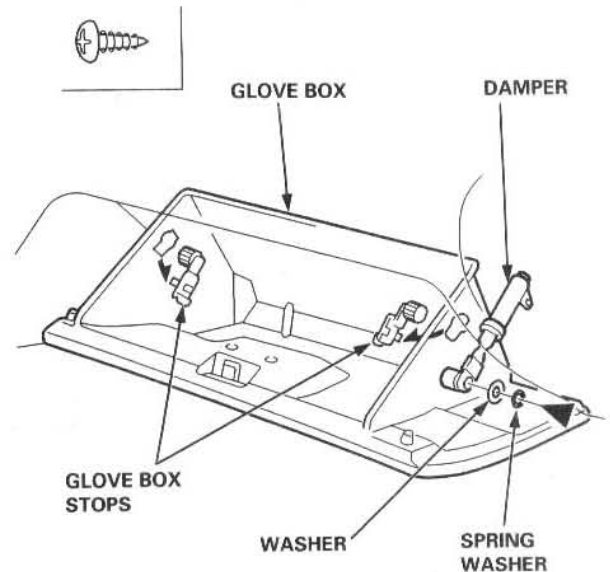
NOTE:

- Make sure the connectors, antenna lead and air mix control cable are connected properly.
- Adjust the air mix control cable (see section 21).
- Before tightening the screws, make sure each wire harness is not pinched.
- Enter the anti-theft code for the radio, then enter the customer's radio station presets.

Glove box:

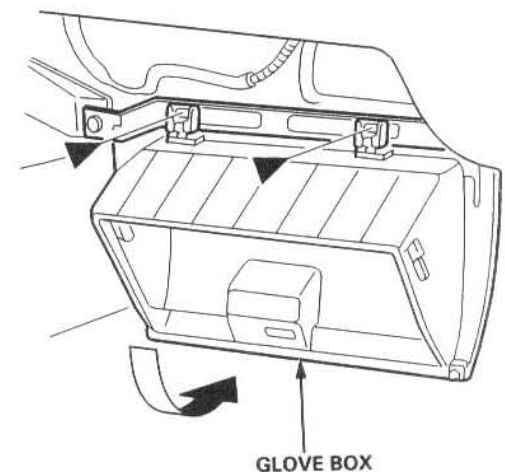
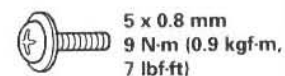
1. Remove the damper screw from the glove box. Remove the glove box stop from each side.

►: Screw location, 1



2. Lower the glove box, and remove the screws, then remove the glove box.

►: Screw locations, 2



(cont'd)

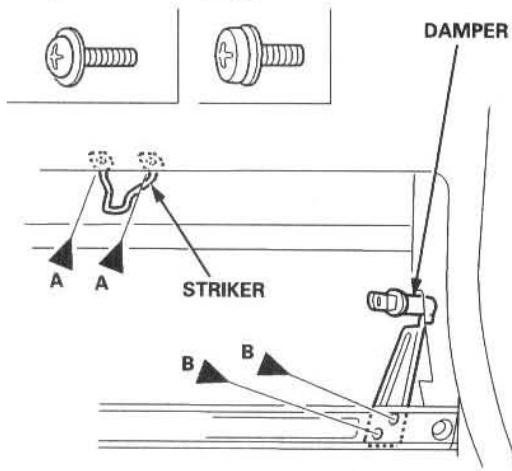
Dashboard Component Removal/Installation (cont'd)

- If necessary, remove the striker and damper.

►: Screw locations

A ►, 2

B ►, 2



- Installation is the reverse of the removal procedure.

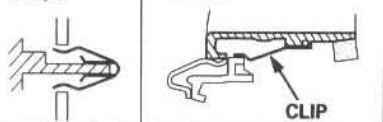
Center air vent:

- Carefully detach the clips, and pull out the center air vent. Disconnect the connectors, and remove the center air vent.

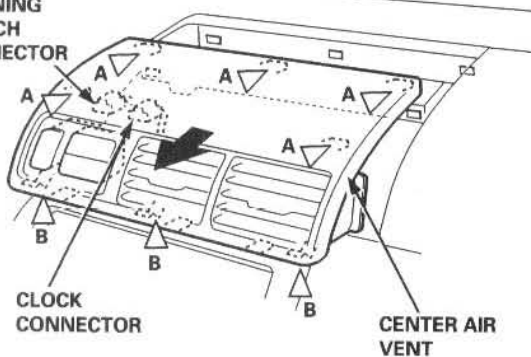
►: Clip locations

A ►, 5

B ►, 3



HAZARD
WARNING
SWITCH
CONNECTOR

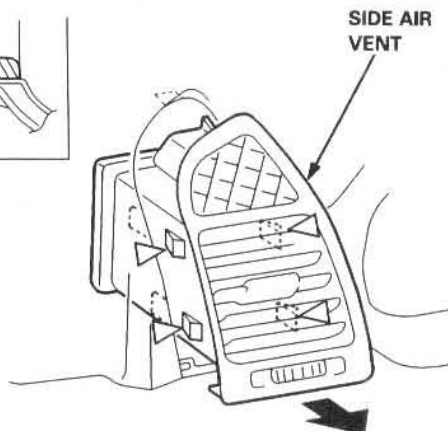
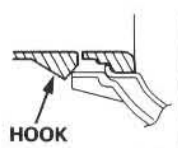


- Installation is the reverse of the removal procedure.

Side air vent:

Carefully pry the side edge of the air vent, and remove it.

►: Hook locations, 4





Dashboard Removal/Installation

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

CAUTION: Wear gloves to remove and install the dashboard.

NOTE:

- An assistant is helpful when removing and installing the dashboard.
- Take care not to scratch the dashboard, body and other related parts.
- Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.

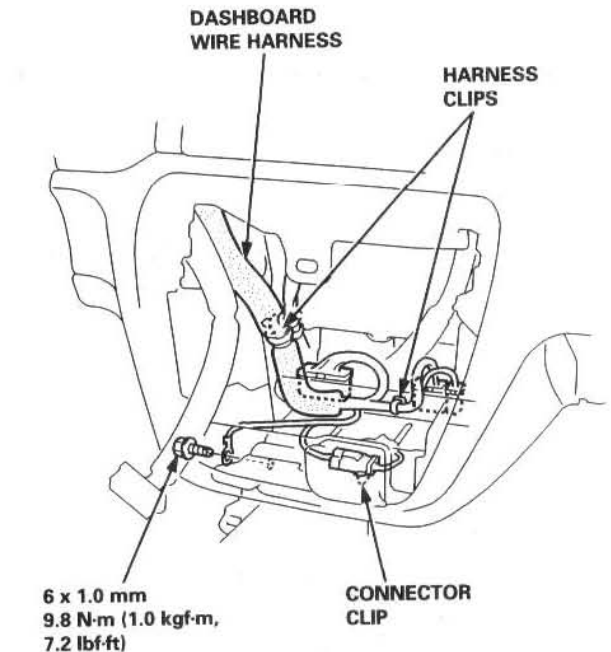
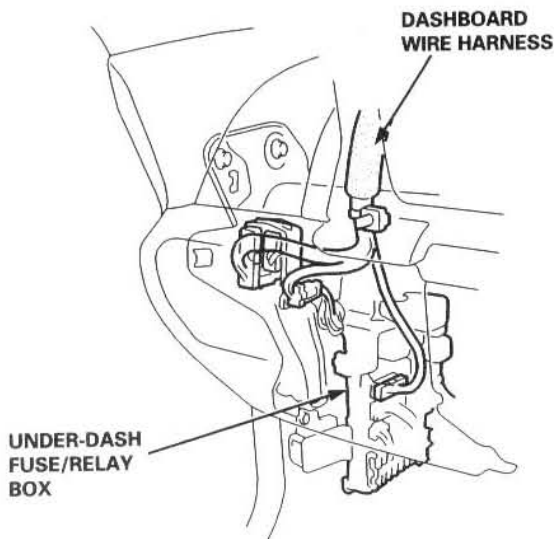
1. Remove:
 - Center console (see page 20-45)
 - Dashboard lower cover (see page 20-47)
 - Center panel, audio unit and heater control unit (see pages 20-48, 49)
 - Left kick panel (see page 20-41)

2. Lower the glove box (see page 20-49).

3. Disconnect the driver's airbag connector, and lower the steering column (see section 17).

NOTE: To prevent damage to the steering column, wrap it with a shop towel.

4. Disconnect the dashboard wire harness connectors, the harness clips, and the ground bolts.



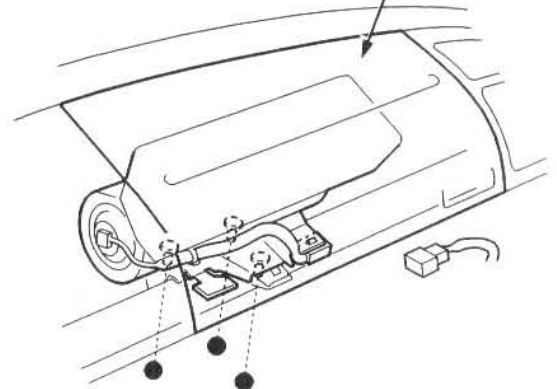
5. Disconnect the front passenger's airbag connector (see section 24). Remove the front passenger's airbag mounting nuts.

●: Nut locations, 3



6 x 1.0 mm
9.8 N-m (1.0 kgf-m,
7.2 lbf-ft)

FRONT PASSENGER'S AIRBAG



(cont'd)

Dashboard Removal/Installation (cont'd)

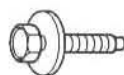
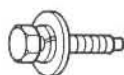
6. Remove the bolts, then remove the glove box frame with the glove box. Remove the bolts, then lift and remove the dashboard.

CAUTION: Use protective tape on the bottom of the front pillar trim.

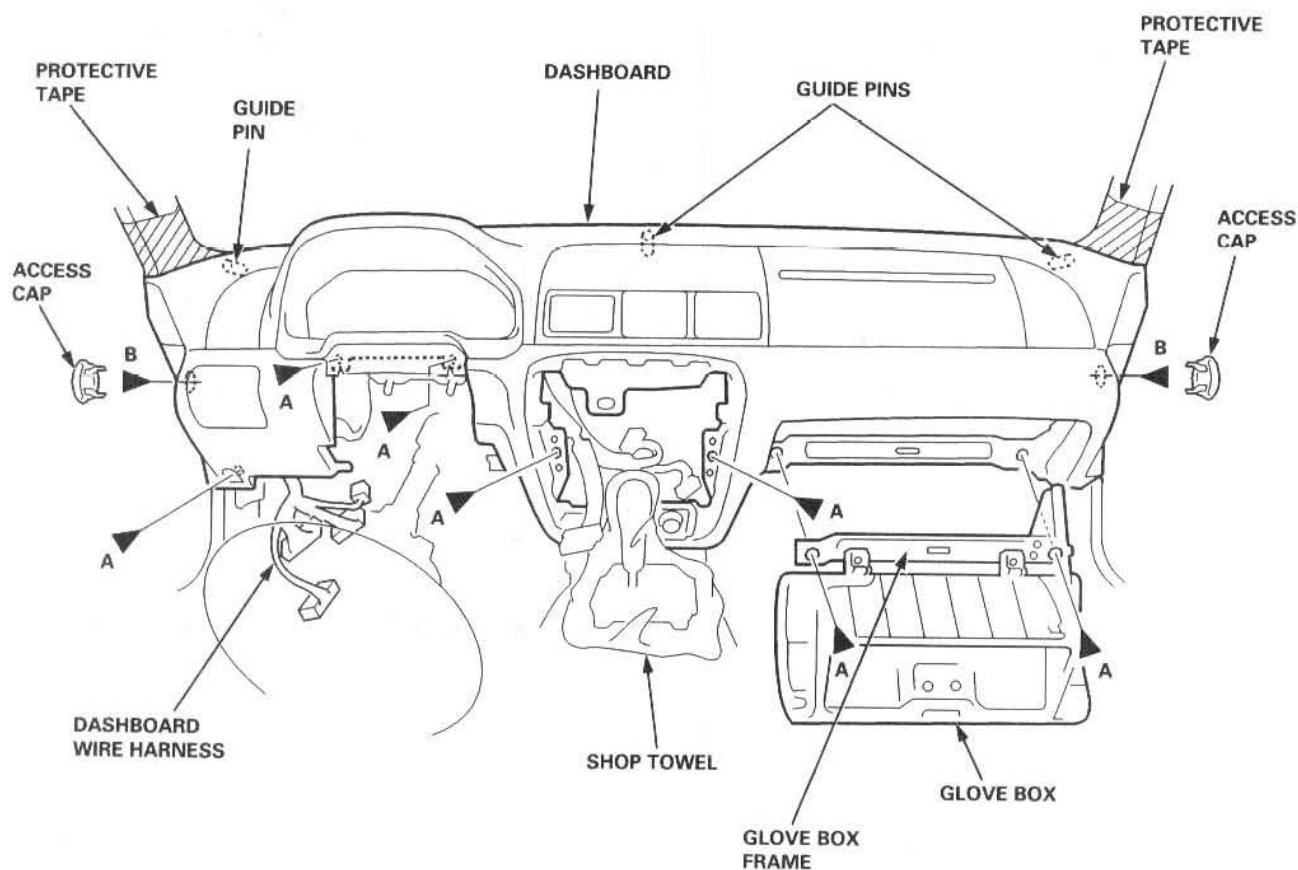
►: Bolt locations

A ►, 7

B ►, 2



6 x 1.0 mm
9.8 N-m (1.0 kgf-m,
7.2 lbf-ft)



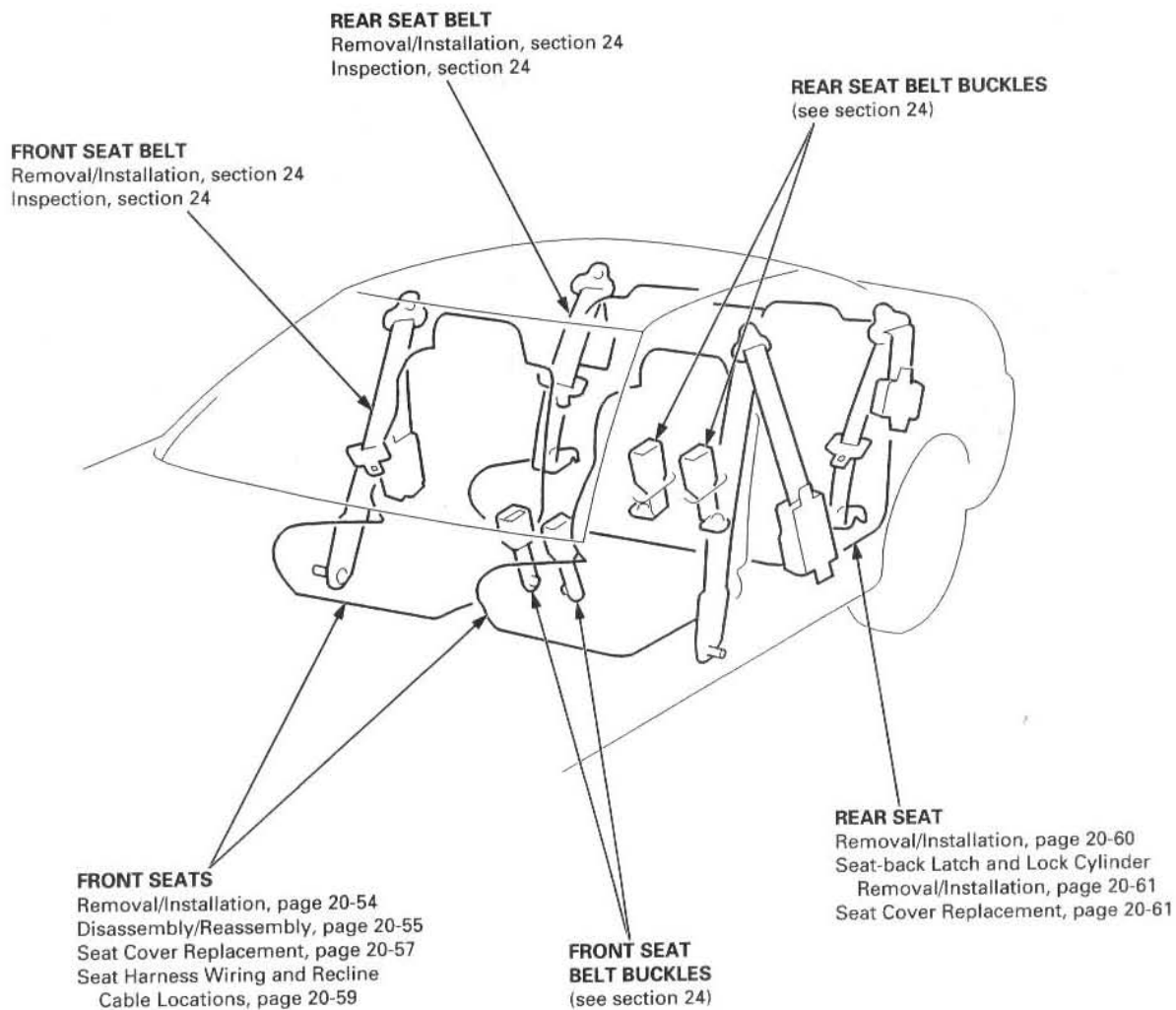
7. Installation is the reverse of the removal procedure.

NOTE:

- Make sure the dashboard fits onto the guide pins correctly.
- Before tightening the bolts, make sure the dashboard wire harnesses are not pinched.
- Make sure the connectors are connected properly.
- Enter the anti-theft code for the radio, then enter the customer's radio station presets.



Component Location Index



Seats

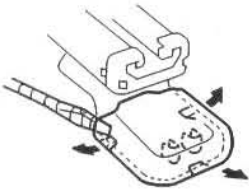
Front Seat Removal/Installation

CAUTION: When prying with a flat tip screwdriver, wrap it with protective tape to prevent damage.

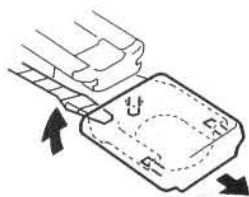
NOTE: Take care not to scratch the seat covers and body.

1. Remove the seat track end cover, then remove the bolts.

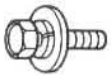
Rear inner:



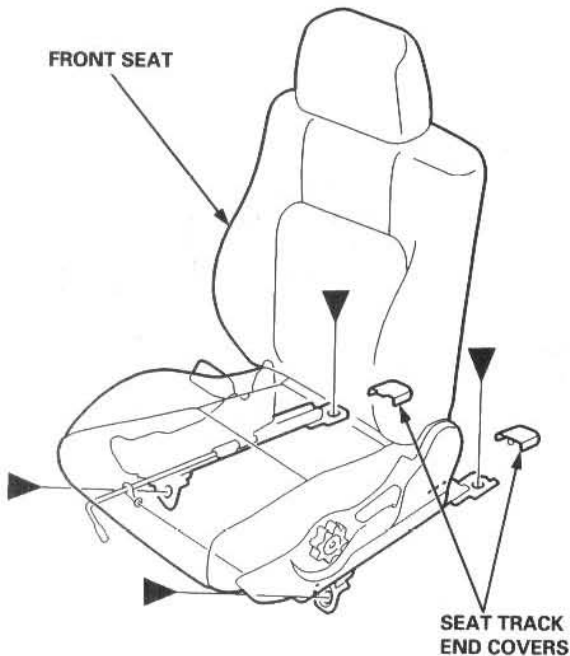
Rear outer:



►: Bolt locations, 4

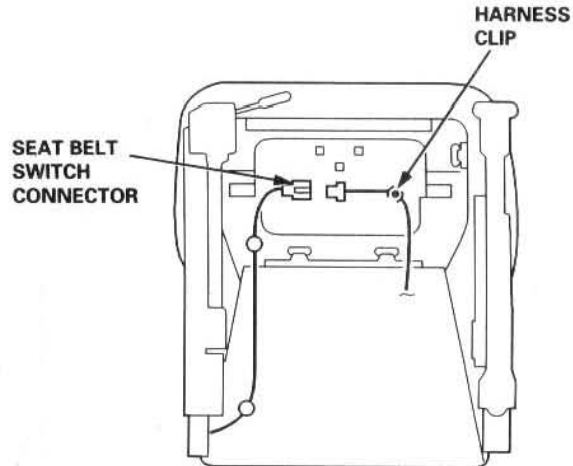


10 x 1.25 mm
34 N·m (3.5 kgf·m,
25 lbf·ft)

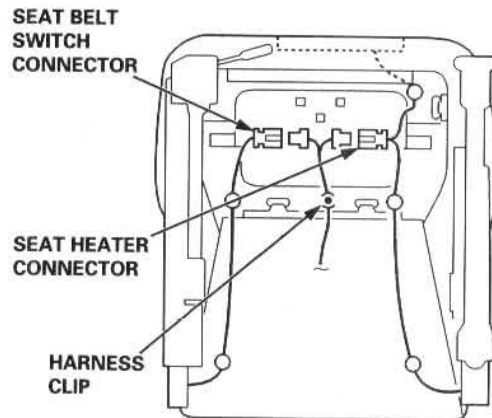


2. If so equipped, lift the front seat, and disconnect the connector(s).

With seat belt switch:



With seat belt switch and seat heater:



3. Remove the headrest.
4. Carefully remove the front seat through the front door opening.
5. Installation is the reverse of the removal procedure.

NOTE: Make sure the connector(s) is connected properly.



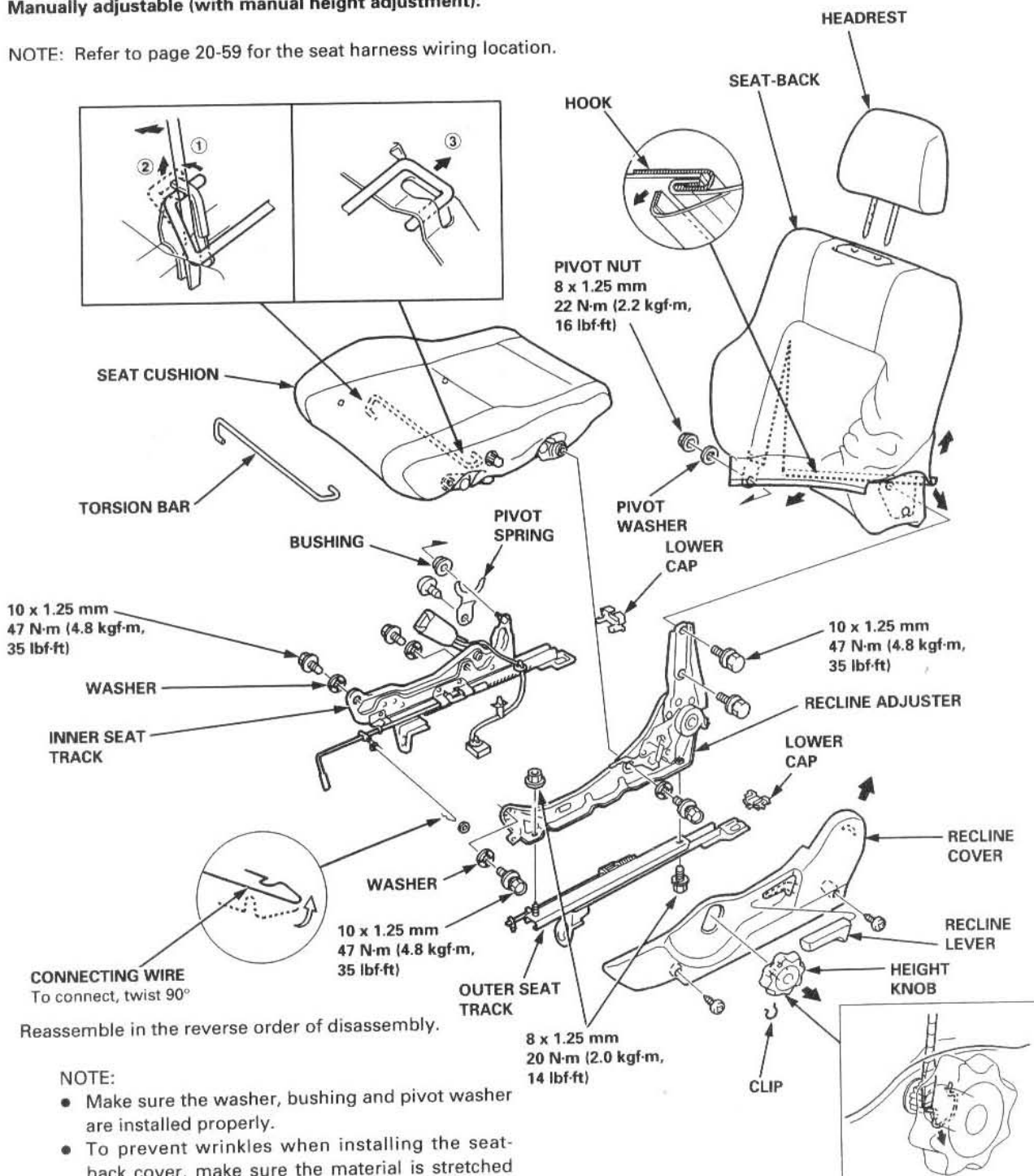
Front Seat Disassembly/Reassembly

CAUTION: When prying with a flat tip screwdriver, wrap it with protective tape to prevent damage.

NOTE: Take care not to scratch the seat covers and body.

Manually adjustable (with manual height adjustment):

NOTE: Refer to page 20-59 for the seat harness wiring location.



NOTE:

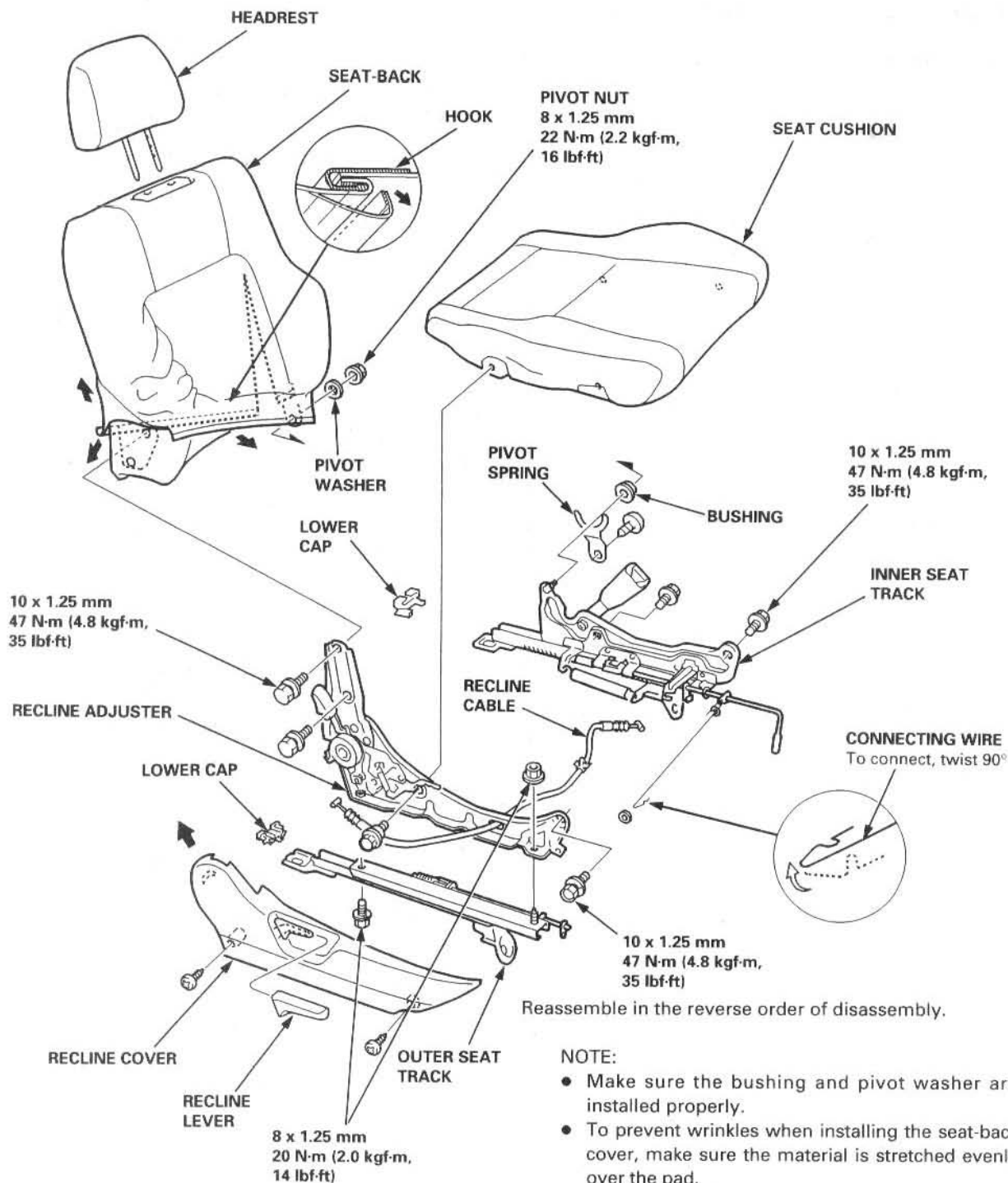
- Make sure the washer, bushing and pivot washer are installed properly.
- To prevent wrinkles when installing the seat-back cover, make sure the material is stretched evenly over the pad.
- Grease the sliding portion of the seat track.

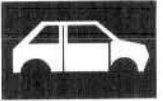
(cont'd)

Front Seat Disassembly/Reassembly (cont'd)

Manually adjustable (with recline cable):

NOTE: Refer to page 20-59 for the recline cable location.





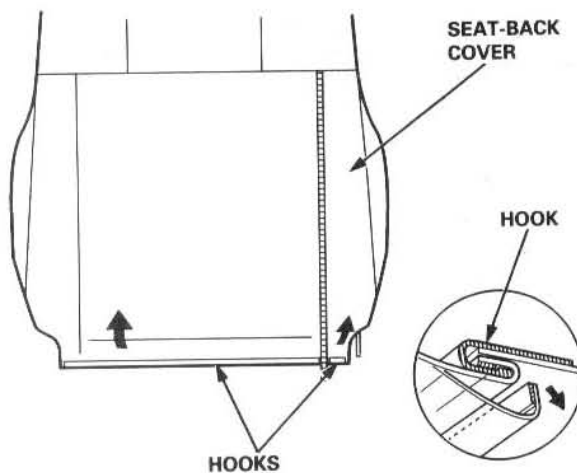
Front Seat Cover Replacement

CAUTION: Wear gloves to remove and install the seat covers.

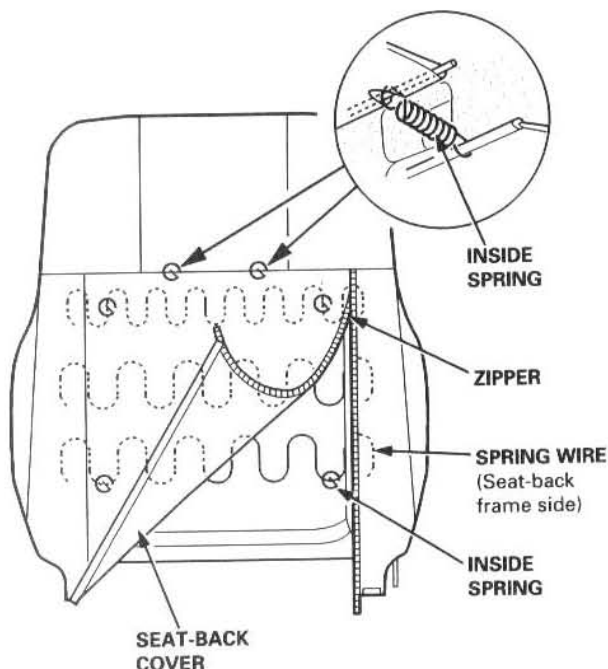
NOTE: Take care not to tear the seams or damage the seat covers.

Seat-back cover:

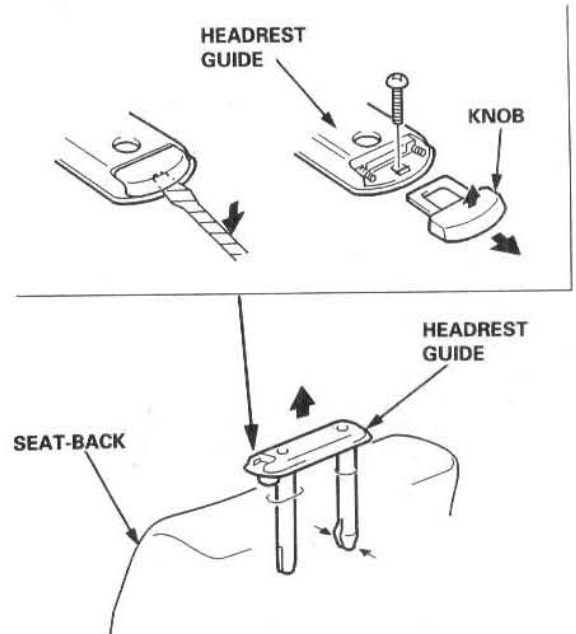
1. Slide the front seat forward, and fold the seat-back forward.
2. Release the hooks.



3. Unzip the cover, and release all of the inside springs, then fold back the seat-back cover.



4. Remove the headrest.
5. Remove the headrest guide, then remove the seat-back cover.



6. Installation is the reverse of the removal procedure.

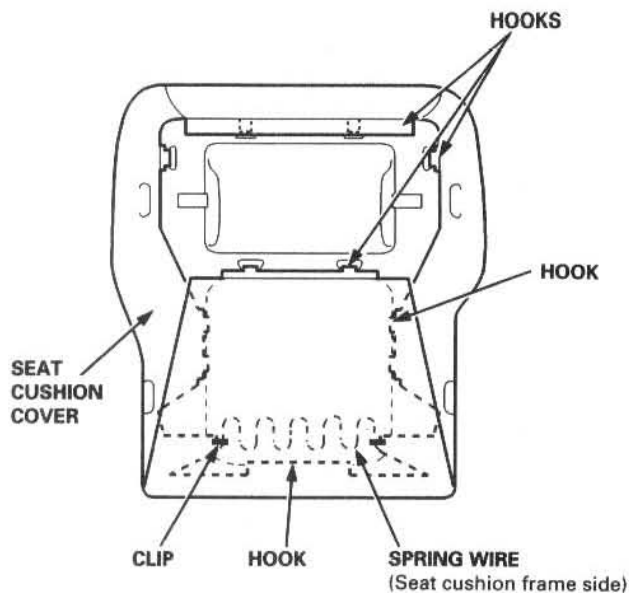
NOTE: To prevent wrinkles when installing a seat-back cover, make sure the material is stretched evenly over the pad before securing the inside springs and hooks.

(cont'd)

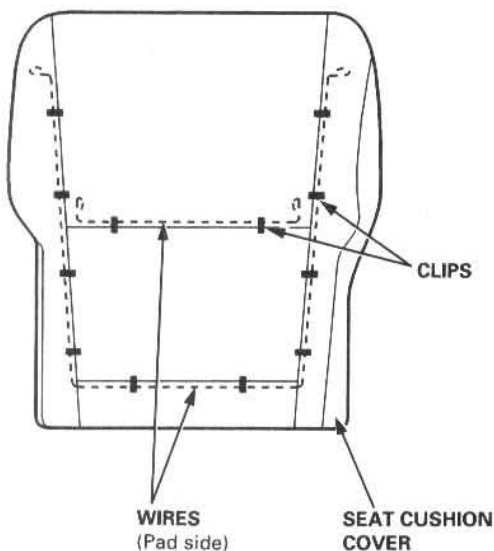
Front Seat Cover Replacement (cont'd)

Seat cushion cover:

1. Remove the seat cushion (see pages 20-55, 56)
2. Release the hooks and clips from under the seat cushion, then loosen the seat cushion cover.



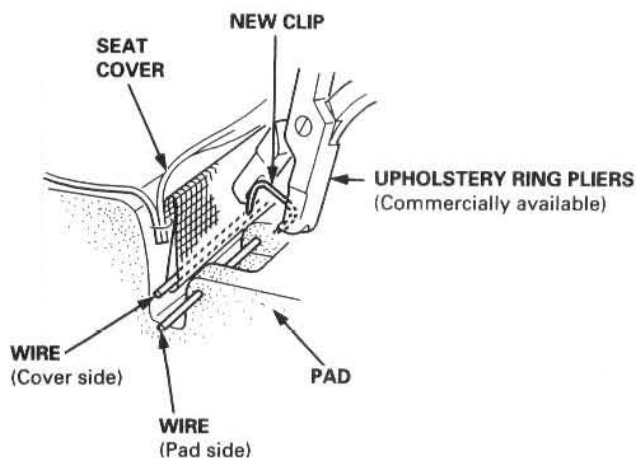
3. Pull back the edge of the seat cushion cover all the way around, then release the clips, and remove the seat cushion cover.



4. Installation is the reverse of the removal procedure.

NOTE:

- To prevent wrinkles when installing a seat cushion cover, make sure the material is stretched evenly over the pad before securing the hooks and clips.
- Replace the clips with new ones.



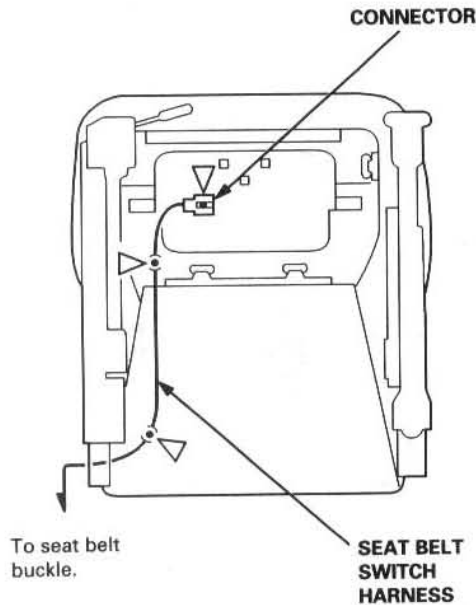


Front Seat Harness Wiring and Recline Cable Locations

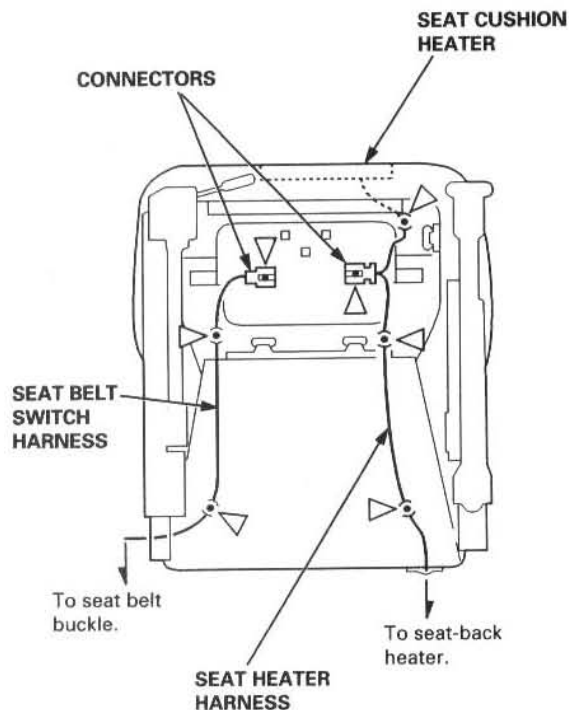
NOTE: When installing the seat cushion, make sure the seat harness, connector and recline cable are fastened correctly on the seat cushion frame.

▷: Clip locations

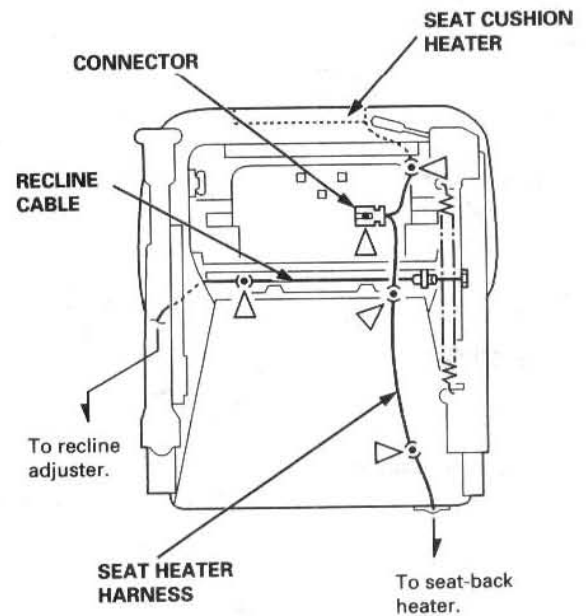
With seat belt switch:



With seat belt switch and seat heater:



With seat heater and recline cable:



Seats

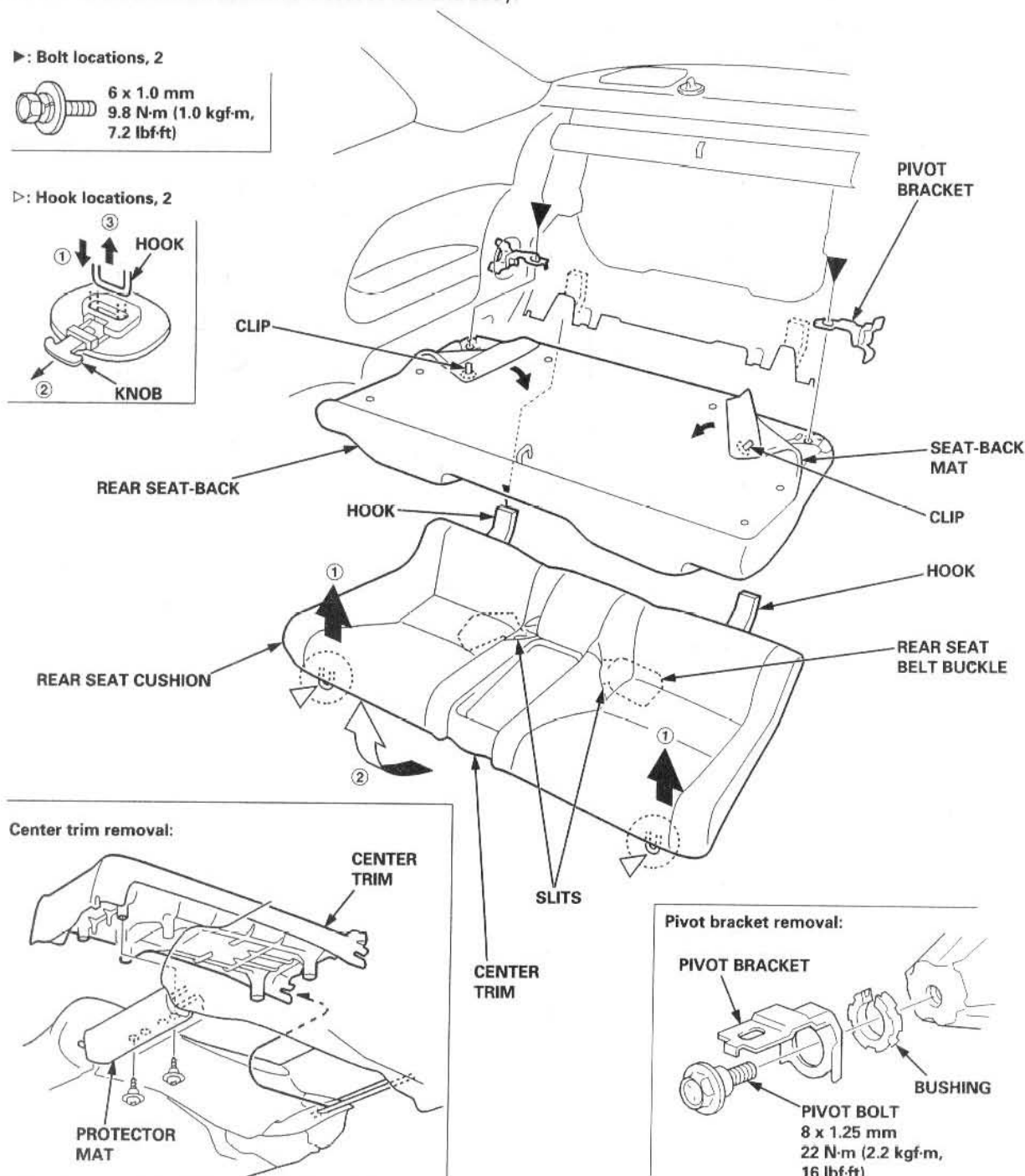
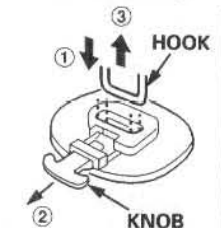
Rear Seat Removal/Installation

NOTE: Take care not to scratch the seat covers and body.

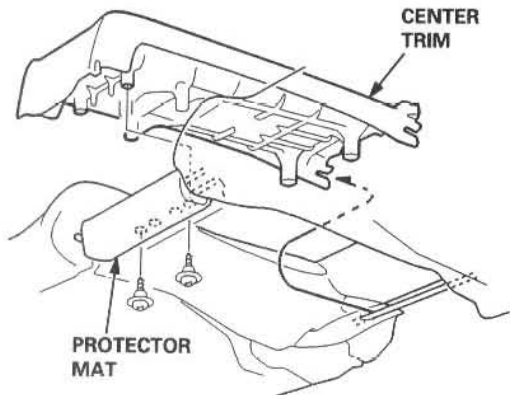
► Bolt locations, 2



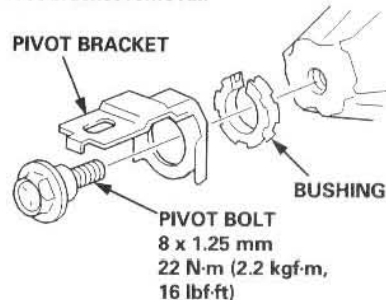
► Hook locations, 2



Center trim removal:



Pivot bracket removal:



Installation is the reverse of the removal procedure.

NOTE:

- When installing the rear seat cushion, slip the seat belt buckles through the slits in the rear seat cushion.
- Make sure the rear seat-back locks securely.
- If necessary, adjust the rear seat-back latch (see page 20-61) and rear seat-back.

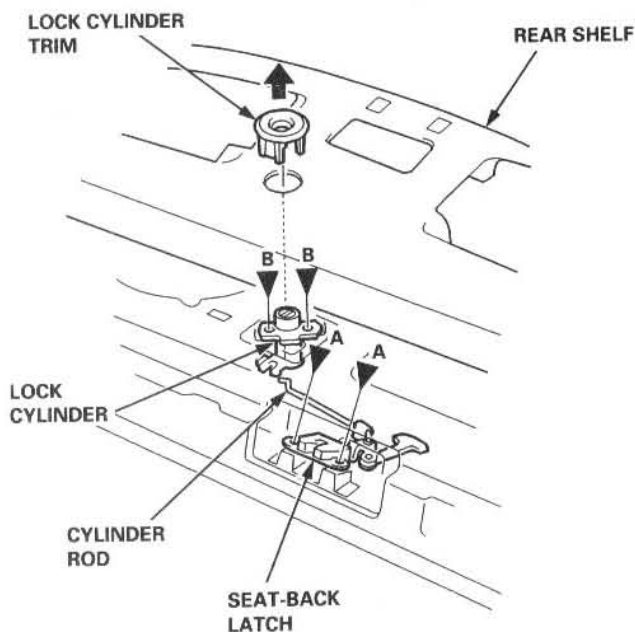
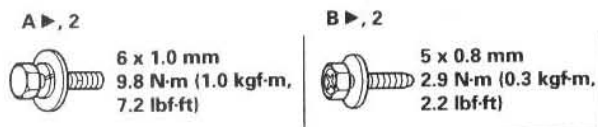


Rear Seat-back Latch and Lock Cylinder Removal/Installation

Before removing the seat-back latch and lock cylinder, remove the rear pillar trim, rear bulkhead upper trim, lock cylinder trim, high mount brake light (for some models) and speaker covers, then remove the rear shelf (see page 20-41).

NOTE: Take care not to bend the cylinder rod.

► Bolt locations



Installation is the reverse of the removal procedure.

NOTE:

- Make sure the cylinder rod is connected securely.
- Make sure the seat-back locks securely and opens properly.
- If necessary, adjust the seat-back latch.

Rear Seat Cover Replacement

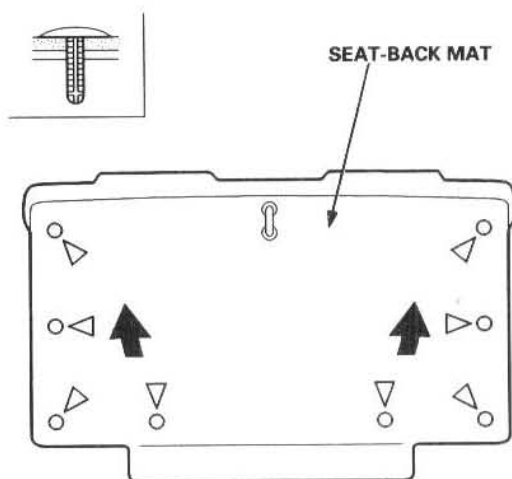
CAUTION: Wear gloves to remove and install the seat covers.

NOTE: Take care not to tear the seams or damage the seat covers.

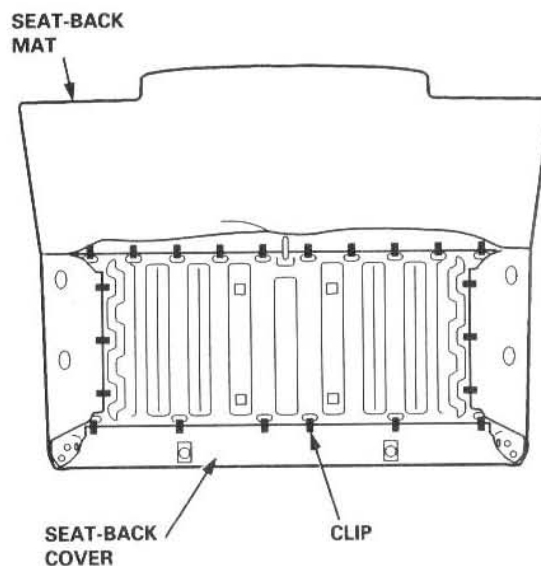
Seat-back cover:

1. Remove the seat-back.
2. Release the clips, and pull back the seat-back mat.

► Clip locations, 8



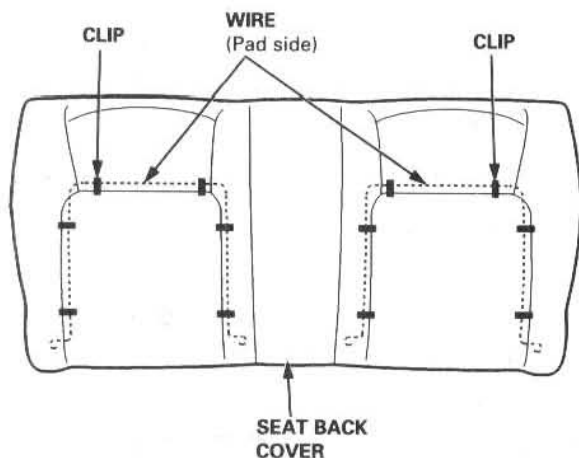
3. Release the clips, and loosen the seat-back cover.



(cont'd)

Rear Seat Cover Replacement (cont'd)

4. Pull back the edge of the seat-back cover all the way around, and release the clips, then remove the seat-back cover.



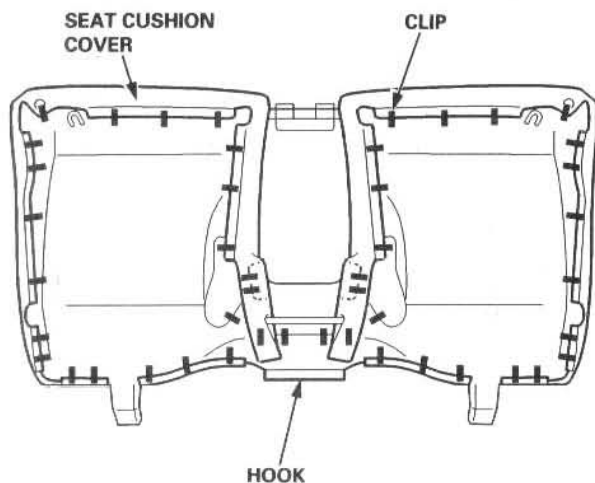
5. Installation is the reverse of the removal procedure.

NOTE:

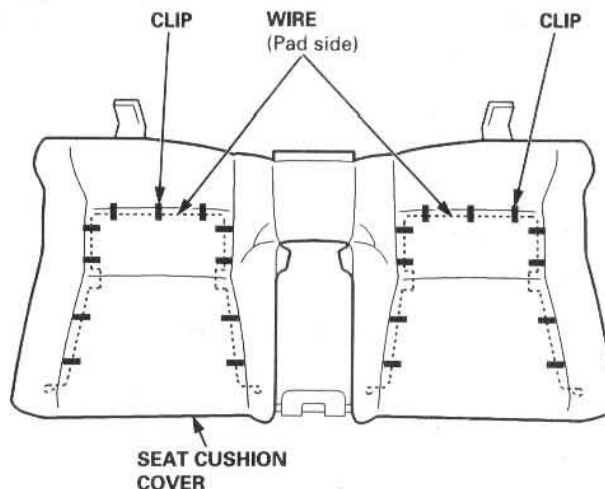
- To prevent wrinkles when installing a seat-back cover, make sure the material is stretched evenly over the pad before securing the clips.
- Replace the clips with new ones.

Seat cushion cover:

1. Remove the seat cushion (see page 20-60).
2. Remove the center trim from the seat cushion (see page 20-60).
3. Release the hook and the clips, and loosen the seat cushion cover.



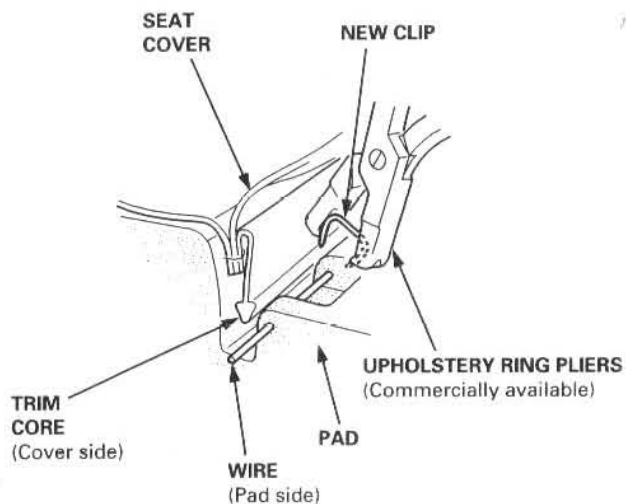
4. Pull back the edge of the seat cushion cover all the way around, and release the clips, then remove the seat cushion cover.



5. Installation is the reverse of the removal procedure.

NOTE:

- To prevent wrinkles when installing a seat cushion cover, make sure the material is stretched evenly over the pad before securing the clips and hook.
- Replace the clips with new ones.

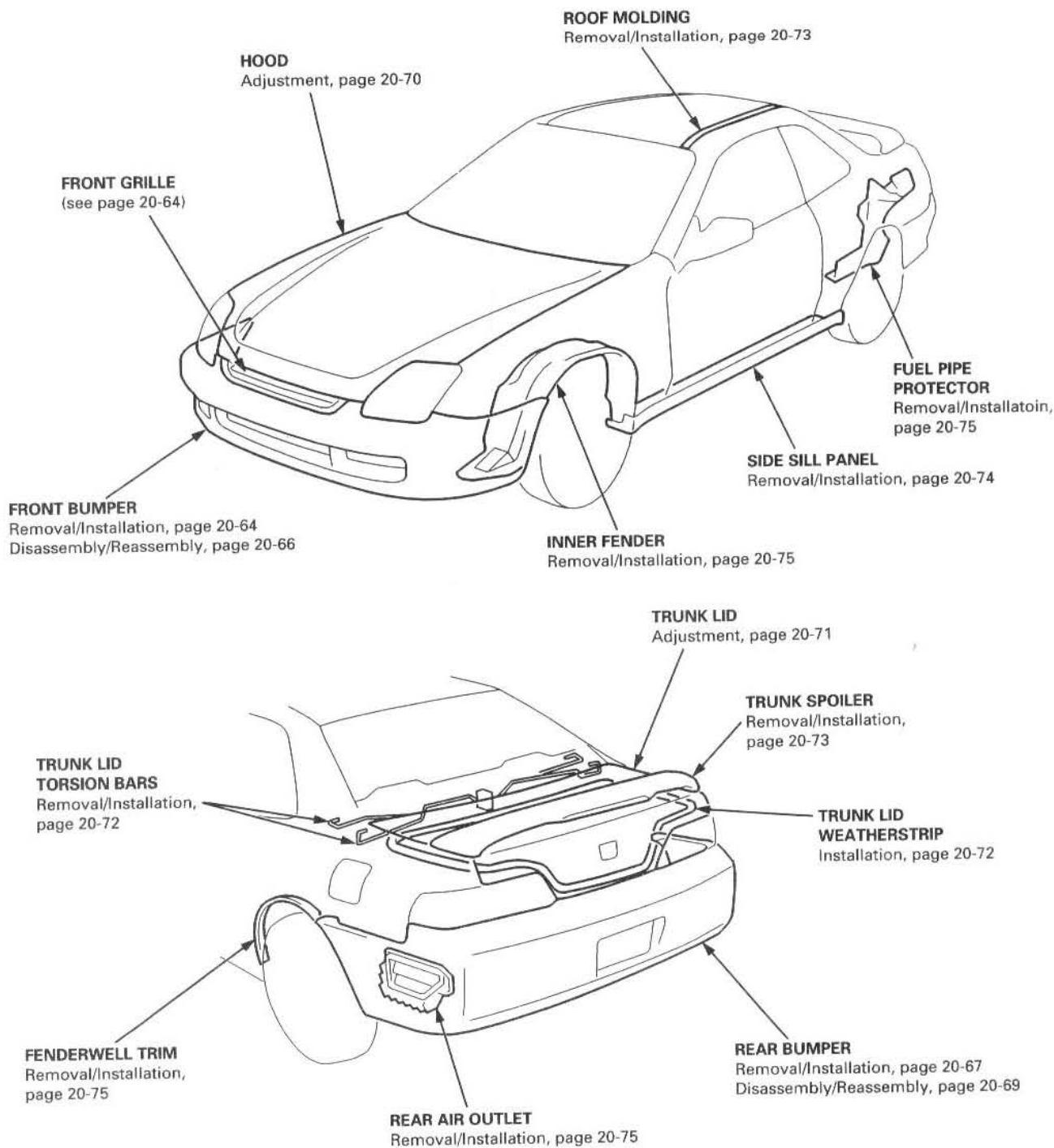




Exterior

Component Location Index

NOTE: Refer to the 1997 Prelude Body Repair Manual (P/N 61S3030) for the hood and trunk lid removal.



Front Bumper Removal/Installation

CAUTION: Wear gloves to remove and install the front bumper.

NOTE:

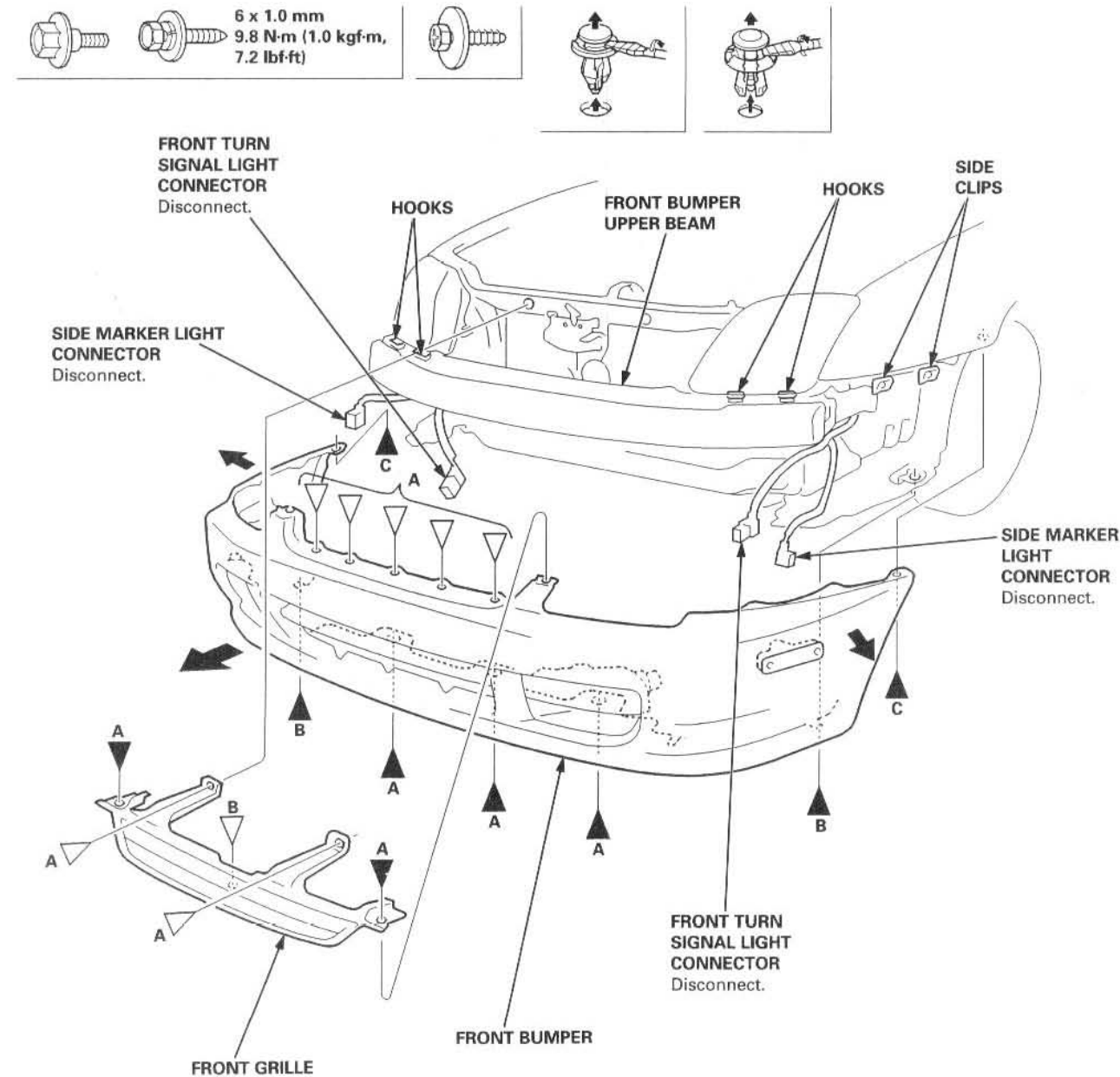
- An assistant is helpful when removing the front bumper.
- Take care not to scratch the front grille, front bumper and body.

►: Bolt screw locations
A ►, 5 B ►, 2

▷: Clip locations
A ▷, 7 B ▷, 1

C ►, 2

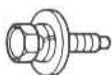
B ▷, 1





►: Bolt locations

A ►, 6

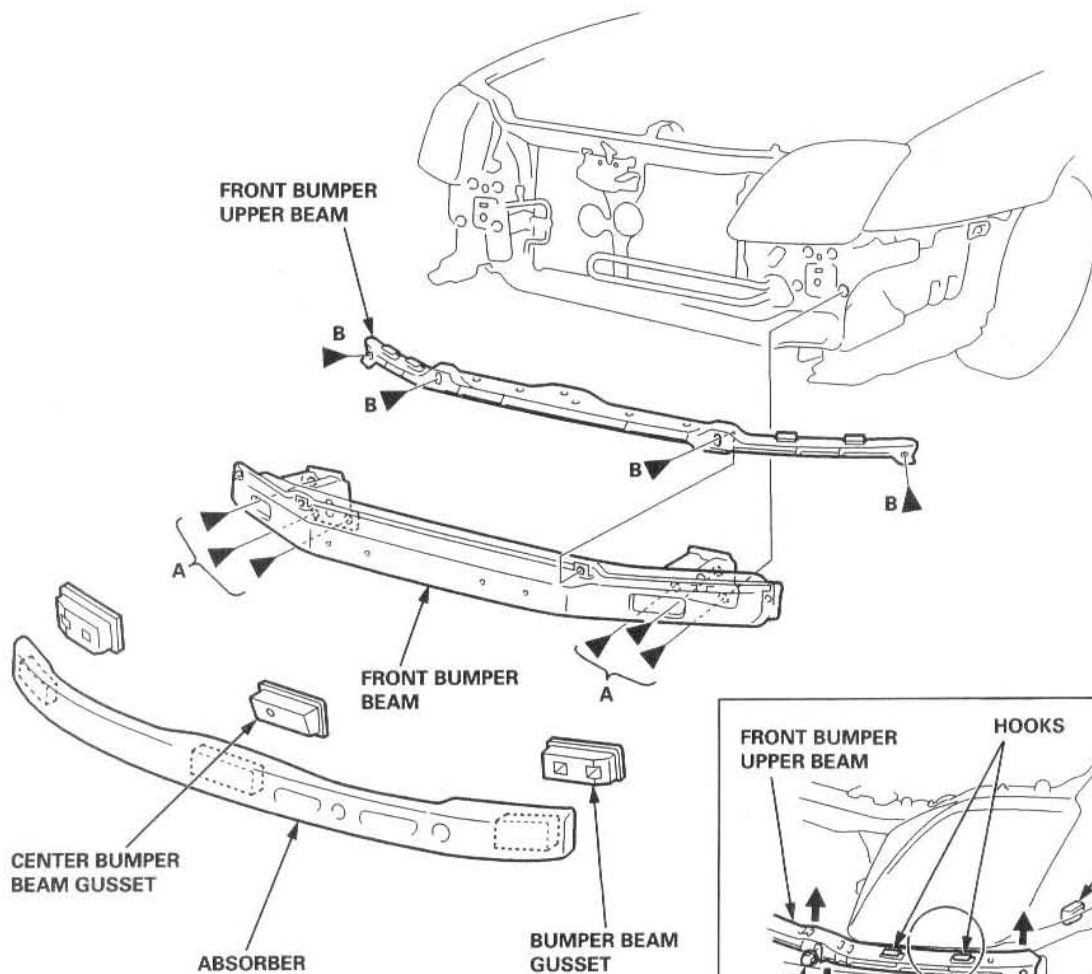


8 x 1.25 mm
22 N·m (2.2 kgf·m,
16 lbf·ft)

B ►, 4



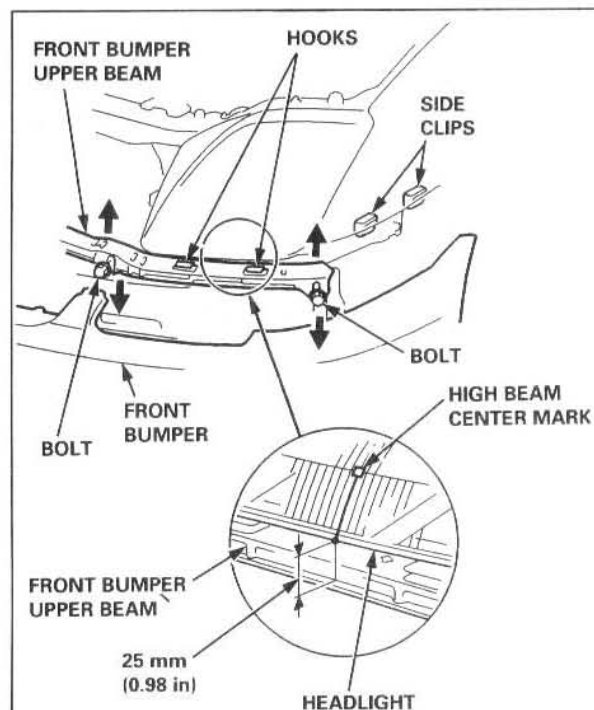
6 x 1.0 mm
9.8 N·m (1.0 kgf·m,
7.2 lbf·ft)



Installation is the reverse of the removal procedure.

NOTE:

- Make sure the front bumper engages the front bumper upper beam and side clips securely.
- If necessary, adjust the front bumper upper beam to obtain the proper gap.



Front Bumper Disassembly/Reassembly

CAUTION: Wear gloves to disassemble and reassemble the front bumper and front bumper beam.

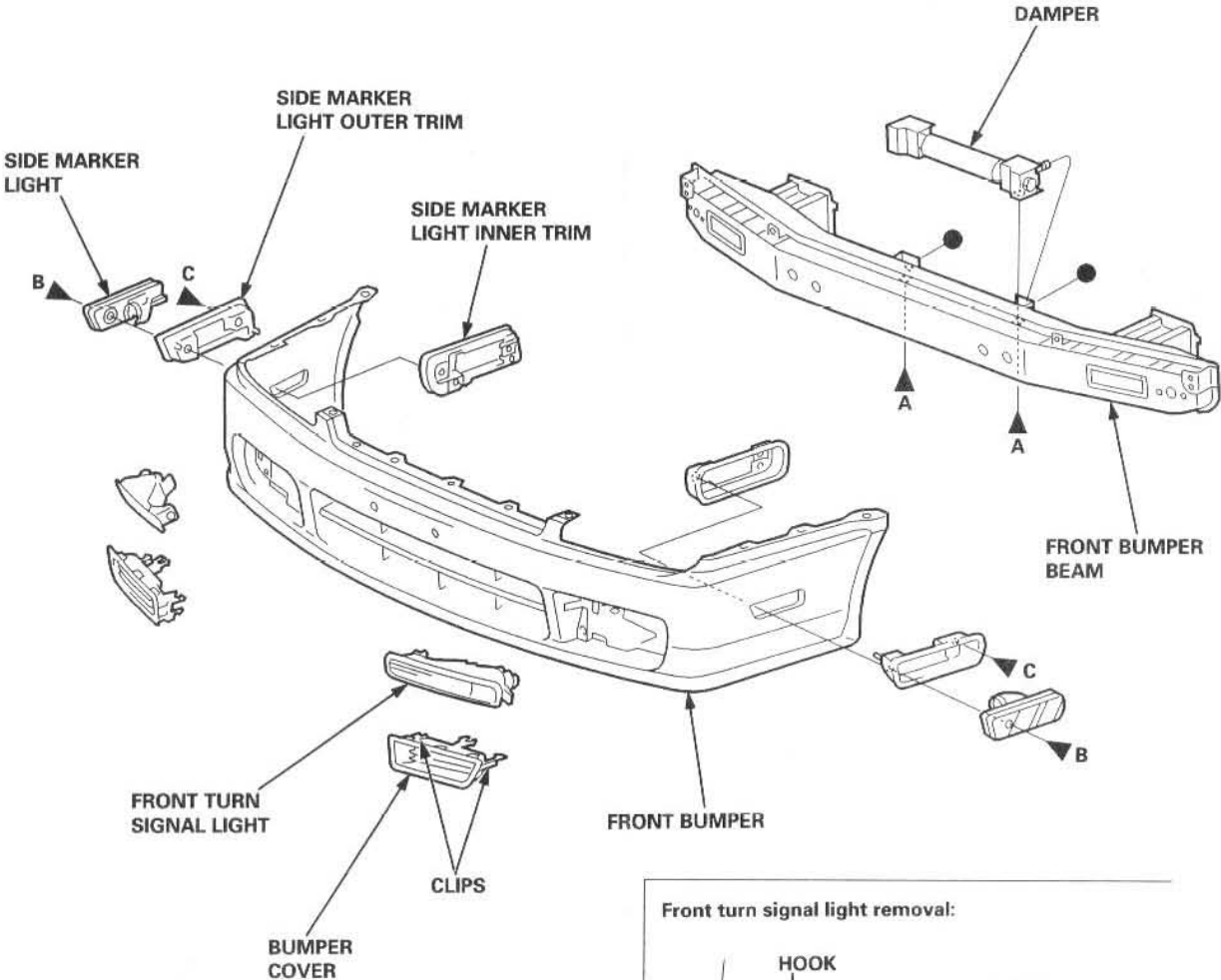
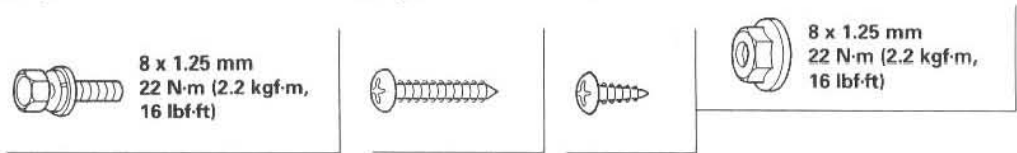
NOTE: Take care not to scratch the front bumper.

►: Bolt screw locations
A ►, 2

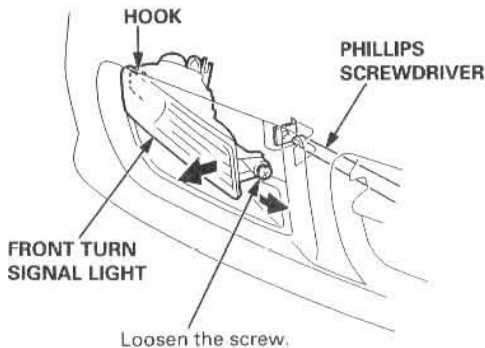
B ►, 2

C ►, 2

●: Nut locations, 2



Front turn signal light removal:



Reassemble in the reverse order of disassembly.



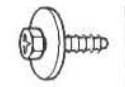
Rear Bumper Removal/Installation

CAUTION: Wear gloves to remove and install the rear bumper.

NOTE:

- An assistant is helpful when removing the rear bumper.
- Take care not to scratch the rear bumper and body.

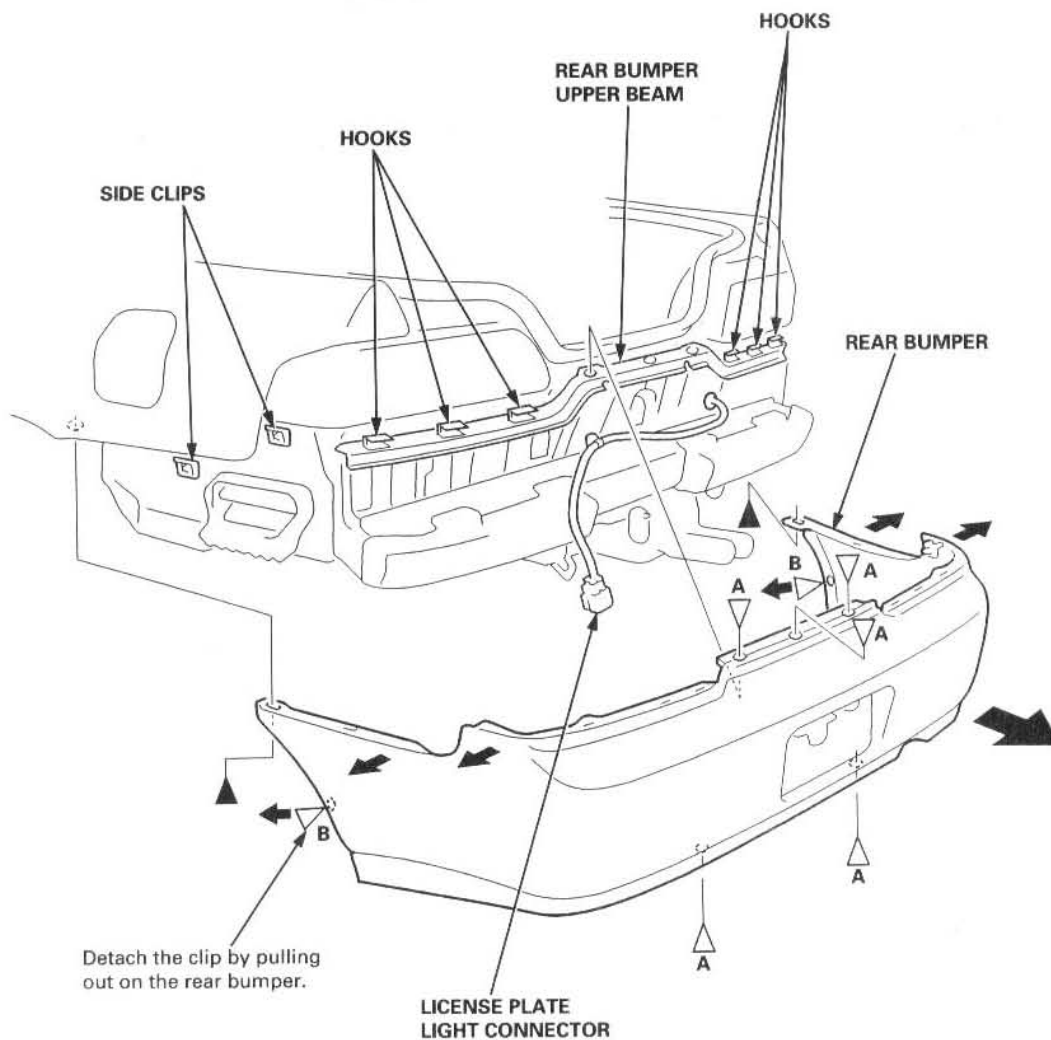
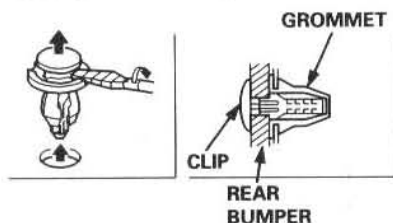
►: Screw locations, 2



▷: Clip locations

A ▷, 5

B ▷, 2



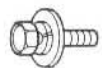
(cont'd)

Exterior

Rear Bumper Removal/Installation (cont'd)

►: Bolt locations, 4

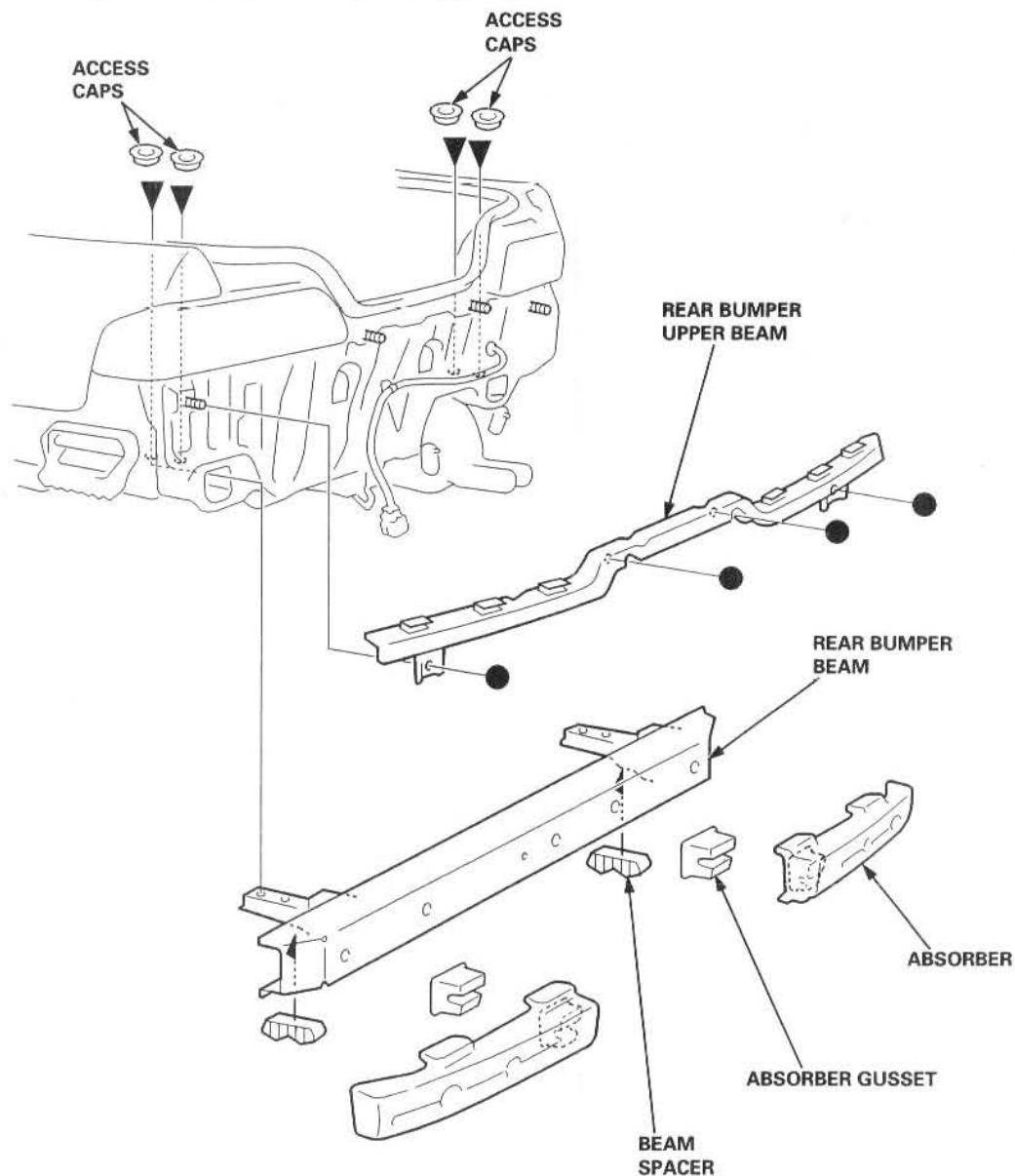
●: Nut locations, 4



10 x 1.25 mm
38 N-m (3.9 kgf-m,
28 lbf-ft)



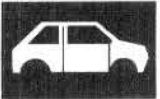
6 x 1.0 mm
9.8 N-m (1.0 kgf-m,
7.2 lbf-ft)



Installation is the reverse of the removal procedure.

NOTE:

- If necessary, replace any damaged clips.
- Make sure the rear bumper engages the side clips and hooks on each side securely.

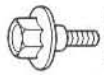


Rear Bumper Disassembly/ Reassembly

CAUTION: Wear gloves to disassemble and reassemble the rear bumper.

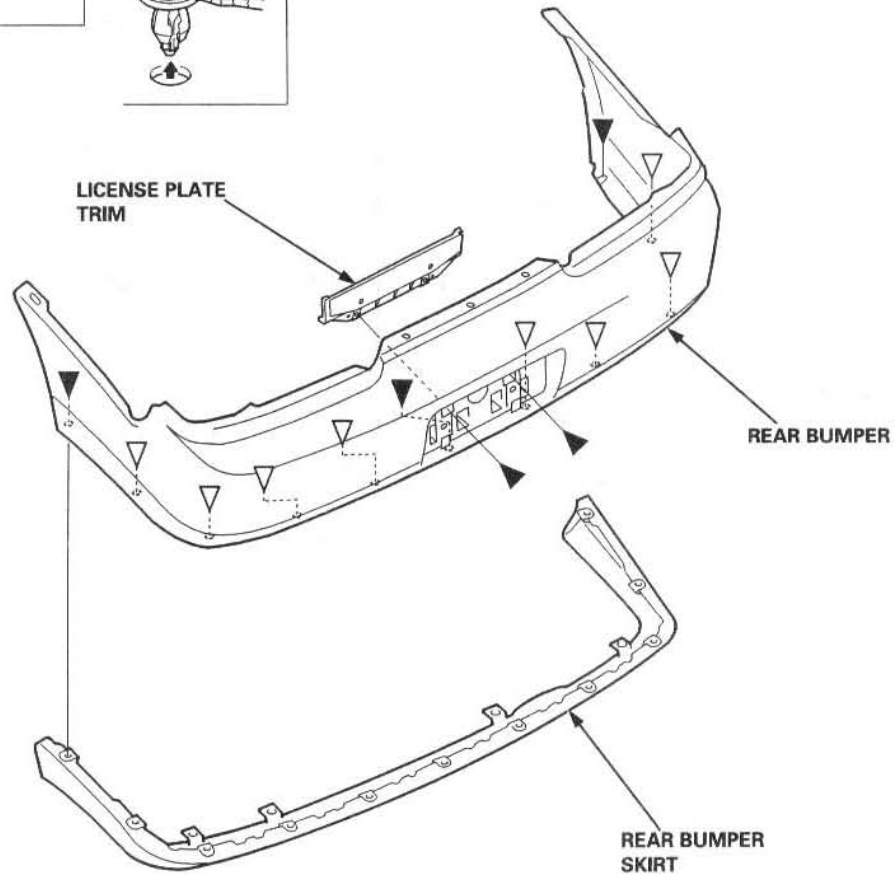
NOTE: Take care not to scratch the rear bumper and bumper skirt.

►: Bolt locations, 5



6 x 1.0 mm
9.8 N·m (1.0 kgf·m,
7.2 lbf·ft)

▷: Clip locations, 8



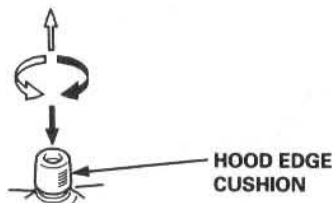
Reassemble in the reverse order of disassembly.

Exterior

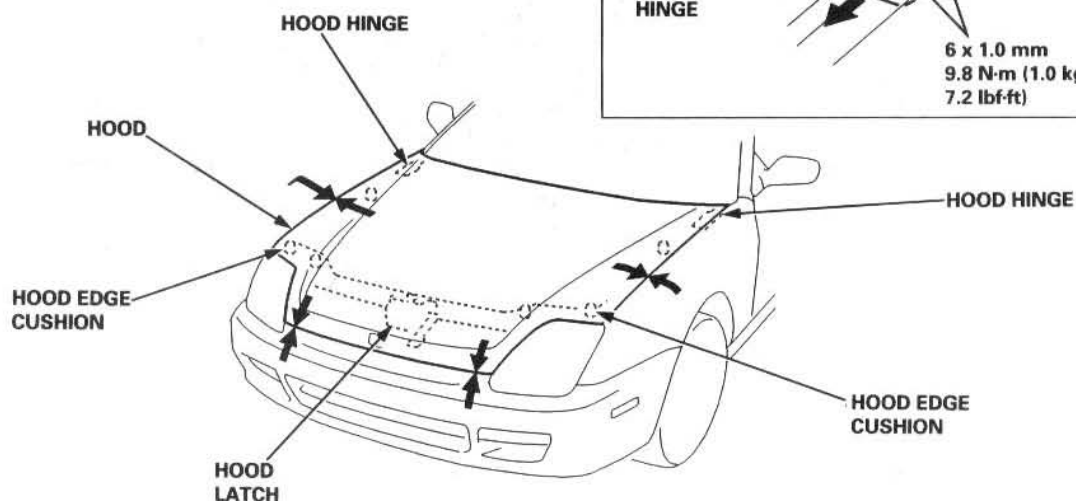
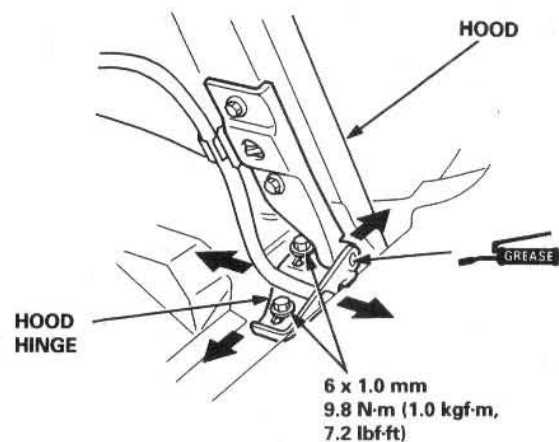
Hood Adjustment

NOTE: Before adjusting the hood, loosen each bolt slightly.

Turn the hood edge cushions, as necessary, to make the hood fit flush with the body at front and side edges.

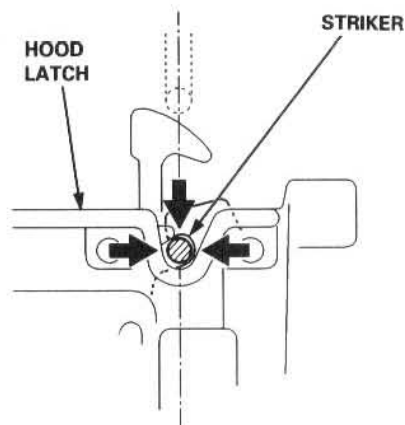
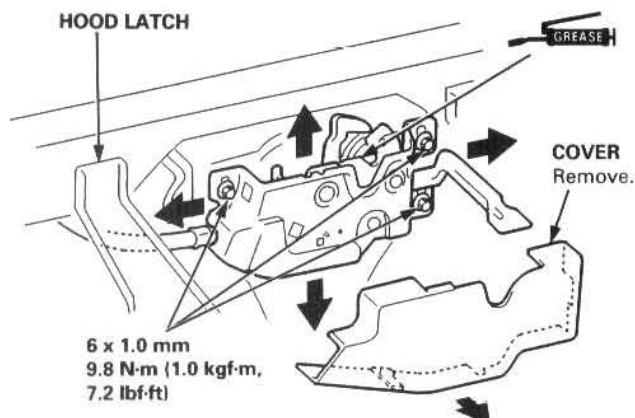


Adjust the hood right and left, as well as fore and aft, by using the elongated holes on the hood hinge.



Adjust the hood latch to obtain the proper height at the forward edge.

Move the hood latch right or left until the striker is centered in the hood latch as shown.

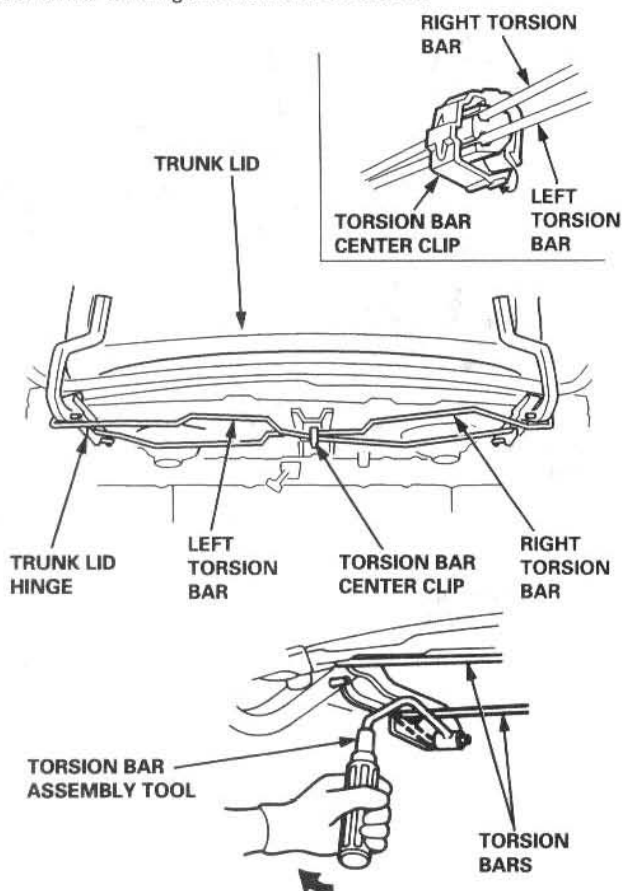


Trunk Lid Torsion Bars Removal/Installation

CAUTION: Wear gloves to remove and install the torsion bars.

NOTE: Take care not to damage the body.

Remove the torsion bars with the torsion bar assembly tool while holding the trunk lid as shown.



Installation is the reverse of the removal procedure.

NOTE:

- Adjust the torsion bars fore or aft with the torsion bar assembly tool as shown.



○ = Normal position
● = Higher tension

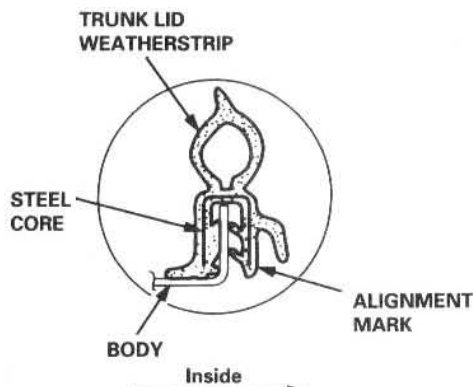
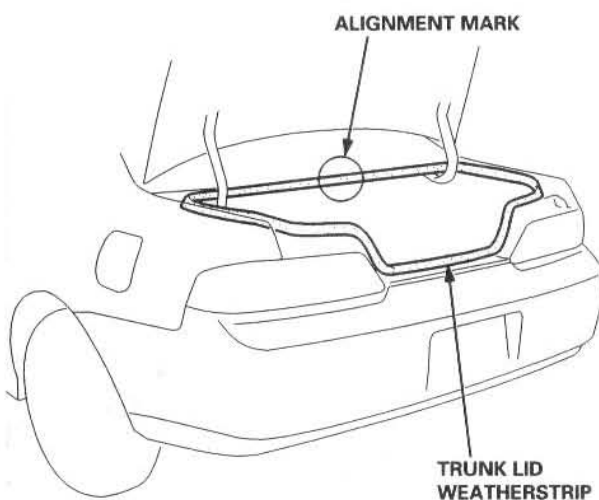
- Make sure the trunk lid opens properly.

Trunk Lid Weatherstrip Installation

When installing the trunk lid weatherstrip, align it with the alignment mark on the trunk lid opening.

NOTE:

- Make sure there are no wrinkles in the weatherstrip.
- Check for water leaks.

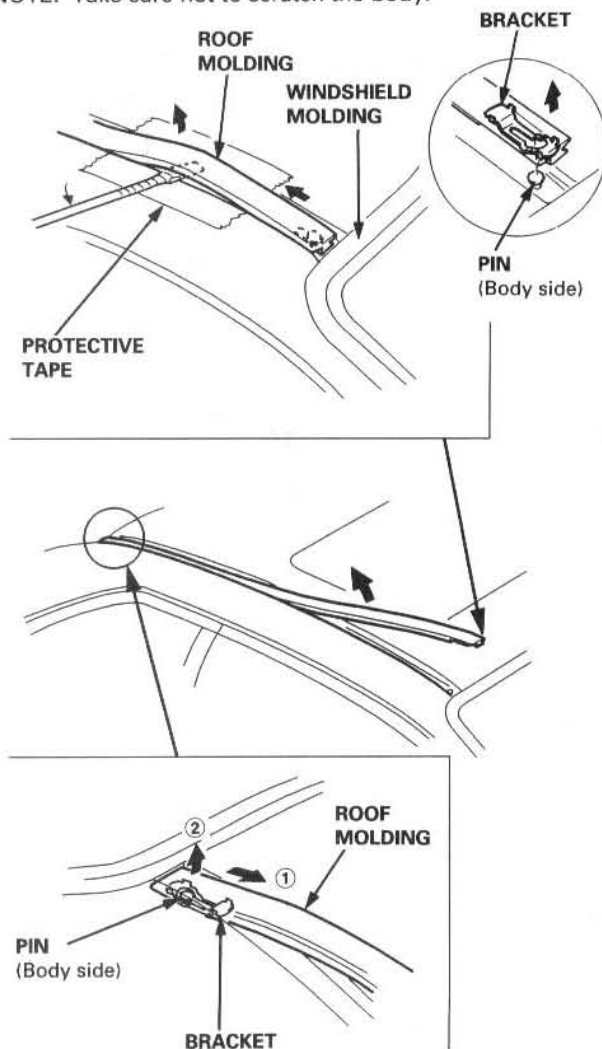




Roof Molding Removal/Installation

CAUTION: When prying with a flat tip screwdriver, wrap it with protective tape to prevent damage, and use protective tape on the body.

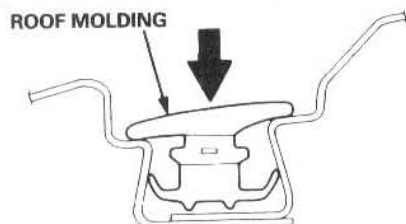
NOTE: Take care not to scratch the body.



Installation is the reverse of the removal procedure.

NOTE:

- Take care not to damage the windshield molding.
- Make sure the roof molding is installed securely.

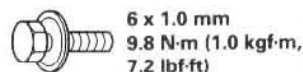


Trunk Spoiler Removal/Installation

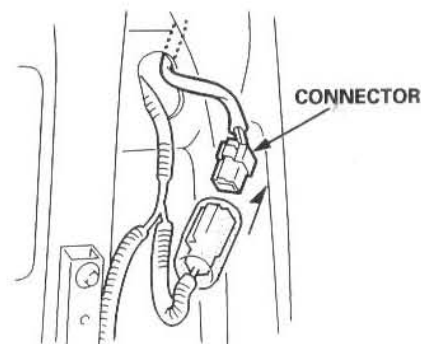
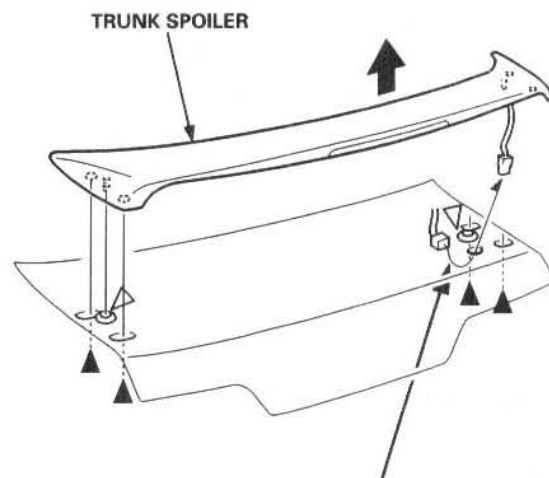
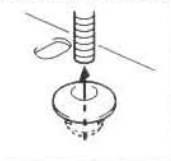
For some models:

NOTE: Take care not to scratch the trunk spoiler and body.

►: Bolt locations, 4



▷: Grommet locations, 2



Installation is the reverse of the removal procedure.

NOTE: Make sure the connector is connected properly.

Exterior

Side Sill Panel Removal/Installation

NOTE: Take care not to scratch the body.

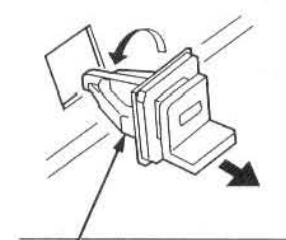
▷: Clip locations

A ▷, 4



NOTE: Loosen the screw, then remove the lower clip using a clip remover.

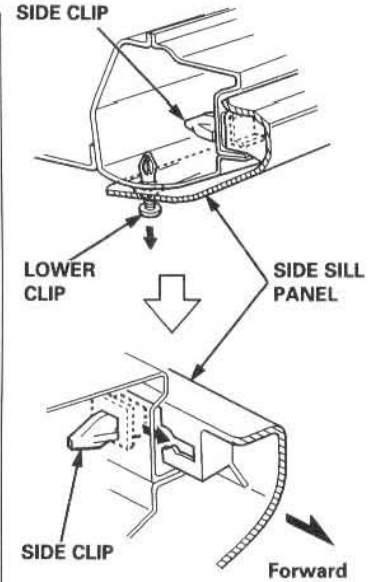
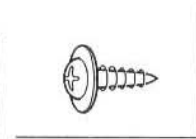
B ▷, 7



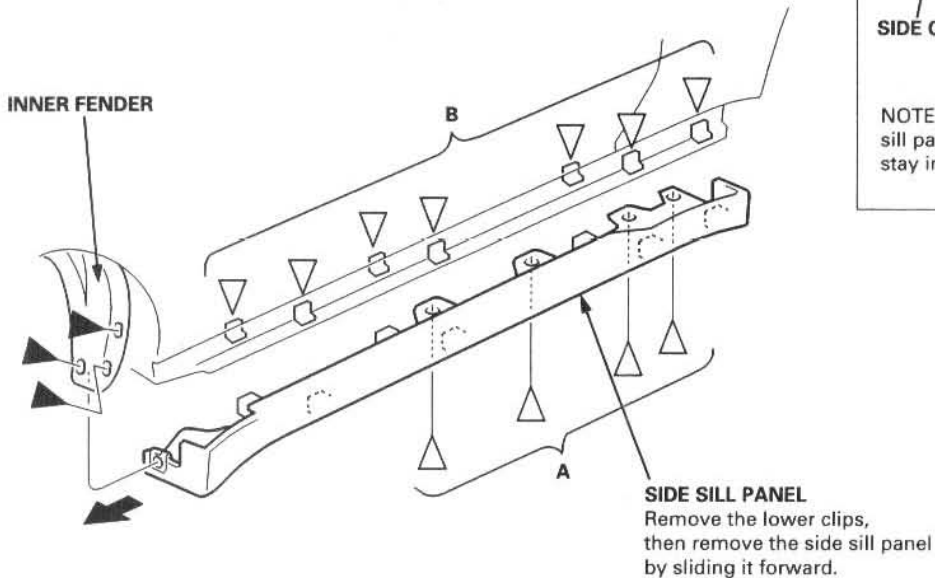
SIDE CLIP

Remove the side clips from the body by turning them 45°

▶: Screw locations, 3



NOTE: When removing the side sill panel, the side clips will stay in the body.



SIDE SILL PANEL

Remove the lower clips, then remove the side sill panel by sliding it forward.

To install the side sill panel, remove the side clips from the body, install them on the side sill panel, then install the side sill panel on the vehicle.

NOTE:

- Take care not to twist the side sill panel.
- If necessary, replace any damaged clips.



Inner Fender, Fenderwell Trim, Fuel Pipe Protector and Rear Air Outlet Removal/Installation

NOTE: If necessary, replace any damaged clips.

Inner fender:

►: Bolt, screw locations

A ►, 1

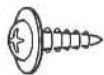
B ►, 3

C ►, 1



6 x 1.0 mm
9.8 N·m (1.0 kgf·m,
7.2 lbf·ft)

D ►, 4



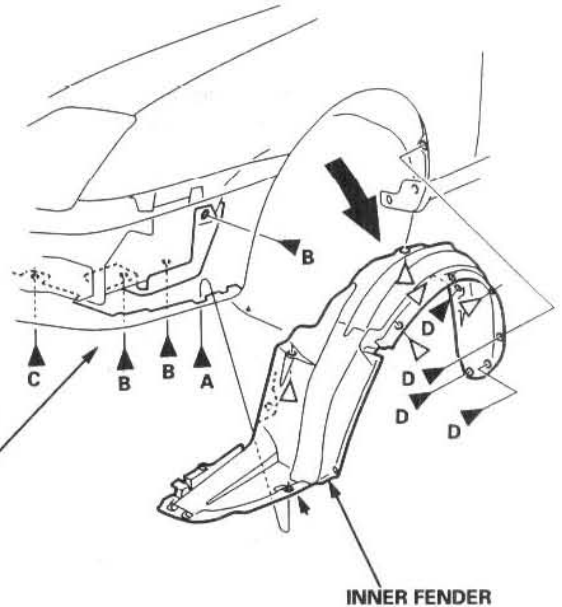
▷: Clip locations, 5



FRONT BUMPER

INNER FENDER

SPLASH SHIELD



Fenderwell trim/Fuel pipe protector/Rear air outlet:

NOTE:

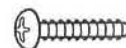
- Take care not to bend the fenderwell trim.
- Before installing the fenderwell trim, clean the body bonding surface with a sponge dampened in alcohol.
- After cleaning, keep oil, grease or water from getting on the surface.
- To remove the fuel pipe protector, first remove the rear wheel (see section 18).
- To remove the rear air outlet, first remove the rear bumper (see page 20-67).

►: Screw locations

A ►, 1

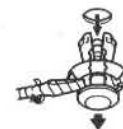


B ►, 2

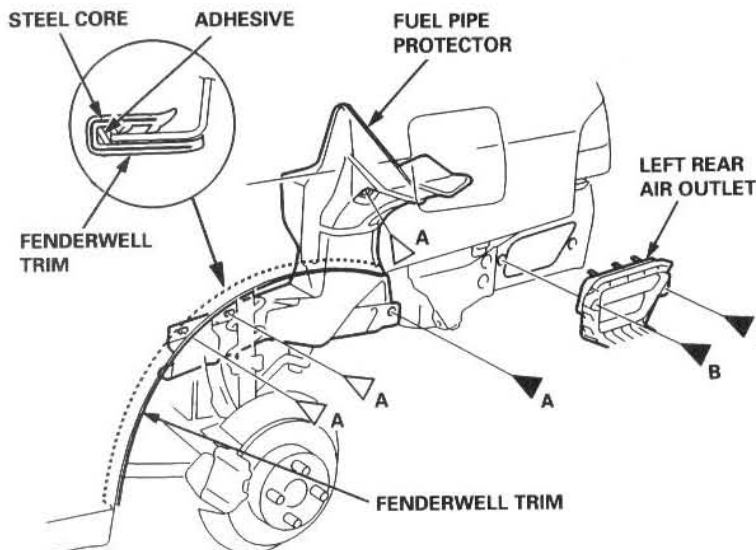
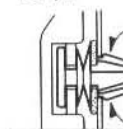


▷: Clip locations

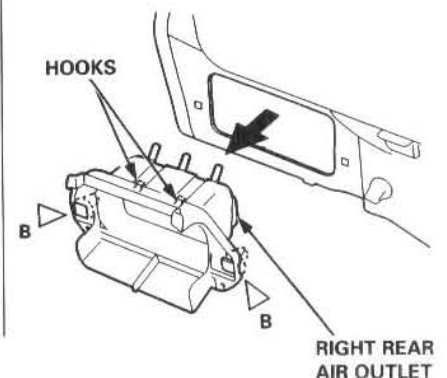
A ▷, 3



B ▷, 2

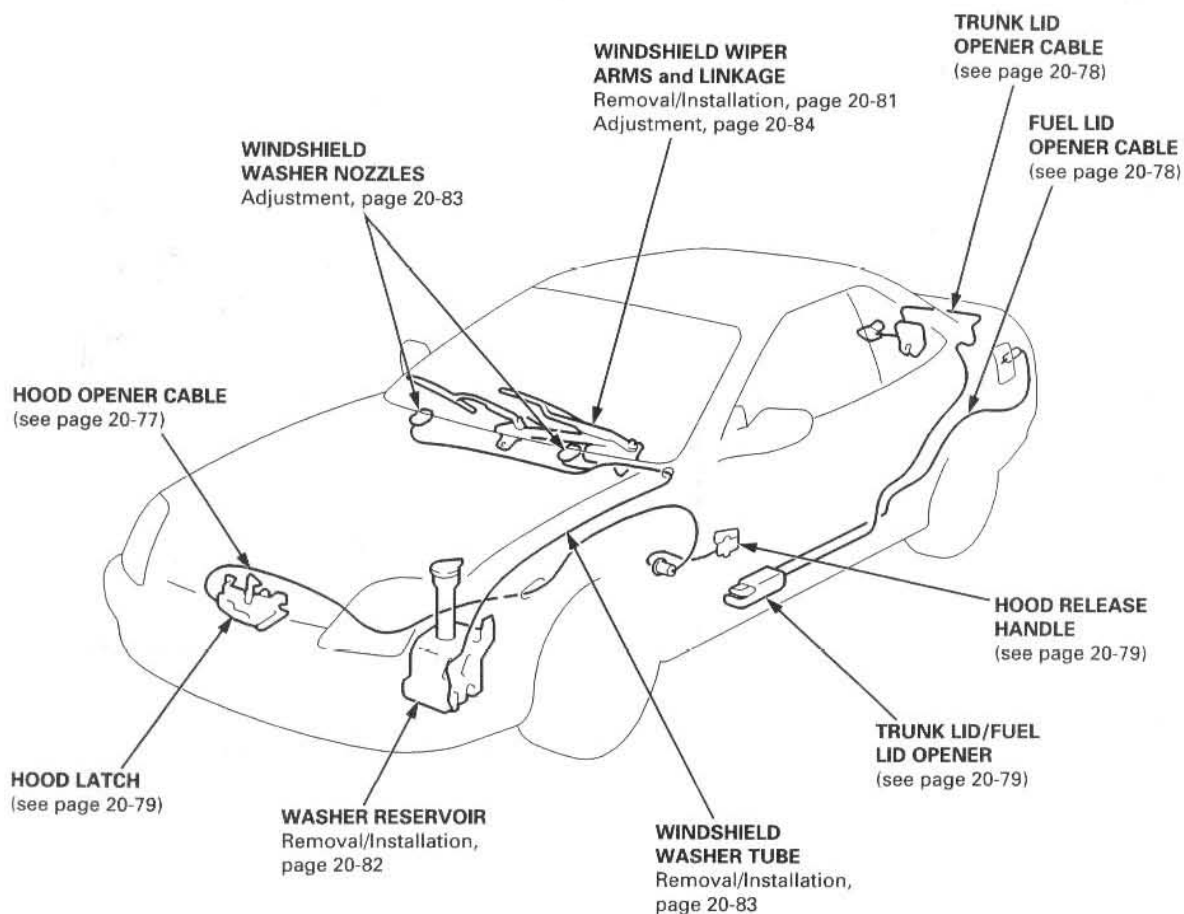


NOTE: Remove the rear trim panel and right trunk side trim (see page 20-42).



Opener Cable/Opener and Latch/Wiper and Washer

Component Location Index



FUEL LID LATCH
(see page 20-80)

TRUNK LID LATCH
(see page 20-80)

LOCK CYLINDER
(see page 20-80)



Opener Cables Removal/Installation

NOTE:

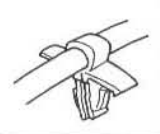
- Use a clip remover to remove the clips.
- Take care not to bend the opener cables.

Hood opener cable:

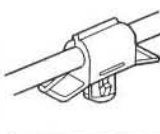
NOTE: Remove the inner fender (see page 20-75) and kick panel (see page 20-41).

▷: Clip locations

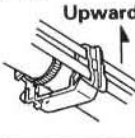
A ▷, 2



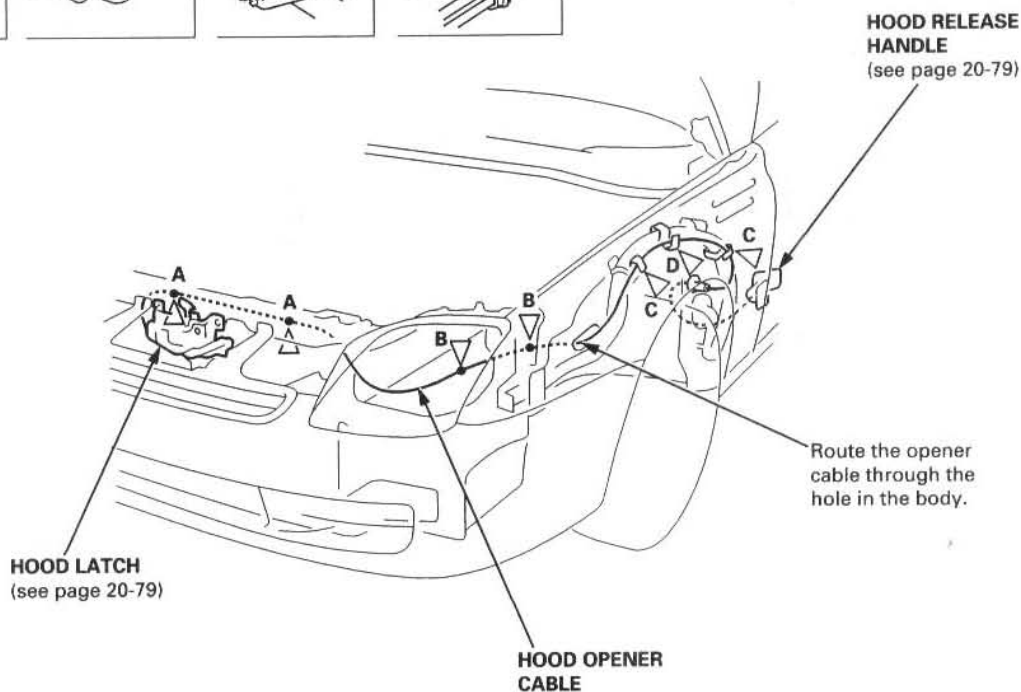
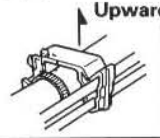
B ▷, 2



C ▷, 2



D ▷, 1



Installation is the reverse of the removal procedure.

NOTE:

- Make sure the hood opener cable is routed and connected properly.
- Make sure the hood opens properly.

(cont'd)

Opener Cable/Opener and Latch/Wiper and Washer

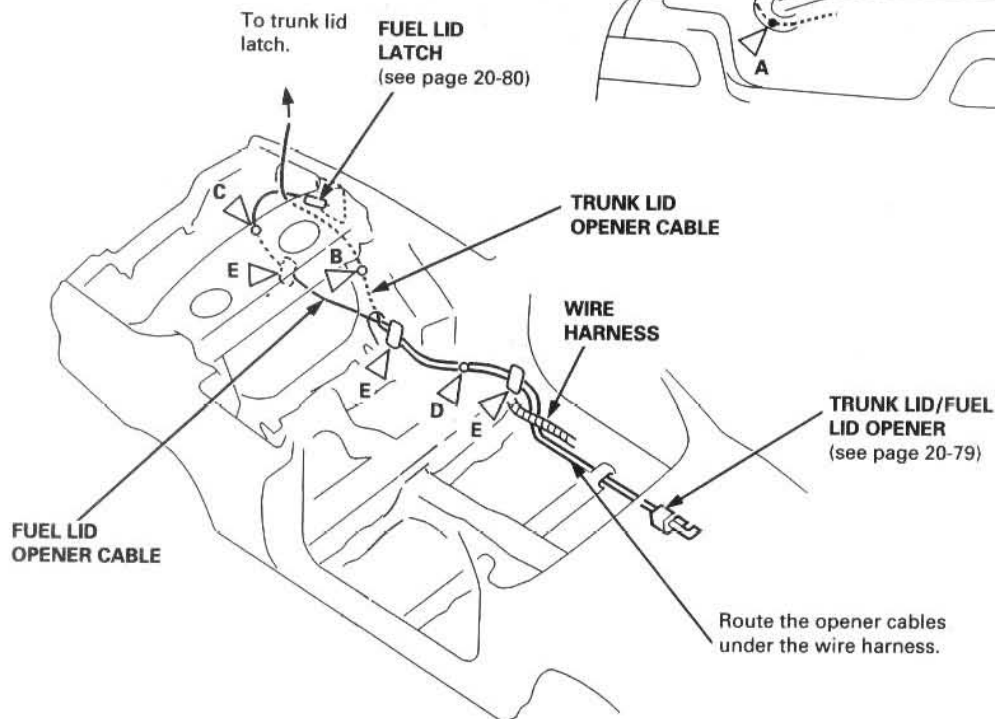
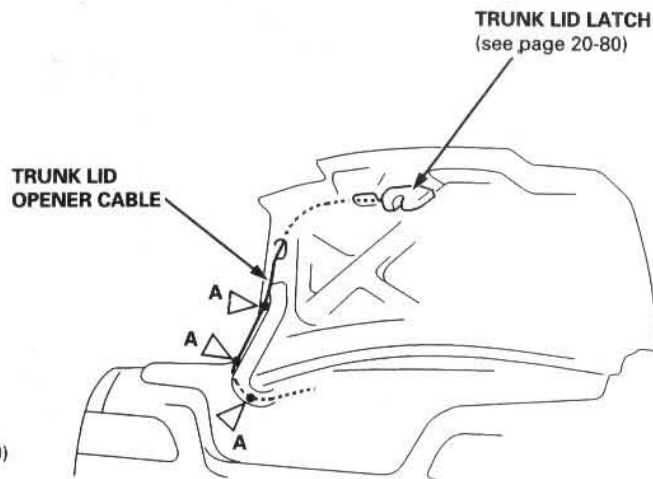
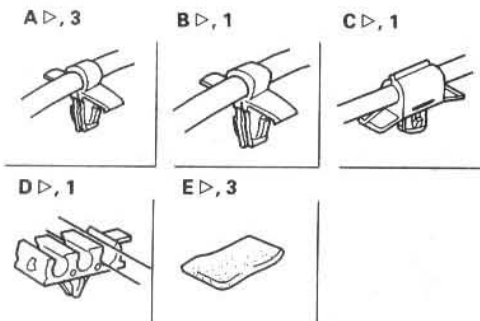
Opener Cable Removal/Installation (cont'd)

Trunk lid/Fuel lid opener cable:

NOTE: Remove the following parts, then pull the carpet back, as necessary (see page 20-44).

- Rear seat cushion (see page 20-60)
- Rear seat-back (see page 20-60)
- Door sill molding (left side, see page 20-41)
- Door trim (left side, see page 20-41)
- Rear pillar trim (left side, see page 20-41)
- Rear bulkhead upper trim (see page 20-41)
- Quarter trim panel (left side, see page 20-41)
- Trunk mat and spare tire lid
- Rear trim panel (see page 20-42)
- Trunk side trim (left side, see page 20-42)

▷: Clip, cable cushion locations



Installation is the reverse of the removal procedure.

NOTE:

- Make sure each opener cable is routed and connected properly.
- Make sure the trunk lid and fuel lid open properly.



Opener and Latch Removal/Installation

NOTE: Take care not to bend the opener cables.

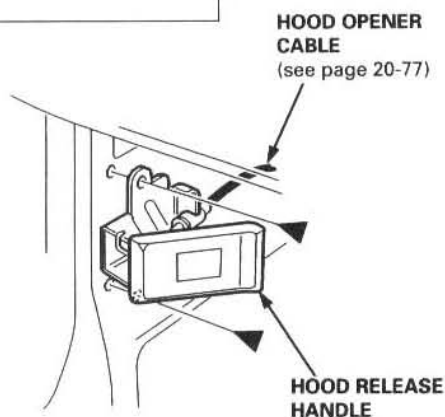
Hood release handle:

NOTE: Remove the kick panel (see page 20-41).

►: Bolt locations, 2



6 x 1.0 mm
9.8 N·m (1.0 kgf·m,
7.2 lbf·ft)

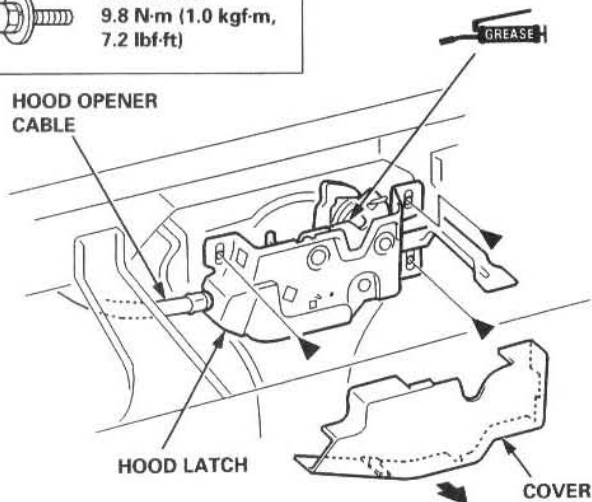


Hood latch:

►: Bolt locations, 3



6 x 1.0 mm
9.8 N·m (1.0 kgf·m,
7.2 lbf·ft)



Installation is the reverse of the removal procedure.

NOTE:

- Make sure the opener cable is connected properly.
- Make sure the hood opens properly and locks securely.

Trunk lid/Fuel lid opener:

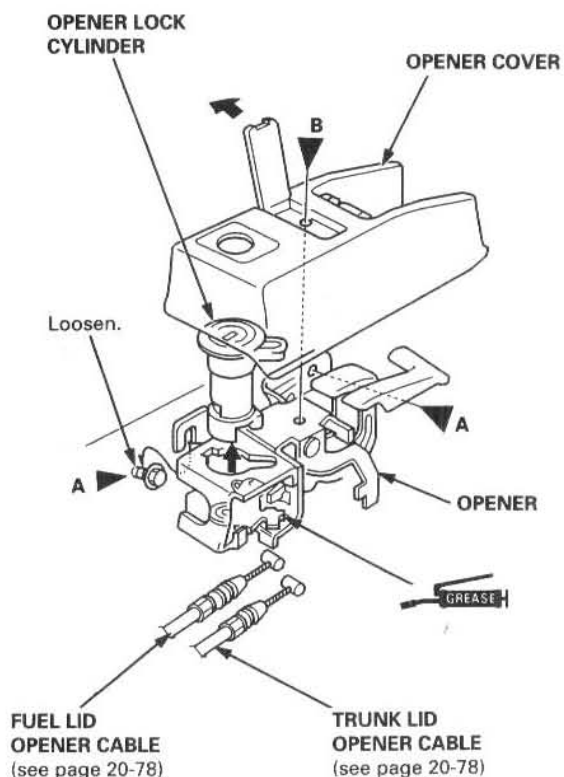
►: Bolt, screw locations

A ►, 2



6 x 1.0 mm
9.8 N·m (1.0 kgf·m,
7.2 lbf·ft)

B ►, 1



Installation is the reverse of the removal procedure.

NOTE:

- Make sure the opener cable is connected properly.
- Make sure the trunk lid and fuel lid open properly.

(cont'd)

Opener Cable/Opener and Latch/Wiper and Washer

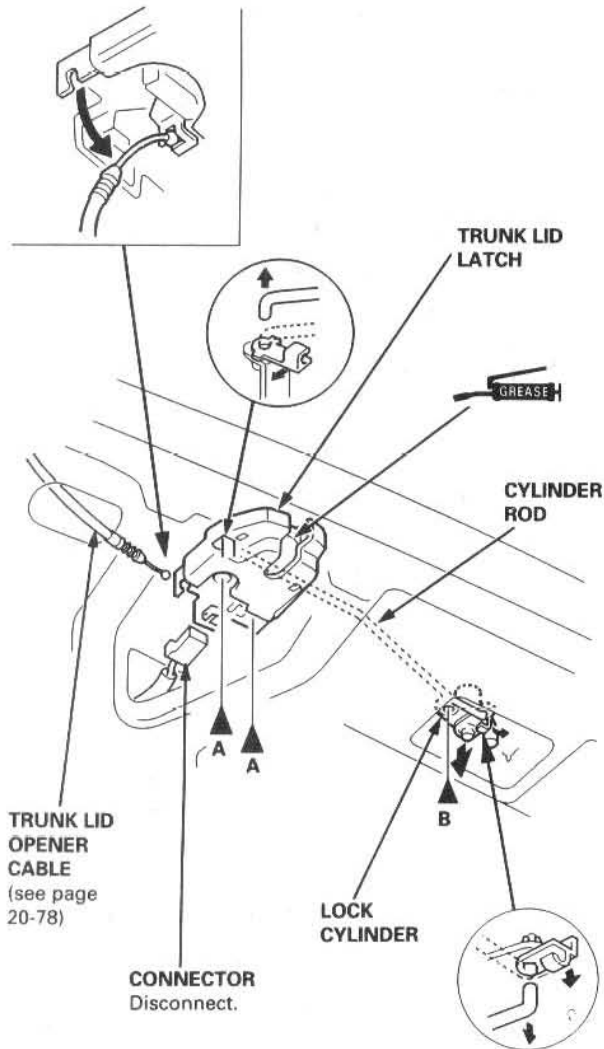
Opener and Latch Removal/Installation (cont'd)

Trunk lid latch/Lock cylinder:

►: Bolt locations

A ►, 2 B ►, 1

6 x 1.0 mm
9.8 N-m (1.0 kgf-m,
7.2 lbf-ft)



Installation is the reverse of the removal procedure.

NOTE:

- Grease the trunk lid latch as shown.
- Make sure the trunk lid opens properly and locks securely.
- Make sure the connector, cylinder rod and opener cable are connected properly.

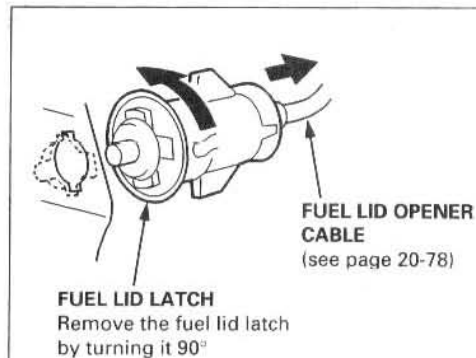
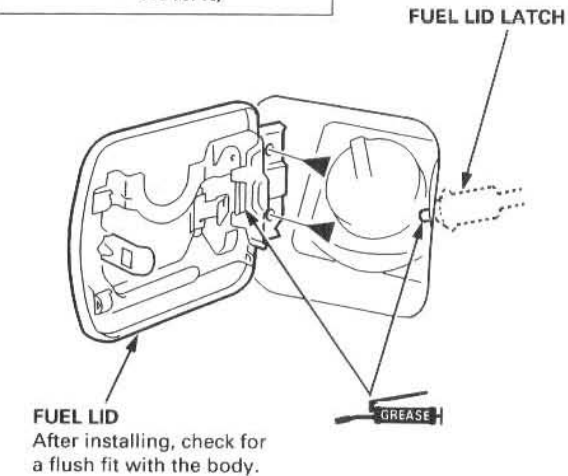
Fuel lid latch:

NOTE: Remove the following parts.

- Rear trim panel (see page 20-42)
- Rear edge of the trunk side trim (left side, see page 20-42)

►: Bolt locations, 2

6 x 1.0 mm
9.8 N-m (1.0 kgf-m,
7.2 lbf-ft)



Installation is the reverse of the removal procedure.

NOTE:

- Make sure each opener cable is connected properly.
- Make sure the fuel lid opens properly and locks securely.



Windshield Wiper Arms and Windshield Wiper Linkage Removal/Installation

CAUTION: Wear gloves to remove and install the windshield wiper linkage.

NOTE: Take care not to scratch the hood and body.

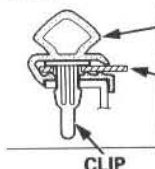
1. Remove the windshield wiper arms, then remove the cowl cover.

▷: Clip locations

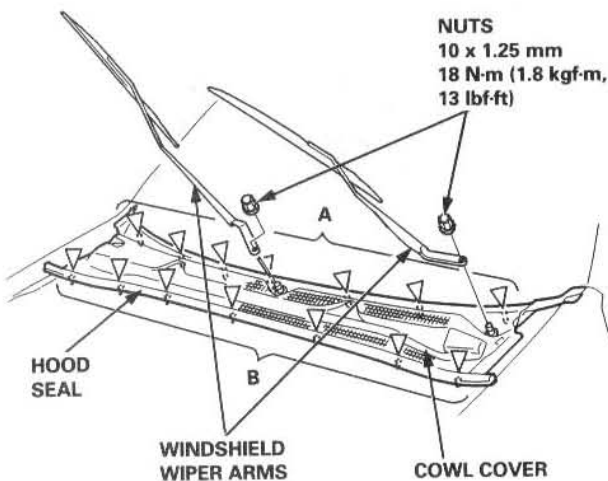
A ▷, 7



B ▷, 7



HOOD SEAL
COWL COVER
CLIP



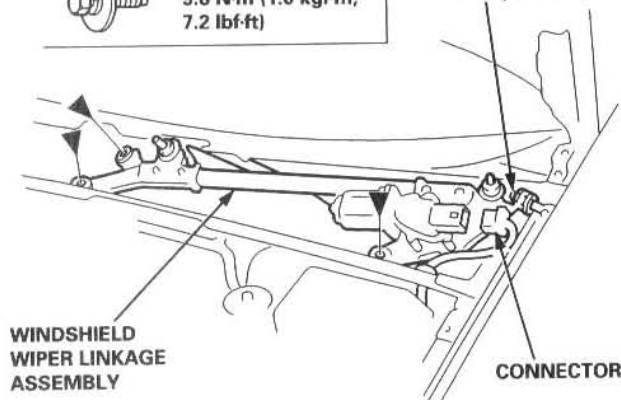
2. Disconnect the connector, then remove the windshield wiper linkage assembly.

▷: Bolt locations, 3



6 x 1.0 mm
9.8 N-m (1.0 kgf-m,
7.2 lbf-ft)

PIN
(Body side)



3. Separate the windshield wiper linkage and windshield wiper motor.

NOTE: Scribe a line across the link and windshield wiper linkage to show the original adjustment.

●: Nut location, 1

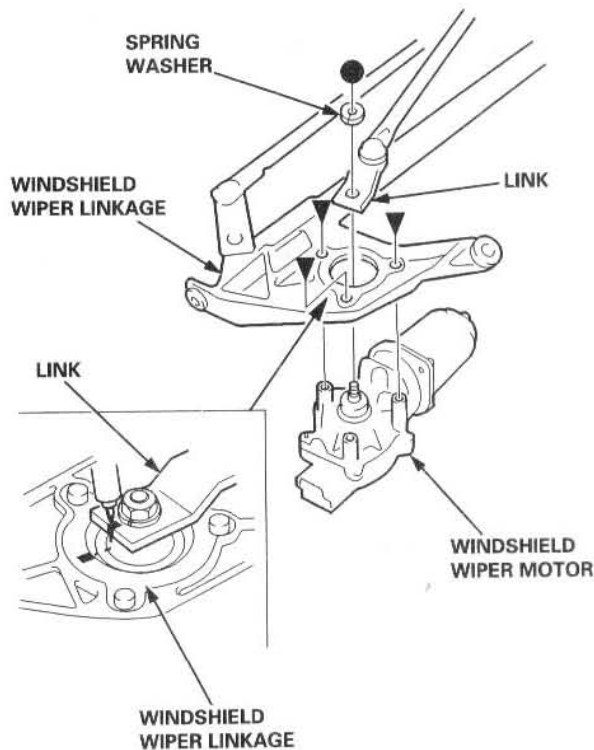


8 x 1.25 mm
15 N-m (1.5 kgf-m,
11 lbf-ft)

▷: Bolt locations, 3



6 x 1.0 mm
8 N-m (0.8 kgf-m,
5.8 lbf-ft)



4. Installation is the reverse of the removal procedure.

NOTE:

- Make sure the connector is connected properly.
- Check the windshield wiper motor operation.
- Grease the moving parts.
- If necessary, replace any damaged clips.
- Adjust the windshield wiper arms as described on page 20-84.

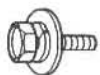
Opener Cable/Opener and Latch/Wiper and Washer

Washer Reservoir Removal/Installation

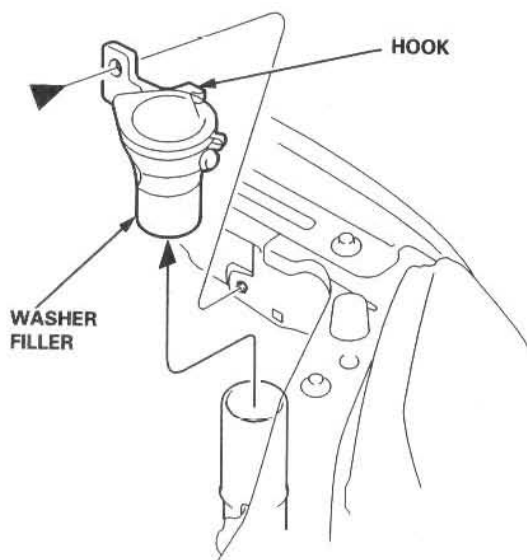
CAUTION: Wear gloves to remove and install the washer reservoir.

1. Remove the bolt, then pull out the washer filler.

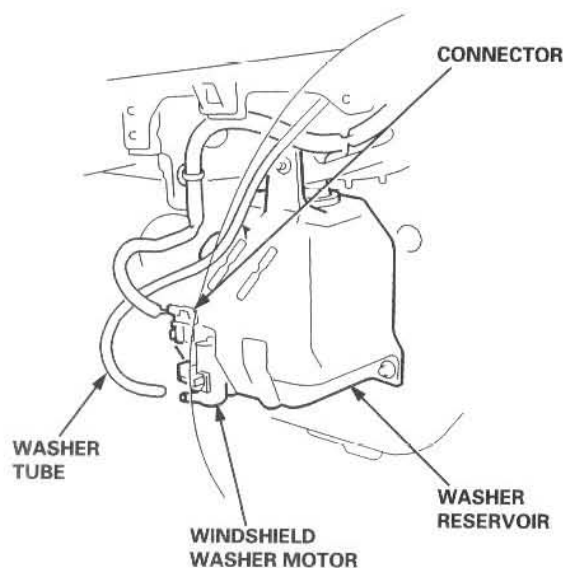
►: Bolt location, 1



6 x 1.0 mm
9.8 N·m (1.0 kgf·m,
7.2 lbf·ft)



2. Pull away the inner fender as necessary (see page 20-75).
3. Disconnect the washer tube and washer motor connector.



4. Remove the washer reservoir.

►: Bolt locations, 3



6 x 1.0 mm
9.8 N·m (1.0 kgf·m,
7.2 lbf·ft)



5. Installation is the reverse of the removal procedure.

NOTE:

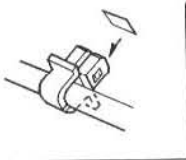
- Make sure the washer motor connector and washer tube are connected properly.
- Check the washer motor operation.



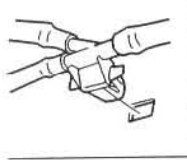
Washer Tube Removal/Installation

NOTE: Remove the left inner fender (see page 20-75).

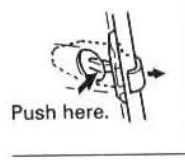
▷: Clip locations
A ▷, 3



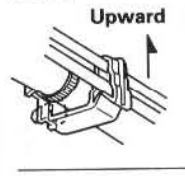
B ▷, 1



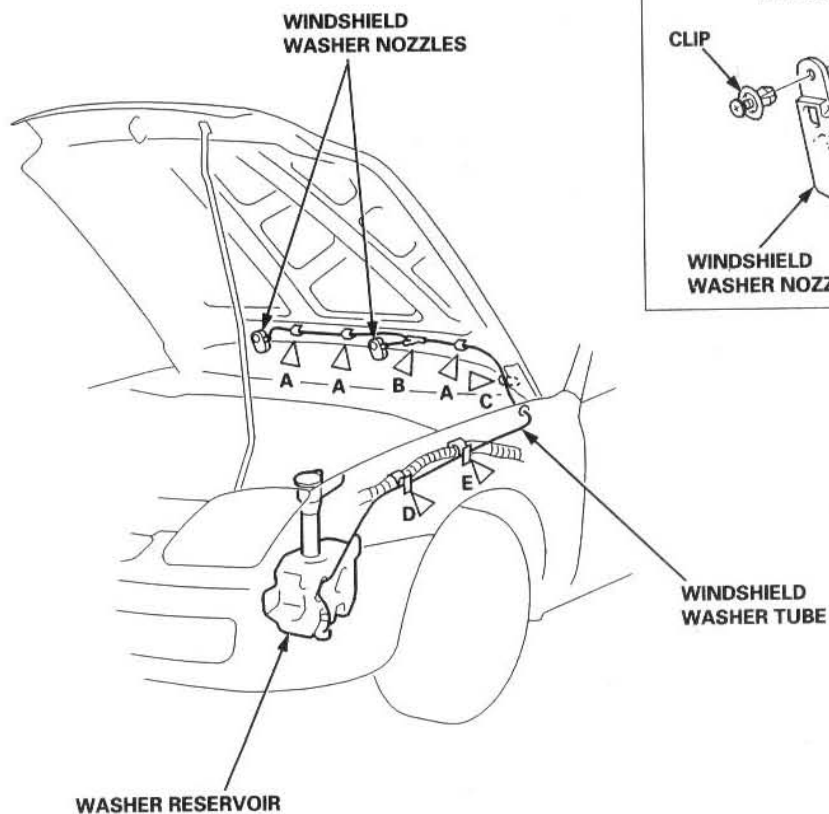
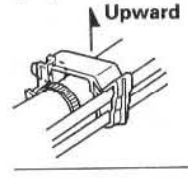
C ▷, 1



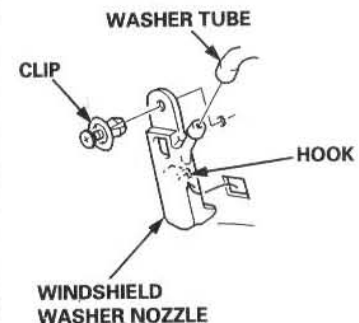
D ▷, 1



E ▷, 1



Washer nozzle removal:



Installation is the reverse of the removal procedure.

NOTE:

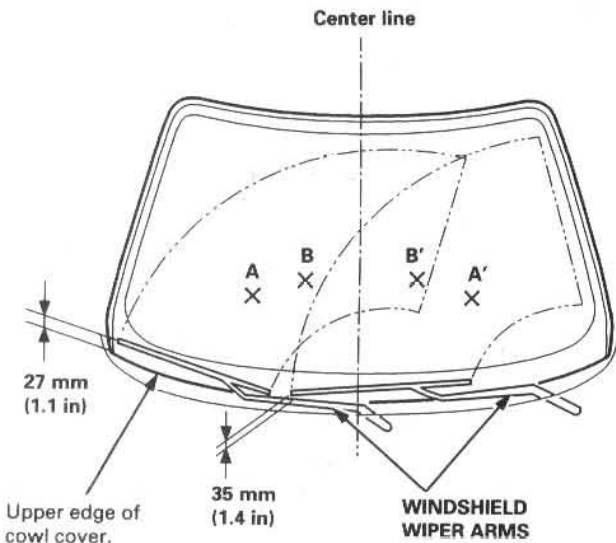
- Take care not to pinch the washer tube.
- If necessary, replace any damaged clips.
- After installing, adjust the aim of the windshield washer nozzles (see page 20-84).

Opener Cable/Opener and Latch/Wiper and Washer

Windshield Wiper Arms/Washer Nozzle Adjustment

1. Adjust the wiper arms so that their park positions match the illustration.

View from front to rear



2. By inserting a tack and moving it as necessary, adjust the washer nozzles so that they aim at positions A, A', B, and B' shown in the illustration.

Distance Nozzle aim	from center line	from upper edge of cowl cover
A and A'	319 mm (12.6 in)	310 mm (12.2 in)
B and B'	146 mm (5.7 in)	433 mm (17.0 in)



Installation

Apply the emblems where shown.

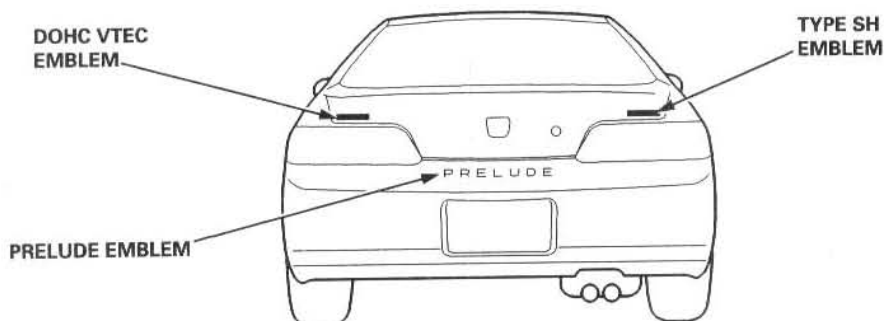
For PRELUDE emblem: Align the application tape with the upper edge of the rear bumper, as shown, then press the emblem into place. Remove the application tape.

For DOHC VTEC/TYPER SH emblem: Align the application tape with the edge of the trunk lid, as shown, then press the emblem into place. Remove the application tape.

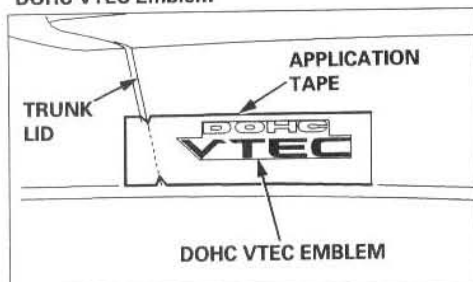
NOTE:

- Before applying, clean the body surface with a sponge dampened in alcohol.
- After cleaning, keep oil, grease and water from getting on the surface.
- When applying, make sure there are no wrinkles in the emblems.

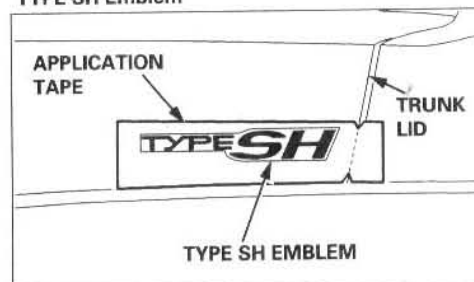
Attachment Points (Reference):



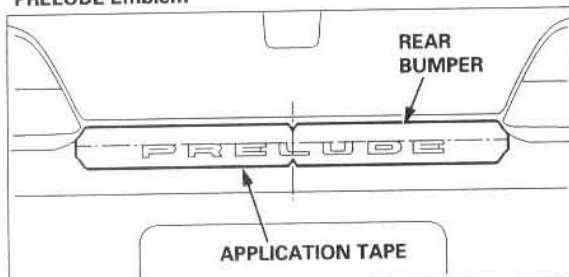
DOHC VTEC Emblem



TYPE SH Emblem



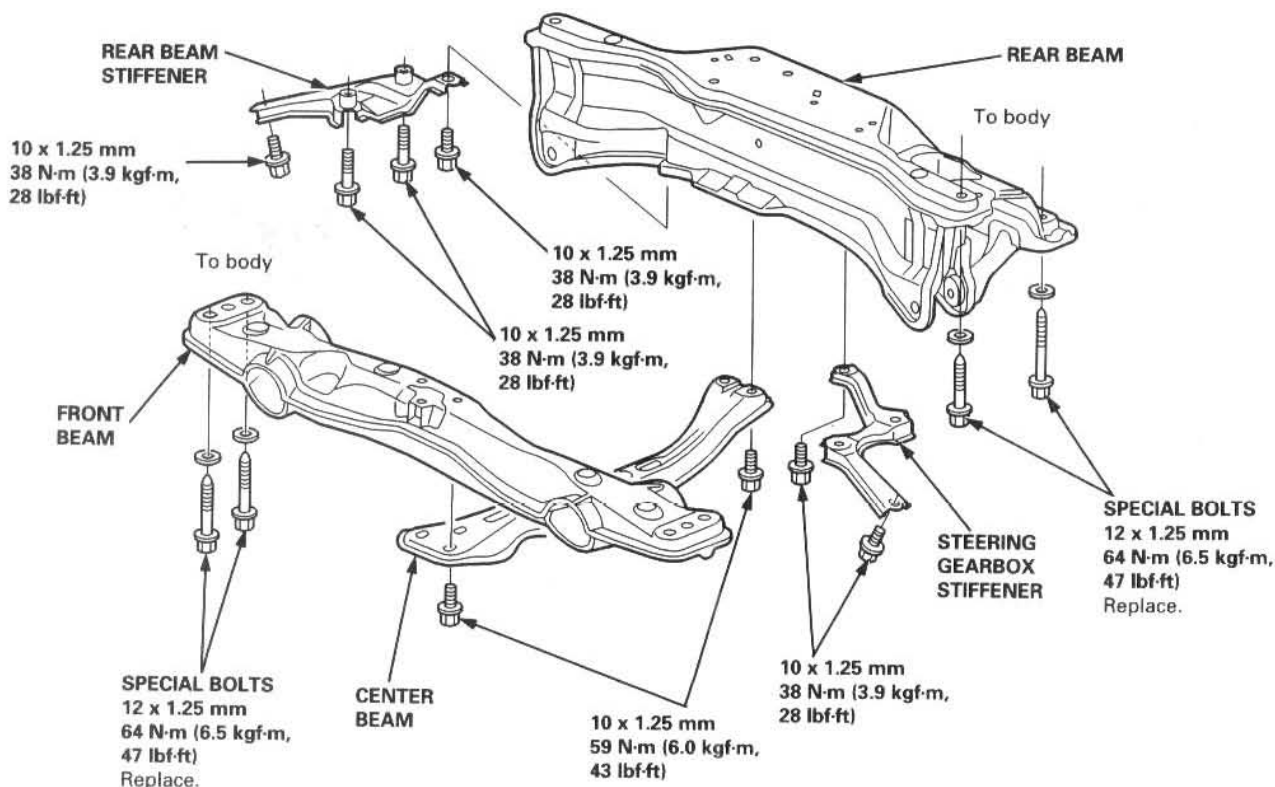
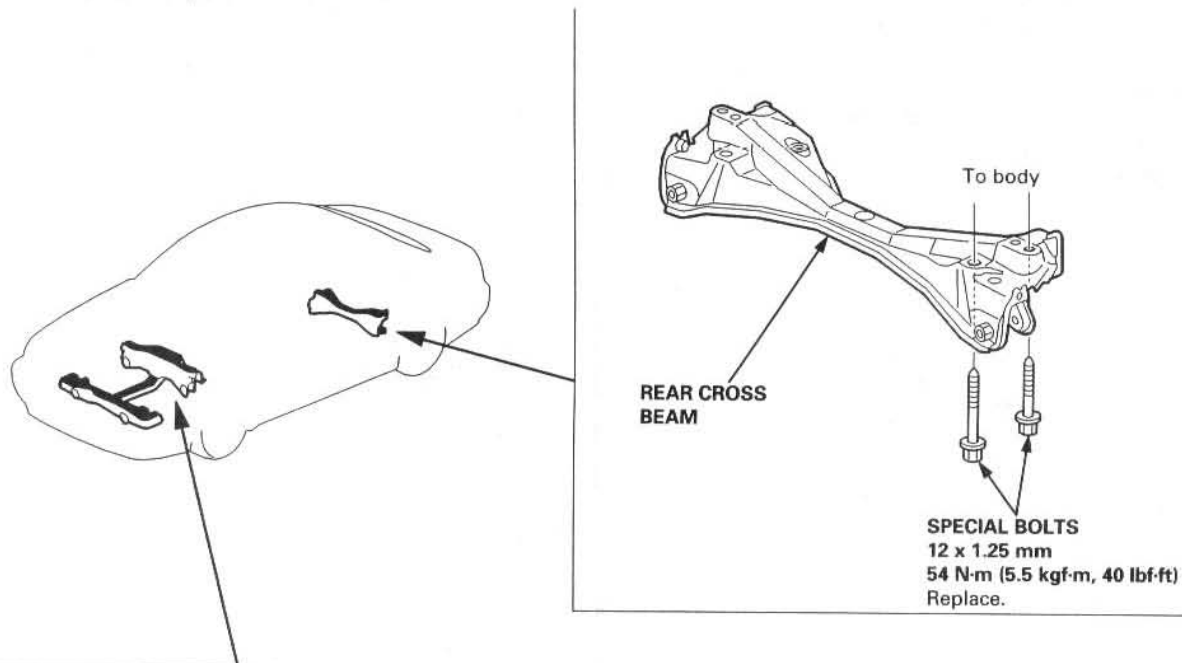
PRELUDE Emblem



Sub-frame

Sub-frame Torque Sequence:

CAUTION: After loosening the sub-frame mounting bolts, be sure to replace them with new ones.

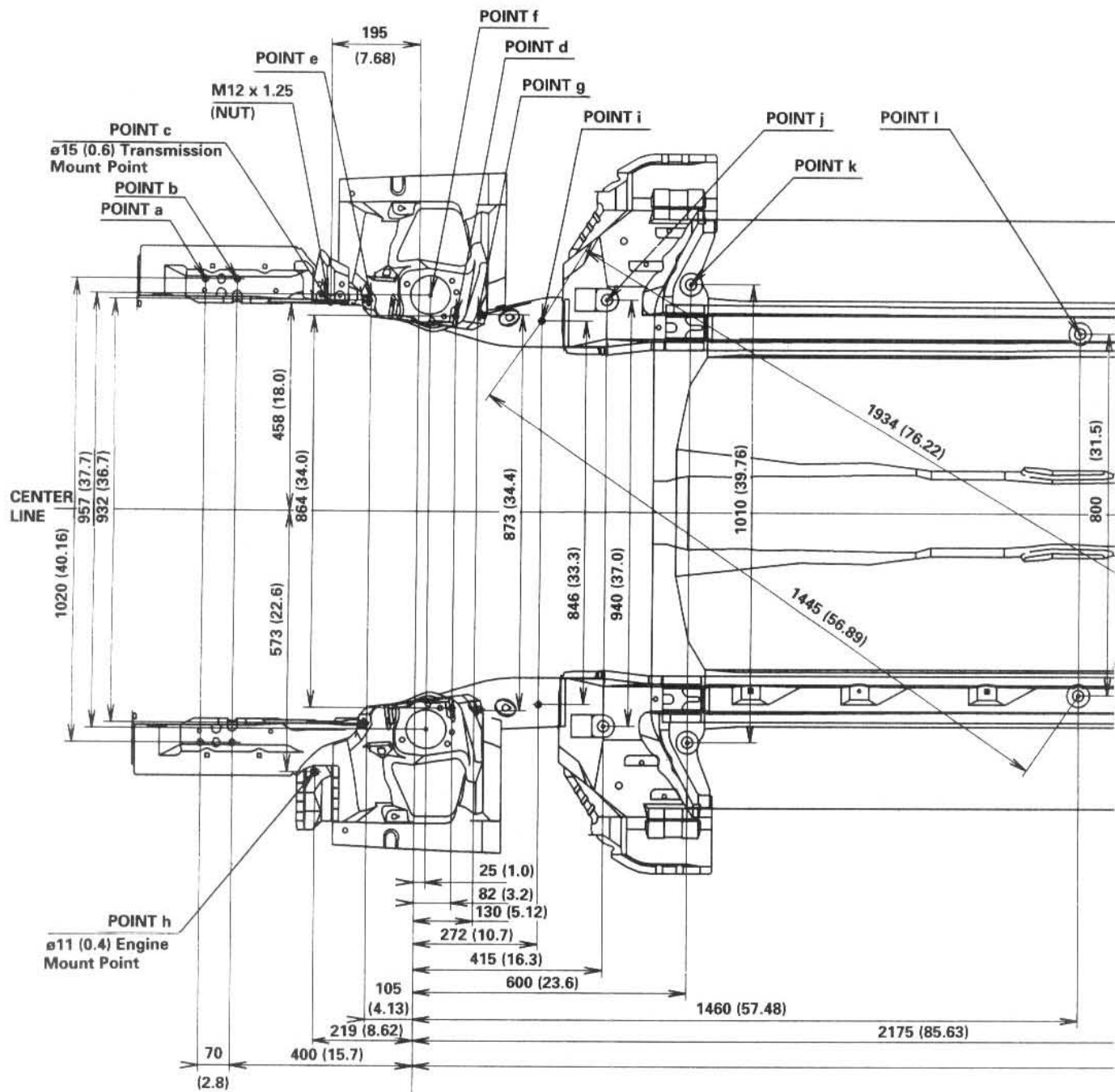


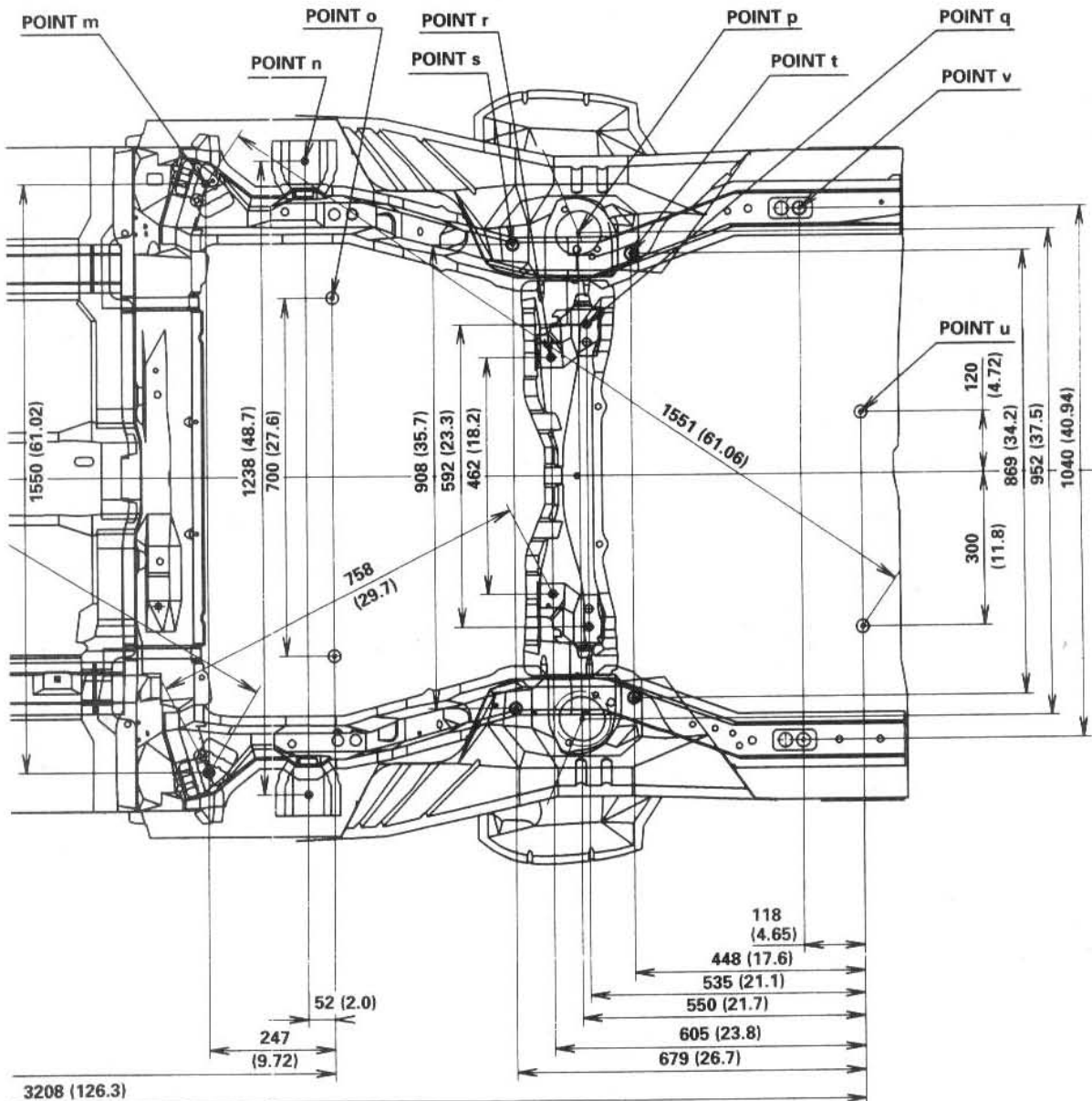
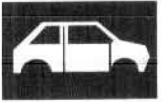


Frame Repair Chart

Top view:

Unit: mm (in)
ø: Inner diameter





(cont'd)

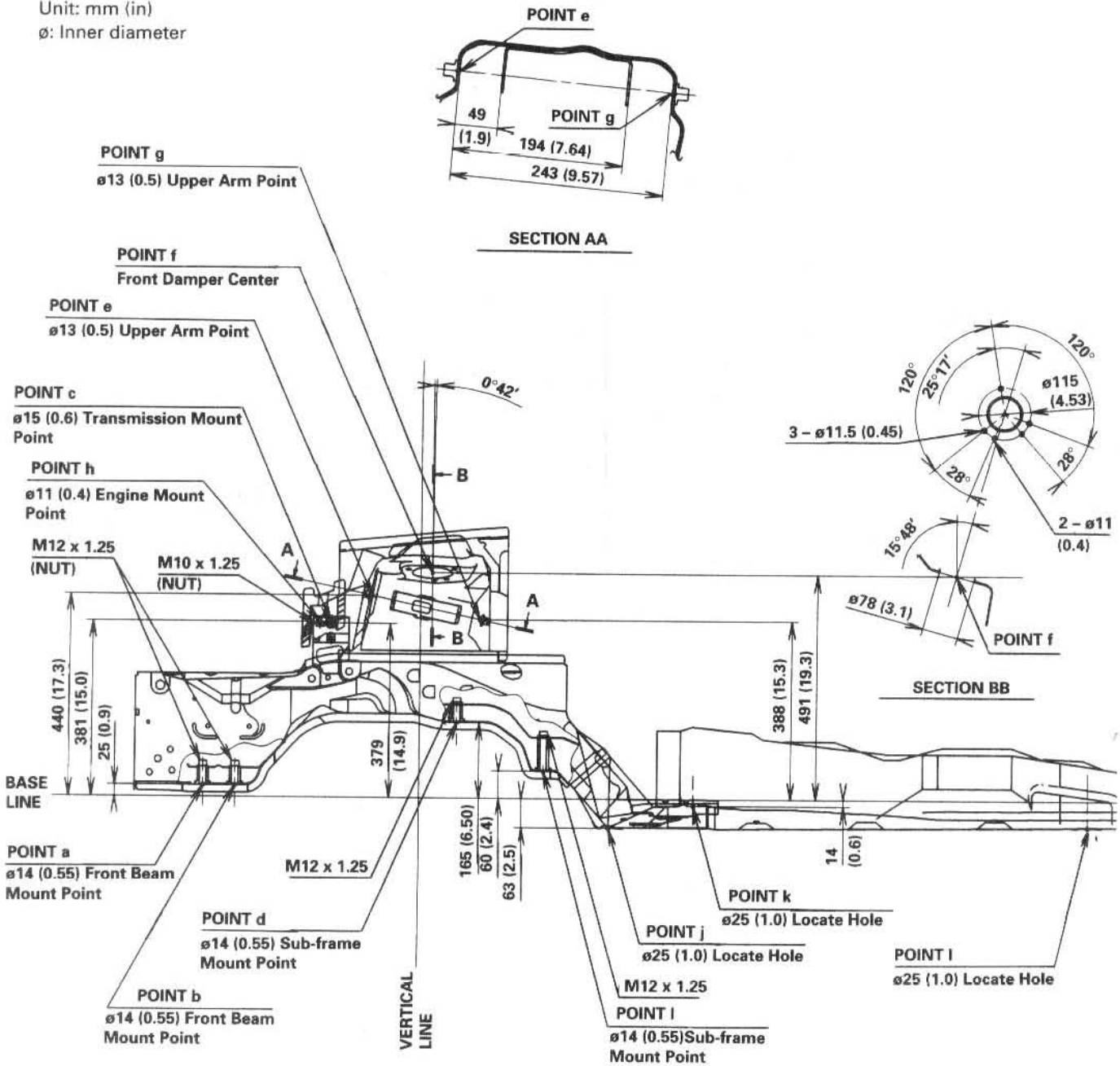
Frame Repair Chart

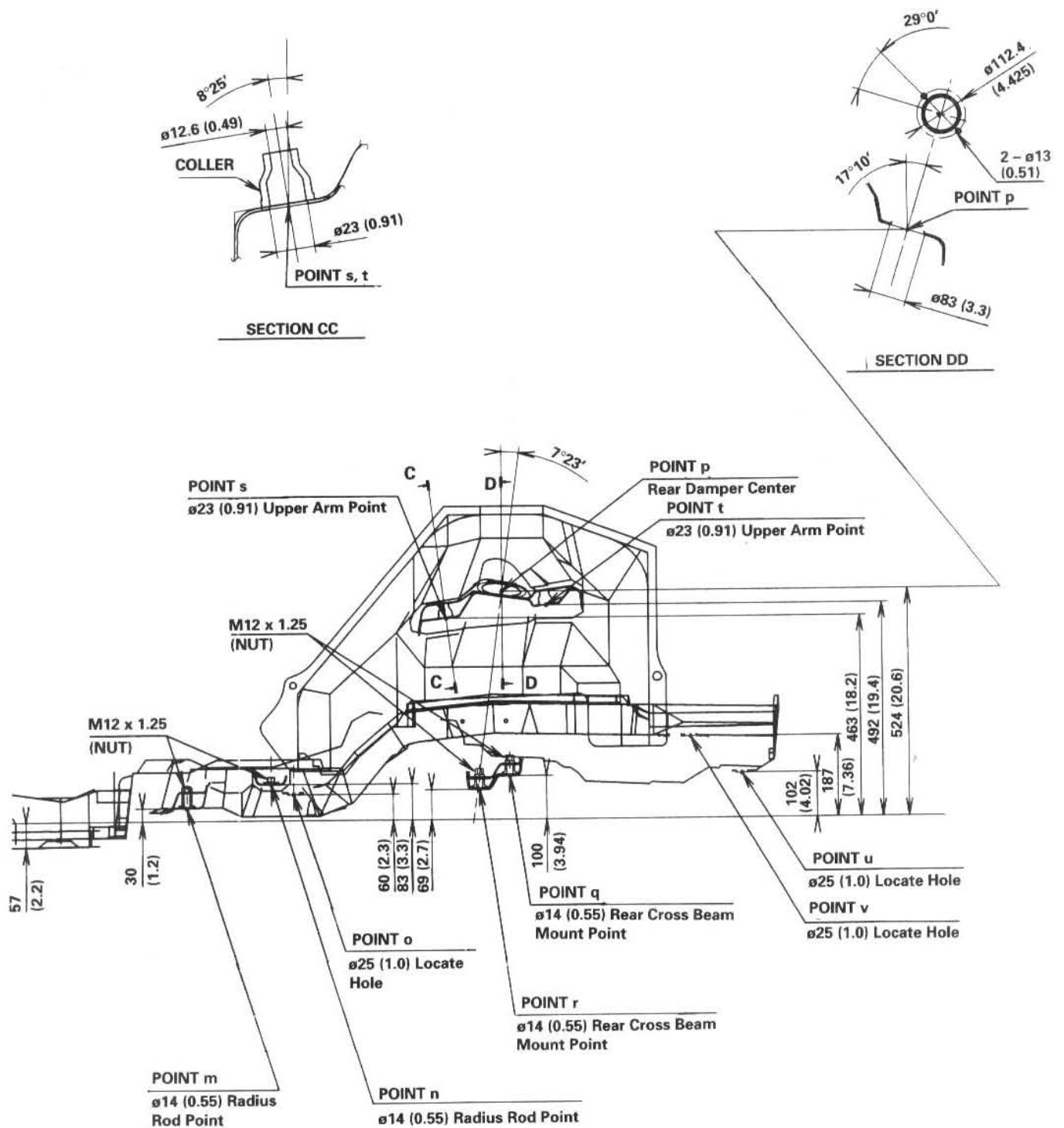
(cont'd)

Side view:

Unit: mm (in)

Ø: Inner diameter





Heater and Air Conditioning

Heater 21

NOTE: Section 21 ("Heater") is included in section 22.

Air Conditioning 22-1

SUPPLEMENTAL RESTRAINT SYSTEM (SRS)

The Prelude SRS includes a driver's airbag located in the steering wheel hub and a passenger's airbag located in the dashboard above the glove box. Information necessary to safely service the SRS is included in this Service Manual. Items marked with an asterisk (*) on the contents page include, or are located near, SRS components. Servicing, disassembling or replacing these items will require special precautions and tools, and should therefore be done by an authorized Honda dealer.

▲ WARNING

- To avoid rendering the SRS inoperative, which could lead to personal injury or death in the event of a severe frontal collision, all SRS service work must be performed by an authorized Honda dealer.
- Improper service procedures, including incorrect removal and installation of the SRS, could lead to personal injury caused by unintentional activation of the airbags.
- Do not bump the SRS unit. Otherwise, the system may fail in case of a collision, or the airbags may deploy when the ignition switch is ON (II).
- All SRS electrical wiring harnesses are covered with yellow insulation. Related components are located in the steering column, front console, dashboard, dashboard lower panel, and in the dashboard above the glove box. Do not use electrical test equipment on these circuits.



**Click here to go back to
the Introduction page**

Heater and Air Conditioning

Heater 21

NOTE: Section 21 ("Heater") is included in section 22.

Air Conditioning 22-1

Air Conditioning

Special Tools	22-2	A/C Filter – '99 Model	
Illustrated Index	22-3	Replacement	22-38
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Circuit Diagram	22-6	Replacement	22-39
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Troubleshooting		Evaporator	
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A/C Thermostat		Condenser	
Test	22-37	Replacement	22-63
Relays			
Test	22-38		

* Read SRS precautions before working in this area.



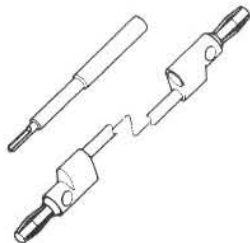
Special Tools

Ref. No.	Tool Number	Description	Qty	Page Reference
*①	07JGG – 001010A	Belt Tension Gauge	1	22-61
②	07SAZ – 001000A	Backprobe Set	2	22-29
③	07947 – 6340300	Driver Attachment	1	22-58
④	07965 – 6920500	Hub Assembly Guide Attachment	1	22-59

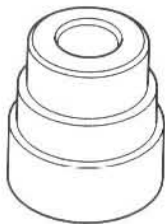
* Included in the Belt Tension Gauge Set, T/N 07TGG – 001000A



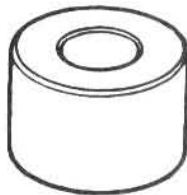
①



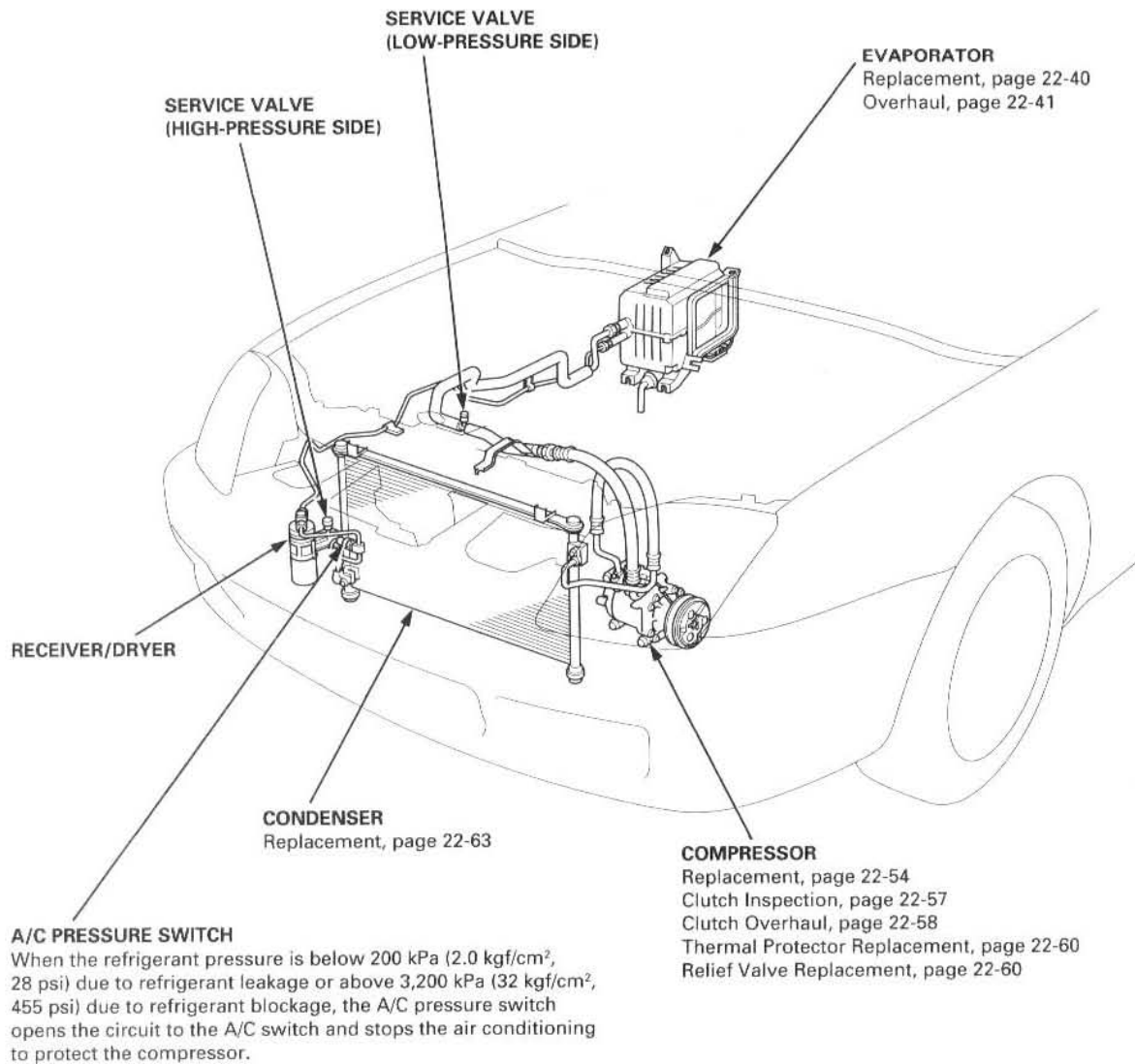
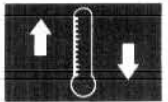
②



③



④

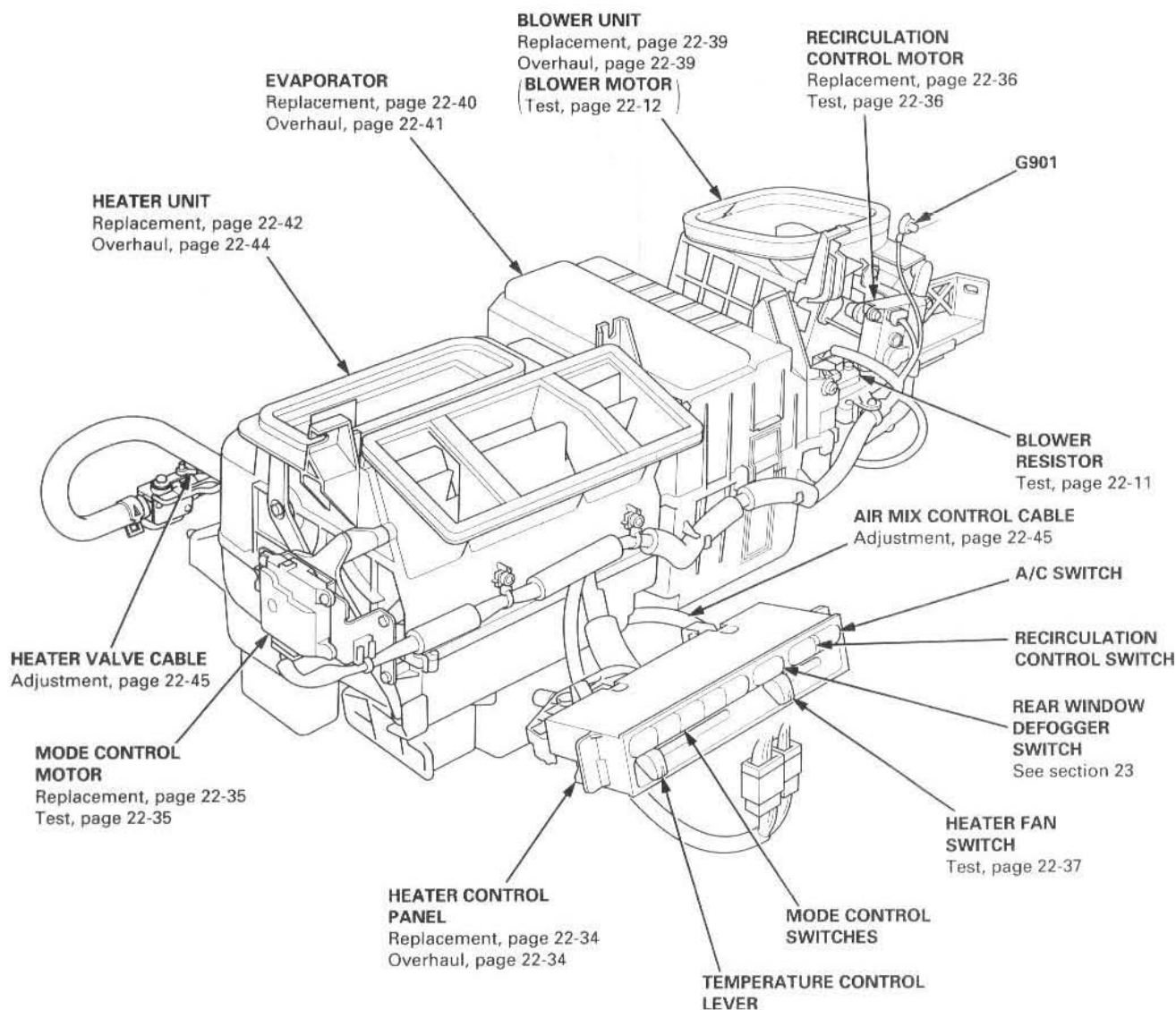


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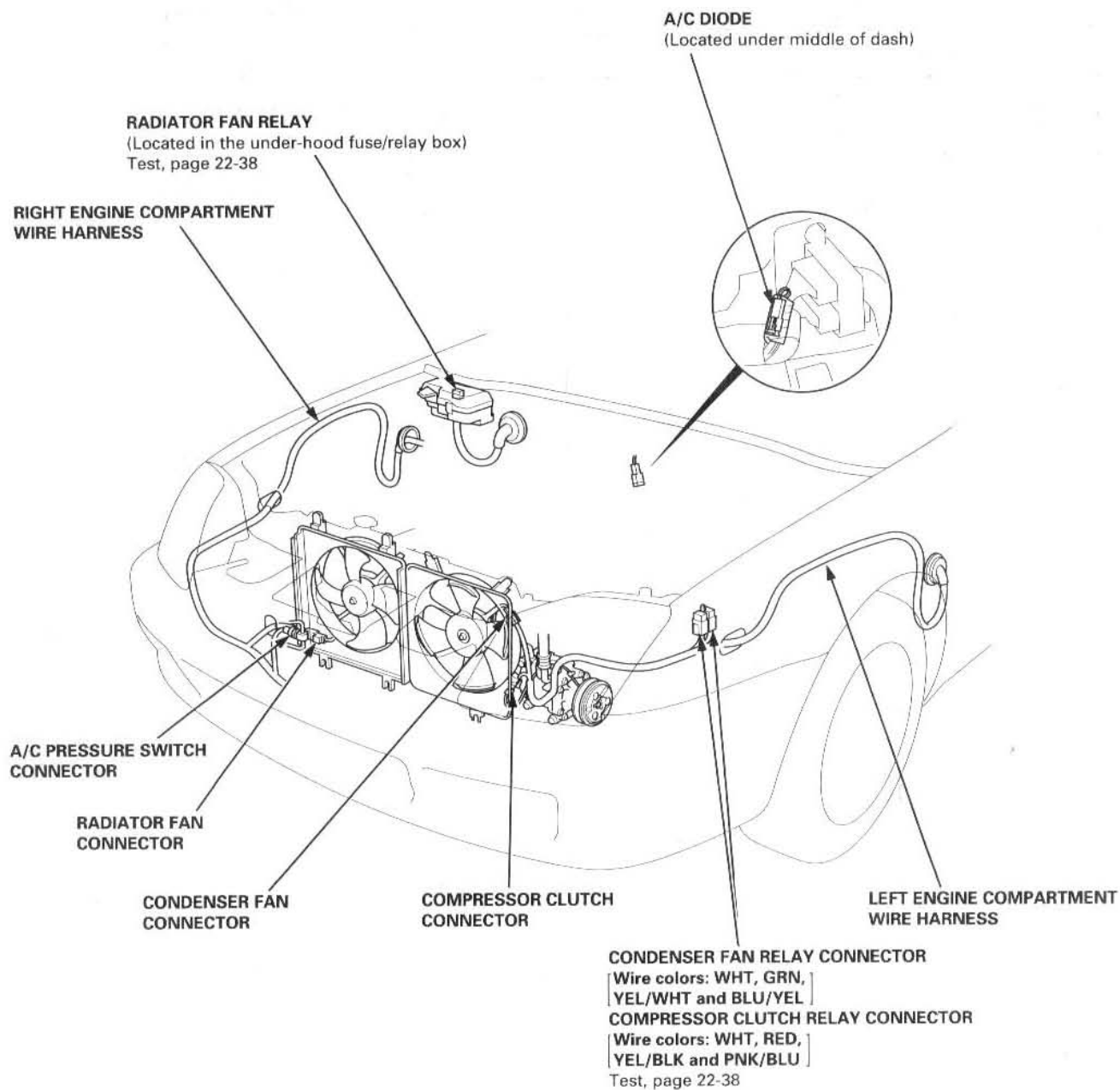
Illustrated Index

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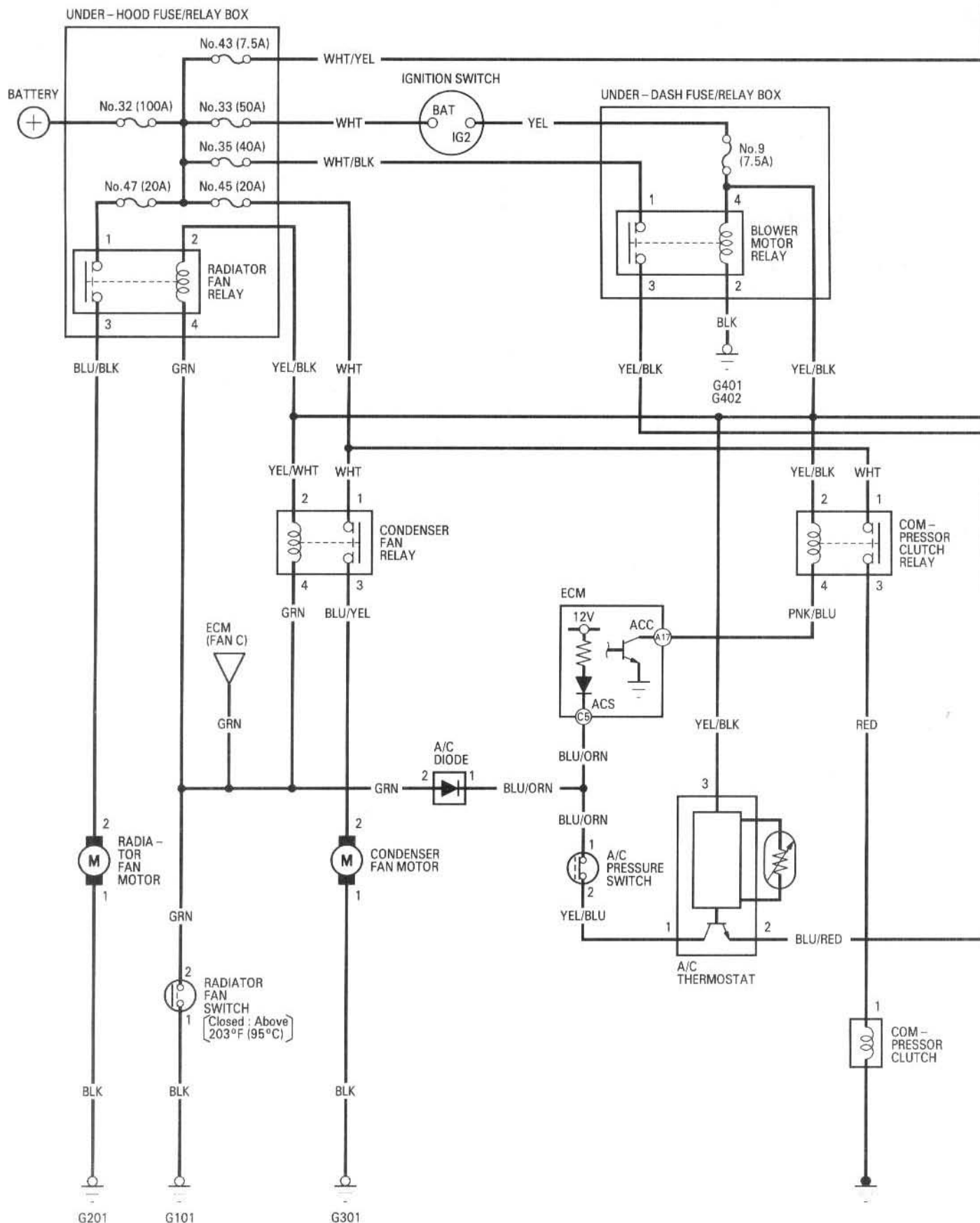
SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

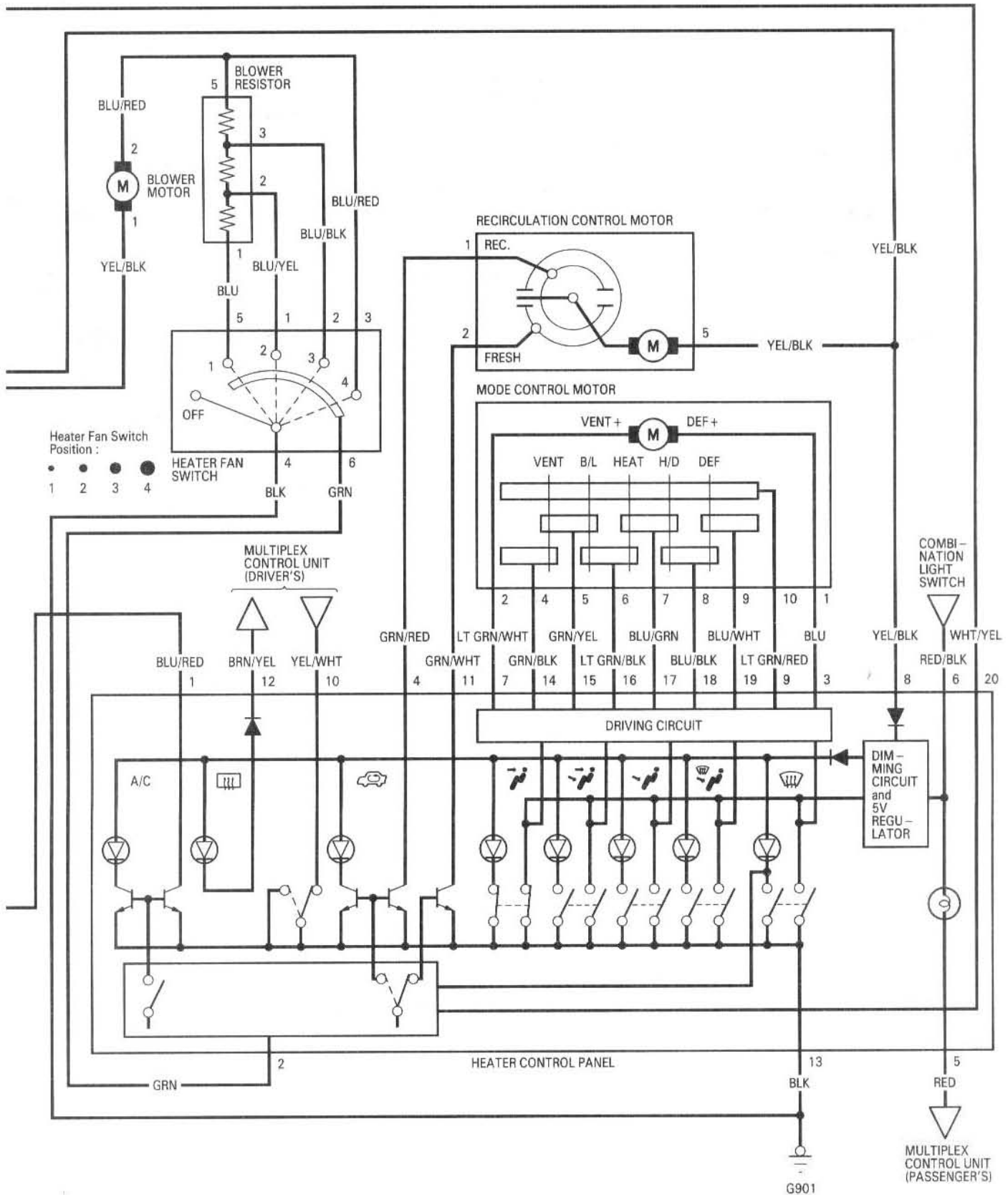
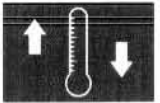


Wiring/Connector Locations



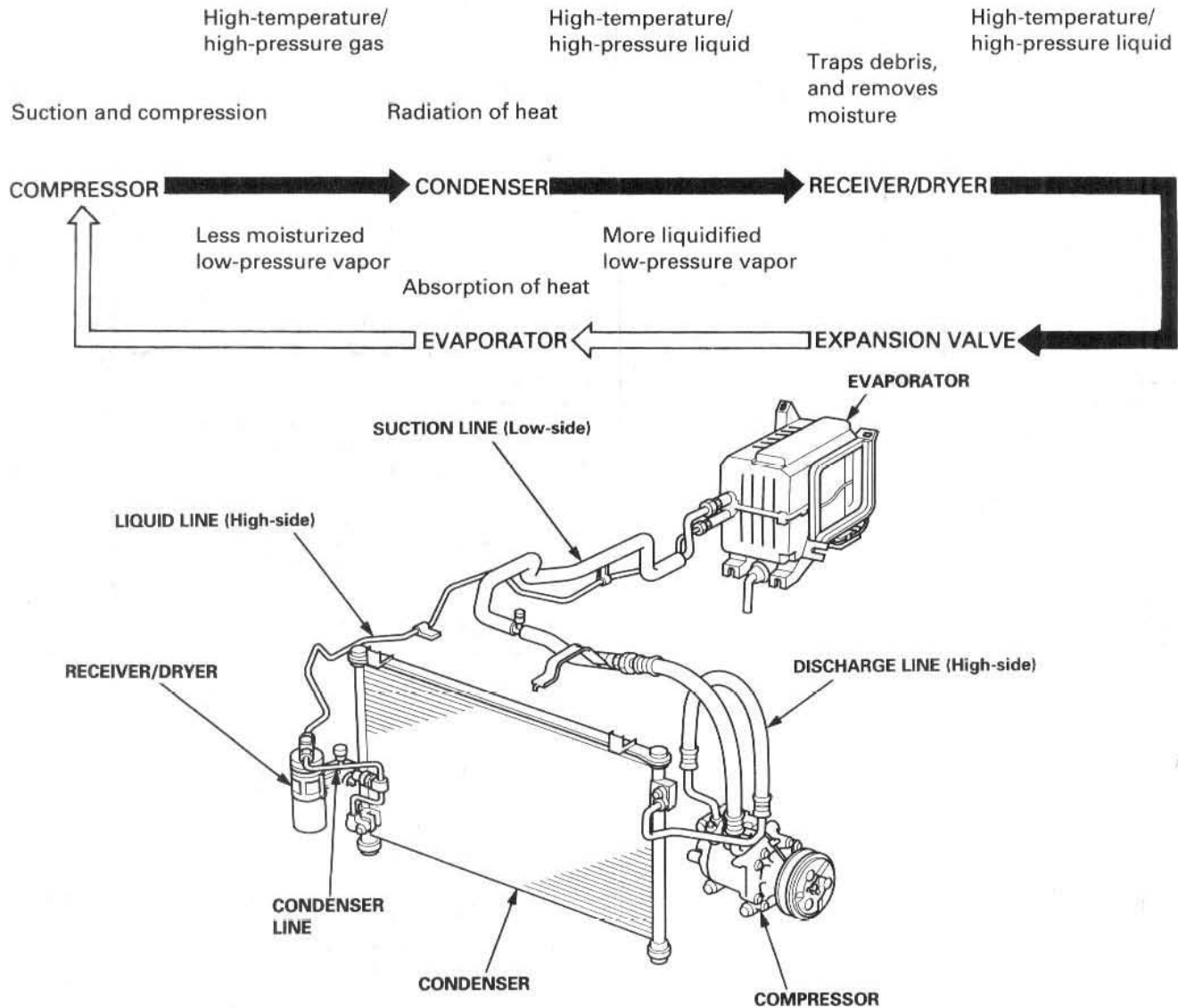
Circuit Diagram





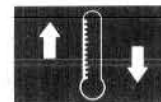
Description

The air conditioner system removes heat from the passenger compartment by circulating refrigerant through the system as shown below.



This vehicle uses HFC-134a (R-134a) refrigerant which does not contain chlorofluorocarbons. Pay attention to the following service items:

- Do not mix refrigerants CFC-12 (R-12) and HFC-134a (R-134a). They are not compatible.
- Use only the recommended polyalkyleneglycol (PAG) refrigerant oil (SP-10) designed for the R-134a compressor. Intermixing the recommended (PAG) refrigerant oil with any other refrigerant oil will result in compressor failure.
- All A/C system parts (compressor, discharge line, suction line, evaporator, condenser, receiver/dryer, expansion valve, O-rings for joints) have to be proper for refrigerant R-134a. Do not confuse with R-12 parts.
- Use a halogen gas leak detector designed for refrigerant R-134a.
- R-12 and R-134a refrigerant servicing equipment are not interchangeable. Use only a Recovery/Recycling/Charging System that is U.L.-listed and is certified to meet the requirements of SAE J2210 to service R-134a air conditioning system.
- Always recover the refrigerant R-134a with an approved Recovery/Recycling/Charging System before disconnecting any A/C fitting.



Symptom Chart

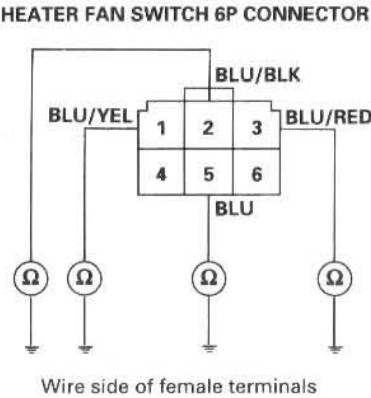
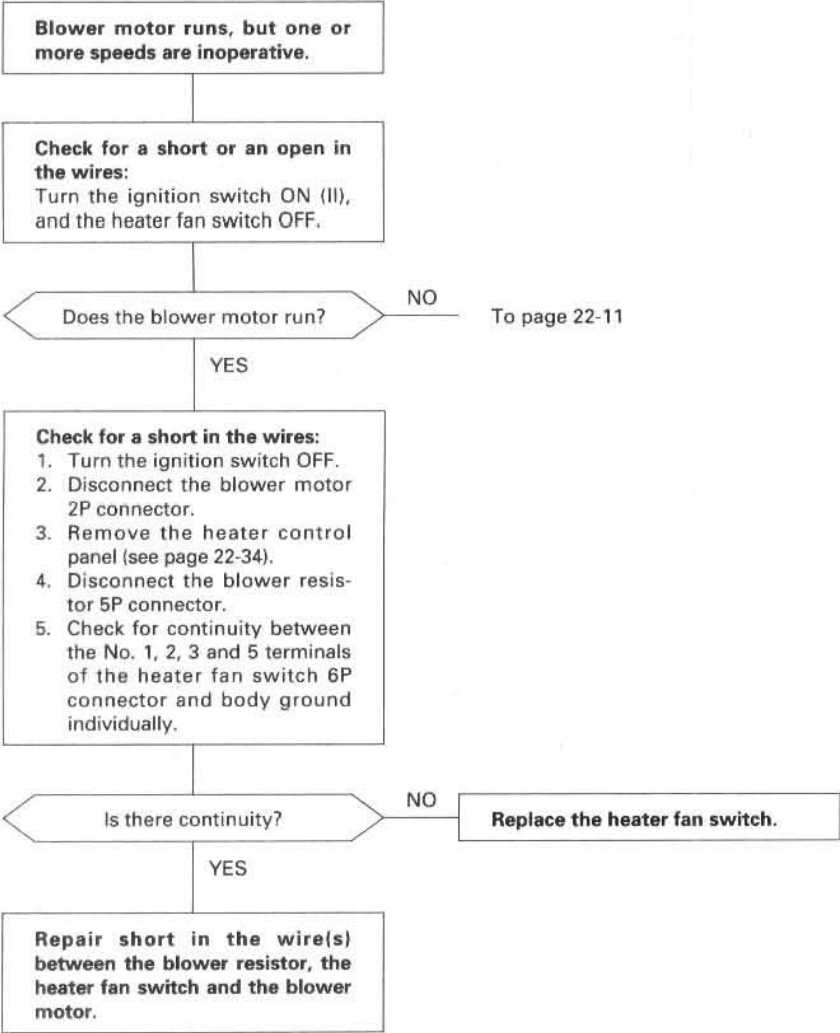
NOTE:

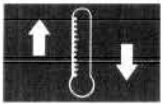
- Check the engine coolant level, and allow the engine to warm up before troubleshooting.
- Any abnormality must be corrected before continuing the test.
- Because of the precise measurements needed, use a digital multimeter when testing.
- Before performing any troubleshooting procedures check:
 - Fuses No. 35 (40 A), No. 43 (7.5 A), No. 45 (20 A), No. 47 (20 A) in the under-hood fuse/relay box, and No. 9 (7.5 A) in the under-dash fuse/relay box.
 - Grounds No. G101, G201, G301, G401, G402, G901
 - Cleanliness and tightness of all connectors

Symptom		Remedy
Hot air flow is low.	Blower motor runs, but one or more speeds are inoperative.	Perform the procedures in the flowchart (see page 22-10).
	Blower runs properly.	Check for the following: <ul style="list-style-type: none"> • Clogged heater duct • Clogged heater outlet • Incorrect door position
No hot air flow.	Blower motor does not run at all.	Perform the procedures in the flowchart (see page 22-12).
	Blower motor runs.	Check for the following: <ul style="list-style-type: none"> • Clogged heater duct • Clogged blower outlet • Clogged heater valve • Faulty air mix door • Heater valve cable adjustment (see page 22-45) • Air mix control cable adjustment (see page 22-45) • Faulty cooling system thermostat (see section 10) • Clogged evaporator • Frozen evaporator
Mode control motor does not run, or one or more modes are inoperative.		Perform the procedures in the flowchart (see page 22-15).
Recirculation control doors do not change between FRESH and RECIRCULATE.		Perform the procedures in the flowchart (see page 22-17).
Radiator fan does not run at all (but condenser fan runs with the A/C on).		Perform the procedures in the flowchart (see page 22-19).
Condenser fan does not run at all (but radiator fan runs with the A/C on).		Perform the procedures in the flowchart (see page 22-22).
Both fans (radiator and condenser) do not run for engine cooling, but they both run with the A/C on.		Perform the procedures in the flowchart (see page 22-25).
Both fans do not run with the A/C on.		Perform the procedures in the flowchart (see page 22-26).
Compressor clutch does not engage.		Perform the procedures in the flowchart (see page 22-27).
A/C system does not come on (both fans and compressor).		Perform the procedures in the flowchart (see page 22-30).

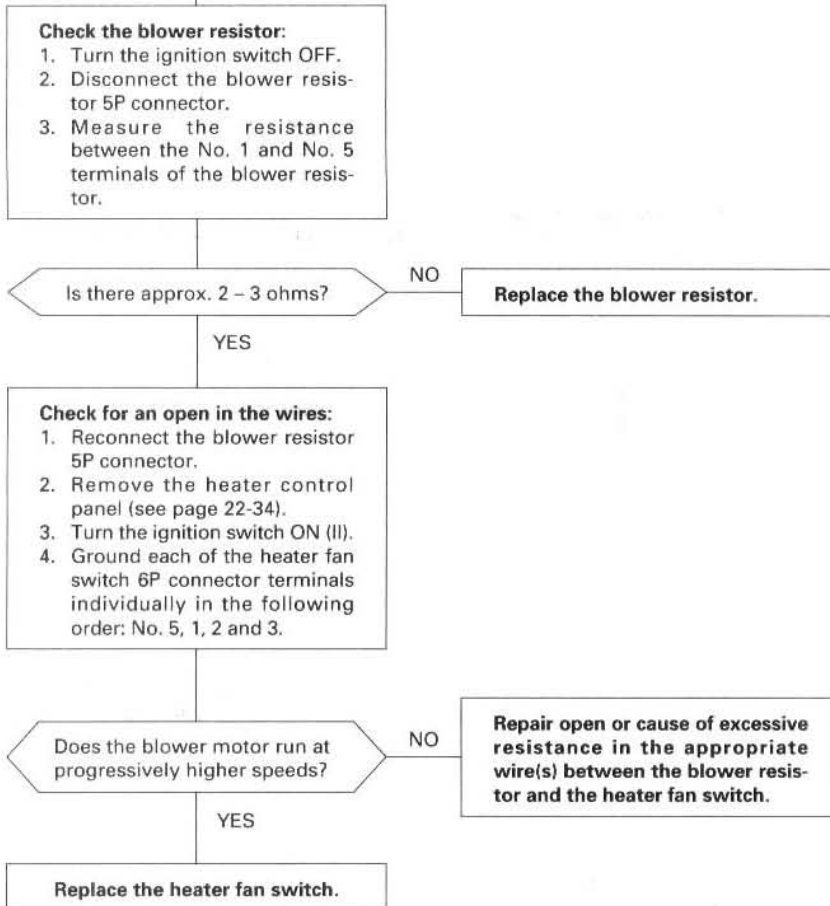
Troubleshooting

Blower Motor Speed

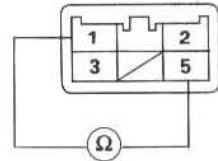




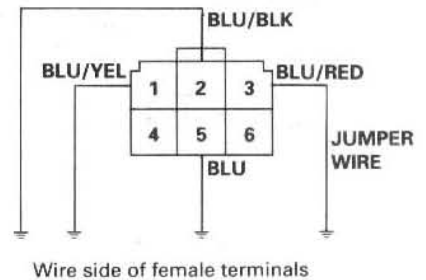
From page 22-10



BLOWER RESISTOR

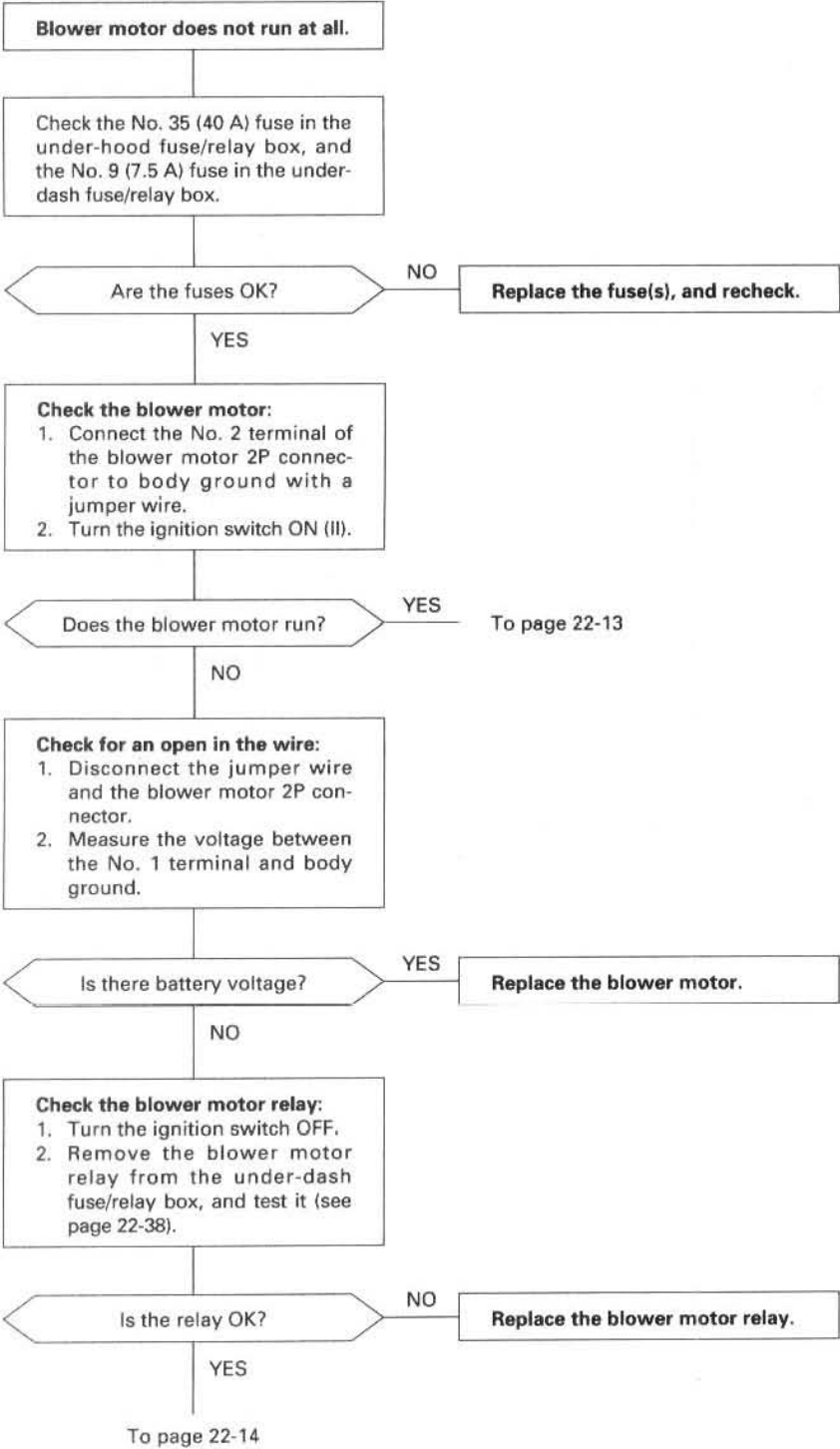


HEATER FAN SWITCH 6P CONNECTOR

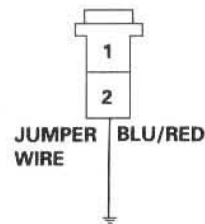


Troubleshooting

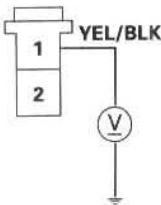
Blower Motor

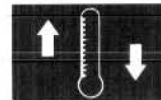


BLOWER MOTOR 2P CONNECTOR

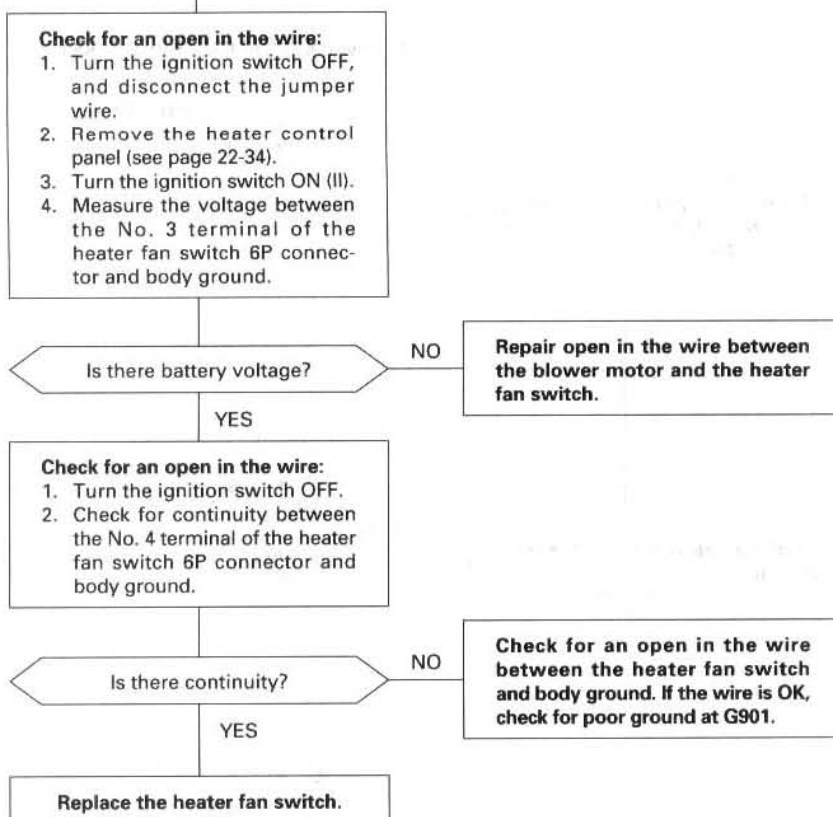


Wire side of female terminals

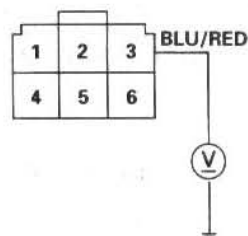




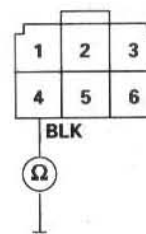
From page 22-12



HEATER FAN SWITCH 6P CONNECTOR



Wire side of female terminals

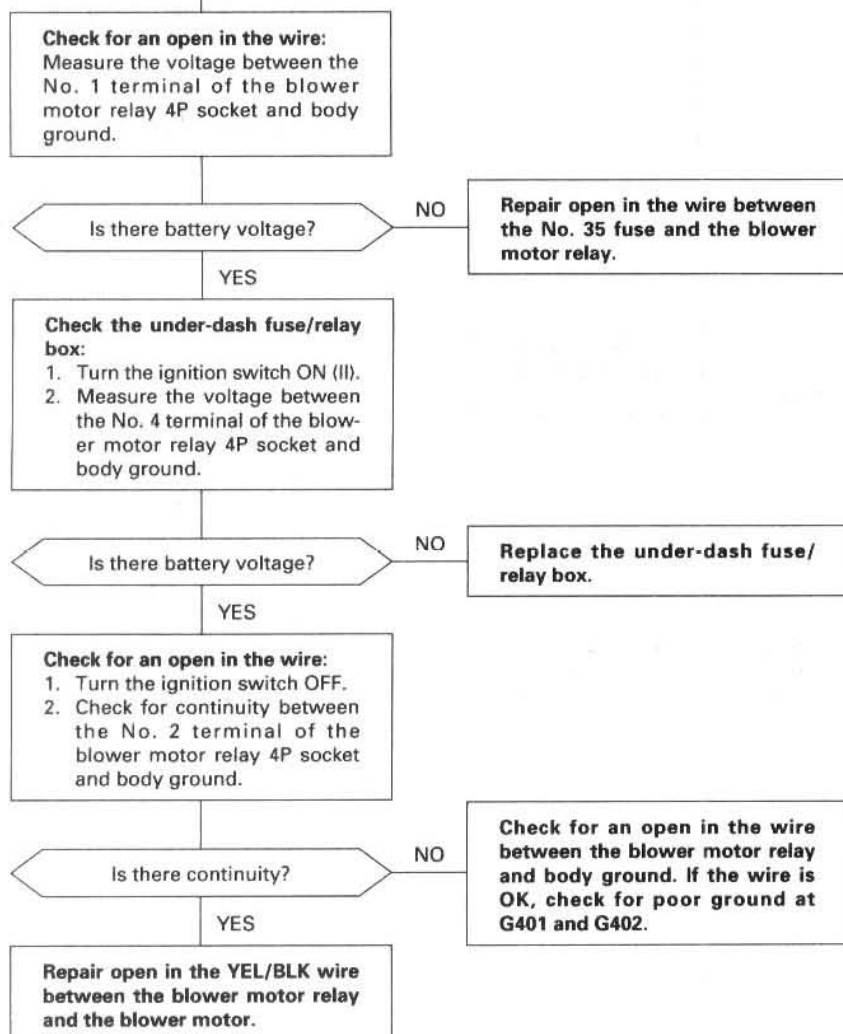


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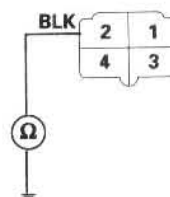
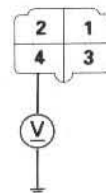
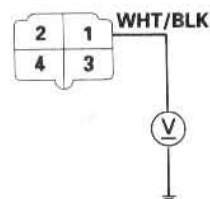
Troubleshooting

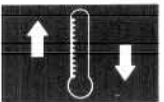
Blower Motor (cont'd)

From page 22-12



BLOWER MOTOR RELAY 4P SOCKET





Mode Control Motor

Mode control motor does not run, or one or more modes are inoperative.

Check for a short in the wires:

1. Disconnect the mode control motor 10P connector.
2. Remove the heater control panel (see page 22-34).
3. Check for continuity between the No. 3, 7, 9, 14, 15, 16, 17, 18 and 19 terminals of the heater control panel 22P connector and body ground individually.

Is there continuity?

YES

Repair short in the wire(s) between the heater control panel and the mode control motor.

NO

Check for an open in the wires:

Check for continuity between the following terminals of the heater control panel 22P connector and the mode control motor 10P connector.

22P: 10P:
No. 3 — No. 1
No. 7 — No. 2
No. 9 — No. 10
No. 14 — No. 4
No. 15 — No. 5
No. 16 — No. 6
No. 17 — No. 7
No. 18 — No. 8
No. 19 — No. 9

Is there continuity?

NO

Repair open in the wire(s) between the heater control panel and the mode control motor.

YES

Test the mode control motor (see page 22-35).

Is the mode control motor OK?

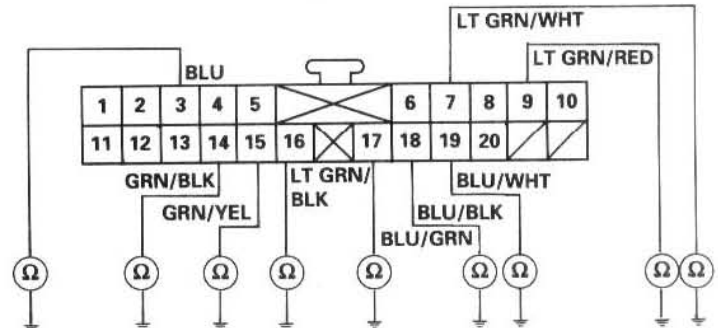
YES

Check for loose wires or poor connections at the heater control panel 22P connector and at the mode control motor 10P connector. If the connections are good, replace the heater control panel.

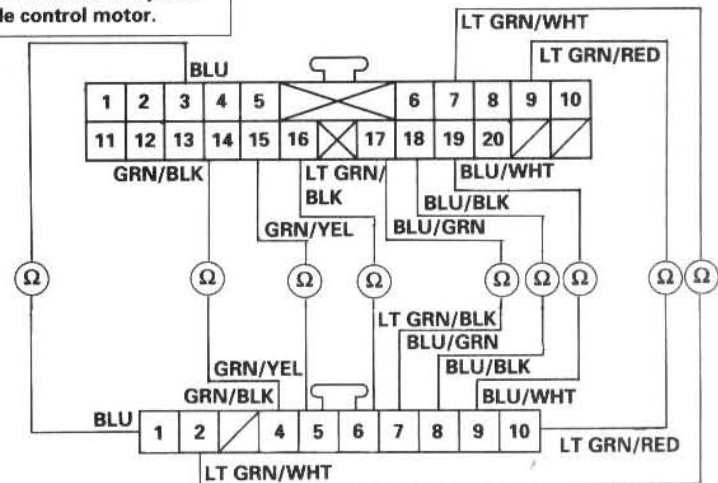
NO

To page 22-16

HEATER CONTROL PANEL 22P CONNECTOR



Wire side of female terminals



MODE CONTROL MOTOR 10P CONNECTOR

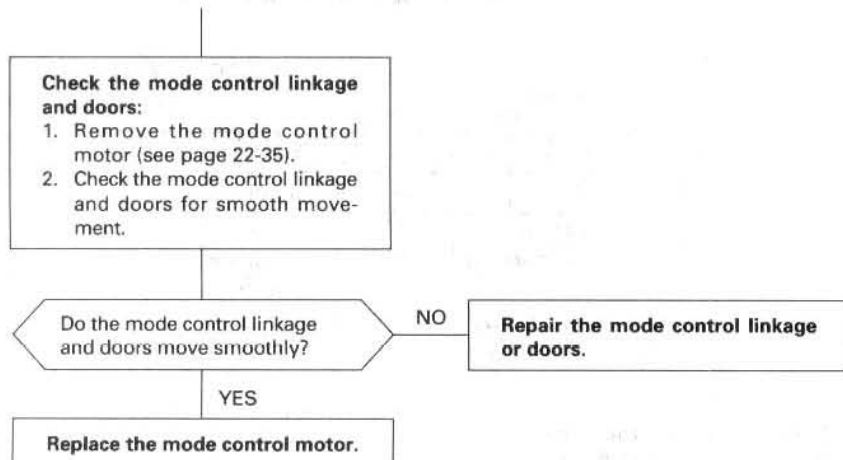
Wire side of female terminals

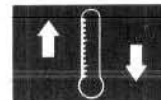
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Troubleshooting

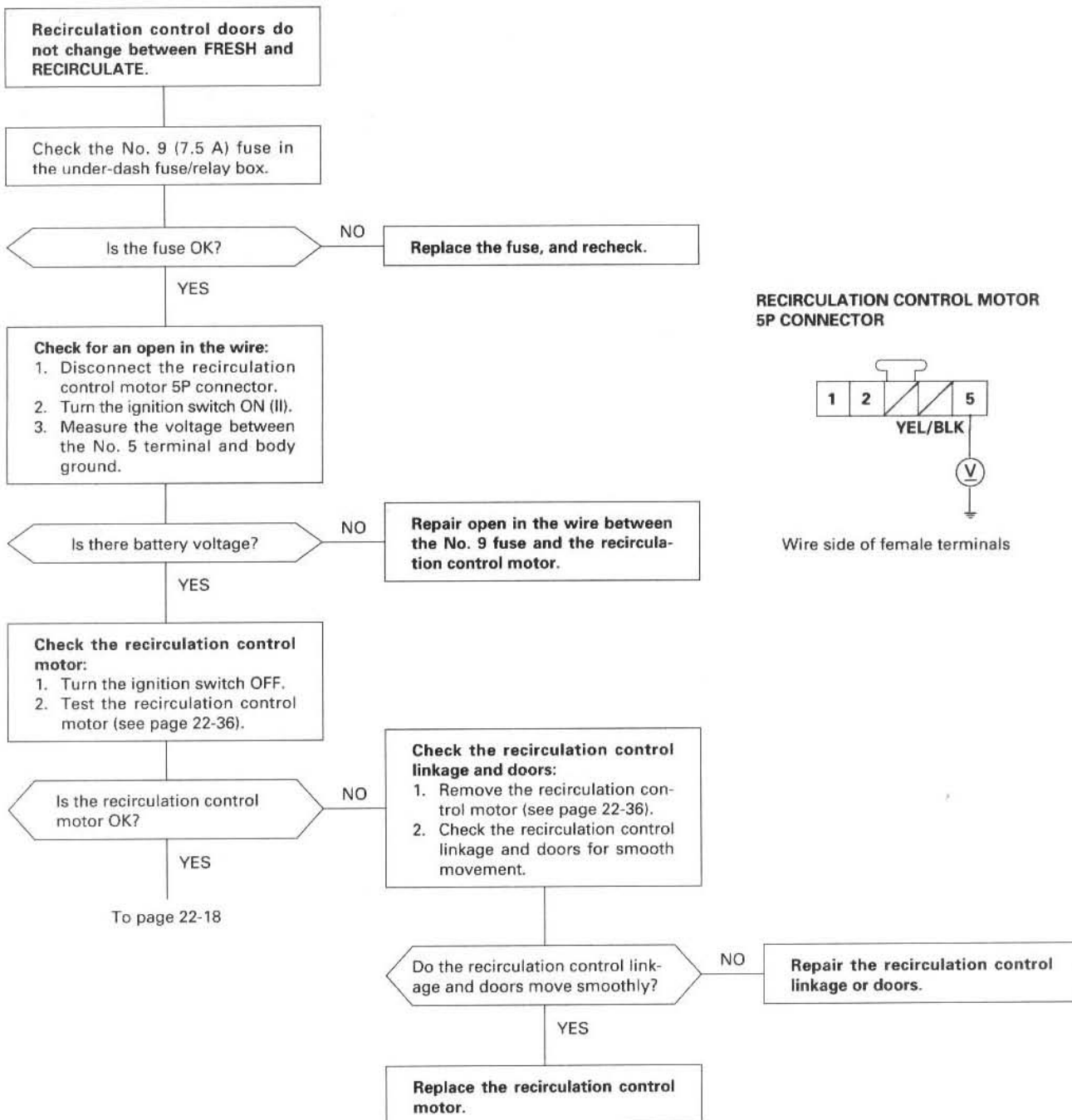
Mode Control Motor (cont'd)

From page 22-15





Recirculation Control Motor



(cont'd)

Troubleshooting

Recirculation Control Motor (cont'd)

From page 22-17

Check for a short in the wires:

1. Remove the heater control panel (see page 22-34).

2. Check for continuity between the No. 4 and No. 11 terminals of the heater control panel 22P connector and body ground individually.

Is there continuity?

YES

Repair short in the wire(s) between the recirculation control motor and the heater control panel.

Check for a short to power:

Check the same wires for voltage.

Is there any voltage?

YES

Repair short to power in the wire(s) between the recirculation control motor and the heater control panel. (This damages the heater control panel.)

Check for an open in the wires:

Check for continuity between the following terminals of the recirculation control motor 5P connector and the heater control panel 22P connector.

5P: 22P:

No. 1 — No. 4

No. 2 — No. 11

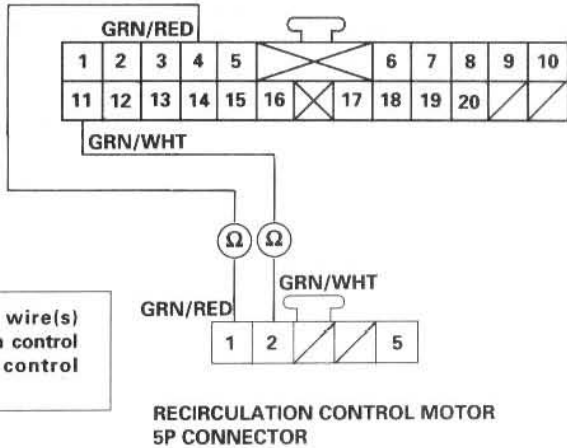
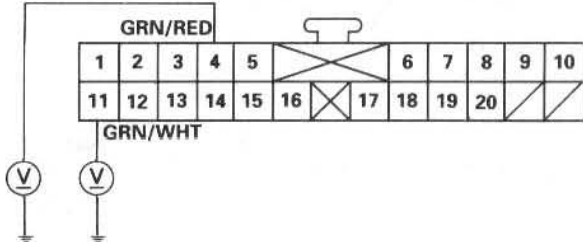
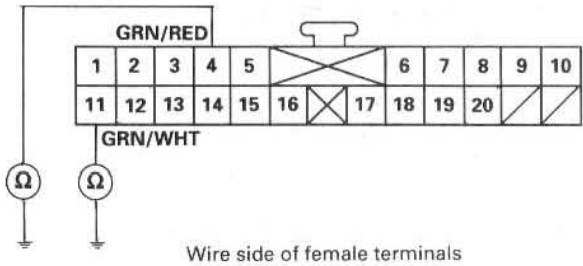
Is there continuity?

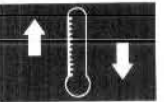
NO

Repair open in the wire(s) between the recirculation control motor and the heater control panel.

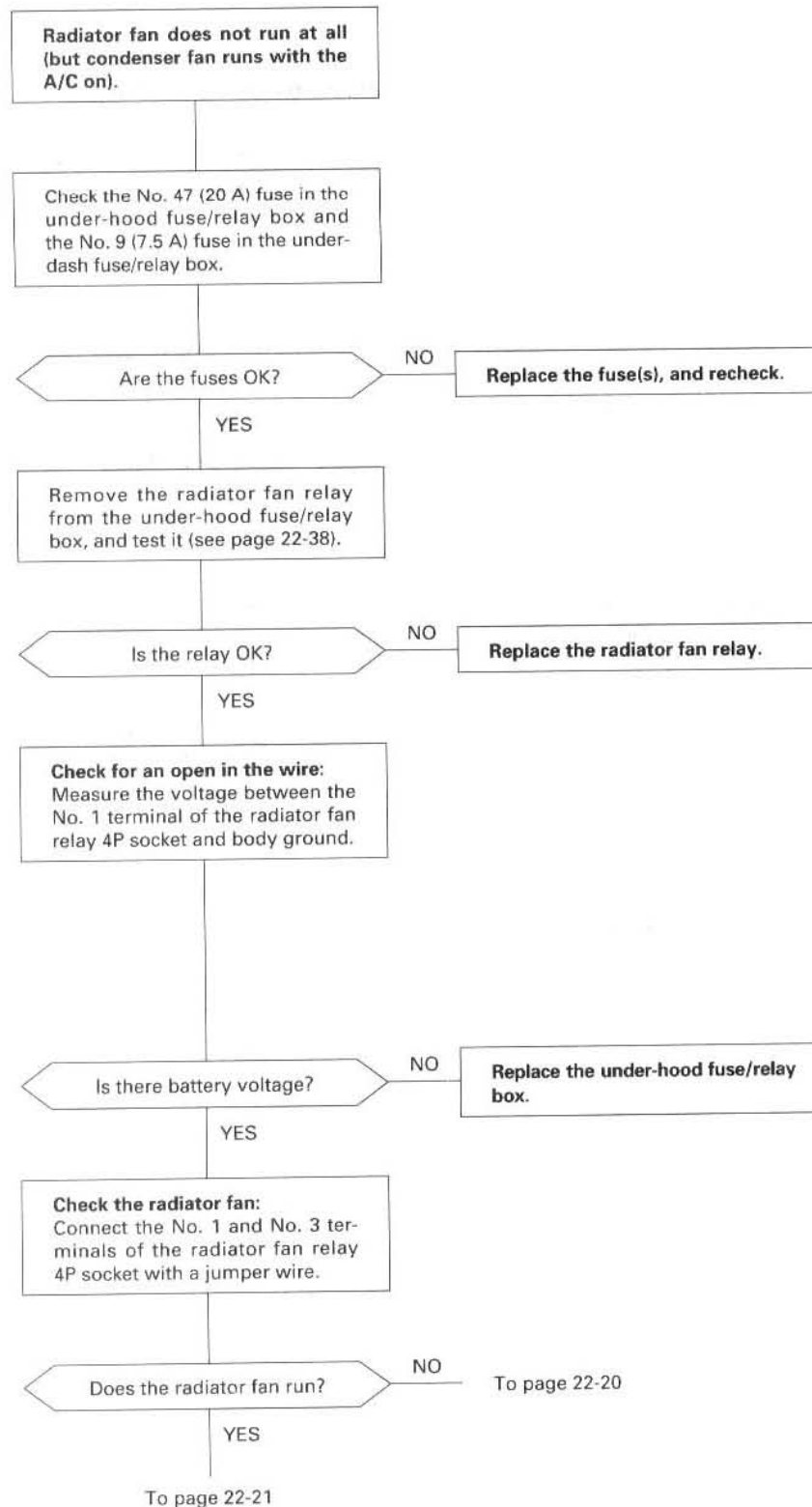
Check for loose wires or poor connections at the heater control panel 22P connector and at the recirculation control motor 5P connector. If the connections are good, replace the heater control panel.

HEATER CONTROL PANEL 22P CONNECTOR

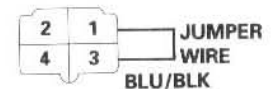
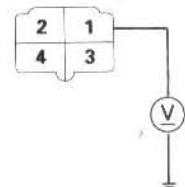




Radiator Fan



RADIATOR FAN RELAY 4P SOCKET

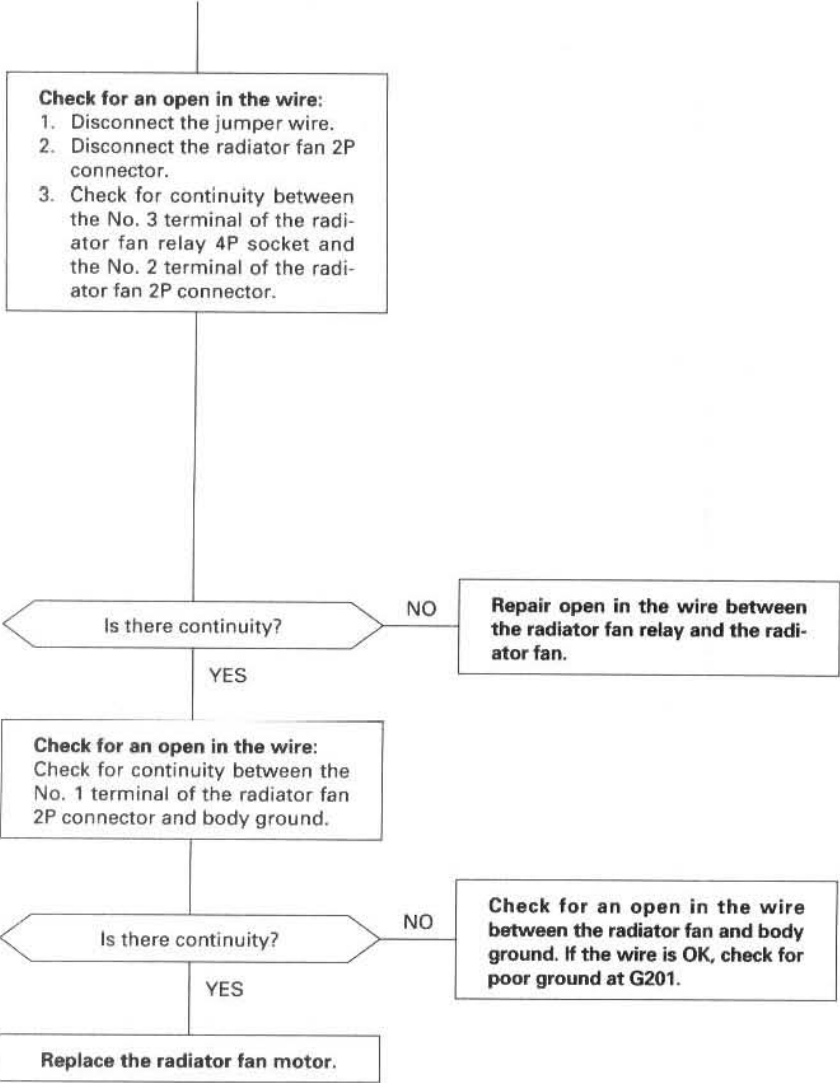


(cont'd)

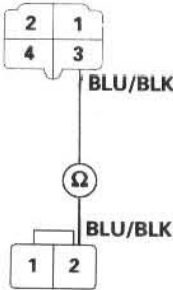
Troubleshooting

Radiator Fan (cont'd)

From page 22-19

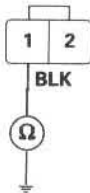


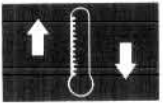
RADIATOR FAN RELAY 4P SOCKET



RADIATOR FAN 2P CONNECTOR

Wire side of female terminals





From page 22-19

Check for an open in the wire:
1. Disconnect the jumper wire.
2. Turn the ignition switch ON (II).
3. Measure the voltage between the No. 2 terminal of the radiator fan relay 4P socket and body ground.

Is there battery voltage?

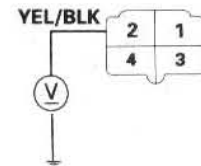
NO

Repair open in the wire between the No. 9 fuse and the radiator fan relay.

YES

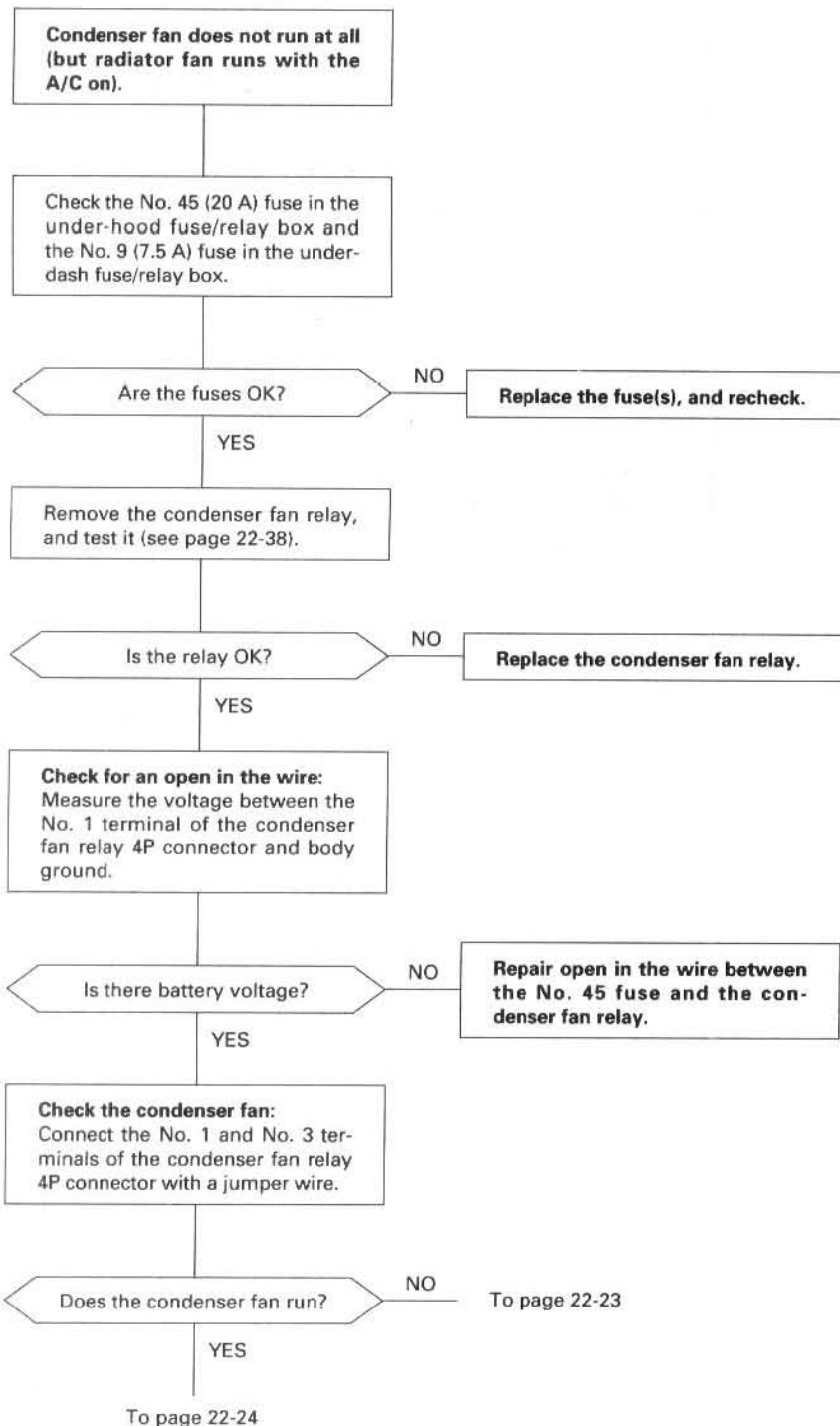
Repair open in the GRN wire between the radiator fan relay and the A/C diode.

RADIATOR FAN RELAY 4P SOCKET

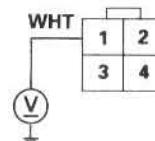


Troubleshooting

Condenser Fan

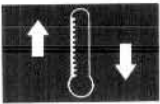


CONDENSER FAN RELAY 4P CONNECTOR

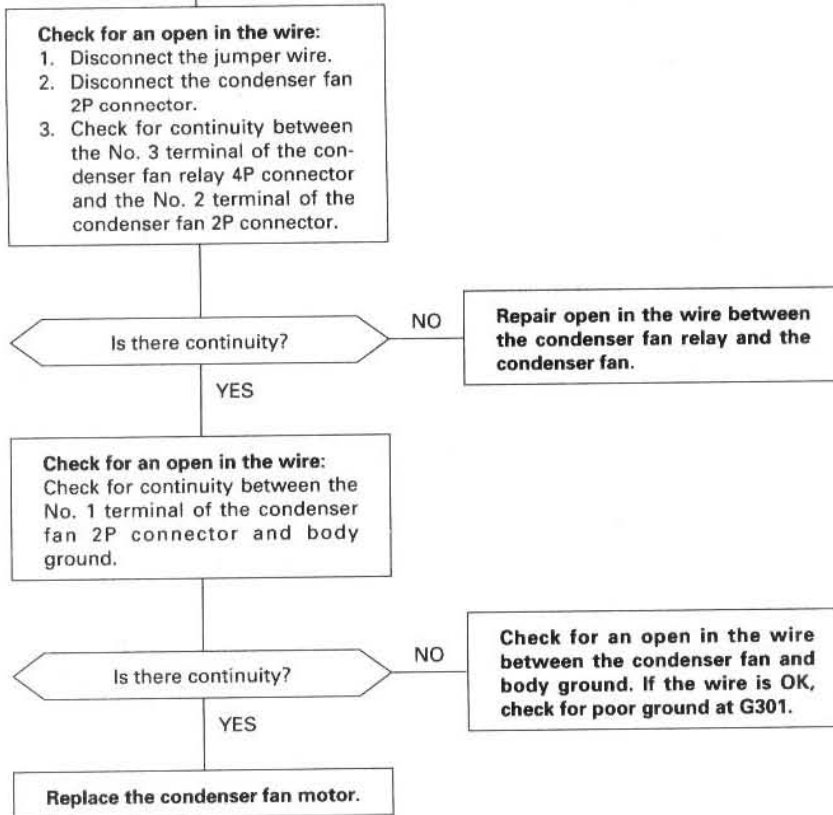


Wire side of female terminals



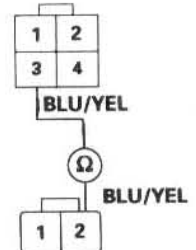


From page 22-22



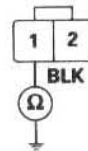
CONDENSER FAN RELAY 4P CONNECTOR

Wire side of female terminals



CONDENSER FAN 2P CONNECTOR

Wire side of female terminals



(cont'd)

Troubleshooting

Condenser Fan (cont'd)

From page 22-22

Check for an open in the wire:

1. Disconnect the jumper wire.
2. Turn the ignition switch ON (II).
3. Measure the voltage between the No. 2 terminal of the condenser fan relay 4P connector and body ground.

Is there battery voltage?

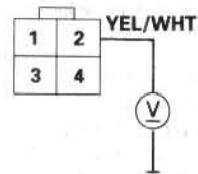
NO

Repair open in the wire between the No. 9 fuse and the condenser fan relay.

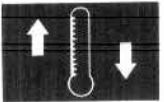
YES

Repair open in the GRN wire between the condenser fan relay and the A/C diode.

CONDENSER FAN RELAY 4P CONNECTOR



Wire side of female terminals



Radiator Fan Switch

Both fans (radiator and condenser) do not run for engine cooling, but they both run with the A/C on.

Check for an open in the wire:

1. Disconnect the radiator fan switch 2P connector.
2. Turn the ignition switch ON (II).
3. Measure the voltage between the No. 2 terminal and body ground.

Is there battery voltage?

NO

Repair open in the wire between the radiator fan relay, the condenser fan relay and the radiator fan switch.

YES

Check for an open in the wire:

1. Turn the ignition switch OFF.
2. Check for continuity between the No. 1 terminal of the radiator fan switch 2P connector and body ground.

Is there continuity?

NO

Check for an open in the wire between the radiator fan switch and body ground. If the wire is OK, check for poor ground at G101.

YES

Check the cooling system.

Is the cooling system OK?

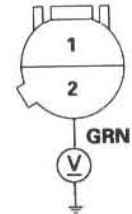
NO

Repair the cooling system.

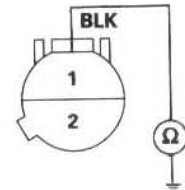
YES

Replace the radiator fan switch.

RADIATOR FAN SWITCH 2P CONNECTOR

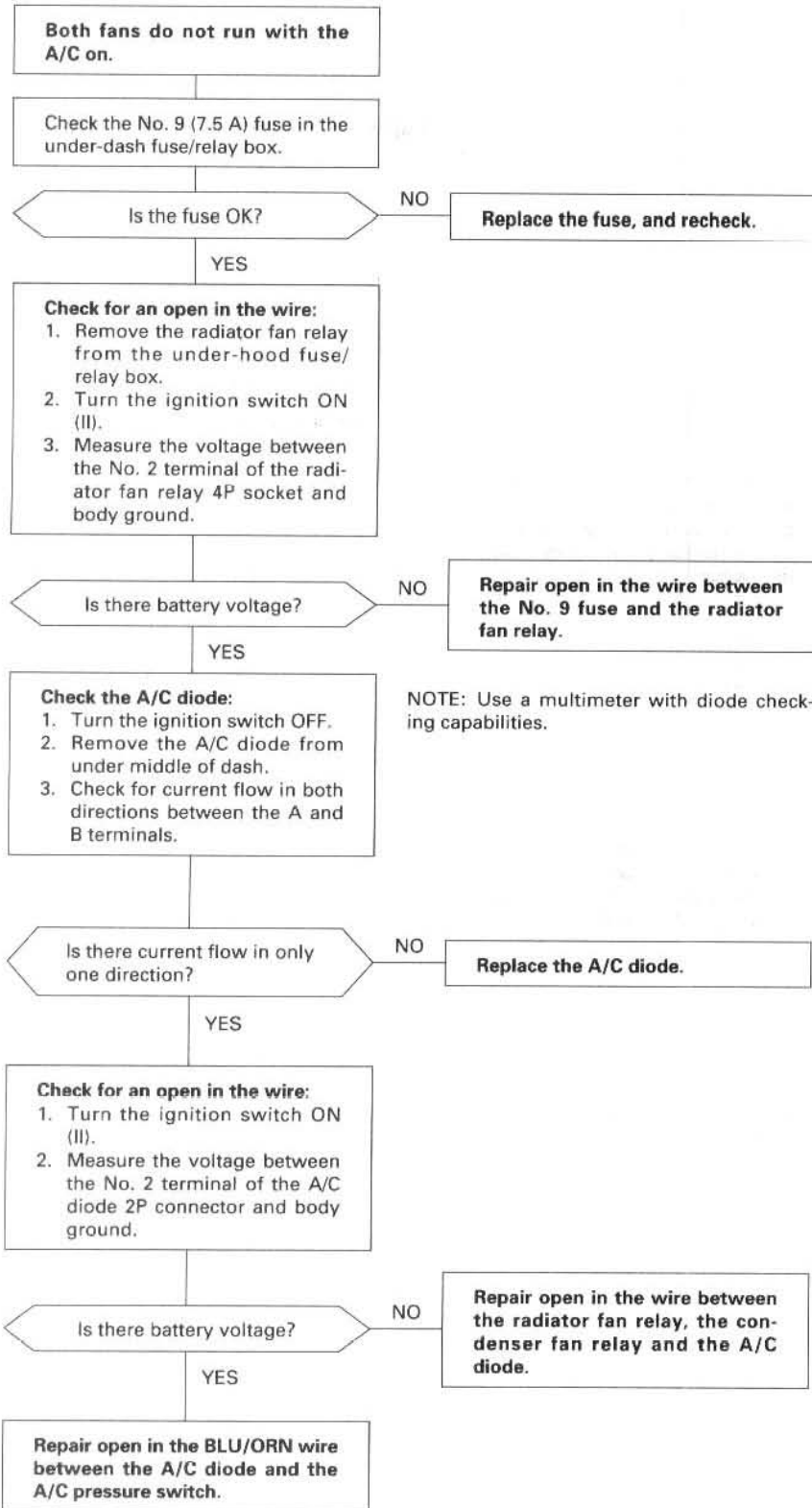


Wire side of female terminals

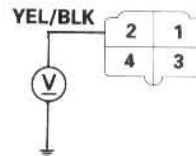


Troubleshooting

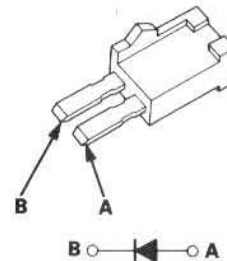
Both Fans



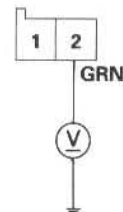
RADIATOR FAN RELAY 4P SOCKET



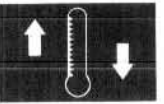
A/C DIODE



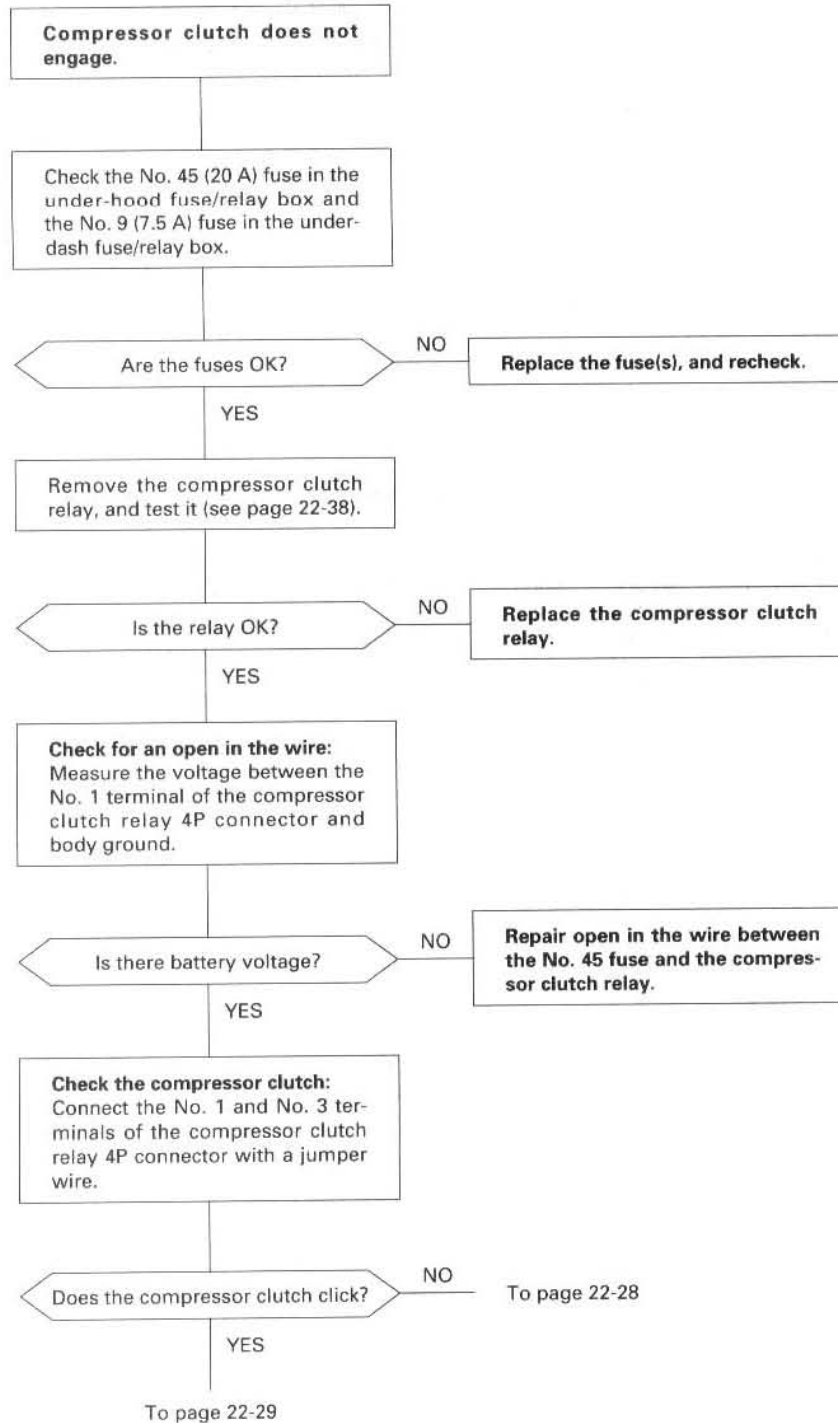
A/C DIODE 2P CONNECTOR



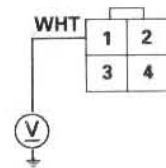
Wire side of female terminals



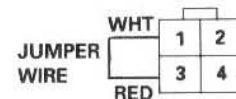
Compressor



**COMPRESSOR CLUTCH RELAY
4P CONNECTOR**



Wire side of female terminals



(cont'd)

Troubleshooting

Compressor (cont'd)

From page 22-27

Check for an open in the wire:

1. Disconnect the jumper wire.
2. Disconnect the compressor clutch 1P connector.
3. Check for continuity between the No. 3 terminal of the compressor clutch relay 4P connector and the terminal of the compressor clutch 1P connector.

Is there continuity?

NO

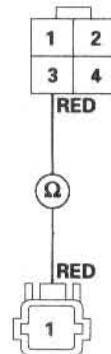
Repair open in the wire between the compressor clutch relay and the compressor clutch.

YES

Inspect the compressor clutch clearance, the thermal protector and, the compressor clutch field coil (see page 22-57).

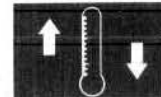
COMPRESSOR CLUTCH RELAY 4P CONNECTOR

Wire side of female terminals



COMPRESSOR CLUTCH 1P CONNECTOR

Terminal side of male terminal



From page 22-27

Check for an open in the wire:

1. Disconnect the jumper wire.
2. Turn the ignition switch ON (II).
3. Measure the voltage between the No. 2 terminal of the compressor clutch relay 4P connector and body ground.

Is there battery voltage?

NO

Repair open in the wire between the No. 9 fuse and the compressor clutch relay.

YES

Check for an open in the wire:

1. Turn the ignition switch OFF, then reinstall the compressor clutch relay.
2. Make sure the A/C switch is OFF, then turn the ignition switch ON (II).
3. Using a *Backprobe Set (T/N 07SAZ - 001000A), measure the voltage between the No. 17 terminal of the ECM connector A (32P) and body ground with the ECM connectors connected.

Is there battery voltage?

NO

Repair open in the wire between the compressor clutch relay and the ECM.

YES

Check for an open in the wire:

1. Turn the A/C and heater fan switches ON.
2. Using a *Backprobe Set (T/N 07SAZ - 001000A), measure the voltage between the No. 5 terminal of the ECM connector C (31P) and body ground with the ECM connectors connected.

Is there less than 1 volt?

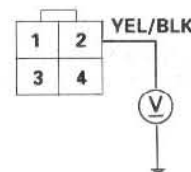
NO

Repair open in the wire between the ECM and the A/C pressure switch.

YES

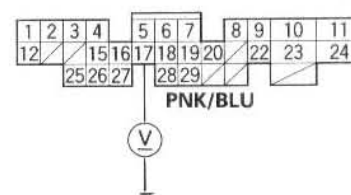
Check for loose wires or poor connections at the ECM connectors A (32P) and C (31P). If the connections are good, substitute a known-good ECM, and recheck. If the symptom/indication goes away, replace the original ECM.

COMPRESSOR CLUTCH RELAY 4P CONNECTOR



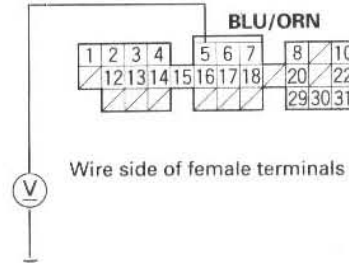
Wire side of female terminals

ECM CONNECTOR A (32P)



Wire side of female terminals

ECM CONNECTOR C (31P)



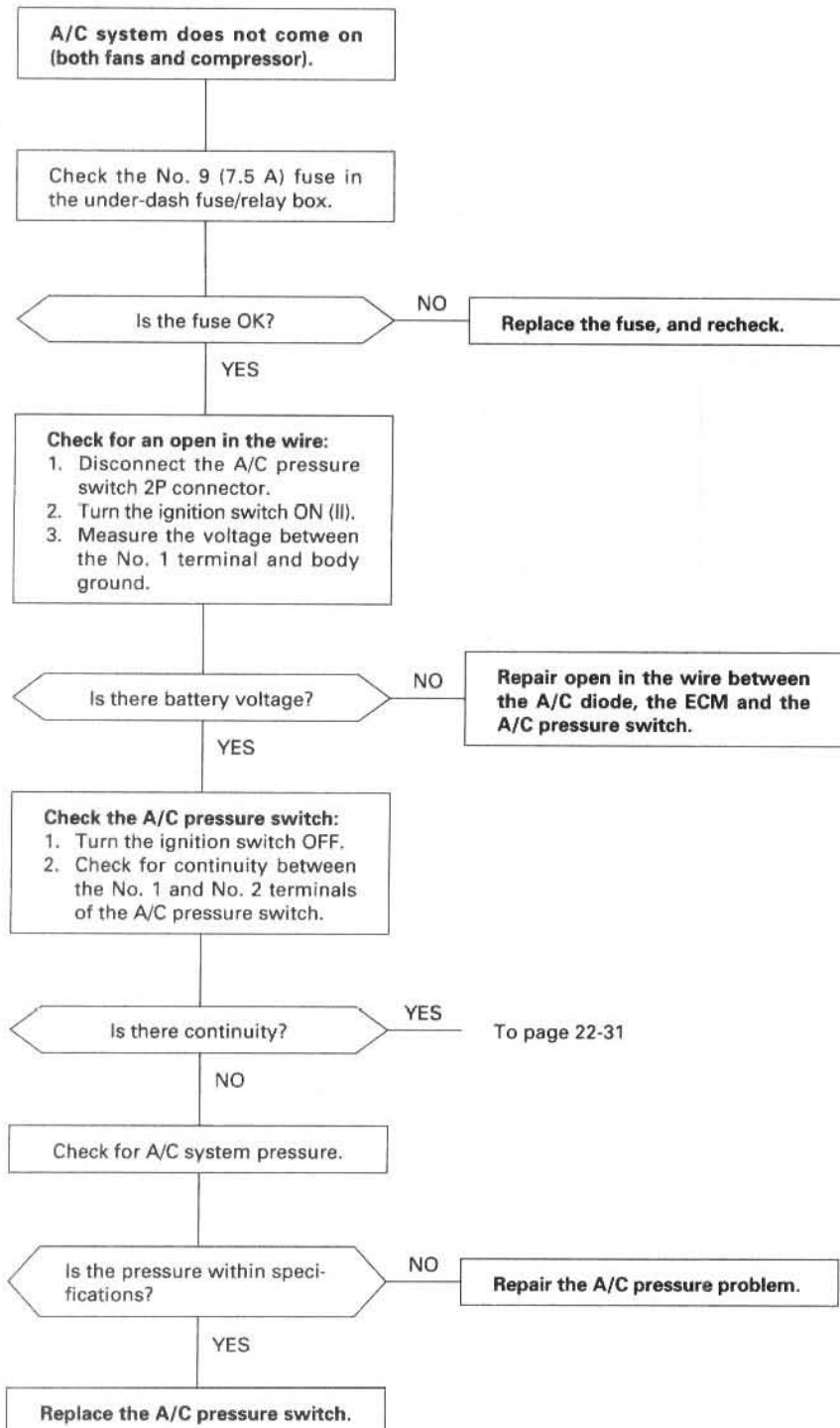
Wire side of female terminals

***How to use the Backprobe Sets**

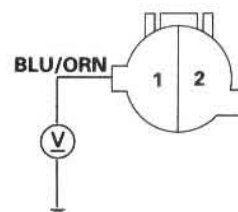
Connect the backprobe adapters to the stacking patch cords, and connect the cords to a multi-meter. Using the wire insulation as a guide for the contoured tip of the backprobe adapter, gently slide the tip into the connector from the wire side until it comes in contact with the terminal end of the wire (see section 11).

Troubleshooting

A/C System

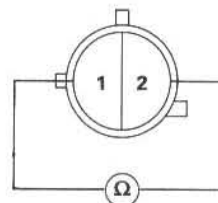


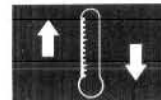
A/C PRESSURE SWITCH 2P CONNECTOR



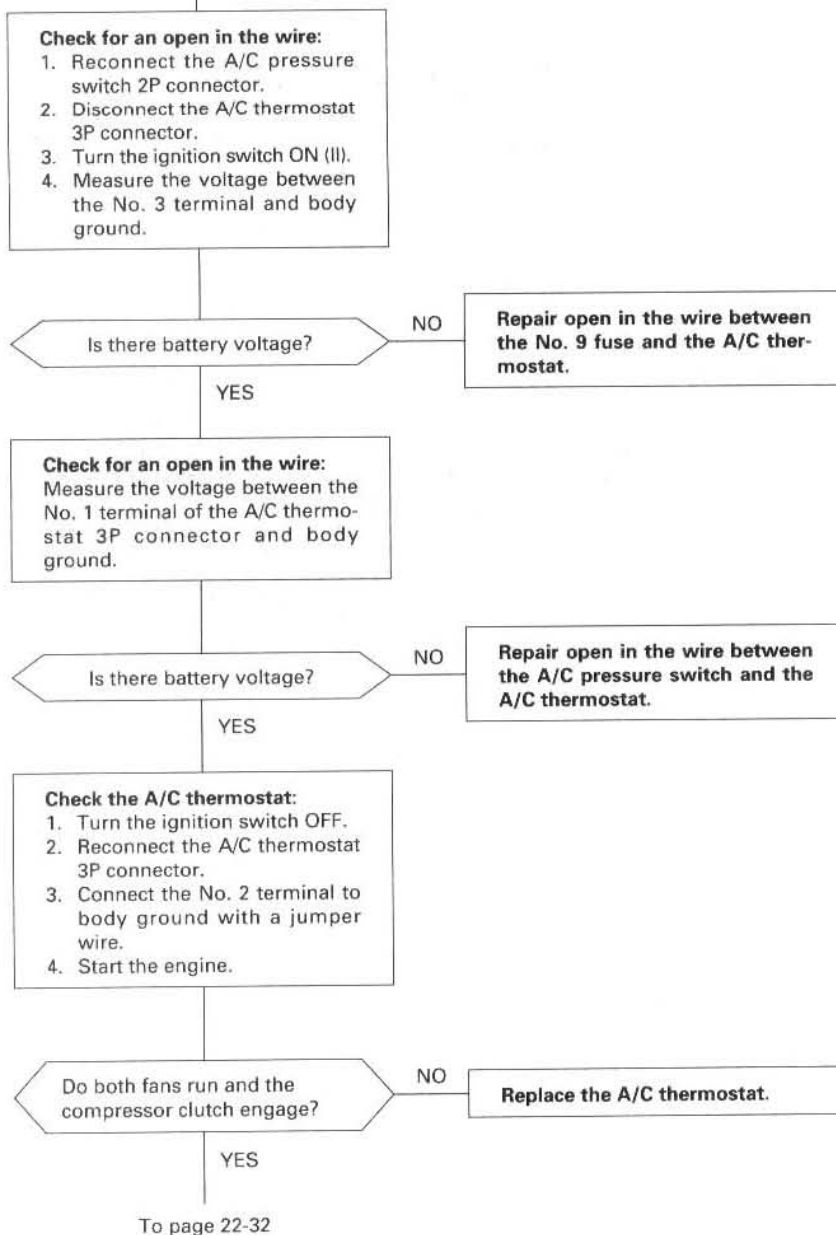
Wire side of female terminals

A/C PRESSURE SWITCH

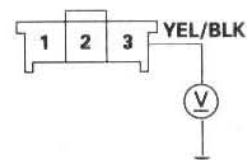




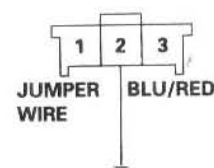
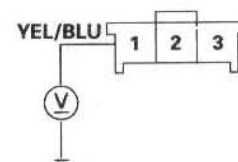
From page 22-30



A/C THERMOSTAT 3P CONNECTOR



Wire side of female terminals



(cont'd)

Troubleshooting

A/C System (cont'd)

From page 22-31

Check for an open in the wire:

1. Turn the ignition switch OFF, then disconnect the jumper wire.
2. Remove the heater control panel (see page 22-34).
3. Turn the ignition switch ON (II).
4. Measure the voltage between the No. 1 terminal of the heater control panel 22P connector and body ground.

Is there battery voltage?

NO

Repair open in the wire between the A/C thermostat and the heater control panel.

YES

Check for an open in the wire:

1. Turn the ignition switch OFF.
2. Check for continuity between the No. 2 terminal of the heater control panel 22P connector and the No. 6 terminal of the heater fan switch 6P connector.

Is there continuity?

NO

Repair open in the wire between the heater control panel and the heater fan switch.

YES

Check for an open in the wire

Check for continuity between the No. 4 terminal of the heater fan switch 6P connector and body ground.

Is there continuity?

NO

Check for an open in the wire between the heater fan switch and body ground. If the wire is OK, check for poor ground at G901.

YES

Test the heater fan switch (see page 22-37).

Is the heater fan switch OK?

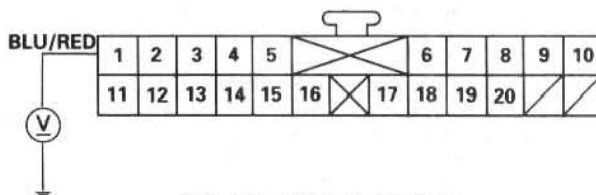
NO

Replace the heater fan switch.

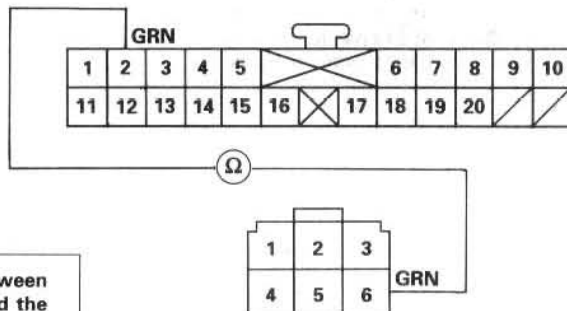
YES

Check for loose wires or poor connections at the heater control panel 22P connector. If the connections are good, replace the heater control panel.

HEATER CONTROL PANEL 22P CONNECTOR

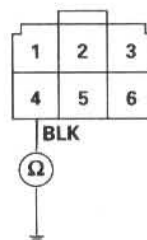


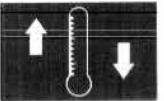
Wire side of female terminals



HEATER FAN SWITCH 6P CONNECTOR

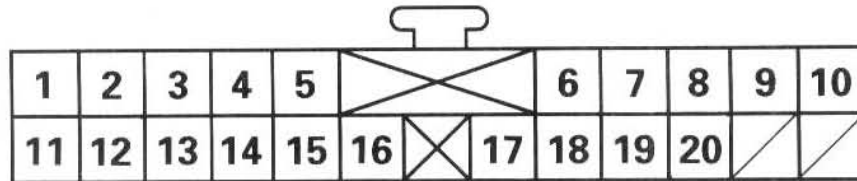
Wire side of female terminals





Heater Control Panel Input/Output Signals

HEATER CONTROL PANEL 22P CONNECTOR



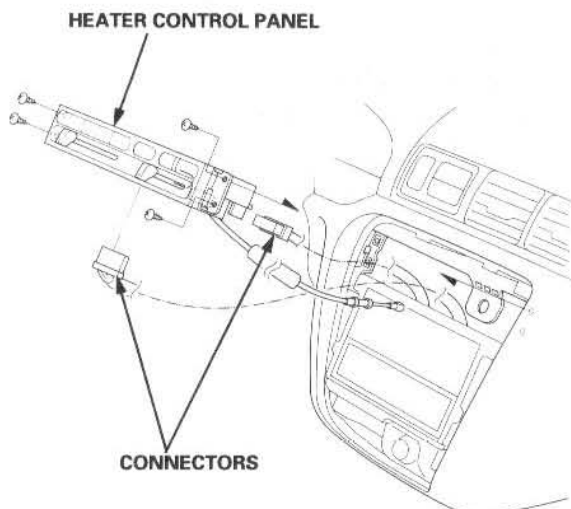
Wire side of female terminals

Cavity	Wire color	Signal		Cavity	Wire color	Signal	
1	BLU/RED	A/C THERMOSTAT	INPUT	12	BRN/YEL	MULTIPLEX CONTROL UNIT (DRIVER'S) (Rear window defogger)	OUTPUT
2	GRN	HEATER FAN SWITCH	OUTPUT	13	BLK	GROUND	OUTPUT
3	BLU	MODE CONTROL MOTOR DEF +	OUTPUT	14	GRN/BLK	MODE 1	OUTPUT
4	GRN/RED	RECIRCULATE	INPUT	15	GRN/YEL	MODE 2	OUTPUT
5	RED	MULTIPLEX CONTROL UNIT (PASSENGER'S) (Dash lights brightness controller)	OUTPUT	16	LT GRN/BLK	MODE 3	OUTPUT
6	RED/BLK	COMBINATION LIGHT SWITCH (Via No. 10 (15 A) fuse)	INPUT	17	BLU/GRN	MODE 4	OUTPUT
7	LT GRN/WHT	MODE CONTROL MOTOR VENT +	OUTPUT	18	BLU/BLK	MODE 5	OUTPUT
8	YEL/BLK	IG2 (Power)	INPUT	19	BLU/WHT	MODE 6	OUTPUT
9	LT GRN/RED	MODE CONTROL MOTOR GROUND	INPUT	20	WHT/YEL	+B (Power)	INPUT
10	YEL/WHT	MULTIPLEX CONTROL UNIT (DRIVER'S) (Rear window defogger)	INPUT	21	—	—	—
11	GRN/WHT	FRESH	INPUT	22	—	—	—

Heater Control Panel

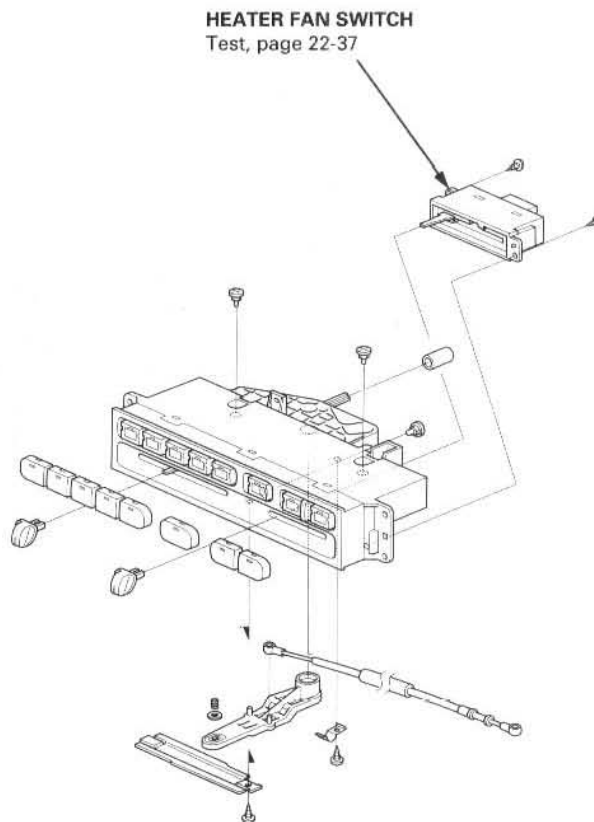
Replacement

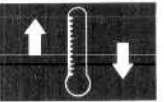
1. Remove the center panel (see section 20).
2. Disconnect the air mix control cable from the heater unit (see page 22-45).
3. Remove the self-tapping screws, then pull the heater control panel. Disconnect the connectors, and remove the heater control panel.



4. Install in the reverse order of removal. Adjust the air mix control cable and the heater valve cable (see page 22-45).

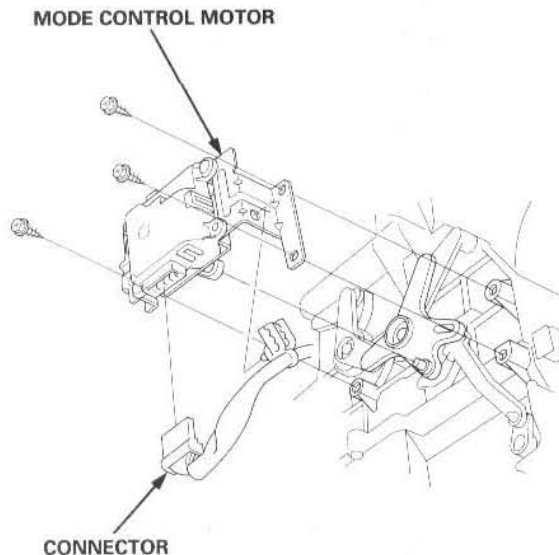
Overhaul





Replacement

1. Disconnect the connector from the mode control motor, then remove the self-tapping screws and the mode control motor.



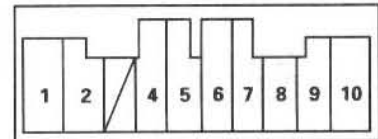
2. Install in the reverse order of removal. After installation, make sure the mode control motor runs smoothly.

Test

1. Disconnect the 10P connector from the mode control motor.
2. Connect battery power to the No. 2 terminal, and ground the No. 1 terminal; the mode control motor should run smoothly, and stop at VENT. If it doesn't, reverse the connections; the mode control motor should run smoothly, and stop at DEF.

CAUTION: When the mode control motor stops running, disconnect battery power immediately.

MODE CONTROL MOTOR
10P CONNECTOR



3. When the mode control motor running in step 2, check for continuity between the No. 4, 5, 6, 7, 8 and 9 terminals and the No. 10 terminal individually. There should be continuity for a moment.

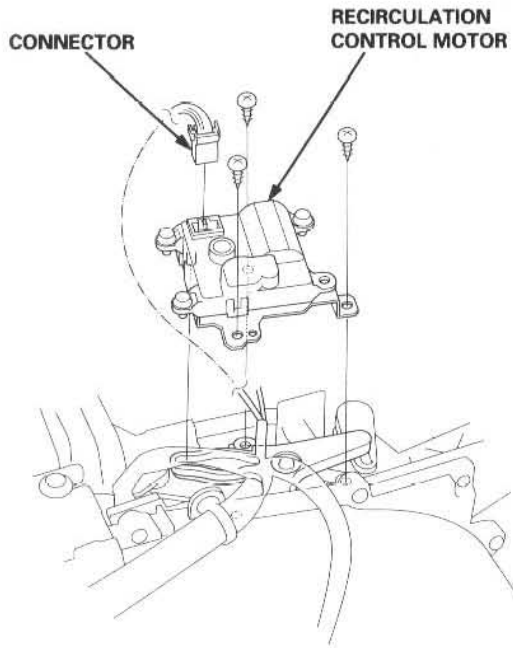
CAUTION: Use a digital multimeter with an output of 1 mA or less at the 20 k Ω range.

4. If the mode control motor does not run in step 2, remove it, then check the mode control linkage and doors for smooth movement. If they move smoothly, replace the mode control motor.

Recirculation Control Motor

Replacement

1. Disconnect the connector from the recirculation control motor, then remove the self-tapping screws and the recirculation control motor.



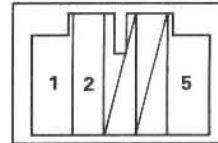
2. Install in the reverse order of removal. After installation, make sure the recirculation control motor runs smoothly.

Test

1. Disconnect the 5P connector from the recirculation control motor.
2. Connect battery power to the No. 5 terminal, and ground the No. 1 and No. 2 terminals; the recirculation control motor should run smoothly.

CAUTION: Never connect the battery in the opposite direction.

RECIRCULATION
CONTROL MOTOR
5P CONNECTOR



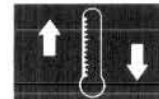
3. Disconnect the No. 1 or No. 2 terminals from ground; the recirculation control motor should stop at FRESH or RECIRCULATE.

NOTE: Don't cycle the recirculation control motor for a long time.

4. If the recirculation control motor does not run in step 2, remove it, then check the recirculation control linkage and doors for smooth movement. If they move smoothly, replace the recirculation control motor.

Heater Fan Switch

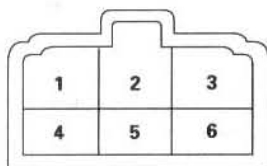
A/C Thermostat



Test

Check for continuity between the terminals according to the table below.

Terminal Position	1	2	3	4	5	6
OFF						
•				○	○	○
•	○			○		○
•		○		○		○
•			○	○		○



Test

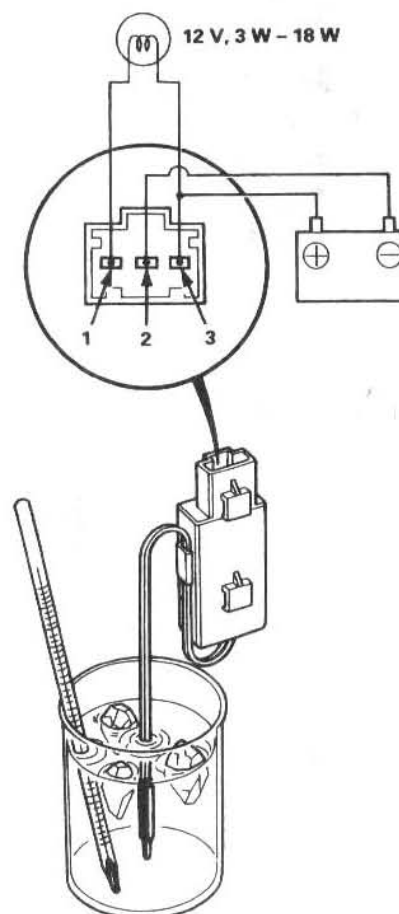
Connect battery power to the No. 3 terminal, ground the No. 2 terminal, and connect a test light between the No. 1 and No. 3 terminals.

NOTE: Use a 12 V, 3 W – 18 W test light.

Dip the A/C thermostat into a cup filled with ice water, and check the test light.

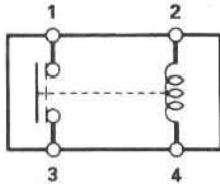
The light should go off at 36 – 39°F (2 – 4°C) or less, and should come on at 39 – 41°F (4 – 5°C) or more.

If the light doesn't come on and go off as specified, replace the A/C thermostat.

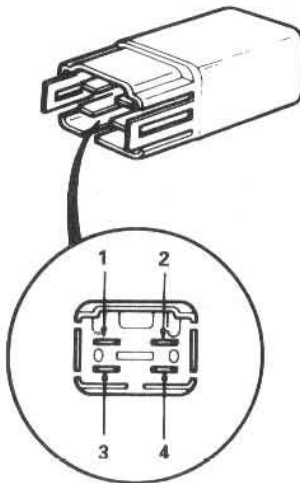


Test

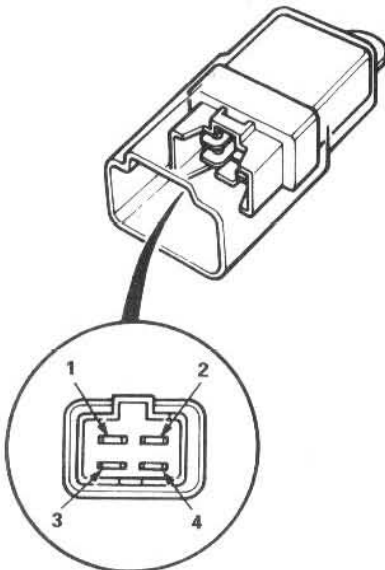
There should be continuity between the No. 1 and No. 3 terminals when power and ground are connected to the No. 2 and No. 4 terminals, and there should be no continuity when power is disconnected.



- Blower motor relay
- Radiator fan relay

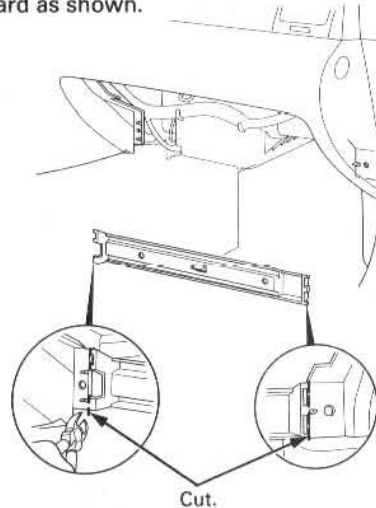


- Condenser fan relay
- Compressor clutch relay

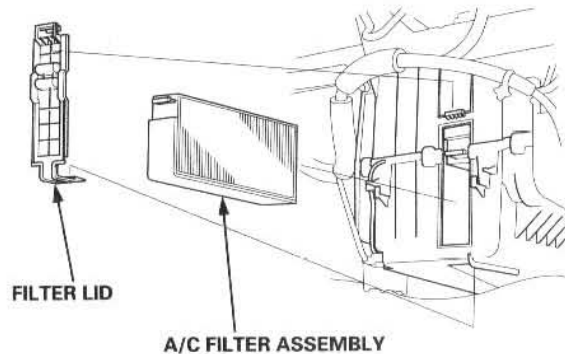


Replacement

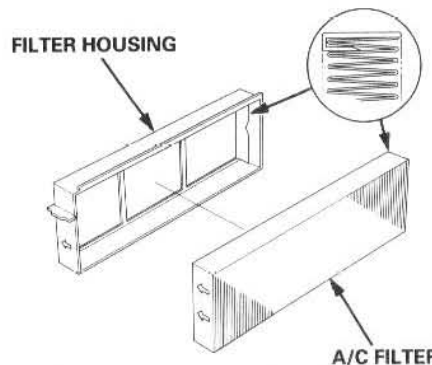
1. Remove the glove box (see section 20).
2. Cut the glove box frame mounting part of the dashboard as shown.



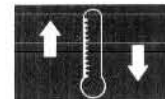
3. Remove the filter lid from the evaporator, then pull out the lower A/C filter assembly and the upper A/C filter assembly in that order.



4. Remove the A/C filter from the filter housing. Replace the A/C filter according to the maintenance schedule in the owner's manual.

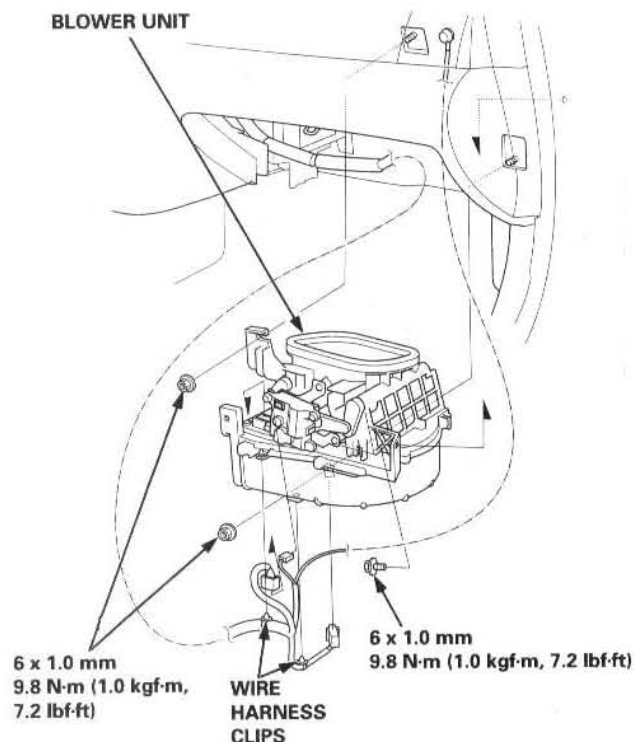


5. Install in the reverse order of removal. Make sure that there is no air leakage.



Replacement

1. Remove the evaporator (see page 22-40).
2. Disconnect the connectors from the recirculation control motor, the blower resistor and the blower motor, then remove the wire harness clips from the blower unit. Remove the mounting bolt, the mounting nuts and the blower unit.

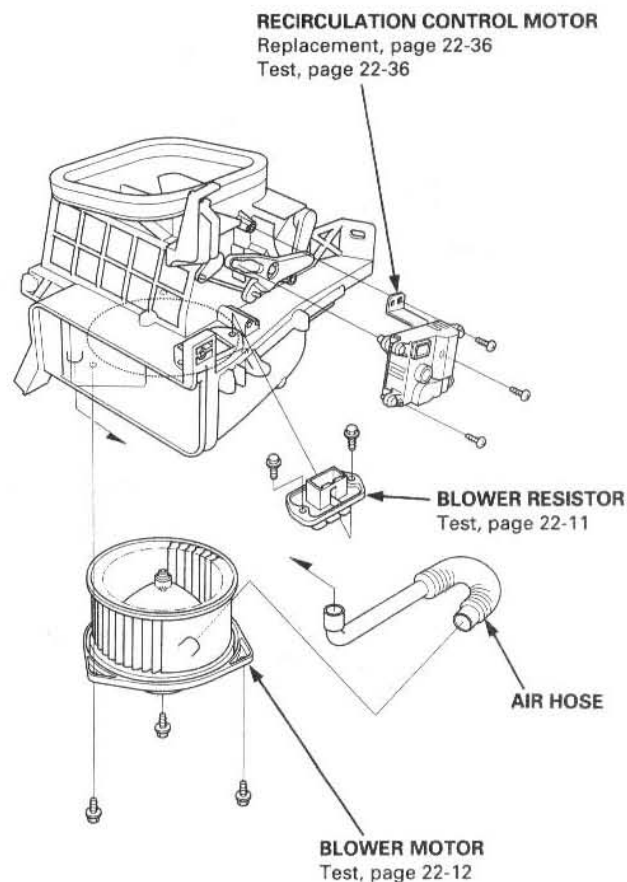


3. Install in the reverse order of removal. Make sure that there is no air leakage.

Overhaul

NOTE:

- The recirculation control motor, the blower resistor and the blower motor can be replaced without removing the blower unit. When replacing the blower motor, remove the ECM cover first, but do not disconnect the ECM connectors (see section 11).
- Before reassembly, make sure that the recirculation control doors and linkage move smoothly without binding.
- After reassembly, make sure the recirculation control motor runs smoothly (see page 22-36).
- Make sure that there is no air leakage.



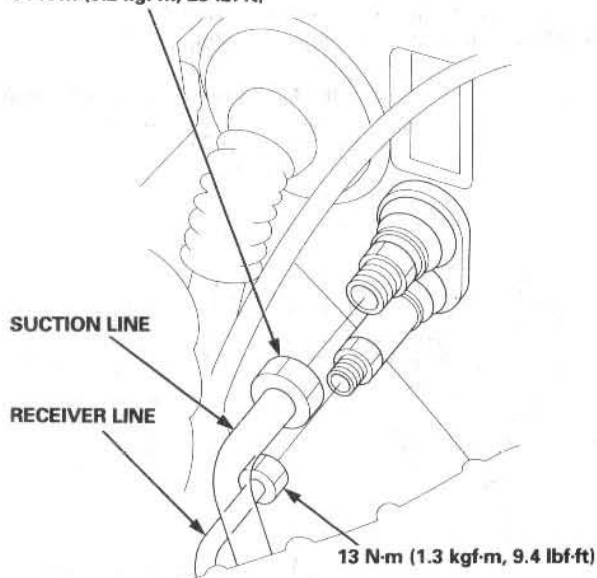
Evaporator

Replacement

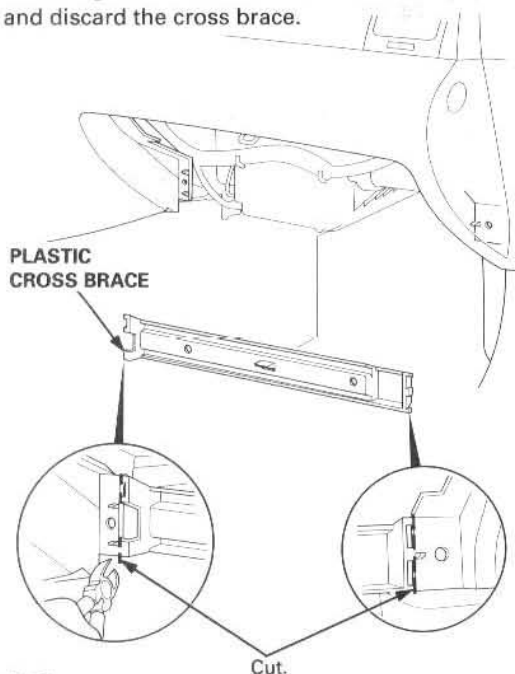
1. Recover the refrigerant with a Recovery/Recycling/Charging System (see page 22-51).
2. Disconnect the suction and receiver lines from the evaporator.

NOTE: Plug or cap the lines immediately after disconnecting them to avoid moisture and dust contamination.

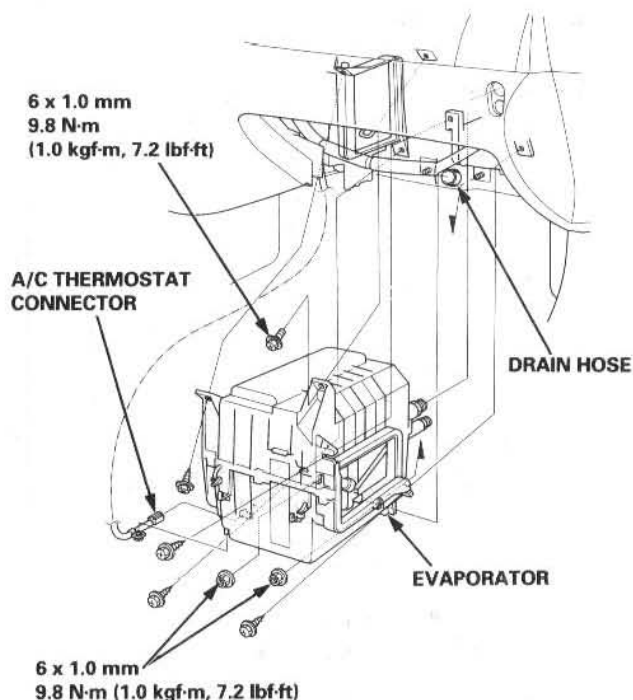
31 N·m (3.2 kgf·m, 23 lbf·ft)



3. Remove the glove box and the glove box bracket (see section 20).
4. Cut the plastic cross brace in the glove box opening with diagonal cutters in the areas shown. Remove and discard the cross brace.



5. Disconnect the connector from the A/C thermostat, and remove the wire harness and the clip from the evaporator. Remove the self-tapping screws, the mounting nuts and the mounting bolt. Disconnect the drain hose, then remove the evaporator.

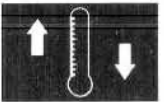


6. Install in the reverse order of removal. Make note of the following items.

- If you're installing a new evaporator, add refrigerant oil (SP-10) (see page 22-46).
- Replace the O-rings with new ones at each fitting, and apply a thin coat of refrigerant oil before installing them.

NOTE: Be sure to use the right O-rings for HFC-134a (R-134a) to avoid leakage.

- Apply sealant to the grommets.
- Make sure that there is no air leakage.
- Charge the system (see page 22-53), and test its performance (see page 22-48).



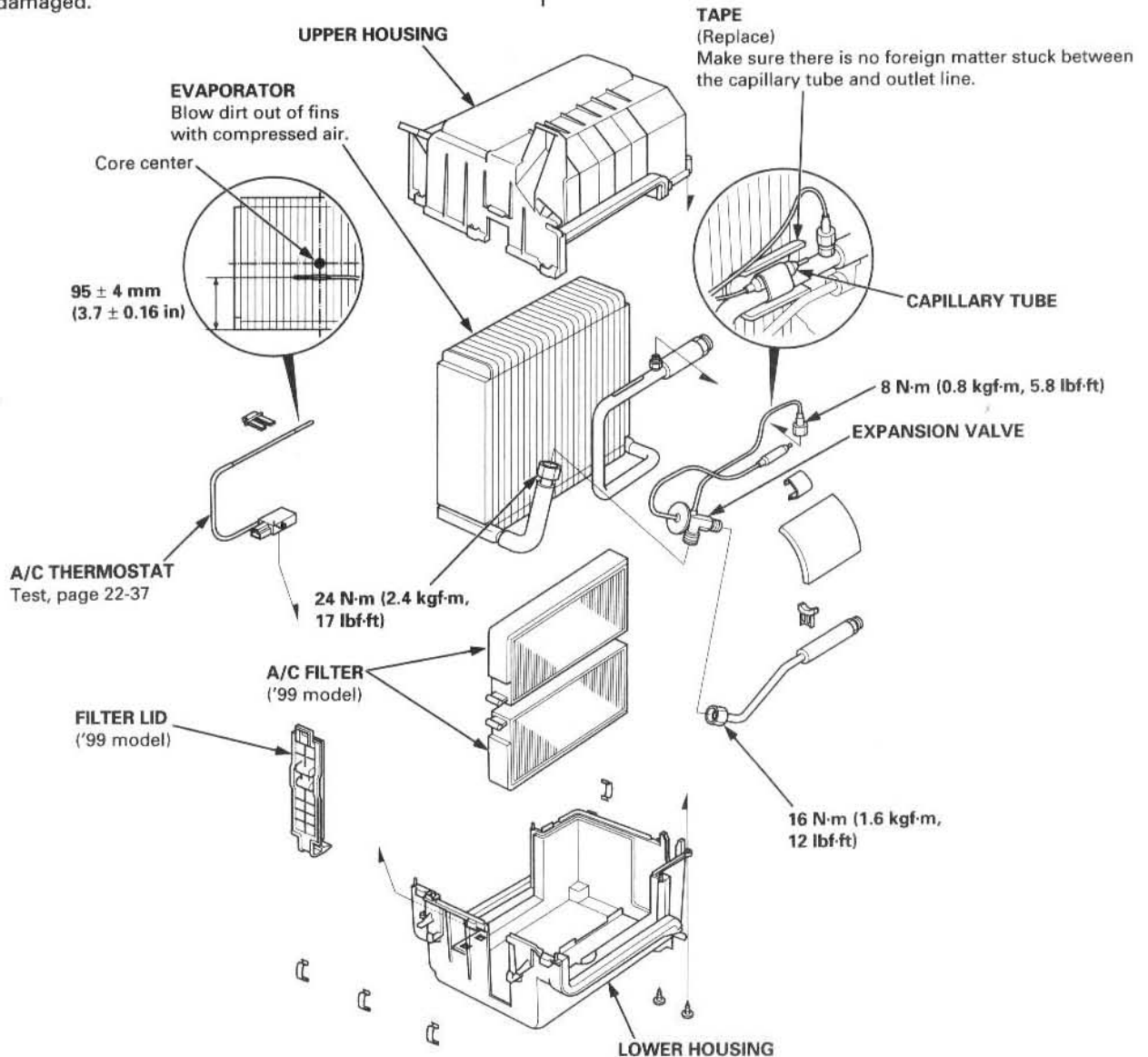
Overhaul

1. Remove the filter lid, then pull out the A/C filters ('99 model).
2. Pull out the A/C thermostat sensor from the evaporator fins.
3. Remove the self-tapping screws and the clamps from the housings.
4. Carefully separate the housings, then remove the evaporator.
5. If necessary, remove the expansion valve.

NOTE: When loosening the nuts of the expansion valve, use a second wrench to hold the expansion valve or the evaporator line. Otherwise, they can be damaged.

6. Reassemble the evaporator in the reverse order of disassembly. Make note of these items.

- Replace the O-rings with new ones at each fitting, and apply a thin coat of refrigerant oil before installing them.
NOTE: Be sure to use the right O-rings for HFC-134a (R-134a) to avoid leakage.
- Install the expansion valve capillary tube with the capillary tube in contact with the outlet line directly, and wrap it with tape.
- Reinstall the A/C thermostat sensor to its original location.
- Make sure that there is no air leakage.

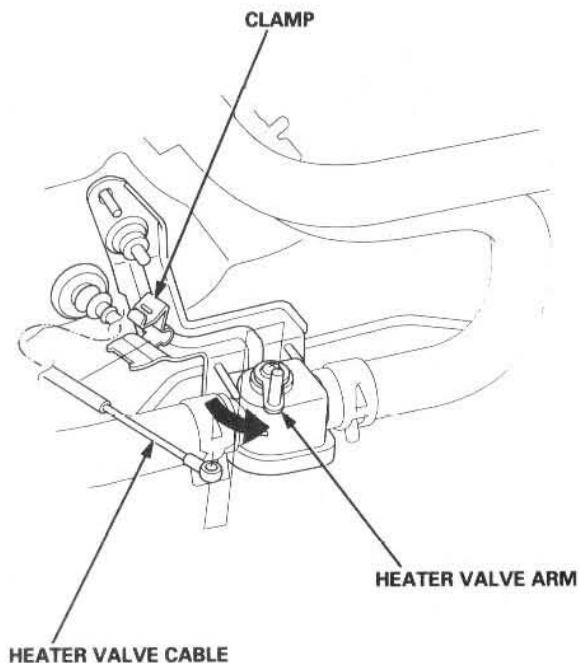


Heater Unit

Replacement

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.
2. Disconnect the negative cable from the battery.
3. From under the hood, open the cable clamp, then disconnect the heater valve cable from the heater valve arm. Turn the heater valve arm to the fully opened position as shown.



4. When the engine is cool, drain the engine coolant from the radiator (see section 10).

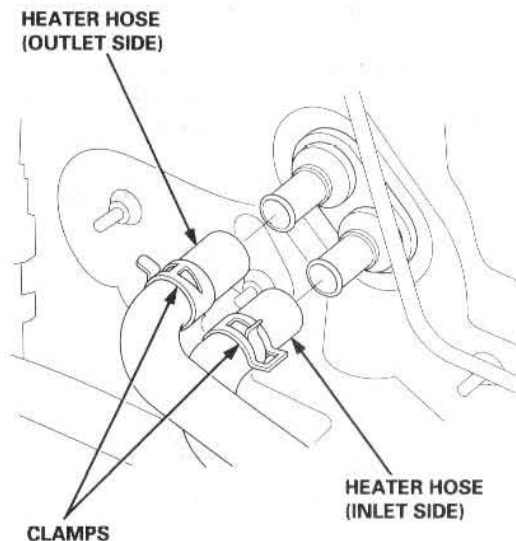
⚠ WARNING Do not remove the radiator cap when the engine is hot; the engine coolant is under pressure and could severely scald you.

5. Disconnect the heater hoses from the heater unit.

CAUTION: Engine coolant will damage paint. Quickly rinse any spilled engine coolant from painted surfaces.

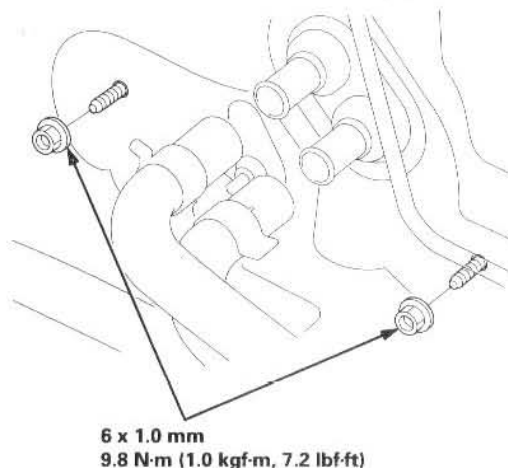
NOTE:

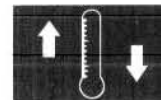
- Engine coolant will run out when the hoses are disconnected; drain it into a clean drip pan.
- When removing the heater hoses, take care not to damage or bend the fuel lines, the brake lines, etc.



6. Remove the mounting nuts from the heater unit.

NOTE: When removing the mounting nuts, take care not to damage or bend the fuel lines, the brake lines, etc.

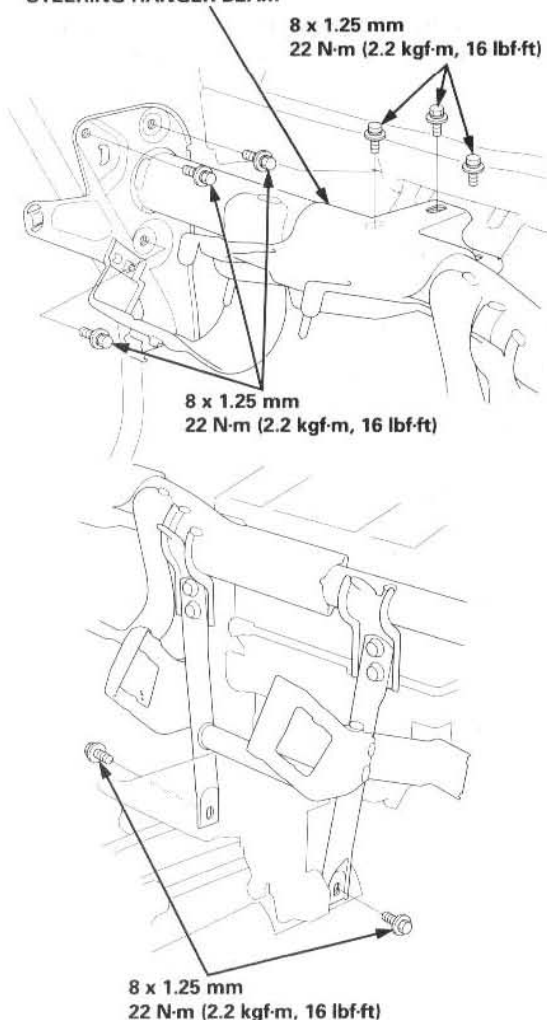




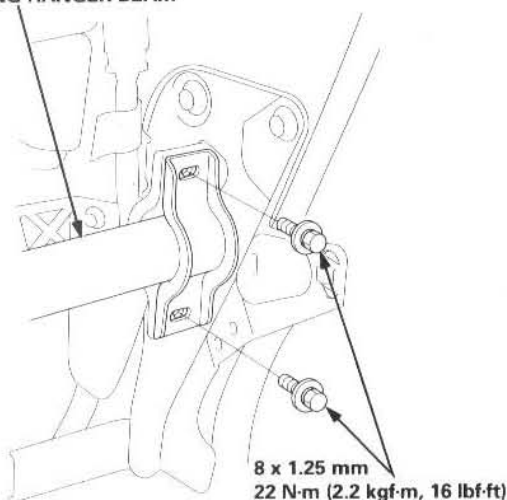
7. Remove the dashboard (see section 20).

8. Remove the mounting bolts in the following sequence, then remove the steering hanger beam.

STEERING HANGER BEAM



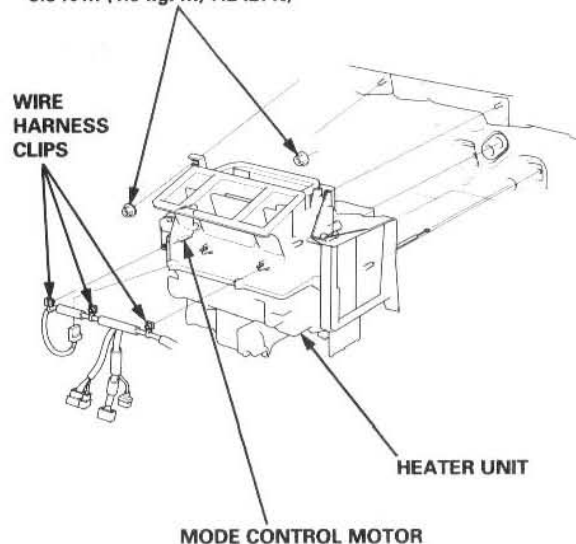
STEERING HANGER BEAM



9. Remove the evaporator (see page 22-40).

10. Disconnect the connector from the mode control motor, and remove the wire harness clips from the heater unit. Remove the mounting nuts and the heater unit.

6 x 1.0 mm
9.8 N-m (1.0 kgf-m, 7.2 lbf-ft)



11. Install in the reverse order of removal. Make note of the following items.

- Apply sealant to the grommets.
- Do not interchange the inlet and outlet heater hoses. Make sure that the clamps are secure.
- Refill the cooling system with engine coolant (see section 10).
- Adjust the air mix control cable and the heater valve cable (see page 22-45).
- Make sure that there is no air leakage.
- Enter the anti-theft code for the radio, then enter the customer's radio station presets.

Heater Unit

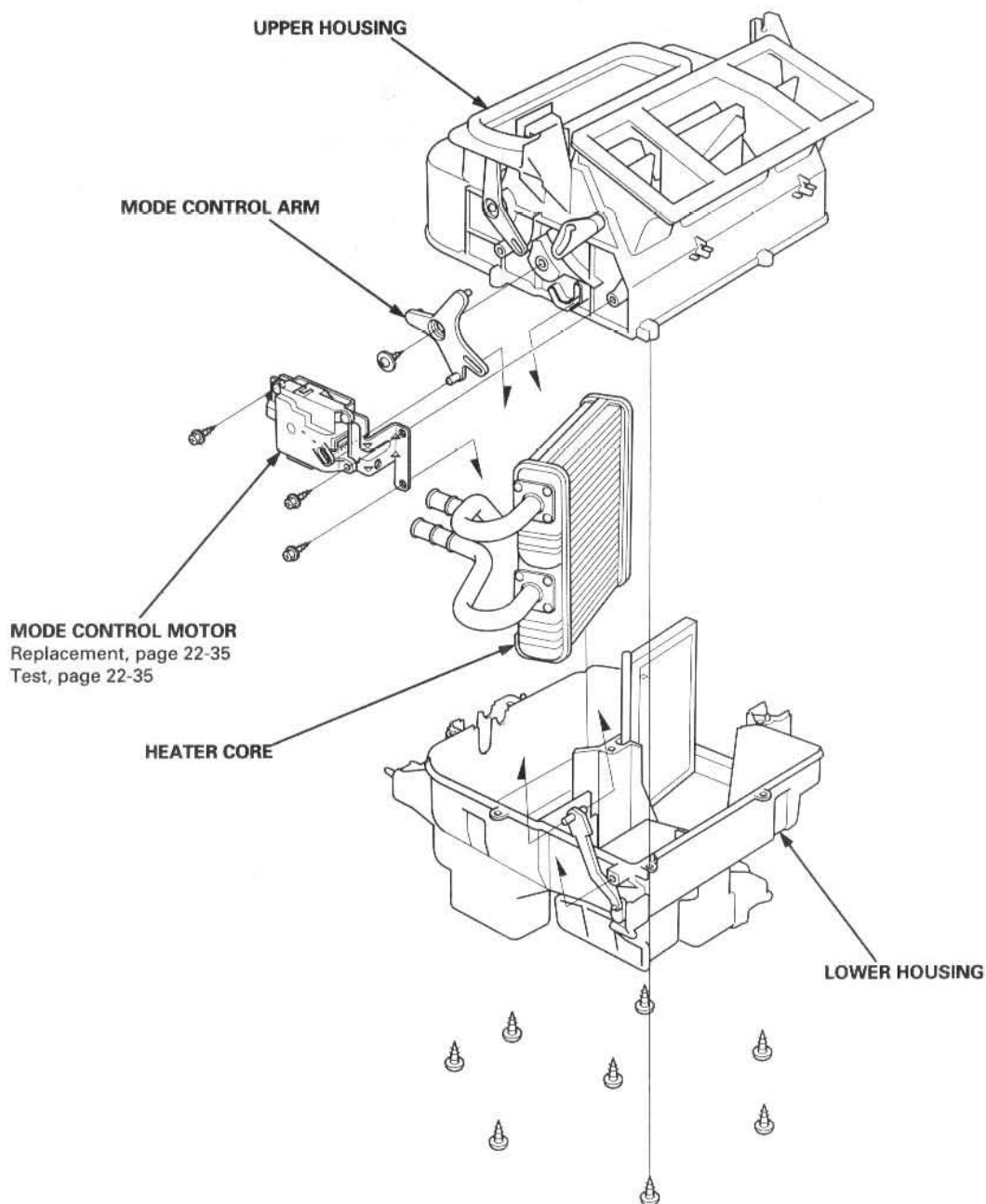
Overhaul

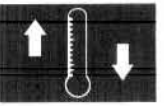
1. Remove the self-tapping screws and the mode control motor together with the bracket.
2. Remove the self-tapping screw and the mode control arm.
3. Remove the self-tapping screws, then carefully separate the housings.

4. Pull out the heater core.

NOTE: Be careful not to bend the inlet and outlet lines during heater core removal.

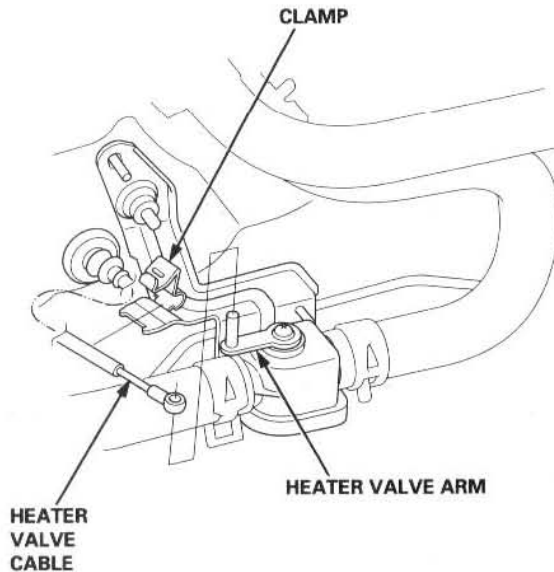
5. Reassemble the heater unit in the reverse order of disassembly. Make sure that there is no air leakage.



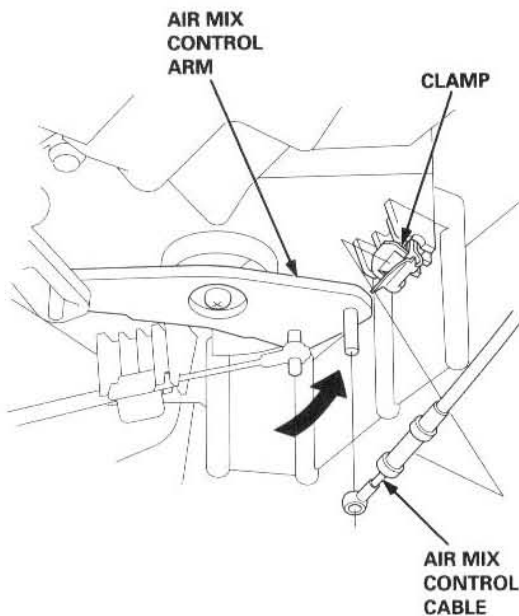


Adjustment

1. From under the hood, open the cable clamp, then disconnect the heater valve cable from the heater valve arm.

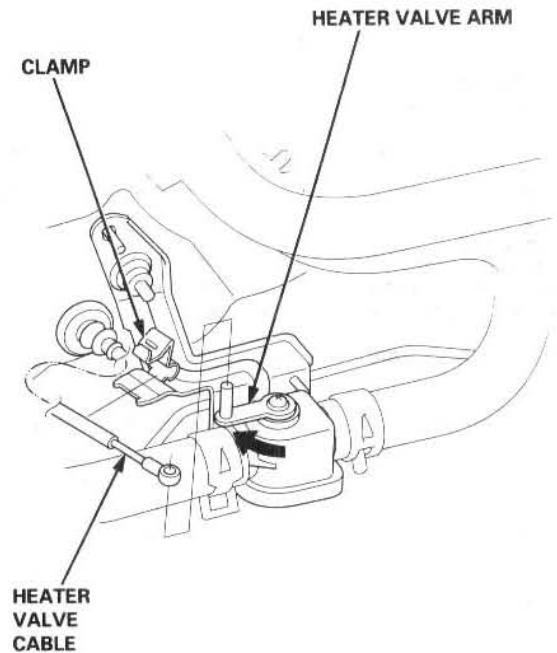


2. From under the dash, disconnect the air mix control cable housing from the cable clamp, and disconnect the air mix control cable from the air mix control arm.



3. Set the temperature control lever to MAX COOL.
4. Turn the air mix control arm fully counterclockwise as shown above, and hold it. Attach the air mix control cable to the air mix control arm, then snap the hook of the air mix control cable housing into the cable clamp.

5. From under the hood, turn the heater valve arm to the fully closed position as shown, and hold it. Attach the heater valve cable to the heater valve arm, and gently pull on the heater valve cable housing to take up any slack, then install the heater valve cable housing into the cable clamp.



A/C Service Tips and Precautions

The air conditioner system uses HFC-134a (R-134a) refrigerant and polyalkyleneglycol (PAG) refrigerant oil*, which are not compatible with CFC-12 (R-12) refrigerant and mineral oil. Do not use R-12 refrigerant or mineral oil in this system, and do not attempt to use R-12 servicing equipment; damage to the air conditioner system or your servicing equipment will result.

*KEIHIN SP-10:

- P/N 38897 – P13 – A01AH: 120 ml (4 fl-oz, 4.2 Imp-oz)
- P/N 38899 – P13 – A01: 40 ml (1 1/3 fl-oz, 1.4 Imp-oz)

Use only service equipment that is U.L.-listed and is certified to meet the requirements of SAE J2210 to remove R-134a from the air conditioner system.

CAUTION: Exposure to air conditioner refrigerant and lubricant vapor or mist can irritate eyes, nose and throat. Avoid breathing the air conditioner refrigerant and lubricant vapor or mist.

If accidental system discharge occurs, ventilate work area before resuming service.

R-134a service equipment or vehicle air conditioner systems should not be pressure tested or leak tested with compressed air.

⚠ WARNING Some mixtures of air and R-134a have been shown to be combustible at elevated pressures and can result in fire or explosion causing injury or property damage. Never use compressed air to pressure test R-134a service equipment or vehicle air conditioner systems.

Additional health and safety information may be obtained from the refrigerant and lubricant manufacturers.

1. Always disconnect the negative cable from the battery whenever replacing air conditioning parts.
2. Keep moisture and dust out of the system. When disconnecting any lines, plug or cap the fittings immediately; don't remove the caps or plugs until just before you reconnect each line.
3. Before connecting any hose or line, apply a few drops of refrigerant oil to the O-ring.
4. When tightening or loosening a fitting, use a second wrench to support the matching fitting.
5. When discharging the system, use a R-134a refrigerant Recovery/Recycling/Charging System; don't release refrigerant into the atmosphere.
6. Add refrigerant oil after replacing the following parts.

NOTE:

- To avoid contamination, do not return the oil to the container once dispensed, and never mix it with other refrigerant oils.
- Immediately after using the oil, replace the cap on the container, and seal it to avoid moisture absorption.
- Do not spill the refrigerant oil on the vehicle; it may damage the paint; if the refrigerant oil contacts the paint, wash it off immediately.

Condenser 25 ml (5/6 fl-oz, 0.9 Imp-oz)

Evaporator 40 ml (1 1/3 fl-oz, 1.4 Imp-oz)

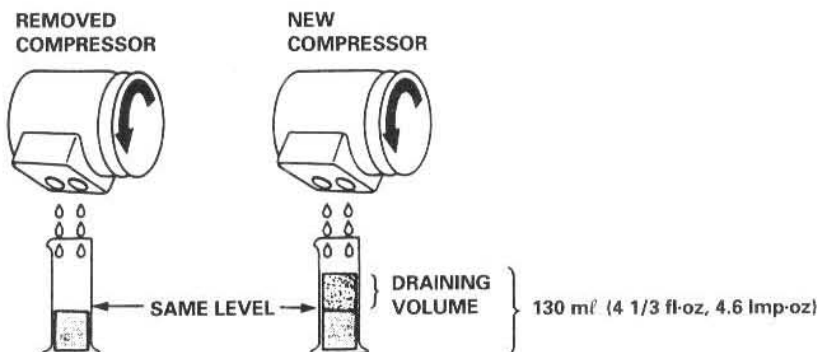
Line or hose 10 ml (1/3 fl-oz, 0.4 Imp-oz)

Receiver/Dryer 10 ml (1/3 fl-oz, 0.4 Imp-oz)

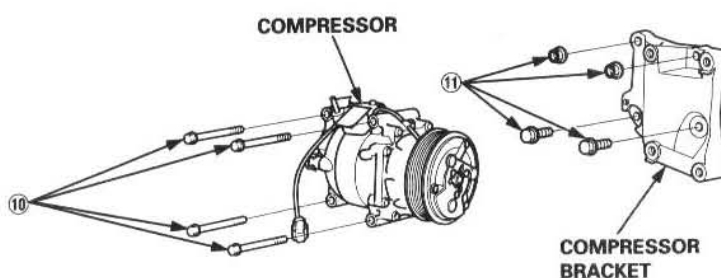
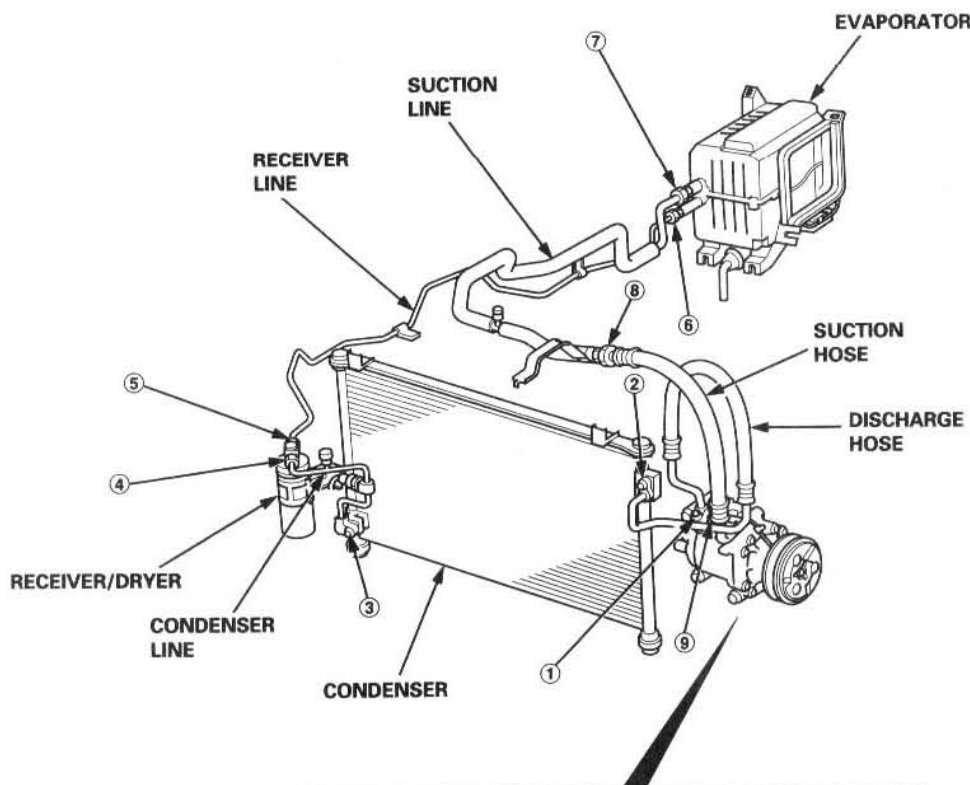
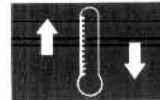
Leakage repair 25 ml (5/6 fl-oz, 0.9 Imp-oz)

Compressor..... For compressor replacement, subtract the volume of oil drained from the removed compressor from 130 ml (4 1/3 fl-oz, 4.6 Imp-oz), and drain the calculated volume of oil from the new compressor: 130 ml (4 1/3 fl-oz, 4.6 Imp-oz) — Volume of removed compressor = Volume to drain from new compressor.

NOTE: Even if no oil is drained from the removed compressor, don't drain more than 50 ml (1 2/3 fl-oz, 1.8 Imp-oz) from the new compressor.



A/C System Torque Specifications



① Discharge hose to the compressor (6 x 1.0 mm)	9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)
② Discharge hose to the condenser (6 x 1.0 mm)	9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)
③ Condenser line to the condenser (6 x 1.0 mm)	9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)
④ Condenser line to the receiver/dryer	13 N·m (1.3 kgf·m, 9.4 lbf·ft)
⑤ Receiver line to the receiver/dryer	13 N·m (1.3 kgf·m, 9.4 lbf·ft)
⑥ Receiver line to the evaporator	13 N·m (1.3 kgf·m, 9.4 lbf·ft)
⑦ Suction line to the evaporator	31 N·m (3.2 kgf·m, 23 lbf·ft)
⑧ Suction hose to the suction line	31 N·m (3.2 kgf·m, 23 lbf·ft)
⑨ Suction hose to the compressor (6 x 1.0 mm)	9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)
⑩ Compressor to compressor bracket (8 x 1.25 mm)	22 N·m (2.2 kgf·m, 16 lbf·ft)
⑪ Compressor bracket to cylinder block (10 x 1.25 mm)	49 N·m (5.0 kgf·m, 36 lbf·ft)

A/C System Service

Performance Test

The performance test will help determine if the air conditioner system is operating within specifications.

Use only service equipment that is U.L.-listed and is certified to meet the requirements of SAE J2210 to remove HFC-134a (R-134a) from the air conditioner system.

CAUTION: Exposure to air conditioner refrigerant and lubricant vapor or mist can irritate eyes, nose and throat. Avoid breathing the air conditioner refrigerant and lubricant vapor or mist.

If accidental system discharge occurs, ventilate work area before resuming service.

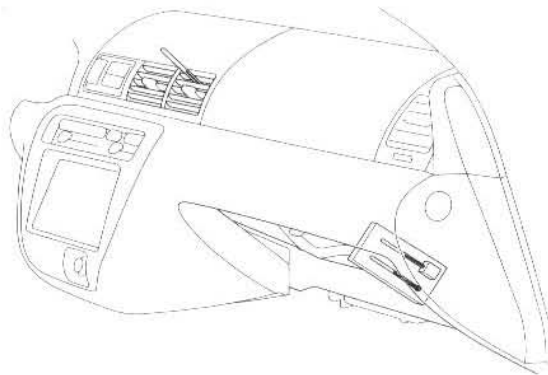
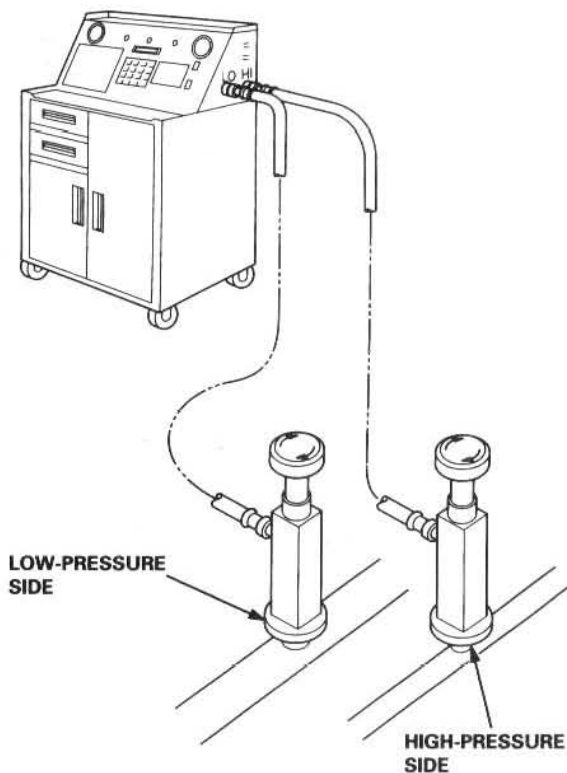
R-134a service equipment or vehicle air conditioner systems should not be pressure tested or leak tested with compressed air.

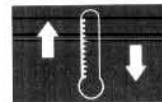
⚠ WARNING Some mixtures of air and R-134a have been shown to be combustible at elevated pressures and can result in fire or explosion causing injury or property damage. Never use compressed air to pressure test R-134a service equipment or vehicle air conditioner systems.

Additional health and safety information may be obtained from the refrigerant and lubricant manufacturers.

1. Connect a R-134a refrigerant Recover/Recycling/Charging System to the vehicle, as shown, following the equipment manufacturer's instructions.
2. Insert a thermometer in the center air vent. Determine the relative humidity and air temperature.
3. Test conditions:
 - Avoid direct sunlight.
 - Open hood.
 - Open front doors.
 - Set the temperature control lever to MAX COOL, the mode control switch on VENT and the recirculation control switch on RECIRCULATE.
 - Turn the A/C switch on and the heater fan switch on MAX.
 - Run the engine at 1,500 rpm.
 - No driver or passengers in vehicle
4. After running the air conditioning for 10 minutes under the above test conditions, read the delivery temperature from the thermometer in the dash vent and the high and low system pressure from the A/C gauges.

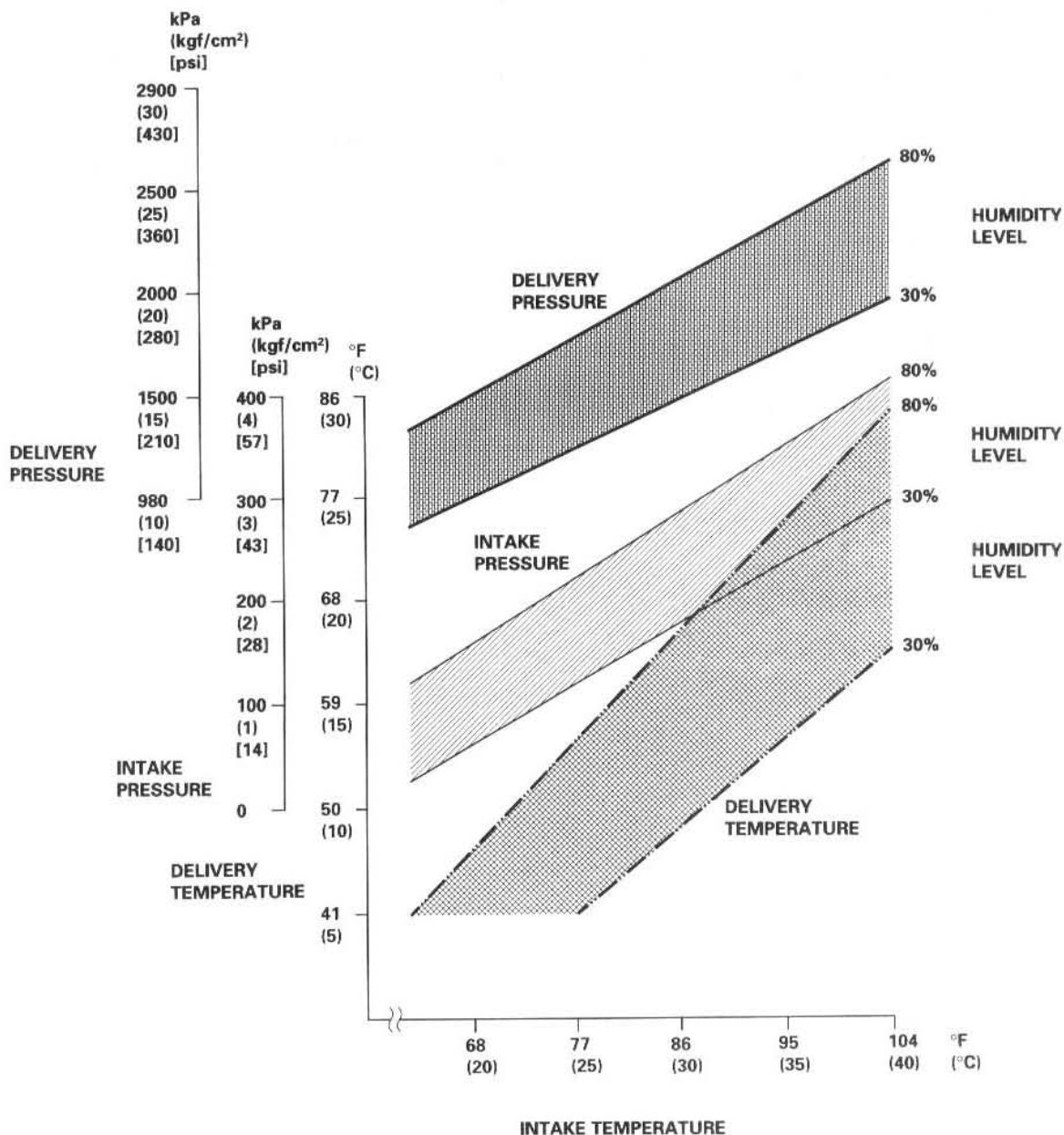
Recovery/Recycling/Charging System





5. To complete the charts:

- Mark the delivery temperature along the vertical line.
- Mark the intake temperature (ambient air temperature) along the bottom line.
- Draw a line straight up from the air temperature to the humidity.
- Mark a point one line above and one line below the humidity level (10% above and 10% below the humidity level).
- From each point, draw a horizontal line across the delivery temperature.
- The delivery temperature should fall between the two lines.
- Complete the low-side pressure test and high-side pressure test in the same way.
- Any measurements outside the line may indicate the need for further inspection.

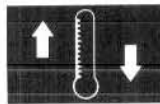


A/C System Service

Pressure Test Chart

NOTE: Performance Test is on page 22-48.

Test results	Related symptoms	Probable cause	Remedy
Discharge (high) pressure abnormally high	After stopping compressor, pressure drops to about 200 kPa (2.0 kgf/cm ² , 28 psi) quickly, and then falls gradually.	Air in system	Recover, evacuate, and recharge with specified amount. Evacuation: see page 22-52. Charging: see page 22-53.
	Reduced or no air flow through condenser.	<ul style="list-style-type: none"> • Clogged condenser or radiator fins • Condenser or radiator fan not working properly 	<ul style="list-style-type: none"> • Clean • Check voltage and fan rpm. • Check fan direction.
	Line to condenser is excessively hot.	Restricted flow of refrigerant in system	Restricted lines
Discharge pressure abnormally low	High and low pressures are balanced soon after stopping compressor. Low side is higher than normal.	<ul style="list-style-type: none"> • Faulty compressor discharge valve • Faulty compressor seal 	Replace the compressor.
	Outlet of expansion valve is not frosted, low-pressure gauge indicates vacuum.	<ul style="list-style-type: none"> • Faulty expansion valve • Moisture in system 	<ul style="list-style-type: none"> • Replace • Recover, evacuate, and recharge with specified amount.
Suction (low) pressure abnormally low	Expansion valve is not frosted, and low-pressure line is not cold. Low-pressure gauge indicates vacuum.	<ul style="list-style-type: none"> • Frozen expansion valve • Faulty expansion valve 	Replace the expansion valve.
	Discharge temperature is low, and the air flow from vents is restricted.	Frozen evaporator	Run the fan with compressor off, then check evaporator temperature sensor.
	Expansion valve is frosted.	Clogged expansion valve	Clean or replace.
	Receiver/dryer outlet is cool, and inlet is warm (should be warm during operation).	Clogged receiver/dryer	Replace
Suction pressure abnormally high	Low-pressure hose and check joint are cooler than the temperature around evaporator.	<ul style="list-style-type: none"> • Expansion valve open too long • Loose expansion capillary tube 	Repair or replace.
	Suction pressure is lowered when condenser is cooled by water.	Excessive refrigerant in system	Recover, evacuate, and recharge with specified amount.
	High and low pressure are equalized as soon as the compressor is stopped, and both gauges fluctuate while running.	<ul style="list-style-type: none"> • Faulty gasket • Faulty high-pressure valve • Foreign particle stuck in high-pressure valve 	Replace the compressor.
Suction and discharge pressures abnormally high	Reduced air flow through condenser.	<ul style="list-style-type: none"> • Clogged condenser or radiator fins • Condenser or radiator fan not working properly 	<ul style="list-style-type: none"> • Clean condenser and radiator. • Check voltage and fan rpm. • Check fan direction.
Suction and discharge pressure abnormally low	Low-pressure hose and metal end areas are cooler than evaporator.	Clogged or kinked low-pressure hose parts	Repair or replace.
	Temperature around expansion valve is too low compared with that around receiver/dryer.	Clogged high-pressure line	Repair or replace.
Refrigerant leaks	Compressor clutch is dirty.	Compressor shaft seal leaking	Replace the compressor.
	Compressor bolt(s) are dirty.	Leaking around bolt(s)	Tighten bolt(s) or replace compressor.
	Compressor gasket is wet with oil.	Gasket leaking	Replace the compressor.



Recovery

Use only service equipment that is U.L.-listed and is certified to meet the requirements of SAE J2210 to remove HFC-134a (R-134a) from the air conditioner system.

CAUTION: Exposure to air conditioner refrigerant and lubricant vapor or mist can irritate eyes, nose and throat. Avoid breathing the air conditioner refrigerant and lubricant vapor or mist.

If accidental system discharge occurs, ventilate work area before resuming service.

R-134a service equipment or vehicle air conditioner systems should not be pressure tested or leak tested with compressed air.

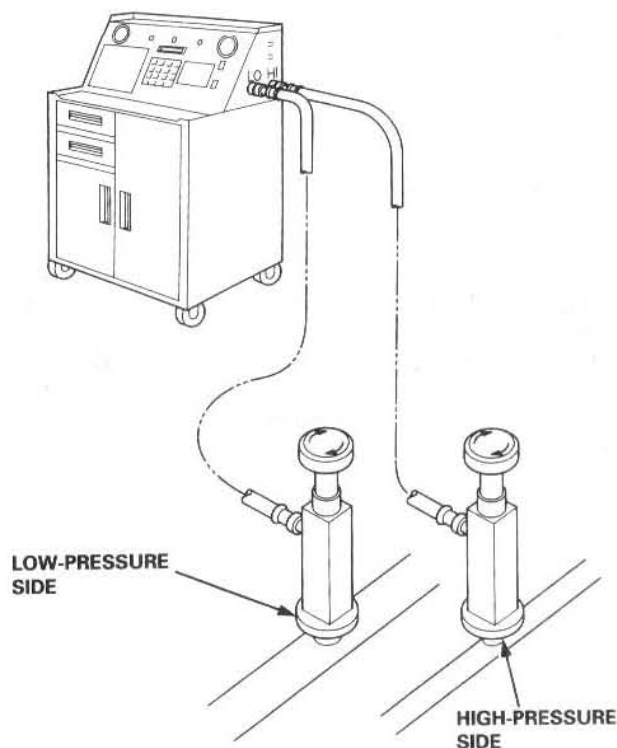
⚠ WARNING Some mixtures of air and R-134a have been shown to be combustible at elevated pressures and can result in fire or explosion causing injury or property damage. Never use compressed air to pressure test R-134a service equipment or vehicle air conditioner systems.

Additional health and safety information may be obtained from the refrigerant and lubricant manufacturers.

1. Connect a R-134a refrigerant Recovery/Recycling/Charging System to the vehicle, as shown, following the equipment manufacturer's instructions.
2. Measure the amount of refrigerant oil removed from the A/C system after the recovery process is completed.

NOTE: Be sure to install the same amount of new refrigerant oil back into the A/C system before charging.

Recovery/Recycling/Charging System



A/C System Service

Evacuation

Use only service equipment that is U.L.-listed and is certified to meet the requirements of SAE J2210 to remove HFC-134a (R-134a) from the air conditioner system.

CAUTION: Exposure to air conditioner refrigerant and lubricant vapor or mist can irritate eyes, nose and throat. Avoid breathing the air conditioner refrigerant and lubricant vapor or mist.

If accidental system discharge occurs, ventilate work area before resuming service.

R-134a service equipment or vehicle air conditioner systems should not be pressure tested or leak tested with compressed air.

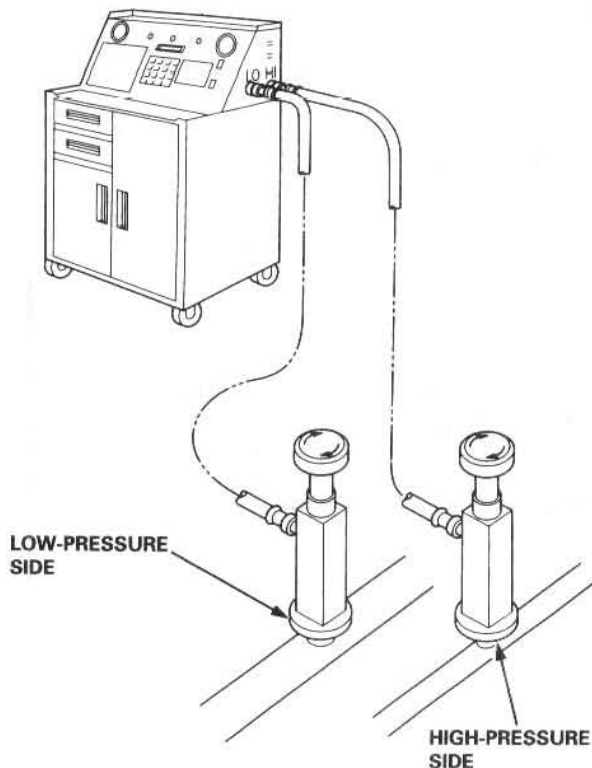
⚠ WARNING Some mixtures of air and R-134a have been shown to be combustible at elevated pressures and can result in fire or explosion causing injury or property damage. Never use compressed air to pressure test R-134a service equipment or vehicle air conditioner systems.

Additional health and safety information may be obtained from the refrigerant and lubricant manufacturers.

1. When an A/C System has been opened to the atmosphere, such as during installation or repair, it must be evacuated using a R-134a refrigerant Recovery/Recycling/Charging System. (If the system has been open for several days, the receiver/dryer should be replaced, and the system should be evacuated for several hours.)
2. Connect a R-134a refrigerant Recovery/Recycling/Charging System to the vehicle, as shown, following the equipment manufacturer's instructions.

NOTE: If the low-pressure does not reach more than 93.3 kPa (700 mmHg, 27.6 in.Hg) in 15 minutes, there is probably a leak in the system. Partially charge the system, and check for leaks (see Leak Test).

Recovery/Recycling/Charging System





Charging

Use only service equipment that is U.L.-listed and is certified to meet the requirements of SAE J2210 to remove HFC-134a (R-134a) from the air conditioner system.

CAUTION: Exposure to air conditioner refrigerant and lubricant vapor or mist can irritate eyes, nose and throat. Avoid breathing the air conditioner refrigerant and lubricant vapor or mist.

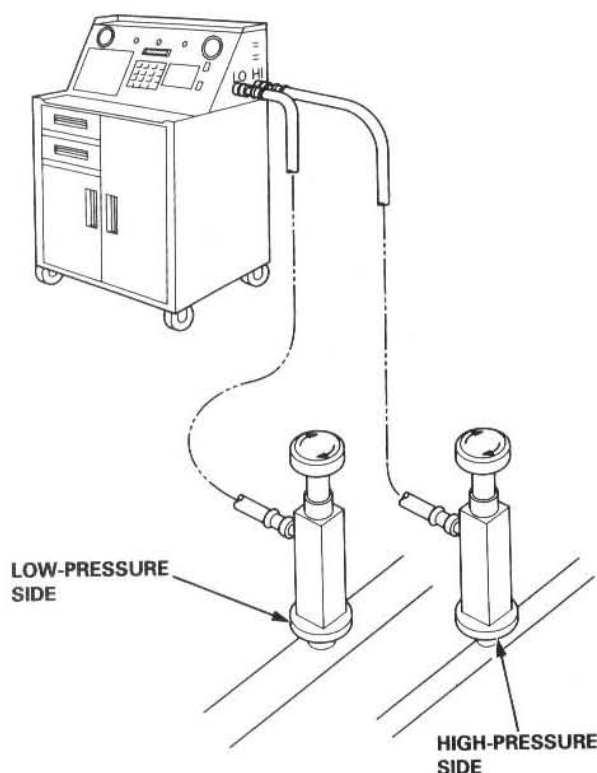
If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from the refrigerant and lubricant manufacturers.

Refrigerant capacity: 750^{+0}_{-50} g ($26.5^{+0}_{-1.8}$ oz)

CAUTION: Do not overcharge the system; the compressor will be damaged.

Connect a R-134a refrigerant Recovery/Recycling/Charging System to the vehicle, as shown, following the equipment manufacturer's instructions.

Recovery/Recycling/Charging System



Leak Test

Use only service equipment that is U.L.-listed and is certified to meet the requirements of SAE J2210 to remove HFC-134a (R-134a) from the air conditioner system.

CAUTION: Exposure to air conditioner refrigerant and lubricant vapor or mist can irritate eyes, nose and throat. Avoid breathing the air conditioner refrigerant and lubricant vapor or mist.

If accidental system discharge occurs, ventilate work area before resuming service.

R-134a service equipment or vehicle air conditioner systems should not be pressure tested or leak tested with compressed air.

⚠ WARNING Some mixtures of air and R-134a have been shown to be combustible at elevated pressures and can result in fire or explosion causing injury or property damage. Never use compressed air to pressure test R-134a service equipment or vehicle air conditioner systems.

Additional health and safety information may be obtained from the refrigerant and lubricant manufacturers.

1. Connect a R-134a refrigerant Recovery/Recycling/Charging System to the vehicle, as shown in the previous column, following the equipment manufacturer's instructions.

NOTE: Be sure to install the same amount of new refrigerant oil back into the A/C system before charging.

2. Open the high-pressure valve to charge the system to the specified capacity, then close the supply valve, and remove the charging system couplers.

Refrigerant capacity: 750^{+0}_{-50} g ($26.5^{+0}_{-1.8}$ oz)

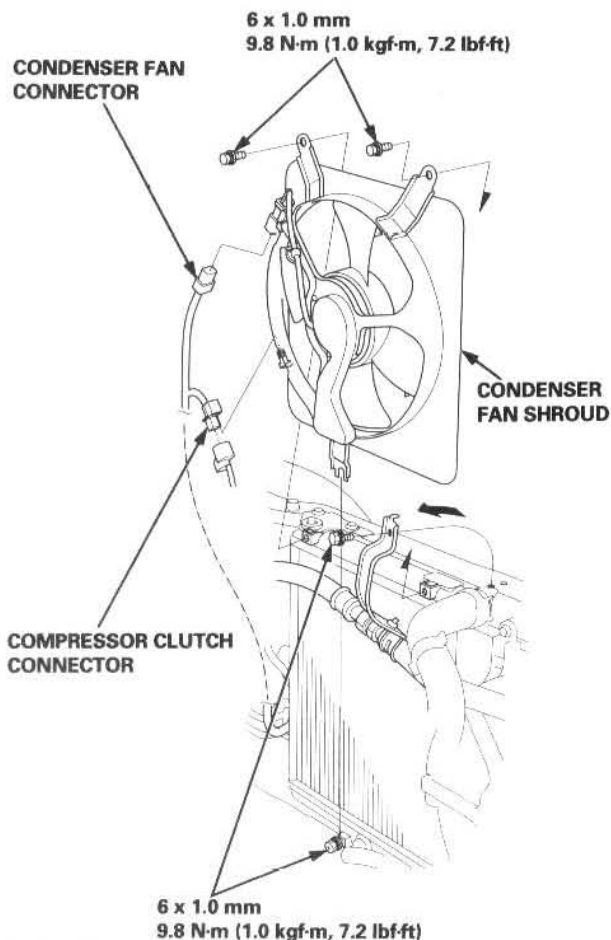
3. Check the system for leaks using a R-134a refrigerant leak detector with an accuracy of 14 g (0.5 oz) per year or better.
4. If you find leaks that require the system to be opened (to repair or replace hoses, fittings, etc.), recover the system according to the Recovery Procedure on page 22-51.
5. After checking and repairing leaks, the system must be evacuated (see System Evacuation on page 22-52).

Compressor

Replacement

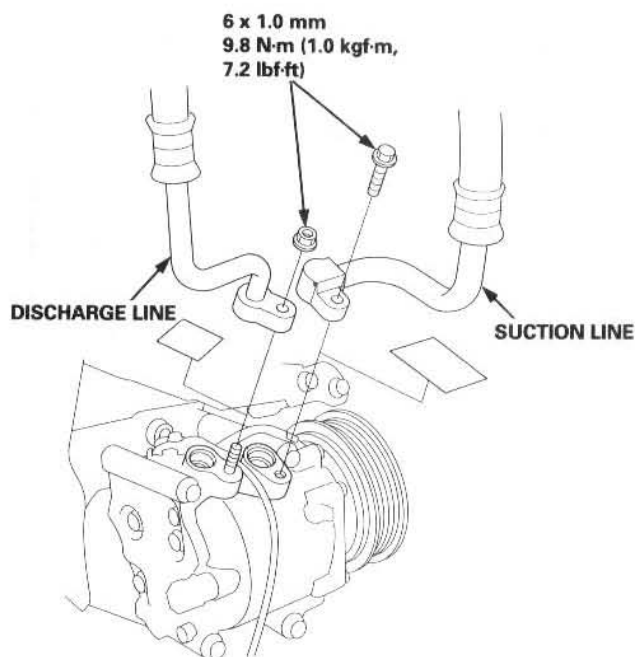
1. If the compressor is marginally operable, run the engine at idle speed, and let the air conditioner work for a few minutes, then shut the engine off.
2. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.
3. Disconnect the negative cable from the battery.
4. Recover the refrigerant with a Recovery/Recycling/Charging System (see page 22-51).
5. Loosen the A/C compressor belt (see page 22-62), then remove it from the pulleys.
6. Disconnect the condenser fan connector. Remove the compressor clutch connector from the condenser fan shroud, then disconnect the compressor clutch connector. Remove the bolt and the suction line bracket as shown. Loosen the lower mounting bolt, then remove the upper mounting bolts and the condenser fan shroud.

NOTE: Be careful not to damage the radiator fins when removing the condenser fan shroud.



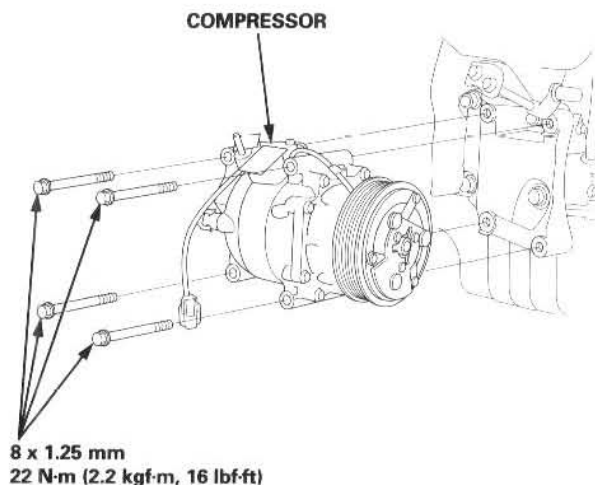
7. Remove the nut and the bolt, then disconnect the suction and discharge lines from the compressor.

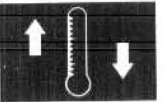
NOTE: Plug or cap the lines immediately after disconnecting them to avoid moisture and dust contamination.



8. Remove the mounting bolts and the compressor.

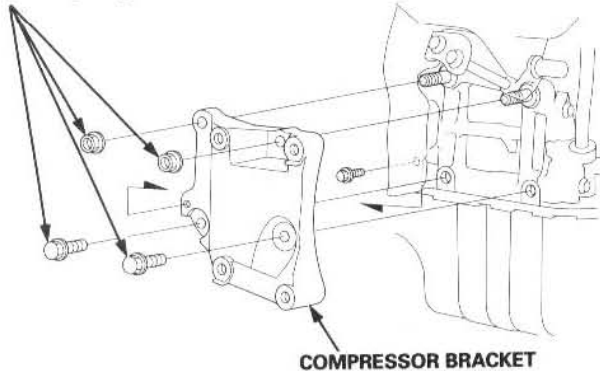
NOTE: Be careful not to damage the radiator fins when removing the compressor.





9. If necessary, remove the lower mounting bolt from the heat insulator, then remove the mounting bolts, the mounting nuts and the compressor bracket.

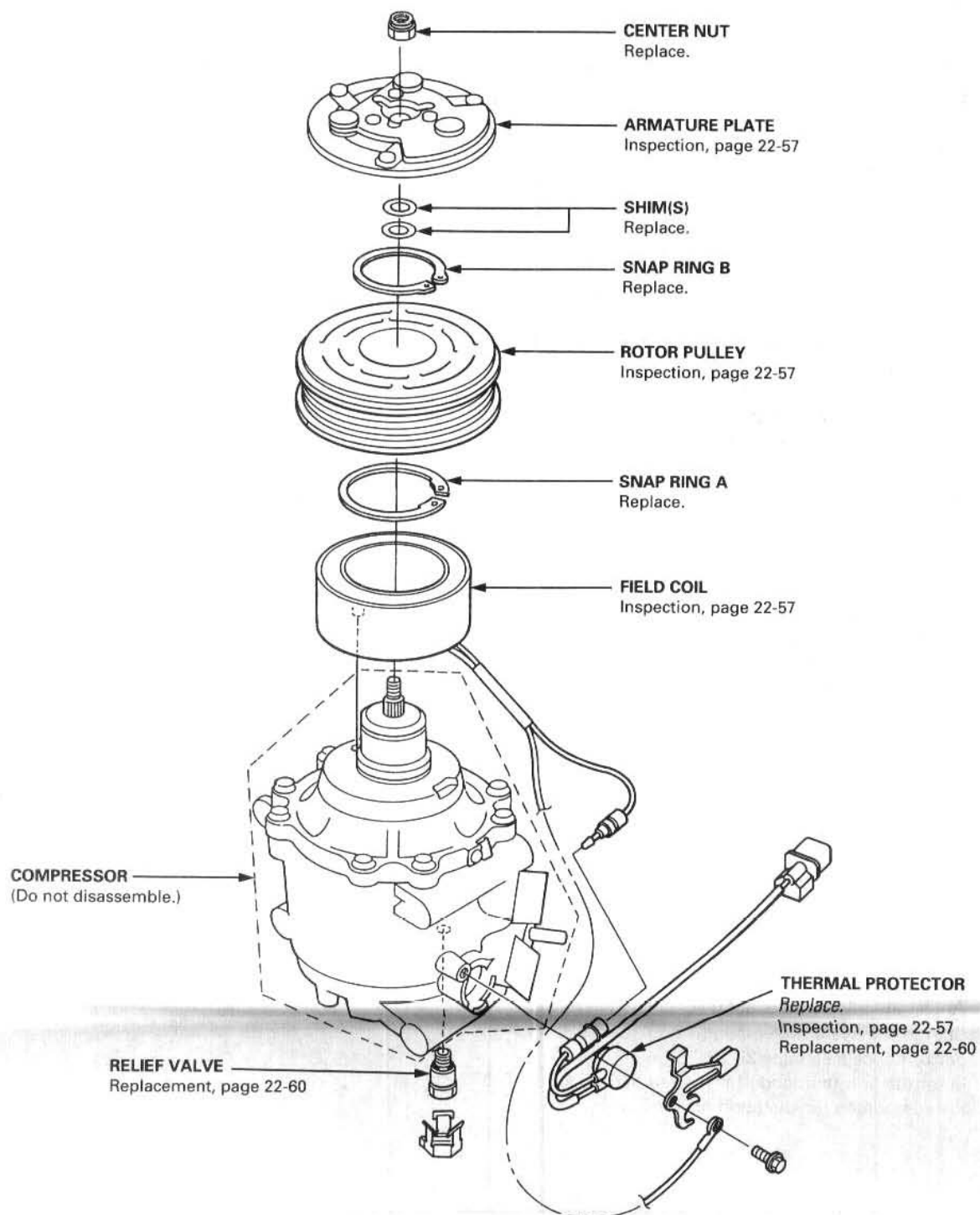
10 x 1.25 mm
49 N·m (5.0 kgf·m, 36 lbf·ft)

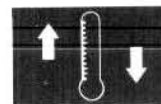


10. Install in the reverse order of removal. Make note of the following items.
- If you're installing a new compressor, drain all the refrigerant oil from the removed compressor, and measure its volume. Subtract the volume of drained oil from 130 ml (4 1/3 fl-oz, 4.6 Imp-oz); the result is the amount of oil you should drain from the new compressor (through the suction fitting).
 - Replace the O-rings with new ones at each fitting, and apply a thin coat of refrigerant oil before installing them.
NOTE: Be sure to use the right O-rings for HFC-134a (R-134a) to avoid leakage.
 - Use refrigerant oil (SP-10) for R-134a KEIHIN spiral type compressors only.
 - To avoid contamination, do not return the oil to the container once dispensed, and never mix it with other refrigerant oils.
 - Immediately after using the oil, replace the cap on the container, and seal it to avoid moisture absorption.
 - Do not spill the refrigerant oil on the vehicle; it may damage the paint; if the refrigerant oil contacts the paint, wash it off immediately.
 - Be careful not to damage the radiator fins when installing the compressor.
 - Adjust the A/C compressor belt (see page 22-62).
 - Charge the system (see page 22-53), and test its performance (see page 22-48).
 - Enter the anti-theft code for the radio, then enter the customer's radio station presets.

Compressor

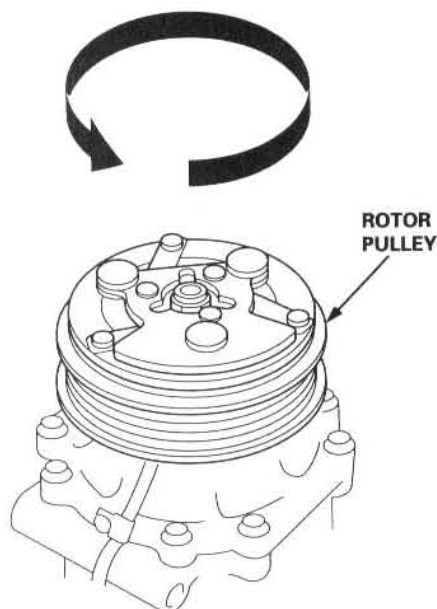
Illustrated Index





Clutch Inspection

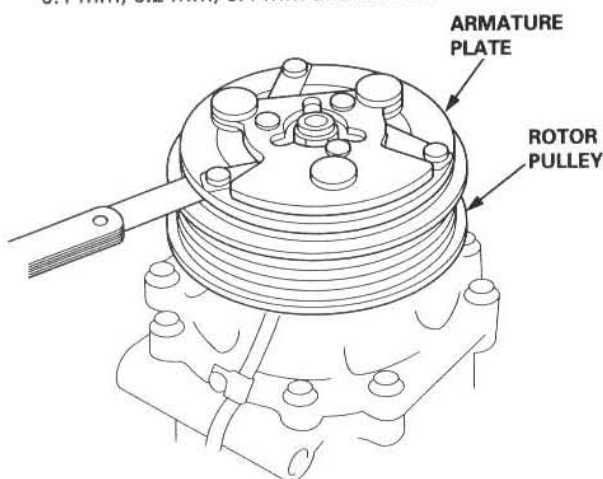
- Check the plated parts of the armature plate for color changes, peeling or other damage. If there is damage, replace the clutch set.
- Check the rotor pulley bearing play and drag by rotating the rotor pulley by hand. Replace the clutch set with a new one if it is noisy or has excessive play/drag.



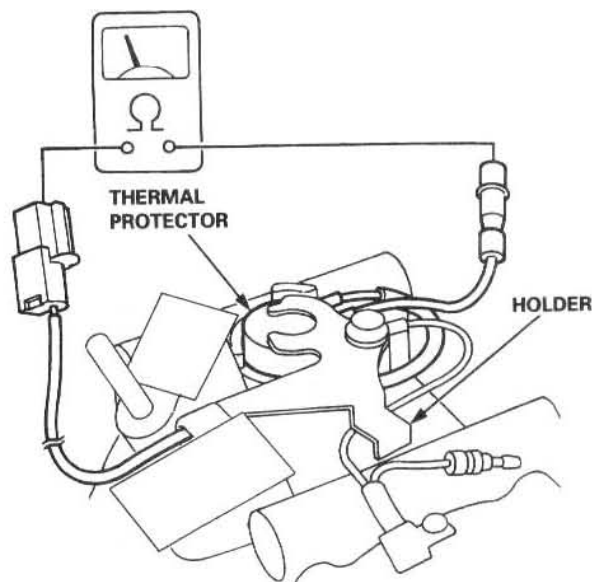
- Measure the clearance between the rotor pulley and the armature plate all the way around. If the clearance is not within specified limits, the armature plate must be removed and shims added or removed as required, following the procedure on page 22-58.

Clearance: 0.5 ± 0.15 mm (0.020 ± 0.006 in)

NOTE: The shims are available in four thicknesses: 0.1 mm, 0.2 mm, 0.4 mm and 0.5 mm



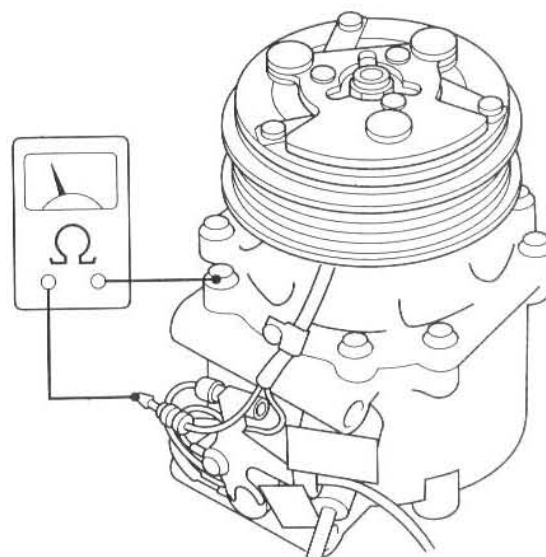
- Release the field coil connector from the holder, then disconnect it. Check the thermal protector for continuity. If there is no continuity, replace the thermal protector.



- Check resistance of the field coil.

Field Coil Resistance: 3.4 ± 0.15 ohms at 68°F (20°C)

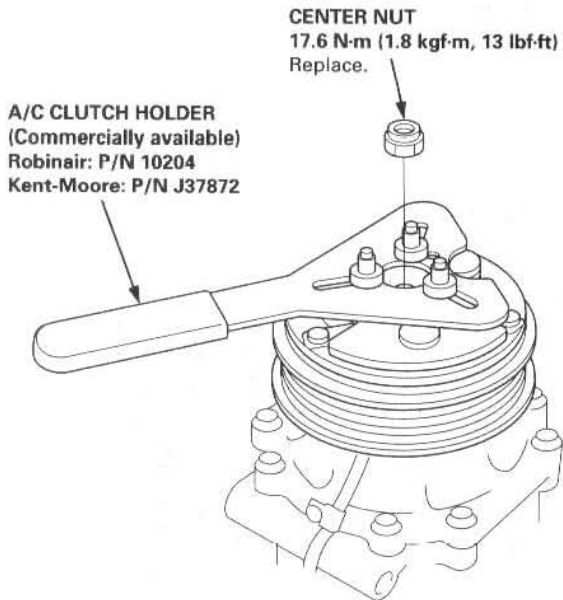
If resistance is not within specifications, replace the field coil.



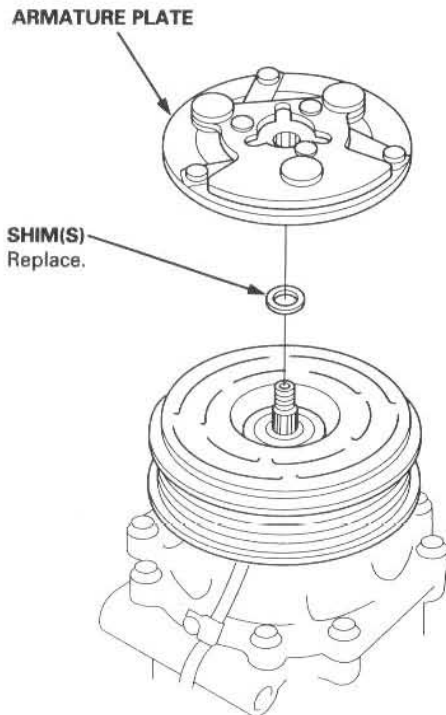
Compressor

Clutch Overhaul

1. Remove the center nut while holding the armature plate with the tool.



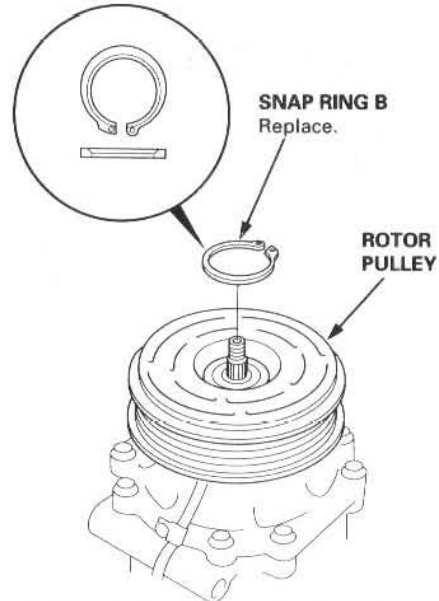
2. Remove the armature plate by pulling it up by hand.



3. Remove the snap ring B with snap ring pliers.

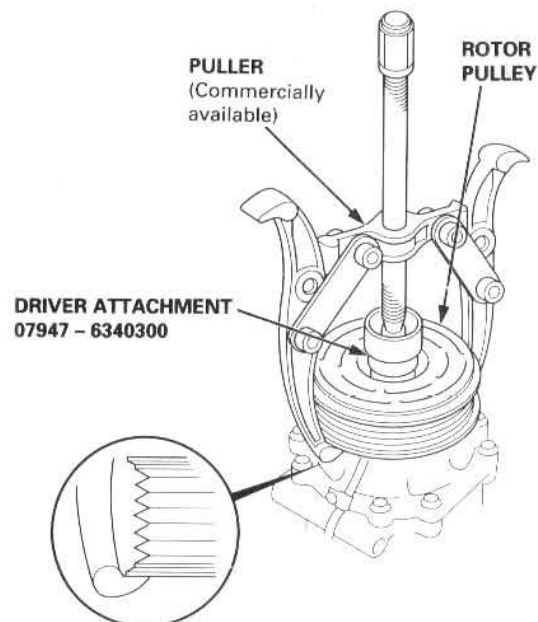
NOTE:

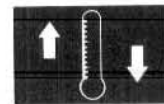
- Be careful not to damage the rotor pulley and compressor during removal/installation.
- Once the snap ring B is removed, replace it with a new one.



4. Remove the rotor pulley from the shaft with the tools.

NOTE: Put the claws of the puller on the back of the rotor pulley, not on the belt area; otherwise the rotor pulley can be damaged.

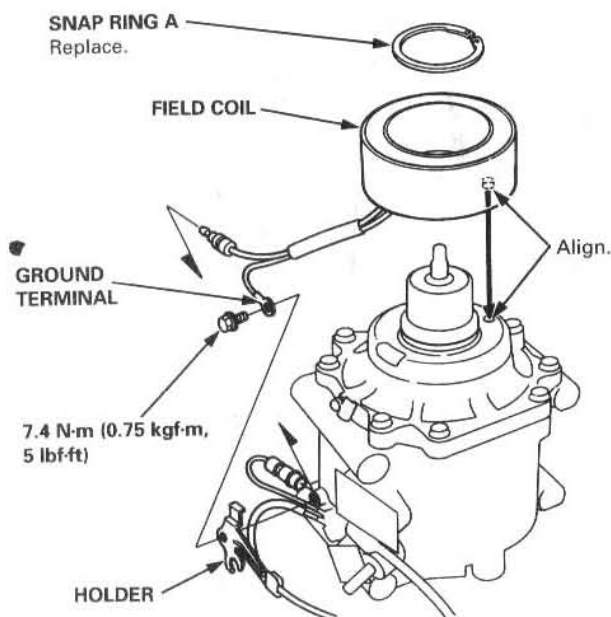




5. Remove the screw from the field coil ground terminal, then disconnect the field coil connector. Remove the snap ring A with snap ring pliers, then remove the field coil.

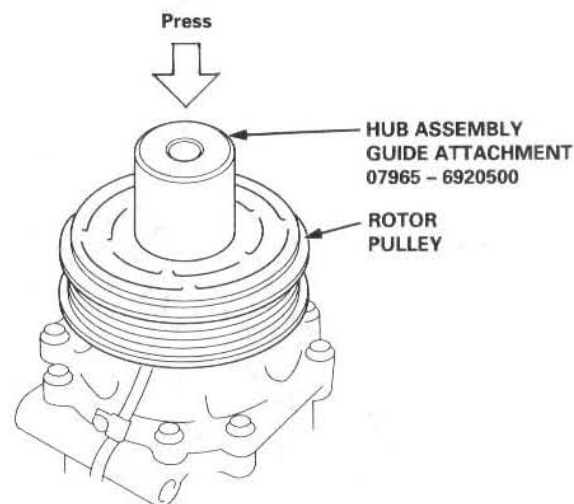
NOTE:

- Be careful not to damage the field coil and compressor during remove/installation.
- Once the snap ring A is removed, replace it with a new one.
- When installing the field coil, align the boss on the field coil with the hole in the compressor.



6. Position the rotor pulley squarely over the field coil. Press the rotor pulley onto the compressor boss with the special tool. If the rotor pulley does not press on straight, remove it, and check the rotor pulley and compressor boss for burrs or damage.

CAUTION: Maximum press load: 39,200 kPa (400 kgf/cm², 5,690 psi)

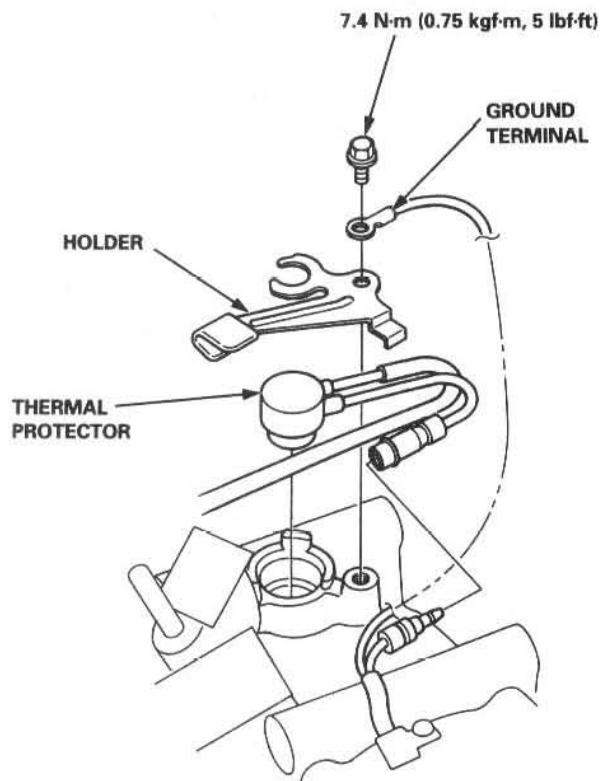


7. Reassemble the compressor clutch in the reverse order of disassembly. Make note of the following items.
 - Install the field coil with the wire side facing down.
 - Clean the rotor pulley and compressor sliding surfaces with non-petroleum solvent.
 - Make sure the snap rings are fully seated in the groove.
 - Make sure that the rotor pulley turns smoothly after it's reassembled.
 - Route and clamp the wires properly or they can be damaged by the rotor pulley.

Compressor

Thermal Protector Replacement

1. Remove the bolt, the ground terminal and the holder. Disconnect the field coil connector, then remove the thermal protector.



2. Replace the thermal protector with a new one, and apply silicone sealant to the top of the thermal protector.



3. Install in the reverse order of removal.

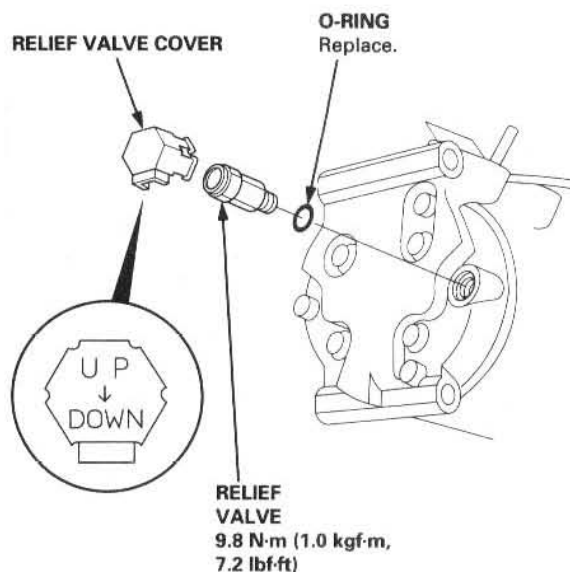
Relief Valve Replacement

1. Remove the relief valve cover, the relief valve and the O-ring.

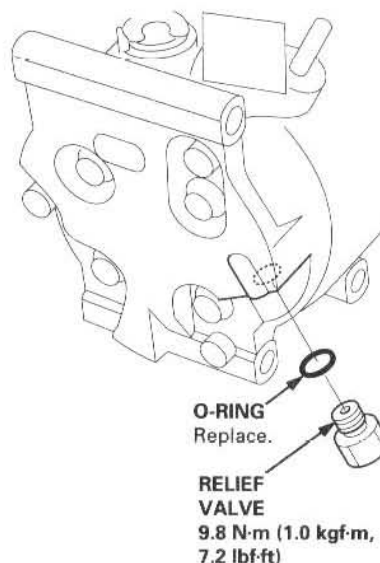
NOTE:

- Do not let the compressor oil run out.
- Make sure that no foreign matter enters the system.

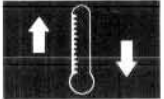
'97 - '98 models



'99 model



2. Clean the mating surfaces.



3. Replace the O-ring with a new one at the relief valve, and apply a thin coat of refrigerant oil before installing it.

NOTE:

- To avoid contamination, do not return the oil to the container once dispensed, and never mix it with other refrigerant oils.
- Immediately after using the oil, replace the cap on the container, and seal it to avoid moisture absorption.
- Do not spill the refrigerant oil on the vehicle; it may damage the paint; if the refrigerant oil contacts the paint, wash it off immediately.

4. Install and tighten the relief valve.
5. Put the cover on the relief valve so that the arrow directs downwards as shown in the illustration above.
6. Charge the system (see page 22-53), and test its performance (see page 22-48).

A/C Compressor Belt

Adjustment

Deflection Method

1. Apply a force of 98 N (10 kgf, 22 lbf), and measure the deflection between the alternator pulley and the crankshaft pulley.

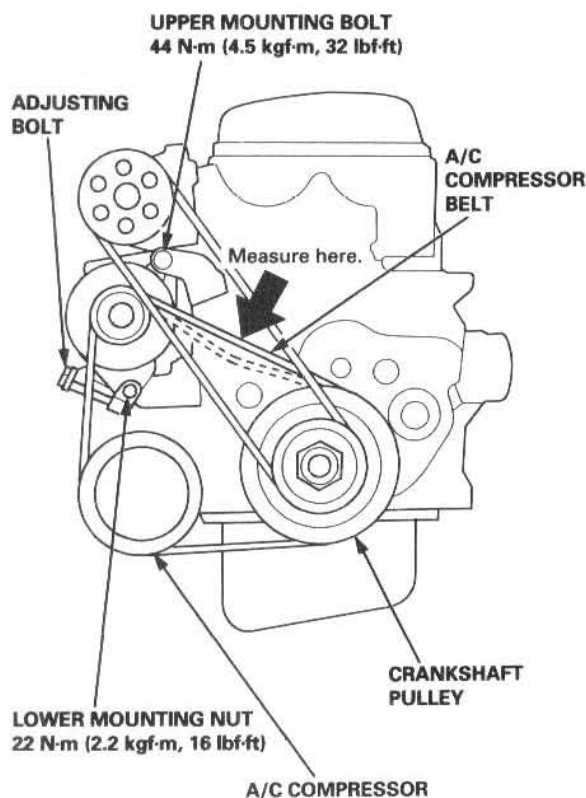
A/C Compressor Belt

Used Belt: 9.5 – 12.5 mm (0.37 – 0.49 in)

New Belt: 5.5 – 7.5 mm (0.22 – 0.30 in)

NOTE:

- If there are cracks or any damage evident on the belt, replace it with a new one.
- "Used belt" means a belt which has been used for five minutes or more.
- "New belt" means a belt which has been used for less than five minutes.



2. Loosen the upper mounting bolt and the lower mounting nut of the alternator.
3. Turn the adjusting bolt to get proper belt tension, then retighten the lower mounting nut and the upper mounting bolt.
4. Recheck the deflection of the A/C compressor belt.

Tension Gauge Method

1. Attach the special tool to the A/C compressor belt as shown, and measure the tension of the belt.

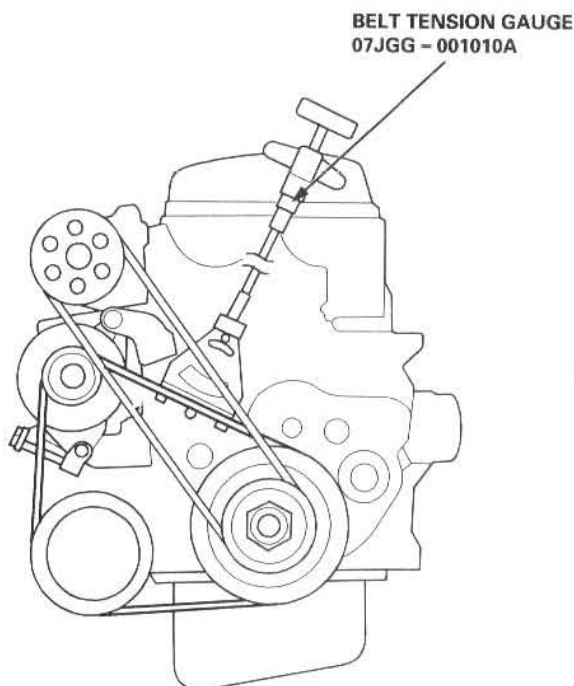
A/C Compressor Belt

Used Belt: 390 – 540 N (40 – 55 kgf, 88 – 121 lbf)

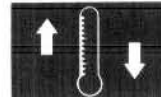
New Belt: 880 – 1,030 N (90 – 105 kgf, 198 – 231 lbf)

NOTE:

- If there are cracks or any damage evident on the belt, replace it with a new one.
- Follow the manufacturer's instructions for the belt tension gauge.
- "Used belt" means a belt which has been used for five minutes or more.
- "New belt" means a belt which has been used for less than five minutes.

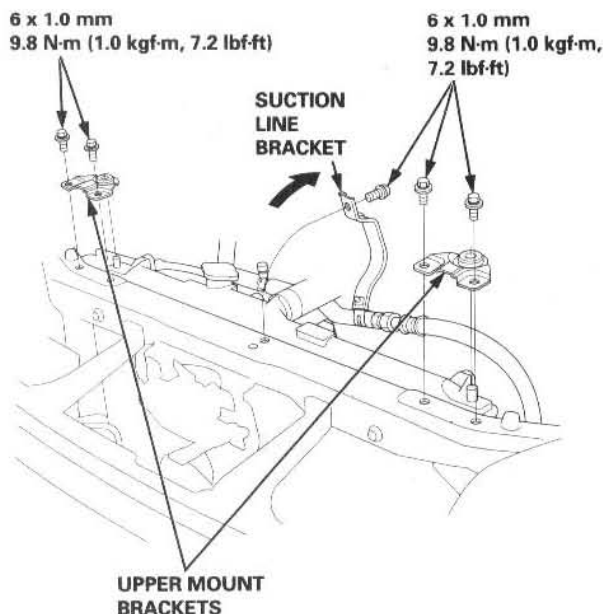


2. Loosen the upper mounting bolt and the lower mounting nut of the alternator.
3. Turn the adjusting bolt to get proper belt tension, then retighten the lower mounting nut and the upper mounting bolt.
4. Recheck the tension of the A/C compressor belt.



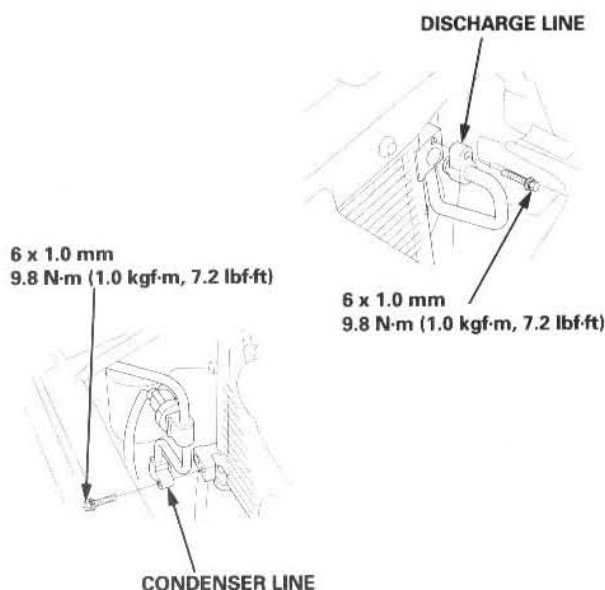
Replacement

1. Recover the refrigerant with a Recovery/Recycling/Charging System (see page 22-51).
2. Remove the bolt and the suction line bracket as shown. Remove the bolts and the upper mount brackets from the radiator.



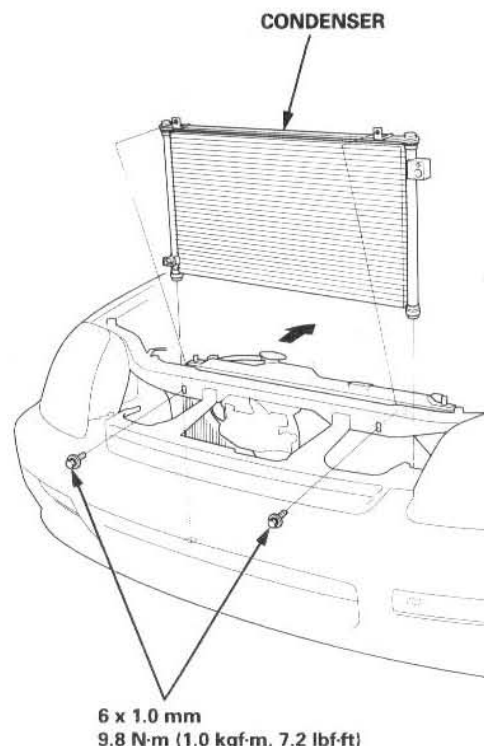
3. Remove each bolt, then disconnect the discharge and condenser lines from the condenser.

NOTE: Plug or cap the lines immediately after disconnecting them to avoid moisture and dust contamination.



4. Remove the mounting bolts, then remove the condenser by lifting it up as shown.

NOTE: Be careful not to damage the radiator and condenser fins when removing the condenser.



5. Install in the reverse order of removal. Make note of the following items.

- If you're installing a new condenser, add refrigerant oil (SP-10) (see page 22-46).
- Replace the O-rings with new ones at each fitting, and apply a thin coat of refrigerant oil before installing them.
NOTE: Be sure to use the right O-rings for HFC-134a (R-134a) to avoid leakage.
- Be careful not to damage the radiator and condenser fins when installing the condenser.
- Be sure to install the lower mount cushions of condenser securely into the holes.
- Charge the system (see page 22-53), and test its performance (see page 22-48).

Electrical

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SUPPLEMENTAL RESTRAINT SYSTEM (SRS) (If electrical maintenance is required)

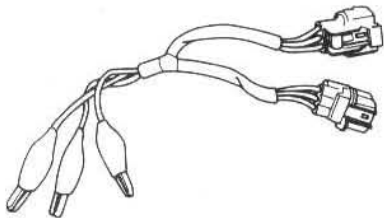
The Prelude SRS includes a driver's airbag located in the steering wheel hub and a passenger's airbag located in the dashboard above the glove box. Information necessary to safely service the SRS is included in this Service Manual. Items marked with an asterisk (*) on the contents page include, or are located near, SRS components. Servicing, disassembling or replacing these items will require special precautions and tools, and should therefore be done by an authorized Honda dealer.

⚠ WARNING

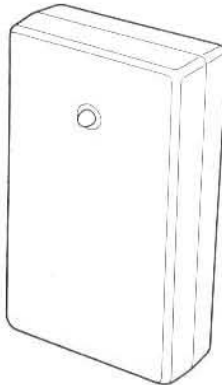
- To avoid rendering the SRS inoperative, which could lead to personal injury or death in the event of a severe frontal collision, all SRS service work must be performed by an authorized Honda dealer.
- Improper service procedures, including incorrect removal and installation of the SRS, could lead to personal injury caused by unintentional activation of the airbags.
- Do not bump the SRS unit. Otherwise, the system may fail in case of a collision, or the airbags may deploy when the ignition switch is ON (II).
- All SRS electrical wiring harnesses are covered with yellow insulation. Related components are located in the steering column, front console, dashboard, dashboard lower panel, and in the dashboard above the glove box. Do not use electrical test equipment on these circuits.

Special Tools

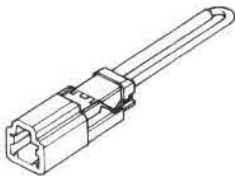
Ref. No.	Tool Number	Description	Qty	Page Reference
①	07LAJ – PT3020A	Test Harness	1	23-66, 67
②	07MAJ – SP00300	Keyless Entry Checker	1	23-138
③	07PAZ – 0010100	SCS Service Connector	1	23-107



①



②



③

Tips and Precautions

Before Troubleshooting

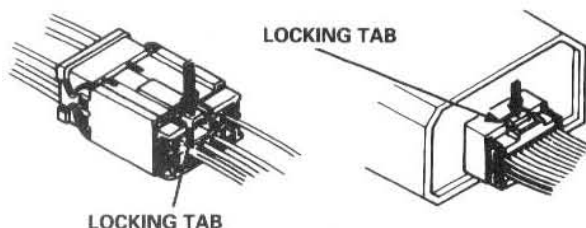
- Check applicable fuses in the appropriate fuse/relay box.
- Check the battery for damage, state of charge, and clean and tight connections.
- Check the alternator belt tension.

CAUTION:

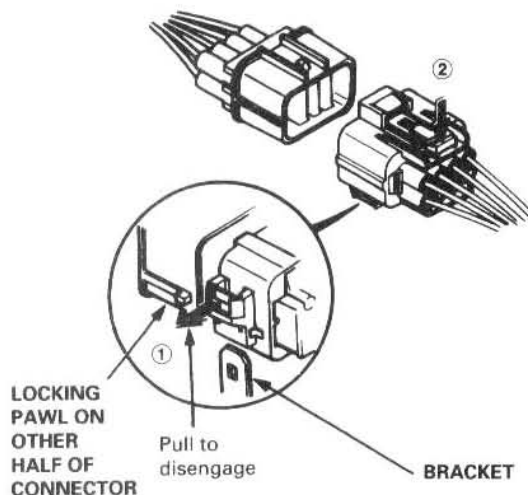
- Do not quick-charge a battery unless the battery ground cable has been disconnected, otherwise you will damage the alternator diodes.
- Do not attempt to crank the engine with the battery ground cable loosely connected or you will severely damage the wiring.

Handling Connectors

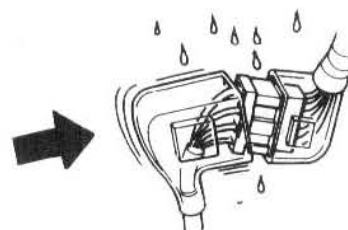
- Make sure the connectors are clean and have no loose wire terminals.
- Make sure multiple cavity connectors are packed with grease (except watertight connectors).
- All connectors have push-down release type locks.



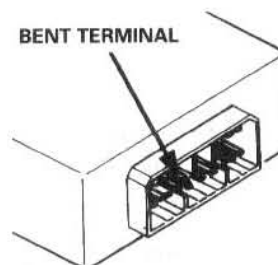
- Some connectors have a clip on their side used to attach them to a mount bracket on the body or on another component. This clip has a pull type lock.
- Some mounted connectors cannot be disconnected unless you first release the lock and remove the connector from its mount bracket.



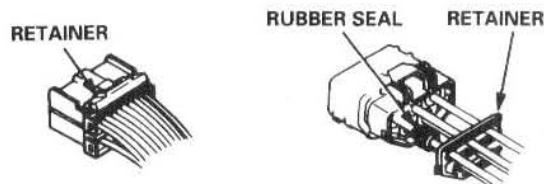
- Never try to disconnect connectors by pulling on their wires; pull on the connector halves instead.
- Always reinstall plastic covers.



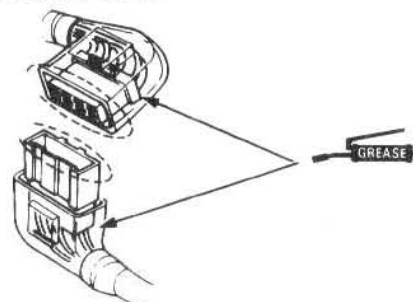
- Before connecting connectors, make sure the terminals are in place and not bent.



- Check for loose retainer and rubber seals.



- The backs of some connectors are packed with grease. Add grease if necessary. If the grease is contaminated, replace it.

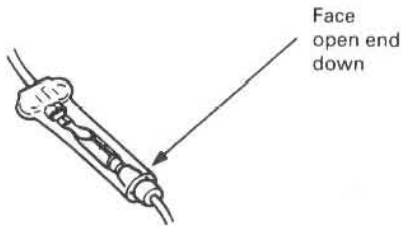


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Troubleshooting

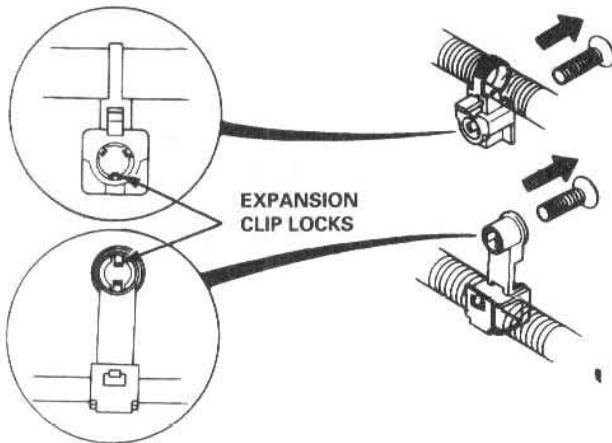
Tips and Precautions (cont'd)

- Insert the connector all the way and make sure it is securely locked.
- Position wires so that the open end of the cover faces down.

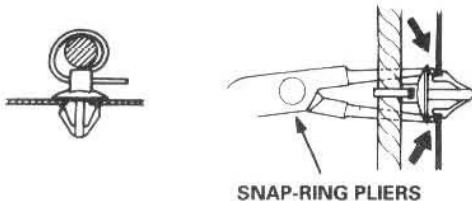


Handling Wires and Harnesses

- Secure wires and wire harnesses to the frame with their respective wire ties at the designated locations.
- Remove clips carefully; don't damage their locks.

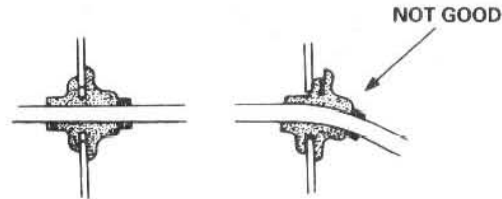


Slip pliers under the clip base and through the hole at an angle, then squeeze the expansion tabs to release the clip.



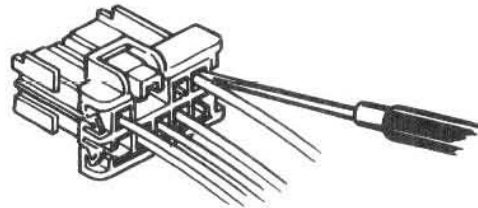
- After installing harness clips, make sure the harness doesn't interfere with any moving parts.
- Keep wire harnesses away from exhaust pipes and other hot parts, from sharp edges of brackets and holes, and from exposed screws and bolts.

- Seat grommets in their grooves properly.

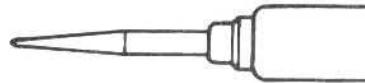


Testing and Repairs

- Do not use wires or harnesses with broken insulation. Replace them or repair them by wrapping the break with electrical tape.
- After installing parts, make sure that no wires are pinched under them.
- When using electrical test equipment, follow the manufacturer's instructions and those described in this manual.
- If possible, insert the probe of the tester from the wire side (except waterproof connector).



- Use a probe with a tapered tip.



- Refer to the instructions in the Honda Terminal Kit for identification and replacement of connector terminals.

Five-step Troubleshooting

1. **Verify The Complaint**
 Turn on all the components in the problem circuit to verify the customer complaint. Note the symptoms. Do not begin disassembly or testing until you have narrowed down the problem area.

2. **Analyze The Schematic**
 Look up the schematic for the problem circuit. Determine how the circuit is supposed to work by tracing the current paths from the power feed through the circuit components to ground. If several circuits fail at the same time, the fuse or ground is a likely cause.

 Based on the symptoms and your understanding of the circuit operation, identify one or more possible causes of the problem.

3. **Isolate The Problem By Testing The Circuit**
 Make circuit tests to check the diagnosis you made in step 2. Keep in mind that a logical, simple procedure is the key to efficient troubleshooting. Test for the most likely cause of failure first. Try to make tests at points that are easily accessible.

4. **Fix The Problem**
 Once the specific problem is identified, make the repair. Be sure to use proper tools and safe procedures.

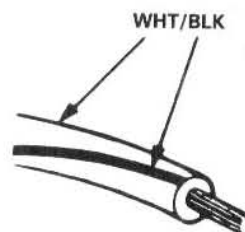
5. **Make Sure The Circuit Works**
 Turn on all components in the repaired circuit in all modes to make sure you've fixed the entire problem. If the problem was a blown fuse, be sure to test all of the circuits on the fuse. Make sure no new problems turn up and the original problem does not recur.

Wire Color Codes

The following abbreviations are used to identify wire colors in the circuit schematics:

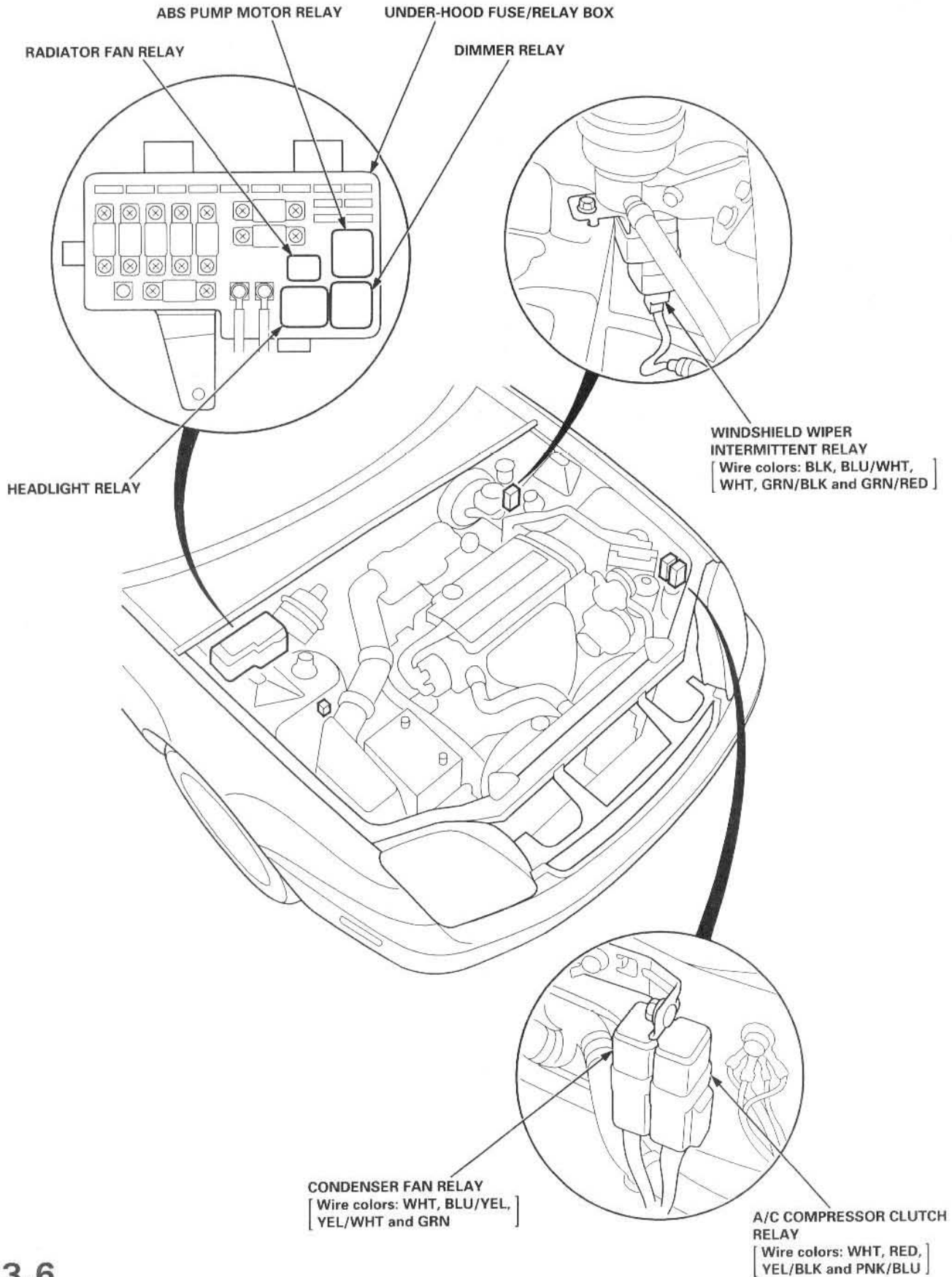
WHT	White
YEL	Yellow
BLK	Black
BLU	Blue
GRN	Green
RED	Red
ORN	Orange
PNK	Pink
BRN	Brown
GRY	Gray
PUR	Purple
LT BLU	Light Blue
LT GRN	Light Green

The wire insulation has one color or one color with another color stripe. The second color is the stripe.

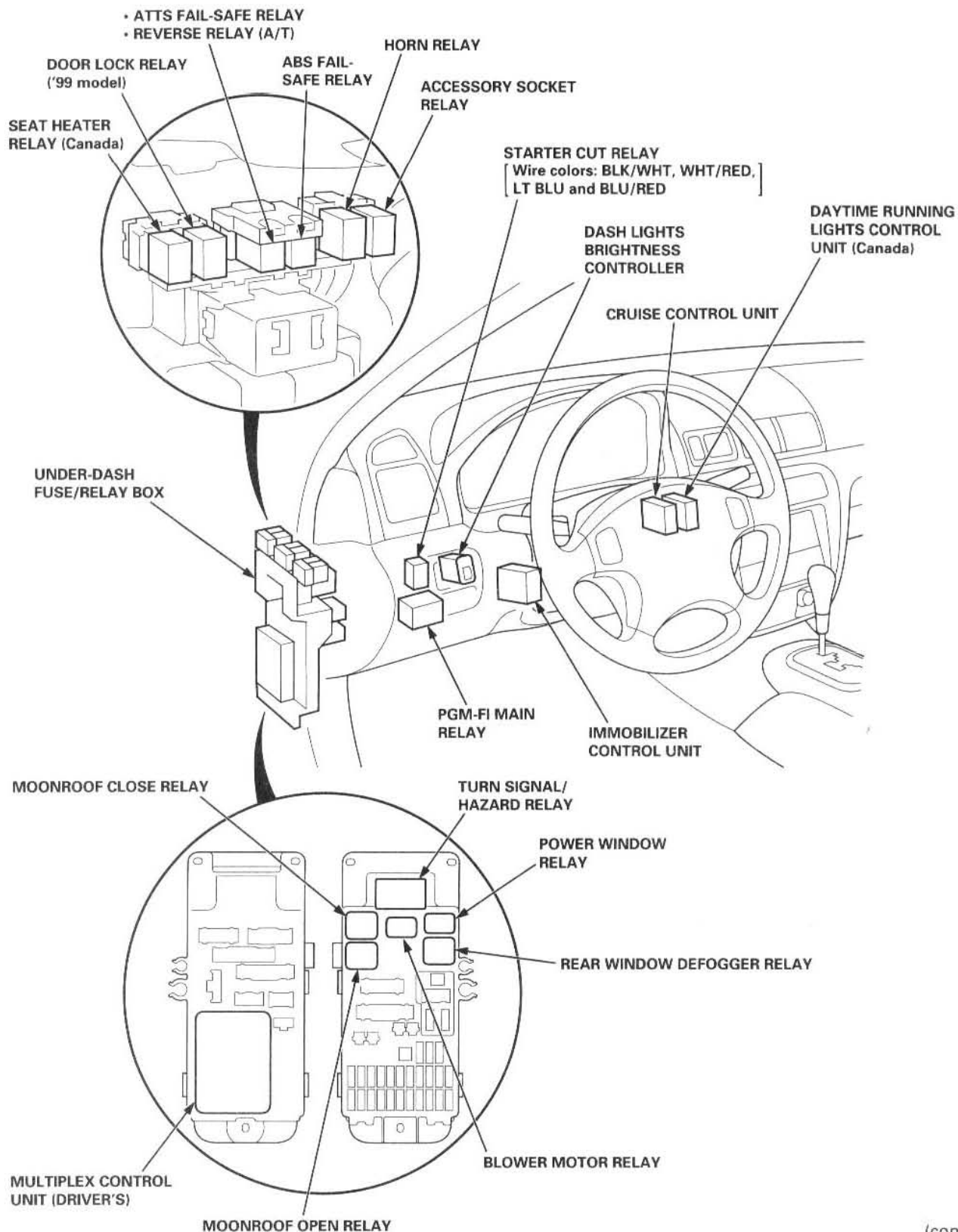


Relay and Control Unit Locations

Engine Compartment



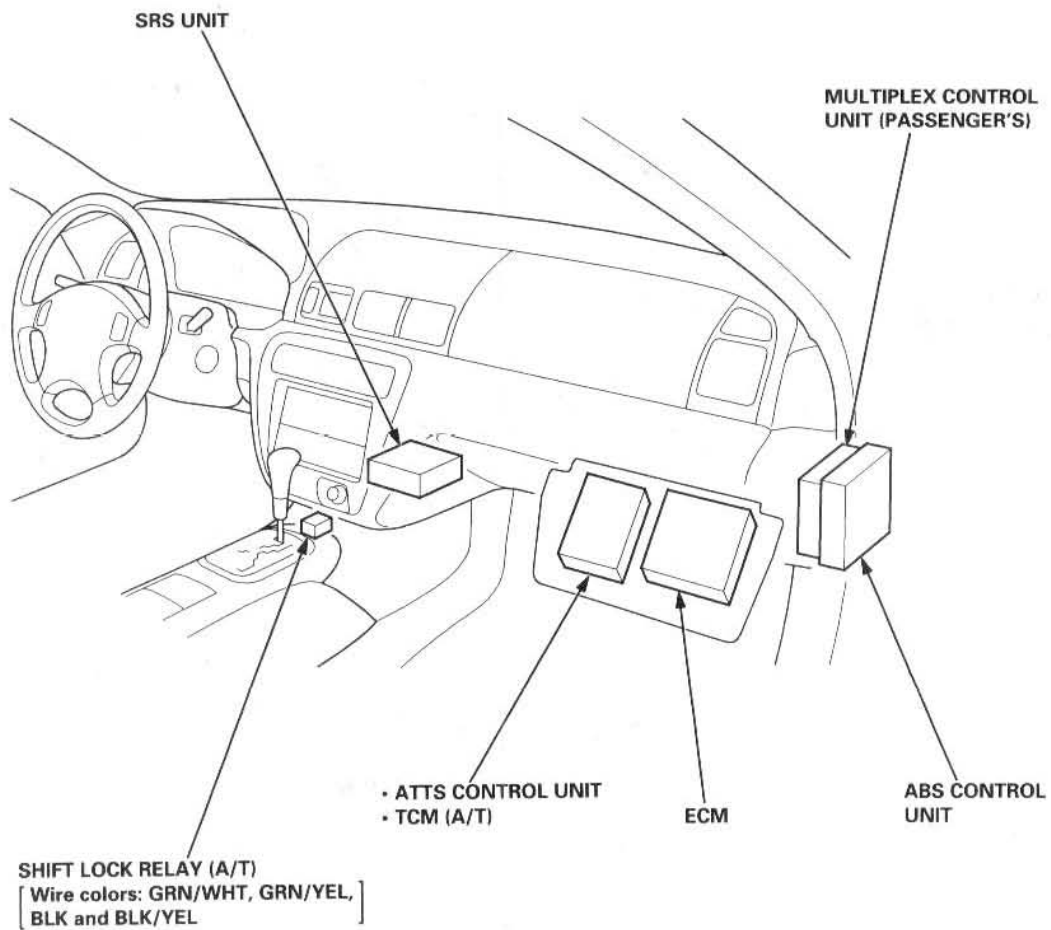
Dashboard



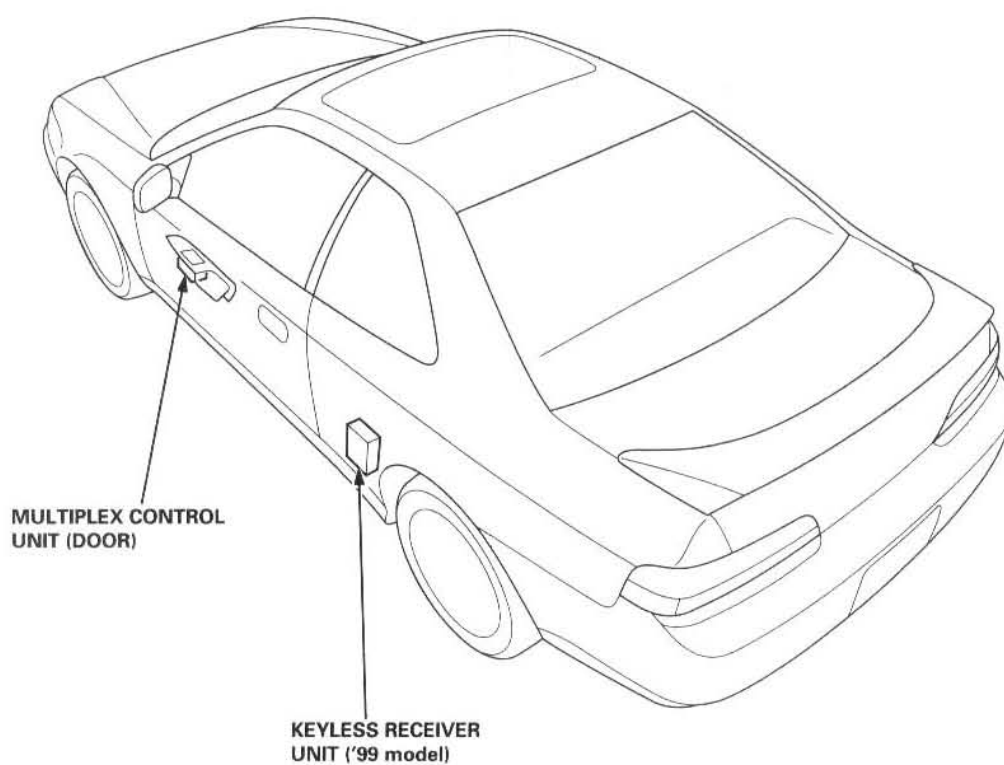
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Relay and Control Unit Locations

Dashboard (cont'd)



Door and Quarter Panel

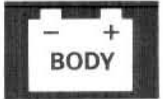


Connector Identification and Wire Harness Routing

How to Identify Connectors:

Identification numbers have been assigned to all connectors. The number is preceded by the letter "C" for connectors, "G" for ground terminals or "T" for non-ground terminals.

Harness	Location	Engine Compartment	Dashboard	Others (Floor, Door, Roof, Trunk)
Starter cables		T1, T2 and ⊕		
Battery ground cables		T3 G1 and ⊖		
Engine ground cables		T4, T5 G2		
Engine wire harness		C101 through C146 T101, T102 and T103 G101		
Right engine compartment wire harness		C201 through C210 G201		
Left engine compartment wire harness		C301 through C326 G301 and G302		
Main wire harness		C251 through C259	C401 through C464 G401, G402, G403 and G404	
ECM wire harness		C281 through C294	C471 through C488 G471	
ABS modulator unit wire harness		C381 through C382		
Shift lock solenoid sub-harness (A/T)			C498 through C499	
ATTS sub-harness		C351 through C357		



Harness	Location	Engine Compartment	Dashboard	Others (Floor, Door, Roof, Trunk)
Right side wire harness				C501 through C518 G501
Dashboard wire harness			C551 through C572 G551	
Rear wire harness				C601 through C609 G601
Driver's door wire harness				C651 through C663
Passenger's door wire harness				C681 through C691
Roof wire harness				C701 through C703
SRS main harness			C801 through C806 G801	
Heater sub-harness			C901 through C909 G901	
Rear window defogger wire harness				C931 through C933
Spoiler sub-harness				C631 through C633

Connector Identification and Wire Harness Routing

Starter Cables

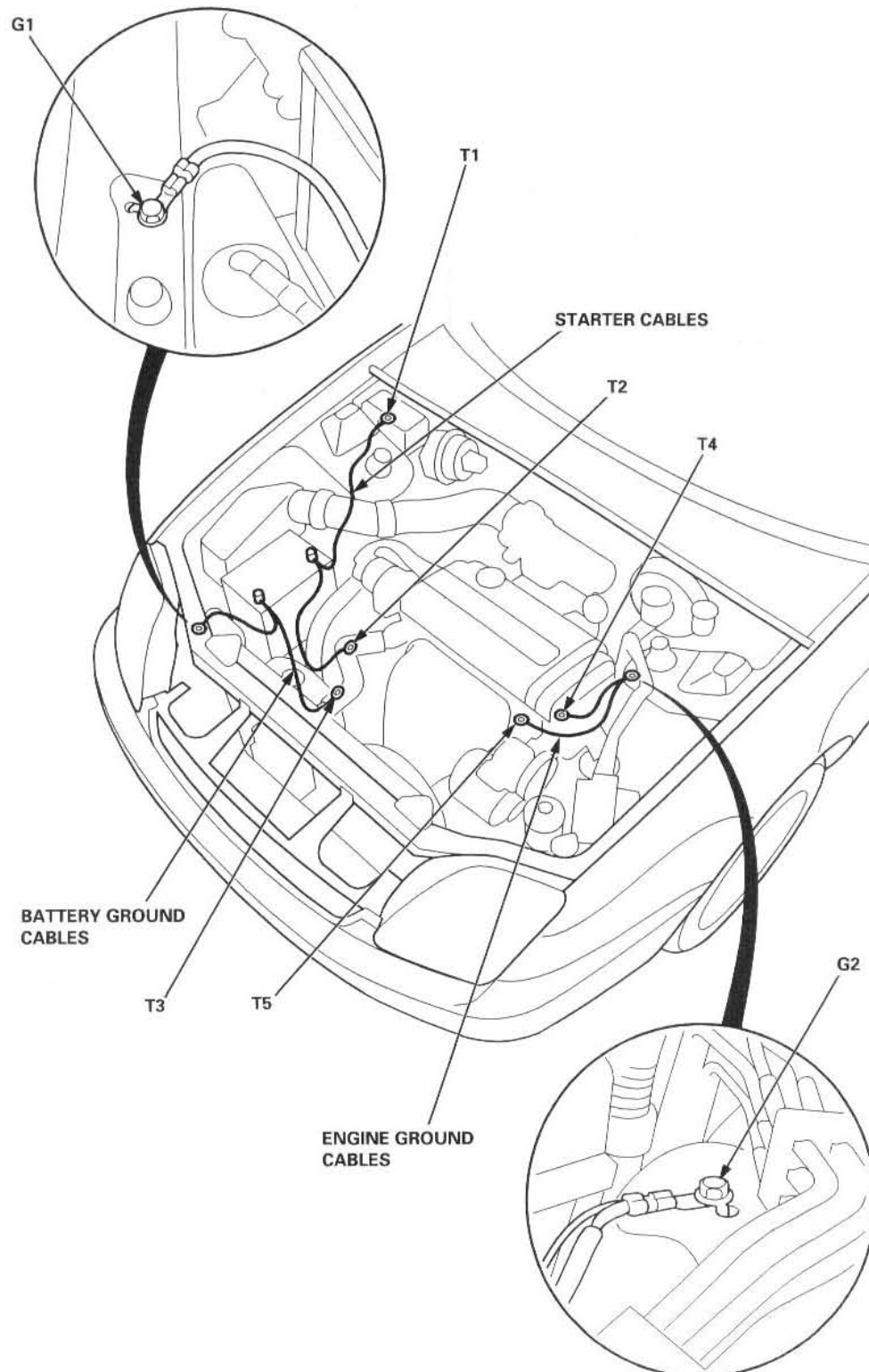
Connector or Terminal	Number of Cavities	Location	Connects to	Notes
T1		Right side of engine compartment	Under-hood fuse/relay box	
T2		Right side of engine compartment	Starter motor	
⊕		Battery	Battery positive terminal	

Battery Ground Cables

Connector or Terminal	Number of Cavities	Location	Connects to	Notes
T3		Middle of engine compartment	Transmission housing	
G1		Right side of engine compartment	Body ground, via battery ground cables	
⊖		Battery	Battery negative terminal	

Engine Ground Cables

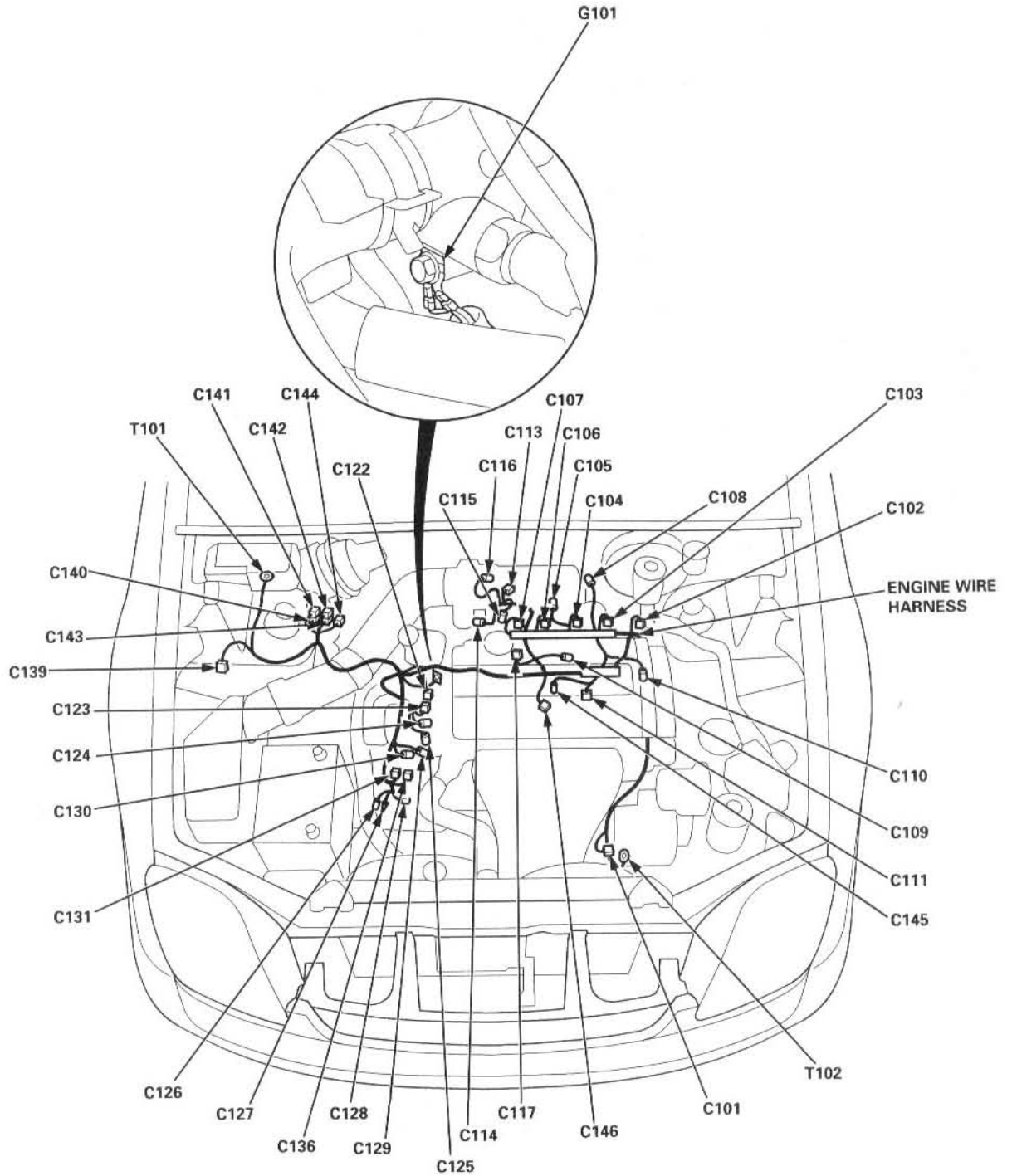
Connector or Terminal	Number of Cavities	Location	Connects to	Notes
T4		Middle of engine compartment	Cylinder head cover	
T5		Middle of engine compartment	PSP switch bracket	
G2		Left side of engine compartment	Body ground, via engine ground cables	



Connector Identification and Wire Harness Routing

Engine Wire Harness (With ATTS)

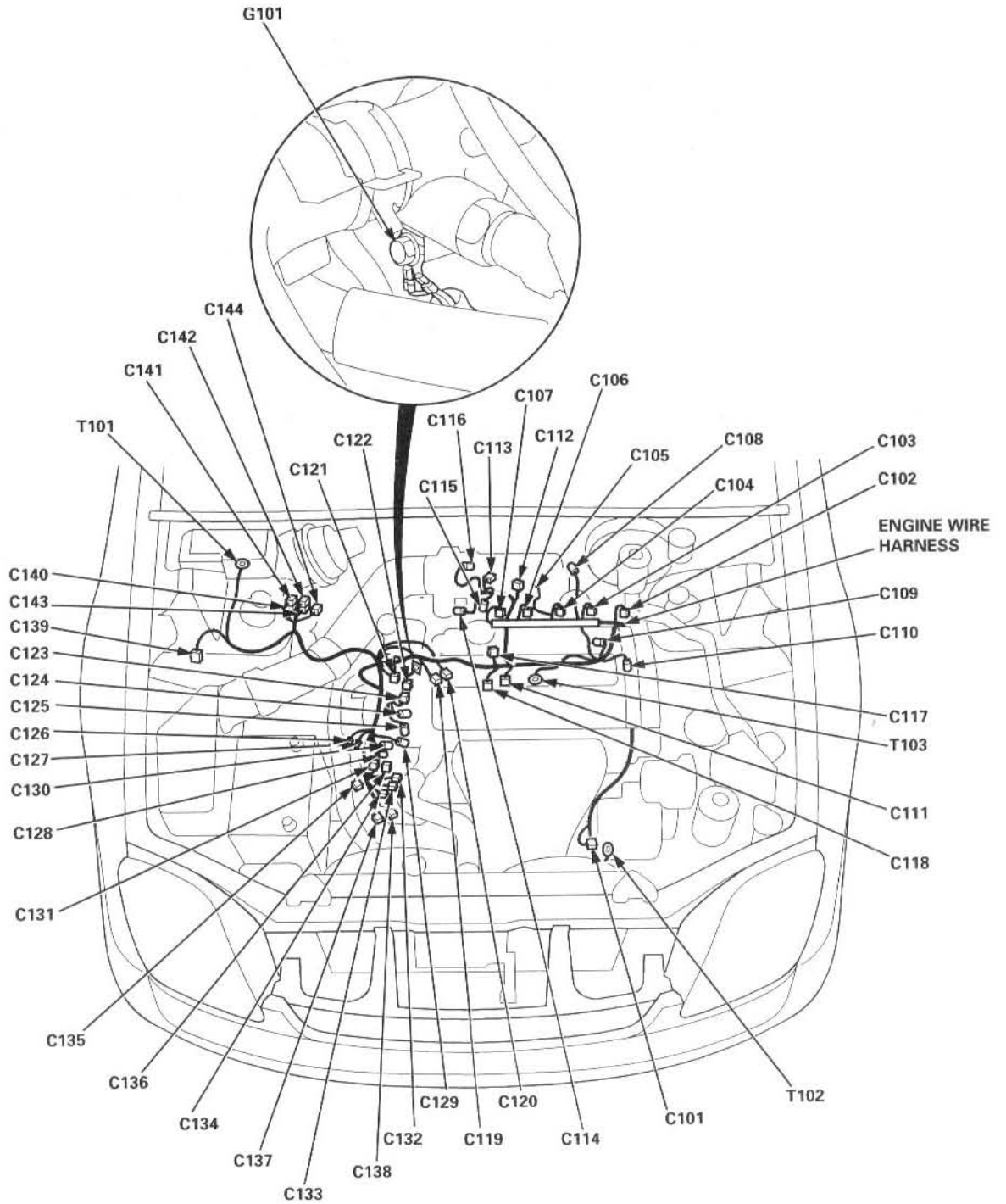
Connector or Terminal	Number of Cavities	Location	Connects to	Notes
C101	4	Left side of engine compartment	Alternator	
C102	4	Middle of engine	TDC/CKP sensor	
C103	2	Middle of engine	No. 1 fuel injector	
C104	2	Middle of engine	No. 2 fuel injector	
C105	2	Middle of engine compartment	IAC valve	
C106	2	Middle of engine	No. 3 fuel injector	
C107	2	Middle of engine	No. 4 fuel injector	
C108	2	Middle of engine compartment	IAT sensor	
C109	2	Middle of engine compartment	IAB control solenoid valve	
C110	2	Middle of engine compartment	PSP switch	
C111	1	Middle of engine compartment	Knock sensor (KS)	
C113	4	Middle of engine	Ignition coil	
C114	3	Middle of engine compartment	TP sensor	
C115	2	Middle of engine	Radiator fan switch	
C116	3	Middle of engine compartment	MAP sensor	
C117	14	Middle of engine	Junction connector	
C122	3	Middle of engine	Vehicle speed sensor (VSS)	
C123	1	Middle of engine	VTEC solenoid valve	
C124	2	Middle of engine	VTEC pressure switch	
C125	3	Middle of engine	EGR valve lift sensor	
C126	1	Middle of engine	Back-up light switch (+)	
C127	1	Middle of engine	Back-up light switch (-)	
C128	1	Middle of engine	Starter solenoid	
C129	2	Middle of engine	ECT sensor	
C130	1	Middle of engine	Coolant temperature sending unit	
C131	4	Middle of engine	CYP sensor	
C136	2	Middle of engine	Ignition control module (ICM)	
C139	2	Right side of engine compartment	Main wire harness (C259)	
C140	10	Right side of engine compartment	ECM wire harness (C285)	
C141	14	Right side of engine compartment	ECM wire harness (C286)	
C142	14	Right side of engine compartment	ECM wire harness (C283)	
C143	8	Right side of engine compartment	ECM wire harness (C282)	
C144	14	Right side of engine compartment	ECM wire harness (C281)	
C145	1	Middle of engine	Engine oil pressure switch	
C146	14	Middle of engine	ATTS sub-harness (C351)	
T101		Right side of engine compartment	Under-hood fuse/relay box	
T102		Left side of engine compartment	Alternator	
G101		Middle of engine	Engine ground, via engine wire harness	



Connector Identification and Wire Harness Routing

Engine Wire Harness (Without ATTS)

Connector or Terminal	Number of Cavities	Location	Connects to	Notes
C101	4	Left side of engine compartment	Alternator	
C102	4	Middle of engine	TDC/CKP sensor	
C103	2	Middle of engine	No. 1 fuel injector	
C104	2	Middle of engine	No. 2 fuel injector	
C105	2	Middle of engine compartment	IAC valve	
C106	2	Middle of engine	No. 3 fuel injector	
C107	2	Middle of engine	No. 4 fuel injector	
C108	2	Middle of engine compartment	IAT sensor	
C109	2	Middle of engine compartment	IAB control solenoid valve	
C110	2	Middle of engine compartment	PSP switch	
C111	1	Middle of engine compartment	Knock sensor (KS)	
C112	8	Middle of engine	Junction connector	
C113	4	Middle of engine	Ignition coil	
C114	3	Middle of engine compartment	TP sensor	
C115	2	Middle of engine	Radiator fan switch	
C116	3	Middle of engine compartment	MAP sensor	
C117	14	Middle of engine	Junction connector	
C118	4	Middle of engine	Heated oxygen sensor (HO2S)	
C119	10	Middle of engine	A/T gear position switch	
C120	2	Middle of engine	Countershaft speed sensor	A/T
C121	1	Middle of engine	Oil pressure switch	A/T
C122	3	Middle of engine	Vehicle speed sensor (VSS)	
C123	1	Middle of engine	VTEC solenoid valve	
C124	2	Middle of engine	VTEC pressure switch	
C125	3	Middle of engine	EGR valve lift sensor	
C126	1	Middle of engine	Back-up light switch (+)	M/T
C127	1	Middle of engine	Back-up light switch (-)	M/T
C128	1	Middle of engine	Starter solenoid	
C129	2	Middle of engine	ECT sensor	
C130	1	Middle of engine	Coolant temperature sending unit	
C131	4	Middle of engine	CYP sensor	
C132	2	Middle of engine	A/T clutch pressure control solenoid valve B	
C133	2	Middle of engine	A/T clutch pressure control solenoid valve A	
C134	2	Middle of engine	Mainshaft speed sensor	A/T
C135	2	Middle of engine	Lock-up control solenoid valve and shift control solenoid valve A	A/T
C136	2	Middle of engine	Ignition control module (ICM)	
C137	2	Middle of engine	Shift control solenoid valve B	A/T
C138	2	Middle of engine	Shift control solenoid valve C	A/T
C139	2	Right side of engine compartment	Main wire harness (C259)	
C140	10	Right side of engine compartment	ECM wire harness (C285)	
C141	14	Right side of engine compartment	ECM wire harness (C284)	A/T
C142	14	Right side of engine compartment	ECM wire harness (C283)	
C143	8	Right side of engine compartment	ECM wire harness (C282)	M/T
C143	14	Right side of engine compartment	ECM wire harness (C282)	A/T
C144	14	Right side of engine compartment	ECM wire harness (C281)	
T101		Right side of engine compartment	Under-hood fuse/relay box	
T102		Left side of engine compartment	Alternator	
T103		Middle of engine	Engine oil pressure switch	
G101		Middle of engine	Engine ground, via engine wire harness	



Connector Identification and Wire Harness Routing

Left Engine Compartment Wire Harness

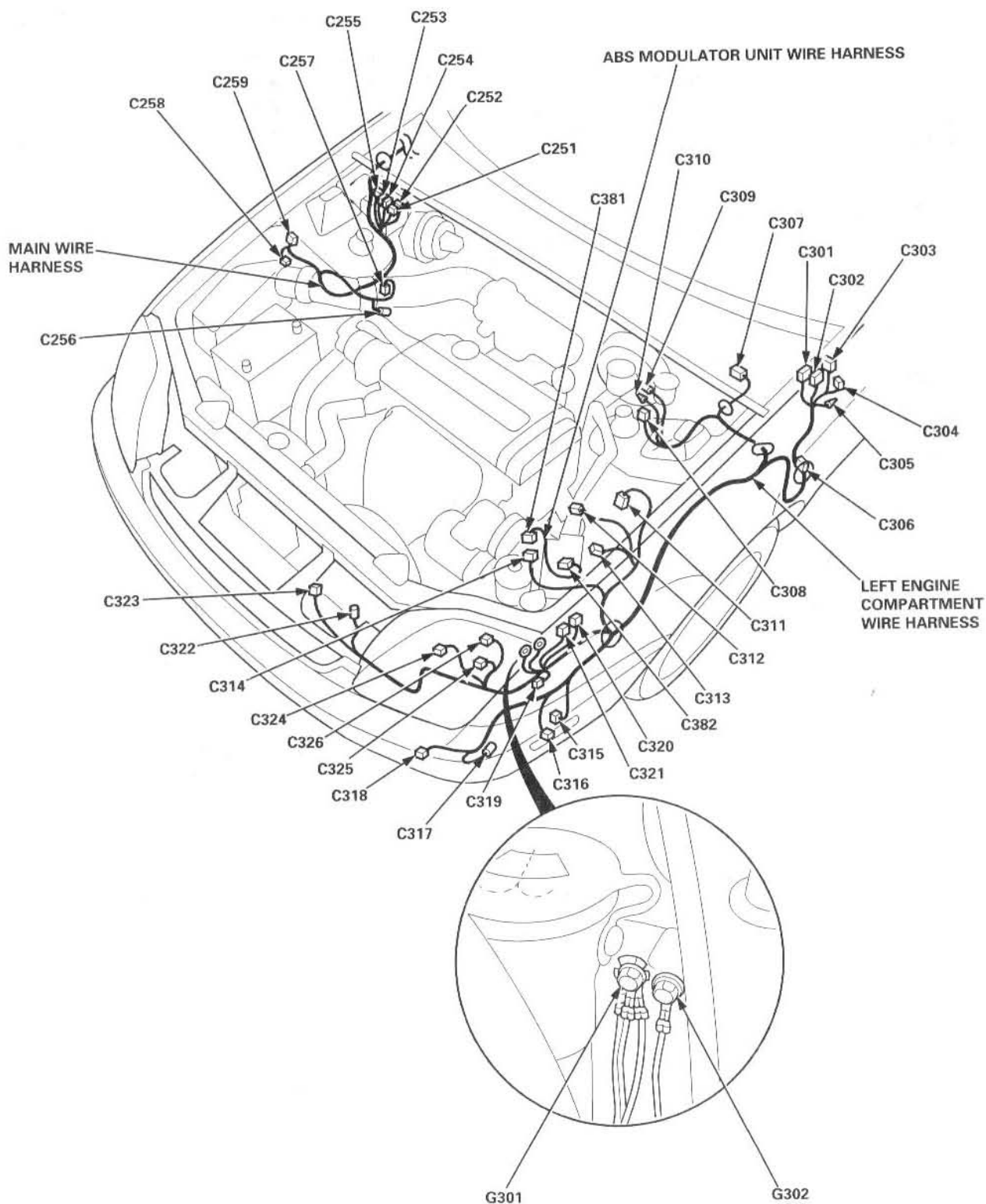
Connector or Terminal	Number of Cavities	Location	Connects to	Notes
C301	14	Under left side of dash	Main wire harness (C425)	Optional
C302	14	Under left side of dash	Main wire harness (C424)	
C303	7	Under left side of dash	Main wire harness (C423)	Optional
C304	3	Under left side of dash	Security wire harness	
C305	1	Under left side of dash	Fog light system connector	Optional
C306	20	Behind left kick panel	Junction connector	
C307	5	Left rear of engine compartment	Windshield wiper motor	
C308	6	Left side of engine compartment	Windshield wiper intermittent relay	
C309	1	Left side of engine compartment	Brake fluid level switch (+)	
C310	1	Left side of engine compartment	Brake fluid level switch (-)	
C311	2	Left side of engine compartment	EGR control solenoid valve	
C312	2	Left side of engine compartment	ABS left front wheel sensor	
C313	2	Left side of engine compartment	ABS pump motor	
C314	10	Left side of engine compartment	ABS modulator unit wire harness (C381)	
C315	2	Behind front bumper	Windshield washer motor	
C316	2	Behind front bumper	Left front side marker light	
C317	1	Behind front bumper	Fog light system connector	Optional
C318	2	Behind front bumper	Left front turn signal light	
C319	3	Left side of engine compartment	Security alarm system	Optional
C320	4	Left side of engine compartment	Condenser fan relay	
C321	4	Left side of engine compartment	A/C compressor clutch relay	
C322	1	Left side of engine compartment	A/C compressor clutch	
C323	2	Left side of engine compartment	Condenser fan motor	
C324	2	Behind left headlight	Left front parking light	
C325	3	Behind left headlight	Left headlight (high beam)	
C326	3	Behind left headlight	Left headlight (low beam)	
G301		Left side of engine compartment	Body ground, via left engine compartment wire harness	
G302		Left side of engine compartment	Body ground, via left engine compartment wire harness	

ABS Modulator Unit Wire Harness

Connector or Terminal	Number of Cavities	Location	Connects to	Notes
C381	10	Left side of engine compartment	Left engine compartment wire harness (C314)	
C382	10	Left side of engine compartment	ABS modulator unit	

Main Wire Harness (Engine compartment branch)

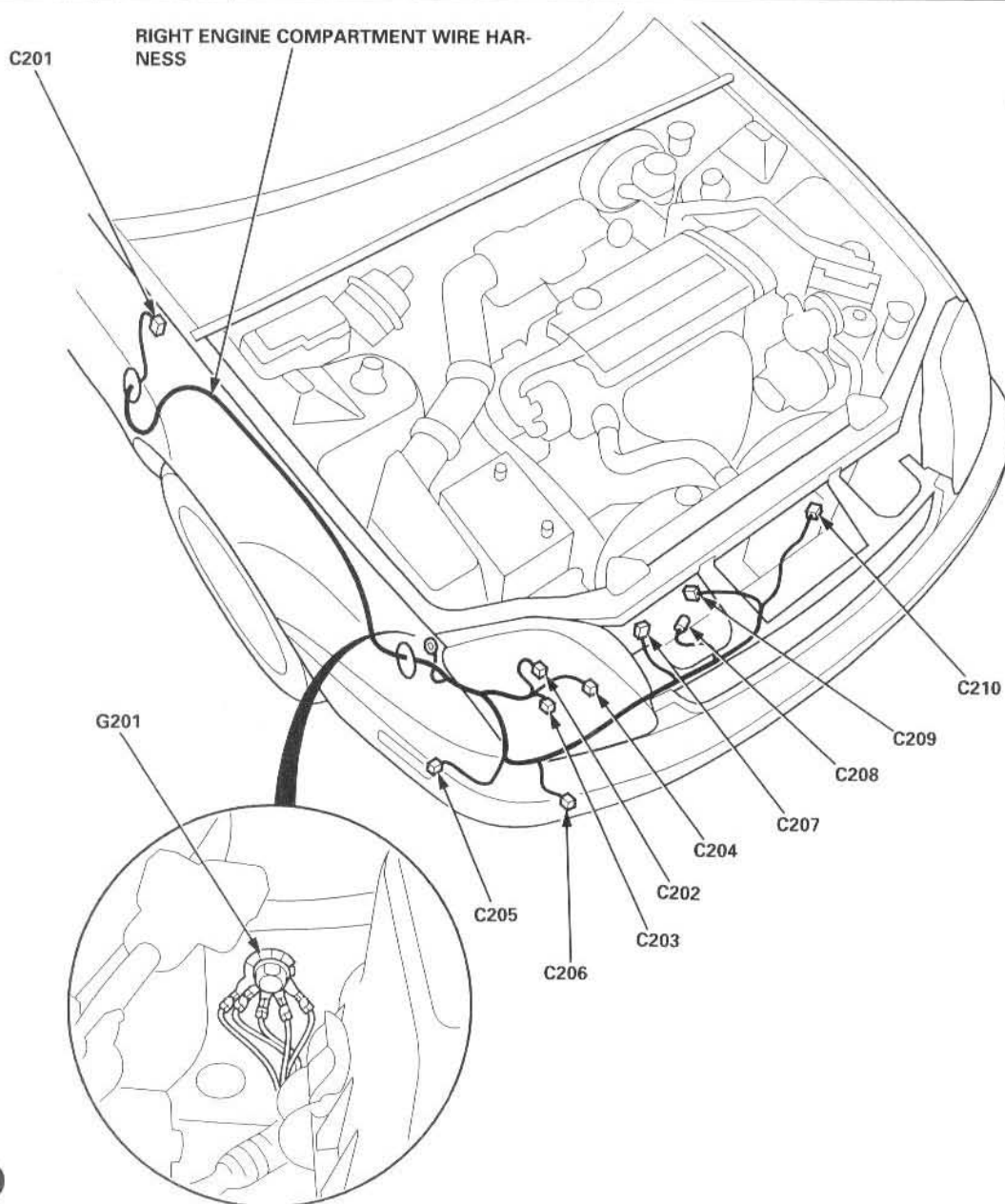
Connector or Terminal	Number of Cavities	Location	Connects to	Notes
C251	11	Right side of engine compartment	Under-hood fuse/relay box (C951)	
C252	9	Right side of engine compartment	Under-hood fuse/relay box (C952)	
C253	3	Right side of engine compartment	Under-hood fuse/relay box (C953)	
C254	7	Right side of engine compartment	Under-hood fuse/relay box (C954)	
C255	3	Right side of engine compartment	ELD unit (C959)	
C256	2	Right side of engine compartment	Intake control solenoid valve	
C257	2	Right side of engine compartment	ABS right front wheel sensor	
C258	2	Right side of engine compartment	Test tachometer connector	
C259	2	Right side of engine compartment	Engine wire harness (C139)	



Connector Identification and Wire Harness Routing

Right Engine Compartment Wire Harness

Connector or Terminal	Number of Cavities	Location	Connects to	Notes
C201	12	Behind right kick panel	Main wire harness (C455)	
C202	3	Behind right headlight	Right headlight (low beam)	
C203	3	Behind right headlight	Right headlight (high beam)	
C204	2	Behind right headlight	Right front parking light	
C205	2	Behind front bumper	Right front side marker light	
C206	2	Behind front bumper	Right front turn signal light	
C207	2	Behind middle of front bumper	Radiator fan motor	
C208	2	Behind middle of front bumper	A/C pressure switch	
C209	2	Behind middle of front bumper	Right horn	
C210	2	Behind middle of front bumper	Left horn	
G201		Right side of engine compartment	Body ground, via right engine compartment wire harness	

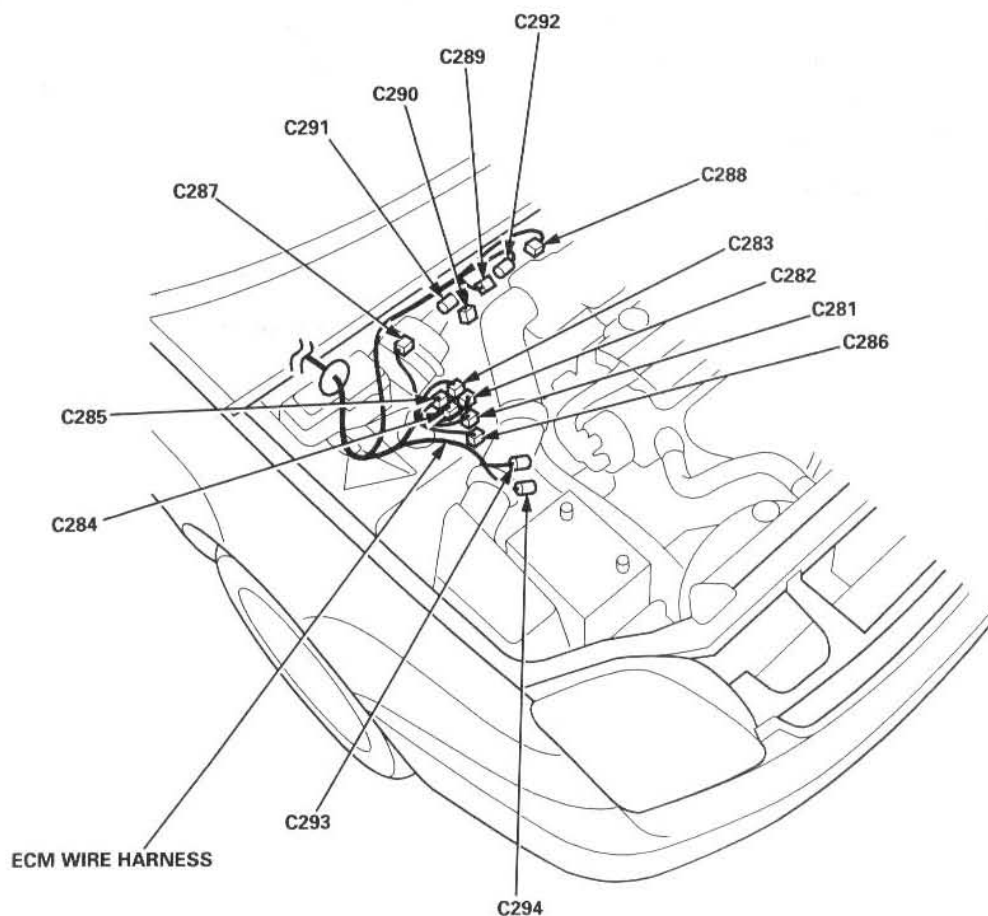


ECM Wire Harness (Engine compartment branch)

Connector or Terminal	Number of Cavities	Location	Connects to	Notes
C281	14	Right side of engine compartment	Engine wire harness (C144)	M/T, ATTS
C282	8	Right side of engine compartment	Engine wire harness (C143)	
C282	14	Right side of engine compartment	Engine wire harness (C143)	
C283	14	Right side of engine compartment	Engine wire harness (C142)	A/T
C284	14	Right side of engine compartment	Engine wire harness (C141)	
C285	10	Right side of engine compartment	Engine wire harness (C140)	ATTS
C286	14	Right side of engine compartment	Engine wire harness (C141)	
C287	4	Right side of engine compartment	Cruise control actuator	*2
C288	2	Right side of engine compartment	EVAP bypass solenoid valve	
C289	3	Right side of engine compartment	Fuel tank pressure sensor	
C290	2	Right side of engine compartment	EVAP control canister vent shut valve	*2
C291	2	Right side of engine compartment	EVAP purge control solenoid valve	*1
C292	2	Right side of engine compartment	EVAP purge flow switch	
C293	4	Right side of engine compartment	Primary heated oxygen sensor (Primary HO2S)	
C294	4	Right side of engine compartment	Secondary heated oxygen sensor (Secondary HO2S)	ATTS

*1: '97 - 98 models (49ST, Canada)

*2: '97 - 98 models (California), '99 model



(cont'd)

Connector Identification and Wire Harness Routing

ECM Wire Harness (cont'd)

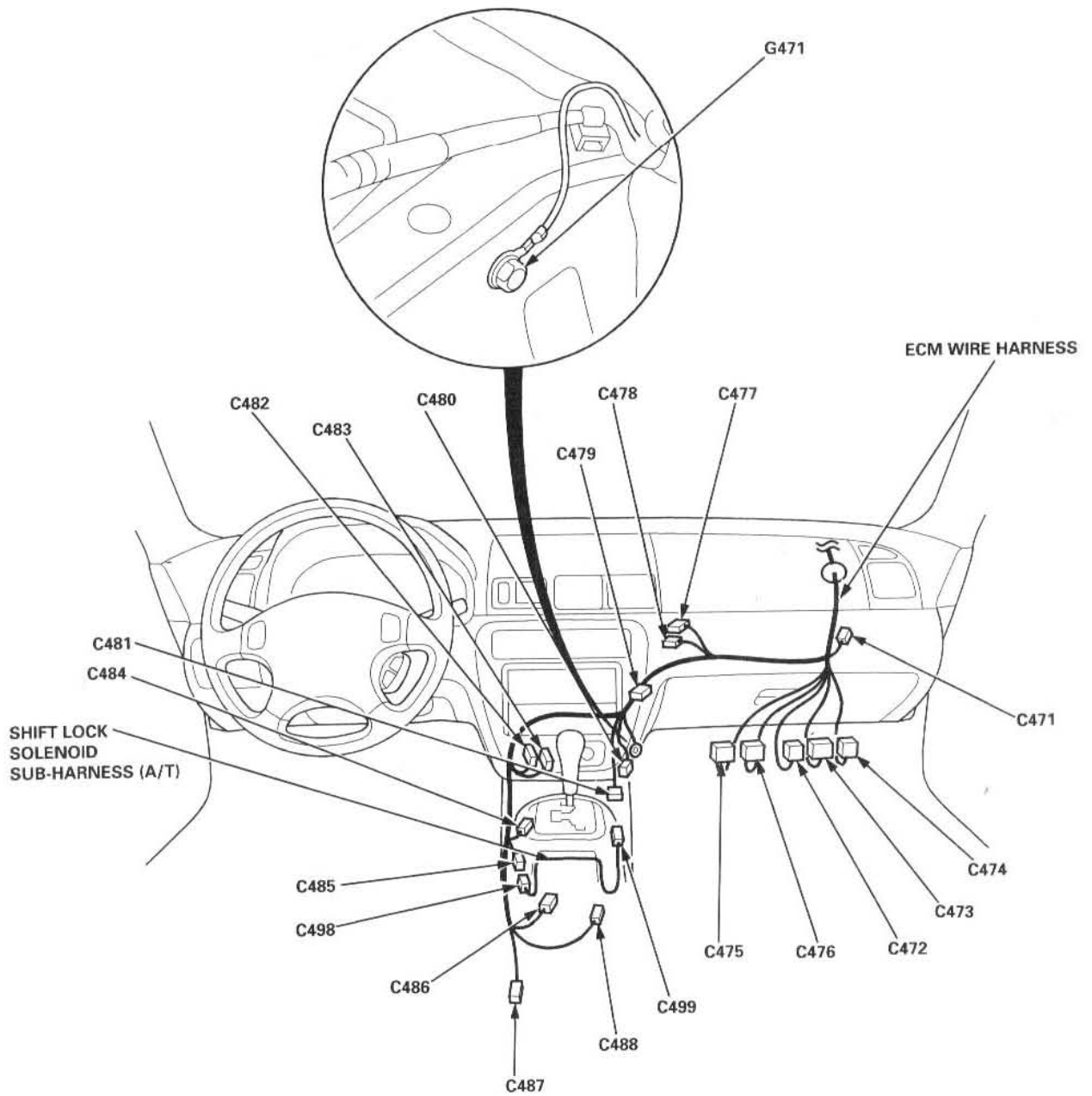
Connector or Terminal	Number of Cavities	Location	Connects to	Notes
C471	2	Behind glove box	Diode	A/T
C472	16	Front passenger's footwell	ECM	
C473	31	Front passenger's footwell	ECM	
C474	32	Front passenger's footwell	ECM	A/T
C475	26	Front passenger's footwell	TCM	
C475	26	Front passenger's footwell	ATTS control unit	
C476	22	Front passenger's footwell	TCM	A/T
C476	22	Front passenger's footwell	ATTS control unit	
C477	20	Behind glove box	Main wire harness (C454)	
C478	22	Behind glove box	Main wire harness (C453)	A/T, ATTS M/T
C478	6	Behind glove box	Main wire harness (C453)	
C479	20	Behind right side of dash	Junction connector	
C480	2	Under middle of dash	Service check connector	*1
C481	16	Under middle of dash	Data link connector	
C482	12	Under middle of dash	Dashboard wire harness (C567)	
C482	10	Under middle of dash	Dashboard wire harness (C567)	*2
C483	12	Under middle of dash	Dashboard wire harness (C568)	A/T
C484	6	Behind center console	Shift lock relay	A/T
C485	2	Behind center console	Shift lock solenoid sub-harness (C498)	A/T
C486	8	Behind center console	Mode switch	A/T
C487	2	Behind center console	Ashtray light	Optional
C488	1	Behind center console	Parking brake switch	
G471		Under middle of dash	Body ground, via ECM wire harness	

*1: '97 - 98 models (ATTS), '99 model

*2: '97 - 98 models (M/T, A/T)

Shift Lock Solenoid Sub-harness (A/T)

Connector or Terminal	Number of Cavities	Location	Connects to	Notes
C498	2	Behind center console	ECM wire harness (C485)	
C499	2	Behind center console	Shift lock solenoid	

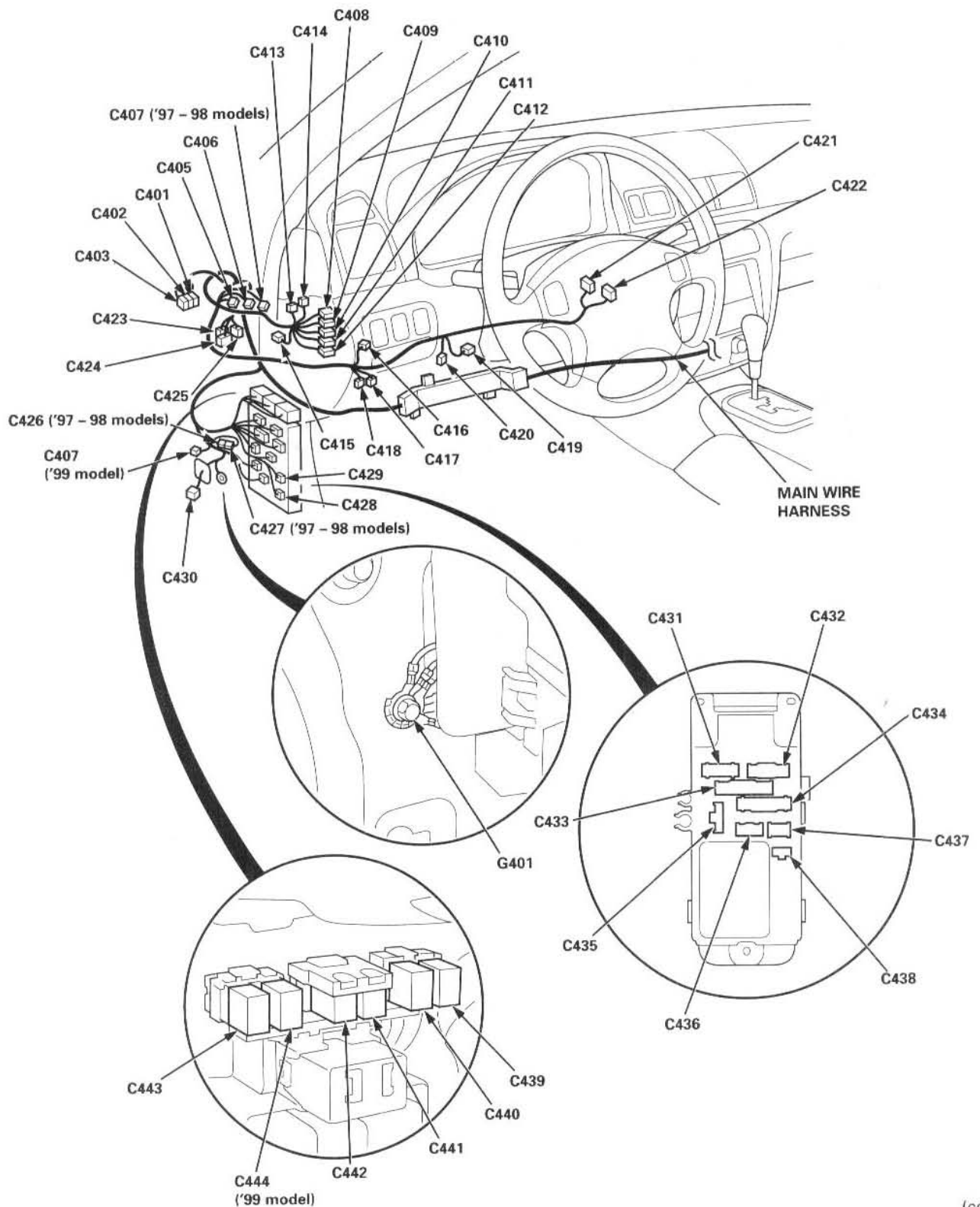


Connector Identification and Wire Harness Routing

Main Wire Harness

Connector or Terminal	Number of Cavities	Location	Connects to	Notes
C401	2	Under left side of dash	Dashboard wire harness (C558)	
C402	16	Under left side of dash	Dashboard wire harness (C556)	
C403	20	Under left side of dash	Dashboard wire harness (C555)	
C405	12	Under left side of dash	Security system connector	*1
C406	20	Under left side of dash	Junction connector	
C407	2	Under left side of dash	Security system connector	*2
C407	2	Under left side of dash	Security system connector	*3
C408	5	Under left side of dash	Combination light switch	
C409	4	Under left side of dash	Combination light switch	
C410	6	Under left side of dash	Ignition key switch	
C411	3	Under left side of dash	Ignition switch	
C412	10	Under left side of dash	Front main steering angle sensor and intermittent dwell time controller	ATTS
C413	4	Under left side of dash	Starter cut relay	
C414	7	Under left side of dash	PGM-FI main relay	
C415	2	Under left side of dash	Multiplex control unit inspection connector	
C416	3	Under left side of dash	SRS main harness (C802)	
C417	3	Above clutch pedal	Clutch switch	M/T
C418	2	Above clutch pedal	Clutch interlock switch	M/T
C419	8	On the steering column	Immobilizer control unit	
C420	4	Above brake pedal	Brake switch	
C421	14	Under left side of dash	Cruise control unit	
C422	14	Under left side of dash	Daytime running lights control unit	Canada
C423	7	Under left side of dash	Left engine compartment wire harness (C303)	
C424	14	Under left side of dash	Left engine compartment wire harness (C302)	
C425	14	Under left side of dash	Left engine compartment wire harness (C301)	
C426	2	Under left side of dash	Option connector (C427)	*4
C427	2	Under left side of dash	Option connector (C426)	*4
C428	8	Behind left kick panel	Multiplex control unit (driver's)	
C429	14	Behind left kick panel	Multiplex control unit (driver's)	
C430	25	Under left side of dash	Driver's door wire harness (C651)	
C431	14	Behind left kick panel	Under-dash fuse/relay box (C961)	
C432	14	Behind left kick panel	Under-dash fuse/relay box (C962)	
C433	22	Behind left kick panel	Under-dash fuse/relay box (C963)	
C434	20	Behind left kick panel	Under-dash fuse/relay box (C964)	
C435	3	Behind left kick panel	Under-dash fuse/relay box (C965)	
C436	5	Behind left kick panel	Under-dash fuse/relay box (C966)	
C437	8	Behind left kick panel	Under-dash fuse/relay box (C967)	
C438	4	Behind left kick panel	Under-dash fuse/relay box (C968)	
C439	5	Under left side of dash	Horn relay	
C440	5	Under left side of dash	Accessory socket relay	
C441	5	Under left side of dash	A/T reverse relay	
C441	5	Under left side of dash	ATTS fail-safe relay	
C442	5	Under left side of dash	ABS fail-safe relay	
C443	5	Under left side of dash	Seat heater relay	Canada
C444	5	Under left side of dash	Door lock relay	'99 model
G401		Behind left kick panel	Body ground, via main wire harness	

*1: Canada optional *2: '97 - 98 models (USA optional) *3: '99 model (USA optional) *4: '97 - 98 models



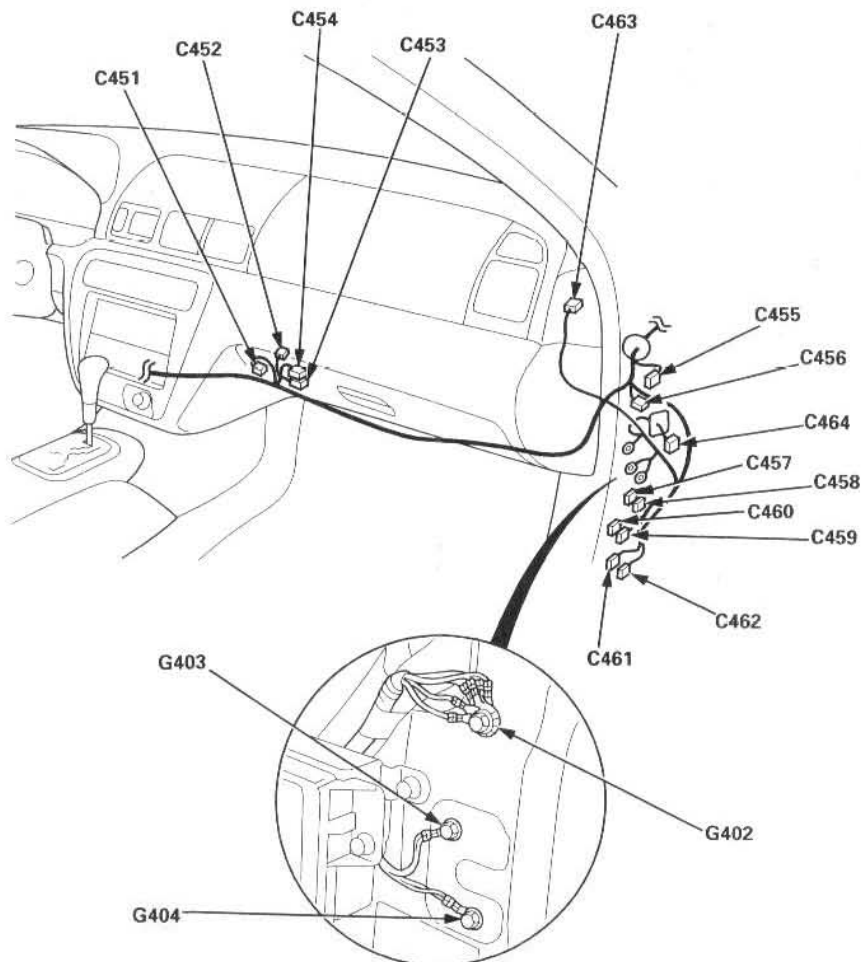
(cont'd)

Connector Identification and Wire Harness Routing

Main Wire Harness (cont'd)

Connector or Terminal	Number of Cavities	Location	Connects to	Notes
C451	3	Under middle of dash	Lateral acceleration (Lg) sensor	ATTS
C452	2	Under middle of dash	Diode	
C453	22	Under middle of dash	ECM wire harness (C478)	
C453	6	Under middle of dash	ECM wire harness (C478)	
C454	20	Under middle of dash	ECM wire harness (C477)	
C455	12	Under right side of dash	Right engine compartment wire harness (C201)	
C456	20	Under right side of dash	Junction connector	*3 *4
C457	14	Behind right kick panel	Multiplex control unit (passenger's)	
C458	20	Behind right kick panel	Multiplex control unit (passenger's)	
C459	22	Behind right kick panel	ABS control unit	
C460	12	Behind right kick panel	ABS control unit	
C461	12	Behind right kick panel	Right side wire harness (C502)	
C461	8	Behind right kick panel	Right side wire harness (C502)	
C462	22	Under right side of dash	Right side wire harness (C501)	
C463	6	Under right side of dash	Roof wire harness (C701)	
C464	25	Under right side of dash	Passenger's door wire harness (C681)	
G402		Under right side of dash	Body ground, via main wire harness	
G403		Under right side of dash	Body ground, via main wire harness	
G404		Under right side of dash	Body ground, via main wire harness	

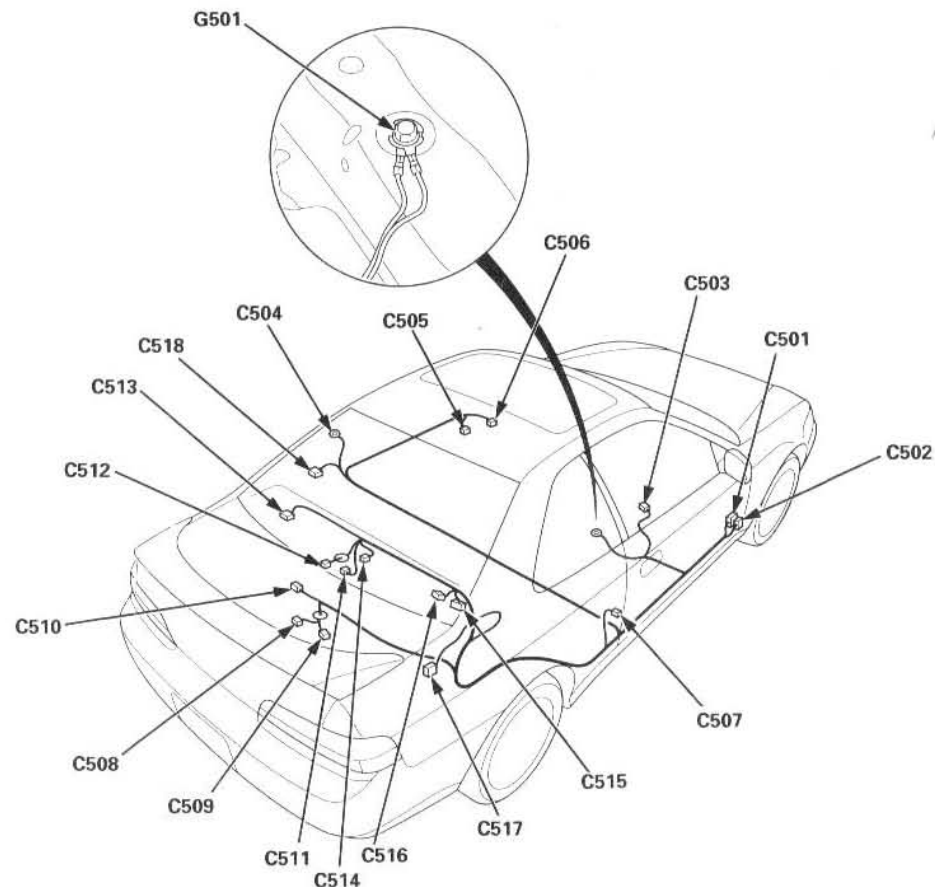
*1: A/T, ATTS *2: M/T *3: USA Type SH, Canada *4: USA without ATTS



Right Side Wire Harness

Connector or Terminal	Number of Cavities	Location	Connects to	Notes
C501	22	Behind right kick panel	Main wire harness (C462)	*1 *2 Canada
C502	12	Behind right kick panel	Main wire harness (C461)	
C502	8	Behind right kick panel	Main wire harness (C461)	
C503	3	Under front passenger's seat	Passenger's seat heater	Canada
C504	1	Left quarter panel	Driver's door switch	
C505	3	Under driver's seat	Driver's seat heater	
C506	2	Under driver's seat	Driver's seat belt switch	
C507	1	Right quarter panel	Passenger's door switch	
C508	2	Middle of fuel tank	Fuel pump (FP)	
C509	3	Middle of fuel tank	Fuel gauge sending unit	ATTS*4 ATTS*5
C510	3	Left side of trunk	Yaw rate sensor	
	4	Left side of trunk	Yaw rate sensor	
C511	2	Middle front of trunk	Trunk light	*3
C512	2	Middle of trunk lid	High mount brake light	
C513	4	Left side of rear shelf	Left rear speaker	
C514	1	Middle front of trunk	Rear window defogger coil	
C515	18	Left side of rear shelf	Stereo amplifier	
C516	4	Left side of rear shelf	Right rear speaker	
C517	10	Under rear shelf	Rear wire harness (C601)	'99 model
C518	8	Left quarter panel	Keyless receiver unit	
G501		Right side of floor	Body ground, via right side wire harness	

*1: USA Type SH, Canada *2: USA without ATTS *3: Except Type SH *4: '97 model *5: '98 – 99 models



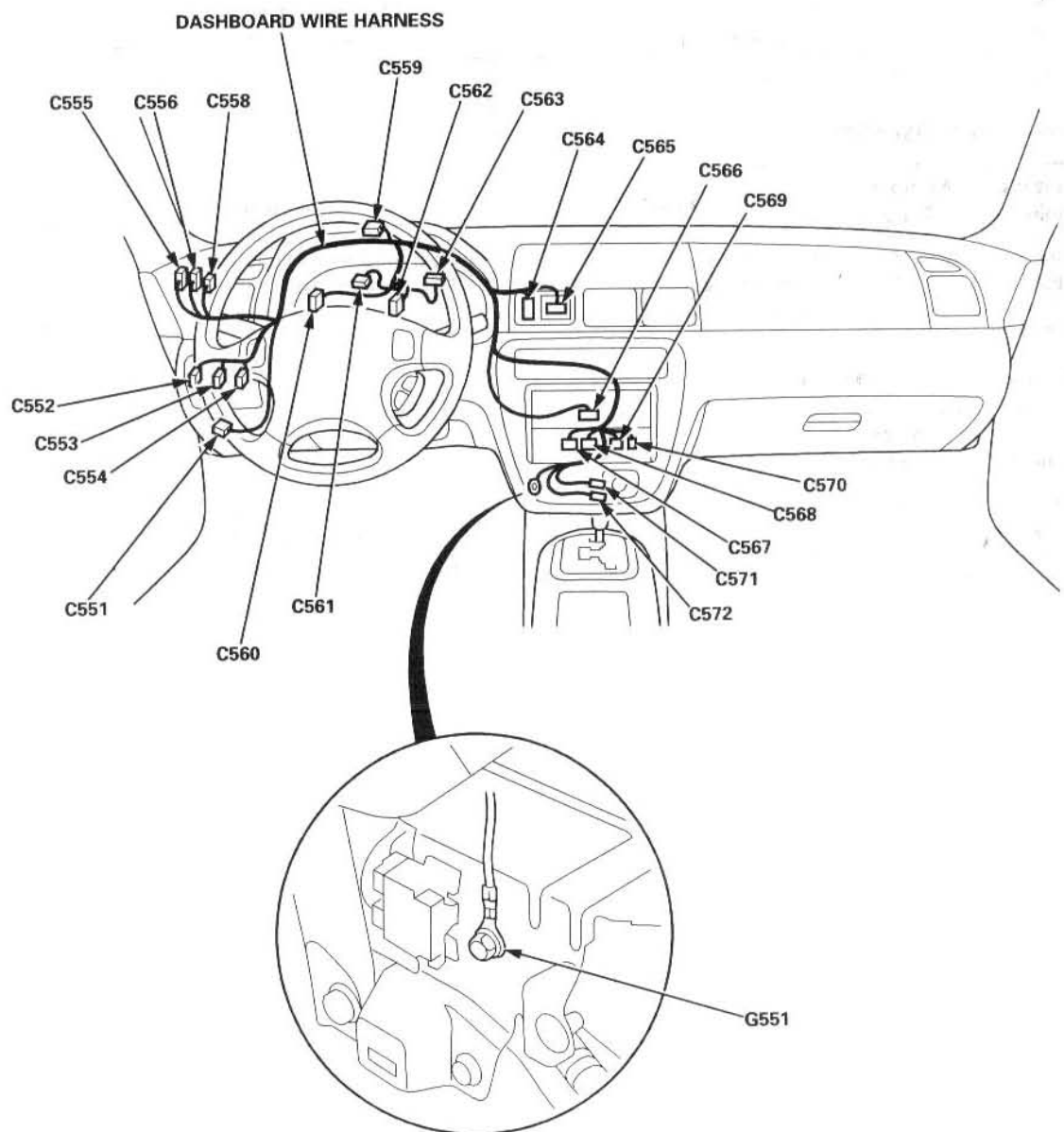
Connector Identification and Wire Harness Routing

Dashboard Wire Harness

Connector or Terminal	Number of Cavities	Location	Connects to	Notes
C551	16	Behind left kick panel	Under-dash fuse/relay box (C969)	A/T
C552	6	Under left side of dash	Cruise main switch	
C553	5	Under left side of dash	Moonroof switch	
C554	6	Under left side of dash	Dash lights brightness controller	
C555	20	Under left side of dash	Main wire harness (C403)	
C556	16	Under left side of dash	Main wire harness (C402)	
C558	2	Under left side of dash	Main wire harness (C401)	
C559	20	Behind gauges	Junction connector	
C560	12	Behind gauges	Gauge assembly	
C561	16	Behind gauges	Gauge assembly	
C562	16	Behind gauges	Gauge assembly	
C563	13	Behind gauges	Gauge assembly	
C564	6	Behind middle of dash	Hazard warning switch	
C565	4	Behind middle of dash	Clock	
C566	16	Behind audio unit	Audio unit	
C566	20	Behind audio unit	Audio unit	
C567	12	Under middle of dash	ECM wire harness (C482)	
C567	10	Under middle of dash	ECM wire harness (C482)	
C568	12	Under middle of dash	ECM wire harness (C483)	
C569	8	Under middle of dash	Heater-sub harness (C902)	'97 – 98 models '99 model *1 *2 A/T
C570	2	Under middle of dash	Heater-sub harness (C903)	
C571	1	Under middle of dash	Accessory socket (+)	
C572	1	Under middle of dash	Accessory socket (–)	
G551		Under middle of dash	Body ground, via dashboard wire harness	

*1: '97 – 98 models (ATTS), '99 model

*2: '97 – 98 models (M/T, A/T)



Connector Identification and Wire Harness Routing

Rear Wire Harness

Connector or Terminal	Number of Cavities	Location	Connects to	Notes
C601	10	Under rear shelf	Right side wire harness (C517)	*1
C602	2	Right side of trunk lid	Spoiler sub-harness (C631)	
C603	2	Middle rear of trunk lid	Trunk latch switch	
C604	6	Right rear of trunk	Right taillight	
C605	2	Behind rear bumper	License plate light	
C606	6	Left rear of trunk	Trailer lighting connector	
C607	6	Left rear of trunk	Left taillight	
C608	2	Right side of trunk	ABS right rear wheel sensor	
C609	2	Left side of trunk	ABS left rear wheel sensor	
G601		Left side of trunk	Body ground, via rear wire harness	

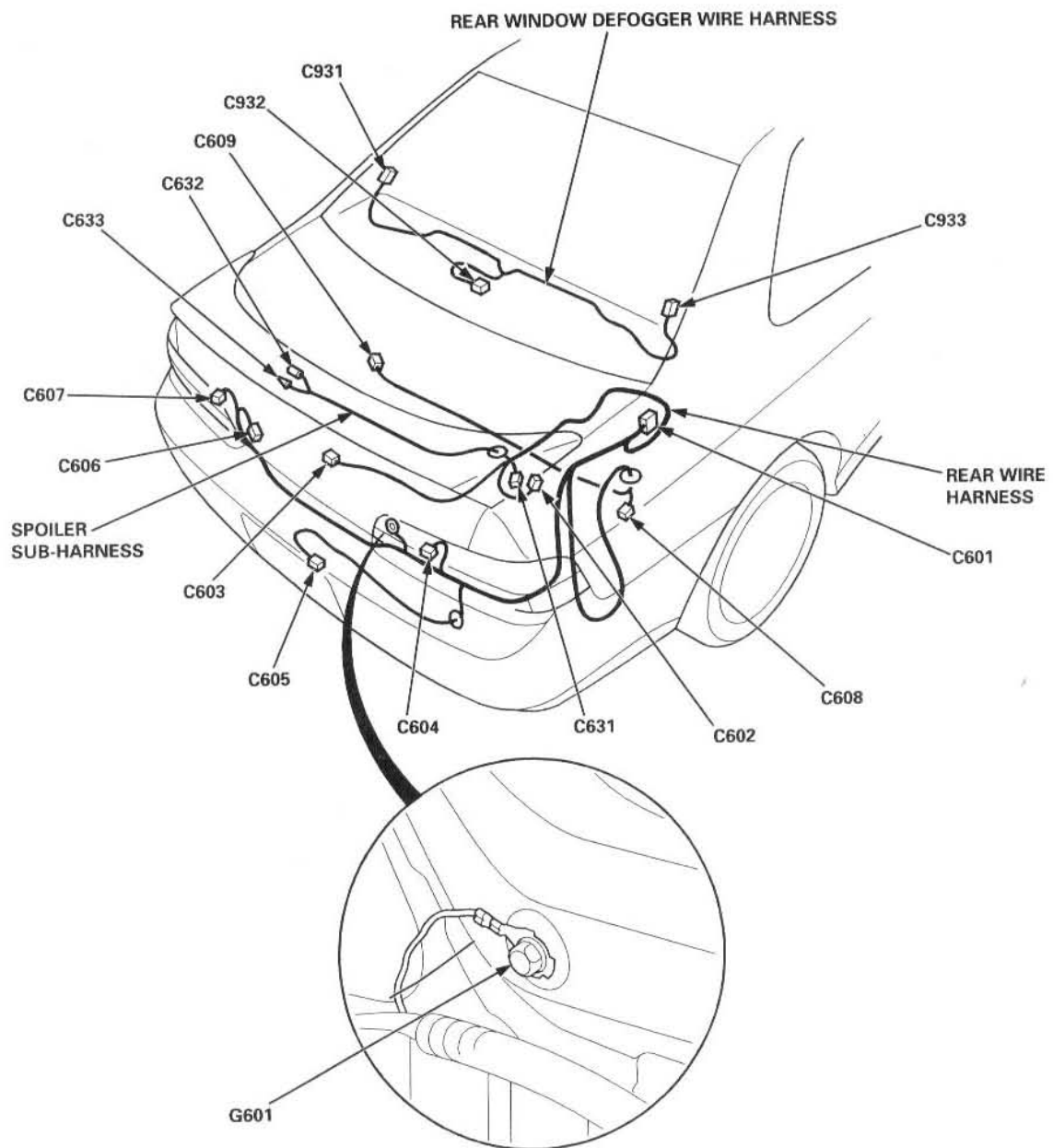
*1: Type SH

Spoiler Sub-harness (Type SH)

Connector or Terminal	Number of Cavities	Location	Connects to	Notes
C631	2	Left side of trunk	Rear wire harness (C602)	
C632	1	Built into rear spoiler	High mount brake light (+)	
C633	1	Built into rear spoiler	High mount brake light (-)	

Rear Window Defogger Wire Harness

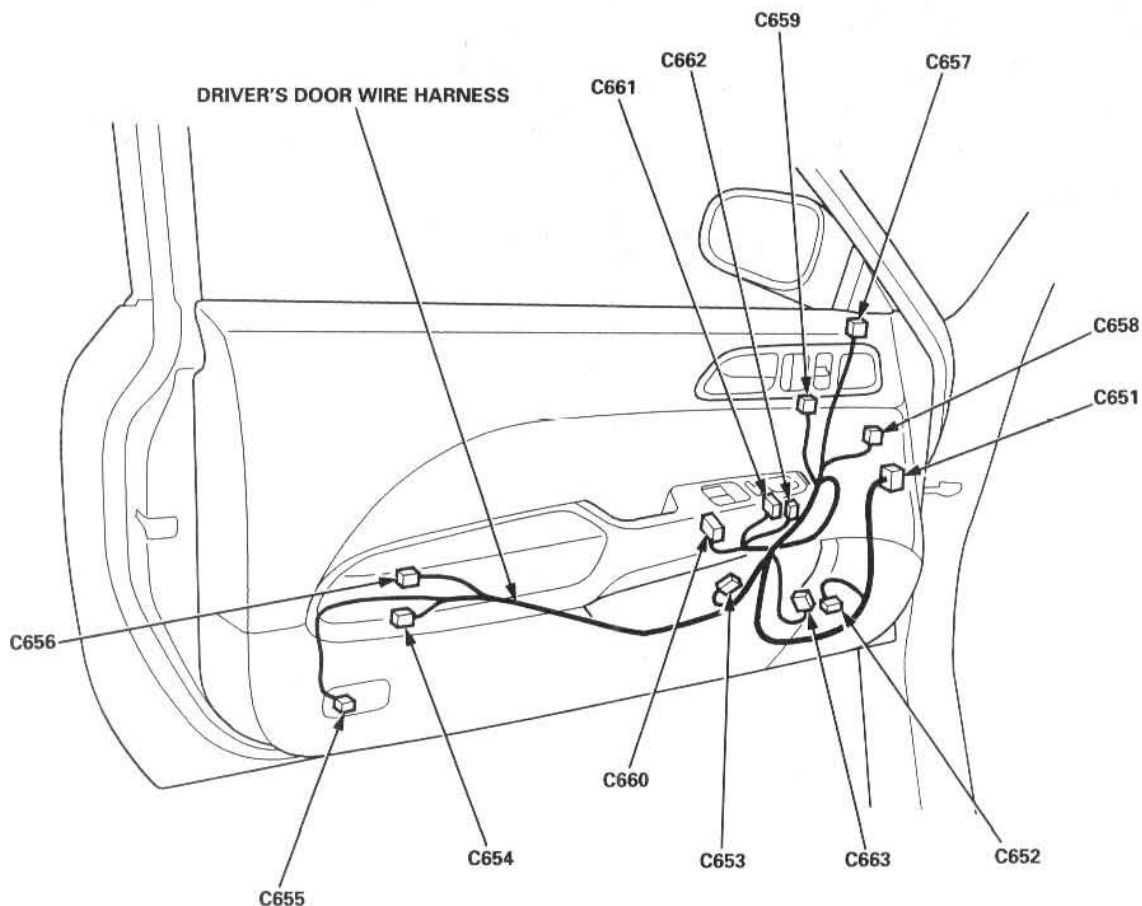
Connector or Terminal	Number of Cavities	Location	Connects to	Notes
C931	1	Left C-pillar	Rear window defogger (+)	
C932	2	Middle front of trunk	Rear window defogger coil	
C933	1	Right C-pillar	Rear window defogger (-)	



Connector Identification and Wire Harness Routing

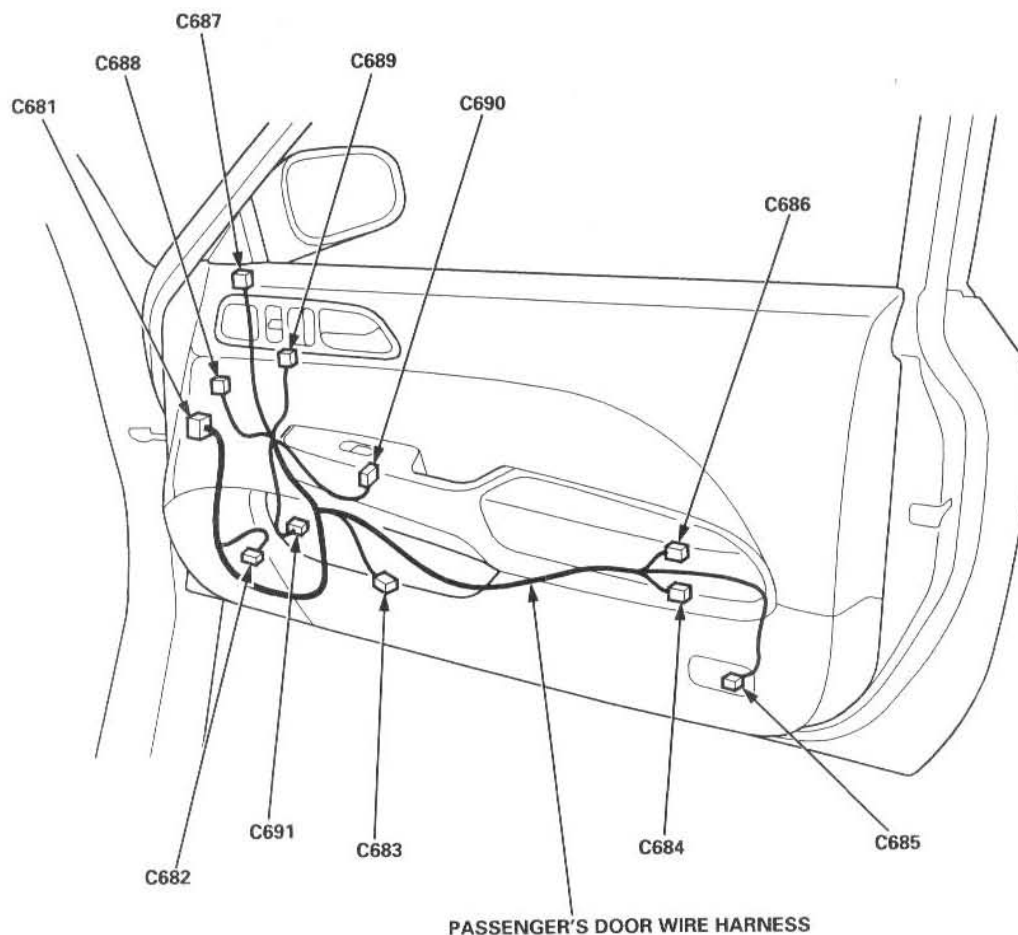
Driver's Door Wire Harness

Connector or Terminal	Number of Cavities	Location	Connects to	Notes
C651	25	Driver's door	Main wire harness (C430)	Type SH USA Canada
C652	2	Driver's door	Driver's door speaker	
C653	4	Driver's door	Driver's window motor	
C654	6	Driver's door	Driver's door lock actuator	
C655	2	Driver's door	Driver's door courtesy light	
C656	3	Driver's door	Driver's door key cylinder switch	
C657	3	Driver's door	Left power mirror actuator	
C657	6	Driver's door	Left power mirror actuator and defogger	
C658	2	Driver's door	Left tweeter	
C659	3	Driver's door	Driver's door lock switch	
C660	20	Driver's door	Multiplex control unit (door)	Canada Canada
C661	10	Driver's door	Power mirror switch	
C662	2	Driver's door	Power mirror switch	
C663	6	Driver's door	Driver's seat heater switch	



Passenger's Door Wire Harness

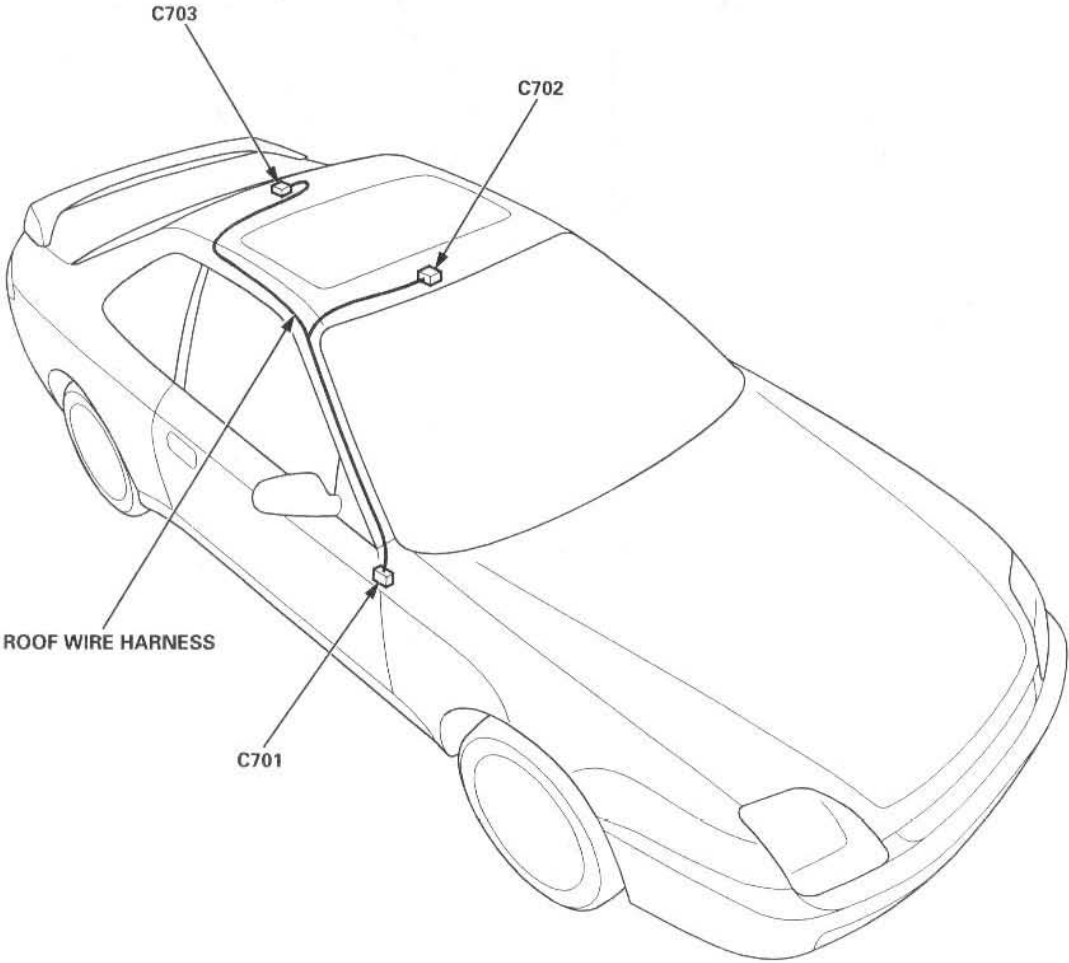
Connector or Terminal	Number of Cavities	Location	Connects to	Notes
C681	25	Passenger's door	Main wire harness (C464)	Type SH USA Canada
C682	2	Passenger's door	Passenger's door speaker	
C683	2	Passenger's door	Passenger's window motor	
C684	2	Passenger's door	Passenger's door lock actuator	
C685	2	Passenger's door	Passenger's door courtesy light	
C686	3	Passenger's door	Passenger's door key cylinder switch	
C687	3	Passenger's door	Right power mirror actuator	
C687	6	Passenger's door	Right power mirror actuator and defogger	
C688	2	Passenger's door	Right tweeter	
C689	3	Passenger's door	Passenger's door lock switch	
C690	5	Passenger's door	Passenger's window switch	Canada
C691	6	Passenger's door	Passenger's seat heater switch	



Connector Identification and Wire Harness Routing

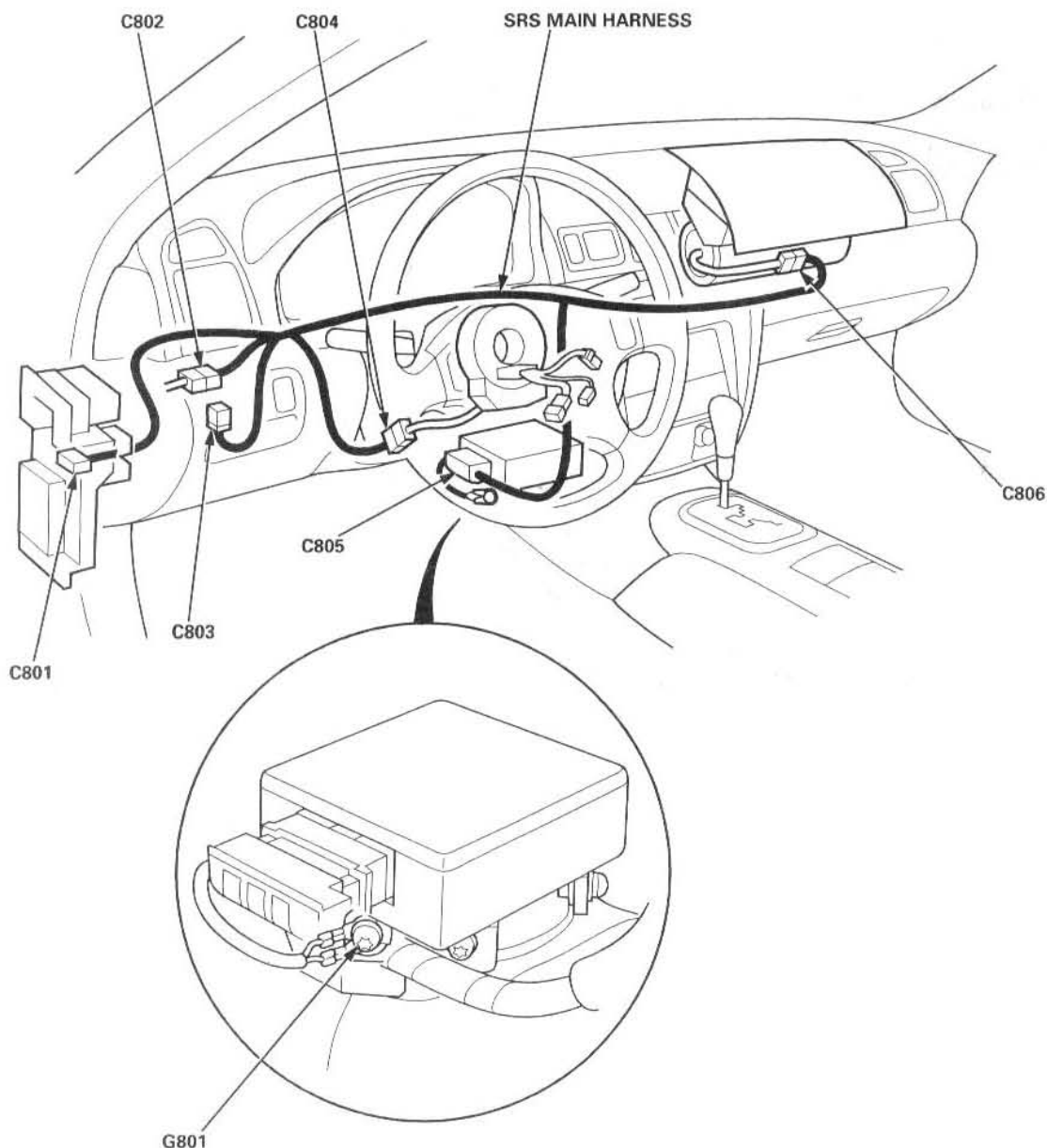
Roof Wire Harness

Connector or Terminal	Number of Cavities	Location	Connects to	Notes
C701	6	Under right side of dash	Main wire harness (C463)	
C702	4	Front of roof	Ceiling light/spotlight	
C703	2	Rear of roof	Moonroof motor	



SRS Main Wire Harness

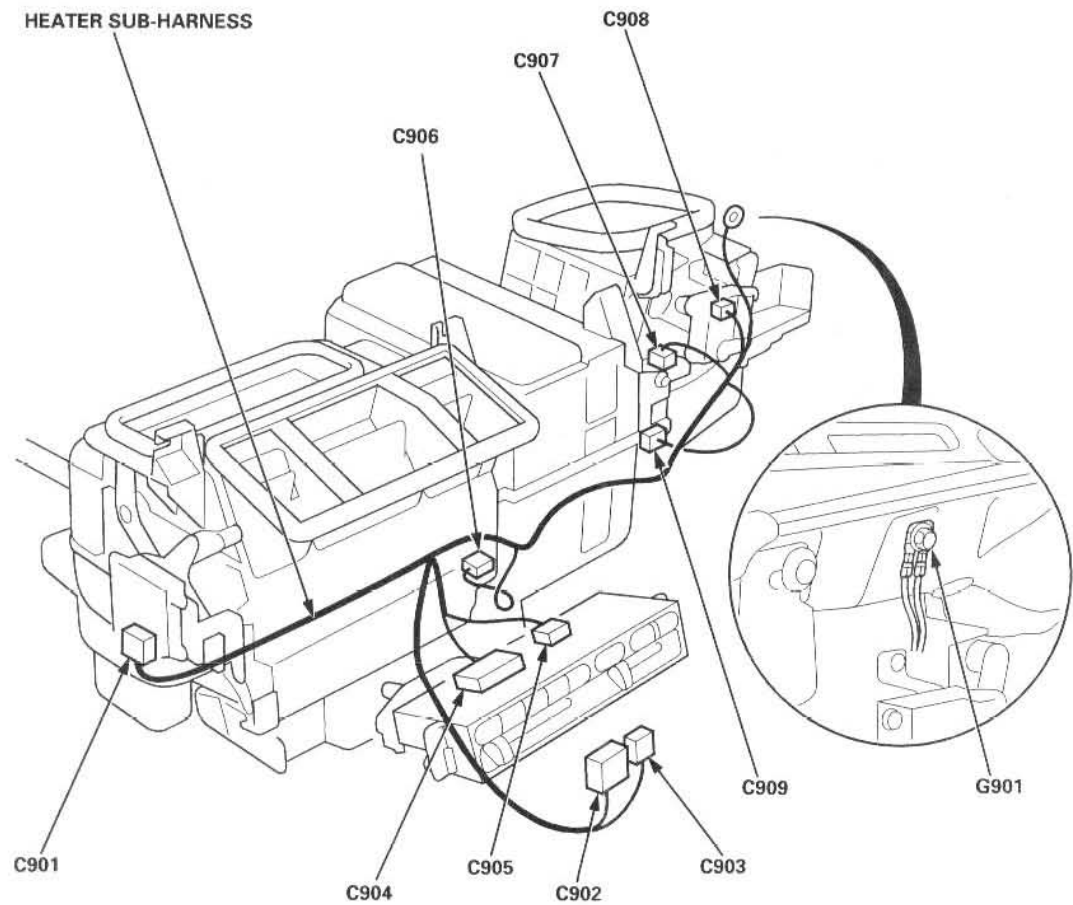
Connector or Terminal	Number of Cavities	Location	Connects to	Notes
C801	2	Behind left kick panel	Under-dash fuse/relay box (C977)	
C802	3	Under left side of dash	Main wire harness (C416)	
C803	2	Under left side of dash	Memory erase signal (MES) connector	
C804	2	Under left side of dash	Cable reel	
C805	18	Middle of floor	SRS unit	
C806	2	Behind glove box	Front passenger's airbag assembly	
G801		Middle of floor	Body ground, via SRS main harness	



Connector Identification and Wire Harness Routing

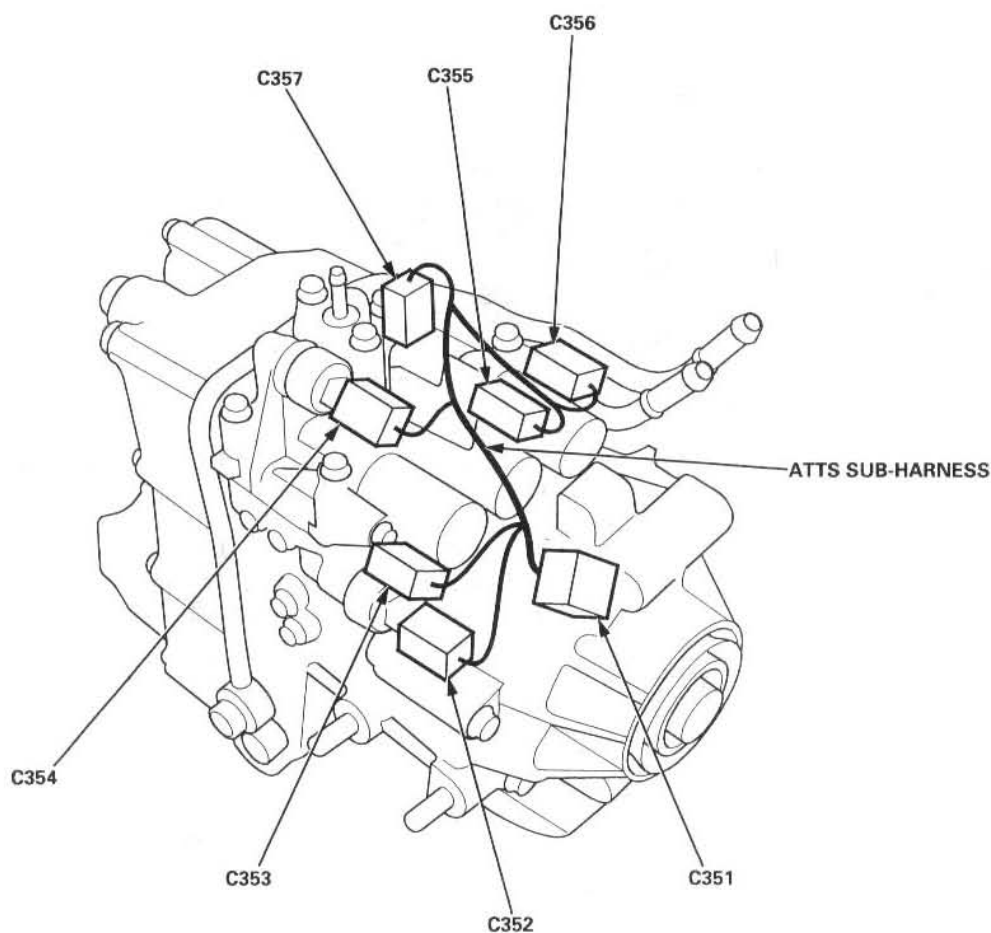
Heater Sub-harness

Connector or Terminal	Number of Cavities	Location	Connects to	Notes
C901	10	Behind left side of center console	Mode control motor	
C902	8	Under middle of dash	Dashboard wire harness (C569)	
C903	2	Under middle of dash	Dashboard wire harness (C570)	
C904	22	Behind heater control panel	Heater control panel	
C905	6	Behind heater control panel	Heater fan switch	
C906	3	Under right side of dash	A/C thermostat	
C907	5	Under right side of dash	Blower resistor	
C908	5	Behind glove box	Recirculation control motor	
C909	2	Behind glove box	Blower motor	
G901		Under right side of dash	Body ground, via heater-sub harness	



ATTS Sub-harness

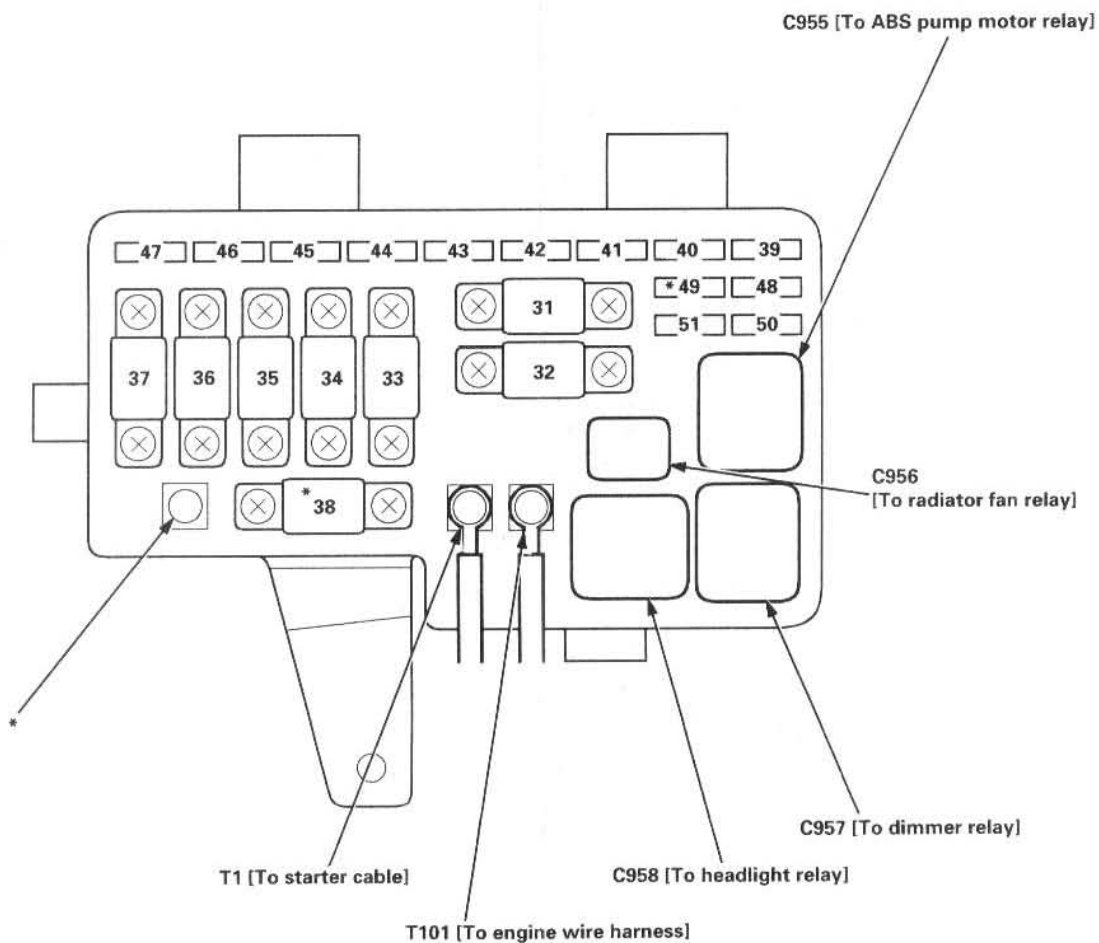
Connector or Terminal	Number of Cavities	Location	Connects to	Notes
C351	14	Left side of engine compartment	Engine wire harness (C146)	
C352	3	Left side of engine compartment	Left oil pressure sensor	
C353	2	Left side of engine compartment	Left solenoid	
C354	3	Left side of engine compartment	Right oil pressure sensor	
C355	2	Left side of engine compartment	Right solenoid	
C356	2	Left side of engine compartment	Linear solenoid	
C357	2	Left side of engine compartment	Oil temperature sensor	



Fuses

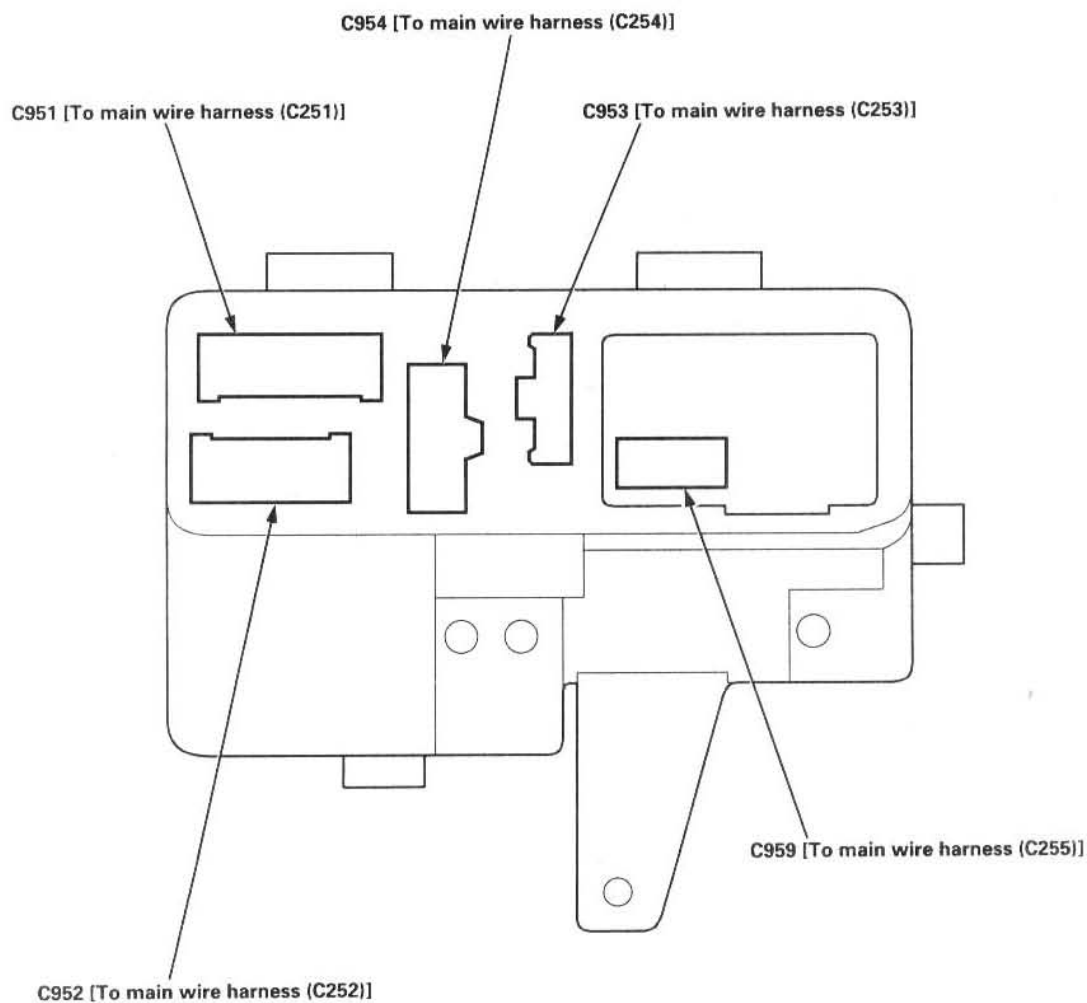
Under-hood Fuse/Relay Box

NOTE: The under-hood fuse/relay box is located on the right side of the engine compartment.



*: Not used

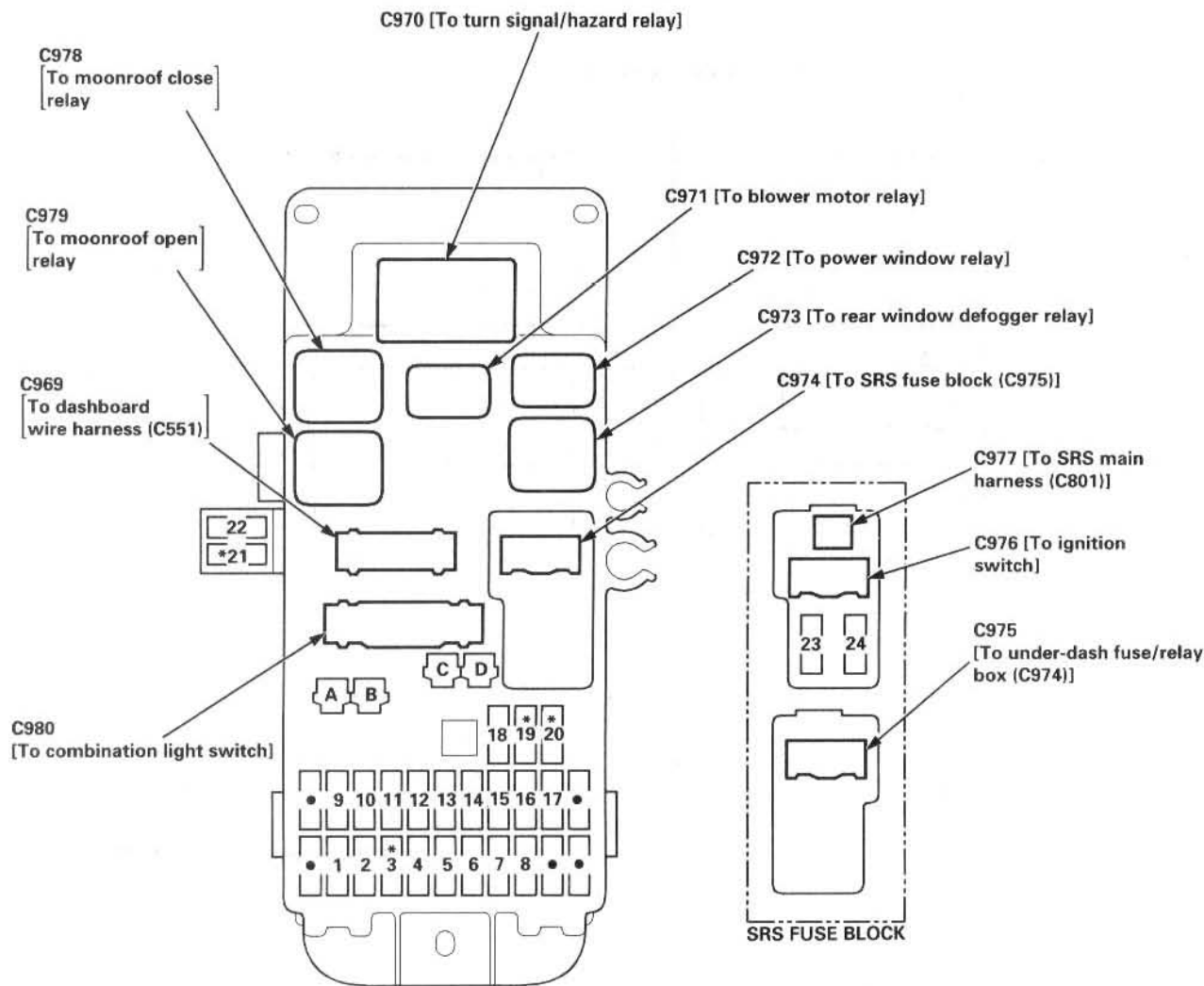
NOTE: View from the backside of the under-hood fuse/relay box.



Fuses

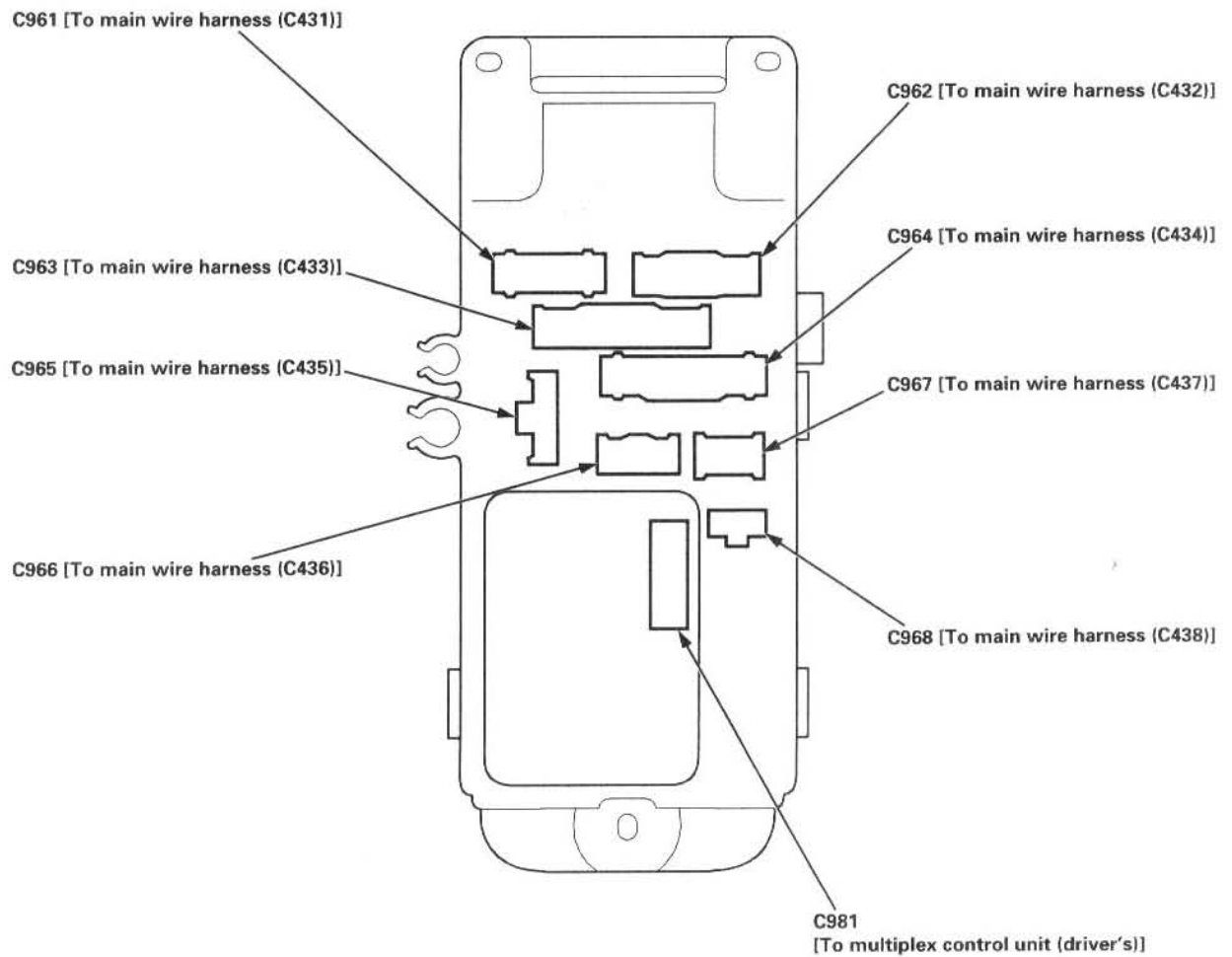
Under-dash Fuse/Relay Box

NOTE: The under-dash fuse/relay box is located behind the left kick panel.



- : Spare fuse
 - *: Not used
 - *21: Not used ('97 - 98 models)
 - A: C981
 - B: C982
 - C: C983
 - D: C984
- To optional connector

NOTE: View from the backside of the under-dash fuse/relay box.

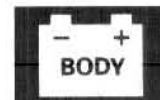


Power Distribution

Fuse-to-Component(s) Index (in numerical sequence)

Under-hood Fuse/Relay Box:

<u>Fuse</u>	<u>Capacity</u>	<u>Wire Color</u>	<u>Circuit(s) Protected</u>
31	30 A	WHT/BLU	ABS pump motor
32	100 A	—	All
33	50 A	WHT	Ignition switch (BAT)
34	40 A	WHT/GRN	Rear window defogger
35	40 A	WHT/BLK	Blower motor
36	50 A	WHT/RED	No. 1, 4 and 6 fuses (in under-dash fuse/relay box)
37	40 A	WHT/BLU	No. 5, 8, 15 and 16 fuses (in under-dash fuse relay box) Moonroof open relay Moonroof close relay
38	—	—	Not used
39	10 A	WHT/GRN	Turn signal/hazard relay
40	20 A	WHT/GRN	ABS modulator unit ABS pump motor relay
41	15 A	WHT/YEL	Brake lights Horn relay Horns Ignition key light and key interlock solenoid
42	20 A	RED/GRN	Combination light switch Security alarm system (Canada: optional)
43	7.5 A	WHT/YEL	Audio unit Clock ECM Heater control panel Immobilizer indicator light Multiplex control unit (driver's) Multiplex control unit (passenger's) Multiplex control unit (door) Security alarm system (Canada: optional) TCM
44	10 A	WHT	Multiplex control unit (driver's)
45	20 A	WHT	A/C compressor clutch Condenser fan motor
46	15 A ('97 – 98 models) 10 A ('99 model)	WHT/BLU	Accessory socket Audio unit Ceiling light/spotlight Courtesy lights Data link connector Trunk light
47	20 A	BLU/BLK	Radiator fan motor
48	7.5 A	GRN/ORN	ABS control unit (MCK)
49	—	—	Not used
50	20 A	RED/GRN	Daytime running lights control unit (Canada) Right headlight
51	20 A	RED/YEL	Daytime running lights control unit (Canada) High beam indicator Left headlight



Under-dash Fuse/Relay Box:

<u>Fuse</u>	<u>Capacity</u>	<u>Wire Color</u>	<u>Circuit(s) Protected</u>
1	10 A	WHT/BLU	ATTS control unit
2	7.5 A	BLU/RED	ECM
			PGM-FI main relay
3	—	—	Not used
4	10 A	WHT/GRN	Immobilizer control unit
			PGM-FI main relay
5	10 A	WHT/GRN	Stereo amplifier
6	15 A	WHT/BLK	Driver's seat heater (Canada)
			Passenger's seat heater (Canada)
7	30 A	GRN/YEL	Moonroof motor (open)
		GRN/RED	Moonroof motor (close)
8	7.5 A	RED/BLU	Daytime running lights control unit (Canada)
9	7.5 A	YEL/BLK	ABS control unit
			A/C thermostat
			A/C compressor clutch relay
			ATTS control unit
			Blower motor relay
			Condenser fan relay
			Heater control panel
			Power mirror actuator
			Power mirror defogger (Canada)
			Radiator fan relay
			Recirculation control motor
			Seat heater relay (Canada)
10	15 A	RED/BLK	Ashtray light (optional)
			A/T gear position console light
			A/T gear position indicator
			Audio unit light
			Cruise main switch light
			Dash lights brightness controller
			Driver's seat heater switch light (Canada)
			Front parking lights
			Front side marker lights
			Gauge lights and cruise indicator
			Hazard warning switch light
			Heater control panel light
			License plate light
			Moonroof switch light
			Multiplex control unit (driver's)
			Multiplex control unit (door)
			Passenger's seat heater switch light (Canada)
			Rear side marker lights
			Security alarm system (Canada: optional)
			Taillights
			Trailer lighting connector
11	7.5 A	BRN/YEL	Heater control panel (rear window defogger)
			Multiplex control unit (driver's)
12	7.5 A	YEL	Daytime running lights control unit (Canada)

(cont'd)

Power Distribution

Fuse-to-Component(s) Index (in numerical sequence) (cont'd)

Under-dash Fuse/Relay Box:

<u>Fuse</u>	<u>Capacity</u>	<u>Wire Color</u>	<u>Circuit(s) Protected</u>
13	15 A	YEL	A/T gear position dimming circuit and shift indicator circuit Back-up lights Clock Cruise control unit Daytime running lights indicator light (Canada) Gauge assembly Multiplex control unit (driver's) Multiplex control unit (passenger's) Turn signal switch
14	15 A	BLK/YEL	Alternator EGR control solenoid valve ELD unit EVAP control canister vent shut valve EVAP purge control solenoid valve EVAP bypass solenoid valve IAB control solenoid valve Intake control solenoid valve Primary heated oxygen sensor (Primary HO2S) Secondary heated oxygen sensor (Secondary HO2S) Security alarm system (Canada: optional) Shift lock relay (A/T) TCM Vehicle speed sensor
15	20 A	GRN/WHT	Multiplex control unit (door) Driver's window motor
16	20 A	BLU/BLK	Multiplex control unit (passenger's) Passenger's window motor
17	30 A	GRN/BLK	Intermittent wiper relay Windshield wiper/washer switch Windshield wiper motor
18	7.5 A	YEL/RED	Accessory socket relay Shift lock solenoid
19	—	—	Not used
20	—	—	Not used

Auxiliary Fuse Holder:

<u>Fuse</u>	<u>Capacity</u>	<u>Wire Color</u>	<u>Circuit(s) Protected</u>
21	—	—	Not used ('97 – 98 models)
21	10 A	YEL/GRN	Keyless receiver unit ('99 model)
22	7.5 A	YEL/RED	ATTS fail-safe relay ATTS control unit

SRS Fuse Block:

<u>Fuse</u>	<u>Capacity</u>	<u>Wire Color</u>	<u>Circuit(s) Protected</u>
23	15 A	RED/BLU	SRS unit (VA)
		RED/ORN	PGM-FI main relay
24	10 A	BLK/WHT	SRS unit (VB)



Ground Distribution

Ground-to-Component(s) Index

NOTE: All ground wires are BLK unless otherwise noted.

Ground	Component or Circuits Grounded
G1	Battery
	Transmission housing
G2	Cylinder head cover
	PSP switch bracket
G101	ATTS control unit (PG1, PG2)
	ATTS control unit (LG1, LG2: BRN/BLK)
	Data link connector (BRN/BLK)
	ECM (PG1, PG2)
	ECM (LG1, LG2: BRN/BLK)
	Left solenoid (with ATTS)
	PGM-FI main relay
	PSP pressure switch
	Radiator fan switch
	Right solenoid (with ATTS)
	Shift control solenoid valve B, C (A/T)
	TCM (PG1)
	TCM (LG1, LG2: BRN/BLK)
	Vehicle speed sensor
	VTEC pressure switch
	Shielding
	between ECM and knock sensor (BRN/BLK)
	between ECM and primary and secondary heated oxygen sensor
	between ECM and TDC/CKP sensor
	between ECM and CYP sensor
	between TCM and countershaft speed sensor
	between TCM and mainshaft speed sensor
G201	Radiator fan motor
	Right headlight (low beam)
	Right front parking light
	Right front turn signal light
	Right front side marker light
G301	Brake fluid level switch
	Condenser fan motor
	Intermittent wiper relay
	Left headlight (low beam)
	Left front parking light
	Left front turn signal light
	Left front side marker light
	Windshield wiper motor
	Windshield washer motor
G302	ABS pump motor

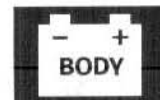
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Ground Distribution

Ground-to-Component(s) Index (cont'd)

NOTE: All ground wires are BLK unless otherwise noted.

Ground	Component or Circuits Grounded
G401	Accessory socket relay Accessory socket A/T gear position indicator circuit Blower motor relay Ceiling light/spotlight Clutch switch (M/T) Clutch interlock switch (M/T) Clock Combination light switch Cruise main switch Cruise control unit Driver's window motor Driver's door lock switch Driver's door key cylinder switch Driver's seat heater switch (Canada) ELD unit Gauge assembly Horns Ignition key switch Immobilizer control unit Moonroof switch Moonroof open/close relay Multiplex control unit (driver's, passenger's, door) Power mirror switch Power window relay Security alarm system (Canada: optional) Turn signal/hazard relay — plus everything grounded through G402



NOTE: All ground wires are BLK unless otherwise noted.

Ground	Component or Circuits Grounded
G402	ABS fail-safe relay Daytime running lights control unit (Canada) Dimmer relay Door lock relay ('99 model) Driver's door lock actuator Left power mirror defogger (Canada) Multiplex control unit (driver's, passenger's, door) Multiplex control inspection connector Passenger's door lock switch Passenger's door key cylinder switch Passenger's seat heater switch (Canada) Right power mirror defogger (Canada) Seat heater relay (Canada)
G403	ABS control unit (2 wires)
G404	ABS control unit (2 wires)
G471	Ashtray light (optional) A/T gear position switch Cruise control actuator Data link connector EVAP purge flow switch Mode switch (A/T) Parking pin switch (A/T) Shift lock relay (A/T)
G501	Driver's seat belt switch Fuel gauge sending unit Fuel pump (FP) High mount brake light (except Type SH) Keyless receiver unit ('99 model) Seat heater (driver's, passenger's) Stereo amplifier Shielding between stereo amplifier and left rear microphone
G551	Audio unit
G601	High mount brake light (Type SH) License plate light Taillight (right, left) Trailer lighting connector Trunk latch switch
G801	SRS unit (2 wires)
G901	Heater control panel Heater fan switch

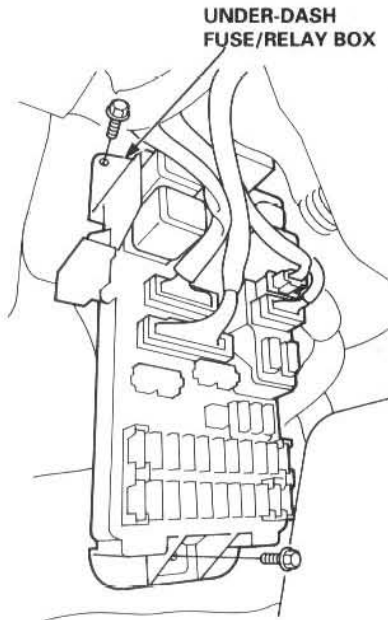
Under-dash Fuse/Relay Box

Removal/Installation

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

Removal:

1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.
2. Disconnect the battery negative cable, then disconnect the positive cable, and wait at least three minutes.
3. Remove the dashboard lower cover (see section 20).
4. Remove the door sill molding, left kick panel and access panel (see section 20).
5. Remove the two mounting bolts, and pull the under-dash fuse/relay box away from the body.



6. Disconnect the under-dash fuse/relay box connectors, and remove the under-dash fuse/relay box.

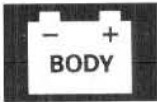
NOTE: The SRS main harness connector is a spring-loaded lock type (see section 24).

Installation:

1. Connect the connectors to the under-dash fuse/relay box, then install the under-dash fuse/relay box in the reverse order of removal.

NOTE: The SRS main harness connector is a spring-loaded lock type (see section 24).

2. Install the left kick panel and access panel, and the door sill molding.
3. Install the dashboard lower cover.
4. Connect both the negative cable and positive cable to the battery, enter the anti-theft code for the radio, then enter the customer's radio station presets.
5. Confirm that all systems work properly.



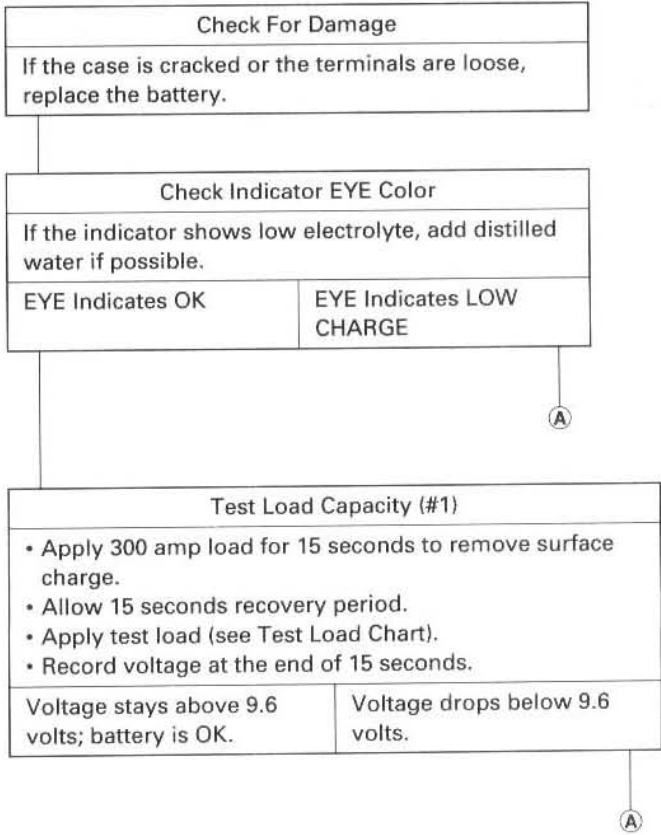
Test

⚠ WARNING

- Battery fluid (electrolyte) contains sulfuric acid. It may cause severe burns if it gets on your skin or in your eyes. Wear protective clothing and a face shield.
 - If electrolyte gets on your skin or clothes, rinse it off with water immediately.
 - If electrolyte gets in your eyes, flush it out by splashing water in your eyes for at least 15 minutes; call a physician immediately.
- A battery gives off hydrogen gas. If ignited, the hydrogen will explode and could crack the battery case and splatter acid on you. Keep sparks, flames, and cigarettes away from the battery.
- Overcharging will raise the temperature of the electrolyte. This may force electrolyte to spray out of the battery vents. Follow the charger manufacturer's instructions, and charge the battery at a proper rate.

Use either a JCI or Bear ARBST tester, and follow the manufacturer's procedures. If you don't have one of these computerized testers, follow this conventional test procedure:

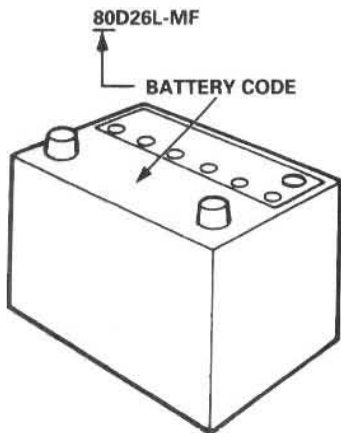
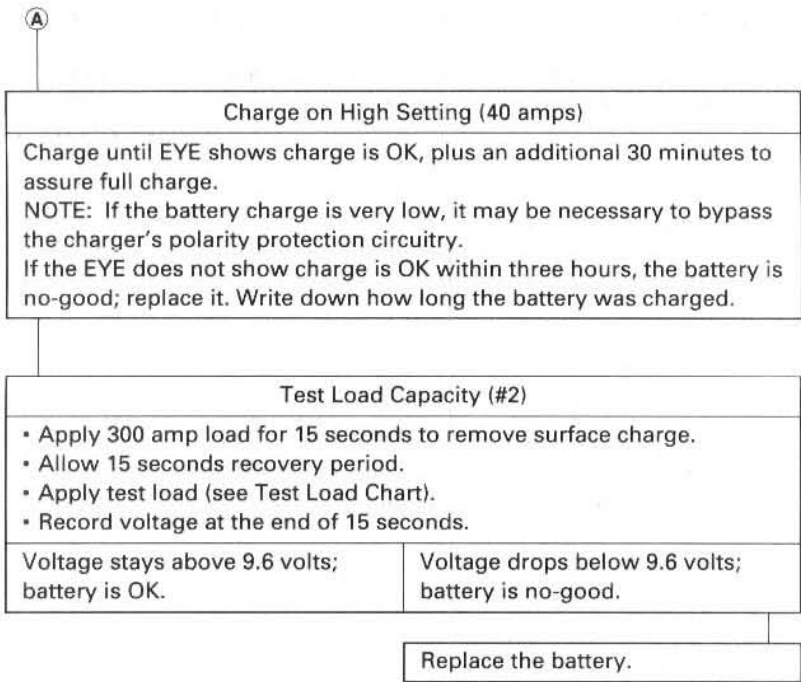
To get accurate results, the temperature of the electrolyte must be between 70°F (21°C) and 100°F (38°C).



(cont'd)

Battery

Test (cont'd)



TEST LOAD CHART		
Use the test load or use 1/2 the cold cranking amps (CCA) printed on the label on the top of the battery. If neither is indicated, use the information below:		
BATTERY CODE	COLD CRANKING AMPS (CCA)	TEST LOAD (amps)
80	550	270

Power Relays

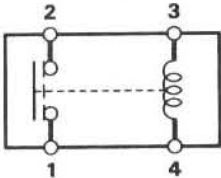
Relay Test

NOTE: See page 23-87 for turn signal/hazard relay input test.

Normally-open type A:

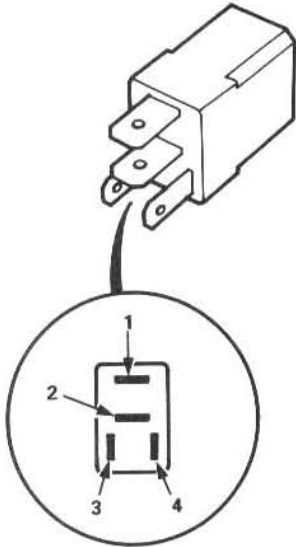
1.
- Check for continuity between the terminals.
- There should be continuity between the No. 1 and No. 2 terminals when power and ground are connected to the No. 3 and No. 4 terminals.
- There should be no continuity between the No. 1 and No. 2 terminals when power is disconnected.

Terminal	1	2
Power (No. 3 – No. 4)		
Disconnected		
Connected		

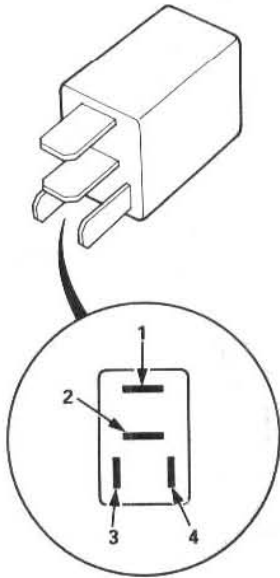


- Horn relay
- Accessory socket relay
- ABS fail-safe relay
- Reverse relay
- ATTS fail-safe relay
- Seat heater relay

type 1:



type 2:



(cont'd)

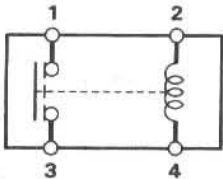
Power Relays

Relay Test (cont'd)

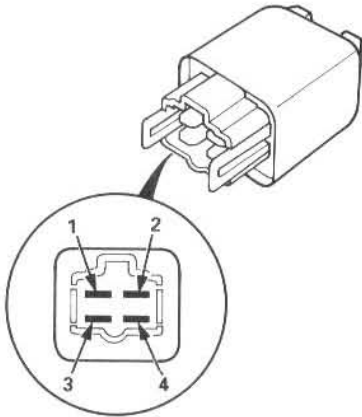
Normally-open type B:

- 1. Check for continuity between the terminals.
 - There should be continuity between the No. 1 and No. 3 terminals when power and ground are connected to the No. 2 and No. 4 terminals.
 - There should be no continuity between the No. 1 and No. 3 terminals when power is disconnected.

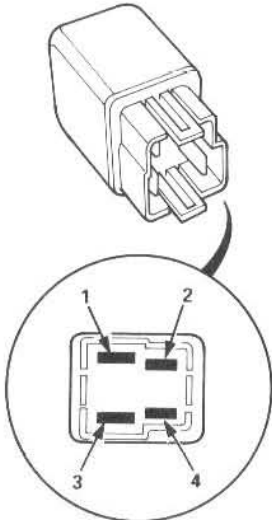
Terminal	1	3
Power (No. 2 – No. 4)		
Disconnected		
Connected		



• Starter cut relay

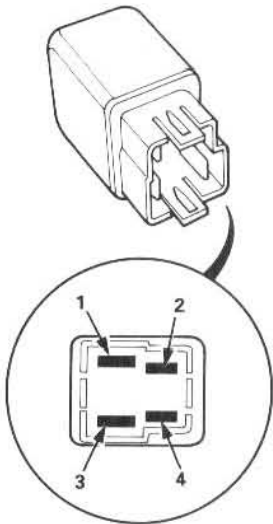


• ABS pump motor relay

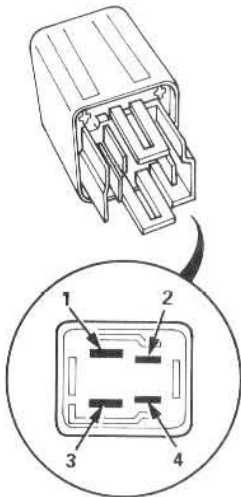


• Rear window defogger relay

type 1:

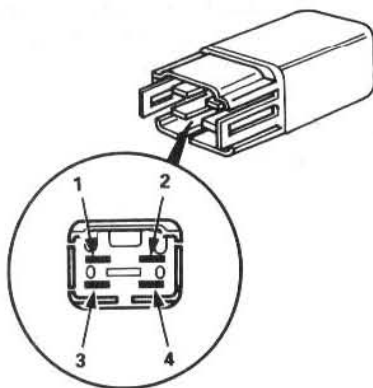


type 2:

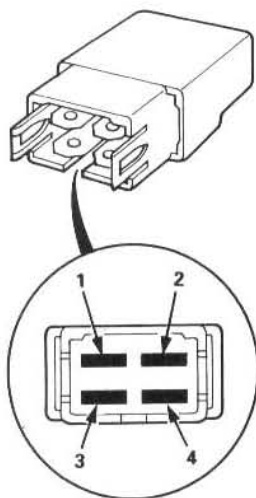


- Blower motor relay
- Power window relay

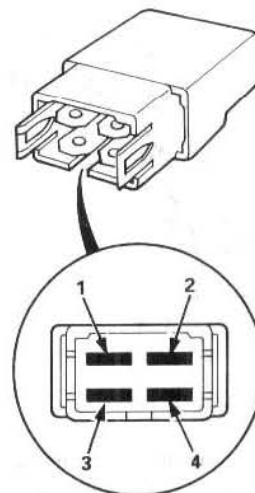
type 1:



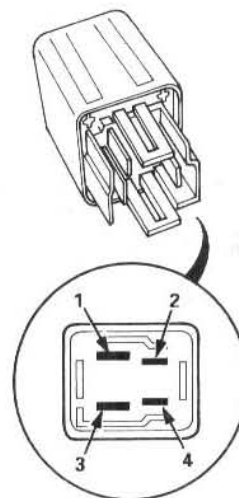
type 2:



- Radiator fan relay



- Headlight relay

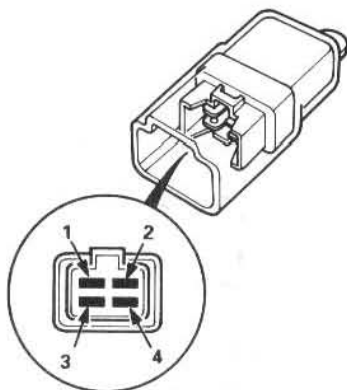


(cont'd)

Power Relays

Relay Test (cont'd)

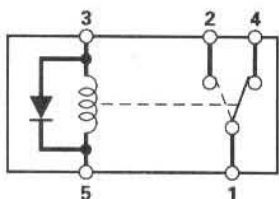
- Condenser fan relay
- A/C compressor clutch relay



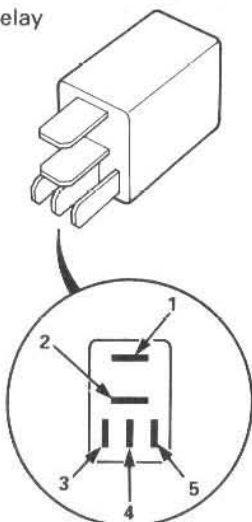
Five-terminal type A:

- Check for continuity between the terminals.
 - There should be continuity between the No. 1 and No. 2 terminals when power and ground are connected to the No. 3 and No. 5 terminals.
 - There should be continuity between the No. 1 and No. 4 terminals when power is disconnected.

Terminal	1	2	4
Power (No. 3 – No. 5)			
Disconnected	○	○	○
Connected	○	○	



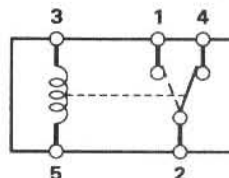
- Door lock relay



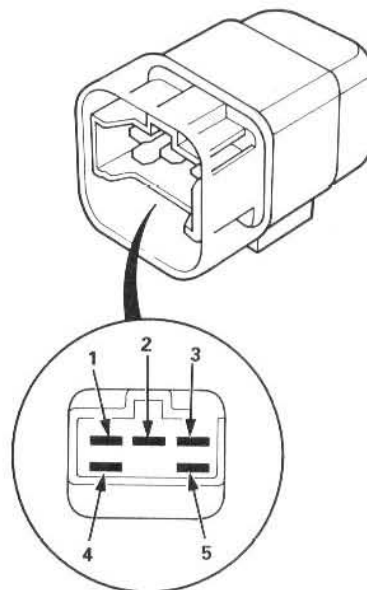
Five-terminal type B:

- Check for continuity between the terminals.
 - There should be continuity between the No. 1 and No. 2 terminals when power and ground are connected to the No. 3 and No. 5 terminals.
 - There should be continuity between the No. 2 and No. 4 terminals when power is disconnected.

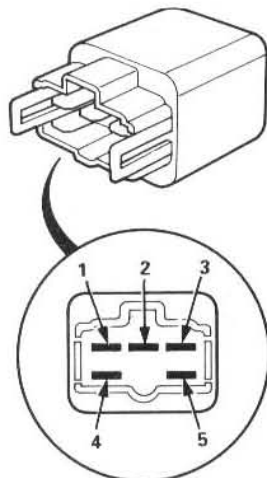
Terminal	1	2	4
Power (No. 3 – No. 5)			
Disconnected		○	○
Connected	○	○	



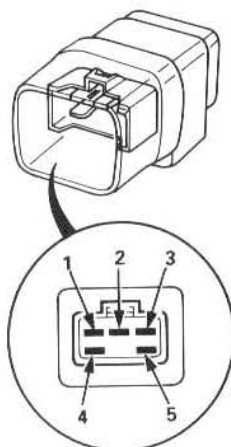
- Shift lock relay



- Moonroof open relay
- Moonroof close relay



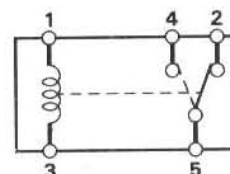
- Windshield wiper intermittent relay



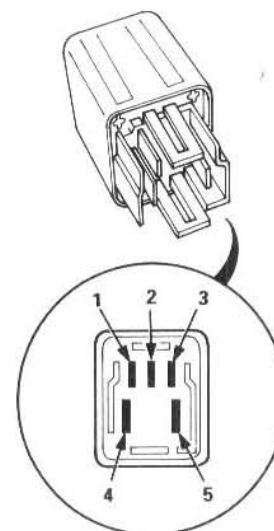
Five-terminal type C:

1. Check for continuity between the terminals.
 - There should be continuity between the No. 4 and No. 5 terminals when power and ground are connected to the No. 1 and No. 3 terminals.
 - There should be continuity between the No. 2 and No. 5 terminals when power is disconnected.

Terminal	2	4	5
Power (No. 1 – No. 3)			
Disconnected	○	○	○
Connected		○	○



- Dimmer relay



Ignition Switch

Test

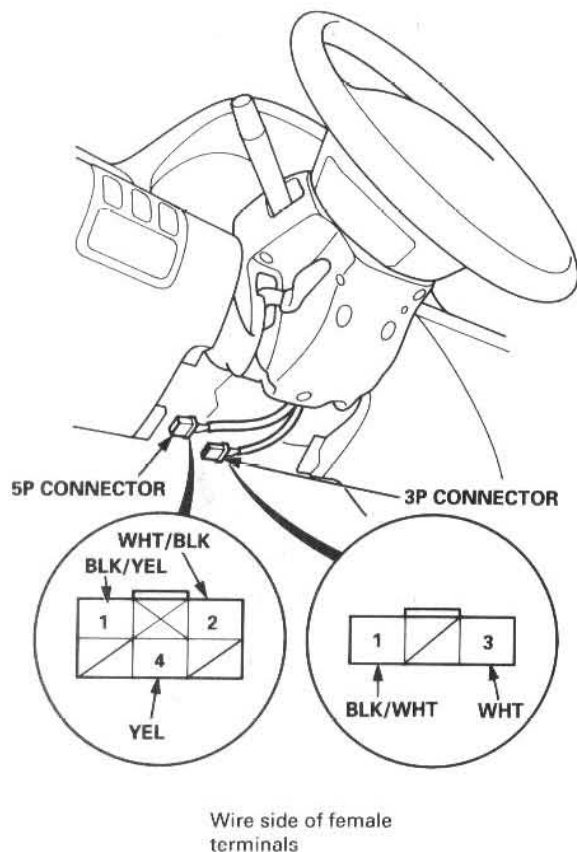
SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.
2. Disconnect the battery negative cable.
3. Remove the dashboard lower cover (see section 20).
4. Remove the door sill molding, left kick panel and access panel (see section 20).
5. Disconnect the 5P connector from the under-dash fuse/relay box and disconnect the 3P connector from the main wire harness.

6. Check for continuity between the terminals in each switch position according to the table.

Terminal Position	WHT/ BLK (ACC)	WHT (BAT)	BLK/ YEL (IG1)	YEL (IG2)	BLK/ WHT (ST)
O (LOCK)					
I (ACC)	○	○			
II (ON)	○	○	○	○	
III (START)		○	○		○

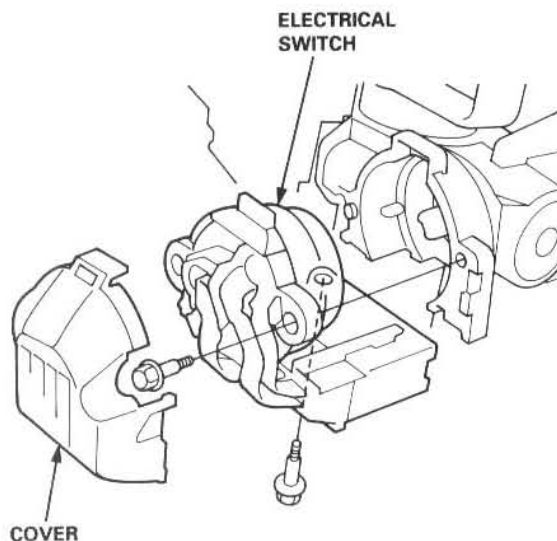
7. If the continuity checks do not agree with the table, replace the electrical switch.
8. After reconnecting the battery, enter the anti-theft code for the radio, then enter the customer's radio station presets.



Electrical Switch Replacement

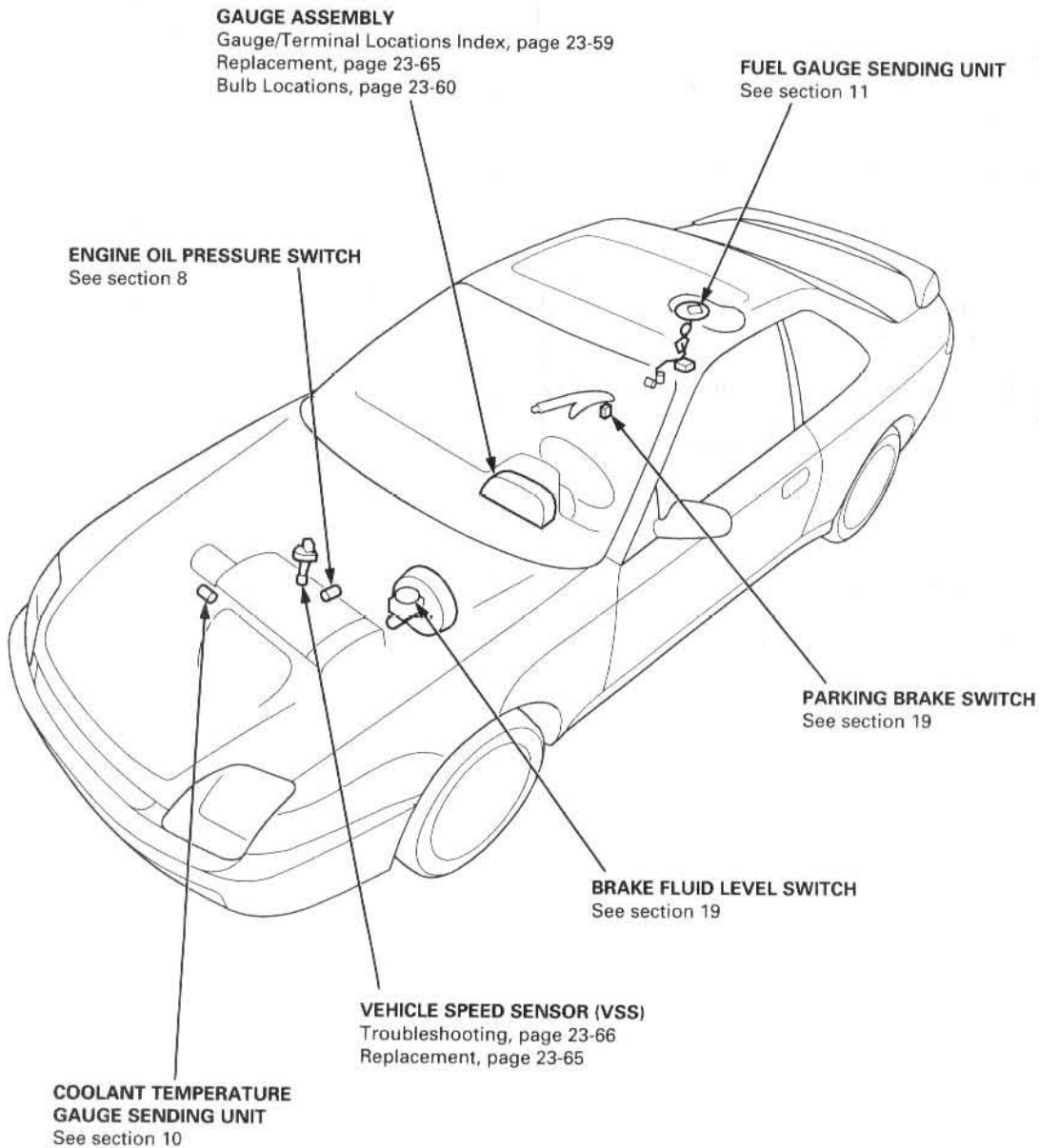
SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.
2. Disconnect the battery negative cable.
3. Remove the dashboard lower cover (see section 20).
4. Remove the door sill molding, left kick panel and access panel (see section 20).
5. Disconnect the 5P connector from the under-dash fuse/relay box, and disconnect the 3P connector from the main wire harness (see previous page).
6. Remove the steering column covers (see section 17).
7. Insert the ignition key, and turn it to "0".
8. Remove the two screws, and replace the electrical switch.
9. Install in the reverse order of removal.
10. After reconnecting the battery, enter the anti-theft code for the radio, then enter the customer's radio station presets.

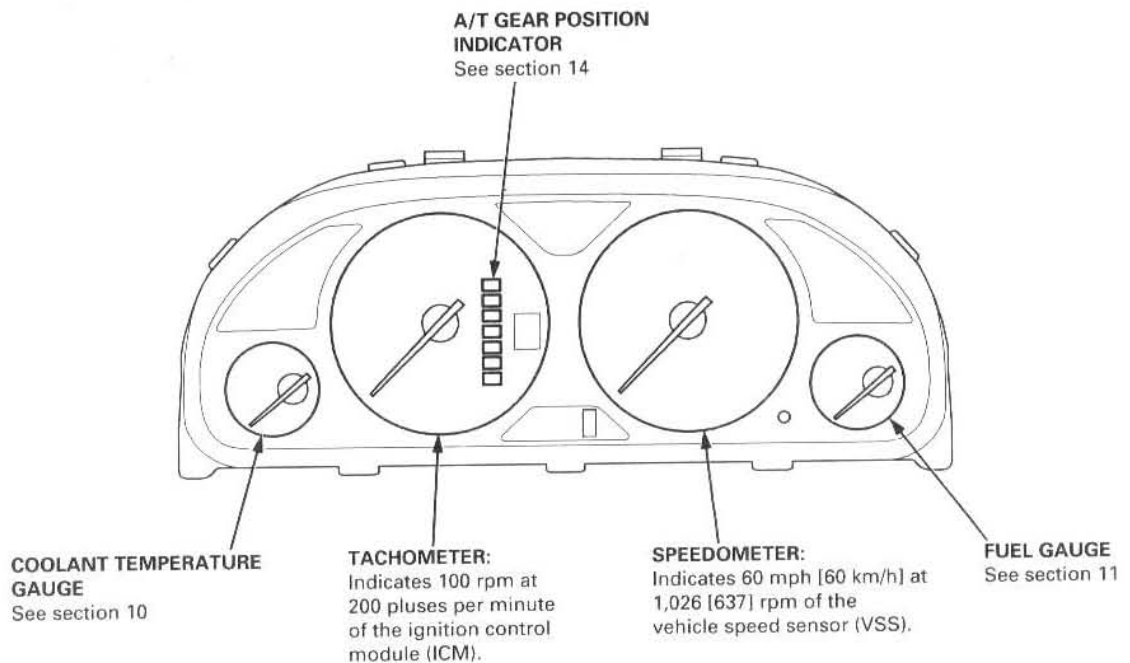
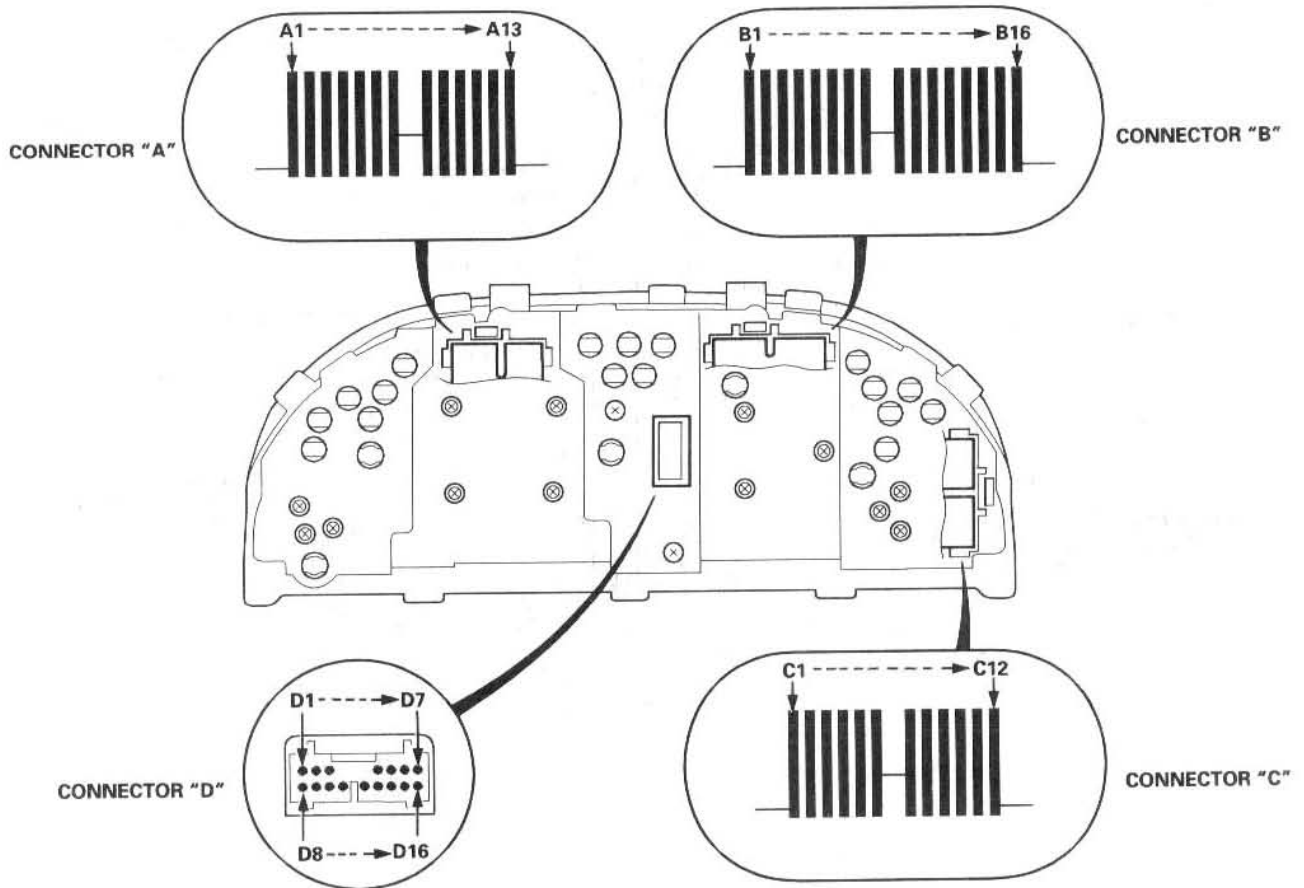


Gauge Assembly

Component Location Index

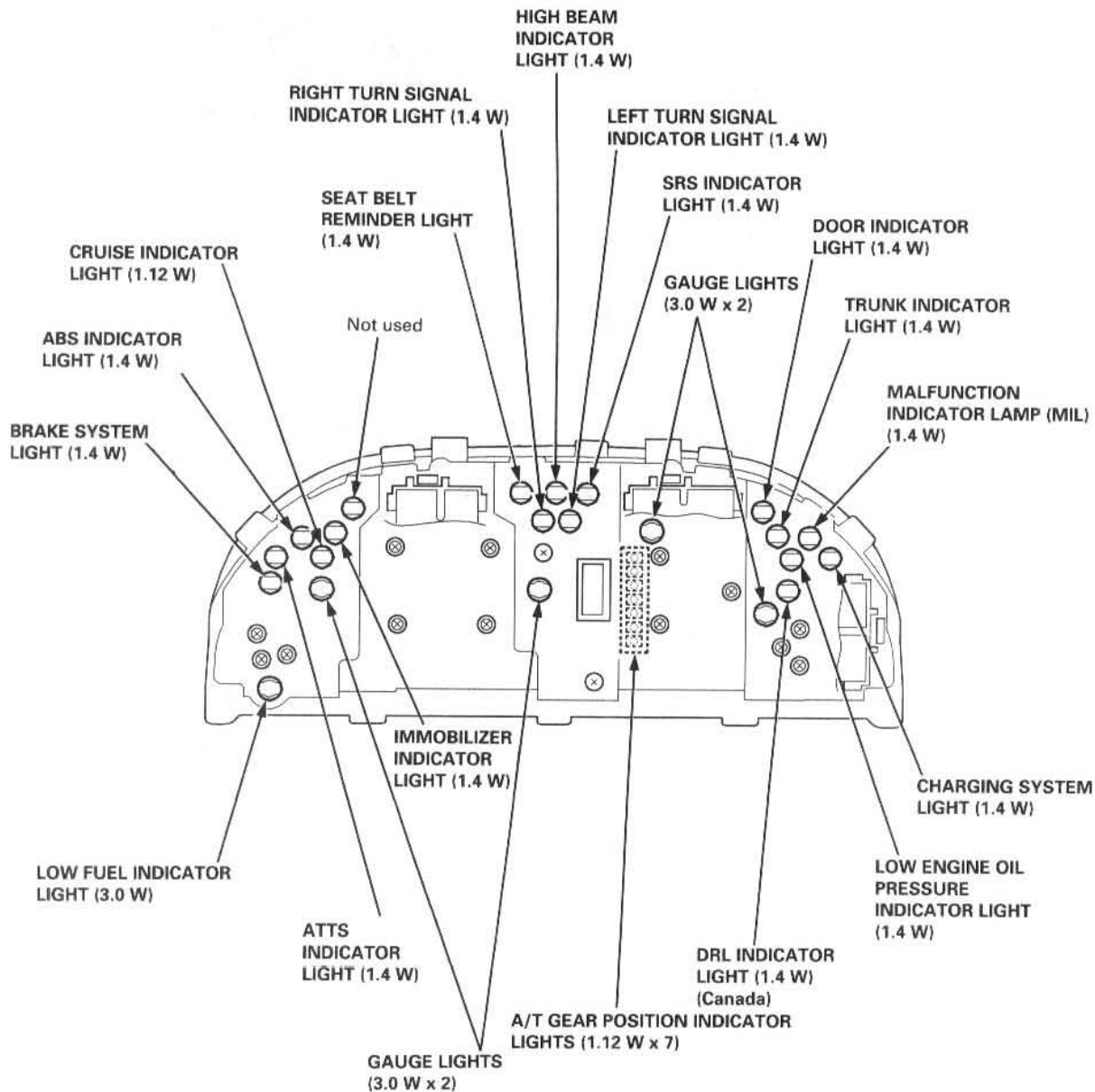


Gauge/Terminal Location Index



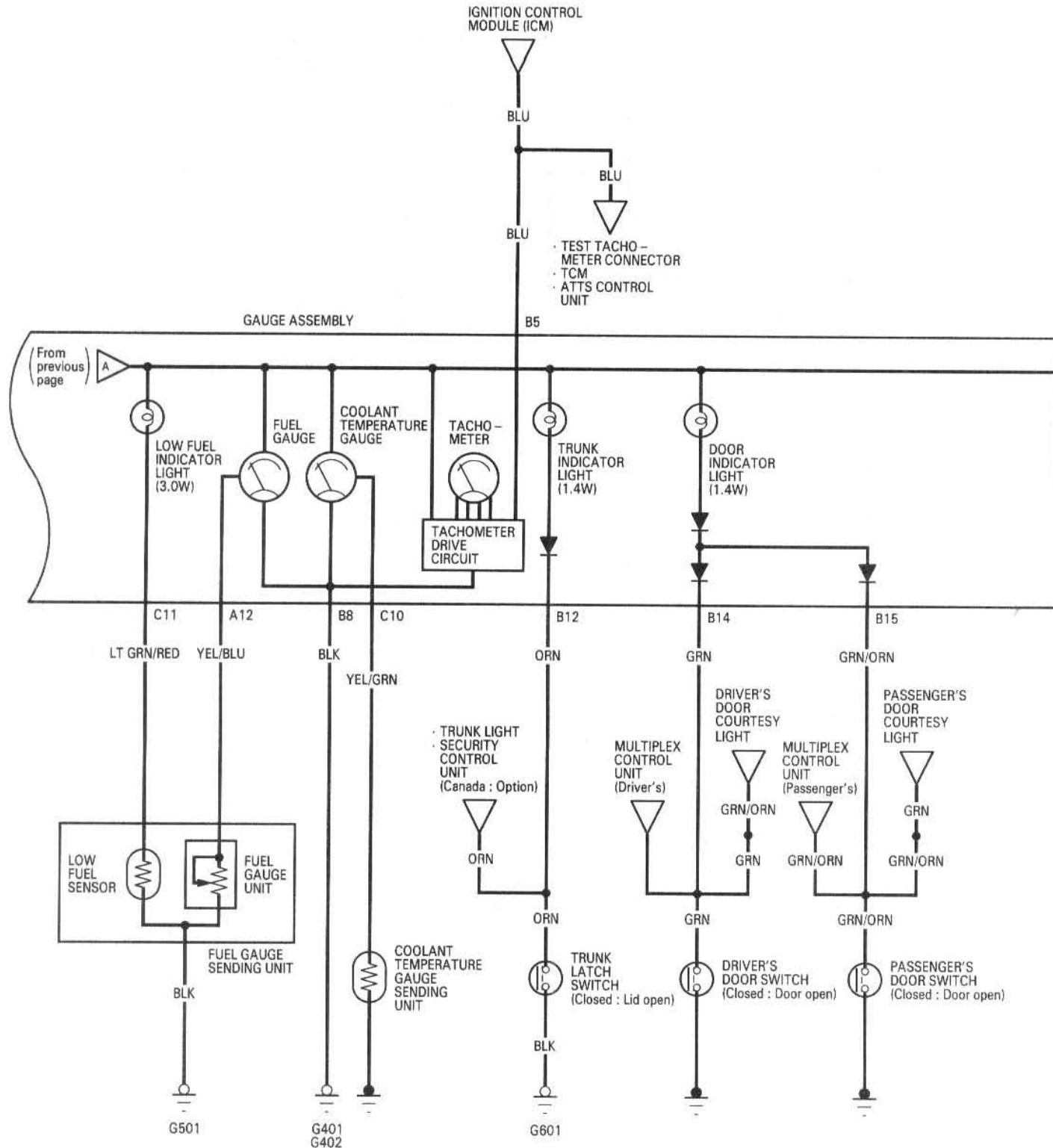
Gauge Assembly

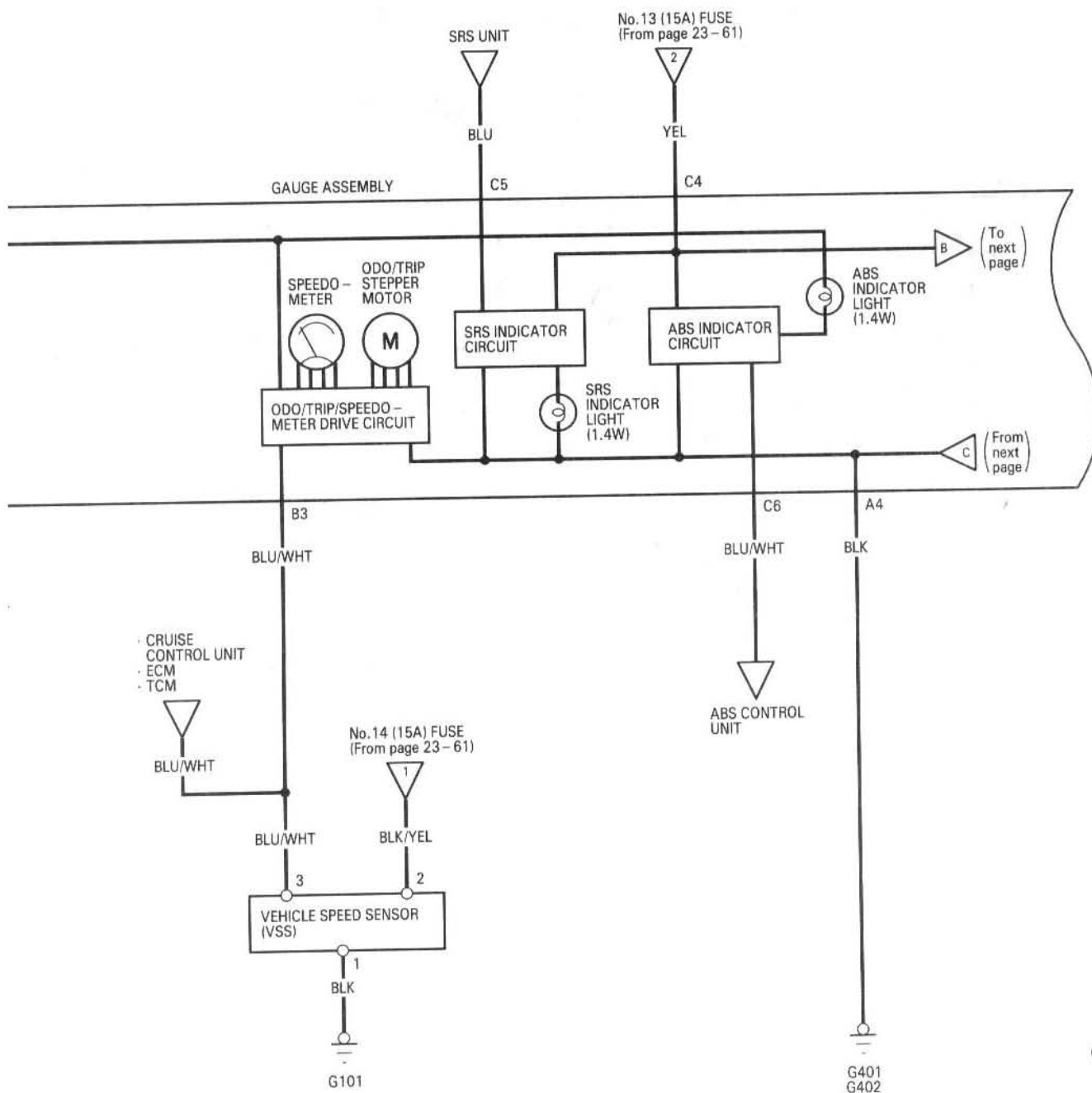
Bulb Locations



Gauge Assembly

Circuit Diagram (cont'd)

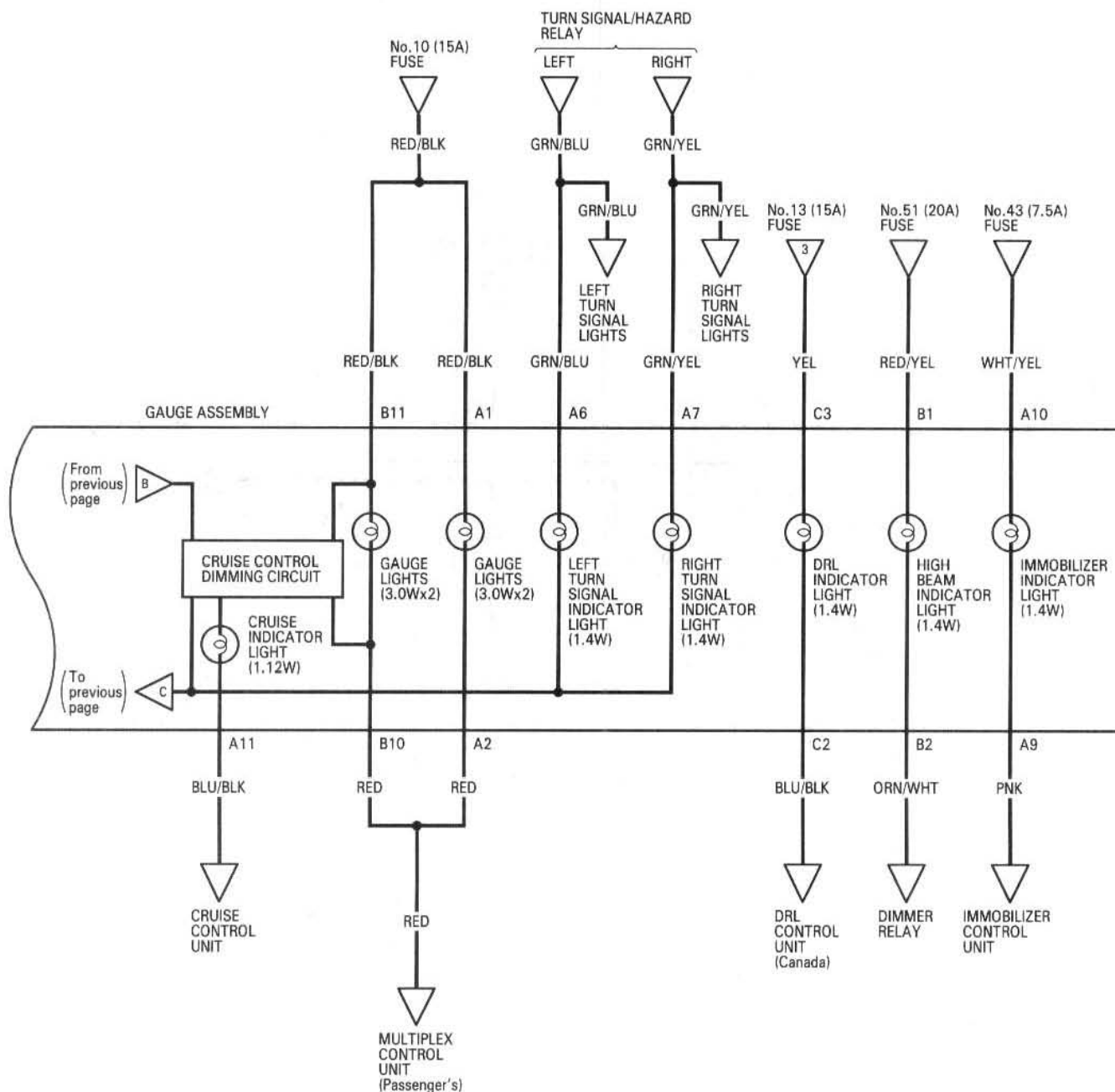




(cont'd)

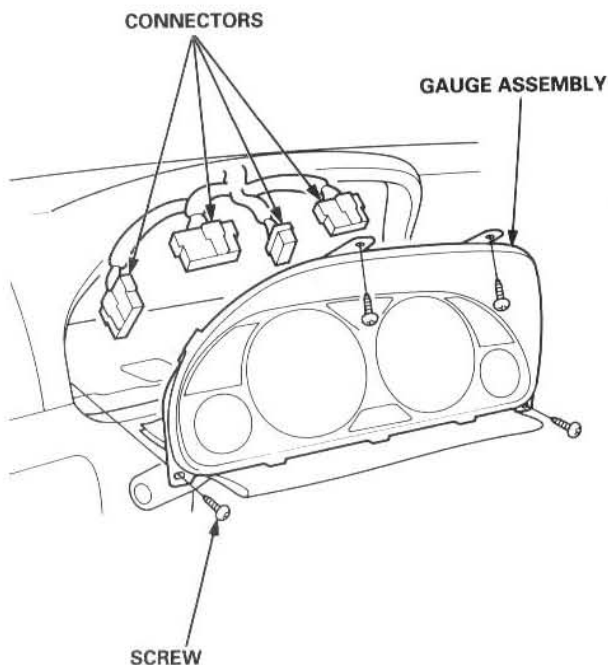
Gauge Assembly

Circuit Diagram (cont'd)



Replacement

1. Remove the instrument panel (see section 20).
2. Remove the screws from the gauge assembly, and spread a protective cloth on the upper column cover.
3. Disconnect the connectors, and remove the gauge assembly.

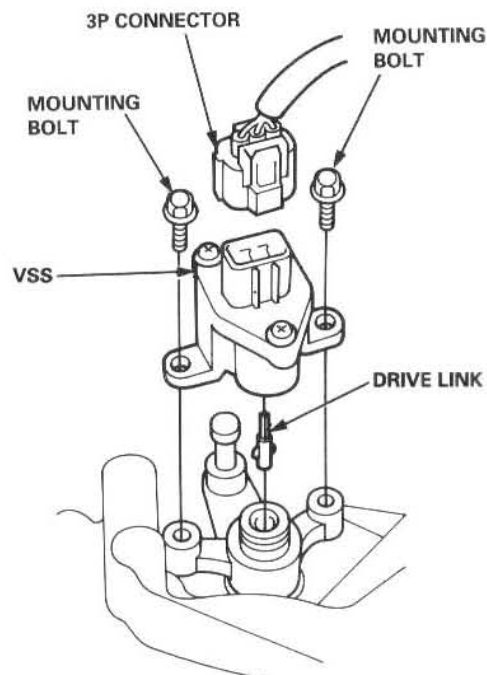


4. Install in the reverse order of removal.

Replacement

1. Disconnect the 3P connector from the vehicle speed sensor (VSS).

NOTE: The VSS drive link is a very small part; be careful not to lose it.



2. Remove the two mounting bolts, then remove the VSS.
3. Install in the reverse order of removal.

Vehicle Speed Sensor (VSS)

Troubleshooting

Before testing, inspect the No. 14 (15 A) fuse in the under-dash fuse/relay box.

Test the BLK wire:

1. Disconnect the 3P connector from the vehicle speed sensor (VSS).
2. Connect the test harness only to the engine wire harness.
3. Connect the RED test harness clip to the positive probe of an ohmmeter.
4. Check for continuity between the RED test harness clip and body ground.

Is there continuity?

NO

Repair open in the BLK wire between the VSS and G101.

YES

Test the BLK/YEL wire:

1. Connect the WHT test harness clip to the positive probe of a voltmeter, and connect the RED test harness clip to the negative probe.
2. Turn the ignition switch ON (II).

Is there battery voltage?

NO

Repair open in the BLK/YEL wire between the VSS and under-dash fuse/relay box.

YES

Test the BLU/WHT wire:

1. Disconnect the WHT test harness clip.
2. Connect the GRN test harness clip to the positive probe of a voltmeter.

Is there 5 V or more?

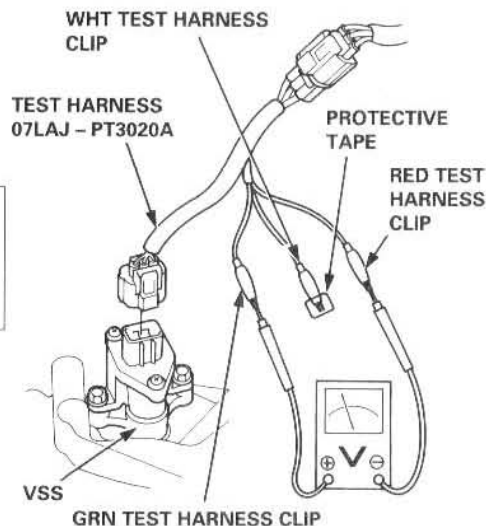
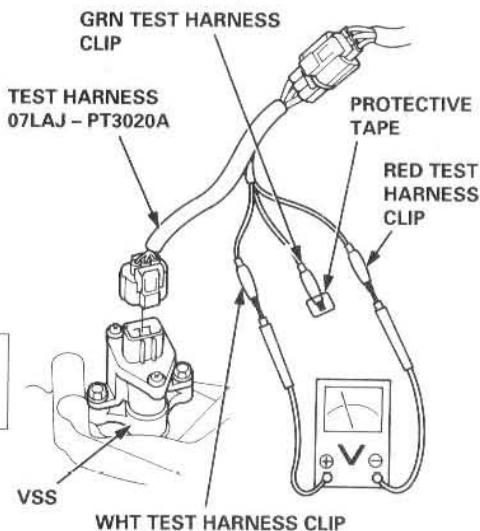
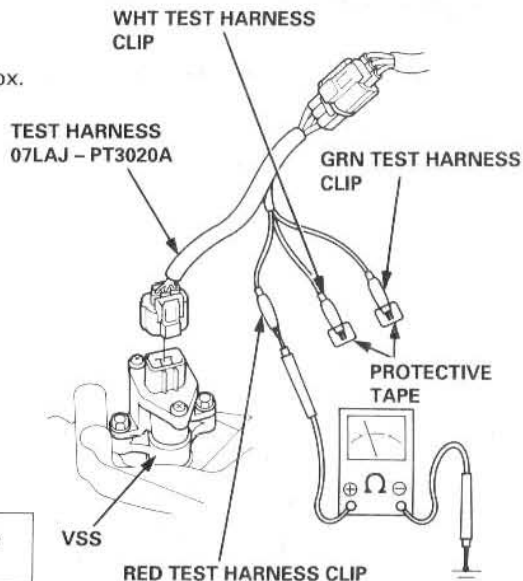
NO

Repair short in the BLU/WHT wire between the VSS and
— ECM.
— TCM.
— Cruise control unit.

YES



To next page



From previous page

A

Test the VSS:

1. Turn the ignition switch OFF.
2. Connect the other test harness connector to the VSS.
3. Raise the front of the vehicle and support it with safety stands.
4. Put the vehicle in neutral with the ignition switch ON (II).
5. Slowly rotate one wheel with the other wheel blocked.

Does voltage pulse from 0 to approx. 5 V or more?

NO

Replace the VSS.

YES

Test the Speedometer:

1. Disconnect the 16P connector "B" from the gauge assembly.
2. Touch a probe to the BLU/WHT wire, and connect it to body ground through a voltmeter.
3. Slowly rotate one wheel with the other wheel blocked.

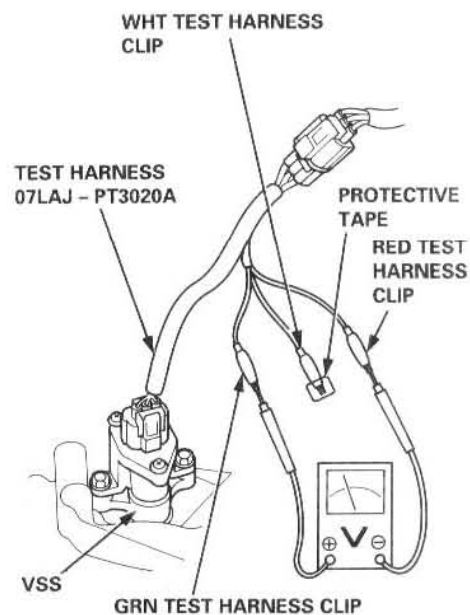
Does the meter indicate pulsing voltage?

NO

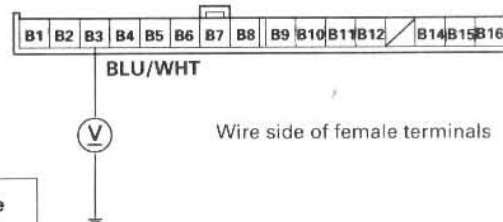
Repair open in the BLU/WHT wire between the VSS and the speedometer.

YES

Replace the speedometer.



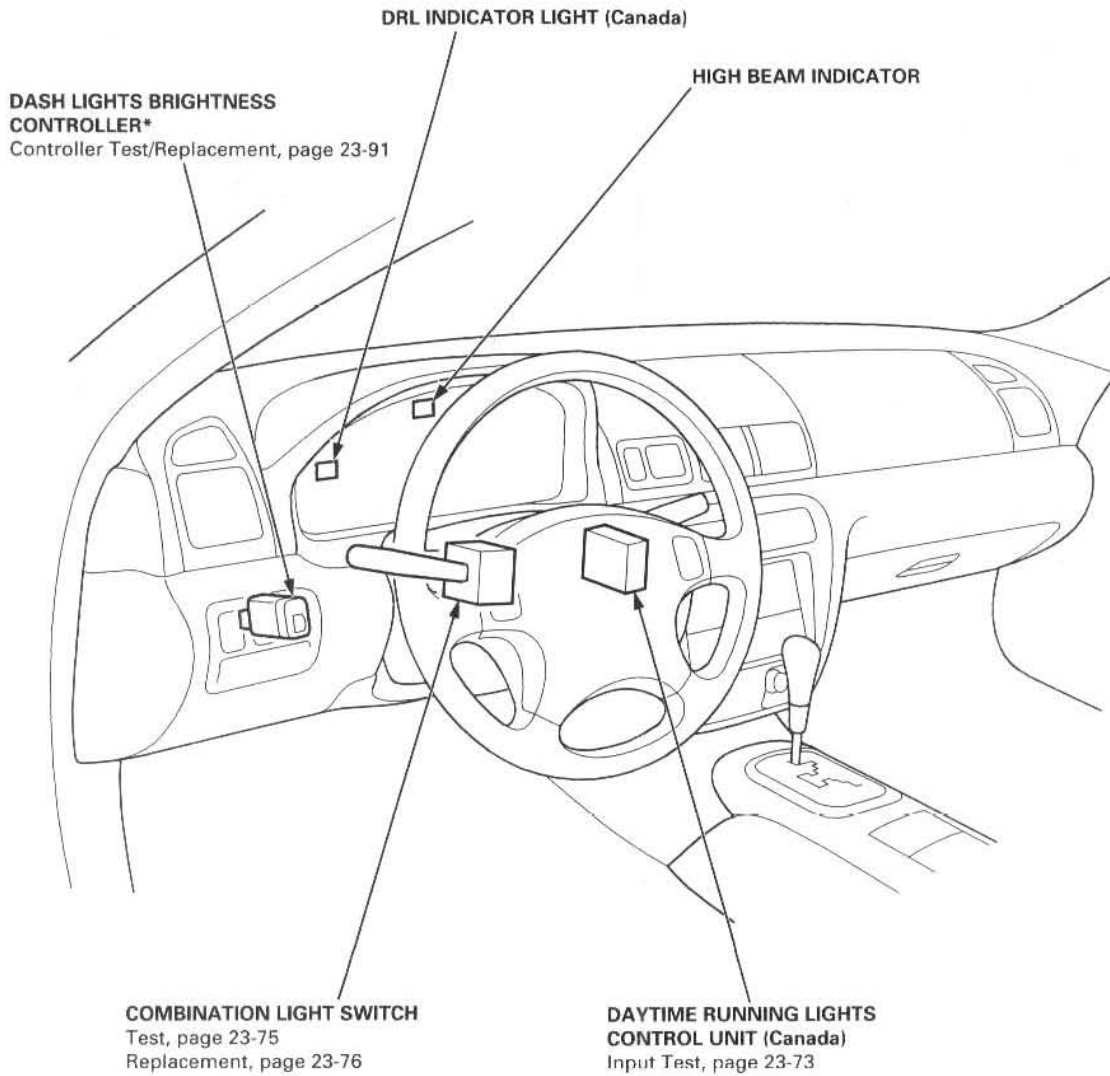
**DASHBOARD WIRE HARNESS
16P CONNECTOR "B"**



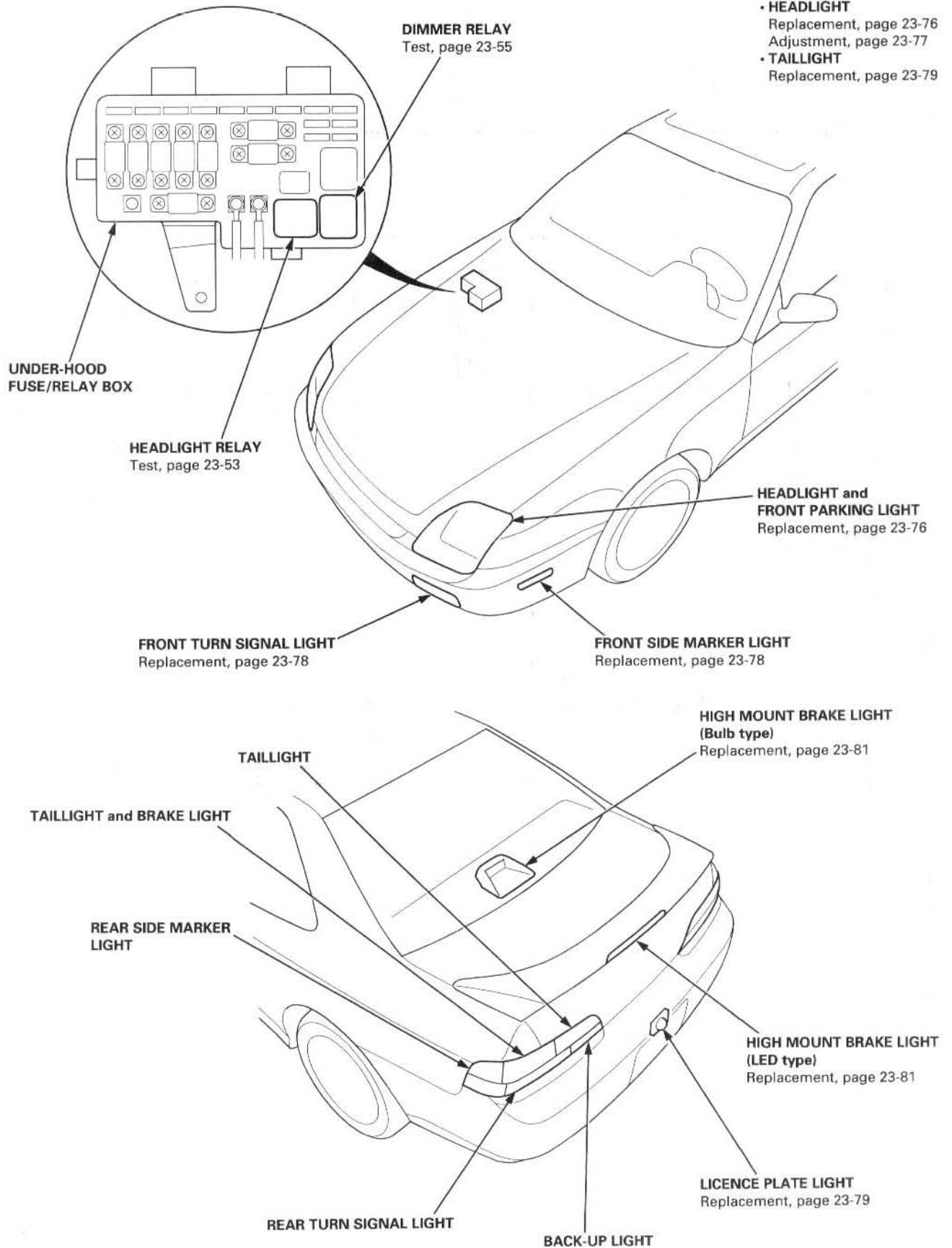
Wire side of female terminals

Lighting System

Component Location Index

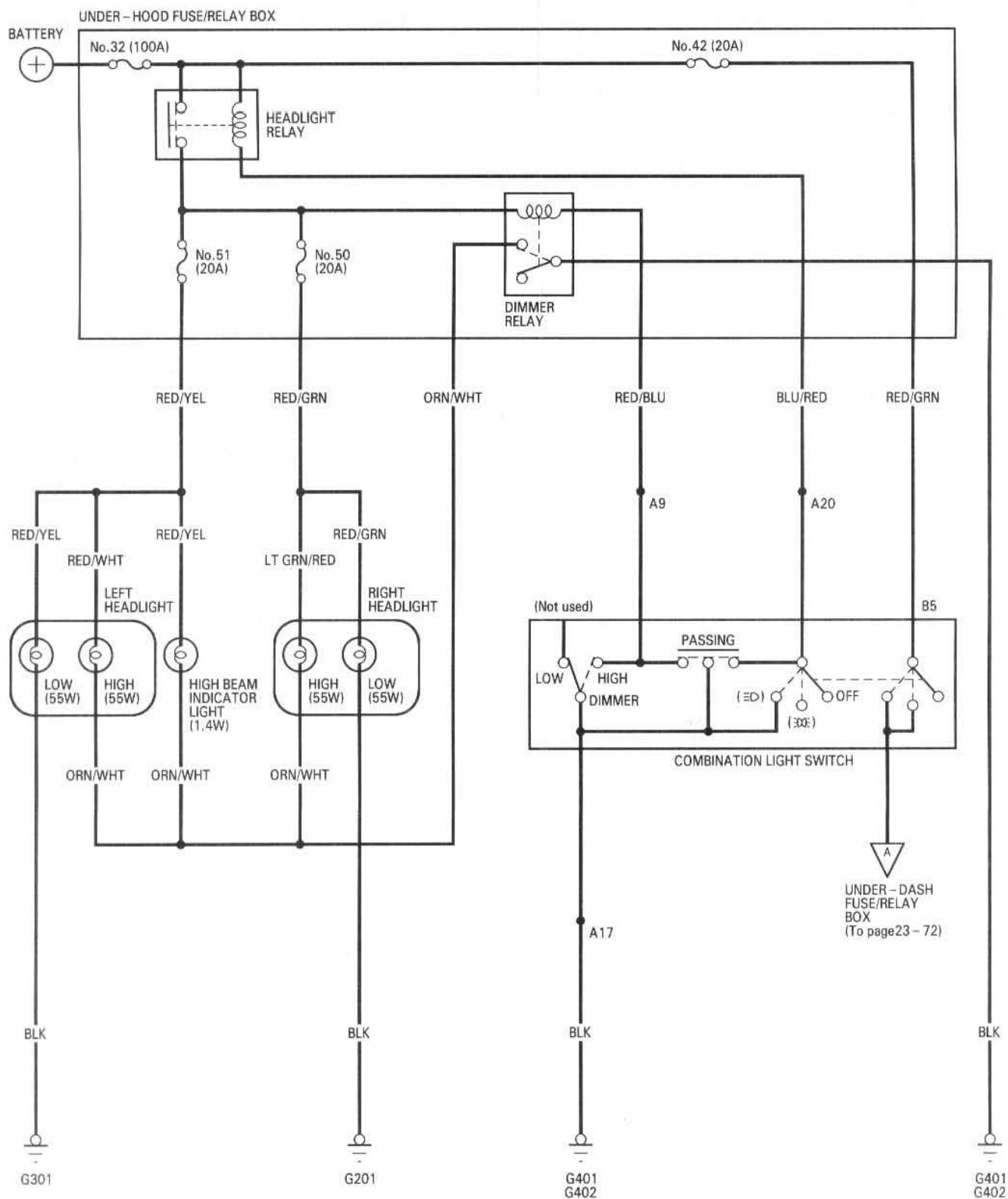


*: You can also test the switch by using the Multiplex Control System self-diagnosis function (mode 2). (See page 23-111.)

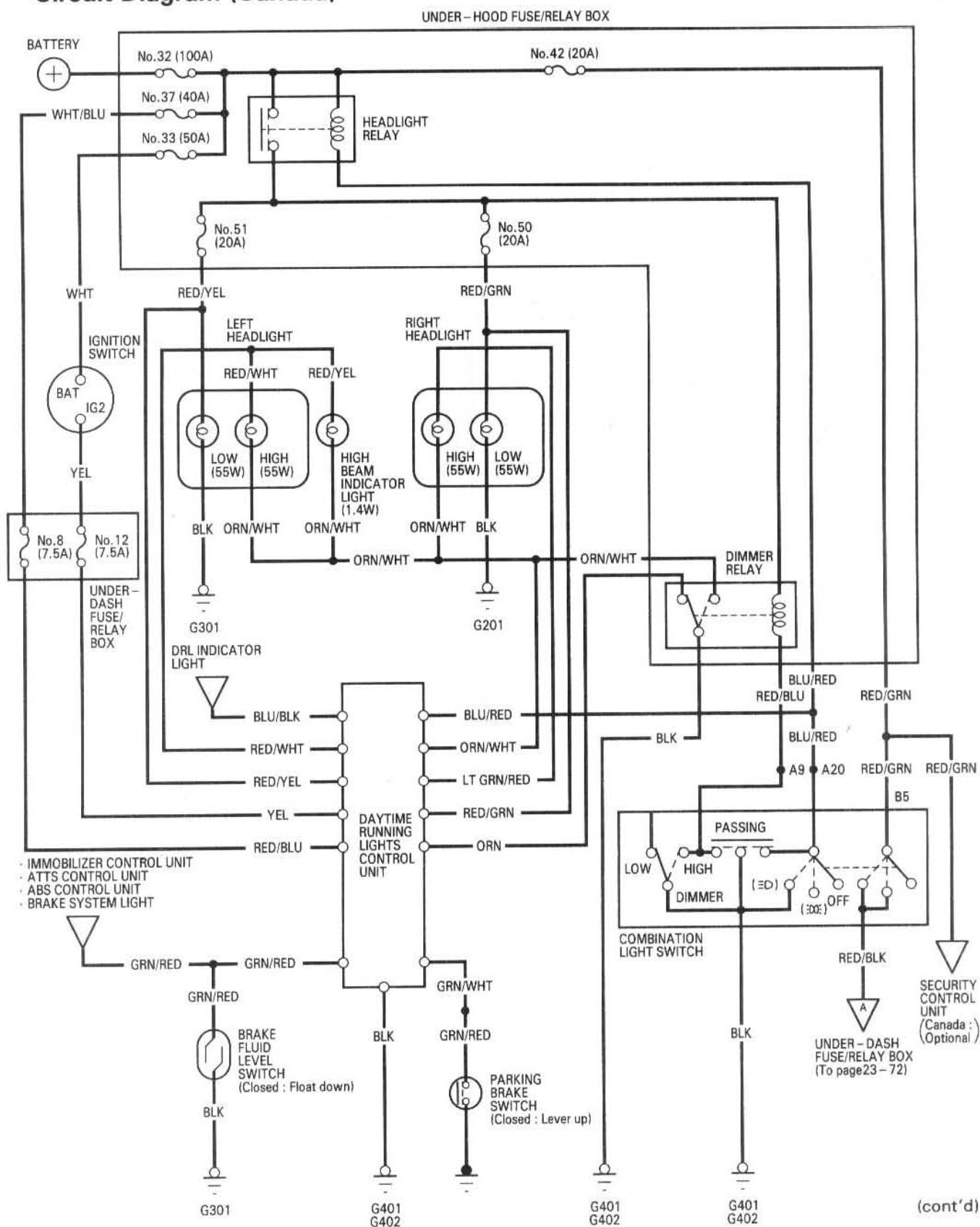


Lighting System

Circuit Diagram (USA)



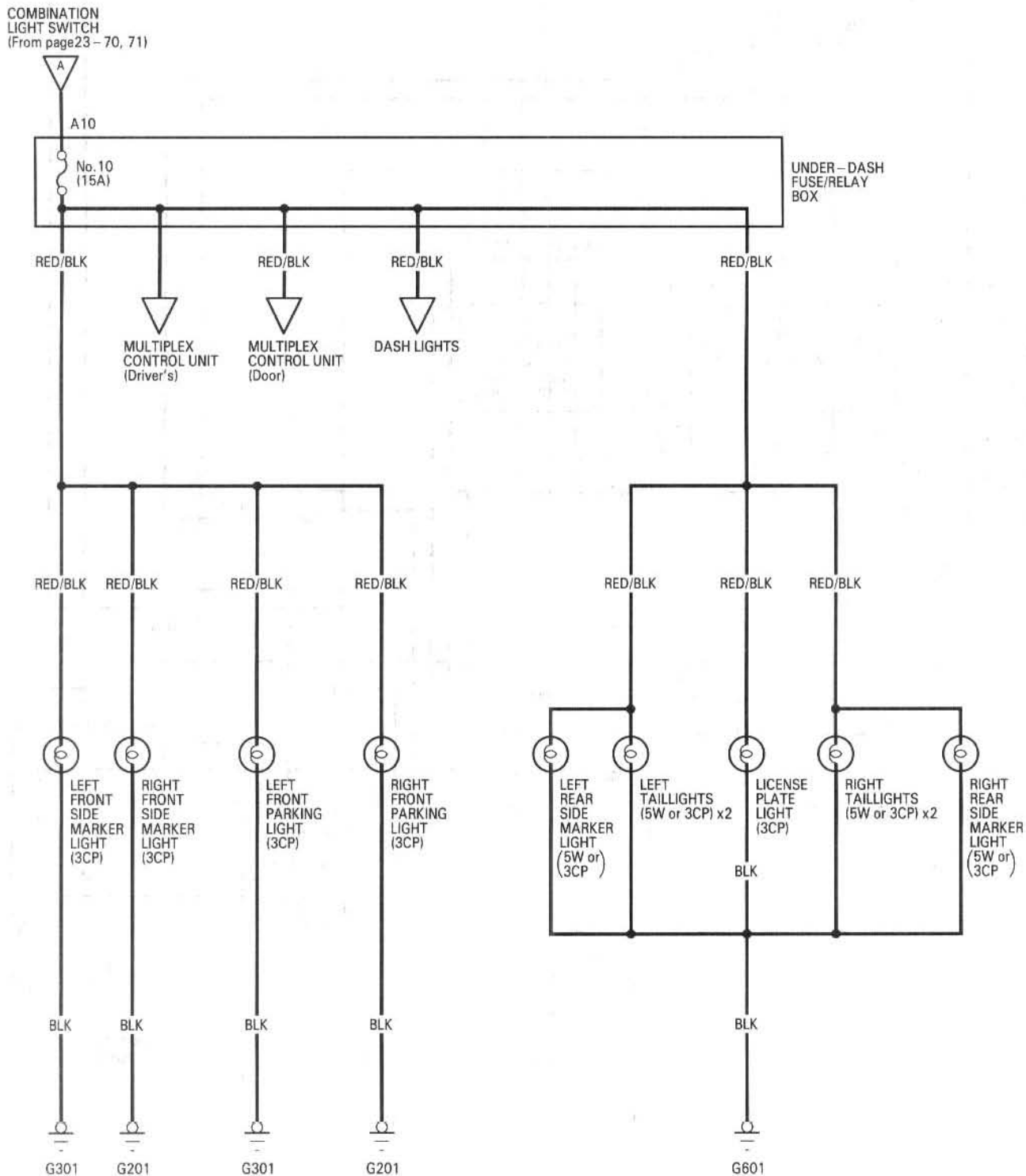
Circuit Diagram (Canada)



(cont'd)

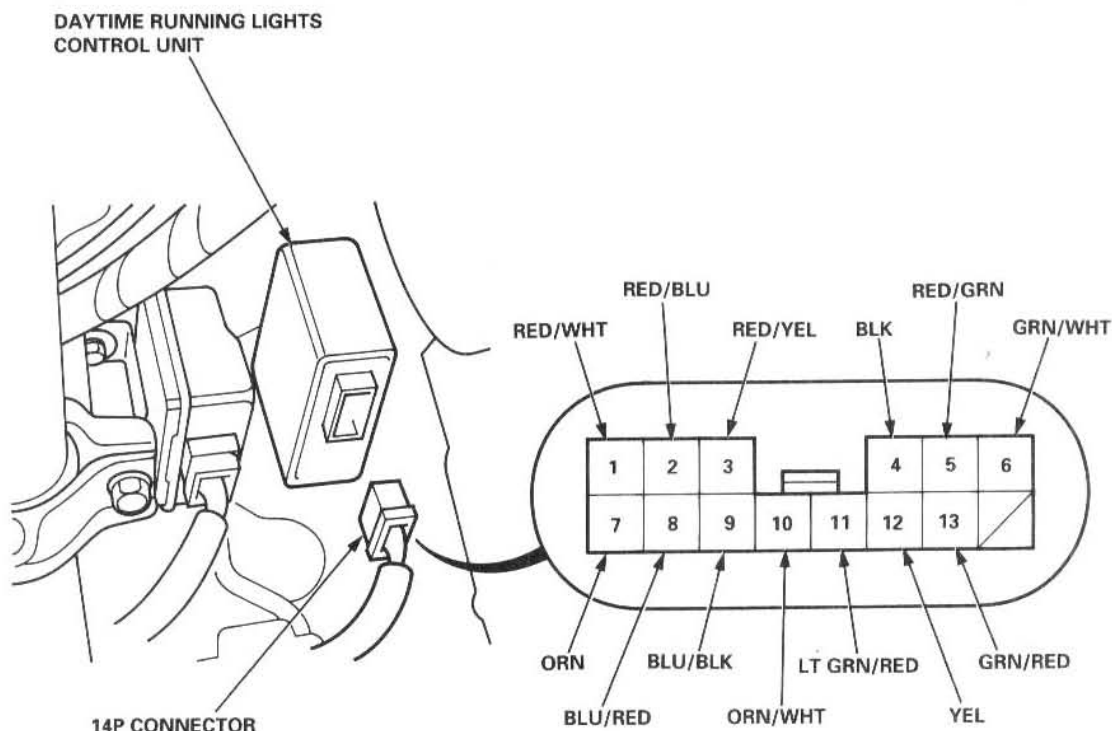
Lighting System

Circuit Diagram (cont'd)



Daytime Running Lights Control Unit Input Test (Canada)

1. Remove the dashboard lower cover (see section 20).
2. Disconnect the 14P connector from the control unit.
3. Inspect the connector and socket terminals to be sure they are all making good contact.
 - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
 - If the terminals look OK, make the following input tests at the connector.
 - If any test indicates a problem, find and correct the cause, then recheck the system.
 - If all the input tests prove OK, the control unit must be faulty; replace it.

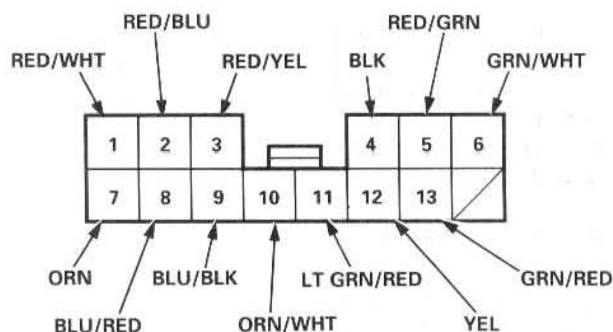


Wire side of female terminals

(cont'd)

Lighting System

Daytime Running Lights Control Unit Input Test (Canada) (cont'd)

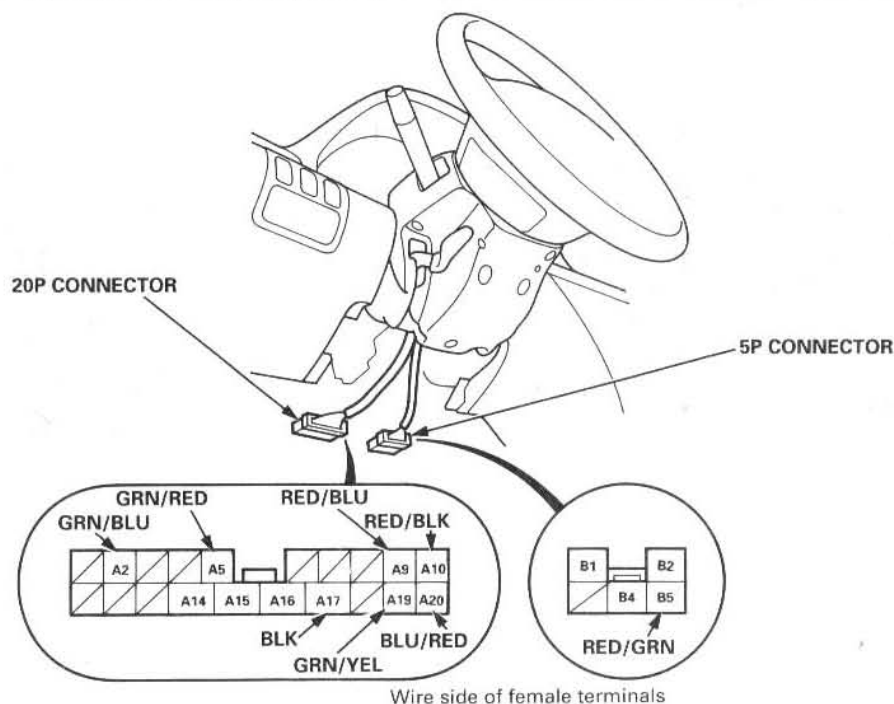


Wire side of female terminals

Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
4	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	<ul style="list-style-type: none"> • Poor ground (G401, G402). • An open in the wire
2	RED/BLU	Under all conditions	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> • Blown No. 8 (7.5 A) fuse in the under-dash fuse/relay box • An open in the wire
8	BLU/RED	Under all conditions	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> • Faulty headlight relay • An open in the wire
12	YEL	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> • Blown No. 12 (7.5 A) fuse in the under-dash fuse/relay box • An open in the wire
5	RED/GRN	Passing switch ON	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> • Faulty passing switch • Faulty dimmer relay • Faulty headlight relay • Blown No. 50 (20 A) fuse in the under-hood fuse/relay box • Blown No. 51 (20 A) fuse in the under-hood fuse/relay box • An open in the wire
3	RED/YEL			
10	ORN/WHT	Passing switch ON	Check for continuity to ground: There should be continuity.	<ul style="list-style-type: none"> • Faulty combination light switch • Faulty dimmer relay • An open in the wire
7	ORN	Combination light switch OFF		
1	RED/WHT	Combination light switch OFF	Check for continuity between the terminals: There should be continuity.	<ul style="list-style-type: none"> • Blown headlight bulb (high beam) • An open in the wire
11	LT GRN/RED			
9	BLU/BLK	Ignition switch ON (II)	Connect to ground: The DRL indicator light should come on.	<ul style="list-style-type: none"> • Blown bulb • An open in the wire
13	GRN/RED	Ignition switch ON (II)	Connect to ground: The brake system light should come on.	<ul style="list-style-type: none"> • Blown bulb • An open in the wire
6	GRN/WHT	Parking brake lever up	Check for continuity to ground: There should be continuity.	<ul style="list-style-type: none"> • Faulty parking brake switch • An open in the wire

Combination Light Switch Test

1. Remove the dashboard lower cover (see section 20).
2. Disconnect the 20P connector from the under-dash fuse/relay box, and disconnect the 5P connector from the main wire harness.
3. Inspect the connector terminals to be sure they are all making good contact.
 - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
 - If the terminals look OK, check for continuity between them in each switch position according to the table. If there is no continuity between any of them, check for continuity in the switch harness.
 - If there is continuity in the switch harness, replace the combination light switch.
 - If there is no continuity in the switch harness, repair the harness or replace the combination light switch.



Lighting switch:

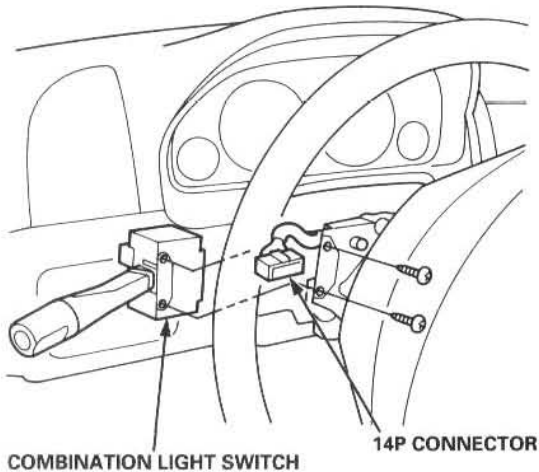
Terminal		A9	A20	A17	B5	A10
Position						
Headlight switch	OFF					
	⏏				○ — ○	
	⏏		○ — ○	○ — ○	○ — ○	○ — ○
		○ — ○	○ — ○	○ — ○	○ — ○	○ — ○
Passing switch	OFF					
	ON	○ — ○	○ — ○	○ — ○		

Turn signal switch:

Terminal		A5	A2	A19
Position				
LEFT	○ — ▶ — ○			
NEUTRAL				
RIGHT	○ — ▶ — ○			

Combination Light Switch Replacement

1. Remove the steering column covers (see section 17).
2. Disconnect the 14P connector from the combination light switch, then remove the two screws and the switch.

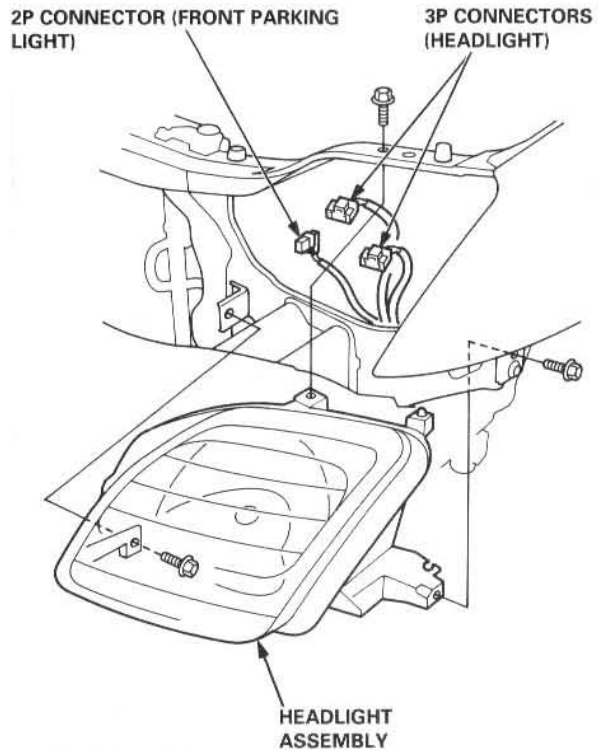


3. Install the combination light switch in the reverse order of removal.

Replacement

CAUTION: Halogen headlights become very hot in use; do not touch them or the attaching hardware immediately after they have been turned off.

1. Remove the front bumper and front bumper upper beam (see section 20).
2. Disconnect the connectors.
3. Remove the three mounting bolts, then remove the headlight assembly.



HEADLIGHT: 55 W x 2
FRONT PARKING LIGHT: 5 W

4. Install the headlight in the reverse order of removal.
5. After replacement, adjust the headlights to local requirements.

Adjustment

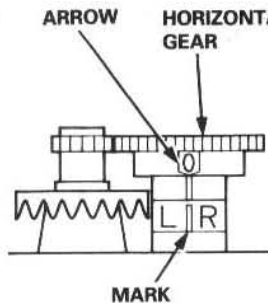
Before adjusting the headlights:

- Park the vehicle on level ground.
- Make sure the fuel tank is full.
- The driver or someone who weighs the same should sit in the driver's seat.
- Load the trunk with the items you usually carry.
- Push down on the front and rear bumpers several times to make sure the vehicle is sitting normally.

CAUTION: Halogen headlights become very hot in use; do not touch them or the attaching hardware immediately after they have been turned off.

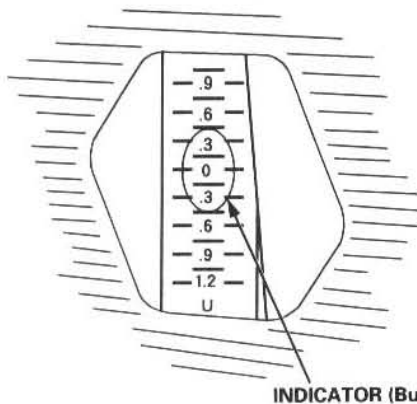
1. Open the hood.
2. Check the horizontal adjustment indicator. The mark on the horizontal indicator gear should be aligned with the mark on the horizontal indicator.

NOTE: The illustration shows the left side adjuster.



3. Check the vertical adjustment indicator. The bubble should be centered underneath the longest scribe mark on the gauge.

VERTICAL INDICATOR:



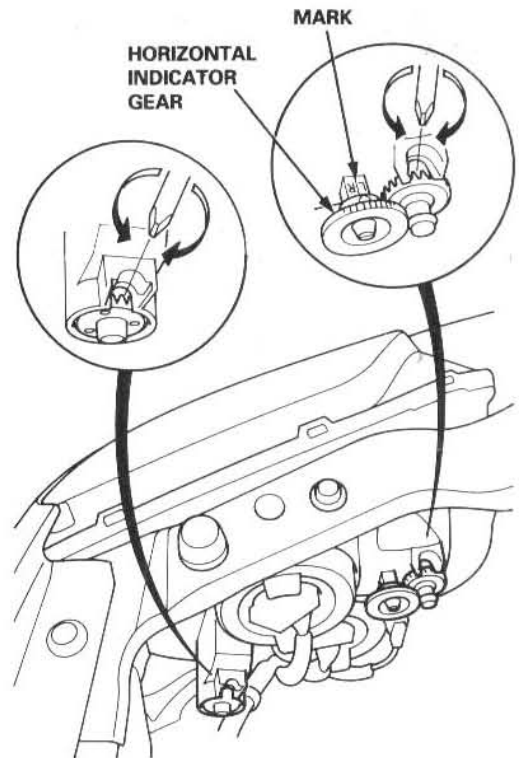
4. If either indicator is not aligned with its "0" mark as described above, an adjustment can be made by using a Phillips screwdriver.

5. Adjust the headlights to local requirements by turning the adjusters.

6. After headlight replacement, it may be necessary to readjust the horizontal indicator gear.

- First install the headlight, and adjust its horizontal and vertical aimings according to local requirements.
- Then check that the arrow on the horizontal indicator gear is aligned with the mark on the horizontal indicator.
- If they are not aligned, remove the screw, adjust the indicator gear, and retighten the screw.

NOTE: As the outer lenses are made of an acrylic-coated, polycarbonated material, do not cover the headlights when they are turned on.

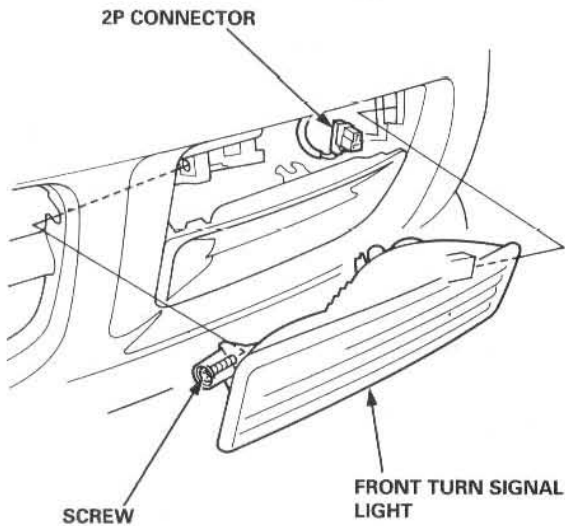


Front Turn Signal Light

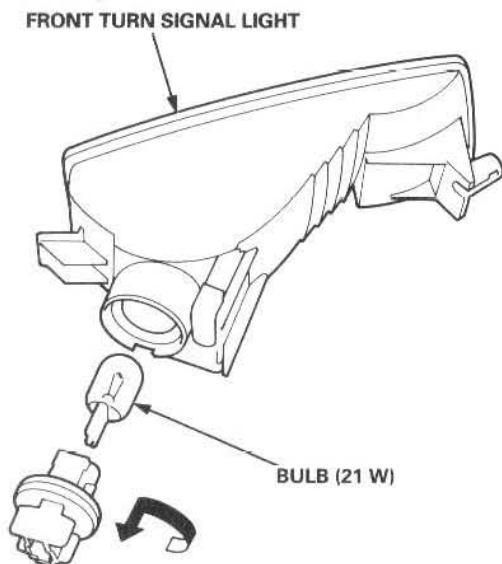
Front Side Marker Light

Replacement

1. Remove the screw, and pull the front turn signal light assembly out of the front bumper.



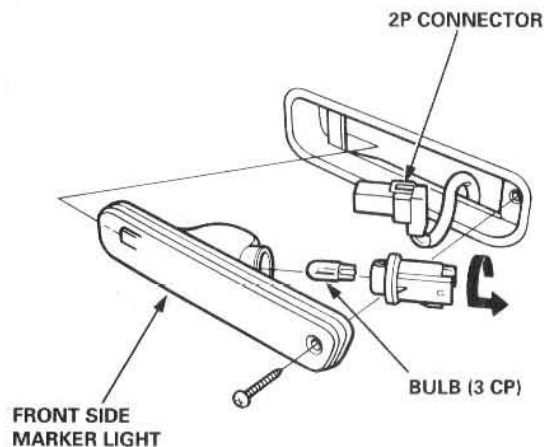
2. Disconnect the 2P connector from the front turn signal light.
3. Turn the bulb socket 45° counterclockwise, remove it from the light housing, then replace the bulb.



1. Remove the screw, and pull the front side marker light assembly out of the front bumper.

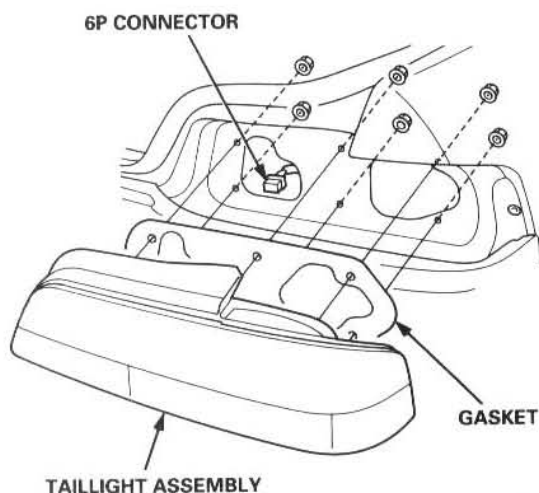
NOTE: Be careful not to damage the front bumper.

2. Disconnect the 2P connector from the front side marker light.
3. Turn the bulb socket 45° counterclockwise, remove it from the light housing, then replace the bulb.



Replacement

1. Open the trunk lid, and pull back the rear trim panel.
2. Disconnect the 6P connector from the taillight assembly.
3. Remove the six mounting nuts and the taillight assembly.



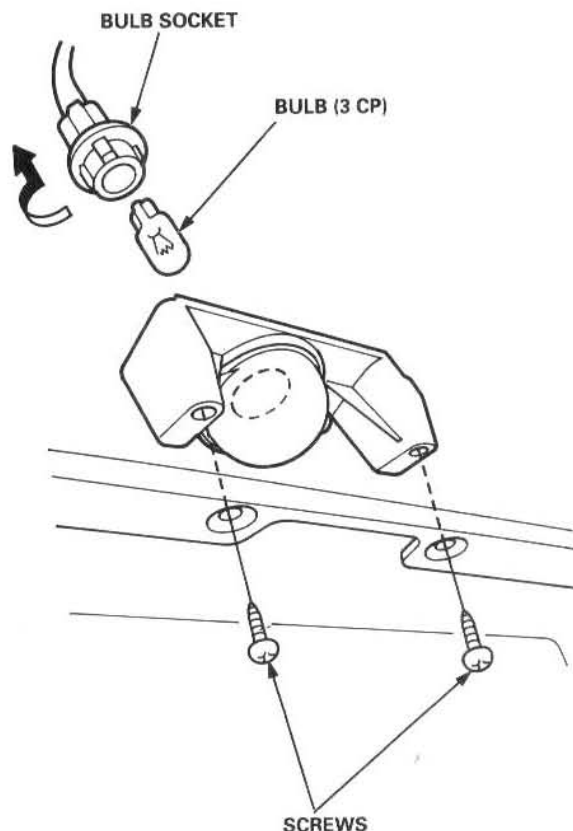
TAILLIGHT: 5 W or 3 CP
 BRAKE/TAILLIGHT: 21 W/5 W
 TURN SIGNAL LIGHT: 21 W
 BACK-UP LIGHT: 21 W
 SIDE MARKER LIGHT: 5 W or 3 CP

NOTE:

- Inspect the gasket; replace it if it is distorted or stays compressed.
- After installing them, run water over the lights to make sure they do not leak.

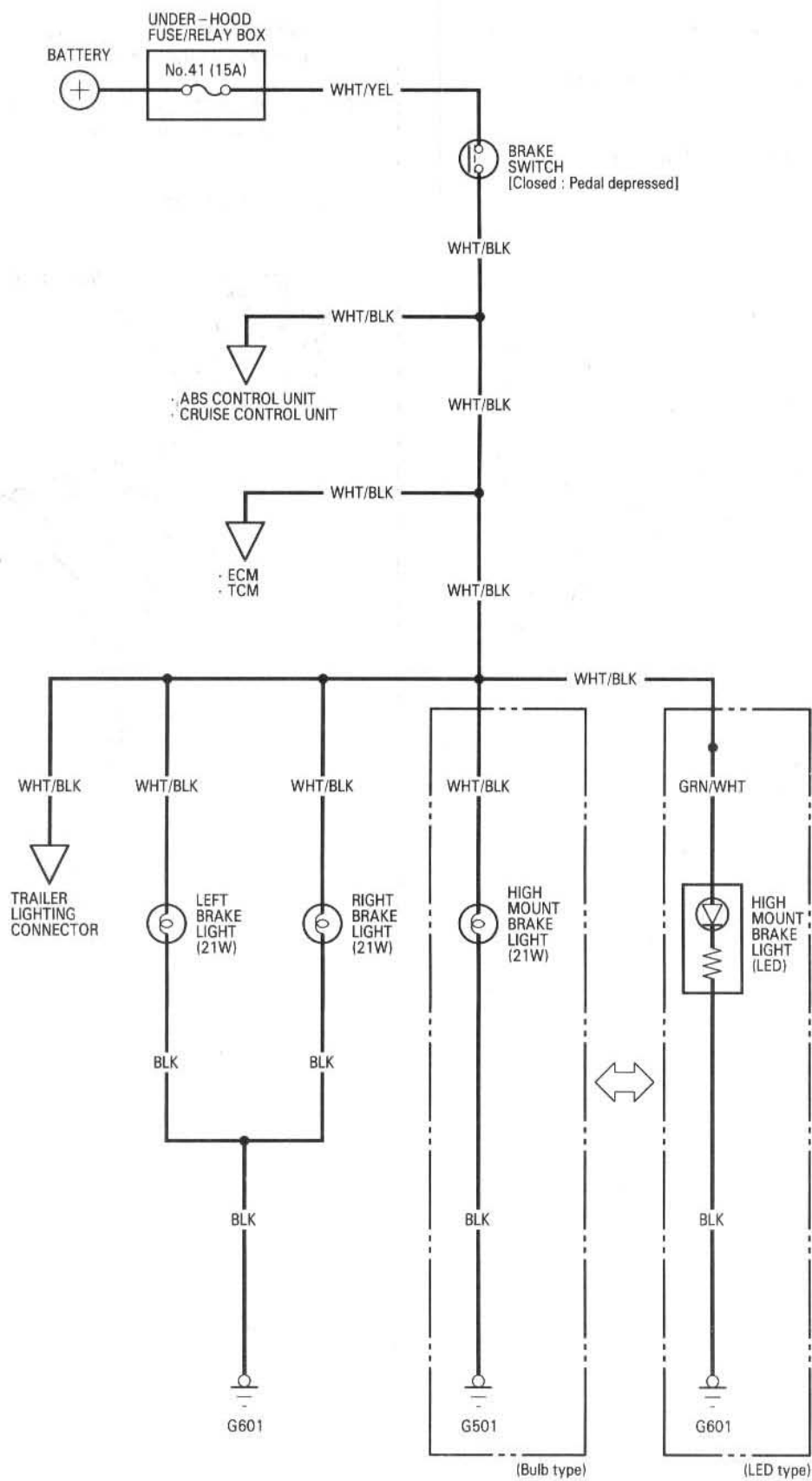
Replacement

1. Remove the two mounting screws, and pull the license plate light out.
2. Turn the bulb socket 45° counterclockwise, from the light housing, then replace the bulb.



Brake Lights

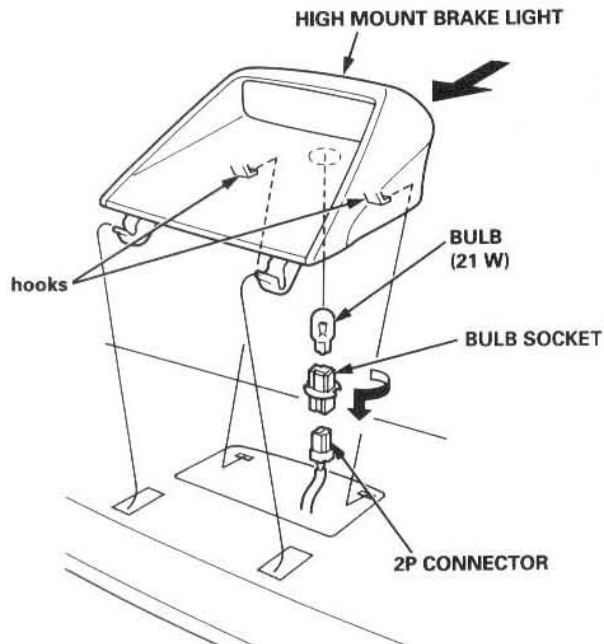
Circuit Diagram



High Mount Brake Light Replacement

Bulb type:

1. Open the trunk lid.
2. Fold down the rear seat, and disconnect the 2P connector from the high mount brake light.
3. First push the high mount brake light toward the rear window, then pull it up to release the hooks.

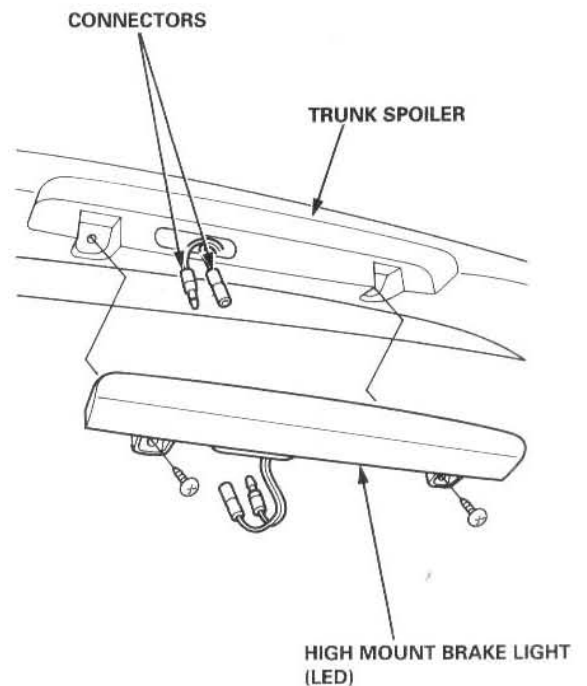


4. Clean the rear window glass, then install the light in the reverse order of removal.

LED type:

1. Remove the two screws from the high mount brake light.
2. Disconnect the connectors from the high mount brake light, and remove the light.

NOTE: Be careful not to damage the trunk spoiler and trunk.



3. Install the light in the reverse order of removal.

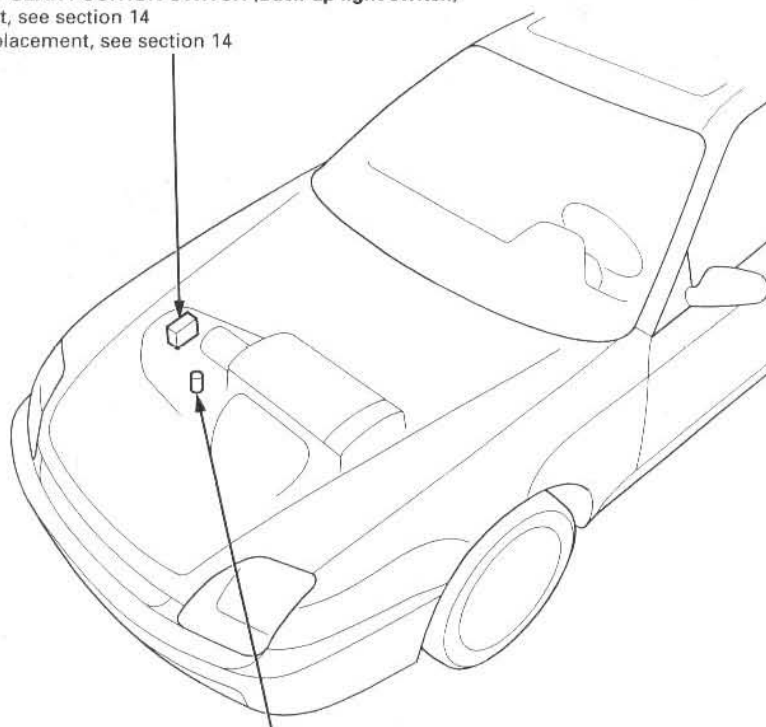
Back-up Lights

Component Location Index

A/T GEAR POSITION SWITCH (Back-up light switch)

Test, see section 14

Replacement, see section 14

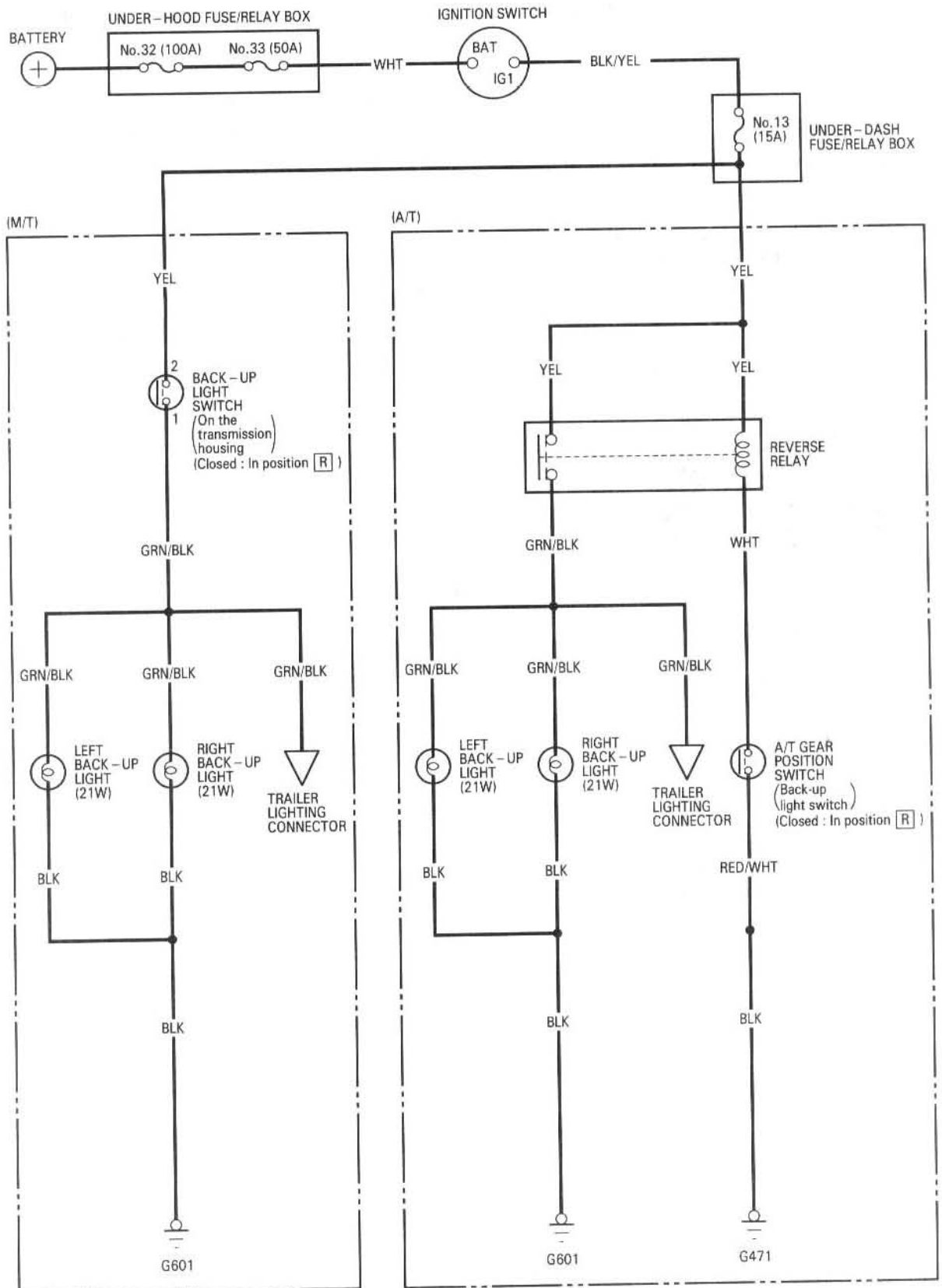


BACK-UP LIGHT SWITCH (M/T)

Test, page 23-84

Replacement, see section 13

Circuit Diagram



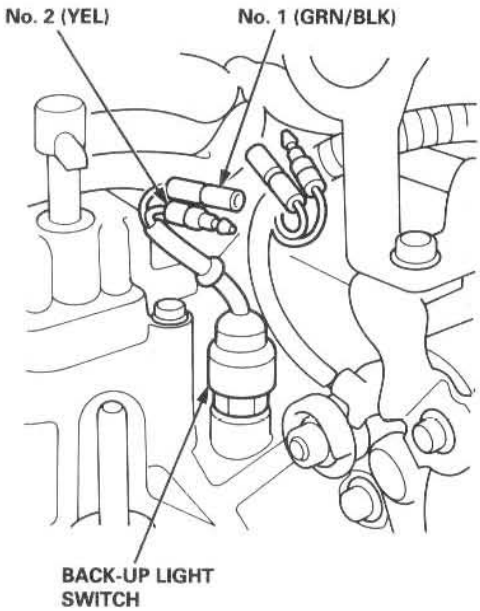
Back-up Lights

Switch Test (Manual Transmission)

NOTE: Check the No. 13 (15 A) fuse in the under-dash fuse/relay box before testing.

- 1. Test the back-up light switch by moving the shift lever to reverse and turning the ignition switch ON (II).
- 2. If the back-up lights do not go on, check the back-up light bulbs in the taillight assembly.
- 3. If the fuse and bulbs are OK, disconnect the connectors from the back-up light switch.

- If there is no continuity, replace the back-up light switch.
- If there is continuity, but the back-up lights do not go on, check for:
 - poor ground (G601).
 - an open in the YEL or GRN/BLK wire.

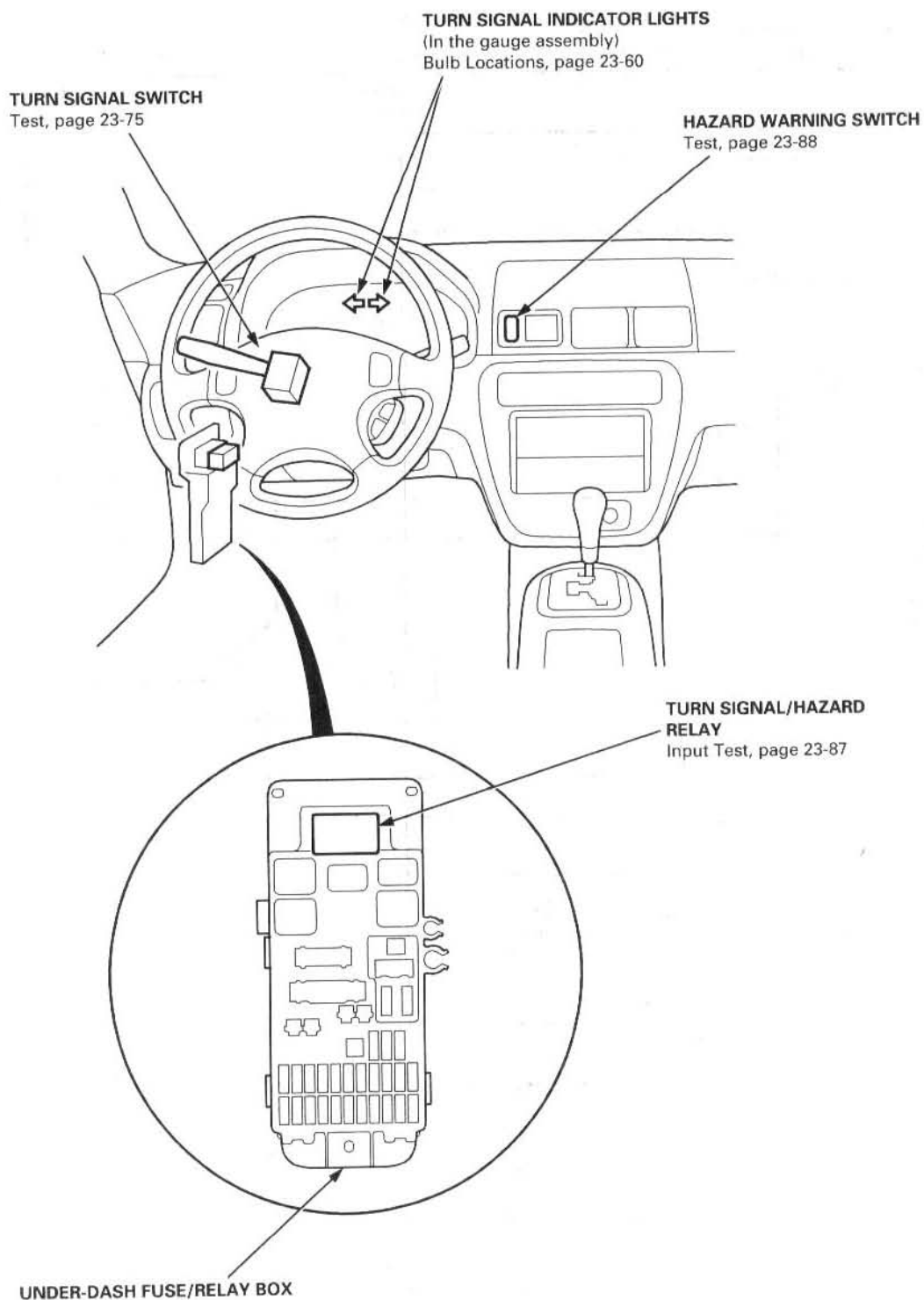


- 4. Check for continuity between the terminals in each switch position according to the table.

Terminal Position	1	2
REVERSE		
ALL EXCEPT REVERSE		

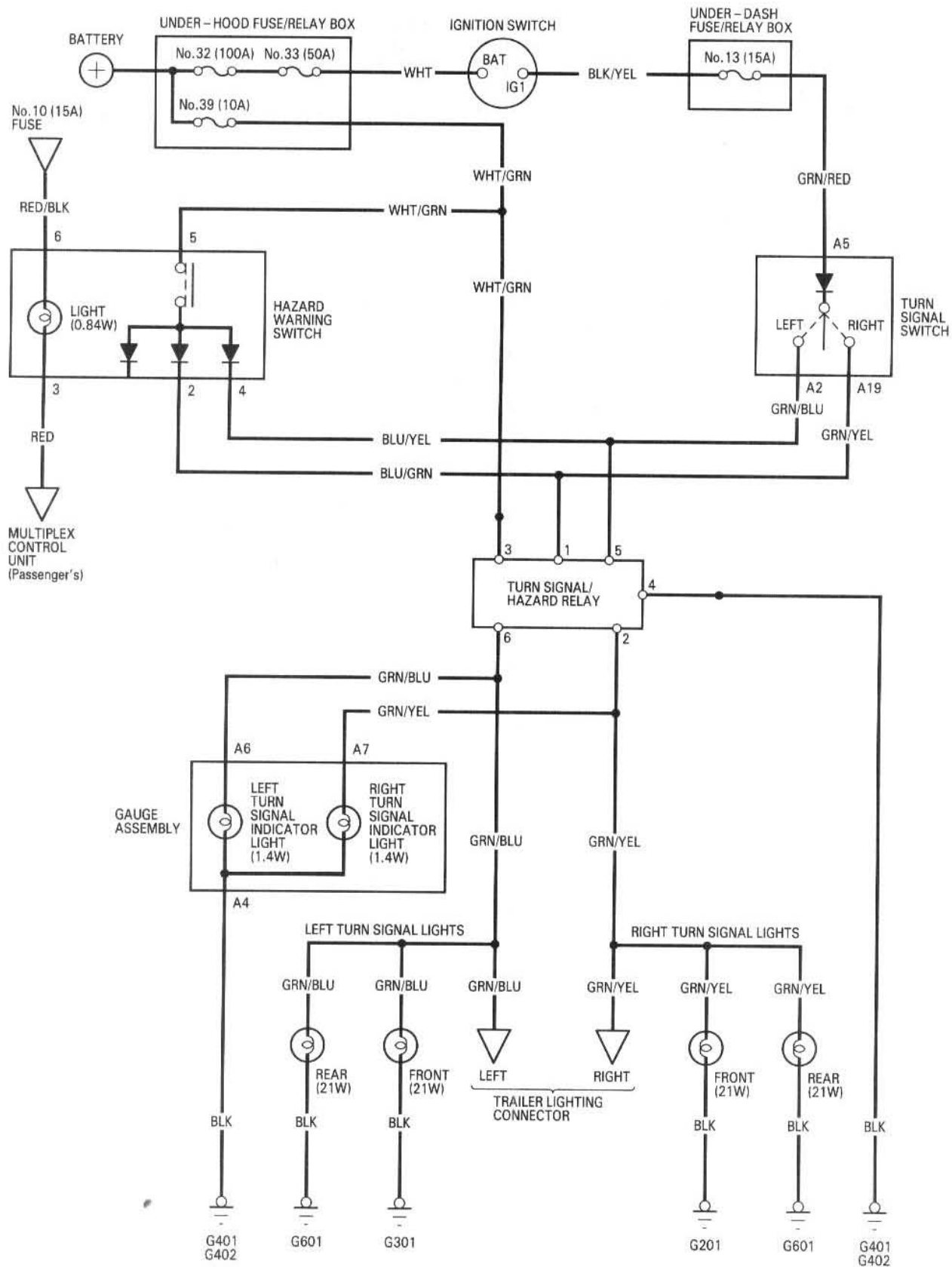
Turn Signal/Hazard Flasher System

Component Location Index



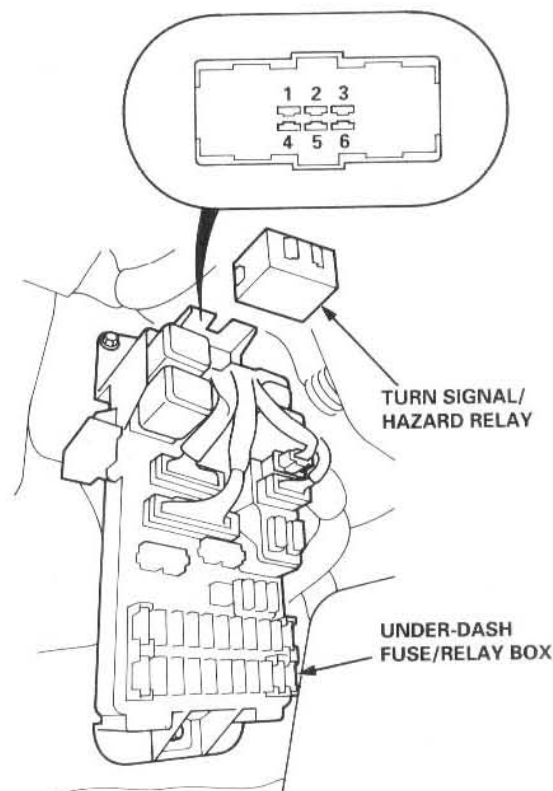
Turn Signal/Hazard Flasher System

Circuit Diagram



Turn Signal/Hazard Relay Input Test

1. Remove the driver's side kick panel, then remove the turn signal/hazard relay from the under-dash fuse/relay box.
2. Inspect relay and socket terminals to be sure they are all making good contact.
 - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
 - If the terminals look OK, make the following input tests at the socket.
 - If any test indicates a problem, find and correct the cause, then recheck the system.
 - If all the input tests prove OK, the turn signal/hazard relay must be faulty; replace it.

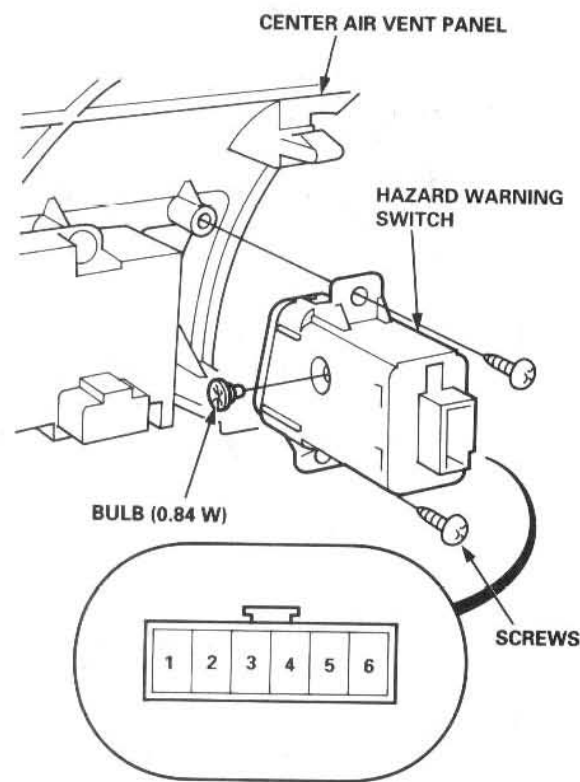


Cavity	Test condition	Test: Desired result	Possible cause if result is not obtained
4	Under all conditions	Check for continuity to ground: There should be continuity.	<ul style="list-style-type: none"> • Poor ground (G401, G402) • An open in the wire
3	Under all conditions	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> • Blown No. 39 (10 A) fuse in the under-hood fuse/relay box • An open in the wire
1	Hazard warning switch ON	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> • Faulty hazard warning switch • An open in the wire
	Ignition switch ON (II) and turn signal switch in RIGHT		<ul style="list-style-type: none"> • Faulty turn signal switch • An open in the wire
5	Hazard warning switch ON	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> • Faulty hazard warning switch • An open in the wire
	Ignition switch ON (II) and turn signal switch in LEFT		<ul style="list-style-type: none"> • Faulty turn signal switch • An open in the wire
3 • 6	Connect the No. 3 terminal to the No. 6 terminal.	Left turn signal lights should come on as the jumper wire is connected.	<ul style="list-style-type: none"> • Blown bulb • Poor ground (G301, G601) • An open in the wire
3 • 2	Connect the No. 3 terminal to the No. 2 terminal.	Right turn signal lights should come on as the jumper wire is connected.	<ul style="list-style-type: none"> • Blown bulb • Poor ground (G201, G601) • An open in the wire

Turn Signal/Hazard Flasher System

Hazard Warning Switch Test

- 1. Remove the center air vent panel (see section 20).
- 2. Remove the two screws, then pull the hazard warning switch out from the center panel.



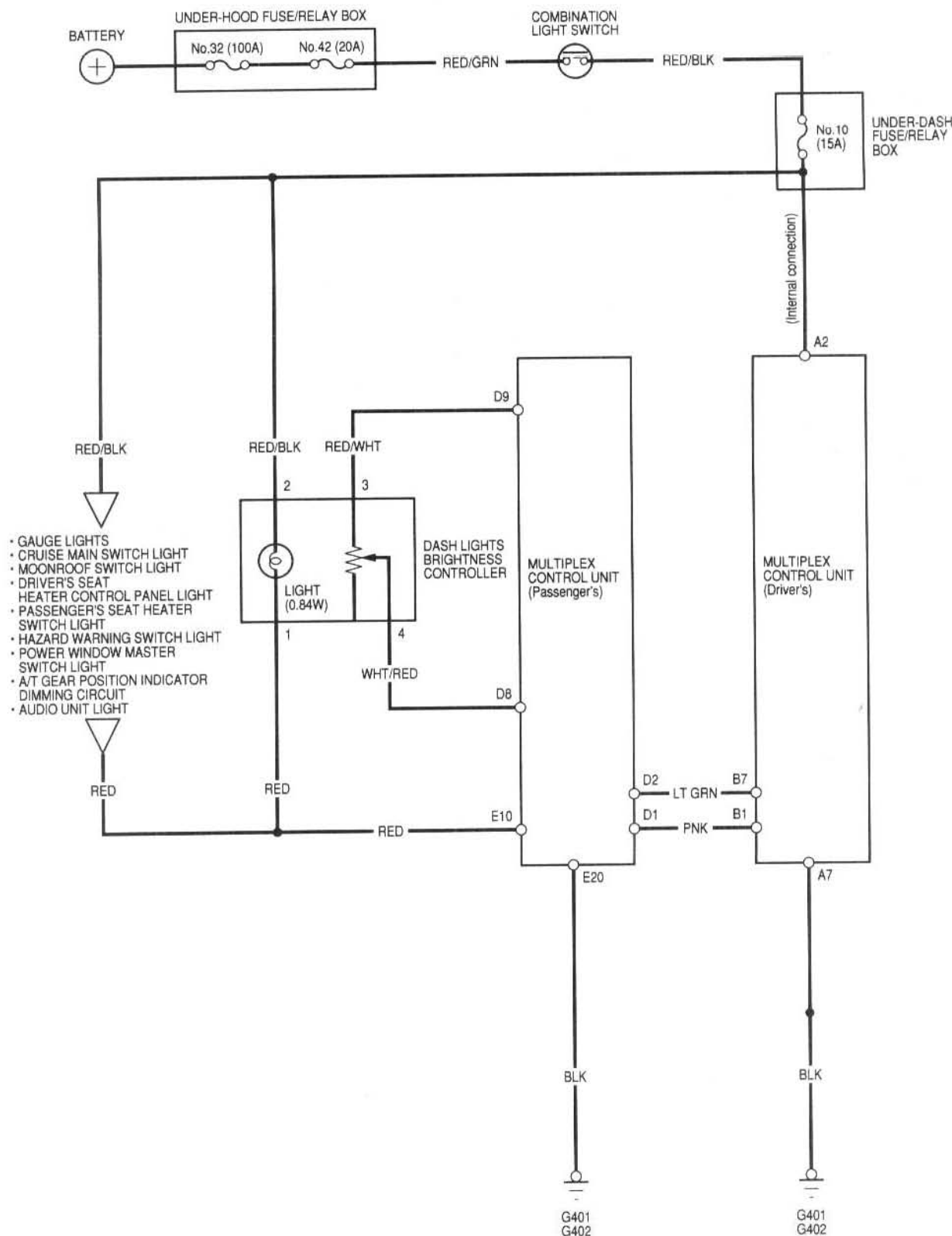
- 3. Check for continuity between the terminals in each switch position according to the table. Use an ohmmeter that has diode checking capability.

Terminal	3	6	5	1 (*)	2	4
Position						
OFF						
ON	○	○	○	○	○	○

* : Not used

Dash Lights Brightness Control

Circuit Diagram



Dash Lights Brightness Control

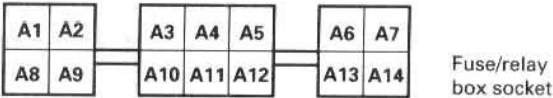
Control Unit Input Test

NOTE:

- Before testing, go to the Multiplex Control System Troubleshooting Guide (see page 23-103).
- All connector views are from wire side of female terminals unless otherwise noted.

Multiplex Control Unit (Driver's):

1. Remove the under-dash fuse/relay box (see page 23-48).
2. Remove the driver's unit from the under-dash fuse/relay box (see page 23-106).
3. Inspect the connector and socket terminals to be sure they are all making good contact.
 - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
 - If the terminals look OK, make the following input tests at the connector and the fuse/relay box socket.
 - If any test indicates a problem, find and correct the cause, then recheck the system.
 - If all the input tests prove OK, the control unit must be faulty; replace it.

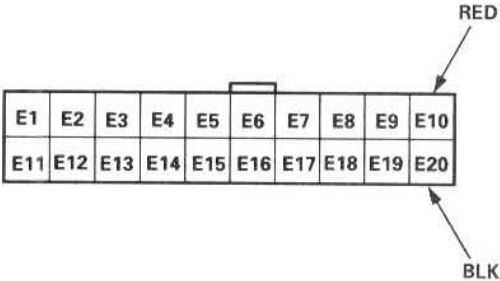
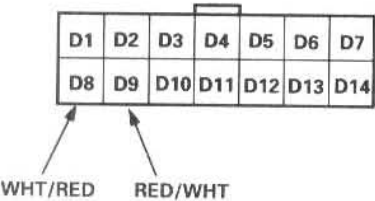


Disconnect the connectors from the unit.

Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
A2	Fuse/relay box socket	Combination light Switch ON (☺☺) or (☺☐)	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none">• Blown No. 10 (15 A) fuse in the under-dash fuse/relay box• Faulty combination light switch• An open in the wire
A7		Under all conditions	Check for continuity to ground: There should be continuity.	<ul style="list-style-type: none">• Poor ground (G401, G402)• An open in the wire

Multiplex Control Unit (Passenger's):

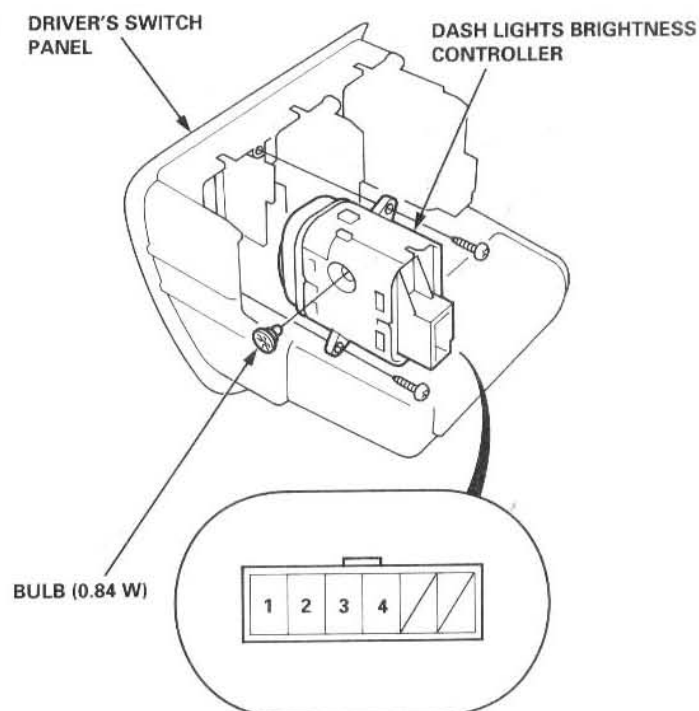
1. Remove the right kick panel (see section 20).
2. Disconnect the 14P and 20P connectors, then remove the passenger's unit.
3. Inspect the connector and socket terminals to be sure they are all making good contact.
 - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
 - If the terminals look OK, make the following input tests at the connector.
 - If a test indicates a problem, find and correct the cause, then recheck the system.
 - If all the input tests prove OK, the control unit must be faulty; replace it.



Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
D9 • D8	RED/WHT and WHT/RED	Adjusting dial rotated	Check for resistance between the D8 and D9 terminals: There should be 0 – 12 kΩ at all times.	<ul style="list-style-type: none"> Faulty dash light brightness controller An open in the wire
E10	RED	Combination light switch ON (☺) or (≡)	Attach to ground: Dash lights should come on full bright.	<ul style="list-style-type: none"> An open in the wire
E20	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	<ul style="list-style-type: none"> Poor ground (G401, G402) An open in the wire

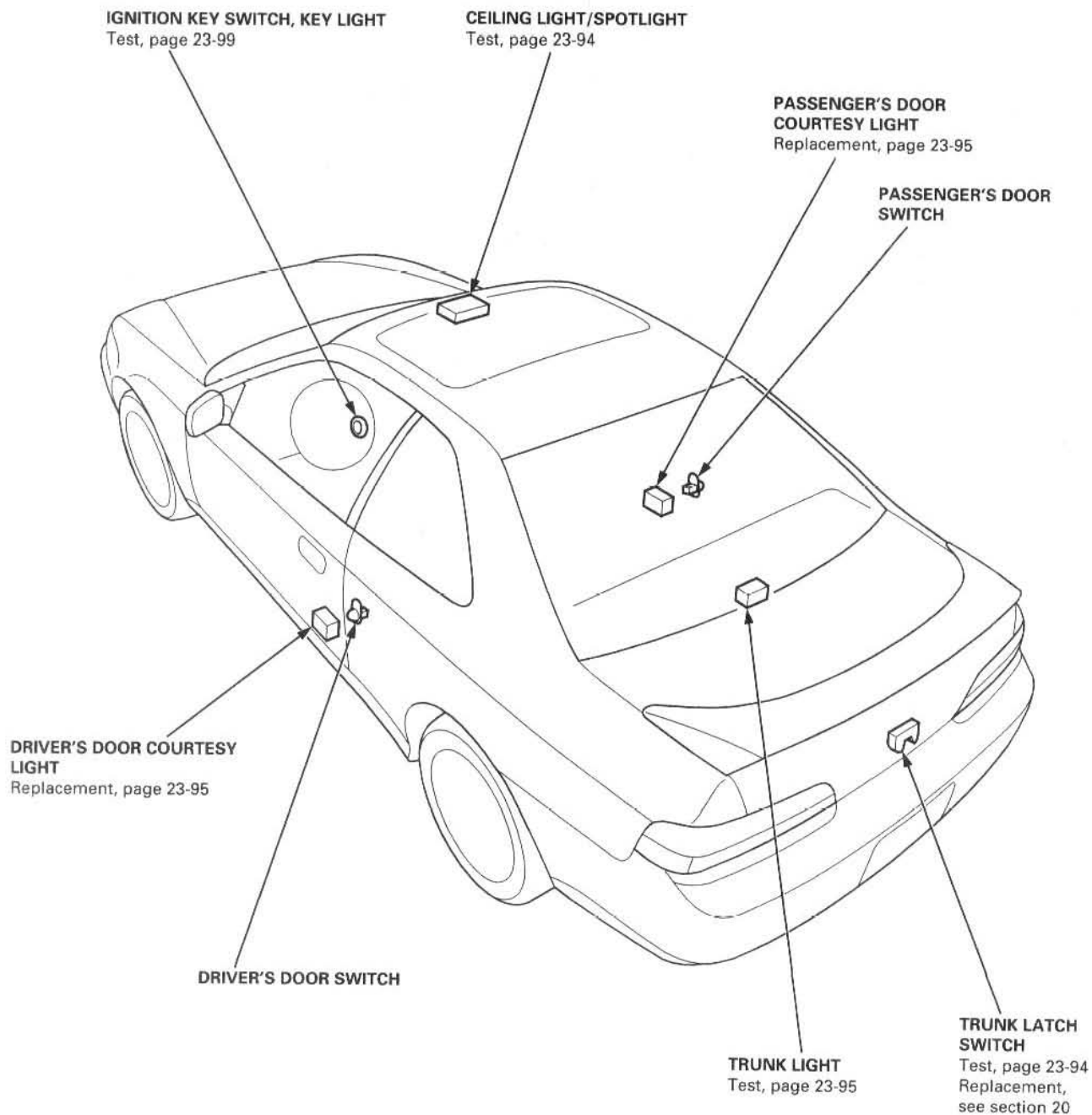
Controller Test/Replacement

1. Remove the driver's switch panel (see section 20).
2. Measure resistance between the No. 3 and No. 4 terminals while rotating the adjusting dial. Resistance should vary from 0 from to 12,000 ohms as the dial is rotated.
3. If necessary, remove the two screws, and replace the controller.



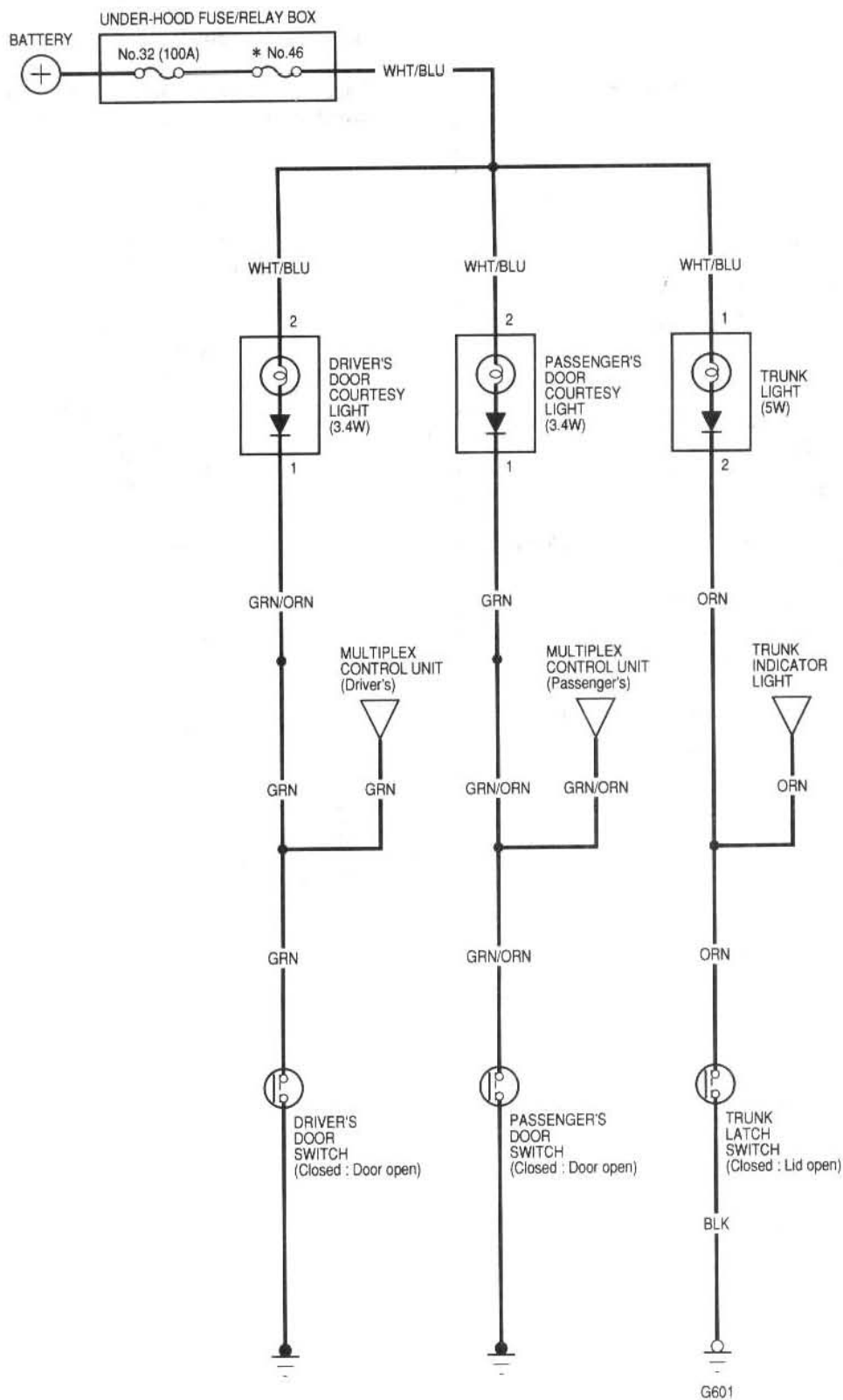
Interior Lights

Component Location Index



Circuit Diagram

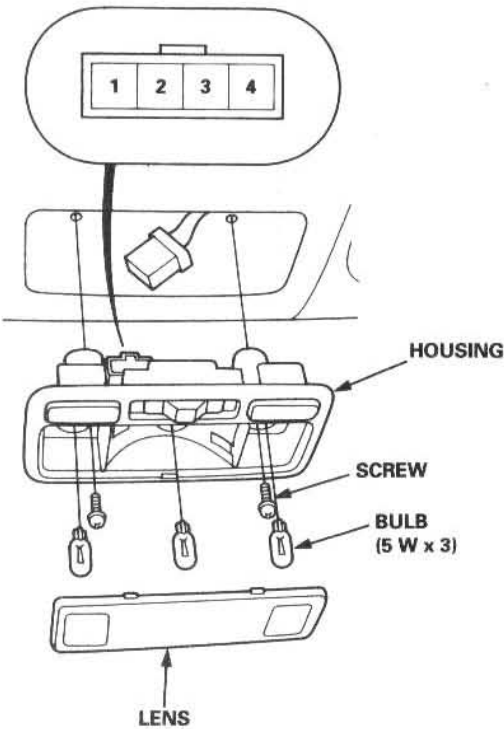
* No.46 (15A) : '97-98 models
(10A) : '99 model



Interior Lights

Ceiling Light/Spotlight Test

- 1. Turn the light switch OFF.
- 2. Pry off the lens.
- 3. Remove the two screws from the housing.
- 4. Disconnect the 4P connector, and remove the housing.

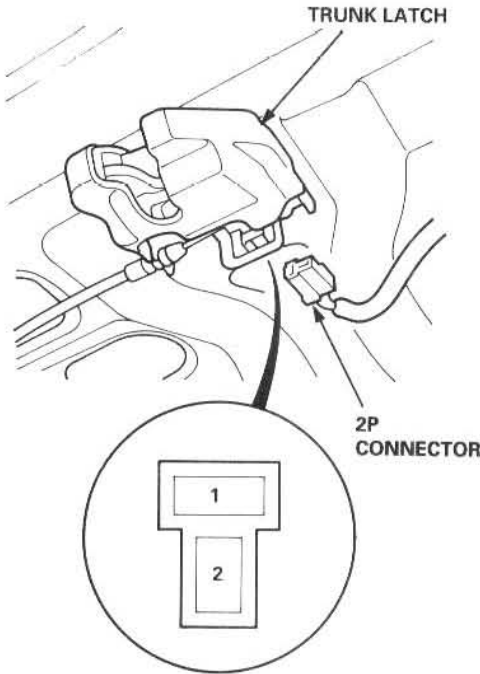


- 5. Check for continuity between the terminals in each switch position according to the table.

Terminal		1		3	4
Position					
CEILING LIGHTS	OFF				
	MIDDLE	○	⊕	○	
	ON	○	⊕	○	
SPOT-LIGHTS	SW1	ON	○	⊕	○
		OFF			
	SW2	ON	○	⊕	○
		OFF			

Trunk Latch Switch Test

- 1. Open the trunk lid.
- 2. Disconnect the 2P connector from the trunk latch.
- 3. Check for continuity between the terminals in each switch position according to the table.

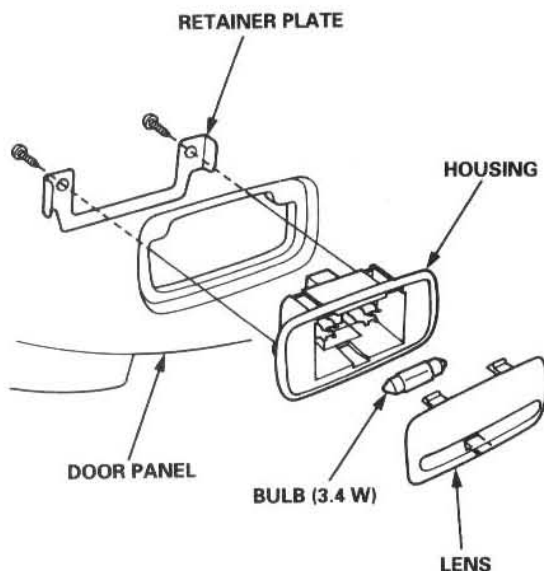


Terminal	1	2
Position		
OPEN	○	○
CLOSED		

Courtesy Light Replacement

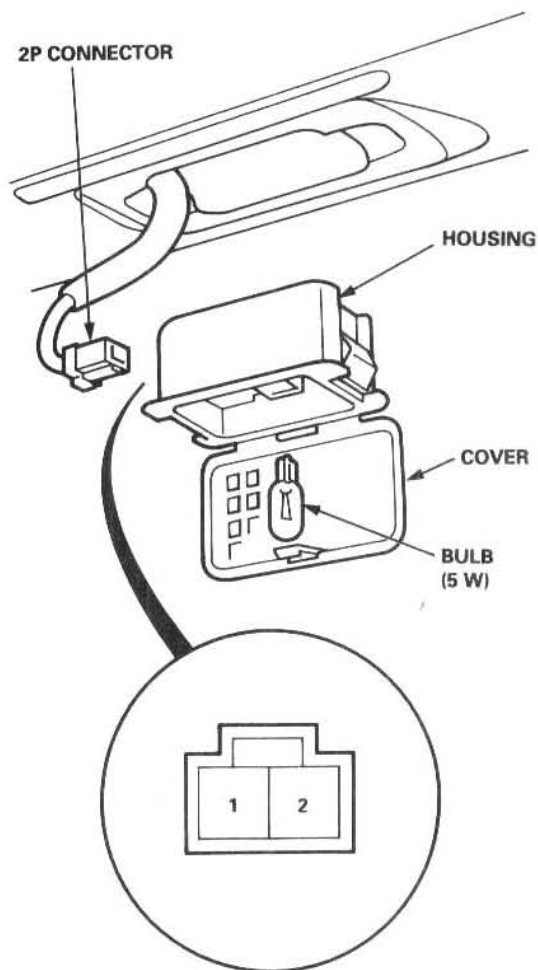
NOTE: The bulb or lens alone can be replaced without removing the door panel.

1. Remove the door panel (see section 20).
2. Remove the two screws and retainer plate from behind the door panel.
3. Replace the courtesy light.



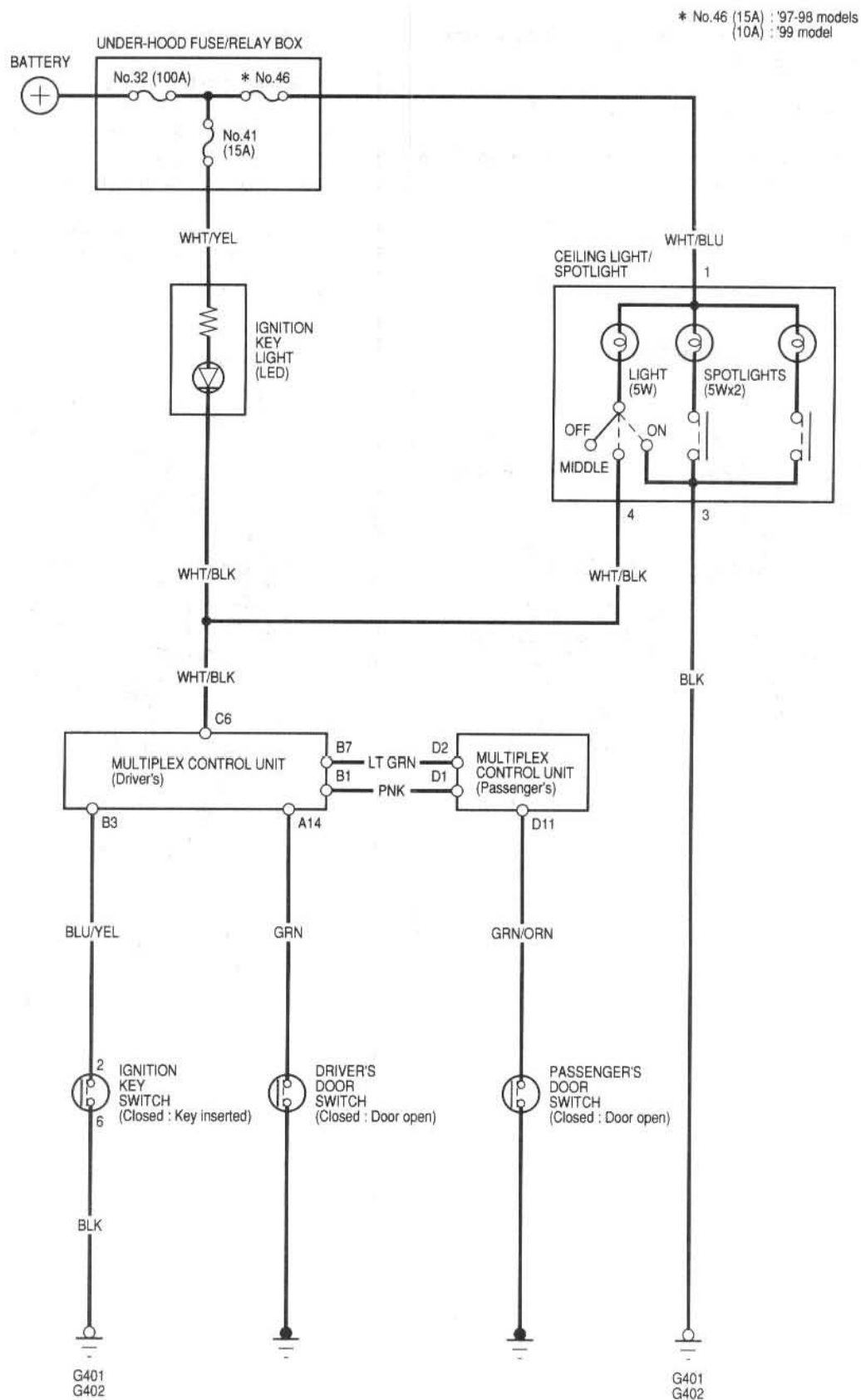
Trunk Light Test

1. Open the trunk lid.
2. Pry out the trunk light assembly.
3. Disconnect the 2P connector from the housing.
4. Open the trunk light cover.
5. Make sure that the bulb is OK. Check for continuity between the No. 1 and No. 2 terminals.



Entry Light Control System

Circuit Diagram



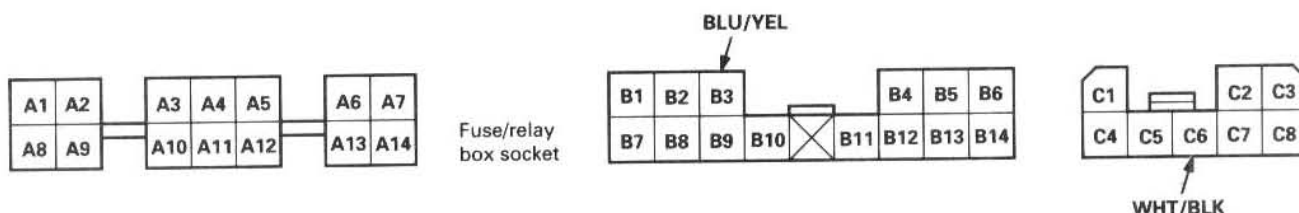
Control Unit Input Test

NOTE:

- Before testing, go to the Multiplex Control System Troubleshooting Guide (see page 23-103).
- All connector views are from wire side of female terminals unless otherwise noted.

Multiplex Control Unit (Driver's):

1. Remove the under-dash fuse/relay box (see page 23-48).
2. Remove the driver's unit from the under-dash fuse/relay box (see page 23-106).
3. Inspect the connector and socket terminals to be sure they are all making good contact.
 - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
 - If the terminals look OK, make the following input tests at the connector and the fuse/relay box socket.
 - If any test indicates a problem, find and correct the cause, then recheck the system.
 - If all the input tests prove OK, the control unit must be faulty; replace it.



Disconnect the connectors from the unit.

Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
C6	WHT/BLK	Under all conditions	Attach to ground: The ignition key light should come on.	<ul style="list-style-type: none"> • Blown LED • An open in the wire
		Ceiling light switch in the MIDDLE position	Connect to ground: Ceiling light should come on.	<ul style="list-style-type: none"> • Blown *No. 46 fuse in the under-hood fuse/relay box • Faulty ceiling light • An open in the wire

Reconnect the connectors to the unit.

*No. 46 (15 A): '97 – 98 models
(10 A): '99 model

Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
B3	BLU/YEL	Ignition key inserted into the ignition switch	Check for voltage to ground: There should be less than 1 V.	<ul style="list-style-type: none"> • Faulty ignition key switch • Poor ground (G401, G402) • An open in the wire
A14	Fuse/relay box socket	Driver's door open	Check for voltage to ground: There should be less than 1 V.	<ul style="list-style-type: none"> • Faulty driver's door switch • An open in the wire

(cont'd)

Entry Light Control System

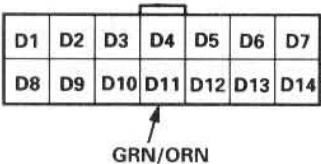
Control Unit Input Test (cont'd)

NOTE:

- Before testing, go to the Multiplex Control System Troubleshooting Guide (see page 23-103).
- All connector views are from wire side of female terminals unless otherwise noted.

Multiplex Control Unit (Passenger's):

1. Remove the right kick panel (see section 20).
2. Disconnect the 14P and 20P connectors, then remove the passenger's unit (see page 23-105).
3. Inspect the connector and socket terminals to be sure they are all making good contact.
 - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
 - If the terminals look OK, make the following input tests at the connector and the fuse/relay box socket.
 - If any test indicates a problem, find and correct the cause, then recheck the system.
 - If all the input tests prove OK, the control unit must be faulty; replace it.

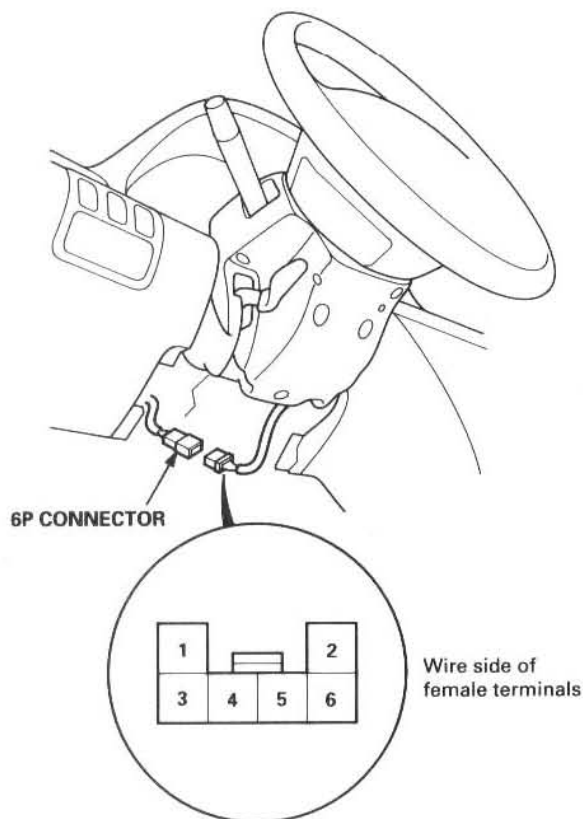


Reconnect the connectors to the unit.

Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
D11	GRN/ORN	Passenger's door open	Check for voltage to ground: There should be less than 1 V.	<ul style="list-style-type: none">• Faulty passenger's door switch• An open in the wire

Ignition Key Switch Test

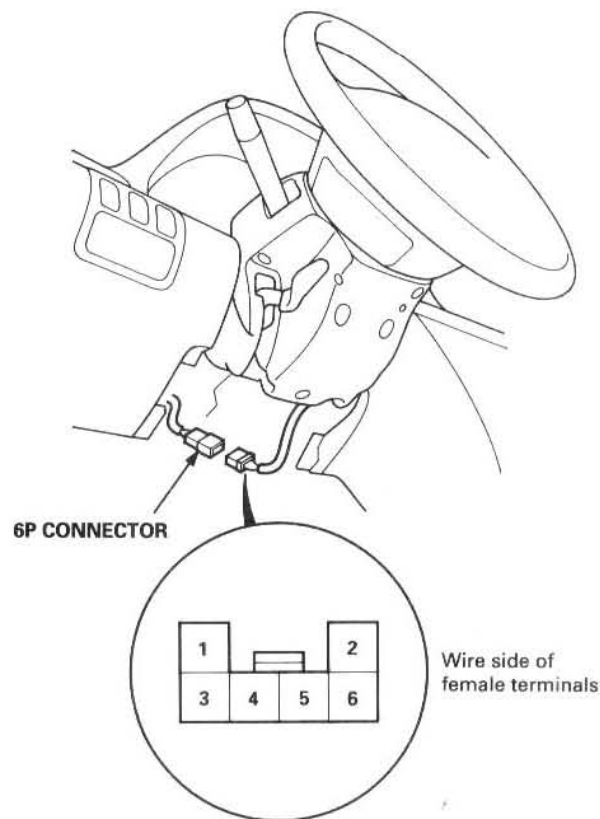
1. Remove the dashboard lower cover (see section 20).
2. Disconnect the 6P connector from the main wire harness.



3. Check for continuity between the terminals No. 2 and No. 6.
 - There should be continuity with the key in the ignition switch.
 - There should be no continuity with the key removed.

Ignition Key Light Test

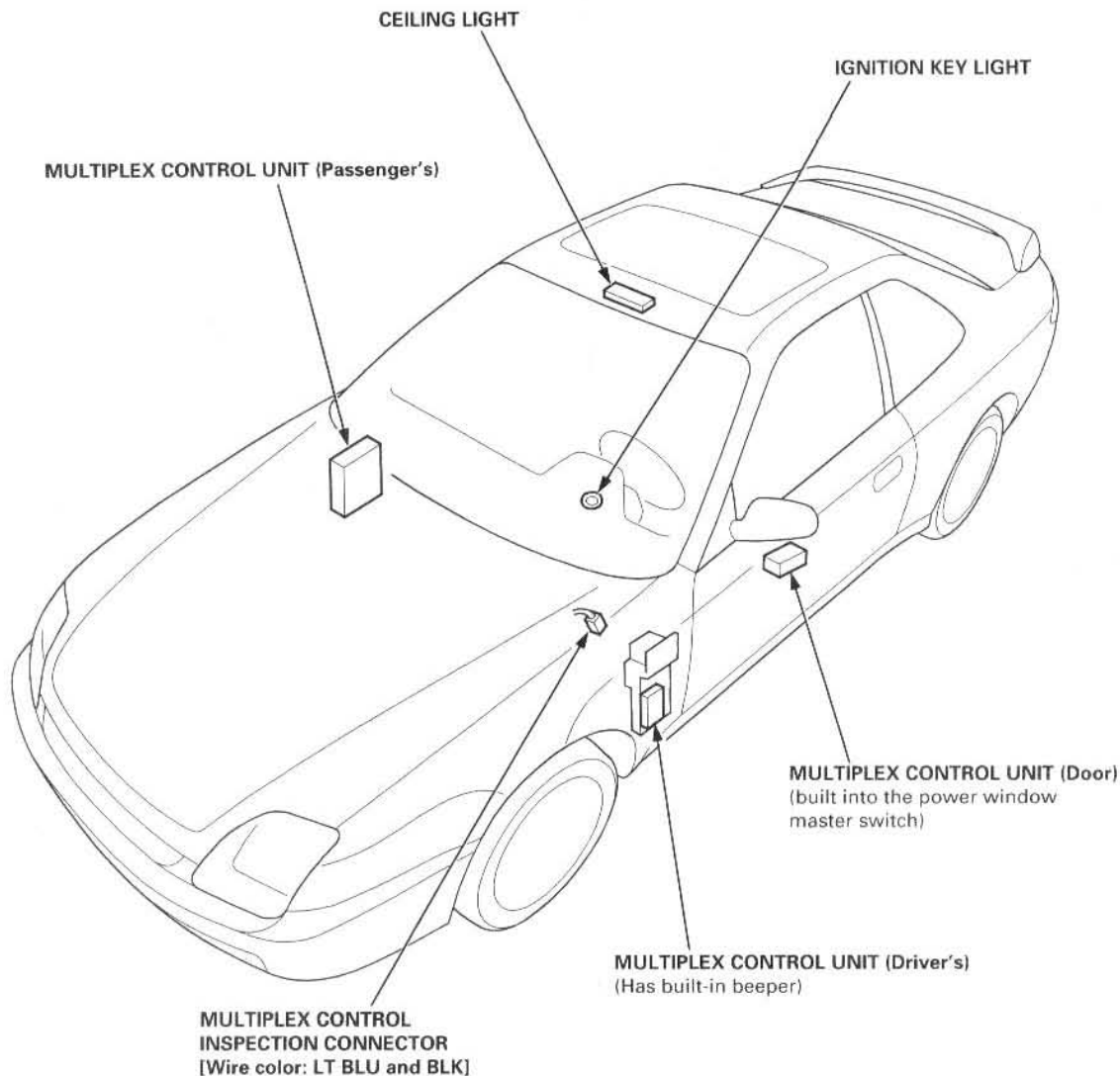
1. Remove the dashboard lower cover (see section 20).
2. Disconnect the 6P connector from the main wire harness.



3. The LED should come on when power is connected to terminal No. 5, and ground is connected to terminal No. 1.
If the LED does not come on, replace it.

Multiplex Control System

Component Location Index



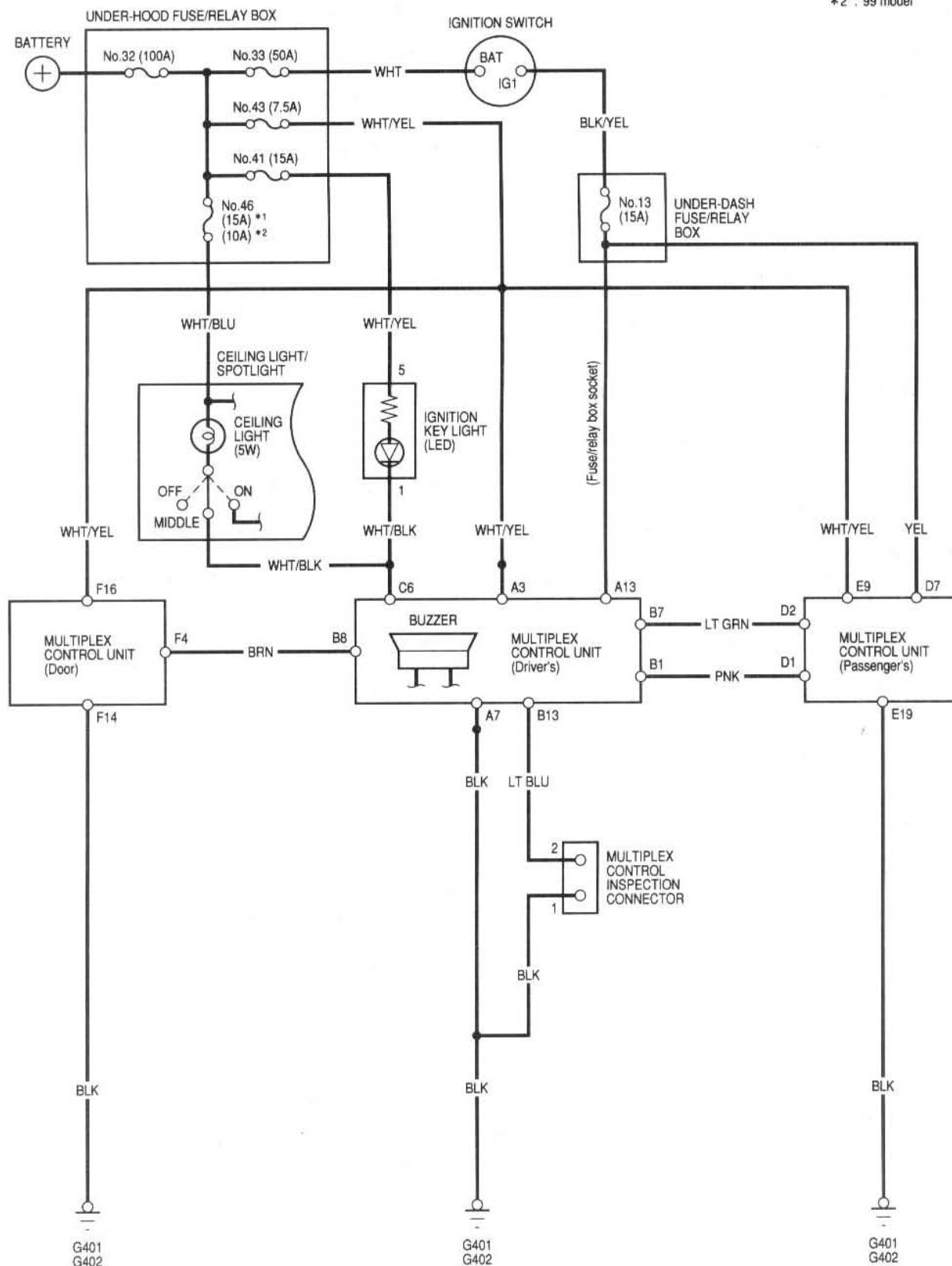
Description

The multiplex control unit is composed of three control units (located in the driver's side kick panel, passenger's side kick panel, and driver's door).

These three control units integrate the independent control units as usual and feature multiplex communication lines. The system reduces the number of control units and wire harness bulk, and improves the quality of electrical functions by means of the integrated circuits. This system has a built-in self-diagnosis function.

Circuit Diagram (Power, Ground, Communication Lines)

*1 : '97-98 models
 *2 : '99 model



Multiplex Control System

System Functions

- Multiplex Control System
 - Multiplex function
 - Wake up/sleep function
 - Fail-safe function
 - Self-diagnosis function
 - Mode 1: Self-diagnosis for the multiplex control system.
 - Mode 2: Failure diagnosis for the input line of each system.
- Integrated Control System
 - Seat Belt Reminder Circuit
 - Lights-on Reminder Circuit
 - Key-in Reminder Circuit
 - Engine Oil Pressure Indicator Flasher Circuit
- Dash Lights Brightness Control
- Entry Light Control System
- Power Door Locks
- Power Window
- Wiper/Washer
- Interlock System (see section 14)
- Rear Window Defogger

Multiplex Communication System

Multiplex Communication Functions

- To reduce the number of wire harnesses, digital signals are sent via shared multiplex communication lines rather than sending normal electrical signals through individual wires.
- The input signals from each switch are converted to digital signals at the central processing unit (CPU). The digital signals are sent from the transmitter unit to the receiver unit as serial signals.
- The transmitted signal is converted to a switch signal at the receiver unit, and it operates the related component.
- There are exclusive communication lines between each of the multiplex control units:
 - Door → Driver's (from the door to the driver's multiplex control units) Wire color: BRN
 - Driver's → Passenger's (from the driver's to the passenger's multiplex control units) Wire color: LT GRN
 - Passenger's → Driver's (from the passenger's to the driver's multiplex control units) Wire color: PNK
- The control units always communicate via these lines when the system is operating, and they stop communicating when the system is OFF.

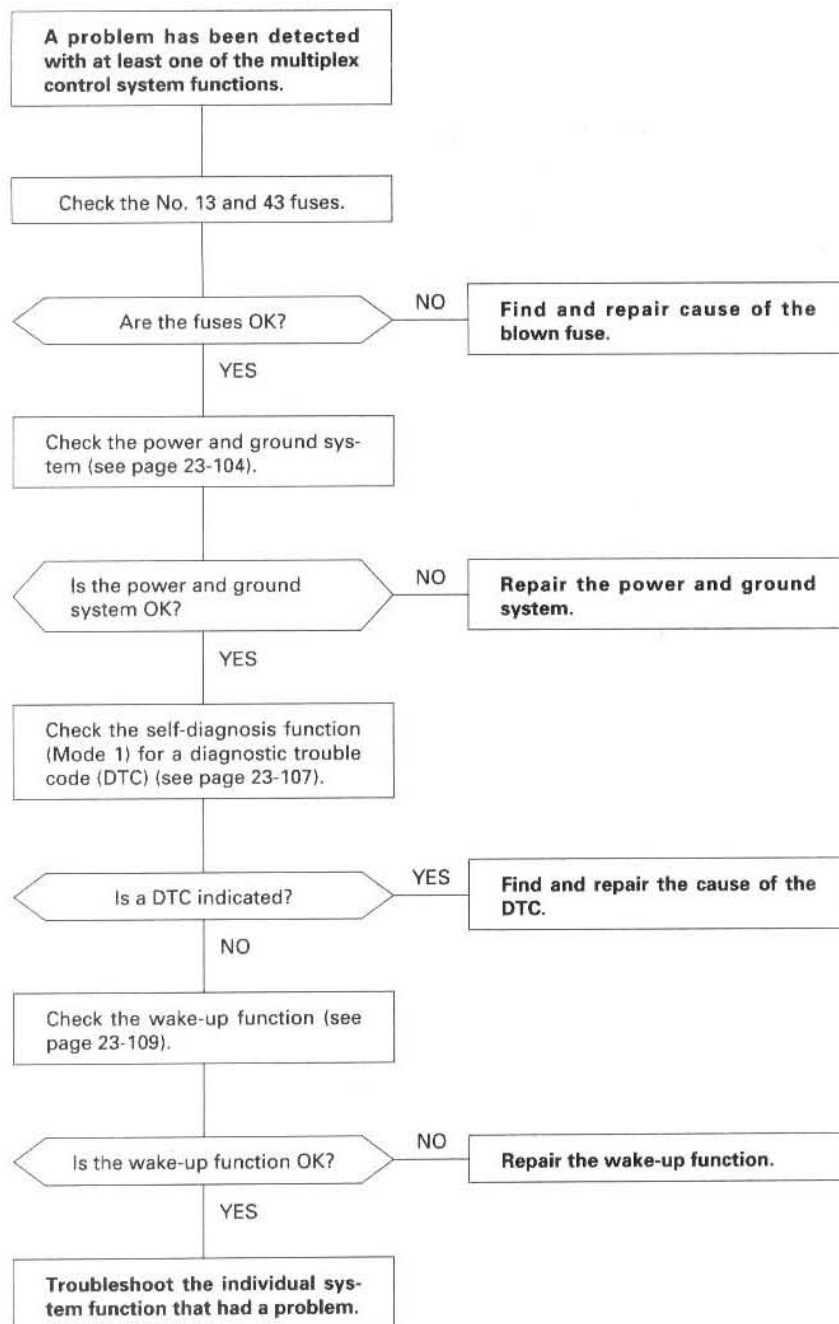
Wake-up and Sleep Functions

- The multiplex control system has "wake-up" and "sleep" functions to decrease parasitic draw on the battery when the ignition switch is OFF.
- In the sleep mode, the multiplex control unit stops the functions (communication and CPU control) when it is not necessary for the system to operate.
- As soon as any operation is done (for example, a door is unlocked), the related control unit in the sleep mode wakes up and begins to function at once. This control unit also sends a wake-up signal to the other control units via the communication lines.
- When the ignition switch is turned OFF, there is about a 10 second delay before the control units go from the wake-up mode to the sleep mode.
- If any door is open, the sleep mode will not function.

Fail-safe Functions

- To prevent improper operation, the multiplex control system has a fail-safe function. In the fail-safe mode, the output signal is fixed when any part of the system malfunctions (for example, a faulty control unit or communication line).
- Each control unit has a hardware fail-safe function that fixes the output signal when there is any CPU malfunction and a software fail-safe function that ignores the signal from the malfunctioning control unit and allows the system to operate normally.

Troubleshooting Guide

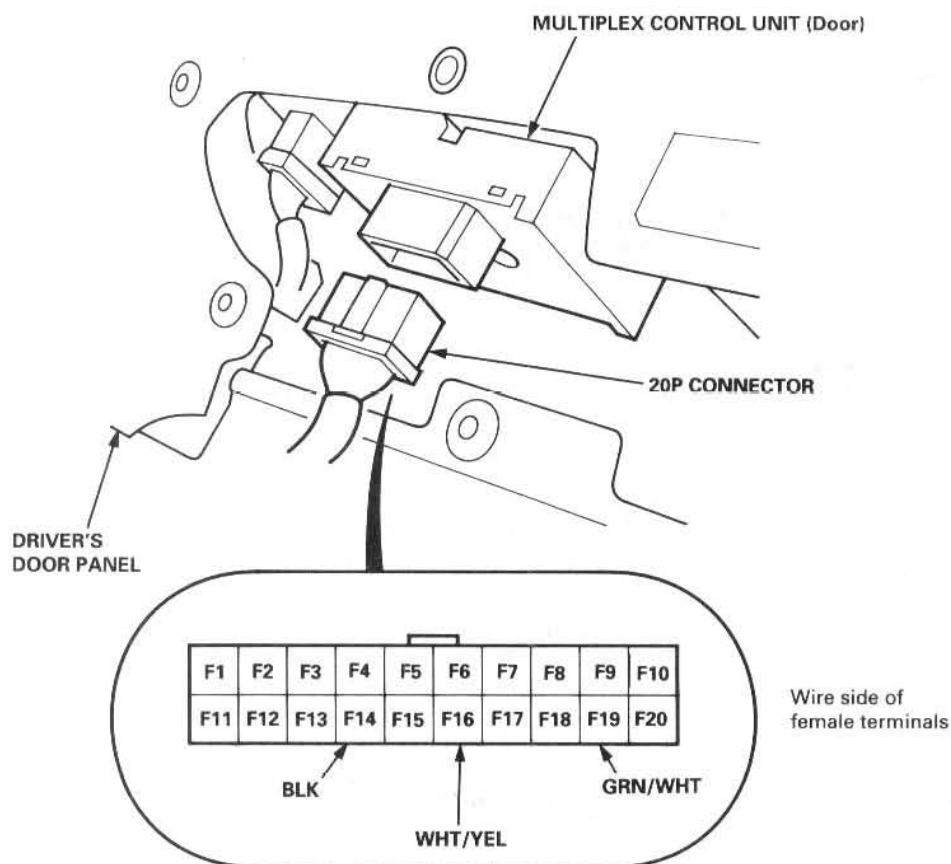


Multiplex Control System

Power and Ground Test

Multiplex Control Unit (Door):

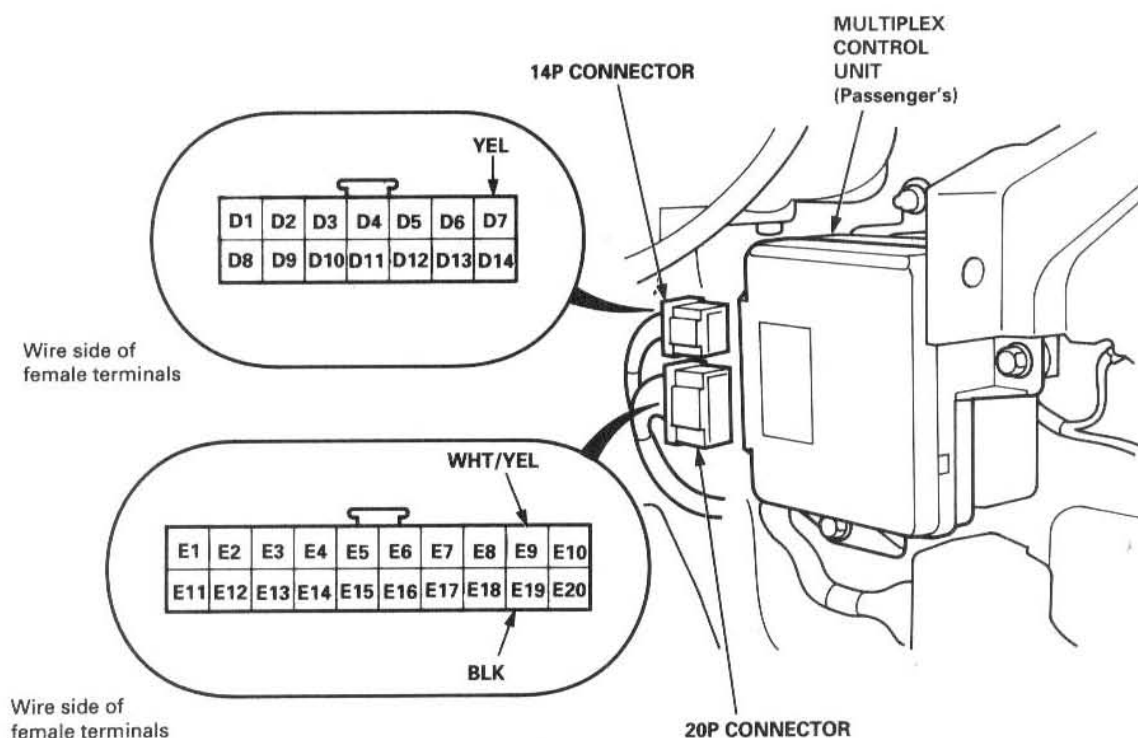
1. Remove the driver's door panel, and disconnect the 20P connector from the door unit.
2. Inspect the connector and socket terminals to be sure they are all making good contact.
 - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
 - If the terminals look OK, make the following input tests at the connector.
 - If a test indicates a problem, find and correct the cause, then recheck the system.
 - If all the input tests prove OK, the control unit (power window master switch) must be faulty; replace it.



Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
F16	WHT/YEL	Under all conditions	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none">• Blown No. 43 (7.5 A) fuse in the under-hood fuse/relay box• An open in the wire
F19	GRN/WHT	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none">• Blown No. 15 (20 A) fuse in the under-dash fuse/relay box• An open in the wire
F14	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	<ul style="list-style-type: none">• Poor ground (G401, G402)• An open in the wire

Multiplex Control Unit (Passenger's):

1. Remove the right kick panel (see section 20).
2. Disconnect the 14P and 20P connectors, then remove the passenger's unit.
3. Inspect the connector and socket terminals to be sure they are all making good contact.
 - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
 - If the terminals look OK, make the following input tests at the connector.
 - If a test indicates a problem, find and correct the cause, then recheck the system.
 - If all the input tests prove OK, the control unit must be faulty; replace it.



Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
E9	WHT/YEL	Under all conditions	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> • Blown No. 43 (7.5 A) fuse in the under-hood fuse/relay box • An open in the wire
E19	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	<ul style="list-style-type: none"> • Poor ground (G401, G402) • An open in the wire
D7	YEL	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> • Blown No. 13 (15 A) fuse in the under-dash fuse/relay box • An open in the wire

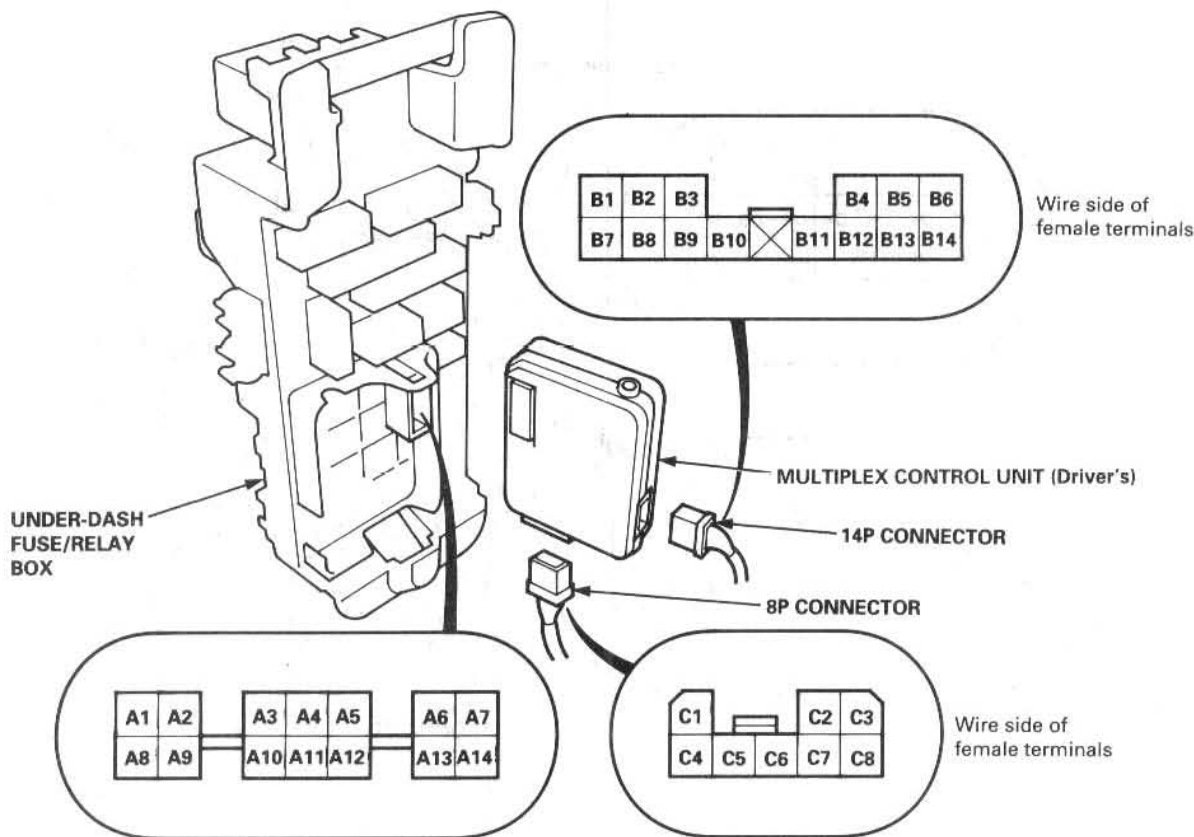
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Multiplex Control System

Power and Ground Test (cont'd)

Multiplex Control Unit (Driver's):

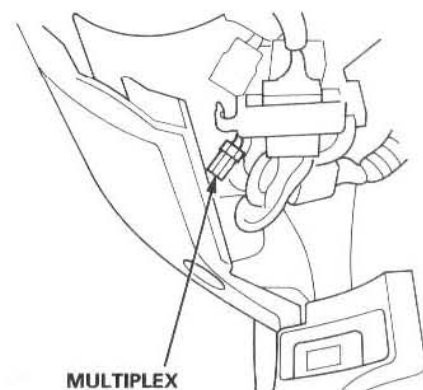
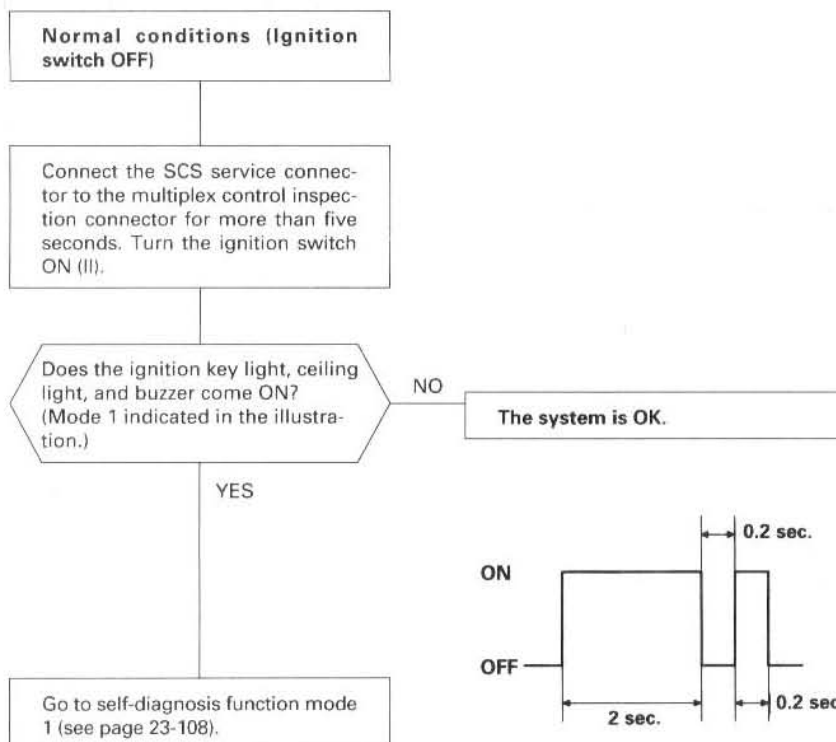
1. Remove the under-dash fuse/relay box (see page 23-48).
2. Remove the driver's unit from the under-dash fuse/relay box.
3. Inspect the connector and socket terminals to be sure they are all making good contact.
 - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
 - If the terminals look OK, make the following input tests at the connector and the fuse/relay box socket.
 - If any test indicates a problem, find and correct the cause, then recheck the system.
 - If all the input tests prove OK, the control unit must be faulty; replace it.



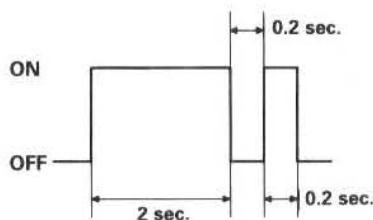
Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
A3		Under all conditions	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none">• Blown No. 43 (7.5 A) fuse in the under-hood fuse/relay box• An open in the wire
A7	Fuse/relay box socket	Under all conditions	Check for continuity to ground: There should be continuity.	<ul style="list-style-type: none">• Poor ground (G401, G402)• An open in the wire
A13		Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none">• Blown No. 13 (15 A) fuse in the under-dash fuse/relay box• An open in the wire

Self-diagnosis Function (Mode 1)

- One second after you go into self-diagnosis function mode 1, the function starts to indicate the diagnostic trouble code (DTC), and repeats the DTC every three seconds.
- From mode 1, disconnect the SCS service connector for five to ten seconds, then reconnect the SCS service connector, and the function goes from mode 1 to mode 2.
- Make sure the ceiling light switch is in the middle position.



**MULTIPLEX
INSPECTION
CONNECTOR**



NOTE:

If no DTCs are indicated, but you know the system is abnormal, check these items:

- If the lights do not come on and buzzer does not beep, check the continuity between the BLK wire of the multiplex control inspection connector and body ground, and check the continuity between the LT BLU wire of the multiplex control inspection connector and multiplex control unit (driver's).
- If only the lights or the buzzer indicates the DTC(s), the lights or buzzer is probably faulty.

(cont'd)

Multiplex Control System

Self-diagnosis Function (Mode 1) (cont'd)

Diagnostic Trouble Code (DTC) Table

NOTE: The numbers in the table show the troubleshooting sequence.

Trouble code	Multiplex control unit (DOOR)	DOOR → DRIVER'S communication line	Multiplex control unit (DRIVER'S)	DRIVER'S → PASSENGER'S communication line	PASSENGER'S → DRIVER'S communication line	Multiplex control unit (PASSENGER'S)
Buzzer and Ignition key light ON						
—			1			
1	2	1	3			
2			2	1		3
3			3		1	2

Communication Line Test

1. Continuity Test

Check for continuity according to the table.

- If there is continuity, go to step 2.
- If there is no continuity, check for an open in the wire.

2. Voltage Test

- Turn the ignition switch ON (II).
- Check for voltage between communication line and ground:
The voltage should match the following table.

Communication line	Wire	Continuity	Standard (V)
DOOR → DRIVER'S	BRN	YES	3.5 – 9.5
DRIVER'S → PASSENGER'S	LT GRN	YES	4.0 – 10.5
PASSENGER'S → DRIVER'S	PNK	YES	3.0 – 10.0

- If the voltage is too high:
 - Check for short to another wire.
 - Check for poor contact at the connector on the receiver side unit.
 - Faulty circuit in the receiver side unit.
- If the voltage is too low:
 - Check for short to ground or to another wire.
 - Check for poor contact at the connector on the transmit side unit.
 - Faulty circuit in the transmitter side unit.

If any control unit appears to be faulty, select one control unit, substitute a known-good control unit, then recheck. If the system works properly, the original control unit is faulty; replace it. If there is still a malfunction, substitute a known-good control unit for another control unit, then recheck. If the system works properly, that control unit is faulty; replace it.

Wake-up Function Test

Description:

- When the ignition switch is turned ON (II):
When the ignition switch is ON (II), all of the multiplex control units wake up at the same time. In this case, the communication lines are not related for wake up function.
- When a switch related to the multiplex control unit (door) is operated:
First, the multiplex control unit (door) wakes up, then the control unit starts to communicate to the control unit (driver's). By this communication, the control unit (driver's) wakes up. The control unit (driver's) wakes the control unit (passenger's) up by the communication line, and all the control units start to function.
- When a switch related to the multiplex control unit (driver's or passenger's) is operated:
The control unit related to the operated switch wakes up, then the control unit wakes up the other unit. (In this case, the control unit (door) does not wake up.)

Related Switch (Input):

The switches and input signals that can wake up the multiplex control unit are shown below:

Related Switch (Input) Table:

Multiplex Control Unit (Passenger's)	Multiplex Control Unit (Driver's)	Multiplex Control Unit (Door)
No. 13 (15 A) fuse	No. 13 (15 A) fuse	No. 15 (20 A) fuse
DRIVER'S-PASSENGER'S communication line (LT GRN)	DOOR-DRIVER'S communication line (BRN), PASSENGER'S-DRIVER'S communication line (PNK)	Driver's door lock switch (LOCK/UNLOCK)
Passenger's door switch Passenger's key cylinder switch (LOCK/UNLOCK) Passenger's door lock switch (LOCK/UNLOCK)	Combination light switch (300) Driver's door switch	Driver's door key cylinder switch (UNLOCK) Driver's door lock knob switch (LOCK/UNLOCK)

Multiplex Control System

Confirming the Function

1. Shifting to the sleep mode:
 - 1) Turn the ignition switch OFF.
 - 2) Cancel the key-off operation timer in the power window system by opening and closing one of the doors.
 - 3) Make sure that the exterior lights are off.
 - 4) If you do not operate the switches related to the multiplex control units more than one minute after meeting the above conditions, the system function shifts to the sleep mode.
(All of the switches must be turned OFF except door lock knob switches.)
2. Confirming the sleep mode:
 - 1) Check for voltage between the communication line.
There should be no voltage with the sleep mode ON.
There should be standard voltage with the sleep mode OFF (see the voltage test table on page 23-108).
 - 2) Check for voltage between each communication line and body ground while shifting to the sleep mode (see page 23-108).
There should be no voltage.
 - 3) Check the parasitic draw at the battery while shifting to the sleep mode. The ampere should change from about 70 through 80 mA to less than 10 mA.
3. Confirming the wake up mode:

After confirming the sleep mode, turn the related switch (see previous table) ON, and wake up each control unit. If all of the operations works properly, the wake up mode is OK.

(If any of the control units are faulty and cannot wake up, several parts of the system will not work at the same time.)

Faulty Communication Line Symptoms

Open in the line:

If there is an open in a communication line, most of the systems do not operate because one of the control units cannot wake up the other control units. But the control unit that is not awake can wake up by operating a switch related to the control unit.

All of the control units wake up by turning the ignition switch ON (II).

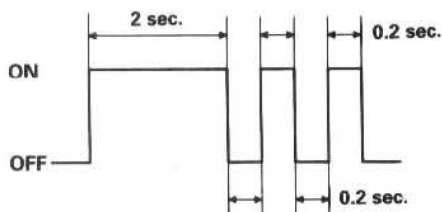
Short in the line:

- Most of the systems do not operate because one of the control units cannot wake up the other control units.
- The control unit can wake up by a related switch operation, but the other control units cannot wake up.
- All of the control units wake up by turning the ignition switch ON (III).

Self-diagnosis Function (Mode 2)

From mode 1, disconnect the SCS service connector from the multiplex control inspection connector for five to ten seconds, then reconnect the SCS service connector again, and the function goes from mode 1 to mode 2.

Mode 2:



To cancel mode 2, disconnect the SCS service connector from the multiplex control inspection connector for more than 10 seconds or turn the ignition switch OFF.

1. Operate the switches as shown below in mode 2.
2. If the related circuit line of the switch is OK, the function indicates this by the ignition key light and ceiling light blinking once and the beeper sounding once.

NOTE: If the line is faulty, there should be no indication. Refer to the tests for each system.

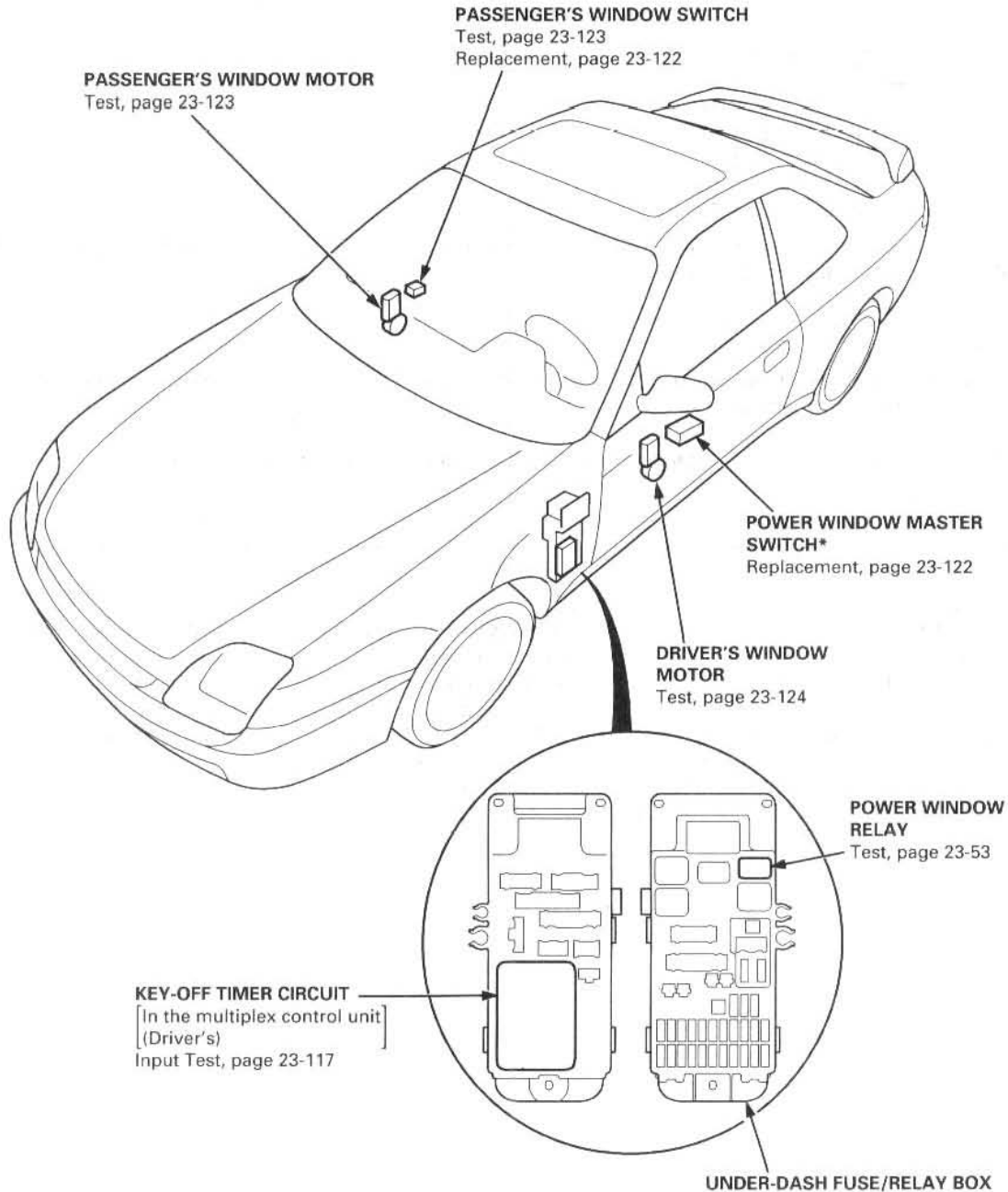
Object Input Table:

Multiplex Control Unit (Passenger's)	Multiplex Control Unit (Driver's)	Multiplex Control Unit (Door)
Passenger's door switch Passenger's door lock switch (LOCK/UNLOCK) Dashlights brightness controller Intermittent dwell time controller (Windshield wiper/washer switch)	Windshield wiper/washer switch (Except MIST switch) Rear window defogger switch Driver's door switch Back-up light switch (M/T) Driver's seat belt switch Combination light switch (☺☺) Alternator (L)	Driver's door lock switch Driver's door key cylinder switch (UNLOCK) Driver's door lock knob switch Power window master switch

Power Windows

Component Location Index

*: You can also test the switch by using the Multiplex Control System self-diagnosis function (mode 2) (see page 23-111).

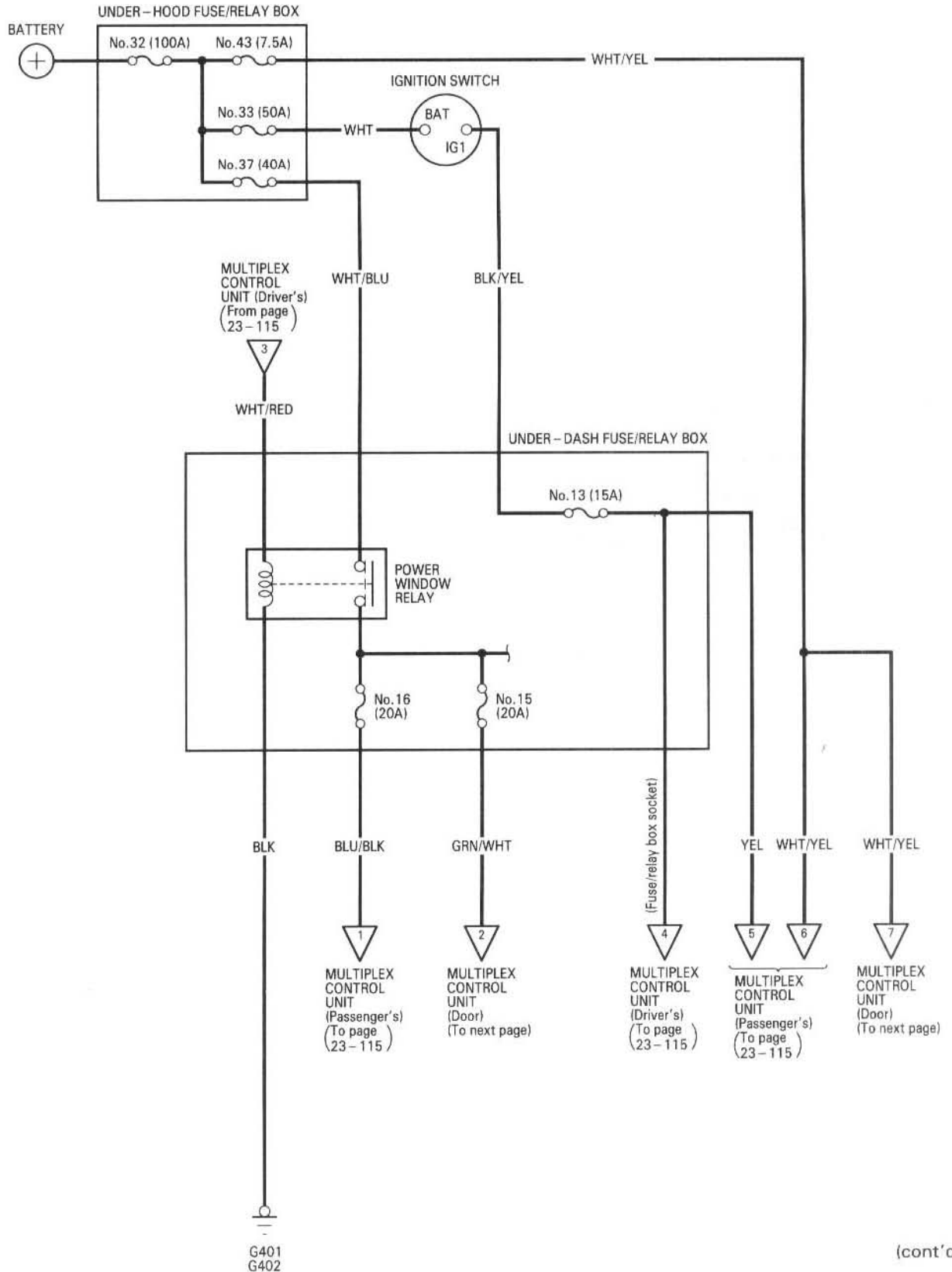


Power Window Key-off Operation

Description:

The power windows can still be operated for about 10 minutes after the ignition switch is turned from the "II" to the "I" or "O" position as long as neither door has been opened. This provides a convenience to parked occupants.

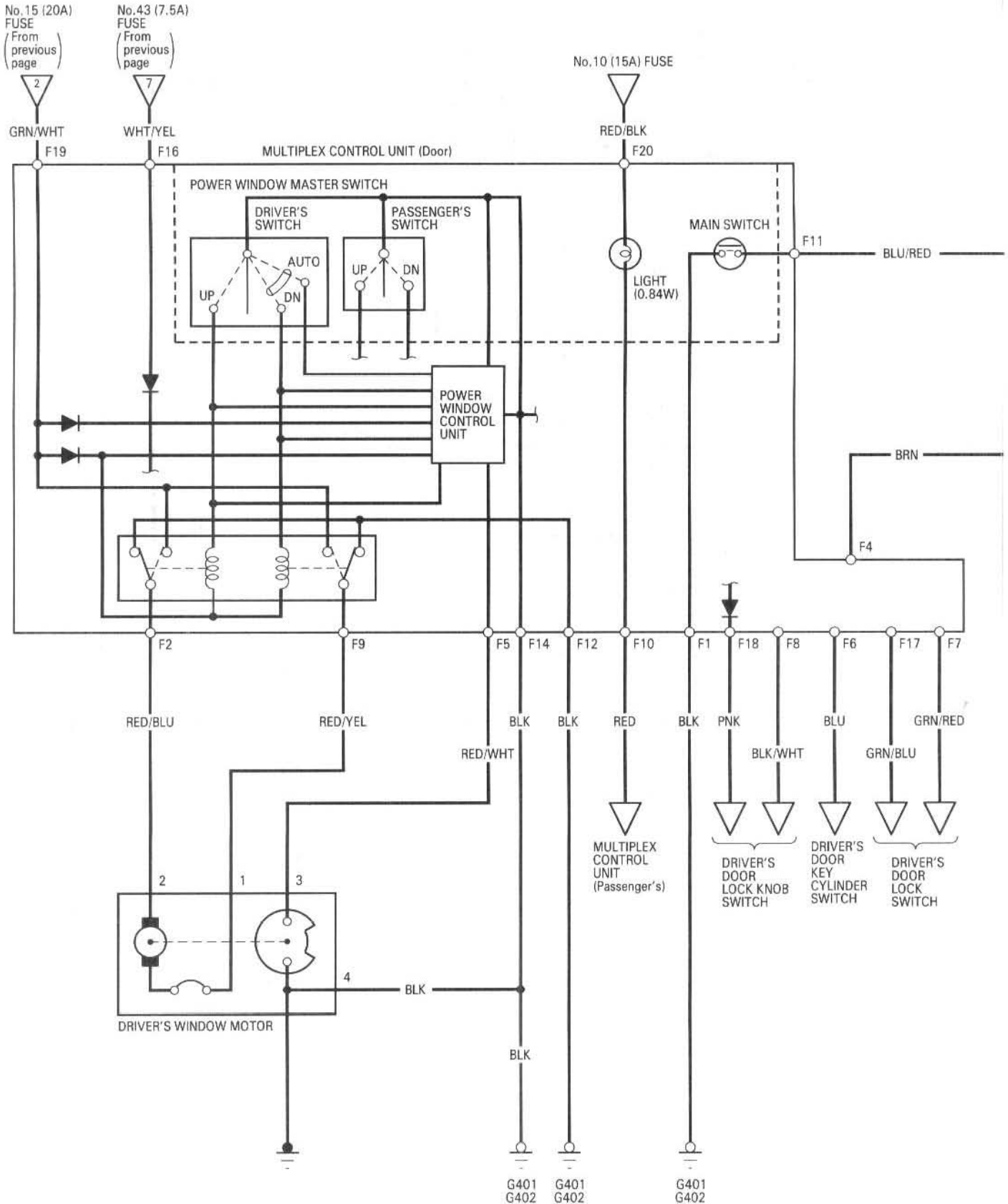
Circuit Diagram

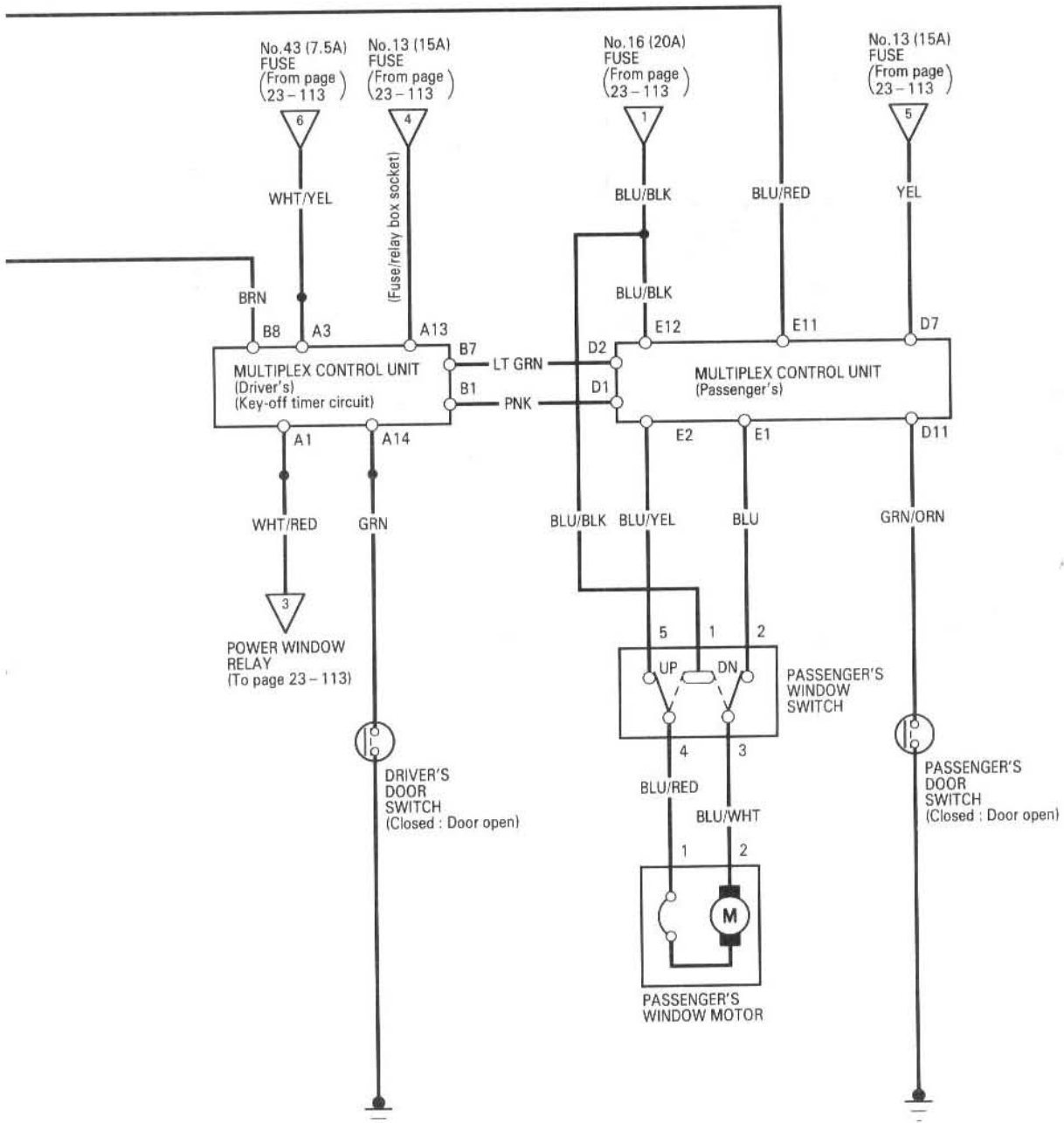


Power Windows

Circuit Diagram (cont'd)

DN : DOWN





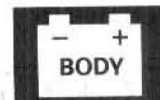
Power Windows

Troubleshooting

NOTE:

- Before testing, go to the Troubleshooting Guide (see page 23-103).
- The numbers in the table show the troubleshooting sequence.

Symptom	Item to be inspected		Blown No. 37 (40 A) fuse (In the under-hood fuse/relay box)	Power window relay	In the under-dash fuse/relay box		Passenger's switch	Driver's motor	Pulser (In driver's motor)	Passenger's motor	Window regulator	Door switches	Control unit input	Poor ground	Open circuit in the wires, loose or disconnected terminals
All windows do not work.	1	2											3	G401 G402	WHT/BLU
Driver's window does not work.			1				2			3		4	G401 G402		GRN/WHT
Driver's window does not work in AUTO.								1				2			RED/WHT
Passenger's window does not work.					1	2			3	4					BLU/BLK
All windows do not work within 10 minutes after the ignition switch is OFF (neither door opened).	1											2	3		



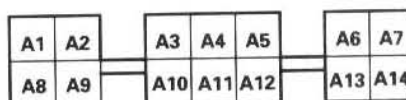
Control Unit Input Test

NOTE:

- Before testing, go to the Troubleshooting Guide (see page 23-103).
- All connector views are from the wire side of female terminals unless otherwise noted.

Multiplex Control Unit (Driver's):

1. Remove the under-dash fuse/relay box (see page 23-48).
2. Remove the driver's unit from the under-dash fuse/relay box (see page 23-106).
3. Inspect the connector and socket terminals to be sure they are all making good contact.
 - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
 - If the terminals look OK, make the following input tests at the connector and the fuse/relay box socket.
 - If any test indicates a problem, find and correct the cause, then recheck the system.
 - If all the input tests prove OK, the control unit must be faulty; replace it.



Fuse/relay
box socket

Disconnect the connectors from the unit.

Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
A13	Fuse/relay box socket	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none">• Blown No. 13 (15 A) fuse in the under-dash fuse/relay box• An open in the wire

Reconnect the connectors to the unit.

Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
A1	WHT/RED	Under all conditions	Check for resistance to ground: There should be approx 60 Ω .	<ul style="list-style-type: none">• Faulty power window relay• Poor ground (G401, G402)• An open in the wire
A14	GRN	Driver's door opened	Check for voltage to ground: There should be less than 1 V.	<ul style="list-style-type: none">• Faulty driver's door switch• An open in the wire
		Driver's door closed	Check for voltage to ground: There should be 5 V or more.	

(cont'd)

Power Windows

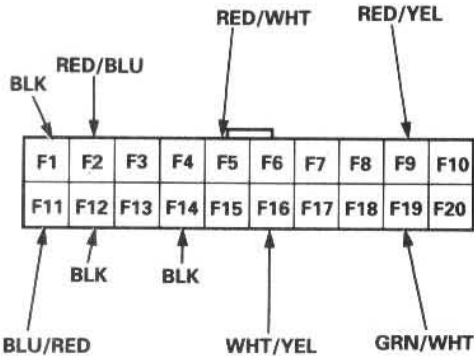
Control Unit Input Test (cont'd)

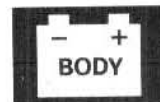
NOTE:

- Before testing, go to the Troubleshooting Guide (see page 23-103).
- All connector views are from wire side of female terminals unless otherwise noted.

Multiplex Control Unit (Door):

1. Remove the driver's door panel, and disconnect the 20P connector from the door unit (see page 23-104).
2. Inspect the connector and socket terminals to be sure they are all making good contact.
 - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
 - If the terminals look OK, make the following input tests at the connector.
 - If a test indicates a problem, find and correct the cause, then recheck the system.
 - If all the input tests prove OK, the control unit (power window master switch) must be faulty; replace it.





Disconnect the connector from the control unit.

Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
F16	WHT/YEL	Under all conditions	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> • Blown No. 43 (7.5 A) fuse in the under-hood fuse/relay box • An open in the wire
F19	GRN/WHT	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> • Blown No. 15 (20 A) fuse in the under-dash fuse/relay box • An open in the wire
F9	RED/YEL	Connect the F9 terminal to the F12 terminal, and the F2 terminal to the F16 terminal.	Check for driver's window motor: It should run (the window moves up).	<ul style="list-style-type: none"> • Faulty driver's window motor • An open in the wire
F2	RED/BLU			
F12	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	<ul style="list-style-type: none"> • Poor ground (G401, G402) • An open in the wire
F14				
F1	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	<ul style="list-style-type: none"> • Poor ground (G401, G402) • An open in the wire

Reconnect the connector to the control unit.

Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
F5	RED/WHT	While operating the driver's window switch.	Check for voltage between the F5 and F14 terminals: Approx. 6 V should be indicated as the driver's window motor runs.	<ul style="list-style-type: none"> • Faulty pulser • Faulty driver's window motor • An open in the wire
F11	BLU/RED	With master main switch ON	Check for voltage to ground: There should be less than 1 V.	<ul style="list-style-type: none"> • Faulty multiplex control unit (Passenger's) • An open in the wire

(cont'd)

Power Windows

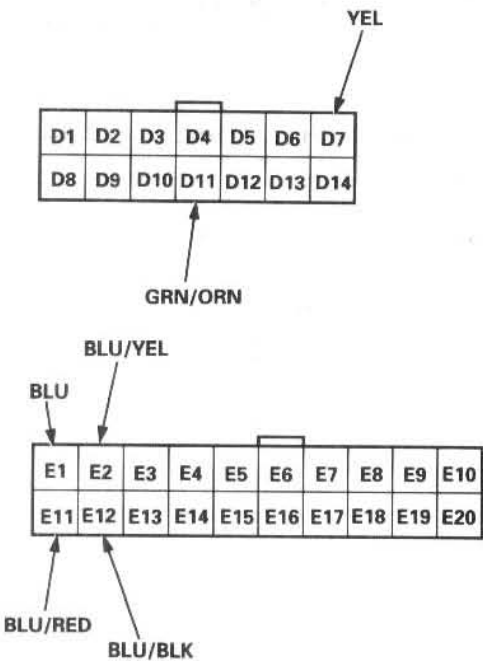
Control Unit Input Test (cont'd)

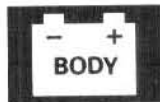
NOTE:

- Before testing, go to the Troubleshooting Guide (see page 23-103).
- All connector views are from the wire side of female terminals unless otherwise noted.

Multiplex Control Unit (Passenger's):

1. Remove the right kick panel (see section 20).
2. Disconnect the 14P and 20P connectors, then remove the passenger's unit (see page 23-105).
3. Inspect the connector and socket terminals to be sure they are all making good contact.
 - If the terminals are bent, loose corroded, repair them as necessary, and recheck the system.
 - If the terminals look OK, make the following input tests at the connector.
 - If a test indicates a problem, find and correct the cause, then recheck the system.
 - If all the input tests prove OK, the control unit must be faulty; replace it.





Disconnect the connectors from the control unit.

Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
E12	BLU/BLK	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> • Blown No. 37 (40 A) fuse in the under-hood fuse/relay box • Faulty power window relay • An open in the wire
E1	BLU	Ignition switch ON (II) and passenger's switch up	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> • Faulty passenger's power window motor • Faulty passenger's window switch • An open in the wire
E2	BLU/YEL	Ignition switch ON (II) and passenger's switch down		

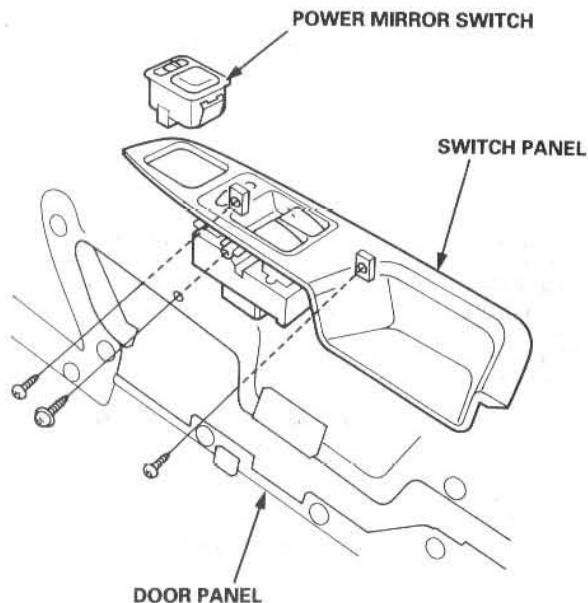
Reconnect the connectors to the control unit.

Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
D11	GRN/ORN	Passenger's door opened	Check for voltage to ground: There should be less than 1 V.	<ul style="list-style-type: none"> • Faulty passenger's door switch • An open in the wire
		Passenger's door closed	Check for voltage to ground: There should be 5 V or more.	
D7	YEL	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> • Blown No. 13 (15 A) fuse in the under-dash fuse/relay box • An open in the wire
E11	BLU/RED	Under all conditions (driver's master switch ON)	Check for voltage to ground: There should be 0 V.	<ul style="list-style-type: none"> • Faulty master switch • Poor ground (G401, G402) • An open in the wire

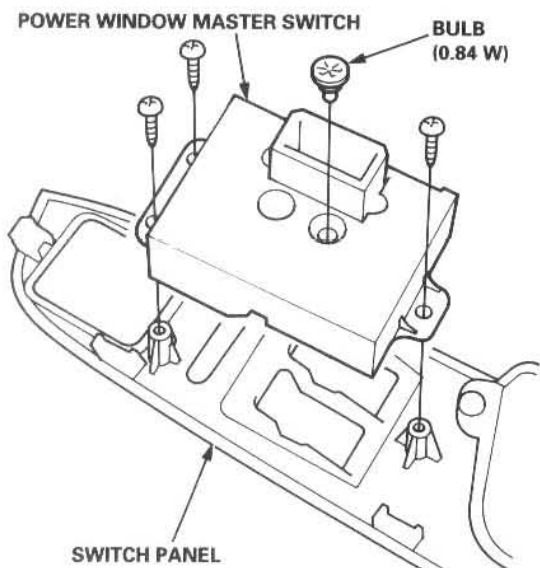
Power Windows

Master Switch Replacement

1. Remove the driver's door panel (see section 20).
2. Remove the mounting screw from the switch panel, then remove the power mirror switch from the switch panel.
3. Remove the two mounting screws from the switch panel, then remove the switch panel from the door panel.



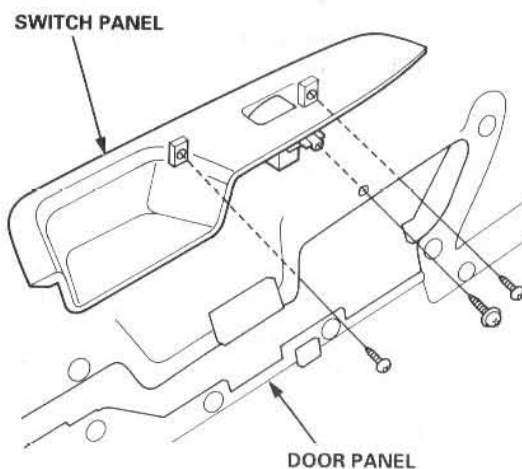
4. Remove the three mounting screws, then remove the master switch from the switch panel.



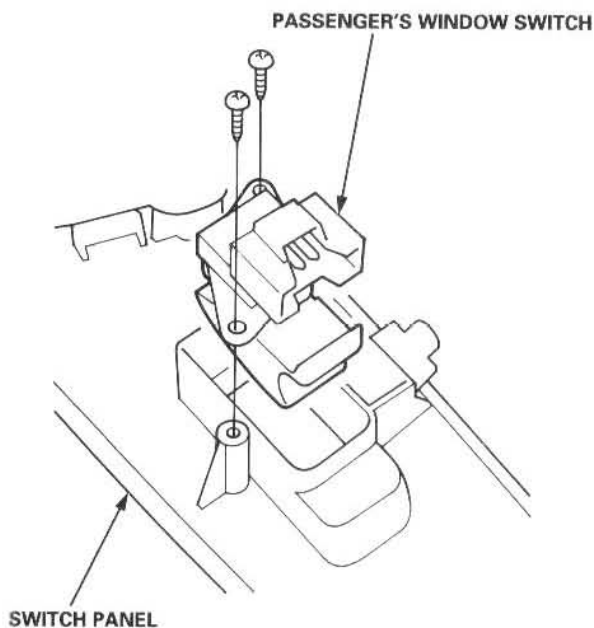
5. Install in the reverse order of removal.

Passenger's Window Switch Replacement

1. Remove the passenger's door panel (see section 20).
2. Remove the one mounting screw from the switch panel.
3. Remove the two mounting screws from the switch panel, then remove the switch panel from the door panel.



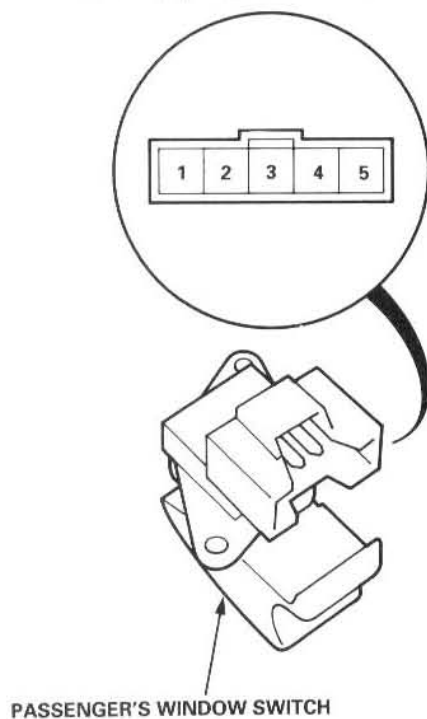
4. Remove the two mounting screws, then remove the passenger's switch from the switch panel.



5. Install in the reverse order of removal.

Passenger's Window Switch Test

1. Remove the passenger's window switch (see page 23-122).

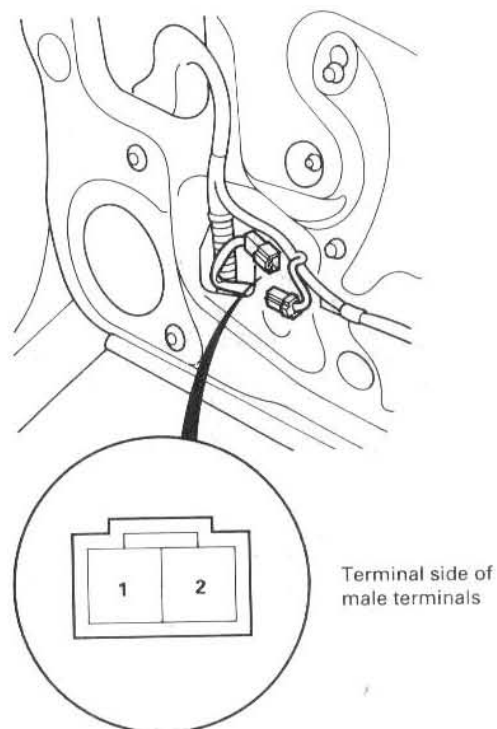


2. Check for continuity between the terminals in each switch position according to the table.

Terminal Position	1	2	3	4	5
UP	○	○—○		○	
NEUTRAL		○—○		○—○	
DOWN	○		○	○—○	○

Passenger's Window Motor Test

1. Remove the passenger's door panel (see section 20).
2. Disconnect the 2P connector from the window motor.



3. Check window motor operation by connecting power and ground according to the table.

CAUTION: When the motor stops running, disconnect one lead immediately.

Terminal Direction	1	2
UP	⊕	⊖
DOWN	⊖	⊕

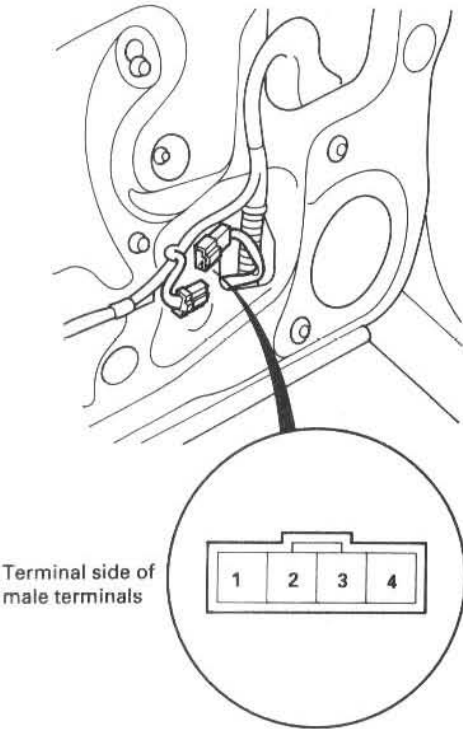
4. If the motor does not run or fails to run smoothly, replace it.

Power Windows

Driver's Window Motor Test

Motor Test:

- 1. Remove the driver's door panel (see section 20).
- 2. Disconnect the 4P connector from the window motor.



Pulser Test:

- 5. Connect the test leads of an analog ohmmeter to the No. 3 and No. 4 terminals.
- 6. Run the motor by connecting power and ground to the No. 1 and No. 2 terminals. The ohmmeter needle should move back and forth alternately.

- 3. Test the motor in each direction by connecting battery power and ground according to the table.

CAUTION: When the motor stops running, disconnect one lead immediately.

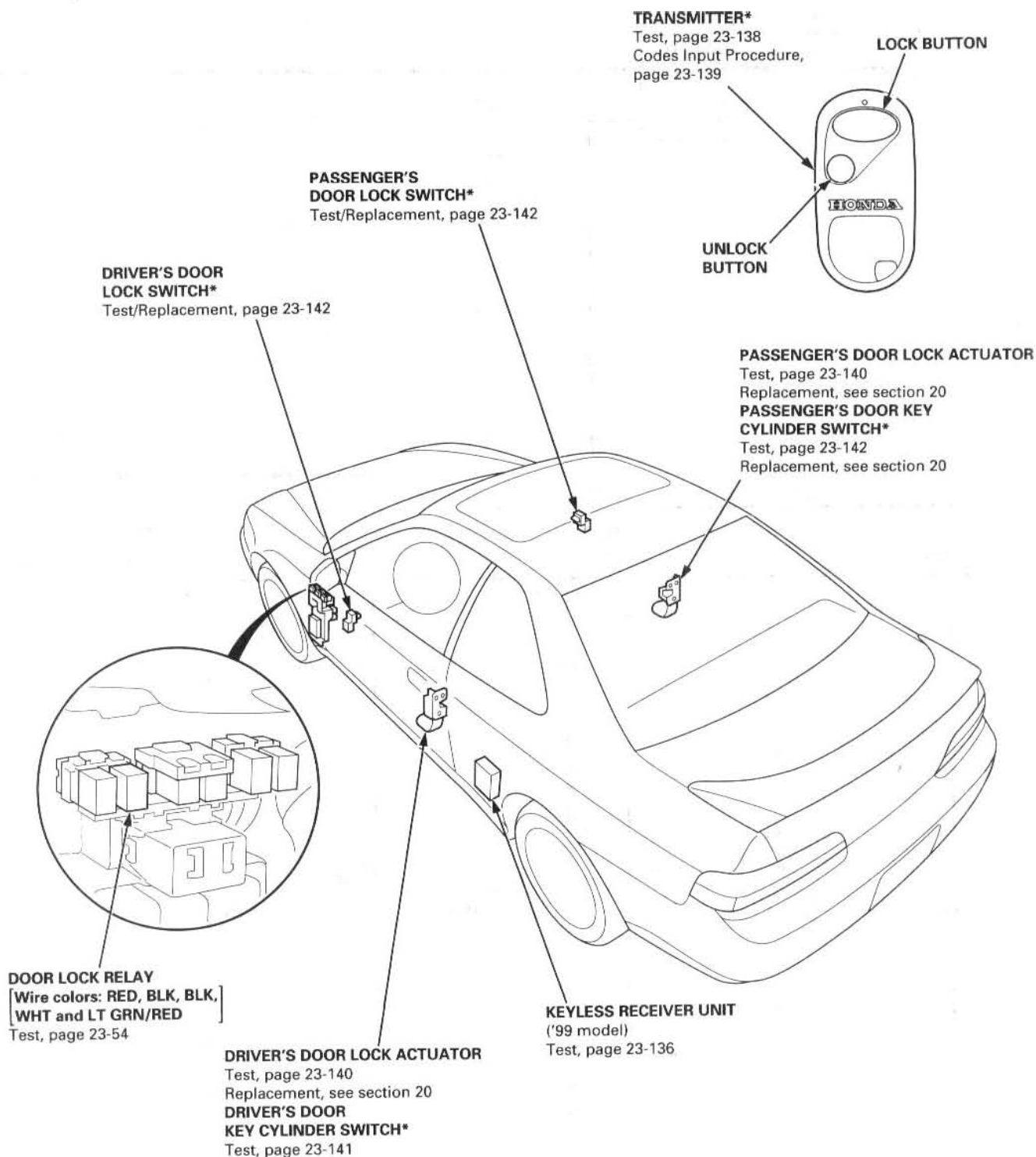
Terminal	1	2
Direction		
UP	⊖	⊕
DOWN	⊕	⊖

- 4. If the motor does not run or fails to run smoothly, replace it.

Power Door Locks



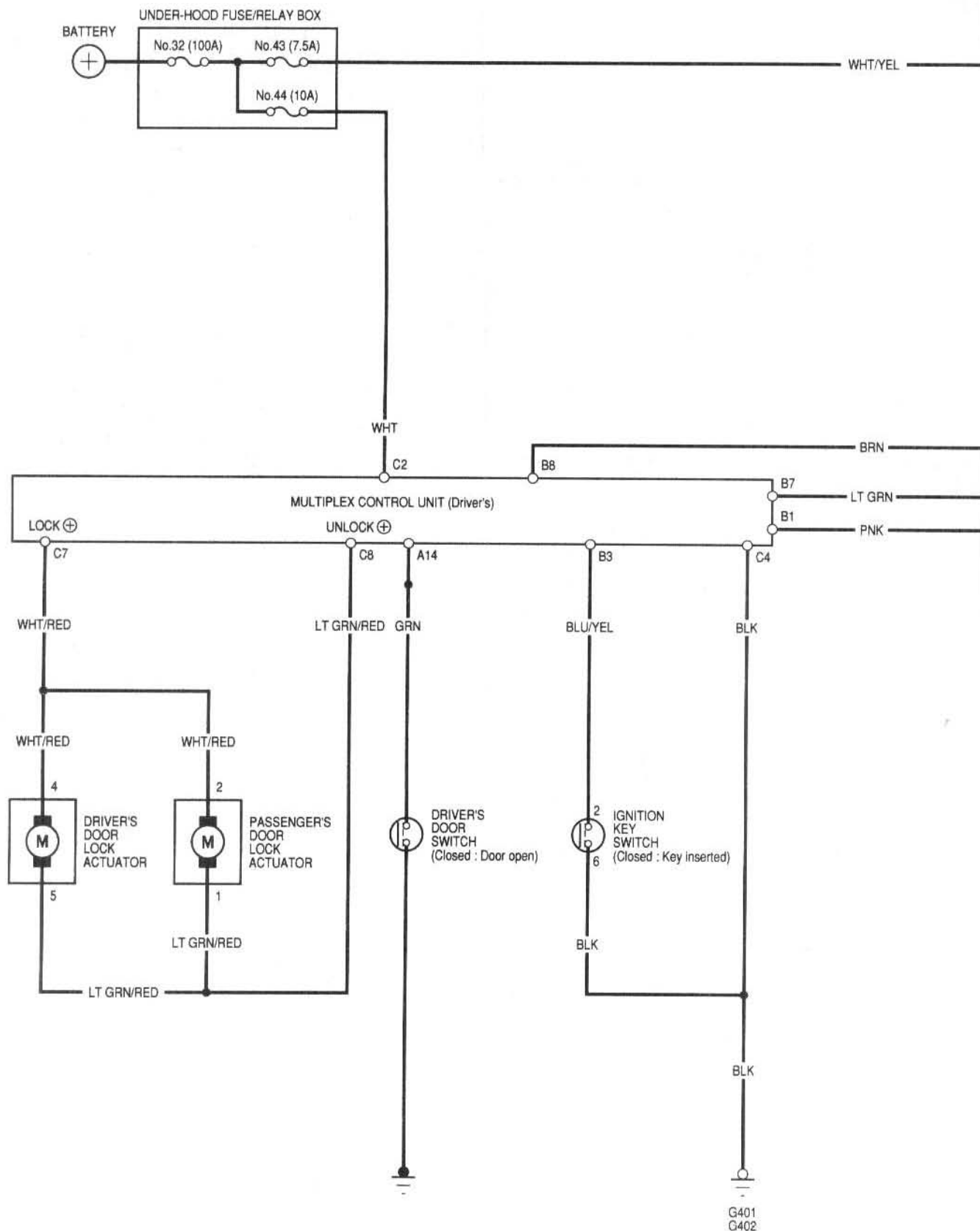
Component Location Index

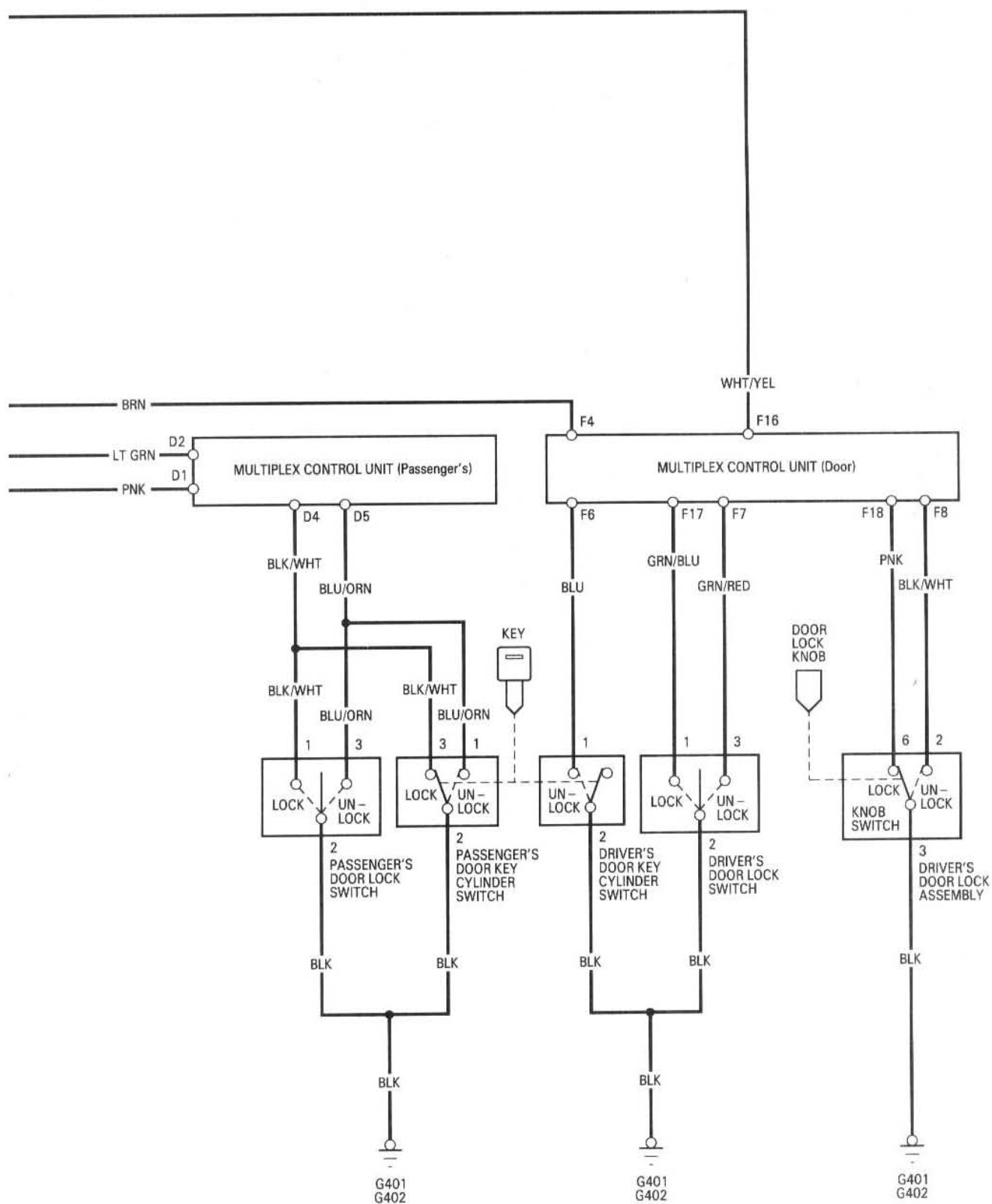


*: You can also test the switch by using the Multiplex Control System self-diagnosis function (mode 2) (see page 23-111).

Power Door Locks

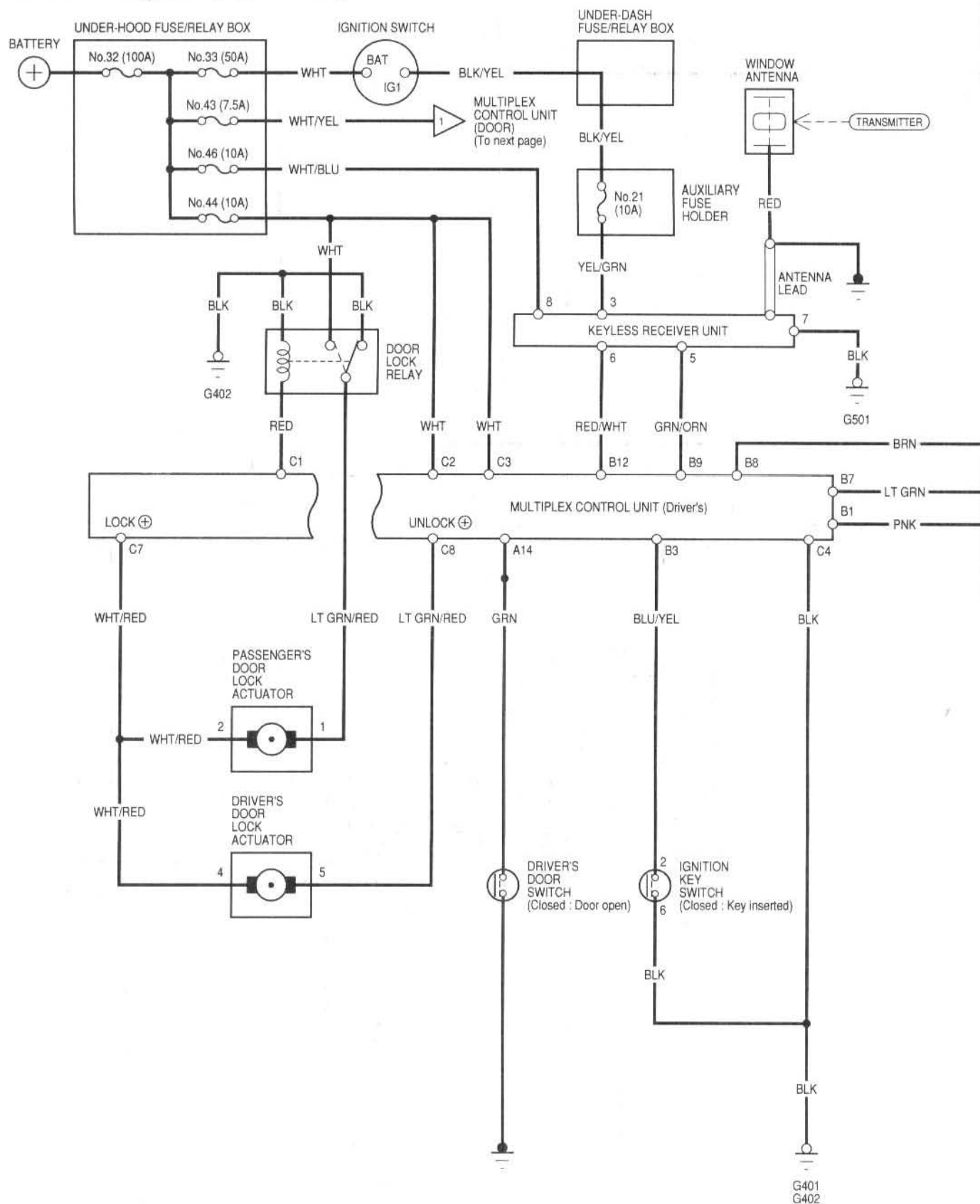
Circuit Diagram ('97-98 models)

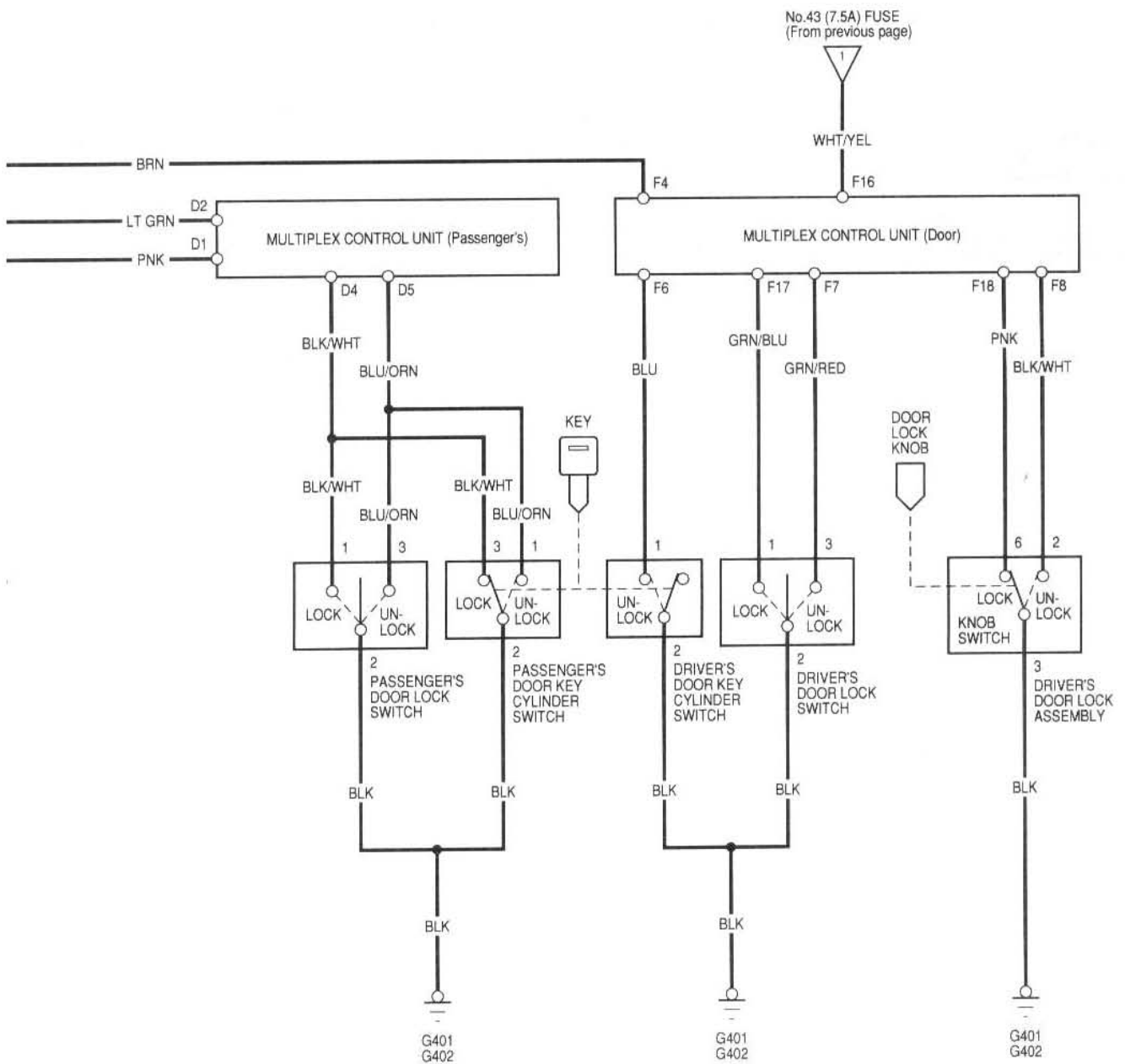




Power Door Locks

Circuit Diagram ('99 model)





Power Door Locks

Troubleshooting

NOTE:

- Before testing, go to the Troubleshooting Guide (see page 23-103).
- The numbers in the table show the troubleshooting sequence.

Item to be inspected		Blown No. 44 (10 A) fuse (In the under-hood fuse/relay box)	Disconnected or obstructed door lock rod/linkage	Driver's door lock knob switch (In the driver's door lock actuator)	Ignition key switch	Driver's door switch	Door lock actuator	Driver's door key cylinder switch	Driver's door lock switch	Passenger's door lock switch	Control unit input	Passenger's door key cylinder switch	Transmitter	Window antenna	Keyless receiver input	Poor ground	Open circuit in wires, loose or disconnected terminals
Symptom																	
Power door lock system doesn't work at all.		1									2					G401, G402	WHT
Doors don't lock or unlock with the driver's door lock switch.	Both doors								1		2					G401, G402	GRN/BLU or GRN/RED
	One door		1				2				3						
Doors don't lock or unlock with the passenger's door lock switch.	Both doors									1	2					G401, G402	BLK/WHT or BLU/ORN
	One door		1				2				3						
Doors don't lock or unlock with the driver's door lock knob.	Both doors			1							2					G401, G402	PNK or BLK/WHT
	One door		1				2				3						
Doors don't lock or unlock with the passenger's door key.	Both doors										2	1				G401, G402	BLK/WHT or BLU/ORN
	One door		1				2				3						
Doors don't unlock with the driver's door key.	Driver's door		1				2										
	(*) Both Doors			2				1								G401, G402	BLU
The door will lock when the ignition key is inserted and the driver's door is open.					1	2					3					G401, G402	BLU/YEL or GRN
*1The power door lock system works properly but the keyless entry system doesn't.													1	2	3	G501	WHT/BLU YEL/GRN or RED

(*) If the system is normal, all doors will unlock when the door key is kept in the unlock position (key cylinder switch and door lock knob switch turned ON) for one second or more.

*1: '99 model

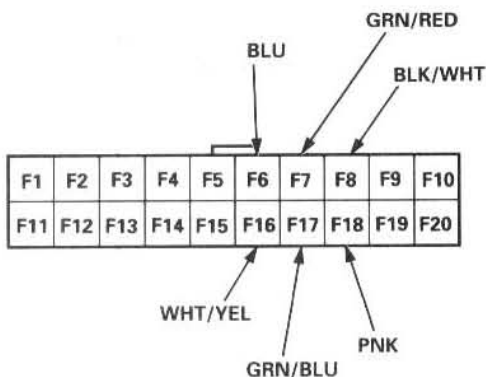
Control Unit Input Test

NOTE:

- Before testing, go to the Troubleshooting Guide (see page 23-103).
- All connector views are from wire side of female terminals unless otherwise noted.

Multiplex Control Unit (Door):

1. Remove the driver's door panel, and disconnect the 20P connector from the door unit (see page 23-104).
2. Inspect the connector and socket terminals to be sure they are all making good contact.
 - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
 - If the terminals look OK, make the following input tests at the connector.
 - If a test indicates a problem, find and correct the cause, then recheck the system.
 - If all the input tests prove OK, the control unit must be faulty; replace it.



Disconnect the connector from the unit.

Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
F16	WHT/YEL	Under all conditions	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> • Blown No. 43 (7.5 A) fuse in the under-hood fuse/relay box • An open in the wire

(cont'd)

Power Door Locks

Control Unit Input Test (cont'd)

Reconnect the connector to the unit.

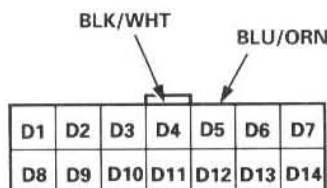
Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
F6	BLU	Driver's door key cylinder switch in UNLOCK	Check for voltage to ground: There should be less than 1 V.	<ul style="list-style-type: none"> Faulty driver's door key cylinder switch Poor ground (G401, G402) An open in the wire
		Driver's door key cylinder switch in neutral	Check for voltage to ground: There should be 5 V or more.	
F17	GRN/BLU	Driver's door lock switch in LOCK	Check for voltage to ground: There should be less than 1 V.	<ul style="list-style-type: none"> Faulty driver's door lock switch Poor ground (G401, G402) An open in the wire
		Driver's door lock switch in neutral	Check for voltage to ground: There should be 5 V or more.	
F7	GRN/RED	Driver's door lock switch in UNLOCK	Check for voltage to ground: There should be less than 1 V.	
		Driver's door lock switch in neutral	Check for voltage to ground: There should be 5 V or more.	
F18	PNK	Driver's door lock knob locked	Check for voltage to ground: There should be less than 1 V.	<ul style="list-style-type: none"> Faulty driver's door lock actuator Poor ground (G401, G402) An open in the wire
		Driver's door lock knob unlocked	Check for voltage to ground: There should be 5 V or more.	
F8	BLK/WHT	Driver's door lock knob unlocked	Check for voltage to ground: There should be less than 1 V.	
		Driver's door lock knob locked	Check for voltage to ground: There should be 5 V or more.	

NOTE:

- Before testing, go to the Troubleshooting Guide (see page 23-103).
- All connector views are from the wire side of female terminals unless otherwise noted.

Multiplex Control Unit (Passenger's):

1. Remove the right kick panel (see section 20).
2. Disconnect the 14P connector from the passenger's unit (see page 23-105).
3. Inspect the connector and socket terminals to be sure they are all making good contact.
 - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
 - If the terminals look OK, make the following input tests at the connector.
 - If any test indicates a problem, find and correct the cause, then recheck the system.
 - If all the input tests prove OK, the control unit must be faulty; replace it.



Reconnect the connectors to the unit

Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
D4	BLK/WHT	Passenger's door lock switch in LOCK	Check for voltage to ground: There should be less than 1 V.	<ul style="list-style-type: none"> • Faulty passenger's door lock switch • Poor ground (G401, G402) • An open in the wire
		Passenger's door lock switch in neutral	Check for voltage to ground: There should be 5 V or more.	
D4	BLK/WHT	Passenger's door lock key cylinder locked	Check for voltage to ground: There should be less than 1 V.	<ul style="list-style-type: none"> • Faulty passenger's door lock key cylinder switch • Poor ground (G401, G402) • An open in the wire
		Passenger's door lock key cylinder in neutral	Check for voltage to ground: There should be 5 V or more.	
D5	BLU/ORN	Passenger's door lock switch in UNLOCK	Check for voltage to ground: There should be less than 1 V.	<ul style="list-style-type: none"> • Faulty passenger's door lock switch • Poor ground (G401, G402) • An open in the wire
		Passenger's door lock switch in neutral	Check for voltage to ground: There should be 5 V or more.	
D5	BLU/ORN	Passenger's door lock key cylinder unlocked	Check for voltage to ground: There should be less than 1 V.	<ul style="list-style-type: none"> • Faulty passenger's door lock key cylinder switch • Poor ground (G401, G402) • An open in the wire
		Passenger's door lock key cylinder in neutral	Check for voltage to ground: There should be 5 V or more.	

(cont'd)

Power Door Locks

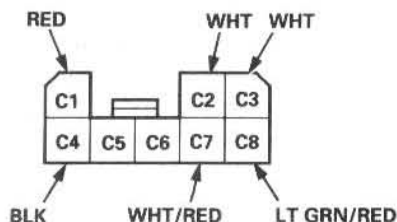
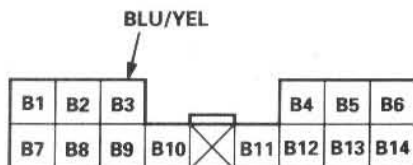
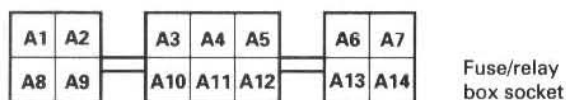
Control Unit Input Test (cont'd)

NOTE:

- Before testing, go to the Troubleshooting Guide (see page 23-103).
- All connector views are from wire side of female terminals unless otherwise noted.

Multiplex Control Unit (Driver's):

1. Remove the under-dash fuse/relay box (see page 23-48).
2. Remove the driver's unit from the under-dash fuse/relay box (see page 23-106).
3. Inspect the connector and socket terminals to be sure they are all making good contact.
 - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
 - If the terminals look OK, make the following input tests at the connector.
 - If any test indicates a problem, find and correct the cause, then recheck the system.
 - If all the input tests prove OK, the control unit must be faulty; replace it.





Disconnect the connectors from the unit.

Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
C4	BLK	Under all conditions	Check for continuity: There should be continuity.	<ul style="list-style-type: none"> • Poor ground (G401, G402) • An open in the wire
C2	WHT	Under all conditions	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> • Blown No. 44 (10 A) fuse in the under-hood fuse/relay box • An open in the wire
C3				
C8	LT GRN/ RED	Connect the C8 terminal to the C2 terminal, and the C7 terminal to the C4 terminal momentarily.	Check door lock operation: All doors should unlock.* ¹ Driver's door should unlock.* ²	<ul style="list-style-type: none"> • Blown No. 44 (10 A) fuse in the under-hood fuse/relay box • Faulty actuator • An open in the wire
C7	WHT/RED			
C7	WHT/RED	Connect the C7 terminal to the C2 terminal, and the C8 terminal to the C4 terminal momentarily.	Check door lock operation: All doors should lock.* ¹ Driver's door should lock.* ²	
C8	LT GRN/ RED			
C1* ²	RED	Connect the C3 terminal to the C1 terminal, and the C7 terminal to the C4 terminal momentarily.	Check door lock operation: Passenger's door should unlock.	<ul style="list-style-type: none"> • Poor ground (G402) • Faulty door lock relay • Faulty actuator • An open in the wire

*1: '97 – 98 models

*2: '99 model

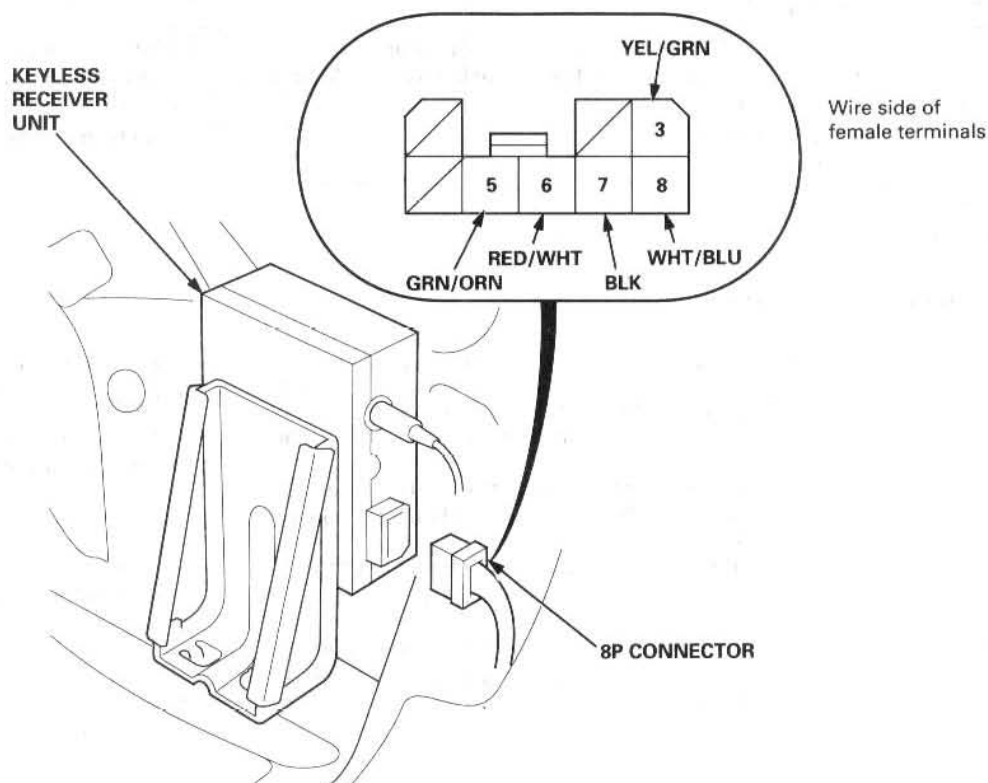
Reconnect the connectors to the unit.

Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
B3	BLU/YEL	Ignition key out of the ignition switch	Check for voltage to ground: There should be 5 V or more.	<ul style="list-style-type: none"> • Faulty ignition key switch • Poor ground (G401, G402) • An open in the wire
		Ignition key inserted into the ignition switch	Check for voltage to ground: There should be less than 1 V.	
A14	Fuse/relay box socket	Driver's door opened	Check for voltage to ground: There should be less than 1 V.	<ul style="list-style-type: none"> • Faulty driver's door switch • An open in the wire
		Driver's door closed	Check for voltage to ground: There should be 5 V or more.	

Power Door Locks

Keyless Receiver Unit Input Test

1. Remove the rear seat (see section 20).
2. Remove the left quarter trim panel (see section 20).
3. Disconnect the 8P connector from the keyless receiver unit.
4. Inspect the connector and socket terminals to be sure they are all making good contact.
 - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
 - If the terminals look OK, make the following input tests at the connector.
 - If any test indicates a problem, find and correct the cause, then recheck the system.
 - If all the input tests prove OK, the control unit must be faulty; replace it.



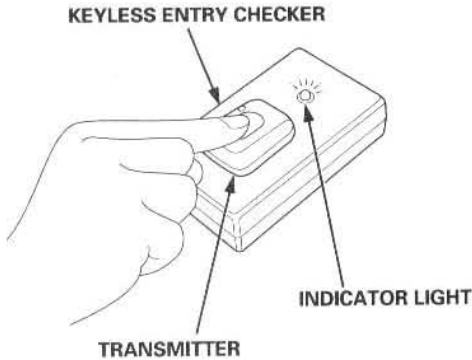
Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
3	YEL/GRN	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> • Blown No. 21 (10 A) fuse in the auxiliary fuse holder • An open in the wire
5	GRN/ORN	Under all conditions	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> • Blown No. 46 (10 A) fuse in the under-hood fuse/relay box • Faulty multiplex control unit (driver's) • An open in the wire
6	RED/WHT	Under all conditions	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> • Blown No. 46 (10 A) fuse in the under-hood fuse/relay box • Faulty multiplex control unit (driver's) • An open in the wire
7	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	<ul style="list-style-type: none"> • Poor ground (G501) • An open in the wire
8	WHT/BLU	Under all conditions	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> • Blown No. 46 (10 A) fuse in the under-hood fuse/relay box • An open in the wire

Power Door Locks

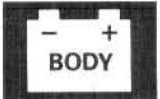
Transmitter Test

NOTE:

- If the doors unlock or lock with the transmitter, but the LED on the transmitter does not come on, the LED is faulty; replace the transmitter.
 - If any door is open, you cannot lock the door with the transmitter.
 - If you unlocked the doors with the transmitter, but do not open any of the doors within 30 seconds, the doors relock automatically.
 - The doors do not lock or unlock with the transmitter if the ignition key is inserted in the ignition switch.
1. Using a keyless entry checker (07MAJ – SP00300):
 - Place the transmitter on the keyless entry checker, and press the transmitter button.
 - If the indicator light does not come on, check for:
 - a dead or low battery
 - Faulty transmitter
 - If the indicator light comes on, the transmitter is OK.



NOTE: After a transmitter battery has been replaced, aim the transmitter at the receiver, and press the transmitter button six times. Confirm you can hear the sound of the door lock actuators when you press the sixth time.



Transmitter Programming

Storing transmitter codes:

The codes of up to three transmitters can be read into the keyless receiver unit memory. (If a fourth code is stored, the code which was input first will be erased.)

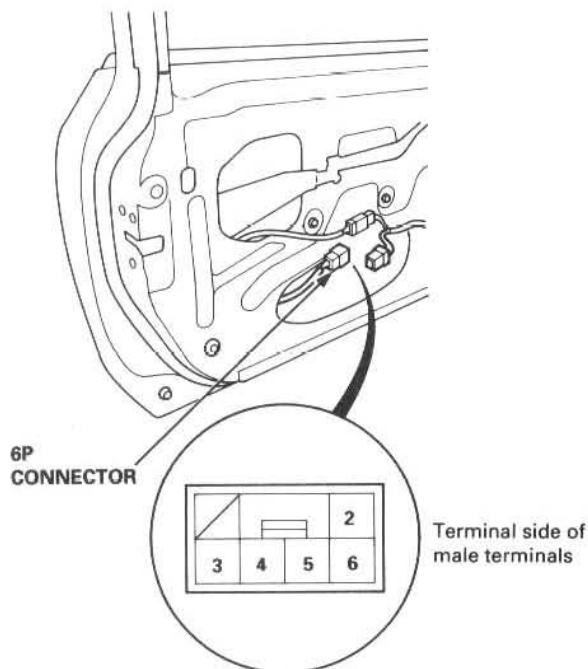
NOTE: It is important to maintain the time limits between the steps.

1. Turn the ignition switch ON (II).
2. Within 1 to 4 sec., push the transmitter lock or unlock button with the transmitter aimed at the receiver (control unit).
3. Within 1 to 4 sec., turn the ignition switch OFF.
4. Within 1 to 4 sec., turn the ignition switch ON (II).
5. Within 1 to 4 sec., push the transmitter lock or unlock button with the transmitter aimed at the receiver (control unit).
6. Within 1 to 4 sec., turn the ignition switch OFF.
7. Within 4 sec., turn the ignition switch ON (II).
8. Within 1 to 4 sec., push the transmitter lock or unlock button with the transmitter aimed at the receiver (control unit).
9. Within 1 to 4 sec., turn the ignition switch OFF.
10. Within 4 sec., turn the ignition switch ON (II).
11. Within 1 to 4 sec., push the transmitter lock or unlock button with the transmitter aimed at the receiver (control unit).
12. Confirm you can hear the sound of the door lock actuators. Within 1 to 4 sec., push the transmitter lock or unlock button again.
13. Within 10 sec., aim the transmitters (up to three) whose codes you want to store at the receiver, and press the transmitter lock or unlock buttons. Confirm that you can hear the sound of the door lock actuators after each transmitter code is stored.
14. Turn the ignition switch OFF, and pull out the key.
15. Confirm proper operation with the new codes(s).

Power Door Locks

Driver's Door Lock Actuator Test

1. Remove the driver's door panel (see section 20).
2. Disconnect the 6P connector from the actuator.



3. Check actuator operation by connecting power and ground according to the table.

CAUTION: To prevent damage to the actuator, apply battery voltage only momentarily.

Terminal Position	4	5
LOCK	⊕	⊖
UNLOCK	⊖	⊕

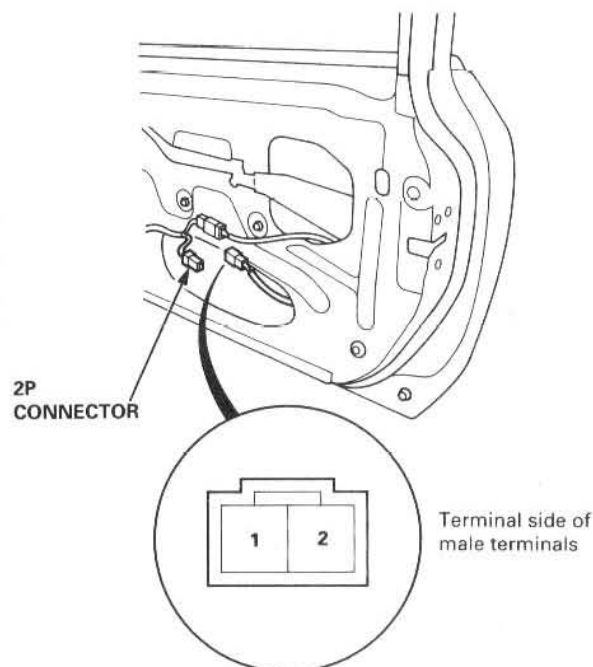
4. Check for continuity between the terminals in each knob switch position according to the table.

Terminal Position	2	3	6
LOCK		○	○
UNLOCK	○	○	

5. If the actuator fails to work properly, replace it.

Passenger's Door Lock Actuator Test

1. Remove the passenger's door panel (see section 20).
2. Disconnect the 2P connector from the actuator.



3. Check actuator operation by connecting power and ground according to the table.

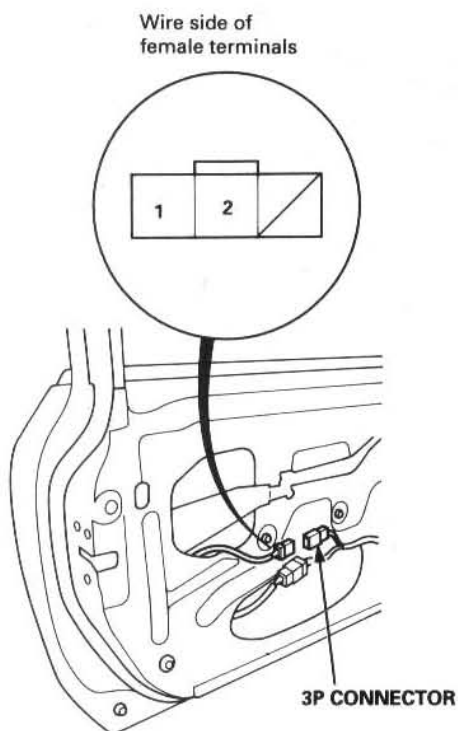
CAUTION: To prevent damage to the actuator, apply battery voltage only momentarily.

Terminal Position	1	2
LOCK	⊖	⊕
UNLOCK	⊕	⊖

4. If the actuator fails to work properly, replace it.

Driver's Door Lock Key Cylinder Switch Test

1. Remove the driver's door panel (see section 20).
2. Disconnect the 3P connector from the key cylinder switch.



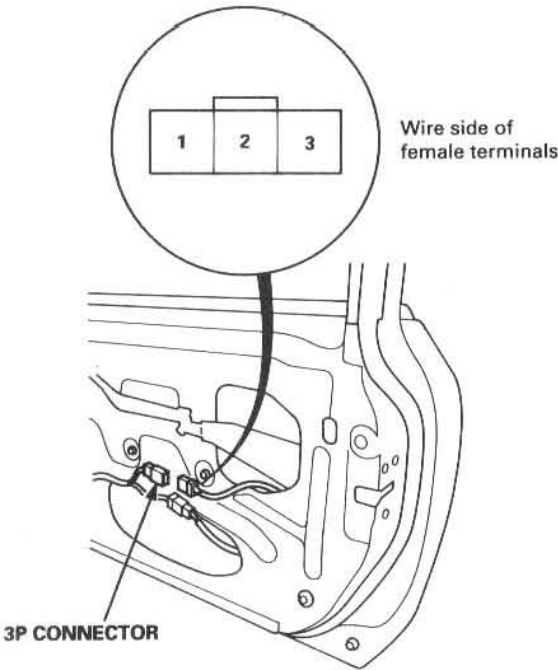
3. Check for continuity between the terminals in each switch position according to the table.

Terminal	1	2	3
Position			
LOCK			
NEUTRAL			
UNLOCK	○	○	

Power Door Locks

Passenger's Door Lock Key Cylinder Switch Test

- 1. Remove the passenger's door panel (see section 20).
- 2. Disconnect the 3P connector from the key cylinder switch.

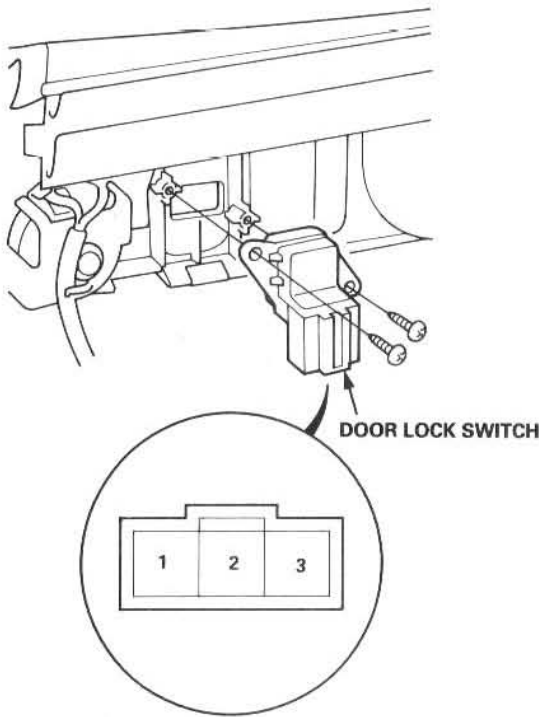


- 3. Check for continuity between the terminals in each switch position according to the table.

Terminal Position	1	2	3
LOCK		○ — ○	
NEUTRAL			
UNLOCK	○ — ○		

Door Lock Switch Test

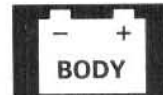
- 1. Remove the door panel (see section 20).
- 2. Remove the two screws, then remove the door lock switch.



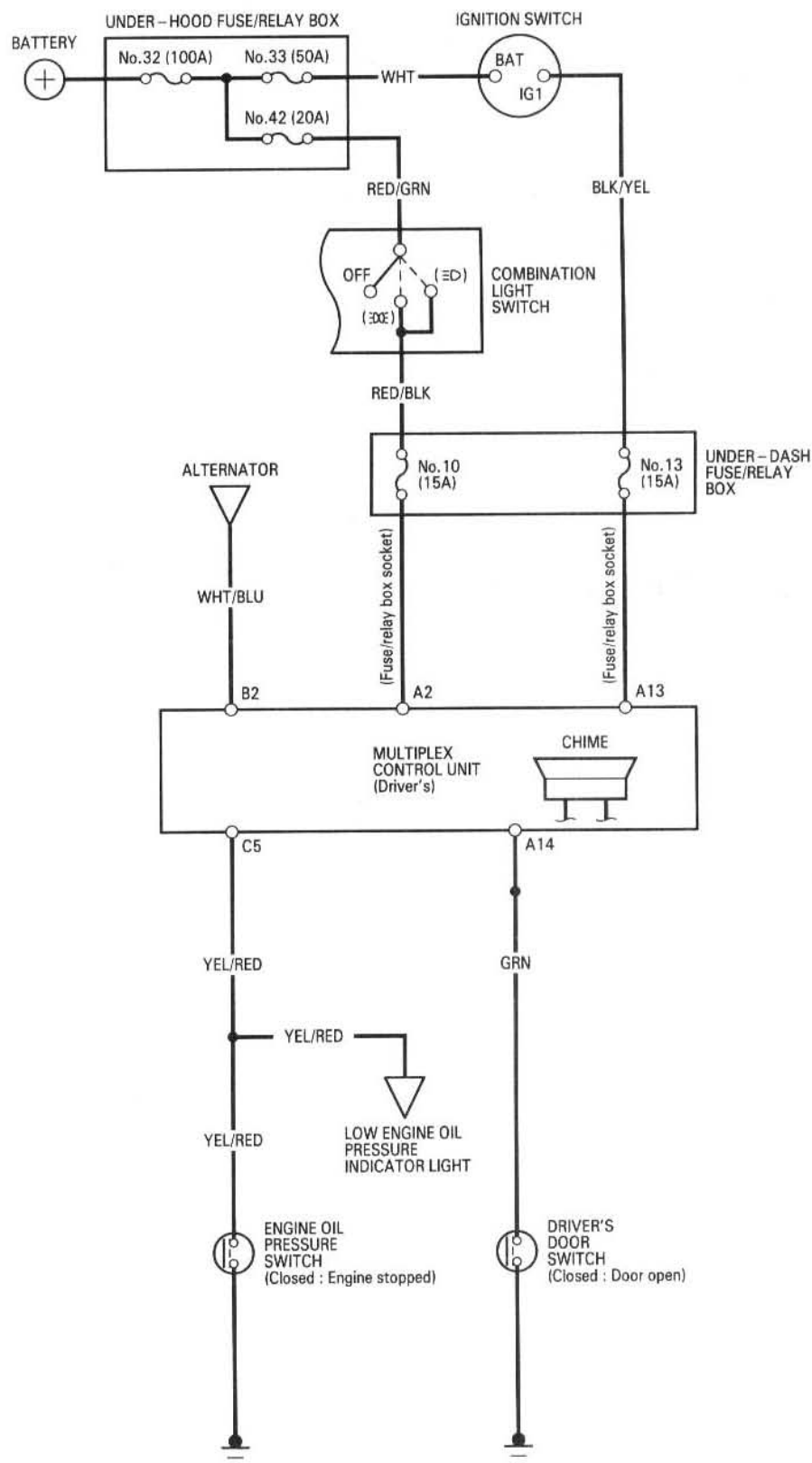
- 3. Check for continuity between the terminals in each switch position according to the table.

Terminal Position	1	2	3
LOCK	○ — ○		
NEUTRAL			
UNLOCK		○ — ○	

Lights-on Reminder/Engine Oil Pressure Indicator Flasher System



Circuit Diagram



Lights-on Reminder/Engine Oil Pressure Indicator Flasher System

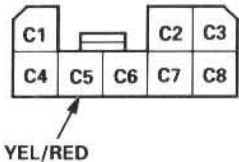
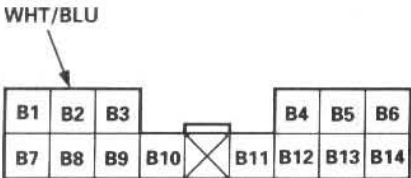
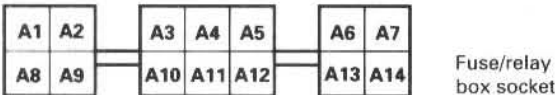
Control Unit Input Test

NOTE:

- Before testing, go to the Troubleshooting Guide (see page 23-103).
- All connector views are from wire side of female terminals unless otherwise noted.

Multiplex Control Unit (Driver's):

1. Remove the under-dash fuse/relay box (see page 23-48).
2. Remove the driver's unit from the under-dash fuse/relay box (see page 23-106).
3. Inspect the connector and socket terminals to be sure they are all making good contact.
 - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
 - If the terminals look OK, make the following input tests at the connector and the fuse/relay box socket.
 - If any test indicates a problem, find and correct the cause, then recheck the system.
 - If all the input tests prove OK, the control unit must be faulty; replace it.



Lights-on Reminder System:

Disconnect the connectors from the unit.

Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
A14	Fuse/relay box socket	Driver's door open	Check for continuity to ground: There should be continuity.	<ul style="list-style-type: none">• Faulty driver's door switch• An open in the wire
A13		Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none">• Blown No. 13 (15 A) fuse in the under-dash fuse/relay box• An open in the wire
A2		Combination light switch ON (☺) or (☹)	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none">• Blown No. 10 (15 A) fuse in the under-dash fuse/relay box• Faulty combination light switch• An open in the wire



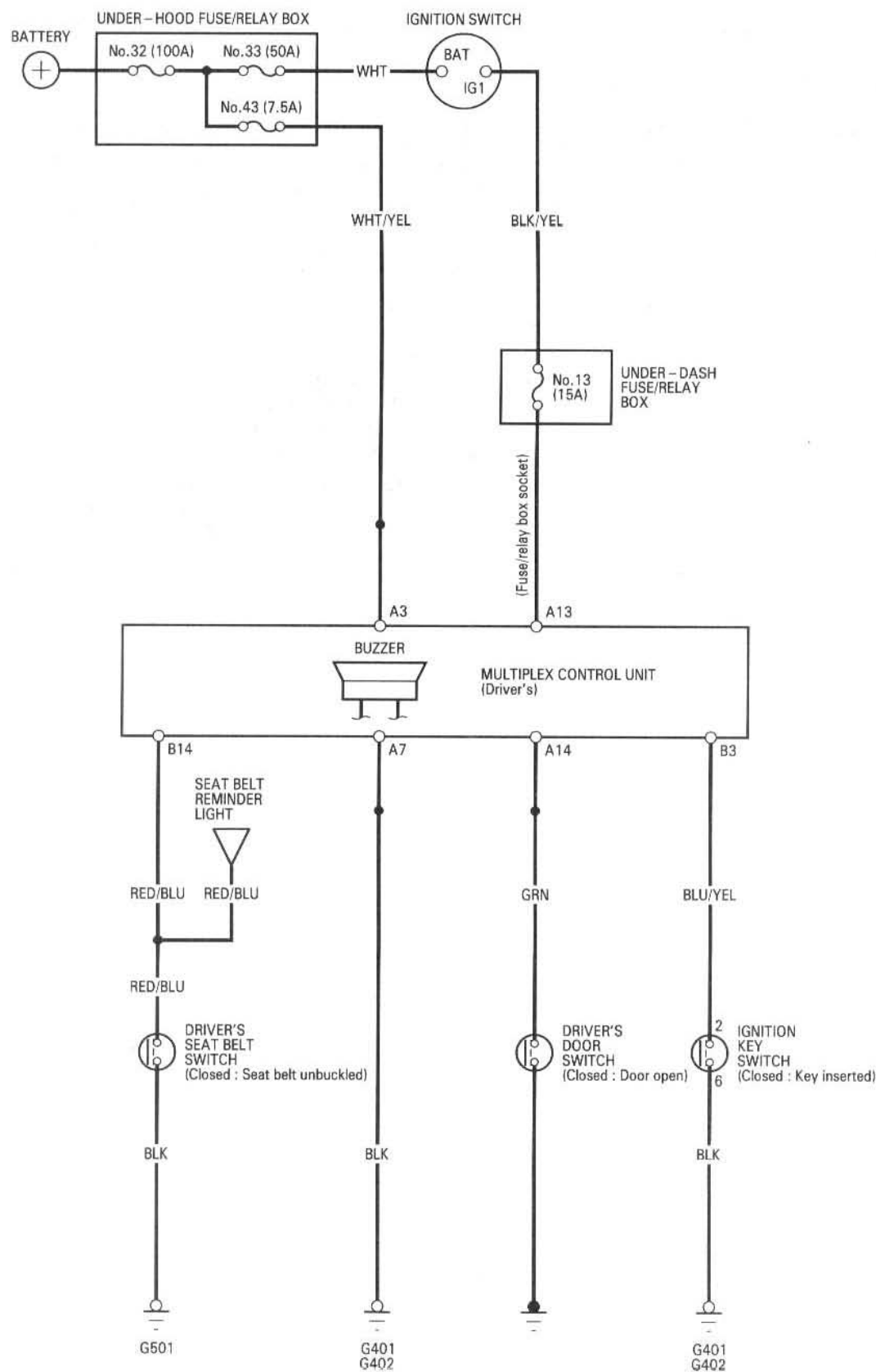
Engine Oil Pressure Indicator Flasher System:

Disconnect the connectors from the unit.

Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
A13	Fuse/relay box socket	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none">• Blown No. 13 (15 A) fuse in the under-dash fuse/relay box• An open in the wire
B2	WHT/BLU	Engine running	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none">• Faulty charging system• An open in the wire
C5	YEL/RED	Ignition switch OFF	Check for continuity to ground: There should be continuity.	<ul style="list-style-type: none">• Faulty engine oil pressure switch• An open in the wire
		Ignition switch ON (II)	Check light operation. If the light does not come on, attach the YEL/RED terminal to ground: Light should come on as the ignition switch is turned ON (II).	<ul style="list-style-type: none">• Blown bulb• An open in the wire
		Start the engine.	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none">• Insufficient oil• Improper lubrication• Faulty engine oil pressure switch• A open in the wire

Seat Belt Reminder/Key-in Reminder System

Circuit Diagram



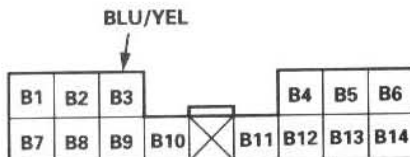
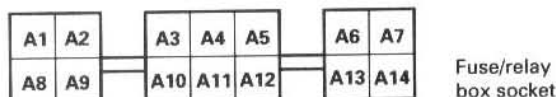
Control Unit Input Test

NOTE:

- Before testing, go to the Troubleshooting Guide (see page 23-103).
- All connector views are from wire side of female terminals unless otherwise noted.

Multiplex Control Unit (Driver's):

1. Remove the under-dash fuse/relay box (see page 23-48).
2. Remove the driver's unit from the under-dash fuse/relay box (see page 23-106).
3. Inspect the connector and socket terminals to be sure they are all making good contact.
 - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
 - If the terminals look OK, make the following input tests at the connector and the fuse/relay box socket.
 - If any test indicates a problem, find and correct the cause, then recheck the system.
 - If all the input tests prove OK, the control unit must be faulty; replace it.



Key-in Reminder System:

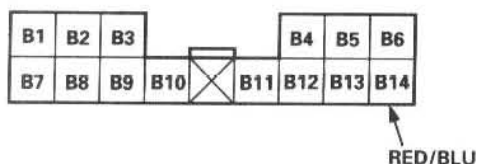
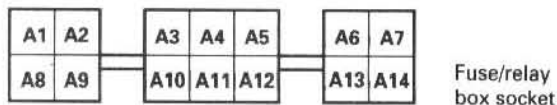
Disconnect the connectors from the unit.

Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
A14	Fuse/relay box socket	Driver's door open	Check for voltage to ground: There should be 1 V or less.	<ul style="list-style-type: none"> • Faulty driver's door switch • An open in the wire
A13		Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> • Blown No. 13 (15 A) fuse in the under-dash fuse/relay box • An open in the wire
B3	BLU/YEL	Ignition key is inserted into the ignition switch.	Check for voltage to ground: There should be 1 V or less.	<ul style="list-style-type: none"> • Faulty ignition key switch • Poor ground (G401, G402) • An open in the wire

(cont'd)

Seat Belt Reminder/Key-in Reminder System

Control Unit Input Test (cont'd)

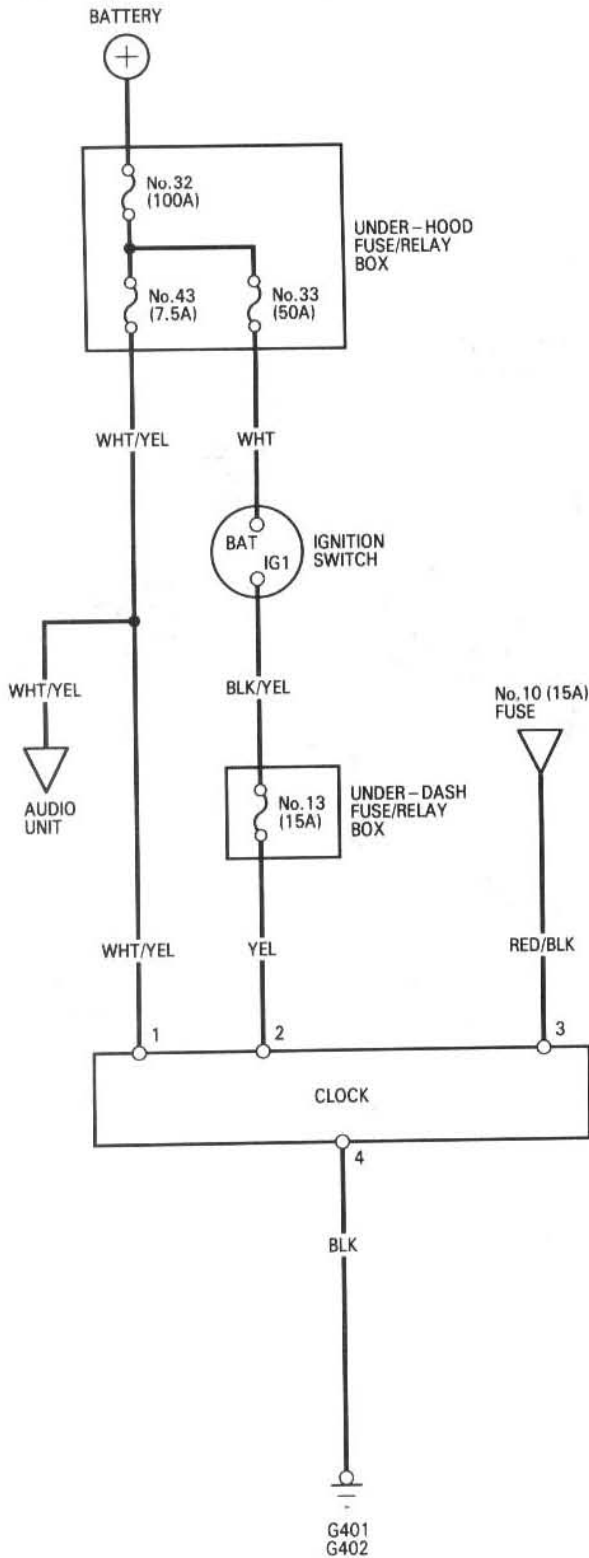


Seat Belt Reminder system:

Disconnect the connectors from the unit.

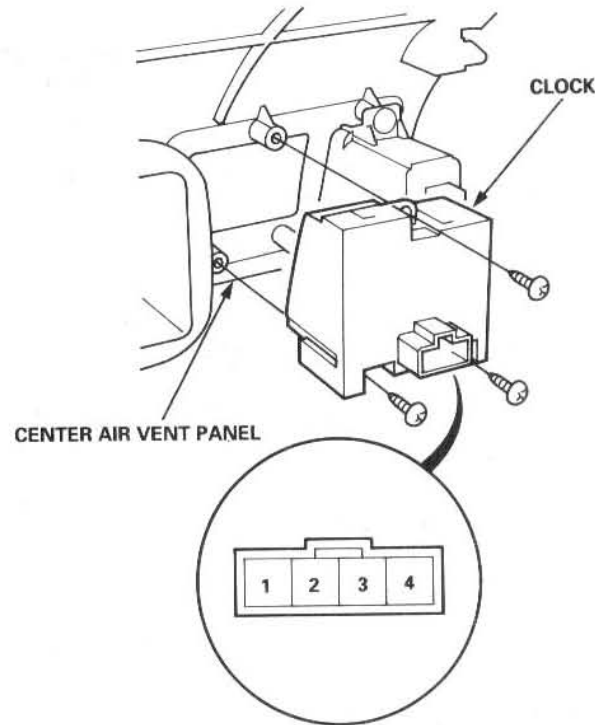
Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
A13	Fuse/relay box socket	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> • Blown No. 13 (15 A) fuse in the under-dash fuse/relay box • An open in the wire
B14	RED/BLU	Driver's seat belt unbuckled	Check for continuity to ground: There should be continuity.	<ul style="list-style-type: none"> • Faulty driver's seat belt switch • Poor ground (G501) • An open in the wire

Circuit Diagram



Removal

1. Remove the center air vent panel (see section 20).
2. Disconnect the connectors from the hazard warning switch and the clock.
3. Remove three screws and the clock from the center air vent panel.



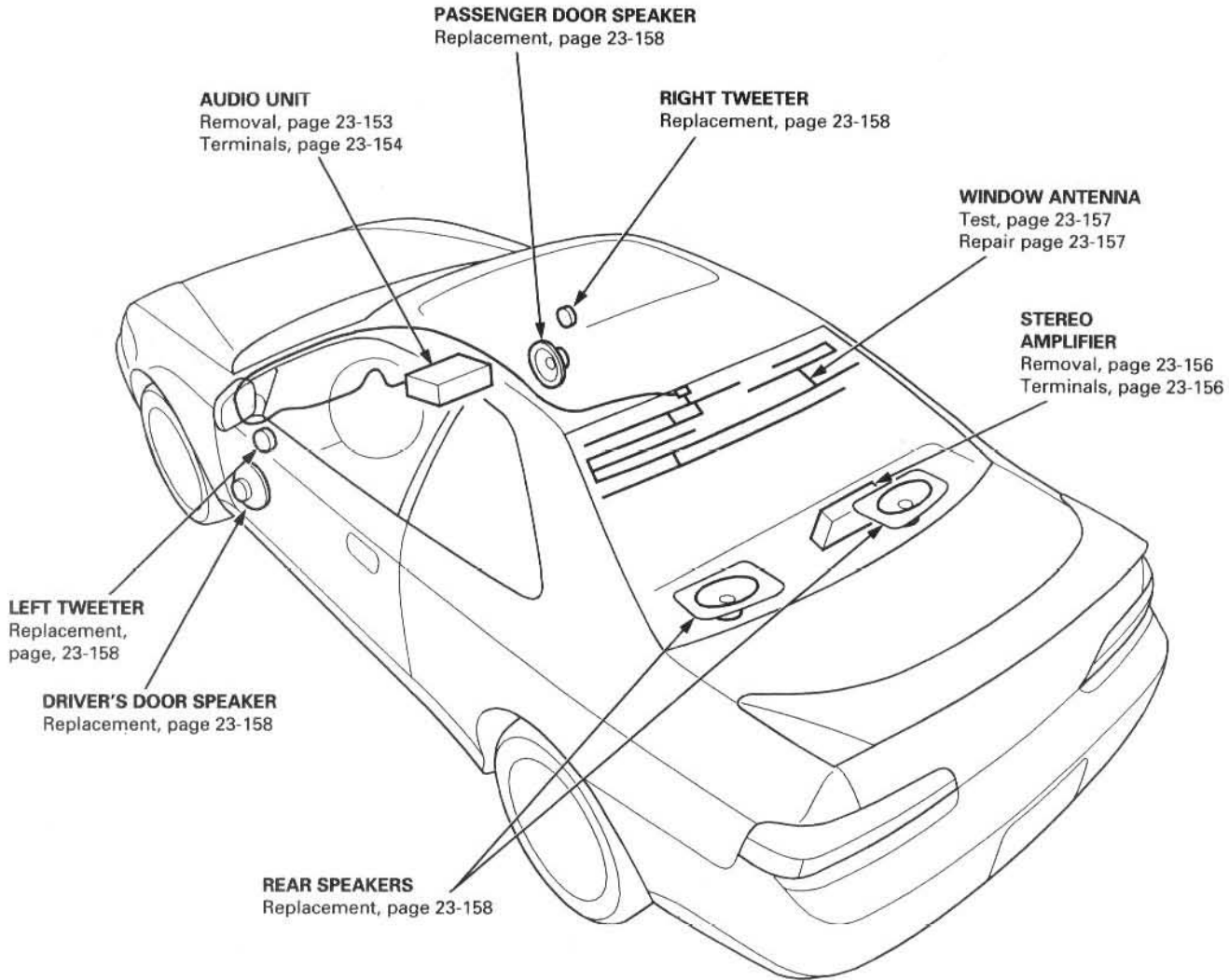
Terminals

Cavity	Wire	Connects to
1	WHT/YEL	Constant power (time memory)
2	YEL	IG1 (main clock power supply)
3	RED/BLK	Lights-on signal
4	BLK	Ground (G401, G402)

Stereo Sound System

Component Location Index

SRS Components are located in the area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.



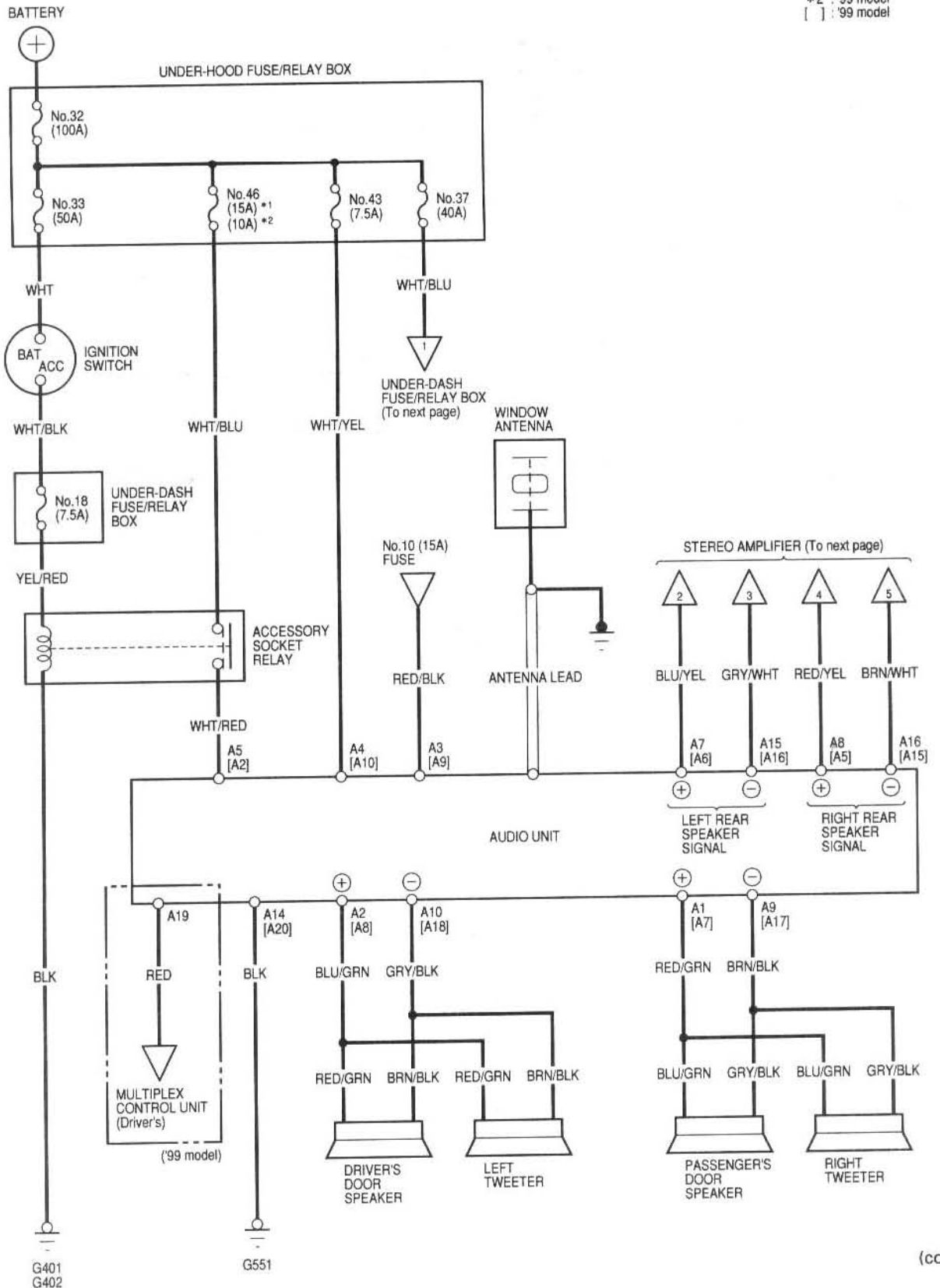
AFB Sound System

Description:

The stereo amplifier controls the sound from the rear speakers to feed back the sound picked up by the inner rear speaker microphone.

Circuit Diagram

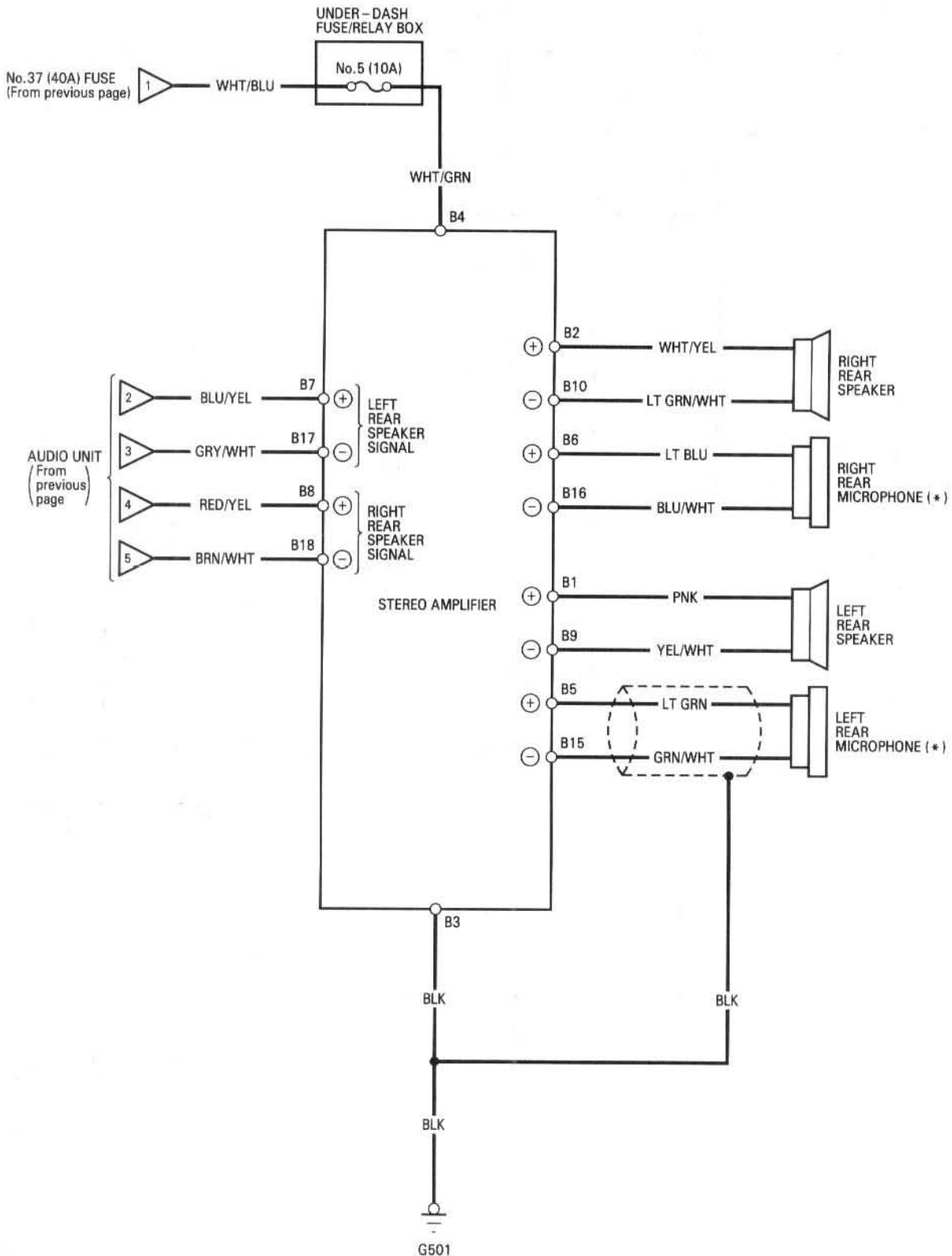
*1 : '97-'98 models
 *2 : '99 model
 [] : '99 model



(cont'd)

Stereo Sound System

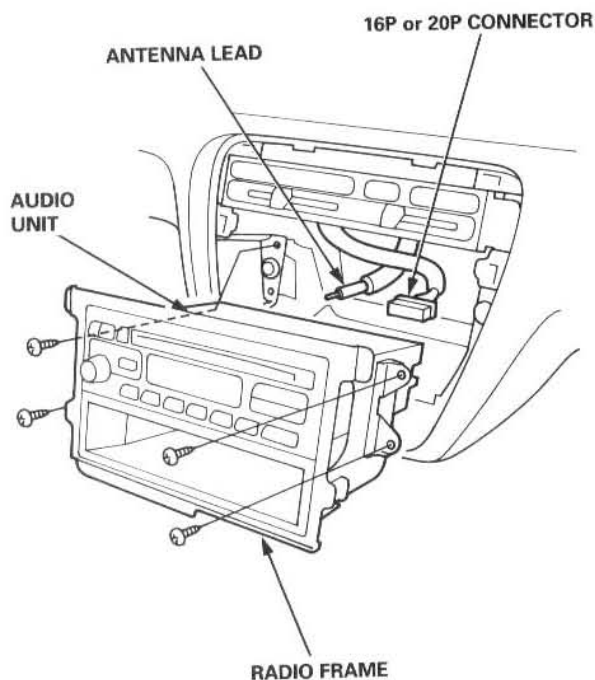
Circuit Diagram (cont'd)



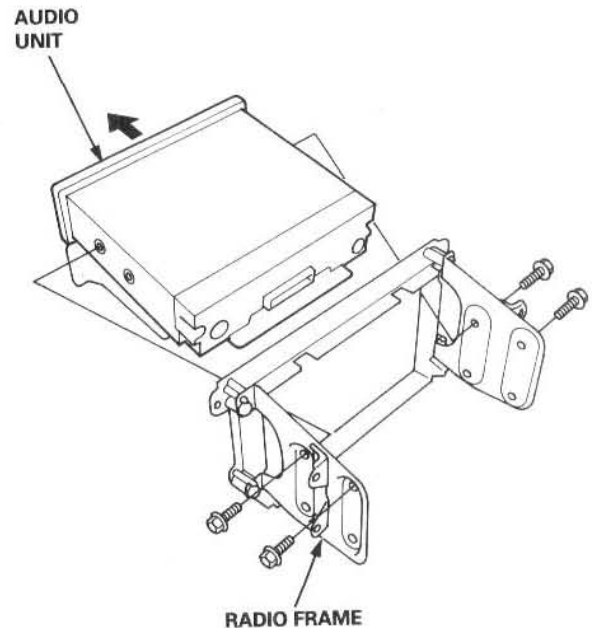
Audio Unit Removal

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.
2. Remove the radio panel assembly (see section 20).
3. Remove the four mounting screws, then remove the radio frame and audio unit from the dashboard.
4. Disconnect the 16P or 20P connector and antenna lead, then remove the audio unit.



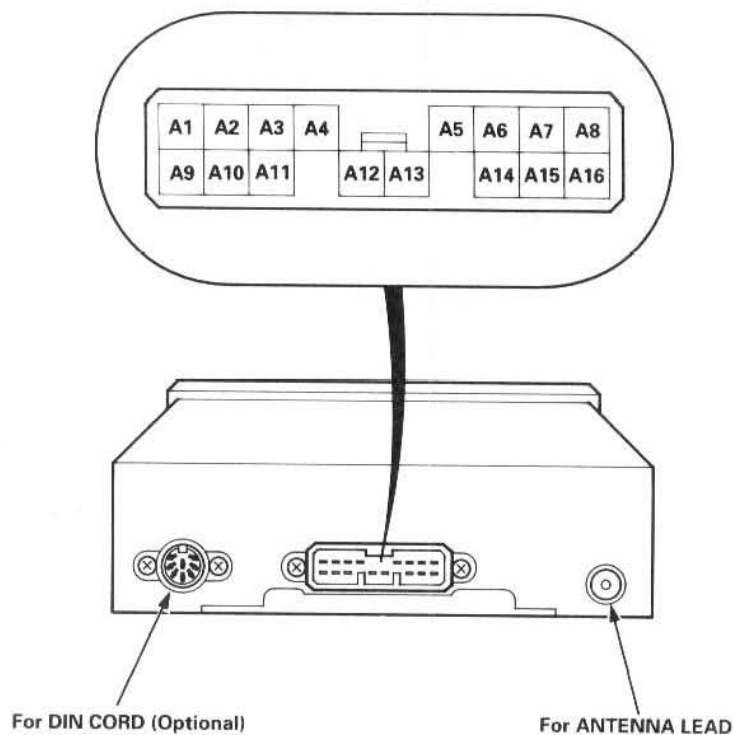
5. Remove the four mounting screws, then remove the audio unit from the radio frame.



6. Install in the reverse order of removal.
7. After installing the audio unit, enter the anti-theft code for the radio, then enter the customer's radio station presets.

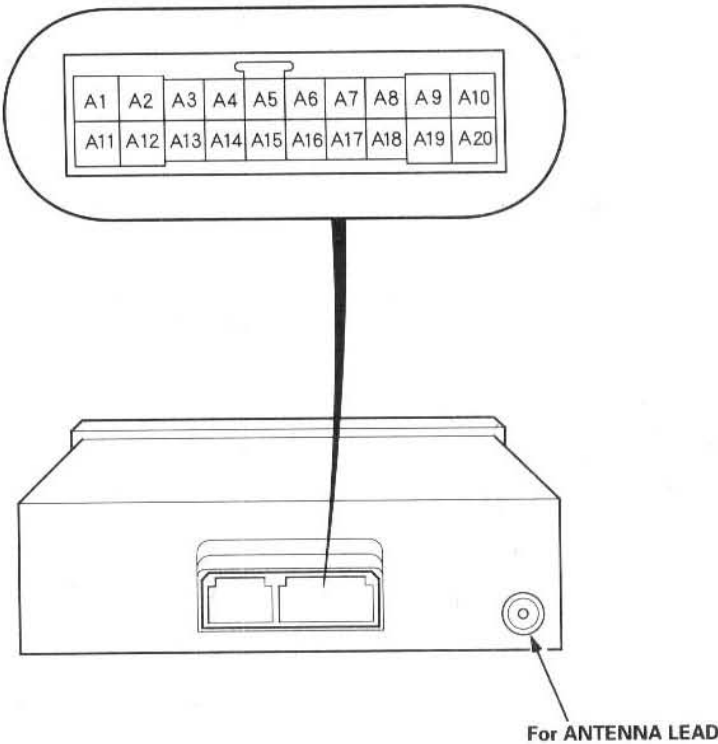
Stereo Sound System

Audio Unit Terminals ('97 – 98 models)



Cavity	Wire	Connects to	Cavity	Wire	Connects to
A1	RED/GRN	Passenger's door speaker ⊕, Right tweeter ⊕	A9	BRN/BLK	Passenger's door speaker ⊖, Right tweeter ⊖
A2	BLU/GRN	Driver's door speaker ⊕, Left tweeter ⊕	A10	GRY/BLK	Driver's door speaker ⊖, Left tweeter ⊖
A3	RED/BLK	Lights-on signal	A11	—	(not used)
A4	WHT/YEL	Constant power (Tuning memory)	A12	—	(not used)
A5	WHT/RED	ACC (Main stereo power supply)	A13	—	(not used)
A6	—	(not used)	A14	BLK	Ground (G551)
A7	BLU/YEL	Left rear speaker signal ⊕	A15	GRY/WHT	Left rear speaker signal ⊖
A8	RED/YEL	Right rear speaker signal ⊕	A16	BRN/WHT	Right rear speaker signal ⊖

Audio Unit Terminals ('99 model)

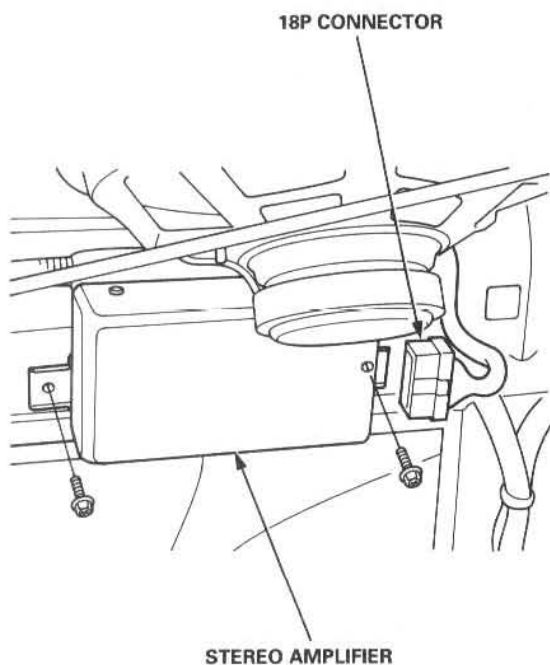


Cavity	Wire	Connects to	Cavity	Wire	Connects to
A1	—	(not used)	A11	—	(not used)
A2	WHT/RED	ACC (Main stereo power supply)	A12	—	(not used)
A3	—	(not used)	A13	—	(not used)
A4	—	(not used)	A14	—	(not used)
A5	RED/YEL	Right rear speaker signal ⊕	A15	BRN/WHT	Right rear speaker signal ⊖
A6	BLU/YEL	Left rear speaker signal ⊕	A16	GRY/WHT	Left rear speaker signal ⊖
A7	RED/GRN	Passenger's door speaker ⊕, Right tweeter ⊕	A17	BRN/BLK	Passenger's door speaker ⊖, Right tweeter ⊖
A8	BLU/GRN	Driver's door speaker ⊕, Left tweeter ⊕	A18	GRY/BLK	Driver's door speaker ⊖, Left tweeter ⊖
A9	RED/BLK	Lights-on signal	A19	RED	Dash lights brightness controller
A10	WHT/YEL	Constant power	A20	BLK	Ground (G551)

Stereo Sound System

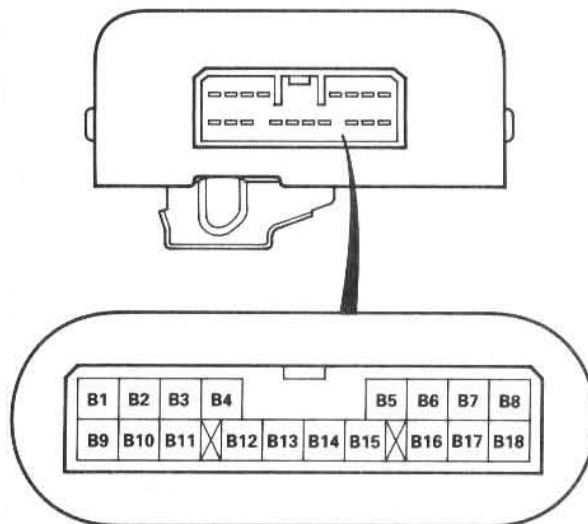
Stereo Amplifier Removal

1. Open the trunk lid.
2. Disconnect the 18P connector from the stereo amplifier.
3. Remove the two mounting bolts, then remove the stereo amplifier from the trunk.



4. Install in the reverse order of removal.

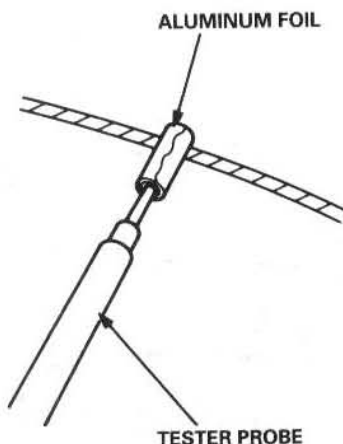
Stereo Amplifier Terminals



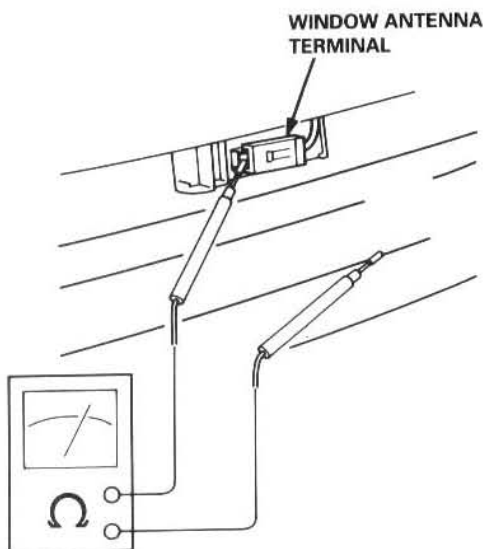
Cavity	Wire	Connects to
B1	PNK	Left rear speaker ⊕
B2	WHT/YEL	Right rear speaker ⊕
B3	BLK	Ground (G501)
B4	WHT/GRN	Constant power
B5	LT GRN	Left rear microphone ⊕
B6	LT BLU	Right rear microphone ⊕
B7	BLU/YEL	Left rear speaker signal ⊕
B8	RED/YEL	Right rear speaker signal ⊕
B9	YEL/WHT	Left rear speaker ⊖
B10	LT GRN/WHT	Right rear speaker ⊖
B11	—	(not used)
B12	—	(not used)
B13	—	(not used)
B14	—	(not used)
B15	GRN/WHT	Left rear microphone ⊖
B16	BLU/WHT	Right rear microphone ⊖
B17	GRY/WHT	Left rear speaker signal ⊖
B18	BRN/WHT	Right rear speaker signal ⊖

Window Antenna Wire test

1. Wrap aluminum foil around the tip of the tester probe as shown.



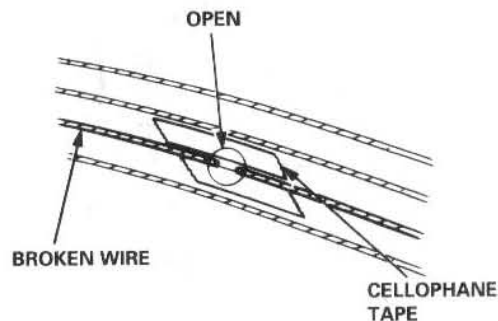
2. Touch one tester probe to the window antenna terminal, and move the other tester probe along the antenna wires to check that continuity exists.



Window Antenna Wire Repair

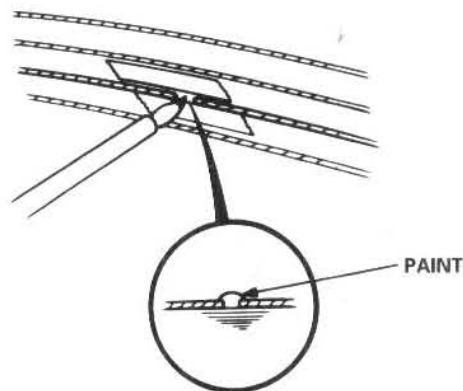
NOTE: To make an effective repair, the broken section must be no longer than one inch (25 mm).

1. Lightly rub the area around the broken section with fine steel wool, then clean it with alcohol.
2. Care mask above and below the broken portion of the window antenna wire with cellophane tape.



3. Using a small brush, apply a heavy coat of silver conductive paint extending about 1/8" on both sides of the break. Allow 30 minutes to dry.

NOTE: Thoroughly mix the paint before use.



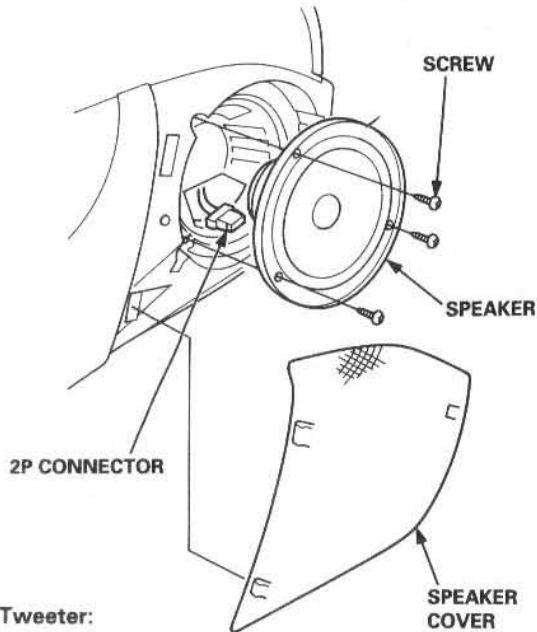
4. Check for continuity in the repaired wire.
5. Apply a second coat of paint in the same way. Let it dry three hours before removing the tape.

Stereo Sound System

Speaker Replacement

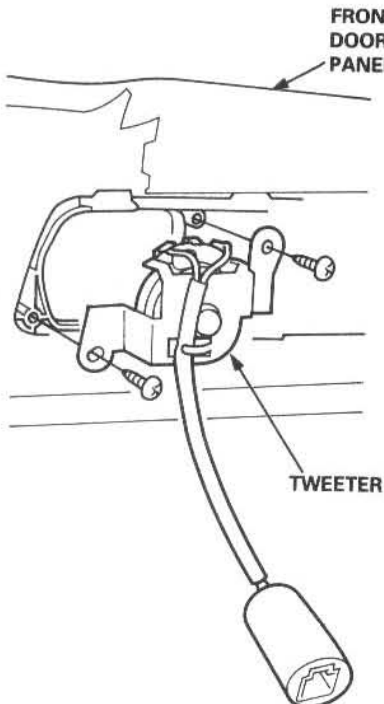
Front Door Speaker:

1. Remove the speaker cover.
2. Remove the three screws, then disconnect the 2P connector from the speaker.



Tweeter:

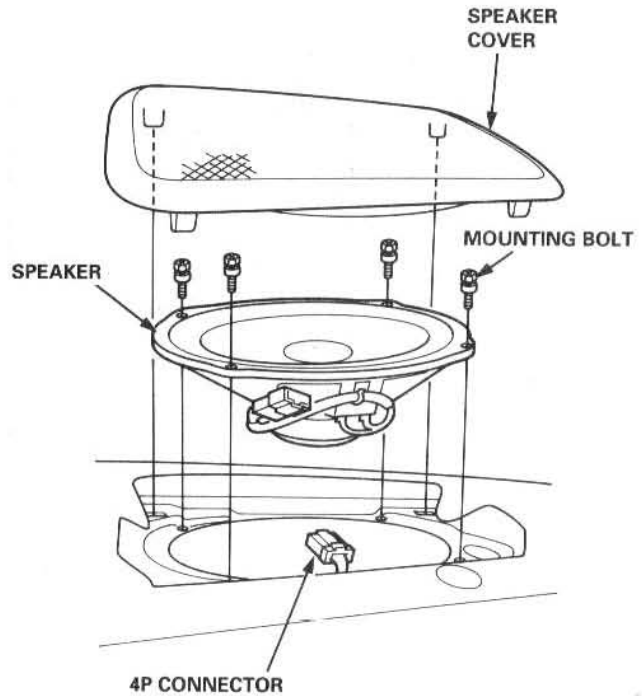
1. Remove the front door panel (see section 20).



2. Remove the screws and tweeter.

Rear Speaker:

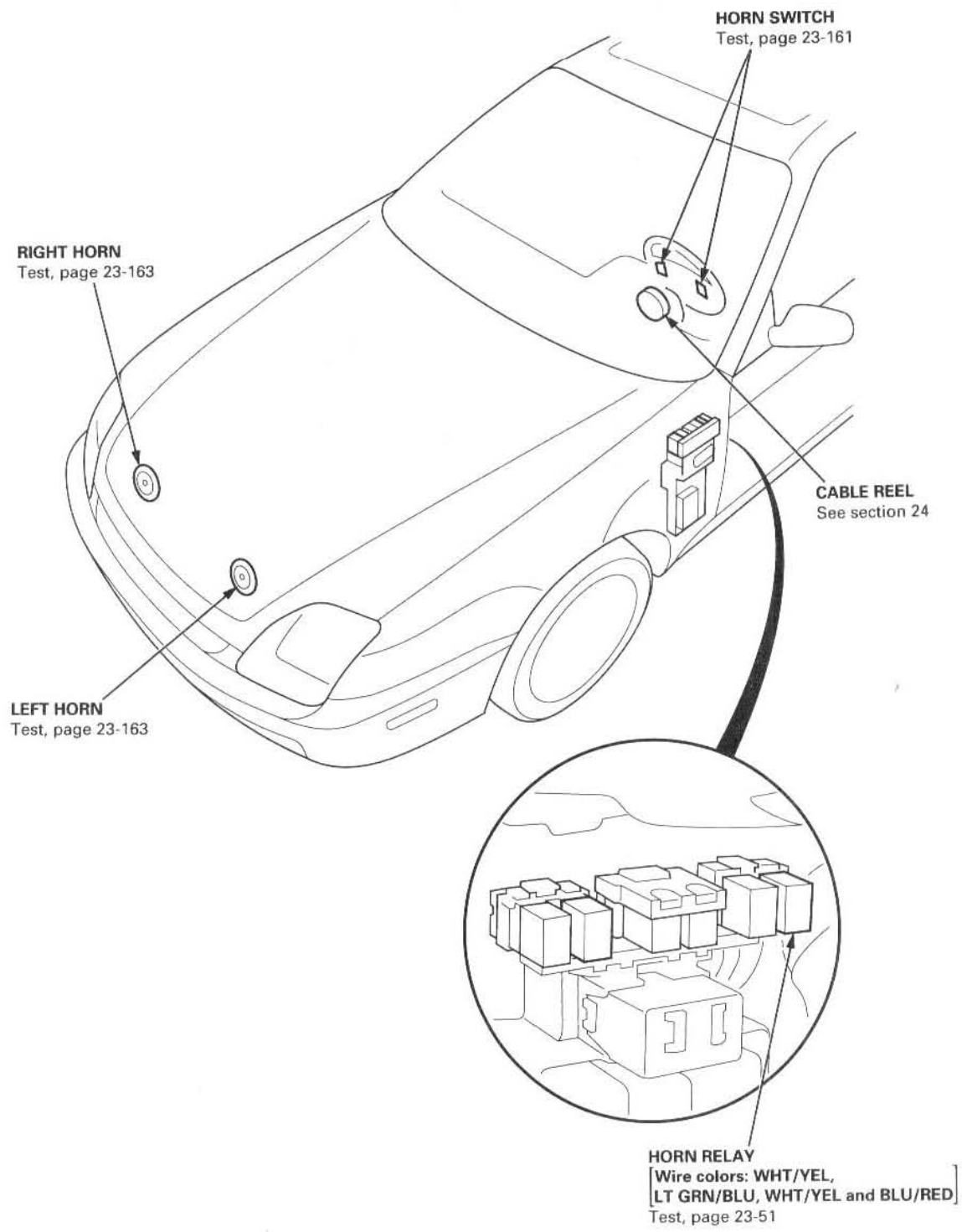
1. Remove the speaker cover.
2. Remove the four mounting bolts then disconnect the 4P connector from the speaker.



Horns

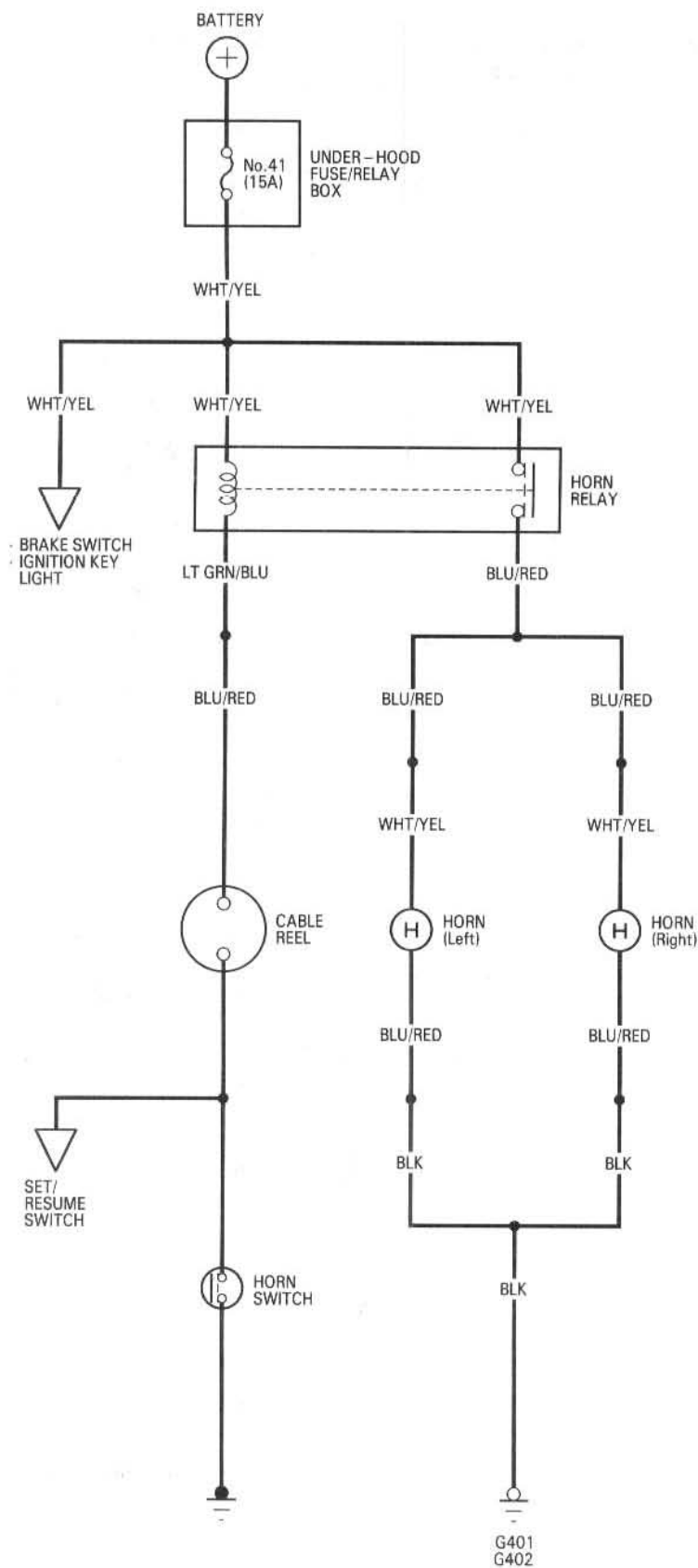
Component Location Index

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.



Horns

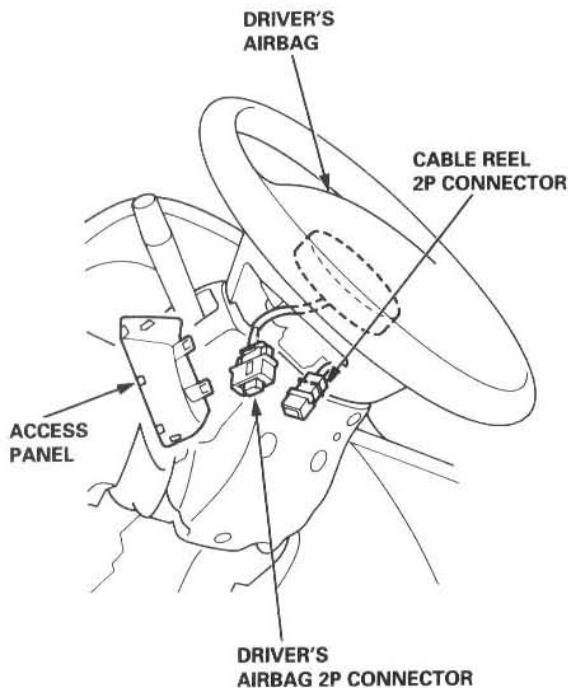
Circuit Diagram



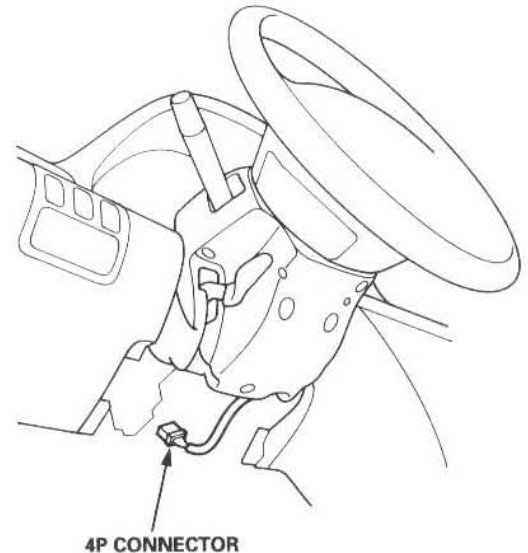
Horn Switch Test

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

1. Disconnect the battery negative cable, then disconnect the positive cable, and wait at least three minutes.
2. Remove the access panel from the steering wheel, then disconnect the 2P connector between the driver's airbag and cable reel.



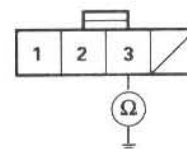
3. Remove the dashboard lower cover (see section 20).
4. Disconnect the combination switch harness 4P connector from the main wire harness.



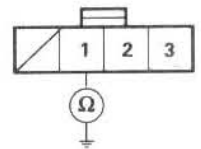
5. Check for continuity between the No. 3 ('97 - 98 models) or No. 1 ('99 model) terminal of the 4P connector of the combination switch harness and body ground with the horn switch pressed.

Wire side of female terminals

'97 - 98 models



'99 model



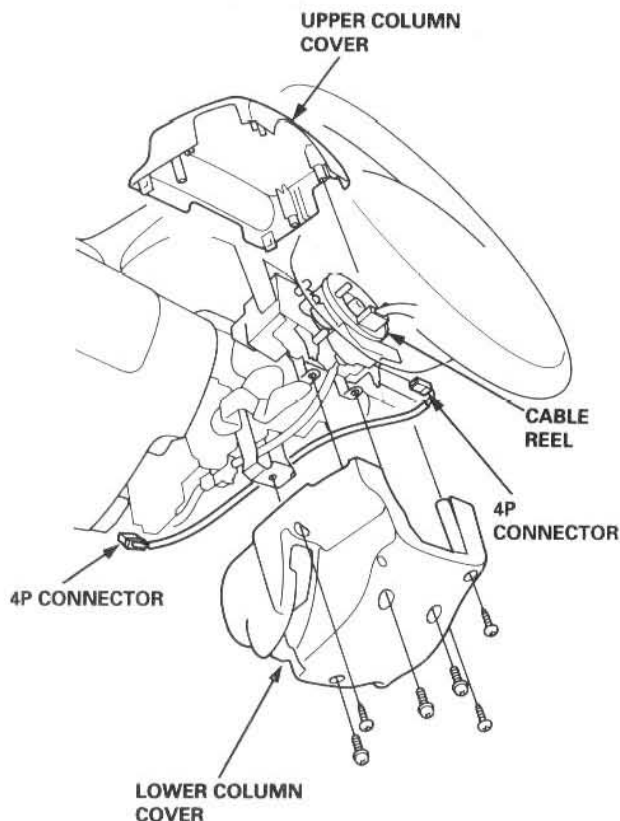
- If there is continuity, the horn switch is OK.
- If there is no continuity, go to step 6.

(cont'd)

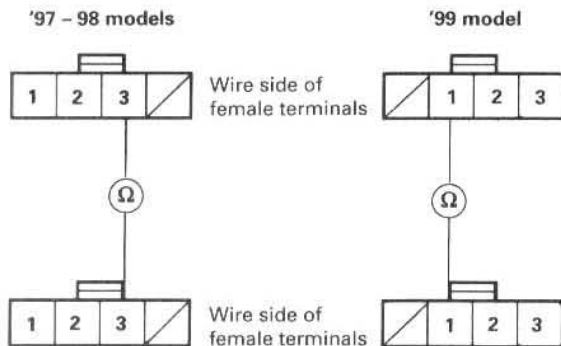
Horns

Horn Switch Test (cont'd)

6. Remove the steering column covers, then disconnect the 4P connector from the cable reel.



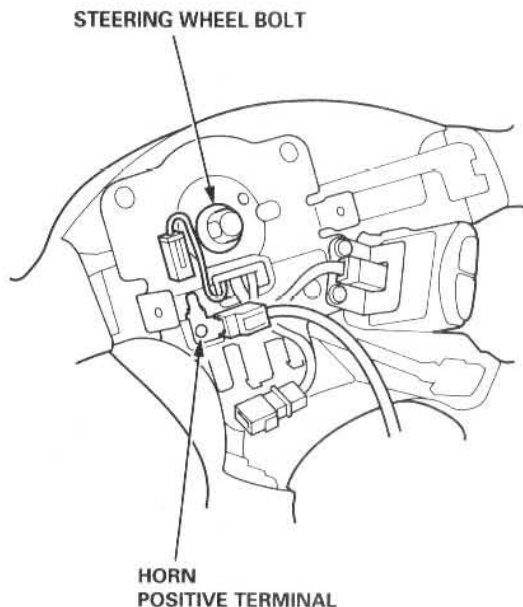
7. Check for continuity between the No. 3 ('97 – 98 models) or No. 1 ('99 model) terminal of the (main wire harness side) 4P connector and the No. 3 ('97 – 98 models) or No. 1 ('99 model) terminal of the (cable reel side) 4P connector.



- If there is no continuity, replace the combination switch harness.
- If there is continuity, go to step 8.

8. Remove the driver's airbag assembly (see section 24).

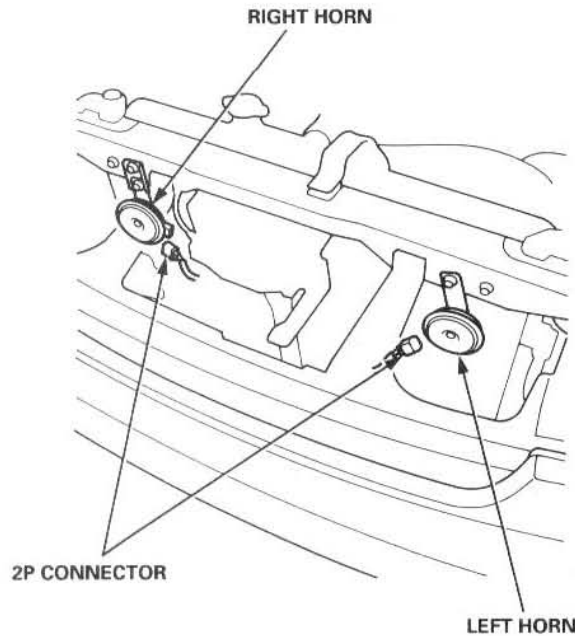
9. Check for continuity between the horn positive terminal and the steering wheel bolt with the horn switch pressed.



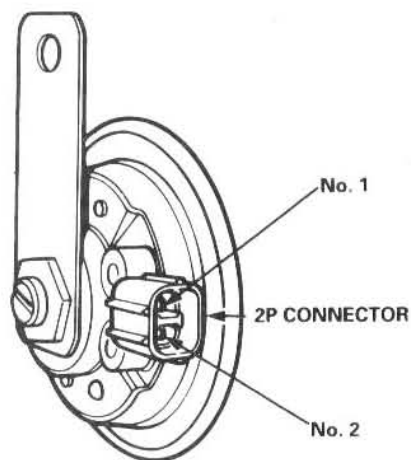
- If there is continuity, check the cable reel.
 - If there is no continuity, replace the horn switch.
10. If all the tests prove OK, install the driver's airbag and reinstall the access panel on the steering wheel.
11. Reconnect the battery positive cable, then the negative cable.
12. After installing the airbag assembly, confirm proper system operation:
- Turn the ignition switch ON (II); the SRS indicator light should come on for about six seconds and then go off.
 - Make sure both horn buttons work.

Test

1. Open the hood.
2. Disconnect the 2P connector, and remove the horn.



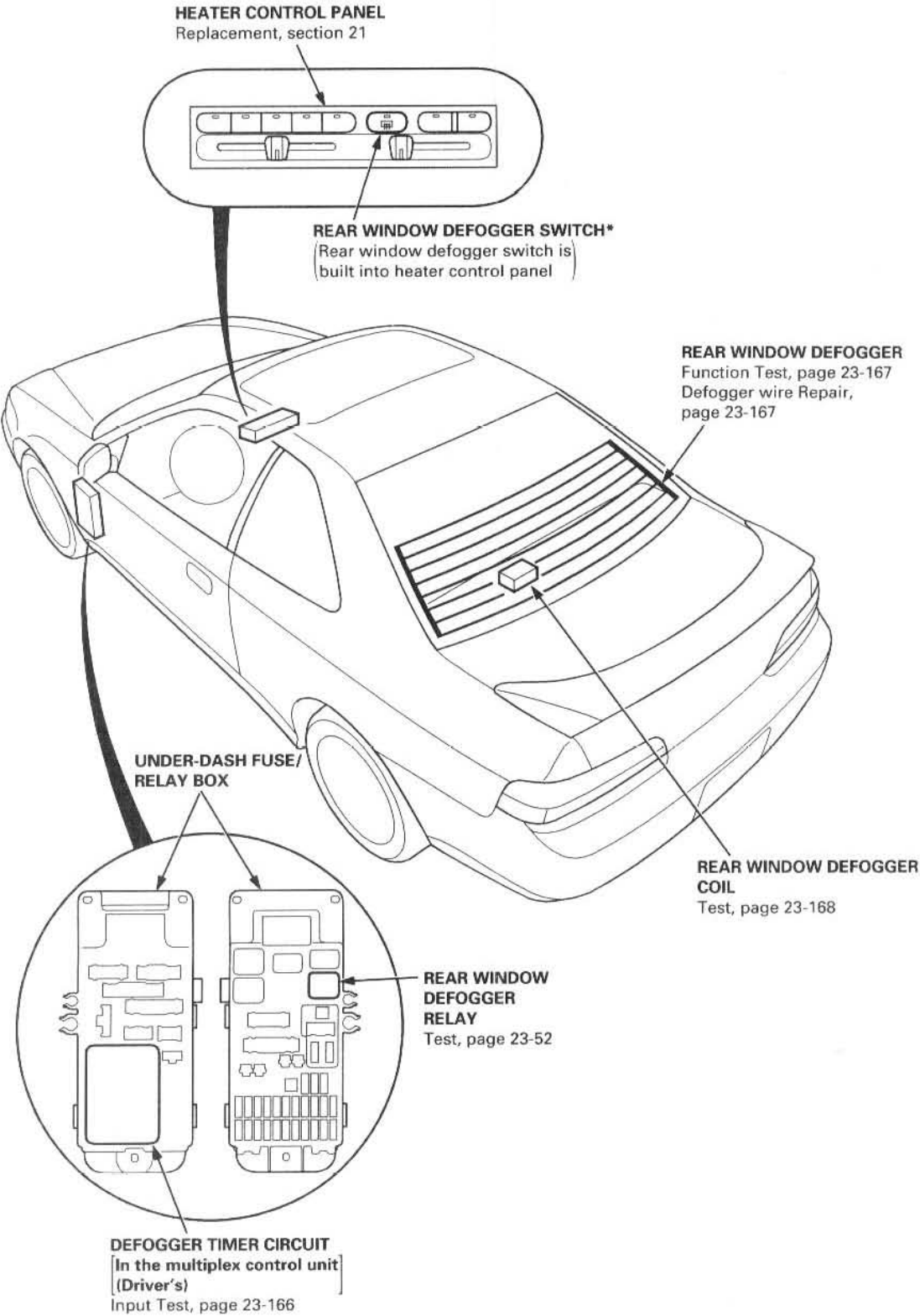
3. Test the horn by connecting battery power to one terminal and grounding the other. The horn should sound.



4. If the horn fails to sound, replace it.

Rear Window Defogger

Component Location Index



*; You can also test the switch by using the Multiplex Control System self-diagnosis function (mode 2). (See page 23-111.)

Rear Window Defogger

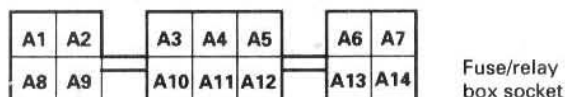
Control Unit Input Test

NOTE:

- Before testing, go to the Troubleshooting Guide (see page 23-103).
- All connector views are from the wire side of female terminals unless otherwise noted.

Multiplex Control Unit (Driver's):

1. Remove the under-dash fuse/relay box (see page 23-48).
2. Remove the driver's unit from the under-dash fuse/relay box (see page 23-106).
3. Inspect the connector and socket terminals to be sure they are all making good contact.
 - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
 - If the terminals look OK, make the following input tests at the fuse/relay box socket.
 - If any test indicates a problem, find and correct the cause, then recheck the system.
 - If all the input tests prove OK, the control unit must be faulty; replace it.



Disconnect the connectors from the unit.

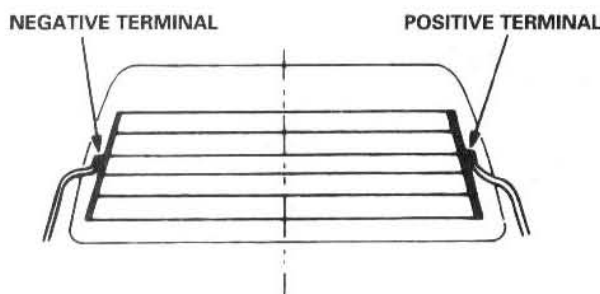
Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
A13	Fuse/relay box socket	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none">• Blown No. 13 (15 A) fuse in the under-dash fuse/relay box• An open in the wire
A9		Defogger switch pushed, ignition switch ON (II)	Check for continuity to ground: There should be continuity as the switch is pushed.	<ul style="list-style-type: none">• Poor ground (G901)• Faulty rear window defogger switch• An open in the wire
A10		Ignition switch ON (II)	Attach to ground: Rear window defogger should work and the defogger switch indicator light should come on.	<ul style="list-style-type: none">• Blown No. 11 (7.5 A) fuse in the under-dash fuse/relay box• Faulty rear window defogger relay• Blown LED• An open in the wire

Function Test

CAUTION: Be careful not to scratch or damage the defogger wires with the tester probe.

1. Check for voltage between the positive terminal and body ground with the ignition switch and defogger switch ON.
There should be battery voltage.

- If there is no voltage, check for:
 - faulty defogger relay.
 - faulty defogger switch.
 - faulty defogger coil.
 - an open in the BLK/GRN wire.
- If there is battery voltage, go to step 2.



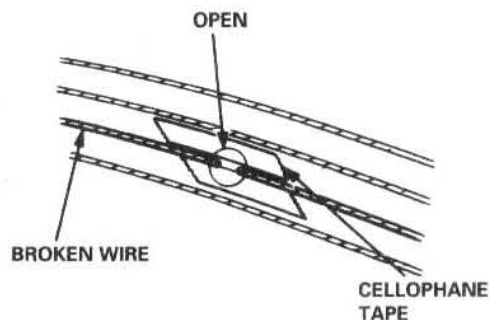
View from inside the vehicle

2. Check for continuity between the negative terminal and body ground.
If there is no continuity, check for an open in the defogger ground wire.
3. Touch the voltmeter positive probe to the halfway point of each defogger wire, and the negative probe to the negative terminal.
There should be approximately 6 V with the ignition switch and the defogger switch ON.
 - If the voltage is as specified, the defogger wire is OK.
 - If the voltage is not as specified, repair the defogger wire.
 - If it is more than 6 V, there is a break in the negative half of the wire.
 - If it is less than 6 V, there is a break in the positive half of the wire.

Defogger Wire Repair

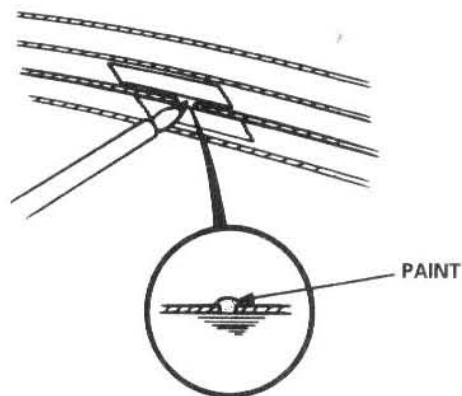
NOTE: To make an effective repair, the broken section must be no longer than one inch.

1. Lightly rub the area around the broken section with fine steel wool, then clean it with alcohol.
2. Carefully mask above and below the broken portion of the defogger wire with cellophane tape.



3. Using a small brush, apply a heavy coat of silver conductive paint extending about 1/8" on both sides of the break. Allow 30 minutes to dry.

NOTE: Thoroughly mix the paint before use.

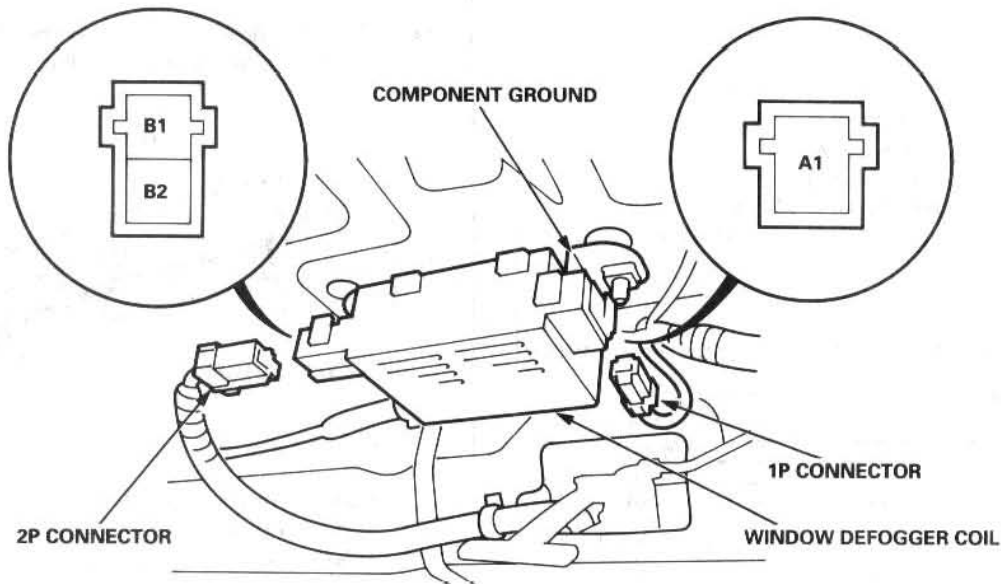


4. Check for continuity in the repaired wire.
5. Apply a second coat of paint in the same way. Let it dry three hours before removing the tape.

Rear Window Defogger

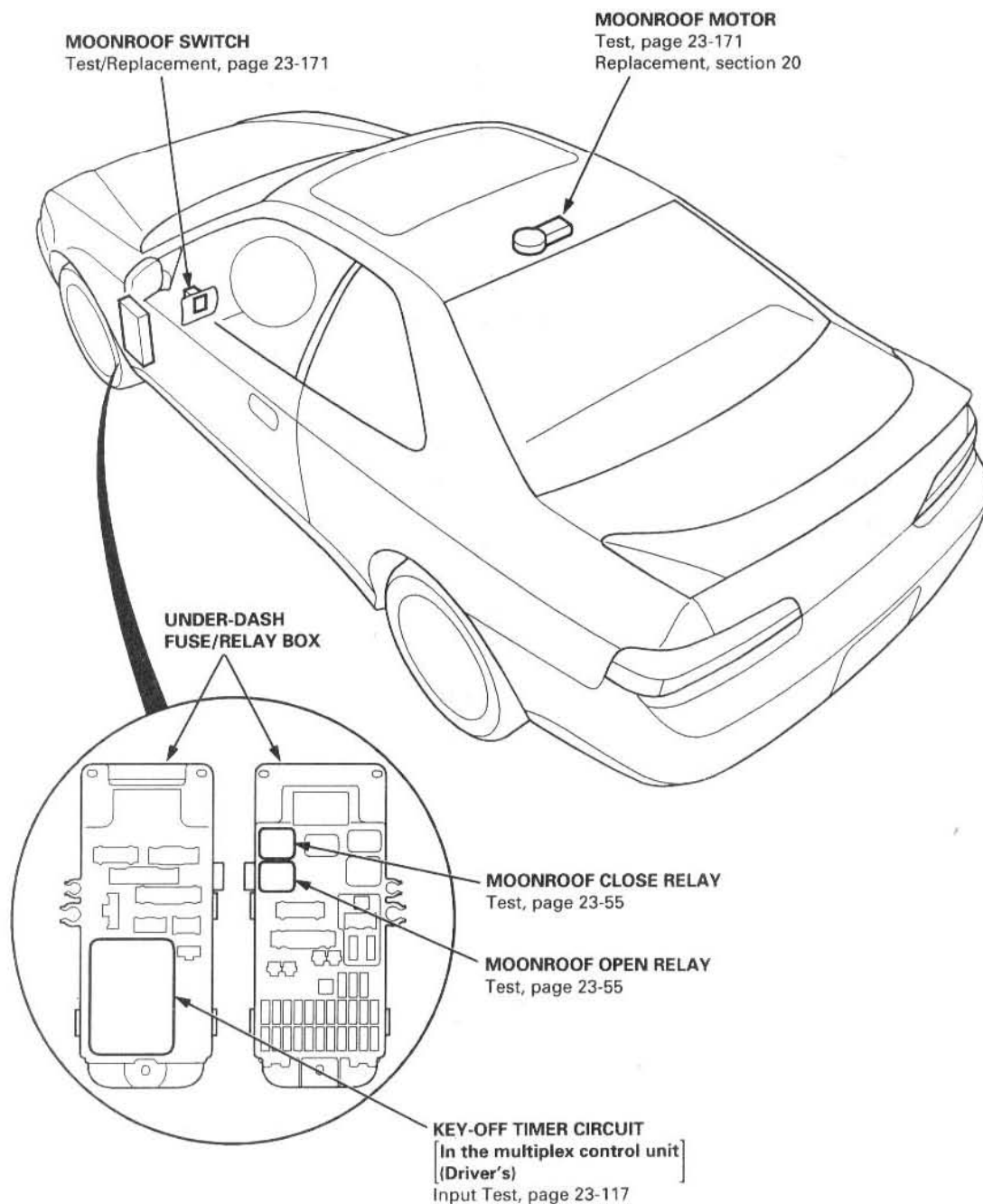
Window Defogger Coil Test

1. Open the trunk lid.
2. Disconnect the 1P and 2P connectors from the rear window defogger coil.



3. Check for continuity between the A1 and B2 terminals. There should be continuity.
4. Check for continuity between the B2 terminal and component ground. There should be continuity.
5. If there is no continuity, replace the defogger coil.

Component Location Index



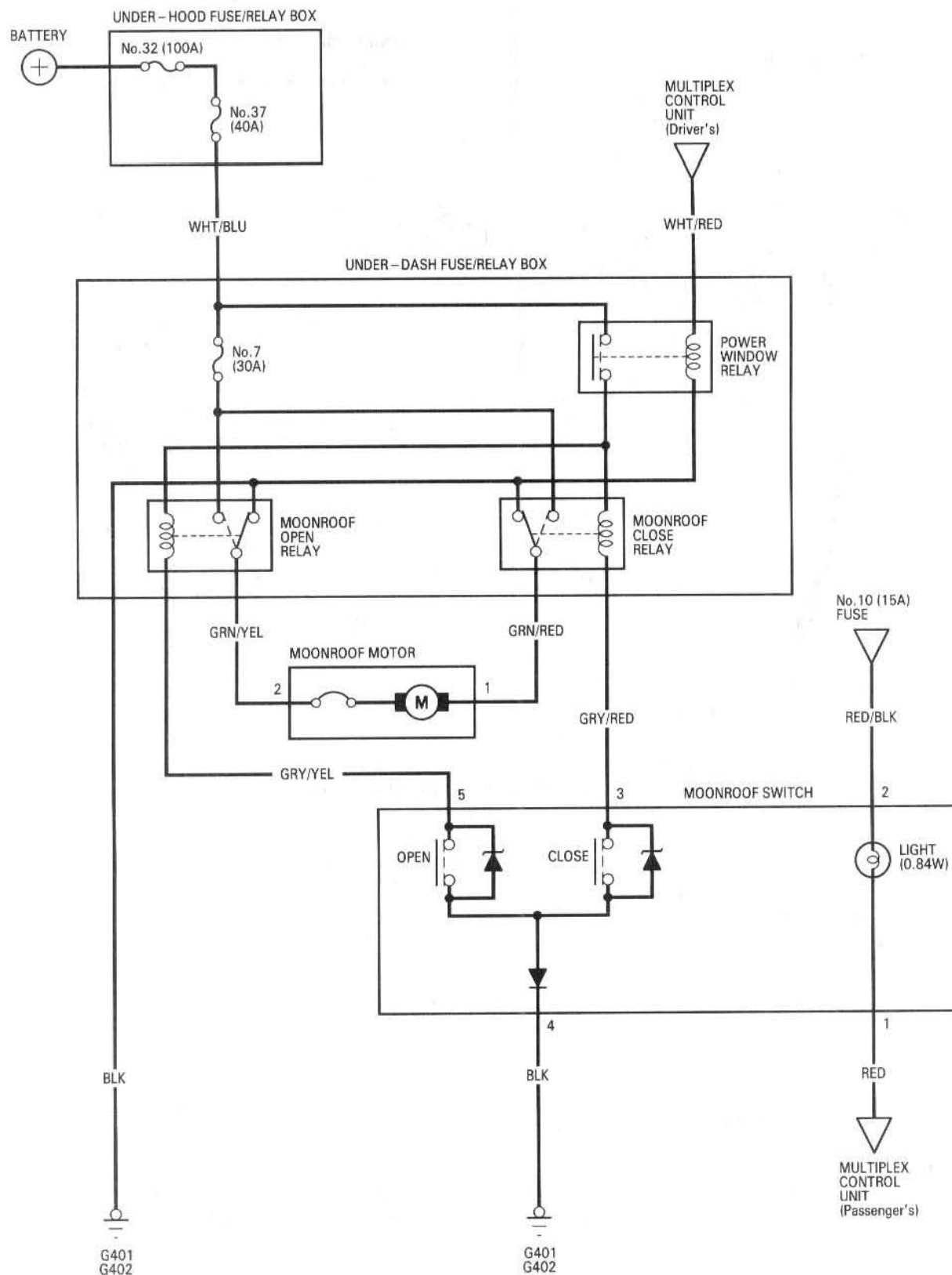
Moonroof Key-off Operation

Description:

The moonroof can still be operated for about 10 minutes after the ignition switch is turned from the "II" to the "I" or "O" position, as long as neither of the doors has been opened. This provides a convenience to parked occupants while offering a degree of security against unwanted or accidental moonroof operation.

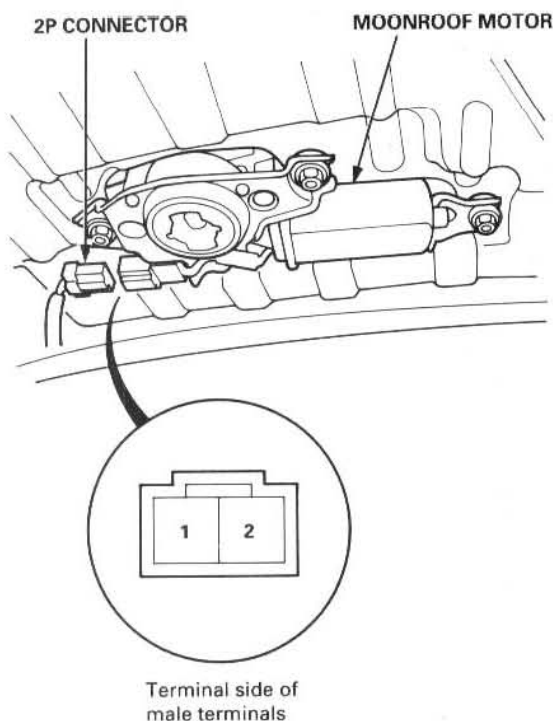
Moonroof

Circuit Diagram



Motor Test

1. Carefully remove the headliner (see section 20).



2. Disconnect the 2P connector from the moonroof motor.
3. Test the motor by connecting power and ground according to the table.

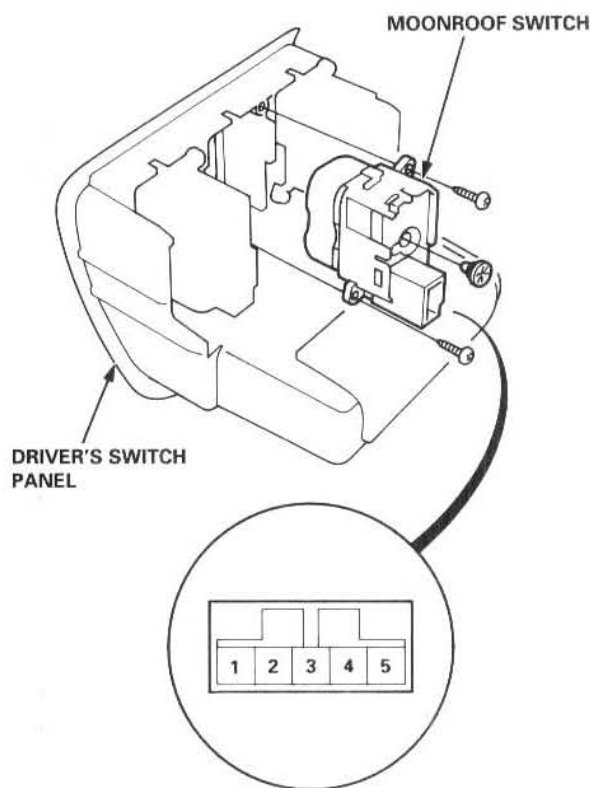
Terminal	1	2
Position		
OPEN	⊖	⊕
CLOSE	⊕	⊖

- If the motor runs smoothly, repair the roof wire harness.
- If the motor fails to run or does not run smoothly, replace the motor (see section 20).

NOTE: See closing force check in section 20 for motor clutch test.

Switch Test/Replacement

1. Carefully pry the switches out of the dashboard, then disconnect the connectors from them.
2. Remove the two mounting screws, then remove the switch from the driver's switch panel.



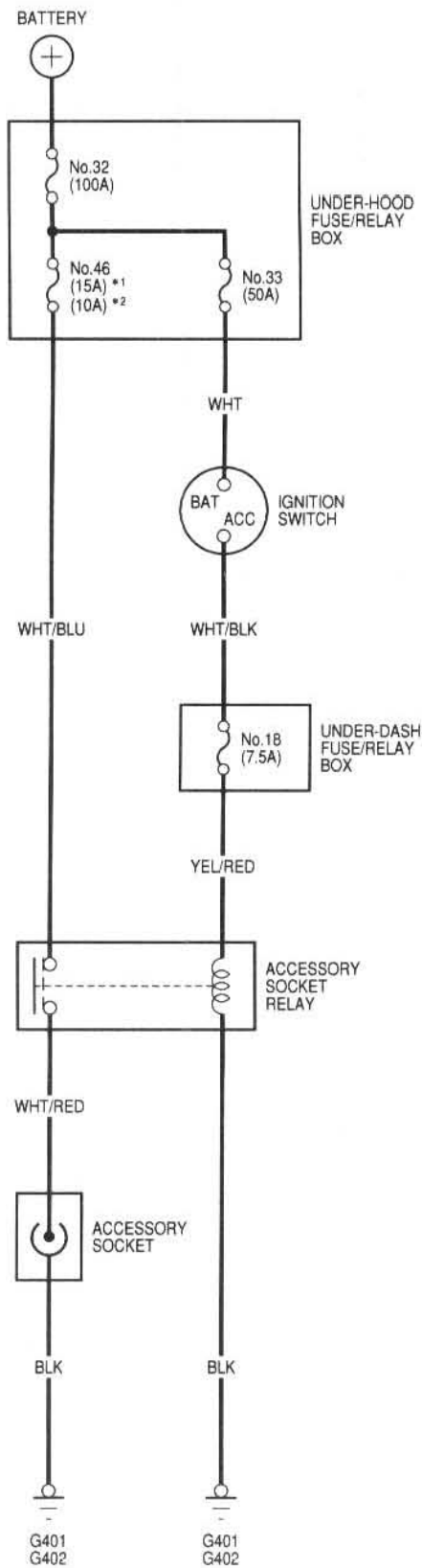
3. Check for continuity between the terminals in each switch position according to the table. Use a meter with diode checking capability.

Terminal	1	2	3	5	4
Position					
NEUTRAL	○	⊖	○		
OPEN	○	⊖	○	○	▶
CLOSE	○	⊖	○	○	▶

Accessory Socket

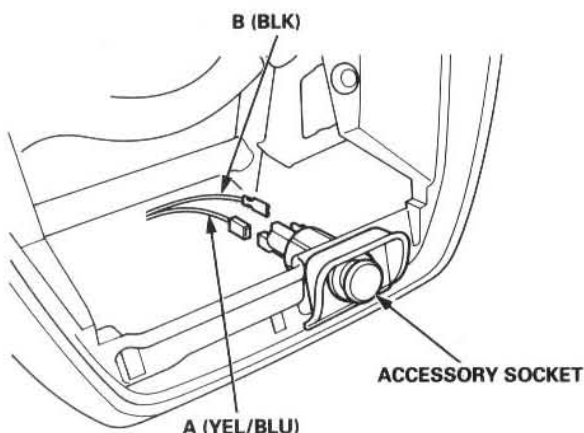
Circuit Diagram

*1 : '97-'98 models
*2 : '99 model



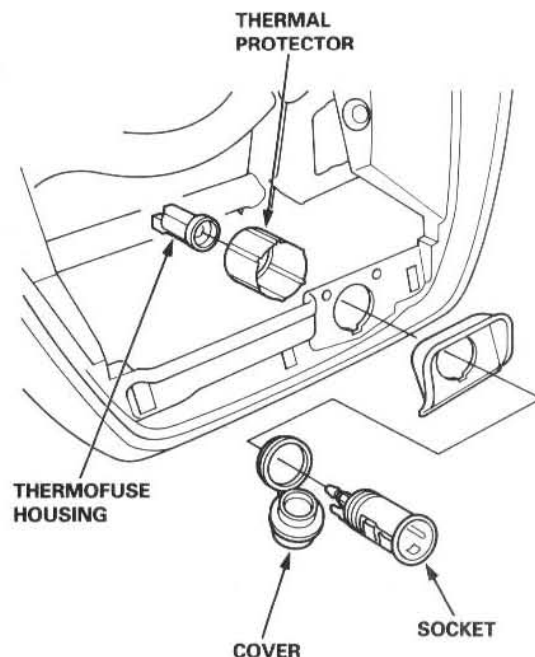
Accessory Socket Test/Replacement

1. Remove the audio unit (see page 23-153).
2. Disconnect the connectors.
3. Inspect the connector terminals to be sure they are all making good contact.
 - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
 - If the terminals look OK, go to step 4.



4. Turn the ignition switch ACC (I), and check for voltage between the A and B terminals.
 - There should be battery voltage.
 - If there is no battery voltage, check for:
 - blown No. 18 (7.5 A) fuse in the under-dash fuse/relay box.
 - faulty accessory socket relay.
 - poor ground (G401, G402).
 - an open in the wire.

5. Remove the thermofuse housing and thermal protector, then remove the socket cover.



Power Mirrors

Component Location Index

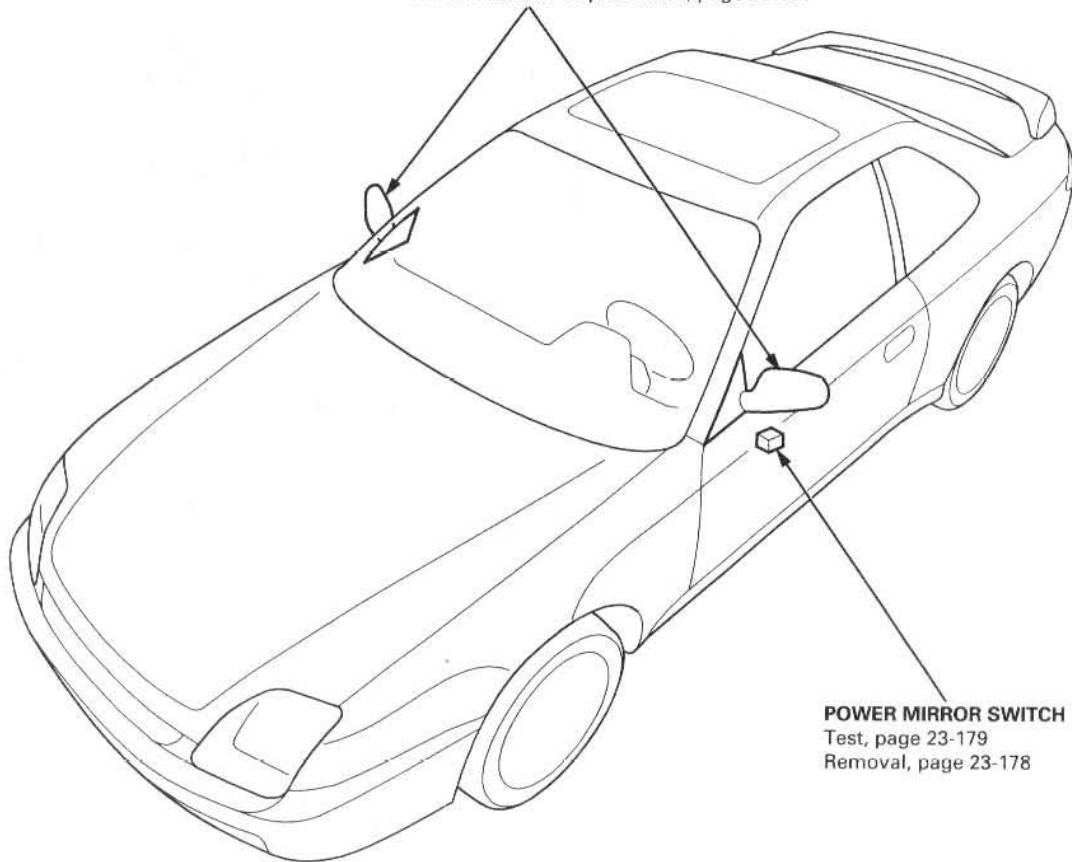
POWER MIRRORS

Function Test, page 23-177

Test, page 23-180

Replacement, section 20

Mirror Actuator Replacement, page 23-181

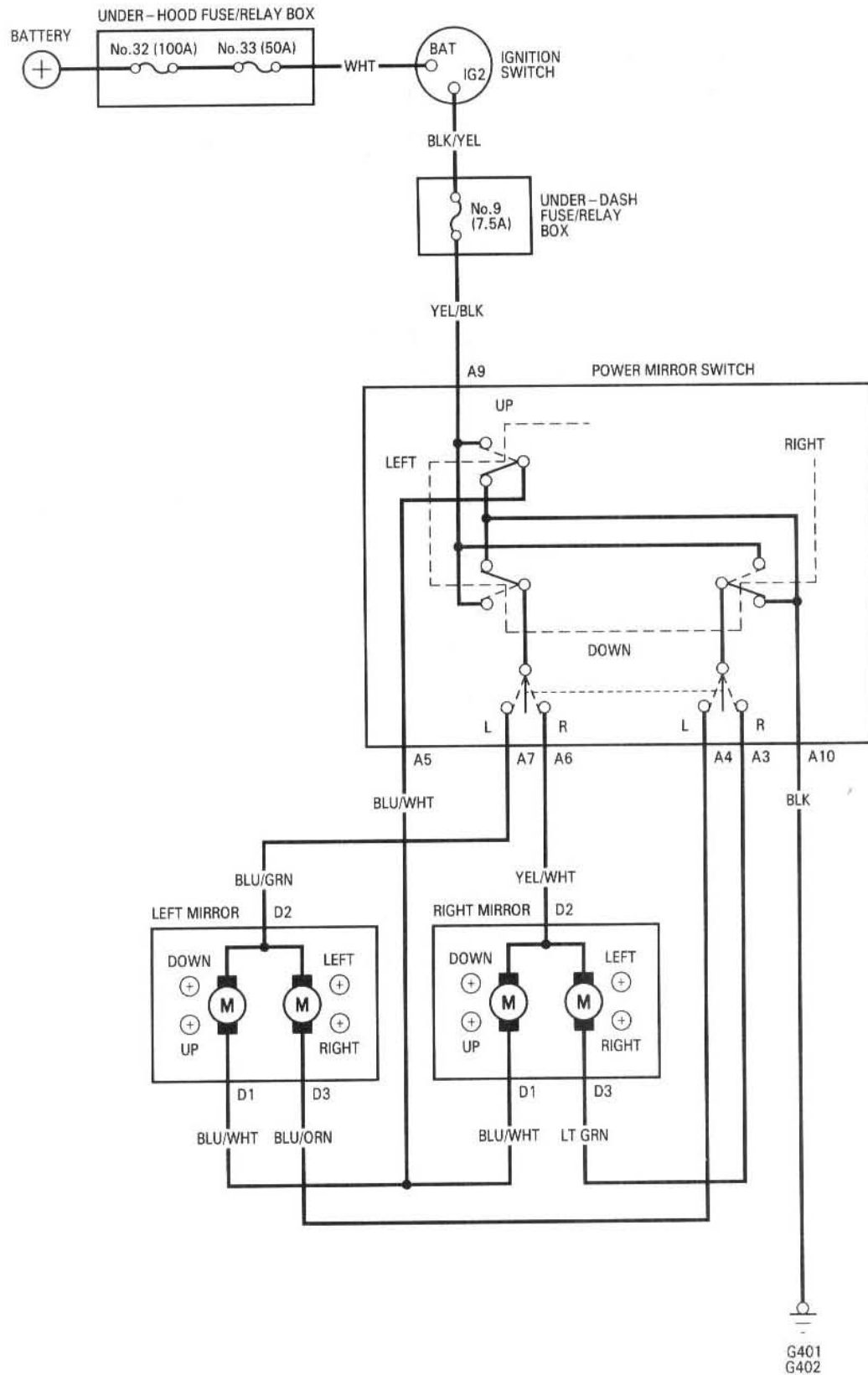


POWER MIRROR SWITCH

Test, page 23-179

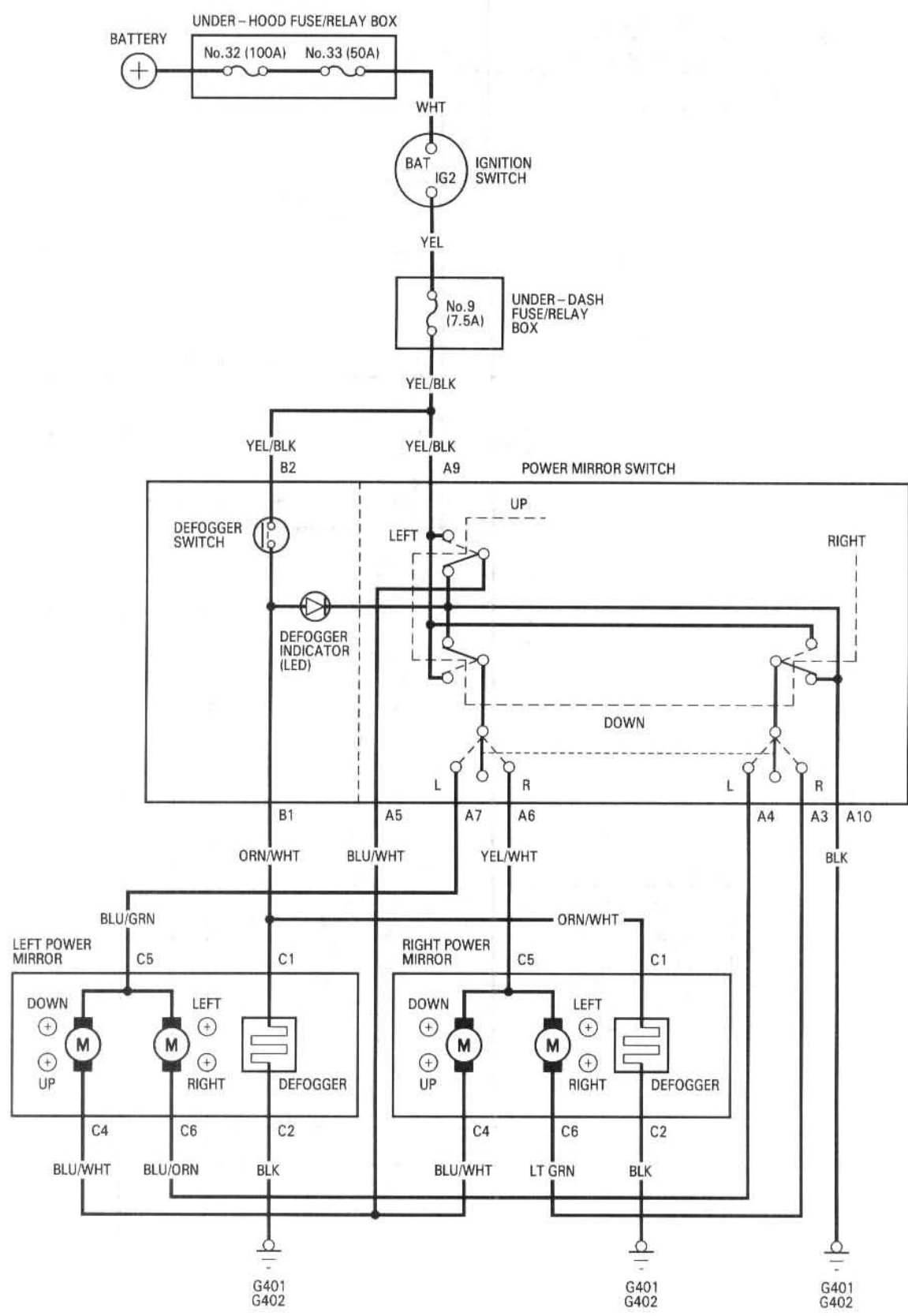
Removal, page 23-178

Circuit Diagram (USA)



Power Mirrors

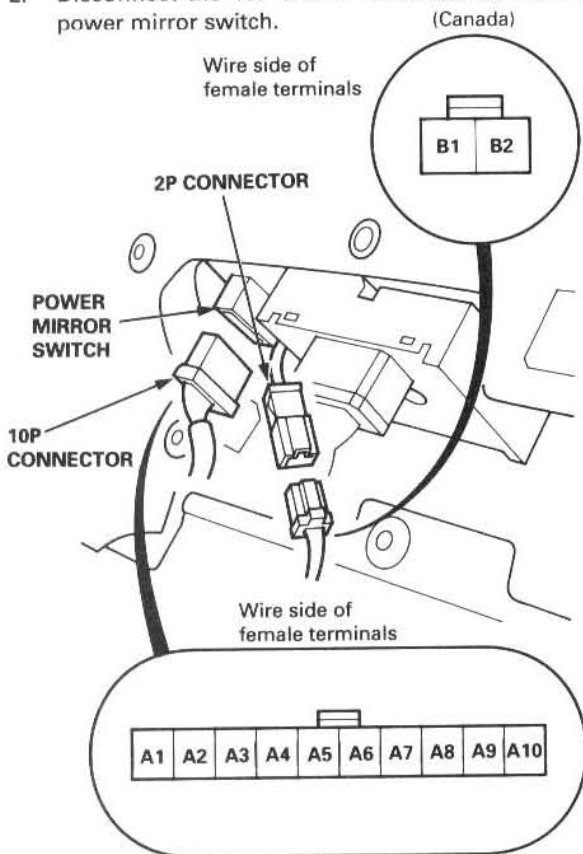
Circuit Diagram (Canada)



Function Test

NOTE: Before testing, check the No. 9 (7.5 A) fuse in the under-dash fuse/relay box.

1. Remove the driver's door panel (see section 20).
2. Disconnect the 10P and 2P connector(s) from the power mirror switch.



Mirror Test

One or both inoperative:

1. Check for voltage between the A9 terminal and body ground with the ignition switch ON (II). There should be battery voltage.
 - If there is no battery voltage, check for an open in the YEL/BLK wire.
 - If there is battery voltage, go to step 2.
2. Check for continuity between the A10 terminal and body ground. There should be continuity.
 - If there is no continuity, check for:
 - an open in the BLK wire.
 - poor ground (G401, G402).

Left mirror inoperative:

1. Connect the A9 terminal to the A7 terminal, and A5 (or A4) terminal to body ground with jumper wires. The left mirror should tilt down (or swing left) with the ignition switch ON (II).
 - If the mirror does not tilt down (or does not swing left), check for:
 - an open in the BLU/WHT (or BLU/ORN) wire between the left mirror and the 10P connector.
 - faulty left mirror actuator.
 - If the mirror neither tilts down nor swings left, repair the BLU/GRN wire.
 - If the mirror works properly, check the mirror switch.

Right mirror inoperative:

1. Connect the A9 terminal to the A6 terminal, and A5 (or A3) terminal to body ground with jumper wires. The left mirror should tilt down (or swing left) with the ignition switch ON (II).
 - If the mirror does not tilt down (or does not swing left), check for:
 - an open in the BLU/WHT (or LT GRN) wire between the left mirror and the 10P connector.
 - faulty right mirror actuator.
 - If the mirror neither tilts down nor swings left, repair the YEL/WHT wire.
 - If the mirror works properly, check the mirror switch.

(cont'd)

Power Mirrors

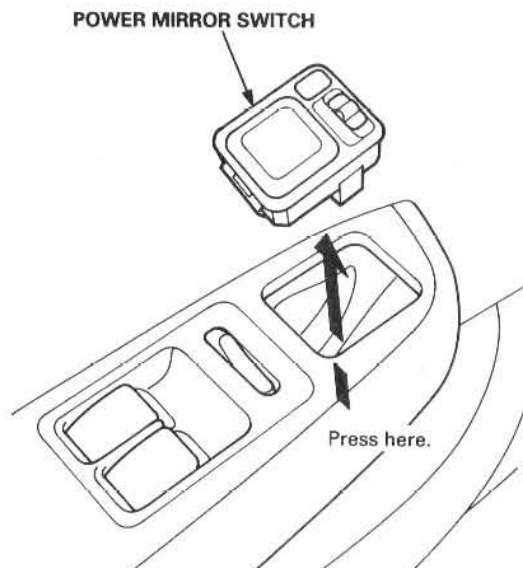
Function Test (cont'd)

Defogger test (Canada):

1. Check for voltage between the B2 terminal of the 2P connector and body ground with the ignition switch ON (II).
There should be battery voltage.
 - If there is no voltage, check for:
 - poor ground (G401, G402),
 - an open in the YEL/BLK wire,
 - If there is battery voltage, go to step 2.
2. Connect the power mirror defogger 2P connector B1 and B2 terminals with a jumper wire. Both the right and left mirrors should gradually warm up when the ignition switch is turned ON (II).
 - If neither mirror warms up, repair the ORN/WHT wire.
 - If only one fails to warm up, check its mirror defogger element.
 - If both mirrors warm up, check the defogger switch.

Power Mirror Switch Removal

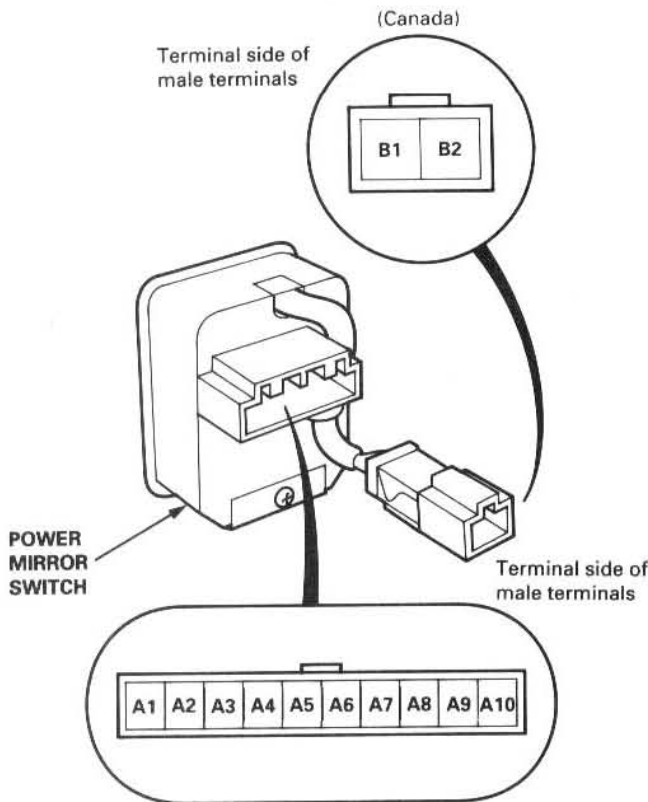
1. Remove the driver's door panel (see section 20).
2. Remove the power mirror switch from the switch panel by carefully pressing from below.



3. Install in the reverse order of removal.

Switch Test

1. Remove the switch from the switch panel (see previous page).



2. Check for continuity between the terminals in each switch position according to the table.

Defogger Switch (Canada):

Terminal	B2	B1	LED	A10
Position				
ON				
OFF				

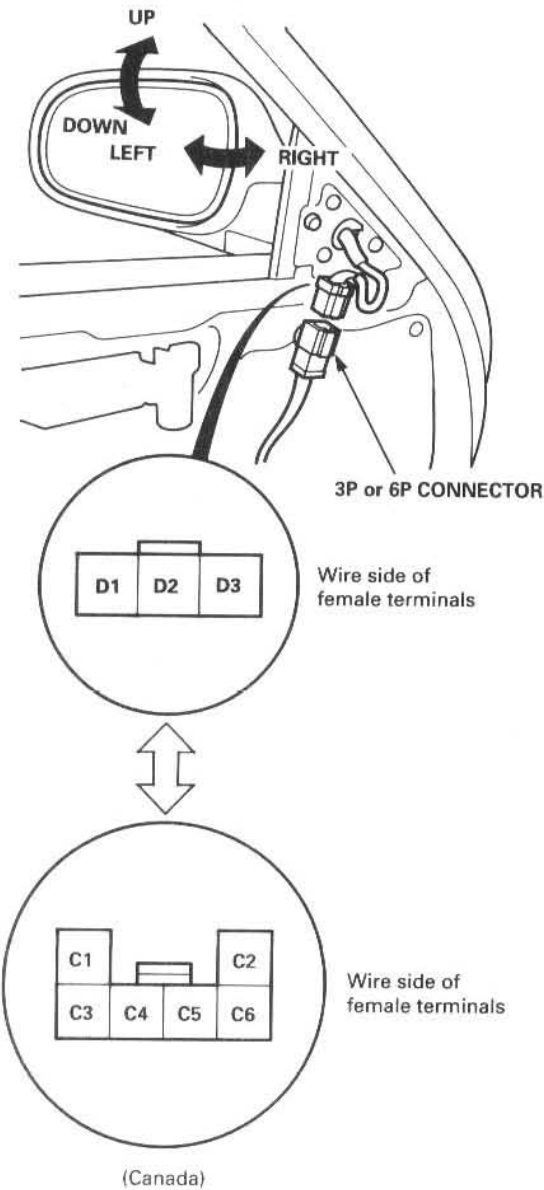
Mirror Switch:

Terminal	A3	A4	A5	A6	A7	A9	A10
Position							
R	OFF						
	UP						
	DOWN						
	LEFT						
	RIGHT						
L	OFF						
	UP						
	DOWN						
	LEFT						
	RIGHT						

Power Mirrors

Power Mirror Test

- 1. Remove the door panel (see section 20).
- 2. Disconnect the 3P or 6P connector from the power mirror assembly.



- 3. Check actuator operation by connecting power and ground according to the table.

Terminal Position	C6 or D3	C5 or D2	C4 or D1
TILT UP		⊖	⊕
TILT DOWN		⊕	⊖
SWING LEFT	⊖	⊕	
SWING RIGHT	⊕	⊖	

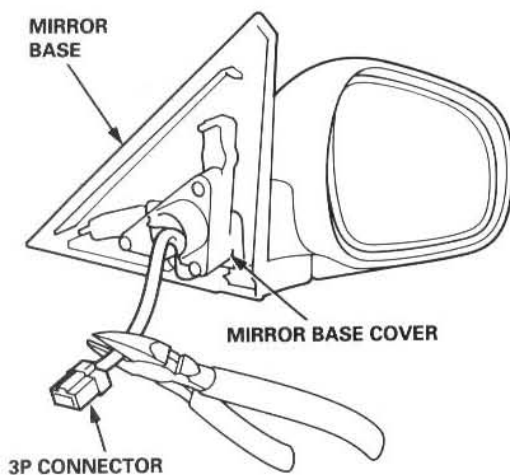
Defogger Test:

- 4. Check for continuity between the C1 and C2 terminals of the 6P connector.
There should be continuity.
- 5. If the mirror fails to work properly, replace the mirror assembly (see section 20).

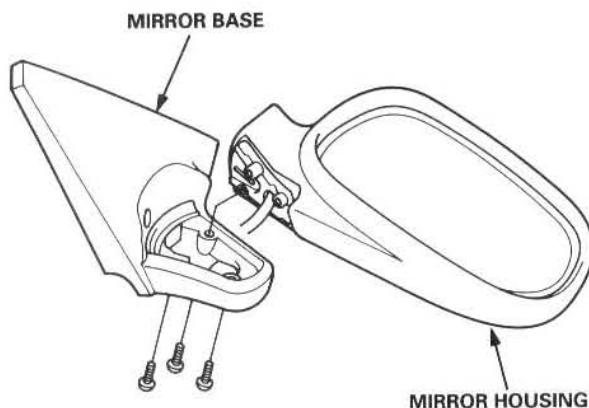
Mirror Actuator Replacement

NOTE: If the mirror is equipped with a defogger, replace the mirror assembly (see section 20).

1. Remove the door mirror from the vehicle (see section 20), and disconnect the electrical connector.
2. Record the terminal locations and wire colors, and cut the wire harness with wire cutters.
3. Remove the mirror base cover, then remove the harness clamp from the mirror base.

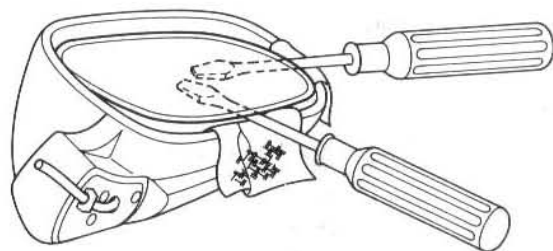


4. Remove the three mounting screws, and separate the mirror base from the mirror housing.

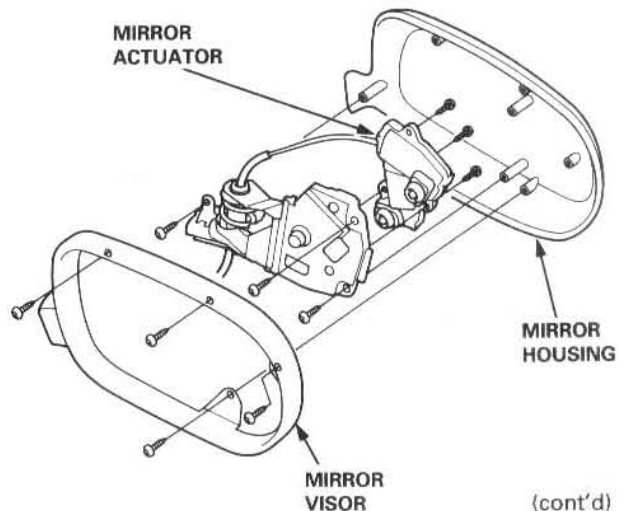


5. Insert a flat tip screwdriver into the groove between the mirror housing and the mirror holder, then pry off the mirror.

NOTE: Be careful not to damage the mirror housing.



6. Remove the four screws, and separate the mirror visor from the mirror housing. Then remove the actuator.

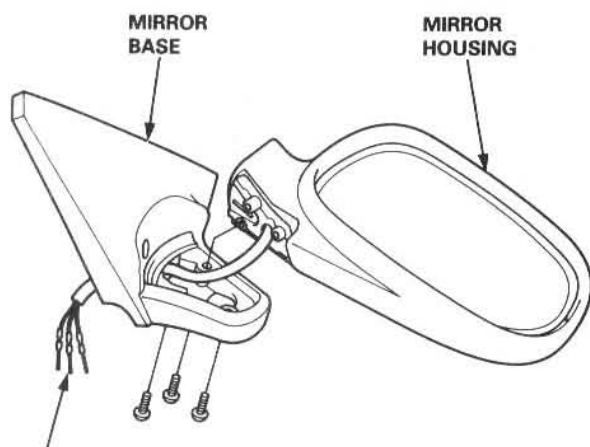


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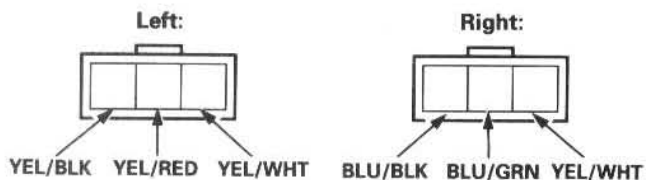
Power Mirrors

Mirror Actuator Replacement (cont'd)

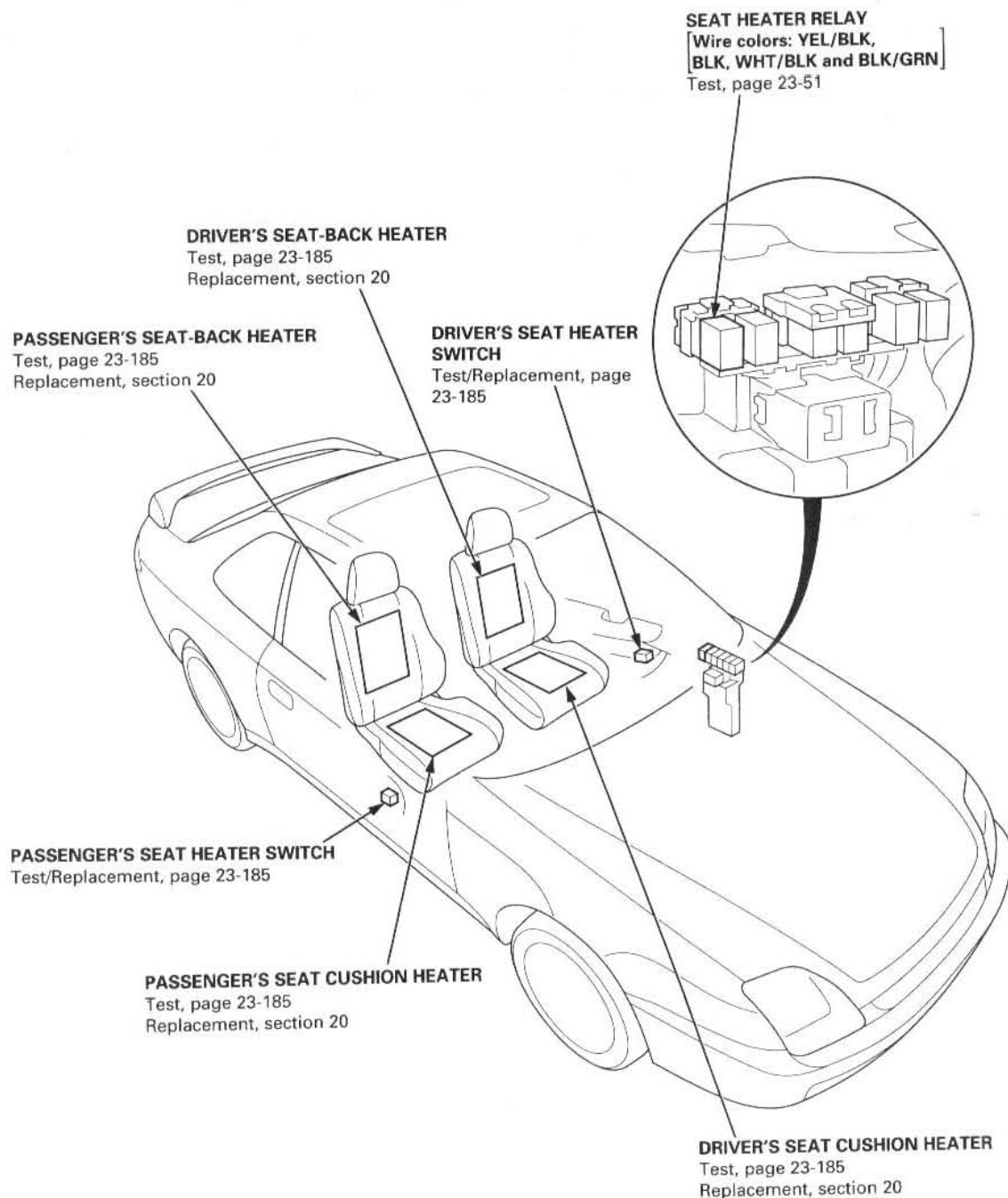
7. Route the wire harness of the new actuator through the shaft hole.
8. Assemble the actuator and the mirror visor by installing the screws.
9. Attach the actuator to the mirror base by pressing it into place by hand. When installing the joint pin, be careful not to break the mirror glass, and make sure that the rubber is correctly placed and does not get pinched.
10. Assemble the mirror base and mirror housing by installing the screws.
11. Insert the terminals into the connector in the original arrangement (recorded in step 2), as shown below.
12. Apply tape to seal the intersection of the connector and the wire harness.
13. Reinstall the mirror assembly.
14. Operate the power mirror to check that the actuator works smoothly.



NOTE: Make sure the terminals don't get deformed when routing the harness through the shaft hole.



Component Location Index

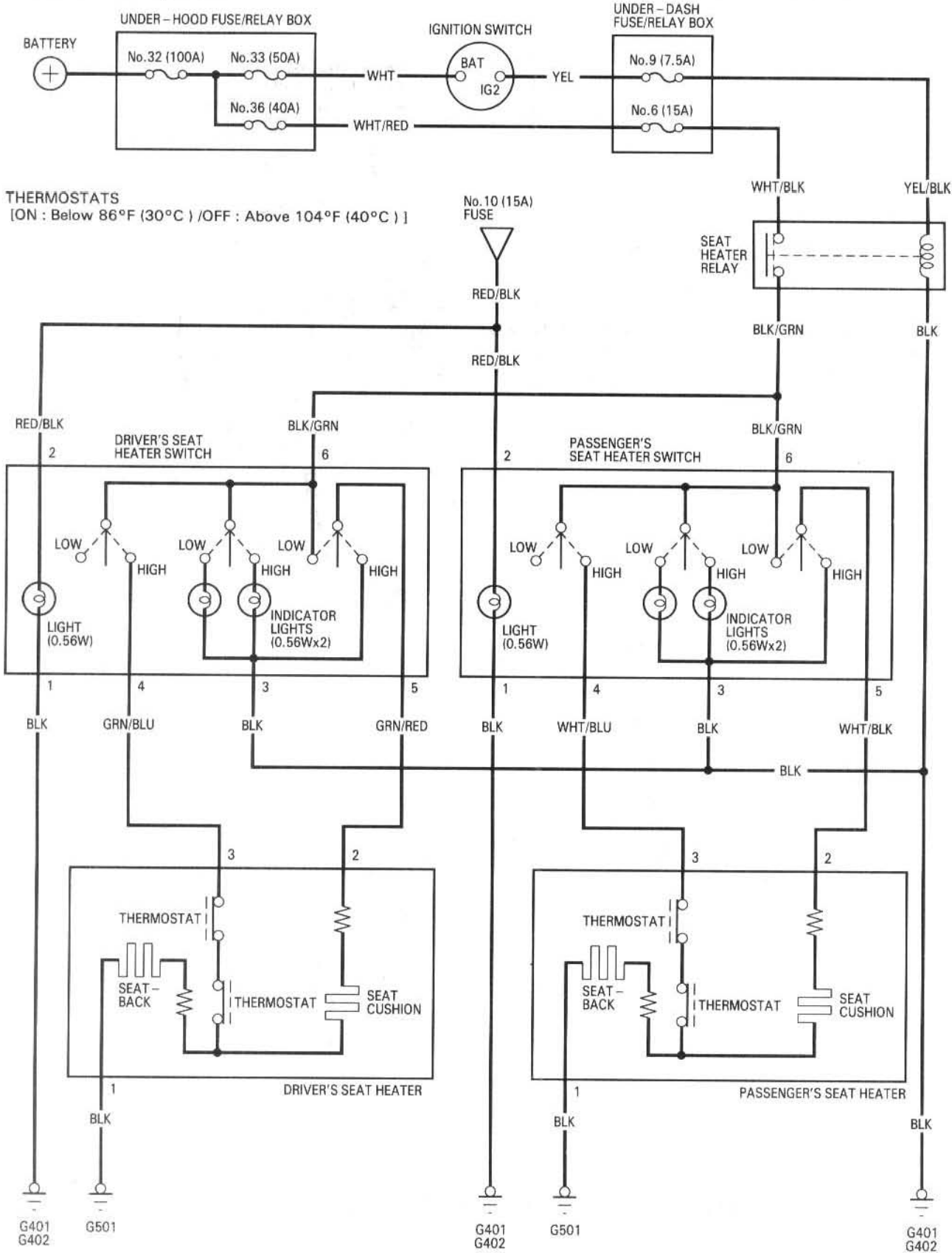


Description

Two heaters are provided in each front seat; one in the seat cushion and another in the seat-back. In normal use, temperature is automatically controlled by the thermostats [OFF above 104°F (40°C)] built into each seat cushion heater.

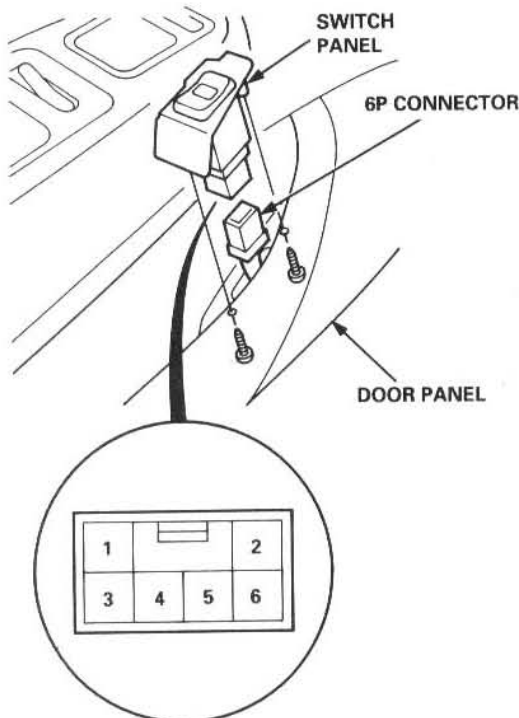
Seat Heaters (Canada)

Circuit Diagram



Switch Test/Replacement

1. Remove the door panel (see section 20).
2. Remove the two mounting screws from the switch panel.
3. Carefully remove the switch panel and switch from the door panel.
4. Disconnect the 6P connector from the switch.

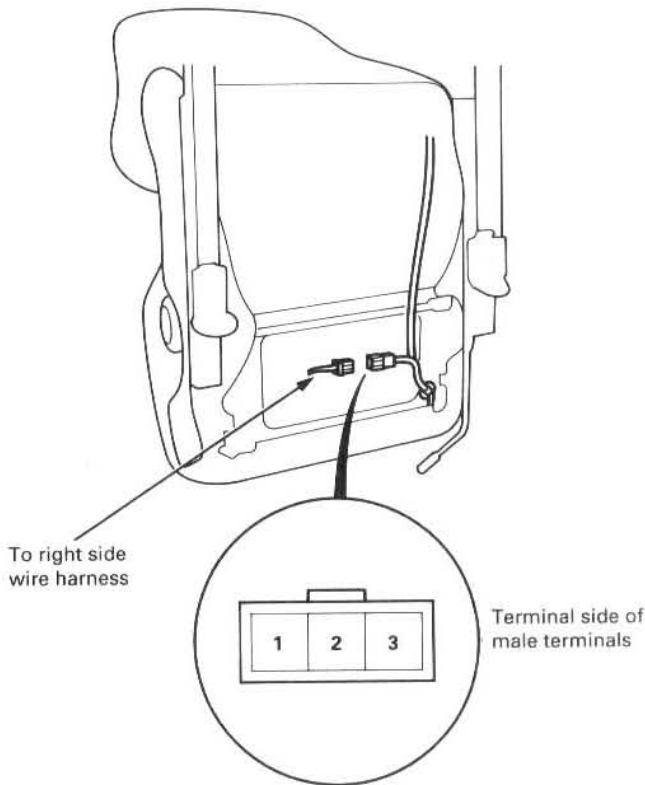


5. Check for continuity between the terminals in each switch position according to the table.

Terminal		1		2	3		6	4	5
Position									
ON	HIGH	○	⊕	○	○	⊕	○	○	○
	LOW	○	⊕	○	○	⊕	○	○	○
OFF		○	⊕	○					

Heater Test

1. Remove the front seat (see section 20).
2. Disconnect the 3P connector as shown below.

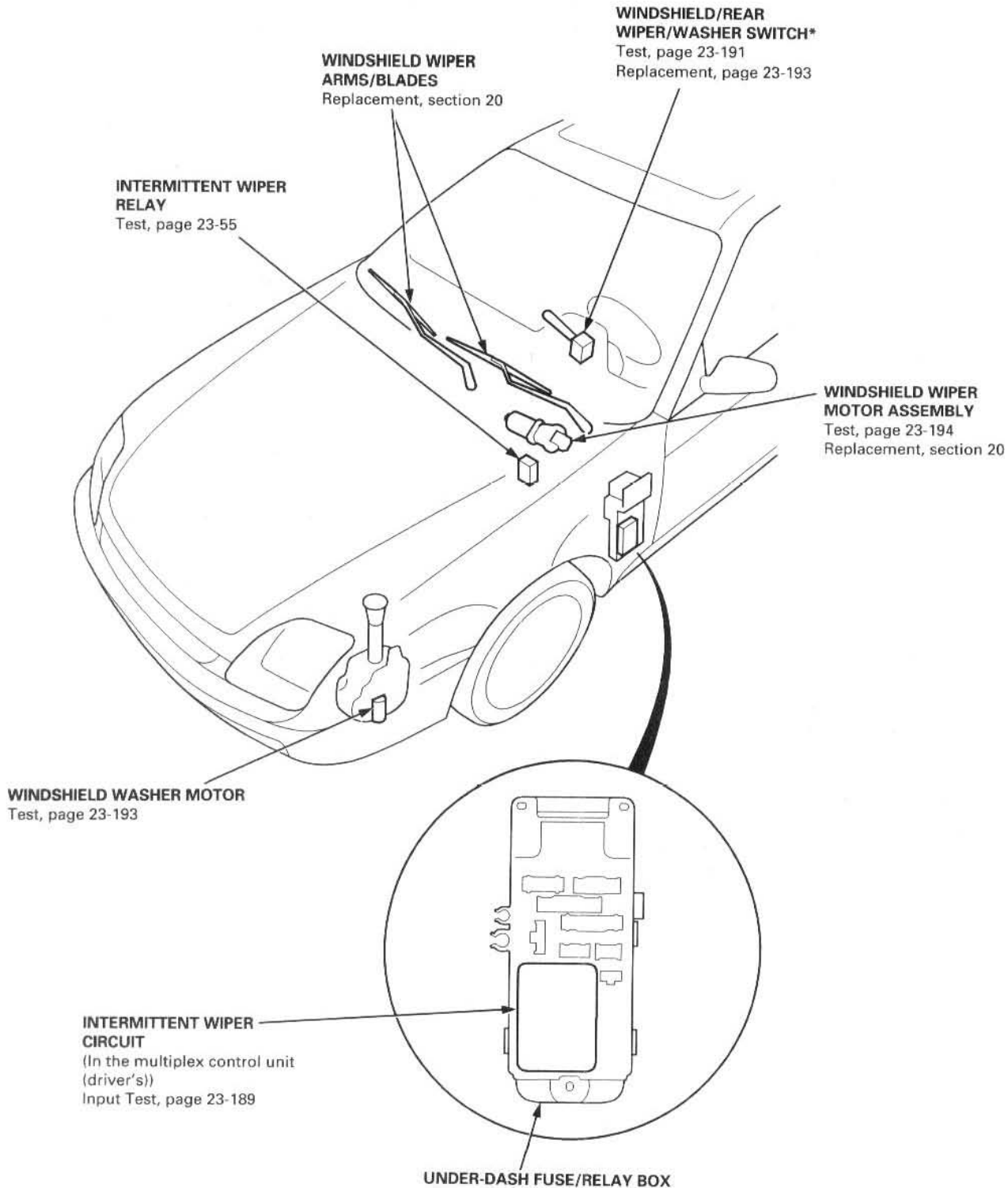


3. Check for continuity between the No. 3 and No. 2 terminals, and No. 2 and No. 1 terminals. There should be continuity.

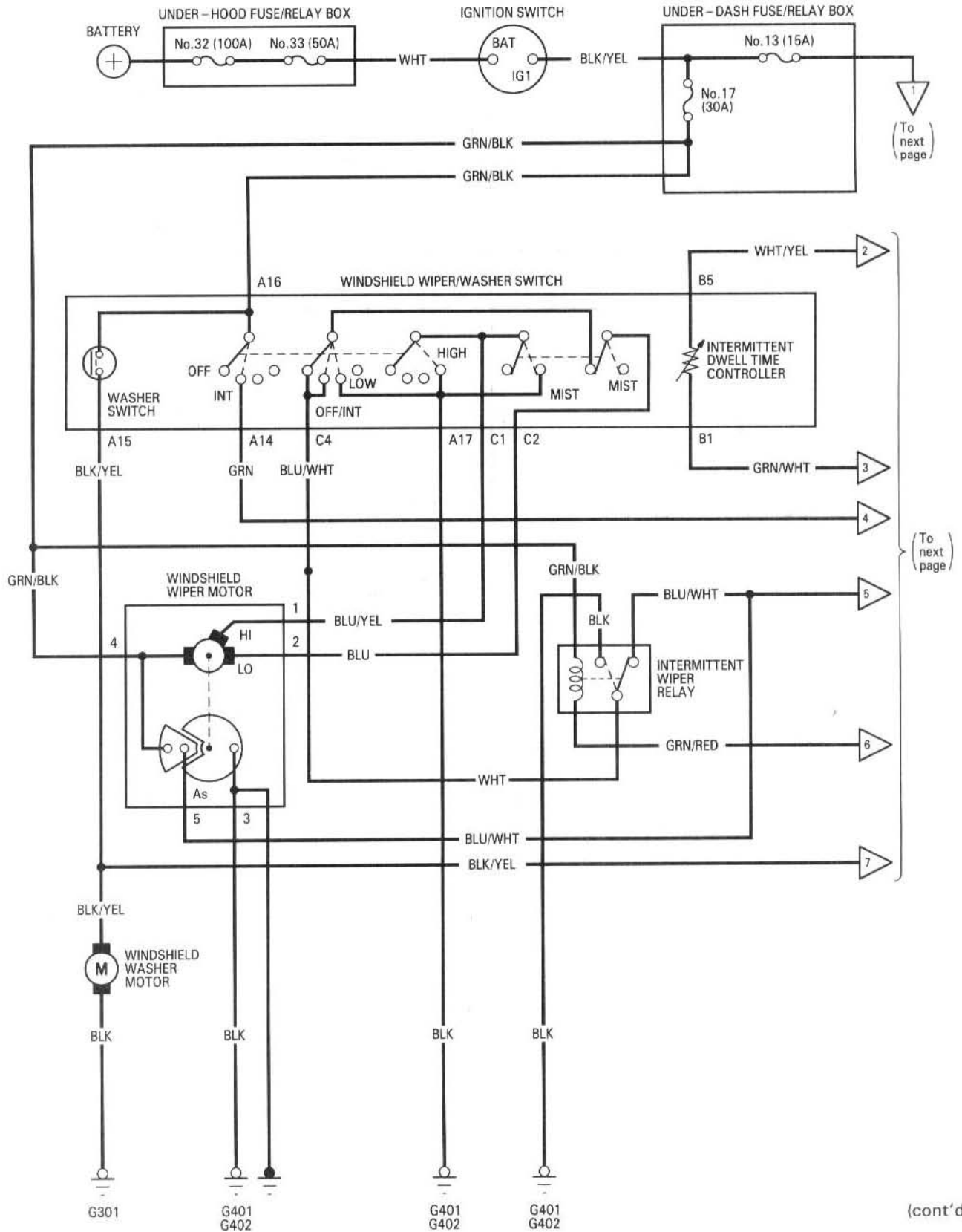
Wiper/Washer

Component Location Index

*: You can also test the switch by using the Multiplex Control System self-diagnosis function (mode 2). (See page 23-111.)



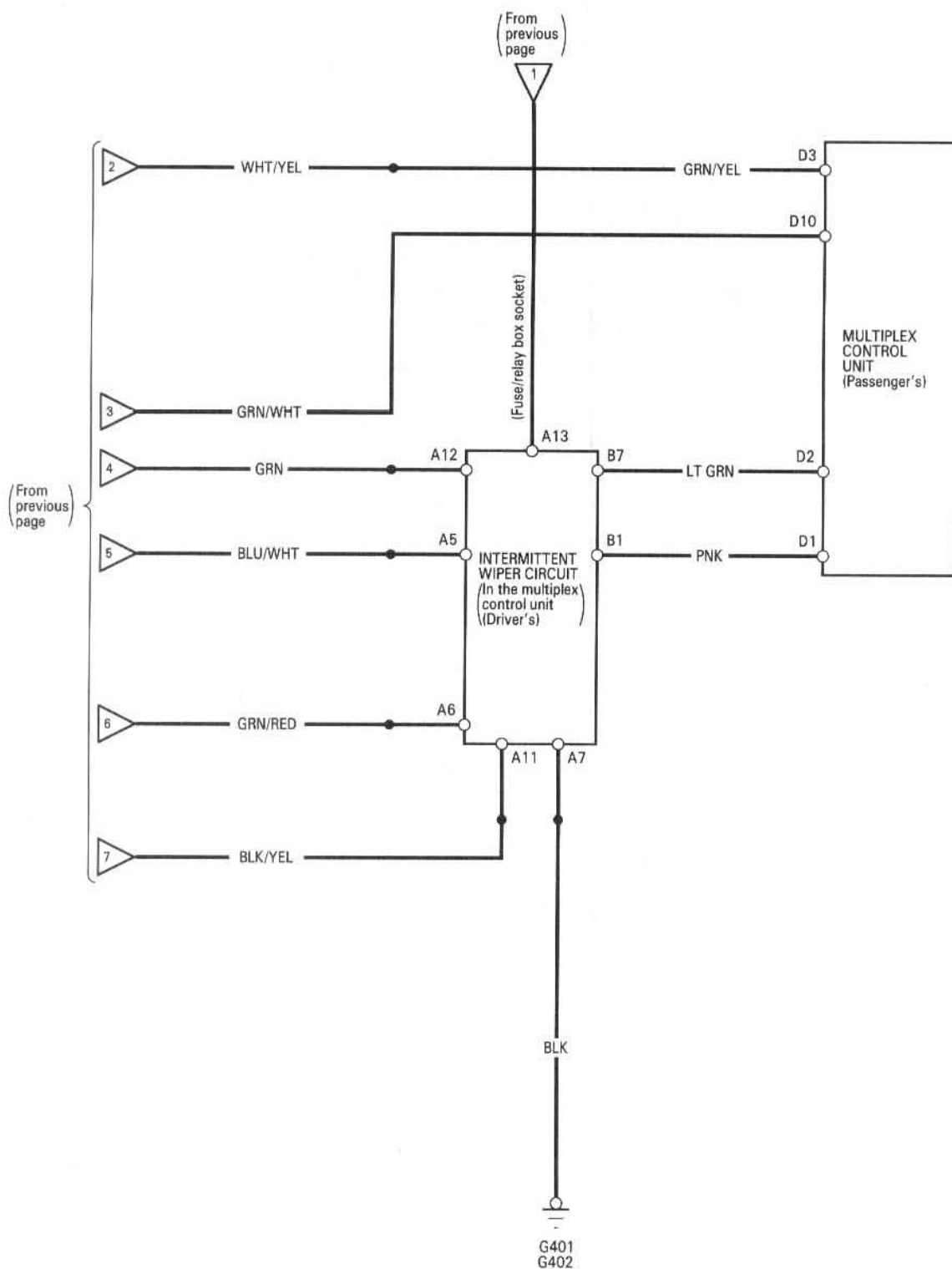
Circuit Diagram



(cont'd)

Wiper/Washer

Circuit Diagram (cont'd)



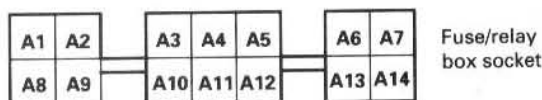
Control Unit Input Test

NOTE:

- Before testing, go to the Troubleshooting Guide (see page 23-103).
- All connector views are from the wire side of female terminals unless otherwise noted.

Multiplex Control Unit (Driver's):

1. Remove the under-dash fuse/relay box (see page 23-48).
2. Remove the driver's unit from the under-dash fuse/relay box (see page 23-106).
3. Inspect the connector and socket terminals to be sure they are all making good contact.
 - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
 - If the terminals look OK, make the following input tests at the fuse/relay box socket.
 - If any test indicates a problem, find and correct the cause, then recheck the system.
 - If all the input tests prove OK, the control unit must be faulty; replace it.



Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
A6	Fuse/relay box socket	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> • Blown No. 17 (30 A) fuse in the under dash fuse/relay box • Faulty intermittent wiper relay • An open in the wire
A5		Ignition switch ON (II) and wiper switch OFF	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> • Blown No. 17 (30 A) fuse in the under-dash fuse/relay box • Faulty intermittent wiper relay • Faulty windshield wiper switch • An open in the wire
A12		Ignition switch ON (II) and wiper switch at INT	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> • Blown No. 17 (30 A) fuse in the under-dash fuse/relay box • Faulty wiper switch • An open in the wire
A11		Ignition switch ON (II) and washer switch ON	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> • Blown No. 17 (30 A) fuse in the under-dash fuse/relay box • Faulty washer switch • An open in the wire
A13		Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> • Blown No. 13 (15 A) fuse in the under-dash fuse/relay box

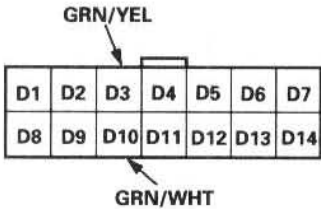
(cont'd)

Control Unit Input Test (cont'd)

- NOTE:
- Before testing, go to the Troubleshooting Guide (see page 23-103).
 - All connector views are from the wire side of female terminals unless otherwise noted.

Multiplex Control Unit (Passenger's):

1. Remove the right kick panel (see section 20).
2. Disconnect the 14P connector from the passenger's unit (see page 23-105).
3. Inspect the connector and socket terminals to be sure they are all making good contact.
 - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
 - If the terminals look OK, make the following input tests at the connector.
 - If any test indicates a problem, find and correct the cause, then recheck the system.
 - If all the input tests prove OK, the control unit must be faulty; replace it.

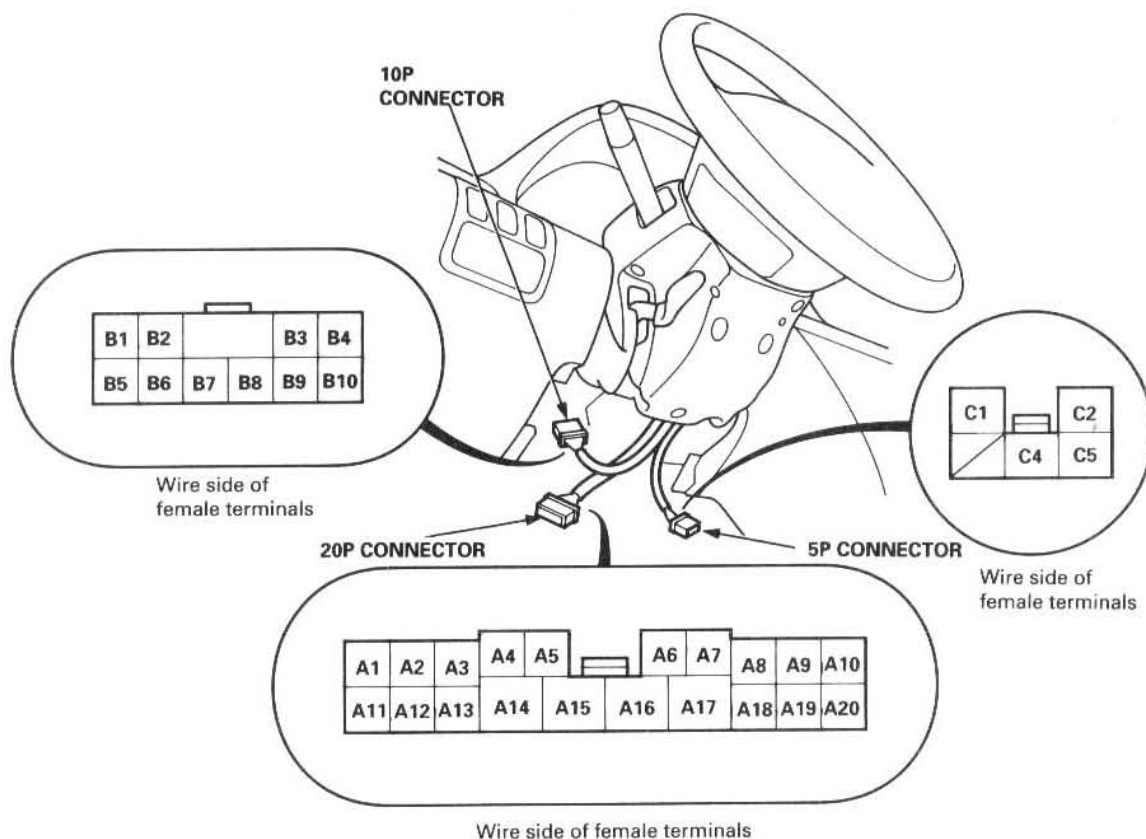


Disconnect the connectors from the unit.

Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
D3	GRN/YEL	Intermittent dwell time control ring turned	Check for resistance between the terminals: It should vary from 0 to 36 kΩ as the ring is turned.	<ul style="list-style-type: none">• Faulty intermittent dwell time controller• An open in the wire
D10	GRN/WHT			

Wiper/Washer Switch Test

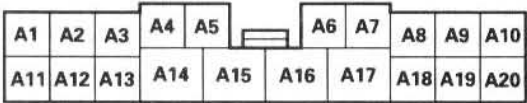
1. Remove the dashboard lower cover (see section 20).
2. Disconnect the combination switch harness 10P and 5P connector from the main wire harness, and disconnect the 20P connector from the under-dash fuse relay box.
3. Check for continuity between the terminals in each switch position according to the table.
 - If there is continuity, the switch is OK.
 - If there is no continuity, check for continuity between the switch harnesses.
 - If the switch harness is OK, replace the wiper/washer switch.



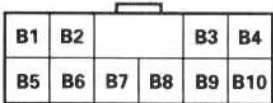
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Wiper/Washer

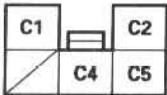
Wiper/Washer Switch Test (cont'd)



Wire side of female terminals



Wire side of female terminals



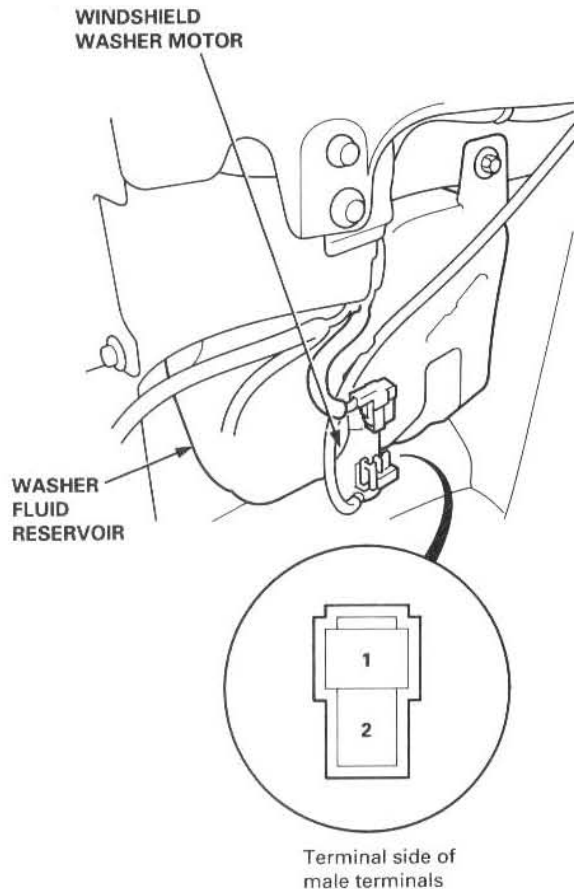
Wire side of female terminals

Windshield Wiper/Washer Switch:

Terminal	A14	A15	A16	A17	B1		B5	C1	C2	C4
Position										
OFF										
INT										
LO										
HI										
Mist switch "ON"										
Washer switch "ON"										
Intermittent dwell time controller turned						0-36kΩ 				

Washer Motor Test

1. Remove the left inner fender (see section 20).
2. Disconnect the 2P connector from the washer motor.



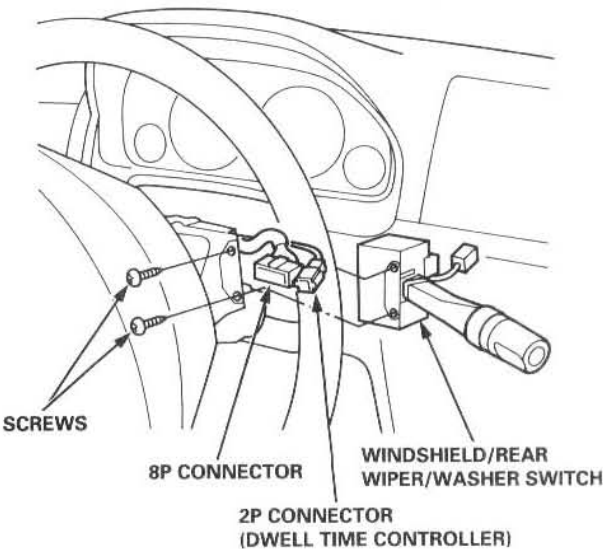
3. Test the washer motor by connecting battery power and ground according to the table.

Terminal	1	2
Battery		
Connected	⊕	⊖

- If the motor fails to run smoothly, replace it.
- If the motor runs smoothly, but little or no washer fluid is pumped, check for a disconnected or blocked washer hose, or a clogged pump outlet in the motor.

Switch Replacement

1. Remove the dashboard lower cover (see section 20).
2. Remove the steering column covers (see section 17).
3. Remove the two screws and the switch.

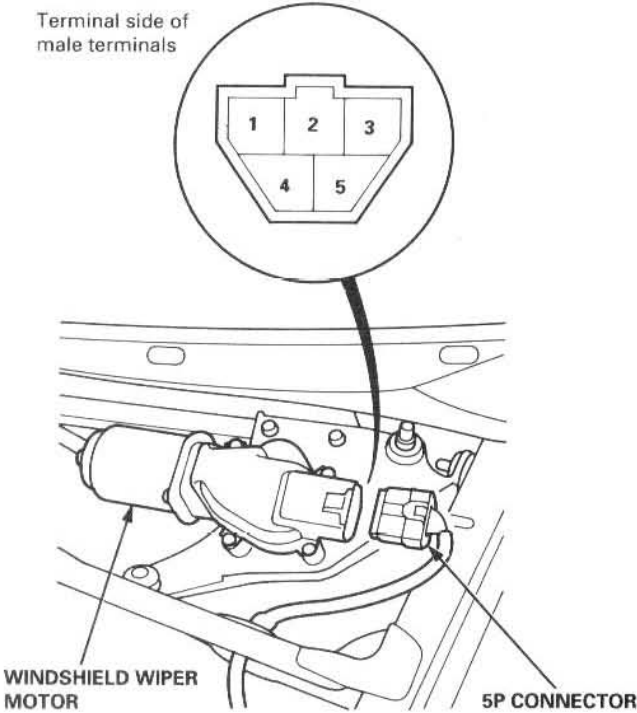


4. Install in the reverse order of removal.

Windshield Wiper Motor Test

- 1. Open the hood, and remove the cap nuts and the wiper arms (see section 20).

NOTE: Carefully remove the wiper arms, so that they do not touch the hood.
- 2. Remove the cowl cover by prying out the trim clips (see section 20).
- 3. Disconnect the 5P connector from the windshield wiper motor.



- 4. Test the motor by connecting battery power and ground according to the table.

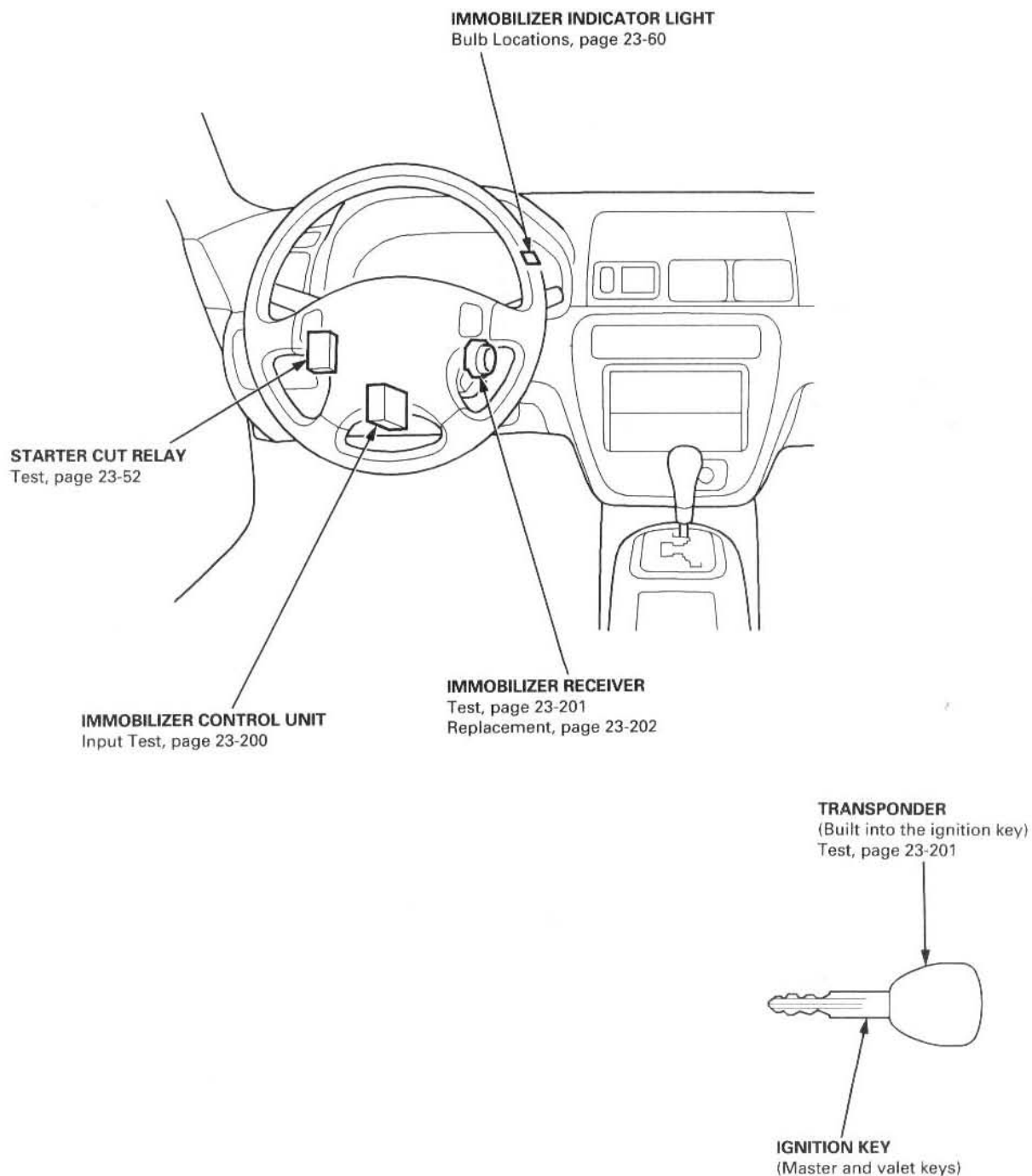
Terminal Position	1	2	4
LOW SPEED		⊖	⊕
HIGH SPEED	⊖		⊕

If the motor does not run or fails to run smoothly, replace it.

- 5. Connect an analog voltmeter between the No. 5 (+) and No. 3 (−) terminals, and run the motor at low or high speed.

The voltmeter should indicate 0 V and 4 V or less alternately.

Component Location Index



Immobilizer System

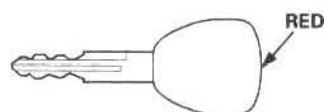
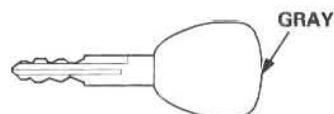
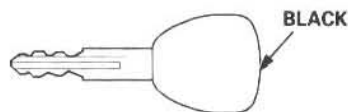
Description

The vehicle is equipped with an immobilizer system that will disable the vehicle unless the proper ignition key is used. This system consists of a transponder located in the ignition key, a receiver, a control unit, an indicator light, and the ECM.

The vehicle has three kinds of keys.

- The master key is for:
 - ignition switch.
 - door locks.
 - trunk lock.
- The valet key is for:
 - ignition switch.
 - door locks.
- The learning key is for rewriting the immobilizer system.

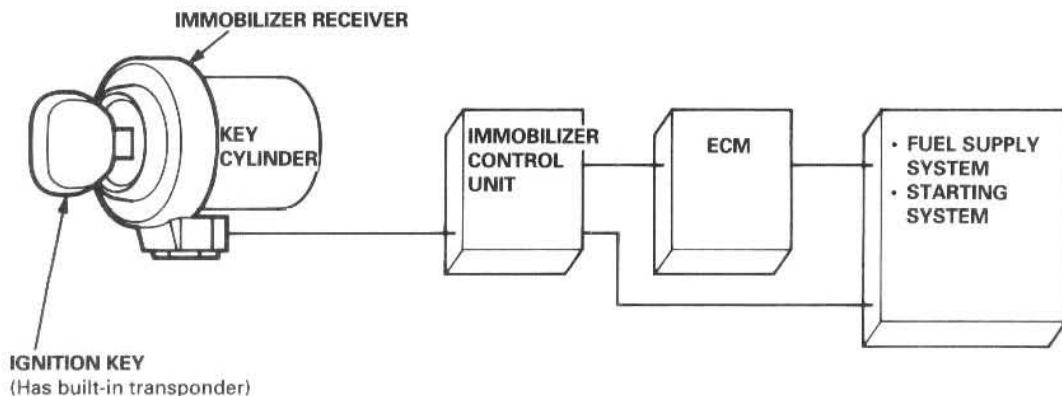
NOTE: This key cannot start the engine; do not use it except for rewriting the system. If someone tries to start the engine with the learning key, all master and valet keys must be relearned.



When the key is inserted in the ignition and turned to the (II) position, the immobilizer control unit sends power to the transponder through the receiver.

The transponder then sends a coded signal back through the receiver to the control unit.

The control unit in turn signals the ECM, as well as the starter cut relay.



- If the proper key has been used, the starter cut relay will be energized, and the ECM will energize the fuel supply system. The immobilizer indicator light in the gauge assembly will simultaneously come on for about two seconds, then go off, thereby signaling that the immobilizer unit has recognized the code sent by the transponder.
- If the wrong key has been used and the code was not received or recognized by the unit, the indicator light will come on for about two seconds, then it will continue blinking until the ignition switch is turned OFF.
- If the ignition switch is turned OFF, the indicator will blink for about five seconds to signal that the unit has been set correctly, then the indicator will go off.

IMMOBILIZER INDICATOR LIGHT BLINKING PATTERN:

IGNITION SWITCH			
PROPER KEY INSERTED	INDICATOR LIGHT	ON	
		OFF	
WRONG KEY INSERTED	INDICATOR LIGHT	ON	
		OFF	

(cont'd)

Immobilizer System

Description (cont'd)

Problems and Replacement Parts:

Problem	Parts set	PGM-Tester required?
① Master or valet key has been lost or additional master or valet key is required.	A	YES
② All master and valet keys have been lost.	A x 2, and B	YES
③ Learning key has been lost.	B	YES
④ Immobilizer receiver does not work.	C	NO
⑤ Immobilizer control unit does not work.	B	YES
⑥ ECM does not work.	E	YES
⑦ Ignition switch does not work.	D	YES
⑧ Door key cylinder has been broken.	F (G)	NO (YES)

Parts Set:

A: Blank key

E: ECM

B: Immobilizer control unit
Master key
Learning key

F: Door key cylinder
Master keys for doors open or locked

C: Immobilizer receiver

G: Ignition switch with immobilizer receiver
Immobilizer control unit
Master key
Learning key
Door key cylinders
Trunk key cylinder

D: Ignition switch with immobilizer receiver
Immobilizer control unit
Master key
Learning key

NOTE:

- The immobilizer system can store up to five key codes.
- If it is necessary to rewrite the immobilizer control unit to learn a new key, the dealer needs the customer's vehicle, all its master keys and valet keys, its learning key, and the Honda PGM Tester equipped with an immobilizer program card. Any key that is not learned during rewriting will no longer start the engine.
- If the customer has lost his key, and cannot start the engine, contact Honda Customer Relations.

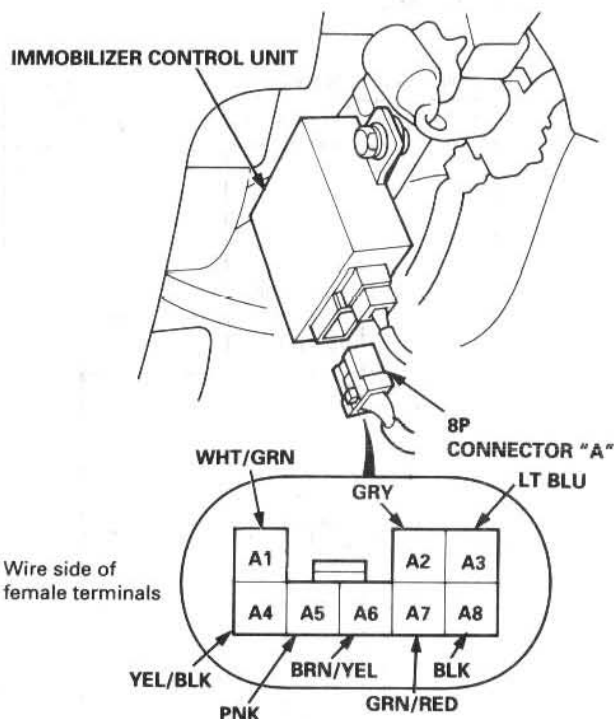
Before Testing:

- Due to the action of the immobilizer system, the engine takes slightly more time to start than engines of vehicle without an immobilizer system.
- When the system is normal, and the proper key is inserted, the indicator light comes on for two seconds, then it will go off.
- If the indicator starts to blink after two seconds, or if the engine does not start, repeat the starting procedure.
 - If the engine still does not start, perform the immobilizer control unit input test and transponder and immobilizer receiver test.
- If all the input tests and transponder and immobilizer receiver test prove OK, check the ECM (see section 11).
 - If the ECM is OK, the immobilizer control unit must be faulty; replace the immobilizer control unit, master key and learning key together, and then rewrite the ECM with the Honda PGM Tester.
 - If the ECM is faulty, substitute a known-good ECM, and recheck. However, since the known-good ECM has a different code stored into it, it must be rewritten with the Honda PGM Tester. Otherwise, the engine will not start.

Immobilizer System

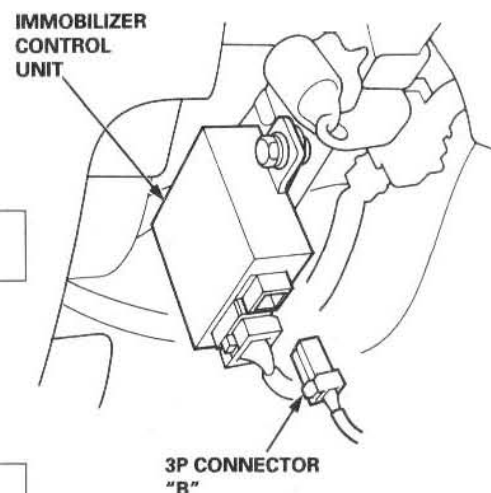
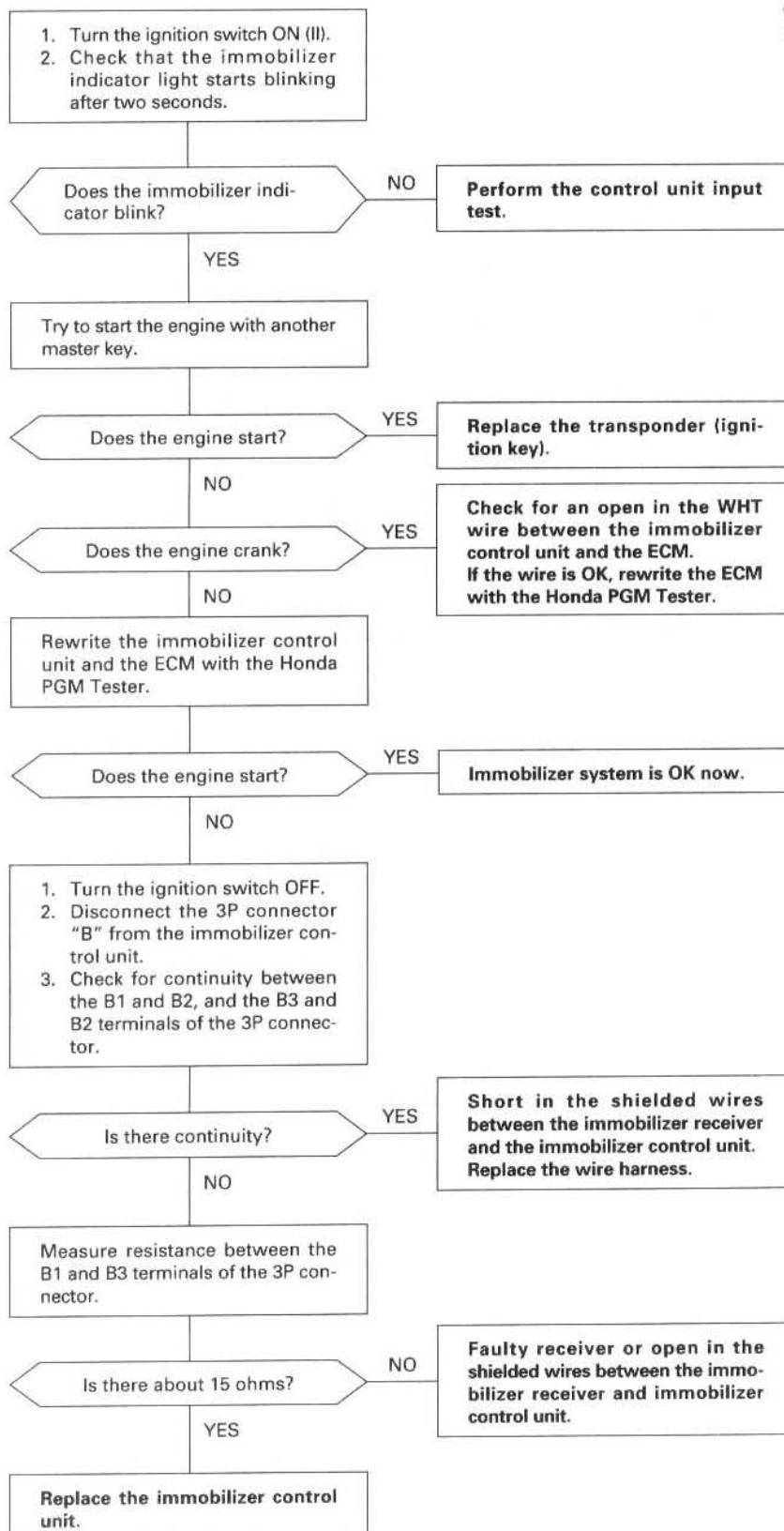
Control Unit Input Test

1. Remove the dashboard lower cover (see section 20).
 2. Disconnect the 8P connector "A" from the immobilizer control unit.
 3. Inspect the connector and socket terminals to be sure they are all making good contact.
 - If the terminals are bent, loose, or corroded, repair them as necessary, and recheck the system.
 - If the terminals look OK, make the following input tests at the connector.
- If any test indicates a problem, find and correct the cause, then recheck the system.
- If all the input tests prove OK, check the immobilizer receiver and transponder.

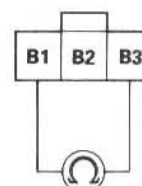
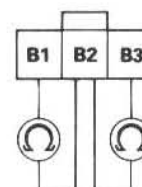


Cavity	Wire	Test condition	Test: Desired results	Possible cause if result is not obtained
A1	WHT/GRN	Under all conditions	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> • Blown No. 4 (10 A) fuse in the under-dash fuse/relay box. • An open in the wire
A2	GRY	M/T: With clutch pedal depressed	Check for continuity to ground: There should be continuity.	<ul style="list-style-type: none"> • Faulty clutch interlock switch • An open in the wire
		A/T: Shift lever in P or N		<ul style="list-style-type: none"> • Faulty A/T gear position switch • An open in the wire
A3	LT BLU	Ignition switch at START (III)	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> • Blown No. 2 (7.5 A) fuse in the under-dash fuse/relay box • Faulty starter cut relay • An open in the wire
A4	YEL/BLK	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> • Blown No. 4 (10 A) fuse in the under-dash fuse/relay box • Faulty PGM-FI main relay • An open in the wire
A5	PNK	Under all conditions	Attach to ground: The immobilizer indicator should come on.	<ul style="list-style-type: none"> • Blown No. 43 (7.5 A) fuse in the under-hood fuse/relay box • Blown bulb • Faulty gauge circuit • An open in the wire
A6	BRN/YEL	Under all conditions	Check for continuity between the A6 terminal and the No. 22 terminal of the ECM 31P connector: There should be continuity.	<ul style="list-style-type: none"> • An open in the wire
A7	GRN/RED	Ignition switch OFF	Check for continuity to ground: There should be continuity with the parking brake lever up and no continuity with the lever down.	<ul style="list-style-type: none"> • Faulty parking brake switch • An open in the wire • Faulty brake fluid level switch
A8	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	<ul style="list-style-type: none"> • Poor ground (G401, G402) • An open in the wire

Immobilizer Receiver and Transponder Test



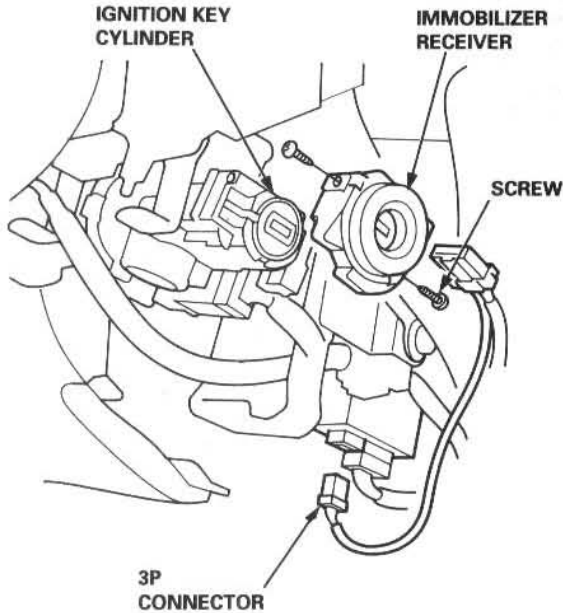
Wire side of female terminals



Immobilizer System

Immobilizer Receiver Replacement

1. Remove the dashboard driver's lower cover (see section 20).
2. Remove the steering column covers (see section 20).
3. Remove the windshield wiper/washer switch assembly (see page 23-193).
4. Disconnect the 3P connector from the immobilizer control unit.
5. Remove the screw from the immobilizer receiver, then remove the receiver from the ignition key cylinder. If necessary, disconnect the connector from the receiver.



6. Install in the reverse order of removal.

NOTE: As this harness serves as communication link, install it carefully.

7. After replacement, check the immobilizer system.

Restraints

Seat Belts	24-2
Supplemental Restraint System (SRS)	24-9

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Removal/Installation	24-3
Rear Seat Belt	
Removal/Installation	24-5
Inspection	24-7
Child Seat Anchor Plate	24-8

**Click here to go back to
the Introduction page**



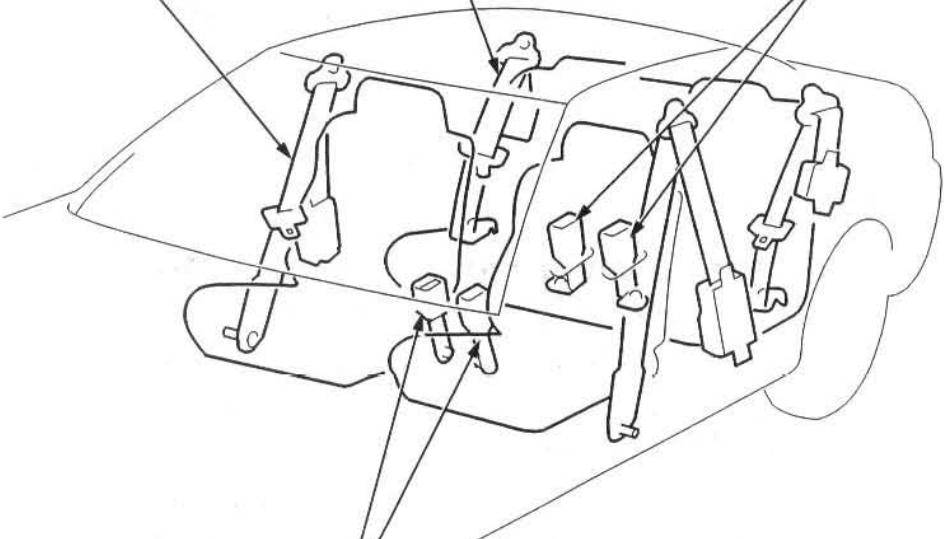
Seat Belts

Component Location Index

FRONT SEAT BELT
Removal/Installation, page 24-3
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REAR SEAT BELT
Removal/Installation, page 24-5
Inspection, page 24-7

REAR SEAT BELT BUCKLES
(see page 24-6)



**FRONT SEAT
BELT BUCKLES**
(see page 24-4)

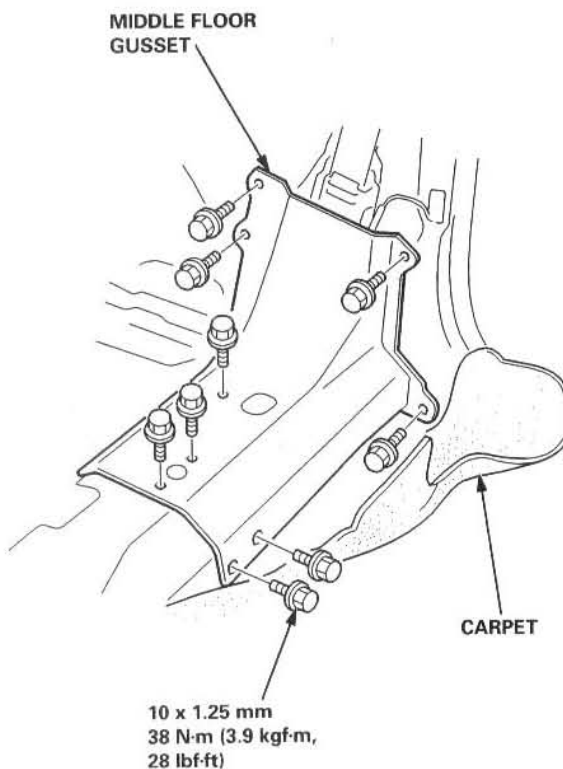


Front Seat Belt Removal/Installation

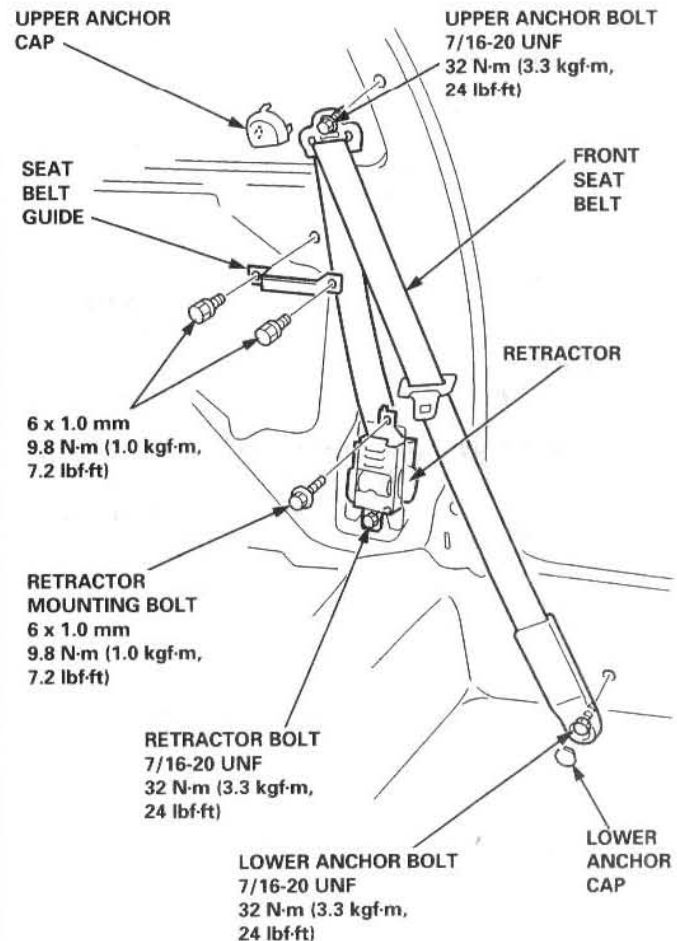
CAUTION: Check the front seat belts for damage, and replace them if necessary. Be careful not to damage them during removal and installation.

Front seat belt:

1. Slide the front seat forward fully.
2. Remove (see section 20):
 - Door sill molding
 - Rear seat-back and rear seat cushion
 - Door trim (as necessary)
 - Rear pillar trim
 - Rear bulkhead upper trim
 - Quarter trim panel
3. Pull back the carpet as necessary, and remove the bolts securing the middle floor gusset. Remove the middle floor gusset.



4. Remove the upper anchor cap, lower anchor cap and seat belt guide.



5. Remove the upper and lower anchor bolts, the retractor bolt, the retractor mounting bolt, and remove the front seat belt and retractor.
6. Installation is the reverse of the removal procedure.

NOTE:

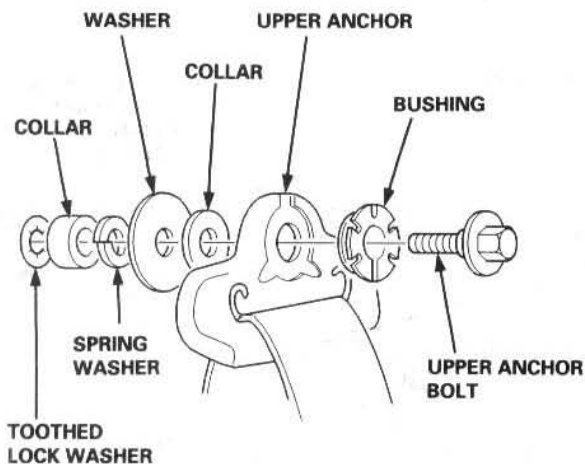
- Check that the retractor locking mechanism functions as described on page 24-7.
- Assemble the washers and collars on the upper and lower anchor bolts as shown on page 24-4.
- Before installing the anchor bolts, make sure there are no twists or kinks in the front seat belt.

(cont'd)

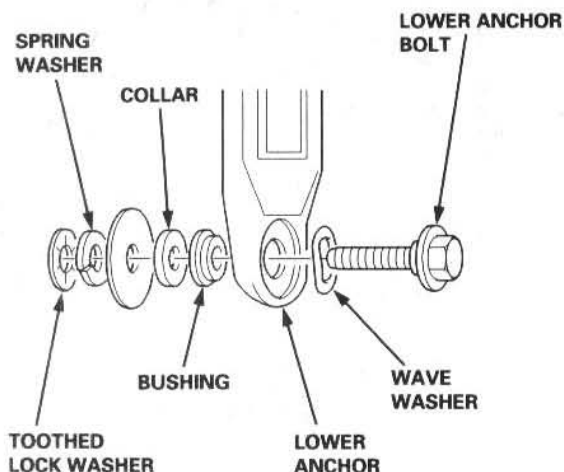
Seat Belts

Front Seat Belt Removal/Installation (cont'd)

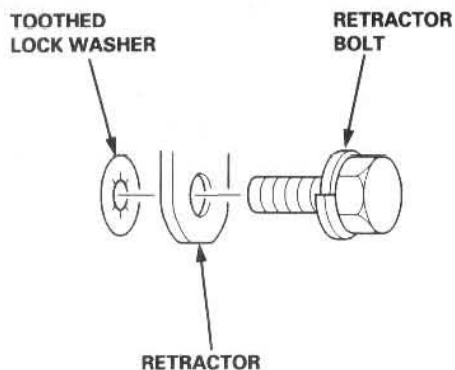
Upper anchor bolt construction:



Lower anchor bolt construction:



Retractor bolt construction:

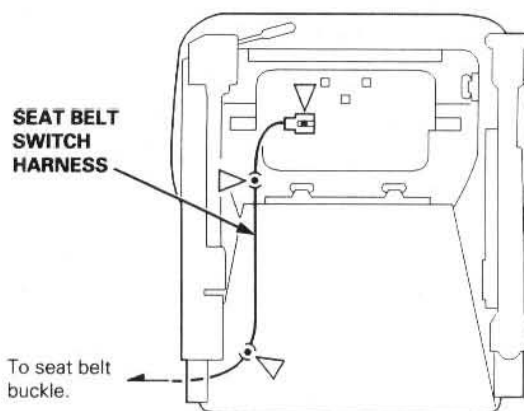


Seat belt buckle:

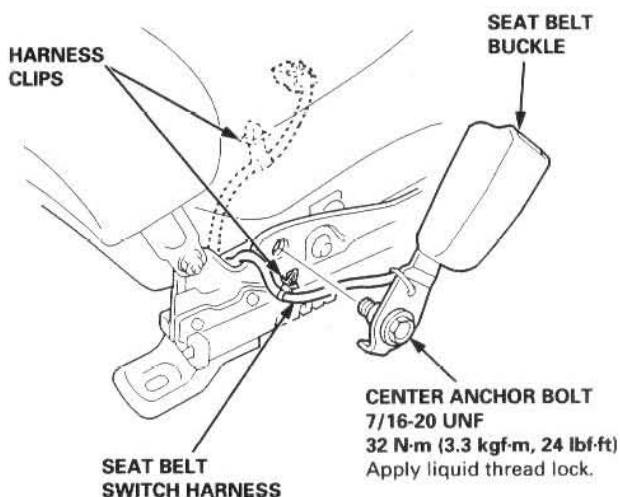
1. Remove the front seat (see section 20).
2. Driver's: Detach the seat belt switch connector and harness clips from the seat cushion frame.

NOTE: Raise the seat cushion to its maximum height (with manual height adjustment).

▷:Clip locations

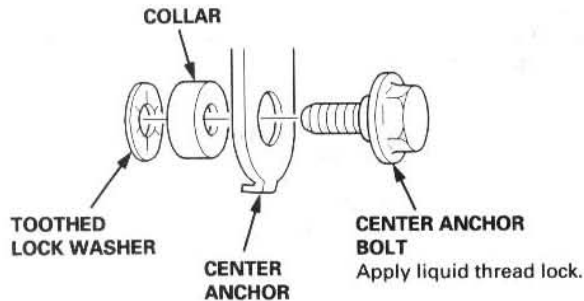


3. Remove the center anchor bolt, then remove the seat belt buckle. Pull out the seat belt switch harness (with seat belt switch).





Center anchor bolt construction:



4. Installation is the reverse of the removal procedure.

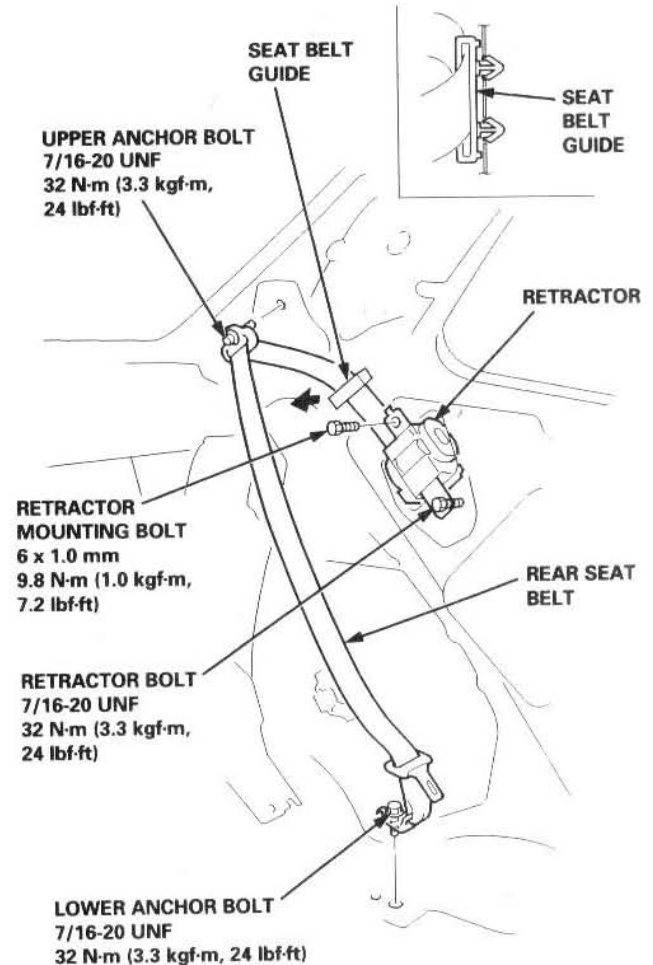
NOTE: Assemble the collar on the center anchor bolt as shown.

Rear Seat Belt Removal/Installation

CAUTION: Check the rear seat belts for damage, and replace them if necessary. Be careful not to damage them during removal and installation.

Rear seat belt:

1. Remove (see section 20):
 - Door sill molding
 - Rear pillar trim
 - Rear seat-back and rear seat cushion
 - Rear bulkhead upper trim
 - Door trim (as necessary)
 - Quarter trim panel
2. Detach the seat belt guide. Remove the upper and lower anchor bolts, the retractor bolt, the retractor mounting bolt, and remove the rear seat belt and retractor.



(cont'd)

Seat Belts

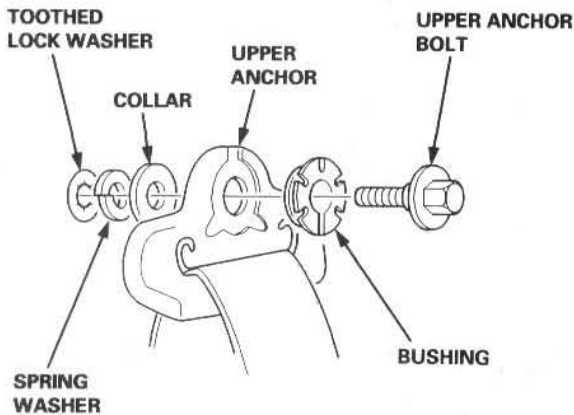
Rear Seat Belt Removal/Installation (cont'd)

3. Installation is the reverse of the removal procedure.

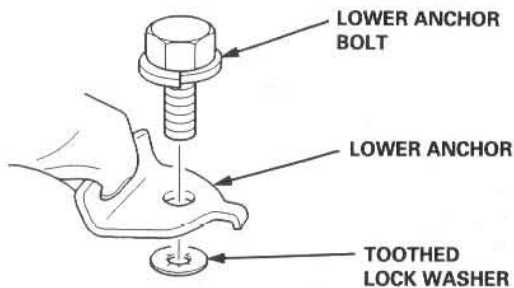
NOTE:

- Check that the retractor locking mechanism functions as described on page 24-7.
- Assemble the washers, collar and bushing on the upper anchor bolt as shown.
- Before installing the anchor bolt, make sure there are no twists or kinks in the rear seat belt.

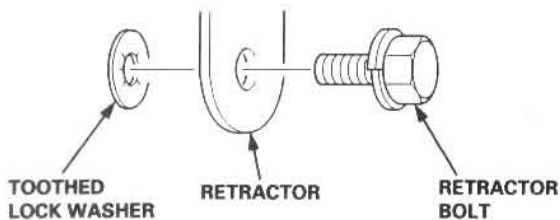
Upper anchor bolt construction:



Lower anchor bolt construction:



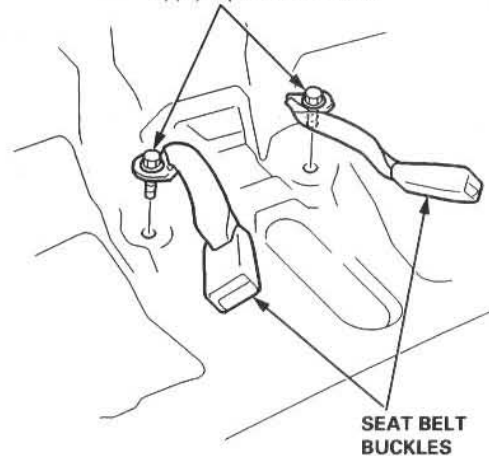
Retractor bolt construction:



Seat belt buckles:

1. Remove the rear seat cushion (see section 20).
2. Remove the center anchor bolts, then remove the seat belt buckles.

CENTER ANCHOR BOLTS
7/16-20 UNF
32 N·m (3.3 kgf·m,
24 lbf·ft)
Apply liquid thread lock.

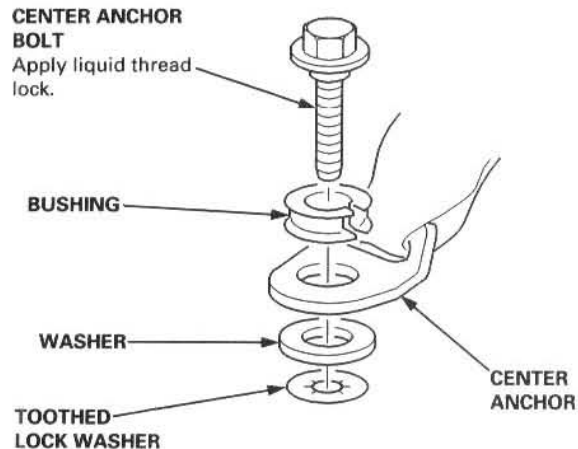


3. Installation is the reverse of the removal procedure.

NOTE:

- Assemble the washers and bushing on the center anchor bolts as shown.
- When installing the seat cushion, slip the seat belt buckles through the slits in the seat cushion.

Center anchor bolt construction:





Inspection

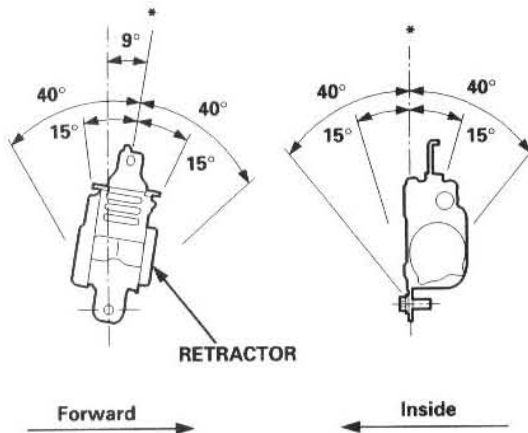
Retractor Inspection

1. Before installing the retractor, check that the seat belt can be pulled out freely.
2. Make sure that the seat belt does not lock when the retractor is leaned slowly up to 15° from the mounted position. The seat belt should lock when the retractor is leaned over 40° .

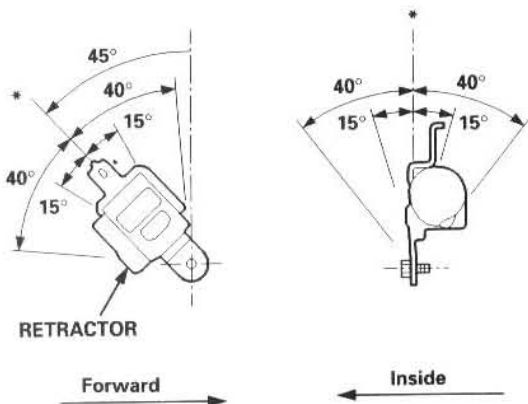
CAUTION: Do not attempt to disassemble the retractor.

Front:

*: Mounted Position



Rear:



3. Replace the seat belt with a new one if there is any abnormality.

In-vehicle Seat Belt Inspection

1. Check that the seat belt is not twisted or caught on anything.
2. After installing the anchors, check for free movement on the anchor bolts. If necessary, remove the anchor bolts and check that the washers and other parts are not damaged or improperly installed.
3. Check the seat belts for damage or discoloration. Clean with a shop towel if necessary.

CAUTION: Use only soap and water to clean.

NOTE: Dirt build-up in the metal loops of the upper anchors can cause the seat belts to retract slowly. Wipe the inside of the loops with a clean cloth dampened in isopropyl alcohol.

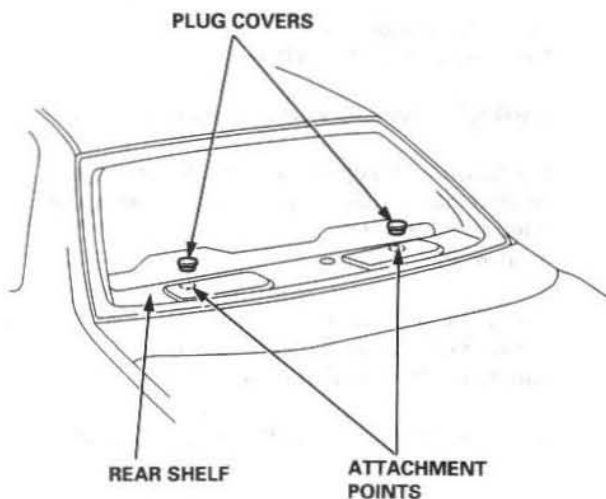
4. Check that the seat belt does not lock when pulled out slowly. The seat belt is designed to lock only during a sudden stop or impact.
5. Make sure that the seat belt will retract automatically when released.
6. For each passenger's seat belt, make sure that the locking mechanism in the seat belt retractor will engage when the seat belt is pulled all the way out.
7. Replace the seat belt with a new one if there is any abnormality.

Seat Belts

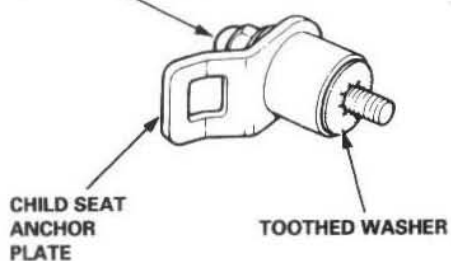
Child Seat Anchor Plate

Attachment points are provided for a rear seat mounted child restraint system which uses a top tether. The attachment points are located on the rear shelf, just behind the rear seat-back. When using a child seat with a top tether, install the child seat anchor plate securely.

NOTE: Remove the plug covers from the attachment points of the rear shelf.



8 x 1.25 mm
22 N·m (2.2 kgf-m, 16 lbf-ft)



NOTE:

- Do not remove the toothed washer from the child seat anchor plate. Use the child seat anchor plate with the toothed washer attached to it.
- When installing a child seat on the rear seat, follow the instructions of the manufacturer of the child seat.
- Additional anchor plates are available.

⚠ WARNING Do not use the child seat anchor plate for any other purpose; it is designed exclusively for installation of a child seat.

Supplemental Restraint System (SRS)

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Spring-loaded Lock Connector with		Disposal	24-59
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Disconnecting the Airbag		Replacement	24-61
Connectors	24-18	SRS Unit	
Steering-related Precautions	24-19	Replacement	24-65
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Self-diagnostic Procedures	24-20		

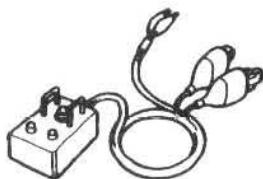


Special Tools

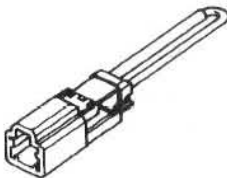
Ref. No.	Tool Number	Description	Qty	Page Reference
①*1	07HAZ – SG00500	Deployment Tool	1	24-59
②*1	07PAZ – 0010100	SCS Service Connector	1	24-21
③	07SAZ – TB4011A	SRS Inflator Simulator	1	24-34
④	07TAZ – SZ5011A	SRS Simulator Lead C	1	24-34
⑤*2	07TAZ – 001020A	Backprobe Adapter, 17 mm	2	24-30

*1: Included in SRS Tool Set 07MAZ – SM5000B

*2: Use with the stacking patch cords from T/N 07SAZ – 001000A, Backprobe Set.



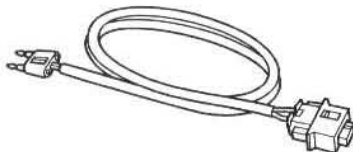
①



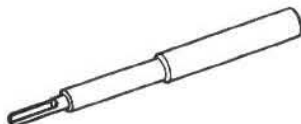
②



③



④



⑤

Component/Wiring Locations Index



NOTE: All SRS electrical wiring harnesses are covered with yellow insulation.

SRS INDICATOR LIGHT (In the gauge assembly)
Troubleshooting, page 24-21
Gauge assembly, section 23

CABLE REEL
Replacement,
page 24-61

To HORN SWITCH

To CRUISE CONTROL
SET/RESUME SWITCH

To DRIVER'S AIRBAG

DASHBOARD WIRE HARNESS
to SRS INDICATOR LIGHT in
GAUGE ASSEMBLY
12P CONNECTOR

DRIVER'S AIRBAG
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page 24-55
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FRONT PASSENGER'S AIRBAG
Replacement, page 24-57
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SRS MAIN HARNESS
to FRONT PASSENGER'S
AIRBAG
2P CONNECTOR

MAIN WIRE HARNESS
to DASHBOARD WIRE HARNESS
16P CONNECTOR

**SRS MAIN
HARNESS**

**SERVICE CHECK
CONNECTOR (2P)**
[GRN/BLK, RED/WHT]

SRS MAIN HARNESS
to UNDER-DASH
FUSE/RELAY BOX
2P CONNECTOR

SRS MAIN HARNESS
to MAIN
WIRE HARNESS
3P CONNECTOR

SRS MAIN HARNESS
to SRS UNIT
18P CONNECTOR

**SRS UNIT
GROUND**

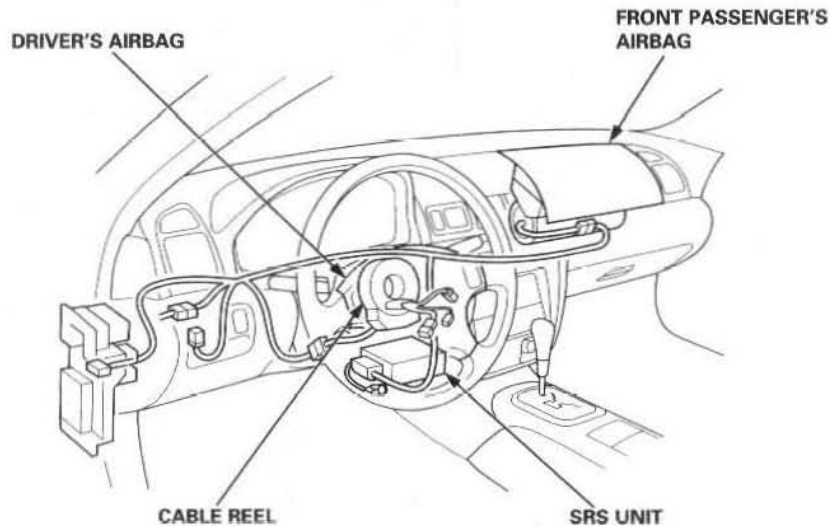
SRS UNIT
(Including safing sensor
and impact sensor)
Replacement, page 24-65

SRS MAIN HARNESS
to CABLE REEL
2P CONNECTOR

**MEMORY ERASE SIGNAL
(MES) CONNECTOR (2P)**
[GRY, GRY] or [GRN, GRN]

Description

The SRS is a safety device which, when used in conjunction with the seat belt, is designed to help protect the driver and front passenger in a frontal impact exceeding a certain set limit. The system consists of the SRS unit (including safing sensor and impact sensor), the cable reel, the driver's airbag and front passenger's airbag.

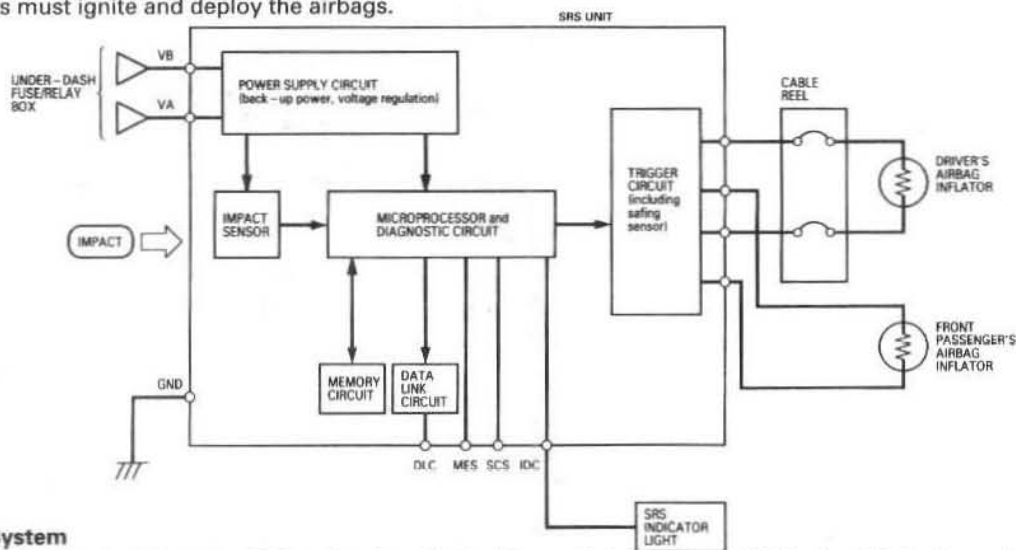


Operation

The main circuit in the SRS unit senses and judges the force of impact and, if necessary, ignites the inflator charges. If battery voltage is too low or power is disconnected due to the impact, the voltage regulator and the back-up power circuit respectively will keep voltage at a constant level.

For the SRS to operate:

- (1) The impact sensor must activate, and send electric signals to the microprocessor.
- (2) The microprocessor must compute the signals, and must send signals to the airbag inflators.
- (3) The inflators must ignite and deploy the airbags.



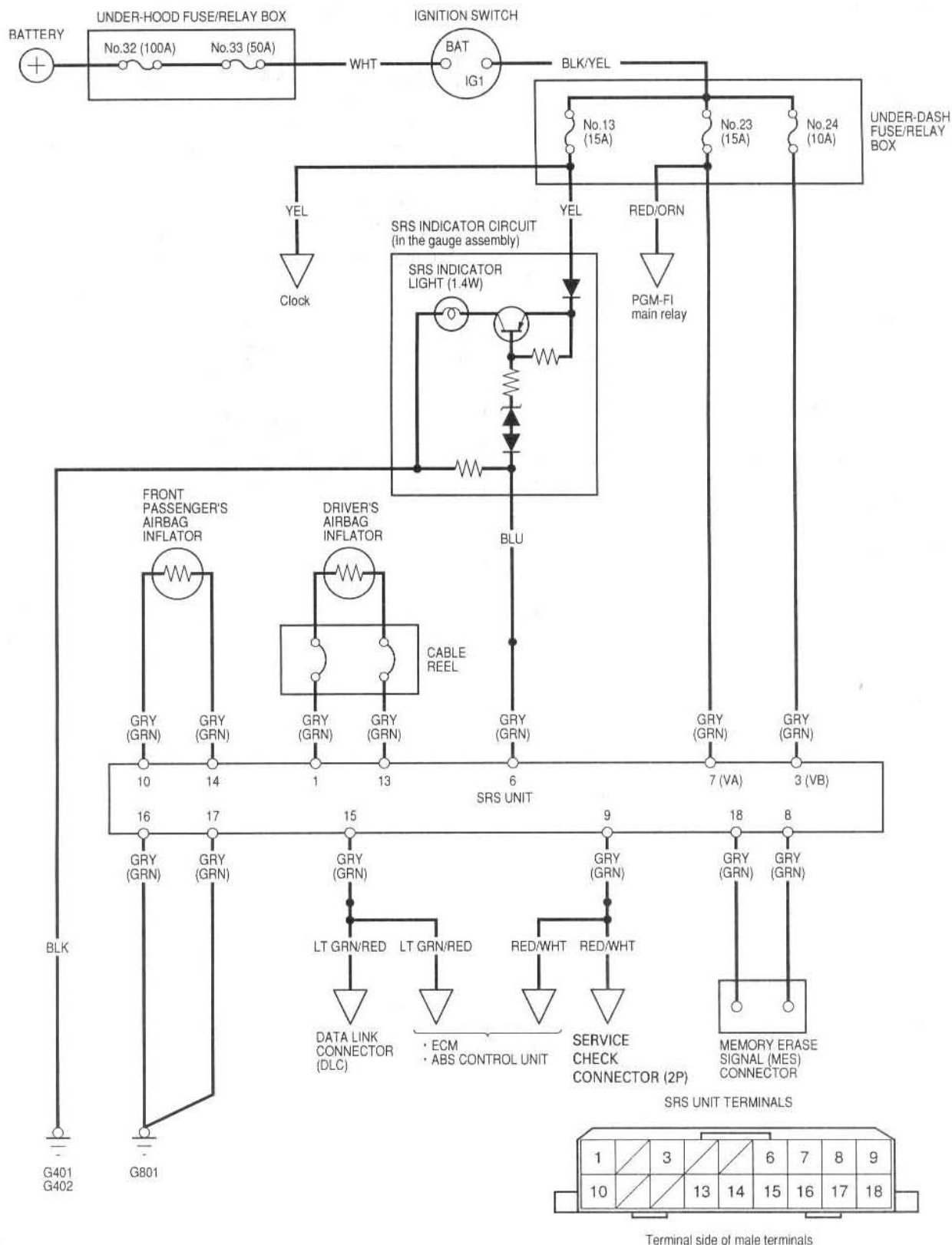
Self-diagnosis System

A self-diagnosis circuit is built into the SRS unit; when the ignition switch is turned ON (II), the SRS indicator light comes on and goes off after about six seconds if the system is operating normally.

If the light does not come on, or does not go off after six seconds, or if it comes on while driving, it indicates an abnormality in the system. The system must be inspected and repaired as soon as possible.

For better serviceability, the memory will store the cause of the malfunction, and the data link circuit passes on the information from the memory to the data link connector (DLC). This information can be read with the Honda PGM Tester connected to the DLC (16P).

Circuit Diagram

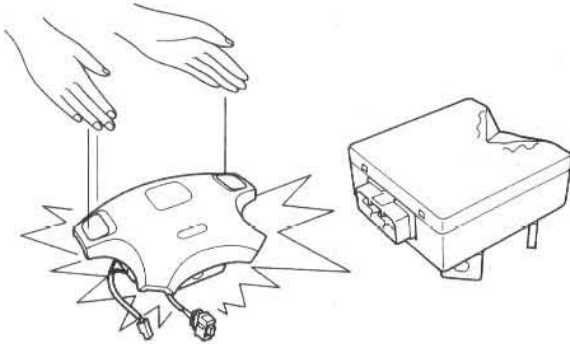


Precautions/Procedures

General Precautions

- Carefully inspect any SRS part before you install it. Do not install any part that shows signs of being dropped or improperly handled, such as dents, cracks or deformation:

- Airbags
- Cable reel
- SRS unit



- Use only a digital multimeter to check the system. If it's not a Honda multimeter, make sure its output is 10 mA (0.01 A) or less when switched to the smallest value in the ohmmeter range. A tester with a higher output could damage the airbag circuit or cause accidental deployment and possible injury.
- Do not install used SRS parts from another vehicle. When making SRS repairs, use only new parts.
- Except when performing electrical inspections, always disconnect both the negative cable and positive cable from the battery, and wait at least three minutes before beginning work.
- Replacement of the combination light and wiper/washer switches and cruise control switch can be done without removing the steering wheel:
 - Combination light and wiper/washer switch replacement (see section 23).
 - Cruise control set/resume switch replacement (see section 4).
- Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.
- Whenever the airbag has been activated, replace the SRS unit.
- The original radio has a coded theft protection circuit. Be sure to get the customer's code number before disconnecting the battery cables.

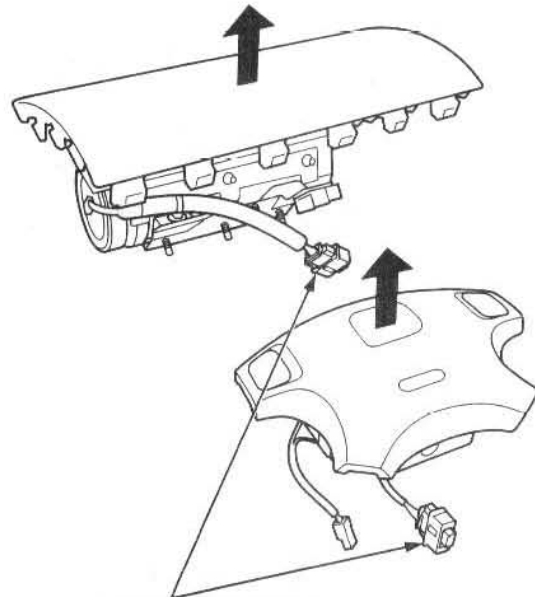
Airbag Handling and Storage

Do not try to disassemble the airbag. It has no serviceable parts. Once an airbag has been operated (deployed), it cannot be repaired or reused.

For temporary storage of the airbag during service, please observe the following precautions:

- Store the removed airbag with the pad surface up. The driver's and front passenger's airbag connectors have a built-in short contact (see page 24-18).

⚠ WARNING If the airbag is improperly stored face down, accidental deployment could propel the unit with enough force to cause serious injury.



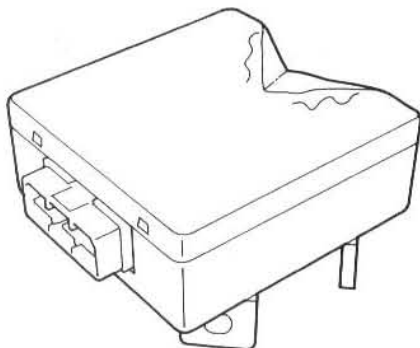
AIRBAG CONNECTORS
(With built-in short contact)

- Store the removed airbag on a secure flat surface away from any high heat source (exceeding 212°F/100°C) and free of any oil, grease, detergent or water.
- Improper handling or storage can internally damage the airbag, making it inoperative. If you suspect the airbag has been damaged, install a new unit and refer to the Deployment/ Disposal Procedures for disposing of the damaged airbag.



SRS Unit Precautions

- Take extra care when painting or doing body work in the area below the dashboard. Avoid direct exposure of the SRS unit or wiring to heat guns, welding, or spraying equipment.
- Disconnect the airbag connector(s) before disconnecting SRS harness connectors (see page 24-18).
- After any degree of frontal body damage, or after a collision without airbag deployment, inspect the SRS unit for physical damage. If it is dented, cracked, or deformed, replace it.



- Be sure the SRS unit is installed securely.
- Do not disassemble the SRS unit.
- Store the SRS unit in a cool (less than about 40°C/ 104°F) and dry (less than 80% humidity, no moisture) place. Do not spill water or oil on the SRS unit, and keep it away from dust.
- During installation or replacement, be careful not to bump (impact wrench, hammer, etc.) the area around the SRS unit. The airbags could accidentally deploy and cause damage or injury.

Inspection After Deployment

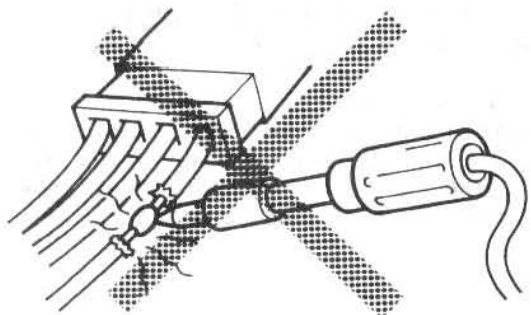
After a collision in which the airbags were deployed, replace the SRS unit, and inspect the following:

1. Inspect all the SRS wire harnesses. Replace, don't repair, any damaged harnesses.
2. Inspect the cable reel for heat damage. If there is any damage, replace the cable reel.
3. After the vehicle is completely repaired, turn the ignition switch on. If the SRS indicator light comes on for about six seconds and then goes off, the SRS system is OK. If the indicator light does not function properly, go to SRS Troubleshooting.

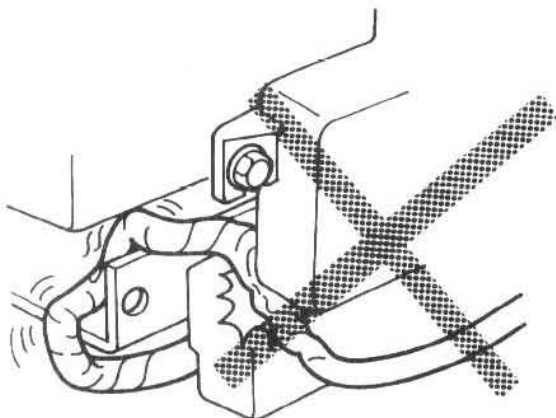
Precautions/Procedures

Wiring Precautions

- Never attempt to modify, splice or repair SRS wiring. SRS wiring can be identified by special yellow outer covering.



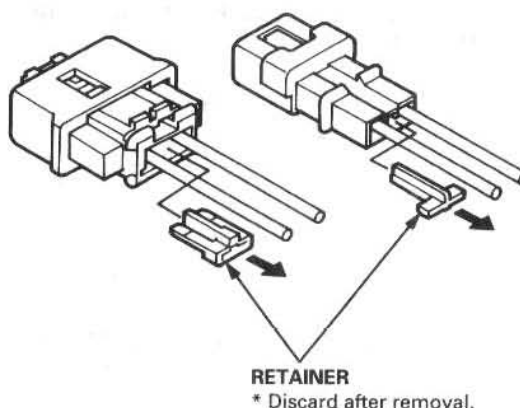
- Be sure to install the harness wires so that they are not pinched or interfering with other parts.



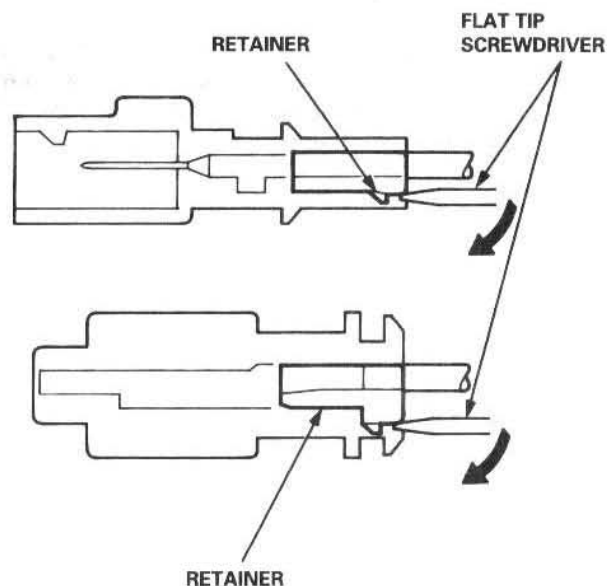
- Make sure all SRS ground locations are clean and grounds are securely fastened for optimum metal-to-metal contact. Poor grounding can cause intermittent problems that are difficult to diagnose.

Backprobing Spring-loaded Lock Connectors

- When checking voltage or resistance on this type of connector the first time, it is necessary to remove the retainer to insert tester probes from the wire side. It is not necessary to reinstall the removed retainer; the terminals will stay locked in the connector housing.



- To remove the retainer, insert a flat-tip screwdriver between connector body and retainer, and carefully pry out the retainer. Take care not to break the connector.



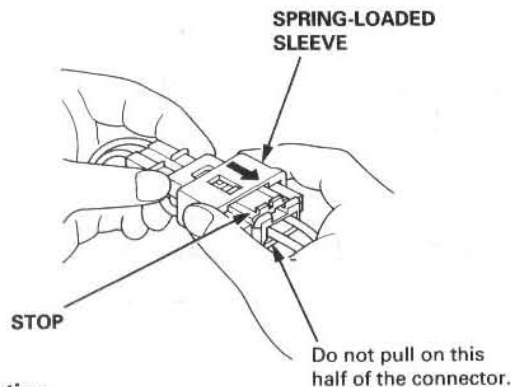


Spring-loaded Lock Connector

Some SRS system connectors have a spring-loaded lock.

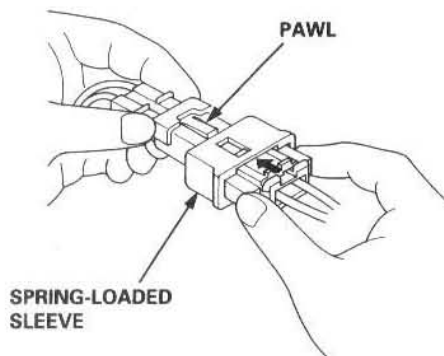
Disconnecting

To release the lock, pull the spring-loaded sleeve toward the stop while holding the opposite half of the connector. Then pull the connector halves apart. Be sure to pull on the sleeve and not on the connector half itself.

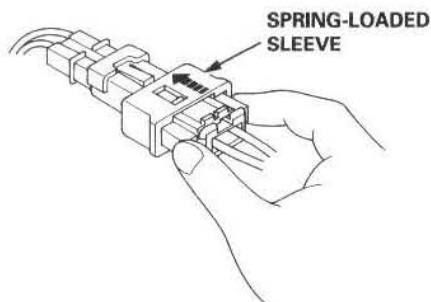


Connecting

1. Hold the pawl-side connector half, and press on the back of the sleeve-side connector half in the direction shown. As the two connector halves are pressed together, the sleeve is pushed back by the pawl. Do not touch the sleeve.



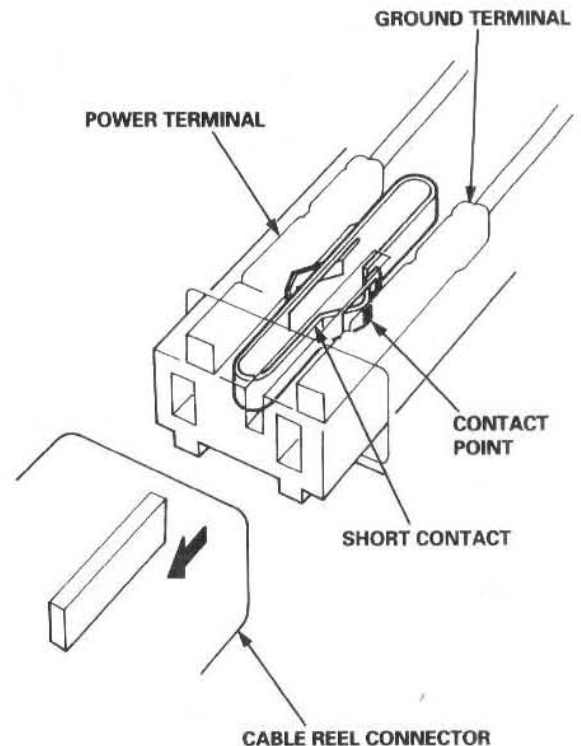
2. When the connector halves are completely connected, the pawl is released, and the spring-loaded sleeve locks the connector.



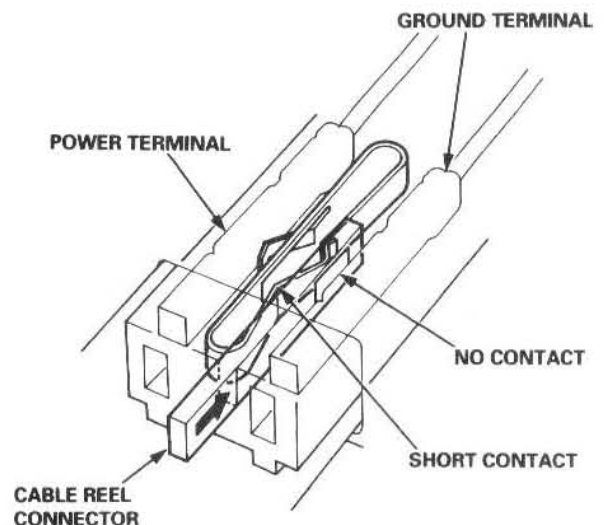
Spring-loaded Lock Connector with Built-in Short Contact

The driver's airbag and front passenger's airbag have a spring-loaded lock connector with a built-in short contact. When this connector is disconnected, the power terminal and the ground terminal in the airbag connector are automatically shorted.

Connector halves disconnected:



Connector halves connected:

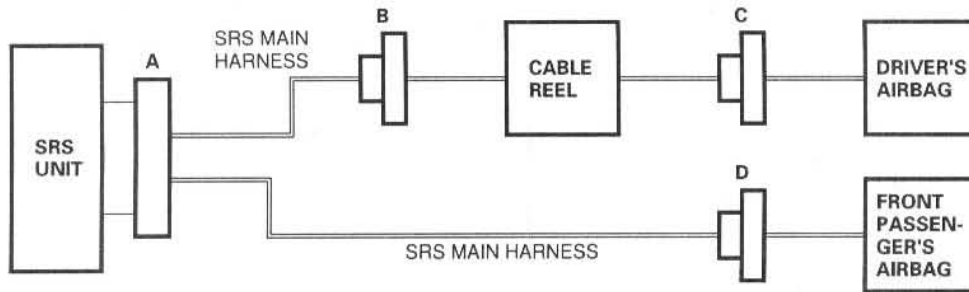


Precautions/Procedures

Disconnecting the Airbag Connectors

⚠ WARNING To prevent accidental airbag deployment, turn the ignition switch OFF, disconnect the negative battery cable, and wait three minutes before disconnecting any SRS connectors.

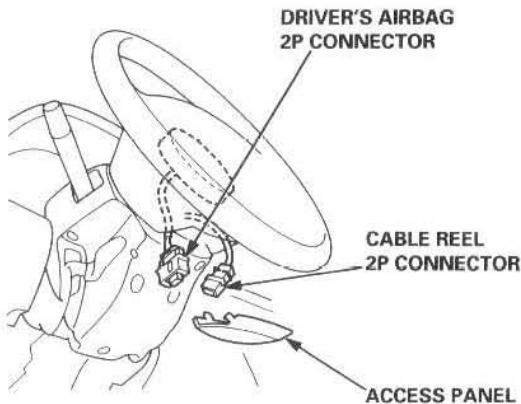
- Before disconnecting the SRS main harness (A) from the SRS unit, disconnect both airbags (C, D).
- Before disconnecting the cable reel 2P connector (B), disconnect the driver's airbag 2P connector (C).



1. Disconnect the battery negative cable, then disconnect the positive cable from the battery, and wait at least three minutes.
2. Disconnect the airbag connector(s).

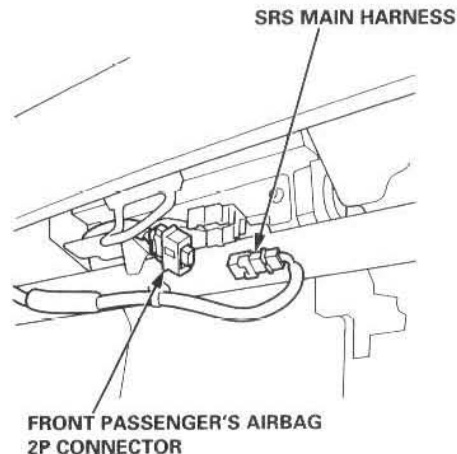
Driver's Side:

- Remove the access panel from the steering wheel, then disconnect the 2P connector between the driver's airbag and cable reel. When disconnected, the airbag connector is automatically shorted.



Front Passenger's Side:

- Remove the glove box, then disconnect the 2P connector between the front passenger's airbag and SRS main harness. When disconnected, the airbag connector is automatically shorted.

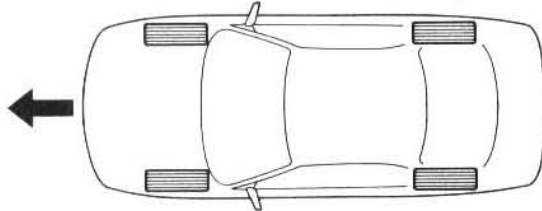




Steering-related Precautions

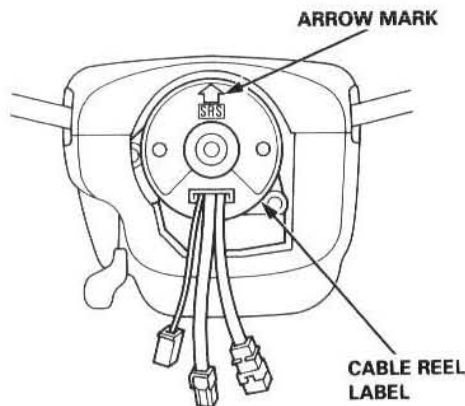
Steering Wheel and Cable Reel Alignment

To avoid misalignment of the steering wheel on reassembly, make sure the wheels are turned straight ahead before removing the steering wheel.



To center the cable reel, rotate the cable reel clockwise until it stops.

Then rotate it counterclockwise (approximately two and a half turns) until the arrow mark on the cable reel label points straight up.



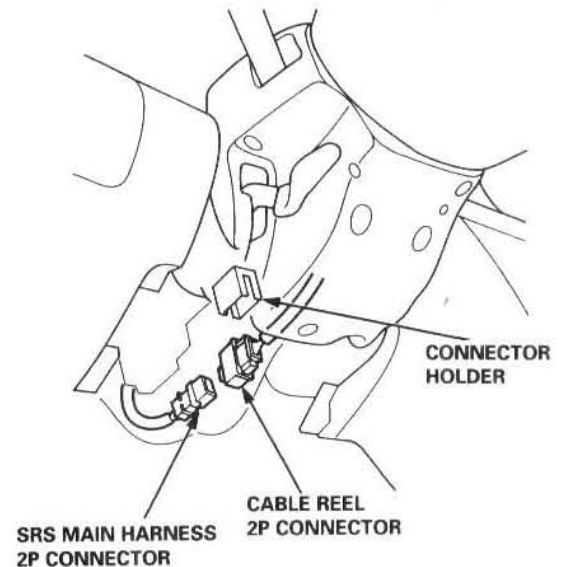
Steering Column Removal

CAUTION: Before removing the steering column, disconnect the connector between the cable reel and the SRS main harness.

If the steering column is going to be removed without dismantling the steering wheel, lock the steering by turning the ignition key to 0-LOCK position, or remove the key from the ignition switch so that the steering wheel will not turn.

NOTE:

- When the airbag and cable reel are disconnected, don't reconnect the battery cable. If the battery is reconnected and the ignition switch is turned ON (II), the SRS unit will store this as an open in the driver's airbag inflator, and the SRS indicator light will come on.
- For disconnecting the spring-loaded lock type connector, refer to page 24-17.



Do not replace the original steering wheel with any other design because it will make it impossible to properly install the airbag (only use genuine Honda replacement parts).

After reassembly, confirm the wheels are still turned straight ahead and that the steering wheel spoke angle is correct. If minor spoke angle adjustment is necessary, do so only by adjusting the tie-rods, not by removing and repositioning the steering wheel.

Troubleshooting

Self-diagnostic Procedures

The self-diagnostic function of the SRS system allows it to locate the causes of system problems and to store this information in memory. For easier troubleshooting, this data can be retrieved via a data link circuit.

- When you turn the ignition switch ON (II), the SRS indicator will come on. If it goes off after six seconds, the system is normal.
- If there is an abnormality, the system locates and defines the problem, stores this information in memory, and turns the SRS indicator light on. The data will remain in the memory even when the ignition switch is turned off or if the battery is disconnected.
- When you connect the SCS service connector to the service check connector (2P), and turn the ignition switch ON (II), the SRS indicator light will indicate the diagnostic trouble code (DTC) by the number of blinks.
- After reading and recording the DTC, proceed with the troubleshooting for this code.

Precautions

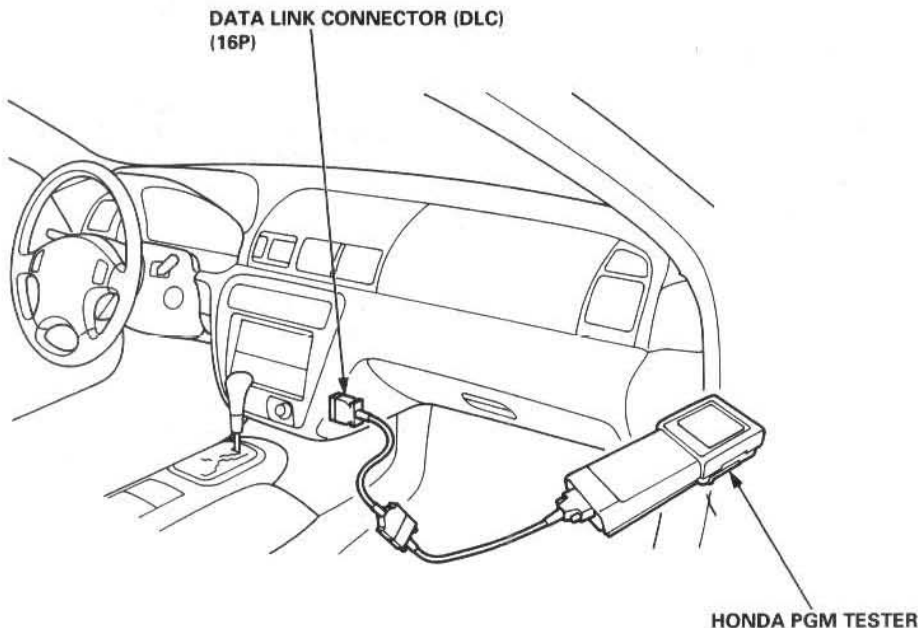
- Use only a digital multimeter to check the system. If it's not a Honda multimeter, make sure its output is 10 mA (0.01 A) or less when switched to the smallest value in the ohmmeter range. A tester with a higher output could damage the airbag circuit or cause accidental airbag deployment and possible injury.
- Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.
- Before you remove the SRS main harness, disconnect the driver's airbag connector and the front passenger's airbag connector.
- Make sure the battery is sufficiently charged (see section 23). If the battery is dead or low, measuring values won't be correct.
- Do not touch a tester probe to the terminals in the SRS unit or harness connectors, and do not connect the terminals with a jumper wire. Use only the backprobe set or the special tools.

For backprobing spring-loaded lock type connectors, refer to page 24-17.

Reading the DTC

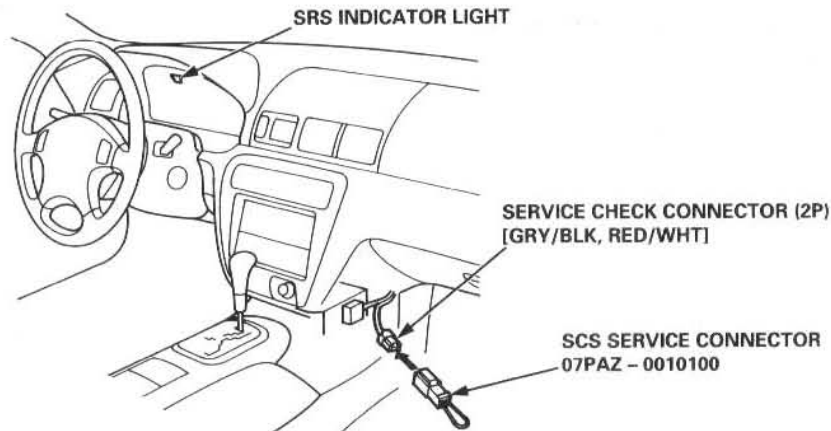
When the SRS indicator light is on, read the DTC using one of these methods:

- A. Connect the Honda PGM Tester to the 16P Data Link Connector (DLC), and follow the tester's prompts. If the tester indicates no DTC, DTC 9-1 or DTC 9-2, double-check by jumping the service check connector and watching the SRS indicator light (see next page).





- B. The SRS indicator light can also indicate the DTC by the number of blinks when the SCS service connector is connected to the service check connector (2P).
1. Turn the ignition switch OFF, and wait for ten seconds. Then connect the SCS service connector to the service check connector (2P). If you do not wait ten seconds, the SRS unit will not be completely reset and will not output DTCs.

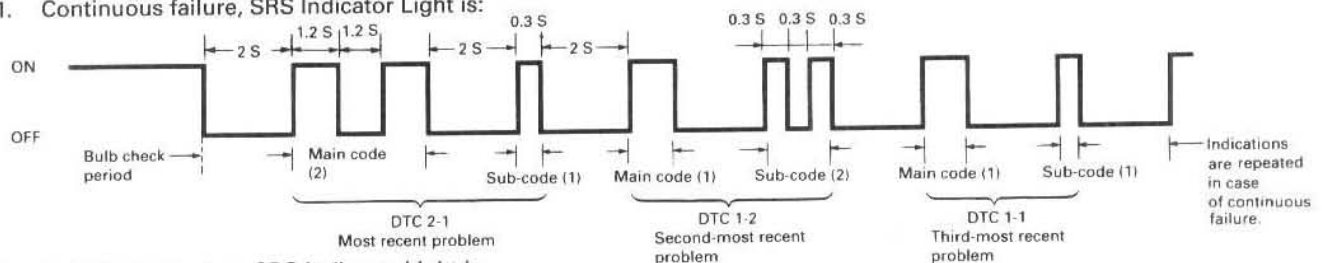


2. Turn the ignition switch ON (II). The SRS indicator light comes on for about six seconds and then goes off. Then it will indicate the DTC:
 - The DTC consists of a main code and a sub-code.
 - Including the most recent problem, up to three different malfunctions can be indicated.
 - In case of a continuous failure, the DTC will be indicated repeatedly (see example 1 below).
 - In case of an intermittent failure, the SRS indicator light will indicate the DTC one time, then it will stay on (see example 2 below).
 - If both a continuous and an intermittent failure occur, both DTCs will be indicated as continuous failures.
 - In case the system is normal (no DTC), the SRS indicator light will stay on (see example 3).
3. Read the DTC.
4. Turn the ignition switch OFF, and wait for ten seconds. Then disconnect the SCS service connector from the service check connector (2P).

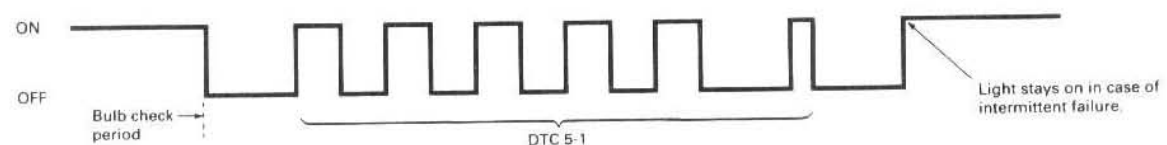
Examples of DTC Indications:

S: second

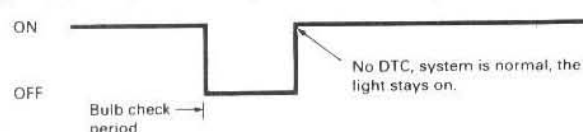
1. Continuous failure, SRS Indicator Light is:



2. Intermittent failure, SRS Indicator Light is:



3. Normal (no failure), SRS Indicator Light is:

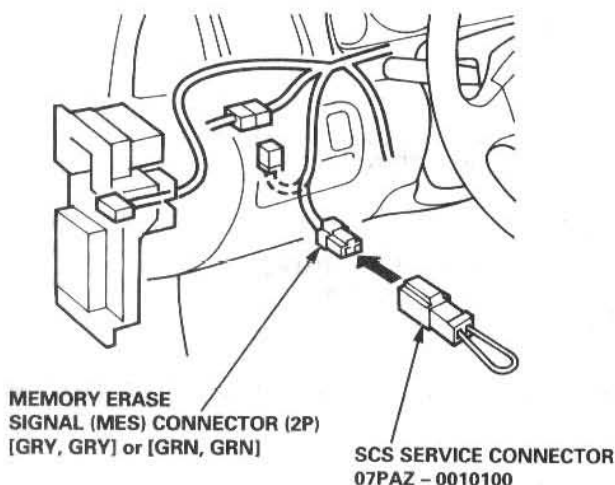


Troubleshooting

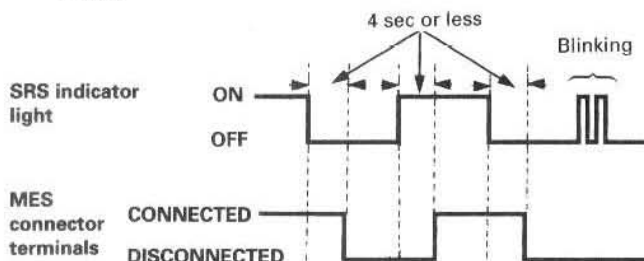
Erasing the DTC Memory

To erase the DTC(s) from the SRS unit, use a Honda PGM Tester (see the Honda PGM Tester SRS vehicle System Supplement) or the following procedure.

1. Make sure the ignition switch is OFF.
2. Connect the SCS service connector to the MES connector (2P). Do not use a jumper wire.



3. Turn the ignition switch ON (II).
4. The SRS indicator light comes on for about six seconds and goes off. Remove the SCS service connector from the MES connector (2P) within four seconds after the SRS indicator light goes off.
5. The SRS indicator light comes on again. Reconnect the SCS service connector to the MES connector (2P) within four seconds after the SRS indicator light comes on.
6. The SRS indicator light goes off. Remove the SCS service connector from the MES connector (2P) within four seconds.
7. The SRS indicator light indicates that the memory is erased by blinking two times.
8. Turn the ignition switch OFF, and wait for ten seconds.

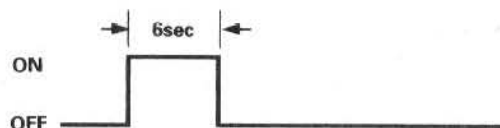


Troubleshooting Intermittent Failures

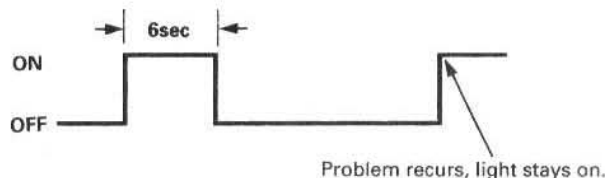
If there was a malfunction, but it doesn't recur, it will be stored in the memory as an intermittent failure, and the SRS indicator light comes on.

After checking the DTC, troubleshoot as follows:

1. Read the DTC (see "Reading the DTC").
2. Erase the DTC memory (see "Erasing the DTC Memory").
3. With the shift lever in neutral, turn the ignition switch ON (II), and let the engine idle.
4. The SRS indicator light comes on for about six seconds and then goes off.



5. Shake the wire harness and the connector, take a test drive (quick acceleration, quick braking, cornering), and turn the steering wheel fully left and right, and hold it there for five to ten seconds to find the cause of the intermittent failure. If the problem recurs, the SRS indicator light will stay on.



6. If you can't duplicate the intermittent failure, the system is OK at this time.



Diagnostic Trouble Code (DTC) Chart

SRS indicator light	DTC	Possible cause	Corrective action	See page
doesn't come on	none (doesn't come on)	Faulty SRS indicator light circuit	Troubleshooting	24-26
comes on	none* ² (doesn't go off)	Faulty SRS indicator light circuit, internal failure of SRS unit, faulty SRS power supply	Troubleshooting	24-29
	1-1	Open in the driver's airbag inflator		24-34
	1-2	Increased resistance in the driver's airbag inflator		24-34
	1-3	Short to another wire in the driver's airbag inflator or decreased resistance		24-36
	1-4	Short to power in the driver's airbag inflator		24-38
	1-5	Short to ground in the driver's airbag inflator		24-40
	2-1	Open in the passenger's airbag inflator	Troubleshooting	24-42
	2-2	Increased resistance in the passenger's airbag inflator		24-42
	2-3	Short to another wire in the passenger's airbag inflator or decreased resistance		24-44
	2-4	Short to power in the passenger's airbag inflator		24-46
	2-5	Short to ground in the passenger's airbag inflator		24-48

(cont'd)

Troubleshooting

Diagnostic Trouble Code (DTC) Chart (cont'd)

SRS indicator light	DTC	Possible cause	Corrective action	See page
comes on	5-1	Internal failure of the SRS unit	SRS unit replacement	24-65
	5-2			
	5-3			
	5-4			
	5-5			
	6-1	Internal failure of the SRS unit	SRS unit replacement	24-65
	6-2			
	6-3			
	6-4			
	7-1	Internal failure of the SRS unit	SRS unit replacement	24-65
	7-2			
	7-3			
	8-1	Internal failure of the SRS unit	SRS unit replacement	24-65
	8-2			
	8-5			
	8-6	Internal failure of the SRS unit or two failures at a time	Troubleshooting	24-50
	9-1*1*2	Internal failure of the SRS unit	SRS unit replacement	24-65
	9-2	Faulty SRS power supply (VB line)	Troubleshooting	24-52
	10-1	SRS airbags deployed (SRS unit must be replaced)	SRS unit replacement	24-65

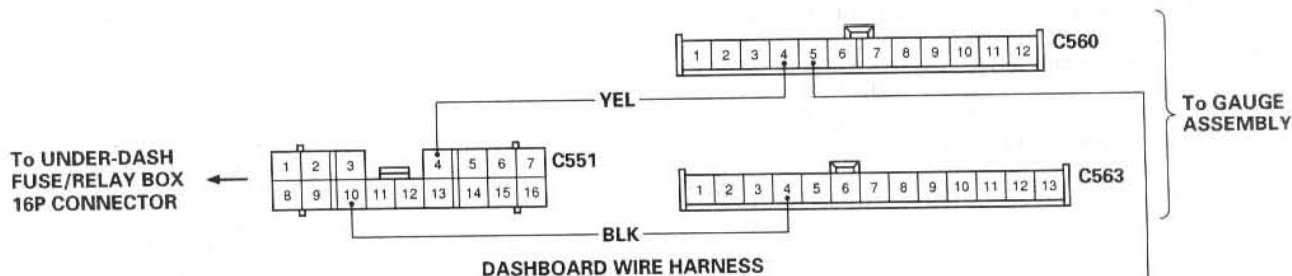
*1: In case of an intermittent failure DTC 9-1, it means there was an internal failure of the SRS unit or a faulty SRS indicator light circuit. Do the troubleshooting for intermittent failures (see page 24-22).

*2: DTC cannot be read with a Honda PGM Tester; check by jumping the SCS service connector.

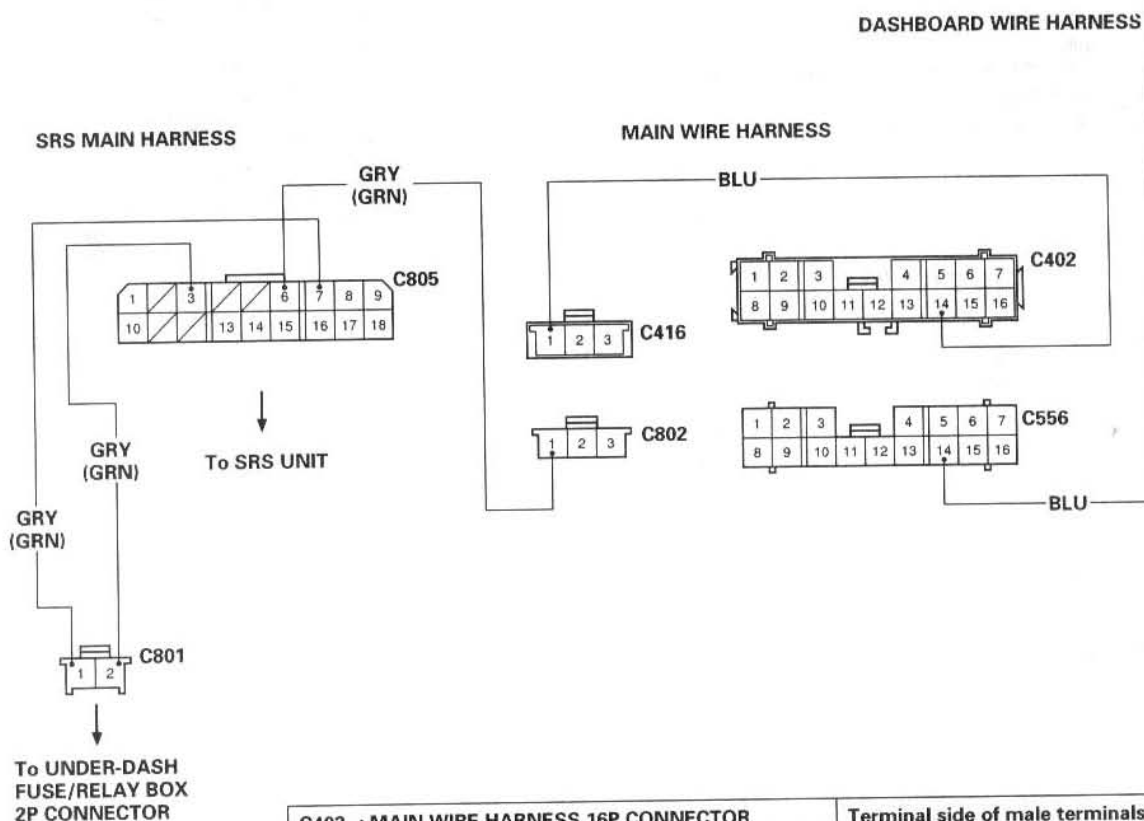


SRS Indicator Light Wire Connections

SRS Indicator Light Power Circuit



SRS Indicator Light Control Circuit



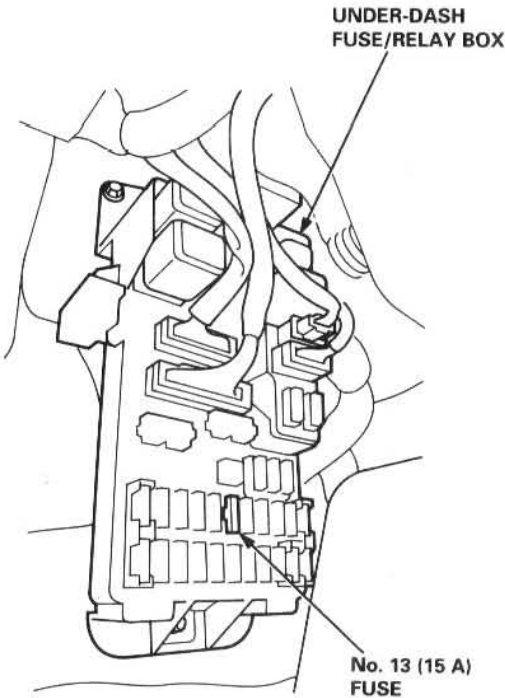
C402 : MAIN WIRE HARNESS 16P CONNECTOR	Terminal side of male terminals
C416 : MAIN WIRE HARNESS 3P CONNECTOR	Terminal side of male terminals
C551 : DASHBOARD WIRE HARNESS 16P CONNECTOR	Wire side of female terminals
C556 : DASHBOARD WIRE HARNESS 16P CONNECTOR	Wire side of female terminals
C560 : DASHBOARD WIRE HARNESS 12P CONNECTOR	Wire side of female terminals
C563 : DASHBOARD WIRE HARNESS 13P CONNECTOR	Wire side of female terminals
C801 : SRS MAIN HARNESS 2P CONNECTOR	Wire side of female terminals
C802 : SRS MAIN HARNESS 3P CONNECTOR	Wire side of female terminals
C805 : SRS MAIN HARNESS 18P CONNECTOR	Wire side of female terminals

Troubleshooting

The SRS Indicator Light Doesn't Come On

CAUTION: Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

Check the power supply (fuse): Turn the ignition switch ON (II), and check whether the other indicator lights come on or not (brake system, etc.).	
Do the other indicator lights come on?	
YES	NO
Check the fuse: Check the No. 13 (15 A) fuse in the under-dash fuse/relay box.	
Is the fuse OK?	
YES	NO
Check the bulb: Replace the No. 13 (15 A) fuse, and check that the SRS indicator light comes on.	
Does the SRS indicator light come on?	
YES	NO
END	
Check the wire harness between fuse and gauge assembly: Check for an open in the wire harness between fuse No. 13 (15 A) and the gauge assembly, and repair. Check that the SRS indicator light comes on.	
Does the SRS indicator light come on?	
YES	NO
END	
Check the SRS indicator light bulb: 1. Turn the ignition switch OFF. 2. Remove the gauge assembly. 3. Check for a blown SRS indicator light bulb.	
Is the SRS indicator light bulb OK?	
YES	NO
Check the SRS indicator light circuit: Replace the bulb, and reconnect the gauge assembly connectors. Then turn the ignition switch ON (II).	
Does the SRS indicator light come on?	
YES	NO
END	



(A) To page 24-27

(B) To page 24-27



From page 24-26

(A)

Check the SRS indicator light circuit:

1. Disconnect the dashboard wire harness 12P connector from the gauge assembly.
2. Connect a voltmeter between the No. 5 terminal (+) of the 12P connector and ground.
3. Turn the ignition switch ON (II), and measure voltage.

Is there 8.5 V or less for six seconds after the ignition switch has been turned ON (II)?

YES

NO

Faulty SRS indicator light circuit in the gauge assembly; replace the SRS printed circuit board in the gauge assembly.

Check the wire harness of the SRS indicator light circuit (1):

1. Turn the ignition switch OFF.
2. Disconnect the main wire harness 16P connector from the dashboard wire harness.
3. Connect a voltmeter between the No. 14 terminal (+) of the main wire harness 16P connector and ground.
4. Turn the ignition ON (II), and measure voltage.

Is there 8.5 V or less for six seconds after the ignition switch has been turned ON (II)?

YES

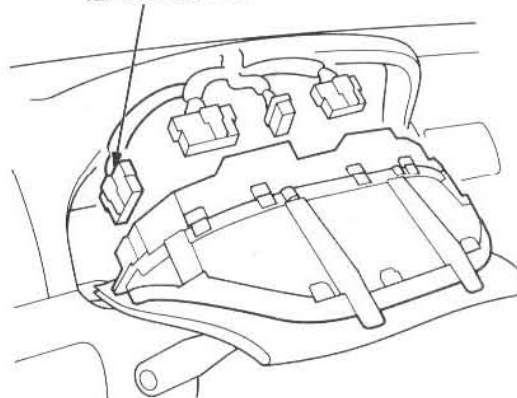
NO

Short to power in the BLU wire of the dashboard wire harness; repair the harness.

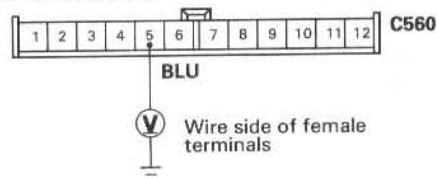
From page 24-26

(B)

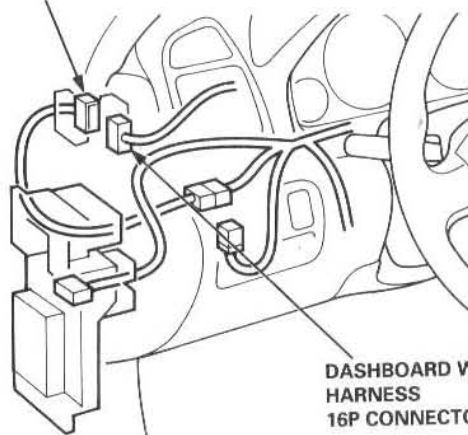
**DASHBOARD WIRE HARNESS
12P CONNECTOR**



**DASHBOARD WIRE HARNESS
12P CONNECTOR**

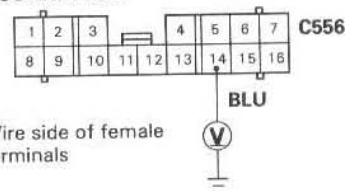


**MAIN WIRE
HARNESS 16P CONNECTOR**



**DASHBOARD WIRE
HARNESS
16P CONNECTOR**

**MAIN WIRE HARNESS
16P CONNECTOR**



To page 24-28

(cont'd)

Troubleshooting

The SRS Indicator Light Doesn't Come On (cont'd)

From page 24-27

Check the wire harness of the SRS indicator light circuit (2):

1. Turn the ignition switch OFF.
2. Disconnect the SRS main harness 3P connector from the main wire harness.
3. Connect a voltmeter between the No. 1 terminal (+) of the SRS main harness 3P connector and ground.
4. Turn the ignition switch ON (II), and measure voltage.

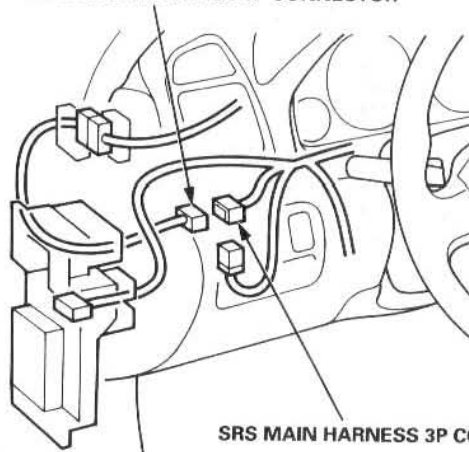
Is there 8.5 V or less for six seconds after the ignition switch has been turned ON (II)?

YES

NO

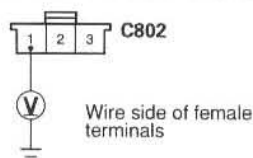
Short to power in the BLU wire of the main wire harness; repair the harness.

MAIN WIRE HARNESS 3P CONNECTOR



SRS MAIN HARNESS 3P CONNECTOR

SRS MAIN HARNESS 3P CONNECTOR



Check the wire harness of the SRS indicator circuit (3):

1. Turn the ignition switch OFF.
2. Disconnect the battery negative cable, then the positive cable, and wait three minutes.
3. Disconnect the driver's and front passenger's airbag connector (see page 24-18).
4. Disconnect the SRS main harness 18P connector from the SRS unit.
5. Reconnect the battery positive cable, then reconnect the negative cable.
6. Connect a voltmeter between the No. 6 terminal (+) of the SRS main harness 18P connector and ground.
7. Turn the ignition switch ON (II), and measure voltage. There should be 0.5 V or less.

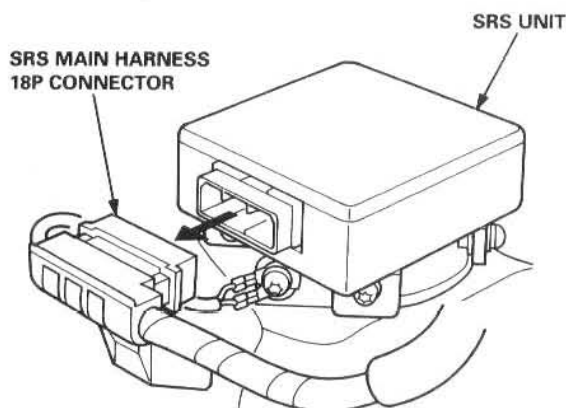
Is voltage as specified?

YES

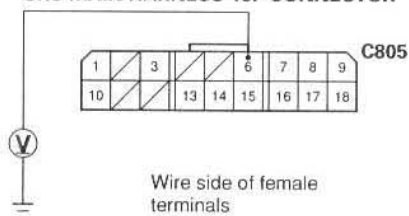
NO

Faulty SRS unit; replace the unit (see page 24-65).

Short to power in the BLU wire of the SRS main harness; replace the harness.



SRS MAIN HARNESS 18P CONNECTOR





The SRS Indicator Light Doesn't Go Off

CAUTION: Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

Try to reproduce the SRS indicator light:

1. Erase the DTC memory (see page 24-22).
2. Turn the ignition switch ON (II), and check that the SRS indicator light comes on for about six seconds and then goes off.

Does the SRS indicator light stay on?

YES

NO

Intermittent failure, system is OK at this time. See Troubleshooting Intermittent Failures on page 24-22.

Check the No. 23 (15 A) fuse:

1. Turn the ignition switch OFF.
2. Check for blown No. 23 (15 A) fuse in the under-dash fuse/relay box.

Is the fuse OK?

YES

NO

Replace the fuse, and erase the memory:

1. Replace the No. 23 (15 A) fuse.
2. Erase the DTC memory (see page 24-22).
3. Turn the ignition switch ON (II).

Does the SRS indicator light go off after six seconds?

YES

NO

END

Confirm the DTC, and continue troubleshooting.

Check for an open in the SRS main harness (VA line):

1. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
2. Disconnect the driver's and front passenger's airbag connector (see page 24-18).
3. Disconnect the SRS main harness 18P connector from the SRS unit.
4. Reconnect the battery positive cable, then reconnect the negative cable.
5. Connect a voltmeter between the No. 7 terminal (+) of the SRS main harness 18P connector and ground.
6. Turn the ignition switch ON (II).

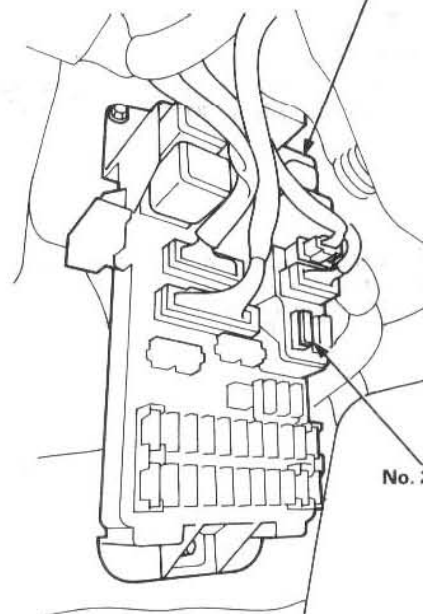
Is there battery voltage?

YES

NO

Open in the SRS main harness (VA line); replace the harness.

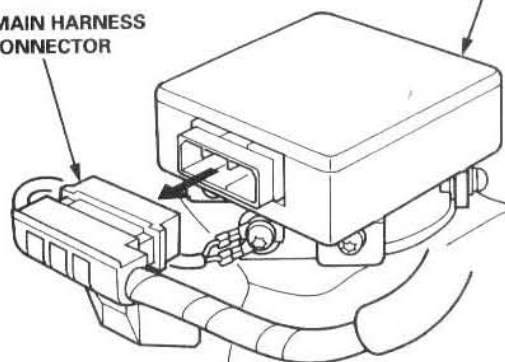
UNDER-DASH
FUSE/RELAY BOX



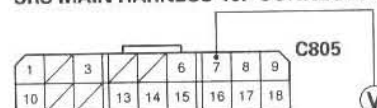
No. 23 (15 A) FUSE

SRS MAIN HARNESS
18P CONNECTOR

SRS UNIT



SRS MAIN HARNESS 18P CONNECTOR



Wire side of female
terminals

(cont'd)

Troubleshooting

The SRS Indicator Light Doesn't Go Off (cont'd)

From page 24-29
(A)

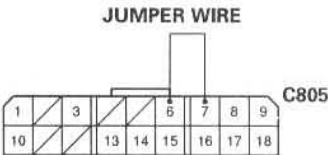
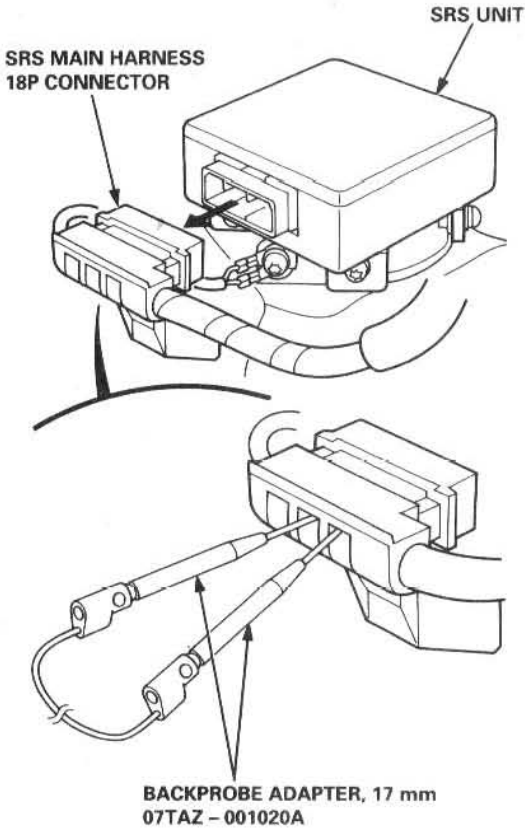
Check the SRS unit:
Connect the SRS main harness 18P connector terminals No. 6 and No. 7 with a jumper wire and backprobe adapters.

Does the SRS indicator light go off?

YES NO

Faulty SRS unit or poor contact at the SRS main harness 18P connector; check the connector.
If the connector is OK, replace the SRS unit.

(B)
To page 24-31



Wire side of female terminals



From page 24-30
(B)

Check the SRS indicator circuit:

1. Turn the ignition switch OFF.
2. Remove the gauge assembly. Do not disconnect the dashboard wire harness 12P connector from the gauge assembly.
3. Turn the ignition switch ON (II).
4. Connect the dashboard wire harness 12P connector terminals No. 4 and No. 5 with a jumper wire.

Does the SRS indicator light go off?

YES

NO

Faulty SRS indicator light circuit in the gauge assembly; replace the SRS printed circuit board in the gauge assembly.

Check for a short to ground in the SRS indicator light circuit:

1. Turn the ignition switch OFF.
2. Disconnect the dashboard wire harness 12P connector from the gauge assembly.
3. Check resistance between the No. 5 terminal of the dashboard wire harness 12P connector and ground. There should be 1 M Ω or more.

Is the resistance as specified?

YES

NO

(C)
To page 24-32

Check for an open in the SRS indicator light circuit:

1. Check resistance between the No. 6 terminal of the SRS main harness 18P connector and the No. 5 terminal of the dashboard wire harness 12P connector; there should be 0 – 1.0 Ω .

Is the resistance as specified?

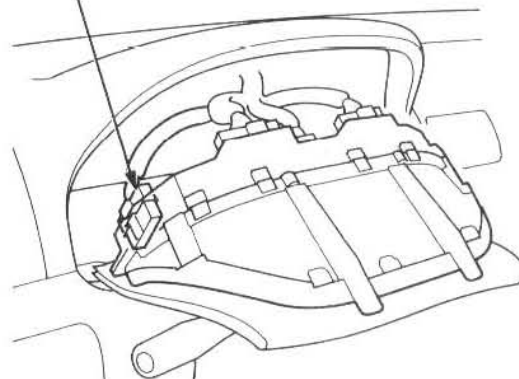
YES

NO

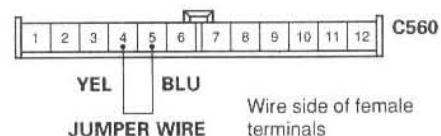
(D)
To page 24-33

(E)
To page 24-33

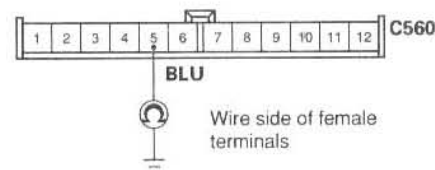
**DASHBOARD WIRE HARNESS
12P CONNECTOR**



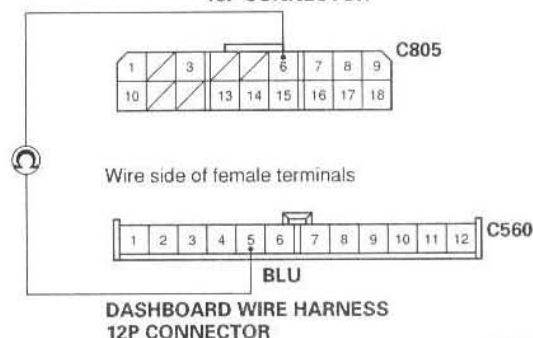
**DASHBOARD WIRE HARNESS
12P CONNECTOR**



**DASHBOARD WIRE HARNESS
12P CONNECTOR**



**SRS MAIN HARNESS
18P CONNECTOR**



(cont'd)

Troubleshooting

The SRS Indicator Light Doesn't Go Off (cont'd)

From page 24-31
(C)

Check for a short to ground in the main wire harness:

1. Disconnect the dashboard wire harness 16P connector from the main wire harness.
2. Check resistance between the No. 14 terminal of the dashboard wire harness 16P connector and ground. There should be 1 MΩ or more.

Is the resistance as specified?

YES

NO

Short to ground in the dashboard wire harness; repair the dashboard wire harness.

Check for a short to ground in the SRS main harness:

1. Disconnect the SRS main harness 3P connector from the main wire harness.
2. Check resistance between the No. 1 terminal of the SRS main harness 3P connector and ground. There should be 1 MΩ or more.

Is the resistance as specified?

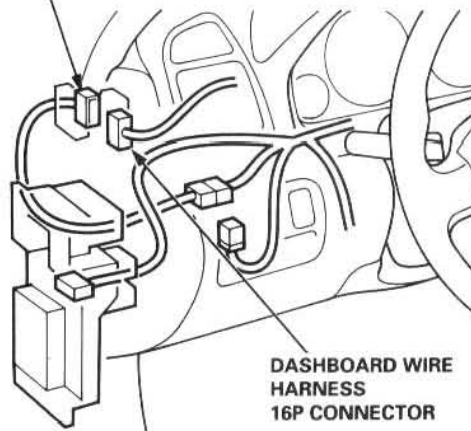
YES

NO

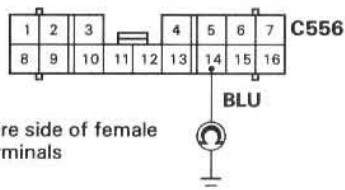
Short to ground in the main wire harness; repair the main wire harness.

Short to ground in the SRS main harness; replace the SRS main harness.

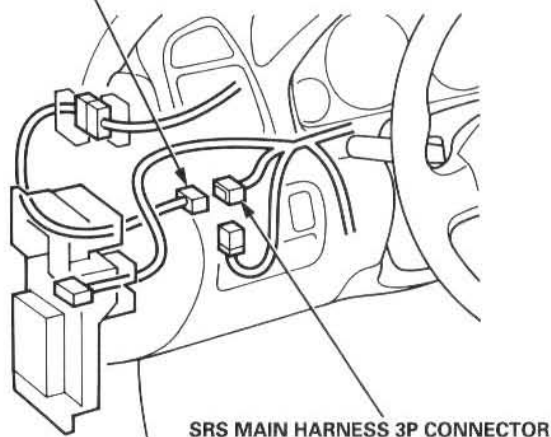
MAIN WIRE HARNESS 16P CONNECTOR



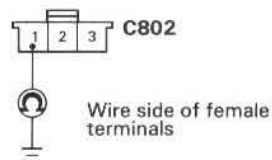
DASHBOARD WIRE HARNESS 16P CONNECTOR



MAIN WIRE HARNESS 3P CONNECTOR



SRS MAIN HARNESS 3P CONNECTOR





From page 24-31
(D)

Check the SRS indicator circuit input voltage:

1. Reconnect the SRS main harness 18P connector to the SRS unit.
2. Connect a voltmeter between the No. 5 terminal (+) of the dashboard 12P connector and ground.
3. Turn the ignition switch ON (II), and measure voltage.

Is there 8.5 V or more six seconds after the ignition switch has been turned ON (II)?

YES

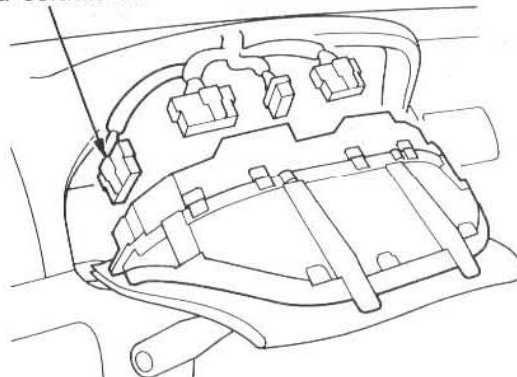
NO

The problem has disappeared due to disconnecting and connecting the connectors. Be sure all terminals make good contact, and recheck the system (see Troubleshooting of Intermittent Failures on page 24-22).

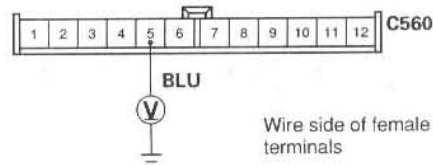
Poor contact at the SRS main harness 18P connector; check the connector.

- If the connector is OK, substitute a known-good SRS unit, and recheck.
- If the problem is still present, replace the SRS main harness.

**DASHBOARD WIRE HARNESS
12P CONNECTOR**



**DASHBOARD WIRE HARNESS
12P CONNECTOR**



From page 24-31
(E)

Check for an open in the dashboard wire harness:

1. Disconnect the dashboard wire harness 16P connector from the main wire harness.
2. Check resistance between the No. 6 terminal of the SRS main harness 18P connector and No. 14 terminal of the main wire harness 16P connector; there should be 0 – 1.0 Ω.

Is the resistance as specified?

YES

NO

Open in the BLU wire of the dashboard wire harness; repair the dashboard wire harness.

Check for an open in the main wire harness:

1. Disconnect the SRS main harness 3P connector from the main wire harness.
2. Check resistance between the No. 6 terminal of the SRS main harness 18P connector and the No. 1 terminal of the SRS main harness 3P connector; there should be 0 – 1.0 Ω.

Is the resistance as specified?

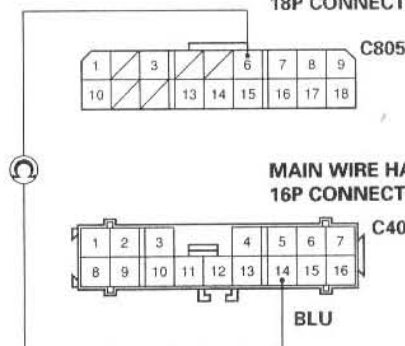
YES

NO

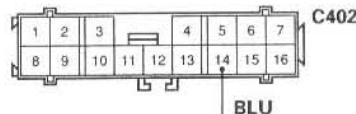
Open in the BLU wire of the main wire harness; repair the main wire harness.

Open in the SRS main harness; replace the SRS main harness.

**SRS MAIN HARNESS
18P CONNECTOR**

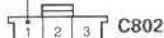
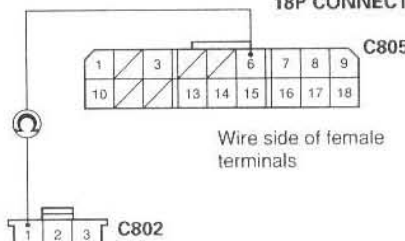


**MAIN WIRE HARNESS
16P CONNECTOR**



Terminal side of male terminal

**SRS MAIN HARNESS
18P CONNECTOR**



**SRS MAIN HARNESS
3P CONNECTOR**

Troubleshooting

DTC 1-1 and DTC 1-2

CAUTION: Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

Try to reproduce the SRS indicator light:

1. Erase the DTC memory (see page 24-22).
2. Turn the ignition switch ON (II), and check that the SRS indicator light comes on for about six seconds and then goes off.

Does the SRS indicator light stay on?

YES

NO

Intermittent failure, system is OK at this time. See Troubleshooting Intermittent Failures on page 24-22.

Check for an open in the driver's airbag inflator:

1. Turn the ignition switch OFF.
2. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
3. Disconnect the driver's airbag 2P connector from the cable reel 2P connector. Do not disconnect the passenger's airbag connector.
4. Connect the special tool (2 Ω) to the cable reel 2P connector.
5. Reconnect the battery positive cable, then reconnect the negative cable.
6. Erase the DTC memory (see page 24-22).
7. Read the DTC (see page 24-20).

Is DTC 1-1 or DTC 1-2 indicated?

YES

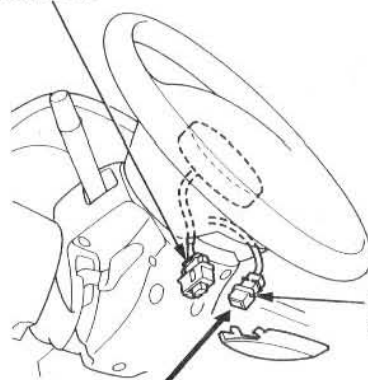
NO

Open or increased resistance in the driver's airbag inflator; replace the driver's airbag (see page 24-55).

Check for an open in the cable reel:

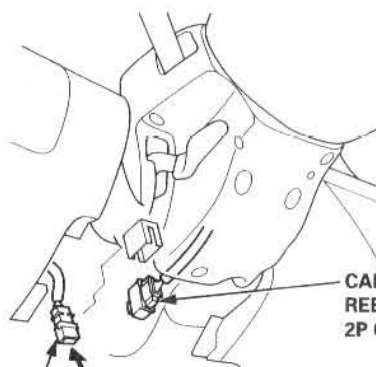
1. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
2. Disconnect the special tool (2 Ω) from the cable reel 2P connector.
3. Remove the dashboard lower cover, and disconnect the cable reel 2P connector from the SRS main harness.
4. Connect the special tool (2 Ω) to the SRS main harness 2P connector. (cont'd)

DRIVER'S AIRBAG
2P CONNECTOR



CABLE REEL
2P CONNECTOR

SRS SIMULATOR
LEAD C
07TAZ - SZ5011A
and SRS INFLATOR
SIMULATOR
(2 Ω JACK)
07SAZ - TB4011A



CABLE
REEL
2P CONNECTOR

SRS SIMULATOR
LEAD C
07TAZ - SZ5011A
and SRS INFLATOR
SIMULATOR
(2 Ω JACK)
07SAZ - TB4011A

SRS MAIN HARNESS
2P CONNECTOR

To page 24-35



From page 24-34

Check for an open in the cable reel (cont'd)

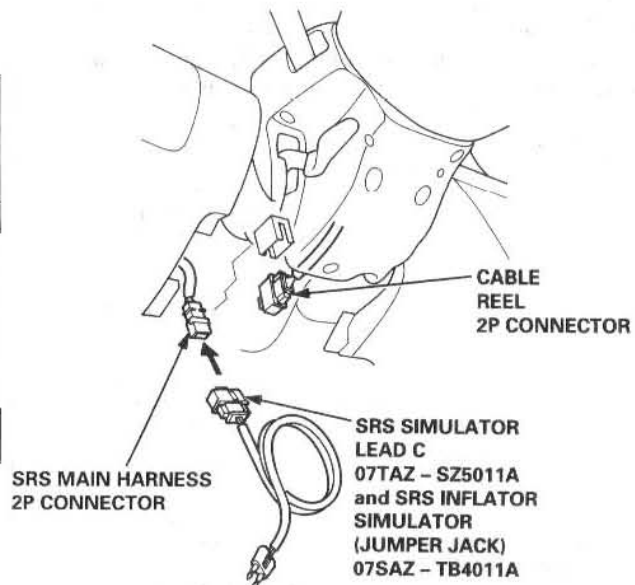
5. Reconnect the battery positive cable, then reconnect the negative cable.
6. Erase the DTC memory (see page 24-22).
7. Read the DTC (see page 24-20).

Is DTC 1-1 or DTC 1-2 indicated?

YES

NO

Open or increased resistance in the cable reel; replace the cable reel (see page 23-61).



Check for an open in the SRS main harness:

1. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
2. Disconnect the front passenger's airbag connector from the SRS main harness.
3. Remove the special tool (2 Ω) from the SRS main harness 2P connector, and connect the special tool (jumper) to the SRS main harness 2P connector.
4. Disconnect the SRS main harness 18P connector from the SRS unit.
5. Check resistance between terminals No. 1 and No. 13 of the SRS main harness 18P connector. There should be approx. 0 - 1.0 Ω .

Is the resistance as specified?

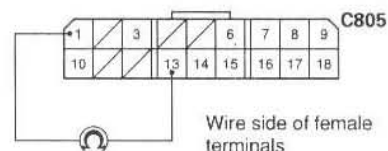
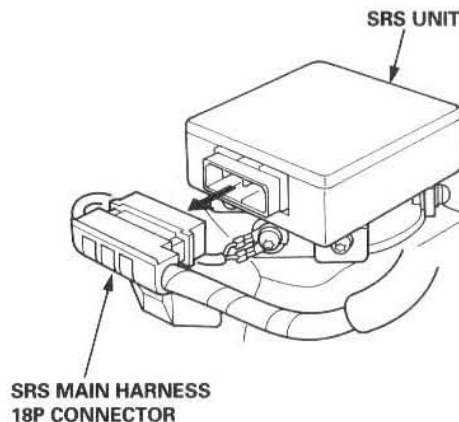
YES

NO

Poor contact at the SRS main harness 18P connector; check the connector.

- If the connector is OK, substitute a known-good SRS unit, and recheck.
- If the problem is still present, replace the SRS main harness.

Open or increased resistance in the SRS main harness; replace the harness.



Troubleshooting

DTC 1-3

CAUTION: Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

Try to reproduce the SRS indicator light:

1. Erase the DTC memory (see page 24-22).
2. Turn the ignition switch ON (II), and check that the SRS indicator light comes on for about six seconds and then goes off.

Does the SRS indicator light stay on?

YES

NO

Intermittent failure, system is OK at this time. See Troubleshooting Intermittent Failures on page 24-22.

Check for a short to another wire in the driver's airbag inflator:

1. Turn the ignition switch OFF.
2. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
3. Disconnect the driver's airbag 2P connector from the cable reel 2P connector. Do not disconnect the passenger's airbag connector.
4. Connect the special tool (2 Ω) to the cable reel 2P connector.
5. Reconnect the battery positive cable, then reconnect the negative cable.
6. Erase the DTC memory (see page 24-22).
7. Read the DTC (see page 24-20).

Is DTC 1-3 indicated?

YES

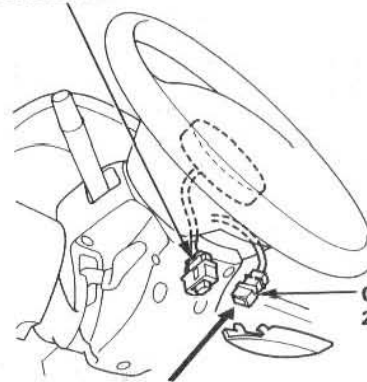
NO

Short in the driver's airbag inflator; replace the driver's airbag (see page 24-55).

Check for a short in the cable reel:

1. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
2. Disconnect the special tool (2 Ω) from the cable reel 2P connector.
3. Remove the dashboard lower cover, and disconnect the cable reel 2P connector from the SRS main harness.
4. Connect the special tool (2 Ω) to the SRS main harness 2P connector. (cont'd)

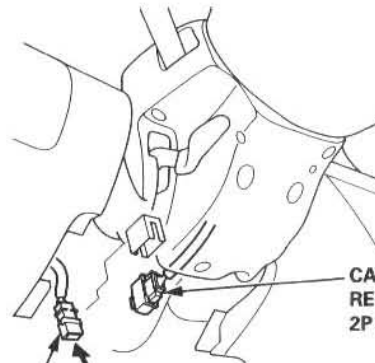
DRIVER'S AIRBAG
2P CONNECTOR



CABLE REEL
2P CONNECTOR



SRS SIMULATOR
LEAD C
07TAZ - SZ5011A
and SRS INFLATOR
SIMULATOR
(2 Ω JACK)
07SAZ - TB4011A



CABLE
REEL
2P CONNECTOR

SRS MAIN HARNESS
2P CONNECTOR

SRS SIMULATOR
LEAD C
07TAZ - SZ5011A
and SRS INFLATOR
SIMULATOR
(2 Ω JACK)
07SAZ - TB4011A

To page 24-37



From page 24-36

Check for a short in the cable reel (cont'd)

5. Reconnect the battery positive cable, then reconnect the negative cable.
6. Erase the DTC memory (see page 24-22).
7. Read the DTC (see page 24-20).

Is DTC 1-3 indicated?

YES

NO

Short in the cable reel; replace the cable reel (see page 24-61).

Check for a short in the SRS main harness:

1. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
2. Disconnect the front passenger's airbag connector from the SRS main harness.
3. Disconnect the SRS main harness 18P connector from the SRS unit. Do not disconnect the special tool (2 Ω) from the SRS main harness 2P connector.
4. Check the resistance between terminals No. 1 and No. 13 of SRS main harness 18P connector. There should be approx. 2.0 – 3.0 Ω .

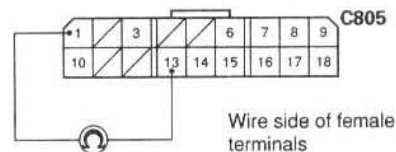
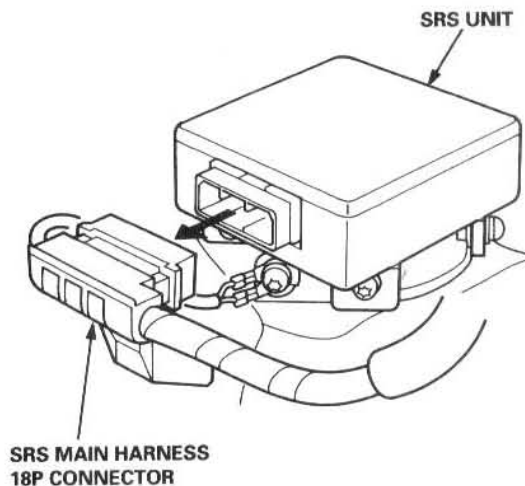
Is the resistance as specified?

YES

NO

Faulty SRS unit; replace the SRS unit (see page 24-65).

Short in the SRS main harness; replace the SRS main harness.



Troubleshooting

DTC 1-4

CAUTION: Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

Try to reproduce the SRS indicator light:

1. Erase the DTC memory (see page 24-22).
2. Turn the ignition switch ON (II), and check that the SRS indicator light comes on for about six seconds and then goes off.

Does the SRS indicator light stay on?

YES

NO

Intermittent failure, system is OK at this time. See Troubleshooting Intermittent Failures on page 24-22.

Check for a short to power in the driver's airbag inflator:

1. Turn the ignition switch OFF.
2. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
3. Disconnect the driver's airbag 2P connector from the cable reel 2P connector. Do not disconnect the passenger's airbag connector.
4. Connect the special tool (2 Ω) to the cable reel 2P connector.
5. Reconnect the battery positive cable, then reconnect the negative cable.
6. Erase the DTC memory (see page 24-22).
7. Read the DTC (see page 24-20).

Is DTC 1-4 indicated?

YES

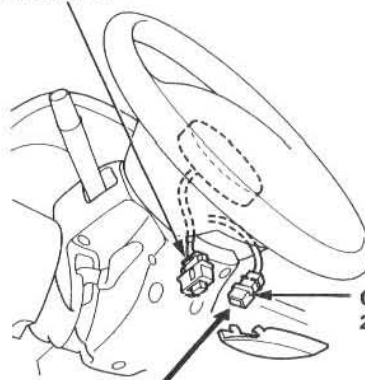
NO

Short to power in the driver's airbag inflator; replace the driver's airbag (see page 24-55).

Check for a short to power in the cable reel:

1. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
2. Disconnect the special tool (2 Ω) from the cable reel 2P connector.
3. Remove the dashboard lower cover, and disconnect the cable reel 2P connector from the SRS main harness.
4. Connect the special tool (2 Ω) to the SRS main harness 2P connector. (cont'd)

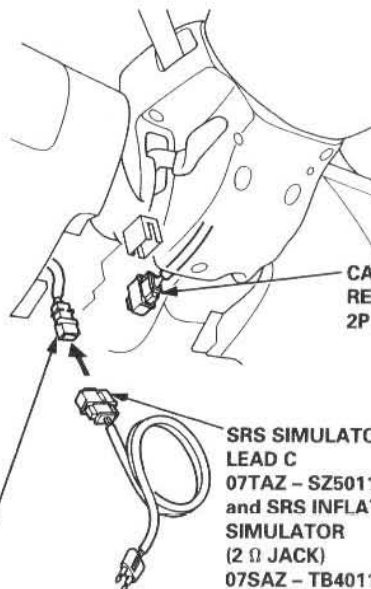
DRIVER'S AIRBAG
2P CONNECTOR



CABLE REEL
2P CONNECTOR



SRS SIMULATOR
LEAD C
07TAZ - SZ5011A
and SRS INFLATOR
SIMULATOR
(2 Ω JACK)
07SAZ - TB4011A



CABLE
REEL
2P CONNECTOR

SRS SIMULATOR
LEAD C
07TAZ - SZ5011A
and SRS INFLATOR
SIMULATOR
(2 Ω JACK)
07SAZ - TB4011A

SRS MAIN HARNESS
2P CONNECTOR

To page 24-39



From page 24-38

Check for a short power in the cable reel (cont'd):

5. Reconnect the battery positive cable, then reconnect the negative cable.
6. Erase the DTC memory (see page 24-22).
7. Read the DTC (see page 24-20).

Is DTC 1-4 indicated?

YES

NO

Short to power in the cable reel; replace the cable reel (see page 24-61).

Check for a short to power in the SRS main harness:

1. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
2. Disconnect the front passenger's airbag connector from the SRS main harness.
3. Remove the special tool (2 Ω) from the SRS main harness 2P connector.
4. Disconnect the SRS main harness 18P connector from the SRS unit.
5. Connect a voltmeter between the No. 1 (+) terminal of the SRS main harness 18P connector and body ground.
6. Turn the ignition switch ON (II), and measure voltage. There should be 0.5 V or less.
7. Turn the ignition switch OFF.
8. Connect a voltmeter between the No. 13 (+) terminal of the SRS main harness 18P connector and body ground.
9. Turn the ignition switch ON (II), and measure voltage. There should be 0.5 V or less.

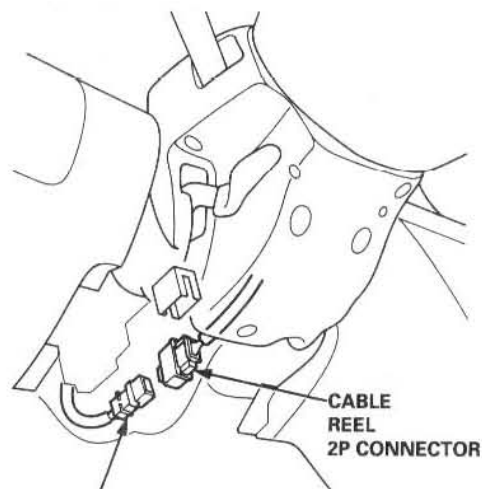
Are voltages as specified?

YES

NO

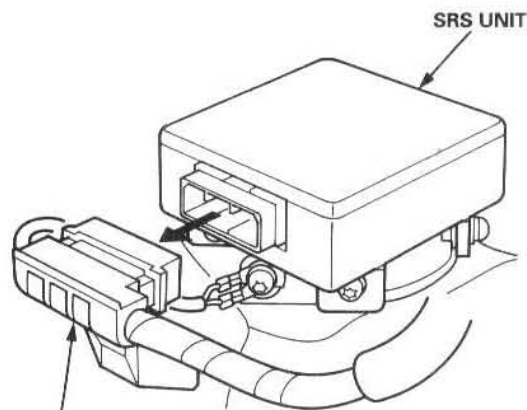
Faulty SRS unit; replace the SRS unit (see page 24-65).

Short to power in the SRS main harness; replace the SRS main harness.

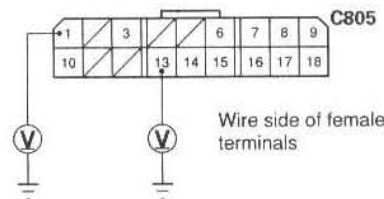


SRS MAIN HARNESS 2P CONNECTOR

NOTE: Do not connect the special tool (2 Ω).



SRS MAIN HARNESS 18P CONNECTOR



Troubleshooting

DTC 1-5

CAUTION: Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

Try to reproduce the SRS indicator light:

1. Erase the DTC memory (see page 24-22).
2. Turn the ignition switch ON (II), and check that the SRS indicator light comes on for about six seconds and then goes off.

Does the SRS indicator light stay on?

YES

NO

Intermittent failure, system is OK at this time. See Troubleshooting Intermittent Failures on page 24-22.

Check for a short to ground in the driver's airbag inflator:

1. Turn the ignition switch OFF.
2. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
3. Disconnect the driver's airbag 2P connector from the cable reel 2P connector. Do not disconnect the passenger's airbag connector.
4. Connect the special tool (2 Ω) to the cable reel 2P connector.
5. Reconnect the battery positive cable, then reconnect the negative cable.
6. Erase the DTC memory (see page 24-22).
7. Read the DTC (see page 24-20).

Is DTC 1-5 indicated?

YES

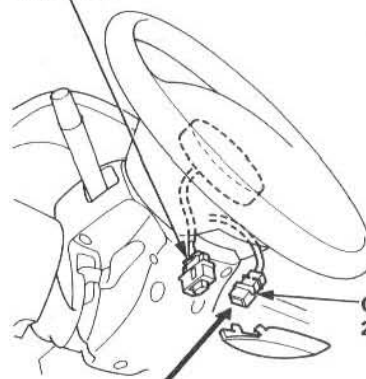
NO

Short to ground in the driver's airbag inflator; replace the driver's airbag (see page 24-55).

Check for a short to ground in the cable reel:

1. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
2. Disconnect the special tool (2 Ω) from the cable reel 2P connector.
3. Remove the dashboard lower cover, and disconnect the cable reel 2P connector from the SRS main harness.
4. Connect the special tool (2 Ω) to the SRS main harness 2P connector. (cont'd)

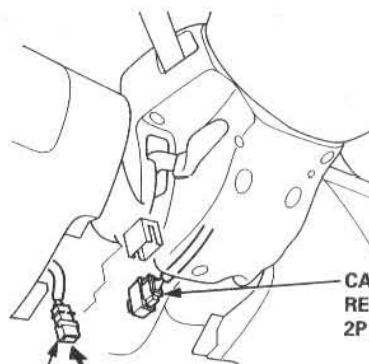
DRIVER'S AIRBAG
2P CONNECTOR



CABLE REEL
2P CONNECTOR



SRS SIMULATOR
LEAD C
07TAZ - SZ5011A
and SRS INFLATOR
SIMULATOR
(2 Ω JACK)
07SAZ - TB4011A



CABLE REEL
2P CONNECTOR

SRS MAIN HARNESS
2P CONNECTOR

SRS SIMULATOR
LEAD C
07TAZ - SZ5011A
and SRS INFLATOR
SIMULATOR
(2 Ω JACK)
07SAZ - TB4011A

To page 24-41



From page 24-40

Check for a short to ground in the cable reel (cont'd):

5. Reconnect the battery positive cable, then reconnect the negative cable.
6. Erase the DTC memory (see page 24-22).
7. Read the DTC (see page 24-20).

Is DTC 1-5 indicated?

YES

NO

Short to ground in the cable reel; replace the cable reel (see page 24-61).

Check for a short to ground in the SRS main harness:

1. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
2. Disconnect the front passenger's airbag 2P connector from the SRS main harness.
3. Remove the special tool (2 Ω) from the SRS main harness 2P connector.
4. Check resistance between the No. 1 terminal of the SRS main harness 18P connector and ground, and between the No. 13 terminal of the SRS main harness 18P connector and ground. There should be 1 M Ω or more.

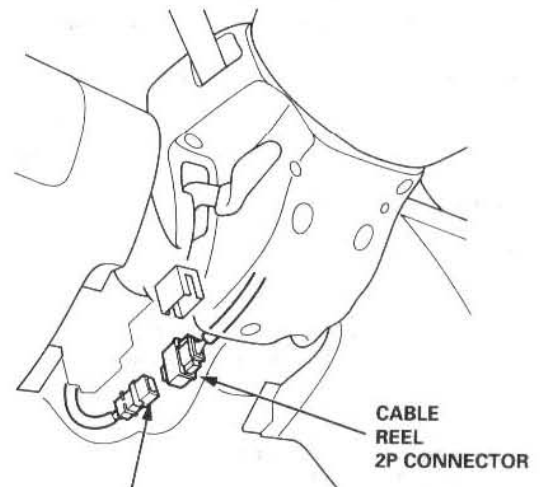
Is the resistance as specified?

YES

NO

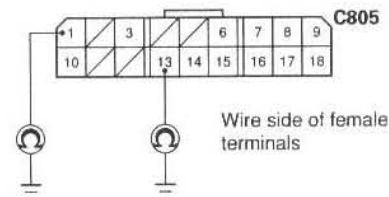
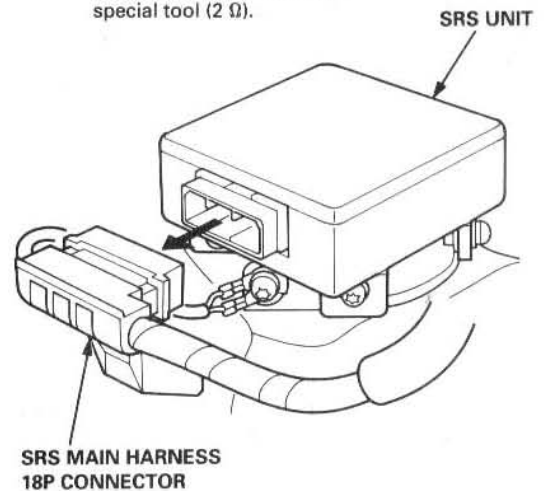
Faulty SRS unit; replace the SRS unit (see page 24-65).

Short to ground in the SRS main harness; replace the SRS main harness.



SRS MAIN HARNESS 2P CONNECTOR

NOTE: Do not connect the special tool (2 Ω).



Troubleshooting

DTC 2-1 and DTC 2-2

CAUTION: Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

Try to reproduce the SRS indicator light:

1. Erase the DTC memory (see page 24-22).
2. Turn the ignition switch ON (II), and check that the SRS indicator light comes on for about six seconds and then goes off.

Does the SRS indicator light stay on?

YES

NO

Intermittent failure, system is OK at this time. See Troubleshooting Intermittent Failures on page 24-22.

Check for an open in the passenger's airbag inflator:

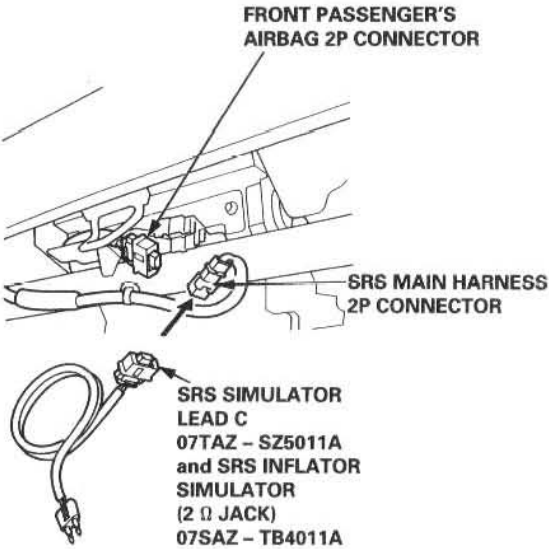
1. Turn the ignition switch OFF.
2. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
3. Disconnect the front passenger's airbag connector from the SRS main harness (see page 24-18).
4. Connect the special tool (2 Ω) to the SRS main harness 2P connector. Do not disconnect the driver's airbag connector.
5. Reconnect the battery positive cable, then reconnect the negative cable.
6. Erase the DTC memory (see page 24-22).
7. Read the DTC (see page 24-20).

Is DTC 2-1 or DTC 2-2 indicated?

YES

NO

Open or increased resistance in the passenger's airbag inflator; replace the passenger's airbag (see page 24-57).



To page 24-43



From page 24-42

Check for an open in the SRS main harness:

1. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
2. Disconnect the driver's airbag 2P connector from the cable reel 2P connector (see page 24-18).
3. Remove the special tool ($2\ \Omega$) from the SRS main harness 2P connector, then connect the special tool (jumper) to the SRS main harness 2P connector.
4. Disconnect the SRS main harness 18P connector from the SRS unit.
5. Check resistance between the No. 10 terminal and No. 14 terminal of the SRS main harness 18P connector. There should be approx. $0 - 1.0\ \Omega$.

Is the resistance as specified?

YES

NO

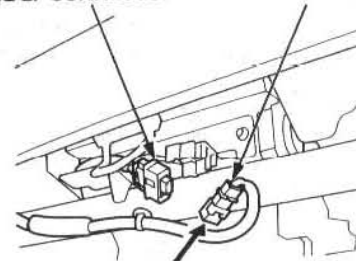
Poor contact at the SRS main harness 18P connector; check the connector.

- If the connector is OK, substitute a known-good SRS unit, and recheck.
- If the problem is still present, replace the SRS main harness.

Open or increased resistance in the SRS main harness; replace the harness.

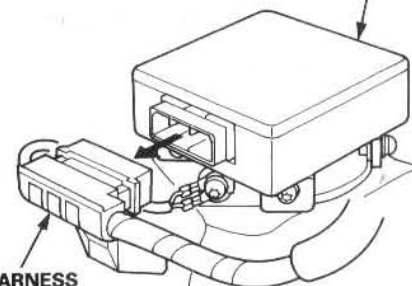
FRONT PASSENGER'S AIRBAG 2P CONNECTOR

SRS MAIN HARNESS 2P CONNECTOR

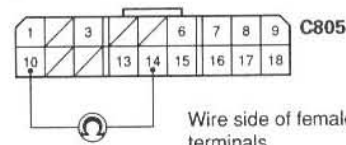


SRS SIMULATOR LEAD C
07TAZ - SZ5011A
and SRS INFLATOR SIMULATOR (JUMPER JACK)
07SAZ - TB4011A

SRS UNIT



SRS MAIN HARNESS 18P CONNECTOR



Troubleshooting

DTC 2-3

CAUTION: Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

Try to reproduce the SRS indicator light:
1. Erase the DTC memory (see page 24-22).
2. Turn the ignition switch ON (II), and check that the SRS indicator light comes on for about six seconds and then goes off.

Does the SRS indicator light stay on?

YES

NO

Intermittent failure, system is OK at this time. See Troubleshooting Intermittent Failures on page 24-22.

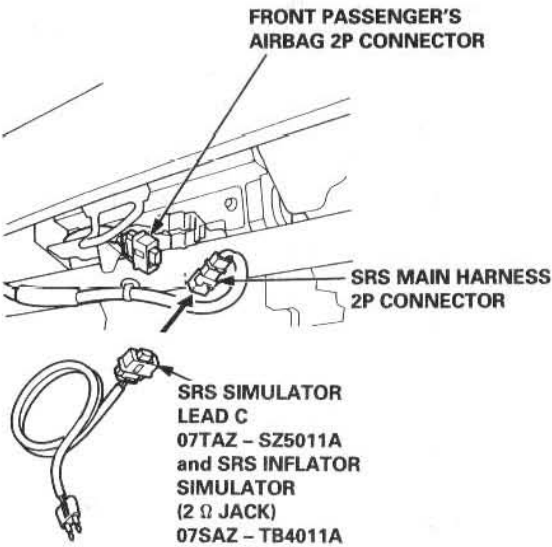
Check for a short to another wire or decreased resistance in the passenger's airbag inflator:
1. Turn the ignition switch OFF.
2. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
3. Disconnect the front passenger's airbag 2P connector from the SRS main harness (see page 24-18).
4. Connect the special tool (2 Ω) to the SRS main harness 2P connector. Do not disconnect the driver's airbag connector.
5. Reconnect the battery positive cable, then reconnect the negative cable.
6. Erase the DTC memory (see page 24-22).
7. Read the DTC (see page 24-20).

Is DTC 2-3 indicated?

YES

NO

Short to another wire or decreased resistance in the passenger's airbag inflator; replace the passenger's airbag (see page 24-57).



To page 24-45



From page 24-44

Check for a short to another wire or decreased resistance in the SRS main harness:

1. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
2. Disconnect the driver's airbag 2P connector from the cable reel 2P connector.
3. Disconnect the SRS main harness 18P connector from the SRS unit. Do not disconnect the special tool (2 Ω).
4. Check resistance between the No. 10 terminal and No. 14 terminal of the SRS main harness 18P connector. There should be approx. 2.0 – 3.0 Ω .

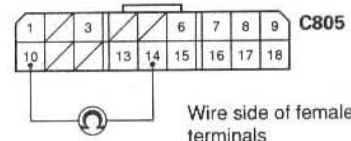
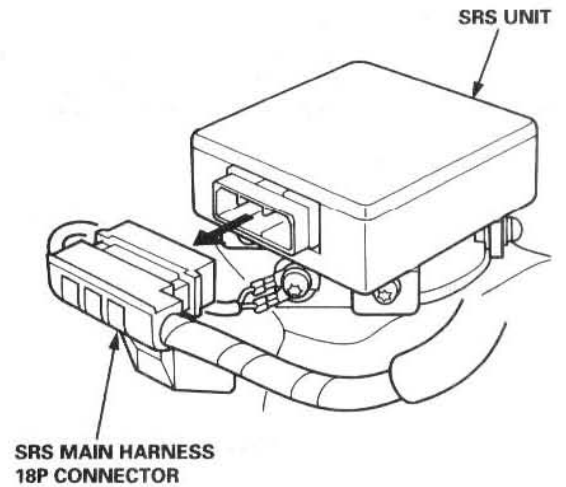
Is the resistance as specified?

YES

NO

Faulty SRS unit; replace the SRS unit (see page 24-65).

Short to another wire or decreased resistance in the SRS main harness; replace the SRS main harness.

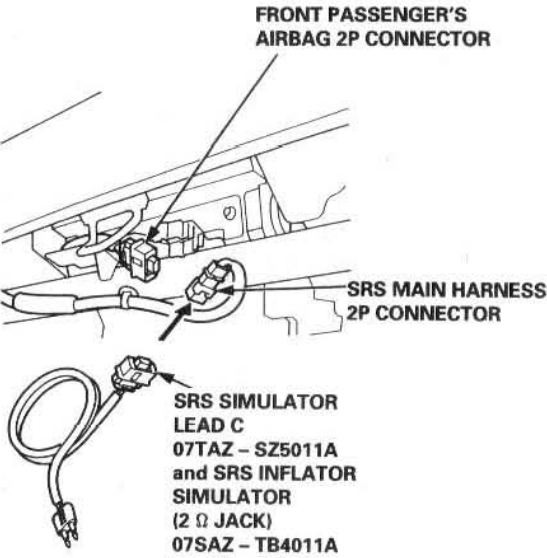


Troubleshooting

DTC 2-4

CAUTION: Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

Try to reproduce the SRS indicator light: 1. Erase the DTC memory (see page 24-22). 2. Turn the ignition switch ON (II), and check that the SRS indicator light comes on for about six seconds and then goes off.	
Does the SRS indicator light stay on?	
YES	NO
Intermittent failure, system is OK at this time. See Troubleshooting Intermittent Failures on page 24-22.	
Check for a short to power in the passenger's airbag inflator: 1. Turn the ignition switch OFF. 2. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes. 3. Disconnect the front passenger's airbag 2P connector from the SRS main harness (see page 24-18). 4. Connect the special tool (2 Ω) to the SRS main harness 2P connector. Do not disconnect the driver's airbag connector. 5. Reconnect the battery positive cable, then reconnect the negative cable. 6. Erase the DTC memory (see page 24-22). 7. Read the DTC (see page 24-20).	
Is DTC 2-4 indicated?	
YES	NO
Short power in the passenger's airbag inflator; replace the passenger's airbag (see page 24-57).	



To page 24-47



From page 24-46

Check for a short to power in the SRS main harness:

1. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
2. Disconnect the driver's airbag 2P connector from the cable reel 2P connector.
3. Disconnect the SRS main harness 18P connector from the SRS unit.
4. Remove the special tool ($2\ \Omega$) from the SRS main harness 2P connector.
5. Reconnect the battery positive cable, then reconnect the negative cable.
6. Connect a voltmeter between the No. 10 (+) terminal of SRS main harness 18P connector and ground.
7. Turn the ignition switch ON (II), and measure voltage. There should be 0.5 V or less.
8. Connect a voltmeter between the No. 14 (+) terminal of the SRS main harness 18P connector and ground, and measure voltage. There should be 0.5 V or less.

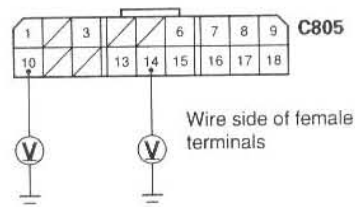
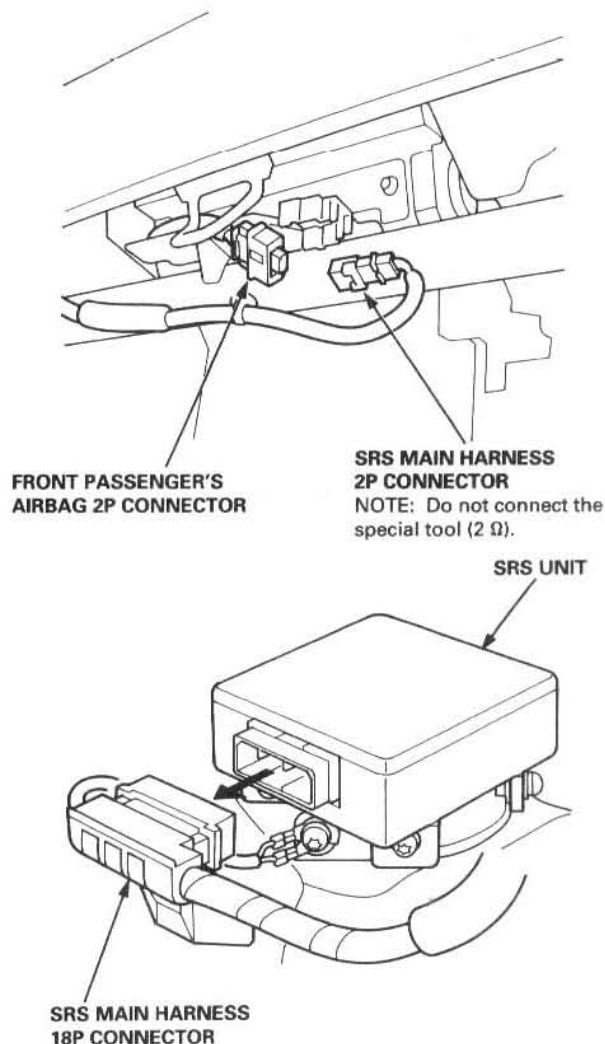
Are voltages as specified?

YES

NO

Faulty SRS unit; replace the SRS unit (see page 24-65).

Short to power in the SRS main harness; replace the SRS main harness.



Troubleshooting

DTC 2-5

CAUTION: Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

Try to reproduce the SRS indicator light:
1. Erase the DTC memory (see page 24-22).
2. Turn the ignition switch ON (II), and check that the SRS indicator light comes on for about six seconds and then goes off.

Does the SRS indicator light stay on?

YES

NO

Intermittent failure, system is OK at this time. See Troubleshooting Intermittent Failures on page 24-22.

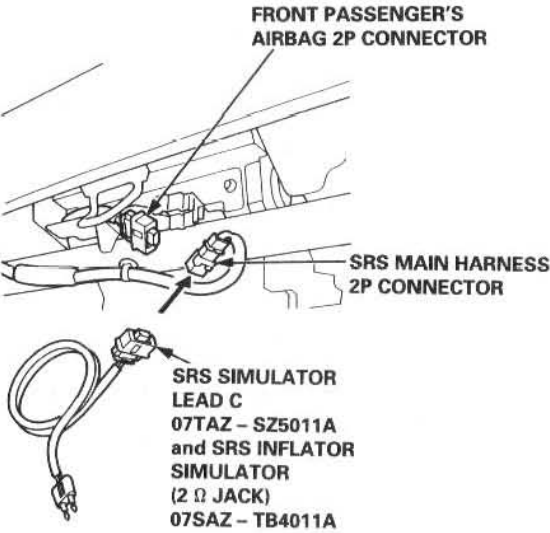
Check for a short to ground in the passenger's airbag inflator:
1. Turn the ignition switch OFF.
2. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
3. Disconnect the front passenger's airbag 2P connector from the SRS main harness (see page 24-18).
4. Connect the special tool (2 Ω) to the SRS main harness 2P connector. Do not disconnect the driver's airbag connector.
5. Reconnect the battery positive cable, then reconnect the negative cable.
6. Erase the DTC memory (see page 24-22).
7. Read the DTC (see page 24-20).

Is DTC 2-5 indicated?

YES

NO

Short power in the passenger's airbag inflator; replace the passenger's airbag (see page 24-57).



To page 24-49



From page 24-48

Check for a short to ground in the SRS main harness:

1. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
2. Disconnect the driver's airbag 2P connector from the cable reel 2P connector.
3. Disconnect the SRS main harness 18P connector from the SRS unit.
4. Remove the special tool ($2\ \Omega$) from the SRS main harness 2P connector.
5. Check resistance between the No. 10 terminal of the SRS main harness 18P connector and ground, and between the No. 14 terminal of the SRS main harness 18P connector and ground. There should be $1\ \text{M}\Omega$ or more.

Is the resistance as specified?

YES

NO

Faulty SRS unit; replace the SRS unit (see page 24-65).

Short to ground in the SRS main harness; replace the SRS main harness.

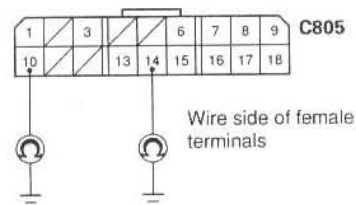
FRONT PASSENGER'S
AIRBAG 2P CONNECTOR

SRS MAIN HARNESS
2P CONNECTOR

NOTE: Do not connect the
special tool ($2\ \Omega$).

SRS UNIT

SRS MAIN HARNESS
18P CONNECTOR



Troubleshooting

DTC 8-6

CAUTION: Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

Besides indicating an abnormality in the SRS unit, DTC 8-6 may also indicate that two problems equivalent to DTC 1-1 and 2-4, 1-4 and 2-1, or 1-4 and 2-4 occurred at the same time. Proceed in the order shown below.

Check the SRS main harness:

1. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.

2. Disconnect the driver's airbag and front passenger's airbag connectors (see page 24-18).

3. Disconnect the SRS main harness 18P connector from the SRS unit.

4. Reconnect the battery positive cable, then reconnect the negative cable.

5. Turn the ignition switch ON (II).

6. Connect a voltmeter and measure voltage between the No. 10 terminal of the SRS main harness 18P connector and ground, and between the No. 14 terminal and ground. There should be approx. 0 – 0.5 V.

Are voltages as specified?

YES

NO

Short to power in the SRS main harness; replace the SRS main harness.

Check the SRS main harness and the cable reel:

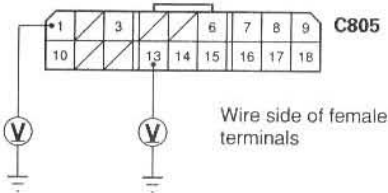
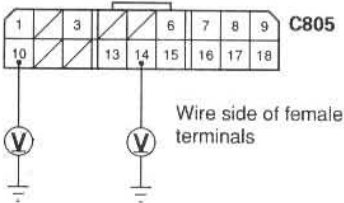
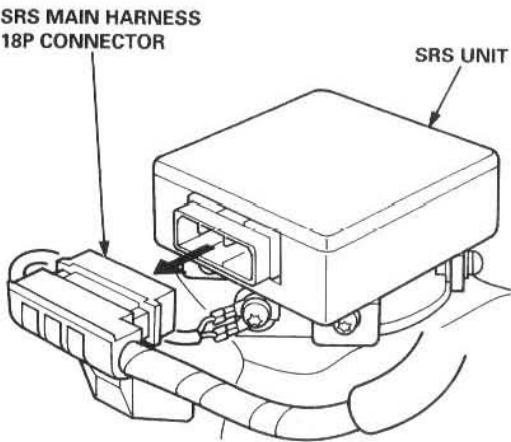
Connect a voltmeter and measure voltage between the No. 1 terminal of the SRS main harness 18P connector and ground, and between the No. 13 terminal and ground. There should be approx. 0 – 0.5 V.

Are voltages as specified?

YES

NO

Faulty SRS unit; replace the SRS unit (see page 24-65).



To page 24-51



From page 24-50

Check the cable reel:

1. Turn the ignition switch OFF.
2. Disconnect the cable reel 2P connector from the SRS main harness.
3. Turn the ignition switch ON (II).
4. Connect a voltmeter and measure voltage between the No. 1 terminal of the SRS main harness 18P connector and ground, and between the No. 13 terminal and ground. There should be approx. 0 – 0.5 V.

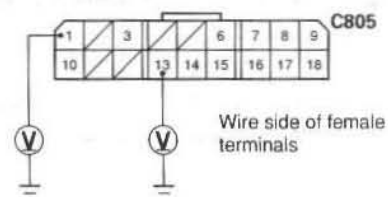
Are voltages as specified?

YES

NO

Short to power in the cable reel; replace the cable reel (see page 24-61).

Short to power in the SRS main harness; replace the SRS main harness.



Troubleshooting

DTC 9-2

CAUTION: Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

Check the fuse:

1. Turn the ignition switch OFF.
2. Check for blown No. 24 (10 A) fuse in the under-dash fuse/relay box.

Is the fuse OK?

YES

NO

(A) To page 24-53

Replace the fuse. Turn the ignition switch ON (II), and check that the fuse doesn't blow.

Is the fuse OK?

YES

NO

The problem has disappeared. Test-drive the vehicle and see **Troubleshooting of Intermittent Failures** on page 24-22.

Check for short to ground between the under-dash fuse/relay box and the SRS unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
3. Disconnect the driver's and front passenger's airbag connectors (see page 24-18).
4. Disconnect the SRS main harness 18P connector from the SRS unit.
5. Check resistance between the No. 3 terminal of the SRS main harness 18P connector and ground. There should be 1 M Ω or more.

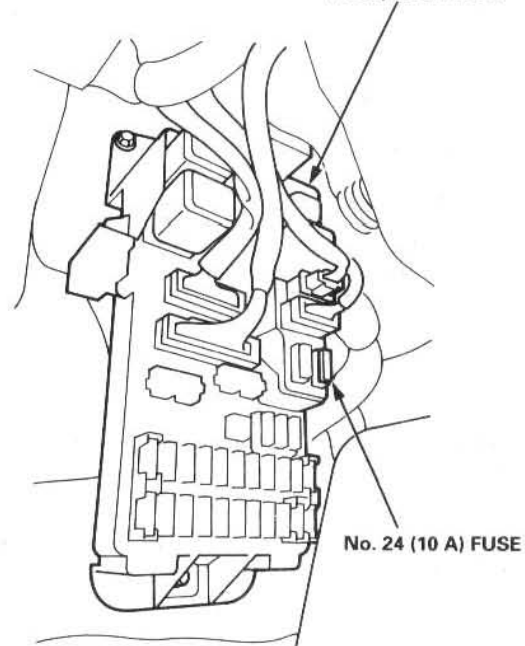
Is the resistance as specified?

YES

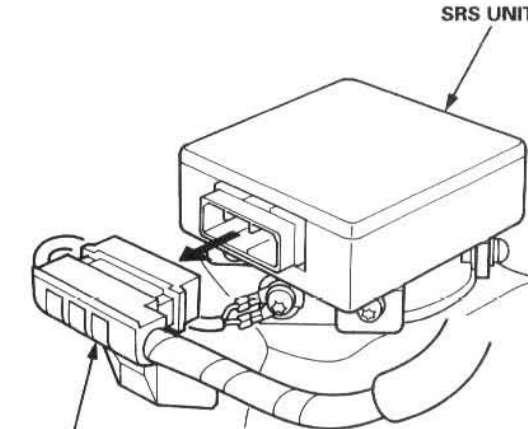
NO

Faulty SRS unit; replace the SRS unit (see page 24-65).

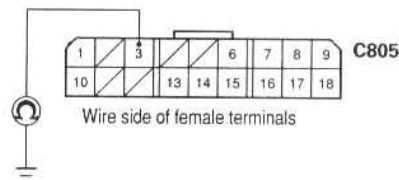
UNDER-DASH
FUSE/RELAY BOX



SRS UNIT



SRS MAIN HARNESS
18P CONNECTOR



(B)

To page 24-53



from page 24-52 (B)

Check for short to ground in the SRS main harness:

1. Disconnect the SRS main harness 2P connector from the under-dash fuse/relay box.
2. Check resistance between the No. 3 terminal of the SRS main harness 18P connector and ground. There should be 1.0 M Ω or more.

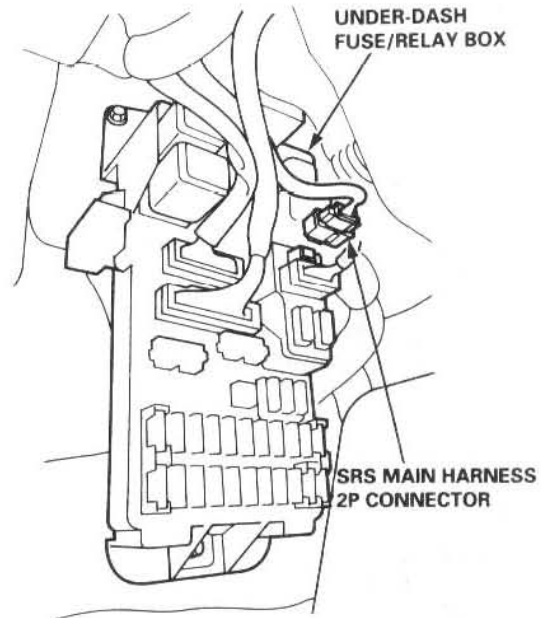
Is the resistance as specified?

YES

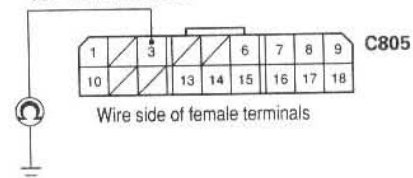
NO

Short to ground in the under-dash fuse/relay box; replace the under-dash fuse/relay box.

Short to ground in the SRS main harness; replace the SRS main harness.



SRS MAIN HARNESS 18P CONNECTOR



(A) From page 24-52

Check for an open in the SRS main harness:

1. Turn the ignition switch OFF.
2. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
3. Disconnect the driver's and front passenger's airbag connector (see page 24-18).
4. Disconnect the SRS main harness 18P connector from the SRS unit.
5. Reconnect the battery positive cable, then reconnect the negative cable.
6. Connect a voltmeter between the No. 3 terminal of the SRS main harness 18P connector and ground.
7. Turn the ignition switch ON (II), and measure voltage.

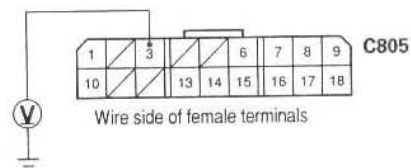
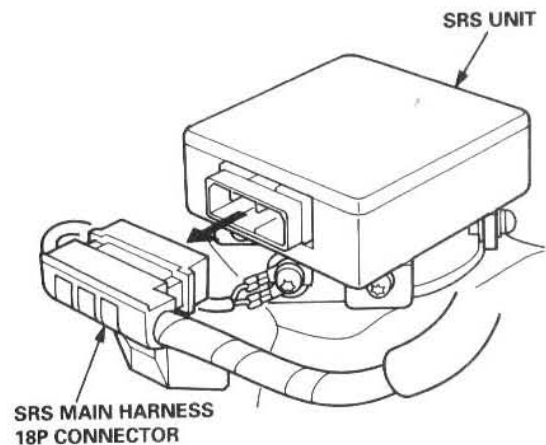
Is there battery voltage?

YES

NO

Poor contact at the SRS main harness 18P connector; check the connector.

- If the connector is OK, substitute a known-good SRS unit, and recheck.
- If the problem is still present, replace the SRS main harness.



To page 24-54

(cont'd)

Troubleshooting

DTC 9-2 (cont'd)

From page 24-53

Check for an open in the SRS main harness:

1. Turn the ignition switch OFF.
2. Disconnect the SRS main harness 2P connector from the under-dash fuse/relay box.
3. Check resistance between the No. 2 terminal of the SRS main harness 2P connector and No. 3 terminal of the SRS main harness 18P connector.
There should be 0 – 0.5 Ω .

Is the resistance as specified?

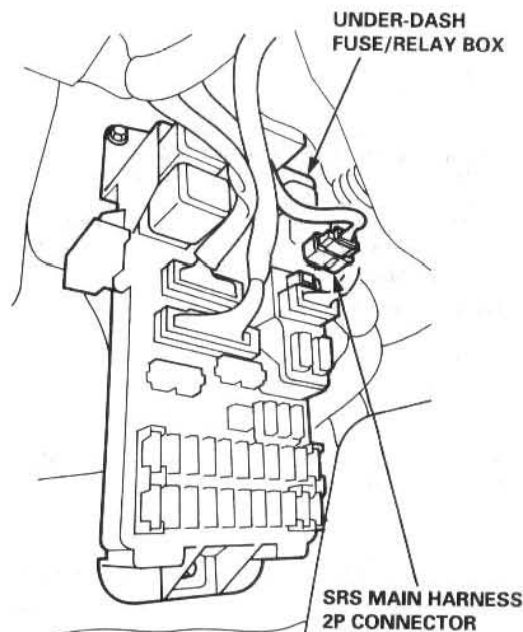
YES

NO

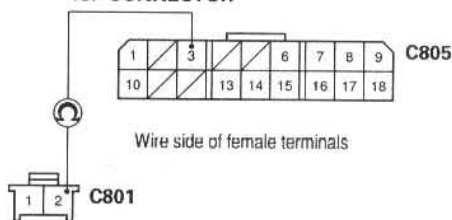
Poor contact at the SRS main harness 2P connector; check the connector.

- If the connector is OK, substitute a known-good under-dash fuse/relay box, and recheck.
- If the problem is still present, replace the SRS main harness.

Open in the SRS main harness; replace the SRS main harness.



SRS MAIN HARNESS 18P CONNECTOR



SRS MAIN HARNESS 2P CONNECTOR



Driver's Airbag

Replacement

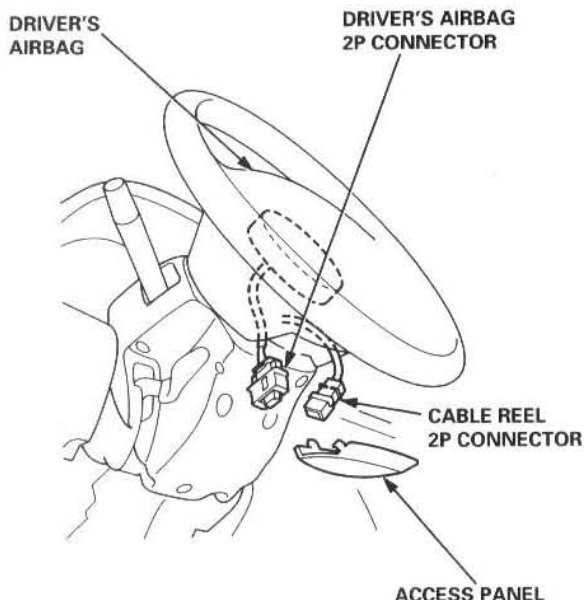
After a collision in which the airbags were deployed, the airbags and the SRS unit must be replaced.

⚠ WARNING Store a removed airbag with the pad surface up. If the airbag is improperly stored face down, accidental deployment could propel the unit with enough force to cause serious injury.

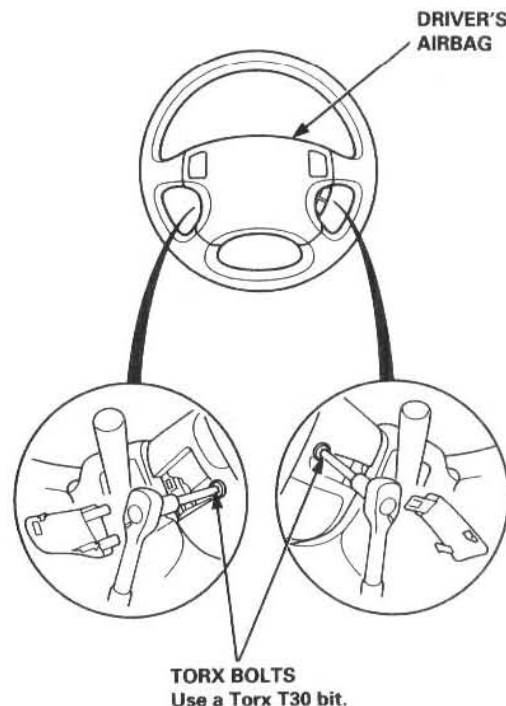
CAUTION: Do not disassemble or tamper with the airbag.

NOTE:

- Do not install used SRS parts from another vehicle. When repairing, use only new SRS parts.
 - Carefully inspect the airbag before you install it. Do not install an airbag that shows signs of being dropped or improperly handled, such as dents, cracks or deformation.
1. Disconnect the battery negative cable, then disconnect the positive cable from the battery, and wait at least three minutes.
 2. Remove the access panel from the steering wheel, then disconnect the 2P connector between the driver's airbag and cable reel. When disconnected, the airbag connector is automatically shorted.



3. Remove the two Torx bolts from the steering wheel, and disconnect the horn connector. Remove the driver's airbag.

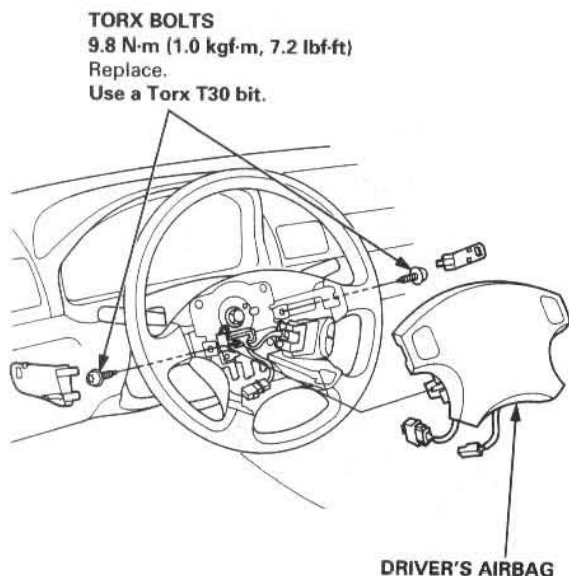


(cont'd)

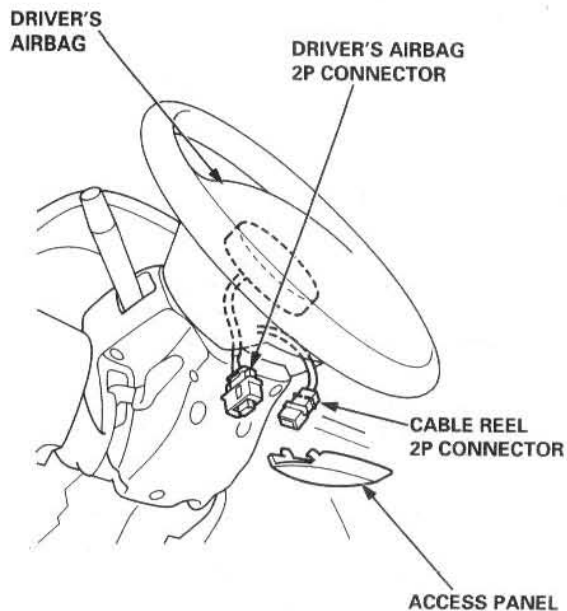
Driver's Airbag

Replacement (cont'd)

4. Place the new driver's airbag into the steering wheel, and secure it with new Torx bolts.



5. Connect the driver's airbag 2P connector to the cable reel 2P connector, then install the access panel on the steering wheel.



6. Connect the battery positive cable, then connect the negative cable.
7. After installing the airbag assembly, confirm proper system operation:
 - Turn the ignition switch ON (II); the SRS indicator light should come on for about six seconds and then go off.
 - Make sure both horn buttons work.



Front Passenger's Airbag

Replacement

After a collision in which the airbags were deployed, the airbags and the SRS unit must be replaced.

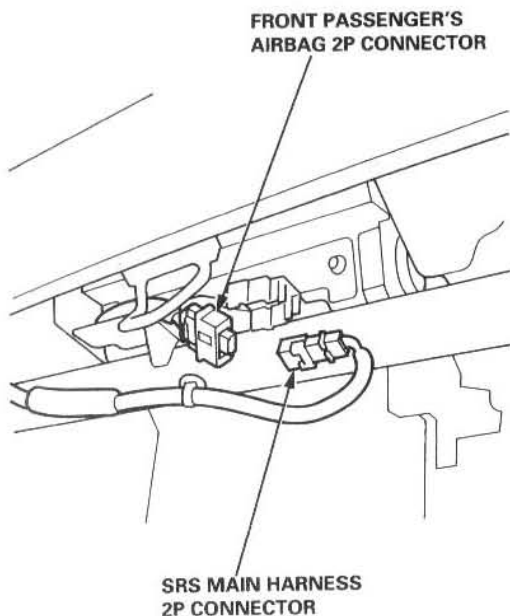
⚠ WARNING Store a removed airbag with the pad surface up. If the airbag is improperly stored face down, accidental deployment could propel the unit with enough force to cause serious injury.

CAUTION: Do not disassemble or tamper with the airbag.

NOTE:

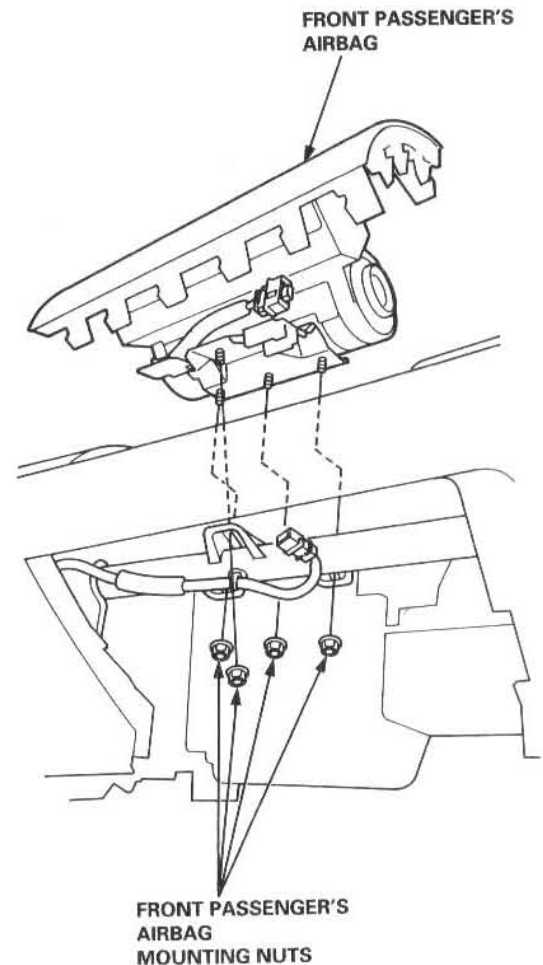
- Do not install used SRS parts from another vehicle. When repairing, use only new SRS parts.
- Carefully inspect the airbag before you install it. Do not install an airbag that shows signs of being dropped or improperly handled, such as dents, cracks or deformation.

1. Disconnect the battery negative cable, then disconnect the positive cable from the battery, and wait at least three minutes.
2. Remove the glove box (see section 20).
3. Disconnect the 2P connector between the front passenger's airbag and SRS main harness. When disconnected, the airbag connector is automatically shorted.



4. Remove the four mounting nuts from the bracket.
5. Lift the front passenger's airbag out of the dashboard.

NOTE: The airbag lid has pawls on its side which attach it to the dashboard. To remove the airbag, cover the lid and dashboard with a cloth, and pry carefully with a flat tip screwdriver.

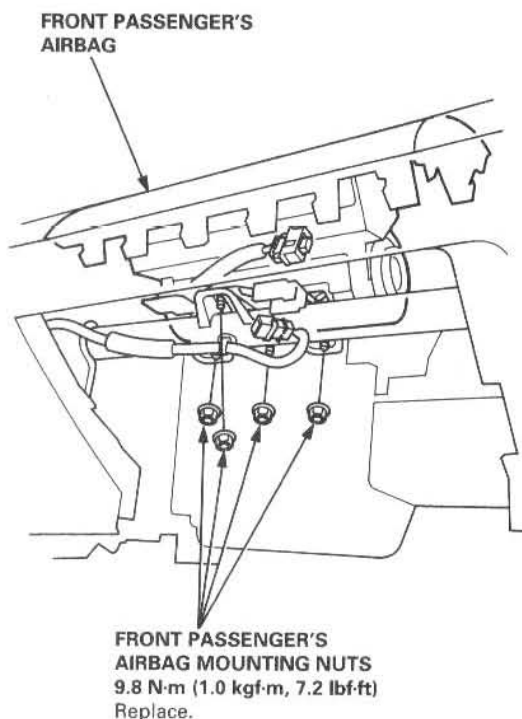


(cont'd)

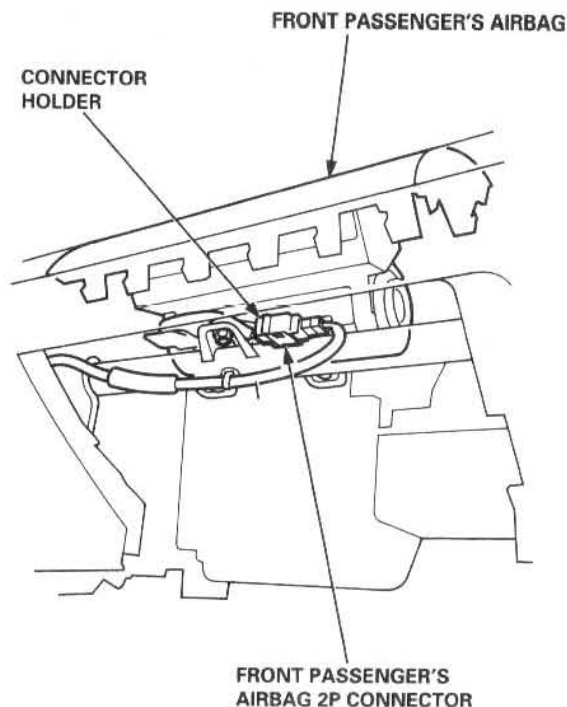
Front Passenger's Airbag

Replacement (cont'd)

6. Place the new front passenger's airbag into the dashboard. Tighten the front passenger's airbag mounting nuts.



7. Attach the airbag connector to the connector holder, then reinstall the glove box.



8. Connect the battery positive cable, then connect the negative cable.
9. After installing the airbag, confirm proper system operation. Turn the ignition switch ON (II); the SRS indicator light should come on for about six seconds and then go off.



Disposal

Before scrapping any airbags (including those in a whole vehicle to be scrapped), the airbags must be deployed. If the vehicle is still within the warranty period, before you deploy the airbags, the Honda District Service Manager must give approval and/or special instructions. Only after the airbags have been deployed (as the result of vehicle collision, for example), can they be scrapped. If the airbags appear intact (not deployed), treat them with extreme caution. Follow this procedure:

Deploying the Airbags: In-vehicle

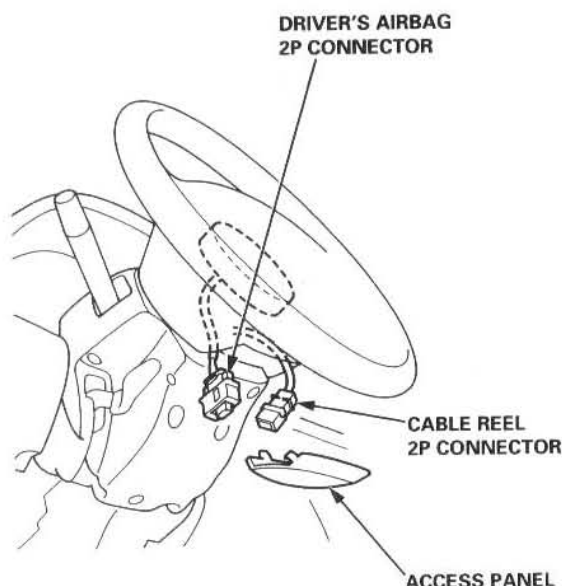
NOTE: If an SRS vehicle is to be entirely scrapped, its airbags should be deployed while still in the vehicle. The airbags should not be considered as salvageable parts and should never be installed in another vehicle.

⚠ WARNING Confirm that each airbag is securely mounted; otherwise, severe personal injury could result from deployment.

1. Disconnect the battery negative cable, then disconnect the positive cable.
2. Confirm that the special tool is functioning properly by following the check procedure on the tool label or on page 24-60.

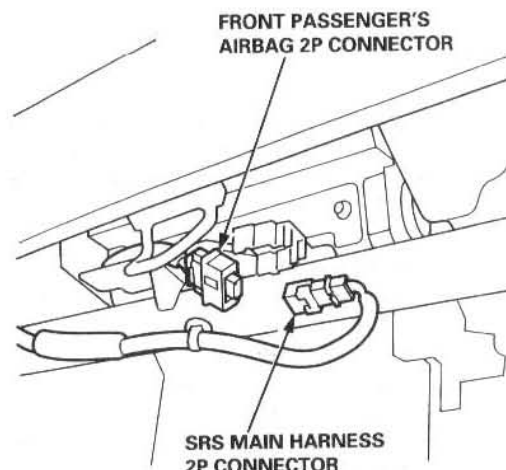
Driver's Airbag:

3. Remove the access panel, then disconnect the 2P connector between the driver's airbag and the cable reel.

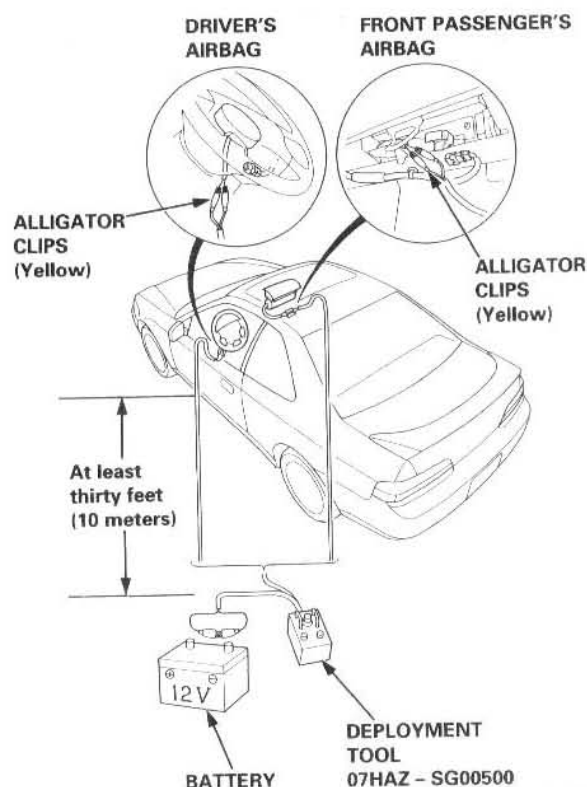


Front Passenger's Airbag:

4. Remove the glove box, then disconnect the 2P connector between the front passenger's airbag and SRS main harness.



5. Cut off the airbag connector, strip the ends of the airbag wires, and connect the deployment tool alligator clips to the airbag. Place the deployment tool at least thirty feet (10 meters) away from the airbag.



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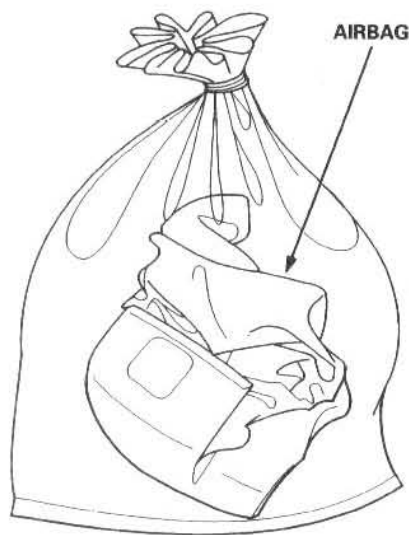
Airbag

Disposal (cont'd)

6. Connect a 12 volt battery to the tool:
 - If the green light on the tool comes on, the airbag igniter circuit is defective and cannot deploy the airbag. Go to Damaged Airbag Special Procedure.
 - If the red light on the tool comes on, the airbag is ready to be deployed.
7. Push the tool's deployment switch. The airbag should deploy (deployment is both highly audible and visible; a loud noise and rapid inflation of the bag, followed by slow deflation).
 - If the airbags deploy and the green light on the tool comes on, continue with this procedure.
 - If an airbag doesn't deploy, yet the green light comes ON, its igniter is defective. Go to Damaged Airbag Special Procedure.
 - During deployment, the airbag can become hot enough to burn you. Wait thirty minutes after deployment before touching the airbag.
8. Dispose of the complete airbag. No part of it can be reused. Place it in a sturdy plastic bag, and seal it securely.

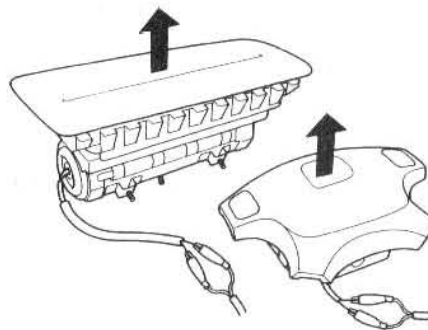
CAUTION:

- Wear a face shield and gloves when handling a deployed airbag.
- Wash your hands and rinse them well with water after handling a deployed airbag.



Deploying the Airbag: Out-of-vehicle

NOTE: If an intact airbag has been removed from a scrapped vehicle, or has been found defective or damaged during transit, storage or service, it should be deployed as follows:



1. Confirm that the special tool is functioning properly by following the check procedure on this page or on the tool label.
2. Position the airbag face up, outdoors on flat ground at least thirty feet (10 m) from any obstacles or people.
3. Follow steps 5, 6, 7, and 8 of the in-vehicle deployment procedure.

Damaged Airbag Special Procedure

▲ WARNING If an airbag cannot be deployed, it should not be treated as normal scrap; it should still be considered a potentially explosive device that can cause serious injury.

1. If installed in a vehicle, follow the removal procedure on page 24-55 and 24-57.
2. In all cases, make a short circuit by twisting together the two airbag inflator wires.
3. Package the airbag in exactly the same packaging that the new replacement part came in.
4. Mark the outside of the box "DAMAGED AIRBAG NOT DEPLOYED" so it does not get confused with your parts stock.
5. Contact your Honda District Service Manager for how and where to return it for disposal.

Deployment Tool: Check Procedure

1. Connect the yellow clips to both switch protector handles on the tool; connect the tool to a battery.
2. Push the operation switch: green means the tool is OK; red means the tool is faulty.
3. Disconnect the battery and the yellow clips.



Replacement

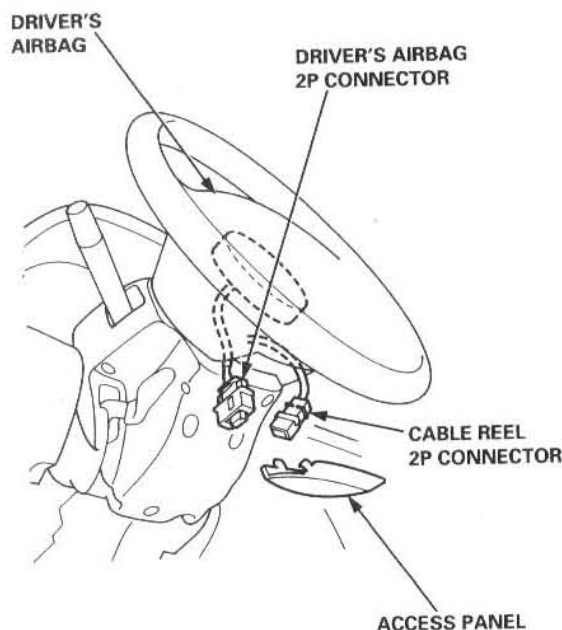
⚠ WARNING Store a removed airbag with the pad surface up. If the airbag is improperly stored face down, accidental deployment could propel the unit with enough force to cause serious injury.

CAUTION:

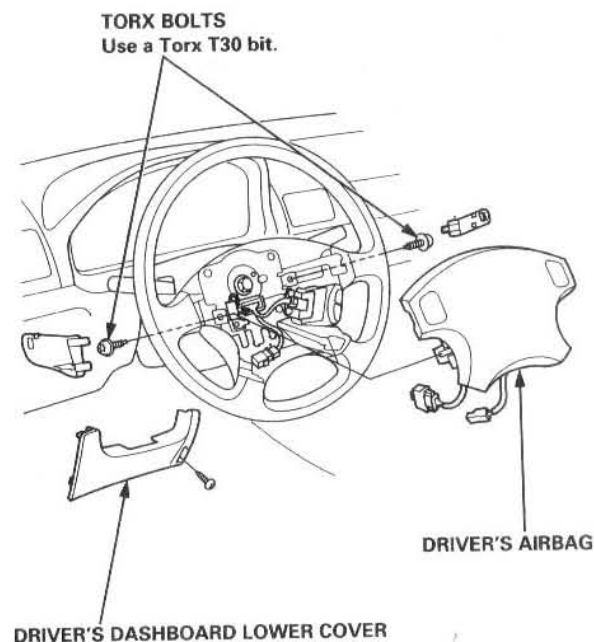
- Always disconnect the airbag connector when the SRS main harness is disconnected.
- Do not disassemble or tamper with the airbag.

NOTE: Carefully inspect the airbag before installing it. Do not install an airbag that shows signs of being dropped or improperly handled, such as dents, cracks or deformation.

1. Disconnect the battery negative cable, then disconnect the positive cable from the battery, and wait at least three minutes.
2. Remove the access panel from the steering wheel, then disconnect the 2P connector between the driver's airbag and the cable reel.



3. Make sure the wheels are aligned straight ahead.
4. Remove the driver's dashboard lower cover.
5. Remove the two Torx bolts from the steering wheel, and disconnect the horn connector. Remove the driver's airbag.

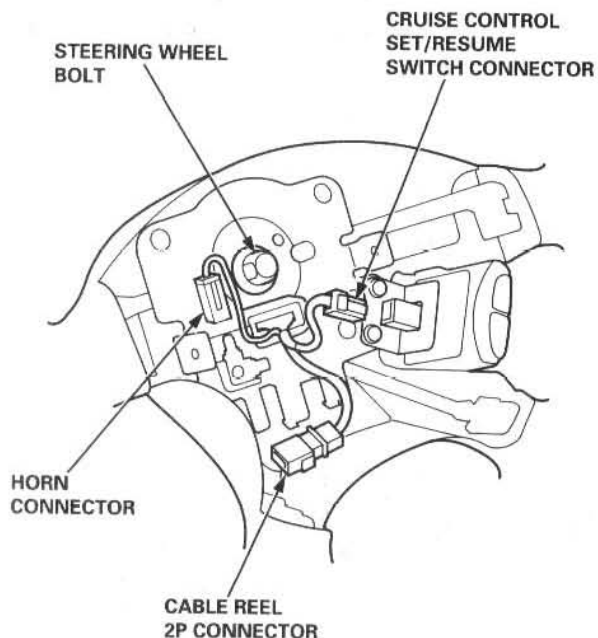


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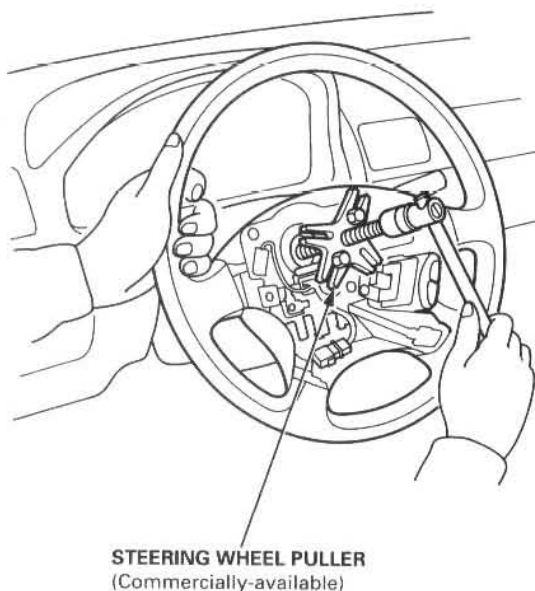
Cable Reel

Replacement (cont'd)

6. Disconnect the connectors from the horn and cruise control set/resume switches, then remove the steering wheel bolt.



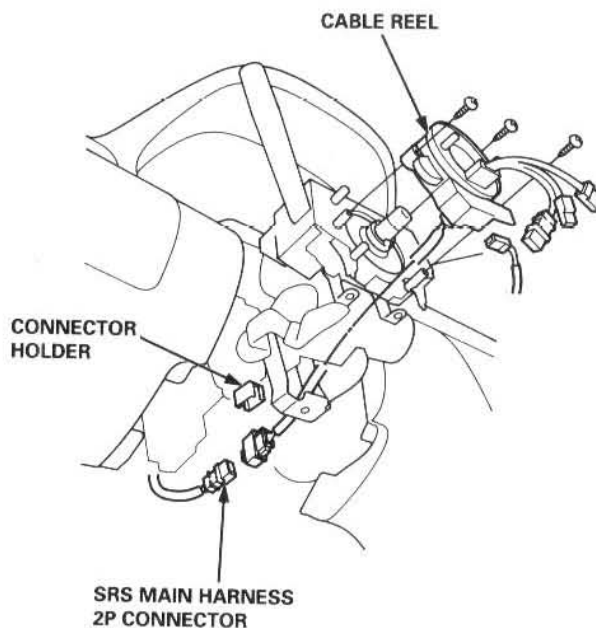
7. Remove the steering wheel with a steering wheel puller.



8. Remove the column covers.



9. Disconnect the 2P connector between the cable reel and SRS main harness.



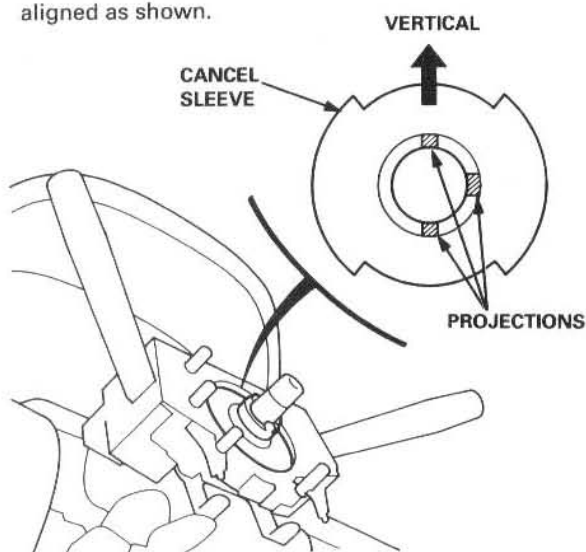
10. Remove the cable reel from the column.



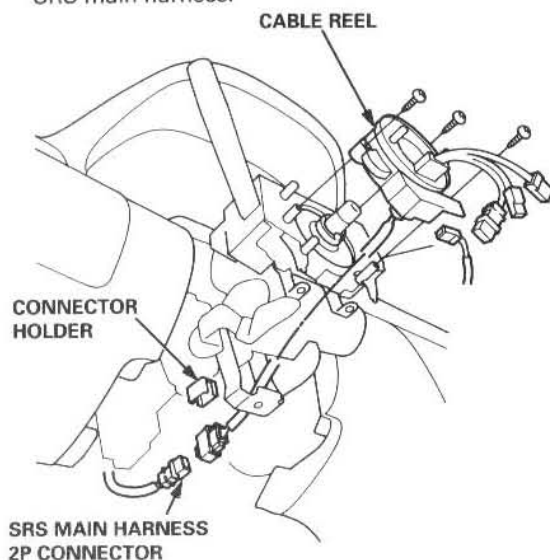
NOTE:

- Before installing the steering wheel, the front wheels should be aligned straight ahead.
- Be sure to install the harness wires so that they are not pinched or interfering with other parts.
- After reassembly, confirm that the wheels are still turned straight ahead and that the steering wheel spoke angle is correct (road test). If minor spoke angle adjustment is necessary, do so only by adjusting the tie-rods, not by removing and repositioning the steering wheel.

11. Set the cancel sleeve so that the projections are aligned as shown.

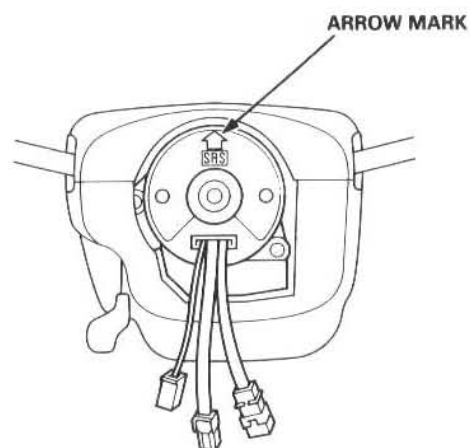


12. Carefully install the cable reel on the steering column shaft. Then connect the 2P connector to the SRS main harness.

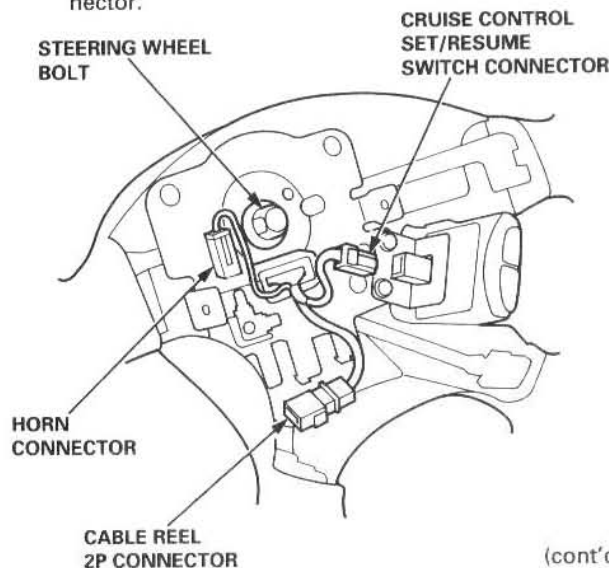


13. Install the steering column covers.

14. If necessary, center the cable reel. (New replacement cable reels come centered.) Do this by first rotating the cable reel clockwise until it stops. Then rotate it counterclockwise (approximately two and a half turns) until the arrow mark on the cable reel label points straight up.



15. Install the steering wheel, then connect the horn connector and cruise control set/resume switch connector.

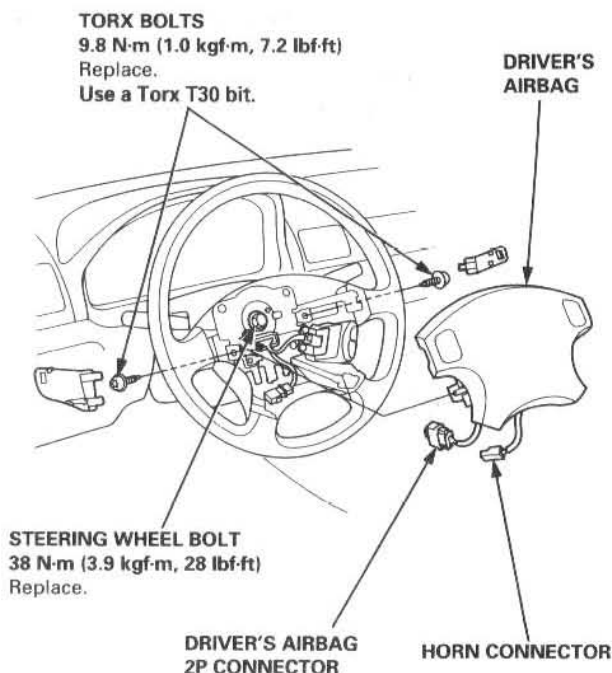


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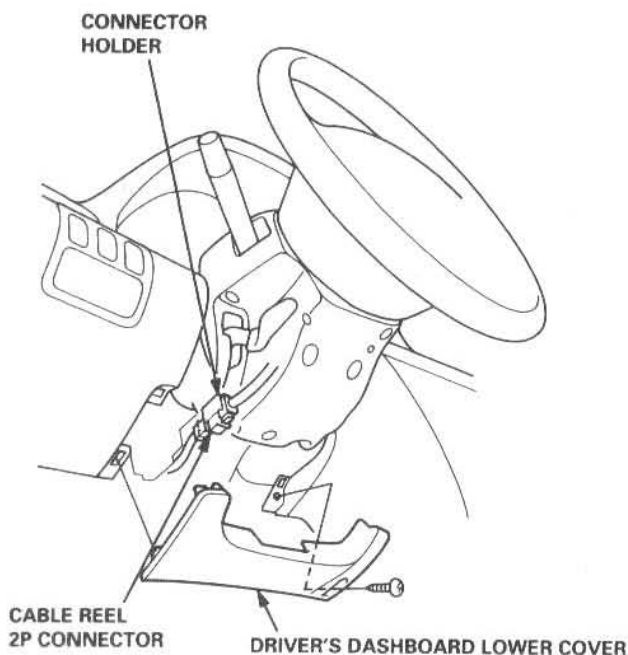
Cable Reel

Replacement (cont'd)

16. Tighten the steering wheel bolt to the specified torque, and connect the horn connector to the steering wheel. Then install the driver's airbag.



17. Attach the cable reel 2P connector to the connector holder. Then install the driver's dashboard lower cover.



18. Reconnect the driver's airbag 2P connector to the cable reel 2P connector, and reinstall the access panel on the steering wheel.

19. Reconnect the battery positive cable, then the negative cable.

20. After installing the cable reel, confirm proper system operation:

- Turn the ignition switch ON (II); the SRS indicator light should come on for about six seconds and then go off.
- Make sure both horn buttons work.
- Go for a test drive, and make sure the cruise control switches work.



Replacement

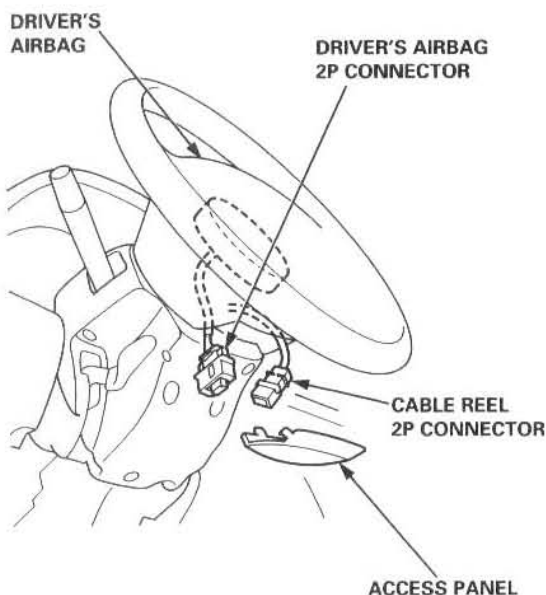
CAUTION:

- Before disconnecting any part of the SRS main harness, disconnect the airbag connectors.
- During installation or replacement, do not bump (impact wrench, hammer etc.) the area near the SRS unit.
- Do not damage the SRS unit terminals or connectors.
- Do not disassemble the SRS unit; it has no serviceable parts.
- Store the SRS unit in a clean, dry area.
- Do not use any SRS unit which has been subjected to water damage or shows signs of being dropped or improperly handled, such as dents, cracks or deformation.

1. Disconnect the battery negative cable, then disconnect the positive cable from the battery, and wait at least three minutes.
2. Disconnect the airbag connectors.

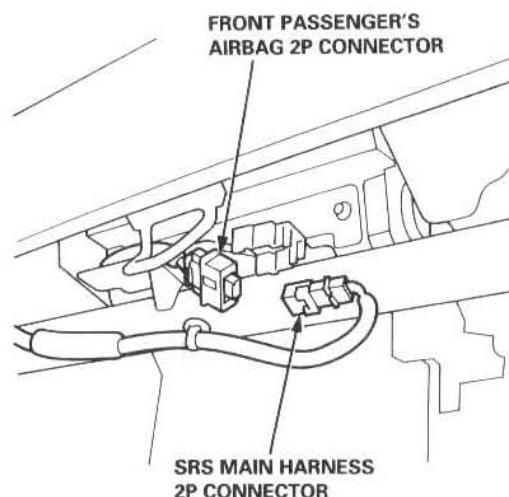
Driver's Side:

- Remove the access panel from the steering wheel, then disconnect the 2P connector between the driver's airbag and cable reel. When disconnected, the airbag connector is automatically shorted.

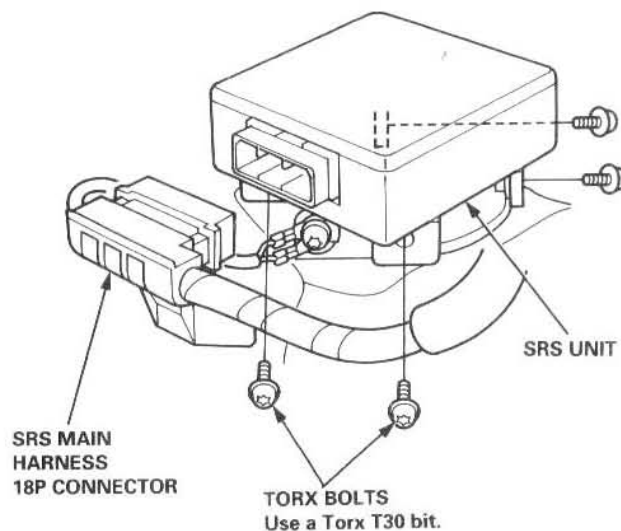


Front Passenger's Side:

- Remove the glove box (see section 20).
- Disconnect the 2P connector between the front passenger's airbag and SRS main harness. When disconnected, the airbag connector is automatically shorted.



3. Pull down the carpet at the slit above the SRS unit.
4. Disconnect the SRS main harness 18P connector from the SRS unit.



5. Remove the four Torx bolts from the SRS unit, then pull out the SRS unit from the bracket.

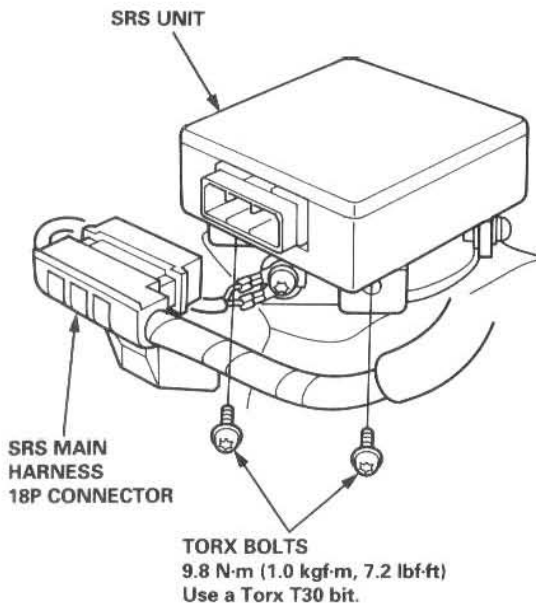
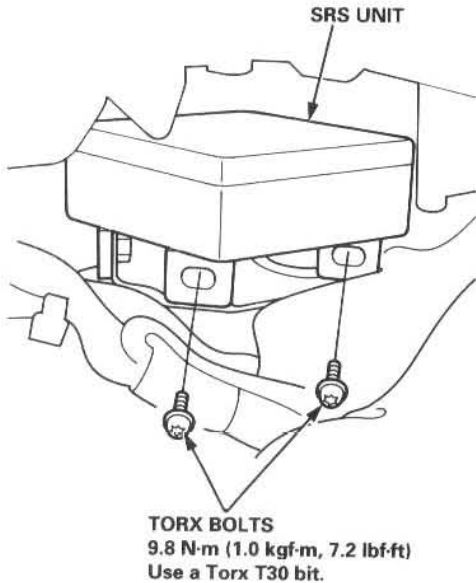
(cont'd)

SRS Unit

Replacement (cont'd)

6. Install the new SRS unit.

NOTE: Do not reuse a torx bolt that has red threads. Replace the bolt with a new one.



7. Connect the SRS main harness 18P connector to the SRS unit; push it into position until it clicks.
8. Put the carpet back in place.

9. Reconnect the driver's airbag 2P connector to the cable reel 2P connector, then reinstall the access panel on the steering wheel.
10. Reconnect the front passenger's airbag connector to the SRS main harness.
11. Reconnect the battery positive cable, then the negative cable.
12. After installing the SRS unit, confirm proper system operation: Turn the ignition switch ON (II); the SRS indicator light should come on for about six seconds and then go off.