TAPE READERS (CX)

ADJUSTMENTS

CONTENTS PAGE

1. GENERAL

1.01 This section provides adjustment information for CX tape readers (Figure 1). It is reissued to incorporate TCNs 1630 and 1739, and to include new information for readers CX806 and CX808 and the latest engineering changes. Marginal arrows indicate changes and additions.

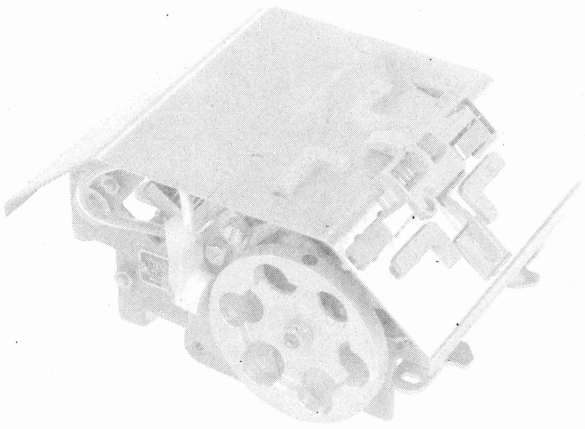


Figure 1 - CX Tape Reader (Typical)

Prepared for American Telephone and Telegraph Company by Teletype Corporation

1.02 The adjustments are arranged in a sequence which should be followed if a complete readjustment of the reader is undertaken. In some cases, the sequence that should be followed is indicated by the letters (A), (B), (C), etc. No single adjustment should be undertaken without first completely understanding the procedure and knowing the requirement. Therefore, read a procedure all the way through before as a first step. If one adjustment is changed, related adjustments should be checked.

CAUTION: REMOVE POWER BEFORE MAKING ANY ADJUSTMENTS.

1.03 In the adjustment procedures, the location of clearances and the position of parts are illustrated by line drawings. Requirements and procedures are presented in the several texts accompanying the drawings. Tools necessary to maintain the reader are illustrated in Section 570-005-800.

1.04 References made to left or right, front or rear, top or bottom, etc refer to the reader as viewed with the flywheel in the front (Figure 1).

1.05 Unless specifically stated otherwise, make screws or nuts friction tight to make an adjustment and tighten them securely once the adjustment is made.

Note: Disregard all adjustments or spring tensions that do not apply to the reader being adjusted.

1.06 The spring tensions specified are indications and not exact values. Therefore, to obtain reliable readings it is important that spring tensions be measured by spring scales placed in the positions shown in the drawings. Springs that do not meet the requirements should be replaced by new ones.

Note: Use only spring scales found in Maintenance Tools, Section 570-005-800.

1.07 When a procedure calls for using pry points or slots to make an adjustment, place a screwdriver between the points or in the slots and pry parts in the proper direction.

1.08 If metal dust is near any moving part, it may indicate insufficient clearance, and the proper adjustment should be made immediately.

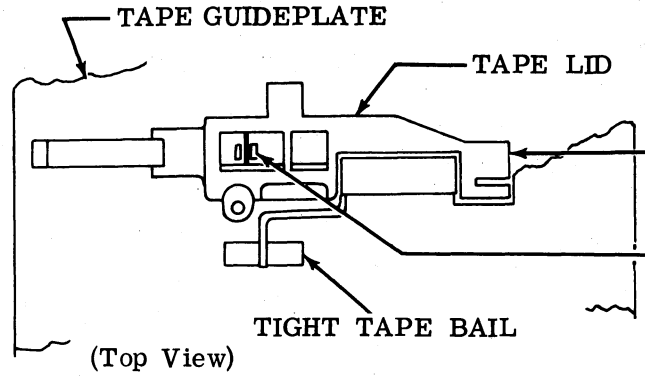
1.09 Before proceeding with the adjustments, put the start-stop lever (except CX806) into the RUN (left) position. Manually actuate the operating magnet and slowly rotate the main shaft counterclockwise, as viewed from the flywheel. This will put the various mechanical assemblies into operation. Check for freedom of movement (no binding) between parts.

CAUTION: IMPROPERLY ADJUSTED EQUIPMENT MAY BE DAMAGED IN A MATTER OF SECONDS IF OPERATED UNDER POWER.

2. BASIC UNIT

2.01 Control Mechanism

Note: Remove tape guideplate and coverplate. Lubricate tape lid and cover per Section 592-801-701.



(Top View)

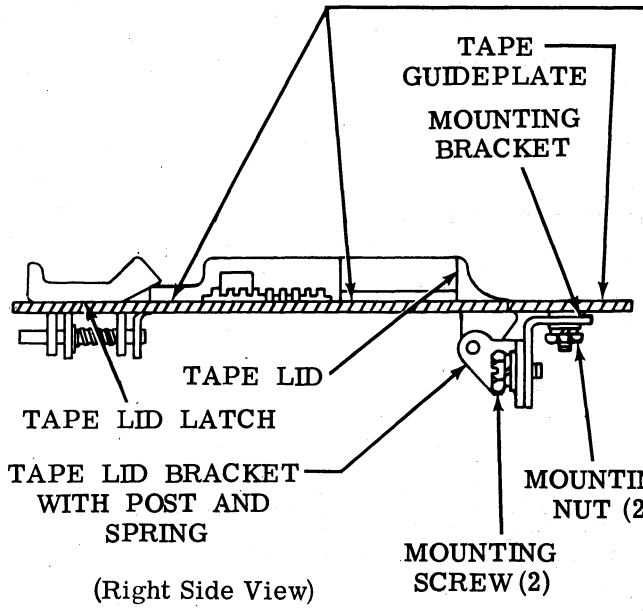
TAPE LID

(1) Requirement
Radius of tape guideplate should match contour of tape lid.

(2) Requirement
Feed wheel groove in tape lid should line up with slot in tape guideplate. Tape lid vanes should be centrally located between slots in tape guideplate.

(3) Requirement
Two flat bearing surfaces of tape lid should rest against tape guideplate. Remaining bearing surfaces should be within 0.005 inch from tape guideplate.

To Adjust
Loosen two mounting nuts and screws. With locating pin engaged in tape guideplate slot, position lid to meet requirements (1) and (2). Press tape lid against tape guideplate and tighten nuts and screws to meet requirement (3). Check requirements and, if necessary, refine adjustments.

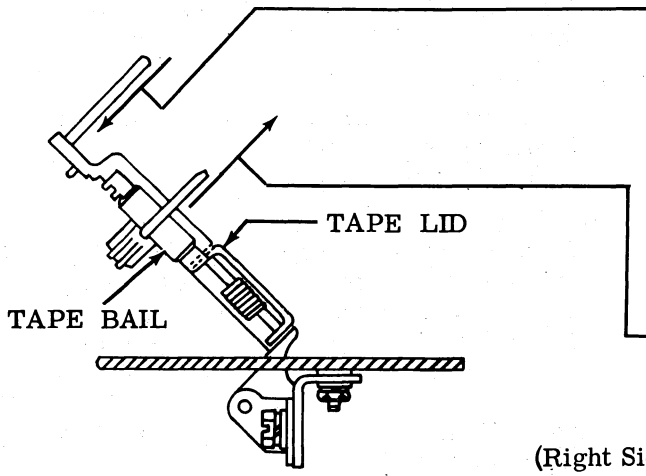


(Right Side View)

TAPE LID SPRING

To Check
With tape lid unlatched, apply the push end of appropriate scale to the latching surface.

Requirement
Min 1 oz---Max 5 oz to start tape lid moving.



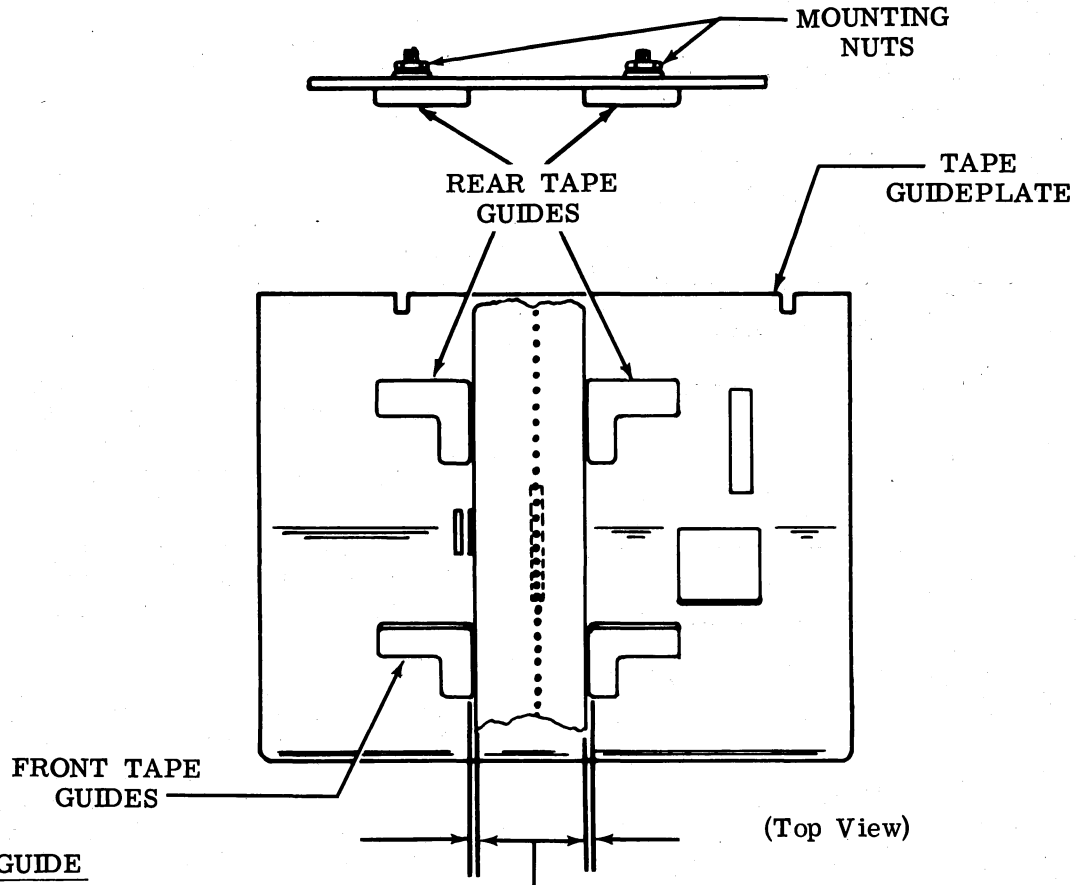
(Right Side View)

TAPE BAIL TENSION

To Check
With tape lid open, apply the pull end of appropriate scale to end of tape bail.

Requirement
Min 1/4 oz---Max 1 oz to start bail moving.

2.02 Control Mechanism (continued)



TAPE GUIDE

To Check
Place tape in reader and close tape lid. Draw tape through to left. Tape should run parallel to edge of tape guideplate without binding.

(1) Requirement
Min 0.005 inch---Max 0.010 inch clearance between tape edge and guides. 5-level readers use 5-level tape, 6-level readers use 6-level tape, etc.

(2) Requirement
Tape should not ride up sides of tape guides.

(3) Requirement
Tape guides should be in line with tape path as gauged by eye.

To Adjust
Loosen tape guide mounting nuts friction tight. Unlatch tape lid and place tape between tape guides with tape over feed wheel slot in tape guideplate. Push tape guide in horizontal direction to meet requirements. Tighten mounting nuts while holding tape guide firmly. Recheck and refine adjustment if necessary.

→ TAPE GUIDE WITH ADJUSTABLE SPRING
(Readers With Universal Tape Reading Mechanism)

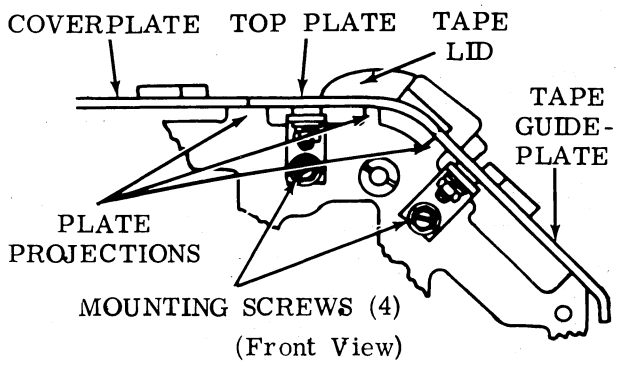
To Check
Push guide into various detented positions. Place tape in reader and draw tape to left and right sides.

Requirement
Tape guide should move into its detented positions and prevent tape from sliding under its guiding edge.

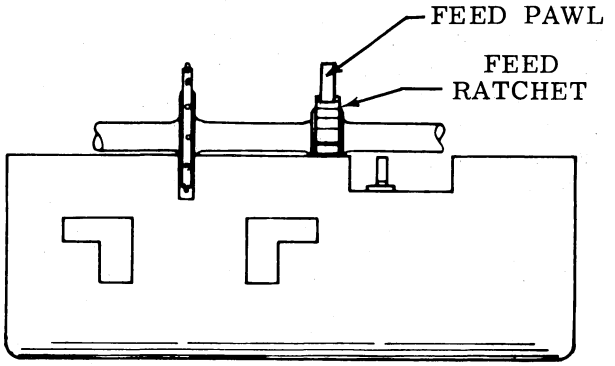
To Adjust
Increase or decrease tape guide spring tension as required to meet requirement. To decrease tension, push tape guide nut toward tape guideplate. Increase tension
→ by removing spring and reforming.

→ Note: Readers with post-type tape guides
→ are not adjustable.

2.03 Control Mechanism (continued)



(Front View)



(Top View)

TAPE GUIDEPLATE

(1) Requirement
Tape guideplate should rest against at least three plate projections. Bottom slots on left side of guideplate should rest against its projections.

(2) Requirement
Feed wheel should turn freely with control lever in FREE position. (Not required on CX806.)

(3) Requirement
With "letters" tape in reader, tape-out pin should be centered between code holes, or code holes and edge of tape.

To Adjust
Loosen tape guideplate mounting bracket nuts friction tight. Place sensing pins in their most retracted position. Position tape guideplate with tape lid unlatched and control lever in STOP position. Recheck all requirements.

Note 1: Removal and replacement of guideplate requires rechecking TAPE-OUT CONTACT ASSEMBLY BRACKET, and SENSING BAIL adjustments.

Note 2: Readers equipped with auxiliary contacts should remake the 2.14 TIMING (UNIVERSAL) CONTACT ACTUATOR adjustment before replacing the tape guideplate.

TOP PLATE (If Present On Reader)

(1) Requirement
Top plate should rest firmly on two right and at least one left plate projection. Upper surface of the top plate should be flush with, or below (Max 0.003 inch) surface of tape guideplate in area of sensing fingers.

(2) Requirement
Feed wheel slot in top plate should be in line with slot in tape guideplate. With control lever in FREE position, feed wheel should rotate freely.

To Adjust
Position top plate with its mounting bracket nuts and screws friction tight. Do not tighten.

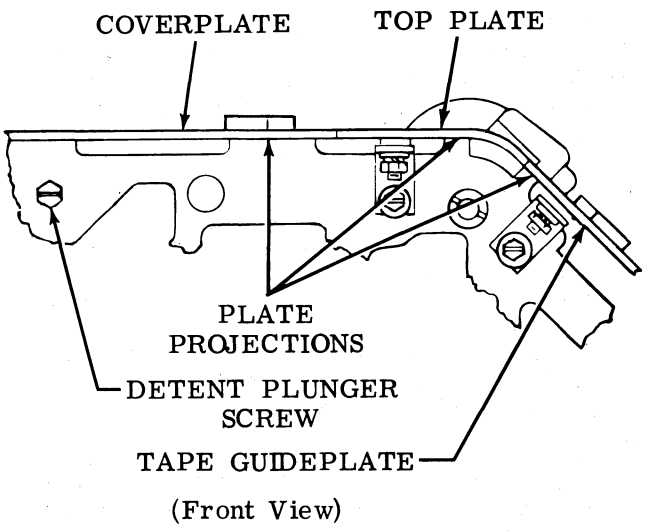
(3) Requirement
With "letters" tape in reader, tape-out pin should be centered between code holes, or code holes and edge of tape.

To Adjust
Position tape guideplate and top plate.

(4) Requirement
With tape lid latched
Min 0.008 inch---Max 0.025 inch clearance under tape lid extensions covering feed wheel slots and tape-out pin.
Min 0.008 inch---Max 0.015 inch clearance between tape lid and top plate measured in area of sensing finger slots when play in lid is taken toward tape guideplate.

To Adjust
Loosen screws holding tape lid mounting brackets together. Position tape lid to meet requirements. Recheck requirements (1) and (2).

2.04 Control Mechanism (continued)



(Front View)

COVERPLATE

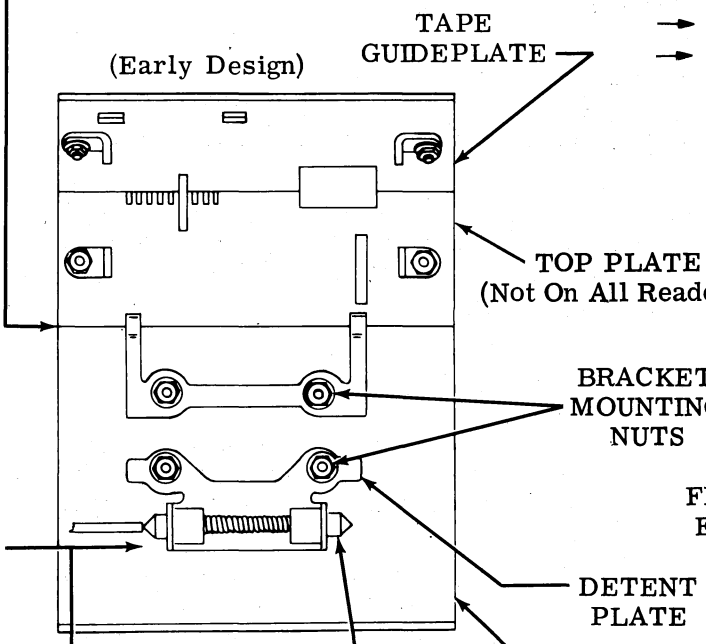
(1) Requirement
Coverplate and top plate should be held flush along their common edge by detent action.

(2) Requirement
Coverplate should rest firmly on at least three front and rear plate projections.

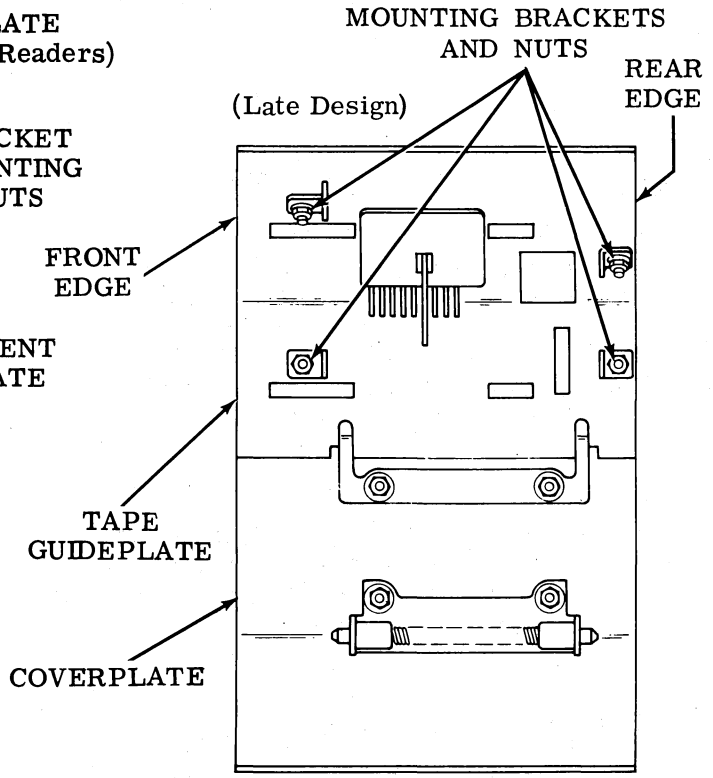
(3) Requirement
Front edge of coverplate and top plate should be in line.

To Adjust
Move screws which fix position of detent plunger to extreme lower right position. Tighten screws. Loosen four bracket mounting nuts on coverplate, and position plate. If necessary, refine location of detent plunger screws to meet requirement (1).

Note: Removal and replacement of cover plate will not affect adjustments.



(Bottom View)



(Bottom View)

COVERPLATE PLUNGER SPRING

Requirement
Min 8 oz---Max 20 oz
to start one of the plungers moving.

2.05 Control Mechanism (continued)

TAPE-OUT CONTACT ASSEMBLY

To Check
Remove contact assembly from its mounting bracket.

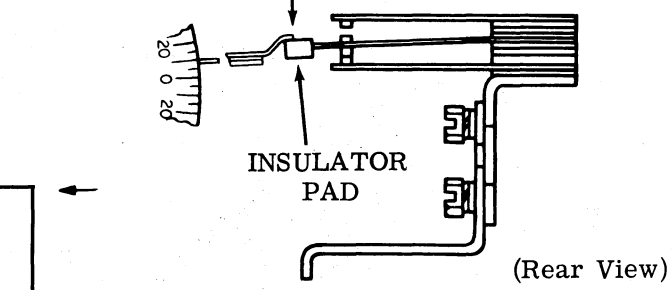
(1) Requirement (CX808 only)
Min 8 grams---Max 15 grams to open normally closed contacts.

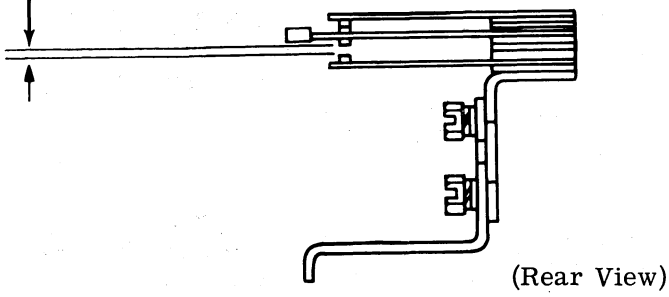
To Adjust
Bend contact swinger.

(2) Requirement
Min 0.005 inch---Max 0.010 inch

To Adjust
Bend normally open contact spring.

Note: Replace contact assembly. Make sure contact swinger is under tape-out pin extension.

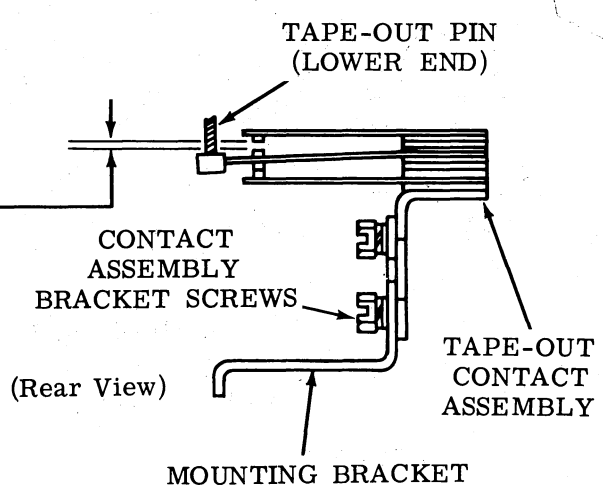




TAPE-OUT CONTACT ASSEMBLY BRACKET

Requirement
With tape in reader, tape lid latched.
There should be
Min 0.010 inch---Max 0.015 inch
CX808
Min 0.008 inch
clearance between top contacts. Some movement in lower contact spring when tape lid is unlatched.

To Adjust
Loosen screws which hold contact assembly bracket and mounting bracket together.
Position bracket by means of pry points.
If necessary, refine TAPE-OUT CONTACT ASSEMBLY (2.05).

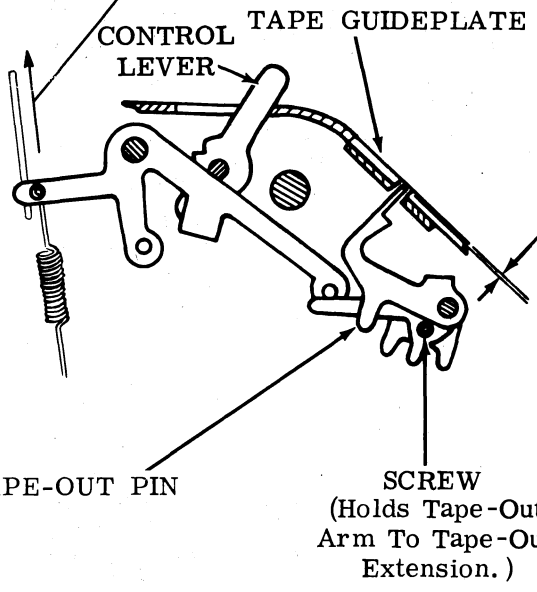


2.06 Control and Sensing Mechanisms

CONTROL LEVER SPRING

→ **To Check (Not required on CX806)**
Place control lever in RUN position and hold tight tape arm away from control lever.

Requirement
Min 1 oz---Max 5 oz
to start lever moving.



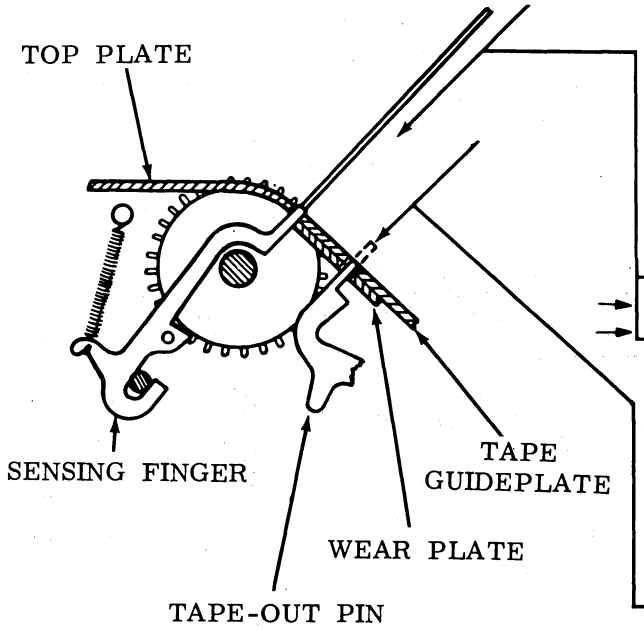
(Front View)

TAPE-OUT PIN

(1) Requirement (Not required on CX806)
With reader in FREE position, it should require
Min some---Max 0.010 inch
clearance between the top of the tape-out pin and the surface of the tape guide-plate.

(2) Requirement
→ With reader in RUN position, tape-out pin should be stopped by tape guideplate.

To Adjust
→ **Place control lever in FREE position.**
Loosen screw which secures tape-out arm to tape out extension. Position tape-out pin by means of pry points. Tighten screw and recheck.



(Front View)

SENSING FINGER SPRINGS

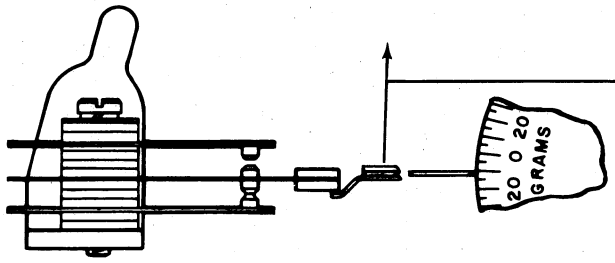
Requirement (each spring)
With sensing fingers in uppermost position, code reading contact springs held away it should require
Min 2-1/2 oz---Max 6 oz
(CX808 only)
→ Min 1/2 oz---Max 2 oz
to move sensing finger flush with tape guideplate.

TAPE-OUT PIN SPRING

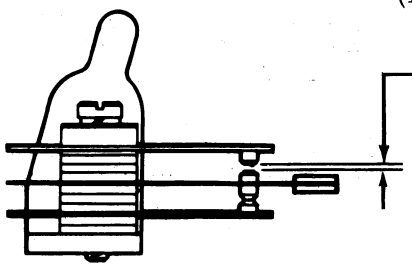
Requirement
With tape-out contact swinger held away, it should require
Min 5 grams---Max 15 grams
to move tape-out pin flush with tape guide-plate.

2.07 Control Mechanism (continued)

START-STOP CONTACT ASSEMBLY



(Front Views)



To Check
Remove contact assembly and its mounting bracket from reader.

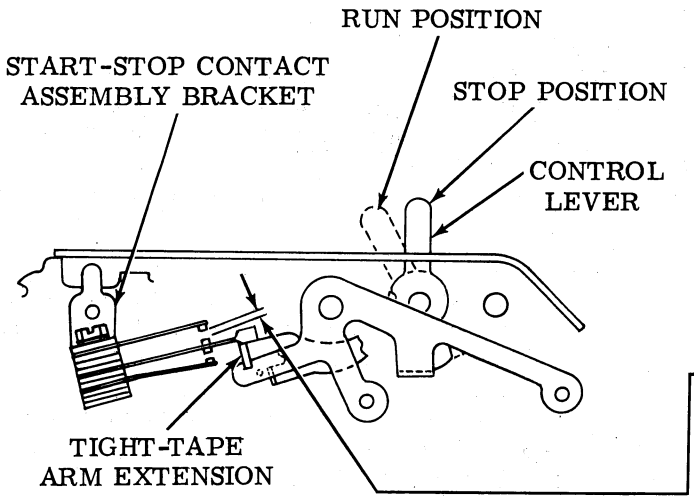
(1) Requirement
Min 8 grams---Max 15 grams to open normally closed contacts.

To Adjust
Bend contact swinger.

(2) Requirement
All readers except CX805 and CX808: ←
Min 0.008 inch---Max 0.015 inch clearance between normally open contacts.
CX805, and CX808: ←
Min 0.025 inch---Max 0.030 inch clearance between normally open contacts.

To Adjust
Bend upper contact leaf.

Note: Replace contact assembly. Make sure contact swinger is over tight-tape arm extension.

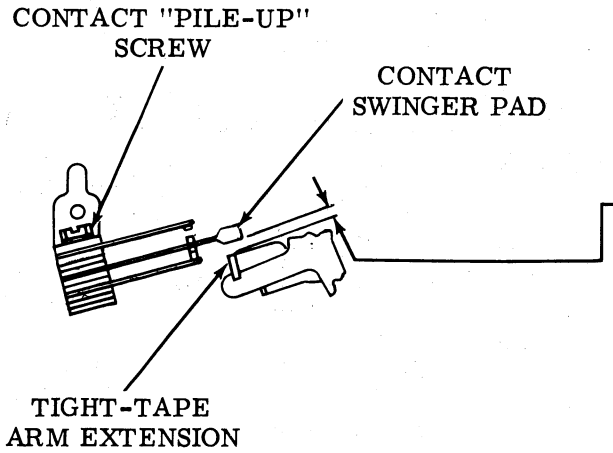


START-STOP CONTACT ASSEMBLY BRACKET

To Check (Not required on CX806) ←
With control lever in STOP position.

(1) Requirement
(CX805 and CX808) ←
Min 0.012 inch---Max 0.018 inch clearance between upper contact and swinger.

To Adjust
Loosen contact mounting bracket screws and position bracket until requirement has been met. Tighten screws.

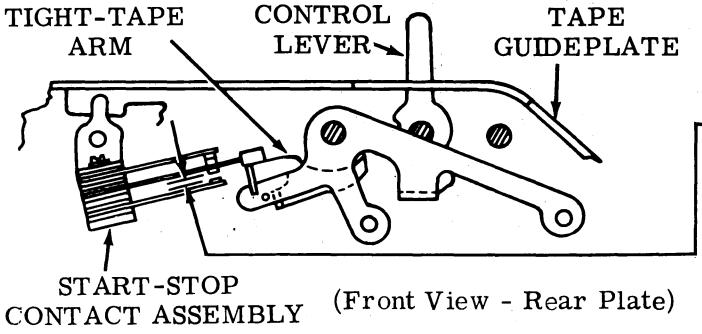


To Check
With control lever in RUN position.

(2) Requirement
There should be no less than 0.003 inch clearance between insulated pad on contact swinger and tight-tape lever extension.

To Adjust
Loosen contact "pile-up" screws and position assembly until requirement is met. Tighten screws.

2.08 Control Mechanism (continued)



(Front View - Rear Plate)

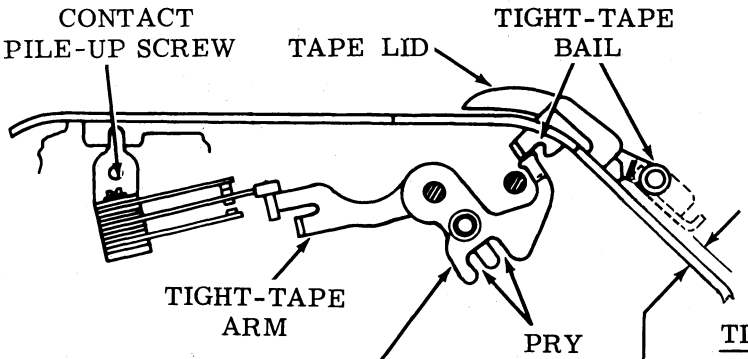
START-STOP CONTACT ASSEMBLY BRACKET (Continued)

(1) Requirement (Not required on CX806)
With control lever in STOP position:
Min 0.010 inch---Max 0.015 inch
gap between normally closed contacts.

To Adjust
Position contact assembly bracket with its mounting screws loosened.

(2) Requirement
Tight-tape arm extension should fully engage insulator pad on swinger tip. Swinger should be approximately parallel to rear plate.

To Adjust
Loosen screws securing contact pile-up to assembly bracket. Position assembly.

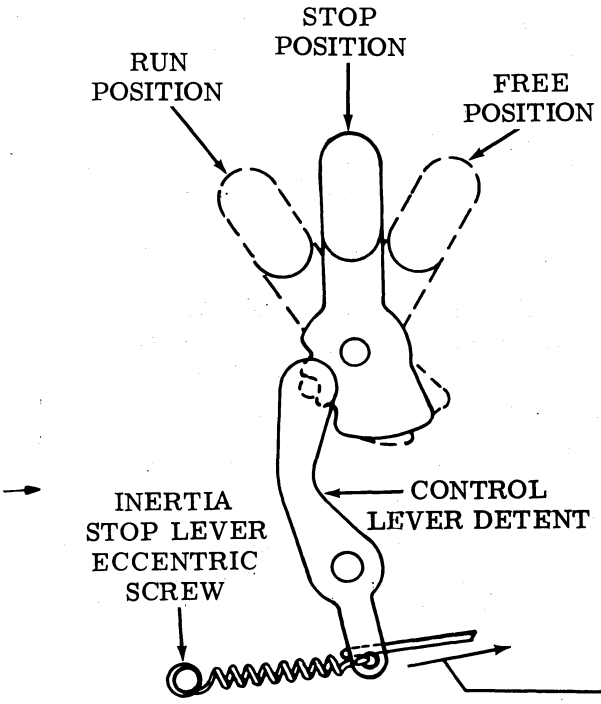


(Front View)

TIGHT-TAPE ARM

Requirement (Not on CX806)
With control lever in RUN position:
Bottom set of contacts should open when tight-tape bail is raised:
Min 0.045 inch---Max 0.075 inch
from tape guideplate.

To Adjust
Loosen screw which secures arm with hub to tight-tape lever. By means of pry points, position tight-tape arm to satisfy the following:
With a 0.040 inch gauge between tight-tape bail and tape guideplate, contacts should remain closed.
With a 0.060 inch gauge between tight-tape bail and tape guideplate, contacts should open. Check contacts visually. Tighten screw and recheck.



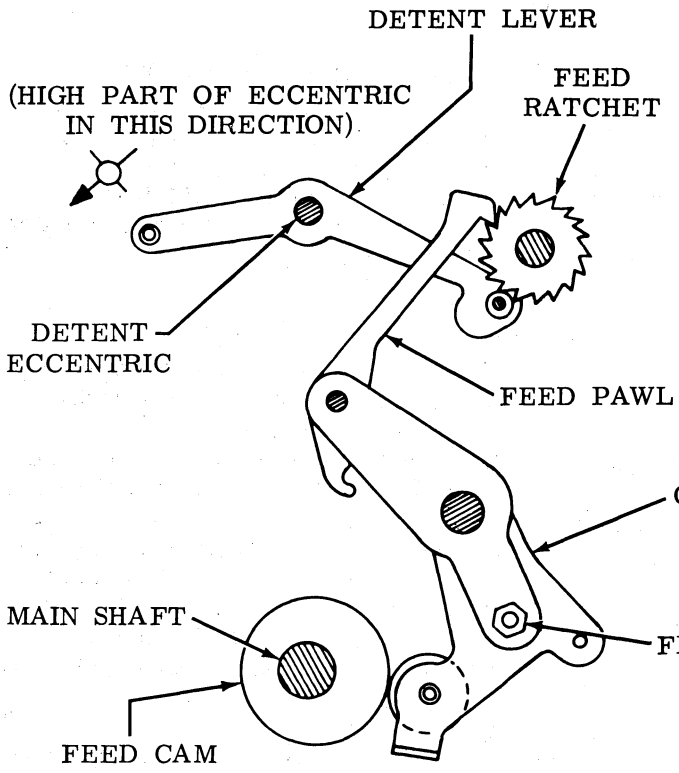
(Front View)

CONTROL LEVER DETENT SPRING

(1) Requirement (Not on CX806)
With control lever in STOP position, it should require
Min 13 oz---Max 22 oz
to start detent moving.

(2) Requirement
On CX806 with control spacer:
Min 10 oz
to start detent moving.

2.09 Tape Feed Mechanism



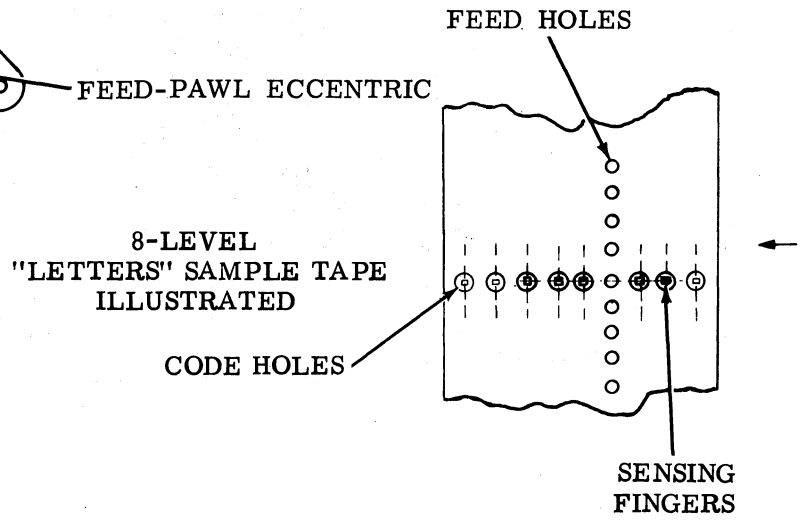
FEED WHEEL DETENT

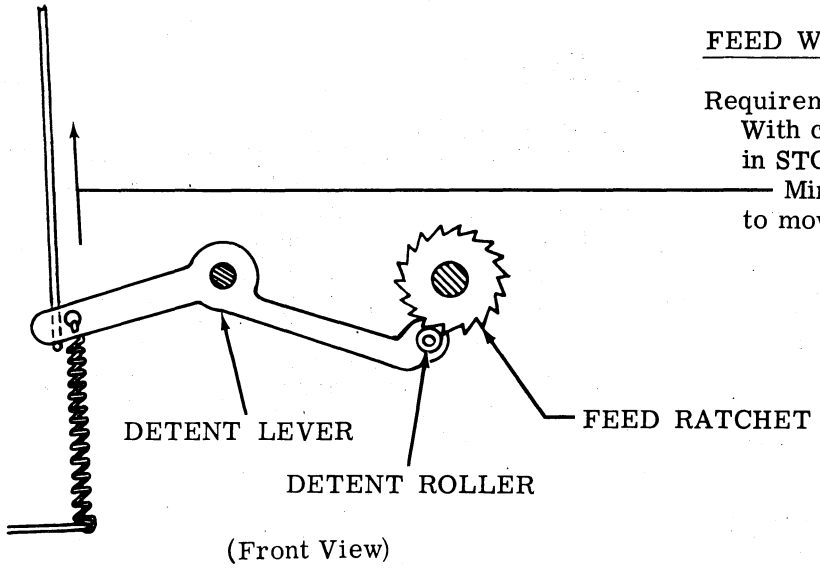
Requirement

With play in tape taken lightly toward right, feed wheel should center sensing fingers in code holes of new, conforming perforated tape.

To Adjust

With tape lid unlatched, feed pawl held away from ratchet, sensing fingers in lowermost position, eccentric screw friction tight, adjust eccentric.





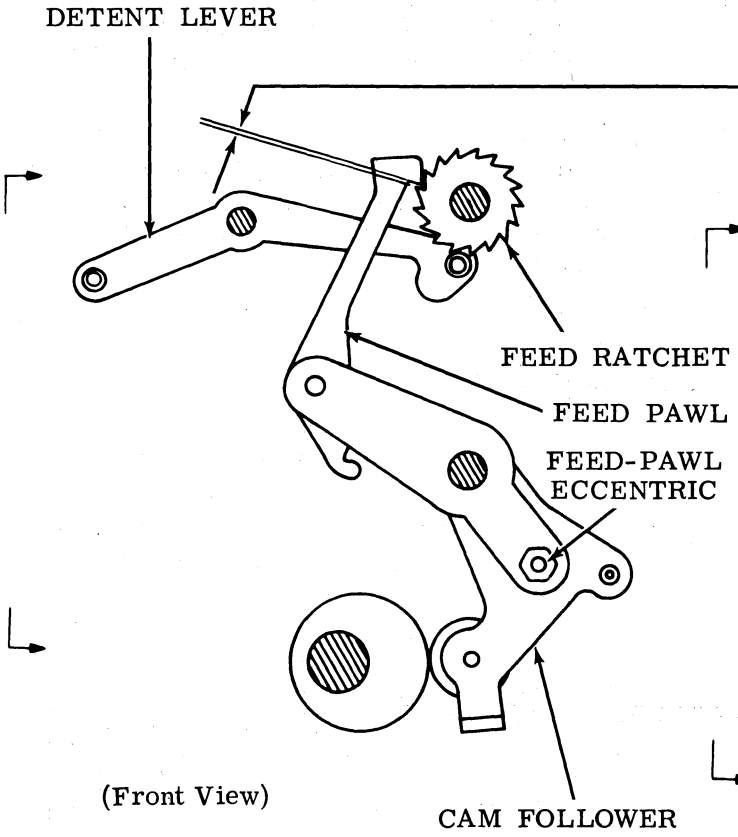
FEED WHEEL DETENT SPRING

Requirement

With coverplate removed and control lever in STOP position, it should require Min 21 oz---Max 30 oz to move roller away from ratchet.

2.10 Tape Feed Mechanism (continued)

→ Note: Remove tape guideplate before making
→ adjustment.



FEED PAWL

→ (1) Requirement (except for CX808)
With the high part of feed-pawl eccentric to the left, sensing fingers in lowermost position.
— Min some---Max 0.003 inch clearance between feed pawl and ratchet tooth just engaged.

→ (2) Requirement (CX808 only)
With the feed cam follower on the high part of its cam and the feed wheel detent spring unhooked, take up all rotational feed wheel play in a clockwise direction. Push down left end of detent lever until detent engages feed ratchet. There should be no perceptible clockwise rotation of the feed wheel. In the counterclockwise direction a barely perceptible amount of rotation is permissible as gaged by eye.

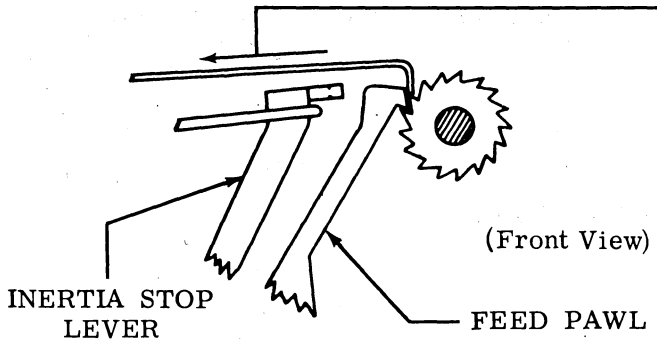
To Adjust
Loosen eccentric feed pawl screw nut and rotate screw to meet requirement. Check requirement four places on the feed wheel approximately 90 degrees apart. Tighten screw nut.

Note: Recheck SENSING BAIL (2.12).

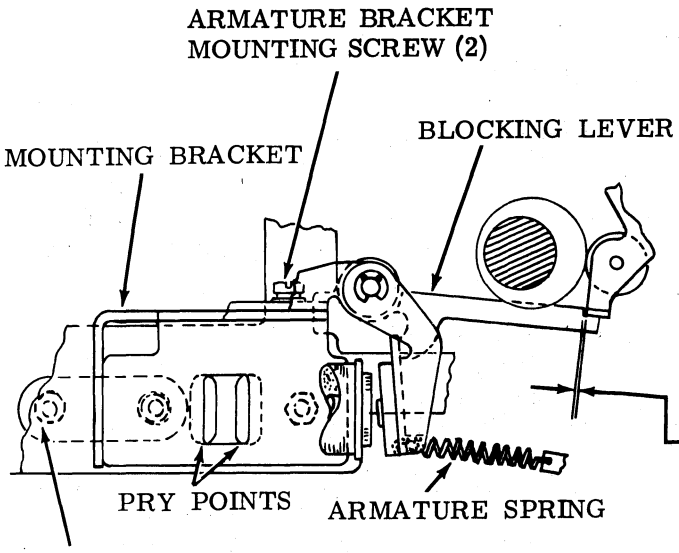
FEED-PAWL SPRING

Requirement
With a feed pawl in uppermost position and inertia stop lever held away it should require
— Min 1 oz---Max 5 oz
CX808 only
— Min 2 oz---Max 5 oz
to start feed pawl moving away from feed ratchet.

→ Note: CX808 has no inertia stop lever.



2.11 Control Mechanism (continued)



(Front View)

MAGNET ASSEMBLY

(1) Requirement
With magnet energized, armature should contact and be flush with core faces.

To Adjust
Remove magnet assembly from reader. With armature bracket mounting screws loosened, position armature and tighten screws. Replace assembly.

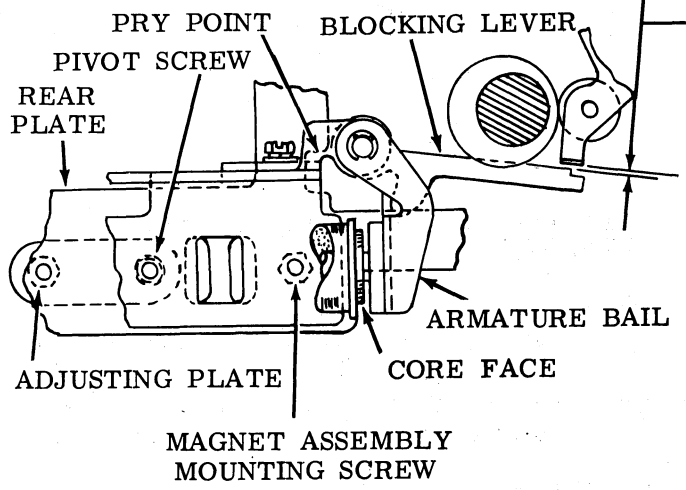
(2) Requirement
With magnet de-energized and followers on high point of cams there should be Min 0.003 inch---Max 0.006 inch clearance between blocking surface of blocking lever and feed cam follower.

To Adjust
With assembly mounting screws and locking screw friction tight, position assembly by means of pry points. Tighten locking screw.

(3) Requirement
With magnet energized, followers on low point of cams:
(All readers except CX808)
Min 0.005 inch---Max 0.010 inch

(CX808 only)
Min 0.002 inch---Max 0.008 inch clearance between top surface of blocking lever and bottom surface of feed cam follower measured at closest point.

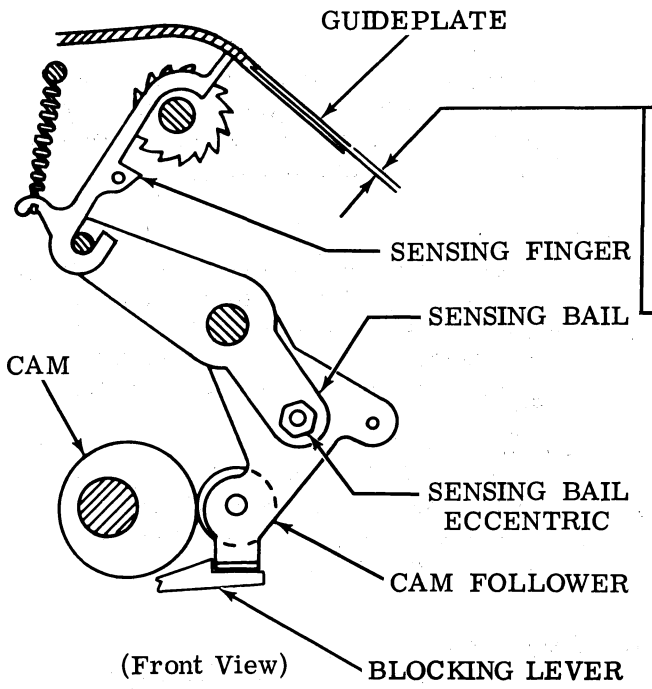
To Adjust
With magnet assembly mounting screw and pivot screw friction tight, position magnet assembly (using pry point) to meet requirement. Tighten screws.



(Front View)

2.12 Sensing and Tape Feed Mechanisms

Note: Make this adjustment with guideplate in position. See 2.14, Note 2 before replacing guideplate.

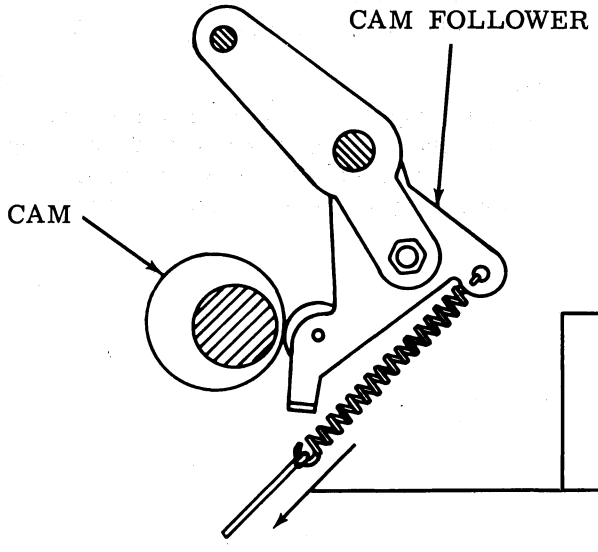


SENSING BAIL

(1) Requirement
With sensing fingers in lowermost position:
Min 0.008 inch---Max 0.012 inch
between highest sensing pin and surface of tape guideplate.

(2) Requirement (CX808)
With sensing fingers in their lowest position.
Min 0.008 inch under flush---Max flush
between highest sensing pin and surface of the tape guideplate when cam followers are on their blocking levers.

To Adjust
With nut on sensing bail eccentric friction tight, adjust eccentric. Tighten nut and recheck.



FEED AND SENSING CAM FOLLOWER SPRINGS

(1) Requirement (Each Spring)
With cam followers on low point of cams it should require
Min 10 oz---Max 12 oz
to pull spring to installed length.

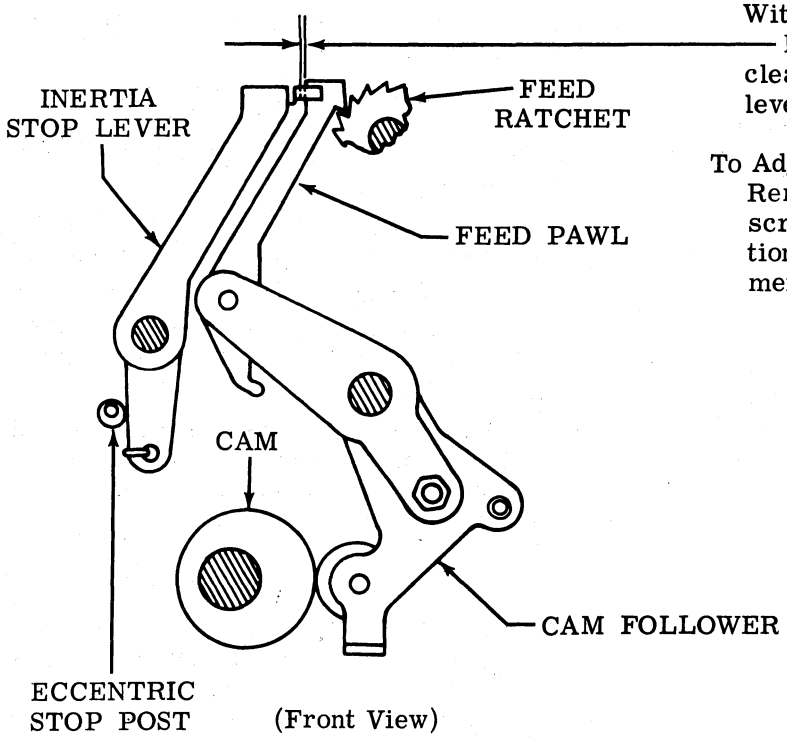
(2) Requirement (CX808)
With cam followers on the low part of their cams it should require
Min 3 oz---Max 5 oz
to extend the sensing cam follower spring to its installed length.

2.13 Tape Feed Mechanism (continued)

INERTIA STOP LEVER

Requirement (Not on CX808)
With feed pawl in lowermost position:
Min some---Max 0.012 inch
clearance between notch in inertia stop lever and feed pawl.

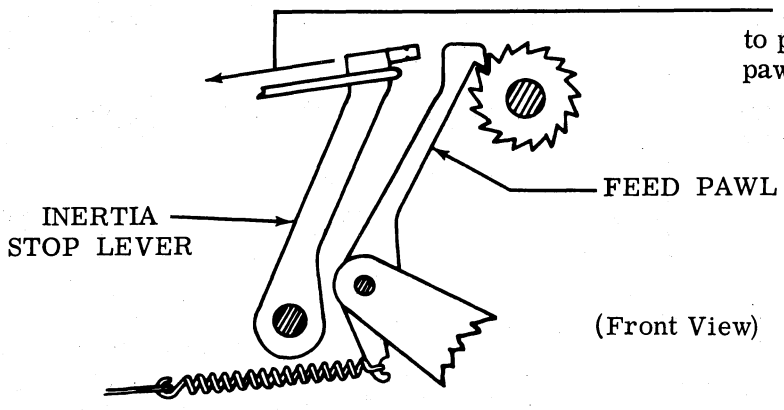
To Adjust
Remove top plate by loosening its mounting screws. With eccentric stop post nut friction tight, rotate stop post to meet requirement.



(Front View)

INERTIA STOP LEVER SPRING

Requirement (Not on CX808)
With control lever in STOP position it should require
Min 1 oz---Max 5 oz
to pull inertia stop lever away from feed pawl.



(Front View)

2.14 Sensing Mechanism

TIMING (UNIVERSAL) CONTACT ACTUATOR

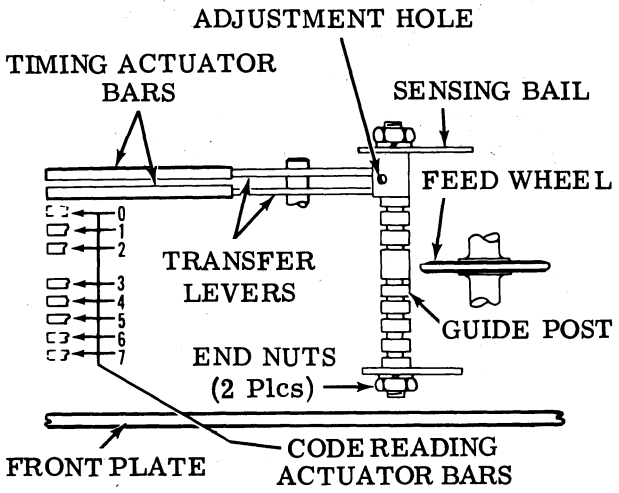
Note 1: Remove tape guideplate to make this adjustment.

Requirement (Not on CX808)
With straight edge along left ends of actuator bars, timing actuator bars should be in line with code reading actuator bars with all play taken up to the right as gaged by eye. When main shaft is rotated, timing actuator bars should start to move with code reading actuator bars.

To Adjust
Loosen the end nuts (2) friction tight, securing the slotted shaft to the sensing bail. Rotate the shaft with a tommy wrench in the adjustment hole to meet requirement. Tighten nuts.

Note 2: To avoid damage to the sensing fingers when replacing the tape guideplate and cover plate, follow the next procedure:

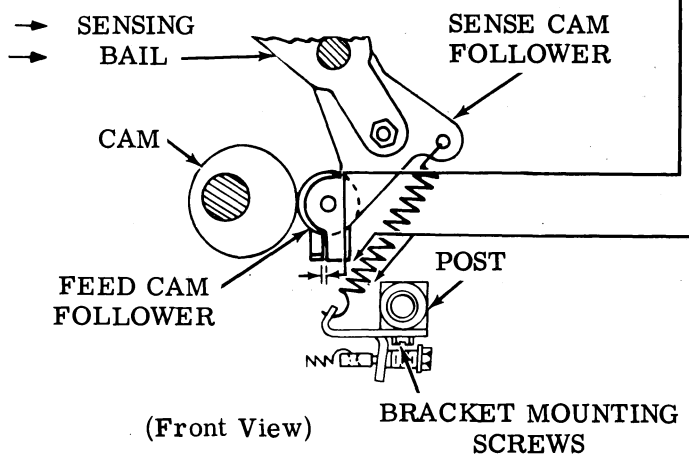
- Rotate cam shaft until sensing fingers are in their retracted position.
- Position tape guideplate on to front and rear mounting screws (loosened). Sensing fingers are retracted below upper surface of tape guideplate.
- Tighten screws friction tight while holding plate down flush against front and rear plate stops. Tighten screws.
- If further adjusting is necessary, loosen plate nuts friction tight, adjust plate and tighten nuts.
- With cover plate bracket screws loosened friction tight, snap plate in place and position until mating surfaces are flush. Tighten screws.



SENSE CAM FOLLOWER

Requirement
With feed cam follower on high part of cam there should be some clearance between tabs on feed cam follower and sense cam follower.

To Adjust
If clearance is not there, this indicates defective parts.



(Front View)

CAM FOLLOWER SPRING CLEARANCE

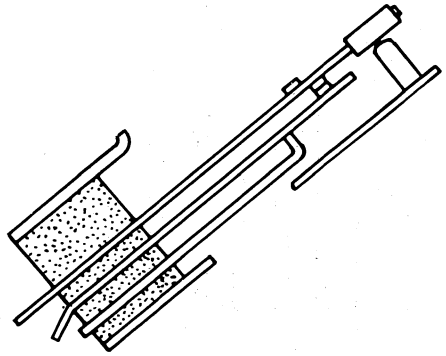
Requirement (Not on CX808)
Clearance of cam follower springs between cam followers and post should be approximately equal.

To Adjust
With feed cam follower on high part of cam and mounting bracket screws friction tight, position bracket to meet requirement. Tighten mounting bracket screws.

Note: Rotate camshaft one revolution to insure that cam followers or post do not interfere with springs.

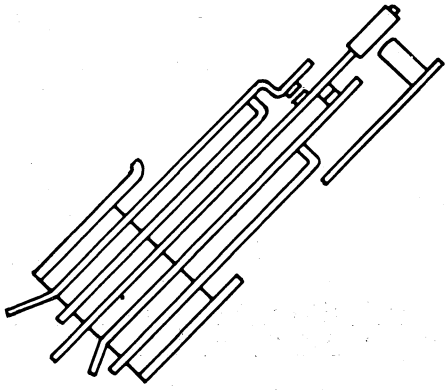
2.15 Control Mechanism (continued)

Note: The illustrations of code contacts on this page apply to the procedures in 2.17 and 2.18. Adjustments (D), (E) and (F (1) through (6)) apply to transfer type contact assemblies only; all other adjustments apply to both transfer type and make-only type contact assemblies. Adjustments (A) through (E) are preliminary. Preliminary adjustments should be made with the contact assembly removed from the reader. For each adjustment, start with the contact pile-up farthest from the bending tool handle to avoid disturbing completed adjustments.



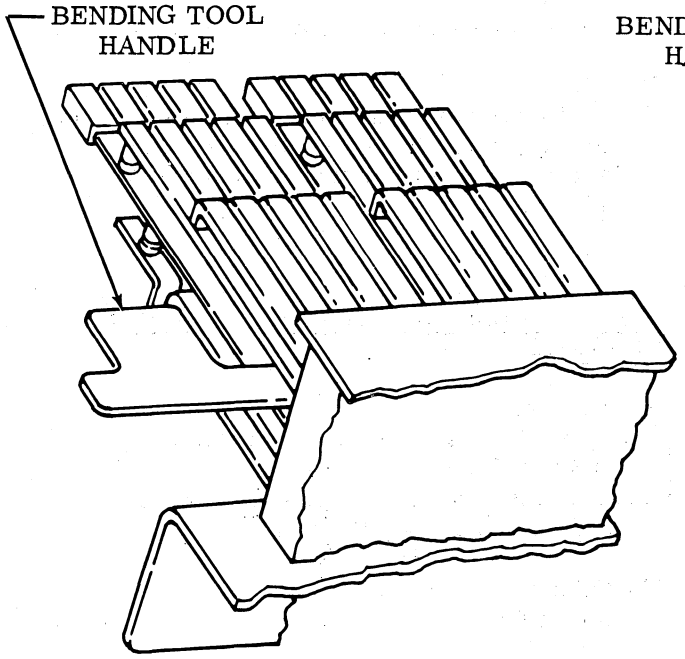
MAKE-ONLY TYPE CONTACT ASSEMBLY

(Front View)

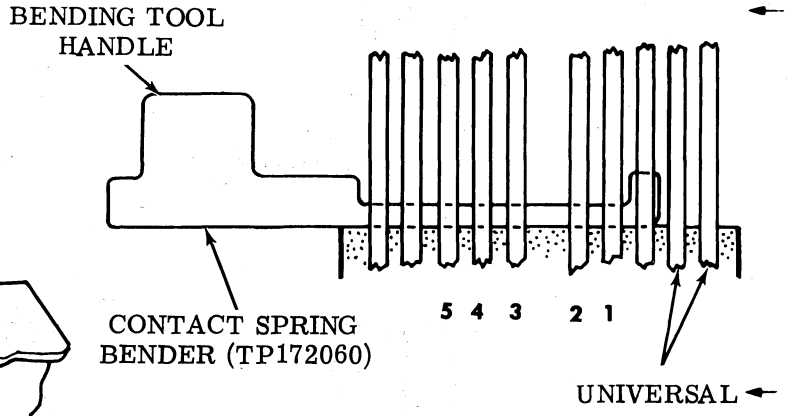


TRANSFER TYPE CONTACT ASSEMBLY

(Front View)



(Bottom View - From Left Side)

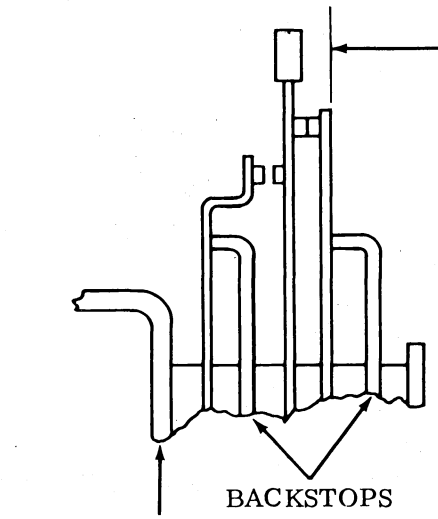


(Top View - From Left Side)

2.16 Control Mechanism (continued)

Note: Refer to note in 2.15 before proceeding.

(A) BACKSTOP - NORMALLY CLOSED CONTACT

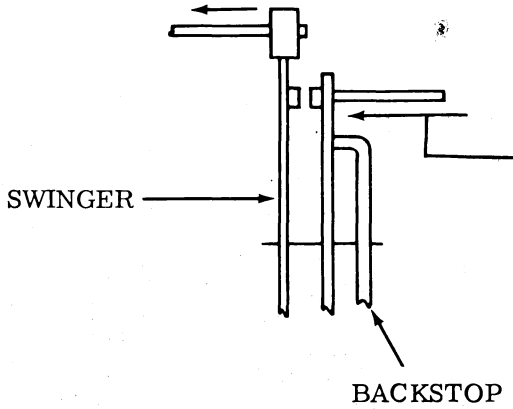


(Front View)

Requirement
Normally closed contact leaves should be parallel to mounting plate and in line with each other.

To Adjust
Bend backstop. Gauge by eye.

(B) SPRING TENSION - NORMALLY CLOSED CONTACT AGAINST BACKSTOP

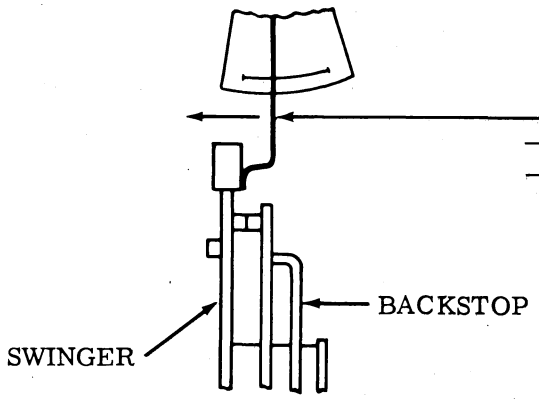


(Front Views)

Requirement
Min 4 oz---Max 7 oz
CX808 only.
Min 3 oz
to move stationary leaf away from backstop.

To Adjust
Bend stationary leaf and, if necessary, bend backstop away from leaf and form leaf to increase tension. Reposition backstop to meet (A) above.

(C) SPRING TENSION - NORMALLY CLOSED CONTACT



Requirement
Min 30 grams---Max 50 grams
CX808 only.
Min 25 grams---Max 45 grams
to open contact.

To Adjust
Bend swinger.

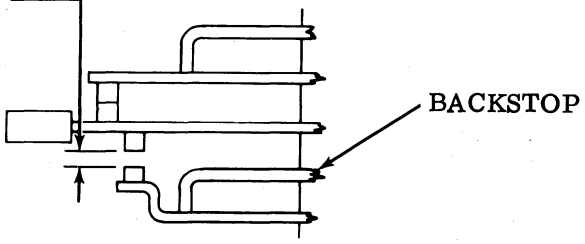
2.17 Control Mechanism (continued)

Note: Refer to note in 2.15 before proceeding.

(D) NORMALLY OPEN CONTACT

Requirement
Min 0.010 inch---Max 0.015 inch gap between contacts.

To Adjust
Bend backstop.

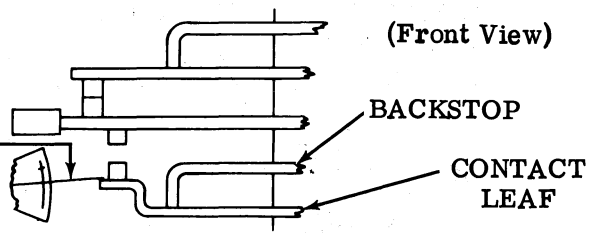


(Front View)

(E) SPRING TENSION — NORMALLY OPEN CONTACT

Requirement
Min 30 grams---Max 40 grams to move contact from backstop.

To Adjust
Bend contact leaf. If necessary, bend backstop away from leaf to increase tension, then reposition backstop to meet requirement (D).



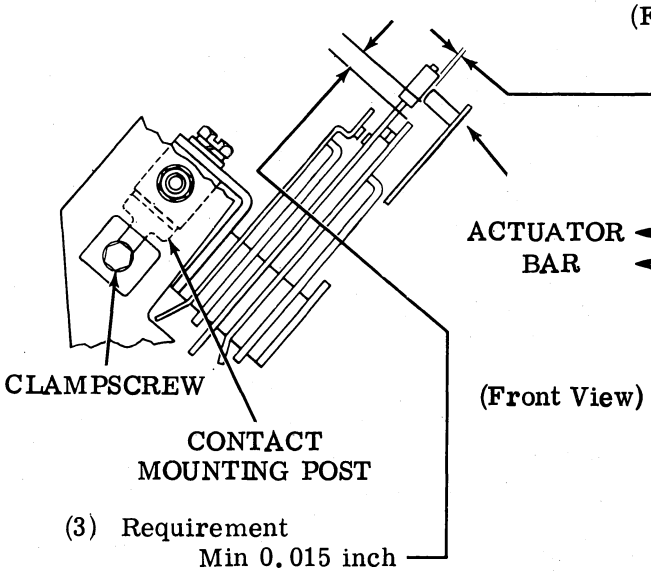
(Front View)

Note: Make the following adjustments with contact assembly installed in reader.

(F) CONTACT INSTALLATION

(1) Requirement
With magnet energized, no tape in reader, and sensing fingers in uppermost position, there should be some clearance between swinger insulators and actuator bars as gauged by eye.

(2) Requirement (CX808 only)
With sensing fingers in their highest position (sensing cam follower on lowest point of its cam) no tape in reader and all play in actuator bars taken up to the right, there should be
Min 0.010 inch
clearance between the closest swinger insulator and its actuator bar.



(Front View)

(3) Requirement
Min 0.015 inch
clearance between closest pair of actuator bars and tip of normally closed contacts.

To Adjust
With clamp screw and contact mounting post nuts friction tight, rotate post until requirement (1) is met. Do not tighten nuts. With actuator bar mounting post nuts friction tight, rotate post until requirement (2) is met. Tighten these nuts. Refine requirement (1), and tighten clamp screw and then the contact mounting post nuts.

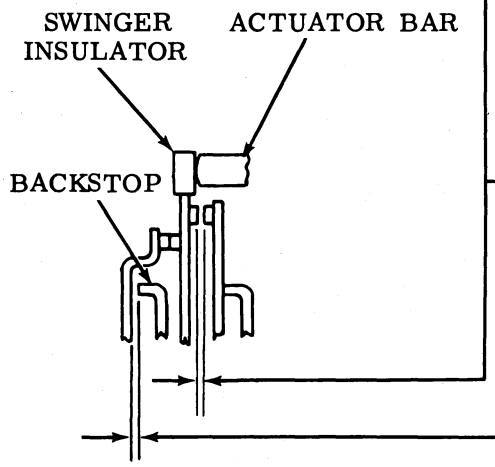
Note: To meet this requirement, it may be necessary to bend normally closed contact backstops. If this is done, check affected tensions in 2.16 and 2.17.

2.18 Control Mechanism (continued)

(F) CONTACT INSTALLATION (continued)

(4) Requirement (Transfer Type Contacts)
There should be
Min 0.005 inch
clearance between normally open contact and swinger.

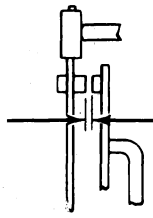
To Adjust
Maintain these requirements:
(a) SENSING BAIL (2.12)
(b) Requirement (1)
(c) Requirement (5)



(Front Views)

(5) Requirement (CX808 only)
With sensing cam follower on low part of cam, blank tape in reader, and tape lid closed, there should be
Min 0.005 inch
clearance between contact points with least clearance. Remove dust cover if present.

To Adjust
Loosen contact mounting post nuts and clamp screw on CX808. Rotate the contact mounting post to meet requirement. Tighten nuts and screws.



(6) Requirement (Transfer Type Contacts)
With blank tape in reader, sensing cam follower on low point of cam
Min some---Max 0.005 inch
clearance between normally open contacts and backstop.

To Adjust
Bend normally open contact backstops.
Check affected tensions in 2.16 and 2.17.

(7) Requirement
Make-only type contacts
Min 0.005 inch
gap between normally closed contacts.

To Adjust
Refine requirement (1).

2.19 Code Contact Output (Transfer and Make-Only Contact Assemblies)

CODE CONTACT OUTPUT

To Check

Connect 28 v dc (not on gold contacts — see Section 592-801-100 before applying voltage to gold contacts) (minimum) power supply to contact swinger. Connect contact spring through suitable resistance to power supply to provide 10 to 20 milliamperes current. Connect an oscilloscope across resistor to view contact closures.

(1) Requirement

With blank tape (spacing) in reader, tape spacing contacts should not open and marking contacts should not close.

(2) Requirement

When reading "letters" tape (marking) at 1000 wpm, spacing contacts should open every cycle and marking contacts (spacing - or marking-type contacts) should close for approximately 3 to 5 milliseconds. Central portion of marking signal (1.75 milliseconds minimum length) should be free of breaks or chatter greater than 10 microseconds duration.

(3) Requirement (Readers Without Pickup Coil)

When reading "letters" tape at 750 wpm, spacing contacts should open every cycle and marking contacts should close for approximately 3.5 to 5.5 milliseconds. Central portion of this closure (3.0 milliseconds minimum) should have no breaks or chatter for 10 microseconds duration or longer. No code-level contact should close later than 0.25 milliseconds before the universal contact closes nor open less than 0.25 milliseconds after the universal contact opens. See illustrations on page 22.

To Adjust

Perform preliminary CONTACT INSTALLATION adjustments in 2.17 and 2.18. Connect oscilloscope to contact assembly to be adjusted.

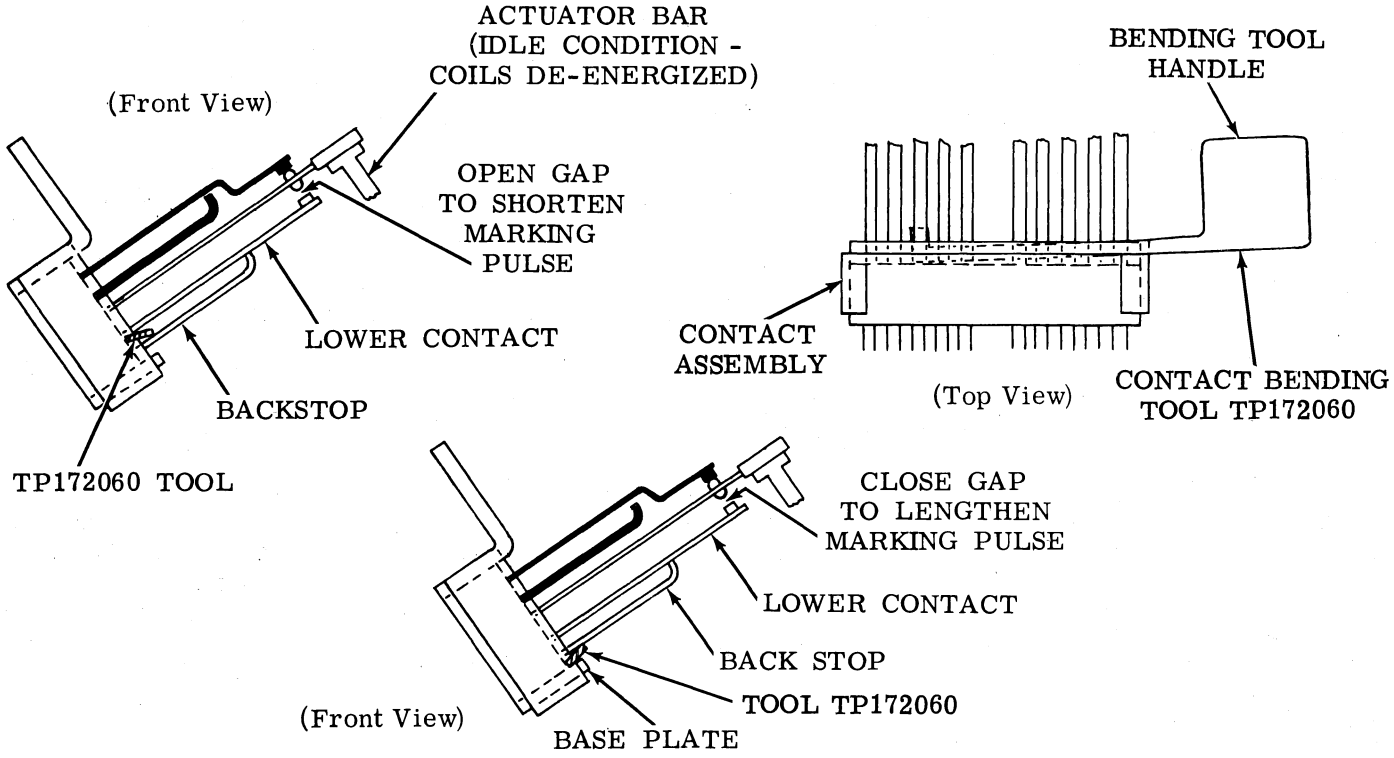
Note 1: For each adjustment, start with the contact pile-up farthest from the bending tool handle to avoid disturbing completed adjustments and work towards the front plate. See illustration on page 22.

If the marking contact closure being viewed is too long, remove power from reader (idle condition, coils not energized) insert the TP172060 tool between the lower contact and its backstop* and carefully bend the backstop down. If the marking closure is too short, insert the tool between the backstop and base plate of the contact assembly and bend backstop up.

*Note 2: A barely perceptible movement of the backstop can considerably affect contact closure times.

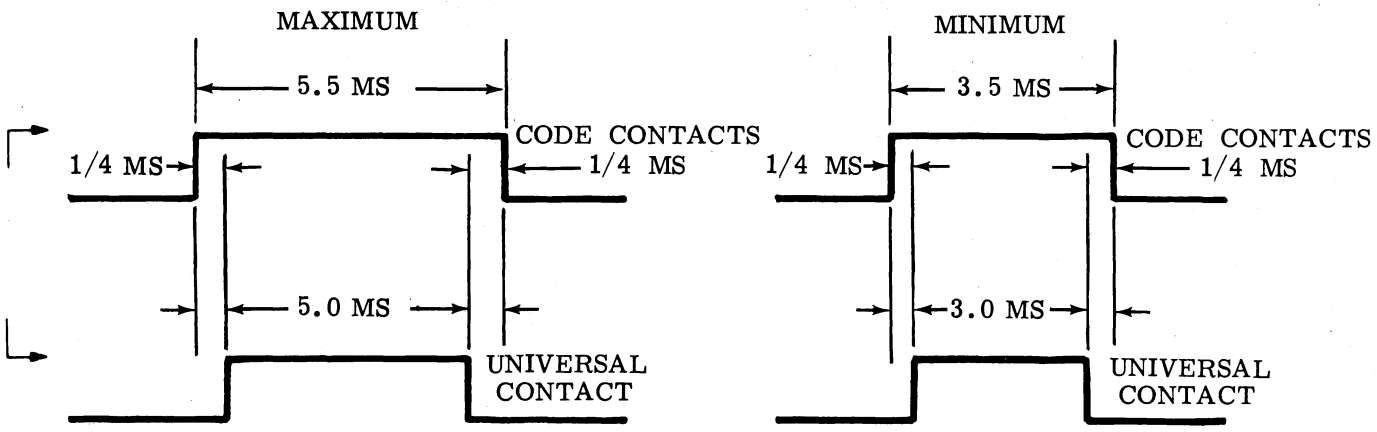
2.20 Code Contact Output (Transfer and Make-Only Contact Assemblies) (continued)

Note: The following illustrations apply to the procedures in 2.19.



Note: Shaded contacts and backstops not included on TP171884 contact assembly.

WAVEFORMS FOR READERS WITHOUT PICKUP COIL



2.21 Code Contact Output (Transfer and Make-Only Contact Assemblies) (continued)

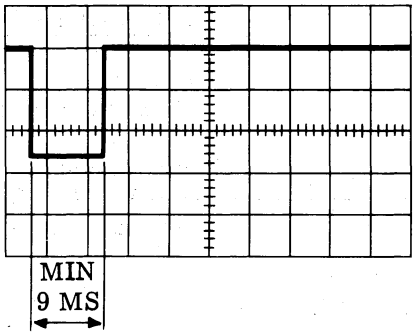
CODE CONTACT OUTPUT (For use on M37 RT Sets)

To Check

With the reader connected to a M37 RT (Reperforator Transmitter) Set and operating in the local condition, observe contacts 1 through 8 on an oscilloscope connected to the RT set electrical service unit terminal board (TB112).

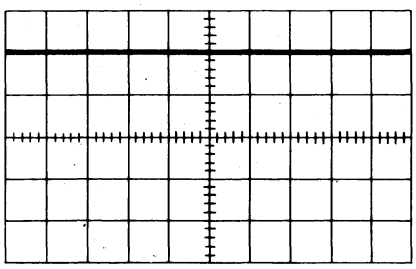
(1) Requirement

Using delete tape in the reader, place reader control lever in RUN position (except for CX806). The code contacts should close for nine milliseconds (Min) (with breaks and/or contact chatter permissible, observe waveform below on oscilloscope). If all contacts (1 through 8) meet requirements, move control lever to STOP position. Leave oscilloscope probe on last terminal (A8).

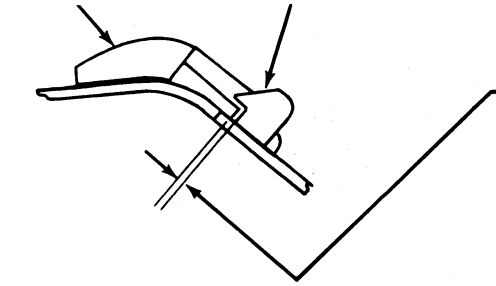


(2) Requirement

Remove delete tape from reader and replace it with null tape, close tape lid and place control lever in RUN position (except for CX806). The contacts should not close and no contact bounce should be observed on the oscilloscope. The waveform should resemble sample shown below.



2.22 Control Mechanism (continued)



(Front View)

TAPE LID LATCH (Early Design)

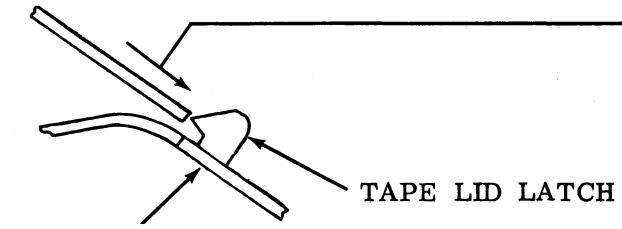
Requirement
With tape lid held closed it should require Min some---Max 0.015 inch clearance between left edge of latch and tape lid.

To Adjust
Position latch with its mounting screws loosened.

TAPE LID LATCH SPRING (Early Design)

To Check
Hold tape lid in latched position.

Requirement
Min 4-1/2 oz---Max 7-1/2 oz to start latch moving.

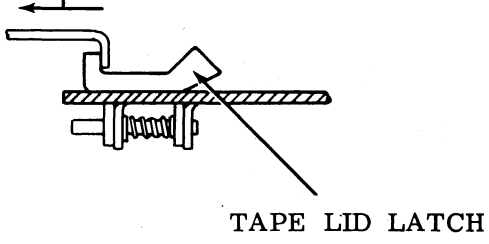


(Front View)

TAPE LID LATCH SPRING (Late Design)

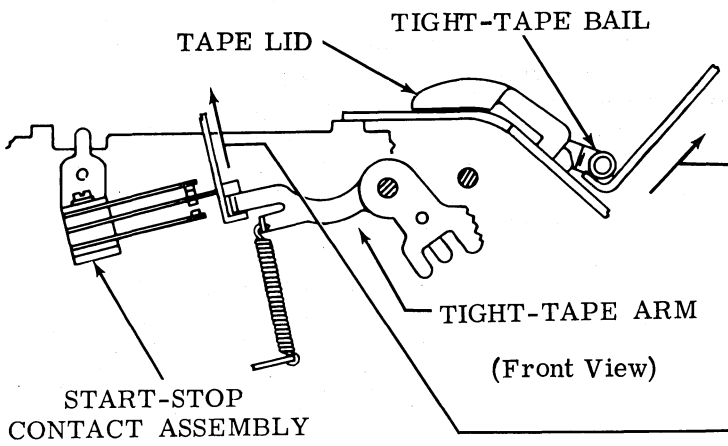
To Check
Open tape lid.

Requirement
Min 9 oz---Max 15 oz to start latch moving.



(Right Side View)

2.23 Control Mechanism (continued)

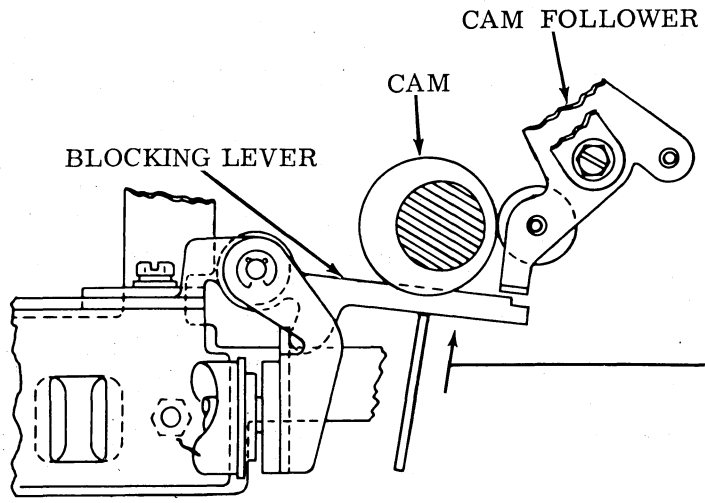


(Front View)

TIGHT-TAPE ARM SPRING

(1) Requirement
With control lever in RUN position and tape lid latched, it should require
Min 1 oz---Max 3-1/2 oz
to open bottom start-stop contacts.

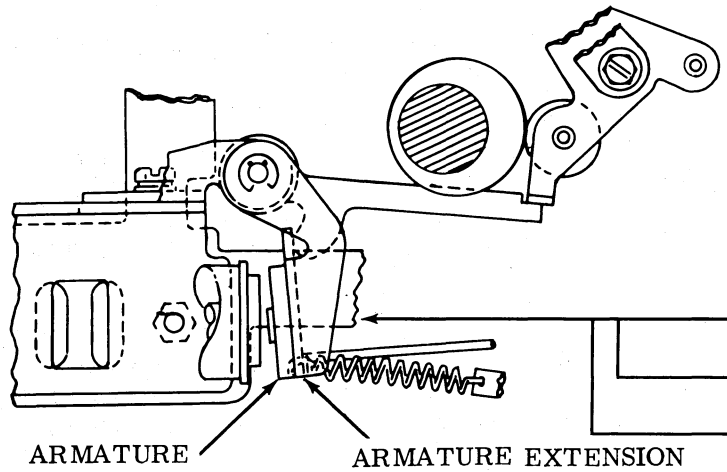
(2) Requirement (CX808 only)
With cover plate removed and the control lever in RUN position, it should require
Min 1/2 oz---Max 2 oz
to start tight tape arm moving.



(Front View)

BLOCKING LEVER SPRING

Requirement
With reader resting on rear plate, magnet in energized position, and followers on low point of cams, it should require
Min 1/2 oz---Max 1-1/2 oz
to start blocking lever moving.

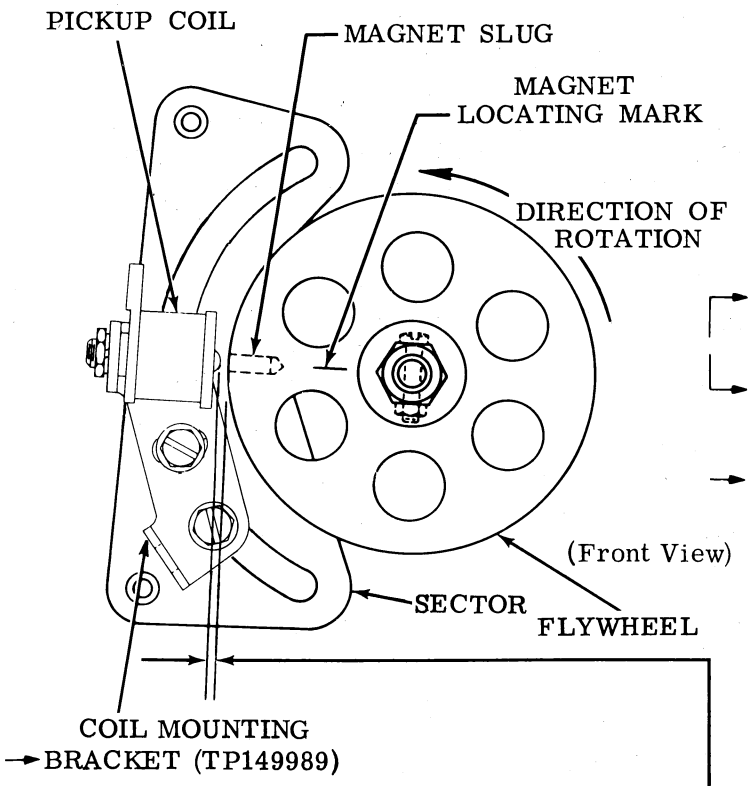


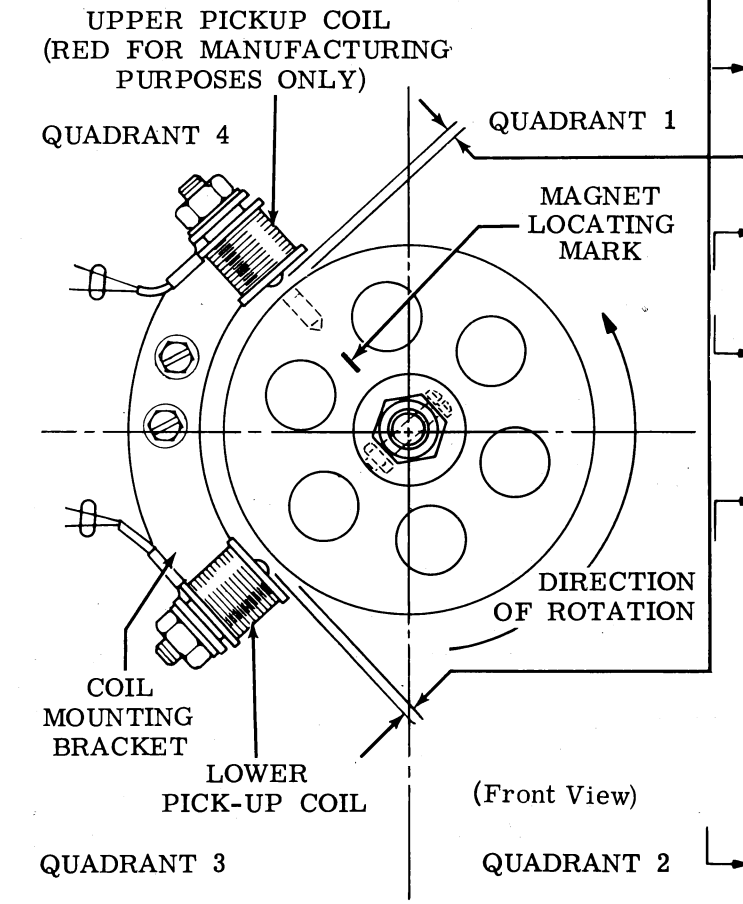
(Front View)

ARMATURE SPRING

Requirement
For all readers (except CX805, 806, and 808)
Min 22 oz---Max 27 oz
CX805 and CX806:
Min 28 oz---Max 32 oz
CX808 only)
Min 9 oz---Max 11 oz
to hold armature against core faces.

2.24 Magnetic Pickup and Timing Mechanism





MAGNETIC PICKUP

Note 1: This is a preliminary adjustment. It should be modified to meet specific timing requirements of associated apparatus. For readers equipped with the TP149989 coil mounting bracket, it may also be necessary to mount pickup coil on either upper or lower ear of bracket.

Note 2: When making (2) Requirement and (3) Requirement on readers with early designed magnet brackets (TP171286), center the pry point in the sector slot.

(1) Requirement (one coil)

With sensing fingers in uppermost position, magnet slug in flywheel should be adjacent to pickup coil core.

To Adjust

Loosen nut on end of main shaft. Remove screw from shaft. Position flywheel to place magnet slug in same quadrant as coil. Tighten nut and replace screw. Loosen coil bracket mounting screws, position coil adjacent to magnet slug.

(2) Requirement (One or two coils)(Not CX808)

At closest point between magnet slug and pickup coil core, clearance should be Min 0.003 inch---Max 0.006 inch

To Adjust

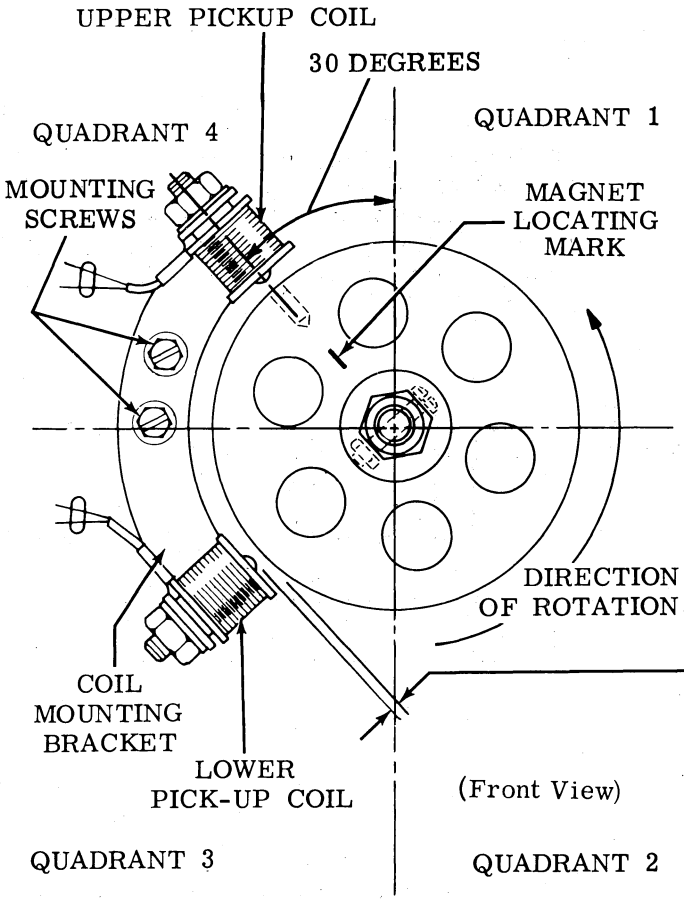
Loosen screws holding coil bracket to sector, move coil bracket while holding appropriate gage between wheel and magnet core. Position magnet to requirement (2). Tighten upper screw friction tight. Position bracket to make a rough adjustment. Tighten lower screw. Loosen upper screw and refine adjustment.

(3) Requirement (two coils)

With code contacts fully closed and some clearance between contact actuator bars and contact swinger insulators (gauge by eye) the flywheel magnet slug should be in the 4th quadrant.

Note 3: The insulation cover on the upper pickup coil may be dyed red for manufacturing purposes. Replacement coils will not be identified by color, electrically both coils are the same.

2.25 Magnetic Pickup and Timing Mechanism (continued)



MAGNETIC PICKUP (CX808)

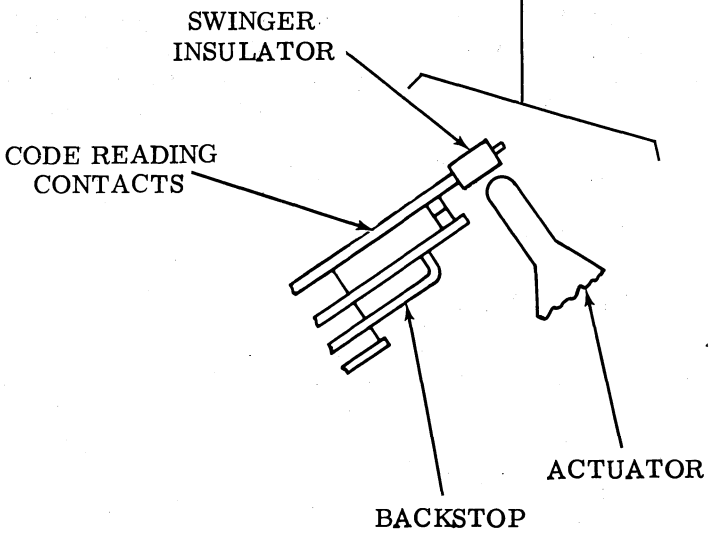
(1) Requirement (Preliminary)
The upper pickup coil should be approximately 30 degrees to the left of a vertical center line through the main shaft. With the sensing cam follower on the low part of its cam, the magnetic slug in the flywheel should be located in the upper left hand quadrant (quadrant 4).

To Adjust
Remove the nut, lockwasher, and flat washer from the front end of the main shaft, loosen the screw and its locknut from the flywheel. Position flywheel to meet requirement and replace and tighten screws and nuts.

(2) Requirement
With the flywheel at its closest point to the coil cores, clearance should be Min some---Max 0.010 inch

(3) Requirement
With the flywheel magnet opposite the upper coil, code reading contacts should be closed.

To Adjust
Loosen the two coil mounting bracket screws, position bracket to meet requirements. Tighten screws.



2.26 Magnetic Pickup and Timing Mechanism (continued)

Note: For readers with two pickup coils when used on M37 RT sets.

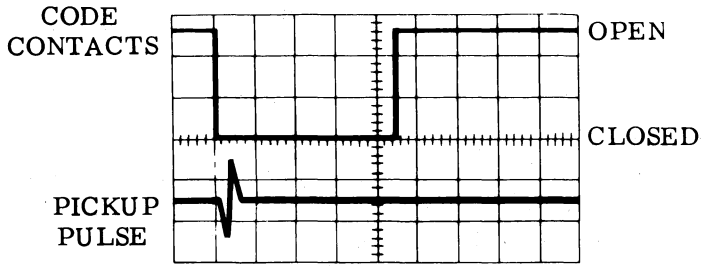
MAGNETIC PICKUP

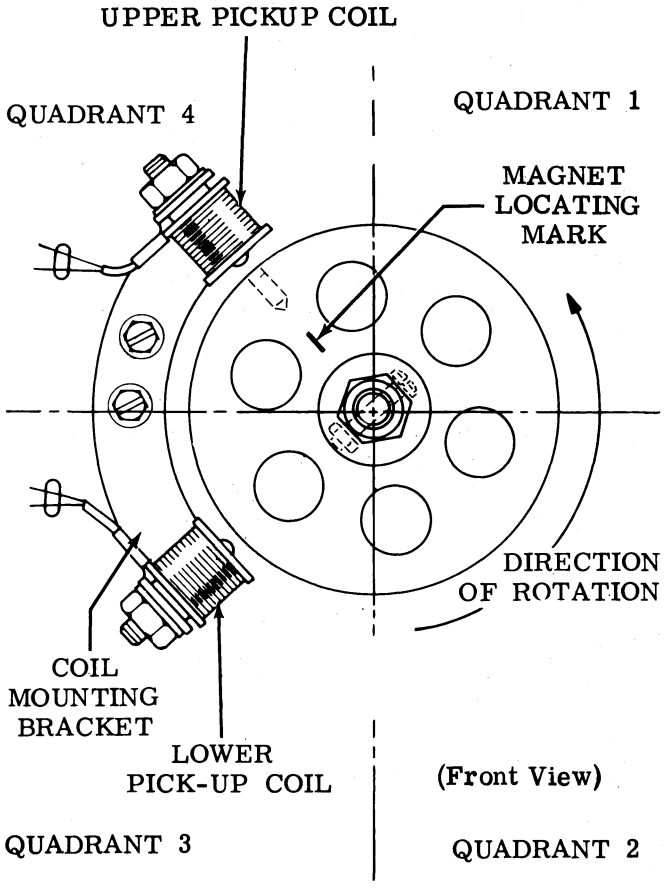
To Check

With delete tape in the reader and connected to a M37 RT set and operating in the local condition, observe pickup pulses and code contact (1 through 8) waveform on an oscilloscope connected to the RT set electrical service unit, terminal board TB112.

Requirement

The magnetic pickup pulse should occur after all reader contacts (8) are completely closed. Observe pickup pulses and code contact (1 through 8) waveforms on oscilloscope, waveforms should resemble sample shown below.

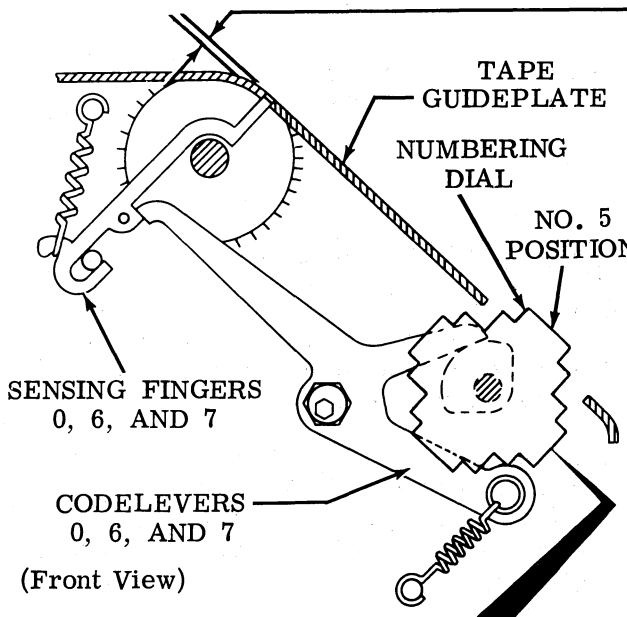




To Adjust

Loosen nut on end of cam shaft and remove screw and nut from flywheel. Position flywheel to meet requirement. Replace flywheel screw and nut, tighten nut on shaft. Loosen the two coil bracket screws friction tight, position upper coil until it is adjacent to magnet slug. Recheck Requirement, position coil bracket to meet requirement for each coil. Tighten screws.

2.27 Universal Tape Reading Mechanism



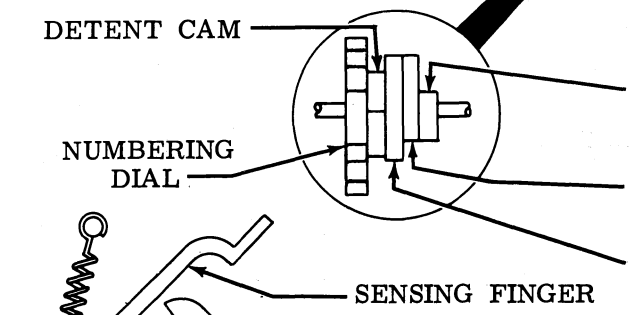
UNIVERSAL TRANSFER LEVER

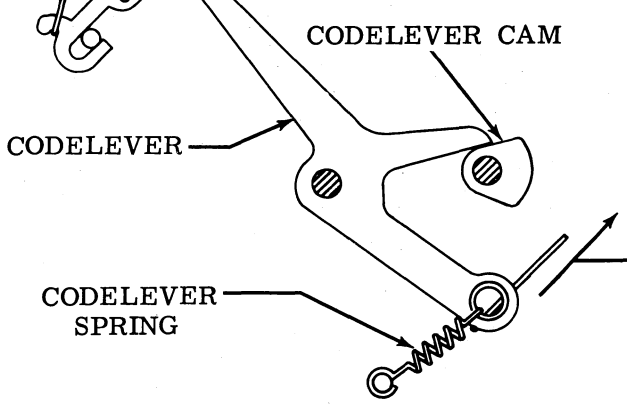
To Check
Trip clutch and rotate cam until sensing fingers are in their uppermost position.

Requirement
With numbering dial detented in number 5 position, sensing fingers 0, 6, and 7 should be below flush with the tape guideplate:
Min some---Max 0.012 inch

To Adjust
Loosen eccentric lever post nut friction tight. Insert wrench into post socket and rotate post.

Note: Identifying slot on lever eccentric post should be in the seven to eleven o'clock portion of quadrants 2 and 3.

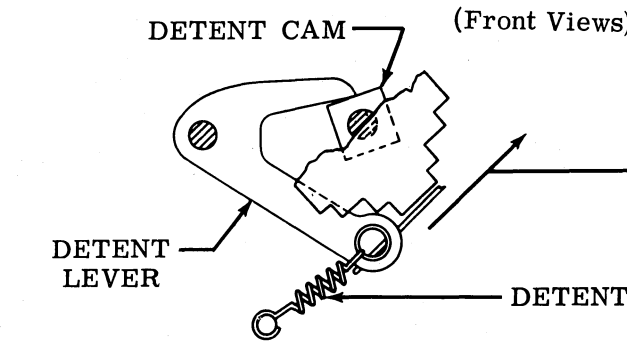




UNIVERSAL CODE LEVER SPRING

To Check
Remove top plate.

Requirement (Each Spring)
When code levers are on low part of their respective cams:
Min 1 oz---Max 3 oz
to start levers moving.



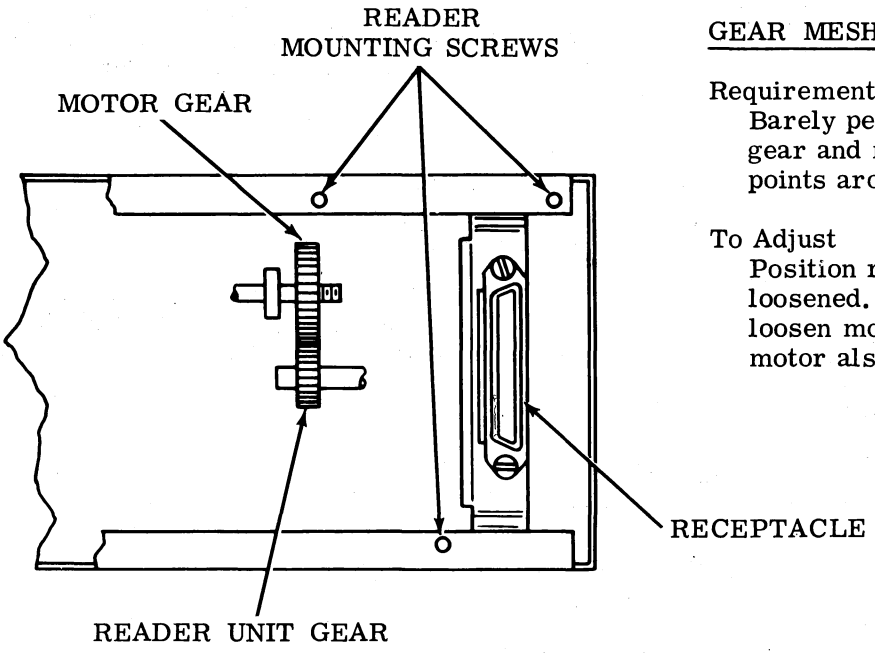
UNIVERSAL DETENT LEVER SPRING

To Check
Remove top plate.

Requirement
Min 15 oz---Max 30 oz
to separate detent lever from its cam.

2.28 Reader Installation

Note: This adjustment is required only when the reader is installed initially or following servicing. Refer to the appropriate adjustment section for instructions for readers without drive gears.



(Top View)

GEAR MESH (If so Equipped)

Requirement

Barely perceptible backlash between reader gear and motor gear measured at four points around motor gear.

To Adjust

Position reader with its mounting screws loosened. If requirement cannot be met, loosen motor mounting screws and position motor also.