

## COOK C-377 TYPE CONNECTORS

### DESCRIPTION, INSTALLATION, TESTING

#### 1. GENERAL

1.01 This section is a cover sheet for the Cook Electric, Description and Installation of Type C-377 Main Frame Connectors, Technical Practices Bulletin C-102.011. GAEL 1747-1 authorizes the use of this equipment in Pacific Company (PAC).

1.02 (Reserved for future use)

1.03 The C-377 Connector is a high density (100 pair) block used to terminate outside plant cables in central offices (CO) or customer premise locations requiring current or voltage protection.

1.04 If corrections are required in the manufacturer's instruction, use Form E 3973-1 as described in Section 000-010-901PT to process the correct information.

1.05 If equipment design and/or manufacturing problems should occur, refer to Section 010-700-011PT for procedures on how to file an Engineering Complaint for General Trade Products.

#### 2. TRAINING

2.01 A formal training package on this equipment is not contemplated. If a need for formal training develops, a training request should be directed to the Engineering Staff Director-Switching.

#### 3. MAINTENANCE

3.01 The recommended standard maintenance items for Cook Electric are listed in the GTP Catalog and should be ordered directly from Cook Electric via the GTP 2 Purchase Order Form.

All other accessory equipment at the frame location, such as protector modules, test cords, etc, are interchangeable with Western Electric (WE) 303 equipment.

#### 4. ORDERING PROCEDURES

##### A. General

4.01 Ordering of CO terminating apparatus must be done in sufficient time to:

- Allow for the specified manufacturing and shipping interval
- Permit time for installation and splicing prior to the date on which the cable is to be placed in-service.

4.02 The C-377 connector requirements and stub lengths are determined by Network Distribution Engineering.

4.03 Responsibility for ordering terminating apparatus depends on local arrangements. All orders must be submitted on Form GTP 2 Purchase Order per System Instructions 70, Section 2. All Cook Electric material approved for use in PAC is listed in the GTP Catalog. Send Purchase Orders to:

- In Northern California and Nevada —  
RPO  
221 W. Winton Avenue, Room 140  
Hayward, CA 94544
- In Southern California —  
Regional Procurement Organization  
2420 Yates Avenue, Room 235  
Los Angeles, CA 90040

4.04 Purchase orders or requisitions should contain the following information:

- Statement that the order is subject to terms and conditions of Master Agreement 78-57

#### NOTICE

Not for use or disclosure outside the  
Bell System except under written agreement

**SECTION 636-330-901PT**

- Description of material, including any numeric/alphabetic identification referenced in the price list
- PAC order number
- Requested delivery date
- Applicable price
- Location where material is to be shipped
- Location where invoices are to be rendered.

4.05 When issuing confirming orders, the Purchase Order should reference the name of the person with whom the order was verbally placed. A contact telephone number should also be included to facilitate any questions that may arise concerning the order.

**B. Delivery Interval**

4.06 Cook Electric will ship any combination of C-377 type connectors as follows:

“Up to 350 units within 45 days after receipt of order, with 350 units per month thereafter until completion of requirement.”

**5. REPAIR/RETURN**

5.01 All defective material is to be returned to the supplier for repair or replacement. Factory turnaround time is 10 working days from the receipt of defective material. The material is to be shipped, transportation prepaid to the supplier. Repaired items will carry a new product warranty.

5.02 Cook Electric's warranty is for one year from the date of delivery as covered in Master Agreement 78-57.

**6. EXCLUSIONS/REVISIONS**

6.01 The following manufacturer's instruction sections are excluded and/or revised.

SECTION 100 - GENERAL  
DESCRIPTION  
SECTION 200 - INSTALLATION  
SECTION 300 - ACCESSORIES } Added Note

*Note:* All references to the Cook Electric C-378 connector in the above sections should be disregarded. This connector is not standard for use in PAC nor is it covered under Master Agreement 78-57. Utilization of this connector on customer premises will require a CE 1075 as covered in System Instructions 72, Section 2 and 5.

**Attachment:**

Cook Electric, Technical Practices Bulletin C-102.11, Issue 2, September 1978

Technical Practices Bulletin  
C-102.011  
Publication Issue 2  
September 1978

# Description and Installation of Type **C-377** (100 Pair) and Type **C-378** (50 Pair) Main Frame Connectors



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## COOK ELECTRIC

a Northern Telecom company

**6201 Oakton St., Morton Grove, Ill. 60053 / Telephone 312-967-6600 / Telex 724472 / TWX 910-223-3654 / Cable "Cookpro"**

- **In Canada:** Cook Electric Company of Canada, Ltd., 2110 B Notre Dame Avenue, Winnipeg, Manitoba R3H 0K1, Telephone 204-633-9254; TWX 610-641-9560
- **In Brazil:** Cook Electric do Brasil Telecomunicacoes, Ltda., Caixa Postal 1145-ZC-00, Rua Albano 313, Jacarepagua, Rio de Janeiro, Brasil, Telephone 392-3030
- **Export:** C-Trade, Inc. or Cook Electric International, Inc., 8375 NW 53rd St.—Suite 200, Miami, Fla. 33166, Telephone 305-592-1600

### C-377 CONNECTOR APPLICATION CONSIDERATIONS

- Provides greatest pair density of all present Cook Electric Connectors.
- Uses proven Cook Electric protector modules which are interchangeable with Cook Electric C-310, C-303, C-330, C-353, C-311, and C-550 Connectors.
- Mounts on all types of frames by using Universal Vertical Adapter Bar. (For example, an 8-foot high equipment bay in an electronic exchange can hold 700 pairs on an 8-foot vertical. This assumes a 14-1/2 inch floor clearance. With less clearance an 8-foot vertical can hold 800 pairs. See paragraph 1.03.)
- Mounting height just 11 inches: Permits maximum vertical space saving. Ample space between verticals.
- Mounts with special switching systems, including PABX and Centrex, which utilize combination frames (where terminal blocks and C-377 Connectors are mounted on the same side) or narrow double sided frames with short jumper runs.
- Mounts on protector frames, where jumpering between switching equipment and the protectors is done on a separate intermediate distributing frame.
- Comfortable working space. On standard spaced verticals (8-inch centers) there's ample room to work between units. Plastic T-Guards protect hands from C.O. jumper field wire-wrap pins when removing modules from adjacent protector.
- Good aisle clearance. Connector is behind standard guard rails; there's no encroachment on working room in the aisle.
- Protector modules available include high strike MESA<sup>®</sup> carbon for voltage protection, a simplified heat coil MESA carbon for low current protection, 2-electrode fail-safe gas protection, and 3-electrode fail-safe gas protection.
- Clearly marked jumper field. Angled pins for accessibility. Outside plant terminals covered by plastic trough covers to reduce wiring errors. Large fanning strip slots are provided to aid in feeding jumper wires from the rear of the Connector.
- Industry standard, front facing, gold-plated test field in two 50 pair sections. Facilitates testing with automatic cable testing and tagging equipment. Same test fields used on C-303 and C-310.
- Optional grounding methods provided to permit isolating equipment and cable grounds where necessary.
- C-377 Connector may be obtained without test fields if desired.
- Also available as a 50 pair unit; Cook Electric C-378 Connector. Same features as C-377 Connector.
- Outside plant cable terminates on jumper side, allowing addition of terminated conductors or repair of terminal pins without interruption of working circuits.

**NOTE:** This publication has been revised to reflect product improvements and additional accessories. Revision arrows are not used because of the large number of changes.

## CONTENTS

### SECTION 100 - GENERAL DESCRIPTION

		Page
1.	General . . . . .	1
2.	Connector Base . . . . .	6
3.	Protector Modules . . . . .	9

### SECTION 200 - INSTALLATION

4.	General . . . . .	17
5.	Installing Universal Vertical Adapter Bar . . . . .	17
6.	Installing Connector Base . . . . .	19
6.01	Precautions . . . . .	19
6.02	Stubbed Connectors . . . . .	19
6.03	Stubless Connectors . . . . .	19
7.	Grounding . . . . .	24
8.	Marking and Jumpering . . . . .	26
9.	Carbon Clearing . . . . .	26
10.	Splicing to Entrance Cable and C.O./O.P. Connection . . . . .	28
11.	Changing "Stub Down" to "Stub Up" . . . . .	28
12.	Testing . . . . .	28

### SECTION 300 - ACCESSORIES

13.	General . . . . .	31
14.	Single Pair Test Cord . . . . .	31
15.	Single Pair Test Cord With Mini Test Clips . . . . .	31
16.	Four-Conductor Test Cords . . . . .	31
17.	Fifty Pair Front Tap Test Shoe . . . . .	32
18.	"H" Test Connector . . . . .	32
19.	MDF Test Jack Assembly . . . . .	33
20.	C-377 Universal Vertical Adapter Bar . . . . .	33
21.	Test Point Insulator Button . . . . .	33
22.	Circuit Designation Pin . . . . .	33
23.	Wire-Wrap Terminal Cap . . . . .	33
24.	Long Ground Strap . . . . .	33
25.	C-377 Wall Mounting Bracket . . . . .	35
26.	C-378 Wall Mounting Bracket . . . . .	35
27.	Hinged Trunk Identification Strip . . . . .	35
28.	Pin Replacement Kit . . . . .	35
29.	T-Guard Replacement Kit . . . . .	35
30.	Terminal Cover Kit . . . . .	36
31.	Connector Mounting Kit . . . . .	36

# COOK ELECTRIC TYPE C-377 AND C-378 MAIN FRAME CONNECTORS

**INTRODUCTION:** This bulletin provides general information (Section 100), installation procedures (Section 200), and accessories data (Section 300) for the Cook Electric Type C-377 and C-378 Main Frame Connectors.

## SECTION 100 - GENERAL DESCRIPTION

**1. GENERAL.**

**1.01** The C-377 Connector (figure 1) is a compact size, 100 pair unit designed to terminate outside plant cables in central offices or customer premise locations where current (heat coil) and/or voltage (carbon arrester or gas tube) cable pair protection is required. The Connector can be used without protection (using straight-thru modules) if only the termination features are desired.

**1.02** The C-377 Connector consists of a connector base, designed for quick installation on an MDF (main distribution frame) and protector modules, which plug into the connector base (see figure 1). This Connector and its complement of protector modules provides features for testing, identification of incoming circuits, and disconnection of outside cable pairs in addition to current and voltage protection. Various catalog options provide for ordering units with or without a cable stub, with any of the basic protector modules, or without any protector modules (connector base only). If only 50 pair capacity is required, an alternate compact type C-378 Connector is available, with all the features of the 100 pair unit (figure 2).

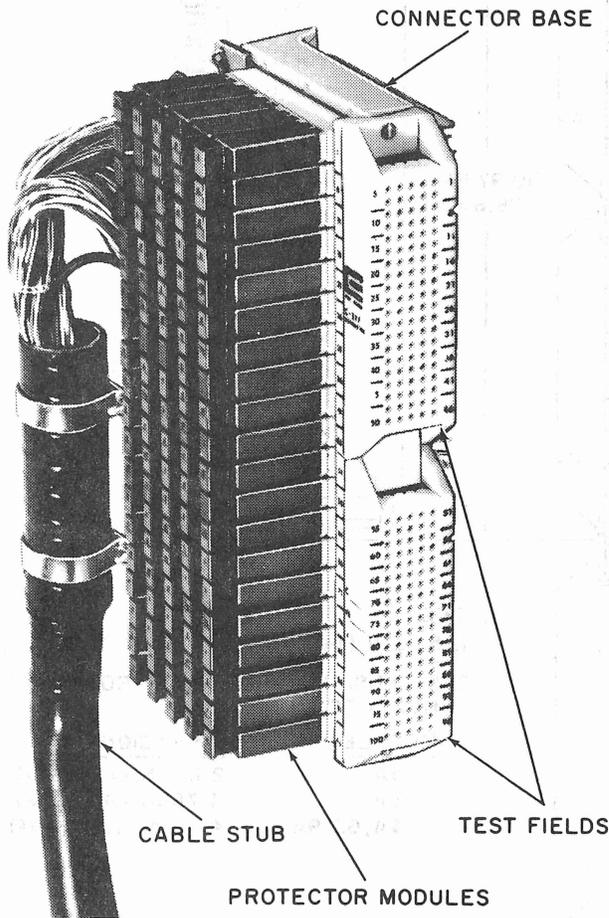


Figure 1. C-377 Connector (100 Pair)

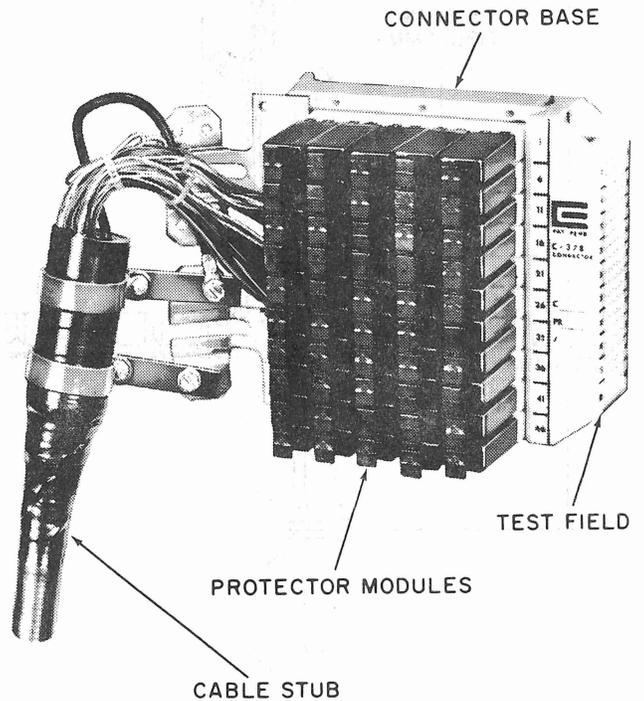


Figure 2. C-378 Connector (50 Pair)

1.03 Pair capacities of MDF's equipped with C-377 Connectors are shown in table 1 along with the capacities of other Cook Electric Connectors. Note that standard MDF's allow 14-1/2 inches between the bottom Connector and the floor. Overall dimensions for the C-377 Connector are shown in figure 3. Overall dimensions for the C-378 Con-

connector are shown in figure 4. Details of the connector base are discussed in paragraph 2.

1.04 The protector modules available for use with the C-377 Connector are listed in table 2. Details of the protector modules are listed in paragraph 3.

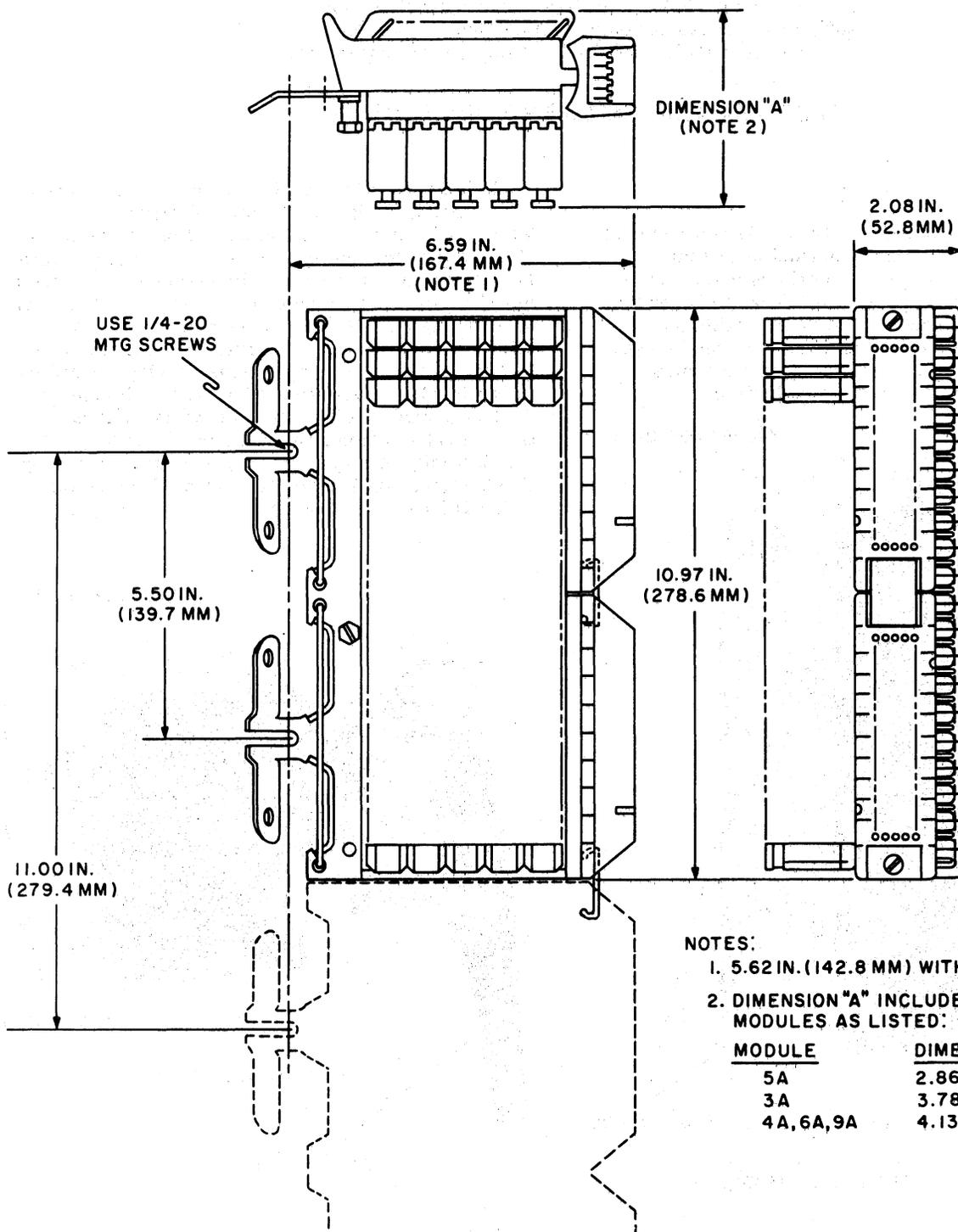
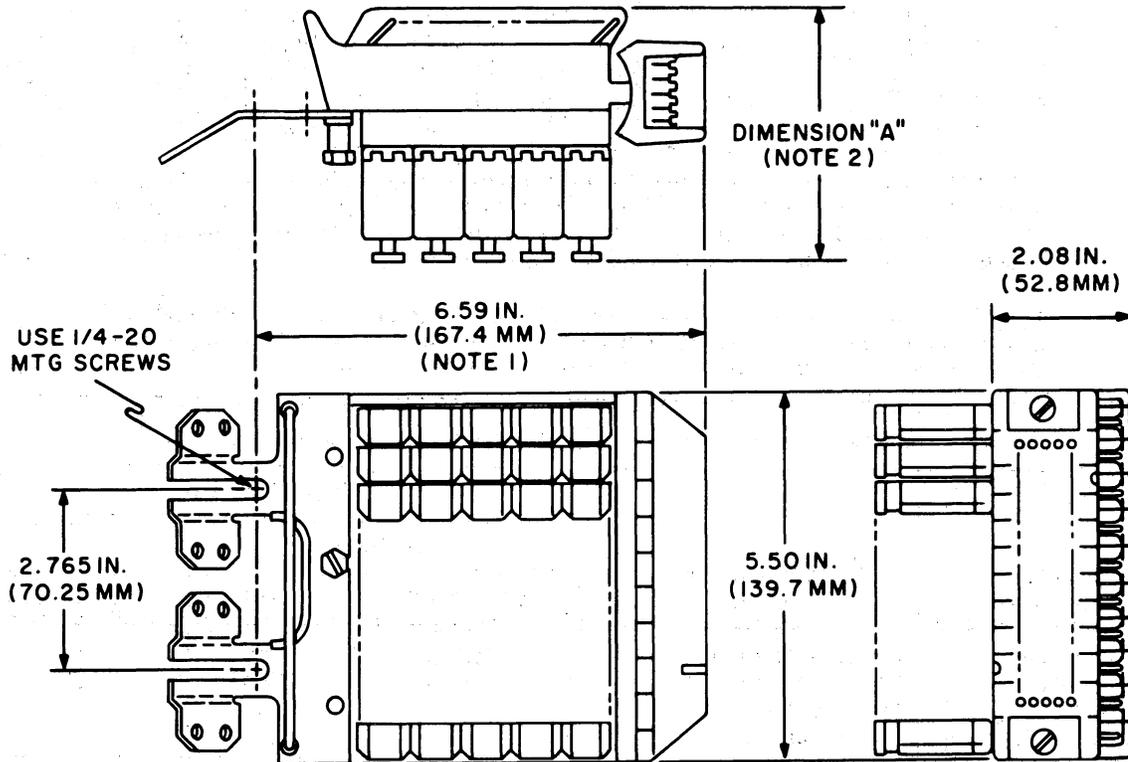


Figure 3. C-377 Connector Dimensions



**NOTES:**

1. 5.62 IN. (142.8 MM) WITHOUT TEST FIELDS.

2. DIMENSION "A" INCLUDES PROTECTOR  
MODULES AS LISTED:

<u>MODULE</u>	<u>DIMENSION "A"</u>
5A	2.86 IN. (72.6 MM)
3A	3.78 IN. (96.0 MM)
4A, 6A, 9A	4.13 IN. (104.7 MM)

Figure 4. C-378 Connector Dimensions

Table 1. Standard MDF Capacities With C-377 and Other Connectors

MDF HEIGHT		TERMINATED PAIRS	TERMINATED PAIRS (OTHER TYPES)				
Feet/Inches	mm	C-377*	C-310	C-303	6800	300	3800/C-50
7'-0"	2134	600	400	300	200	100	100
8'-0"	2438	700	500	400	300	200	200
9'-0"	2743	800	600	400	300	200	200
11'-6"	3505	1100	800	600	400	300	300
14'-6"	4420	1400	1000	800	600	400	400

\*The frame capacities listed above assume a standard 14.5-inch clearance between the floor and first Connector position. Increased capacities of 100 pair or more per vertical may be realized by reducing the floor-to-connector clearance and allowing the top Connector to extend beyond the frame top.

NOTE: Riser openings for cable stubs must be large enough to accommodate the increased number of cable pairs that will be necessary to make full use of the C-377 Connector termination capacity (see figures 5 and 6).

Table 2. Cook Electric Protector Modules for Central Office Connectors

CATALOG NUMBER	IDENTIFICATION COLOR	PROTECTION		
		VOLTAGE		CURRENT (HEAT COIL)
		ARRESTER	VDC	
303-0350 303-0370 303-0351 303-0371	3A Black Module 3A Red Module 3A Black Module 3A Red Module	MESA Carbon	450 450 350 350	— — — —
303-0450 303-0470 303-1094* 303-0451 303-0471 303-1093*	4A Black Module 4A Red Module 4A Black Module w/X 4A Black Module 4A Red Module 4A Black Module w/X	MESA Carbon	450 450 450 350 350 350	3.45 ohm
303-0550 303-0570 303-0580	5A Black Module 5A Red Module 5A Yellow Module	Unprotected Module (For circuit continuity in unexposed plant)		
303-0650 303-0670	6A Black Module 6A Red Module	2-Electrode Fail-Safe Gas	400	—
303-0950 303-0970	9A Black Module 9A Red Module	3-Electrode Fail-Safe Gas	400	—
303-1016	White Module (4A size)	"Warning" Module for Hi-Voltage Testing (No protection; no circuit continuity)		
303-1053 303-1054 303-1024	Green Module (3A size) Green Module (4A size) Green Module (5A size)	Denied Service Grounding Modules (C.O. open; O.P. grounded)		

\*Pair reversing.

These Modules are used on: Cook Electric Connectors Type C-303, C-310, C-311, C-330, C-353, C-550, C-377 and C-378.  
Western Electric Connectors Type 302 and 303.  
Reliable Electric Connectors Type R303, R305, R710, and R713.

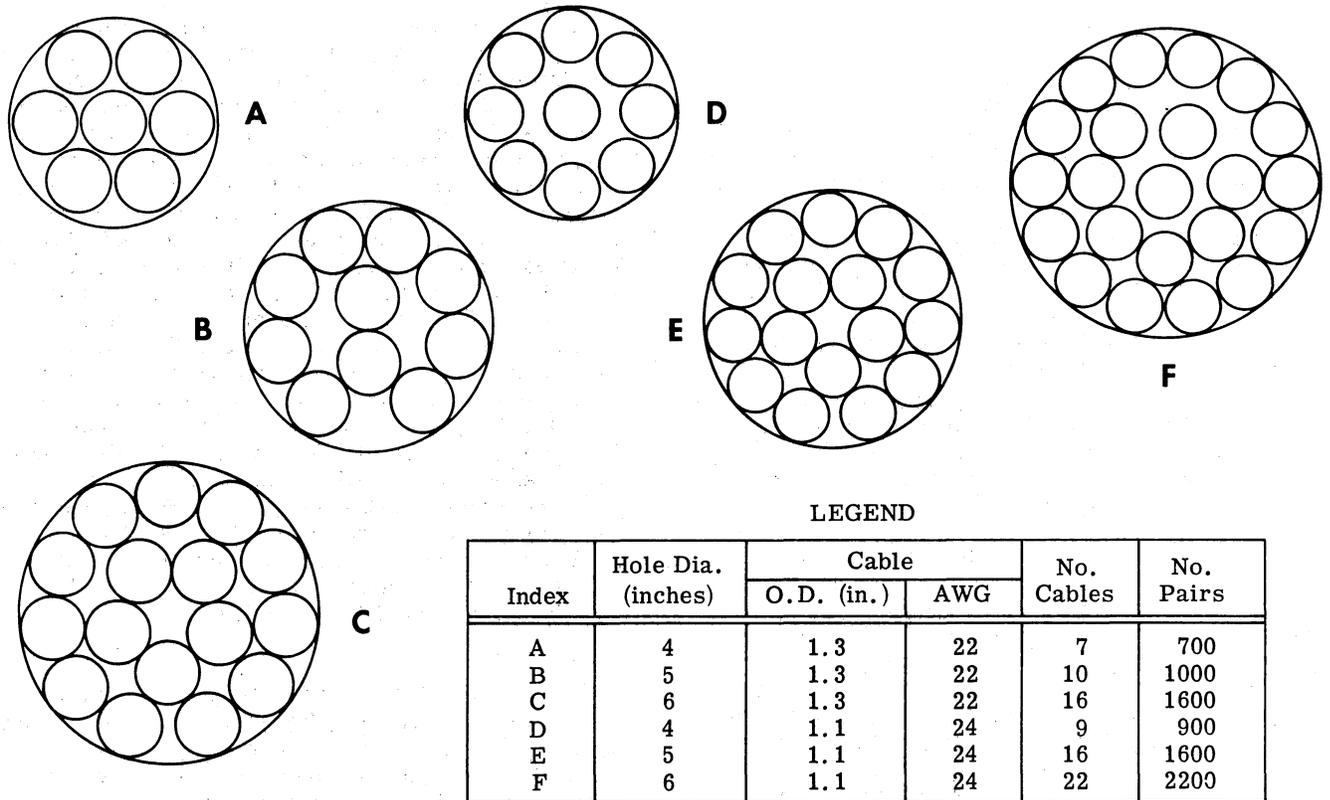


Figure 5. Round Riser Opening Cable Capacities

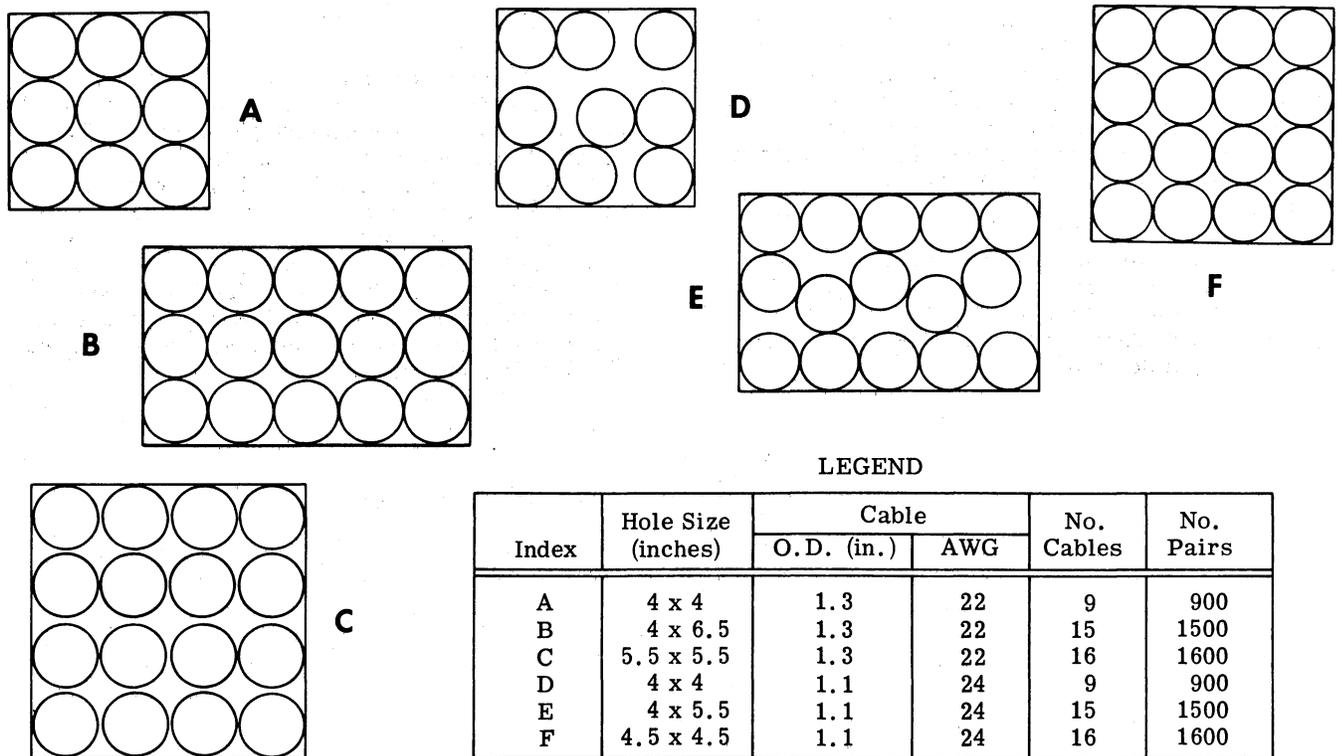


Figure 6. Square and Rectangular Riser Opening Cable Capacities

## 2. CONNECTOR BASE.

2.01 The connector base (see figure 7) is a one piece, flame retardent plastic molded panel fastened to an oblique angle mounting bracket. Oblique angle mounting is used for easy access and rapid grouping of pairs in stubs being wired to stubless Connectors. The mounting is quickly changed to the final straight-on position for wiring to the jumper terminals. Stubbed Connectors are mounted directly in the straight-on position. The connector base panel is equipped with a group of 100 five-pin grip type terminals. Four of these terminals provide contact for tip and ring connections between outside plant cable and the inside plant jumpers. The fifth terminal provides a ground connection to the ground terminal through a unique printed circuit board. This fifth terminal also serves as a polarization terminal.

2.02 Inside plant or C.O. (Central Office) and O.P. (Outside Plant) wire-wrap terminals are located on the back of the connector base. O.P. terminals are covered with T-guards and arranged in alternate rows, thereby providing quick identification and easy access to the C.O. terminals. The terminals are designed for mechanically wire-wrapped connections. C.O. terminals are angled out, to permit easy wire-wrapping access with the connector base in the straight-on position.

2.03 Twenty large sized, rectangular fanning strip holes are provided in the connector base for jumper pairs and are aligned with the rows of C.O. wire-wrap terminals. Four fanning strip holes are also formed between the oblique angle mounting bracket and two wire brackets. These holes are used to group the O.P. wires in bundles before entering the cable stub. Every set of 5 terminals is identified by numbers placed adjacent to the wire-wrap terminals on the side of the connector base.

2.04 A test field is located on the front edge of the connector base. The test field is in two groups, top and bottom, for test access to O.P. pairs. C-377 Connectors may be ordered without test fields, if desired.

2.05 The connector base is furnished with or without a cable stub. When a connector base is ordered with a stub, the stub is furnished in a "stub-down" position. (The stub can be changed to a "stub-up" position on the job site, however, it is recommended that connector bases be ordered with the "stub-up" position when this is a known requirement.) Extra length stubs, in increments of 10 feet, are available on request. The 101 pair ALVYN cable used for stubbing has a PVC sheath, an aluminum shield, tinned 22 or 24 gauge wire, and PVC and polyethylene insulated conductors. The cable shield is connected directly to the C-377 frame hardware with a No. 10 AWG ground strap. (The 22 gauge wire, 101 pair cable has a nominal O.D. of 1.3 inches, and 24 gauge wire, 101 pair cable has a nominal O.D. of 1.1 inches.) All cable stubs are fitted with a gas tight pressure plug. The primary purpose of this plug is to allow for pressure testing of the vault closure. CAUTION: These cables must not be maintained under continuous pressure. It is necessary to plug the main cable as close as practical to the vault splice.

2.06 Refer to table 3 for C-377 and C-378 Connector ordering information. This table also includes information for ordering protector modules. When the cable entering the C.O. is exposed to possible contact with power conductors operating at voltages above 300 volts, the wires in the stub cable of the Connector should be at least two gauges larger than the wires in the fusing link or entrance cable.

2.07 A fuse link (six foot minimum length) or entrance cable of 24 gauge wire or finer should be used when stubbing with 22 gauge wire. When stubbing with 24 gauge wire, the fuse link or wires in the entrance cable should be 26 gauge. This will insure that the cable stub or wiring on the rear of the base will not fuse open on severe high current power faults. The current carrying capacity of the C-377 Connector modules is designed to exceed the current carrying capacity of 22 gauge copper wire, in the event that a line should be subjected to a sustained power cross.

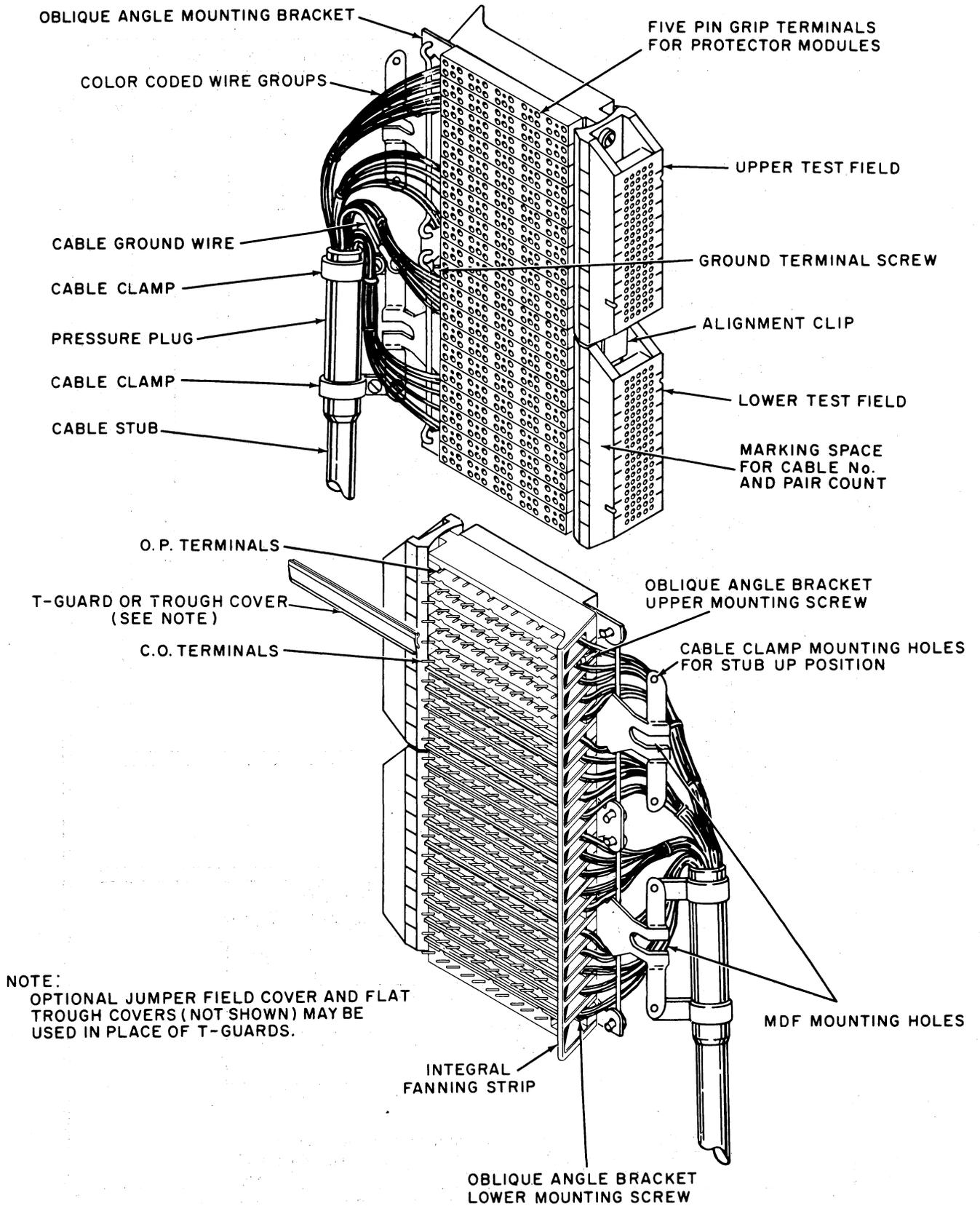


Figure 7. Connector Base Details

Table 3. Connector and Protector Module Ordering Information

Determine Correct Catalog Number According to the Following Directions:		XXX - XX	X	X	
		A	B	C	D
<b>A. Connector Type</b>	<u>Enter No.</u>				
C-377 - 100 Pair . . . . .	377	}	}	}	}
C-378 - 50 Pair . . . . .	378				
<b>B. Module Type</b>	<u>Enter No.</u>				
None . . . . .	00	}	}	}	}
3A E/W 450 Vdc . . . . .	30				
3A E/W 350 Vdc . . . . .	31				
4A E/W 450 Vdc . . . . .	40				
4A E/W 350 Vdc . . . . .	41				
5A . . . . .	50				
6A . . . . .	60				
9A . . . . .	90				
<b>C. Stub and Test Field</b>	<u>Enter No.</u>				
Stubless E/W Test Field . . . . .	0	}	}	}	}
Stubless W/O Test Field . . . . .	1				
22 Gauge E/W Test Field . . . . .	2				
22 Gauge W/O Test Field . . . . .	3				
24 Gauge E/W Test Field . . . . .	4				
24 Gauge W/O Test Field . . . . .	5				
<b>D. Stub Length</b>	<u>Enter No.</u>				
10 foot . . . . .	1	}	}	}	}
20 foot . . . . .	2				
30 foot . . . . .	3				
40 foot . . . . .	4				
50 foot . . . . .	5				
60 foot . . . . .	6				
70 foot . . . . .	7				
80 foot . . . . .	8				
90 foot . . . . .	9				
100 foot . . . . .	0				

<b>EXAMPLE:</b>	377 - 41	3	5
A. C-377 Connector 100 Pair Equipped with:	}		
B. 4A (350 Vdc) Modules	}		
C. 22 Gauge Stub and without Test Field	}		
D. 50 foot stub	}		

**NOTE:** All units with cable stubs are furnished in a "stub-down" position . . . unless specified "stub-up".

### 3. PROTECTOR MODULES.

3.01 Several types of protector modules are available to satisfy various C.O. requirements for line and equipment protection. The protector modules are all equipped with five contact pins and a plastic shell (see figure 8). The plastic shell for the module is made from a self extinguishing plastic insulating material. When inserted into the connector base, the contact pins provide the following contacts for one cable pair:

- a. Tip and ring to O.P. (outside plant) conductors (long pins).
- b. Tip and ring to C.O. (central office) equipment (short pins).
- c. Ground, which also serves as a polarization pin.

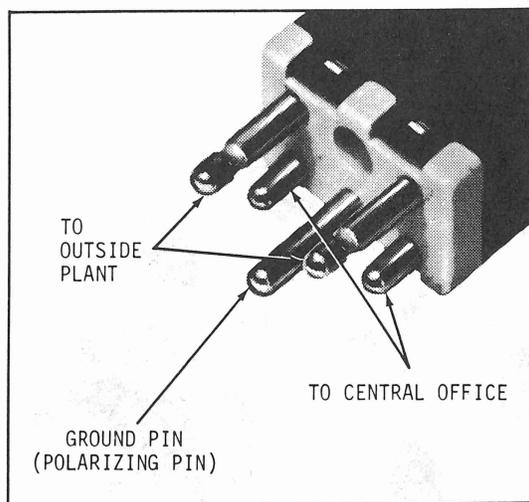


Figure 8. Protector Module Pin Details

3.02 When the protector modules are fully inserted (see figure 9) into the connector base, the O.P. and C.O. equipment are connected. The grounding pin is connected to provide continuity through the connector base mounting bar and inter-connector ground straps to the copper ground bar at the base of the MDF (main distribution frame).

3.03 When the protector module is pulled out to the detent position (see figure 9), the C.O. equipment is disconnected from the O.P. cable pairs, while leaving the O.P. cable pairs protected.

3.04 Refer to figures 10 through 16 for protector module specifications. Refer to table 3 for ordering information. The protector modules are available with color coded plastic shells to identify different circuit types.

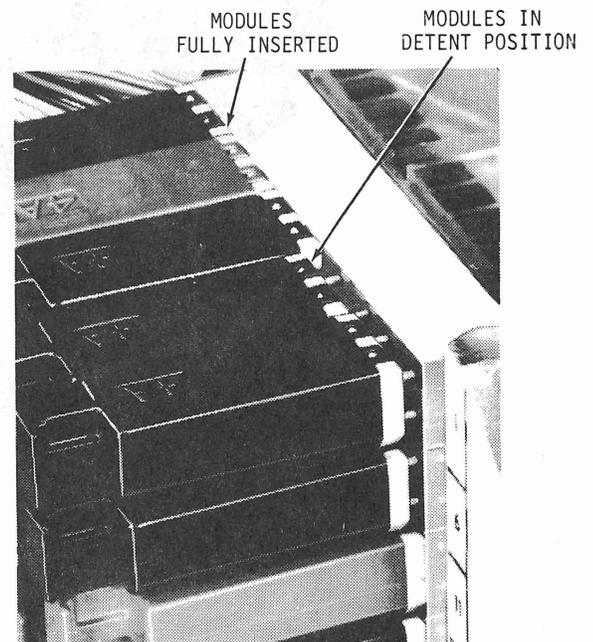
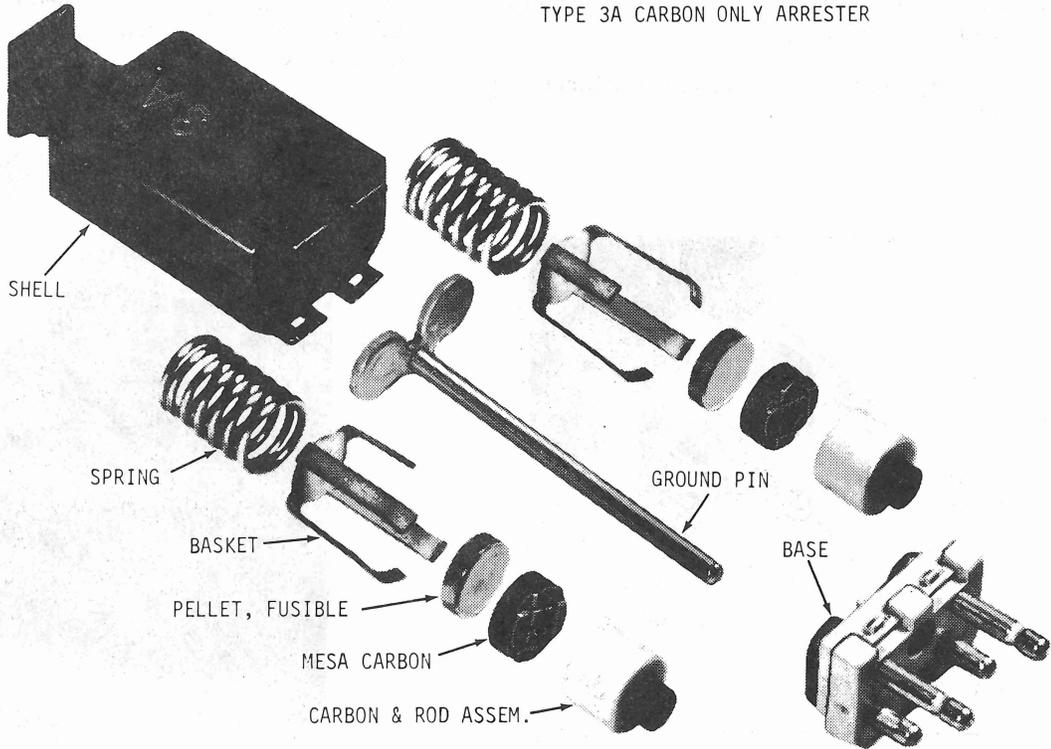
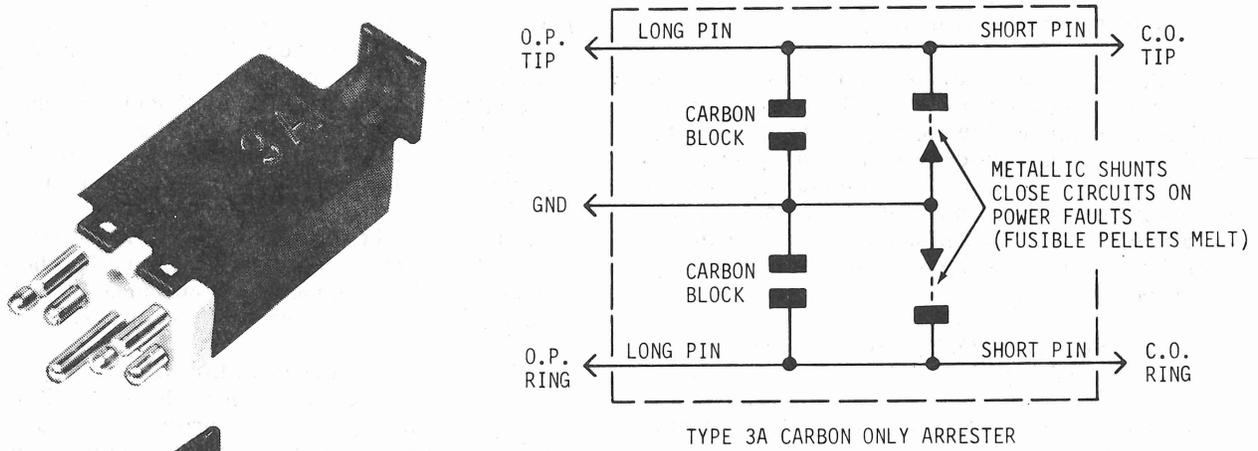


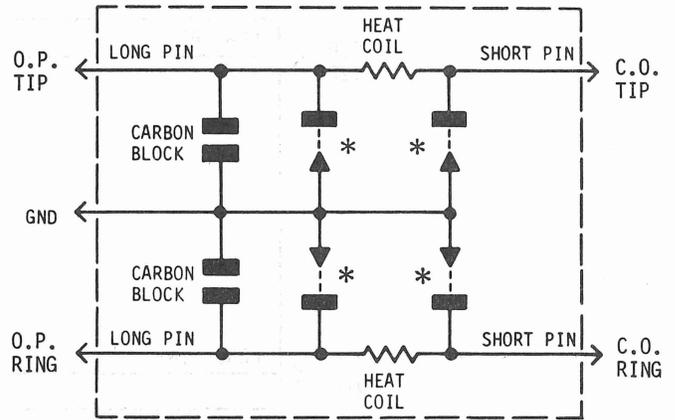
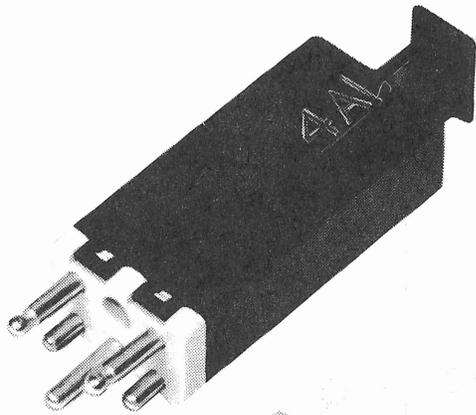
Figure 9. Protector Module Alternate Position



### SPECIFICATIONS

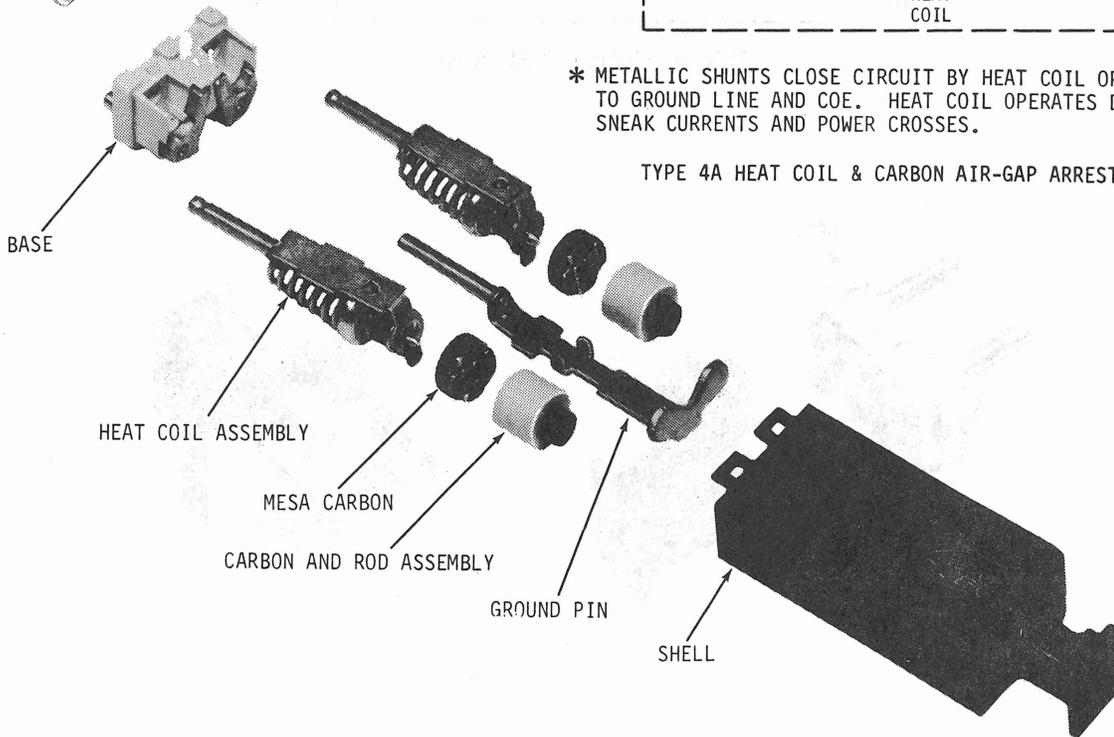
Type of Protection . . . . .	Voltage, with MESA carbon air gap blocks and a fusible metal alloy
Nominal Voltage Breakdown . . . . .	350V (white dot on shell) or 450V
Typical Power Cross Fail-Safe Time . . . . .	1.8 Sec (30 A Power Cross)
Shell Number . . . . .	3A
Shell Color . . . . .	Black (Standard Circuit) Red (Special Circuit)

Figure 10. Type 3A Protector Module Details



\* METALLIC SHUNTS CLOSE CIRCUIT BY HEAT COIL OPERATION TO GROUND LINE AND COE. HEAT COIL OPERATES DUE TO SNEAK CURRENTS AND POWER CROSSES.

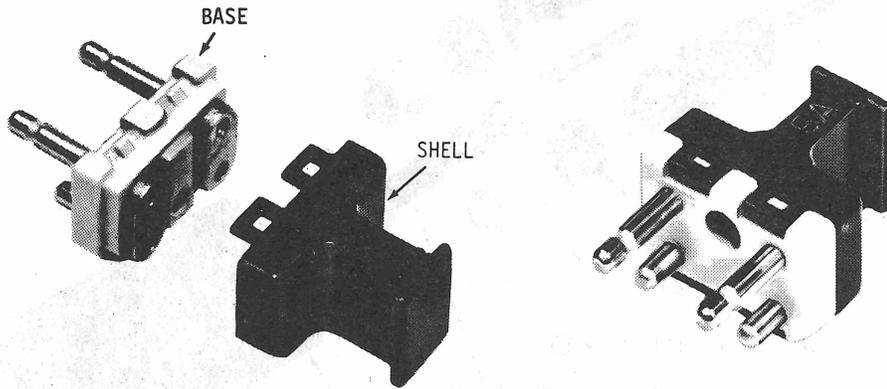
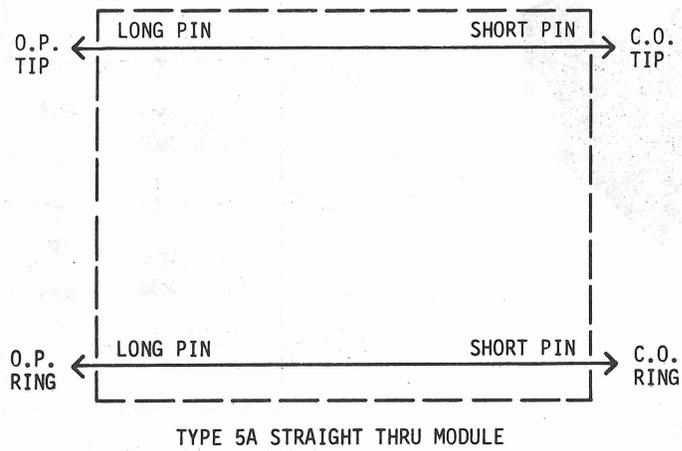
TYPE 4A HEAT COIL & CARBON AIR-GAP ARRESTER



### SPECIFICATIONS

Type of Protection . . . . .	Voltage, sneak current, and power fault protection with MESA carbon blocks and heat coils
Nominal Voltage Breakdown . . . . .	350V (white dot on shell) or 450V
Approximate Resistance . . . . .	3.45Ω
Current Load (3 hour limit) . . . . .	0.35A
Current Load (10 second limit) . . . . .	1.0A
Shell Number . . . . .	4A
Shell Color . . . . .	Black (Standard Circuit) Red (Special Circuit)

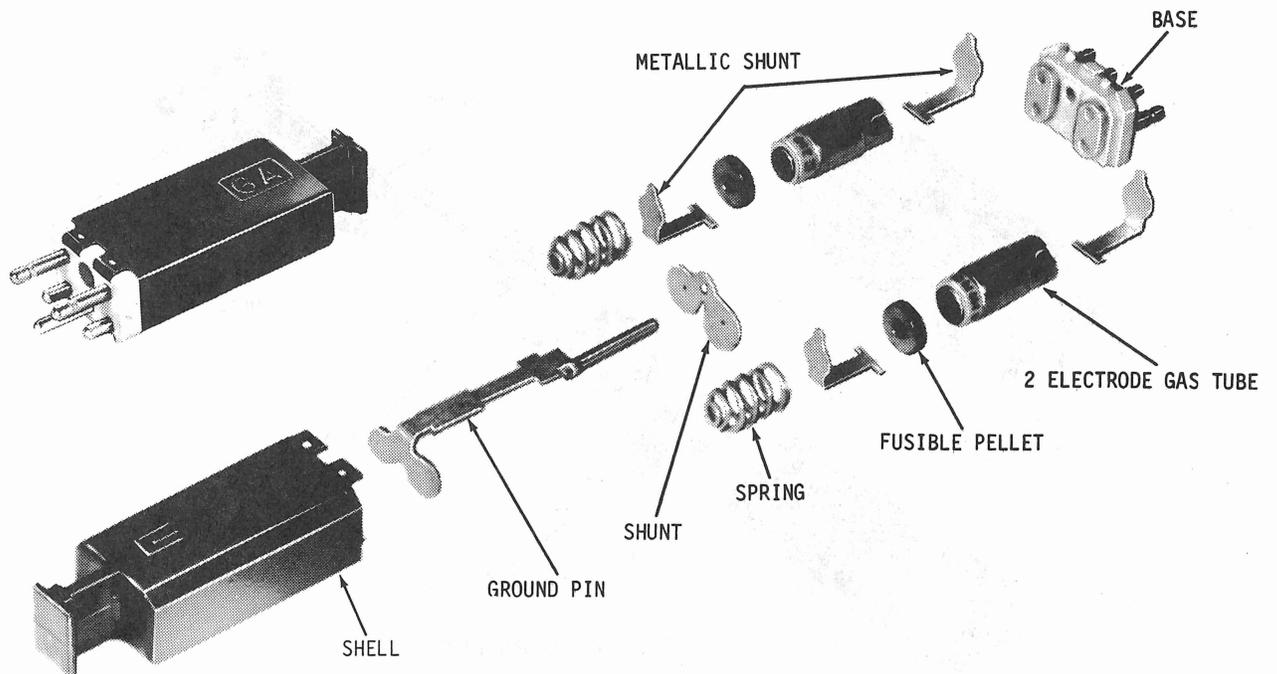
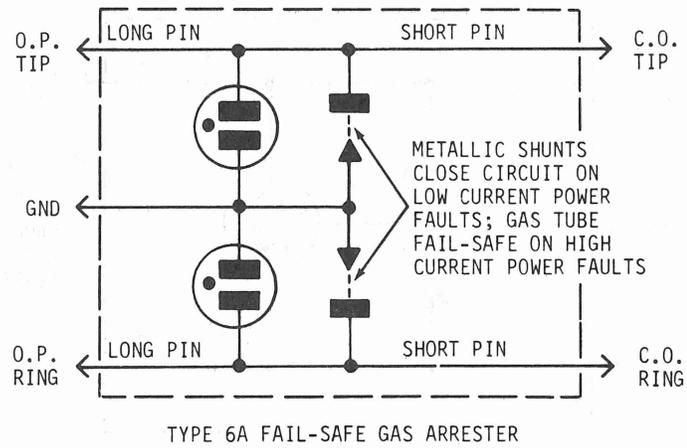
Figure 11. Type 4A Protector Module Details



### SPECIFICATIONS

Type of Protection . . . . .	None (Straight-thru). Provides circuit continuity where no protection is required, such as, unexposed central office circuits. A long shell version is also available to permit easy removal when the module is in a position on the connector base that is surrounded by other long shell modules.
Shell Number . . . . .	5A
Shell Color . . . . .	Black (Unprotected Circuit), Red (Unprotected Special Circuit), Yellow (Unprotected Circuit), with long shell (same size as 4A).

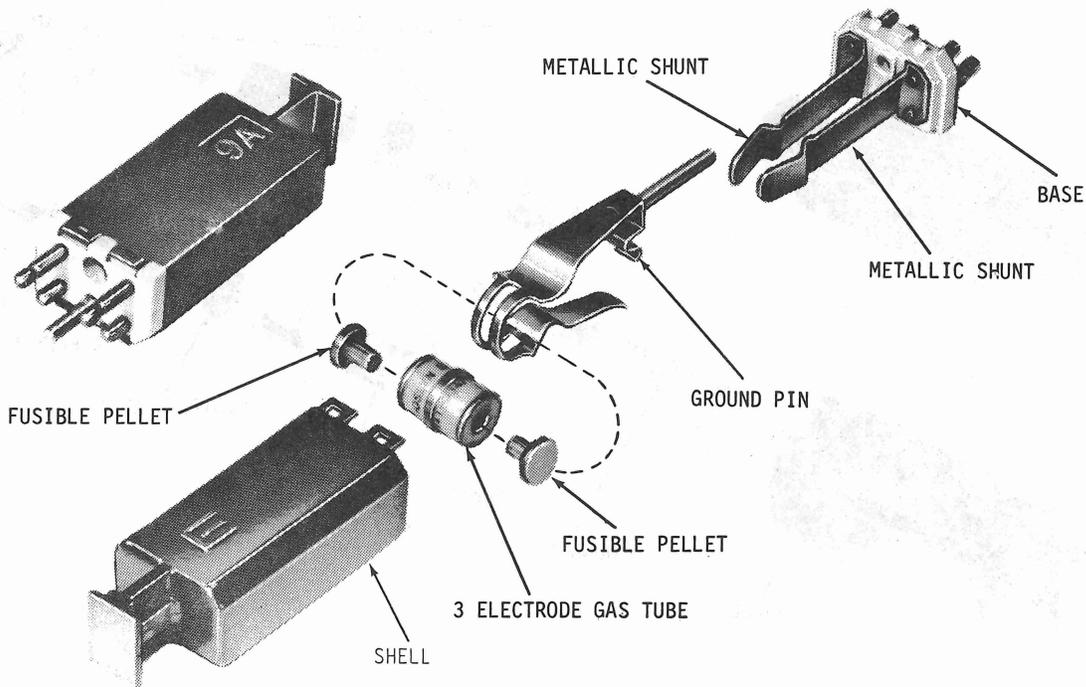
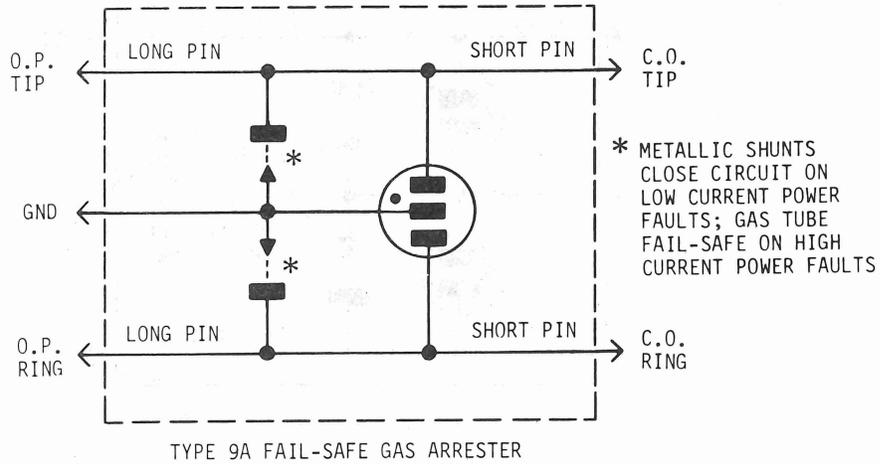
Figure 12. Type 5A Protector Module Details



### SPECIFICATIONS

Type of Protection .....	Voltage protection with a pair of two electrode fail-safe gas arresters. This self restoring gas arrester will shunt transient voltages to ground and return to normal in microseconds
Nominal Voltage Breakdown .....	400 Vdc
Shell Number .....	6A
Shell Color .....	Black (Standard Circuit) Red (Special Circuit)

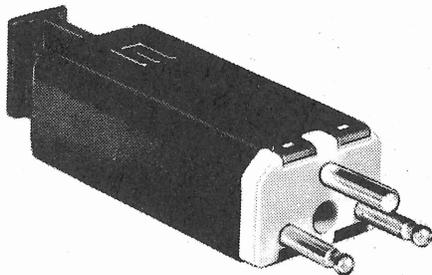
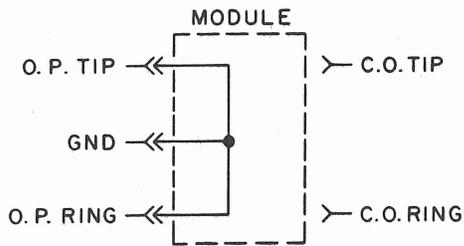
Figure 13. Type 6A Protector Module Details



### SPECIFICATIONS

Type of Protection . . . . .	Voltage protection with a single three electrode fail-safe gas arrester. This self restoring gas arrester will shunt transient voltages to ground and return to normal in microseconds.
Nominal Voltage Breakdown . . . . .	400 Vdc
Shell Number . . . . .	9A
Shell Color . . . . .	Black (Standard Circuit) Red (Special Circuit)

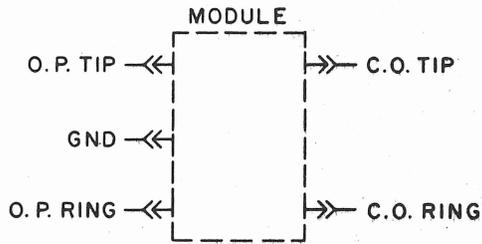
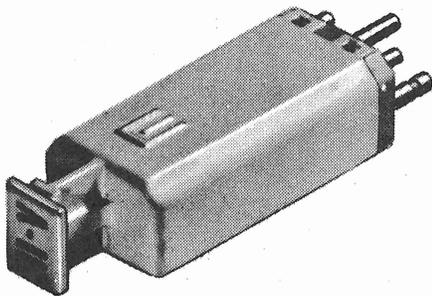
Figure 14. Type 9A Protector Module Details



**SPECIFICATIONS**

Type of Protection . . . . .	Permanent ground on outside plant cable pairs. Used to temporarily disconnect a subscriber line in the idle condition or not in use. Prevents noise induction to adjacent circuits. C.O. side is disconnected.
Shell Number . . . . .	3A, 4A, or 5A
Shell Color . . . . .	Green

Figure 15. Denied Service Grounding Module Details



**SPECIFICATIONS**

Type of Protection . . . . .	None. No connections on any pins. Used as a warning marker for high voltage testing. Handle marked "HI-V" in red for easy identification.
Shell Number . . . . .	4A
Shell Color . . . . .	White

Figure 16. High Voltage Warning Module Details

## SECTION 200 - INSTALLATION

### 4. GENERAL.

4.01 Two types of installation procedures are provided in the following paragraphs. The procedure in paragraph 6.02 is for stubbed Connectors and the procedure in paragraph 6.03 is for stubless Connectors. Because of the compact size of the C-377 Connector, a new Universal Vertical Adapter Bar must be added to the MDF (main distribution frame) per paragraph 5.

4.02 Prior to installing C-377 Connectors, open the riser holes in the floor per local C.O. instructions. (For overhead cable, first follow instructions in paragraph 11.) Remove any fanning strips on the MDF vertical. The C-377 Connector has fanning strips built into the connector base and mounting bracket.

### NOTE

Connectors are shipped with the protection modules in the "detent" position. (Protection on O.P. pairs, but pairs disconnected from C.O.). It is not necessary to remove the protector modules to install the Connector.

### 5. INSTALLING UNIVERSAL VERTICAL ADAPTER BAR.

5.01 The C-377 Connector requires a Universal Vertical Adapter Bar to accommodate the compact spacing dimensions of the connector base. This adapter bar is used in place of the normal vertical (with 8-inch centers for mounting holes) by bolting to the ends of the transverse arms (see figure 17).

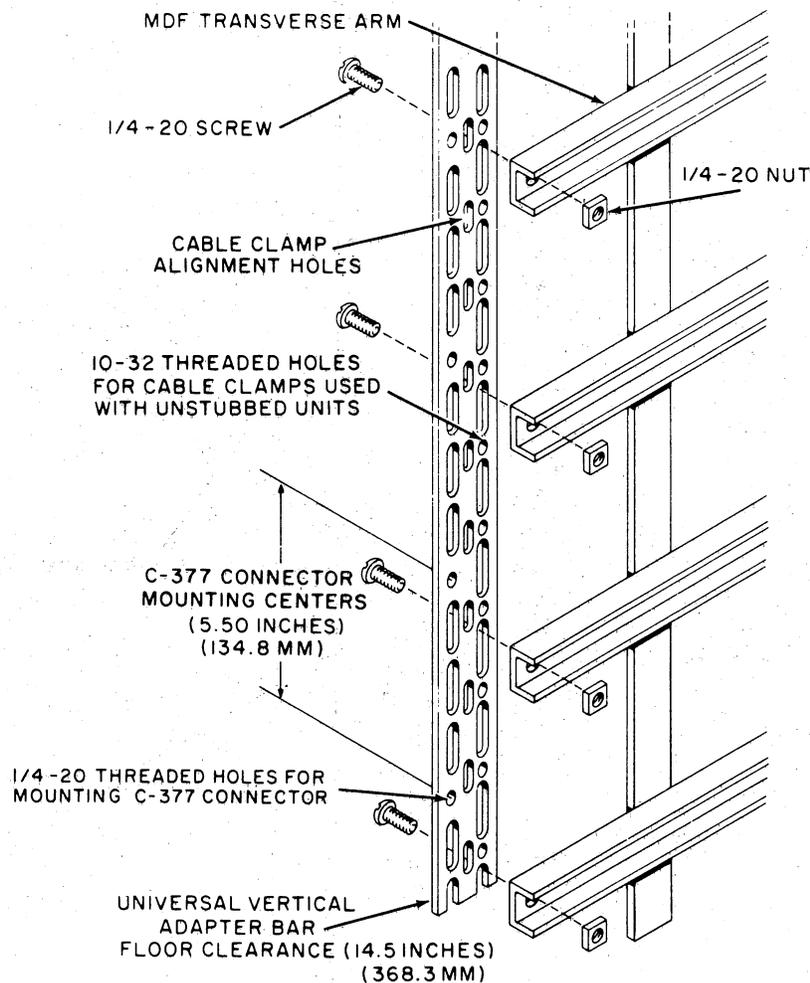


Figure 17. Installation of Universal Vertical Adapter Bar on MDF Transverse Arm

5.02 The Universal Vertical Adapter Bar is also used when the normal vertical cannot be removed. In this case, the Universal Vertical Adapter Bar is bolted to the side of the existing vertical, with spacer washers to provide proper screw clearance (see figure 18).

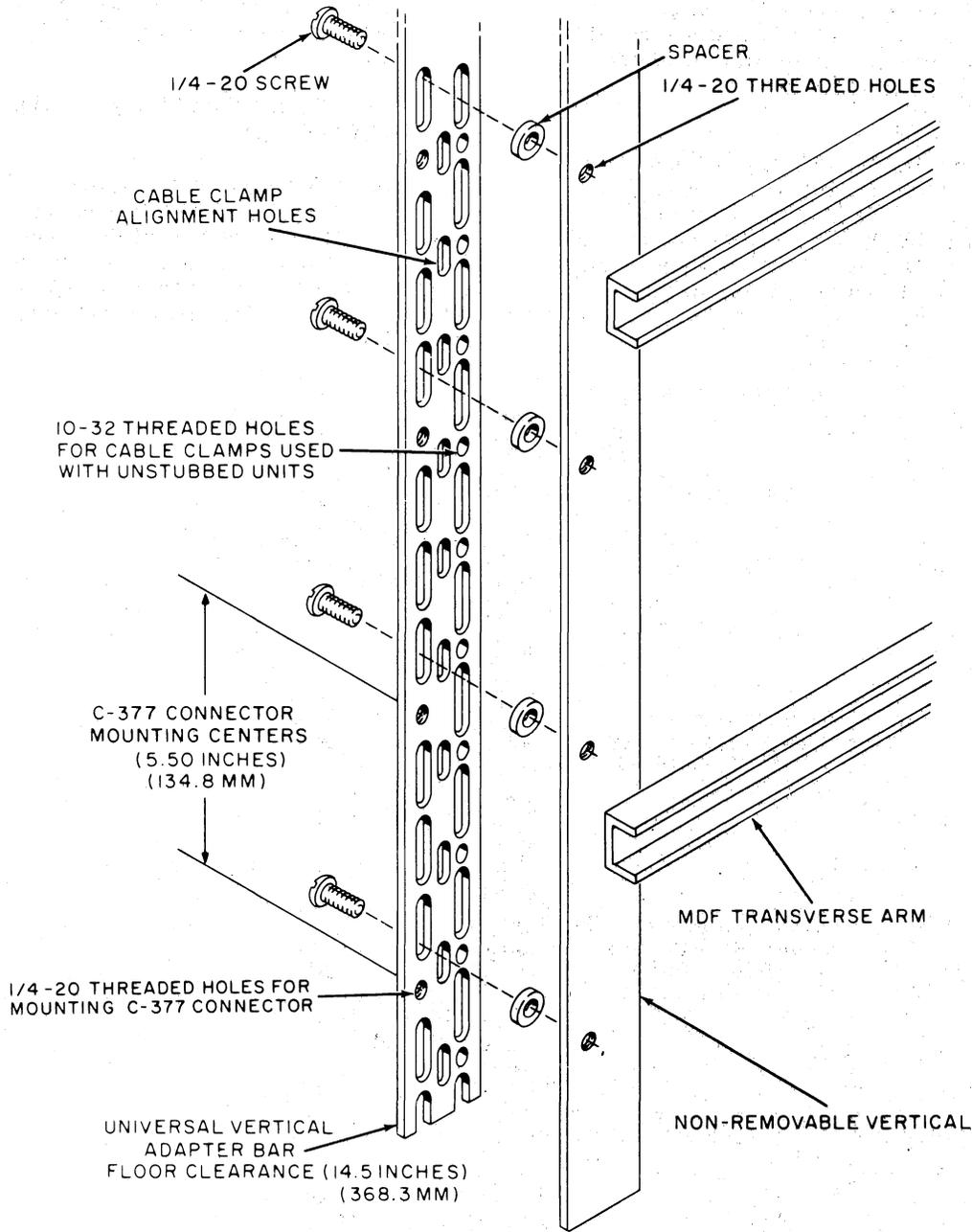


Figure 18. Installation of Universal Vertical Adapter Bar on Non-Removable MDF Vertical

6. INSTALLING CONNECTOR BASE.

6.01 PRECAUTIONS. Observe the following precautions while handling and installing the C-377 Connector.

- a. Store the C-377 Connector and protector modules in a dry location. Do not leave the units on loading docks or in outside locations where assemblies may be exposed to the weather.
- b. Use care when unpacking the Connector from the shipping carton to avoid damage to connector base, protector modules or cable stub. Refer to figure 19 for typical Connector packing.
- c. DO NOT BEND CABLE STUB INTO A SHORT RADIUS CURVE; the cable pairs may be damaged.
- d. Do not remove the Connector from its protective carton until it is ready for installation on the MDF.

6.02 STUBBED CONNECTORS. Install stubbed C-377 Connectors per the following steps:

- a. Remove the Connector from the shipping carton. Remove any cable twist that may be present in the cable stub.
- b. Start the two 1/4 x 20 mounting screws (Supplied - slotted with hex head) in the appropriate mounting holes in the left side of the Universal Vertical Adapter Bar. Engage about one full turn. If access to the mounting screws is difficult, a short 3/8-inch nutdriver (Cook part No. 452-0500, or equivalent) may be helpful.

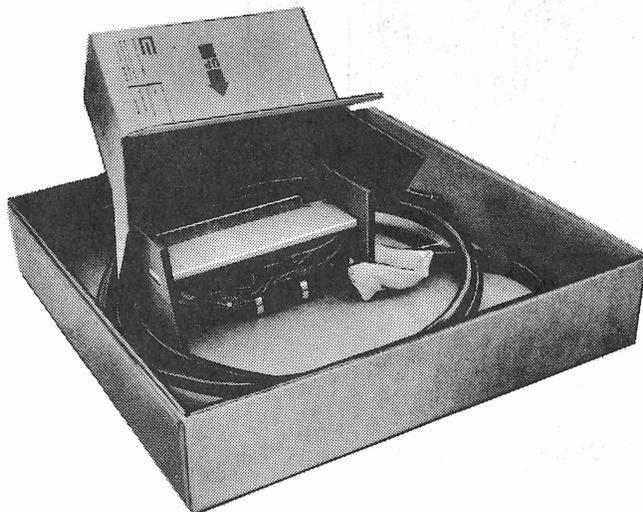


Figure 19. Typical Connector Packing Details

- c. Mark the cable number and pair count on the Connector cable stub. Place cable stub through appropriate riser hole beneath the desired MDF vertical.
- d. Attach the Connector to the Universal Vertical Adapter Bar by sliding the slots in the oblique angle mounting bracket around the mounting screws, as shown in figure 20. Position the Connector in the straight-on position and tighten the two mounting screws.
- e. Ground the Connector by one of the two methods outlined in paragraph 7, or by local C.O. procedures.
- f. Arrange all the stub cables against the transverse arms and other parts of the MDF to provide a neat and orderly routing to the riser holes. Lash the stub cables to the transverse arms (and other locations if necessary). (See figure 20).
- g. Seal the riser holes in the floor in accordance with local instructions.

IMPORTANT NOTE

Be sure to perform the following step to insure good Connector operation.

- h. When carbon protection is used, test the protector modules for carbon dust shorting per paragraph 9. Be sure all protectors are cleared before proceeding with step i.
  - i. Splice the cable stub to the entrance cable. The cable stub is wired with standard cable wire color coding. Cable pairs can be matched to the central office jumper terminals on the back of the connector base per table 4.
  - j. Connector base is now ready for jumpering to C.O. equipment. Be sure to leave protector modules in detent position to prevent any line faults from appearing on the C.O. jumper terminals during jumpering.
- 6.03 STUBLESS CONNECTORS. Install stubless C-377 Connectors per the following steps:
- a. Remove the Connector from the shipping carton.
  - b. Remove plastic jumper field cover, if used, and loosen two oblique angle bracket mounting screws (see figure 7). Loosen screws sufficiently for heads to clear recessed mounting holes (but do not remove screws).
  - c. Separate connector base and oblique angle mounting bracket.

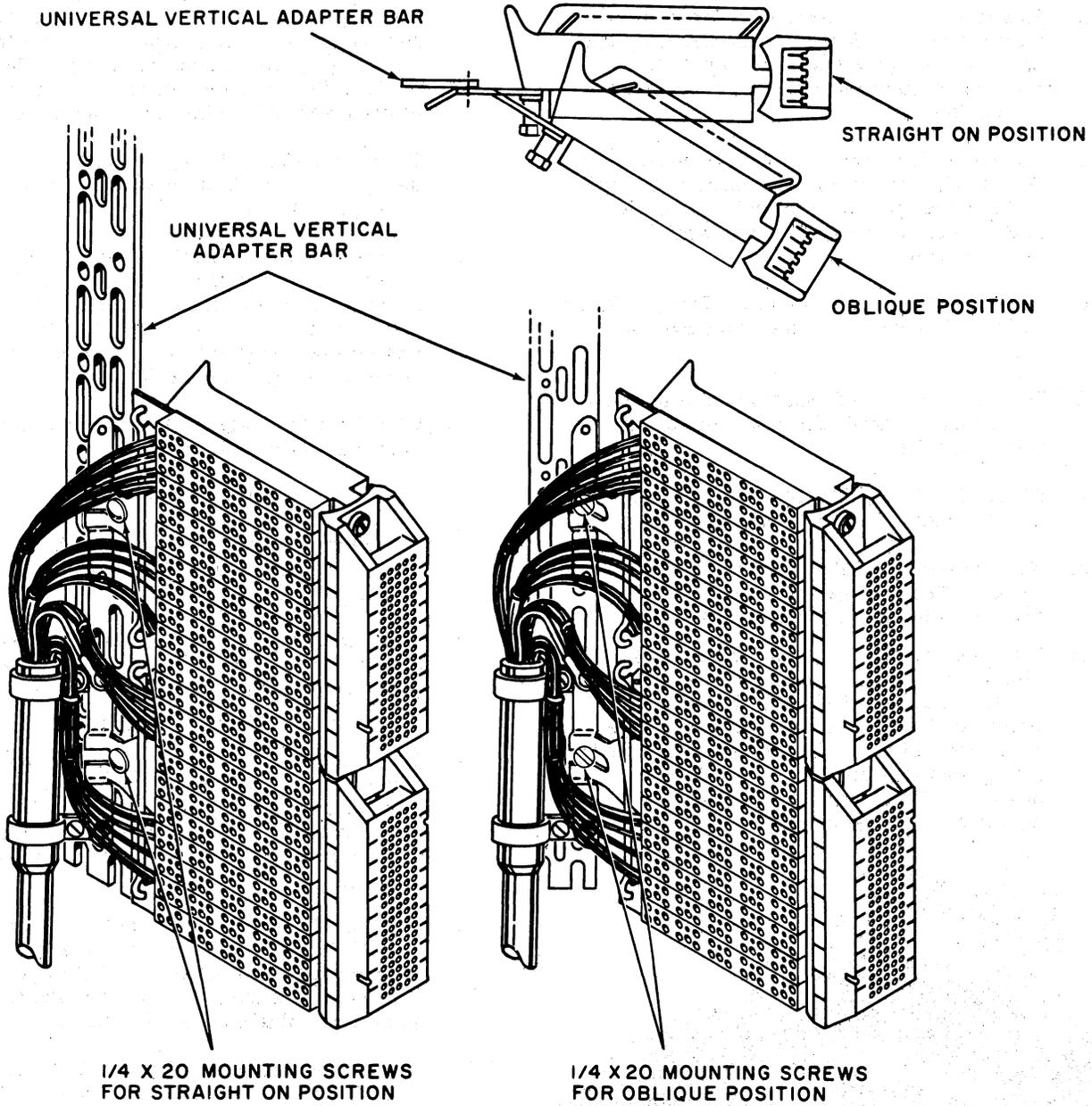


Figure 20. Mounting Stubbed C-377 Connector to MDF

Table 4. Cable Pair Color Codes

CABLE PAIR GROUP	BINDER COLOR	CABLE PAIR SUB-GROUP	TIP WIRE COLOR	RING WIRE COLOR (FOR EACH TIP WIRE COLOR)
1-25	Blue	1-5 6-10 11-15 16-20 21-25	White - Red - Black - Yellow - Violet -	{ 1st wire-Blue 2nd wire-Orange 3rd wire-Green 4th wire-Brown 5th wire-Slate
26-50	Orange	26-30 31-35 36-40 41-45 46-50	White - Red - Black - Yellow - Violet -	- Same as above
51-75	Green	51-55 56-60 61-65 66-70 71-75	White - Red - Black - Yellow - Violet -	- Same as above
76-100	Brown	76-80 81-85 86-90 91-95 96-100	White - Red - Black - Yellow - Violet -	- Same as above

- d. Remove screws from cable clamps and separate cable clamps from oblique mounting bracket.
- e. Mount cable clamps on Universal Vertical Adapter Bar (see figures 17, 18, and 21), in the position desired for the C-377 Connector. Use screws removed in step (d).
- f. Obtain desired cable stub, place cable stub through appropriate riser hole beneath the desired MDF vertical, and mount in cable clamps. Mark cable number and pair count on cable stub. Attach shield ground wire under top cable clamp screw. (See figure 21). If multi-hundred sheathed cable is stubbed and formed, run shield ground to bus bar. Cable should also be moisture sealed at sheath butt point.
- g. Mount oblique angle mounting bracket to Universal Vertical Adapter Bar using 1/4-20 screws. Mount the oblique position (see figure 22).
- h. Identify and separate the four 25-pair binder groups of the cable stub and feed through the oblique angle mounting bracket fanning strip holes (see figure 22).
- i. Replace connector base removed in steps (b) and (c) (see figure 23). Tighten upper and lower mounting screws. Be sure screws are fitted into recessed holes while tightening.
- j. Remove T-guard (or flat trough cover) from O.P. terminals. Connect cable stub wires to O.P. terminals. Use table 4 and figure 24 as a reference in assigning pairs to terminals.
- k. Replace T-guards (or flat trough covers) when wiring is complete.
- l. Loosen oblique angle mounting bracket mounting screws and slide Connector into straight-on position. Tighten the two 1/4-20 mounting screws.
- m. Ground the Connector by one of the two methods outlined in paragraph 7, or by local C.O. procedures.
- n. Arrange all the stub cables against the transverse arms and other parts of the MDF to provide a neat and orderly routing to the riser holes. Lash the stub cables to the transverse arms (and other locations if necessary).

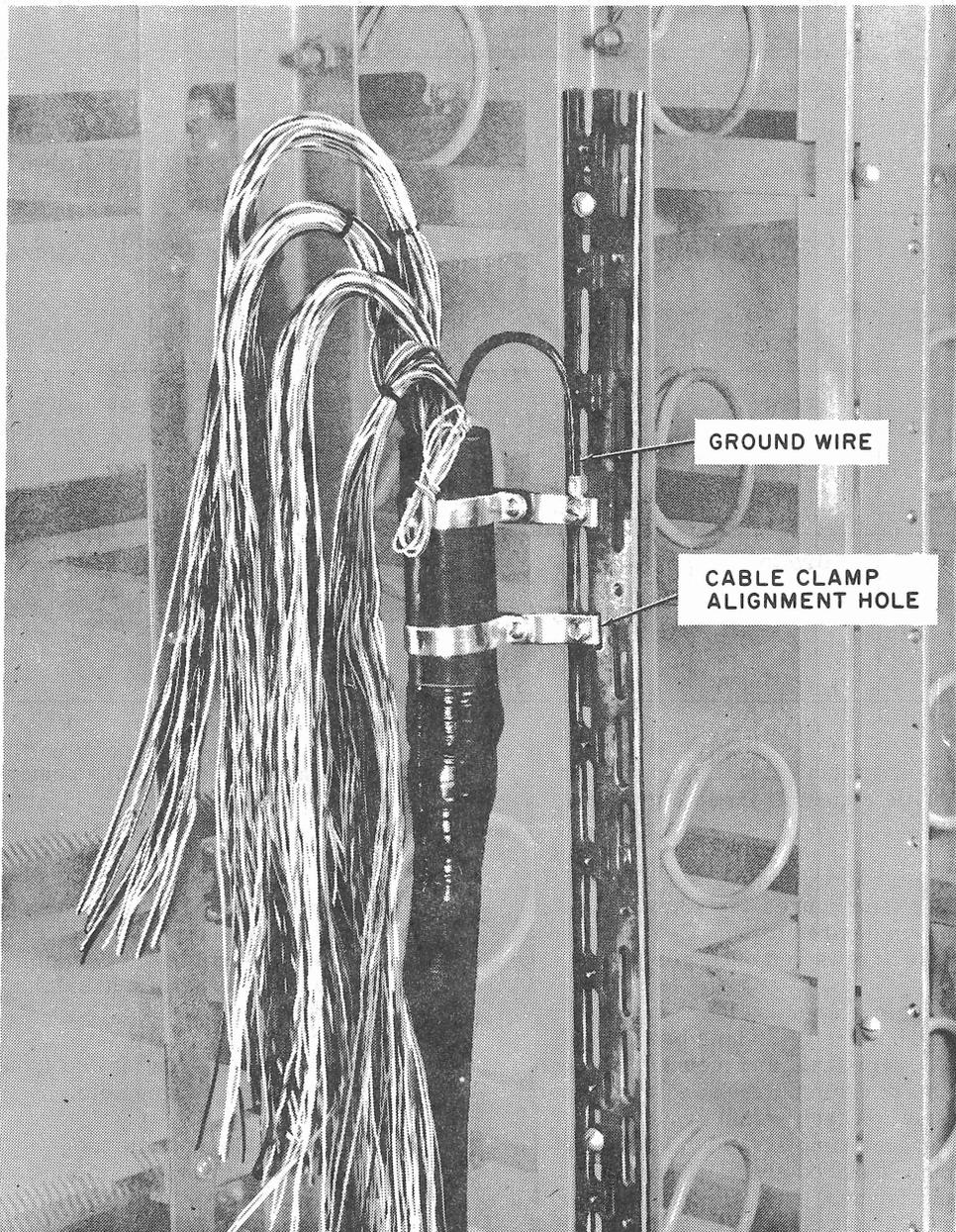


Figure 21. Cable Clamp Mounting for Stubless Connectors

- o. Seal the riser holes in the floor in accordance with local instructions.

**IMPORTANT NOTE**

Be sure to perform the following step to insure good Connector operation.

- p. When carbon protection is used, test the protector modules for carbon dust shorting per paragraph 9. Be sure all protectors are cleared before proceeding with step (q).
- q. Splice the cable stub to the entrance cable. The cable stub is wired with standard cable wire color coding. Cable pairs can be

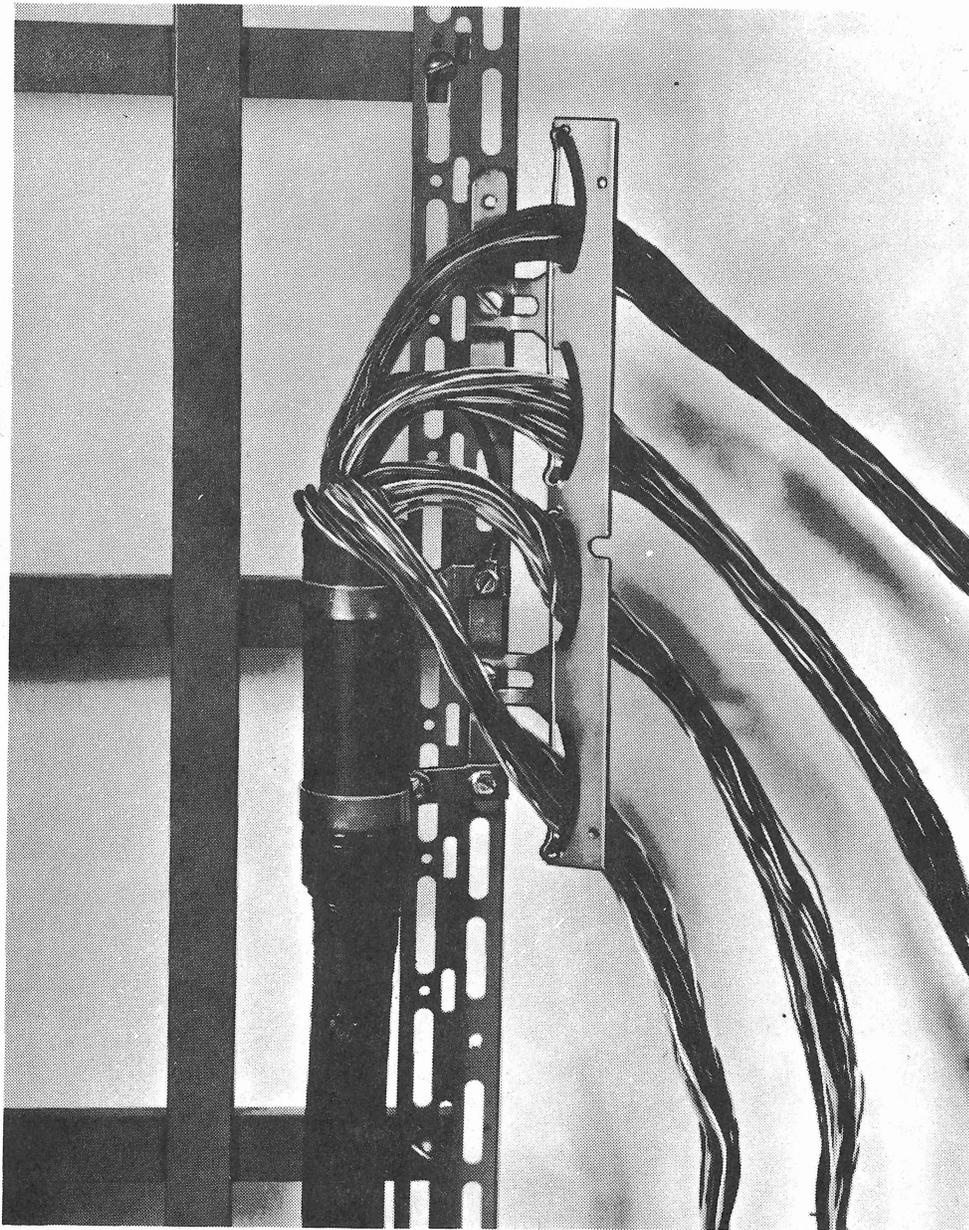


Figure 22. Oblique Angle Mounting Bar Installation

matched to the central office jumper terminals on the back of the connector base per table 4.

- r. Connector base is now ready for jumpering to C.O. equipment. Be sure to leave protector modules in detent position to prevent any line faults from appearing on the C.O. jumper terminals during jumpering.

7. GROUNDING.

7.01 The C-377 Connector may be grounded by the basic ground method or the independent ground method. Other local procedures may also be used, but be sure to use the ground terminal on the Connector for ground wires.

7.02 The basic ground method connects the Connector ground wiring to the oblique mounting angle bracket and to ground straps. Ground is then supplied to the Connector from the MDF ground bus through the MDF and the ground straps. This type of grounding is accomplished by using

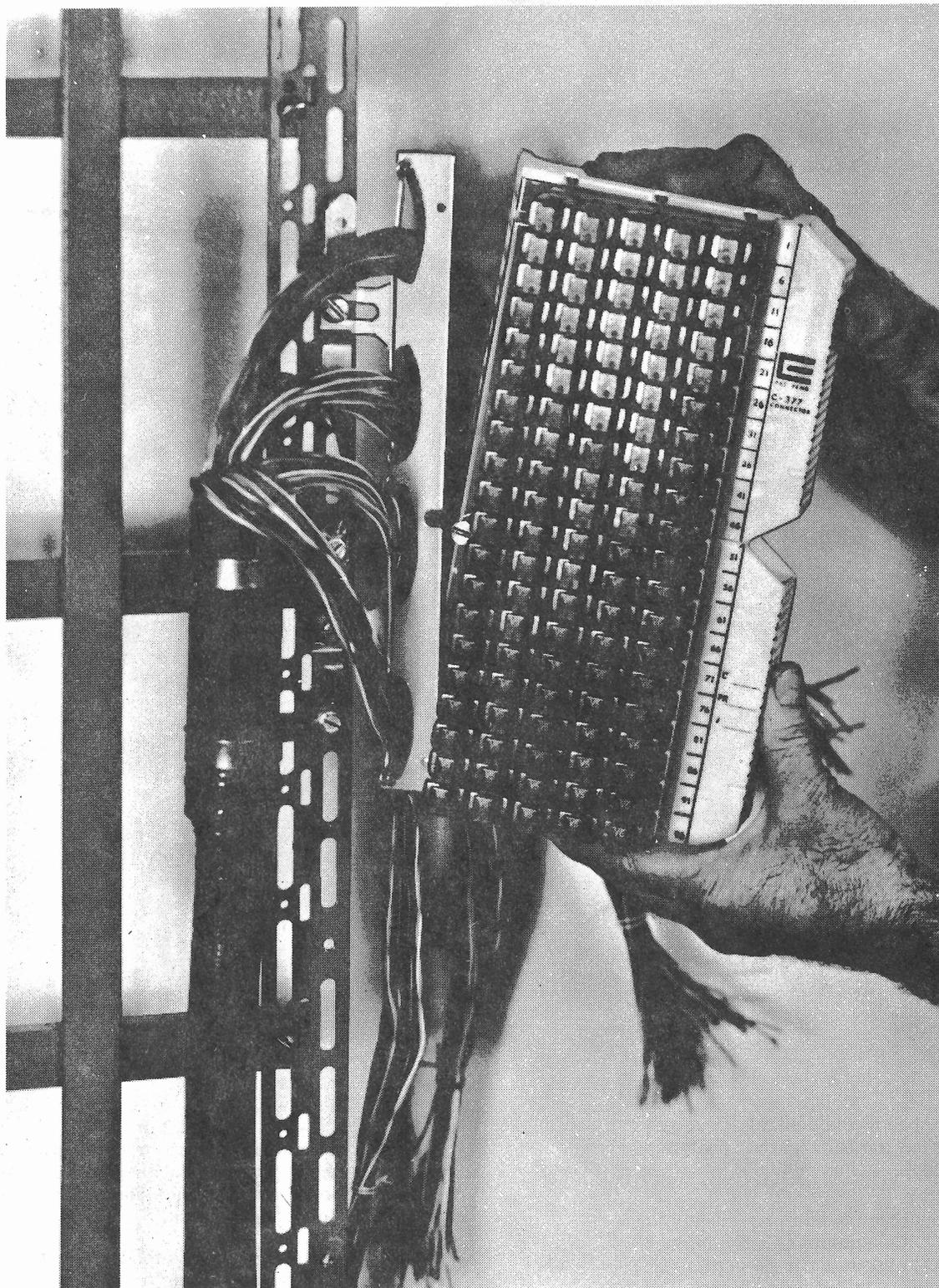
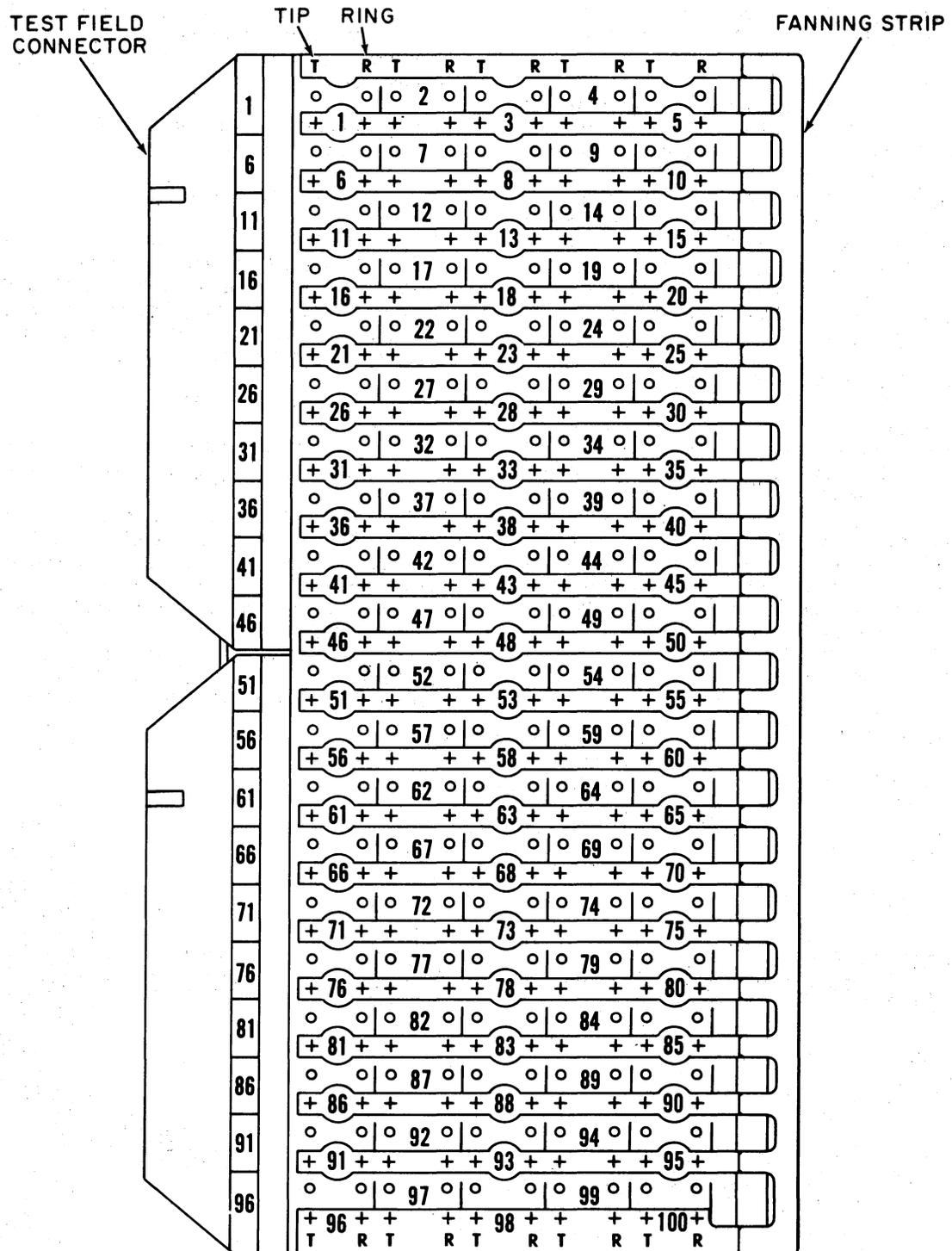


Figure 23. Replacing Connector Base



**LEGEND:**  
 (o) O.P. TERMINALS (WITH T-GUARDS)  
 (+) C.O. TERMINALS (ANGLED PINS, NOT COVERED)

Figure 24. C-377 Connector Terminal Assignments  
(Viewed From Wire-Wrap Side)

an interconnector ground strap (supplied) between each ground screw and a long ground strap from the last ground screw to the ground bus (see I, figure 26).

7.03 The independent ground method is similar to the basic method except that the ground terminal is isolated from the oblique angle mounting bracket. Ground is then supplied from the ground bus through linked ground straps to each Connector and no ground circuit is carried through the MDF. This type of grounding requires that a fiber washer (supplied) be placed under the ground screw and ground strap terminals to insulate the ground plane from the oblique angle mounting bracket (see II, figure 26).

8. MARKING AND JUMPERING.

8.01 The side of the lower test field is provided with a space to mark the cable number and pair count for the Connector (see figure 7). After marking, the Connector can be jumpered. C.O. terminals are angled out for easy access when the Connector is in the straight-on position. Terminal numbers are marked in black, on both sides of the test field, with a number for the beginning of every set of five terminals (1, 6, 11, 16, etc.). Refer to figure 24. Terminal numbers are also molded into the connector base between the rows of terminals (three numbers per row: 1, 3, 5, 6, 8, 10; etc.)

8.02 All jumper wires should be routed through the connector base fanning strip holes before being wire-wrapped to the desired terminal. Use the fanning strip hole adjacent to the terminals being wired.

8.03 Replace plastic jumper field cover, if used, (see figure 7).

9. CARBON CLEARING.

9.01 The following procedure may be used to test 3A and 4A protectors and remove any carbon dust which may accumulate in the carbon block gap. This procedure shall be performed prior to splicing the cable stub into the entrance cable and with the protectors in the detent position.

NOTE

Be sure protectors are not connected to the C.O. equipment before testing.

9.02 Connect test equipment as shown in figure 25. Touch the test probe to each tip and ring test terminal located on the top and bottom test fields. Use a blunt probe when contacting the test field to avoid damaging the gold plated test field contacts. Single pair Test Cord 303-1001 is an excellent probe to use for this purpose. This dual contact probe permits clearing both tip and ring circuits simultaneously when the clip leads are tied

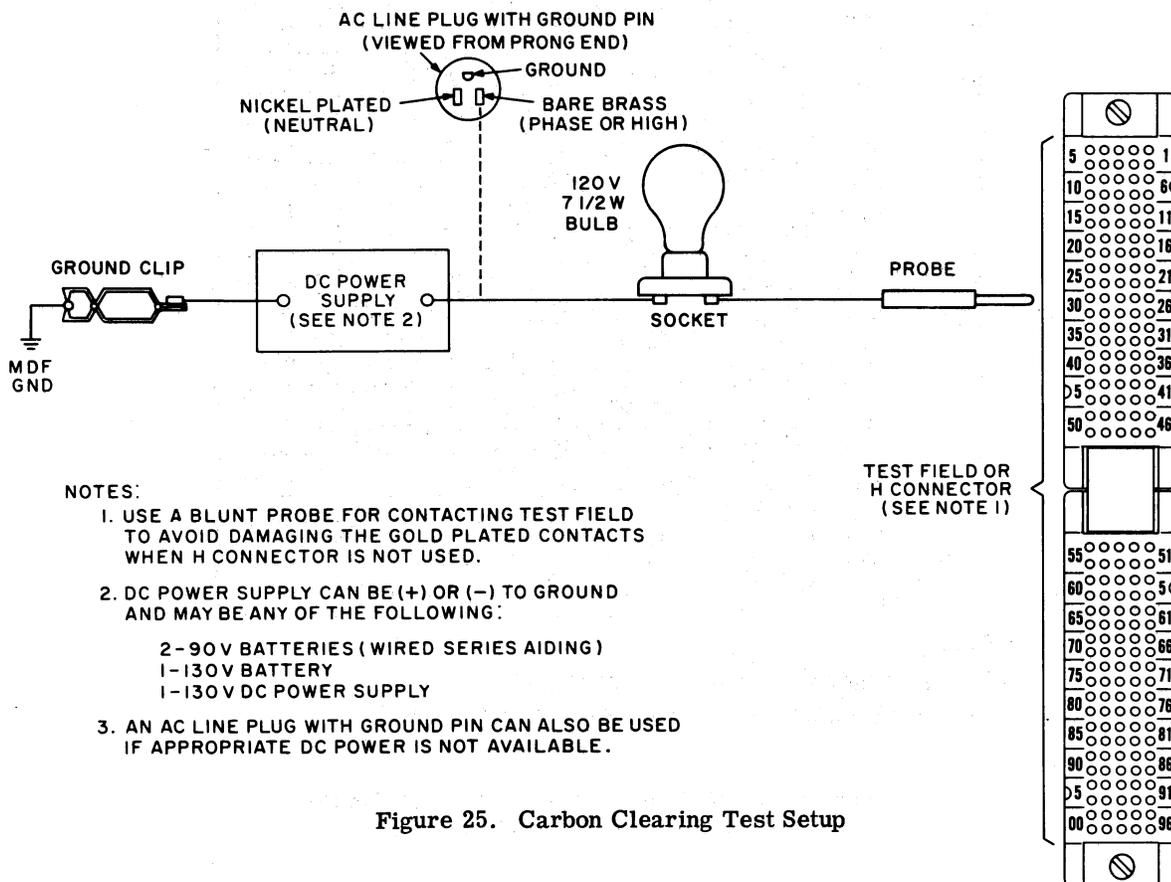
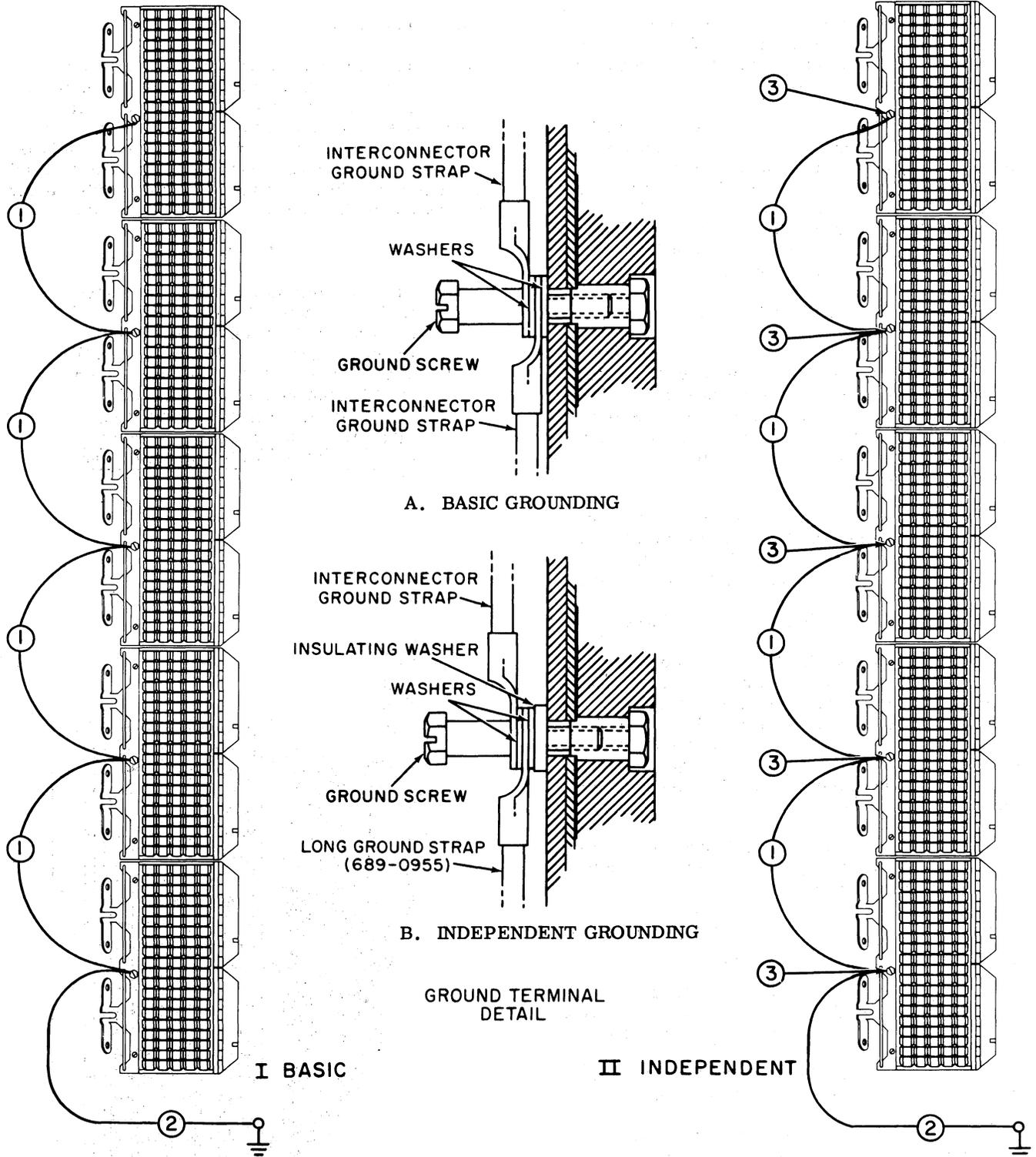


Figure 25. Carbon Clearing Test Setup



**LEGEND:**

- 1. INTERCONNECTOR GROUND STRAP (023-7712, SUPPLIED)
- 2. LONG GROUND STRAP (689-0955, NOT SUPPLIED)
- 3. INSULATING WASHER (SUPPLIED, SEE GROUND TERMINAL DETAIL)

Figure 26. C-377 Connector Grounding Methods

together and connected to the lamp and battery circuit. "H" Test Connector 303-1008 may also be used if it is desired to avoid all test probe contact with the test field terminals.

9.03 The test probe should remain in contact with the test terminal for one full second or longer. If a carbon-dust condition exists, the light bulb will illuminate. The flow of current should burn out the carbon dust and the lamp will then extinguish. If the lamp remains illuminated, remove the protector and replace with a new unit. Test the new protector in the same manner.

#### 10. SPLICING TO ENTRANCE CABLE AND C.O./O.P. CONNECTION.

10.01 The final two steps in the installation of the C-377 Connector are the entrance cable splicing and the C.O./O.P. connection. Splice the cable stub to the entrance cable using table 4 as a guide. The cable stub is wired with standard cable wire color coding.

10.02 Push each protector module in to the fully inserted position from the detent position. The outside plant and central office are then connected. This completes the installation procedure.

#### 11. CHANGING "STUB DOWN" TO "STUB UP".

11.01 C-377 CONNECTOR. If it is necessary to change the cable stub position from "stub down" to "stub up", use the following procedure. Use this method only if no other cable routing is possible. Handle the cable very carefully to avoid breaking wires. (If the "stub up" requirements is known in advance order the C-377 Connector with the "stub up" position.)

- a. Remove two screws holding cable clamps to lower mounting position on oblique angle mounting bracket.
- b. Remove two screws and nuts holding cable clamps to pressure plug.
- c. Replace cable clamps in upper mounting position on oblique angle mounting bracket using the two screws removed in step (a).
- d. Carefully turn cable stub 180 degrees and fit pressure plug into cable clamps.
- e. Secure cable clamps onto pressure plug with screws and nuts (see figure 27).

11.02 C-378 CONNECTOR. For C-378 Connectors, follow the method described in paragraph 11.01, but refer to figure 28.

#### 12. TESTING.

12.01 The connector base has two 50 pair test fields available at the top and bottom of the connector. Test points are connected directly to the outside plant cable with a separate connection for the ring and tip of every pair. The test field is marked with numbers showing the beginning and end of each row of five terminals (see figure 29). Refer to Section 300 for accessories to aid in testing.

#### NOTE

The protector modules may be placed in the detent position while testing, if desired. In this position the O.P. (outside plant) and I.P. (inside plant) are disconnected, however protection is still connected to the O.P. If testing from the test field location, take care to be sure that test voltage does not exceed protector breakdown voltage.

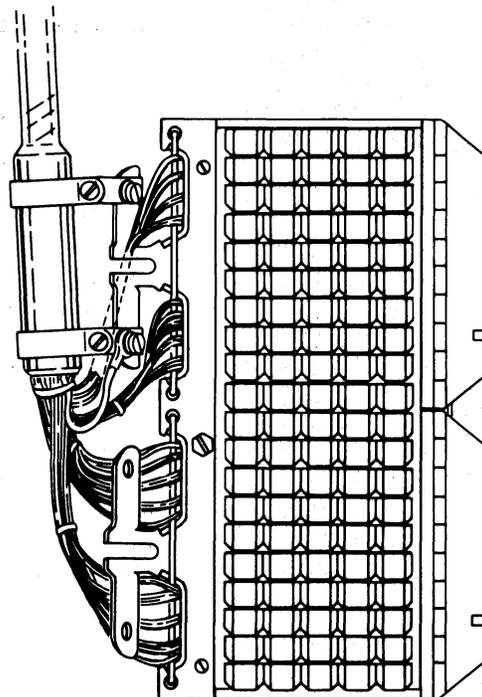


Figure 27. C-377 Connector "Stub Up" Position

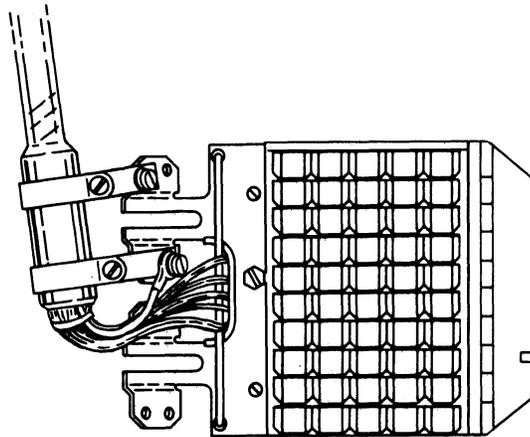


Figure 28. C-378 Connector "Stub Up" Position

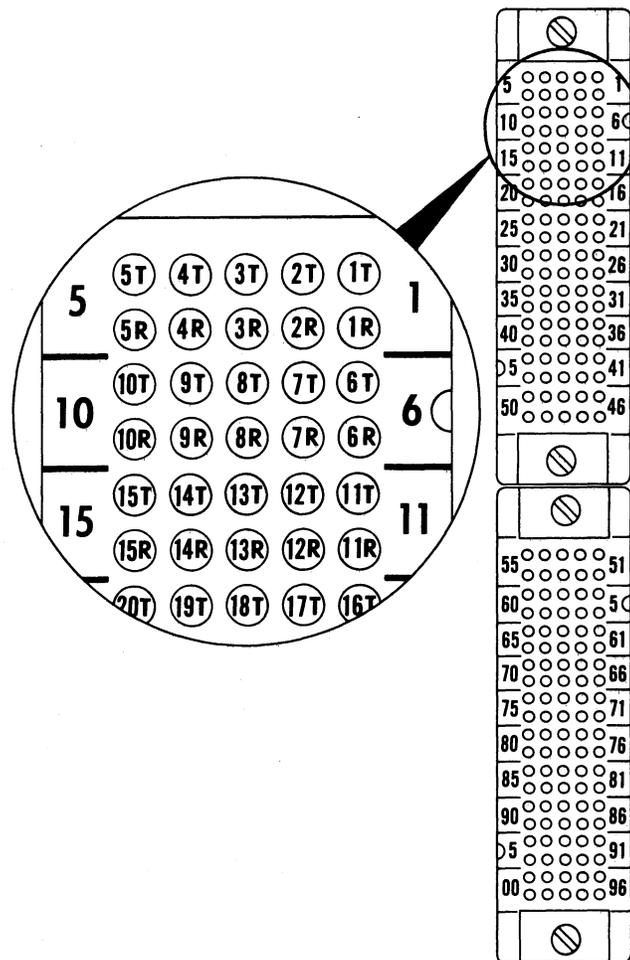


Figure 29. Test Field Terminal Details

## SECTION 300 - ACCESSORIES

### 13. GENERAL.

13.01 Accessories available for use with the C-377 Connector are described in the following paragraphs. These accessories include test equipment and ground straps.

### 14. SINGLE PAIR TEST CORD (303-1001).

14.01 This test cord plugs into the test fields to make tests on the tip and ring lines of a pair (see figure 30). A plug on one end of the cable matches the holes for a pair in the test field. The other end of the test cord is terminated with alligator clips for connection to test equipment. Use the single pair test cord as follows:

- a. Push the plug into the test field to make contact with the pair to be tested.
- b. Monitor the pair to be sure it is not being used.
- c. Attach alligator clips to test equipment. Pull protector module, for pair being tested, into the detent position.
- d. Make desired tests.

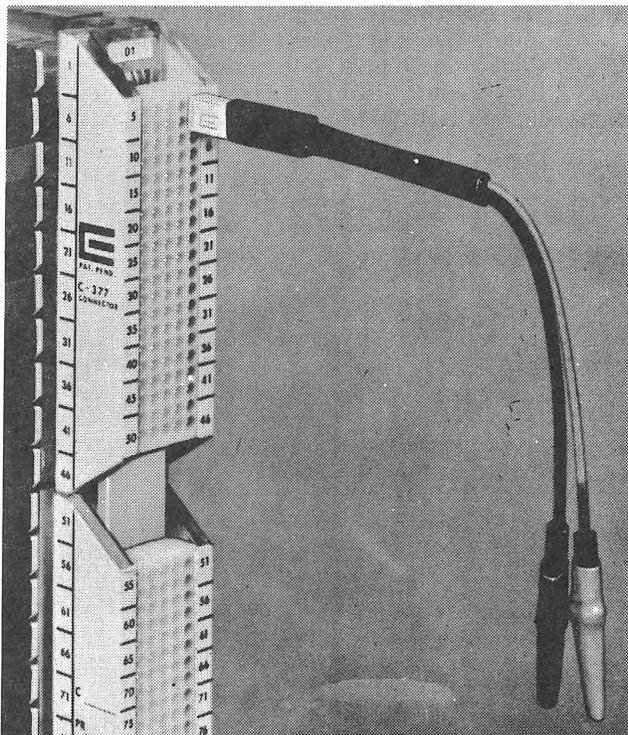


Figure 30. Single Pair Test Cord

- e. Remove test equipment and cord when testing is completed and return protector module to "in" position.

### 15. SINGLE PAIR TEST CORD WITH MINI TEST CLIPS (303-1213).

15.01 This test cord attaches to wire-wrap terminals or quick-clip terminals to make tests on the tip and ring lines of a pair (see figure 31). Two mini test clips at one end of the cable clip onto the terminals of the pair. The other end of the test cord is terminated with alligator clips for connection to test equipment. Use the single pair test cord as follows:

- a. Clip the mini test clips onto the terminals to make contact with the pair to be tested.
- b. Monitor the pair to be sure it is not being used.
- c. Attach alligator clips to test equipment. Pull protector module, for pair being tested, into the detent position.
- d. Make desired tests.
- e. Remove test equipment and cord when testing is completed and return protector module to "in" position.

### 16. FOUR-CONDUCTOR TEST CORDS (303-1012, 303-1013, AND 303-1103).

16.01 These Test Cords plug into the protector module socket after the module is removed (see figure 32). Tests can be made toward the outside plant or toward the central office. One end of the Test Cords has a plug with the same pin arrangement as a protector module. Test Cord 303-1012 has a dual telephone plug on the other end

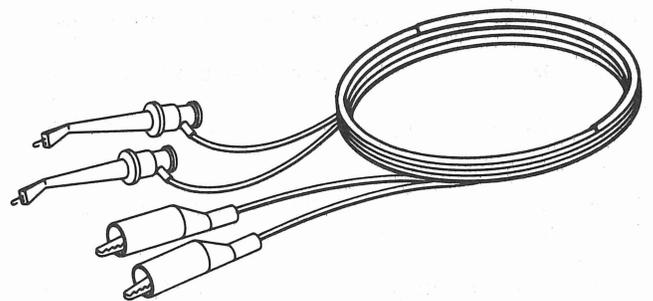


Figure 31. Single Pair Test Cord With Mini Test Clips

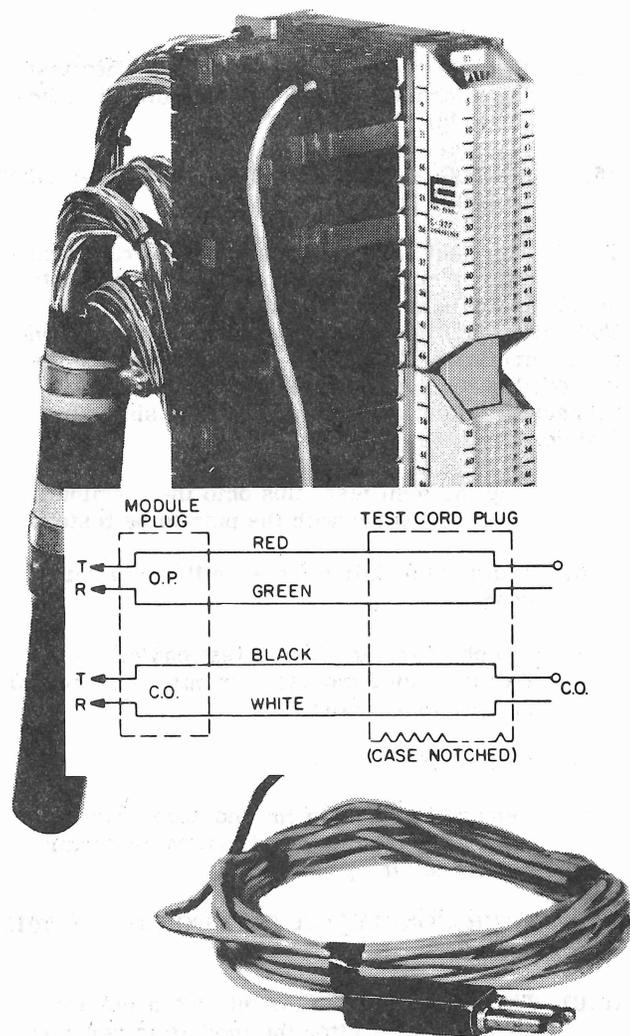


Figure 32. Four Conductor Test Cord

for connecting to a test jack or to test equipment. Test Cord 303-1013 has no termination on the cable and may be wired in to meet local conditions. Test Cord 303-1103 is terminated with four alligator clips. Use Four Conductor Test Cord as follows:

- a. Monitor line to be sure it is not being used.
- b. Remove protector module from the pair to be tested.
- c. Insert module plug into protector module position.
- d. Connect other end of cord to test equipment and make tests.

- e. After testing, remove test plug and replace protector module. Be sure central office is connected to outside plant.

17. FIFTY PAIR FRONT TAP TEST SHOE (303-1004, or 303-1080, 303-1081, and 303-1082).

17.01 A 50 Pair Test Shoe can be connected to either of the connector test fields for multi-pair outside plant testing and cable arrangements (see figure 33). Use the 50 Pair Shoe as follows:

- a. Remove plastic cover from the spring-loaded terminals of the shoe.
- b. Carefully place the shoe into position against the connector test field. Be sure clamps are behind test field. Turn wing nuts finger tight.
- c. Attach other end of cord to test equipment or another test shoe.
- d. If the tests or rearrangements require that the central office be disconnected, pull protector modules into the detent position. Return modules to "in" position after testing is completed.
- e. Remove test equipment and test shoe.

18. "H" TEST CONNECTOR (303-1008).

18.01 The "H" Test Connector (see figure 34) plugs into either the top or bottom test field on the C-377 Connector to provide terminals for testing with a test probe. Wear and damage to the test field contacts is thereby minimized.

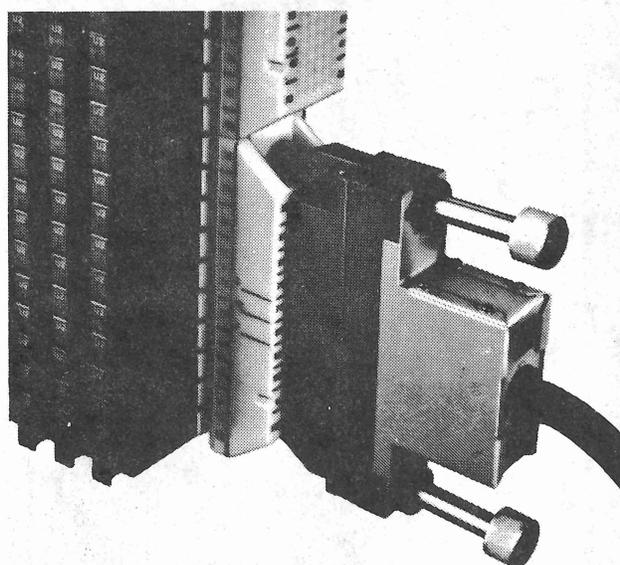


Figure 33. Fifty-Pair Front Tap Test Shoe

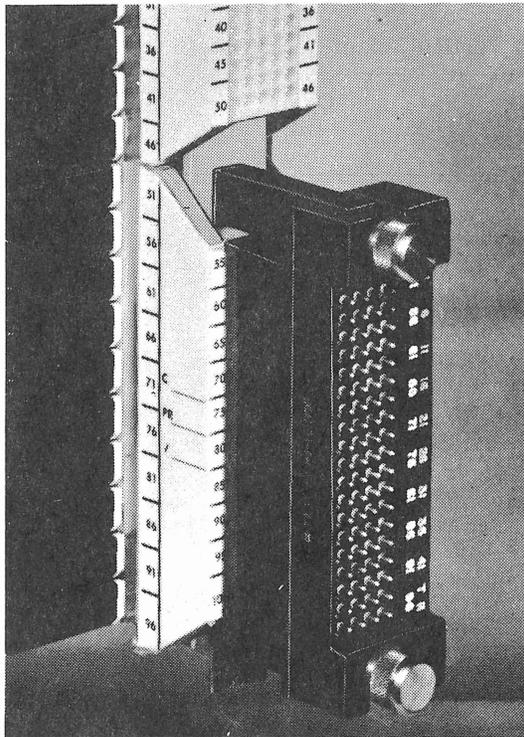


Figure 34. "H" Test Connector

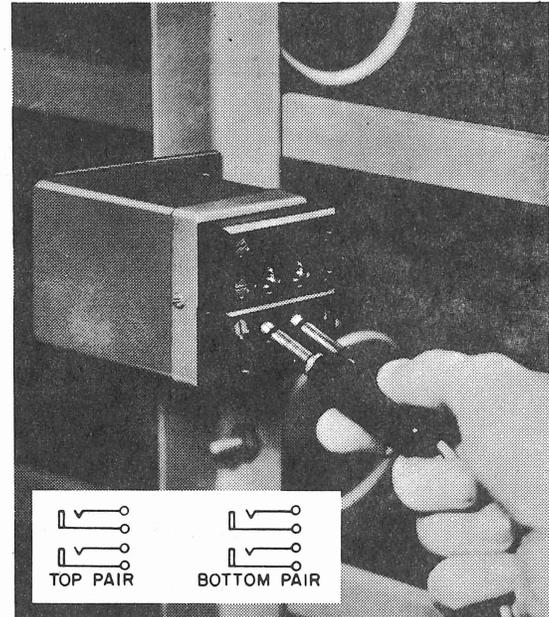


Figure 35. MDF Test Jack Assembly

19. MDF TEST JACK ASSEMBLY (303-1026).

19.01 The MDF Test Jack Assembly mounts on an MDF vertical (see figure 35) and contains two jacks compatible with the plug on Test Cord 303-1012. This plug is equivalent to WECO plug No. 289B. These jacks may be wired to remotely located test equipment.

20. C-377 UNIVERSAL VERTICAL ADAPTER BAR.

20.01 This bar is used in place of the standard vertical to mount the C-377 Connector on the MDF (see figure 36). The compact size of the C-377 Connector makes this bar necessary. Refer to paragraph 5 for additional details. Universal vertical adapter bar sizes and part numbers are listed in table 5.

21. TEST POINT INSULATOR BUTTON (303-1019).

21.01 The Test Point Insulator Button fits into the recess for the contacts on the test fields (see figure 37). This button may be used to isolate

contacts during testing with the Fifty Pair Front Tap Shoe or the "H" Test Connector.

22. CIRCUIT DESIGNATION PIN (303-1020).

22.01 The red colored Circuit Designation Pin is used to mark the position of a special circuit protector module (also colored red) when the protector module is removed. The pin fits into the blind hole opposite the ground pin terminal on the front of the connector base (see figure 38).

23. WIRE-WRAP TERMINAL CAP (545-1137).

23.01 This red colored plastic cap may be used to mark and protect the wire-wrap terminals of special circuits. The cap is designed to fit snugly over a wire-wrap terminal with a wire wrapped in place (see figure 39).

24. LONG GROUND STRAP (689-0955).

24.01 The Long Ground Strap (28-inch, No. 6 AWG) is used to connect the C-377 Connector ground screw terminal of the lowest Connector in any MDF to the MDF copper ground bus (see figure 40).

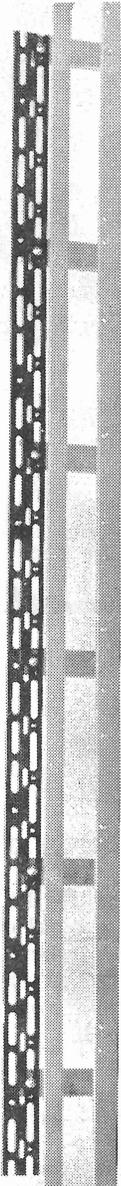


Table 5. Universal Vertical Adapter Bar Sizes

PART NO.	MDF HEIGHT	NO. OF PAIRS PROTECTED	OVERALL LENGTH (Inches)	C-377 CONNECTOR QUANTITY
377-1681	—	100	11	1
377-1682	—	200	22	2
377-1685	—	300	33	3
377-1684	—	400	44	4
377-1683	—	500	55	5
377-1670	7'	600	66	6
377-1671	8'	700	76	7
377-1672	9'	800	88	8
377-1673	10'	900	98	9
377-1674	11'-6"	1100	121	11
377-1675	14'-6"	1400	154	14

NOTE:  
REFER TO TABLE 5  
FOR SIZES AND  
C-377 CONNECTOR  
CAPACITIES.

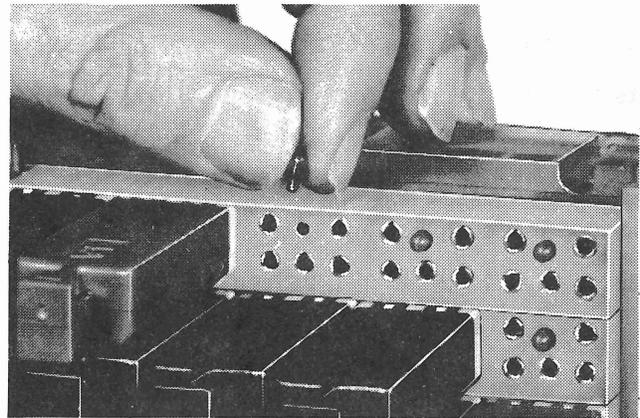


Figure 38. Circuit Designation Pin

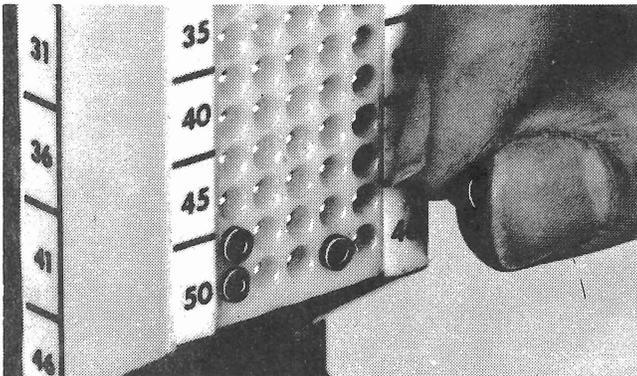


Figure 37. Test Point Insulator Button

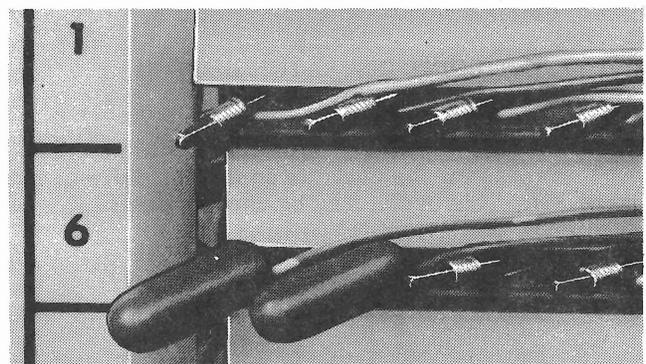


Figure 39. Wire-Wrap Terminal Cap

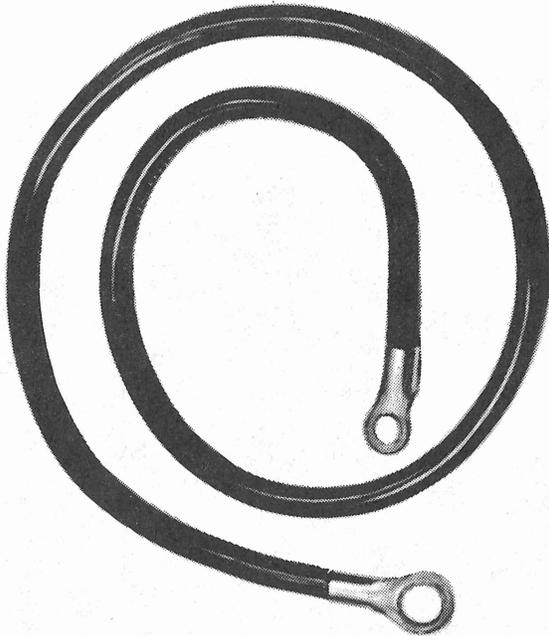


Figure 40. Long Ground Strap

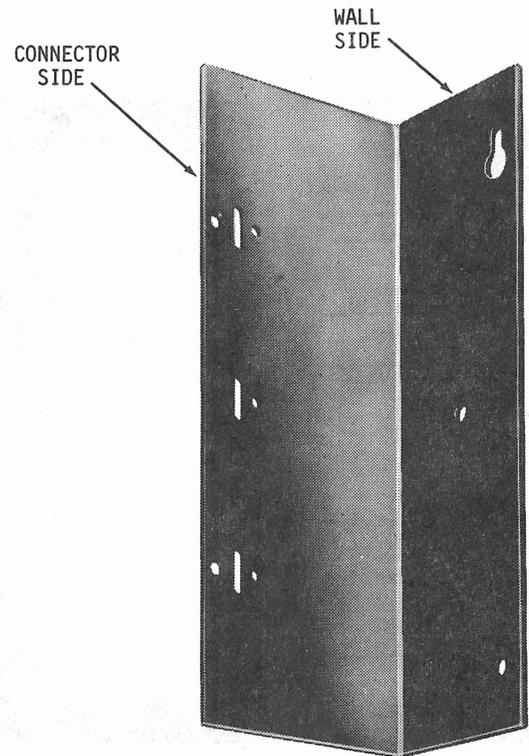


Figure 41. Wall Mounting Bracket

25. C-377 WALL MOUNTING BRACKET (377-1003).

25.01 This Wall Mounting Bracket is used to mount a C-377 Connector on a wall or other flat surface (see figure 41).

26. C-378 WALL MOUNTING BRACKET (378-1003).

26.01 This Wall Mounting Bracket, similar to part No. 377-1003, is used to mount a C-378 Connector on a wall or other flat surface.

27. HINGED TRUNK IDENTIFICATION STRIP (377-1004).

27.01 This identification strip is used as a hand marking strip for pair numbers. An adhesive strip on the hinge fits under the test fields and adheres to the connector base (see figure 42).

28. PIN REPLACEMENT KIT (377-1004).

28.01 The Pin Replacement Kit, consisting of a handle, two terminal removal shafts, and an assortment of outside plant and C.O. terminals, is used to replace broken terminals on either the C-377 or C-378 Connector.

29. T-GUARD REPLACEMENT KIT (377-1006).

29.01 This kit of 20 T-Guards (see figure 7), is used for C.O. pin protection.

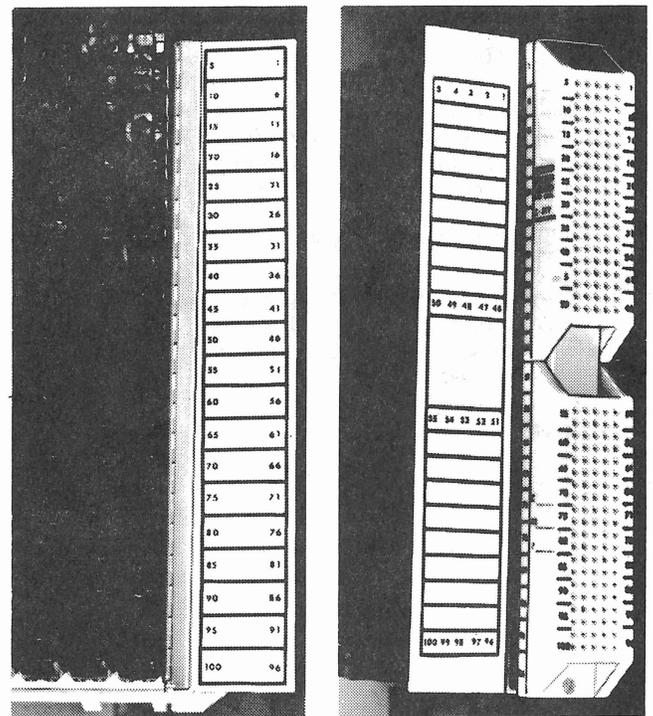
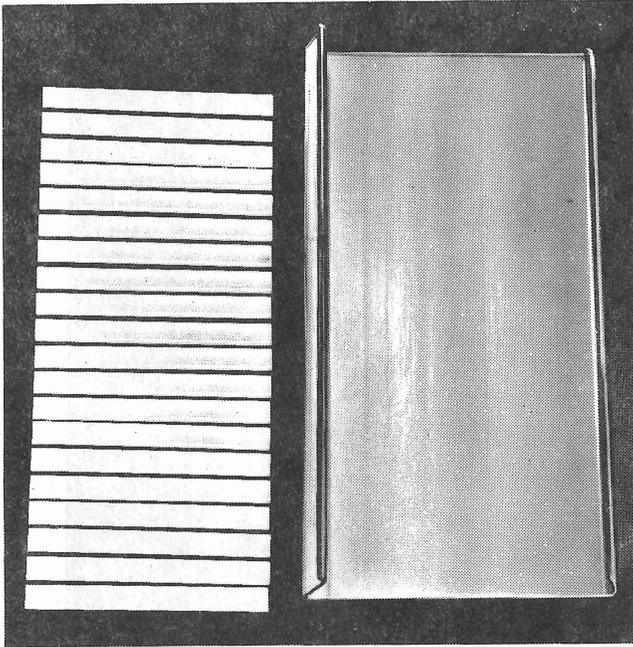
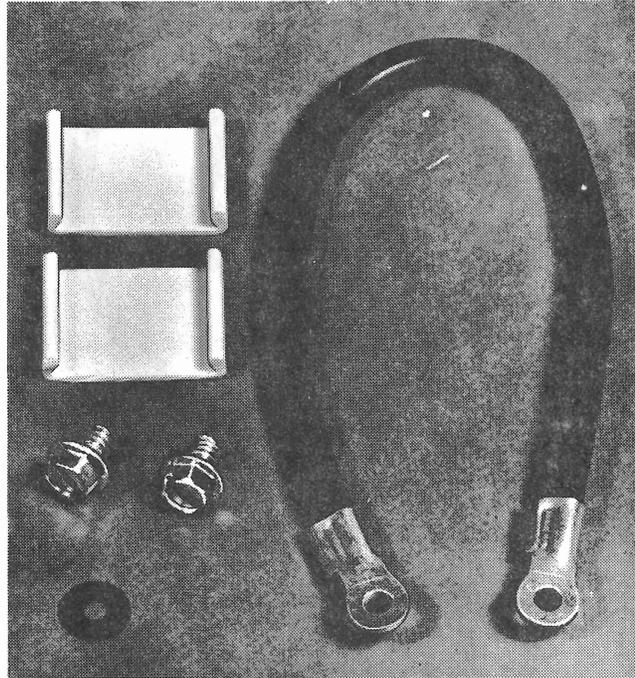


Figure 42. Hinged Trunk Identification Strip



TERMINAL COVER KIT, 377-1009:  
1 - JUMPER FIELD COVER  
20 - FLAT TERMINAL TROUGH COVERS

Figure 43. Terminal Cover Kit



CONNECTOR MOUNTING KIT, 323-1665:  
1 - INTERCONNECTOR GROUND STRAP  
1 - INSULATING WASHER  
2 - MOUNTING SCREWS (1/4-20)  
2 - ALIGNMENT CLIPS

Figure 44. Connector Mounting Kit

30. TERMINAL COVER KIT (377-1009).

30.01 The Terminal Cover Kit, containing one Jumper Field Cover and 20 flat Terminal Trough Covers, may be used in place of T-Guards for C.O. pin protection (see figure 43).

31. CONNECTOR MOUNTING KIT (323-1665).

31.01 The Connector Mounting Kit (see figure 44), consisting of an insulating washer, 2 alignment clips, an interconnector ground strap, and 2

1/4-20 mounting screws in a coin envelope, is used to install the C-377 or C-378 Connector. The 1/4-20 screws are used to mount the Connector on the Universal Vertical Adapter Bar, the alignment clips bridge the gaps between test fields, and the interconnector ground strap and insulating washer are used in grounding the Connector. The kit is supplied with the Connector.