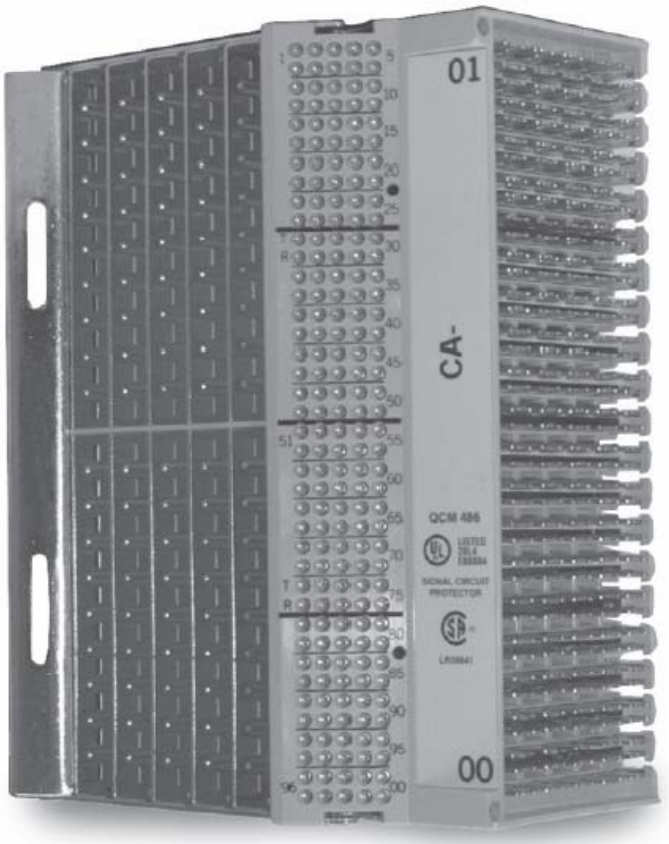


Figure 1 — QCM486 Miniature Protector Connector

Contents

1. General

1.1 This document describes the installation and testing of the QCM486 Miniature Protector Connector manufactured

1.2 This document is being reissued since Acquisition by Bourns, Inc.

1.3 Contact your customer service representative to purchase accessories that are sold separately or to request installation information, if necessary.

2. Description

2.1 The QCM486 Miniature Protector Connector (MPC) (Figure 1) is a 100-pair connector for terminating and protecting cable pairs in Central Offices (CO) and customer premises.

2.2 The MPC provides:

- Voltage protection or voltage/current protection on cable pairs
- Direct-feed facility between outside-plant cable pairs and CO when electrical protection is not required.
- Disconnection between outside-plant cable pairs and CO or customer premises pairs.
- Cross-connection between outside-plant cable pairs and CO or customer premises connecting block.
- Testing access to outside-plant cable pairs.
- Testing access to CO or customer premises pairs.
- Guards and markers for identifying and protecting special service circuits.

2.3 The MPC can be mounted on Conventional Distributing Frames, Compact Distributing Frames, or Customer Premises Distributing Frames.

2.4 The MPC is available stubless or equipped with a 100-pair (top or bottom entry) stub. Available stub lengths are 9.1, 15.2, or 30.5 mm (30, 50 or 100 ft.) with 22 or 24-gauge conductors. The dimensions and weights of the MPC are shown in Table 1.

DIMENSION	*MEASUREMENT*
Height	*213 mm (0.4 in.)*
Width	*102 mm (4.0 in.)*
Depth	*165 mm (6.75 in.)*
Weight	*41 kg (8.51b.)*

Table 1 — MPC Dimensions

3. Precautions

3.1 The MPC is shipped in protective packing with protector modules installed in the detent position. Observe the following precautions when storing, handling and installing the unit:

• Store in a dry location. Do not leave on loading docks or locations exposed to weather or where temperatures are higher than +45°C (+113°F).

• If the MPC has been exposed to temperatures below -30°C (- 22°F), allow to warm to room temperature before installing to avoid damage to cable stub.

• When unpacking, open the top of the container marked THIS SURFACE UP AT ALL TIMES.

• Do not remove protective packing material around the MPC until the stub cable has been placed through the cable vault entrance, and the MPC is ready to be mounted on the distributing frame.

• Do not bend the stub cable to a radius of less than 150 mm (6 in.).

• To avoid damage to the MPC from rolling ladders on the conventional MDF, the ladder guard rail projection must be 650 mm (25.5 in.).

• Compact DSPF/PDF clearances for rolling ladder and the MPC is approximately 51 mm (2 in.).

NOTE: *If this measurement is not met, contact the Central Office Engineering Group for correction prior to mounting MPC units.*

3.2 Where distributing frame verticals are not drilled to fit MPC 140 mm (5.5 in.) mounting centers, replace verticals, drill as required, or install a mounting bar kit.

3.3 The following precautions are included per requirement of the Underwriters Laboratories Inc.®:

● National Electrical Code Requirements: The installation of this product, including any field-installed components, shall meet all applicable federal, state, and local laws and regulations and, if unrestricted, comply with articles 800, 820 and all other appropriate requirements of the National Electrical Code, ANSI/NFPA 70.

● Only products marked "for indoor or outdoor use" or "for outdoor use" are suitable for outdoor use. Products without this marking are not suitable for outdoor use and are implied to be suitable for indoor use only.

● The use of a fuse link for each and every line is recommended when connecting any equipment to the telephone circuit. For typical applications, a one-foot or longer length fuse link of at least two wire sizes smaller than the typical wire gauge in use within the circuit is recommended.

● It is recommended that any components added to this product be both listed for the purpose and compatible.

● Risk of electric shock — Protector is not to be used without the arrester assembly installed.

4. Components

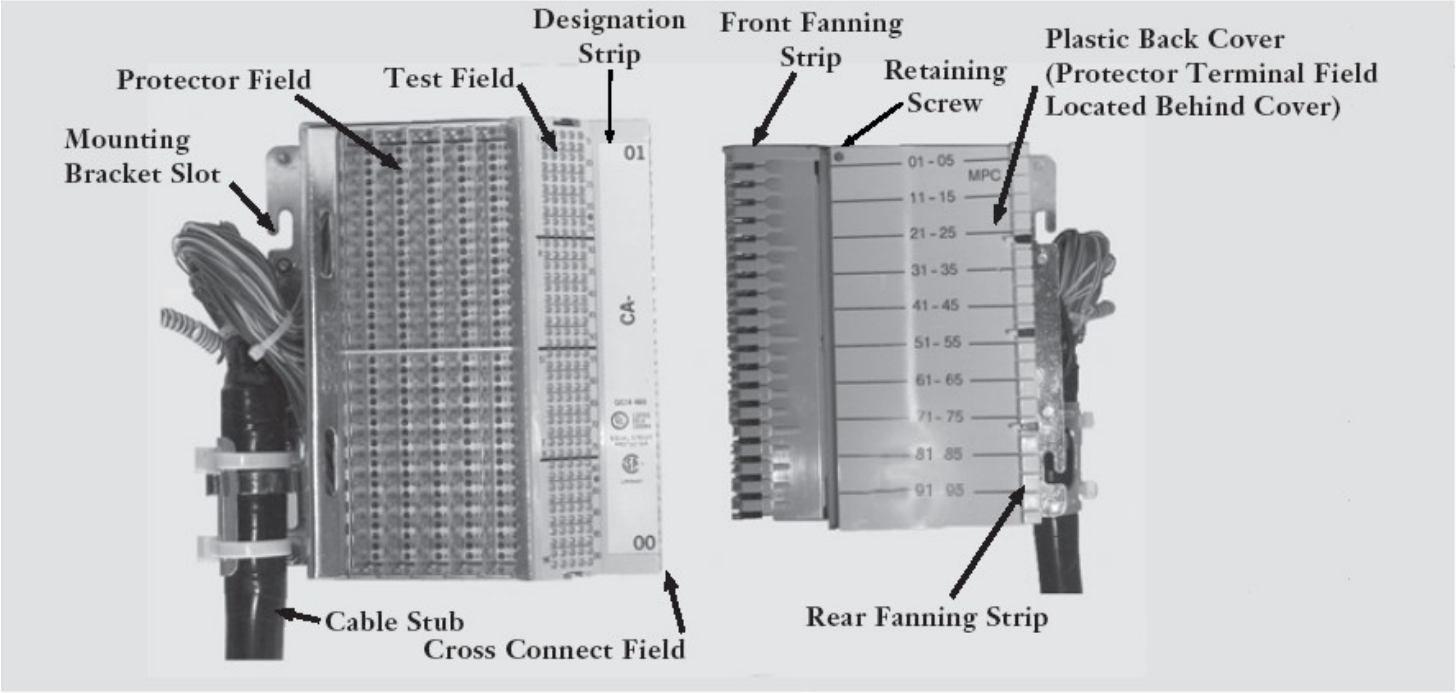


Figure 2 - MPC Components

5. Protectors

5.1 Each protector unit (Figure 3) has male pins on the base, a finger grip for removal, and a detent latch. Protector units provide the following connections and terminations:

- Tip (T)- and Ring (R)-conductor terminations for one outside plant cable pair and parallel connection to equivalent test field pair through the two long pins on the base.
- T- and R-conductor connections to one CO cross-connect terminal pair through the two short pins on the base.
- Ground connection to MPC housing through spring contacts on the side of protector units.

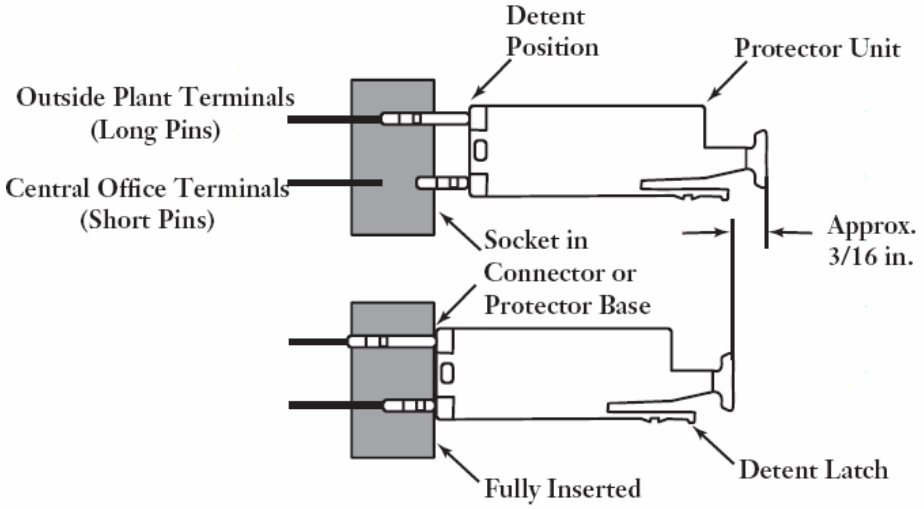


Figure 3 - Protector Detail

5.2 The detent latch on the protector unit engages the cut-out in the protector housing when the unit is in the partially withdrawn detent position. To insert the unit completely or to remove it, depress the detent latch.
5.3 The protector terminal field is a plastic block mounted at the back of the protector housing. The block is equipped with one hundred 4-terminal receptacles to accept a hundred protector units. Each 4-terminal receptacle consists of two long pin terminals and two short pin terminals.
5.4 The two long-pin terminals engage female contacts on the protector side. Wire-wrap terminals on the other side terminate the Tip (T)- and Ring (R)- conductors of one outside plant cable pair. The long pins are also wired to corresponding test-terminals on the test field.
5.5 The two short-pin terminals engage female contacts on the protector side. Wire wrap terminals on the other side terminate the Tip and Ring of one CO pair through internal wiring from the corresponding pair of contacts on the cross-connect field.
5.6 When the protector unit is withdrawn to the detent position the short pins on the protector unit break contact with the receptacle pins, opening the circuit between CO and outside-plant cable pairs. The long pins on the protector unit maintain contact with the receptacle pins, maintaining protection on the outside-plant cable pair.
5.7 The QTH52A (single unit) and QTHS2B (5 unit) removal tools are intended for use with protector units equipped with QCF4ASSM/SSP guards.
5.8 To remove the guard from a protector unit, hold the tool vertically, and engage the right jaw of the tool with the right side of the guard flange. Offset the left jaw behind the guard, squeeze, rotate counterclockwise, and pull guard from protector unit.
5.9 To remove the protector unit, engage the unit handle with the right jaw of the tool, offset the left jaw on the unit latch, squeeze, rotate counterclockwise and pull.

6. Mounting Bar Kit

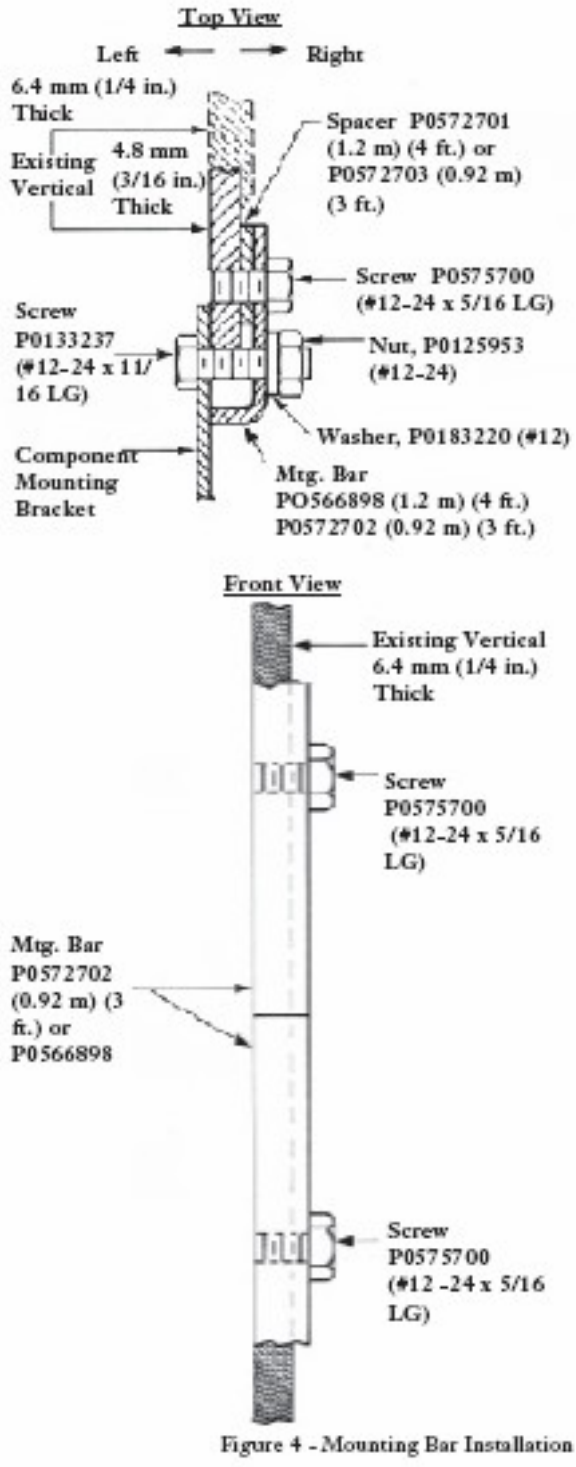


Figure 4 - Mounting Bar Installation

6.1 Mounting bar kits are for use on distributing frame verticals which are not drilled to fit the MPC 5.5-in. mounting centers. To select appropriate kit (refer to Table 2).
6.2 Before installing, make sure you have the right mounting bar kit for installation on the distributing frame.
6.3 If the frame vertical is 4.8 mm (3/16 in.) thick, place the spacers provided between frame vertical and mounting bars.
6.4 Place a 1.2 mm (4 ft.) mounting bar against the right side of the vertical, with the short bend of the mounting bar located to the left (Figure 5).
6.5 Fasten mounting bar to vertical using the screws provided. Leave 75 mm (3 in.) between the mounting bar and the guard rail at the bottom of the frame. Insert screws from right, through the 50-mm (2-in.) slots in the mounting bar, into the existing holes in verticals. Position screws at top, center and bottom of bar.
6.6 Fasten the connector to the mounting bar with the screws, nuts and bolts provided. Insert screws from left into the 12.7-mm (0.5-in.) slots in the mounting bar, and assemble lock washers and nuts loosely.
NOTE: *For distance of first MPC from floor or ladder guard rail, see Figure 7 and Table 3.*

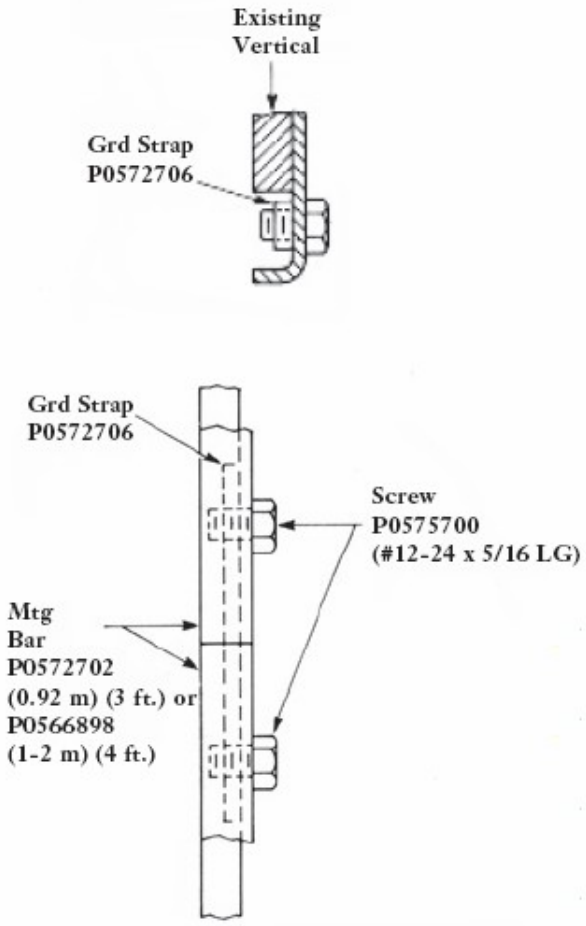


Figure 5 - Ground Strap

Code	Frame Height	Vertical Thickness
QKY1A*	2.45 m (8 ft.)	4.8 mm (3/16 in.)
QKY18*	3.5 m (11.5 ft.)	4.8 mm (3/16 in.)
QKY1C	4.39 m (14 ft. 5 in.)	4.8 mm (3/16 in.)
QKY2A	2.45 m (8 ft.)	6.4 mm (1/4 in.)
QKY2B	3.5 m (11.5 ft.)	6.4 mm (1/4 in.)
QKY2C	4.39 (14 ft. 5 in.)	6.4 mm (1/4 in.)

*QKY1 fits 6.4 mm (1/4 in.) frames by omitting spacers.

Table 2 - Mounting Bar Kit Types and Application

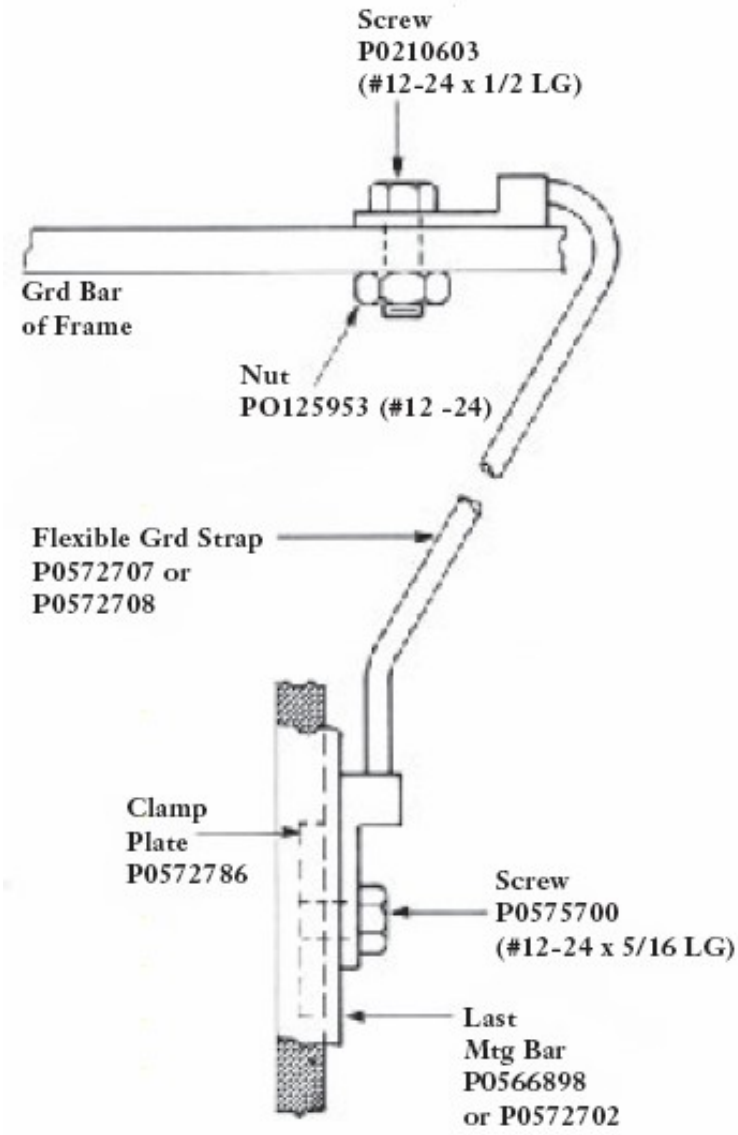


Figure 6 — Top Flexible Ground Arrangement

6.7 Repeating Steps 3, 4, and 5, mount the remaining bars immediately above the first.
NOTE: *Begin with 1.2-mm (4-ft.) bars, if provided, and proceed to 0.92-mm (3-ft.) bar(s).*
NOTE: *The top bar and spacer may be shortened for nonstandard height frame. Cut as required, remove burrs, and paint end.*
6.8 Connect a ground strap between the top mounting slot of each mounting bar and the bottom mounting slot of the bar above (Figure 5).

6.9 Using flexible ground strap and clamp plate, connect the mounting bar kit to the ground bar of frame (Figure 6).
NOTE: *When free mounting holes are not available on the ground bar, use the existing nut and bolt on the bar to mount the other end of the flexible ground strap.*

7. Recommended Distributing Frame Capacities

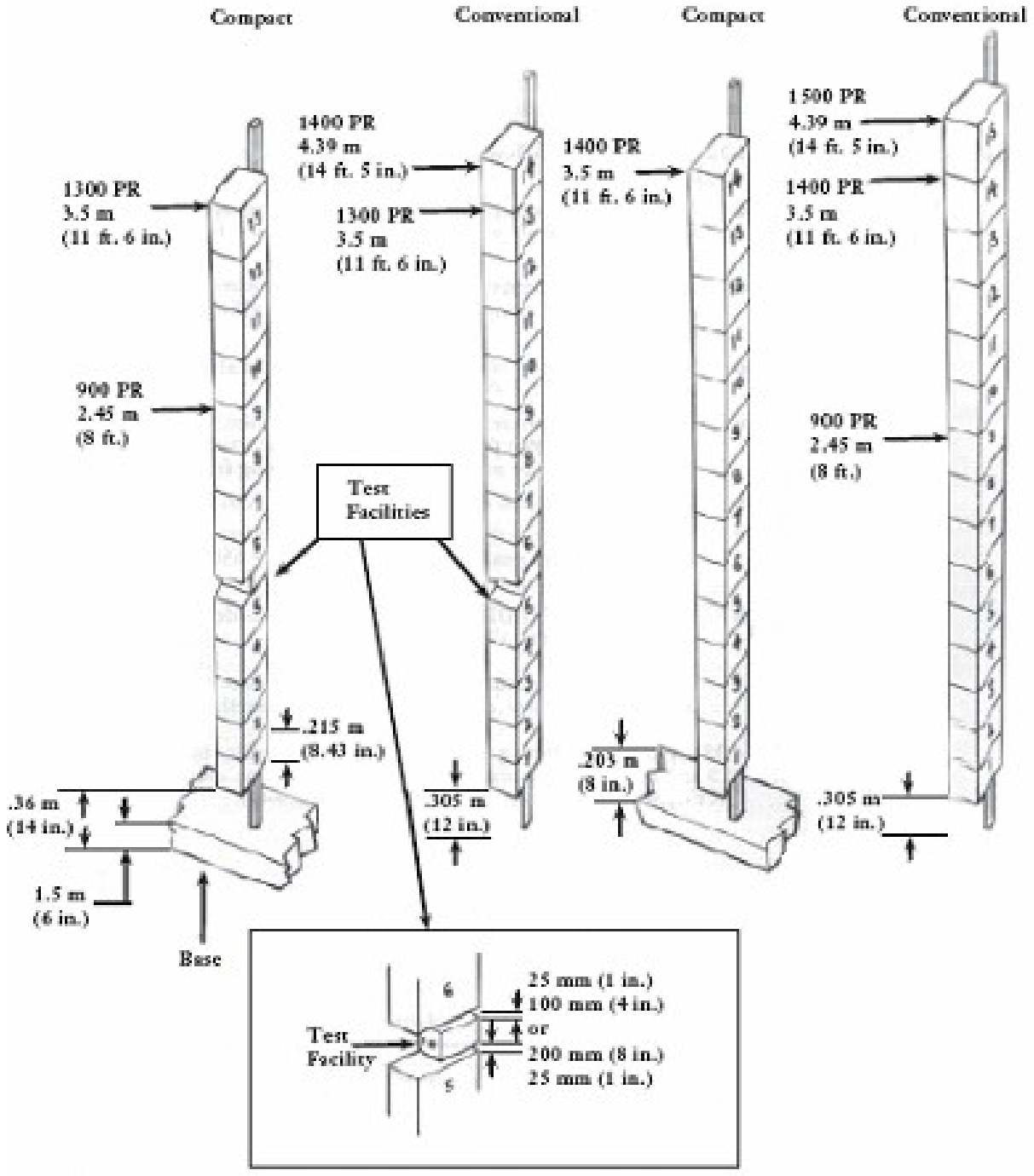


Figure 7 – Connector Mounting Arrangements

Recommended Distributing Frame Capacities		
Frame Height	Equipped with Test Facility (Drawing ED1479-70) (MPC Pairs)	Not Equipped with Test Facility (MPC Pairs)
1.8 m (6 ft.) Customer Premises)	600* (no test facilities)	600
2.45 m (8 ft.) Compact	900*	900
3.5 m (11 ft. 6 in.) Conventional	1300	1400
3.5 m (11 ft. 6 in.) Compact	1300*	1400
4.4 m (14 ft. 5 in.)* Conventional	1400	1500
*The vertical capacity can be optimized by staggering the mounting of the test facilities.		

Table 3 - Frame Distributing Capacities

8. Installing Stubbed Connectors in Locations With Cable Vaults

8.1 Open cable vault entrance hole(s) or ferrule(s) using local instructions and procedures.

8.2 Remove the MPC from its shipping container (keep the protective packing around the connector assembly).

8.3 Mark the stub cable with its identification number and the pair count of the outside-plant cable to which the stub is to be spliced.

8.4 Pass the stub cable through the entrance hole into the cable vault. Remove any twists in the cable.

8.5 Screw the two mounting screws supplied with the MPC part way into the mounting holes on the distributing frame vertical. Insert screws from left side of vertical.

8.6 Hang the MPC by its mounting bracket slots on the two screws in the frame vertical (Figures 8 and 9).

NOTE: *Mount the first MPC on the appropriate frame verticals:*

• Compact (PDF) 356 mm (14 in.) from floor or 203 mm (8 in.) from ladder guard rail (Figure 7).

• Conventional (PDF) 305 mm (12 in.) from floor (Figure 7).

NOTE: *Position the MPC so that the plastic stud on the top of the connector immediately below engages the slot on the bottom of the connector being mounted.*

8.7 Tighten the mounting screws to secure MPC to vertical.

8.8 Dress the stub down the frame and into the cable vault.

8.9 Secure the stub(s) to the vertical with cable retaining brackets.

8.10 Close cable vault entrance hole or ferrule according to local procedures.

8.11 Mark the designation strip with cable number and pair count of the MPC cable being terminated.

NOTE: *An adhesive designation number card is supplied with each MPC.*

8.12 Test the protector modules.

8.13 Splice the stub to the outside-plant cable using standard splicing procedures.

9. Installing Stubbed Connectors in Locations Without Cable Vaults

9.1 Remove the MPC from its shipping container (keep protective material around the connector assembly).

9.2 Mark the stub cable with the identification number and pair count of the cable to which the stub is to be spliced.

9.3 Determine the splice location and whether the stub entrance is from the top or bottom of the distributing frame.

9.4 Screw the two mounting screws supplied with the MPC part way into the mounting holes at the required position on the left side of the distributing frame vertical.

9.5 Run the stub cable up or down the distributing frame as required to the splice location.

9.6 Hang the MPC by its mounting bracket slots on the two screws in the frame vertical (Figures 8 and 9).

NOTE: *Mount the first MPC on the appropriate frame verticals:*

• Compact (PDF) 356 mm (14 in.) from floor or 203 mm (8 in.) from ladder guard rail (Figure 7).

• Conventional (PDF) 305 mm (12 in.) from floor (Figure 7).

NOTE: *Position the MPC so that the plastic stud on the top of the connector immediately below engages the slot on the bottom of the connector being mounted.*

9.7 Tighten screws to secure the MPC to the vertical.

9.8 Dress the stub up or down the distributing frame.

9.9 Mark the MPC designation strip with the number and pair-count of the cable being terminated.

NOTE: *An adhesive designation number card is supplied with each MPC.*

9.10 Test the protector modules.

9.11 Splice the stub to the main cable, as required by the job specifications, using standard splicing procedures for the type of cable involved.

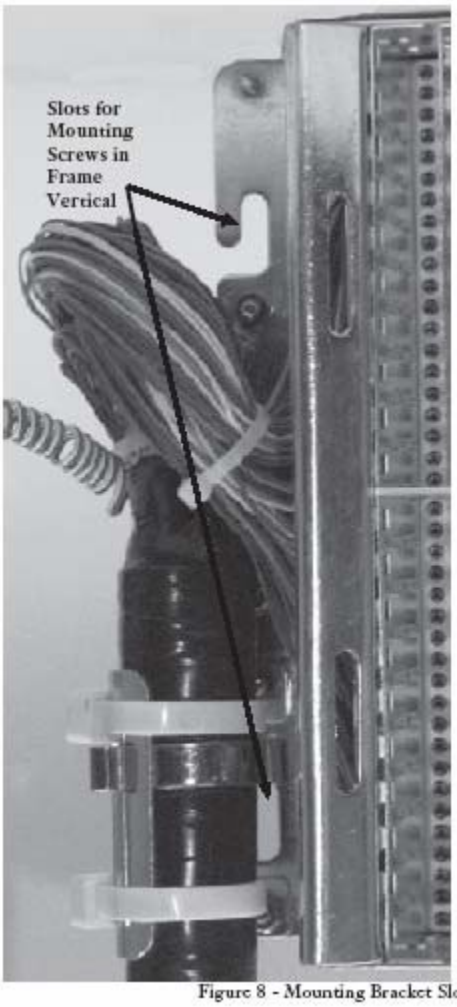


Figure 8 - Mounting Bracket Slots

NOTE:

• Insulate the DSPF upright with 18 mm (.75 in.) diameter split fiber tubing for protection of cable leads.

• The cross-aisle cable (26 gauge) must be butted 25 mm (1 in.) above or below the associated connector, depending on the frame entrance, and fanned out to the terminals.

• The quick-clip terminal connections must be made with a QTH38-type tool, leaving 13 mm (0.5 in.) of dressed slack.

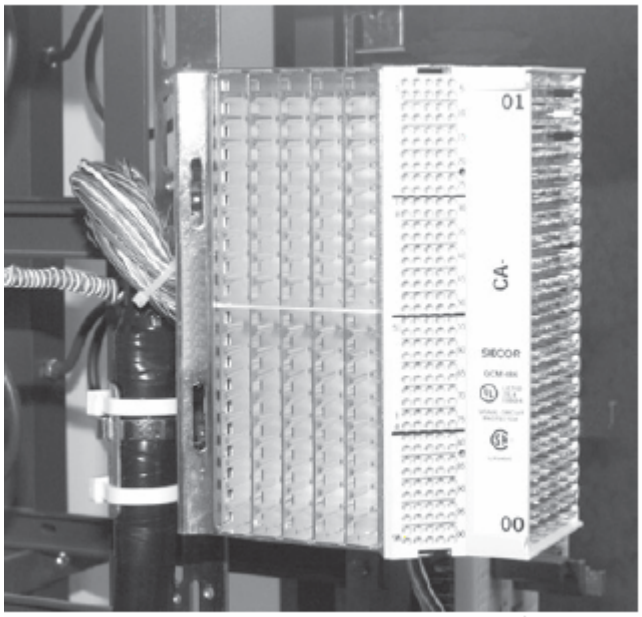


Figure 9 - MPC Mounted to Frame

10. Installing Dual Stub Connector in Remote Frames

10.1 Remove the MPC from its shipping container (keep protective material around the connector assembly).

10.2 Mark the stubs cable with the identification number and pair count of the cable to which the stubs are to be placed.

10.3 Determine the splice location and whether the stub entrance is from the top of the bottom of the distribution frame.

10.4 Screw the two mounting screws supplied with the MPC part way into the mounting holes at the required position *on the left side of the distributing frame vertical*.

10.5 Run the one of the stub cable up/down the distributing frame as required to the splice location and then the second stub.

10.6 Hang the MPC by its mounting bracket slots on the two screws in the frame vertical.

NOTE: *Position the MPC so that the plastic stud on the top of the connector immediately below engages the slot on the bottom of the connector being mounted.*

10.7 Tighten screws to secure MPC to the vertical.

10.8 Dress one of the stubs to the distribution frame, and then dress the second stub.

10.9 Mark the MPC designation strip with the number and pair-count of the cable being terminated.

10.10 Test the protector modules.

NOTE: *Splice stubs to the main cable, as required by the job specification, using standard splicing procedures for the type of cable involved.*

Figure 10 - MPC Dual Stubs

11. Installing Stubless Connector

NOTE: *Before proceeding with installation, divide the cable to be terminated into 100-pair binders for each connector location.*

NOTE: *A mounting adapter (P0566899) can be used to mount the MPC during installation for easier access to work areas. This section will describe the procedure when using this bracket.*

11.1 Pull the 100-pair binders up the frame until all slack is removed. Binders must extend at least 625 mm (2 ft.) above the MPC position.

11.2 Tie the binder to the transverse arm below the MPC position.

11.3 Separate the 100-pair binder into four 25-pair groups, and tag each group with its applicable pair count: 1-25, 26-50, 51-75 or 76-100.

11.4 Secure the mounting adapter on the frame vertical with two screws.

11.5 Unpack the MPC, remove protective material, and mount the MPC on the adapter. Tighten thumbscrews to secure the MPC on the adapter.
11.6 Loosen the locking thumbscrews, swing the MPC full left, and lock in position.
11.7 Remove the plastic cover from the protector terminal field by removing the retaining screw.
11.8 Unlock the adapter, switch the MPC full right, and lock in position.
11.9 Push the four 25-pair groups through the four slots in the MPC mounting bracket; the group with pair-count 1-25 must be in the top slot followed by pair-counts 26-50, 51-75, and 76-100 in the other slots in descending order. Remove any slack by reaching around the MPC and pulling and pushing the wires into the protector terminal field.
11.10 At the rear of the connector, bring groups 1-25 and 26-50 together, and secure them to the cable mounting stud on the MPC mounting bracket using a cable tie. Repeat for groups 51-75 and 76-100.
11.11 Lace the two 50-pair groups from the rear tie wraps on the MPC to the first transverse arm below the MPC.
11.12 Unlock the adapter, swing the MPC full left, and lock in position.
11.13 Using standard wire-wrap tools, procedures and the wiring diagram in Figure 10, terminate the cable pairs on the long-pin terminals of the protector terminal field.
11.14 Dress all wires on protector field, and replace the cover over protector terminals.
11.15 Unlock the adapter, swing the MPC to center position.
11.16 Loosen, but do not remove, the screws securing the adapter to the frame vertical and the thumbscrews securing the MPC to the adapter.
11.17 Lift adapter and MPC off the frame vertical, and remove the adapter from the MPC mounting bracket.

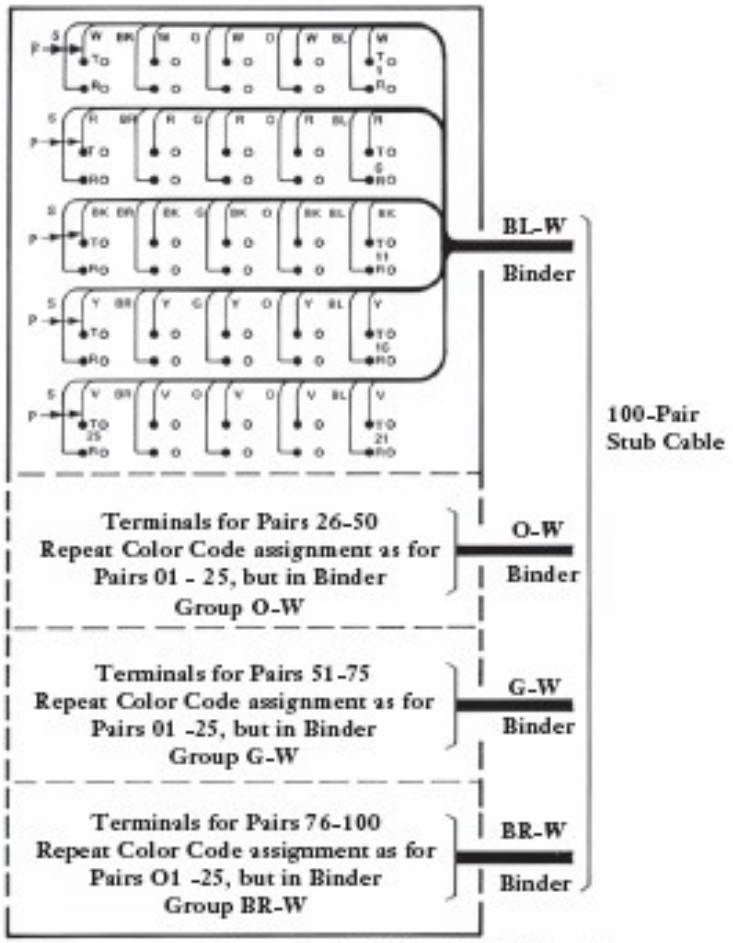
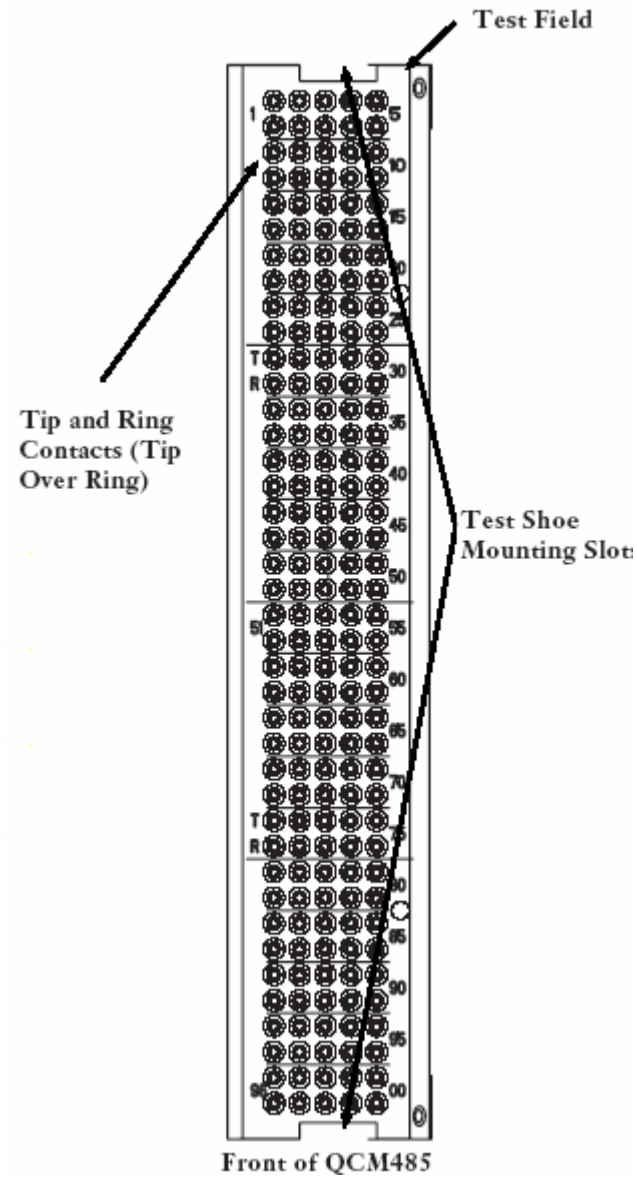


Figure 11 - Cable Terminal Wiring Diagram

11 .18 Hang the MPC by its mounting bracket slots on the two screws in the frame vertical. Tighten the screws.
NOTE: *Mount the first MPC on the appropriate frame verticals (Figure 9):*
• Compact (PDF) 356 mm (14 in.) from floor or 203 mm (8 in.) from ladder guard rail.
• Conventional (PDF) 305 mm (12 in.) from floor (Figure 6).
NOTE: *Position the MPC so that the plastic stud on the top of the connector immediately below engages the slot on the bottom of the connector being mounted.*
11.19 Dress the binders down the frame, and tie to the transverse arms as required.



12. Testing

Test field terminals are numbered to show beginning and end of each row of five terminals (Figure 10):

- 1, 5
- 6, 10
- 11, 15 (through . . .)
- 96, 00 (100)

Use of p/n QCM31A test connector or other standard test equipment is recommended to test connections. Test connector p/n QCM31A fits into the top and bottom slots on the test field and has locating pins which mate with holes on the field to ensure proper alignment.

NOTE: *For MPC dual stubs: test field for this is not connected.*

13. Cross Connect Wire

NOTE: *Use only approved type wire, NTCL/ CSW with quick clip terminals.*

13.1 Installation

13.1.1 Untwist the cross-connect pair to the area between front and rear fanning strips of the MPC.

13.1.2 Insert the cross-connect wire into the appropriate slot of both rear and front fanning strips, depending on pair numbers and cross-connect terminal rows.

NOTE: *On the front fanning strip, place regular wires in rear slots and back-tap wires in front slots. Back-tap wires which later become regular connections can be moved at that time from front to rear slot.*

13.1.3 Terminate cross-connect wire on the applicable quick-clip terminals on the cross-connect field.

NOTE: *The A0276558 termination/removal tool must be used on quick-clip terminals.*

13.1.4 Dress cross-connect wire in the channels on the cross-connect field, between front and rear fanning strips, and on the distributing frame.

13.2 Removal

NOTE: *When disconnecting wires on the cross-connect field, take care not to loosen or break other connections. Avoid removing wires from the vertical side of the distributing frame.*

13.2.1 Disconnect the required wire from the cross-connect terminals. Use the QTH38-type tool for quick-clip terminals.

13.2.2 Carefully pull disconnected wire out of the fanning strips.

> **CAUTION:** *Do not try to remove cross-connect wire by forcing them through fanning, strip slots.*

13.2.3 Proceed to the horizontal side of the distributing frame and remove the cross-connecting wire from the shelf.