

Raychem

INTERCONNECTION SYSTEMS
ENGINEERING STANDARD

TITLE
ASSEMBLY PROCEDURES FOR MTCP AND
MTCR CONNECTORS (AWIP PROGRAM)

NUMBER
ES-71027

REV	DESCRIPTION	DATE	APPROVED
A	INITIAL RELEASE PER ECN# T-7903	3/10/87	<i>R. Kelly</i>
B	REVISED PER ECN# T-8388	6/23/87	<i>E. Stadler</i>
C	REVISED PER ECN# T- 8835	9/21/87	<i>E. Stadler</i>
D	REVISED PER ECN# T-10656	8/26/88	<i>E. Stadler</i>
E	REVISED PER ECN# T-12757	8/24/89	<i>R. Kelly</i>
F	REVISED PER ECN# T- 17943	12/15/92	<i>P. ...</i>

ES-71027

ASSEMBLY PROCEDURES FOR MTCP AND MTCR CONNECTORS

AWIP Program

If this document is printed it becomes uncontrolled. Check for the latest revision

PREPARED BY
Robert Kelly 9/18/87

Robert Kelly
Documentation Supervisor

APPROVED: APPLICATIONS ENGINEERING
E. Stadler 9/21/87

Ed Stadler
Applications Engineer

APPROVED: QUALITY ASSURANCE
Gary Hammond 9/21/87

Gary Hammond
Quality Assurance Manager

APPROVED: PRODUCT ENGINEERING
John Cameron Sept 21, 87

John Cameron
Product Engineering Manager

Raychem Corporation
300 Constitution Drive
Menlo Park, CA 94025

Phone: (415) 361 3333
TWX: 910 373 1728

FSCM No. 06090

CONTENTS

PARAGRAPH	TITLE	PAGE
1.0	Purpose and Scope	3
2.0	References	3
3.0	Tools	3
4.0	Materials	3
5.0	Procedures	4
5.1	Installing and Removing Shell Keying Pins	4
5.2	Installing Mating Hardware	6
5.3	Contact Insertion	7
5.4	Contact Removal	7
5.5	Backshell Installation	9
5.6	Cable Clamp Installation	10
5.7	Panel Mounting of Receptacle Shells	12
5.8	Connector Mating and Demating	13

REVISION REFERENCE

Sheet No.	1	2	3	4	5	6	7	8	9	10	11	12
Revision	E	E	E	D	D	E	F	E	E	D	D	D
Sheet No.	13	14										
Revision	D	E										

If this document is printed it becomes uncontrolled. Check for the latest revision

1.0 PURPOSE AND SCOPE

This standard contains procedures for contact insertion and removal, EMI backshell installation, connector keying, mating hardware installation, panel mounting and cable clamp installation. These procedures are applicable to the following components:

MTCP-KT2-0001: 2-inch MTCP plug with socket insert.
MTCP-KT2-0002: 2-inch flangeless MTCP receptacle with pin insert
MTCR-KT1-0001: 1-inch MTCR plug connector with pin insert.
MTCR-KT1-0004: 1-inch flangeless MTCR receptacle with socket insert.
MTCR-333-04S: 1-inch flangeless MTCR receptacle with socket insert.
CHA-0036: Keying pin, triangular.
D-602-0104: Pin contact for MTCR, size 12, twisted pair.
D-602-0105: Socket contact for MTCR, size 12, twisted pair.
D-602-0140: Pin contact for MTCP, size 16, coaxial.
D-602-0171: Socket contact for MTCP, size 16, coaxial.
MS27488-12: Sealing plug for MTCR.
MS27488-16: Sealing plug for MTCP.

2.0 REFERENCES

None required.

3.0 APPLICATION EQUIPMENT AND TOOLS

M81969/14-04 insertion/removal tool for size 12 contacts.
M81969/14-03 insertion/removal tool for size 16 contacts.
Phillips screwdriver, #0 and #1.
Torque driver, 9 inch-pound; Raychem P/N CE-1603400.
Torque driver, 15 inch-pound; Raychem P/N CE-1605300.
7/64-inch rigid hex tip for torque drivers; Raychem P/N 1606100.
7/64-inch flexible hex tip for torque drivers; Raychem P/N 1603600.
Needle nose pliers.
Open end wrench, 1/4 inch.

4.0 MATERIALS

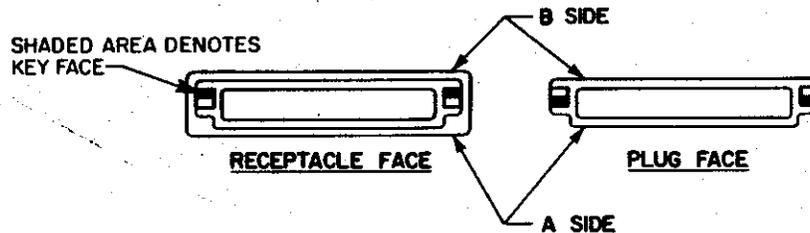
Isopropyl alcohol

5.0 PROCEDURES

5.1 Installing and Removing Shell Keying Pins.

1. Determine keying codes and pin orientation in accordance with Figure 5-1.

SUGGESTED KEYING CODES							
		AA					
		BA					
		BB					
		BC					
		BD					
		CA					
		CB					
		CC					
		CD					
		DA					
		DB					
		DC					
		DD					
RECEPTACLE FACE	PLUG FACE		RECEPTACLE FACE	PLUG FACE	RECEPTACLE FACE	PLUG FACE	RECEPTACLE FACE
WHEN USING STANDARD RECTANGULAR KEYING PINS			WHEN USING SPECIAL TRIANGULAR KEYING PINS		WHEN MIXING STANDARD RECTANGULAR AND SPECIAL TRIANGULAR KEYING PINS		



**TYPICAL KEYING PIN ASSEMBLY
IN CONNECTOR (DD CODE SHOWN)**

If this document is printed it becomes uncontrolled. Check for the latest revision

Figure 5-1. Shell Keying Codes and Pin Orientation

2. Insert keying pins into their recesses in the face of the shells using needle-nose pliers as shown in Figure 5-2.
 - o Use only needle-nose pliers that have a smooth gripping surface.

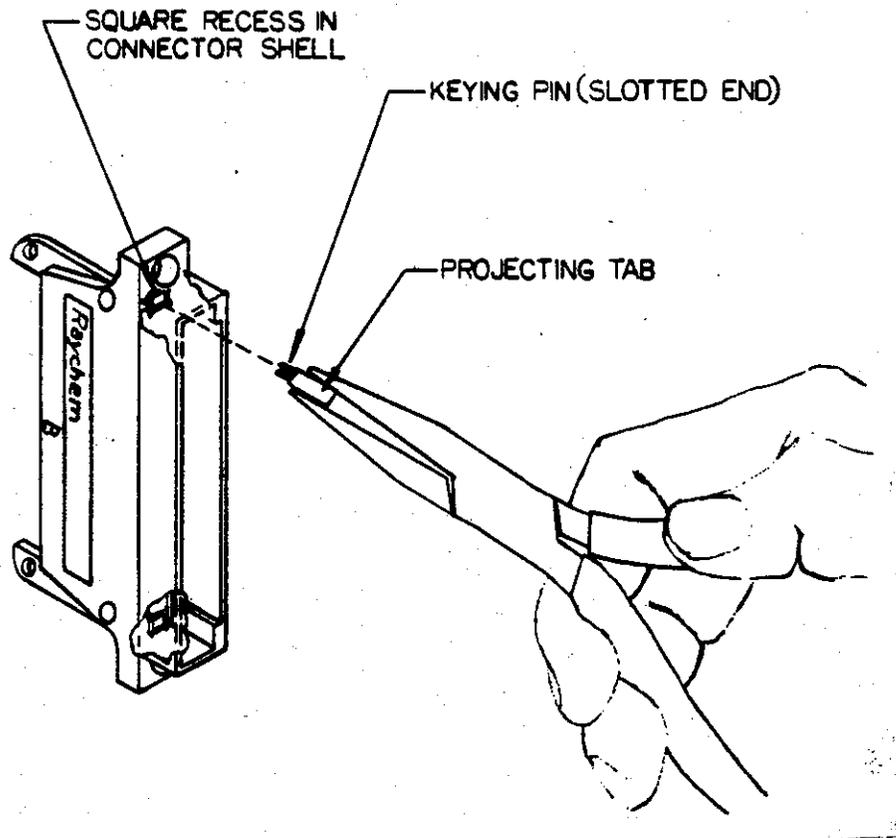
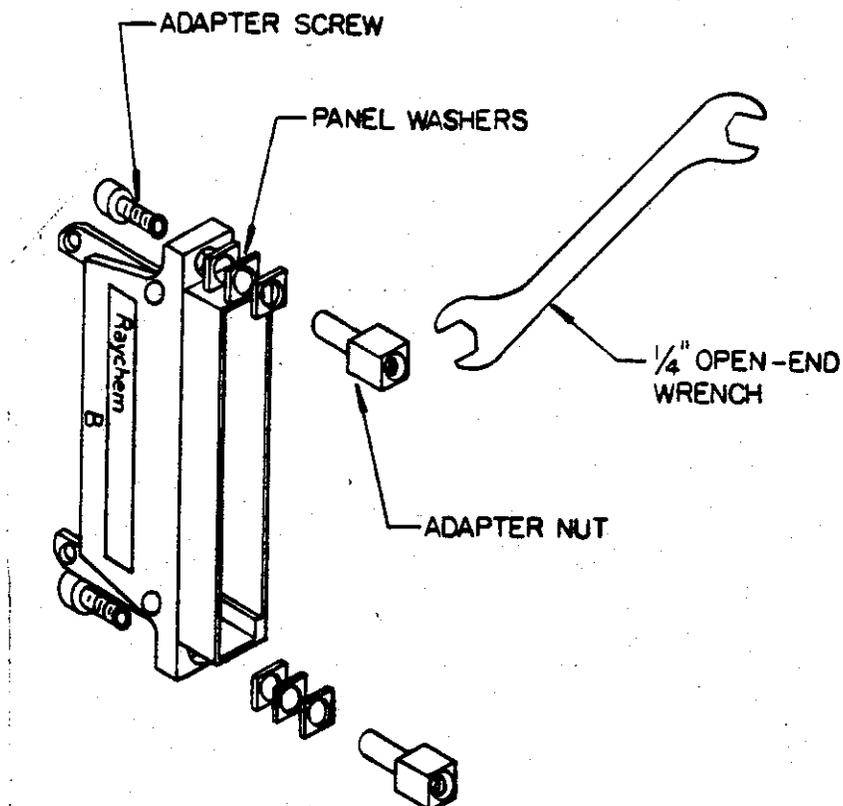


Figure 5-2. Inserting Keying Pins

5.2 Installing Mating Hardware.

Install three panel washers, one adapter nut, and one adapter screw on each side of the shell as shown in Figure 5-3.

- o Use CE-1605300 torque driver with CE-1606100 or CE-1603600 tip (7/64 inch), and tighten the adapter screws to 15 ± 1 inch-lb while holding the adapter nut with a 1/4-inch open end wrench.
- o Use only the hardware supplied with the connector.



If this document is printed it becomes uncontrolled. Check for the latest revision

Figure 5-3. Mating Hardware Installation

5.3 Contact Insertion

1. Make sure that there is no cable clamp attached to the rear of the MTCP or MTCR connector.
 2. Carefully push the terminated contact straight into the rear of the connector until it reaches a positive stop.
 - o A click can be heard when the retaining clip snaps into place.
 3. Pull gently on the cable to make sure that the contact is fully seated.
4. Insert a sealing plug into each unused cavity except for unused cavities in MTCR connectors mounted to the WIU. For MTCR connectors mounted to the WIU, install a D-602-0105 contact, terminated to approximately six inch of 55A0124-24-9/6 twisted pair wire in accordance with ES 61129, into each unused socket cavity. Cap each free wire end with D-098-01-63-04 shrink tubing, locating the end of the wire approximately at the center of the tubing.
- o It is recommended that unused cavities in **pin inserts** have pin contacts inserted to assure the integrity of the interfacial seal during connector use.

5.4 Contact Removal

- o **NOTE:** For removing contacts from MTCP and MTCR connectors, the removal tool must be disassembled so that the removal end can be used by itself. Select tool as follows:

For MTCP connectors (size 16 contacts) use M81969/14-03 tool.
For MTCR connectors (size 12 contacts) use M81969/14-04 tool.

1. Remove the cable clamp from the rear of the connector.
 2. Remove the EMI backshell if there is one.
 3. Install the removal end of the insertion/removal tool around the cable of the contact to be removed (Figure 5-4).
- o Use isopropyl alcohol as a lubricant on the tool.

WARNING

Isopropyl alcohol is a volatile, flammable liquid which may cause burns if ignited. Do not use near open flames or electrical sparks.

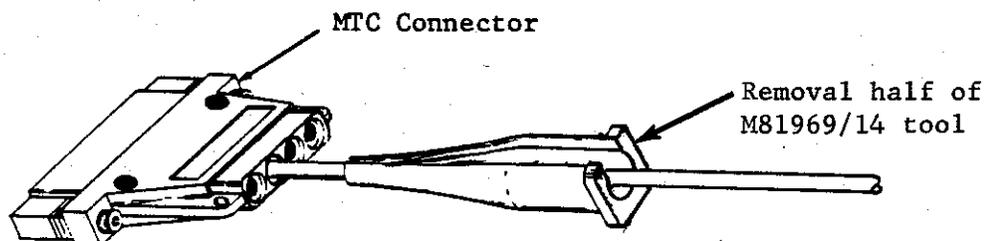


Figure 5-4. Removal Tool Installed on Cable to be Removed

4. Slowly and carefully push the tool into the rear of the connector (Figure 5-5).

- o Be sure to keep the tool lined up straight with the cavity.
- o If the end of the tool hits the rear of the contact, move the end of the tool slightly until it slides in over the contact and bottoms against the contact retention shoulder, where it will release the retention clip.

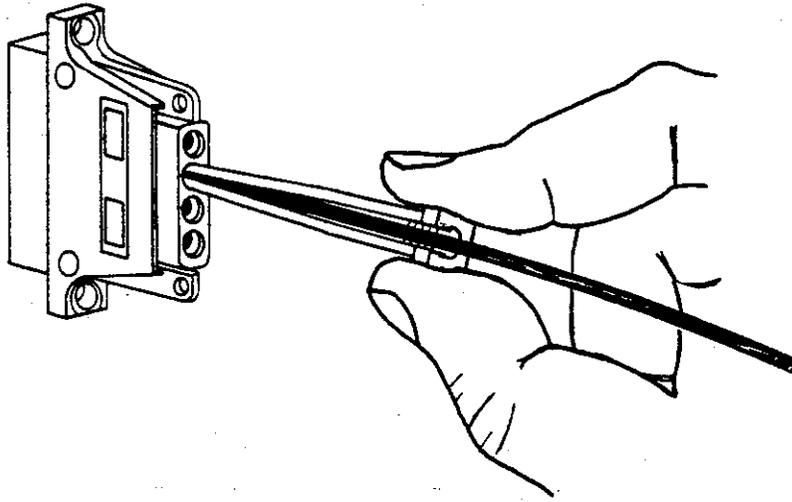


Figure 5-5. Pushing Removal Tool into Rear of Connector

5. Hold the cable tightly against the tool and pull the cable/contact assembly, together with the tool, out of the connector (Figure 5-6).

- o When removing an unwired contact, use a mating contact to push the contact from the front while using the tool to release the retention clip.

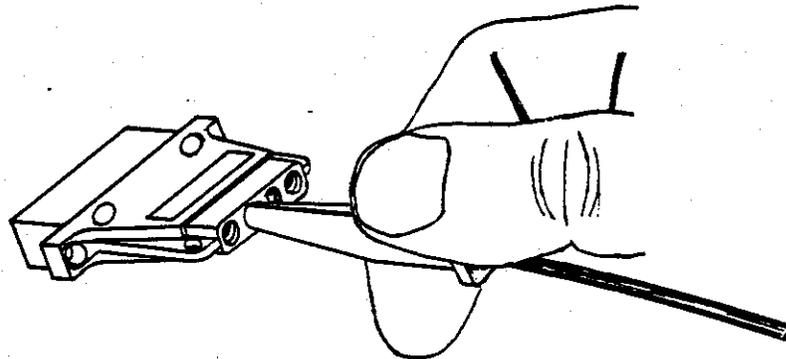


Figure 5-6. Pulling Contact/Cable Assembly Out of Connector

6. Pull sealing plugs straight out using fingers.

5.5 Backshell Installation.

- o This procedure is applicable only for MTCR connectors for data bus applications. For MTCP connectors, skip to Paragraph 5.6.

Attach the two backshell halves to the connector shell (Figure 5-7).

- o The top and bottom backshell halves are identical and overlap each other at the edges.
- o **IMPORTANT:** When attaching backshells to a plug shell, be sure that the small fingers at the ends of the tabs are hooked around the lip of the shell in the recessed areas. Improperly installed tabs will prevent proper connector mating.
- o Make sure that the grounding tabs at the sides of the backshell halves fit against the outside edges of the plug shell (See inset). It may be necessary to spread the sides of the backshell halves slightly during assembly.
- o Use a Phillips screwdriver that fits the heads of the two attachment screws on each backshell half, and tighten gently with fingertips to avoid stripping the threads. The screws may require a #0 tip or a #1 tip, depending on the screw head configuration.

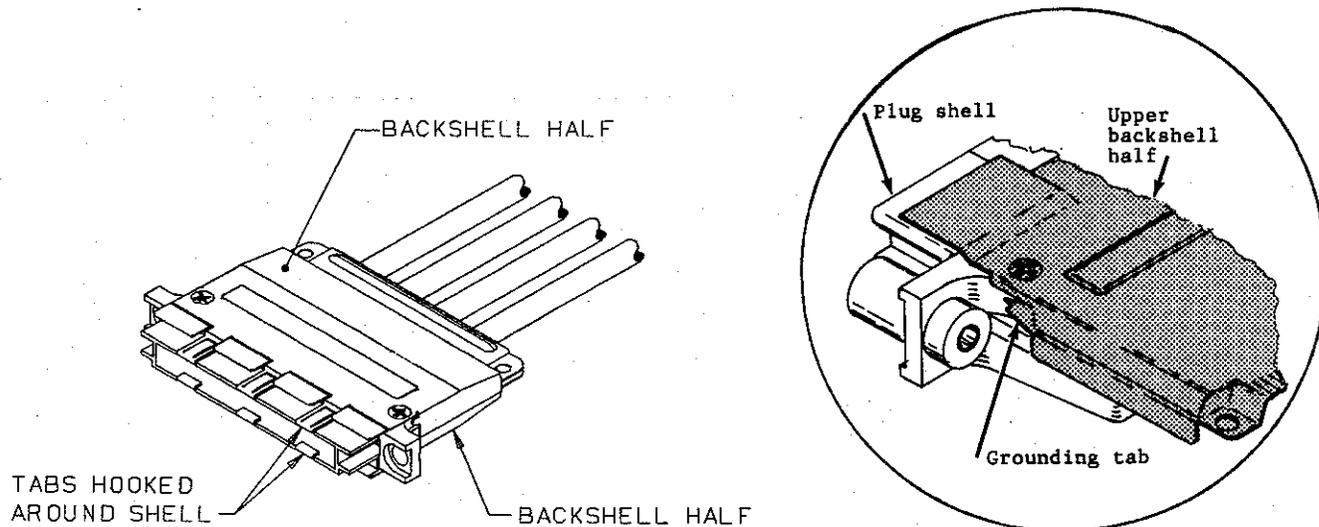


Figure 5-7. Attaching EMI Backshell to Connector Shell

5.6 Cable Clamp Installation.

5.6.1 Installing Cable Clamps on MTCP Connectors.

1. Align the clamps and start the screws as shown in Figure 5-8.
 - o Use only the clamps supplied in the kit.
2. Dress the round wires evenly across the rubber pads of the clamps.
3. Tighten the cable clamp screws.

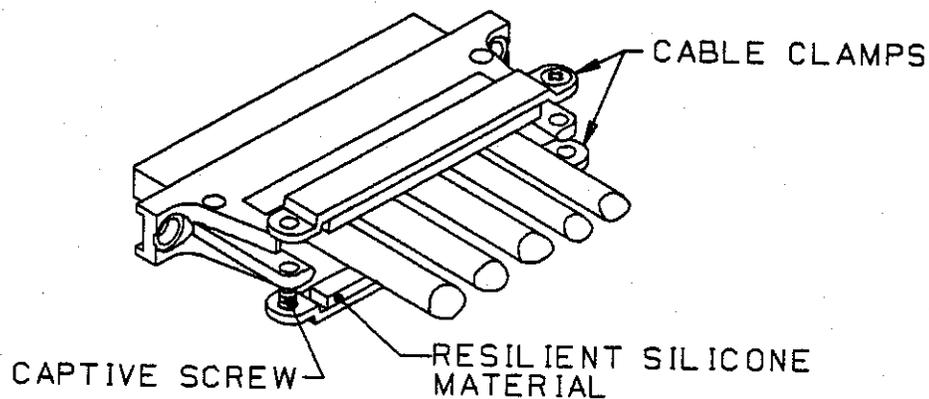


Figure 5-8. Installing Cable Clamps on MTCP Connectors

5.6.2 Installing Cable Clamps on MTCR Connectors with EMI Backshells.

1. Insert inner clamps between the backshell and the cables (Figure 5-9).
 - o Make sure that the rounded corners of the clamps align with the rounded corners of the backshells.
 - o The cutouts in the inner clamps must line up with the grounding ferrules on the cables (Figure 5-10).

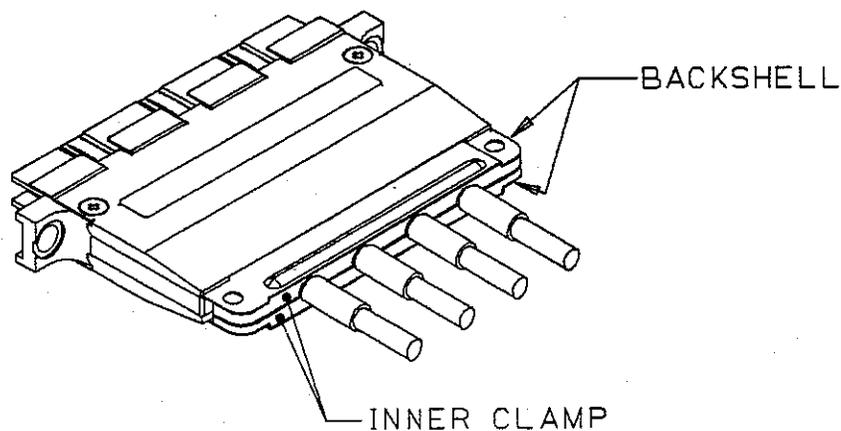


Figure 5-9. Inserting Inner Clamps Between Backshell Halves

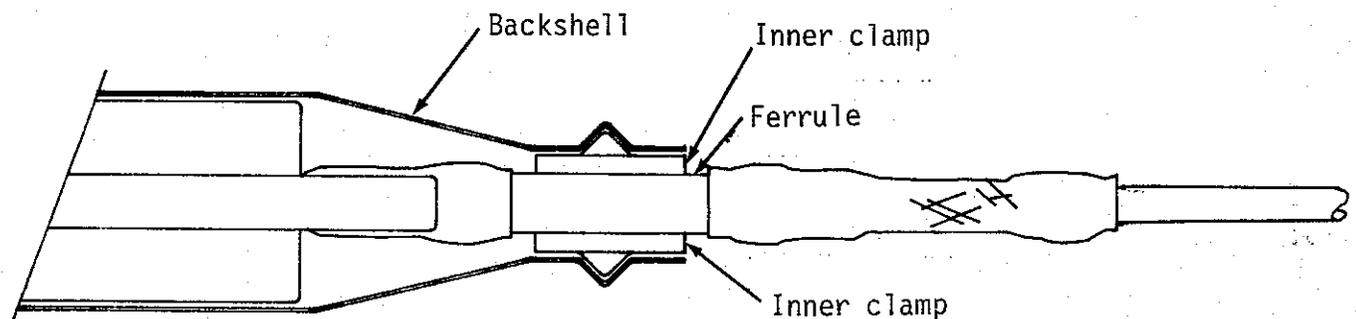


Figure 5-10. Position of Grounding Ferrules Between Clamps

2. Install the outer clamps at the rear of the EMI backshells (Figure 5-11).

- o Make sure that the rounded corners of the outer clamps are to the rear, lining up with the rounded corners of the inner clamps and EMI backshells.

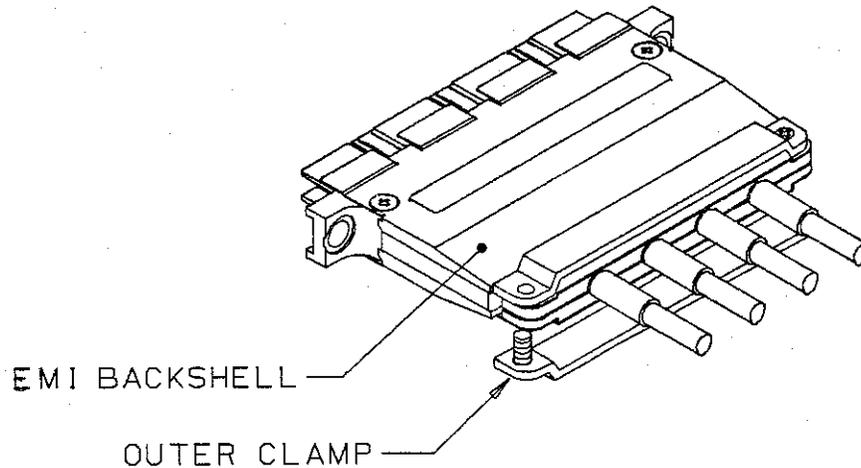


Figure 5-11. Installing Outer Clamps

5.7 Panel Mounting of Receptacle Shells.

5.7.1 General Information.

1. All receptacle shells can be back mounted on panels with a maximum thickness of 0.103 inch (2.6 mm) (Figure 5-12).

- o See SCD of receptacle shell for panel cutout dimensions.

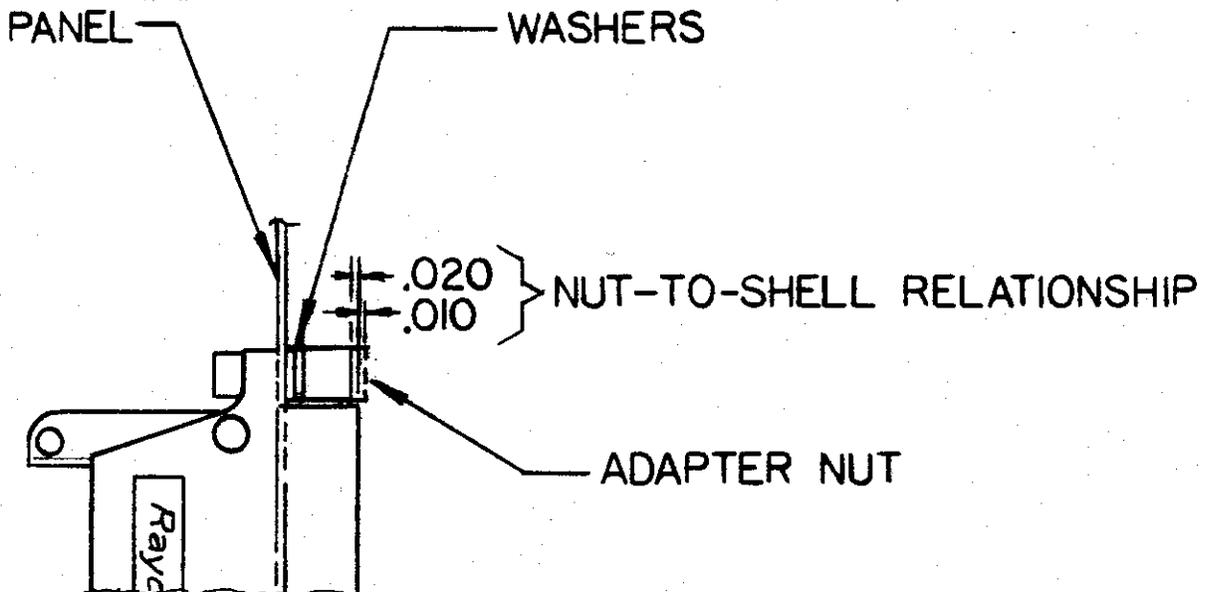


Figure 5-12. Panel Mounting Detail

2. If two or more receptacle connectors are panel mounted with their flat sides together, cable clamps must be installed prior to shell mounting.

5.7.2 Procedure.

1. Measure the panel thickness and determine the number of panel washers required from Table 5-1.
 - o Use of panel thicknesses not listed in Table 5-1 is not recommended.

Table 5-1

Panel Thickness	Number of Washers
No panel	3
0.011 - 0.041 inch (0.3 - 1.0 mm)	2
0.042 - 0.072 inch (1.1 - 1.8 mm)	1
0.073 - 0.103 inch (1.9 - 2.6 mm)	0

2. Mount the receptacle shell as shown in Figure 5-12, using the required number of washers.
 - o Use 7/64-inch hex key for tightening the adapter screw, while holding the adapter nut with a 1/4-inch open-end wrench.
 - o Torque requirement is 15 ± 1 inch pounds (use tool CE-1605300 or equivalent).
3. Make sure that the front surface of the adapter nut is flush with the front surface of the shell within +0.010 inch (0.25 mm), -0.020 inch (0.50 mm) (see Figure 5-12).

5.8 Connector Mating and Demating.

5.8.1 Prerequisites for Connector Mating. Before attempting to mate connectors, make sure that the following prerequisites are met:

1. Shell Keying: Both shells must be keyed according to the same keying code (Paragraph 5.1).
2. Contact Types: Intermating contacts must be of opposite types, except for dummy inserts. Pin contacts intermate only with socket contacts.

5.8.2 Connector Mating.

1. Insert the plug shell into the receptacle shell.
 - o Shells are polarized and will only go together one way.
2. Engage both jackscrews one full turn.
3. Alternately turn jackscrews approximately one turn at a time until the connectors are torqued to 9 ± 1 inch-pounds. (Use tool CE-1603400 or equivalent.)
 - o **IMPORTANT:** Do not overtorque. Excess tightening torque may cause damage to the mating threads.

5.8.3 Connector Demating.

1. Loosen both jackscrews one full turn.
2. Loosen both jackscrews alternately one turn at a time until the connector halves separate.
3. Remove the plug shell from the receptacle shell.