



All numerical values are in metric units [with U.S. customary units in brackets]. Dimensions are in millimeters. Unless otherwise specified, dimensions have a tolerance of  $\pm 0.13$  and angles have a tolerance of  $\pm 2^\circ$ . Figures and illustrations are for identification only and are not drawn to scale.

## 1. INTRODUCTION

This specification covers the requirements for application of the 68-Position Heavy Duty Hybrid Connector. This connector is used on engine control modules and consist of sixty 1 mm contacts and eight 1.6 mm contacts. It is a vertical-mount wire-to-board connector system which mounts to the exterior of modules.



Refer to Application Specifications 114-6071 and 114-13045 for all termination and application information for the contacts which are used in the 68-Position Heavy Duty Hybrid Connector.

When corresponding with TE Connectivity Personnel, use the terminology provided in this specification to facilitate your inquiries for information. Basic terms and features of this product are provided in Figure 1.

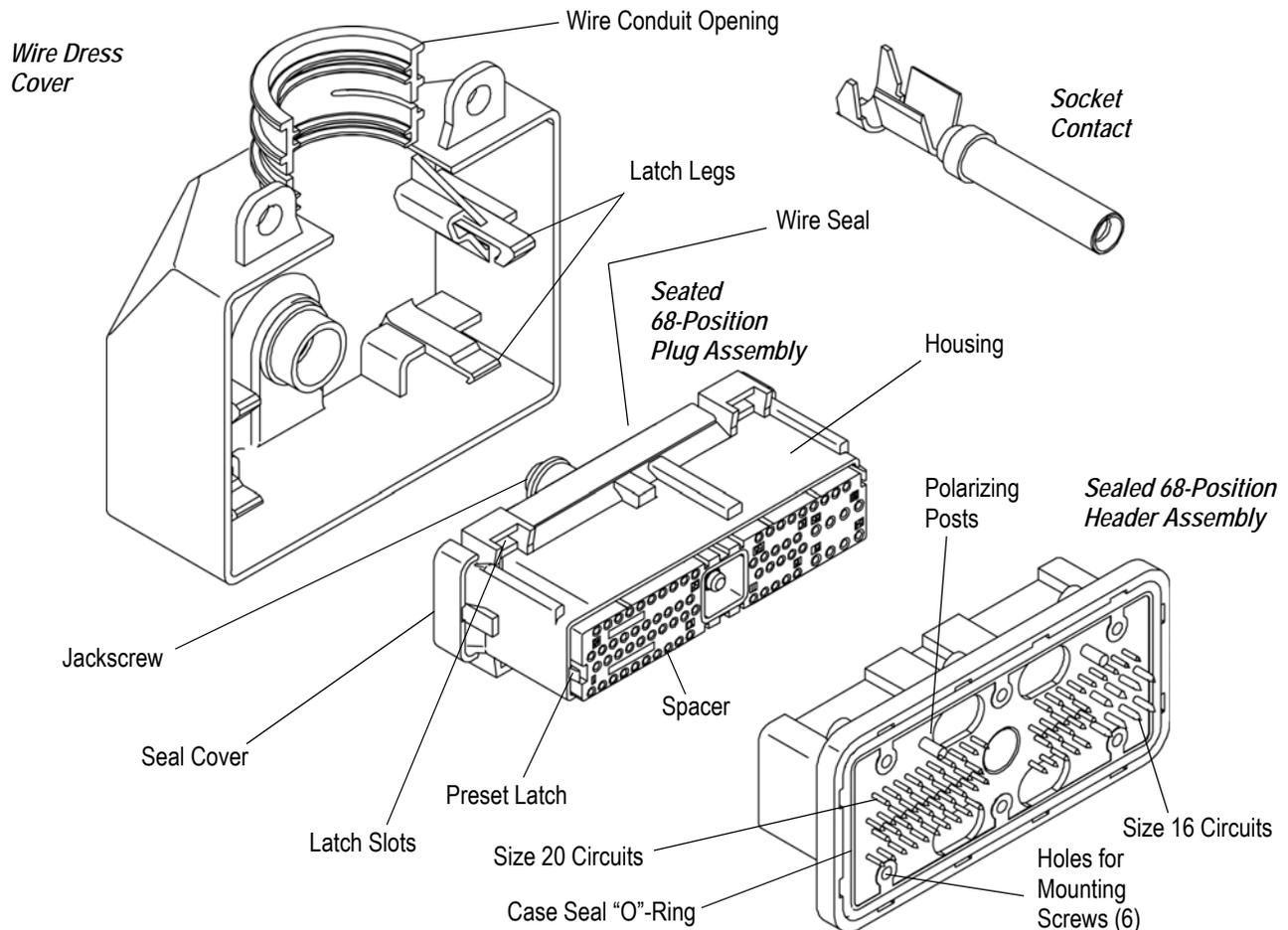


Figure 1

## 2. REFERENCE MATERIAL

### 2.1. Revision Summary

- Material changed to PTFE

## 2.2. Customer Assistance

Reference Base Part Number 776315 and Product Code A243 are representative numbers that identify the 68-Position Heavy Duty Hybrid Connector product line. These numbers are used in the customer service network to access tooling and product application information. This service is provided by your local TE Representative or, after purchase, by calling the Tooling Assistance Center number at the bottom of page 1.

## 2.3. Drawings

Customer Drawings for each product part number are available from the service network. The information contained in the Customer Drawings takes priority if there is a conflict with this specification or with any other technical documentation supplied by TE.

## 2.4. Specifications

Product Specification 108-1945 provides product performance requirements and test information. Application Specifications 114-6071 and 114-13045 provide information for termination and requirements of the contacts used in this connector assembly.

## 2.5. Manuals

Manual 402-40 is available upon request and can be used as a guide in soldering. This manual provides information on various flux types and characteristics along with the commercial designation and flux removal procedures. A checklist is included in the manual as a guide for information on soldering problems.

## 2.6. Instructional Material

The following list includes available instruction sheets (408-series) that provide information for the handling of this product line.

<u>Document Number</u>	<u>Document Title</u>
408-3295	Preparing Reel of Contacts for Application Tooling
408-6927	Design Recommendations for Printed Circuit (PC) Board Support Fixture
408-7424	Checking Terminal Crimp Height Gaging Die Closure
408-9816	Handling Of Reeled Products

## 3. REQUIREMENTS

### 3.1. Storage

#### A. Ultraviolet Light

Prolonged exposure to ultraviolet light may deteriorate the chemical composition used in the connectors.

#### B. Reel Storage

When using reeled contacts, store coil wound reels horizontally and traverse wound reels vertically.

#### C. Shelf Life

The contacts and connectors should remain in the shipping containers until ready for use to prevent deformation to the product. The contacts and connectors should be used on a first in, first out basis to avoid storage contamination that could adversely affect signal transmissions.

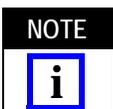
#### D. Storage Temperature

Maximum storage temperature should not exceed 150°C [302°F].

#### E. Chemical Exposure

Do not store contacts near any chemicals listed below, as stress corrosion cracking in the contacts may occur.

Alkalies	Ammonia	Citrates	Phosphates	Citrates	Sulfur Compounds
Amines	Carbonates	Nitrites	Sulfur	Nitrites	Tartrates



*Where the above environmental conditions exist, phosphor-bronze contacts are recommended if available.*

### 3.2. Exposure Limitations

The operating temperature range of this connector assembly is -40° to 125° C [-40° to 257° F].

### 3.3. Special Considerations

Size 16 circuits (8 larger circuits) will seal properly with 14 AWG GXL, 16 AWG GXL, and 14 AWG PTFE wire, with wire insulation (OD) between 2.5 and 3.18 mm. Size 20 circuits (60 smaller circuits) will seal properly with 18 AWG GXL and 16 AWG PTFE wire, with wire insulation (OD) between 2 and 2.5 mm.

### 3.4. Strain Relief Arrangement

Care should be taken when attaching the wire dress cover as not to bend or crush any wires. make sure that the wires are not bent or angled coming through the wire seal. Doing so may cause the wires to open the wire seal holes too much and form leak paths. The wires should be bent after exiting the wire cover, in order to fit all the wires comfortably underneath the wire dress cover.

### 3.5. Contact Termination

Terminate the contacts in according to the specific tooling instructional material and crimp requirements provided in Application Specifications 114-6071 and 114-13045.

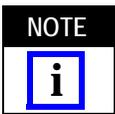
### 3.6. Plug Assembly Procedures



*Seal cover and wire seal must not be removed or altered in any way.*



*The back of the connector must be completely sealed. Those cavities that are not used must have individual seal plugs. Use seal plug 776363-1 for size 16 holes, and seal plug 776364-1 for size 20 holes. See Figure 2.*



*Contact retention fingers will not engage if contact assemblies are inserted into plug housing cavity while the plug spacer (TPA) is in the closed position.*

Check to be sure the plug spacer is in the open, or as-shipped position. See Figure 2. Proceed as follows:

1. To insert a terminated contact, push it straight into the appropriate circuit cavity as far as it will go. See Figure 2.
2. Pull back on the contact wire with a force of 8.9 to 13.3 N [2 to 3 lbs] to be sure the retention finger is holding the contact.

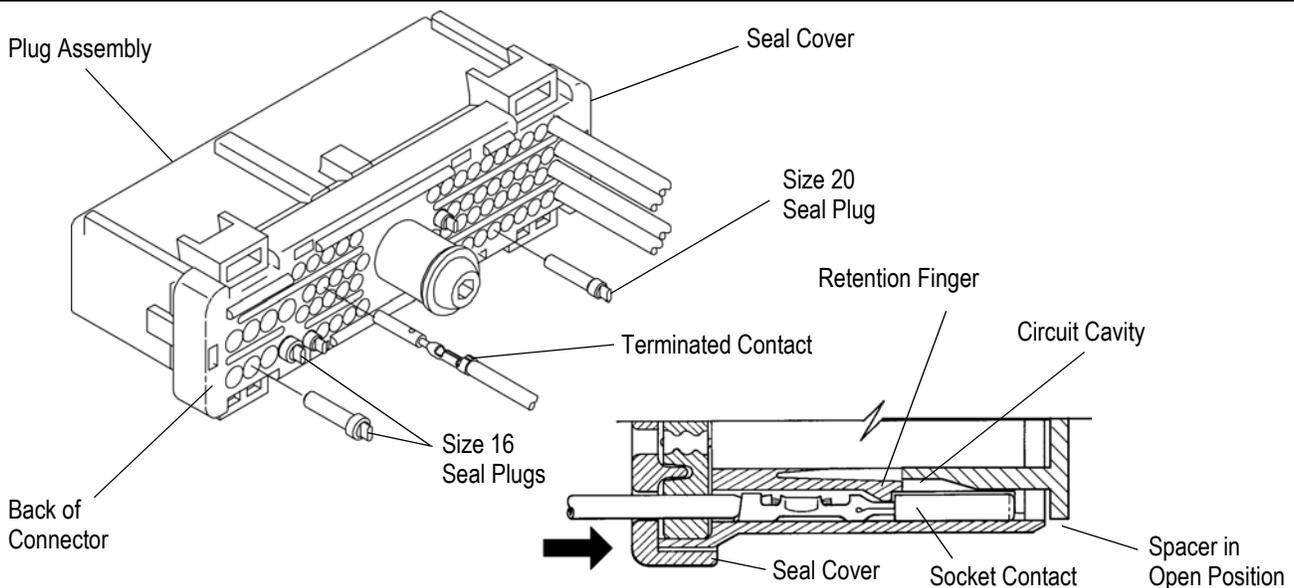


Figure 2

3. After all required contacts have been inserted, the spacer must be closed to its locked position. Release the locking latches by squeezing them inward and slide the spacer forward until it is flush with the housing plug assembly. See Figure 3.

**NOTE**  


*The spacer should seat with a force of 56 N [12.5 lbs]. If the spacer does not seat, verify that all contacts are fully inserted.*

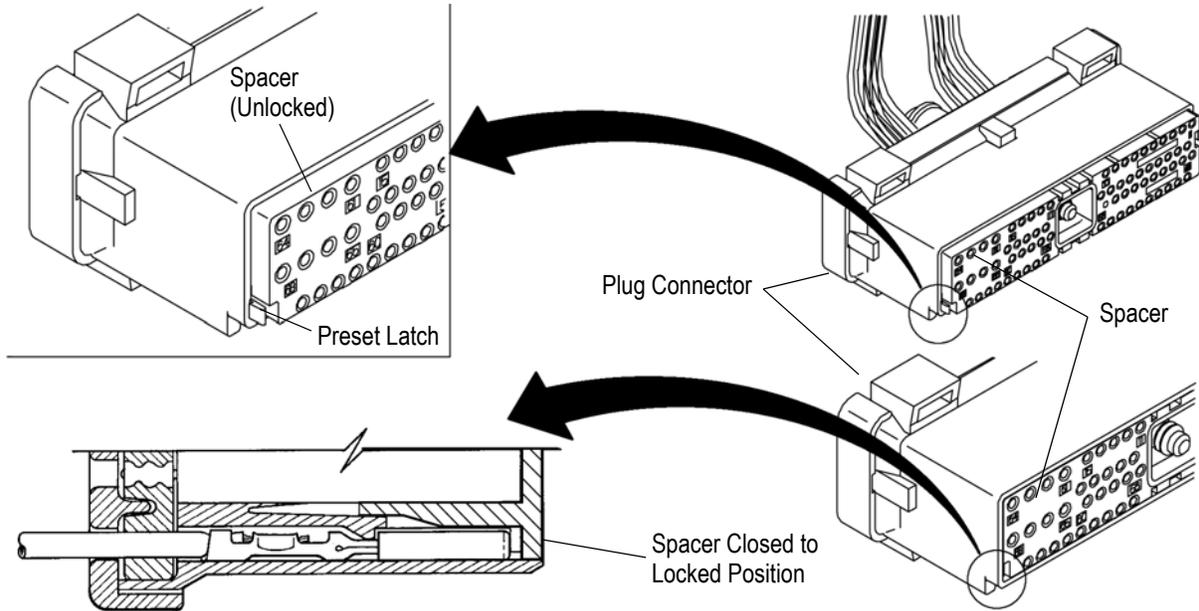


Figure 3

4. Assemble the wire dress cover and dress wires as shown in Figure 4.

5. Bolt the wire dress cover to the electronics module using customer supplied hardware. See Paragraph 3.15.

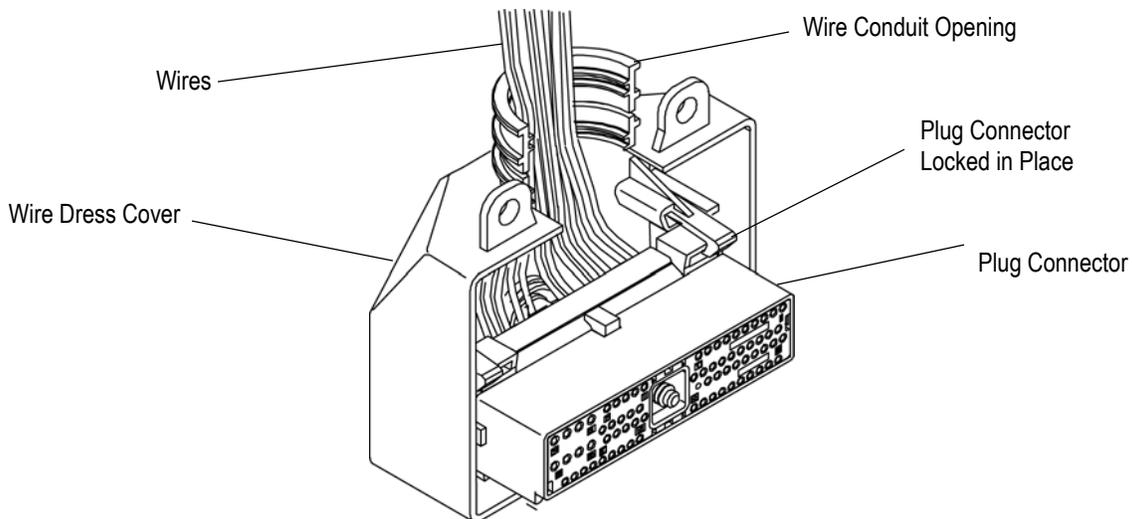


Figure 4

### 3.7. Plug Disassembly Procedures

Refer to Figure 5 and proceed as follows:

1. To remove the wire dress cover, loosen the two bolts holding the wire dress cover to the electronics module.

2. Cut the wire tie around the conduit, and release the four latch legs going into the plug assembly. See Figure 5.

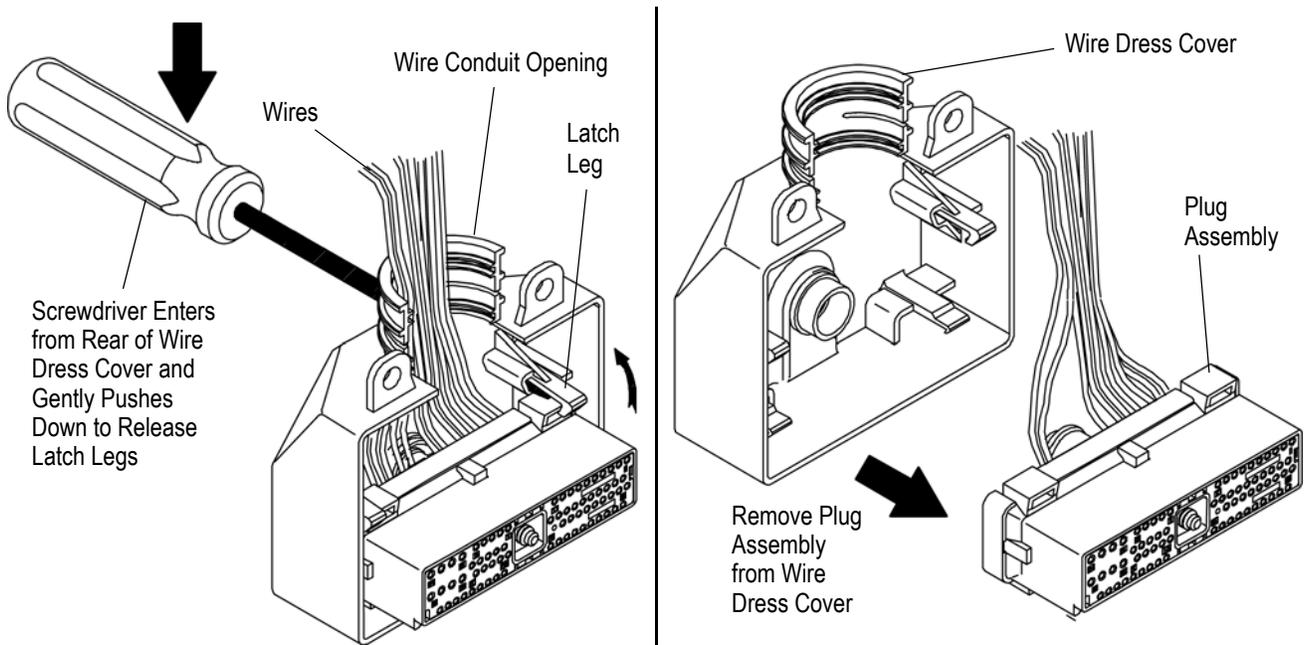


Figure 5

3. To remove the plug spacer, insert any hooked tool into the opening around the jackscrew. Rotate the tool to catch the underneath the spacer. Pull spacer straight out from the plug housing. See Figure 6



*Do not pry against the wall of the plug housing, as damage to the connector sealing system could occur.*

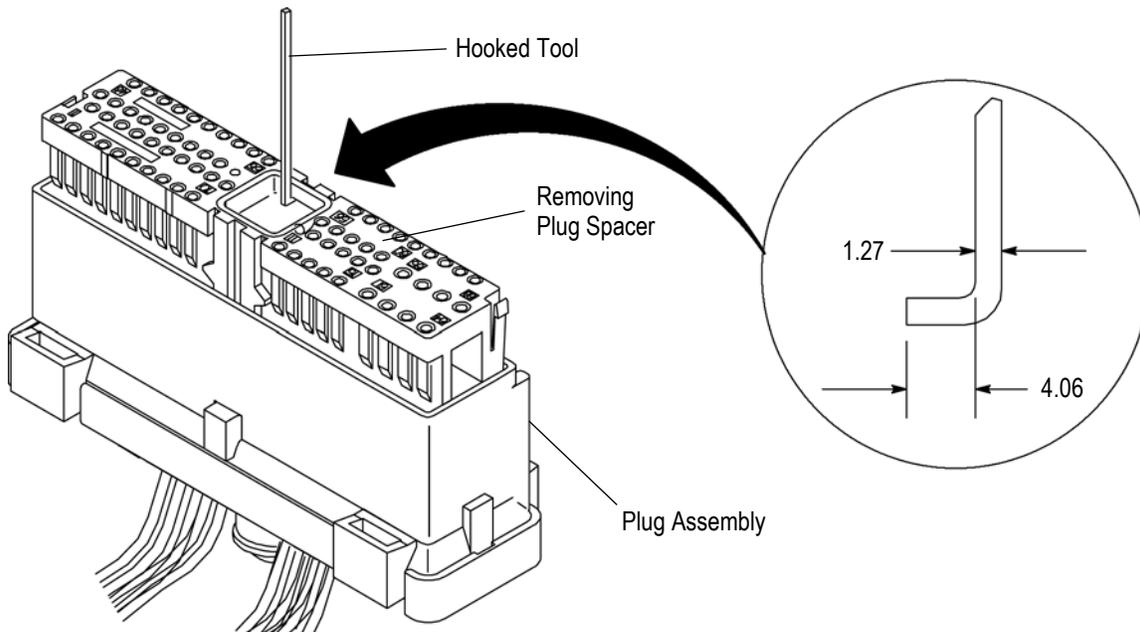


Figure 6

4. Insert a 1.4 mm screwdriver into the contact cavity and deflect the retention finger holding the contact. Gently pull the wire until the contact is free from the housing. Repeat this procedure for the remaining number of contacts to be removed as shown in Figure 7.

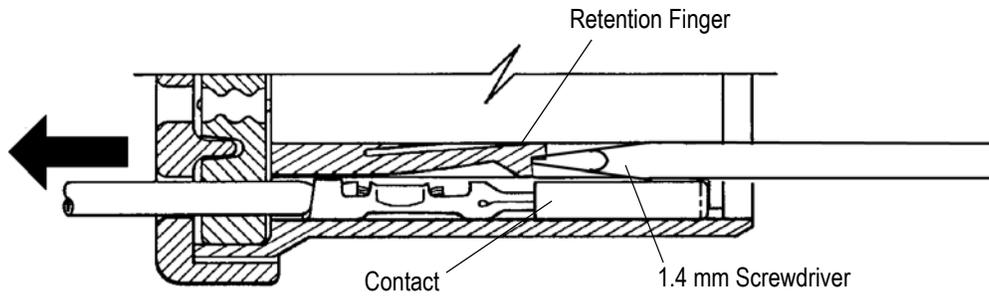


Figure 7

### 3.8. Printed Circuit Boards

#### A. Thickness

The header assembly has been designed to accommodate a pc board thickness of 2 mm thick. Contact the Product Information Center or the Tooling Assistance Center at the number listed at the bottom of page 1 for suitability of other board thicknesses.

#### B. Tolerance

The maximum bow of the pc board shall be 0.03 mm over the length of the header assembly.

#### C. Layout

The mounting and contact holes in the pc board must be precisely located to ensure proper placement and optimum performance of the header assembly. The "X" and "Y" symbols on the pc board layout represent customer established datums. They are the origin for the basic dimension (XXX and YYY datum), the point from which ALL hole positions must be located. Design the pc board using the dimensions provided in Figure 8.

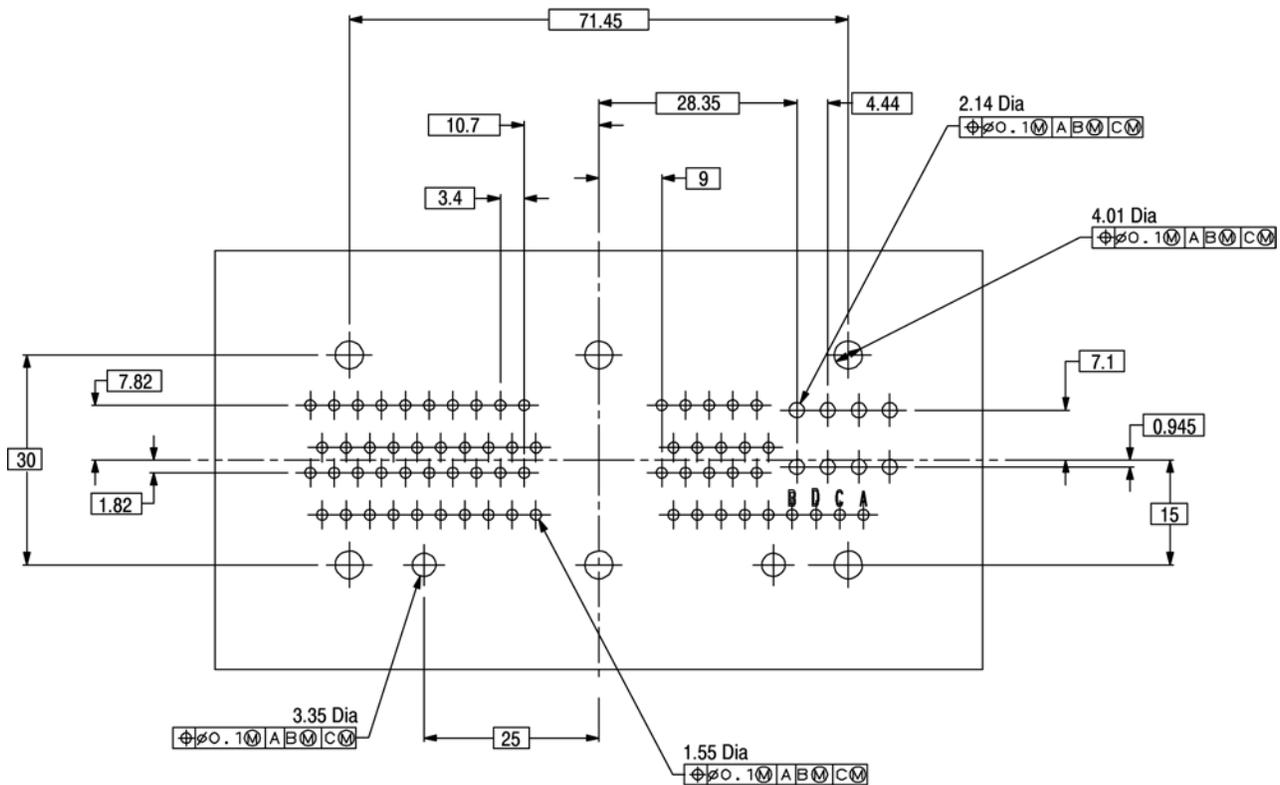


Figure 8

### 3.9. Contact Holes

The holes in the pc board for all contacts must be prepared as specified in Figure 9.

**NOTE:** The drilled hole diameter must be sized so that the diameter of the finished hole after plating meets the dimensions as shown.

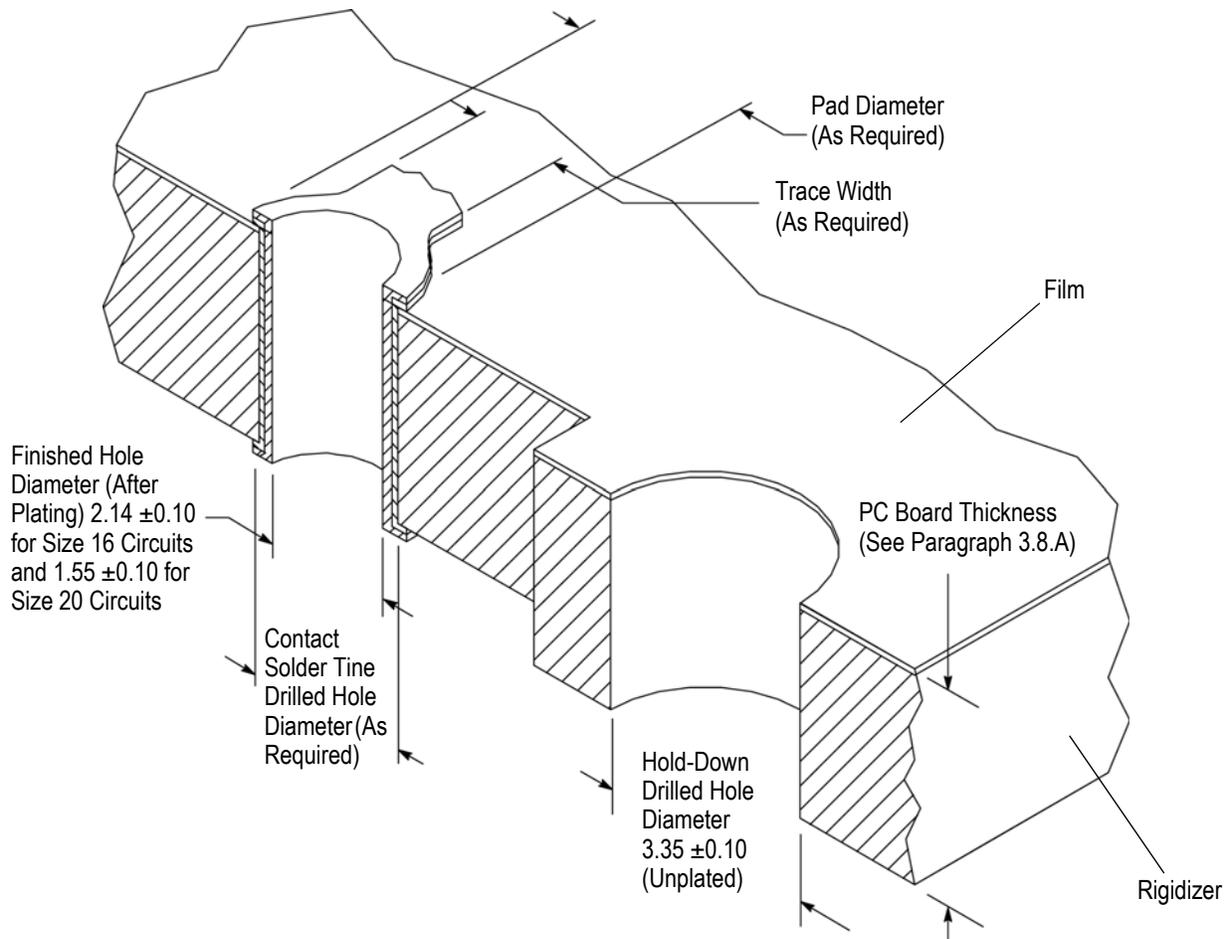


Figure 9

### 3.10. Header Assembly Application

This connector is for a vertical, surface mount application with pc boards. The header housing has a case seal for sealing against electronic module housings.

### 3.11. Header Assembly Placement

**NOTE** *Make sure that the case seal o-ring is properly placed inside the groove on the bottom side of the header assembly before mating to the rigidizer. The seal should not be bunched up or popping out of its retention features.*



1. The header assembly contains two plastic posts on the underside which are meant to polarize the header through the rigidizer and pc board.
2. All six mounting screws must be torqued through the rigidizer plate into the header assembly. The torque shall be  $2.25 \pm .22 \text{ N}\cdot\text{m}$  [ $20 \pm 2 \text{ in}\cdot\text{lbs}$ ].
3. Check for proper placement of the header interface seal, which sits inside the header pocket. This seal should be flush against the bottom of the pocket. See Figure 10.

**CAUTION** *The interface seal and case seal must be in place to use the connector. Removing either seal will result in module failures.*



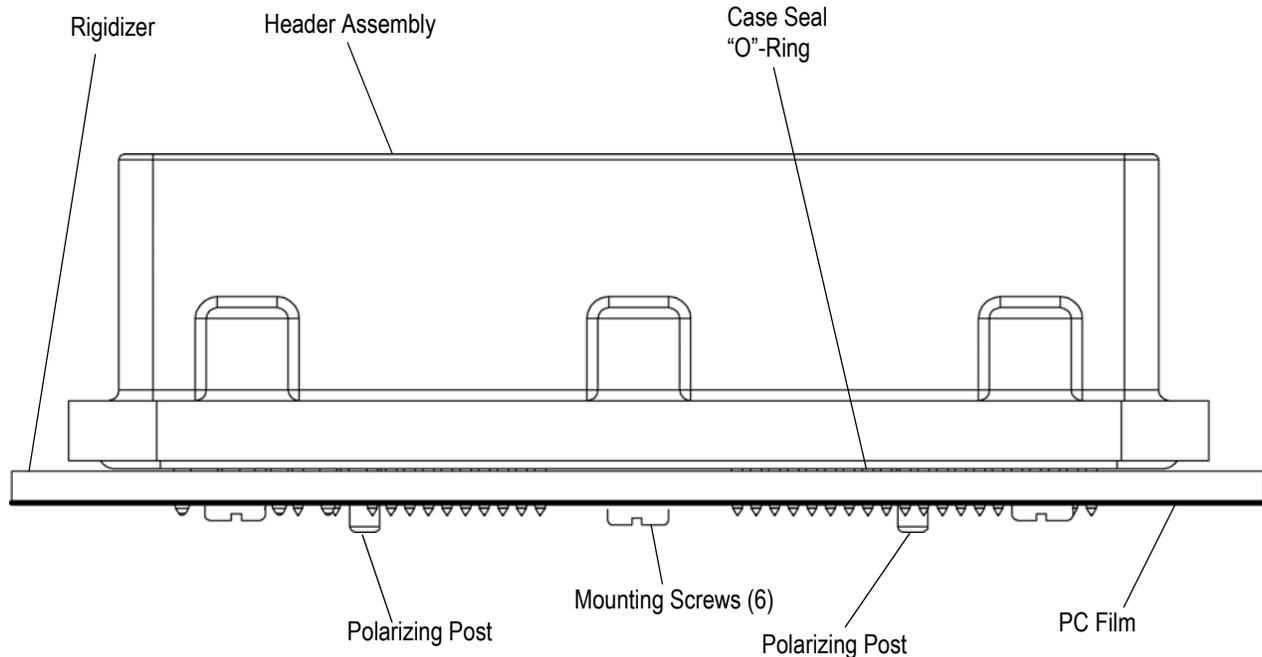


Figure 10

### 3.12. Soldering Header Assembly

The 68-Position Heavy Duty Hybrid Connector Header Assembly may be soldered to the pc board with an infrared reflow process, provided the temperature and exposure time is within the ranges specified in Figure 11. TE recommends the use of SN60 or SN62 solder for the connectors. Refer to Paragraph 2.5 for documentation material that is available for establishing soldering guidelines.

SOLDERING PROCESS	TEMPERATURE (DEGREES)		TIME (At Max Temperature)
	CELSIUS	FARENHEIT	
Infrared Reflow Soldering	225	437	30 Seconds

Figure 11

#### A. Flux Selection

The connector solder tines must be fluxed prior to soldering with a mildly activated rosin base flux. Selection of the proper flux will depend on the type of pc board and other components mounted to the board.

#### B. Reflow Parameters

Due to the many variables involved with the reflow process (e.g., component density, orientation, etc.), TE recommends that the user conduct trial runs under actual manufacturing conditions to ensure product and process compatibility.

#### C. Cleaning

After soldering, removal of fluxes, residues, and activators is necessary. Consult with the supplier of the solder and flux for recommended cleaning solvents. For a list of common cleaning solvents that will not affect the connectors or assemblies for the times and temperatures provided without any adverse effects on the connector assembly, refer to Figure 12.



*Consideration must be given to toxicity and other safety requirements recommended by the solvent manufacturer. Trichloroethylene and Methylene Chloride can be used with no harmful affect to the connectors; however TE does not recommend them because of the harmful occupational and environmental effects. Both are carcinogenic (cancer-causing) and Trichloroethylene is harmful to earth ozone layer.*



If you have a particular solvent that is not listed, contact the Tooling Assistance Center or Product Information number at the bottom of Page 1.

CLEANER		TIME (Minutes)	TEMPERATURES, DEGREES (Maximum)	
NAME	TYPE		CELSIUS	FARENHEIT
Alpha 2110 †	Aqueous	1	132	270
Bioact EC-7 ‡	Solvent	5	100	212
Butyl Carbitol •	Solvent	1	Room Ambience	
Isopropyl Alcohol	Solvent	5	100	212
Kester 5778 ■	Aqueous	5	100	212
Kester 5779 ■	Aqueous	5	100	212
Loncoterge 520 •	Aqueous	5	100	212
Loncoterge 530 •	Aqueous	5	100	212
Terpene Solvent	Solvent	5	100	212

† Product of Fry's Metals, Inc.

‡ Product of Petroferm, Inc.

• Product of Union Carbide Corp.

■ Product of Litton Systems, Inc.

Figure 12

D. Drying



Excessive temperatures may cause housing degradation. Do NOT solder the header assembly with the plug connector or wire dress cover attached to it.

E. Checking Installed Connector

All solder joints should conform to those specified in Workmanship Specification 101-21. The mounting screws must be torqued to 2.25 ± 0.22 N•m [20 ± 2 in-lbs]. The housing wall should be almost flush against the rigidizer. See Figure 13.

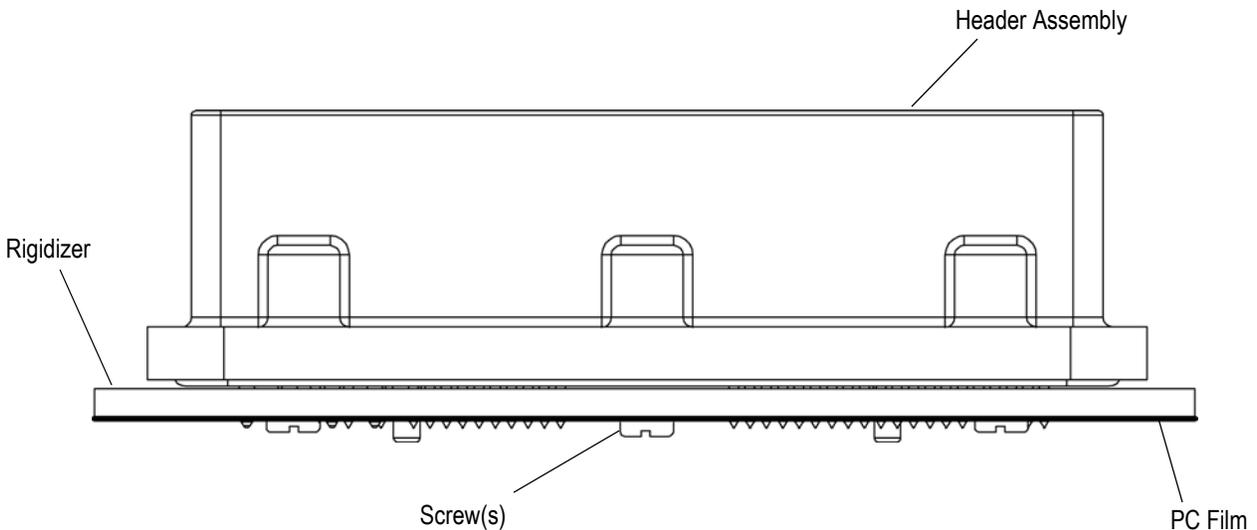


Figure 13

### 3.13. Polarization and Keying Features

The header assembly has key slots on the sides of the pocket which will accept corresponding keying protrusions from the plug assembly. There are four different possible keying arrangements. See Figure 14.

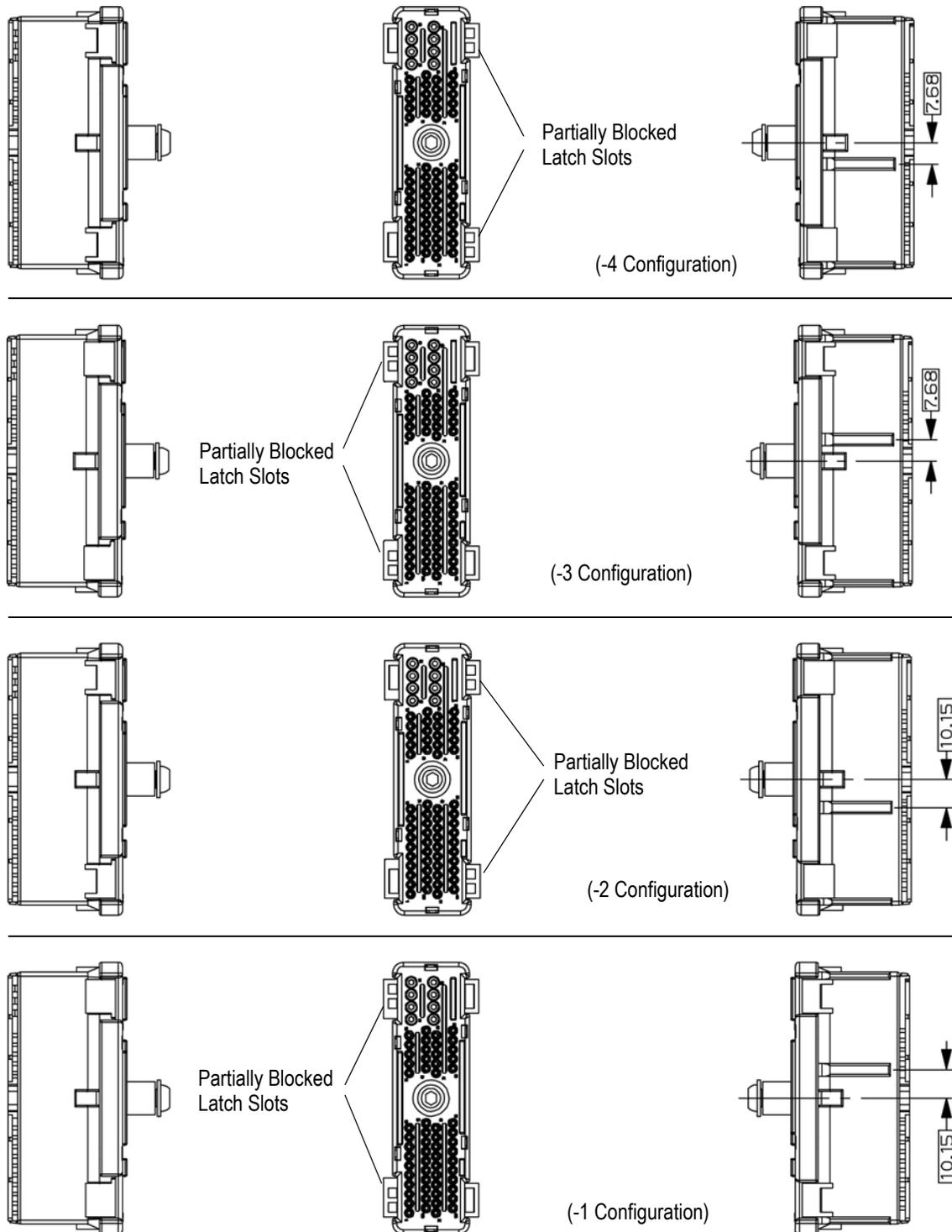


Figure 14

The plug assembly has polarized latch holes for mating with the wire dress cover. Two of the latch slots will be partially blocked, allowing the wire dress cover to only be mated in one direction. See Figure 15.

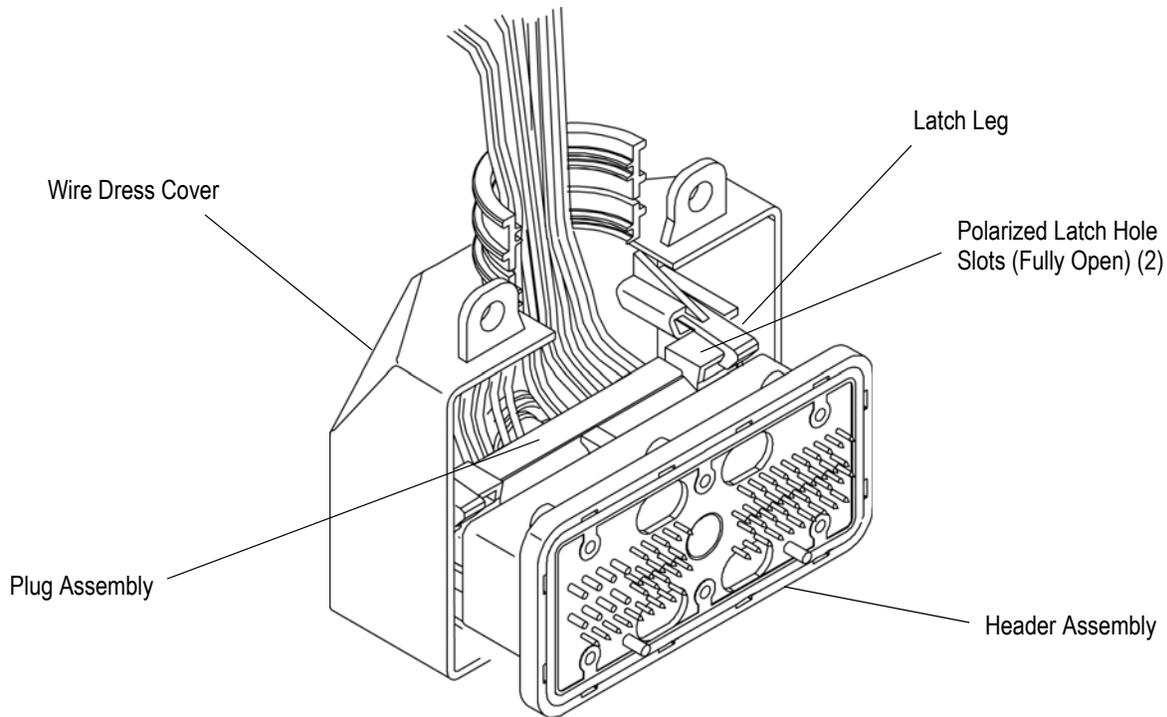


Figure 15

### 3.14. Mounting Hardware

Six customer supplied No. 6-19 screws are required to mount the header assembly to the rigidizer. Also, to mount the wire dress cover to the electronic module, two customer supplied screws are required. These screws must have a shaft of <7.0 mm diameter, and a head flange diameter > 9.0 mm.

### 3.15. Reading Voltage During Service

**CAUTION** Do NOT pierce wire insulation to take voltage readings.



It has been common practice in electrical troubleshooting to probe wires by piercing the insulation with a sharp point. This practice must be strongly discouraged when dealing with the 68-Position Heavy Duty Hybrid Connector System, or any other sealed connector system. The resulting pinholes in the insulation will allow moisture to invade the system by traveling along the wire strands. This nullifies the effectiveness of the connector seals and may result in system failure.

### 3.16. Repair/Replacement

Damaged crimped contacts or housings must be removed, discarded, and replaced with new components. Damaged pc board connectors must be removed from the pc board by standard desoldering methods and replaced.

**CAUTION** If a damaged contact is apparent before the contacts are inserted into the housing, cut the wire in back of the contact and reterminate the wire end. If contacts or housing are damaged after insertion, the wire must be cut directly in back of the housing and reterminated with new contacts and housing.



## 4. QUALIFICATIONS

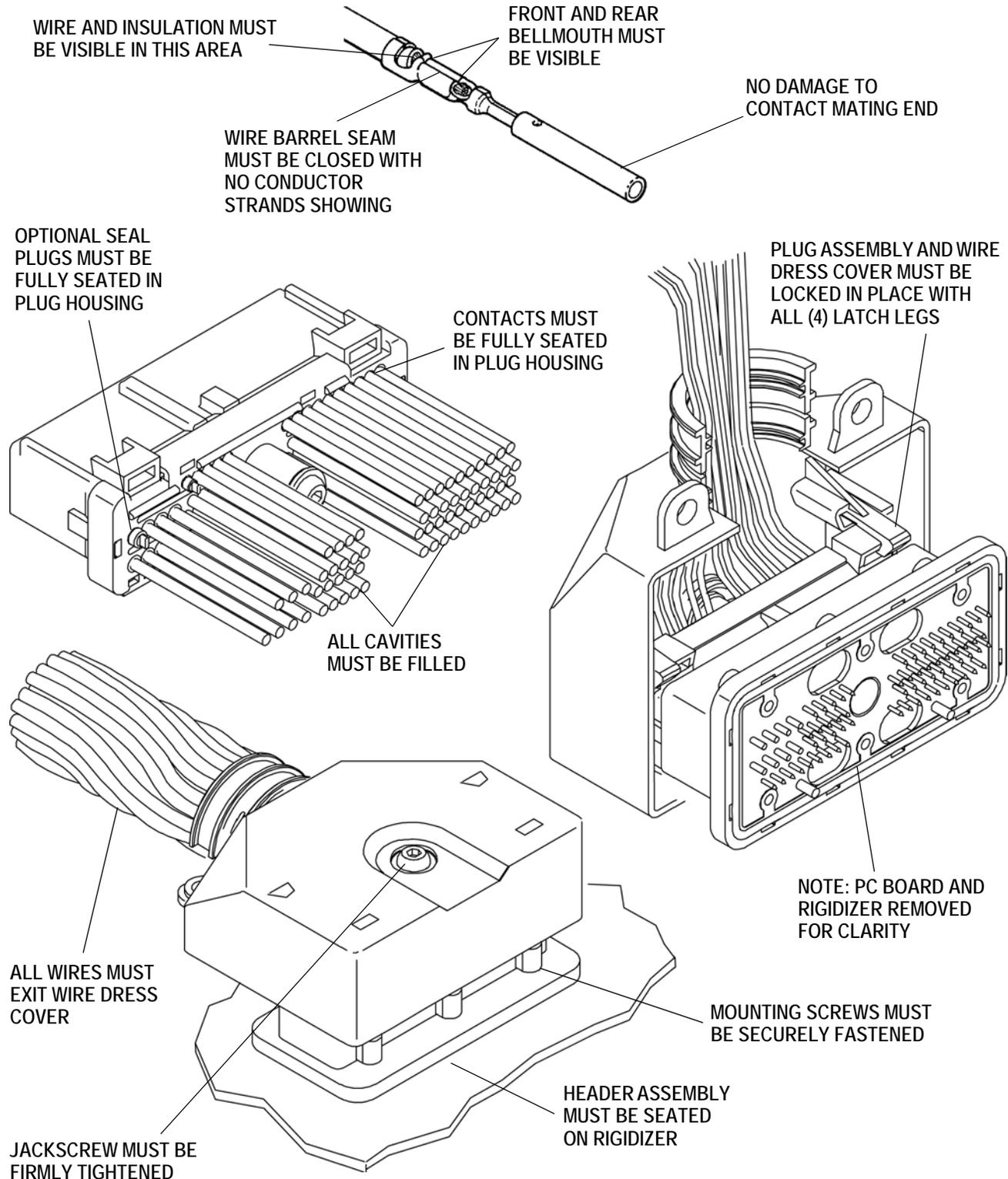
The 68-Position Heavy Duty Hybrid Connector is not required to be agency approved.

## 5. TOOLING

No specific application tooling is required for the application of the 68-Position Heavy Duty Hybrid Connector. Information for crimp termination tooling for the contacts is available in Application Specifications 114-6071 and 114-13045.

## 6. VISUAL AID

Figure 16 shows a typical application of 68-Position Heavy Duty Hybrid Connector. This illustration should be used by production personnel to ensure a correctly applied product. Applications which DO NOT appear correct should be inspected using the information in the preceding pages of this specification and in the instructional material shipped with the product or tooling.



**FIGURE 16. VISUAL AID**