



NOTE

All numerical values are in metric units [with U.S. customary units in brackets]. Dimensions are in millimeters [and inches]. Unless otherwise specified, dimensions have a tolerance of ± 0.13 mm [$\pm .005$ in.] 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 Quadrax DSub Connectors and Quadrax Contacts. The Quadrax DSub Connectors consist of a four-position free hanging/ panel-mount plug, a right-angle printed circuit (pc) board mount receptacle, and a free-hanging receptacle.

The Quadrax Pin and Socket Contacts shall be applied to appropriate Quadrax cables. The contact assembly contains an outer shell, a one-piece dielectric, and four signal contacts. An inner crimp ferrule is included with the cable applied contacts, and an optional sealing boot/plug is also available. These Quadrax Contacts may also be used in other connector systems such as ARINC 600 Connectors, and MIL-DTL-38999 style connectors. Contact TE Connectivity Product Engineering for specific application requirements for these other product lines.

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

NOTE: Figures and illustrations are for reference only and are not drawn to scale.

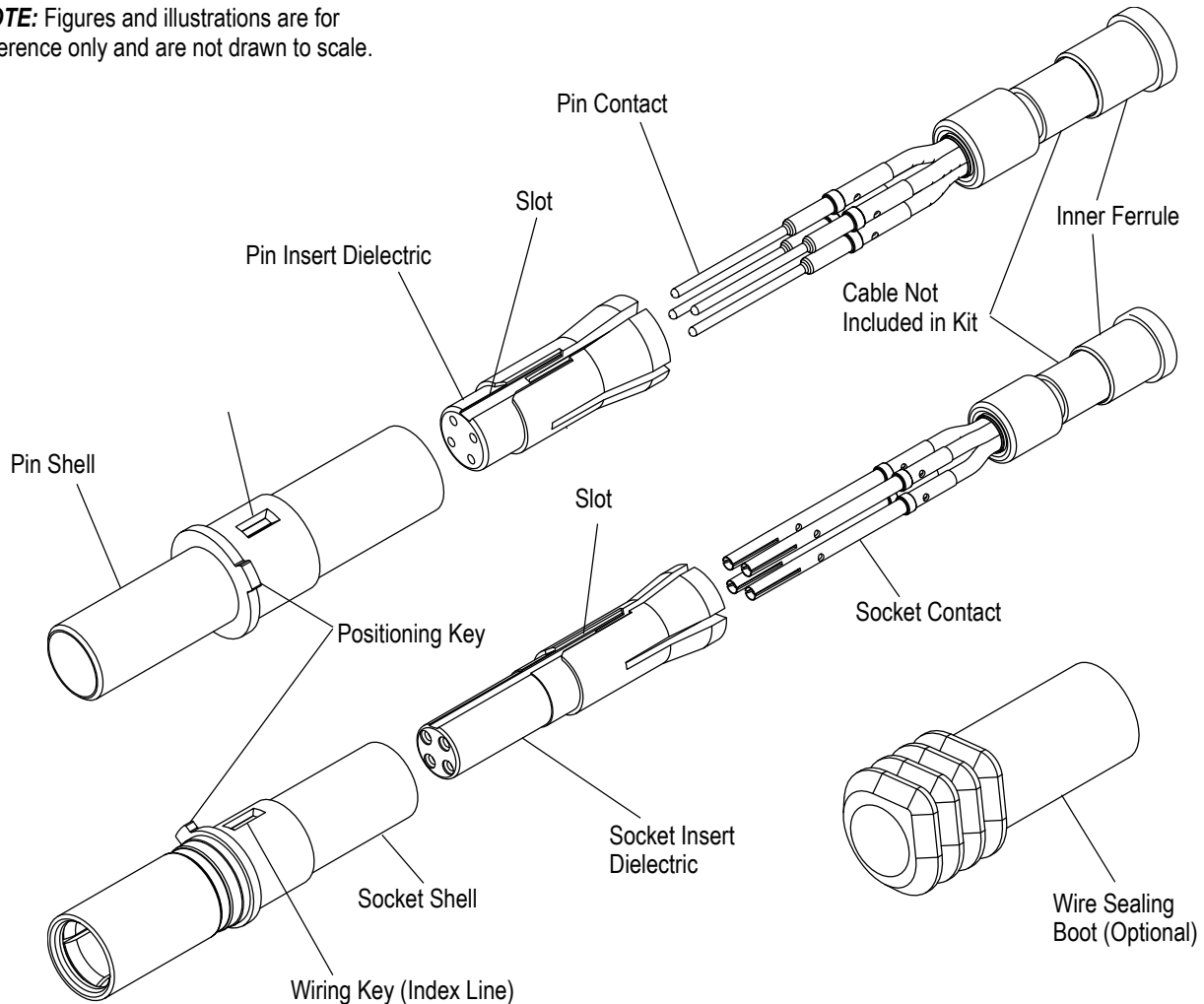


Figure 1

2. REFERENCE MATERIAL

2.1. Revision Summary

- Updated document to corporate requirements and updated text in Paragraph 2.2

2.2. Customer Assistance

Reference Product Base Part Numbers 1445692, 2000314, and Product Code H723 are representative numbers of Quadrax DSub Connectors and Contacts. Use of these numbers will identify the product line and help you to obtain product and tooling information. Such information can be obtained through a local TE Representative, by visiting our website at www.te.com, or by calling PRODUCT INFORMATION or the TOOLING ASSISTANCE CENTER at the numbers at the bottom of page 1.

2.3. Drawings

Customer Drawings for product part numbers are available from the service network. If there is a conflict between the information contained in the Customer Drawings and this specification or with any other technical documentation supplied, the information contained in the Customer Drawings takes priority.

2.4. Manuals

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

2.5. Specifications

Product Specification [108-2131](#) and Qualification Test Report [501-574](#) provides product performance and test information for the Quadrax Contacts. Test Specification [109-11](#) provides solderability requirements and evaluation methods. The DSub connectors are tested to Product Specification [108-2311](#). Application Specification [114-13123](#) provides crimping procedures and requirements for the pin and socket contacts.

2.6. Instructional Material

The following list includes available instruction sheets (408-series) that may provide assembly procedures for product, operation, maintenance and repair of tooling.

<u>Document Number</u>	<u>Document Title</u>
408-2766	Coaxial Cable Stripper Cable Kits 603995
408-7424	Checking Terminal Crimp Height or Gaging Die Closure
408-7516	Application Tooling for Screw-Machine Contacts

3. REQUIREMENTS

3.1. Safety

Do not stack product shipping containers so high that the containers buckle or deform.

3.2. Limitations

The connectors are designed to operate within a temperature range of -65° to 125°C [-85° to 257°F].



NOTE

Temperature rating of the cable must be considered when determining operating temperature of the connector and cable assembly.

3.3. Storage

A. Ultraviolet Light

Prolonged exposure to ultraviolet light may deteriorate the chemical composition of components used in the contacts or connectors.

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

B. Shelf Life

The contacts and connector kits should remain in the shipping containers until ready for use to prevent damage. These products should be used on a first in, first out basis to avoid storage contamination.

C. Chemical Exposure

Do not store product near any chemical listed below as they may cause stress corrosion cracking in the material.

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



NOTE

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

3.4. Cable Selection and Preparation

Special considerations must be adhered to in the cable stripping operation.

A. Selection

The pin and socket contacts will accept a wire size of 24 and 26 AWG in a 4-conductor (Quad) cable configuration in 100 Ohm and 150 Ohm. Cable suppliers such as Raychem* and TENSOLITE may be used. Contact TE to confirm all cable sizes and compatible contacts.

B. Preparation



CAUTION

Reasonable care must be taken not to nick, scrape, or cut any conductors during the stripping operation.



NOTE

Dimensions and procedures for stripping the cable may be found on TE Application Specification 114-13123.

3.5. Crimped Contact Requirements



NOTE

Dimensions and procedures for crimping the contacts may be found on TE Application Specification 114-13123.

3.6. Pin Contact Assembly



NOTE

Dimensions and procedures for assembling pin contacts and pin shell may be found on TE Application Specification 114-13123.

3.7. Socket Contact Assembly



NOTE

Dimensions and procedures for assembling the socket contacts and socket shell may be found on TE Application Specification 114-13123.

3.8. Contact Cavity Numbering

Figure 2 provides information on contact cavity numbering with regards to standard and reverse number assignments for the pin and socket connector assembly per ARINC 600 Supplement 14.



NOTE

The same specific part number can be used as either a standard or reverse pin assignment. Cavity numbers 2 and 4 are the same for either standard or reverse assignment. On standard wiring assignment, position 1 will be adjacent to the wiring key (index line). On reverse assignment, position 3 will be adjacent to the wiring key. Standard versus reverse assignments are dependent on the location of cavity numbers 1 and 3.

TENSOLITE is a trademark.

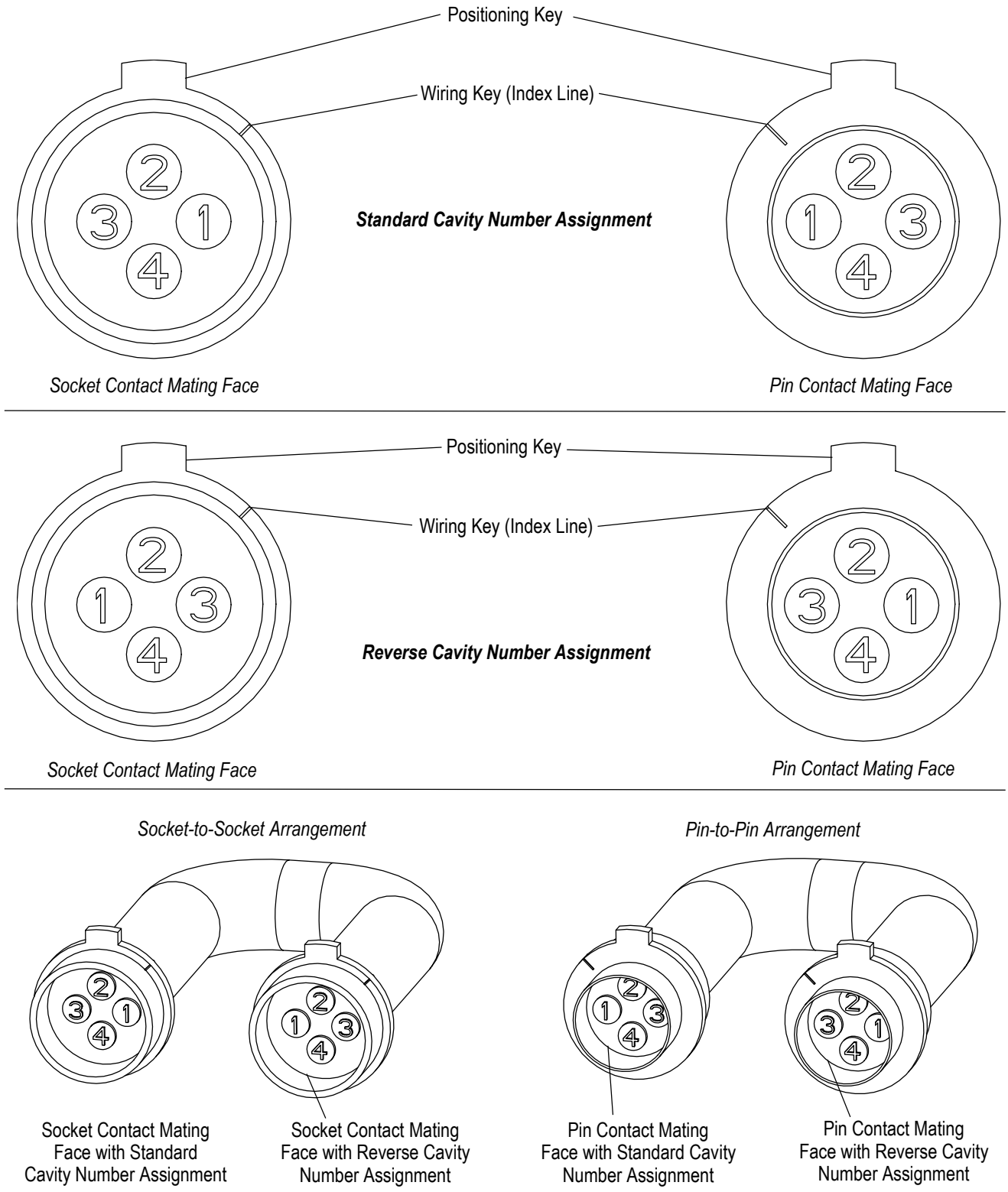


Figure 2

3.9. Installation of Quadrax Contacts into Plug and Receptacle Connector Assemblies

The following paragraphs provide information on assembly procedures for the pin and socket contact assemblies installed in the receptacle and plug connectors.

A. Installation of Quadrax Pin Contact Assemblies in Receptacle Connectors

Line up the positioning key with the internal key on the connector. Install the pin shell sub-assembly into the receptacle assembly until the pin shell snaps in place. Insert wire seal until flush with rear surface of housing. Refer to Figure 3.

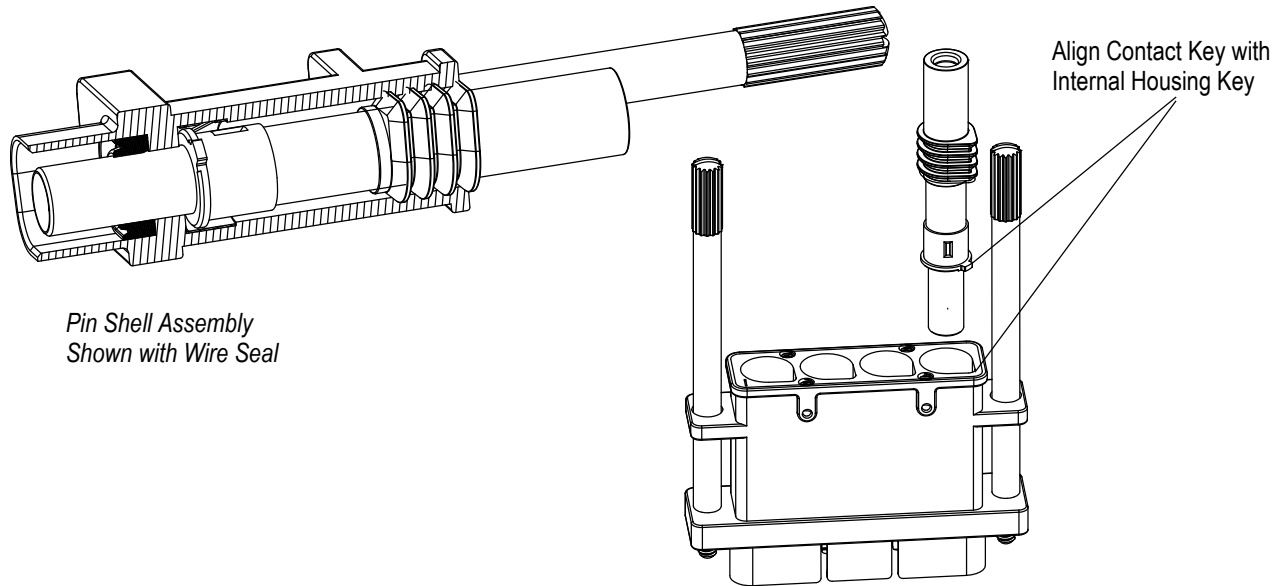


Figure 3

B. Installation of Quadrax Socket Contact Assemblies into Plug Connectors

Line up the positioning key with the internal key on the connector. Install the socket shell sub-assembly in the plug assembly until the socket shell snaps in place. Insert wire seal until flush with rear surface of housing. Refer to Figure 4.

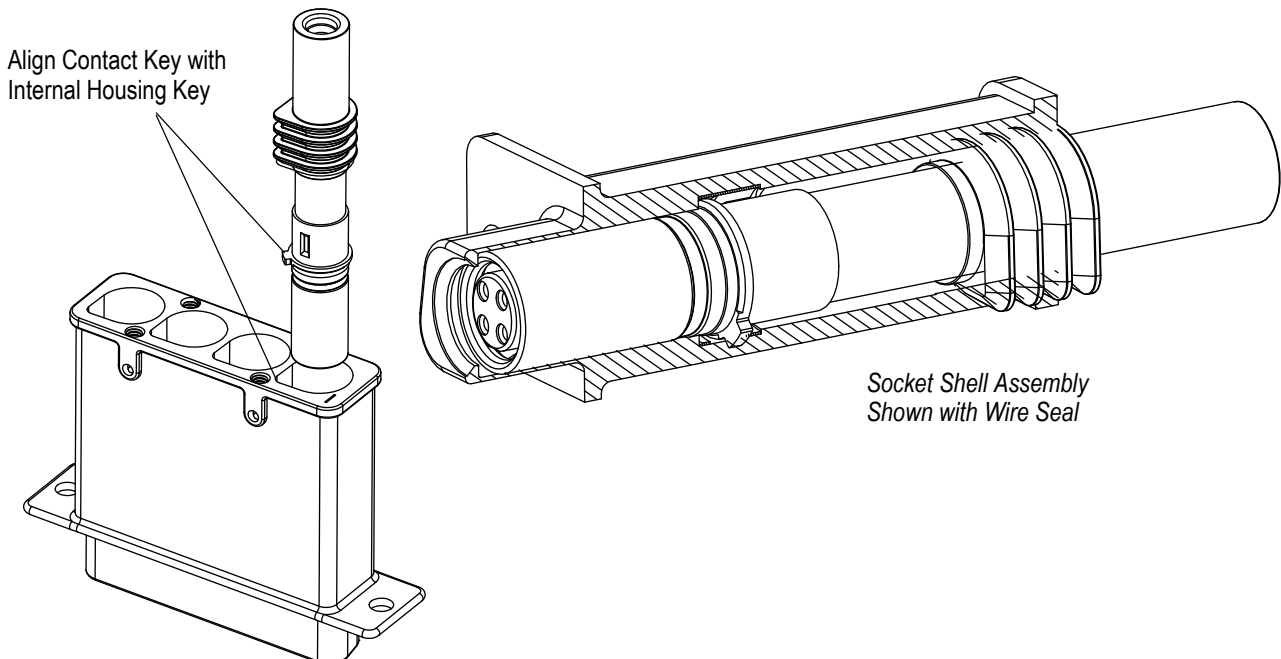


Figure 4

3.10. Installation of Backshell Assembly (See Figure 5)

1. Place one side of the backshell on the back of the connector aligning the rib on the housing with the groove in the backshell. Make sure that the backshell is on top of the last gland of the sealing boot/plug.



NOTE

Make sure the screw threads are recessed into the strain relief clamp to prevent interference with the housing during assembly.

2. Repeat step 1 with the other half of the strain relief clamp.
3. Using a 5/64-in. Allen wrench, tighten the captive screws.
4. Apply two cable ties through the backshell as shown.

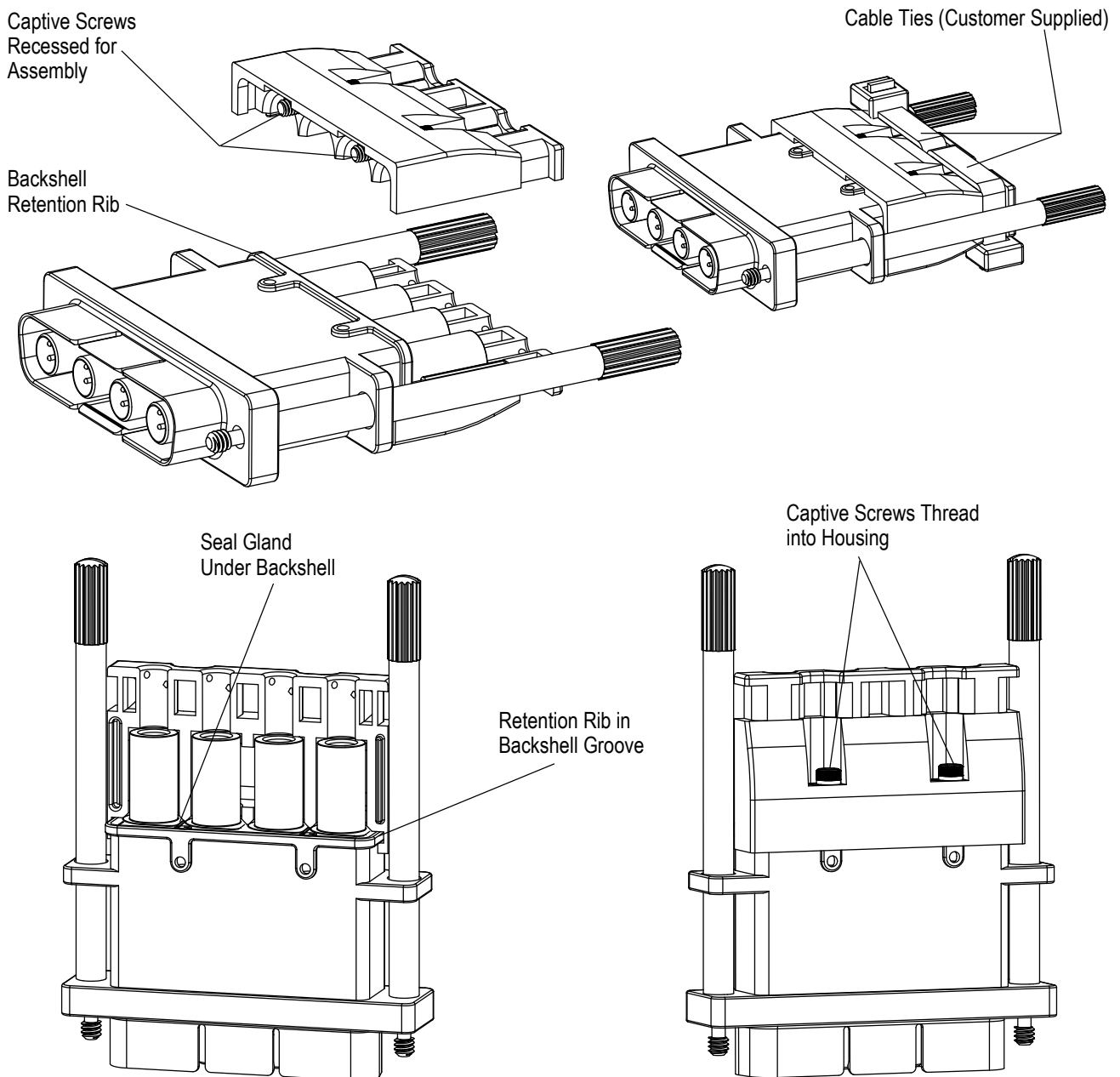
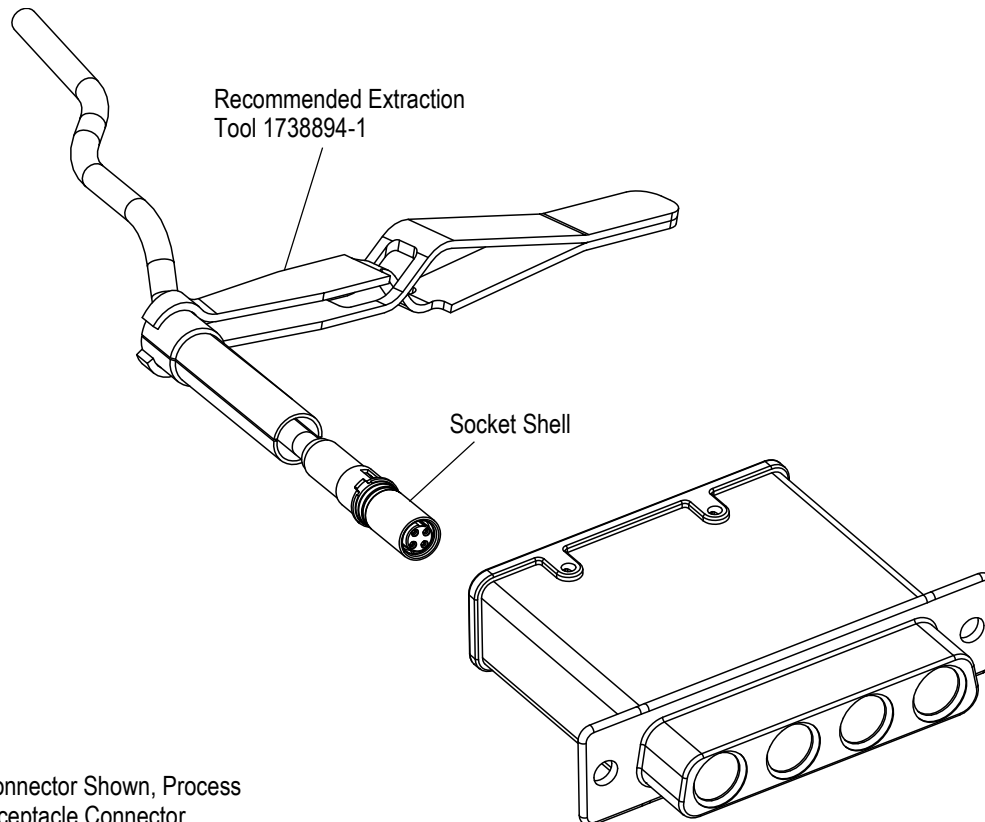


Figure 5

3.11. Removal of Quadrax Contacts from Plug and Receptacle Connector Assemblies (RR/RR)

Use recommended Extraction Tool 1738894-1 for removal of the pin or socket contacts from the plug or receptacle connector assemblies. Refer to Figure 6.

1. Cut wire tie and remove backshell by loosening the captive screws.
2. Slide sealing boot back up the cable and out of the way.
3. Insert extraction tool over wire insulation and bottom the tool in the cavity hole.
4. Pull up while holding the tool and cable. Contact should easily come out.



NOTE: Plug Connector Shown, Process is Same for Receptacle Connector

Figure 6

3.12. Mounting Hardware

A. Assembling Screw Retainer Kit (211883-5) (Figure 7)

1. Align the oval (flat) side of the retainer with the front of the connector flange.
2. Slide the retainer onto the flange and align holes.
3. Thread the retainer screw through the retainer from the back of the flange.

B. Assembling Screwlock Kits (212447-1)

a. Right-Angle Receptacle (Figure 7)

- (1) Pass the screwlock through the panel and thread it into the threaded flange of the connector.



NOTE

Recommend torque for the screwlock assembly to be 0.45 N•m [4 in.-lb].

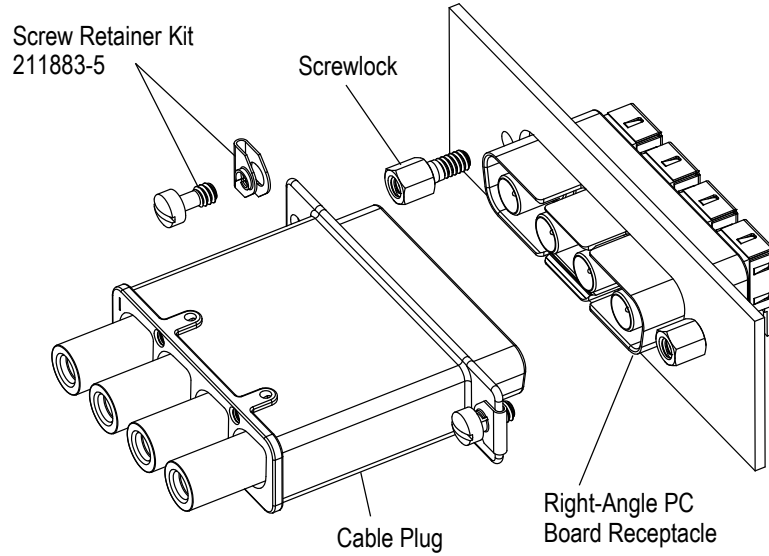


Figure 7



NOTE

Panel thickness is 1.52-1.65 mm [.060-.065 in.].

b. **Free Hanging Plug** (Figure 8)

- (1) Install two flat washers on the screwlock and insert the screwlock through the front of the connector flange.
- (2) Secure the assembly with a lockwasher and a nut.

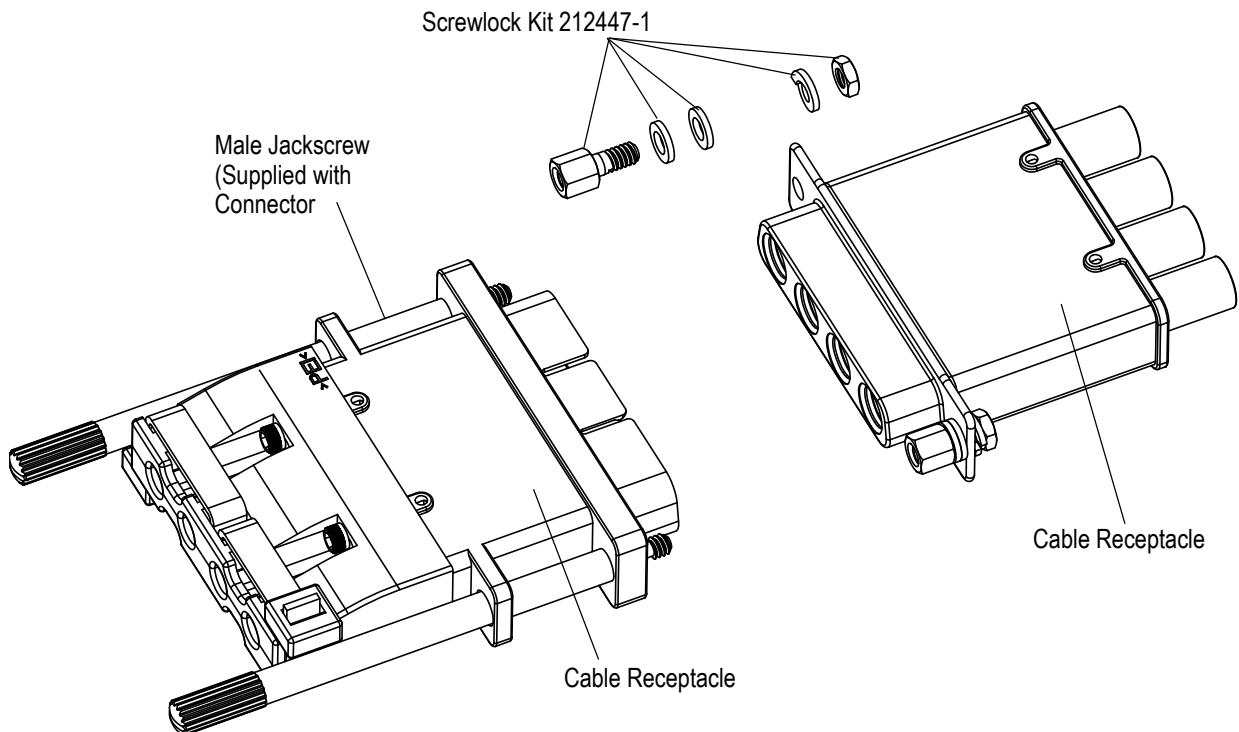


Figure 8

3.13. PC Board Connectors

A. PC Board Material and Thickness

1. PC board material may be glass epoxy (FR-4, G-10), or other TE Engineering approved substrates.
2. The pc board contact can be installed on various thickness of pc board. Board thickness may vary depending upon the application, however, contact tail length through the pc board becomes important for wave soldering operations. A recommended minimum of 1.27 mm [.050 in.] of the contact solder tail should protrude through the pc board.
3. Contact the Product Information Center or the Tooling Assistance Center number listed at the bottom of page 1 for suitability pc board materials or thicknesses.

B. PC Board Layout

The contact holes in the pc board must be located as shown to ensure proper placement and performance of the connector. Design the pc board using the dimensions provided in Figure 9. The layout shows the top (component) side of the board.

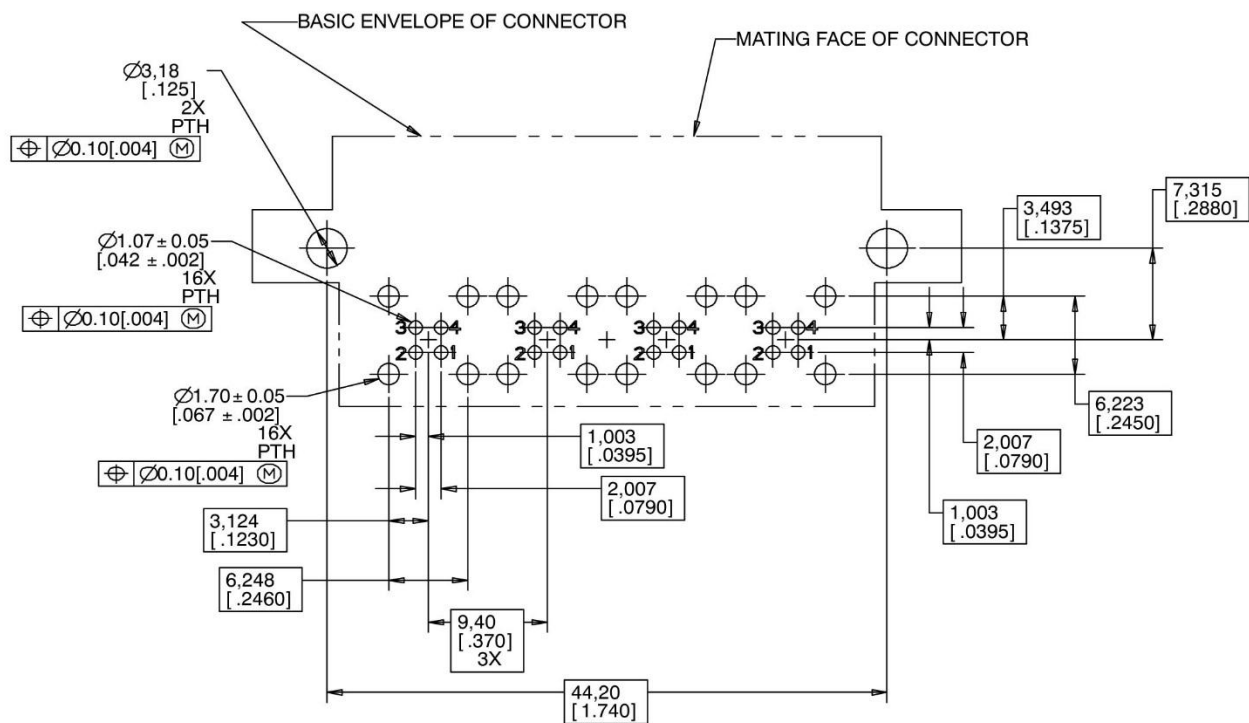


Figure 9

C. Contact Holes

The contact holes in the pc board must be precisely located to ensure proper placement and optimum performance of the connector, and must be prepared to the requirements provided in Figure 10.

3.14. Connector Spacing

Care must be taken to avoid interference between adjacent connectors and/or other components. There is no required spacing between connectors, however spacing may be dependent on variable hardware used and the clearance required for mating connectors.

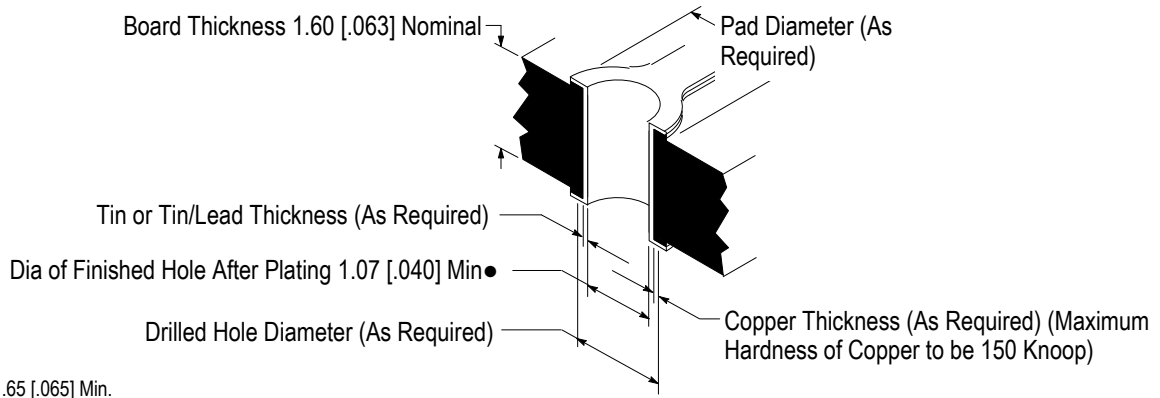


Figure 10

3.15. Placement



CAUTION

Connectors should be handled only by the housing to avoid deformation, contamination, or damage to the contacts.

When placing connectors on the pc board, make sure that the contacts are aligned and started into the matching holes before seating the connector onto the pc board.

3.16. Soldering Connectors

The PC Board Quadrax Connector can be soldered with wave, vapor phase, or infrared reflow processes, provided the temperatures and exposure time are within the ranges specified in Figure 11. TE recommends the use of SN60 or SN62 solder for the connectors. Refer to Paragraph 2.4 for instructional material that is available for establishing soldering guidelines.

SOLDERING PROCESS	TEMPERATURE	TIME (At Max Temperature)
Wave	260°C [500°F] (Wave Temperature)	5 Seconds
Vapor Phase	215°C [419°F]	5 Minutes
Infrared Reflow	230°C [446°F]	5 Minutes

Figure 11

A. Flux Selection

Contact solder tines must be fluxed prior to soldering with a mildly active, rosin base flux. Selection of the flux will depend on the type of pc board and other components mounted on the board. Additionally, the flux must be compatible with the wave solder line, manufacturing, health, and safety requirements. Call the Product Information phone number at the bottom of page 1 for consideration of other types of flux. Some fluxes that are compatible with these connectors are provided in Figure 12.

FLUX TYPE	ACTIVITY	RESIDUE	COMMERCIAL DESIGNATION	
			KESTER	ALPHA
Type RMA (Mildly Activated)	Mild	Noncorrosive	186	611

Figure 12

B. Cleaning

After soldering, removal of fluxes, residues, and activators is necessary. Consult with the supplier of the solder and flux for recommended cleaning solvents. The following is a listing of common cleaning solvents that will not affect the connectors for the time and temperature specified. See Figure 13.

KESTER AND ALPHA are trademarks of their respective companies.



DANGER

Consideration must be given to toxicity and other safety requirements recommended by the solvent manufacturer. Refer to the manufacturer's Material Safety Data Sheet (MSDS) for characteristics and handling of cleaners. Trichloroethylene and Methylene Chloride can be used with no harmful effect 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 the earth's ozone layer.



NOTE

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)	TEMPERATURE (Max)
NAME	TYPE		
ALPHA 2110	Aqueous	1	132°C [270°F]
BIOACT EC-7	Solvent	5	100°C [212°F]
Butyl CARBITOL	Solvent	1	Ambient Room
Isopropyl Alcohol	Solvent	5	100°C [212°F]
KESTER 5778	Aqueous		
KESTER 5779	Aqueous		
LONCOTERGE 520	Aqueous		
LONCOTERGE 530	Aqueous		
Terpene	Solvent		

Figure 13

C. Drying

When drying cleaned connectors, make certain that temperature limitations are not exceeded: -40° to 105° C [-40° to 221°F]. Excessive temperatures may cause degradation.

3.17. Checking Installed Connector

All solder joints should conform to those specified in Test Specification 109-11. The connector must seat on the pc board to within the tolerance of 0-0.25 mm [.000-.010 in.].

3.18. Panel Cutouts

Recommended panel cutout is shown in Figure 14. Panel thickness range is 1.52-1.65 mm [.060-.065 in.].

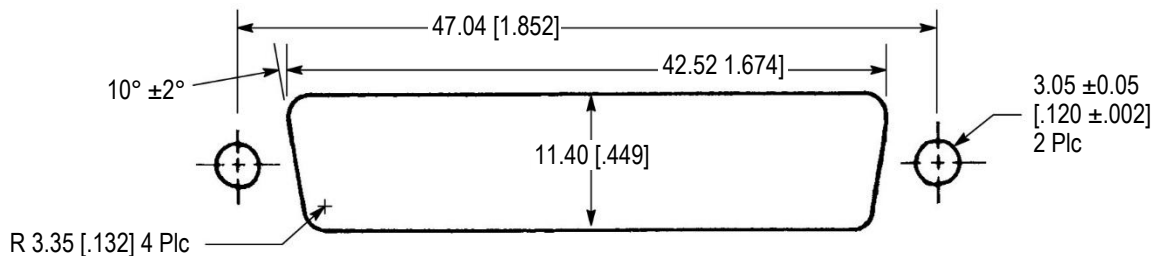


Figure 14

3.19. Mating/Unmating

To properly mate and unmate the two halves of a connector system, align the keystone keying and fully mate the connectors. Engage and tighten the retainer screws/jack screws to 0.40-0.45 Nm [3.5-4.0 in.-lbs] to ensure the seal is compressed and the shells are bottomed.

ALPHA, BIOACT, CARBITOL, LONCOTERGE, and KESTER are trademarks of their respective owners.



NOTE
Connector shells must bottom for full engagement and seal compression.

3.20. Repair/Replacement



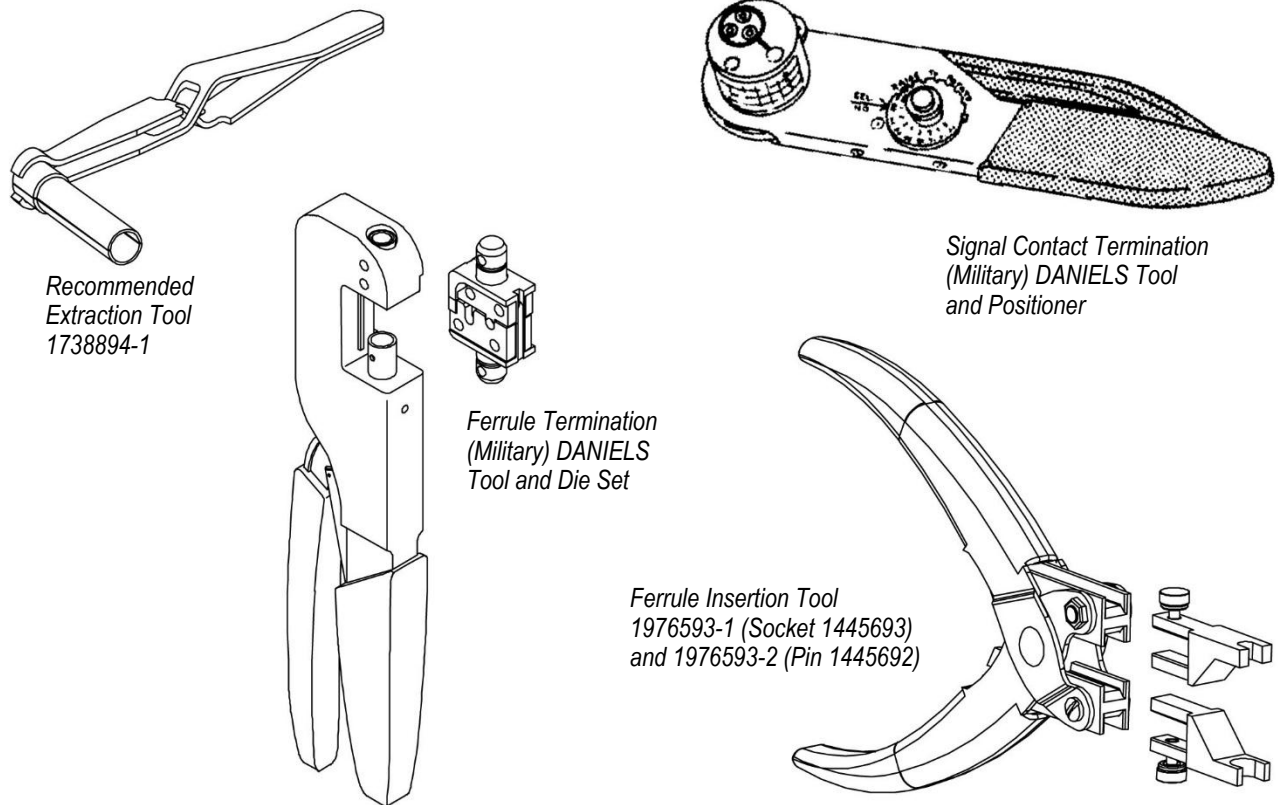
CAUTION
Damaged components must not be used. If a damaged component is evident, it must be removed and replaced with a new one. Terminated contacts and ferrules must not be re-terminated.

4. QUALIFICATION

Quadrax DSub Connectors and Quadrax Contacts are not required to be agency evaluated and tested.

5. TOOLING

Quadrax Contacts and ferrules can be terminated using hand crimping tools that accommodate the wire size specified. Military (DANIELS) tool, positioner, and die sets are available to crimp the screw-machine pin or socket contact, and ferrule. See Figure 15 for recommended tooling.



WIRE SIZE (AWG)	CONTACT TYPE	CONTACT TERMINATION TOOLING			FERRULE TERMINATION TOOLING		RECOMMENDED EXTRACTION TOOL
		HAND TOOL	POSITIONER OR DIE SET	SELECTOR SETTING	HAND TOOL	DIE SET	
26	Pin or Socket	M22520/2-01	K709	4	M22520/5-01 or 608650-1	5-45	1738894-1
24	Pin or Socket	M22520/2-01	K709	5	M22520/5-01 or 608650-1	5-45	1738894-1

Figure 15

6. VISUAL AID

The illustration below shows a typical application of Quadrax DSub Connectors and Contacts. 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.

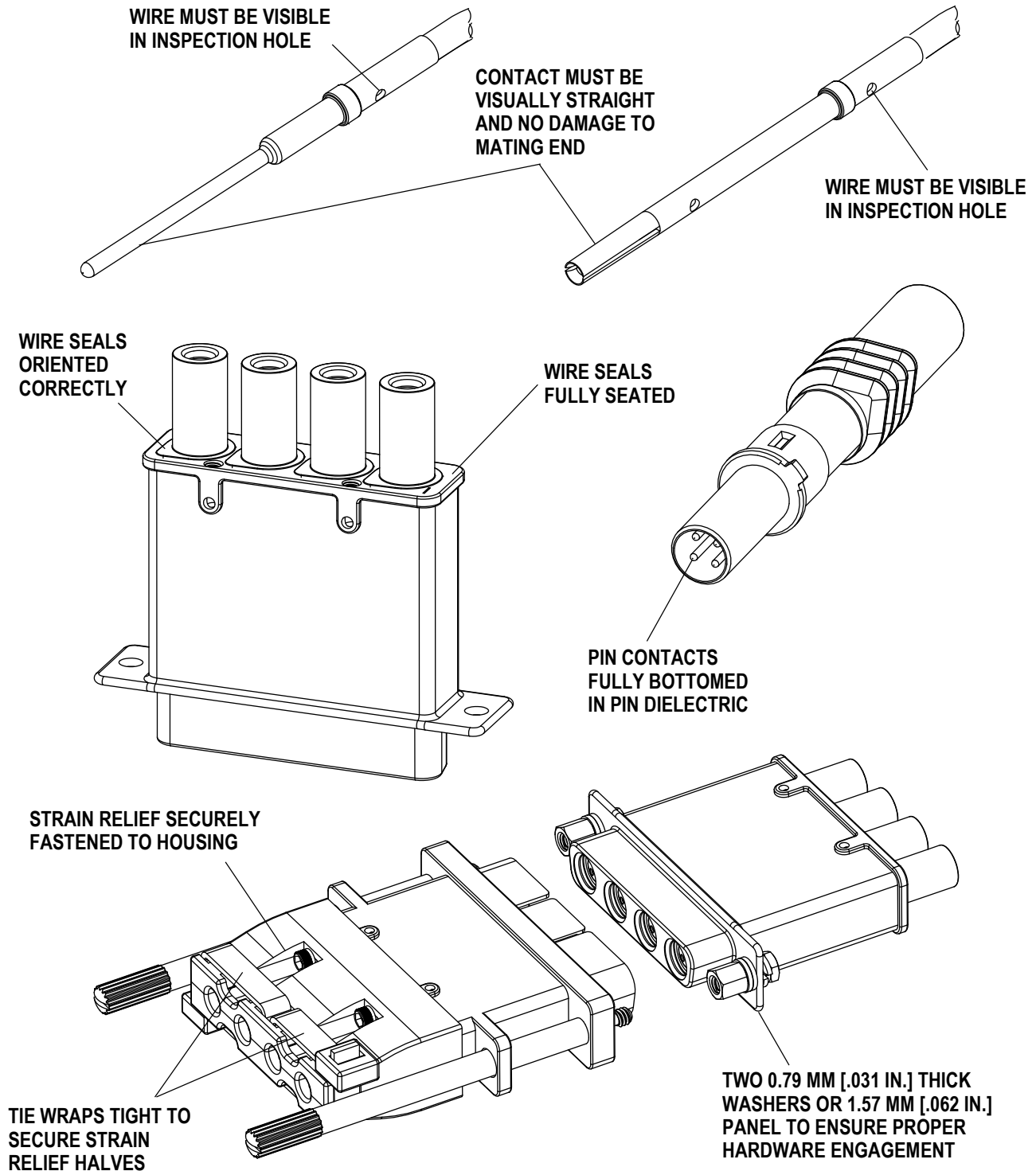


FIGURE 16. VISUAL AID