



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 [± 0.005] 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 AMR charging and BOT connector kit typically used for AMR (autonomous mobile robot) and charging dock application. The AMR connector system allows docking/mate into a charging unit to recharge batteries and/or supply collected data to larger computerized network. All data/signal contacts are pre-installed into charger and BOT housings. Power pin and socket contacts (sold separately) will be secured into TPA (terminal position assurance) molded component for alignment and easy replacement within both the BOT connector and the charger connector. Charger connector assembly has a defined amount of spring-loaded float in X, Y, and Z axis. BOT connector is directly mounted to enclosure with screws, charger connector is mounted to enclosure with retaining plate, secured from the inside with screws. AMR charging and BOT connector kits are available in 2 power + 8 signal/data and 3 power + 8 signal/data.

When corresponding with TE Connectivity (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.

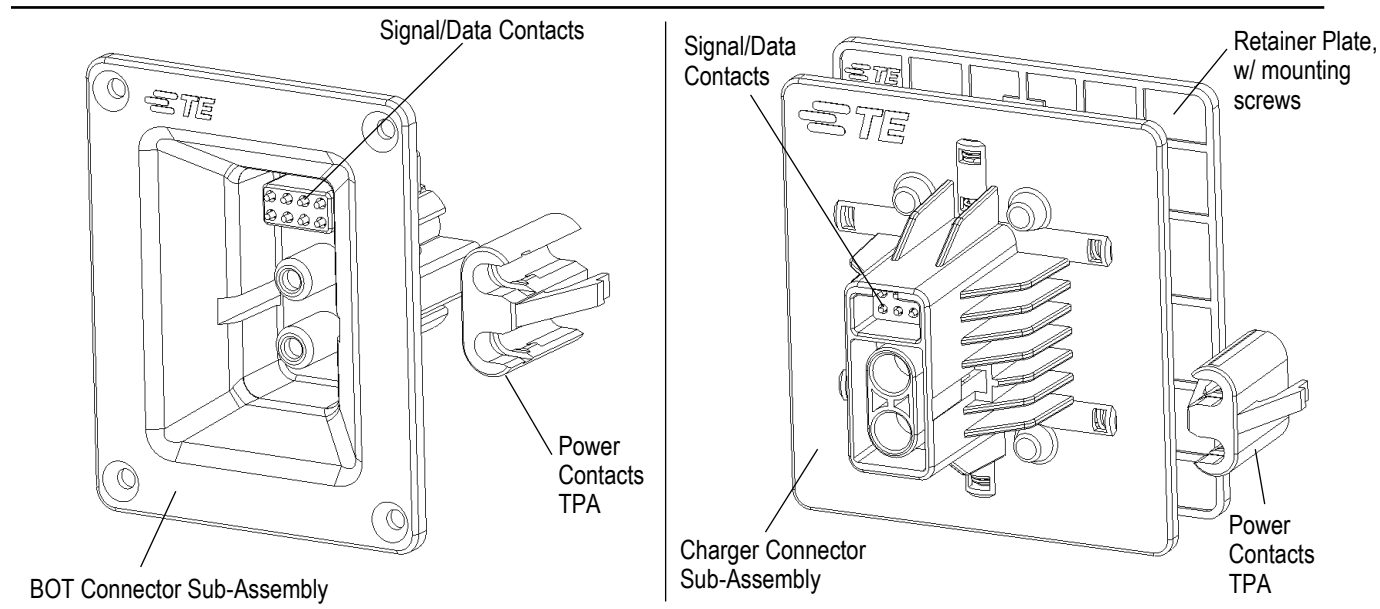


Figure 1

2. REFERENCE MATERIAL

2.1. Revision Summary

Proposed

2.2. Customer Assistance

Reference Product Base Part Number 2399991, 2399992, 2400405 and 2400406 and Product Code 2349 are representative of the AMR Charging and BOT Connector Kit. Use of these numbers will identify the product line and help you to obtain product and tooling information when visiting www.te.com or calling the number at the bottom of this page.

2.3. Drawings

Customer drawings for product part numbers are available from www.te.com. Information contained in the customer drawing takes priority.

2.4. Specifications

Product Specification 108-160493 provides product performance and test results.

3. REQUIREMENTS

3.1. Safety

Perform all electrical wiring of the mating dimming receptacle with power turned OFF.

3.2. Limitations

The connectors are designed to operate in a temperature range of -20° to 60°C [-4° to 76°F].

3.3. Material

The base housing and cover are made of UL 94V-0, UV f1 rated thermoplastic. Data/Signal contacts are made of copper alloy with gold plating on entire contact.

3.4. Storage

A. Shelf Life

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

B. Chemical Exposure

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

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

3.5. Handling

The AMR BOT Connector Kit is supplied with the TPA unassembled; therefore, take precautions not to damage or lose the TPA prior to assembly. The AMR Charger Connector Kit is supplied with the TPA, Retainer Plate with mounting hardware unassembled; therefore, take precautions not to damage or lose the TPA, Retaining Plate with hardware prior to assembly. Charger Connector Kit is supplied with the float springs and the Data/Signal contacts preinstalled in their correct position, therefore, take precautions to not bend or damage the contacts during subsequent assembly operations.

3.6. Power Pin and Socket Contact Termination

A. Machined power Pins (TE part number: 2390329) and Sockets (TE part number: 2390328) contacts, sold separately, are supplied loose-piece for manual application using 4/8-indent hand crimp tools. Contacts are to be terminated to either 8awg or 10awg stranded copper wire using tooling specified in Table 1 and Figure 2.

Description	Daniels Manufacturing Corporation Tool Number
4/8-Indent Crimp Tool	M305
Positioner	TP1846

Table 1

B. Wire must be stripped to the dimension shown in Figure 2



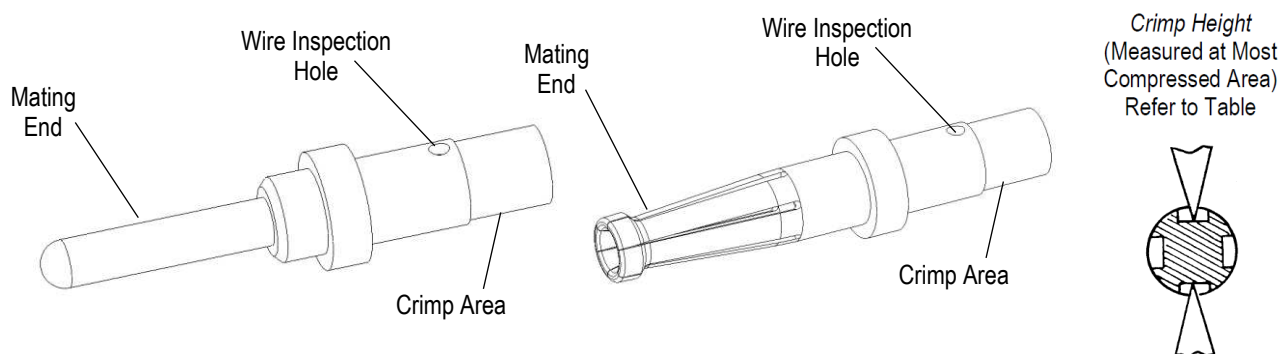
Do not nick, scrape, or cut the wire conductor during the stripping operation.



Figure 2

C. Crimped Contact Requirements

- Crimp Length: For optimum crimp effectiveness, crimp must be within the area shown in Figure 3
- Wire Conductor and Insulation Location: The wire conductors must be visible through the wire inspection hole. The wire insulation must not enter the contact wire barrel. A slight gap between the wire insulation and the contact wire barrel is permissible
- Mating End: The mating end of the Pin or Socket must not be deformed.
- Crimp Height: Crimp height must be measured and within the dimension shown in Figure 3.



WIRE SIZE	Crimp Tool Setting	Contact Crimp Height
8AWG	Position #6	2.62±0.10 [.103±.004]
10AWG	Position #5	2.44±0.10 [.096±.004]

Figure 3

3.7. Power Contacts and TPA Assembly

Once the power contacts are crimped to desired wire gauge and insulation color, they need to be snapped into the TPA (Terminal Position Assurance). The raised shoulder portion on the Power pin or socket contact should be aligned with the corresponding keyway in the TPA. Take precaution to verify the pin/socket direction in reference to the TPA latch during insertion. Crimped contact and wire will snap past the TPA raised features and be fully seated in the TPA as shown. Reference figure 4.

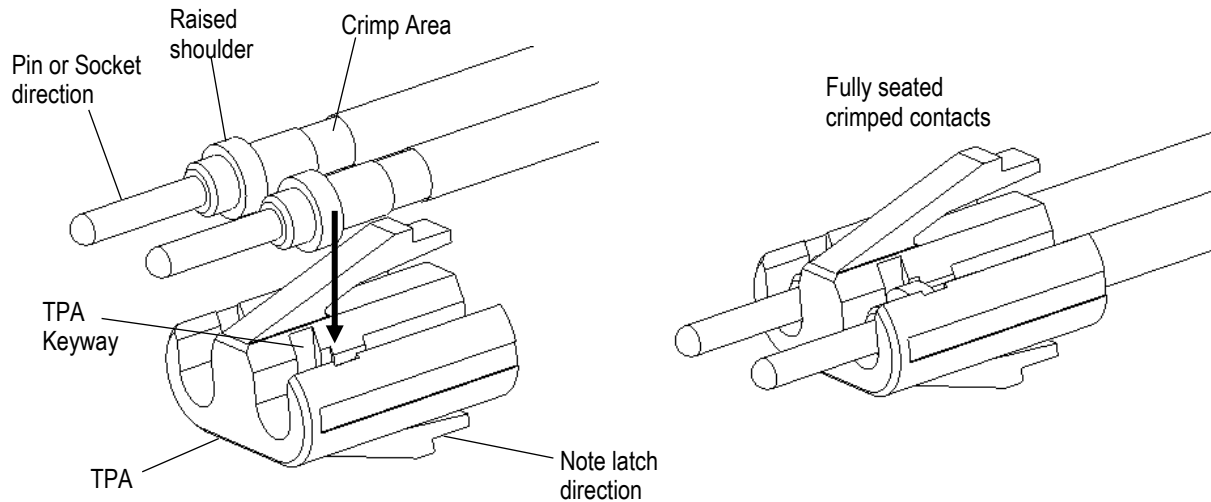


Figure 4

3.8. TPA Assembly to main housings

- A. With the power contacts assembled into the TPA, this assembly can be latched into the AMR BOT/Charger connector housing sub-assembly. Housing has a TPA alignment key, which only allows the TPA assembly to be inserted one direction. TPA assembly inserts into the housing with the mating end of the power contacts leading. TPA assembly is inserted into the housing until both TPA latches fully engage the housing latch ledge. Care must be taken to ensure **both** TPA latches are latched. AMR BOT and Charger have same TPA assembly method. See figure 5.

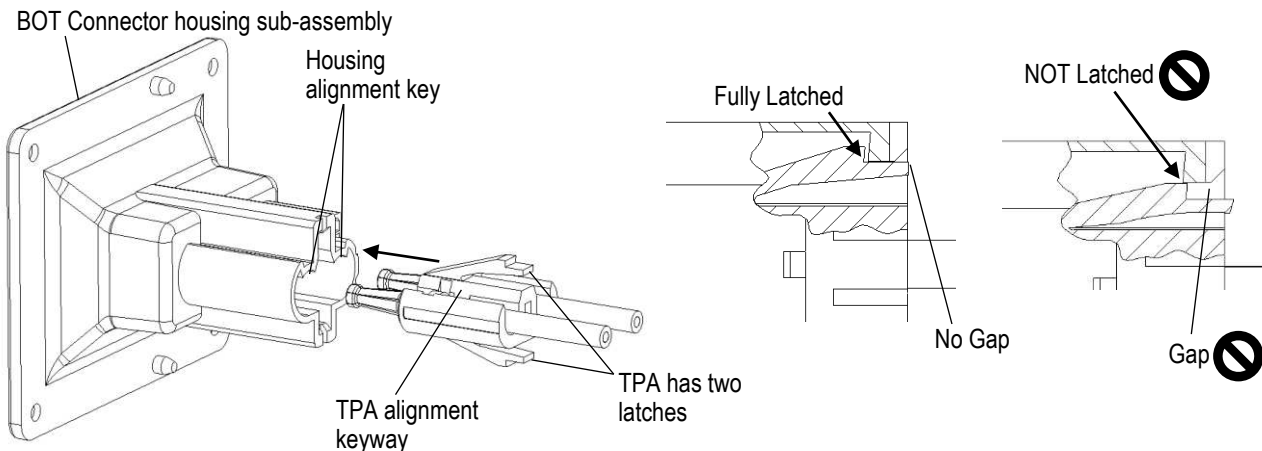


Figure 5

3.9. AMR BOT and Charger Mounting

A. AMR BOT connector mounting: A flat surface shall be provided to mount AMR BOT connector assembly with customer supplied hardware. To provide solid mounting, it is recommended that the surfaces between connector assembly and BOT housing are clean and free from any debris. The connector housing has four mounting holes which accept 4mm or #8 size screws. A screw with a countersunk style head (90° angle) should be used. Screws of the appropriate length and type must be determined by the BOT manufacturer. Screw torque of 1.0 to 2.0 N-m is recommended. Do NOT exceed 3.0 N-m torque. It is recommended that the BOT connector to be mounted with the molded TE logo in the top location but is not absolutely necessary. Care should be taken to ensure correct orientation of corresponding AMR charger connector. BOT connector has alignment posts molded on the housing to polarize the mounting direction. See Figure 6

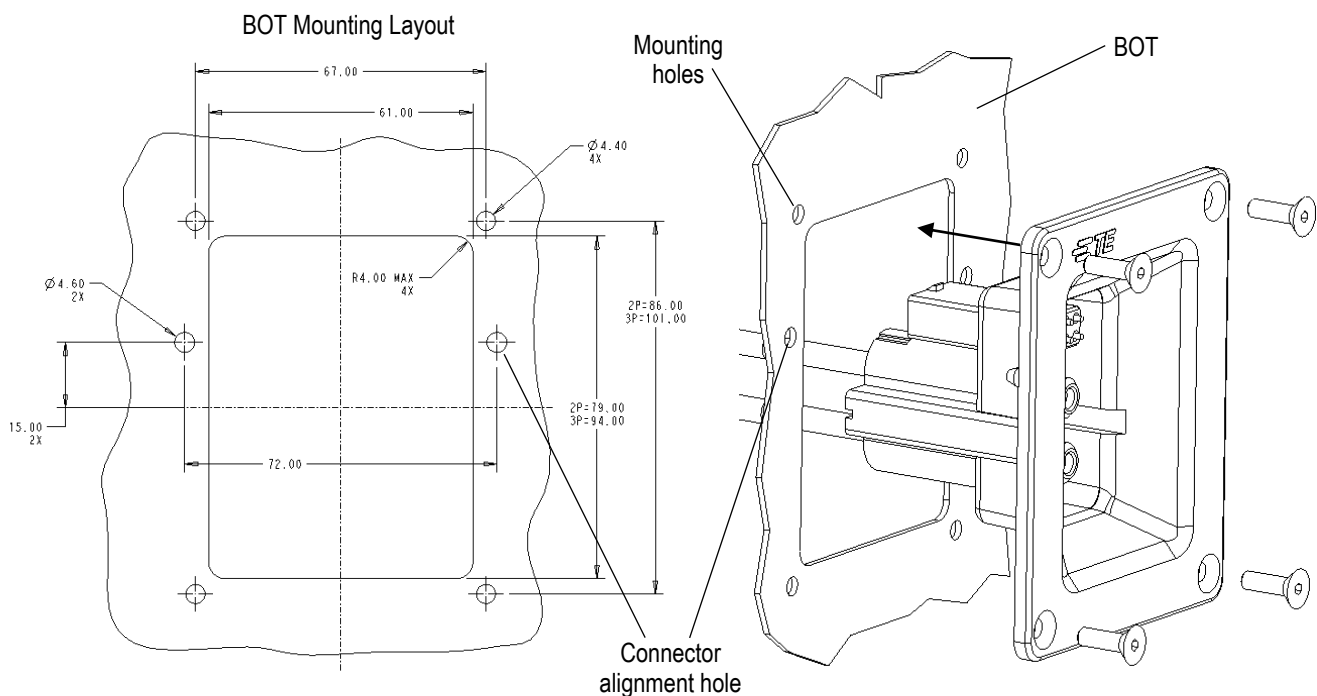


Figure 6

B. AMR Charger connector mounting: A flat surface shall be provided to mount AMR Charger connector assembly with supplied retainer plate and screws. To provide solid mounting, it is recommended that the surfaces between connector assembly and Charger unit housing are clean and free from any debris. The recommended panel/mounting surface thickness is 1.50 to 2.00mm. The mounting surface is suggested to be aluminum or steel to ensure adequate strength to remain flat during the mating/unmating sequence. The Charger connector assembly has six pre-installed springs, these springs rest between the Charger Unit housing and the connector assembly and allow the AMR Charger connector assembly to “float” for BOT misalignment. Once the Charger connector assembly with springs is placed into the Charger Unit opening, the retainer plate is secured from the inside of Charger Unit with the supplied retainer plate mounting screws. Supplied screws are thread cutting screws designed for plastic applications. Screw torque of 1.0 to 1.5N-m is recommended. Do NOT

overtighten. On the rear of the AMR Charger connector housing there is a directional arrow and “up” indicating mounting direction. See Figure 7a and 7b

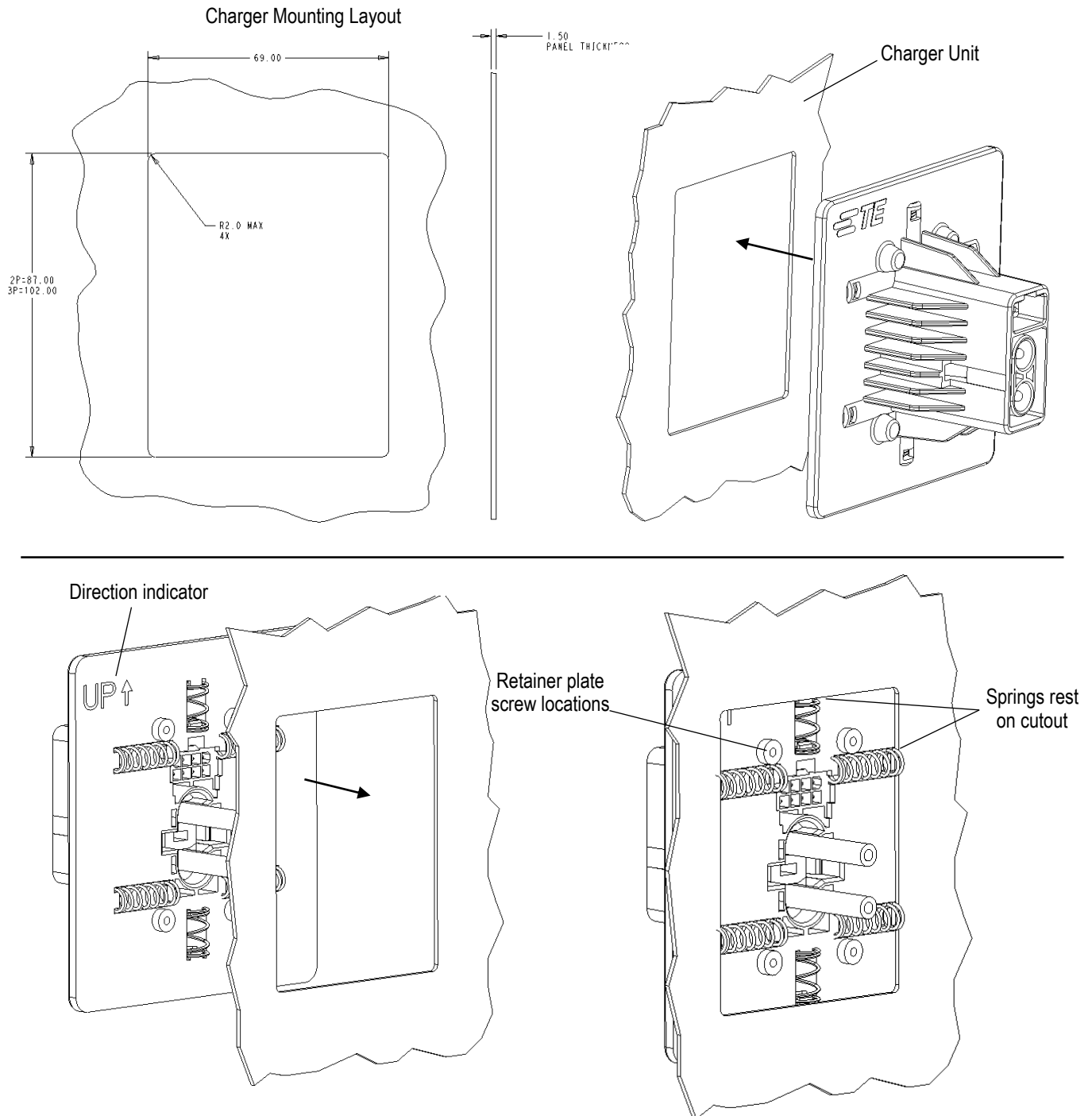
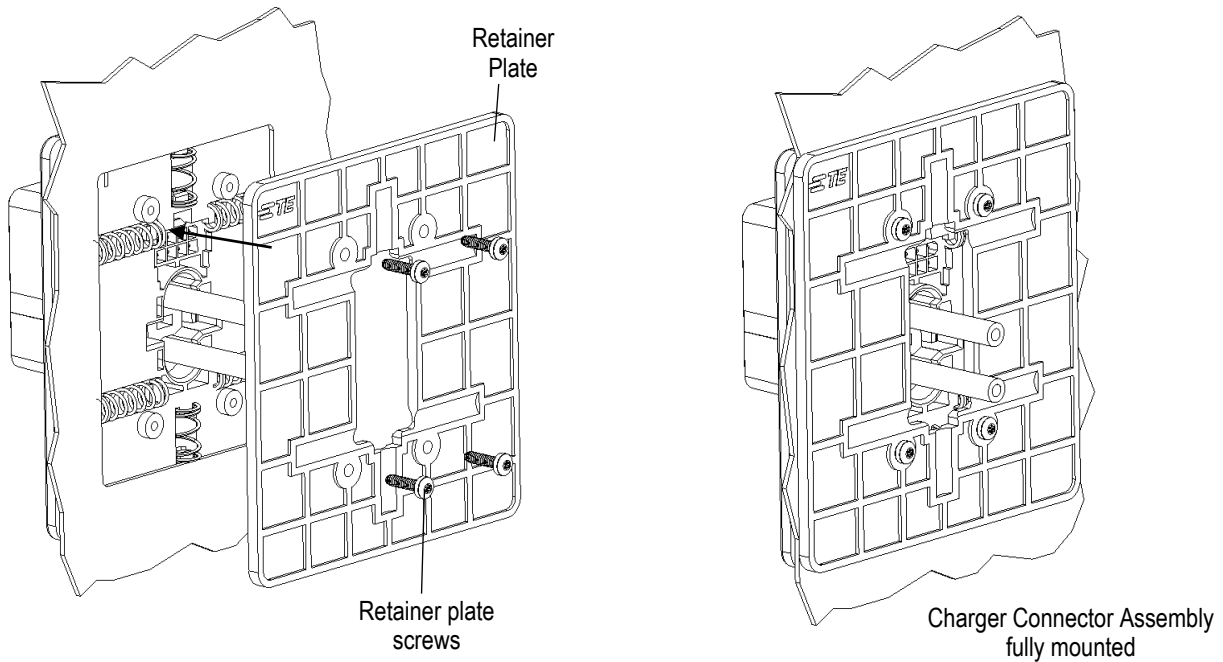


Figure 7a


NOTE

To ensure full proper amount of Charger float; springs must rest on the thickness of the Charger Unit panel and be contained between retainer plate and Charger connector housing.


Figure 7b

3.10. AMR Charger Connector Designed Float

When mounted to the appropriate panel/mounting surface the AMR Charger Connector is designed to have float for the instance that the AMR BOT approaches to dock to the charger slightly off from perfectly center. The spring-loaded AMR Charger connector is designed to re-center in the Charger Unit panel opening when the AMR BOT is not docked. The AMR Charger will float $\pm 15.0\text{mm}$ left to right and will float $\pm 10.0\text{mm}$ up and down. See figure 8.

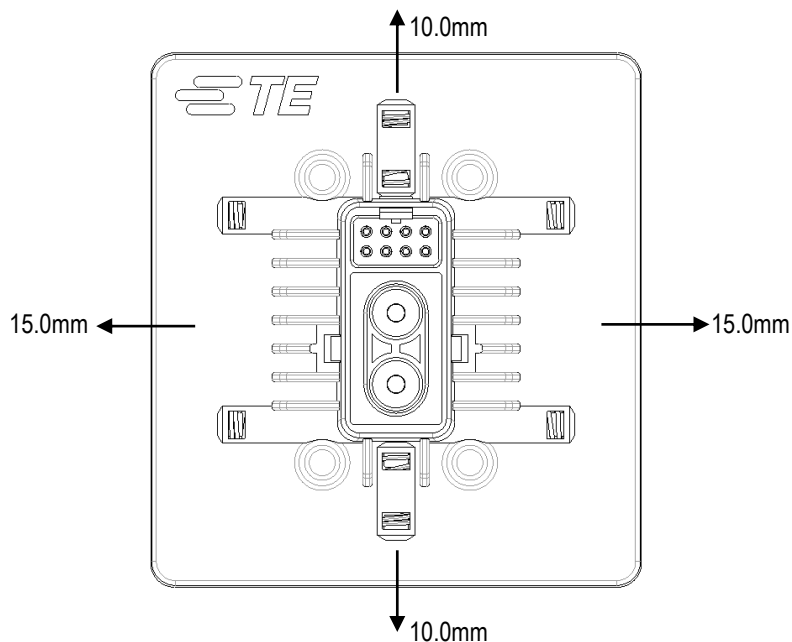


Figure 8

3.11. AMR BOT to AMR Charger Full Mating

To ensure electrical continuity (power and signal) the AMR BOT connector must be fully mated to the AMR Charger connector. Care should be taken to not to exceed a maximum mating force of 20 pounds. The AMR BOT must be able to navigate and drive to a mating distance of 28.0 ± 0.50 mm. See figure 9

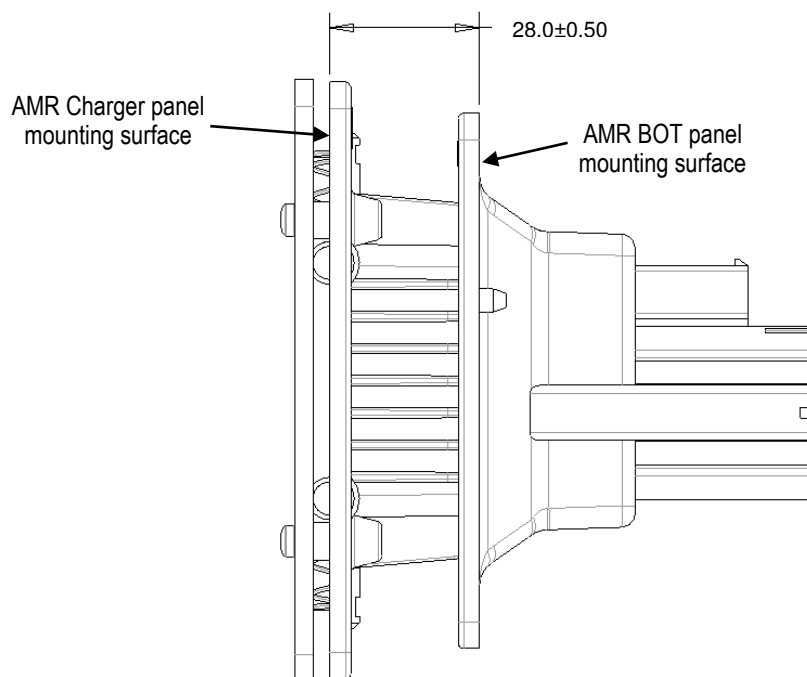


Figure 9

3.12. Workmanship

AMR BOT and/or AMR Charger connector assemblies must not be damaged in any way. Inspect entire assembly for proper contacts and ensure contacts are not damaged or bent. When assembling TPA to housing assembly, ensure TPA latches are fully latched to housing. Inspect AMR Charger connector assembly is free to float on the Charger Unit.

3.13. Data/Signal Connections

Data/Signal interface connection on both AMR BOT and Charger connectors is a TE Mini Universal Mate-N-Lok2 connector interface of 8 pins in a 4 x 2 grid that will mate with TE plug housing part number 794192-1 and TE terminal 1-794217-0 for 30-26AWG wire or 1-794219-0 for 26-22AWG wire. See figure 10.

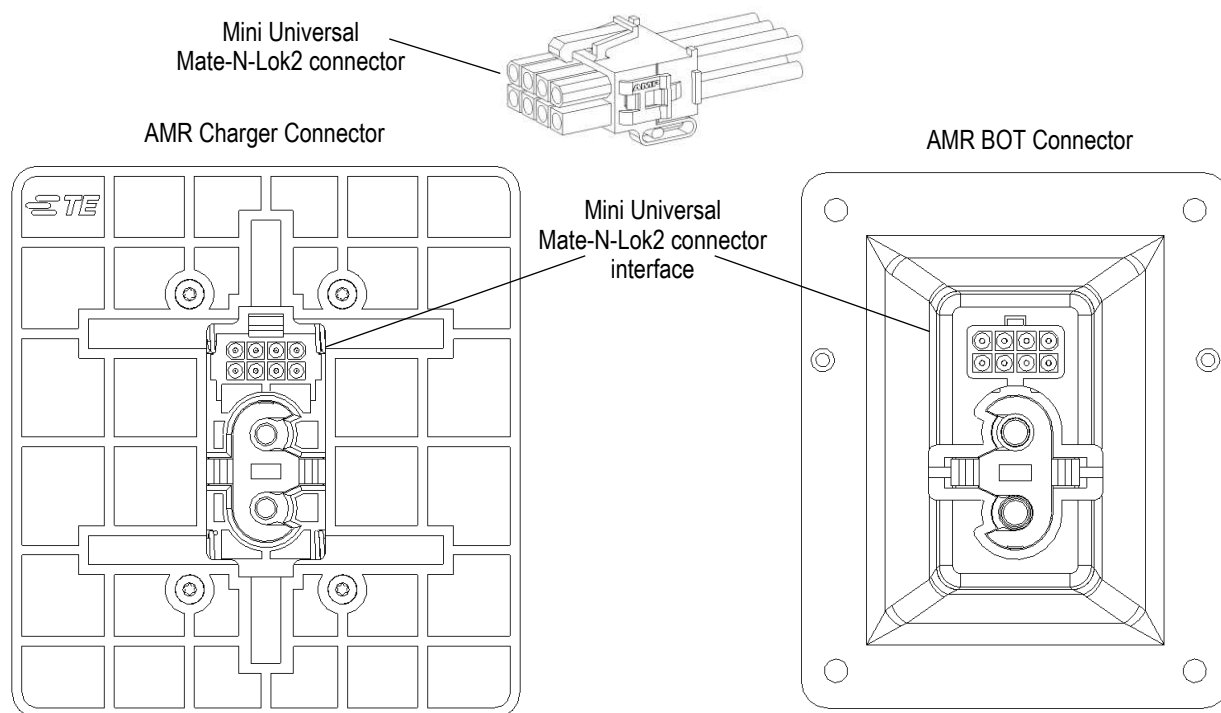


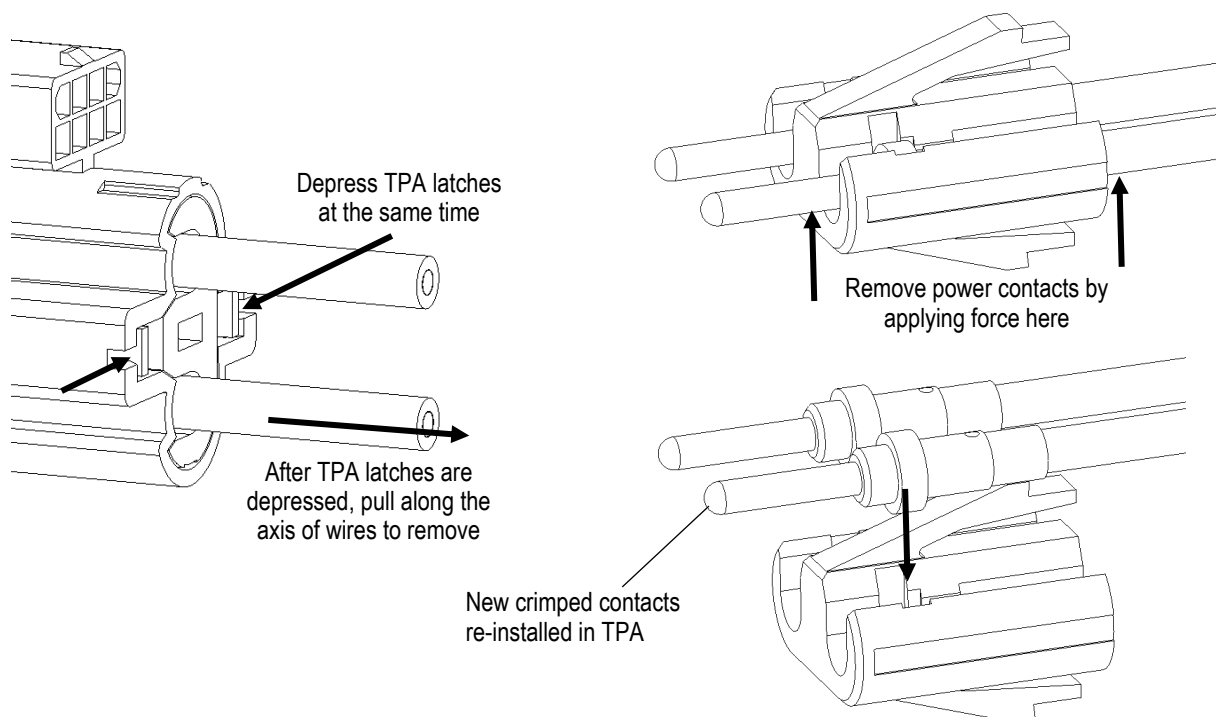
Figure 10

3.14. Replacement and Repair

The power contacts and TPA contact carrier are repairable. DO NOT use power contact with a worn, damaged, or defective interface. If damaged, replace the power contact with a new crimped one.

If the pin or socket power contacts start to wear or become damaged, they can be replaced with new contacts by removing the TPA from the main housing. With both TPA latches depressed, the TPA is released from the main housings with axial force applied to the power wires. Once the TPA and contacts are free from the housing, worn crimped power contacts can be removed from the TPA retention features. Inspect TPA for damage, if no damage, TPA can be re-used. If TPA damaged a new TPA must be used. New power contacts can be crimped onto fresh wires as described in section 3.6 and re-installed into the TPA per sections 3.7 and 3.8. See figure 11.

The signal/data contacts and housings are not repairable. If damaged, replace the connector assembly with a new one.

**Figure 11**

4. QUALIFICATION

AMR BOT and Charger Connectors are Recognized by Underwriters Laboratories, Inc. in File E28476, Volume 163.

5. TOOLING

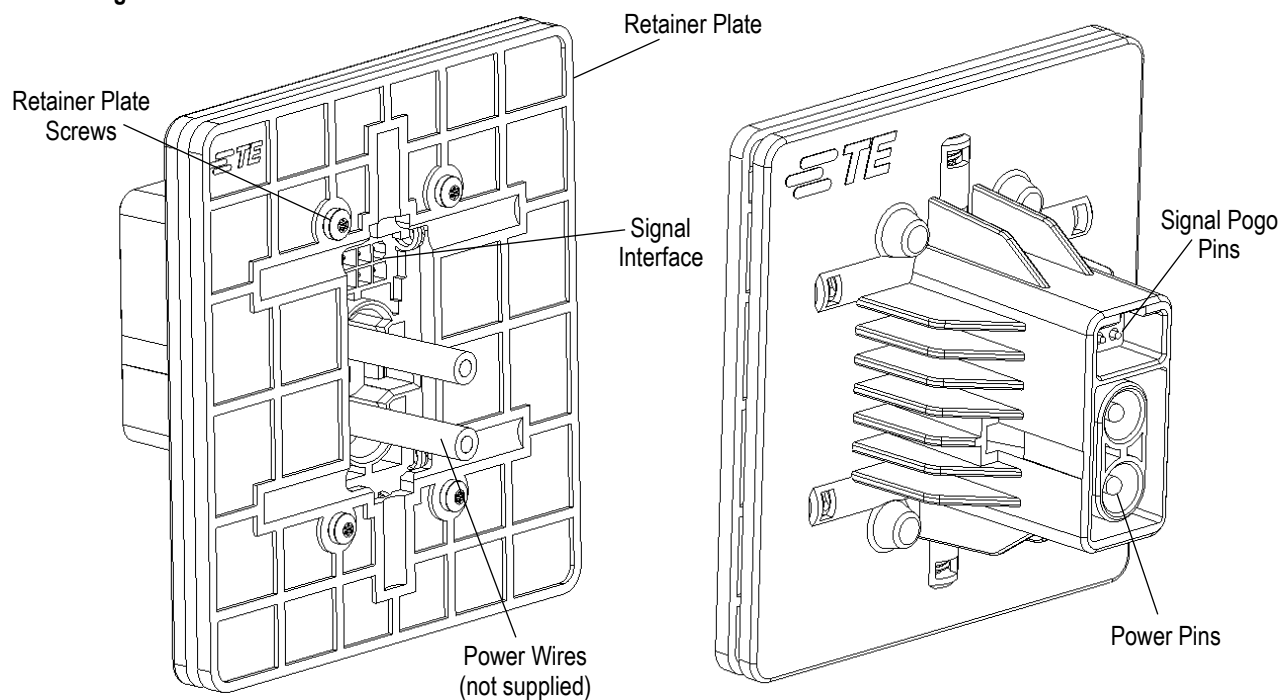
A customer supplied assembly fixture and a small press is recommended to aid in assembly of the power contacts to the TPA. The press can be mechanical or pneumatic, but it should be adjustable to ensure proper power contact seating is achieved.

Appropriate crimping tooling for crimping the pin and socket contacts is required. Refer to section 3.6 for the appropriate 4/8 indent crimp tool and contact position numbers when contacting Daniels Manufacturing Corporation.

6. VISUAL AID

The illustration below shows a typical application of AMR BOT and Charger Connectors. 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. See figure 12

AMR Charger Connector



AMR BOT Connector

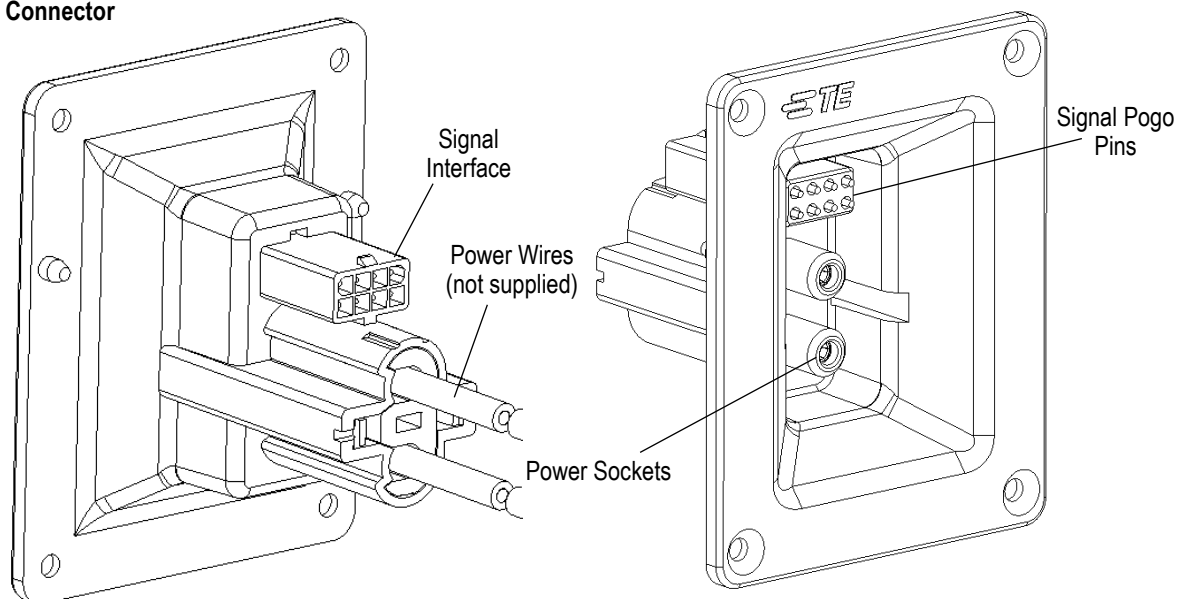


FIGURE 12. VISUAL AID