



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 ± 0.15 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 Industrial Ethernet Cat 6A M12 Connector System for panel-mount applications in production and manufacturing environments. The connector system consists of X-code plug cable assembly and printed circuit (PC) board mounted receptacle connector and RJ45 plug cable assembly.

The cable assemblies are available in M12 X-code single ended and M12 male-to-male double-ended and M12 male-to-RJ45 male double-ended. The cable can be Cat 6A shielded. The PC board mounted receptacle connectors are available in a 10Gb M12 rear-mount. All of the M12 connectors and cables in this product line are 8-pin M12 X-code connectors per IEC 61076-2-109. RJ45 connectors per IEC 60603-7-3.

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.

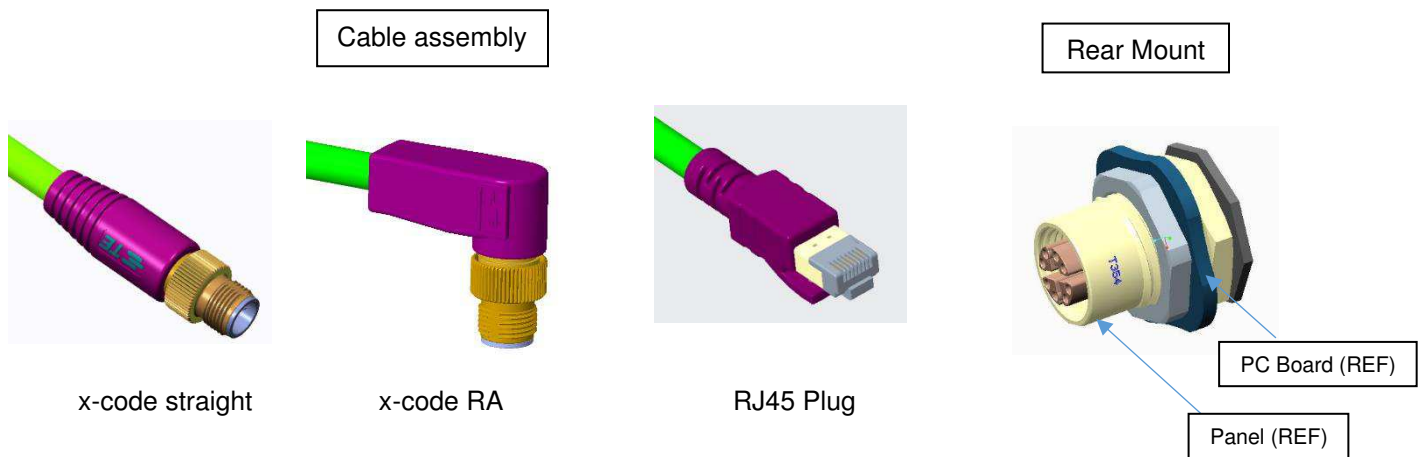


Figure 1

2. REFERENCE MATERIAL

2.1 Revision Summary

Initial release of document

2.2 Customer Assistance

Reference Product Base Part Numbers

TAX3812XXX2-XXX (M12 X-CDOE MALE STRAIGHT SINGLE ENDED CABLE ASSEMBLY) AND
TAX3822XXX2-XXX (M12 X-CDOE MALE RIGHT ANGLE SINGLE ENDED CABLE ASSEMBLY) AND
TAX38X2XXX2-XXX (M12 X-CDOE MALE TO M12 X-CODE MALE DOUBLE END CABLE ASSEMBLY) AND
TCX38X2XXX2-XXX (M12 X-CDOE MALE TO RJ45 MALE DOUBLE END CABLE ASSEMBLY) AND
2232331-1 M12 X-CODE PANEL MOUNT PCB CONNECTOR AND
2271195-1 M12 X-CODE PANEL MOUNT SOLDER CONNECTOR

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 Representative, by visiting our website at www.te.com, or by calling PRODUCT INFORMATION or the TOOLING ASSISTANCE CENTER at the numbers searched in the website.



2.3 Drawings

Customer Drawings for specific products are available from the responsible Engineering Department via 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

Design Objective 108-137538 provides expected test and performance requirements.

2.5 Standards and Publications

Standards and publications developed by the International Electrotechnical Commission (IEC) provide industry test and performance requirements. Standards available that pertain to this product is:

IEC 61076-2-109, "Connectors for Electronic Equipment—Product Requirements—Part 2-109: Circular Connectors—Detail Specification for Connectors with M12*1 Screw Locking for Data Transmission Frequencies Up to 500 MHz"

IEC 60603-7-1: Connectors for electronic equipment-Detail specification for 8 way, shielded, free and fixed connectors

3. REQUIREMENTS

3.1 Safety

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

3.2 Storage

A. Ultraviolet Light

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

B. Shelf Life

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

C. Chemical Exposure

Do not store connectors near any chemicals listed below as they may cause stress corrosion cracking in the contacts.

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

3.3. Operating Temperature

The cable assemblies and connectors must be used within the operating temperature given on the customer drawing for the specific connector.

3.4. Cable Assemblies

Various configurations of cable assemblies are pre-terminated for use in this connector system. See Figure 1 as an example of a typical cable assembly, but for cable assembly drawings for specific part numbers, contact the PRODUCT INFORMATION and TE website.

3.5. Wire Bend Radius

TE Engineering recommends that individual cables should be dressed to a bend radius of at *least* ten times the cable outside diameter. Likewise, cable bundles should be dressed to a bend radius of at *least* ten times the diameter of the bundle.

3.6. Panel Mounting

The receptacle assembly is available from TE rear panel-mount configuration. A properly mounted receptacle assembly must have the following requirements:

- The O-ring gasket must be flat against the panel
- The panel nut must be flat against the panel and tightened to the torque value given in Figure 2
- Max panel thickness: rear mount 4.0 mm

Refer to Figure 2 for panel cutout dimensions and torque values.

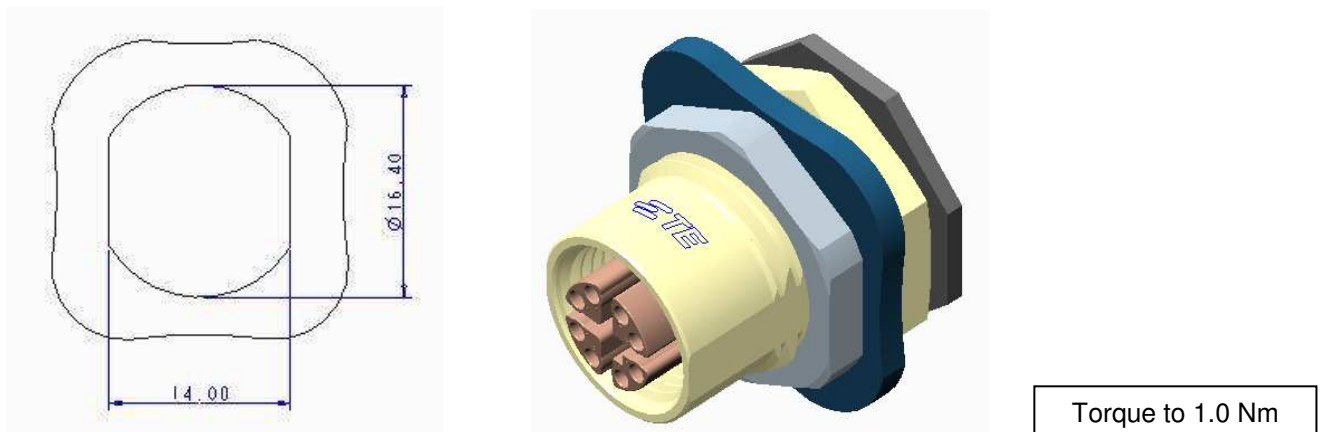


Figure 2

3.7 Mating Face Circuitry

The contact insertion pattern will be determined by circuitry. Please refer to C-drawing to find the corresponding interface dimensions.

3.8 PC Board

PC Board thickness shall be 1.60mm. The mounting and contact holes in the PC board must be precisely located to ensure proper placement and optimum performance of the receptacle connector. Design the PC board using the dimensions provided in Figure 3.

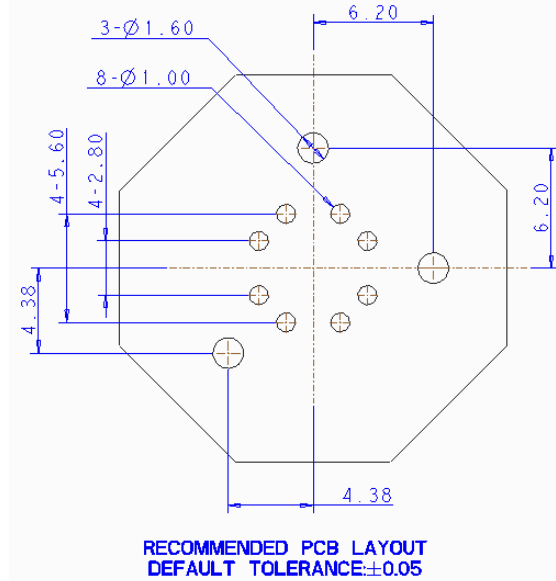


Figure 3

3.9 PC Board Receptacle Connector Placement



The receptacle connectors should be handled only by the housing to prevent deformation or other damage to the solder tines.

A. Manual Placement

Align the receptacle connector solder tines with the appropriate holes in the PC board. Start all solder tines into the pc board, then press on the receptacle connector until it seats on the PC board.

B. Robotic Placement

The robotic equipment must be adjusted to feed, pick up, and place the receptacle connectors on the PC board with an accuracy of 0.25 mm. The receptacle connector datum surfaces detailed on the customer drawing will ensure correct placement of the receptacle connector.

3.10 Soldering

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.

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.



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 affecting 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.

C. Drying

When drying cleaned assemblies and printed circuit boards, make certain that temperature limitations are not exceeded 105°C [221°F] for standard temperature products. Excessive temperatures and dwell time may cause housing degradation.

D. Soldering Guidelines

Industrial Ethernet 10Gb M12 Connectors can be soldered using wave soldering with peak temperature as 260 degree and 5~10 seconds.

3.11 Checking Installed Connector

The receptacle connectors must be seated on the PC board to the dimensions shown in Figure 4.

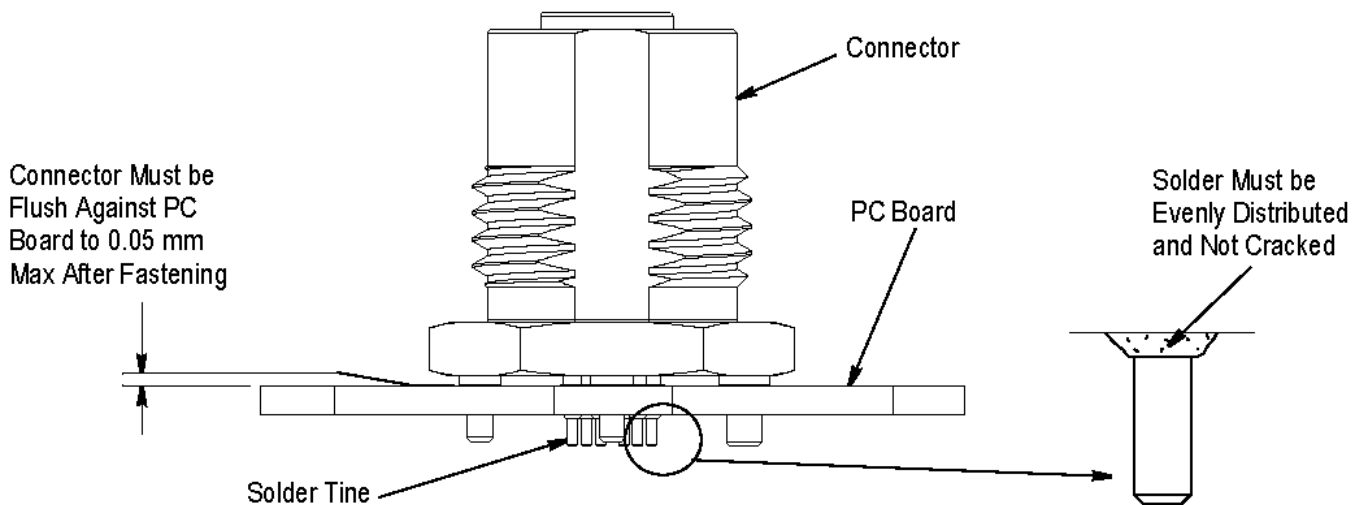


Figure 3

3.12 Installation to panel

Installation to panel order is shown on figure 4.

- Insert connector body on PC board and then put O-ring on connector body.
- Put connector body into the panel hole.
- Screw the nut on connector body.

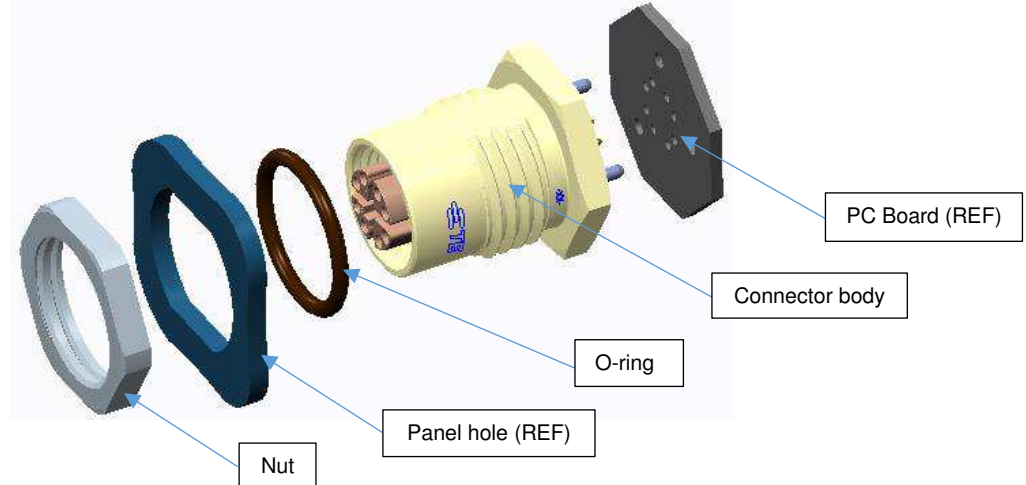


Figure 4

3.13 Polarization/Mating of Connectors

3.13.1 The configuration of the Industrial Ethernet 10Gb M12 Connector mating face prevents accidental inversion when mating the two components. Properly engaged connectors must have the following requirements:

- The plug assembly and receptacle assembly must be engaged in the proper key position.
- The coupling nut of the plug assembly must be fully hand tightened into the receptacle assembly. (Typical hand tightened torque is 0.4 N-m [3.5 lbf-in.])

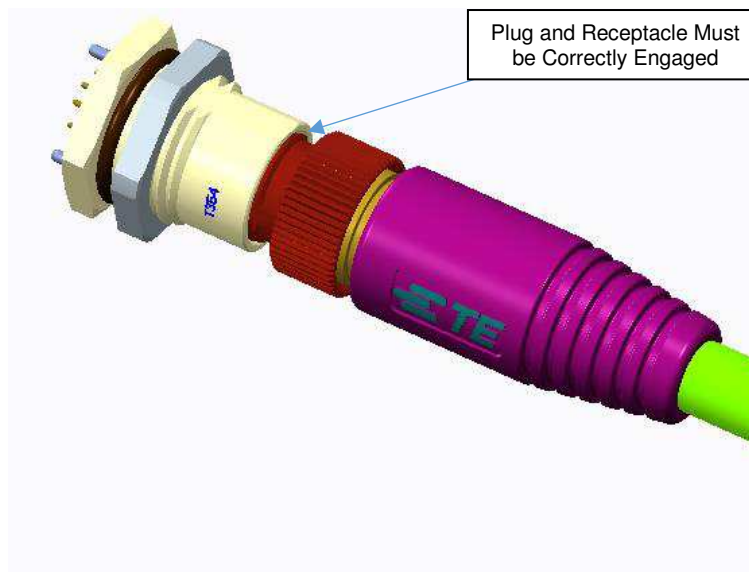


Figure 5

3.13.2 RJ45 connector mating / un-mating:

Mating — The RJ45 plug assembly and receptacle assembly must be engaged in the proper key position. Then insert the RJ45 plug till the click

Un-mating — Press the RJ45 clasp then pull the RJ45 plug outward



Must not un-mating the RJ45 plug rudly, which will be get damaged due to clasp structure design.

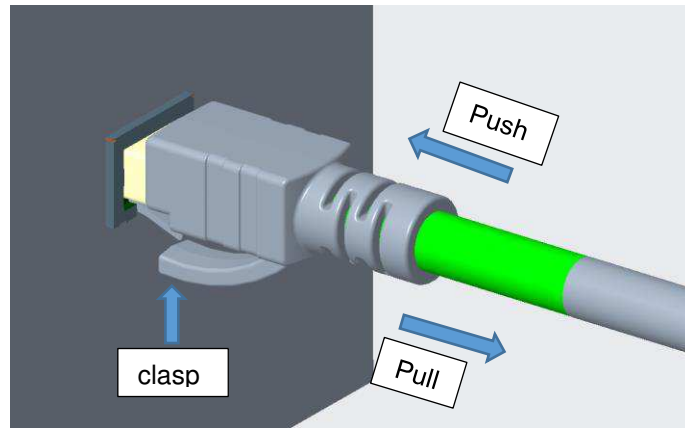


Figure 6

3.14 Repair/Replacement

Damaged PC board receptacle connectors may be removed from the PC board by standard re-soldering methods.

4. QUALIFICATION

M12 cable assemblies are recognized by Underwriters Laboratories Inc. (UL)

5. TOOLING

No tooling is required for assembly of M12 cable assemblies and RJ45.