



NOTE

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 ± 0.13 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 M8 and M12 cable assemblies and CSCs for printed circuit (pc) board and panel mounting applications. The cable assembly and connectors are designed for use in industrial equipment and control, signal, and electrical appliances. The cable assembly and connectors have an ingress protection rating of IP67/IP68.

The connectors are available as field installable with screw termination and panel mount available with wires or solder type through-hole pc board mount contacts. The connectors consist of a female (receptacle) and a male (plug) and are available in unshielded or shielded and straight or angled. The cable assembly is available in single ended and double ended with straight and angle connectors.

When corresponding with 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.

M8 Field Installable Straight Connectors



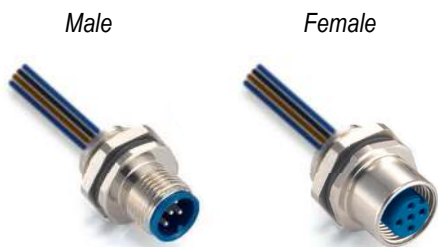
M12 Field Installable Straight Connectors



M12 Field Installable Angled Connectors



**M12 Front Panel Mount
Straight Connectors With Wires**



**M12 Rear Panel Mount
PC Board Mount Straight Connectors**



M12 Cable Assembly



Figure 1

2. REFERENCE MATERIAL

2.1. Revision Summary

Initial release of application specification

2.2. Customer Assistance

Reference Product Base Part Numbers 2273001 (cable assembly) and 2271110 (field installable connector) and Product Code E512 are representative of M8 and M12 cable assemblies and CSCs. 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 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. Specifications

Product Specification 108-19483 provides product performance and test results.

2.5. Instructional Material

Instruction Sheets (408-series) provide product assembly instructions. Instructional material available that pertain to this product are:

[408-32151](#) M12×1 X-Coded 8-Position Cable Plug Using Category 6A Cable

2.6. 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 are:

IEC 61076-2-101, "Connectors for Electronic Equipment—Product Requirements—Part 2-101: Circular Connectors—Detail Specification for M12 Connectors with Screw Locking"

IEC 61076-2-104, "Connectors for Electronic Equipment—Product Requirements—Part 2-104: Circular Connectors—Detail Specification for Circular Connectors with M8 Screw Locking or Snap Locking"

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 61076-2-111

2.7. Manuals

Manual [402-40](#) can be used as a guide to soldering. This manual provides information on various flux types and characteristics with the commercial designation, flux removal procedures, and a guide for information on soldering problems.

3. REQUIREMENTS

3.1. Storage

A. Ultraviolet Light

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

B. 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.

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

3.2. Operating Temperature

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

3.3. Cable Selection

The connectors accept cable having the requirements given on the specific connector customer drawing. In this specification, when the connector assembly procedure depends on the cable shield outer diameter, that diameter is included in the assembly requirements of Paragraph 3.4.

3.4. Cable Preparation and Connector Assembly

A. M8 Field Installable Connectors

These connectors must meet the cable preparation and connector assembly requirements given in Figure 2.

B. Cable Assembly

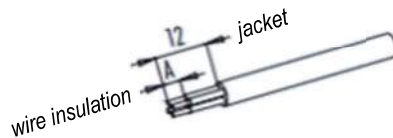
The cable of the cable assembly must remain perpendicular to the connector and avoid an excessively sharp bend radius. The minimum bend radius of a cable is $\pm 10^\circ$.

3.5. PC Board

The recommended pc board material and thickness and layout is given on the connector customer drawing.

M8 Field Installable Connector

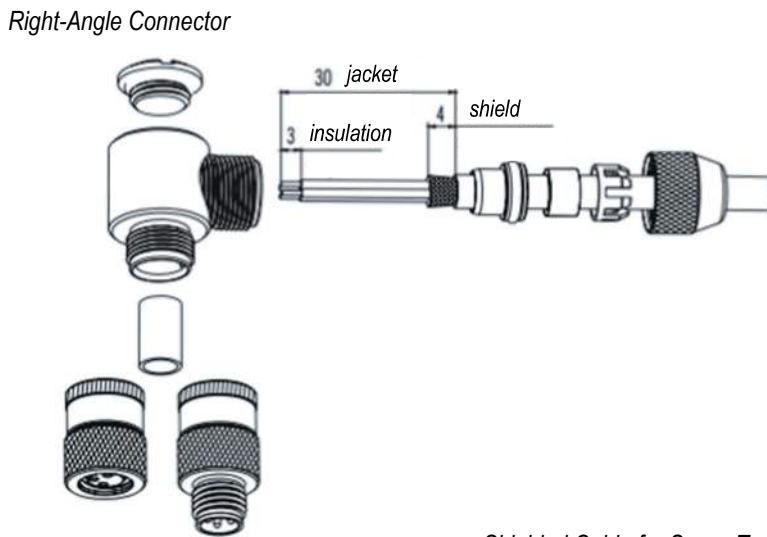
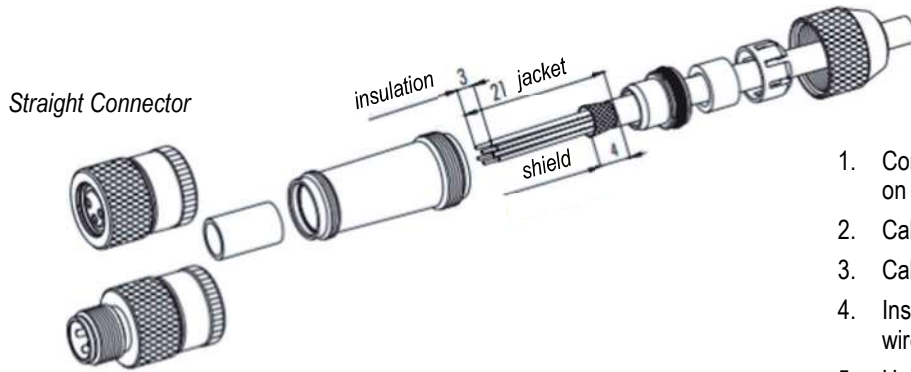
Unshielded Cable



DIMENSION A TERMINATION	
SCREW	SOLDER
4	3

Figure 2 (Cont'd)

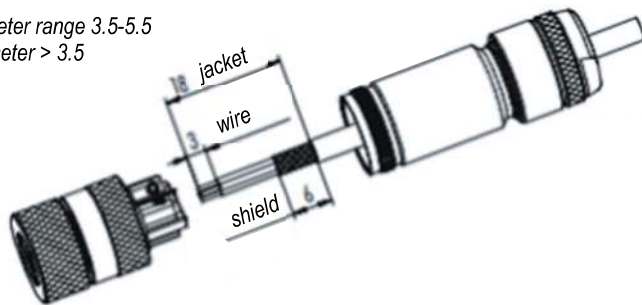
M8 Field Installable Connector
Shielded Cable for PC Board Mount



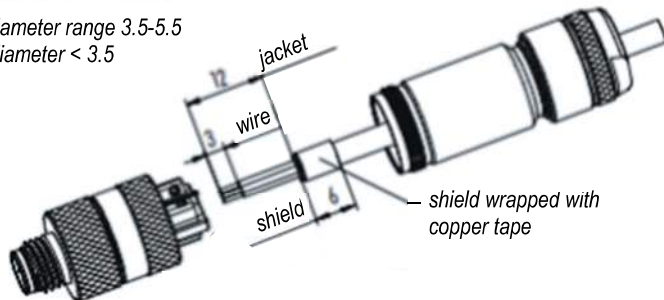
1. Connector components must be installed on cable.
2. Cable jacket must be stripped.
3. Cable shield must be stripped, then flared.
4. Insulation must be stripped from individual wires.
5. Housing, shielding ring, sealing ring, and pinch ring must be installed over individual wires and onto cable.
6. Pressing screw must be threaded, but not tightened onto housing.
7. Insulating tube must be inserted into housing.
8. Individual wires must be soldered.
9. Contact carrier must be threaded onto housing.
10. Pressing screw must be hand tight.
11. For right-angle connector, locking screw must be tightened.

Shielded Cable for Screw Termination

*cable diameter range 3.5-5.5
shield diameter > 3.5*



*cable diameter range 3.5-5.5
shield diameter < 3.5*



1. Connector components must be installed on cable.
2. Cable jacket must be stripped.
3. Cable shield must be stripped, then flared.
4. For shield diameter ≤ 3.5 , cable shield must be folded back over braid, then wrapped with copper tape.
5. Insulation must be stripped from individual wires.
6. Individual wires must be connected.
7. Housing must be threaded onto contact carrier.
8. Pressing screw must be hand tight.

Figure 2 (End)

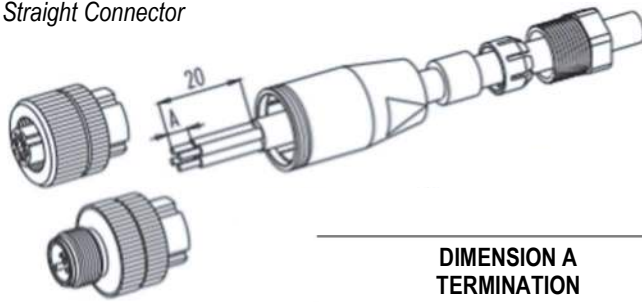
A. M12 Field Installable Connectors

These connectors must meet the following cable preparation and connector assembly requirements given in Figure 3.

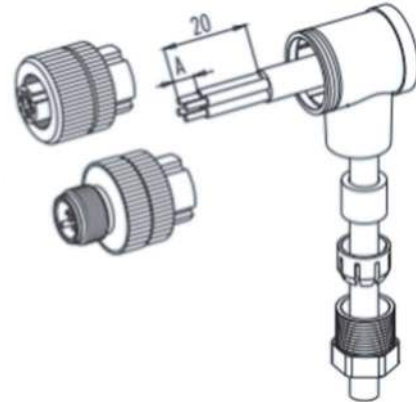
M12 Field Installable Connector

Unshielded Cable
3- Through 12-Position Connectors

Straight Connector

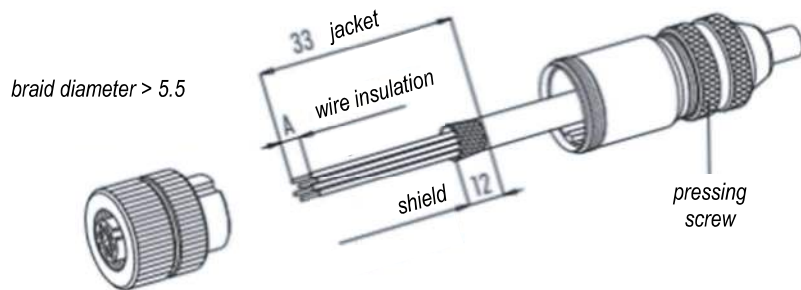


Right-Angle Connector



DIMENSION A TERMINATION	
SCREW	SOLDER
5	3.5

Shielded Cable
3- Through 8-Position Connectors

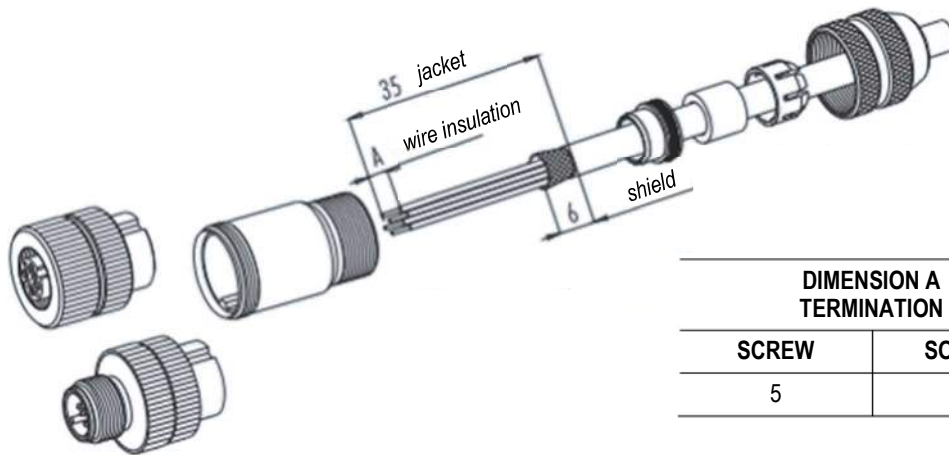


DIMENSION A SCREW TERMINATION
5

1. Connector components must be installed on cable.
2. Cable jacket must be stripped.
3. Housing, shielding ring, sealing ring, and pinch ring must be installed over individual wires and onto cable.
4. Pressing screw must be tightened:
plastic shell—hand tight
metal shell—torque of 1 Nm [8.85 in.-lb]
5. For right-angle connector, locking screw must be tightened.

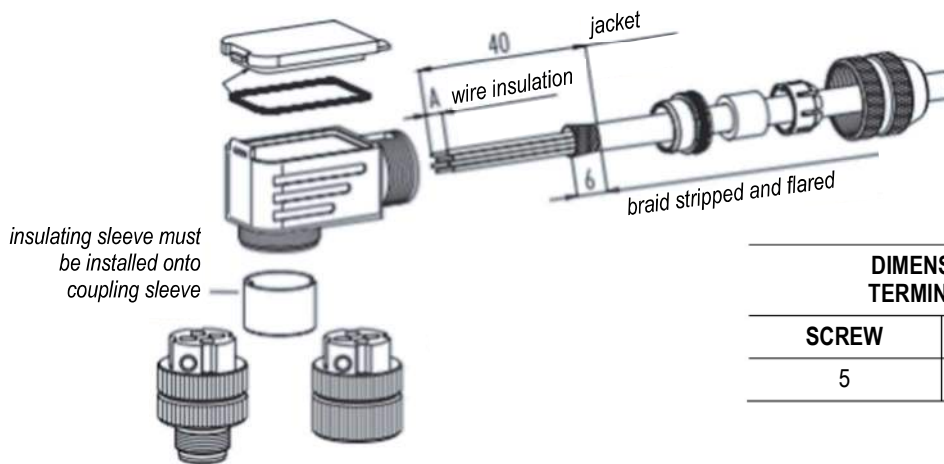
Figure 3 (Cont'd)

Shielded Cable
12-Position Connectors



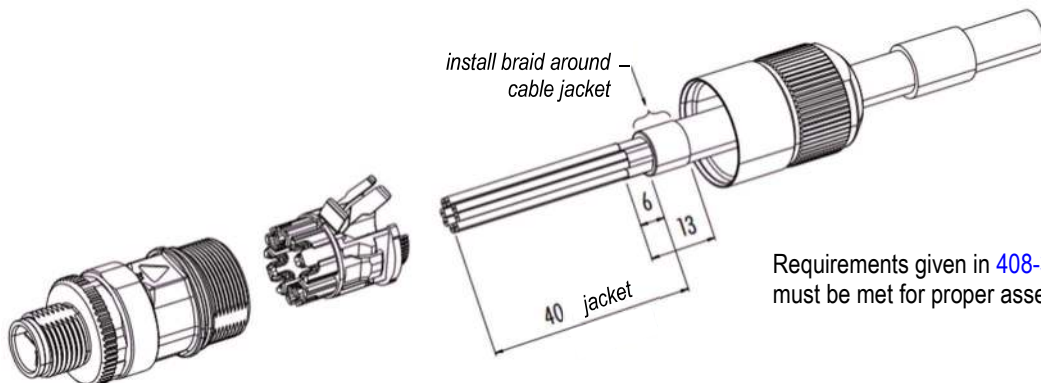
DIMENSION A TERMINATION	
SCREW	SOLDER
5	3.5

Shielded Cable
12-Position Connectors with Shielding Ring



DIMENSION A TERMINATION	
SCREW	SOLDER
5	3.5

Shielded Cable
IDC X-Code High-Speed Connector



Requirements given in [408-32151](#) must be met for proper assembly.

Figure 3 (End)

3.6. Panel

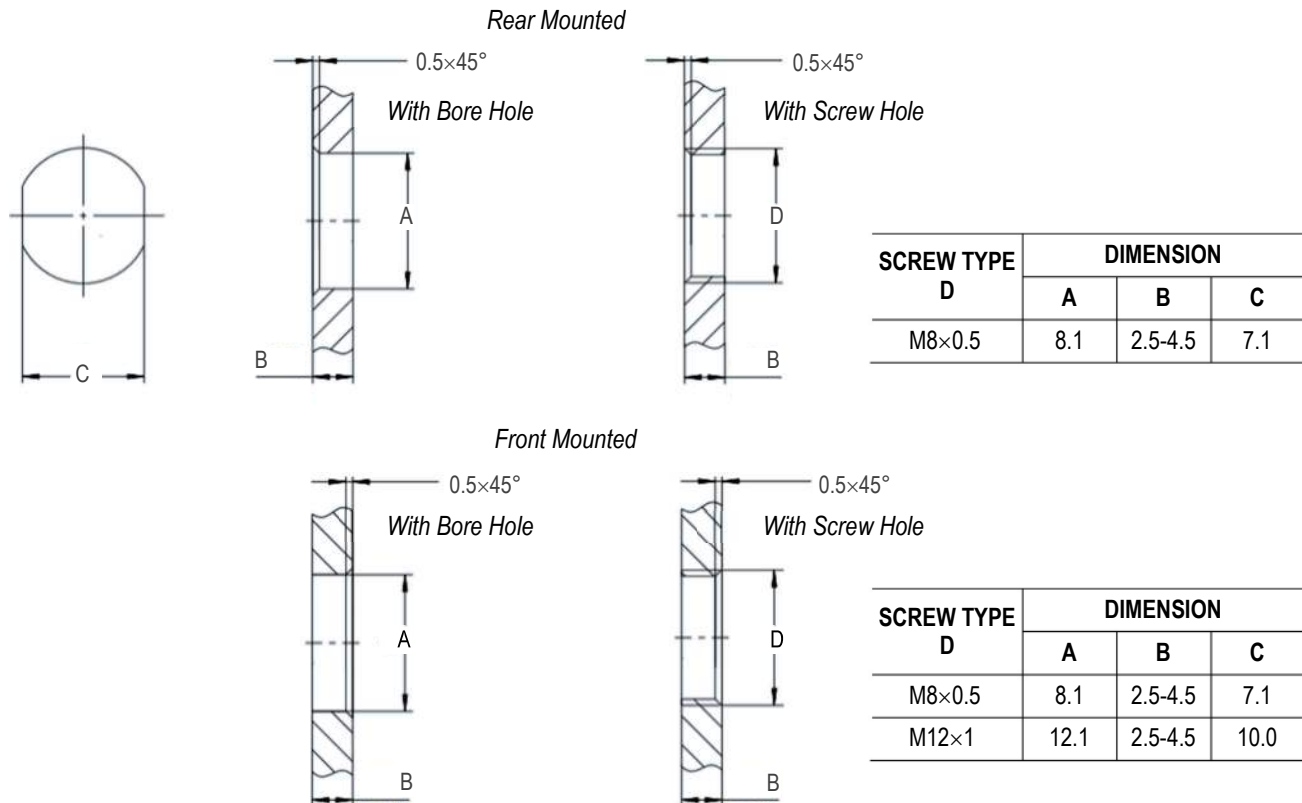
A. Recommended Thickness and Cutout

The maximum panel thickness shall be 4.5. The recommended panel cutouts are given in Figure 4.

B. Indexing

There are two rotational orientations for mounting the connector to the panel: top/bottom and left/right. This orientation must be chosen before creating the cutout in the panel.

Recommended Panel Cutout for M8 Connectors



Recommended Panel Cutout for M12 Connectors

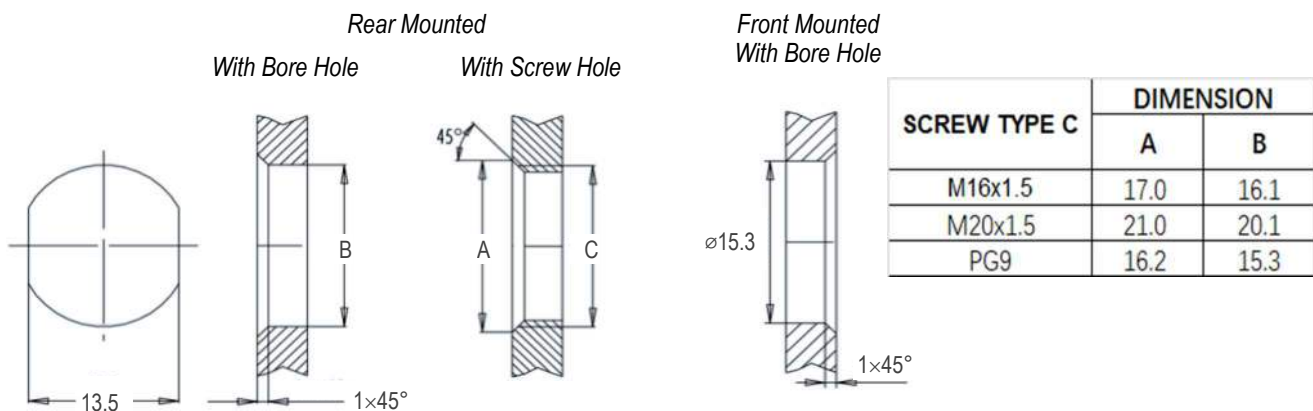


Figure 4

C. Mounting

The connector is designed to be front or rear panel mounted. The mounted connector must meet the following requirements:

- the flat of the connector must be aligned with the flat edge cut in the panel
- the O-ring or gasket must be between the flange and the panel
- the gasket must be flat against the panel

the panel nut must be flat against the panel and tight to the torque given in

SCREW TYPE	TORQUE (Nm [ft-lb])
	Metal Housing
M8×0.5	1 [0.74]
M12×1, M16×1.5, M20×1.5, PG9	1.25[0.92]

— Figure 5

Figure 5

3.7. Mating and Unmating



DANGER

To avoid personal injury, these connectors and cable assemblies must not be mated or unmated under live conditions (electrical load).

The recommended torque for mating the connectors is:

M8 connectors: 0.4 Nm [3.54 lb-ft]

M12 connectors: 0.6 Nm [5.31 lb-ft]

3.8. Replacement and Repair

These cable assemblies and connectors are not repairable. Damaged or defective components must not be used. Connectors must not be re-used by removing the cable.

Fitting and servicing should only be performed by qualified personnel in accordance with all guidelines and standards.

4. QUALIFICATION

M8 and M12 cable assemblies are Recognized by Underwriters Laboratories Inc. (UL) in File E 193908. Agency evaluation for M8 and M12 CSCs was not defined at the time of publication of this application specification.

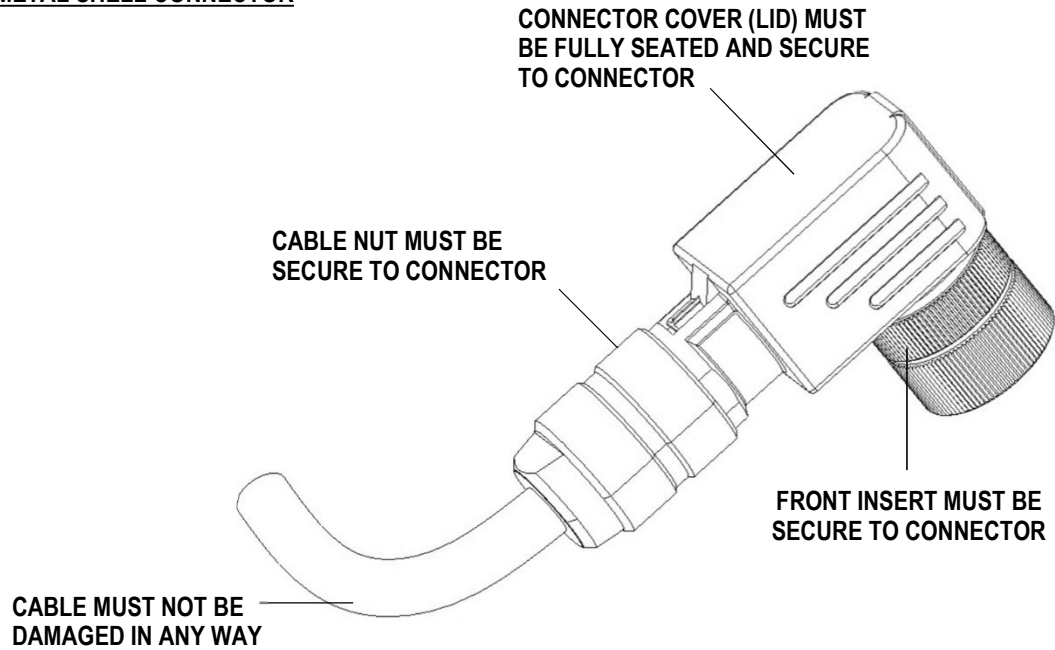
5. TOOLING

No tooling is required for assembly of M8 and M12 cable assemblies and CSC.

6. VISUAL AID

The illustration below shows a typical application of M8 and M12 cable assemblies and CSCs. 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.

FIELD-INSTALLABLE RIGHT-ANGLE METAL SHELL CONNECTOR



FIELD-INSTALLABLE STRAIGHT CONNECTOR MATED TO PC BOARD PANEL MOUNT CONNECTOR

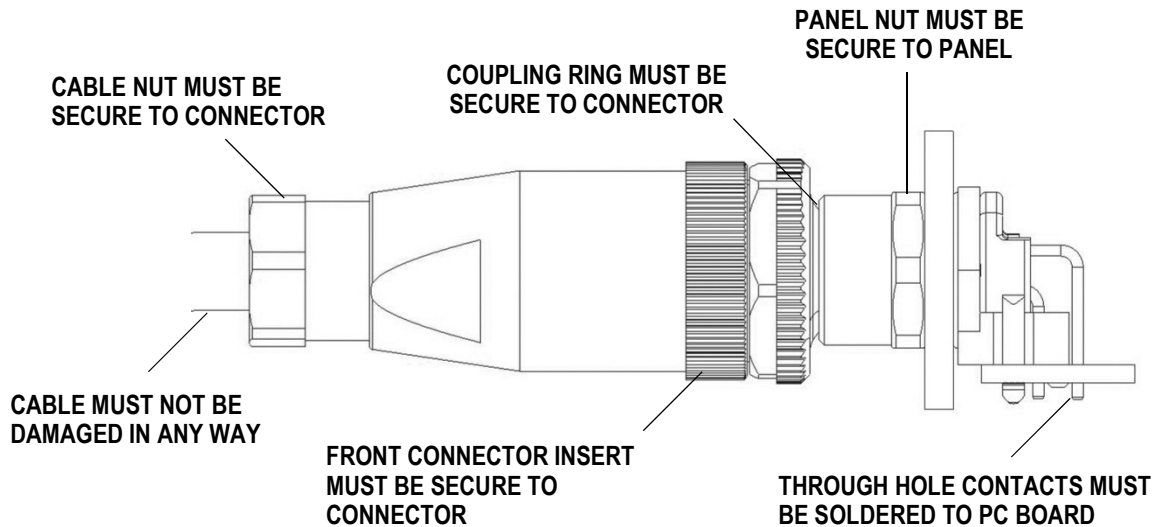


FIGURE 6. VISUAL AID (CONT'D)

**FIELD-INSTALLABLE RIGHT-ANGLE
CONNECTOR MATED TO PANEL MOUNT
CONNECTOR WITH WIRES**

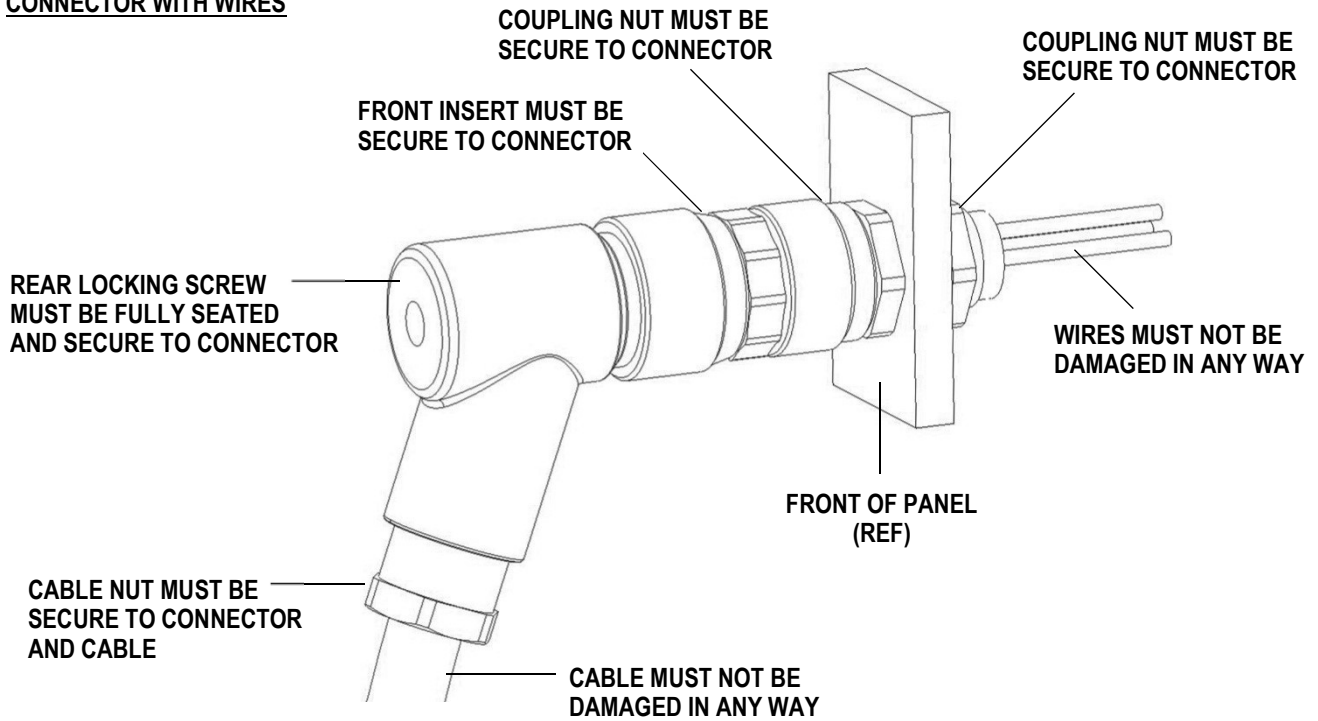


FIGURE 6. VISUAL AID (END)