



**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  $\pm 0.13$  [ $\pm 0.005$ ] 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 the ELCON Mini four position Cable to Board connector system. The cable connector is designed to host four Standard Power Timer contacts.

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

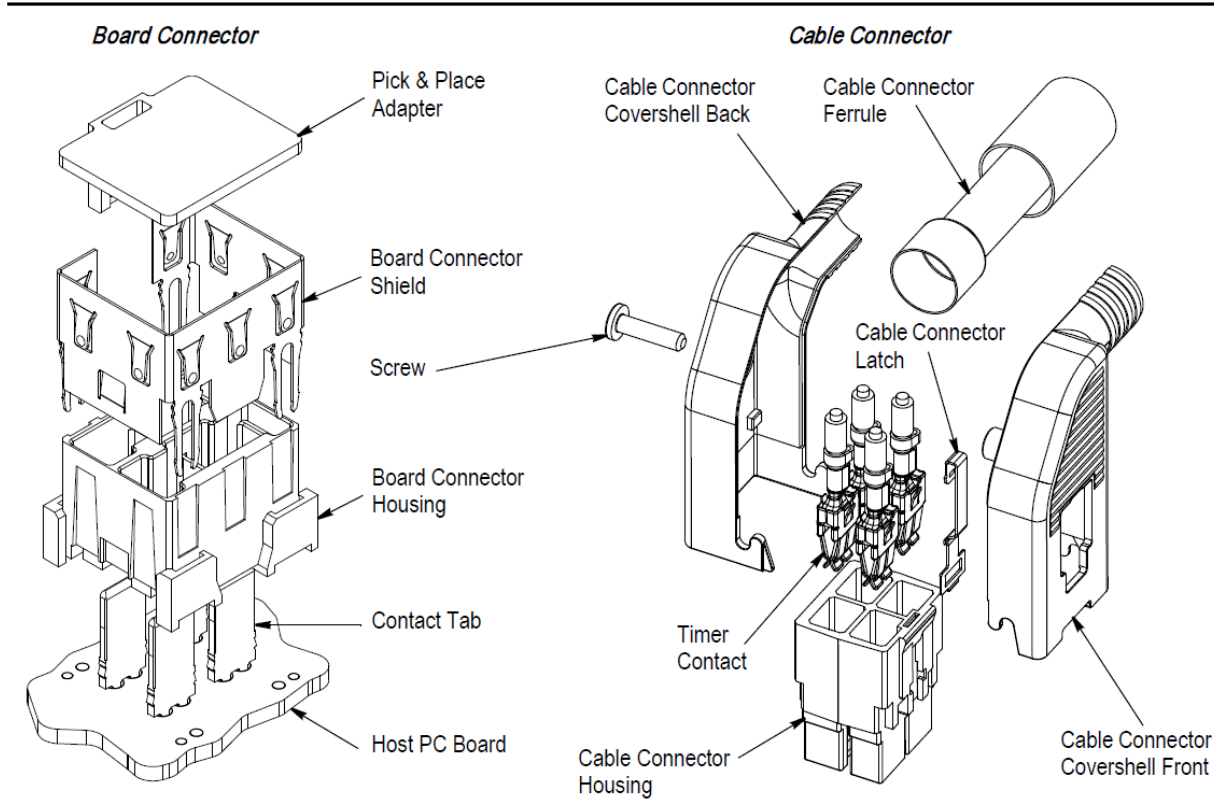


Figure 1

**2. REFERENCE MATERIAL**

**2.1. Revision Summary**

Add without shield part number into this document.

**2.2. Customer Assistance**

Reference product base Part numbers 2173168, 2173211, 2173200 and 2173132, and Product Code L849 are representative of the ELCON Mini four position cable-to-board connector system. 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](http://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

For the product specification of the 4 pos. cable to board power connector system with coding contacts, see: Product Specification: 108-19429.

Timer contacts Specifications:

Product Specification: 108-18025

Application Specification: 114-18037

## 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.

## 3. REQUIREMENTS

### 3.1. Storage

#### A. Ultraviolet Light

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

#### B. Shelf Life

The pc board connectors are packed in embossed tape and reel, shipped in a box. 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.

#### C. Storage temperature

Maximum storage temperature should not exceed 90°C [194°F].

#### D. 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

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

#### NOTE



### 3.2. Exposure Limitations

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

### 3.3. Contact Termination

Terminate the contacts in according to the specific tooling instructional material and crimp requirements provided in Application Specification 114-18037.

### 3.4. Printed Circuit (PC)

#### Boards A. Thickness

The power board connector has been designed to accommodate a minimum pc board thickness of 1.5 mm. 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

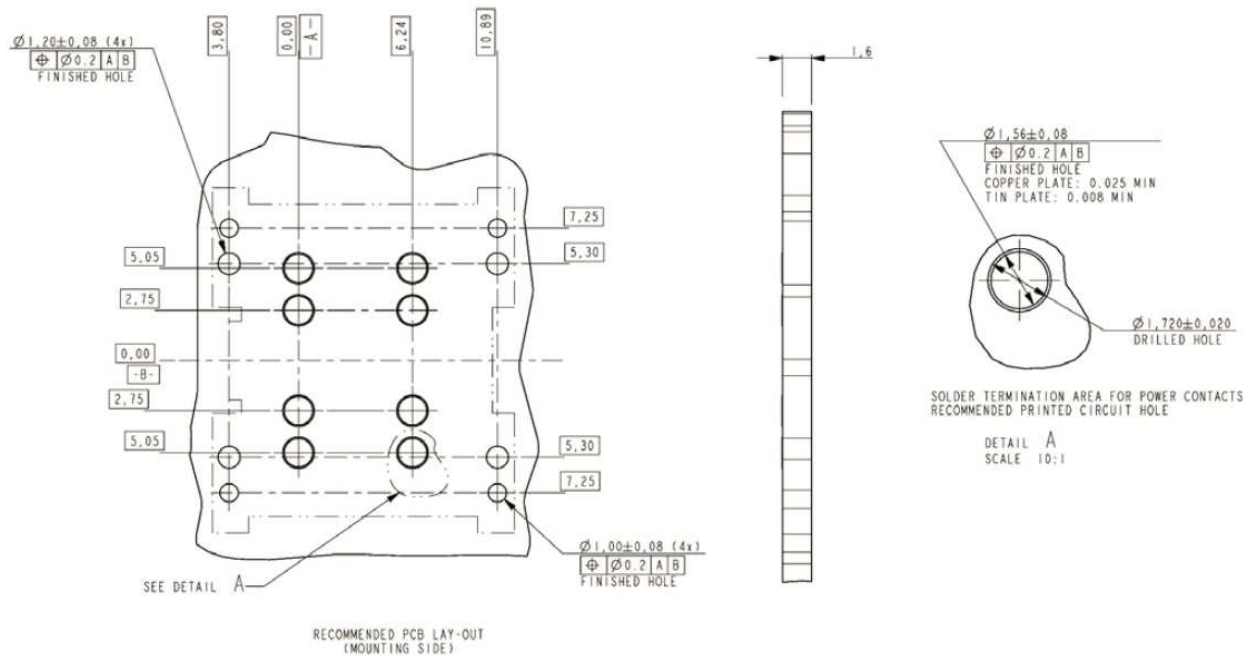
The maximum bow of the pc board shall be 0.03 mm over the length of the board connector and shall meet the guidelines of IPC-2122, as well as the requirements stated in the customer drawing of the board connector.

#### C. Material

The pc board shall be glass epoxy (FR-4 or G-10). Contact the Product Information Center or the Tooling Assistance Center at the number listed at the bottom of page 1 for suitability of other pc board materials.

#### D. 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. Design the pc board using the dimensions provided in Figure 2.



**NOTE:** Refer to Customer Drawing 2173211 for more details and the latest update of dimensions.

Figure 2

### 3.5. Routing Recommendation

The suggested routing provided in Figure 3 is recommended in order to achieve temperature control of the printed wire board tracks. Suggested routing is based on a two-layered pc board and the routing needs to be applied on the top and bottom side of the pc board. The two layers need to be connected by plated through holes as specified in Paragraph 3.5 and Figure 2.

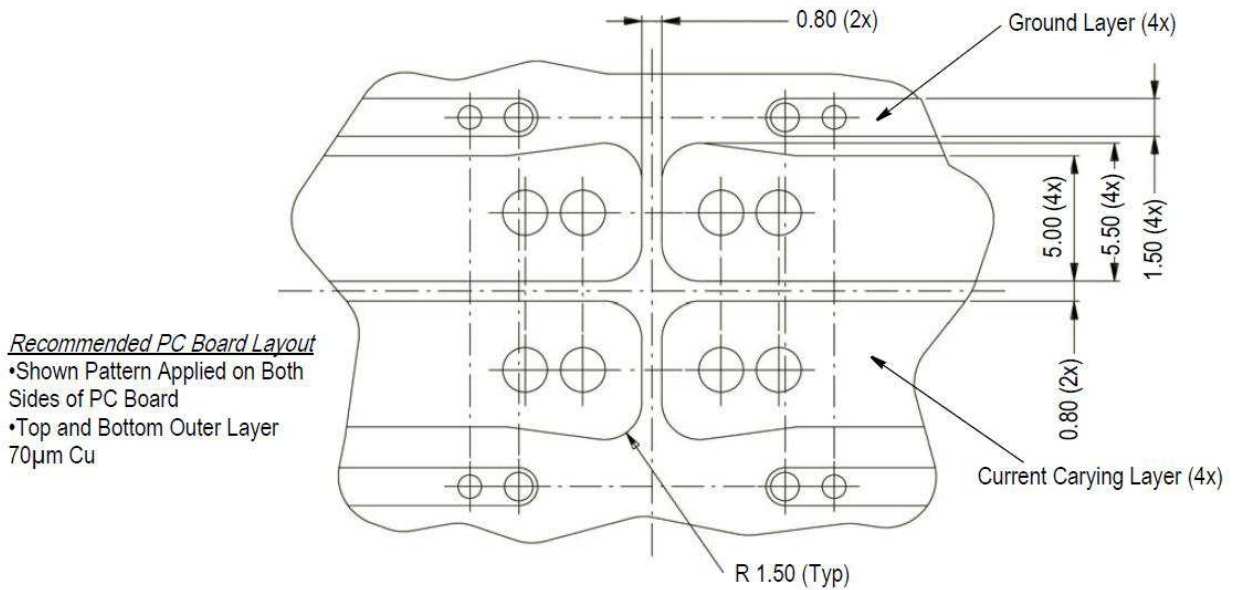


Figure 3

### 3.6. Mounting the Power Board Connector

Pin and paste technology is used to mount the connector onto the pc board. The board connector can be placed onto the pc board in only one orientation. See Figure 4

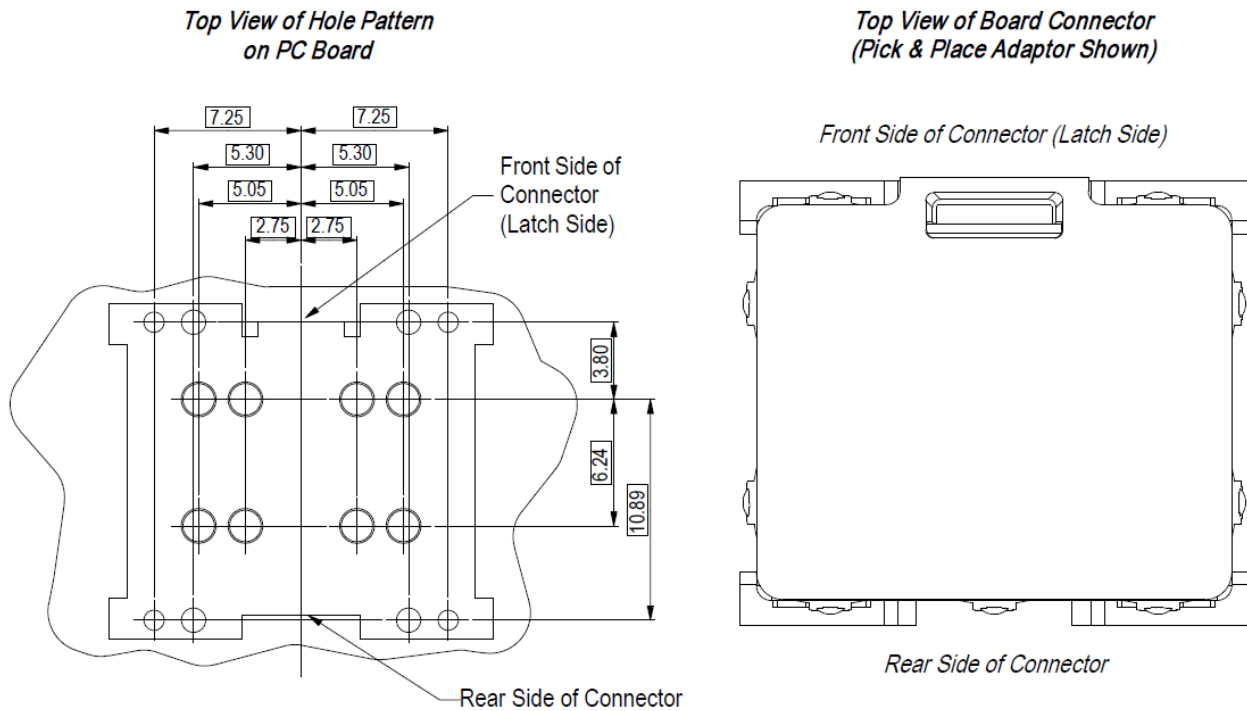
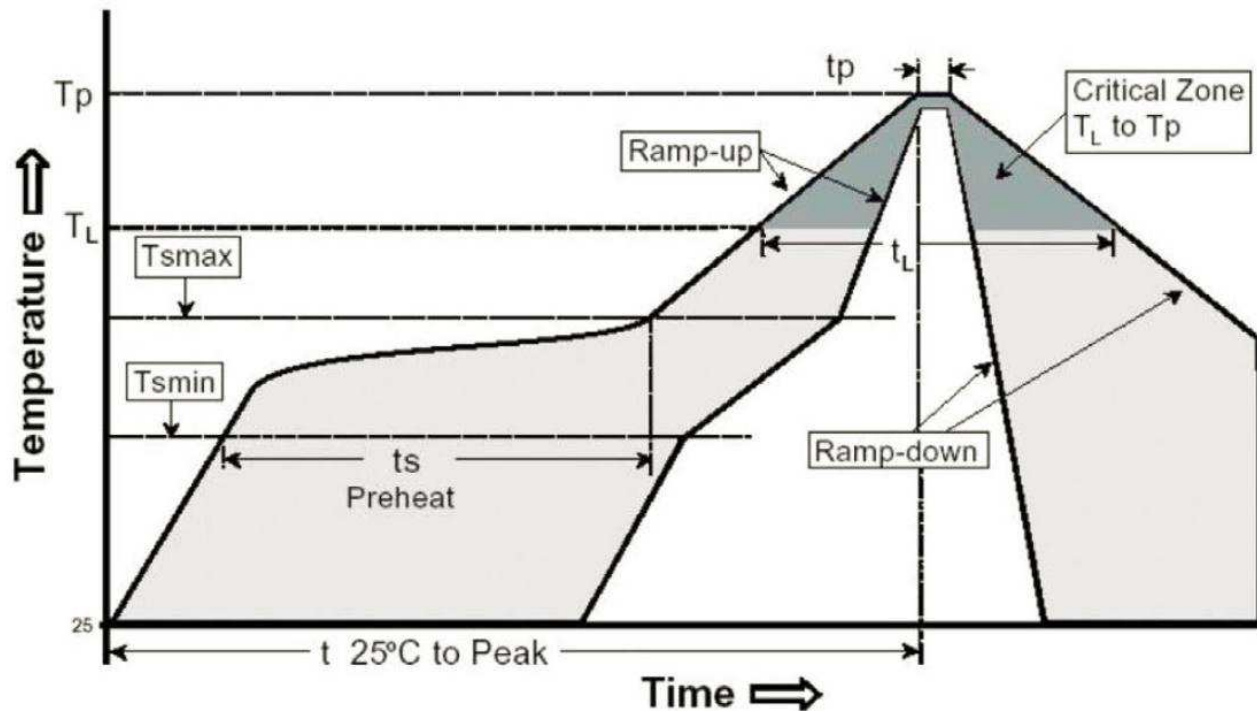


Figure 4

The board connector can be manually placed or can be placed by means of pick-and-place equipment. The maximum force needed to place the board connector onto the pc board is 20 N [4.5 lbf].

### 3.7. Soldering

The pc board connector must be soldered using non-focused infrared (IR) reflow or equivalent technique. Reflow temperature and time may vary depending on the size of the host pc board and replacement of other components. The reflow temperature and approximate time to which the pc board connector can be subjected is specified in Figure 5.



PROFILE FEATURE	Pb-FREE ASSEMBLY SMALL BODY
Average Ramp-Up Rate (TL to TP)	3°C/Second Max
Preheat	
— Temperature Min (TS min)	150°C
— Temperature Max (TS max)	200°C
— Time (min to max) tS	60-180 Seconds
$T_{S\ max}$ to $T_L$	
— Ramp-Up Rate	3°C/Second Max
Preheat	
— Temperature Min (TL)	217°C
— Time (tL)	60-180 Seconds
Peak Temperature (TP)	260 +0/-5°C
Time Within 5°C of actual Peak Temperature (tp)	20-40 Seconds
Ramp-Down Rate	6°C/Second Max
Time 25°C to Peak Temperature	8 Minutes Max

Figure 5

### A. Flux Selection

The connector power tab contact 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 pc board. See Figure 6.

FLUX TYPE	ACTIVITY	RESIDUE	COMMERCIAL DESIGNATION	
			KESTER	ALPHA
RMA	Mild	Noncorrosive	186	611

Figure 6

### B. Reflow Parameters

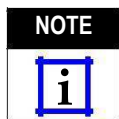
Due to the many variables involved with the reflow soldering process (e.g., component density, orientation, etc.), TE recommends that the user conduct trial runs under actual manufacturing conditions to ensure product and process compatibility.

### 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 7.



*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)	TEMPERATURE (Maximum)
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 7

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

### D. Drying



*Excessive temperatures may cause housing degradation.*

Connectors can withstand a temperature of -40 to 125°C [-40 to 257°F]. Values may vary with different automatic cleaning equipment (see equipment manufacturer's recommendations).

### 3.8. Checking Installed Connector

All solder joints should conform to those specified in Workmanship Specification 101-21. The power board connector must seat on the pc board to within the tolerance shown in Figure 8.

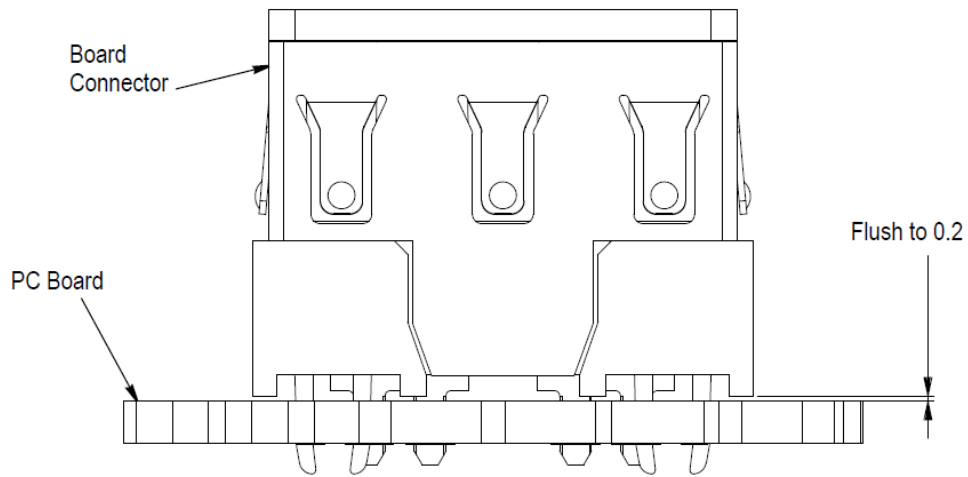


Figure 8

### 3.9. Removing the Pick-and-Place Adapter

Prior to mating the cable connector and the power board connector, the pick-and-place adapter needs to be removed. The following illustrations provide instructions on removing this adapter. See Figure 9.

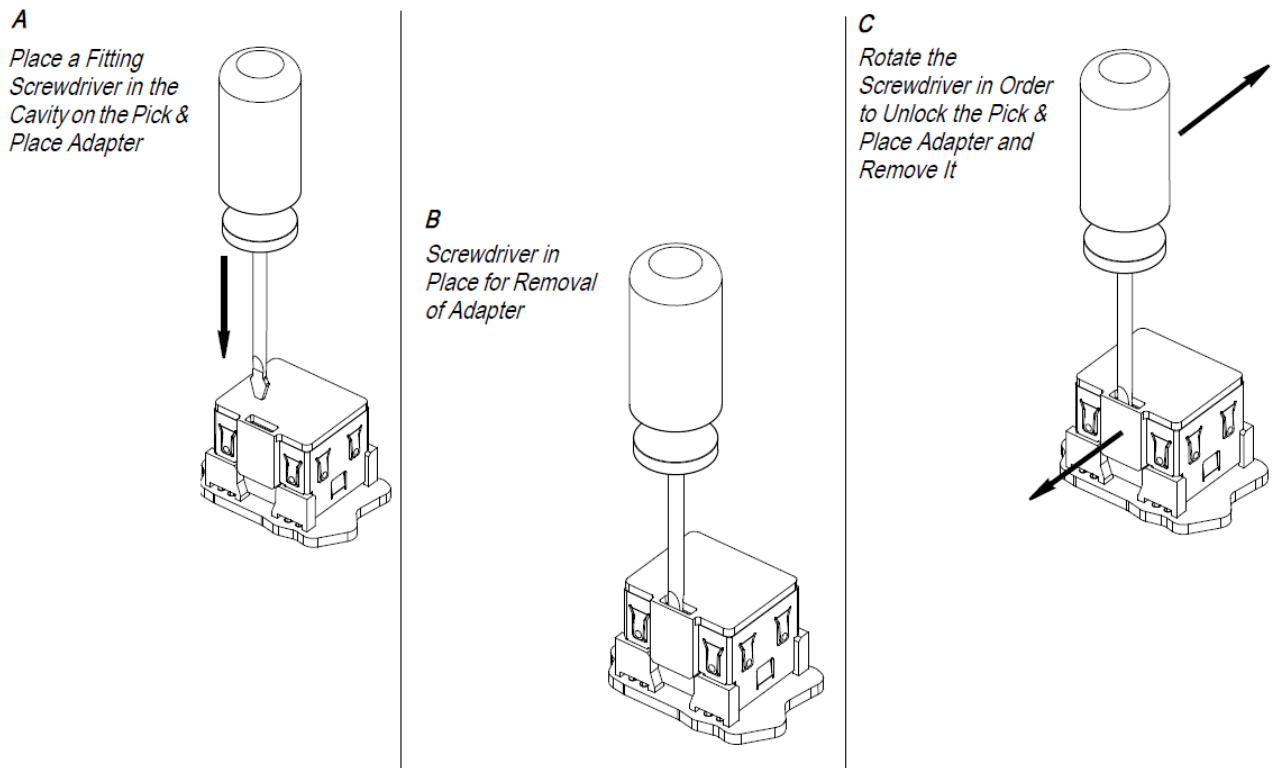


Figure 9

### 3.10. Mating of the Cable Connector and the Board Connector

#### A. Coding of the Contacts

The mating of the cable connector and the board connector can only be mated in one arrangement. The housings are polarized to ensure proper mating. Refer to Figure 10.

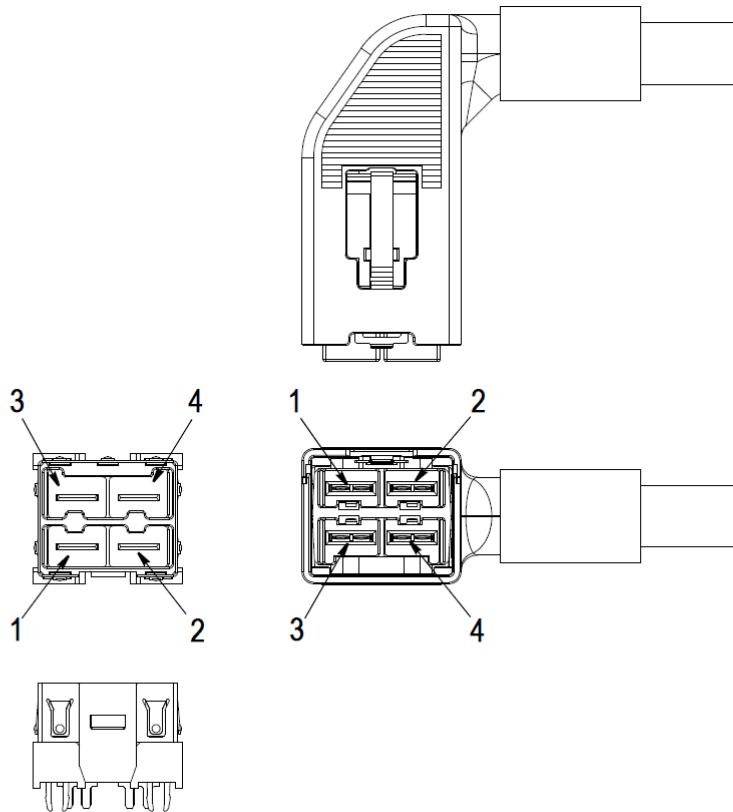


Figure 10

#### B. Mating Procedures

1. Orient the cable connector so that the latch of the cable connector is located on the latch-side of the board connector. See Figure 11.

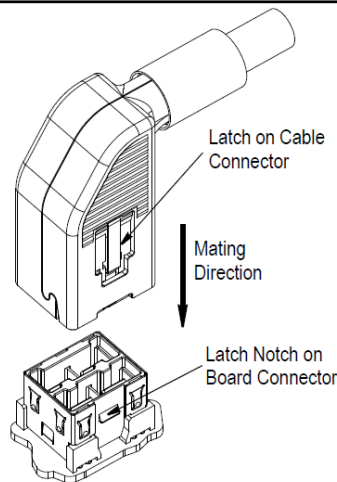


Figure 11



2. Press the cable connector onto the board connector until a tactile and audible “click” is heard and felt. The cable connector is mated if the latch opening is positioned as shown in Figure 12. The mating process is now complete.

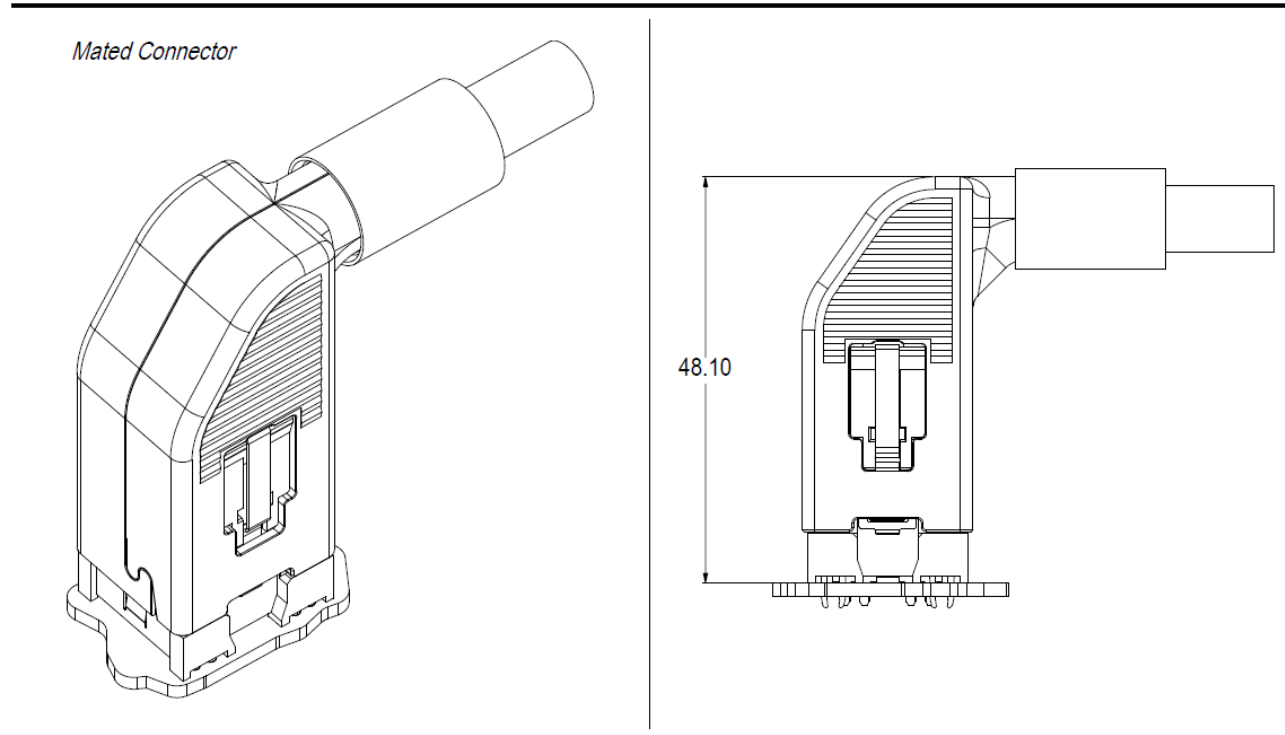


Figure 12

### 3.11. Un-Mating of the Connectors

1. Press the latch on the cable connector in order to unlatch the connectors. The maximum force needed to unlatch the connectors is 25 N [5.4 lbf].
2. While pressing the latch, withdraw the cable connector from the board connector with a slight rocking motion. See Figure 13.

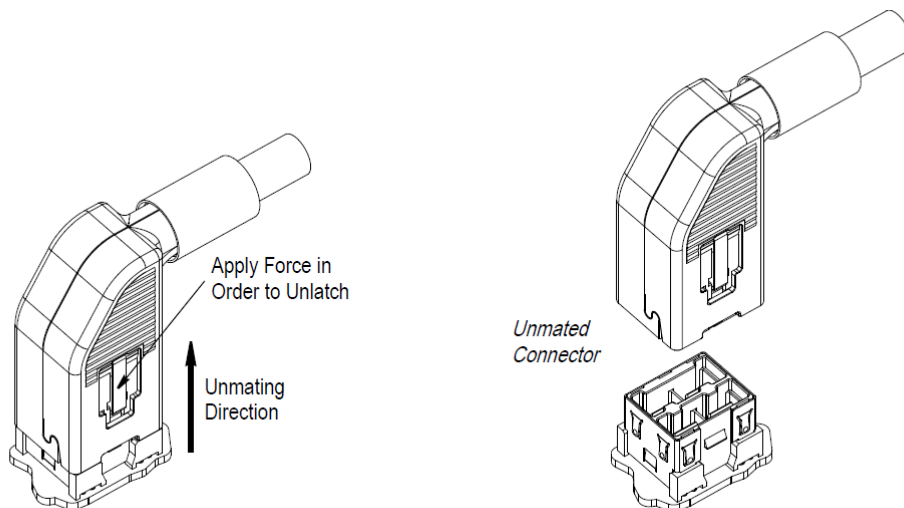


Figure 13

### 3.12. Replacement and Repair



*Damaged product should NOT be used. A damaged board connector, soldered on a pc board can be removed from the pc board (and replaced by a fully functional connector) by disconnecting the solder-joints between the solder-pins of the connector and the pc board using appropriate de-soldering methods and equipment.*

### 4. QUALIFICATIONS

This product has not yet been sent for agency evaluation and testing.

### 5. TOOLING

No special tooling is needed to apply this product. However, if “Pick-and-Place” methods are used to apply the connectors to the pc boards, then that specific equipment must be utilized.

### 6. VISUAL AID

The illustration below shows a typical application of this product. 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.

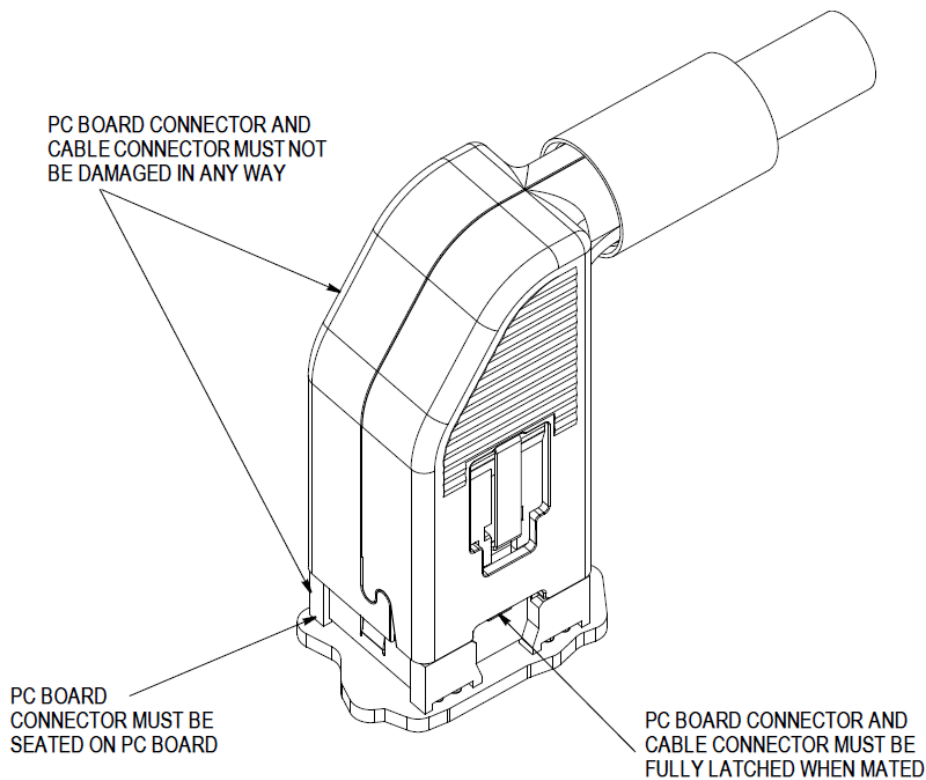


FIGURE 14. VISUAL AID