



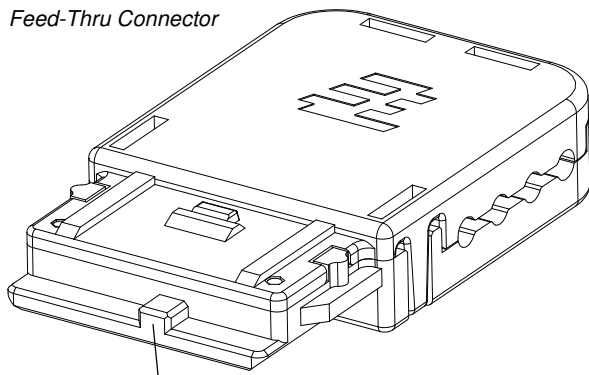
All numerical values are in metric units [with U.S. customary units in brackets]. Dimensions are in millimeters. Unless otherwise specified, dimensions have a tolerance of  $\pm 0.20$  and angles have a tolerance of  $\pm 2^\circ$ . Figures and illustrations are for identification only and are not drawn to scale.

1. INTRODUCTION

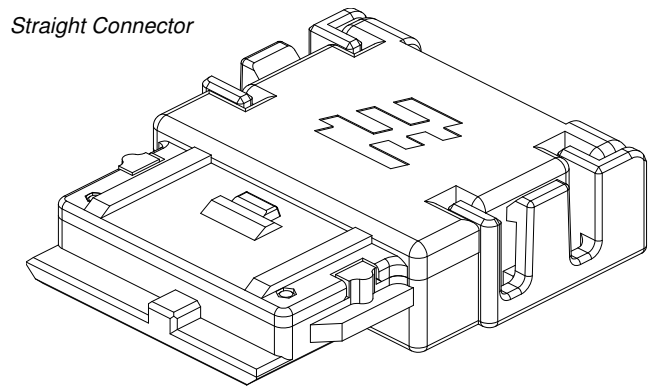
The NEVALO Interconnect System is designed to be a complete LED lighting interconnect solution. The NEVALO surface mount clip mates to the Feed-Thru, Straight, and Right-Angle connectors which make a card edge connection to the printed circuit (pc) board pads. These connectors are insulation displacement contact (IDC) terminated to the NEVALO ribbon cable and a terminator connector is placed on the free end to create a series circuit between all connectors and the driver.

When corresponding with Tyco Electronics Personnel, use the terminology provided on this specification to help facilitate your inquiry for information. Basic terms and features of receptacles are provided in Figure 1.

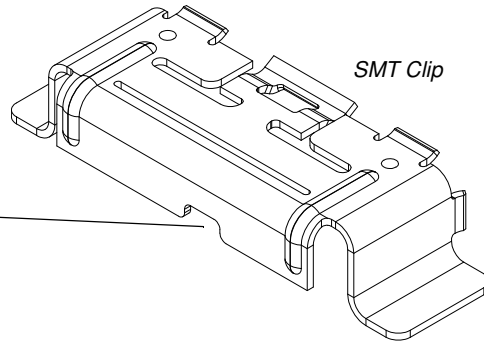
Feed-Thru Connector



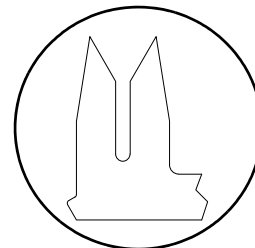
Straight Connector



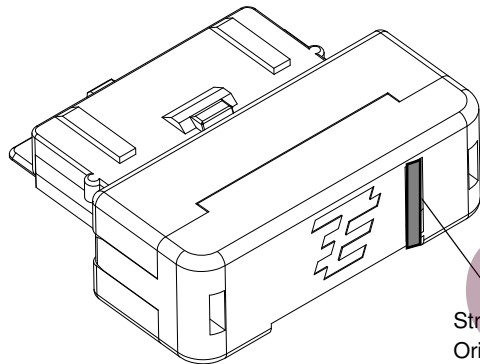
SMT Clip



Keying Features to Prevent Over/Under Powering of Light Modules

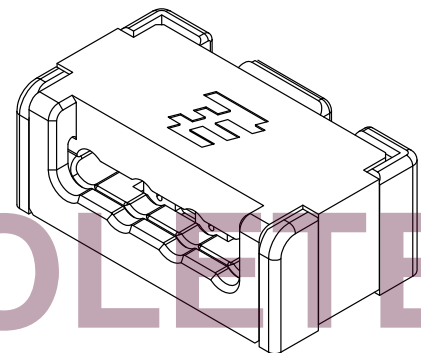


Typical NEVALO IDC Contact



Right-Angle Connector

Stripes for Proper Orientation of Ribbon Cable



Terminator

Figure 1

## 2. REFERENCE MATERIAL

### 2.1. Revision Summary

- Initial release of document

### 2.2. Customer Assistance

Reference Part Number 2154234 and Product Code L895 are representative numbers of the NEVALO Interconnect System. Use of these numbers will identify the product line and expedite your inquiries through a service network established to help you obtain product information. Such information can be obtained through a local Tyco Electronics Representative or, after purchase, by calling the Tooling Assistance Center or the Product Information Center number at the bottom of page 1.

### 2.3. Drawings

Customer Drawings for each connector are available from the service network. The information contained in Customer Drawings takes priority if there is a conflict with this specification or with any technical documentation supplied by Tyco Electronics.

### 2.4. Specifications

Design Objective 108-2442 provides expected product performance and test information.

### 2.5. Instructional Material

Instruction Sheet 408-10413 provides information for the NEVALO Interconnect System Hand Crimping Tool Kit 2161090-1.

## 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 receptacle connector material.

#### B. Shelf Life

The connectors should remain in the shipping containers until ready for use to prevent deformation to the connectors. The connectors should be used on a first in, first out basis to avoid storage contamination.

#### 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. Materials

The NEVALO housings are made from glass-filled PBT, while the IDC contacts are made from copper alloy with tin plate over nickel.

### 3.4. Limitations

The operating temperature range for the NEVALO Interconnect System is -20° to 105°C [-4° to 221°F].

### 3.5. Special Characteristics

NEVALO Interconnects are available in four colors. Housings have a molded keying feature that corresponds to keying features on the mating part (clip, driver, etc.) to prevent over/under powering of light modules. See Figure 1.

### 3.6. Cable Preparation

The IDC contacts in the NEVALO Interconnects are designed to accept NEVALO ribbon cable stranded tinned copper conductors. An initial cut needs to be made using a guillotine-type cutting tool. See Figure 2. Contact your Tyco Electronics Representative for current tool recommendations for cutting and notching of cables.



A notching procedure is required when a NEVALO Feed-Thru connector is used. Use cable notching tool 2119990-1 to ensure proper notch size and length. Contact the Product Information Center number at the bottom of page 1 for specific information on this process or refer to hand tool instruction sheet.



Care must be taken when aligning cable prior to termination to maintain parallelism between the end of the cable and the inner wall of the connector.

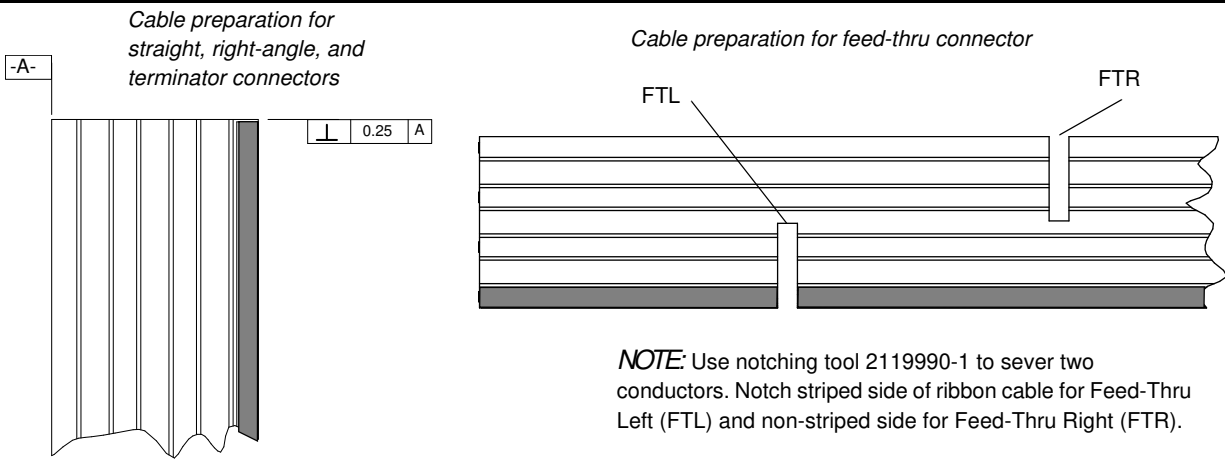


Figure 2



Feed-Thru connectors should not be placed closer than 25 mm [1 in.] apart (centerline-to-centerline) due to tooling constraints. Printed Circuit Board width may effect minimum spacing.

### 3.7. Product Selection

All NEVALO Interconnects should be used with corresponding colored ribbon cable, light modules, and drivers. Right/left, up/down orientation corresponds to connector orientation relative to NEVALO ribbon cable stripe. Figure 3 shows proper connector orientation.

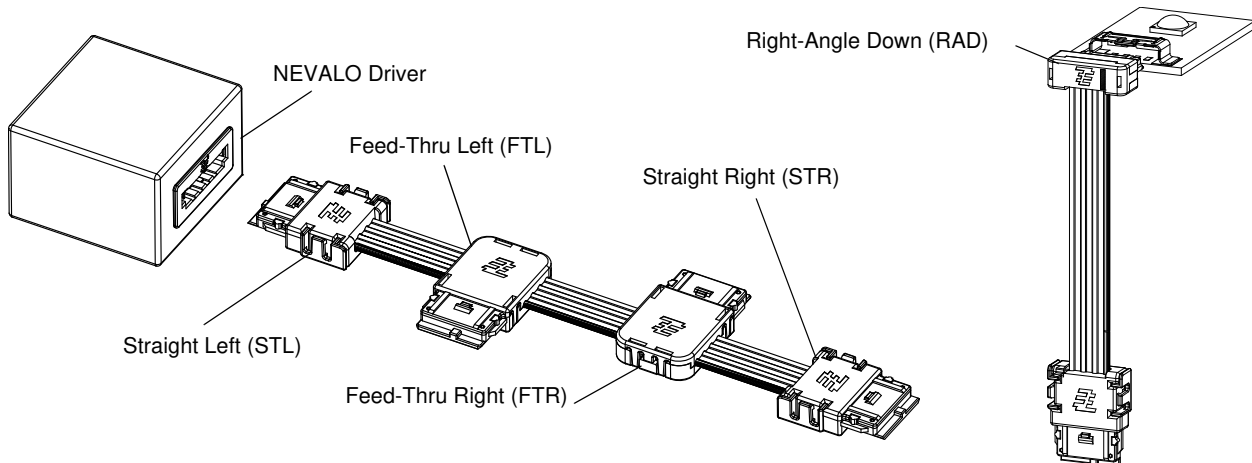


Figure 3

### 3.8. PC Board

#### A. Material and Thickness

The pc board material shall be metal clad. There is no required thickness for the pc board.

#### B. Tolerance

Maximum allowable bow of the pc board shall be 0.05 mm over the length of the connector.

#### C. Pads

The pc board circuit pads must be solderable in accordance with Test Specification 109-11.

#### D. Layout

The pc board layout must be designed using the dimensions provided on the customer drawing for the specific connector. Reference sample of the recommended pc board layout is shown in Figure 4.

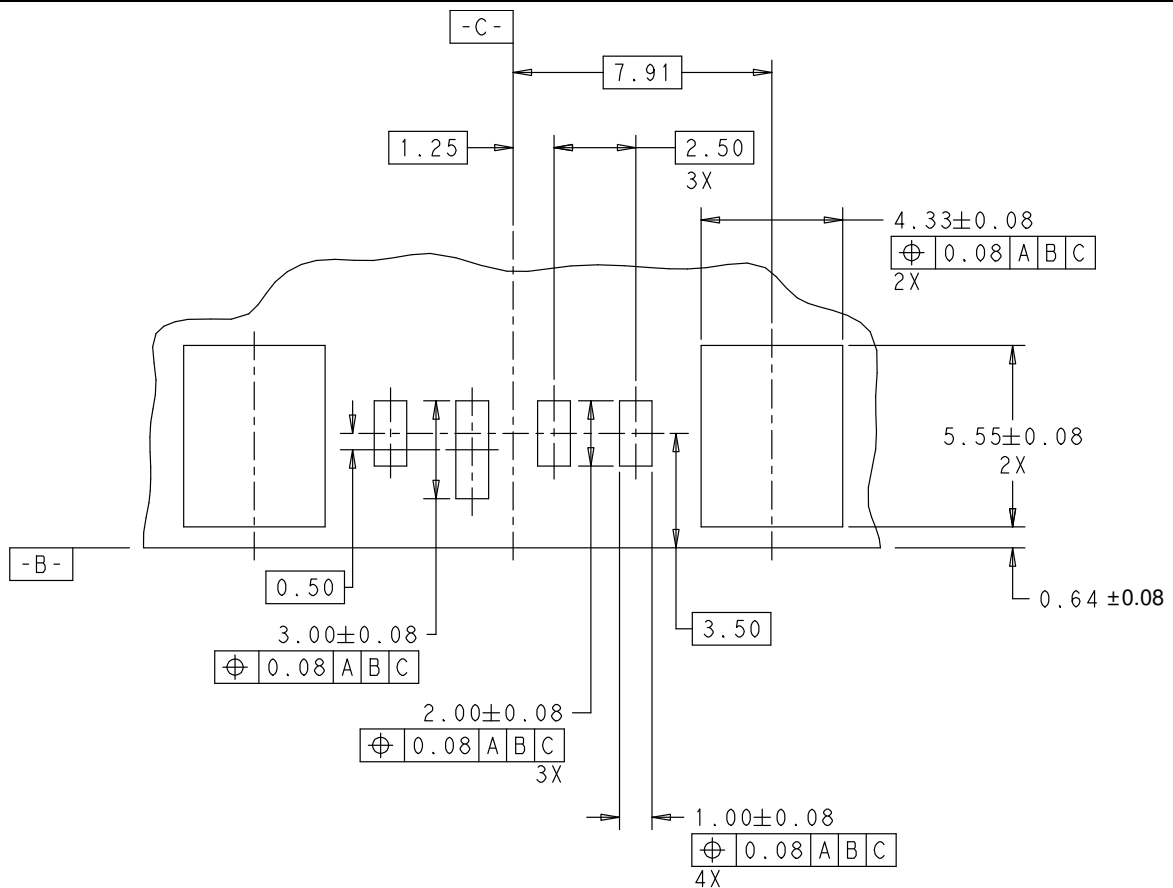


Figure 4

### 3.9. Soldering

Observe guidelines and procedures when soldering contacts. Solder, clean, and dry all leads to contacts according to the following. The connectors should be soldered using vapor phase reflow (VPR), double-sided, non-focused infrared (IR), forced air convection, or equivalent soldering techniques. All solder joints should conform to the Workmanship Specification 101-21 and IPC-S-815.

#### A. Flux Selection

Contacts 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. Flux that is compatible with the connectors is provided in Figure 5.

FLUX TYPE	ACTIVITY	RESIDUE	COMMERCIAL DESIGNATION	
			KESTER‡	ALPHA‡
Type RMA (Mildly Activated)	Mild	Noncorrosive	185/197	611

Figure 5



No flux allowable on any of the four inner pads.

B. Connectors with SMT Contacts

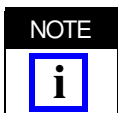
**1. Solderability**

The pc board pads must be solderable in accordance with Test Specification 109-11 (Test Method A, non-activated rosin flux) and all other requirements for surface mount contacts specified in this document.

**2. Solder Paste Characteristics**

1. Alloy type shall be SAC 305; Sn 96.5/Ag 3.0/Cu 0.5.
2. Flux incorporated in the paste shall be rosin, mildly active (RMA) type.
3. Paste will be at least 80% solids by volume.
4. Mesh designation -200 to +325 (74 to 44 square micron openings, respectively).
5. Minimum viscosity of screen print shall be 5y10% cp (centipoise).
6. Minimum viscosity of stencil print shall be 7.5y10% cp (centipoise).

**3. Solder Volume**



Solder volume may vary depending on solder paste composition.

Solder volume is required to be 4.27 mm<sup>3</sup> per solder foot (calculated per 50% solid content).

**4. Screen (or Stencil)**

The stencil aperture shall be determined by the circuit pad size and thickness. It may be any shape as long as it prevents solder bridging and maintains the given volume of solder paste.

C. Process

Connectors with surface mount contacts should be soldered using vapor phase (VPR), double-sided, non-focused infrared reflow (IR) or equivalent soldering techniques. Due to many variables involved with the reflow process (i.e., component density, orientation, etc.), it is recommended that trial runs be conducted under actual manufacturing conditions to ensure product and process compatibility. These connectors will withstand the temperature and exposure time specified in Figure 6.

SOLDERING PROCESS	TEMPERATURE (Max)	TIME (At Max Temperature)
IR	220°C [428°F]	3 Minutes

Figure 6

The lead-free reflow profile is shown in Figure 7.

‡Alpha and Kester are trademarks.

Kester Lead-Free Reflow Profile  
Alloys: Sn96.5/Ag3.0/Cu0.5 and Sn96.5/Ag3.5

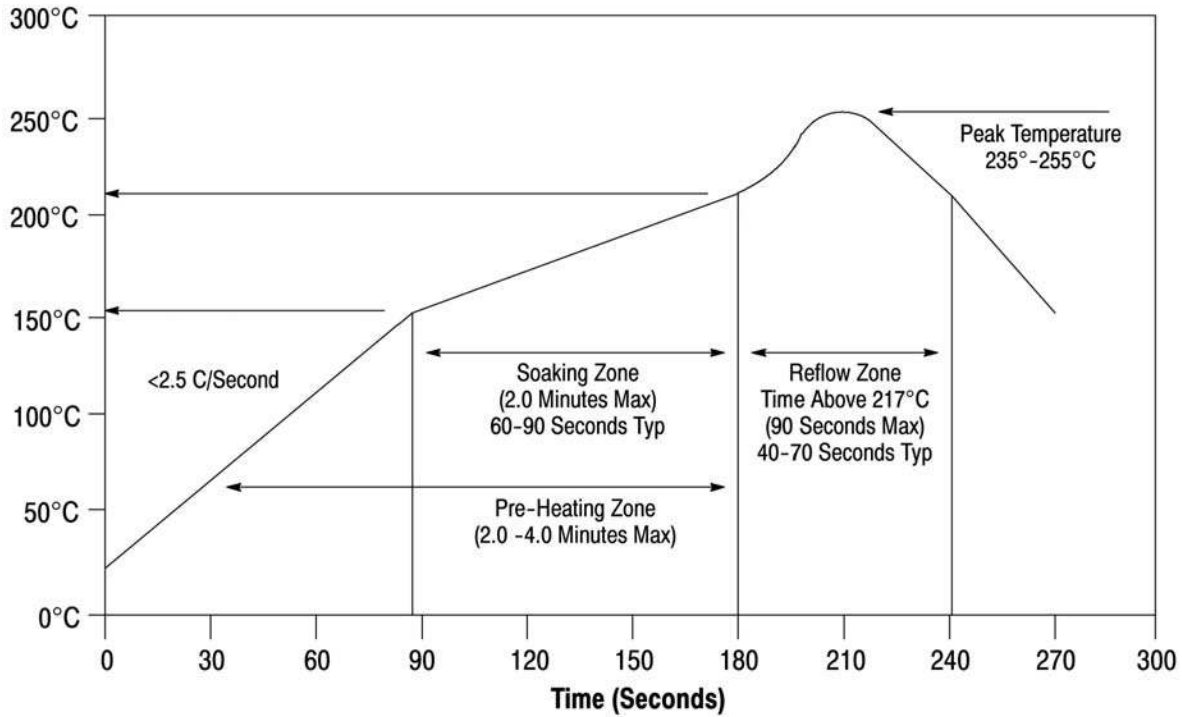


Figure 7

3.10. Connector Placement

A. Position

Optimally, the clip solder feet should be centered on the pads; however, slight misalignment is permissible. Refer to Figure 8.

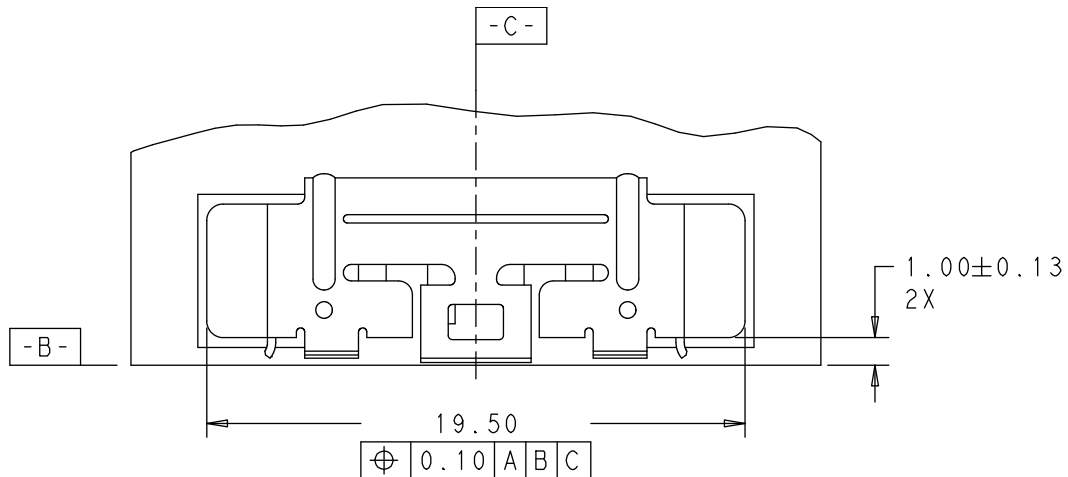


Figure 8

B. Seating Force

It is imperative that the clip solder feet are sufficiently pressed into the solder paste.

### 3.11. Terminated Connector Requirements

Prepared cable shall be terminated according to the procedures given in the applicable tooling instructions. See Section 5, TOOLING, for details on tooling options and instructional materials. Figure 9 shows criteria for acceptable terminations.



*Tyco Electronics specified tooling must be used to ensure proper termination.*

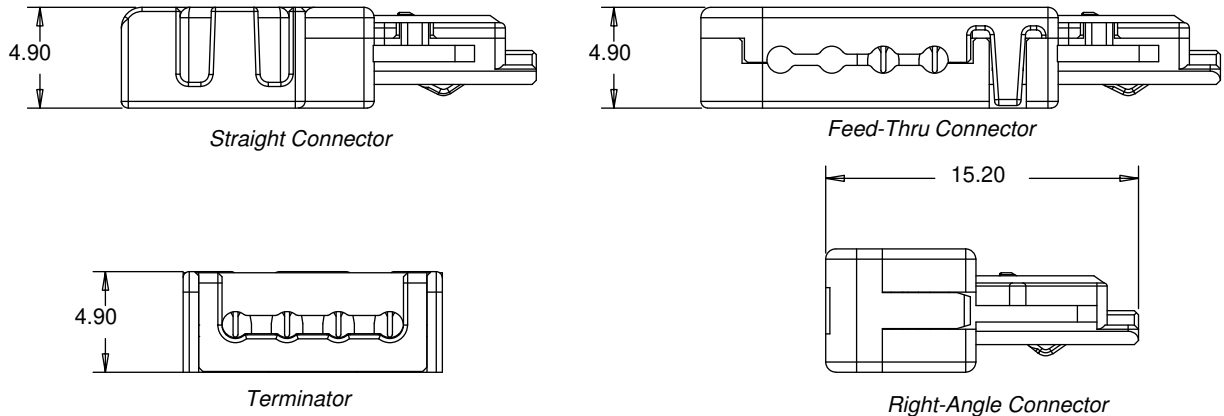


Figure 9

### 3.12. Repair/Replacement

NEVALO Interconnects are not repairable. If a connector becomes damaged, it must be cut from the ribbon cable and replaced with a new one.



*Pre-terminated cable cannot be used with a new connector. If ribbon cable insulation has been pierced, the cable must be replaced as well.*

## 4. QUALIFICATIONS

The NEVALO Interconnect System has not yet been sent for agency evaluation and testing.

## 5. TOOLING

This section provides a selection of tools for various application requirements. Modified designs and additional tooling concepts may be available to meet other application requirements. For additional information, contact one of the service groups at the bottom of page 1.

There are manually operated and pneumatically operated (auto-cycle and foot pedal actuated) arbor frame assemblies designed for bench mounted operation. They accept standardized upper/lower tooling assemblies that have been designed for the NEVALO Interconnect System. Hand crimping tools are designed for prototype and low-volume applications. Instruction sheets covering tool setup and operation are packaged with the tooling. See Figure 10

CONNECTOR TYPE	DIE SET	HAND TOOL FRAME	HAND TOOL KIT (DOCUMENT)
Feed-Thru Straight Terminator	Multi-Nest 2161080-1	PRO-CRIMPER* III 2119991-1	2161090-1 (408-10413)
Right-Angle	Right-Angle 2161085-1		

Figure 10



*Tooling not required to unmate connectors from clip.*

6. VISUAL AID

Figure 11 shows a typical application of the NEVALO Interconnect System. 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.

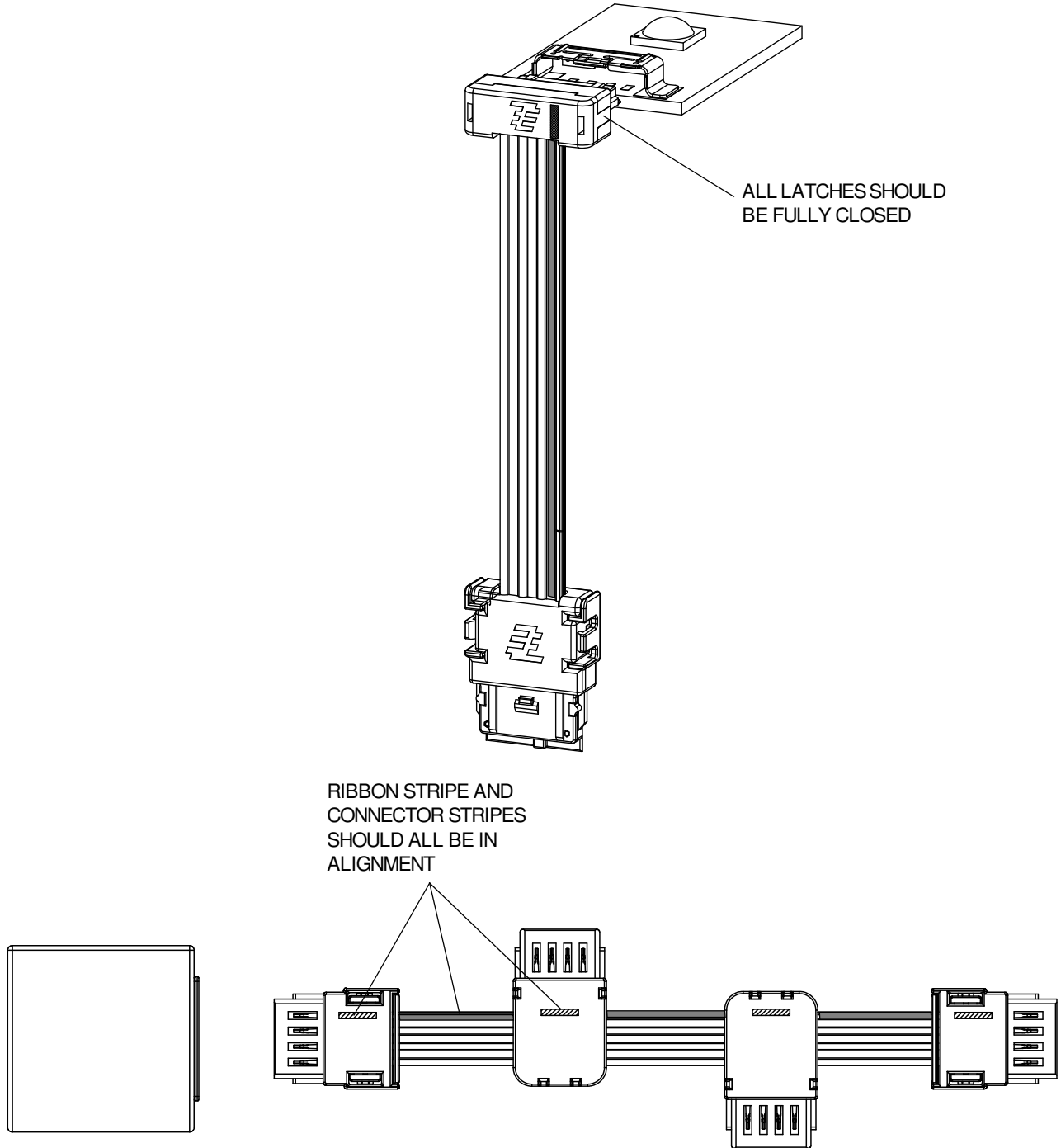


FIGURE 11. VISUAL AID (CONT'D)



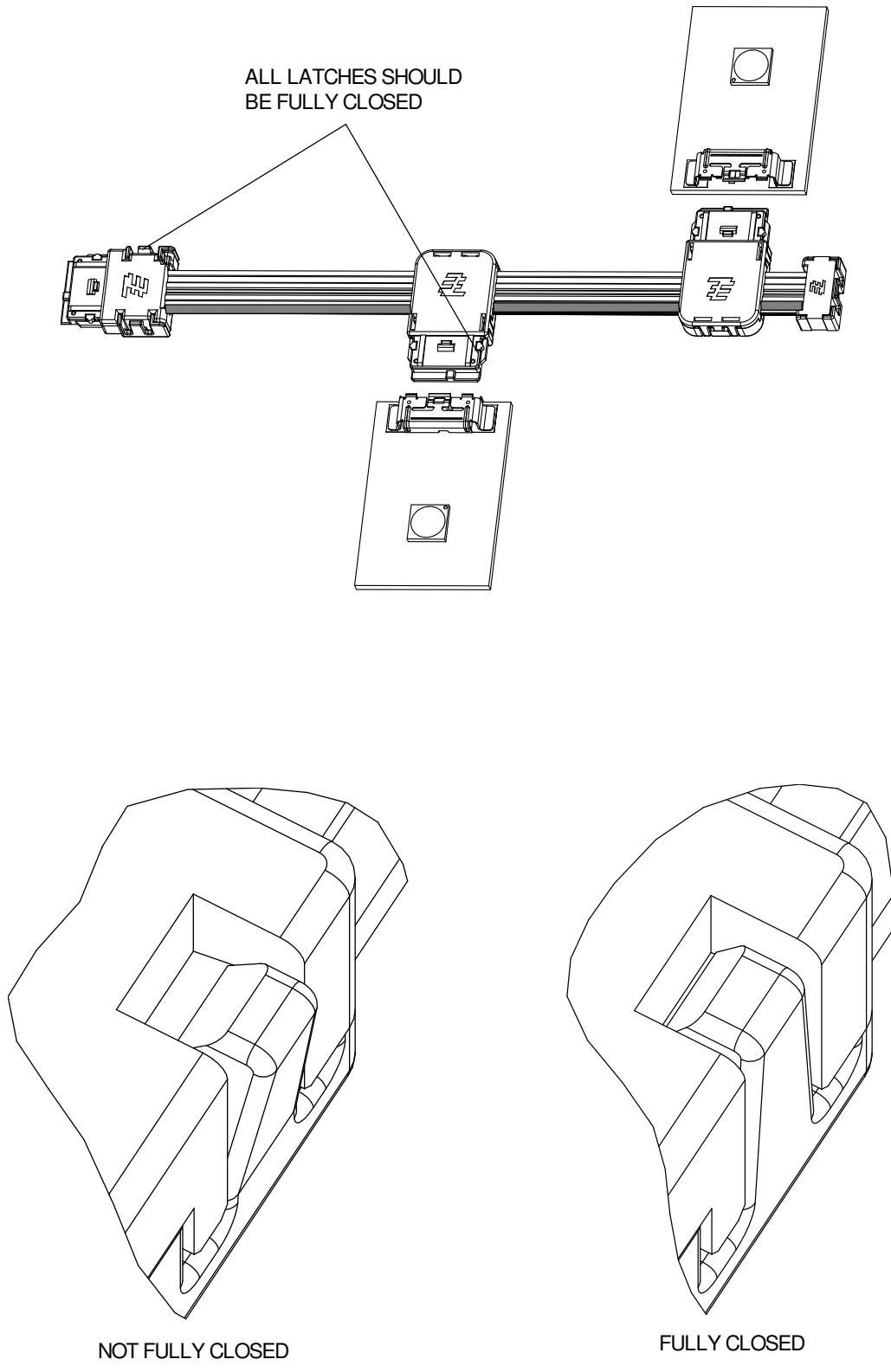


FIGURE 11. VISUAL AID (CONT'D)

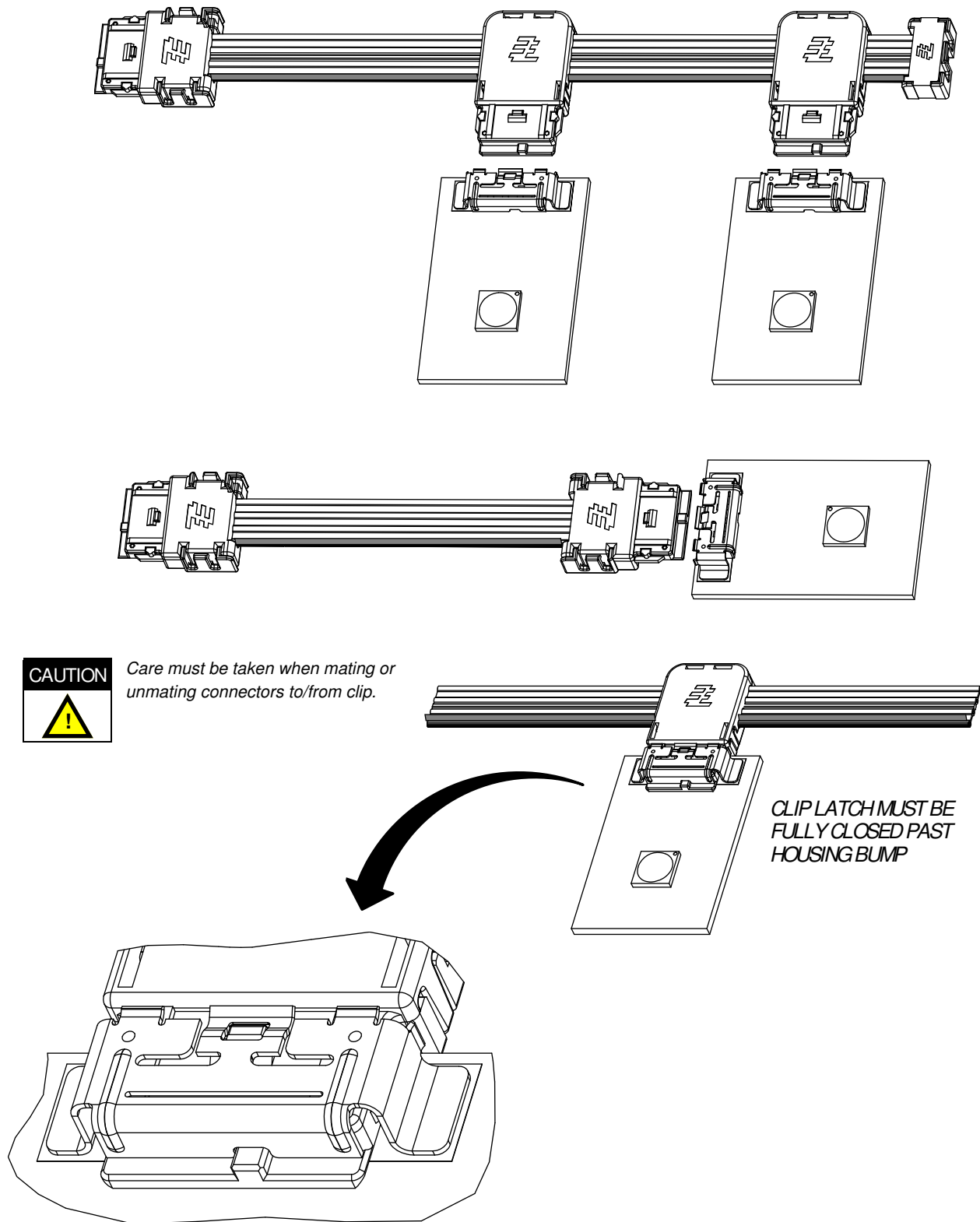


FIGURE 11. VISUAL AID (END)