



# **Connector Installation Guide Compression and Mechanical Connectors**



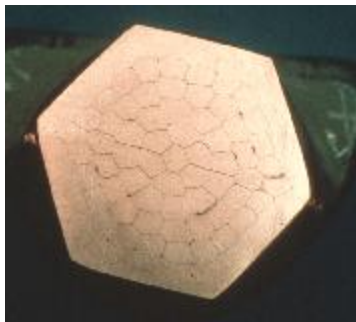
# Typical Cross Section of a Compression Connector Before Installation



Before compression, a typical cross section of cable consists of 75% metal and 25% air

# Typical Cross Section of a Compression Connector After Installation

After compression, little air is left.



# Compression Connector Types



Single & Dual  
Mounting holes



Flared-End



Narrow Tongue



C-Taps



Splices



H-Taps



Grid Grounding



## 1. Determine Proper Connector For Cable

- Conductor size and CU = Copper conductors only
- Conductor size and “AL9” = Aluminum conductors only
- Conductor size and “AL9CU” = Aluminum or Copper conductors
- Match size and type of conductor to proper lug

Note: Consult manufacturers instructions on whether fine stranded conductors or welding cable conductor types may be used.



## Marking Information on Connectors:

- Manufacturer
- Wire Size
- Wire material- CU, AL, or AL9CU (indicates Dual Rating and 90° C)
- Optional Crimp Indicator Bands
- Listing Information



## 2. Strip and Properly Prepare Cable

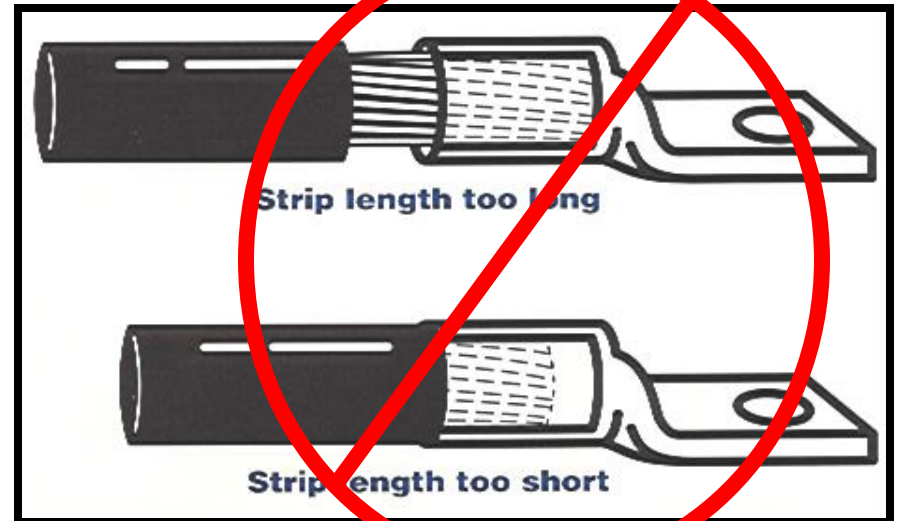
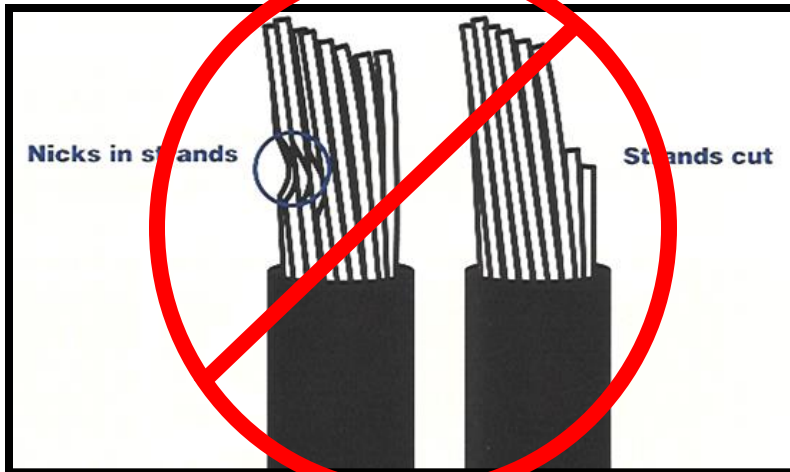
- Strip insulation carefully to avoid nicking strands.
- Strip to proper length so conductor can be fully inserted.
- Refer to manufacturer's instructions for strip length.
- Most connectors are suitable for one conductor. Never install more than one conductor unless specifically allowed by the manufacturer's instructions.

### Aluminum Conductor –

- Brush the stripped portion of the conductor to remove oxide film using a stainless steel wire brush.
- Apply oxide inhibitor compound and wire brush into the stranding. Do not remove pre-filled inhibitor from the barrel.



# Installation Guide for Compression

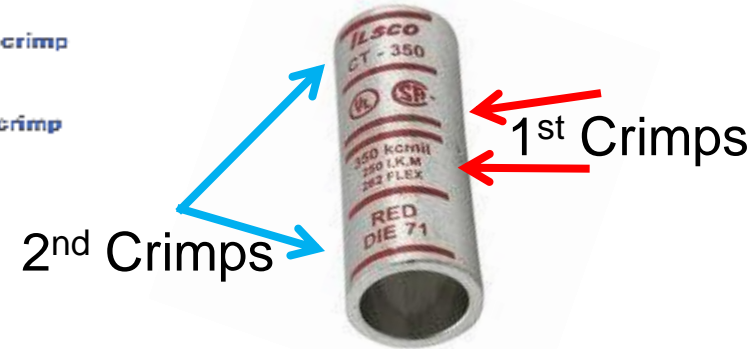




### 3. Select proper installing die tool

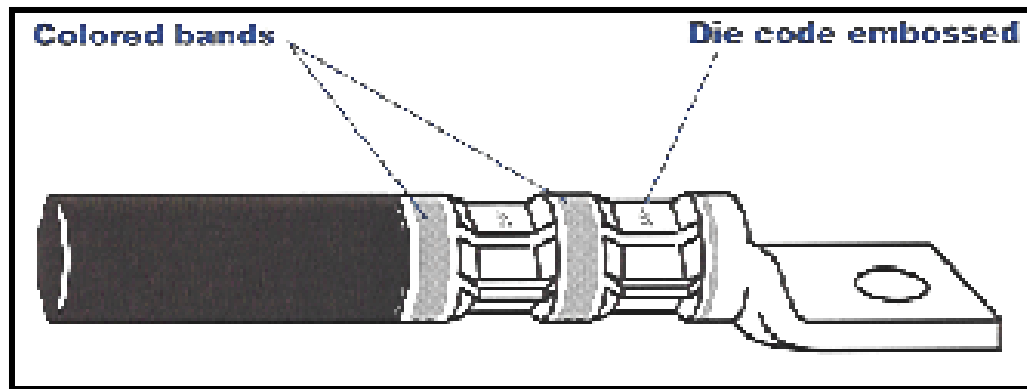
- Always refer to the connector manufacturer's instructions for the proper compression die that is intended for the connector.
- Manufacturer's may use colored bands or dots that correspond to color markings on dies.
- Manufacturer's may use die code number marked or stamped on the connector.
- Knurls may be used in place of colored bands.

When making multiple crimps, make the first crimp nearest the tongue and work towards the barrel end.



4. Locate tool with correct die in proper position on connector and activate tool
- Connectors that are banded with colored stripes to indicate number and location of each crimp.
  - Connectors may also be marked with the die code number at each compression location.
  - Follow manufacturers instructions whether to crimp on the colored bands or between the colored bands.

When making multiple crimps, make the first crimp nearest the tongue and work towards the barrel end.



#### 4. Continued....

When crimped, the die code number or other marking will be embossed on connector for easy inspection to determine if correct die and connector combination were used.



Shown with IVTB-6-ALIO-CRMP Head

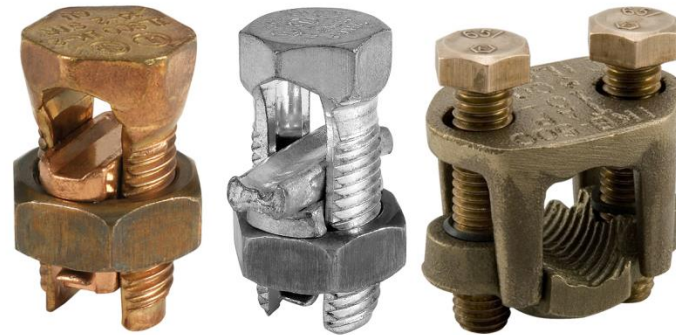
Select proper installing dieless tool

- Crimp as directed by the manufacturer's instructions.

## 5. Connector Securement

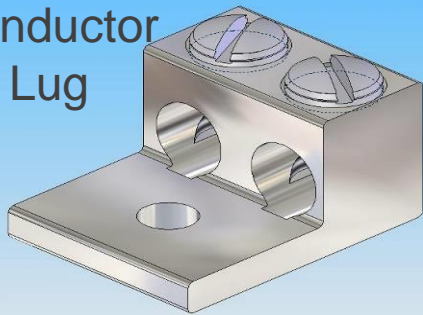


Use a 2-hole connector if there is a concern for twisting the connection.

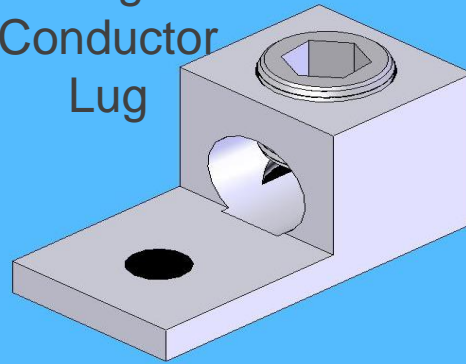


# Mechanical Connector Types

Double  
Conductor  
Lug



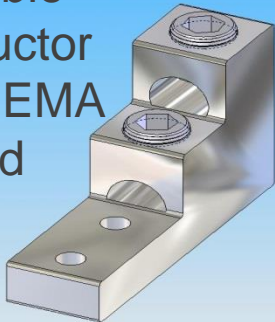
Single  
Conductor  
Lug



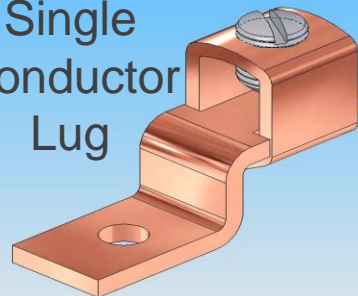
Overhead  
Transformer



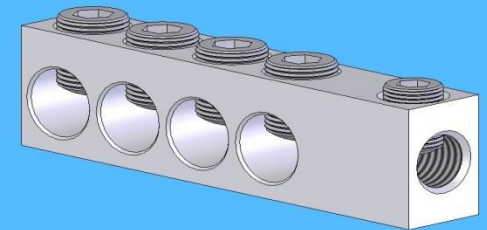
Double  
Conductor  
Lug, NEMA  
Pad



Copper  
Single  
Conductor  
Lug



Stud Type Transformer

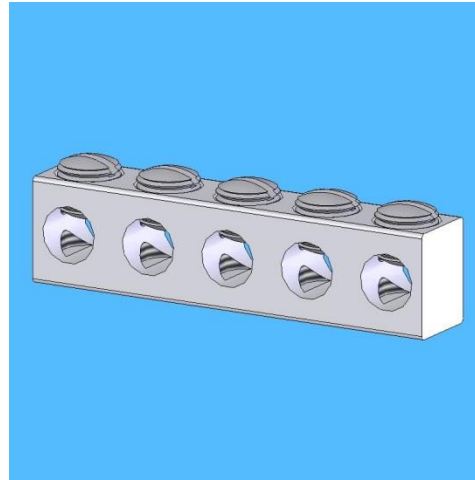




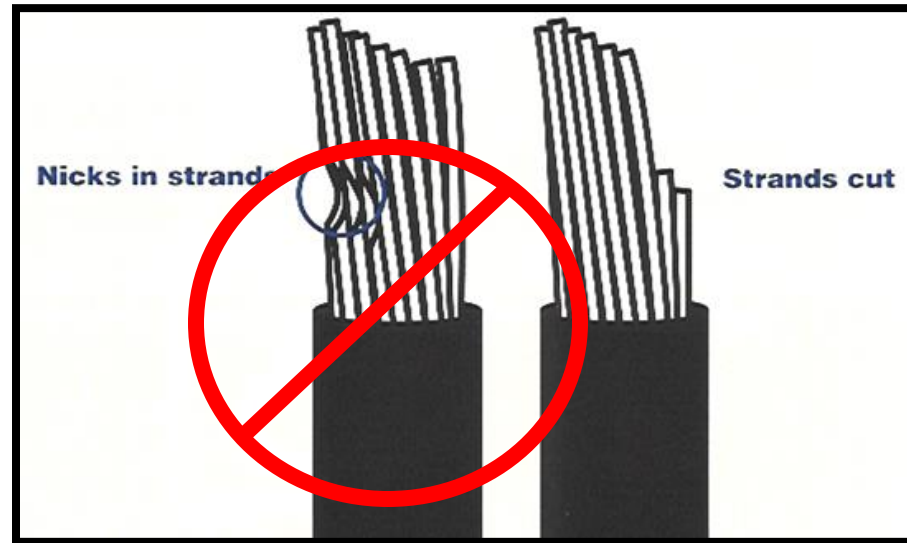


## Marking Information on Connectors:

- Manufacturer's name or Symbol
- Wire Size or range
- Wire material- CU, AL, or Both
- Temperature Rating if applicable
- AL9CU Shows Dual Rating (Al & Cu) and 90°C
- UL and/or CSA if it is a listed connector

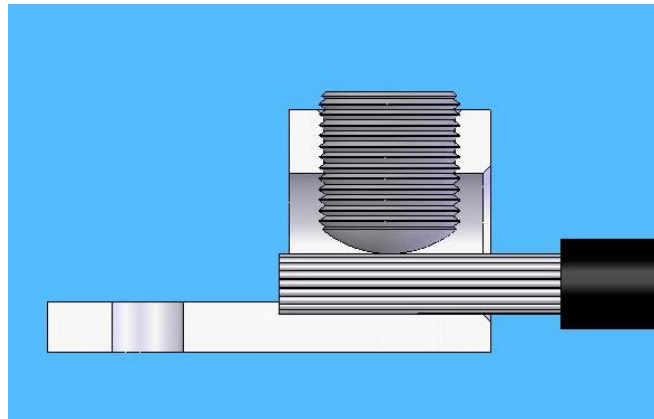


1. Unlike Compression connectors, mechanical connectors typically take a range of conductors. It is important to check that the cable falls within the cable range listed on the connector.
2. If the connector is intended to be used on a bus, pad or equipment, mount the connector and tighten the mounting hardware per the manufacturer's specifications.



### 3.Strip and Properly Prepare Cable

- Strip insulation carefully to avoid nicking strands
- Strip to proper length so conductors can be fully inserted
- Refer to manufacturers instructions for strip length
- Aluminum Conductor –
  - Brush the stripped portion of the conductor to remove oxide film with a stainless steel wire brush. Apply oxide inhibitor compound and wire brush into the stranding



4. Insert the conductor(s) and tighten all set screws per the manufacturer's recommendations.

- Do not retighten after properly torqued.
- Most connectors are suitable for one conductor. Never install more than one conductor unless specifically allowed by the manufacturer's instructions.
- Use the mounting bolt size as recommended by the manufacturer.

- Generally used as taps.
- If conductors are different materials, a spacer bar is included. Aluminum conductor should always be positioned on top.



- Voltage Rating (Insulated Only)
- 300 volts
- 600 volts
- 1000 volts signs/luminaires
- Note: NOT MARKED
- Non-insulated listed connectors are suitable for 2,000 volts. They may be used over 2,000 volts up to 35,000 volts where the effects of corona have been investigated.

- Non-insulated Temperature Rating
  - 75°C - Use the connector at 75°C ampacity
  - 90°C - Use the connector at 90°C ampacity
- Higher temp rated conductors at higher ambient temperatures may be used as long as the ampacity levels are used per the connector rating.
- Use the NEC<sup>®</sup> to obtain the conductor ampacity ratings.

- Insulated Temperature Rating
  - Never exceed the temperature rating of an insulated connector. See Packaging or Product for the marking.





## *Installation Guide for Grounding*

- Grounding
- DB Direct Burial
- The connector is suitable for direct burial in the soil or embedded in concrete.





DB = Direct Burial

Suitable Conductor



Compression Die Information

Rod size Information

Look for the product markings for suitability for attachment to rods, pipe, and concrete encased reinforcement steel.





Rod size

Conductor size

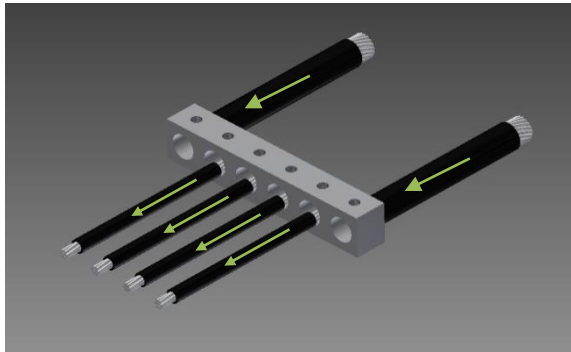


Direct burial

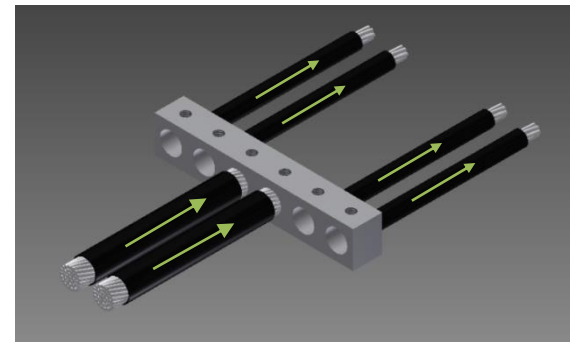
Conductor size

Rebar size

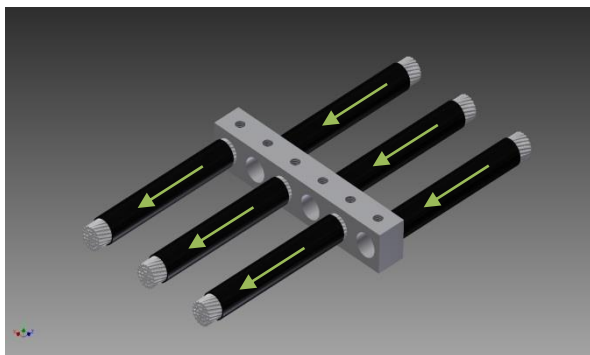
## Suggested Ways to Load or Balance



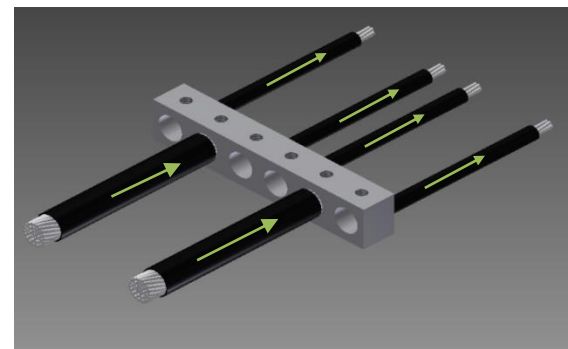
**Parallel Feed – 4 smaller load wires in between**



**Parallel Feeds, 4 Load Wires on outer two holes**

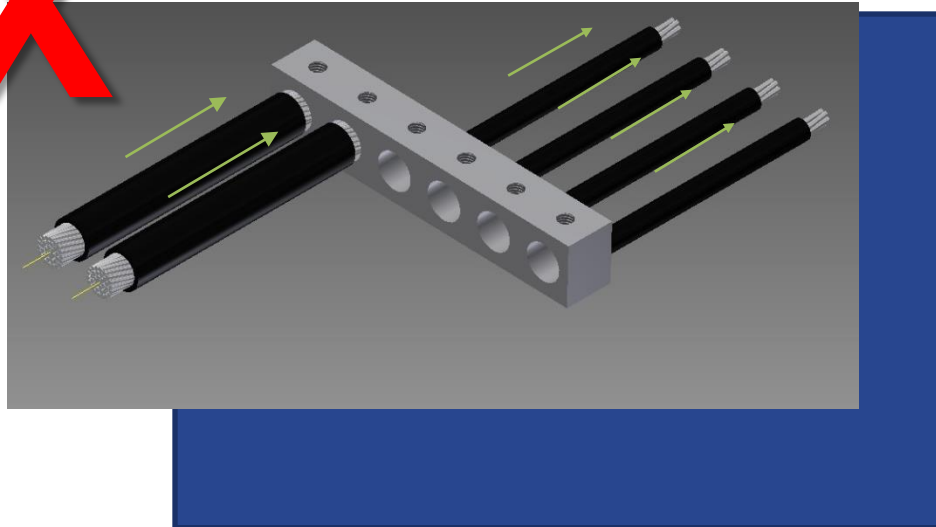


**Three Parallel Feeds, Three parallel Loads**



**Two Parallel Feeds, 4 Load Wires - Load wires on outer edges and in the center two holes**

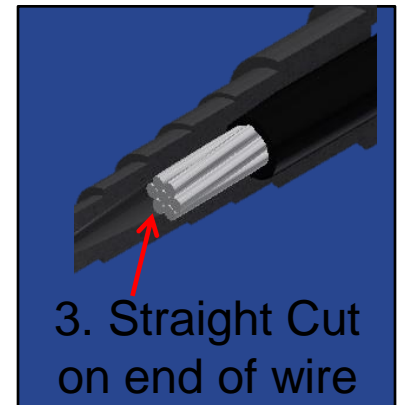
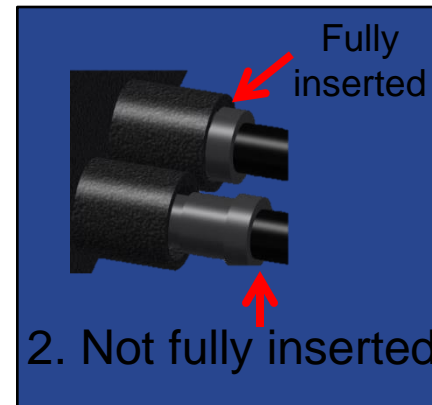
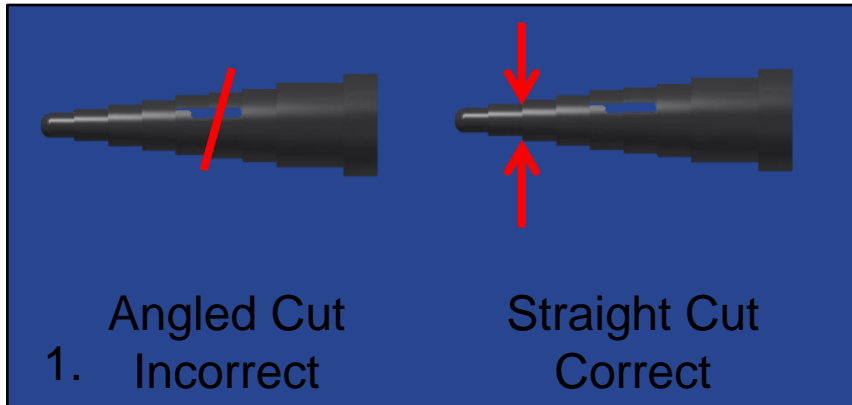
**X** Incorrect application



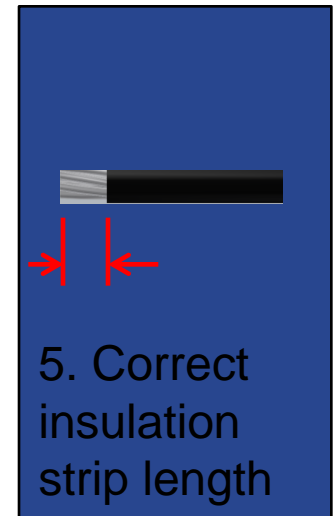
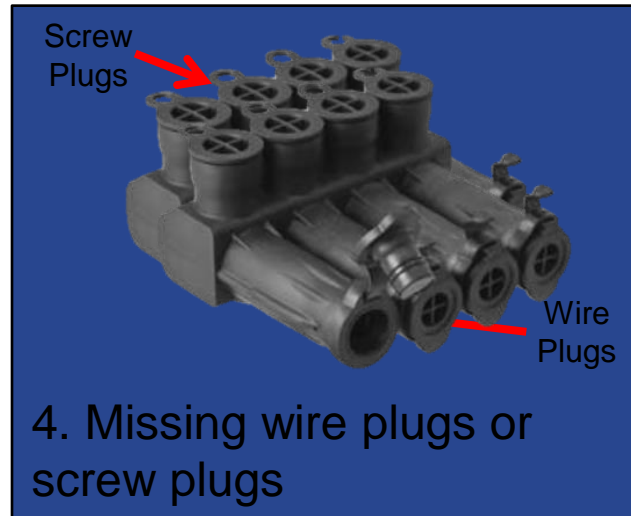
**Parallel Feeds one end, 4 Load Wires  
opposite end**



# Typical Failure Modes in Sealed Connectors



- Typical Failure Modes**
1. Wire plug cut at angle
  2. Wire plug or screw plug not fully inserted
  3. Angled cut on end of wire
  4. Missing wire plugs or screw plugs
  5. Short/long insulation strip length



## Wire Connectors

- UL 486A-486B
- CSA C22.2 No. 65
- ANCE NMX-J-543
- ANSI C119.1, C119.4, C119.5, C119.6



## Splicing Wire Connectors

- UL 486C
- CSA C22.2 No. 188
- ANCE NMX-J-548



## Grounding and Bonding Equipment

- UL 467
- CSA C22.2 No. 41
- ANCE NMX-J-567

