RAPID LOCK* Single-Pole Quick-Connect/Disconnect Bus Bar Connectors

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 ±0.13 [±.005] and angles have a tolerance of ±2°. Figures and illustrations are for identification only and are not drawn to scale.

1. INTRODUCTION

This specification covers the requirements for application of RAPID LOCK single-pole quick-connect/disconnect bus bar connectors used in bus bar and backplane power distribution applications. The connector consists of a crown socket and pin contact. The connector is available in screw mount (using a screw and washers) and swage mount (using an integral press-fit knurl and washer) for mounting to a bus bar or backplane.

The crown socket is a right-angle configuration and is available in sizes 8, 4, 2, and 12. The crown socket consists of a housing (with a cap) and a body. The housing contains a crown contact and contact cavity that features retention clips designed to hold the pin contact in the crown socket. The pin contact features a seating flange designed to support the pin contact on the mounting surface. The pin contact contains a crown band that provides stable electrical connection. When the pin contact is fully inserted into the crown socket, the retention clips engage the locking feature of the pin contact to prevent accidental unmating.

A right-angle insulation boot is available to provide additional insulation for the cable. The insulation boot accommodates cable terminating to crown socket sizes 8, 4, and 2. The insulation boot is available in various colors for indicator requirements.

The crown socket is designed to be crimped onto cable using manual or hydraulic tooling.

When corresponding with 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.

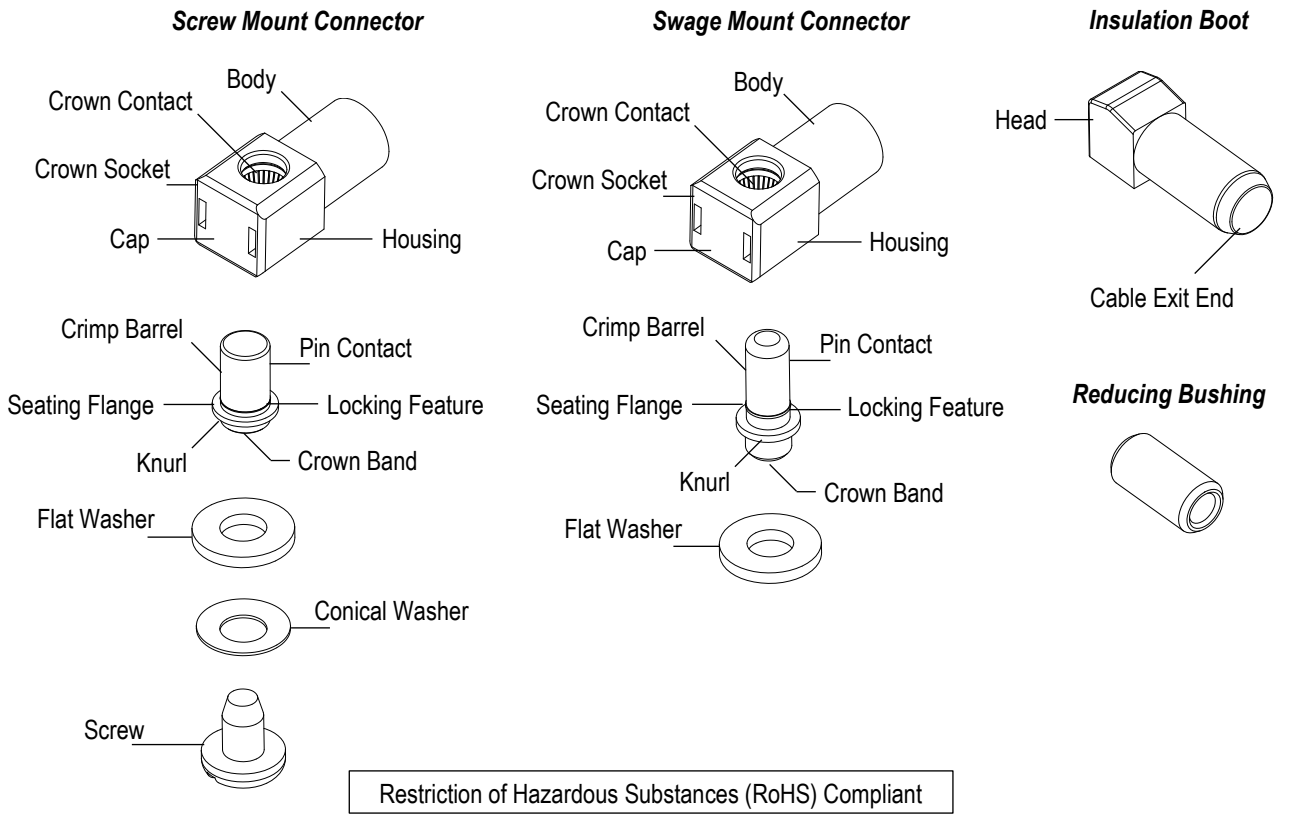


Figure 1

© 2021 TE Connectivity family of companies
All Rights Reserved
*Trademark

TOOLING ASSISTANCE CENTER 1-800-722-1111
PRODUCT INFORMATION 1-800-522-6752

This controlled document is subject to change.
For latest revision and Regional Customer Service, visit our website at www.te.com.

TE Connectivity, TE connectivity (logo), and TE (logo) are trademarks. Other logos, product, and/or company names may be trademarks of their respective owners.

2. REFERENCE MATERIAL

2.1. Revision Summary

Initial release of application specification

2.2. Customer Assistance

Reference Product Base Part Number 6648228 and Product Code D040 are representative of RAPID LOCK quick-connect/disconnect bus bar connectors. Use of these numbers will identify the product line and expedite your inquiries through a service network established to help you obtain product and tooling information. Such information can be obtained through a local Representative or, after purchase, by calling PRODUCT INFORMATION at the number 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 Specifications (108-series) provide product performance and test information. There no specifications available that pertain to this product.

2.5. Instructional Material

Instruction Sheets (408-series) provide product assembly instructions or tooling setup and operation procedures and Customer Manuals (409-series) provide machine setup and operating procedures. There is no instructional material that pertains to this product.

3. REQUIREMENTS

3.1. Safety

Safety interlocks and/or insulating devices must be designed into the system to avoid inadvertent electrical shock.

DANGER
To avoid personal injury, the electrical system must be de-energized before installing or removing any connector and before mounting or removing connectors from the bus bar or backplane.

3.2. Chemical Exposure

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

Concentrated Sulfur Chlorine

3.3. Material

The body of the crown socket is made of tellurium copper plated with silver over nickel; the housing is made of thermoplastic, and the crown contact is made of beryllium copper plated in gold over nickel. The pin contact is made of tellurium copper alloy plated with silver over nickel. The screws and washers are made of steel plated with nickel. The insulation boot is made of fire retardant grade polyvinyl chloride (PVC).

3.4. Cable Selection and Preparation

A. Selection

The crown socket accepts stranded copper cable sizes listed in Figure 2.

B. Preparation

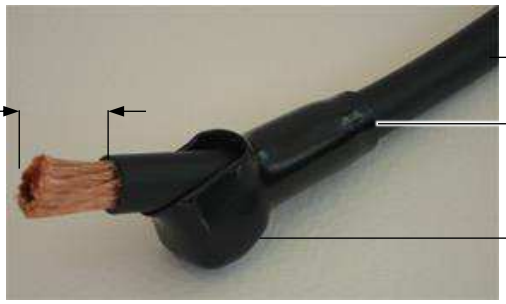
The insulation boot (available for crown socket sizes 8, 4, and 2) must be installed onto the cable before stripping the cable. The cable exit end of the boot is molded solid and must be cropped so that the

diameter of the boot allows the boot to slide onto the cable. Since the boot in not intended to protect the cable or pin contact from ingress of dust or water, a loose fit is permissible. The boot must not be damaged during cropping. See Figure 2.

The end of the cable exiting the head of the insulation boot must be stripped. Proper cable strip length is necessary to properly insert the cable into the crown socket. The strip length of the cable is given in Figure 2.

CAUTION
Care must be taken not to nick, scrape, or cut any part of the cable during the stripping operation.

Note: Not to Scale



CROWN SOCKET SIZE	CABLE	
	SIZE (AWG)	STRIP LENGTH (-0/+0.51 [-0/+.020])
8	12, 10	06.86 [.270]
	8, 6	012.7 [.500]
4	8, 6, 4	012.7 [.500]
2	2, 0, 1/0	15.24 [.600]
12 mm	3/0	025.0 [.984]

Figure 2

3.5. Reducing Bushing

For cable size 12 AWG, the reducing bushing must be installed onto the cable, then the end of the cable and the reducing bushing must be inserted into the crimp barrel of the pin contact. The reducing bushing must be flush with the top of the crimp barrel.

3.6. Termination

The terminated crown socket must meet the following requirements:

A. Cable Insulation Location

The insulation of the cable must not enter the body of the crown socket. See Figure 3.

B. Crimp Location

The crimp must be centered on the body of the crown socket. See Figure 3.

C. Tensile Strength

Crimped crown sockets must hold the cable firmly and have a crimp pull-out test value specified in Figure 3.

3.7. Bus Bar and Backplane

A. Material and Thickness

The bus bar or backplane thickness shall be 3.0 [.118] or 3.18 [.125]. Call PRODUCT INFORMATION at the number at the bottom of page 1 for suitability of other thicknesses.

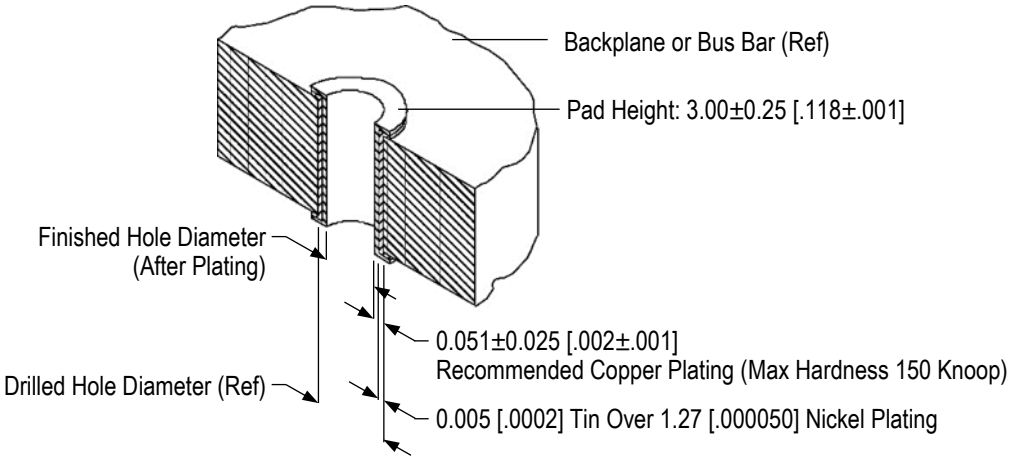


CABLE SIZE (AWG)	TENSILE STRENGTH (N [lbs])
12, 10	311.5 [70]
8	400.5 [90]
6	445.0 [100]
4	623.0 [140]
2	801.0 [180]
0, 1/0	1112.5 [250]
3/0	1557.5 [350]

Figure 3

B. Hole Dimension and Circuit Pad Thickness

The hole in the mounting surface for the pin contact must be drilled and plated through to specific dimensions. The plating type and finished hole size must be as stated to provide unrestricted insertion of the pin socket. The circuit pad thickness must be as stated. See Figure 4.



MOUNTING SURFACE	CONNECTOR MOUNTING TYPE	CROWN SOCKET CONTACT SIZE	FINISHED HOLE DIAMETER (After Plating)
Backplane or Bus Bar	Swage-Mount	8	6.60+0.07/-0.03 [+.0027/-.001]
		4	6.60+0.07/-0.03 [+.0027/-.001]
		2	9.40+0.08/-0.03 [+.0031/-.001]
		12 mm	12.00+0.08/-0.03 [+.0031/-.001]
	Screw-Mount	4	6.60+0.07/-0.03 [+.0027/-.001]
		2	9.40+0.08/-0.03 [+.0031/-.001]

Figure 4

3.8. Mounting

A. Screw Mount Connector

The screw mount pin contact must be mounted onto the bus bar or backplane according to the following:

— The seating flange of the pin contact is fully seated on the mounting surface. When seating a pin with knurl feature, please refer to below procedure and Figure 5.

1. Insert the location dowel into bus bar or backplane support fixture. (Optional procedure, to prevent pin fall from bus bar or backplane when move bus bar or backplane with pin)

2. Lay bus bar or backplane onto support fixture.

3. Put Rapid Lock Pin onto bus bar or backplane hole.

4. Place the seating tool onto Rapid Lock Pin, the seating flange of the pin must be touched by seating tool. (Optional Procedure for small top surface pins)

5. Apply a force to pin or seating tool to press the pin into bus bar or backplane until the pin flange is fully seated on the mounting surface. The application tooling (such as an arbor press) used to seat Rapid Lock pin must provide adequate downward force to insert pin into bus bar or backplane holes.

The seating flange of the pin contact is fully seated on the mounting surface

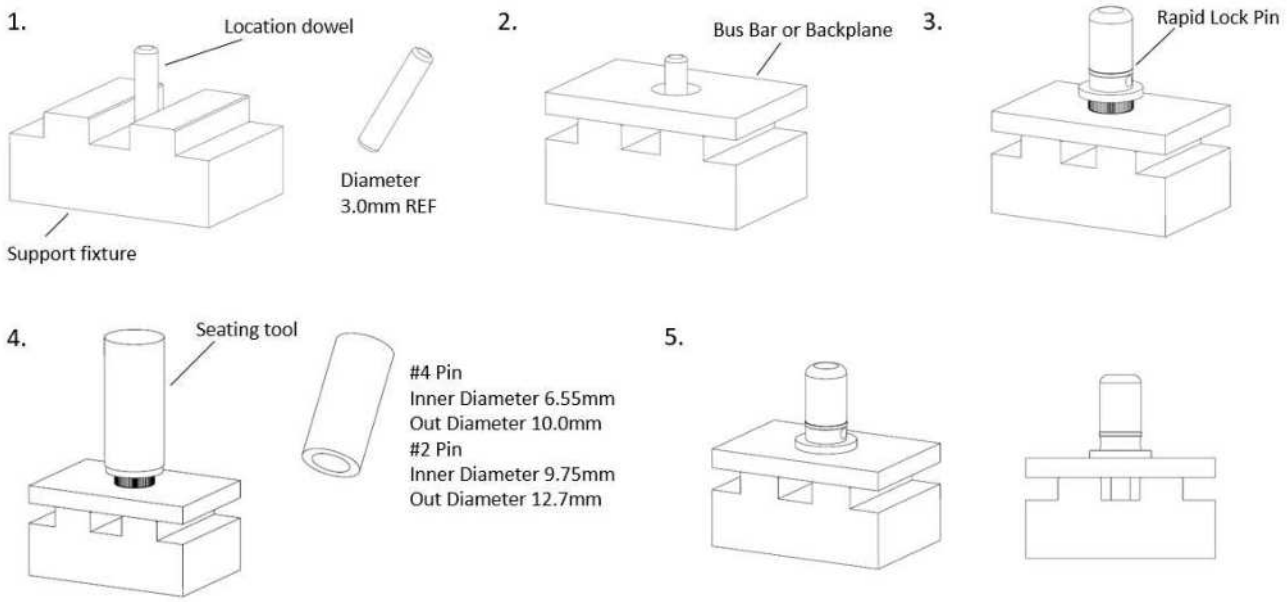


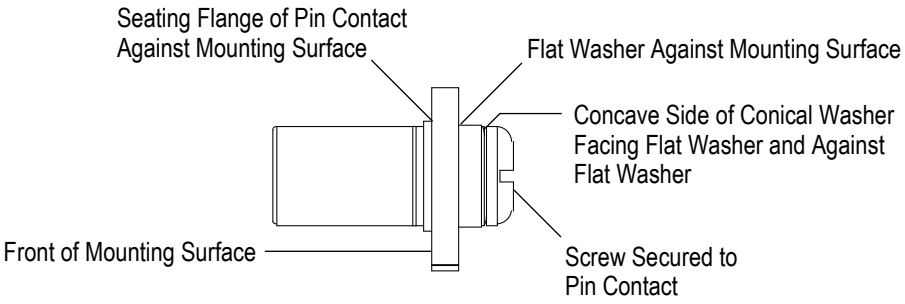
Figure 5

— The flat washer is over the knurl of the pin contact and against the mounting surface.

— The concave side of the conical washer is facing the flat washer and against the flat washer.

— The screw is secured to the pin contact to a torque given in Figure 6.

Mounting Screw Mount Connector



CROWN SOCKET SIZE	TORQUE (Nm [in.-lbs])
4	2.1
2	2.9

Figure 6

B. Swage Mount Connector

The swage mount pin contact must be mounted onto the bus bar or backplane according to the following.

Before swage:

— A support fixture must be used to support the pin contact during swaging. The pin contact must sit freely in a hole in the support fixture.

— The seating flange of the pin contact is fully seated on the mounting surface.

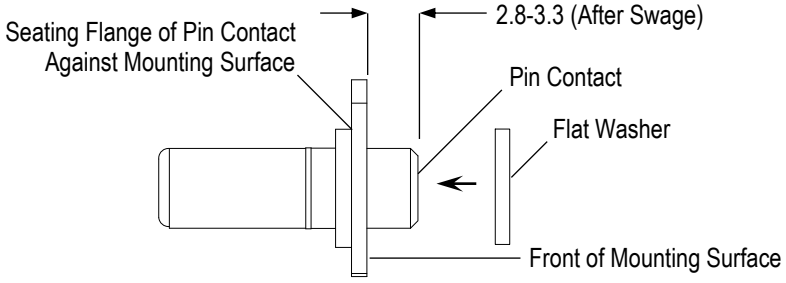
After swage:

— The seating flange of the pin contact is against the mounting surface. The portion of the pin contact that protrudes from the front of the mounting surface is within the dimension range given in Figure 7.

— The flat washer is over the protruding portion of the pin contact and against the mounting surface. The flat washer must be unable to rotate.

— The pin contact is not distorted or damaged, and the plating of the pin contact is not broken.

Mounting Swage Mount Connector



CROWN SOCKET SIZE	TORQUE (Nm [in.-lbs])
8	2.0
4	3.5
2	4.5
12 mm	5.0

Figure 7

— The mechanical strength of the swaged joint meets the torque value given in Figure 7.

— The electrical resistance of the swaged joint should be determined.

C. Pressing force of mounting

Typical value of pressing the pins into PCB or bus bar by simulation analysis.

MOUNTING SURFACE	CONNECTOR MOUNTING TYPE	CROWN SOCKET CONTACT SIZE	TYPICAL PRESSING FORCE (N)
Backplane or Bus Bar	Swage-Mount	8	1500
		4	1500
		2	1800
		12 mm	4000
	Screw-Mount	4	1500
		2	1800

3.9. Mating and Unmating

The contact cavity of the crown socket must be aligned with the pin contact, then the crown socket pushed straight onto the pin contact until the crown socket is against the seating flange of the pin contact and the locking feature snaps into place (there should be an audible click).

After mating the crown socket to the pin contact, the crown socket must be pulled back lightly to ensure that the crown socket is fully seated. See Figure 8.

A guideline for the average force needed for mating and the average force needed for unmating is given in Figure 8.

3.10. Installing Insulation Boot

The insulation boot must be pulled over the crown socket. The head of the insulation boot must be against the housing of the crown socket. The pin contact must not be exposed at the opening of the boot. See Figure 7.

3.11. Repair

Components of the connector are not repairable. Damaged or defected components must not be used.

CROWN SOCKET SIZE	MATING FORCE N (lb-force)	UNMATING FORCE N (lb-force)
8	19.32 [4.343]	10.63 [2.389]
4	29.04 [4.505]	16.08 [3.615]
2	48.43 [10.89]	19.53 [4.390]
12 mm	100 [73.75]	20 [14.75]

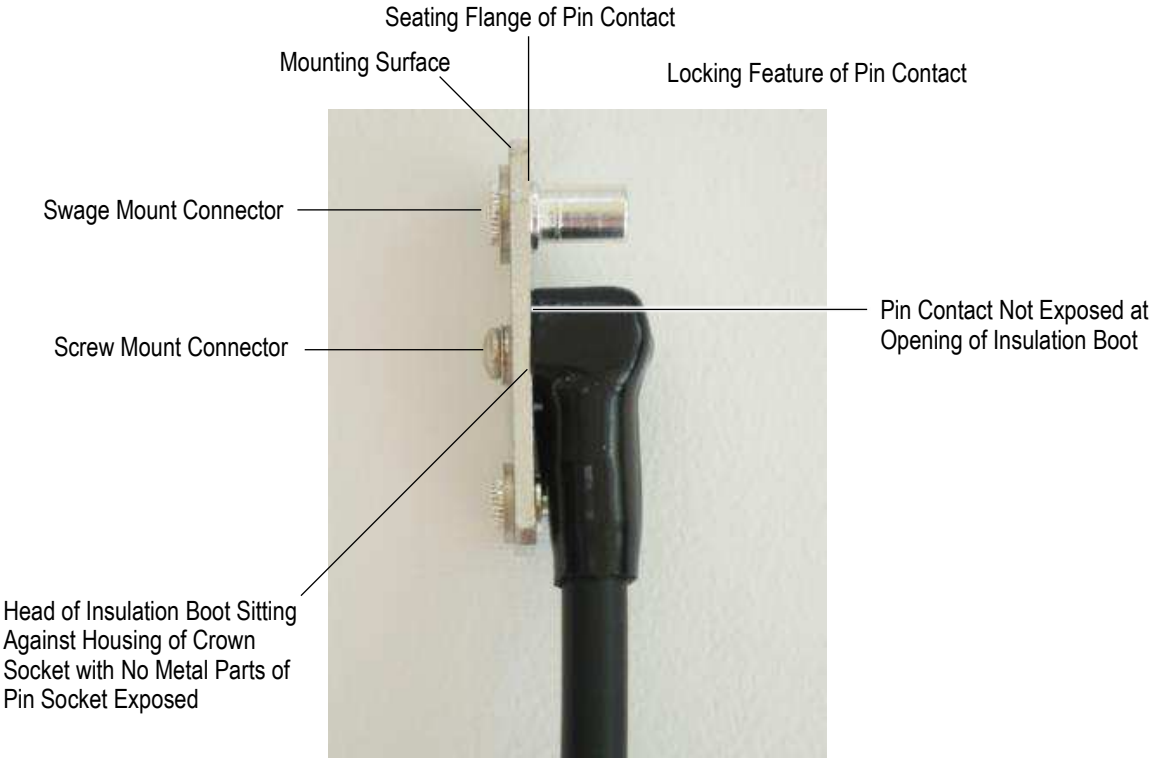


Figure 8

4. QUALIFICATION

RAPID LOCK quick connect/disconnect bus bar connectors are Listed by Underwriters Laboratories Inc. (UL) in File E28476.

5. TOOLING

Tooling part numbers are given in Figure 9.

NOTE
For industry-standard tooling, consult manufacturer's literature for information on using the tooling.

5.1. Cropping Insulation Boot

A scissors should be used to crop the molded end of the insulation boot to allow it to be installed onto the cable.

5.2. Crimping Crown Socket

A. Hand Tools

The electric-hydraulic hand tool produces an output force of 62 kN.

Industry-standard battery-operated crimping tools and hydraulic hand crimping tools are available.

B. Power Units

Industry-standard power units are available.

C. Die Sets

Industry-standard die sets are available to be used with the hand crimping tools.

Contact information for recommended industry-standard tooling is as follows:

STANLEY-DUBUIS at www.dubuis.com

Pacific Industrial Components (PICO) Corporation at www.picotools.com

5.3. Swaging

CAUTION
The swage connector pin contacts must be loaded and swaged individually using a fly press or multi-loaded and swaged collectively using a power press. During loading, pin contacts must be adequately supported to prevent swelling of the pin contact shank, distortion of the pin contact, or damage to the pin contact plating.

A. Fly Press

A good-quality commercially-available fly press must be used to secure the pin contact to a bus bar and when swaging individual pin contacts.

NOTE
A commercially-available power press should be used when swaging multiple pin contacts.

5.4. Removal

The removal tool is available to remove the pin contact from the crown socket. The removal tool is suitable for all connections to crown socket sizes 8, 4, and 2. This tool is needed to depress the crown socket internal retention clips and release them from the locking feature of the pin contact. This tool is designed to release the retention clips without deforming them.

Before removing the pin contact from the crown socket, all power must be turned off. The removal tool must be inserted between the crown socket and the mounting surface.

DANGER
To avoid personal injury, all power to the connectors must be turned OFF.

WIRE SIZE (AWG)	PICO CORPORATION CRIMP TOOLING (Military Standard)			DIE SET for STANLEY-DUBUIS Hand Crimping Tools
	POWER UNIT	INDENTER HEAD	LOCATOR	
12	Series 400 (M22520/23-01)	414DA-4713-5	4713-1	—
10		414DA-4713-4	4713-1	—
8		414DA-8N or 414DA-4713-2 (M22520/23-02)	4046A or 4713-1 (M22520/23-09)	2161347-1
6		414DA-4713	4713-1	2161348-1
4		414DA-4713	4711-1	2161349-1
2		414DA-4711-2	4711-1	2161350-1
0, 1/0	Series 400 or Series 500 (M22520/23-01)	514DA-1/0N.290 (M22520/23-05)	12159 (M22520/23-13)	—
3/0		514DA-4/0N.430	12158-SPG	2161350-1

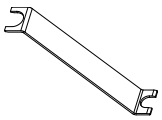
STANLEY and DUBUIS are trademarks of their respective owners.



AUTOPRESS 62 Electro-Hydraulic Battery-Operated Hand Crimping Tool 1629804-1



Typical Fly Press (Refer to Instructional Material Included with Press)



Removal Tool 1857376-1



STANLEY-DUBUIS BPP062 Pistol Battery-Operated Hand Crimping Tool



STANLEY-DUBUIS BPL062 Inline Battery-Operated Hand Crimping Tool



STANLEY-DUBUIS D62 Hydraulic Hand Crimping Tool



Die Set for STANLEY-DUBUIS Hand Crimping Tools (Ref, Refer to Table)



Power Unit (Ref, Refer to Table)



Indenter Head (Ref, Refer to Table)



Locator (Ref, Refer to Table)

Figure 9

6. VISUAL AID

The illustration below shows a typical application of RAPID LOCK quick-connect/disconnect bus bar connectors. 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.

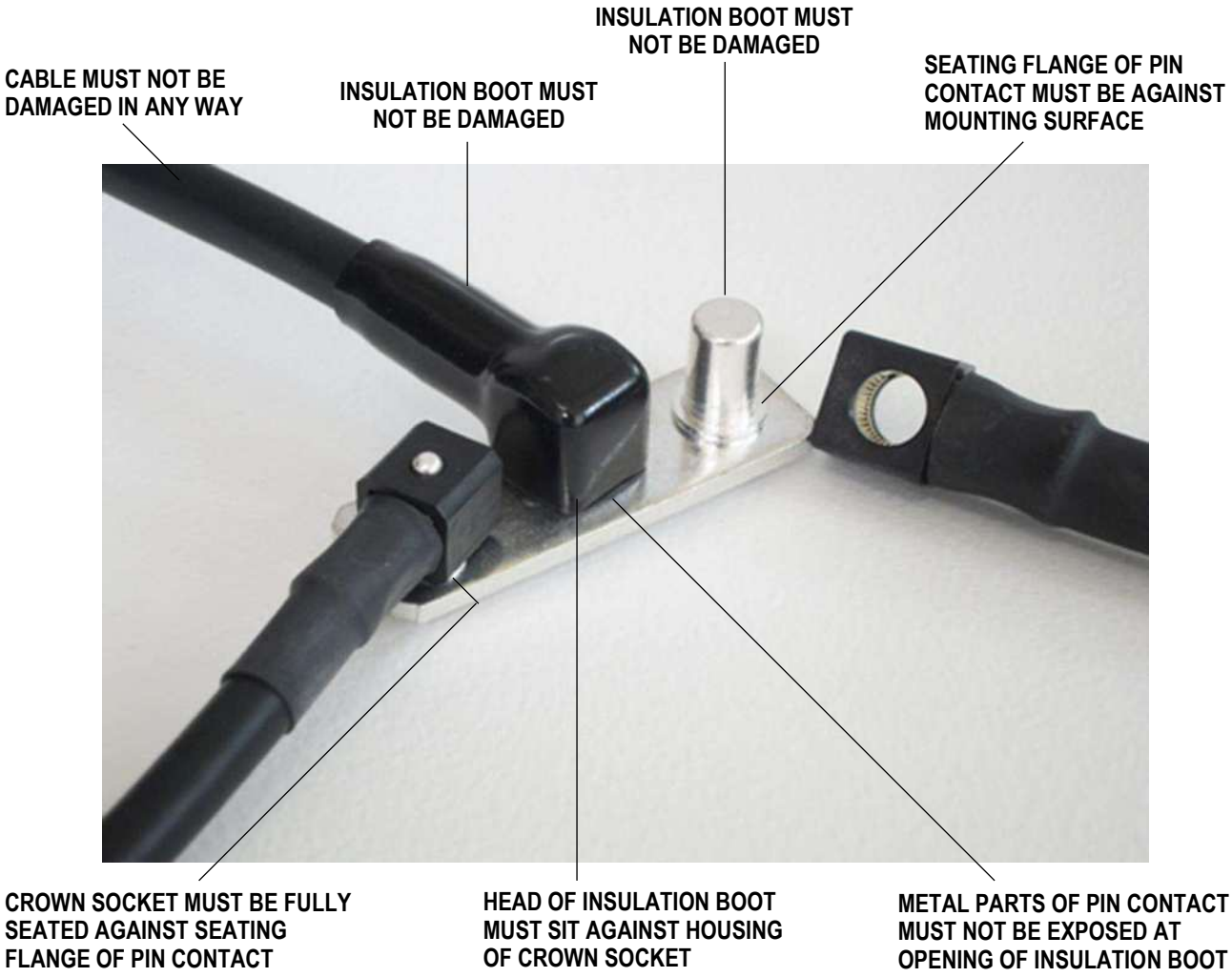


FIGURE 10. VISUAL AID