



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 [$\pm .005$] 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 assembly and application of NECTOR M Standard connectors. Connector components, and quantity of each component, are selected for the wire/cable used in the application and is based upon:

- Number of conductors
- Cable jacket diameter
- Conductor size

NECTOR M Standard connectors are available in two housing size variants, based upon cable conductor counts; 3 conductor housing and 5/6/7 conductor housings. The 3 conductor housings are intended for cables having 3 conductors. The 5/6/7 conductor housings are intended for cables having 5 conductor, 6 conductors, or, 7 conductors. The housings for 5 conductors and 6 conductors use a modified 7 conductor housing with specified plug/socket contact locations blocked to form a 5 conductor housing, or 6 conductor housing. Each housing size variant is available in two forms: *panel-mount form*, in which the connector installs into a specified opening in a flat panel and is restrained to the panel with a threaded hex nut, and *free-hang form*, in which the connector is not restrained to a mounting surface.



NOTE

NECTOR M Standard pin and socket housings are available with a number of “keying” formats that restrict pin/socket connector mating to like keying format connectors. Select pin and socket housings with appropriate keying format option.



NOTE

Pin and socket contacts are available in crimp-to-wire versions that are selected based upon conductor size and current-rating. Appropriate tooling is required to crimp the contacts onto conductors.

Pin and socket contacts are available in two wire-connection versions: crimp, screw clamp. The crimp version contacts are selected for specific conductor sizes. These contacts require appropriate tooling to crimp the contacts onto conductors. The screw clamp version pin and socket contacts use a clamping screw and accept a range of conductor sizes (14-18 AWG, 2.5-1.5 mm²).

The NECTOR M Standard 3 position and 5/6/7 position connectors have one contact designated “PE”. This is intended to be a ground contact and is positioned within the connector housings so that the PE contacts in mating pin/socket connectors make connection first upon mating and break connection last upon un-mating. All other contacts make connection simultaneously upon mating and un-mating.

When corresponding with TE Connectivity 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.



NOTE

Restrictions for use of NECTOR M Standard connectors is as follows:

- Connectors are intended only for connection and disconnection without electrical load.
- Do not mate NECTOR M Standard connectors with comparable products from different manufacturers since this will result in dangerous compatibilities.
- NECTOR M Standard connectors are not replacements for the prevailing national domestic plug and socket outlet system.

2. REFERENCE MATERIAL

2.1. Revision Summary

Initial release of application specification

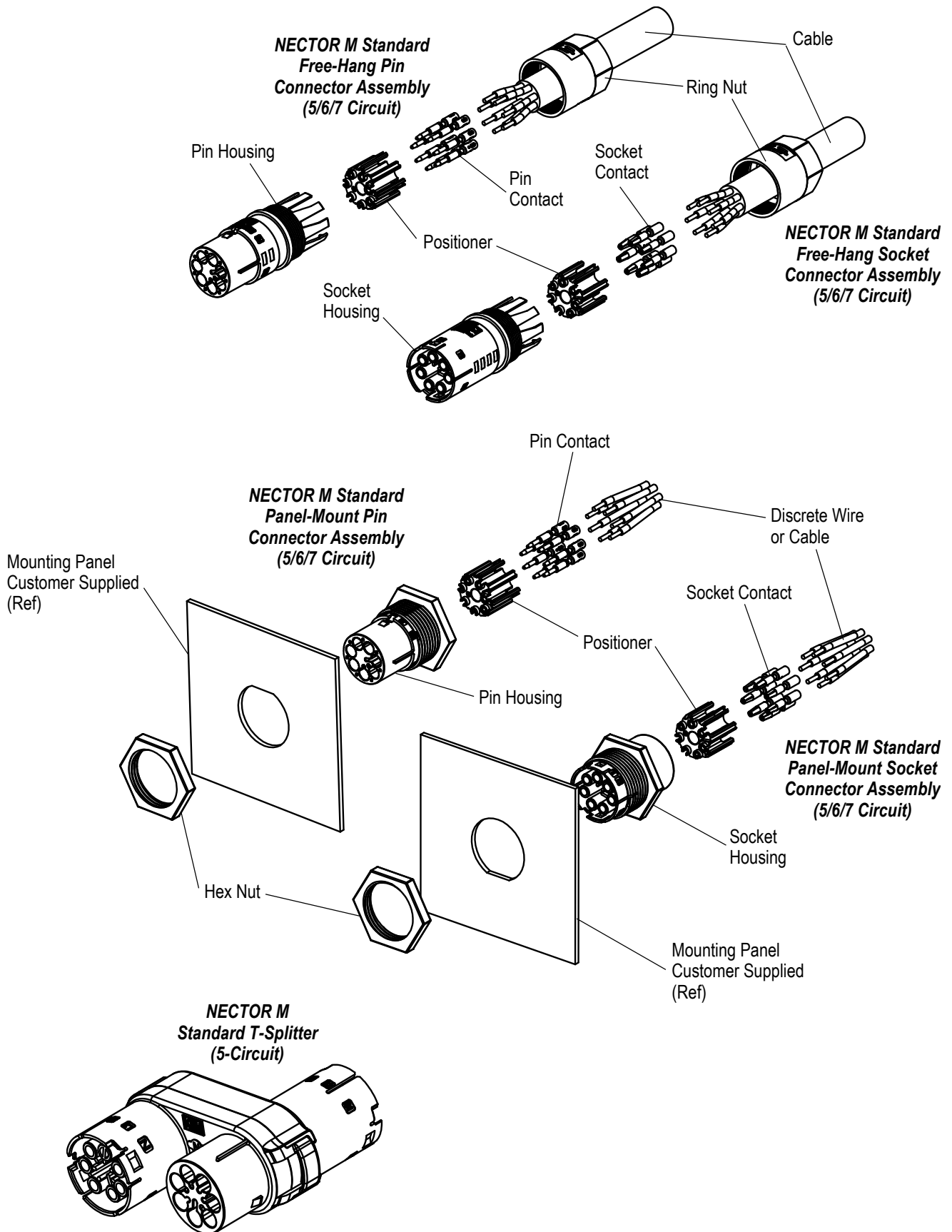


Figure 1 (cont'd)

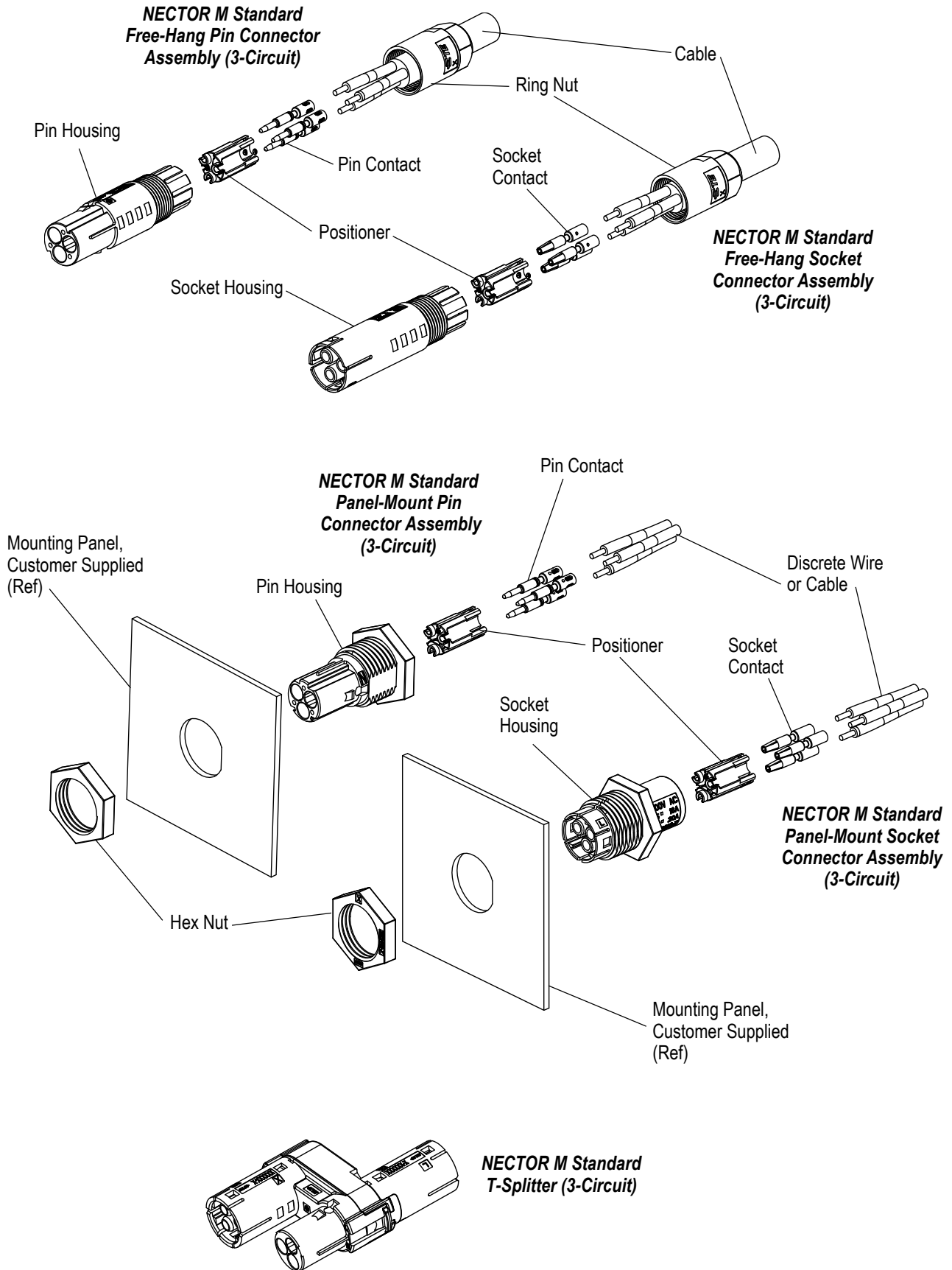


Figure 1 (end)

2.2. Customer Assistance

Reference Product Base Part Numbers 293468, 293615, 293656, 293721, and Product Code K680 are representative of NECTOR M Standard connectors. Use of these numbers will identify the product line and help obtain product and tooling information when visiting www.te.com or calling the number at the bottom of page 1.

2.3. Customer Drawings

Customer drawings for product part numbers are available from www.te.com. Information contained in the customer drawing takes priority.

2.4. Specifications

Product Specifications 108-20304 (3-position) and 108-20324 (5/6/7-position) provide product performance and test results.

2.5. Instructional Material

Instruction Sheet [408-7516](#) provides information on Hand Crimping Tool 601967-1, which is used to terminate crimp contacts used in these connectors.

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 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. Reel Storage

If using reel contacts, store coil wound reels horizontally and traverse wound reels vertically.

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



NOTE

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

3.3. Material

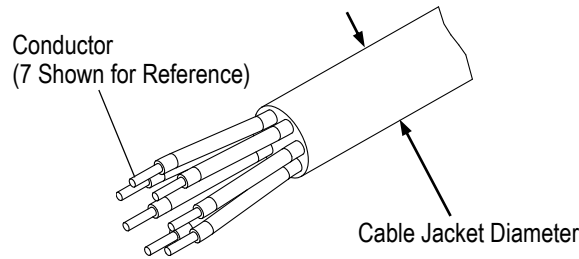
NECTOR M Standard connector components are made of the following materials:

- Housing components are made from flame retardant (UL 94 V-O) thermoplastic Nylon
- Electrical contacts are made of brass and plated with nickel underplate and tin top plate

3.4. Cable Selection and Preparation

Recommended cable is circular construction FROR 450V/750V, H05VV-F, or RZ1-LSF-OH having 3, 5, 6, or 7 stranded copper conductors. Reference Figure 2 for conductor gauge size and cable jacket diameter.

NECTOR Cable



STANDARD	CABLE		CONDUCTOR SIZE	
	NO. OF CONDUCTORS	CABLE JACKET DIA	1.5 mm ²	2.5 mm ²
FROR 450V/750V	3	7.5 mm-10.4 mm	x	x
H05VV-F	3	7.5 mm-10.4 mm	x	x
	5	9.6 mm-15.5 mm	x	x
	7	9.6 mm-15.5 mm	x	x
RZ1-LSF-OH	6	9.6 mm-15.5 mm	x	x

Figure 2

The cable must be prepared according to the illustration and dimensional requirements in Figure 3.

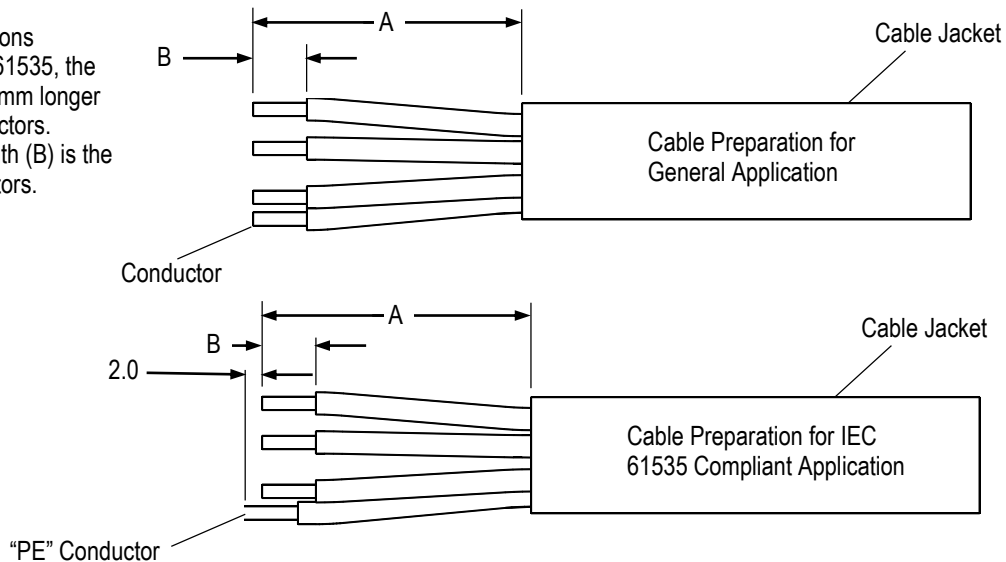


CAUTION

Proper strip lengths of cable jacket and conductors must be observed for the contact type used in the application. When preparing the cable jacket, reasonable care must be taken not to nick or cut the conductors insulation. Care must be taken for the conductors' preparation as follows:

- Do not nick the stranded conductors
- There must not be any remainders of the conductor insulation on the stripped conductors
- Single strands of the conductor should not be cut or pulled during stripping operation
- After removing the conductor insulation, single strands of the conductor should not protrude from the conductor bundle
- If the wire is not to be crimped immediately after preparation then the conductor end should be protected against dirt or strands separating from the conductor bundle (example: partial pull-off of insulation may be used to protect conductor end)

NOTE: For applications compliant with IEC 61535, the "PE" conductor is 2 mm longer than all other conductors. Conductor strip length (B) is the same for all conductors.



CONTACT TYPE	CABLE JACKET STRIP LENGTH (A)	CONDUCTOR STRIP LENGTH (B)
Crimp	20 mm ±0.5	5 mm

Figure 3

3.5. NECTOR M Standard

A. Connectors Form Factor

The NECTOR M Standard connectors are available in 3-circuit form factor, and 7-circuit form factor. In addition, 5-circuit and 6-circuit form factors are available using modified 7-circuit housings having specific circuits blocked. Each connector form factor is available in two variants as follows and shown in Figure 4.

- Panel-Mount Connectors
- Free-Hang Connectors

Component sizes vary depending on the selected connector form factor and variant. Reference available component drawings for size dimensions relevant to the connector application.

B. Circuits Identification

Molded housings for NECTOR M 3-circuit and NECTOR M 5/6/7-circuit connectors have alpha-numeric symbols molded on the housings to identify the circuits. NECTOR 3-circuit connectors have symbols; (⊕), L, and N. The 5/6/7-circuit connector has symbols; (⊕), L1, L2, L3, S1, S2, and N. These symbols are in approximate alignment with the circuit intended for that identification. The “PE” (⊕) circuit provides “make first” function when connectors are coupled and “break last” when connectors are separated. Also, the “PE” (⊕) circuit provides a convenient alignment reference when assembling connector components.

NECTOR M Standard 3-circuit connectors are intended to have 3 contacts installed into the connector. There are no provisions in the connector design to ensure mating corresponding pin/socket circuits if fewer than 3 contacts are used.

NECTOR M Standard 5/6/7-circuit connectors accommodate up to 7 contacts (circuits) and have provisions to allow 5-contact assemblies and 6-contact assemblies. Separate housing components are available to assemble 5-contact connector, 6-contact connector, or 7-contact connector. Selecting the corresponding housing components ensures mating of corresponding pin/socket circuits.

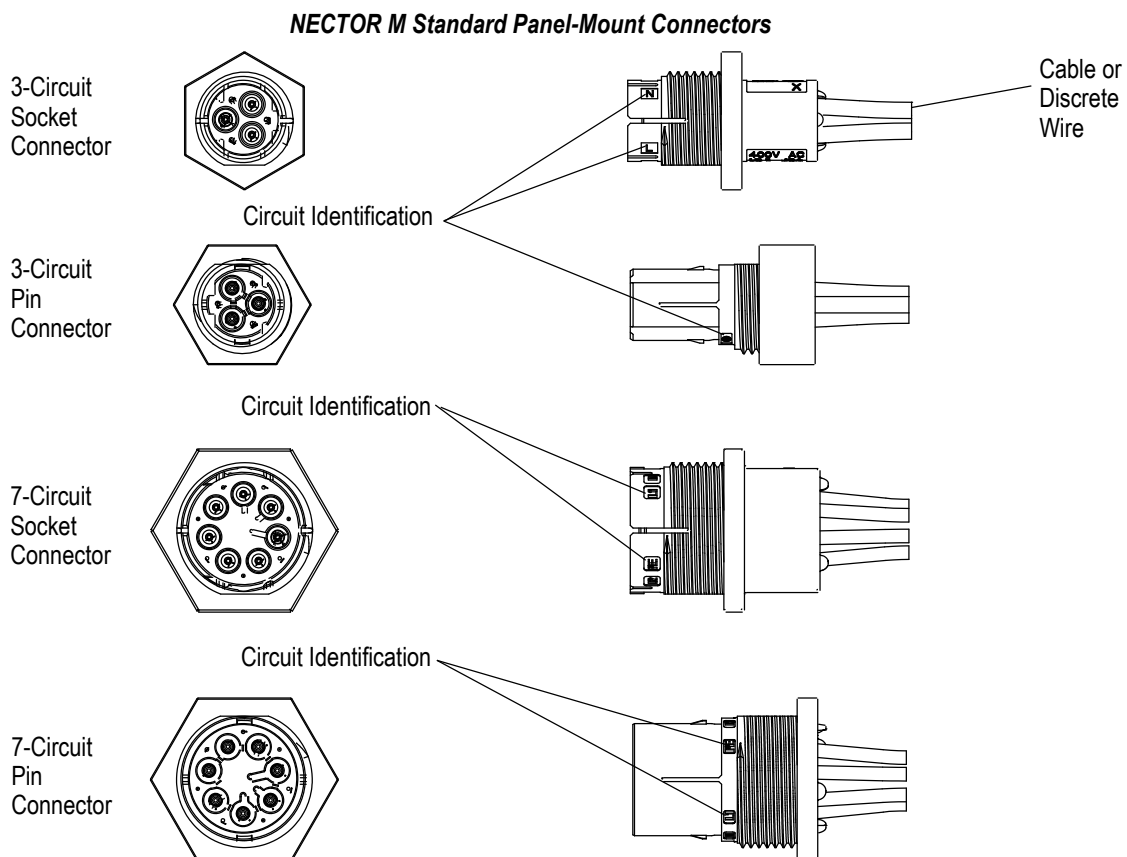


Figure 4 (cont'd)

NECTOR M Standard Free-Hang Connectors

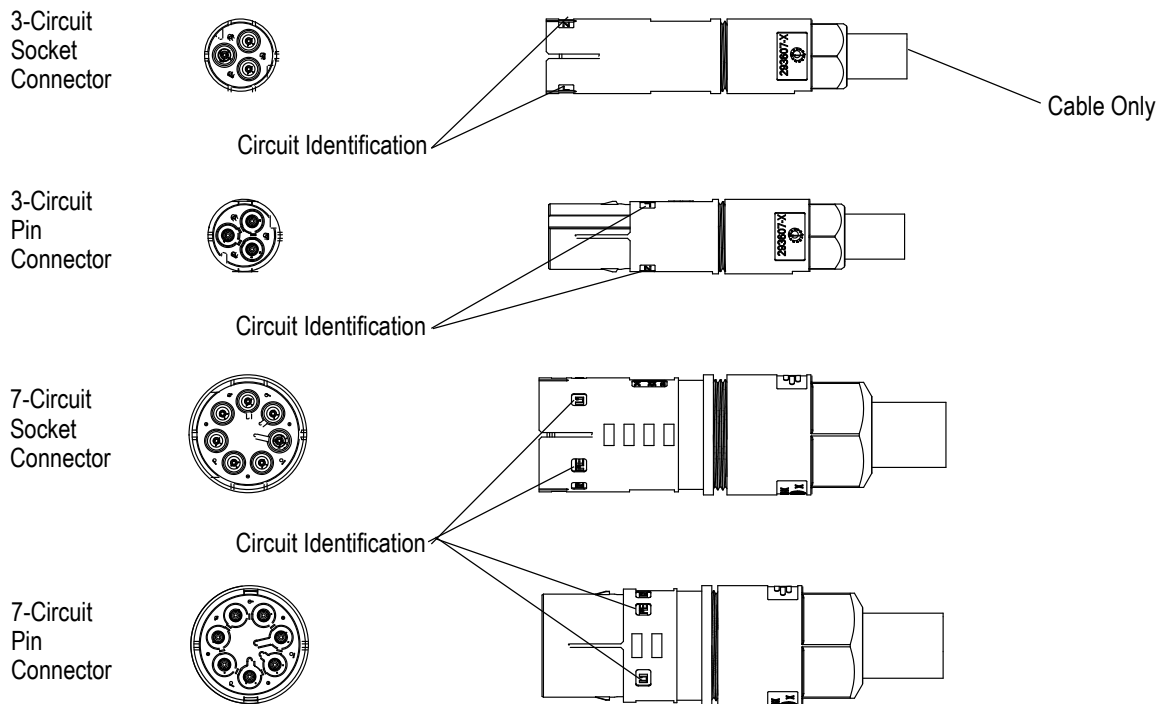


Figure 4 (end)



NOTE

When appropriate housing components are used, 5/6/7 connectors will only mate to corresponding connectors (pin or socket) having the same contact configurations (example: 5-contact pin connector will only mate to 5-contact socket connector).

To ensure proper mating contacts alignments for the different circuit number connectors (5, 6, or 7), specific contacts positions must be observed, as shown in Figure 5.

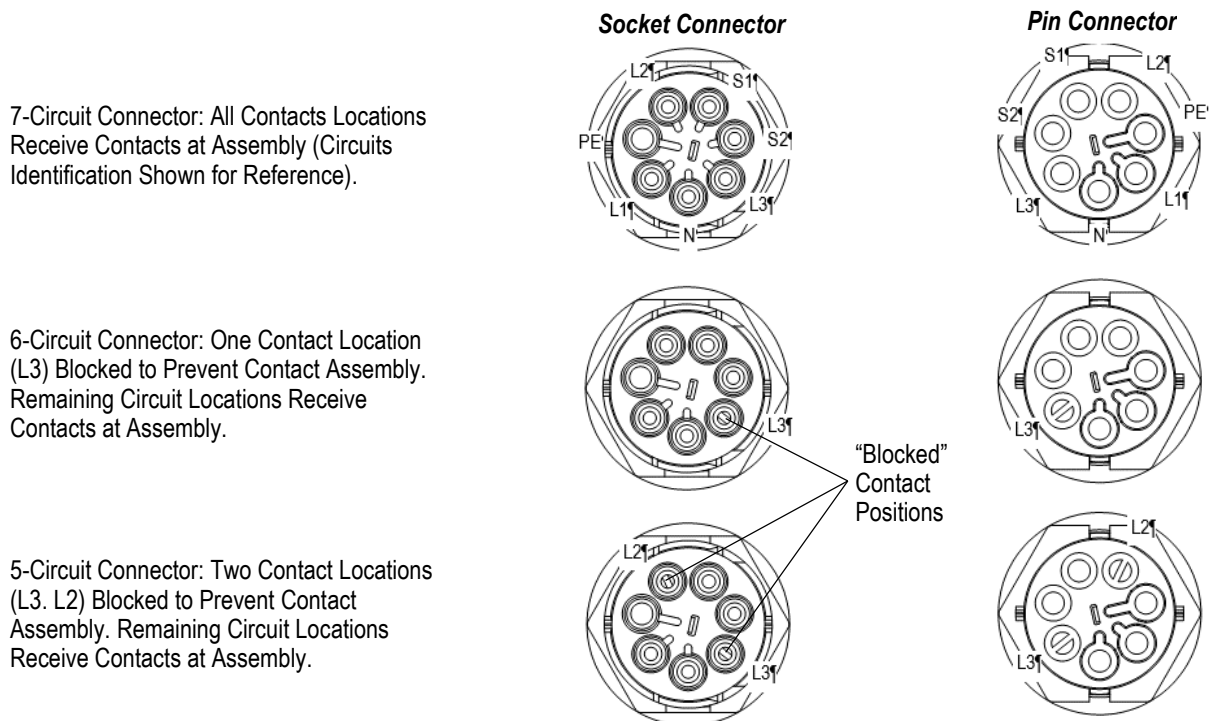


Figure 5

3.6. Connector “Keying” Codes

The mating connector housings have mechanical features (“keying” codes) at the mating interfaces to ensure alignment of corresponding circuits upon pin/socket mating. These features are fixed in the housings and restrict pin/socket connector mating to similarly coded connectors. A number of coding variations are available for each form factor connector, as shown in Figure 6. The “keying” code must be selected when selecting the connector housing form factor and number of circuits.



NOTE

Keying codes must be selected when selecting connector housings. The various keying codes are fixed on the selected housing and can only be changed by selecting different housing components. Mating pin/socket connectors must have the same keying code.

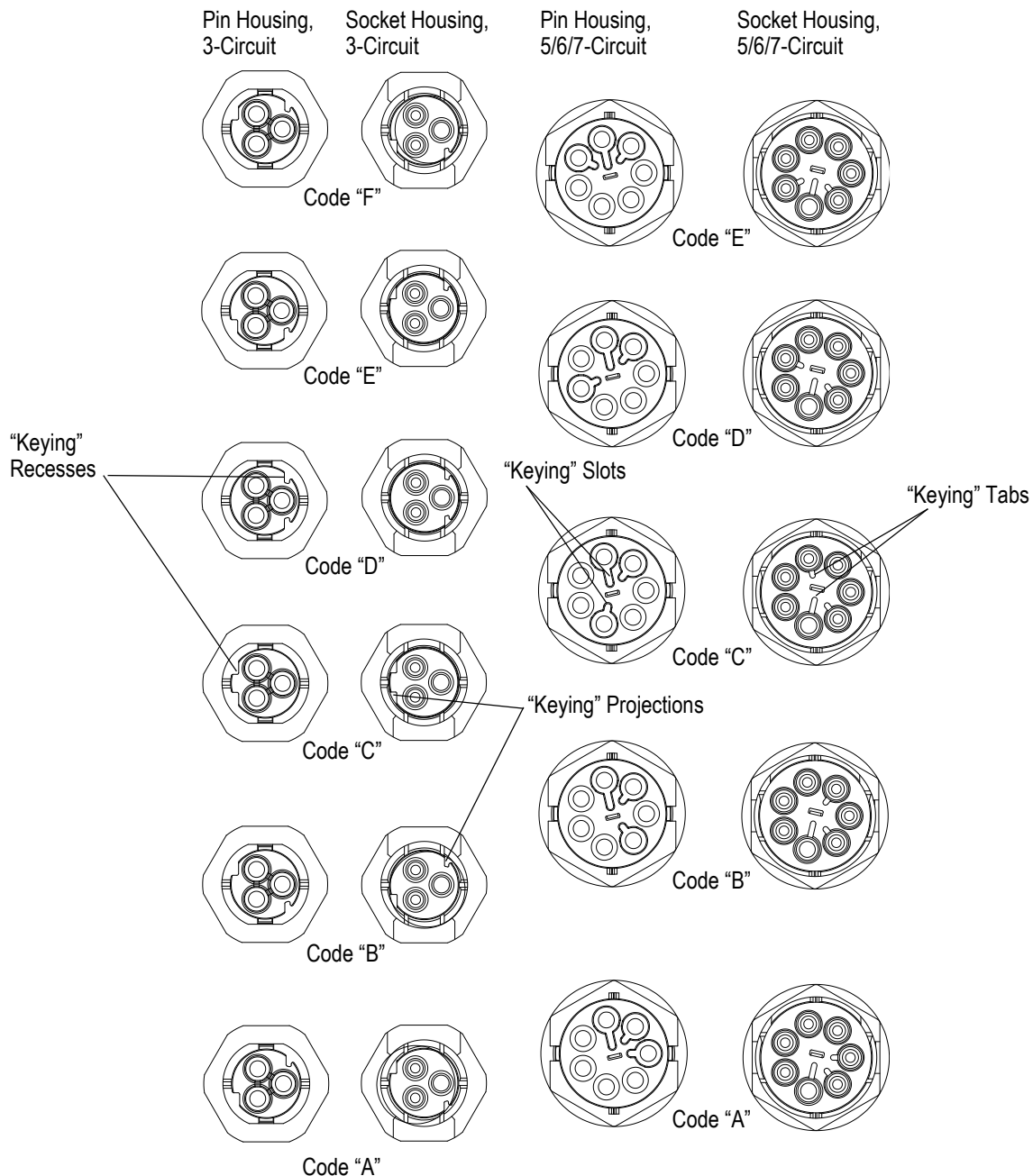


Figure 6

3-circuit form factor connector housings are designed in 6 keying code options; A thru F. The keying is accomplished by different sized recesses or projections molded into the front connector housing. The various keying codes are accomplished by changing the combinations of the keying recesses/projections.



NOTE

3-circuit connector housings may not be available in “keying” codes D, E, F. Check availability of keying coded housings before making final selection.

7-circuit form factor connector housings are available in 5 keying code options; A thru E. The keying is achieved by different length protruding tabs on socket housings and corresponding slots on pin housings. Three tab/slots are used at two different lengths (“long”, “short”). One “long” tab/slot is always located on the “PE” circuit. One “short” tab is always on the “L1” circuit (next to PE circuit). A third slot/tab (short length) is placed on one of the remaining 5 circuits. 5 keying codes are determined by the location of the third tab/slot.

3.7. Crimp Contacts

NECTOR M Standard crimp contacts have a tubular barrel for crimping onto stranded copper conductor. Contacts are provided loose-piece and are available for wire conductor sizes shown in Figure 7. The crimp is a “4/8-indent” style commonly used on tubular crimp barrel contacts. Use manual hand tool P/N 601967-1 to crimp the contacts to wires. Optional contact positioning tool 2280173-1 attaches to the hand tool for easy positioning of contacts in the crimp tool. Also, pneumatic-operated crimp tool WA27F (Daniels Manufacturing Company) may be used for increased production rate.

WIRE SIZE	TOOL SELECTOR NO.
1.5 mm ²	6
2.5 mm ²	7

NOTE: Ensure that crimp tool is set according to wire size or corresponding tool selector number (“SEL NO.” on selector dial) as shown in Figure 8.

NOTE: In addition to the listed conductor sizes, crimp contacts are also available in “low” current and “high” current rated versions.

Reference Product Specifications 108-20304 or 108-20324 for appropriate contact selection.

Figure 7

A. Crimping Procedure

Crimp the contact onto appropriate size stranded conductor according to the following steps:

1. Prepare the wires (cable) as described in Paragraph 3.4; and Figures 2 and 3.
2. Set the crimp tool “SELECTOR” position to the wire size being crimped (or, use tool selector number as given in Figure 7).
3. Insert the mating end of the contact (pin or socket) into the indenter from the front of the crimp tool (as shown in Figure 8). Align the crimp barrel with the four crimp anvils of the tool so that the crimp barrel wire entry protrudes slightly from the indenter to allow wire insertion.
4. Carefully squeeze the tool handles to close the crimp anvils enough to grip the contact crimp barrel and hold it in position to receive the wire.
5. Insert the prepared wire into the contact barrel, taking care not to bend or damage the wire strands.
6. With the contact and wire in place, squeeze the handles until they stop in the fully closed position, crimping the contact barrel to the wire.
7. Release the handles and remove the crimped contact from the crimp tool.



NOTE

Consistent contact crimp barrel positioning in the crimp tool is most easily obtained by using optional contact positioning tool 2280173-1.



NOTE

The hand tool uses a ratchet mechanism in the handles to ensure proper crimping of the contacts. The ratchet mechanism will not release until the tool handles have been fully closed.

The completed crimp is to appear as shown in Figure 9A.

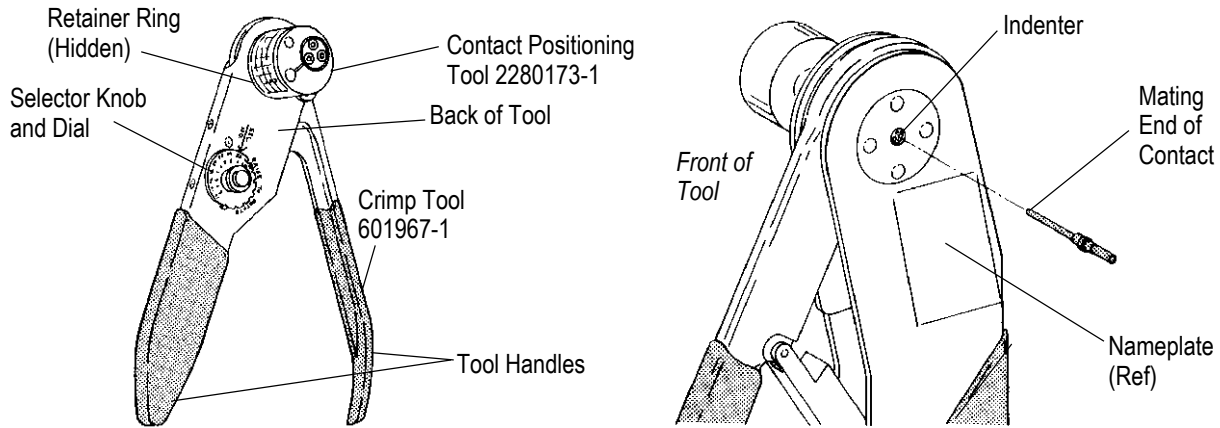


Figure 8

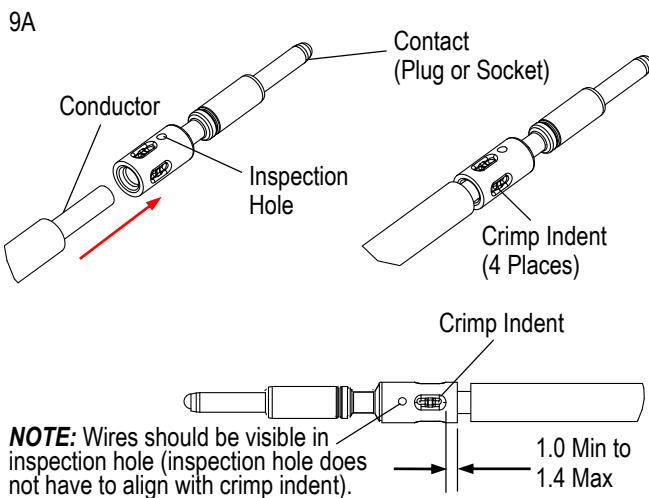
B. Crimp Quality

Crimp quality is determined by proper “SELECTOR” number setting on the crimp tool, and by maintaining required gage calibration of the crimp tool indent anvils. The indent anvils are gaged using a cylindrical “GO/NO GO” plug gage, as shown in Figure 9B. The gaging is done with the hand tool held completely closed. Gaging of the indent anvils should be done before performing any crimps, periodically during use, and, at any time the “SELECTOR” setting is changed.



CAUTION

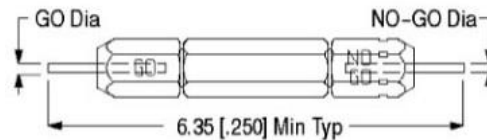
The crimp anvils closed size cannot be adjusted except by tool selector setting. Do not use tool if it does not meet “GO/NO-GO” size for the tool selector setting.



NOTE: Wires should be visible in inspection hole (inspection hole does not have to align with crimp indent).



Suggested Plug Gage Design



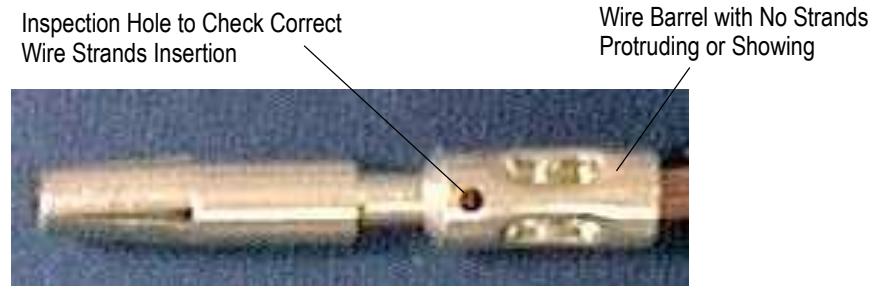
TOOL (MILITARY SPEC)	TOOL SELECTOR SETTING	GAGE ELEMENT DIAMETER ±0.003 [.0001]	
		GO	NO-GO
601967-1 (mil-c-22520/1-01) and 608668-1	1	0.71 [.028]	0.84 [.033]
	2	0.81 [.032]	0.94 [.037]
	3	0.91 [.036]	1.04 [.041]
	4●	0.99 [.039]●	1.12 [.044]●
	5	1.14 [.045]	1.27 [.050]
	6	1.32 [.052]	1.45 [.057]
	7	1.50 [.059]	1.63 [.064]
	8	1.73 [.068]	1.85 [.073]

●Use for periodic general inspection.

Figure 9

C. Other Requirements

Under no circumstances should the insulation materials be within the wire crimp barrel. All existing wire strands must be enclosed within the wire barrel. Any stranding outside the crimp barrel or broken strands outside the wire crimp are not permissible. See Figure 10.



Socket Shown for Ref Only

Figure 10

D. Wire Pull Out Force

The measuring of the wire pull out forces from the wire crimp is carried out as a supporting manufacturing control. See Figure 11.

WIRE SIZE	CRIMP TENSILE [N] (MINIMUM VALUES)
1.5 mm ²	200
2.5 mm ²	300

Figure 11

3.8. Connector Assembly

NECTOR M Standard 3-circuit and 5/6/7-circuit connectors each have 2 connector variants as follows:

- Panel-Mount Connector
- Free-Hang Connector

The assembly procedure is slightly different for each connector variant and is explained in the following paragraphs.



NOTE

To ensure proper mating contacts alignments for the different circuit number connectors (5, 6, or 7), specific contact assembly positions must be observed, as shown in Figures 5 and 13.

A. Contacts Positioner Assembly

NECTOR M Standard contacts (pin/socket) must be assembled to the contact “Positioner” component before final assembly into the connector housing. The contacts positioner assembly can be made with discrete wires (panel-mount) or wires contained within a cable (free-hang, panel-mount).

Crimp contacts are provided separately from the positioner component and must be crimped onto wires before assembly to the positioner.



NOTE

Refer to the specific customer drawing for component part numbers, allowable conductor sizes, and contact part numbers for the intended connector assembly. Refer to Paragraph 3.4 for Cable Selection and Preparation; Paragraph 3.7.A for Crimping Procedure; Paragraph 3.7.B for Crimp Quality.

After crimping contacts onto the conductors (discrete/cable) the contacts are assembled to the plastic “positioner” component as shown in Figure 12.

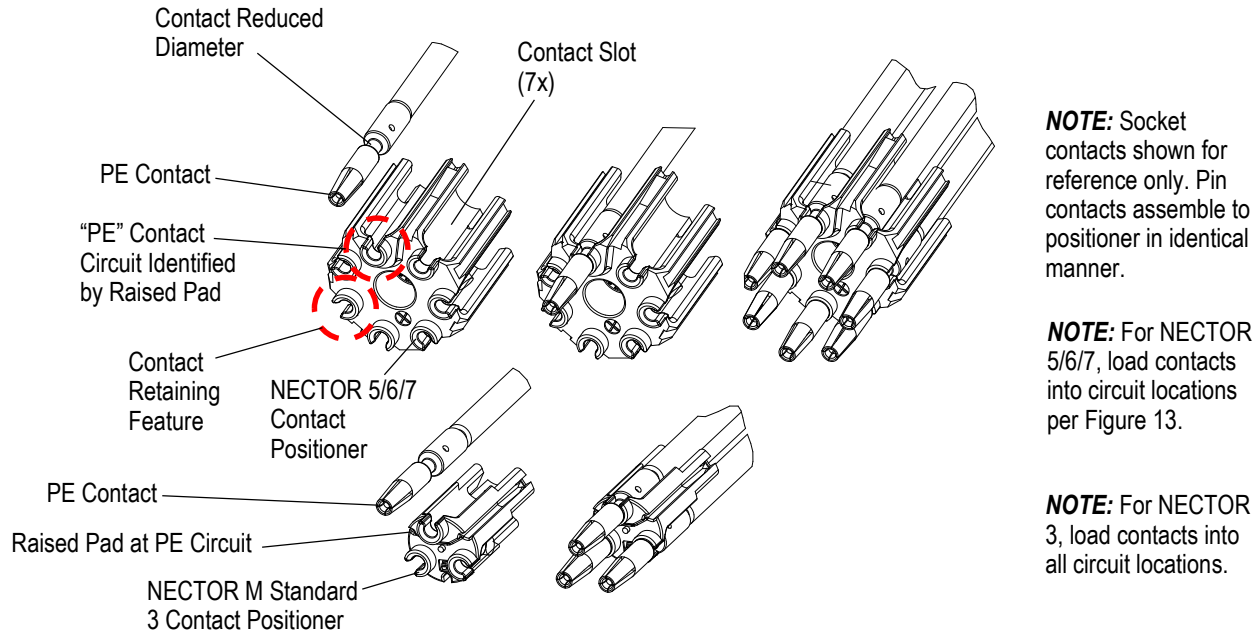


Figure 12

The contacts (pin/socket) are retained in the positioner component by “snap fit” of the contact “reduced diameter” into corresponding retaining features in the positioner. Assemble contacts to the positioner as follows:

1. Start with PE contact and identify corresponding PE “contact slot” on Positioner component (raised pad, Figures 12 & 13).
2. Place the contact crimp barrel in a “contact slot” in the positioner component. Orient the contact so the “reduced diameter” portion aligns with the “contact retaining feature” in the positioner (see Figure 12).
3. With the contact partially assembled to the positioner, apply finger pressure to the reduced diameter area of the contact to “snap” the contact into the positioner retaining feature
4. Repeat this assembly procedure for each Positioner “contact slot” to receive a contact, maintaining corresponding contact/positioner circuit assignments “L”, “S”, and “N” per Figure 14.

For a 7-contact assembly, load a contact into each contact slot of the positioner. For 5-contact and 6-contact assemblies, load contacts into the positioner contact slot locations as shown in Figure 13.

i **NOTE**
 The PE contact slot is identified by a raised pad at the “contact retaining feature” (see Figures 12, 13). The raised pad causes the PE contact to be positioned 1mm ahead of the remaining contacts, and ensures the “make first/ break last” functionality of the PE contact. This PE circuit raised pad feature is on 3-contact positioners and 7-contact positioners.

i **NOTE**
 The “contacts positioner assembly” procedure described above is identical for NECTOR M Standard panel-mount connectors and free-hang connectors.

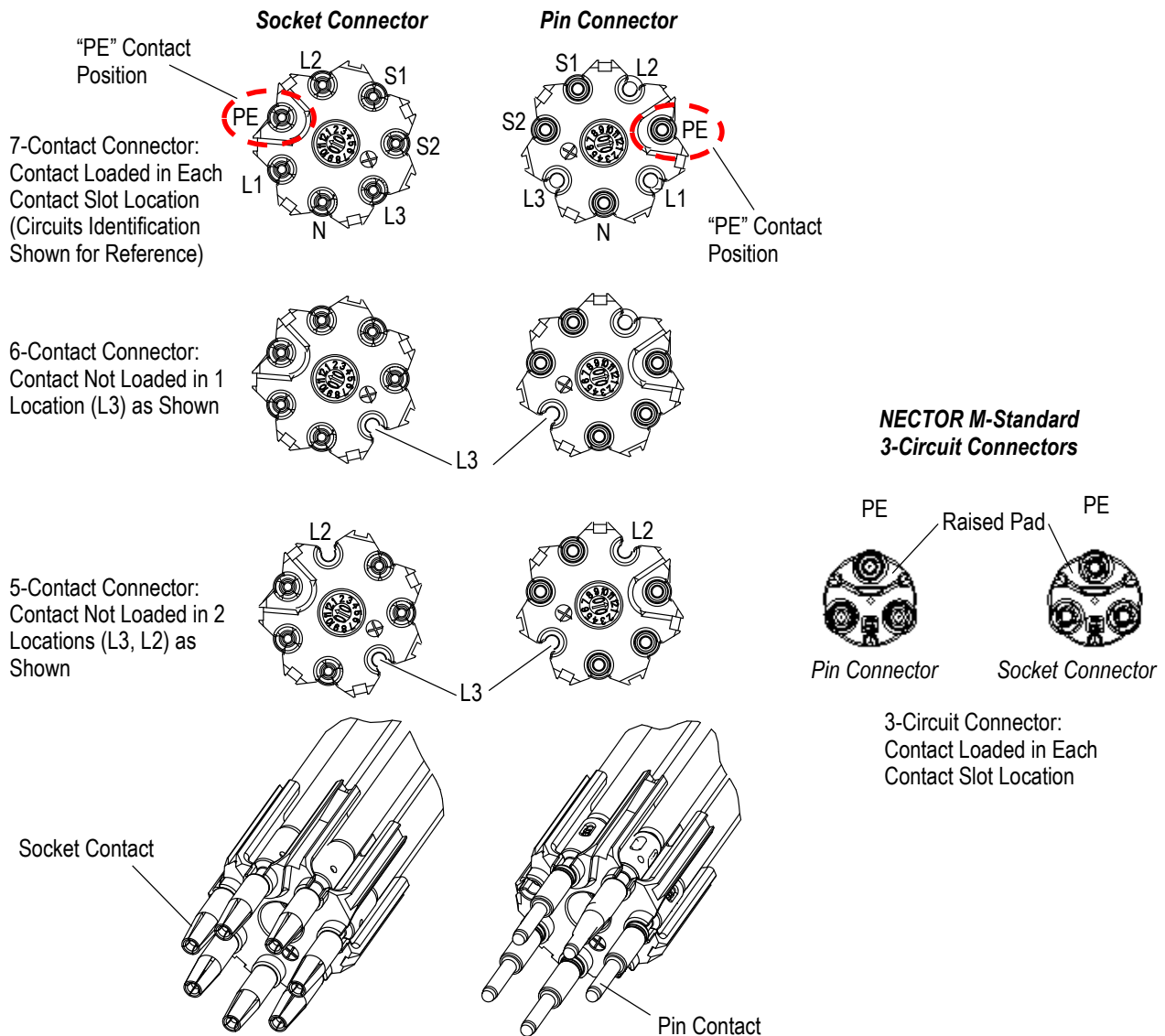


Figure 13

3.9. Panel-Mount Connector Assembly

Select the appropriate panel-mount housing, positioner, and contacts from the components Customer Drawings.



NOTE

NECTOR M Standard panel-mount connectors are only approved for use with crimp-style contacts.

Crimp the contacts onto the wire/cable conductors (see Paragraph 3.7.A) and assemble contacts to the positioner component to form a Contacts Positioner Assembly (See Paragraph 3.8) for the intended connector assembly. The housing selection is based upon:

- Number of circuits (3, 5, 6, or 7)
- Contact type (Pin or Socket)
- Polarizing "Code" (A, B, C, D, E, F)

The Contacts Positioner Assembly must have the same number and type (pin/socket) of contact circuits as the selected housing.

The NECTOR M Standard panel-mount connectors are assembled by inserting a contact positioner assembly into the panel-mount housing, as shown in Figure 14 (NECTOR M 3-circuit) and Figure 15 (NECTOR M 5/6/7-circuit).

Assemble the panel-mount connector as follows:

1. Select appropriate connector housing (pin or socket) for the intended connector assembly.
2. Align the PE circuit on the NECTOR front housing with the PE contact of the positioner assembly.

**NOTE**

Reference Figure 14 for identification of PE circuit on NECTOR M 3-circuit product and Figure 15 for NECTOR M 5/6/7 circuit product.

3. Insert the contacts positioner assembly into the connector housing, taking care to align the “alignment recesses” with corresponding raised features inside the connector housing.
4. Resistance will be felt as the flex latches on the positioner engage protruding latch features inside the connector housing. Apply pressure to the positioner to fully engage positioner/housing latches. An audible “click” will be heard when the latches fully engage.

**NOTE**

NECTOR M 3-circuit and NECTOR M 5/6/7-circuit panel-mount connectors are not intended to be dis-assembled. Ensure correct components are selected prior to assembly.

5. After assembly, apply Loctite 401 or 414 adhesive to each assembly latch location (3 locations on 3-circuit, 4 locations on 5/6/7-circuit), taking care not to fill adhesive onto crimp contacts. Reference Figures 14 and 15 for location of adhesive application.

Panel-mount connectors are installed into mounting panel as follows (ref Figure 14, applies to NECTOR M 3-circuit and NECTOR M 5/6/7-circuit):

6. Prepare mounting panel with appropriate sized “D” hole (reference Pin Housing or Socket Housing drawing for detailed dimensions).
7. Align “flat” surface on connector housing threads with “flat” in mounting panel “D” hole and insert connector into mounting panel.
8. Assemble threaded hex nut onto connector housing threads protruding through panel to complete the installation. Tighten the hex nut to a torque of 1.0 N-m.

Loctite is a trademark.

NECTOR M Standard 3-Circuits Panel-Mount Assembly

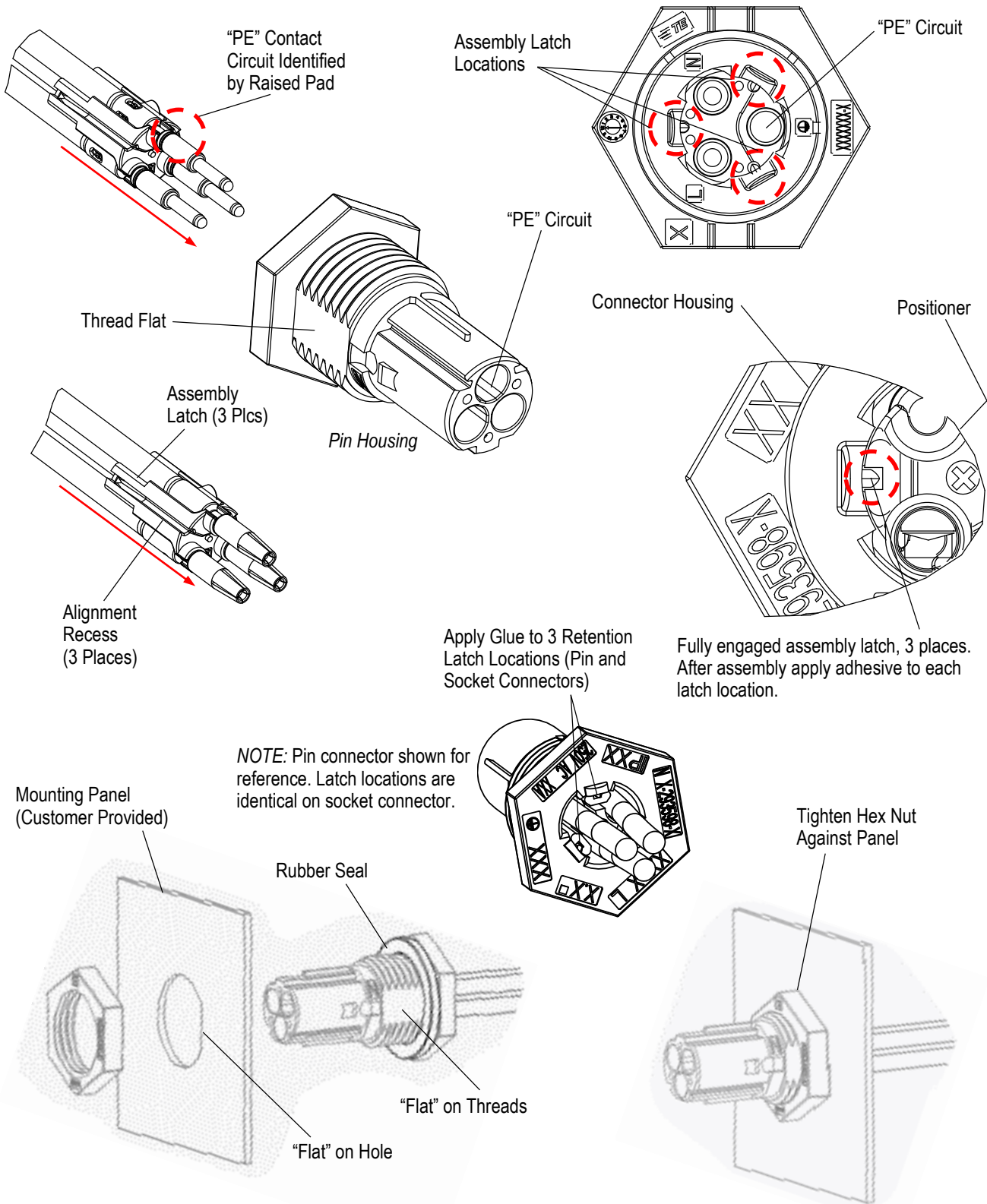


Figure 14

NECTOR M Standard 5/6/7 Circuits Panel-Mount Assembly

NOTE: Pin connector shown for reference. Latch locations are identical on socket connector.

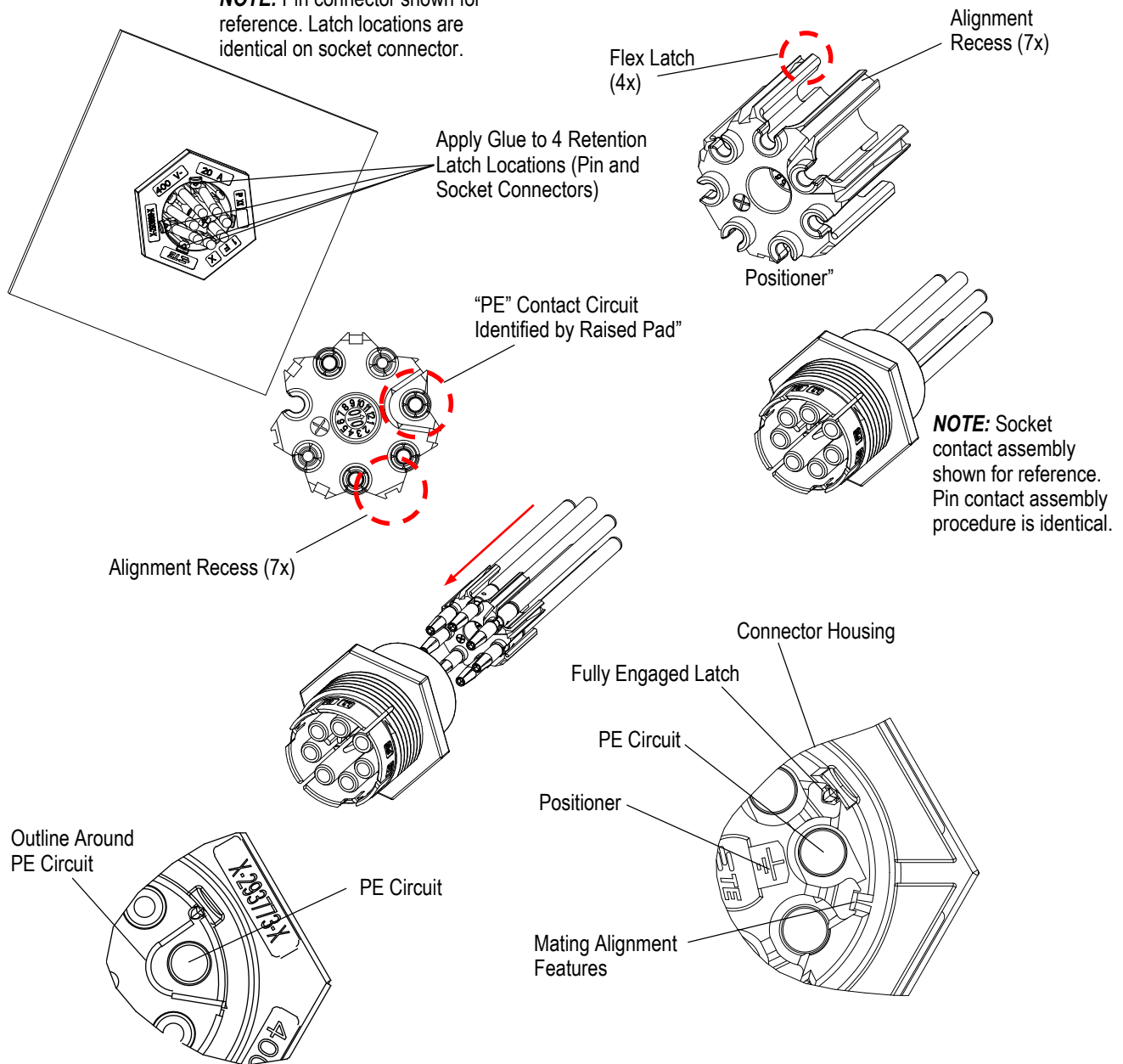


Figure 15

3.10. NECTOR M Standard Free-Hang Connector Assembly

The NECTOR M Standard free-hang connectors are assembled in a similar manner to the panel-mount connectors. However, an additional component is used to secure the cable to the connector. Also, the connector housing components have different features to identify the PE circuit.

i NOTE
 NECTOR M Standard free-hang connectors must not be assembled using discrete wires. Recommended cables are specified in Paragraph 3.4 and Figure 2.

The additional component is a “ring nut”. This component is available in multiple part number versions having different size cable entry openings to accommodate a range of cable jacket diameters. See Figure 16.


NOTE

Do not mate pin/socket connectors until each connector is fully assembled.

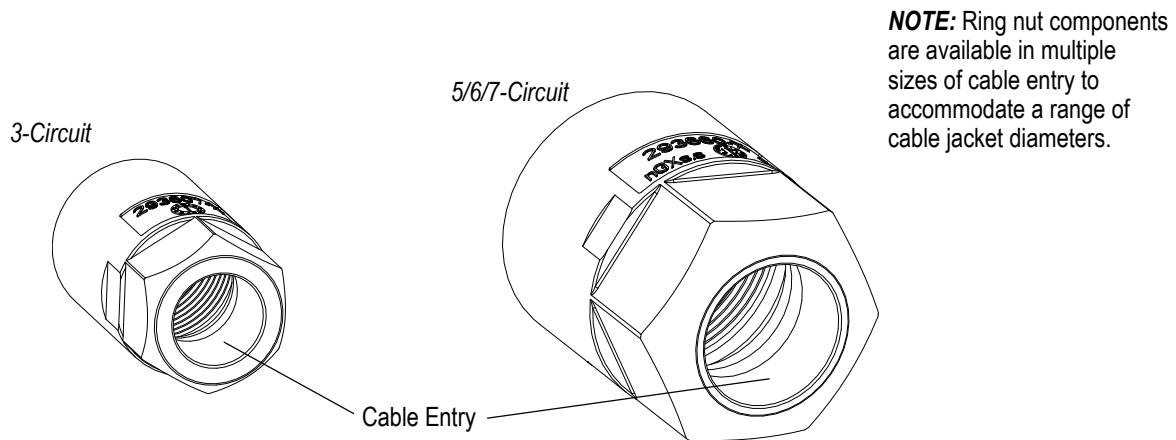
NECTOR M Standard Ring Nut


Figure 16

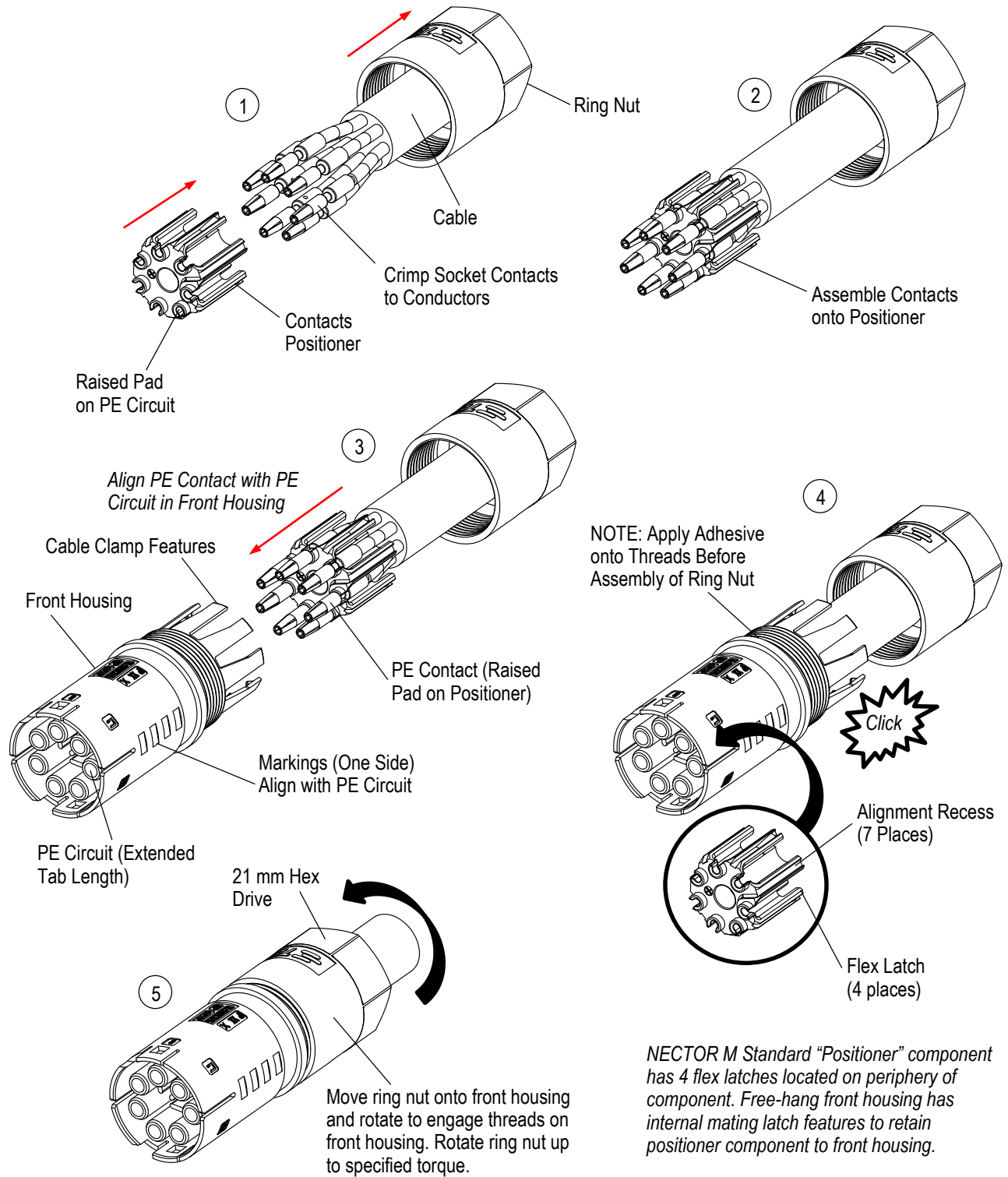
A. NECTOR M Standard 5/6/7 Circuits

NECTOR M Standard 5/6/7 circuits' free-hang connector assembly using crimp contacts is assembled as follows (see Figures 17 and 18):

1. Select appropriate connector housing (pin or socket), positioner, ring nut, and contacts for the intended connector assembly (refer to the components Customer Drawings).
2. Prepare cable per Paragraph 3.4.
3. Crimp contacts to conductors with instructions provided in Paragraph 3.7.A.
4. Place "ring nut" over cable jacket (orient as shown in Figure 17, 18).
5. Assemble crimped conductors to positioner component to form "contacts positioner assembly" per Paragraph 3.8.
6. Align PE circuit on the front connector housing with the PE contact of the positioner assembly. The 5/6/7-circuit free-hang housings have recessed features on one side that are in-line with the PE contact for easy identification.
7. Insert the contacts positioner assembly into the connector housing, taking care to align the "PE" circuits and the positioner "alignment recesses" with corresponding features on connector housing.
8. Resistance will be felt as the flex latches on the positioner engage the corresponding protruding latch features inside the connector housing. Apply pressure to the positioner to fully engage positioner/housing latches. An audible "click" will be heard when the latch fully engages.
9. Before assembly of ring nut onto connector housing, apply Loctite 401, or 414 adhesive all around threaded portion of front housing component. Reference Figures 17, 18, and 19.
10. Move the ring nut component axially along cable to the connector housing. Carefully engage the threaded ring nut with the corresponding thread on the connector housing. Do not force the thread engagement, otherwise the assembly components may "cross thread" and damage the assembly components.
11. When the threads are fully engaged, rotate the ring nut onto the connector housing. The ring nut will apply pressure on the front housing cable clamp features and provide the cable strain relief. Apply a torque of 1.5-1.8 N-m to the ring nut to complete the assembly.

Loctite is a trademark.

NECTOR M Standard Socket Connector Assembly, Free-Hang, 5/6/7-Circuit



NECTOR M Standard "Positioner" component has 4 flex latches located on periphery of component. Free-hang front housing has internal mating latch features to retain positioner component to front housing.

Figure 17

NECTOR M Standard Pin Connector Assembly, Free-Hang 5/6/7-Circuit

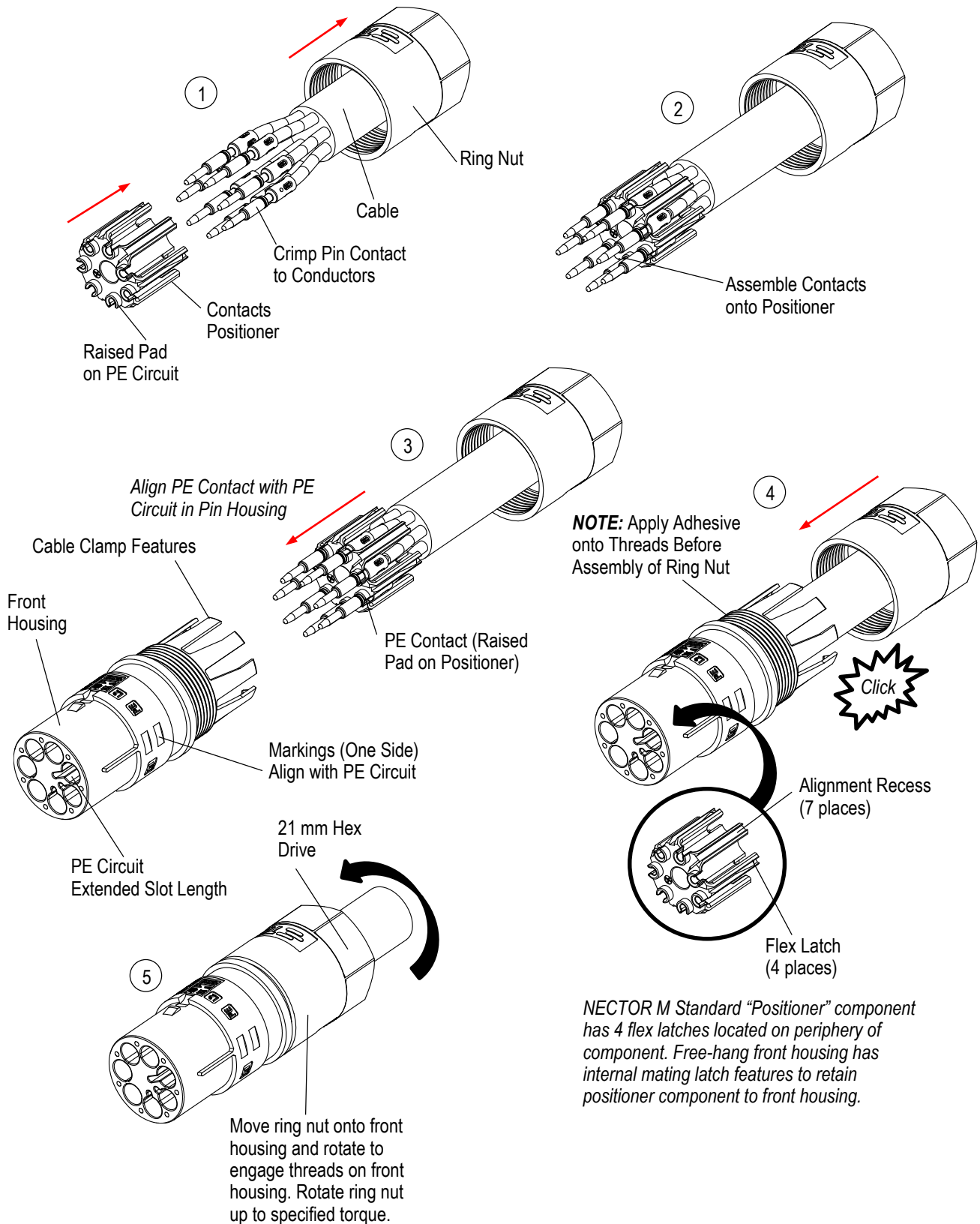


Figure 18

12. The connector assembly is made “non-reworkable” by applying quick-setting adhesive to threads of connector housing before assembly of “ring nut” component. Recommended adhesives are:

- Loctite 414 Super Bonder
- Loctite 401 Prism



CAUTION

NECTOR M Standard series housing components are molded of reinforced thermoplastic Polyamide (NYLON) material. Do NOT use Loctite 770 primer since it reduces adhesive bond strength on thermoplastic Polyamide material.

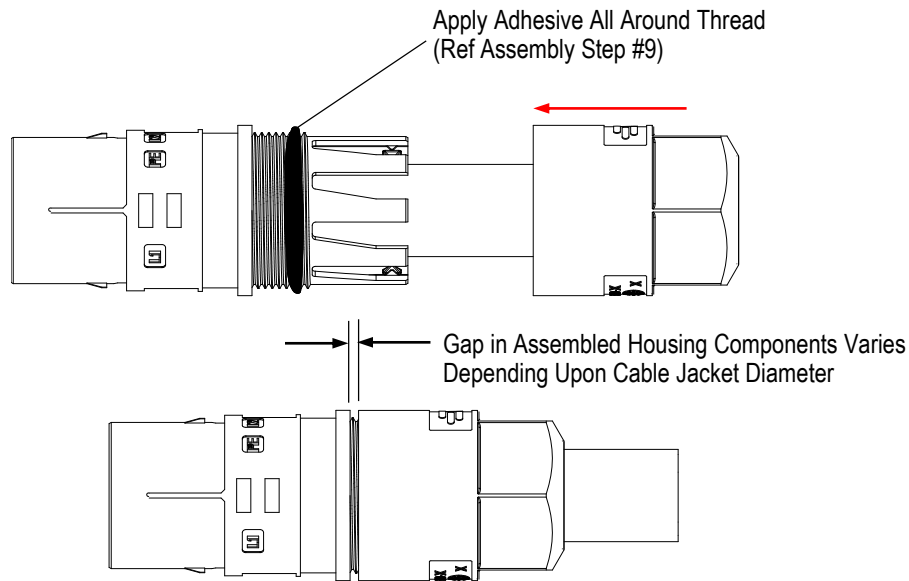


Figure 19

B. NECTOR M Standard 3 Circuits

3-circuits free-hang connector using crimp contacts is assembled as follows (see Figures 20, 21):

1. Select appropriate connector housing (pin or socket), positioner, ring nut, and contacts for the intended connector assembly (refer to the components Customer Drawings).
2. Prepare cable per Paragraph 3.4.
3. Crimp contacts to conductors with instructions provided in Paragraph 3.7.A.
4. Place “ring nut” over cable jacket. (Orient as shown in Figures 20, 21.)
5. Assemble crimped conductors to positioner component to form “contacts positioner assembly” per Paragraph 3.8.
6. Align PE circuit on the front housing with the PE contact of the positioner assembly. The 3-circuit free-hang housings have recessed features on one side that are in-line with the PE contact for easy identification (see Figure 20).
7. Insert the contacts positioner assembly into the connector housing, taking care to align the positioner alignment recesses with corresponding protrusions in connector housing.
8. Resistance will be felt as the flex latches (3 places) on the positioner engage the corresponding latch protrusions inside the connector housing. Apply pressure to the positioner to fully engage positioner/housing latches. An audible “click” will be heard when the latches fully engage.
9. Before assembly of ring nut onto connector housing, apply Loctite 401, or 414 adhesive all around threaded portion of front housing component. Reference Figures 19, 20, and 21.

Loctite and Super Bonder are trademarks of their respective owners.

10. Move the ring nut component axially along the cable to the connector housing. Carefully engage the threaded ring nut with the corresponding thread on the connector housing. Do not force the thread engagement, otherwise the assembly components may “cross thread” and damage the assembly components.

11. When the threads are fully engaged, rotate the ring nut onto the connector housing. The ring nut will apply pressure on the front housing cable clamp features and provide the cable strain relief. Apply a torque of 1.5-1.8 N-m to the ring nut to complete the assembly.

NECTOR M Standard Socket Connector Assembly, Free-Hang, 3-Circuit

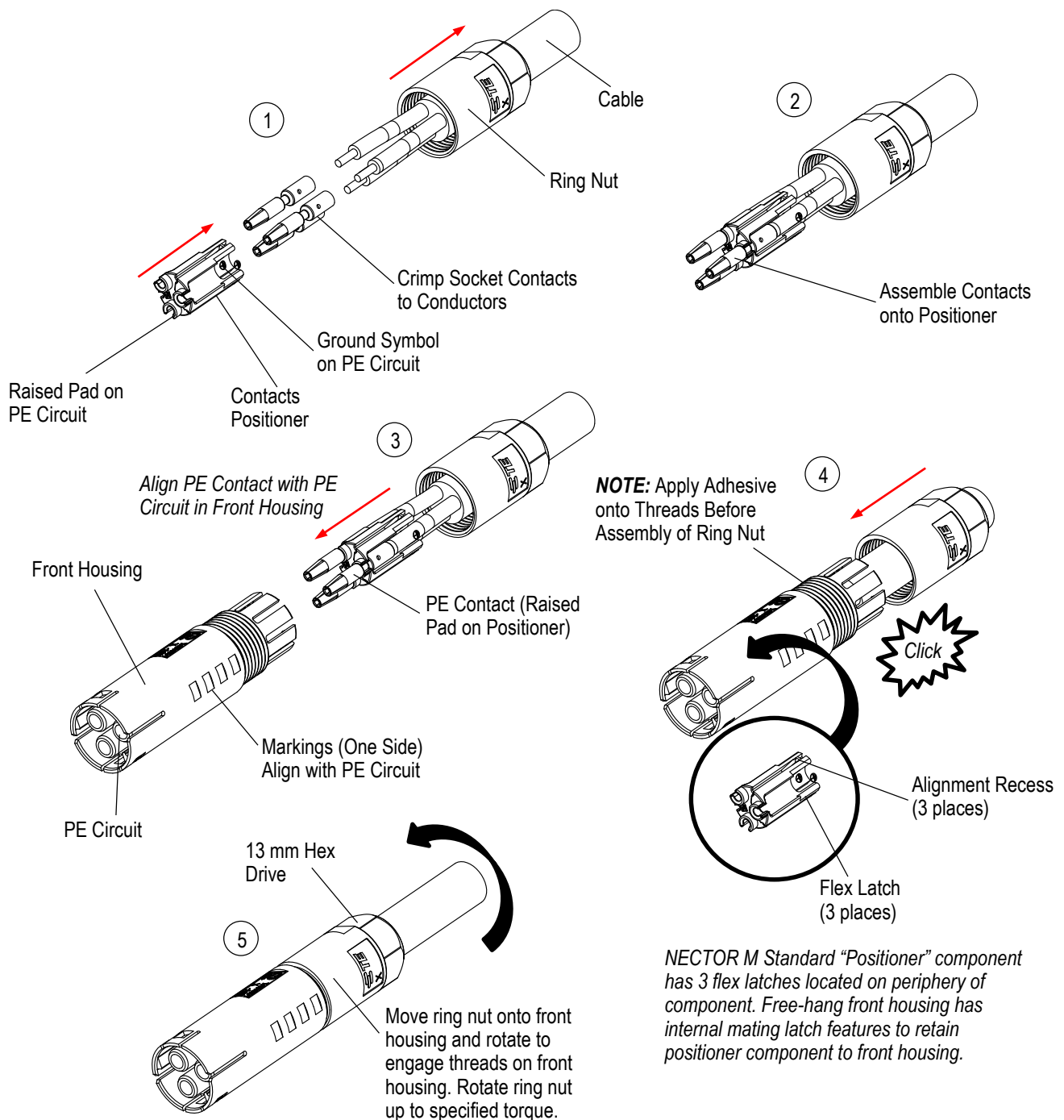
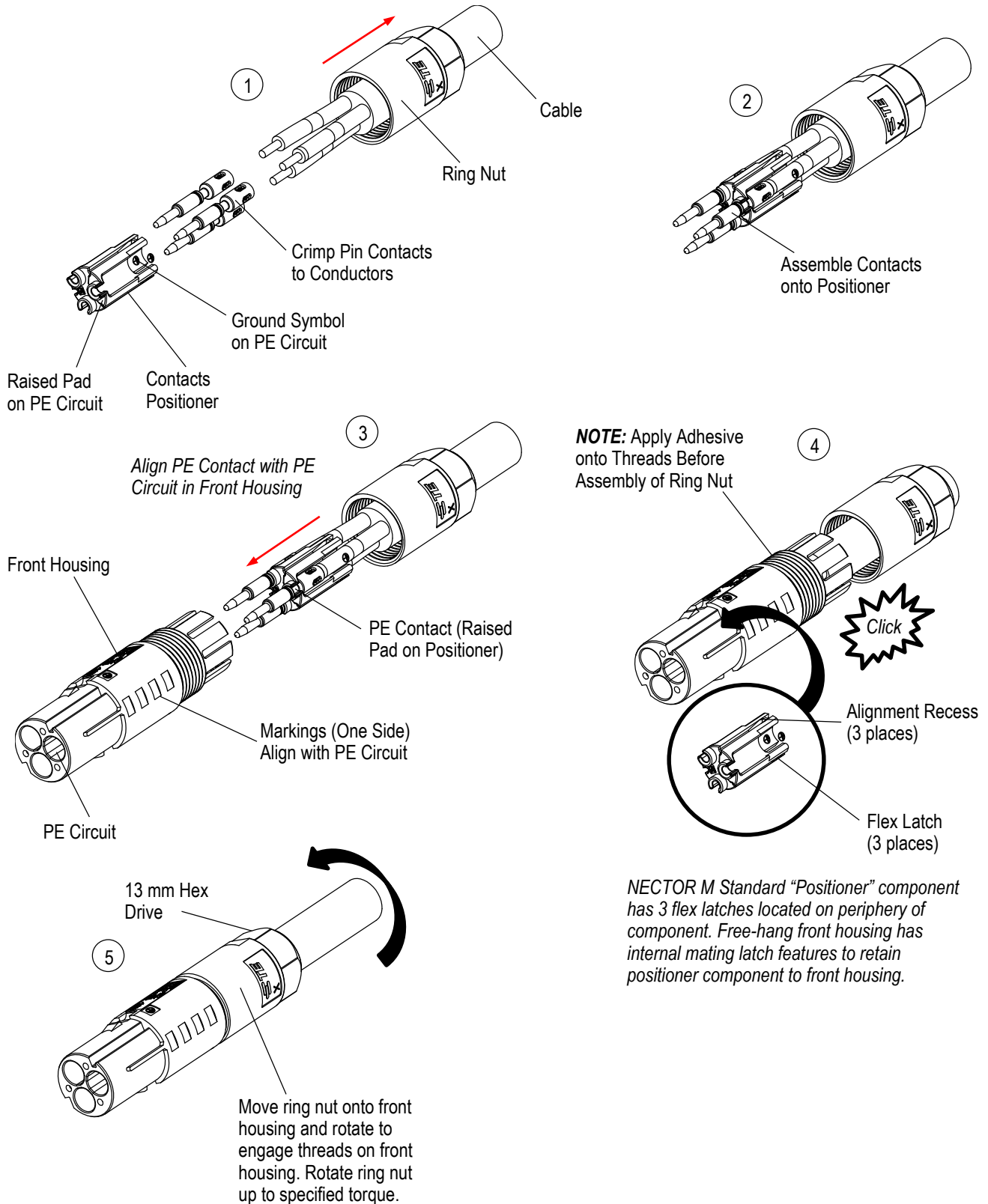


Figure 20

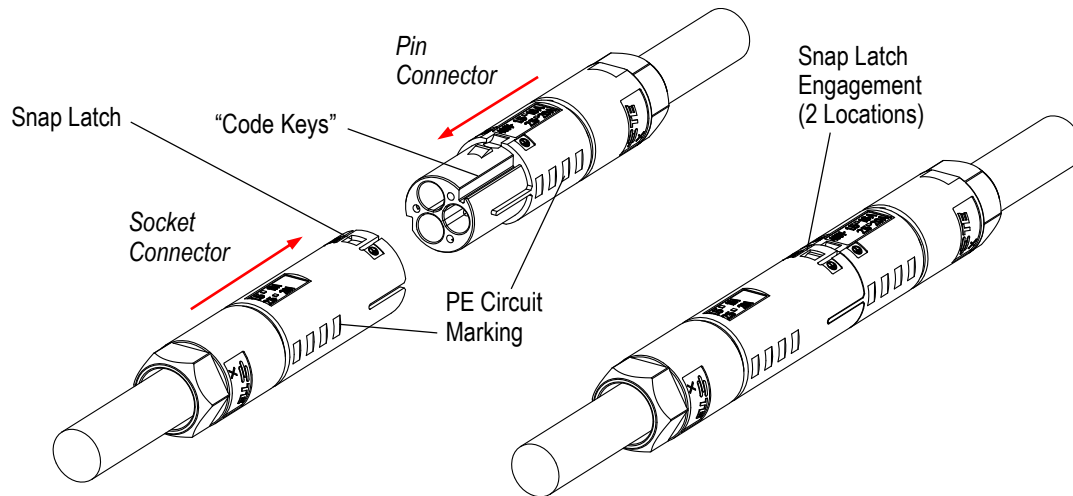
NECTOR M Standard Pin Connector Assembly, Free-Hang, 3-Circuit



NECTOR M Standard "Positioner" component has 3 flex latches located on periphery of component. Free-hang front housing has internal mating latch features to retain positioner component to front housing.

Figure 21

NECTOR M Standard 3-Circuits Connectors Coupling, Free-Hang



NECTOR M Standard 5/6/7-Circuits Connectors Coupling, Free-Hang

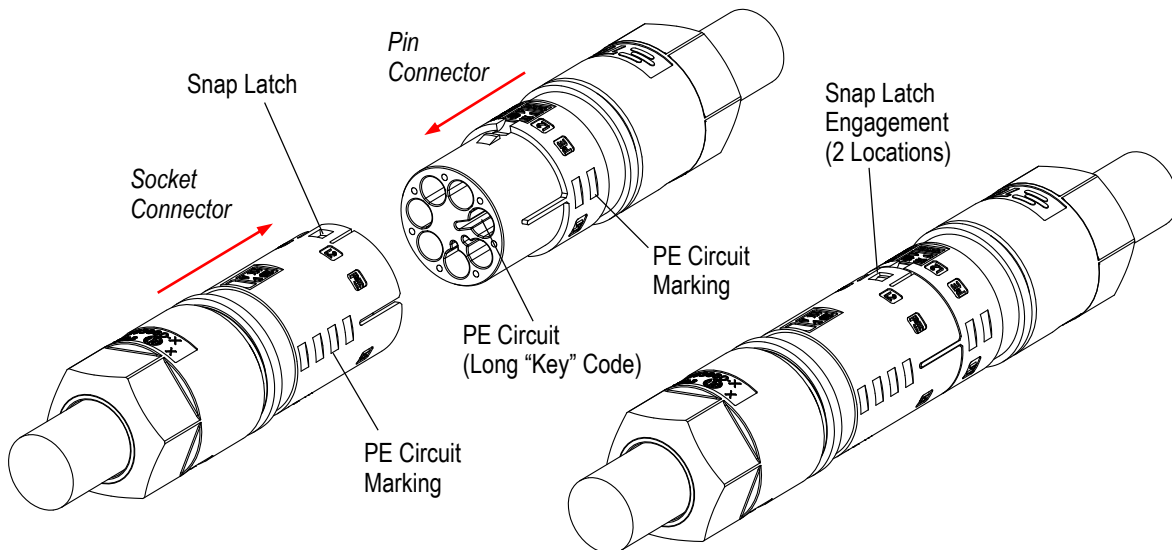


Figure 22

3.11. Pin/Socket Connectors Coupling

NECTOR M Standard pin connectors couple to corresponding socket connectors having the same:

- form factor (3-circuit, 7-circuit)
- number of circuits
- keying code

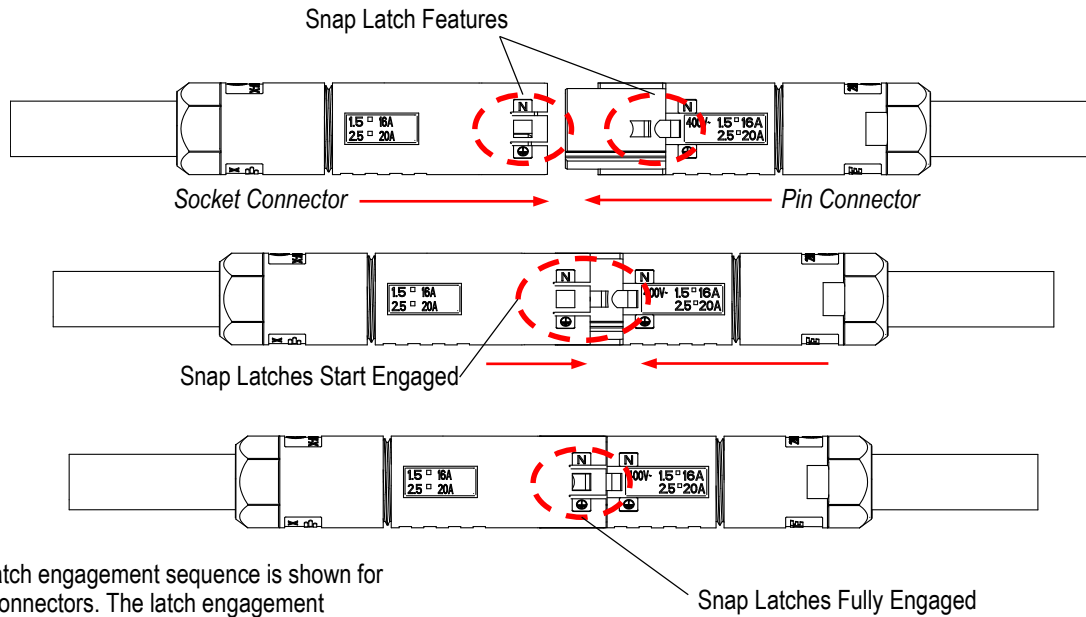
The pin/socket coupling procedure is the same for 3-circuit connectors and 5/6/7-circuit connectors. It is important to identify the “PE” circuit on each connector before mating, otherwise, the “keying” features will not align and prevent coupling of pin/socket connectors.

“PE” on 3-circuit connectors is identified by marking on one side of the connector housing, as shown in Figure 22. The PE circuit is aligned with these markings.

“PE” on 5/6/7-circuit connectors is identified by the code “keys” on the mating connector faces. There are 3 code keys; 2 at “short” length, 1 at “long” length. PE circuit is the longer length key. Additional PE circuit marking is on one side of connector housings, as shown in Figure 22.

Connectors are coupled as followed (see Figures 22, 23):

1. Identify and align “PE” circuit on the pin and socket connectors.
2. Align the cylindrical pin housing with corresponding cylindrical shell of socket housing.
3. Insert pin housing into socket housing shell and engage snap latches. An audible “click” will be heard when the latches are fully engaged.



NOTE: Latch engagement sequence is shown for 3-circuit connectors. The latch engagement sequence is identical for 5/6/7-circuit connectors.

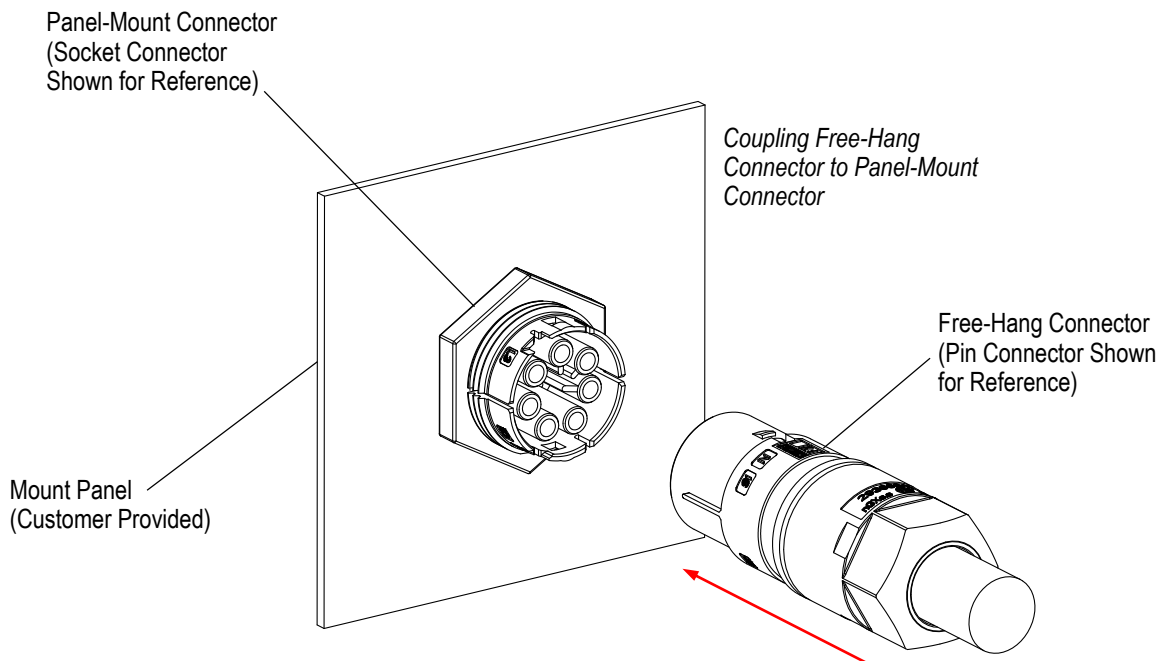


Figure 23

3.12. De-Coupling Connectors

Coupled connectors are retained in position by two flex latches on the socket housing and corresponding protruding latch features on the pin housing. The latches are located on opposite sides of the pin and socket housings and are designed to prevent unintended/accidental “de-coupling” the connectors.

To “de-couple” connectors the socket housing flex latches must be raised simultaneously so they disengage from the protruding latches on the pin housing. While the flex latches are raised, the coupled connectors can be separated by removing the pin connector housing from the socket connector shell.

A. De-coupling NECTOR 5/6/7-circuit Connectors

The NECTOR 5/6/7-circuit socket housing has recesses adjacent to the flex latches to provide access to the latches for de-coupling. The flex latches must be raised to disengage the protruding latch on pin housing and allow the connectors to separate. This is shown in Figure 24.

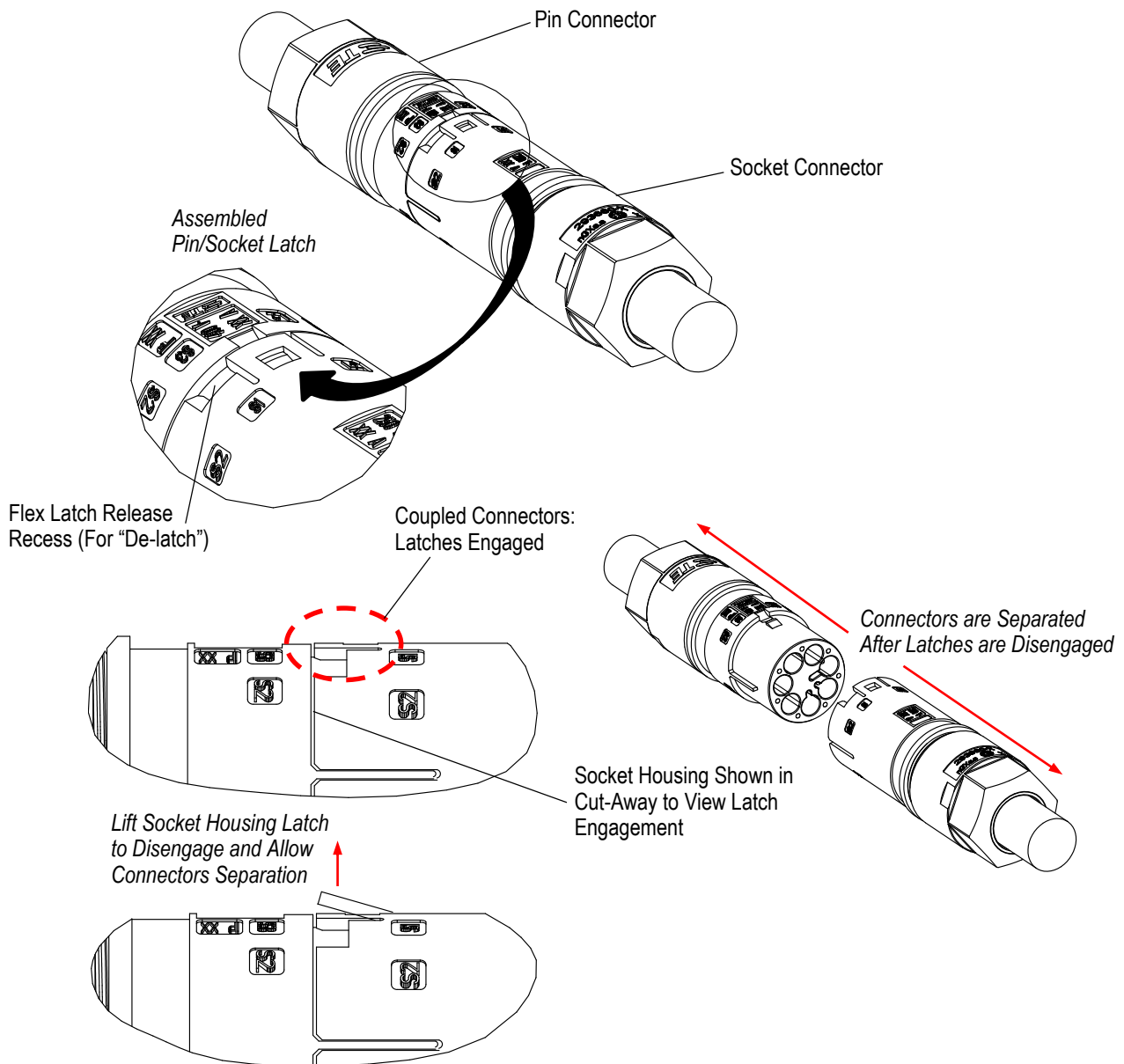


Figure 24

De-latching tool 2213523-1 is available for disengaging housing latches on NECTOR M 5/6/7-circuit connectors. The tool simultaneously raises the socket housing flex latches and allows the connectors to be easily separated.

The procedure for de-coupling NECTOR M 5/6/7-circuit connectors using “de-latch” tool 2213523-1 is as follows (see Figure 25):

1. Locate release recesses adjacent to flex latches on socket housing shell, as shown in Figure 24.
2. Position the de-latch tool perpendicular to connectors' axis as shown in Figure 25.
3. Align the tool release prongs with flex latch release recesses.
4. Carefully insert the tool release prongs into the flex latch release recesses until the tool bottoms out against the socket housing shell. In this position, the release prongs on the tool will have raised the flex latches sufficiently to allow the latches to disengage.
5. With the de-latch tool in place, rotate the tool slightly, as shown in Figure 25, to provide initial separation of the latches. With the latches separated, carefully remove the de-latch tool.
6. After initial separation of the connector latches, and removal of the de-latch tool, fully separate the connectors to complete de-coupling.

Figure 25 depicts using de-latch tool 2213523-1 to de-couple connectors in a “free-hang” installation and in a “panel-mount” installation.

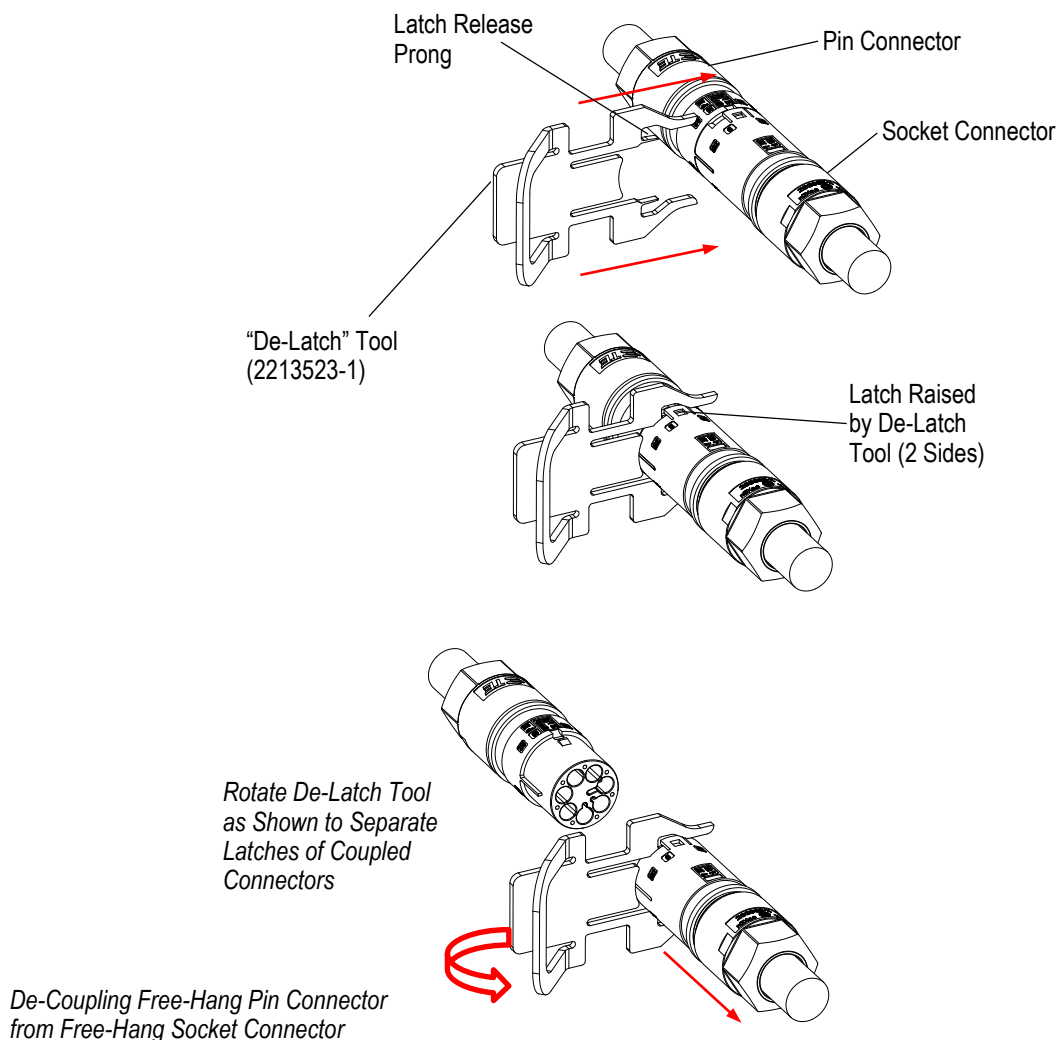


Figure 25 (cont'd)

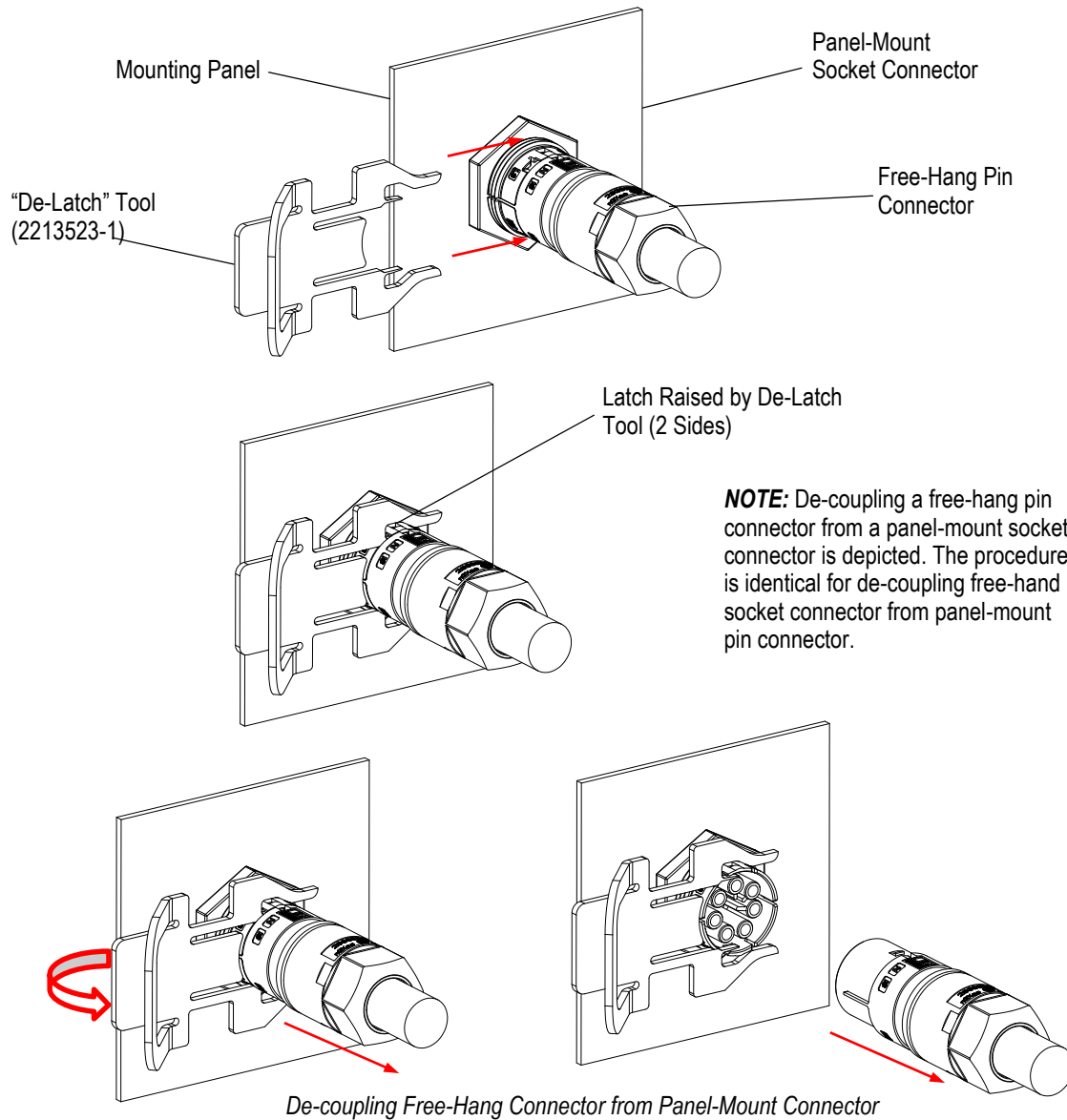


Figure 25 (end)



CAUTION

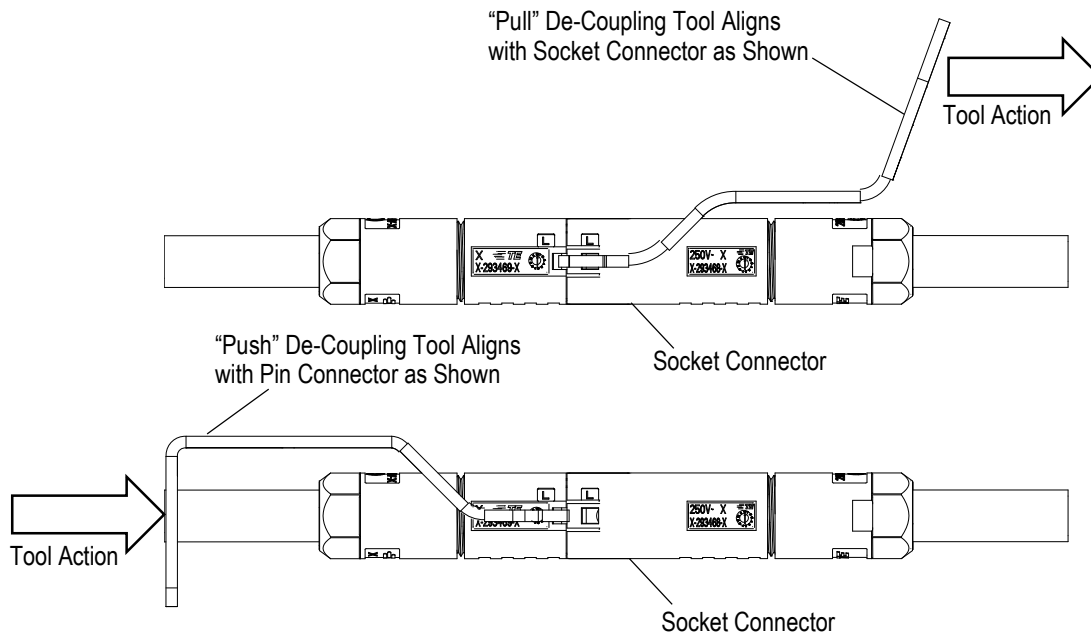
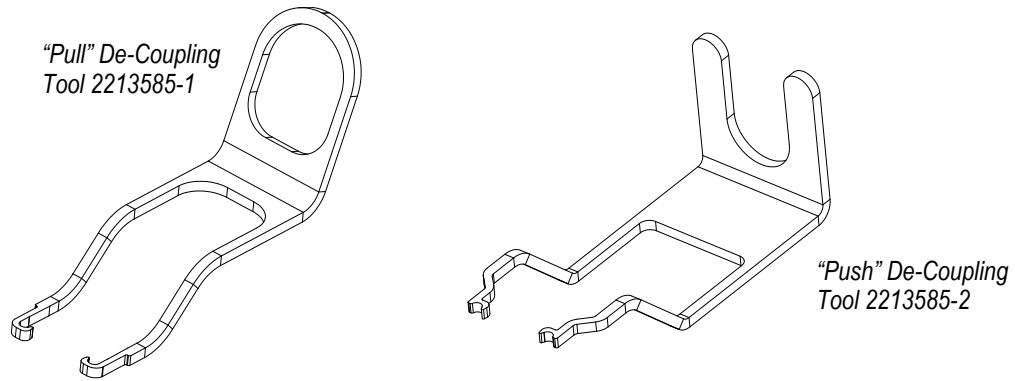
Failure to use a suitable release tool can result in overstress and damage of the connector latches.

B. De-Coupling NECTOR M 3-Circuit Connectors

Two tools are available for de-coupling NECTOR M 3-circuit connectors (Figure 26)

Each of the tools acts upon the socket connector to deflect the flex latch on the socket housing and allow separation of the mated connectors. The tools are characterized by the action required to deflect the flex latches on the socket connector, and are described as "pull" type (2213585-1), and "push" type (2213585-2). When one connector of the installation is panel-mounted, there is limited access to the coupled connectors on the side toward the mounting panel and correct tool selection is determined by the installation of connectors to be de-coupled, as shown in Figure 27.

When a "free-hang" socket connector is mated to a "free-hang" pin connector, then either tool may be used to de-couple the connectors (shown in Figures 26 and 27).



FREE-HANG		PANEL-MOUNT		PULL TOOL 2213585-1	PUSH TOOL 2213585-2
SOCKET	PIN	SOCKET	PIN		
X			X	X	
	X	X			X
X	X			X	X

Figure 26

After selection of the appropriate tool for the connector installation, the connectors de-coupling is accomplished as follows:

1. Orient the de-coupling tool to align with connectors as shown in Figures 26 and 27.
2. Latch hooks at end of de-coupling tool are inserted into latch recesses in pin housing. The recesses are located adjacent to the flex latches. The long arms of the de-coupling tool are flexible and will deflect to allow the latch hooks to install into the latch recesses in the pin housing (Figure 28).
3. Activate the de-coupling tool (push or pull) so that the latch hooks engage the socket housing flex latches and raise the latches.
4. The de-coupling tools provide initial disengagement of the latches maintaining the connectors coupling. After the initial latch disengagement the connectors may be grasped and fully disengaged.

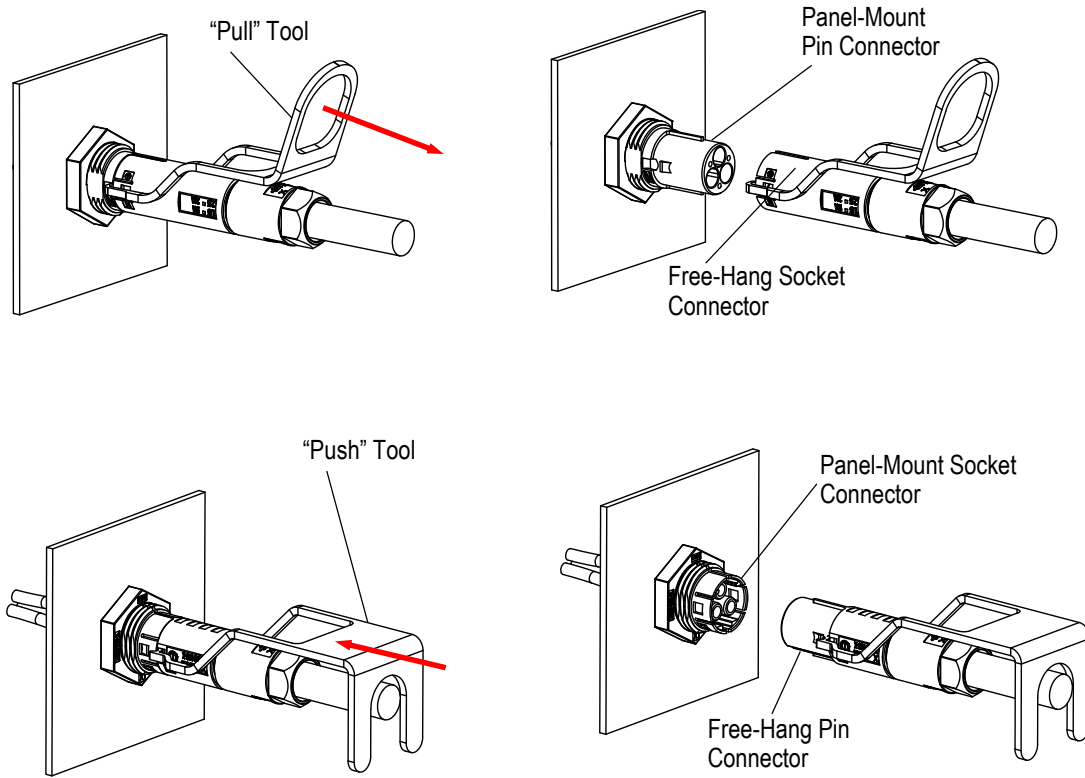


Figure 27

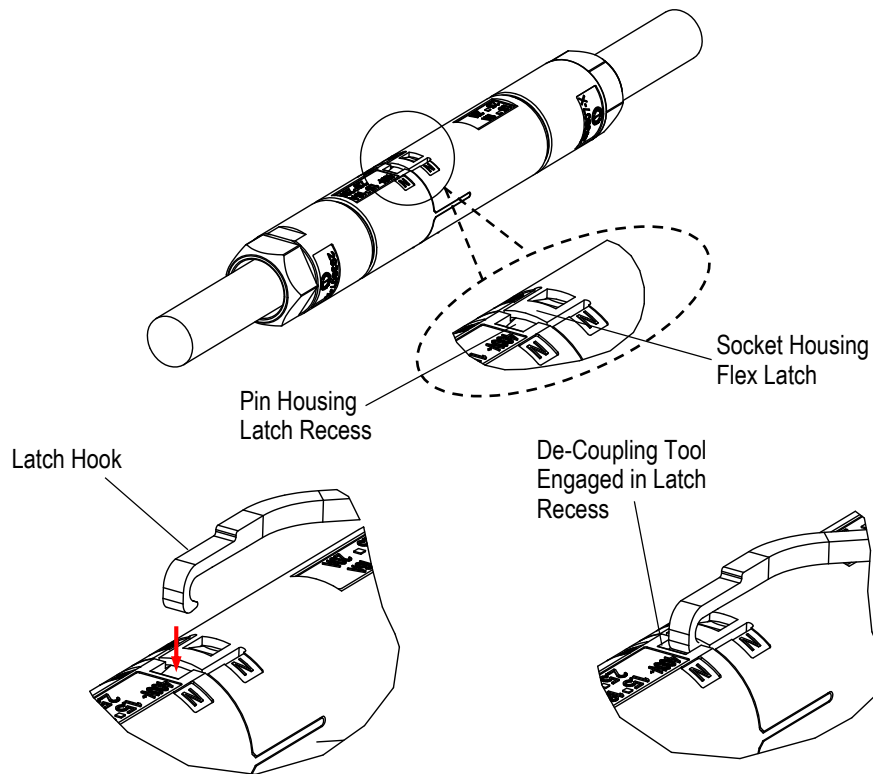


Figure 28

4. QUALIFICATION

NECTOR M Standard connector family is Recognized by Underwriters Laboratories Inc. and UL/CSA International in File E28476.

5. TOOLING

The following tooling is needed for termination and application of this product line. See Figure 29.

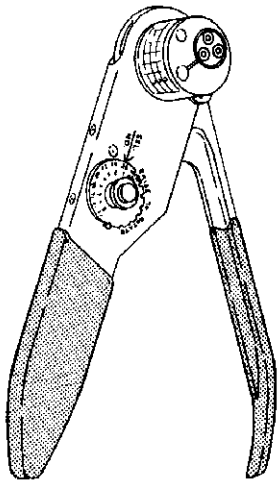
Crimp Tool 601967-1 (Instruction Sheet 408-7516)

Positioning Tool 2280173-1

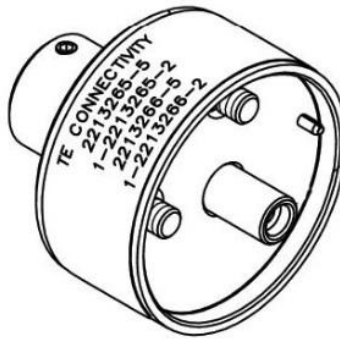
De-Latching Tool 2213523-1

Pull De-Coupling Tool 2213585-1

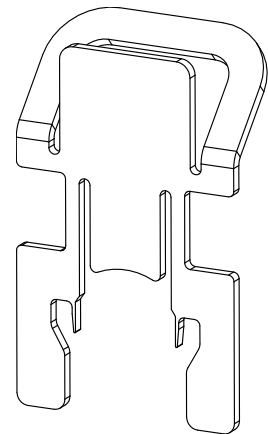
Push De-Coupling Tool 2213585-2



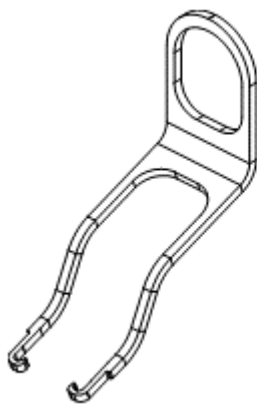
Crimp Tool 601967-1



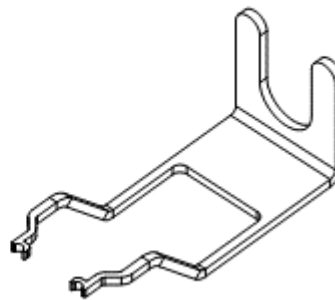
Positioning Tool 2280173-1



De-Latching Tool 2213523-1



*"Pull" De-Coupling
Tool 2213585-1*



*"Push" De-Coupling
Tool 2213585-2*

Figure 29

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.

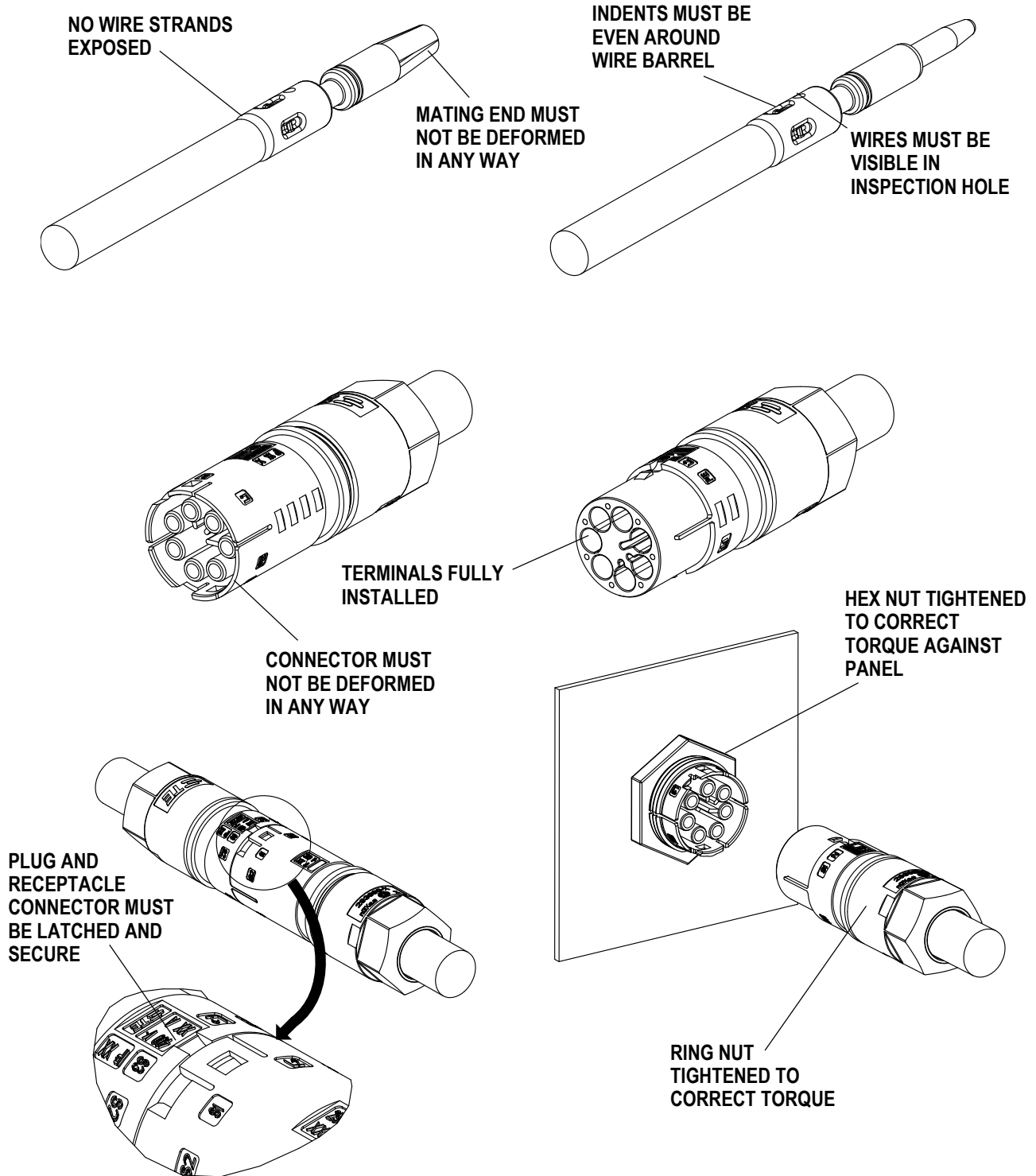


FIGURE 30. VISUAL AID