

# 3M™ Cold Shrink Splice Kit QS-III 5456A-WG

for Jacketed Concentric Neutral (JCN),  
Flat Strap Neutral and Concentric Neutral Cable

## Instructions

**IEEE Std. 404**

25/28 kV Class

200 kV BIL

### **CAUTION**

Working around energized systems may cause serious injury or death. Installation should be performed by personnel familiar with good safety practice in handling electrical equipment. De-energize and ground all electrical systems before installing product.

**Kit Selection Table**

Kit Number	Cable Insulation O.D. Range	Conductor Size Range
5456A-WG	0.84" to 1.36" (21,3 to 34,5 mm)	1 AWG–250 kcmil* (50–120 mm <sup>2</sup> )

\*Splices (including size transitions) can be made to smaller or larger conductors (but larger conductors may require special neutral handling), provided both cables are within the Insulation O.D. Range and the connector meets the dimensional requirements shown below.

**Connector Dimensional Requirements**

	Minimum Inches (mm)	Maximum Inches (mm)
<b>Outside Diameter</b>	0.46" (11,7 mm)	1.36" (34,5 mm)
<b>Length</b> Aluminum (Al/Cu) Compression	—	4.00" (102 mm)
<b>Length</b> Copper Compression and 3M™ Shearbolt Connector QCI 2-250	—	4.50" (114 mm)

## 1.0 Kit Contents

- a. 3M™ Cold Shrink Splice Body 5456A-WG (1 ea.)
- b. Cold Shrink Adapter Tube (2 ea.)
- c. Red Compound Tubes (non-silicone grease) (2 ea.)
- d. Scotch® Mastic Sealing Strips 2230, 6" length (4 ea.)
- e. Cable Preparation Template (1 ea.)
- f. Instruction Booklet (1 ea.)

**Note:** *Do not use knives to open plastic bags.*

**Note:** *Connector not shown, but if included, it is indicated on the packaging label.*

**Note:** *Kit contains 0, 1 or 2 of item “B,” Cold Shrink Adapter Tube, as needed per conductor size.*

## 2.0 Prepare Cables

- 2.1 Check to be sure the cable fits within the kit ranges as shown on the cover page.
- 2.2 Prepare cables according to standard procedures. Refer to template provided or illustration below for proper dimensions. **Additional distance is required on one cable to provide extra neutral wire length for connecting the neutrals.** (Figure 1).

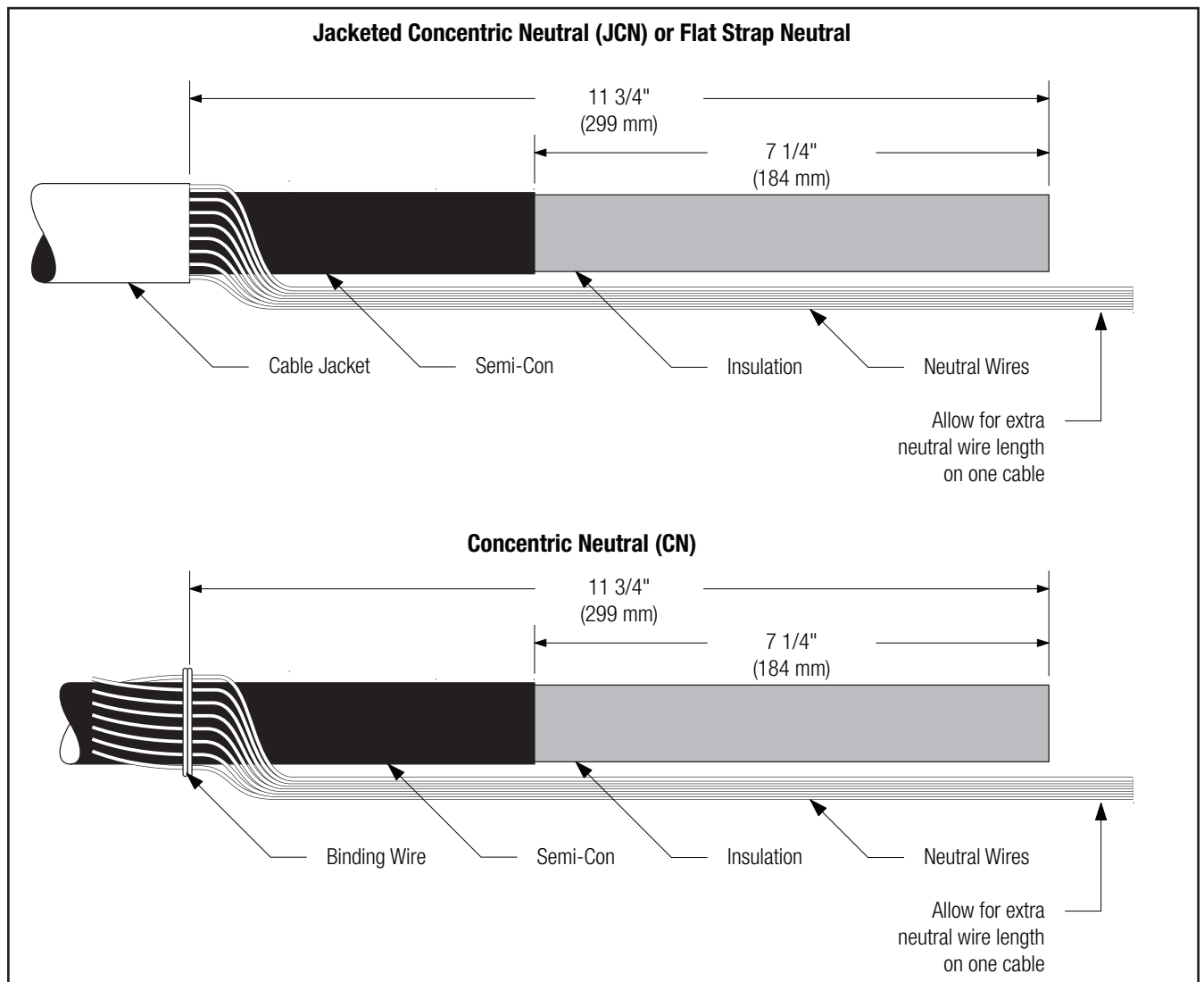


Figure 1

**Note:** Cables must be within the insulation O.D. range of the splice kit and the connector must meet the dimensional requirements shown on the front page.

- 2.3 Carefully bend the neutral wires back over the edge of the cable jackets (JCN) or binding wire or tape (CN). Press them against the cable and temporarily secure/cover the end of the wires with vinyl tape (Figure 2).

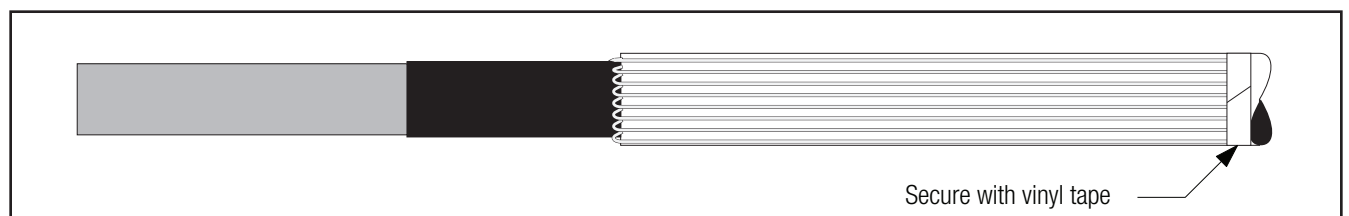


Figure 2

- 2.4 Clean or cover cable jacket if necessary, for cold shrink parking position. Slide splice body onto cable, loose core end first. (Figure 3).

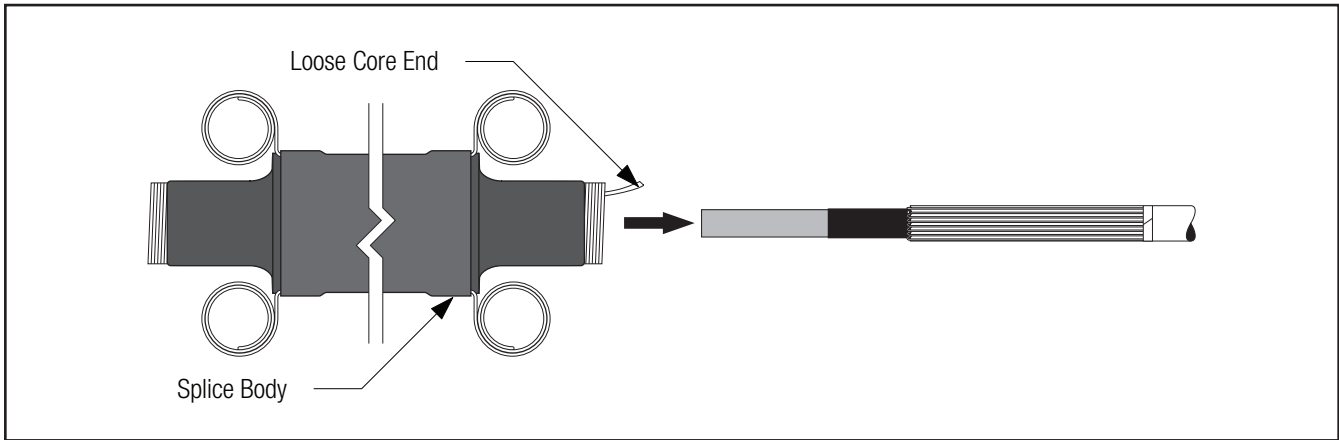


Figure 3

### 3.0 Install Connector

**Note:** *If using a crimp-type connector, go to step 3.3.*

- 3.1 If using a 3M™ Shearbolt Connector QCI 2-250, refer to the instructions included with the connector for insulation cut-back dimension. Insulation removal length shall not exceed 2 1/2" (64 mm) from conductor end (Figure 4).

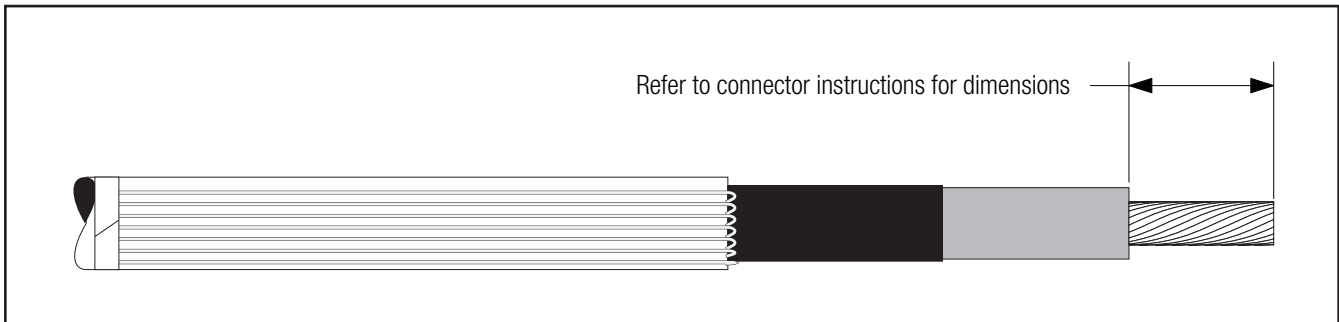


Figure 4

- 3.2 Install 3M™ Shearbolt Connector QCI 2-250 according to the instructions included with the connector (Figure 5).

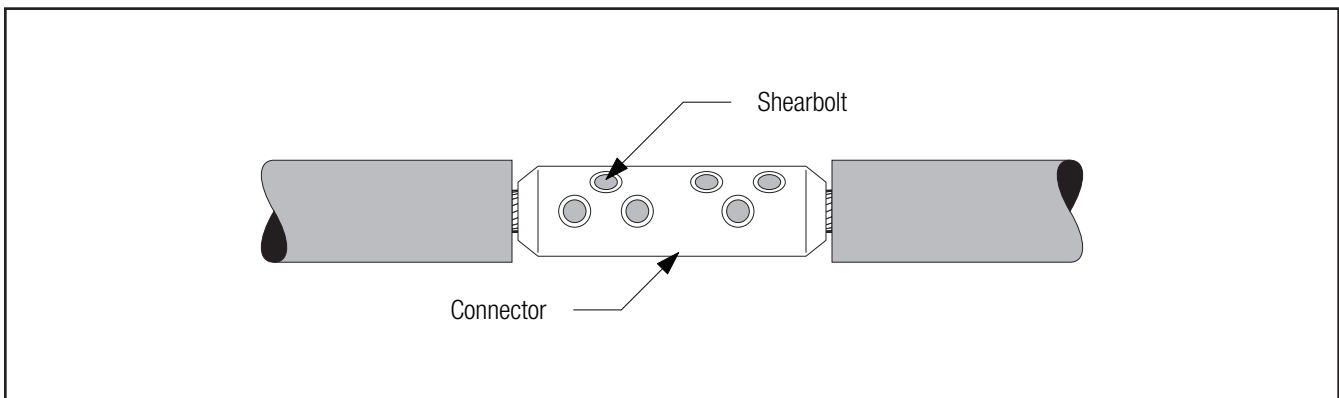


Figure 5

**Go to section 4.0 “Install Splice.”**

**3.3 If using a crimp type connector, remove cable insulation for 1/2 connector length plus an allowance\* for increases in connector length due to crimping. Insulation removal length shall not exceed 2 1/4" (57 mm) from conductor end. Do not install connector now (Figure 6).**

**\*Note:** *This assumes that the installer has determined the increased length of an aluminum connector crimped with a specific tool and die.*

#### Aluminum (Al/Cu) Crimp Connector Growth Chart

Conductor Size	Typical growth allowance (per end)
1 AWG–3/0 AWG	1/8" (3 mm)
4/0 AWG–250 kcmil	1/4" (6 mm)

**Note:** 1) *Copper connectors do not require a length change allowance.*  
 2) *Maximum aluminum connector crimped length allowed is 4.5" (114 mm).*

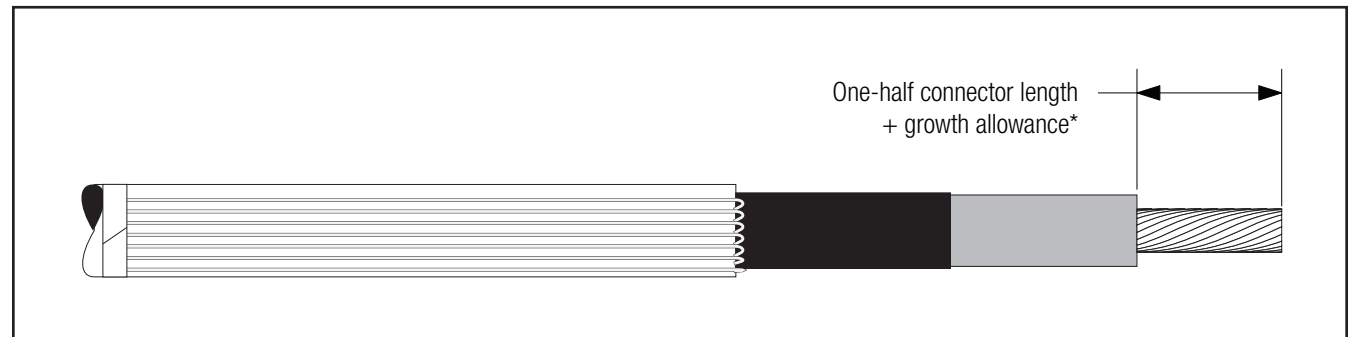


Figure 6

**3.4 For 1 through 1/0 AWG copper connectors or connectors with an O.D. between 0.46–0.60" (11,7–15,2 mm):** Slide the cold shrink adapter tube with the **RED CORE** onto the insulation with the loose core ribbon end going on first, away from the cable end.

**For 2/0 AWG through 250 kcmil copper connectors, 1 through 3/0 AWG aluminum connectors, or connectors with an O.D. between 0.53–0.84" (13,5–21,3 mm):** Slide the cold shrink adapter tube with the **WHITE CORE** onto the insulation with the loose core ribbon end going on first, away from the cable end (Figure 7).

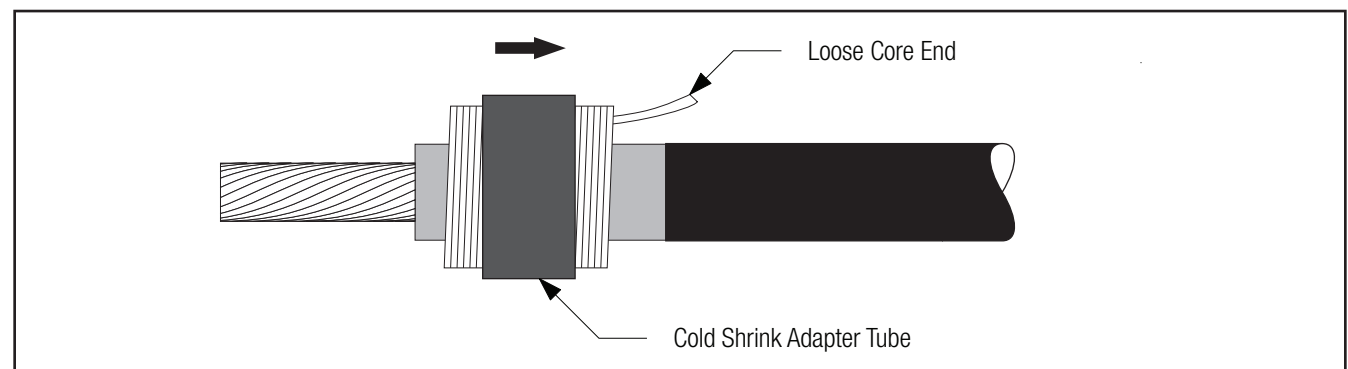


Figure 7

- 3.5 Install connector. See table (on cover) for proper connector dimensions. (For standard 3M™ Connectors, refer to table at the end of this instruction for crimping information). Remove any excess oxidation inhibitor from connector ends if aluminum connector is used. File sharp connector flashing if necessary, taking care to remove all metal filings from splice area (*Figure 8*).

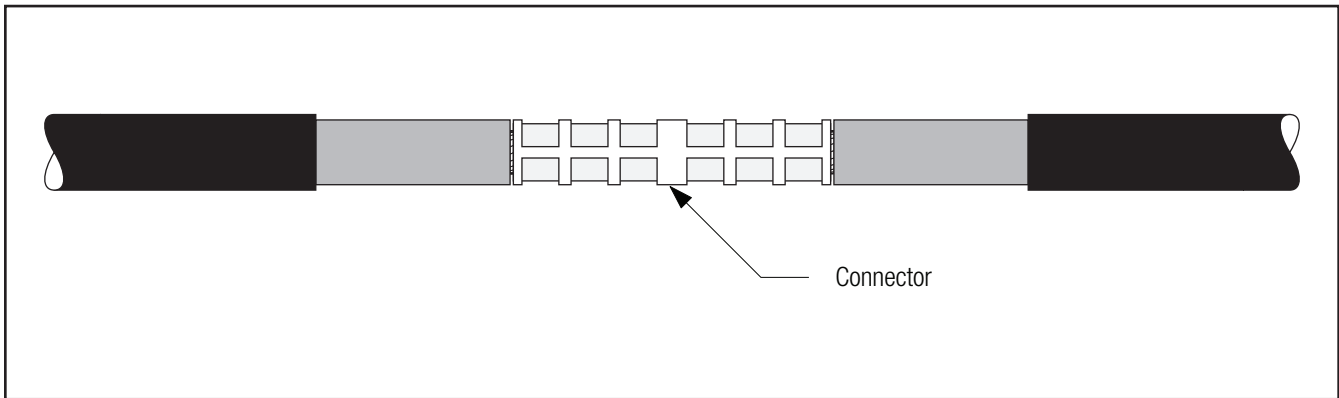


Figure 8

## 4.0 Install Splice

- 4.1 Apply a tape marker to semi-con insulation shield on cable which does not contain splice. Measure 8 3/4" (222 mm) from center of connector (*Figure 9*).

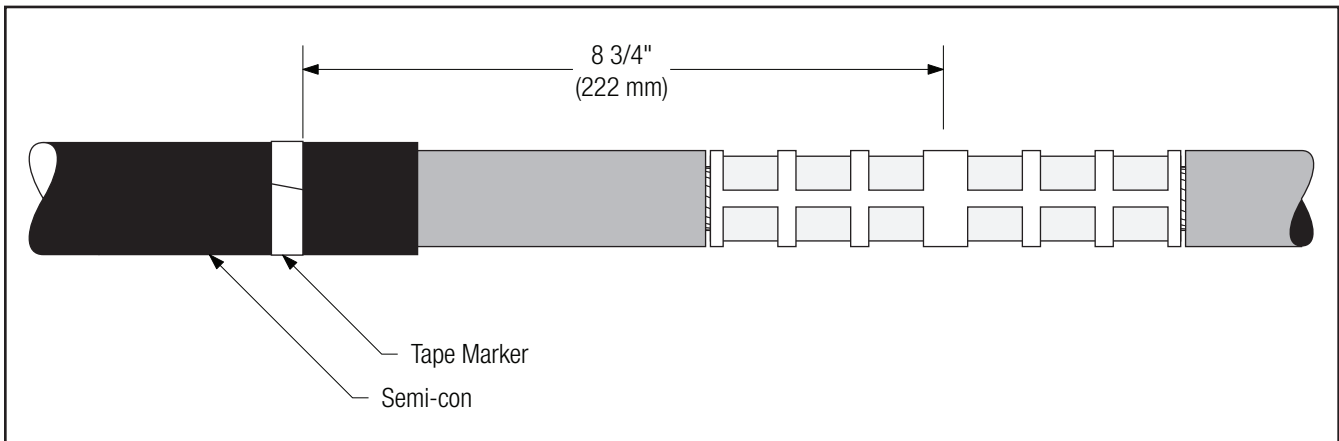


Figure 9

- 4.2 **If using cold shrink adapter tube:** Position adapter tube over the connector. Shrink adapter near center of connector by pulling and unwinding the loose core end in a counter-clockwise direction (*Figure 10*).

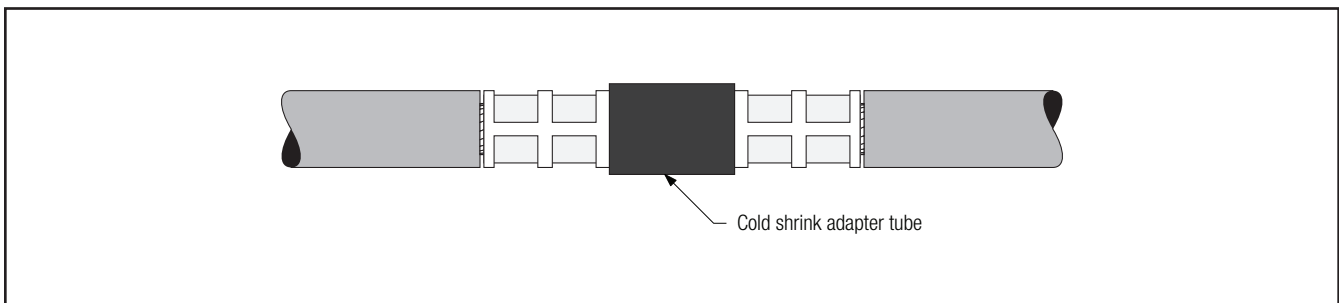


Figure 10

4.3 Clean cables using standard practice:

- a. Do not allow solvent or abrasive to contact the cable semi-conductive insulation shield.
- b. Do not reduce cable insulation diameter below 0.84" (21,3 mm) specified for the splice.
- c. The insulation surface must be round, smooth and free of cuts/voids. Sanding may be necessary, finish sanding should be done with a 300 grit or higher electrical grade abrasive.
- d. Make certain that the cable insulation is smooth, clean and dry before continuing.

4.4 Apply red compound on cable insulations, making certain to fill in edge of cable semi-con. **Do not use silicone grease (Figure 11).**

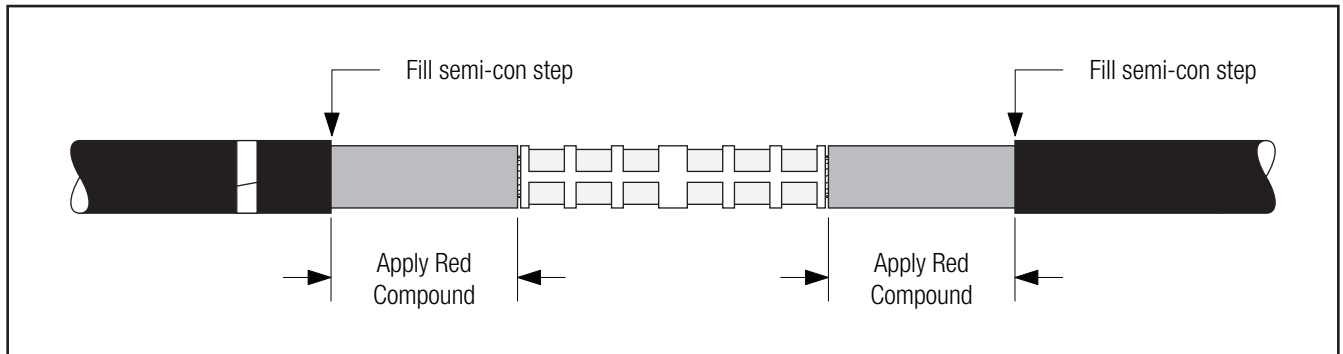


Figure 11

4.5 Position the splice body over connector area, aligning end of the splice body (not the core) at the center of the tape marker. Slowly start to remove the splice core by pulling and unwinding the loose core end counterclockwise, allowing only 1/4" (6 mm) of the splice to shrink onto the tape marker. Carefully slide the splice body off the tape marker by pulling and twisting until the entire tape marker is exposed. Continue removing the core to complete the splice body installation (Figure 12).

**Note:** The splice body ends must overlap onto the semi-con of each cable by at least 1/2" (13 mm).

**Note:** Do not push the splice body toward the tape marker as this may cause the end to roll under. If the end does roll under, DO NOT use sharp-edged tools to pull it out as this could cut and damage the splice.

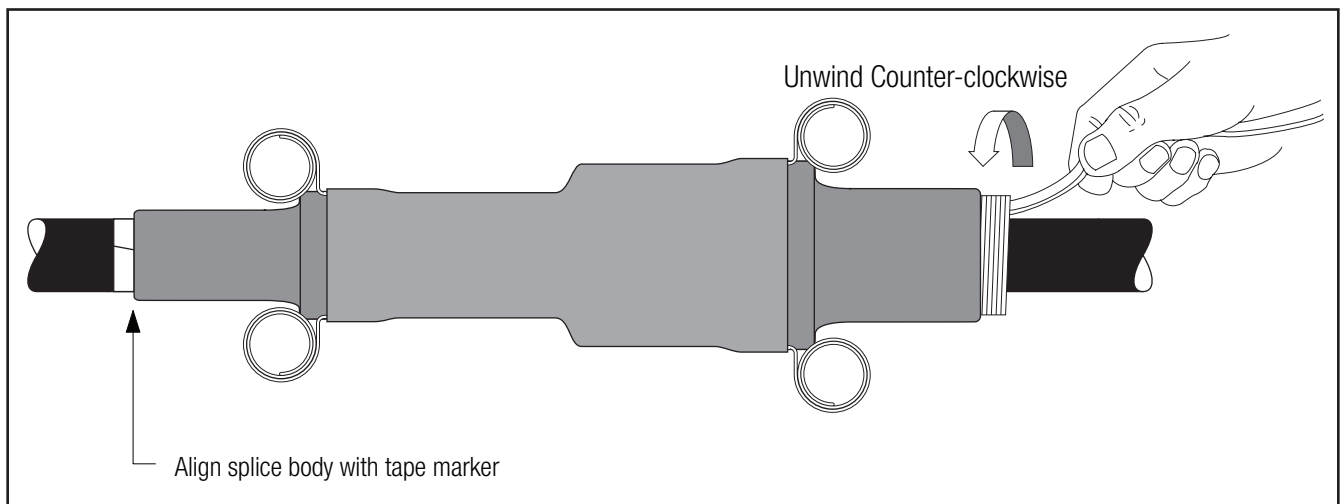


Figure 12

## 5.0 Sealing Jacket on JCN Cables (Optional)

5.1 Wrap a mastic sealing strip against the neutral wires at the end of cable jacket (*Figure 13*).

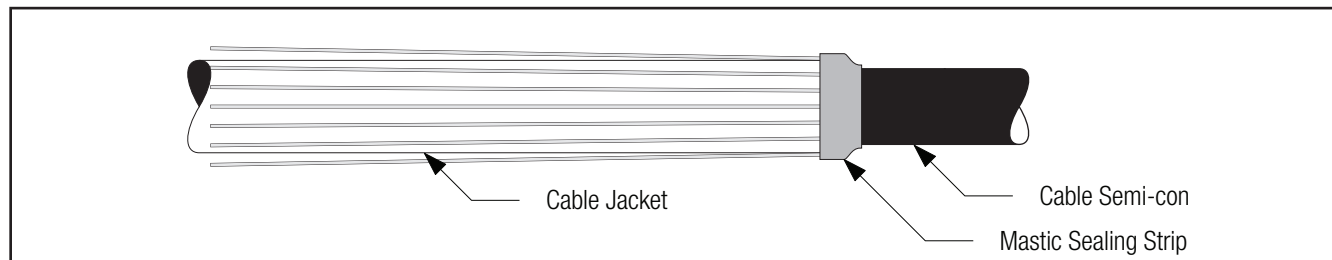


Figure 13

5.2 Fold neutral wires over splice body and wrap another mastic sealing strip over the cable jacket end and the first mastic sealing strip (*Figure 14*).

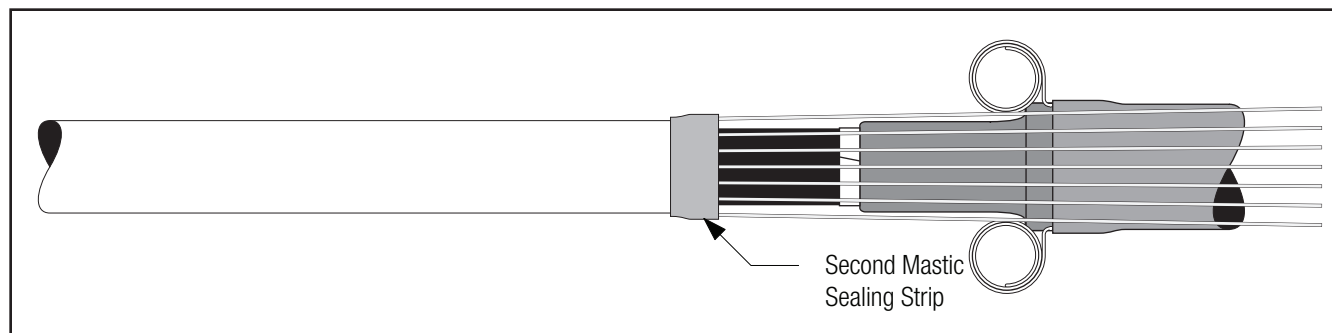


Figure 14

5.3 Cover mastic seals at each cable jacket with two wraps of vinyl tape (*Figure 15*).

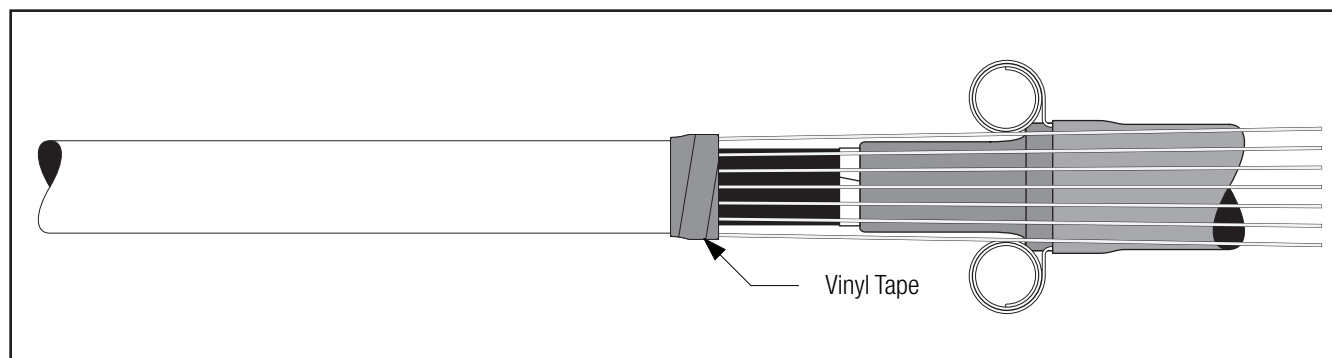


Figure 15



## 6.0 Additional Protection for Splice Body (Optional)

- 6.1 To further enhance protection of splice body from physical damage cover the splice body end seals with Scotch® Rubber Mastic Tape 2228 (not supplied with kit). Beginning 2" (25 mm) on splice wire cover tube apply one half-lapped layer onto the cable semi-con (*Figure 16*).
- 6.2 Overwrap mastic with two half-lapped layers of vinyl tape.

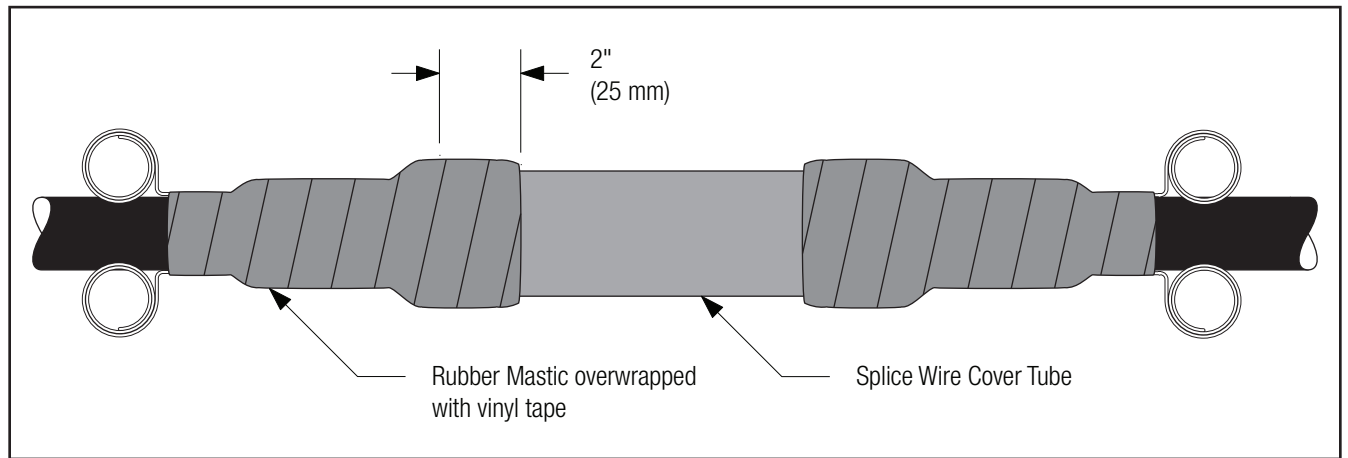


Figure 16

## 7.0 Connect Neutral Wires

- 7.1 Connect neutral wires and splice wires together using an appropriate "C," "H" or butt type connector (*Figure 17*).

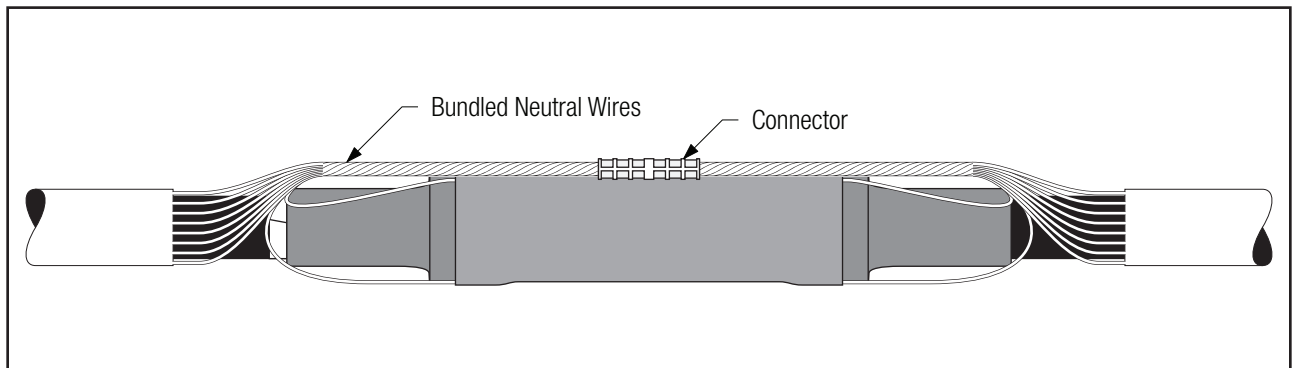


Figure 17

- 7.2 Splice is complete.

## Crimping Tool - Die Sets (number of crimps/end)

3M™ Connector No.	Conductor Size (AWG or kcmil)	Burndy Corporation					Thomas & Betts Corp.				Square D Co. Anderson Div.	Kearney
		MD6	MY29	Y34A	Y35, Y39, Y45*, Y46*	Y1000**	TBM 5	TBM 8	TBM 12	TBM 15	VC6-3** VC6-FT**	Type 0
10004 (Cu)	1	---	1 AWG(1)	A1CR (1)	U1CRT(1)	---	Green(1)	Green(1)	---	37(1)	(1)	---
20004 (Al/Cu)	1	W163(3)	1 AWG(1)	A1CAB(1)	U1CART(1)	(1)	Gold(2)	Gold(2)	---	45(1)	(1)	1/2 (3)
CI-21 (Al/Cu)	1	BG (3)	---	U243(1)	U25ART(1)	---	---	Olive(2)	---	50(2)	(1)	5/8-1 (3)
10005 (Cu)	1/0	W163(2)	1/0(1)	A25R(1)	U25RT(1)	---	Pink(2)	Pink(2)	---	42(2)	(1)	---
20005 (Al/Cu)	1/0	W241(2)	1/0(1)	A25AR(1)	U25ART(1)	(1)	Tan(2)	Tan(2)	---	50(1)	(1)	5/8-1 (3)
CI-1/0 (Al/Cu)	1/0	BG (3)	---	U243 (1)	U25ART(1)	---	---	Olive(2)	---	50(1)	(1)	5/8-1 (3)
10006 (Cu)	2/0	W241(2)	2/0(1)	A26R(1)	U26RT(2)	---	Black(2)	Black(2)	---	45(1)	(1)	---
20006 (Al/Cu)	2/0	BG(4)	2/0(1)	A26AR(2)	U26ART(2)	(1)	Olive(2)	Olive(2)	---	54H(2)	(2)	5/8-1 (3)
11006 (Cu)	2/0	W241(3)	2/0(2)	A26R(2)	U26RT(2)	---	Black(3)	Black(3)	---	45(2)	(2)	---
CI-2/0 (Al/Cu)	2/0	W249(3)	---	---	U28ART(2)	---	---	Blue(4)	---	76(2)	(2)	840 (4)
10007 (Cu)	3/0	W243(2)	3/0(1)	A27R(1)	U27RT(2)	---	Orange(2)	Orange(2)	---	50(1)	(1)	---
20007 (Al/Cu)	3/0	W166(4)	3/0(1)	---	U27ART(2)	(1)	Ruby(2)	Ruby(2)	---	60(2)	(2)	737 (3)
11007 (Cu)	3/0	W243(3)	3/0(2)	A27R(2)	U27RT(3)	---	Orange(3)	Orange(3)	---	50(2)	(2)	---
CI-3/0 (Al/Cu)	3/0	W249(3)	---	---	U28ART(2)	---	---	Blue(4)	---	76(2)	(2)	840 (4)
10008 (Cu)	4/0	BG(3)	4/0(1)	A28R(2)	U28RT(2)	---	Purple(2)	Purple(2)	---	54H(2)	(2)	---
20008 (Al/Cu)	4/0	W660(4)	4/0(2)	A26AR(2)	U28ART(2)	(1)	---	White(4)	---	66(4)	(2)	840 (4)
11008 (Cu)	4/0	BG(4)	4/0(2)	A28R(3)	U28RT(3)	---	Purple(3)	Purple(3)	---	54H(3)	(3)	---
CI-4/0 (Al/Cu)	4/0	W249(3)	---	---	U28ART(2)	---	---	Blue(4)	---	76(2)	(2)	840 (4)
10009 (Cu)	250	W166(3)	250(1)	A29R(2)	U29RT(2)	---	Yellow(2)	Yellow(2)	---	62(2)	(2)	---
20009 (Al/Cu)	250	W249(3)	---	A29AR(2)	U29ART(2)	(1)	---	---	71H(2)	71H(4)	(3)	---
11009 (Cu)	250	W166(4)	250(2)	A29R(3)	U29RT(3)	---	Yellow(3)	Yellow(3)	---	62(3)	(3)	---
CI-250 (Al/Cu)	250	---	---	---	U31ART(2)	---	---	---	87H(2)	87H(2)	(2)	---

\*Y45 and Y46 accept all Y35 dies ("U Series"). For Y45, use PT6515 adapter. For Y46, use PUADP adapter.

\*\*Anderson VC6-3, VC6-FT and Burndy Y1000 require no die set.



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