

3M™ Cold Shrink QT-III Silicone Rubber Indoor Termination Kits

With High-K Stress Relief

For Jacketed Concentric Neutral (JCN) Cable and Concentric Neutral (CN) Cable

7653-T-150, 7655-T-150, 7656-T-150

Instructions

IEEE Std. No. 48

Class 1 Termination

25/28 kV Class

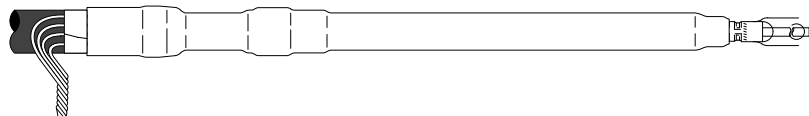
*35 kV Class

150 kV BIL

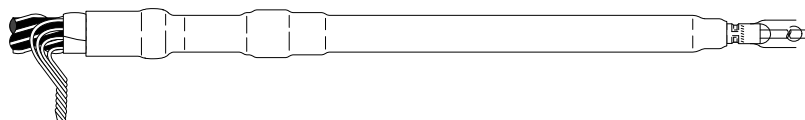
CAUTION

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.

Jacketed Concentric Neutral (JCN) Cable



Concentric Neutral (CN) Cable



1.0 Kit Contents

- 1 High-K, Tracking Resistant, Silicone Rubber Termination
- 2 Strips Scotch® Mastic Strip 2230 (black with white release liners, bagged)
- 1 Instruction Sheet

NOTE: Do not use knives to open plastic bags.

Kit Selection Table

NOTE: Final Determination Factor is cable insulation diameter.

Kit Number	Primary Insulation O.D. Range	Jacket O.D. Range	Conductor Size Range (AWG & kcmil)		
			15 kV	25/28 kV	*35 kV
7653-T-150	0.72" – 1.29" (18,3 – 32,8 mm)	1.04" – 1.60" (26,4 – 40,6 mm)	2/0 – 300 (70 – 150 mm ²)	2 – 4/0 (35 – 120 mm ²)	2 – 2/0 (35 – 70 mm ²)
7655-T-150	1.05" – 1.80" (26,7 – 45,7 mm)	1.39" – 2.40" (35,3 – 61,0 mm)	500 – 1000 (240 – 500 mm ²)	250 – 800 (150 – 400 mm ²)	3/0 – 600 (95 – 325 mm ²)
7656-T-150	1.53" – 2.32" (38,9 – 58,9 mm)	1.84" – 2.80" (46,7 – 71,1 mm)	1250 – 2000 (625 – 1000 mm ²)	900 – 1750 (500 – 800 mm ²)	700 – 1500 (400 – 725 mm ²)

*The 150 kV impulse level meets the impulse requirements for 35 kV class equipment where indoor terminations are used.

Table 1

Instructions for Jacketed Concentric Neutral (JCN) Cable

2.0 Prepare Cable

- 2.1 Check to be sure cable size fits within kit size range as shown in Table 1.
- 2.2 Train cable into position and cut to length required for installation. Allow sufficient neutral wire length for grounding connection.
- 2.3 Prepare cable using dimensions shown in Figure 1. **BE SURE TO ALLOW FOR DEPTH OF TERMINAL LUG.**

NOTE: Provide an additional exposed conductor distance to account for growth during crimping of ALUMINUM lugs or connectors as follows:

Aluminum Lug and Connector Growth Allowance	2 - 350	400 - 650	750 - 1000	1250 - 2000
	1/4" (6 mm)	1/2" (13 mm)	3/4" (19 mm)	Field Determined

NOTE: It is imperative to remove all remnants of the semi-con layer, even if the semi-con layer comes off as one layer. There should not be any remaining black areas, or particles, on the cable insulation layer.

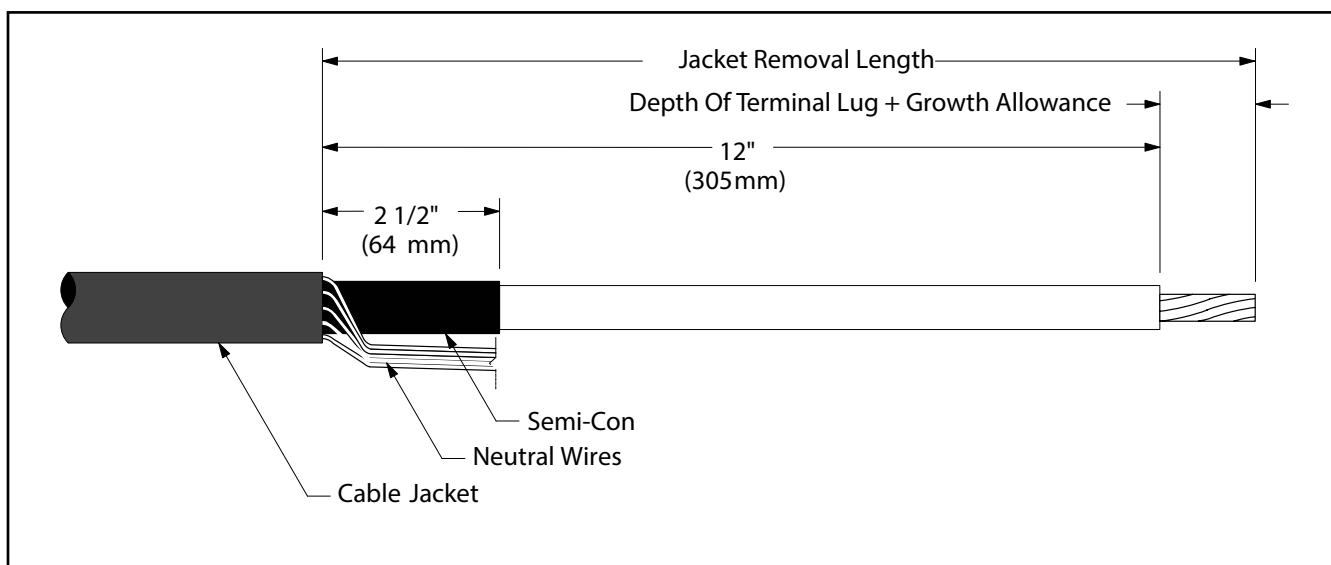


Figure 1

- 2.4 Select a Scotch® Mastic Strip 2230 from kit and remove white release liners. Using light tension, apply a **SINGLE WRAP** of mastic around the cable jacket 1/4" (6 mm) from cut edge (Figure 2). Cut off excess.

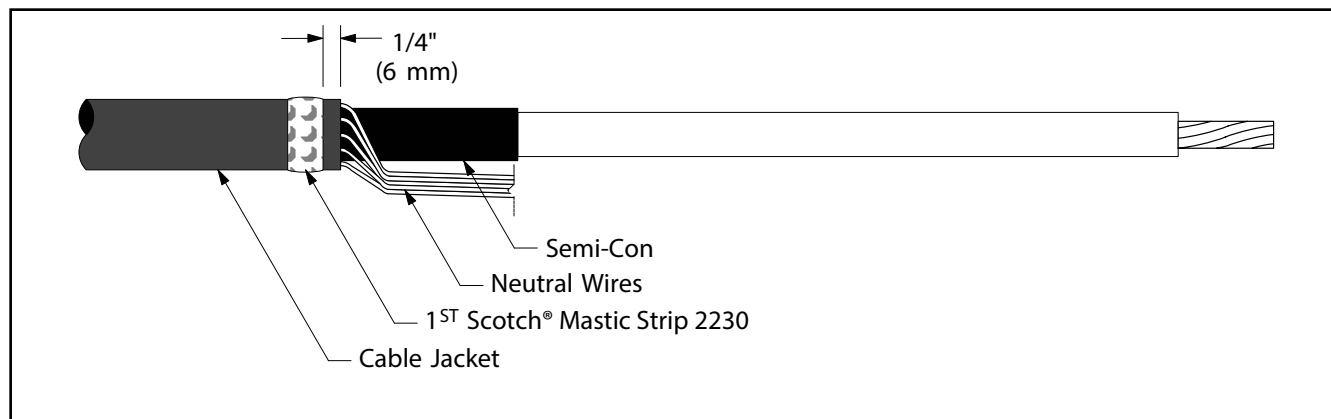


Figure 2

2.5 Bend neutral wires back over applied sealing mastic and secure to cable jacket 4 1/2" (114 mm), below cable semi-con edge using vinyl tape (Figure 3).

NOTE: Position vinyl tape with care, it also serves as a marker for positioning the termination.

2.6 Select second Scotch® Mastic Strip 2230 from kit and remove white release liners. Apply a second **SINGLE WRAP** of mastic over the neutral wires and previously applied mastic (Figure 3). Cut off excess.

2.7 Compress neutral wires into Scotch® Mastic Strip 2230 by over-wrapping seal strips with two highly stretched layers of electrical grade vinyl tape (Figure 3). **Be sure to cover all exposed mastic.**

NOTE: If using flat strap neutral cable, cover the flat strap neutral wires starting 1" (25 mm) from the Vinyl Tape Marker (that was applied in Step 2.5) and proceed towards the edge of the semi-con layer where the flat strap neutrals are bent back onto the jacket, using two half-lapped layers of electrical grade vinyl tape. The vinyl tape can extend onto the semi-con layer up to 1/4" (6 mm).

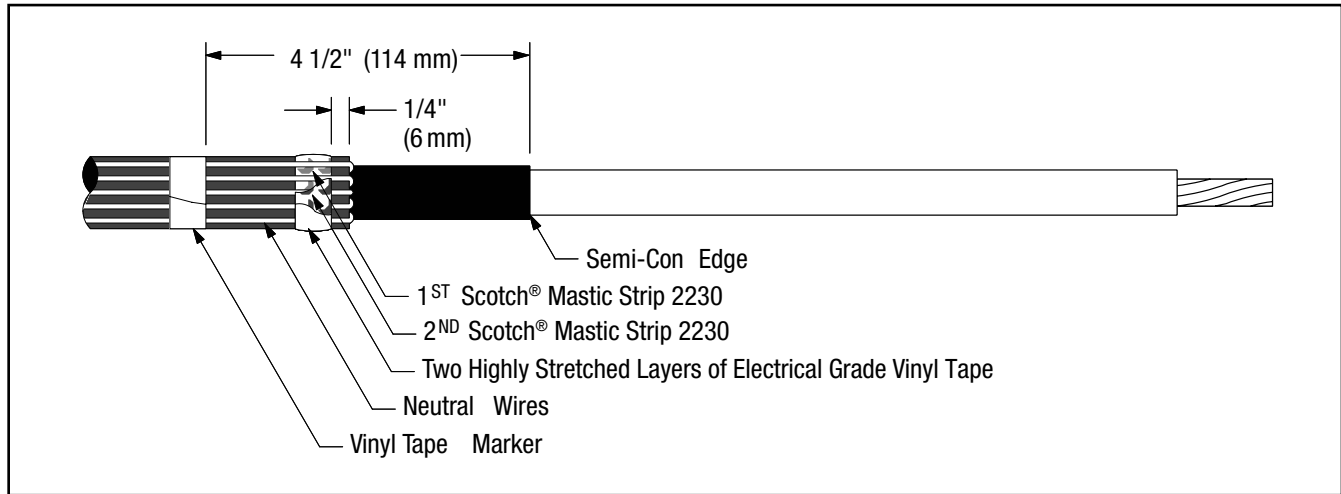


Figure 3

3.0 Install Lug or Connector

Important Packaging Notice

In order to make sure that you receive an undamaged termination, this 3M™ Cold Shrink QT-III Termination is packed with a RED SHIPPING CORE inside of the white core. Please remove the red shipping core BEFORE you install the termination. This shipping core can be recycled with other polypropylene waste.

3.1 Check to insure 3M™ Cold Shrink QT-III Silicone Rubber Termination assembly fits over the selected lug or connector. If lug or connector (Figure 4) will not fit through the termination core, clean the insulation (per Step 4.0) and slide termination on cable before installing lug or connector. **DO NOT REMOVE CORE AT THIS TIME.**

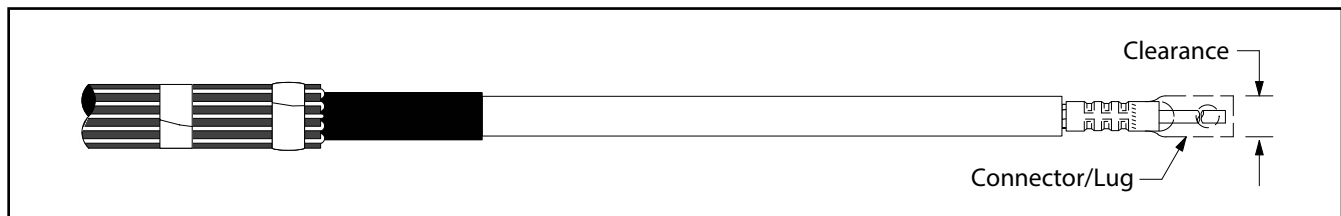


Figure 4

NOTE: Refer to pages 10 - 12 for 3M™ Lug and Connector crimping information.

NOTE: For Aluminum Conductors - Thoroughly wire brush conductor strands to remove aluminum oxide layer. Immediately insert conductor into lug or connector barrel as far as it will go.

- 3.2 Position connector or lug and crimp according to manufacturer's directions. Remove excess oxide inhibitor and sharp crimp flashings following crimping.

4.0 Clean Cable Insulation and Lug or Connector Barrel Using Standard Practice

- 4.1 Wipe the cable insulation with an approved solvent (such as 3M™ Cable Cleaning Solvent CC Series). **DO NOT ALLOW SOLVENT TO TOUCH SEMI-CON INSULATION SHIELD!**
- 4.2 If abrasive must be used:
- Use on insulation only. **DO NOT USE ABRASIVE ON SEMI-CON INSULATION SHIELD!**
 - Use only aluminum oxide abrasive; grit 120 or finer.
 - Be careful not to reduce the cable insulation diameter below that allowed by the kit.

5.0 Install Termination

- 5.1 Slide the termination body onto the cable and remove core. Pull while unwinding counterclockwise starting with the loose end (Figure 5). Make sure the termination body (not the core) is butted up to the edge of the vinyl tape marker previously applied (Figure 5).

NOTE: Once the termination body makes contact over the mastic seal area, there is no need to continue supporting the assembly. DO NOT PUSH OR PULL ON THE TERMINATION ASSEMBLY WHILE UNWINDING THE CORE.

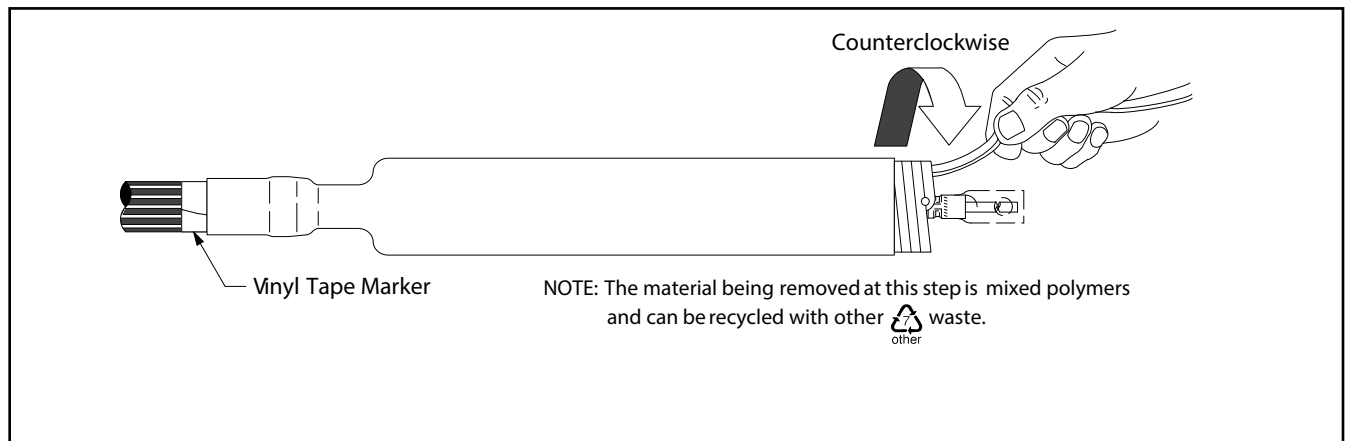


Figure 5

- 5.2 Collect all concentric neutral wires together (Figure 6) and connect to system ground according to standard practice.

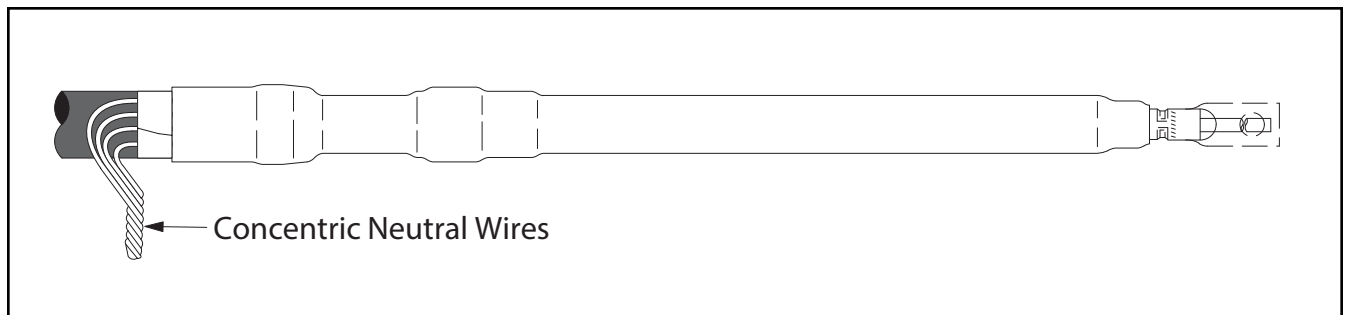
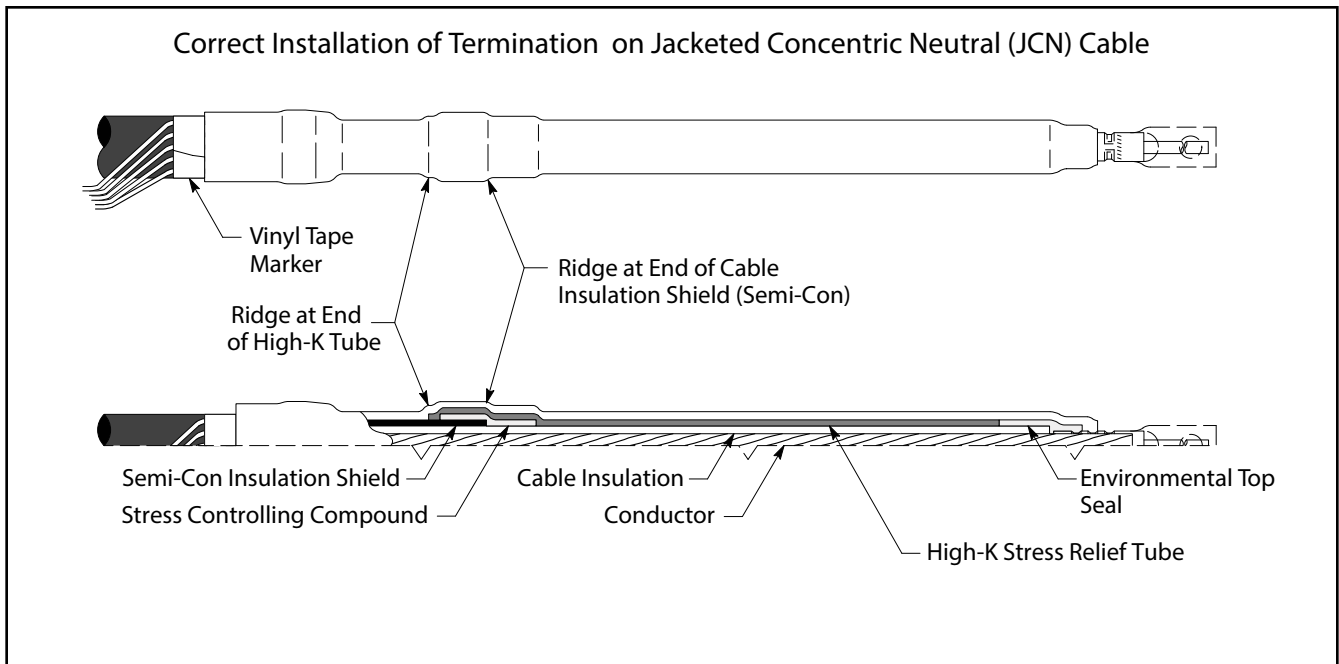


Figure 6



Instructions for Concentric Neutral (CN) Cable

6.0 Prepare Cable

- 6.1 Check to be sure cable size fits within kit range as shown in Table 1.
- 6.2 Train cable into position and cut to length required for installation. Allow sufficient neutral wire length for grounding connection.
- 6.3 Prepare cable using dimensions shown in Figure 7. **BE SURE TO ALLOW FOR DEPTH OF TERMINAL LUG.**

NOTE: Provide an additional exposed conductor distance to account for growth during crimping of ALUMINUM lugs or connectors as follows:

Aluminum Lug and Connector Growth Allowance	2 - 350	400 - 650	750 - 1000	1250 - 2000
	1/4" (6 mm)	1/2" (13 mm)	3/4" (19 mm)	Field Determined

NOTE: It is imperative to remove all remnants of the semi-con layer, even if the semi-con layer comes off as one layer. There should not be any remaining black areas, or particles, on the cable insulation layer.

- 6.4 Secure neutral wires to cable with several highly stretched layers of electrical grade vinyl tape around the cable and neutral wires 2 3/4" (69,9 mm) from cut edge of cable semi-con (Figure 7).
- 6.5 Select a Scotch® Mastic Strip 2230 from kit and remove white release liners. Using light tension, apply a **SINGLE WRAP** of mastic around the cable and neutral wires 2 3/4" (69,9 mm) from cut edge of cable semi-con, directly on top of vinyl tape (Figure 7). Cut off excess.

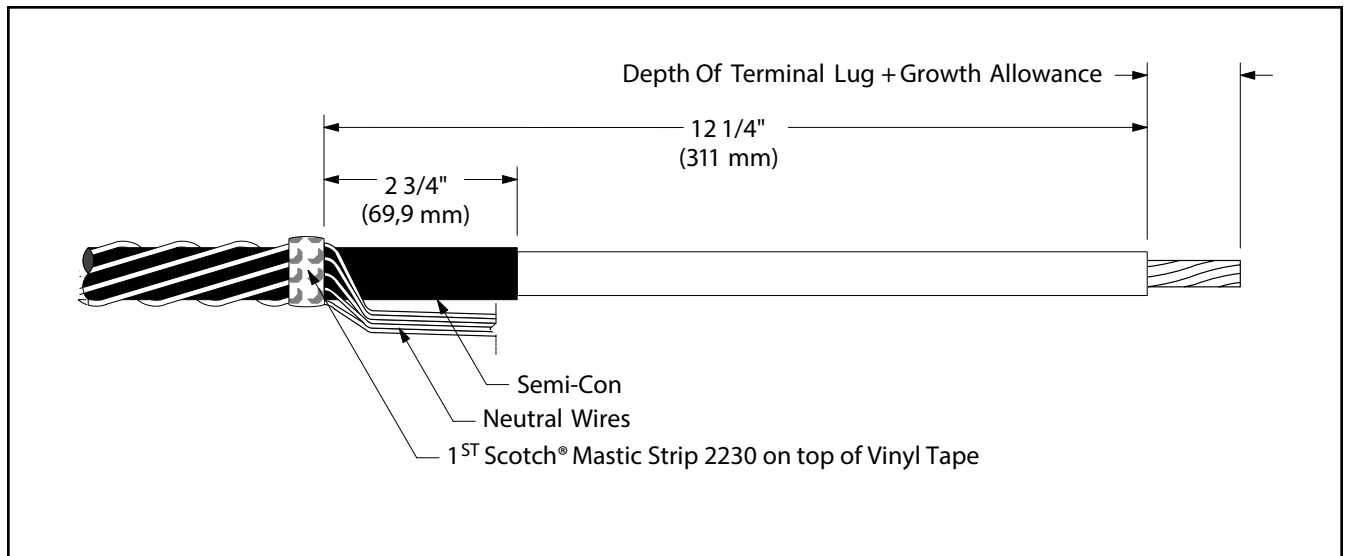


Figure 7

- 6.6 Bend neutral wires back over applied sealing mastic and secure to cable $4\frac{1}{2}$ " (114 mm), below cable semi-con edge using vinyl tape (Figure 8).

NOTE: Position vinyl tape with care, it also serves as a marker for positioning the termination.

- 6.7 Select second Scotch® Mastic Strip 2230 from kit and remove white release liners. Apply a second **SINGLE WRAP** of mastic over the neutral wires and previously applied mastic (Figure 8). Cut off excess.
- 6.8 Compress neutral wires into mastic by over-wrapping seal strips with two highly stretched layers of electrical grade vinyl tape (Figure 8). **Be sure to cover all exposed mastic.**

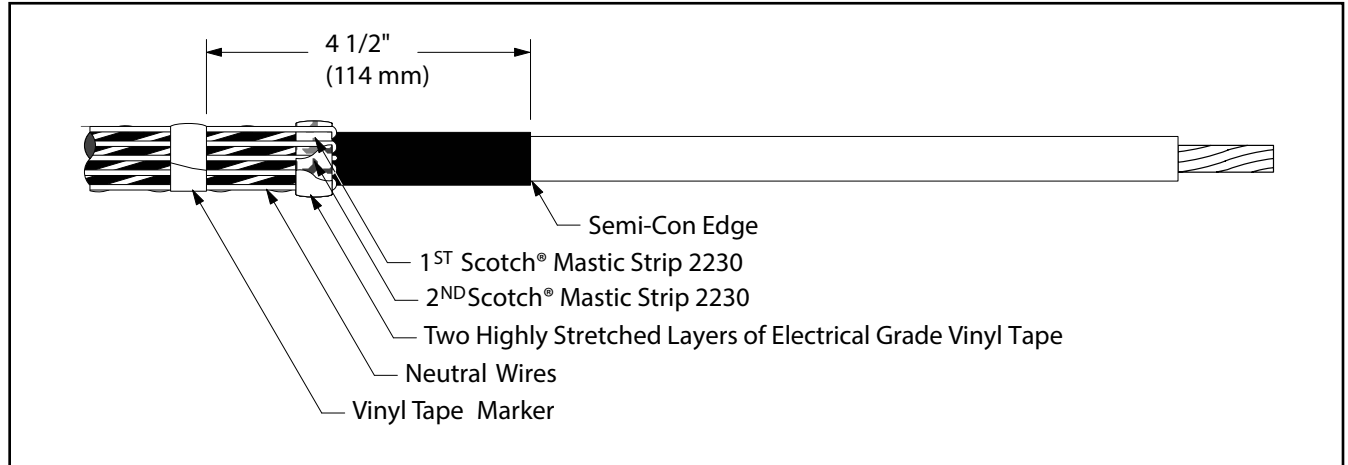


Figure 8

7.0 Install Lug or Connector

Important Packaging Notice

In order to make sure that you receive an undamaged termination, this 3M™ Cold Shrink QT-III Termination is packed with a RED SHIPPING CORE inside of the white core. Please remove the red shipping core BEFORE you install the termination. This shipping core can be recycled with other polypropylene waste.

- 7.1 Check to insure 3M™ Cold Shrink QT-III Silicone Rubber Termination assembly fits over the selected lug or connector. If lug or connector (Figure 9) will not fit through the termination core, clean the insulation (per Step 8.0) and slide termination on cable before installing lug or connector. **DO NOT REMOVE CORE AT THIS TIME.**

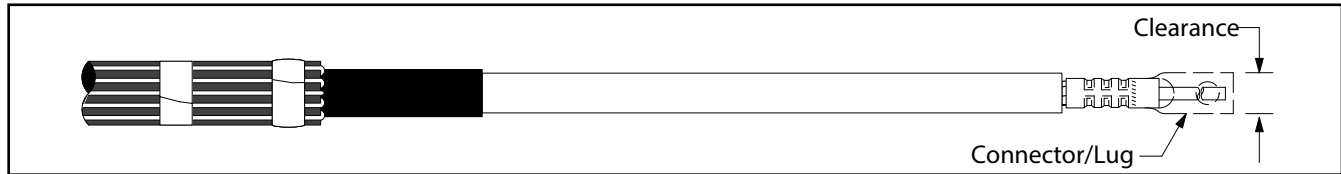


Figure 9

NOTE: Refer to pages 10 - 12 for 3M™ Lug and Connector crimping information.

NOTE: For Aluminum Conductors - Thoroughly wire brush conductor strands to remove aluminum oxide layer. Immediately insert conductor into lug or connector barrel as far as it will go.

- 7.2 Position connector or lug and crimp according to manufacturer's directions. Remove excess oxide inhibitor and sharp crimp flashings following crimping.

8.0 Clean Cable Insulation and Lug or Connector Barrel Using Standard Practice

- 8.1 Wipe the cable insulation with an approved solvent (such as 3M™ Cable Cleaning Solvent CC Series). **DO NOT ALLOW SOLVENT TO TOUCH SEMI-CON INSULATION SHIELD!**
- 8.2 If abrasive must be used:
- Use on insulation only. **DO NOT USE ABRASIVE ON SEMI-CON INSULATION SHIELD!**
 - Use only aluminum oxide abrasive; grit 120 or finer.
 - Be careful not to reduce the cable insulation diameter below that allowed by the kit.

9.0 Install Termination

- 9.1 Slide the termination body onto the cable and remove core. Pull while unwinding, counterclockwise, starting with the loose end (Figure 10). Make sure the termination body (not the core) is butted up to the edge of the vinyl tape marker previously applied (Figure 10).

NOTE: Once the termination body makes contact over the mastic seal area, there is no need to continue supporting the assembly. DO NOT PUSH OR PULL ON THE TERMINATION ASSEMBLY WHILE UNWINDING THE CORE.

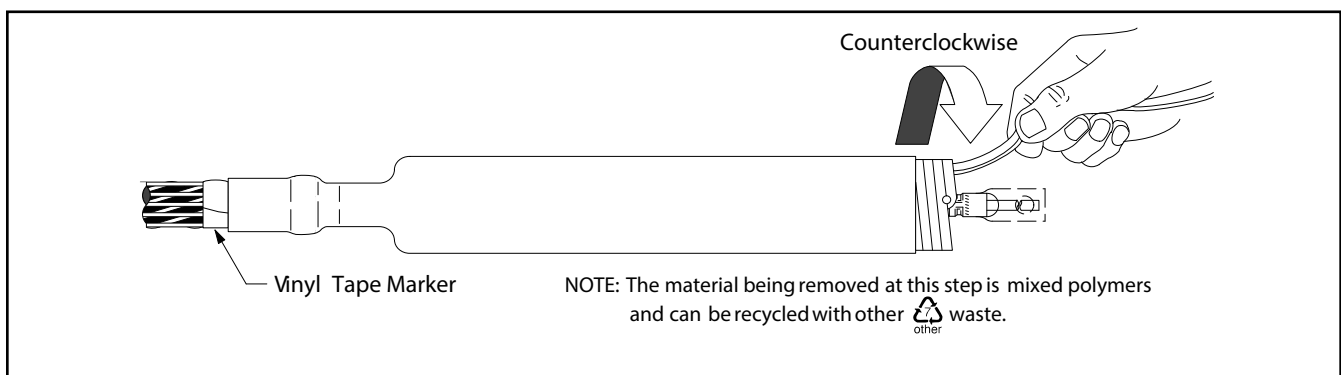


Figure 10

- 9.2 Collect all concentric neutral wires together (Figure 11) and connect to system ground according to standard practice.

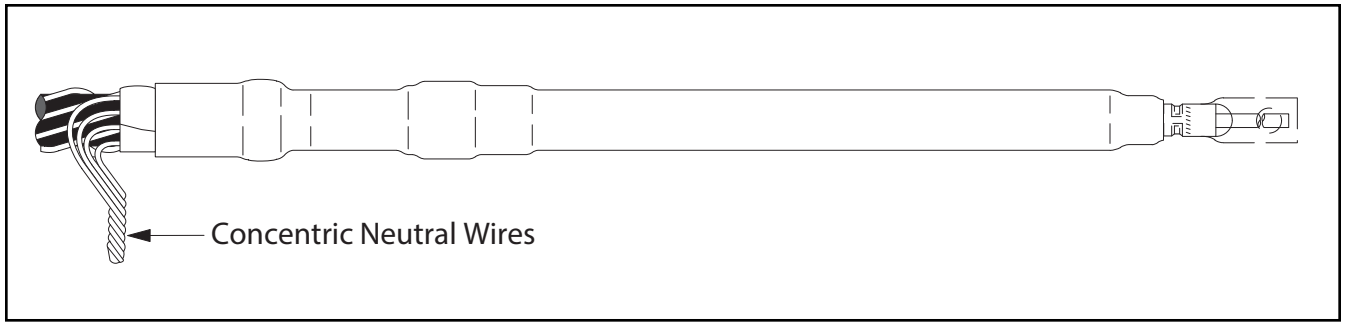
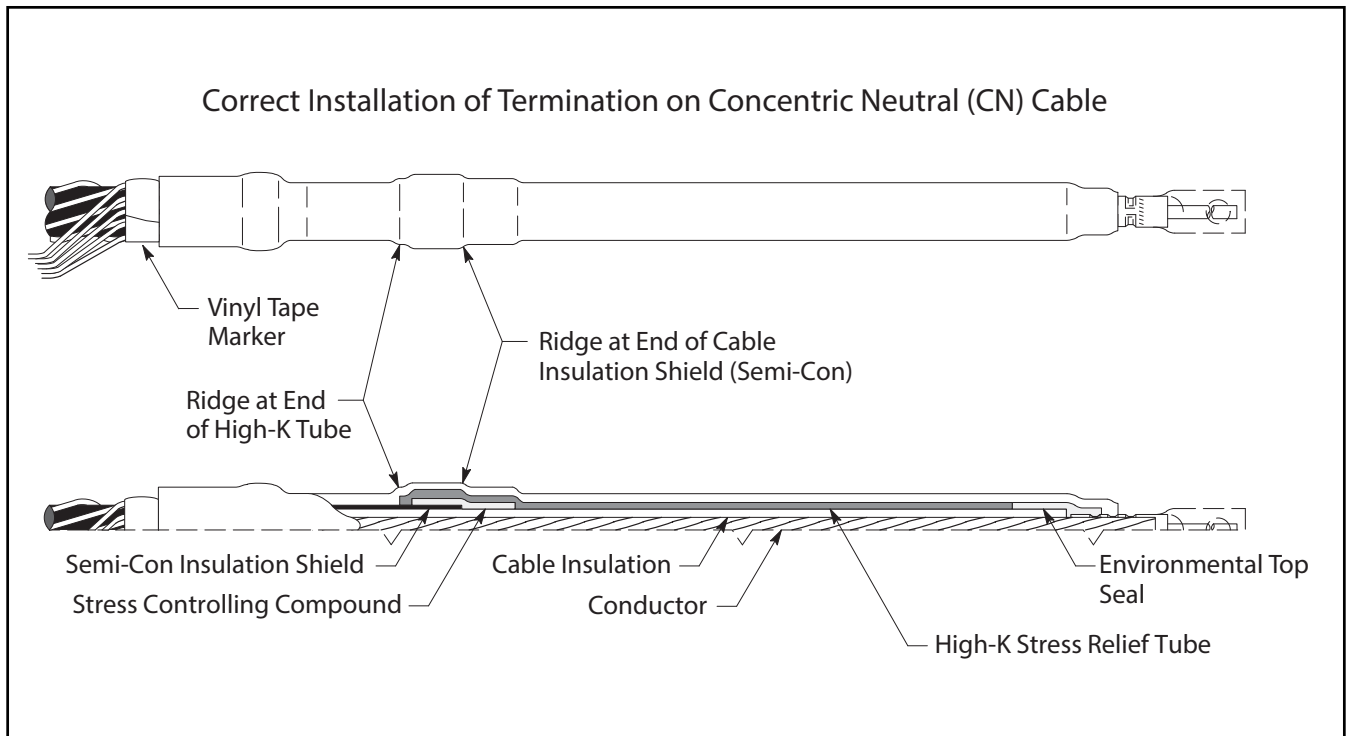
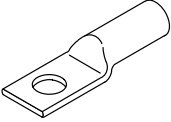
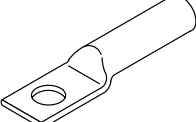
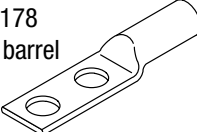


Figure 11



Tooling Index

Lug and Crimping Information for 3M™ Scotchlok™ Copper Lugs		
30014 thru 30045 One hole 	31036 thru 31068 One hole-long barrel 	31145 thru 31178 Two hole-long barrel 

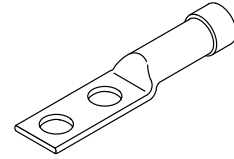
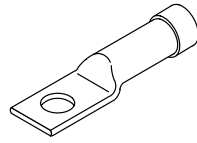
Cable Size AWG/ kcmil	Stud Size (in.)	3M™ Scotchlok™ Copper Lug Number	Crimping Tool-Die Sets (Minimum Number Of Crimps)							
			Burdny Corporation				Thomas & Betts Corporation			Square D Co. Anderson Div.
			MD6	MY29	Y34A	Y35, Y39, Y45*, Y46*	TBM 5	TBM 8	TBM 15	VC6-3, VC6-FT**
6	10 1/4 5/16	30014 30015 30016	–	6AWG(1)	–	U5CRT(1)	Blue(1)	Blue(1)	–	(1)
4	10 1/4 3/8	30018 30019 30021	W161(1)	4AWG(1)	A4CR(1)	U4CRT(1)	Grey(1)	Grey(1)	–	(1)
2	1/4 5/16 3/8	30022 30023 30024	W162(2)	2AWG(1)	A2CR(1)	U2CRT(2)	Brown(1)	Brown(1)	33(1)	(2)
1	5/16 3/8	30027 30028	–	1AWG(1)	A1CR(1)	U1CRT(2)	Green(1)	Green(1)	37(1)	(2)
1/0	5/16 3/8	30031 30032	W163(2)	1/0(1)	A25R(1)	U25RT(1)	Pink(2)	Pink(2)	42H(2)	(1)
2/0	3/8 3/8	30036 31036	W241(2) W241(3)	2/0(1) 2/0(2)	A26R(1) A26R(2)	U26RT(2) U26RT(3)	Black(2) Black(3)	Black(2) Black(3)	45(1) 45(2)	(1) (2)
3/0	1/2 1/2	30041 31041	W243(2) W243(3)	3/0(1) 3/0(2)	A27R(1) A27R(2)	U27RT(2) U27RT(3)	Orange(2) Orange(3)	Orange(2) Orange(3)	50(1) 50(2)	(2) (3)
4/0	1/2 1/2 1/2	30045 31045 31145	BG(3) BG(4) BG(4)	4/0(1) 4/0(2) 4/0(2)	A28R(2)	U28RT(2) U28RT(3) U28RT(3)	Purple(2) Purple(3) Purple(3)	Purple(2) Purple(3) Purple(3)	54H(2) 54H(3) 54H(3)	(2) (3) (3)
250	1/2 1/2	31049 31149	W166(4)	250(2)	A29R(2)	U29RT(3)	Yellow(2)	Yellow(2)	62(2)	(2)
300	1/2 1/2	31053 31153	–	–	A30R(2)	U30RT(3)	–	White(3)	66(3)	(3)
350	1/2 1/2	31056 31156	–	–	A31R(2)	U31RT(3)	–	Red(4)	71H(4)	–
400	1/2 1/2	31060 31160	–	–	A32R(2)	U32RT(3)	–	Blue(4)	76H(4)	–
500	1/2 5/8 1/2	31066 31067 31166	–	–	A34R(2)	U34RT(3)	–	Brown(4)	87H(4)	–
600	1/2 1/2	31068 31168	–	–	–	U36RT(3)	–	Green(4)	94H(4)	–
750	1/2	31172	–	–	–	Y39, Y45, Y46 U39RT(5)	–	–	106H(4)	–
1000	1/2	31178	–	–	–	Y45: S44RT(6) Y46: P44RT(6)	–	–	125H(4)	–

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

** Anderson VC6-3 and VC6-FT require no die set.

Tooling Index

Lug and Crimping Information for 3M™ Scotchlok™ Copper/Aluminum Lugs															
40016 thru 40079 One hole								40132 thru 40178 Two hole							



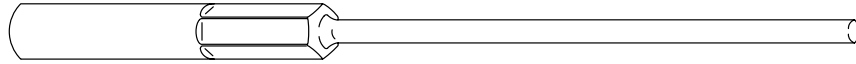
Cable Size AWG/ kcmil	Stud Size (in.)	3M™ Scotchlok™ Lug Number	Crimping Tool-Die Sets (Minimum Number Of Crimps)												
			Burdny Corporation					Thomas & Betts Corporation				Square D Co. Anderson Div.		ITT Blackburn Co.	Kearny Nat'l Div.
			MD6	MY29	Y34A	Y35, Y39, Y45*, Y46*	Y1000**	TBM 5	TBM 8	TBM 12	TBM 15	VC6-3** VC6-FT**	VC8C**	OD58	TYPE 0
6	5/16	40016	W161(1)	6AWG(1)	A6CAB(1)	U6CABT(1)	(1)	Grey(1)	Grey(1)	-	29(1)	(1)	-	BY19(3)	J(3)
4	5/16	40020	W162(3)	4AWG(1)	A4CAB(1)	U4CABT(1)	(1)	Green(2)	Green(2)	-	37(1)	(1)	-	BY53(3)	P(3)
2	3/8	40024	W163(3)	2AWG(1)	A2CAB(1)	U2CABT(1)	(1)	Pink(2)	Pink(2)	-	42H(2)	(1)	-	BY23(3)	1/2(3)
	1/2	40025	W163(3)	2AWG(1)	A2CAB(1)	U2CABT(1)	(1)	Pink(2)	Pink(2)	-	42H(2)	(1)	-	BY23(3)	1/2(3)
1	3/8	40028	W163(3)	1AWG(1)	A1CAR(1)	U1CART(1)	(1)	Gold(2)	Gold(2)	-	45(1)	(1)	-	BY23(3)	1/2(3)
	1/2	40029	W163(3)	1AWG(1)	A1CAR(1)	U1CART(1)	(1)	Gold(2)	Gold(2)	-	45(1)	(1)	-	BY23(3)	1/2(3)
1/0	3/8	40032	W241(3)	1/0(1)	A25AR(1)	U25ART(1)	(1)	Tan(2)	Tan(2)	-	50(1)	(1)	-	BY25(3)	5/8-1(3)
	1/2	40033	W241(3)	1/0(1)	A25AR(1)	U25ART(1)	(1)	Tan(2)	Tan(2)	-	50(1)	(1)	-	BY25(3)	5/8-1(3)
	3/8	40132	W241(3)	1/0(1)	A25AR(1)	U25ART(1)	(1)	Tan(2)	Tan(2)	-	50(1)	(1)	-	BY25(3)	5/8-1(3)
2/0	1/2	40037	BG(4)	2/0(1)	A26AR(2)	U26ART(2)	(1)	Olive(2)	Olive(2)	-	54H(2)	(2)	-	BY31C(3)	5/8-1(3)
	1/2	40137	BG(4)	2/0(1)	A26AR(2)	U26ART(2)	(1)	Olive(2)	Olive(2)	-	54H(2)	(2)	-	BY31C(3)	5/8-1(3)
3/0	1/2	40041	W166(4)	3/0(1)	A27AR(2)	U27ART(2)	(1)	Ruby(2)	Ruby(2)	-	60(2)	(2)	-	-	737(3)
	1/2	40141	W166(4)	3/0(1)	A27AR(2)	U27ART(2)	(1)	Ruby(2)	Ruby(2)	-	60(2)	(2)	-	-	737(3)
4/0	1/2	40045	W660(4)	4/0 (2)	A28AR(2)	U28ART(2)	(1)	-	White(4)	-	66(4)	(2)	-	BY35C(4)	840(4)
	5/8	40046	W660(4)	4/0 (2)	A28AR(2)	U28ART(2)	(1)	-	White(4)	-	66(4)	(2)	-	BY35C(4)	840(4)
	1/2	40145	W660(4)	4/0 (2)	A28AR(2)	U28ART(2)	(1)	-	White(4)	-	66(4)	(2)	-	BY35C(4)	840(4)
250	1/2	40049	W249(3)	-	A29AR(2)	U29ART(2)	(1)	-	-	71H(4)	71H(2)	(3)	-	-	-
	5/8	40050	W249(3)	-	A29AR(2)	U29ART(2)	(1)	-	-	71H(4)	71H(2)	(3)	-	-	-
	1/2	40149	W249(3)	-	A29AR(2)	U29ART(2)	(1)	-	-	71H(4)	71H(2)	(3)	-	-	-
300	1/2	40053	-	-	A30AR(2)	U30ART(2)	(1)	-	-	76H(4)	76H(2)	(3)	-	-	-
	1/2	40153	-	-	A30AR(2)	U30ART(2)	(1)	-	-	76H(4)	76H(2)	(3)	-	-	-
350	1/2	40056	-	-	-	U31ART(2)	(1)	-	-	87H(4)	87H(3)	(3)	-	-	-
	5/8	40057	-	-	-	U31ART(2)	(1)	-	-	87H(4)	87H(3)	(3)	-	-	-
	1/2	40156	-	-	-	U31ART(2)	(1)	-	-	87H(4)	87H(3)	(3)	-	-	-
400	1/2	40160	-	-	-	U32ART(4)	(1)	-	-	94H(4)	94H(4)	-	(2)	-	-
500	5/8	40067	-	-	-	U34ART(4)	(1)	-	-	106H(4)	106H(3)	-	(2)	-	-
	1/2	40166	-	-	-	U34ART(4)	(1)	-	-	106H(4)	106H(3)	-	(2)	-	-
600	1/2	40170	-	-	-	U36ART(4)	(1)	-	-	-	115H(3)	-	(3)	-	-
750	5/8	40073	-	-	-	U39ART(4)	(1)	-	-	-	125H(4)	-	(3)	-	-
	1/2	40172	-	-	-	U39ART(4)	(1)	-	-	-	125H(4)	-	(3)	-	-
1000	5/8	40079	-	-	-	S44ART(4)	(1)	-	-	-	140H(4)	-	(3)	-	-
	1/2	40178	-	-	-	S44ART(4)	(1)	-	-	-	140H(4)	-	(3)	-	-

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

** Anderson VC6-3, VC6-FT, VC8C and Burndy Y1000 require no die set.

Tooling Index

Crimping Information for
3M™ Stem Connectors
Copper/Aluminum



Conductor Size AWG & kcmil		3M™ Connector Number	Crimping Table For 3M™ Stem Type Connector				
Stranded	Solid		Recommended Crimping Tools				
			Manufacturer	Mech. Tool	Die (Minimum No. Crimps)	Hydraulic	Die (Minimum No. Crimps)
2, 1 4 1/0	1, 1/0 2 2/0	SC0001 SC0002 SC0010	Burndy	MD6	BG(4), W241(3)	Y35, Y39, Y45*, Y46*	U25ART(2), U243(2)
			Kearny	0–51, 0–52	5/8–1 (4)	WH–1, WH–2	5/8–1(4)
			T & B	TBM 5	Tan(2)	–	–
			T & B	TBM 8	Olive(2), Tan(2)	TBM 15	50(2)
			Anderson	–	–	VC6**	(2)
2/0 3/0 4/0	3/0 4/0 –	SC0020 SC0030 SC0040	Burndy	MD6	W249(3)	Y35, Y39, Y45*, Y46*	U28ART(2)
			Kearny	0–51, 0–52	840(5)	WH–1, WH–2	840(2)
			T & B	TBM 8	Red(4)	TBM 15	71H(3)
			Anderson	–	–	VC6**	(2)

* Y45 and Y46 accept all Y35 dies (“U” series). For Y45 use PT6515 adapter. For Y46 use PUADP adapter.

** Anderson VC6 is dieless and does not require a die set.

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78-8126-0932-5 Rev F