3M™ Cold Shrink Silicone Rubber Termination QT-III
7600-S-3G Series Three-Core Outdoor Termination

Instructions

IEEE Std. No. 48
Class 1 Termination

⚠️ CAUTION
Working around energized electrical 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 Contents

1 Cold Shrink Silicone Rubber Breakout Boot Assembly
1 Cold Shrink Silicone Rubber Jacket Seal Assembly
3 Silicone Rubber Phase Re-jacketing Sleeve Assembly
3 Cold Shrink Silicone Rubber Termination Assembly
1 Tinned Copper Ground Braid Assembly
3 Constant-Force Spring (Small)
1 Constant-Force Spring (Large)
8 Mastic Seal Strip
(2 per termination bag & 2 per breakout boot bag)
1 Roll, Scotch® Super 33+™ Vinyl Electrical Tape - 3/4"
1 Roll, Scotch® Vinyl Electrical Tape Super 88 - 1-1/2"
1 Roll, Scotch® Electrical Shielding Tape 24
1 Cable Preparation Kit
1 Installation Instructions

**3M™ Cold Shrink Termination QT-III Application Ranges**

(Final determining factor is cable insulation diameter.)

<table>
<thead>
<tr>
<th>Kit Number</th>
<th>BIL (kV)</th>
<th>Cable Insulation Range [Inch (mm)]</th>
<th>Cable O.D. Max</th>
<th>Conductor Size Range</th>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5 kV 100% 133% 8.7 kV 100% 133% 15 kV 100% 133%</td>
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<tr>
<td>7620-S2-3G</td>
<td>95</td>
<td>0.33–0.50 (8.40–12.7)</td>
<td>2.20</td>
<td>8-2 6-4 6-4 -- --</td>
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<tr>
<td>7621-S2-3G</td>
<td>95</td>
<td>0.50–0.70 (12.7–17.8)</td>
<td>2.80</td>
<td>1-3/0 2-2/0 2-2/0 2-1 --</td>
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<td>110</td>
<td>0.70–0.92 (17.8–23.4)</td>
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<td>4/0-350 3/0-350 3/0-350 1/0-4/0 2-3/0</td>
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<tr>
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<td>150</td>
<td>0.50–0.70 (12.7–17.8)</td>
<td>2.80</td>
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<tr>
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<td>3.30</td>
<td>4/0-350 3/0-350 3/0-350 1/0-4/0 2-3/0</td>
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<tr>
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<td>3.90</td>
<td>2/0-250 1-4/0 -- --</td>
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<td>350-500 250-500 -- --</td>
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<td>3.90</td>
<td>2/0-250 1-4/0 1/0-3/0 --</td>
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<td>4.50</td>
<td>350-500 250-500 4/0-500 1/0-350</td>
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<tr>
<td>7686-S8-3G</td>
<td>200</td>
<td>1.53–1.70 (38.9–43.2)</td>
<td>5.40</td>
<td>750 500-750 500-750 350-500</td>
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</table>
1.0 Prepare Cable

1.1 Determine phase (core) length required for correct phase spacing and bolted terminal lug connections (A + B Figure 1, according to the longest phase to be connected). Allow for dimension C as needed.

Note: Individual phase length and separation dimensions vary according to specific installation and equipment design requirements. They must, therefore, be determined by the installer and must conform to accepted engineering practices. Max phase length = 4 ft + termination length (from table in Figure 18, page 11)

1.2 Remove cable jacket, armor, bedding (inner sheath) and core fillers according to Figure 1 dimensions. Secure copper tape shield ends with temporary vinyl tape bands (Figure 1).

Note: Do not discard leftover jacket material.
2.0 Install Shield Grounding Braid Assembly & Re-route Cable Ground Wire(s)

2.1 Position ground braid assembly over cable with assembly connector aligned to edge of armor (Figure 2).

*Note: For single ground wire cables, apply assembly to side opposite cable ground wire. Assembly connector should not overlap armor.*

*Hint: Use temporary vinyl tape wraps as needed to assist in holding braid assembly to cable (Figure 2).*

2.2 Attach Ground Braid Assembly Legs to Cable Phase Metallic Shields

(a.) **Short (Center) Braid Tail** – Position ground braid assembly as shown (Figure 2). Wrap short, center ground braid tail around metallic shield of first cable core. Trim excess braid length to prevent overlap (Figure 2). Secure ground braid to cable metallic shield using small constant-force spring (Figure 2). Spring and braid leg should be wrapped in the same direction. Cinch (twist with hand) constant-force springs to tighten.

(b.) **Install Second & Third Ground Braid Tails** Wrap the second and third ground braids around core legs to adjust length. Position ground braid tails so all constant force springs are equal distance from the cable armor.

2.3 Apply two highly-stretched half-lapped layers vinyl tape over constant-force springs (Figure 2).
2.4 Measure distance \([J]\) (Figure 3). Retrieve previously removed cable jacket material. Cut a straight piece to dimension \([J]\) and wrap it around cable phases beneath ground strap assembly and cable ground wire. Secure jacket section in place using wide vinyl tape (Figure 3). Note: Temporarily remove vinyl tape wrap on ground braid.

![Figure 3](image_url)
2.5 Fill one armor valley section with tightly-wrapped layers of Scotch® Electrical Shielding Tape 24 (Figure 4).

2.6 Secure ground braid assembly to cable armor using large constant-force spring (Figure 4). Once spring has been applied, cinch (twist with hand) to tighten.

2.7 Apply one half-lapped layer vinyl tape over large constant-force spring and cable armor (Figure 4).  

*Note: Apply vinyl tape to hold down ground strap (Figure 4).*

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Figure 4

- 24-Tape Fill to level of armor high points
- Large Constant-Force Spring or tie wire for 7686
- Vinyl Tape

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2.8 Bind cable ground wire with four half-lapped layers wide vinyl tape (Figure 5). Limit width of tape wrapping to approximately 2-1/2”.

![Figure 5](image)

2.9 Loop cable ground wire back over armor (Figure 6). Adjust ground wire position over cable jacket to run parallel with tail of ground braid assembly.

*Note: Do not make sharp or tight bends in ground wire. Ground wire loop should not extend beyond edge of protective jacket section as shown.*

![Figure 6](image)

2.10 Apply two half-lapped layers wide vinyl tape over looped ground wire area (Figure 7).

![Figure 7](image)
2.11 Wrap two mastic seal strips (one on top the other) over cable jacket. Locate the mastic strip directly under the shield braid solder block and ground wire (Figure 8).

**Note:** It will be necessary to temporarily remove vinyl tape over ground braid tail to complete this step.

![Mastic Seal Strips Under Ground Wire & Shield Braid Tail](image)

**Figure 8**

2.12 Separate ground wire strands over mastic seal strips as shown in Figure 9.

**Hint:** Directly over the mastic seal strips, lift and bend the ground wire 90°. Reverse twist the ground conductor to open strands. Use a screwdriver to aid in separating the strands. On 19 strand wire with reverse twist innerconductors, twist ground wire in the opposite direction to aid in separating the inner-conductors. Flatten, straighten and re-position the separated ground conductors. Be careful not to damage ground wire.

![Separated Ground Wire Strands](image)

**Figure 9**

2.13 Apply one mastic seal strip around ground wire strands (Figure 10). Apply one mastic seal strip around solder block section of ground braid tail. Align seal strip wraps with previously applied mastic band around cable jacket.

**Note:** Avoid crossing individual wires at mastic seal location.

![Mastic Layer Over Solder Block Section](image)

**Figure 10**
2.14 Wrap two additional mastic seal strips directly over previously applied mastic. ( Figure 11 ).

2.15 Cover mastic seal area with two highly stretched half-lapped layers of wide vinyl tape.

2.16 Install cold shrink jacket extension assembly. Align the jacket seal tube (not the plastic support core) to overlap ground wire seal area by approximately 1/4”. To install, pull loose core end, while unwinding counter clockwise around the cable. ( Figure 12 ).

2.17 Bind cable ground wire and ground braid tail to cable jacket using wide vinyl tape ( Figure 12 ). Apply at least eight tape layers and wrap only to width of tape roll.
3.0 Install Silicone Rubber Breakout Boot Assembly

3.1 Inspect breakout boot assembly and confirm that all loose plastic core ends are free as shown (Figure 13).

3.2 To ensure that the breakout boot can be fully seated into the breakout area of the cable, it will be necessary to unwind a few turns of each finger core.

Caution: Do not unwind too far such that boot fingers begin to collapse.

3.3 Hold loose neck-end core ribbon to one side so that it can not become trapped between cable phases. Slide boot assembly over cable end; guiding individual cable cores through boot assembly fingers.

Hint: View end of cable through finger cores to ease cable phase insertion.

3.4 Slide breakout boot assembly onto cable as far as it will go. Large neck-end should fully extend over previously-installed jacket sealing assembly tube.

Hint: Spreading cable phases while sliding the boot assembly can ease the installation.

3.5 Remove large neck-end core. Grasping loose core ribbon end, pull and unwind counter clock-wise around cable.

3.6 Remove each finger core. Grasping loose core ribbon end, pull and unwind counter clock-wise around each cable phase leg.

4.0 Install Silicone Rubber Re-jacketing Sleeves

4.1 From the chart below, determine the correct [A] dimension for the termination being installed.

<table>
<thead>
<tr>
<th>Dimension [A] (According to 3M™ Termination QT-III Product Number)</th>
<th>7620-S2-3G</th>
<th>7691-S4-3G</th>
<th>7684-S8-3G</th>
</tr>
</thead>
<tbody>
<tr>
<td>7621-S2-3G</td>
<td>7692-S4-3G</td>
<td>7685-S8-3G</td>
<td></td>
</tr>
<tr>
<td>7622-S2-3G</td>
<td>7693-S4-3G</td>
<td>7686-S8-3G</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7695-S4-3G</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4.2 Place a vinyl tape marker on each cable phase leg at dimension [X] (Figure 14).

Note: [X] = [A] + [B]. Allow for crimp growth when using aluminum lugs.

4.3 Determine required re-jacketing sleeve length for each phase leg (Distance [S], Figure 14). Be sure to include 1.0” breakout boot finger overlap in measurement.
4.4 Using scissors, trim re-jacketing sleeve assembly to length required (Figure 15). Cut tubing and inner braid together.

*Note: Inner polyester braid should extend approximately 3.0" beyond re-jacketing tube end before cutting. There is no need for termination-end braid exposure.*

4.5 Guide one re-jacketing sleeve assembly over each cable phase leg (Figure 16). **Push sleeve assembly from above. Continuously guide the free end maintaining sleeve-to-cable-core alignment.**

4.6 Slide re-jacketing sleeve until inner polyester braid is adjacent to breakout boot finger (Figure 17).

4.7 Fold outer silicone tubing back on itself for 1.0" (Figure 17) and trim off exposed polyester braid.

*Note: Do not damage silicone tubing while cutting. Sleeve assembly may be rotated to ease trimming. When doing so, rotate in the direction of the cable copper tape shield wrap.*
4.8 Slide re-jacketing sleeve assembly down until folded tube contacts edge of breakout boot finger (Figure 17).
4.9 Pull folded silicone tube section down onto breakout boot finger (Figure 17).

**Note:** Re-jacketing tube end should align with upper edge of installed marker tape (Figure 17). Minor tube adjustments can be made as needed.

### 5.0 Install 3M™ Cold Shrink Termination QT-III Assemblies

5.1 Prepare cable phase legs according to dimensions shown (Figure 18).

5.2 Secure re-jacketing sleeve and cable copper tape shield ends with two half-lapped layers of vinyl tape (Figure 19). Start taping 0.8” over re-jacketing sleeve, extend 0.2” over cable semi-con and return to starting point.

**Note:** Do not exceed 0.2” semi-con overlap.
5.3 Place a termination installation marker tape at position [M] (Figure 20).

5.4 Install terminal lugs.

Note: Special Case – When lug spade dimension is larger than inside diameter of white plastic termination core, position termination assemblies over cable phase legs prior to installing lugs.

Remove inner red shipping core from each termination assembly by pulling and unwinding the loose red core ribbon. Position one termination over each cable phase leg. Each termination assembly must be positioned with its loose white core ribbon end directed toward the open (cut) end of the cable. Continue with lug installations.

(a.) For Aluminum Conductors - Thoroughly wire brush conductor strands to remove aluminum oxide layer. Immediately insert conductor into terminal lug barrel as far as it will go.

(b.) Ensure that each lug face is parallel to equipment bushing or lug connection interface (Figure 21)
(c.) Crimp terminal lug according to manufacturer recommendations. Start at the upper end as shown (Figure 21). Remove all traces of oxide inhibitor that may have come out of lug barrel during crimping.

(d.) Thoroughly clean primary insulation and lug barrel area using solvent wipe from supplied cable preparation kit. **Note: Avoid solvent contact with cable semi-conductive screen.**

5.5 Install 3M™ Cold Shrink Termination QT-III assemblies.

(a.) Remove the inner red shipping core from the termination assembly by pulling and unwinding the loose red core end.

(b.) Position the termination assembly with the loose white core ribbon directed toward the terminal lug.

(c.) Align the base of the termination (not the plastic core) with the installation marker tape as shown (Figure 22).

(d.) Grasp the loose white core ribbon. Pull and unwind counter clock-wise around cable end (Figure 22).

**Note:** *After the silicone rubber termination makes adequate contact (approximately 1.0”)*, release the assembly and continue unwinding the core. Do not pull or push on the assembly while unwinding.

(e.) Remove the installation marker tape.

![Termination Base Aligned With Marker Tape Edge](image)

**Figure 22**

5.6 Connect shield braid tail and cable ground wire to system ground (earth) according to normal practice.
Important Notice

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