1.0 SCOPE

The Raychem spin lock adapter is a variable angle backshell able to achieve angles of straight (0°), 45° and 90°, terminate the shielded braid using a Tinel-Lock ring, and provide strain relief with a molded boot.

This assembly guide defines the general assembly requirements of TE Connectivity drawings for Raychem spin lock adapters with molded boot.

2.0 APPLICABLE DOCUMENTS

TE Customer drawings

- SLM40 – Spin Lock Adapter, Heat Shrinkable Molded Part, Code 40
- SLM41 – Spin Lock Adapter, Heat Shrinkable Molded Part, Code 41
- SLM54 – Spin Lock Adapter, Heat Shrinkable Molded Part, Code 54
- CH00-0250-019 – Spin Lock Adapter Ordering Information

TE Installation procedures

- ELE-3COP-359 – Tinel-Lock Ring Installation with Resistance Heater
- ELE-3COP-452 – Installation and Torque Tightening of Standard and Type 2 Adapters
- ELE-3COP-604 – Application of S1125 Adhesive

3.0 SAFETY PRECAUTIONS

All personnel performing the procedures outlined in this document should have the following safety protection equipment.

- Provide Eye Protection and other personal protection equipment (PPE) as required.
- Provide High Temperature Safety Equipment as required.
- Material Safety Data Sheets (MSDS) from the manufacturer should be made available. If none are available, contact the manufacturer as required. For Raychem products, MSDS are available on-line at www.te.com.

4.0 PART DESCRIPTION

Sealed SLM Series Raychem Spin Lock Adapter with Heat Shrinkable Molded Part

- The components for the Raychem spin lock adapter are provided in a plastic bag under a specific part number and appear similar to the components shown in Figure 1.

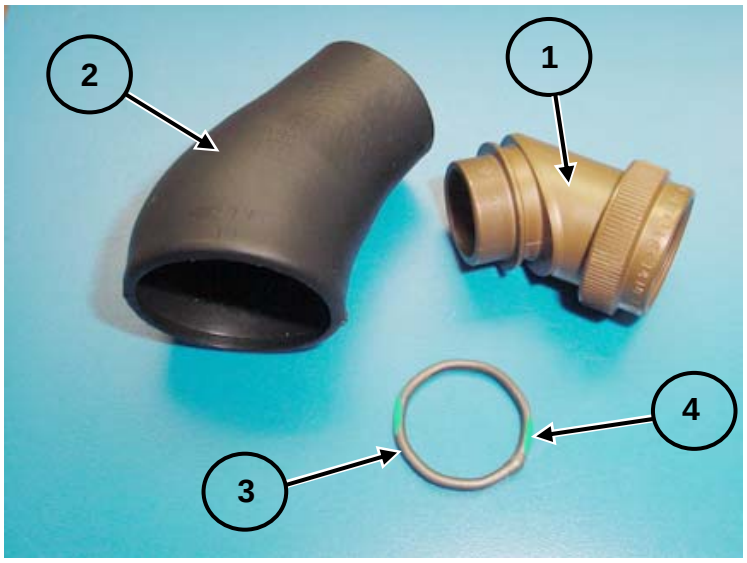

Figure 1. Raychem Spin Lock Backshell, Molded Boot, Tinel-Lock Ring

1. Raychem Spin Lock backshell
2. Molded strain relief boot
3. Tinel-Lock ring
4. Thermochromic indicator paint (2 places - 180º apart)

5.0 APPLICATION TOOLS

- CV-1981-PID – Heat Gun
- DMC BT-ST-300D – Torque wrench (or equivalent)
- DMC BT-BS-610T – Torque Strap wrench (or equivalent)
- AD-5000-TINEL-ASSY (220/240V) – Tinel-Lock Installation Tool (available all locations)
- RH-3960-1-TINEL-KIT-120V – Tinel-Lock Installation Tool (not available in Europe)
- LOCTITE® 243 – per ELE-3COP-452
- Marking pen (e.g. removable ink, such as dry-erasable pen)
- Wire cutter / trimming scissors

6.0 PROCEDURE

6.1. Installation Preparations

1. Mark the backshell and molded boot according to the desired angles found in Table 1.

Table 1. Desired Connection Angle Marking Points

Desired Angle	Backshell Marking Locations	Molded Boot Marking Locations
0º	Mark A	Mark G
45º Right	Mark E	Mark G
90º	Mark A	Mark F
45º Left	Mark D	Mark F

2. Mark backshell on upper body using parting line as reference for mark A as shown in Figure 2a.

   Use a removable-ink pen for marking.

3. Mark backshell at D and C reference marks in Figure 2a, using a marking pen.

4. Mark backshell at approximately half way between mark A and B, or mark A and C, and label as mark E or mark D, as shown in Figure 2a, using a marking pen.

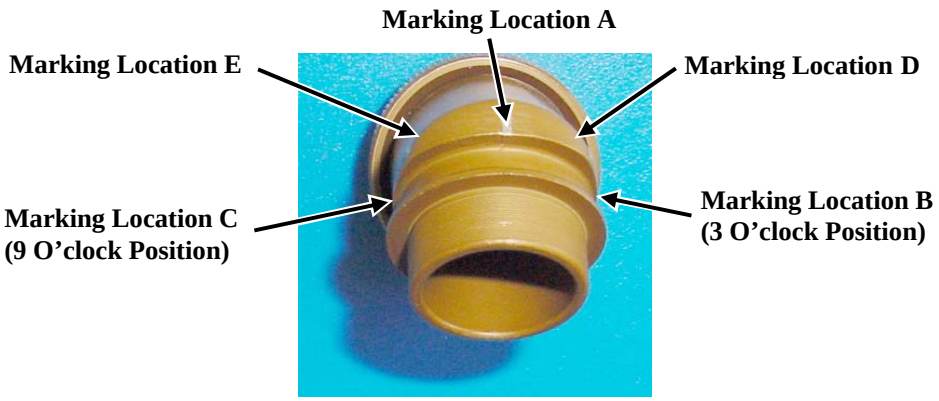

Figure 2a. Backshell Body Marking

5. Mark the Raychem spin lock molded boot (strain relief) at the parting line, as mark F on upper surface, and as mark G, on lower surface, using mold marks as the reference point. See Figure 2b and Table 1.

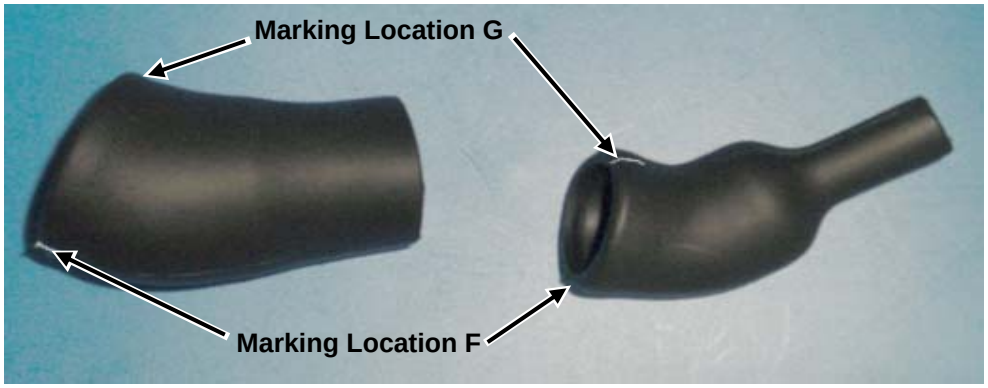

Figure 2b. Molded Boot Strain Relief Markings (Before and After)

6.2. Cable Preparations

1. Prepare the cable end by removing a portion of the cable jacket and cable shield to expose the wires at the end of the cable according to the application requirements.

   Refer to cable/connection application instructions for details.

   If more cable shield removal is required, refer to steps 6 through 9.

2. Terminate the wires/cables in the cable bundle with the contacts required for the connector in the specific application.

   Refer to manufacturer's instructions.

3. Position the heat shrink tubing so that the tail end (J end) of the molded part overlaps the shrink tubing.

4. Place the (strain relief) molded boot (1 in Figure 3) on to cable bundle with correct orientation, followed by Tinel-Lock ring (2 in Figure 3), followed by the backshell (3 in Figure 3) over the end of the cable bundle as shown in Figure 3.

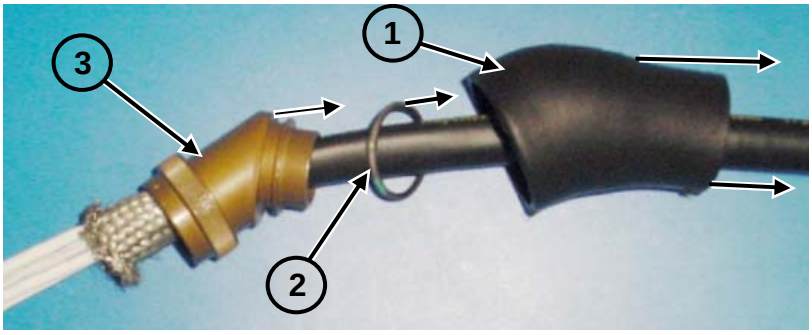

Figure 3. Installing the Molded Boot, Tinel-Lock Ring, and Backshell

5. If no more cable preparation is required, skip to step 10.

6. If required, verify there is enough exposed braid by measuring and marking the overbraid to indicate 1-1/2 to 2 inches from the end of the heat shrink tubing. See Figure 4.

a. If the exposed braid is too long, cut the braid to remove the excess.

b. If there is insufficient exposed braid, remove more cable jacket to expose more braid.

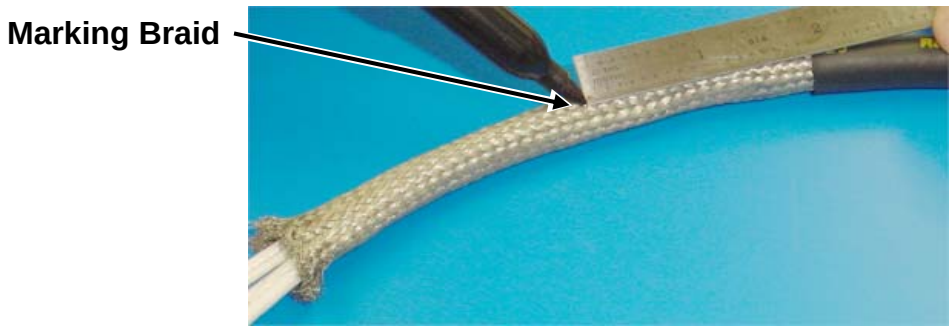

Figure 4. Measuring the Braid

7. Bunch the braided shield at the marking point in preparation for cutting the braid. See Figure 5.

Figure 5. Bunching the Braided Shield

8. Using small scissors or a small cutting tool, cut the braid at the mark made earlier on the bunched braid. See Figures 6a and 6b.


6a


6b

Figure 6. Cutting the Shielded Braid

9. Separate the shield sections so there is a clean break between the sections, cut any remaining threads, and then remove the unused braid section. See Figure 7.

10. Pin the connector before continuing with the installation procedure.

    Refer to manufacturer's instructions for pinning the connector.

Figure 7. Separated Shielded Braid Sections

11. Finger-tighten the backshell onto connector thread, ensuring no wires are trapped.

    Feel for the positive alignment and meshing of the anti rotation teeth by gently twisting the backshell back and forth until the connector is completely mated to backshell.

    The backshell will be tightened onto the connector using the required torque values before completing the required cable tests.

12. If the cable assembly does not have a braided shield to terminate, skip the next procedure and go to Section 6.4 *Completing the Installation*.

13. Go to the next procedure to install the Tinel-Lock ring on the backshell to terminate the braided shield onto the backshell.

6.3. Tinel-Lock Ring Installation

- If using the AD-5000-TINEL-ASSY (220/240V) Tool, refer to ELE-3COP-359 and skip the following steps.
- If using the RH-3960-1-TINEL-KIT-120V Tool , use the following steps as a guide.

WARNING

To prevent burns, allow the Heat Gun and the assembly to cool down before handling. The Heat Gun and the assembly become hot during the installation of the heat-shrink tubing. Refer to this Warning each time the Heat Gun is used in the following procedures.

1. Pass the backshell on to cable bundle and place it next to the braided shield. See Figures 8a and 8b and refer to ELE-3COP-359.
2. Open the braided shield into a fan shape as shown in Figures 8a and 8b.
3. Press the braided shield over the end of the backshell, past the shield termination surface to just beyond the boot groove. See Figures 8a and 8b.
4. Pass the Tinel-Lock ring over the end of the backshell to the shoulder of the shield termination surface, just before the boot groove on the backshell.
   a. It may help to ease the Tinel-Lock ring into place by rocking it side to side, walking it into place, but don't use brute force to force it straight into place.
   b. Ensure there is enough full braided weave past the Tinel-Lock ring. See Figures 8a and 8b.

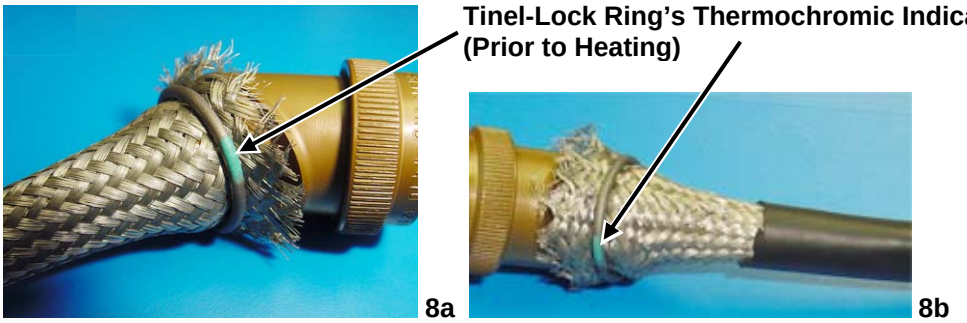

Figure 8. Backshell, Braided Shield, and Tinel-Lock Ring in Place

5. Place both electrodes on the either side of the ring, griping it between the electrodes, ensuring that at least one spot of thermochromic paint on the ring is visible. See Figure 9.
   - Avoid touching the backshell and the thermochromic paint with the electrodes.
6. Use the foot-pedal to activate the electrodes while ensuring the electrodes are squeezed against the ring to make good contact with the ring.
7. Observe the thermochromic paint closely and when it changes color (darkens), ease the pressure on the foot-pedal to deactivate the electrodes. See Figures 9 and 10.

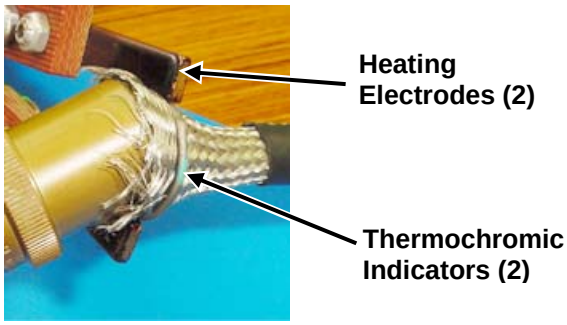

Figure 9. Heating the Tinel-Lock Ring

NOTE:	When the Tinel-Lock ring thermochromic indicator changes color (darkens), it has shrunk to the backshell's shield termination surface. See Figure 10.

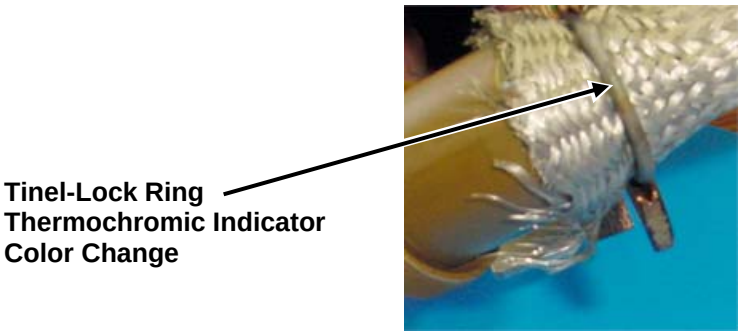

Figure 10. Tinel-Lock Ring's Thermochromic Indicator Color Change

8. Trim excess from the braided shield using small scissors or a small cutter to remove all excess braid evenly around the Tinel-Lock ring. See Figures 11a and 11b.

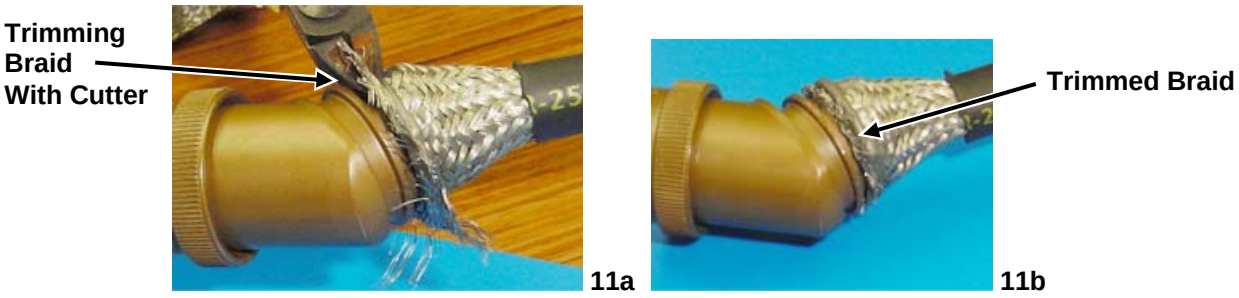

Figure 11. Trimming Braid from the Backshell

6.4. Completing the Installation

1. Complete the backshell connection to the connector in the following steps.
   a. Gently disconnect the backshell from the connector, leaving enough space between the backshell and connector to apply thread sealant in the next step.
   b. Apply LOCTITE® 243 to the first 2 or 3 threads of the connector.
   c. Gently screw the backshell onto the connector thread, ensuring no wires are trapped.

      Feel for the positive alignment and meshing of the anti rotation teeth by gently twisting the backshell back and forth until the connector is completely mated to backshell.
   d. Tighten the backshell onto the connector using the required torque values as specified in ELE-3COP-452.

      Refer to ELE-3COP-452 for installation and torque values to tighten the backshell onto the connector.
2. Slide the molded boot over the edge of the backshell to the boot groove and prepare the cable and molded boot to be partially shrink at this end of the molded boot.

   Refer to ELE-3COP-604 for preparation of the molded boot and the cable assembly.
3. Shrink the end of the molded boot nearest the backshell, down to a loose fit on the backshell at the boot groove.

   Refer to ELE-3COP-359 and manufacturer's instructions and safety concerns including wearing safety gloves for heat protection.
4. Stop heating, once the boot is recovered partially to the point where there is sufficient room to apply the adhesive and easily align the molded boot to the position markers.
5. Apply sealant (S-1125) to the backshell at boot groove to start the sealing process of the molded boot to the backshell.

   Refer to ELE-3COP-604 to apply sealant to the backshell.

6. Position the molded boot over the reference marks made earlier at the required positions.
   a. Position the mark (G) on the molded boot to the mark on the backshell (A) for a 0° or straight through connection.
   b. Position the mark (F) on the molded boot to the mark on the backshell (A) for a 90° connection.
   c. Position the mark (F) on the molded boot at the D mark or E mark between the A mark and the B or between the A mark and C mark on the backshell for a 45° connection.
7. Completely seal the molded boot to the cable assembly at the other end of the molded boot in the following steps.
   a. Apply sealant (S-1125) to the other end of the molded boot (allowing for expansion of the molded boot when heat shrinking the molded boot to the cable bundle).

      Refer to ELE-3COP-604 to properly apply sealant to the cable bundle.
   b. Shrink the other end of the molded boot, farthest from the backshell, onto the cable.

      Refer to ELE-3COP-359 and manufacturer's instructions and safety concerns including wearing safety gloves for heat protection.
8. Continue with any harness assembly tests as applicable before completing this procedure.
9. If there is no other cable test required, this ends the assembly procedures for the Raychem spin lock adapter with molded strain relief.

7.0 NOTES

Refer to the following figures for examples of directed flow connections that illustrate the configurations where the Raychem spin lock adapters with a molded boot may be used to achieve a smaller cable run with less bends in the cable.

12a

12b

Figure 12. Four Raychem Spin Lock Adapters into One Cable Run

Figure 13. Two Raychem Spin Lock Adapters into One Cable Run