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# ELE-3COP-359

## Title - Braid termination using a Tinel Lock™ ring installed using a resistance heater.

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Before starting work please read this document carefully and note the guidance given.

### 1 Purpose and Scope

This COP describes the procedure to be used when carrying out the installation of a Tinel-Lock™ adaptor. The instructions in this document take preference over IPC/WHMA requirements, as do the drawing and any customer documentation.

### 2 Performance Objective

This code of practice is produced to support operators already trained in the installation of heat shrinkable and harnessing products. It identifies the procedure to be used to ensure that the shield is terminated reliably and consistently using Tinel-Lock™ rings. Tinel-Lock™ rings are designed to give a high conductivity, 360°, high pressure, gas-tight joint to shields terminated to adaptors or any other conductive back fitting machined with the correct Tinel-Lock™ profile.

### 3 Materials and Equipment:

TE Adaptor and Tinel-Lock™ ring  
Shield to be terminated  
Scissors or small side cutters  
Tinel-Lock™ installation tool:  
Bench tool, part number AD-5010-TINEL-BENCH-230V  
Hand tool, part number AD-5000-TINEL-ASSY

#### Note:

Tinel-Lock™ rings are specified according to the type of cable shield used.  
There are different designations of ring for each adaptor entry size.  
AI rings are marked with a thermo chromic paint spot.  
BI rings are marked with a thermo chromic paint spot and a Red spot.  
CI rings are marked with a thermo chromic paint spot and a Blue spot.  
The thermo chromic paint spot changes colour from green to black when the correct installation temperature is reached.

#### Pull On Braids (RAY-10X)

Ring Designator	Compatible Braid Types
AI	Single layer 36AWG
	Single layer 34AWG
BI	Double layer 36AWG
	Double layer 34AWG
	Single layer 30AWG
	Single layer 32AWG
CI	Contact TE

#### EPD Machine Braids

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Ring Designator	Compatible Braid Types	Adaptor Entry Size
AI	Single Braided cable Double Braided Cable	04 to 18 04, 05, 06, 07 only
BI	Double Braided Cable	08 to 18
CI	Contact TE	

Note:

Machined single braids for up to and including entry size 07 MUST have a system evaluation completed before sign off.

#### 4 Health and Safety

Adhere to local Codes and Regulations relating to Safe Working practices. For the U.K. adhere to requirements of the Health and Safety at Work Act 1974 and subsequent amendments. Care must be taken to avoid contact with hot surfaces.

#### 5 Procedure

To ensure system performance a limitation of 2.5 milliohms maximum has been placed on the final installed cable shield/adaptor/connector interface. This measurement is impractical to achieve after production due to an insulating jacket covering the screen and extending under the lip at the moulded part, therefore the following system of test/measurement should be carried out during the cable assembly stage.

- a) Measure screen resistance of the prepared cable, end to end and record result.
- b) After installing the adaptor and Tinel-Lock™ component on first end, measure from the cable shield to the connector body and record result. Ensure that this value is less than the value recorded in (a) above + 2.5 milliohms.
- c) After fitment of second and subsequent ends, measure and record result. Ensure that the value is less than the result recorded in (b) above + 2.5 milliohms.

#### Standard Method

This procedure applies to single and double layers of Tinel-Lock™ compatible shield.

Strip the cable jacket to the required length to expose cable shield.

Cut shield to required length and ease away from the wires beneath taking care to ensure that the weave of the shield is maintained.

Expand the shield diameter by gently compressing from the end until it slides over the adaptor Tinel-Lock™ profile. See Figure 1.

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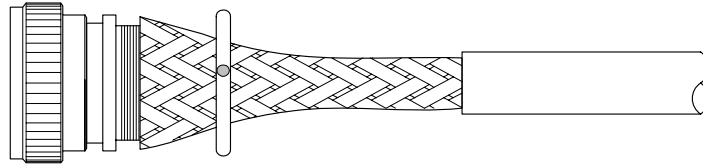


Figure 1

Push the shield forward until it fully covers the Tinel-Lock™ profile and bottoms on the shoulder provided. Slide the Tinel-Lock™ ring along the shield and up onto the profile, stopping short of the shoulder provided and ensuring that it is perpendicular to the axis of the adaptor. See Figure 2. Tinel rings may be eased into place in a rocking or walking motion. This helps nest the strands of shield neatly, do not use a brute force straight push.

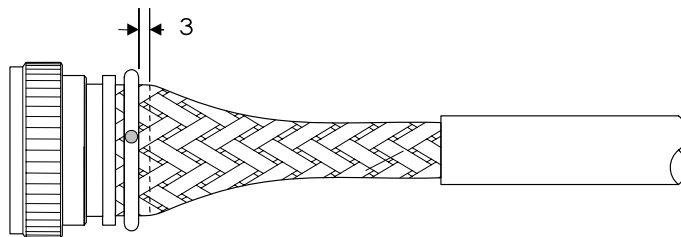


Figure 2

### Hand tool

Grip the ring in the electrodes of the hand tool ensuring that at least one spot of thermo chromic paint on the ring is visible. Avoid touching the adaptor with the electrodes. See Figure 3.

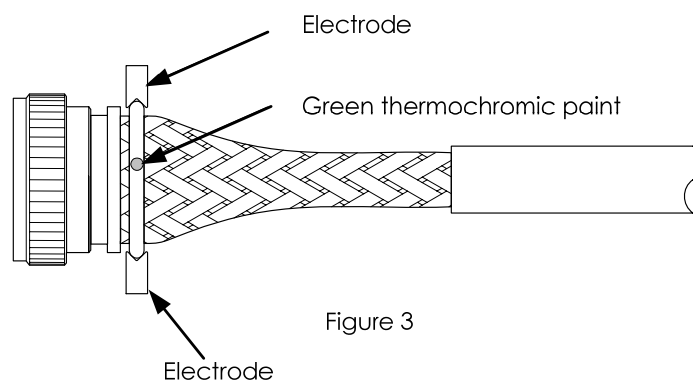


Figure 3

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Squeeze the tongs to activate the electrodes, indicated by a green light illuminated on the control box. Observe the thermo chromic paint closely and when it turns black, ease the pressure on the tongs until the switch releases.

#### Bench Tool

Slide the ring into the spring-loaded electrodes ensuring the thermo chromic paint on the ring is visible. Avoid touching the adaptor with the electrodes. Push the green button or press foot switch (dependent upon model) to activate the electrodes, indicated by a green light illuminated on the control box. Observe the thermo chromic paint closely and when it turns black, release the switch.

Using scissors or small side cutters neatly trim shield strands back to the shoulder. See Figure 4.

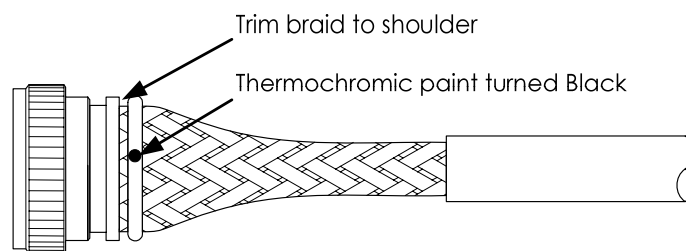


Figure 4

#### Note:

The heating cycle should take no longer than 15 seconds. If, at the end of this time, the thermo chromic paint has not changed colour to black, or the ring has not gripped, check the following:

Examine the ring and the tongs to ensure that they are clean. If not lightly abrade to ensure good electrical contact and retry.

If the adaptor is warm, the tongs may have made contact. Adjust ring and tong position, and retry.

Insufficient shield may be available to achieve grip due to an incompatible shield gauge. Adopt the shield roll-back procedure to increase thickness and retry.

Disturbance due to handling may have caused the shield to loose its weave and reduce the effective wall thickness. Adopt the shield roll-back procedure to increase thickness and retry.

Ensure correct Tinel ring has been used.

Tinel-Lock™ rings may not grip with incorrect shield configurations. The problem occurs when the shield is not compatible with Tinel-Lock™ rings or has lost its weave during handling, resulting in a reduction of the effective wall thickness. Using extra shield, either by rolling back the cable shield to create an extra shield layer, or by adding a separate cut piece, will increase the effective wall thickness.

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### Increasing the braid thickness

Cut shield to length and ease away from the wires beneath taking care to minimize disturbance of the weave. Ensure sufficient length of shield is available to allow for rolling back and trimming as illustrated. For double shield roll back the outer shield only. Expand the shield diameter by gently compressing from the end until it slides over the adaptor Tinel-Lock™ profile. See Figure 5.

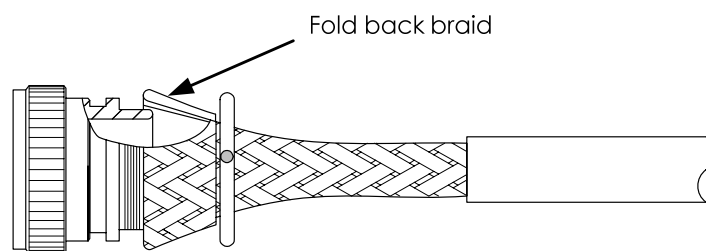


Figure 5

As an alternative to rolling back, a cut piece of shield can be used. See Figure 6.

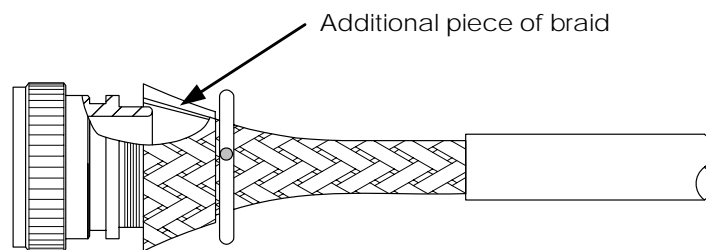


Figure 6

Slide the Tinel-Lock™ ring along the shield and up onto the profile, stopping short of the shoulder provided and ensuring that it is perpendicular to the axis of the adaptor. See Figure 7. Tinel rings may be eased into place in a rocking or walking motion. This helps nest the strands of shield neatly, do not use a brute force straight push.

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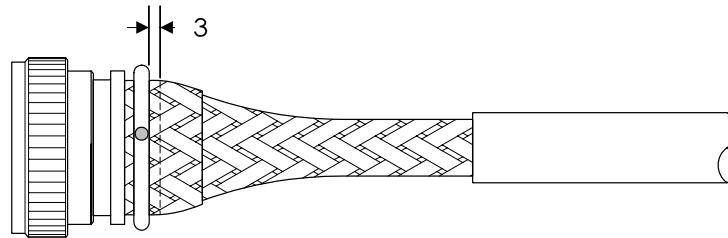


Figure 7

### Hand tool

Grip the ring in the electrodes of the hand tool ensuring that at least one spot of thermo chromic paint on the ring is visible. Avoid touching the adaptor with the electrodes. See Figure 8.

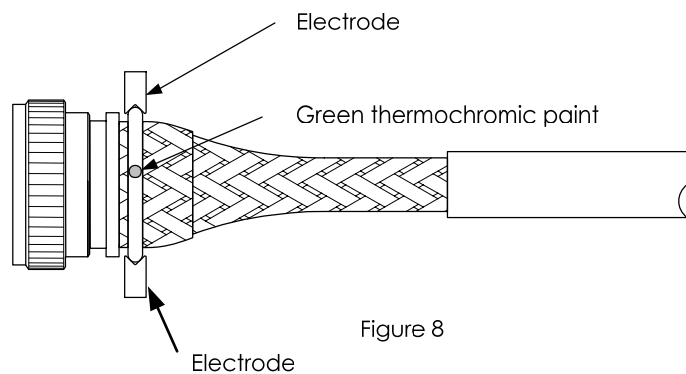


Figure 8

Squeeze the tongs to activate the electrodes, indicated by a green light illuminated on the control box. Observe the thermo chromic paint closely and when it turns black, ease the pressure on the tongs until the switch releases.

### Bench Tool

Slide the ring into the spring-loaded electrodes ensuring the thermo chromic paint on the ring is visible. Avoid touching the adaptor with the electrodes. Push the green button or press foot switch (dependent upon model) to activate the electrodes, indicated by a green light illuminated on the control box. Observe the thermo chromic paint closely and when it turns black, release the switch.

Using scissors or small side cutters neatly trim shield strands back to the shoulder and the rolled back or separate piece of shield to length. See Figure 9.

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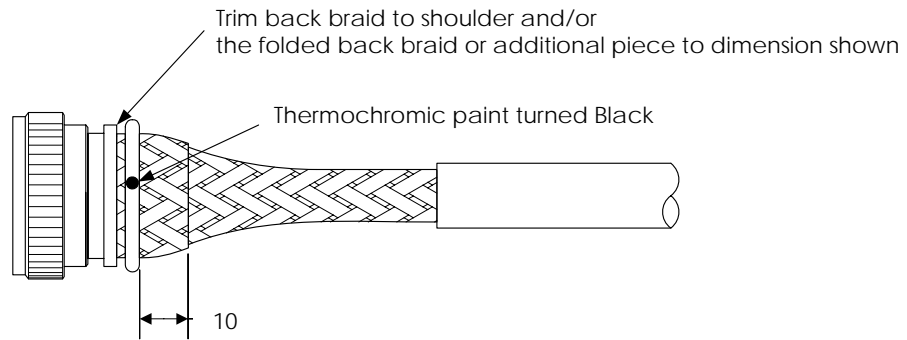


Figure 9

### 6 Inspection Requirements

Ensure strands are not scraped, nicked severed or otherwise damaged.  
Strands are not flattened, untwisted, buckled, kinked or otherwise deformed.  
Ensure the Tinel™ ring is tight.  
Ensure the Thermo chromic paint has changed colour to black.

### 7 Visual Standards



ACCEPTABLE  
Standard termination



ACCEPTABLE  
Additional shield method

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NOT ACCEPTABLE  
Ring not recovered,  
thermochromic paint unchanged  
in colour



NOT ACCEPTABLE  
Shield weave not maintained

Rev No	CR No	Date	Raised	Approved
6	CR06-DM-071	11/04/06	John Cronin	Ken Wallington
7	CR09-DM-018	23/02/09	Paul Newman	Neil Dorricott
8	Visual Identity	06/06/11	Paul Newman	Neil Dorricott

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