

## Splice/Tee Connection Kit Installation Instructions (SR-SPLICE-KIT)

For use with Warmup WSR Parallel Self-Regulating Cable

Model	WSR- <b>&lt;a&gt;</b> W- <b>&lt;c&gt;</b> - <b>&lt;XXX&gt;</b> d				
Code	WSR- <b>&lt;a&gt;</b> <b>&lt;b&gt;</b> W- <b>&lt;c&gt;</b> - <b>&lt;XXX&gt;</b> d				
	<b>&lt;a&gt;</b> = 5, 8, 10 W/ft W/ft insulated pipe @50°F (10°C)	<b>&lt;b&gt;</b> = 9, 12, 15 W/ft W/ft in water @32°F (0°C)	<b>&lt;c&gt;</b> = 1 / 2 1 = 110-120 V AC 2 = 208-277 V AC	<b>&lt;XXX&gt;</b> = 250, 500 or <b>1000ft</b> Cable length	<b>&lt;d&gt;</b> = CR Outer jacket material

## Kit & Cable Description

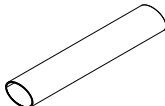
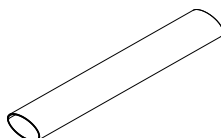
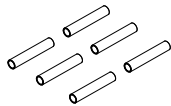

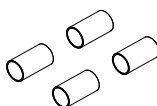
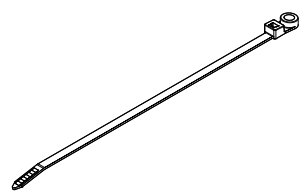

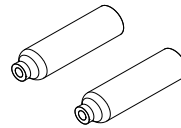
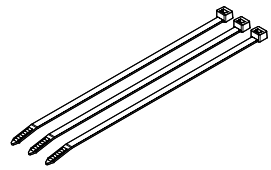
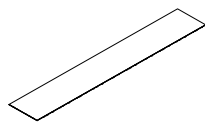
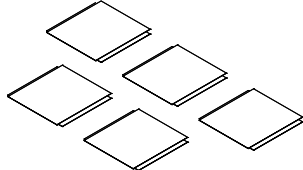
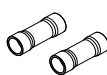


Warmup's Splice and Tee Kit [SR-SPLICE-KIT] is a specially designed kit with all the components necessary to allow for safe and reliable Splice/Tee and End Seal of Warmup's WSR Self-Regulating Cable. The kit contains materials for one Splice and one End Seal, or one Tee connection and one End Seal.

Warmup's WSR Self-Regulating Cable features an advanced positive temperature coefficient [PTC] self-regulating core is positioned between two 16 AWG multi-strand tinned copper bus wires. These are then insulated with a modified polyolefin layer which is wrapped in a tinned copper braid for grounding.

The cable's outer jacket, made from modified polyolefin, ensures superior resistance to UV, abrasion, chemical, and mechanical wear, enhancing durability in harsh conditions.








## Kit Components

End Termination Kit		Splice/Tee Kit			
1 x Heat-Shrink Tube Ø 7/8" x 5 1/8" (21 mm x 130 mm)		1 x Heat Shrink Tube Ø 1 1/2" x 7 7/8" Ø 28mm x 200mm		6 x Heat Shrink Tube Ø 1/8" x 1" Ø 4.5mm x 25mm	
1 x Braided Sleeve 4" (100 mm)		4 x Heat Shrink Tube Ø 1/2" x 1" Ø 12.5mm x 25mm		1 x Screw Mount Zip Tie 7 1/2" 190mm	
1 x Heat-Shrink Cap Ø 5/8" x 1 3/8" (15 mm x 35 mm)		2 x Heat Shrink Cap Ø 1/2" x 2" Ø 12.5mm x 50mm		3 x Zip Tie 7 1/2" 190mm	
		1 x Cloth Tape 1" x 5 7/8" 25mm x 150mm		5 x Mastic Squares	
		2 x Insulated Crimp 1/4" x 7/8" 7.85 x 21.5mm		1 x Copper Crimp 1/4" x 5/8" 6.5 x 16mm	
		3 x Warning Labels			

## Receiving, Storing and Handling


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-  Identify components against the packing list to ensure the proper type and quantity has been received check corresponding documentation.
-  Inspect components for damage incurred during shipping.
-  Components should be checked to verify catalogue type, power rating, voltage rating, and quantity.
-  Components should be examined to verify compatibility with the environmental elements that might be encountered. Special consideration should be given to the area of installation (indoor versus outdoor) and where applicable, the components should be appropriately rated for the intended application. Refer to the kit markings.
-  Components should be stored in clean, dry areas and should not be released to the field until they are needed for construction so as to minimize inadvertent damage.

## Tools Required for Installation

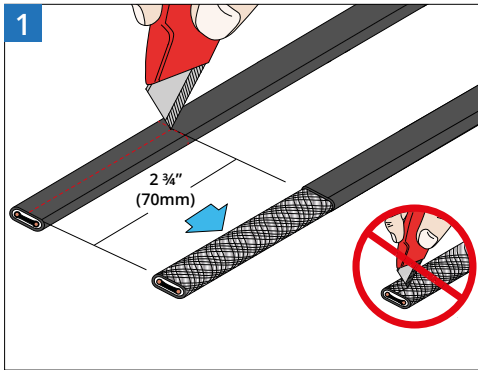
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- Needle Nose Pliers
- Pen
- Heat Gun
- Crimping Tool
- Measuring Tape
- Utility Knife
- Wire Cutters

 Please read these instructions carefully before beginning installation.  
Failure to do so could result in electric shock or fire.  
**CAUTION: a ground fault protection device must be used with this heating device**  
**ATTENTION : ce produit doit être utilisé avec une protection de mise à la terre**

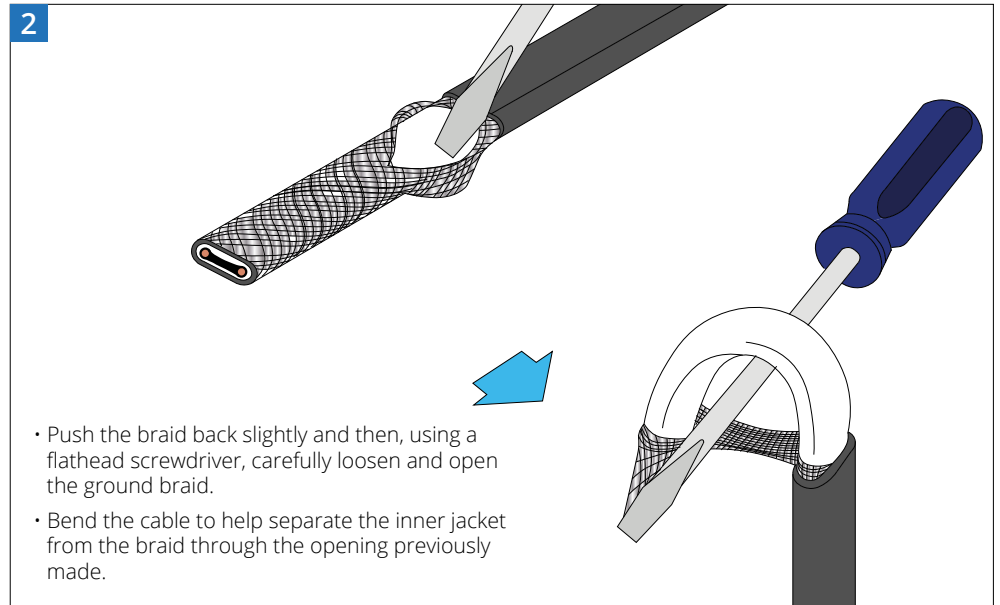
-  Before installation, servicing or maintenance, the cables MUST be de-energized. The branch-circuit switch or circuit breaker supplying the equipment shall be placed in the OPEN (OFF) position and secured with a lockout device. This lockable disconnecting means shall simultaneously disconnect all ungrounded conductors and must comply with NEC/CEC requirements.
-  To reduce the risk of shock or fire ground-fault equipment protection with a 30mA trip level must be installed on each heating cable branch circuit.
-  The self-regulating cable and its components must be installed in accordance with the National Electrical Code [NEC] and Canadian Electrical Code [CEC] and any other applicable national and local codes. Review their requirements prior to installation.
-  When installation is complete, an insulation resistance test should be conducted with a test voltage of at least 500 V dc using a megohmmeter between the self-regulating cable bus wires and the metallic braid. IEEE 515.1 recommends that the test voltage for polymer insulated heating cables be 2500 Vdc. Minimum resistance should be 20 MΩ. After the application of thermal insulation, the measured value of the entire branch circuit should not be less than 5 MΩ.
-  The tinned copper braid must be connected to a suitable grounding/earthing terminal.
-  Bus wires will short if they contact each other. Keep bus wires separated. Damage to the bus wires can result in overheating or short circuits. Take care when removing the jacket or core insulation to prevent damage to the braid or bus wires.
-  Do not replace or substitute components. Only the components supplied in the SR-SPLICE-KIT are approved for use. Using incompatible components may cause, electric shock, or dielectric failure, and will void all approvals and certifications.
-  Ensure you have the correct type of Warmup components for your installation. To maintain cCSAus compliance, only Warmup approved components may be used with WSR Self-Regulating Cable.
-  The equipment [cable and components] shall be installed such that the cable is protected from mechanical damage. The cable shall not be subjected to tension or torque.
-  Ensure that you have the correct type and size of self-regulating cable for your installation (wattage output and voltage rating). Ensure that connection kits and cable ends are kept dry before and during installation.
-  Connections should not be located in an area where moisture is present and should not be located at the lowest point of downspouts.
-  The minimum bending radius of the cable is 1¼" (30 mm). Do not bend on the narrow axis.
-  DO NOT connect power to the cable while it is on the reel.
-  The minimum installation temperature for the cable is -4°F (-20°C) when use with integral component kits and -40°F (-40°C) when use with enclosure kits.
-  The presence of the self-regulating cable shall be made evident by the posting of warning signs where clearly visible. For Roof & Gutter applications apply with supplied warning label on circuit breaker panels, contactor panels and junction boxes. For Pipe Trace applications, warning labels at intervals not exceeding 6 m (20 ft) along the pipeline or vessel and on or adjacent to equipment in the piping system that requires periodic servicing.
-  Person(s) involved in the installation, testing and maintenance of self-regulating heating systems shall be suitably trained in all special techniques required. Installations are intended to be carried out under the supervision of a qualified persons.
-  The person(s) responsible for installation shall verify that the installation and inspection are performed by personnel who are trained, qualified, and knowledgeable in trace heating systems. The installation and inspection shall be in accordance with Warmup's design documents, product recommendations, and installation instructions.
-  The proposed installation shall be verified for the proper selection of self-regulating cable and component systems identified for the application. Warmup's documentation shall be reviewed for specific installation requirements and the proposed installation shall be verified that the heating system is compatible with the environment.
-  Leave these installation instructions with the user for future reference. The self-regulating heating system [cable and components] documentation shall be retained for each self-regulating heating circuit for as long as the system is in use.
-  The SR-SPLICE-KIT instructions must be used with reference to the installation instructions for the WSR Self-Regulating cable.

# Splice/Tee Installation

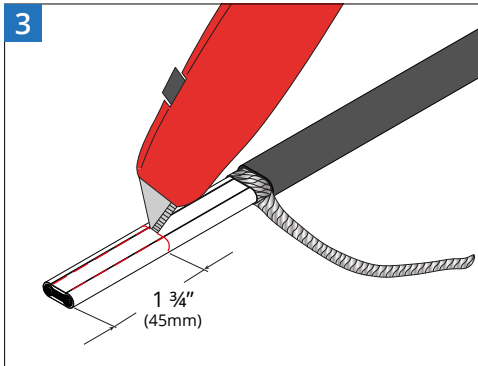


- Measure and mark approximately 2 3/4" (70mm) from the end of the heating cable on the outer jacket.
- Lightly score the outer jacket as shown, ensuring you DO NOT cut the ground braid or inner jacket. Bend the cable to break the outer jacket.

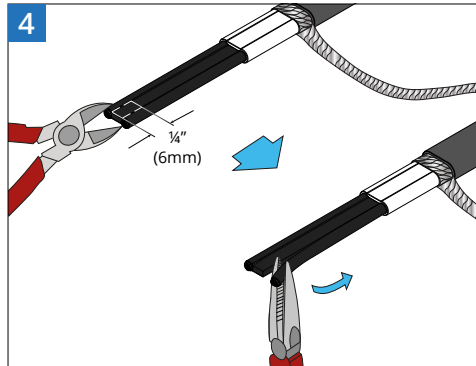
**NOTE:** It is better to do multiple shallow scores to the outer jacket than go too deep and cut the braid.



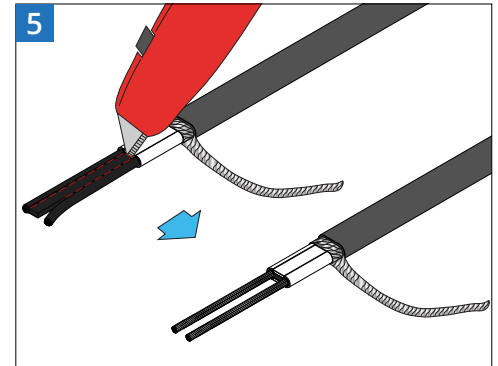
- Push the braid back slightly and then, using a flathead screwdriver, carefully loosen and open the ground braid.
- Bend the cable to help separate the inner jacket from the braid through the opening previously made.



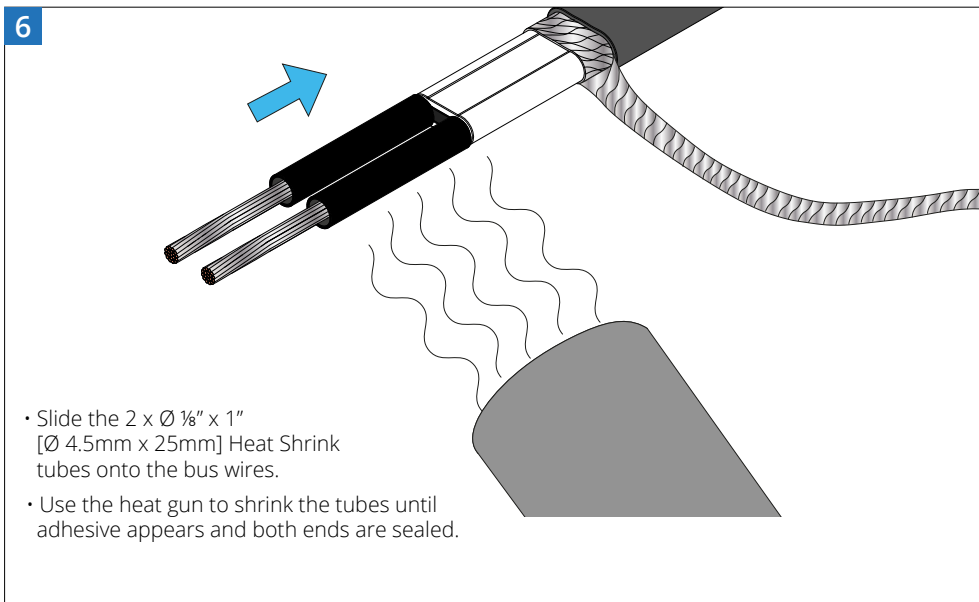
- Straighten the ground braid and leave to one side.
- Measure and mark approximately 1 3/4" [45mm] down the inner insulation.
- Slice the inner insulation layer as shown. Bend the cable to break the inner jacket and remove.



- Using wire cutters, create a 1/4" (6mm) cut as close to and parallel with the bus wires.
- Using pliers, peel back the bus wire from the exposed length of self-regulating conductive core down to the inner insulation.



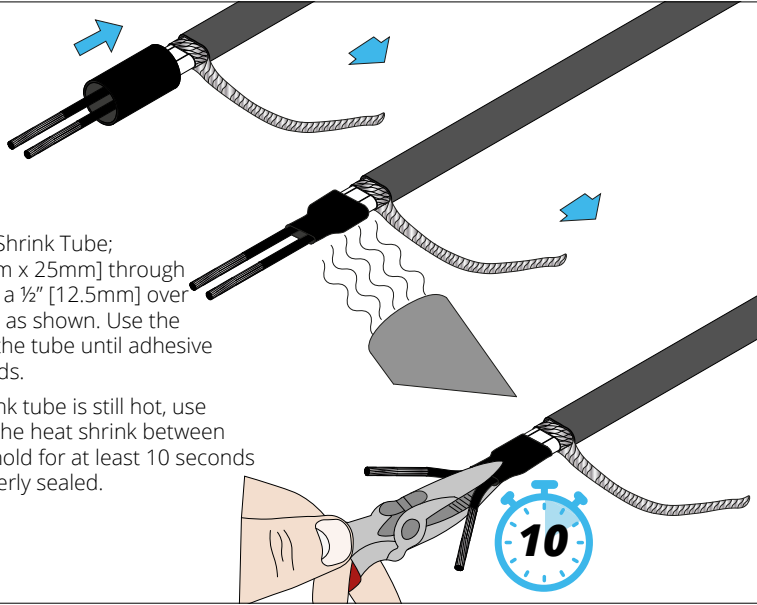
- Carefully slice and remove the self-regulating conductive core with the utility knife, ensuring you DO NOT CUT the bus wires.
- Ensure all of the core and any remaining materials are removed from the bus wires.



- Slide the 2 x Ø 1/8" x 1" [Ø 4.5mm x 25mm] Heat Shrink tubes onto the bus wires.
- Use the heat gun to shrink the tubes until adhesive appears and both ends are sealed.

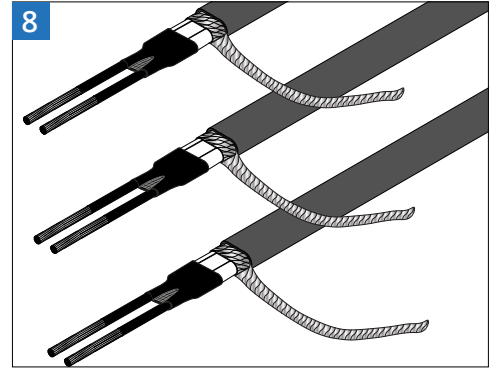
# Splice/Tee Installation

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- Place the 1 x Heat-Shrink Tube;  $\text{Ø } \frac{1}{2} \times 1 \text{''}$  [ $\text{Ø } 12.5\text{mm} \times 25\text{mm}$ ] through both bus wires and a  $\frac{1}{2} \text{''}$  [ $12.5\text{mm}$ ] over the inner insulation as shown. Use the heat gun to shrink the tube until adhesive appears at both ends.
- While the heat shrink tube is still hot, use the pliers to pinch the heat shrink between the bus wires and hold for at least 10 seconds to ensure it is properly sealed.

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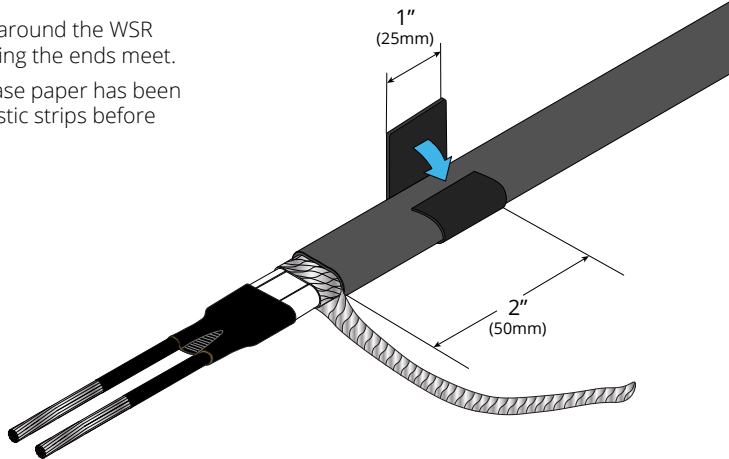


- Repeat Steps 3 - 7 for the other cables.

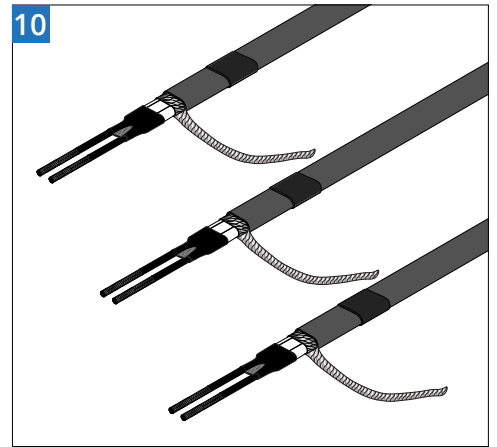
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- Remove the release paper from the Mastic Strips.
- Wrap the mastic strip around the WSR cable as shown, ensuring the ends meet.

**NOTE:** Ensure all release paper has been removed from the mastic strips before application.



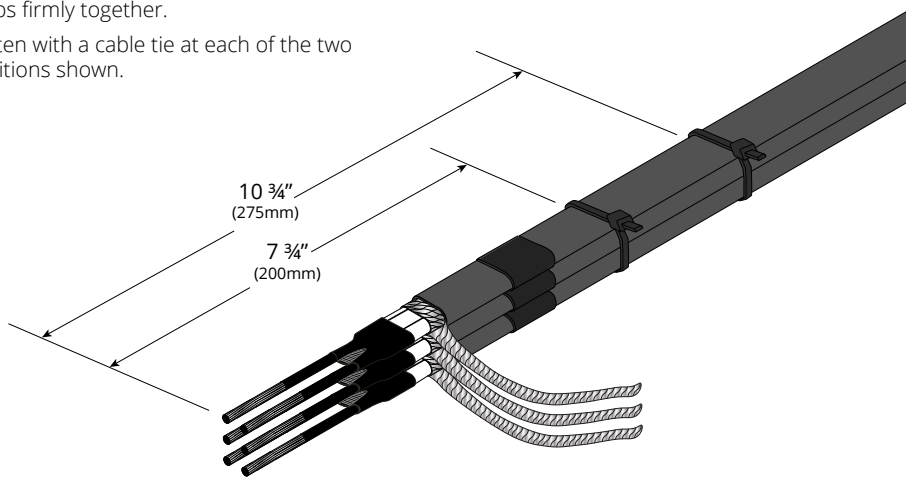
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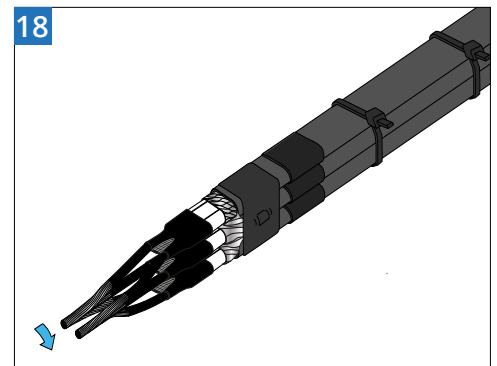
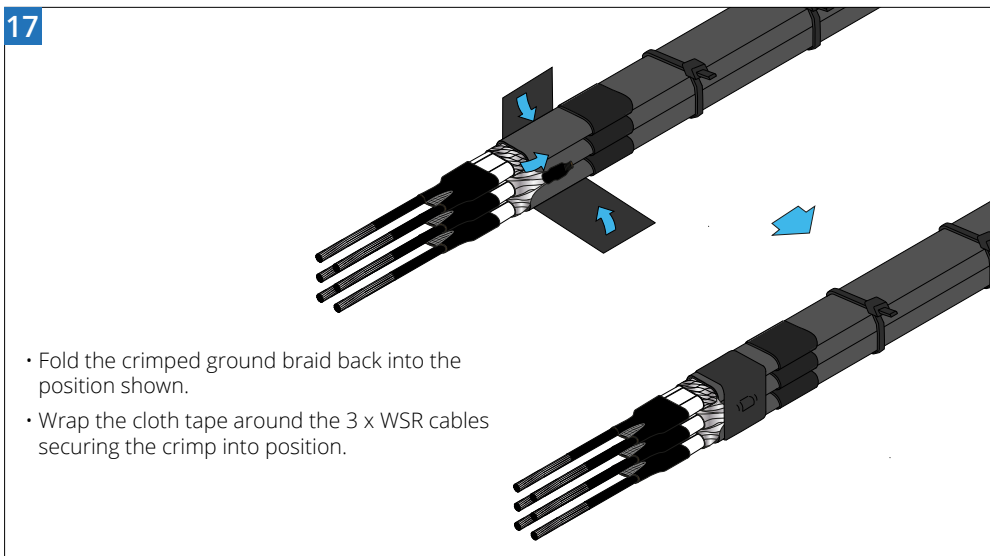
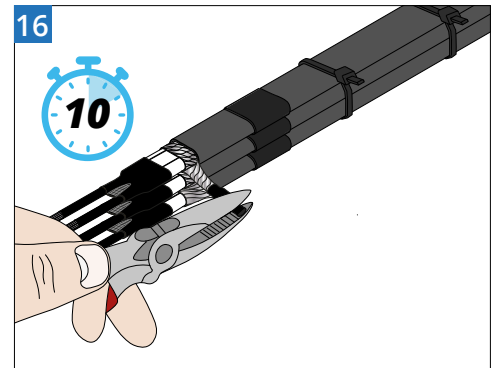
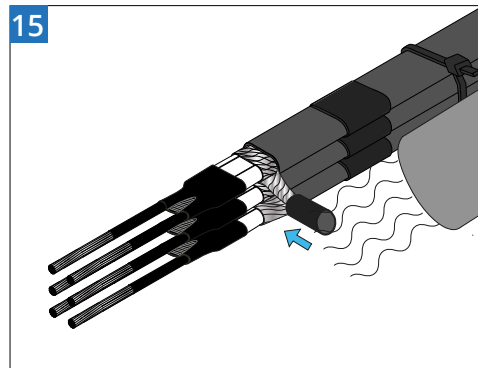
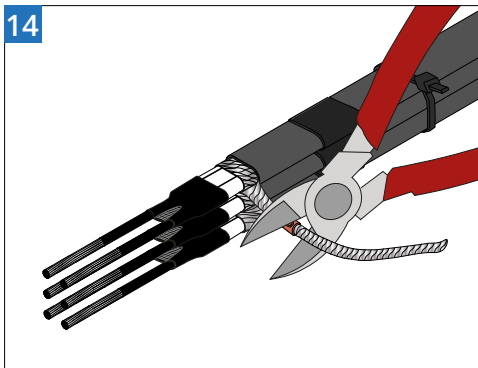
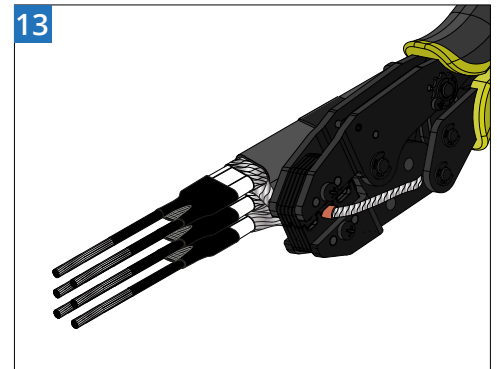
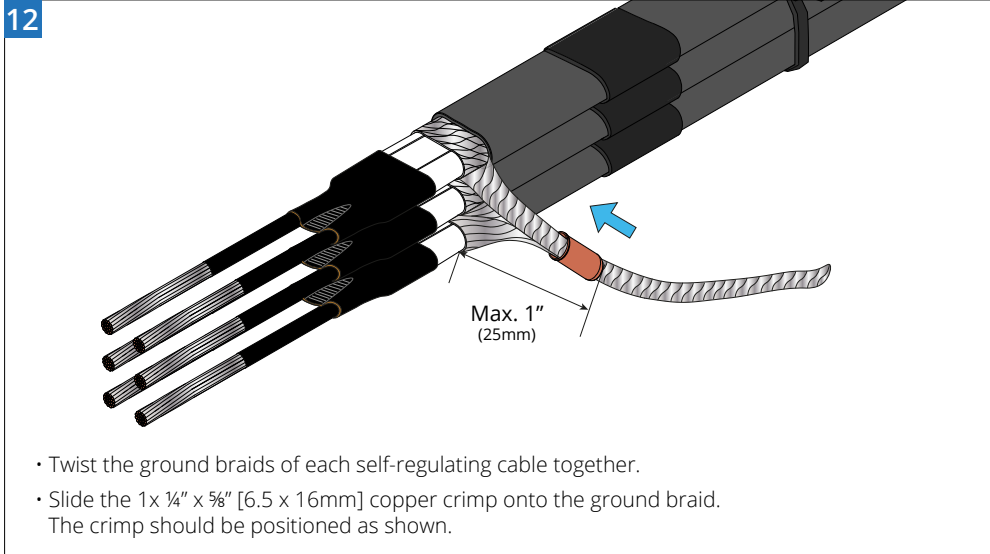
- Add the mastic strips to the other self-regulating cables as shown in Step 9.

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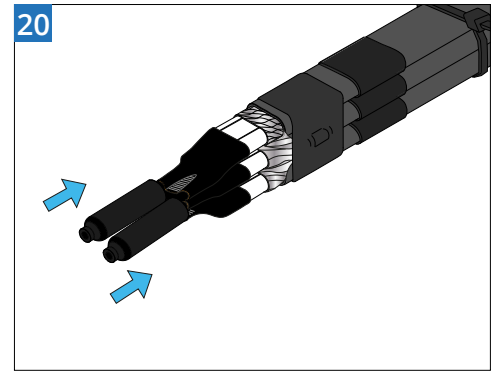
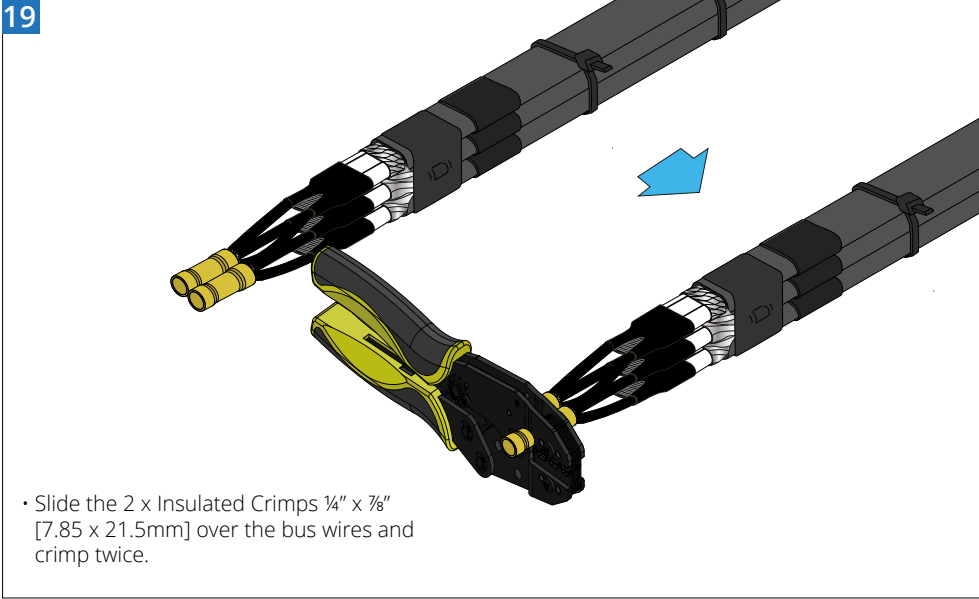
- Align the self-regulating cables, pressing the mastic strips firmly together.
- Fasten with a cable tie at each of the two positions shown.



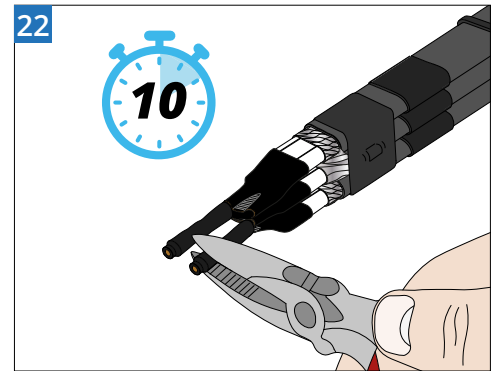
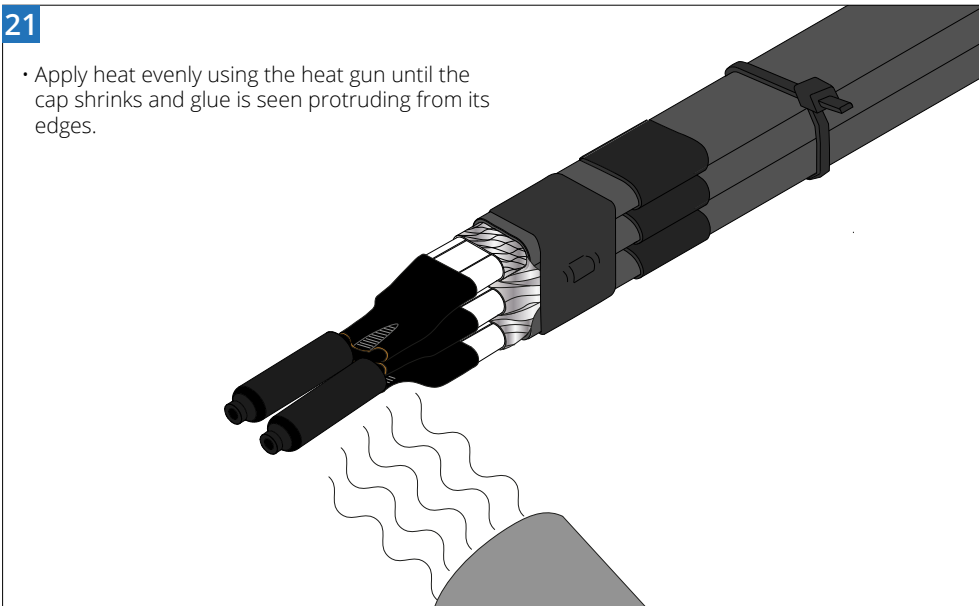
## Splice/Tee Installation



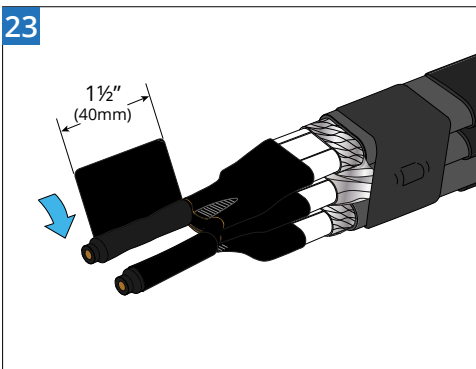
# Splice/Tee Installation



• Slide each Heat Shrink Cap  $\varnothing$  1/2" x 2" [ $\varnothing$ 12.5mm x 50mm] over each bus wire.

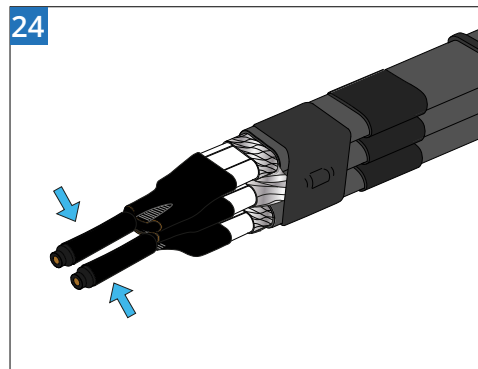


• While the heat shrink tube is still hot, use the pliers to pinch the ends of the heat shrink cap and hold for at least 10 seconds to ensure it is properly sealed.



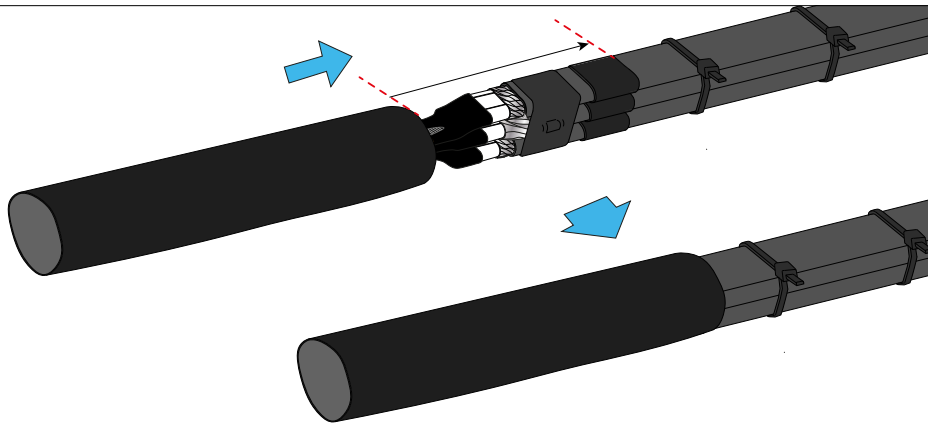
• Remove the release paper from the Mastic Strips.  
• Wrap the mastic strip around the capped bus wires.

**NOTE:** Ensure all release paper has been removed from the mastic strips before application.



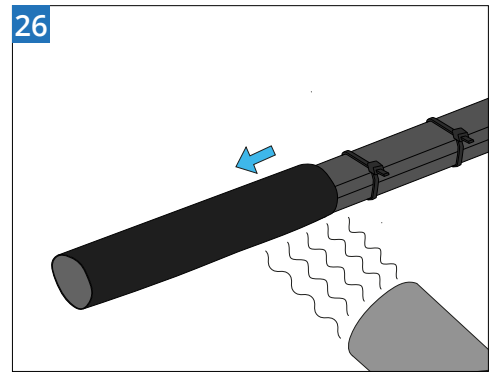
• Press the capped bus wires together.

25



- Slide the large Heat Shrink Tube  $\text{Ø } 1\frac{1}{8}'' \times 7\frac{7}{8}''$  [ $\text{Ø } 28\text{mm} \times 200\text{mm}$ ] over the WSR cables to the position shown at the edge of the Mastic Strips.

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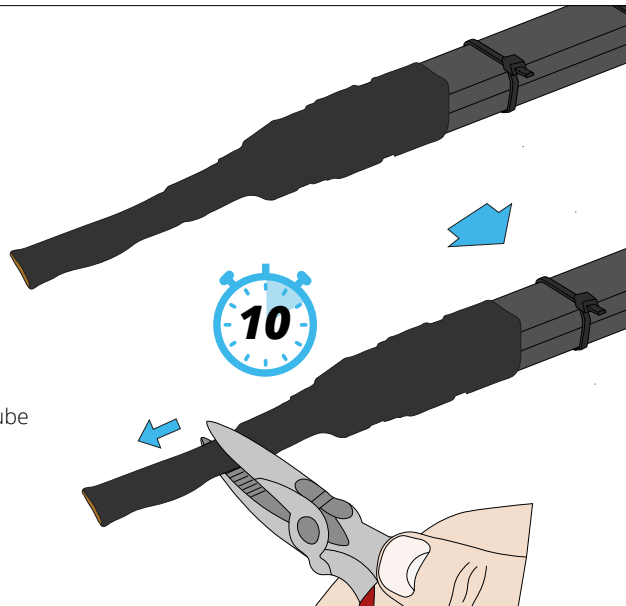


- Starting at the end of heat shrink at the mastic end, use the heat gun to shrink the tube until a ring of mastic and adhesive is seen and then work down the rest of the heat shrink tube until fully contracted.

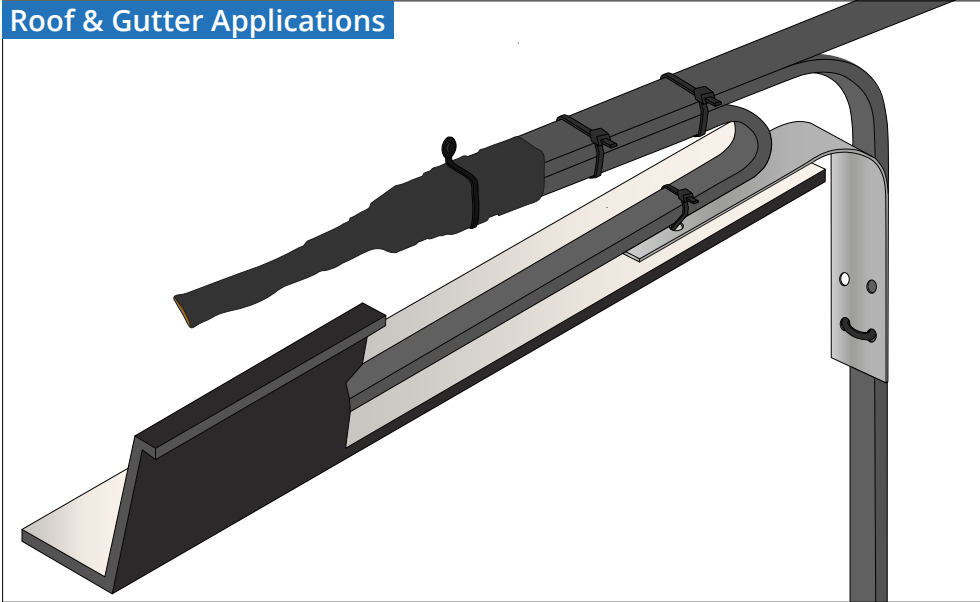
27

- While the heat shrink tube is still hot, use the pliers to remove the air from the tube and then pinch the end of the heat shrink tube just after the heat shrink caps and hold for at least 10 seconds to ensure it is properly sealed.

- Once sealed, pinch down the remaining length of heat shrink tube to seal.

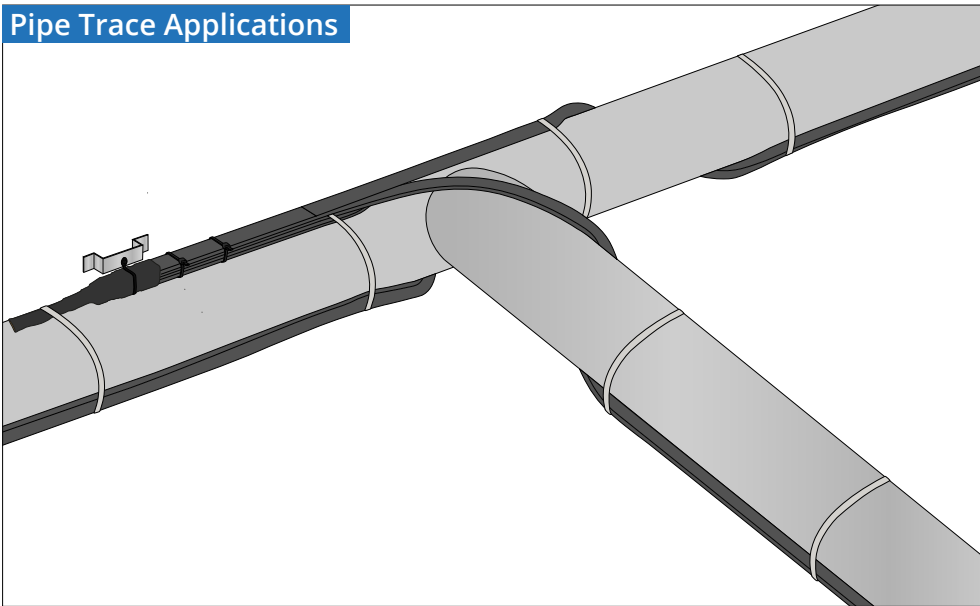


### Roof & Gutter Applications



- Secure the WSR Cable to the downspout hanger [SR-HANGER-KIT] referring to its installation instructions.
- Wrap the Screw Mount Zip Tie, 7 ½" [190mm] around the middle of the joint as shown. Secure the zip tie to the roof fascia to keep it elevated so that it is not in direct contact with the flowing water.

### Pipe Trace Applications



- For pipe trace applications, secure the joint and WSR heating cable to the pipe using glass cloth tape.
- Where required the joint can be fixed to the wall using the Screw Mount Zip Tie, 7 ½" [190mm] and a bracket where appropriate.

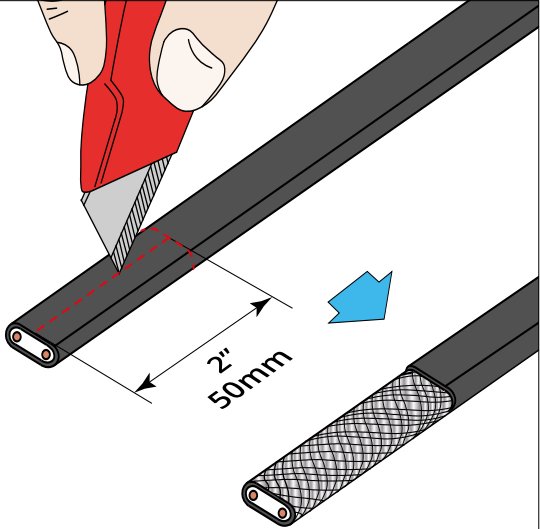


# End Termination Installation

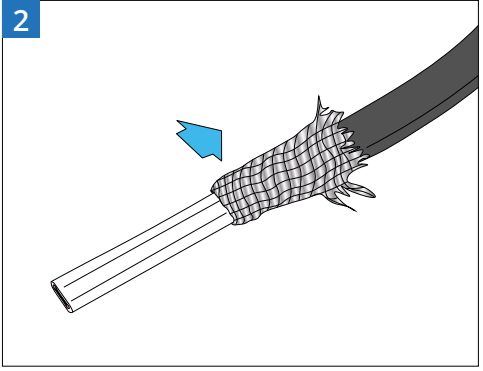
**1**

- Measure and mark approximately 2" [50mm] from the end of the heating cable on the outer jacket.
- Lightly score the outer jacket as shown, ensuring you DO NOT cut the ground braid or inner jacket.

**NOTE:** It is better to do multiple shallow scores to the outer jacket than go too deep and cut the braid.

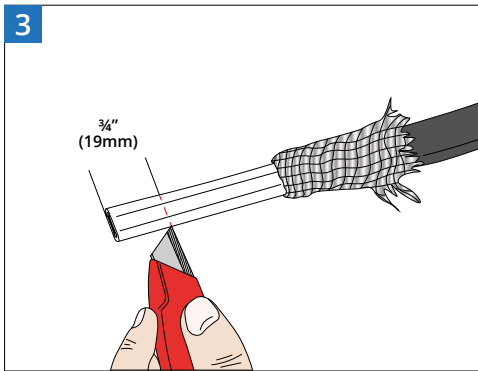


**2**



- Unravel and push back the ground braid as shown to expose the inner insulation.

**3**

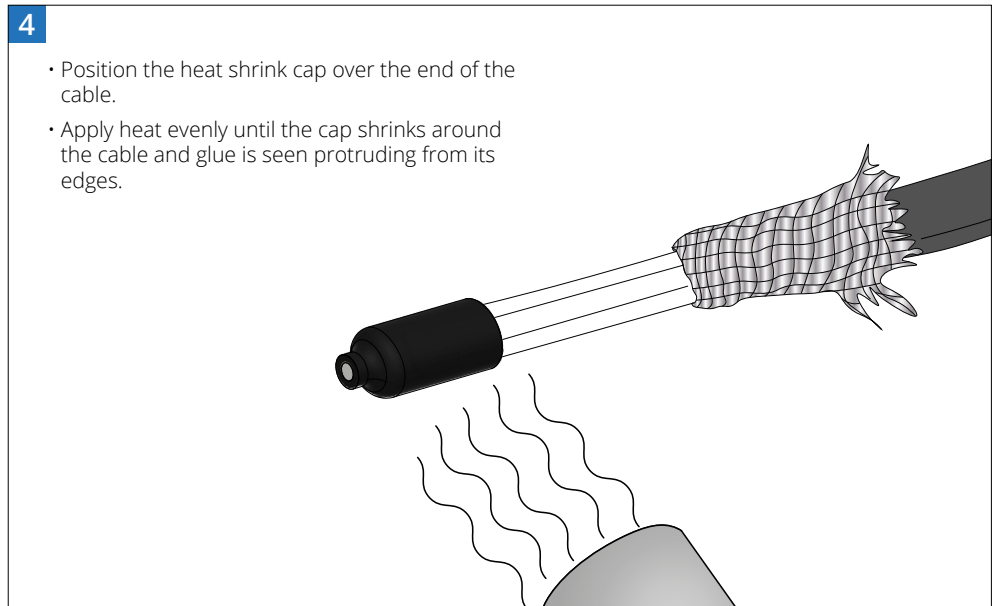


- Cut  $\frac{3}{4}$ " [19mm] off the end of the cable.

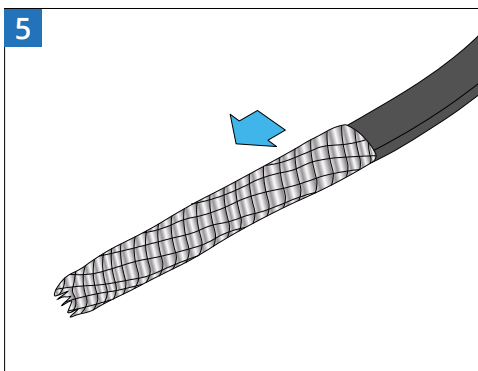
**WARNING: ELECTRIC SHOCK HAZARD.**  
To prevent short circuits, do not connect bus wires together. Keep ground braid out of heat shrink cap.

**4**

- Position the heat shrink cap over the end of the cable.
- Apply heat evenly until the cap shrinks around the cable and glue is seen protruding from its edges.

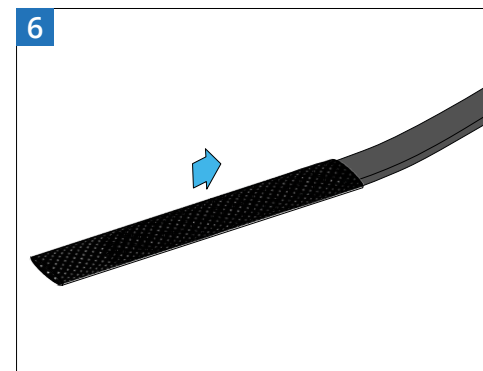


**5**



- Pull the ground braid back over the cable and heat shrink cap and twist the ends of the ground braid together.

**6**

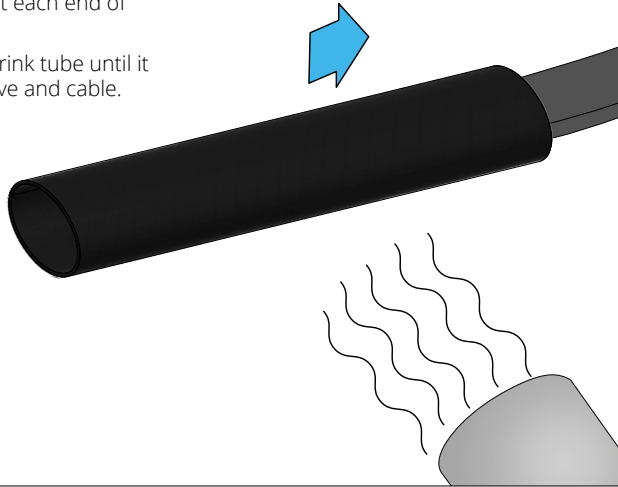


- Fit the 4" [150 mm] Braided Sleeve over the ground braid, allowing at least  $\frac{1}{2}$ " [12.5mm] to extend past the end of the cable.

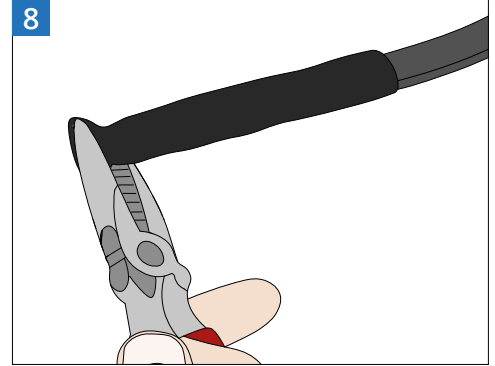
## End Termination Installation

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- Fit the 3/4" ID x 5 1/8" [20 mm x 130 mm] heat shrink tube over the braided sleeve, allowing at least 1/2" [12.5mm] to extend past each end of the braided sleeve.
- Apply heat evenly to the heat shrink tube until it shrinks around the braided sleeve and cable.



8



- While the heat shrink tube is still hot, gently press the end of the heat shrink tube with pliers and hold in position until the heat shrink cools. If the end is not visibly sealed after this step, repeat the process.




## Maintenance

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A system inspection for freeze protection systems is recommended before the winter season. Category II systems should be inspected annually. All observations and measured values (as appropriate) should be recorded on a log sheet.

**Caution:** Always consult the self-regulating cable heating system documentation [cable & components] prior to maintenance / repair / modification.

The full maintenance requirements, including maintenance log sheet, are detailed in the WSR Self-Regulating cable manual. The SR-SPLICE-KIT instructions must be used with reference to the installation instructions for the WSR Self-Regulating cable manual. Some maintenance procedures for the SR-SPLICE-KIT include:

-  Junction boxes should be checked to verify that they are free of moisture and water. The thermal insulation and weather barrier should be inspected and repaired as needed.
-  The electrical insulation resistance of each circuit should be measured and recorded.
-  Major changes in insulation resistance or trace heater current should be resolved. In the event of an earth fault or over current interruption, the device shall not be reset until the cause of the trip has been investigated by qualified personnel.

<b>Model</b>	SR-SPLICE-KIT
<b>Operating Voltage</b>	110 - 120 V AC / 208 - 277 V AC
<b>Minimum Recommended Installation Temperature</b>	- 4°F (- 20°C)
<b>Maximum Operating Current</b>	40A - Pipe Tracing 20A - Roof & Gutter applications
<b>Maximum Continuous Exposure Temperature</b>	185°F (85°C)
<b>Required Ground Fault Equipment Protection (GFEP)</b>	30mA
<b>Weight</b>	2¼ oz (61 g)

## Contact

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Warmup is available 24/7/365 at (888) 927-6333  
For quotes, layouts and specific technical information contact us at:

### **Warmup Inc**

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Please be advised Warmup Inc., provides these technical specifications and or instructions on a self help basis. We take every precaution to ensure they are accurate. Some of the products are sourced from manufacturers and we relay that information on to you. We do not have the technical specifications reviewed by an engineer and sometimes errors do happen. Our products are only reviewed with an ordinary level of care and when using said products in a situation that warrants additional care please be sure to conduct your own review. As such we strongly suggest before installing our products you have them reviewed by a professional engineer or qualified professional. We under no circumstances warrant our products for a particular use unless specifically agreed in writing.