

# Power Connection Box Installation Instructions

## (SR-SFIT-BOX-S)

For use with Warmup WSR Parallel Self-Regulating Cable  
Non-hazardous and Hazardous Locations

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 Power Connection Box [SR-SFIT-BOX-S] is a specially designed junction box for safe and reliable power supply connection for Warmup's WSR Self-Regulating Cable. The box accommodates up to three heating cables and features screw clamp terminals for secure electrical connections. The kit also includes a pipe standoff bracket which protects the heating cable and allows up to 80mm of pipe insulation. The pipe standoff holds the junction box away from the pipe surface with pipe straps included to secure it.

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.

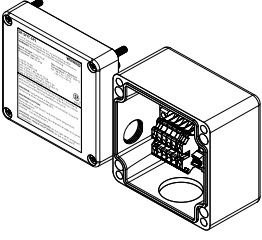
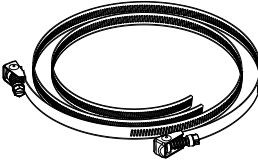
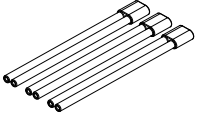
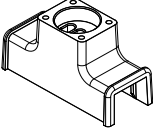
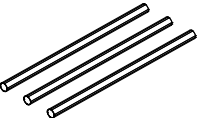
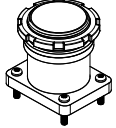






## SR-SFIT-BOX-S - Approved Applications






<b>Ordinary and Hazardous Locations</b> †	<b>Per US (NEC 500) and CA (CE Code Annex J18)</b>	
	Class I, Division 2, Groups A, B, C and D T3	Class II, Division 2, Groups F, G T3
	<b>Per US (NEC 505)</b>	
	Class I, Zone 1, AEx eb IIC T3 Gb	Class II, Zone 21, AEx tb IIIC T200°C Db
	<b>Per IECEx/ATEX standards</b>	
	Ex eb IIC T3 Gb	Ex tb IIIC T200°C Db

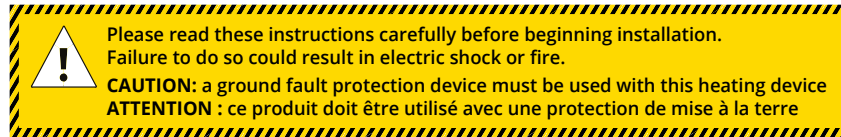
† For hazardous locations, WSR self-regulating cable MUST be installed with Warmup approved accessories for hazardous locations

## Kit Components

<p>1 x Junction Box with a DIN-rail Mounted Terminal Block for Electrical Connections &amp; Front Cover with 4 x Captive Screws</p>		<p>2 x Pipe Straps for 2" to 6" (51mm to 152mm) OD Pipes</p>		<p>3 x Silicone Heat Resistant Boots 1/8" ID x 6" (3.5mm x 150mm)</p>	
<p>1 x Tee Pipe Stand-Off Bracket allowing for up to 80 mm Pipe Insulation</p>		<p>3 x Green &amp; Yellow Heat-Shrink Tubes 1/4" ID x 6" (7 mm x 150 mm)</p>		<p>1 x M25x1.5 Cable Gland &amp; Lock Nut Strain Relief for WSR cables</p>	
<p>1 x M25x1.5 Cable Strain Relief Gland and Lock Nut for Incoming Power Supply</p>		<p>1 x Watertight Sealing Grommet for up to 3 x WSR Cables</p>		<p>1 x M25x1.5 Cable Entry Blanking Plug</p>	
<p>3 x Warning Labels</p>					

## Receiving, Storing and Handling

-  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.

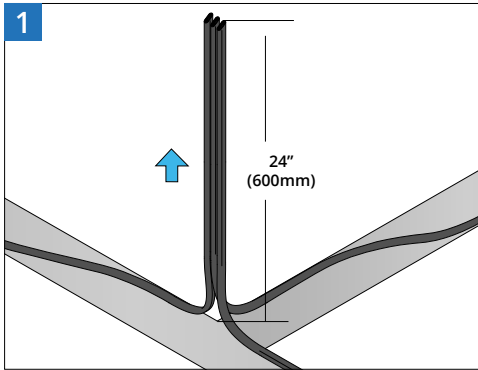


-  Before installation, servicing or maintenance, the cables MUST be de-energized. The branch-circuit switch or circuit breaker supplying the equipment shall be placed in the OPEN (OFF) position and secured with a lockout device. This lockable disconnecting means shall simultaneously disconnect all ungrounded 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. Ground-fault equipment protective devices intended for use with self-regulating heating cable circuits in Division areas shall be appropriately identified for use in Division areas.
-  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.
-  The equipment [cable and components] shall not be installed in a location where the external conditions are conducive to the build-up of electrostatic charge on such surfaces. In addition, the equipment shall only be cleaned with a damp cloth and shall be cleaned regularly to prevent dust accumulation.
-  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 any components. Only the components supplied in the SR-SFIT-BOX-S are approved for use. Using incorrect components may cause leaks, damage, 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.
-  When the process temperature is 302°F (150°C), service temperature of cable entry and branch point are:  
**Cable entry:** 135.54°F (57.52°C)  
**Branch point:** 141.91°F (61.06°C)  
**Note:** End user shall select a suitably Certified cable and cable gland for final installation.
-  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. If the cable is to be terminated within an explosive atmosphere, then the free end shall be terminated in a suitably certified termination. Junction boxes shall be installed in a low mechanical risk position.
-  The SR-SFIT-BOX-S was submitted to clamping tests corresponding to the 25% of tensile value in clause A.3.1.1 of CSA/UL 60079-0, so when installing you MUST provide additional and effective clamping of the cable to ensure that pulling is not transmitted to the terminations and prevent pulling and twisting after installation.
-  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 warning signs 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 when using the Division/Zone method of area classification. 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; i.e. Class and Division/Zone. 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-SFIT-BOX-S instructions must be used with reference to the installation instructions for the WSR Self-Regulating cable.

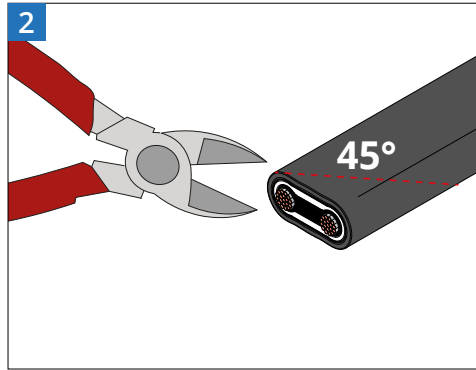
## Tools Required for Installation

- Pliers
- Utility Knife
- Natural Cure, Single Part RTV Adhesive
- Screwdriver
- Measuring Tape
- Heat gun
- Wire Cutters
- Glass Cloth Tape

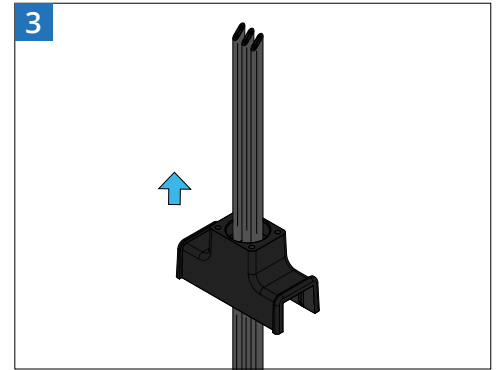
## Installation



- Leave excess cable as shown to ensure there is sufficient cable to reach the terminals of the connection box, to allow for an easier install and to provide excess cable for any future electrical works.

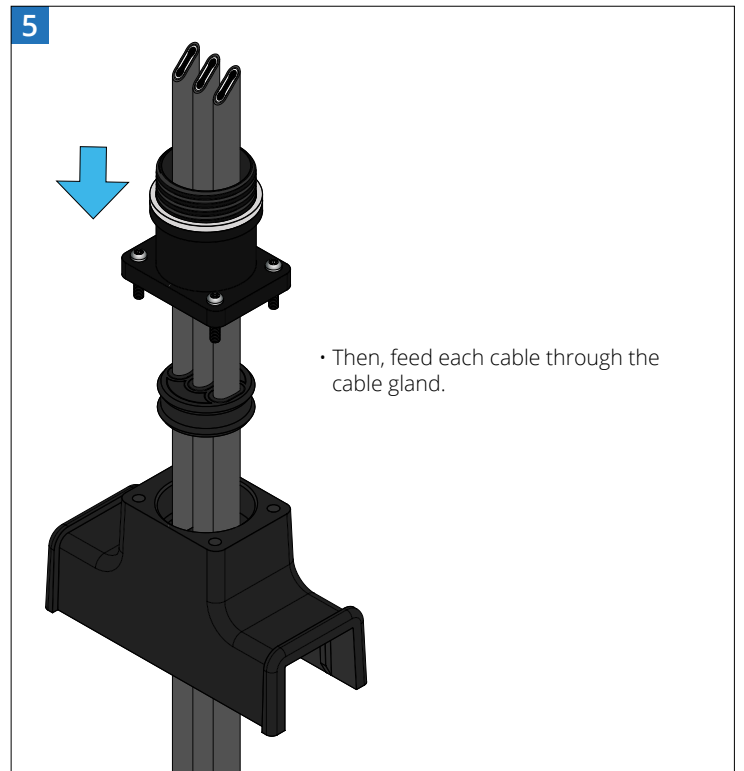
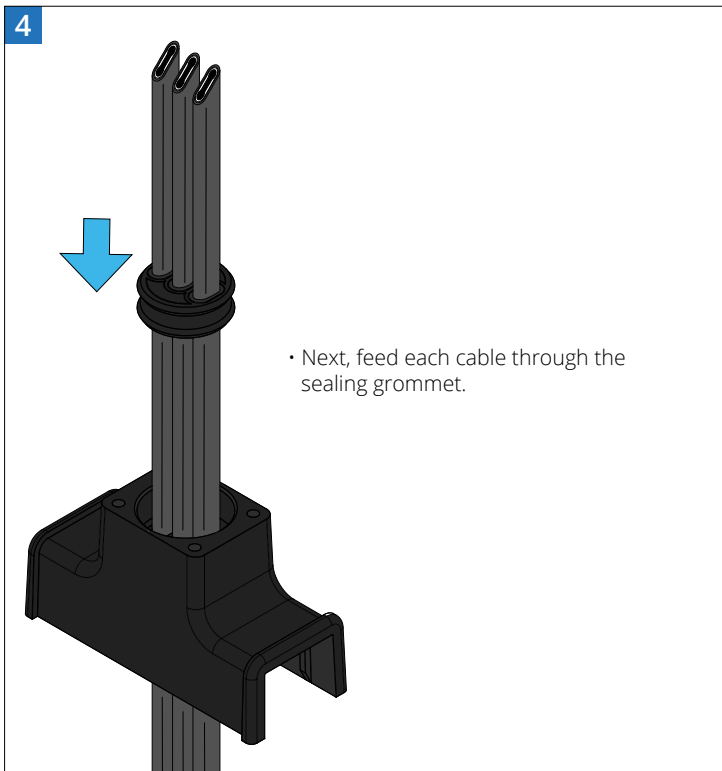


- Cut the ends of the cables at a 45° angle as this will help when feeding the cables through the SR-SFIT-BOX-S cable spacer and watertight sealing grommet.

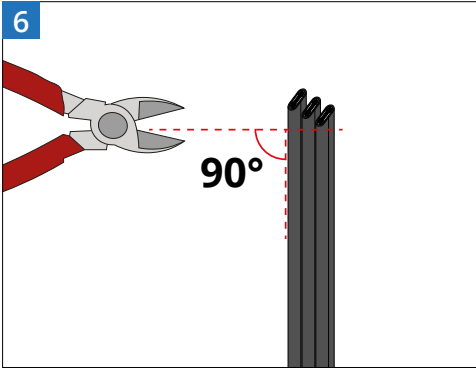


- Feed the self-regulating cables through the pipe stand-off bracket first.

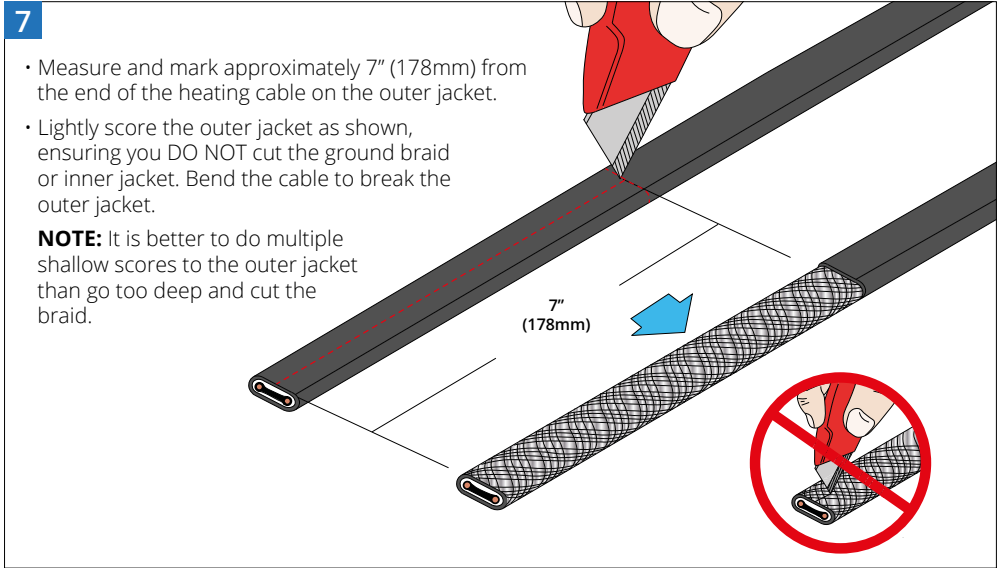
**NOTE:** Do not break any sealing membrane on the grommet unless a WSR cable is being installed within that penetration.



# Installation



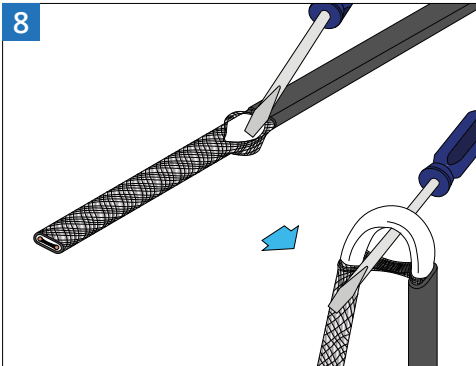
- Cut the ends of the cables square, ready to begin removal of the outer jacket.



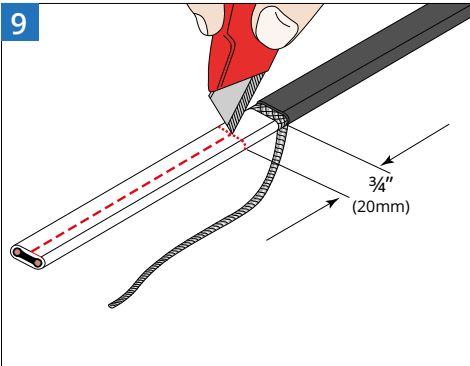
- Measure and mark approximately 7" (178mm) from the end of the heating cable on the outer jacket.

- 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.

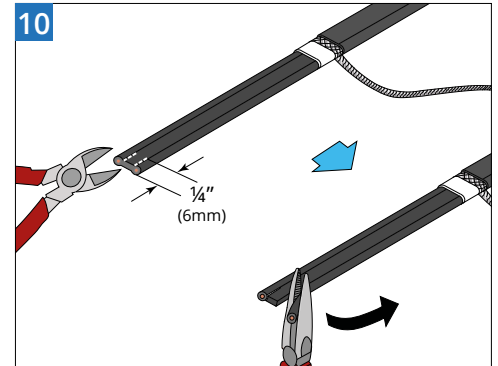
**NOTE:** It is better to do multiple shallow scores to the outer jacket than go too deep and cut the braid.



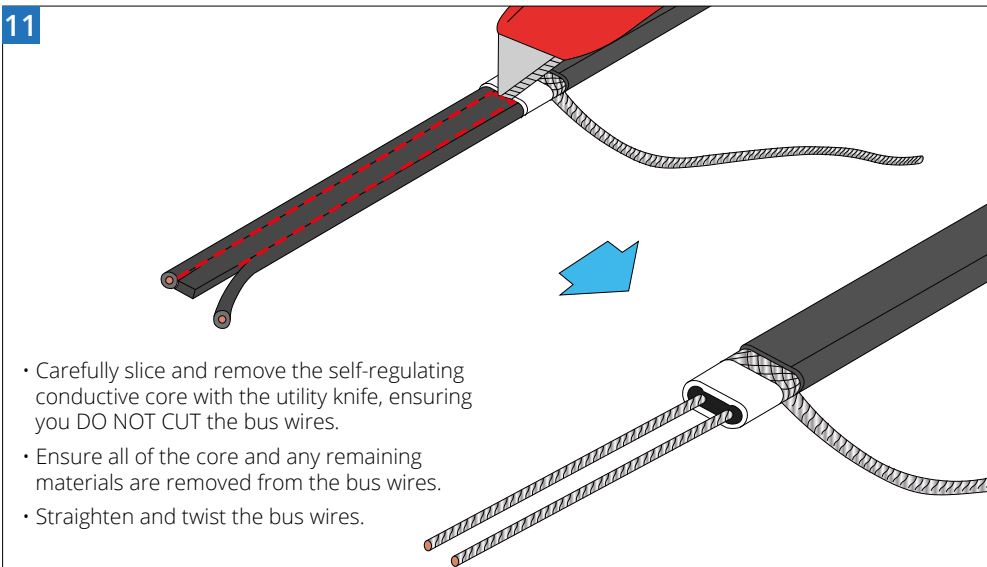
- Push the braid back slightly and then, using a flathead screwdriver, carefully loosen and open the ground braid.
- Bend the cable to help separate the inner jacket from the braid through the opening previously made.



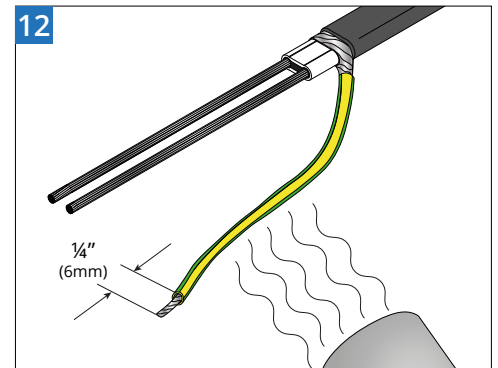
- Pull the ground braid to the narrow side of the self-regulating cable that will face the front of the connection box.
- Measure and mark approximately 3/4" (20mm) from the outer insulation up the inner insulation.
- Slice and remove the inner insulation layer as shown. Bend the cable to break the inner jacket.



- 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.



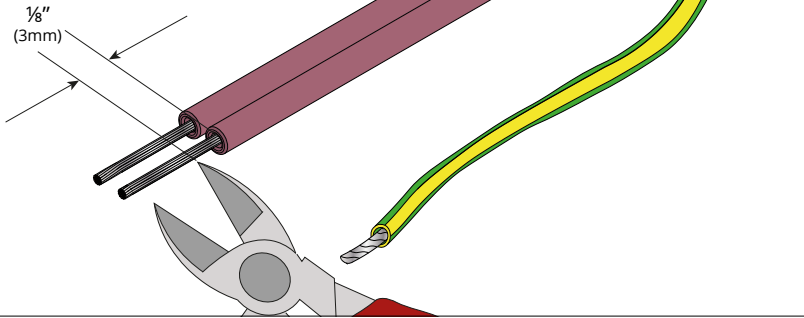
- Carefully slice and remove the self-regulating conductive core with the utility knife, ensuring you DO NOT CUT the bus wires.
- Ensure all of the core and any remaining materials are removed from the bus wires.
- Straighten and twist the bus wires.



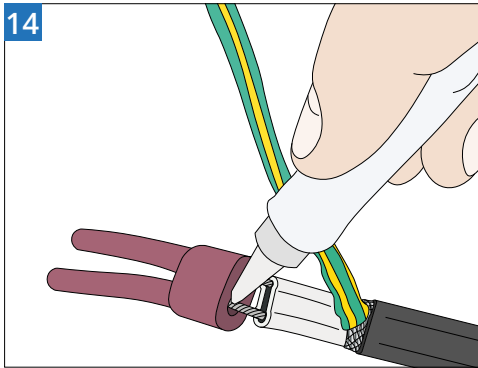
- Straighten the ground braid.
- Slide the Green & Yellow Heat-Shrink Tube; 1/4" ID x 6" (7 mm x 150 mm) through the ground braid.
- Use a heat gun to shrink the tube by moving the gun from side to side continuously until it has fully contracted.
- Repeat for the other cable ground braids.

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- Slide the silicone boot onto the bus wires.
- Cut the bus wires so that extend  $\frac{1}{8}$ " (3mm) from the end of the boot.
- Repeat for the other cable bus wires.

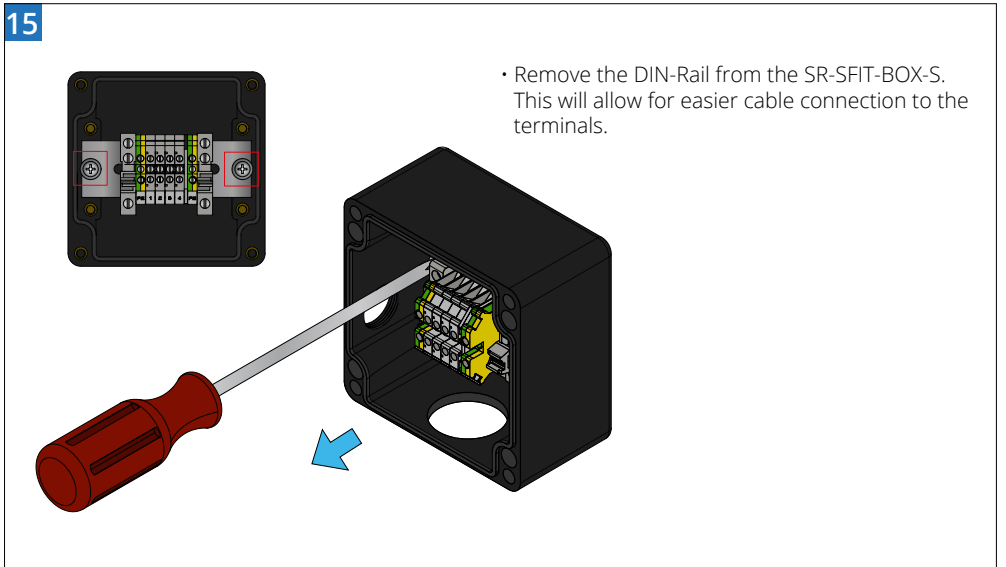


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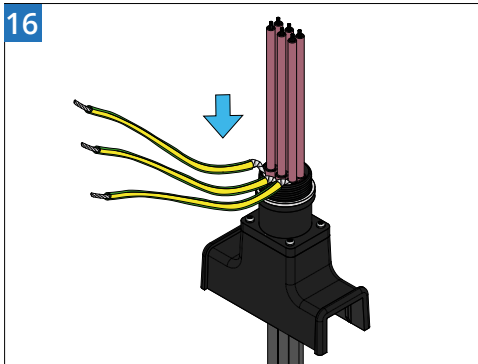
- Seal the ends of the silicone boot with a Natural Cure, Single Part RTV Adhesive.

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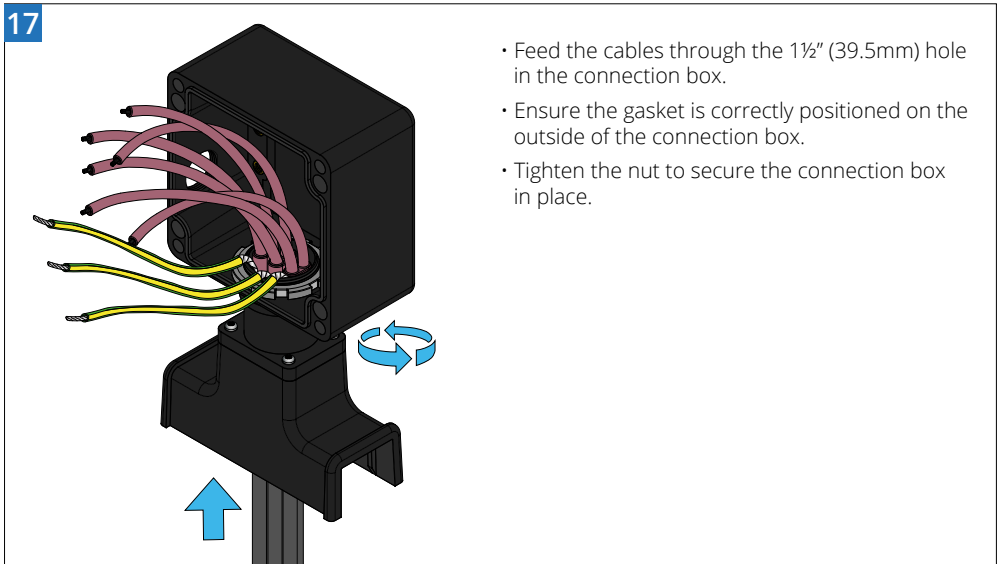
- Remove the DIN-Rail from the SR-SFIT-BOX-S. This will allow for easier cable connection to the terminals.

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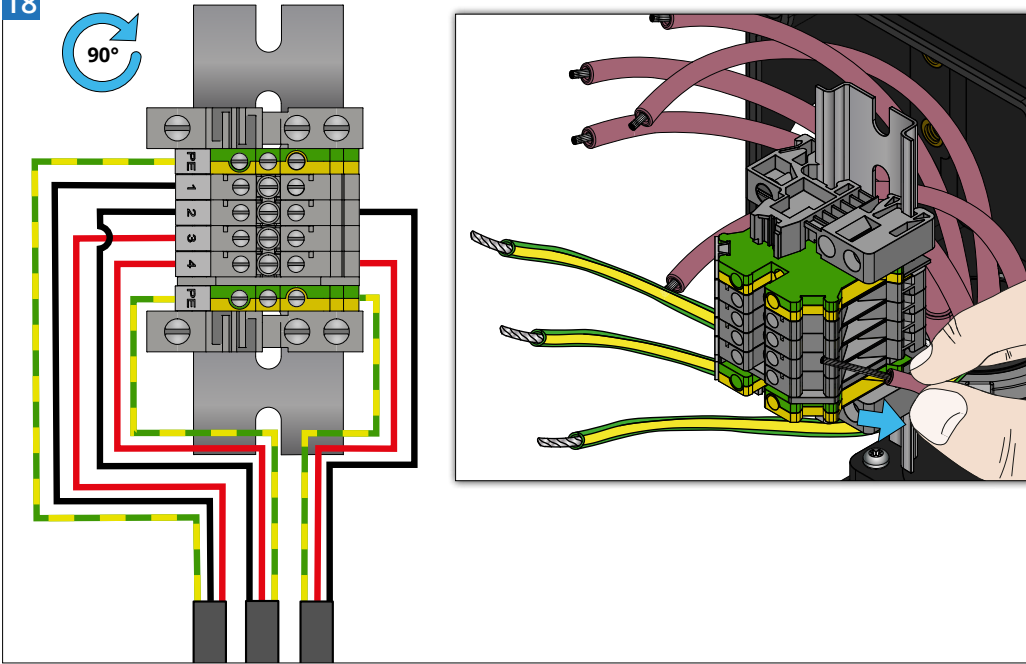
- Reassemble the stand-off bracket, positioning the cables such that the shoulder on the boot is flush with the top cable spacer as shown.

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- Feed the cables through the  $1\frac{1}{2}$ " (39.5mm) hole in the connection box.
- Ensure the gasket is correctly positioned on the outside of the connection box.
- Tighten the nut to secure the connection box in place.

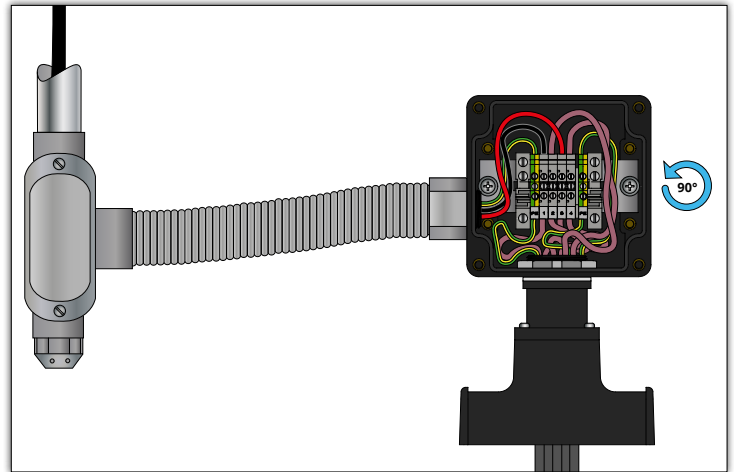
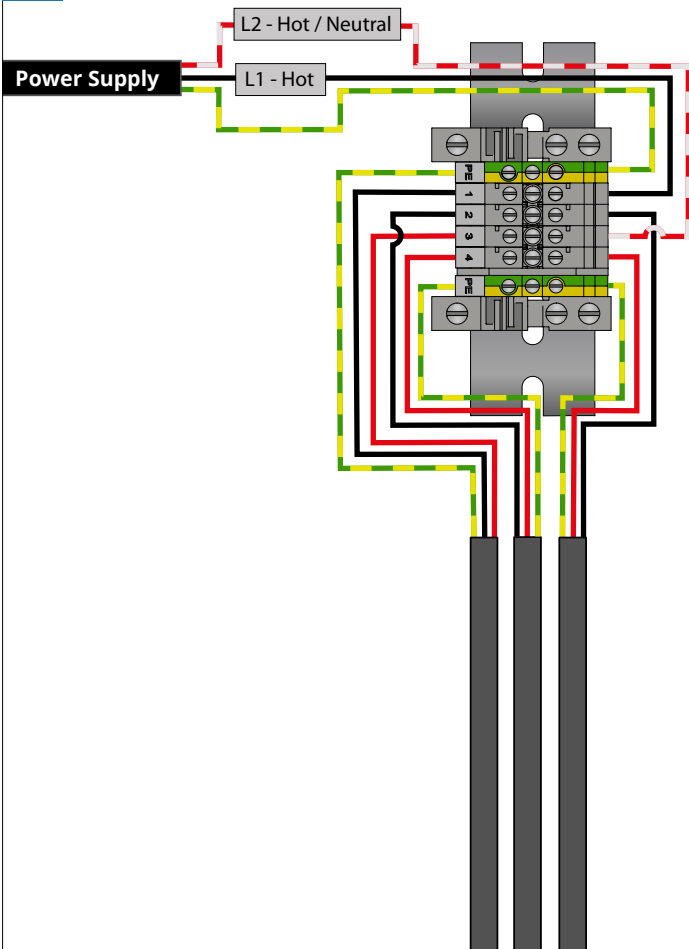
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- Rotate the DIN-Rail and terminals 90° to allow for easier cable connection.
- Wire the self-regulating cables to the terminals as shown.

**NOTE:** To help with installation, pull back the silicone boot and pinch it to expose more of the bus wire. Then insert the bus wires into the terminals and make the connection. Once secure push the silicone boot into the terminal block so that there are no exposed bus wires.

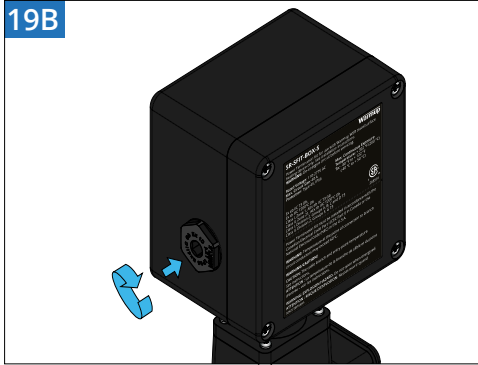
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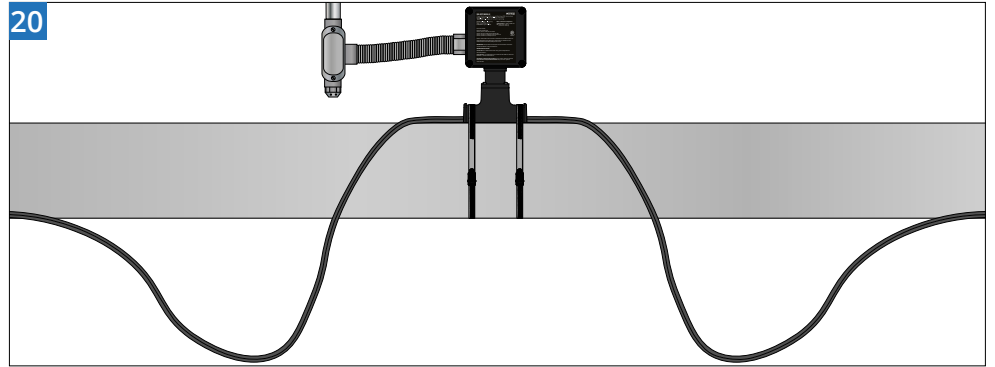
- Non-heating power supply leads shall be enclosed in a rigid conduit, intermediate metal conduit, electrical metallic tubing or other approved means [dia. ½" to ¾" (13-18mm)], per NEC/CEC.
- Install the M25x1.5 Cable Strain Relief Gland and Lock Nut for Incoming Power Supply to the connection box.
- If using a suitable flexible conduit, a compatible entry gland must be used.
- A low-point drain in the conduit leading to the connection box is recommended to prevent moisture accumulation.
- Wire the power supply to the connection box terminals as shown in the wiring diagram.
- Return the DIN rail and terminals to their original position (rotate 90°) and secure within the SR-SFIT-BOX-S. Push all cables into the enclosure.

**NOTE:** At least 150 mm (6 inches) of non-heating lead must be included within the junction box.

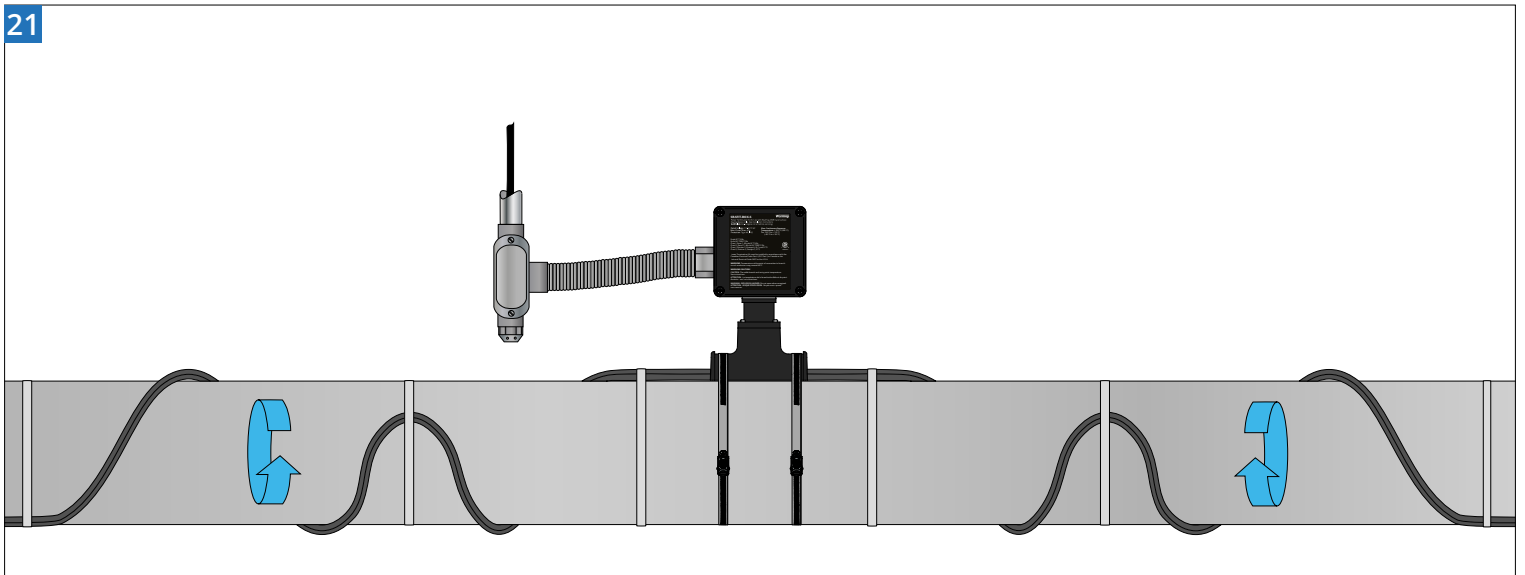
## Installation




- If there is no incoming power supply and you are using the SR-SFIT-BOX-S as a splice or tee kit then install the M25x1.5 Cable Entry Blanking Plug in place of the M25x1.5 Cable Strain Relief Gland and Lock Nut.



- Fit the SR-SFIT-BOX-S cover using the 4 x captive screws.
- Secure the SR-SFIT-BOX-S to the pipe using the supplied Pipe Straps.



- Wrap the excess self-regulating cable around the pipe as shown to provide strain relief to the cable entering the SR-SFIT-BOX-S.
- Secure the self-regulating cable to the pipe at the locations shown to also provide additional strain relief. Use glass cloth tape to secure the cable to the pipe.

 You **MUST** provide additional and effective clamping of the cable to ensure that pulling is not transmitted to the terminations and prevent pulling and twisting after installation.




## 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-SFIT-BOX-S instructions must be used with reference to the installation instructions for the WSR Self-Regulating cable manual. Some maintenance procedures for the SR-SFIT-BOX-S 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-SFIT-BOX-S
<b>Operating Voltage</b>	110 - 120 V AC / 208 - 277 V AC
<b>Ambient Temperature Range (Ta)</b>	-40°F to +122°F (-40°C to +50°C)
<b>Protection Grade</b>	Type 4X; IP66
<b>Maximum Circuit Size</b>	40 A
<b>Maximum Continuous Exposure Temperature</b>	392°F (200°C)
<b>Hazardous Locations Ratings Marking*</b>	Ex eb IIC T3 Gb, Ex tb IIIC T200°C Db Class I, Zone 1, AEx eb IIC T3 Gb Class II, Zone 21, AEx tb IIIC T200°C Db Class I, Division 2, Groups A, B, C and D T3 Class II, Division 2, Groups F, G T3
<b>Required Ground Fault Equipment Protection (GFEP)</b>	30mA
<b>Weight</b>	50 oz (1420 g)
<b>Warranty</b>	10 Years

\* For hazardous locations, WSR self-regulating cable MUST be installed with Warmup approved accessories for hazardous locations

## Contact

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Warmup is available 24/7/365 at (888) 927-6333  
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