HEATIZON SYSTEMS

RADIANT HEATING AND SNOW MELTING SYSTEMS

HOTT-WIRE®

SNOW MELTING

Self Regulating Cable

Hott-Wire® SR Design & Installation Manual

Hott-Wire® is a Registered Trademark of Heatizon Systems

HEATIZON SYSTEMS

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Hott-Wire® SR Specifications

Heating cable	Hott-Wire® SR
Voltage	120, 208, 240, 277 or 480V
Watts at 32ºF (0ºC)	Up to 24W per lin. ft.
Length	Refer to product label
Diameter/Height	Approx. 0.26” x 0.75”
Bending Radius	Not tighter than 2” inside diameter
Cable Type	SR
Max Withstand Temp	185°F (85°C)
Max Maintain Temp	150°F (65°C)
Minimum Spacing	2”
Standard Spacing	4” to 9”
Cap Thickness	1½” - 4”

Electrical Connection Wiring

120V and 277V Connection	
Phase	Cold Lead
Neutral	Cold Lead
Ground	G Shield

208V, 240V,480V Connection	
Phase	Cold Lead
Phase	Cold Lead
Ground	G Shield

Note: It is important that Hott-Wire® SR be installed only by qualified persons who are familiar with the proper sizing, installation, construction and operation of snow melting systems and the hazards involved. Hott-Wire® SR products are designed for asphalt, concrete, and paver applications.

Note: Hott-Wire® SR must be installed in accordance with the manufacturer’s installation instructions, as well as with the National Electric Code (NEC) and Canadian Electrical Code (CEC), part 1, and local codes and regulations.

Note: A ground fault protection device (i.e. GFCI, GFEP, etc.) must be used when installing all Hott-Wire® SR products. See the NEC or CEC for details.

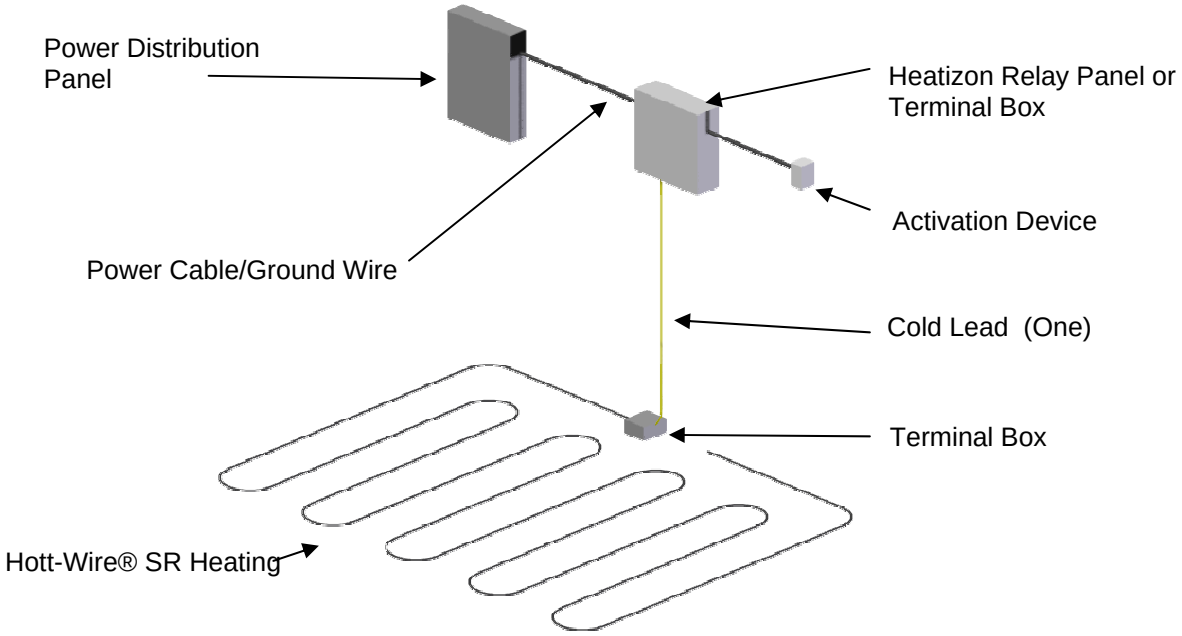
Note: Do not bend Hott-Wire® SR within 1.6” (40mm) of a termination or connection between the Hott-Wire Heating Element and the cold lead or power connection.

Required Tools:
- 2500 VDC Megohmmeter
- Digital Multimeter (DMM)
- Screwdrivers
- Wire Stripper
- Crimping tool
- Utility Knife
- Heatshrink Heat-finding device

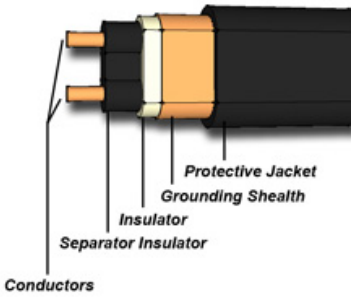
Note: Hott-Wire® SR should be stored in cool, dry location

Note: Section 426.20 of the NEC limits embedded deicing and snow melting equipment to a maximum 1300 watts/m² (120 watts/ft²) of heated area.

Hott-Wire® SR Snow Melt System



Hott-Wire® SR Cable



Warnings

- Read this entire Design and Installation Manual prior to installing Hott-Wire® SR.

- Do not twist, kink, or spiral the Hott-Wire® SR.

- Always test Hott-Wire® SR with a Megohmmeter Tester insulation resistance tester prior to installing, once installation is complete, and prior to energizing. In the event Hott-Wire® SR fails any Megohmmeter Test, call Heatizon at 801-293-1232.

- The minimum installation temperature is 40ºF (5ºC).

- Hott-Wire's® SR Heating Element may be cut to length in the field, but otherwise must not be altered, cut, damaged, or modified in any way.

- Use only copper wire from the distribution panel to the Hott-Wire® SR cold leads.

- Do not allow Hott-Wire® SR Heating Elemant to touch or cross other electrical conductors or gas lines.

- Hott-Wire® SR braided grounding shield must be grounded to a suitable earth ground.

Reminders

Always measure, verify and record the actual resistance at specific points throughout the installation process. A resistance recording page is included in this manual for this purpose. Compare each reading to the original reading for SR Cables. If the taken readings differ from those expected, do not energize the Hott-Wire® SR, and call Heatizon Systems @ 801-293-1232.

Always roll the Hott-Wire® SR spool or uncoil the coil to unreel the heating element. Do not pull Hott-Wire® SR from the spool.

Remember to verify that the supply voltage matches the design voltage of the Hott-Wire® SR product you have purchased.

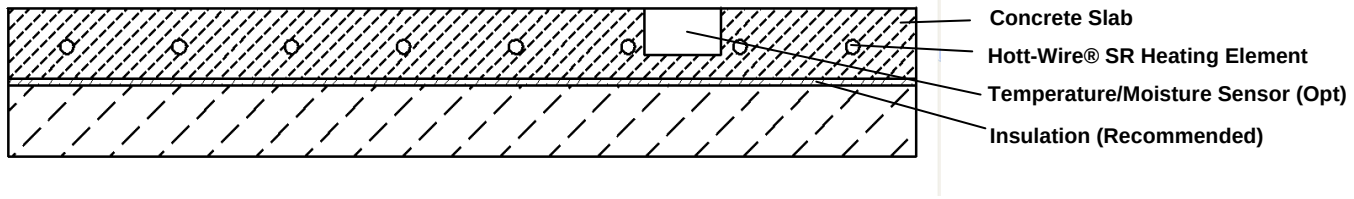
Remember to use asphalt, concrete, a sand bed, thin-set, or a cement based self-leveling product to embed the Hott-Wire® SR Heating Element.

Metal structures or materials used to install or support the Hott-Wire® SR Heating Element must be grounded in accordance with CSA Standard C22.1, section 10, and with the NEC.

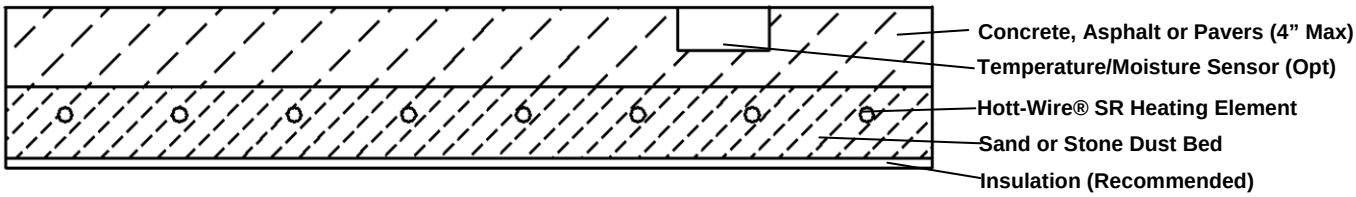
Please contact Heatizon Systems at 801-293-1232 with additional questions.

Sample Application: Hott-Wire® SR in a Concrete Slab

Note: Insulation is always recommended but only required in high water table areas.



Sample Application: Hott-Wire® SR in a Sand Bed Under Concrete, Asphalt or Pavers



Design and Installation

STEP 1 PLAN THE LAYOUT

Gather Necessary Information:

- Size and layout of area
- Voltage and Amperage Available
- Geographic Location
- Cover or cap material and thickness (1½" minimum)

Design Requirements

- Whenever possible, The American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) design criterion should be followed.
- Hott-Wire® SR must not be closer than 6" to the edge of the slab
- All Hott-Wire® SR snowmelt systems may be activated manually or automatically.
- Identify and mark for jumpering the location of all future joints in asphalt or concrete.

Draw a sketch of the area where Hott-Wire® SR snow melt will be installed. The sketch should show all measurements and dimensions in order to determine the area to be snow melted. Determine the best location for the Hott-Wire® SR activation device.

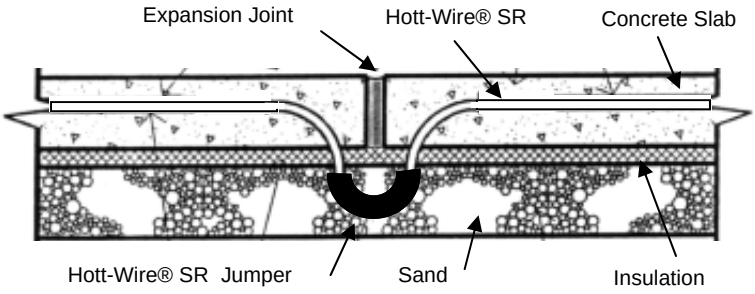
Note: The transition joint between Hott-Wire® SR Heating Element and the cold lead must be embedded in asphalt, concrete, sand, stone, other cementitious material, or be in a terminal box.

Note: Make certain to plan for the movement of water created by melted snow.

STEP 2 PLAN THE JUMPERS

Never extend Hott-Wire® SR through any joint in asphalt and/or concrete. Determine the number of joints in order to determine the number of Jumper Kits required for the project. Always jumper under all joints using the appropriate Jumper Kit provided by Heatizon Systems.

Hott-Wire® SR Cable Jumper (Heatizon Systems Part # SRJMPKIT)



Note: When Jumper is required see instructions included with SRJMPKIT.

STEP 3 VERIFY SNOW MELTING OBJECTIVES

If it is not certain that the desired snow melting objectives have been met, contact your Hott-Wire® SR dealer for assistance in determining the Watts per square foot needed to accomplish your snow melting objectives. Heatizon recommends that, whenever possible, all snow melting projects be designed using ASHRAE's design criterion. In the event access to ASHRAE's design criteria is not available or applicable, then the "General Guidelines for Product Selection" Table, below, may be helpful. Use the Hott-Wire® SR Selection tables on the next page to identify the Hott-Wire® SR product that meets the design objectives.

Once the design is complete, the space between lengths of Hott-Wire® SR Heating Element are decided and the total length of each Hott-Wire® SR zone has already been determined, go to Step 4, "Confirm Materials."

General Guidelines for Product Selection

For heavy snow areas or critical emergency accesses, ADA critical areas, landing pads.	30+ Watts per square foot (323 Watts/M^2)
Areas with higher than average amounts of snow or having medium pedestrian traffic or commercial accesses, residential driveways and walkways that are steep.	20-30 Watts per square foot (215-323 Watts/M^2)
Areas with average snow or light pedestrian traffic, residential driveways and walkways.	20+ Watts per square foot (215 Watts/M^2)

Design and Installation

STEP 4 CONFIRM MATERIALS

When materials arrive, examine them for damage. If damage exists file a claim with the shipping company and contact Heatizon Systems. Next examine the Hott-Wire® SR snow melt system and compare the list of materials ordered to those received.

STEP 5 MEASURE & RECORD RESISTANCE

Remove the Hott-Wire® SR Heating Element from the box. Using a megohmmeter tester set at 2500 Vdc, check the insulation resistance of the Hott-Wire® SR Heating Element to make certain it is greater than 20MΩ. Confirm the megohmmeter result by measuring the resistance with a Digital Multimeter and record the value measured on *Resistance Recording Table a*t the back of this manual. Resistance measurement and megohmmeter testing must be taken several times during the installation process: Immediately upon removal from the packaging, after installation of the heating element, and after cement, or asphalt application. Hott-Wire® SR Cable should also be checked for electrical continuity.

Note: Always roll the Hott-Wire® SR spool to unreel the heating element. Do not pull Hott-Wire® SR from the spool.

STEP 6 PREPARE AREA

Ensure that the substraight has been properly compacted and flat, and that drainage has been satisfactorily addressed.

Eliminate objects that may damage the Hott-Wire® SR Heating Element prior to installation. If Hott-Wire® SR is going to be installed into a new asphalt or concrete slab, identify and mark the location of any and all joints.

STEP 7 TRANSFER THE PLAN TO THE SITE

Using the site sketch, the spacing of Hott-Wire® SR Heating Element, and the calculated length of Hott-Wire® SR Heating Element, begin the installation. Note that the minimum distance between the Hott-Wire® SR Heating Element runs cannot be less than 2 inches.

Hott-Wire® SR Heating Element should be thoroughly tested before, during, and after installation to ensure they have not been damaged either in transit or during installation.

Install SRJMKITS in appropriate places now.

When using Hott-Wire® SR Heating Element, the connection between the appropriate power conductors and the Heating Element must be in a NEMA 4 or 4X junction box or in Heatizon's Terminal Box.

Damage to the Hott-Wire® SR Heating Element is easily detectable with a 2500 Vdc field Megohmmeter Tester. Cable insulation resistance should be measured on arrival of the cable.

Test the installation resistance of the Hott-Wire® SR Cable using a 2500 Vdc Megohmmeter Tester connected between the braid and the two bus wires. Readings of less than 20Ω indicates cable jacket damage. Replace or repair damaged cable sections before the slab is poured.

STEP 8 DETERMINE ACTIVATOR LOCATION

An automated activator is the “eyes and ears” of the snow melt system. It is important that it be installed in a location that will allow it to turn the snow melt system “on” when it is needed and “off” when it is not needed.

Manual activators required human action—as a result they should be placed in a location that is convenient and easily accessible.

STEP 9 INSTALL THE ACTIVATOR

Install the selected activator by carefully following the specific set of instructions that were included in the packaging.

Note: If the selected activation device requires conduit for a temperature sensor, the conduit must be centered between two runs of Hott-Wire® SR Heating Element. Warning: Do not allow the sensor conduit to cross the Hott-Wire® SR Heating Element. Do not allow any part of the activator to touch the Hott-Wire® SR Heating Element.

STEP 10 INSTALL HOTT-WIRE® SR CABLE ELEMENT

Install the Hott-Wire® SR Heating Element so that the starting and ending connection points and any activation sensor are in their desired locations. Make certain that the power end of the Cold Lead cable of the Hott-Wire® SR Cable has conductors which extend back to the Hott-Wire® SR Termination Box or Heatizon Relay Panel.

Begin laying the Hott-Wire® SR Heating Element across the area to be snow-melted in evenly spaced runs. Measure and record the resistance on the *Resistance Recording Table* at the back of this manual.

Hott-Wire® SR Heating Element may be secured in place by landscape stakes and plastic wire ties, welded wire fabric and plastic wire ties or tape, or pre-punched steel straps purchased from your Hott-Wire® SR distributor.

Heatizon does not recommend retrofitting Hott-Wire® SR Heating Element.

Warning: Do not damage or subject the Hott-Wire® SR Heating Element to mechanical or shear stress. Never cut or damage the insulator on Hott-Wire® SR Heating Element.

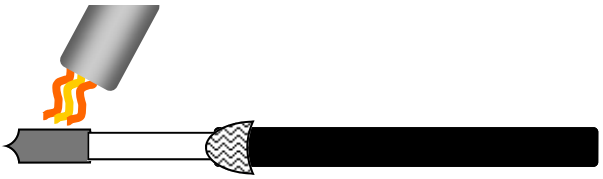
Note: Heatizon recommends that photographs of the installed Hott-Wire® SR Heating Element be taken and/or hand drawings documenting the layout be completed prior to before installing the asphalt, concrete, or pavers.

STEP 11 INSTALL END KIT FOR HOTT-WIRE® SR HEATING ELEMENT

A. Score the outer jacket of the Hott-Wire® SR Heating Cable 2” from the end of the cable. Remove the jacket to expose the braid. Do not cut the braided ground shield.

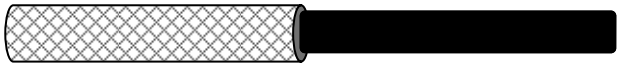
B. Push the braid back, and cut off the end 3/4” of the base cable.

C. Slide the heat shrink cap over the end of the cable. Apply heat evenly until it shrinks around the cable.

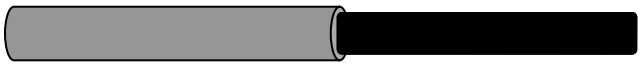


D. Pull the pushed-back braid over the sealed end cap and twist the braid end together.

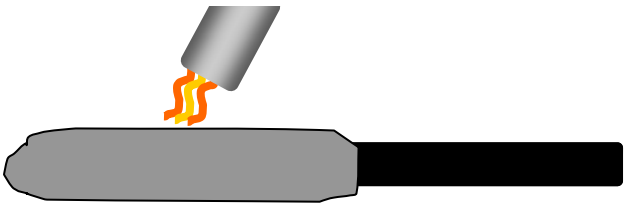
E. Slide the 4” woven braid sleeving over the end of the cable, allowing at least 1/2” to extend past the end of the cable.



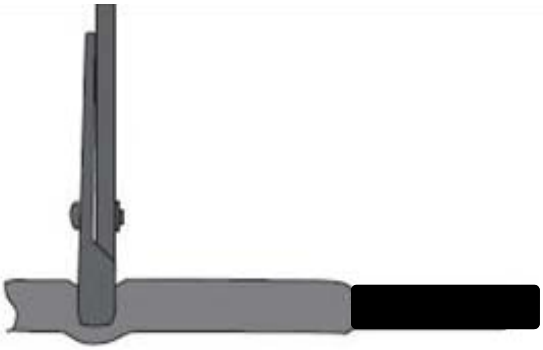
F. Slide the 5” heat shrink tubing over the woven braid piece, allowing 1/2” to extend past each end of the woven sleeving.



G. Apply heat evenly to the heat shrink tube until it shrinks around the cable. Be careful not to burn the heat shrink.



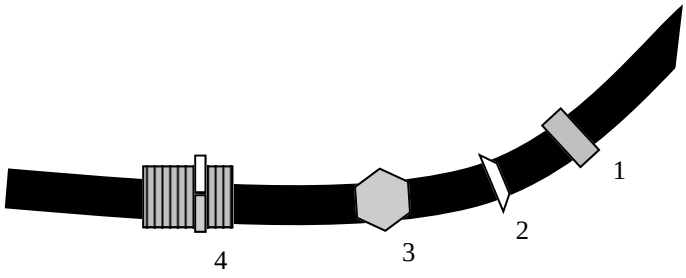
H. While the shrink tubing is still hot, gently squeeze the end of the heat shrink tube with pliers and hold until cool. Do not cut the heat shrink The end must remain visibly sealed when the pliers are removed. If the tube does not remain sealed, then repeat steps F and G.



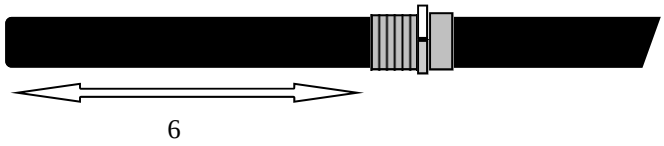
Warning: Do not overheat the tube or cable. Keep the heat source moving at all times.

STEP 12 INSTALL POWER TERMINATION KIT FOR HOTT-WIRE® SR

A. Slide the four (4) components of the nylon cable connector onto the Hott-Wire® SR Heating Cable in the order shown, right.

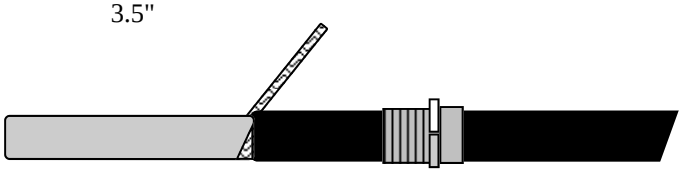


B. Assemble the connector and tighten, leaving six inches of cable extending through the connector.

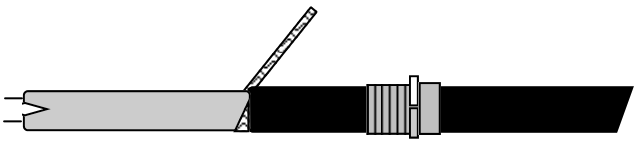


C. Score the cable outer jacket 3-3.5” from the cable end. Remove the jacket to expose the braid. Do not cut the braid.

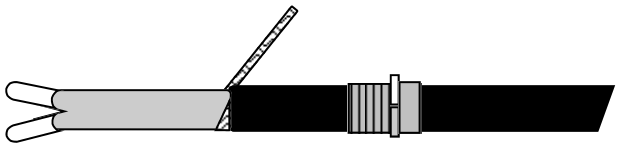
D. Pick the braid apart near the outer jacket and pull the cable through the opening in the braid. Twist the braid into a pigtail.



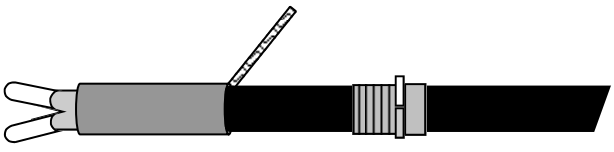
E. Using standard electrical cutters, cut a 3/4” long notch out of the cable, between the two conductor wires. Bare a 3/8” length of each conductor by stripping off the outside insulation and the inner black core material.



F. Slide one end of each of the two insulated barrel connectors over the bare portion of the conductors. Crimp the barrel connectors on using a crimpling tool..



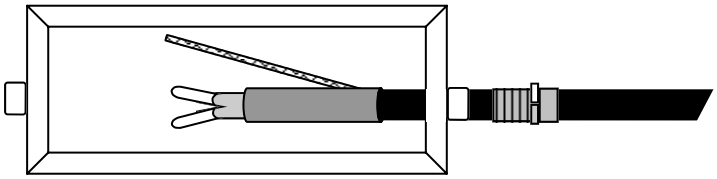
G. Slide a 3” length of heat shrink tubing over and



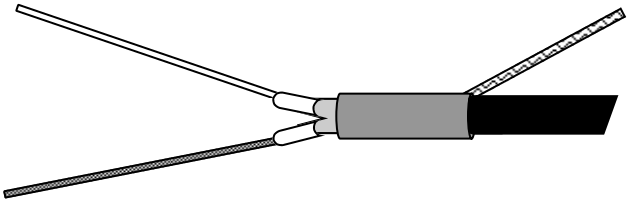
Warning: Do not overheat the tube or cable. Keep the heat source moving at all times.

Design and Installation

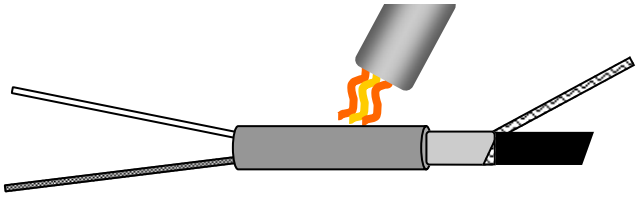
H. Insert entire assembly into NEMA 4 or 4X Electrical Junction Box. Junction box should be protected from weather if possible.



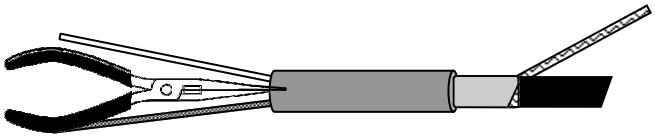
I. Strip the incoming power leads and ground wire to expose a 3/8" length of bare conductor. Insert the bared portion of the power leads into the other end of the insulated barrel connectors and crimp them.



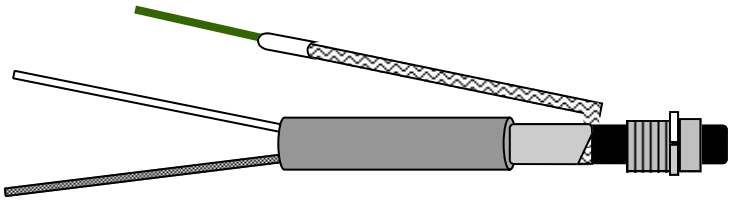
J. Center the 3" length of heat shrink tubing over the connection. Apply heat evenly to shrink tubing around the heating cable, barrel connectors and power leads. Do not burn the heat shrink.



K. While the shrink tubing is still hot, gently squeeze the shrink tubing between the power leads with needle-nose pliers and hold until cool. The shrink tubing must remain visibly sealed when the pliers are removed. If the tubing does not remain sealed, reheat the tubing and try again.



L. Insert the end of the braided pigtail into one end of the uninsulated barrel connector and crimp it. Insert the stripped end of the ground wire into the end of the barrel connector and crimp it.



M. Carefully push the connected wires into the power termination box and secure the cover. Screw the 1/2" compression cable connector into the power termination box to form a water tight seal.

N. Hott-Wire® SR Cable power leads may be connected to a Heatizon Relay Panel or appropriate activation device (see your Heatizon dealer for alternatives).

Warning: Do not overheat the tube or cable. Keep the heat source moving at all times.

STEP 13 APPLY THE ASPHALT, CONCRETE OR PAVERS

Ensure that any necessary sensor conduit has been properly installed before proceeding beyond this point. Heatizon recommends that photographs of the installed Hott-Wire® SR Heating Element be taken and/or hand drawings documenting the layout be completed prior to before installing the asphalt, concrete, or pavers.

For Asphalt Applications

Heatizon Systems Hott-Wire® SR Heating Element is of high quality and durable construction. As a result, it can tolerate the heat and compression of newly poured asphalt. Lay Hott-Wire® SR out on a flat substraight (sand or stone dust), then cover substraight material prior to hand shoveling hot asphalt over the heating element. Do not drive any vehicle over Hott-Wire® SR cable.

For Paver Applications

Proceed with the installation by covering the Hott-Wire® SR Heating Element with a layer of sand or stone dust. Ensure that the sand or stone dust covers the entire heating element ***and*** the connection between the heating element and cold leads before the pavers are installed.

For Concrete Applications

Proceed with applying concrete. Ensure that the concrete covers the entire heating element ***and*** the connection between the Hott-Wire® SR Heating Element and cold leads.

Warning: Do not damage or subject the Hott-Wire® SR Heating Element to mechanical or shear stress. Never cut or damage the insulator on Hott-Wire® SR Heating Element.

Eliminate all moisture in the concrete, asphalt or sand/stone dust bed in accordance with drying times recommended by the manufacturer or supplier. The system must not be turned on until concrete or asphalt product has fully dried (a minimum of 7 days is recommended). Once the asphalt or concrete has dried, measure and record resistance on *Resistance Recording Table a*t the back of this manual. Verify that the megohms are greater than 20 using a megohmmeter tester set at 2500 Vdc.

STEP 14 CONNECT POWER SUPPLY & ACTIVATION

The connection of the power supply and the activation device must be done by a qualified electrician in accordance with the National Electrical Code (NEC) and the Canadian Electrical Code (CEC).

Electrical Requirements:
120VAC — One to phase and one to neutral
208, 240, or 277VAC — Both to phase

Note: The breaker amperage rating is determined by specific product selected.

The shield from the Cold Lead(s) must be wired to Ground for all primary power installations. Measure a final resistance reading at this stage in the installation and record on *Resistance Recording Table a*t the back of this manual. Verify that the megohms are greater than 20 using a megohmmeter tester set a 2500 Vdc.

STEP 15 TROUBLESHOOTING

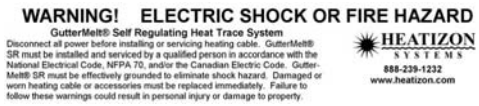
Problem: Hott-Wire® SR Cable fails the Megohmmeter Test
Potential Causes:

- Check field installed power/end terminations, connections splices and tees; correct as necessary.
- Inspect the Hott-Wire® SR Cable for damage to the insulator, exposed braided shield, and/or contact between the braided shield and the core wire(s). Replace entire length of damaged Hott-Wire® SR Cable.
- Call Heatizon Systems technical support @ 801-293-1232

Note: In the event the power/end termination, splices or tees are not the cause of the failed Megohmmeter Test and the Hott-Wire® SR Cable has not been damaged in any way, remove and replace the entire length of Hott-Wire® SR. For Warranty claims, please return the entire length of Hott-Wire® SR to Heatizon Systems, with the end termination and power termination connections intact, for evaluation prior to replacement.

Design and Installation

STEP 16 COMPLETE AND ATTACH LABELS



Place the included labels in the following locations:

- Electrical Panel Label — Inside door at electrical service panel. This label matches the information printed on the Hott-Wire® SR Cable.

- Stop Sign Warning Label — on or near the area which is heated by Hott-Wire® SR Cable

Note: Make certain to record information from the Product Identification Label, which can be found on the Cold Lead portion of each heating cable.

STEP 17 COMPLETE WARRANTY CERTIFICATE

Mail in the warranty certificate immediately after installing the Hott-Wire® SR system. Failure to complete the warranty card could void the manufacturer's warranty. The warranty is subject to the guarantee conditions listed on the warranty certificate, and upon documentation that the required resistance readings were completed. You may wish to keep a copy of the warranty card for your reference.

The Hott-Wire® SR snow melting system is now ready to use and enjoy!

Keep these instructions and all other owner/operating manuals for future reference.

Note: The Hott-Wire® SR Heating Element is designed for snow melt applications in concrete, asphalt, a sand or stone dustbed under pavers, or other cementitious applications only.

Note: The Hott-Wire® SR Heating Element must be embedded in concrete, asphalt, mortar, a sand or stone dust bed under pavers, or similar cementitious material.

Resistance Recording Table

Use a Digital Multi Meter to measure the resistance of the Hott-Wire® SR Heating Element, and compare it to the expected resistance for the product purchased. Hott-Wire® SR Cable should be tested using a megohmmeter tester set at 2500 VDC. The measured value should not be less than 20 megohms. Record all test results below.

Prior to Installation (When removed from Package)	After Installation of Hott-Wire Heating Element on Substraight	After Asphalt or Paved Concrete Application
Ω MΩ	Ω MΩ	Ω MΩ
Date Time	Date Time	Date Time

Product & Accessory Information

Heatizon M330 Relay Panel
Heatizon Control Panel
Heatizon M329 Selector Box
Heatizon Pavement Sensor
Heatizon Aerial Sensor

Customer Warranty Information

Name					
Address					
City		**State**		**Zip**	
Phone		**Email**			

Purchased Product Details

Model		**Size**	Sq. Ft.
Manufacture Date		**Serial Number**	
Watts & Volts	Watts Volts	**Ohms**	Ω

Surface	**Concrete** ❐	**Asphalt** ❐	**Sand Bed** ❐	**Other** ❐	**Retrofit** ❐

Heatizon Systems Hott-Wire® SR Warranty

Heatizon Systems warrants Hott-Wire® SR Heating Element to be free from defects in material and workmanship for a period of ten (10) years. Such warranty periods shall commence on the date of shipment by Heatizon Systems. If any parts are found to be defective in manufacture during such time period, Heatizon Systems will, at its sole option, replace or repair defective parts.

This Limited Warranty applies only if articles sold hereunder (a) are selected, designed, and installed according to instruction and operation manuals furnished by Heatizon Systems and installed in a "workmanlike manner" according to the building association standards adopted by Heatizon Systems, (b) remain in their originally installed location, (c) are connected to proper power supplies, (d) are not misused or abused, (e) show no evidence of tampering, mishandling, neglect, damage (accidental or otherwise), modifications or repair without the approval of Heatizon Systems, or damage done to the product by anyone other than Heatizon Systems, and (f) are installed in accordance with applicable code requirements. Any warranty claims must be made in writing, no later than one (1) month following expiration of the warranty period, and must be accompanied by the warranted part or component. Any claim not made in such manner shall not be honored by Heatizon Systems.

This Limited Warranty does not cover:
1. The workmanship of any installer of Heatizon Systems radiant panel or cable heating products.
2, Any Heatizon Systems radiant heating products that have a failure or malfunction resulting from improper or negligent operation, accident, abuse, misuse, unauthorized alteration or improper repair or maintenance.
3. Any Heatizon Systems radiant heating products that have had components not purchased from Heatizon Systems integrated into or connected to them.
4. Any labor costs for removal of alleged defective part(s) and/or reinstallation of replacement part(s), transportation to and from Heatizon Systems (if necessary) and any other material necessary to perform the exchange or repair.
5. Any Heatizon Systems heating products that have not been properly registered by completion and return of the Warranty Registration Card attached hereto within ninety (90) days of the date of sale.

DISCLAIMER OF WARRANTIES:

This warranty described above is in lieu of all other warranties, express or implied, including but not limited to any implied warranties of fitness for a particular purpose and merchantability. Heatizon Systems expressly disclaims and excludes any liability for losses, expenses, inconveniences, consequential, incidental, indirect, or punitive damages for breach of any express or implied warranty. By installing and/or purchasing Heatizon Systems products, you accept the terms of this limited warranty.

Some states do not allow the exclusion or limitation of incidental or consequential damages, or limitations on how long an implied warranty lasts, so the above limitations and exclusions may not apply to you. This Limited Warranty gives you specific legal rights, and you may also have other rights which may vary from state to state.

How to make a Warranty Claim

1. Gather the following information:
   - Date of purchase
   - Who product was purchased from
   - Date of installation, if installed
   - Names and phone numbers of electrician/installer
   - Completed resistance recording page from installation
   - Serial number from product label

2. Contact Heatizon Systems for a Return Materials Authorization number, and information on the next required steps to complete your warranty claim.

HEATIZON SYSTEMS

Mail: Heatizon Systems
4137 South 500 West
Murray, UT 84123
USA

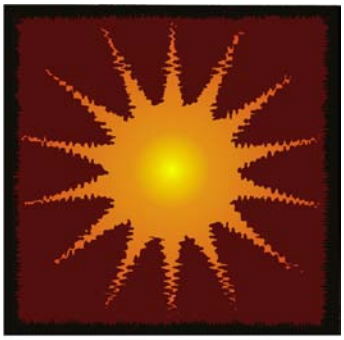
Phone: (801) 293-1232

Toll Free: (888) 239-1232

Fax: (801) 293-3077

Email: info@heatizon.com

Website: www.heatizon.com



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