

# Self–Regulating Heating Cable Installation & Maintenance Instruction Manual

SAVE THESE INSTRUCTIONS!

Additional copies of this manual are available upon request.

You must read and understand this manual before installing, operating, or servicing this product. Failure to understand these instructions could result in an accident causing serious injury or death.

Keep these instructions for future reference.

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IMPORTANT SAFETY INSTRUCTIONS



SAFETY ALERT SYMBOL

The symbol above is used to call your attention to instructions concerning your personal safety. It points out important safety precautions. It means “**ATTENTION! Become Alert! Your Personal Safety is involved!**” Read the message that follows and be alert to the possibility of personal injury or death.



A person who has not read and understood all operating Instructions is not qualified to operate this product.



- Do not immerse heater in liquid.
- Keep volatile or combustible material away from heater when in use.
- Use heater only in approved locations.
- Keep sharp metal objects away from heater.

Failure to observe these warnings may result in electric shock, risk of fire, and personal injury.



- Never handle the heater while it is in operation; always disconnect the heater from the power source and allow to cool prior to handling.
- Inspect heater and connection kits before use.
- If spillage of foreign matter onto heater occurs, disconnect from power source and clean after heater is allowed to cool.
- Never operate a heater without an appropriate heat sink (device being heated is considered a heat sink).
- Do not operate heater above rated temperature value.
- Fasten heater to device using approved methods only.
- Do not repair damaged or faulty heaters.
- Do not crush or apply severe physical stress on heater or cord assembly.
- Disconnect heater when not in use.

Failure to observe these warnings may result in personal injury or damage to the product and/or property.



Immediate hazards which **WILL** result in severe personal injury or death.



Hazards or unsafe practices that **COULD** result in severe personal injury or death.



Hazards or unsafe practices that **COULD** result in minor personal injury or property damage.



End User Must Comply to the Following:

- Only qualified personnel are allowed to connect the electrical wiring.
- De-energize all power circuits before installation or servicing.
- Keep ends of heating devices and kit components dry before and during installation.
- The conductive layer of this heating device must be connected to a suitable grounding/earthing terminal.
- Installation in accordance with the Canadian Electrical Code Part I (Canada) or the National Electric Code (USA) as applicable.
- All electrical wiring must follow local electrical codes.
- The person who performs the final installation / wiring must be qualified for this work.
- The end-user is responsible for providing a suitable disconnecting device.
- The end-user is responsible for providing suitable electrical protection device. It is highly recommended that a ground fault circuit breaker be used.

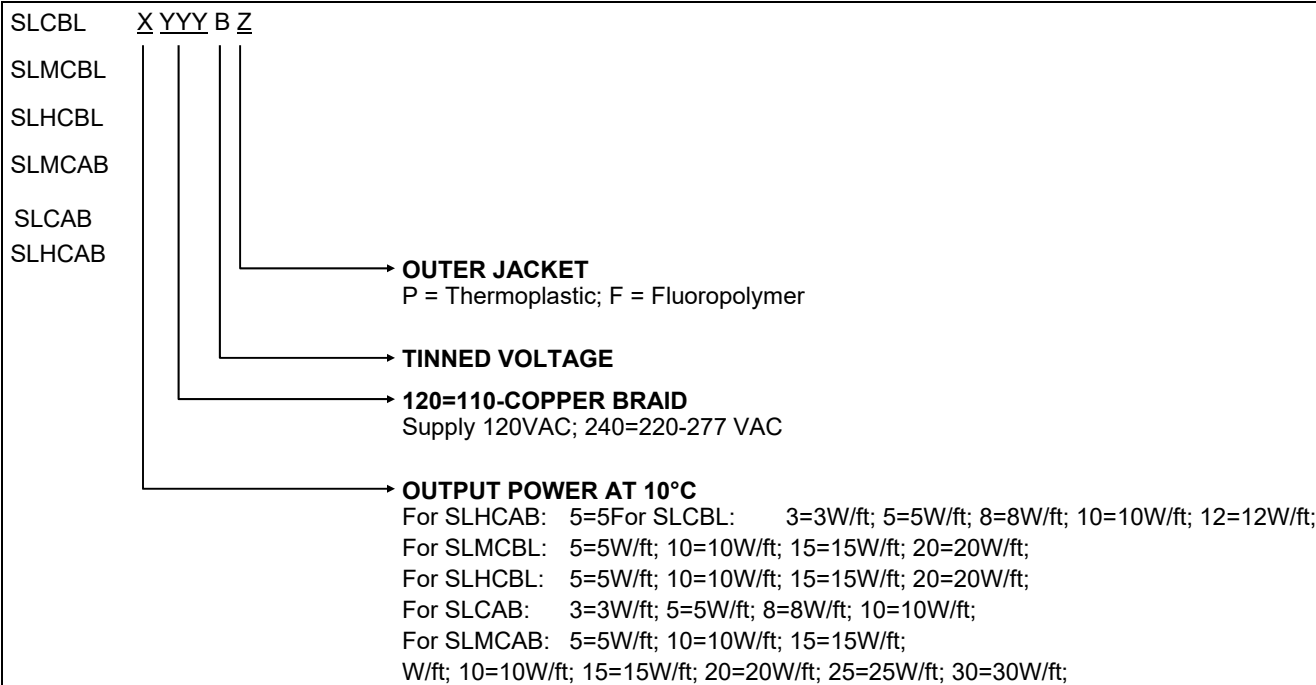
Failure to observe these warnings could result in severe personal injury or death.

PART INTENDED USE

The following standard must apply for installaions in the USA.

- IEEE 515.1 Installation Type A, Insulated Surfaces (including pipes)
- IEEE 515.1 Installation Type B, Roof and Gutter De-Icing
- IEEE 515.1 Installation Type C, Embedded Snow Melting

PART NUMBER MATRIX



TECHNICAL PARAMETERS

Protection Class : IP65

Part Number		Power (W/Ft)	Voltage	Maximum Intermittent Exposure Temperature	Maximum Maintain or Continuous Exposure Temperature
SLCBL	3240	3	208V-277V	85°C	65°C
	5240	5	208V-277V	85°C	65°C
	8240	8	208V-277V	85°C	65°C
	10240	10	208V-277V	85°C	65°C
	12240	12	208V-277V	85°C	65°C
	3120	3	110V-120V	85°C	65°C
	5120	5	110V-120V	85°C	65°C
	8120	8	110V-120V	85°C	65°C
	10120	10	110V-120V	85°C	65°C
	12120	12	110V-120V	85°C	65°C
SLMCBL	5240	5	208V-277V	135°C	110°C
	10240	10	208V-277V	135°C	110°C
	15240	15	208V-277V	135°C	110°C
	20240	20	208V-277V	135°C	110°C
	5120	5	110V-120V	135°C	110°C
	10120	10	110V-120V	135°C	110°C
	15120	15	110V-120V	135°C	110°C
SCHCBL	20120	20	110V-120V	135°C	110°C
	5240	5	208V-277V	200°C	120°C
	10240	10	208V-277V	200°C	120°C
	15240	15	208V-277V	200°C	120°C
	20240	20	208V-277V	200°C	120°C
	5120	5	110V-120V	200°C	120°C
	10120	10	110V-120V	200°C	120°C
SLCAB	15120	15	110V-120V	200°C	120°C
	20120	20	110V-120V	200°C	120°C
	3240	3	208V-277V	85°C	66°C
	5240	5	208V-277V	85°C	66°C
	8240	8	208V-277V	85°C	66°C
	10240	10	208V-277V	85°C	66°C
	3120	3	110V-120V	85°C	66°C
SLMCAB	5120	5	110V-120V	85°C	66°C
	8120	8	110V-120V	85°C	66°C
	10120	10	110V-120V	85°C	66°C
	3240	3	208V-277V	185°C	121°C
	5240	5	208V-277V	185°C	121°C
	8240	8	208V-277V	185°C	121°C
	10240	10	208V-277V	185°C	121°C
SLHCAB	3120	3	110V-120V	185°C	121°C
	5120	5	110V-120V	185°C	121°C
	8120	8	110V-120V	185°C	121°C
	10120	10	110V-120V	185°C	121°C
	5240	5	208V-277V	185°C	121°C
	10240	10	208V-277V	185°C	121°C
	15240	15	208V-277V	185°C	121°C
SLHCAB	20240	20	208V-277V	185°C	121°C
	25240	25	110V-120V	185°C	121°C
	30240	30	110V-120V	185°C	121°C
	5120	5	110V-120V	185°C	121°C
	10120	10	110V-120V	185°C	121°C
	15120	15	110V-120V	232°C	190°C
	20120	20	110V-120V	232°C	190°C
	25120	25	110V-120V	232°C	190°C
	30120	30	110V-120V	232°C	190°C

GENERAL INFORMATION

This manual is designed for use with BriskHeat’s self-regulating heater products. For applications not specifically addressed, please contact your local representative.

How Heating Systems Work

An electric heating cable system uses the electric heating cable to replace the heat that is lost through the thermal insulation system. Replacing the lost heat allows the pipe and product inside the pipe to be kept at a constant temperature. This will keep water from freezing and bursting a pipe, or a liquid from setting up and plugging the pipe. Simple systems may turn the entire system on with a contactor or switch, while others will use a thermostat with each heating cable to control the temperature.

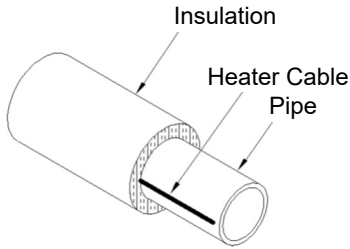


Figure 1

PRODUCT SELECTION

Consult BriskHeat factory for product selection and application engineering support.

RECEIPT & STORAGE

Receipt

- Compare the materials against the shipping bill to verify receipt of proper materials.
- Inspect heating cable and components for transit damage. Insulation resistance tests on each spool of cable are recommended.
- If design documents (line lists or per circuit bills of material) exists, check the received materials against the lists to verify of all needed materials. If no design documents exists, keep a receipt log of all materials received.

Storage

Cables and system components should be stored in a clean, dry area. The equipment should be protected from mechanical damage during storage. The storage temperature range is (-40°F to 140°F) -40°C to 60°C.

INSTALLATION

⚠ WARNING

While there are many acceptable ways of installing BriskHeat’s electric heating equipment, certain actions can be dangerous to personnel and your installations. Please take care to avoid the following problems:

- Do not twist the bus wires together at either end of the heating cable. Each of these wires has a voltage or neutral applied to it; twisting them together will cause a short circuit.
- Insulate black polymer surrounding bus wires. The black compound extruded around the bus wires is electrically conductive and should be treated as a conductor.
- All electrical connections in the system should be sealed against moisture. To prevent electrical arcing and fire hazard, all cable connections and electrical wiring connections should be sealed against moisture. This includes the use of proper cable sealing kits and the moisture proofing of all wire connections.
- Do not expose heating cables to temperatures above their maximum ratings. Higher temperatures can greatly shorten the life of a heating cable.

- Immediately replace any damaged heating cable or components. Failure to replace any damaged components ( heating cable, components, or thermal insulation) will result in system failure.
- Classified areas (explosive dust or gases) require the use of special electrical components. Any area having explosive gases (such as chemical / petrochemical installations) or explosive dusts (such as coal handling or graineries) require special cable, connection components and control components that are approved for use in these areas. Installation of non-approved products can result in fires or explosions.
- Installation on plastic pipe requires special considerations in selections & installation.

Scheduling

The installation of the electric heat tracing needs to be coordinated with the piping, insulation, electrical and instrument groups. It should begin only after the majority of mechanical construction is complete. Pressure testing of the pipe and installation of the instruments should be complete prior to the start of the heating cable installation.

Pre-Installation Check

Walk the piping system and plan the routing of the heating cable. Use this check to verify completion of instrumentation and mechanical work. All coatings (paint, etc.) must be dry before attempting the heating cable installation. Minimum installation temperature -40°F (-40°C)

Heater Handling

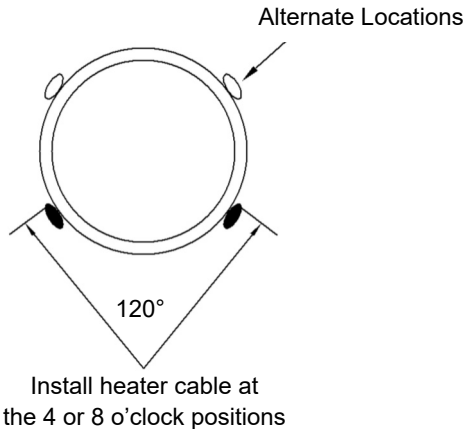
- Use a reel holder to roll out the heating cable.
- Keep the cable strung loosely, but close to the pipe being traced. This will avoid interference with supports and other equipment.
- Leave an extra 305-457mm (12-18”) of heating cable at all power connections, tee splices and end seal connections to facilitate easy working of the connections.
- **ADDITIONAL HEATING CABLE IS REQUIRED ON VALVES, PIPE SUPPORTS AND OTHER EQUIPMENT.** See the installation detail section for exact lengths and method of installation.
- When handling the heating cable, avoid pulling it over or installing against sharp edges.
- Do not kink or crush the cable, including walking on it or driving over it with equipment.
- Do not exceed minimum bending radius of 0.5” (12mm) at 68°F (20°C) during installation. Colder temperatures will increase the minimum bend radius. Use caution to avoid exceeding a safe bend radius during cold temperature installations.

Heating Cable Location

The heating cable may be installed in either straight runs or spiraled around the pipe. Spiraling is generally used when a limited number of cable types are available.

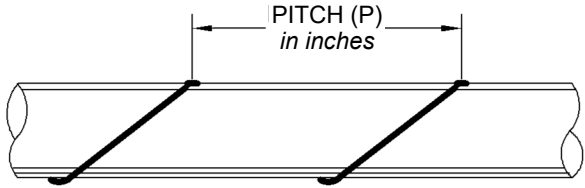
Straight Tracing

When straight tracing is used, install the heating cable on the lower quadrant of the pipe. This helps prevent physical damage to the heating cable from falling objects and being walked on, and promotes optional thermal transfer to materials inside the pipe.



Spiraling

Spiraling increases the length of heating cable installed per foot of pipe. For spiraling application assistance, contact BriskHeat factory.



Attachment

For regular installations, the heating cable may be attached with fiberglass tape. Plastic wire ties may also be used provided the plastic has a maximum temperature rating equal to or better than the system requirements. The cable should fit snugly against the pipe and be secured at one 305mm (12”) intervals, as shown in *Figure 4*.

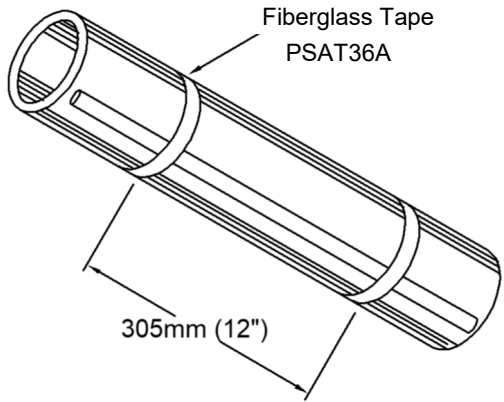


Figure 4

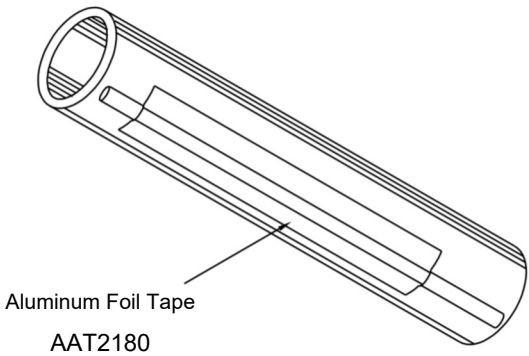


Figure 5

Notes:

1. To prevent possible damage to the heating cable, do not fasten with metal straps, wire, vinyl electrical tape or duct tape.
2. Aluminum foil tape should only be used if specified by design. The foil is most often used on plastic pipe to offset the insulate effect of the plastic. See Figure 5 above.

Cutting the Heating Cable

Do not cut the cable until it is attached to the pipe. Confirm the allowances for terminations, connections and heat sinks (valves, support, etc.) before cutting the cable. Heating cable power is not affected by cutting to length. Protect all heating cable ends from moisture or mechanical damage if exposed for long periods of time.

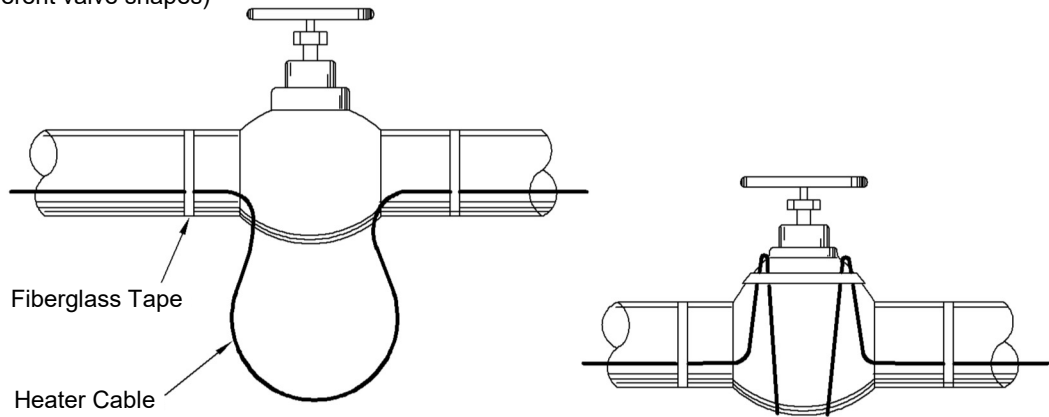
Installation Details

Heating cables should be applied in a manner to facilitate the easy removal of valves and small in-line devices without the removal of excessive thermal insulation or having to cut the heating cable. The best way to accomplish this is to loop the cable. The amount of heating cable installed on each valve, hanger, etc. varies with the pipe size and type of device. For installation and application assistance, contact BriskHeat factory.

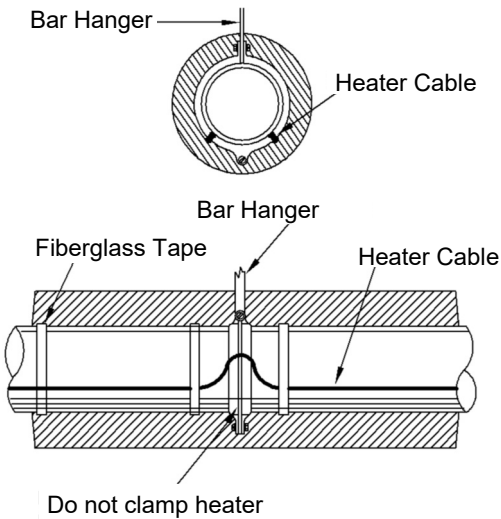
The following figures show installation details for various typical situations:

Valve

Typical installation method  
(may vary for different valve shapes)



Hanger Support



Shoe Support

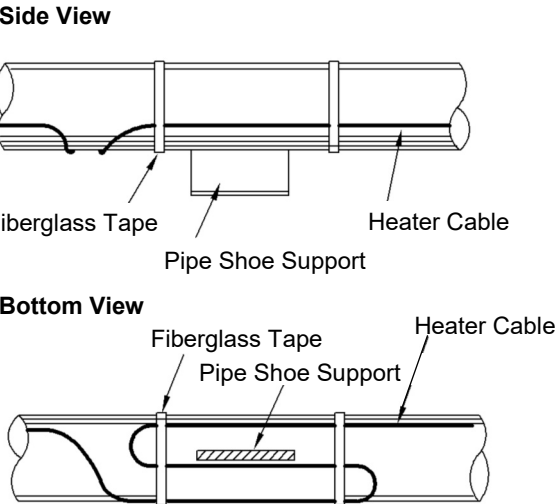


Figure 9

Figure 10

Elbow

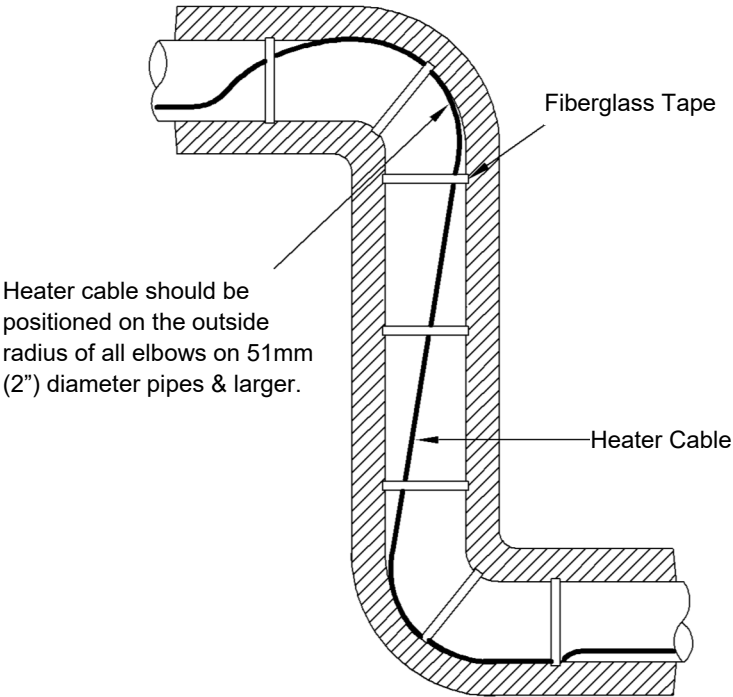


Figure 7

Flange

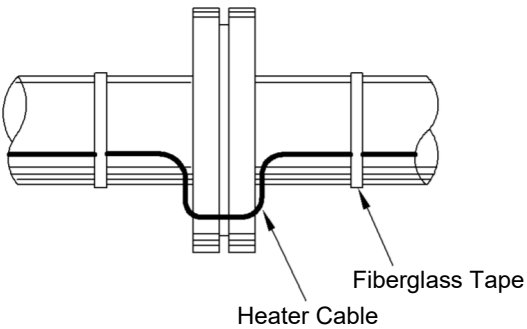
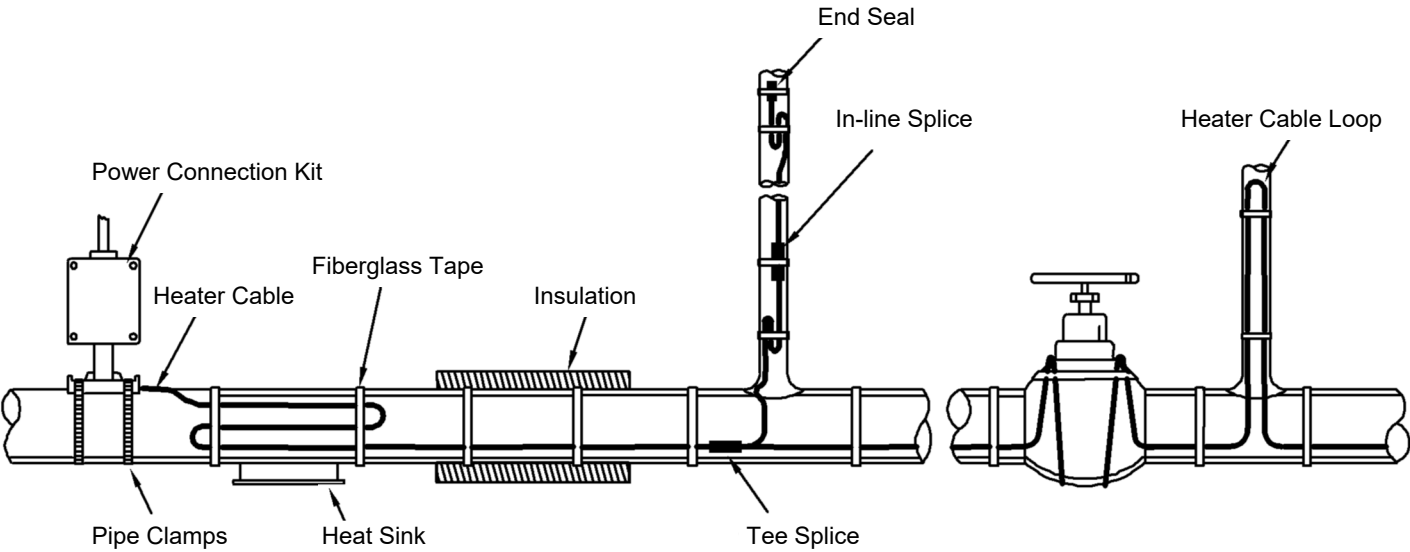


Figure 8

SYSTEM COMPONENTS

Only BriskHeat’s approved termination, connection and splice kits should be used. Failure to do so will void warranties and agency approvals. Installation instructions in each component kit should be followed regarding heating cable preparation and assembly. Make end seals (terminations) and splice connections before making the power connections. It is recommended that all heating cables be tagged as they are installed with a discrete circuit number. This will facilitate identification, components needed and electrical wiring during later phases of the installation. Power connection kits utilize an adapter plate kit for installation on instrument tubing and tanks. Installation instructions for mounting are included in each kit.














**⚠ WARNING**  
Connecting bus wires together will create an electrical short.



*Note: Heating cable power connections and end seals are required for each heating cable. Heating cable splices, tees, and thermostats are used as needed.*

Figure 11

System Component Compatibility

	SLCBL	SLMCBL	SLHCBL	SLCAB	SLMCAB	SLHCAB
SLCBLUC	 Yes Ordinary Locations and Roof & Gutter	No	No	No	No	No
SLCBLUC-GF	 Yes Ordinary Locations and Roof & Gutter	No	No	No	No	No
SLCBLKC	 Yes Ordinary Locations and Roof & Gutter	No	No	No	No	No
SLCBLSK	 Yes Ordinary Locations and Roof & Gutter	No	No	No	No	No
PTBO-GET	 Yes Hazardous Locations	Yes	Yes	No	No	No
JHE-GET	 Yes Hazardous Locations	Yes	Yes	No	No	No
JHS-GET	 Yes Hazardous Locations	Yes	Yes	No	No	No
JHT-GET	 Yes Hazardous Locations	Yes	Yes	No	No	No
SLCABUC	No	No	No	 Yes Ordinary and Hazardous Locations	No	No
SLCABSK	No	No	No	 Yes Ordinary and Hazardous Locations	No	No
SLCABKC	No	No	No	 Yes Ordinary and Hazardous Locations	No	No
SLMCABUC	No	No	No	No	 Yes Ordinary and Hazardous Locations	No
SLMCABKC	No	No	No	No	 Yes Ordinary and Hazardous Locations	No
SLCABUC-CSA-M	No	No	No	Yes Ordinary and Hazardous Locations	 Yes Ordinary and Hazardous Locations	No
SLCABEND-CSA-2	No	No	No	Yes Ordinary and Hazardous Locations	 Yes Ordinary and Hazardous Locations	No
ROOFKIT	No	No	No	Yes SLCAB-BP only	No	No
ROOFENDKIT	No	No	No	Yes SLCAB-BP only	No	No
SLCABPWP-H	No	No	No	No	No	 Yes Ordinary and Hazardous Locations
SLCABKC-H	No	No	No	No	No	 Yes Ordinary and Hazardous Locations

SLCBL Connection / Termination Kits

For use in ordinary locations with SLCBL cable only (UL approved).

For use in roof & gutter snow melting & de-icing applications with SLCBL cable only (UL approved).



**Approvals valid only when** used with appropriate heating cable and installation accessories, and installed in accordance with all applicable instructions, codes, and regulations.

SLCBLUC: SLCBL Power Connection Kit



Kit Contents:

- |   |  |
|---|--|
| 2 Heat-trace warning labels                           | 3 Wire nuts  |
| 2 De-icing snow melt caution labels                   | 1 Black heat-shrink tube 1/2" x 1" (13mm x 25mm)       |
| 1 Standoff pipe mounting bracket                      | 1 Green/Yellow heat-shrink tube 1/4" x 6" (6mm x 15cm) |
| 1 Lock nut  | 2 Black heat-shrink tubes 1/8" x 5-1/2" (3mm x 14cm)   |
| 1 1/2"NPT Seal fitting with strain relief and grommet | 1 Sealing gasket                                       |
|   | 1 End seal   |

Enough to complete:

One input power connection and one end seal termination.

*NOTE: Junction box and pipe strap sold seperately. Requires UL Listed junction box suitable for the location with a clearance hole for 1/2" conduit or 1/2" NPT thread hub. For heating cable with no outer-jacket (Type -B only), a metallic junction box must be used to ensure proper grounding.*

SLCBLUC-GF: Ground Fault Power Connection Kit



Kit Contents:

- |                                     |  |
|-------------------------------------|--|
| 2 Heat-trace warning labels         | 1 Heat-shrink tube 3/4" x 8" (19mm x 20cm)             |
| 2 De-icing snow melt caution labels | 1 Heat-shrink tube 3/4" x 5" (19mm x 13cm)             |
| 1 Cloth tape                        | 2 Heat-shrink tubes 1/8" x 1" (3mm x 25mm)             |
| 2 Mastic strips                     | 1 Heat-shrink tube 1/2" x 1" (13mm x 25mm)             |
| 1 Clamp ties                        | 1 Heat-shrink tube 5/16" x 1-1/2" (8mm x 38mm)         |
| 2 Crimp-on insulated terminals      | 1 Ground fault device with 120V 3-Prong NEMA 5-15 plug |
| 1 Crimp-on non-insulated barrel     |  |

Enough to complete:

One ground-fault protection power input power connection.

SLCBLKC: SLCBL End Seal Kit



Kit Contents:

- |   |   |
|---|---|
| 2 Heat-shrink caps                          | 2 Woven braid sleeves 1/2" x 4" (13mm x 10cm) |
| 2 Heat-shrink tubes 3/4" x 5" (19mm x 13cm) |   |

Enough to complete:

Two end seal terminations.

SLCBLSK: SLCBL Splice and Tee Kit



Kit Contents:

- |                |   |                                 |
|----------------|---|---------------------------------|
| 1 Clamp tie    | 1 Black heat-shrink tube 1" x 8" (25mm x 20cm)    | 2 Heat-shrink caps              |
| 3 Cable ties   | 3 Black heat-shrink tubes 1/2" x 1" (13mm x 25mm) | 1 Heat-shrink tube              |
| 1 Cloth tape   | 6 Black heat-shrink tubes 1/8" x 1" (3mm x 25mm)  | 1 Crimp-on non-insulated barrel |
| 5 Matic strips | 2 Crimp-on insulated terminals                    | 1 End seal                      |

Enough to complete:

One splice connection and one end seal termination or one tee connection and one end seal termination.

*NOTE: This kit does not complete an input power connection*

SLCBL, SLMCBL, SLHCBL Connection / Termination Kits

For use in Hazardous Area Locations with SLCBL (BP, BF) cable only (CSA approved).

For use in non-hazardous area locations with SLCBL, SLMCBL, SLHCBL cable (non-CSA approved).



**Approvals valid only when** used with appropriate heating cable and installation accessories, and installed in accordance with all applicable instructions, codes, and regulations.

Hazardous (Classified) Locations  
Class I, Division 2, Groups A, B, C, D  
Class II, Division 2, Groups E, F, G  
Class III

PTBO-GET: SLCBL, SLMCBL, SLHCBL Power Connection Kit With Octagon Enclosure



Kit Contents:

- |  |  |
|--|--|
| 1 Octagon junction box with terminal power connections | 1 M25x1.5 IP68 Seal fitting                            |
| 1 Pipe standoff mounting bracket                       | 2 Watertight sealing grommets                          |
| 2 Pipe Straps  | 1 Watertight sealing plug                              |
| 1 Lock nut   | 2 Green/Yellow heat-shrink tube 1/4" x 6" (6mm x 15cm) |
| 1 Sealing gasket                                       | 2 Black heat-shrink tube 1/8" x 5-1/2" (3mm x 14cm)    |

Enough to complete:

One input power connection.

JHE-GET: SLCBL, SLMCBL, SLHCBL Low-Profile End Seal Kit



Kit Contents:

- |                                 |
|---------------------------------|
| 1 End seal housing              |
| 1 Watertight sealing grommet    |
| 3 Pressure seal end with screws |

Enough to complete:

One low-profile end seal termination.

JHS-GET: SLCBL, SLMCBL, SLHCBL Low-Profile Splice Connection Kit



Kit Contents:

- |                                  |
|----------------------------------|
| 1 In-line splice housing         |
| 2 Watertight sealing gaskets     |
| 2 Housing covers with screws     |
| 2 Watertight sealing grommets    |
| 2 Pressure seal ends with screws |

Enough to complete:

One low-profile splice termination.

JHT-GET: SLCBL, SLMCBL, SLHCBL Low-Profile Tee Connection Kit



Kit Contents:

- |                                  |
|----------------------------------|
| 1 Tee splice housing             |
| 2 Watertight sealing gaskets     |
| 2 Housing covers with screws     |
| 3 Watertight sealing grommets    |
| 3 Pressure seal ends with screws |

Enough to complete:

One low-profile tee connection.

*NOTE: This kit does not complete an input power connection.*

FM APPROVED SLCAB connection / termination kit

KITS	USAGE
<b>SLCABUC:</b> SLCAB Universal Connection Kit. FM approved. <div><div>13/4" (19mm) NPT pipe standoff</div><div>2Ring terminals</div><div>4Large, Insulated crimp connectors</div><div>2Small, Insulated crimp connectors</div><div>2Pipe straps (for up to 6" (152mm) IPS pipe)</div><div>2Heat sink end caps</div><div>16" (152mm) shrink sleeve</div><div>13 oz. (89ml) tube of RTV sealant</div><div>1Roll of fiberglass tape</div><div>1Caution label</div><div>1Ground screw</div></div>	<div><div><div><div><div></div><div>FM</div><div>APPROVED</div></div></div><div>Ordinary Locations Hazardous (Classified) Locations Class I, Division 2, Group B, C, D Class II, Division 2, Group F, G Class III, Division 2</div></div><div><b>Approvals valid only when</b> used with appropriate heating cable and installation accessories, and installed in accordance with all applicable instructions, codes, and regulations. <u>Enough to complete:</u> Two end terminations and one input connection, or one input power splice  <i>NOTE: Requires a 3/4" (19mm) NPT junction box</i></div></div>

SLCABSK: SLCABSK Kit. FM approved.

- 20Large yellow crimp connectors

20Large blue crimp connectors

10Heat shrink tubes

13 oz, (89ml) tube of RTV sealant

Enough to complete:  
Ten input power connections, or Ten tee splices

SLCABKC: SLCAB End Seal Kit. FM approved.

- 10Heat shrink tube

Enough to complete:  
Ten end terminations

FM APPROVED SLMCAB connection / termination kit

KITS	USAGE
<b>SLMCABUC:</b> SLMCAB Universal Connection Kit. FM approved. <div><div>13/4" (19mm) NPT pipe standoff</div><div>2Ring terminals</div><div>3Large, crimp connectors</div><div>2Small, crimp connectors</div><div>2Pipe straps (for up to 6" (152mm) IPS pipe)</div><div>2End boots</div><div>13 oz. (89ml) tube of RTV sealant</div><div>1Roll of fiberglass tape</div><div>1Caution label</div><div>1Ground screw</div></div>	<div><div><div><div><div></div><div>FM</div><div>APPROVED</div></div></div><div>Ordinary Locations Hazardous (Classified Locations Class I, Division 2, Group B, C, D Class II, Division 2, Group F, G Class III, Division 2</div></div><div><b>Approvals valid only when</b> used wir appropriate heating cable and installation accessories, and installed in accordance with all applicable instructions, codes, and regulations. <u>Enough to complete:</u> Two end terminations and one input connection, or one input power splice, or one tee splice  <i>NOTE: Requries a 3/4" (19mm) NPT junctiuon box</i></div></div>

SLMCABKC: SLMCAB End Seal Kit. FM approved.

- 10End boots

4Roll of fiberglass tape

13 oz, (89ml( tube of RTV sealant))

Enough to complete:  
Ten end terminations

CSA APPROVED SLCAB AND SLMCAB connection / termination kit

KITS	USAGE
<b>SLCABUC-CSA-M:</b> SLCAB and SLMCAB Universal Connection Kit. CSA approved. <div><div>1Connector body</div><div>1Connector cap</div><div>2Connector gland washers</div><div>1Grommet</div><div>1Termination boot</div><div>1Stain relief grip</div><div>1Standoff bracket</div><div>1Locknut</div><div>1Termination block</div><div>1Roll of fiberglass tape</div><div>1Silicone sealant</div><div>1Pipe strap (for 2" to 6" (51 to 152mm) O.D.pipes)</div><div>1Ring tongue terminal</div><div>1End seal kit</div></div>	<div><div><div><div><div></div><div>CSA</div><div>US</div></div></div><div>Ordinary Locations 130-03 (-G,-W, -S) Hazardous (Classified) Locations Class I, Division 1<sup>†</sup> and 2, Groups B, C, D Class II, Division 1<sup>†</sup> and 2, Groups E, F, G Class III, Division 1<sup>†</sup> and 2 3, 5, 8 W/ft T6 10 W/ft T5</div></div><div><b>Approvals valid only when</b> used with appropriate heating cable and installation accessories, and installed in accordance with all applicable instructions, codes, and regulations.  *2E approved for 3 watts/ft and 5 watts/ft only  <u>Enough to complete:</u> One input connection and one end termination. Splices and power input splices can be made using two kits  <i>NOTE: Requires a 3/4" (19mm) NPT junction box</i></div></div>

SLCABEND-CSA-2: SLCAB and SLMCAB End Seal Kit. CSA approved.

- 1End cap

1Clamp

1Sealant

Enough to complete:  
One end termination

CSA APPROVED SLHCAB connection / termination kit

KITS	USAGE
<b>SLCABPWP-H :</b> SLHCAB Power Connection Kit for pipes. CSA approved. <div><div>1Base</div><div>1Top</div><div>2Junction Box</div><div>1Sealing Grommet (large hole)</div><div>1Sealing Grommet (small hole)</div><div>1Sealing Gasket</div><div>2Shrink Tubes 1/8" x 51/2" (black)</div><div>1Shrink Tube 1/4" x 51/2" (green/yellow)</div><div>1Shrink Tube 1/2" x 11/2" (white)</div><div>1Lock Ring</div><div>1Adaptor (for installation on pipe smaller than 1")</div><div>1Stainless Steel Tie Wire</div></div>	<div><div><div><div><div></div><div>CSA</div><div>US</div></div></div><div>Ordinary Locations 130-03 (-G,-W, -S) Hazardous (Classified) Locations Class I, Division 1<sup>†</sup> and 2, Groups B, C, D Class II, Division 1<sup>†</sup> and 2, Groups E, F, G Class III, Division 1<sup>†</sup> and 2 3, 5, 8 W/ft T6 10 W/ft T5</div></div><div><b>Approvals valid only when</b> used with appropriate heating cable and installation accessories, and installed in accordance with all applicable instructions, codes, and regulations.  <u>Enough to complete:</u> One input connection and one end termination. Splices and power input splices can be made using two kits  <i>NOTE: Requires a 3/4" (19mm) NPT junction box</i></div></div>

SLCABKC-H: SLHAB End Seal Kit. CSA approved.

- 1End cap

1Clamp

1Sealant

Enough to complete:  
One end termination

<sup>†</sup>CI/D1 approval for BF only. Contact a BriskHeat representative for information on Division I hazardous location systems.



THERMAL INSULATION

Pre-Installation Checks

Inspect the heating cable and components for correct installation and possible damage. In particular, verify that:

- The proper extra amount of heating cable has been installed at each valve, flange, pipe support, etc. and that it is free from physical nicks, tears or gouging. Additional cable beyond the specified amount at a heat sink is not a problem due to the self-regulation effect of the heating cable.
- Connections, splices and end seals are correctly installed, including cable seals at power connection enclosures.
- Ensure insulation is properly rated fir the maximum edxposure temperature of the heated system.

Installation

Check the thermal insulation type and thickness against the design criteria. Changes in insulation type or thickness may require a different wattage heating cable. Verify that all pipe work, including wall penetrations, fittings, etc. has been completely insulated.

Check the system to verify that:

- Insulation is not wet from rainfall prior to the application of waterproofing.
- Lap joints on vertical piping are properly overlapped - higher piece lapped over the top of lower piece.
- Band seals are used at lap joints to prevent the ingress of water.
- All penetrations of lagging (valve stems, hanger rods, etc.) are properly water proofed.
- Irregular shaped items (i.e. pumps, etc.) are properly waterproofed.

To minimize potential damage to the heating cable, install the insulation as soon as possible. It is recommended that another insulation resistance (megger) test be done after the insulation has been installed to verify that the heating cable was not damaged during the insulation installation.

Marking

Install "Electric Trace" signs on alternate sides of the piping at regular intervals, as a warning to maintenance personnel. Permanently mark the outside of the insulation lagging with the location of heating cable components. This will facilitate maintenance in the event of a problem.

THERMOSTATS & SENSORS

Temperature sensitive applications will require the use of a thermostatic control. Selection of the proper thermostat must consider voltage and amperage ratings of the device as well as the suitability of housing for the environment (explosion proof, rain tight, corrosion resistance, etc.). Thermostat housing should be mounted as close as possible to the power connection kit. It may be attached to the power connection kit provided code requirements are met with regard to conduit connections seals, etc. To sense the coolest air temperature, ambient (air sensing) thermostats should be mounted in the shade when possible. When using pipe-sensing thermostats, the bulb (sensor) should be mounted on the opposite side of the pipe from the heater, or as far away as is practical. This will allow the thermostat to sense the actual pipe temperature and not be influenced by the heater temperature. Mount the bulb at least three (3) feet from the closest heat sink if possible.

Moisture inside the enclosure will cause both corrosion and electrical shorting problems. The potential for this type of problem can be greatly reduced by:

- Proper sealing of all enclosures openings.
- Keeping enclosure cover closed and secured as mush as possible during installation sequence.
- Proper closing and sealing of the cover to prevent leaking into the housing.
- Use of a moisture proofing/electrical spray (aerosol) sealant on thermostat and electrical connections (including all metal parts) at completion of installation.
- Connection and use of space heater if thermostat is so equipped. **Do not de-energize space heater during summer months.**

ELECTRICAL REQUIREMENTS

Voltage Rating

Verify that the heating cable voltage rating is suitable for the service being used. 240 volt rated cables may be used from 208 to 277 volts, with an accompanying change in power output.

Electrical Loading

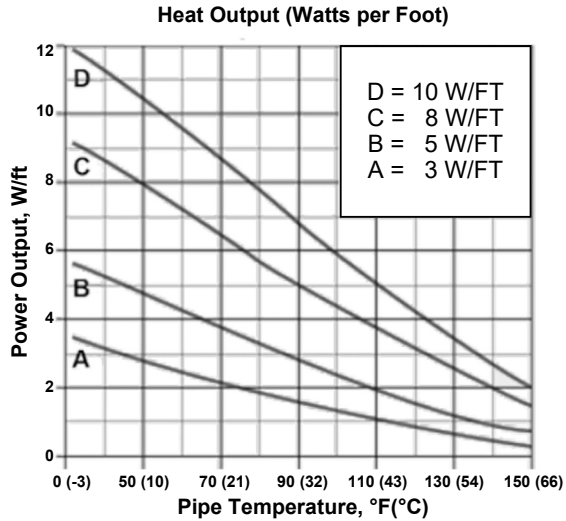
Size over-current protective devices shown in Figure 12 and 13. If devices are other than standard thermal magnetic circuit breakers, consult factory.

(For installation in USA) All appropriately rated circuit breakers must be identified using a reference label indicating which branch circuit supplies the circuits to the series heating cable sets.

SLCAB

Maximum Circuit Length in Feet Vs. Circuit Breaker Size

Heat Cable Type	Circuit Breaker Size	Start-up Temperature		
		50°F (10°C)	0°F (-18°C)	-20°F (-29°C)
SLCAB3120	15 amp	300	200	180
	20 amp	-	270	230
	30 amp	-	330	330
SLCAB3240	15 amp	660	410	360
	20 amp	-	560	480
	30 amp	-	660	660
SLCAB5120	15 amp	230	150	130
	20 amp	270	200	175
	30 amp	-	270	260
SLCAB5240	15 amp	460	300	260
	20 amp	540	400	345
	30 amp	-	540	520
SLCAB8120	15 amp	150	95	85
	20 amp	200	125	100
	30 amp	210	190	170
	40 amp	-	210	210
SLCAB8240	15 amp	295	195	170
	20 amp	390	250	225
	30 amp	420	375	340
	40 amp	-	420	420
SLCAB10120	15 amp	115	70	60
	20 amp	150	95	85
	30 amp	180	145	120
	40 amp	-	180	165
SLCAB10240	15 amp	230	150	130
	20 amp	305	200	175
	30 amp	360	300	260
	40 amp	-	360	360



Voltage Adjustment Factors

Power Adjustment Factor		
Product Type	208 VAC	277 VAC
SLCAB3240	0.75	1.28
SLCAB5240	0.86	1.16
SLCAB8240	0.91	1.10
SLCAB10240	0.93	1.08

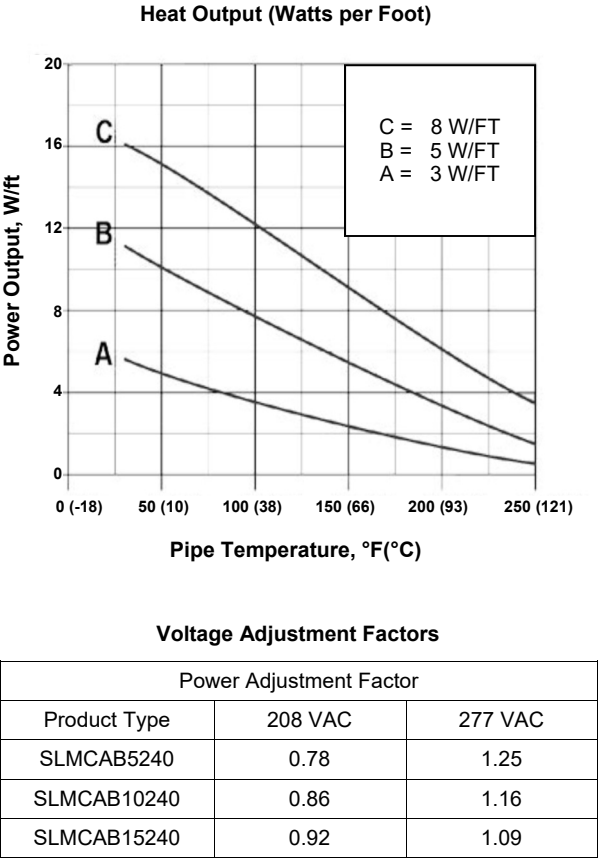
Figure 12

SLMCAB

Maximum Circuit Length in Feet Vs. Circuit Breaker Size

Heat Cable Type	Circuit Breaker Size	Start-up Temperature		
		50°F (10°C)	0°F (-18°C)	-20°F (-29°C)
SLMCAB5120	15 amp	150	135	130
	20 amp	200	180	170
	30 amp	240	220	210
SLMCAB5240	15 amp	250	230	220
	20 amp	330	305	295
	30 amp	480	440	420
SLMCAB10120	15 amp	90	85	80
	20 amp	120	110	105
	30 amp	180	165	160
SLMCAB10240	15 amp	140	130	125
	20 amp	190	175	170
	30 amp	280	260	250
SLMCAB15120	15 amp	70	65	60
	20 amp	90	85	80
	30 amp	130	125	120
SLMCAB15240	15 amp	100	95	90
	20 amp	135	125	120
	30 amp	200	185	180

Figure 13

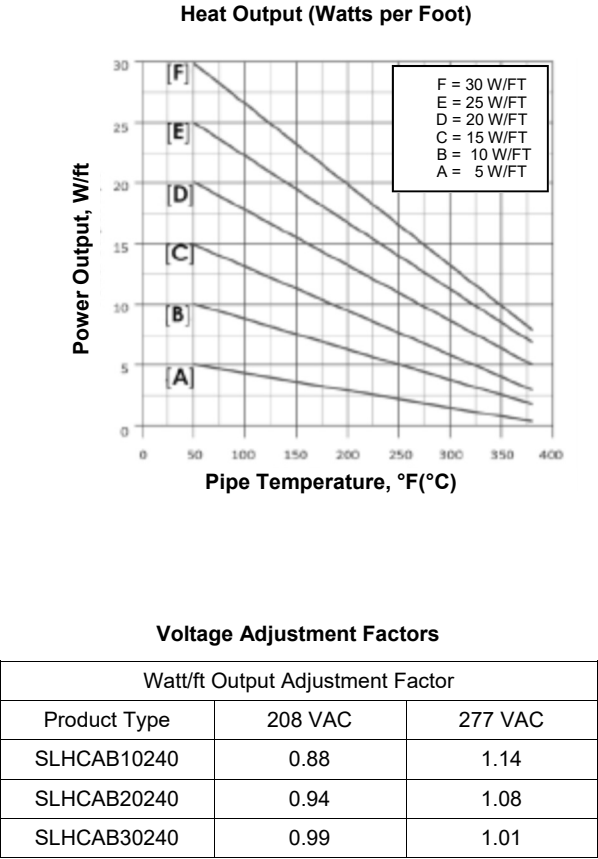


SLHCAB

Maximum Circuit Length in Feet Vs. Circuit Breaker Size

Heat Cable Type	Circuit Breaker Size	Start-up Temperature		
		50°F (10°C)	-0°F (-20°C)	-50°F (-45°C)
SLHCAB5120	10 amp	240	140	115
	15 amp	320	220	190
	20 amp	330	265	225
SLHCAB5240	10 amp	485	275	232
	15 amp	643	436	377
	20 amp	660	530	449
SLHCAB10120	10 amp	162	105	80
	15 amp	249	170	127
	20 amp	265	215	164
SLHCAB10240	10 amp	324	209	160
	15 amp	498	337	255
	20 amp	530	433	328
SLHCAB15120	10 amp	123	54	52
	15 amp	177	90	82
	20 amp	200	115	103
SLHCAB15240	20 amp	406	229	206
	30 amp	420	350	275
	40 amp	420	350	320
SLHCAB20120	10 amp	75	45	35
	15 amp	121	65	55
	20 amp	150	80	70
SLHCAB20240	20 amp	295	164	141
	30 amp	315	215	170
	40 amp	360	215	215
SLHCAB25120	10 amp	55	30	25
	15 amp	90	45	45
	20 amp	115	60	50
SLHCAB25240	20 amp	229	124	98
	30 amp	229	158	120
	40 amp	240	158	158
SLHCAB30120	20 amp	229	124	98
	30 amp	229	158	120
	40 amp	240	158	158
SLHCAB30240	20 amp	229	124	98
	30 amp	229	158	120
	40 amp	240	158	158

Figure 14

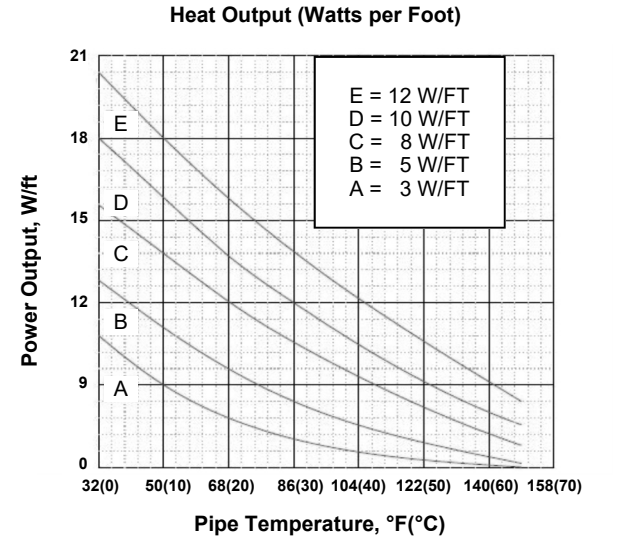


SLCBL

Maximum Circuit Length in Feet Vs. Circuit Breaker Size

Heat Cable Type	Circuit Breaker Size	Start-up Temperature			
		50°F (10°C)	32°F (0°C)	-4°F (-20°C)	-40°F (-40°C)
SLCBL3120	10 amp	240	200	140	115
	15 amp	320	300	220	190
	20 amp	330	320	265	225
	30 amp	330	320	280	265
	40 amp	330	320	280	265
SLCBL3240	10 amp	485	396	275	232
	15 amp	643	606	436	377
	20 amp	660	643	530	449
	30 amp	660	643	557	530
SLCBL5120	10 amp	162	135	105	80
	15 amp	249	215	170	127
	20 amp	265	252	215	164
	30 amp	265	252	240	200
SLCBL5240	10 amp	324	269	209	160
	15 amp	498	429	337	255
	20 amp	530	505	433	328
	30 amp	530	505	480	400
SLCBL8120	10 amp	123	100	54	52
	15 amp	177	145	90	82
	20 amp	200	180	115	103
	30 amp	210	180	175	135
SLCBL8240	10 amp	246	203	108	104
	15 amp	354	291	183	164
	20 amp	406	360	229	206
	30 amp	420	360	350	275
SLCBL10120	10 amp	75	55	45	35
	15 amp	121	85	65	55
	20 amp	150	105	80	70
	30 amp	155	120	105	85
SLCBL10240	10 amp	147	111	85	68
	15 amp	242	177	131	114
	20 amp	295	216	164	141
	30 amp	315	246	215	170
SLCBL12120	10 amp	55	40	30	25
	15 amp	90	60	45	45
	20 amp	115	80	60	50
	30 amp	115	90	80	60
SLCBL10240	10 amp	111	78	59	49
	15 amp	183	124	91	85
	20 amp	229	160	124	98
	30 amp	229	180	158	120
SLCBL10240	40 amp	240	210	158	158

Figure 15



Watt/ft Output Adjustment Factor		
Product Type	208 VAC	277 VAC
SLCBL3240	0.82	1.13
SLCBL5240	0.85	1.12
SLCBL8240	0.89	1.08
SLCBL10240	0.89	1.08
SLCBL12240	0.89	1.08

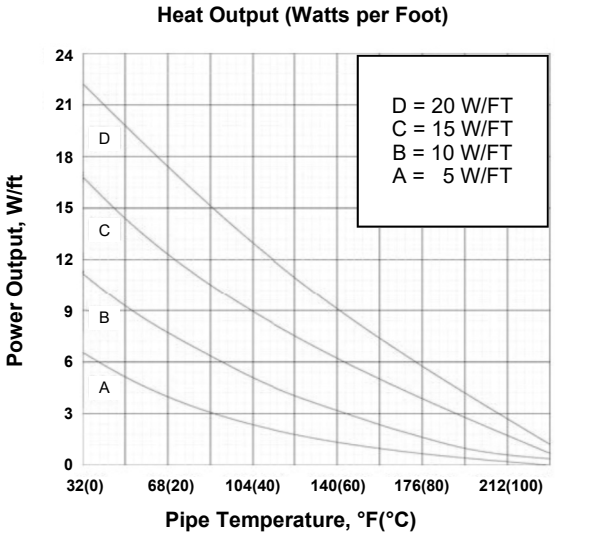
Max Circuit Length Adjustment Factor		
Product Type	208 VAC	277 VAC
SLCBL3240	0.96	1.08
SLCBL5240	0.94	1.09
SLCBL8240	0.92	1.11
SLCBL10240	0.92	1.11
SLCBL12240	0.92	1.11

SLMCBL

Maximum Circuit Length in Feet Vs. Circuit Breaker Size

Heat Cable Type	Circuit Breaker Size	Start-up Temperature			
		50°F (10°C)	32°F (0°C)	-4°F (-20°C)	-40°F (-40°C)
SLMCBL5120	10 amp	110	80	-	-
	15 amp	133	105	98	90
	20 amp	195	160	148	138
	30 amp	210	195	170	165
	40 amp	210	195	183	180
SLMCBL5240	10 amp	220	160	145	135
	15 amp	265	210	195	180
	20 amp	390	320	295	275
	30 amp	420	390	365	360
SLMCBL10120	10 amp	75	73	-	-
	15 amp	100	95	80	70
	20 amp	133	148	125	100
	30 amp	174	180	156	130
SLMCBL10240	10 amp	150	145	121	114
	15 amp	200	190	160	140
	20 amp	265	295	249	200
	30 amp	347	360	311	280
	40 amp	347	350	311	260
SLMCBL15120	10 amp	57	51	-	-
	15 amp	94	87	57	54
	20 amp	120	108	71	69
	30 amp	154	133	80	80
SLMCBL15240	10 amp	114	101	68	65
	15 amp	187	173	114	108
	20 amp	239	216	141	137
	30 amp	308	265	180	173
SLMCBL20120	10 amp	51	41	-	-
	15 amp	82	72	51	49
	20 amp	102	90	67	61
	30 amp	131	115	84	74
SLMCBL20240	10 amp	101	82	62	55
	15 amp	164	144	101	98
	20 amp	203	180	134	121
	30 amp	262	229	167	147
SLMCBL20240	40 amp	300	255	220	190

Figure 16



Watt/ft Output Adjustment Factor		
Product Type	208 VAC	277 VAC
SLMCBL5240	0.84	1.20
SLMCBL10240	0.85	1.18
SLMCBL15240	0.91	1.09
SLMCBL20240	0.90	1.07

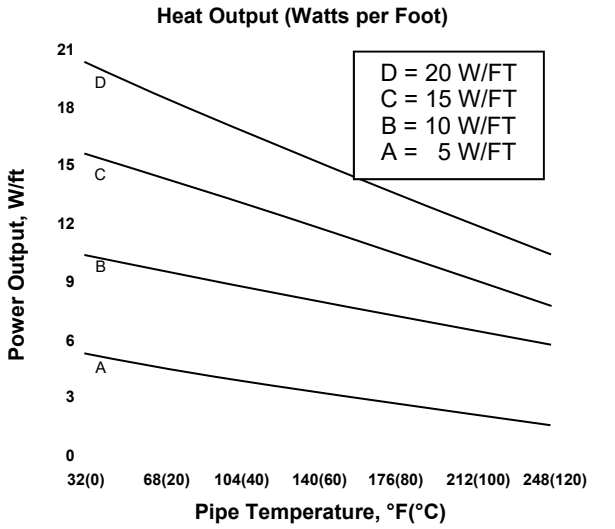
Max Circuit Length Adjustment Factor		
Product Type	208 VAC	277 VAC
SLMCBL5240	0.95	1.04
SLMCBL10240	0.94	1.06
SLMCBL15240	0.91	1.10
SLMCBL20240	0.91	1.11

SLHCBL

Maximum Circuit Length in Feet Vs. Circuit Breaker Size

Heat Cable Type	Circuit Breaker Size	Start-up Temperature			
		50°F (10°C)	32°F (0°C)	-4°F (-20°C)	-40°F (-40°C)
SLHCBL5120	10 amp	120	110	105	90
	15 amp	180	175	158	143
	20 amp	240	215	190	180
	30 amp	259	245	240	225
	40 amp	266	255	250	240
SLHCBL5240	10 amp	240	220	210	180
	15 amp	360	350	315	285
	20 amp	479	430	380	360
	30 amp	518	490	480	450
	40 amp	531	510	500	480
SLHCBL10120	10 amp	73	69	65	58
	15 amp	118	110	98	88
	20 amp	148	140	130	118
	30 amp	220	200	182	175
	40 amp	255	240	220	230
SLHCBL10240	10 amp	146	138	130	116
	15 amp	236	220	195	175
	20 amp	295	280	260	235
	30 amp	440	400	364	350
	40 amp	510	480	440	460
SLHCBL15120	10 amp	50	47	42	40
	15 amp	75	65	63	60
	20 amp	100	90	83	80
	30 amp	143	135	125	120
	40 amp	190	175	168	160
SLHCBL15240	10 amp	100	93	83	80
	15 amp	150	130	125	120
	20 amp	200	180	165	160
	30 amp	285	270	250	240
	40 amp	380	350	335	320
SLHCBL20120	10 amp	39	33	34	32
	15 amp	58	55	50	48
	20 amp	75	71	68	63
	30 amp	115	105	100	95
	40 amp	153	143	133	125
SLHCBL20240	10 amp	77	70	67	63
	15 amp	115	110	100	95
	20 amp	150	142	135	125
	30 amp	230	210	200	190
	40 amp	306	286	265	250

Figure 17



Voltage Adjustment Factors		
Watt/ft Output Adjustment Factor		
Product Type	208 VAC	277 VAC
SLHCBL5240	0.87	1.07
SLHCBL10240	0.88	1.08
SLHCBL15240	0.88	1.08
SLHCBL20240	0.86	1.07

Max Circuit Length Adjustment Factor		
Product Type	208 VAC	277 VAC
SLHCBL5240	0.99	1.08
SLHCBL10240	0.99	1.06
SLHCBL15240	0.98	1.06
SLHCBL20240	1.00	1.08

Ground Fault Protection

Ground fault circuit breakers are required on all heater constructions per the National Electric Code. Typically, 30ma trip devices are required due to the capacitive leakage of the heating cable construction.

Waterproofing

Moisture penetration of the electrical system is the single largest source of problems in a heating cable system installation. Therefore, particular care must be given to the proper sealing of all electrical connections and splices. Heating cable sealing kits will provide a proper seal for the heating cable itself, when used per kit instructions. All other electrical connections (heater to power wiring, thermostat connections, panel and breaker connections, etc.) should be sealed or moisture proofed in some fashion. Either mastic shrink tube or an aerosol electrical insulative sealant should be used on all connections to reduce any moisture penetration. The sealant will also reduce the potential for corrosion on exposed metal parts.

TESTING

Recommendations

Electrical tests are recommended at specific points in the receipt and installation of the heating cable. This periodical testing is designed to prevent the expenditure of wasted labor in the event of damage to the product. Installation costs of the cable and thermal insulation are much greater that the heating cable. Quick identification of any heating cable damage is the most economic approach to an installation. An insulation resistance test is recommended at the following point of the installation process:

- UPON RECEIPT of the heating cable
- BEFORE thermal INSULATION installation
- IMMEDIATELY AFTER thermal insulation installation
- As part of a PERIODIC MAINTENANCE program

Procedure

The insulation resistance test is used to check for damage to extruded jackets. Connections for the megger are made as shown in *Figures 18 & 19*.

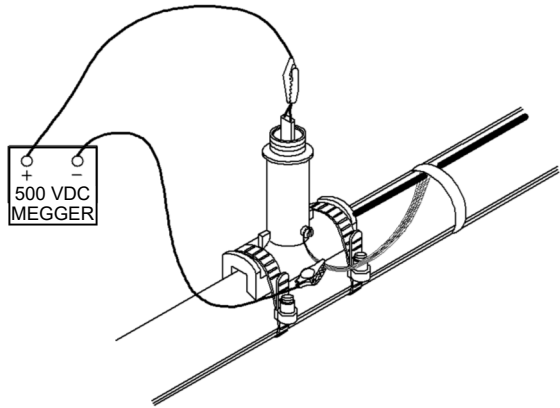


Figure 18

FOR HEATING CABLES WITH BRAID

Test from heating cable bus to braid

*Note: Test should use at least a 500 VDC megger. Do not use a megger with an excess of 2500 VDC. Minimum acceptable readings should be 20 megohms per circuit, regardless of length.*

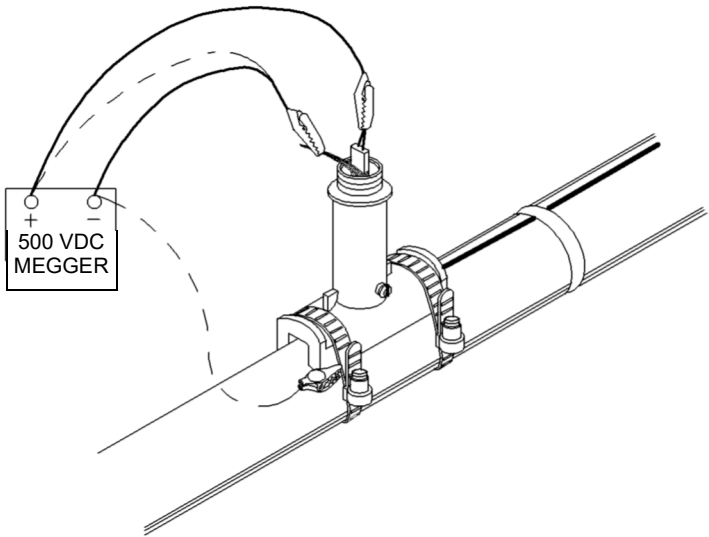


Figure 19

A record should be kept of the readings taken from the time the cable is first installed on the pipe. A history of the insulation resistance reading can be helpful in spotting moisture ingress into the electrical system (by seeing a gradual decline in the insulation resistance or physical damage to the heating cable (sharp decline in the insulation resistance). A sample record for this is shown in *Figure 20*. (See *following page*)

BRISKHEAT PERIOD INSPECTION RECORD

Circuit Number

Heater Type

Circuit Length

Freeze Protection Circuits -

Perform these checks as season requiring use approaches.

Temperature Maintenance Circuits -

Perform these checks at least twice per year.

Maintenance Checks for _____ Month _____ Year _____							
Visual inspection inside connection box corrosion, moisture, etc.	Initial						
	Date						
Damage or cracks (leaks) in insulation seals at valves, hangers, pumps, etc.	Initial						
	Date						
Heating cable properly connected and grounded. heating cable and connections insulated from connection box.	Initial						
	Date						
Thermostat checked for moisture, corrosion, set point, switch operation, and capillary damage	Set Point						
	Initial						
	Date						
	Reading						
Megger tests performed at power connection with both bus wires disconnected from power wiring.	Initial						
	Date						
Circuit voltage at power connection.	Reading						
Circuit amperage after 5 minutes	Reading						
Pipe temperature at time amps were measured.	Reading						
Watts/Ft. Volts x Amps = w/ft. feet	Initial						
	Date						
All connections, boxes, and thermostats have been resealed.	Initial						
	Date						
End seals, covered splices and tees marked On insulation cladding.	Initial						
	Date						

Remarks & Comments

PERIODIC INSPECTION RECORD FORM

Figure 20  
Periodic Inspection Record Form

- The Periodic Inspection record Form may be used in one of two ways:
- One sheet per circuit** - The results of periodic tests of a single circuit are posted in vertical columns, beginning on the left and working toward the right. This allows easy comparison of test values for up to seven test sequences on an individual circuit.
  - One circuit per column** - Test data for a single test sequence on as many as seven circuits can be recorded on a single sheet.

## START-UP

### Heat-up Time

Heat-up capacity (the ability to heat the pipe and it's contents rapidly) is not normally designed into the system. Cold start-ups should allow adequate time for the pipe to come up to temperature.

## Diversity Factor

If the electrical supply capability is limited, then a diversity factor may be used in a cold start situation (trying to start the entire system up in very cold weather). This is accomplished by staggering the initial turn on of the heating cable circuits to allow the inrush currents to occur in a sequential fashion rather than all at once.

## OPERATION & MAINTENANCE

## System Design, Installation & Documentation

The heating cable system must be properly designed, installed and documented. This documentation should at least include line lists and location identification documentation. As built installation drawings provided the optimum maintenance tool. Test records should also be considered as part of the system documentation requirements. *See Figure 20 & 21.*

## Preventive Maintenance

A preventive maintenance program is needed which will encompass both visual and electrical checks of the system. These should be done not only before initial operation of the system, but also on a scheduled basis. The checks should also be done after any maintenance has been performed.

## Visual Inspections

- Thermal insulation - check weatherproofing for damage, missing seals, cracks or gaps in caulking and mastic coatings, damaged or missing lagging. When damage does exist, the insulation will need to be repaired or replaced, and then resealed. WET INSULATION HAS POOR INSULATING PROPERTIES, THEREFORE THE INSULATION MUST BE KEPT DRY. If insulation has been damaged, check the heating cable for damage - replace the damaged section.
- Inspect junction boxes, connection boxes and thermostats for corrosion, moisture or foreign matter.
- Tightness of electrical connections, proper electrical insulation of heating cable wires, adequacy of moisture seal on electrical connections and that a minimum of one (1) inch of electrically insulated heater extends above the grounding connection. No strands of the ground braid should extend above this connection.
- Check all thermostats or sensor capillary leads to verify they are tied back and shielded from physical damage.
- Verify all enclosure, connection box, etc. covers are properly closed and that the thermostat is switching off and on by measuring current flow in the circuit when the unit switches on. Reset the knob to the proper temperature after completion of the test.

### Frequency

Inspections should be made prior to the start of the freeze season on freeze protection systems. Process maintenance systems should be checked on a frequent base, at least twice a year.

## Personnel Training

Qualified maintenance personnel must be used to maintain the system. It is recommended that periodic training programs be utilized to assist in keeping maintenance personnel up to date on equipment and procedures.

## Maintenance

The heating cables will not require any maintenance. Mechanical temperature controls should be sprayed with a moisture repellent/corrosion inhibitor once a year on all metal parts.

## Piping Repairs

Disconnect the electrical connection for the heating cable and protect it from mechanical or thermal damage during the repair. Check the heating cable installation after the repairs per established procedures. Replace and water seal the thermal insulation system.

## DAMAGED PRODUCTS

Do not attempt to repair a damaged heating cable - replace the entire section. Fault currents will often destroy the bus wire / core material interface between the damaged portion and the voltage supply end of the circuit.

Replace the damaged heating cable immediately. Moisture migration into the good section of the heating cable may cause electrical shorting in that cable after repair of the damaged section.

Any product exposed to fire or flame should be removed from service immediately and replaced. Further fire damage could result if energized.

## TROUBLESHOOTING GUIDE

SYMPTOMS	PROBABLE CAUSE	CORRECTION
<b>A. Circuit Breaker Trips (Standard)</b>	1. Circuit breaker undersized 2. Circuit oversized 3. Start-up at too low temp. 4. Defective circuit breaker 5. Connection and/or splices may be shorting out. 6. Physical damage to the heating cable may be causing a short. 7. Wires connected at end seal.	1, 2, 3. Re-establish what the current loads are going to be and resize the breakers.* 4. Replace circuit breaker. 5, 6. Locate and repair incorrect connections, splices, or damaged sections of heating cable. ** Megger per installation instructions. 7. Disconnect wires and perform a current check for possible other damage.
<b>B. Circuit Breaker Trips (Ground Leakage Type)</b>	1. All of section A. 2. Excessive moisture in connection boxes or splices. 3. Nick or cut in heater or power feed wire with moisture present.	1. All of section A. 2. Dry out and re-seal connections and splices. Megger per Installation Instructions (20 megohms min.) Work on connections outside the thermal insulation first, going to the below insulation connections and seals after the others have been eliminated. 3. Locate and repair or replace damaged heating cable or power wire.**

- \* Check to see if existing power wire sizing is compatible with larger sized breakers.

- \*\* To locate shorting problems, follow these steps:**

1. Visually inspect the power connections and splices that are outside of the thermal insulation for proper installation.
2. Check around the valves, pumps, and any area where there may have been maintenance work done, for visual indications of damage.
3. Look for crushed or damaged insulation lagging along the pipe.
4. Inspect heating cable splices under the thermal insulation.
5. If you have not located the problem by now, you will have to isolate one section of the heating cable at a time until you determine the general area of damage. First, isolate by disconnecting any tees or splices then remove insulation from that area until the specific damage is found. For long runs of cable, it may be necessary to cut the cable in half to isolate the shorted section.

SYMPTOMS	PROBABLE CAUSE	CORRECTION
<b>C. Power output is zero or lower than rated.</b> ***	1. Low or no input voltage.	1. Repair electrical supply lines and equipment.
	2. Circuit is shorter than design shows. a. Splices or tees may not have been connected. b. Heating cable may have been severed.	2. Check routing and length of heating cable (use "as-builts"), and recalculate power requirements. a. Connect and recheck the power.  b. Locate and repair the damaged heating cable. Recheck the power.
	3. Improper crimping causing a high resistance connection.	3. Re-crimp using correct procedure.
	4. Control thermostat is wired in the opened position.	4. Rewire in the normally closed position.
	5. Pipe is at an elevated temperature.	5. Check pipe temperature and recalculate the output.***
	6. Heating cable has been exposed to excessive moisture.	6,7. Replace the heating cable.
	7. Heating cable has been exposed to excessive temperatures.	
<b>D. Power output appears correct but pipe temperatures are below design value.</b>	1. Insulation is wet.	1. Remove and replace with dry insulation and insure proper weatherproofing.
	2. Insufficient heating cable was used on valves, supports, and other heat sinks.	2. Splice in additional heating cable but do not go over maximum circuit length.
	3. Thermostat was set incorrectly.	3. Reset the thermostat.
	4. There are thermal design inconsistencies.	4. Check with the local or factory representatives for design conditions. Modify as recommended.

\*\*\* The power output on lower resistance heating cables is temperature sensitive and requires a special procedure to determine it's value.

1. Check the pipe temperature under the thermal insulation.

2. Allow heating cable to stabilize for 10 minutes and then measure the current.

3. Calculate the power (watts / ft.) of the heating cable by multiplying the current by the input voltage and dividing by the actual circuit length

I xV

Ft.

=

Watts

Ft.

4. Compare this measured value to the power output curves for the heating cable at the measured pipe temperature. If the heating cable's actual output is substantially below the theoretical output, the bus wire interface with the core has been damaged by the fault current and the cable must be replaced. This is not a highly accurate method of analysis, so use discretion in comparing theoretical and actual values.

HEAT TRACE INSTALLATION RECORD

1. Circuit No.\_\_\_\_\_

2. Receiving Documentation

Item

A. Cable Type

B. Cable Length

3. Receiving Testing

A. Check for physical damage

B. Continuity Check

Check for continuity between power leads.

C. 500VDC min., 2500VDC recommended, megger check between leads and sheath, 20 megohms min.

D. Lot No.

4. Post Installation Testing

A. Continuity Check

Check for continuity between cold leads.

B. 500VDC min., 2500VDC recommended, megger check between leads and sheath, 20 megohms min.

C. Visually Check Cable Installation Prior to Release for Thermal Insulation.

5. Final Testing and Commissioning

A. Circuit approved for testing by client.

B. 500VDC min., 2500 VDC recommended, megger check between leads and sheath, 20 megohms min.

C. Energized Testing

(all test data to be within 10% of design data)

1. Circuit Voltage

2. Initial Current

3. Current after 15 minutes of operation

4. Current after 30 minutes of operation

5. Pipe temperature

6. Circuit Acceptance

Date\_\_\_\_\_

DESIGN

ACTUAL

\_\_\_\_\_

\_\_\_\_\_

Date\_\_\_\_\_

O.K. \_\_\_\_\_ Damage \_\_\_\_\_

O.K. \_\_\_\_\_ Open \_\_\_\_\_

Megohms\_\_\_\_\_

No. \_\_\_\_\_

Date\_\_\_\_\_

O.K. \_\_\_\_\_ Open \_\_\_\_\_

Megohms\_\_\_\_\_

Visual Check O.K. \_\_\_\_\_

Date\_\_\_\_\_

Approved \_\_\_\_\_

Megohms\_\_\_\_\_

DESIGN

ACTUAL

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

*This circuit has been tested and documented in accordance with the above itemized data. This circuit by:*

Contractor\_\_\_\_\_

Date\_\_\_\_\_

The **Heat Trace Installation Record** can be used to monitor the initial installation and check out process. This form can be used in conjunction with the **Periodic Inspection Record** shown in *Figure 20*.

Figure 21

NOTE

WARRANTY INFORMATION

BriskHeat warrants to the original purchaser of this product for the period of eighteen (18) months from date of shipment or twelve (12) months from date of installation, whichever comes first. BriskHeat's obligation and the exclusive remedy under this warranty shall be limited to the repair or replacement, at BriskHeat's option, of any parts of the product which may prove defective under prescribed use and service following BriskHeat's examination, is determined by BriskHeat to be defective. The complete details of the warranty can be found online at [www.briskheat.com](http://www.briskheat.com) or by contacting us at 1-800-848-7673 (toll free, U.S. / Canada) or 1-614-294-3376 (Worldwide).



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