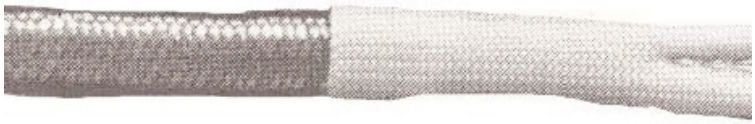
SL-Series
Self-Regulating Heating Cable
Installation Instructions



⚠ Read and understand this material before installing this heater. Failure to understand how to safely install the heater could result in an accident causing serious injury or death. This heater should only be installed by qualified personnel.

TEMPCO ELECTRIC HEATER CORPORATION
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Introduction

Thank you for purchasing a Tempco SL Series self-limiting heating cable system.

A heating cable system is a combination of heating cable, connection / termination kits, temperature controller,and accessories based on your particular application. Your heater is designed to provide a long and efficient service life with function, reliability, and safety in mind.

All Tempco Self-Limiting Heating Cable utilize a parallel resistance modular design. This allows the heating cable to be cut to length and terminated in the field, without affecting the heating power per unit length. The modular design enables the cable terminations / electrical connections to be made with cold leads and cold ends (e.g. cable not heated in electrical junction box).

A temperature controller is recommended for all self-limiting heating cable.

⚠ DANGER

A person who has not read and understood all installation instructions is not qualified to install this product.

⚠ WARNING

End User Must Comply to the Following:

- Only qualified personnel are allowed to connect the electrical wiring.
- Disconnect all supply power at the source before making any heating cable power input connections.
- All electrical wiring must follow local electrical codes and highly recommend following NEC Article 427.
- Final installation / wiring is to be inspected by the authority who has jurisdiction in the area that the heater is installed.
- 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.

⚠ DANGER

⚠ CAUTION

- 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.
- Never operate heater without a temperature control device.
- Do not wrap the heating cable over itself
- 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 heater.

- 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.

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SL series Self - Limiting Heat Trace Cable Accessories

HTP90021 Universal Connection / Termination Kit

1 - 3/4" (19mm) NPT pipe standoff
2 - Ring terminals
4 - Large, Insulated crimp connectors
2 - Small, Insulated crimp connectors
2 - Pipe straps (for up to 6" (152mm) IPS pipe)
2 - Heat sink end caps
1 - 6" (152mm) shrink sleeve
1 - 3 oz. (89ml) tube of RTV sealant
1 - Roll of fiberglass tape
1 - Caution label
1 - Ground screw

Enough to complete:
Two end terminations and one input connection, or one input power splice.

HTP90022 SL End Seal Kit

10 - Heat Shrink tubes

Enough to complete:
Ten end terminations

HTP00023 SL Splice / Lead End Termination Kit

20 - Large yellow crimp connectors
20 - Large Blue crimp connectors
10 - Heat Shrink tubes
1 - 3 oz. (89ml) tube of RTV sealant

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

Prior to Installation

STEP 1: Check for suspected damage to heater like rips, punctures, etc. Ensure surface to be heated is free of jagged or sharp edges or weld splatter.

STEP 2: Confirm all necessary installation hardware and tools are readily available. Depending on the application and kit, this may include...

Tools

Diagonal Cutter	Knife	Screwdriver
Crimping Tool / Wire Stripper	Measuring Tape/Ruler	

Hardware and Accessories

Temperature Controller	Monitor Light Kit (Optional)	Aluminum or Fiberglass
Temperature Sensor	RTV Sealant	Adhesive Tape (verify
Connection / Termination Kits	Pipe Straps	temperature rating)
(see kit descriptions to verify contents	Junction Box	Heat Conductive Putty
and additional required hardware)	Wire Nuts	Pipe Standoffs
Insulating Material	Caution Labels	Pipe Reducer

STEP 3: (A) Verify the total amperage of the system does not exceed the maximum amperage that the heating system components can handle. (B) Verify that the total length of cable required does not exceed the maximum circuit length.

If the cable length exceeds (A) or (B), the cable must be divided into sections.

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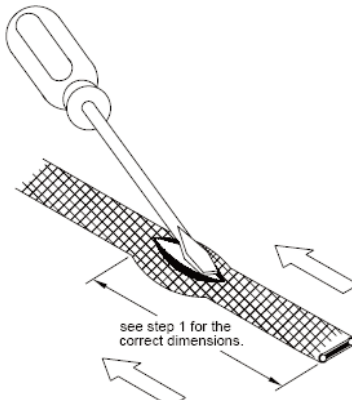
LEAD TERMINATION PREPARATION

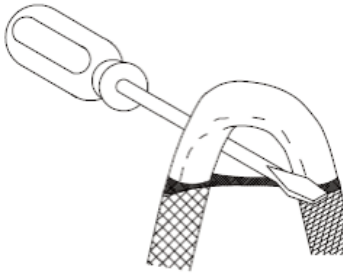
BRAIDED PRODUCTS



Step 1
For External Braid Connection:
Move braid back 12” (305mm) to create a bulge.

For Internal Braid Connection:
Move braid back 5” (127mm) to create a bulge.

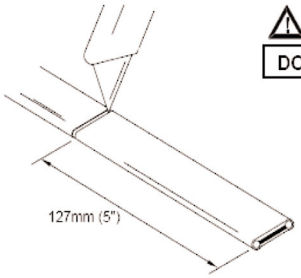
Step 2
At the bulge, separate the braid to make an opening.



Step 3
While bending the heater cable, work it through the braid opening.

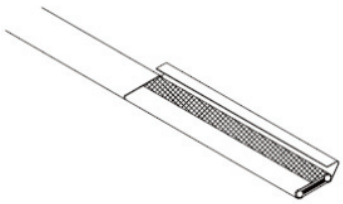
Step 4
Pull the braid tight and proceed to “Prepare the Termination”

OVERJACKET PRODUCTS



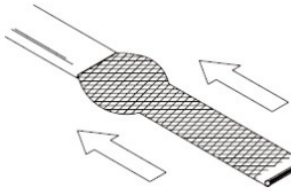
⚠ WARNING:
DO NOT CUT BRAID

Step 1
Lightly cut around heater overjacket 5” (127mm) from the end. Bend cable to break overjacket.

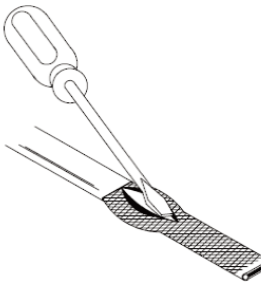


Step 2
Lightly cut overjacket up the center between the first cut mark and the cable end. Bend cable to break overjacket.

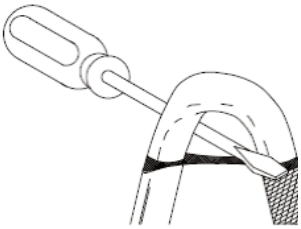
Step 3
Remove overjacket from heater cable.



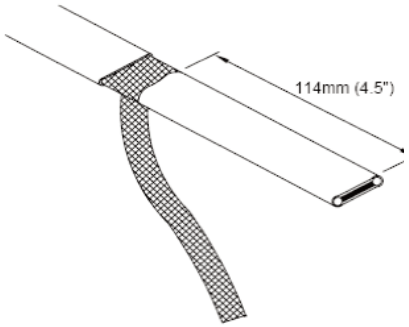
Step 4
Move braid back toward the overjacket creating a bulge.



Step 5
At the bulge, separate the braid to make an opening.



Step 6
While bending the heater cable, work it through the braid opening.



Step 7
Pull the braid tight and proceed to “Prepare the Termination”

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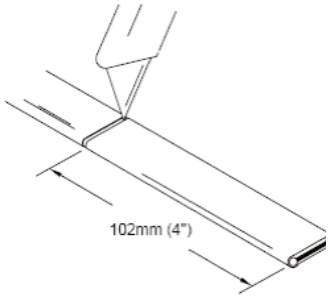
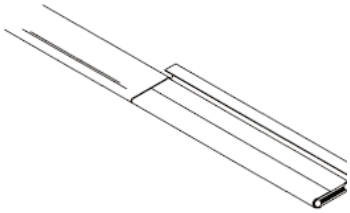
PREPARE THE TERMINATION

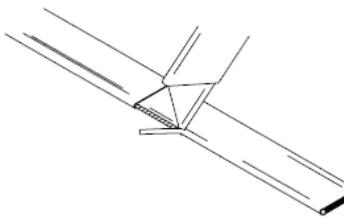


Step 1
Lightly cut around heater outer jacket 4” (102mm) from the end. Bend cable to break outer jacket.



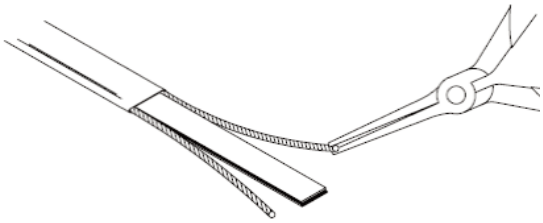
Step 2
Lightly cut outer jacket up the center between the first cut mark and the cable end. Bend cable to break outer jacket.

Step 3
Remove the jacket from the heater cable.



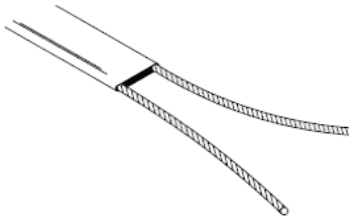
⚠ WARNING:
DO NOT CUT BUS WIRES

Step 4
Shave the core material from the outside of each bus wire.



Step 5
Starting at the end, pull each bus wire away from the core material.

Step 6
Remove exposed core material.



Step 7
Cut 0.25” (6mm) off the end of each bus wire.

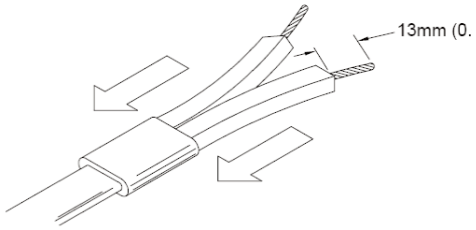
Step 7
Proceed to “Power Termination”

POWER / LEAD END TERMINATION

Step 1
Insert bus wires into power termination

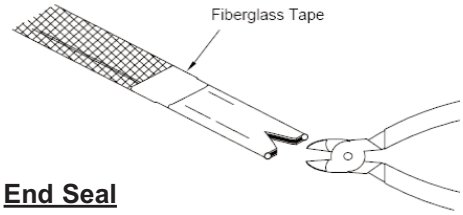
⚠ WARNING

- Bus wires must not touch or cross while inserting into power termination / end seal.
- Only power terminations / end seals specifically approved for the style and type of heater cable being used.



Step 2
Squeeze power termination opening and fill with silicone.

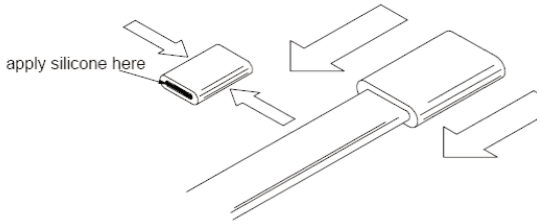
Step 3
Push power termination to overlap jacket.



End Seal

Step 1
Braided Products: Cut braid back 1” (25mm) & tape in place with fiberglass tape.
Overjacket Products: Remove 0.5” (13mm) of overjacket exposing the braid, then remove the 0.5” (13mm) of exposed braid.

Step 2
Make a 0.4” (10mm) cut at the end of the heater cable.



Step 3 Squeeze the end seal and fill with silicone.

Step 4 Push end seal over the heater cable.

Overjacket Products: The end seal should overlap the overjacket.

Step 5 The silicone will set up in about 30 minutes with a complete cure after 24 hours.

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POWER INPUT CONNECTION INSTALLATION

⚠ WARNING

Only authorized and trained personnel should perform the following procedure. The hazard of electrical shock exists with any electrical installation project. Disconnect all supply power at the source prior to making the heating cable power input connections.

⚠ CAUTION

A temperature controller is required for all constant-wattage heating cable.

STEP 1:
Prepare heating cable end as specified under "Power/Lead End Termination". Insert approximately 8" (20cm) of the heating cable(s) through the bottom of the cast aluminum pipe standoff, making sure the first module point stays in contact with the pipe.
NOTE: A maximum of three cables fit through pipe standoff.

STEP 2:
Place the standoff on the pipe surface at the point where the supply wiring and associated fittings will connect to the pipe heat tracing cable. Fasten the standoff to the pipe with pipe straps. Fill the top of the standoff with Silicone RTV to provide a moisture seal between the pipe and electrical junction box. Make certain there are no voids between the cable and pipe standoff. Allow an appropriate amount of time for the Silicone RTV to cure.

STEP 3:
Secure an appropriately sized junction box on the standoff. The standoff is supplied with a 1" NPT fitting. Pull the wiring through the associated fittings into the junction box and connect the heating cable(s) bus wires to the temperature controller with wire nuts. If applicable, secure the braided pigtail to the standoff with the ground screw or to the junction box with the panhead screw. Test the cable installation for continuity and insulation resistance. The insulation resistance between the bus wires and the metallic braid must be greater than 50 megohms at 500 volts. Close the junction box and attach the Caution Label to the cover of the junction box.

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SPLICE INSTALLATION

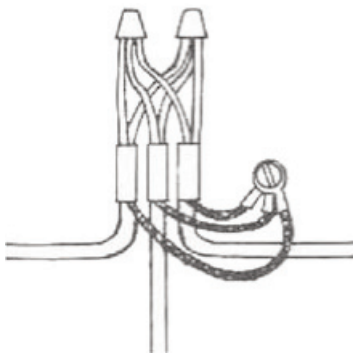
⚠ WARNING

Only authorized and trained personnel should perform the following procedure. The hazard of electrical shock exists with any electrical installation project. Disconnect all supply power at the source prior to making the heating cable power input connections.

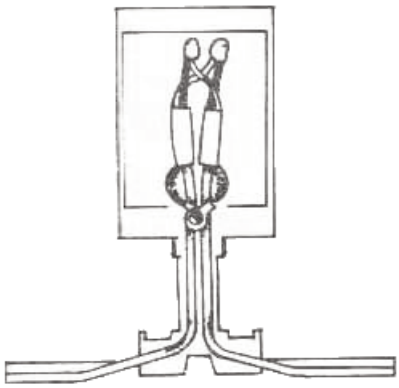
Step 1:
Prepare the heating cable ends to be spliced together as specified under “Power/Lead End Termination”.
CAUTION: Never connect the two parallel conductors of the heating cable together.

STEP 2:
Insert the heating cable cold leads up through the pipe standoff and into the junction box. Attach the pipe standoff and junction box to the pipe where the splice is to be located. Fasten it with appropriately sized pipe clamps.
NOTE: A maximum of three cables fit through pipe standoff.

STEP 3:
Connect the leads of the heating cable ends together using wire nuts as shown in the illustrations.



Tee Splice



In Line Splice

STEP 4:
Connect the terminal lugs on the braid leads to a grounded screw on the pipe standoff or on the junction box.
NOTE: The junction box and pipe standoff must be grounded.

STEP 5:
Test the cable installation for continuity and insulation resistance. The insulation resistance between the bus wires and the metallic braid must be greater than 50 megohms at 500 volts. Close the junction box and attach the Caution Label to the cover of the junction box.

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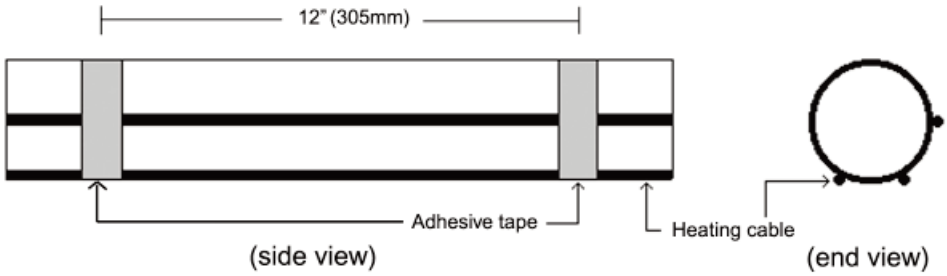
HEATING CABLE INSTALLATION

Cable Wrapping Techniques

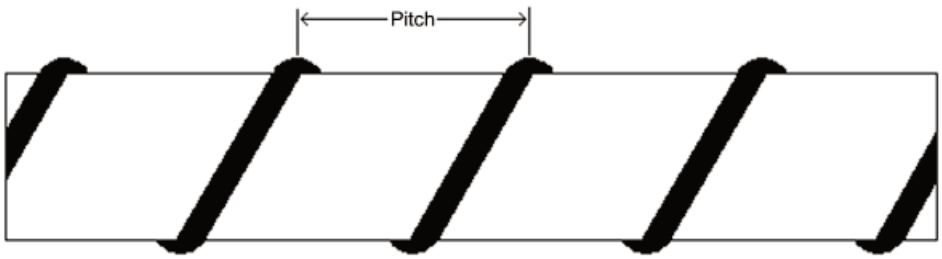


Straight run

A straight run is the simpliest method to installing heating cable. It is possible to have multiple straight runs on a single object. With a single straight run, position cable at the bottom of a horizontal pipe.

⚠ CAUTION

Do not wrap the heating cable over itself or have two heating cables touch.
All parts of heating cable must make intimate contact with surface to be heated.
Use heat conductive putty to fill voids between cable and pipe surface.
Wrap adhesive tape every 12" (305mm) around heating cable and pipe to attach the cable.



Spiral wrap

Spiral wrapping provides more heater coverage than a straight run. It can also require more heating cable. Verify the pitch length (see illustration) prior to installation to ensure you have enough heating cable to finish the job. If you need assistance in determining the pitch length, refer to the catalog example and pitch charts in Section 6 or call Tempco.

⚠ CAUTION

Do not wrap the heating cable over itself or have two heating cables touch.
All parts of heating cable must make intimate contact with surface to be heated.
Use heat conductive putty to fill voids between cable and pipe surface.
Wrap adhesive tape every 12" (305mm) around heating cable and pipe to attach the cable.

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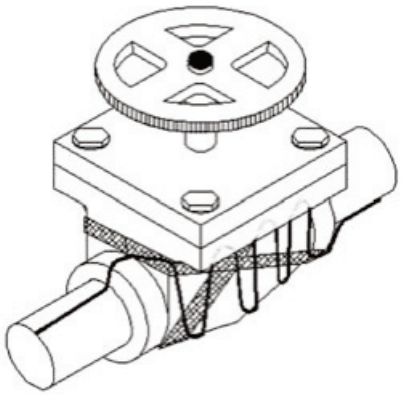
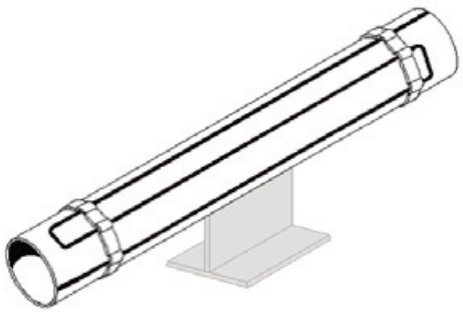
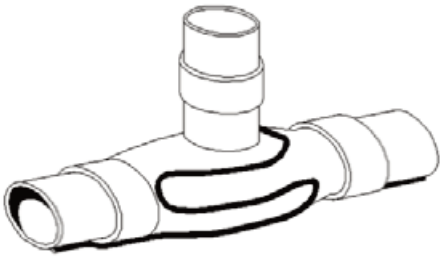
Heating Cable Examples



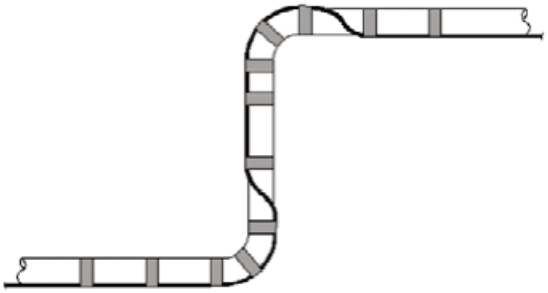
Valve



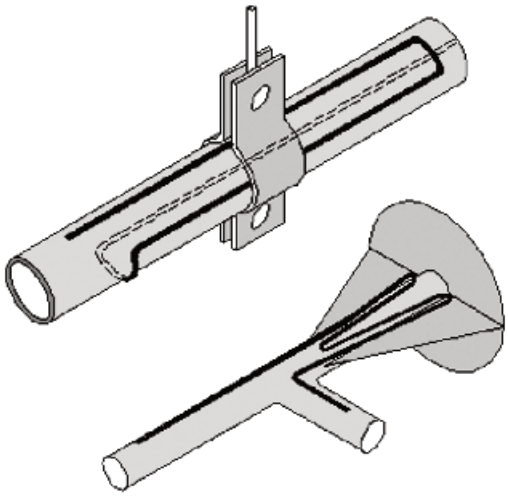
Pipe Support



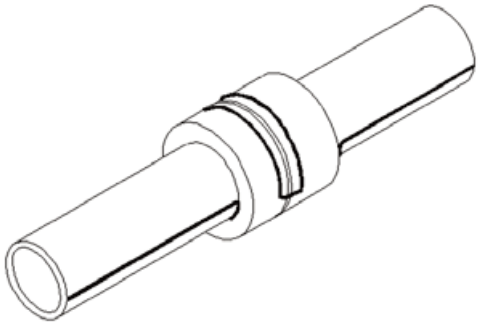
Blind Tee



Elbow



Support



Flange Body

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TROUBLESHOOTING GUIDE

Please read this guide prior to contacting Tempco. This guide is designed to answer the most commonly asked questions. If you are unable to identify the problem or need additional assistance, please contact Tempco at 1-800-323-6859 or e-mail techsupport@tempco.com

Problem	Solution
Entire heating cable run does not heat.	Verify heater is connected to proper voltage. Check to see if there is a resistance reading (not an open circuit) in heater using an ohm meter.
Portion of heating cable does not heat.	Examine unheated module for damage.
Circuit breaker is tripping.	Validate that the circuit breaker is capable of handling the amperage requirement of heater. Examine heater and power wiring for any damage. Verify open circuit exists between bus wire and ground braid.

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SL: 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)
3W/ft 120V	15 amp 20 amp 30 amp	300 - -	200 270 330	180 230 330
3W/ft 240V	15 amp 20 amp 30 amp	660 - -	410 560 660	360 480 660
5W/ft 120V	15 amp 20 amp 30 amp	230 270 -	150 200 270	130 175 260
5W/ft 240V	15 amp 20 amp 30 amp	460 540 -	300 400 540	260 345 520
8W/ft 120V	15 amp 20 amp 30 amp 40 amp	150 200 210 -	95 125 190 210	85 100 170 210
8W/ft 240V	15 amp 20 amp 30 amp 40 amp	295 390 420 -	195 250 375 420	170 225 340 420
10W/ft 120V	15 amp 20 amp 30 amp 40 amp	115 150 180 -	70 95 145 180	60 85 120 165
10W/ft 240V	15 amp 20 amp 30 amp 40 amp	230 305 360 -	150 200 300 360	130 175 260 360

WARRANTY INFORMATION

Tempco warrants to the original purchaser for the period of twelve (12) months from date of shipment or twelve (12) months from date of installation, whichever comes first. Contact factory at 1-800-323-6859 or 630-350-2252 for complete details.

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