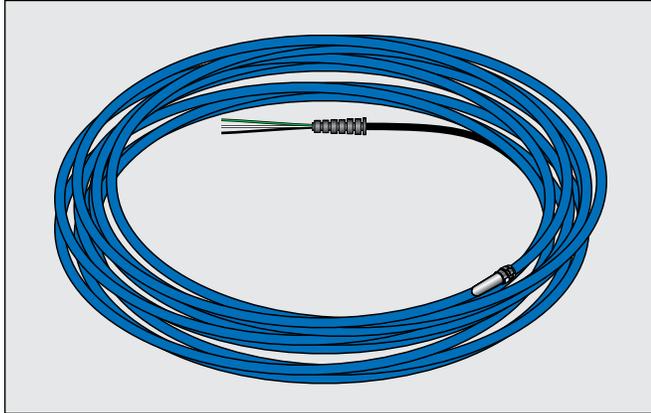


### LOW VOLTAGE

## Installation Instructions



### Kompensator Kit Contents

Qty	Description
1	Kompensator heating cable at pre-determined length

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### General Information

Kompensator is the only job-ready, low voltage, heating cable system available on the market. Kompensator can be used on all metal and non-metal pipe materials, commonly used in the transportation industry to maintain hydraulic oil viscosities in cold temperatures and tanker fluid delivery hoses. Kompensator employs the performance and operating characteristics of self-regulating heating cable technology and can be used with thermal insulation to increase energy efficiency. Kompensator is applied on the outside (externally) of the pipe to provide reliable freeze protection.

1. Kompensator is suitable for use on metal and non-metal pipes.
2. Exposure to temperatures above 150°F (65°C) while operating will shorten the expected life of the heating cable. Maximum exposure temperature is 185°F (85°C) when not powered. Before installing on hot water pipes, set the water heater thermostats below 150°F (65°C).  
\* Do not install in temperatures below -40°F (-40°C).
3. Remove any old heating tapes or insulation before installing the Kompensator heating cable.
4. Use a minimum of 1/2" thick insulation or equivalent.
5. The minimum bending radius of the heating cable is 1/2".
6. If the Kompensator system must be taken off and re-installed carefully follow all installation instructions.
7. Leave these instructions with the user for future reference.
8. These systems can be used with thermostats where applicable to improve energy efficiency.

**Kompensator is a technically advanced product. Handle it with proper care and be sure not to damage the outer sheaths or jackets of the cable. Read the Warnings and Installation Instructions completely before installing this product.**

### ⚠ WARNING:

**Fire and shock hazard. This component is an electrical device which must be installed properly. Follow these important warnings to ensure proper operation and to prevent electrical or fire hazard.**

1. The heater (cable) must not exceed the recommended voltage as described on the product. It is the installer's responsibility to make sure the product is protected from an increase in voltage and to provide correct over-current protection.
2. To minimize the danger of fire if the heating cable is damaged or improperly installed, Kompensator must be installed with over current protection and must also be properly grounded. Arcing may not be stopped by conventional circuit protection.
3. The Kompensator cable is designed for water pipe freeze protection. Thermal design is based on dry insulated metal and plastic pipes.
4. As with any other electrical product, exposure of the Kompensator cable to water or other electrolytes if the cable is damaged creates a risk of electrical shock or fire.
5. Connect only to a dedicated circuit with appropriate over current protection and which are protected from rain and other water (dry location).
6. The cable jacket must not be cut, nicked, or worn down, therefore:
  - Never cut the cable's outer jacket.
  - Prevent chaffing. Do not install the cable where objects might hit it or cut it or where it might be damaged by rubbing against rough surfaces.
  - Before installation, file and remove any sharp edges which might damage the cable. Make sure the cables cross only smooth, non-abrasive surfaces.
  - Protect the complete system with a metal sheath where it might be damaged by animals or impact.
  - Do not use any wire or clamps to attach the cable to the pipe. Use 1/2" or 1" tape, fiberglass tape, or plastic ties.
7. Do not use nails, metal clamps, wires or other devices that might cut the cable or cord to support it between the pipe and its power location.
  - If you discover a nick or worn spot on your cable, immediately disconnect the system and replace the cable. Inspect the cable periodically for damage. And remember to replace any damaged insulation after each inspection of the cable.
7. Never attempt to splice or repair a damaged cable. Replace it with a new unit. The system is not designed to be repaired and to do so may create a danger of fire or shock.
8. Do not install the cable close to flammable materials, liquids, or fumes. If the cable is cut while the system is energized and if there is moisture present, there is a risk of fire and flammable objects or fumes near the cable might be ignited.

## Pre-Installation Information

### General Requirements For Pipe Freeze Protection

- Kompensator heating cables may be used on metal and plastic water pipes. Please consult Heat-Line if you have other pipes or tubing.
- Kompensator heating cables are not intended for use inside any pipes, for freeze protection of liquids other than water, or for use in classified hazardous locations.
- Install with a minimum of 1/2" fire-resistant, waterproof thermal insulation.
- Never use on any pipes that may exceed 150°F (65°C).
- Use appropriate wire gauge for the heating cables circuitry.
- Install only in accessible locations; do not install behind walls or where the cable would be hidden.
- Do not run the heating cable through walls, ceilings, or floors.
- Connect only to circuits with the appropriate over current protection and proper grounding and are protected from rain and other water. Important: For the Heat-Line warranty to be valid, you must comply with all the requirements outlined in these guidelines. Determine Which Kompensator Heating Cable You Need for Pipe Freeze Protection Use the Tables 1 and 2 to select the correct heating cable. Add 2 foot to your pipe length for each valve or spigot on your pipe system. The charts assume the lowest outside temperature is 0°F (-18°C), with a minimum of 1/2" thick waterproof, fire-resistant thermal insulation (preformed foam). For protection to -20°F (-29°C), use 1" thick insulation. Important: All thermal and design information provided here is based upon a "standard" installation with heating cable fastened to an insulated pipe. For any other application or method of installation, consult Heat-Line at (800) 584-4994.

### Bending the Cable

When positioning the heating cable on the pipe, do not bend tighter than 1/2" radius.

The heating cable does not bend well on a flat plane. Do not force such a bend as heating cable may be damaged.



### Optional Accessories

<b>KHL-STAT</b>	Low voltage thermostat
<b>PLD-CG</b>	Cable guards (package of 4)
<b>INSUL-PAD</b>	Elastomeric flexible closed-cell insulation, 1/2" (12.5mm) thick, 6" (152mm) wide, 10' (3m) long
<b>INSUL-FOIL</b>	Aluminum reflective metalized foil bubble insulation
<b>FOIL-TAPE</b>	Professional grade all weather foil tape 2.83" x 150' (72mm x 46m)
<b>INSUL-1.00</b>	Closed cell polyethylene insulation sleeve for 1" ID pipe (6' long, 1 5/8" ID, 3/4" thick wall)
<b>INSUL-1.25</b>	Closed cell polyethylene insulation sleeve for 1 1/4" ID pipe (6' long, 1 7/8" ID, 3/4" thick wall)
<b>INSUL-2.00</b>	Closed cell polyethylene insulation sleeve for 2" ID pipe (6' long, 2 5/8" ID, 3/4" thick wall)
<b>HLP-TAPE</b>	Black polyethylene insulation tape 2" x 100' (51 mm x 30 m)
<b>INSUL-LABEL</b>	Electric Heat Trace Caution Label for Insulation

Table 1 Metal Pipes

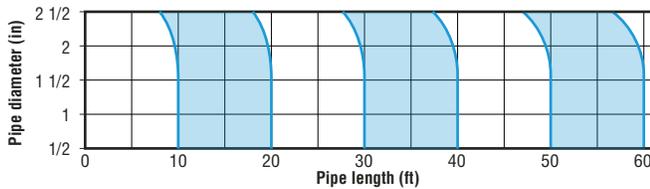
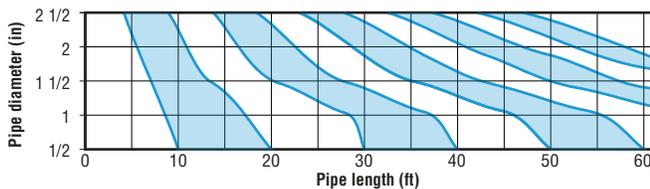


Table 2 Plastic Pipes



### Ordering Chart

#### Kompensator | Product Code

Example: **KHL123 - 040 - CS**

#### Product

- KHL123 12 volt 3 watt per foot
- KHL125 12 volt 5 watt per foot
- KHL243 24 volt 3 watt per foot
- KHL245 24 volt 5 watt per foot

#### Cord-Set Type

CS Cord connected (No GFCI)

#### Length of Heater

- 5 to 40 feet 12 volt 3 watt per foot systems
- 5 to 30 feet 12 volt 5 watt per foot systems
- 5 to 60 feet 24 volt 3 watt per foot systems
- 5 to 40 feet 24 volt 5 watt per foot systems

**Notes:** It is the requirement of the installer to provide proper voltage regulation and over-current protection. It is also the recommendation of Heat-Line that since the power consumption of the product can never be 0 to install a shut-off switch to prevent the draining of batteries or power supply.

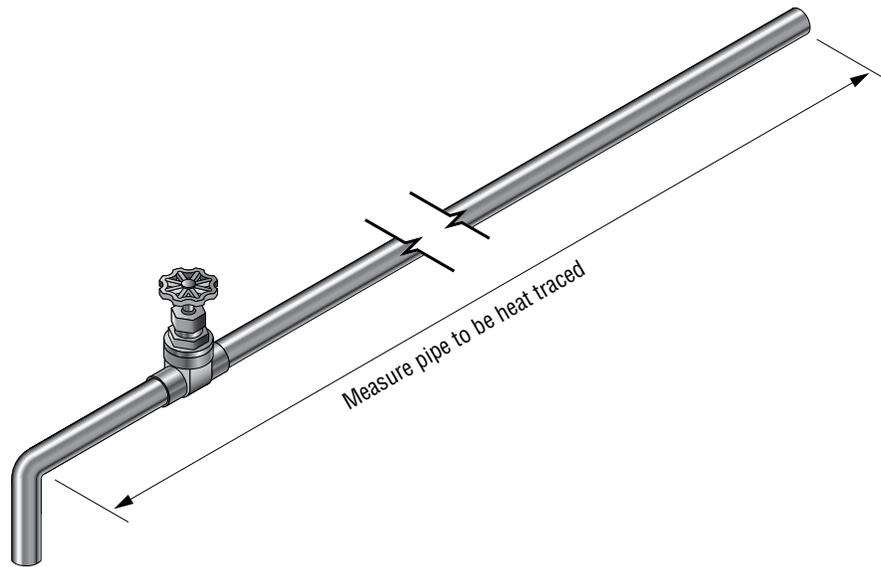
## Installation Instructions for Kompensator Cables on Pipe

### 1

#### Determine the length of cable required

- For systems with pipe diameters up to 1 1/4" I.D. a single straight run should be sufficient using the KHL125 Series Kompensator. For systems with pipe diameters over 1 1/4" I.D. consult Heat-Line Corporation to discuss your particular requirement.

**Note:** Pipes must be insulated for maximum efficiency and performance.



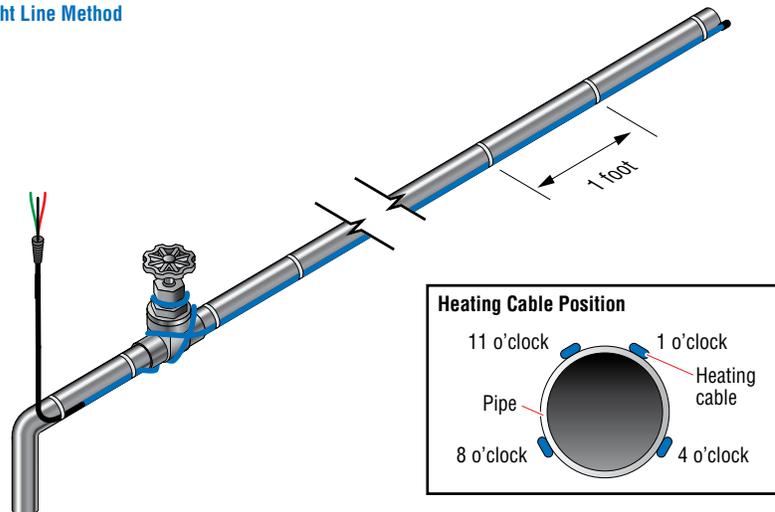
### 2

#### Apply cable to the pipe

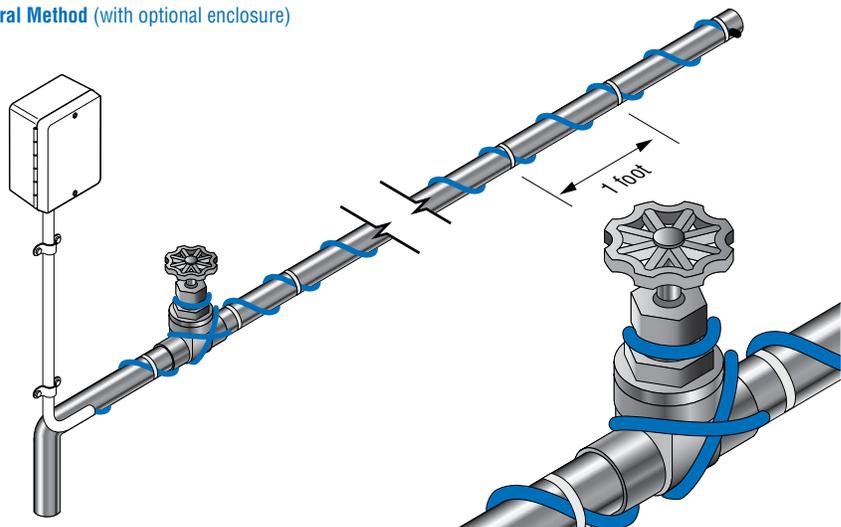
- If your Kompensator cable set is the same length as the pipe, run it straight along the pipe in the 4 or 8 o'clock position. For large diameter pipes you can pitch or spiral the heater evenly along the pipe length or run the cable longitudinally at the 4 or 8 o'clock position.
- To provide extra heat at valves and other fitting areas, simply wrap an extra 2 feet of cable at these areas.
- Fasten the cable at one foot intervals using quality electrical tape or plastic cable ties. DO NOT over tighten or compress the heater as this will damage the conductive core. If there is excess cable double it back.
- If your Kompensator cable set is longer than the pipe, spiral it evenly along the pipe.
- Fasten the cable at one foot intervals using quality electrical tape or plastic cable ties.

**Note:** Pipes must be insulated for maximum efficiency and performance.

#### Straight Line Method



#### Spiral Method (with optional enclosure)



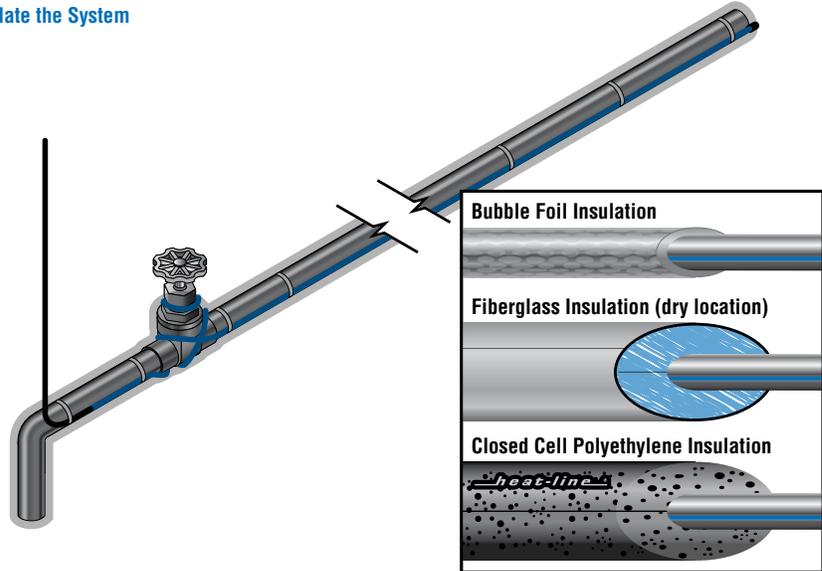
3

Insulate the System

Protect the system with insulation

Insulation may include foil bubble insulations, fiberglass pipe insulations in dry locations or foam insulations outside in wet locations.

- Before insulating ensure that there is no cable damage, such as nicks or cuts.



Wiring, Sizing and Power Requirements

The Kompensator heating cable has a conductive polymer core and its heat output changes (increases or decreases) with heat and cold. It is important to understand however, the cable never operates at 0 output and that it is a consumer of energy when powered. Though the heat outputs will change with temperature variables along the pipe, it is consuming power while it is on.

It is recommended that you install a shutoff switch to avoid draining the battery or power supply. Please see control options for further information on controlling your Kompensator.

**Note:** It is the installer's responsibility to make sure proper voltage regulation is supplied.

**Note:** Always fuse based on wire size as per electrical code.

Fuse and Breaker Sizing Recommendations

**KHL123 Series (12 volt, 3 watts @ 50°F)**

Fuse or Breaker Size (AMP)	Kompensator Length (feet) Max. 40'	Wire Gauge (AWG)
5	1 – 8	14
7.5	9 – 12	14
10	13 – 16	14
15	17 – 26	12
20	26 – 40	12

**KHL125 Series (12 volt, 5 watts @ 50°F)**

Fuse or Breaker Size (AMP)	Kompensator Length (feet) Max 30'	Wire Gauge (AWG)
5	1 – 7	14
7.5	8 – 10	14
10	11 – 14	14
15	15 – 20	12
20	20 – 30	12

**KHL243 Series (24 volt, 3 watts @ 50°F)**

Fuse or Breaker Size (AMP)	Kompensator Length (feet) Max 60'	Wire Gauge (AWG)
5	1 – 15	14
7.5	16 – 23	14
10	24 – 35	14
15	36 – 48	12
20	48 – 60	12

**KHL245 Series (24 volt, 5 watts @ 50°F)**

Fuse or Breaker Size (AMP)	Kompensator Length (feet) Max 40'	Wire Gauge (AWG)
5	1 – 10	14
7.5	10 – 15	14
10	16 – 20	14
15	21 – 30	12
20	31 – 40	12

Suggested fusing for equipment protection and startup temperatures not colder than 10°F.

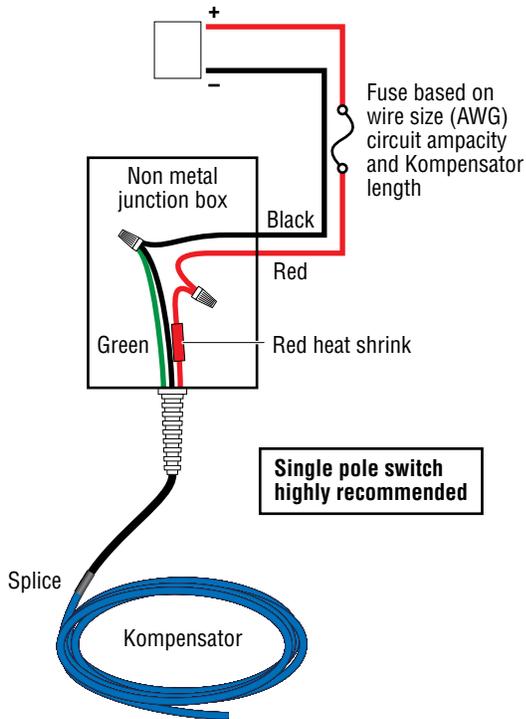
Control Options:

Kompensator heaters can be installed with multiple control capabilities installed by others. These include and not limited to:

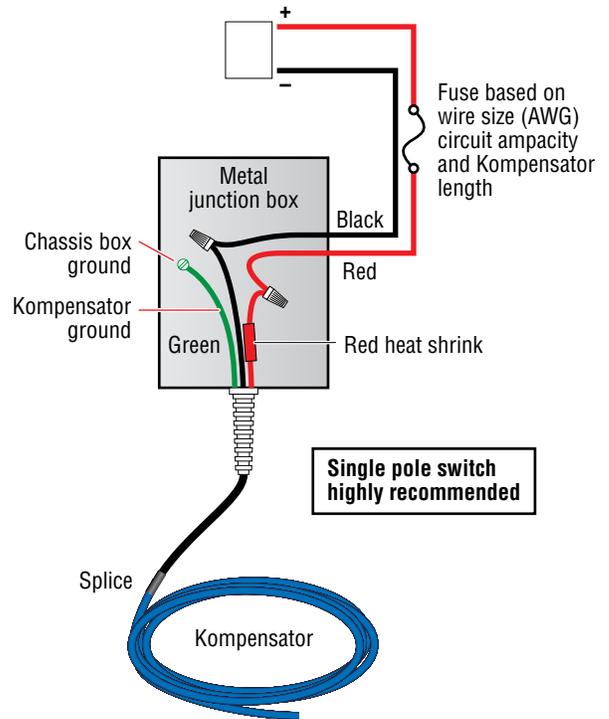
- Shut off switches
- LED indicator lights
- Low voltage thermostats
- Timers

Wire Schematics

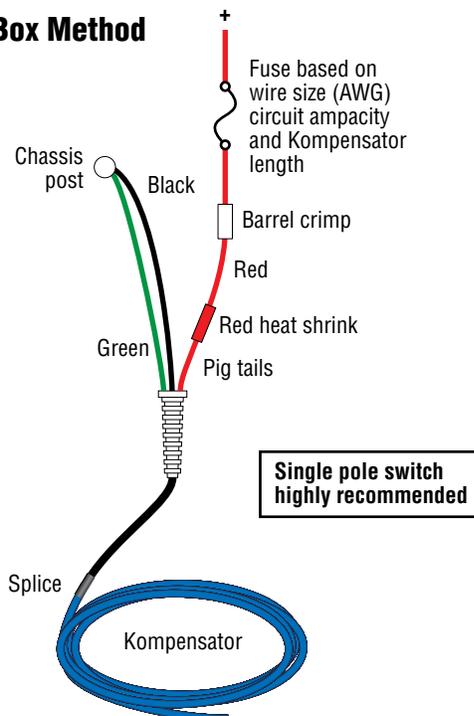
Non Metal Junction Box



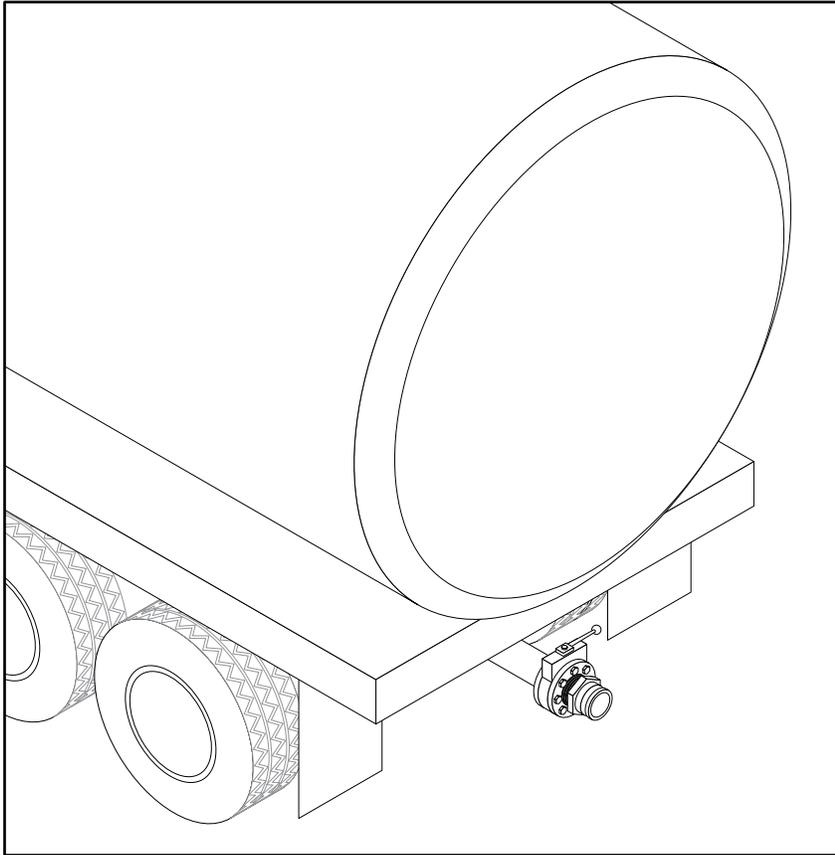
Metal Junction Box



No Box Method



Examples:

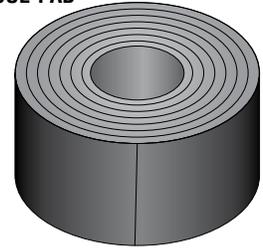


Accessories

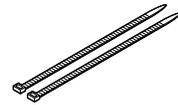
Aluminum tape  
Part # FOIL-TAPE



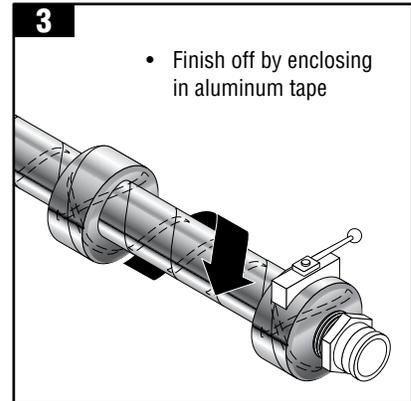
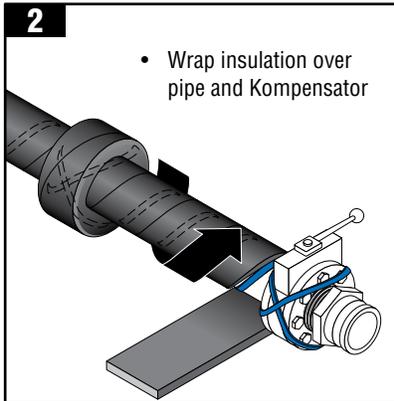
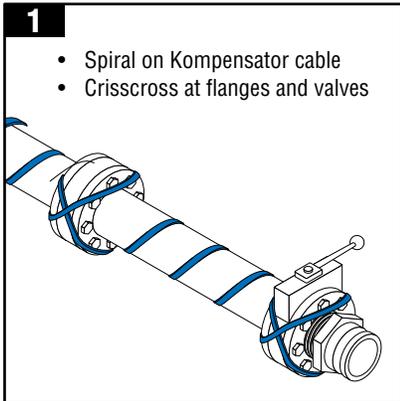
Insulation  
Part # INSUL-PAD



Cable ties



Cable guard  
Part # PLD-CG



## Limited Warranty

During the time periods and subject to the conditions hereinafter set forth. Heat-Line will repair or replace to the original user any portion of your Kompensator product which proves defective in materials or workmanship of Heat-Line. Contact Heat-Line or your installer for warranty service.

At all times Heat-Line shall have and possess the sole right and option to determine whether to repair or replace defective equipment, parts or components. **Damage due to natural events or conditions beyond the control of Heat-Line are NOT COVERED BY THIS WARRANTY.**

**WARRANTY PERIOD:** 12 months from date of purchase or 15 months from date of manufacture, whichever ever occurs first.

**ACCESSORIES, COMPONENTS, ELECTRONICS:** Not manufactured by Heat-Line, are warranted only to the extent of original manufacturer's warranty.

**LABOUR, COSTS, ETC.:** Heat-Line shall in **NO EVENT** be responsible or liable for the cost of field labour or other charges incurred by any customer in removing and/or re-fixing any Heat-Line product, part or component thereof.

### **THIS WARRANTY WILL NOT APPLY:**

- (a) to defects or malfunctions resulting from failure to properly install, operate or maintain the unit in accordance with printed instructions provided,
- (b) to failures resulting from abuse, accident or negligence;
- (c) to normal maintenance services and
- (d) to parts not used in accordance with applicable local codes, ordinance and good trade practices;
- (e) if the unit is moved from its original installation location or
- (f) if the unit is used for purposes other than for what it was designed and manufactured,

**PRODUCT IMPROVEMENTS:** Heat-Line reserves the right to change or improve its products or any component thereof without being obligated to provide such a change or improvement for units sold and/or shipped prior to such change or improvement.

**WARRANTY EXCLUSIONS:** As to any Heat-Line product after the expiration of the time period of the warranty applicable thereto as set forth above. There will be no warranties including any implied warranties of merchantability or fitness for any particular purpose. No warranties or representations at any time made by any representative of Heat-Line, shall vary or expand the provisions hereof.

**LIABILITY LIMITATION:** In no event shall Heat-Line be liable or responsible for consequential, incidental or special damages resulting from or related in any manner to any Heat-Line product or parts thereof. In the absence of suitable proof of the purchase date, the effective date of this warranty will be based upon the date of manufacture plus 90 days.

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### Heat-Line Freeze Protection Systems

1095 Green Lake Road  
Algonquin Highlands, ON Canada  
KOM 1J1  
Tel: (705) 754-4545  
(800) 584-4944  
Fax: (705) 754-4567  
info@heatline.com  
[www.heatline.com](http://www.heatline.com)

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