



CARAPACE® Job-Ready

Freeze Protected Polyethylene Pipe System

Installation Instructions

General Information

CARAPACE is adaptable to ALL areas where natural frost protection cannot be achieved. CARAPACE is a high performance, reliable product designed to work in extreme cold and harsh environments.

CARAPACE systems are supplied job ready with the self-regulating heating cable factory extruded on the outside of a PE 4710 high density polyethylene pipe. Depending on the CARAPACE model operating maximum pressure ratings range from 200 to 250 PSI. CARAPACE is available in both SDR and SODR pipe dimensions suitable for rural and municipal applications using low or high pressure pumping systems. This includes constant pressure systems and sewage force main use.

It is recommended that the CARAPACE installation be made by a qualified and experienced trades-person. This will help ensure optimum performance is achieved in each installation.

Thermostatic controls are optional but should be considered for every application for further energy savings if applicable. The use of insulation in all installations is highly recommend and therefore should be considered for cold weather reliability and energy efficiency.

- This heating cable set shall be installed in accordance with the National Electrical Code (USA) or the Canadian Electrical Code.
- It is imperative that for all installations where the pipes are exposed to the outside ambient temperature that weatherproof insulation be used. (Wall thickness ½ inch minimum). Heat-Line offers closed cell foam types, foil/air bubble type and others. Other types of weather-proof insulations may also be used.
- CARAPACE can be used even when there is no water in the pipe. CARAPACE WILL NOT melt or overheat if the pipe is dry. In the event of power failure your system may freeze. The system will however re-energize immediately following power restoration and will thaw out. In most cases no damage to pipes will be encountered.

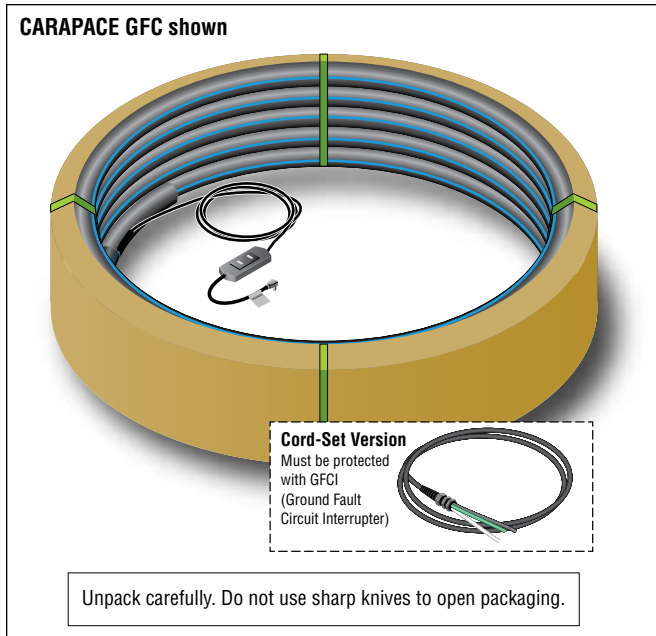
CARAPACE is a technically advanced product. Handle it with proper care and be sure not to damage the outer sheath or jacket of the pipe and or heating cable.

Read the Safety Instructions and Installation Instructions completely before installing this product.

Approvals



B137.1 approved Usage W and X Canada
Installation Type A USA



Kit Contents

Qty	Description
1	CARAPACE - Predetermined length (GFC shown on page 1)
1	Optional Cord-Set (CS) power connection

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WARNING:

Important Safety Instructions and Rules for safe Installation and Operation

Fire and shock hazard. This component is an electrical device which must be installed properly.

- Read these rules and instructions carefully. Failure to follow them could result in serious bodily injury and/or property damage.
- Check your local building, plumbing and electrical codes before installing. You must comply with their

rules. CARAPACE is cCSAus approved for use in Canada and the USA.

- Before installing this product have the electrical outlet checked by an electrician to make sure it is properly installed and grounded.
- Before installing or servicing your CARAPACE BE CERTAIN that the power source is disconnected.
- Do not use extension cords.
- Never tamper with or alter the electrical apparatus associated with your CARAPACE system.

- Check unoccupied residences regularly to ensure that all systems are operating properly.

- 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.

WHEN PERFORMING WORK OR REPAIRS ON YOUR WATER SYSTEM BE SURE TO UNPLUG YOUR CARAPACE SYSTEM FROM THE POWER SUPPLY

Ordering Charts

CARAPACE | Product Code

CARAPACE (Pre-Assembled and Factory Finished)

Example: **CR2 - 5 - 125 - 100 - GFC** or **CS**

Product

CR	Rural 120 Volt
CR2	Rural 240 Volt
CM2	Municipal 240 Volt

Wattage

5	5 Watt self-regulating heater
3	3 Watt self-regulating heater

Pipe Size

100	Pipe size 1"	CR(2) – ID, SIDR 9 200 PSI CM2 – OD, CTS SODR 9 250 PSI
125	Pipe size 1 1/4"	CR(2) – ID, SIDR 9 200 PSI

Cord-Set Type

GFC

Ground Fault Protected

	<i>Max length</i>
3 watt / 120 volt	270 ft
5 watt / 120 volt	230 ft
3 watt / 240 volt	550 ft
5 watt / 240 volt	460 ft

CS (No GFCI)

Cord Connected

	<i>Max length</i>
	270 ft
	230 ft
	660 ft
	540 ft

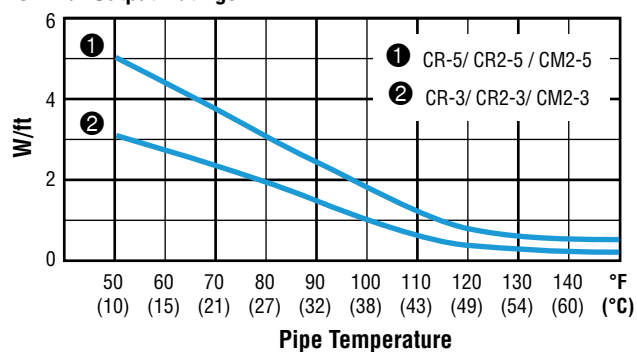
Note: "CS" systems must provide 20 Amp circuits for circuit lengths greater than 550 ft for 3 watt CARAPACE and 460 ft for 5 watt CARAPACE.

Length of CARAPACE

Optional Accessories

HLA-120 120V plug-in thermostat (GFC)**GF-STAT** 120/240V hard wire thermostat (CS)**TIMER-120P** 120V plug-in timer (GFC)**TIMER-240P** 240V plug-in timer (GFC)**TIMER-CS** 120/240V hard wire timer (CS)**MA-10** 120/240V GFCI/ELCI (CS)**INSUL-1.00** Closed cell polyethylene insulation sleeve for 1" ID pipe (6' long, 1 5/8" ID, 3/4" thick wall)**INSUL-1.25** Closed cell polyethylene insulation sleeve for 1 1/4" ID pipe (6' long, 1 7/8" ID, 3/4" thick wall)**INSUL-3.00** Closed cell polyethylene insulation sleeve for 3" ID pipe (6' long, 3 1/2" ID, 3/4" thick wall)**HLP-TAPE** Tape for insulation sleeves (100 ft)

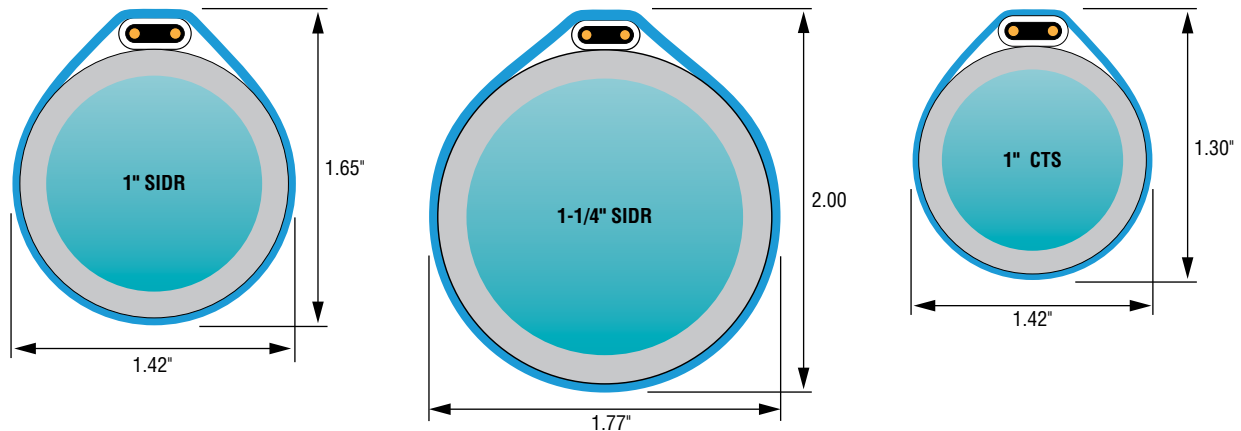
Nominal Output Ratings



Supply Voltage

CR	100–130 Volts	Single Phase	60 Hz
CR2	200–277 Volts	Single Phase	60 Hz
CM2	200–277 Volts	Single Phase	60 Hz

CARAPACE Cross Sections



Product Characteristics

	CR-5-100, CR2-5-100	CR-3-100, CR2-3-100	CR-5-125, CR2-5-125	CR-3-125, CR2-3-125	CM2-3-100	CM2-5-100
Minimum Bend Radius of Product at 73.4 F (23°C)*	32.00 in (813 mm)	32.00 in (813 mm)	42.15 in (1071 mm)	42.15 in (1071 mm)	22.50 in (572 mm)	22.50 in (572 mm)
Overall Product Weight (per 10 ft. nominal)	3.8 lbs. (1.7 kg)	3.8 lbs. (1.7 kg)	5.4 lbs. (2.5 kg)	5.4 lbs. (2.5 kg)	3.5 lbs. (1.6 kg)	3.5 lbs. (1.6 kg)
Heating Cable Buss Wire Size	16 AWG	16 AWG	16 AWG	16 AWG	16 AWG	16 AWG
Heating Cable Dimensions	0.46 in x 0.25 in (11.7 mm x 6.35 mm)	0.46 in x 0.25 in (11.7 mm x 6.35 mm)	0.46 in x 0.25 in (11.7 mm x 6.35 mm)	0.46 in x 0.25 in (11.7 mm x 6.35 mm)	0.46 in x 0.25 in (11.7 mm x 6.35 mm)	0.46 in x 0.25 in (11.7 mm x 6.35 mm)
Heating Cable Watt Density	5 W/ft @ 50°F (10°C)	3 W/ft @ 50°F (10°C)	5 W/ft @ 50°F (10°C)	3 W/ft @ 50°F (10°C)	3 W/ft @ 50°F (10°C)	5 W/ft @ 50°F (10°C)
HDPE Pipe Dimensional Data	1" ID SIDR 9 200 PSI	1" ID SIDR 9 200 PSI	1.25" ID SIDR 9 200 PSI	1.25" ID SIDR 9 200 PSI	1" CTS SODR 9 250 PSI	1" CTS SODR 9 250 PSI
Overall Outer Dimensions of Product**	1.65 in x 1.42 in (42 mm x 36 mm)	1.65 in x 1.42 in (42 mm x 36 mm)	2.00 in x 1.77 in (51 mm x 45 mm)	2.00 in x 1.77 in (51 mm x 45 mm)	1.46 in x 1.30 in (37 mm x 33 mm)	1.46 in x 1.30 in (37 mm x 33 mm)

*The Minimum Bend Radius provided above includes a safety factor of 2:1.

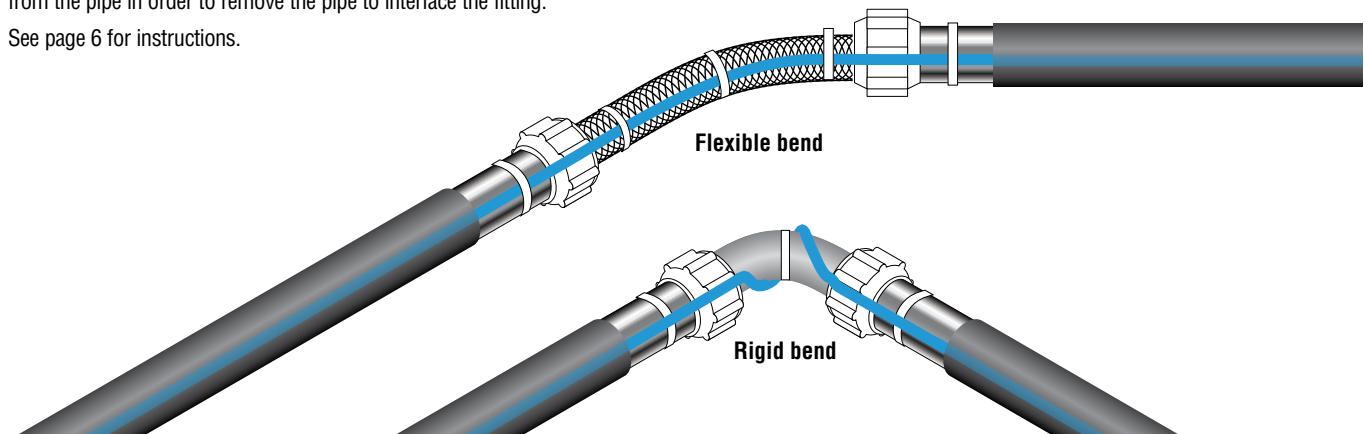
**The overall outer dimension of the product is the complete cross section of the HDPE pipe, heating cable and outer extruded sheath.

Fitting Interface Process

CARAPACE can be retrofitted with flexible or sharp bends using flexible hose or rigid elbows. Heat-Line recommends and offers Philmac fittings.

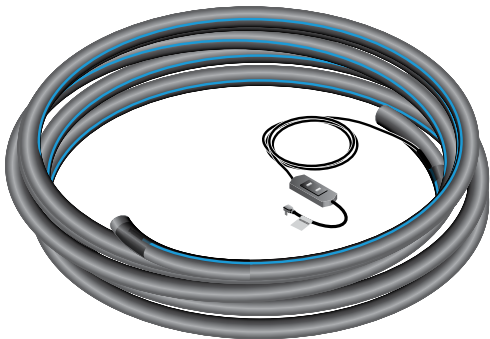
CARAPACE can be used with all standard residential and municipal pipe fittings such as elbows, couplings etc., but it is first necessary to extract the heating cable from the pipe in order to remove the pipe to interface the fitting.

See page 6 for instructions.



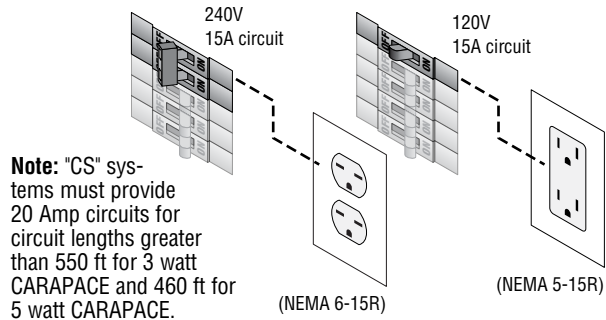
1

- Do not use sharp instruments to unpack roll.
- Carefully unpack your CARAPACE system and make a visual inspection of the fitting and electrical apparatus for any shipping damage.



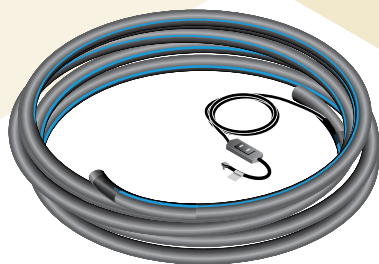
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- It is recommended that a single circuit (15 amp) be installed by a qualified person for dedicated use of the CARAPACE system.
- Do not use extension cords. Custom CARAPACE power lead extensions are available from Heat-Line at time of order.



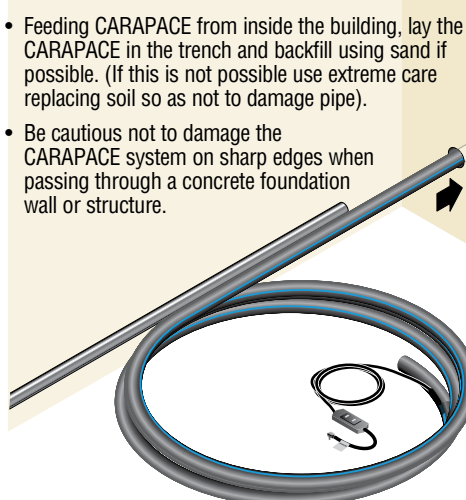
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- Install the CARAPACE system so the power termination end is on the inside of the building and near your power supply.



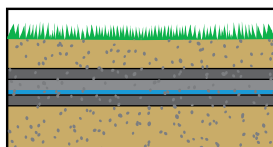
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- Feeding CARAPACE from inside the building, lay the CARAPACE in the trench and backfill using sand if possible. (If this is not possible use extreme care replacing soil so as not to damage pipe).
- Be cautious not to damage the CARAPACE system on sharp edges when passing through a concrete foundation wall or structure.

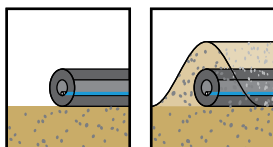


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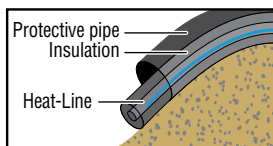
- Construct a level depth trench where possible (shallow is fine) and completely insulate the CARAPACE system with Heat-Line insulation. Your CARAPACE may also be installed within a 3" or 4" drainage type duct (optional), for mechanical protection.



Bury the pipe a minimum of 3 inches deep



Run above ground. Cover with 3 inches of soil or sand (optional).

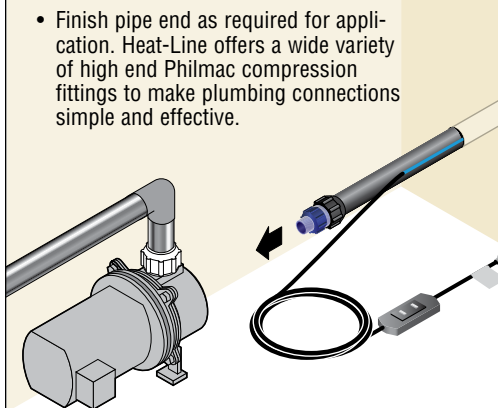


On rocky or inclined surfaces, and where the pipe enters the lake, protect with oversized plastic pipe (4 inch diameter or larger)

Note: Above ground installations are suitable, but must be insulated.

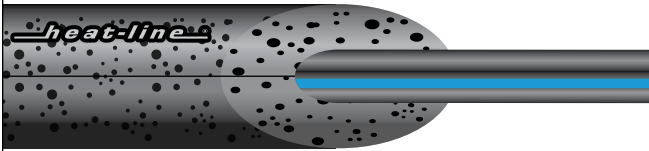
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- Finish pipe end as required for application. Heat-Line offers a wide variety of high end Philmac compression fittings to make plumbing connections simple and effective.



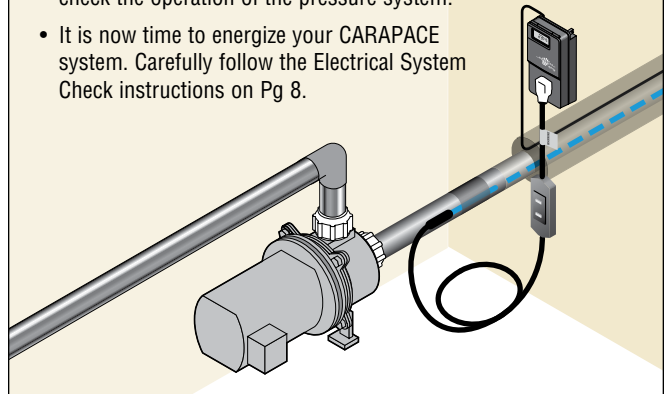
7

- In areas where the pipe cannot be buried (or above ground) or is close to the ground surface (less than 6") always install Heat-Line weather proof insulation for heat loss reduction and further mechanical protection.
- Finish off your plumbing by installing foot valve, pumps, etc. as required.



8

- After all plumbing fittings have been completed check the operation of the pressure system.
- It is now time to energize your CARAPACE system. Carefully follow the Electrical System Check instructions on Pg 8.



Control Devices and Insulation Installation

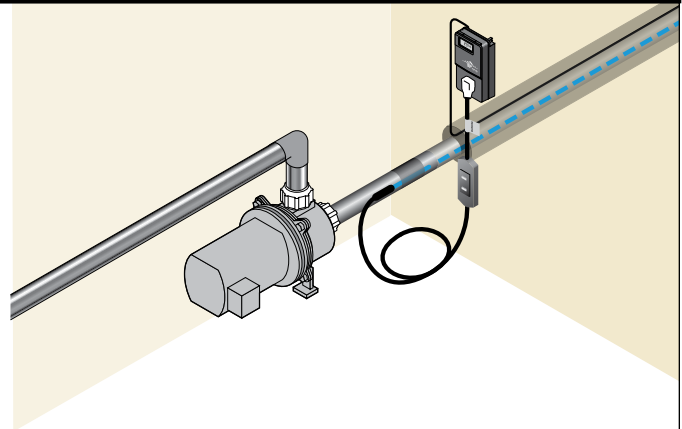
Control devices are not required to operate the heating cable system. They can be added for energy efficiency.

Thermostats are used to duty cycle the system in an on/off operation saving power consumption and maintain a certain pipe temperature. A sensor lead must be placed on the coldest section of pipe.

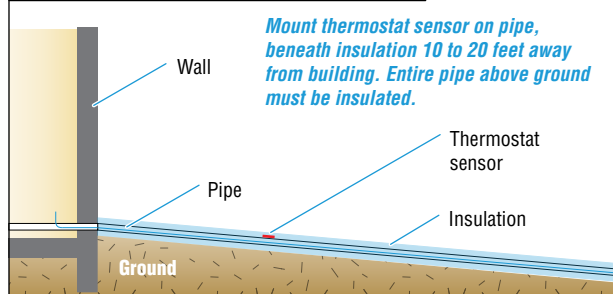
Timers are used to duty cycle the system in an on/off operation based on preset time intervals to save on power consumption.

Insulation is recommended for all new pipe installations, even where the pipe is to be buried.

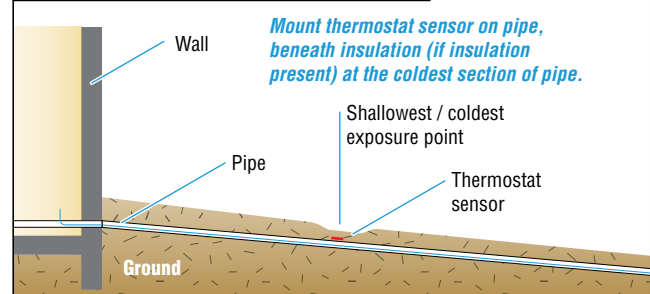
For existing pipe applications, insulation is only required where the pipe is exposed to ambient outdoor temperatures, and/or where the pipe is above the ground. Insulation aids in heat retention making the heating cable more energy efficient and providing cold weather reliability.



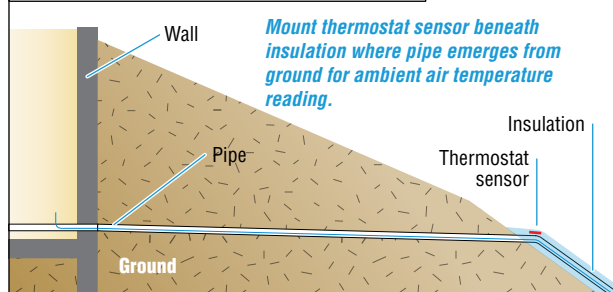
Above Ground Installation



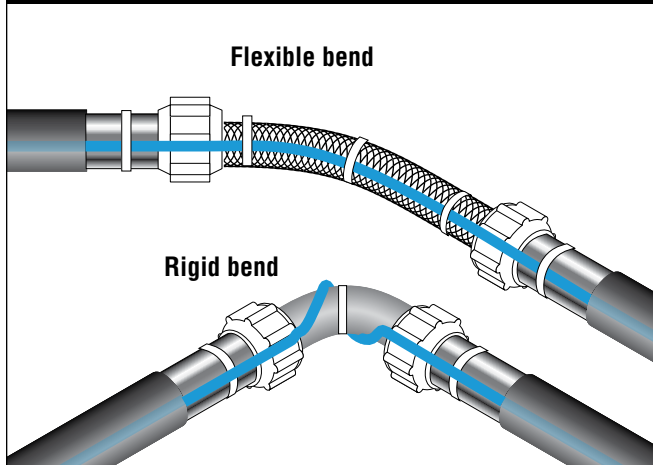
Shallow Buried



Deep Buried Underground Near Building



CARAPACE Flex Interface Process



Description

Use this instruction to retrofit a CARAPACE system with flexible or sharp bends using flexible hose or rigid elbows.

This is a professional product designed to be installed by licensed trade-persons and must be inspected by the proper electrical and mechanical authorities following completion of the finished installation.

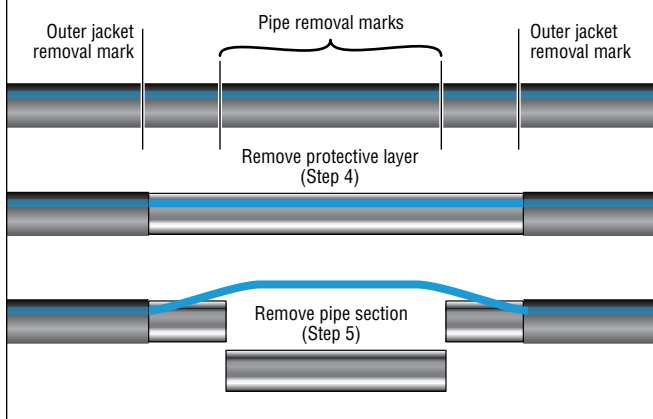
CARAPACE freeze protected pipe systems can be used with all standard residential and municipal pipe fittings such as elbows, couplings etc., but it is first necessary to extract the heating cable from the pipe in order to remove the pipe to interface the fitting. While a flexible joint is illustrated, the same process is followed for any fitting type.

Tools Required

- Utility knife or hook knife
- Polyethylene pipe cutter
- Tools Required
- Marker

1

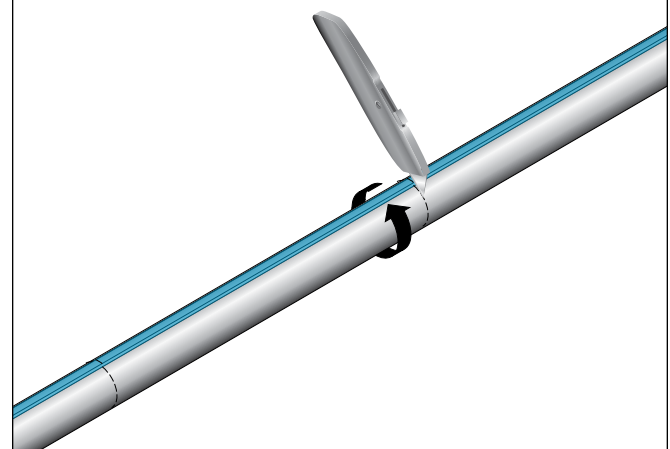
- Determine the location of the flexible fitting, straight elbow or fitting to be installed.
- Mark the outer jacket 4 to 6 inches beyond where the pipe will be cut and be liberal about leaving enough cable.



2

- Using a utility knife, score the protective outer jacket at the mark you made in Step 1.

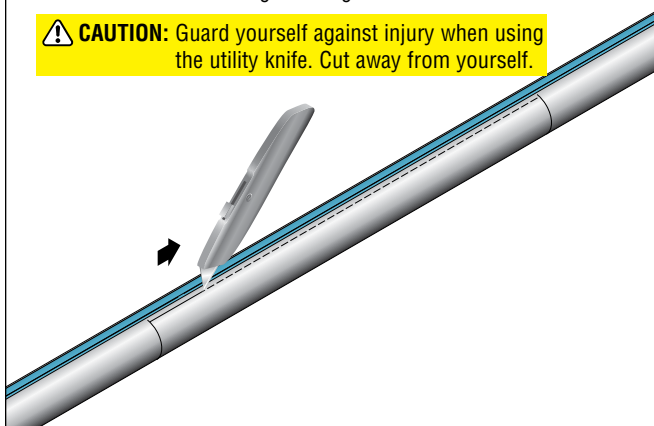
⚠ CAUTION: Score only! Do not cut heating cable jacket.



3

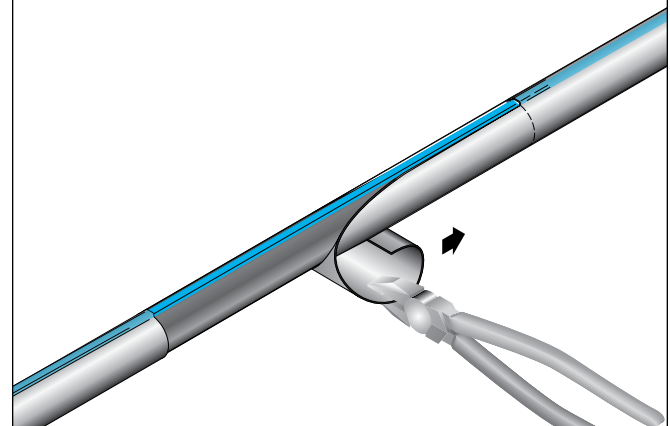
- Carefully wedge utility knife into the space next to the heating cable and cut away outer jacket of polyethylene pipe. Be careful not to damage heating cable.

⚠ CAUTION: Guard yourself against injury when using the utility knife. Cut away from yourself.



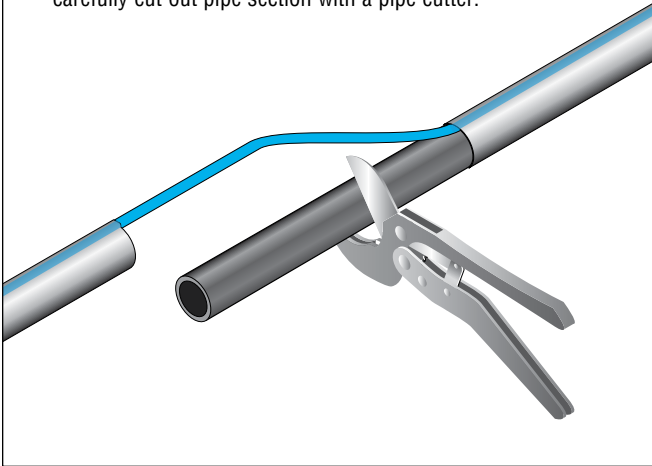
4

- Peel away protective layer to expose bare pipe and heating cable.



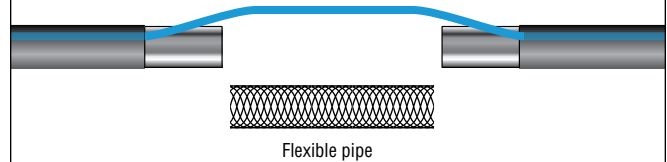
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- Once the cable is extracted and clear of the pipe, carefully cut out pipe section with a pipe cutter.



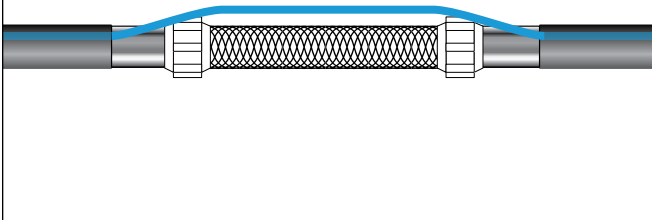
6

- Install fitting or cut flexible pipe to length allowing room for fitting selected.



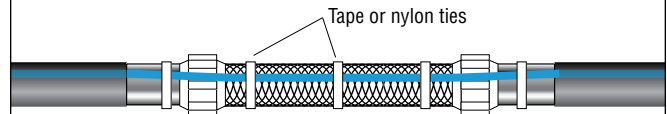
7

- Using compression fittings, connect CARAPACE to the flexible hose.



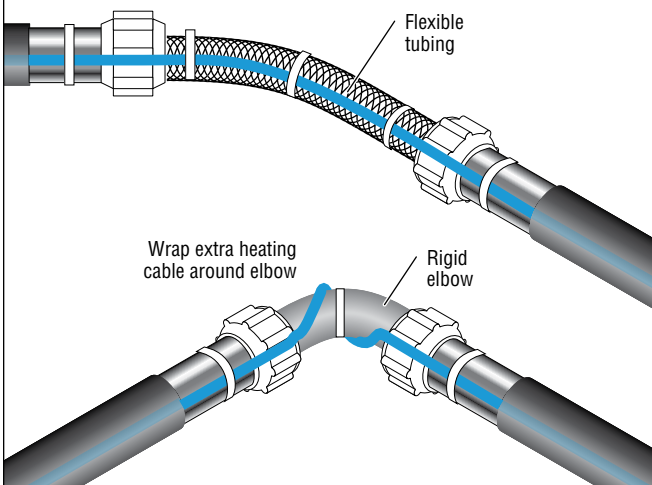
8

- Attach the heating cable to the flexible hose with tape or nylon ties.



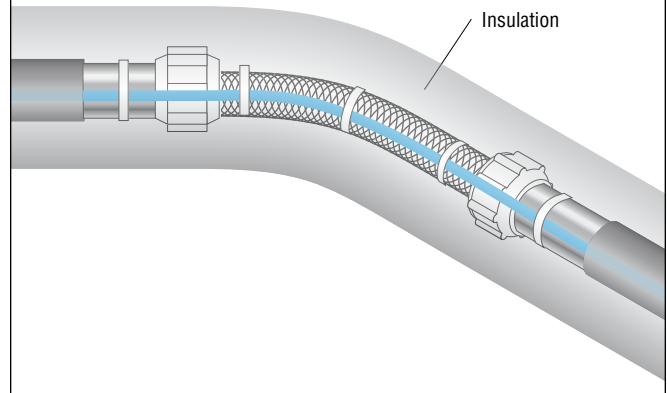
9

- Position pipe.



10

- Add polyethylene foam sleeve insulation to entire system.
- See Control Devices and Insulation Installation section on page 5.

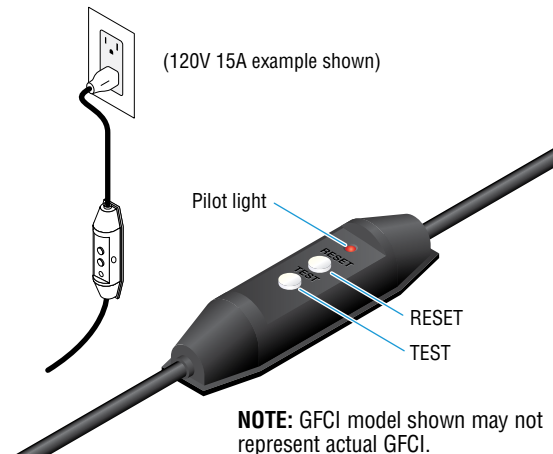


Electrical System Check on GFC Models (perform monthly while in use)

- Unpack the CARAPACE system plug from its protective package.
- Plug into your dedicated outlet. 120V outlet (5-15R) for 120V systems or 240V outlet (6-15R) for 240V systems.
- Push RESET button on the cord set ground fault device until light turns ON. If light does not illuminate check power to outlet. Do not remove or tamper with the cord set. If used with a thermostat it may be necessary to bypass the thermostat control and plug directly into receptacle to perform test.
- Push TEST button and light will turn OFF. This indicates that the electrical circuit is intact and fully protected.
- Push RESET button again and light will turn ON. This indicates that your CARAPACE is working.
- Follow this test procedure before each season and monthly while in use.

Your CARAPACE is now fully functional.

If at any time your CARAPACE system fails to work call your local electrician or Heat-Line for assistance at (800) 584-4944.



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 Heat-Line 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.**

STANDARD WARRANTY PERIOD: 60 months from date of purchase or 63 months from date of manufacture, whichever ever occurs first.

EXTENDED WARRANTY PERIOD: 120 months from date of purchase or 123 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 reaffixing any Heat-Line product, part or component thereof.

THIS WARRANTY WILL NOT APPLY:

- to defects or malfunctions resulting from failure to properly install, operate or maintain the unit in accordance with printed instructions provided,
- to failures resulting from abuse, accident or negligence;
- to normal maintenance services and
- to parts not used in accordance with applicable local codes, ordinance and good trade practices;
- if the unit is moved from its original installation location or
- if the unit is used for purposes other than for what it was designed and manufactured,
- to the integral ground fault device and related electronics.

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.



CARAPACE[®] Warranty Form

CONGRATULATIONS!

You have just purchased the most advanced pipe freeze-protection system available on the market, backed by the finest warranty offered in the industry. Your CARAPACE Factory system comes with a standard 5 year limited warranty with an optional 10 year limited warranty available.

~ The warranty applies only to the original purchaser of the product and is not transferable at any time for any reason. The warranty form must be filled out and returned to Heat-Line within 6 months of invoice date or unit manufactured date plus 9 months to be eligible for the 10 year extended warranty. ~

OWNER MAILING ADDRESS

Name _____
Address _____
City _____
Prov/State _____ Postal/ZIP _____
Country ☐ Canada ☐ USA ☐ Other: _____
Home Phone _____
Email _____

INSTALLATION ADDRESS (if different than mailing)

Name _____
Address _____
City _____
Prov/State _____ Postal/ZIP _____
Country _____
Work/Cell _____

PRODUCT INFORMATION

Product Cat.# _____
Serial # _____
Length _____

Installation Type: ☐ Lake / River
☐ Well
☐ Municipal
☐ Sewage
☐ Other: _____

WARRANTY INFORMATION

5 Year Limited Warranty: **INCLUDED!**

☐ 10 Year Limited Warranty: \$1.50 / foot (\$60.00 minimum)

PAYMENT DETAILS FOR 10 YEAR LIMITED WARRANTY

System Length*

1 – 40 feet = \$ 60.00 41 – 640 feet = \$ 1.50 per foot

* For custom lengths involving inches, round up to the nearest foot

System Length*

x \$ 1.50/ft

= Subtotal

Taxes and Currency

If Canadian Address:	Subtotal: _____
Provincial Tax %: _____	Tax Due: _____
Total in CDN Currency: 	

PAYMENT METHOD

☐ Cheque

Enclose and make out to Heat-Line for full amount

Credit Card:

☐ Mastercard or

☐ Visa

Name on Card: _____

Card Number: _____

Expiration Date: ____ / ____ / ____

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 CARAPACE Factory 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.**

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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 reaffixing 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,
- (g) to the integral ground fault device and related electronics.

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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 able 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.

PROOF OF PURCHASE

If a proof of purchase copy is submitted with this warranty application form, the warranty period will be effective as of invoice date. In the absence of suitable proof of purchase, the effective date of this warranty will be based upon the date of unit manufacture plus 3 months.

Proof of purchase (invoice) attached: ☐ Yes ☐ No

By signing below you acknowledge you have read and understand the full limited warranty document.

Signed: _____

Dated: _____

The warranty form must be filled out and returned to Heat-Line within 6 months of invoice date or unit manufactured date plus 9 months to be eligible for 10 year extended warranty.

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