



Retro-FM[®]

Force Main and Large Diameter Pipe Freeze Protection

Installation Instructions

Kit Description

Retro-FM is a tubular self-regulating heating system designed for use in pressurized sewage and grey water force mains, as well as potable large diameter pipe systems. The entry fitting is pressure rated and CSA certified for this use. The tubular core is constructed of HDPE (high density polyethylene) and will push inside most pipes for long distances. They can also be drawn in with a fish tape.

Retro-FM utilizes a conductive polymer tubular heater technology which provides a barrier from the fluids while providing extremely efficient freeze protection. Retro-FM can be used as a system to prevent freezing or as a precautionary system. If the system freezes, Retro-FM can be energized to begin the thawing process.

Retro-FM is supplied job ready with a 1 inch MIP fitting and a 1 inch FIP X 2 inch MIP PVC reducing bushing to quickly interface into force main Tee fittings. Supplied with a 20 foot electrical cold lead. Available with Ground-Fault Protection (GFCI) or Cord-Set (CS) both in 120 volt and 240 volt.

Tools Required

- Adjustable wrench
- Pump pliers

Additional Materials Required

- Teflon tape or thread sealant
- Reduction bushings and fitting components as required

Approvals

Heating Cable
Pipe



LR85446 CSA
NSF PE 4710 ASTM 2737
Usage P and X Canada
Installation Type A USA
Certified for pressure systems operating at a
maximum 230 PSI

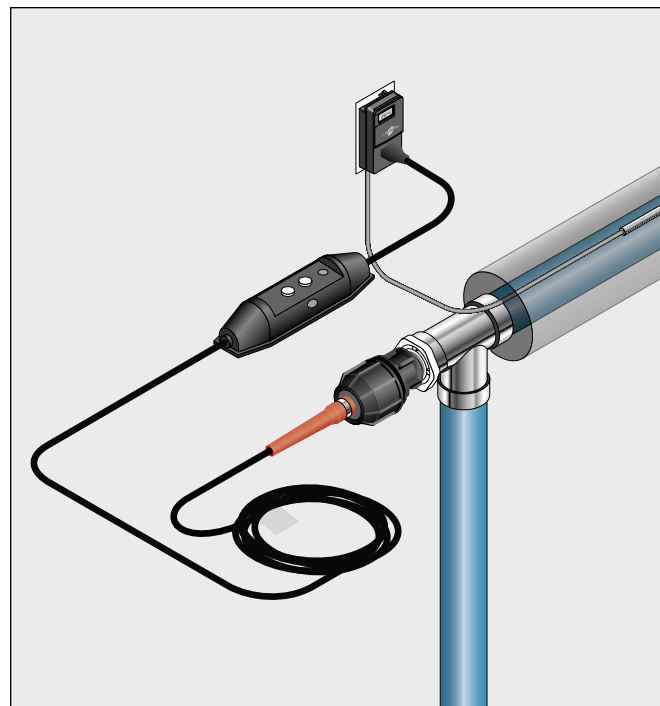


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⚠ WARNING:

Important Safety Instructions and Rules for safe Installation and Operation

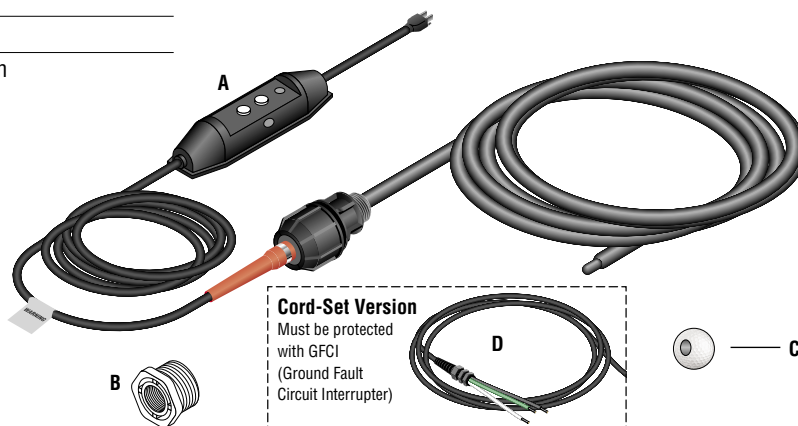
FIRE AND SHOCK HAZARD. This component is an electrical device which must be installed properly. Read and follow these rules and instructions carefully. Failure to follow them could result in serious bodily injury and/or property damage.

WHEN PERFORMING WORK OR REPAIRS ON YOUR WATER SYSTEM BE SURE TO UNPLUG YOUR HEAT-LINE SYSTEM FROM THE POWER SUPPLY.

- Check your local building, plumbing and electrical codes before installing. You must comply with their rules. Retro-FM meets cCSAus codes for use in Canada and the United States.
- Before installing this product have the electrical outlet checked by an electrician to make sure it is properly installed and grounded in accordance with your local Electrical Code.
- Before installing or servicing your Retro-FM **BE CERTAIN** that the power source is disconnected.
- Do not use extension cords.
- This product is designed to keep drains from freezing in serious climate conditions. The Retro-FM tube may obstruct certain materials, especially solids in the drains so a service schedule for proper maintenance is recommended. **The use of this product is at the sole discretion of the user. Heat-Line will not be liable for obstructions or blockages that may occur in some situations.**
- Never tamper with or alter the electrical apparatus associated with your Heat-Line system.

Kit Contents

Item	Qty	Description
A	1	Retro-FM –Predetermined length (GFC shown)
B	1	1" FIP x 2" MIP PVC reducing bushing
C	1	Pre-drilled dissolving ballpoint
D	1	Optional Cord-Set (CS) power connection

**Optional Accessories**

HLA-120	General purpose 120V, plug-in thermostat (for GFC models)	INSUL-2.00	Polyethylene insulation sleeve for 2 inch ID pipe (6 feet long, 2 5/8 inch ID, 3/4 inch thick wall)
GFA-STAT	NEMA 4X Ground Fault Protected Adjustable Thermostat 120V/240V 30amp (for CS models)	INSUL-3.00	Polyethylene insulation sleeve for 3 inch ID pipe (6 feet long, 3 1/2 inch ID, 3/4 inch thick wall)
MA-10	GFCI/ELCI Electrical Equipment Protection Device (for CS models)	INSUL-4.00	Polyethylene insulation sleeve for 4 inch ID pipe (6 feet long, 4 1/2 inch ID, 1 inch thick wall)
TIMER-120P	120V plug-in timer (for GFC models)	HLP-TAPE	Black wrap tape for sealing insulation ends together 2 inches x 100 feet (50.8mm x 3m)
TIMER-240P	240V plug-in timer (for GFC models)	WARRANTY	Extended 10 year limited product warranty
TIMER-CS	120/240V hard wire timer (for CS models)		
INSUL-FOIL	Aluminum reflective metalized foil bubble insulation		
FOIL-TAPE	Professional Grade All Weather Foil Tape 2.83 inches x 150 feet (72mm x 46m)		

Ordering Chart**Retro-FM | Product Code**Example: **FM - 5 - 100 - GFC****Product**

FM	120 volt Retro-FM
FM2	240 volt Retro-FM

Wattage

5	5 Watt, TPR heater jacket
8	8 Watt, TPR heater jacket

Cord-Set Type

GFC Ground Fault Protected	CS Cord Connected (No GFCI)
<i>Max length</i>	<i>Max length</i>

5 watt / 120 volt	230 ft	270 ft
8 watt / 120 volt	150 ft	200 ft
5 watt / 240 volt	460 ft	540 ft
8 watt / 240 volt	300 ft	400 ft

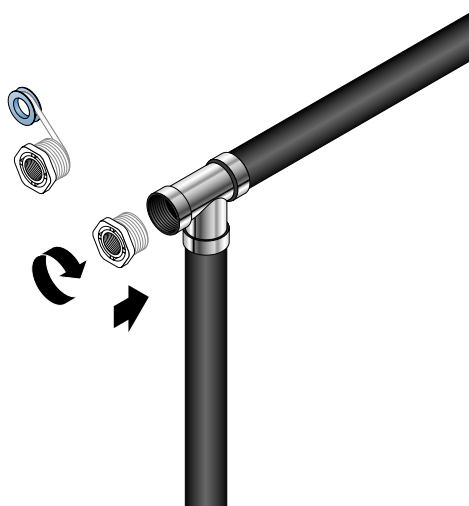
Length of Heater

Note: Installers must provide 20 Amp circuits for CS circuit lengths greater than 460 ft for 5 watt and 300 ft for 8 watt systems.

Sewage Forced Main Installation Instructions

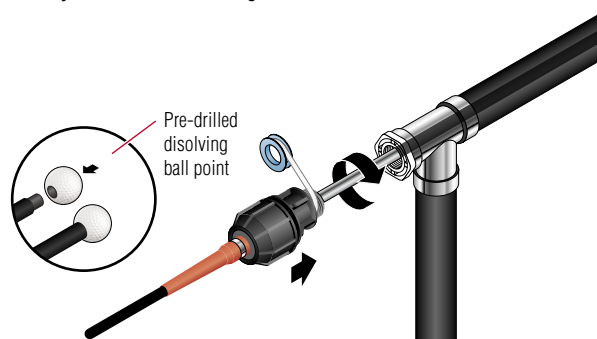
1 Sewage Forced Main

- Using the provided PVC reducing bushing, install into threaded Tee to accept 1-inch MIP Retro-FM fitting. If the provided PVC reducing bushing is not suitable determine and install required bushing.
- Use appropriate Teflon tape or thread sealants.



2 Sewage Forced Main

- Push the pre-drilled dissolving ballpoint onto the end-seal of the tubular heater making sure it is firmly in place before you proceed to install the Retro-FM.
- Push or draw in Retro-FM tubular heater.
- Use appropriate Teflon tape or thread sealants and apply directly to 1 inch MIP fitting.



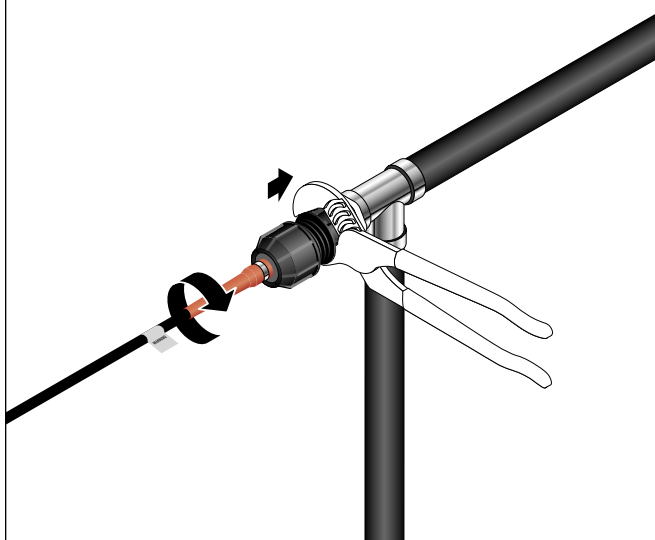
NOTES

The pre-drilled dissolving ballpoint is designed to reduce the friction of the Retro-FM tubular heater end-seal during installation. It also aids the passing of the tubular heater product through and around fittings located along length the pipe.

Dissolving ballpoint not recommended for polyethylene pipes of 2 inches or less.

3 Sewage Forced Main

- Tighten 1 inch MIP fitting with a wrench.
- Fitting body should rotate around tubular heater as the MIP fitting tightens.



4 Sewage Forced Main

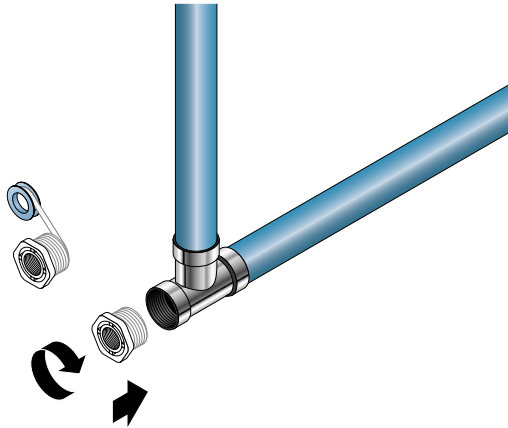
- Engage nut to fitting body and tighten with a pump plier.
- CAUTION:** It is an O-ring seal, **DO NOT** over-tighten.
- In accordance with standard industry practices test the integrity of the seal.
 - After all plumbing fittings have been completely installed, it is time to energize your Retro-FM system.
 - **Carefully follow the Electrical System Connection Instructions on page 9.**
 - **Refer to Control Devices and Insulation Installation on page 8 to complete your installation.**



Potable Water Supply Installation Instructions

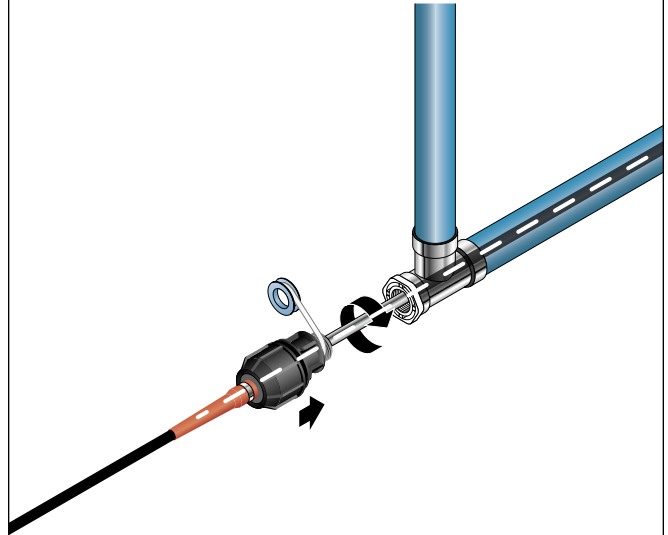
1 Potable Water Supply

- Using the provided PVC reducing bushing, install into threaded Tee to accept 1-inch MIP Retro-FM fitting. If the provided PVC reducing bushing is not suitable determine and install required bushing.
- Use appropriate Teflon tape or thread sealants.



2 Potable Water Supply

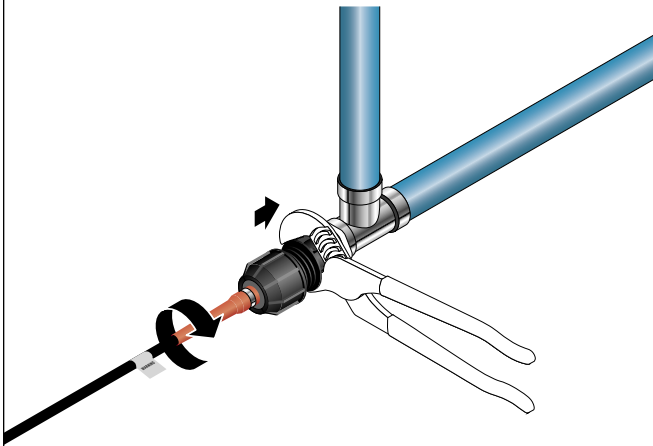
- Push or draw in Retro-FM tubular heater.
- Use appropriate Teflon tape or thread sealants and apply directly to 1 inch MIP fitting.



NOTE: The pre-drilled dissolving ballpoint is only designed to be used in non-potable applications.

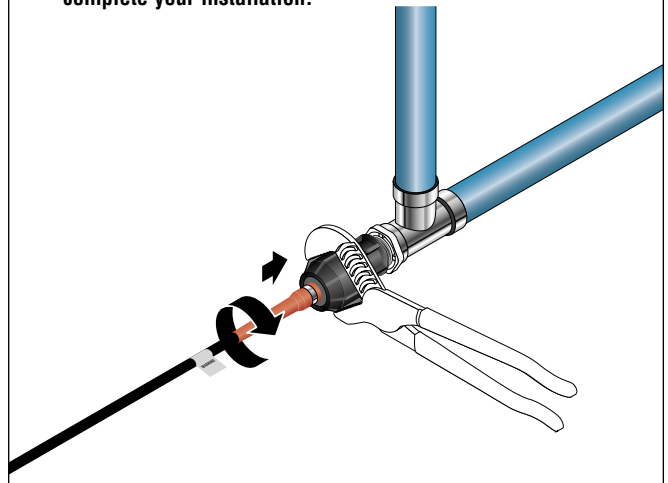
3 Potable Water Supply

- Tighten 1 inch MIP fitting with a wrench.
- Fitting body should rotate around tubular heater as the MIP fitting tightens.



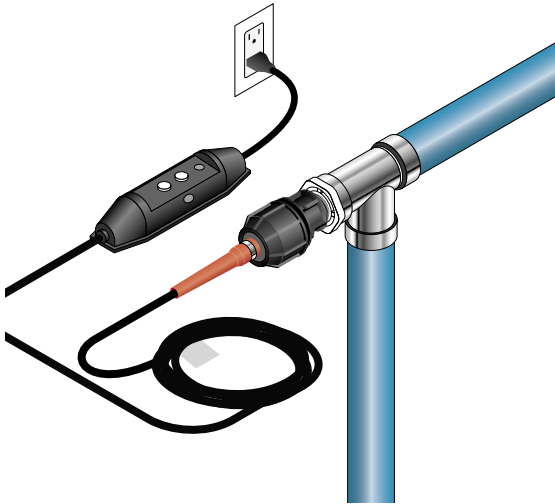
4 Potable Water Supply

- Engage nut to fitting body and tighten with a pump plier.
- CAUTION:** It is an O-ring seal, **DO NOT** over-tighten.
- In accordance with standard industry practices test the integrity of the seal.
 - After all plumbing fittings have been completely installed, it is time to energize your Retro-FM system.
 - **Carefully follow the Electrical System Connection Instructions on page 9.**
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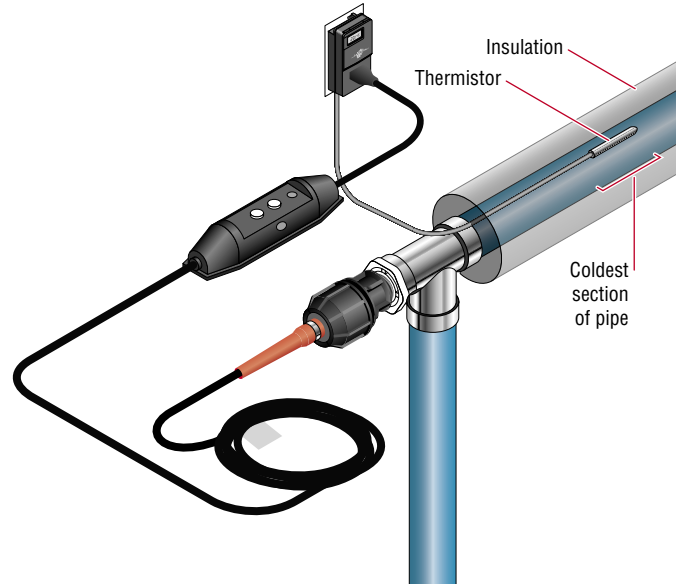


Installation Examples

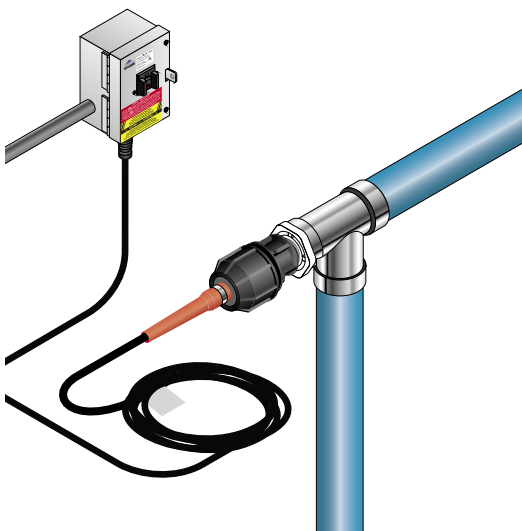
**Typical Retro-FM-GFC
Model Installation**



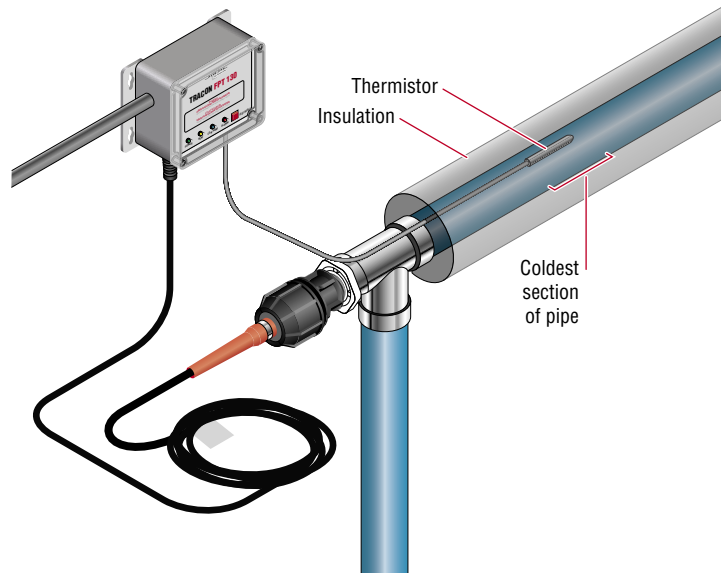
**Retro-FM-GFC Installation
with Heat-Line HLA Thermostat**



**Retro-FM-CS Installation with
Heat-Line MilliAmp GFCI/ELCI**

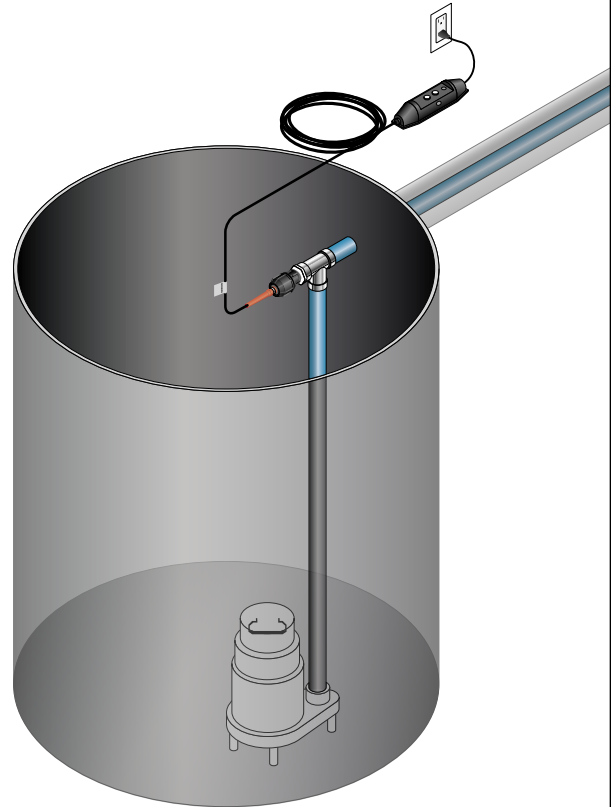


**Retro-FM-CS Installation with
Heat-Line GFA-STAT Thermostat
with Built in GFCI / ELCI**

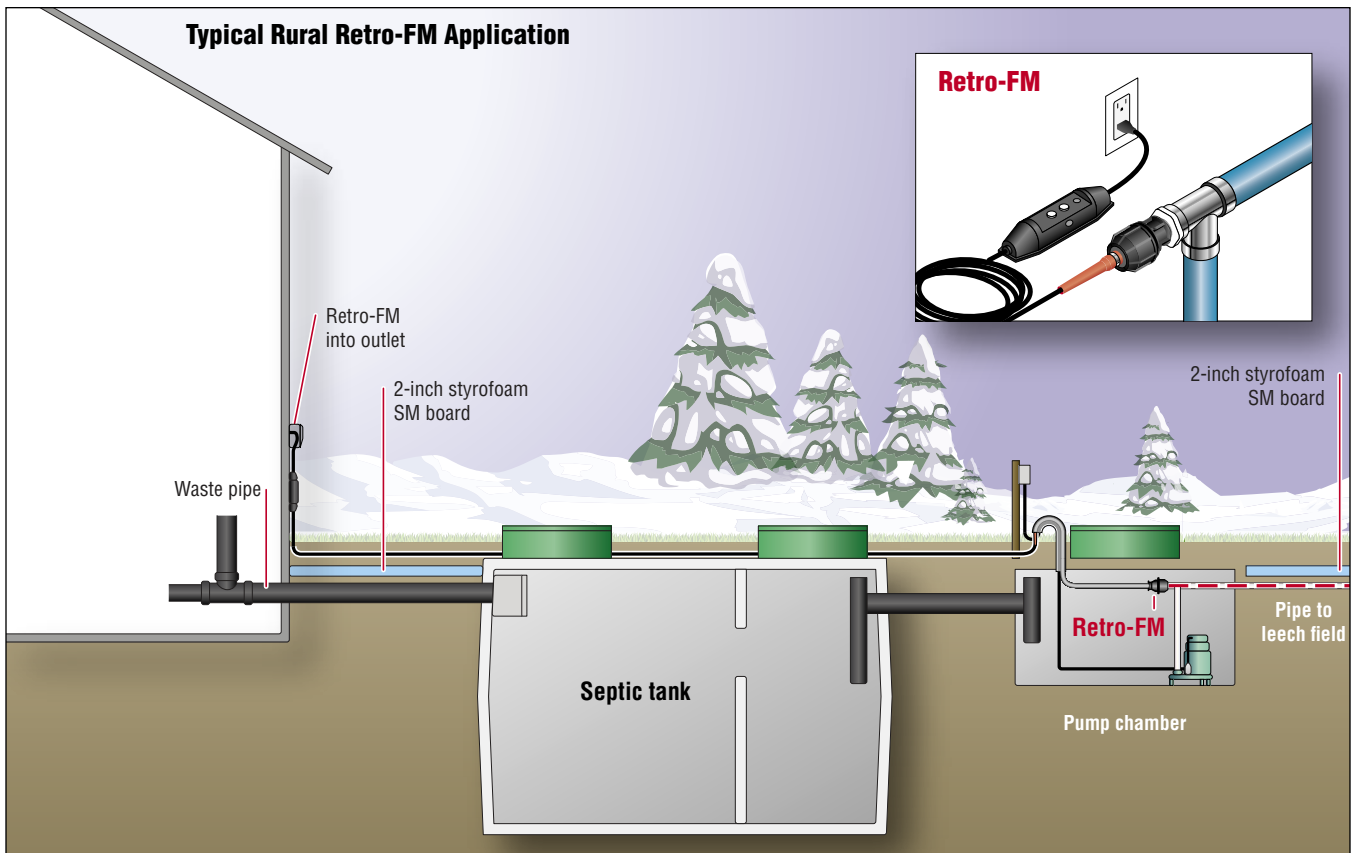


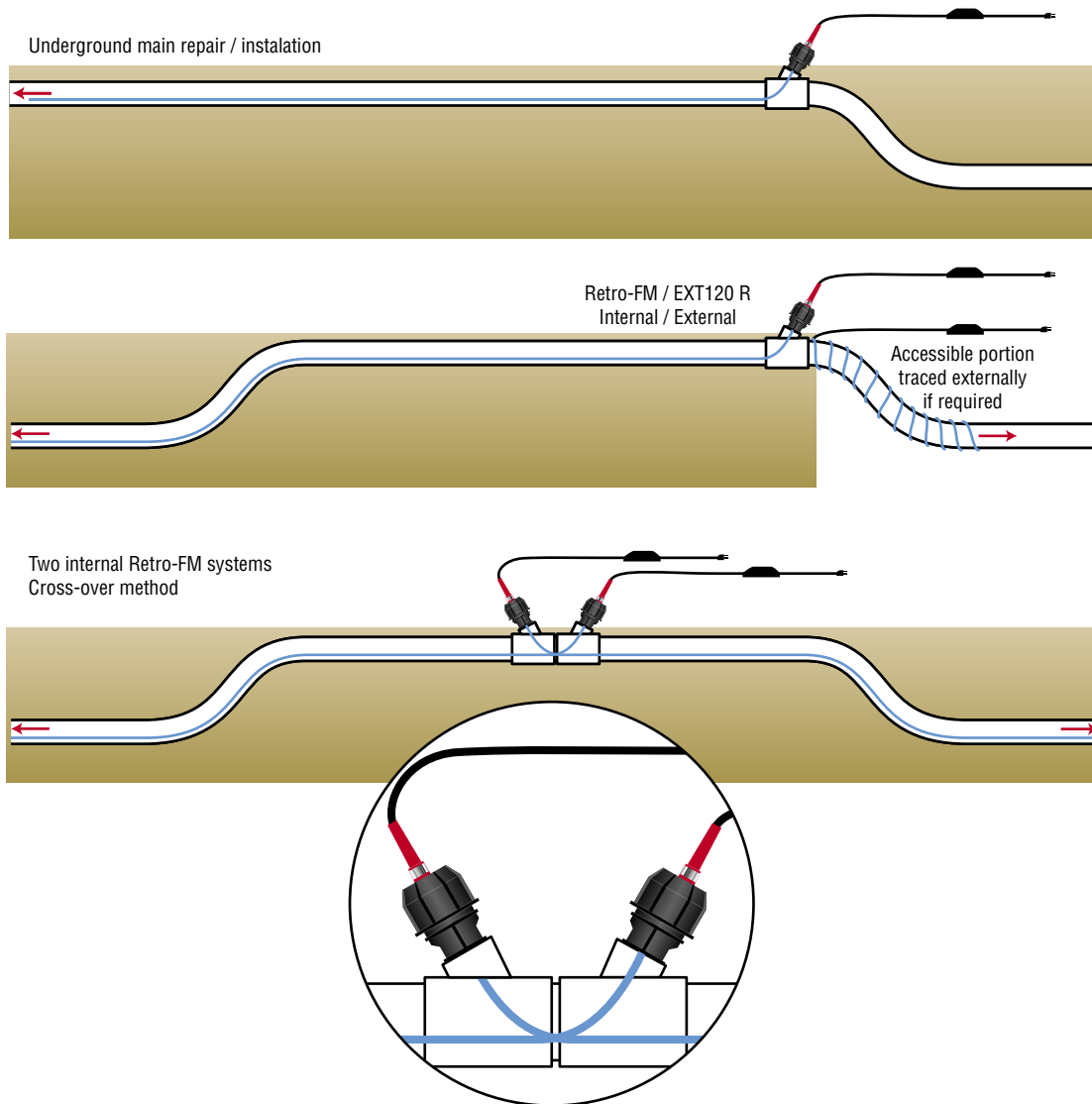
Typical Sewage Basin Installation with Retro-FM-GFC

Installation into a 2 inch pipe through a tee assembly.



Typical Rural Retro-FM Application



Protection for Vulnerable Mains

Control Devices and Insulation Installation

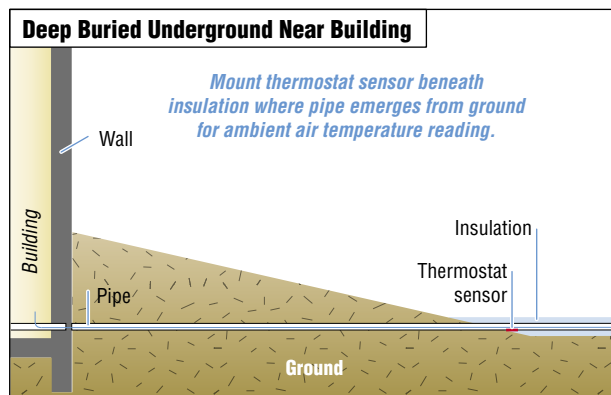
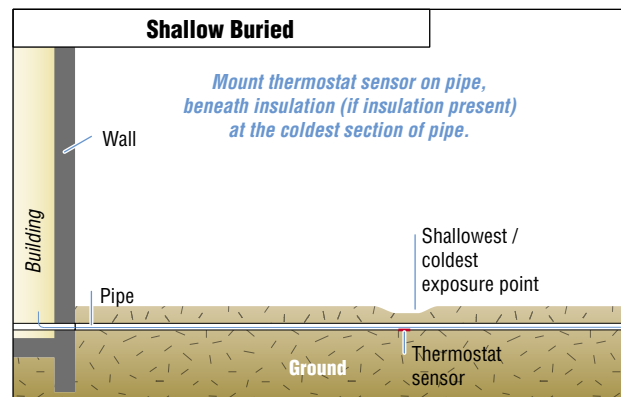
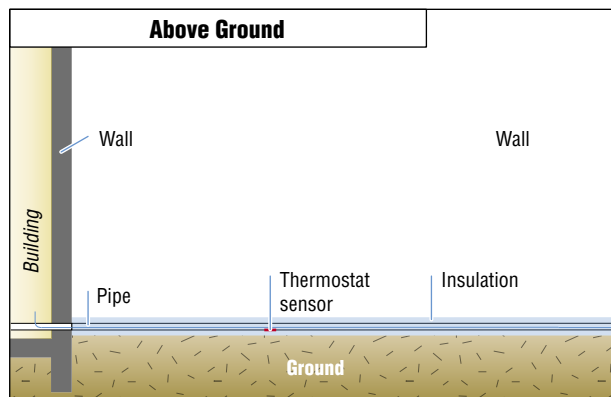
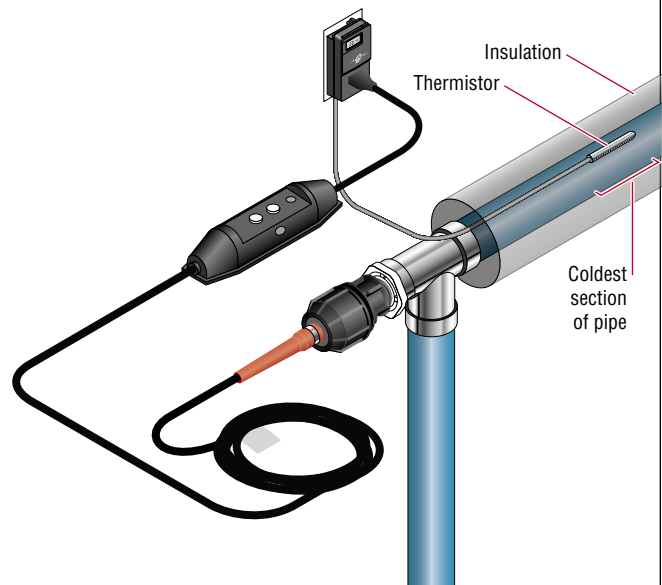
Control devices are not required to operate the heating cable system. They can be added for energy efficiency.

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.



Electrical System Connection

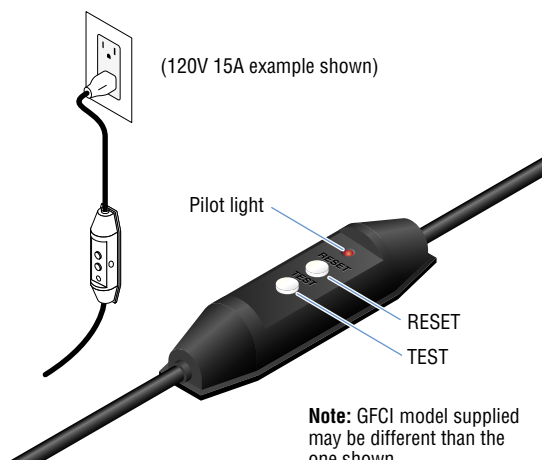
Electrical Connection for GFC (Ground Fault Plug-in) Models

- Unpack the Retro-FM system plug from its protective package.
- Plug into your dedicated outlet. 120V 5-15R outlet for 120V systems or 240V 6-15R outlet for 240V systems.
- Push reset button on the cord set ground fault device until light comes 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 go OFF. This indicates that the electrical circuit is intact and fully protected.
- Push reset button again and light will come ON. This indicates that your Retro-FM is working.
- Follow this test procedure before each season and monthly while in use.

Your Retro-FM is now fully functional.

If at any time your Retro-FM system fails to work call your local electrician or Heat-Line for assistance at 1-800-584-4944.

Unplug when not in use.



Electrical Connection for CS (Cord-Set) Models into Junction Box

NOTE: The “CS” version is designed to be installed by a qualified electrician and must be inspected by the governing electrical authority following completion of installation.

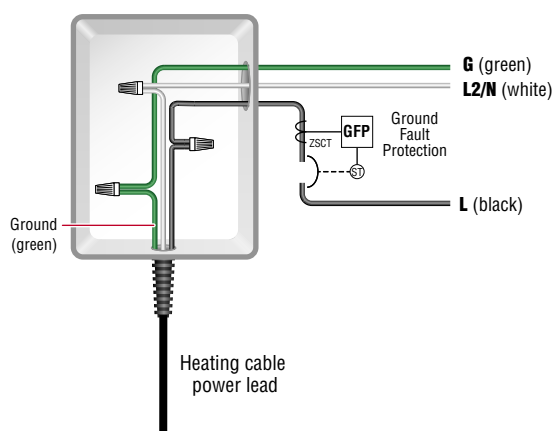
- Ensure the Retro-FM system will be operated on a dedicated ground fault protected circuit with over-current protection appropriate for the circuit conductor size and heating cable length.
- Confirm power is disconnected at the power supply prior to proceeding.
- Remove approved junction box cover.
- Route the Retro-FM cord-set wires into box with the supplied strain relief fitting.
- Connect appropriate wires together using approved wire nuts. Match wires white to white, black to black, and green to green. In the case of a metal junction box/enclosure, match green to ground screw and confirm screw is tight and secured afterward.

- Double check that the wires have been connected correctly and tight.
- Install junction box cover.
- Establish power to the circuit and test/reset the ground fault device for proper operation.
- Test the GFCI at the breaker before each season and monthly while in use.

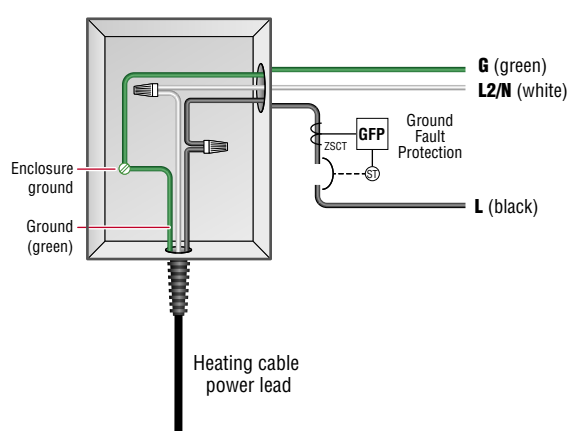
Your Retro-FM system is now fully functional.

If at any time your Retro-FM system fails to work call your local electrician or Heat-Line for assistance at 1-800-584-4944.

Non-Metal Junction Box



Metal Junction Box



Electrical Connection for CS models installed with the optional GFA-STAT (FPT-130)

A. Ensure the Retro-FM system will be operated on a dedicated circuit with over-current protection appropriate for the circuit conductor size and heating cable length.

NOTE: GFA-STAT (FPT-130) includes ground fault protection.

B. Confirm power is disconnected at the power supply prior to proceeding.

C. Remove front cover of the GFA-STAT.

D. Remove black strain relief from the Retro-FM power cord.

E. Route the Retro-FM cord-set wires through strain relief fitting supplied with the GFA-STAT.

F. Follow electrical guidelines per the GFA-STAT (FPT-130) manual included with your GFA-STAT unit.

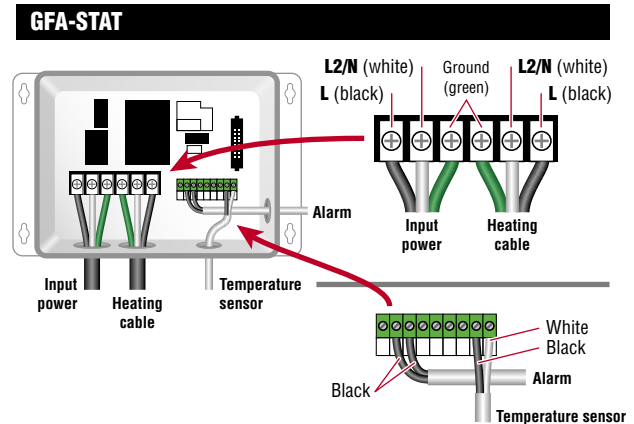
G. Double check that the wires have been connected correctly.

H. Establish power to the circuit and test/reset the ground fault device for proper operation.

I. Test the GFA-STAT GFCI before each season and monthly while in use.

Your Retro-FM system is now fully functional.

If at any time your Retro-FM system fails to work call your local electrician or Heat-Line for assistance at 1-800-584-4944.



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 Retro-FM 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:

- (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.

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.

Heat-Line Freeze Protection Systems

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Algonquin Highlands, ON Canada
KOM 1J1
Tel: 1-705-754-4545
1-800-584-4944
Fax: 1-705-754-4567
info@heatline.com
www.heatline.com

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Important: All information, including illustrations, is believed to be reliable. Users, however, should independently evaluate the suitability of each product for their particular application. Heat-Line a Division of Christopher MacLean Ltd. makes no warranties as to the accuracy or completeness of the information, and disclaims any liability regarding its use. Heat-Line's only obligations are those in the Heat-Line Standard Terms and Conditions of Sale for this product, and in no case will Heat-Line be liable for any incidental, indirect, or consequential damages arising from the sale, resale, use, or misuse of the product. Specifications are subject to change without notice. In addition, Heat-Line reserves the right to make changes—without notification to Buyer—to processing or materials that do not affect compliance with any applicable specification.

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Retro-FM Warranty Form

CONGRATULATIONS!

You have just purchased the most advanced internal freeze-protection system available on the market, backed by the finest warranty offered in the industry. Your Retro-FM 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:

☐ Sewage
☐ Water
☐ Other: _____

WARRANTY INFORMATION

5 Year Limited Warranty: **INCLUDED!**

☐ 10 Year Limited Warranty: \$1.75 / foot (\$75.00 minimum)

PAYMENT DETAILS FOR 10 YEAR LIMITED WARRANTY

System Length*

Units 1 to 540 feet = \$1.75 per foot OR \$75.00 minimum

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

System Length*

= Subtotal

x \$ 1.75/ft

Taxes and Currency

If Canadian Address:

Subtotal: _____

Provincial Tax %: _____

Tax Due: _____

Total in CDN Currency:

If U.S. Address or Other Country:

No Taxes Apply

Total in US 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 Retro-FM 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.

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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:

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- (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;
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(f) if the unit is used for purposes other than for what it was designed and manufactured,
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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.

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.

Heat-Line and Retro-FM are registered trademarks of Heat-Line Corporation.

Heat-Line, a division of Christopher MacLean, Ltd.

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