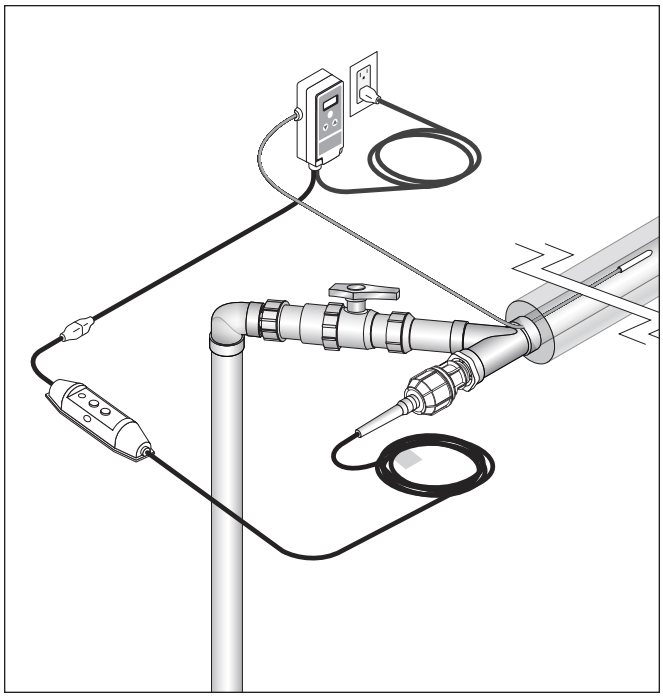
heat-line®
Freeze Protection Systems

Retro-FM®

Force Main and Large Diameter Pipe Freeze Protection



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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

c SP us
Drinking Water
NSF/ANSI 61

Usage P and X
Installation Type D USA

⚠ WARNING:

Important Safety Instructions and Rules for safe Installation and Operation

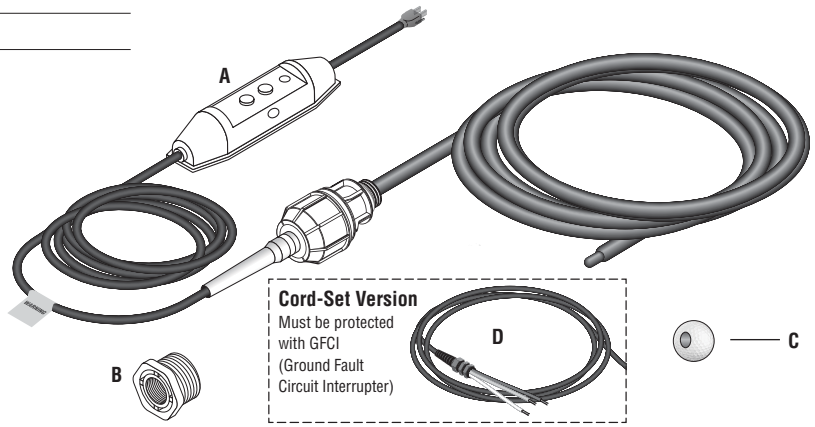
FIRE AND SHOCK HAZARD. This component is an electrical device which must be installed properly. Read and follow these rules and instructions carefully. Failure to follow them could result in serious bodily injury and/or property damage.

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.
- Do not install the Retro-FM plumbing connection in a manner that would render the system non-serviceable.
- Check unoccupied residences regularly to ensure that all systems are operating properly.
- For the Heat-Line warranty to be valid, you must comply with all the requirements outlined in this installation manual.
- Leave these installation instructions with the user for future reference.
- Grounded, certified 15-amp, 120/240-volt receptacles must be approved for wet locations if exposed to weather.
- Both the National Electrical Code and Canadian Electrical Code require ground-fault protection for all pipe heating cable applications.

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

HLJ-STAT General purpose 120V, plug-in thermostat (for GFC models)

HLA-120 General purpose 120V, plug-in thermostat (for GFC models)

GFA-STAT NEMA 4X Ground fault protected adjustable thermostat 120V/240V 30amp (for CS models)

MA-10 GFCI/ELCI electrical equipment protection device (for CS models)

TIMER-120P 120V plug-in timer (for GFC models)

TIMER-240P 240V plug-in timer (for GFC models)

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)

INSUL-2.00 Polyethylene insulation sleeve for 2 inch ID pipe (6 feet long, 2 5/8 inch ID, ¾ inch thick wall)

INSUL-3.00 Polyethylene insulation sleeve for 3 inch ID pipe (6 feet long, 3 1/2 inch ID, ¾ inch thick wall)

INSUL-4.00 Polyethylene insulation sleeve for 4 inch ID pipe (6 feet long, 4 1/2 inch ID, 1 inch thick wall)

HLP-TAPE Black wrap tape for sealing insulation ends together 2 inches x 100 feet (50.8mm x 3m)

WARRANTY Extended 10 year limited product warranty

Ordering Chart

Example: **FM – 5 – 100 – GFC**

Product

FM	120 V Retro-FM
FM2	240 V Retro-FM

Nominal Power Output

5	5 W/ft @ 50°F (16 W/m @ 10°C)
8	8 W/ft @ 50°F (26 W/m @ 10°C)

Cord-Set Type

GFC	Ground fault protected 5-15 P 120 V / 6-15 P 240 V
CS	Cord connected (no GFCI)

Length of System

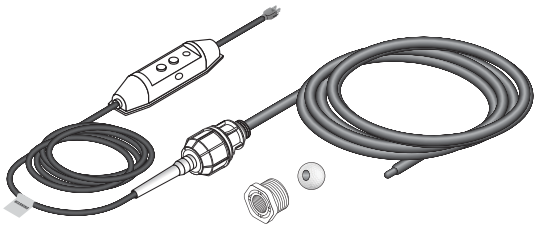
	GFC Ground Fault Protected *Max length*	**CS** Cord Connected (no GFCI) *Max length*
5 W/ft 120 V	230 ft	230 ft
8 W/ft 120 V	150 ft	150 ft
5 W/ft 240 V	460 ft	540 ft
8 W/ft 240 V	300 ft	400 ft

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

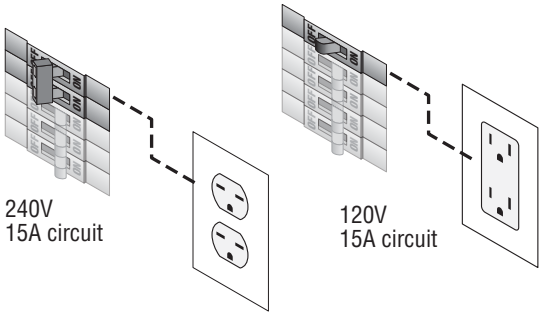
Sewage Forced Main Installation Instructions

1 Sewage Forced Main

- Carefully remove your Retro-FM system. It comes complete with all parts as required pre-assembled.

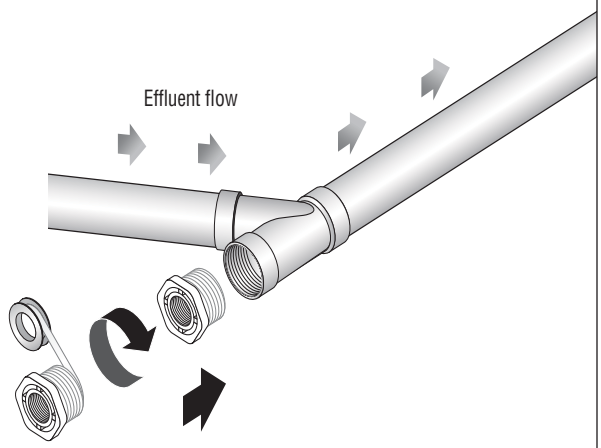


- It is recommended that a single circuit (15 amp) be installed by a qualified electrician for dedicated use of the Retro-FM system. **Do not use extension cords.**



2 Sewage Forced Main

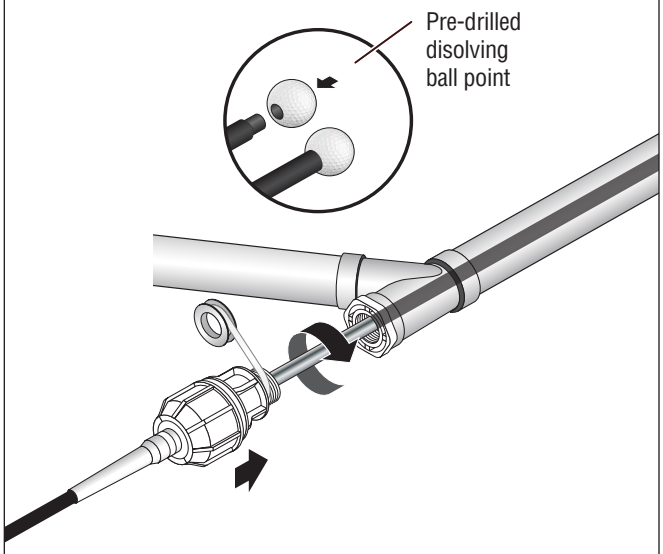
- Install a tee wye fitting with the appropriate female thread size to interface with the supplied Retro-FM male threaded adapter or PVC reducing bushing.
- It is recommended that the tubular heater be installed straight through the tee wye, as shown (effluent flows through at 45 degrees), instead of through the tee wye.
- If required, install the provided PVC reducing bushing into the female threaded tee wye to accept the 1-inch MIP Retro-FM fitting. If the provided PVC reducing bushing is unsuitable, determine and install the required bushing.
- Use the appropriate Teflon tape or thread sealants to seal threaded plumbing joints, ensuring a secure and leak-free installation.



Note: Do not install the Retro-FM fitting connection point in a manner that would render the system not able to be serviced. Consult Heat-Line with questions regarding installation parameters with respect to serviceability.

3 Sewage Forced Main

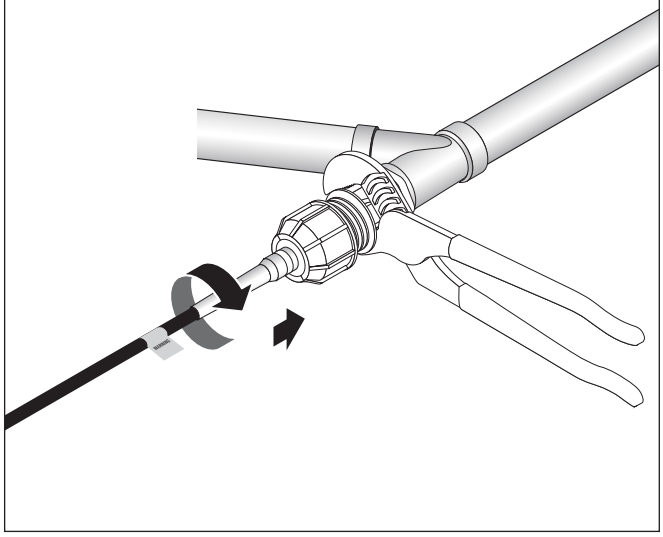
- For pipe sizes greater than 2-inch push the pre-drilled dissolving ballpoint onto the end seal of the tubular heater, ensuring it is firmly in place before installing the Retro-FM.
- Short Retro-FM systems may be pushed in the pipe. Longer systems may require the use of fish tape or other installation methods. For long systems, a vacuum can be used to draw a sponge "mouse" through the pipe with a 1/8" mason line attached. These sponges can be hand-made or purchased from Heat-Line. Extra long systems may require “cutting in” a coupling or series of couplings to provide access points to pull in the Retro-FM.
- A non-toxic (potable) lubricant can be used to make tubular heater insertion or pushing of long lengths easier.
- Once the entire length of Retro-FM is fed into the pipe, use the appropriate Teflon tape or thread sealants to seal threaded plumbing joints.



Note: The pre-drilled dissolving ballpoint is designed to reduce the friction of the Retro-FM tubular heater end seal during installation. It is not recommended for pipes 2 inches or less, or for drinking water-safe pipes.

4 Sewage Forced Main

- Thread the 1-inch MIP male adapter body into the previously installed PVC reducing bushing until hand tight.
- Tighten the 1-inch MIP male body adapter with an adjustable wrench or pump pliers. Do not over-tighten.
- Ensure the fitting adapter rotates around the tubular heater as the MIP fitting tightens.

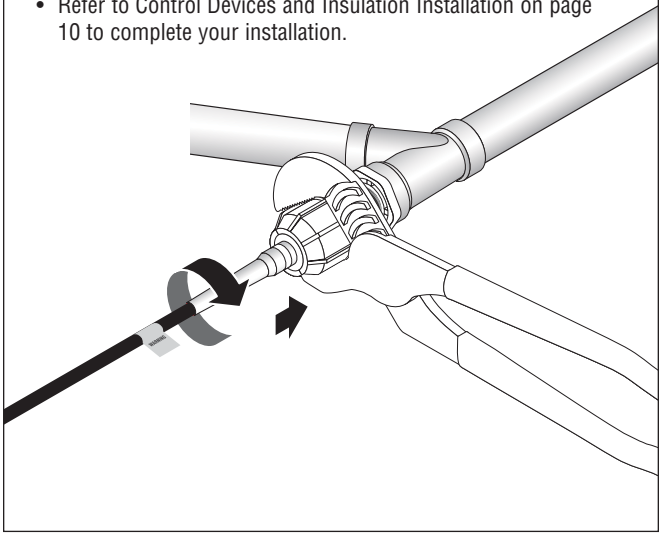


5 Sewage Forced Main

- Tighten the 1-inch MIP male adapter nut to the fitting body using an adjustable wrench or pump plier.

CAUTION: It is an O-ring seal, **DO NOT** over-tighten.

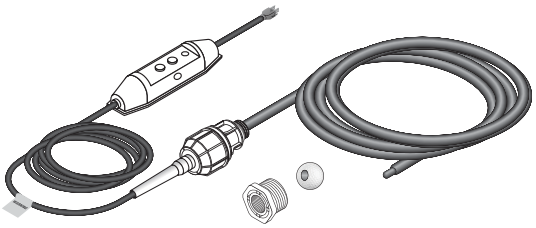
- After all the plumbing fittings have been completely installed, a licensed tradesperson should observe the installation and certify that the Philmac fitting has made a secure connection. Pressure testing the system prior to service is highly recommended to ensure a proper connection.
- It is now time to energize your Retro-FM system. Carefully follow the Electrical System Connection Instructions on page 11.
- Refer to Control Devices and Insulation Installation on page 10 to complete your installation.



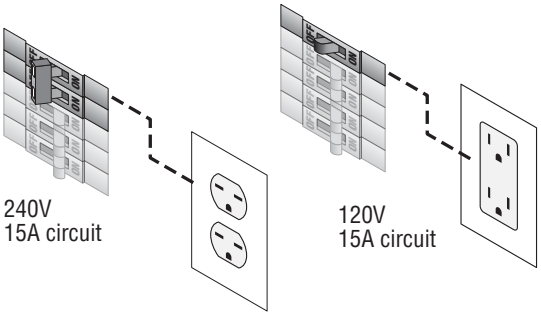
Potable Water Supply Installation Instructions

1 Potable Water Supply

- Carefully remove your Retro-FM system. It comes complete with all parts as required pre-assembled.

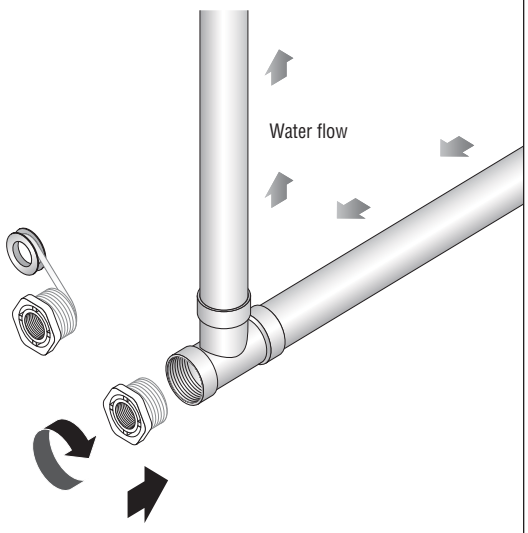


- It is recommended that a single circuit (15 amp) be installed by a qualified electrician for dedicated use of the Retro-FM system. **Do not use extension cords.**



2 Potable Water Supply

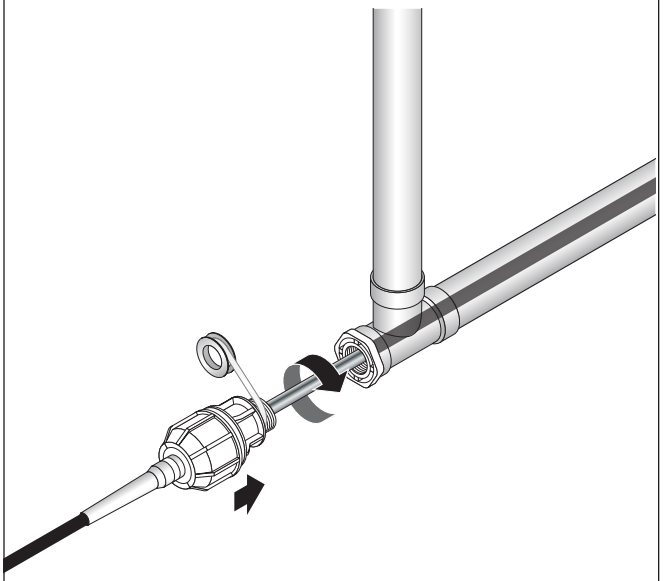
- Install a tee fitting with the appropriate female thread size to interface with the supplied Retro-FM male threaded adapter or PVC reducing bushing.
- It is recommended that the tubular heater be installed straight through the tee, as shown (water flows through at 90 degrees), instead of through the branch.
- If required, install the provided PVC reducing bushing into the female threaded tee to accept the 1-inch MIP Retro-FM fitting. If the provided PVC reducing bushing is unsuitable, determine and install the required bushing.
- Use the appropriate Teflon tape or thread sealants to seal threaded plumbing joints, ensuring a secure and leak-free installation.



Note: Do not install the Retro-FM fitting connection point in a manner that would render the system not able to be serviced. Consult Heat-Line with questions regarding installation parameters with respect to serviceability.

3 Potable Water Supply

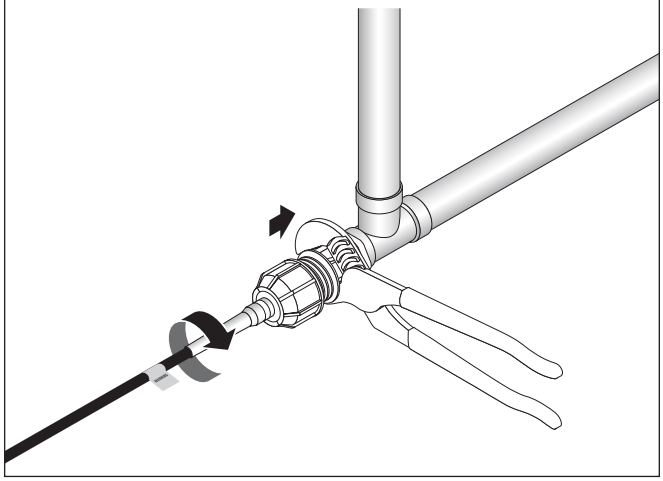
- Short Retro-FM systems may be pushed in the pipe. Longer systems may require the use of fish tape or other installation methods. For long systems, a vacuum can be used to draw a sponge "mouse" through the pipe with a 1/8" mason line attached. These sponges can be hand-made or purchased from Heat-Line. Extra long systems may require “cutting in” a coupling or series of couplings to provide access points to pull in the Retro-FM.
- A non-toxic (potable) lubricant can be used to make tubular heater insertion or pushing of long lengths easier.
- Once the entire length of Retro-FM is fed into the pipe, use the appropriate Teflon tape or thread sealants to seal threaded plumbing joints.



Note: Do not use the pre-drilled dissolving ballpoint in drinking water safe applications.

4 Potable Water Supply

- Thread the 1-inch MIP male adapter body into the previously installed PVC reducing bushing until hand tight.
- Tighten the 1-inch MIP male body adapter with an adjustable wrench or pump pliers. Do not over-tighten.
- Ensure the fitting adapter rotates around the tubular heater as the MIP fitting tightens.

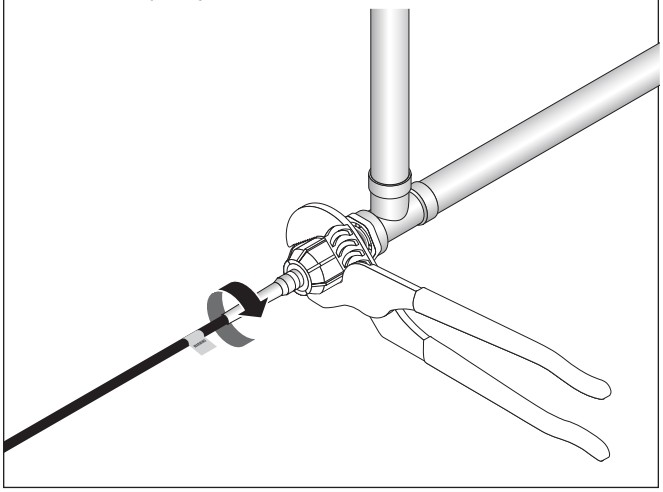


5 Potable Water Supply

- Tighten the 1-inch MIP male adapter nut to the fitting body using an adjustable wrench or pump plier.

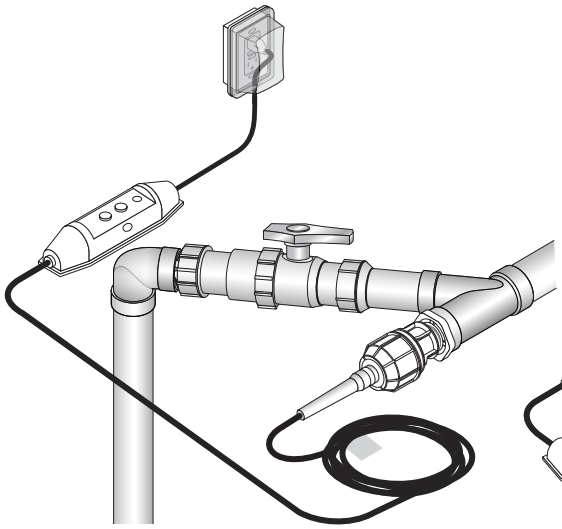
CAUTION: It is an O-ring seal, **DO NOT** over-tighten.

- After all the plumbing fittings have been completely installed, a licensed tradesperson should observe the installation and certify that the Philmac fitting has made a secure connection. Pressure testing the system prior to service is highly recommended to ensure a proper connection.
- It is now time to energize your Retro-FM system. Carefully follow the Electrical System Connection Instructions on page 11.
- Refer to Control Devices and Insulation Installation on page 10 to complete your installation.

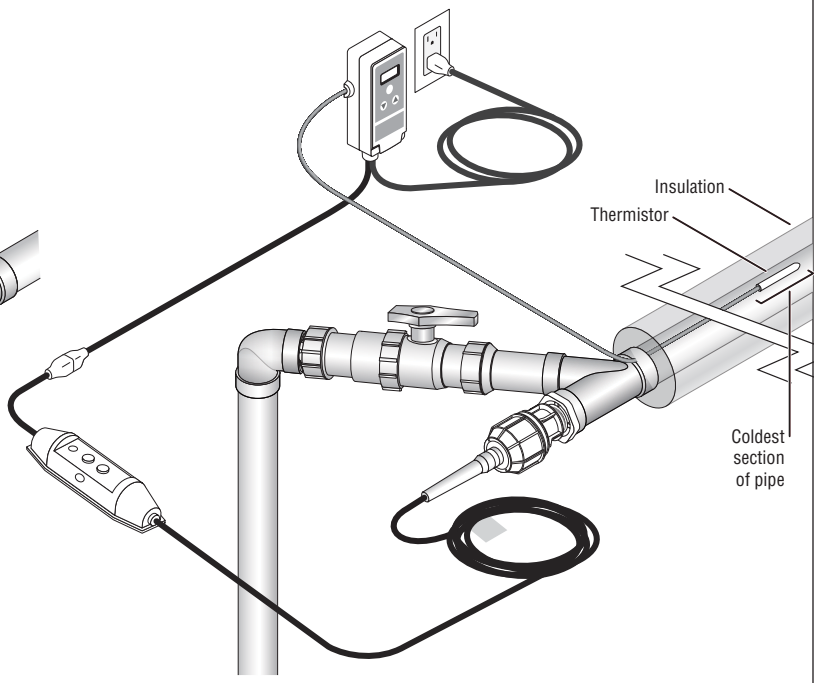


Installation Examples

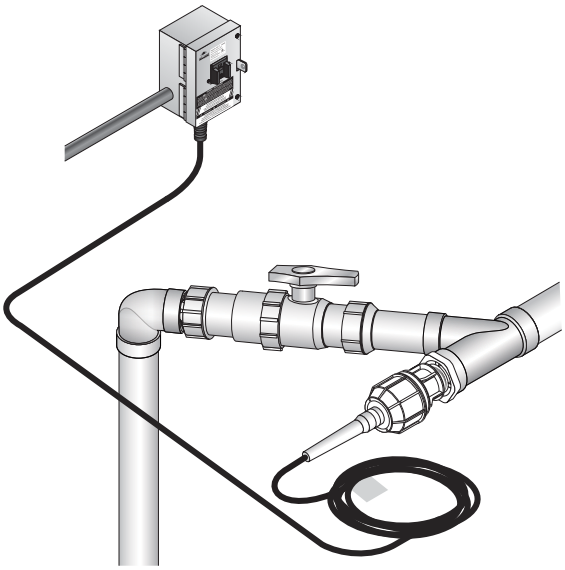
Typical Retro-FM-GFC Model Installation



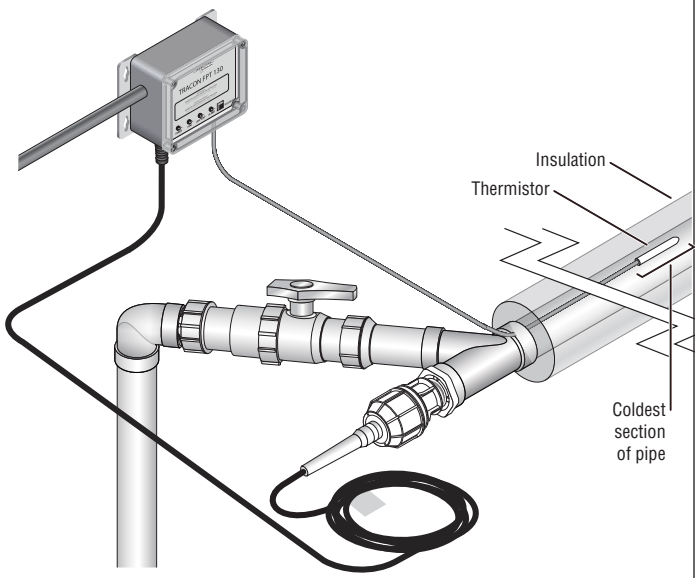
Retro-FM-GFC Installation with Heat-Line HLJ-STAT Thermostat



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

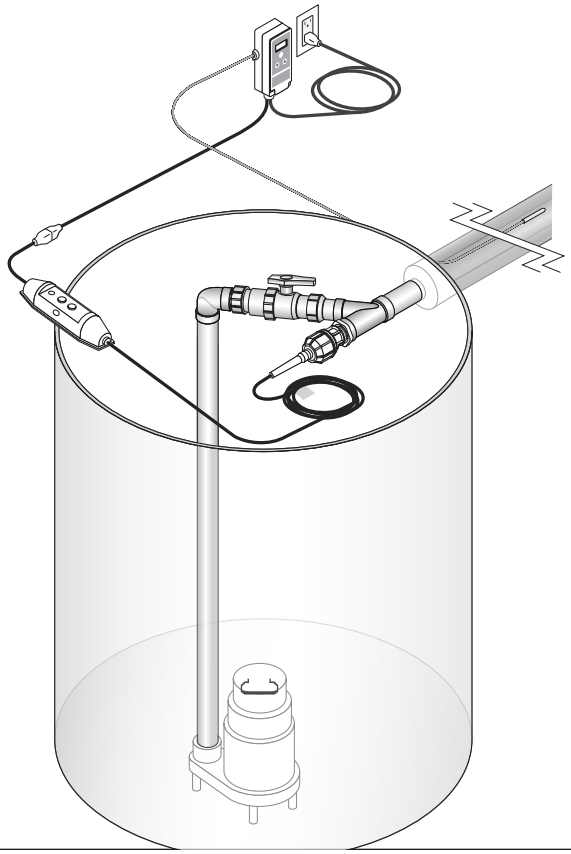


Retro-FM-CS Installation with Heat-Line GFA-STAT Thermostat with Built in GFCI / ELCI

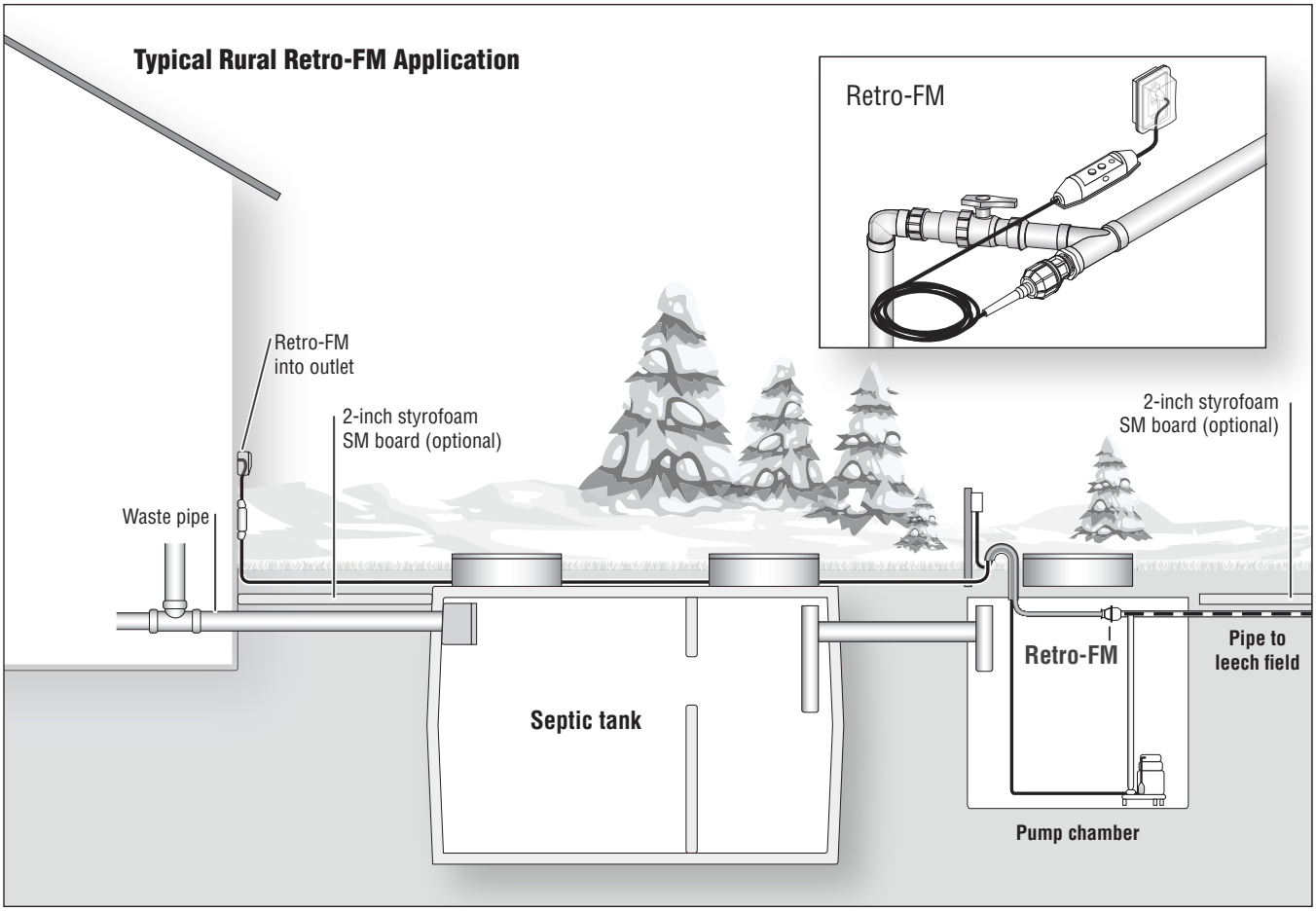


Typical Sewage Basin Installation with Retro-FM-GFC

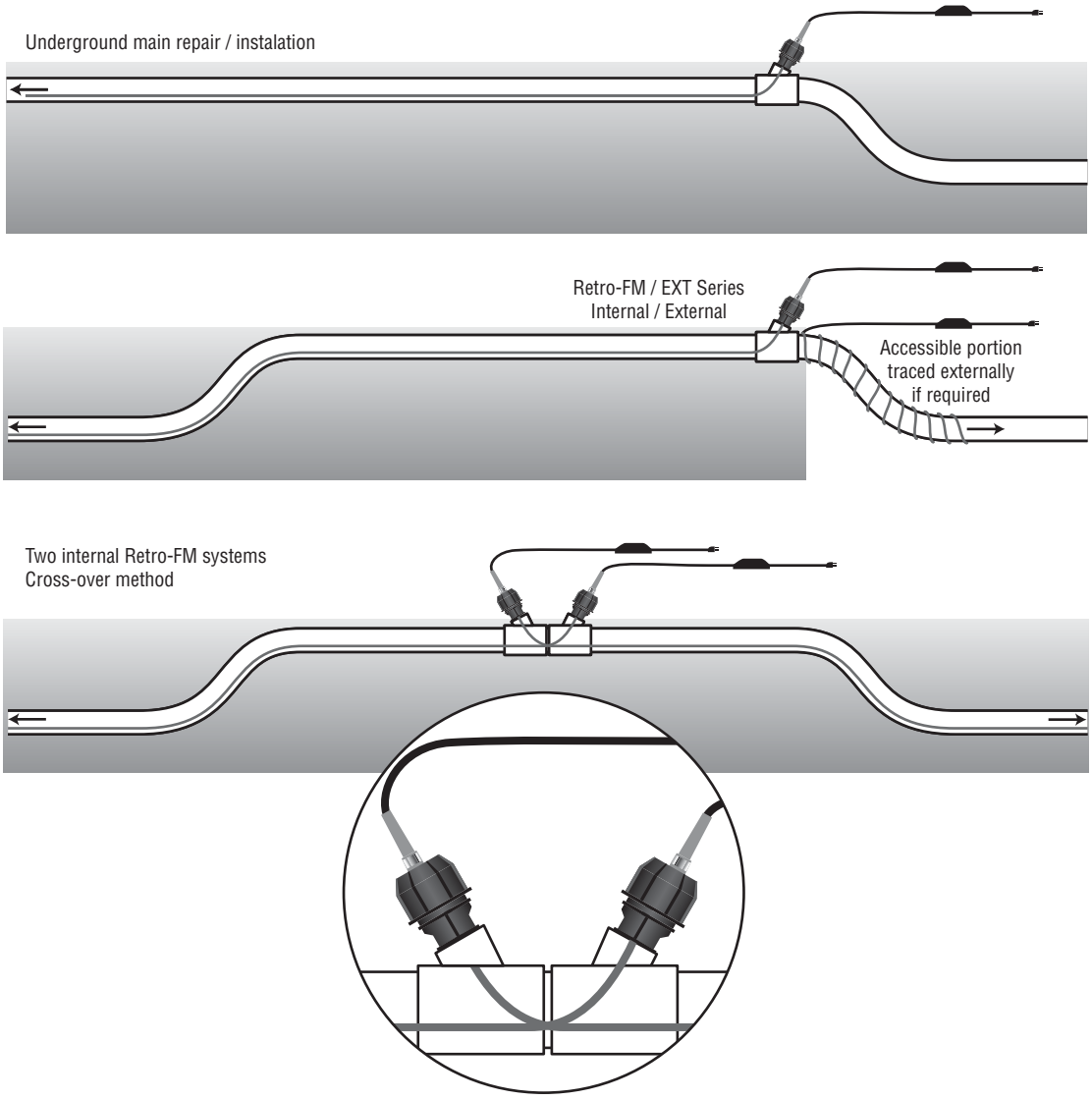
Installation into a 2 inch pipe through a tee assembly.



Typical Rural Retro-FM Application



Protection for Large Diameter 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.

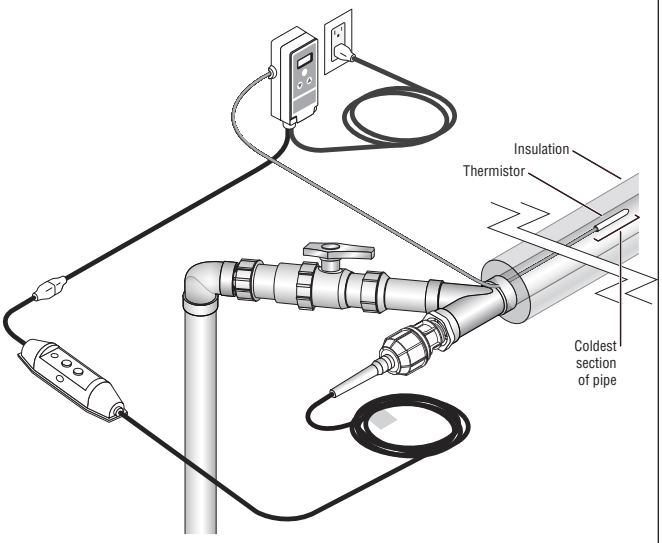
Thermostats are used to duty cycle the system in an on/off operation saving power consumption and maintain a certain pipe temperature. A sensor lead must be placed on the coldest section of pipe.

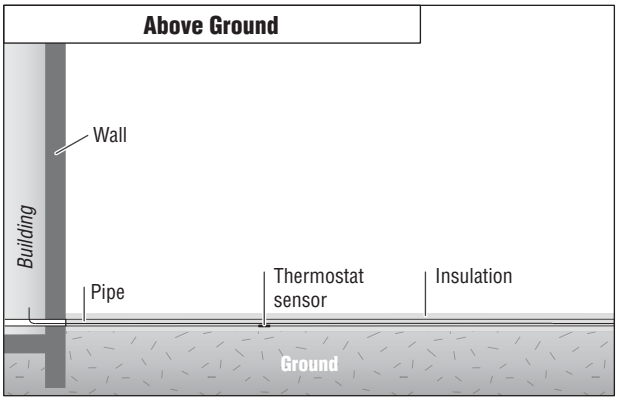
Timers are used to duty cycle the system in an on/off operation based on preset time intervals to save on power consumption.

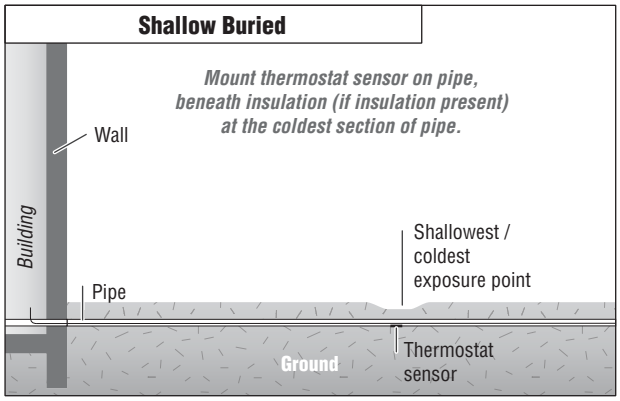
Insulation is recommended for all new pipe installations, even where the pipe is to be buried.

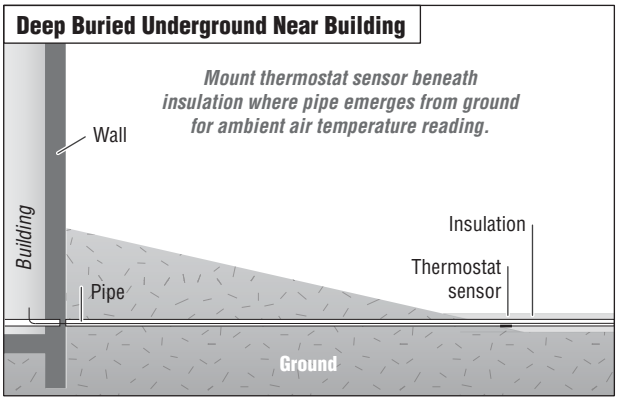
For existing pipe applications, insulation is only required where the pipe is exposed to ambient outdoor temperatures, and/or where the pipe is above the ground. Insulation aids in heat retention making the heating cable more energy efficient and providing cold weather reliability.

Retro-FM-GFC Installation with Heat-Line HLJ-STAT Thermostat









Electrical System Connection

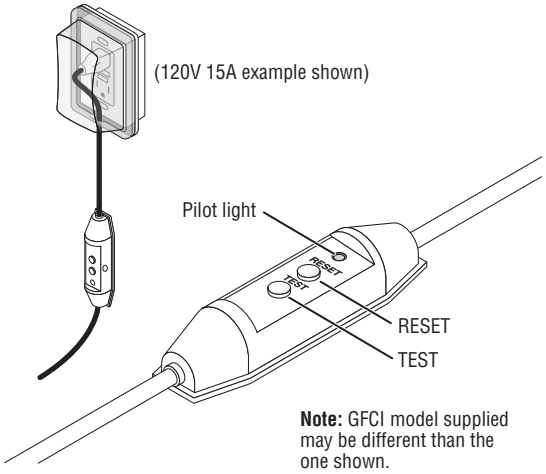
Electrical Connection for GFC (Ground Fault Plug-in) Models

A. Unpack the Retro-FM system plug from its protective package.
B. Plug into your dedicated outlet. 120V 5-15R outlet for 120V systems or 240V 6-15R outlet for 240V systems.
C. 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.
D. Push test button and light will go OFF. This indicates that the electrical circuit is intact and fully protected.
E. Push reset button again and light will come ON. This indicates that your Retro-FM is working.
F. 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.



Note: GFCI model supplied may be different than the one shown.

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

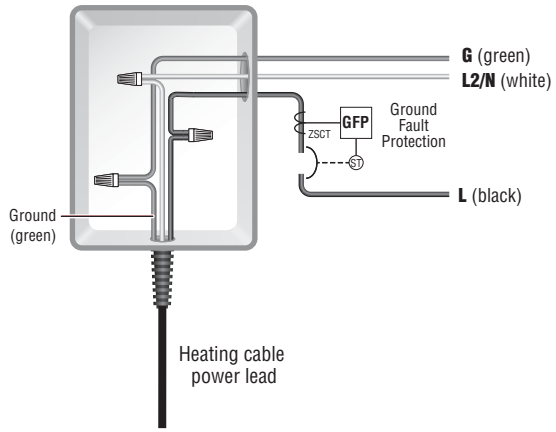
NOTE: The "CS" version is designed to be installed by a qualified electrician and must be inspected by the governing electrical authority following completion of installation.

A. 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.
B. Confirm power is disconnected at the power supply prior to proceeding.
C. Remove approved junction box cover.
D. Route the Retro-FM cord-set wires into box with the supplied strain relief fitting.
E. 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.
F. Double check that the wires have been connected correctly and tight.
G. Install junction box cover.
H. Establish power to the circuit and test/reset the ground fault device for proper operation.
I. Test the GFCI at the breaker before each season and monthly while in use.

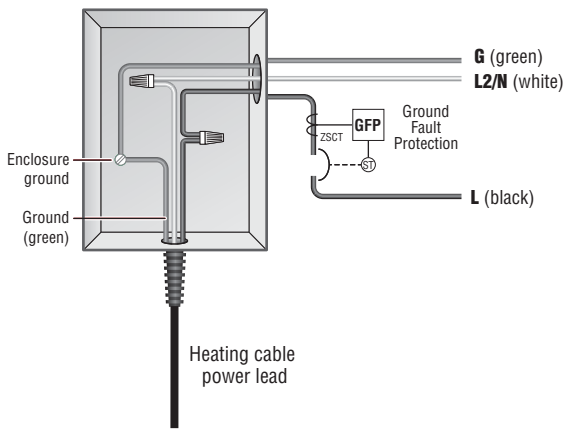
Your Retro-FM system is now fully functional.

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.

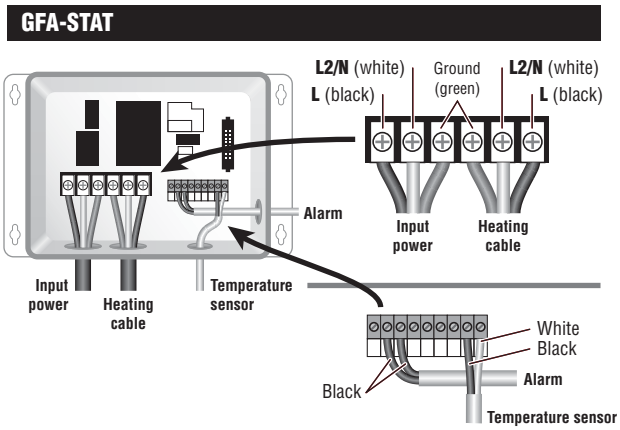
G. Double check that the wires have been connected correctly.

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, which ever occurs first.

EXTENDED WARRANTY PERIOD: 120 months from date of purchase or 123 months from date of manufacture, which 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
1095 Green Lake Road
Algonquin Highlands, ON Canada
K0M 1S0
Tel: 1-705-754-4545
1-800-584-4944
Fax: 1-705-754-4567
info@heatline.com
www.heatline.com

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heat-line®
Freeze Protection Systems

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* _____ **x $ 1.75/ft** **= Subtotal** _____

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, which ever occurs first.

EXTENDED WARRANTY PERIOD: 120 months from date of purchase or 123 months from date of manufacture, which 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.

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, a division of Christopher MacLean, Ltd.
1095 Green Lake Road / Algonquin Highlands, ON Canada / K0M 1S0 / info@heatline.com / **www.heatline.com**