

# ProLine Heaters

*Freeze Protection Solutions for Water Supply Systems*

## ProLine In-Pipe Self-Regulating Heating Cable System

**120V | 240V • Custom Lengths Available**

|                                                                                          |                                                                                    |                                                                                 |
|------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| <b>Self-Regulating</b><br>Automatically adjusts output — won't overheat even in dry pipe | <b>Drinking Water Safe</b><br>NSF/ANSI 61 certified for potable water applications | <b>Custom Lengths</b><br>Order the exact length you need — up to 275 ft at 120V |
|------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|

### Installation & Product Guide

*Read all instructions completely before beginning installation.*

Available from your local electrical distributor | [www.prolineheaters.com](http://www.prolineheaters.com)

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## General Information & Approvals

ProLine in-pipe self-regulating heating cable systems are designed to prevent existing water supply pipes from freezing without excavation or pipe removal. Suitable for residential, rural, commercial, and agricultural water supply applications, ProLine systems are engineered for reliability in extreme cold-weather environments down to -30°C (-22°F).

The ProLine system uses Emerson EasyHeat self-regulating heating cable combined with the Emerson ILSR Heating Cable Connection Kit. The cable is custom-cut to your specified length and inserted directly inside the water supply pipe. The self-regulating core automatically increases heat output as temperatures drop and reduces output as temperatures rise — preventing overheating even if the pipe runs dry.

It is recommended that installation be performed by a qualified tradesperson with knowledge of both plumbing and electrical systems. All electrical work must comply with the National Electrical Code (USA) or the Canadian Electrical Code.

### Certifications & Approvals

|                           |                                                                             |
|---------------------------|-----------------------------------------------------------------------------|
| <b>Heating Cable</b>      | EasyHeat TSR31F (120V) — NSF/ANSI 61 Drinking Water Certified               |
| <b>Usage Type</b>         | Potable water supply pipe (in-pipe application)                             |
| <b>Electrical Listing</b> | cULus Listed                                                                |
| <b>GFCI Protection</b>    | Built-in GFI cord set (120V models) — GFCI breaker required for 240V models |
| <b>Compliance</b>         | National Electrical Code (NEC) / Canadian Electrical Code (CEC)             |

### Safety Instructions — Read Before Installing

#### **IMPORTANT — DISCONNECT POWER BEFORE SERVICING**

WHEN PERFORMING WORK OR REPAIRS ON YOUR WATER SYSTEM, ALWAYS UNPLUG OR DE-ENERGIZE YOUR PROLINE HEATING CABLE SYSTEM FROM THE POWER SUPPLY FIRST. Failure to disconnect power may result in serious electric shock or death.

#### **MAXIMUM SYSTEM PRESSURE**

Do not allow pipe pressure to exceed 60 PSI (414 kPa). Exceeding this pressure may result in water leaking into the heating cable, creating a risk of electric shock and/or cable failure. Confirm pipe operating pressure before installation.

## Important Safety Rules

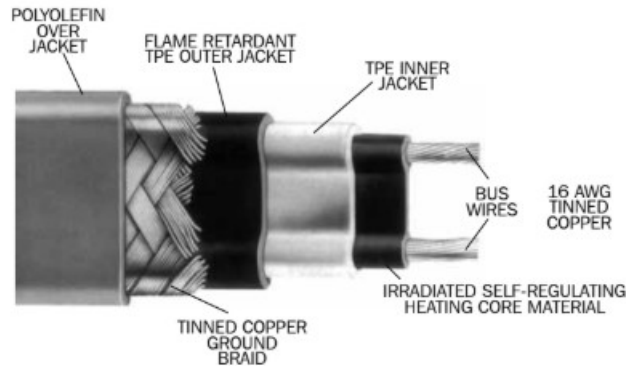
- Read all instructions carefully before installing. Failure to follow instructions could result in bodily injury and/or property damage.
- Have the electrical outlet inspected and verified by a licensed electrician before installation. Ensure the circuit is properly grounded.
- Do not use extension cords with this product under any circumstances.
- Never cut, nick, or damage the outer jacket of the heating cable. Any cut or damaged cable must be replaced — do not attempt to splice or repair a damaged cable.
- Never tamper with or alter the electrical components of the ProLine system.
- Do not install the cable entry fitting in a location that could become flooded or submerged.
- Do not install in sewer or wastewater pipes. ProLine is designed for potable water supply applications only.
- Do not use the system to thaw frozen pipes where cable length exceeds 67 m (220 ft).
- When installing in metal pipes, ensure all pipe ends are de-burred and smooth to prevent damage to the cable jacket.
- A single dedicated 15-amp circuit is required. Do not share the circuit with other devices.
- Leave these installation instructions with the property owner for future reference.

## Product Description & Features

### What is a Self-Regulating Heating Cable?

A self-regulating (or "self-limiting") heating cable contains a conductive polymer heating core between two copper bus wires. As the temperature of the cable drops, the polymer core becomes more conductive, increasing heat output. As temperature rises, conductivity decreases and heat output drops automatically. This means the cable can never overheat or burn out — even if it is overlapped with itself, or if the pipe runs dry temporarily.

### CONSTRUCTION DETAILS



### Features & Benefits

**Self-Regulating Technology:** Automatically adjusts heat output based on pipe temperature — no separate thermostat required for basic freeze protection. Will not overheat or burn out, even if energized without water in the pipe.

**Potable Water Safe:** TSR31F cable jacket is NSF/ANSI 61 certified and approved for direct contact with drinking water inside water supply pipes.

**Custom Length Ordering:** ProLine cables are cut to the exact length you need at time of order. Lengths available from a few feet up to 275 ft at 120V (see ordering guide).

**Suitable for Multiple Pipe Types:** Can be installed in polyethylene, PVC, ABS, PEX, copper, galvanized steel, and iron pipes from 3/4" to 2" ID. Larger pipes (up to 6") can be served with dual-cable configurations.

**Easy Installation:** The cable is rigid enough to be pushed into straight pipe runs without a fish tape. A pull cord is provided for longer or bent installations.

**Fully Serviceable:** The cable can be removed and replaced if necessary, through the compression fitting entry point.

**Energy Efficient:** Self-regulating technology eliminates energy waste. Optional thermostats further reduce energy consumption by up to 50%.

**Proven in Extreme Cold:** Rated to -30°C (-22°F) minimum installation temperature. Suitable for above-ground and buried applications.

**Re-Energizes After Power Failure:** If power is interrupted during a cold snap, the system will re-energize and thaw the pipe when power is restored. In most cases, no pipe damage occurs.

**120V and 240V Options:** Available in both 120V (plug-in GFI) and 240V (hard-wire) configurations to suit any installation.

## Technical Specifications

|                                     |                                                                                 |
|-------------------------------------|---------------------------------------------------------------------------------|
| <b>Heating Cable Type</b>           | Self-regulating conductive polymer (Emerson EasyHeat TSR31F / 240V equivalent)  |
| <b>Outer Jacket</b>                 | Fluoropolymer (PVDF) — drinking water safe, NSF/ANSI 61 certified               |
| <b>Power Output (nominal)</b>       | ~3 W/ft at 50°F (10 W/m at 10°C) — output varies automatically with temperature |
| <b>Voltage — 120V Model</b>         | 120 VAC, 60 Hz                                                                  |
| <b>Voltage — 240V Model</b>         | 240 VAC, 60 Hz                                                                  |
| <b>Max Cable Length — 120V</b>      | 84 m (275 ft) for water supply; 67 m (220 ft) for thawing applications          |
| <b>Max Cable Length — 240V</b>      | Contact ProLine for maximum length — varies by cable model                      |
| <b>Min Installation Temperature</b> | -30°C (-22°F)                                                                   |
| <b>Max Cable Temperature</b>        | +85°C (+185°F) — self-regulating, will not exceed safe operating limits         |
| <b>Max Operating Pressure</b>       | 60 PSI (414 kPa) — do not exceed                                                |
| <b>Pipe Size (compatible)</b>       | 3/4" to 2" ID for single cable; up to 6" with dual cable                        |
| <b>Pipe Materials</b>               | Polyethylene, PVC, ABS, PEX, copper, galvanized steel, iron                     |
| <b>Entry Fitting</b>                | Emerson ILSR compression fitting — 3/4" NPT threaded connection                 |
| <b>Power Connection — 120V</b>      | GFI cord set (120VAC, 15A, 30mA trip) — plug-in model                           |
| <b>Power Connection — 240V</b>      | Hard-wire to GFCI-protected circuit — electrician required                      |
| <b>Circuit Requirement</b>          | Dedicated 15A circuit — do not share with other loads                           |
| <b>Cable Footmarks</b>              | Length markers printed on outer jacket every 30 cm (12") for easy measurement   |

2.0.

## Applications

ProLine self-regulating heating cable is suitable for the following applications:

- Existing residential water supply lines subject to freezing
- Rural homes and farm water supply systems
- Agricultural and commercial water supply
- Construction site temporary water supply

- Cottages, cabins, and seasonal properties
- Sump pump discharge lines
- Well supply lines and pressure systems
- Lake, river, and pond water intake lines
- Municipal water service connections
- Recreational vehicle (RV) park water supplies
- Waterfront and dock water supply lines
- Industrial process water lines (use SR31J cable for non-potable)

**NOTE:** ProLine systems are NOT approved for use in sewer, drain, or waste water pipes. For non-potable process water drain and vent pipe applications, use SR31J cable with the ILSR kit.

## Ordering Guide — Custom Length Cable Systems

ProLine heating cable systems are custom-assembled to your specified length. Orders are placed through your local electrical distributor. To place an order, provide the following information:

|          |                             |                                                                                                                                             |
|----------|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1</b> | <b>Voltage</b>              | Specify 120V or 240V                                                                                                                        |
| <b>2</b> | <b>Cable Length</b>         | Measure the total length of pipe to be protected, from the entry fitting location to the far end of the pipe. Round up to the nearest foot. |
| <b>3</b> | <b>Pipe Type &amp; Size</b> | Specify pipe material and internal diameter (e.g., 1" ID polyethylene, or 1" NPT thread for copper/PVC/iron)                                |
| <b>4</b> | <b>Connection Type</b>      | GFI plug-in (120V only) or hard-wire cord set (120V or 240V)                                                                                |

### Maximum Cable Lengths

Cable lengths are measured from the entry fitting to the far end of the heating cable within the pipe. Some cable length is consumed within the entry fitting assembly itself. When calculating required length, measure the pipe run from the planned fitting entry point to the furthest point of the pipe requiring freeze protection.

|                                        |                                                            |
|----------------------------------------|------------------------------------------------------------|
| <b>120V — Water Supply Protection</b>  | Up to 84 m (275 ft) per circuit                            |
| <b>120V — Pipe Thawing Application</b> | Do not exceed 67 m (220 ft) for thawing                    |
| <b>240V — Water Supply Protection</b>  | Contact ProLine distributor — length varies by cable model |
| <b>Pipe Diameter 3/4" to 2" ID</b>     | Single cable per pipe                                      |
| <b>Pipe Diameter 2" to 6" ID</b>       | Dual cable configuration required (two ILSR kits)          |

### Pipe Section Removal for Fitting Installation

When installing the entry fitting on polyethylene pipe, a section of pipe must be removed to allow the tee fitting to be joined. Cut the pipe as squarely as possible. The following section lengths are required for compression tee fittings:

| Pipe Size | Section of Pipe to Remove |
|-----------|---------------------------|
| 3/4" ID   | 6-1/4"                    |
| 1" ID     | 6-1/4"                    |
| 1-1/4" ID | 6-1/4"                    |
| 1-1/2" ID | 6-1/2"                    |
| 2" ID     | 7-1/2"                    |

**NOTE:** For NPT threaded fitting connections (copper, PVC, ABS, iron pipe), no pipe section removal is required. The male adapter threads directly into a tee or wye fitting already in the plumbing system.

## Kit Contents & Tools Required

### What Is Included with Your ProLine System

Each ProLine custom cable order includes the following components:

|                                                                                                                                  |                                                                                          |
|----------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| <b>ProLine Self-Regulating Heating Cable:</b> Custom-cut to ordered length — NSF/ANSI 61 potable water safe fluoropolymer jacket | <b>Insulated Splice Connectors:</b> 3 pcs — for connecting cable bus wires to power cord |
| <b>ILSR Compression Fitting Assembly:</b> 3/4" NPT Base, Compression Grommet, Compression Bushing, Compression Cap, Grommet Plug | <b>Heat Shrink Tubes — Large:</b> 3 x 15 cm (6") tubes, 19 mm (0.75") ID                 |
| <b>GFI Cord Set (120V models):</b> 120V, 15A with built-in 30mA GFI protection and pilot light                                   | <b>Heat Shrink Tubes — Medium:</b> 3 x 51 mm (2") tubes, 12 mm (0.5") ID                 |
| <b>Pull Cord:</b> Food-grade, 2 m (6.5 ft) for assisting cable insertion                                                         | <b>Heat Shrink Tubes — Small:</b> 2 pcs — 19 mm and 44 mm lengths, 3 mm (0.125") ID      |

### Tools & Materials Required for Installation

|                                    |                                                          |
|------------------------------------|----------------------------------------------------------|
| • Scissors or sharp knife          | • Electrical tape                                        |
| • Needle nose pliers               | • Pipe wrench or adjustable wrench                       |
| • Wire cutters                     | • Plumbing tools and fittings (tee, couplings)           |
| • Heat gun                         | • Petroleum jelly or wire pulling lubricant (food-grade) |
| • Tape measure                     | • Teflon tape or pipe thread sealant                     |
| • Ruler                            | • Fish tape or rope (for long runs over 30 m / 100 ft)   |
| • Flat-head screwdriver (4" shaft) | • Voltage tester                                         |
| • Crimping tool                    | • Optional: vacuum and sponge 'mouse' for long pulls     |

## System Overview — How the ProLine System Works

### Cable Anatomy

The ProLine self-regulating heating cable has the following layers from the inside out:

**Two Copper Bus Wires:** Carry electrical current along the full length of the cable

**Self-Regulating Heating Core:** Conductive polymer that generates heat — automatically increases output as temperature drops

**Inner Jacket (polyolefin):** Provides electrical insulation between the heating core and the ground braid

**Ground Braid (tinned copper):** Provides grounding and protection against electrical shock

**Outer Jacket (fluoropolymer / PVDF):** NSF/ANSI 61 certified for direct potable water contact — chemical and abrasion resistant

### How the System is Assembled

**End Seal Installation:** Heat shrink tubing is applied to the far end (non-power end) of the cable inside the pipe, creating a watertight seal to prevent water ingress at the cable tip.

**Cable Insertion:** The cable is pushed or pulled through the pipe to the required depth. The outer jacket's smooth surface and a food-grade lubricant allow the cable to slide easily through most pipes.

**Compression Fitting Assembly:** The ILSR compression fitting (3/4" NPT) is threaded into a tee or fitting in the pipe, and the cable exits through the fitting's rubber grommet. Tightening the compression cap creates a watertight seal around the cable.

**Power Splice Connection:** The cable's copper bus wires are connected to the power cord using insulated splice connectors and heat shrink tubing, creating a weatherproof electrical junction outside the pipe.

**Electrical Connection:** The GFI cord set is plugged into a dedicated 15A outlet (120V) or hard-wired to a GFCI-protected circuit (240V). The built-in GFI provides ground fault protection.

### Planning Your Installation

Before beginning installation, determine the following:

- Entry point location — ideally inside the building, close to the electrical supply, and at a location accessible for future servicing.
- Pipe run length — measure from the entry point fitting to the furthest end of the pipe needing protection.
- Pipe bends and fittings — note the number and severity of bends. Gentle sweeping bends are acceptable; sharp elbows or right-angle fittings may require additional access couplings for cable insertion.
- Electrical supply — confirm a dedicated 15A circuit (120V) or dedicated GFCI-protected 240V circuit is available near the entry point.
- Insulation needs — insulation is required on all above-ground pipe sections and is strongly recommended on shallow-buried or exposed runs.

**NOTE:** The cable entry fitting (tee connection) must always be installed in an accessible location above ground, inside a building, or in a weatherproof enclosure. Do not bury the fitting or install it in a location that could become flooded.

## Installation — Standard Polyethylene (PE) Pipe

The following instructions apply to polyethylene water supply pipe installations using a compression tee fitting. The compression tee is threaded with a 3/4" FNPT female thread to accept the ILSR Compression Fitting Assembly.

**IMPORTANT:** Your ProLine cable arrives with the End Seal and Power Splice pre-assembled at the factory. The cable is ready to insert into the pipe — no additional end seal preparation is required.

### 1

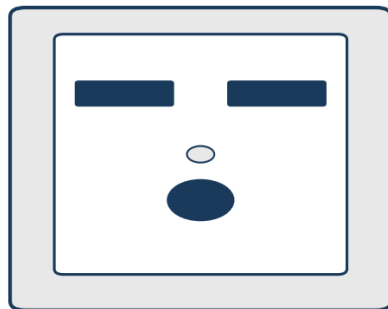
#### Prepare Electrical Circuit

A single dedicated 15-amp circuit is required. Have a licensed electrician verify the circuit is properly installed, grounded, and protected. Do not use extension cords.

120V: Use a 5-15R outlet (standard 15A receptacle).

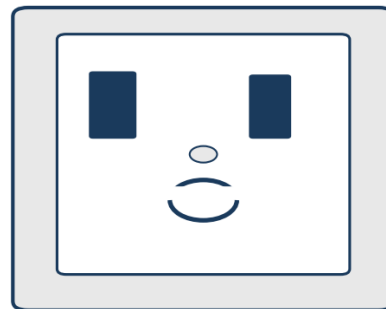
240V: Hard-wire to a dedicated GFCI-protected double-pole 15A breaker.

240V / 15A Circuit



NEMA 6-15R

120V / 15A Circuit



NEMA 5-15R

*A single dedicated 15A circuit is required. Have a qualified electrician perform all electrical work. Do not use extension cords.*

Fig. 1 — 120V and 240V dedicated circuit outlet types

### 2

#### Locate Entry Point & Cut Pipe

Determine the entry point — preferably inside the building, near the electrical supply.

Turn off the water supply and drain the pipe section to be cut.

Cut a section of pipe as shown in the Ordering Guide pipe section table (page 6).

**CAUTION:** Do not cut the pipe too short — the pipe ends must extend into the compression

tee far enough to make a secure compression joint. Cut pipe ends must be square and clean.

Smooth and de-burr all pipe cut ends before assembly.

## Step 2 — Remove Pipe Section to Create Entry Point

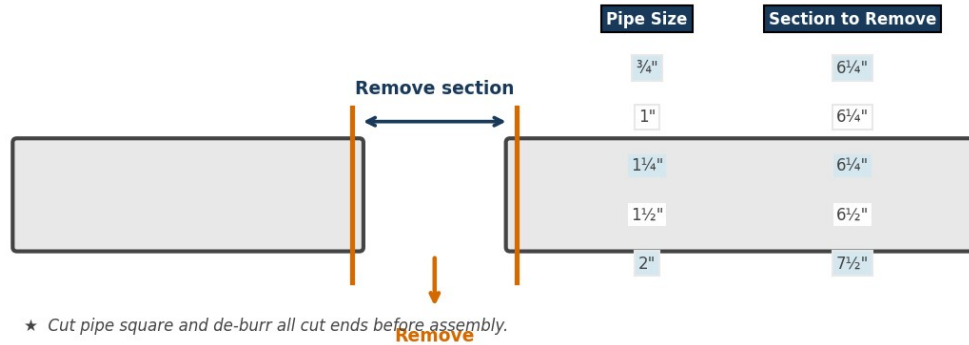


Fig. 2 — Remove the required pipe section to create the installation access point

3

### Prepare Tee Fitting for Pipe

Slide the compression nut, collet, reducing cone (if required for pipe size), and O-ring onto each end of the pipe that will connect to the tee fitting body.

**IMPORTANT:** Ensure the taper of the collet faces toward the nut.

The electrical entry side of the tee fitting is factory-sealed — do NOT tighten the nut on the side where the cable and cord exit the fitting.

4

### Verify Cable Assembly Before Insertion

Your ProLine cable arrives factory-assembled with the End Seal heat-shrunk and sealed at the far (non-power) end of the cable. The Power Splice connection is also pre-made.

Inspect the End Seal for any damage before inserting the cable.

A 2 m (6 ft) pull cord is included for runs over 30 m (100 ft) or pipe with multiple bends.

5

### Insert Cable Into Pipe

Thread the cable (End Seal end first) through the ILSR Compression Fitting Base and into the pipe at the tee location. See full insertion instructions on page 12.

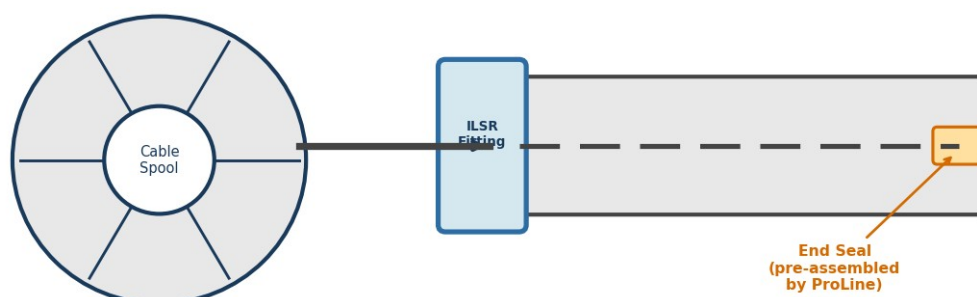
Apply food-grade petroleum jelly or wire pulling lubricant to the cable to ease insertion.

Push or pull the cable until the End Seal reaches the desired depth inside the pipe.

Do not use sharp instruments or excessive force when feeding the cable.

**NOTE:** The cable can typically be pushed up to 30 m (100 ft) in straight, downhill runs without a fish tape. Longer runs or those with bends will require pulling methods.

## Inserting the Cable Into the Pipe



Push cable slowly — footmarks on jacket show insertion depth

Fig. 3 — Push cable (End Seal end first) through the ILSR fitting and into the pipe

6

### Assemble Compression Tee Fitting

Push each pipe end fully into the tee fitting body until it seats against the internal stop.

Tap the insert (O-ring side) into the pipe end using a forked flat object — do not hit the cable jacket.

Slide the collet and nut up to the fitting body. Engage the nut threads and tighten firmly with a wrench.

**IMPORTANT:** Do NOT over-tighten the nut on the electrical exit side of the tee. This side is sealed at the factory.

Repeat for both pipe ends of the tee.

7

### Assemble Compression Fitting & Seal Cable Exit

Thread the Compression Base of the ILSR fitting into the tee fitting's NPT port using Teflon tape.

Slide the Compression Grommet and Compression Bushing over the cable.

Thread the Compression Cap onto the Compression Base and tighten to 2.7 Nm (24 in-lbs)

or until the cap contacts the base. Do not over-tighten.

Ensure the cable does not twist during tightening.

8

### Test Plumbing & Energize System

Restore water supply and check all fittings for leaks.

Pressure testing prior to energizing is recommended.

Remove the 2 m pull cord if it was used (see page 12).

Complete electrical connection as described in the Electrical System Connection section (page 13).

Perform the GFI test as described in the Electrical System Connection section.

Your ProLine system is now fully functional.

## Installation — NPT Threaded Fitting (PVC, Copper, ABS, Iron, PEX)

This installation method applies when the pipe is not polyethylene, or when the entry point is at an existing threaded connection in the plumbing system. The ILSR Compression Fitting Base (3/4" NPT male) threads into a 3/4" FNPT female port on a tee, wye, or other fitting installed in the pipe system.

### **METAL PIPE CAUTION**

When installing in metal pipes (copper, galvanized, iron), ensure all pipe ends are de-burred and reamed smooth. Sharp edges inside the pipe **WILL** damage the cable outer jacket.

### **1 Install Tee Fitting in Pipe System**

Install a plumbing tee fitting in the pipe at the planned entry point (inside the building near the electrical supply). The tee must have a 3/4" FNPT (female NPT) branch port to accept the ILSR Compression Fitting Base.

For copper pipe — use a sweat tee or threaded tee adapter.

For PVC/ABS pipe — use solvent-weld or threaded tee.

For iron/galvanized — use a standard threaded tee.

Apply Teflon tape or pipe thread sealant to all male threads. Smooth and de-burr all internal edges.

**RECOMMENDATION:** Orient the tee so the cable runs straight through the tee body (water flows through at 90 degrees to the cable run) for easiest insertion.

### **2 Verify Cable Assembly**

Your ProLine cable arrives factory-assembled — the End Seal is pre-applied at the far end of the cable and the Power Splice is pre-made. The cable is ready to insert.

Inspect the End Seal for any damage. If the run exceeds 30 m (100 ft) or has multiple bends, attach the included 2 m (6 ft) pull cord to the End Seal end of the cable before insertion.

### **3 Thread ILSR Compression Base Into Tee**

Apply Teflon tape to the 3/4" NPT male threads on the ILSR Compression Fitting Base.

Thread the Compression Base into the tee fitting port by hand, then tighten with a wrench.

Ensure the cable entry grommet area is oriented for easy cable exit toward the electrical supply.

## ILSR Compression Fitting — Assembly Components

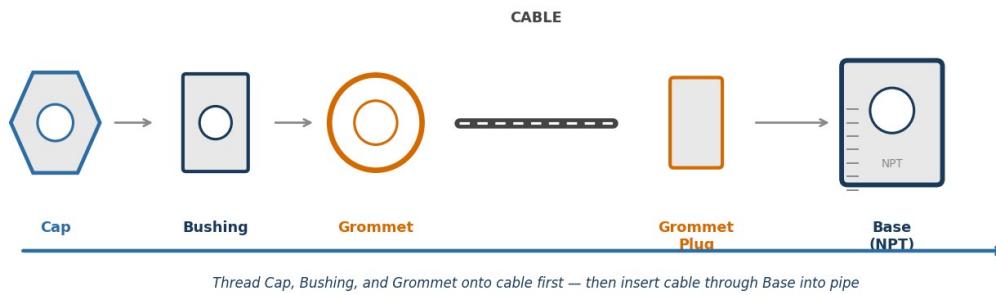


Fig. 4 — ILSR Compression Fitting components — thread Cap, Bushing, and Grommet onto cable before inserting

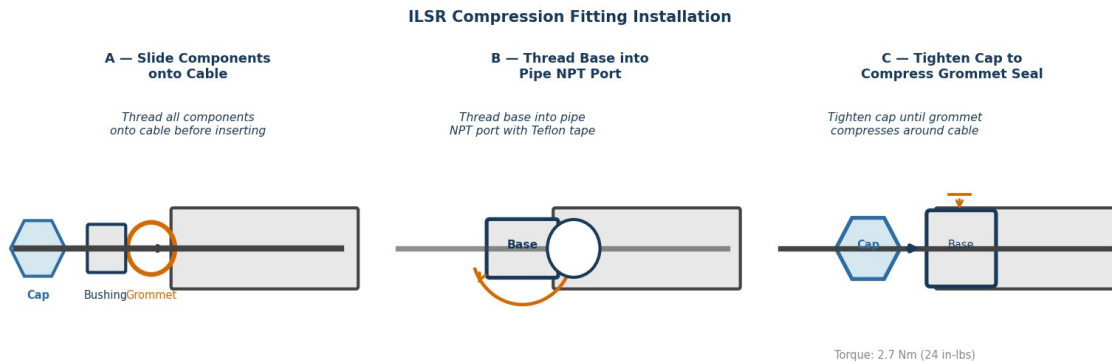


Fig. 5 — Fitting installation: (A) thread components onto cable, (B) thread base into NPT port, (C) tighten cap to seal

4

### Apply Lubricant and Insert Cable

Apply food-grade petroleum jelly or wire pulling lubricant generously to the cable.

Feed the cable (End Seal end first) through the Compression Fitting Assembly and into the pipe.

Push or pull the cable to the required depth. See full cable insertion instructions on page 14.

Apply non-toxic (potable) grease to the top tapered edge of the rubber sealing grommet.

5

### Seal the Cable Exit

With the cable at the correct depth, slide the Compression Grommet and Compression Bushing over the cable toward the Compression Base.

Thread the Compression Cap onto the Compression Base. Tighten to 2.7 Nm (24 in-lbs).

**IMPORTANT:** Hold the cable stationary while tightening to prevent the cable from twisting inside the pipe. Ensure the rubber grommet is not twisting during tightening.

Tighten the nut until the compression collar stands proud 3/16" above the fitting body.

## 6

### Test & Energize

Restore water supply pressure and check all connections for leaks.

Complete electrical connection as described in the Electrical System Connection section (page 13).

Perform GFI system test before leaving the system in service.

Your ProLine system is now fully functional.

**NOTE:** For pipe diameters larger than 2" ID (up to 6"), two parallel heating cables may be required. When using dual cables, tie the cables together using 14 AWG copper wire every 2 m (6 ft) to prevent them from coiling inside the pipe. Two ILSR kits are required for dual-cable installations.

## Installing the Cable Into the Pipe

The heating cable is inserted into the pipe End Seal first (toward the far end of the pipe being protected). The cable's self-regulating core gives it enough rigidity to be pushed through most straight pipe runs.

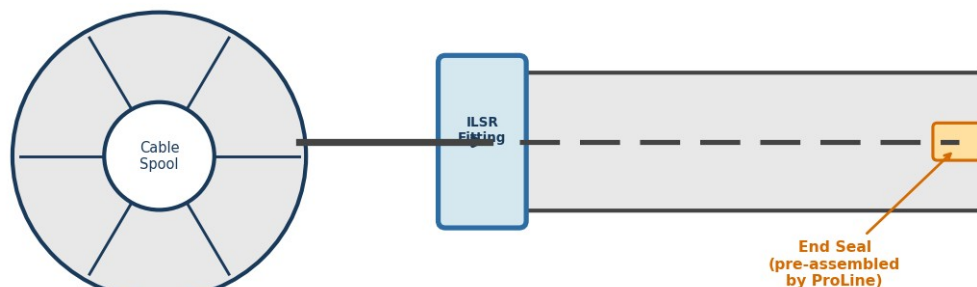
### Pushing Method (Runs up to ~30 m / 100 ft, Straight)

Apply food-grade petroleum jelly or wire pulling lubricant generously to the outer jacket of the cable before insertion. This greatly reduces insertion friction.

Straighten the cable as much as possible. Feed the End Seal end into the pipe through the Compression Fitting Assembly. Push the cable slowly and steadily. The cable contains printed "Footmarks" — length numbers on the outer jacket every 30 cm (12") — use these to track how much cable has been inserted and how much remains.

Continue pushing until the End Seal reaches the desired depth. The cable can typically be pushed more than 30 m (100 ft) in straight, downhill runs.

Inserting the Cable Into the Pipe



*Push cable slowly — footmarks on jacket show insertion depth*

Fig. 6 — Feed cable (End Seal first) through the ILSR fitting and push into pipe

### Fish Tape Method (Longer Runs)

For runs longer than 30 m (100 ft) or where pipe has multiple bends, use a fish tape:

1. Run the fish tape through the pipe from the far end to the entry point.
2. Attach the fish tape to the Pull Cord (which is attached to the cable).
3. Pull the fish tape from the far end, drawing the cable through the pipe.
4. Pull slowly and carefully — maximum pull force is 220 N (50 lbs). Do not apply more force than this.

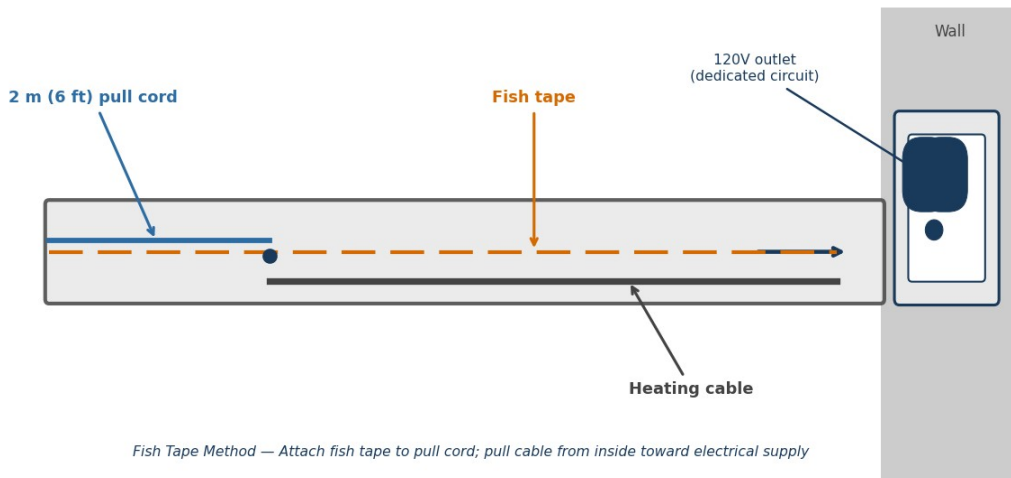


Fig. 7 — Fish tape method: attach fish tape to pull cord and draw cable through from inside

### Vacuum/Mouse Method (Very Long Runs)

For very long runs, a vacuum and sponge 'mouse' can be used to draw a cord through the pipe, which is then used to pull the cable:

1. Attach a 1/8" mason line to a small sponge that fits inside the pipe diameter.
2. Place the sponge at the far end of the pipe. Apply a vacuum at the entry end to draw the sponge (and attached mason line) through the pipe.
3. Use the mason line to pull the fish tape through the pipe, then attach and pull the cable.

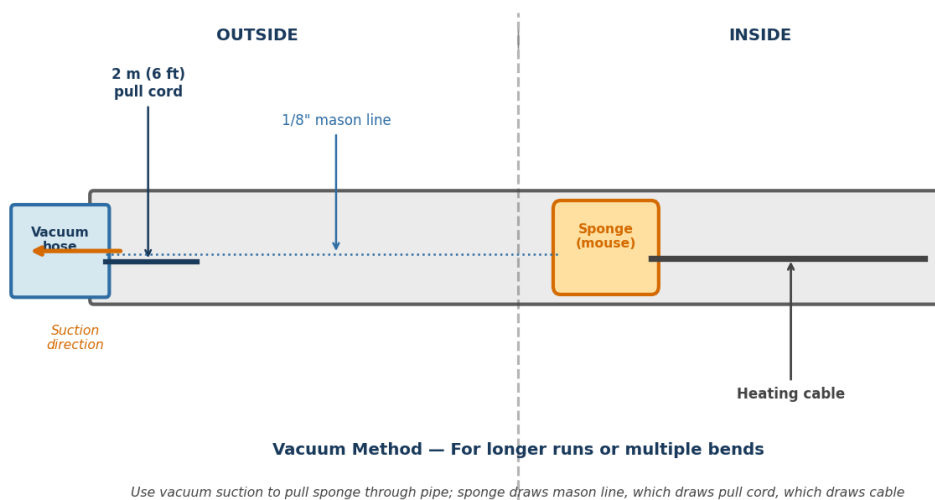


Fig. 8 — Vacuum method: vacuum suction draws sponge through pipe, pulling mason line and cable

**NOTE:** For extra-long runs requiring intermediate access, couplings can be cut into the pipe to provide additional entry points for cable insertion. Use compression couplings so the plumbing system remains sealed.

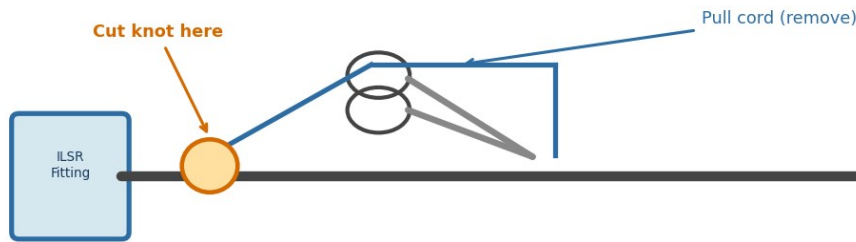
### After Cable Insertion — Remove Pull Cord

A 2 m (6 ft) pull cord is included for long cable runs. If used, remove it after the cable is fully inserted:

1. Once the cable is fully inserted, cut the knot at the pull cord attachment point.

2. Remove the cord by pulling on whichever side moves most easily.
3. Remove by pulling — do not cut the cord from the cable jacket.

#### Removing the Pull Cord After Cable Insertion



*Cut the knot and pull the cord free — pull from whichever side moves most easily*

*Fig. 9 — Cut the knot and pull the cord free after cable is fully inserted*

#### **⚠ DO NOT ALLOW OPEN END OF CABLE TO CONTACT WATER**

Before the End Seal is fully installed and before the cable is connected to power, ensure the non-sealed end of the cable does not contact water. Water infiltration into the cable core will damage the cable and may result in electrical shock and/or cable failure.

### Single-Cable vs. Dual-Cable Pipe Configurations

**Config 1 — Small Pipe (3/4" to 2" ID), Serviceable End Seal:** Cable enters through one ILSR fitting. End Seal exits through a second ILSR fitting (CFIL, additional compression fitting). Both fittings are accessible for service.

**Config 2 — Small Pipe (3/4" to 2" ID), Non-Serviceable End Seal:** Cable enters through one ILSR fitting. End Seal remains inside the pipe. Simpler installation but cable cannot be removed without cutting pipe.

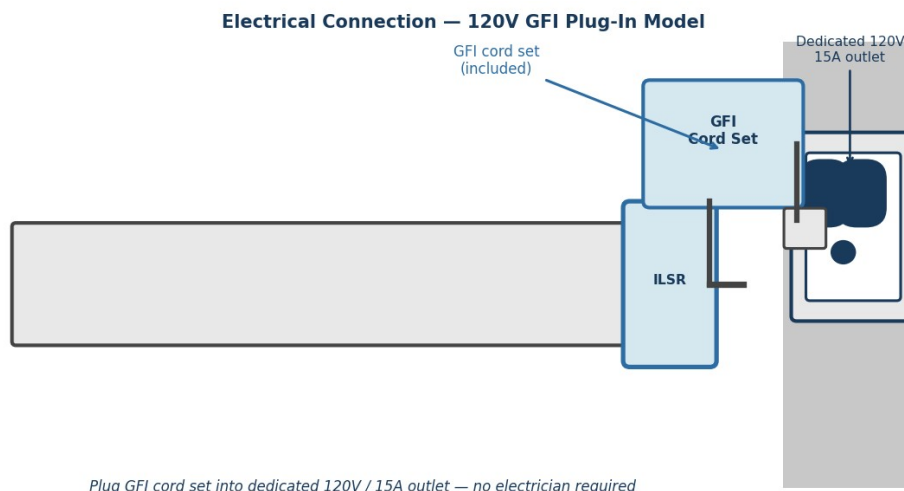
**Config 3 & 4 — Large Pipe (2" to 6" ID), Dual Cable, Serviceable:** Two parallel cables installed in the same pipe. Each cable has its own ILSR kit. End Seals can exit through a second ILSR fitting.

**Config 5 & 6 — Large Pipe, Loop-Back:** Single cable is looped back inside the pipe (180° turn). Both ends of the cable exit through the same ILSR fitting. Minimum bend radius: 25 mm (1").

## Electrical System Connection

### 120V GFI Plug-In Model (GFI Cord Set)

- A. Ensure the Power Splice is complete and the cable is fully inserted to the correct depth.
- B. Plug the GFI cord set into your dedicated 120V 5-15R outlet (standard 15A receptacle).
- C. Press the RESET button on the GFI cord set. The pilot light should illuminate (ON). If the light does not come on, check power to the outlet. Do not remove or tamper with the cord set.
- D. Press the TEST button on the GFI cord set. The pilot light should go OFF. This confirms the GFI is functioning.
- E. Press the RESET button again. The pilot light should come back ON. Your ProLine system is now fully operational.
- F. Perform this GFI test at the start of each cold season and monthly throughout the winter while the system is in use.



*Fig. 10 — 120V GFI plug-in model: plug cord set into dedicated 15A outlet*

**Your ProLine system is now fully functional.** If the system fails to work at any time, call your ProLine distributor for technical assistance.

#### **⚠ GFI TRIPS AND CANNOT BE RESET**

If the GFI cord set trips and cannot be reset, this indicates the cable is damaged. The cable must be inspected, repaired, or replaced before the system is placed back in service. Do not bypass or defeat the GFI protection under any circumstances.

### 240V Hard-Wire Model (Cord Set — CS) into Junction Box

The 240V hard-wire version must be installed by a licensed electrician and inspected by the local electrical authority upon completion.

- A.** Ensure the ProLine system will be operated on a dedicated, ground fault protected circuit with over-current protection appropriate for the circuit conductor size and cable length.
- B.** Confirm power is disconnected at the breaker panel before proceeding.
- C.** Remove the approved junction box or NEMA 4X enclosure cover.
- D.** Route the ProLine cord-set wires into the box using the supplied strain relief fitting.
- E.** Connect wires using approved wire nuts: white to white (neutral), black to black (hot), green to green (ground).  
In a metal junction box, also connect green to the enclosure ground screw.
- F.** Double-check all wire connections are correct and tight.
- G.** Install the junction box cover.
- H.** Establish power to the circuit and test/reset the GFCI breaker for proper operation.
- I.** Test the GFCI at the breaker before each season and monthly while in use.

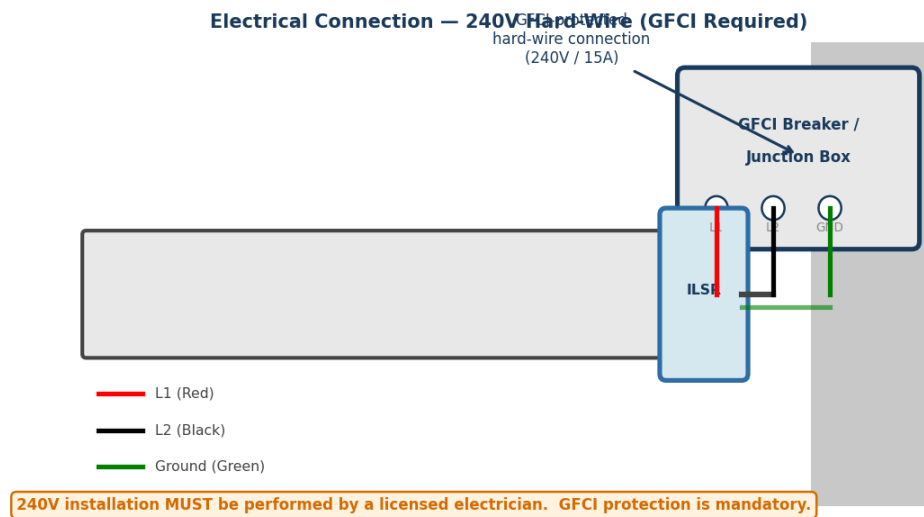


Fig. 11 — 240V hard-wire model: connect to GFCI-protected junction box (licensed electrician required)

## Control Devices, Thermostats & Insulation

Control devices are not required for basic freeze protection — the ProLine self-regulating cable will maintain pipe temperature automatically. However, thermostats and timers can reduce energy consumption significantly.

### Thermostats

A thermostat cycles the heating cable on and off based on measured pipe or ambient temperature, preventing unnecessary energy use during mild weather. The thermostat sensor should be mounted on the coldest section of the pipe, under any insulation if insulation is used.

Thermostat options include plug-in 120V models for GFI cord set installations, and hard-wire GFCI-protected models for CS installations. Contact your ProLine distributor for compatible thermostat accessories.

### Timers

Timers cycle the system on and off based on preset time intervals. While less precise than thermostats, timers provide a simple energy-saving option and are available in plug-in (GFI) and hard-wire (CS) models.

### Insulation

Insulation is strongly recommended for all ProLine installations and is required in the following situations:

- All above-ground pipe sections exposed to outdoor temperatures.
- Shallow-buried pipe sections (less than 1.2 m / 4 ft below grade in cold climates).
- Any section of pipe exposed to wind chill or drafts.

Insulation improves the energy efficiency of the system and increases freeze protection reliability. Minimum insulation wall thickness: 12 mm (1/2") for moderate climates; 19 mm (3/4") for very cold climates or above-ground applications. Use closed-cell foam, fiberglass, or foil/air bubble type insulation rated for outdoor use.

### Thermostat Sensor Placement

|                                    |                                                                                                                                                      |
|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Above-Ground Pipe</b>           | Mount thermostat sensor on the pipe, under the insulation, 3–6 m (10–20 ft) from the building entry. Entire above-ground pipe run must be insulated. |
| <b>Shallow Buried Pipe</b>         | Mount thermostat sensor on the pipe at the shallowest / coldest point of the pipe run, under insulation if insulation is present.                    |
| <b>Deep Buried (Near Building)</b> | Mount thermostat sensor at the point where the pipe emerges from the ground near the building, for accurate ambient air temperature reading.         |

### Operating Tips

- The ProLine system is to be operated whenever there is a risk of pipe freeze-up. In most regions, this means leaving the system energized from late autumn through early spring.
- If a thermostat is used, set it to maintain pipe temperature at 5°C (40°F) or above. Adjust the setpoint based on local climate and installation conditions.
- The pilot light on the GFI cord set should be illuminated (ON) whenever the cable is energized and the circuit is active. A dark pilot light indicates a tripped GFI or loss of power.
- Test the GFI at the beginning of each heating season and monthly during the winter. Press TEST — light should go off. Press RESET — light should come back on.

- Unoccupied properties should be checked regularly to confirm all systems are operating properly.
- If the system fails to thaw a frozen pipe within a reasonable time after power is restored, contact your electrical distributor or a licensed plumber.

## Adjusting Cable Length After Installation

In certain situations, it may be necessary to shorten the length of heating cable inside the pipe after installation. This can occur when a shorter cable was required but the system was ordered with extra length, or when the pipe being protected turns out to be shorter than planned.

### **DO NOT CUT THE HEATING CABLE**

NEVER attempt to shorten the cable by cutting it inside or outside the pipe.

The only approved method for reducing internal cable length is the extraction method described below. Cutting the cable will destroy the end seal and void the warranty.

### Cable Length Adjustment Procedure

The following steps allow you to extract a portion of the heating cable from inside the pipe through the compression fitting, effectively reducing the in-pipe heating length:

**1**

#### **Shut Off System**

Turn off the water supply system and drain the pipe to relieve pressure. Unplug or de-energize the ProLine heating cable system completely.

**2**

#### **Remove Compression Nut**

Loosen and remove the compression nut at the electrical exit point of the fitting. Slide the nut along the cord out of the way — do not remove from the cord.

**3**

#### **Remove Compression Collar**

Carefully remove the red compression collar from the rubber entry seal grommet. You may need to gently pry with your fingers. Slide the collar up slightly.

**4**

#### **Clean Grease**

Wipe any existing grease from the rubber entry seal grommet and cable jacket.

**5**

#### **Extract Cable**

Carefully slide the heating cable through the rubber entry seal grommet by the required amount. The amount you extract equals the reduction in in-pipe heating length. Example: extracting 125 mm (5") of cable reduces in-pipe cable length by 125 mm.

**6**

#### **Apply Lubricant**

Apply non-toxic food-grade grease or lubricant to the

tapered edge of the rubber entry seal grommet. This prevents the cable from twisting when the nut is re-tightened.

**7**

#### **Replace Compression Collar**

Bring the compression collar back down to its original seated position on top of the entry seal grommet.

**8**

#### **Re-Install Nut**

Bring the nut back and loosely start the threads. Ensure all components are seated correctly.

**9**

#### **Tighten Nut**

Tighten the nut until the compression collar stands proud 3/16" above the fitting body. Ensure the entry seal grommet does not twist during tightening — the cable must be oriented so it curves naturally.

**10**

#### **Wipe and Test**

Wipe excess grease or lubricant. Restore water supply. Check for leaks before re-energizing the system.

## Lake & Outdoor Pipe Applications

ProLine systems are well suited for protecting lake-source water supply pipes, rural water intakes, and similar outdoor applications where the pipe runs from a water source to the building below the frost line.

### Outdoor Intersection / Existing Pipe Concept

When a water supply pipe runs from a lake or pond, the ProLine entry fitting should be installed at a location that remains accessible and above the high-water mark. The following approach keeps the cable entry fitting serviceable while protecting the pipe from the water source all the way to the building.

- Locate the entry fitting inside the building or in a weatherproof above-ground enclosure — never buried underground or where it could be submerged.
- The pipe from the lake must be 'splayed' or brought above ground at the shoreline to allow fitting access. Use sweep-radius elbows only — do not use sharp elbow fittings as the cable cannot navigate tight bends.
- Install the ProLine system so the cable runs from the entry fitting all the way through the above-ground section and down the buried pipe to the water intake.
- Mount the power supply (junction box or GFI outlet) in a weatherproof NEMA 4X enclosure above the high water mark at the same location as the fitting.
- Always install the cable entry fitting and power supply ABOVE the high water mark. Submersion of the fitting or power supply is a serious electrical hazard.

### Weighting/Ballasting Water Pipes in Lakes

Lake intake pipes must be weighted to prevent them from floating to the surface when water levels drop or during spring thaw. Pre-mixed concrete bags are a practical and environmentally acceptable method.

**NOTE:** Concrete products are generally environmentally safe. However, check with local environmental authorities before placing concrete in or near a lake or waterway. Use paper-wrapped bags (not plastic) as paper will naturally deteriorate and allow concrete to cure in place.

Concrete bag placement guidelines:

- Place pre-mixed concrete bags (typically 30 kg / 66 lb) over the pipe at intervals as required to hold the pipe on the lake bottom. "Straddle" the pipe with the bag and drop it in place dry — do not try to move it once placed.
- Bags must be placed in the critical gradient zone — from the low water mark to the high water mark — where the pipe may become exposed as water levels drop seasonally.
- Below the low water mark, the pipe is always submerged and does not need weighting.
- Insulate the pipe section between the low water mark and the building entry. When water recedes in autumn, the exposed insulated pipe must be weighted down as insulation is buoyant and will cause the pipe to float.
- The ProLine cable inside the insulated section provides freeze protection when the pipe is exposed above the water line.

## Maintenance & Troubleshooting

### Routine Maintenance

|                                           |                                                                                                                                                                                       |
|-------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Monthly (during heating season)</b>    | Test the GFI cord set — press TEST button (light should go OFF), then RESET (light should come ON). If the GFI cannot be reset, the cable is damaged and must be replaced.            |
| <b>Start of each heating season</b>       | Test the GFI as above. Inspect the power splice connection and compression fitting for any signs of moisture, corrosion, or damage. Check that all insulation is in place and intact. |
| <b>Annually</b>                           | Have a licensed electrician verify the dedicated circuit is functioning correctly and that ground fault protection is operational.                                                    |
| <b>After any work on the water system</b> | Always unplug or de-energize the ProLine system before working on the plumbing. Re-test the GFI after power is restored.                                                              |

### Troubleshooting Guide

| Symptom / Issue                                                | Possible Cause & Solution                                                                                                                                                                        |
|----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>GFI pilot light is OFF / no power to cable</b>              | Check that the GFI cord is plugged in and the outlet has power. Press RESET on GFI. If GFI cannot be reset, cable may be damaged — contact distributor.                                          |
| <b>GFI trips repeatedly</b>                                    | Cable is likely damaged. Do not bypass the GFI. Remove the cable system and contact your ProLine distributor for replacement.                                                                    |
| <b>Pipe still freezing despite system being on</b>             | Verify GFI pilot light is ON. Check that insulation is present on all above-ground sections. Consider adding a thermostat. Confirm the cable extends to the full length of the freezing section. |
| <b>Water leak at compression fitting</b>                       | Shut off water and de-energize system. Inspect compression tee fitting. Tighten compression nuts if loose. Re-test with water pressure.                                                          |
| <b>Visible water at power splice location</b>                  | Immediately unplug or de-energize the system. Inspect the power splice heat shrink for damage. If the power splice is not fully sealed, the cable must be replaced.                              |
| <b>System energized but pipe froze (power outage occurred)</b> | This is expected behavior during a power outage. Once power is restored and the GFI is reset, the cable will re-energize and thaw the pipe. In most cases no pipe damage occurs.                 |

## Limited Warranty

ProLine Heaters warrants to the original purchaser that this product is free from defects in materials and workmanship for a period of TWO (2) YEARS from the date of original purchase. ProLine Heaters will, at its option, repair or replace any defective product covered under this warranty at no charge for parts. Labor, installation, and removal costs are not covered by this warranty.

### This Warranty Will NOT Apply:

- Defects or malfunctions resulting from failure to properly install, operate, or maintain the product in accordance with the instructions provided in this guide.
- Damage resulting from abuse, accident, misuse, negligence, or unauthorized modification.
- Damage caused by exceeding the maximum pipe operating pressure of 60 PSI (414 kPa).
- Products installed in applications for which they are not approved (e.g., sewer lines, waste water systems, pipe pressures exceeding 60 PSI).
- Damage from pipe freezing caused by power failure, GFI tripping, or disconnection of the electrical supply.
- Products used in applications other than those described in this installation guide.
- Damage to the cable jacket caused by sharp pipe edges, mechanical impact, or improper installation.
- Normal wear and the integral ground fault device and related electronics.
- Products on which the serial number has been altered or removed.

### Warranty Service

To obtain warranty service, contact the electrical distributor through whom you purchased your ProLine system, or contact ProLine Heaters directly. You will be required to provide proof of purchase and a description of the defect.

ProLine Heaters shall not be liable for any incidental, indirect, special, or consequential damages arising from the sale, resale, use, or misuse of this product. ProLine Heaters reserves the right to make changes to its products or specifications without notice. This warranty gives you specific legal rights; you may also have other rights that vary by jurisdiction.

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ProLine Heaters | Available from your local electrical distributor | [www.prolineheaters.com](http://www.prolineheaters.com)

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