



# INSTALLATION MANUAL

INS-RF-P-202206-00



## 120V Preassembled Heating Cable for Pipe Freeze Protection

RF-P Series

ORF-P Series

BFPC1-1A Series

RFG-P Series

MFR-P Series

DRF-P Series



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Read through the entire instruction sheet before you begin.  
 Make sure you have selected the correct length of heating cable.

### Customer service

If you have any questions about this product, please contact our technical support team:

	Canada: 1 800 463-7043 • info@ouellet.com • www.ouellet.com USA: 1 800 525-3622 • USAinfo@ouellet.com • www.ouellet.com
	877 335-7790 • info@britech.ca • www.britech.ca
	1 800 526-7887 • info@delta-therm.com • www.delta-therm.com
	1 800 463-7043 • info@globalcommander.ca • www.globalcommander.ca
	1 800 463-7043 • www.momentoconfort.com

## A. General Information

### How Heating Cable Work

#### **The Problem**

Thermal insulation alone will not prevent pipes from freezing. For example, a 19mm (0.75in) pipe having 25mm (1in) thick insulation will freeze solid in only 13 hours when the ambient temperature is at -10°C (14°F). Frozen water pipes can burst causing loss of supply, flooding, and damage.

#### **The Solution**

An electric heating cable compensates the heat that is lost through the thermal insulation layer by keeping the pipe and water inside the pipe at a constant temperature. With a built-in bi-metallic thermostat (inside the black cap), the heating cable operates only when the thermostat is at a temperature of 4°C (40°F) or below.

### Heating Cable Application

The cable is mounted straight along the pipe and will protect pipes up to 3.8cm (1.5in) in diameter.

The electric heating cable is designed and approved for freeze protection of insulated metallic or plastic general water piping at the generally accepted maintenance temperature of 4°C (40°F) with approved accessories.



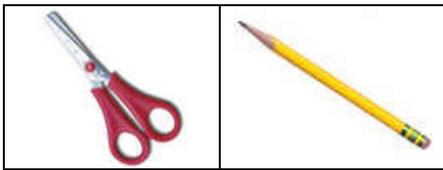
#### **Warnings:**

- Do not use on pipes heated above 65°C (150°F) such as steam lines.
- Never install in walls, floors or ceiling.
- Never install on plastic pipe unless pipe is filled with water.
- Do not use on waste lines, drain lines, fuel lines or hoses.
- Do not use for roof and gutter de-icing applications.

### **Material Required**

 <p><i>Electric Heating Cable</i></p>	 <p><i>Adhesive tape with thermal resistance greater than 80°C/175°F</i></p>	 <p><i>1/2in. fiberglass or equivalent non-flammable pipe insulation</i></p>
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### **Tools Required**



### **Receipt, Storage and Transportation**

#### **Receipt**

- Compare the materials against the invoice and check to verify the proper materials have been received. The cable's model number is printed on its label.
- Review design documents and check the received materials against the lists to verify all the needed materials were received.
- Inspect the heating cable and accessories to ensure there has been no in-transit damage.

#### **Storage**

- Cables and system components should be stored in a clean, dry area. The storage temperature range is -18°C to 60°C (0°F to 140°F).

#### **Transportation**

- Transport heating cables and connection components at a clean and dry location.
- During transportation, any contact with chemicals and petrochemical products must be effectively avoided.
- It must be ensured that the heating cables are protected against mechanical damage during transportation.

### **Before Installation**

The piping, insulation, electrical and instrument components need to be coordinated before the installation of the electric heat tracing system. Installation should begin only after most of the mechanical construction is complete. Make sure all mechanical testing (i.e. hydrostatic testing/purging) is complete and the system has been cleared.

If the cable is stiff (due to cold weather), first uncoil the cable and then power it with a 120V outlet until it is warm and pliable. Next, unplug and apply it to the pipe.



### ***Warnings***

These are vitally important safety warnings that must be followed. Failure to do so could cause overheating and result in serious fire hazard or electrical shock)

- Improper installation use and/or maintenance of electrical heating cable can cause fire, electric shock and/or freezing of pipe.
- Make sure there is a properly grounded electrical outlet close enough to plug in the cable.
- Heating cables must be installed in compliance with the (U.S.) National Electrical Code and Canadian Electrical Code. Ground fault protection (GFCI) of the power supply circuit is required.
- Proper installations are based on the use of manufacturer's specified parts only. Any substitute parts or vinyl electrical tapes should not be used.
- Do not connect power to the heating cable while it is coiled.
- Do not install damaged heating cable.
- Minimum pipe length is 0.9 m (3 ft.)
- Never alter the cable in any way. If made shorter, it will overheat. Once cut, the cable cannot be repaired.
- Do not install cable on more than one pipe.
- Never allow the heating cable to touch, cross or overlap itself at any point.
- Disconnect the cable from its power source during installation.
- Always keep the heating section of the system at least 2.5cm (1 in) away from combustible surfaces.

### **Caution**

- Do not install the electric heating cable system when the ambient temperature is colder than the minimum installation temperature 0°C (32°F).
- These instructions must be saved and made available to the owner and transferred to future owners.
- If after reading the following instructions, you still have questions regarding installation or operation of this heating cable, contact: Technical Support.

## B. Select the Proper Heating Cable Length

Use the following table to select the proper heating cable. (length)

Pipe Length	Pipe Diameter				
	1/2"	3/4"	1"	1.25"	1.5"
3'	3	3	3	3	3
4'	3	3	3	3 + 3	3 + 3
5'	3	3	3 + 3	3 + 3	3 + 3
6'	6	6	6	6	6
7'	6	6	6	3 + 6	3 + 6
8'	6	6	6	3 + 6	3 + 6
9'	9	9	9	9	9
10'	9	9	9	9	6 + 6
11'	9	9	9	6 + 6	6 + 6
12'	12	12	12	12	12
13'	12	12	12	12	6 + 9
14'	12	12	12	6 + 9	6 + 9
15'	15	15	15	15	15
16'	15	15	15	15	9 + 9
17'	15	15	15	9 + 9	9 + 9
18'	18	18	18	18	18
20'	18	18	18	18	9 + 12
22'	12 + 12	12 + 12	12 + 12	12 + 12	12 + 12
24'	24	24	24	24	24
26'	24	24	24	12 + 15	12 + 15
28'	12 + 15	12 + 15	12 + 15	12 + 15	12 + 18
30'	30	30	30	30	30
35'	18 + 18	18 + 18	18 + 18	18 + 18	18 + 18
40'	40	40	40	40	40
45'	18 + 24	18 + 24	18 + 24	18 + 24	24 + 24
50'	24 + 24	24 + 24	24 + 24	24 + 24	12 + 40
55'	24 + 30	24 + 30	24 + 30	24 + 30	18 + 40
60'	60	60	60	60	60
65'	6 + 60	6 + 60	6 + 60	6 + 60	6 + 60
70'	30 + 40	30 + 40	30 + 40	30 + 40	12 + 60
75'	15 + 60	15 + 60	15 + 60	15 + 60	15 + 60
80'	80	80	80	80	80
85'	24 + 60	24 + 60	24 + 60	24 + 60	6 + 80
90'	30 + 60	30 + 60	30 + 60	30 + 60	30 + 60
95'	18 + 80	18 + 80	18 + 80	18 + 80	18 + 80
100'	40 + 60	40 + 60	40 + 60	40 + 60	40 + 60

**Example:**

- 3 means: you need one 3' heating cable.
- 3+3 means: you need two 3' heating cables.
- 12+15 means: you need one 12' heating cable with one 15' heating cable.
  
- For pipe sizes not listed or for more information, contact the factory representative, please contact us.
  
- This design guide is based on the generally accepted maintenance temperature 4°C (40°F) for freeze protection.
  
- This design guide is calculated based on 0.5" fiberglass insulation. Closed-cell flexible foam insulation may also be used. If the overall R value of the insulation, protective barrier and waterproof barrier is not greater than 2.0.

## C. Installation Instructions

### Pre-Installation Check

- The heating cable should be tested to ensure electrical integrity with at least a 500 VDC megohmmeter (megger) between the grounding pin and any of the other two pins. Minimum resistance should be 20 megohmmeter. Readings below 20 megohmmeter may mean the electrical insulation has been damaged, and the heating cable must be replaced.
- Ensure the service voltage available is correct for the heating cable system.
- Inspect the piping system and plan the routing of the heating cable on the pipe. Remove any burrs, rough surfaces, or sharp edges at the same time. Remove dirt, rust, and scale with a wire brush. Remove oil and grease films with a suitable solvent.

### Laying Out the Heating Cable

**Standard Lengths:** to protect a pipe with a standard length of heating cable



- Apply the cable straight along the bottom of horizontal pipe or the “weather side” of vertical pipe

**Non-standard Lengths:** to protect a pipe with other than one standard length of heating cable



- Apply two separate cables on opposite sides of the pipe, starting from opposite ends.
- Overrun in the middle of the pipe should not exceed 0.9 m (3 ft).



#### **Warning:**

- Avoid pulling or jerking on the heating cable or installing against sharp edges.
- Do not kink or crush the cable, including walking on it or running over it with equipment.
- Warnings: Do not use metal attachments such as pipe straps or tie wire to attach the heater cable, as these may damage heating cable and cause electrical arcing or fire.

### Caution

- Once the heating cable has been run for the entire section, begin fastening it with application tape or good quality Listed fiberglass tape (listed fiberglass tape with temperature rating higher than 80°C (175°F) to the pipe.
- In order to keep the thermostat and the entire length of heating cable tightly in contact with the pipe, circumferential bands of tape should be installed at approximately 15cm (6in) intervals.
- The thermostat should be placed on the coldest end of the pipe.
- If necessary, hand-tightened plastic wire ties, which have a temperature rating higher than 80°C (175°F), may also be used to secure the cable.
- For plastic pipe systems, wrapping the plastic pipe with aluminum foil before installing the heating cable will improve heat transfer and provide more even heat distribution.



**Warning:** Substandard adhesive tapes may allow the cable to move at normal cable operating temperatures and could result in overheating, fire, or electrical shock.



**Warning:** Do not use metal attachments such as pipe straps or tie wire to attach the heater cable, as these may damage heating cable and cause electrical arcing or fire.

### **Bending, Crossing and Cutting the Heating Cable**

- The minimum bending radius is 8mm (5/16in). Do not bend the heating cable along the flat plane. Sharper bends than 8mm (5/16in) can damage the heating element.



**Warning:** This heating cable is not a parallel resistance cable. It cannot be cut to the desired length. Once cut, the cable cannot be repaired. Also, the cable should never be overlapped.

### Thermal Insulation



- After installing the heat tracing system, visually inspect the cable to ensure it is properly installed and there are no signs of damage.
- Use a maximum 17mm (0.5in) fiberglass (including pre-formed fiberglass) insulation over the cable and the thermostat to keep the heat tracing system working more efficiency.
- In order to protect the insulation from moisture, and physical damage, and to ensure the proper performance of the heat tracing system, a protective barrier (with an additional waterproof barrier over-wrapped in the opposite direction) should be installed over the system.
- Apply “Electric Traced” labels to the insulation weather barrier at intervals of 3 m (10 ft) along pipe, as a warning to maintenance personnel.



**Warning:** Never use more than 17mm (0.5in) of fiberglass insulation or other not fire-retarded insulation material for the heat tracing system. (The overall R value of the insulation, protective barrier and waterproof barrier should not be greater than 2.0). Over-insulation can cause the heating cable to overheat and cause fire hazard or electrical shock.

### **Electrical Requirements**

- Make sure that the heating cable load you are connecting is within the rating of your control system.
- The cable should be plugged into a permanently installed receptacle.
- Ground fault circuit breakers are required on all heater constructions per the National Electric Code. Use circuit breakers that incorporate 30-mA ground-fault circuit protection or equivalent levels of ground-fault protection.

### **Testing**

- It is recommended that after the installation of the thermal insulation and weather barrier but before energizing the circuit, another insulation resistance (megger) test should be performed. This should reveal any damage to the heating cable that may have occurred during the insulation installation.
- It is the installer's or electrician's responsibility to perform a series of tests on the heat tracing system at specific points at the start of and during installation of the heating cable.
- Quick identification of any heating cable damage is the most economic approach to troubleshooting an installation. The installation costs of the cable and thermal insulation are much greater than the heating cable.
- Once power is connected, but before putting the system into operation, verify all heating cable testing and documentation have been completed for each heat tracing circuit. This will ensure that the system has been installed per the manufacturer's recommendations.

### **Maintenance**

- Inspect the cable at the beginning of every heating season and monthly during operation.
- Preventive Maintenance: A preventive maintenance program is needed which will encompass both visual and electrical checks of the system. These should be done not only before initial operation of the system, but also on a scheduled basis. The checks should also be done after any maintenance has been performed.
- Check the system to verify that the insulation is not wet from rainfall. Wet sections of pipe can result in cold spots or frozen sections. If the insulation is damp or wet, it should be replaced.
- Turn off or disconnect the power when the heating season ends. Reconnect before the next heating season.



**Warning:** Disconnect the power connection before inspecting.

## D. Troubleshooting

Symptom	Problem Causes	Correction
Circuit Breaker Trips	Circuit breaker is undersized.	Replace the circuit breaker if defective or improperly sized.
	Defective circuit breaker.	Check to see if existing power wire sizing is compatible with larger sized breakers.
	Physical damage to the heating cable may be causing a direct short.	Check for where there may have been maintenance work done. Remove the insulation and replace the cable.
	GFCI is undersized.	Replace undersized GFCI with 30-mA GFCI.
Low insulation resistance	Nicks or cuts in the heating cable.	If heating cable is not yet thermal insulated, visually inspect the entire length for damage. If the system is thermal insulated, remove the insulation and replace the cable.
	Short between the braid and heating cable core or the braid and pipe.	
Frozen Pipe (The heating cable does not work)	Loose power connection.	If the light inside the power plug is not illuminated, check the power outlet or circuit to determine if it has power.
	The bi-metal thermostat inside the black cap is damaged.	Replace the damaged heating cable with a new one.
	There is another heat source near the bi-metal thermostat.	Remove the heat source.
	The heat output of the system cannot compensate the heat loss of the pipe.	Recheck the selection procedure to make sure you have selected the correct length and number of heating cables.