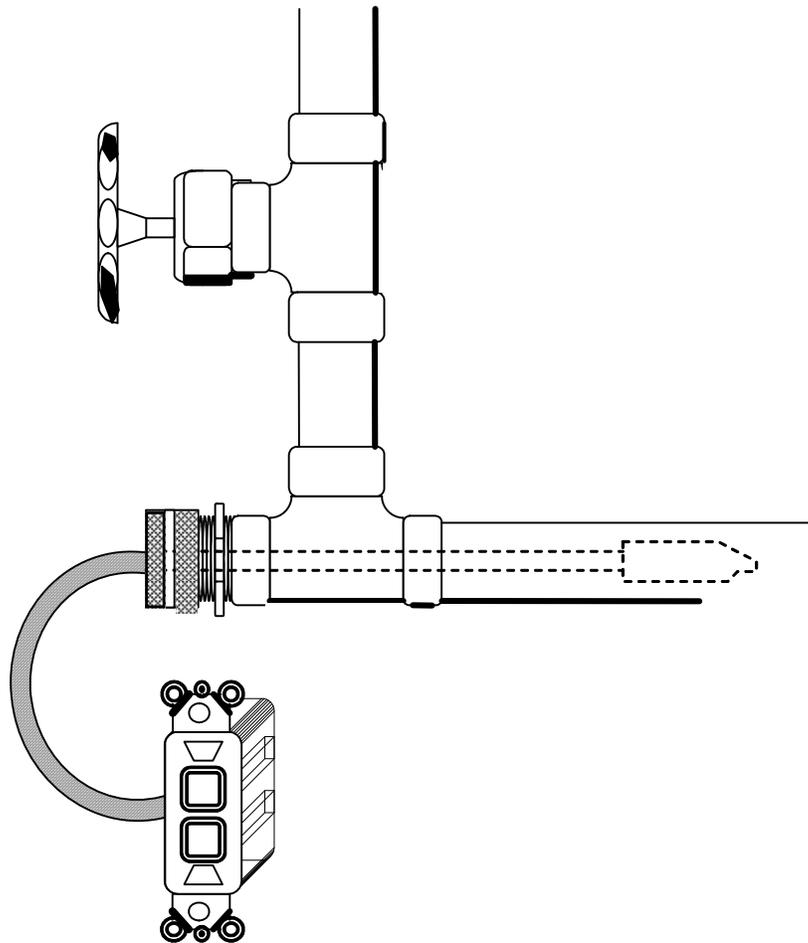


ARCTIC TRACE®

TL Series

***Installation Information
Operation and Maintenance***

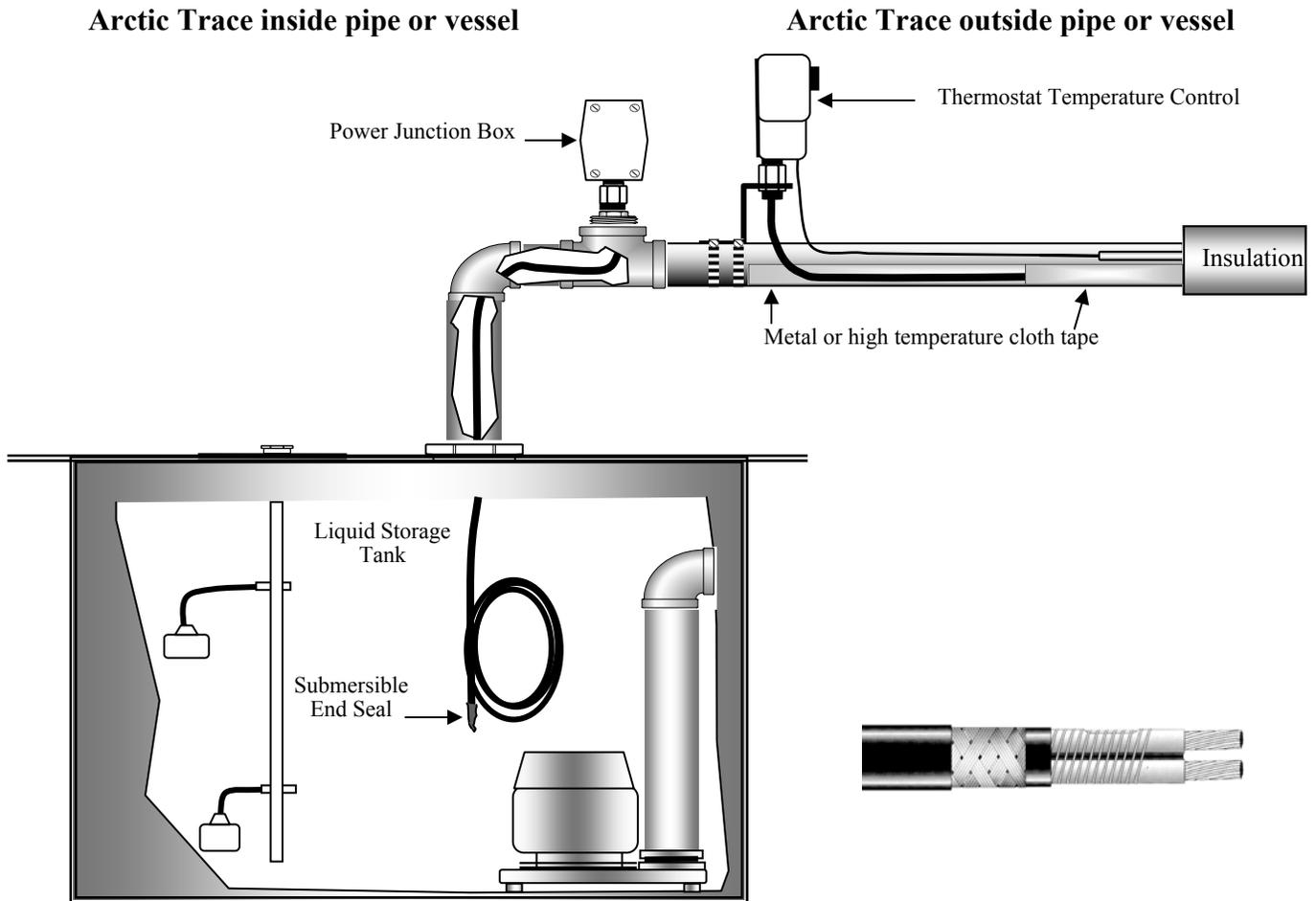


Submersible Heat Trace Freeze Protection System

du Alaska Incorporated

ARCTIC TRACE[®]

Typical Equipment Layout for Industrial Heating Cable in Ordinary Location



- A. Heat trace applications for long or short runs of buried or insulated liquid filled plastic or metal pipe, drains, watering points, or sewer and water outfall with minimum valve closure, we would suggest the use of TL Tefzel coated submersible cable inside the pipe.
- B. Runs of piping with numerous valve connection pumping equipment of less than 700' create a challenge for the heat trace installation, for those applications we suggest the use of type TL Temperature Limiting applied to the equipment or pipe surface.
- C. High temperature steam cleaning, sanitary, special O.E.M., or factory assembled heaters as specified with fitting and accessories we may suggest the use of TL or CW depending on the application. Consult Factory.

INSTALLATION INFORMATION

This information will provide a general overview of the procedures involved in the installation of The Arctic Trace heat cable systems.

- **Inspection**

Check all material received to insure that the proper voltage, AMP output, and the cable jacket are suitable for your application.

DO NOT install heat cable that shows any type of damage.

CAUTION:

DO NOT connect power to the heating cable while it is on a reel or in the shipping carton.

Installation Inside the Pipe

After Arctic Trace heat cable has been cut to length attach the waterproof end cap #305C as listed in these instructions and then test the cable per instructions.

Pull heat cable through pipe to be heat traced as you would any other electrical wire. Care should be taken to assure heat cable is not damaged by abrasions in the line. Do not place heat cable in any unsafe way such as valve closures, or any mechanical device that may cut or damage the cable.

Exit pipe from a 1/2" FNPT fitting (supplied by others) through 1/2" MNPT Pressure connector / strain relief #206C, as listed in these instructions. Run heat cable to a NEMA 4X junction box using #206C strain relief.

OR connect a pigtail or suitable flexible power cord as specified by the Project Engineers.

Power Connection

Before considering a connection to a voltage source, the circuit fabrication instruction for the specific cable type should have been carefully followed. Power connection, GFCI and pilot lights kits are available for various cable and should not be substituted, unless they conform to National, State, and Local Electrical Codes.

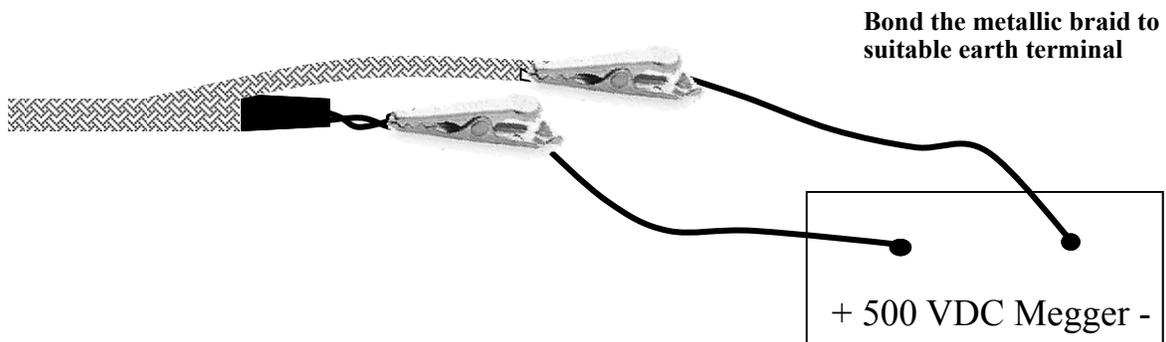
Before removing the cable from the reel, perform a dielectric resistance test with a 500 VDC meg-ohm meter (Megger) between the bus wires and ground. The minimum resistance reading should be 20 meg-ohms. Be sure all piping and equipment to be traced is completely installed and pressure tested. Equipment surfaces should be reasonably clean. Any loose scale, oil or rust should be removed.

Over-current protection device needs to be sized at 20% greater than the load.

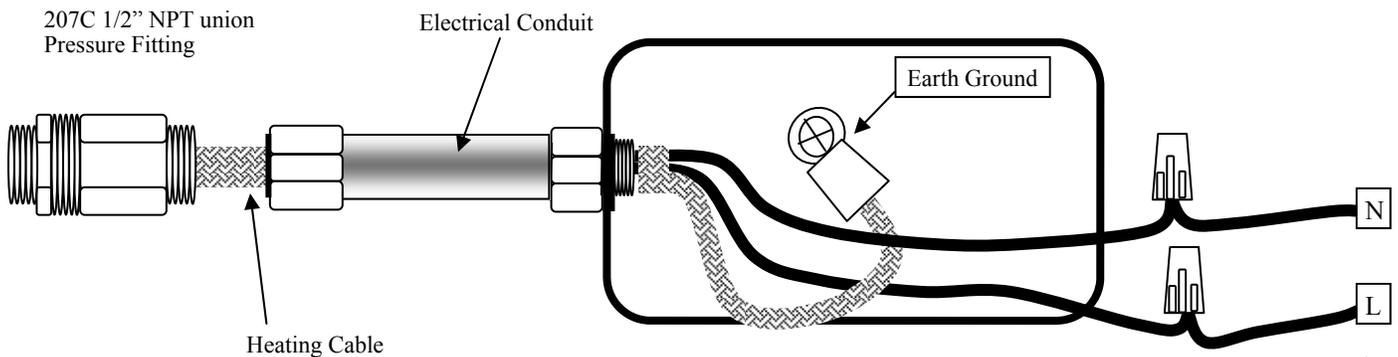
Heat cable must only be installed by a qualified electrician and all National, State, and Local Electrical Codes need to be followed.

Connect power with a suitable GFCI as required by National Electric Code.

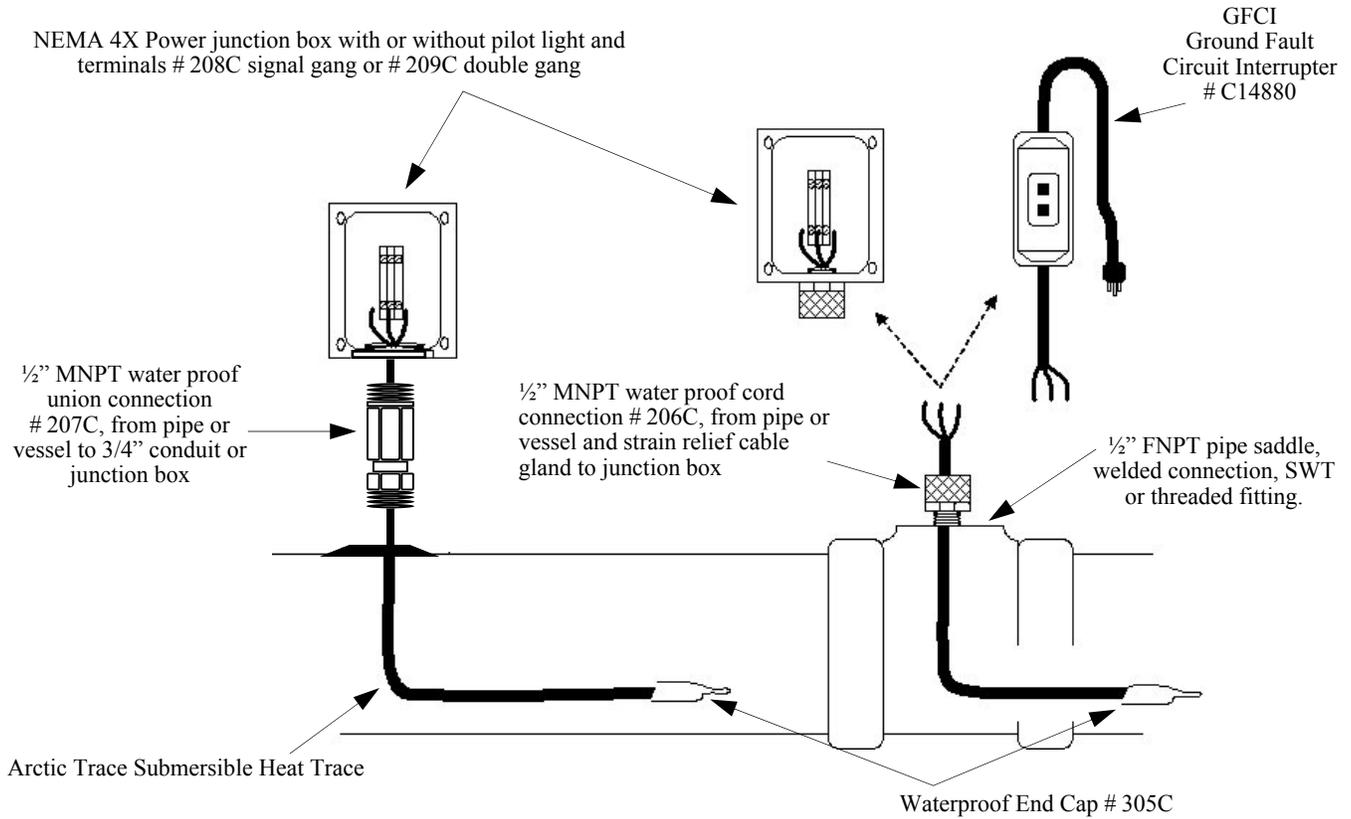
Dielectric Resistance Test



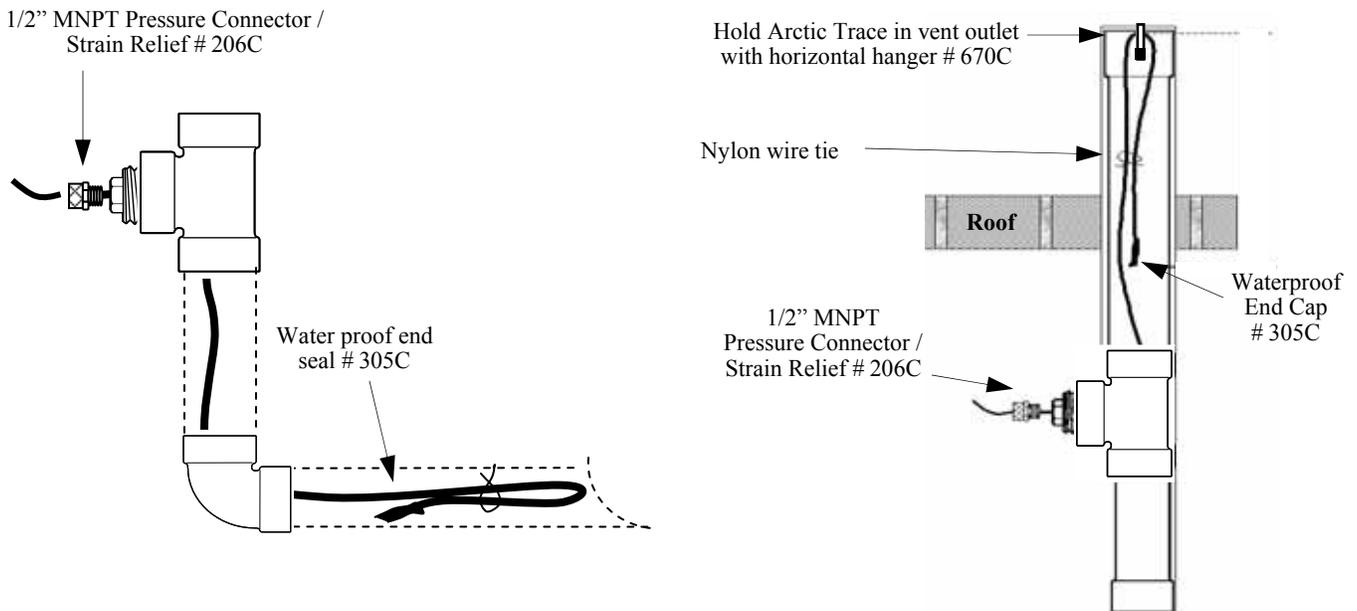
Power Connection



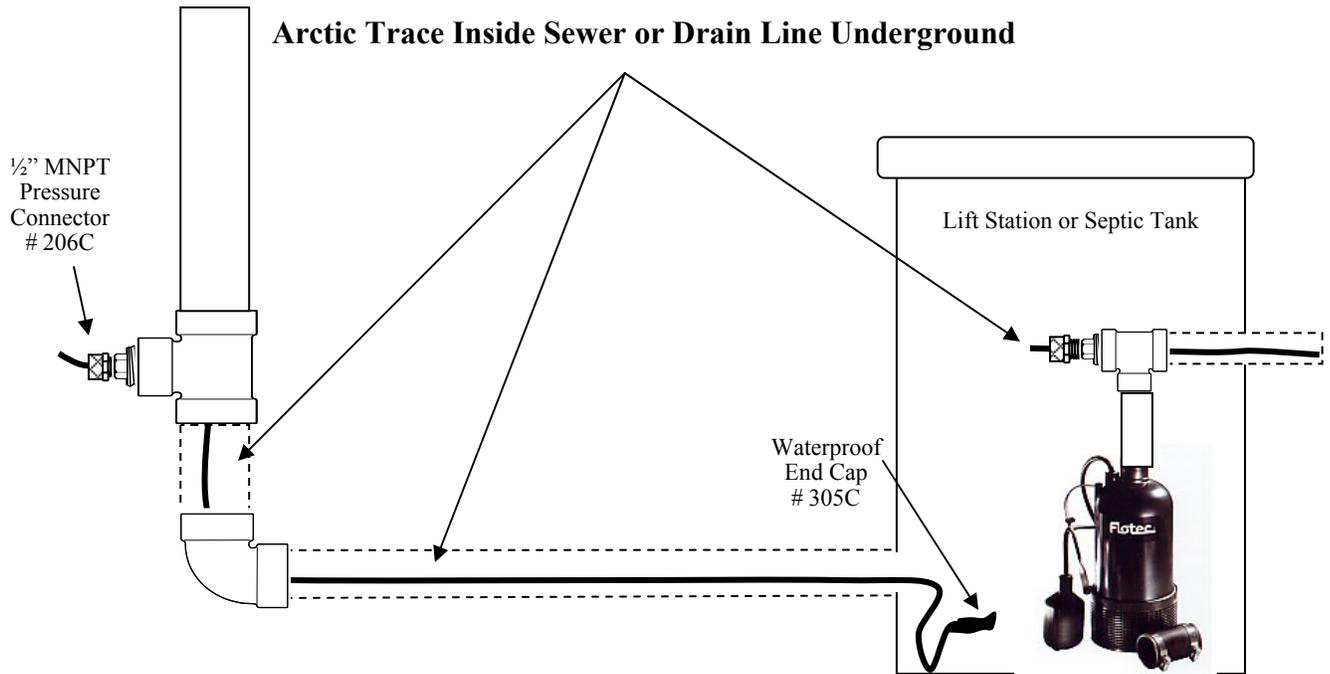
Arctic Trace Heat Cable Inside Pipe or Vessel



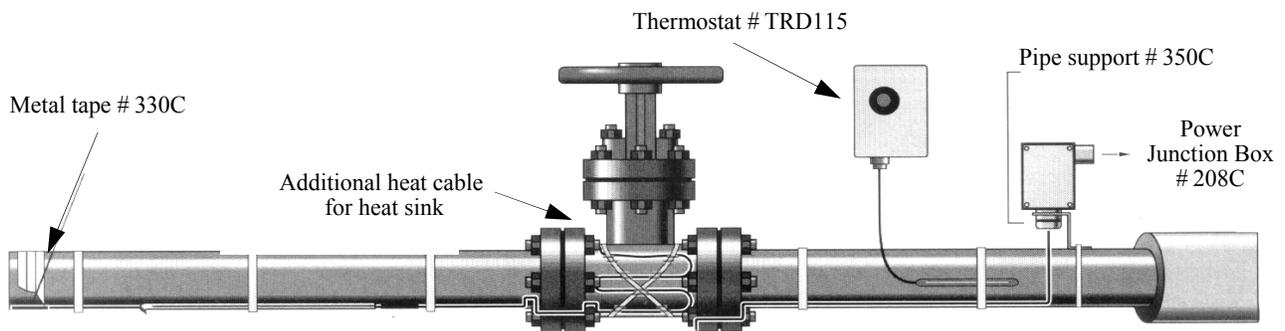
In drains and downspout to prevent freezing and in vent to prevent frost plugging



- Install cleanout with ½" female NPT connection.
- Loop Arctic Trace at the outlet of vent or drain pipe over itself for a minimum of a 3' loop.
- Hold loop in place with nylon wire ties on downspout application only.
- Push or pull Arctic Trace into position as shown in vent or drain pipe.
- Connect GFCI to heat cable and operate as needed to prevent vent freezing of vent opening.

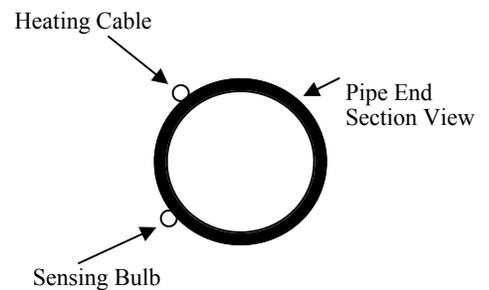


Arctic Trace Heat Cable Surface Mounted On Pipe or Vessel

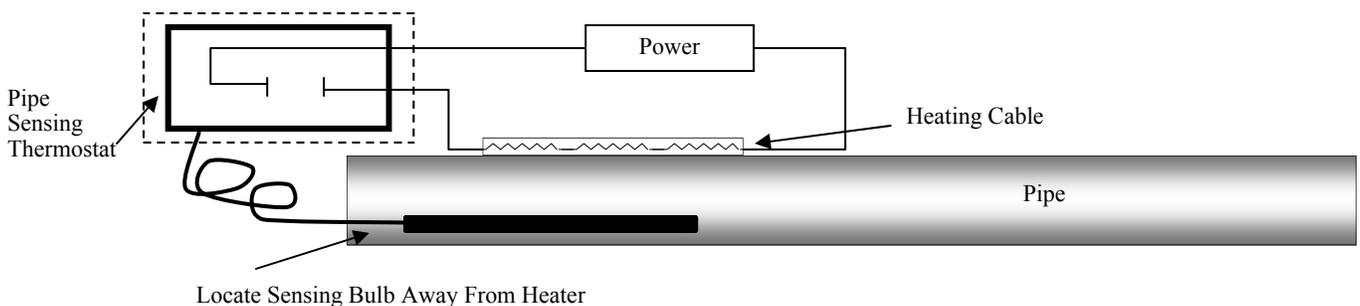


Installation on surface of pipe

Cable should be run straight or spiraled along pipe as required to provide for proper watt requirement output for the demand needed. Cable should be attached to pipe by the use of 2" metal tape # 330C allowing full heat transfer and equal heat distribution. Since surface mounting is not as efficient as inside the pipe mounting, additional cable must be applied to heat sinks like valves, pipe supports and flanges. When attaching temperature sensor, if required, attach to pipe with metal tape at 90° off set for multiple or single passes never on top or bottom of pipe.



Arctic Trace Heat Cable Control Option



Surface Mounting or Inside the Pipe or Vessel Installation Hazardous Locations

Arctic Trace maybe installed inside pipe or vessel or on the pipe or vessel surface for freeze protection or viscosity control of process fluids or gases.

Arctic Trace Installation:

Cut the Arctic Trace cable to length and install on pipe or vessel surface or inside pipe or vessel. Refer to Arctic Trace installation instructions.

Power Connection:

Connect heat trace to power using a GUATU26C hazardous location power connection kit. Install as shown in Fig G for heat tracing application inside pipe or vessel. Install as shown in Fig H for heat tracing application on pipe or vessel surface.

Heat Trace End Seal:

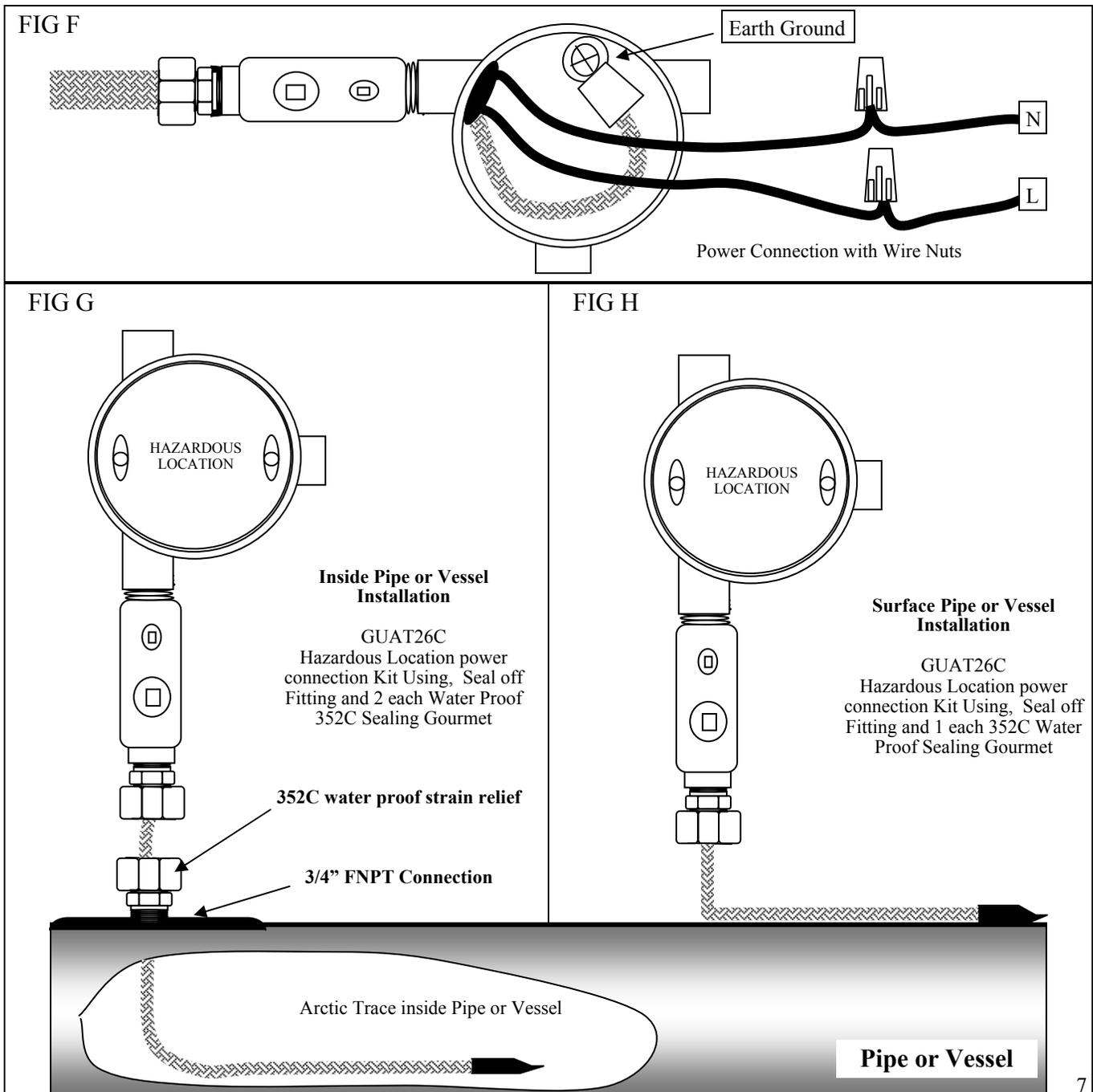
Install # 305C water proof end seal to any exposed heat trace end of line in accordance with end seal kit insulation. The kit will provide the required electrical insulation, braid coverage and stop and water liquid or gas infiltration into heating cable.

Code Compliance:

All wiring and safety devices need to be installed in accordance with State and Local codes.

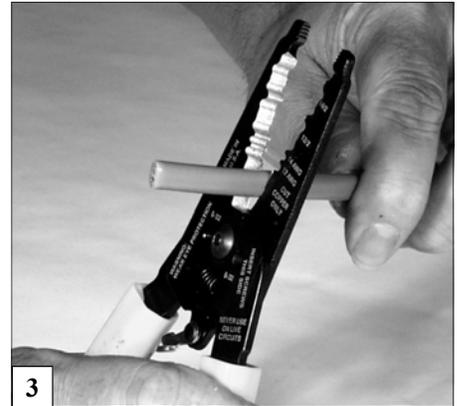
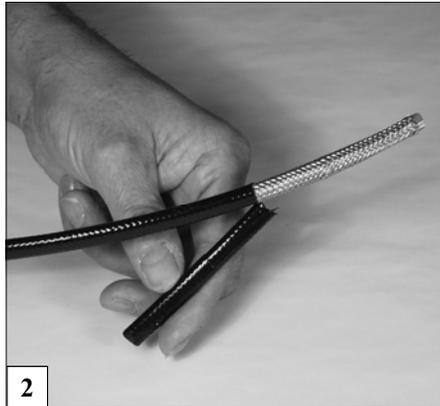
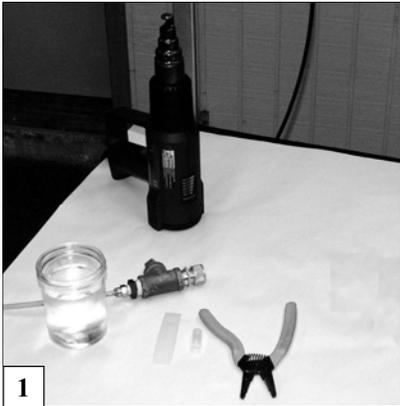
Heat Trace wiring:

Power connection should be connected in the junction box using wire nuts and crimp ground fitting shown in Fig F.

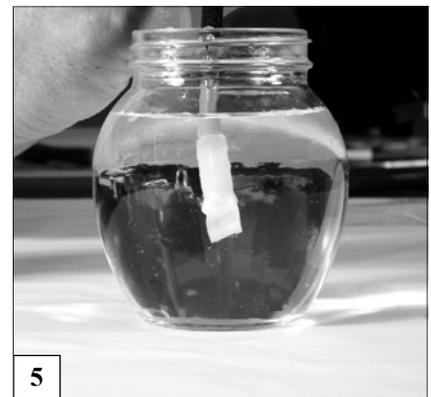
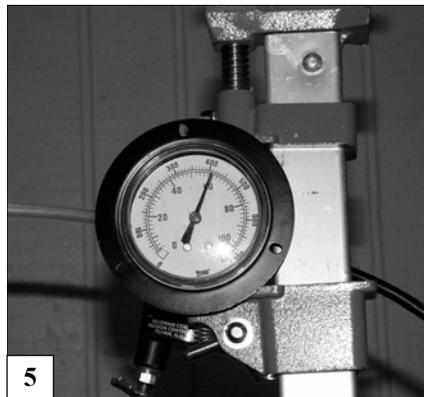
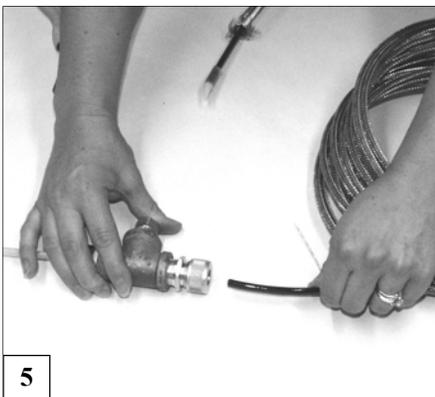
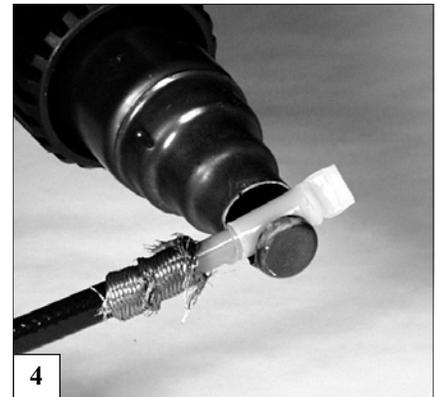


Instruction Sheet P/N 305C Tefzel End Cap

Package to include: 1 each Tefzel End Cap and 1 each Heat Shrink Braid Guard

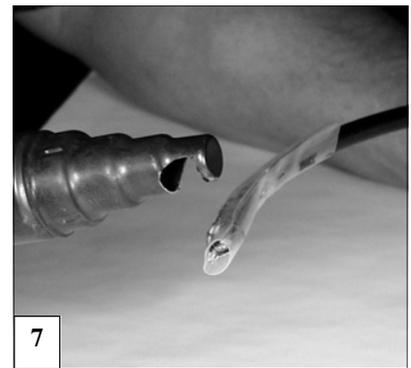
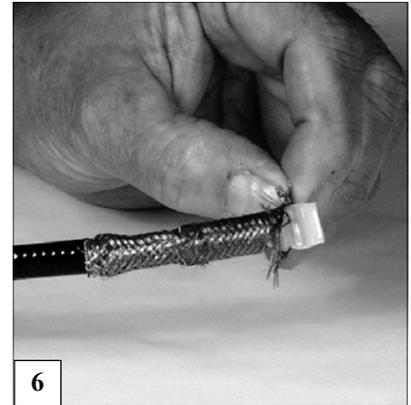


1. Tools needed - High temperature hot air heat gun, sharp clean wire cutting tool, 25 psig shop air supply, 206C or 207C pressure connector.
2. Cut heat trace to desired length. If your heater has an over jacket, with a sharp blade carefully remove 6" of ETFE over jacket from end to be sealed. Take care not to cut or damage the braid during this operation.
3. Move the braid so that it does not interfere and cut heat trace 3" back at a 45° angle with using a sharp wire cutting tool. Inspect cut to insure that the carrier wires do not make contact. If they do, perform step 3 again
4. Place Tefzel End Cap over wire end to be sealed, hold metal braid away from operation, and heat with high temperature hot air heat gun (part # 907). Do not use open flame. As End Cap is heated it will turn transparent and wire color will show though clearly. Continue to move heat around the End Cap until all sides are uniform and cable coating begins to ooze out from open end of End Cap. Allow End Cap to cool before step 5.
5. End Cap integrity test should now be done by pressurizing opposite end of heat trace with 25 psig air supply using pressure connector 206C or 207C. Now submerging Tefzel End assembly in clean water. If no bubbles are present cap has been installed correctly. If bubbles are present repeat steps 2 through 5.



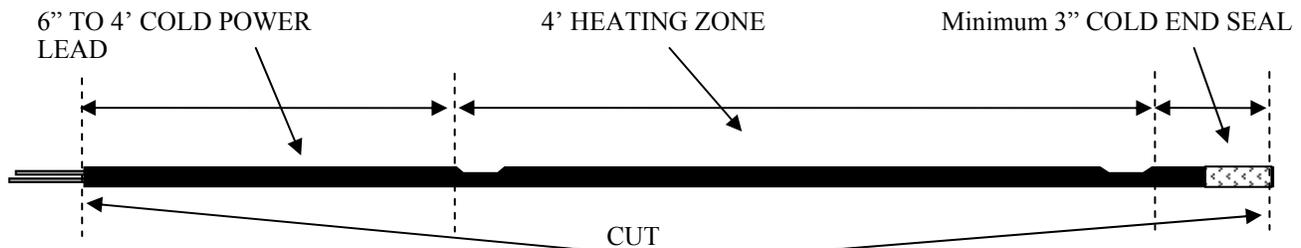
Instruction Sheet P/N 305C Tefzel End Cap Continued

- Slip the metal braid back over End Cap so it extends about 1". Fold the excess braid back so when the braid guard is attached it will hold the braid in place at the end of the wire.
- Place the braid guard over the end cap and metal braid. Heat shrink to braid guard until it firmly holds the braid in place.
- An insulation resistance test is recommended between the 2 buss wires and the braid. Test with 500 VDC megger minimum acceptable reading should be 20 megohms per circuit tested. Do not use a megger with an excess of 2500 VDC. If test fails check for faulty end cap installation or any heating cable damage.
- When wire passes electrical test it may then be installed. Take care not to damage End Cap during installation.
- After installation check for a leak at wire termination point beyond pressure fitting (# 206C or 207C) and replace End Cap if a leak is found allowing water to drip from inside of the wire.
- If problem cannot be corrected do not use or connect wire to voltage.



Arctic Trace® heating cables are constructed with multiple heating zones of various lengths depending on the voltage and watt per foot output. During assembly when a heating zone is cut, that length of heat cable becomes a cold lead and will not have a heating output. When making power connection or terminating the end of the heating cable care should be taken to assure the heating part of the cable contacts the process area to be heated. Heating zone spacing can be identified by a slight depression on the heating cables edge.

EXAMPLE



CAUTION

This product must only be installed by a qualified electrician, who fully understands electrical equipment placement, and must never under any circumstance be placed in service without the use of an adequate ground fault circuit interrupter to protect personnel from shock or injury.

After this equipment has been placed in service it must be tested to ensure all wiring and safety devices are working.

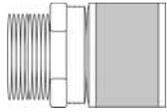
All National, State, and Local Electrical Codes must be followed.

If this product is not installed properly fire, death, or injury may result.

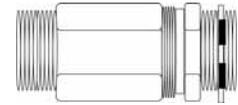
Installation Instructions for 206C, 207C or 207SS

for use with Arctic Trace® TL series submersible heat trace

Part # 206C



**Part # 207C
or 207SS**

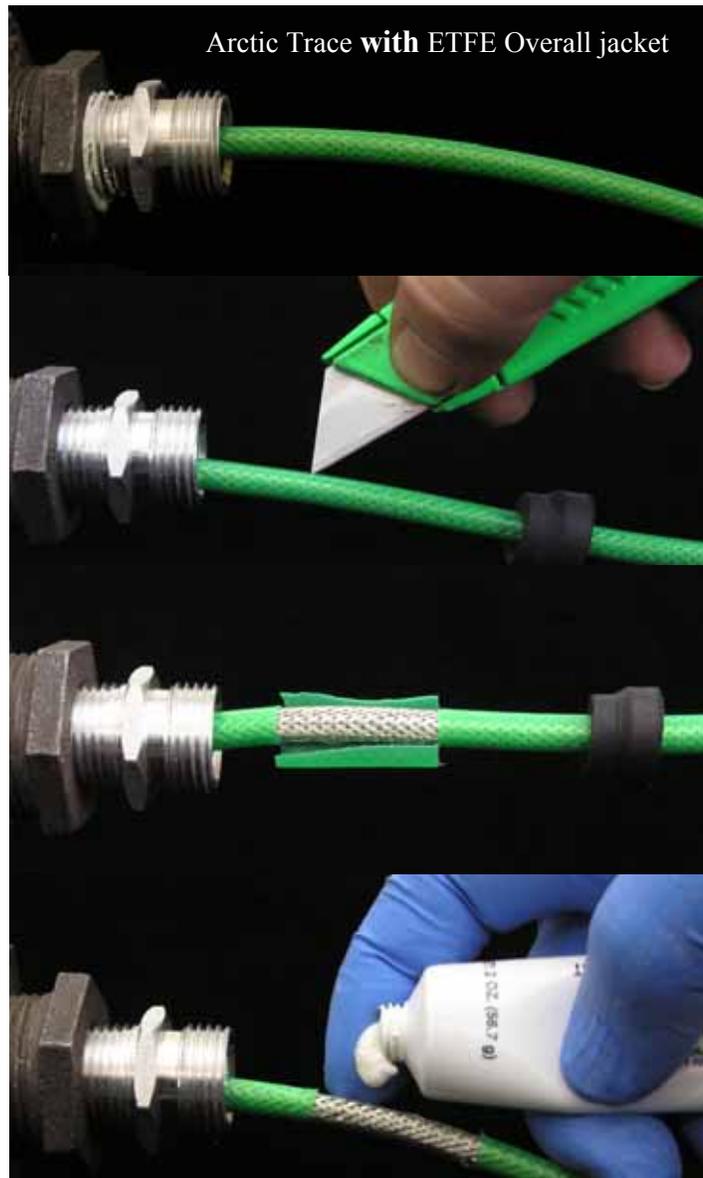


1/2" MNPT waterproof pressure connector / strain relief

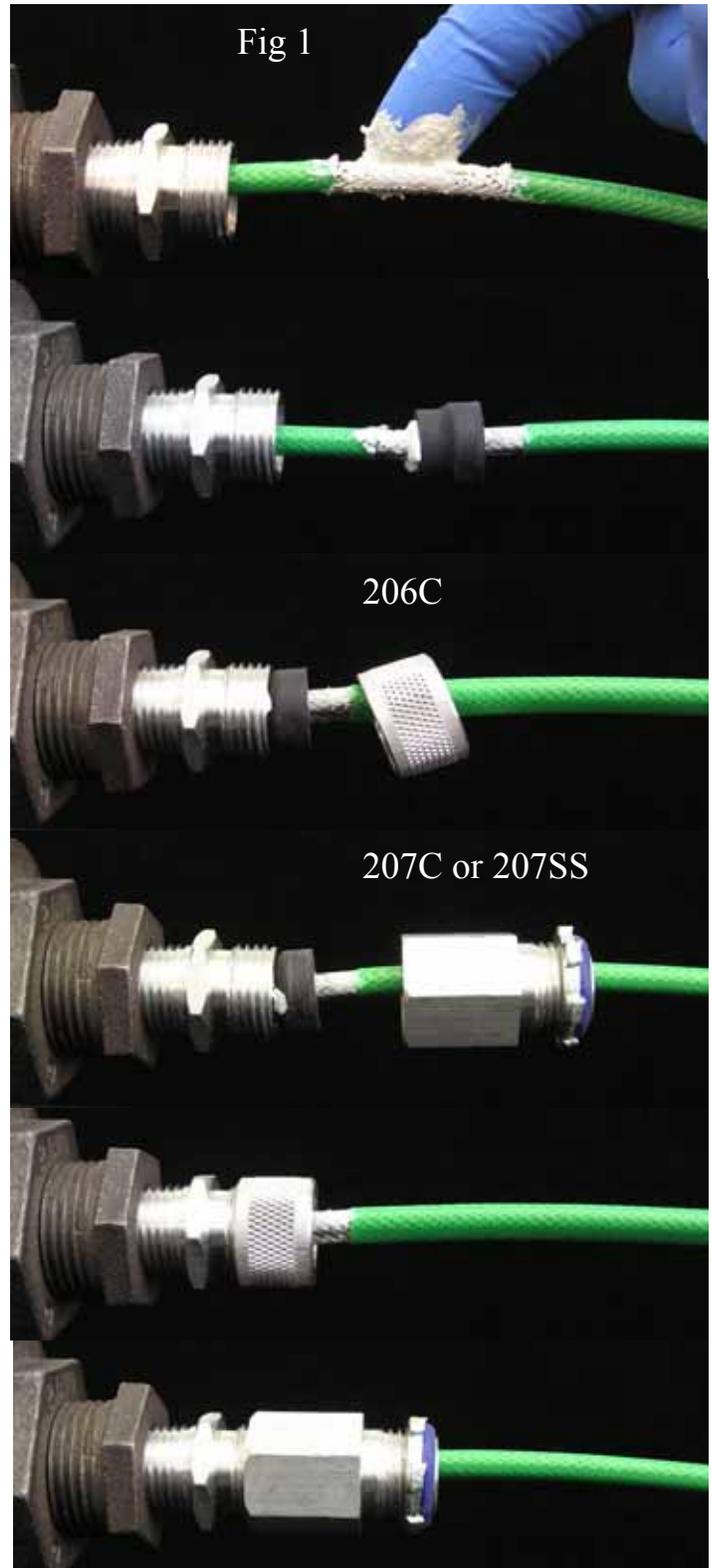
Package Includes: 1 each 206C, 207C or 207SS 1/2" MNPT water proof strain relief pressure fitting
1 each Teflon paste tube

Caution should be taken when installing TL series heat trace **with overall jacket** inside pipes, tank, drains or vents. To insure a water tight seal follow installation instruction carefully. Failure to do so may cause liquid to leak from the pressure fitting and may enter the power connection.

- Install heat trace in pipeline or vessel with 305C waterproof end cap attached. Leave ample room to make electrical connections. Disassemble the pressure fitting. Apply Teflon paste to the 1/2" MNPT connection and screw it into your 1/2" FNPT pipe, tank or vessel.
- Slide the rubber grommet on the heat trace. Using a clean sharp blade cut a 2" slit along the heat trace outer jacket in the area where you are going to install the rubber grommet. **Use extreme caution not to damage or cut the metal braid.**
- Carefully remove the overall jacket from the assembly area. **Use extreme caution not to damage or cut the metal braid.**
- Open the Teflon paste supplied and apply the paste to the exposed metal braid.



- Massage the Teflon paste into the exposed metal braid. Make sure the paste covers the metal braid completely and fills all the holes in the metal braid as seen in Fig 1.
- Slide the rubber grommet over the metal braid placing it in the center of the prepared area.
- Reassemble the union assembly making sure the rubber grommet stays in place centered in the prepared area during this assembly.
- Completely tighten the union assembly compressing the rubber grommet making a water tight seal.
- Test the assembly for leaks before making any electrical connection. If leaks occurs repeat the field repair process until no leaks are found.



CAUTION

This product must only be installed by a qualified electrician, who fully understands electrical equipment placement, and must never under any circumstance be placed in service without the use of an adequate ground fault circuit interrupter to protect personnel from shock or injury.

After this equipment has been placed in service, it must be tested to ensure all wiring and safety devices are working.

All National, State, and Local Electrical Codes must be followed.

If this product is not installed properly fire, death, or injury may result.

Instruction Sheet P/N C14880 GFCI Cord Assembly

Packing to include: - GFCI with extension cord, solderless connectors, and heat shrink

1. Place the Arctic Trace end to be attached to the pigtail on a suitable wood working surface.



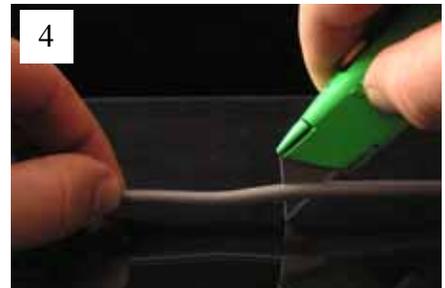
2. Pull back metallic braid approximately 6" to 8".



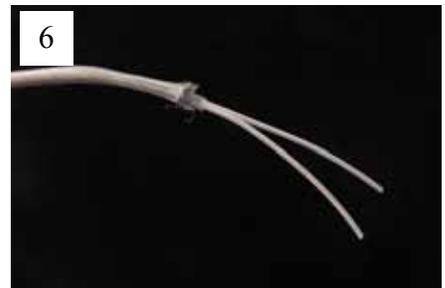
3. Insert sharp razor knife in the center of the Arctic Trace between the two 12 gauge carrier bus wires.



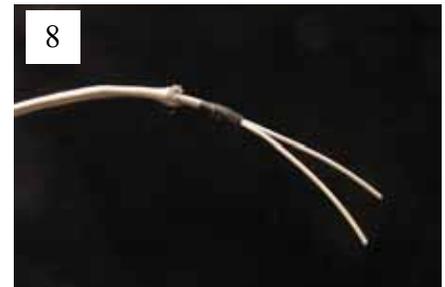
4. With the blade firmly imbedded in the wood below carefully pull the Arctic Trace through the blade separating the two 12 gauge bus wires



5 & 6. Strip back the two over jackets and remove them.



7. Strip off any remaining heater element assuring it will not contact the metal braid.



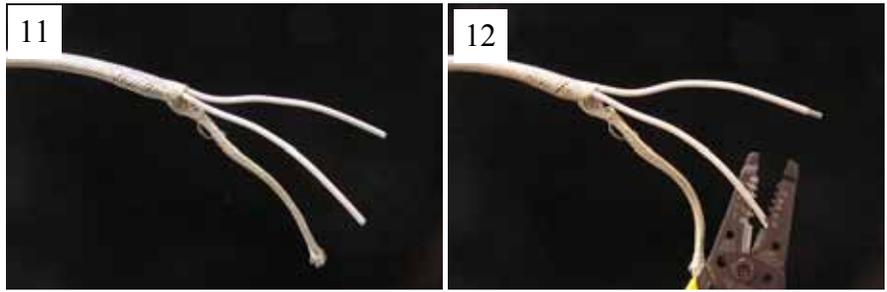
8. Carefully tape the junction between the stripped wire and power wires to be connected with suitable electrical tape. Again assuring the metal heating element will not make contact with the braid.



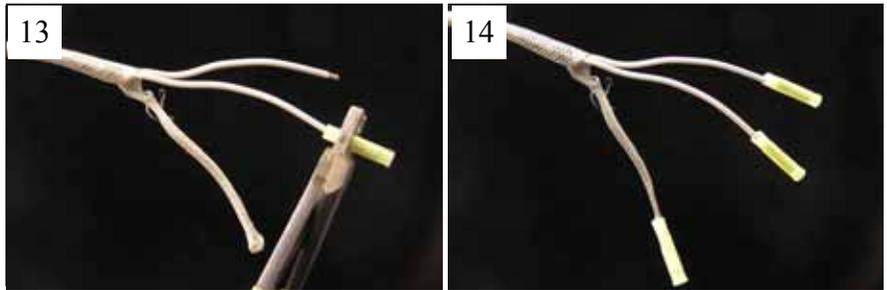
9. Slip the metallic braid back over the bus wires and use a pencil or blunt instrument to open the braid.

10. Pull the bus wires through the braid as shown in picture.

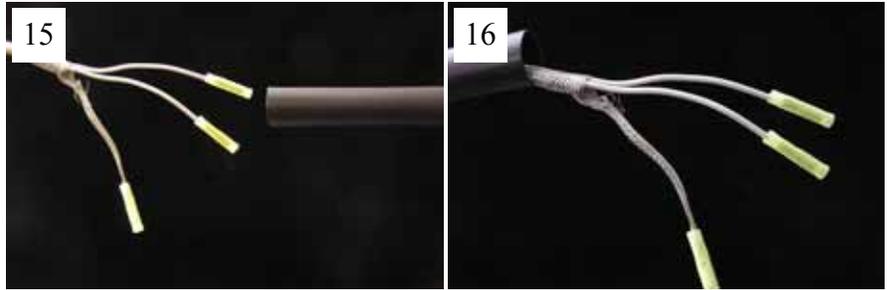
- 11. Cut to length needed
- 12. Carefully strip 1/4" of insulation from the bus wires.



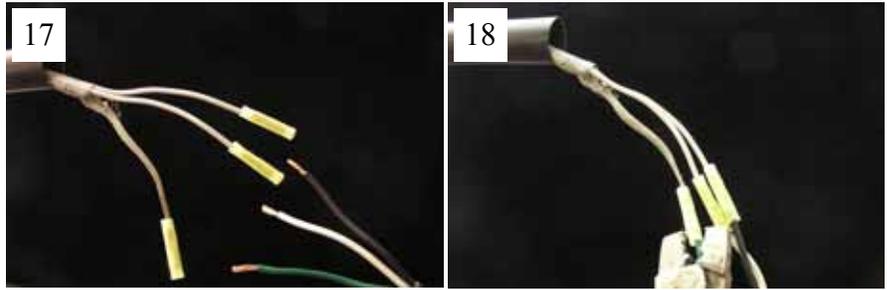
- 13 & 14. Crimp the solderless connectors to the bus wires and metallic braid using a suitable crimping tool.



- 15 & 16. Slip the heat shrink over the Arctic Trace assembly.

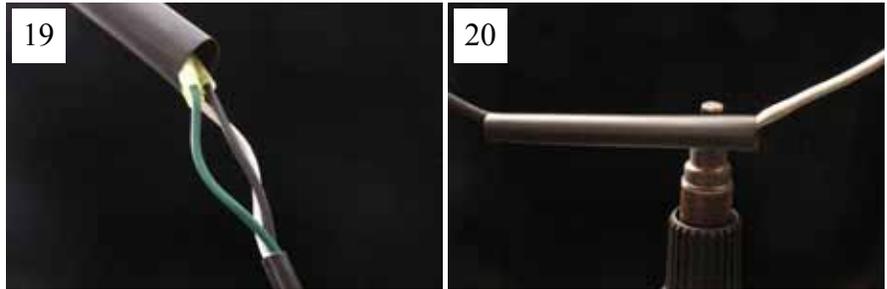


- 17. Prep the power connection wires on the Ground Fault Circuit Interrupter to accommodate the solderless connector.



- 18. Connect the **green to braid**, the white to one of the bus wires, and the black to the other bus wire, polarity is not important.

- 19. Slip the heat shrink back over the splice assuring all exposed wiring is covered.
- 20. Shrink the heat shrink with a suitable hot air gun.



- 21. Plug the assembly into a power source and check operation of the Ground Fault Circuit Interrupter.



HEAT TRACE INSTALLATION RECORD

1. Circuit No, _____

2. Receiving Documentation Date _____

	DESIGN	ACTUAL
Item	_____	_____
A. Cable Type	_____	_____
B. Cable Length	_____	_____

3. Receiving Testing Date _____

A. Check for physical damage O.K. _____ Damage _____

B. Continuity Check
Check for continuity between power leads. O.K. _____ Open _____

C. 500VDC min., 2500VDC recommended,
megger check between leads and
sheath, 20 megohms min. Megohms _____

D. Lot No. No. _____

4. Post Installation Testing Date _____

A. Continuity Check
Check for continuity between cold leads O.K. _____ Open _____

B. 500VDC min., 2500VDC recommended,
megger check between leads and
sheath, 20 megohms min. Megohms _____

C. Visually Check Cable Installation Prior to
Release for Thermal Insulation. Visual Check O.K. _____

5. Final Testing and Commissioning Date _____

A. Circuit approved for testing by client. Approved _____

B. 500VDC min., 2500 VDC recommended,
megger check between leads and
sheath, 20 megohms min. Megohms _____

	DESIGN	ACTUAL
C. Energized Testing (all test data to be within 10% of design data)		
1. Circuit Voltage	_____	_____
2. Initial Current	_____	_____
3. Current after 15 minutes of operation	_____	_____
4. Current after 30 minutes of operation	_____	_____
5. Pipe temperature	_____	_____

6. Circuit Acceptance

This circuit has been tested and documented in accordance with the above itemized data. This circuit accepted by:

Contractor _____ Date _____
 Client _____ Date _____

du Alaska Incorporated, 6706 Greenwood Street, Anchorage, Alaska 99518, - 907-522-3004 - DUALASKA@ALASKA.NET

The Heat Trace Installation Record can be used to monitor the initial installation and circuit testing. This form can be used to verify heat trace installation at Periodic Inspection.

Accessories and Optional Equipment

Part #

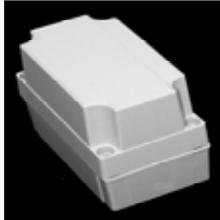
206C 1/2" MNPT Water Proof Strain Relief / Pressure Connector



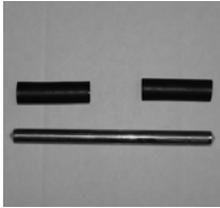
207SS 1/2"X1/2" MNPT Water Proof Strain Relief / Pressure Connector



208C NEMA 4X Power Connection Junction Box with DIN Terminals Single Gang



209C NEMA 4X Power Connection Junction Box with DIN Terminals Double Gang



210 Brass Well Ballast Allows for deep well heat cable hold down ballast



305C Water Proof End Seal



330C 150'x2" Metal Heat Transfer Tape



38036 500VDC Insulation Tester / DC Megohmmeter



907 120VAC, 1100F Heat Gun w/end cap adapter

Part #

C148880 15 Amp GFCI Protected Plug and Cord Set



C33120SP 20 Amp 120 volt, Universal Power connection kit with switch, pilot light and GFCI



SST-2 120/208/240/277VAC 30 AM Freeze Protection Digital Thermostat, Status Indicators, temperature Sensor, 30 mA GFEP NEMA 4X Enclosure



TRF115 120/240 VAC General Purpose Adjustable Thermostat, 5' Capillary, NEMA4X



Automatic Ice and Snow Melting Controls

Snow, Ice, Roof, Gutter, Pavement, Concrete Sensors and Controls



One Year Limited Warranty

du Alaska hereby warrants to the original purchasing consumer that its Arctic Trace heating cable is free from defects in material and workmanship for a period of one (1) year from the date of original purchase. du Alaska's obligation under the terms of this limited warranty shall be limited to repairing or replacing, at du Alaska's option, free of charge, F.O.B. from its factory, any part or parts of the Arctic Trace heating cable which in its sole judgment is found to be defective; and providing further that the claim be made within one (1) year from the date of original purchase and said part or parts be returned as directed by du Alaska at the time the claim is made.

This warranty applies to installations in the open ambient air. The warranty shall also apply to installation in clean water under a pressure of no more than 200 PSIG if the heat seal cap has been sealed to the wire by hot air gun welding in such a manner that no leak exists between the heat seal cap and the Cable Tefzel cover. No warranty whatsoever exists in any other installation or manner of installation.

All information concerning the product supplied by du Alaska is furnished upon the express condition that the customer shall make its own assessment to determine the product's suitability for a particular purpose.

WARRANTY EXCLUSIONS. *Except as expressly stated herein and to the fullest extent permitted by law, du Alaska shall not be liable for direct, indirect, incidental, consequential or other types of damages arising out of resulting from the purchase or use of the product. This Limited Warranty is in lieu of all other warranties, express or implied, specifically including, but not limited to, implied warranties of merchantability or fitness for a particular purpose.* The remedies under this warranty are only as set forth herein (except as to the extent they are required by any applicable laws) and du Alaska neither assumes nor authorizes anyone to assume for it any other obligations. Some states do not allow the exclusion or limitations of incidental or consequential damages, so the foregoing limitations or exclusions may not apply to you. In such states, liability shall be limited to the extent allowed by state law. We do not warrant this product against normal wear and tear, unauthorized modifications or alterations, improper use, improper maintenance, accident, misuse, negligence, theft, loss or damage from outside causes.



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