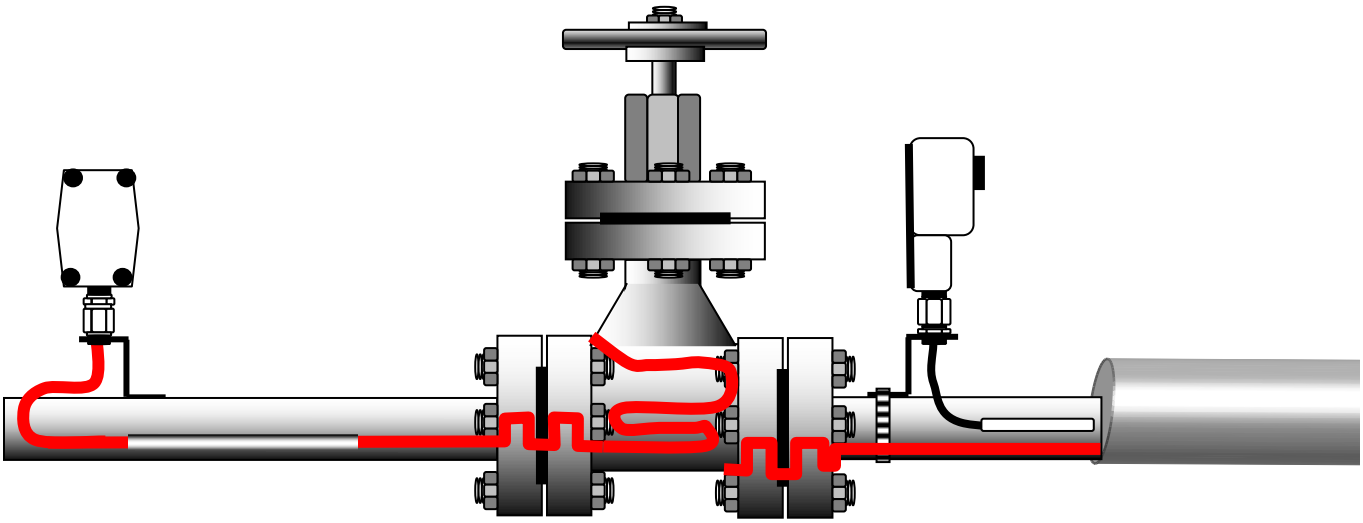
ARCTIC TRACE®

Installation Information



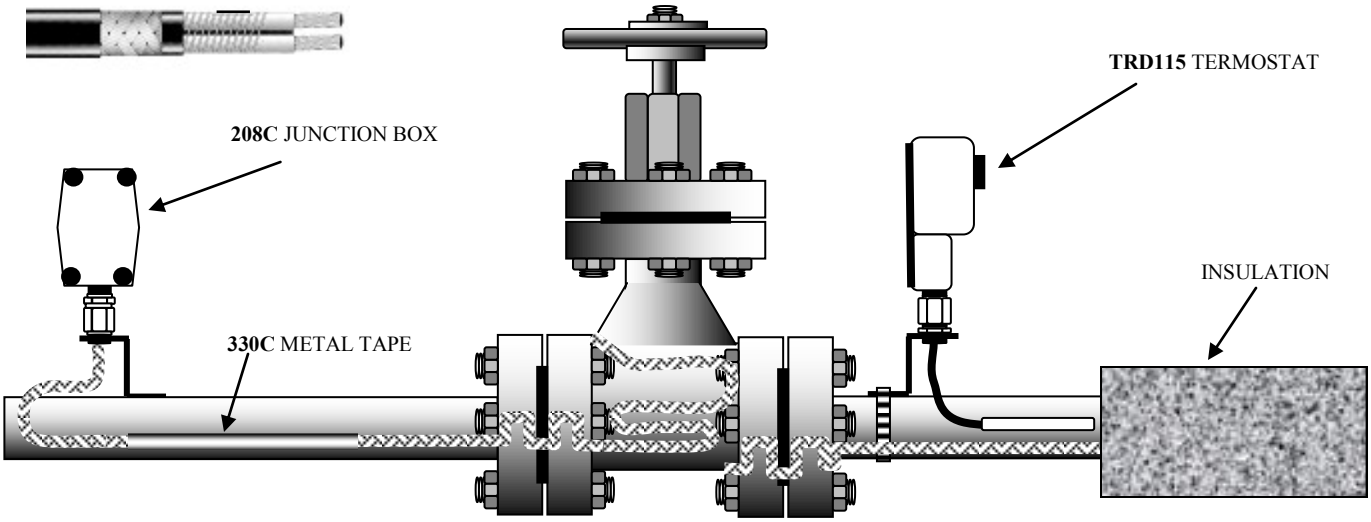
Heat Trace Freeze Protection System
Pipe & Vessel Surface Heating Applications

duAlaska Incorporated

Form E16SF

ARCTIC TRACE ®

Typical Equipment Layout Industrial Heating Cable Ordinary Location



INSTALLATION INFORMATION

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

- **Heater Sizing and Selection**

Refer to engineering and specification manual for proper sizing of heat cable and watt per foot as may be required for freeze protection, viscosity control and other pipe and vessel heating demands. Applications that allow heat temperature of pipes and vessels to exceed 140F will require the use of an appropriate temperature control devices to protect the equipment from overheating or damaging pipe, vessel, insulation, and other equipment in contact with the heating cable.

- **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.

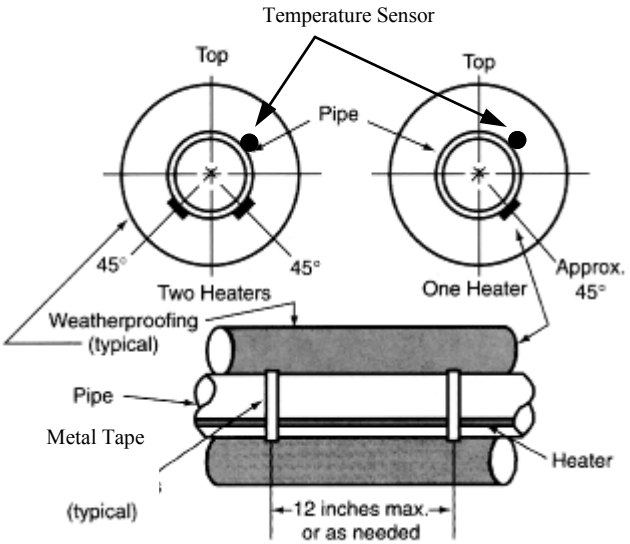
CAUTION:

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

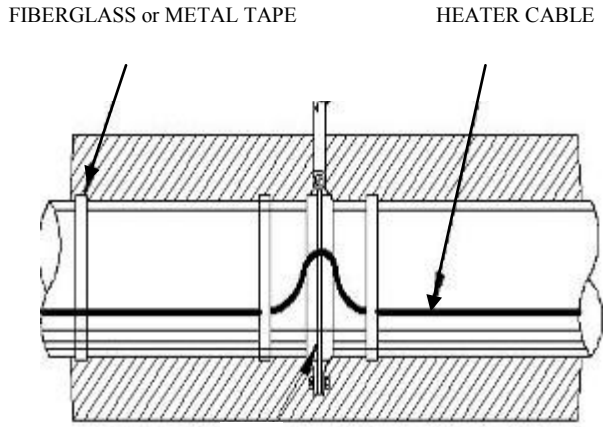
- **Installation on surface of pipe or vessel**

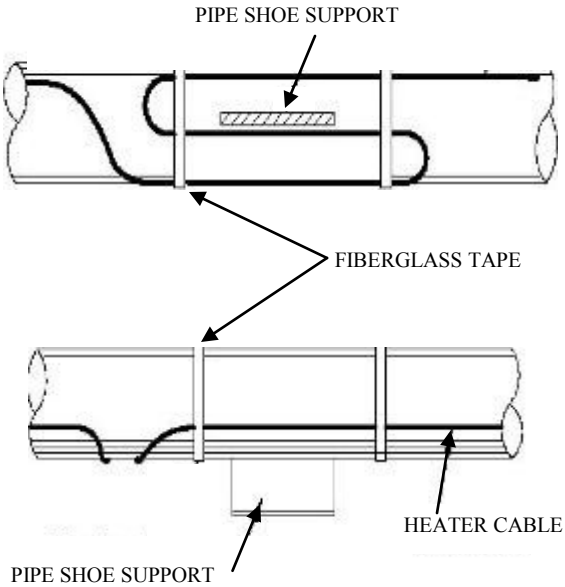
Cable should be run straight or spiraled along pipe as required to provide for proper watt requirement output for the demand needed.

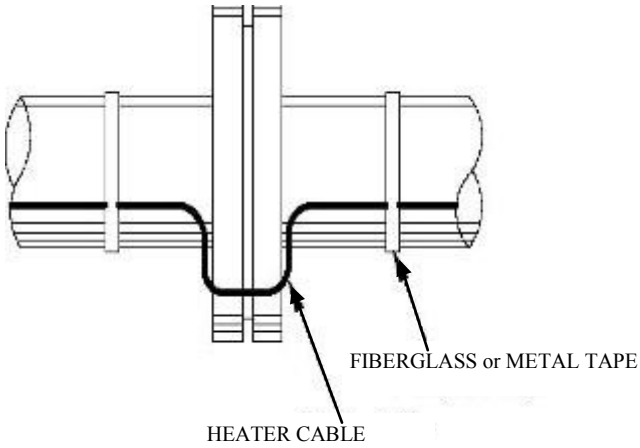
Cable should be attached to pipe by the use of 2" metal tape (P/N 330C) allowing full heat transfer and equal heat distribution.
When since surface mounting additional cable must be applied to heat sinks like valves, pipe supports and flanges. When attaching temperature sensor, if required, attach to pipe with metal tape at 90º off set for multiple or single passes never on top or bottom of pipe. (see Diagram to below)

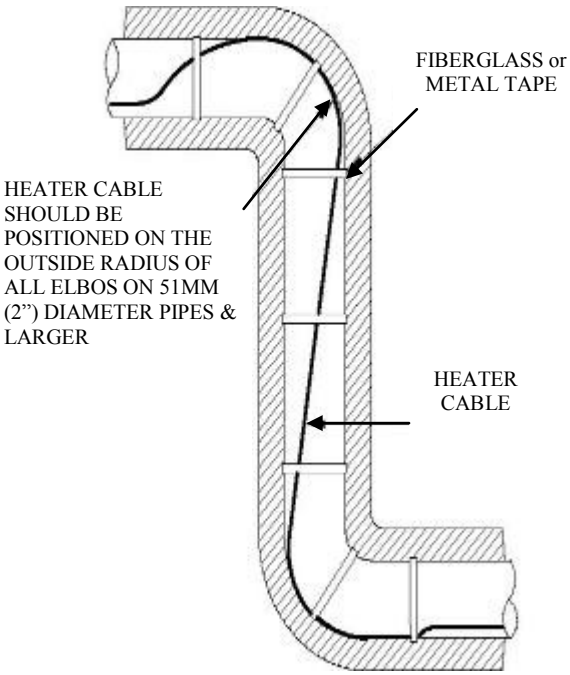


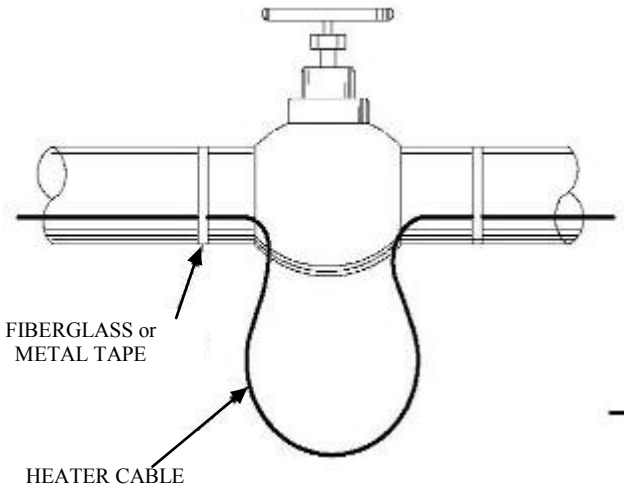
Heat Cable Surface Mounted On Pipe or Vessel

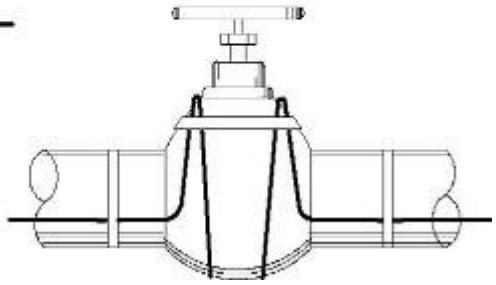












Surface Mounting or Inside the Pipe or Vessel Installation
Hazardous Locations

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.

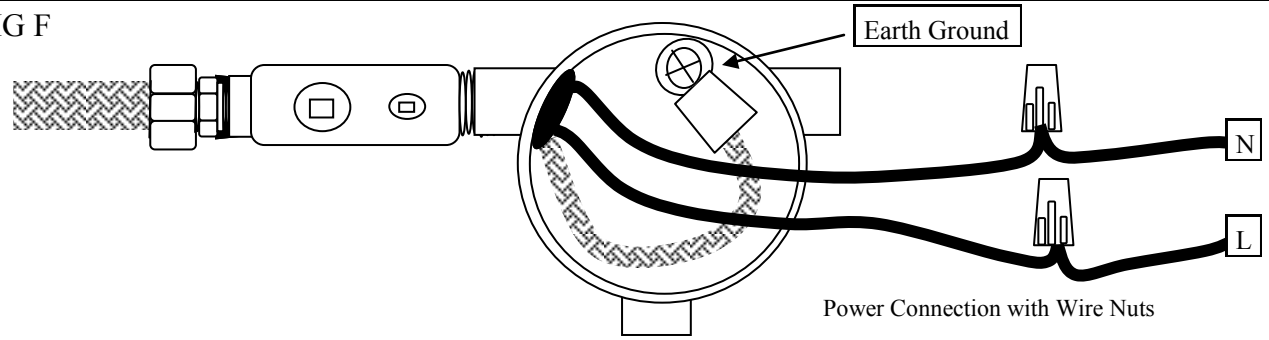
Code Compliance:

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

Heat Trace wiring:

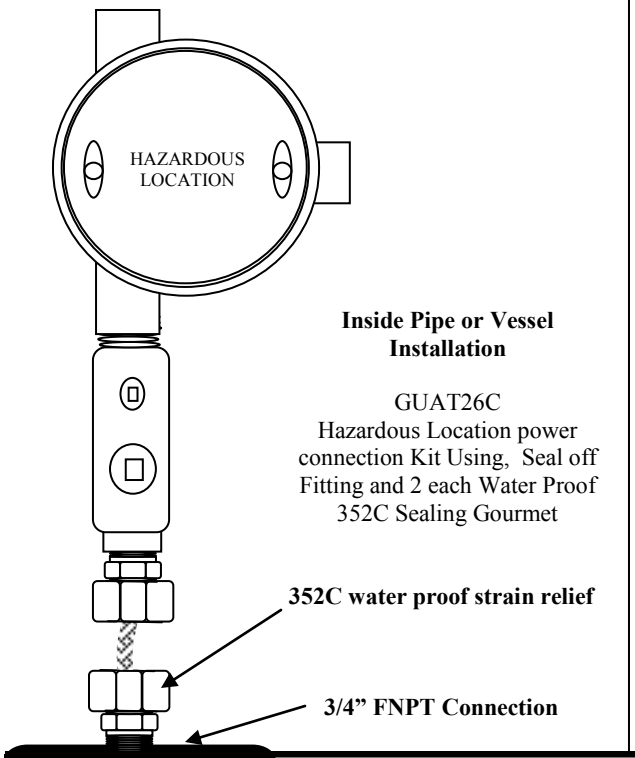
Power connection should be connected in the junction box using wire nuts and crimp ground fitting shown in Fig F.

FIG F



Power Connection with Wire Nuts

FIG G



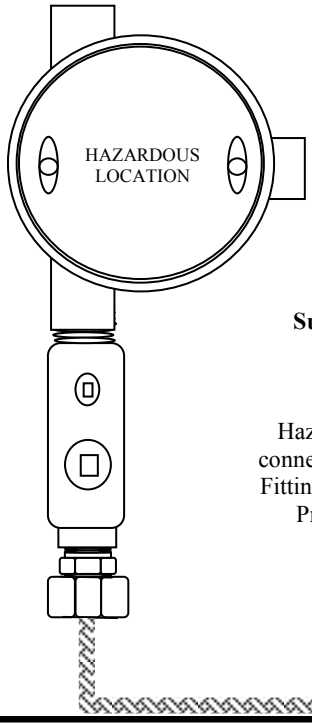
Inside Pipe or Vessel Installation

GUAT26C
Hazardous Location power connection Kit Using, Seal off Fitting and 2 each Water Proof 352C Sealing Gourmet

352C water proof strain relief

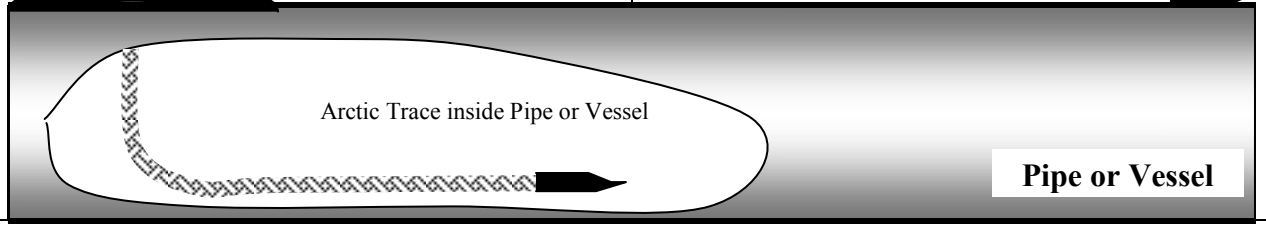
3/4" FNPT Connection

FIG H



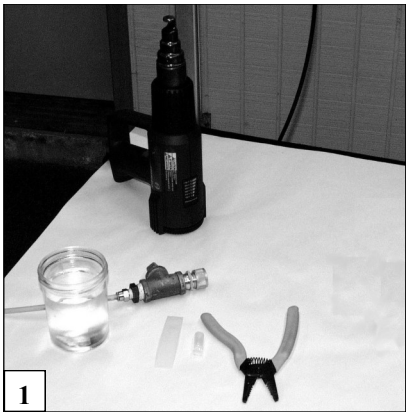
Surface Pipe or Vessel Installation

GUAT26C
Hazardous Location power connection Kit Using, Seal off Fitting and 1 each 352C Water Proof Sealing Gourmet



Instruction Sheet P/N 305C Tefzel End Cap

Package to include: 1 each Tefzel End Cap and 1 each Heat Shrink Braid Guard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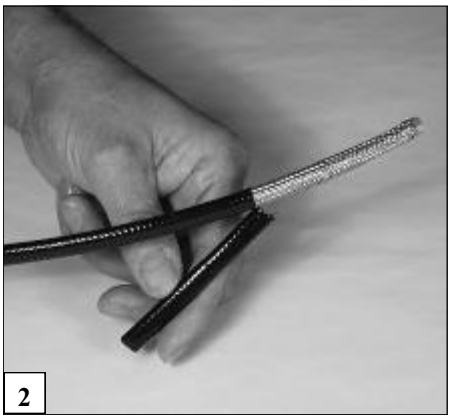
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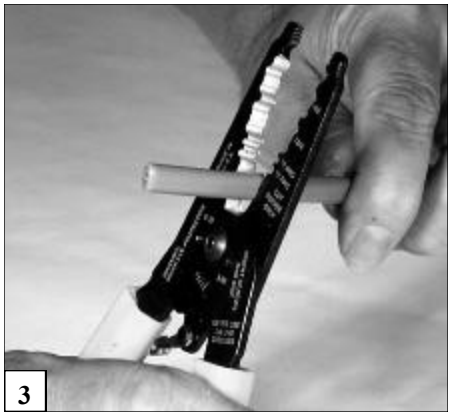
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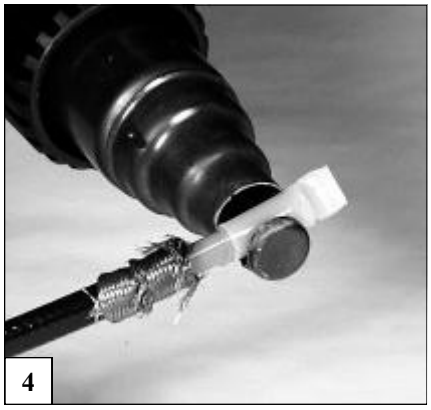
1. Tools needed - High temperature hot air heat gun, sharp clean wire cutting tool, 25 psig shop air supply, 206C or 207C pressure connector.

2. Cut heat trace to desired length. If your heater has an over jacket, with a sharp blade carefully remove 6" of TFE 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 45º 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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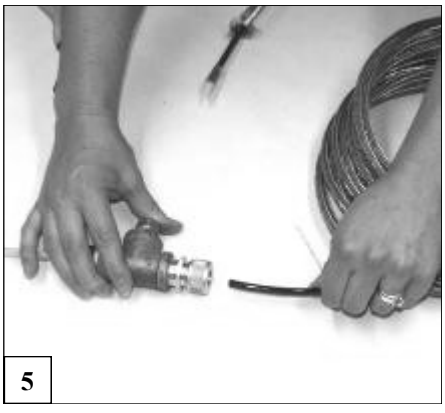
4. Place Tefzel End Cap over wire end to be sealed, hold metal braid away from operation, and heat with high temperature hot air heat gun (part # 907). Do not use open flame. As End Cap is heated it will turn transparent and wire color will show though clearly. Continue to move heat around the End Cap 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.

6. 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.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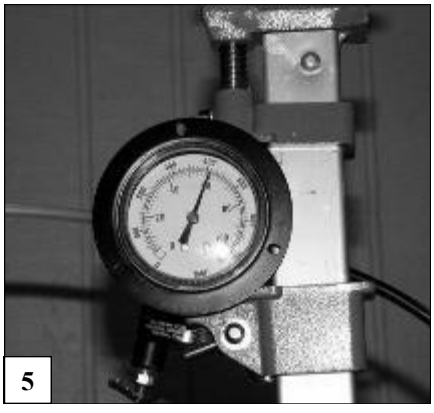
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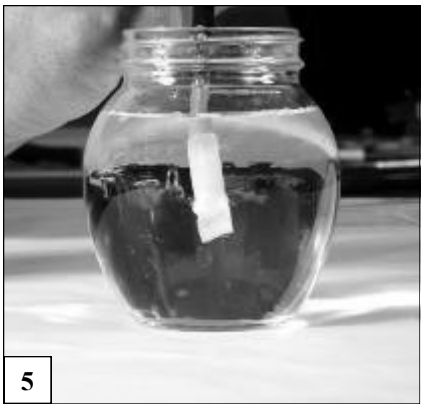
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Instruction Sheet P/N 305C Tefzel End Cap Continued

6. 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.

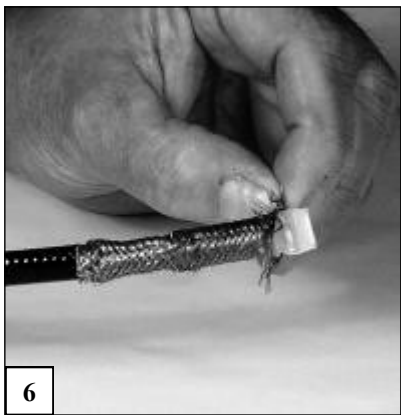
7. Place the braid guard over the end cap and metal braid. Heat shrink to braid guard until it firmly holds the braid in place.

8. 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.

9. When wire passes electrical test it may then be installed. Take care not to damage End Cap during installation.

10. 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.

11. If problem cannot be corrected do not use or connect wire to voltage.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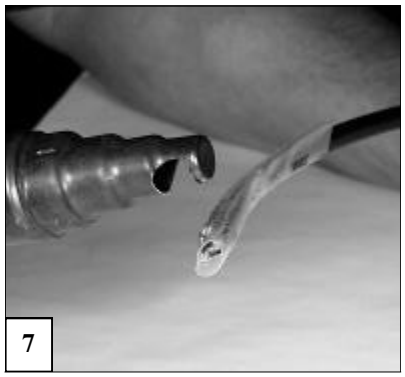
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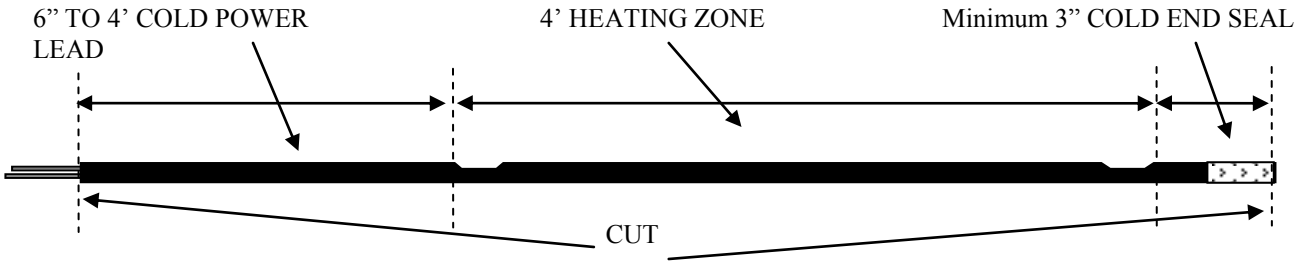
Arctic Trace® heating cables are constructed with multiple heating zones of various lengths depending on the voltage and watt per foot output. During assembly when a heating zone is cut, that length of heat cable becomes a cold lead and will not have a heating output. When making power connection or 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.

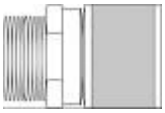
After this equipment has been placed in service it must be tested to ensure all wiring and safety devices are working.

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

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

Instruction Sheet P/N 206C/207C Pressure Connector / Strain Relief

Part # 206C



Part # 207C

1/2" MNPT waterproof pressure connector / strain relief for
Heat trace wire ***with*** and ***without*** ETFE Overall jacket

Package Includes: **1 each 206C or 207C 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*** *or* ***without 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.*

Installation Instructions to install 206C/207C pressure fitting for use with Arctic Trace® TL series submersible heat trace manufactured WITHOUT ETFE Overall jacket

- 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.

- 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 approximately 2" long as seen in Fig 1.

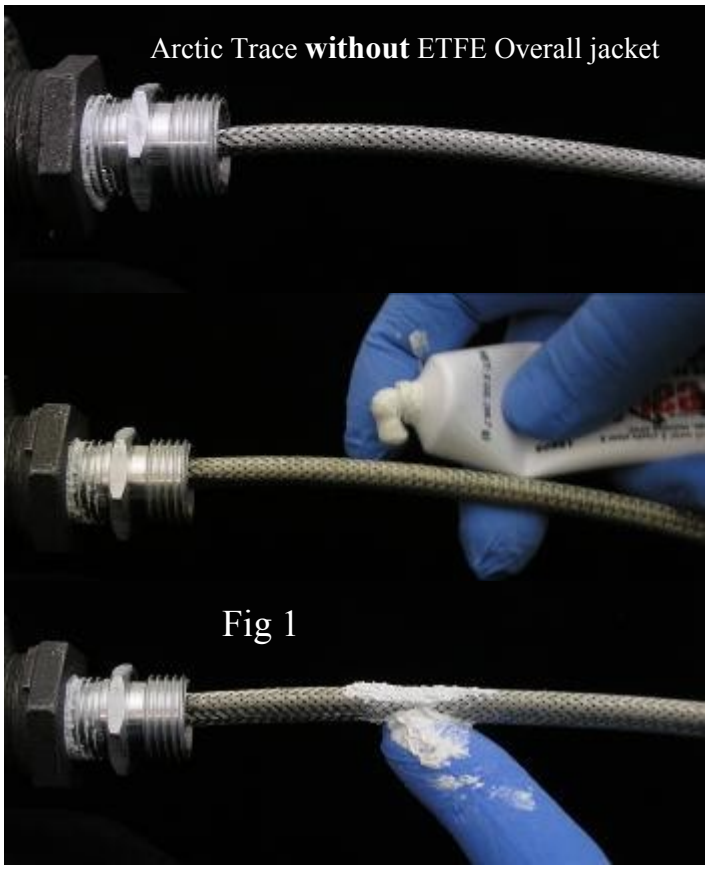


Fig 1

- Pull ground braid down along wire and cut off about 4” of wire under ground braid.

- Pull ground braid back over end of wire making braid diameter small enough to pass though grommet. Slide the rubber grommet over the metal braid placing it in the center of the prepared area.

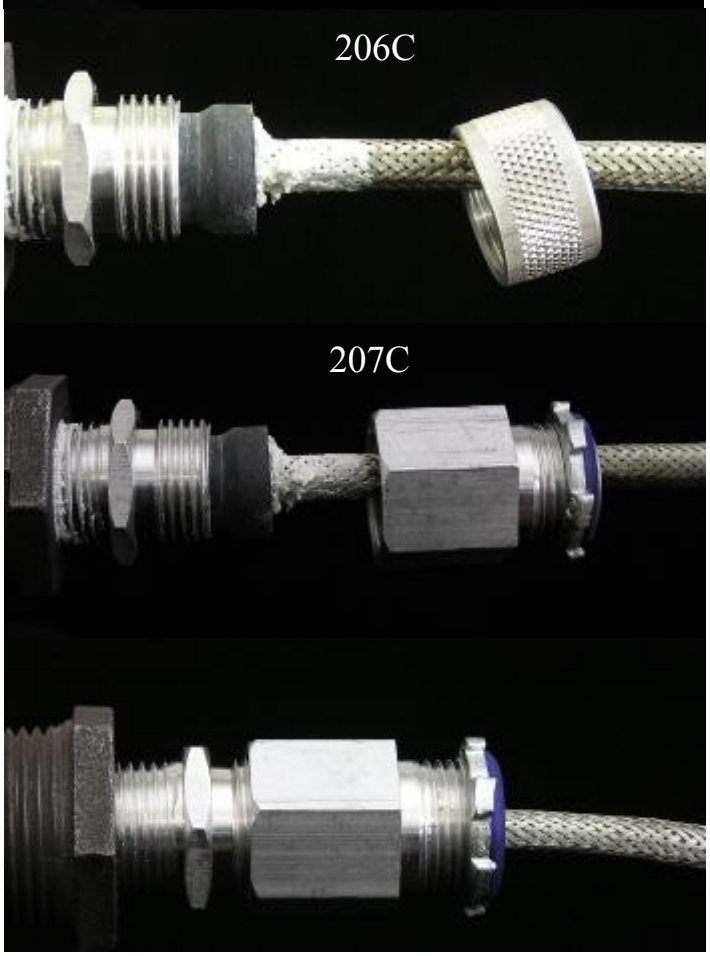
- Reassemble the union assembly making sure the rubber grommet stays in place, centered in the prepared area and does not move on the heat trace during this assembly.

206C

- Completely tighten the union assembly compressing the rubber grommet making a water tight seal.

207C

- Test the assembly for leaks before making any electrical connection. If leaks occurs repeat the field repair process until no leaks are found.



Installation Instructions to install 206C/207C pressure fitting for use with Arctic Trace® TL series submersible heat trace manufactured WITH ETFE Overall jacket

- 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 repair 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.

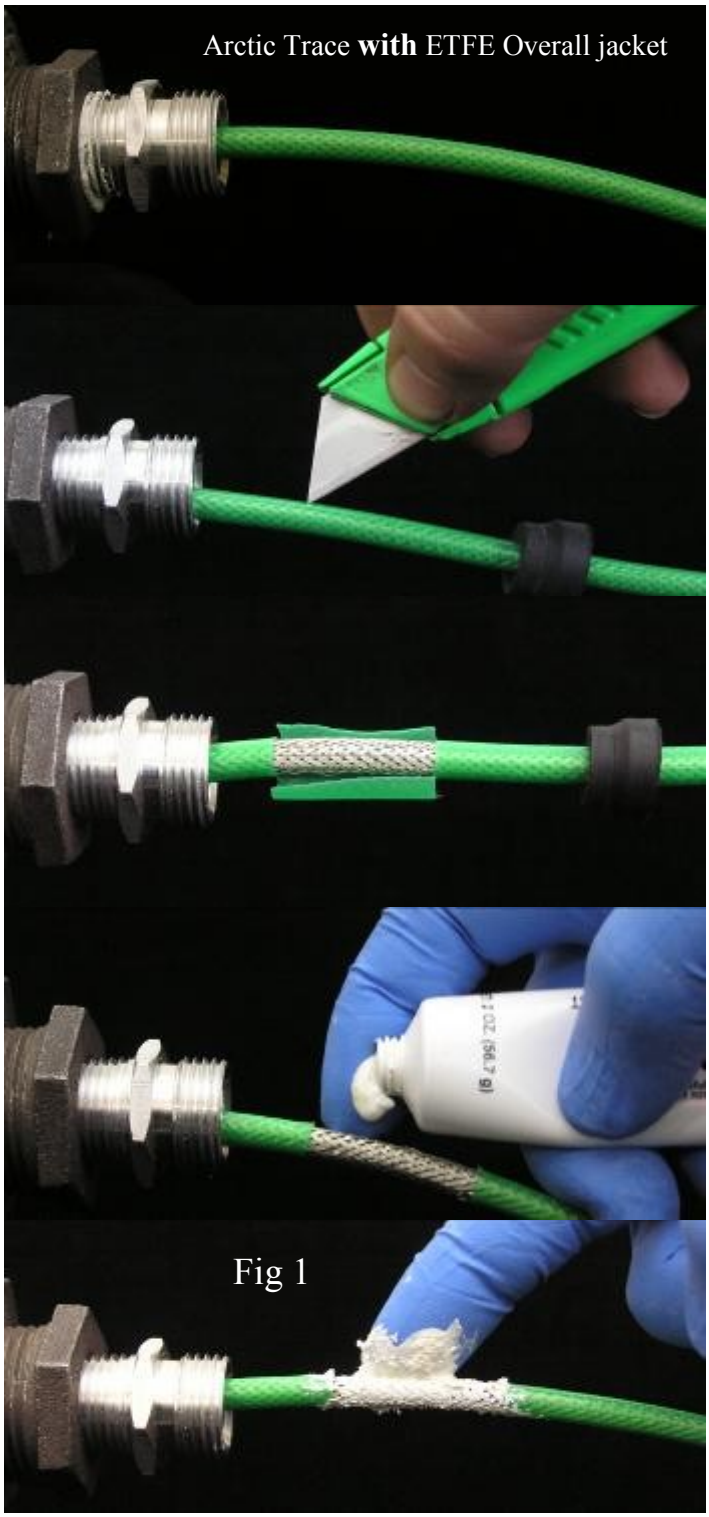


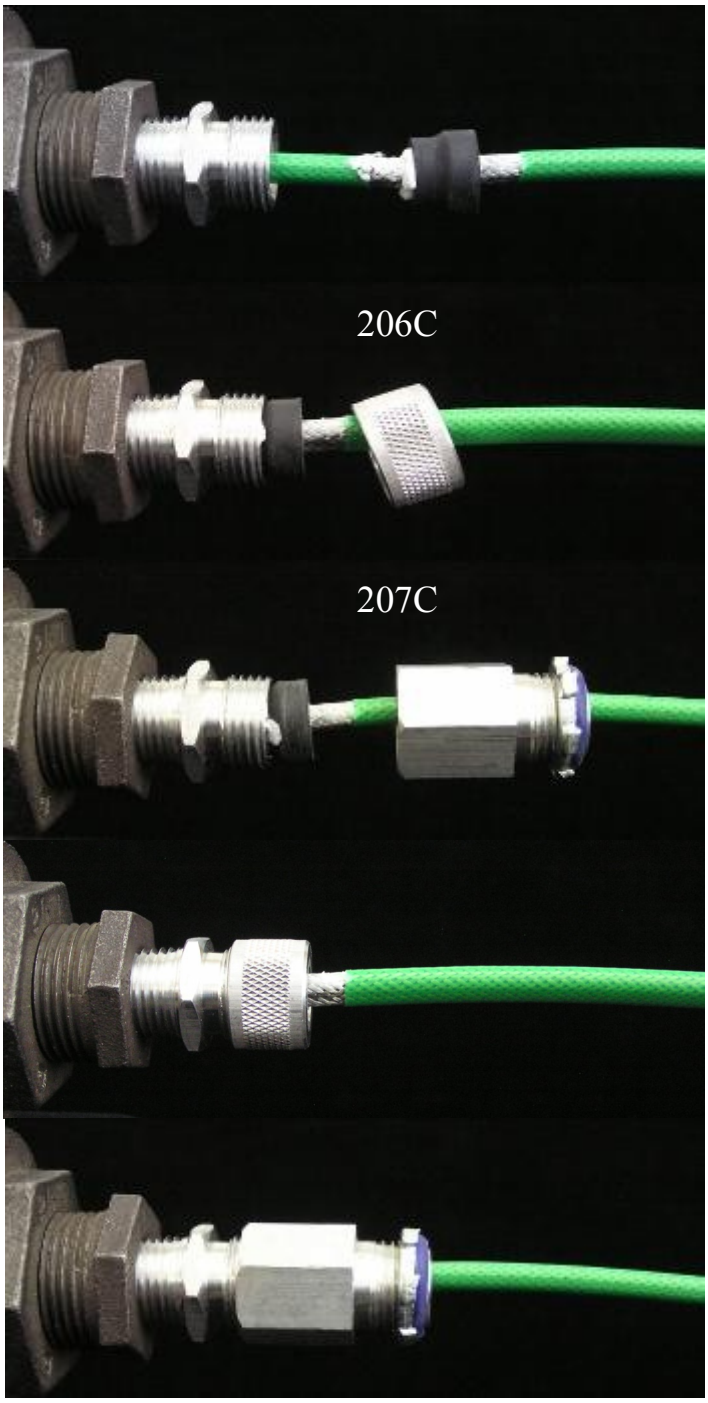
Fig 1

- 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

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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.

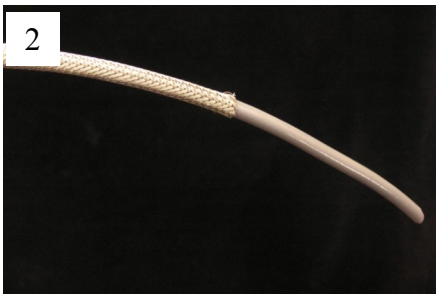
Instruction Sheet P/N C14880 GFCI Cord Assembly

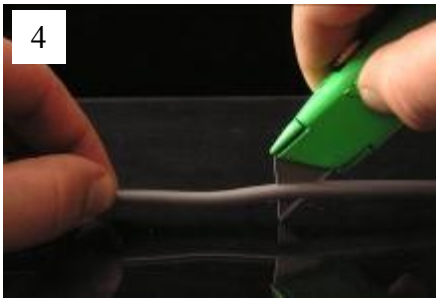
Packing to include: - GFCI with extension cord, solderless connectors, and heat shrink

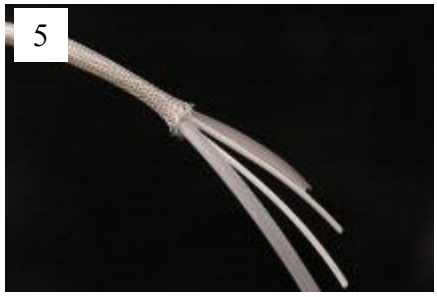
1. Place the Arctic Trace end to be attached to the pigtail on a suitable wood working surface.
2. Pull back metallic braid approximately 6” to 8”.
3. Insert sharp razor knife in the center of the Arctic Trace between the two 12 gauge carrier bus wires.
4. With the blade firmly imbedded in the wood below carefully pull the Arctic Trace through the blade separating the two 12 gauge bus wires

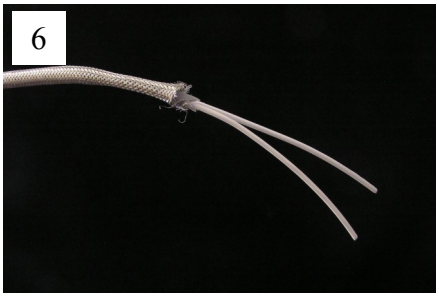
5 & 6. Strip back the two over jackets and remove them.

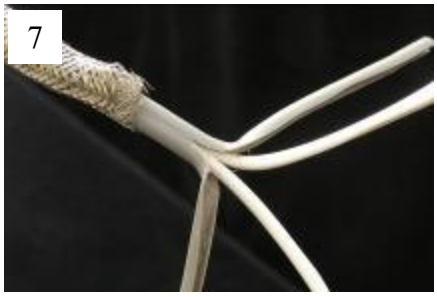
7. Strip off any remaining heater element assuring it will not contact the metal braid.
8. Carefully tape the junction between the stripped wire and power wires to be connected with suitable electrical tape. Again assuring the metal heating element will not make contact with the braid.
9. Slip the metallic 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.

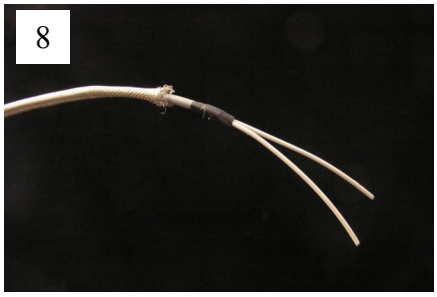






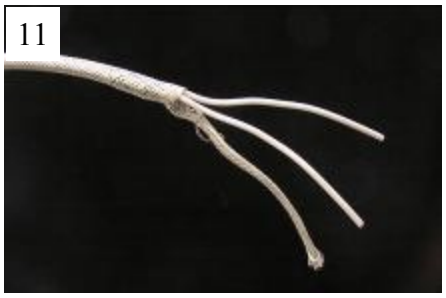


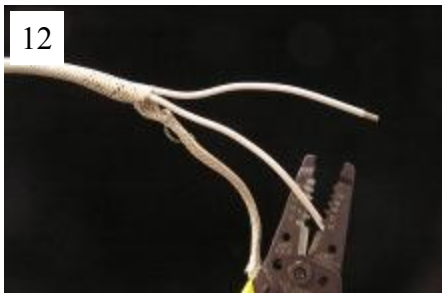




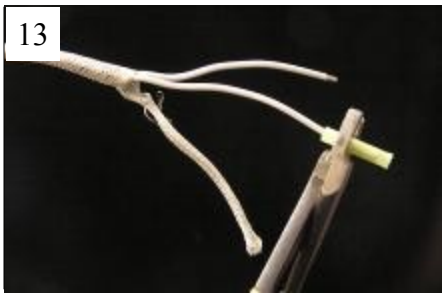
11. Cut to length needed

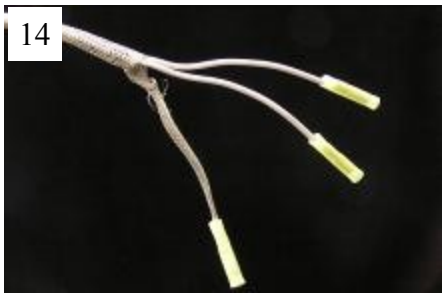
12. Carefully strip 1/4” of insulation from the bus wires.



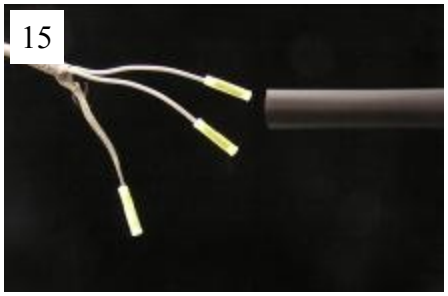


13 & 14. Crimp the solderless connectors to the bus wires and metallic braid using a suitable crimping tool.



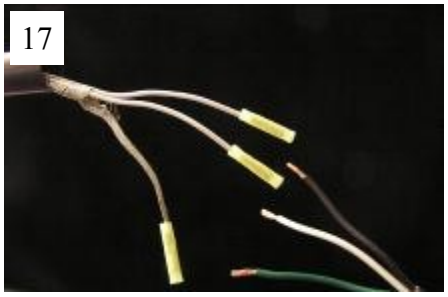


15 & 16. Slip the heat shrink over the Arctic Trace assembly.



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.

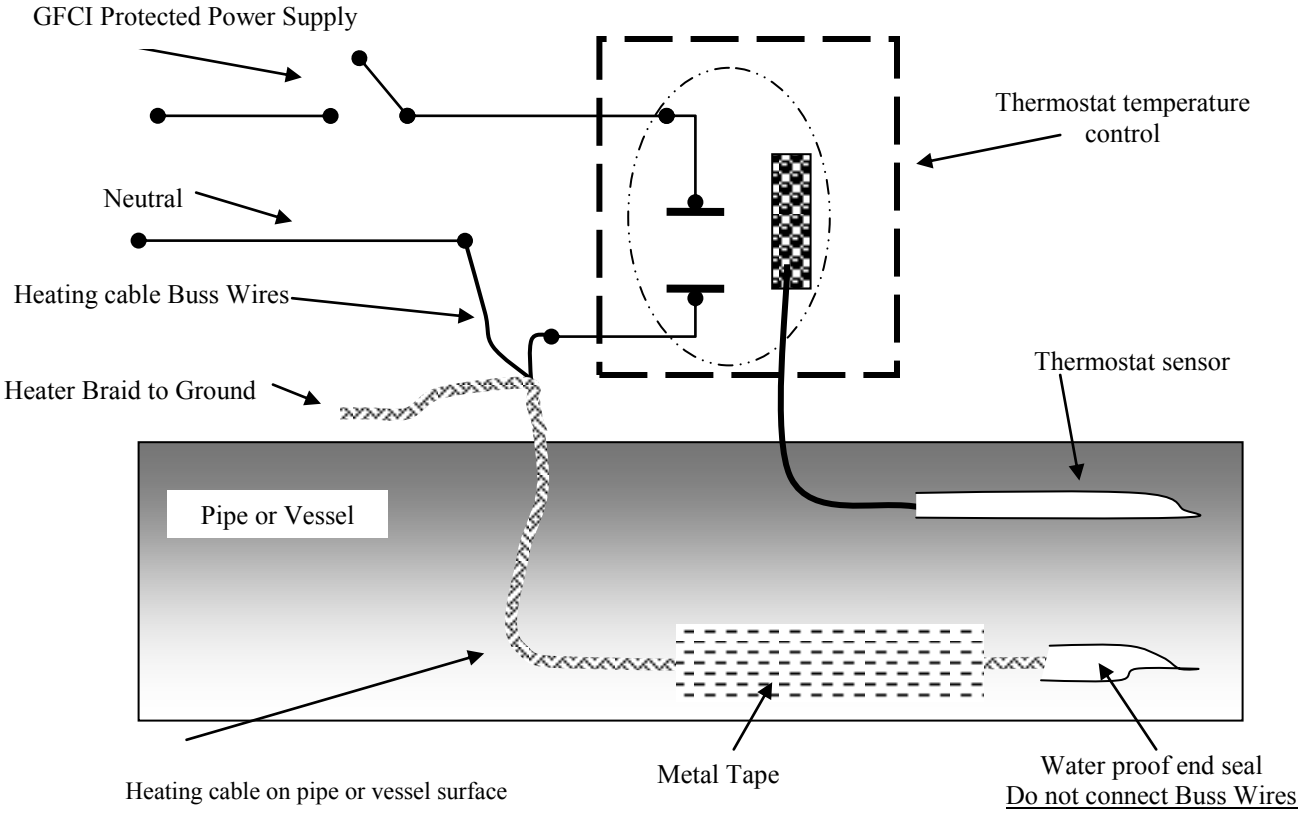


19. Slip the heat shrink back over the splice assuring all exposed wiring is covered.

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.

Electrical Temperature Control Single Phase Circuit



- **Power Connection**

Before considering 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 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.

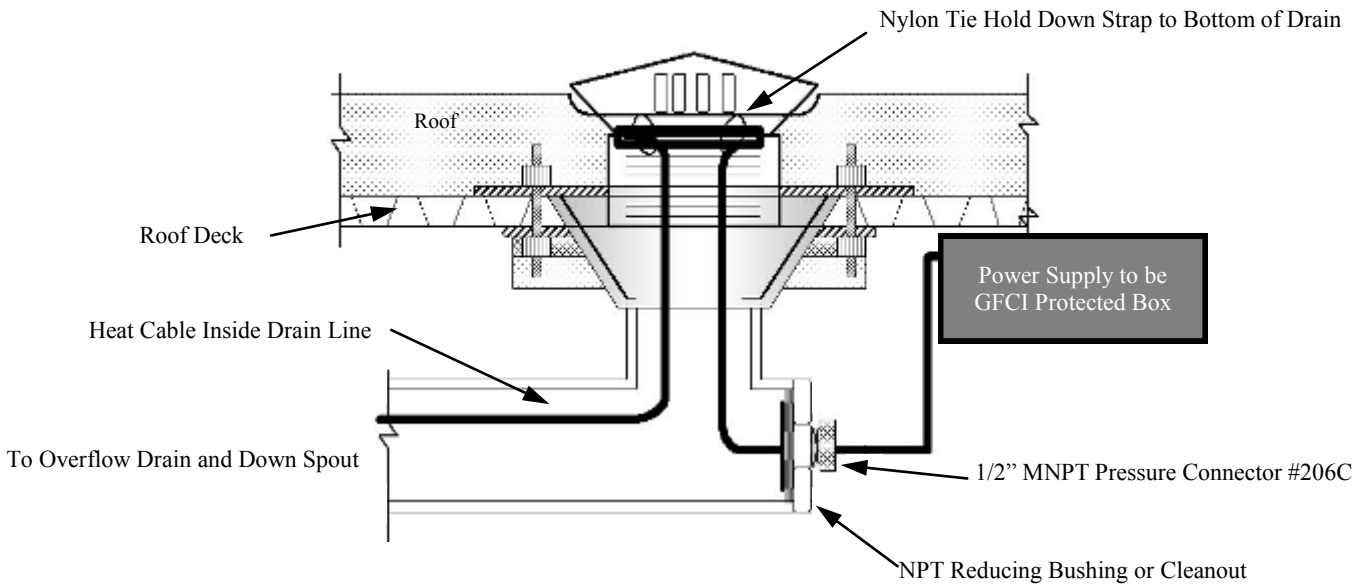
Heat cable must only be installed by a qualified electrician and all National, State, and Local Electrical Codes need to be followed.

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

- **Thermostats & Sensors**

Temperature sensitive applications require the use of a thermostatic control. In selection of the proper thermostat, consider voltage and amperage ratings of the device as well as the suitability of housing for the environment (explosion proof, rain tight, corrosion resistance, etc.) Mount thermostat housing as close as possible to the power connection kit. It may be attached to the power connection kit provided code requirements are met with regard to conduit connections, seals, etc. To sense the coolest air temperature, ambient (air sensing) thermostats should be mounted in the shade and away from any additional heat source. When using pipe-sensing thermostats, the bulb (sensor) should be mounted as shown on page 2. This will allow the thermostat to sense the actual pipe temperature and not be influenced by the heater temperature. Mount the sensing bulb on the pipe at least three (3) feet from the closest heat sink if possible.

Roof Drain



⚠ WARNINGS:

While there are many acceptable ways of installing Arctic Trace Heat Tracing Systems' electric heating equipment, certain actions can be dangerous to personnel and your installations. Please take care to avoid the following problems:

Do Not twist the bus wires together at either end of the heater cable. Each of these wires has a voltage or neutral applied to it; twisting them together will cause a short circuit.

To prevent electrical arcing and fire hazard, all cable connections and electrical wiring connections should be sealed against moisture. This includes the use of proper cable sealing kits and the moisture proofing of all wire connections.

Do Not expose heater cables to temperatures above their maximum ratings. Higher temperatures can greatly shorten the life of a heater cable.

Immediately replace any damaged heater cable or components. Failure to replace any damaged components (heater cable, components, or thermal insulation) will result in system failure.

Do Not install heater cables > 5 watt per foot without the use of a thermostat temperature control protecting equipment and heater cable from damaging over temperature.

Classified areas (explosive dust or gases) require the use of special electrical components.

Any area having explosive gases (such as chemical / petrochemical installations) or explosive dusts (such as coal handling or graineries) require special cable, connection components and control components that are approved for use in these areas.

Installation of non-approved products can result in fires or explosions.

CAUTION

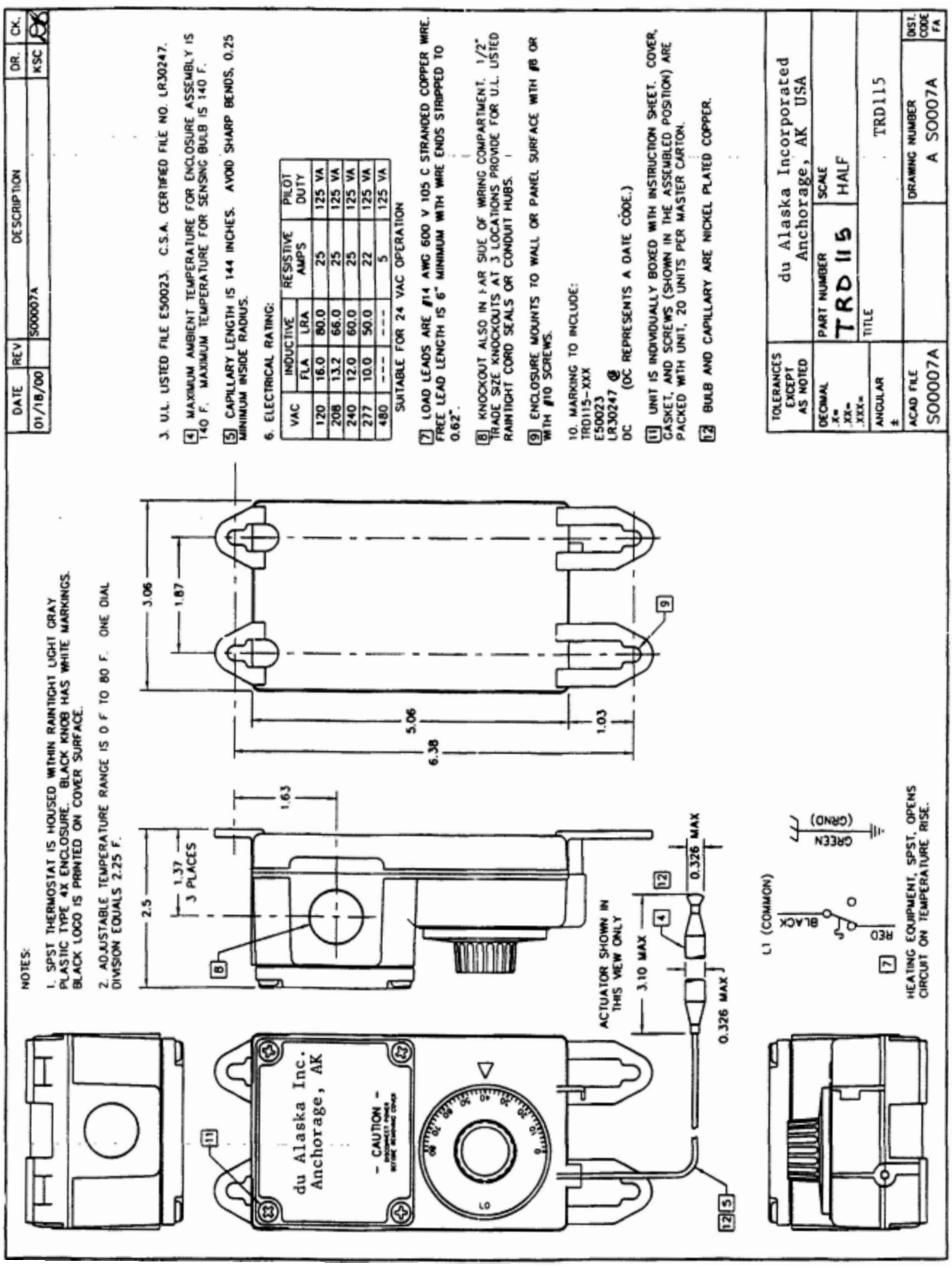
This product must only be installed by a qualified personnel, who fully understands electrical equipment placement, and must never under any circumstance be placed in service without the use of an adequate ground fault circuit interrupter to protect personnel from shock or injury.

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.

P/N TRD115 General Purpose Thermostat



Accessories and Optional Equipment

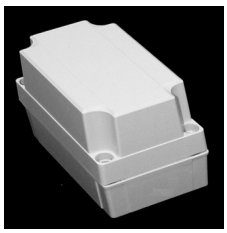
Part #

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

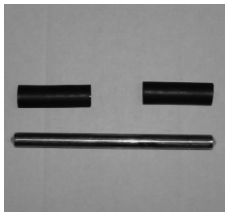
207C 1/2”X1/2” MNPT Water Proof Strain Relief / Pressure Connector

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

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

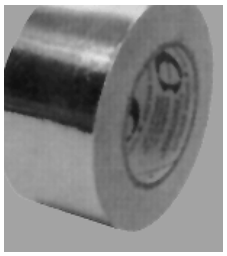


210 Brass Well Ballast Allows for deep well heat cable hold down ballast



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

C33240SP
20 Amp 240 volt

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

TRD115
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 installation. 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 installation 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 able ETFE 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, we 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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