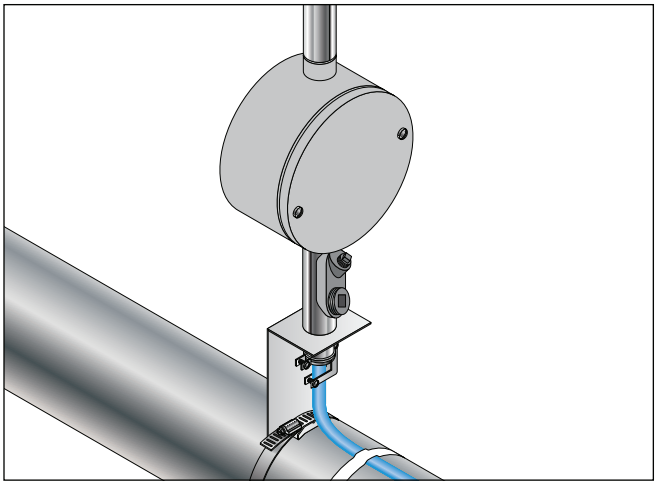
heat-line®
Freeze Protection Systems

1548-4010C Electrical Connection Kit

For Use With Dekoron 2700 and 2300 Family of Heating Cables



Approvals

Non-Hazardous Locations / Hazardous Locations
Class I, Div 1*/2, Groups A, B, C, D
Class II, Div 1*/2, Groups E, F, G
Class III, Div 1* and 2

*Contact Heat-Line representative for information on Division 1 hazardous location systems.

Installation Instructions

Kit Description

The Dekoron ® 1548-4010C electrical connection and end seal kit distributed by Heat-Line contains components needed to make one power input connection and one end termination in Ordinary or Division 2 locations; or one power input connection in Division 1 locations; or one end termination in Division 1 locations. Splices and power input splices can be made by using 2 kits.

Tools Required

- Flat-head screwdriver
- Wire cutters
- Diagonal cutting pliers
- Needle-nose pliers
- Utility knife or razor blade
- Crimp tool
- Phillips screwdriver

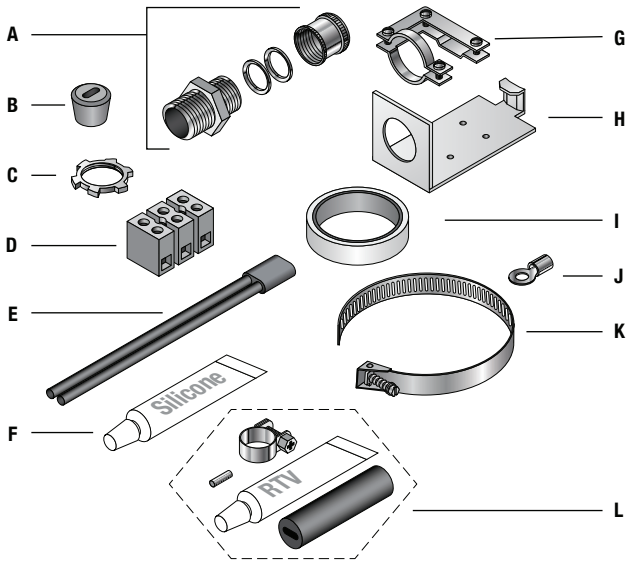
Additional Materials Required (but not provided)

- Weather Tight Junction Box (3/4 in. NPT Hubs)*
- Sealing Fitting (Division 1)*
- Pipe Strap (for pipe sizes other than 2 in. to 6 in. O.D.)
- Additional Fiberglass Tape

* The hazardous location designation of the complete cable set is governed by the lowest hazardous location rating of the sealing fitting and outlet box.

Power Connection Kit Parts

Item	Qty	Description
A	1	Connector Cap
	2	Connector Gland Washers
	1	Connector Body
B	1	Grommet
C	1	Locknut
D	1	Termination Block
E	1	Termination Boot
F	1	Silicone Sealant
G	1	Strain Relief Grip
H	1	Standoff Bracket
I	1	Roll of Fiberglass Tape
J	1	Ring Tongue Terminal
K	1	Pipe Strap (for 2" to 6" O.D. Pipes)
L	1	End Seal Kit



⚠ WARNING:

- **The Canadian Electrical Code and National Electric Code requires ground fault protection of equipment for each branch circuit supplying electrical heating cables or devices.**
- If the heating cable has a stainless steel ground braid, the following caution applies: The metal covering shall not be used as the bonding-to-ground means. Alternative means of protection shall be provided per CE Code part I.
- For cable installed in outdoor or wet indoor locations, use a suitable weather proofing cover (such as aluminum jacketing) to protect the thermal insulation.
- After installation of thermal insulation is complete, the insulation resistance of the system should not be less than 10 Mohms when measured at 500 Vdc between each circuit and ground with set de-energize and all circuit neutrals isolated from ground.
- Ground metal structures used for support or on which the cable is installed in accordance with CE Code part 1, Section 10.
- Install at –22°F (–30°C) or above.
- Do not install heater closer than 1/2 inch to any exposed combustible surface unless the cable has a metal shield or sheath and is provided with a positive temperature control which will limit the surface temperature to a value not exceeding 162°F (72°C).
- Minimum bending radius for heating cable is 1/4 inch.

Technical Information 2305 / 2310 / 2315 Self-Regulating Heating Cables

Specifications

Part Number	Thermal Rating @ 50°F (10°C) (Watts/ft.)	Service Voltage (Volts)	Maximum Circuit Length (ft.)	Bus Wire Size (AWG)	Exposure Temperature	Maintenance Temperature
2305-1	5	120	240	16	366°F (185°C) 150 PSIG Saturated Steam	250°F (120°C)
2305-2	5	240	480	16		
2310-1	10	120	180	16		
2310-2	10	240	280	16		
2315-1	15	120	135	16		
2315-2	15	240	200	16		

120 Volt Circuit Breaker Sizing vs. Max Circuit Length (ft.)

Max. Circuit Length (ft.)	15A	20A	30A
2305-1 if started at: 50°F (10°C)	150	200	240
0°F (–20°C)	150	200	240
–40°F (–40°C)	130	170	210
2310-1 if started at: 50°F (10°C)	90	120	180
0°F (–20°C)	85	110	165
–40°F (–40°C)	80	105	160
2315-1 if started at: 50°F (10°C)	70	90	135
0°F (–20°C)	65	85	125
–40°F (–40°C	60	80	120

240 Volt Circuit Breaker Sizing vs. Max Circuit Length (ft.)

Max. Circuit Length (ft.)	15A	20A	30A
2305-2 if started at: 50°F (10°C)	250	330	480
0°F (–20°C)	230	305	440
–40°F (–40°C)	220	295	420
2310-2 if started at: 50°F (10°C)	140	190	280
0°F (–20°C)	130	175	260
–40°F (–40°C)	125	170	250
2315-2 if started at: 50°F (10°C)	100	135	200
0°F (–20°C)	95	125	185
–40°F (–40°C)	90	120	180

Technical Information 2703 / 2705 / 2708 / 2710 Self-Regulating Heating Cables

Specifications

Part Number	Thermal Rating @ 50°F (10°C) (Watts/ft.)	Service Voltage (Volts)	Maximum Circuit Length (ft.)	Bus Wire Size (AWG)	Exposure Temperature °F (°C)	Maintenance Temperature °F (°C)
2703-1	3	120	330	16	150 (66)	185 (85)
2703-2	3	240	660	16	150 (66)	185 (85)
2705-1	5	120	270	16	150 (66)	185 (85)
2705-2	5	240	540	16	150 (66)	185 (85)
2708-1	8	120	210	16	150 (66)	185 (85)
2708-2	8	240	420	16	150 (66)	185 (85)
2710-1	10	120	180	16	150 (66)	185 (85)
2710-2	10	240	360	16	150 (66)	185 (85)

120 Volt Circuit Breaker Sizing vs. Max Circuit Length (ft.)

Max. Circuit Length (ft.)	15A	20A	30A	40A
2703-1 if started at: 50°F (10°C)	300	–	–	–
0°F (–20°C)	200	270	330	–
–20°F (–29°C)	180	230	330	–
2705-1 if started at: 50°F (10°C)	230	270	–	–
0°F (–20°C)	150	200	270	–
–20°F (–29°C)	130	175	260	270
2708-1 if started at: 50°F (10°C)	150	200	210	–
0°F (–20°C)	95	125	190	210
–20°F (–29°C)	85	100	170	210
2710-1 if started at: 50°F (10°C)	115	150	180	–
0°F (–20°C)	70	95	145	180
–20°F (–29°C)	60	85	120	165

240 Volt Circuit Breaker Sizing vs. Max Circuit Length (ft.)

Max. Circuit Length (ft.)	15A	20A	30A	40A
2703-2 if started at: 50°F (10°C)	660	–	–	–
0°F (–20°C)	410	560	660	–
–20°F (–29°C)	360	480	660	–
2705-2 if started at: 50°F (10°C)	460	540	–	–
0°F (–20°C)	300	400	540	–
–20°F (–29°C)	260	345	520	540
2708-2 if started at: 50°F (10°C)	295	390	420	–
0°F (–20°C)	195	250	375	420
–20°F (–29°C)	170	225	340	420
2710-2 if started at: 50°F (10°C)	230	305	360	–
0°F (–20°C)	150	200	300	360
–20°F (–29°C)	130	175	260	360

Recommended circuit breakers to minimize effect of transit startup currents.

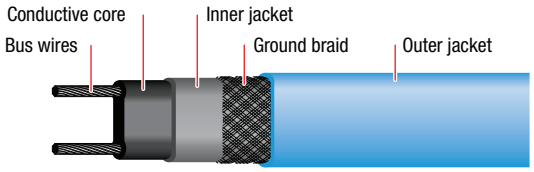
Westinghouse: Types SA, EB, EHB, FB, HFB

General Electric: E100 Type TEB, E150 Types TED, THEO

Square D: Types EH, FA, IF

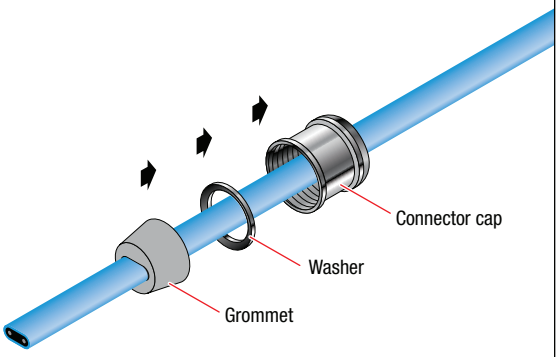
Heating Cable Configuration

Heater with Ground Braid and Outer Jacket



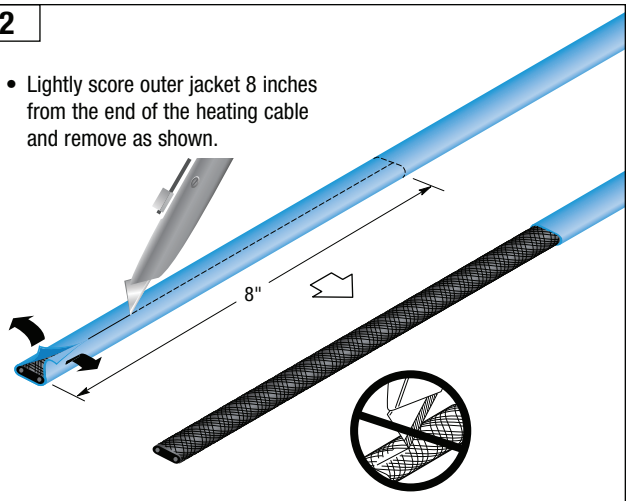
1

- Slide compression ring, grommet ring, and grommet onto the heating cable.



2

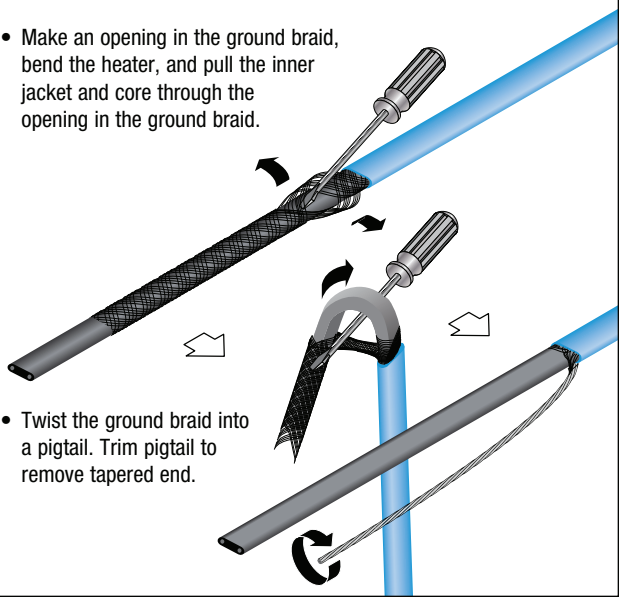
- Lightly score outer jacket 8 inches from the end of the heating cable and remove as shown.



Do Not Cut or Damage Ground Braid or Inner Jacket

3

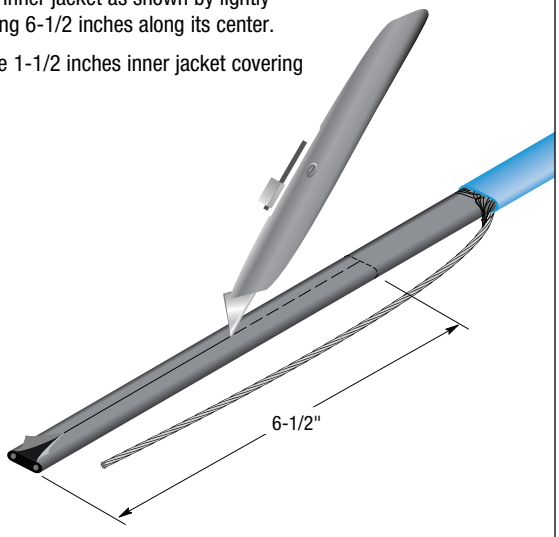
- Make an opening in the ground braid, bend the heater, and pull the inner jacket and core through the opening in the ground braid.



- Twist the ground braid into a pigtail. Trim pigtail to remove tapered end.

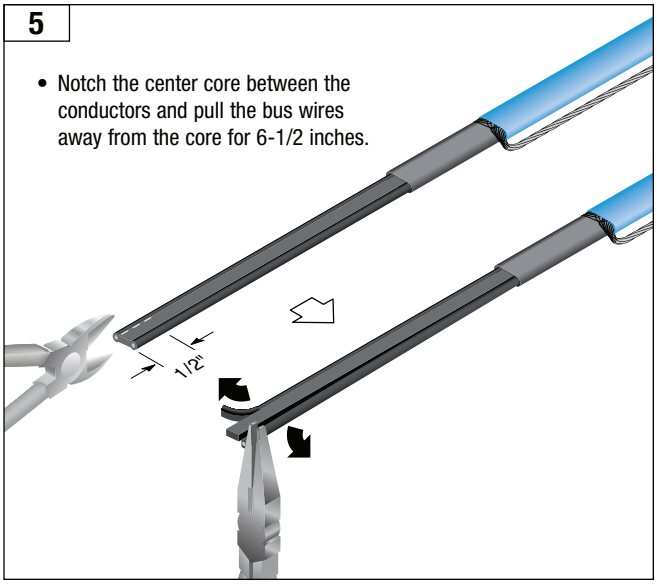
4

- Strip inner jacket as shown by lightly scoring 6-1/2 inches along its center.
- Leave 1-1/2 inches inner jacket covering core.



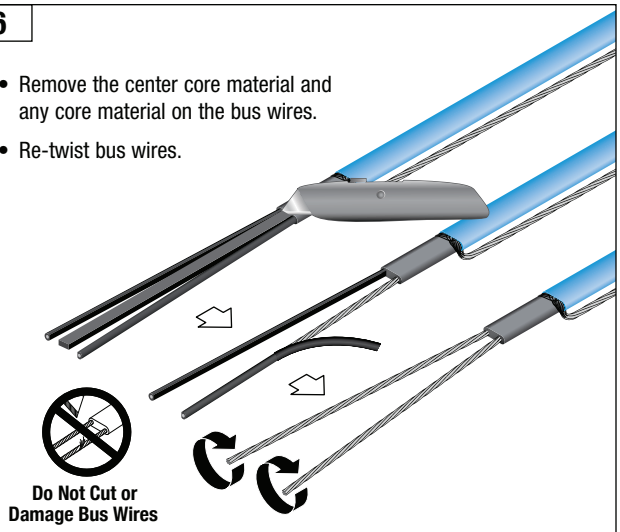
5

- Notch the center core between the conductors and pull the bus wires away from the core for 6-1/2 inches.



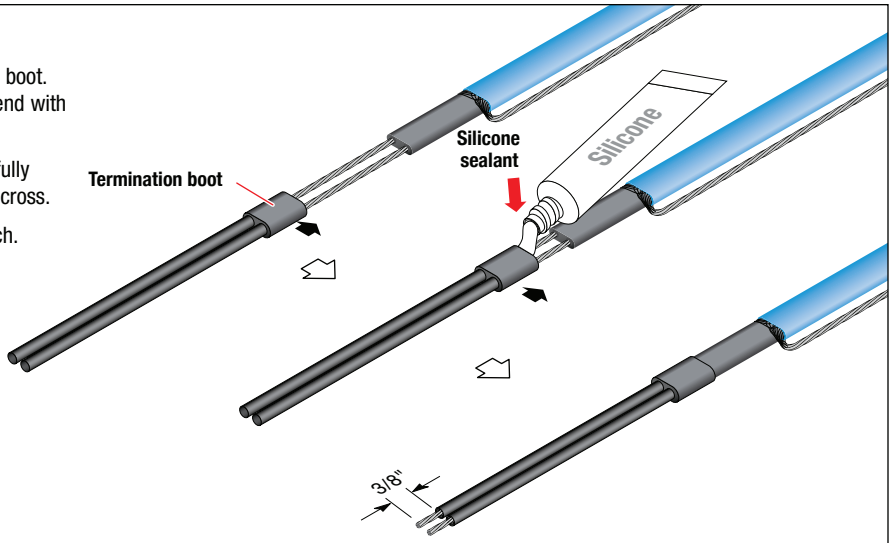
6

- Remove the center core material and any core material on the bus wires.
- Re-twist bus wires.



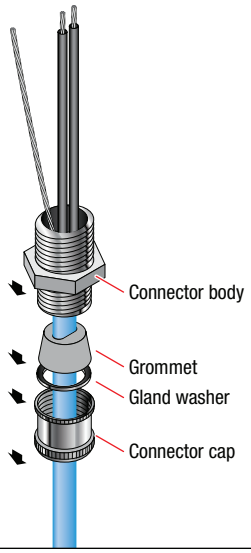
7

- Start sliding the bus wires into the termination boot. Before the boot is completely on, fill the boot end with silicone sealant.
- Continue sliding the heater into the boot until fully inserted. Make sure the wires do not touch or cross.
- Trim the ends of the bus wires to 3/8 of an inch.



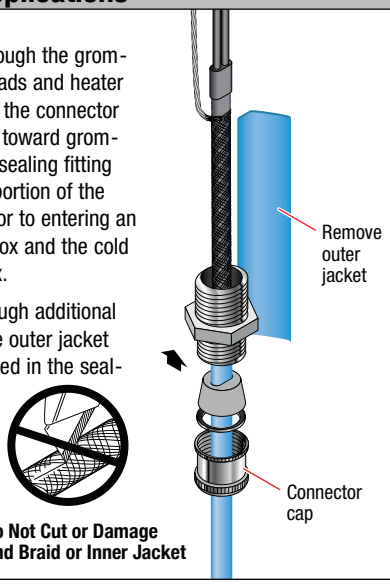
8A Ordinary and Division 2 Applications

- Slide the grommet up to the outer jacket cut back. Guide the cold leads, ground braid and heater through the connector body (inside bevel end toward grommet), insert the grommet into the body and tighten the connector cap.



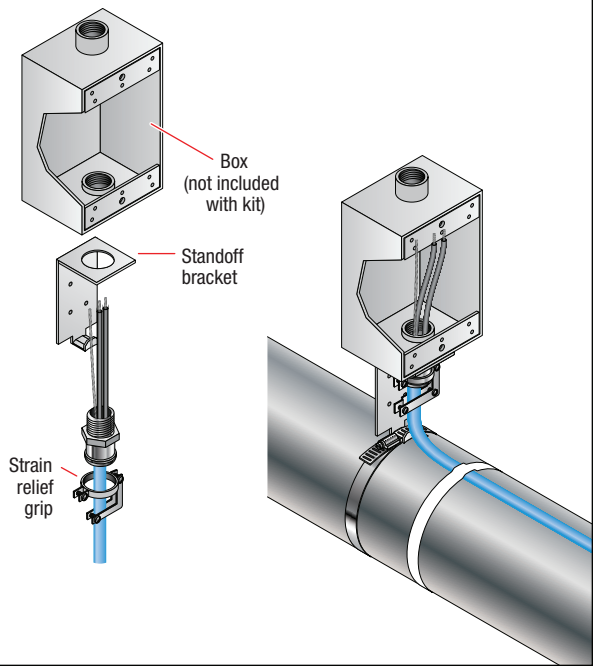
8B Division 1 Applications

- Pull enough heater through the grommet so that the cold leads and heater can be guided through the connector body (inside bevel end toward grommet) and an approved sealing fitting such that the heating portion of the heater will end just prior to entering an approved connection box and the cold leads will be in the box.
- Score and remove enough additional outer jacket so that the outer jacket cut back will be centered in the sealing fitting.



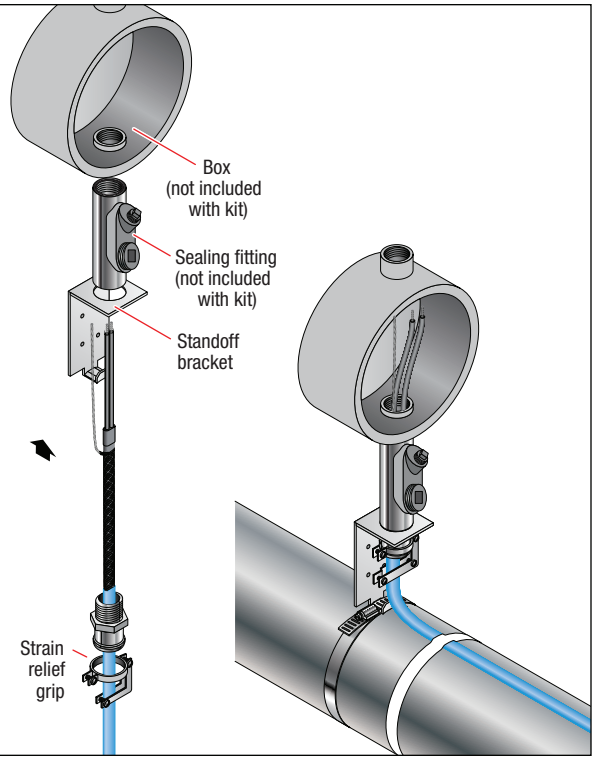
9A Ordinary and Division 2 Applications

- Insert the connector body through the standoff bracket and thread a junction box onto the connector. (Use a thread sealant for a water-tight seal.) (Use locknut if needed to make up any gap between bracket and box.)
- Attach the rounded portion of the strain relief grip to the connector cap aligning the flat surface of the grip with the heater surface.
- Attach the grip to the heater. Attach the standoff bracket to the pipe using the pipe strap. Connect the cold lead wires to power supply and ground braid pigtail to ground wire. Install box cover.
- Secure the heater to the pipe with fiberglass tape or cable ties every 12 inches.



9B Division 1 Applications

- Insert the connector body through the standoff bracket and attach an approved sealing fitting to the connector. Attach an approved box to the sealing fitting.
- Guide the cold leads, ground braid and heater through the connector body and sealing fitting into the box. Insert the grommet into the body and tighten the connector cap.
- Attach the rounded portion of the strain relief grip to the connector cap aligning the flat surface of the grip with the heater surface. Attach the grip to the heater. Attach the standoff bracket to the pipe using the pipe strap.
- Connect the cold lead wires to power supply and ground braid pigtail to ground using the ring tongue terminal provided. Install the box cover.
- Complete the sealing fitting installation by filling with sealing compound per manufacturer's directions.
- Secure the heater to the pipe with fiberglass tape or cable ties every 12 inches.



Input Power Splice (for power connection to two lengths of heater – additional kits required)

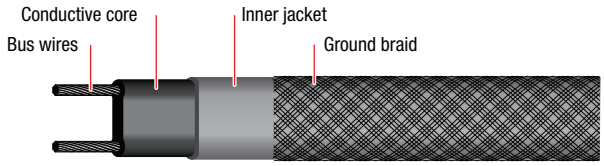
- To make a power connection to two lengths of heater use a box with an additional hub to accommodate the second heater. Follow the above power connection procedure for the first heater. For the second heater, install the connector fitting components in the additional hub in the box. Prepare the heater following the above procedure; then guide the cold leads and heater through for connec tion to power inside the box.

Splice (for splicing two lengths of heater – additional kits required)

- To splice one length of heater to another length, use a box with appropriately located hubs. Follow the above power connection procedure for the first heater. For the second heater, install the connector fitting components in the additional hub in the box; then guide the cold leads and heater through. Attach leads from one heater to leads from the other heater.

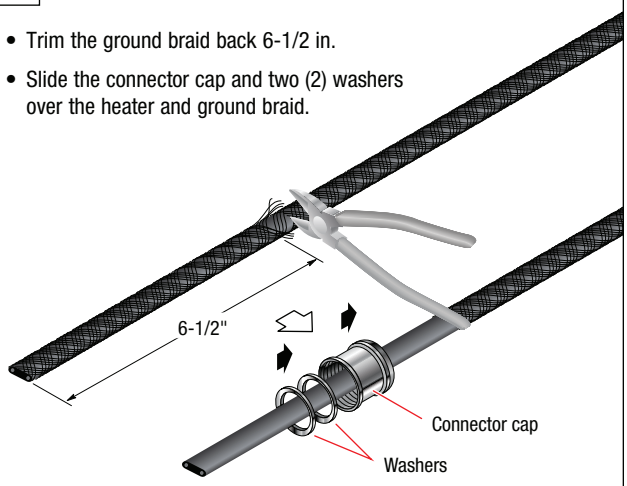
Heating Cable Configuration

Heater with Ground Braid



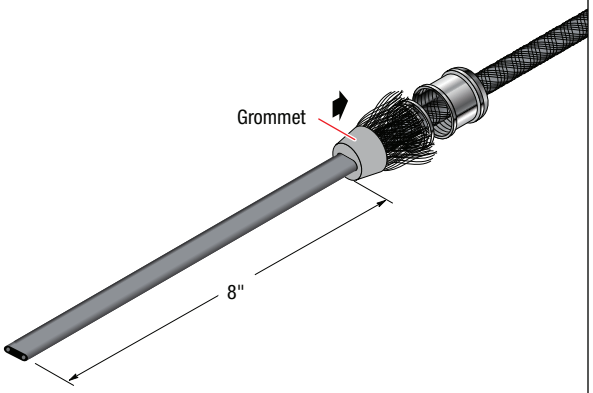
1

- Trim the ground braid back 6-1/2 in.
- Slide the connector cap and two (2) washers over the heater and ground braid.



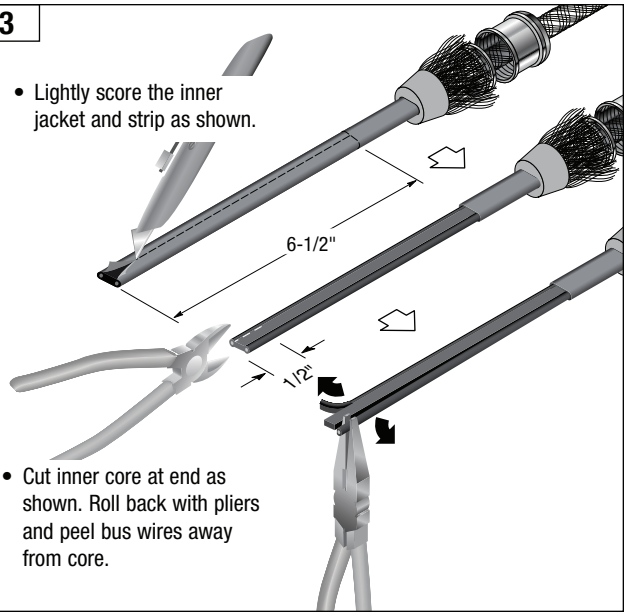
2

- Slide the grommet on the heater, pushing the ground braid back, until 8 in. of heater is through the grommet.



3

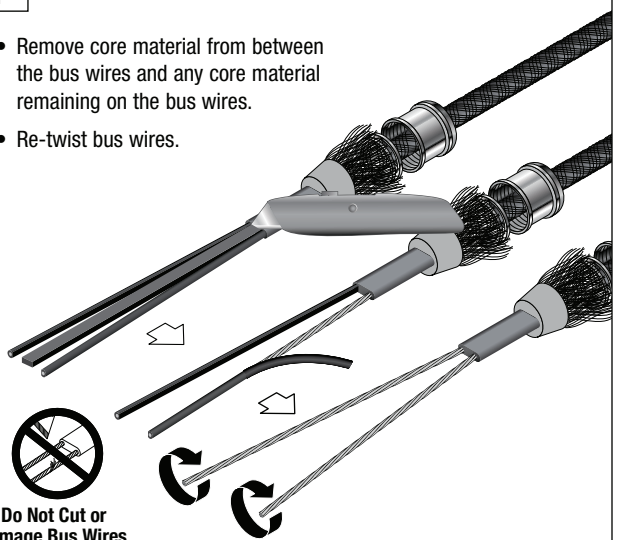
- Lightly score the inner jacket and strip as shown.



- Cut inner core at end as shown. Roll back with pliers and peel bus wires away from core.

4

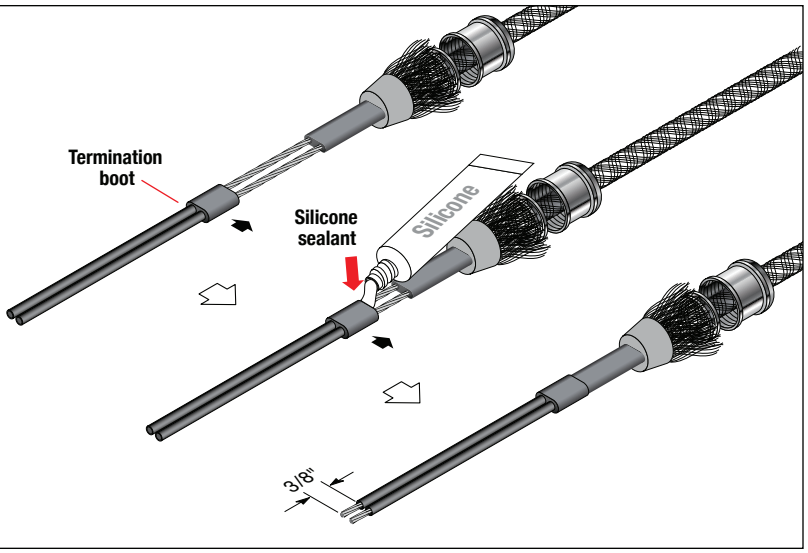
- Remove core material from between the bus wires and any core material remaining on the bus wires.
- Re-twist bus wires.



Do Not Cut or Damage Bus Wires

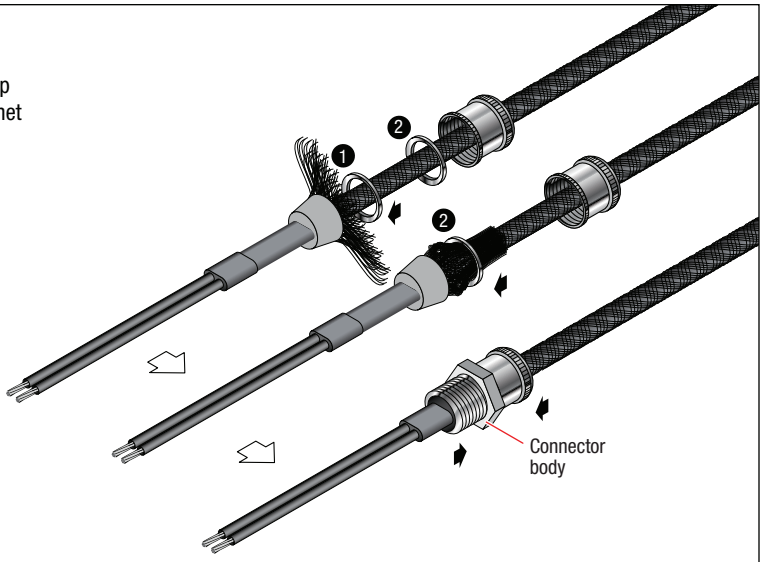
5

- Start sliding the bus wires into the termination boot. Before the boot is completely on, fill the boot end with silicone sealant.
- Continue sliding the heater into the boot until fully inserted. Make sure the wires do not touch or cross.
- Trim the ends of the bus wires to 3/8 of an inch.



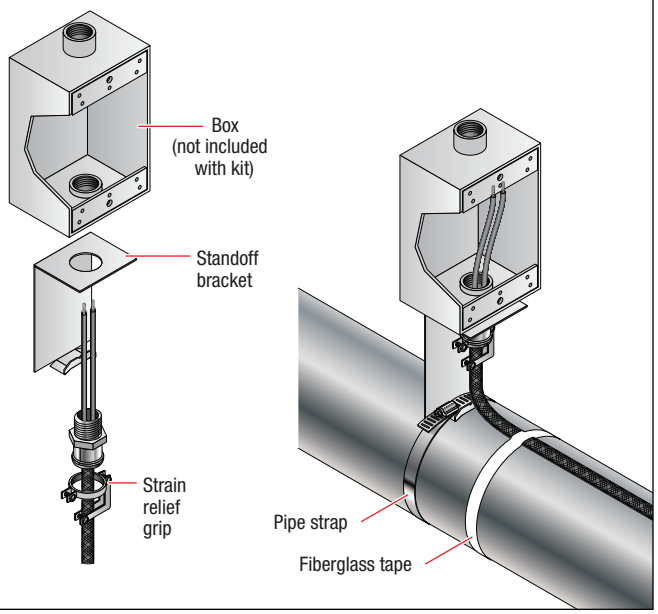
6

- Spread the ground braid out and slide the first washer (❶) up to the grommet trapping the ground braid between the grommet and washer.
- Fold the ground braid back over the first washer and slide the second washer (❷) and cap over the folded ground braid.
- Guide the cold leads and heater through the connector body (inside bevel toward grommet), insert the grommet into the body and tighten the connector cap.



7 Ordinary and Division 2 Applications

- Insert the connector body through the standoff bracket and thread a junction box onto the connector. (Use a thread sealant for a water-tight seal.) (Use locknut if needed to make up any gap between bracket and box.)
- Attach the rounded portion of the strain relief grip to the connector cap aligning the flat surface of the grip with the heater surface. Attach the grip to the heater.
- Attach the standoff bracket to the pipe using the pipe strap. Connect the cold lead wires to power supply. Install box cover.
- Secure the heater to the pipe with fiberglass tape or cable ties every 12 inches.



Input Power Splice (for power connection to two lengths of heater – additional kits required)

- To make a power connection to two lengths of heater use a box with an additional hub to accommodate the second heater. Follow the above power connection procedure for the first heater. For the second heater, install the connector fitting components in the additional hub in the box. Prepare the heater following the above procedure; then guide the cold leads and heater through for connection to power inside the box.

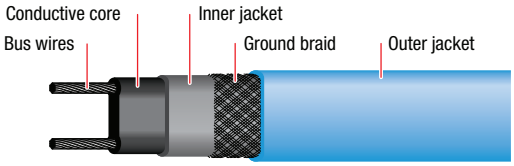
Splice (for splicing two lengths of heater – additional kits required)

- To splice one length of heater to another length, use a box with appropriately located hubs. Follow the above power connection procedure for the first heater. For the second heater, install the connector fitting components in the additional hub in the box; then guide the cold leads and heater through. Attach leads from one heater to leads from the other heater.

End Seal Installation for Heating Cable with Ground Braid and Outer Jacket in Division 1 Locations

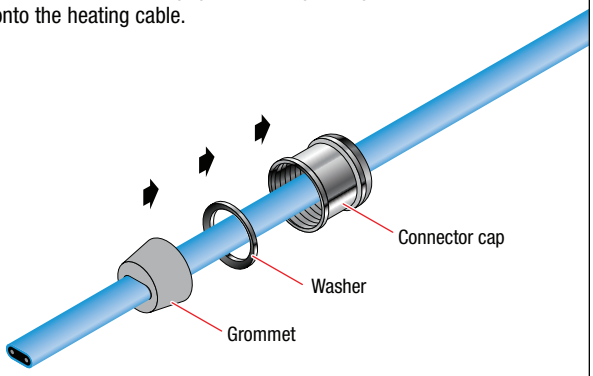
Heating Cable Configuration

Heater with Ground Braid and Outer Jacket



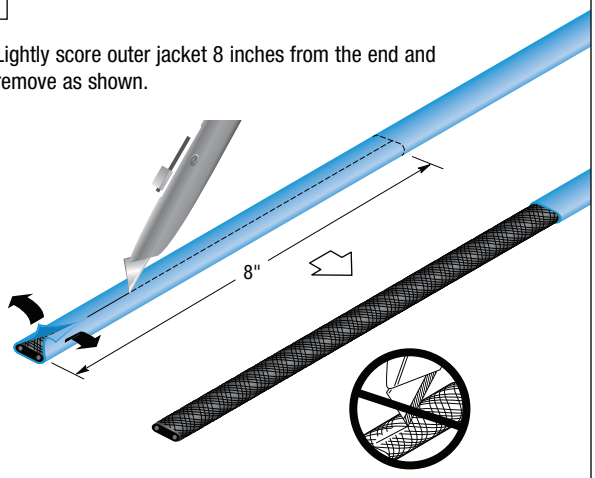
1

- Slide compression ring, grommet ring, and grommet onto the heating cable.



2

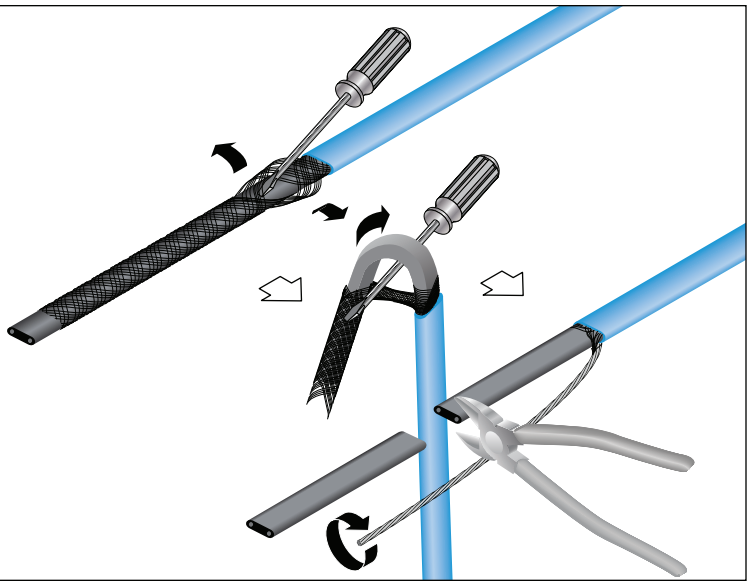
- Lightly score outer jacket 8 inches from the end and remove as shown.



Do Not Cut or Damage Ground Braid or Inner Jacket

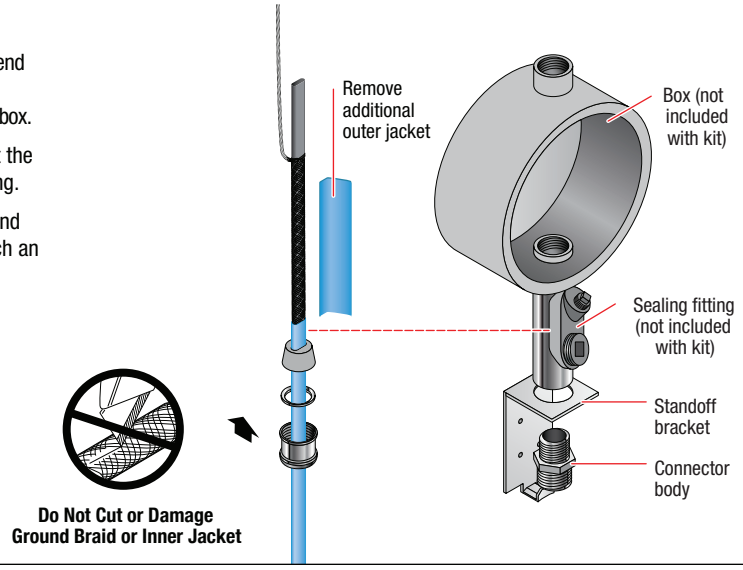
3

- Make an opening in the ground braid, bend the heater, and pull the inner jacket and core through the opening in the ground braid.
- Twist the ground braid into a pigtail.



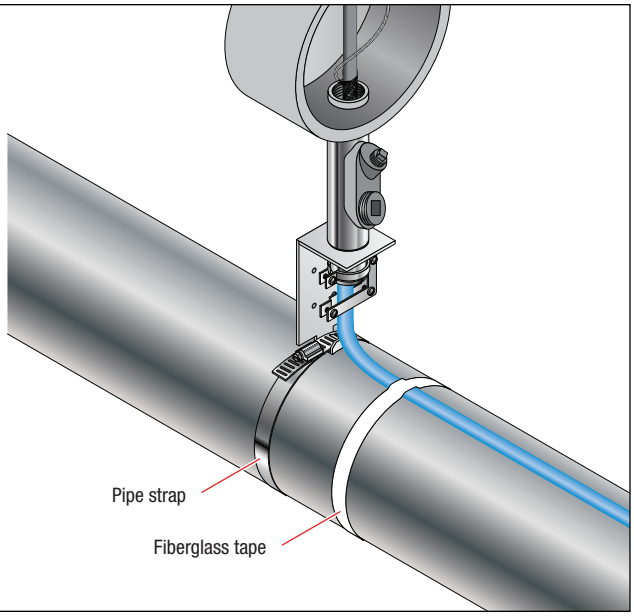
4

- Pull enough heater through the grommet so that the heater end can be guided through the connector body (inside bevel end toward grommet) and an approved sealing fitting and into a box.
- Score and remove enough additional outer jacket so that the outer jacket cut back will be centered in the sealing fitting.
- Insert the connector body through the standoff bracket and attach an approved sealing fitting to the connector. Attach an approved box to the sealing fitting.



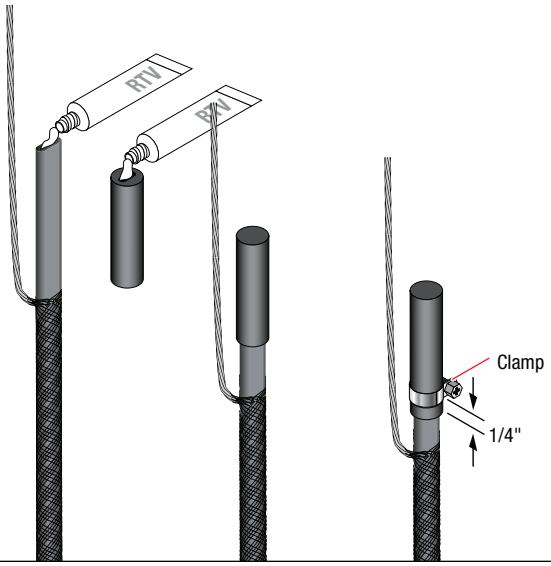
5

- Guide the heater and ground braid through the connector body and sealing fitting into the box. Insert the grommet into the body and tighten the connector cap.
- Attach the rounded portion of the strain relief grip to the connector cap aligning the flat surface of the grip with the heater surface. Attach the grip to the heater. Attach the standoff bracket to the pipe using the pipe strap.



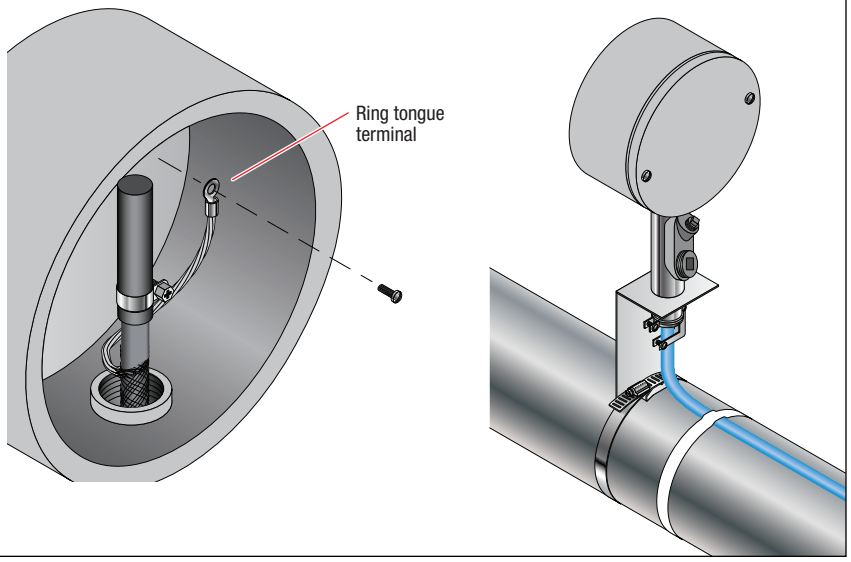
6

- Trim the end of the heater if needed so that once the end seal cap is on it will be centered in the box.
- Apply RTV sealant into the end cap and also on the end of the heater.
- Slide the end cap onto the heater.
- Slide the clamp over the end cap and position it 1/4 inch from the heater entrance point. (Note: the screw may have to be completely removed in order to get the clamp over the cap, and then reinstalled.)
- Tighten the clamp until the cap deforms.



7

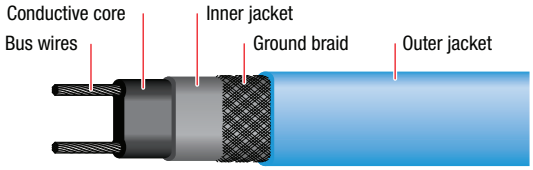
- Connect the ground braid pigtail to ground point in box using the ring tongue terminal provided.
- Install the box cover.
- Complete the sealing fitting installation by filling with sealing compound per manufacturer's instructions.



End Seal Installation for Heating Cable with Ground Braid and Outer Jacket in Ordinary & Division 2 Locations

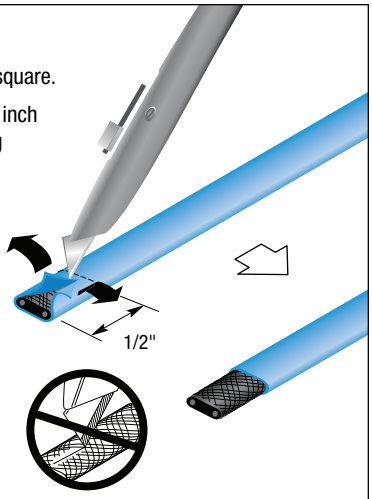
Heating Cable Configuration

Heater with Ground Braid and Outer Jacket



1

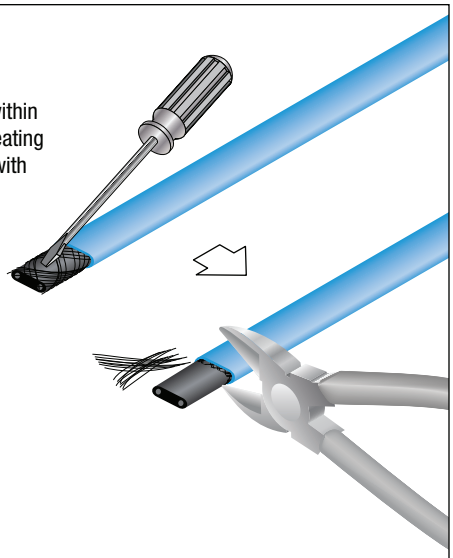
- Trim end of heating cable square.
- Strip outer jacket back 1/2 inch from the end of the heating cable.



Do Not Cut or Damage Ground Braid or Inner Jacket

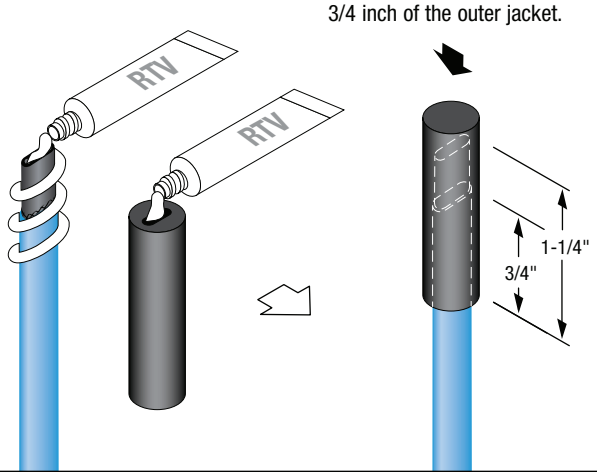
2

- Unravel and trim ground braid to within 1/2 inch of the heating cable end, even with outer jacket.



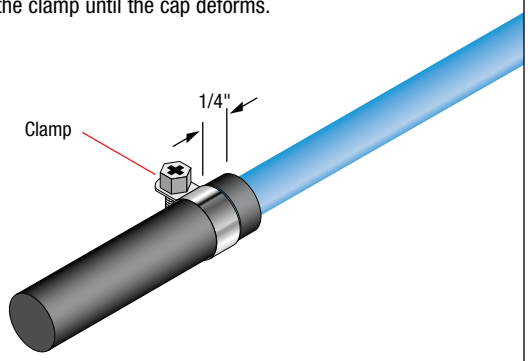
3

- Apply RTV sealant over 1 inch of the heater end and into the end cap.
- Slide end cap over the heating cable. Make sure 1-1/4 inches of the heater goes into the end cap, including 3/4 inch of the outer jacket.

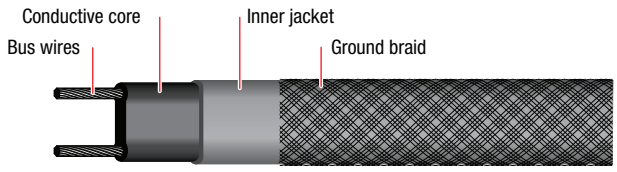


4

- Slide the clamp over the end cap and position it 1/4 inch from the heater entrance point. (Note: the screw may have to be completely removed in order to get the clamp over the cap, and then reinstalled.)
- Tighten the clamp until the cap deforms.

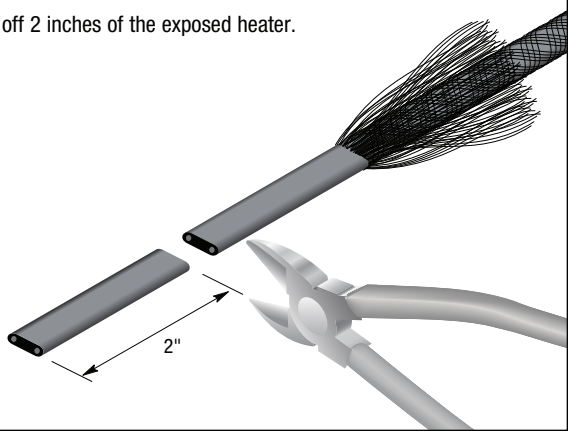


End Seal Installation for Heating Cable with Ground Braid Only in Ordinary & Division 2 Locations



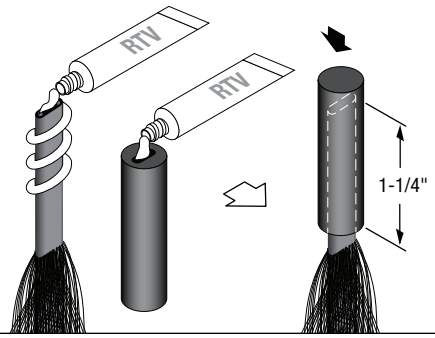
1

- Peel back approximately 4 inches of ground braid.
- Cut off 2 inches of the exposed heater.



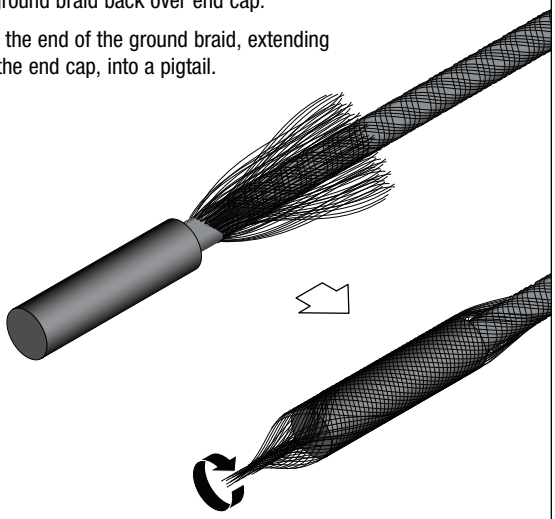
2

- Apply RTV sealant over 1 inch of the heater end and into the end cap.
- Slide end cap over the heating cable. Make sure 1-1/4 inches of the heater goes into the end cap.



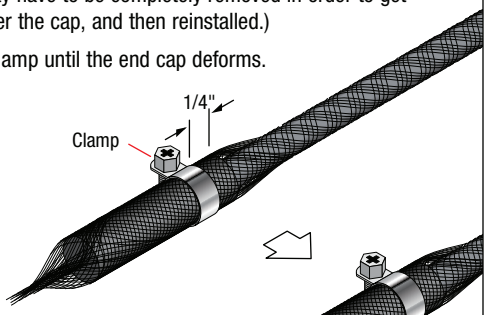
3

- Pull ground braid back over end cap.
- Twist the end of the ground braid, extending past the end cap, into a pigtail.

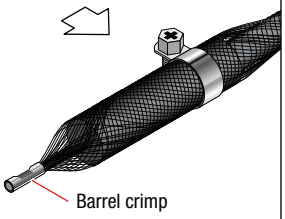


4

- Slide the clamp over the end cap and ground braid and position it 1/4 inch from the heating cable entrance point. (Note: the screw may have to be completely removed in order to get the clamp over the cap, and then reinstalled.)
- Tighten the clamp until the end cap deforms.



- Slide the barrel crimp over the ground braid pigtail and crimp to secure the ground braid to secure the ground braid.



Heat-Line Freeze Protection Systems
1095 Green Lake Road
Algonquin Highlands, ON, Canada
K0M 1J1
Tel: 1-705-754-4545
1-800-584-4944
Fax: 1-705-754-4567
info@heatline.com
www.heatline.com