

PBS-310-A | PBS-310-A10



Installation Instructions

PBS-310-A | PBS-310-A10 Power entry kit
for up to 2 trace heaters
for use with BARTEC BPL trace heaters

Consignes d'installation

Kit de connexion PBS-310-A | PBS-310-A10
pour jusqu'à 2 câbles chauffants
de type BARTEC BPL

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Safety

For safe installation of the PBS-310-A | PBS-310-A10 Single entry power junction box the technical requirements and instructions given in this manual must be followed.

⚠ WARNING

Risk of fire or electrical shock. Follow these guidelines to avoid personal injury or material damage.

- All electrical systems and installations must comply with BARTEC GmbH requirements and be installed in accordance with the relevant electrical codes and any other applicable national and local codes.
- BARTEC GmbH, the US and Canadian electrical codes require ground fault protection to be provided for all trace heating circuits.
- Install the connection kit, trace heaters and end seals carefully.
- Use the trace heater in accordance with the intended purpose and strictly comply with the operational data specified in section *Technical Data*.
- The bending radius of the trace heater must be at least 1" (25 mm).
- Any defective component of the kit must be replaced before installation.
- To avoid short circuits, do not connect the trace heater bus wires together.
- Keep all components and the trace heaters dry before and during installation.
- This kit contains silicone adhesive. Keep out of reach of children. Store at below 77 °F (25 °C). Follow the safety instructions given on the packaging.
- Keep these instructions for future reference. If applicable, leave them with the end user.
- De-energize before installation or servicing.
- Use only original BARTEC accessories.

NOTICE

The following instructions are provided in English only. Refer to www.bartec.us for the French version.

Sécurité

Afin de garantir la sécurité lors de l'installation et de l'utilisation du Boîte de jonction à une entrée PBS-310-A | PBS-310-A10, il est impératif de respecter les exigences ainsi que les consignes techniques mentionnées dans le présent manuel.

⚠ AVERTISSEMENT

Risque d'incendie ou d'électrocution. Suivez ces consignes pour éviter toute blessure ou dommage matériel.

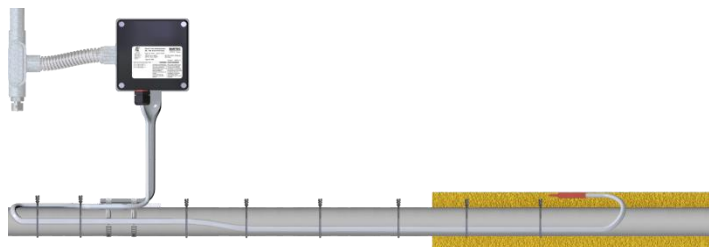
- Tous les systèmes et installations électriques doivent satisfaire aux exigences imposées par la société BARTEC GmbH et doivent être installés conformément aux normes électriques en vigueur ainsi qu'aux autres prescriptions nationales et locales applicables.
- La société BARTEC GmbH ainsi que les normes électriques américaines et canadiennes imposent une protection contre les défauts à la terre pour tous les circuits de traçage électrique.
- La pose du kit de raccordement, des câbles chauffants et des embouts d'étanchéité doit être réalisée avec soin.
- Utilisez le câble chauffant conformément à l'usage prévu et en respectant les caractéristiques de fonctionnement spécifiées à la section *Caractéristiques techniques*.
- Le rayon de courbure du câble chauffant ne doit pas être inférieur à 1" (25 mm).
- Tout élément défectueux dans le kit doit être remplacé avant l'installation.
- Pour éviter un court-circuit, ne jamais raccorder ensemble les deux conducteurs du câble chauffant.
- Conservez tous les éléments et les câbles chauffants au sec avant et pendant l'installation.
- Ce kit contient de la colle silicone. Tenir hors de portée des enfants. Stocker à une température inférieure à 77 °F (25 °C). Respectez les consignes de sécurité indiquées sur l'emballage.
- Conservez ces instructions pour un usage ultérieur. Le cas échéant, remettez-les à l'utilisateur final.
- Mettez le système hors tension avant toute installation ou opération de maintenance.
- Utilisez exclusivement des pièces et accessoires d'origine BARTEC.

AVIS

Les instructions qui suivent sont fournies en anglais uniquement. Veuillez vous référer au site www.bartec.us pour la version française.

Overview

This manual covers the installation and operation of the BARTEC PBS-310-A | PBS-310-A10 Single entry power junction box.



The trace heating system uses a power limiting trace heater. Its fixed specific resistance offers a constant power output irrespective of the ambient temperature. The aluminum outer jacket ensures maximum mechanical strength.

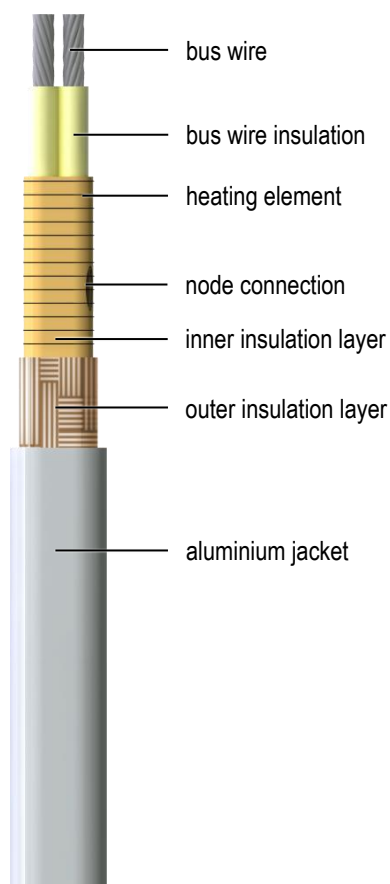
The trace heaters are fixed equipment heating systems for pipes in ordinary and hazardous areas. The trace heater can be cut and installed to any required length (up to the maximum heating circuit length as shown on page 9).

Compatibility

The manual applies for the following trace heaters:

- BARTEC BPL

The following terms describe the parts of the trace heater within these instructions:



Certifications / Approvals



PBS-310-A | PBS-310-A10 Single entry power junction box for BARTEC BPL power limiting trace heaters

Technical data

Maximum exposure temperature	<i>continuous</i>	-40 to 644 °F (-40 to 350 °C)
	<i>intermittent</i>	-40 to 797 °F (-40 to 425 °C)
Minimum operation temperature		-40 °F (-40 °C)
Minimum installation temperature		-40 °F (-40 °C)
Power supply		0 to 277 Vac
Trace heater output		5 to 20 W/ft (15 to 70 W/m)
Protection classification		Class I, Div 2 Group A, B, C, D Class II, Div 2 Group E, F, G Class III
Heater dimensions	<i>outer dimensions</i>	0.42" x 0.3" (10.7 x 7.7 mm)
	<i>bus wires</i>	12 AWG (3 mm ²)
Minimum bending radius		1" (25 mm)
Weight		11.1 lbs / 100 ft (16.5 kg / 100 m)
Conduit entry size	<i>PBS-310-A</i>	3/4"
	<i>PBS-310-A10</i>	1"
Max. power conductor size	<i>PBS-310-A</i>	10 AWG (6 mm ²)
	<i>PBS-310-A10</i>	6 AWG (10 mm ²)
Terminals		Spring clamp Ex e, 2x3 line, 1x3 PE

Maximum pipe / workpiece temperature¹

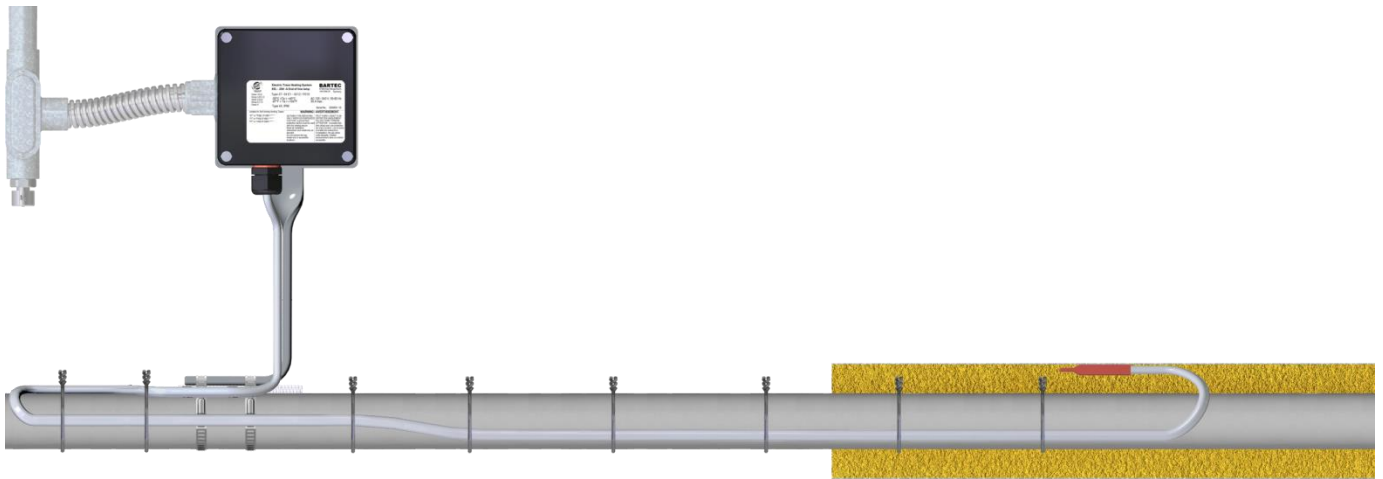
	T5	T4	T3	T2	T1	SAFE ²
5BPL-AL	97 °F (36 °C)	160 °F (71 °C)	320 °F (160 °C)	552 °F (289 °C)	662 °F (350 °C)	662 °F (350 °C)
10BPL-AL	52 °F (11 °C)	82 °F (28 °C)	212 °F (100 °C)	475 °F (246 °C)	613 °F (323 °C)	613 °F (323 °C)
15BPL-AL	-	-	102 °F (39 °C)	352 °F (178 °C)	529 °F (276 °C)	529 °F (276 °C)
20BPL-AL	-	-	-	176 °F (80 °C)	365 °F (185 °C)	365 °F (185 °C)

¹ Applies for 230 V, for 277 V applications contact your local BARTEC representative for assistance. Surface temperature limits in accordance with EN60079.

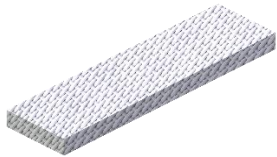
² Surface temperature limited by materials of construction (withstand temperature)

Kit contents

The following table lists the kit contents of the PBS-310-A | PBS-310-A10 Single entry power junction box³:



PBS-310-A | PBS-310-A10 Single entry power junction box



1 x
Thermal break pad



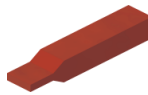
1 x
Cover for junction box
incl. 4 fixing screws



1 x
Junction box with connection terminals
“-A” junction boxes 4.8" x 4.7" (122 x 120 mm)
“-A10” junction boxes 6.3" x 6.3" (160 x 160 mm)



1 x
Silicone pants



1 x
End seal



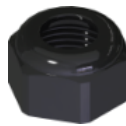
1 x
Silicone adhesive



1 x
Plastic gland body



1 x
BPL-Grommet



1 x
Fixing nut

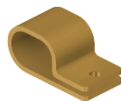


1 x
Seal ring for gland body

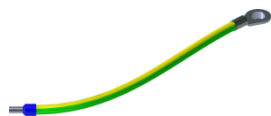


1 x
Lock nut for gland body

³ Note that the illustrations might vary depending on whether you use the PBS-310-A or the PBS-310-A10 kit.



1 x
Bonding clip



1 x
Bonding jumper for bonding clip



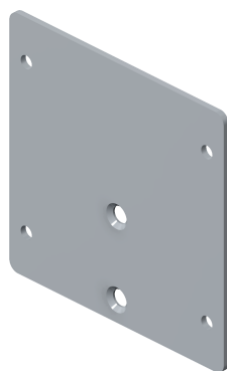
1 x
Fixing screw for bonding clip
ISO 1207, M4x10



1 x
Washer
ISO 7089, M4



1 x
Nut
ISO 4032, M4



1 x
Base plate for mounting stand (galvanized)



1 x
Mounting stand
L-shape, galvanized



2 x
Fixing screw for junction box ISO
1207, M6x35 (~1 1/3")



2 x
Fixing screw for base plate
ISO 2009, M5x20 (~ 3/4")



2 x
Washer
ISO 7092, M6



2 x
Washer
ISO 7089, Type B, M5



2 x
Split washer
DIN 127, Type B, M6



2 x
Split washer
DIN 127, Type B, M5




2 x
Nut
ISO 4032, M6




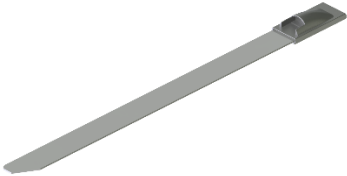
2 x
Nut
ISO 4032, M5

Accessories

The following accessories are available for the PBS-310-A | PBS-310-A10 Single entry power junction box.

	<p>BPL cable gland kit and end seal spare parts kit for replacement of damaged or lost parts</p>	<p>Catalog No.: CAK-PLG Order No.: 432394 Part No.: 27-59CX-E101/0001</p>
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	<p>Stainless steel tie wire for installation of power limiting trace heaters on pipes, etc.</p>	<p>Catalog No.: TW-05 Order No.: 710109 Part No.: <i>Contact your local BARTEC distributor.</i></p>
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	<p>Stainless steel cable ties for installation of power limiting trace heaters, mounting stands, etc. <i>SSC-03: pipe ø up to 3" / DN80</i> <i>SSC-06: pipe ø up to 6" / DN150</i> <i>Pack of 100 pcs.</i></p>	<p>SSC-03: Catalog No.: SSC-03 Order No.: 126227 Part No.: 03-6510-0208 SSC-06: Catalog No.: SSC-06 Order No.: 126228 Part No.: 03-6510-0209</p>
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	<p>Glass cloth tape for fixation of self-regulating trace heaters on all pipes including stainless steel / required during preparation of power limiting trace heaters <i>1/2" x 108 ft (33 m) per roll</i> <i>Minimum installation temperature (dry surface): 15 °F (-10 °C)</i> <i>Maximum withstand temperature: 392 °F (200 °C)</i></p>	<p>Catalog No.: GT-108 Order No.: 100306 Part No.: 02-5500-0047</p>
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Tip: Refer to the following table to estimate the required number of tape rolls for your installation (for fixation of trace heaters on pipes only)

Pipe diameter in inch (DN)	1/4" (DN8)	1/2" (DN15)	3/4" (DN20)	1" (DN25)	1 1/4" (DN32)	1 1/2" (DN40)	2" (DN50)	2 1/2" (DN65)	3" (DN80)	4" (DN100)	6" (DN150)	8" (DN200)	10" (DN250)	12" (DN300)	14" (DN350)	16" (DN400)	18" (DN450)	20" (DN500)	24" (DN600)
Required no. of tape rolls per 100 ft (30 m) of piping	1	1	1	1	2	2	2	3	3	4	5	7	9	10	11	12	14	15	18

Stainless steel pipe straps

stainless steel, for fixation of mounting stands on pipes etc. No special tooling required.

for pipe \varnothing up to 3" / DN80:

Catalog No.: PC-1
Order No.: 710144

for pipe \varnothing up to 10" / DN250:

Catalog No.: PC-2
Order No.: 710145

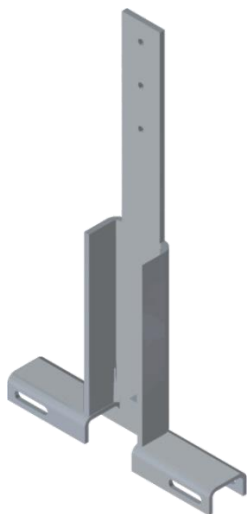
Mounting stand

L-shape, galvanized

Catalog No.: MB-GL200

Order No.: 117725

Part No.: 05-0105-0162

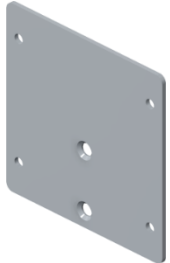
Stainless steel mounting stand (optional)

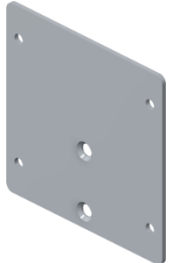
T-shape, 6.3 x 11.3" (160 x 287 mm)


Catalog No.: MB-SS200

Order No.: 129911

Part No.: 05-0091-0051

	<p>Stainless steel base plate for mounting stands (optional)</p> <p>for "A"-type junction boxes with 4.8 x 4.7" (122 x 120 mm)</p> <p>or "A10"-type junction boxes with 6.3 x 6.3" (160 x 160 mm)</p>	<p>"A"-Type:</p> <p>Catalog No.: MP-SS122 Order No.: 123958 Part No.: 05-0091-0011</p> <p>"A10"-Type:</p> <p>Catalog No.: MP-SS160 Order No.: 123960 Part No.: 05-0091-0013</p>
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	<p>Galvanized base plate for mounting stands (optional)</p> <p>for "A"-type junction boxes with 4.8 x 4.7" (122 x 120 mm)</p> <p>or "A10"-type junction boxes with 6.3 x 6.3" (160 x 160 mm)</p>	<p>"A"-Type:</p> <p>Catalog No.: MP-GL122 Order No.: 121684 Part No.: 05-0005-0015</p> <p>"A10"-Type:</p> <p>Catalog No.: MP-GL160 Order No.: 121686 Part No.: 05-0005-0017</p>
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	<p>Electrically traced warning label</p> <p>Warning label for trace heater circuits</p> <p><i>Recommended: electrical warning label every 10 ft. (3 m) on the outside of the thermal cladding on a clearly visible place.</i></p> <p><i>Packaged in rolls of 100 pieces per roll</i></p>	<p>English:</p> <p>Catalog No.: HTWL-US Order No.: 113550 Part No.: 05-2144-0047</p> <p>French:</p> <p>Catalog No.: HTWL-FR Order No.: 120300 Part No.: 05-2144-0703</p>
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Installation

Preparation

Before installing any electric trace heating, the person installing must check if the trace heating has been designed and planned correctly. It is particularly essential to verify the following points:

- complete project planning documentation, operating instructions and installation instructions.
- correct selection of the trace heater and accessories with respect to:
 - calculation of heat losses
 - max. permissible operating temperature
 - max. permissible ambient temperature
 - temperature class (for hazardous locations)
 - heating circuit length

Before installing, make sure that all piping and equipment is properly installed and pressure tested.

Maximum heating circuit length

The following table shows the maximum circuit lengths in ft (m) for the different BPL trace heater types with standard circuit breaker amperages. Breaker sizing should be based on the National Electrical Code, Canadian Electrical Code or any other local or applicable code. The values apply for a volt drop variation of max. 10 %.

Trace heater type	Start-up temperature in °F (°C)	Maximum heating circuit length in ft. (m)											
		Operating Voltage: 120 Vac (.BPL1-AL only)			Operating Voltage: 208 Vac (.BPL2-AL only)			Operating Voltage: 240 Vac (.BPL2-AL only)			Operating Voltage: 277 Vac (.BPL2-AL only)		
		20 A	30 A	40 A	20 A	30 A	40 A	20 A	30 A	40 A	20 A	30 A	40 A
5BPL.-AL	+50 (+10)	291 (90)	291 (90)	291 (90)	518 (160)	518 (160)	518 (160)	567 (175)	567 (175)	567 (175)	640 (195)	640 (195)	640 (195)
	0 (-18)	275 (85)	275 (85)	275 (85)	502 (155)	502 (155)	502 (155)	550 (170)	550 (170)	550 (170)	623 (190)	623 (190)	623 (190)
	-40 (-40)	259 (80)	259 (80)	259 (80)	470 (145)	470 (145)	470 (145)	518 (160)	518 (160)	518 (160)	607 (185)	607 (185)	607 (185)
10BPL.-AL	+50 (+10)	178 (55)	210 (65)	210 (65)	324 (100)	356 (110)	356 (110)	340 (105)	405 (125)	405 (125)	328 (100)	443 (135)	443 (135)
	0 (-18)	162 (50)	194 (60)	194 (60)	308 (95)	340 (105)	340 (105)	324 (100)	388 (120)	388 (120)	322 (98)	427 (130)	427 (130)
	-40 (-40)	146 (45)	178 (55)	178 (55)	292 (90)	324 (100)	324 (100)	307 (95)	372 (115)	372 (115)	315 (96)	410 (125)	410 (125)
15BPL.-AL	+50 (+10)	121 (37)	162 (50)	162 (50)	194 (60)	275 (85)	275 (85)	246 (75)	344 (105)	344 (105)	203 (62)	322 (98)	344 (105)
	0 (-18)	113 (35)	152 (47)	152 (47)	185 (57)	266 (82)	266 (82)	230 (70)	328 (100)	328 (100)	194 (59)	308 (94)	328 (100)
	-40 (-40)	108 (33)	145 (45)	145 (45)	178 (55)	259 (80)	259 (80)	213 (65)	312 (95)	312 (95)	190 (58)	302 (92)	312 (95)
20BPL.-AL	+50 (+10)	85 (26)	131 (40)	131 (40)	146 (45)	227 (70)	227 (70)	171 (52)	275 (85)	275 (85)	148 (45)	230 (70)	302 (92)
	0 (-18)	79 (24)	125 (38)	125 (38)	136 (42)	217 (67)	217 (67)	164 (50)	259 (80)	259 (80)	141 (43)	223 (68)	289 (88)
	-40 (-40)	72 (22)	118 (36)	118 (36)	130 (40)	211 (65)	211 (65)	157 (48)	256 (78)	256 (78)	135 (41)	217 (66)	282 (86)

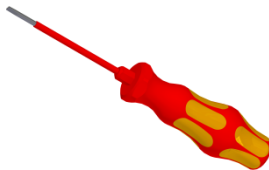
Required tools / equipment

The following tools and equipment are required for installation of the PBS-310-A | PBS-310-A10 Single entry power junction box:

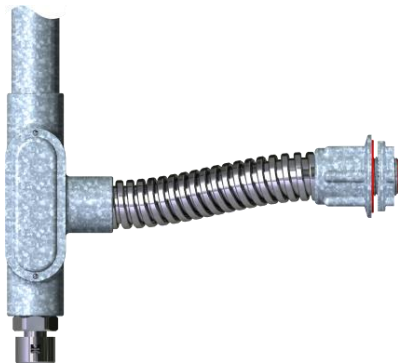
- Flat screwdriver
- Cross-head screwdriver
- Electricians screwdriver
- Wire cutters
- Utility knife
- Tape measure
- Adjustable wrenches (2x)
- Needle nose pliers
- Multimeter



2 x



- NEMA Type 4X rated conduit pipe and conduit hub with conduit drain.
- BARTEC Glass cloth tape (see section *Accessories on page 6*)



1

Cautions and warnings

⚠ WARNING

Risk of fire or electrical shock. De-energize all power circuits before installation or servicing. Always use ground fault equipment protection with the trace heating system.

⚠ AVERTISSEMENT

Risque d'incendie ou d'électrocution. Mettre tous les circuits électriques hors tension avant toute installation ou opération de maintenance. Toujours utiliser un dispositif de protection contre les défauts à la terre au sein du système de traçage électrique.

- Double-check that all power circuits are de-energized before you begin your work.
- Make sure that you do not exceed the maximum heating circuit length for the trace heater type you use.

2

Nodes

BPL trace heaters use a heating element that is wound around the inner insulation. To ensure power supply, it alternately touches the bus wires at fixed intervals. These contact points are called nodes. They represent the limits of a heating zone.

The position of the nodes is marked by asterisks at the beginning of the product identification string: i.e. **** BARTEC® 5BPL1-AL ...



When the trace heater is cut within a heating zone, this zone will remain cold.



3

Trace heater preparation

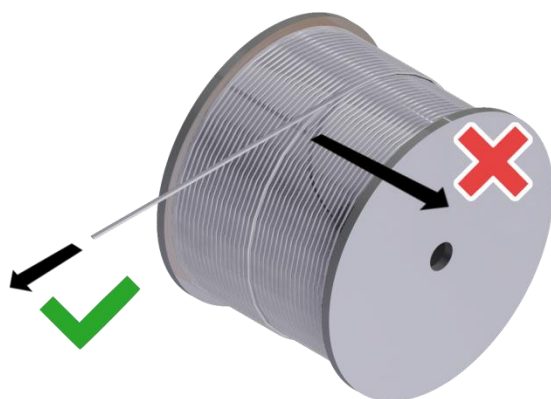
⚠ WARNING

Risk of short circuit and/or material damage. Keep the trace heater ends dry before and during installation.

⚠ AVERTISSEMENT

Risque de court-circuit et/ou de dommages matériels. Conservez les extrémités du câble chauffant au sec avant et pendant toute la durée de l'installation. Respectez les indications fournies dans le guide de conception du système de traçage.

- Unroll the required trace heater in a straight line. Do not cut the trace heater yet.
- Do not bend or pinch the trace heater, or pull it over sharp edges.



4

- Before cutting the trace heater, measure the distance from the trace heater end to the first node marker.
- Note the measured distance.



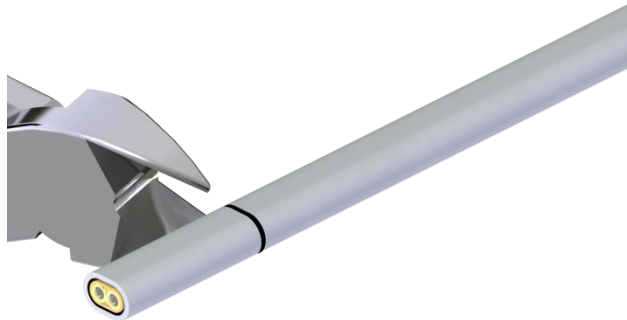
If you cannot find the node markers, refer to section Alternate method for node location on page 32.

5

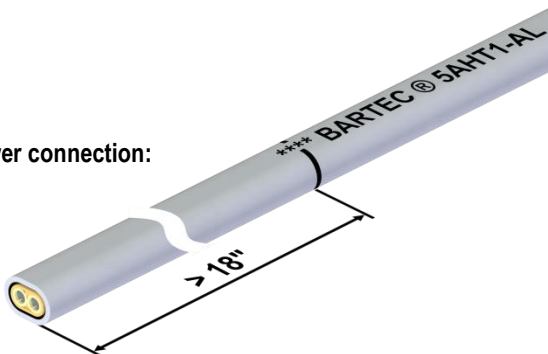
- Make sure that the distance to the first node is:
 - at least 18" (460 mm) for the trace heater end facing towards the power connection equipment
 - at least 12" (300 mm) for the trace heater end facing towards the end seal

This ensures that the connection equipment will be protected from excessive heat.

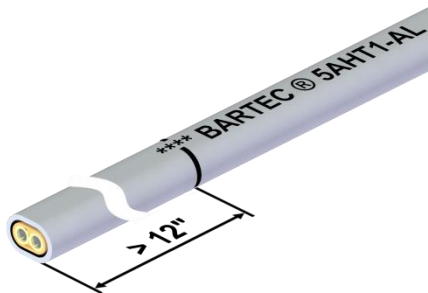
- Cut off the trace heater ensuring a straight cut.



for power connection:



for end seal:



6

Trace heater routing

⚠ WARNING

Risk of fire, injury and/or property damage. Observe the following instructions when routing BPL trace heaters.

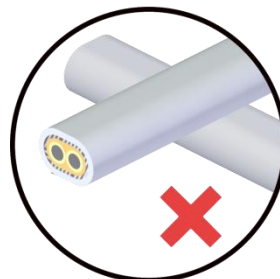
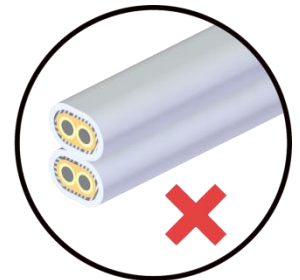
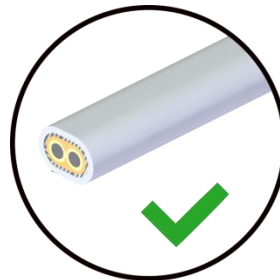
⚠ AVERTISSEMENT

Risque d'incendie, de blessures et/ou de dommages matériels. Suivez les consignes suivantes pour la pose des cables chauffants de type BPL.

- Install the trace heater in a straight line along the pipe. This saves time, helps to avoid installation mistakes and prevents damage to the trace heater during the thermal insulation work.

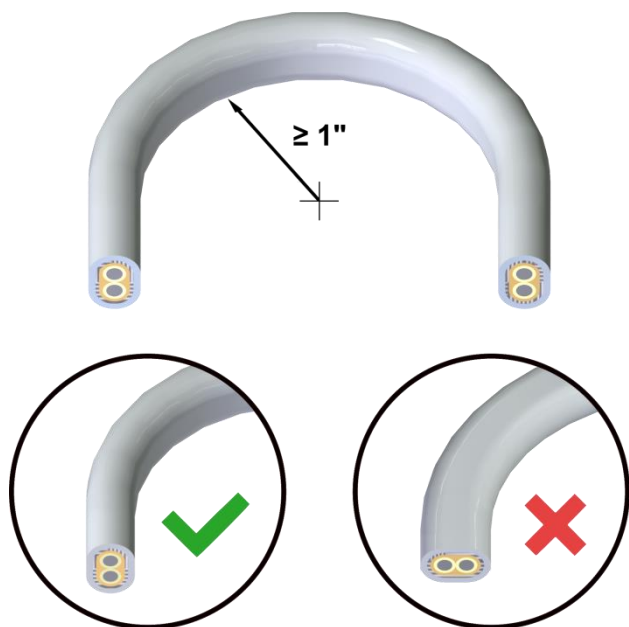


- Never step on or drive over the trace heater. Do not use it as a loop for stepping on.
- When installing allow for an additional length of trace heater for assembling splice connections, tee branches, end seals etc. (approx. 1.6 ft (0.5 m) for each).
- Do not cross, overlap, or group the trace heaters.



7

- When routing trace heaters on bends, observe the minimum bending radius of 1" (25 mm).
- Do not bend the trace heater on the narrow axis.

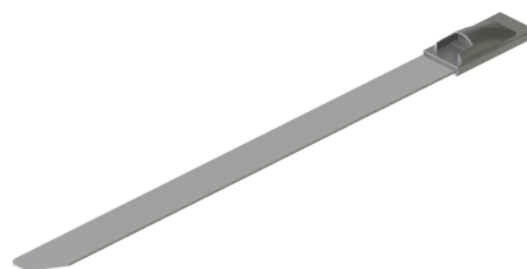


8

Fastening

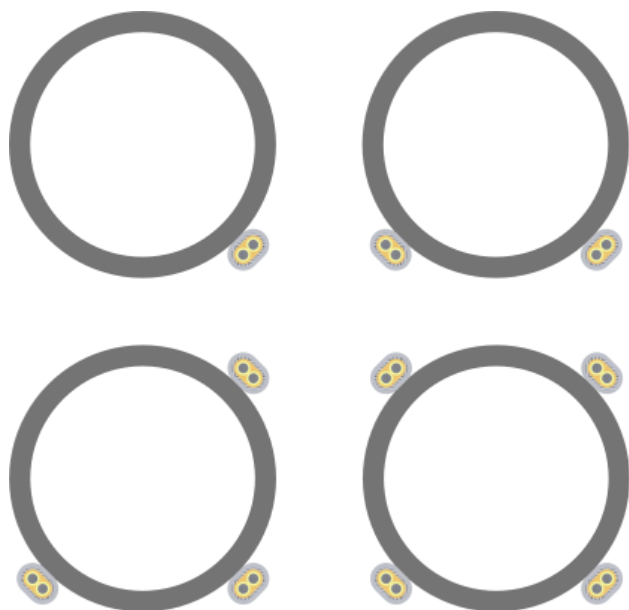
Select the correct fastening material:

- Always use fastener that suits the expected temperatures.
- Preferably use soft stainless tie wire or stainless steel bands.



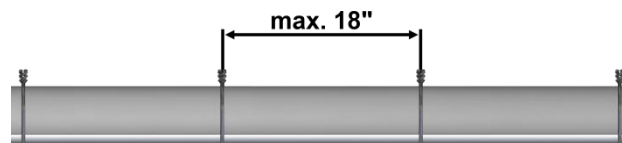
10

- Preferably install the trace heater in the lower half of the pipe, **but not on the lowest point**. This prevents mechanical damage and allows for better heat distribution.
- If you use multiple trace heaters, position them with an offset of 90°.



9

- Fasten the trace heater on the pipe at intervals of a maximum of 18" (450 mm).



NOTICE

In order to ensure good heat transfer the trace heater should have a flat, flush fit over the whole length. If necessary, reduce the distances between the fixing points.

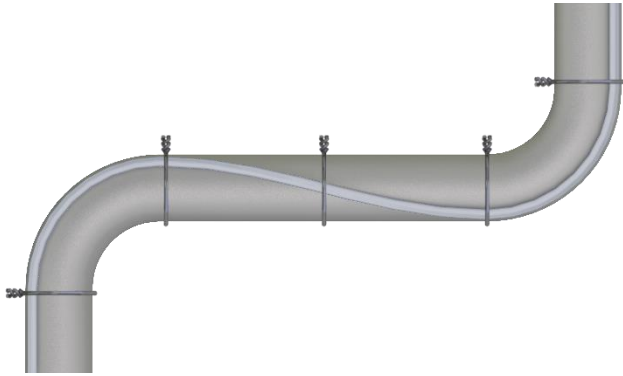
AVIS

Pour assurer une bonne conduction thermique, le câble chauffant doit être posé bien à plat et bien au contact de la tuyauterie sur toute la longueur. Au besoin, réduisez l'écartement entre les points d'attache.

11

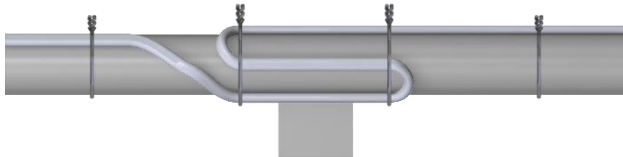
Typical installation details

- Installation on bends:



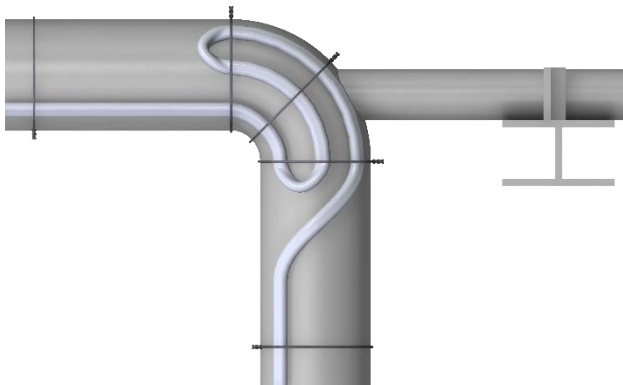
12

- Installation on pipe supports:



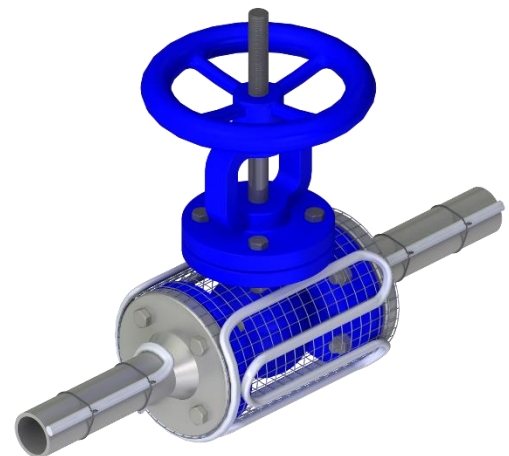
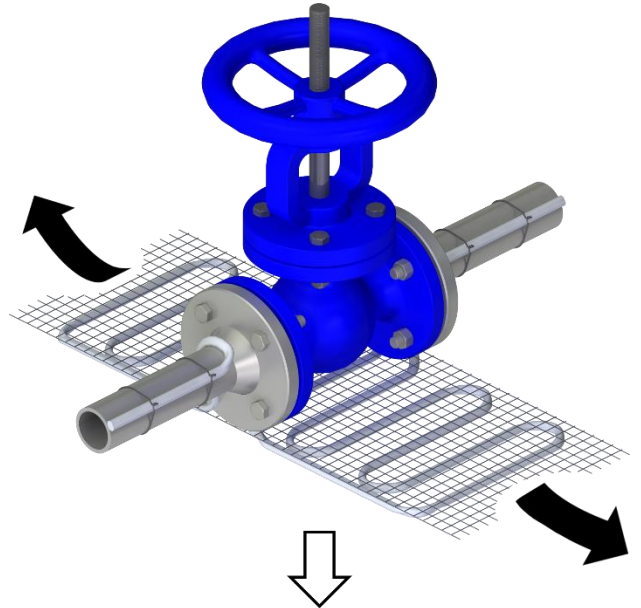
13

- Installation on dummy legs:



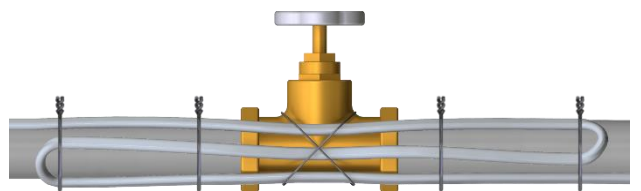
14

- Installation on flanged valves, mesh method (if DN > 100):



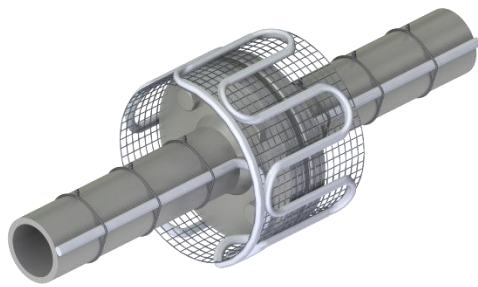
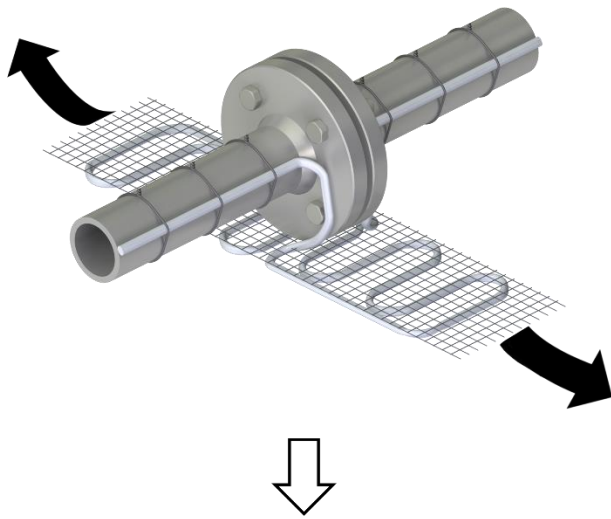
15

- Installation on welded valves, without mesh (if DN < 100):



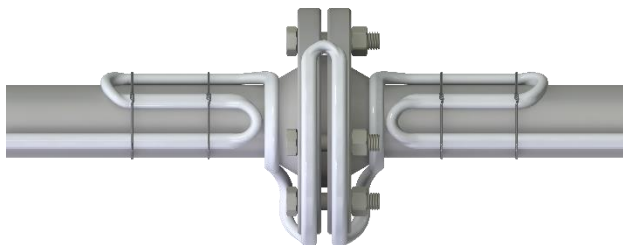
16

- Installation on flanged valves, mesh method (if DN > 150):



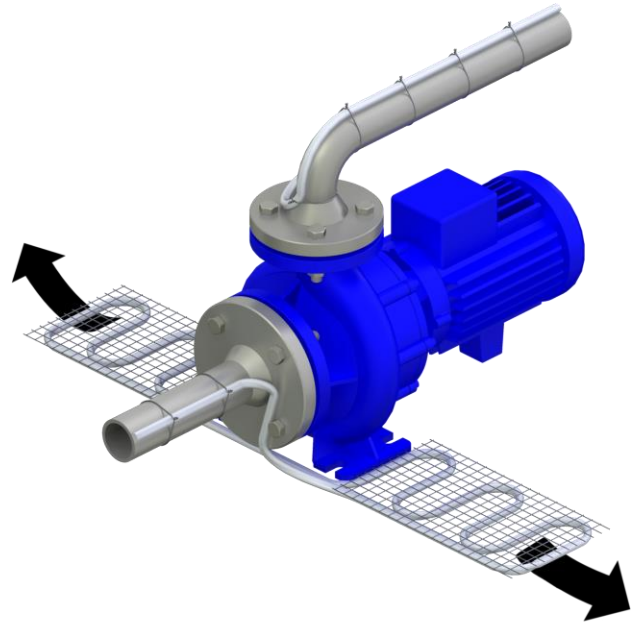
17

- Installation on flanges without mesh (DN ≤ 150):



18

- Installation on pumps, mesh method:



19

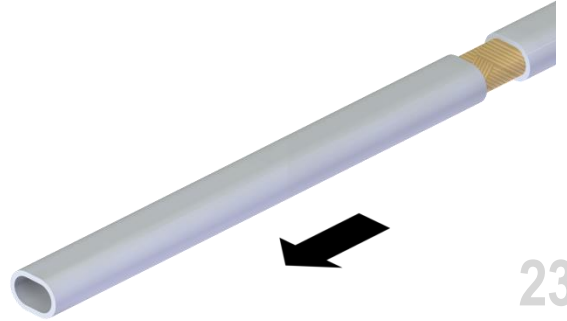
Preparation of the trace heater for connection

- Slide the fixing nut, the grommet, the gland body and the seal ring onto the trace heater.



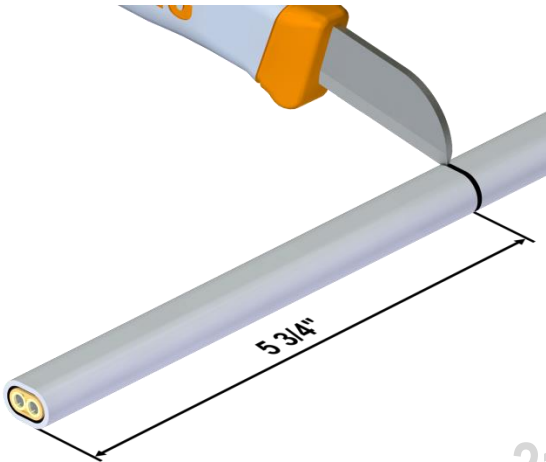
20

- Slide the aluminium jacket from the trace heater.



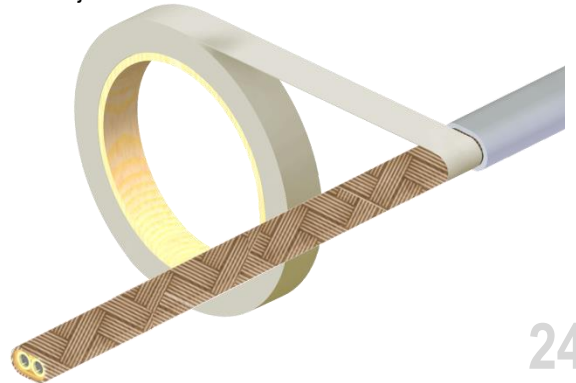
23

- Score around the aluminium jacket at 5 3/4" (145 mm) from the end of the trace heater.



21

- Place 1 wrap of glass cloth tape over the insulation jacket next to the aluminium jacket.



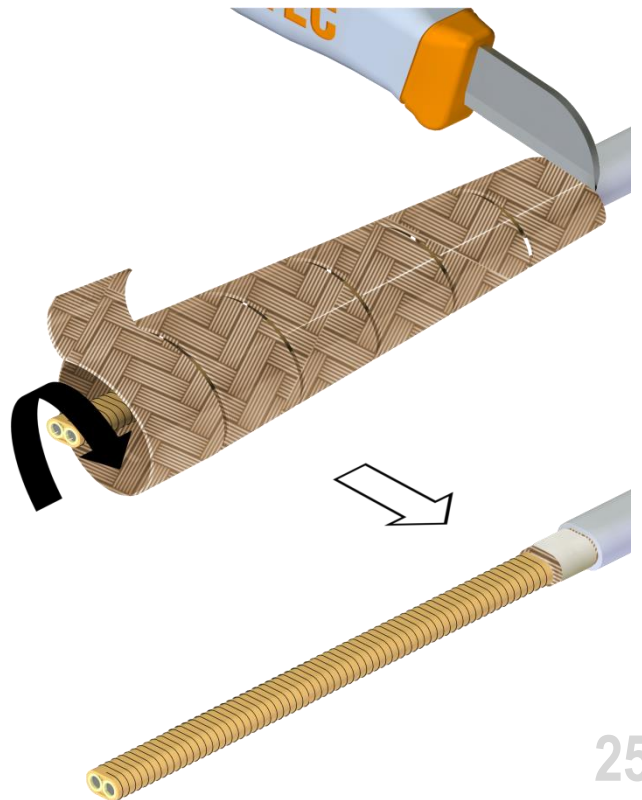
24

- Gently bend the aluminium jacket up and down at the scoring line until the aluminium jacket separates.



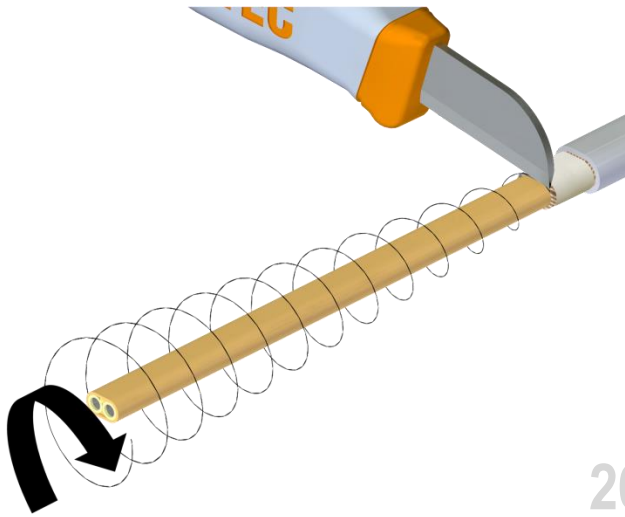
22

- Unwrap the outer insulation layer and cut it off.

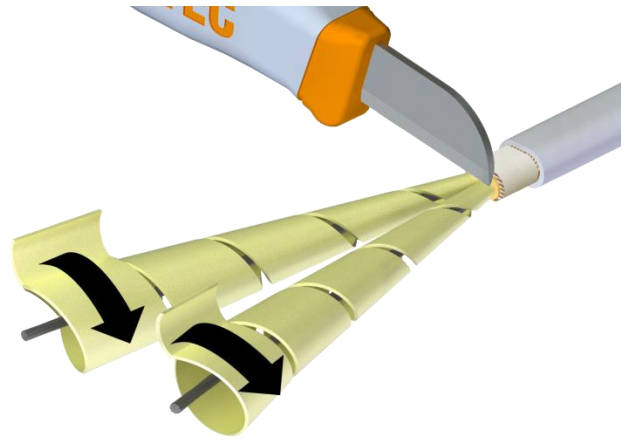


25

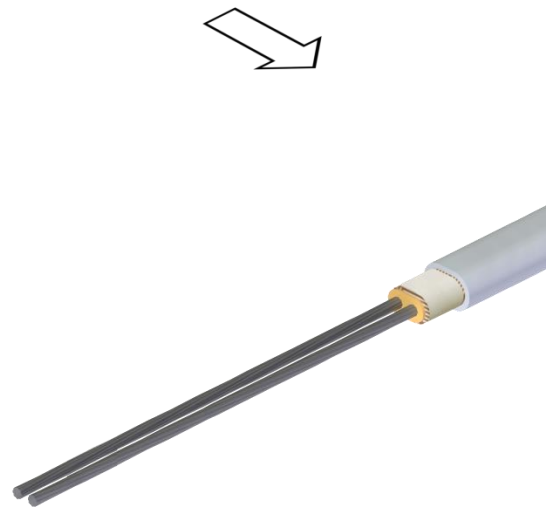
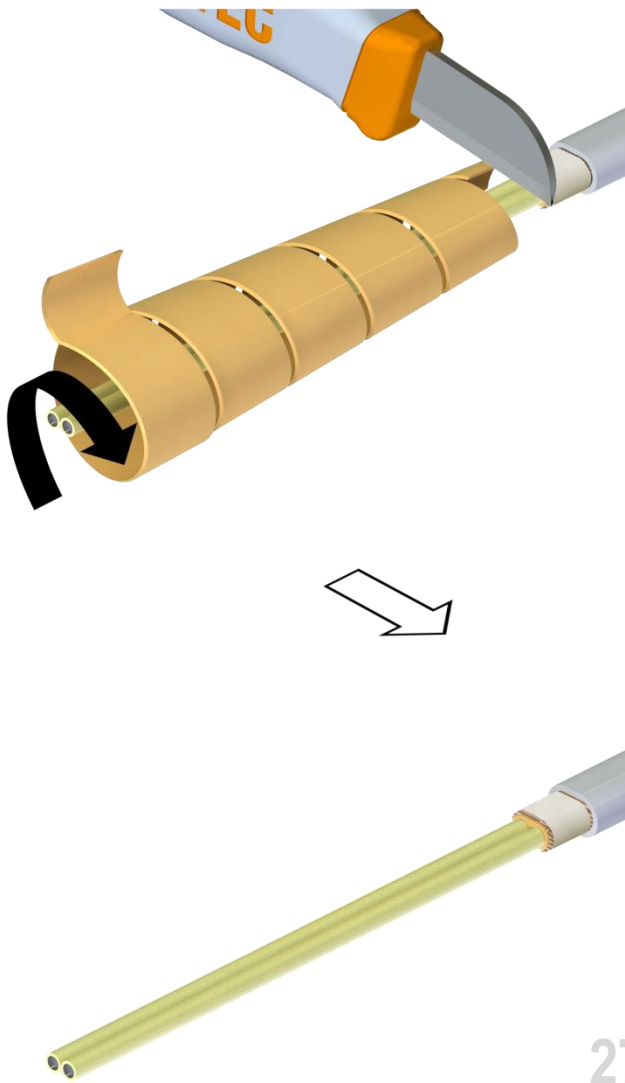
- Unwind the heating element and cut it off.



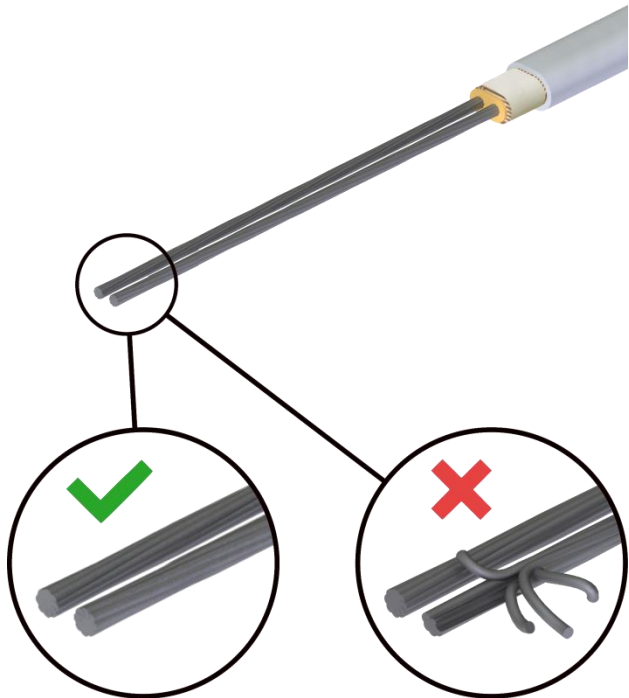
- Unwrap the exposed bus wire insulation and cut it off.



- Unwrap the inner insulation layer and cut it off.

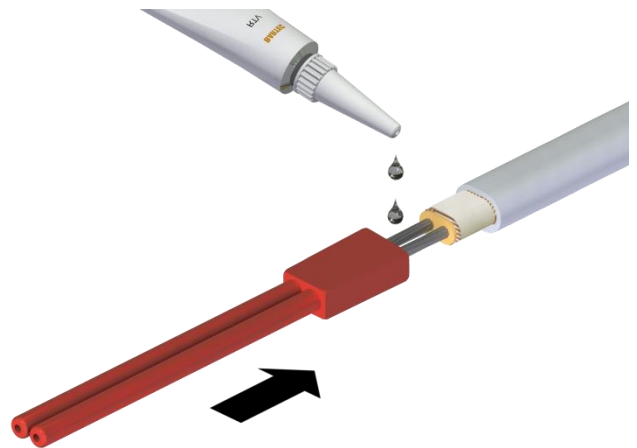


- Make sure that all bus wires are intact and not nicked or damaged.



29

- Thread the bus wires into the silicone pants.
- Add further silicone adhesive into the silicone pants to ensure optimal sealing.
- Slide the silicone pants all the way onto the aluminum jacket.



31

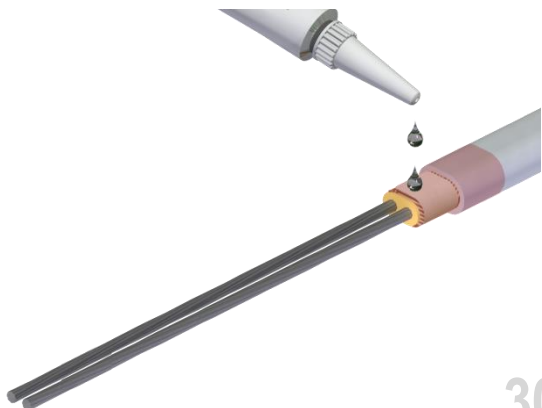
CAUTION

The silicone adhesive may cause irritation to skin and eyes. Avoid eye contact. Avoid repeated or prolonged skin contact. In case of contact with eyes, rinse with water and seek medical advice.

ATTENTION

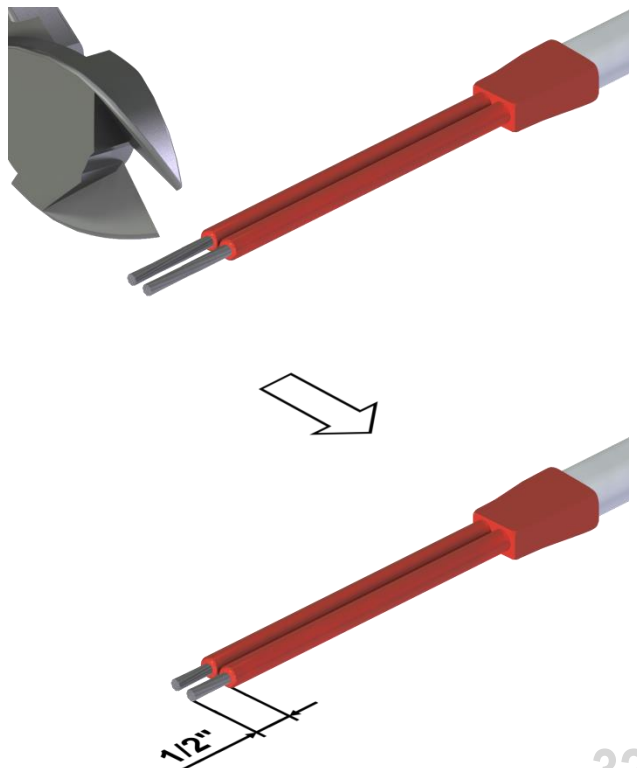
La colle silicone peut irriter la peau et les yeux. Eviter tout contact avec les yeux. Eviter tout contact répété ou prolongé avec la peau. En cas de contact avec les yeux, rincer à l'eau claire et consulter un médecin.

- Put a liberal amount of silicone adhesive all around the taped insulation layer and aluminium jacket.



30

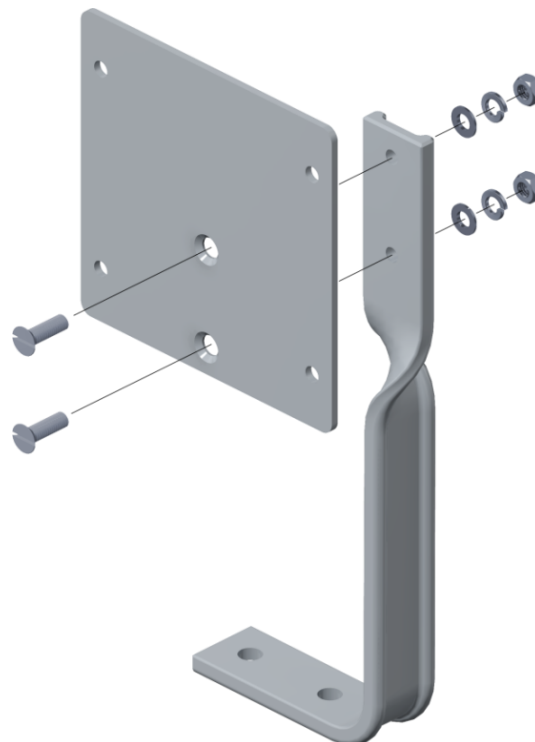
- If necessary, trim the exposed bus wire ends to 1/2" (12 mm).



32

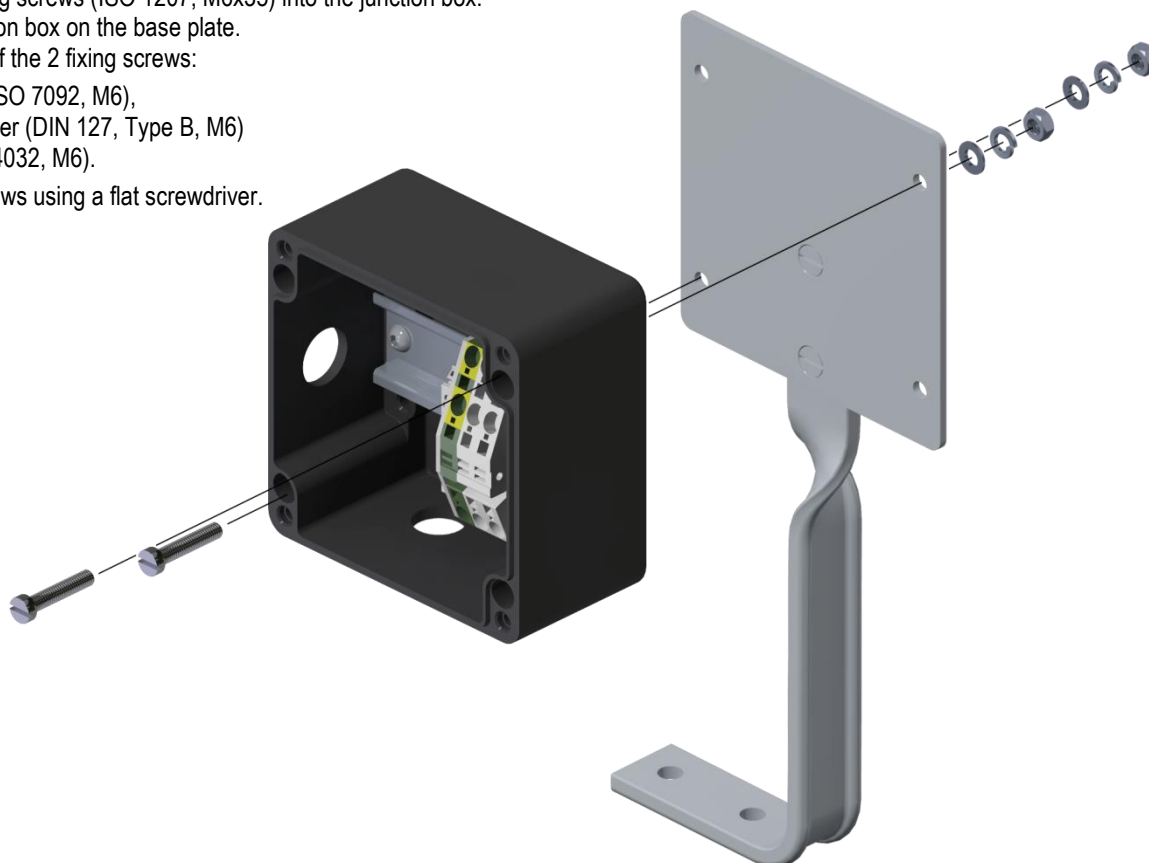
Installation of the mounting stand

- Insert the 2 fixing screws (ISO 2009, M5x20) into the base plate.
- Install the base plate on the mounting bracket.
- Install on each of the 2 fixing screws:
 - a washer (ISO 7089, Type B, M5),
 - a split washer (DIN 127, Type B, M5)
 - a nut (ISO 4032, M5).
- Tighten the screws using a flat screwdriver.



33

- Insert the 2 fixing screws (ISO 1207, M6x35) into the junction box.
- Install the junction box on the base plate.
- Install on each of the 2 fixing screws:
 - a washer (ISO 7092, M6),
 - a split washer (DIN 127, Type B, M6)
 - a nut (ISO 4032, M6).
- Tighten the screws using a flat screwdriver.



34

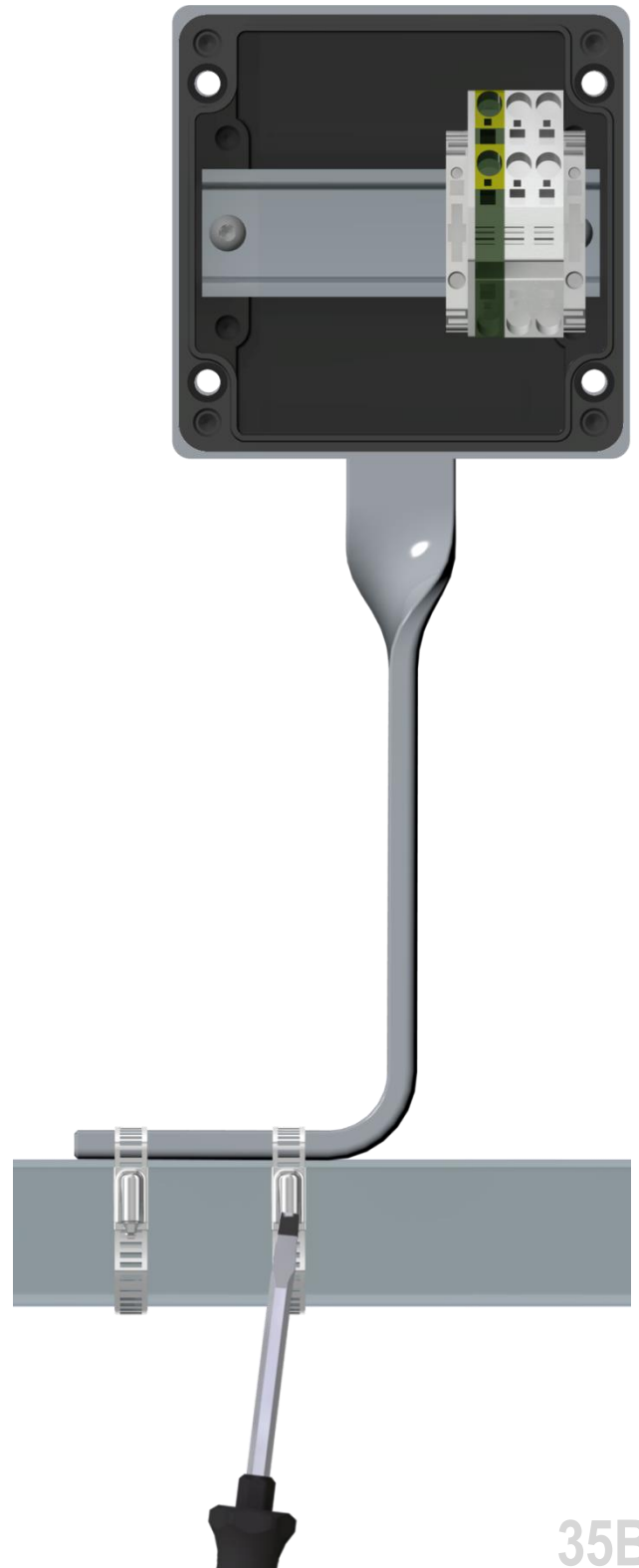
For pipe temperatures up to 302 °F (150 °C) the mounting stand can be installed directly on the pipe (“on-pipe”).

- Place the mounting stand on the pipe.
- Put the thermal break pad under the mounting stand.
- Install the pipe straps and tighten them firmly using a screwdriver.



For pipe temperatures exceeding 302 °F (150 °C) install the mounting stand on a support other than the pipe (“off-pipe”).

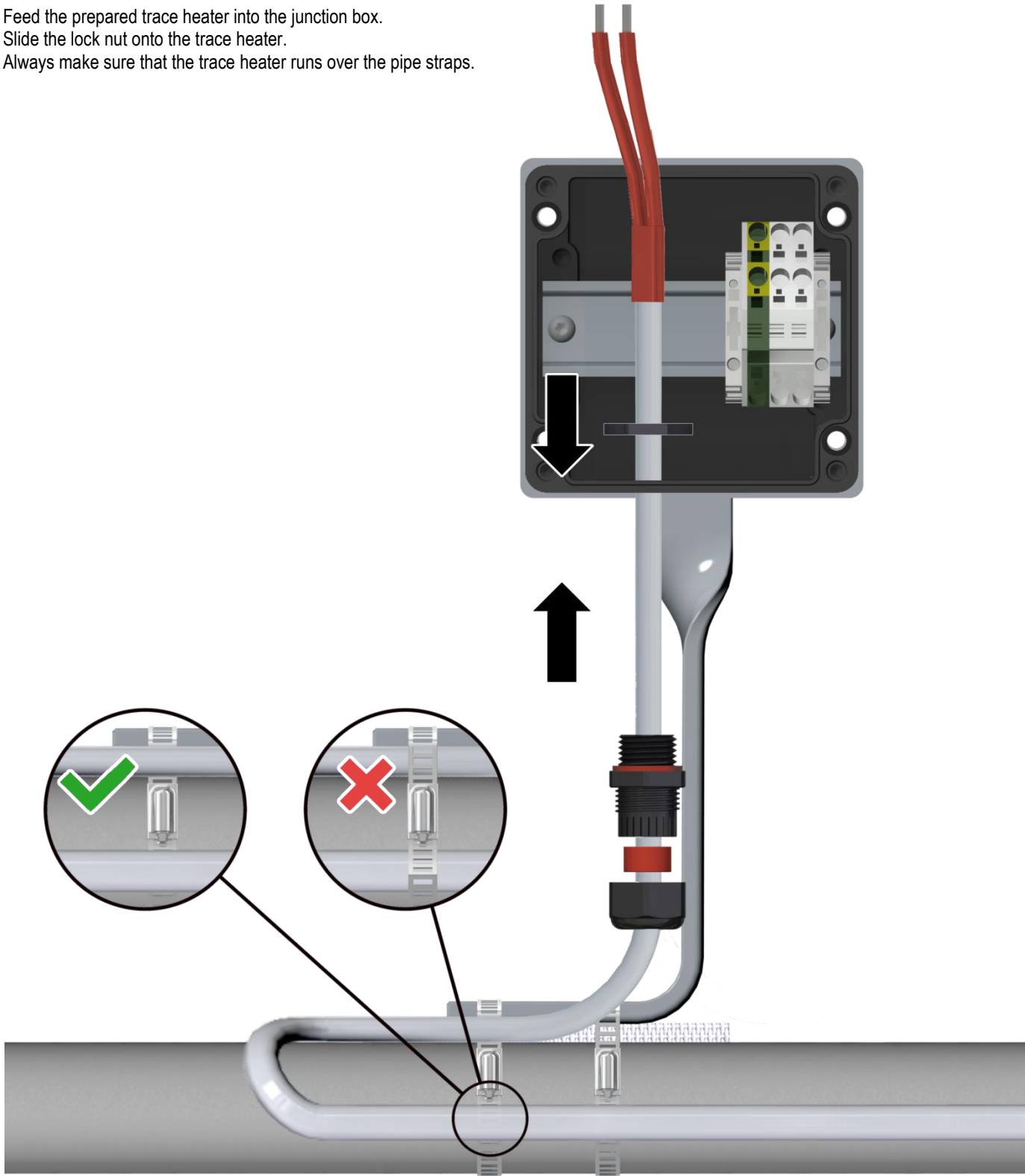
- Place the mounting stand on the strut channel support.
- Install the pipe straps and tighten them firmly using a screwdriver.



Installation of the trace heater and power wires

For PBS-310-A only. For PBS-310-A10 see step 36B on page 22.

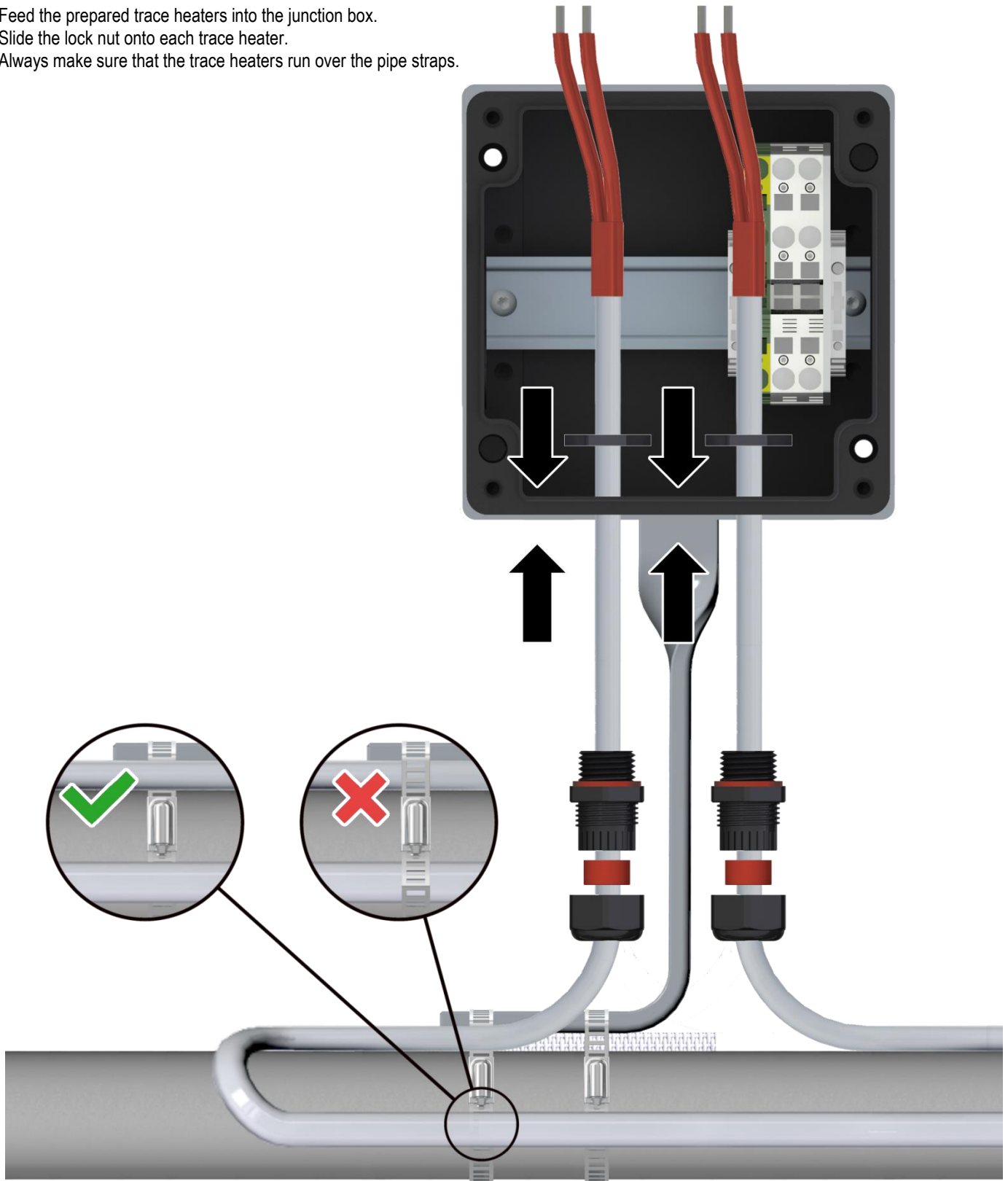
- Feed the prepared trace heater into the junction box.
- Slide the lock nut onto the trace heater.
- Always make sure that the trace heater runs over the pipe straps.



36A

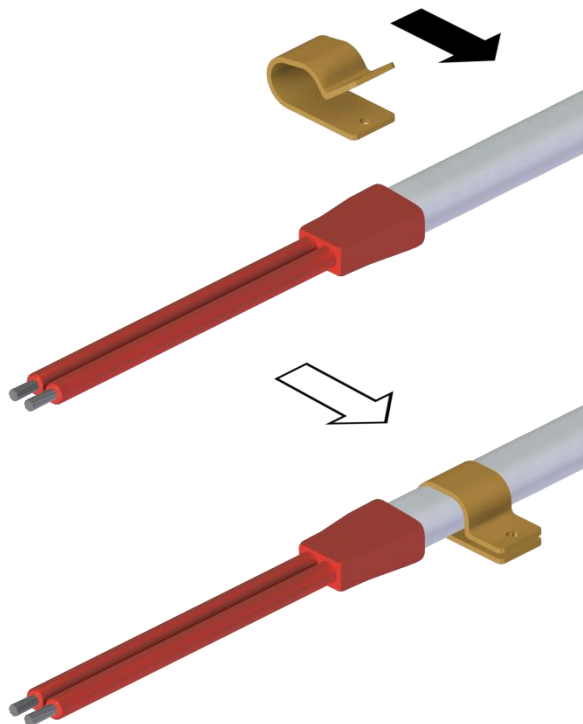
For PBS-310-A10 only. For PBS-310-A see step 36A on page 21.

- Feed the prepared trace heaters into the junction box.
- Slide the lock nut onto each trace heater.
- Always make sure that the trace heaters run over the pipe straps.



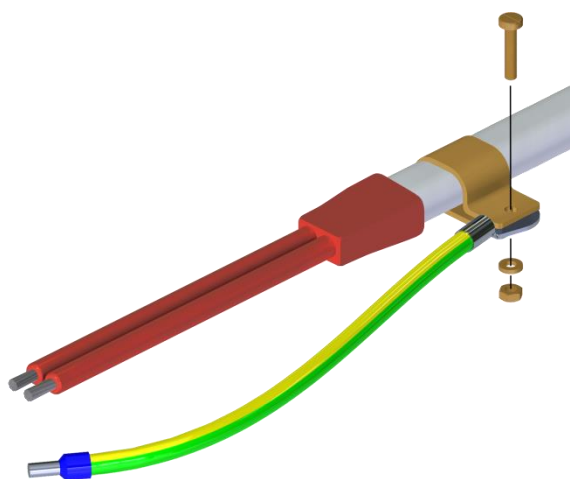
36B

- Slide the bonding clip onto the trace heater(s).



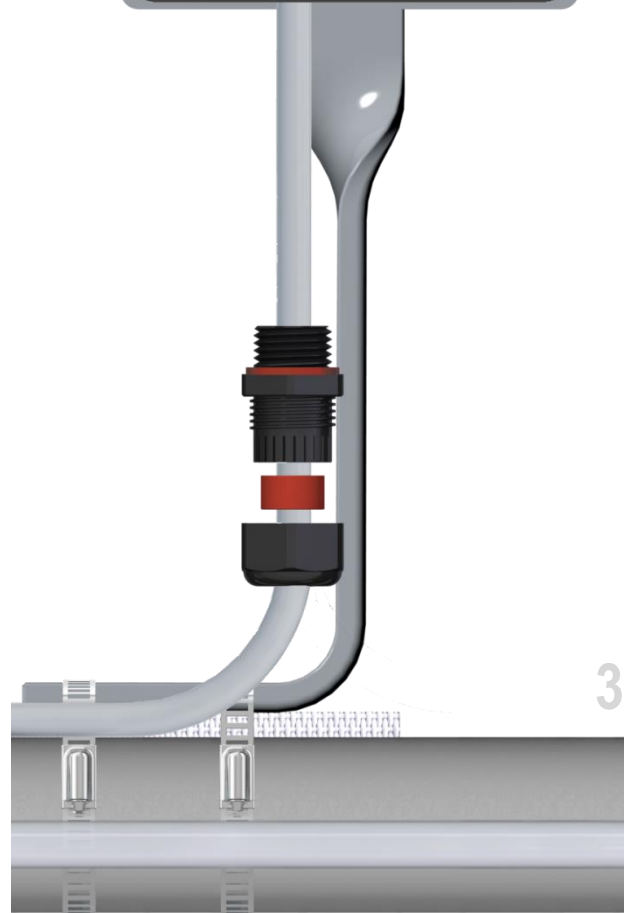
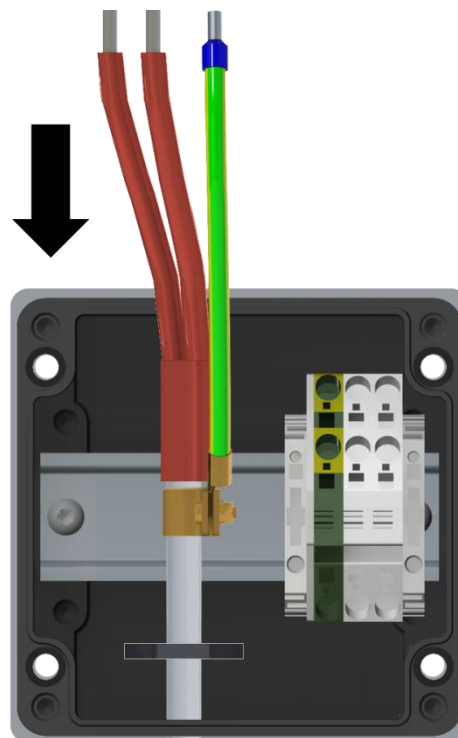
37

- Install the bonding jumper at the bonding clip.
- Install the fixing screw, the washer and the nut.
- Tighten the fixing screw using a flat screwdriver. Lock the counter nut using an adjustable wrench.



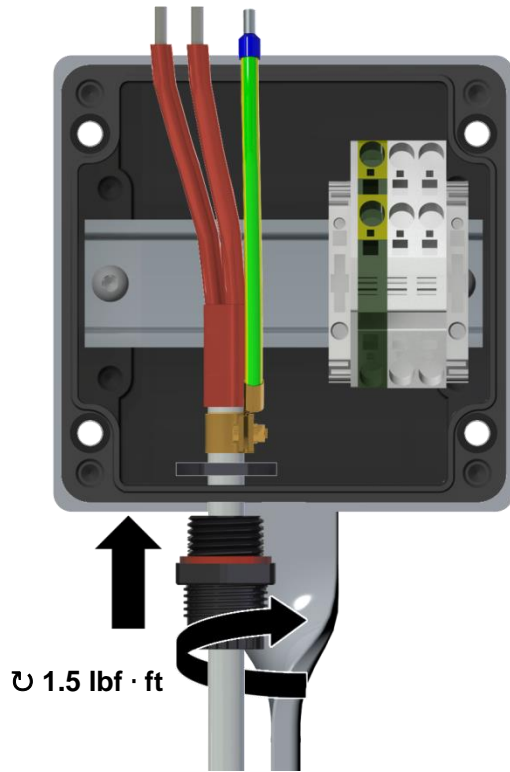
38

- Push back the trace heater until the bonding clip is positioned just over the bottom of the junction box.



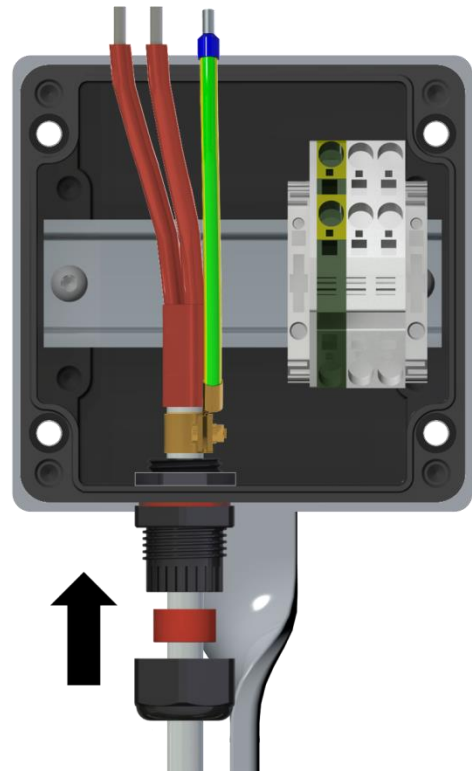
39

- Screw the gland body into the junction box. Make sure that the final tightening torque is 1.5 lbf · ft (2 Nm).



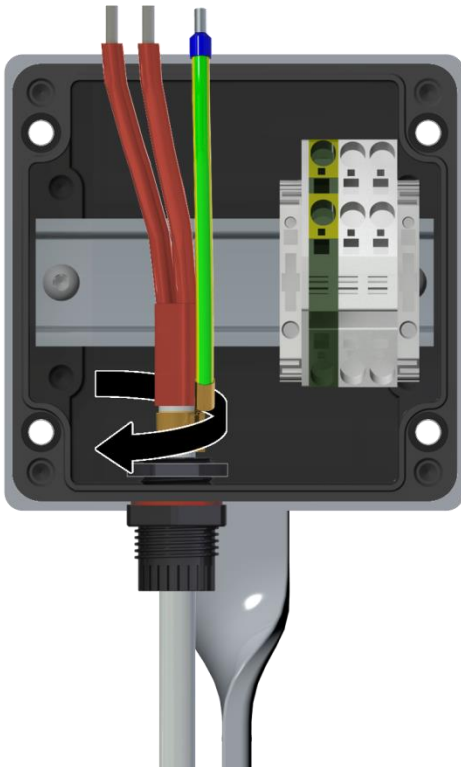
40

- Slide the grommet into the gland body and screw the fixing nut onto the gland body.



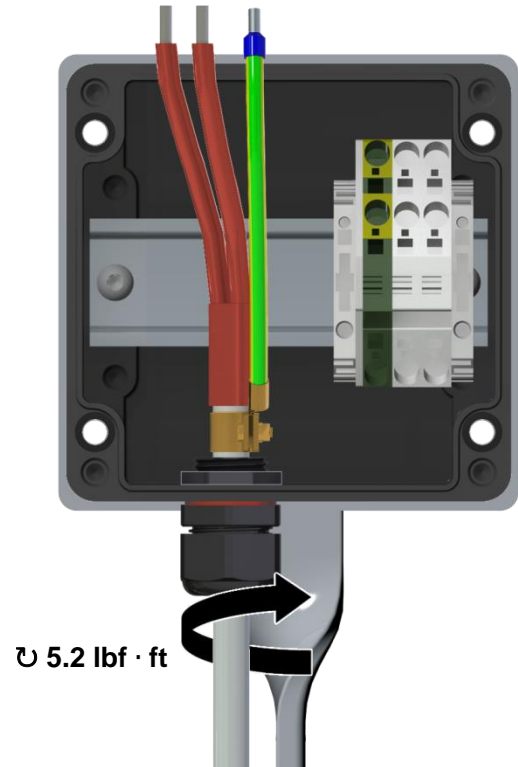
42

- Tighten the lock nut while locking the gland body using 2 adjustable wrenches.



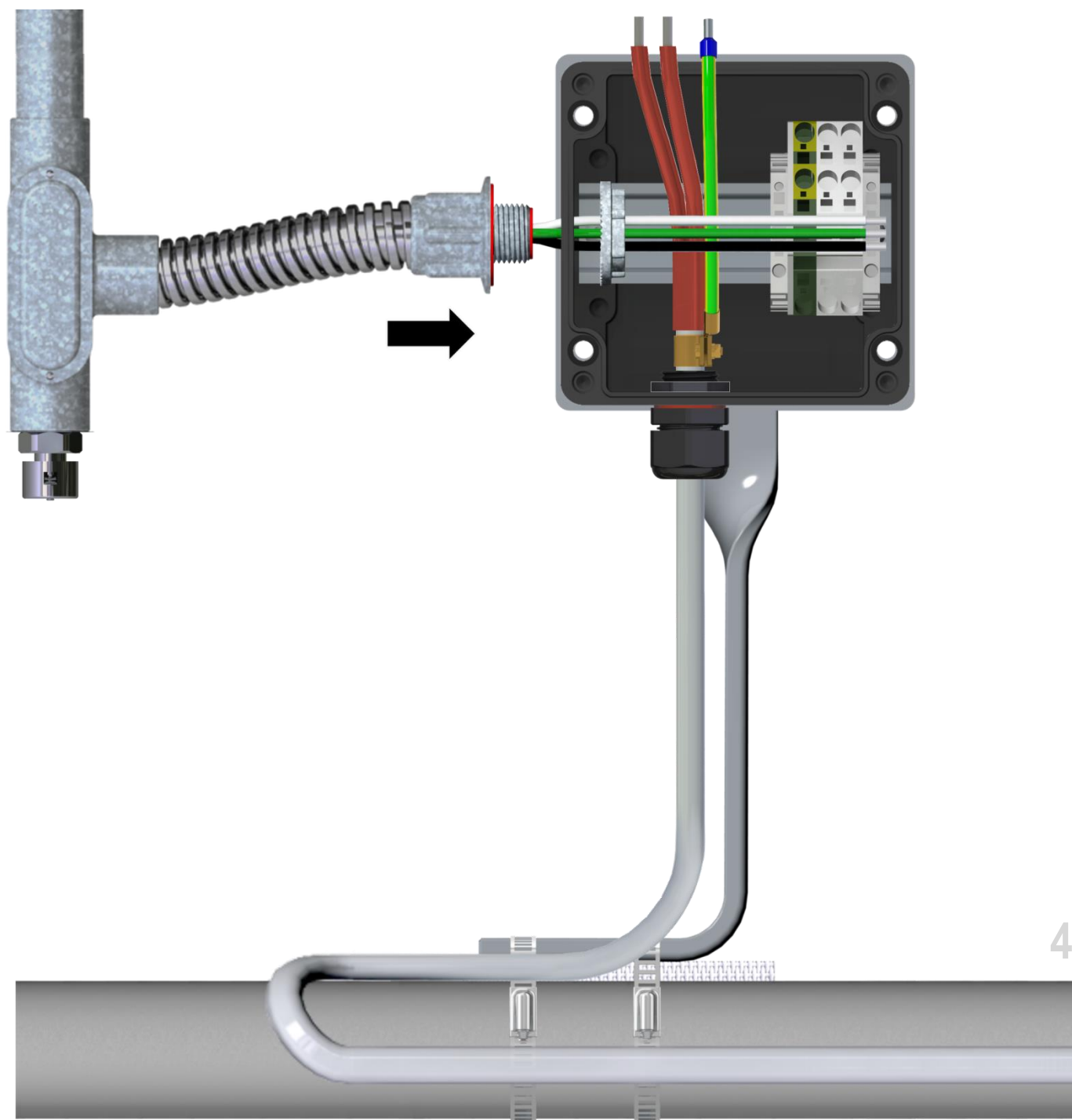
41

- Tighten the fixing nut. Make sure that the final tightening torque is 5.2 lbf · ft (7 Nm).



43

- Install the conduit pipe and conduit hub according to the manufacturer's installation instructions.
- Feed the power wires into the junction box.



NOTICE

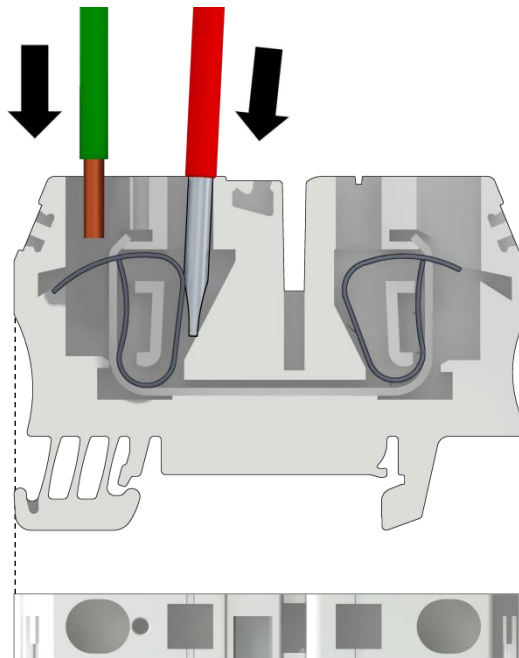
The conduit entry size is 3/4" for PBS-310-A and 1" for PBS-310-A10.

AVIS

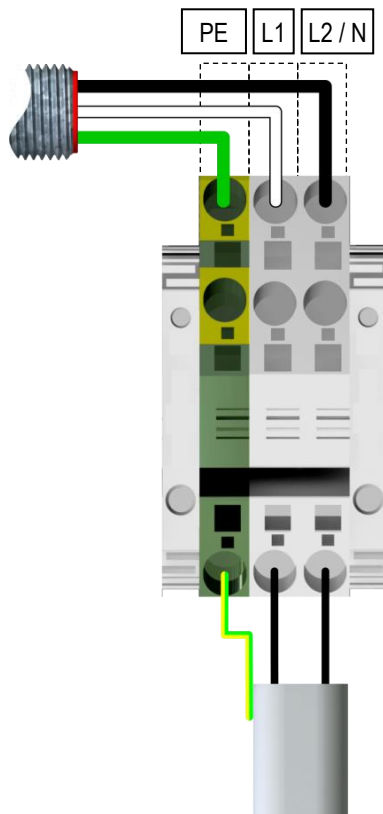
L'entrée de conduit est de 3/4" pour PBS-310-A et de 1" pour PBS-310-A10.

Wiring

- For wire connection at the terminals insert a small screwdriver into the screwdriver slot, then insert the wire.
- Connect all wires as shown.

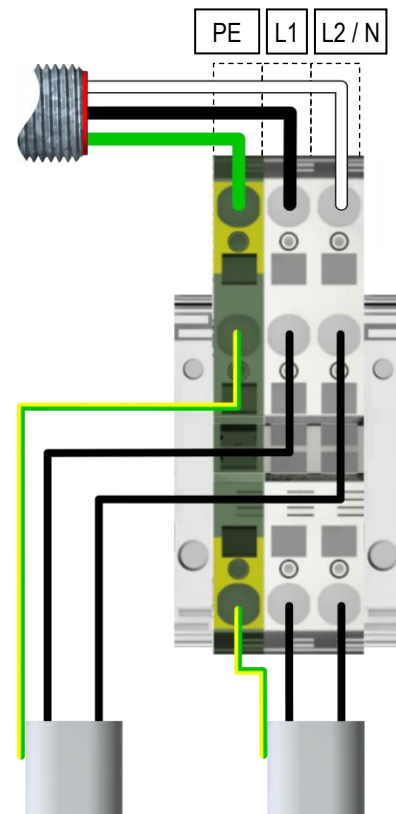


Power connection wiring



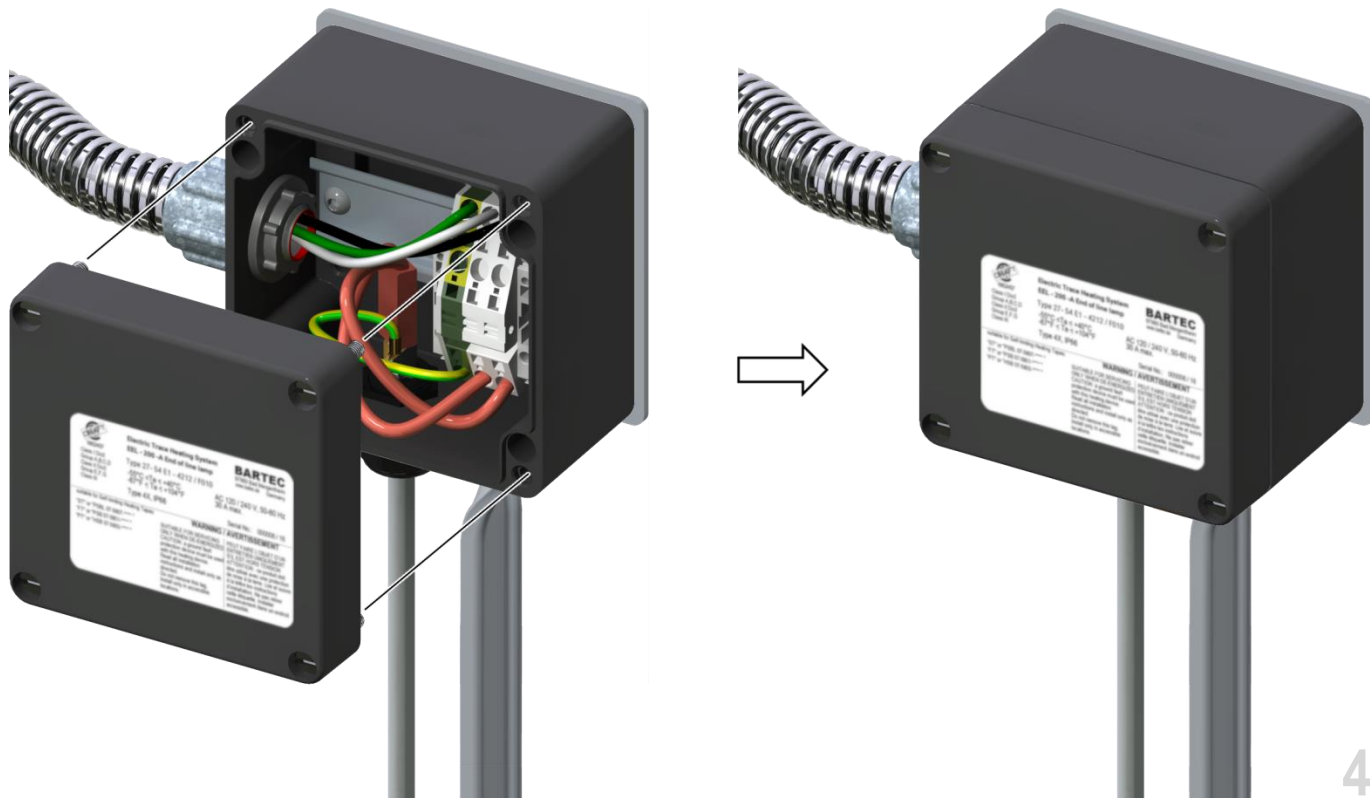
45A

Powered splice connection wiring (-A10 version only)



45B

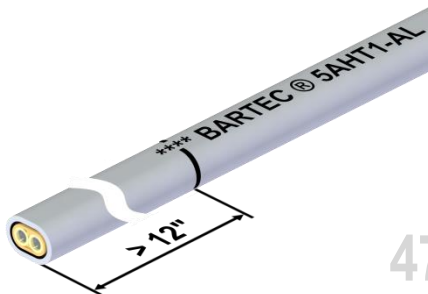
- Mount the cover of the junction box and tighten the 4 fixing screws using a screwdriver.



46

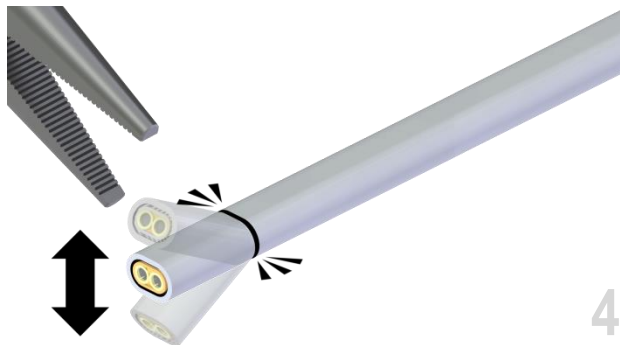
Installation of the end seal

- Remember to make sure that the distance from the end of the trace heater to the first node is at least 12" (300 mm).



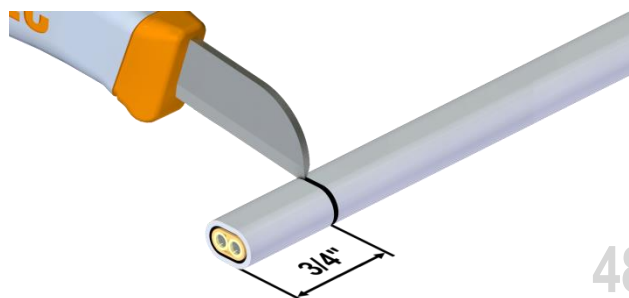
47

- Gently bend the aluminium jacket up and down at the scoring line using needle nose pliers until the aluminium jacket separates.



49

- Score around the aluminium jacket at 3/4" (20 mm) from the end of the trace heater.



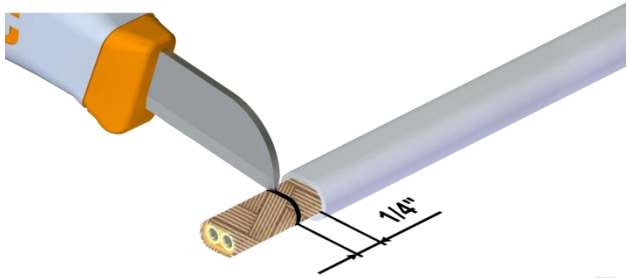
48

- Slide the aluminium jacket from the trace heater.



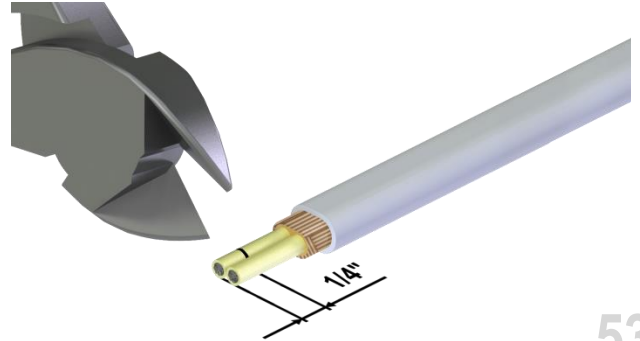
50

- Score around the outer insulation at 1/4" (5 mm) from the edge of the aluminium jacket.



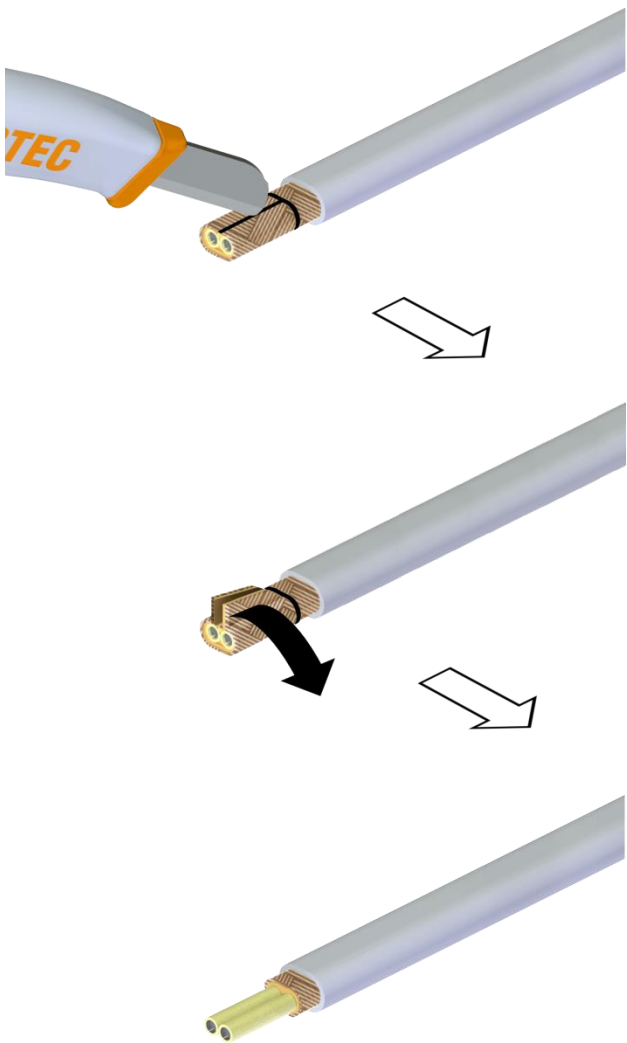
51

- Remove 1/4" (5 mm) of one of the bus wires.



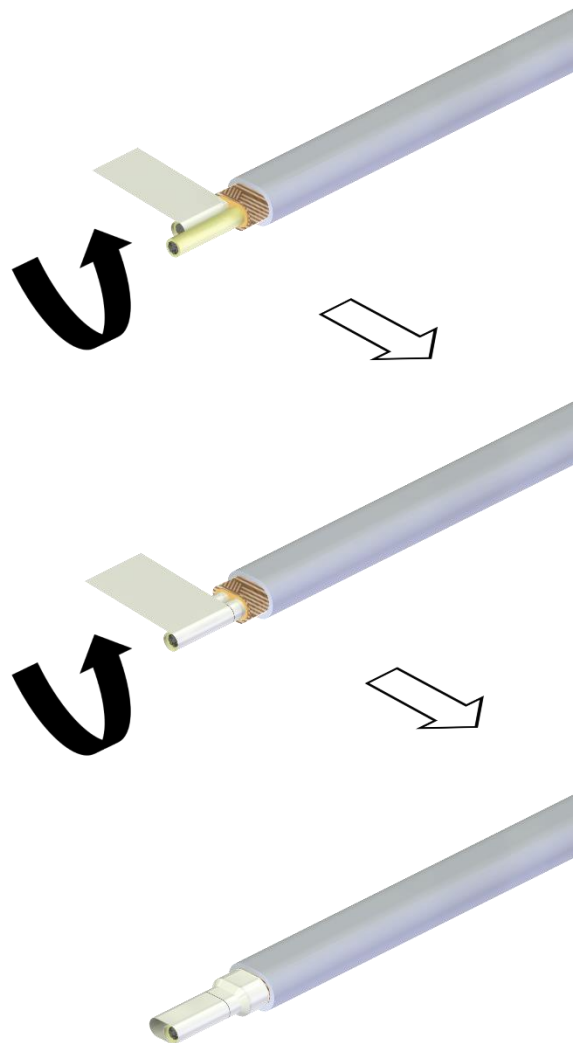
53

- Score along the middle of the exposed outer insulation.
- Unwrap the outer insulation layer.



52

- Wrap glass cloth tape separately around each of the bus wires.
- Then, wrap glass cloth tape around the both bus wires and around the outer insulation layer.



54

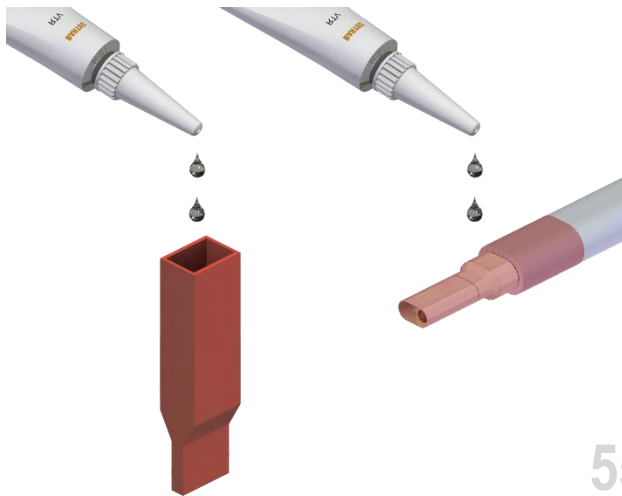
⚠ CAUTION

The silicone adhesive may cause irritation to skin and eyes. Avoid eye contact. Avoid repeated or prolonged skin contact. In case of contact with eyes, rinse with water and seek medical advice.

⚠ ATTENTION

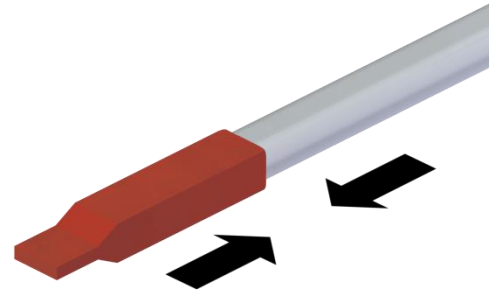
La colle silicone peut irriter la peau et les yeux. Éviter tout contact avec les yeux. Éviter tout contact répété ou prolongé avec la peau. En cas de contact avec les yeux, rincer à l'eau claire et consulter un médecin.

- Put a liberal amount of silicone adhesive all around the trace heater end seal as well as into the end seal.



55

- Push the end seal onto the trace heater.



NOTICE

Allow the adhesive to cure for 20 minutes, then visually inspect. Full strength is reached after 24 hours.

AVIS

Laissez sécher la colle 20 minutes avant de procéder à une inspection visuelle. La résistance finale sera atteinte après 24 heures.

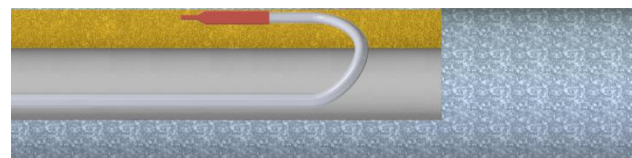
56

Application of the pipe insulation

- Apply the pipe insulation according to the manufacturer's installation instructions.
- Apply an electrical warning label every 10 ft. (3 m) on a clearly visible place.



If the pipe temperature exceeds 374 °F (190 °C), install the end seal above the insulation but below the outer cladding. This way, the end seal will be protected from excessive heat and mechanical damage.



10 ft.

ELECTRICALLY HEATED
Before starting work, all pipe freeze call.
AMERICAN T&E

ELECTRICALLY HEATED
Before starting work, all pipe freeze call.
AMERICAN T&E

57

Tests and commissioning

Measurement of the insulation resistance

The measurement of the insulation resistance is used to determine damage to the trace heater and possible installation faults. It must be carried out at the following times:

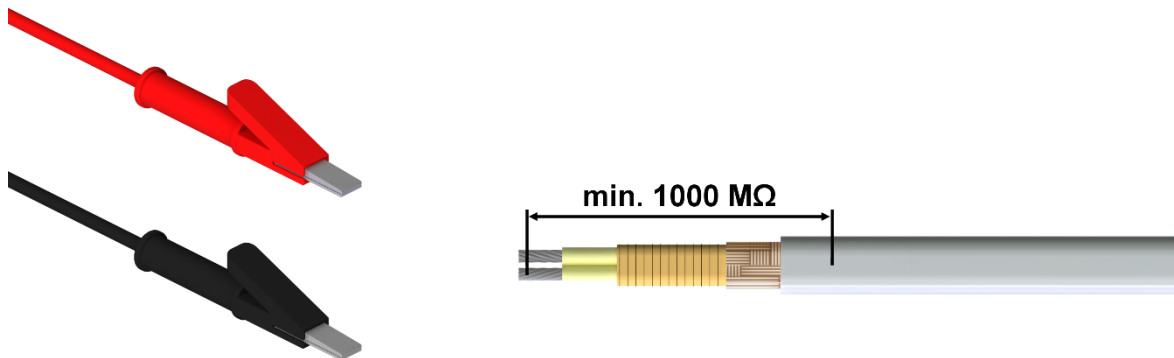
- Preliminary test (on the reel, before installation of the trace heater on the construction site)
- Acceptance test (after installation of the heating circuit and before installation of the thermal insulation)
- Final inspection (immediately after completion of work on the thermal insulation)
- Upon commissioning
- Before switching on the installation

Preparation of the measurement:

- De-energize the heating circuit.
- Disconnect the thermostat or controller, if installed.
- Disconnect the bus wires and PE wires from the terminal block, if installed.
- For the measurement you will need a megohmmeter with, at least, a minimum testing voltage of 500 Vdc and a maximum testing voltage of 1000 Vdc.

Measurement:

- Set the test voltage to 0 Vdc.
- Connect the negative (-) lead to the aluminum jacket of the trace heater.
- Connect the positive (+) lead to both trace heater bus wires simultaneously.
- Turn on the megohmmeter and set the voltage to 500 Vdc.
- Apply the voltage for 1 minute. The meter reading should stabilize. Rapid changes in the reading indicate a breakdown of the insulation.
- Record the insulation resistance value in the Inspection Record.
- Repeat the measurement at 1000 Vdc.



Results:

- Properly installed dry and clean trace heater sets should measure thousands of megohms, regardless of the trace heater length or measuring voltage (0-1000 Vdc). Even if optimum conditions may not apply, all insulation resistance values should be greater than the IEC/IEEE 60079-30-1:2015 minimum recommendation of 20 megohms. However, BARTEC strongly recommends a minimum reading of 1000 megohms. If the reading is lower or fluctuating, refer to section *Troubleshooting* on page 31.
- Insulation resistance values for any particular circuit, should not vary more than 25 percent as a function of measuring voltage. Greater variances may indicate a problem with your trace heating system. Confirm proper installation and/or contact your local BARTEC representative for assistance.

⚠ WARNING

Risk of fire or electrical shock. If the insulation resistance is insufficient you must fix the heating circuit before putting it into operation.

After the measurement:

If trace heater meets all resistance criteria:

- Reconnect the bus wires.
- Reconnect any thermostat or controller.
- Reenergize the circuit.

Troubleshooting

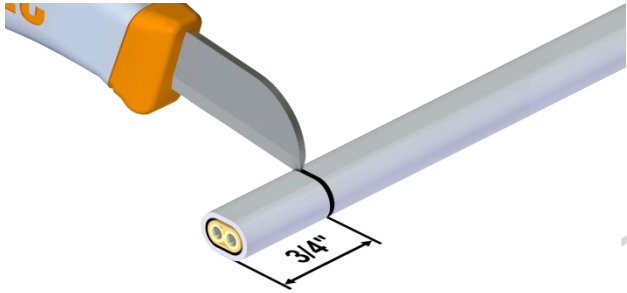
Problem	Possible cause	Remedy
Trace heater remains cold	No power supply	Check the power wiring for continuity to circuit breaker.
	Trace heater bus wires or power wiring not properly connected	Connect the trace heater and power wires according to the installation instructions.
	Control unit adjusted incorrectly	Adjust the control unit according to the installation instructions.
Automatic circuit breaker tripped	Automatic circuit breaker defective	Replace the automatic circuit breaker.
	Automatic circuit breaker has wrong tripping characteristics, e. g. "B" instead of "C"	Install an automatic circuit breaker with Type-C tripping characteristics or contact the factory for Type-B tripping characteristics.
	Nominal circuit breaker size is insufficient	Install an automatic circuit breaker with higher capacity. Observe the maximum amperage of all components of the trace heating circuit.
	Maximum heating circuit length has been exceeded	Split the heating circuit into separate circuits.
	End seal has not been installed	Install the end seal according to the installation instructions.
	Short circuit	Identify the cause and remedy the fault (e. g. ensure that trace heater bus wires are not twisted together).
Ground fault protection is disengaged	Humidity inside the connection system or end seal	Dry the components. For junction boxes, be sure that the conduit drain is installed and breathing properly.
	Trace heater damaged	Replace the trace heater at the point where it is damaged.
	Moisture in the components	Dry the components. For junction boxes, be sure that the conduit drain is installed and breathing properly.
Low or inconsistent insulation resistance	Ground fault protection defective	Replace the ground fault protection device(s).
	Trace heater damaged	Replace the trace heater at the point where it is damaged.
	Moisture in the components	Dry the components. For junction boxes, be sure that the conduit drain is installed and breathing properly.
	Arcing due to damaged trace heater insulation	Replace the trace heater at the point where it is damaged.
	Arcing due to inadequate stripping distance between heating element and grounding braid	Check the stripping distance between bus wires/heating element and grounding braid at all power, splice and end seal connections to ensure adequate separation.
Short-circuit between the grounding braid and the heating element or the grounding braid and the pipe	Short-circuit between the grounding braid and the heating element or the grounding braid and the pipe	Check for cut or damaged cable or inadequate stripping length.
	Test leads touching the junction box	Relocate test leads and retest.

Note: High pipe temperature may lower the insulation resistance reading relative to earlier readings on a cold pipe.

Alternate method for node location – only required if you cannot identify the node marker asterisks (***) on the trace heater

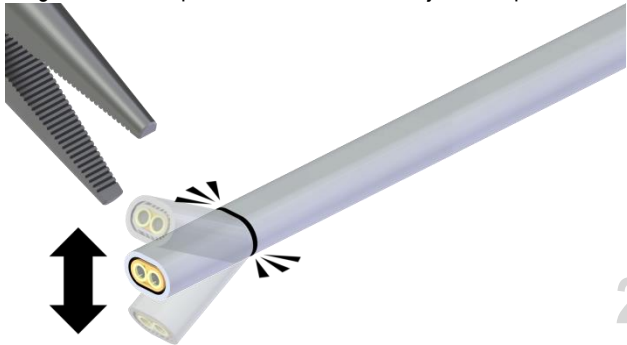
Alternate method for node location

- Score around the aluminium jacket at 3/4" (20 mm) from the end of the trace heater.



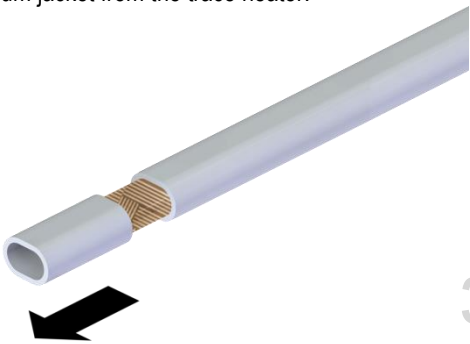
1

- Gently bend the aluminium jacket up and down at the scoring line using needle nose pliers until the aluminium jacket separates.



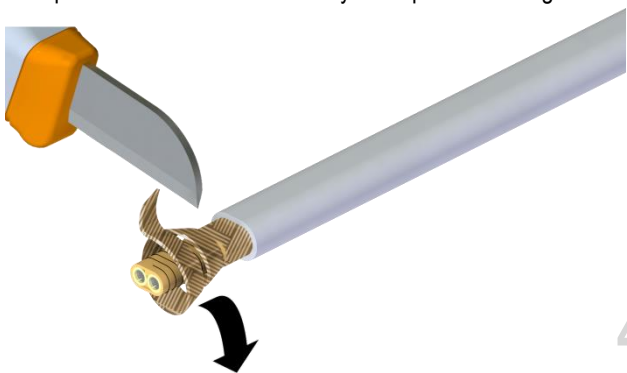
2

- Slide the aluminium jacket from the trace heater.



3

- Unwrap and cut off the outer insulation layer to expose the heating element.



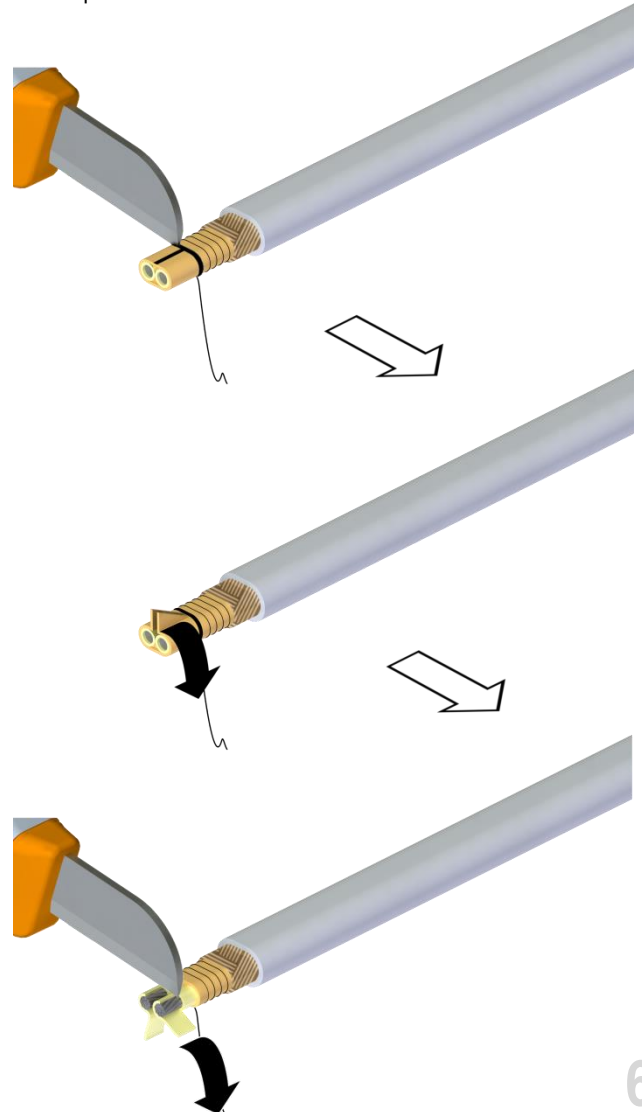
4

- Unravel 4-5 spirals of the heating element from around the inner insulation layer.



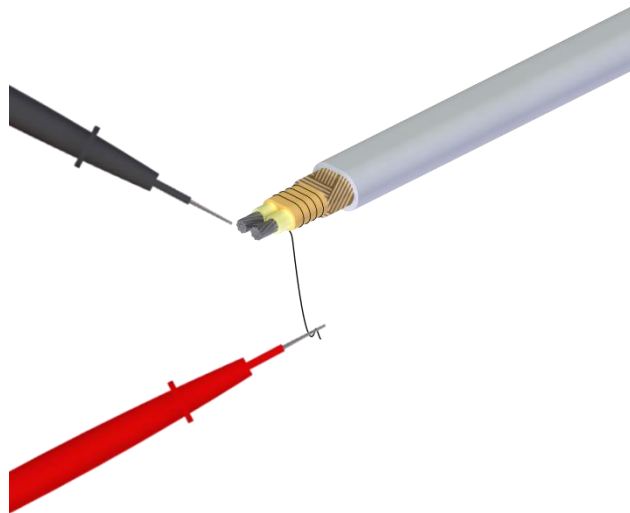
5

- Score around and along the middle of the bared inner insulation layer.
- Unwrap the inner insulation layer and bus wire insulation and cut it off to expose both bus wires.



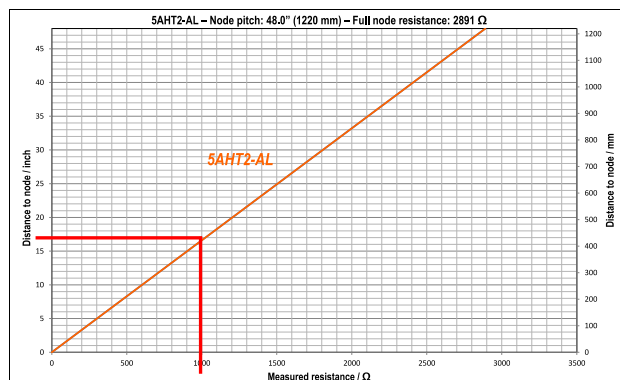
6

- Using a standard multimeter, subsequently measure the resistance of each of the bus wires against the heating element.
- One of the 2 bus wires will display a much lower resistance.
- Note this lower reading.



7

- You can now determine the distance between the trace heater end and the next node by referring to the respective product chart.
- For the product charts see section *Product charts for node location* beginning on page 34.



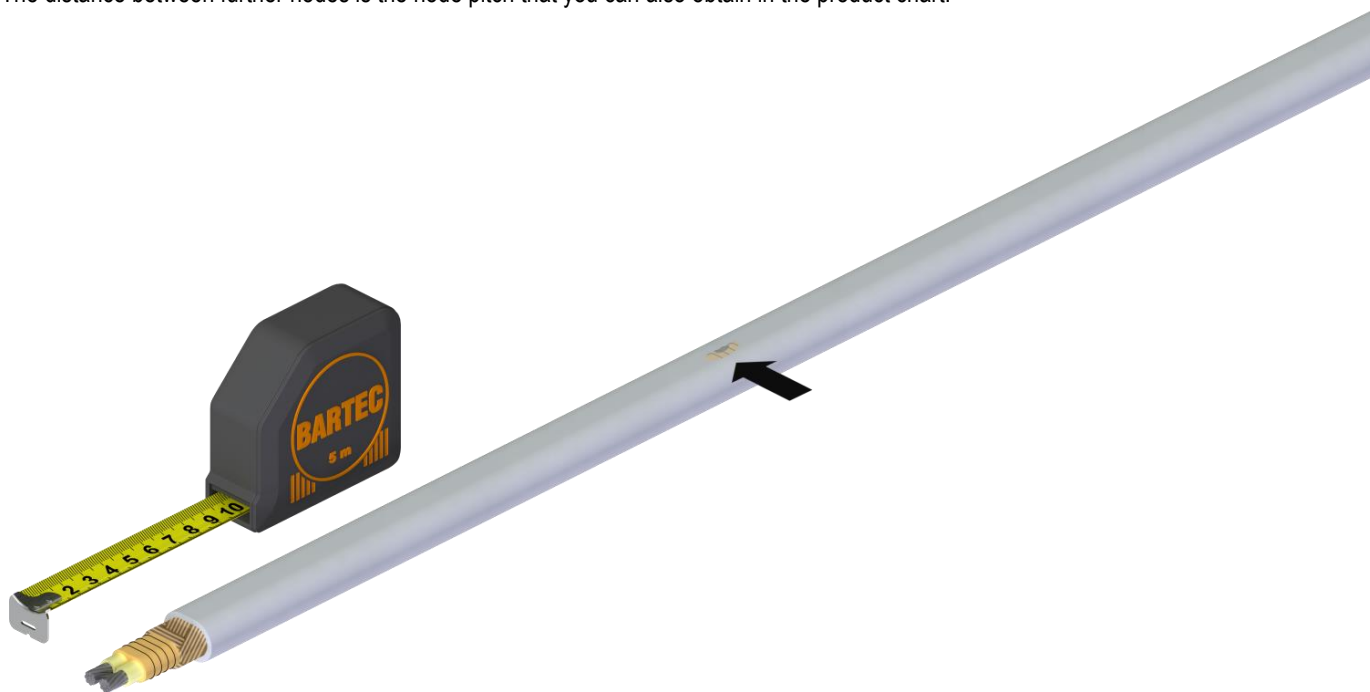
→ **Example**

- Measured resistance: 1000 Ω
- Trace heater type: 5BPL2-AL
- Full node resistance: 2891 Ω
- Node pitch: 48"

Distance to the next node: $1000 \Omega / 2891 \Omega \times 48'' = 17''$

8

- Using a tape measure, you can now locate the next node from the end of the trace heater.
- The distance between further nodes is the node pitch that you can also obtain in the product chart.

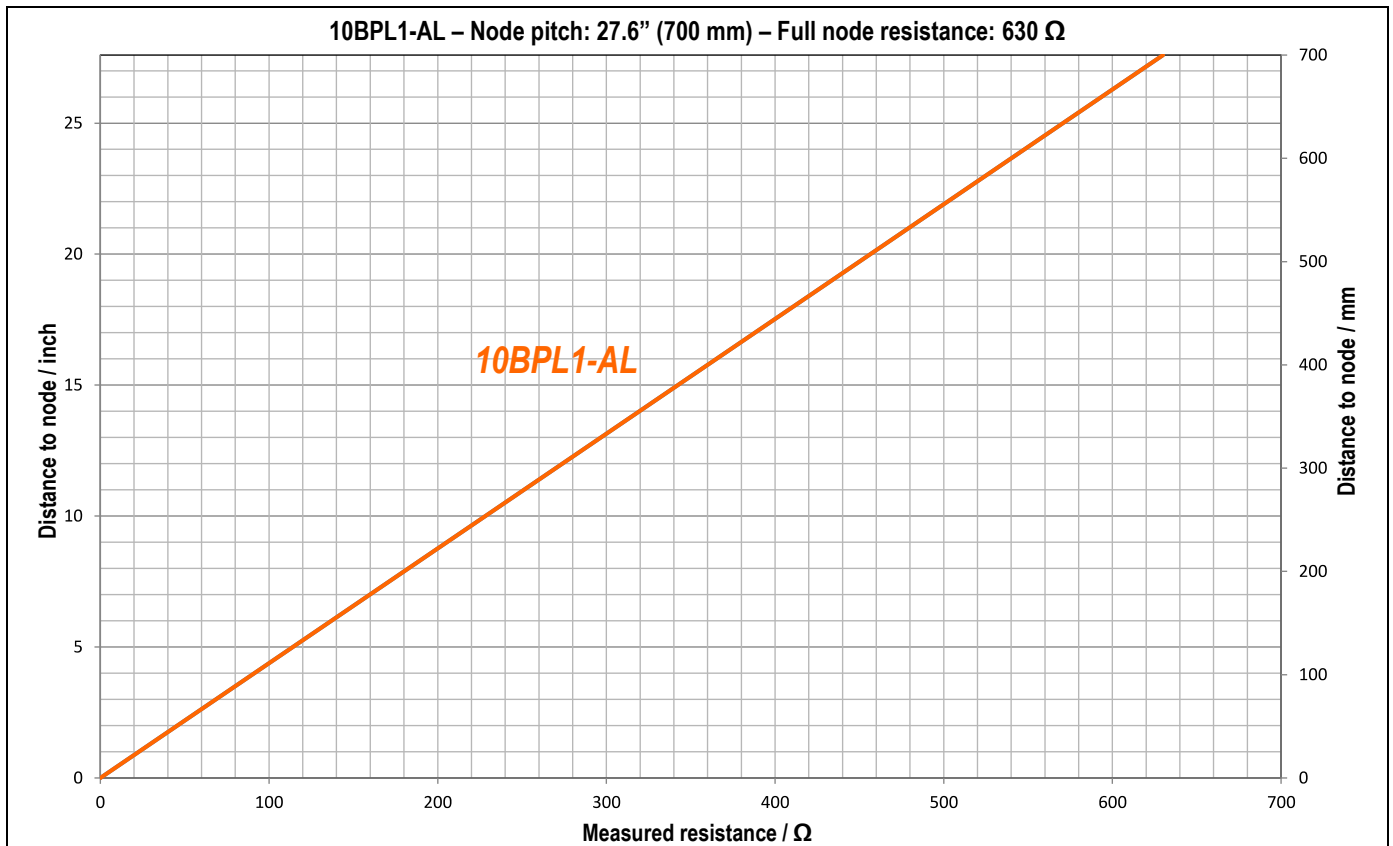
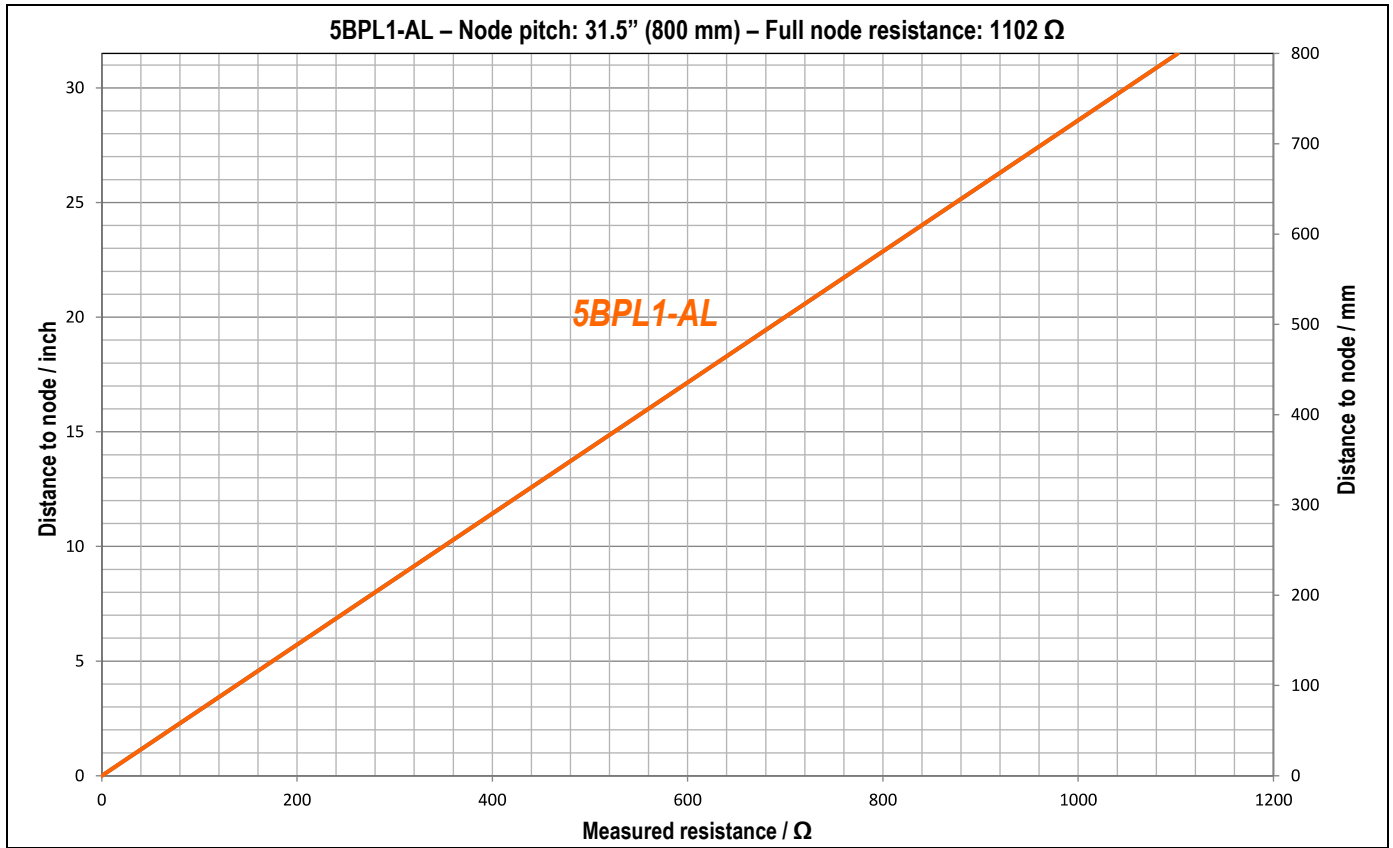


Once you have located the node position, you can continue with Step 6 on page 12.

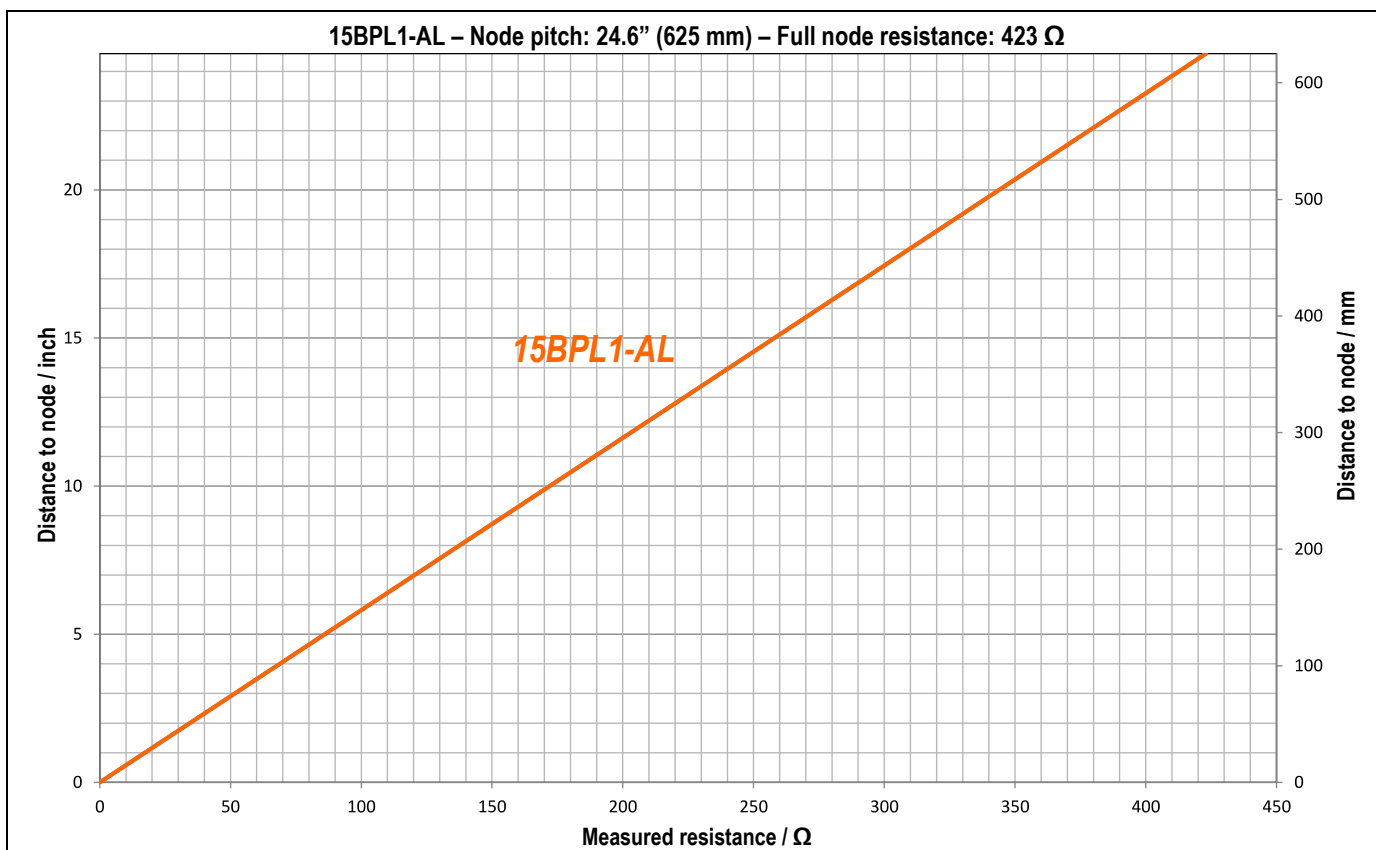
9

Alternate method for node location – only required if you cannot identify the node marker asterisks (***) on the trace heater

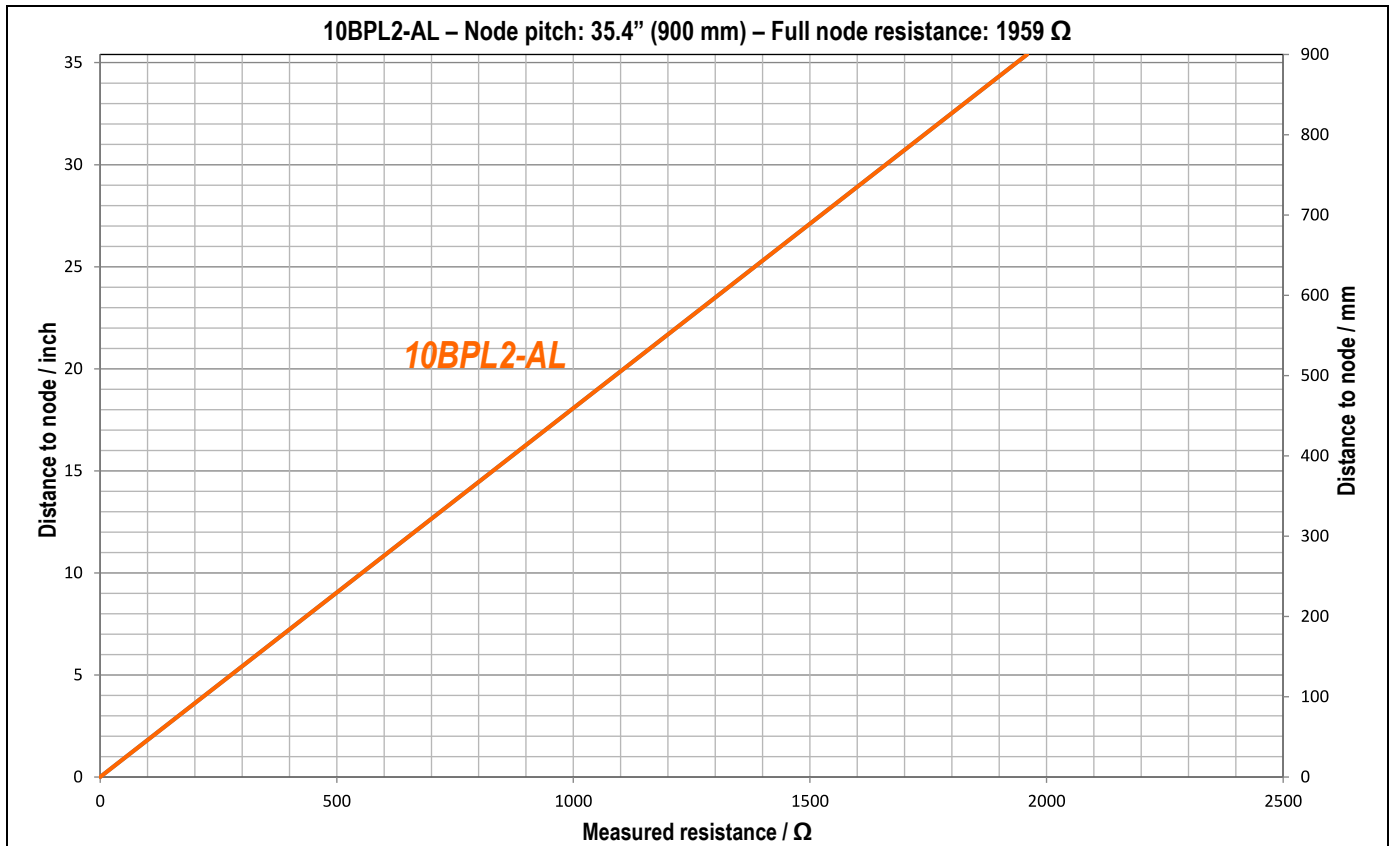
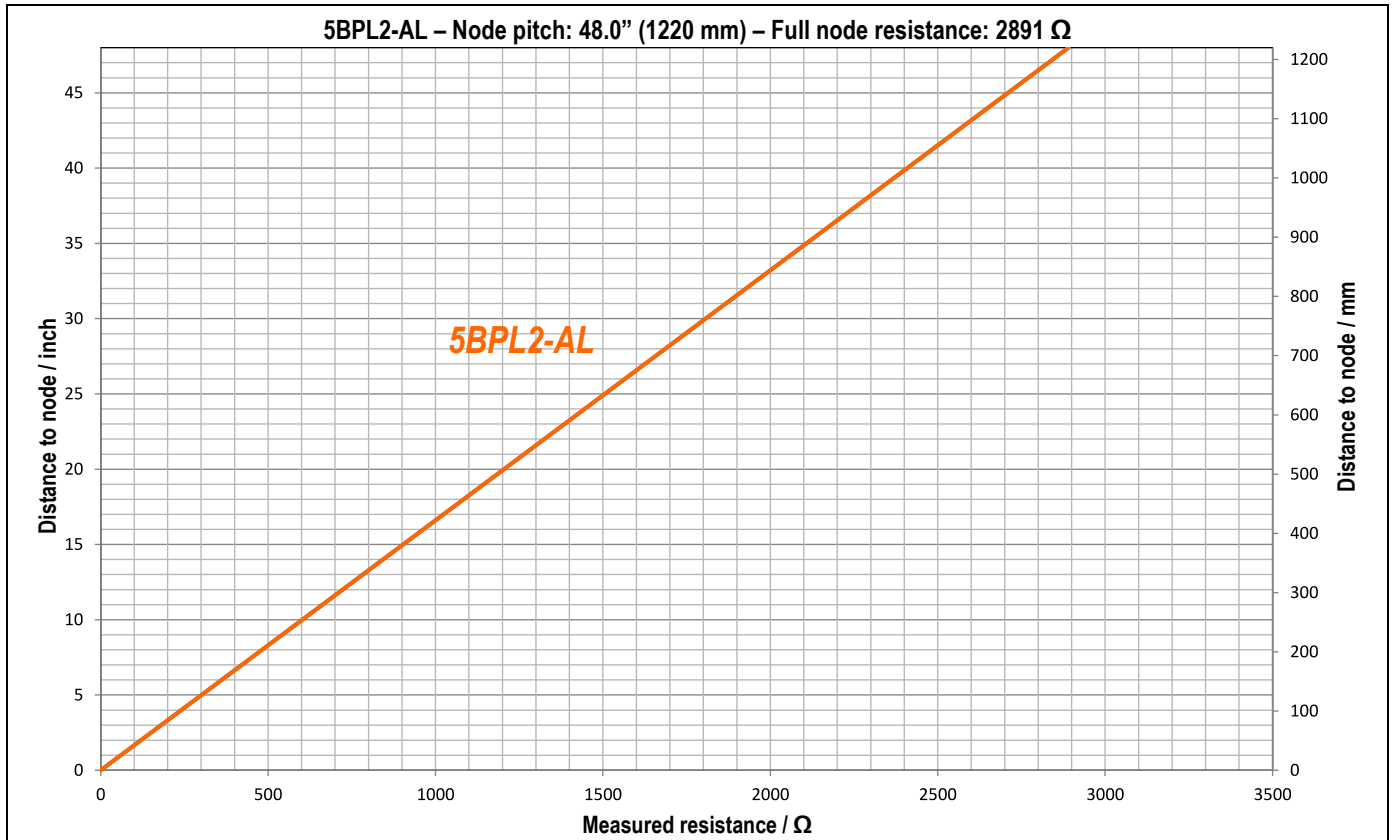
Product charts for node location



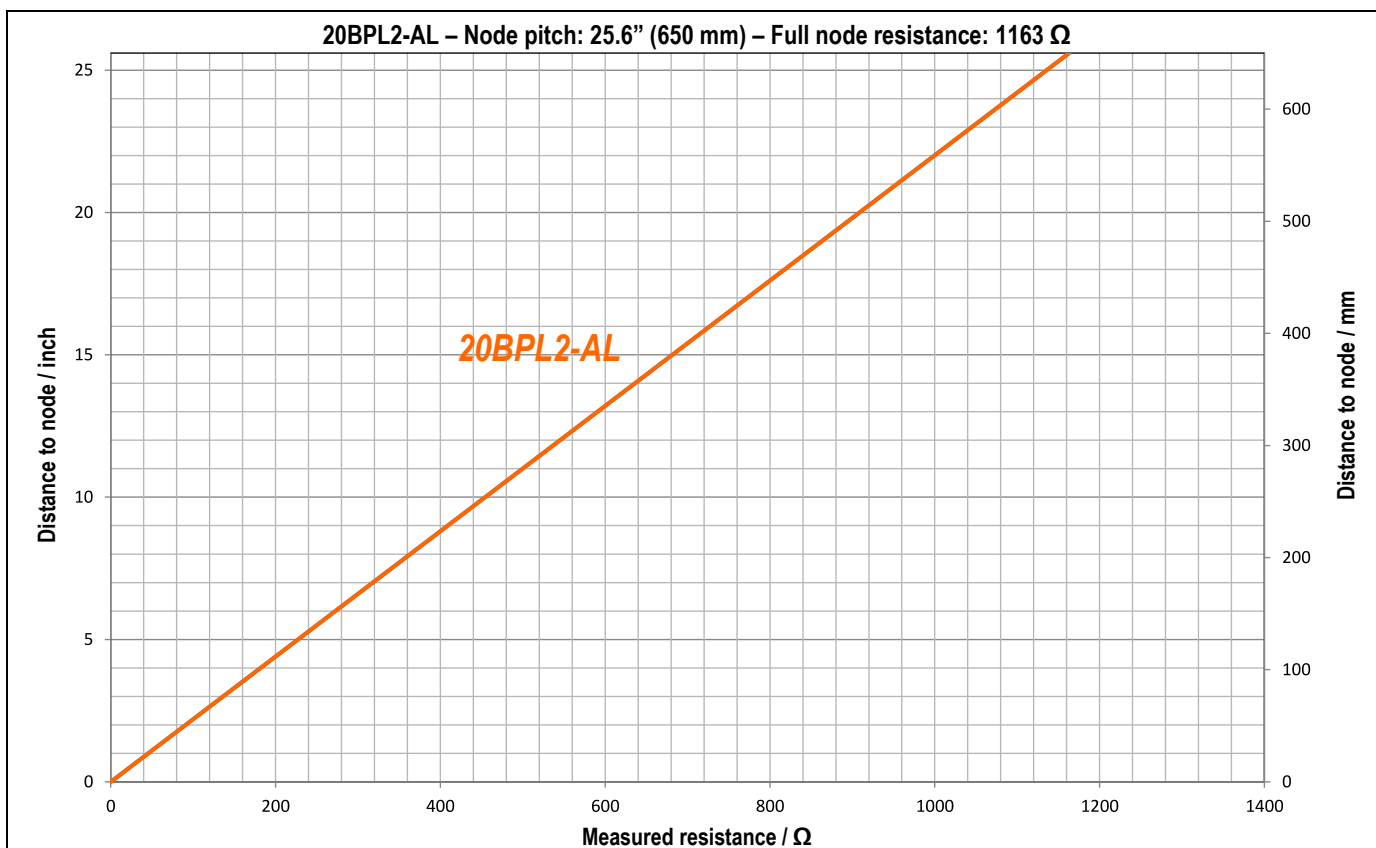
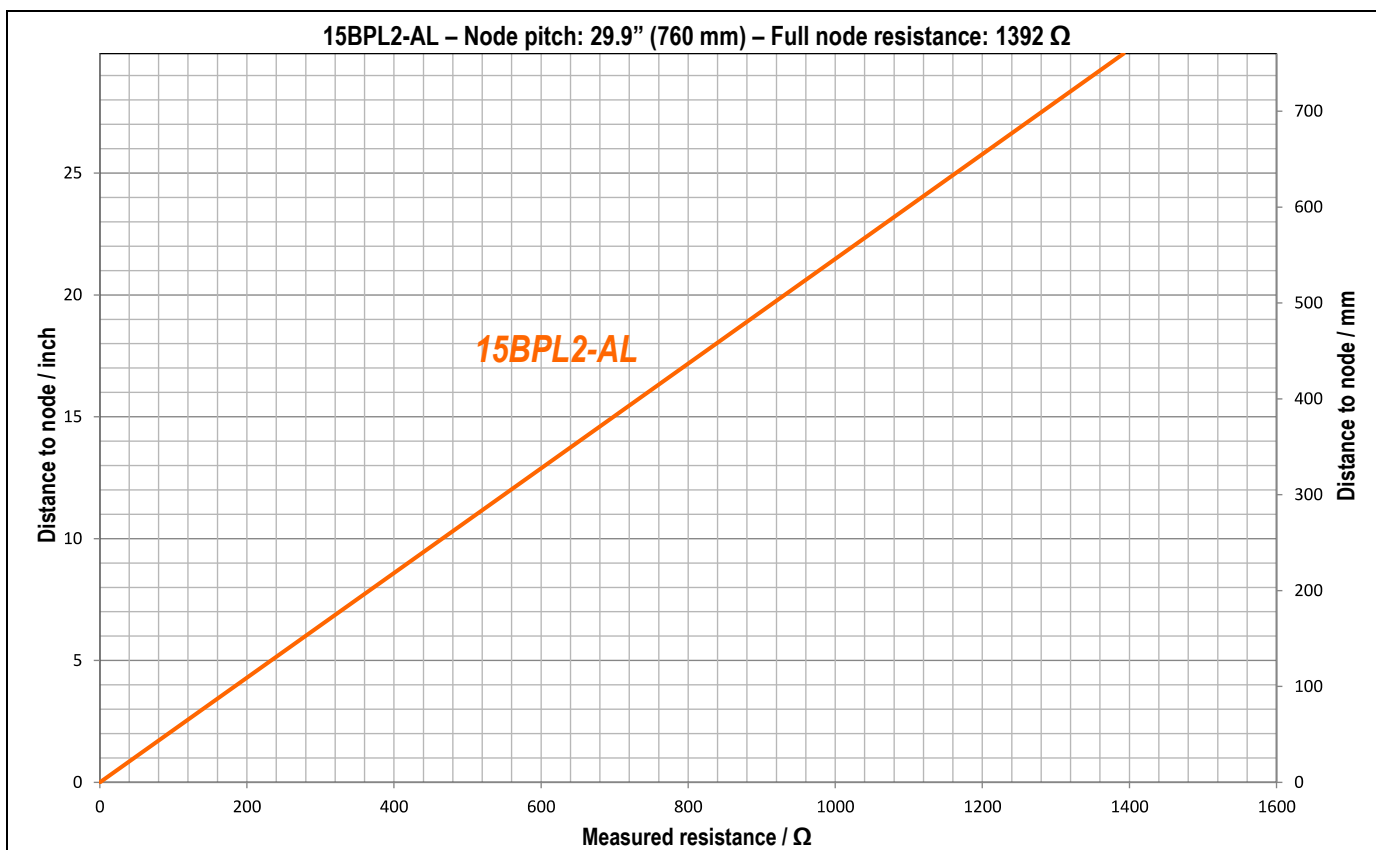
Product charts for node location



Product charts for node location



Product charts for node location



BARTEC REGIONAL OFFICES**BARTEC GERMANY**

BARTEC Vertrieb Deutschland GmbH
 Max-Eyth-Straße 16
 97980 BAD MERGENTHEIM, Germany
 Tel.: +49-79 31-597 0
 Fax: +49-79 31-597 119
 info@bartec.de
 www.bartec.de

BARTEC AUSTRIA

BARTEC Elektrotechnik GmbH
 Brown Boveri Straße 8/2/1
 2351 WIENER NEUDORF, Austria
 Tel.: +43-2236-212 040
 Fax: +43-2236-212 04 99
 office@bartec.at
 www.bartec.de

BARTEC NORWAY

BARTEC Technor AS
 Vestre Svanholmen 24
 4313 Sandnes, Norway
 +47 51 84 41 00
 +47 51 84 41 01
 www.bartec-technor.no
 sales@bartec-technor.no

BARTEC MIDDLE EAST

BARTEC Middle East
 HB-01, Near Round About 8,
 Jebel Ali Free Zone
 P.O. Box 17830, DUBAI,
 United Arab Emirates
 Tel.: +971 4 8876 162
 Fax: +971 4 8876 182
 bartec@bartec.ae
 www.bartec.de

BARTEC FRANCE

BARTEC France
 20, rue de l'industrie
 BP 80420 Fegersheim
 67412 ILLKIRCH CEDEX, France
 Tel.: +33 3 88-59 03 05
 Fax: +33 3 88-64 34 11
 info@bartec.fr
 www.bartec.fr

BARTEC US

BARTEC US Corp.
 650 Century Plaza Drive
 Suite D120
 HOUSTON TX 77073, USA
 Tel.: +1 281 214 8542
 Fax: +1 281 214 8547
 sales@bartec.us
 www.bartec.us

BARTEC NETHERLANDS

BARTEC NEDERLAND b.v.
 Boelew erf 25
 2987 VD RIDDERKERK, The Netherlands
 Tel.: +31-180-41 05 88
 info@bartec.nl
 www.bartec.nl

BARTEC ITALY

BARTEC S.r.l.
 Via per Carpiano, 8/10
 20077 MELEGNANO (Mi), Italy
 Tel.: +39-02-92 27 78 00
 Fax: +39-02-98 23 19 96
 info@bartec.it
 www.bartec.it

BARTEC SWEDEN (& DK, FI, LT, LV, EE)

BARTEC AB
 Tennvägen 1
 371 50 KARLSKRONA, Sweden
 Tel: +46 455 68 74 00
 Tel: +45 8988 1112 (for DK)
 info@bartec.se
 www.bartec.se

BARTEC SAUDI ARABIA

Bartec MIDDLE EAST LLC
 31952 AL KHOBER P.O Box 3685
 Kingdom of Saudi Arabia
 Tel.: + 966 13 823 8101
 Fax: + 966 13 823 8102
 fahad.khan@bartec.de
 www.bartec.de

BARTEC KOREA

BARTEC Ltd, Korea
 C-601, 168, Gasandigital 1-ro,
 Geumcheon-gu, Seoul, Korea
 Tel.: +82 2 2631 4271
 Fax: +82 2 6264 1609
 info@bartec.co.kr
 www.bartec.de

BARTEC CHINA

BARTEC Explosion Proof Appliances
 (Shanghai) Co. Ltd.
 New Building 7, No. 188 Xinjun Ring Road
 Caohejing Pujiang Hi-Tech Park
 (Pudong Area), Minhang District
 201114 SHANGHAI, China
 Tel.: +86 21 34637288
 Fax: +86 21 34637282
 info@bartec.com.cn
 www.bartec.com.cn

BARTEC BELGIUM

BARTEC Belgium N. V.
 H. Hartlaan 26,
 Industriepark Schoonhees West Zone 1
 3980 TESSENDERLO, Belgium
 Tel.: +32-13-67 23 08
 Fax: +32-13-67 23 09
 bartec@bartec.be
 www.bartec.be

BARTEC UK

BARTEC (UK) Ltd.
 Arundel House, Little 66
 Hollins Brook Park, Pilsworth Road
 BURY BL9 8RN, United Kingdom
 Tel.: +44-8444 992 710
 Int Tel.: +44 161 767 1590
 Fax: +44-8444 992 715
 Int Fax: +44 161 767 1591
 info@bartec.co.uk
 www.bartec.co.uk

BARTEC RUSSIA

OOO „BARTEC Rus“
 5A, bld. 1 Volkovskoe Shosse
 "Volkovskoy" Business Center, Office 401
 141006, Mytischki, Moscow Region
 Russia
 Tel. + Fax: +7 495 249 0542
 mail@bartec-russia.ru
 www.bartec-russia.ru

BARTEC INDIA

BARTEC India Pvt. Ltd.
 C-56 /45, 1st Floor-Priska Tower,
 Sector-62 Noida-201309, U.P., INDIA
 Tel.: +91 120 4523 200
 Fax: +91 120 4523 264
 E-mail: info.bartecindia@bartec.in
 www.bartec.de

BARTEC LATIN AMERICA

BARTEC LATAM SAS
 Calle 106 # 54-78
 Oficina 402, Torre Empresarial Baikal
 BOGOTA D.C., Colombia
 Tel.: +57 (1) 7035 146 (Sales)
 Tel.: +57 (1) 7559 301 (Admin)
 info@bartec.com.co
 www.bartec.com.co

BARTEC ASIA PACIFIC

BARTEC Pte Ltd
 63 Hillview Avenue
 # 07-20/21 Lam Soon Building
 SINGAPORE 669569
 Tel.: +65-6 7625030
 Fax: +65-6 7625031
 info@bartecasia.com
 www.bartecasia.com