ENGINEERING
TOMORROW

Installation Instruction

Power connection kit

Cable to Junction Box with ½" NPT cable gland

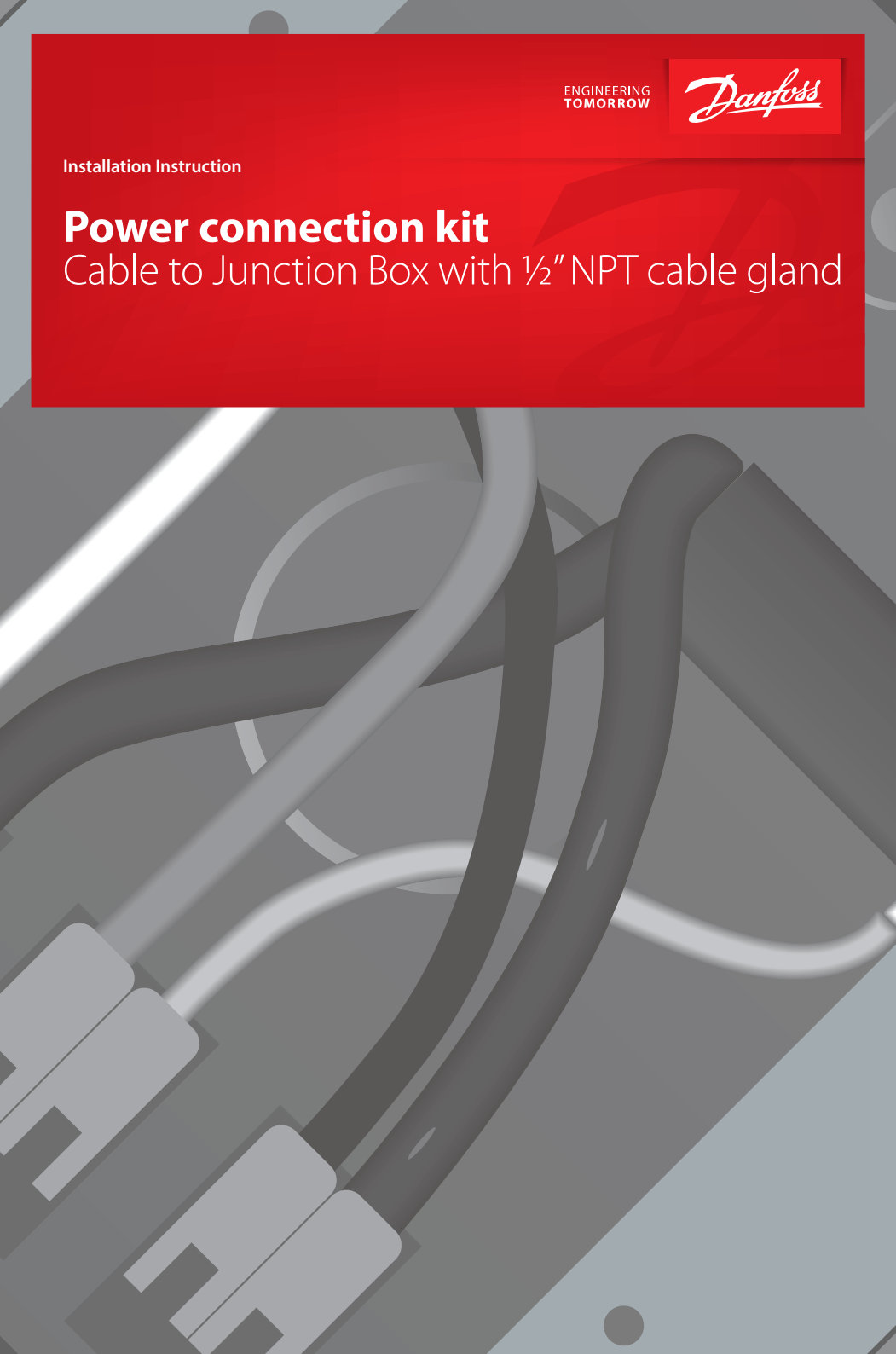


Table of contents

1 Overview

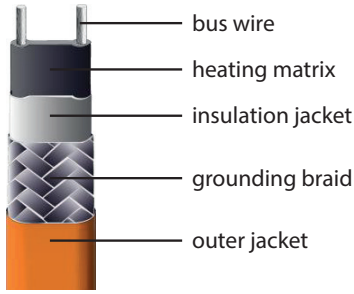
Cold applied connection system for use with a ½" NPT thread junction box Danfoss PX or RX trace heaters.
Catalog No.: 088L0023.

This manual introduces the operation and installation of Danfoss heat shrink connection technology for use with a ½" NPT thread junction box and the following self-regulating trace heaters:

- Danfoss PX Pipe Trace Heating System
- Danfoss RX-C Roof and Gutter De-Icing System

To connect the trace heater to the cold lead cable the 2 bus wires are insulated with heat shrink tubes, then connected to the cold lead cable inside the junction box. Additionally, a green/yellow heat shrink tube is provided to connect the twisted grounding braid to the grounding conductor. Finally, the end of the trace heater is insulated by means of another heat shrink tube.

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



2 Certifications / Approvals

Heat shrink technology connection system for use with a ½" NPT thread junction box and Danfoss PX/RX trace heaters

3 Technical data

Ambient temperature range	-40 °F to +185 °F / -40 °C to +85° C
Max. operating temperature end cap	185 °F / 85 °C
Electrical data	see specifications of the trace heater used

4 Safety

Safety

For safe installation and operation of the cold applied connection system 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 Danfoss requirements and be installed in accordance with the relevant electrical codes and any other applicable national and local codes.
- The US and Canadian electrical codes require ground fault protection to be provided for all trace heating circuits.
- Install the connection system and trace heaters carefully.
- Use the trace heater and connection system 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).Do not bend on the narrow axis.
- 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.
- Beware of hot surfaces when using the heat gun.
- Keep these instructions for future reference.If applicable, leave them with the end user.
- De-energize before installation or servicing.
- Use only original accessories.

NOTICE

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

Sécurité

Afin de garantir la sécurité lors de l'installation et de l'utilisation du système de connexion à liaison froide, 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.

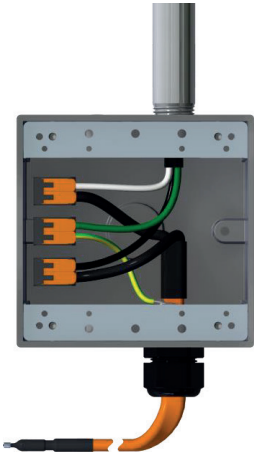
- Tous les systèmes et installations électriques doivent satisfaire aux exigences imposées par la société Danfoss et doivent être installés conformément aux normes électriques en vigueur ainsi qu'aux autres prescriptions nationales et locales applicables.
- Les normes électriques américaines et canadiennes imposent une protection contre les défauts à la terre pour tous les circuits de traçage électrique.
- Notez que le guide de conception fourni avec chaque cable chauffant contient des informations importantes additionalles qu'il convient de respecter en plus du present manuel.
- La pose du système de connexion et des câbles chauffants doit être réalisée avec le plus grand soin.
- Utilisez le câble chauffant et le système de connexion adaptés à l'usage prévu et répondant aux 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).Ne pas courber le câble chauffant sur la tranche.
- 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.
- Soyez prudent lors de l'utilisation du pistolet à air chaud, certaines surfaces peuvent devenir brûlantes.
- Conservez ces instructions pour un usage ultérieur.Le cas échéant, remettez-les à l'utilisateur final.
- Mettre hors tension avant toute installation ou opération de maintenance.
- Utilisez exclusivement des pièces et accessoires d'origine.

AVIS

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

5 Kit contents

The following table lists the kit contents for each of the heat shrink technology connection systems for PX/RX trace heaters:



Power connection kit

 2 x Heat shrink tube for bus wires (black)	 1 x Heat shrink tube for grounding braid (green/yellow)
 1 x Outer heat shrink tube for bus wires (black)	 3 x Terminal block
 1 x Plastic gland body	 1 x Inner heat shrink tube for end-termination
 1 x Grommet	 1 x Outer heat shrink tube for end-termination
 1 x Fixing nut	 2 x Protection heat shrink end termination

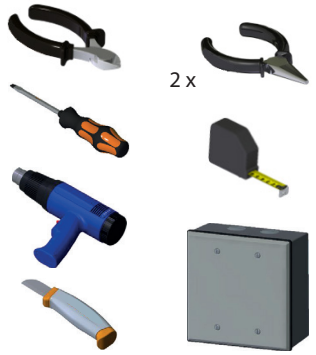
6 Installation

Required tools / equipment

1

The following tools and equipment are required for installation of the connection system:

- Wire cutters
- Flat screwdriver
- Heat gun
- Utility knife
- Needle-nose pliers (2x)
- Tape measure
- 4" x 4" (or larger) UL Listed or CSA Certified junction box with ½" NPT thread.



Cautions and warnings

2

⚠ WARNING:

Risk of fire or electrical shock. De-energize all power circuits before installation or servicing. Always use ground fault equipment within the heat tracing system.

- 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. Refer to the system manual of the heating system

⚠ Advertissement:

Risque d'incendie ou d'electrocution. 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.

- Vérifiez bien que tous les circuits électriques sont hors tension avant de débuter votre travail.
- Veillez à ne pas dépasser la longueur de circuit de traçage maximale autorisée pour le type de câble chauffant utilisé. Consultez à ce sujet le guide de conception du systéme de traçage.

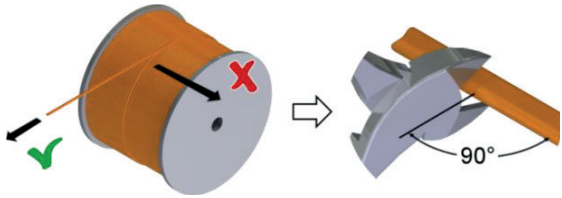
Preparation of the trace heater

3

⚠ WARNING:

Risk of short cuts and material damage. Keep the trace heater ends dry before and during installation. Observe the trace heater's installation instructions.

Unroll the required trace heater in a straight line and cut to the correct length. Cut off the trace heater ensuring a straight cut:



⚠ WARNING:

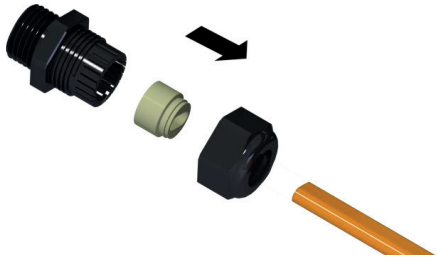
Risk of electrical shock and material damage. The gland body and grommet for PX/RX trace heaters are slightly different. Make sure to use the cable gland kit that fits the trace heater you use.

⚠ ADVERTISSEMENT:

Risque d'électrocution et/ou de dommages matériels. Le corps du presse-étoupe et le passe-fil destinés aux câbles chauffants PX/RX sont légèrement différents. Prenez donc garde á bien utiliser le corps du presse-étoupe et le passe-fil adaptés au cäble chauffant utilisé.

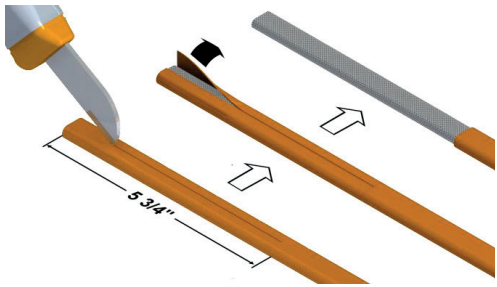
Slide the fixing nut, the grommet and the gland body onto the trace heater.

4

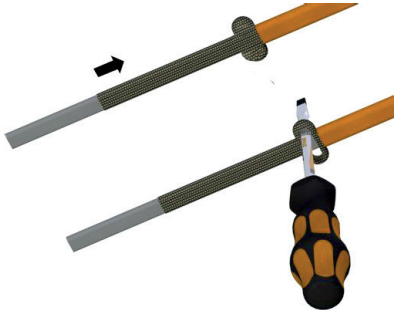


Remove 5 ¾" (145 mm) of the outer jacket on the end of the trace heater.

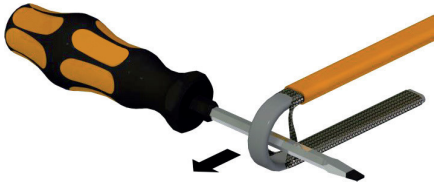
5



Push the grounding braid back. Use the screwdriver to form an eyelet. Be careful not to damage the internal insulation jacket **6**



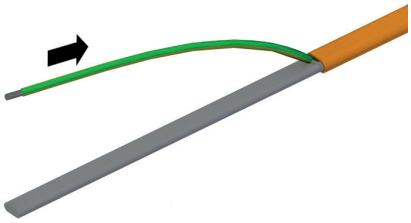
Bend the trace heater and pull the heating matrix out of the grounding braid. **7**

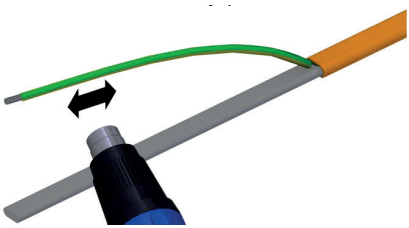


Twist the grounding braid in order to form a wire. **8**

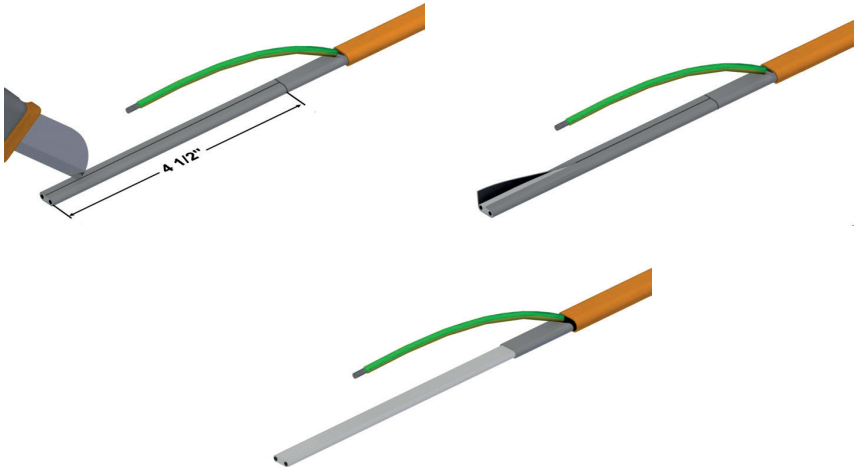
Push the green/yellow heat shrink tube (length: 4 ¾" (120 mm); diameter: ¼" (6 mm) onto the twisted grounding braid. **9**

Shrink the tube at a temperature of 275 °F / 135 °C.



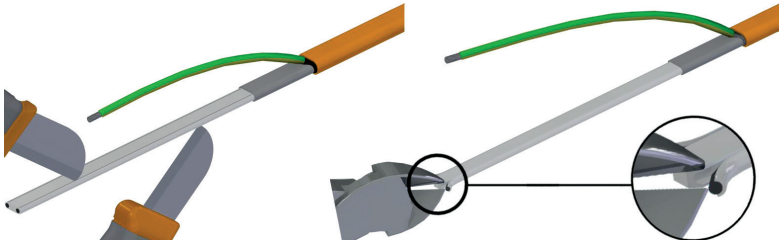


Remove 4 ½" (115 mm) of the internal insulation jacket. **10**



Make a small cut over and under each bus wire. Take care not to damage the bus wires. **11**

Carefully make an incision into the edges of the heating matrix. Take care not to damage the bus wires.



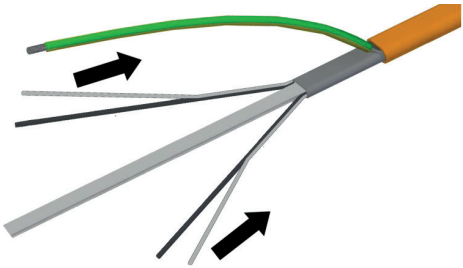
Pull off the bus wires while holding the heating matrix. **12**

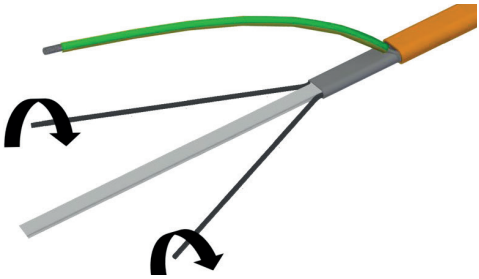
NOTICE:

Risk of malfunction of the heating system. Before you continue, make sure that the bus wires are intact and not nicked or damaged.

Remove any remaining heating matrix that sticks to the bus wires. **13**

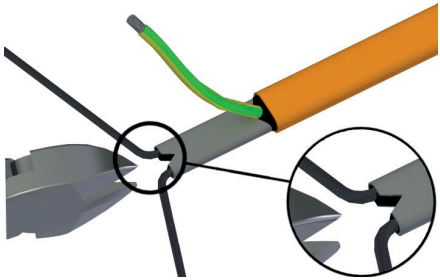
Twist the bus wires.





Remove the remaining heating matrix. Take care not to damage the bus wires. **14**

Carefully cut in a triangle (⅛" (5 mm)) between the bus wires. Take care not to damage the bus wires. **15**



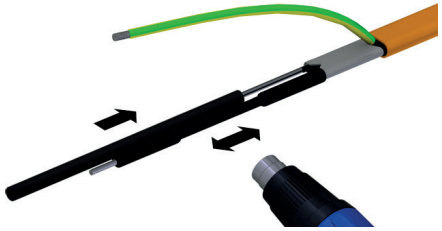
Installation of the heat shrink tubes

Slide the bus wire heat shrink tubes (length: 4" (100 mm); diameter: ¼" (6 mm)) onto the bus wires. **16**

⚠ WARNING:
Risk of burns. Beware of hot surfaces when using the heat gun.

⚠ ADVERTISSEMENT:
Risque de brülure. Soyez prudent lors de l'utilisation du pistolet á ait chaud, certaines surfaces peuvent devenir brülantes.

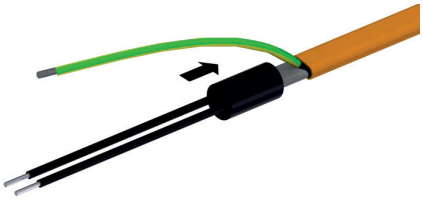
Shrink the tubes at a temperature of 275 °F / 135 °C.

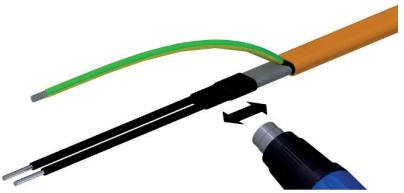


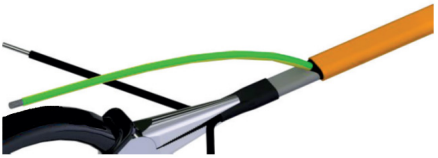
Push the outer heat shrink tube (length: 1" (25 mm); diameter: ½" (12 mm)) over the end of the trace heater. **17**

Shrink the tube at a temperature of 275 °F / 135 °C.

While still hot, compress the tube between the bus wires using pliers and hold for 5 seconds.





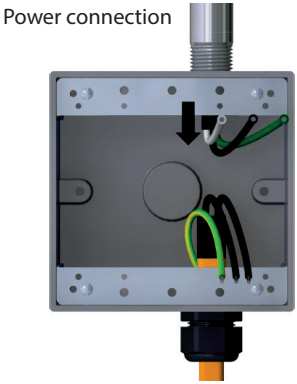


Cable connection

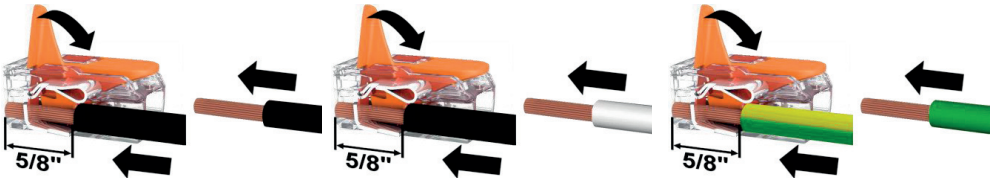
Feed the cables into the junction box and tighten the gland to a torque of 6 ft. lbs. **18**

For powered splice and powered T connection kits repeat steps 3 to 16 to prepare the remaining trace heaters, introduce them into the junction box and tighten the gland.

Feed the cold lead cable into the junction box. **19**



Inside the junction box, use the individual terminal blocks to connect the bus wires and the twisted grounding braid / grounding conductor to each other. Make sure that the wires are fully engaged in the terminal block. **20**

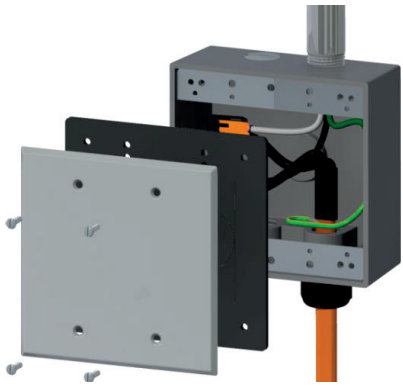


Line Neutral Ground

Establish all connections as shown in the following figure. **21**

Power connection

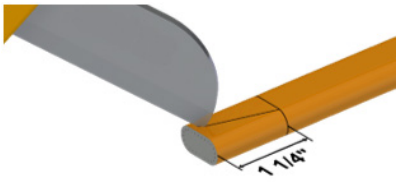
Mount the cover of the junction box according to the manufacturer's installation instructions. **22**



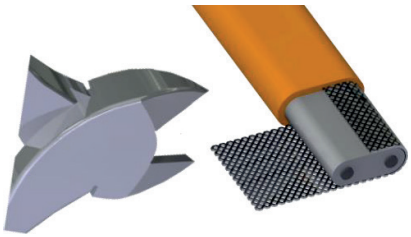
Installation of the end seal **23**

Cut the trace heater off straight.

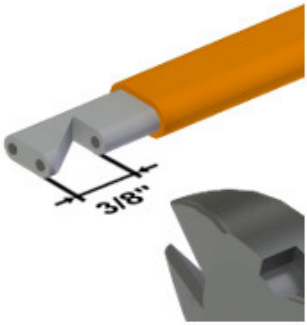
Remove 1 ¼" (30 mm) of the outer jacket on the trace heater.



Remove the exposed grounding braid. Make sure that the insulation jacket is not damaged. **24**



Cut in a triangle (⅜" (5 mm)) between the bus wires. **25**

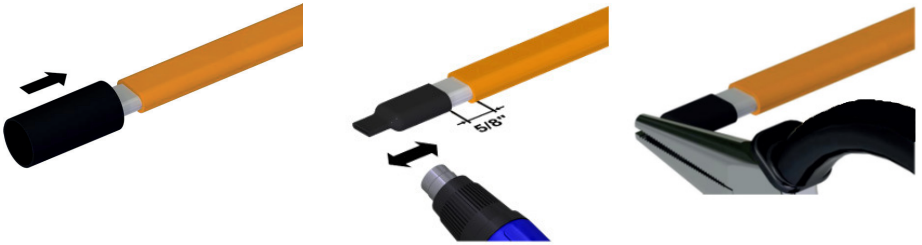


Put the inner heat shrink tube for the end-termination (length: ¾" (20 mm); diameter: ½" (12 mm)) over the end of the trace heater. **26**

Leave an overlap of ⅝" (15 mm) .

Beginning at the end of the cable, shrink the tube at a temperature of 275 °F / 135 °C.

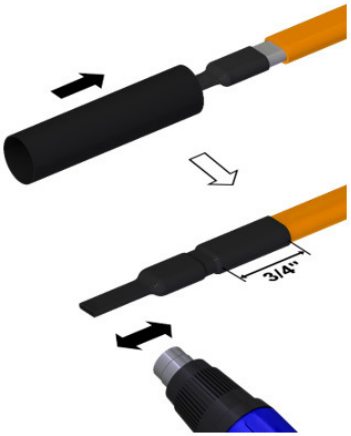
While still hot, compress the end of the tube using pliers and hold for 5 seconds.



Now, put the outer heat shrink tube (length: 2 ¾" (70 mm); diameter: ¾" (19 mm)) over the end of the trace heater. **27**

Make sure that it overlaps the bared part of the trace heater for ¾" (20 mm).

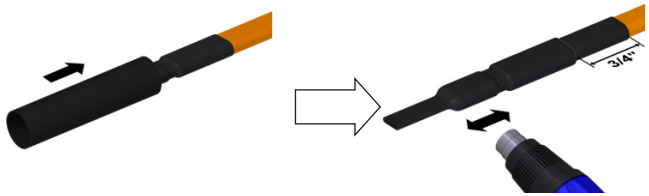
Beginning at the end of the cable, shrink the tube at a temperature of 275 °F / 135 °C.



Now, put the first protection heat shrink tube (length: 2 ⅓" (60 mm); diameter: ¾" (19 mm) over the end of the trace heater. **28**

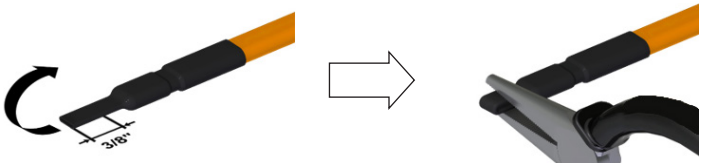
Leave a gap to the outer heat shrink tube of ¾" (20 mm).

Beginning at the end of the trace heater, shrink the tube at a temperature of 275 °F / 135 °C.



Fold over the overlapping end of the heat shrink tube ⅜" (10 mm). **29**

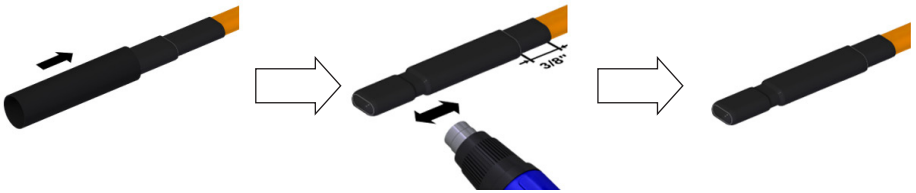
Slightly press the end using pliers.



Now, put the second protection heat shrink tube (length: 2 ⅓" (60 mm); diameter: ¾" (19mm)) over the end of the trace heater. **30**

Leave a gap to the very first heat shrink tube of ⅜" (10 mm).

Beginning at the end of the trace heater, shrink the tube at a temperature of 275 °F / 135 °C.



7 Troubleshooting

Problem	Possible cause	Remedy
Trace heater remains cold	No power supply	Check the supply line
	Trace heater or cold lead cable not properly connected	Connect the trace heater and cold lead cable according to the installation instructions
	Control unit adjusted incorrectly	Adjust the control unit according to the installation instructions
Automatic circuit breaker disengages	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
	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 tape tails are not twisted)
	Humidity inside the connection system or end seal	Replace the connection system / end seal
Ground fault protection is disengaged	Trace heater damaged	Replace the trace heater at the point where it is damaged
	Moisture in the junction box	Dry the junction box. Be sure that the conduit drain is installed and breathing properly
	Ground fault protection defective	Replace the ground fault protection device(s)

8 Safety

For safe installation and operation of the cold applied connection system 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 Danfoss requirements and be installed in accordance with the relevant electrical codes and any other applicable national and local codes.
- The US and Canadian electrical codes require ground fault protection to be provided for all trace heating circuits.
- Install the connection system and trace heaters carefully.
- Note that the design guide that comes with each trace heater contains further important information and must be followed in addition to this manual.
- Use the trace heater and connection system 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).Do not bend on the narrow axis.
- 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.
- Beware of hot surfaces when using the heat gun.
- Keep these instructions for future reference.If applicable, leave them with the end user.
- De-energize before installation or servicing.
- Use only original accessories.

Preparation of the trace heater

⚠ WARNING

Risk of fire or electrical shock.De-energize all power circuits before installation or servicing. Always use ground fault equipment within the heat tracing system.

- 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.Refer to the system manual of the heating system.

⚠ WARNING

Risk of electrical shock and material damage.The gland body and grommet for PX/RX trace heaters are slightly different. Make sure to use the cable gland kit that fits the trace heater you use.

⚠ WARNING

Risk of burns.Beware of hot surfaces when using the heat gun.

9 Sécurité et advertissements

Afin de garantir la sécurité lors de l'installation et de l'utilisation du système de connexion par technique de thermorétraction Danfoss, il est impératif de respecter les exigences techniques ainsi que les consignes 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 Danfoss et doivent être installés conformément aux normes électriques en vigueur ainsi qu'aux autres prescriptions nationales et locales applicables.
- 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 système de connexion et des câbles chauffants doit être réalisée avec le plus grand soin.
- Utilisez le câble chauffant et le système de connexion adaptés à l'usage prévu et répondant aux 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). Ne pas courber le câble chauffant sur la tranche.
- 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.
- Le câble de liaison froide doit être conforme aux exigences locales et être constitué de fils AWG 16 au minimum.
- Soyez prudent lors de l'utilisation du pistolet à air chaud, certaines surfaces peuvent devenir brûlantes.
- Chaque circuit chauffant doit être clairement identifié par un moyen permanent mentionnant le nom du fabricant, le type de circuit, sa puissance et sa tension.
- N'employez jamais de ruban adhésif en vinyle, même en complément de ce kit.
- Conservez ces instructions pour un usage ultérieur. Le cas échéant, remettez-les à l'utilisateur final.
- Mettre hors tension avant toute installation ou opération de maintenance.
- Utilisez exclusivement des pièces et accessoires d'origine Danfoss.

Avertissements et mises en garde

⚠ AVERTISSEMENT

Risque d'incendie ou de choc électrique. Éteignez tous les circuits d'alimentation avant l'installation ou l'entretien. Toujours utiliser un équipement de défaut à la terre dans le système de traçage thermique.

- Vérifiez bien que tous les circuits électriques sont hors tension avant de débuter votre travail.
- Veillez à ne pas dépasser la longueur de circuit de traçage maximale autorisée pour le type de câble chauffant utilisé. Consultez à ce sujet le guide de conception du système de traçage.

⚠ AVERTISSEMENT

Risque d'électrocution et/ou de dommages matériels.Le corps du presse-étoupe et le passe-fil destinés aux câbles chauffants PX/RX sont légèrement différents.Prenez donc garde á bien utiliser le corps du presse-étoupe et le passe-fil adaptés au câble chauffant utilisé.

⚠ AVERTISSEMENT

Risque de brûlure.Soyez prudent lors de l'utilisation du pistolet á ait chaud, certaines surfaces peuvent devenir brûlantes.

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