

SMART Heater for SAILOR VSAT 1m Antenna

Mounting guide



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Record of Revisions

| Rev. | Description | Release Date | Initials |
|------|--|---------------|----------|
| A | Original document | December 2020 | HM/UFO |
| B | Lower operating temperature changed to -55°C | August 2020 | HM/UFO |

SMART Heater mounting

1.1 Scope and purpose

This guide describes how to mount and connect AC power to the SMART Heater for SAILOR VSAT 1m Antenna in a standard SAILOR 900 VSAT antenna. Once you have finished mounting and connecting, refer to the antenna's installation manual.

Important | Only qualified person shall perform this process!

1.2 Introduction

The SMART Heater for SAILOR VSAT 1m Antenna consists of three 250 W heater mats which must be glued into the bottom of the SAILOR 900 VSAT radome bottom (total 750W). A thermostat must be installed to switch the heating mats on and off, depending on the temperature inside the SAILOR 900 VSAT radome. The thermostat is activated at -15°C and de-activated at -10°C ($+5^{\circ}$ Kelvin hysteresis). The cables for the mats must be connected through a connection board built into a waterproof case to comply with safety regulations.



Note that the heating system is an independent self-contained system, it has no electrical connection to the SAILOR 900 VSAT antenna system. To get it working you must connect external 230 VAC power source power to the heating system.

1.3 Tools needed

Make sure you have the following tools:

1. Standard tools.
2. IPA - Isopropyl Alcohol or similar.
3. Fugue pistol.
4. Glue - Dow Corning 7091 or similar.
5. 2,5 kg ballast mass.
6. Ohm meter for testing
7. 8mm wrench
8. 24mm wrench
9. 26mm wrench

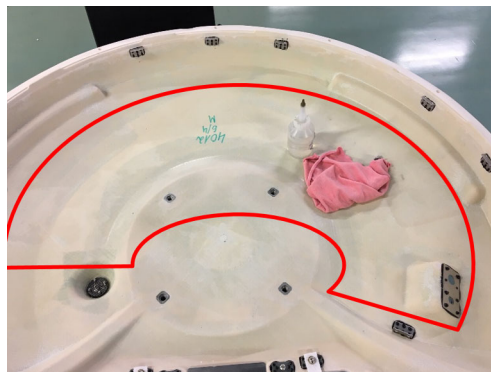
1.4 Mounting instructions

The mounting process consists of the following tasks:

- *How to glue the isolation and heating pads*
- *Assembly of the thermostat*
- *Assembly of the connection box*
- *How to glue the thermostat and the connection box*
- *Mounting the cables*

1.4.1 How to glue the isolation and heating pads

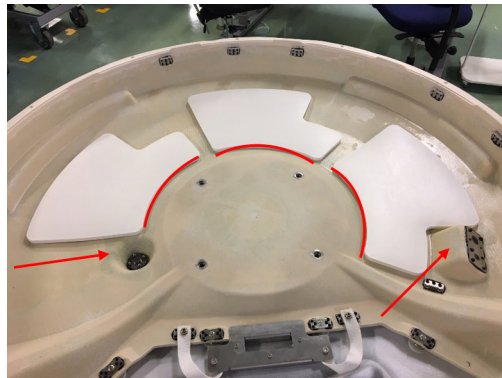
1. Clean the radome bottom with IPA or similar in the marked area.e 1



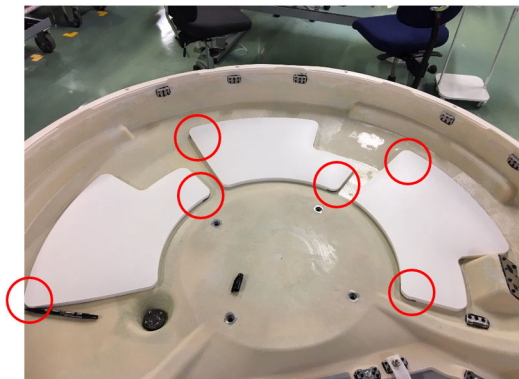
2. Take the three isolation mats and clean them with IPA on both sides of the mats.



3. Place the isolation mats on the radome bottom.
 - Make sure that the round inner sides of the mats fit the inner area where the bottom part extends in height (see curved red line).
 - Place the left mat near the hole for the drain tube (see arrow to the left).
 - Place the right mat close to the extended area where the antenna cable enters the radome (arrow to the right).
 - Place the middle mat centred between the right and left mats as shown on the following figure.



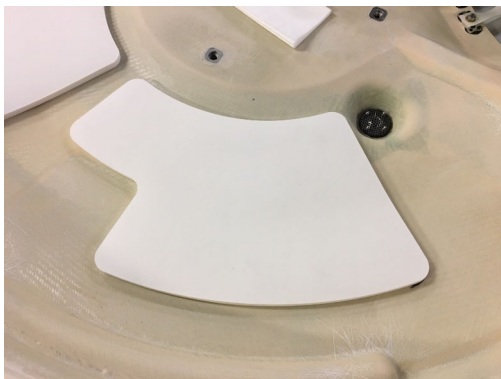
4. Mark the edges of the isolation mats on the radome bottom with a marker to make it easy to place the mats in the correct spot after the glue has been added.



5. Take the sealant gun with the glue, turn one of the mats around and apply the glue to the bottom of the mat as shown in the following figure.



6. Turn the isolation mat around and place it within the markings in the radome bottom.
7. Press the mat against the bottom so the glue extend evenly between the mat and radome bottom.
8. Press the whole area of the isolation mat firmly into place.

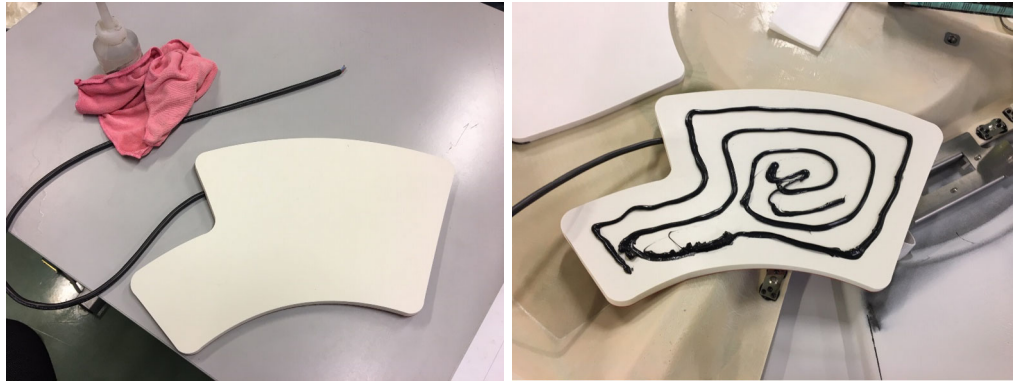


9. Take the heating mat. See Figure 7.



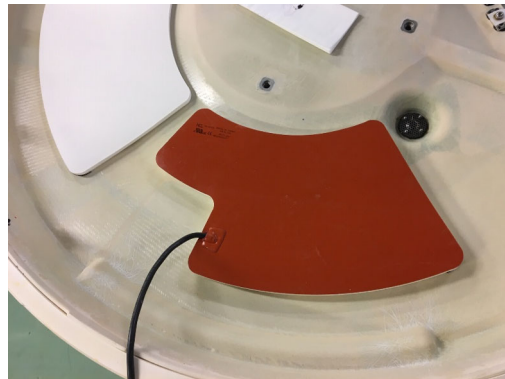
10. Turn the mat around and clean the backside of the heating mat with IPA.

11. Apply the glue to the backside of the heating mat.

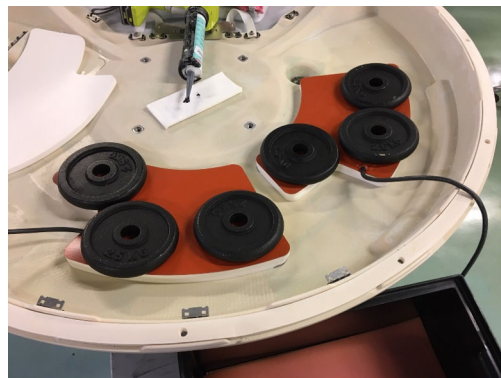


12. Turn and place the heating mat on the isolation mat.

13. Press firmly on the whole area of heating mat so the glue extends evenly.

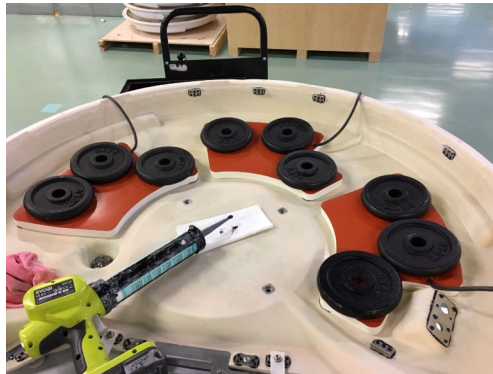


14. Place weights on top of the heating mat similar as shown in the following figure.



15. Repeat the above procedure for the other two mats.

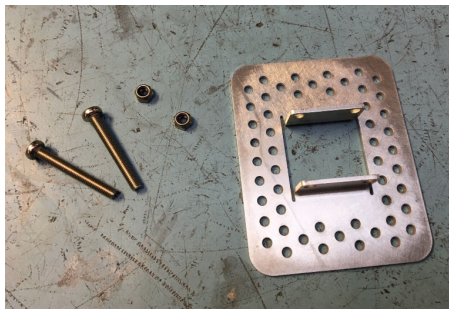
16. Let the glue harden for 24 hours!



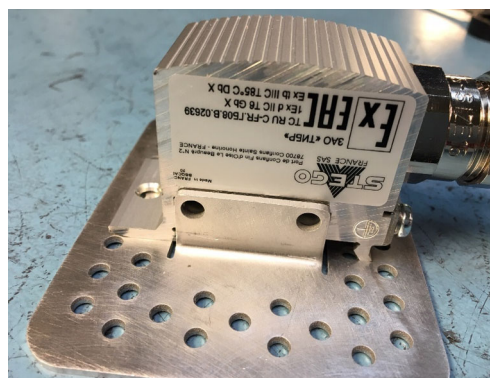
1.4.2 Assembly of the thermostat

To assemble the thermostat make sure you have the following at hand:

- 1 pc. 41-171206 Bracket for 41-207790-000.
- 2 pcs. 51-207113-540 M5x40 screws.
- 2 pcs. 51-204728-005 lock nuts.
- 1 pc. 41-207790-000 Thermostat, 230 V, SwitchTemp -15C.

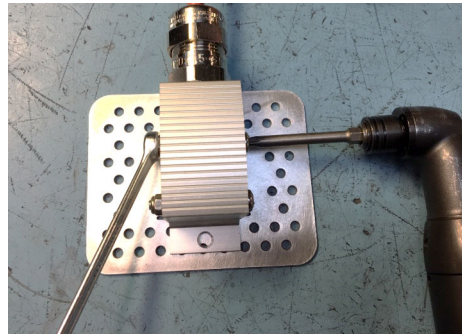
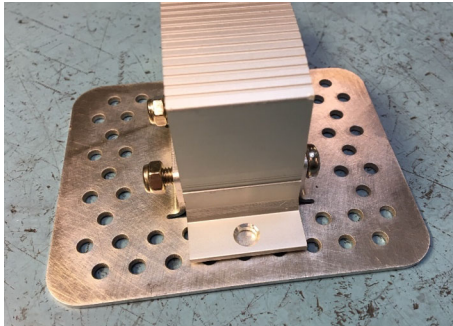


1. Place the thermostat in the bracket so that the screw holes fit.



2. Mount the screws and lock nuts loosely by hand.

3. Fasten the screws and lock nuts with 4,5 Nm.
Hold the lock nuts with a 8mm wrench.



1.4.3 Assembly of the connection box

Have the following item ready at hand:

- 1 pce. 41-207791-000 Electronics Enclosure, IP65.

1. Use an appropriate tool to break out the plastic piece for the cable entries to the box.

Important

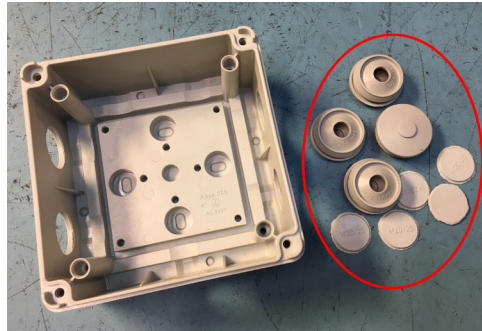
The lid of the box **MUST** stay on while breaking out the plastic pieces.



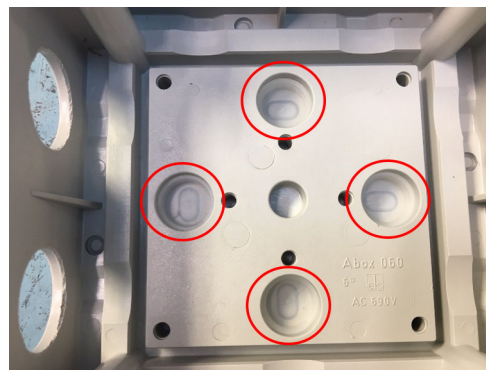
2. Remove a total of 5 plastic pieces. On one side only 1 piece and on the two other sides 2 pieces.



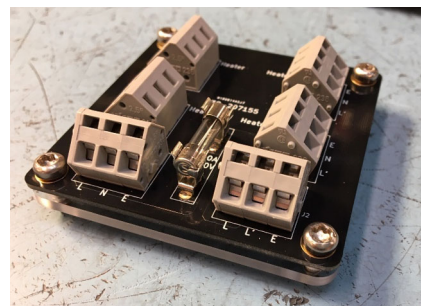
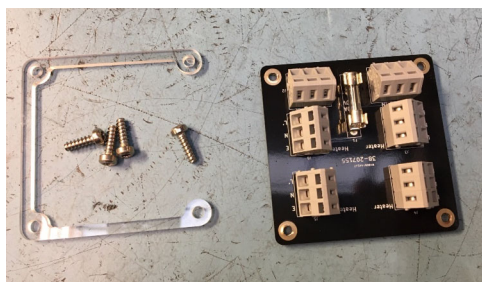
3. Take the lid off the box and discard the plastic pieces shown in the following figure.



4. Keep the four plastic caps shown to the left in the following figure and press the caps into the four holes.

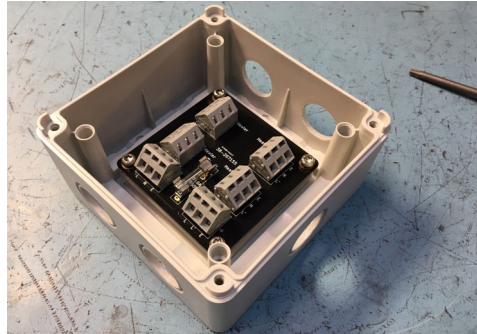


5. Have the following items ready at hand:
- 1 pc. 60-207155 PCB for the Heater.
 - 1 pc. 41-173326 PCB Spacer for 60-207155.
 - 4 pcs. 51-207319-000 Ø4x12 screws.

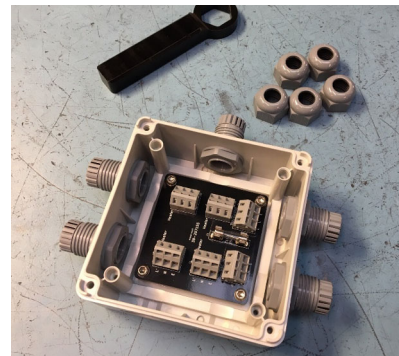


6. First mount the screws through the PCB and then through the spacer.

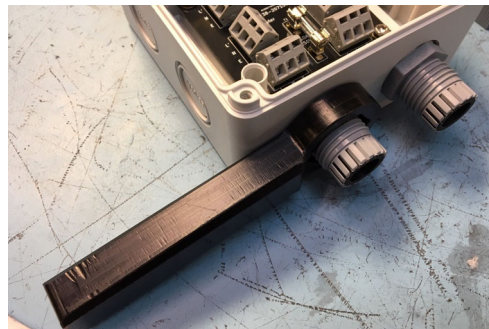
7. Place the PCB with the spacer inside the box. The PCB must be placed identically oriented as shown in the following figure.



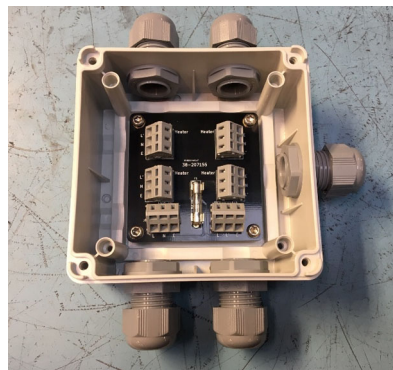
8. Fasten the four screws in the four corners with 2,5 Nm.
9. Take 5 pcs. of 46-207263-000 Cable Gland, Metric, With Locknut, IP68, M20, remove the lock nuts and mount the cable glands in the box.



10. Fasten the cable glands firmly using a 24mm wrench.



11. Mount the external lock nuts loosely, they are fastened later.

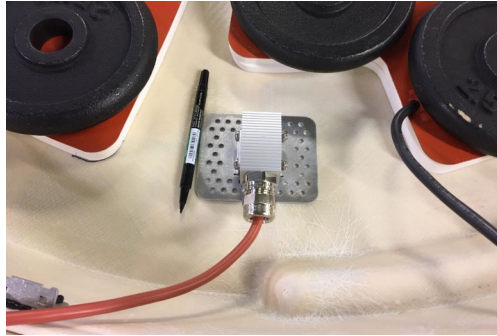


1.4.4 How to glue the thermostat and the connection box

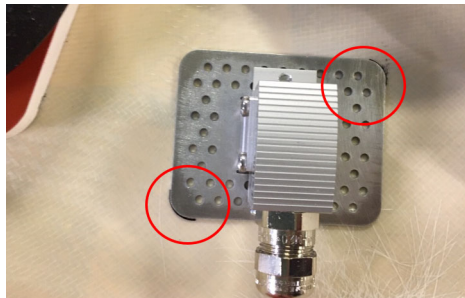
1. Place the thermostat and connection box in the radome bottom.



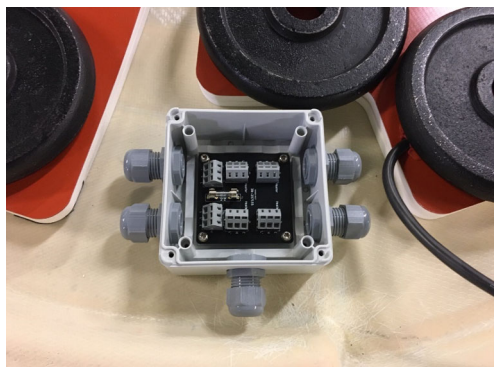
2. Center the thermostat between the heating mats.



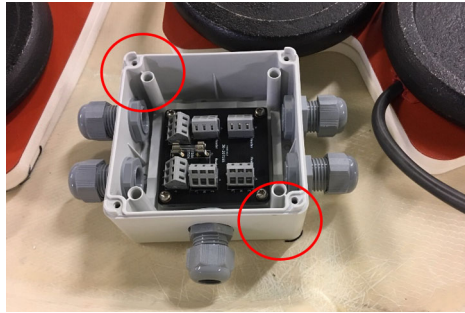
3. Mark the edges of the thermostat with a marker.



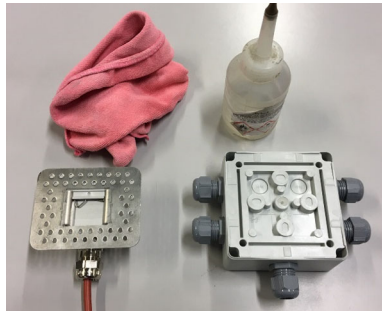
4. Center the connection box between the heating mats as shown in the following figure.



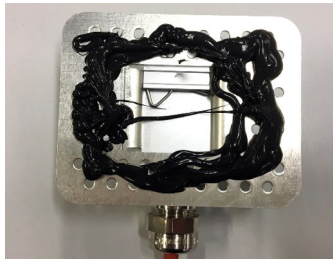
5. Mark the edges of the connection box with a marker.



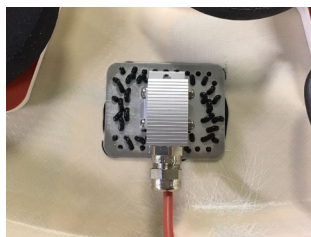
6. Clean the bottom of the thermostat and connection box with IPA.



7. Add the glue Dow Corning 7091 or similar on the backside of the thermostat.



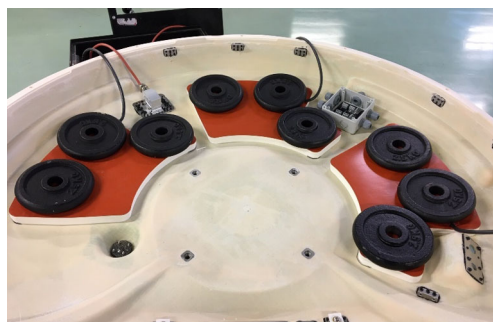
8. Turn and place the thermostat between the markings on the radome bottom and press the thermostat down against the bottom so that the glue is extended evenly.



9. Repeat this procedure for the connection box. It must reside as shown in the following figure.



10. The gluing process is finished. Leave the radome bottom for 24 hours for the glue to harden.



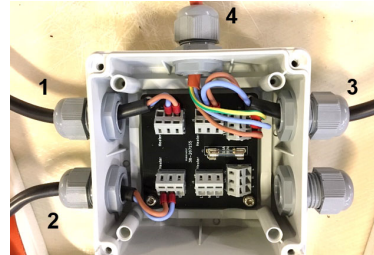
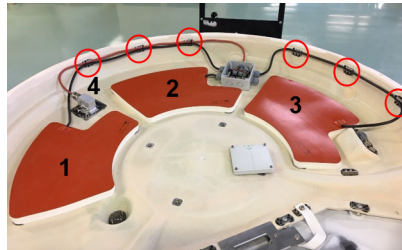
1.4.5 Mounting the cables

1. Have the following items ready at hand:
 - 1 pcs. 46-207263-000 Cable Gland, Metric, With Locknut, IP68, M20.

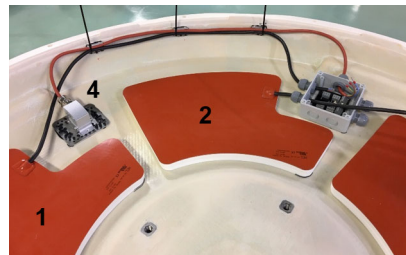


2. Drill a 20mm hole in the bottom of the radome in an appropriate position from where you want to enter the 230 VAC power cable for the heating system.
3. Mount the cable gland and fasten it with a 24mm wrench.
4. Hold against with a 26mm wrench.

- Route the cables from the heating mats and thermostat as shown in the following figure.

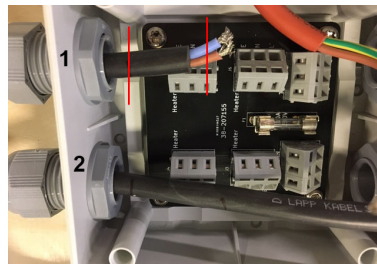


- Fasten the cables with 6 cable ties.
- Enter the cables according to the numbering shown in the previous figure.
- Start with these 3 cables. Cable 1 and 4 do not need to be shortened.



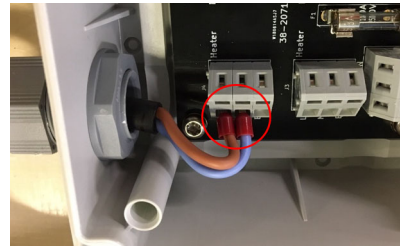
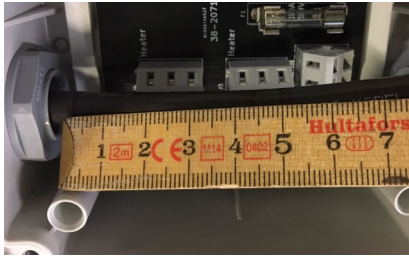
- Mount 3 cable ties loosely.
- Cable 1: Cut off approximately 3 cm of the outer isolation and 1 cm isolation on the two inner wires.

Important Be careful not to damage the inner isolation when cutting the outer isolation.



- Connect the cable in the heater PCB J5, as shown in the previous figure (right).
Brown = L
Blue = N

12. Cable 2: Cut it at approximately 5 cm and cut off approximately 4 cm of the outer isolation and 1 cm of the isolation on the two inner wires.



13. Mount cable 2 in the heater PCB J4, as shown in the previous figure (right).

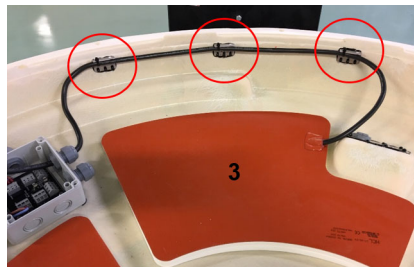
Braun = L

Blue = N

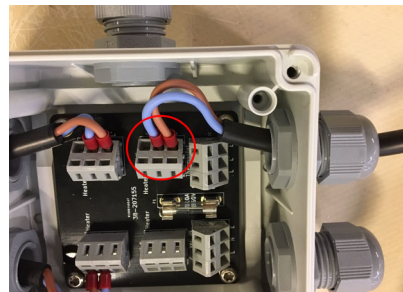
14. Fasten the two lock nuts firmly, so they hold the cables tight.



15. Run cable 3 as shown in the following figure and fasten it with 3 cable ties.



16. Cut cable 3 at approximately 7 cm and cut off approximately 4 cm of the outer isolation and 1 cm of isolation on the 2 inner wires.



17. Mount cable 3 in heater PCB J6, as shown in the previous figure (right).

Brown = L

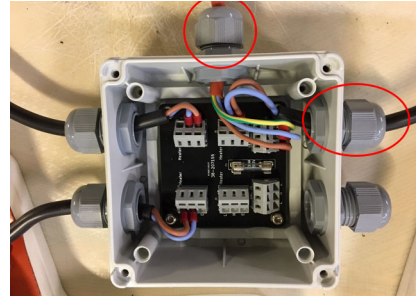
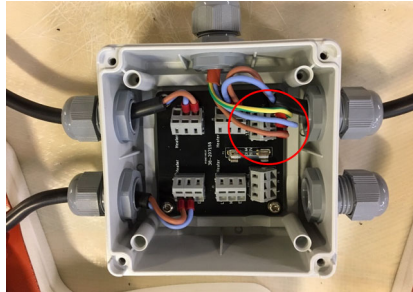
Blue = N

18. Mount the cable from the thermostat in heater PCB Thermostat J2.

Brown = L

Blue = L'

Yellow/Green = E



19. Fasten the two lock nuts firmly, so they hold the cables tight, as shown in the previous figure (right).

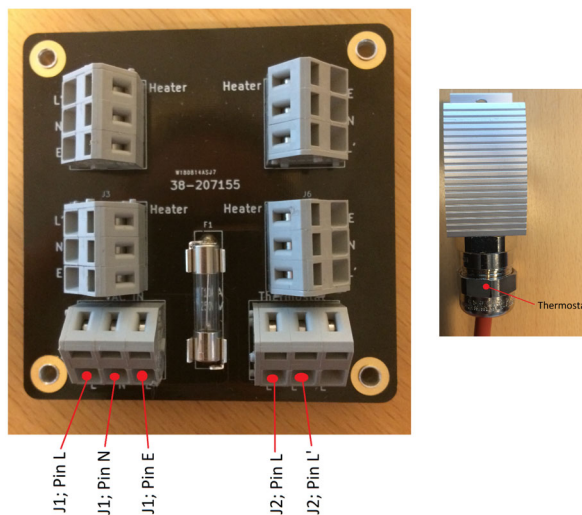
20. Arrange the cables nicely and tighten the cable ties.



1.5 Test of the connections

Use an Ohm meter and verify following Ohm limits:

| Pin | Pin | Ohm |
|-----------|------------|---------------|
| J1; Pin E | J2; Pin L | > 1 mΩ |
| J1; Pin E | J2; Pin L | > 1 mΩ |
| J1; Pin E | Thermostat | < 1 Ω |
| J1; Pin N | J2; Pin L | 60 Ω < > 85 Ω |
| J1; Pin L | J2; PIN L | < 1 Ω |
| J1; Pin L | J2; Pin L | > 1 mΩ |



1. Troubleshoot until the above test values are verified correctly.
 2. Put the lid on the connection box and fix it with the four screws.
- The heater has now been installed successfully in the antenna.



1.6 Technical specifications

| Item | Specification |
|-------------------------|--|
| Input power | 230 VAC, 4A, 50-60 Hz |
| Heater effect | 750W (3 x 250 Watt heating mats) |
| Temperature (ambient) | Operating: -55°C to +55°C, Storage: -40°C to +85°C |
| Sensor element | Thermostatic bi-metal, Lifetime: >100.000 cycles |
| Switch temperature | -15°C ($\pm 3^\circ\text{C}$ tolerance) |
| Switch temp. difference | 5°C ($\pm 3^\circ\text{C}$ tolerance) |
| Certifications | CE Compliant |

