KW APPARECCHI SCIENTIFICI

SERVICE MANUAL
ULTRA-LOW TEMPERATURE FREEZER

Digitally signed by Levința Alexandru
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This manual provides useful information for the reparation and maintenance of a KW ultra-low temperautre freezer.

The maintenance technician must have as a basic preparation the knowledge of low voltage systems and small refrigeration systems with hermetic compressors.

Before using this manual, carefully read the customer's user manual.

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Precautions to be taken in case of opening a circuit containing flammable gases

If case of extraordinary maintenance, if the circuit containing a gas classified as flammable needs to be opened, it is recommended to make sure that the intervention area is well ventilated by opening windows and openings to the outside: if this is not possible, use an Atex certified fan positioned to disperse any gas leaks.

It is recommended not to wear synthetic clothing but, on the contrary, flame retardant and antistatic, in order to avoid possible electrostatic discharges.

PPE for the maintenance

The clothing and the PPE (personal protective equipment) of those who work or carry out maintenance on the device / equipment must comply with the essential safety requirements in force in their country, as indicated in the EEC directive 89/656 and 89/868 relating to use of personal protective equipment.

Depending on the type of intervention it is recommended to use the appropriate PPE which are generally:

	Gloves against mechanical agents
	Protective glasses
	Safety shoes

1. INTERVENTIONS RELATED TO THE STRUCTURE

1.1. HANDLE

1.1.1. HANDLE REPLACEMENT

A HANDLE KIT must be ordered from the manufacturer.

You will recieve:

A- Handle assembly (door part)

B- Latch (cabinet part)

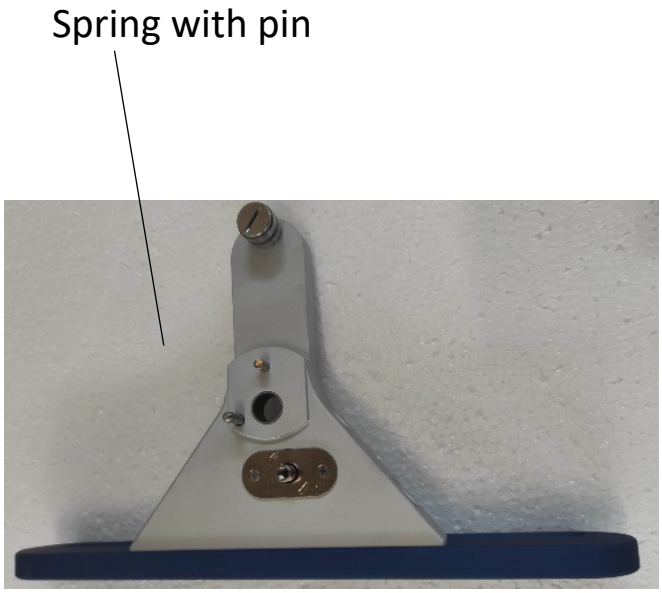
C- Keys

Follow these steps for the complete handle replacement of a vertical freezer:

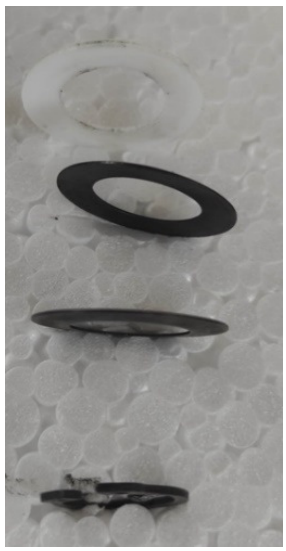
1. Open the door and remove the white plastic cap

2. Remove the sieger ring from the rotation pin with special tweezers

3. Remove the handle from the pin, being careful not to drop it, the sieger ring, the conical washers (positioned in opposition so as to have a spring effect), the 1 mm thick white Teflon washer and the spring with pin located on the inside of the handle.



Handle removed from the rotation pin



The 4 washers. From the top: Teflon washer, 2 conical washers, sieger ring

4. Remove the other two Teflon washers from the pin (1 mm and 1.5 mm)

5. 5. If the latch screwed onto the cabinet needs to be replaced, simply unscrew the 3 screws and replace it with the new latch using the same screws and holes

6. For the plate on the door: if it is firmly fixed on the door and has not moved, its position must be marked with a fine marker.
7. Separate the plate from the rest of the new handle assembly (a)
8. Screw on the plate respecting the mark made with the felt-tip pen.
9. If, on the other hand, the plate has moved and its position is no longer satisfactory, it is necessary to close the door and tighten the door to the structure by using a special clamp.
10. Loosely screw the 4 door plate screws to the door
11. Insert the handle into the pin of the plate and tighten the clamp until the pawl of the handle enters perfectly at the end of the stroke inside the latch. There should be 1 cm between the metal frame that holds the gasket and the door.

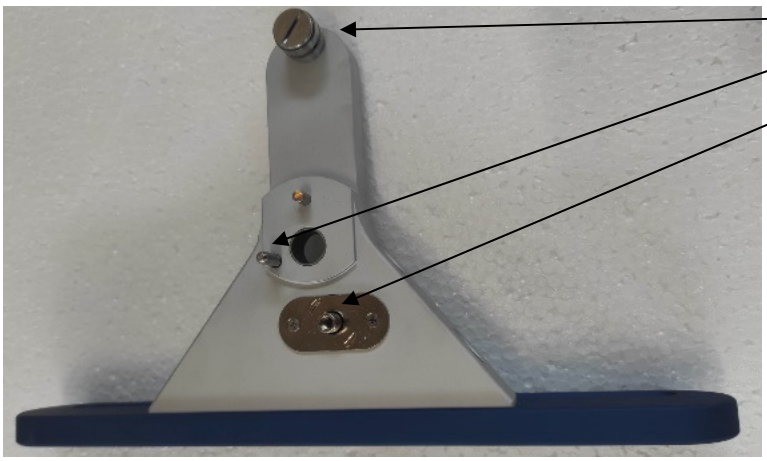
12. Screw the 2 screws of the door plate

13. Remove the handle from the pin and tighten the other two screws as well. Insert the two (1 and 1.5 mm) Teflon washers on the pin

14. Insert the handle into the pin being careful that the pin with the spring are correctly positioned and fix it with the washers in the right sequence, first the Teflon one, then the two conics and finally fix everything with the sieger ring with the help of tweezers and a small screwdriver.
15. Remove the clamp
16. Replace the white plastic cap

1.1.2. SPARE PART REPLACEMENT

IF ONE OF THE DETAILS INDICATED IN THE FIGURE BELOW SHOULD BE REPLACED, IT IS POSSIBLE TO ORDER ONLY THE SINGLE PIECE AND REPLACE IT BY FOLLOWING THE APPROPRIATE STEPS RELATING TO DISASSEMBLY OF THE HANDLE



a- Pawl
b- Spring with pin
c- Door lock

1.2. HINGE - REPLACEMENT

Generally the door is fixed with 3 hinges: to replace one, disassemble it and screw a new hinge back on.
With the tip of a screwdriver, remove the two hinge screw covers.


Be careful to reassemble the hinge with the sieger ring on the top, as shown in the picture

1.3. COUNTERDOOR

1.3.1. REPLACEMENT

The counter doors are simply fixed to the internal casing by means of 2 hinges, each screwed with 2 screws. Therefore, to replace a counter door, unscrew the 4 screws of the hinges and screw the new counter door, which will already be complete with hinges, onto the same inserts.

1.3.2. INSERT M4 REPLACEMENT

Should one of the M4 inserts on which the hinges are fixed be damaged, remove the old insert by using a 6 mm drill bit and replace a new M4 stainless steel insert without head.

1.3.3. COUNTERDOOR DOES NOT CLOSE

If the counter door does not close properly, the 'L' bracket on which the lock hooks will have to be replaced with a new bracket with a longer or shorter tongue, depending on whether the lock does not hook or, on the contrary, the counter door interfere with the relay itself.

1.4. WHEELS - REPLACEMENT

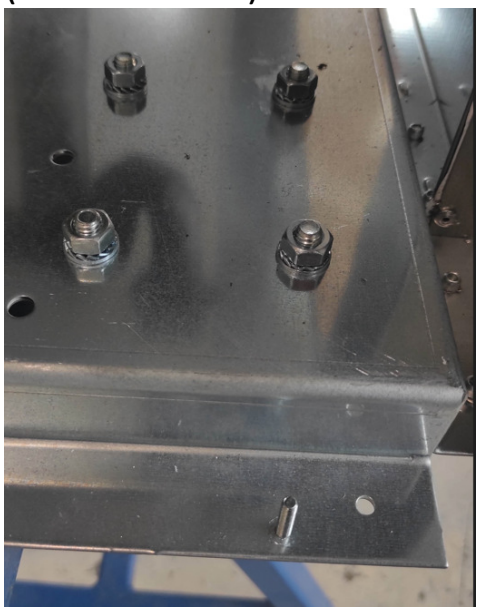
To replace a wheel, a pallet truck that allows to slightly lift the device a few centimeters from the ground is needed.

1.4.1. MEDICAL DEVICE

If the device is a medical device, it will be provided with wheels fixed directly on the inserts, so unscrew the 4 bolts which fix the wheel support to the machine base that are screwed from the bottom up.

1.4.2. NON MEDICAL DEVICE

If, on the other hand, the freezer is not a medical device, the wheels are fixed with 4 bolt-nut pairs, so two tools are required to unscrew and hold the nuts in place. The nuts are however easily accessible since the engine compartment is easily accessible from all four sides of the freezer by removing the appropriate panels which are either screwed or interlocking (the front one).



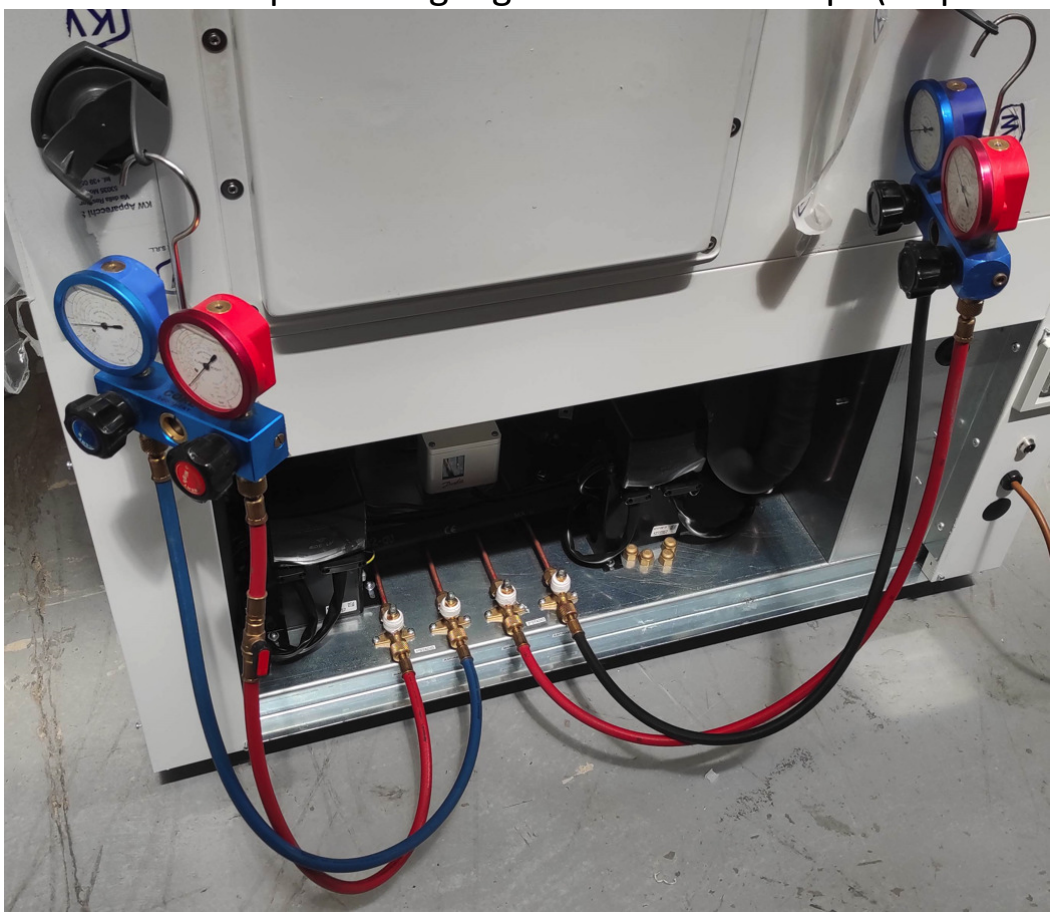
2. REFRIGERATION CIRCUIT

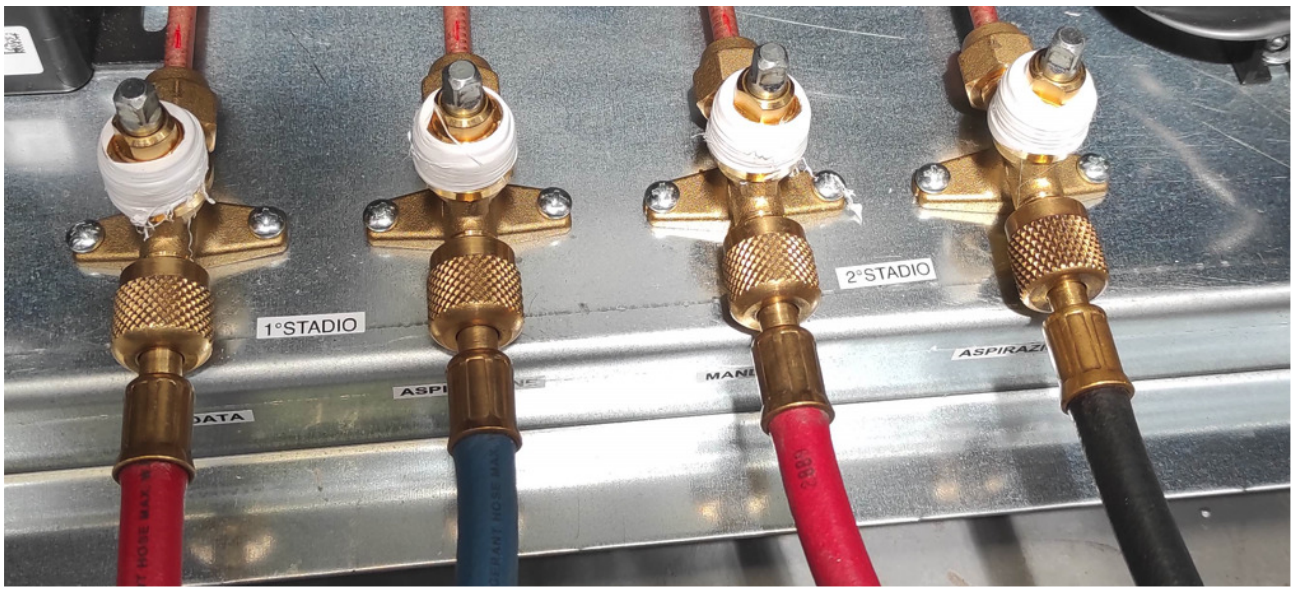
3.1. COMPRESSOR

3.1.1. REPLACEMENT

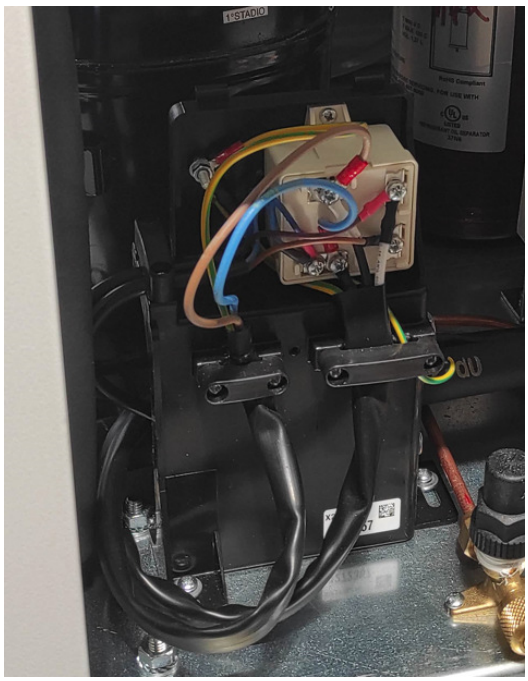
To replace a compressor, the following steps must be followed:

1- Connect the pressure gauges to the circuit taps (respect the labels)





2- If the system contains gas, it must be completely discharged.
a- If the residual gas is environmental impact type (HFC), a recovery pump must be connected to the system and the gas must be recovered inside a special cylinder.
b- If the gas is a HC flammable type, it can be discharged with all the safety precautions (no open flames, no heat sources, use of an Atex fan to disperse the gas, etc.)
Disconnect the recovery pump and connect a vacuum pump for a few minutes to eliminate any residual gas.
For the same reason it is advisable to inject a little nitrogen afterwards.
3- Disconnect the three wires + ground from the compressor that connect it to the equipment box
4- Open the equipment box by removing the screw and disconnect the 3 power supply wires



5- Disassemble the equipment box by unscrewing the two screws
6- Unsolder the 3 tubes of the compressor
7- Unscrew the 4 compressor bolts with a 13 wrench

8- Remove the old compressor
9- Apply the rubber feet to the new compressor and fix it to the base with the 4 bolts
10- Weld the 3 compressor tubes one at a time

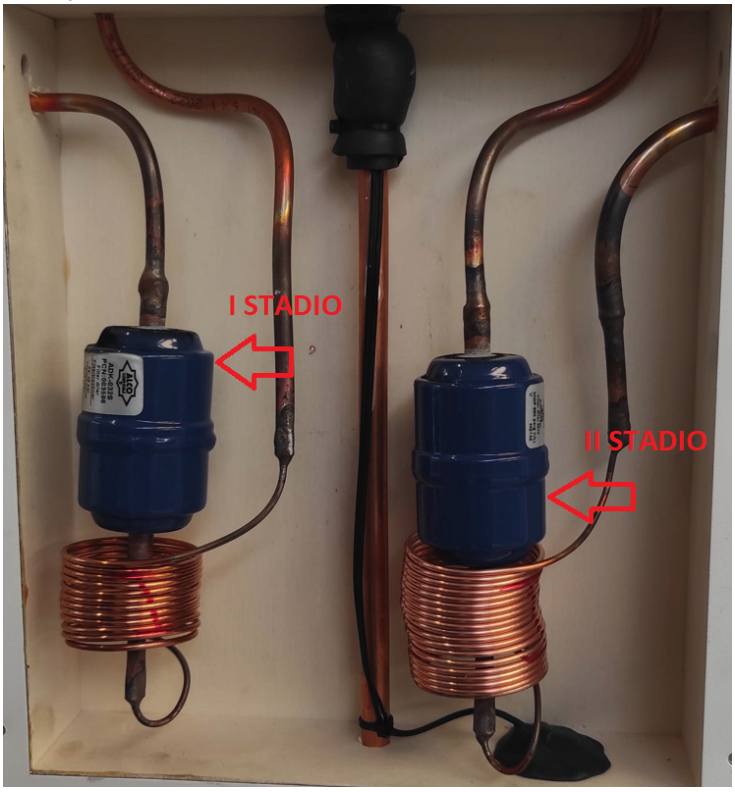
11- Connect a double-stage vacuum pump powerful enough for a couple of hours
12- During the vacuum phase it is possible to connect the new equipment to the compressor
13- Enter the type and quantity of gas declared on the label
14- After charging, check if there is any gas leaks from the three welds just made and from the rest of the circuit
15- Arrange the insulation of the return pipe

3.2. FILTER AND CAPILLRY

3.2.1. REPLACEMENT

1- Unscrew the 12 screws holding the filter cover + capillary on the back of the freezer

2- Empty the circuit following the instructions of "COMPRESSOR REPLACEMENT"
3- Desolder filter + capillary to be replaced and weld the new assembly (the first stage is on the left, the second on the right looking at the box)



4- Vacuum and charge again, check if there is any leaks and (if not) close the capillary box

3.3. FAN

3.3.1. REPLACEMENT

1- Remove the right panel of the engine compartment (if the fan to be replaced is the one on the left, also remove the rear grill)
2- Disconnect the connectors of the fan

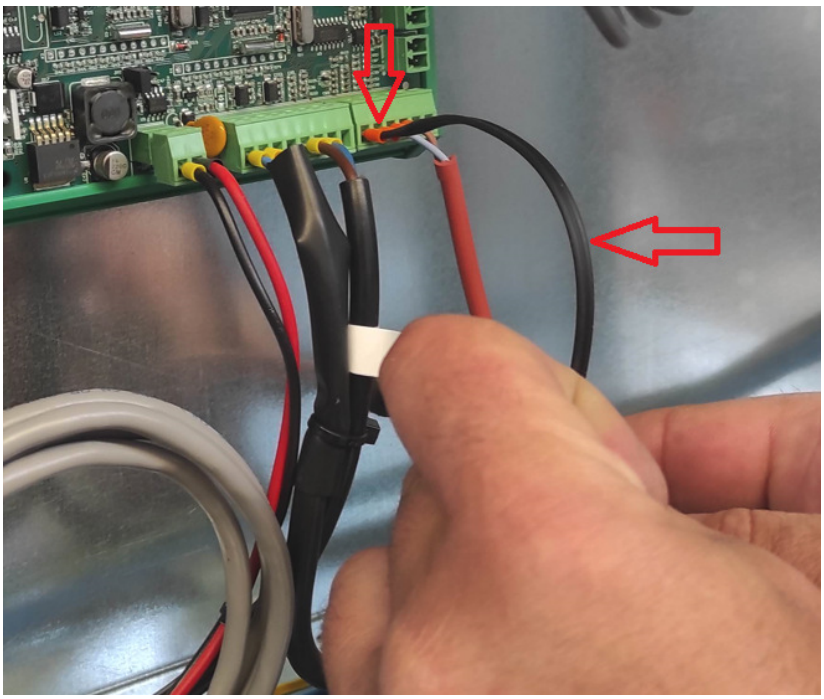
3- Cut the cables that reach the male connector
4- Unscrew the 4 screws of the mouthpiece that holds the fan to be replaced
5- Remove the mouthpiece and fan together
6- Couple the cables of the new fan with those of the second and connect them to the male connector
7- Insert the new part and fix the mouthpiece with the 4 screws
8- For this activity with limited space, especially on smaller models, it is advisable to equip yourself with both a "nano" screwdriver and a very long screwdriver.

3.4. SYSTEM PROBE

3.4.1. REPLACEMENT

1- The system probe is an IP64 NTC positioned inside the capillary box
2- Open the box by unscrewing the 12 screws
3- Cut the two clamps that hold the airgel insulation and the third that holds the probe wire

4- Remove the rear and left side grill to access the electronic board
5- Cut the clamp that holds the probe cable inside the engine compartment
6- Remove the black putty
7- Disconnect the probe from the board connecter

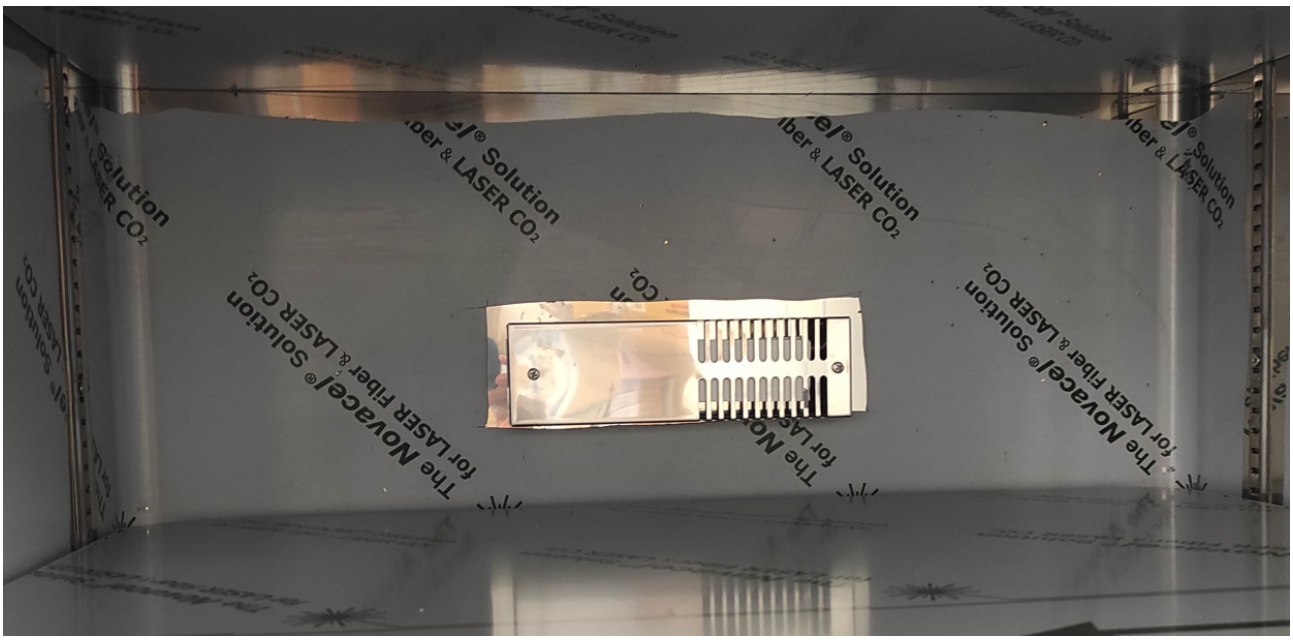


8- Replace the system probe by restoring the clamps and the filler
9- Couple the head of the new probe well with the copper tube, also use conductive paste and restore the airgel insulation and the clamps

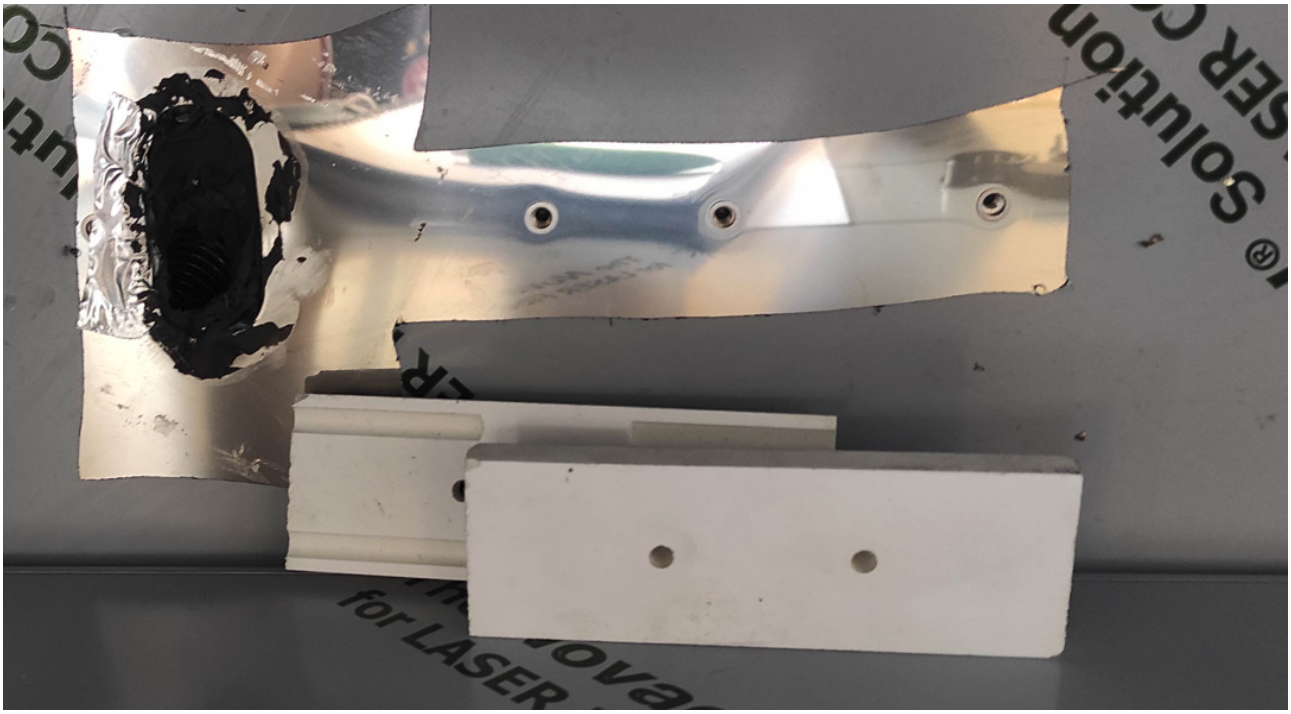
3.5. INTERNAL PROBES

3.5.1. REPLACEMENT

1- Inside a freezer there are generally two PT100 probes, one that manages the compressor and the second one that manages the controller and its value is displayed on the screen.
2- Unscrew the two screws and remove the probe cover box.



3- Loosen the two screws that hold the two Teflon shells in order to easily remove the two probes

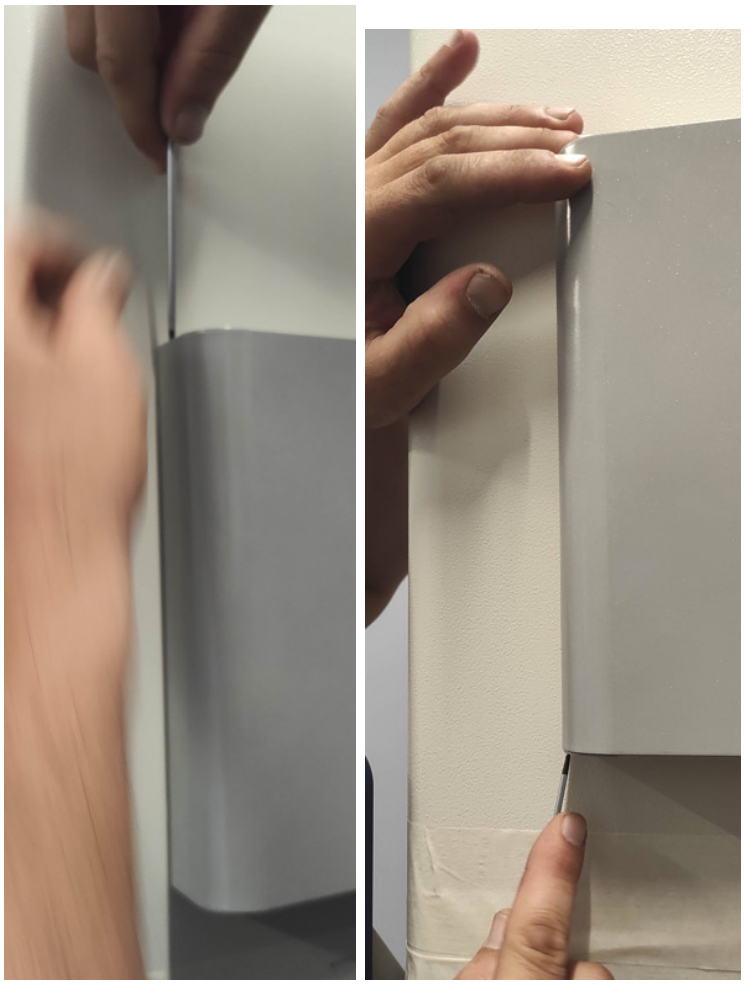


4- Tape the wires of the new probe to the head of the old one
5- Disconnect the old probe from the control board
6- Gently pull the disconnected probe until the tape reaches the height of the electronic board
7- Remove the tape, eliminate the old probe and connect the new one to the board
8- Reassemble the probe + Teflon and tighten the screws
9- Screw the probe cover box back on

3.6. CONTROLLER

3.6.1. CONTROLLER DISASSEMBLE AND RIASSEMBLE

1- With a slotted screwdriver that is neither too small nor too large, force between the support and the front so as to make a click both above and below.



The two tabs, one above and one below, must be released from their position (see following photo)

2- In this way the panel will easily detach from the support
3- To restore it, simply bring the panel back to the support and push it firmly until you hear a "click" of hooking both above and below