RU|MED®
Rubarth Apparate GmbH

Service Manual

Test and Simulation Equipment

for quality control,
research and production

Premium-Line

Made in Germany

Rev. 0.8

Table of Contents

1 Preface

1.1 Notes to the Document

This service manual describes service procedures. This service manual is intended for service employees, who had been authorized by Rubarth Apparate GmbH to execute maintenance and repair.

The described work applies to the following equipment:

- Test and Simulation Equipment of the Premium-Line

The photographs in this manual might deviate from the conditions at your unit.

1.2 Symbols in the Text

The unit is designed according to the state of the art ensuring operating safety. Nevertheless, dangers might arise due the construction, which cannot be excluded.

The following expressions, which are used in this service manual, shall indicate dangers when handling the unit or they shall give information for unit handling.

DANGER

Warning of injuries with fatal consequences.
Non-observance of the warning might result in severe health damages including death.
➔ The arrow indicates a protective measure you should take to avert the danger.

WARNING

Warning of severe injury.
Non-observance of the warning might result in severe health damages.
➔ The arrow indicates a protective measure you should take to avert the danger.

CAUTION

Warning of injury.
Non-observance of the warning might result in minor and moderate health damages.
➔ The arrow indicates a protective measure you should take to avert the danger.

NOTE

Warning of property damage.
Non-observance of the warning might result in considerable damage of the unit or of its environment.
➔ The arrow indicates a protective measure you should take to avert the danger.

HINT
Further useful information.

Furthermore, this operating manual contains safety signs according to DIN 4844 and BGV A8 (Implementation of the EC Regulation 2006/42/EC).

2 Information Concerning the Unit

2.1 Nameplate

2.2 Overview

Item	Designation
1	Control – CONTROL2015 touch
2	USB socket
3	Recirculating air cycle
4	Test room
5	Test room socket (option)
6	Heated condensate collecting pan (option)
7	Condensate collecting pan (option)
8	Feet, adjustable in height
9	Steering rollers (option)
10	Tubular port with cover
11	Electromagnetic door release (option)
12	Ethernet socket (rear)
13	Component compartment

3 Safety

3.1 General Safety Instructions

- By means of this equipment, health-endangering or other dangerous samples can be tested.
  Prior to starting the service work, the service employee must ensure, that no dangers are arising from the unit, meaning, for instance, that
  - the samples had been removed from the equipment.
  - The unit had been decontaminated and disinfected etc.
- Depending on the execution, temperatures from -20 °C to +80 °C might be produced in the unit.
  Prior to execution of service tasks, the service employee must ensure, that the temperature in the unit is within a range avoiding any risk of injury.
- When working at electrical components of the unit, observe the safety regulations for electrical engineering:
  - Disconnect
  - Secure the unit against restart
  - Ensure voltage-free condition
  - Earth and short-circuit
  - Adjacent live parts must be covered or made inaccessible

3.2 Authorized Service Employees

Each service employee, who executes service work on this equipment:

- must be skilled appropriately according to the assigned work (knowledge in mechanical engineering and electrical engineering).
- Should be familiar with the regulations for work safety and accident prevention.
- Should have been instructed in handling the unit.
- Should wear personal protective clothing (safety glasses, tight-fitting protective clothing, safety shoes, safety gloves, respirator mask etc.), which is suitable for the executed work.
- Must have read and understood the service manual.

4 Service Tasks

4.1 Replacing the Door Frame Heater

DANGER

Warning of dangerous electrical voltage!
When working with live parts, dangerous electric shocks are possible.
➔ Withdraw the mains plug prior to the replacement of the door frame heater.

Required Tools/Material:

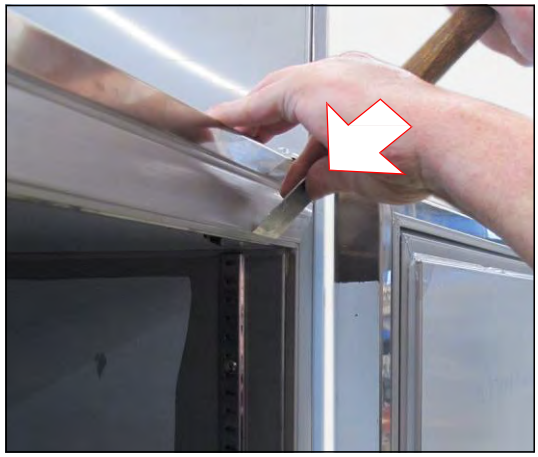
- Metal scraper
- Screwdriver, size: 0.6 × 9.5
- Scissors
- Felt pen
- Crimp connector 1 mm^2
- Crimper
- Insulating tape
- Tape measure
- Sealant: Teroson MS 930

How to replace the door frame heater:

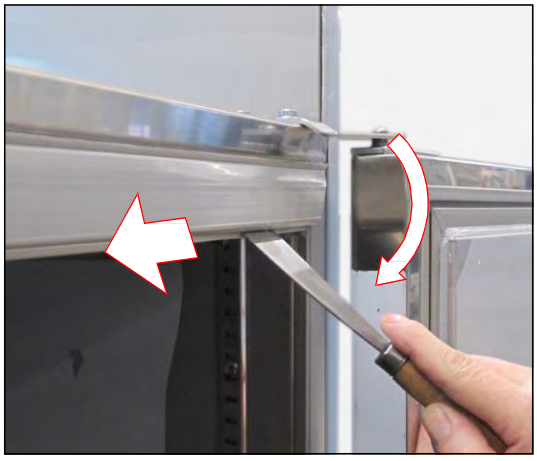
1. Remove the cover, *see page 72*.

Removing the heater:

2. Push a small tool (such as a metal scraper) into the lower joint of the outer door frame profile.

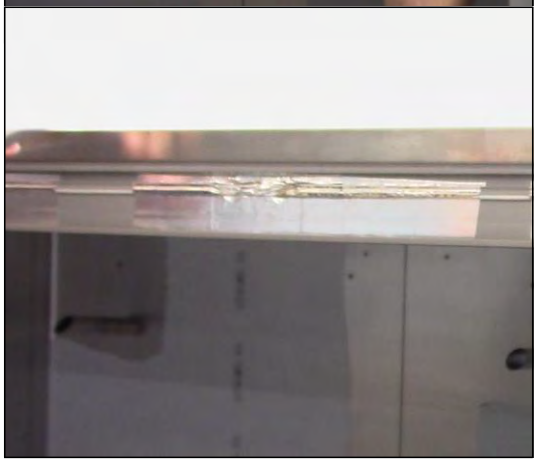


3. Lever out the door frame profile.
4. Pull the tool laterally along the joint to loosen a larger area of the door frame profile.

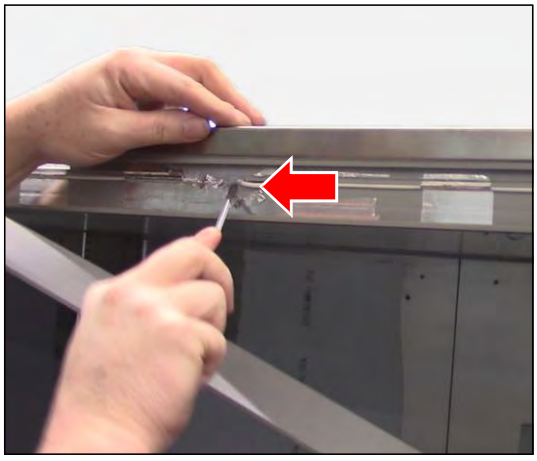


5. Use a further tool to loosen the door frame profile completely and remove it.
6. Remove also the door frame profile on both lower sides.

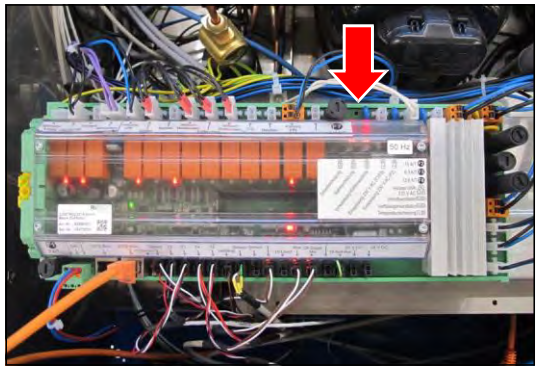
7. The heater, which is fastened with aluminium adhesive tape, is located below the door frame profile.
8. Remove the aluminium adhesive tape.



9. Remove the silicone seal of the heater lead-through using a suitable tool.



10. Cut the heater cable in the component compartment with sufficient distance to the plug.



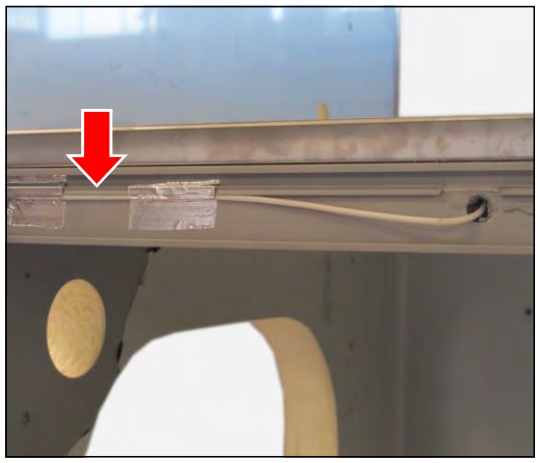
11. Cut the heater cable of the new heater in sufficient length and connect it to the heater cable of the old heater using a crimp connector.

12. Fasten the new heater at the end of the old heater in the component compartment using insulating tape.

13. Withdraw the old heater from the heater lead-through, while inserting the new heater, until both ends of the new heater are placed in the component compartment.

The removal of the heater is finished.

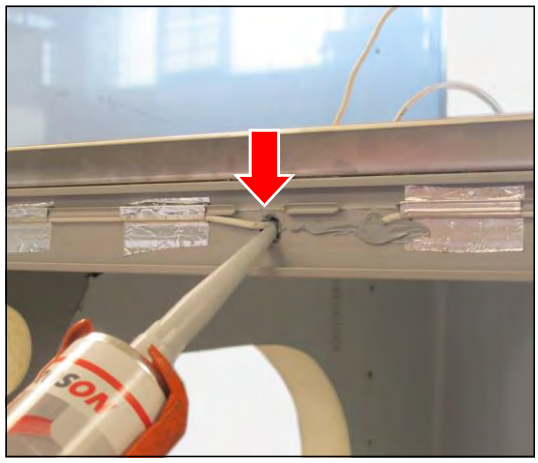
Installing the new heater:



14. Mark the centre of the new heater.

15. Place the marking centrically at the lower side of the unit and install the heater.

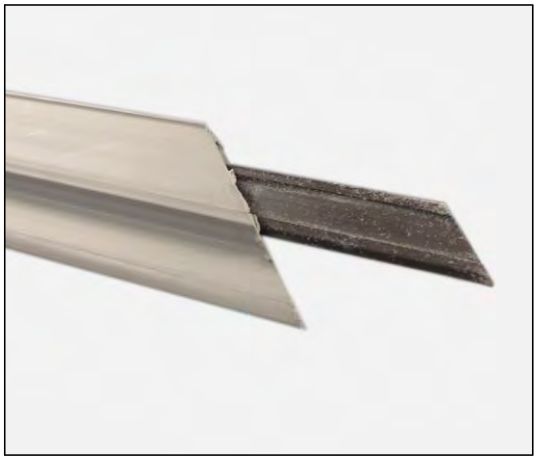
16. Fasten the heater all around in the groove on the outside of the door frame using aluminium adhesive tape.



17. Seal the heater lead-through with sealant Teroson MS 930.

Fastening the door frame profiles:

18. Ensure, that the magnetic strips exist in all door frame profiles.
The groove of the magnetic strip must point to the inside of the door frame profile.



19. Insert the outside of the door frame profile into the groove.
Start from one corner.

20. If required, push the door frame profile laterally into position.

21. Push down the inside of the door frame profile.

HINT
If required for fastening the lateral door frame profiles, pull the upper side of the magnetic strip slightly out to avoid that it will slip off the door frame profile to below.
Fasten the lower end of the door frame profile and push the magnetic strip again completely into the door frame profile.

The replacement of the heater is finished.

4.2 Replacing the Door Seal

Required Tools/Material:

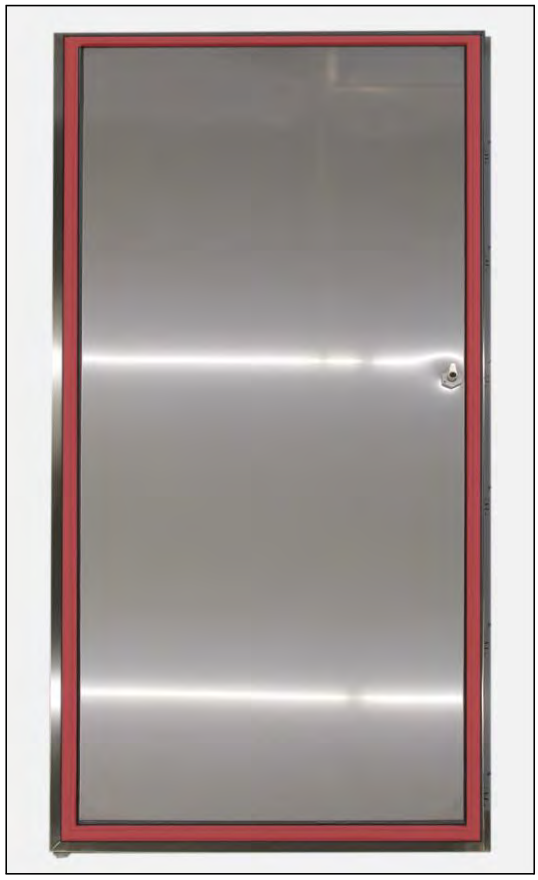
- Extra-long slotted screwdriver, size: 1.0 x 6.5 x 300
- Open-ended spanner/ratchet, size: 10
- Open-ended spanner, grinded to 4.0 mm thickness, size: 13

DANGER

Warning of dangerous electrical voltage!
When working with live parts, dangerous electric shocks are possible.
➔ Withdraw the mains plug prior to the replacement of the door seal.

How to replace the door seal:

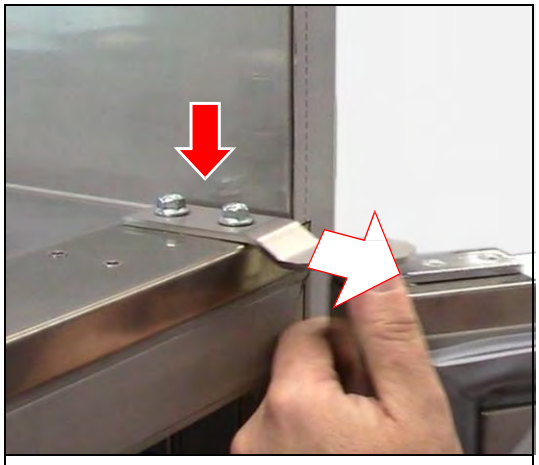
1. Remove the cover, *see page 72*.
2. Pull off the old seal.
3. Check the sealing surface at the groove of the door and clean it, if required.



4. Check the upper and lower door adjuster for being positioned completely to outside.

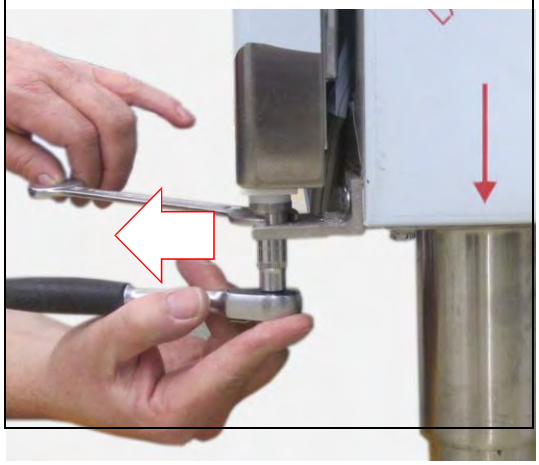
Position the upper and lower door adjuster completely to outside.

5. Loosen both screws of the upper door adjuster.
6. Push the door adjuster completely to outside.
7. Tighten both screws of the upper door adjuster.

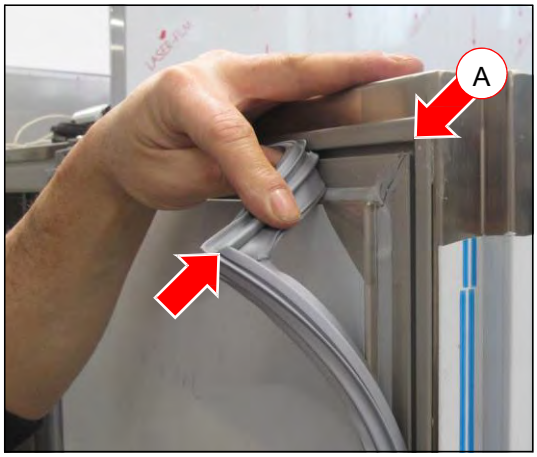


HINT
For loosening of the lower door adjuster, a small open-ended spanner is required.

8. Lock using the small open-ended spanner.
9. Loosen the screw of the lower door adjuster.
10. Push the door adjuster completely to outside.
11. Tighten the screw of the lower door adjuster.

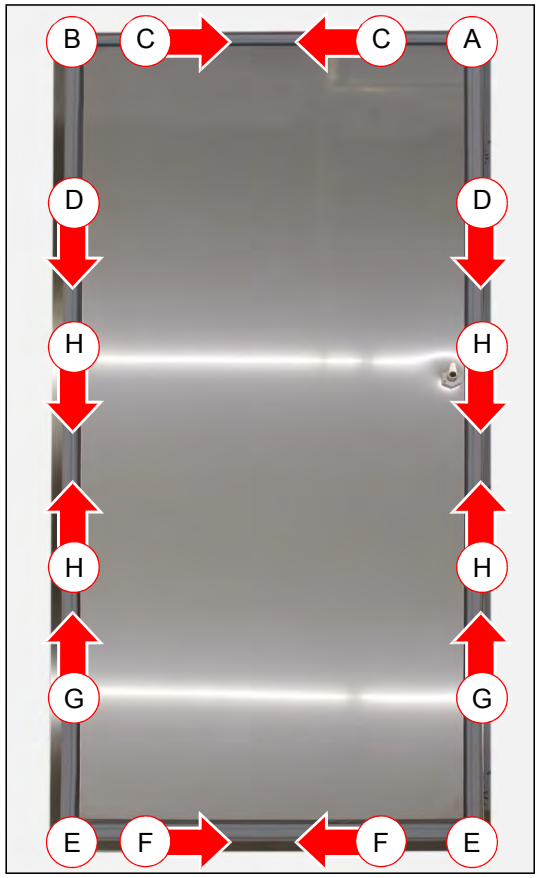


12. Put the new seal on one upper corner (A) and push the tongue of the seal into the groove of the door.



HINT
If necessary, the door seal can be slightly compressed evenly along the largest possible distance.
Don't extend the door seal!

13. Push the opposite upper corner (B) of the seal into the groove of the door.
14. Fasten the door seal evenly and completely at the top left and right (C).
15. Fasten one third of the door seal from the top to the bottom, starting from the upper edges (D).
16. Push the lower edges of the door seal into the groove of the door (E).
17. Fasten the door seal evenly and completely at the bottom left and right (F).
18. Fasten one third of the door seal from the bottom to the top, starting from the lower edges (D).
19. Fasten the central third of the door seal on both sides from the top to the bottom evenly and completely (H).
20. Check the correct seat of the door seal all around.

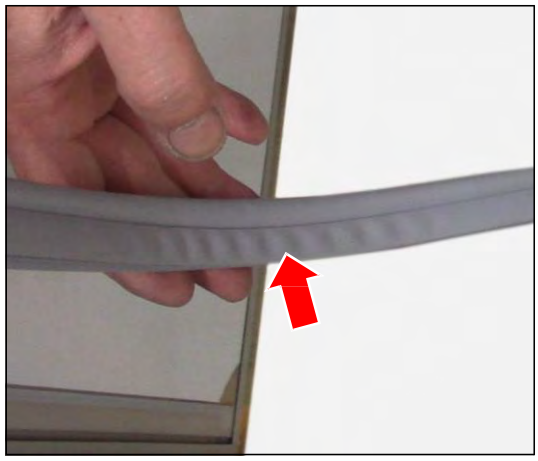


21. Close the door and the unit for approx. 60 minutes and heat up to 50 °C.

- The ripples in the door seal disappear.
- The door seal is correctly inserted.

22. Install the cover, *see page 73*.

The replacement of the door seal is finished.



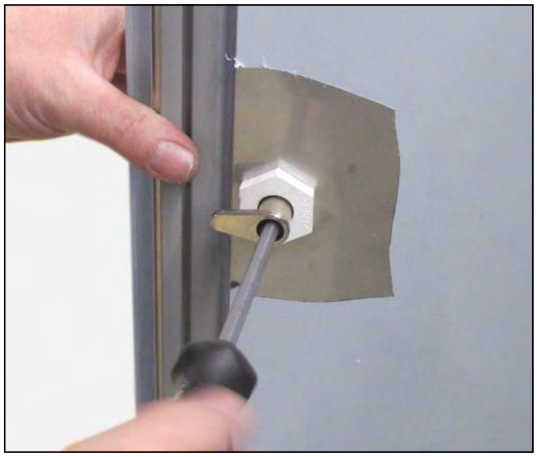
4.3 Replacing the Door Lock

Required Tools/Material:

- Cross-point screwdriver, size: 1 × 80
- Small pipe wrench

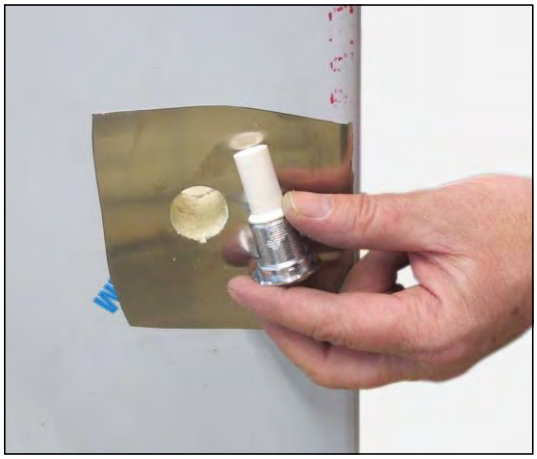
How to replace the door lock: Removing the door lock:

1. Open the door.
2. Loosen the screwing of the rotary lock.



3. Use the pipe wrench to loosen and remove the screwing sleeve of the lock.

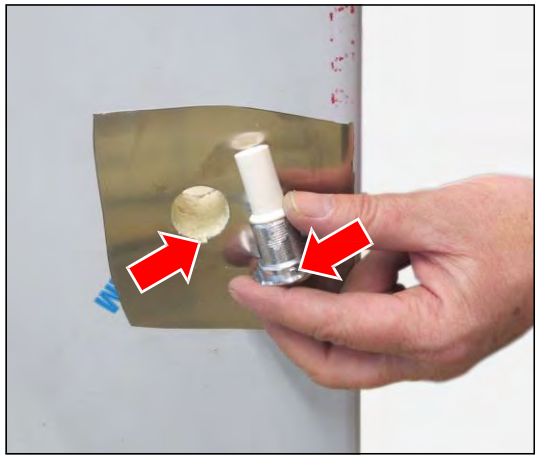
4. Remove the locking cylinder to the front. Removal of the door lock is finished.



Installing the door lock:

5. Insert the new locking cylinder from the front.

HINT
The nose at the locking cylinder must fit into the recess of the bore.
The recess might be located on the top or on the bottom, depending on the execution of the door (left-hinged or right-hinged).



6. Insert the screwing sleeve from the inside of the door.

7. Use a pipe wrench to tighten the screwing sleeve.

8. Position the key in the lock horizontally.

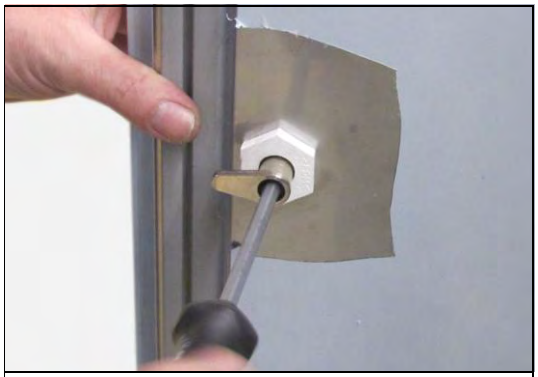
9. Insert the rotary lock with the tongue to the seal and screw it down.

10. Unlock the door.

- The tongue points to above.

The replacement of the door lock

is finished.



4.4 Replacing the Door

Required Tools/Material:

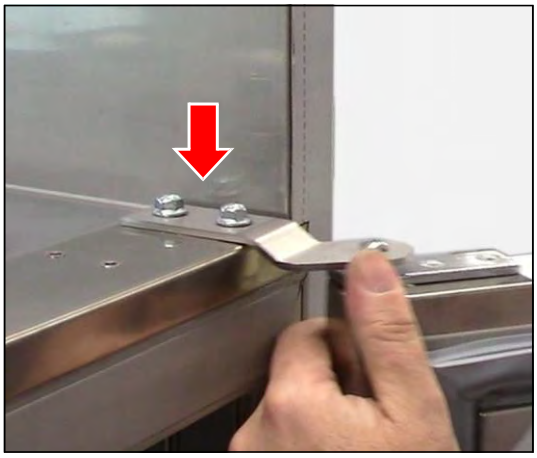
- Extra-long slotted screwdriver, size: 1 x 6.5 x 300
- Open-ended spanner/ratchet, size: 10
- Open-ended spanner, grinded to 4 mm thickness, size: 13

DANGER

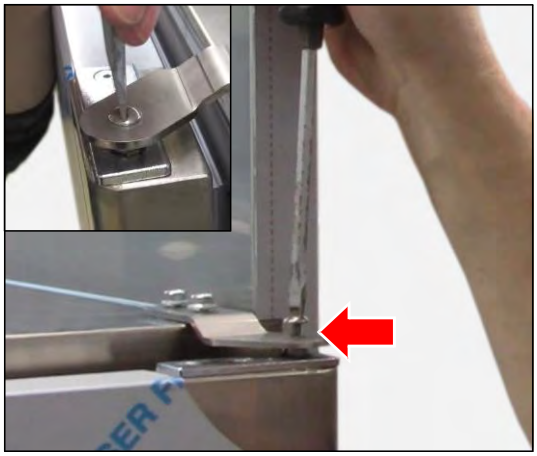
Warning of dangerous electrical voltage!
When working with live parts, dangerous electric shocks are possible.
➔ Withdraw the mains plug prior to the replacement of the door.

How to replace the door:

1. Remove the cover, *see page 72*.
2. Slightly loosen both screws of the upper door adjuster.

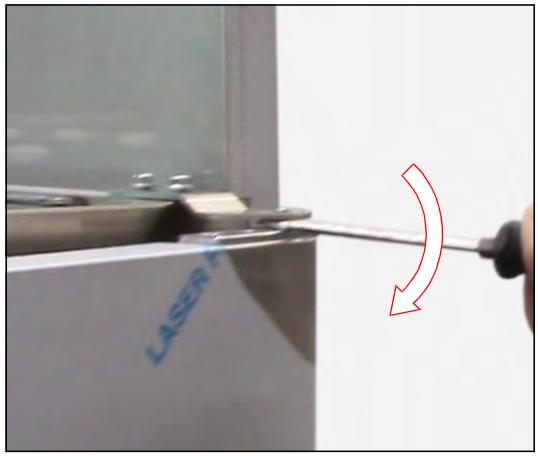


3. Loosen and remove the screw of the upper door adjuster.



4. Slightly open the door and hold it.
5. Take a screwdriver and lever the upper fixing device over the square fastening bolt.
6. Lift the door from the lower fastening bolt.

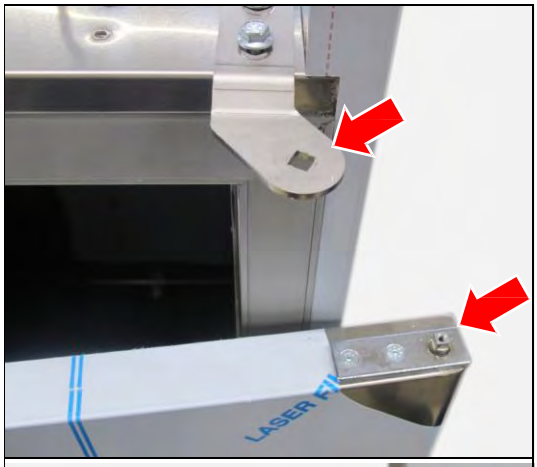
The removal of the door is finished.



7. Place the new door on the lower fastening bolt.
8. Move the door into position, so that the square fastening bolt is located below the support of the fixing device.

CAUTION

Risk of Injury!
When turning the square fastening bolt, a spring is tensioned. The used tool might be slung off due to the spring energy resulting in personal injury or property damage.
➔ Always hold the tool when working.



9. Turn the square fastening bolt clockwise until it fits into the support.
   When turning the bolt, a spring is tensioned, which effects, that the door will be closed at an aperture angle of up to 90 °.
10. Check, if the door closes automatically at an aperture angle, which is less than 90 °.

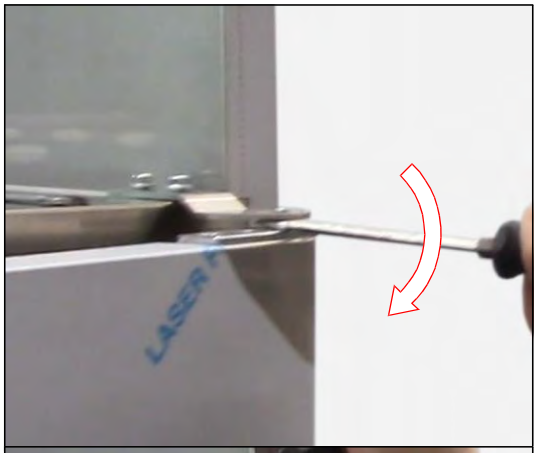
If yes: Proceed with **14.**

If no:

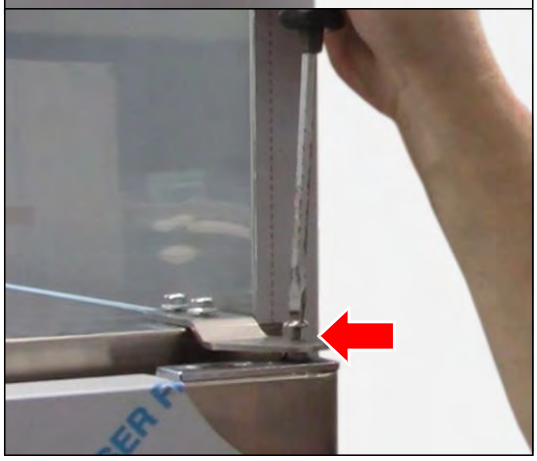
11. Take a screwdriver and lever the upper fixing device over the square fastening bolt.

12. Turn the square fastening bolt clockwise until the spring pressure is relieved with a clicking noise.

13. Repeat the procedure from step **8**.



14. Insert the screw of the upper door fastening device and tighten it.



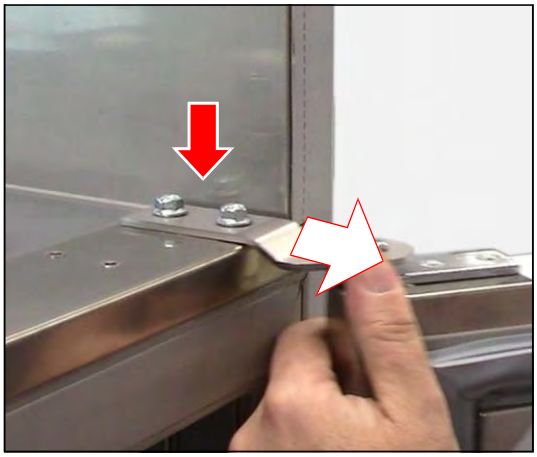
15. Push the door adjuster completely to outside.

16. Tighten both screws of the upper door adjuster.

17. Check the seat of the door seal.

18. Install the cover, *see page 73*.

The replacement of the door is finished.



4.5 Replacing the Fan

DANGER

Warning of dangerous electrical voltage!
When working with live parts, dangerous electric shocks are possible.
➔ Withdraw the mains plug prior to the replacement of the fan.

CAUTION

Risk of burning at the finned tubular heater!
When working at the fan, observe that there is the risk of burning at the hot fins of the finned tubular heater.
➔ Wait, until the finned tubular heater is cooled down before working.

CAUTION

Risk of injury at the fin package of the evaporator and at the finned tubular heater!
When working at the fan, observe that there is the risk of cut injury of the hands due to the sharp-edged fins of the evaporator fin package and the finned tubular heater.
➔ Always work with safety gloves.
➔ Cover dangerous areas with suitable material.

NOTE

Property damage due to use of non-original spare parts!
If a standard fan with capacitor is installed on the board as spare part, property damage at the unit might be resulting.
➔ Only install the original fan being modified for RUMED.

Required Tools/Material:

- Suitable base protecting the test room floor, if it shall be stepped on it.
- Open-ended spanner; size: 7
- Socket spanner, size: 8
- Screwdriver, size: 1.0 × 5.5
- Torx wrench, size: IP 20
- Insulating tape
- Tape measure, folding rule
- Side cutter
- Crimping pliers for end sleeves
- Wire end sleeves, size: _

How to replace the fan:

Removing the fan:

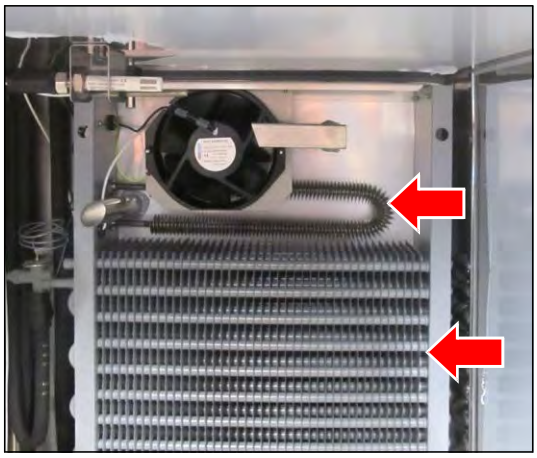
1. Remove the cover, *see page 72*.
2. Remove the back panel, *see page 74*.

CAUTION

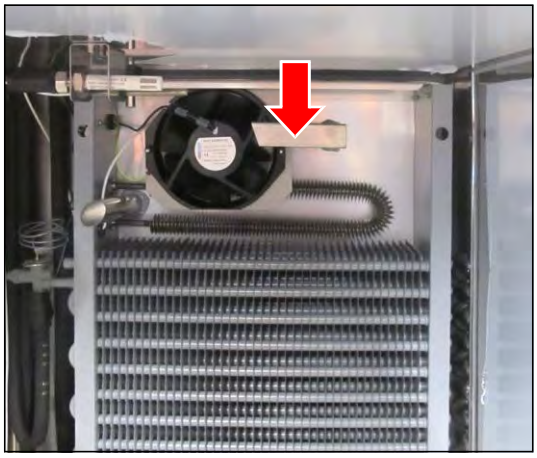
Risk of injury at the fin package of the evaporator and at the finned tubular heater!

When working at the fan, observe that there is the risk of cut injury of the hands due to the sharp-edged fins of the evaporator fin package and the finned tubular heater.

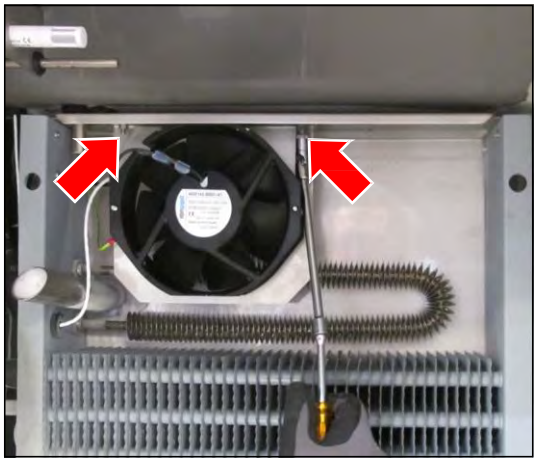
➔ Always work with safety gloves.
➔ Cover dangerous areas with suitable material.



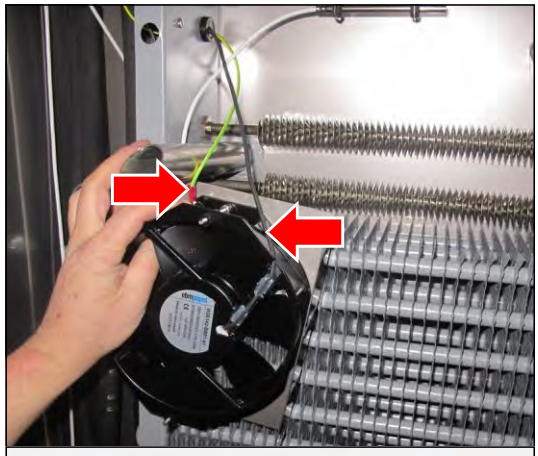
3. Withdraw the Pitot tube of the ultrasonic humidifier.
(With option ultrasonic humidification.)



4. Loosen the two screw nuts (with spring washer and washer) at the fan support plate.



5. Loosen the earth cable from the fan using the Torx key.
6. Cut the grey cable close to the fan.
7. Remove the fan.



8. Remove the two spacer bolts. (With option ultrasonic humidification.)

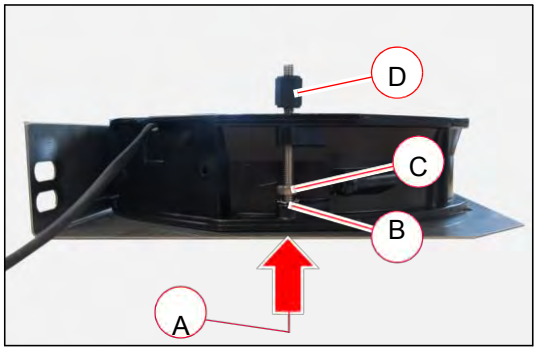
9. Loosen the two fastening screws at the fan and remove them.
   Socket spanner / open-ended spanner; size: 7
10. Separate the fan from the support plate.
    Removal of the fan is finished.

Installing the new fan:

11. Place the fan on the support plate with the label to the front.

12. Screw the fan to the support plate (2 screws).

- Screw (A)
- Spring washer (B)
- Screw nut (C)
- Spacer bolt (D)
  (With option ultrasonic humidification.)

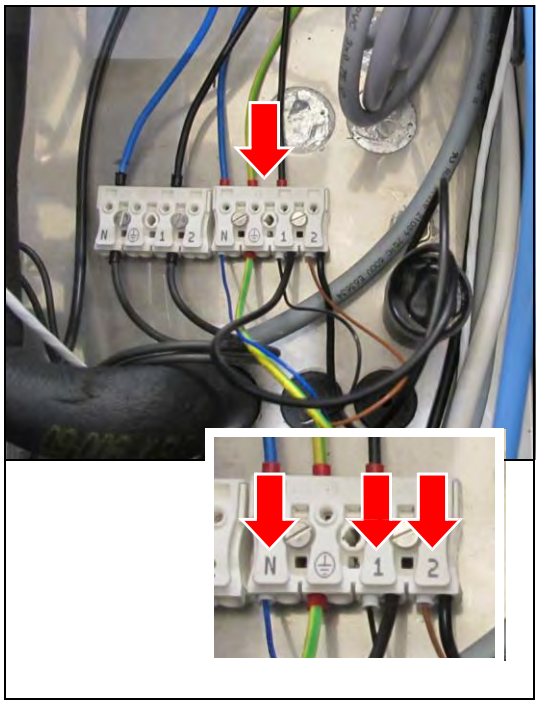


13. Fasten the earth cable to the new fan using the Torx key.

14. Fasten the cable of the new fan at the cable of the old fan using insulting tape.

15. Loosen the three cables of the old fan from the clamping block on the left rear in the component compartment.
(Press the labelled keys and withdraw the cable.)

- Thin blue cable
- Thin black cable
- Thin brown cable



16. From the component compartment, draw the new cable together with the cable of the old fan through the cable lead-throughs.

NOTE

The original cable of the fan must be connected to the clamping unit in the component compartment. A connection of the old cable to the new cable in the test room is not admissible.

17. Cut the three cables of the new fan to length, remove the insulation and fit the wire end sleeves.

18. Connect the three new cables to the clamping block.
(Press the labelled keys and insert the cables.)

- Terminal "N" Thin blue cable
- Terminal "1“ Thin black cable
- Terminal "2": Thin brown cable

NOTE

Always replace the fan together with the capacitor.

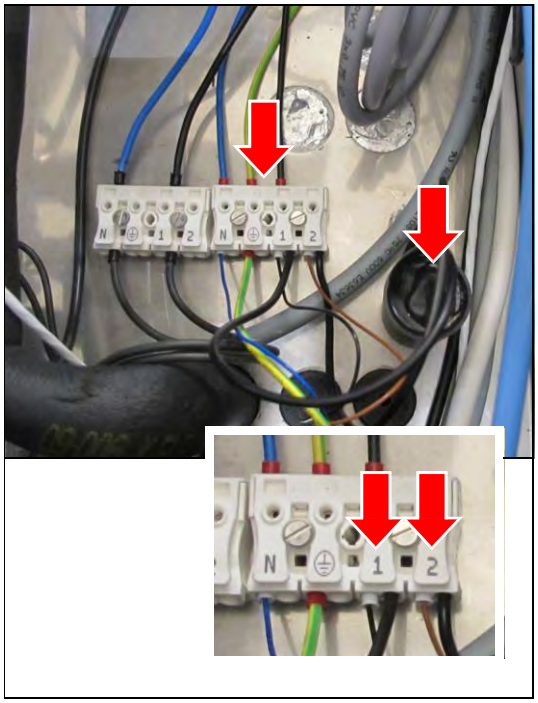
19. Loosen the two black cables of the old fan capacitor from the clamping block. (Press the labelled keys and withdraw the cable.)

20. Unscrew the old capacitor by turning it anticlockwise and remove it.

21. Screw down the new capacitor.

22. Connect the two cables of the new capacitor.
(Press the labelled keys and insert the cables.)

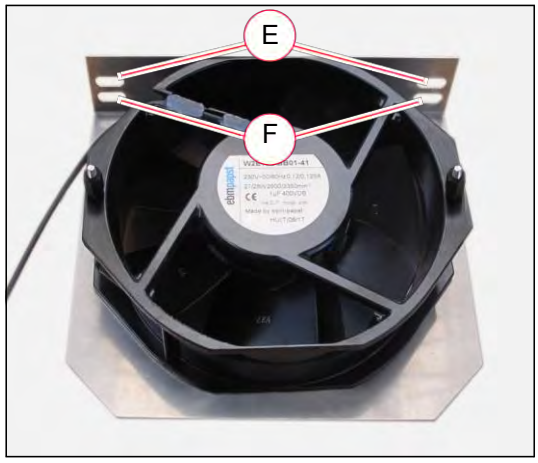
- Terminal "1" One black cable
- Terminal "2" One black cable



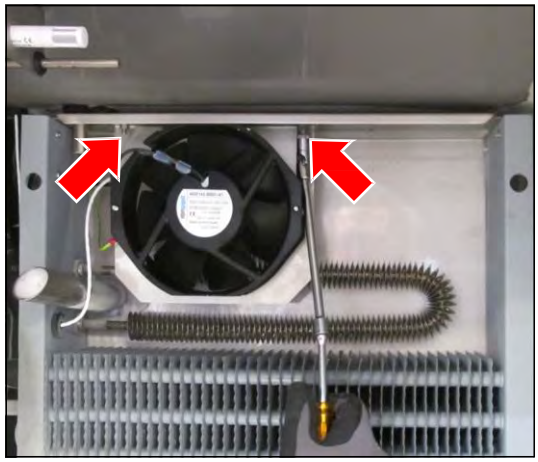
HINT
Only insert one wire into each terminal (see photograph), since otherwise the wires will not be held correctly.

23. Move the fan to fastening position.

- For units with ultrasonic humidification: Fasten the fan in the front bores (E).
- For units without ultrasonic humidification: Fasten the fan in the rear bores (F).

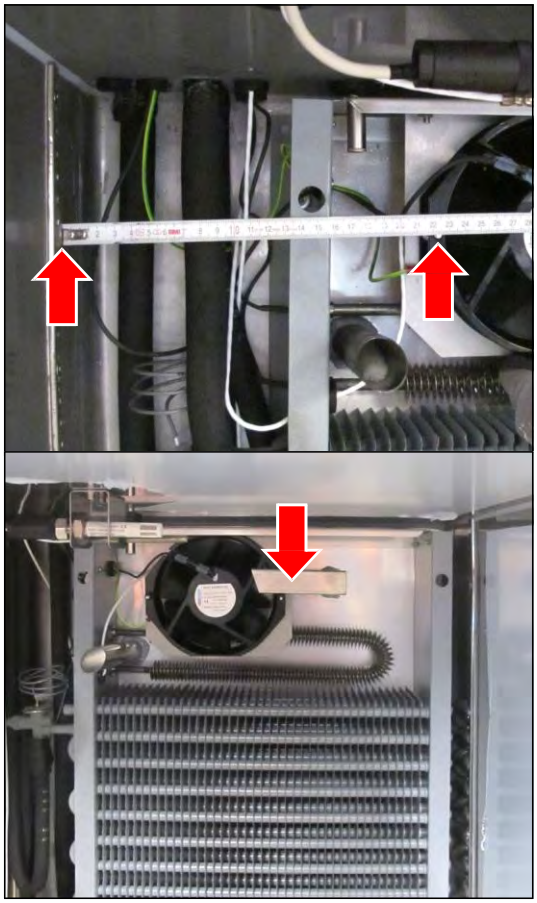


24. Screw the two screw nuts (with spring washer and washer) at the fan.
Do not tighten, yet.



25. Move the fan in the fastening slotted holes in such a way, that the measure from the left outside panel to the centre of the left screw of the fan is 224 mm.

26. Tighten the screw nuts.



27. Insert the Pitot tube of the ultrasonic humidifier.
(With option ultrasonic humidification.)

28. Install the back panel, *see page 75*.

29. Install the cover, *see page 73*.

The replacement of the fan is

finished.

4.6 Replacing the Finned Tubular Heater

DANGER

Warning of dangerous electrical voltage!
When working with live parts, dangerous electric shocks are possible.
➔ Withdraw the mains plug prior to the replacement of the finned tubular heater.

CAUTION

Risk of burning at the finned tubular heater!
When working at the fan, observe that there is the risk of burning at the hot fins of the finned tubular heater.
➔ Wait, until the finned tubular heater is cooled down before working.

CAUTION

Risk of injury at the fin package of the evaporator and at the finned tubular heater!
When working at the finned tubular heater, observe that there is the risk of cut injury of the hands due to the sharp-edged fins of the evaporator fin package and the finned tubular heater.
➔ Always work with safety gloves.
➔ Cover dangerous areas with suitable material.

Required Tools/Material:

- Suitable base protecting the test room floor, if it shall be stepped on it.
- Safety gloves
- Cover material for evaporator fin package and finned tubular heater
- 2 Socket spanners / open-ended spanners, size: 22
- Insulating tape
- Pull wire or the like

How to replace the finned tubular heater:

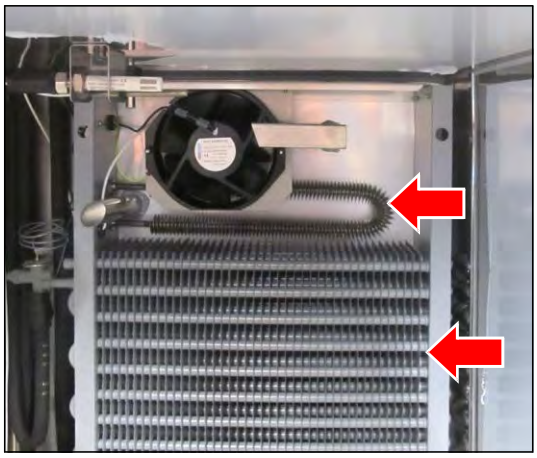
Removing the finned tubular heater:

1. Remove the cover, *see page 72*.
2. Remove the back panel, *see page 74*.

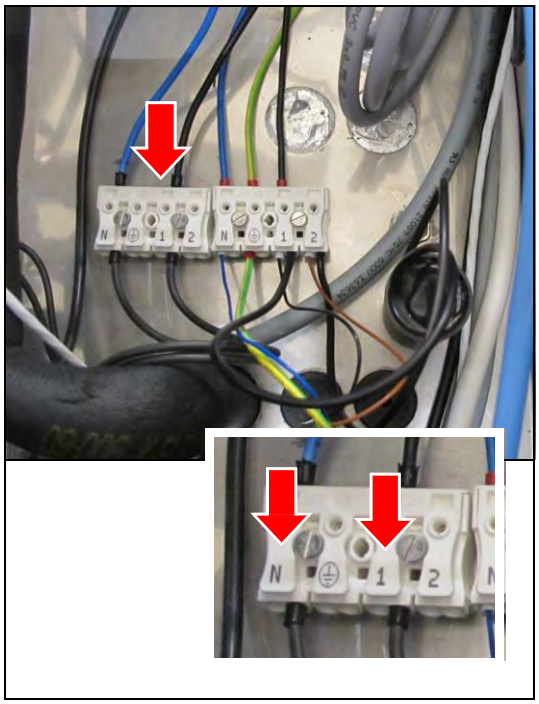
CAUTION

Risk of injury at the fin package of the evaporator and at the finned tubular heater! When working at the finned tubular heater, observe that there is the risk of cut injury of the hands due to the sharp-edged fins of the evaporator fin package and the finned tubular heater.

➔ Always work with safety gloves.
➔ Cover dangerous areas with suitable material.

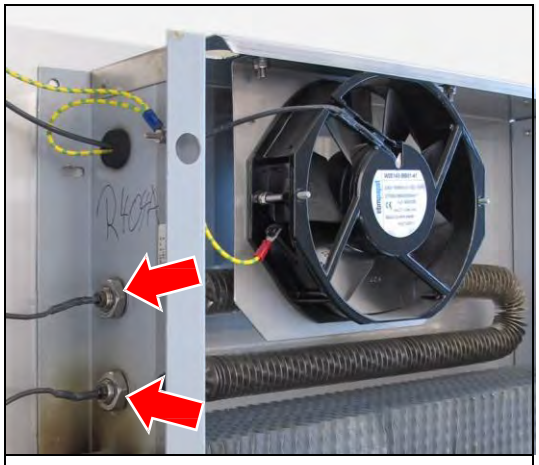


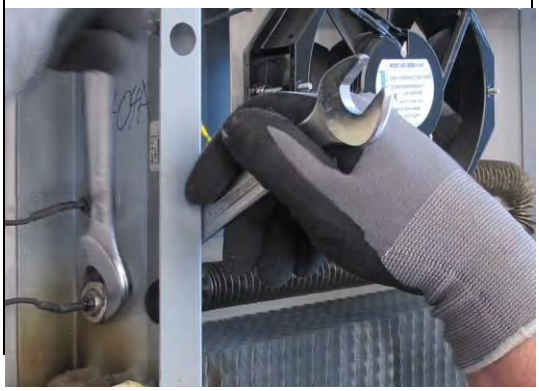
3. Loosen the two cables of the old finned tubular heater from the clamping block on the left rear in the component compartment.
(Press the labelled keys and withdraw the cable.)



4. Fasten a pull wire at the loosened cables using insulating tape.
5. Pull the pull wire into the test room at the loosened cables.
6. Separate the cables and the pull wire.

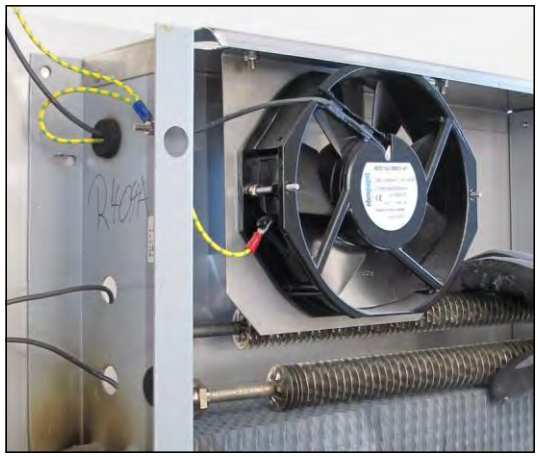
7. Loosen the two screw nuts.
(Apply counter pressure from inside.)





8. Withdraw the finned tubular heater from the bores by tilting it slightly past the fan and out of the test room.
(If required, loosen the fan screwing slightly to pass the fan.)

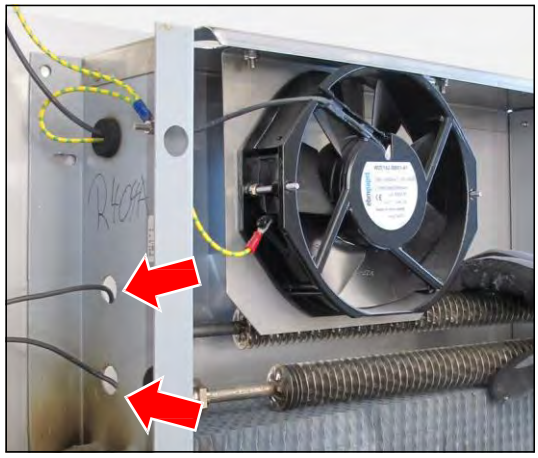
The removal of the finned tubular heater is finished.



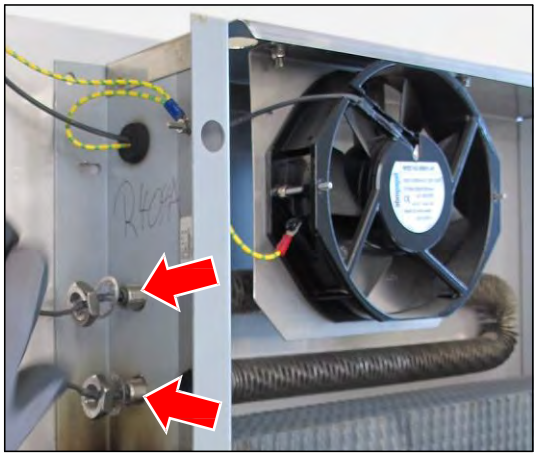
Installing the new finned tubular heater:

9. Draw the cable of the new finned tubular heater through the bores.

10. Push the finned tubular heater past the fan by tilting it slightly and push it into the bores.
(If required, loosen the fan screwing slightly to pass the fan.
The fan screwing must be tightened again imperatively.)



11. Push the toothed washers and the screw nuts on the cables of the finned tubular heater.



12. Loosen the two screw nuts. (Apply counter pressure from inside.)

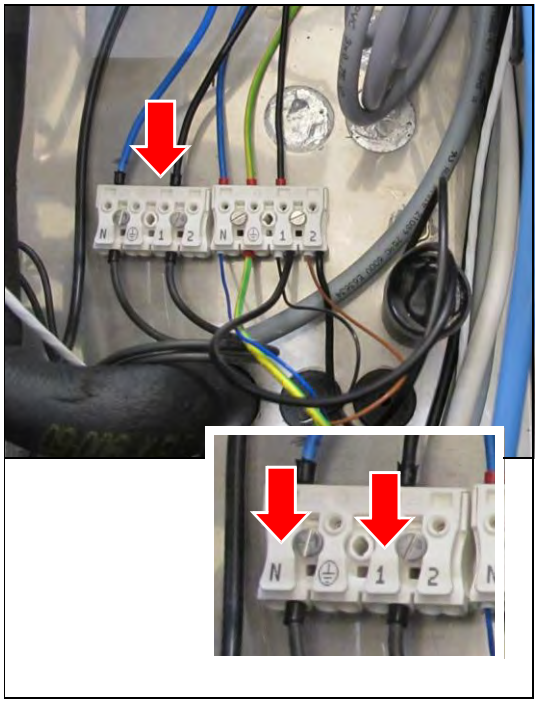
13. Fasten the cables of the new finned tubular heater at the pull wire using insulating tape.

14. Draw the pull wire and the cables into the component compartment.

15. Separate the cables and the pull wire.

16. Connect the two cables of the finned tubular heater.
(Press the labelled keys and insert the cables.)

- Terminal "N" One black cable
- Terminal "1" One black cable



17. Install the back panel, *see page 75*.

18. Install the cover, *see page 73*.

The replacement of the finned tubular heater is finished.

4.7 Replacing the Fan at the Ultrasonic Humidification

Units with extension of the temperature range -20 °C and/or +80 °C are equipped with a fan at the ultrasonic humidification. It must be replaced, if required.

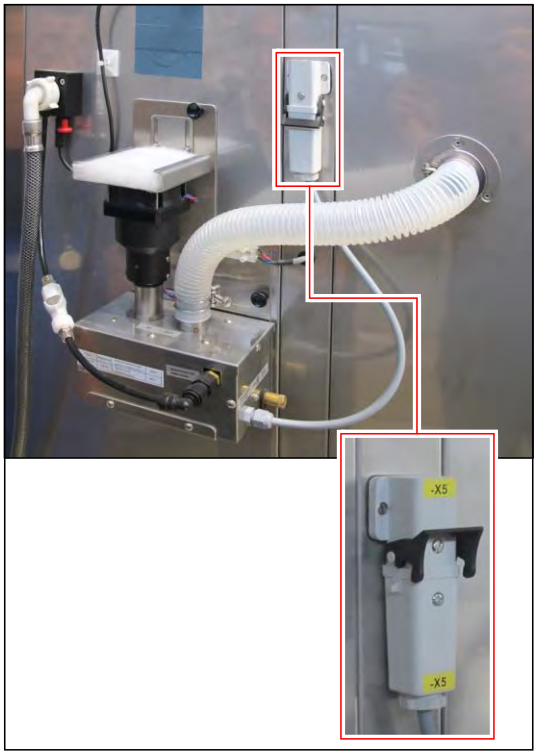
HINT
Replacement of the fan us also possible without removal of the ultrasonic humidification. When replacing the fan, maintenance of the ultrasonic humidification is advisable (*see page 45*). But this requires a removal of it.

Required Tools/Material:

- Open-ended spanner/socket spanner, size: _
- Cross-point screwdriver, size: _

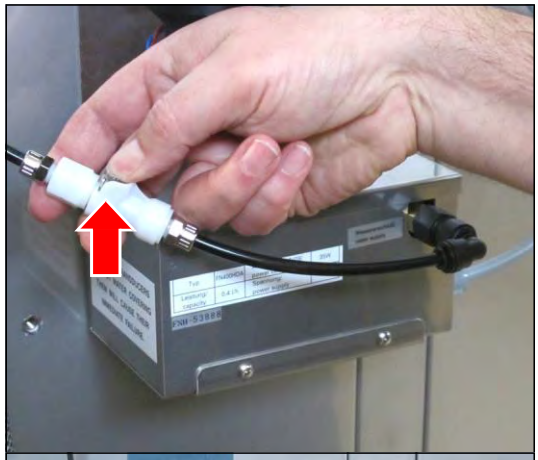
Removing the fan:

1. Switch-off the unit.
2. Close the water supply.
3. Loosen the external water connection.
4. Disconnect the power supply by folding up the black locking bolt and withdraw the plug.

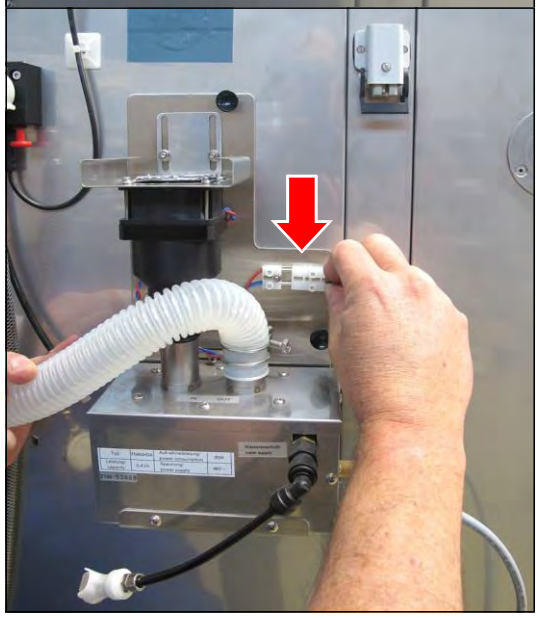


5. Pull off the humidifier outlet hose (held by magnetic force).

6. Open the self-locking coupling of the water connection by pressing the key.

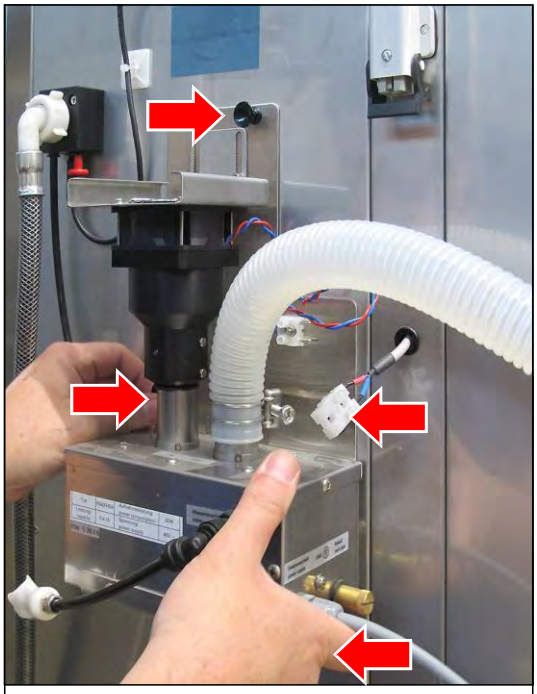


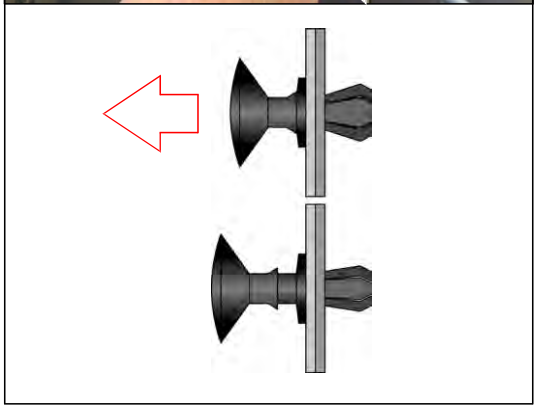
7. Withdraw the fan plug.



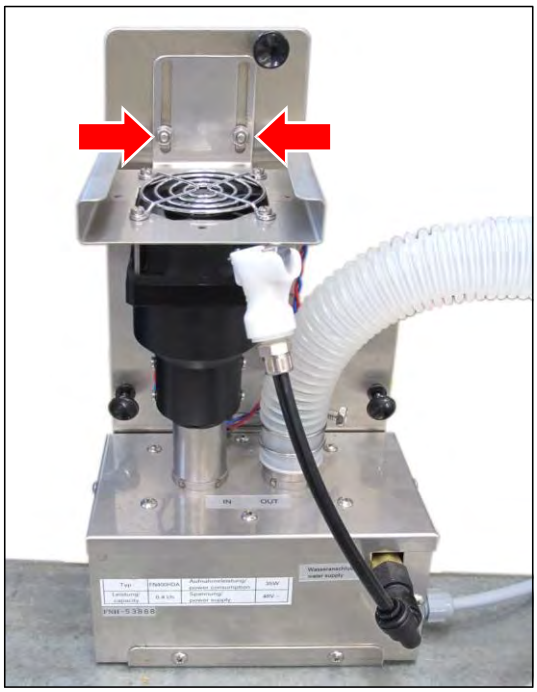
8. Pull out the four clips at the ultrasonic humidifier.

9. Loosen the ultrasonic humidifier and place it on a suitable base.



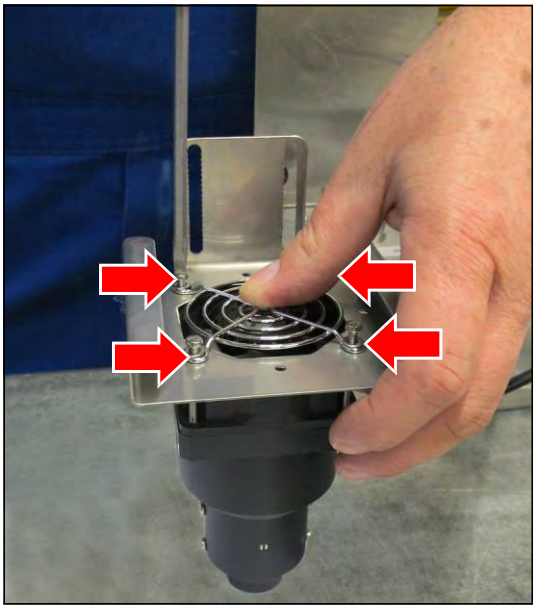


10. Loosen the two screw nuts at the mounting plate of the fan.



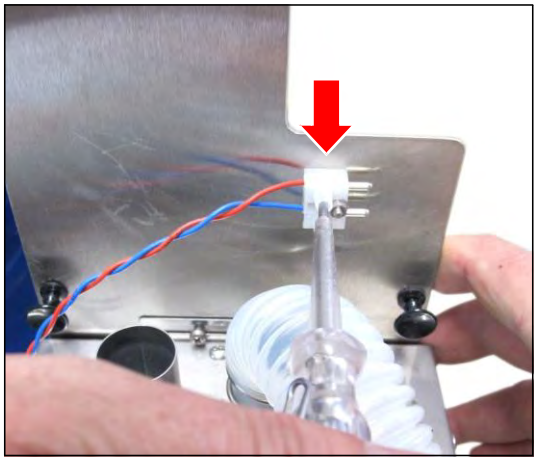
11. Remove the fan unit.

12. Loosen the four screws at the mounting plate of the fan.



13. Remove the fan.

14. Loosen the red and the blue cable of the fan from the terminal strip at the mounting plate of the ultrasonic humidifier.



Removal of the fan is finished.

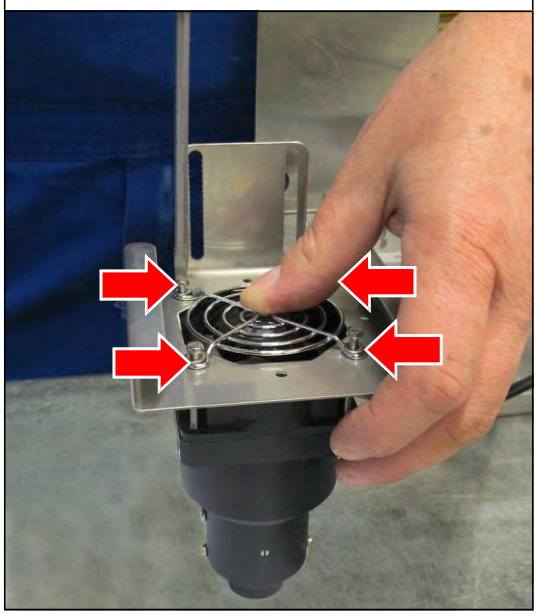
HINT
If required, execute the maintenance of the ultrasonic humidifier. *See page 45*.

Installing the fan:

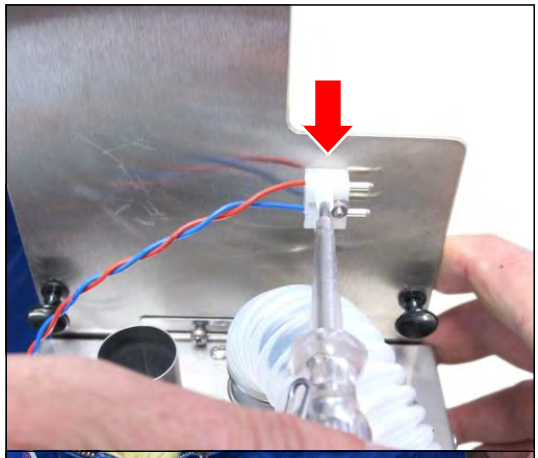
15. Insert the new fan into the fan unit.

HINT
Imperatively observe the flow direction arrow of the fan to be installed.

16. Insert and tighten the four screws at the mounting plate of the fan.

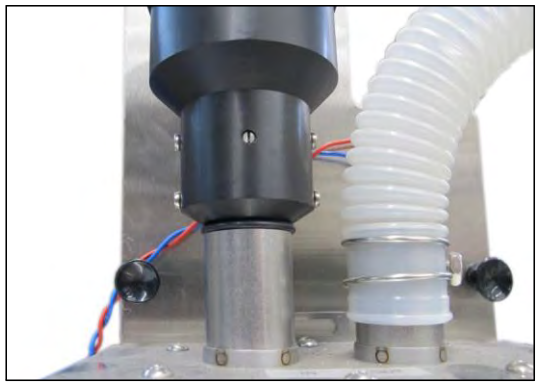


17. Fasten the red and the blue cable of the fan at the terminal strip on the mounting plate of the ultrasonic humidifier.
Red cable: at the top
Blue cable: at the bottom

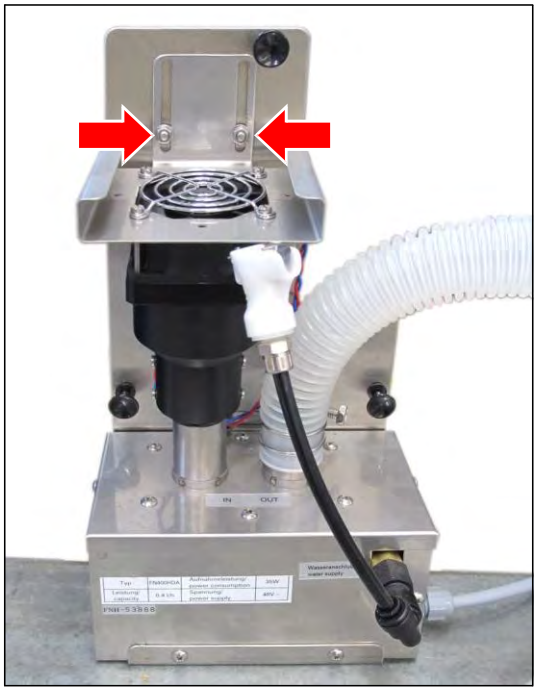


18. Place the fan unit on the inlet tube of the ultrasonic humidification.

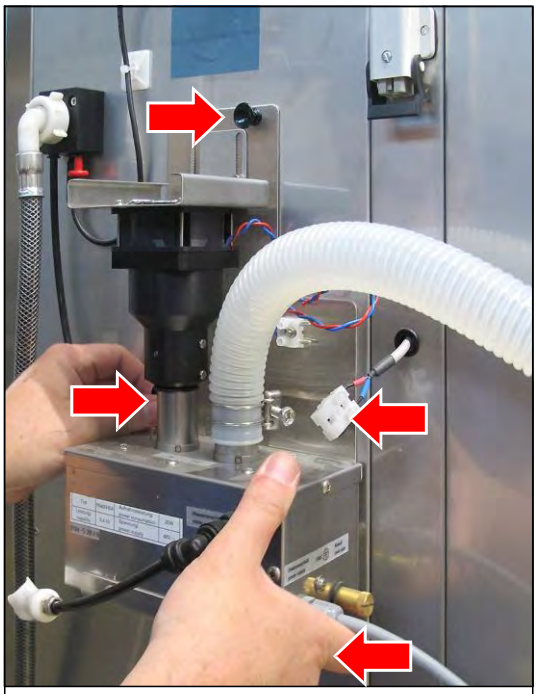
19. For installation, the fan unit must be slightly pressed down to ensure, that the sealing ring seals the fan unit safely.

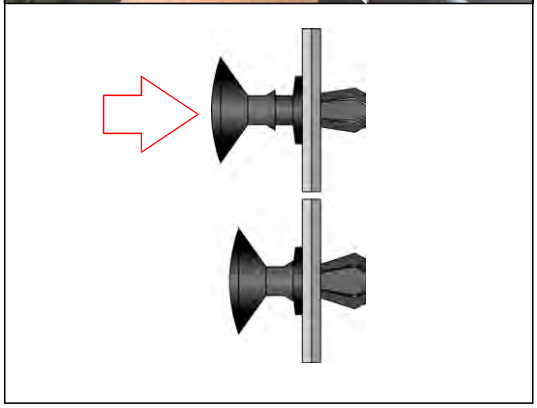


20. Insert the two screw nuts into the mounting plate of the fan and tighten them.



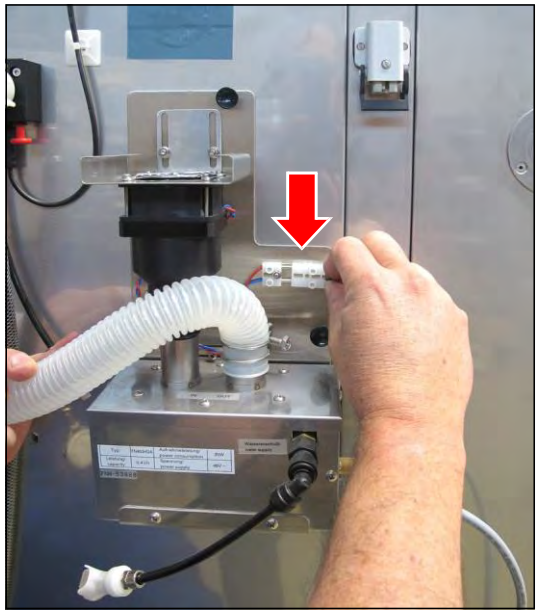
21. Fasten the ultrasonic humidifier to the test and simulation cabinet by pressing the four clips.





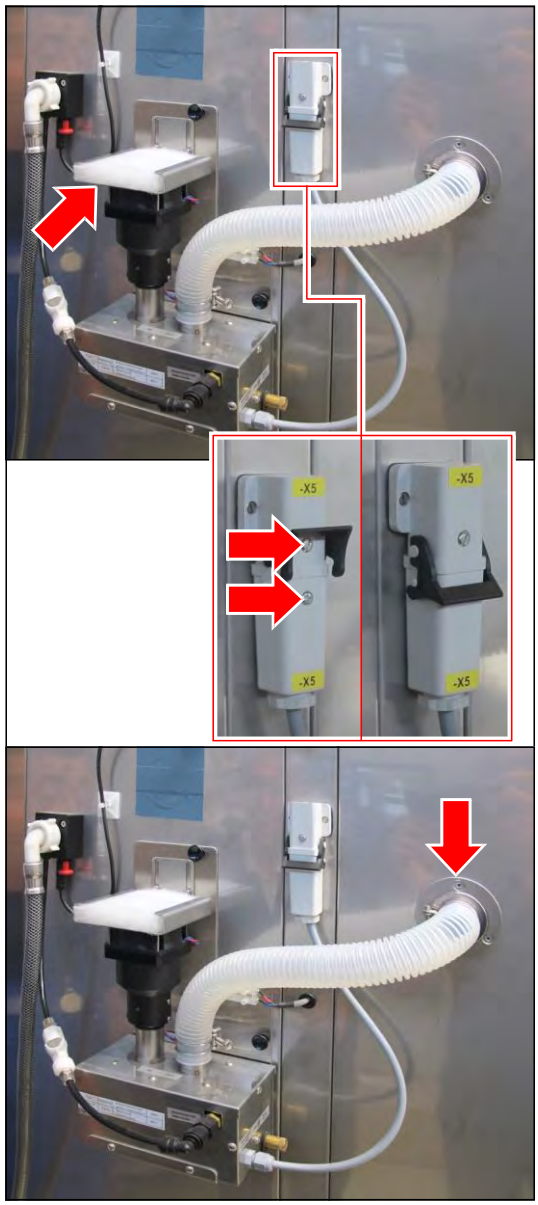
22. Insert the fan plug.

HINT
Observe the colours of the cables:
Red - red
Blue - blue



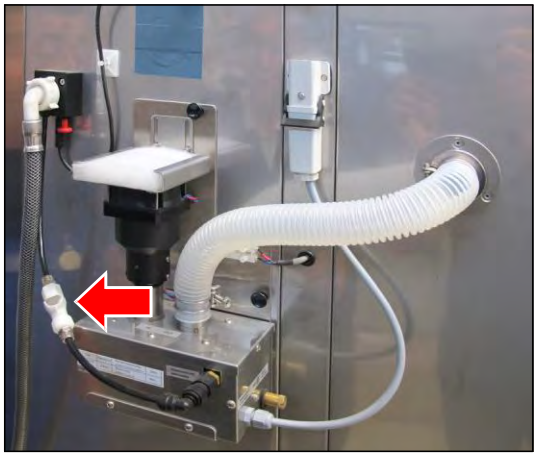
23. Connect the power supply and lock it.

24. Push the new filter mat into the support on the fan.
(The harder side of the filter must point upwards.)



25. Insert the humidifier outlet hose (held by magnetic force).

26. Connect the water supply. The engagement must be audible.
If the connection does not engage, the self-locking coupling will not release the water flow.



27. Reconnect the water supply.

Removal of the fan is finished.

28. Switch the appliance on.

29. Check the ultrasonic humidifier for leaks.

4.8 Replacing the Support of the Conductivity Measurement Sensor

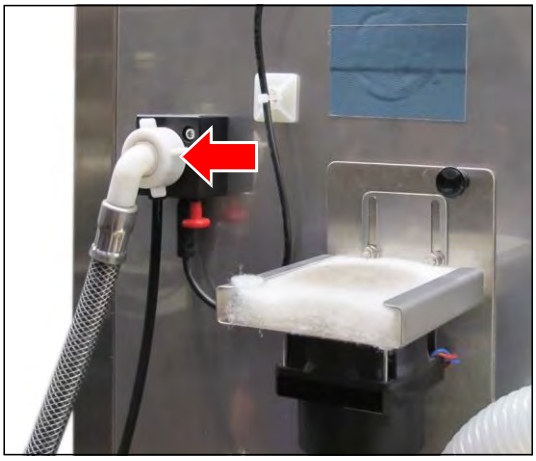
Required Tools/Material:

- Allen key, size: _
- Pincers
- Cable ties

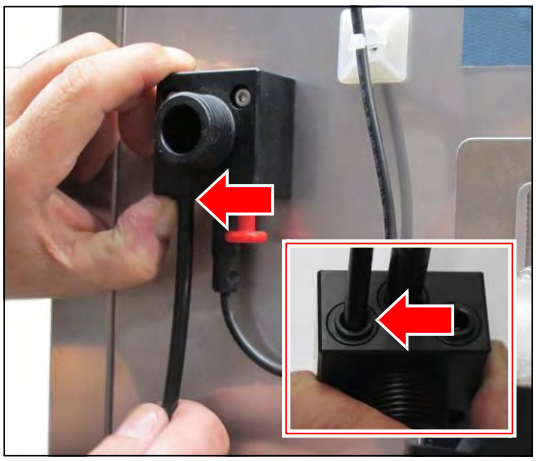
1. Remove the cover, *see page 72*.

Removing the measuring sensor:

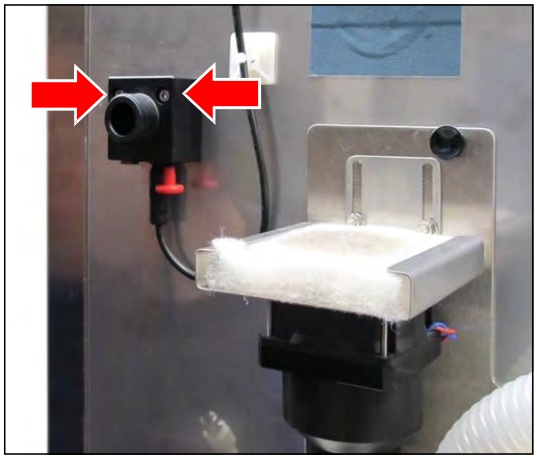
2. Switch-off the unit.
3. Close the water supply.
4. Loosen the external water connection.



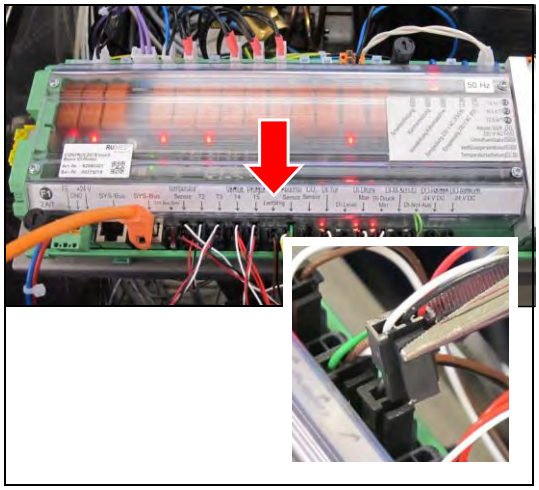
5. Press the retaining ring of the measuring sensor firmly and withdraw the hose.



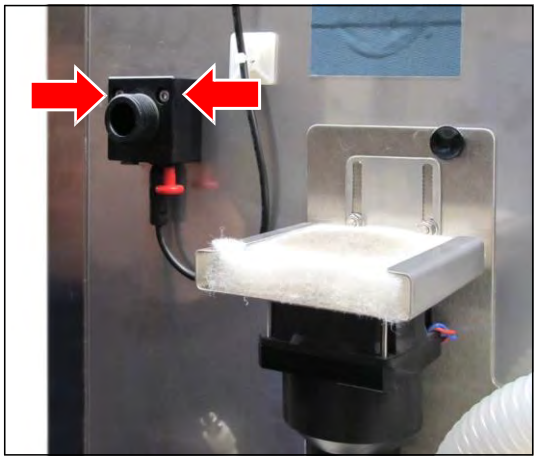
6. Loosen and remove the two screws of the measuring sensor.
7. Cut the cable ties.
8. Cut the cable of the measuring sensor.
9. Fasten the cable of the new measuring sensor at the old cable.
10. From the component compartment, draw the cable of the new measuring sensor together with the cable of the old measuring sensor into the component compartment.
11. Separate the cables.



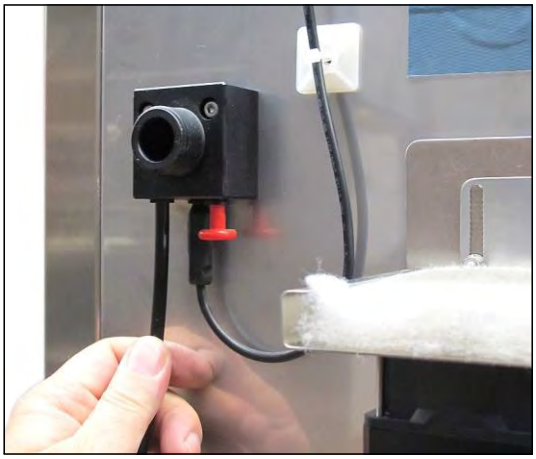
12. Use suitable pliers to remove the plug of the old measuring sensor from the I/O board in the component compartment. (Hold the plug with the pliers in such a way, that the clamping lever is loosened.
13. Insert the plug of the new measuring sensor.



14. Hold the new measuring sensor in position.
15. Insert the two screws and tighten them.
16. Fasten the cable of the measuring sensor at the back panel of the unit using cable ties.

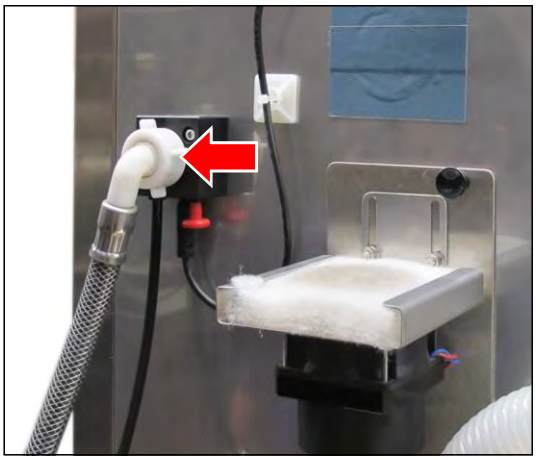


17. Reconnect the hose.
Push the hose into the measuring sensor as far as possible.
After that, withdraw it slightly in order to position the retaining ring to the front.



18. Connect the external water connection.

The replacement of the conductivity measurement sensor is finished.



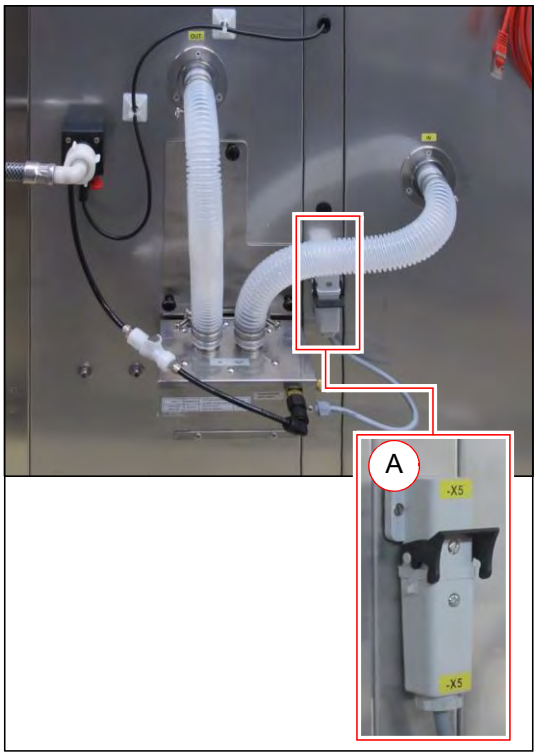
4.9 Maintenance of the Ultrasonic Humidification

Required Tools/Material:

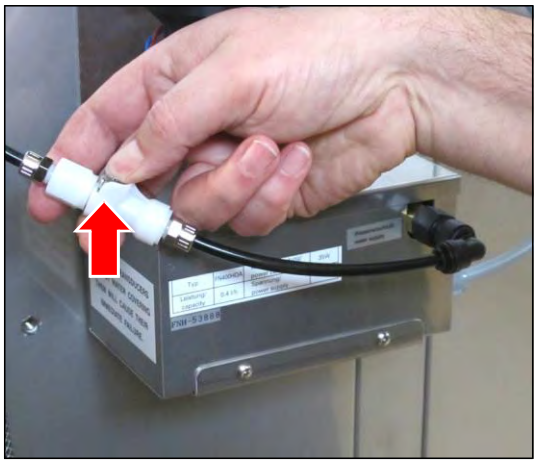
- Cross-point screwdriver, size: 50 SPH; PH 1 × 80
- Brush, smooth cloth
- Torch, if required

Removing the ultrasonic humidifier:

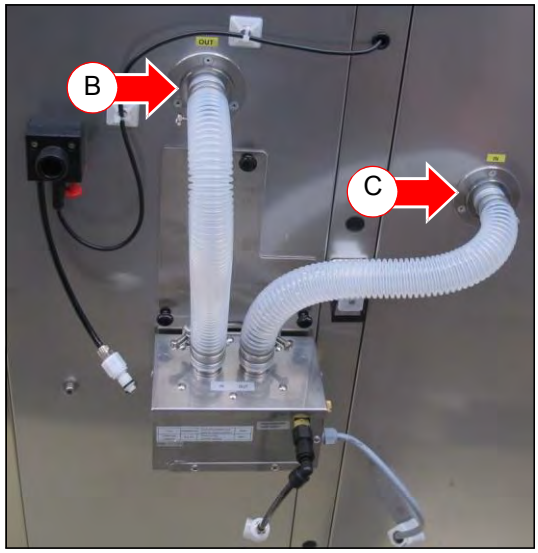
1. Close the water supply.
2. Loosen the external water supply.
3. Disconnect the power supply by folding up the black locking bolt (A) and withdraw the plug.



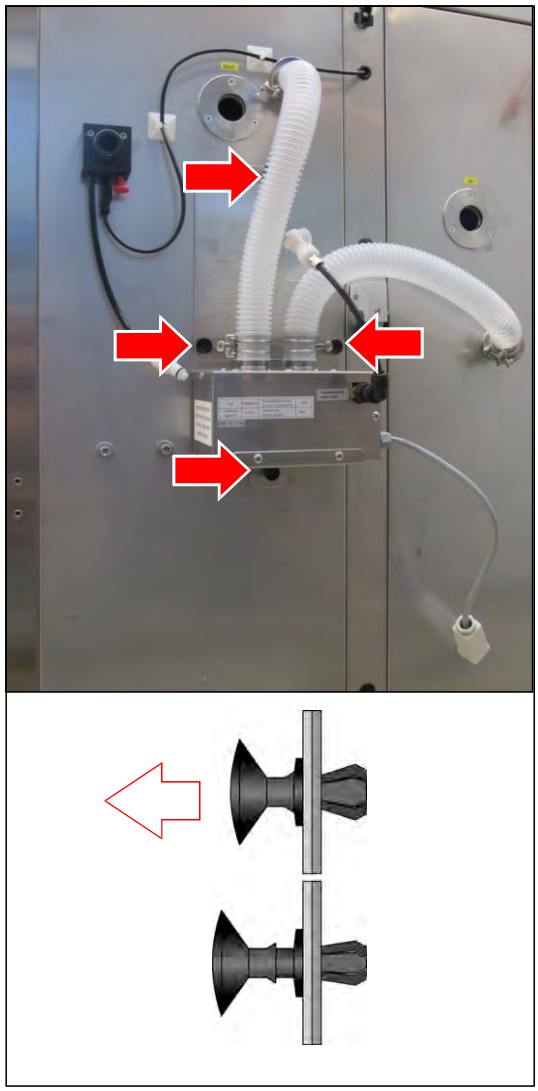
4. Open the self-locking coupling of the water connection by pressing the key.



5. Pull off the humidifier inlet hose (B) (held by magnetic force).
6. Withdraw the humidifier outlet hose (C) (held by magnetic force).

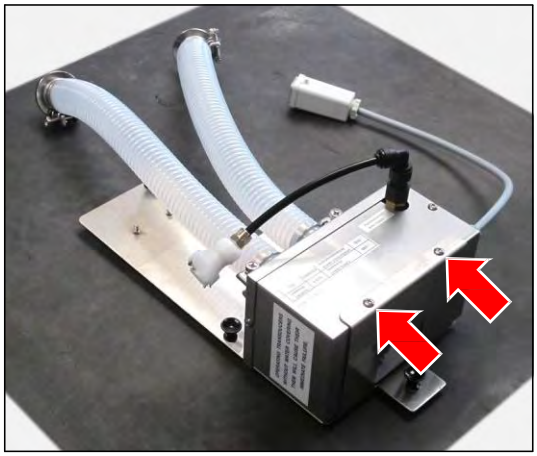


7. Pull out the four clips at the ultrasonic humidifier.
8. Loosen the ultrasonic humidifier and place it on a suitable base.



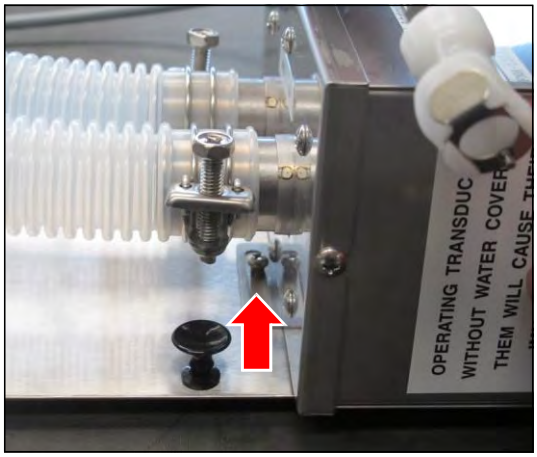
Maintenance of the ultrasonic humidifier:

9. Loosen the two screws and remove them.



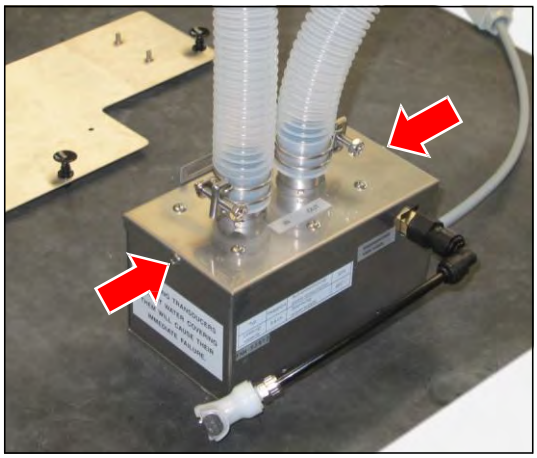
10. If required, push the housing laterally to reach the third screw.

11. Loosen the screw and remove it.



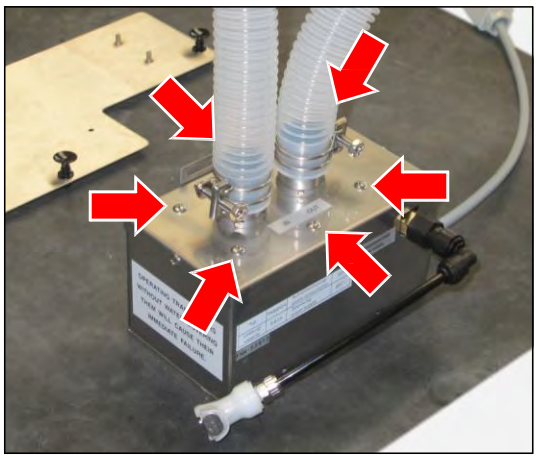
12. Position the housing upright.

13. Loosen the screw on the left and on the right side.

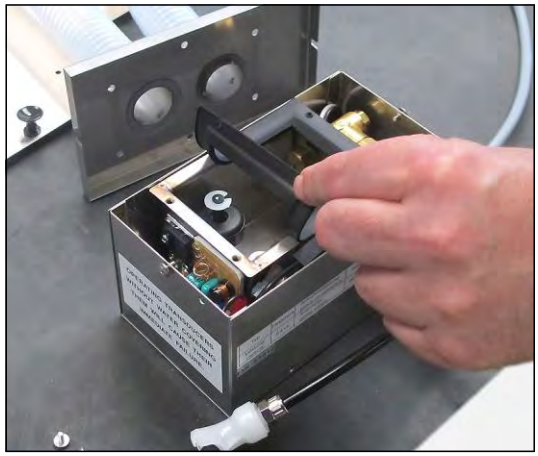


14. Loosen the six screws and remove them.

15. Remove the cover.

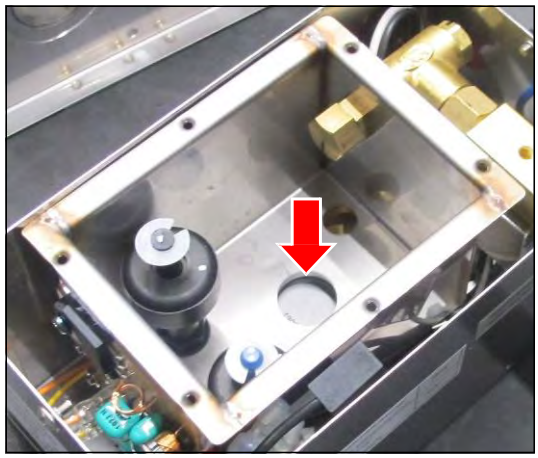


16. Remove the seal and clean it.
If required, replace it.



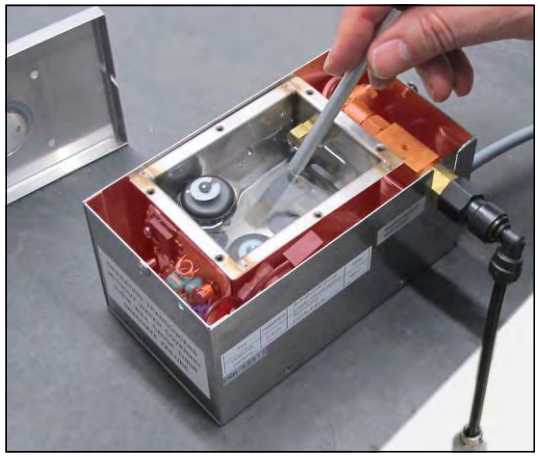
NOTE

Caution! Risk of unit damage!
When using metal objects for cleaning the modulator might be damaged.
➔ Never use metallic tools for cleaning.



NOTE

Caution! Risk of unit damage!
If water flows out of the water tank to the electrical components, the unit will be damaged.
➔ It should be avoided that water flows to the electrical components.
➔ Cleaning should be executed carefully.



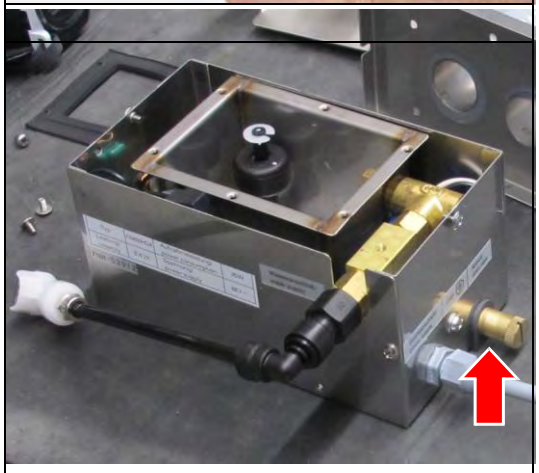
17. Clean the water tank.
Clean also the corners using an appropriate tool (such as a brush).

NOTE

Caution! Risk of unit damage!
If water flows out of the water tank to the electrical components, the unit will be damaged.

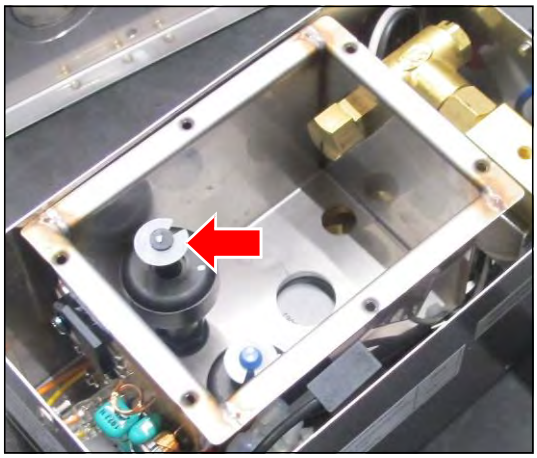
➔ It should be avoided that water flows to the electrical components.
➔ Cleaning should be executed carefully.

18. Hold the water tank as shown and let the water flow off over the long side or drain it by the drain screw.

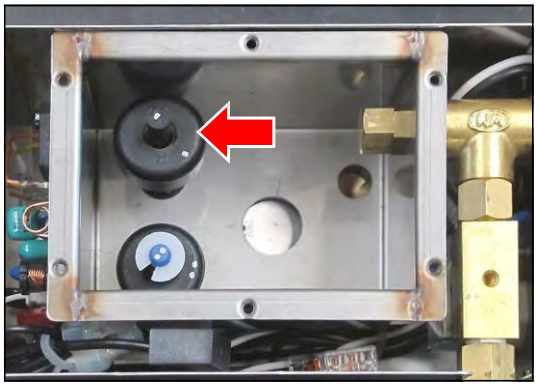


If required, remove the level switch and clean it:

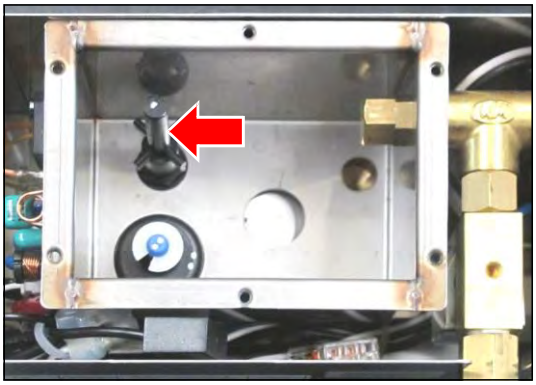
19. Remove the white retaining ring.



20. Remove the float and clean it.

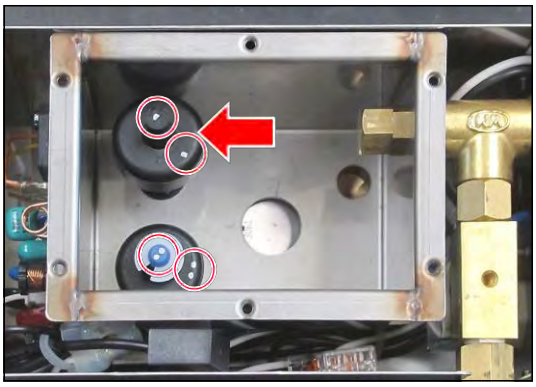


21. Clean the fixing device.



22. Place the float on the fixing device.

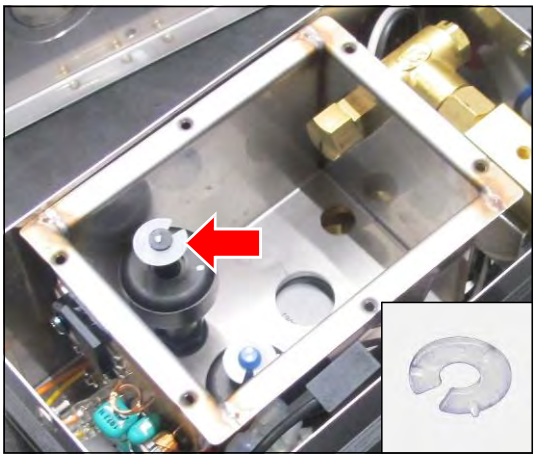
HINT
Observe the point mark on the level switches.
Float with one point only on a fixing device with one point.
Float with two points only on a fixing device with two points.



23. Install the white retaining ring.

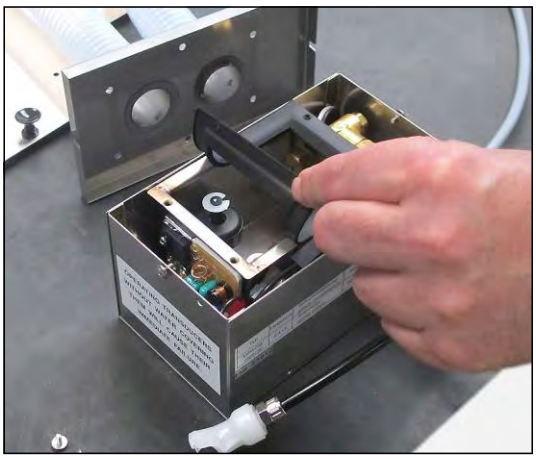
HINT
Install the retaining ring with the webs downwards.

HINT
Ensure, that the retaining ring is seated correctly in the groove of the fixing device.



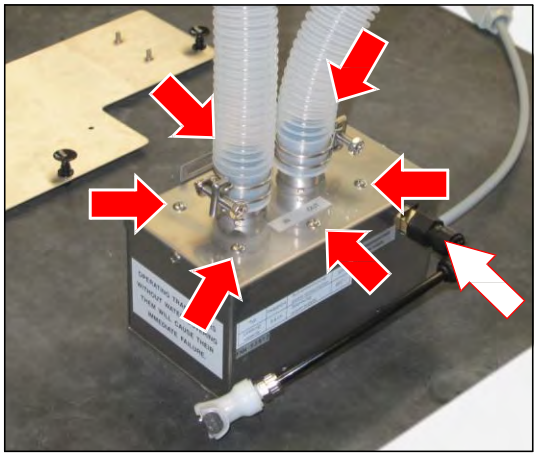
Assembly of the ultrasonic humidifier

24. Apply the seal.



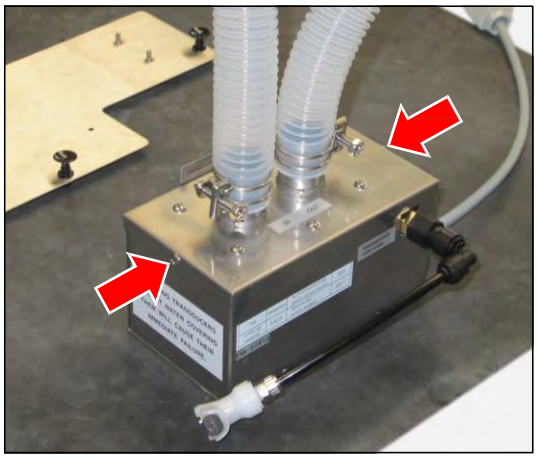
25. Apply the cover.

26. Insert the six screws.
Do not tighten the screws, before all screws have been inserted.



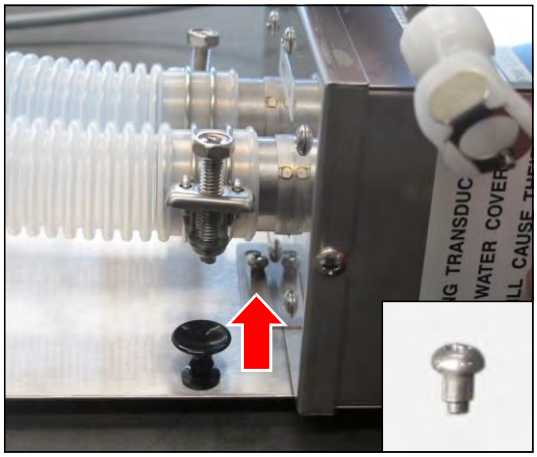
HINT
The position of the bores for the screws can be adapted by moving the water tank above the water inlet.

27. Loosen the screw on the left and on the right side.

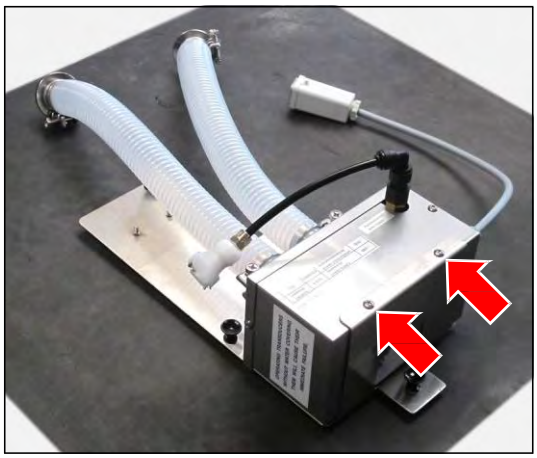


28. Place the ultrasonic humidifier on the mounting plate.

29. Insert the shown screw and tighten it.



30. If required, displace the housing laterally, insert the two screws and tighten them.



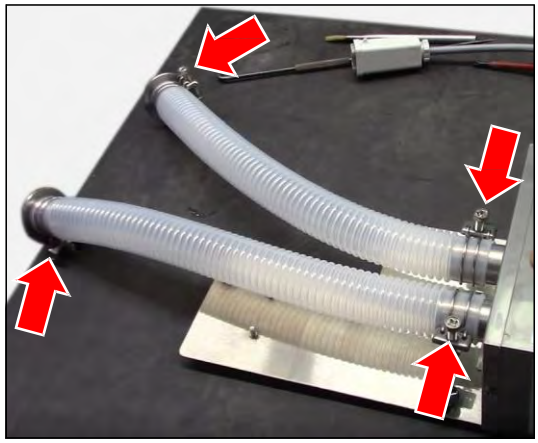
Replace the hoses, if required.

31. Loosen the hose clamps.

32. Remove the hoses.

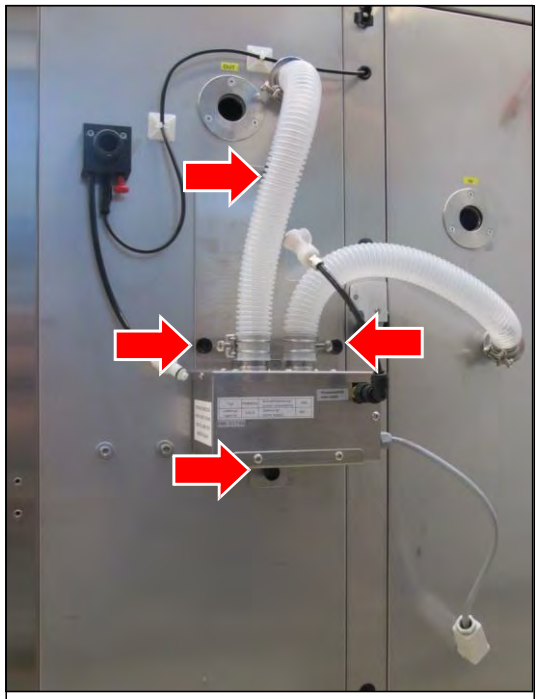
33. Fasten the new hoses.

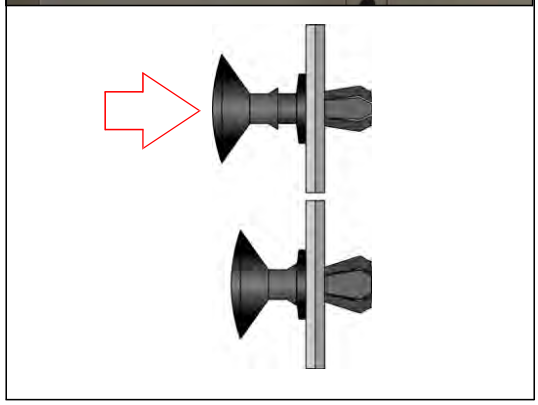
34. Tighten the hose clamps.



Installing the ultrasonic humidifier:

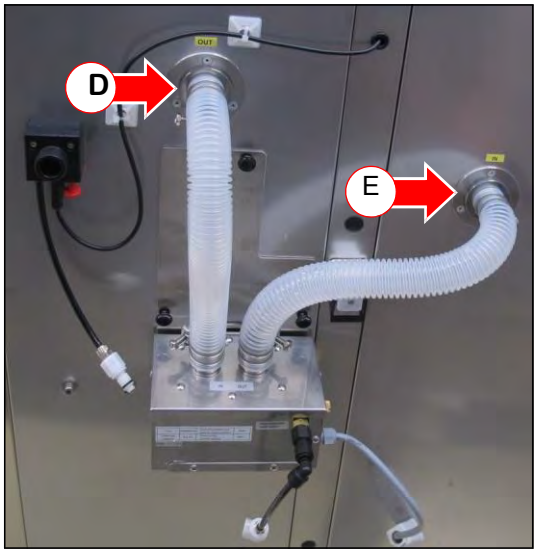
35. Fasten the ultrasonic humidifier to the test and simulation cabinet by pressing the four clips.



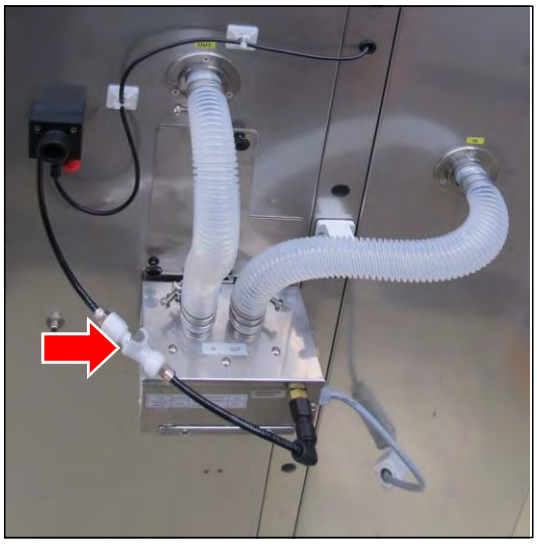


36. Insert the humidifier inlet hose (D) (held by magnetic force).

37. Insert the humidifier outlet hose (E) (held by magnetic force).



38. Connect the water supply. The engagement must be audible.
If the connection does not engage, the self-locking coupling will not release the water flow.



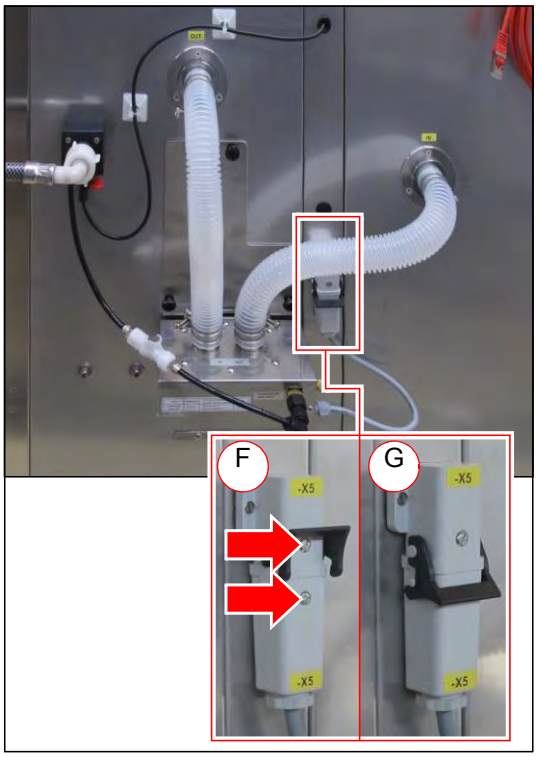
39. Connect the power supply (F) and lock it (G).

NOTE

Property Damage of the Humidification!
Always use demineralized water for the humidification. Otherwise, it might be damaged.

➔ Only supply demineralized water to the humidifier with a conductivity of <5 µS/cm.

40. Reconnect the water supply.

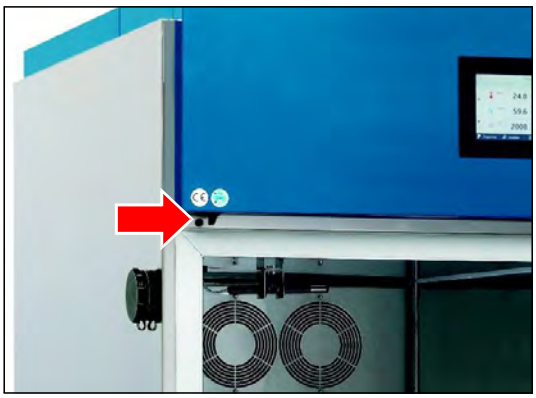


41. Switch the appliance on.

42. Check the ultrasonic humidifier for leaks.

Checking the humidifier function

43. Lift and hold the door limit switch by means of a credit card.



44. Open the door.

The door limit switch should not open and activate the door program!

Fog must escape in intervals from the humidity blow-in pipe on the left of the fan.

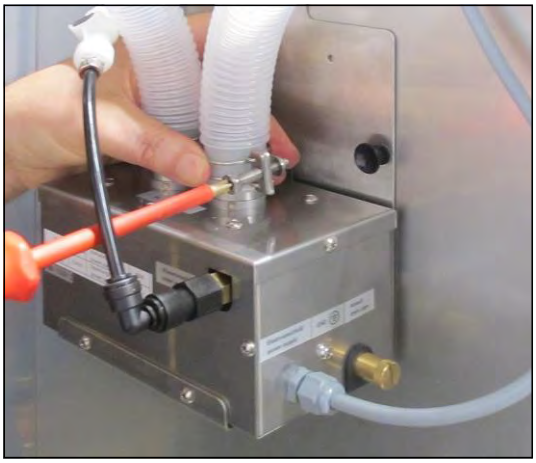
HINT
Units with two doors (P 1060 and P 1700) are equipped with two humidifiers. The function of both humidifiers must be checked.

HINT
This check of the humidifier function might generate an alarm message "Low humidity" at the control.
Acknowledge the alarm message and enter a comment into the logbook.

If no fog is produced:

45. Loosen the hose clamp from the outlet of the ultrasonic humidifier.

46. Withdraw the hose.



47. Check the water level at the ultrasonic humidifier using a torch.

If there is no water in the ultrasonic humidifier:

48. Check the water supply to the unit.

49. Check, if the self-locking coupling is engaged in the water hose.

If the water level is correct und no fog is produced, the modulator might be damaged.

50. Remove the ultrasonic humidifier and send it back.

4.10 Replacing the Control Temperature Sensor (T1)

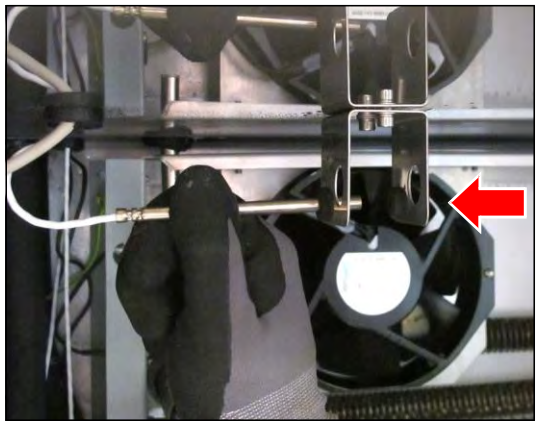
DANGER

Warning of dangerous electrical voltage!
When working with live parts, dangerous electric shocks are possible.
➔ Withdraw the mains plug prior to the replacement of the temperature sensor.

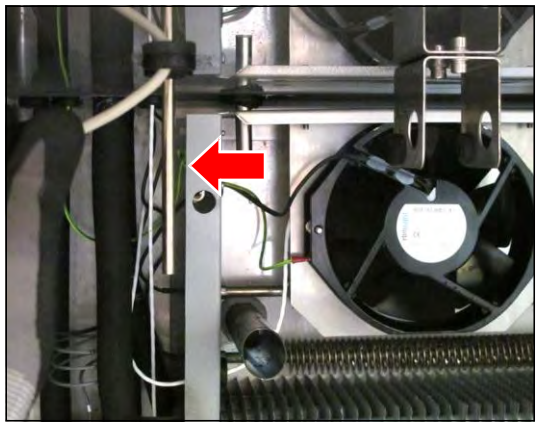
How to replace the control temperature sensor (T1): Removing

the temperature sensor:

1. Remove the cover, *see page 72*.
2. Withdraw the temperature sensor laterally out of the fixing device.

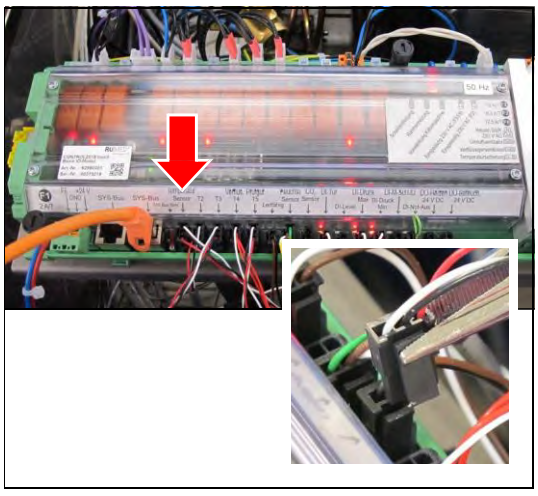


3. Push the cable and afterwards the temperature sensor through the test room ceiling.



4. Use suitable pliers to remove the plug of the temperature sensor from the I/O board in the component compartment. (Hold the plug with the pliers in such a way, that the clamping lever is loosened.

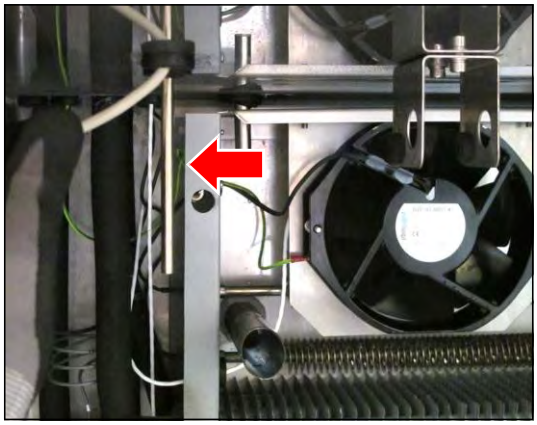
Removal of the temperature sensor is finished.



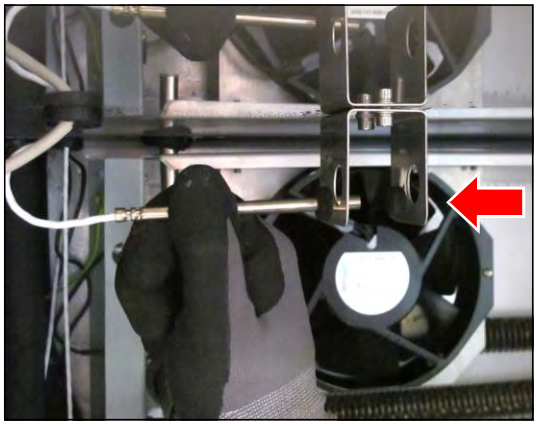
Installing the temperature sensor:

5. Move the new temperature sensor from the component compartment into the test room.

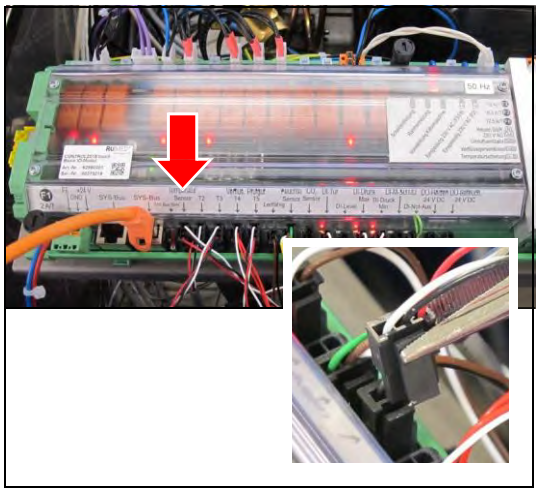
6. Pull the temperature sensor and the cable through the test room ceiling in sufficient length.



7. Push the temperature sensor laterally into the fixing device.



8. Use suitable pliers to insert the plug of the new temperature sensor into the I/O board in the component compartment. (Hold the plug with the pliers in such a way, that the clamping lever is loosened.



The replacement of the temperature sensor is finished.

4.11 Replacing the Overtemperature Sensor (T2)

DANGER

Warning of dangerous electrical voltage!
When working with live parts, dangerous electric shocks are possible.
➔ Withdraw the mains plug prior to the replacement of the temperature sensor.

CAUTION

Risk of burning at the finned tubular heater!
When working at the fan, observe that there is the risk of burning at the hot fins of the finned tubular heater.
➔ Wait, until the finned tubular heater is cooled down before working.

CAUTION

Risk of injury at the fin package of the evaporator and at the finned tubular heater!
When working at the **temperature sensor**, observe that there is the risk of cut injury of the hands due to the sharp-edged fins of the evaporator fin package and the finned tubular heater.
➔ Always work with safety gloves.
➔ Cover dangerous areas with suitable material.

Required Tools/Material:

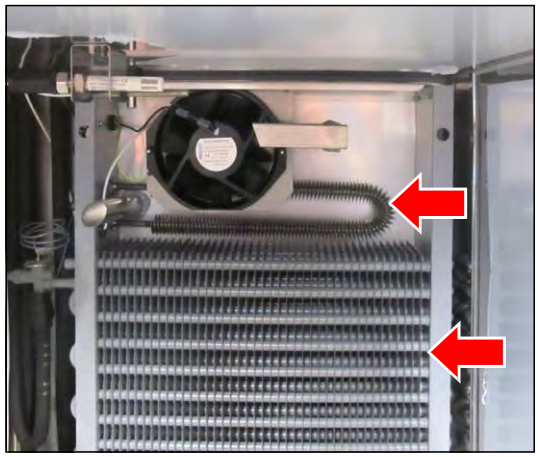
- Suitable base protecting the test room floor, if it shall be stepped on it.
- Safety gloves
- Cover material for evaporator fin package and finned tubular heater

How to replace the overtemperature sensor (T2): Removing the temperature sensor:

1. Remove the cover, *see page 72*.
2. Remove the back panel, *see page 74*.

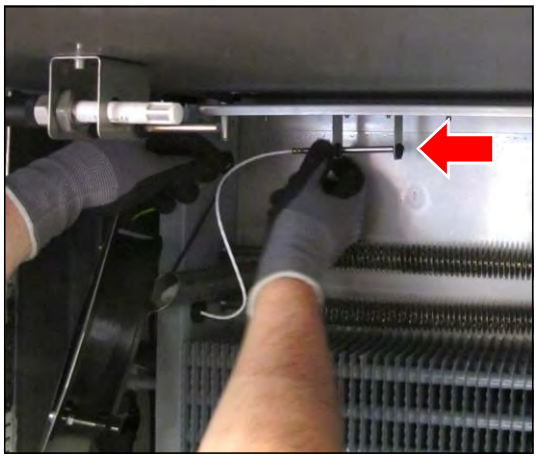
CAUTION

Risk of injury at the fin package of the evaporator and at the finned tubular heater!
When working at the temperature sensor, observe that there is the risk of cut injury of the hands due to the sharp-edged fins of the evaporator fin package and the finned tubular heater.
➔ Always work with safety gloves.
➔ Cover dangerous areas with suitable material.

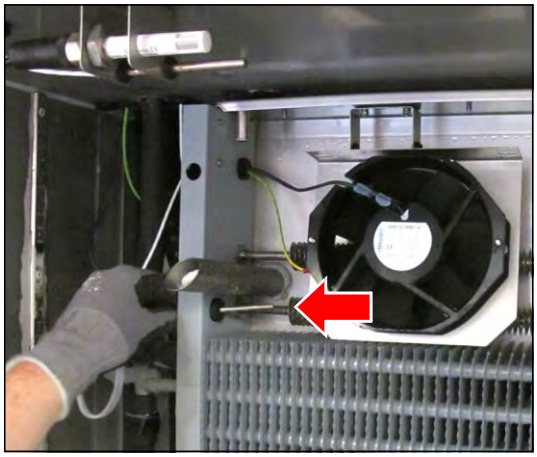


HINT
Removal of the fan for the replacement is not necessarily required.
In the following photographs the fan had been removed to show the position of the overtemperature sensor.
Removal, installation and adjustment of the fan, *see page 22ff.*

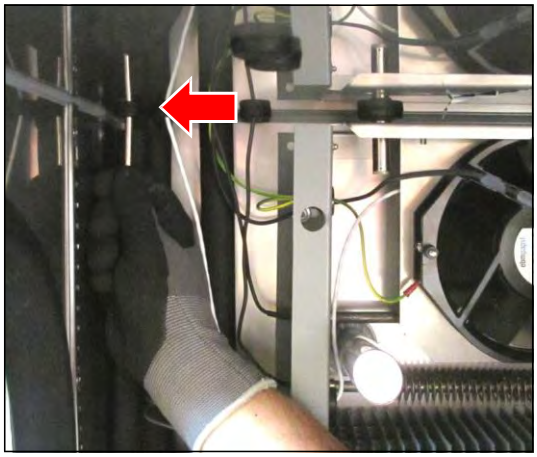
3. Withdraw the temperature sensor laterally out of the fixing device.



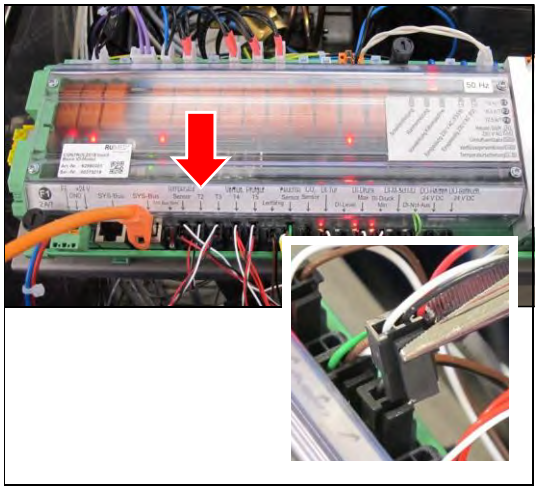
4. Pull the temperature sensor through the lateral lead-through.



5. Push the cable and afterwards the temperature sensor through the test room ceiling.



6. Use suitable pliers to remove the plug of the temperature sensor from the I/O board in the component compartment. (Hold the plug with the pliers in such a way, that the clamping lever is loosened.

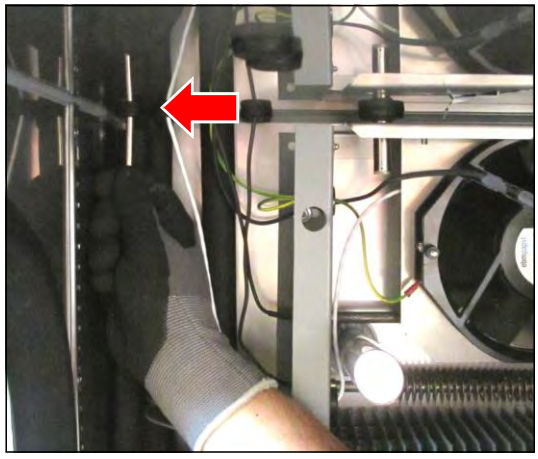


Removal of the temperature sensor is finished.

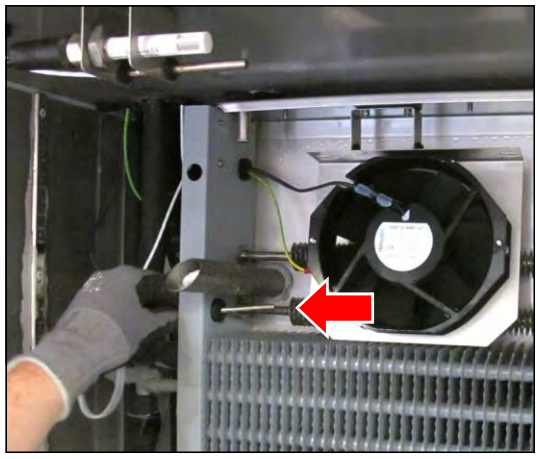
Installing the temperature sensor:

7. Move the new temperature sensor from the component compartment into the test room.

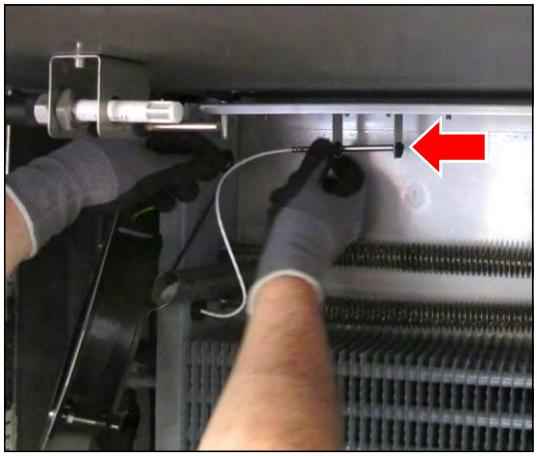
8. Pull the temperature sensor and the cable through the test room ceiling in sufficient length.



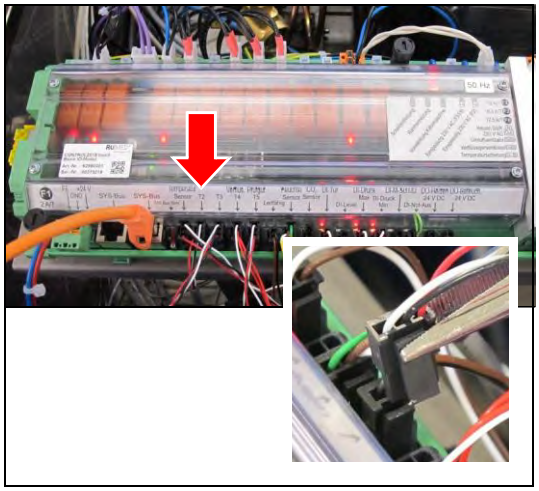
9. Pull the temperature sensor through the lateral lead-through.



10. Push the temperature sensor laterally into the fixing device.



11. Use suitable pliers to insert the plug of the new temperature sensor into the I/O board in the component compartment. (Hold the plug with the pliers in such a way, that the clamping lever is loosened.



The replacement of the temperature sensor is finished.

4.12 Replacing the Humidity Sensor

DANGER

Warning of dangerous electrical voltage!
When working with live parts, dangerous electric shocks are possible.
➔ Withdraw the mains plug prior to the replacement of the humidity sensor.

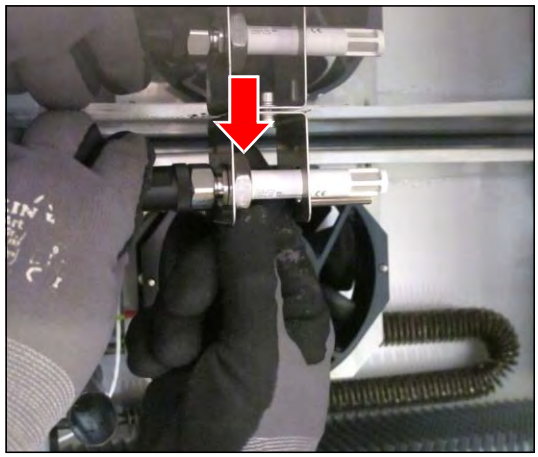
Required Tools/Material:

- Suitable base protecting the test room floor, if it shall be stepped on it.
- Open-ended spanner; size: 24

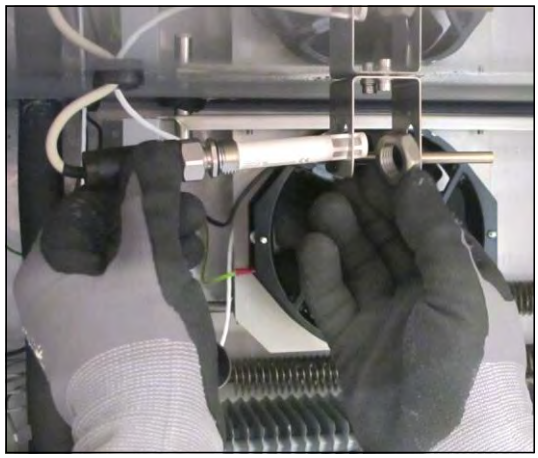
How to replace the humidity sensor:

Removing the humidity sensor:

1. Loosen the fastening nut at the fixing device of the humidity sensor.

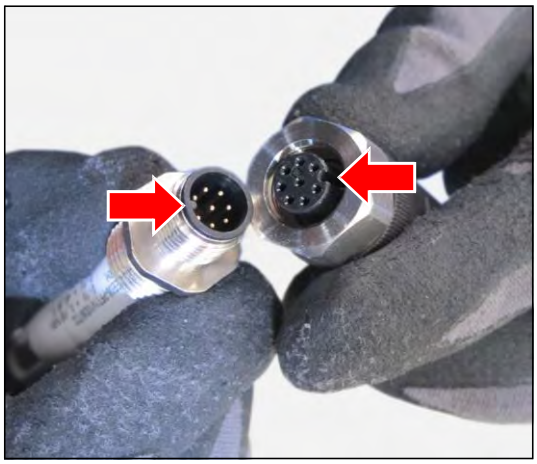


2. Withdraw the humidity sensor from the fixing device.



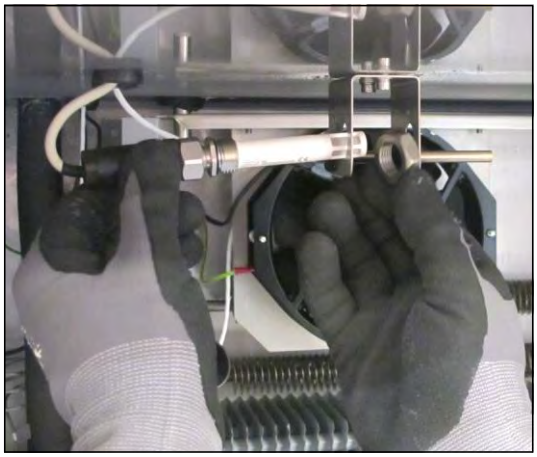
3. Loosen the retaining screw of the humidity sensor and withdraw the humidity sensor.

4. Insert the new humidity sensor. Observe the groove and the nose.

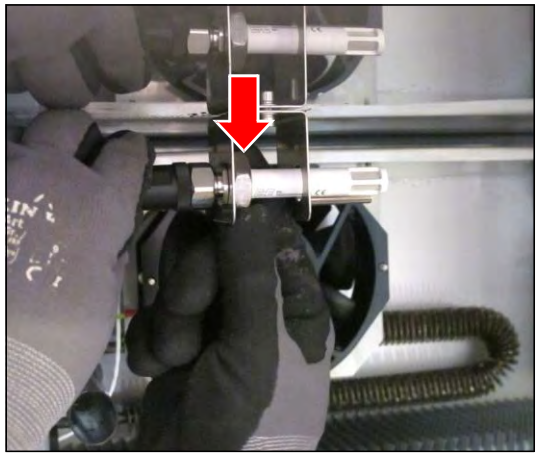


5. Tighten the retaining screw of the humidity sensor.

6. Push the humidity sensor laterally through the left side of the fixing device, through the fastening nut and through the right side of the fixing device.



7. Tighten the fastening nut at the fixing device of the humidity sensor.



4.13 Replacing the Low Temperature Sensor (T3)

DANGER

Warning of dangerous electrical voltage!
When working with live parts, dangerous electric shocks are possible.
➔ Withdraw the mains plug prior to the replacement of the temperature sensor.

Required Tools/Material:

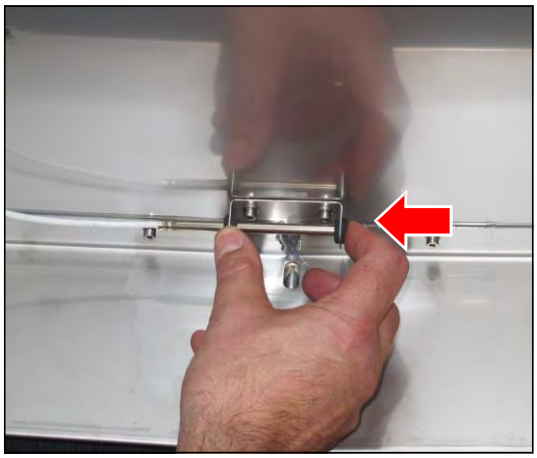
- Suitable base protecting the test room floor, if it shall be stepped on it.

The low temperature sensor (T3) is located at the bottom in the test room behind the back panel.

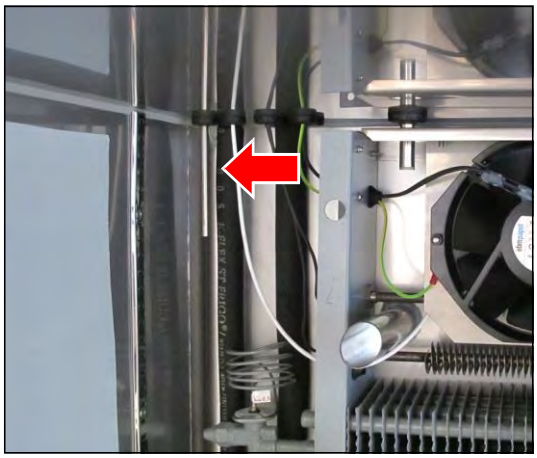
How to replace the low temperature sensor (T3):

Removing the temperature sensor:

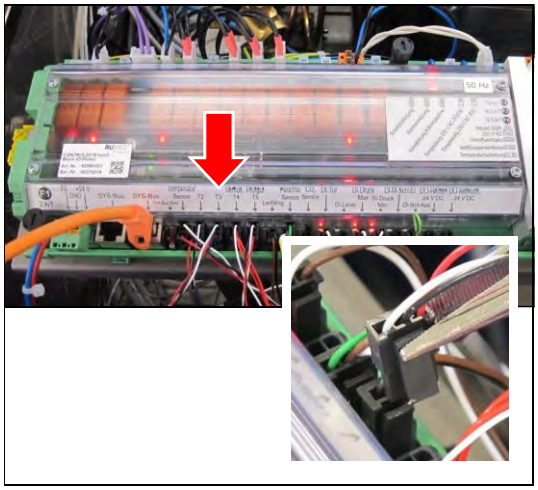
1. Remove the cover, *see page 72*.
2. Remove the back panel, *see page 74*.
3. Withdraw the temperature sensor laterally out of the fixing device.



4. Push the cable and afterwards the temperature sensor through the test room ceiling.



5. Use suitable pliers to remove the plug of the temperature sensor from the I/O board in the component compartment. (Hold the plug with the pliers in such a way, that the clamping lever is loosened.

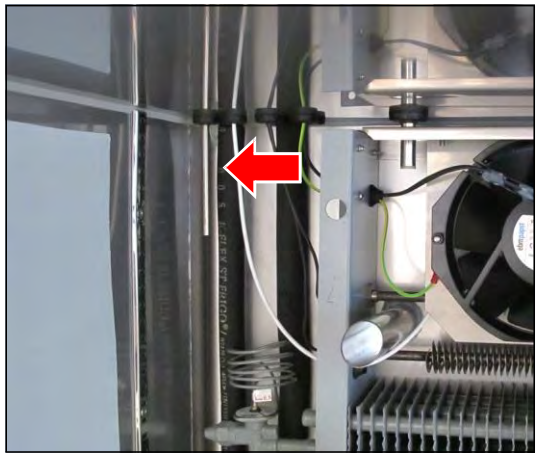


Removal of the temperature sensor is finished.

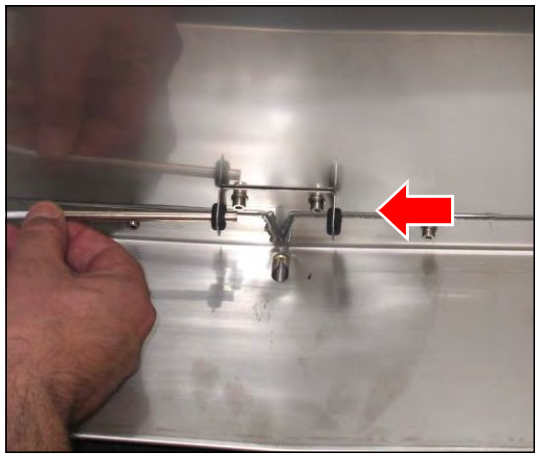
Installing the temperature sensor:

6. Move the new temperature sensor from the component compartment into the test room.

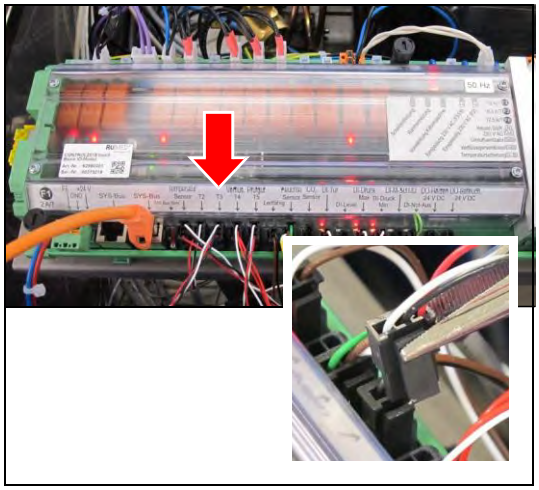
7. Pull the temperature sensor and the cable through the test room ceiling in sufficient length.



8. Push the temperature sensor laterally into the fixing device.



9. Use suitable pliers to insert the plug of the temperature sensor into the I/O board in the component compartment. (Hold the plug with the pliers in such a way, that the clamping lever is loosened.



The replacement of the temperature sensor is finished.

4.14 Replacing the Specimen Temperature Sensor (T5)

DANGER

Warning of dangerous electrical voltage!
When working with live parts, dangerous electric shocks are possible.
➔ Withdraw the mains plug prior to the replacement of the temperature sensor.

Required Tools/Material:

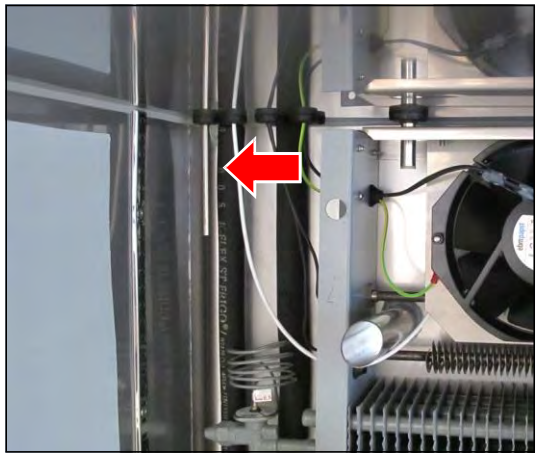
- Suitable base protecting the test room floor, if it shall be stepped on it.

The specimen temperature sensor (T5) is located in the test room. It has no own fixing device.

How to replace the specimen temperature sensor (T5):

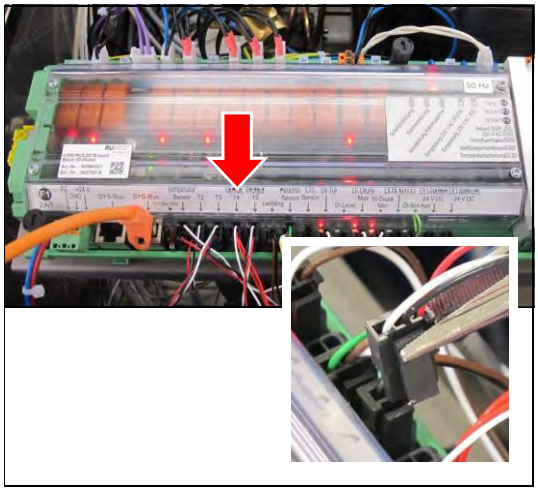
Removing the temperature sensor:

1. Remove the cover, *see page 72*.
2. Remove the back panel, *see page 74*.
3. Push the cable and afterwards the temperature sensor through the test room ceiling.



4. Use suitable pliers to remove the plug of the temperature sensor from the I/O board in the component compartment. (Hold the plug with the pliers in such a way, that the clamping lever is loosened.

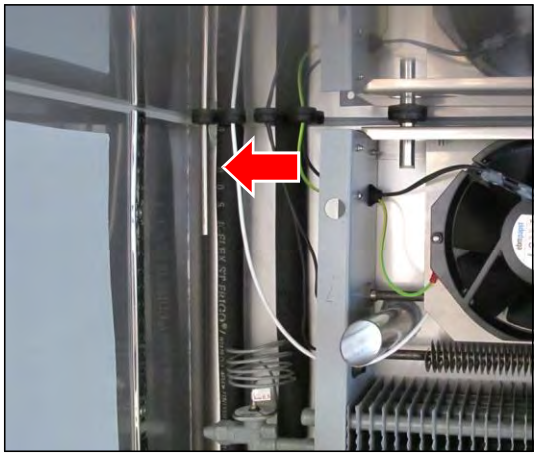
Removal of the temperature sensor is finished.



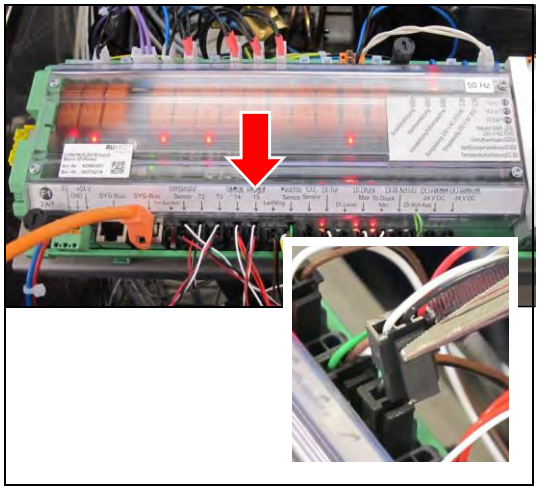
Installing the temperature sensor:

5. Move the new temperature sensor from the component compartment into the test room.

6. Pull the temperature sensor and the cable through the test room ceiling in sufficient length.



7. Use suitable pliers to insert the plug of the new temperature sensor into the I/O board in the component compartment. (Hold the plug with the pliers in such a way, that the clamping lever is loosened.



The replacement of the temperature sensor is finished.

4.15 Replacing the Overtemperature Fuse

DANGER

Warning of dangerous electrical voltage!
When working with live parts, dangerous electric shocks are possible.
➔ Withdraw the mains plug prior to the replacement of the overtemperature fuse.

CAUTION

Risk of burning at the finned tubular heater!
When working at the fan, observe that there is the risk of burning at the hot fins of the finned tubular heater.
➔ Wait, until the finned tubular heater is cooled down before working.

CAUTION

Risk of injury at the fin package of the evaporator and at the finned tubular heater!
When working at the overtemperature fuse, observe that there is the risk of cut injury of the hands due to the sharp-edged fins of the evaporator fin package and the finned tubular heater.
➔ Always work with safety gloves.
➔ Cover dangerous areas with suitable material.

Required Tools/Material:

- Suitable base protecting the test room floor, if it shall be stepped on it.
- Safety gloves
- Cover material for evaporator fin package and finned tubular heater

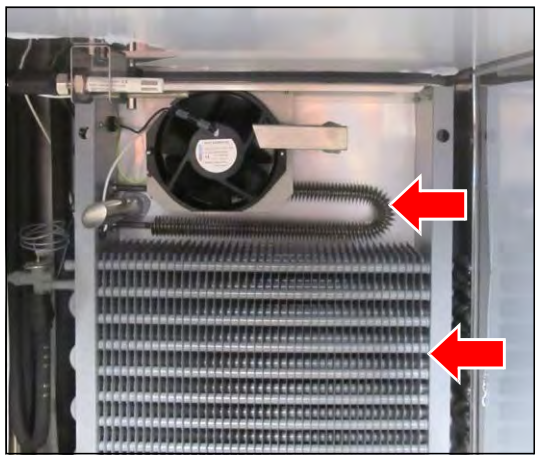
How to replace the overtemperature fuse:

1. Remove the back panel, *see page 74*.

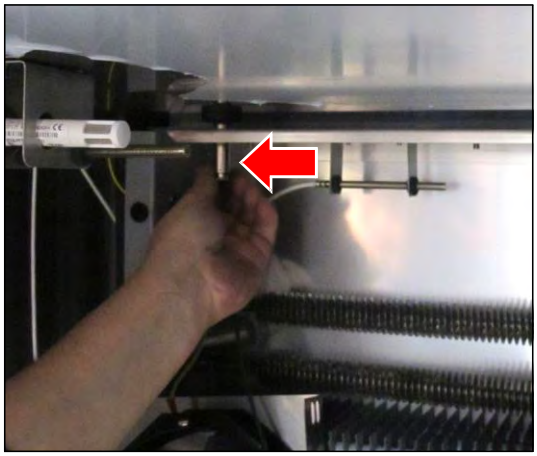
CAUTION

Risk of injury at the fin package of the evaporator and at the finned tubular heater!

When working at the overtemperature fuse, observe that there is the risk of cut injury of the hands due to the sharp-edged fins of the evaporator fin package and the finned tubular heater.
➔ Always work with safety gloves.
➔ Cover dangerous areas with suitable material.



2. Unscrew the sleeve with the overtemperature fuse.
3. If the overtemperature fuse had burst, carefully remove glass splinters and the liquid from the sleeve by slightly knocking.



NOTE

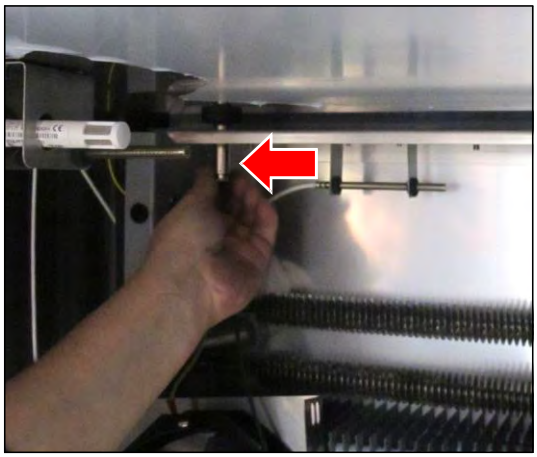
Always install an overtemperature fuse, which is suitable for the unit.

➔ The releasing temperature is imprinted on the shaft.

➔ The releasing temperature must be 10 °C higher than the maximum unit temperature.

4. Insert the new overtemperature fuse into the sleeve with the shaft downwards.
5. Insert the sleeve with the overtemperature fuse against the spring pressure and screw it down.
6. Install the back panel, *see page 75*.

The replacement of the overtemperature fuse is finished.



4.16 Removing the Cover

DANGER

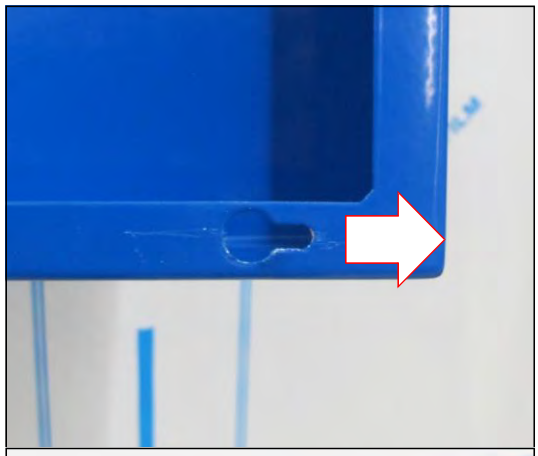
Warning of dangerous electrical voltage!
When working with live parts, dangerous electric shocks are possible.
➔ Withdraw the mains plug prior to the removal of the cover.

Required Tools/Material:

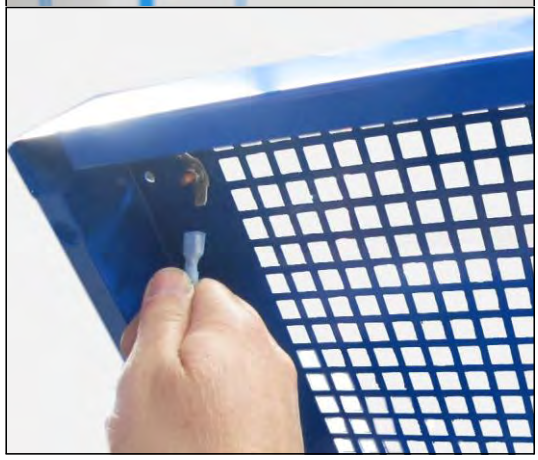
- Screwdriver, size: 1.0 × 5.5

How to remove the cover of the component compartment:

1. Loosen both screws at the top of the cover and remove them.
2. Push the cover backwards to be able to lift it from the rear screws.



3. Lift the cover.
4. Loosen the earth cable in the cover.
5. Remove the cover.



4.17 Installing the Cover

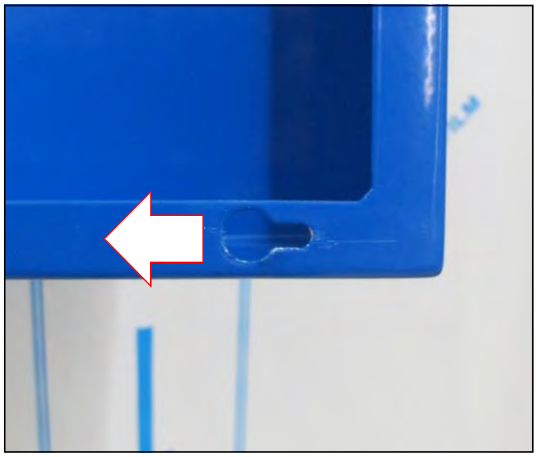
Required Tools/Material:

- Screwdriver, size: 1.0 × 5.5

How to install the cover of the component compartment:

When the service work is finished, the cover of the component compartment must be reinstalled.

1. Place the cover on the unit's rear.
2. Fasten the earth cable in the cover.
3. Lower the cover.



4. Pull the cover forward to fasten it by means of the rear screws.
5. Insert both screws into the cover and tighten them.

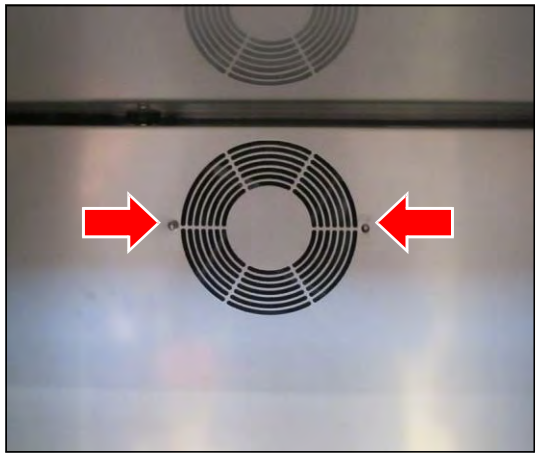
4.18 Removing the Back Panel

Required Tools/Material:

- Open-ended spanner/socket spanner, size: 7

How to remove the back panel of the test room:

1. Remove the shelves.

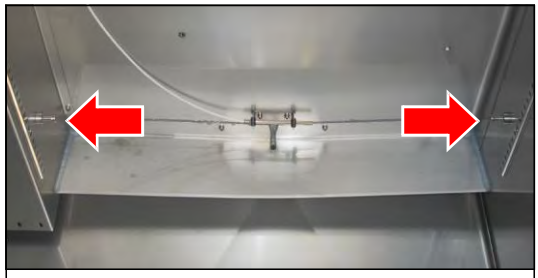


HINT
If required, mark the position of the fastening clips, before they are removed.

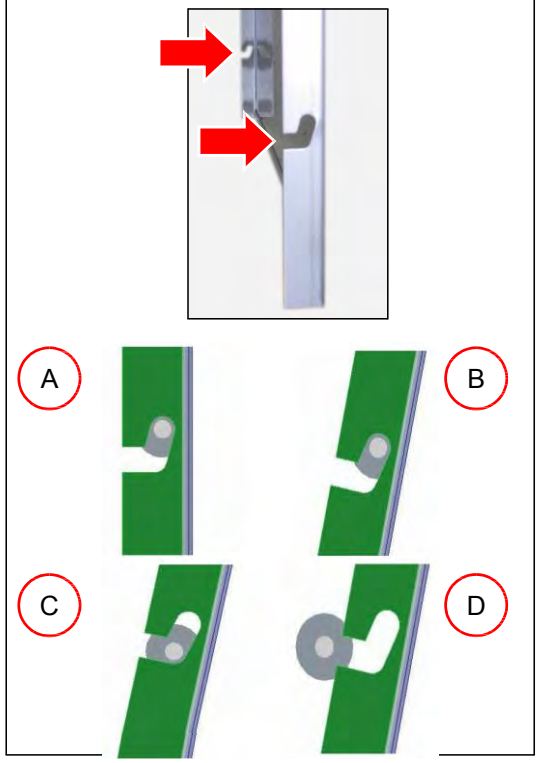
2. Remove the rear fastening clips of the shelves.

3. Loosen and remove the two cap nuts at the back panel.

4. Slightly tilt the upper side of the back panel towards the door (B).



5. Lift the back panel from the fastening bolts, which are located at the lower side of the lateral panels (C) and remove it from the test room (D).



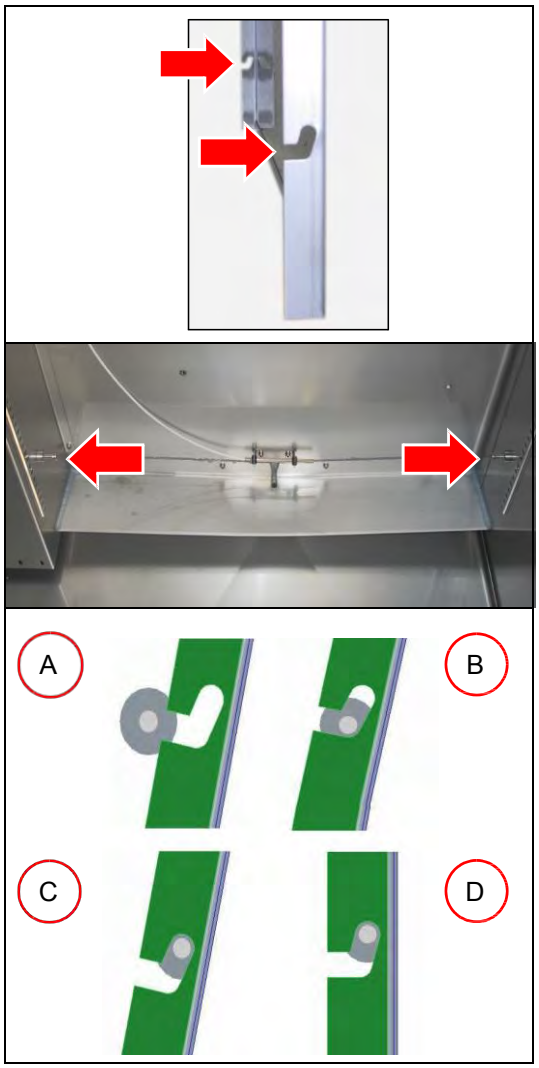
4.19 Installing the Back Panel

Required Tools/Material:

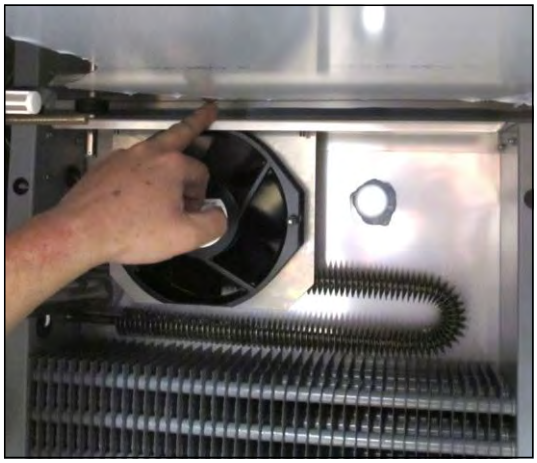
- Open-ended spanner/socket spanner, size: 7

How to install the back panel of the test room:

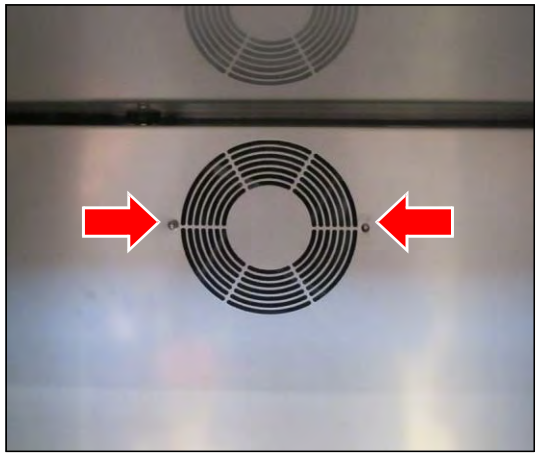
1. Push the lateral recesses in the back panel on the fastening bolts at the lower side of the lateral panels (A), (B).
2. Lower the back panel (C).
3. Place the back panel upright (D).



4. Lift the back panel on the upper support plate and pass the screws through the holes.



5. Insert and tighten the two cap nuts at the back panel.
6. Install the fastening clips of the shelves.
7. Insert the shelves.



4.20 Replacing the Ion Exchanger Cartridge

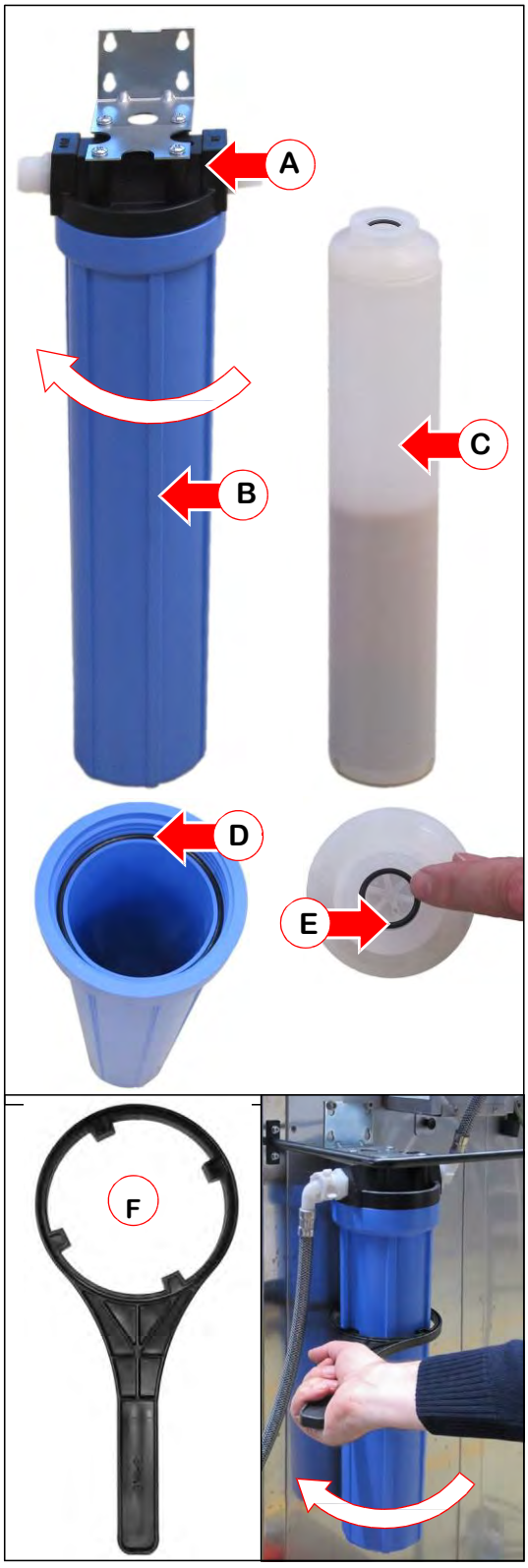
The ion exchanger is an option for units with optional ultrasonic humidification. It is located on the back panel of the unit.

How to replace the ion exchanger cartridge:

1. Close the water supply.
2. Make a water collecting tray available.
3. Release pressure, for instance by loosening the hose at the inlet of the ion exchanger.
   Collect the water in the collecting tray.
4. Remove the blue sleeve of the ion exchanger (B).
   Use tool (F), if required.
   When unscrewing the blue sleeve of the ion exchanger by hand, hold the sleeve in the lower area and turn it.
5. Check, if the seal (E) at the old ion exchanger cartridge is still present, or if it is still on the shaft of the black support (A). Remove it from there.
6. Empty the residual water from the sleeve of the ion exchanger.
7. Check the seal (D).
8. Check the seal (E) at the new ion exchanger cartridge (C).
9. Insert the ion exchanger cartridge into the sleeve.
10. Fasten it.

HINT
Spare cartridges must always be stored in the original packaging in a dark, cool and dry place for no longer than 12 months.

HINT
Use the corresponding tool (F) to loosen the blue sleeve of the ion exchanger.
Push the tool from below as far as possible upwards above the sleeve of the ion exchanger and loosen the sleeve of the ion exchanger.



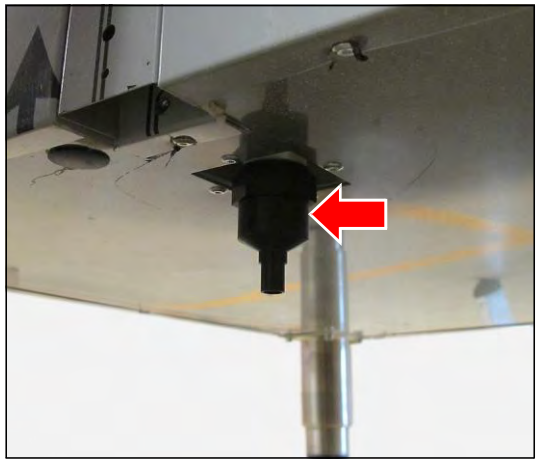
4.21 Maintenance of the Condensate Drain Valve

Required Tools/Material:

- –

Maintenance of the condensate drain valve:

1. Unscrew the condensate drain valve below the unit.



2. Unscrew the condensate drain valve.

3. Clean the ball of the condensate drain valve or replace it, if required.
4. Insert the cleaned or new ball.

5. Screw the condensate drain valve together.
6. Check the function of the condensate drain valve:
   - ❍ Fill water into the condensate drain valve.
   - ❍ The ball must float.
   - ❍ The water is drained until the ball drops and closes the drain.
7. Insert the condensate drain valve below the unit and tighten the screws.

The maintenance of the condensate drain valve is finished.

4.22 Replacing the Fluorescent Lamps

DANGER

Warning of dangerous electrical voltage!
When working with live parts, dangerous electric shocks are possible.
➔ Withdraw the mains plug prior to the replacement of the fluorescent lamps.

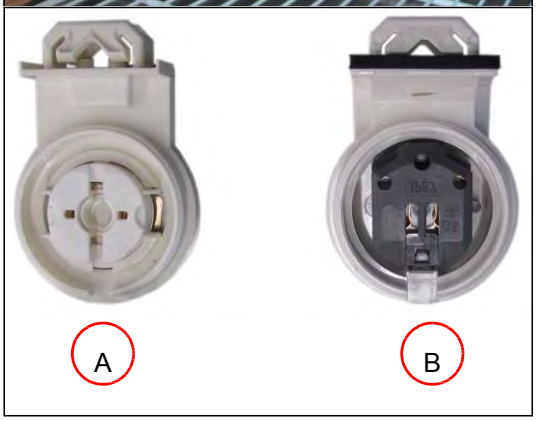
Required Tools/Material:

- –

How to replace the fluorescent lamps:

1. Loosen the threaded ring of the fluorescent lamp on one side.
2. Hold the fluorescent lamp and loosen the threaded ring on the other side.

3. Check the type of the holder.
   - (A): Turn holder (white)
   - (B): Lock holder



4. Turn holder:
   Carefully turn the fluorescent lamp anticlockwise by 90° and remove it downwards from the lock holder.

   Lock holder:
   Carefully remove the fluorescent lamp downwards from the holder.

5. Check, if the red and the black seal in the two threaded rings are undamaged.

6. Push both threaded rings on the new fluorescent lamp.
(One threaded ring, each, with the black seal towards the contact pins.)

HINT
Turn holder: It is a reflector lamp, which emits light in a defined direction.
Thus, insert the fluorescent lamp in such a way, that after having turned it by 90 °, the side, which is marked correspondingly, points upwards.

7. Insert the contact pins of the new fluorescent lamp at one side into the holder.

8. Insert the contact pins at the other side from below completely into the holder.

9. Turn holder: Carefully turn the fluorescent lamp clockwise by 90°.
The engagement of the fluorescent lamp must be audible and perceptible.

10. Tighten the threaded rings on both sides.

The replacement of the fluorescent lamp is finished.

4.23 Replacing the Fluorescent Lamp Holder

DANGER

Warning of dangerous electrical voltage!
When working with live parts, dangerous electric shocks are possible.
➔ Withdraw the mains plug prior to the replacement of the fluorescent lamps.

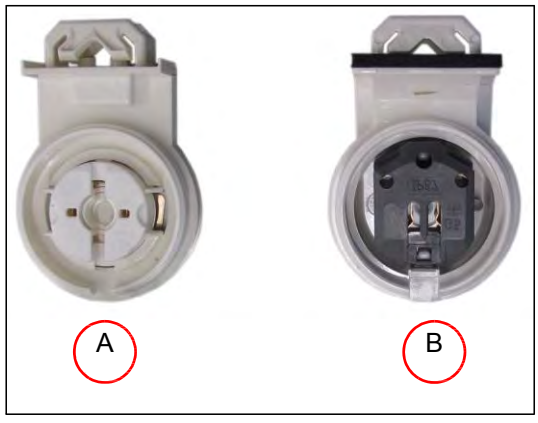
Required Tools/Material:

- Side cutter
- Crimping pliers for end sleeves
- Wire end sleeves, size:

How to replace the fluorescent lamp holder:

1. Loosen the threaded ring of the fluorescent lamp on one side.
2. Hold the fluorescent lamp and loosen the threaded ring on the other side.

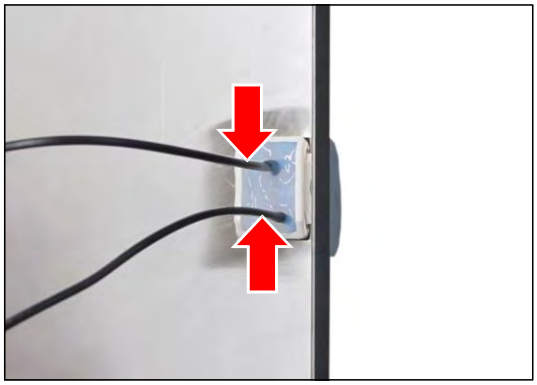
3. Check the type of the holder.
   - (A): Turn holder (white)
   - (B): Lock holder



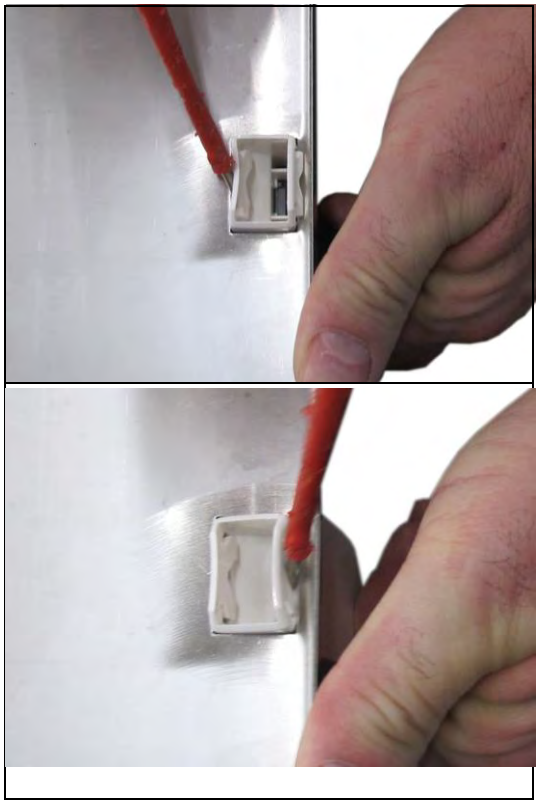
4. Turn holder:
   Carefully turn the fluorescent lamp anticlockwise by 90° and remove it downwards from the lock holder.

   Lock holder:
   Carefully remove the fluorescent lamp downwards from the holder.

5. Separate both cables close to the silicone filling.
6. Fasten the new wire end sleeves at both cut cable ends.



7. Loosen the snap-in noses at the long sides of the holder using a suitable tool.
8. Remove the holder downwards.

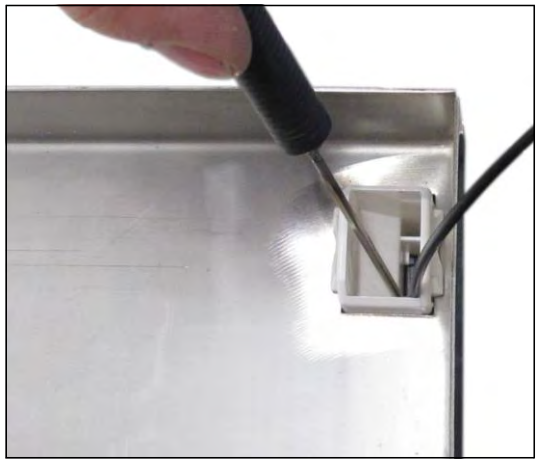


9. Fasten the foot seal at the new holder.

Installing the lock holder:

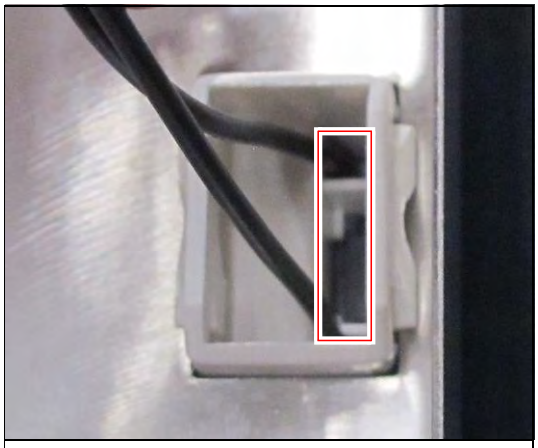
10. Push the holder into position from below.
The snap-in noses must engage.

11. Push both cables into the holder using a suitable tool.



12. Seal the lower area of the cable connection with commercial sanitary silicone.
(Thus, the lower part of the holder is sealed.)

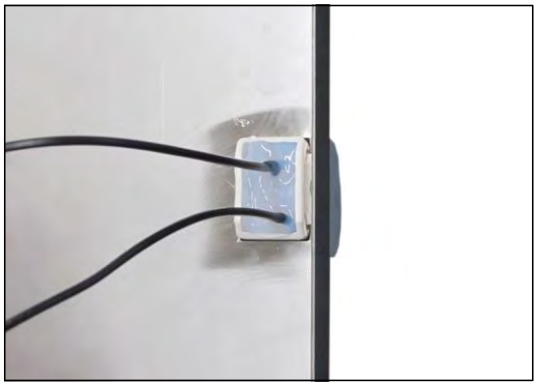
13. Let the silicone dry.



14. Seal the remaining area of the cable connection with thin silicone. (Elastosil® E43)

15. The cables must jut out of the silicone separately and straight towards the top.

The replacement of the fluorescent lamp holder is finished.

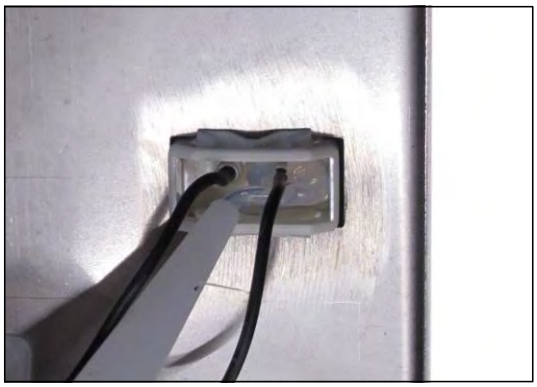


Installing the turn holder:

16. Push the holder into position from below.
The snap-in noses must engage.

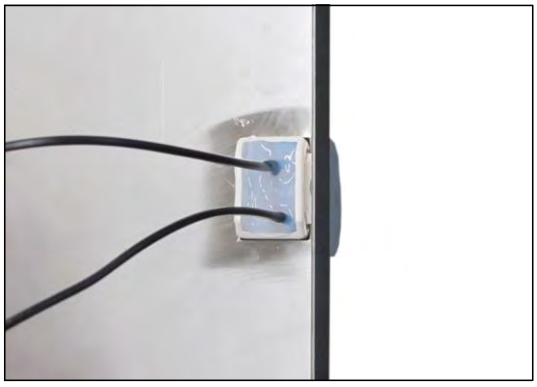
17. Push both cables into the holder using a suitable tool.

18. Seal the remaining area of the cable connection with thin silicone. (Elastosil® E43)



19. The cables must jut out of the silicone separately and straight towards the top.

The replacement of the fluorescent lamp holder is finished.



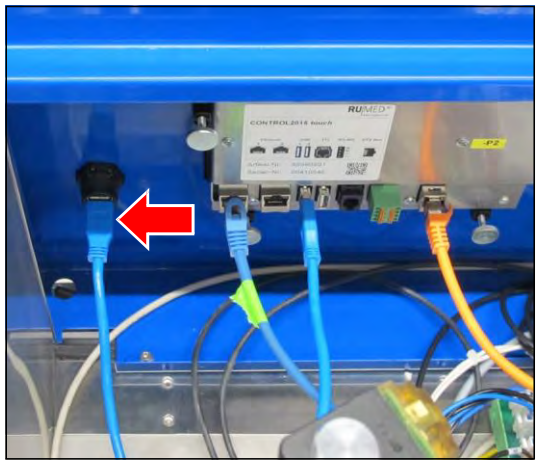
4.24 Replacing the USB Connection

Required Tools/Material:

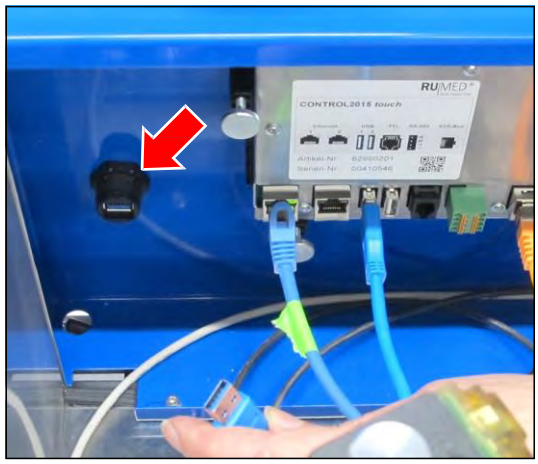
- USB cable, type A, plug to type A, length 0.5 m
- USB panel housing with dust cap

How to replace the USB connection:

1. Remove the cover, *see page 72*.
2. Withdraw the USB cable from the USB panel housing in the component compartment.



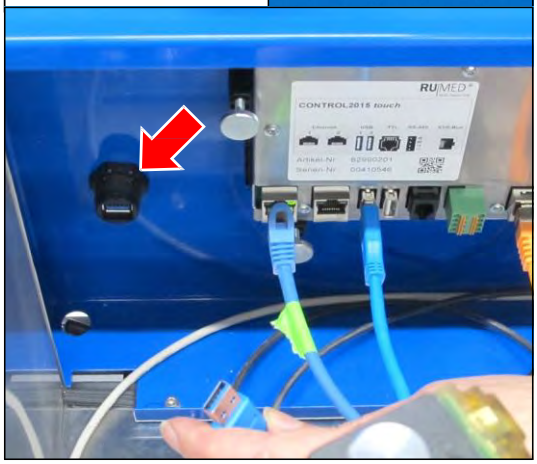
3. Loosen and withdraw the fastening nut at the USB panel housing.
4. Withdraw the USB panel housing to the front.



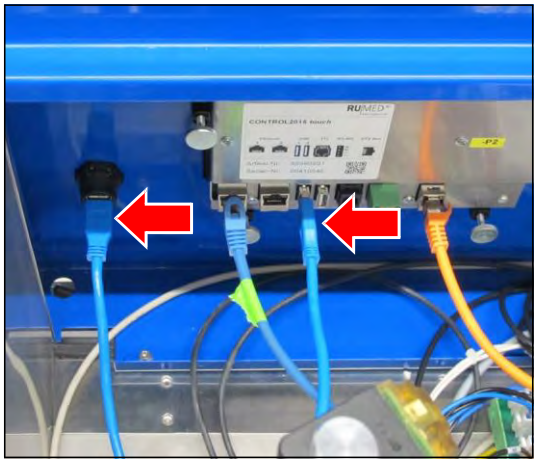
5. Loosen and withdraw the fastening nut at the new USB panel housing.

6. Insert the new USB panel housing from the front.
The nose at the USB panel housing must fit into the recess of the bore.

7. Insert and tighten the fastening nut at the USB panel housing.



8. Connect the USB cable to the USB panel housing and to the control.



The replacement of the USB connection is finished.

4.25 Changing the Steering Rollers - Height Adjustable Feet

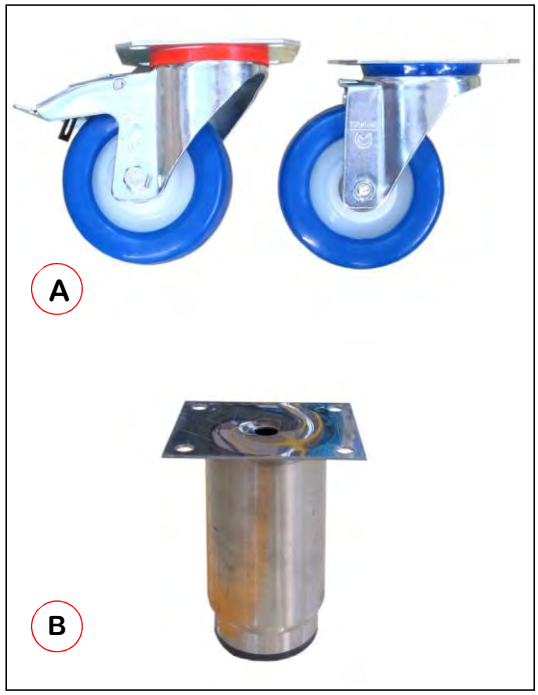
Required Tools/Material:

- Lift truck
- Open-ended spanner/socket spanner, size: _

The test and simulation equipment with stainless-steel housing can be placed on steering rollers (A) or on height adjustable feet (B).
A set of steering rollers comprises two steering rollers with locking brake and two steering rollers without locking brake.

You can change between feet and steering rollers without any problem.

HINT
If the test and simulation equipment cannot be moved through doors etc. due to insufficient height, the feet or the steering rollers can be removed.



Both variants are fastened with four self-locking screws (C).

How to change from steering rollers to height adjustable feet (and vice versa):

NOTE

Property Damage of the Condensate Collecting Pans!
When lifting the test and simulation equipment by means of a lift truck, the condensate collecting pans, which are installed below the unit, might be damaged.

➔ If required, remove the condensate collecting pans below the unit prior to lifting the unit.

NOTE

Cushion your lift truck to prevent damage of the unit surface.

1. Lift the unit with the lift truck.

2. Loosen the four self-locking screws and remove them
3. Remove the steering roller or the foot.

HINT
When installing steering rollers, the steering rollers with locking brake must be installed on the front.

4. Hold the steering roller or foot in installation position.
5. Insert the four self-locking screws and tighten them.
6. The change must be executed with all steering rollers or feet.

The change is finished.

4.26 Cleaning the Unit

DANGER

Warning of Danger of Explosion!
When cleaning the unit in explosive atmospheres, there is the risk of explosion by electrostatic charge.
➔ Clean the unit only with damp antistatic clothes.

WARNING

Warning of hot surfaces!
Risk of burning when cleaning the test room of units with extension of the temperature range to +80 °C.
➔ Ensure that the test room temperature is below 30 °C prior to cleaning.

NOTE

Damage of the Unit!
Never use steel wool to clean the unit. Otherwise the stainless-steel surface is damaged, which results in corrosion.
➔ Never use steel wool to clean the unit.
➔ Stubborn soiling can be removed with a cleaning fleece.
Carefully check the suitability of the cleaning fleece.

HINT
Use demineralized water for cleaning to avoid dry stains.

HINT
Polished stainless-steel surfaces must always be cleaned in direction of the polishing.

1. Remove the specimen and the shelves.
2. Clean the shelves, the surfaces in the test room and the outer surfaces of the unit using a damp cloth.

Removal of Extraneous Rust

- Insignificant, surficial stains:
  Remove them with commercial mild cleansing milk or polishing agent (containing calcium carbonate with additional surface-active substances).
  Household cleaning agents for stainless steel on basis of citric acid are also suitable.

WARNING

Risk of injury by etching material!
Risk of injury when using etching material!
➔ Observe the manufacturers specifications and the regulations for industrial safety and environmental protection.
➔ Wear protective clothing.

- Moderate rust-like soiling:
  Use phosphoric acid cleaners for removal. Proceed carefully to avoid undesirable changes of the surface.
  If small tramp iron particles have already penetrated the surface, they can

also be removed by means of diluted nitric acid.

- Serious contamination with extraneous rust, which had already penetrated into the surface:
  - Degrease
  - Pickle treatment or passivation treatment
    - Pickle treatment: Chemical removal of a thin layer of the stainless-steel surface.
    - Passivation treatment: Controlled formation of the natural passive layer of the stainless steel.

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Subject to changes. Country of origin: Germany