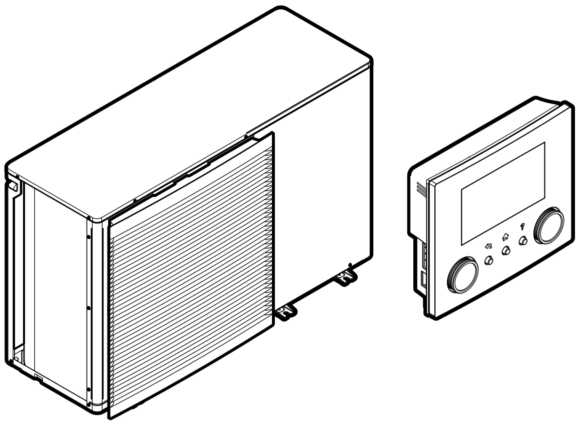
altherma

Service manual

Daikin Altherma 3 M



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Version log

Version code	Description	Date
ESIE20-06	Document release	February 2021
ESIE20-06A	See below	March 2021

The following updates have been applied to the Service Manual:

- Technical data – Wiring diagram: Electrical connection diagram updated.
- Technical data – Wiring diagram: Wiring diagrams for Hydro module updated.

Table of Contents

1 General operation

The low temperature monoblock is a Heat Pump system used for domestic heating and/or cooling applications and can be combined with a domestic hot water tank.

Outdoor units

The outdoor unit consists of:

- Inverter compressor
- A switchbox containing necessary PCBs to control the refrigerant part
- A hydro box containing all PCBs and hydraulic parts to control the space heating/ cooling and optional domestic hot water preparation
- An air cooled heat-exchanger with inverter controlled fan
- A refrigerant to water heat exchanger with PWM controlled pump
- 2 expansion valves (main, and injection)
- 2 space heating connections (Water IN and Water Out)
- System is controlled via MMI2 room interface

Heating mode

The compressor capacity step is defined by the condensing temperature, which is calculated through the high pressure sensor read-out.

In defrost or oil return operation the heat exchanger functions as a condenser, while its fan motor is stopped.

Cooling mode

The compressor capacity step is defined by the evaporation temperature, which is calculated through the low pressure sensor read-out.

Indoor units

The user interface consists of the MMI2, which is indoor installation ONLY.

Below list is only for reference for compatible units. Always refer to the Engineering Databook for compatibility.

Stainless domestic hot water tank EKHWS(U)		Polypropylene domestic hot water tank EKHWP	
Floorstanding heat pump convector FWXV		Wall mounted heat pump convector FWXT	
Concealed heat pump convector FWXM			

2 Troubleshooting

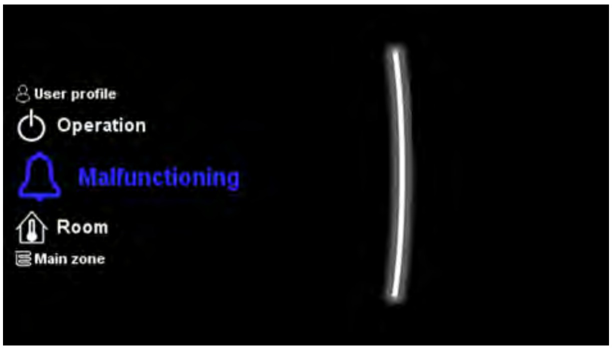
2.1 To display the help text in case of a malfunction

In case of a malfunction, the following will appear on the home screen depending on the severity:

- : Error
- : Malfunction

You can get a short description and a long description of the malfunction as follows:

1	Press the left dial to open the main menu and go to `Malfunctioning`. **Result:** A short description of the error and the error code is displayed on the screen.	



2	Press **?** in the error screen. **Result:** A long description of the error is displayed on the screen.	**?**

2.2 To check the malfunction history

Conditions: The user permission level is set to advanced end user.

1	Go to [8.2]: `Information` > `Malfunction history`.	

You see a list of the most recent malfunctions.

2.3 Error based troubleshooting

> **INFORMATION**
>
> No separate indoor unit is present in the installation.
>
> When a reference is made to the indoor unit, it refers to the hydrobox of the unit.

2.3.1 7H-01 – Water flow problem

Trigger	Effect	Reset
System detects flow abnormality during operation.	Unit will stop operating.	Automatic reset.

To solve the error code

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

1. Check that all stop valves of the water circuit are open. See "4.3 Water circuit" [▶ 299].

   Possible cause: Closed stop valve in the water circuit.

2. Purge the water circuit. See "4.3 Water circuit" [▶ 299].

   Possible cause: Air in the water circuit.

3. Check the water flow. See "4.3 Water circuit" [▶ 299].

   Possible cause: Water flow is too low.

4. Check the water pressure. See "4.3 Water circuit" [▶ 299].

   Possible cause: Water pressure is too low.

5. Check if a by-pass is installed in the water circuit. See "4.3 Water circuit" [▶ 299].

   Possible cause: No by-pass installed in the water circuit.

6. Clean the integrated filter of the shut-off valve. See "5 Maintenance" [▶ 309].

   Possible cause: Dirty filter in the shut-off valve.

7. Perform an electrical check of the water flow sensor. See "3.22 Water flow sensor" [▶ 268].

   Possible cause: Faulty water flow sensor.

8. Perform a check of the 3-way valve. See "3.1 3-way valve" [▶ 86].

   Possible cause: Faulty 3-way valve.

9. Perform a check of the water pump. See "3.24 Water pump" [▶ 276].

   Possible cause: Faulty water pump.

10. Perform a check of the hydro PCB. See "3.12 Hydro PCB" [▶ 160].

    Possible cause: Faulty hydro PCB.

> **INFORMATION**
>
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.2 7H-04 – Water flow problem during domestic hot water production

Trigger	Effect	Reset
Water flow abnormality determined mainly during domestic hot water.	Unit will stop operating.	Manual reset via user interface.

To solve the error code

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

> **NOTICE**
>
> Focus the troubleshooting on the domestic hot water circuit.

1 Check that all stop valves of the water circuit are open. See "4.3 Water circuit" [▶ 299].

Possible cause: Closed stop valve in the water circuit.

2 Purge the water circuit. See "4.3 Water circuit" [▶ 299].

Possible cause: Air in the water circuit.

3 Check the water flow. See "4.3 Water circuit" [▶ 299].

Possible cause: Water flow is too low.

4 Check the water pressure. See "4.3 Water circuit" [▶ 299].

Possible cause: Water pressure is too low.

5 Check if a by-pass is installed in the water circuit. See "4.3 Water circuit" [▶ 299].

Possible cause: No by-pass installed in the water circuit.

6 Perform an electrical check of the water flow sensor. See "3.22 Water flow sensor" [▶ 268].

Possible cause: Faulty water flow sensor.

7 Perform a check of the 3-way valve. See "3.1 3-way valve" [▶ 86].

Possible cause: Faulty 3-way valve.

8 Perform a check of the water pump. See "3.24 Water pump" [▶ 276].

Possible cause: Faulty water pump.

9 Perform a check of the hydro PCB. See "3.12 Hydro PCB" [▶ 160].

Possible cause: Faulty hydro PCB.

> **INFORMATION**
>
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.3 7H-05 – Water flow problem during heating/sampling

Trigger	Effect	Reset
Water flow abnormality determined mainly during space heating.	Unit will stop operating.	Manual reset via user interface.

To solve the error code

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

> **NOTICE**
>
> Focus the troubleshooting on the space heating circuit.

1. Check that all stop valves of the water circuit are open. See "4.3 Water circuit" [▶ 299].

   Possible cause: Closed stop valve in the water circuit.

2. Purge the water circuit. See "4.3 Water circuit" [▶ 299].

   Possible cause: Air in the water circuit.

3. Check the water flow. See "4.3 Water circuit" [▶ 299].

   Possible cause: Water flow is too low.

4. Check the water pressure. See "4.3 Water circuit" [▶ 299].

   Possible cause: Water pressure is too low.

5. Check if a by-pass is installed in the water circuit. See "4.3 Water circuit" [▶ 299].

   Possible cause: No by-pass installed in the water circuit.

6. Perform an electrical check of the water flow sensor. See "3.22 Water flow sensor" [▶ 268].

   Possible cause: Faulty water flow sensor.

7. Perform a check of the 3-way valve. See "3.1 3-way valve" [▶ 86].

   Possible cause: Faulty 3-way valve.

8. Perform a check of the water pump. See "3.24 Water pump" [▶ 276].

   Possible cause: Faulty water pump.

9. Perform a check of the hydro PCB. See "3.12 Hydro PCB" [▶ 160].

   Possible cause: Faulty hydro PCB.

> **INFORMATION**
>
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.4 7H-06 – Water flow during cooling/defrost

Trigger	Effect	Reset
Water flow abnormality determined mainly during cooling or defrost operation.	Unit will stop operating.	Manual reset via user interface.

To solve the error code

INFORMATION

It is recommended to perform the checks in the listed order.

NOTICE

Focus the troubleshooting on the space cooling circuit.

1 Check that all stop valves of the water circuit are open. See "4.3 Water circuit" [▶ 299].

Possible cause: Closed stop valve in the water circuit.

2 Purge the water circuit. See "4.3 Water circuit" [▶ 299].

Possible cause: Air in the water circuit.

3 Check the water flow. See "4.3 Water circuit" [▶ 299].

Possible cause: Water flow is too low.

4 Check the water pressure. See "4.3 Water circuit" [▶ 299].

Possible cause: Water pressure is too low.

5 Check if a by-pass is installed in the water circuit. See "4.3 Water circuit" [▶ 299].

Possible cause: No by-pass installed in the water circuit.

6 Perform an electrical check of the water flow sensor. See "3.22 Water flow sensor" [▶ 268].

Possible cause: Faulty water flow sensor.

7 Perform a check of the 3-way valve. See "3.1 3-way valve" [▶ 86].

Possible cause: Faulty 3-way valve.

8 Perform a check of the water pump. See "3.24 Water pump" [▶ 276].

Possible cause: Faulty water pump.

9 Perform a check of the hydro PCB. See "3.12 Hydro PCB" [▶ 160].

Possible cause: Faulty hydro PCB.

10 Perform a check of the backup heater. See "3.3 Backup heater" [▶ 104].

Possible cause: Faulty backup heater.

11 If installed, perform a check of the booster heater. See "3.5 Booster heater" [▶ 129].

Possible cause: Faulty booster heater.

> **INFORMATION**
>
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.5 80-00 – Inlet water thermistor abnormality

Trigger	Effect	Reset
Inlet water thermistor input is out of range.	Unit will stop operating.	Automatic reset.

To solve the error code

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

1 Perform a check of the inlet water thermistor. See "3.20 Thermistors" [▸ 248].

Possible cause: Faulty inlet water thermistor.

2 Perform a check of the hydro PCB. See "3.12 Hydro PCB" [▸ 160].

Possible cause: Faulty hydro PCB.

> **INFORMATION**
>
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.6 81-00 – Outlet water thermistor abnormality

Trigger	Effect	Reset
Outlet water thermistor input is out of range.	Unit will stop operating.	Automatic reset.

To solve the error code

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

1 Perform a check of the outlet water after backup heater thermistor. See "3.20 Thermistors" [▸ 248].

Possible cause: Faulty outlet water after backup heater thermistor.

2 Perform a check of the hydro PCB. See "3.12 Hydro PCB" [▸ 160].

Possible cause: Faulty hydro PCB.

> **INFORMATION**
>
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.7 81-06 – Outlet water temperature thermistor abnormality

Trigger	Effect	Reset
Outlet water thermistor input is out of range.	Unit will stop operating.	Automatic reset.

To solve the error code

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

1. Perform a check of the outlet water after heat exchanger thermistor. See "3.20 Thermistors" [▸ 248].

   Possible cause: Faulty outlet water after heat exchanger thermistor.

2. Perform a check of the hydro PCB. See "3.12 Hydro PCB" [▸ 160].

   Possible cause: Faulty hydro PCB.

> **INFORMATION**
>
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.8 89-01 – Heat exchanger frozen

Trigger	Effect	Reset
Warning 89-02 or 89-03 occurred 3 times, with less than 30 minutes between each warning.	Unit will stop operating.	Manual reset via user interface.

To solve the error code

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

1. Perform a check of the inlet water thermistor. See "3.20 Thermistors" [▸ 248].

   Possible cause: Faulty inlet water thermistor.

2. Perform a check of the outlet water after heat exchanger thermistor. See "3.20 Thermistors" [▸ 248].

   Possible cause: Faulty outlet water after heat exchanger thermistor.

3. Perform a check of the refrigerant liquid thermistor. See "3.20 Thermistors" [▸ 248].

   Possible cause: Faulty refrigerant liquid thermistor.

4. Perform a check of the hydro PCB. See "3.12 Hydro PCB" [▸ 160].

   Possible cause: Faulty hydro PCB.

5. Check that all stop valves of the refrigerant circuit are open. See "4.2 Refrigerant circuit" [▸ 286].

   Possible cause: Closed stop valve in the refrigerant circuit.

6 Check if the refrigerant circuit is correctly charged. See "4.2 Refrigerant circuit" [▶ 286].

Possible cause: Refrigerant overcharge.

7 Check if the refrigerant circuit is clogged. See "4.2 Refrigerant circuit" [▶ 286].

Possible cause: Clogged refrigerant circuit.

8 Check for the presence of non-condensables and/or humidity in the refrigerant circuit. See "4.2 Refrigerant circuit" [▶ 286].

Possible cause: Non-condensables and/or humidity in the refrigerant circuit.

9 Check the water flow. See "4.3 Water circuit" [▶ 299].

Possible cause: Water flow is too low.

10 Check the water pressure. See "4.3 Water circuit" [▶ 299].

Possible cause: Water pressure is too low.

> **INFORMATION**
>
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.9 89-02 – Heat exchanger frozen

Trigger	Effect	Reset
Condensing temperature <0°C during space heating.	Unit will stop operating.	Automatic reset.
Liquid refrigerant thermistor ≤0°C during space heating or domestic hot water.		

To solve the error code

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

1 Perform a check of the 4-way valve. See "3.2 4-way valve" [▶ 96].

Possible cause: Faulty 4-way valve.

2 Perform a check of the main PCB. See "3.14 Main PCB" [▶ 171].

Possible cause: Faulty main PCB.

> **INFORMATION**
>
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.10 89-03 – Heat exchanger frozen

Trigger	Effect	Reset
Evaporation temperature is too low during defrost.	Unit will NOT stop operating.	Automatic reset.
Outlet water after heat exchanger thermistor <6°C during defrost.		

To solve the error code

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

1 Perform a check of the outlet water after heat exchanger thermistor. See "3.20 Thermistors" [▶ 248].

Possible cause: Faulty outlet water after heat exchanger thermistor.

2 Perform a check of the hydro PCB. See "3.12 Hydro PCB" [▶ 160].

Possible cause: Faulty hydro PCB.

> **INFORMATION**
>
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.11 8F-00 – Abnormal increase outlet water temperature (domestic hot water)

Trigger	Effect	Reset
Outlet water after backup heater thermistor detects a too high temperature during domestic hot water without electrical heater.	Unit will stop operating.	Manual reset via user interface.

To solve the error code

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

1 Check the water circuit for an external heat source. See "4.3 Water circuit" [▶ 299].

Possible cause: Increased water temperature due to an external heat source.

2 Perform a check of the outlet water after backup heater thermistor. See "3.20 Thermistors" [▶ 248].

Possible cause: Faulty outlet water after backup heater thermistor.

3 Perform a check of the backup heater. See "3.3 Backup heater" [▶ 104].

Possible cause: Faulty backup heater.

4 Perform a check of the hydro PCB. See "3.12 Hydro PCB" [▶ 160].

Possible cause: Faulty hydro PCB.

> **INFORMATION**
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.12 8H-00 – Abnormal increase outlet water temperature

Trigger	Effect	Reset
Outlet water after backup heater thermistor detects a too high temperature during space heating without electrical heater.	Unit will stop operating.	Manual reset via user interface.

To solve the error code

> **INFORMATION**
> It is recommended to perform the checks in the listed order.

1. Check the water circuit for an external heat source. See "4.3 Water circuit" [▶ 299].

   Possible cause: Increased water temperature due to an external heat source.

2. Perform a check of the outlet water after backup heater thermistor. See "3.20 Thermistors" [▶ 248].

   Possible cause: Faulty outlet water after backup heater thermistor.

3. Perform a check of the backup heater. See "3.3 Backup heater" [▶ 104].

   Possible cause: Faulty backup heater.

4. Perform a check of the hydro PCB. See "3.12 Hydro PCB" [▶ 160].

   Possible cause: Faulty hydro PCB.

> **INFORMATION**
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.13 8H-03 – Overheating water circuit (thermostat)

Trigger	Effect	Reset
Unit detects activated aquastat.	Pump will stop running.	Automatic reset when the circuit is closed.

To solve the error code

> **INFORMATION**
> It is recommended to perform the checks in the listed order.

1. Check the set trigger temperature of the safety thermostat. See "4.4 Manufacturer components" [▶ 307].

   Possible cause: Faulty trigger temperature setting of the safety thermostat.

2. Check the set water temperature. See "3.21 User interface" [▶ 266].

Possible cause: Faulty water temperature setting.

3 Perform a check of the 3-way valve. See "3.1 3-way valve" [▸ 86].

Possible cause: Faulty 3-way valve.

4 Perform a check of the operation of the Aquastat. See "4.4 Manufacturer components" [▸ 307].

Possible cause: Faulty Aquastat.

> **INFORMATION**
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.14 A1-00 – Zero cross detection problem

Trigger	Effect	Reset
Power supply abnormality. The sinus of the power supply crosses the 0-axis too often in ±10 seconds.	Unit will stop operating.	Manual reset via user interface. Power reset.

To solve the error code

> **INFORMATION**
> It is recommended to perform the checks in the listed order.

1 Perform a check of the main PCB. See "3.14 Main PCB" [▸ 171].

Possible cause: Faulty main PCB.

2 Perform a check of the noise filter PCB. See "3.15 Noise filter PCB" [▸ 194].

Possible cause: Faulty noise filter PCB.

3 Check if the power supply is conform with the regulations. See "4.1 Electrical circuit" [▸ 284].

Possible cause:
- Faulty or disturbance of the power supply (imbalance >4%),
- Power drop,
- Short circuit.

> **INFORMATION**
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.15 A5-00 – Outdoor unit: High pressure peak cut / freeze protection problem

Trigger	Effect	Reset
Pressure is too high in heating / domestic hot water, too low in cooling.	Unit will stop operating.	Manual reset via user interface.

To solve the error code

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

1. Check the water pressure. See "4.3 Water circuit" [▶ 299].

   Possible cause: Water pressure is too low.

2. Check the water flow. See "4.3 Water circuit" [▶ 299].

   Possible cause: Water flow is too low.

3. Check that all stop valves of the water circuit are open. See "4.3 Water circuit" [▶ 299].

   Possible cause: Closed stop valve in the water circuit.

4. Purge the water circuit. See "4.3 Water circuit" [▶ 299].

   Possible cause: Air in the water circuit.

5. Perform a check of the outdoor air thermistor. See "3.20 Thermistors" [▶ 248].

   Possible cause: Faulty ambient air thermistor.

6. Perform a check of all expansion valves. See "3.9 Expansion valve" [▶ 149].

   Possible cause: Faulty expansion valve.

7. Check that all stop valves of the refrigerant circuit are open. See "4.2 Refrigerant circuit" [▶ 286].

   Possible cause: Closed stop valve in the refrigerant circuit.

8. Check if the refrigerant circuit is clogged. See "4.2 Refrigerant circuit" [▶ 286].

   Possible cause: Clogged refrigerant circuit.

9. Check if the refrigerant circuit is correctly charged. See "4.2 Refrigerant circuit" [▶ 286].

   Possible cause: Refrigerant overcharge or shortage.

10. Check for the presence of non-condensables and/or humidity in the refrigerant circuit. See "4.2 Refrigerant circuit" [▶ 286].

    Possible cause: Non-condensables and/or humidity in the refrigerant circuit.

> **INFORMATION**
>
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.16 AA-01 – Backup heater overheated

Trigger	Effect	Reset
Thermal protector is activated. Measured water temperature too high.	Unit will stop operating.	Manual reset via user interface and manual reset of backup heater thermal protector.

To solve the error code

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

1 Check the water pressure. See "4.3 Water circuit" [▶ 299].

Possible cause: Water pressure is too low.

2 Check the water flow. See "4.3 Water circuit" [▶ 299].

Possible cause: Water flow is too low.

3 Purge the water circuit. See "4.3 Water circuit" [▶ 299].

Possible cause: Air in the water circuit.

4 Check the water circuit for an external heat source. See "4.3 Water circuit" [▶ 299].

Possible cause: Increased water temperature due to an external heat source.

5 Perform a check of the backup heater thermal protector. See "3.4 Backup heater thermal protector" [▶ 121].

Possible cause: Faulty backup heater thermal protector.

6 Perform a check of the outlet water after backup heater thermistor. See "3.20 Thermistors" [▶ 248].

Possible cause: Faulty outlet water after backup heater thermistor.

7 Perform a check of the backup heater. See "3.3 Backup heater" [▶ 104].

Possible cause: Faulty backup heater.

8 Perform a check of the hydro PCB. See "3.12 Hydro PCB" [▶ 160].

Possible cause: Faulty hydro PCB.

INFORMATION

If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.17 AA-02 – External backup heater overheated

Trigger	Effect	Reset
Thermal protector is activated. Measured water temperature too high.	Unit will stop operating.	Power reset via outdoor unit.

To solve the error code

INFORMATION

It is recommended to perform the checks in the listed order.

1 Check the water pressure. See "4.3 Water circuit" [▶ 299].

Possible cause: Water pressure is too low.

2 Check the water flow. See "4.3 Water circuit" [▶ 299].

Possible cause: Water flow is too low.

3 Purge the water circuit. See "4.3 Water circuit" [▶ 299].

Possible cause: Air in the water circuit.

4 Check the water circuit for an external heat source. See "4.3 Water circuit" [▶ 299].

Possible cause: Increased water temperature due to an external heat source.

5 Perform a check of the backup heater thermal protector. See "3.4 Backup heater thermal protector" [▶ 121].

Possible cause: Faulty backup heater thermal protector.

6 Perform a check of the outlet water after backup heater thermistor. See "3.20 Thermistors" [▶ 248].

Possible cause: Faulty outlet water after backup heater thermistor.

7 Perform a check of the backup heater. See "3.3 Backup heater" [▶ 104].

Possible cause: Faulty backup heater.

8 Perform a check of the hydro PCB. See "3.12 Hydro PCB" [▶ 160].

Possible cause: Faulty hydro PCB.

INFORMATION

If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.18 AC-00 – Booster heater overheated

Trigger	Effect	Reset
Thermal protection of booster heater does NOT have any feedback signal anymore.	Error will be triggered when bridge connection over booster heater contact is NOT made.	Manual reset via user interface when bridge connection is made.

To solve the error code

INFORMATION

It is recommended to perform the checks in the listed order.

1 Check the water flow. See "4.3 Water circuit" [▶ 299].

Possible cause: Water flow is too low.

2 Purge the water circuit. See "4.3 Water circuit" [▶ 299].

Possible cause: Air in the water circuit.

3 Check the water circuit for an external heat source. See "4.3 Water circuit" [▶ 299].

Possible cause: Increased water temperature due to an external heat source.

4 Check the domestic hot water tank and booster heater related settings. See "3.21 User interface" [▶ 266].

Possible cause: Faulty booster heater settings.

5 Check that the bridge connector X21A of the hydro PCB is correctly connected. See "3.12 Hydro PCB" [▶ 160].

Possible cause: Open jumper X21A on hydro PCB.

6 Perform a check of the booster heater thermal protector. See "3.6 Booster heater thermal protector" [▶ 133].

Possible cause: Faulty booster heater thermal protector.

7 If installed, perform a check of the booster heater. See "3.5 Booster heater" [▶ 129].

Possible cause: Faulty booster heater.

8 Perform a check of the hydro PCB. See "3.12 Hydro PCB" [▶ 160].

Possible cause: Faulty hydro PCB.

9 Perform a check of the power supply, connections, wiring,... between the outdoor unit and domestic hot water tank. See "4.1 Electrical circuit" [▶ 284].

Possible cause: Faulty wiring between the outdoor unit and domestic hot water tank.

> **INFORMATION**
>
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.19 AH-00 – Tank disinfection function not completed correctly

Trigger	Effect	Reset
Disinfection setpoint is NOT reached within 6 hours or NOT kept for the required time.	Unit will NOT stop operating.	Automatic reset when disinfection is completed.

To solve the error code

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

1 Check when the disinfection is scheduled. Schedule it when there is little chance that water will be tapped so that the disinfection can finish in time.

Possible cause: Large quantity of hot water has been tapped during/before disinfection.

2 Check the backup heater settings [2-00] to [2-04] and [4-00]. See "3.21 User interface" [▶ 266].

Possible causes:

- Backup heater is restricted during disinfection,
- Backup heater NOT allowed.

3 Check the domestic hot water tank and booster heater related settings. See "3.21 User interface" [▶ 266].

Possible cause: Faulty booster heater settings.

> **INFORMATION**
>
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.20 AJ-03 – Too long domestic hot water heat-up time required

Trigger	Effect	Reset
Domestic hot water heat-up time >6 hours.	Unit will switch to space heating/cooling for 3 hours.	Automatic reset after a domestic hot water heat-up time <6 hours.

To solve the error code

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

1 Perform a check of the backup heater. See "3.3 Backup heater" [▸ 104].

Possible cause: Faulty backup heater.

2 Check if the power supply is conform with the regulations. See "4.1 Electrical circuit" [▸ 284].

Possible cause:
- Faulty or disturbance of the power supply (imbalance >4%),
- Power drop,
- Short circuit.

3 Perform a check of the hydro PCB. See "3.12 Hydro PCB" [▸ 160].

Possible cause: Faulty hydro PCB.

4 Perform a check of the 3-way valve. See "3.1 3-way valve" [▸ 86].

Possible cause: Faulty 3-way valve.

5 Check the installation for a leaking field installed domestic hot water tap. See "4.3 Water circuit" [▸ 299].

Possible cause: Leaking field installed domestic hot water tap.

6 Check the settings of the backup heater [4-00]. See "3.21 User interface" [▸ 266].

Possible cause: Backup heater NOT allowed.

7 Check the software and EEPROM version on the user interface and PCB. See "3.21 User interface" [▸ 266].

Possible cause: Mismatch between the software ID and EEPROM on the PCB or user interface.

8 Check that the domestic hot water consumption is NOT too large. Lower if needed.

Possible cause: Domestic hot water consumption too large.

> **INFORMATION**
>
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.21 C0-00 – Flow sensor malfunction

Trigger	Effect	Reset
Water flow sensor detects water flow 45 seconds after the water pump has stopped.	Unit will stop operating.	Manual reset via user interface.

To solve the error code

> **INFORMATION**
> It is recommended to perform the checks in the listed order.

1 Check the water pressure. See "4.3 Water circuit" [▶ 299].

Possible cause: Water pressure is too low.

2 Check the water flow. See "4.3 Water circuit" [▶ 299].

Possible cause: Water flow is too low.

3 Purge the water circuit. See "4.3 Water circuit" [▶ 299].

Possible cause: Air in the water circuit.

4 Check the water circuit for an external pump. See "4.3 Water circuit" [▶ 299].

Possible cause: The detected water flow is caused by an external pump.

5 Perform an electrical check of the water flow sensor. See "3.22 Water flow sensor" [▶ 268].

Possible cause: Faulty water flow sensor.

6 Perform a check of the hydro PCB. See "3.12 Hydro PCB" [▶ 160].

Possible cause: Faulty hydro PCB.

> **INFORMATION**
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.22 C4-00 – Heat exchanger temperature sensor problem

Trigger	Effect	Reset
Refrigerant liquid thermistor detects an open or short circuit during compressor operation.	Unit will stop operating.	Power reset.

To solve the error code

> **INFORMATION**
> It is recommended to perform the checks in the listed order.

1 Perform a check of the refrigerant liquid thermistor. See "3.20 Thermistors" [▶ 248].

Possible cause: Faulty refrigerant liquid thermistor.

2 Perform a check of the hydro PCB. See "3.12 Hydro PCB" [▶ 160].

Possible cause: Faulty hydro PCB.

> **INFORMATION**
>
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.23 C5-00 – Heat exchanger thermistor abnormality

Trigger	Effect	Reset
Refrigerant heat exchanger temperature is out of range.	Unit will stop operating.	Automatic reset.

To solve the error code

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

1 Perform a check of the inlet water thermistor. See "3.20 Thermistors" [▶ 248].

Possible cause: Faulty inlet water thermistor.

2 Perform a check of the outlet water after heat exchanger thermistor. See "3.20 Thermistors" [▶ 248].

Possible cause: Faulty outlet water after heat exchanger thermistor.

3 Perform a check of the refrigerant liquid thermistor. See "3.20 Thermistors" [▶ 248].

Possible cause: Faulty refrigerant liquid thermistor.

4 Perform a check of the hydro PCB. See "3.12 Hydro PCB" [▶ 160].

Possible cause: Faulty hydro PCB.

> **INFORMATION**
>
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.24 CJ-02 – Room temperature sensor problem

Trigger	Effect	Reset
User interface room thermistor input is out of range.	Unit will NOT stop operating.	Automatic reset.

To solve the error code

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

1 Perform a check of the room thermistor:

- Measure the room temperature and compare to the room temperature shown on the user interface (remote controller).
- If temperature shown on the user interface differs from the measured temperature, replace the user interface (remote controller). See documentation of the user interface (remote controller) for more information.

Possible cause: Faulty room thermistor.

2 Check the communication wiring between the remote controller and the unit. See "3.21 User interface" [▸ 266].

Possible cause: Faulty wiring between the remote controller and the unit.

3 Perform a check of the hydro PCB. See "3.12 Hydro PCB" [▸ 160].

Possible cause: Faulty hydro PCB.

> **INFORMATION**
>
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.25 E1-00 – Outdoor unit: PCB defect

Trigger	Effect	Reset
Main PCB detects that EEPROM is abnormal.	Unit will stop operating.	Manual reset via user interface.
		Power reset.

To solve the error code

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

1 Perform a check of the main PCB. See "3.14 Main PCB" [▸ 171].

Possible cause: Faulty main PCB.

2 Check if the power supply is conform with the regulations. See "4.1 Electrical circuit" [▸ 284].

Possible cause:
- Faulty or disturbance of the power supply (imbalance >4%),
- Power drop,
- Short circuit.

3 Perform a check of the outdoor unit fan motor. See "3.16 Outdoor unit fan motor" [▸ 217].

Possible cause: Faulty outdoor unit fan motor.

4 Perform a check of the compressor. See "3.7 Compressor" [▸ 134].

Possible cause: Faulty compressor or miswiring of the compressor power supply cable.

Prerequisite: Stop the unit operation via the user interface.

5 Turn OFF the respective circuit breaker.

DANGER: RISK OF ELECTROCUTION

Confirm the rectifier voltage is below 10 V DC before proceeding, see "To prevent electrical hazards" [▶ 285].

6 Check that the thermal interface grease is applied properly on the (PCB or refrigerant piping) contact surface of the heat sink. Adjust if needed.

Possible cause: Thermal interface grease NOT applied properly on the heat sink.

INFORMATION

Make sure to use thermal interface grease Shin Etsu G-776 (spare part number 2269571).

INFORMATION

If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.26 E3-00 – Outdoor unit: Actuation of high pressure switch

Trigger	Effect	Reset
High pressure switch opens due to measured pressure above high pressure switch operating point.	Unit will stop operating.	Manual reset via user interface.
High pressure control (measured pressure just below high pressure switch operating point) occurs 16 times within 300 minutes.		

To solve the error code

INFORMATION

It is recommended to perform the checks in the listed order.

1 Check that all stop valves of the refrigerant circuit are open. See "4.2 Refrigerant circuit" [▶ 286].

Possible cause: Closed stop valve in the refrigerant circuit.

2 Perform a check of the refrigerant pressure sensor. See "3.19 Refrigerant pressure sensor" [▶ 244].

Possible cause: Faulty refrigerant pressure sensor.

3 Perform a check of the high pressure switch. See "3.11 High pressure switch" [▶ 157].

Possible cause: Faulty high pressure switch.

4 Perform a check of the main PCB. See "3.14 Main PCB" [▶ 171].

Possible cause: Faulty main PCB.

5 Check if the refrigerant circuit is correctly charged. See "4.2 Refrigerant circuit" [▶ 286].

Possible cause: Refrigerant overcharge.

6 Check for the presence of non-condensables and/or humidity in the refrigerant circuit. See "4.2 Refrigerant circuit" [▶ 286].

Possible cause: Non-condensables and/or humidity in the refrigerant circuit.

7 Check if the refrigerant circuit is clogged. See "4.2 Refrigerant circuit" [▶ 286].

Possible cause: Clogged refrigerant circuit.

8 Perform a check of the outdoor unit fan motor. See "3.16 Outdoor unit fan motor" [▶ 217].

Possible cause: Faulty outdoor unit fan motor.

INFORMATION

If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.27 E3-24 – High pressure switch abnormality

Trigger	Effect	Reset
High pressure switch opens due to measured pressure above high pressure switch operating point.	Unit will stop operating.	Manual reset via user interface.
High pressure control (measured pressure just below high pressure switch operating point) occurs 16 times within 300 minutes.		

To solve the error code

INFORMATION

It is recommended to perform the checks in the listed order.

1 Perform a check of the refrigerant pressure sensor. See "3.19 Refrigerant pressure sensor" [▶ 244].

Possible cause: Faulty refrigerant pressure sensor.

2 Perform a check of the high pressure switch. See "3.11 High pressure switch" [▶ 157].

Possible cause: Faulty high pressure switch.

3 Perform a check of the main PCB. See "3.14 Main PCB" [▶ 171].

Possible cause: Faulty main PCB.

4 Check if the refrigerant circuit is correctly charged. See "4.2 Refrigerant circuit" [▶ 286].

Possible cause: Refrigerant overcharge.

5 Check for the presence of non-condensables and/or humidity in the refrigerant circuit. See "4.2 Refrigerant circuit" [▶ 286].

Possible cause: Non-condensables and/or humidity in the refrigerant circuit.

6 Check if the refrigerant circuit is clogged. See "4.2 Refrigerant circuit" [▶ 286].

Possible cause: Clogged refrigerant circuit.

7 Perform a check of the outdoor unit fan motor. See "3.16 Outdoor unit fan motor" [▶ 217].

Possible cause: Faulty outdoor unit fan motor.

> **INFORMATION**
>
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.28 E4-00 – Abnormal suction pressure

Trigger	Effect	Reset
Suction pressure was too low (detected by thermistor/pressure sensor or low pressure switch) for several times.	Unit will stop operating.	Manual reset via user interface.

To solve the error code

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

1 Perform a check of the suction pipe thermistor. See "3.20 Thermistors" [▶ 248].

Possible cause: Faulty suction pipe thermistor or connector fault.

2 Check that all stop valves of the refrigerant circuit are open. See "4.2 Refrigerant circuit" [▶ 286].

Possible cause: Closed stop valve in the refrigerant circuit.

3 Check if the refrigerant circuit is correctly charged. See "4.2 Refrigerant circuit" [▶ 286].

Possible cause: Refrigerant shortage.

4 Check for the presence of humidity in the refrigerant circuit. See "4.2 Refrigerant circuit" [▶ 286].

Possible cause: Humidity in the refrigerant circuit.

5 Check if the refrigerant circuit is clogged. See "4.2 Refrigerant circuit" [▶ 286].

Possible cause: Clogged refrigerant circuit.

6 Perform a check of all expansion valves. See "3.9 Expansion valve" [▶ 149].

Possible cause: Faulty expansion valve.

7 Check the required space around the outdoor unit heat exchanger. See "4.5 External factors" [▶ 307].

Possible cause: Insufficient air flow or air by-pass due to required space specifications not met.

8 Clean the outdoor heat exchanger. See "5 Maintenance" [▸ 309].

Possible cause: Dirty outdoor heat exchanger.

9 Perform a check of the main PCB. See "3.14 Main PCB" [▸ 171].

Possible cause: Faulty main PCB.

> **INFORMATION**
>
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.29 E5-00 – Outdoor unit: Overheat of inverter compressor motor

Trigger	Effect	Reset
Compressor overload is detected.	Unit will NOT stop operating.	Automatic reset if the unit runs without warning for 60 seconds.

To solve the error code

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

1 Check that all stop valves of the refrigerant circuit are open. See "4.2 Refrigerant circuit" [▸ 286].

Possible cause: Closed stop valve in the refrigerant circuit.

2 Perform a check of the discharge pipe thermistor. See "3.20 Thermistors" [▸ 248].

Possible cause: Faulty discharge pipe thermistor or connector fault.

3 Perform a check of the outdoor unit fan motor. See "3.16 Outdoor unit fan motor" [▸ 217].

Possible cause: Faulty outdoor unit fan motor.

4 Perform a check of the compressor. See "3.7 Compressor" [▸ 134].

Possible cause: Faulty compressor or miswiring of the compressor power supply cable.

5 Perform a check of all expansion valves. See "3.9 Expansion valve" [▸ 149].

Possible cause: Faulty expansion valve.

6 Perform a check of the 4-way valve. See "3.2 4-way valve" [▸ 96].

Possible cause: Faulty 4-way valve.

7 Perform a check of the main PCB. See "3.14 Main PCB" [▸ 171].

Possible cause: Faulty main PCB.

8 Check if the refrigerant circuit is correctly charged. See "4.2 Refrigerant circuit" [▸ 286].

Possible cause: Refrigerant shortage.

9 Check for the presence of non-condensables and/or humidity in the refrigerant circuit. See "4.2 Refrigerant circuit" [▸ 286].

Possible cause: Non-condensables and/or humidity in the refrigerant circuit.

10 Check if the refrigerant circuit is clogged. See "4.2 Refrigerant circuit" [▸ 286].

Possible cause: Clogged refrigerant circuit.

> **INFORMATION**
>
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.30 E6-00 – Outdoor unit: Compressor startup defect

Trigger	Effect	Reset
The motor rotor does NOT rotate when the compressor is energized.	Unit will NOT stop operating.	Automatic reset after a continuous run for 10 minutes.
	Unit will stop operating	Manual reset via user interface.

To solve the error code

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

1. Perform a check of the discharge pipe thermistor. See "3.20 Thermistors" [▸ 248].

   Possible cause: Faulty discharge pipe thermistor or connector fault.

2. Check that all stop valves of the refrigerant circuit are open. See "4.2 Refrigerant circuit" [▸ 286].

   Possible cause: Closed stop valve in the refrigerant circuit.

3. Check if the refrigerant circuit is clogged. See "4.2 Refrigerant circuit" [▸ 286].

   Possible cause: Clogged refrigerant circuit.

4. Check if the refrigerant circuit is correctly charged. See "4.2 Refrigerant circuit" [▸ 286].

   Possible cause: Refrigerant overcharge or shortage.

5. Check for the presence of non-condensables and/or humidity in the refrigerant circuit. See "4.2 Refrigerant circuit" [▸ 286].

   Possible cause: Non-condensables and/or humidity in the refrigerant circuit.

6. Perform a check of the compressor. See "3.7 Compressor" [▸ 134].

   Possible cause: Faulty compressor or miswiring of the compressor power supply cable.

7. Perform a check of the main PCB. See "3.14 Main PCB" [▸ 171].

   Possible cause: Faulty main PCB.

8. Perform a check of the 4-way valve. See "3.2 4-way valve" [▸ 96].

   Possible cause: Faulty 4-way valve.

9. Perform a check of all expansion valves. See "3.9 Expansion valve" [▸ 149].

   Possible cause: Faulty expansion valve.

> **INFORMATION**
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.31 E7-00 – Outdoor unit: Malfunction of outdoor unit fan motor

Trigger	Effect	Reset
Fan does NOT start 15~30 seconds after ON signal. It can occur that the error code is triggered when the fan motor is running caused by a faulty rotating sensor signal.	Unit will stop operating.	Manual reset via user interface.

To solve the error code

> **INFORMATION**
> It is recommended to perform the checks in the listed order.

1. Perform a check of the outdoor unit fan motor. See "3.16 Outdoor unit fan motor" [▸ 217].

   Possible cause: Faulty outdoor unit fan motor.

2. Perform a check of the main PCB. See "3.14 Main PCB" [▸ 171].

   Possible cause: Faulty main PCB.

> **INFORMATION**
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.32 E8-00 – Outdoor unit: Power input overvoltage

Trigger	Effect	Reset
Compressor running current exceeds standard value for 2.5 seconds.	Unit will stop operating.	Manual reset via user interface.

To solve the error code

> **INFORMATION**
> It is recommended to perform the checks in the listed order.

1. Check the outdoor temperature. See "4.5 External factors" [▸ 307].

   Possible cause: Outdoor temperature is out of operation range.

2. Perform a check of the compressor. See "3.7 Compressor" [▸ 134].

   Possible cause: Faulty compressor or miswiring of the compressor power supply cable.

3. Perform a check of the main PCB. See "3.14 Main PCB" [▸ 171].

Possible cause: Faulty main PCB.

4 Check if the power supply is conform with the regulations. See "4.1 Electrical circuit" [▶ 284].

Possible cause:
- Faulty or disturbance of the power supply (imbalance >4%),
- Power drop,
- Short circuit.

> **INFORMATION**
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.33 E9-00 – Malfunction of electronic expansion valve

Trigger	Effect	Reset
No continuity of the expansion valve.	Unit will stop operating.	Manual reset via user interface.
Minimum expansion valve opening and suction superheat <4 K and discharge superheat <5 K.		Power reset via outdoor unit.

To solve the error code

> **INFORMATION**
> It is recommended to perform the checks in the listed order.

1 Perform a check of all refrigerant side thermistors. See "3.20 Thermistors" [▶ 248].

Possible cause: Faulty refrigerant side thermistor(s).

2 Perform a check of all expansion valves. See "3.9 Expansion valve" [▶ 149].

Possible cause: Faulty expansion valve.

3 Check that all stop valves of the refrigerant circuit are open. See "4.2 Refrigerant circuit" [▶ 286].

Possible cause: Closed stop valve in the refrigerant circuit.

4 Check if the refrigerant circuit is clogged. See "4.2 Refrigerant circuit" [▶ 286].

Possible cause: Clogged refrigerant circuit.

5 Check if the refrigerant circuit is correctly charged. See "4.2 Refrigerant circuit" [▶ 286].

Possible cause: Refrigerant overcharge.

6 Check for the presence of non-condensables and/or humidity in the refrigerant circuit. See "4.2 Refrigerant circuit" [▶ 286].

Possible cause: Non-condensables and/or humidity in the refrigerant circuit.

7 Perform a check of the main PCB. See "3.14 Main PCB" [▶ 171].

Possible cause: Faulty main PCB.

8 Check if the power supply is conform with the regulations. See "4.1 Electrical circuit" [▶ 284].

Possible cause:
- Faulty or disturbance of the power supply (imbalance >4%),
- Power drop,
- Short circuit.

> **INFORMATION**
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.34 EA-00 – Outdoor unit: Cool/heat switchover problem

Trigger	Effect	Reset
Room thermistor is NOT functioning within operation range.	Unit will NOT stop operating.	Automatic reset after a continuous operation for some time.
	If the error occurs too soon: unit will stop operating.	Manual reset via user interface.

To solve the error code

> **INFORMATION**
> It is recommended to perform the checks in the listed order.

1. Perform a check of the 4-way valve. See "3.2 4-way valve" [▶ 96].

   Possible cause: Faulty 4-way valve.

2. Perform a check of the main PCB. See "3.14 Main PCB" [▶ 171].

   Possible cause: Faulty main PCB.

3. Perform a check of the room thermistor:

   - Measure the room temperature and compare to the room temperature shown on the user interface (remote controller).
   - If temperature shown on the user interface differs from the measured temperature, replace the user interface (remote controller). See documentation of the user interface (remote controller) for more information.

   Possible cause: Faulty room thermistor.

4. Check the communication wiring between the remote controller and the unit. See "3.21 User interface" [▶ 266].

   Possible cause: Faulty wiring between the remote controller and the unit.

5. Perform a check of the hydro PCB. See "3.12 Hydro PCB" [▶ 160].

   Possible cause: Faulty hydro PCB.

6. Check that all stop valves of the refrigerant circuit are open. See "4.2 Refrigerant circuit" [▶ 286].

   Possible cause: Closed stop valve in the refrigerant circuit.

7. Check if the refrigerant circuit is clogged. See "4.2 Refrigerant circuit" [▶ 286].

   Possible cause: Clogged refrigerant circuit.

8 Check if the refrigerant circuit is correctly charged. See "4.2 Refrigerant circuit" [▶ 286].

Possible cause: Refrigerant overcharge or shortage.

9 Check for the presence of non-condensables and/or humidity in the refrigerant circuit. See "4.2 Refrigerant circuit" [▶ 286].

Possible cause: Non-condensables and/or humidity in the refrigerant circuit.

> **INFORMATION**
>
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.35 EC-00 – Abnormal increase tank temperature

Trigger	Effect	Reset
Domestic hot water tank thermistor measures a too high temperature.	Unit will NOT stop operating.	Automatic reset.

To solve the error code

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

1 Check the water circuit for an external heat source. See "4.3 Water circuit" [▶ 299].

Possible cause: Increased water temperature due to an external heat source.

2 Perform a check of the domestic hot water tank thermistor. See "3.20 Thermistors" [▶ 248].

Possible cause: Faulty domestic hot water tank thermistor.

3 Perform a check of the hydro PCB. See "3.12 Hydro PCB" [▶ 160].

Possible cause: Faulty hydro PCB.

> **INFORMATION**
>
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.36 EC-04 – Tank preheating

Trigger	Effect	Reset
Unit is preheating the tank.	Unit will NOT stop operating.	Automatic reset.

To solve the error code

1 No specific check / repair procedures must be performed to solve this error code. The water in the heating system and the tank is too cold to perform defrost operation, so the tank needs to be preheated electrically. Wait until preheating operation is done.

> **INFORMATION**
>
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.37 F3-00 – Outdoor unit: Malfunction of discharge pipe temperature

Trigger	Effect	Reset
Discharge pipe thermistor detects a too high temperature.	Unit will NOT stop operating.	Automatic reset when temperature drops normal level.
	If the error re-occurs too soon: unit will stop operating.	Manual reset via user interface.

To solve the error code

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

1. Check that all stop valves of the refrigerant circuit are open. See "4.2 Refrigerant circuit" [▶ 286].

   Possible cause: Closed stop valve in the refrigerant circuit.

2. Check if the refrigerant circuit is correctly charged. See "4.2 Refrigerant circuit" [▶ 286].

   Possible cause: Refrigerant overcharge or shortage.

3. Check for the presence of non-condensables and/or humidity in the refrigerant circuit. See "4.2 Refrigerant circuit" [▶ 286].

   Possible cause: Non-condensables and/or humidity in the refrigerant circuit.

4. Check if the refrigerant circuit is clogged. See "4.2 Refrigerant circuit" [▶ 286].

   Possible cause: Clogged refrigerant circuit.

5. Perform a check of the 4-way valve. See "3.2 4-way valve" [▶ 96].

   Possible cause: Faulty 4-way valve.

6. Perform a check of all expansion valves. See "3.9 Expansion valve" [▶ 149].

   Possible cause: Faulty expansion valve.

7. Perform a check of the main PCB. See "3.14 Main PCB" [▶ 171].

   Possible cause: Faulty main PCB.

8. Perform a check of all refrigerant side thermistors. See "3.20 Thermistors" [▶ 248].

   Possible cause: Faulty refrigerant side thermistor(s).

> **INFORMATION**
>
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.38 F6-00 – Outdoor unit: Abnormal high pressure in cooling

Trigger	Effect	Reset
Outdoor heat exchanger thermistor measures a too high temperature.	Unit will NOT stop operating.	Automatic reset when temperature drops.

To solve the error code

> **INFORMATION**
> It is recommended to perform the checks in the listed order.

1. Clean the outdoor heat exchanger. See "5 Maintenance" [▶ 309].

   Possible cause: Dirty outdoor heat exchanger.

2. Check that all stop valves of the refrigerant circuit are open. See "4.2 Refrigerant circuit" [▶ 286].

   Possible cause: Closed stop valve in the refrigerant circuit.

3. Perform a check of the heat exchanger thermistor. See "3.20 Thermistors" [▶ 248].

   Possible cause: Faulty heat exchanger thermistor.

4. Perform a check of all expansion valves. See "3.9 Expansion valve" [▶ 149].

   Possible cause: Faulty expansion valve.

5. Perform a check of the main PCB. See "3.14 Main PCB" [▶ 171].

   Possible cause: Faulty main PCB.

6. Check if the refrigerant circuit is correctly charged. See "4.2 Refrigerant circuit" [▶ 286].

   Possible cause: Refrigerant overcharge.

7. Check for the presence of non-condensables and/or humidity in the refrigerant circuit. See "4.2 Refrigerant circuit" [▶ 286].

   Possible cause: Non-condensables and/or humidity in the refrigerant circuit.

8. Check if the refrigerant circuit is clogged. See "4.2 Refrigerant circuit" [▶ 286].

   Possible cause: Clogged refrigerant circuit.

9. Perform a check of the outdoor unit fan motor. See "3.16 Outdoor unit fan motor" [▶ 217].

   Possible cause: Faulty outdoor unit fan motor.

> **INFORMATION**
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.39 FA-00 – Outdoor unit: Abnormal high pressure, actuation of high pressure switch

Trigger	Effect	Reset
Outdoor heat exchanger thermistor measures a too high temperature.	Unit will NOT stop operating.	Automatic reset when temperature drops.

To solve the error code

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

1. Clean the outdoor heat exchanger. See "5 Maintenance" [▸ 309].

   Possible cause: Dirty outdoor heat exchanger.

2. Check that all stop valves of the refrigerant circuit are open. See "4.2 Refrigerant circuit" [▸ 286].

   Possible cause: Closed stop valve in the refrigerant circuit.

3. Check the outdoor temperature. See "4.5 External factors" [▸ 307].

   Possible cause: Outdoor temperature is out of operation range.

4. Check the required space around the outdoor unit heat exchanger. See "4.5 External factors" [▸ 307].

   Possible cause: Insufficient air flow or air by-pass due to required space specifications not met.

5. Perform a check of the heat exchanger thermistor. See "3.20 Thermistors" [▸ 248].

   Possible cause: Faulty heat exchanger thermistor.

6. Perform a check of all expansion valves. See "3.9 Expansion valve" [▸ 149].

   Possible cause: Faulty expansion valve.

7. Perform a check of the main PCB. See "3.14 Main PCB" [▸ 171].

   Possible cause: Faulty main PCB.

8. Check if the refrigerant circuit is correctly charged. See "4.2 Refrigerant circuit" [▸ 286].

   Possible cause: Refrigerant overcharge.

9. Check for the presence of non-condensables and/or humidity in the refrigerant circuit. See "4.2 Refrigerant circuit" [▸ 286].

   Possible cause: Non-condensables and/or humidity in the refrigerant circuit.

10. Check if the refrigerant circuit is clogged. See "4.2 Refrigerant circuit" [▸ 286].

    Possible cause: Clogged refrigerant circuit.

11. Perform a check of the outdoor unit fan motor. See "3.16 Outdoor unit fan motor" [▸ 217].

    Possible cause: Faulty outdoor unit fan motor.

> **INFORMATION**
>
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.40 H0-00 – Outdoor unit: Voltage/current sensor problem

Trigger	Effect	Reset
Compressor voltage (DC) is out of range before start-up.	Unit will stop operating.	Manual reset via user interface.

To solve the error code

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

1. Perform a check of the main PCB. See "3.14 Main PCB" [▶ 171].

   Possible cause: Faulty main PCB.

2. Perform a check of the noise filter PCB. See "3.15 Noise filter PCB" [▶ 194].

   Possible cause: Faulty noise filter PCB.

3. Check if the power supply is conform with the regulations. See "4.1 Electrical circuit" [▶ 284].

   Possible cause:
   - Faulty or disturbance of the power supply (imbalance >4%),
   - Power drop,
   - Short circuit.

Prerequisite: Stop the unit operation via the user interface.

4. Turn OFF the respective circuit breaker.

> **DANGER: RISK OF ELECTROCUTION**
>
> Confirm the rectifier voltage is below 10 V DC before proceeding, see "To prevent electrical hazards" [▶ 285].

5. Check that the thermal interface grease is applied properly on the (PCB or refrigerant piping) contact surface of the heat sink. Adjust if needed.

   Possible cause: Thermal interface grease NOT applied properly on the heat sink.

> **INFORMATION**
>
> Make sure to use thermal interface grease Shin Etsu G-776 (spare part number 2269571).

> **INFORMATION**
>
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.41 H1-00 – External temperature sensor problem

Trigger	Effect	Reset
Optional external indoor or outdoor ambient thermistor input is out of range.	Unit will NOT stop operating.	Automatic reset when input is in range.

To solve the error code

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

1 Perform a check of the external indoor or outdoor ambient thermistor. See "3.20 Thermistors" [▸ 248].

Possible cause: Faulty external indoor or outdoor ambient thermistor.

2 Perform a check of the hydro PCB. See "3.12 Hydro PCB" [▸ 160].

Possible cause: Faulty hydro PCB.

> **INFORMATION**
>
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.42 H3-00 – Outdoor unit: Malfunction of high pressure switch

Trigger	Effect	Reset
High pressure switch is activated when compressor is off.	Unit will stop operating.	Manual reset via user interface.

To solve the error code

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

1 Perform a check of the high pressure switch. See "3.11 High pressure switch" [▸ 157].

Possible cause: Faulty high pressure switch.

2 Perform a check of the main PCB. See "3.14 Main PCB" [▸ 171].

Possible cause: Faulty main PCB.

3 Check if the power supply is conform with the regulations. See "4.1 Electrical circuit" [▸ 284].

Possible cause:
- Faulty or disturbance of the power supply (imbalance >4%),
- Power drop,
- Short circuit.

> **INFORMATION**
>
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.43 H4-00 – Malfunction of low pressure switch

Trigger	Effect	Reset
Low pressure switch is defective or NOT well connected.	Unit will stop operating.	Manual reset via user interface.

To solve the error code

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

1 Perform a check of the low pressure switch. See "3.13 Low pressure switch" [▶ 167].

Possible cause: Faulty low pressure switch.

2 Perform a check of the main PCB. See "3.14 Main PCB" [▶ 171].

Possible cause: Faulty main PCB.

> **INFORMATION**
>
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.44 H5-00 – Malfunction of compressor overload protection

Trigger	Effect	Reset
Compressor overload protection is defective.	Unit will stop operating.	Manual reset via user interface.

To solve the error code

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

1 Check that all stop valves of the refrigerant circuit are open. See "4.2 Refrigerant circuit" [▶ 286].

Possible cause: Closed stop valve in the refrigerant circuit.

2 Check if the refrigerant circuit is clogged. See "4.2 Refrigerant circuit" [▶ 286].

Possible cause: Clogged refrigerant circuit.

3 Perform a check of the compressor. See "3.7 Compressor" [▶ 134].

Possible cause: Faulty compressor or miswiring of the compressor power supply cable.

4 Check liquid back issue. Check expansion valve operation. See "3.9 Expansion valve" [▶ 149].

Possible cause: Expansion valve CANNOT keep minimum superheat of 3 K while running as evaporator.

5 Check if the refrigerant circuit is correctly charged. See "4.2 Refrigerant circuit" [▶ 286].

Possible cause: Refrigerant overcharge.

6 Perform a check of the 4-way valve. See "3.2 4-way valve" [▶ 96].

Possible cause: Faulty 4-way valve.

7 Perform a check the discharge pipe thermistor. See "3.20 Thermistors" [▶ 248].

Possible cause: Faulty discharge pipe thermistor or connector fault.

8 Perform a check of the main PCB. See "3.14 Main PCB" [▶ 171].

Possible cause: Faulty main PCB.

> **INFORMATION**
>
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.45 H6-00 – Outdoor unit: Malfunction of position detection sensor

Trigger	Effect	Reset
Compressor fails to start within 15 seconds after the compressor run command signal is sent.	Unit will NOT stop operating.	Automatic reset after a continuous operation of 10 minutes.
	If the error re-occurs within 8 minutes: unit will stop operating.	Manual reset via user interface.

To solve the error code

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

1. Perform a check of the compressor. See "3.7 Compressor" [▶ 134].

   Possible cause: Faulty compressor or miswiring of the compressor power supply cable.

2. Perform a check of the main PCB. See "3.14 Main PCB" [▶ 171].

   Possible cause: Faulty main PCB.

3. Check that all stop valves of the refrigerant circuit are open. See "4.2 Refrigerant circuit" [▶ 286].

   Possible cause: Closed stop valve in the refrigerant circuit.

4. Check if the refrigerant circuit is clogged. See "4.2 Refrigerant circuit" [▶ 286].

   Possible cause: Clogged refrigerant circuit.

5. Check if the refrigerant circuit is correctly charged. See "4.2 Refrigerant circuit" [▶ 286].

   Possible cause: Refrigerant overcharge or shortage.

6. Check for the presence of non-condensables and/or humidity in the refrigerant circuit. See "4.2 Refrigerant circuit" [▶ 286].

   Possible cause: Non-condensables and/or humidity in the refrigerant circuit.

7. Check if the power supply is conform with the regulations. See "4.1 Electrical circuit" [▶ 284].

   Possible cause:
   - Faulty or disturbance of the power supply (imbalance >4%),
   - Power drop,
   - Short circuit.

> **INFORMATION**
>
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.46 H8-00 – Outdoor unit: Malfunction of compressor input system

Trigger	Effect	Reset
DC voltage or current sensor abnormality based on the compressor running frequency and the input current.	Unit will NOT stop operating.	Automatic reset when compressor runs normally for 60 minutes.
	If the error re-occurs too soon: unit will stop operating.	Manual reset via user interface.

To solve the error code

> **INFORMATION**
> It is recommended to perform the checks in the listed order.

1 Perform a check of the main PCB. See "3.14 Main PCB" [▶ 171].

Possible cause: Faulty main PCB.

2 Perform a check of the compressor. See "3.7 Compressor" [▶ 134].

Possible cause: Faulty compressor or miswiring of the compressor power supply cable.

3 Perform a check of the reactor. See "3.18 Reactor" [▶ 242].

Possible cause: Faulty reactor.

> **INFORMATION**
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.47 H9-00 – Outdoor unit: Malfunction of outdoor air thermistor

Trigger	Effect	Reset
Outdoor air thermistor input is out of range.	Unit will stop operating.	Manual reset via user interface.

To solve the error code

> **INFORMATION**
> It is recommended to perform the checks in the listed order.

1 Perform a check of the outdoor air thermistor. See "3.20 Thermistors" [▶ 248].

Possible cause: Faulty ambient air thermistor.

2 Perform a check of the main PCB. See "3.14 Main PCB" [▶ 171].

Possible cause: Faulty main PCB.

> **INFORMATION**
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.48 HC-00 – Tank temperature sensor problem

Trigger	Effect	Reset
Domestic hot water tank thermistor input is out of range.	Unit will NOT stop operating.	Automatic reset when resistance is within range.

To solve the error code

> **INFORMATION**
> It is recommended to perform the checks in the listed order.

1. Perform a check of the domestic hot water tank thermistor. See "3.20 Thermistors" [▸ 248].

   Possible cause: Faulty domestic hot water tank thermistor.

2. Perform a check of the hydro PCB. See "3.12 Hydro PCB" [▸ 160].

   Possible cause: Faulty hydro PCB.

> **INFORMATION**
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.49 HJ-10 – Water pressure sensor abnormality

Trigger	Effect	Reset
Water pressure input is out of range.	Unit will NOT stop operating.	Automatic reset when water pressure is within range.

To solve the error code

> **INFORMATION**
> It is recommended to perform the checks in the listed order.

1. Check the main water supply and pressure of the installation. See "4.3 Water circuit" [▸ 299].

   Possible cause: Main water supply or pressure outside expected range.

2. Check for leaks in the water circuit. See "4.3 Water circuit" [▸ 299].

   Possible cause: Leak in the water circuit.

3. Perform a check of the water pressure sensor. See "3.23 Water pressure sensor" [▸ 272].

   Possible cause: Faulty water pressure sensor.

4. Perform a check of the hydro PCB. See "3.12 Hydro PCB" [▸ 160].

   Possible cause: Faulty hydro PCB.

> **INFORMATION**
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.50 J3-00 – Outdoor unit: Malfunction of discharge pipe thermistor

Trigger	Effect	Reset
Discharge pipe thermistor input is out of range.	Unit will stop operating.	Manual reset via user interface.

To solve the error code

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

1 Perform a check of the discharge pipe thermistor. See "3.20 Thermistors" [▸ 248].

Possible cause: Faulty discharge pipe thermistor or connector fault.

2 Perform a check of the main PCB. See "3.14 Main PCB" [▸ 171].

Possible cause: Faulty main PCB.

> **INFORMATION**
>
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.51 J5-00 – Malfunction of suction pipe thermistor

Trigger	Effect	Reset
Suction pipe thermistor input is out of range range.	Unit will stop operating.	Automatic reset.

To solve the error code

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

1 Perform a check of the suction pipe thermistor. See "3.20 Thermistors" [▸ 248].

Possible cause: Faulty suction pipe thermistor or connector fault.

2 Perform a check of the main PCB. See "3.14 Main PCB" [▸ 171].

Possible cause: Faulty main PCB.

> **INFORMATION**
>
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.52 J6-00 – Outdoor unit: Malfunction of heat exchanger thermistor

Trigger	Effect	Reset
Outdoor heat exchanger thermistor input is out of range.	Unit will stop operating.	Manual reset via user interface.

To solve the error code

> **INFORMATION**
> It is recommended to perform the checks in the listed order.

1. Perform a check of the heat exchanger thermistor. See "3.20 Thermistors" [▸ 248].

   Possible cause: Faulty heat exchanger thermistor.

2. Perform a check of the main PCB. See "3.14 Main PCB" [▸ 171].

   Possible cause: Faulty main PCB.

> **INFORMATION**
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.53 J6-07 – Outdoor unit: Malfunction of heat exchanger thermistor

Trigger	Effect	Reset
Heat exchanger thermistor input is out of range.	Unit will stop operating.	Manual reset via user interface.

To solve the error code

> **INFORMATION**
> It is recommended to perform the checks in the listed order.

1. Perform a check of the heat exchanger (middle) thermistor. See "3.20 Thermistors" [▸ 248].

   Possible cause: Faulty heat exchanger (middle) thermistor.

2. Perform a check of the main PCB. See "3.14 Main PCB" [▸ 171].

   Possible cause: Faulty main PCB.

> **INFORMATION**
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.54 J6-32 – Leaving water temperature thermistor abnormality (outdoor unit)

Trigger	Effect	Reset
Temperature sensor after plate type heat exchanger is broken.	Unit will NOT stop operating.	Automatic reset.

To solve the error code

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

1. Perform a check of the outlet water after heat exchanger thermistor. See "3.20 Thermistors" [▸ 248].

   Possible cause: Faulty outlet water after heat exchanger thermistor.

2. Perform a check of the hydro PCB. See "3.12 Hydro PCB" [▸ 160].

   Possible cause: Faulty hydro PCB.

> **INFORMATION**
>
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.55 J8-00 – Malfunction of refrigerant liquid thermistor

Trigger	Effect	Reset
Refrigerant liquid thermistor detects an abnormal value (open or short circuit)	Unit will stop operating.	Automatic reset.

To solve the error code

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

1. Perform a check of the refrigerant liquid thermistor. See "3.20 Thermistors" [▸ 248].

   Possible cause: Faulty refrigerant liquid thermistor.

2. Perform a check of the hydro PCB. See "3.12 Hydro PCB" [▸ 160].

   Possible cause: Faulty hydro PCB.

3. Check the water flow. See "4.3 Water circuit" [▸ 299].

   Possible cause: Water flow is too low.

> **INFORMATION**
>
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.56 JA-00 – Malfunction of high pressure sensor

Trigger	Effect	Reset
Refrigerant pressure sensor detects a value out of range (>4.5 MPa or <–0.05 MPa).	Unit will stop operating.	Manual reset via user interface.

To solve the error code

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

1 Perform a check of the refrigerant pressure sensor. See "3.19 Refrigerant pressure sensor" [▶ 244].

Possible cause: Faulty refrigerant pressure sensor.

2 Perform a check of the main PCB. See "3.14 Main PCB" [▶ 171].

Possible cause: Faulty main PCB.

> **INFORMATION**
>
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.57 L1-00 – Outdoor unit: Main PCB abnormality

Trigger	Effect	Reset
Outdoor unit main PCB detects current/voltage errors.	Unit will stop operating.	Manual reset via user interface.
		Power reset.

To solve the error code

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

1 Check if the power supply is conform with the regulations. See "4.1 Electrical circuit" [▶ 284].

Possible cause:

- Faulty or disturbance of the power supply (imbalance >4%),
- Power drop,
- Short circuit.

2 Perform a check of the main PCB. See "3.14 Main PCB" [▶ 171].

Possible cause: Faulty main PCB.

> **INFORMATION**
>
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.58 L3-00 – Outdoor unit: Electrical box temperature rise problem

Trigger	Effect	Reset
Switch box temperature is too high.	Unit will stop operating.	Manual reset via remote controller.

To solve the error code

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

1 Perform a check of the main PCB. See "3.14 Main PCB" [▶ 171].

Possible cause: Faulty main PCB.

2 Perform a check of the outdoor unit fan motor. See "3.16 Outdoor unit fan motor" [▶ 217].

Possible cause: Faulty outdoor unit fan motor.

3 Check if the power supply is conform with the regulations. See "4.1 Electrical circuit" [▶ 284].

Possible cause:
- Faulty or disturbance of the power supply (imbalance >4%),
- Power drop,
- Short circuit.

4 Clean the outdoor heat exchanger. See "5 Maintenance" [▶ 309].

Possible cause: Dirty outdoor heat exchanger.

> **INFORMATION**
>
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.59 L4-00 – Outdoor unit: Malfunction of inverter radiating fin temperature rise

Trigger	Effect	Reset
Radiating fin thermistor measures a too high temperature.	Unit will stop operating.	Manual reset via user interface.

To solve the error code

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

1 Perform a check of the outdoor unit fan motor. See "3.16 Outdoor unit fan motor" [▶ 217].

Possible cause: Faulty outdoor unit fan motor.

2 Check if the power supply is conform with the regulations. See "4.1 Electrical circuit" [▶ 284].

Possible cause:
- Faulty or disturbance of the power supply (imbalance >4%),
- Power drop,
- Short circuit.

3 Perform a check of the main PCB. See "3.14 Main PCB" [▶ 171].

Possible cause: Faulty main PCB.

Prerequisite: Stop the unit operation via the user interface.

4 Turn OFF the respective circuit breaker.

DANGER: RISK OF ELECTROCUTION

Confirm the rectifier voltage is below 10 V DC before proceeding, see "To prevent electrical hazards" [▶ 285].

5 Check that the thermal interface grease is applied properly on the (PCB or refrigerant piping) contact surface of the heat sink. Adjust if needed.

Possible cause: Thermal interface grease NOT applied properly on the heat sink.

INFORMATION

Make sure to use thermal interface grease Shin Etsu G-776 (spare part number 2269571).

INFORMATION

If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.60 L5-00 – Outdoor unit: Inverter instantaneous overcurrent

Trigger	Effect	Reset
An output overcurrent is detected by checking the current that flows in the inverter DC section.	Unit will stop operating.	Manual reset via user interface.

To solve the error code

INFORMATION

It is recommended to perform the checks in the listed order.

1 Check that all stop valves of the refrigerant circuit are open. See "4.2 Refrigerant circuit" [▶ 286].

Possible cause: Closed stop valve in the refrigerant circuit.

2 Check if the refrigerant circuit is clogged. See "4.2 Refrigerant circuit" [▶ 286].

Possible cause: Clogged refrigerant circuit.

3 Check if the refrigerant circuit is correctly charged. See "4.2 Refrigerant circuit" [▶ 286].

Possible cause: Refrigerant overcharge or shortage.

4 Check for the presence of non-condensables and/or humidity in the refrigerant circuit. See "4.2 Refrigerant circuit" [▶ 286].

Possible cause: Non-condensables and/or humidity in the refrigerant circuit.

5 Perform a check of the main PCB. See "3.14 Main PCB" [▶ 171].

Possible cause: Faulty main PCB.

6 Perform a check of the compressor. See "3.7 Compressor" [▶ 134].

Possible cause: Faulty compressor or miswiring of the compressor power supply cable.

7 Check if the power supply is conform with the regulations. See "4.1 Electrical circuit" [▶ 284].

Possible cause:
- Faulty or disturbance of the power supply (imbalance >4%),
- Power drop,
- Short circuit.

Prerequisite: Stop the unit operation via the user interface.

8 Turn OFF the respective circuit breaker.

> **DANGER: RISK OF ELECTROCUTION**
>
> Confirm the rectifier voltage is below 10 V DC before proceeding, see "To prevent electrical hazards" [285].

9 Check that the thermal interface grease is applied properly on the (PCB or refrigerant piping) contact surface of the heat sink. Adjust if needed.

Possible cause: Thermal interface grease NOT applied properly on the heat sink.

> **INFORMATION**
>
> Make sure to use thermal interface grease Shin Etsu G-776 (spare part number 2269571).

> **INFORMATION**
>
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.61 L8-00 – Malfunction triggered by a thermal protection in the main PCB

Trigger	Effect	Reset
When compressor overload (except during start-up) is detected.	Unit will stop operating.	Manual reset via user interface.

To solve the error code

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

1 Check that all stop valves of the refrigerant circuit are open. See "4.2 Refrigerant circuit" [286].

Possible cause: Closed stop valve in the refrigerant circuit.

2 Check if the refrigerant circuit is clogged. See "4.2 Refrigerant circuit" [286].

Possible cause: Clogged refrigerant circuit.

3 Check if the refrigerant circuit is correctly charged. See "4.2 Refrigerant circuit" [286].

Possible cause: Refrigerant overcharge or shortage.

4 Check for the presence of non-condensables and/or humidity in the refrigerant circuit. See "4.2 Refrigerant circuit" [286].

Possible cause: Non-condensables and/or humidity in the refrigerant circuit.

5 Perform a check of the main PCB. See "3.14 Main PCB" [171].

Possible cause: Faulty main PCB.

6 Perform a check of the compressor. See "3.7 Compressor" [▸ 134].

Possible cause: Faulty compressor or miswiring of the compressor power supply cable.

> **INFORMATION**
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.62 L9-00 – Prevention of compressor lock

Trigger	Effect	Reset
Detection of start-up failure after time passed to avoid compressor lock.	Unit will stop operating.	Manual reset via user interface.

To solve the error code

> **INFORMATION**
> It is recommended to perform the checks in the listed order.

1 Perform a check of the compressor. See "3.7 Compressor" [▸ 134].

Possible cause: Faulty compressor or miswiring of the compressor power supply cable.

2 Check if the power supply is conform with the regulations. See "4.1 Electrical circuit" [▸ 284].

Possible cause:
- Faulty or disturbance of the power supply (imbalance >4%),
- Power drop,
- Short circuit.

3 Perform a check of the main PCB. See "3.14 Main PCB" [▸ 171].

Possible cause: Faulty main PCB.

4 Check that all stop valves of the refrigerant circuit are open. See "4.2 Refrigerant circuit" [▸ 286].

Possible cause: Closed stop valve in the refrigerant circuit.

5 Check if the refrigerant circuit is clogged. See "4.2 Refrigerant circuit" [▸ 286].

Possible cause: Clogged refrigerant circuit.

6 Check if the refrigerant circuit is correctly charged. See "4.2 Refrigerant circuit" [▸ 286].

Possible cause: Refrigerant overcharge or shortage.

7 Check for the presence of non-condensables and/or humidity in the refrigerant circuit. See "4.2 Refrigerant circuit" [▸ 286].

Possible cause: Non-condensables and/or humidity in the refrigerant circuit.

> **INFORMATION**
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.63 LC-00 – Malfunction in communication system of outdoor unit

Trigger	Effect	Reset
Malfunction in communication system inside the unit.	Unit will stop operating.	Manual reset.

To solve the error code

> **INFORMATION**
> It is recommended to perform the checks in the listed order.

1 Perform a check of the main PCB. See "3.14 Main PCB" [▶ 171].

Possible cause: Faulty main PCB.

2 Perform a check of the outdoor unit fan motor. See "3.16 Outdoor unit fan motor" [▶ 217].

Possible cause: Faulty outdoor unit fan motor.

> **INFORMATION**
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.64 P1-00 – Open phase power supply imbalance

Trigger	Effect	Reset
Malfunction in transmission system inside the outdoor unit.	Unit will stop operating.	Automatic reset.

To solve the error code

> **INFORMATION**
> It is recommended to perform the checks in the listed order.

1 Perform a check of the main PCB. See "3.14 Main PCB" [▶ 171].

Possible cause: Faulty main PCB.

2 Perform a check of the noise filter PCB. See "3.15 Noise filter PCB" [▶ 194].

Possible cause: Faulty noise filter PCB.

3 Check if the power supply is conform with the regulations. See "4.1 Electrical circuit" [▶ 284].

Possible cause:
- Faulty or disturbance of the power supply (imbalance >4%),
- Power drop,
- Short circuit.

> **INFORMATION**
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.65 P3-00 – Abnormal direct current

Trigger	Effect	Reset
Malfunction decision by exceeding direct current limit value.	Unit will stop operating.	Automatic reset.

To solve the error code

1. Replace the main PCB. See "3.14 Main PCB" [▸ 171].

   Possible cause: Onboard sensor error.

> **INFORMATION**
>
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.66 P4-00 – Outdoor unit: Malfunction of radiating fin temperature sensor

Trigger	Effect	Reset
Radiating fin thermistor input is out of range.	Unit will stop operating.	Manual reset via user interface.

To solve the error code

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

1. Perform a check of the radiation fin thermistor. See "3.20 Thermistors" [▸ 248].

   Possible cause: Faulty radiation fin thermistor.

2. Perform a check of the main PCB. See "3.14 Main PCB" [▸ 171].

   Possible cause: Faulty main PCB.

> **INFORMATION**
>
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.67 PJ-00 – Capacity setting mismatch

Trigger	Effect	Reset
Outdoor unit main PCB detects a defective capacity in EEPROM.	Unit will stop operating.	Manual reset via user interface.
		Power supply reset.

To solve the error code

1. Perform a check of the main PCB. See "3.14 Main PCB" [▸ 171].

   Possible cause: Faulty main PCB.

> **INFORMATION**
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.68 U0-00 – Outdoor unit: Shortage of refrigerant

Trigger	Effect	Reset
Refrigerant shortage detected.	Unit will stop operating.	Automatic reset.
		Power reset via outdoor unit.

To solve the error code

> **INFORMATION**
> It is recommended to perform the checks in the listed order.

1. Perform a check of all refrigerant side thermistors. See "3.20 Thermistors" [▶ 248].

   Possible cause: Faulty refrigerant side thermistor(s).

2. Perform a check of the refrigerant pressure sensor. See "3.19 Refrigerant pressure sensor" [▶ 244].

   Possible cause: Faulty refrigerant pressure sensor.

3. Check that all stop valves of the refrigerant circuit are open. See "4.2 Refrigerant circuit" [▶ 286].

   Possible cause: Closed stop valve in the refrigerant circuit.

4. Check if the refrigerant circuit is clogged. See "4.2 Refrigerant circuit" [▶ 286].

   Possible cause: Clogged refrigerant circuit.

5. Check if the refrigerant circuit is correctly charged. See "4.2 Refrigerant circuit" [▶ 286].

   Possible cause: Refrigerant shortage.

6. Check for the presence of non-condensables and/or humidity in the refrigerant circuit. See "4.2 Refrigerant circuit" [▶ 286].

   Possible cause: Non-condensables and/or humidity in the refrigerant circuit.

7. Perform a check of the compressor. See "3.7 Compressor" [▶ 134].

   Possible cause: Faulty compressor or miswiring of the compressor power supply cable.

8. Perform a check of all expansion valves. See "3.9 Expansion valve" [▶ 149].

   Possible cause: Faulty expansion valve.

9. Check for leaks in the refrigerant circuit. Look for oil traces on the unit(s). Check the brazing points on the field piping. Perform a pressure test, see "4.2 Refrigerant circuit" [▶ 286].

   Possible cause: Leak in the refrigerant circuit.

> **INFORMATION**
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.69 U1-00 – Malfunction by reverse phase/open phase

Trigger	Effect	Reset
Outdoor unit main PCB detects incorrect power supply.	Unit will stop operating.	Power reset via outdoor unit.

To solve the error code

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

1. Check if the power supply is conform with the regulations. See "4.1 Electrical circuit" [▸ 284].

   Possible cause:
   - Faulty or disturbance of the power supply (imbalance >4%),
   - Power drop,
   - Short circuit.

2. Perform a check of the noise filter PCB. See "3.15 Noise filter PCB" [▸ 194].

   Possible cause: Faulty noise filter PCB.

3. Perform a check of the main PCB. See "3.14 Main PCB" [▸ 171].

   Possible cause: Faulty main PCB.

> **INFORMATION**
>
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.70 U2-00 – Outdoor unit: Defect of power supply voltage

Trigger	Effect	Reset
Power supply abnormality or instant power failure is detected.	Unit will stop operating.	Power reset via outdoor unit.

To solve the error code

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

1. Check if the power supply is conform with the regulations. See "4.1 Electrical circuit" [▸ 284].

   Possible cause:
   - Faulty or disturbance of the power supply (imbalance >4%),
   - Power drop,
   - Short circuit.

2. Perform a check of the compressor. See "3.7 Compressor" [▸ 134].

   Possible cause: Faulty compressor or miswiring of the compressor power supply cable.

3. Perform a check of the outdoor unit fan motor. See "3.16 Outdoor unit fan motor" [▸ 217].

Possible cause: Faulty outdoor unit fan motor.

4 Perform a check of the main PCB. See "3.14 Main PCB" [▶ 171].

Possible cause: Faulty main PCB.

5 Perform a check of the noise filter PCB. See "3.15 Noise filter PCB" [▶ 194].

Possible cause: Faulty noise filter PCB.

6 Wait until the compressor restarts.

Possible cause:
- Momentary drop of voltage,
- Momentary power failure.

> **INFORMATION**
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.71 U3-00 – Under floor heating screed dry out function not completed correctly

Trigger	Effect	Reset
Under floor heating screed dry-out is interrupted.	Unit will stop operating.	Manual reset via user interface.

To solve the error code

1 Check if the power supply is conform with the regulations. See "4.1 Electrical circuit" [▶ 284].

Possible cause:
- Faulty or disturbance of the power supply (imbalance >4%),
- Power drop,
- Short circuit.

> **INFORMATION**
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.72 U4-00 – Indoor/outdoor unit communication problem

Trigger	Effect	Reset
Communication failure between outdoor and indoor unit.	Unit will stop operating.	Power reset via outdoor unit.

To solve the error code

> **INFORMATION**
> It is recommended to perform the checks in the listed order.

1 Check if the power supply is conform with the regulations. See "4.1 Electrical circuit" [▶ 284].

Possible cause:
- Faulty or disturbance of the power supply (imbalance >4%),
- Power drop,
- Short circuit.

2 Check the wiring between the hydro PCB and the main PCB. See "4.1 Electrical circuit" [▸ 284].

Possible cause: Faulty wiring between the hydro PCB and main PCB.

3 Perform a check of the main PCB. See "3.14 Main PCB" [▸ 171].

Possible cause: Faulty main PCB.

4 Perform a check of the outdoor unit fan motor. See "3.16 Outdoor unit fan motor" [▸ 217].

Possible cause: Faulty outdoor unit fan motor.

5 Perform a check of the hydro PCB. See "3.12 Hydro PCB" [▸ 160].

Possible cause: Faulty hydro PCB.

Prerequisite: Stop the unit operation via the user interface.

6 Turn OFF the respective circuit breaker.

> **DANGER: RISK OF ELECTROCUTION**
>
> Confirm the rectifier voltage is below 10 V DC before proceeding, see "To prevent electrical hazards" [▸ 285].

7 Check that the thermal interface grease is applied properly on the (PCB or refrigerant piping) contact surface of the heat sink. Adjust if needed.

Possible cause: Thermal interface grease NOT applied properly on the heat sink.

> **INFORMATION**
>
> Make sure to use thermal interface grease Shin Etsu G-776 (spare part number 2269571).

> **INFORMATION**
>
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.73 U5-00 – User interface communication problem

Trigger	Effect	Reset
Communication failure between unit and user interface.	Unit will stop operating.	Automatic reset.

To solve the error code

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

1 Perform a check of the hydro PCB. See "3.12 Hydro PCB" [▸ 160].

Possible cause: Faulty hydro PCB.

2 Check if the remote controller user interface functions correctly. See "3.21 User interface" [▶ 266].

Possible cause: Faulty remote controller user interface.

3 Check the communication wiring between the remote controller and the unit. See "3.21 User interface" [▶ 266].

Possible cause: Faulty wiring between the remote controller and the unit.

4 Check if the power supply is conform with the regulations. See "4.1 Electrical circuit" [▶ 284].

Possible cause:
- Faulty or disturbance of the power supply (imbalance >4%),
- Power drop,
- Short circuit.

> **INFORMATION**
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.74 U7-00 – Outdoor unit: Transmission malfunction between main microcomputer - inverter microcomputer

Trigger	Effect	Reset
Communication abnormality between main and inverter microcomputer.	Unit will stop operating.	Manual reset via user interface.

To solve the error code

> **INFORMATION**
> It is recommended to perform the checks in the listed order.

1 Perform a check of the main PCB. See "3.14 Main PCB" [▶ 171].

Possible cause: Faulty main PCB.

> **INFORMATION**
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.75 U8-02 – Connection with room thermostat lost

Trigger	Effect	Reset
Communication abnormality between unit and room thermostat after connection was already made.	Unit will NOT stop operating.	Automatic reset.

To solve the error code

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

1 Check if the power supply is conform with the regulations. See "4.1 Electrical circuit" [▸ 284].

Possible cause:

- Faulty or disturbance of the power supply (imbalance >4%),
- Power drop,
- Short circuit.

2 Check the communication wiring between the remote controller and the unit. See "3.21 User interface" [▸ 266].

Possible cause: Faulty wiring between the remote controller and the unit.

3 Perform a check of the room thermistor:

- Measure the room temperature and compare to the room temperature shown on the user interface (remote controller).
- If temperature shown on the user interface differs from the measured temperature, replace the user interface (remote controller). See documentation of the user interface (remote controller) for more information.

Possible cause: Faulty room thermistor.

4 Perform a check of the hydro PCB. See "3.12 Hydro PCB" [▸ 160].

Possible cause: Faulty hydro PCB.

> **INFORMATION**
>
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.76 U8-03 – No connection with room thermostat

Trigger	Effect	Reset
Communication abnormality between unit and room thermostat, connection NOT possible.	Unit will NOT stop operating.	Automatic reset.

To solve the error code

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

1 Check if the power supply is conform with the regulations. See "4.1 Electrical circuit" [▸ 284].

Possible cause:

- Faulty or disturbance of the power supply (imbalance >4%),
- Power drop,
- Short circuit.

2 Perform a check of the room thermistor:

- Measure the room temperature and compare to the room temperature shown on the user interface (remote controller).
- If temperature shown on the user interface differs from the measured temperature, replace the user interface (remote controller). See documentation of the user interface (remote controller) for more information.

Possible cause: Faulty room thermistor.

3. Check the communication wiring between the remote controller and the unit. See "3.21 User interface" [▸ 266].

   Possible cause: Faulty wiring between the remote controller and the unit.

4. Perform a check of the hydro PCB. See "3.12 Hydro PCB" [▸ 160].

   Possible cause: Faulty hydro PCB.

> **INFORMATION**
>
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.77 U8-04 – Unknown USB device

Trigger	Effect	Reset
Unknown USB device.	Unit will NOT stop operating.	Manual reset via the user interface.

To solve the error code

1. Remove the USB/SDcard from the user interface.

   Possible cause: Connected USB/SDcard to update the user interface or upload e-configuration data is NOT USB mass storage device. The USB's format MUST be FAT-32.

> **CAUTION**
>
> Always safely remove and eject media.

> **INFORMATION**
>
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.78 U8-05 – File malfunction

Trigger	Effect	Reset
File malfunction.	Unit will NOT stop operating.	Manual reset via the user interface.

To solve the error code

1. Remove the USB/SDcard from the user interface.

   Possible cause: Connected USB/SDcard to update the user interface or upload e-configuration data CANNOT be read because wrongly formatted, or the file config.cfg CANNOT be found on the USB/SDcard.

CAUTION

Always safely remove and eject media.

INFORMATION

If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.79 U8-07 – P1/P2 communication error

Trigger	Effect	Reset
Lost communication between unit user interface and unit.	Unit will NOT stop operating.	Automatic reset.

To solve the error code

INFORMATION

It is recommended to perform the checks in the listed order.

1. Check the communication wiring between the user interface and the unit PCB. See "3.21 User interface" [▸ 266].

   Possible cause: Faulty wiring between the user interface and the unit PCB.

2. Check if the unit user interface functions correctly. See "3.21 User interface" [▸ 266].

   Possible cause: Faulty user interface on unit.

3. Perform a check of the hydro PCB. See "3.12 Hydro PCB" [▸ 160].

   Possible cause: Faulty hydro PCB.

4. Check if the power supply is conform with the regulations. See "4.1 Electrical circuit" [▸ 284].

   Possible cause:
   - Faulty or disturbance of the power supply (imbalance >4%),
   - Power drop,
   - Short circuit.

INFORMATION

If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.80 U8-11 – Connection with wireless gateway lost

Trigger	Effect	Reset
Communication abnormality between unit and wireless gateway.	Unit will NOT stop operating.	Automatic reset.

To solve the error code

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

1. Check that the AP mode is active (= WLAN adapter active as access point).
2. For more information about the configuration and further troubleshooting, see the Daikin Residential Controller app or see the website: http://www.onlinecontroller.daikineurope.com/

> **INFORMATION**
>
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.81 UA-00 – Indoor unit, outdoor unit mismatching problem

Trigger	Effect	Reset
Signal transmission between outdoor and indoor unit abnormality. Improper combination of outdoor and indoor unit.	Unit will stop operating.	Power reset via outdoor unit.

To solve the error code

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

1. Check the wiring between the hydro PCB and the main PCB. See "4.1 Electrical circuit" [▸ 284].

   Possible cause: Faulty wiring between the hydro PCB and main PCB.
2. Perform a check of the main PCB. See "3.14 Main PCB" [▸ 171].

   Possible cause: Faulty main PCB.
3. Perform a check of the hydro PCB. See "3.12 Hydro PCB" [▸ 160].

   Possible cause: Faulty hydro PCB.

> **INFORMATION**
>
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.82 UA-17 – Tank type problem

Trigger	Effect	Reset
[E-05] is not set as 1, or [E-07] is not set correctly.	Unit will stop operating.	Power reset via outdoor unit.

To solve the error code

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

1. Check for improper combination of the indoor unit and the water tank. See the combination table in the Databook for more information.
2. Check the setting [E-05] and [E-07] via the user interface. See "3.21 User interface" [▶ 266].

   Possible cause: Faulty [E-05] or [E-07] setting.
3. Perform a check of the hydro PCB. See "3.12 Hydro PCB" [▶ 160].

   Possible cause: Faulty hydro PCB.

> **INFORMATION**
>
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.3.83 UF-00 – Reversed piping or bad communication wiring detection

Trigger	Effect	Reset
Reversed piping or bad communication, wiring detection.	Unit will NOT start operating.	Manual reset via user interface.

To solve the error code

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

1. Check that all stop valves of the refrigerant circuit are open. See "4.2 Refrigerant circuit" [▶ 286].

   Possible cause: Closed stop valve in the refrigerant circuit.
2. Check that the piping and wiring connections of the system are correctly installed. See "6.3 Piping diagram" [▶ 331] and "6.2 Wiring diagram" [▶ 314].

   Possible cause: Piping and/or wiring mismatch.

> **INFORMATION**
>
> If all procedures listed above have been performed and the problem is still present, contact the helpdesk.

2.4 Symptom based troubleshooting

2.4.1 Symptom: Incorrect energy metering read-out

Root cause category: hardware

Possible failure	Root cause	Check	Repair
kWh values measured with field supplied meters show different values as the user interface.	Backup heater wiring is NOT correct.	Check backup heater wiring, see the installer reference guide.	Adjust wiring if required.
Values on user interface are incorrect, show strange values.	User interface is replaced or reset to factory settings; Previous measurements are lost.	Check if user interface is replaced or reset.	Reset measurements of field supplied electrical meters and reset user interface and hydro PCB to factory settings.
Values on user interface are incorrect, show strange values.	Hydro PCB is replaced or reset to factory settings; Previous settings are lost.	Check if hydro PCB is replaced or reset.	Reset measurements of field supplied electrical meters and reset user interface and hydro PCB to factory settings.
Unit operates in emergency mode.	Backup heater is allowed in emergency mode, setting [4-00].	Check setting.	If you do NOT want the backup heater to run automatically in emergency mode, adjust setting.

2.4.2 Water pump related

Symptom: Increased water pump sound level

Root cause category: installation

Possible failure	Root cause	Check	Repair
Water filter blocked.	Dirty water.	▪ Check water filter, ▪ Check water quality.	Clean the water filter.
Air in the water circuit.	NOT enough air purged.	▪ Check if all air purge valves are open, ▪ Check if air purge valves are installed on all highest points of the field installed water circuit.	Purge air out of the unit and field supplied water system and backup heater.
Water pressure too low.	▪ Water pressure NOT checked during filling, ▪ Air was purged from the water circuit after filling, ▪ Leakage. ▪ Expansion vessel is broken or not properly pre-adjusted.	Check water pressure.	Adjust water pressure if required (±2 bar).

Possible failure	Root cause	Check	Repair
Water circuit partially blocked.	Obstruction in the water circuit.	Check water circuit for blockages.	Remove possible blockages and check the water quality.

Root cause category: component – mechanical

Possible failure	Root cause	Check	Repair
Water pump mechanical problem.	Internal pump friction.	Check water pump.	Replace water pump.
Air purge blocked - air trapped in water circuit.	Component failure.	Check air purge valve.	Replace air purge valve.

Symptom: Incorrect water pump operation

Root cause category: software control

Possible failure	Root cause	Check	Repair
Unexpected water pump behaviour.	Water pump software control.	Water pump start/stop conditions: ▪ During space heating (cooling) or domestic hot water off: the pump is off, ▪ During space heating (cooling) or domestic hot water on: pump operation depends on setting [F-0D] (continuous, sample or request). Remark: in domestic hot water operation the pump starts later than the compressor to avoid that the tank is cooled down by the cold water loop.	Replace water pump.

Root cause category: parameter (setting)

Possible failure	Root cause	Check	Repair
Incorrect setting of pump operation mode (continuous, sample, request) (setting [F-0D]).	Incorrect setting.	Confirm setting [F-0].	Adapt setting [F-0] if required (factory setting: [F-0]=1).

2.4.3 Tap water related

Symptom: High water pressure at tapping point

Root cause category: component – mechanical

Possible failure	Root cause	Check	Repair
Safety valve water side blocked.	Component failure.	Check safety valve.	If required, replace safety valve.
Field installed pressure reducing valve problem.	▪ Pressure reducing valve (to reduce pressure of the main water supply) NOT installed, ▪ Pressure reducing valve problem.	Check water system pressure before and after the water pressure reducing valve.	Install or replace water pressure reducing valve.

Symptom: Tap water has white colour

Root cause category: installation

Possible failure	Root cause	Check	Repair
Extreme formation of anode residue.	Water quality and composition of the water (chlorides, conductivity) can lead to accelerated reduction of the anode in the tank and aluminiumhydroxides will be formed on the bottom of the tank. (Remark: a NOT well controlled water softener can cause an increased amount of chlorides in the water.)	Visual check for aluminiumhydroxide residue is ONLY possible with endoscope.	▪ Drain and flush the tank to remove the aluminiumhydroxides, ▪ Check correct setting of field supplied water softener (if installed).

INFORMATION

ONLY for optional third party water tank with anode. See addendum book for impressed current anode system for further troubleshooting.

Symptom: Tap water has bad odour

Root cause category: installation

Possible failure	Root cause	Check	Repair
Water circuit - bad odour of supply water.	Bad quality/contamination of supply water.	Check the water quality (odour/contamination) at cold domestic water inlet.	Assure that quality of entering water is OK.

2.4.4 Symptom: User interface is failure or frozen screen

Root cause category: component – electrical

Possible failure	Root cause	Check	Repair
Hydro PCB NOT operational.	▪ No power supply, ▪ Faulty transformer, ▪ PCB malfunction.	▪ Confirm if a small green led is blinking in regular intervals, ▪ Confirm power supply towards hydro PCB, ▪ Check good operation of transformer.	▪ Re-establish power to hydro PCB, ▪ Replace hydro PCB in case power supply and transformer are OK but led is NOT blinking.
Reactor coil broken.	Component problem.	Check continuity of the reactor coil.	Replace the reactor coil in case faulty.
P1/P2 transmission cable broken/short-circuit.		Check P1/P2 cable (16 V DC on BRC terminals and cable continuity).	Repair P1/P2 cable if required.
User interface failure.		Check user interface software version.	Update user interface software to the latest version. If problem persists, replace the user interface.
No display.	Display contrast too high or too low.		Adjust contrast.
Blocked screen.	Mismatch between software and EEPROM on user interface.		Power reset and user interface reset.

2.4.5 Symptom: Leak

Root cause category: installation

Possible failure	Root cause	Check	Repair
Drain connection of water safety valve leaking.	Bad connection between unit drain pipe and field drain pipe.	Check the drain connection of the water safety valve.	Correct the drain connection if required.
Drain of bottom drain plate NOT well connected.	Bad connection of bottom drain plate and field drain connection.	Check the drain connection between the bottom drain plate and the field drain.	Correct the drain connection if required.
Leakage of drain valve.	Valve NOT completely closed.	Check if drain valve is closed.	Close the drain valve.

Root cause category: component – mechanical

Possible failure	Root cause	Check	Repair
Expansion vessel NOT pressurized.	Component failure.	Check expansion vessel.	Replace expansion vessel.
Safety valve blocked.	Component failure.	Check safety valve.	Replace safety valve.
Safety valve leaking.	Component failure.	Check safety valve.	Replace safety valve.
Leakage of drain valve.	Component failure.	Check drain valve.	Replace drain valve.

Possible failure	Root cause	Check	Repair
Domestic hot water tank leakage.	Component failure.	Check tank visually for leakages.	Repair leakages. If NOT possible, complete unit has to be replaced.
Air Purge leakage.	Component failure.	Check air purge valve for leakages.	Replace air purge valve.

2.4.6 Symptom: Water flow or volume too low

1 If this symptom is determined, check the steps in error codes 7H-xx to solve the error. See "2.3 Error based troubleshooting" [▸ 11].

2.4.7 Compressor related

Symptom: Compressor does not start

Root cause category: software control

Possible failure	Root cause	Check	Repair
Compressor does NOT start because water loop temperature is too low.	Special software control activated - Water loop temperature is too low causing ONLY the backup heater to operate. Compressor will start when water temperature is high enough (for detailed water temperature values, see the operation range in the databook).	Normal unit operation – no specific countermeasure required.	—
Compressor guard timer active.	Compressor guard timer active. Once compressor has stopped it takes 180 seconds before it can restart.	Normal unit operation – no specific countermeasure required.	—

Root cause category: component – electrical

Possible failure	Root cause	Check	Repair
Power cables (U, V, W) incorrectly connected to compressor.	Wrong assembly during repair.	Confirm that the U, V, W wiring is correctly connected. See "6.2 Wiring diagram" [▸ 314] for an indication how to connect correctly.	Correct the U, V, W wiring.

Symptom: Compressor does not increase frequency

Root cause category: software control

Possible failure	Root cause	Check	Repair
Compressor frequency limited - high discharge temperature protection function active.	In case the discharge temperature is higher than 105°C the compressor frequency will be reduced. When the discharge temperature is lower than 105°C the frequency can increase again.	Activation of the protection function can be caused by various reasons, therefore we recommend to check the following: ▪ Check refrigerant charge, ▪ Check expansion valve for correct operation, ▪ Check suction thermistor, ▪ Check discharge pipe thermistor.	Based on the diagnosis execute one of the following actions: ▪ Correct the refrigerant charge, ▪ Replace expansion valve, ▪ Replace suction thermistor, ▪ Replace discharge pipe thermistor.
Compressor frequency limited - high pressure protection function active.	In case high pressure is higher than 38 bar the compressor frequency will be reduced. When the pressure drops below 36 bar the compressor frequency can increase again.	Activation of the protection function can be caused by various reasons, therefore we recommend to check the following: ▪ Check refrigerant pressure sensor, ▪ Check high pressure side plate type heat exchanger for good water flow and heat exchange, ▪ Check the refrigerant charge.	Based on the diagnosis execute one of the following actions: ▪ Replace refrigerant pressure sensor, ▪ Optimize the water flow through the high pressure side plate type heat exchanger, ▪ Correct the refrigerant charge.
Compressor frequency limited.	Inverter control active – target water leaving temperature (target sat. high pressure) reached.	Check if saturated high pressure temperature is within range to heat up the water to the required temperature.	—
Compressor frequency limited - suction pipe superheat protection function active.	This protection control activates when suction superheat is >10°C and expansion valve is fully open (480 pulse). Unit returns to normal operation when suction superheat is <4°C. Remark: check the suction superheat by measuring the suction temperature (with contact thermometer) before the compressor and comparing with the saturated evaporation temperature.	Activation of the protection function can be caused by various reasons, therefore we recommend to check the following: ▪ Check refrigerant charge, ▪ Check expansion valve for correct operation, ▪ Check suction thermistor, ▪ Check the refrigerant circuit for blockages.	Based on the diagnosis execute one of the following actions: ▪ Correct the refrigerant charge, ▪ Replace expansion valve, ▪ Replace suction thermistor, ▪ Remove detected blockages from the refrigerant circuit.

Root cause category: installation

Possible failure	Root cause	Check	Repair
PHE condenser (water side) (partial) blockage.	Dirty water (particles).	▪ Check water flow rate registered by flow sensor, ▪ Check water side plate type heat exchanger for blockage.	▪ If required replace the water plate type heat exchanger, ▪ Check the water quality.

Root cause category: component – mechanical

Possible failure	Root cause	Check	Repair
Limited heat exchange between refrigerant loop and heat sink inverter could result in high inverter temperatures and limited compressor frequency.	▪ Bad contact between refrigerant loop and inverter heat sink, ▪ Lack of refrigerant.	Check contact between refrigerant loop and PCB heat sink.	—

Root cause category: component – electrical

Possible failure	Root cause	Check	Repair
Discharge pipe thermistor – higher temperature measured than actual.	Deviation of thermistor (higher temperature measured than actual).	Check discharge pipe thermistor.	Replace discharge pipe thermistor or main PCB.
Heat sink inverter thermistor - deviation.	Deviation of thermistor (higher temperature measured than actual).	▪ Check heat sink inverter thermistor, ▪ Check PCB.	▪ Replace heat sink inverter thermistor, ▪ Replace PCB.
Expansion valve incorrect control - superheat too high.	▪ Faulty suction thermistor, ▪ Faulty expansion valve control.	▪ Check suction thermistor, ▪ Check the expansion valve.	▪ Replace suction thermistor, ▪ Replace expansion valve.

Symptom: Increased compressor sound level

Root cause category: component – mechanical

Possible failure	Root cause	Check	Repair
Compressor increased bearing friction/bearing failure.	▪ Bad lubrication of compressor internal rotating parts, ▪ Compressor at end of lifetime.	No checks possible.	Replace compressor.
Unit produces (loud) noise or shakes.	▪ Refrigerant overcharge, ▪ Mixing of air in refrigerant system, ▪ Refrigerant undercharge.	Check refrigerant.	After vacuum drying, charge correct amount of refrigerant.

Root cause category: component – electrical

Possible failure	Root cause	Check	Repair
Expansion valve incorrect control - superheat too low.	▪ Faulty suction thermistor, ▪ Faulty expansion valve control.	▪ Check suction thermistor, ▪ Check the expansion valve.	▪ Replace thermistor when required, ▪ Replace expansion valve when required.

2.4.8 Symptom: Abnormal presence of ice

Possible failure	Root cause	Check	Repair
General ice build-up.	—	—	Outdoor unit installation MUST be protected from weather (wind, snow, ...). See installer reference guide for correct installation.
Ice build-up on the outdoor unit.	▪ Clogged drain holes, ▪ Snow on the outdoor unit, ▪ Ice building up on the casing.	Ice is NOT in direct contact with fins.	▪ Unclog drain holes or remove any scraps that can be used for ice to build up, ▪ Remove ice.
Defrost operation malfunction.	NOT enough defrost power: shortage of refrigerant.	▪ Check refrigerant charge, ▪ Check for leaks.	▪ Replace refrigerant, ▪ Fix leaks.
Ice build-up at entry spot of refrigerant.	Refrigerant shortage.	▪ Check refrigerant charge, ▪ Check for leaks.	▪ Replace refrigerant, ▪ Fix leaks.
Partial ice up of coil.	Partial refrigerant blockage.	Check refrigerant circuit.	Replace part where blockage occurs.
	Dirty coil.	Check if coil is dirty.	Clean coil.
	Bad weather conditions.	Unit is NOT powerful enough to defrost due to too strong wind, snow, ...	Outdoor unit installation MUST be protected from weather (wind, snow, ...). See installer reference guide for correct installation.

2.4.9 Symptom: Domestic hot water capacity shortage

Root cause category: end user

Possible failure	Root cause	Check	Repair
Too low domestic hot water setpoint.	User set too low domestic hot water setpoint by schedule or manual operation.	Check domestic hot water tank set temperature in combination with boiler volume and hot water usage.	Adapt domestic hot water setpoint (e.g. 50~55°C). (Remark: check the weather dependent settings (relation outdoor temperature - setpoint) in case weather dependent control is activated.)
Domestic hot water NOT activated.	—	Check if domestic hot water heating is activated.	—

Root cause category: parameter (setting)

Possible failure	Root cause	Check	Repair
Setting domestic hot water operation mode [6-0D] NOT set optimally.	Setting domestic hot water operation mode [6-0D] is set to 2 (scheduled ONLY).	Check setting [6-0D].	In case schedule is ONLY used, assure that the programmed schedule is in line with the timings hot water is required. Adapt the schedules if necessary.

Root cause category: installation

Possible failure	Root cause	Check	Repair
3-way valve does NOT switch correctly between space heating (cooling) connection and domestic hot water connection.	3-way valve incorrectly mounted.	Check the 3-way valve.	Correct the position of the 3-way valve.

Root cause category: component – electrical

Possible failure	Root cause	Check	Repair
3-way valve blocked.	Component failure.	Check the 3-way valve.	Replace the 3-way valve.
Deviation of domestic hot water tank thermistor.	Domestic hot water tank thermistor measures a higher temperature than actual (component failure).	Check domestic hot water tank thermistor.	Replace domestic hot water tank thermistor.

2.4.10 Symptom: General capacity shortage

Root cause category: software control

Possible failure	Root cause	Check	Repair
Compressor frequency limited - high discharge temperature protection function active.	In case the discharge temperature is higher than 105°C the compressor frequency will be reduced. When the discharge temperature is lower than 105°C the frequency can increase again.	Activation of the protection function can be caused by various reasons, therefore we recommend to check the following: ▪ Check refrigerant charge, ▪ Check expansion valve for correct operation, ▪ Check suction thermistor, ▪ Check discharge pipe thermistor.	Based on the diagnosis execute one of the following actions: ▪ Correct the refrigerant charge, ▪ Replace expansion valve, ▪ Replace suction thermistor, ▪ Replace discharge pipe thermistor.
Compressor frequency limited - high pressure protection function active.	In case high pressure is higher than 38 bar the compressor frequency will be reduced. When the pressure drops below 36 bar the compressor frequency can increase again.	Activation of the protection function can be caused by various reasons, therefore we recommend to check the following: ▪ Check refrigerant pressure sensor, ▪ Check high pressure side plate type heat exchanger for good water flow and heat exchange, ▪ Check the refrigerant charge.	Based on the diagnosis execute one of the following actions: ▪ Replace refrigerant pressure sensor, ▪ Optimize the water flow through the high pressure side plate type heat exchanger, ▪ Correct the refrigerant charge.
▪ Compressor frequency limited, ▪ Suction pipe superheat protection function active.	This protection control activates when suction superheat is >10°C and expansion valve is fully open (480 pulse). Unit returns to normal operation when suction superheat is <4°C. Remark: check the suction superheat by measuring the suction temperature (with contact thermometer) before the compressor and comparing with the saturated evaporation temperature.	Activation of the protection function can be caused by various reasons, therefore we recommend to check the following: ▪ Check refrigerant charge, ▪ Check expansion valve for correct operation, ▪ Check suction thermistor, ▪ Check the refrigerant circuit for blockages.	Based on the diagnosis execute one of the following actions: ▪ Correct the refrigerant charge, ▪ Replace expansion valve, ▪ Replace suction thermistor, ▪ Remove detected blockages from the refrigerant circuit.

Root cause category: end user

Possible failure	Root cause	Check	Repair
Space heating (cooling) or domestic hot water operation is NOT activated on the user interface.	—	Confirm if space heating (cooling) operation or domestic hot water operation is activated on user interface.	Activate space heating (cooling) or domestic hot water operation on the user interface.

Root cause category: parameter (setting)

Possible failure	Root cause	Check	Repair
Displayed date/time is wrong - schedules NOT correctly executed.	▪ NOT set date/time after initial start-up, ▪ No power supply for more than 48 hours.	Check date/setting and content of schedules.	Set date/time according to operation manual instructions.
Displayed date/time is wrong - schedules NOT correctly executed.	Daylight Saving Time NOT set correctly.	Check Daylight Saving Time settings.	Set Daylight Saving Time according to operation manual.
Schedules NOT activated.	Schedules were NOT confirmed (see the schedule settings).	Check schedules on the user interface.	Set schedule according to user reference guide.
Holiday setting active.	Holiday setting is activated in the user interface.	Check holiday settings.	Set holiday settings correctly.
Backup heater operation disabled.	Setting backup heater operation mode [4-00] is set to 0 (disable).	Check setting [4-00].	Change setting [4-00] to 1.
Second step of the backup heater is NOT allowed.	Setting "enable backup heater step 2" [4-07] is set to 0 (NOT allowed).	Check setting [4-07].	Change setting [4-07] to 1.
Backup heater equilibrium point was set too low.	Setting "equilibrium temperature" [5-01] was set too low.	Check setting [5-01].	Change setting [5-01] to 0 or higher to more quickly allow backup heater operation.

Root cause category: installation

Possible failure	Root cause	Check	Repair
PHE condenser (partial) blockage.	Dirty water (particles).	▪ Check water flow rate registered by flow sensor, ▪ Check plate heat exchanger for blockage.	▪ If required replace the plate heat exchanger, ▪ Check the water quality.
3-way valve bypass between domestic hot water and space heating (cooling).	3-way valve incorrectly mounted.	Check the 3-way valve.	Correct the position of the 3-way valve.
Water filter blocked.	Dirty water.	▪ Check water filter, ▪ Check water quality.	▪ Clean the water filter, ▪ Check the water quality.

Possible failure	Root cause	Check	Repair
Air in the water circuit.	NOT enough air purged.	▪ Check if all air purge valves are open, ▪ Check if air purge valves are installed on all highest points of the field installed water circuit.	Purge air out of unit and field supplied water system and backup heater.
Water circuit (partially) blocked.	Dirty water.	Check water circuit (unit + field) for blockages.	Remove possible blockages and check the water quality.

Root cause category: component – mechanical

Possible failure	Root cause	Check	Repair
Refrigerant shortage.	▪ Refrigerant leakage, ▪ Incorrectly charged.	▪ Check refrigerant charge, ▪ Pressure test the system to check for leakage.	If required, repair the leak and charge the correct refrigerant amount.
Air Purge blocked - air trapped in water system.	Component failure.	Check air purge valve.	Replace air purge valve.

Root cause category: component – electrical

Possible failure	Root cause	Check	Repair
Refrigerant pressure sensor - higher pressure measured than actual.	Deviation of refrigerant pressure sensor (higher value measured than actual).	Check refrigerant pressure sensor.	Replace refrigerant pressure sensor.
Discharge pipe thermistor – higher temperature measured than actual.	Deviation of thermistor (higher temperature measured than actual).	Check discharge pipe thermistor.	Replace discharge pipe thermistor or replace PCB.
Expansion valve incorrect control - superheat too high.	▪ Faulty suction thermistor, ▪ Faulty expansion valve control.	▪ Check suction thermistor, ▪ Check the expansion valve.	Replace suction thermistor or replace expansion valve.
Backup heater NOT working.	Component failure.	Check backup heater.	Replace backup heater.
Deviation of outlet water after backup heater thermistor will influence the backup heater control.	▪ Deviation of thermistor (higher temperature measured than actual), ▪ Bad contact between sensor and pipe.	Check outlet water after backup heater thermistor.	Replace outlet water after backup heater thermistor or PCB A1P.
Flow sensor deviation – flow measured higher than actual.	Component failure.	Check the flow sensor.	Replace the flow sensor.
3-way valve blocked.	Component failure.	Check the 3-way valve.	Replace the 3-way valve.

2.4.11 Symptom: Space heating capacity shortage

Root cause category: end user

Possible failure	Root cause	Check	Repair
Too low leaving water temperature setpoint.	User set too low leaving water temperature setpoint by schedule or manual operation.	Check leaving water setpoint.	Adapt leaving water setpoint. (Remark: check the weather dependent settings (relation outdoor temperature - setpoint) in case weather dependent control is activated.)
Too low space heating setpoint on room thermostat.	User set too low room setpoint by schedule or manual operation.	Check room thermostat setpoint.	Adapt room thermostat setpoint. (Remark: check the weather dependent settings (relation outdoor temperature - setpoint) in case weather dependent control is activated.)
Space heating NOT activated.		Check if space heating is activated.	

Root cause category: parameter (setting)

Possible failure	Root cause	Check	Repair
External room thermostat used with setting [C-07] on value 2 (= RT control).	Wrong setting of [C-07] - unit control method.	Check setting [C-07].	Adjust setting to match application - see installer reference guide.
Backup heater operation disabled (setting [4-00] is set to 0).	Setting backup heater operation mode [4-00] is set to 2 (ONLY domestic hot water).	Check setting [4-00].	Change setting [4-00] to 1.
Setting domestic hot water operation mode [6-0D] NOT set optimally.	Setting domestic hot water operation mode [6-0D] is set to 0 (reheat ONLY). This will cause the system to work too frequently in domestic hot water operation and less in space heating.	Check setting [6-0D].	It is advisable to set to factory setting (reheat + schedule) and program the schedule to heat the domestic hot water during periods of no space heating required.

Root cause category: installation

Possible failure	Root cause	Check	Repair
3-way valve does NOT switch correctly between space heating (cooling) connection and domestic hot water connection.	3-way valve incorrectly mounted.	Check the 3-way valve.	Correct the position of the 3-way valve.

Root cause category: component – electrical

Possible failure	Root cause	Check	Repair
3-way valve blocked.	Component failure.	Check the 3-way valve.	Replace the 3-way valve.

Root cause category: system design

Possible failure	Root cause	Check	Repair
Water circuit – requested capacity too high.	Incorrect system selection.	Check required capacity by heat load calculation. See the capacity tables in the engineering data book to know max. system capacity at indicated conditions.	Adapt system design.
Water circuit - water volume too big.	▪ Long water piping, ▪ Too many heating emitters.	Check required capacity by heat load calculation. See the capacity tables in the engineering data book to know max. system capacity at indicated conditions.	Adapt system design.
Water circuit - pressure drop too big.	▪ Too small water piping, ▪ Too long water piping, ▪ Too many heating emitters.	Compare the pressure drop of the total system with the water pump characteristics (See check of water pump). Decreased water flow will cause a drop in capacity.	Adapt system design.

2.4.12 Symptom: Inaccurate temperature control

Root cause category: parameter (setting)

Possible failure	Root cause	Check	Repair
Incorrect setting of unit control method (setting [C-07]).	Incorrect setting of unit control method (setting [C-07]) (leaving water control, room thermostat control, ext. room thermostat control).	Check if setting [C-07] (leaving water control, room thermostat control, ext. room thermostat control) is set according to the application.	Adjust setting to match application.
Incorrect setting of pump operation mode (continuous, sample, request) (setting [F-0D]).	Incorrect setting.	Confirm setting [F-0].	Adjust setting [F-0] if required. (Factory setting: [F-0]=1).

Root cause category: installation

Possible failure	Root cause	Check	Repair
User interface – thermostat sensor value NOT representing room temperature.	Bad location of thermostat sensor (external influence) in case of room thermostat control (setting [C-07]=2).	Check if user interface is mounted in the correct position to measure the correct room temperature.	Correct the position of the user interface for more accurate room temperature measurement.

Root cause category: component – electrical

Possible failure	Root cause	Check	Repair
Outlet water after backup heater thermistor deviation causes incorrect temperature control.	▪ Deviation of thermistor (lower temperature measured than actual), ▪ Bad contact between sensor and pipe.	Check outlet water after backup heater thermistor.	Replace outlet water after backup heater thermistor or hydro PCB.
Deviation of domestic hot water tank thermistor. (Remark: ONLY valid for inaccurate domestic hot water temperature control.)	▪ Deviation of thermistor, ▪ Bad contact between sensor and pipe.	Check domestic hot water tank thermistor.	Replace domestic hot water tank thermistor or hydro PCB.
User interface – thermostat sensor has incorrect reading of room temperature.	Deviation of user interface room temperature sensor.	Compare temperature measured by user interface with actual room temperature.	In case of deviation the room temperature offset can be adjusted through setting [2-0A].

2.4.13 Symptom: Power consumption too high

Root cause category: end user

Possible failure	Root cause	Check	Repair
Too high domestic hot water setpoint.	User set too high domestic hot water setpoint by schedule or manual operation.	Check domestic hot water tank set temperature; avoid electric heater use.	Adapt domestic hot water setpoint (e.g. 50~55°C).
Too high leaving water temperature setpoint.	User set too high leaving water temperature setpoint by schedule or manual operation.	Check leaving water setpoint.	Adapt leaving water setpoint (e.g. <55°C will reduce backup heater operation).
Too high space heating setpoint on room thermostat.	User set too high room setpoint by schedule or manual operation.	Check room thermostat setpoint.	Adapt room thermostat setpoint.

Root cause category: parameter (setting)

Possible failure	Root cause	Check	Repair
Too high leaving water temperature (LWT) - weather dependent.	Incorrect weather dependent setting --> too high LWT limit set [1-00]~[1-09].	Check leaving water temperature (LWT) high limit in weather dependent (setting [1-03]).	Adapt high leaving water temperature (LWT) limit for weather dependent heating (setting [1-03]).
User interface thermostat used with setting [C-07] on value 1 (= external thermostat control).	Wrong setting of [C-07] - unit control method.	Check setting [C-07].	Adjust setting to match application - see installer reference guide.

Possible failure	Root cause	Check	Repair
Pump keeps running all the time during space heating (cooling) operation.	Wrong setting of [F-0D] - pump operation.	Check pump operation mode setting [F-0D].	Change setting [F-0D] from continuous operation (value 0) to Sample (1) or Request (2). See installer reference guide for applicable value.
Setting disinfection operation day [2-00] was set to 0 (each day).	Setting disinfection operation day [2-00] was set to 0 (each day).	Check setting [2-00].	Adjust setting if necessary.
Unit is running in emergency operation and is using backup heater ONLY. [4-06] is set to 1.	Unit is running in emergency operation and is using backup heater ONLY. [4-06] is set to 1.	Check setting [4-06].	Adjust setting if necessary.
Backup heater equilibrium point was set too high.	Setting "equilibrium temperature" [5-01] was set too high.	Check setting [5-01].	Change setting [5-01] to less quickly allow backup heater operation.
Setting domestic hot water operation mode [6-0D] NOT set optimally.	Setting domestic hot water operation mode [6-0D] is set to 0 (reheat ONLY). This will cause the system to work too frequently in domestic hot water operation and less in space heating.	Check setting [6-0D] in combination with the re-heat setpoint [6-0C].	It is advisable to set to factory setting (reheat + schedule) and program the schedule to heat the domestic hot water during periods of no space heating required.

Root cause category: component – electrical

Possible failure	Root cause	Check	Repair
Deviation of outlet water after backup heater thermistor will influence the backup heater control.	▪ Deviation of outlet water after backup heater thermistor (lower temperature measured than actual), ▪ Bad contact between sensor and pipe.	Check outlet water after backup heater thermistor.	▪ Replace outlet water after backup heater thermistor when required, ▪ Replace hydro PCB when required.

Root cause category: system design

Possible failure	Root cause	Check	Repair
Water circuit – requested capacity too high causing the system to run at full capacity.	Incorrect system selection.	Check required capacity by heat load calculation. See the capacity tables in the engineering data book to know max. system capacity at indicated conditions.	Adapt system design.

2.4.14 Symptom: System does not start or operate

Root cause category: software control

Possible failure	Root cause	Check	Repair
Thermostat ON conditions for space heating (cooling) are NOT met.	Thermostat ON conditions for space heating (cooling) are NOT met.	Confirm thermostat on conditions depending on the unit control method (setting [C-07]): ▪ Setting 1: external room thermostat indicates by contact when to start/stop, ▪ Setting 2: room thermostat control => compare setpoint with room thermistor value. - Thermo on: room temperature = setpoint - (hysteresis/2), - Thermo off = room temperature + (hysteresis/2). For setting of hysteresis, see setting [9-0C], ▪ Setting 3: outlet water temperature control => Thermo on: outlet water temperature = setpoint. Thermo off: outlet water temperature –1,5°C.	Change setpoint if required.
Thermostat ON conditions for domestic hot water operation are NOT met.	Thermostat ON conditions for domestic hot water operation are NOT met.	Confirm thermostat on conditions depending on the selected domestic hot water control type (setting [6-0D]).	Change setpoint if required.
Out of operation range (ambient temperature above 35°C).	Ambient temperature higher than 35°C.	No action - unit CANNOT operate when ambient temperature is above 35°C.	

Root cause category: end user

Possible failure	Root cause	Check	Repair
Space heating (cooling) or domestic hot water operation is NOT activated on the user interface.		Confirm if space heating (cooling) operation or domestic hot water operation is activated on user interface.	Activate space heating (cooling) or domestic hot water operation on the user interface.

Root cause category: parameter (setting)

Possible failure	Root cause	Check	Repair
Displayed date/time is wrong - schedules NOT correctly executed.	▪ NOT set date/time after initial start-up, ▪ No power supply for more than 48 hours.	Set date/time according to operation manual instructions.	Set date/time according to operation manual instructions.
Displayed date/time is wrong - schedules NOT correctly executed.	Daylight Saving Time NOT set correctly.	Check Daylight Saving Time settings.	Set Daylight Saving Time according to operation manual.
Incorrect setting of unit control method (setting [C-07]).	Incorrect setting of unit control method (setting [C-07]) (leaving water control, room thermostat control, ext. room thermostat control).	Check if setting [C-07] (leaving water control, room thermostat control, ext. room thermostat control) is in set according to the application.	
Incorrect setting of space heating OFF temperature (setting [4-02]).	Incorrect setting of space heating OFF temperature (setting [4-02]).	Check if setting space heating OFF temperature (setting [4-02]) is correct (keep at 35°C).	
Preferential kWh rate power supply settings and electrical connections do NOT match.	Preferential kWh rate power supply settings and electrical connections do NOT match.	Check preferential kWh rate power supply settings and electrical connections (see installer reference guide).	

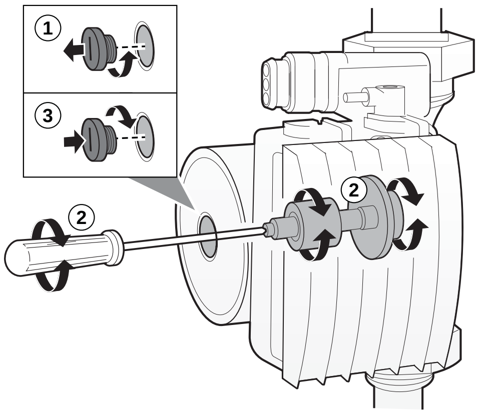
Root cause category: component – electrical

Possible failure	Root cause	Check	Repair
Hydro PCB NOT operational.	▪ No power supply, ▪ Faulty transformer, ▪ Hydro PCB malfunction.	▪ Confirm that HAP led is blinking in regular intervals, ▪ Confirm power supply towards hydro PCB, ▪ Check good operation of transformer.	▪ Re-establish power to hydro PCB. Replace hydro PCB in case power supply and transformer are OK but led is NOT blinking.
Outdoor unit PCB malfunction (Main PCB, inverter PCB, ...)	▪ No power supply, ▪ Outdoor unit PCB malfunction.	▪ Confirm that HAP led is blinking in regular intervals, ▪ Confirm power supply towards outdoor unit PCB, ▪ Check good operation of outdoor unit PCB.	▪ Re-establish power to outdoor unit PCB. Replace outdoor unit PCB in case power supply is OK but led is NOT blinking or in case of PCB not operating correctly.
Reactor coil broken.	Component problem.	Check continuity of the reactor coil.	Replace the reactor coil in case faulty.

Root cause category: hardware

Possible failure	Root cause	Check	Repair
Cooling/heating operation starts, but stops immediately.	▪ Refrigerant overcharge, ▪ Mixing of air in refrigerant system.	Check refrigerant.	After vacuum drying, charge correct amount of refrigerant.

2.4.15 Symptom: The pump is blocked

Possible causes	Corrective action
If the unit has been powered off for a long time, lime might block the rotor of the pump.	Remove the screw of the stator housing and use a screwdriver to turn back and forth the ceramic shaft of the rotor until the rotor is deblocked.[a] **Note:** Do NOT use excessive force. 

[a] If you cannot deblock the rotor of the pump with this method, you will need to disassemble the pump and turn the rotor by hand.

3 Components

CAUTION

When replacing a component ALWAYS make sure the correct spare part for your unit is installed.

3.1 3-way valve

3.1.1 Checking procedures

INFORMATION

It is recommended to perform the checks in the listed order.

To perform a mechanical check of the 3-way valve

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.17 Plate work" [▸ 230].

1 The 3-way valve knob MUST be fully pressed (= motor control). If NOT fully pressed, press the 3-way valve knob.
2 The 3-way valve knob MUST be in domestic hot water or space heating position, NOT in intermediate position. If in intermediate position, put the 3-way valve switch in domestic hot water or space heating position.

Is the problem solved?	Action
Yes	No further actions required.
No	Perform an electrical check of the 3-way valve, see "3.1.1 Checking procedures" [▸ 86].

To perform an electrical check of the 3-way valve

Prerequisite: First perform a mechanical check of the 3-way valve, see "3.1.1 Checking procedures" [▸ 86].

1 Turn ON the power of the unit.
2 Activate `DHW operation` via the user interface.
3 Measure the voltage on connector X2M pin 13 and pin 14a.

   Result: The measured voltage MUST be 230 V AC.
4 Measure the voltage on connector X2M pin 13 and pin 12.

   Result: The measured voltage MUST be 230 V AC.
5 De-activate `DHW operation` and activate `Space operation` via the user interface.
6 Measure the voltage on connector X2M pin 13 and pin 14a.

   Result: The measured voltage MUST be 230 V AC.
7 Measure the voltage on connector X2M pin 13 and pin 12.

   Result: The measured voltage MUST be 0 V AC.

Are the measured voltages correct?	Action
Yes	Perform a position check of the 3-way valve (automatic procedure), see "3.1.1 Checking procedures" [▶ 86].
No	Continue with the next step.

8 Measure the voltage on connector X17A pin 5 and 7.

Result: The measured voltage MUST be 230 V AC.

Is the measured voltage on connector X17A correct?	Action
Yes	Continue with the next step.
No	Perform a check of the hydro PCB, see "3.12.1 Checking procedures" [▶ 160].

9 Disconnect connector X20A from the hydro PCB.

10 Activate `DHW operation` via the user interface.

11 Measure the resistance between X20A pin 3 and 5.

Result: The measured resistance MUST be 0 Ω.

12 De-activate `DHW operation` and activate `Space operation` via the user interface.

13 Measure the resistance between X20A pin 1 and 5.

Result: The measured resistance MUST be 0 Ω.

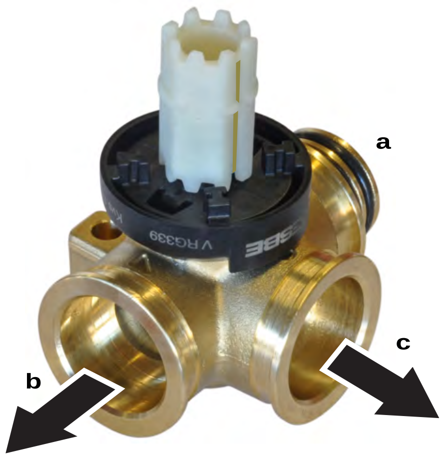
Is the resistance for both measurements on connector X20A correct?	Action
Yes	Relay KVR is switching correctly. Correct the wiring between X20A, X17A and X2M, see "6.2 Wiring Diagram" [▶ 314].
No	Relay KVR is NOT switching correctly. Replace the hydro PCB, see "3.12.2 Repair procedures" [▶ 164],

To perform a position check of the 3-way valve (automatic procedure)

Prerequisite: First perform an electrical check of the 3-way valve, see "3.1.1 Checking procedures" [▶ 86].

1 Turn ON the power of the unit.

2 Activate `DHW operation` via the user interface.



a Water inlet
b Domestic hot water exit
c Space heating exit

> **INFORMATION**
>
> The configuration of the 3-way valve done by the installer may differ from the configuration shown in this procedure.

3 Use a contact thermometer to measure the temperature at the 3-way valve water inlet, the domestic hot water exit and the space heating exit.

Exit	Temperature
Domestic hot water	Same as the 3-way valve inlet
Space heating	"Much" lower than the 3-way valve inlet

4 De-activate `DHW operation` and activate `Space operation` via the user interface.

5 Use a contact thermometer to measure the temperature at the 3-way valve water inlet, the domestic hot water exit and the space heating exit.

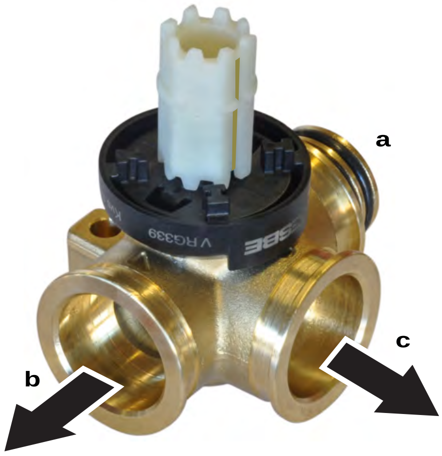
Exit	Temperature
Domestic hot water	"Much" lower than the 3-way valve inlet
Space heating	Same as the 3-way valve inlet

Both temperature checks performed above are correct?	Action
Yes	Component is OK. Return to the troubleshooting of the specific error and continue with the next step.
No	Perform a position check of the 3-way valve (manual procedure), see "3.1.1 Checking procedures" [▶ 86].

To perform a position check of the 3-way valve (manual procedure)

Prerequisite: First perform a position check (automatic procedure), see "3.1.1 Checking procedures" [▶ 86].

1 Manually put the 3-way valve in the domestic hot water position by rotating the 3-way valve knob.



a Water inlet
b Domestic hot water exit
c Space heating exit

> **INFORMATION**
> The configuration of the 3-way valve done by the installer may differ from the configuration shown in this procedure.

2 Use a contact thermometer to measure the temperature at the 3-way valve water inlet, the domestic hot water exit and the space heating exit.

Exit	Temperature
Domestic hot water	Same as the 3-way valve inlet
Space heating	"Much" lower than the 3-way valve inlet

3 Manually put the 3-way valve in the space heating position by rotating the 3-way valve knob.

4 Use a contact thermometer to measure the temperature at the 3-way valve water inlet, the domestic hot water exit and the space heating exit.

Exit	Temperature
Domestic hot water	"Much" lower than the 3-way valve inlet
Space heating	Same as the 3-way valve inlet

Both temperature checks performed above are correct?	Action
Yes	Install a new 3-way valve motor, see "3.1.2 Repair procedures" [▸ 89].
No	Replace the valve body, see "3.1.2 Repair procedures" [▸ 89].

3.1.2 Repair procedures

To remove the 3-way valve motor

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

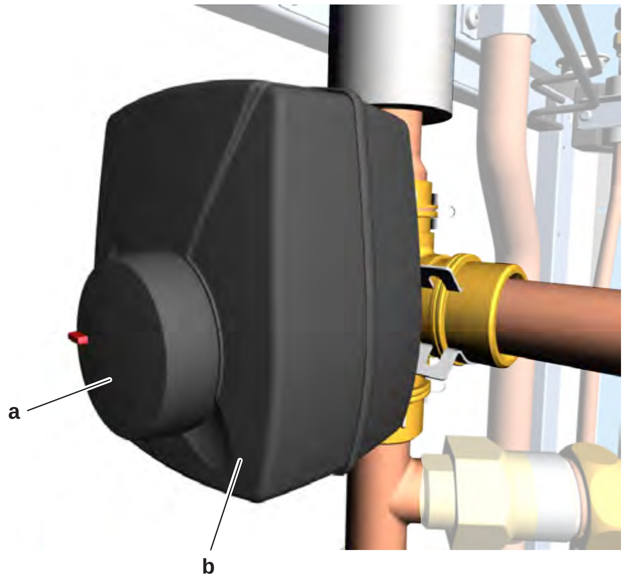
1 Remove the required plate work, see "3.17 Plate work" [▸ 230].

2 Disconnect the 3-way valve motor wiring from the wire terminal X2M.

3 Route the 3-way valve motor harness through the grommet in the switch box.

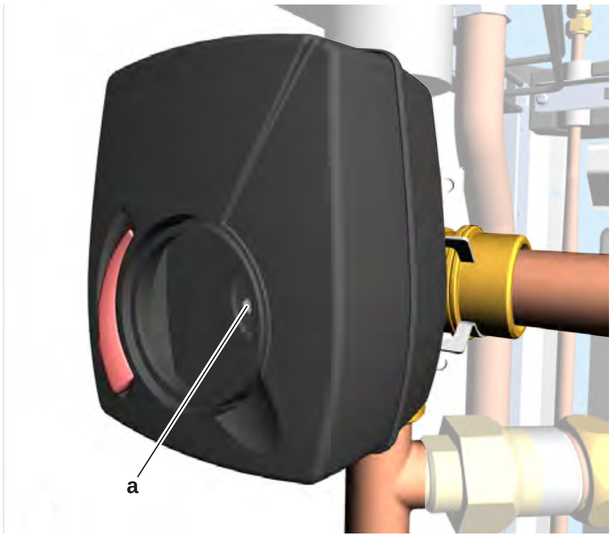
4 Cut all tie straps that fix the 3-way valve motor harness.

5 Pull the 3-way valve knob and remove it from the 3-way valve motor.



a 3-way valve knob
b 3-way valve motor

6 Loosen the screw.



a Screw

7 Remove the 3-way valve motor from the 3-way valve body.

8 To install the 3-way valve motor, see "3.1.2 Repair procedures" [▸ 89].

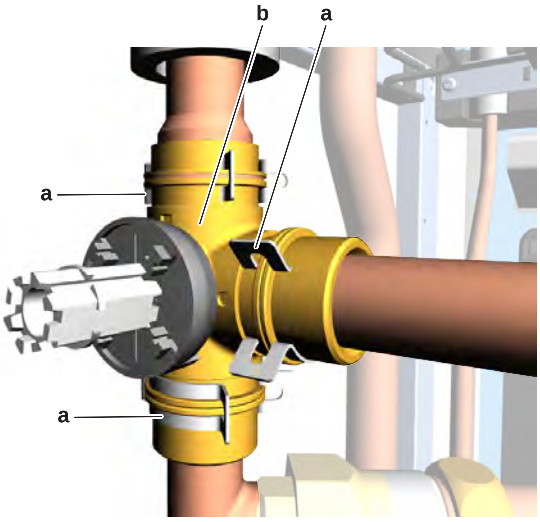
To remove the 3-way valve body

Prerequisite: Remove the 3-way valve motor, see "3.1.2 Repair procedures" [▸ 89].

1 Drain water from the water circuit, see "4.3.2 Repair procedures" [▸ 302].

2 Remove the insulation that covers the 3-way valve body.

3 Remove the 3 clips that fix the 3-way valve body to the piping.



a Clip
b 3-way valve body

4 Remove the 3-way valve body.

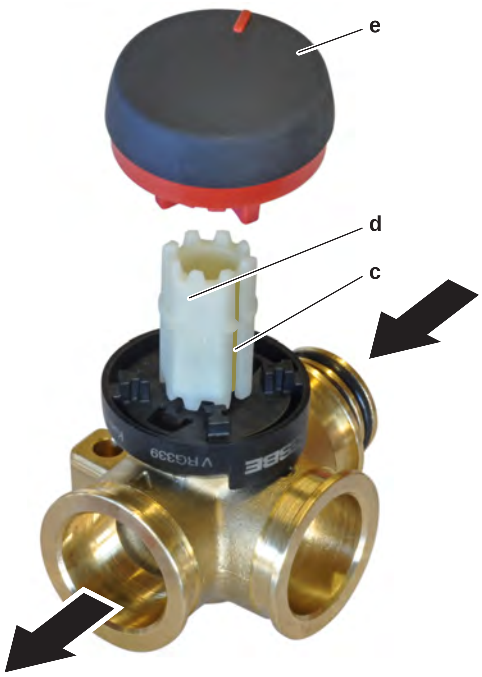
5 To install the 3-way valve body, see "3.1.2 Repair procedures" [▶ 89].

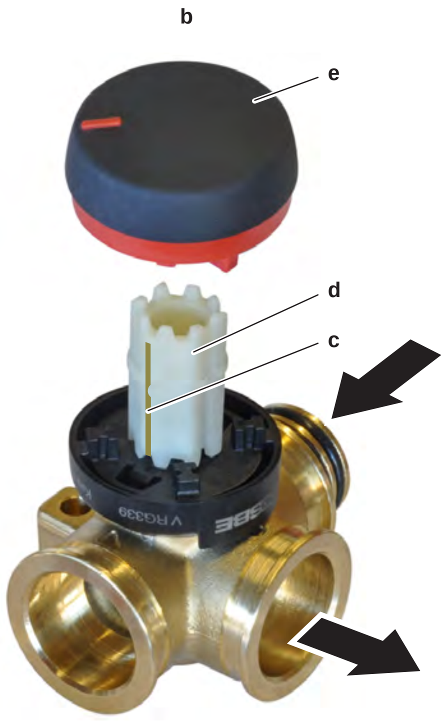
To install the 3-way valve body

> **CAUTION**
>
> Make sure the 3-way valve body axle is aligned with the 3-way valve motor when installing the 3-way valve motor on the 3-way valve body.The 3-way valve motor is shipped with the 3-way valve knob in the central position.

1 Check the position of the notch in the 3-way valve body axle.

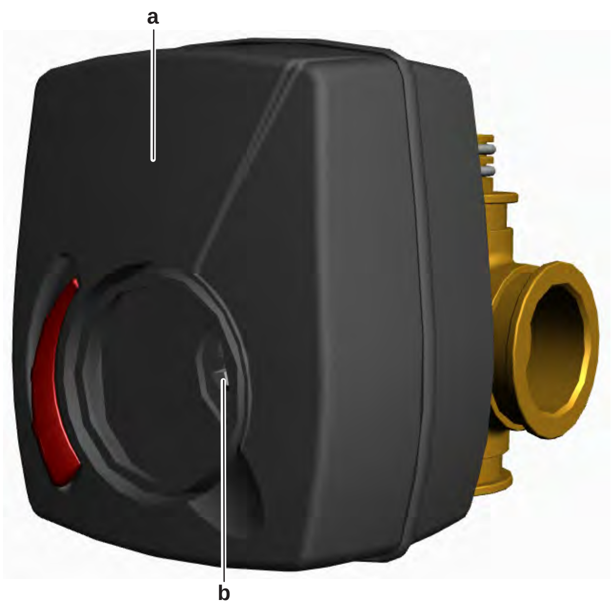
a





a Domestic hot water exit
b Space heating exit
c Notch
d 3-way valve body axle
e 3-way valve knob

2. If needed, manually adjust the position of the 3-way valve axle to align the notch with the 3-way valve motor.
3. Install the 3-way valve motor on the 3-way valve body.
4. Tighten the screw to fix the 3-way valve motor to the 3-way valve body.



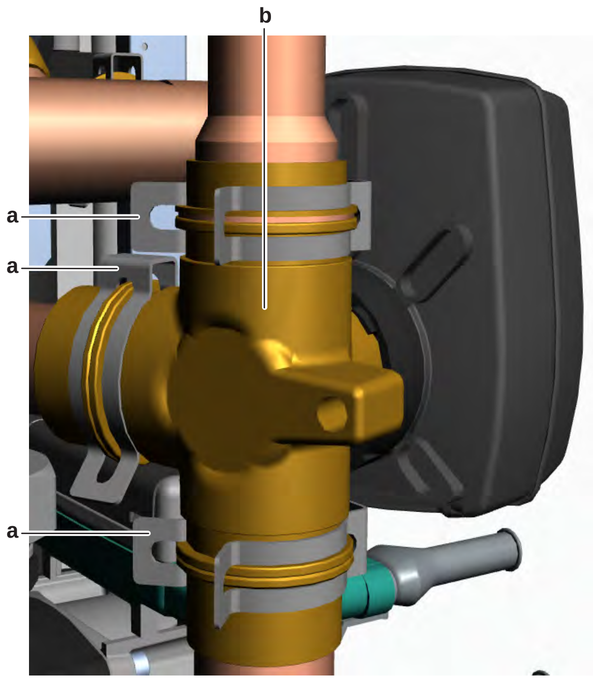
a 3-way valve motor
b Screw

5. Install the 3-way valve knob on the 3-way valve motor.

a 3-way valve knob
b 3-way valve motor

> **CAUTION**
>
> Check the condition of the O-rings and replace if needed. Apply water to the O-rings before installation.

6 Install the 3-way valve body.



a Clip
b 3-way valve body

7 Install the 3 clips to fix the 3-way valve body to the piping.

8 Install the insulation around the 3-way valve body.

9 Route the 3-way valve motor harness through the grommet in the switch box.

10 Connect the 3-way valve motor wiring to the wire terminal X2M.

11 Install new tie straps to fix the 3-way valve harness.

12 Open the valve (if equipped) of the water circuit towards the expansion vessel.

> **CAUTION**
> Make sure to open the valve (if equipped) towards the expansion vessel, otherwise the overpressure will be generated.

13 Open the stop valves and add water to the water circuit if needed, see "4.3.2 Repair procedures" [▶ 302].

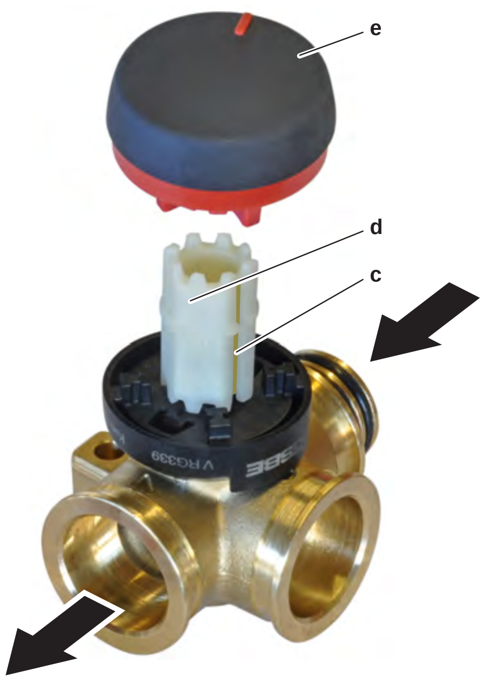
Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

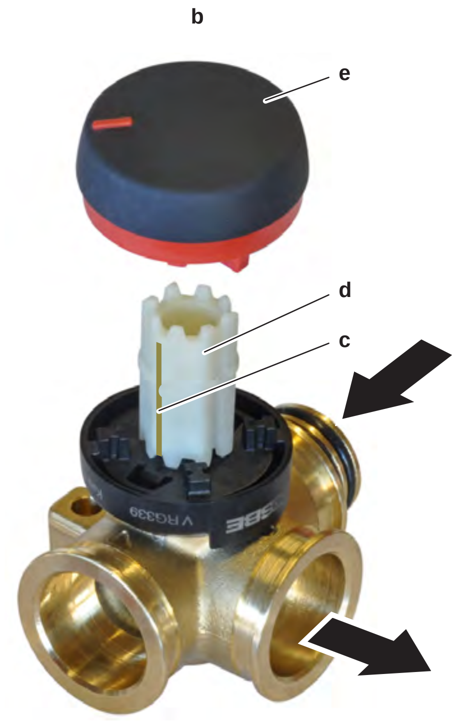
To install the 3-way valve motor

> **CAUTION**
> Make sure the 3-way valve body axle is aligned with the 3-way valve motor when installing the 3-way valve motor on the 3-way valve body.The 3-way valve motor is shipped with the 3-way valve knob in the central position.

1 Check the position of the notch in the 3-way valve body axle.

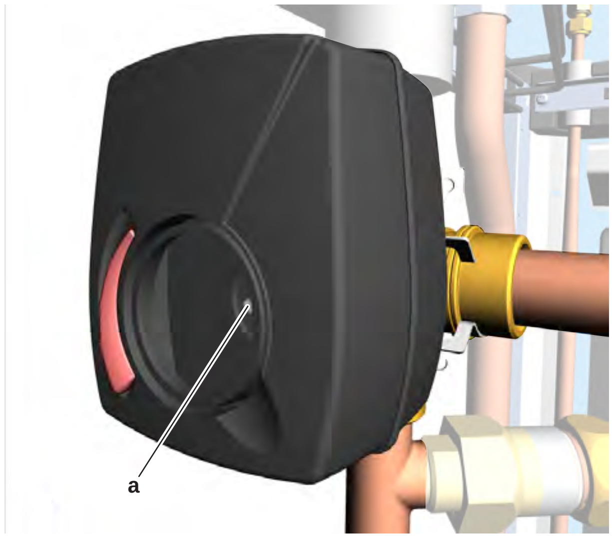
a





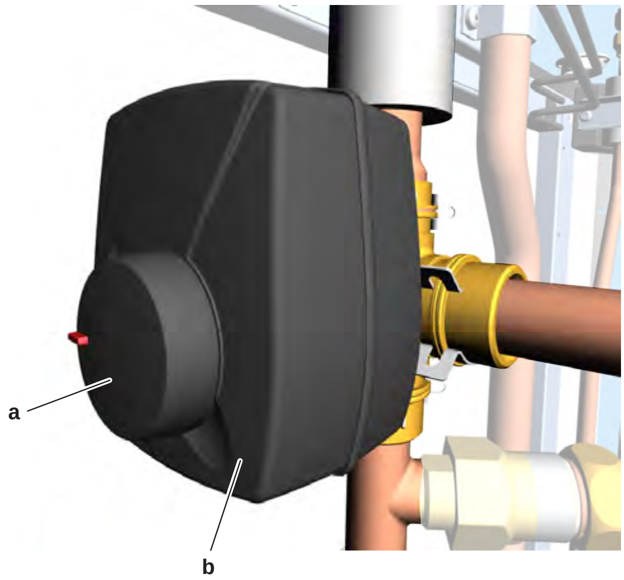
a Domestic hot water exit
b Space heating exit
c Notch
d 3-way valve body axle
e 3-way valve knob

2. If needed, manually adjust the position of the 3-way valve axle to align the notch with the 3-way valve motor.
3. Install the 3-way valve motor on the 3-way valve body.
4. Tighten the screw to fix the 3-way valve motor to the 3-way valve body.



a Screw

5. Install the 3-way valve knob on the 3-way valve motor.



a 3-way valve knob
b 3-way valve motor

6 Route the 3-way valve motor harness through the grommet in the switch box.

7 Connect the 3-way valve motor wiring to the wire terminal X2M.

8 Install new tie straps to fix the 3-way valve harness.

Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

3.2 4-way valve

3.2.1 Checking procedures

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

To perform a mechanical check of the 4-way valve

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

1 Remove the required plate work, see "3.17 Plate work" [▸ 230].

> **DANGER: RISK OF BURNING/SCALDING**
>
> The coil gets hot while energized. Wait for it to cool down.

2 Verify that the screw is firmly fixing the coil to the valve body.

3 Check if any damage or burst is present.

Is the 4-way valve coil firmly fixed and not visually damaged?	Action
Yes	Perform an electrical check of the 4-way valve, see "3.2.1 Checking procedures" [▸ 96].
No	Fix or replace the 4-way valve coil, see "3.2.2 Repair procedures" [▸ 101].

To perform an electrical check of the 4-way valve

1. First perform a mechanical check of the 4-way valve, see "3.2.1 Checking procedures" [▸ 96].
2. Unplug the 4-way valve connector from the appropriate PCB.
3. Measure the resistance of the 4-way valve coil between the pins of the 4-way valve connector.

   Result: The measured value must be:

Unit	Coil resistance
1-phase outdoor unit	1,4 kΩ ± 10%
3-phase outdoor unit	520~600 Ω

Is the measured value correct?	Action
Yes	Continue with the next step.
No	Replace the 4-way valve coil, see "3.2.2 Repair procedures" [▸ 101].

When outdoor unit is combined with Heating + Cooling indoor unit

INFORMATION

This procedure is ONLY possible when the outdoor temperature is within the temperature range for both `Heating` and `Cooling` operation mode. See the databook on Business Portal for the temperature range of the operation modes.

1. Connect the 4-way valve connector to the appropriate PCB.
2. Turn ON the power using the respective circuit breaker.
3. Activate `Heating` operation via the user interface.
4. With the 4-way valve connector connected to the PCB, measure the voltage on the 4-way valve connection of the PCB.

   Result: The measured voltage MUST be:

Unit	Voltage
1-phase outdoor unit	230 V AC
3-phase outdoor unit	12 V DC

5. De-activate `Heating` and activate `Cooling` operation via the user interface.
6. Measure the voltage on the 4-way valve connection on the PCB.

   Result: The measured voltage MUST be:

Unit	Voltage
1-phase outdoor unit	0 V AC
3-phase outdoor unit	0 V DC

Are the measured voltages correct?	Action
Yes	Perform a position check of the 4-way valve, see "3.2.1 Checking procedures" [▶ 96].
No	Perform a check the main PCB, see "3.14 Main PCB" [▶ 171].

INFORMATION

Follow this procedure when the outdoor temperature is outside the temperature range for one of the operation modes (`Heating` or `Cooling`). The unit CANNOT operate in the mode for which the outdoor temperature is outside its temperature range. See the databook on Business Portal for the temperature range of the operation modes.

1. Connect the 4-way valve connector to the appropriate PCB.
2. Turn ON the power using the respective circuit breaker.
3. With the unit operating, connect the service monitoring tool to the unit and check whether the unit is operating in `Heating` or `Cooling` mode.
4. With the 4-way valve connector connected to the PCB, measure the voltage on the 4-way valve connection of the PCB.

   Result: The measured voltage MUST be:

Unit	Voltage in Heating mode	Voltage in Cooling mode
1-phase outdoor unit	230 V AC	0 V AC
3-phase outdoor unit	12 V DC	0 V DC

Is the measured voltage correct?	Action
Yes	Perform a position check of the 4-way valve, see "3.2.1 Checking procedures" [▶ 96].
No	Perform a check the main PCB, see "3.14 Main PCB" [▶ 171].

When outdoor unit is combined with Heating only indoor unit

1. Connect the 4-way valve connector to the appropriate PCB.
2. Turn ON the power using the respective circuit breaker.
3. With the unit operating, connect the service monitoring tool to the unit and check whether the unit is operating in `Heating` or Defrost mode.
4. With the 4-way valve connector connected to the PCB, measure the voltage on the 4-way valve connection of the PCB.

   Result: The measured voltage MUST be:

Unit	Voltage in Heating mode	Voltage in Defrost mode
1-phase outdoor unit	230 V AC	0 V AC
3-phase outdoor unit	12 V DC	0 V DC

Is the measured voltage correct?	Action
Yes	Perform a position check of the 4-way valve, see "3.2.1 Checking procedures" [▶ 96].
No	Perform a check the main PCB, see "3.14 Main PCB" [▶ 171].

To perform a position check of the 4-way valve

1 First perform an electrical check of the 4-way valve, see "3.2.1 Checking procedures" [▶ 96].

When outdoor unit is combined with Heating + Cooling indoor unit

INFORMATION

This procedure is ONLY possible when the outdoor temperature is within the temperature range for both `Heating` and `Cooling` operation mode. See the databook on Business Portal for the temperature range of the operation modes.

1 Activate `Heating` operation via the user interface.

INFORMATION

It is recommended to connect the service monitoring tool to the unit and verify the operation mode of the 4-way valve.

2 Check with a contact thermometer (or by touching) if the flow through the 4-way valve corresponds with the flow shown in the flow diagram. (See "6.3 Piping diagram" [▶ 331]).

INFORMATION

The flow through the 4-way valve is correct if the water temperature after the heat exchanger rises/drops when operating in `Heating`/`Cooling` mode.

Is the flow correct?	Action
Yes	Skip the next step of this procedure.
No	Perform the next step of this procedure.

3 Connect a manifold to one of the service ports of the refrigerant circuit and check the pressure (suction, discharge). Compare with normal operation conditions of the unit.

Refrigerant pressure correct?	Action
Yes	Replace the body of the 4-way valve, see "3.2.2 Repair procedures" [▶ 101].
No	Leaks may be found in the refrigerant circuit. Perform a pressure test of the refrigerant circuit, see "4.2.1 Checking procedures" [▶ 286].

4 De-activate `Heating` and activate `Cooling` operation via the user interface.

5 Check with a contact thermometer (or by touching) if the flow through the 4-way valve corresponds with the flow shown in the flow diagram. (See "6.3 Piping diagram" [▶ 331]).

> **INFORMATION**
>
> The flow through the 4-way valve is correct if the water temperature after the heat exchanger rises/drops when operating in `Heating`/`Cooling` mode.

Is the flow correct?	Action
Yes	4-way valve is OK. Return to the troubleshooting of the specific error and continue with the next procedure.
No	Replace the body of the 4-way valve, see "3.2.2 Repair procedures" [▶ 101].

> **INFORMATION**
>
> Follow this procedure when the outdoor temperature is outside the temperature range for one of the operation modes (`Heating` or `Cooling`). The unit CANNOT operate in the mode for which the outdoor temperature is outside its temperature range. See the databook on Business Portal for the temperature range of the operation modes.

1. With the unit operating, connect the service monitoring tool to the unit and check whether the unit is operating in `Heating` or `Cooling` mode.
2. Check with a contact thermometer (or by touching) if the flow through the 4-way valve corresponds with the flow shown in the flow diagram of the specific operation mode. (See "6.3 Piping diagram" [▶ 331]).

> **INFORMATION**
>
> The flow through the 4-way valve is correct if the water temperature after the heat exchanger rises/drops when operating in `Heating`/`Cooling` mode.

Is the flow correct?	Action
Yes	4-way valve is OK. Return to the troubleshooting of the specific error and continue with the next procedure.
No	Perform the next step of this procedure.

3. Connect a manifold to one of the service ports of the refrigerant circuit and check the pressure (suction, discharge). Compare with normal operation conditions of the unit.

Refrigerant pressure correct?	Action
Yes	Replace the body of the 4-way valve, see "3.2.2 Repair procedures" [▶ 101].
No	Leaks may be found in the refrigerant circuit. Perform a pressure test of the refrigerant circuit, see "4.2.1 Checking procedures" [▶ 286].

When outdoor unit is combined with Heating only indoor unit

1. With the unit operating, connect the service monitoring tool to the unit and check whether the unit is operating in `Heating` or Defrost mode.
2. Check with a contact thermometer (or by touching) if the flow through the 4-way valve corresponds with the flow shown in the flow diagram of the specific operation mode. (See "6.3 Piping diagram" [▶ 331]).

> **INFORMATION**
>
> The flow through the 4-way valve is correct if the water temperature after the heat exchanger rises/drops when operating in `Heating`/Defrost mode.

Is the flow correct?	Action
Yes	Skip the next step.
No	Perform the next step of this procedure.

3 Connect a manifold to one of the service ports of the refrigerant circuit and check the pressure (suction, discharge). Compare with normal operation conditions of the unit.

Refrigerant pressure correct?	Action
Yes	Replace the body of the 4-way valve, see "3.2.2 Repair procedures" [▶ 101].
No	Leaks may be found in the refrigerant circuit. Perform a pressure test of the refrigerant circuit, see "4.2.1 Checking procedures" [▶ 286].

4 If the electrical check and position check have been performed with the unit operating in:

- Defrost mode: Wait for the unit to switch to `Heating` (service monitoring tool) mode and again perform the electrical check and position check.
- `Heating` mode: There is a possibility to put the unit in Defrost operation via `Forced defrost` (see installer reference guide for more information). Again perform the electrical check and position check when the unit is operating in Defrost mode.

Is the flow correct?	Action
Yes	4-way valve is OK. Return to the troubleshooting of the specific error and continue with the next procedure.
No	Replace the body of the 4-way valve, see "3.2.2 Repair procedures" [▶ 101].

3.2.2 Repair procedures

To remove the 4-way valve coil

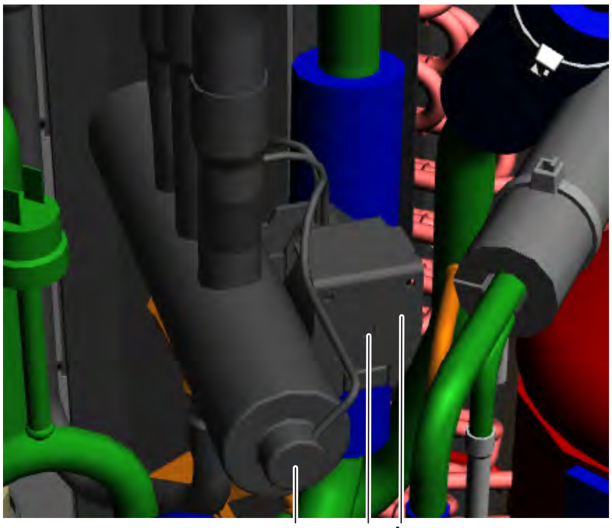
Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.17 Plate work" [▶ 230].

Prerequisite: If needed, remove any parts to create more space for the removal of the 4-way valve coil.

1 Remove the screw and remove the 4-way valve coil from the 4-way valve body.



a Screw
b 4-way valve coil
c 4-way valve body

2 Cut all tie straps that fix the 4-way valve coil harness.

3 Unplug the 4-way valve connector from the appropriate PCB.

4 To install the 4-way valve coil, see "3.2.2 Repair procedures" [▸ 101].

To remove the 4-way valve body

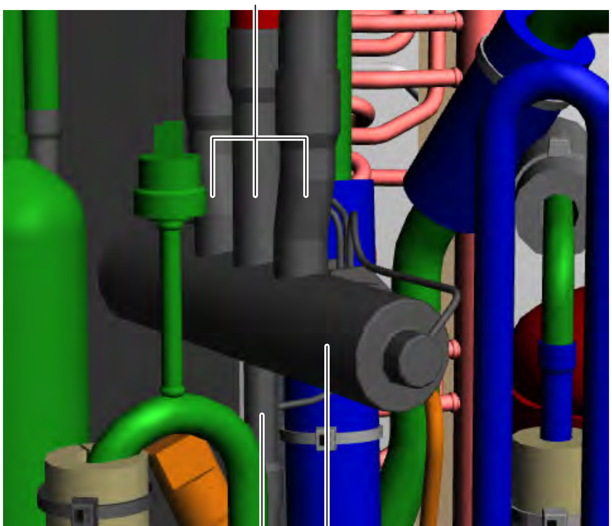
Prerequisite: Recuperate the refrigerant from the refrigerant circuit, see "4.2.2 Repair procedures" [▸ 291].

1 Remove the 4-way valve coil from the 4-way valve body, see "3.2.2 Repair procedures" [▸ 101].

2 Remove and keep the putty (if installed) and the insulation (if installed) for re-use.

3 Supply nitrogen to the refrigerant circuit. The nitrogen pressure MUST NOT exceed 0.02 MPa.

4 Wrap a wet rag around the components near the 4-way valve pipes. Heat the brazing points of the 4-way valve pipes using an oxygen acetylene torch and remove the 4-way valve pipes from the refrigerant pipes using pliers.



a 4-way valve pipe

b 4-way valve

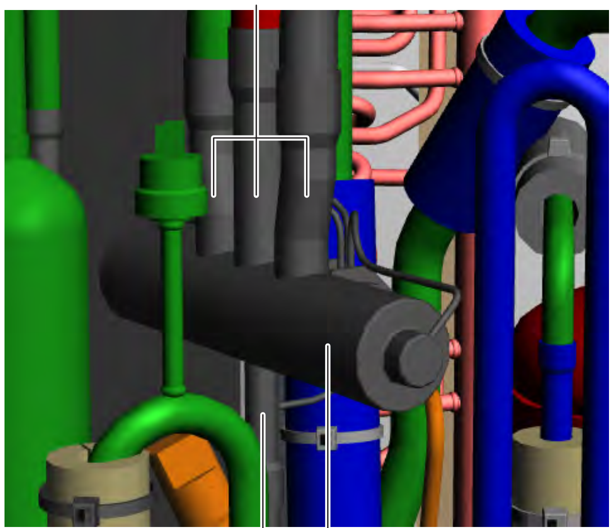
5. Stop the nitrogen supply when the piping has cooled down.
6. Remove the 4-way valve.

> **INFORMATION**
>
> It is ALSO possible to cut the component pipe(s) using a pipe cutter. Make sure to remove the remaining component pipe end(s) from the refrigerant pipes by heating the brazing point(s) of the component pipe(s) using an oxygen acetylene torch.

7. Install plugs or caps on the open pipe ends of the refrigerant piping to avoid dirt or impurities from entering the piping.
8. To install the 4-way valve body, see "3.2.2 Repair procedures" [▶ 101].

To install the 4-way valve body

1. Remove the plugs or caps from the refrigerant piping and make sure they are clean.
2. Remove the 4-way valve coil from the spare part 4-way valve body.
3. Install the 4-way valve body in the correct location and correctly oriented. Insert the pipe ends in the pipe expansions.
4. Supply nitrogen to the refrigerant circuit. The nitrogen pressure MUST NOT exceed 0.02 MPa.
5. Wrap a wet rag around the 4-way valve body and any other components near the 4-way valve and solder the 4-way valve pipes to the refrigerant pipes.



a 4-way valve pipe
b 4-way valve

> **CAUTION**
>
> Overheating the valve will damage or destroy it.

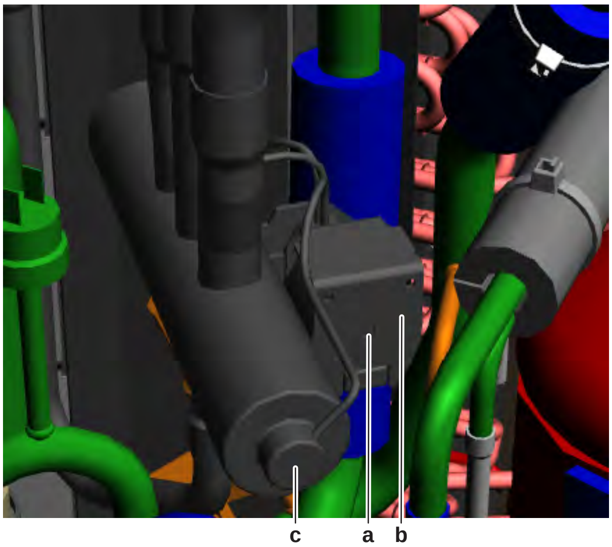
6. After soldering is done, stop the nitrogen supply after the component has cooled-down.
7. Install the putty (if available) and the insulation (if available) in their original location.
8. Install the 4-way valve coil on the 4-way valve body, see "3.2.2 Repair procedures" [▶ 101].

9 Perform a pressure test, see "4.2.1 Checking procedures" [▶ 286].

10 Add refrigerant to the refrigerant circuit, see "4.2.2 Repair procedures" [▶ 291].

To install the 4-way valve coil

1 Install the 4-way valve coil on the 4-way valve body.



a Screw
b 4-way valve coil
c 4-way valve body

2 Install and tighten the screw to fix the 4-way valve coil.

3 Route the 4-way valve coil harness towards the appropriate PCB.

4 Connect the 4-way valve connector to the appropriate PCB.

> **WARNING**
> When reconnecting a connector to the PCB, make sure to connect it on the correct location and do NOT apply force, as this may damage the connector or connector pins of the PCB.

5 Fix the 4-way valve coil harness using new tie straps.

Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

3.3 Backup heater

3.3.1 Built-in backup heater

Checking procedures

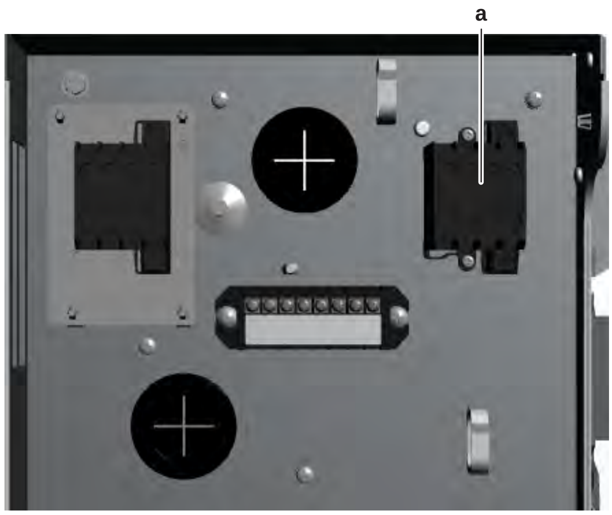
> **INFORMATION**
> It is recommended to perform the checks in the listed order.

To perform a resistance check of the backup heater

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

1 Remove the required plate work, see "3.17 Plate work" [▶ 230].



a Backup heater contactor K1M

2 Measure the backup heater resistance between K1M/1 and K1M/3.

Result: The measured resistance MUST be approximately 18 Ω.

INFORMATION

See the "6.2 Wiring diagram" [▶ 314] for more detailed information.

INFORMATION

Make sure that the wiring between the backup heater contactors and the backup heater connector is properly connected and NOT damaged (check continuity), see "6.2 Wiring diagram" [▶ 314].

Is the measured backup heater resistance correct?	Action
Yes	Return to "Checking procedures" [▶ 104] of the backup heater and continue with the next procedure.
No	Replace the backup heater, see "Repair procedures" [▶ 108].

To perform an insulation check of the backup heater

Prerequisite: First perform a resistance check of the backup heater, see "Checking procedures" [▶ 104].

1 Open all circuit breakers.

CAUTION

To prevent damage to the unit, all circuit breakers MUST be opened before using a Megger.

2 Set the Megger voltage to 500 V AC.

3 Connect the Megger ground test lead directly to the backup heater ground wire.

CAUTION

Do NOT connect the Megger ground test lead to any other ground wire.

4 Measure the insulation resistance between the following terminals. The measured insulation resistance MUST be >3 MΩ.

Terminals
K1M1-ground
K1M3-ground

Is the measured backup heater insulation resistance correct?	Action
Yes	Return to "Checking procedures" [▸ 104] of the backup heater and continue with the next procedure.
No	Replace the backup heater, see "Repair procedures" [▸ 108].

To perform an electrical check of the backup heater

Prerequisite: First perform an insulation check of the backup heater, see "Checking procedures" [▸ 104].

Prerequisite: Check the circuit breaker. Reset if it has tripped.

Prerequisite: Check that the backup heater thermal protector functions correctly. Reset if it has tripped. See "3.4 Backup heater thermal protector" [▸ 121].

1 Turn ON the power of the unit.

INFORMATION

If the circuit breaker or the backup heater thermal protector trips again, determine the root cause of the problem. Something is overloading the electrical circuit or creating a short-circuit.

2 Activate `Installer` on the user interface. See the installer reference guide for the correct procedure.

3 Go to `Actuator test run` via the user interface.

4 Activate backup heater: step 1.

5 Check the status in the Actuators menu of the user interface. This MUST be:

- Backup heater: step 1 = ON

6 Check if the field installed circuit breaker has tripped.

Did the fuse blow or did the field supplied circuit breaker of the backup heater trip?	Action
Yes	Replace the backup heater, see "Repair procedures" [▸ 108].

Did the fuse blow or did the field supplied circuit breaker of the backup heater trip?	Action
No	Return to "Checking procedures" [▶ 104] of the backup heater and continue with the next procedure.

To perform a check of the backup heater contactor(s)

Prerequisite: First perform an electrical check of the backup heater, see "Checking procedures" [▶ 104].

1 Measure the power supply voltage between the following terminals of the backup heater contactor:

- K1M: 2-4
  The measured voltages MUST be 230 V AC ± 10%.

Is the measured power supply voltage correct?	Action
Yes	Skip the next step.
No	Continue with the next step.

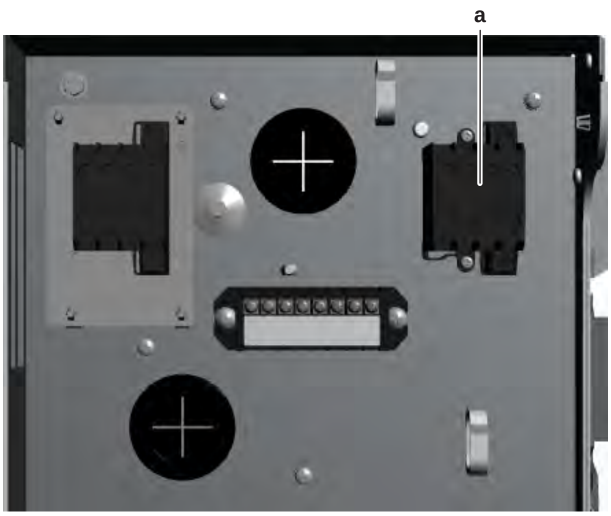
2 Check the power supply (source) of the backup heater.

Is the power supply (source) of the backup heater correct?	Action
Yes	Correct the wiring and/or components between the power supply (source) and the backup heater contactor K1M, see "6.2 Wiring diagram" [▶ 314].
No	Adjust the power supply (source) of the backup heater.

3 With the `Actuator test run` still active, activate backup heater: step 1.

4 Measure the voltage between the following terminals of the backup heater contactor.

- K1M: 1-3 / 2-4
  The measured voltages MUST be 230 V AC ± 10%.



a Backup heater contactor K1M

Are the measured voltages of the backup heater contactor correct?	Action
Yes	Return to "Checking procedures" [▶ 104] of the backup heater and continue with the next procedure.
No	Continue with the next step.

5 Measure the operating voltage on the contactor.

Is the measured operating voltage of the backup heater contactor correct?	Action
Yes	Replace the specific backup heater contactor(s), see "Repair procedures" [▶ 108].
No	Check for the reason of faulty operating voltage (broken wiring, faulty contact, ...), see "6.2 Wiring diagram" [▶ 314].

Problem solved?

After all checking procedures listed above have been performed:

Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

Repair procedures

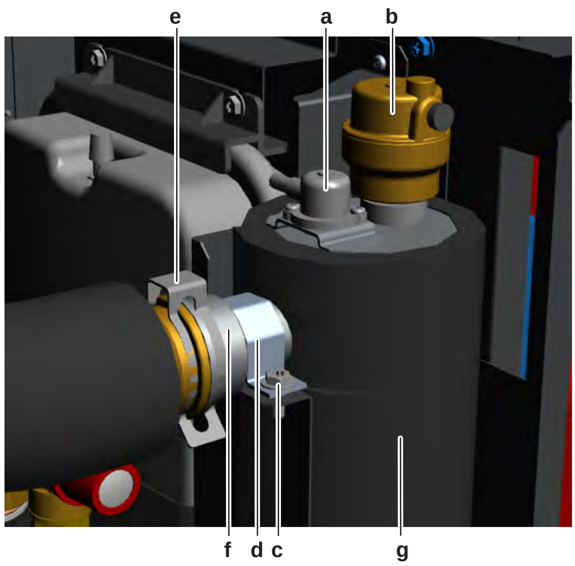
To remove the backup heater

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.17 Plate work" [▶ 230].

1. Drain water from the water circuit, see "4.3.2 Repair procedures" [▶ 302].
2. Remove the backup heater thermal protector, see "Repair procedures" [▶ 123].
3. Unscrew and remove the air purge valve. Keep for reuse.
4. Loosen and remove the screw from the pipe clamp.



a Backup heater thermal protector sensor
b Air purge valve
c Screw (pipe clamp)
d Pipe clamp
e Clip
f Upper backup heater coupling
g Backup heater

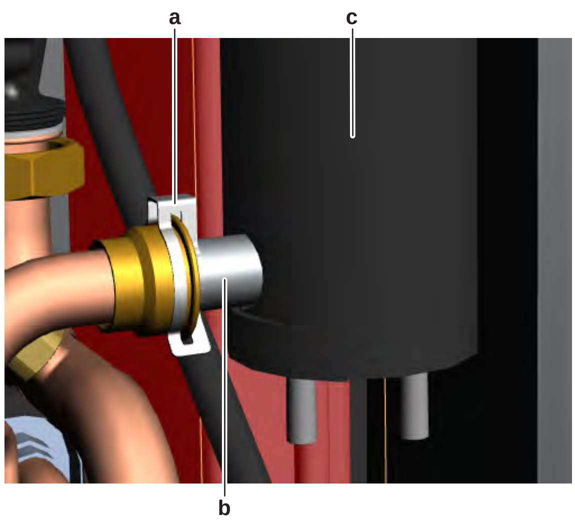
5 Remove the clip from the upper backup heater coupling.

6 Remove the pipe from the pipe clamp to improve manoeuvrability of the backup heater.

7 Separate the upper backup heater coupling.

> **INFORMATION**
>
> Make sure that the O-ring stays in place.

8 Remove the clip from the lower backup heater coupling.



a Clip
b Lower backup heater coupling
c Backup heater

9 Separate the lower backup heater coupling.

INFORMATION

Make sure that the O-ring stays in place.

10 Disconnect the backup heater connector X12Y.

11 Remove the screw and disconnect the ground wire from the switch box.

12 Remove the backup heater from the unit.

13 To install the backup heater, see "Repair procedures" [▸ 108].

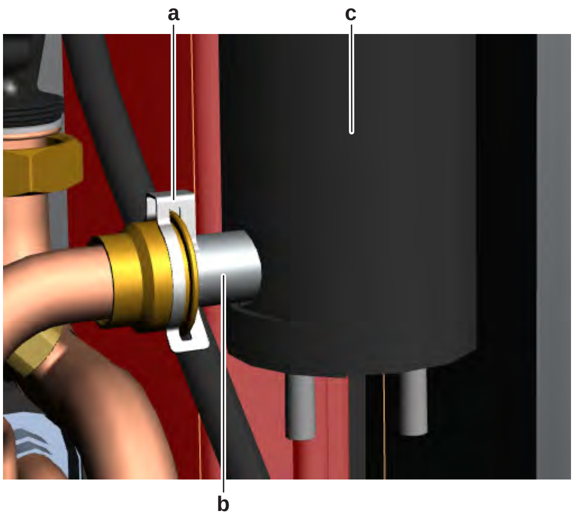
To install the backup heater

1 Install the backup heater in the correct location.

CAUTION

Check the condition of the O-rings and replace if needed. Apply water to the O-rings before installation.

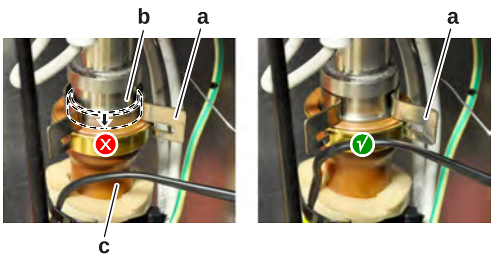
2 Install the lower backup heater coupling and install the clip.



a Clip
b Lower backup heater coupling
c Backup heater

INFORMATION

Make sure that the back-up heater pipe is fully inserted in the back-up heater coupling.

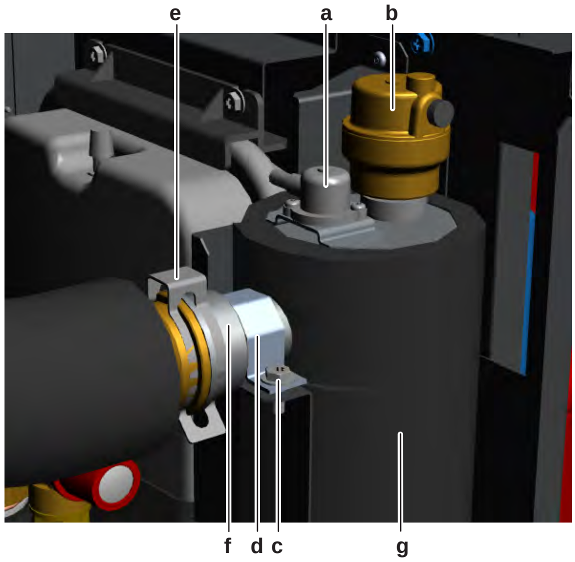


a Clip
b Backup heater pipe
c Backup heater coupling

CAUTION

Check the condition of the O-rings and replace if needed. Apply water to the O-rings before installation.

3 Guide the upper backup heater pipe through the pipe clamp and install the upper backup heater coupling. Install the clip.



- **a** Backup heater thermal protector sensor
- **b** Air purge valve
- **c** Screw (pipe clamp)
- **d** Pipe clamp
- **e** Clip
- **f** Upper backup heater coupling
- **g** Backup heater

4 Install and tighten the screw on the pipe clamp.

5 Connect the ground wire to the switch box using the screw. Tighten the screw.

6 Connect the backup heater connector X12Y.

7 Install and restore all insulation (if needed).

8 Re-install the air purge valve on the backup heater.

INFORMATION

The spare part backup heater already has the backup heater thermal protector installed.

9 Route the backup heater thermal protector harness through the grommet inside the switch box.

10 Connect the backup heater thermal protector wiring to the wiring terminal X7M: 5-6.

11 Fix the backup heater thermal protector harness using new tie straps.

INFORMATION

Take care NOT to damage the insulation during installation.

12 Open the stop valves and add water to the water circuit if needed, see "4.3.2 Repair procedures" [▶ 302].

Is the problem solved?	Action
Yes	No further actions required.
No	Return to "Checking procedures" [▶ 104] of the backup heater and continue with the next procedure.

To remove the backup heater contactor(s)

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn off the respective circuit breaker of the unit and the backup heater.

Prerequisite: Remove the required plate work, see "3.17 Plate work" [▶ 230].

1. Disconnect the wiring from the backup heater contactor terminals.
2. Remove the screws and remove the backup heater contactor(s) from the switch box.
3. To install the backup heater contactor(s), see "Repair procedures" [▶ 108].

To install the backup heater contactor(s)

1. Install the backup heater contactor(s) in the switch box and fix them using the screws.
2. Connect the wiring to the correct backup heater contactor terminals.

Is the problem solved?	Action
Yes	No further actions required.
No	Return to "Checking procedures" [▶ 104] of the backup heater and continue with the next procedure.

3.3.2 Backup heater kit

Checking procedures

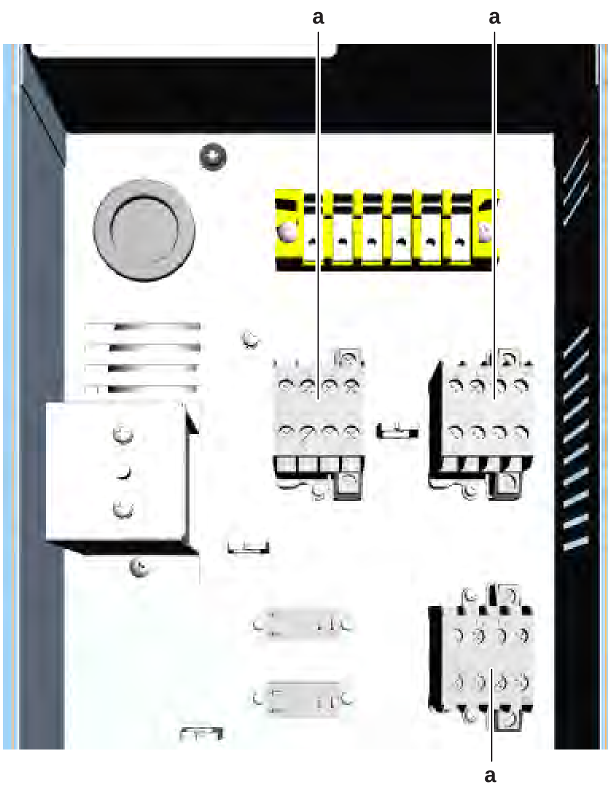
> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

To perform a resistance check of the backup heater

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

1. Remove the required plate work, see "3.17 Plate work" [▶ 230].



a Backup heater contactor

2 Measure the backup heater resistance as shown in the table below. Tolerance = ± 10%.

		3 kW 1~230 V	6 kW 1~230 V	6 kW 3N~400 V	9 kW 3N~400 V
K1M/1	K5M/13	53 Ω	53 Ω	OL	OL
	K1M/3	106 Ω	106 Ω	106 Ω	106 Ω
	K1M/5	159 Ω	159 Ω	106 Ω	106 Ω
K1M/3	K1M/5	53 Ω	53 Ω	106 Ω	106 Ω
K2M/1	K5M/13	26.5 Ω	26.5 Ω	OL	OL
	K2M/3	OL	OL	53 Ω	53 Ω
	K2M/5	OL	OL	53 Ω	53 Ω
K2M/3	K2M/5	53 Ω	53 Ω	53 Ω	53 Ω
K1M/5	K2M/1	132.5 Ω	132.5 Ω	OL	OL

INFORMATION

See the "6.2 Wiring diagram" [▸ 314] for more detailed information.

Is the measured backup heater resistance correct?	Action
Yes	Return to "Checking procedures" [▸ 112] of the backup heater and continue with the next procedure.
No	Replace the backup heater, see "Repair procedures" [▸ 117].

To perform an insulation check of the backup heater

Prerequisite: First perform a resistance check of the backup heater, see "Checking procedures" [▶ 112].

1 Open all circuit breakers.

> **CAUTION**
>
> To prevent damage to the unit, all circuit breakers MUST be opened before using a Megger.

2 Set the Megger voltage to 500 V AC.

3 Connect the Megger ground test lead directly to the backup heater ground wire.

> **CAUTION**
>
> Do NOT connect the Megger ground test lead to any other ground wire.

4 Measure the insulation resistance between the following terminals. The measured insulation resistance MUST be >3 MΩ.

- K1M1-ground
- K1M3-ground
- K1M5-ground
- K2M1-ground
- K2M3-ground
- K2M5-ground

Is the measured backup heater insulation resistance correct?	Action
Yes	Return to "Checking procedures" [▶ 112] of the backup heater and continue with the next procedure.
No	Replace the backup heater, see "Repair procedures" [▶ 117].

To perform an electrical check of the backup heater

Prerequisite: First perform an insulation check of the backup heater, see "Checking procedures" [▶ 112].

Prerequisite: Check the circuit breaker. Reset if it has tripped.

Prerequisite: Check that the backup heater thermal protector functions correctly. Reset if it has tripped. See "3.4 Backup heater thermal protector" [▶ 121].

1 Turn ON the power of the unit.

> **INFORMATION**
>
> If the circuit breaker or the backup heater thermal protector trips again, determine the root cause of the problem. Something is overloading the electrical circuit or creating a short-circuit.

2 Activate `Installer` on the user interface. See the installer reference guide for the correct procedure.

3 Go to `Actuator test run` via the user interface.

4 Activate backup heater: step 1.

5 Activate backup heater: step 2.

6 Check the status in the Actuators menu of the user interface. This MUST be:

- Backup heater: step 1 = ON
  And/Or
- Backup heater: step 2 = ON

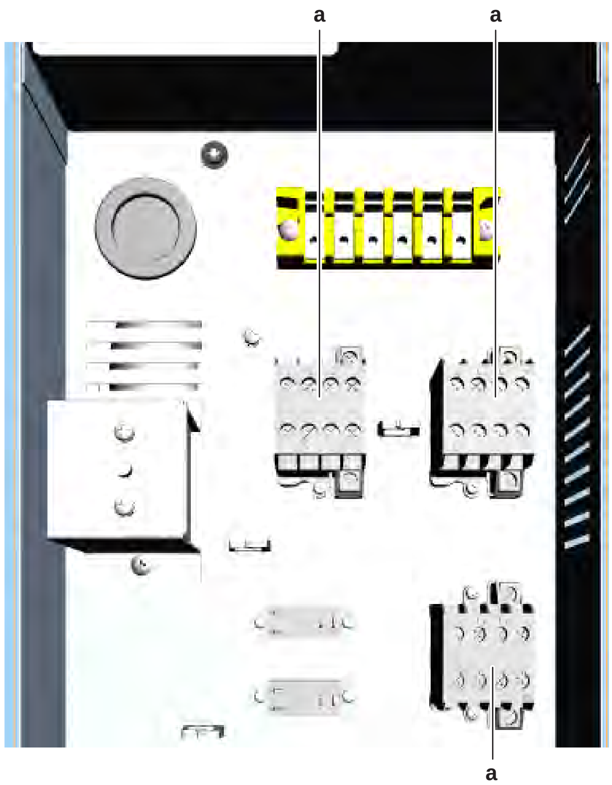
7 Check if the field installed circuit breaker has tripped.

8 Check if the fuse of the backup heater has tripped.

Did the fuse or the field supplied circuit breaker of the backup heater trip?	Action
Yes	Replace the backup heater, see "Repair procedures" [▶ 117].
No	Return to "Checking procedures" [▶ 112] of the backup heater and continue with the next procedure.

To perform a check of the backup heater contactors

1 First perform an electrical check of the backup heater, see "Checking procedures" [▶ 112].



a Backup heater contactor

For backup heater option with 1~, 230 V, 3 kW or 6 kW backup heater:
- K5M: 2-6, 4-6, 2-14
  All measured voltages MUST be 230 V AC ± 10%.

For backup heater option with 3~, 400 V, 6 kW or 9 kW backup heater:
- K5M: 2-4, 4-6, 2-6
  All measured voltages MUST be 400 V AC ± 10%.
- K5M: 2-14
  The measured voltage MUST be 230 V AC ± 10%.

Is the measured power supply voltage correct?	Action
Yes	Skip the next step.
No	Continue with the next step.

2 Check the power supply (source) of the backup heater.

Is the power supply (source) of the backup heater correct?	Action
Yes	Correct the wiring and/or components between the power supply (source) and the backup heater contactor K5M, see "6.2 Wiring diagram" [▶ 314].
No	Adjust the power supply (source) of the backup heater.

3 With the `Actuator test run` still active, activate backup heater: step 1.

4 Measure the voltage between the following terminals of the backup heater contactors.

For backup heater option with 1~, 230 V, 3 kW or 6 kW backup heater:

- K1M: 2-6 / 1-5, 4-6 / 3-5
- K5M: 2-6 / 1-5, 4-6 / 3-5, 2-14 / 1-13
  All measured voltages MUST be 230 V AC ± 10%.

For backup heater option with 3~, 400 V, 6 kW or 9 kW backup heater:

- K1M: 2-4 / 1-3, 4-6 / 3-5, 2-6 / 1-5
- K5M: 2-4 / 1-3, 4-6 / 3-5, 2-6 / 1-5
  All measured voltages MUST be 400 V AC ± 10%.
- K5M: 2-14 / 1-13
  The measured voltage MUST be 230 V AC ± 10%.

5 Activate backup heater: step 2.

6 Measure the voltage between the following terminals of the backup heater contactors.

For backup heater option with 1~, 230 V, 3 kW or 6 kW backup heater:

- K2M: 2-6 / 1-5, 4-6 / 3-5
- K5M: 2-6 / 1-5, 4-6 / 3-5, 2-14 / 1-13
- K2M: 1-K5M: 14
  All measured voltages MUST be 230 V AC ± 10%.

For backup heater option with 3~, 400 V, 6 kW or 9 kW backup heater:

- K2M: 2-4 / 1-3, 4-6 / 3-5, 2-6 / 1-5
- K5M: 2-4 / 1-3, 4-6 / 3-5, 2-6 / 1-5
  All measured voltages MUST be 400 V AC ± 10%.
- K5M: 2-14 / 1-13
  The measured voltage MUST be 230 V AC ± 10%.

INFORMATION

Make sure that the wiring between the backup heater contactors is properly connected and NOT damaged (check continuity), see "6.2 Wiring diagram" [▶ 314].

Are the measured voltages of the backup heater contactors correct?	Action
Yes	Return to "Checking procedures" [▶ 112] of the backup heater and continue with the next procedure.
No	Continue with the next step.

7 Measure the operating voltage on the specific contactor.

Is the measured operating voltage of the backup heater contactor correct?	Action
Yes	Replace the specific backup heater contactor(s), see "Repair procedures" [▶ 117].
No	Check for the reason of faulty operating voltage (broken wiring, faulty contact, ...), see "6.2 Wiring diagram" [▶ 314].

Problem solved?

After all checking procedures listed above have been performed:

Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

Repair procedures

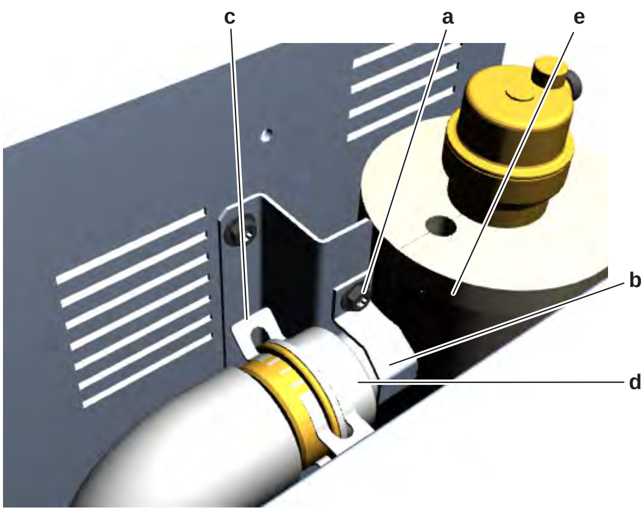
To remove the backup heater

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work.

1. Drain water from the water circuit, see "4.3.2 Repair procedures" [▶ 302].
2. Unscrew and remove the air purge valve from the backup heater. Keep for reuse.
3. Cut the insulation that covers the upper backup heater coupling.
4. Open the insulation and remove the screw from the pipe clamp.



a Screw
b Pipe clamp
c Clip
d Upper backup heater coupling
e Backup heater

5 Remove the clip from the upper backup heater coupling.

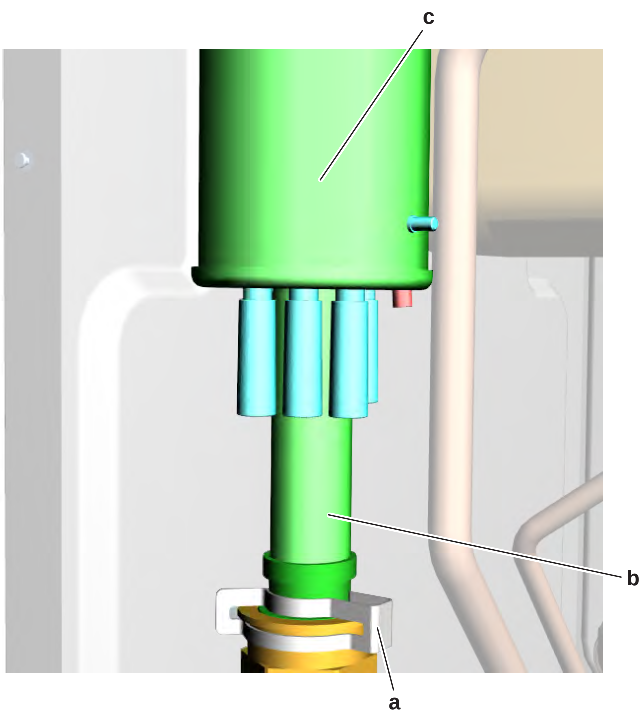
6 Remove the pipe from the pipe clamp to improve manoeuvrability of the backup heater.

7 Separate the upper backup heater coupling.

> **INFORMATION**
>
> Make sure that the O-ring stays in place.

8 Remove the backup heater thermal protector sensor from the backup heater.

9 Remove the clip from the lower backup heater coupling.



a Clip
b Lower backup heater coupling
c Backup heater

10 Separate the lower backup heater coupling.

INFORMATION

Make sure that the O-ring stays in place.

11 Loosen the screws and disconnect the backup heater wiring from the wire terminals in the switch box.

12 Remove the screw and disconnect the ground wire from the switch box.

13 Guide the backup heater wiring and ground wire through the grommet in the switch box.

14 Cut all tie straps that fix the backup heater wiring.

15 Remove the backup heater from the unit.

16 To install the backup heater, see "Repair procedures" [▶ 117].

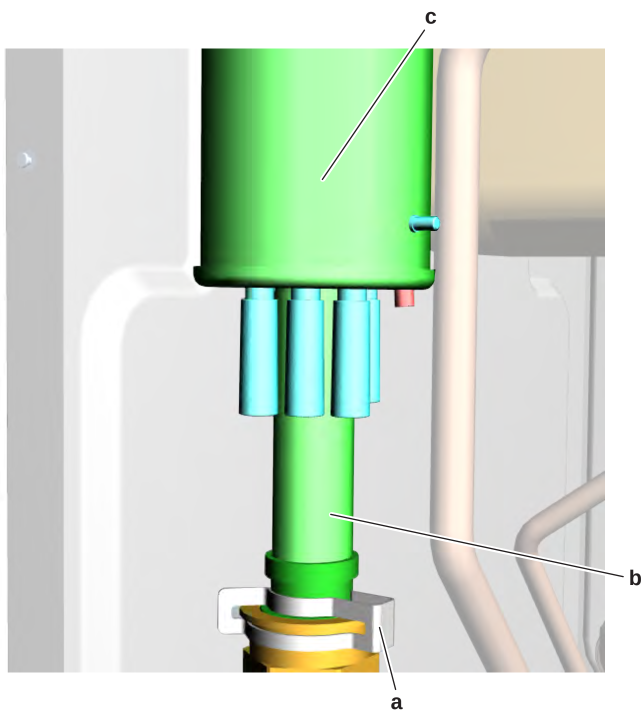
To install the backup heater

1 Install the backup heater in the correct location.

CAUTION

Check the condition of the O-rings and replace if needed. Apply water to the O-rings before installation.

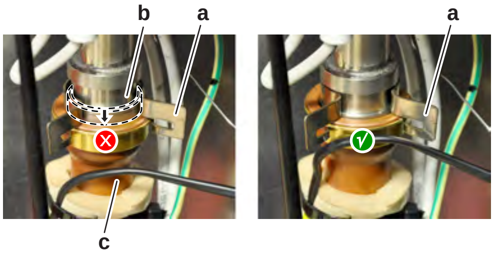
2 Install the lower backup heater coupling and install the clip.



a Clip
b Lower backup heater coupling
c Backup heater

INFORMATION

Make sure that the back-up heater pipe is fully inserted in the back-up heater coupling.

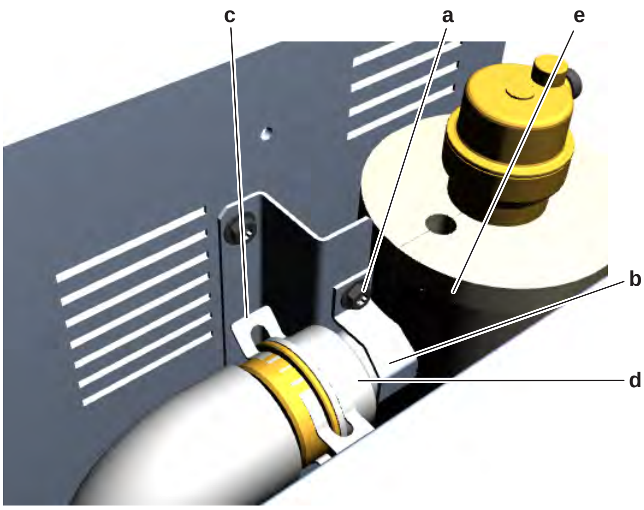


a Clip
b Backup heater pipe
c Backup heater coupling

3 Install the backup heater thermal protector sensor in the backup heater.

> **CAUTION**
>
> Check the condition of the O-rings and replace if needed. Apply water to the O-rings before installation.

4 Guide the upper backup heater pipe through the pipe clamp and install the upper backup heater coupling. Install the clip.



a Screw
b Pipe clamp
c Clip
d Upper backup heater coupling
e Backup heater

5 Install and tighten the screw on the pipe clamp.

6 Route the backup heater wiring and ground wire towards the switch box and through the grommet in the switch box.

7 Connect the ground wire to the switch box using the screw. Tighten the screw.

8 Connect the backup heater wiring to the wire terminals in the switch box and tighten the screws.

9 Fix the backup heater wiring using new tie straps.

10 Re-install the air purge valve on the backup heater.

11 Install and restore all insulation.

> **INFORMATION**
>
> Take care NOT to damage the insulation during installation.

12 Open the valve (if equipped) of the water circuit towards the expansion vessel.

> **CAUTION**
>
> Make sure to open the valve (if equipped) towards the expansion vessel, otherwise the overpressure will be generated.

13 Open the stop valves and add water to the water circuit if needed, see "4.3.2 Repair procedures" [▶ 302].

Is the problem solved?	Action
Yes	No further actions required.
No	Return to "Checking procedures" [▶ 112] of the backup heater and continue with the next procedure.

To remove the backup heater contactors

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn off the respective circuit breaker of the unit and the backup heater.

Prerequisite: Remove the required plate work.

1 Disconnect the wiring from the backup heater contactor terminals.

2 Remove the screws and remove the backup heater contactors from the switch box.

3 To install the backup heater contactors, see "Repair procedures" [▶ 117].

To install the backup heater contactors

1 Install the backup heater contactors in the switch box and fix them using the screws.

2 Connect the wiring to the correct backup heater contactor terminals.

Is the problem solved?	Action
Yes	No further actions required.
No	Return to "Checking procedures" [▶ 112] of the backup heater and continue with the next procedure.

3.4 Backup heater thermal protector

3.4.1 Built-in backup heater

Checking procedures

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

To perform a mechanical check of the backup heater thermal protector

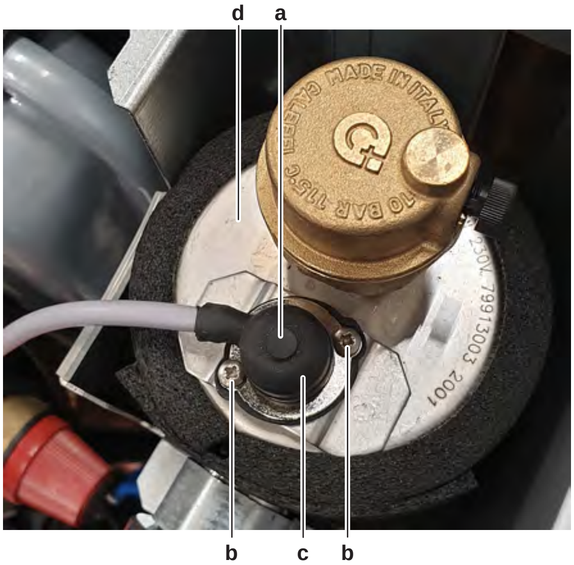
Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.17 Plate work" [▶ 230].

1 If the backup heater thermal protector has tripped:

- Sufficiently cool the backup heater thermal protector (7 K)
- Press the button on the top to reset the backup heater thermal protector



a Reset button
b Screw
c Backup heater thermal protector
d Backup heater

2 Loosen and remove the 2 screws and remove the backup heater thermal protector from the backup heater.

3 Using a hot air gun, heat the backup heater thermal protector above 88°C.

Result: The backup heater thermal protector MUST trip at a temperature of 82~88°C.

> **DANGER: RISK OF BURNING/SCALDING**

Does the backup heater thermal protector trip at correct temperature?	Action
Yes	Perform an electrical check of the backup heater thermal protector, see "Checking procedures" [▶ 121]
No	Replace the backup heater thermal protector, see "Repair procedures" [▶ 123].

To perform an electrical check of the backup heater thermal protector

Prerequisite: First perform a mechanical check of the backup heater thermal protector, see "Checking procedures" [▶ 121].

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

1 With the backup heater thermal protector NOT activated (temperature below 82°C), measure the resistance between the backup heater thermal protector wires on terminal X7M: 5-6.

Result: The resistance MUST be 0 Ω (backup heater thermal protector contacts are closed).

Are all contacts closed?	Action
Yes	Backup heater thermal protector is OK. Return to the troubleshooting of the specific error and continue with the next procedure.
No	Replace the backup heater thermal protector, see "Repair procedures" [▶ 123].

Repair procedures

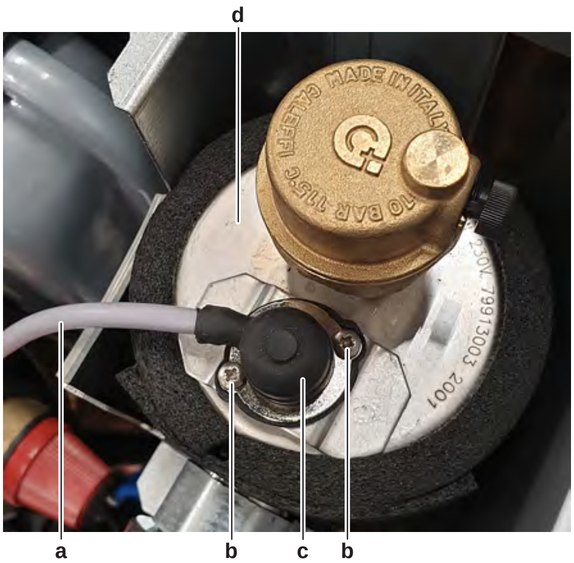
To remove the backup heater thermal protector

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.17 Plate work" [▶ 230].

1. Disconnect the backup heater thermal protector wires from the wire terminal X7M: 5-6.
2. Guide the wires through the grommet in the switch box.
3. Cut all tie straps that fix the backup heater protector harness.
4. Loosen and remove the 2 screws.



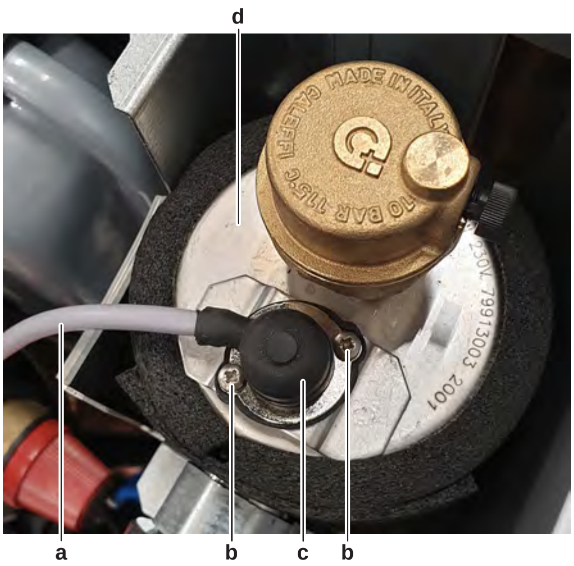
- **a** Backup heater thermal protector harness
- **b** Screw
- **c** Backup heater thermal protector
- **d** Backup heater

5. Remove the backup heater thermal protector together with the gasket from the backup heater.
6. To install the backup heater thermal protector, see "Repair procedures" [▶ 123].

To install the backup heater thermal protector

1. Install the backup heater thermal protector and new gasket on the backup heater.

> **INFORMATION**
>
> Make sure the gasket is correctly installed.



a Backup heater thermal protector harness
b Screw
c Backup heater thermal protector
d Backup heater

2 Install and tighten the 2 screws to fix the backup heater thermal protector.

3 Route the backup heater thermal protector harness through the grommet inside the switch box.

4 Connect the backup heater protector wiring to the wire terminal X7M: 5-6.

5 Fix the backup heater thermal protector harness using new tie straps.

Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

3.4.2 Backup heater kit

Checking procedures

> **INFORMATION**
> It is recommended to perform the checks in the listed order.

To perform a mechanical check of the backup heater thermal protector

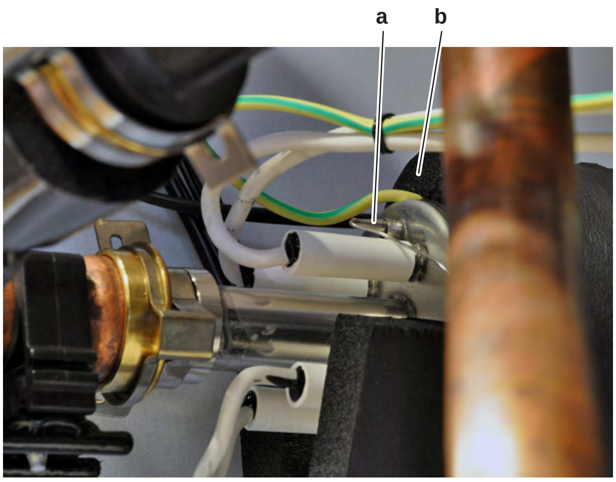
Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.17 Plate work" [▶ 230].

1 If the backup heater thermal protector has tripped:

- Sufficiently cool the sensor (7 K)
- Press the red button to reset the backup heater thermal protector



a Backup heater thermal protector sensor
b Backup heater

2 Remove the backup heater thermal protector sensor from the backup heater.

3 Submerge the backup heater thermal protector sensor in water.

DANGER: RISK OF BURNING/SCALDING

4 Heat the water above 90°C.

5 Measure the temperature of the water. The backup heater thermal protector MUST trip at a temperature of approximately 90°C.

Does the backup heater thermal protector trip at the correct temperature?	Action
Yes	Perform an electrical check of the backup heater thermal protector, see "Checking procedures" [▶ 124]
No	Replace the backup heater thermal protector, see "Repair procedures" [▶ 126].

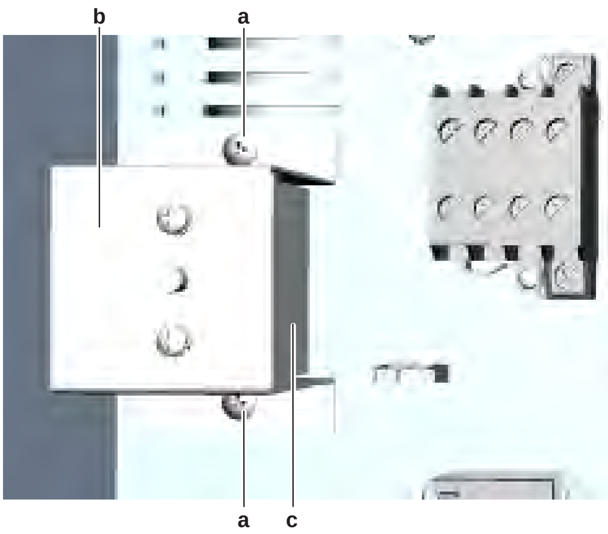
To perform an electrical check of the backup heater thermal protector

Prerequisite: First perform a mechanical check of the backup heater thermal protector, see "Checking procedures" [▶ 124].

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

1 Remove the 2 screws from the backup heater thermal protector bracket.



a Screw
b Backup heater thermal protector bracket
c Backup heater thermal protector

2 Pull the backup heater thermal protector and bracket slightly to the front so the wire terminals (at the back of the thermal protector) are reachable.

3 Disconnect the wires from the backup heater thermal protector.

4 Measure the resistance between the backup heater thermal protector terminals 11-12 and 31-32. All contacts MUST be closed.

Are all contacts closed?	Action
Yes	Backup heater thermal protector is OK. Return to the troubleshooting of the specific error and continue with the next procedure.
No	Replace the backup heater thermal protector, see "Repair procedures" [▸ 126].

Repair procedures

To remove the backup heater thermal protector

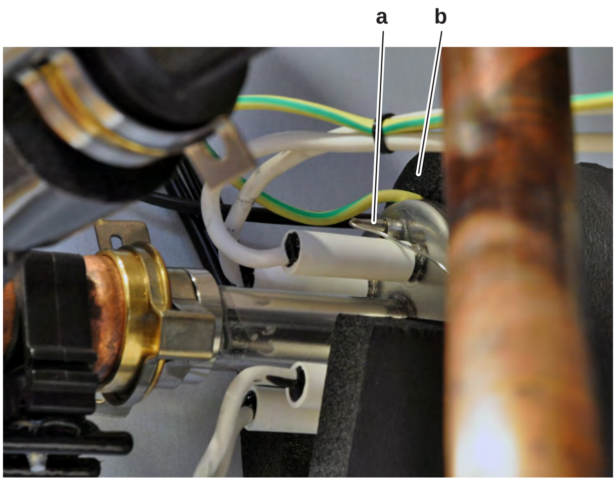
Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

1 Remove the required plate work, see "3.17 Plate work" [▸ 230].

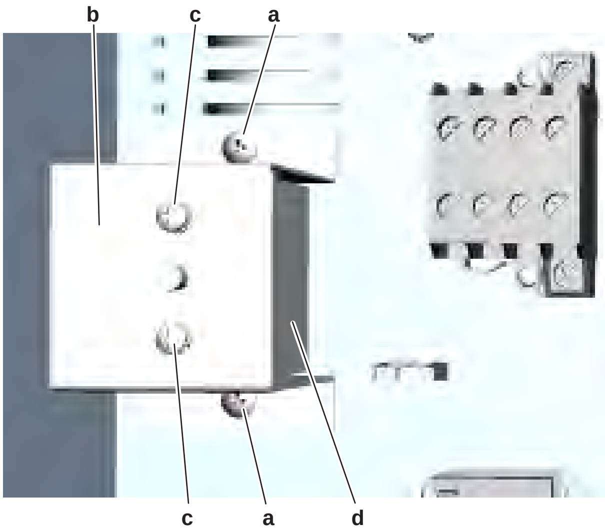
2 Remove the backup heater thermal protector sensor from the backup heater.

3 Guid the backup heater thermal protector sensor and wiring through the grommet inside the switch box.



a Backup heater thermal protector sensor
b Backup heater

4 Loosen and remove the 2 screws that fix the backup heater thermal protector bracket to the switch box.



a Screw
b Backup heater thermal protector bracket
c Screw
d Backup heater thermal protector

5 Loosen and remove the 2 screws that fix the backup heater thermal protector to the bracket.

6 Disconnect the wires from the backup heater thermal protector terminals.

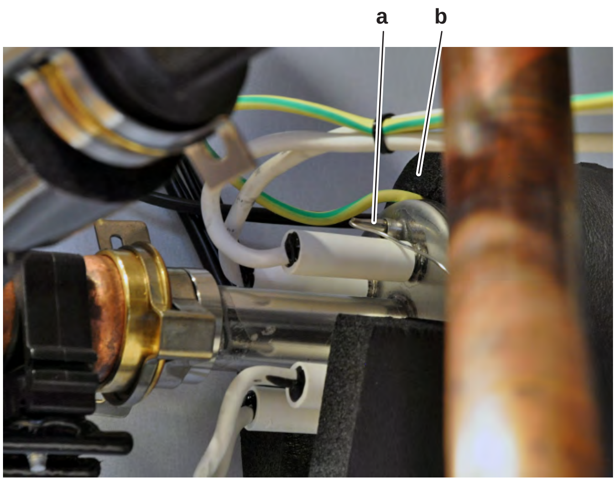
7 Remove the backup heater thermal protector and sensor from the unit.

8 To install the backup heater thermal protector, see "Repair procedures" [▶ 126].

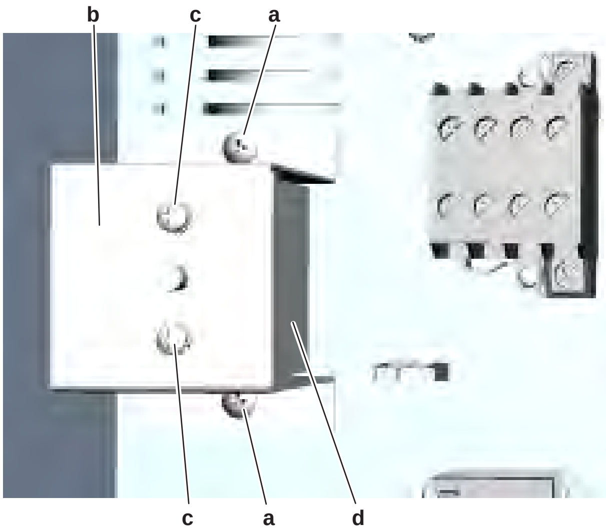
To install the backup heater thermal protector

1 Route the backup heater thermal protector sensor and wiring through the grommet of the switch box.

2 Insert the backup heater thermal protector sensor in the backup heater.



a Backup heater thermal protector sensor
b Backup heater



a Screw
b Backup heater thermal protector bracket
c Screw
d Backup heater thermal protector

3 Connect the wires to the wire terminals at the back of the backup heater thermal protector.

4 Install the backup heater thermal protector on the bracket. Install and tighten the 2 screws.

5 Install the backup heater thermal protector bracket on the switch box. Install and tighten the 2 screws.

Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

3.5 Booster heater

3.5.1 Checking procedures

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

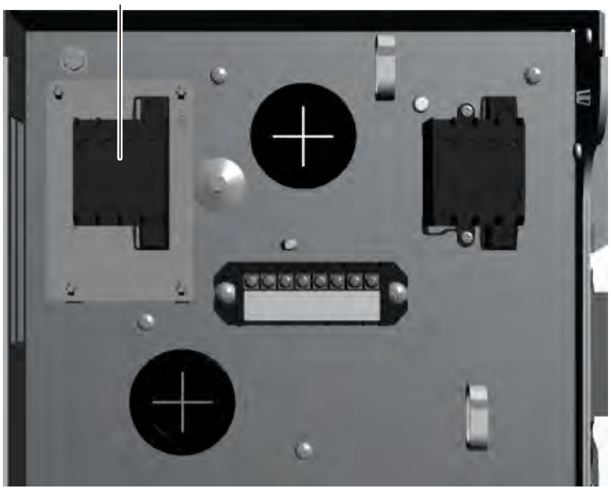
To perform a resistance check of the booster heater

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Check that the booster heater thermal protector functions correctly. Reset if it has tripped. See "3.6 Booster heater thermal protector" [▶ 133].

1 Remove the required plate work, see "3.17 Plate work" [▶ 230].



a Booster heater contactor K3M

2 Measure the booster heater resistance between K3M/1 and K3M/3.

Result: The measured resistance MUST be approximately 18 Ω.

> **INFORMATION**
>
> See the "6.2 Wiring diagram" [▶ 314] for more detailed information.

> **INFORMATION**
>
> Make sure that the wiring between the booster heater contactor and the booster heater is properly connected and NOT damaged (check continuity), see "6.2 Wiring diagram" [▶ 314].

Is the measured booster heater resistance correct?	Action
Yes	Return to "3.5.1 Checking procedures" [▶ 129] of the booster heater and continue with the next procedure.
No	Replace the booster heater, see "3.5.2 Repair procedures" [▶ 132].

To perform an insulation check of the booster heater

Prerequisite: First perform a resistance check of the booster heater, see "3.5.1 Checking procedures" [▸ 129].

1 Open all circuit breakers.

> **CAUTION**
>
> To prevent damage to the unit, all circuit breakers MUST be opened before using a Megger.

2 Set the Megger voltage to 500 V AC.

3 Connect the Megger ground test lead directly to the booster heater ground wire.

> **CAUTION**
>
> Do NOT connect the Megger ground test lead to any other ground wire.

4 Measure the insulation resistance between the following terminals. The measured insulation resistance MUST be >3 MΩ.

Terminals
K3M1-ground
K3M3-ground

Is the measured booster heater insulation resistance correct?	Action
Yes	Return to "3.5.1 Checking procedures" [▸ 129] of the booster heater and continue with the next procedure.
No	Replace the booster heater, see "3.5.2 Repair procedures" [▸ 132].

To perform an electrical check of the booster heater

Prerequisite: First perform an insulation check of the booster heater, see "3.5.1 Checking procedures" [▸ 129].

Prerequisite: Check the circuit breaker. Reset if it has tripped.

1 Turn ON the power of the unit.

> **INFORMATION**
>
> If the circuit breaker or the booster heater thermal protector trips again, determine the root cause of the problem. Something is overloading the electrical circuit or creating a short-circuit.

2 Activate `Installer` on the user interface. See the installer reference guide for the correct procedure.

3 Go to `Actuator test run` via the user interface.

4 Activate Booster heater test.

5 Check the status in the Actuators menu of the user interface. This MUST be:

- Booster heater test = ON

6 Check if the field installed circuit breaker has tripped.

Did the fuse blow or did the field supplied circuit breaker of the booster heater trip?	Action
Yes	Replace the booster heater, see "3.5.2 Repair procedures" [▶ 132].
No	Return to "3.5.1 Checking procedures" [▶ 129] of the booster heater and continue with the next procedure.

To perform a check of the booster heater contactor(s)

Prerequisite: First perform an electrical check of the booster heater, see "3.5.1 Checking procedures" [▶ 129].

1 Measure the power supply voltage between the following terminals of the booster heater contactor:

- K3M: 2-4
  The measured voltages MUST be 230 V AC ± 10%.

Is the measured power supply voltage correct?	Action
Yes	Skip the next step.
No	Continue with the next step.

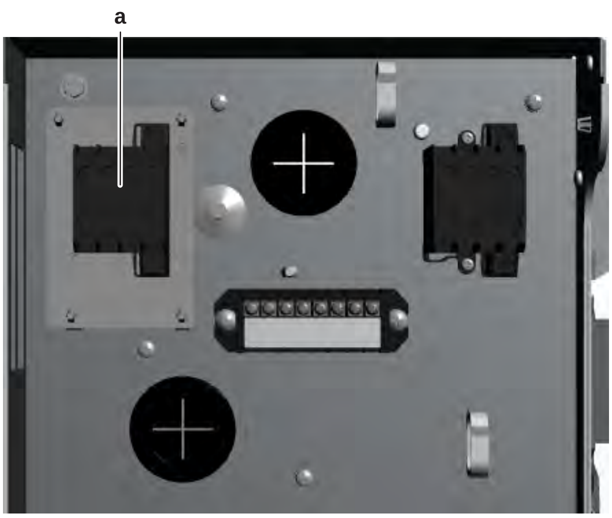
2 Check the power supply (source) of the booster heater.

Is the power supply (source) of the booster heater correct?	Action
Yes	Correct the wiring and/or components between the power supply (source) and the booster heater contactor K3M, see "6.2 Wiring diagram" [▶ 314].
No	Adjust the power supply (source) of the booster heater.

3 With the `Actuator test run` still active, activate booster heater test.

4 Measure the voltage between the following terminals of the booster heater contactor.

- K3M: 1-3 / 2-4
  The measured voltages MUST be 230 V AC ± 10%.



a Booster heater contactor K3M

Are the measured voltages of the booster heater contactor correct?	Action
Yes	Return to "3.5.1 Checking procedures" [▶ 129] of the booster heater and continue with the next procedure.
No	Continue with the next step.

5 Measure the operating voltage on the contactor.

Is the measured operating voltage of the booster heater contactor correct?	Action
Yes	Replace the specific booster heater contactor(s), see "3.5.2 Repair procedures" [▶ 132].
No	Check for the reason of faulty operating voltage (broken wiring, faulty contact, ...), see "6.2 Wiring diagram" [▶ 314].

Problem solved?

After all checking procedures listed above have been performed:

Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

3.5.2 Repair procedures

To remove the booster heater

1. For the correct procedure, see the installation manual of the water tank.
2. To install the booster heater, see "3.5.2 Repair procedures" [▶ 132].

To install the booster heater

1. For the correct procedure, see the installation manual of the water tank.

Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

To remove the booster heater contactor(s)

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn off the respective circuit breaker of the unit and the booster heater.

Prerequisite: Remove the required plate work, see "3.17 Plate work" [▸ 230].

1. Disconnect the wiring from the booster heater contactor terminals.
2. Remove the screws and remove the booster heater contactor(s) from the switch box.
3. To install the booster heater contactor(s), see "3.5.2 Repair procedures" [▸ 132].

To install the booster heater contactor(s)

1. Install the booster heater contactor(s) in the switch box and fix them using the screws.
2. Connect the wiring to the correct booster heater contactor terminals.

Is the problem solved?	Action
Yes	No further actions required.
No	Return to "Checking procedures" [▸ 104] of the backup heater and continue with the next procedure.

3.6 Booster heater thermal protector

3.6.1 Checking procedures

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

To perform a mechanical check of the booster heater thermal protector

1. For the correct procedure, see the installation manual of the water tank.

Does the booster heater thermal protector trip at 80~90°C?	Action
Yes	Perform an electrical check of the booster heater thermal protector, see "3.6.1 Checking procedures" [▸ 133].
No	Replace the booster heater thermal protector, see "3.6.2 Repair procedures" [▸ 134].

To perform an electrical check of the booster heater thermal protector

1. For the correct procedure, see the installation manual of the water tank.

All measured circuit breakers are closed?	Action
Yes	Booster heater thermal protector is OK. Return to the troubleshooting of the specific error and continue with the next procedure.
No	Replace the booster heater thermal protector, see "3.6.2 Repair procedures" [▸ 134].

3.6.2 Repair procedures

To remove the booster heater thermal protector

1. For the correct procedure, see the installation manual of the water tank.
2. To install the booster heater thermal protector, see "3.6.2 Repair procedures" [▸ 134].

To install the booster heater thermal protector

1. For the correct procedure, see the installation manual of the water tank.

Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

3.7 Compressor

3.7.1 Checking procedures

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

To perform an auditive check of the compressor

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.17 Plate work" [▸ 230].

1. Open the compressor insulation.
2. Turn ON the power using the respective circuit breaker.
3. Start the unit operation via the user interface.
4. Wait for - or create condition to operate the compressor.
5. Listen to the compressor when it tries to operate. Judge if a mechanical lock is present.

> **INFORMATION**
>
> If you have a multimeter with data logging functionality, record the current in 1 of the U-V-W wires at compressor start-up. If mechanical lock is present, logged current will drastically increase to a peak value and the unit will trigger an error.

> **INFORMATION**
>
> If a mechanical lock is present, also check and eliminate the root cause. Mechanical lock is most likely caused by lack of lubrication (which might be related to overheat or wet operation), failing crankcase heater (if available), impurities in the refrigerant, ...

A mechanical lock is present on the compressor?	Action
Yes	Replace the compressor, see "3.7.2 Repair procedures" [▸ 140].
No	Perform an mechanical check of the compressor, see "3.7.1 Checking procedures" [▸ 134].

To perform a mechanical check of the compressor

Prerequisite: First perform an auditive check of the compressor, see "3.7.1 Checking procedures" [▸ 134].

Prerequisite: Stop the unit operation via the user interface.

1 Turn OFF the respective circuit breaker.

2 Visually check:

- For oil drops around the compressor. Locate and fix as needed.
- Pipes for signs of damage. Replace pipes as needed.

3 Check that the compressor bolts are correctly fixed. Fix as needed.

4 Check that the compressor wire terminals cover is correctly installed and fixed. Correct as needed.

5 Check the compressor dampers for any damage.

1 Damper

> **INFORMATION**
>
> The compressor dampers may look different.

Compressor dampers are in a good condition?	Action
Yes	Perform an electrical check of the compressor, see "3.7.1 Checking procedures" [▸ 134].
No	Replace the compressor and/or damaged dampers, see "3.7.2 Repair procedures" [▸ 140].

To perform an electrical check of the compressor

1 First perform a mechanical check of the compressor, see "3.7.1 Checking procedures" [▸ 134].

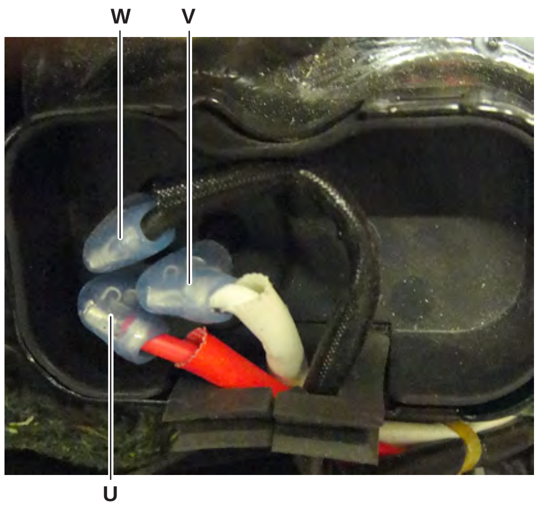
> **DANGER: RISK OF ELECTROCUTION**
>
> Confirm the rectifier voltage is below 10 V DC before proceeding, see "To prevent electrical hazards" [▸ 285].

2 Remove the cover of the compressor wire terminals.

a Compressor wire terminals cover

3 Disconnect the Faston connectors from the compressor wire terminals U, V and W.

> **INFORMATION**
>
> Note the position of the Faston connectors on the compressor wire terminals to allow correct connection during installation.



c Wire terminal U
V Wire terminal V
W Wire terminal W

> **CAUTION**
>
> Before measuring the compressor motor windings resistance, measure the resistance of the multimeter probes by holding the probes against each other. If the measured resistance is NOT 0 Ω, this value MUST be substracted from the measured winding resistance.

4 Measure the resistance between the compressor motor windings U-V, V-W and U-W.

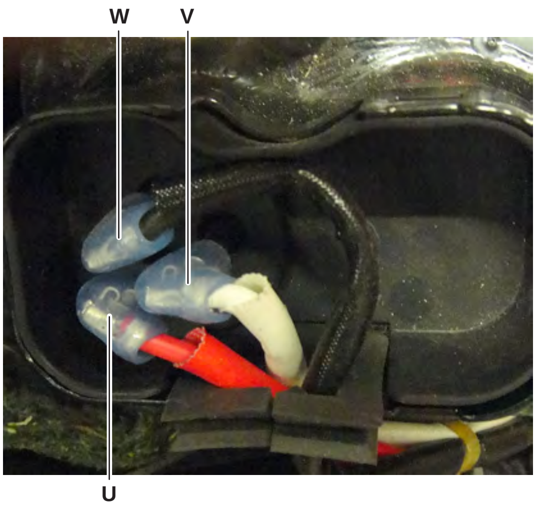
Result: All measurements MUST be approximately the same.

Unit	Compressor	Winding resistance value (at temperature of 20°C)
Single phase unit	M1C	0.343 Ω ± 5%
Three phase unit	M1C	1.16 Ω ± 5%

Compressor motor winding measurements are correct?	Action
Yes	Continue with the next step.
No	Replace the compressor, see "3.7.2 Repair procedures" [▶ 140].

5 Measure the continuity of the U, V and W wires between the compressor and the PCB. If no continuity, correct as needed, see "6.2 Wiring diagram" [▶ 314].

6 Connect the Faston connectors to the compressor wire terminals U, V and W



c Wire terminal U
V Wire terminal V
W Wire terminal W

7 Install the compressor insulation.

8 Turn ON the power using the respective circuit breaker.

9 Start the unit operation via the user interface.

10 Wait for – or create condition to operate the compressor.

11 Once the compressor operates, measure the U-V-W inverter voltages. All measurements MUST be the same.

Inverter voltage measurements are correct?	Action
Yes	Continue with the next step.
No	Perform a check of the appropriate PCB, see "3 Components" [▸ 86].

12 Measure the current in each phase U, V and W while compressor is operating. All measurements MUST be the same.

Compressor motor winding current measurements are correct?	Action
Yes	Perform an insulation check of the compressor, see "3.7.1 Checking procedures" [▸ 134].
No	Preventively replace the compressor, see "3.7.2 Repair procedures" [▸ 140].

To perform an insulation check of the compressor

Prerequisite: First perform an electrical check of the compressor, see "3.7.1 Checking procedures" [▸ 134].

Prerequisite: Stop the unit operation via the user interface.

1 Turn OFF the respective circuit breaker.

DANGER: RISK OF ELECTROCUTION

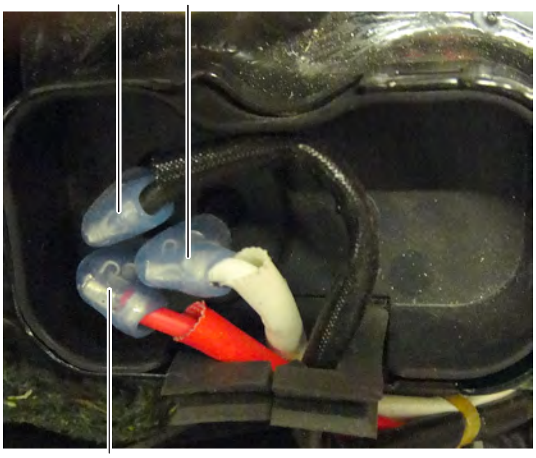
Confirm the rectifier voltage is below 10 V DC before proceeding, see "To prevent electrical hazards" [▸ 285].

2 Remove the cover of the compressor wire terminals.

a Compressor wire terminals cover

3 Disconnect the Faston connectors from the compressor wire terminals U, V and W.

> **INFORMATION**
>
> Note the position of the Faston connectors on the compressor wire terminals to allow correct connection during installation.



c Wire terminal U
V Wire terminal V
W Wire terminal W

4 Set the Megger voltage to 500 V DC or 1000 V DC.

5 Measure the insulation resistance between the following terminals. The measured insulation resistance MUST be >3 MΩ.

- U–ground,
- V–ground,
- W–ground.

Compressor insulation measurements are correct?	Action
Yes	Compressor is OK. Return to troubleshooting of the specific error and continue with the next procedure.
No	Replace the compressor, see "3.7.2 Repair procedures" [▸ 140].

3.7.2 Repair procedures

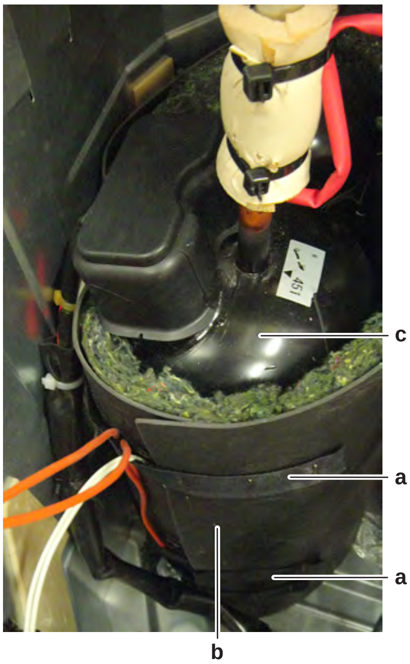
To remove the compressor insulation

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.17 Plate work" [▶ 230].

1 Detach all the strips.



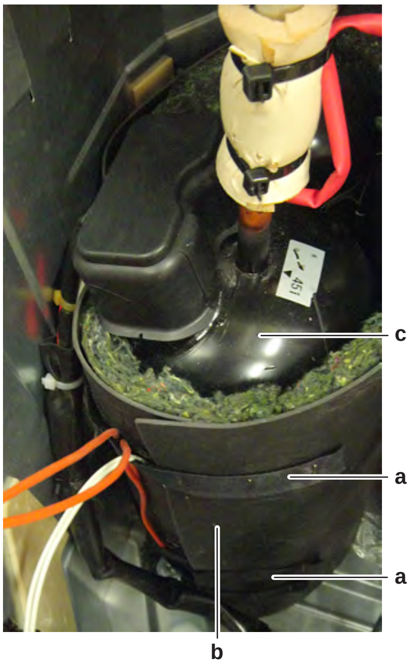
a Strip
b Compressor insulation
c Compressor

2 Remove the compressor insulation from the compressor.

3 To install the compressor insulation, see "3.7.2 Repair procedures" [▶ 140].

To install the compressor insulation

1 Install the insulation around the compressor.



a Strip
b Compressor insulation
c Compressor

2 Route the compressor thermal protector and crankcase heater wiring out of the compressor insulation.

3 Attach the strips.

> **INFORMATION**
>
> Make sure that the insulation nicely fits around the compressor.

To remove the compressor

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.17 Plate work" [▶ 230].

Prerequisite: Remove the compressor insulation.

Prerequisite: Recuperate the refrigerant from the refrigerant circuit, see "4.2.2 Repair procedures" [▶ 291].

1 If needed, remove any parts to create more space for the removal of the compressor.

> **DANGER: RISK OF ELECTROCUTION**
>
> Confirm the rectifier voltage is below 10 V DC before proceeding, see "To prevent electrical hazards" [▶ 285].

2 Remove the cover of the compressor wire terminals.

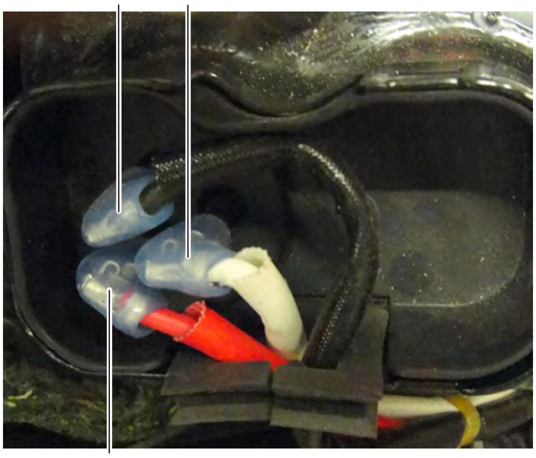
a

a Compressor wire terminals cover

3 Disconnect the Faston connectors from the compressor wire terminals U, V and W.

> **INFORMATION**
>
> Note the position of the Faston connectors on the compressor wire terminals to allow correct connection during installation.

W V



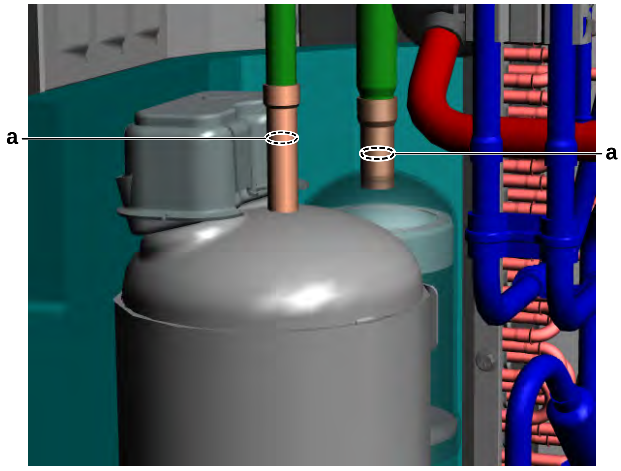
U

c Wire terminal U
V Wire terminal V
W Wire terminal W

4 Remove the compressor thermal protector, see "To remove the compressor thermal protector" [▶ 147].

5 Supply nitrogen to the refrigerant circuit. The nitrogen pressure MUST NOT exceed 0.02 MPa.

6 Wrap a wet rag around the components near the compressor pipes. Heat the brazing points of the compressor pipes using an oxygen acetylene torch and remove the refrigerant pipes from the compressor pipes using pliers.

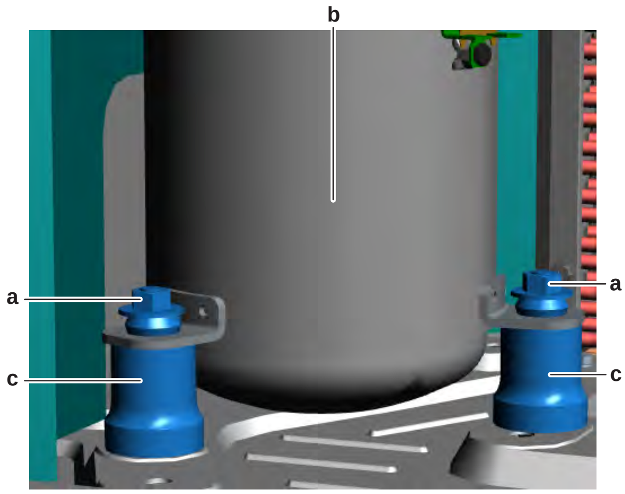


a Compressor pipe

7 Stop the nitrogen supply when the piping has cooled down.

> **INFORMATION**
>
> It is ALSO possible to cut the component pipe(s) using a pipe cutter. Make sure to remove the remaining component pipe end(s) from the refrigerant pipes by heating the brazing point(s) of the component pipe(s) using an oxygen acetylene torch.

8 Remove the nuts and bolts and remove the compressor from the unit.



a Nut
b Compressor
c Damper

9 Remove the 3 dampers from the compressor.

> **INFORMATION**
>
> The compressor dampers may look different.

10 Remove the bushings and keep them for re-use.

11 Install plugs or caps on the open pipe ends of the refrigerant piping to avoid dirt or impurities from entering the piping.

12 To install the compressor, see "3.7.2 Repair procedures" [▶ 140].

To install the compressor

1 Check the state of the dampers. Replace if worn.

2 Install the 3 dampers in the correct location on the unit.

3 Remove the plugs or caps from the refrigerant piping and make sure they are clean.

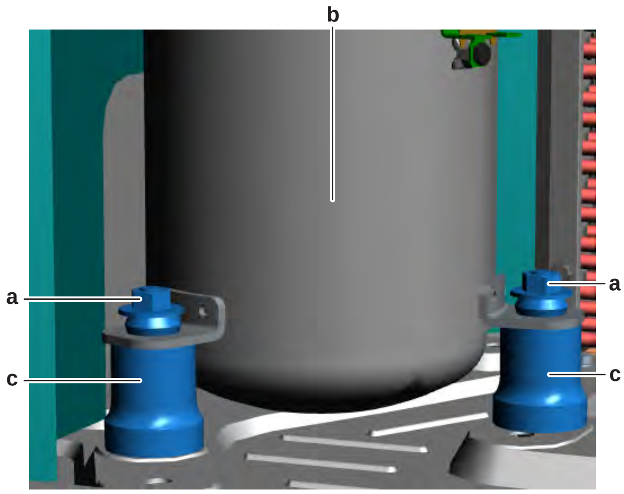
4 Remove the caps from the compressor pipes (of the new compressor).

CAUTION

The oil in the compressor is hygroscopic. Therefore remove the caps from the compressor pipes as late as possible.

5 Install the compressor on the correct location on the dampers. Properly insert the refrigerant pipes in the pipe expansions of the compressor pipes.

6 Install and tighten the bolts and nuts to fix the compressor to the dampers.



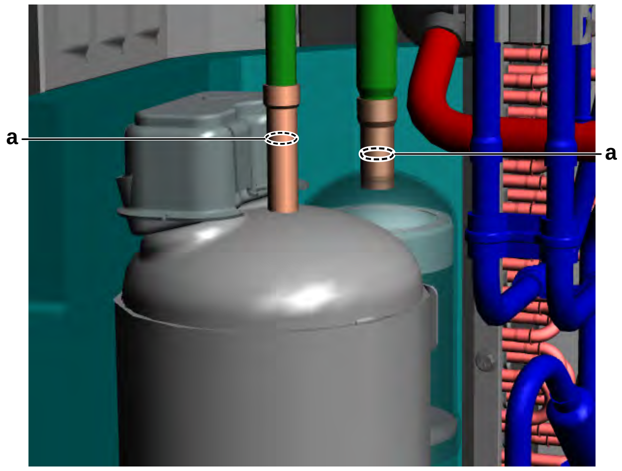
a Nut
b Compressor
c Damper

INFORMATION

The compressor dampers may look different.

7 Supply nitrogen to the refrigerant circuit. The nitrogen pressure MUST NOT exceed 0.02 MPa.

8 Wrap a wet rag around the compressor pipes and any other components near the compressor and solder the compressor pipes to the refrigerant pipes.



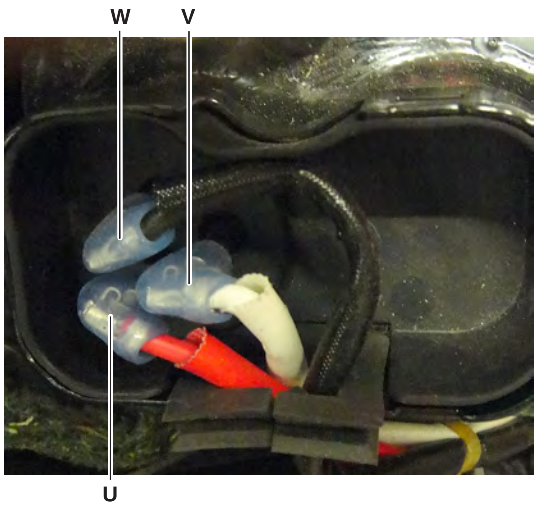
a Compressor pipe

> **CAUTION**
>
> Overheating the compressor pipes (and the oil inside the compressor pipes) will damage or destroy the compressor.

9 After soldering is done, stop the nitrogen supply after the component has cooled-down.

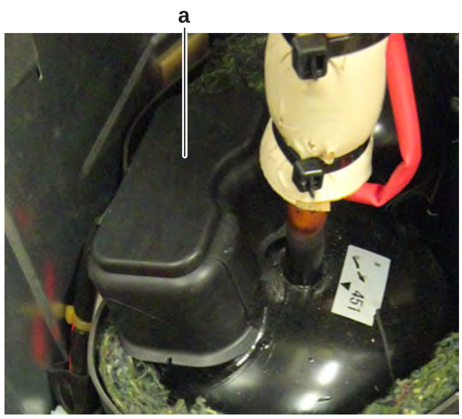
10 Install the compressor thermal protector, see "To install the compressor thermal protector" [▶ 148].

11 Connect the Faston connectors to the compressor wire terminals U, V and W



c Wire terminal U
V Wire terminal V
W Wire terminal W

12 Install the cover of the compressor wire terminals.



a Compressor wire terminals cover

13 Install the compressor insulation, see "3.7.2 Repair procedures" [▶ 140].

14 Perform a pressure test, see "4.2.1 Checking procedures" [▶ 286].

15 Add refrigerant to the refrigerant circuit, see "4.2.2 Repair procedures" [▶ 291].

Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

3.8 Compressor thermal protector

3.8.1 Checking procedures

To perform a mechanical check of the compressor thermal protector

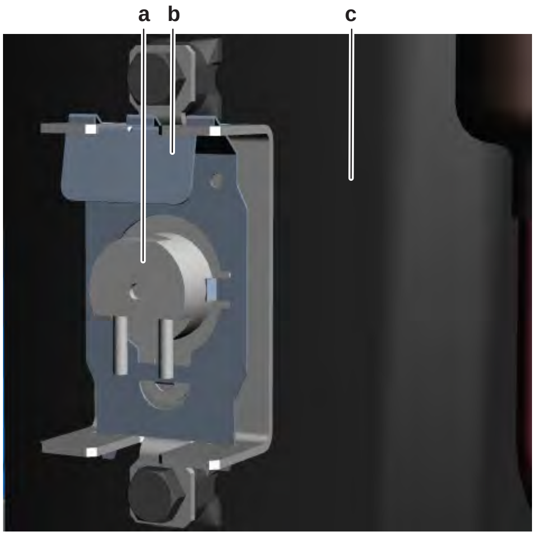
Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.17 Plate work" [▸ 230].

Prerequisite: Remove the compressor insulation.

1 Remove the compressor thermal protection with bracket from the compressor.



a Compressor thermal protector
b Bracket
c Compressor

2 If in doubt, measure the temperature of the compressor thermal protection.

Result: The temperature MUST be below 104°C.

3 Using a hot air gun, carefully heat the compressor thermal protection to slightly above 132°C (compressor thermal protection trips at 126~132°C).

> **INFORMATION**
>
> Make sure that the wiring between the compressor thermal protector connector and the connector on the PCB is properly connected and NOT damaged (check continuity), see "6.2 Wiring diagram" [▸ 314].
>
> For single phase units ONLY: Make sure that the high pressure switch (which is wired in series with the compressor thermal protector) functions correctly, see "3.11.1 Checking procedures" [▸ 157].

4 Disconnect the compressor thermal protector from the intermediate connector and measure the resistance between pins 1-2.

Result: The contact MUST be open (measured resistance = OL).

5 Let the compressor thermal protection cool down below 104°C (reset temperature is 104~116°C).

6 Again measure the resistance between the pins 1-2 of the connector of the compressor thermal protector.

Result: The contact MUST be closed (measured resistance = 0 Ω).

Does the compressor thermal protector contact open and close at the correct temperature?	Action
Yes	Return to the troubleshooting of the specific error and continue with the next procedure.
No	Replace the compressor thermal protector, see "3.8.2 Repair procedures" [▶ 147].

3.8.2 Repair procedures

To remove the compressor thermal protector

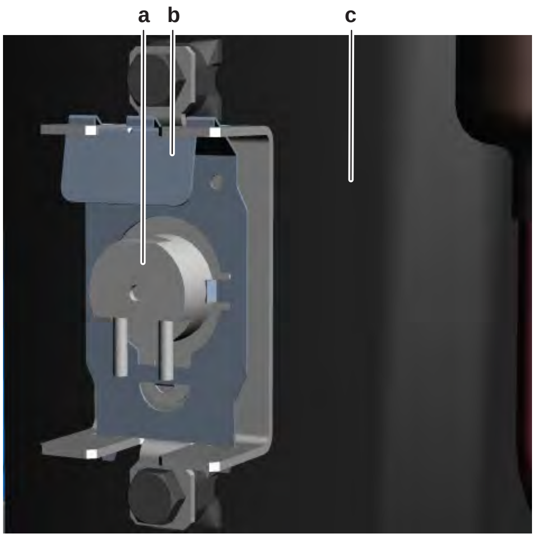
Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.17 Plate work" [▶ 230].

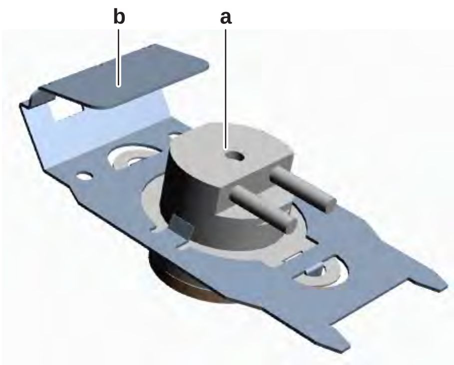
Prerequisite: Remove the compressor insulation.

1. Disconnect the intermediate connector from the compressor thermal protector.
2. Cut all tie straps that fix the compressor thermal protector wiring harness.
3. Remove the compressor thermal protector with bracket from the compressor housing.



a Compressor thermal protector
b Bracket
c Compressor

4. Separate the compressor thermal protector and the compressor thermal protector bracket.

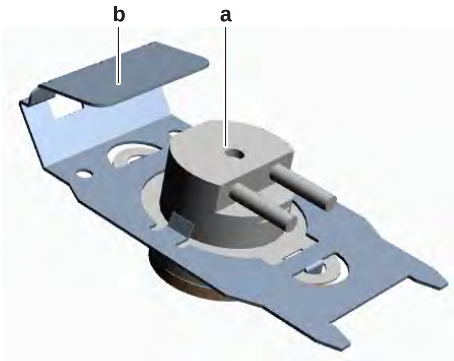


a Compressor thermal protector
b Bracket

5 To install the compressor thermal protector, see "3.7.2 Repair procedures" [▸ 140].

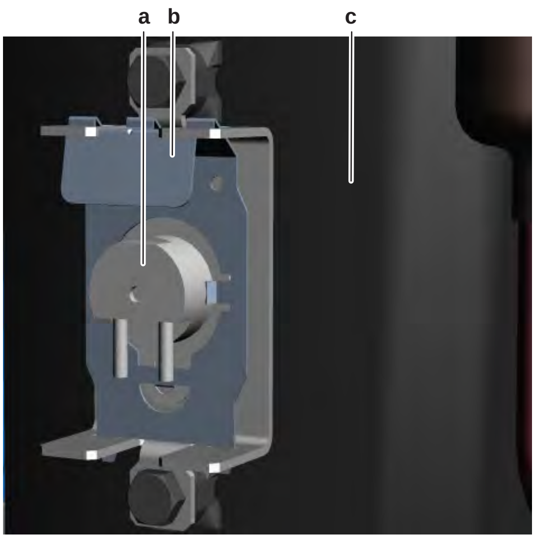
To install the compressor thermal protector

1 Install the compressor thermal protector on the compressor thermal protector bracket.



a Compressor thermal protector
b Bracket

2 Install the compressor thermal protector and bracket on the compressor housing.



a Compressor thermal protector
b Bracket
c Compressor

3 Connect the compressor thermal protector to the intermediate connector.

4 Install new tie straps to fix the compressor thermal protector wiring harness.

5 Install the compressor insulation, see "3.7.2 Repair procedures" [▶ 140].

Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

3.9 Expansion valve

3.9.1 Checking procedures

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

To perform a mechanical check of the expansion valve

Prerequisite: Power OFF the unit for 3 minutes. Then turn ON the unit and listen to the expansion valve assembly. If the expansion valve does NOT make a latching sound, continue with the electrical check of the expansion valve, see "3.9.1 Checking procedures" [▶ 149].

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.17 Plate work" [▶ 230].

1 Remove the expansion valve insulation and visually check:

- For oil drops around the expansion valve. Locate and fix as necessary.
- Pipes for signs of damage. Replace pipes as needed.
- Coil wires for signs of damage. Replace expansion valve coil as needed. See "3.9.2 Repair procedures" [▶ 152].

2 Remove the expansion valve coil from the expansion valve body, see "3.9.2 Repair procedures" [▶ 152].

3 Slide the expansion valve magnet over the expansion valve body and gently rotate the magnet clockwise/counterclockwise to manually close/open the expansion valve.

> **INFORMATION**
>
> After the check, remove the magnet from the expansion valve body and install the expansion valve coil on the expansion valve body. Make sure that the expansion valve coil is firmly slid onto the expansion valve body.

> **INFORMATION**
>
> It is highly recommended to perform a power reset after checking the valve using a magnet.

Does the expansion valve open?	Action
Yes	Perform an electrical check of the expansion valve, see "3.9.1 Checking procedures" [▶ 149].

Does the expansion valve open?	Action
No	Replace the expansion valve body, see "3.9.2 Repair procedures" [▶ 152].

To perform an electrical check of the expansion valve

1 First perform a mechanical check of the expansion valve, see "3.9.1 Checking procedures" [▶ 149].

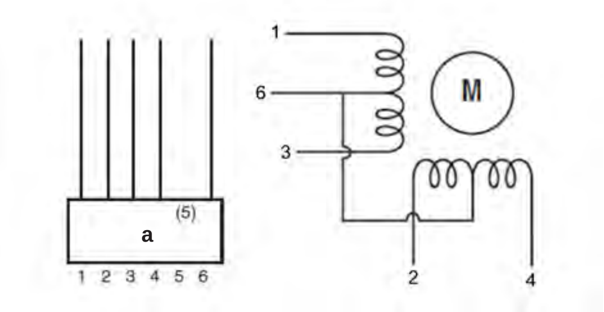
2 Disconnect the electrical connector of the expansion valve coil from the appropriate PCB and measure the resistance of all windings (between the pins of each phase (wire) and the common wire) using a multi meter. All measurements MUST be approximately the same.

Name	Symbol	Location (PCB)	Connector	Winding resistance
Main expansion valve	Y1E	Main	X21A	46±3 Ω
Injection expansion valve	Y3E	Main	X22A	46±3 Ω

INFORMATION

Below is an example of the resistance measurements in which the common wire is connected to pin 6 of the expansion valve coil connector. Connections may differ according to the type of expansion valve.

- Connector pin 1-6,
- Connector pin 2-6,
- Connector pin 3-6,
- Connector pin 4-6.



a Connector

3 Check the insulation resistance of the coil by measuring the resistance between the pins of each phase (1, 2, 3, 4) and GND on the unit.

Result: None of the measurements should be short-circuit.

WARNING

When reconnecting a connector to the PCB, make sure to connect it on the correct location and do NOT apply force, as this may damage the connector or connector pins of the PCB.

Is the measured resistance correct?	Action
Yes	Perform an operation check of the expansion valve, see "3.9.1 Checking procedures" [▶ 149].
No	Replace the expansion valve coil, "3.9.2 Repair procedures" [▶ 152].

To perform an operation check of the expansion valve

Prerequisite: First perform an electrical check of the expansion valve, see "3.9.1 Checking procedures" [▶ 149].

1 Turn ON the power of the unit.

> **INFORMATION**
>
> When power is switched ON, PCB checks all expansion valve coil windings by current check. If winding is short or open, expansion valve error is triggered.

2 Start the unit operation via the user interface.

3 With the unit operating, connect the service monitoring tool to the unit.

4 When the expansion valve is closed according to the service monitoring tool, check the inlet and outlet of the valve with a contact thermometer or use an expansion valve stethoscope to see if refrigerant flows through the expansion valve. Check that the valve is NOT bleeding.

Result: There MUST be NO flow through the expansion valve.

5 When the expansion valve is open according to the service monitoring tool, check the inlet and outlet of the valve with a contact thermometer or use an expansion valve stethoscope to see if refrigerant flows through the expansion valve.

Result: Refrigerant MUST flow through the expansion valve.

6 Wait for the PCB to command the expansion valve to open (when closed) or to close (when open) (pulse output to expansion valve visible on service monitoring tool).

> **INFORMATION**
>
> If the PCB does NOT command the expansion valve to open or close (when it is supposed to), perform a check of the appropriate thermistors and pressure sensors (expansion valves are driven by superheat or subcool value calculated through the thermistors).

7 While in opening or closing sequence each expansion valve winding (Φ1, 2, 3, 4) is supplied with 12 V DC from the PCB. You will need a good multimeter, where its range is set to about 20 V DC, and during opening or closing sequence you may be able to measure the supply voltage for a short time. If you set the multimeter range to Auto, then most likely you may NOT read a value between switching ranges. The best way to check is to feel the movement of the valve by touching, rather than trying to measure the driving voltage.

8 When the expansion valve was commanded to close, check the inlet and outlet of the valve with a contact thermometer or use an expansion valve stethoscope to see if refrigerant flows through the expansion valve. Check that the valve is NOT bleeding.

Result: There MUST be NO flow through the expansion valve.

9 When the expansion valve was commanded to open, check the inlet and outlet of the valve with a contact thermometer or use an expansion valve stethoscope to see if refrigerant flows through the expansion valve.

Result: Refrigerant MUST flow through the expansion valve.

Is the flow through the expansion valve correct?	Action
Yes	Component is OK. Return to the troubleshooting of the specific error and continue with the next step.
No	Replace the expansion valve, see "3.9.2 Repair procedures" [▶ 152].

Problem solved?

After all checking procedures listed above have been performed:

Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

3.9.2 Repair procedures

To remove the expansion valve coil

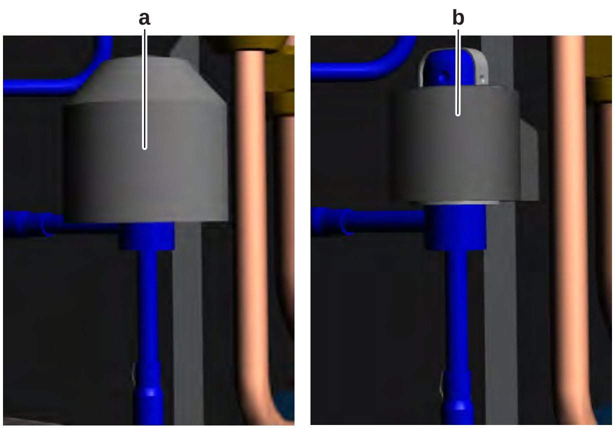
Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.17 Plate work" [▶ 230].

1 If needed, remove any parts or insulation to create more space for the removal.

2 Cut the tie strap and remove the insulation cap.



a Insulation cap
b Expansion valve coil

3 Pull the expansion valve coil to remove it from the expansion valve body.

> **INFORMATION**
>
> It may be needed to turn the expansion valve coil 1/8 turn counter clockwise to unlock it. Make sure to note the correct orientation (position) of the expansion valve coil before removal.

4 Cut all tie straps that fix the expansion valve coil harness.

5 Disconnect the expansion valve coil connector from the appropriate PCB. See "To perform an electrical check of the expansion valve" [▶ 150] for an overview of the expansion valve connectors and their locations.

6 To install the expansion valve coil, see "3.9.2 Repair procedures" [▶ 152].

To remove the expansion valve body

Prerequisite: Recuperate the refrigerant from the refrigerant circuit, see "4.2.2 Repair procedures" [▶ 291].

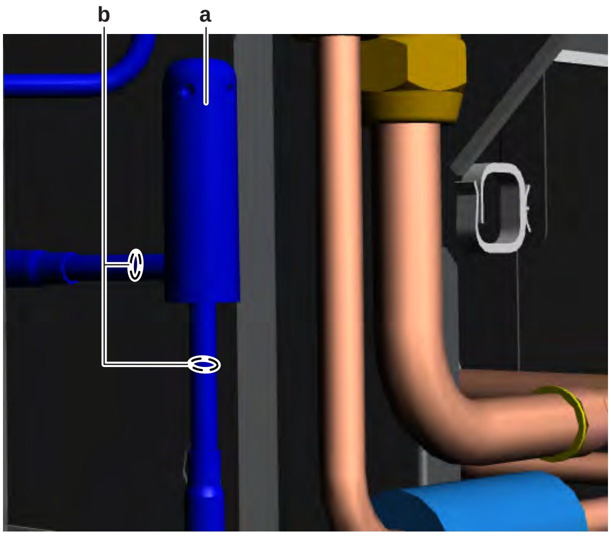
Prerequisite: If needed, remove any parts or insulation to create more space for the removal.

1 Remove the expansion valve coil, see "3.9.2 Repair procedures" [▶ 152].

2 Using a valve magnet, open the expansion valve.

3 Supply nitrogen to the refrigerant circuit. The nitrogen pressure MUST NOT exceed 0.02 MPa.

4 Wrap a wet rag around the components near the expansion valve pipes. Heat the brazing points of the expansion valve pipes using an oxygen acetylene torch and remove the expansion valve pipes from the refrigerant pipes using pliers.



a Expansion valve body
b Expansion valve pipe

5 Stop the nitrogen supply when the piping has cooled down.

6 Remove the expansion valve body.

> **INFORMATION**
>
> It is ALSO possible to cut the component pipe(s) using a pipe cutter. Make sure to remove the remaining component pipe end(s) from the refrigerant pipes by heating the brazing point(s) of the component pipe(s) using an oxygen acetylene torch.

7 Install plugs or caps on the open pipe ends of the refrigerant piping to avoid dirt or impurities from entering the piping.

8 To install the expansion valve body, see "3.9.2 Repair procedures" [▶ 152].

To install the expansion valve body

1 Remove the plugs or caps from the refrigerant piping and make sure they are clean.

2 Remove the expansion valve coil from the spare part expansion valve body.

3 Install the expansion valve body in the correct location and correctly oriented. Insert the pipe ends in the pipe expansions.

4 Open the expansion valve using a valve magnet.

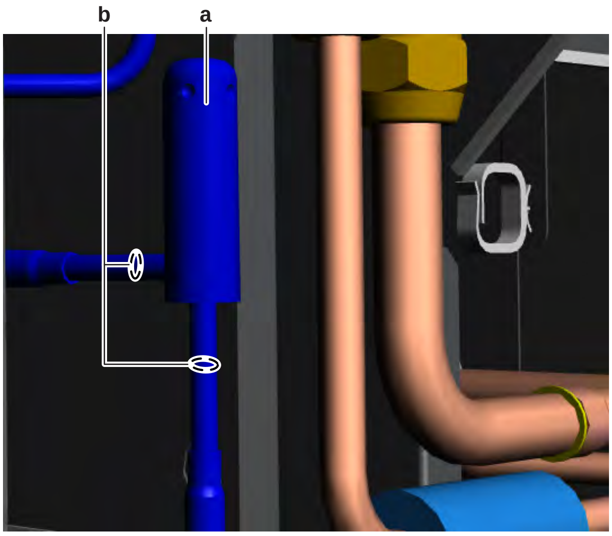
5 Supply nitrogen to the refrigerant circuit. The nitrogen pressure MUST NOT exceed 0.02 MPa.

6 Wrap a wet rag around the expansion valve body and any other components near the expansion valve and solder the expansion valve pipes to the refrigerant pipes.

CAUTION

Overheating the valve will damage or destroy it.

7 After soldering is done, stop the nitrogen supply after the component has cooled-down.



a Expansion valve body
b Expansion valve pipe

8 To install the expansion valve coil, see "3.9.2 Repair procedures" [▶ 152].

9 Perform a pressure test, see "4.2.1 Checking procedures" [▶ 286].

10 Add refrigerant to the refrigerant circuit, see "4.2.2 Repair procedures" [▶ 291].

To install the expansion valve coil with bracket

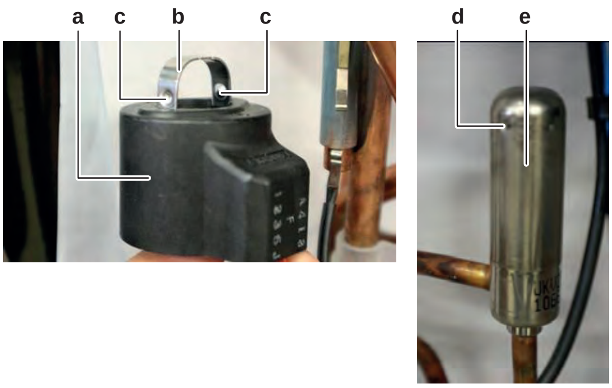
1 Install the expansion valve coil on the expansion valve body.

INFORMATION

The expansion valve coil is equipped with a metal bracket. Fit the nipples of the metal bracket into the notches of the expansion valve body.

CAUTION

Make sure to install the expansion valve coil in the correct position (orientation).



a Expansion valve coil
b Metal bracket
c Nipple
d Notch
e Expanion valve body

2 Route the expansion valve coil harness towards the appropriate PCB.

3 Connect the expansion valve coil connector to the appropriate PCB.

> **WARNING**
>
> When reconnecting a connector to the PCB, make sure to connect it on the correct location and do NOT apply force, as this may damage the connector or connector pins of the PCB.

4 Fix the expansion valve coil harness using new tie straps.

5 Install the insulation cap on the expansion valve coil (if applicable).

Is the problem solved?	Action
Yes	No further actions required.
No	Return to "3.9.1 Checking procedures" [▶ 149] of the expansion valve and continue with the next procedure.

3.10 Flow switch

3.10.1 Checking procedures

To perform an electrical check of the flow switch

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.17 Plate work" [▶ 230].

1 Turn ON the power of the unit.

2 With the unit powered ON but NOT operating, disconnect the flow switch connector X45A from the hydro PCB.

3 Measure the voltage on the connector on the hydro PCB.

Result: The measured voltage MUST be approximately 16 V DC.

Is measured voltage correct?	Then
Yes	Continue with the next step.

Is measured voltage correct?	Then
No	Perform a check of the hydro PCB, see "3.12.1 Checking procedures" [▶ 160].

4 Make sure that the unit is NOT operating, and there is NO water flow.

5 Measure the resistance on the (disconnected) flow switch connector.

Result: The flow switch MUST be open (OL).

6 Activate `Installer` on the user interface. See the installer reference guide for the correct procedure.

7 Go to `Actuator test run` via the user interface.

8 Activate the `Pump`.

9 Make sure to select high speed and check that the water flow is >15 L/min.

10 Again measure the resistance on the (disconnected) flow switch connector.

Result: The flow switch MUST be closed (0 Ω).

Are flow switch measurements correct?	Action
Yes	Flow switch is OK. Return to troubleshooting of the specific error and continue with the next procedure.
No	Replace the flow switch, see "3.10.2 Repair procedures" [▶ 156].

3.10.2 Repair procedures

To remove the flow switch

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.17 Plate work" [▶ 230].

1 Drain the water circuit, see "4.3.2 Repair procedures" [▶ 302].

2 Unscrew the flow switch and remove it from the piping.

3 Disconnect the flow switch wires from terminal D2 of terminal block T5 on the main PCB and from terminal 703 of terminal block XD.

4 Disconnect the flow switch harness connector from the hydro PCB.

5 Cut all tie straps that fix the wiring harness.

6 Guide the flow switch harness out of the switch box and remove the flow switch.

7 To install the flow switch, see "3.10.2 Repair procedures" [▶ 156].

To install the flow switch

1 Install (screw) the flow switch on correct location on the piping. Ensure that the O-ring is correctly installed and NOT damaged.

2 Route the flow switch harness into the switch box.

3 Connect the flow switch harness connector to the hydro PCB.

> **WARNING**
> When reconnecting a connector to the PCB, make sure to connect it on the correct location and do NOT apply force, as this may damage the connector or connector pins of the PCB.

4 Install new tie straps to fix the flow switch wiring harness.

> **INFORMATION**
> Replace all cable ties that were cut during removal.

5 Open the valve (if equipped) of the water circuit towards the expansion vessel.

> **CAUTION**
> Make sure to open the valve (if equipped) towards the expansion vessel, otherwise the overpressure will be generated.

6 Open the stop valves and add water to the water circuit if needed, see "4.3.2 Repair procedures" [▶ 302].

Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

3.11 High pressure switch

3.11.1 Checking procedures

To perform an electrical check of the high pressure switch

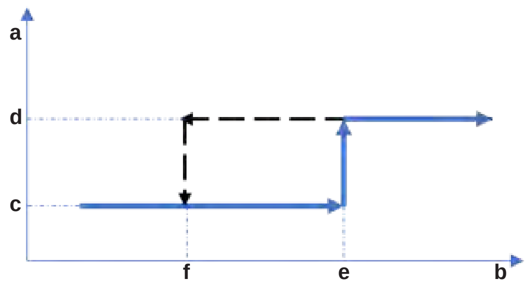
Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.17 Plate work" [▶ 230].

1 Recuperate the refrigerant from the refrigerant circuit, see "4.2.2 Repair procedures" [▶ 291].

2 Fill the refrigerant circuit with nitrogen until pressurized just below operating pressure of the high pressure switch.



a High pressure switch protection control
b Pressure
c High pressure switch closed
d High pressure switch open
e High pressure switch operating pressure
f High pressure switch reset pressure

High pressure switch	Operating pressure (MPa)	Reset pressure (MPa)
S1PH	4.15	3.2

3 Disconnect the Faston connectors from the high pressure switch.

> **INFORMATION**
>
> Measure the continuity of all wiring between the high pressure switch and the appropriate PCB. If NO continuity is measured, repair as needed, see "6.2 Wiring diagram" [▸ 314].
>
> For single phase units ONLY: Make sure that the compressor thermal protector (which is wired in series with the high pressure switch) functions correctly, see "3.8.1 Checking procedures" [▸ 146].

4 Measure the resistance between the Faston connections of the high pressure switch.

Result: The switch MUST be closed.

5 Fill the refrigerant circuit with nitrogen until pressurized just above operating pressure of the high pressure switch.

6 Measure the resistance between the Faston connections of the high pressure switch.

Result: The switch MUST be open.

> **INFORMATION**
>
> If the high pressure switch was triggered open, it will stay open until the refrigerant pressure drops below the reset pressure of the high pressure switch.

7 Lower the pressure of the nitrogen in the refrigerant circuit just above reset pressure of the high pressure switch.

8 Measure the resistance between the Faston connections of the high pressure switch.

Result: The switch MUST be open.

9 Lower the pressure of the nitrogen in the refrigerant circuit just below reset pressure of the high pressure switch.

> **INFORMATION**
>
> If the high pressure switch is activated and the pressure has dropped below the operating pressure, you can also reset the high pressure switch with the manual reset button.

10 Measure the resistance between the Faston connections of the high pressure switch.

Result: The switch MUST be closed.

High pressure switch connector measurements are correct?	Then
Yes	High pressure switch is OK. Return to the troubleshooting of the specific error and continue with the next procedure.
No	Replace the high pressure switch, see "3.11.2 Repair procedures" [▸ 159].

3.11.2 Repair procedures

To remove the high pressure switch

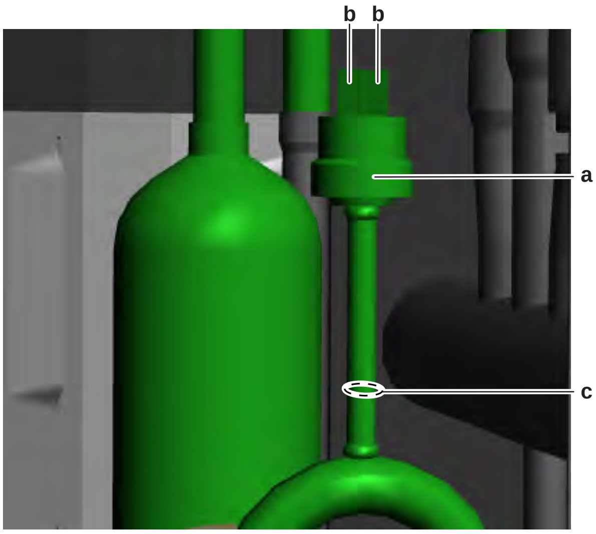
Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.17 Plate work" [▶ 230].

Prerequisite: Recuperate the refrigerant from the refrigerant circuit, see "4.2.2 Repair procedures" [▶ 291].

1. If needed, remove any parts to create more space for the removal of the high pressure switch.
2. Disconnect the Faston connectors from the high pressure switch.
3. Supply nitrogen to the refrigerant circuit. The nitrogen pressure MUST NOT exceed 0.02 MPa.
4. Wrap a wet rag around the components near the high pressure switch. Heat the brazing point of the high pressure switch pipe using an oxygen acetylene torch and remove the high pressure switch pipe from the refrigerant pipe using pliers.



a High pressure switch
b Faston connector
c High pressure switch pipe

5. Stop the nitrogen supply when the piping has cooled down.
6. Remove the high pressure switch.

> **INFORMATION**
>
> It is ALSO possible to cut the component pipe(s) using a pipe cutter. Make sure to remove the remaining component pipe end(s) from the refrigerant pipes by heating the brazing point(s) of the component pipe(s) using an oxygen acetylene torch.

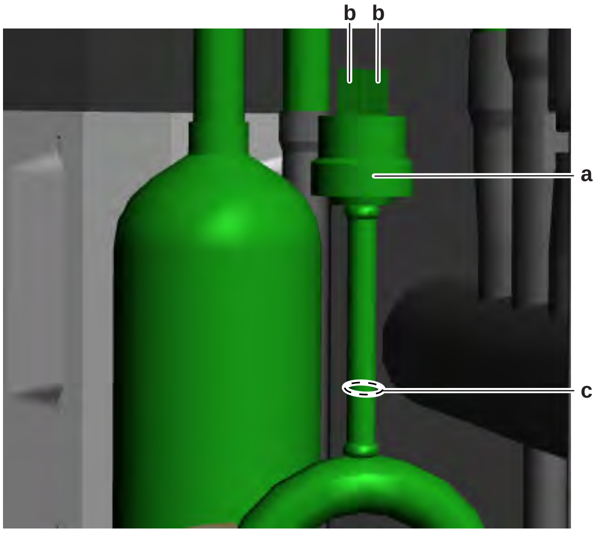
7. Install a plug or cap on the refrigerant piping to avoid dirt or impurities from entering the piping.
8. To install the high pressure switch, see "3.11.2 Repair procedures" [▶ 159].

To install the high pressure switch

1. Remove the plug or cap from the refrigerant piping and make sure it is clean.
2. Install the high pressure switch in the correct location.

3 Supply nitrogen to the refrigerant circuit. The nitrogen pressure MUST NOT exceed 0.02 MPa.

4 Wrap a wet rag around the high pressure switch and any other components near the high pressure switch and solder the high pressure switch pipe to the refrigerant pipe.



a High pressure switch
b Faston connector
c High pressure switch pipe

> **CAUTION**
>
> Overheating the pressure switch will damage or destroy it.

5 After soldering is done, stop the nitrogen supply after the component has cooled-down.

6 Connect the Faston connectors to the high pressure switch.

7 Perform a pressure test, see "4.2.1 Checking procedures" [▶ 286].

8 Add refrigerant to the refrigerant circuit, see "4.2.2 Repair procedures" [▶ 291].

Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

3.12 Hydro PCB

3.12.1 Checking procedures

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

To perform a power check of the hydro PCB

Prerequisite: Stop the unit operation via the user interface.

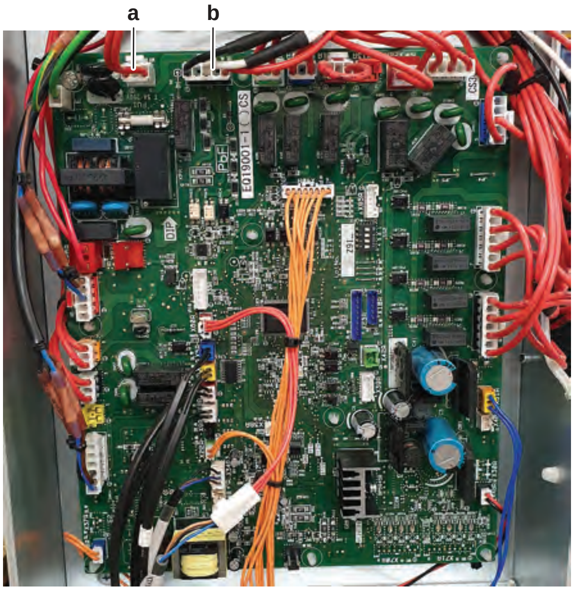
Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.17 Plate work" [▸ 230].

1 Turn ON the power of the unit.

2 Measure the voltage on the connectors X1A: 1-3 and X19A: 1-3 on the hydro PCB.

Result: The measured voltage MUST be 230 V AC.



a Connector X1A
b Connector X19A

Is the measured voltage on the hydro PCB correct?	Action
Yes	Return to "3.12.1 Checking procedures" [▸ 160] of the hydro PCB and continue with the next procedure.
No	Continue with the next step.

Single phase units

1 Measure the output voltage on connector X803A: 1-3 on the noise filter PCB.

Result: The measured voltage MUST be 230 V AC.

Is the measured output voltage on the noise filter PCB correct?	Action
Yes	Correct the wiring between the noise filter PCB and the hydro PCB, see "6.2 Wiring diagram" [▸ 314].
No	Perform a check of the noise filter PCB, see "Checking procedures" [▸ 194].

Three phase units

1 Measure the output voltage on connector X803A: 1-3 on the main PCB.

Result: The measured voltage MUST be 230 V AC.

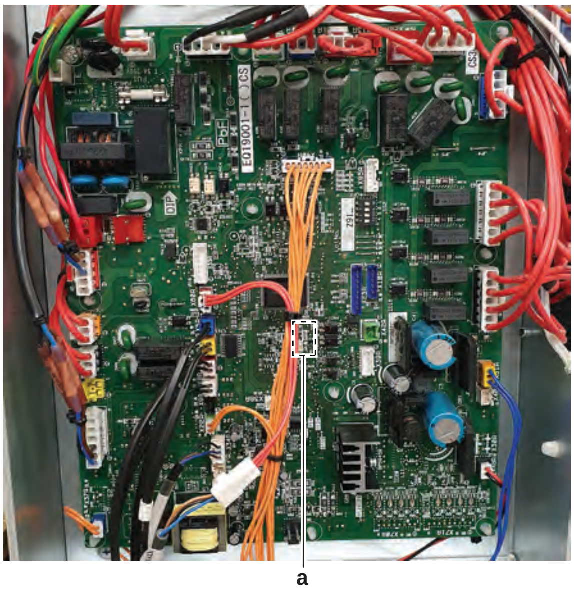
Is the measured output voltage on the main PCB correct?	Action
Yes	Correct the wiring between the main PCB and the hydro PCB, see "6.2 Wiring diagram" [▸ 314].

Is the measured output voltage on the main PCB correct?	Action
No	Perform a check of the main PCB, see "Checking procedures" [▶ 181].

To check the HAP LED of the hydro PCB

Prerequisite: First check the power supply to the hydro PCB, see "3.12.1 Checking procedures" [▶ 160].

1 Locate the HAP LED on the hydro PCB.



a HAP LED

> **INFORMATION**
>
> Make sure the correct software is available on the PCB. If NOT, update using the updater tool.

Does the HAP LED blink in regular intervals (1 second ON/1 second OFF)?	Action
Yes	Return to "3.12.1 Checking procedures" [▶ 160] of the hydro PCB and continue with the next procedure.
No	Replace the hydro PCB, see "3.12.2 Repair procedures" [▶ 164]

To check if the correct spare part is installed

Prerequisite: First perform all earlier hydro PCB checks, see "3.12.1 Checking procedures" [▶ 160].

1 Visit your local spare parts webbank.

2 Enter the model name of your unit and check if the installed spare part number corresponds with the spare part number indicated in the webbank.

Is the correct spare part for the hydro PCB installed?	Action
Yes	Return to "3.12.1 Checking procedures" [▸ 160] of the hydro PCB and continue with the next procedure.
No	Replace the hydro PCB, see "3.12.2 Repair procedures" [▸ 164]

To check the wiring of the hydro PCB

Prerequisite: First perform all earlier hydro PCB checks, see "3.12.1 Checking procedures" [▸ 160].

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

1. Check that all wires are properly connected and that all connectors are fully plugged-in.
2. Check that no connectors or wires are damaged.
3. Check that the wiring corresponds with the wiring diagram, see "6.2 Wiring diagram" [▸ 314].

INFORMATION

Correct the wiring as needed.

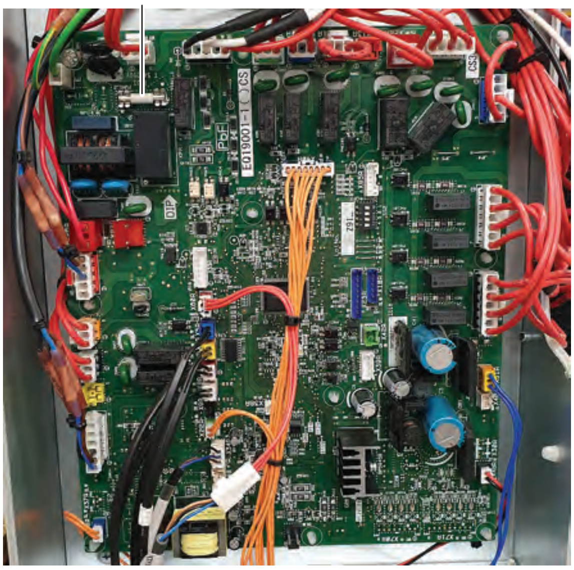
Is the problem solved?	Action
Yes	No further actions required.
No	Return to "3.12.1 Checking procedures" [▸ 160] of the hydro PCB and continue with the next procedure.

To check the fuse of the hydro PCB

Prerequisite: First perform all earlier hydro PCB checks, see "3.12.1 Checking procedures" [▸ 160].

1. Measure the continuity of the fuse. If no continuity is measured, the fuse has blown.

a



a Fuse

Blown fuse on the hydro PCB?	Action
Yes	Replace the blown fuse, see "3.12.2 Repair procedures" [▶ 164]
No	Return to "3.12.1 Checking procedures" [▶ 160] of the hydro PCB and continue with the next procedure.

Problem solved?

After all checking procedures listed above have been performed:

Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

3.12.2 Repair procedures

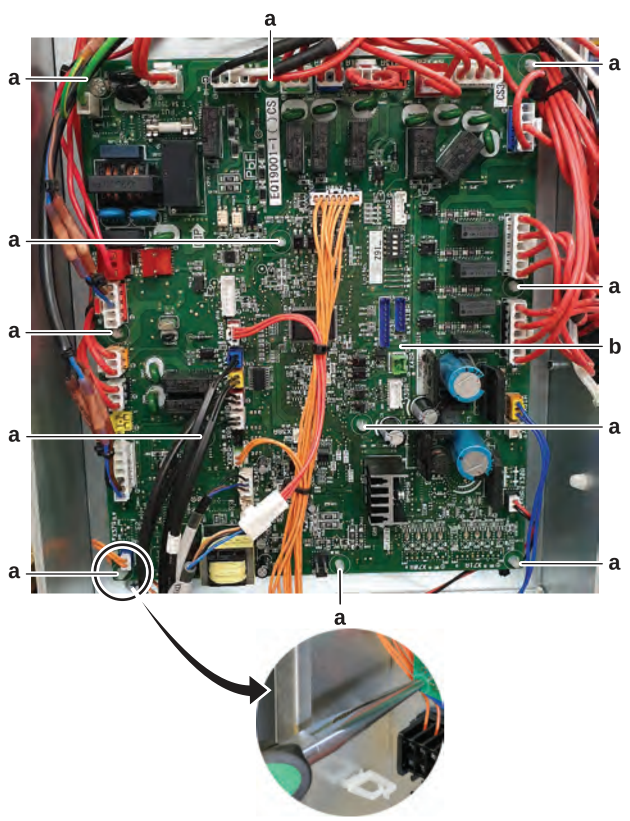
To remove the hydro PCB

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.17 Plate work" [▶ 230].

1. Disconnect all connectors and the ground wire from the hydro PCB.
2. Carefully pull the hydro PCB and unlatch the PCB supports one by one using a small pliers.



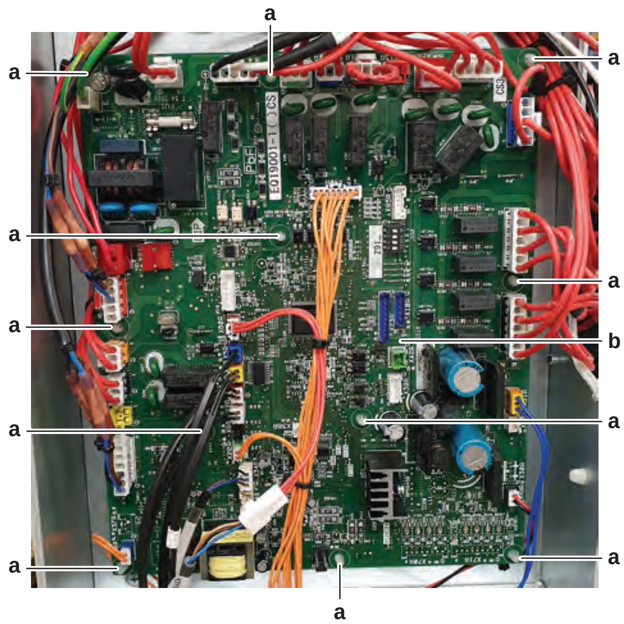
a PCB support
b Hydro PCB

3 Remove the hydro PCB from the switch box.

4 To install the hydro PCB, see "3.12.2 Repair procedures" [▶ 164].

To install the hydro PCB

1 Install the hydro PCB in the correct location in the switch box.



a PCB support
b Hydro PCB

2 Connect all connectors and ground wire to the hydro PCB.

> **INFORMATION**
> Use the wiring diagram and connection diagram for correct installation of the connectors, see "6.2 Wiring diagram" [▶ 314].

> **WARNING**
> When reconnecting a connector to the PCB, make sure to connect it on the correct location and do NOT apply force, as this may damage the connector or connector pins of the PCB.

Is the problem solved?	Action
Yes	No further actions required.
No	Return to "3.12.1 Checking procedures" [▶ 160] of the hydro PCB and continue with the next procedure.

To remove a fuse of the hydro PCB

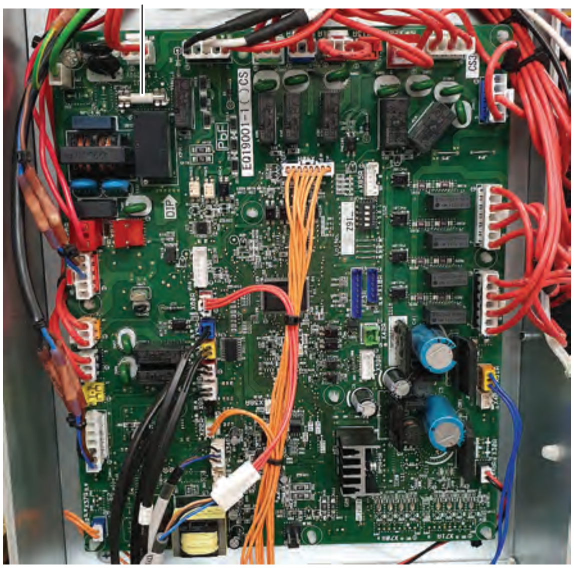
Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.17 Plate work" [▶ 230].

1 Remove the fuse from the PCB.

a



a Fuse

2 To install a fuse on the hydro PCB, see "3.12.2 Repair procedures" [▶ 164].

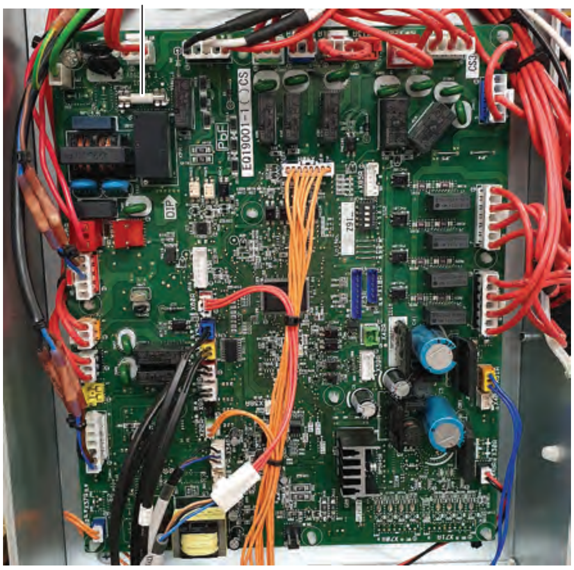
To install a fuse on the hydro PCB

> **WARNING**
>
> For continued protection against risk of fire, replace only with same type and rating of fuse.

1 Install the fuse on the correct location on the PCB.

> **CAUTION**
>
> Make sure the fuse is plugged-in correctly (contact with the fuse holder).

a



a Fuse

Is the problem solved?	Action
Yes	No further actions required.

Is the problem solved?	Action
No	Return to "3.12.1 Checking procedures" [▶ 160] of the hydro PCB and continue with the next procedure.

3.13 Low pressure switch

3.13.1 Checking procedures

To perform an electrical check of the low pressure switch

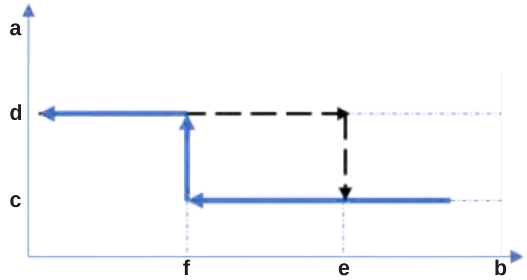
Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.17 Plate work" [▶ 230].

1 Recuperate the refrigerant from the refrigerant circuit, see "4.2.2 Repair procedures" [▶ 291].

2 Connect a vacuum pump to the gas service port of the refrigerant circuit and vacuum to just above operating pressure of the low pressure switch.



a Low pressure switch protection control
b Pressure
c Low pressure switch closed
d Low pressure switch open
e Low pressure switch reset pressure
f Low pressure switch operating pressure

Low pressure switch	Operating pressure (MPa)	Reset pressure (MPa)
S1PL	−0.05~−0.01	0.02~0.08

3 Disconnect the low pressure switch connector from the appropriate PCB.

4 Measure contacts between the pins 1-2 of the low pressure switch connector.

Result: The switch MUST be closed.

5 Vacuum until pressurized just below operating pressure of the low pressure switch.

6 Measure again contacts between the pins 1-2 of the low pressure switch connector.

Result: The switch MUST be open.

> **INFORMATION**
>
> If the low pressure switch was triggered open, it will stay open until the refrigerant pressure rises above the reset pressure of the low pressure switch.

7 Fill the refrigerant circuit with nitrogen until pressurized just below reset pressure of the low pressure switch.

8 Measure again contacts between the pins 1-2 of the low pressure switch connector.

Result: The switch MUST be open.

9 Fill the refrigerant circuit with nitrogen until pressurized just above reset pressure of the low pressure switch.

10 Measure again contacts between the pins 1-2 of the low pressure switch connector.

Result: The switch MUST be closed.

Low pressure switch connector measurements are correct?	Then
Yes	Low pressure switch is OK. Return to the troubleshooting of the specific error and continue with the next procedure.
No	Replace the low pressure switch, see "3.13.2 Repair procedures" [▸ 168].

3.13.2 Repair procedures

To remove the low pressure switch

Prerequisite: Stop the unit operation via the user interface.

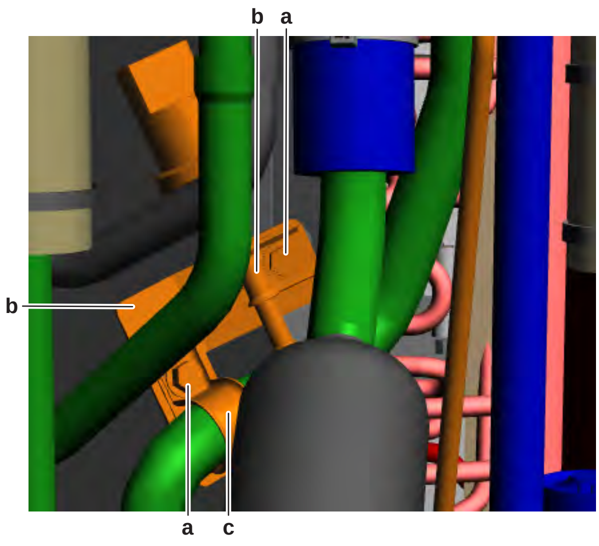
Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.17 Plate work" [▸ 230].

Prerequisite: Recuperate the refrigerant from the refrigerant circuit, see "4.2.2 Repair procedures" [▸ 291].

1 If needed, remove any parts to create more space for the removal of the low pressure switch.

2 Remove the screws and remove the brackets and clip from the low pressure switch and pipe.



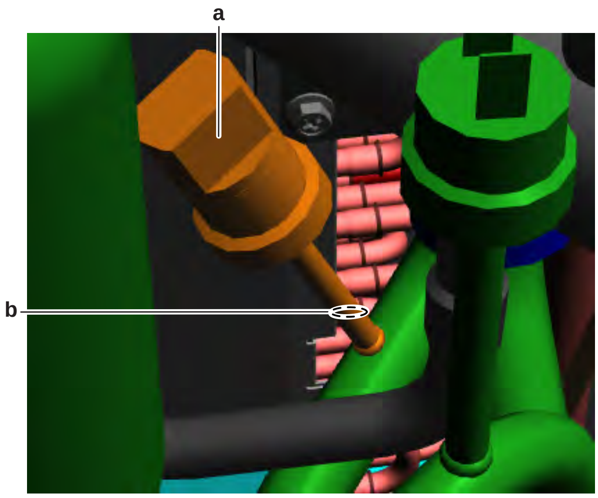
a Screw
b Bracket
c Clip

3 Disconnect the low pressure switch connector from the appropriate PCB.

4 Cut all tie straps that fix the low pressure switch harness.

5 Supply nitrogen to the refrigerant circuit. The nitrogen pressure MUST NOT exceed 0.02 MPa.

6 Wrap a wet rag around the components near the low pressure switch. Heat the brazing point of the low pressure switch pipe using an oxygen acetylene torch and remove the low pressure switch pipe from the refrigerant pipe using pliers.



a Low pressure switch
b Low pressure switch pipe

7 Stop the nitrogen supply when the piping has cooled down.

8 Remove the low pressure switch from the unit.

> **INFORMATION**
>
> It is ALSO possible to cut the component pipe(s) using a pipe cutter. Make sure to remove the remaining component pipe end(s) from the refrigerant pipes by heating the brazing point(s) of the component pipe(s) using an oxygen acetylene torch.

9 Install a plug or cap on the refrigerant piping to avoid dirt or impurities from entering the piping.

10 To install the low pressure switch, see "3.13.2 Repair procedures" [▶ 168].

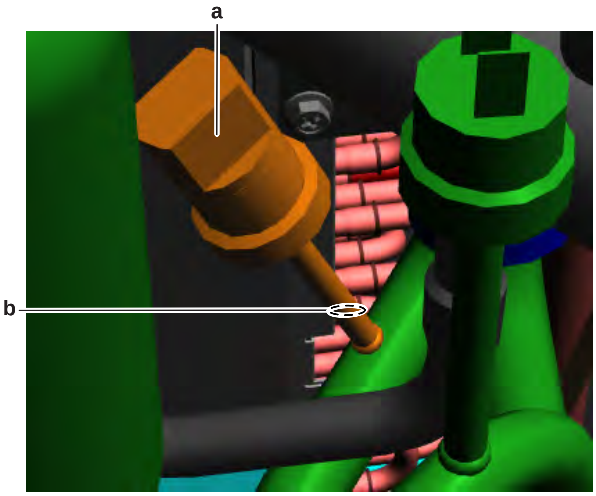
To install the low pressure switch

1 Remove the plug or cap from the refrigerant piping and make sure it is clean.

2 Install the low pressure switch in the correct location.

3 Supply nitrogen to the refrigerant circuit. The nitrogen pressure MUST NOT exceed 0.02 MPa.

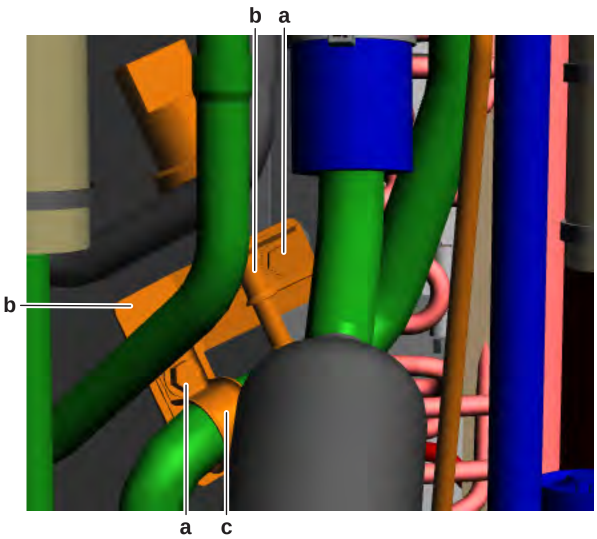
4 Wrap a wet rag around the low pressure switch and any other components near the low pressure switch and solder the low pressure switch pipe to the refrigerant pipe.



a Low pressure switch
b Low pressure switch pipe

> **CAUTION**
>
> Overheating the pressure switch will damage or destroy it.

5 After soldering is done, stop the nitrogen supply after the component has cooled-down.
6 Install the brackets and clip on the low pressure switch and pipe.
7 Install and tighten the screws.



a Screw
b Bracket
c Clip

8 Route the low pressure switch harness towards the appropriate PCB.
9 Fix the harness using new tie straps.
10 Connect the low pressure switch connector to the appropriate PCB.
11 Perform a pressure test, see "4.2.1 Checking procedures" [▶ 286].
12 Add refrigerant to the refrigerant circuit, see "4.2.2 Repair procedures" [▶ 291].

Is the problem solved?	Action
Yes	No further actions required.

Is the problem solved?	Action
No	Return to the troubleshooting of the specific error and continue with the next procedure.

3.14 Main PCB

3.14.1 Single fan outdoor unit - single phase

Checking procedures

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

To perform a power check of the main PCB

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.17 Plate work" [▶ 230].

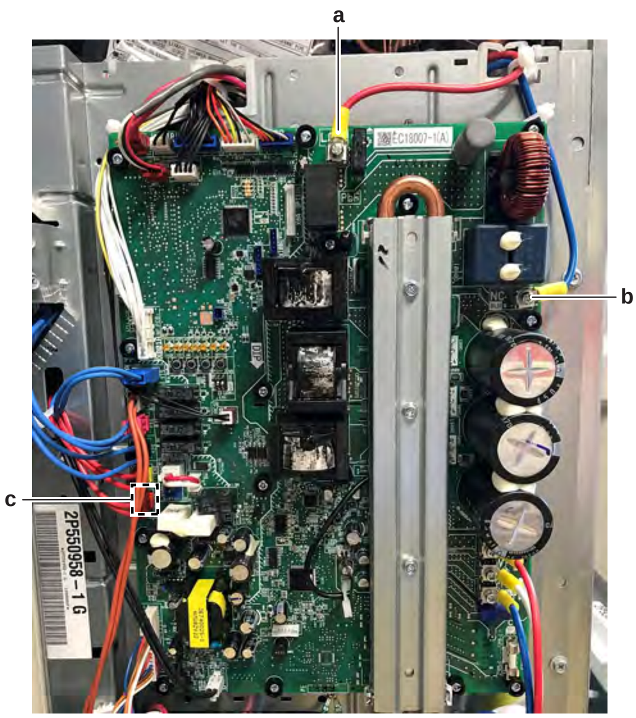
1 Turn ON the power of the unit.

2 Measure the voltage between the wires LC-NC on the main PCB.

Result: The measured voltage MUST be 230 V AC.

3 Measure the voltage on connector X99A on the main PCB.

Result: The measured voltage MUST be 230 V AC.



a LC
b NC
c Connector X99A

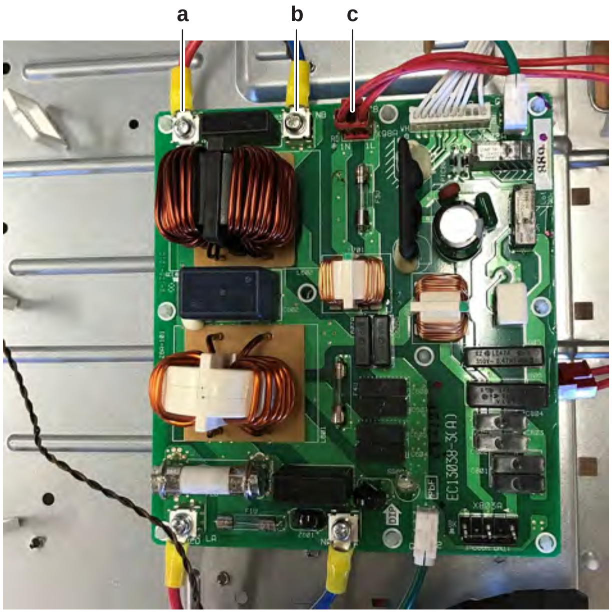
Does the main PCB receive power?	Action
Yes	Return to "Checking procedures" [▶ 171] of the main PCB and continue with the next procedure.
No	Continue with the next step.

4 Measure the output voltage between the wires LB-NB on the noise filter PCB.

Result: The measured voltage MUST be 230 V AC.

5 Measure the output voltage on connector X98A on the noise filter PCB.

Result: The measured voltage MUST be 230 V AC.



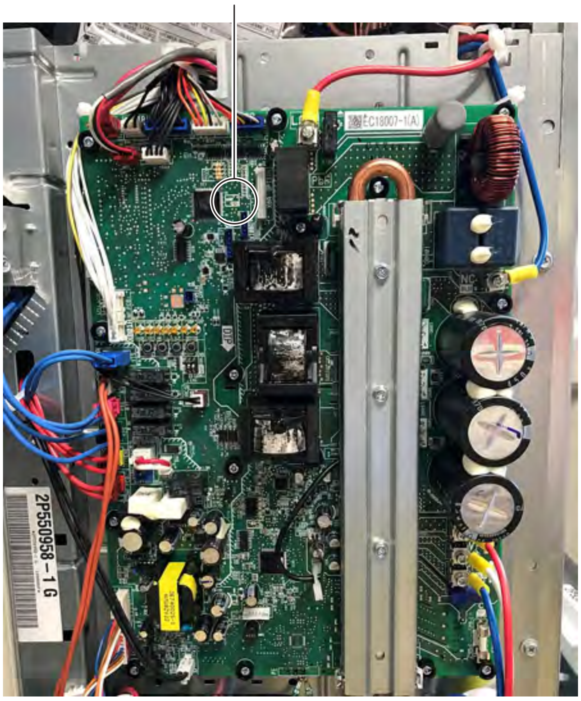
a LB
b NB
c Connector X98A

Output voltage on noise filter PCB correct?	Action
Yes	Correct the wiring between the main PCB and the noise filter PCB, see "4.1.2 Repair procedures" [▶ 286].
No	Perform a check of the noise filter PCB, see "Checking procedures" [▶ 194].

To check the HAP LED of the main PCB

Prerequisite: First check the power supply to the main PCB, see "Checking procedures" [▶ 171].

1 Locate the HAP LED on the main PCB.



a HAP LED

> **INFORMATION**
>
> Make sure the correct software is available on the PCB. If NOT, update using the updater tool.

Does the HAP LED blink in regular intervals (1 second ON/1 second OFF)?	Action
Yes	Return to "Checking procedures" [▶ 171] of the main PCB and continue with the next procedure.
No	Replace the main PCB, see "Repair procedures" [▶ 178].

To check if the correct spare part is installed

Prerequisite: First perform all earlier main PCB checks, see "Checking procedures" [▶ 171].

1. Visit your local spare parts webbank.
2. Enter the model name of your unit and check if the installed spare part number corresponds with the spare part number indicated in the webbank.

> **NOTICE**
>
> Also check that the correct spare part is installed for the capacity adapter.

Is the correct spare part for the PCB installed?	Action
Yes	Return to "Checking procedures" [▶ 171] of the main PCB and continue with the next procedure.
No	Replace the main PCB, see "Repair procedures" [▶ 178].

To check the wiring of the main PCB

Prerequisite: First perform all earlier main PCB checks, see "Checking procedures" [▶ 171].

Prerequisite: Stop the unit operation via the user interface.

1. Turn OFF the respective circuit breaker.
2. Check that all wires are properly connected and that all connectors are fully plugged-in.
3. Check that no connectors or wires are damaged.
4. Check that the wiring corresponds with the wiring diagram, see "6.2 Wiring diagram" [▶ 314].

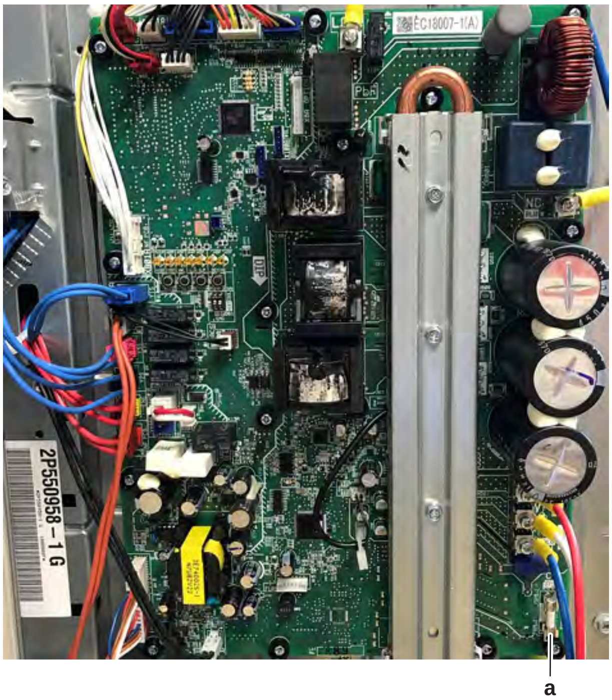
> **INFORMATION**
>
> Correct the wiring as needed.

Is the problem solved?	Action
Yes	No further actions required.
No	Return to "Checking procedures" [▶ 171] of the PCB and continue with the next procedure.

To check the fuse of the main PCB

Prerequisite: First perform all earlier main PCB checks, see "Checking procedures" [▶ 171].

1. Measure the continuity of the fuse. If no continuity is measured, the fuse has blown.



a Fuse

Blown fuse on the main PCB?	Action
Yes	Replace the blown fuse, see "Repair procedures" [▶ 178].

Blown fuse on the main PCB?	Action
No	Return to "Checking procedures" [▶ 171] of the main PCB and continue with the next procedure.

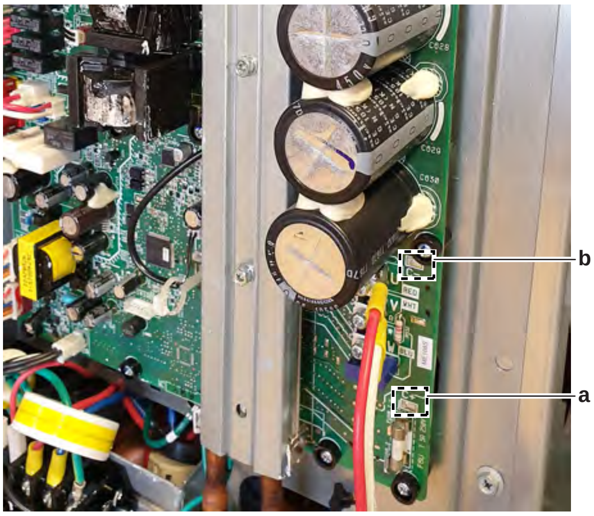
To check the rectifier voltage of the main PCB

Prerequisite: First perform all earlier main PCB checks, see "Checking procedures" [▶ 171].

1 Turn ON the power of the unit.

2 Measure the voltage on the rectifier voltage check terminals (+ and –) on the main PCB.

Result: The measured voltage MUST be 310~325 V DC if compressor is NOT running and 350~365 V DC if compressor is running.



a + terminal
b – terminal

INFORMATION

When measuring on the front of the main PCB, make sure to locally remove the protective varnish with the test leads of the multi meter.

Is the measured rectifier voltage correct?	Action
Yes	Perform a check of the power modules, see "Checking procedures" [▶ 171].
No	Replace the main PCB, see "Repair procedures" [▶ 178].

To perform a diode module check

1 First check the rectifier voltage of the main PCB, see "Checking procedures" [▶ 171].

INFORMATION

If the rectifier voltage is OK, the diode module is OK. If rectifier voltage is NOT OK, replace the main PCB.

Below procedure describes how to check the diode module itself.

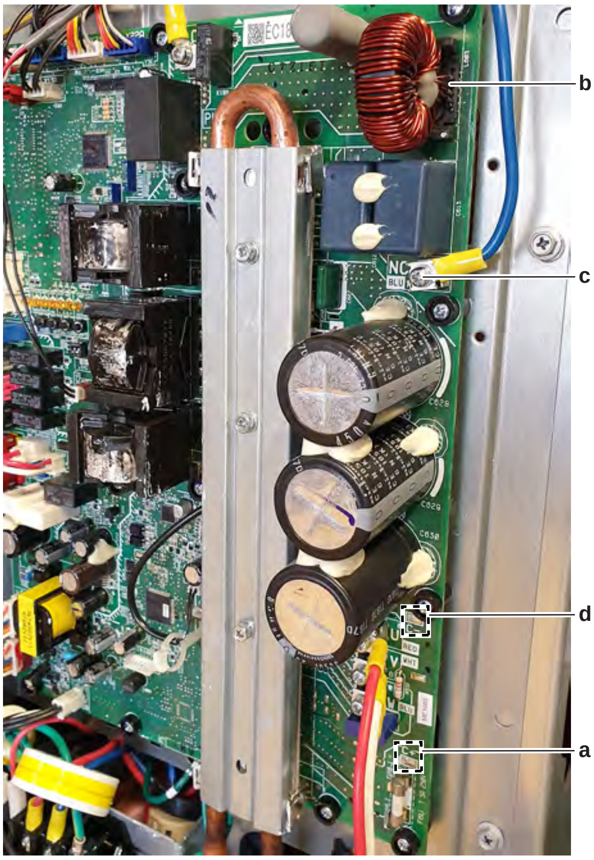
2 Stop the unit operation via the user interface.

3 Turn OFF the respective circuit breaker.

> **DANGER: RISK OF ELECTROCUTION**
>
> Confirm the rectifier voltage is below 10 V DC before proceeding, see "To prevent electrical hazards" [▶ 285].

4 Disconnect the NC wire from the main PCB.

5 Check the diode module in reference with the image and the table below.



- **a** V DC out (+)
- **b** V AC in (L803 coil leads)
- **c** V AC in (NC)
- **d** V DC out (–)

> **INFORMATION**
>
> When measuring on the front of the main PCB, make sure to locally remove the protective varnish with the test leads of the multi meter.

VDC	Com	Ref	VDC	Com	Ref
d	b	0.47 V	b	d	O.L
b	a	0.82 V	a	b	O.L
d	c	0.47 V	c	d	O.L
c	a	0.82 V	a	c	O.L

6 If the diode module is NOT OK, replace the main PCB, see "Repair procedures" [▶ 178].

To perform a power module check

Prerequisite: First check the rectifier voltage of the main PCB, see "Checking procedures" [▶ 171].

Prerequisite: Stop the unit operation via the user interface.

1 Turn OFF the respective circuit breaker.

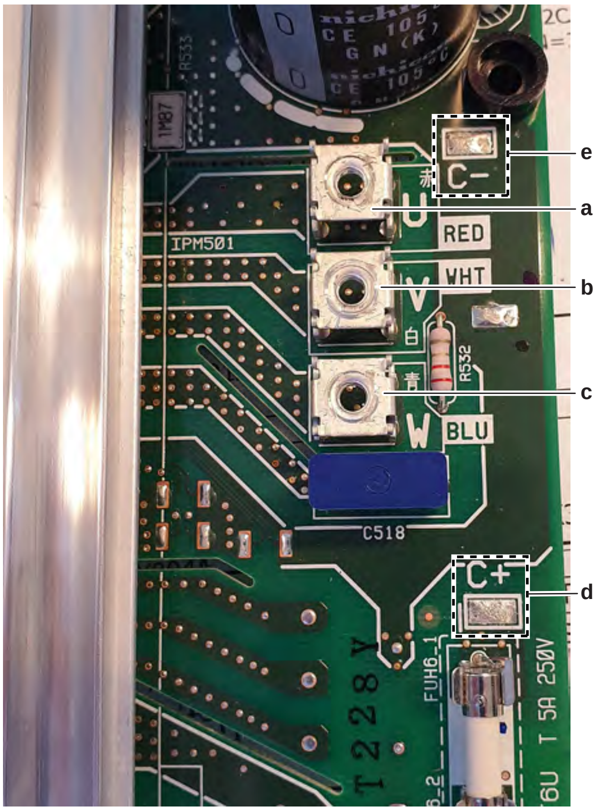
DANGER: RISK OF ELECTROCUTION

Confirm the rectifier voltage is below 10 V DC before proceeding, see "To prevent electrical hazards" [▶ 285].

Power module V1R for compressor

2 Disconnect the compressor wires (screw connections) from the main PCB.

3 Check the power module V1R in reference with the image and the table below.



a U
b V
c W
d C+
e C-

INFORMATION

When measuring on the front of the main PCB, make sure to locally remove the protective varnish with the test leads of the multi meter.

VDC	Com	Ref	VDC	Com	Ref
U	C+	0.424 V	C+	U	O.L
V	C+	0.424 V	C+	V	O.L
W	C+	0.424 V	C+	W	O.L
C-	U	0.424 V	U	C-	O.L
C-	V	0.424 V	V	C-	O.L
C-	W	0.424 V	W	C-	O.L

Are the test results OK?	Action
Yes	Power modules are OK. Return to "Checking procedures" [▶ 171] of the main PCB and continue with the next procedure.
No	Replace the main PCB, see "Repair procedures" [▶ 178].

Problem solved?

After all checking procedures listed above have been performed:

Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

Repair procedures

To remove the main PCB

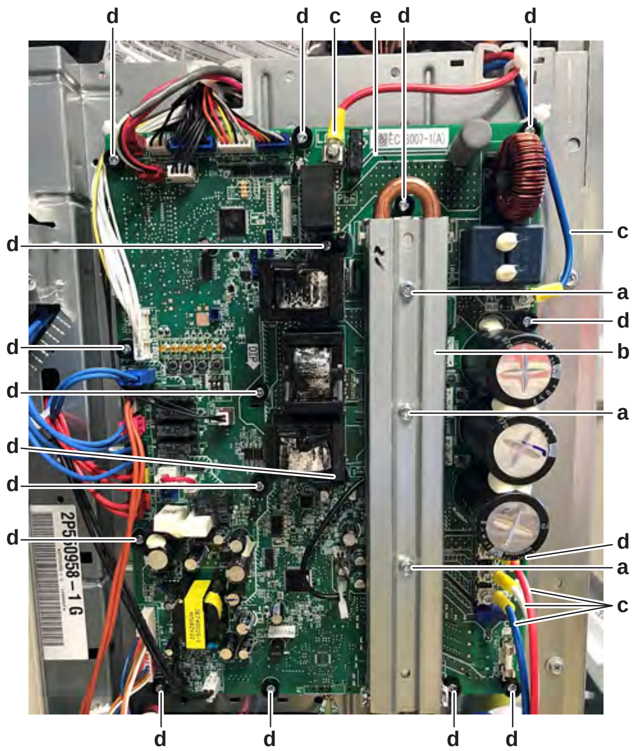
Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.17 Plate work" [▶ 230].

1 Remove the 3 bolts from the main PCB heat sink cover.

2 Lift and pull the cover to remove it from the heat sink.



a Heat sink cover screw
b Heat sink cover
c Wires LC, NC, U, V and W
d PCB fixation screw
e Main PCB

3 Disconnect all connectors from the main PCB.

4 Loosen the screws to disconnect the LC, NC, U, V and W wires.

5 Remove all main PCB fixation screws.

6 Pull the refrigerant pipe forward and move the main PCB out.

7 Remove the bottom screw on the back of the main PCB to disconnect the ground wire.

8 To install the main PCB, see "Repair procedures" [▶ 178].

To install the main PCB

1 Use a piece of cloth to remove the old thermal interface grease and clean the refrigerant pipe.

2 Install the ground wire at the bottom back side of the main PCB. Install and tighten the screw.

3 Apply grease to the refrigerant pipe contact surface of the heat sink (on the main PCB). Distribute the grease as evenly as possible.

CAUTION

ALWAYS apply new grease on the PCB heat sink. NOT doing so may cause the PCB to fail due to insufficient cooling.

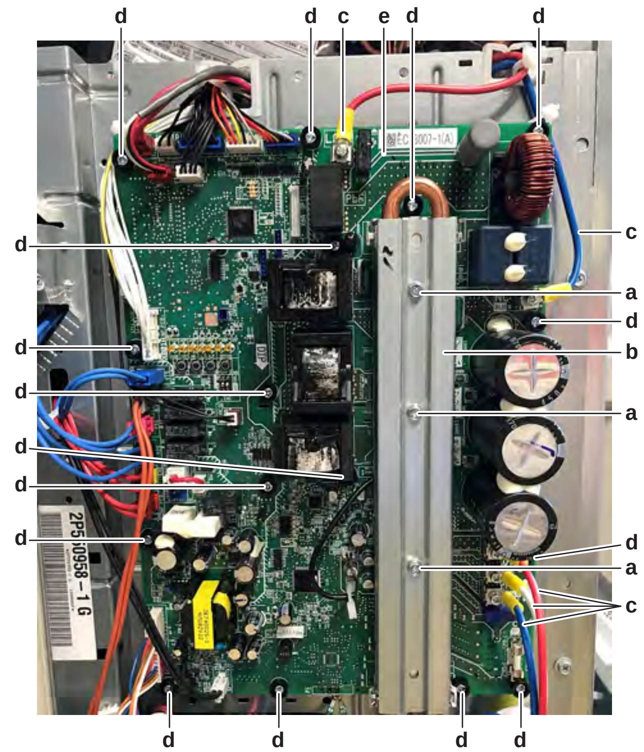
4 Carefully pull the refrigerant pipe forward and install the main PCB on its mounting plate in the correct location. Install and tighten the fixation screws.

INFORMATION

Make sure that the refrigerant pipe is correctly installed on the main PCB heat sink. Do NOT touch the part of the refrigerant pipe that is mounted in the heat sink.

5 Install the heat sink cover. Close and slide it downwards to fix the 2 hooks.

6 Install and tighten the 3 screws so that the heat sink cover presses the refrigerant pipe.



a Heat sink cover screw
b Heat sink cover

c Wires LC, NC, U, V and W
d PCB fixation screw
e Main PCB

7. Connect the LC, NC, U, V and W wires to the main PCB and tighten the screws.
8. Connect all connectors to the main PCB.

Is the problem solved?	Action
Yes	No further actions required.
No	Return to "Checking procedures" [▸ 171] of the PCB and continue with the next procedure.

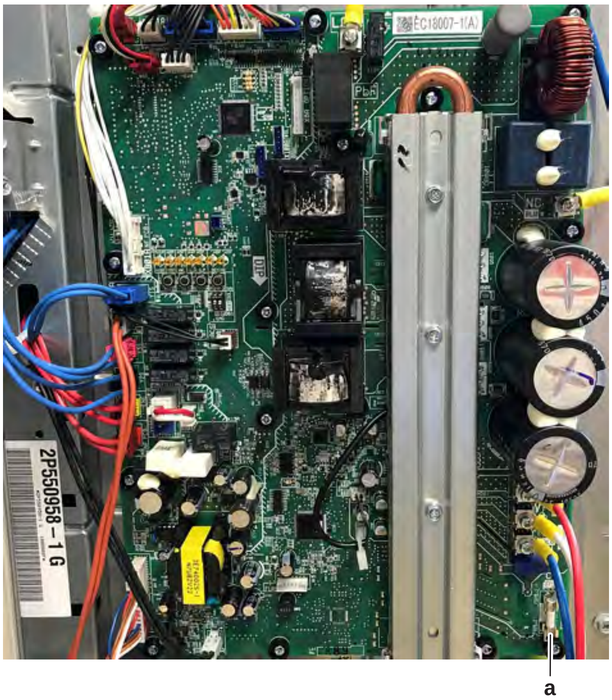
To remove a fuse of the main PCB

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.17 Plate work" [▸ 230].

1. Remove the fuse from the PCB.



a Fuse

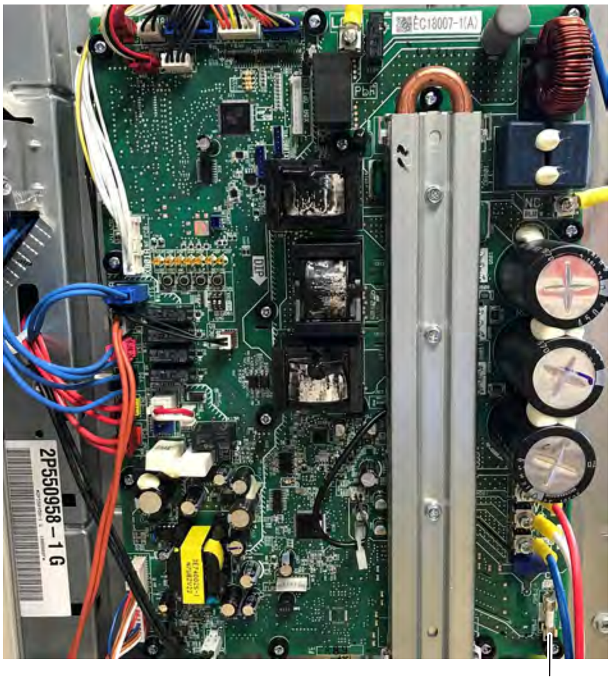
2. To install a fuse on the main PCB, see "Repair procedures" [▸ 178].

To install a fuse on the main PCB

> **WARNING**
>
> For continued protection against risk of fire, replace only with same type and rating of fuse.

1. Install the fuse on the correct location on the PCB.

> **CAUTION**
>
> Make sure the fuse is plugged-in correctly (contact with the fuse holder).



a

a Fuse

Is the problem solved?	Action
Yes	No further actions required.
No	Return to "Checking procedures" [▶ 171] of the PCB and continue with the next procedure.

3.14.2 Single fan outdoor unit - three phase

Checking procedures

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

To perform a power check of the main PCB

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

1 Remove the required plate work, see "3.17 Plate work" [▶ 230].

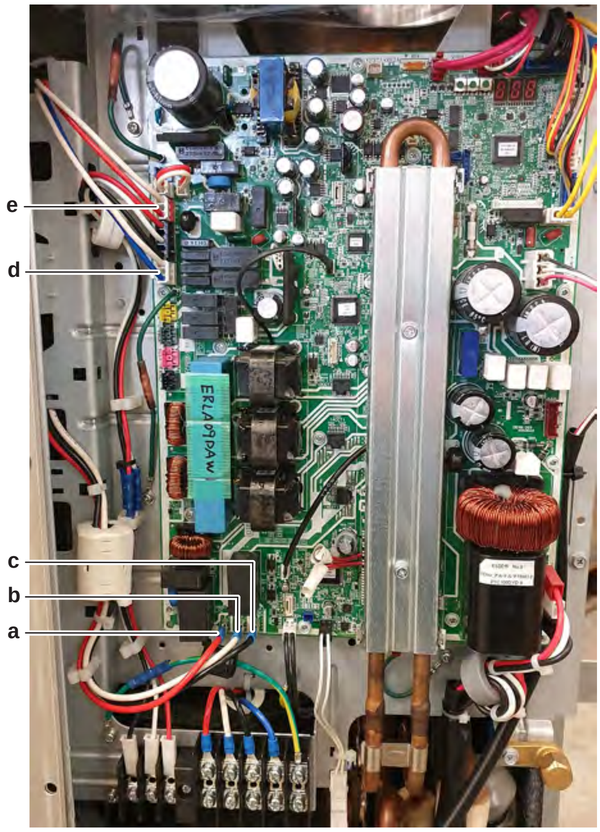
2 Turn ON the power of the unit.

3 Measure the voltage between the phases L1C-L2C-L3C on the main PCB.

Result: All measurements MUST be 400 V AC ± 10%.

4 Measure the voltage connectors X801A and X802A on the main PCB.

Result: The measured voltages MUST be 230 V AC ± 10%.



a L1C
b L2C
c L3C
d Connector X801A
e Connector X802A

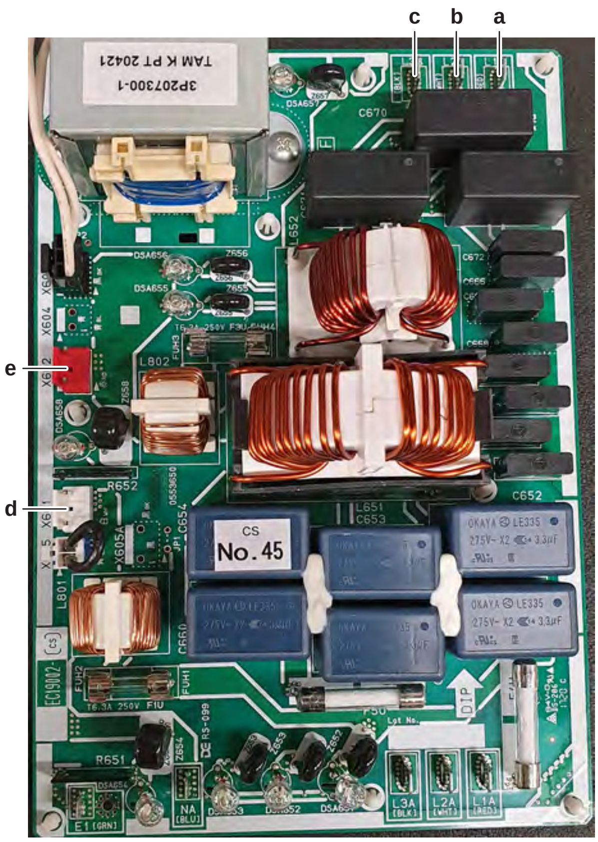
Is the measured voltage on the PCB correct?	Action
Yes	Return to "Checking procedures" [▶ 181] of the PCB and continue with the next procedure.
No	Continue with the next step.

5 Measure the output voltage between the phases L1B-L2B-L3B on the noise filter PCB.

Result: All measurements MUST be 400 V AC ± 10%.

6 Measure the output voltage on connectors X601 and X602 on the noise filter PCB.

Result: The measured voltages MUST be 230 V AC ± 10%.



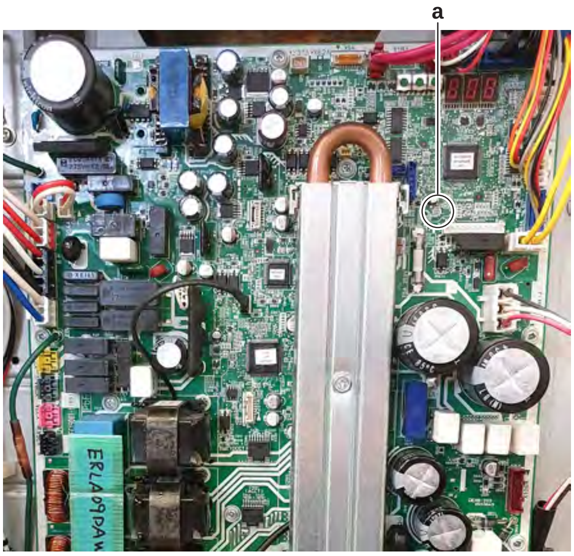
a L1B
b L2B
c L3B
d Connector X601
e Connector X602

Is the output voltage on the noise filter PCB correct?	Action
Yes	Correct the wiring between the main PCB and the noise filter PCB, see "4.1.2 Repair procedures" [▸ 286].
No	Perform a check of the noise filter PCB, see "Checking procedures" [▸ 204].

To check the HAP LED of the main PCB

Prerequisite: First check the power supply to the main PCB, see "Checking procedures" [▸ 181].

1 Locate the HAP LED on the main PCB.



a HAP LED

> **INFORMATION**
>
> Make sure the correct software is available on the PCB. If NOT, update using the updater tool.

Does the HAP LED blink in regular intervals (1 second ON/1 second OFF)?	Action
Yes	Return to "Checking procedures" [▶ 181] of the main PCB and continue with the next procedure.
No	Replace the main PCB, see "Repair procedures" [▶ 190].

To check if the correct spare part is installed

Prerequisite: First perform all earlier main PCB checks, see "Checking procedures" [▶ 181].

1. Visit your local spare parts webbank.
2. Enter the model name of your unit and check if the installed spare part number corresponds with the spare part number indicated in the webbank.

> **NOTICE**
>
> Also check that the correct spare part is installed for the capacity adapter.

Is the correct spare part for the PCB installed?	Action
Yes	Return to "Checking procedures" [▶ 181] of the main PCB and continue with the next procedure.
No	Replace the main PCB, see "Repair procedures" [▶ 190].

To check the wiring of the main PCB

Prerequisite: First perform all earlier main PCB checks, see "Checking procedures" [▶ 181].

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

1. Check that all wires are properly connected and that all connectors are fully plugged-in.
2. Check that no connectors or wires are damaged.
3. Check that the wiring corresponds with the wiring diagram, see "6.2 Wiring diagram" [▶ 314].

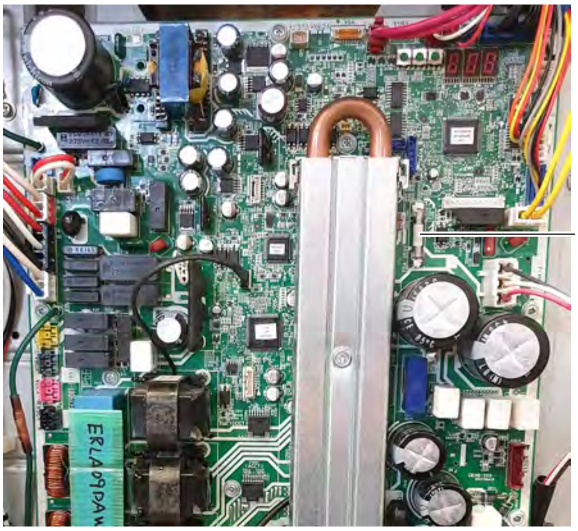
> **INFORMATION**
>
> Correct the wiring as needed.

Is the problem solved?	Action
Yes	No further actions required.
No	Return to "Checking procedures" [▶ 181] of the PCB and continue with the next procedure.

To check the fuse of the main PCB

Prerequisite: First perform all earlier main PCB checks, see "Checking procedures" [▶ 181].

1. Measure the continuity of the fuse. If no continuity is measured, the fuse has blown.



a Fuse F7U

Blown fuse on the main PCB?	Action
Yes	Replace the blown fuse, see "Repair procedures" [▶ 190].
No	Return to "Checking procedures" [▶ 181] of the main PCB and continue with the next procedure.

To check the rectifier voltage of the main PCB

Prerequisite: First perform all earlier main PCB checks, see "Checking procedures" [▶ 181].

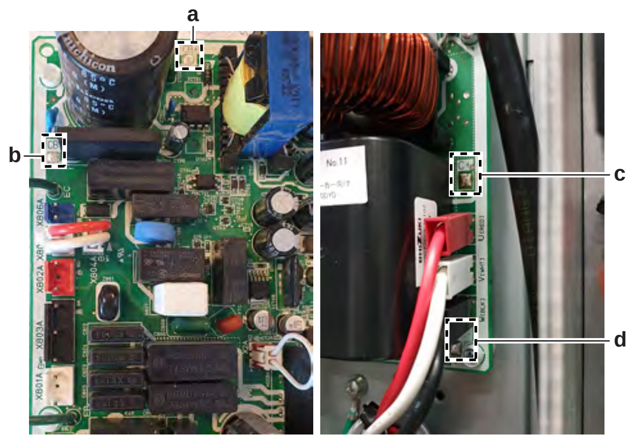
1. Turn ON the power of the unit.

2 Measure the voltage on the rectifier voltage check terminals (+ and –) of the fan circuit on the main PCB.

Result: The measured voltage MUST be approximately 324 V DC when fan is NOT running. Voltage can be higher when fan is running.

3 Measure the voltage on the rectifier voltage check terminals (+ and –) of the compressor circuit on the main PCB.

Result: The measured voltage MUST be 535~560 V DC when compressor is NOT running. Voltage can be higher when compressor is running.



a + terminal of fan circuit
b – terminal of fan circuit
c + terminal of compressor circuit
d – terminal of cmopressor circuit

> **INFORMATION**
> When measuring on the front of the main PCB, make sure to locally remove the protective varnish with the test leads of the multi meter.

Is the measured rectifier voltage correct?	Action
Yes	Perform a check of the power modules of the main PCB, see "Checking procedures" [▶ 181].
No	Replace the main PCB, see "Repair procedures" [▶ 190].

To perform a diode module check

1 First check the rectifier voltage of the main PCB, see "Checking procedures" [▶ 204].

> **INFORMATION**
> If the rectifier voltage is OK, the diode module is OK. If rectifier voltage is NOT OK, replace the main PCB.
>
> Below procedure describes how to check the diode module itself.

2 Stop the unit operation via the user interface.

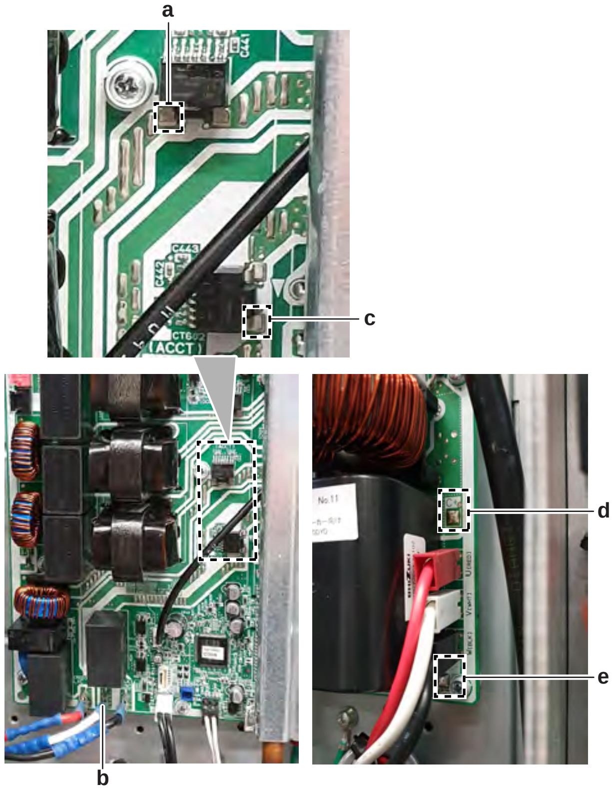
3 Turn OFF the respective circuit breaker.

DANGER: RISK OF ELECTROCUTION

Confirm the rectifier voltage is below 10 V DC before proceeding, see "To prevent electrical hazards" [▶ 285].

Diode module V1R for compressor circuit

1 Check the diode module in reference with the image and the table below.



a V AC in (current sensor - CT601)
b V AC in (L2C)
c V AC in (current sensor - CT602)
d V DC out (+)
e V DC out (–)

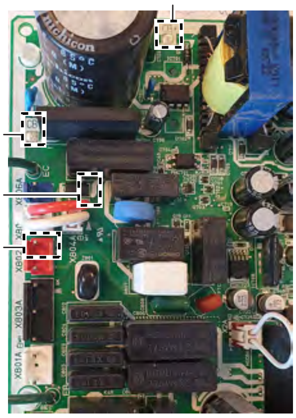
INFORMATION

When measuring on the front of the main PCB, make sure to locally remove the protective varnish with the test leads of the multi meter.

VDC	Com	Ref	VDC	Com	Ref
a	d	0.477 V	d	a	O.L
b	d	0.477 V	d	b	O.L
c	d	0.477 V	d	c	O.L
e	a	0.477 V	a	e	O.L
e	b	0.477 V	b	e	O.L
e	c	0.477 V	c	e	O.L

Diode module V2R for fan circuit

1 Check the diode module in reference with the image and the table below.



a V AC in (anode of D801)
b V AC in (N = X802A: 2)
c V DC out (+)
d V DC out (–)

> **INFORMATION**
>
> When measuring on the front of the main PCB, make sure to locally remove the protective varnish with the test leads of the multi meter.

VDC	Com	Ref	VDC	Com	Ref
a	c	0.505 V	c	a	O.L
b	c	0.505 V	c	b	O.L
d	a	0.567 V	a	d	O.L
d	b	0.567 V	b	d	O.L

2 If a diode module is NOT OK, replace the main PCB, see "Repair procedures" [▶ 190].

To perform a power module check

Prerequisite: First check the rectifier voltage of the main PCB, see "Checking procedures" [▶ 181].

Prerequisite: Stop the unit operation via the user interface.

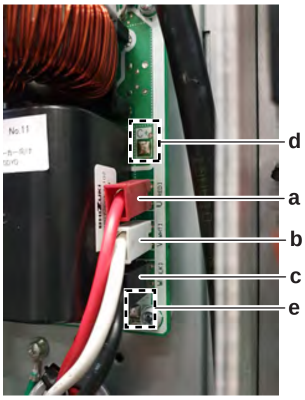
1 Turn OFF the respective circuit breaker.

> **DANGER: RISK OF ELECTROCUTION**
>
> Confirm the rectifier voltage is below 10 V DC before proceeding, see "To prevent electrical hazards" [▶ 285].

Power module V3R for compressor

1 Disconnect the compressor Faston connectors from the main PCB.

2 Check the power module V3R in reference with the image and the table below.



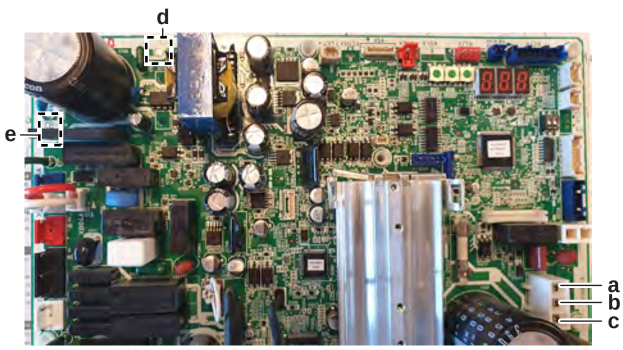
a U
b V
c W
d C+
e C-

> **INFORMATION**
>
> When measuring on the front of the main PCB, make sure to locally remove the protective varnish with the test leads of the multi meter.

VDC	Com	Ref	VDC	Com	Ref
U	C+	0.446 V	C+	U	O.L
V	C+	0.446 V	C+	V	O.L
W	C+	0.446 V	C+	W	O.L
C-	U	0.446 V	U	C-	O.L
C-	V	0.446 V	V	C-	O.L
C-	W	0.446 V	W	C-	O.L

Power module V4R for fan motor

1. Disconnect the fan motor connector from the main PCB.
2. Check the power module V4R in reference with the image and the table below.



a U
b V
c W
d CB+
e CB-

> **INFORMATION**
>
> When measuring on the front of the main PCB, make sure to locally remove the protective varnish with the test leads of the multi meter.

VDC	Com	Ref	VDC	Com	Ref
U	CB+	0.560 V	CB+	U	O.L
V	CB+	0.560 V	CB+	V	O.L
W	CB+	0.560 V	CB+	W	O.L
CB-	U	0.560 V	U	CB-	O.L
CB-	V	0.560 V	V	CB-	O.L
CB-	W	0.560 V	W	CB-	O.L

Are the test results OK?	Action
Yes	Power modules are OK. Return to "Checking procedures" [▸ 171] of the main PCB and continue with the next procedure.
No	Replace the main PCB, see "Repair procedures" [▸ 178].

Problem solved?

After all checking procedures listed above have been performed:

Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

Repair procedures

To remove the main PCB

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

1 Remove the required plate work, see "3.17 Plate work" [▸ 230].

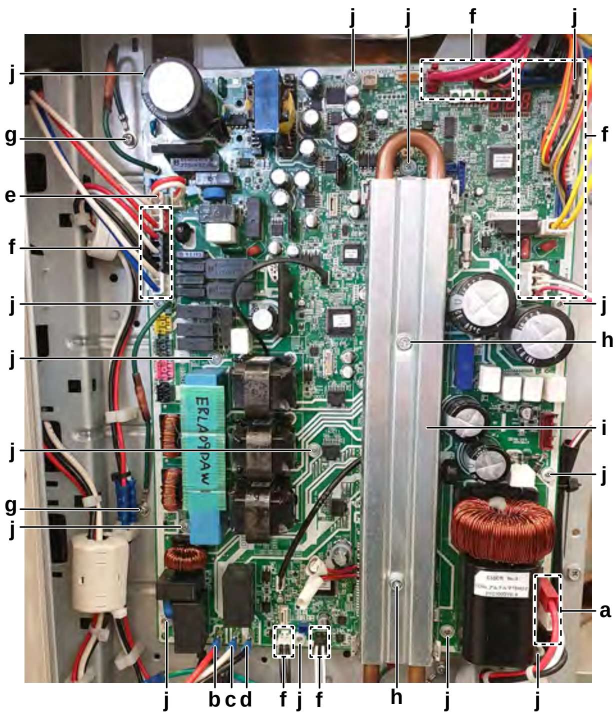
DANGER: RISK OF ELECTROCUTION

Confirm the rectifier voltage is below 10 V DC before proceeding, see "To prevent electrical hazards" [▸ 285].

2 Remove (or flip over) the protective cover sheet.

3 Unplug the compressor U, V and W Faston connectors from the main PCB.

4 Unplug the L1C, L2C and L3C Faston connectors from the main PCB.



a Compressor U, V and W Faston connectors
b L1C
c L2C
d L3C
e Bridge connector
f Connector
g Screw (ground wire)
h Bolt (heat sink cover)
i Heat sink cover
j PCB fixation screw

5 Disconnect the bridge connector. Keep it for reuse.

6 Disconnect the indicated connectors from the main PCB.

7 Remove the screw and disconnect the 2 ground wires from the main PCB mounting plate.

8 Remove the 2 bolts from the main PCB heat sink cover.

9 Lift and pull the cover to remove it from the heat sink.

10 Remove the main PCB fixation screws.

11 Carefully pull the refrigerant pipe forward to separate it from the heat sink on the main PCB.

12 Pull the refrigerant pipe forward and move the main PCB out (upwards).

13 Remove the bottom screw on the back of the main PCB to disconnect the ground wire.

14 To install the main PCB, see "Repair procedures" [▶ 190].

To install the main PCB

1 Use a piece of cloth to remove the old thermal interface grease and clean the refrigerant pipe.

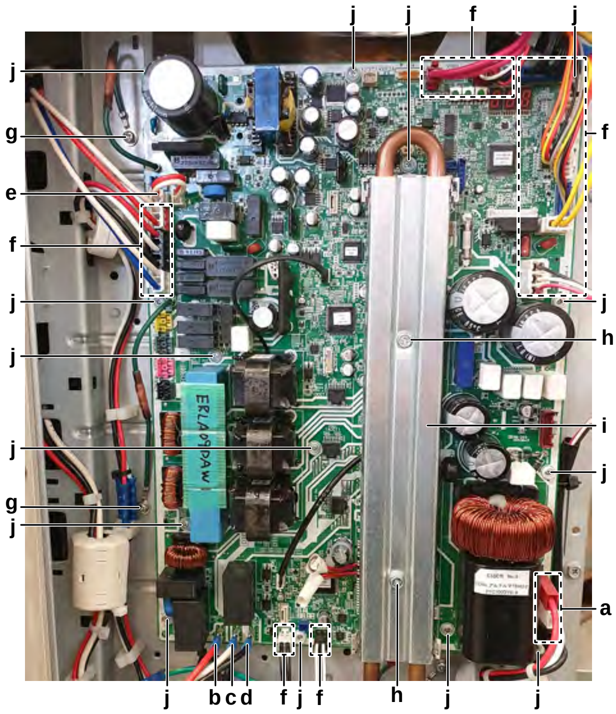
2 Install the ground wire at the bottom back side of the main PCB. Install and tighten the screw.

3 Apply new thermal interface grease to the refrigerant pipe contact surface of the heat sink (on the main PCB). Distribute the grease as evenly as possible.

> **CAUTION**
>
> ALWAYS apply new grease on the PCB heat sink. NOT doing so may cause the PCB to fail due to insufficient cooling.

4 Carefully pull the refrigerant pipe forward and install the main PCB in the correct location on the mounting plate.

5 Install and tighten the main PCB fixation screws to fix the PCB on the mounting plate.



- **a** Compressor U, V and W Faston connectors
- **b** L1C
- **c** L2C
- **d** L3C
- **e** Bridge connector
- **f** Connector
- **g** Screw (ground wire)
- **h** Bolt (heat sink cover)
- **i** Heat sink cover
- **j** PCB fixation screw

6 Correctly install the refrigerant pipe on the heat sink (proper contact with the thermal interface grease on the heat sink of the switch box). Install the heat sink cover.

7 Install the 2 bolts on the heat sink cover and tighten the bolts.

> **INFORMATION**
>
> Make sure that the refrigerant pipe is correctly installed on the main PCB heat sink. Do NOT touch the part of the refrigerant pipe that is mounted in the heat sink.

8 Install and tighten the screws to fix the 2 ground wires to the PCB mounting plate.

9 Connect all connectors to the main PCB.

10 Connect the bridge connector.

> **WARNING**
>
> When reconnecting a connector to the PCB, make sure to connect it on the correct location and do NOT apply force, as this may damage the connector or connector pins of the PCB.

11 Plug the L1C, L2C and L3C Faston connectors on the main PCB.

12 Plug the compressor U, V and W Faston connectors on the main PCB.

13 Install the protective cover sheet.

Is the problem solved?	Action
Yes	No further actions required.
No	Return to "Checking procedures" [▶ 181] of the PCB and continue with the next procedure.

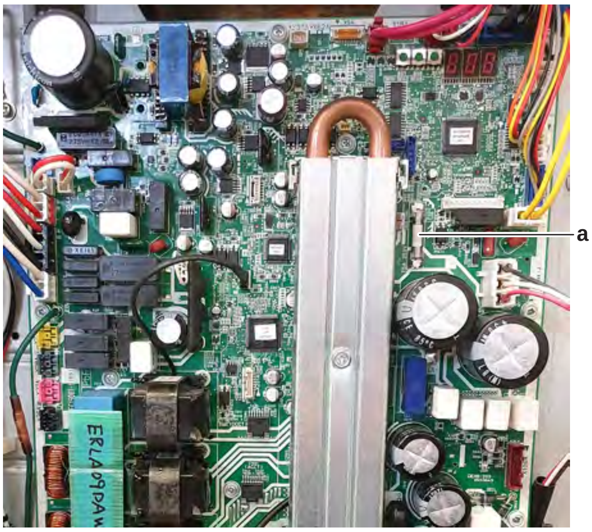
To remove a fuse of the main PCB

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.17 Plate work" [▶ 230].

1 Remove the fuse from the PCB.



a Fuse F7U

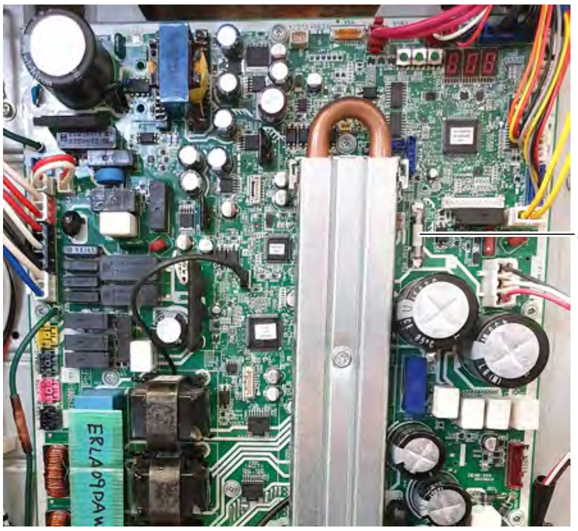
2 To install a fuse on the main PCB, see "Repair procedures" [▶ 190].

To install a fuse on the main PCB

> **WARNING**
>
> For continued protection against risk of fire, replace only with same type and rating of fuse.

1 Install the fuse on the correct location on the PCB.

> **CAUTION**
>
> Make sure the fuse is plugged-in correctly (contact with the fuse holder).



a Fuse F7U

Is the problem solved?	Action
Yes	No further actions required.
No	Return to "Checking procedures" [▶ 181] of the PCB and continue with the next procedure.

3.15 Noise filter PCB

3.15.1 Single fan outdoor unit - single phase

Checking procedures

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

To perform a functionality check of the noise filter PCB

> **INFORMATION**
>
> The noise filter PCB is mounted on the back side of the PCB mounting plate and therefore NOT easily accessible. Therefore, first perform the functionality check described below without dismounting the PCB mounting plate.

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

1. Remove the required plate work, see "3.17 Plate work" [▶ 230].
2. Turn ON the power of the unit.
3. Measure the output voltage of the noise filter PCB on the terminal X1M: 1-2 and between LC and NC on the main PCB.

   Result: The measured voltages MUST be 230 V AC.

a X1M: 1
b X1M: 2
c LC
d NC
e X1M: L
f X1M: N

Is the measured output voltage correct?	Action
Yes	Noise filter PCB is OK. No need to perform other check procedures for the noise filter PCB. Return to the troubleshooting of the specific error and continue with the next procedure.
No	Continue with the next step.

4 Measure the power supply voltage to the noise filter PCB on the terminal X1M: L-N.

Result: The measured voltages MUST be 230 V AC.

Is the measured voltage correct?	Action
Yes	Return to "Checking procedures" [▶ 194] of the PCB and continue with the next procedure.
No	Adjust the power supply to the unit, see "4.1.2 Repair procedures" [▶ 286].

To perform a power check of the noise filter PCB

Prerequisite: First perform a functionality check of the noise filter PCB, see "Checking procedures" [▶ 194].

Prerequisite: Stop the unit operation via the user interface.

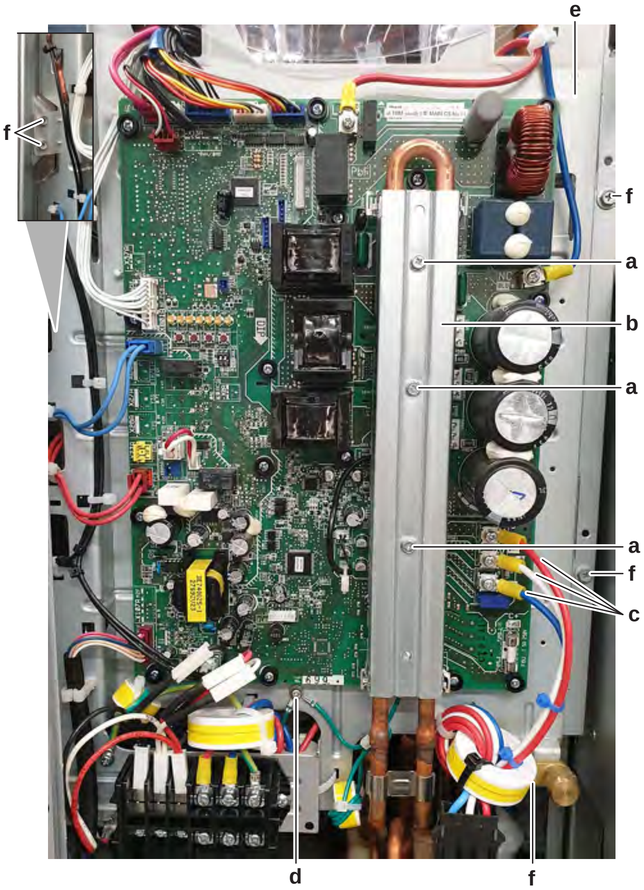
Prerequisite: Turn OFF the respective circuit breaker.

1 Remove the required plate work, see "3.17 Plate work" [▶ 230].

> **DANGER: RISK OF ELECTROCUTION**
>
> Confirm the rectifier voltage is below 10 V DC before proceeding, see "To prevent electrical hazards" [▶ 285].

2 Remove the 3 screws from the main PCB heat sink cover.

3 Lift and pull the cover to remove it from the heat sink.



a Heat sink cover screw
b Heat sink cover
c Wires U, V and W
d Ground wire screw
e Main PCB mounting plate
f Main PCB mounting plate fixation screw

4 Disconnect all connectors from the main PCB.

5 Loosen the screws to disconnect the U, V and W wires.

6 Cut all cable ties that fix cables to the main PCB mounting plate.

7 Loosen the screw to disconnect the ground wires from the main PCB mounting plate.

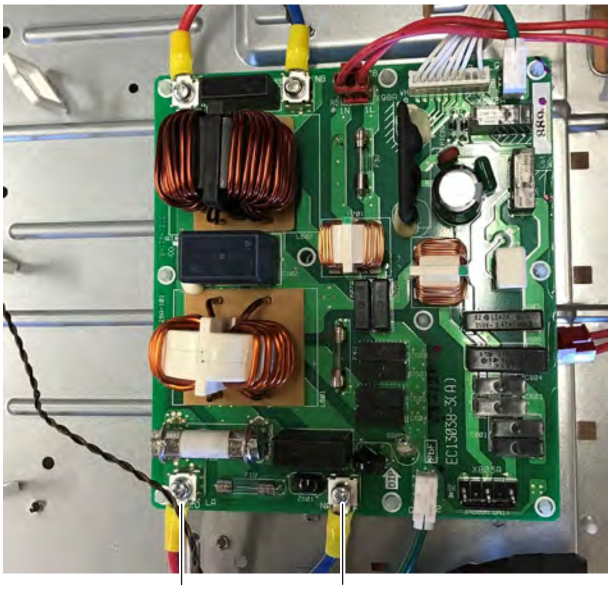
8 Remove all main PCB mounting plate fixation screws.

9 Pull the refrigerant pipe forward and slide the main PCB mounting plate upwards so that the noise filter PCB on the back side is easily accessible.

> **CAUTION**
>
> The noise filter PCB is still connected. Do NOT completely remove the main PCB mounting plate.

10 Turn ON the power of the unit.

11 Measure the voltage between the wires LA-NA of the noise filter PCB. Measured voltage MUST be 230 V AC.



a b

a LA
b NA

Is the measured voltage on the PCB correct?	Action
Yes	Return to "Checking procedures" [▸ 194] procedures of the PCB and continue with the next procedure.
No	Continue with the next step.

12 Check the power supply to the unit, see "4.1.1 Checking procedures" [▸ 284].

Does the unit receive power?	Action
Yes	Correct the wiring from the main power supply terminal to the noise filter PCB, see "Repair procedures" [▸ 200].
No	Adjust the power supply to the unit, see "4.1.2 Repair procedures" [▸ 286].

To perform an electrical check of the noise filter PCB

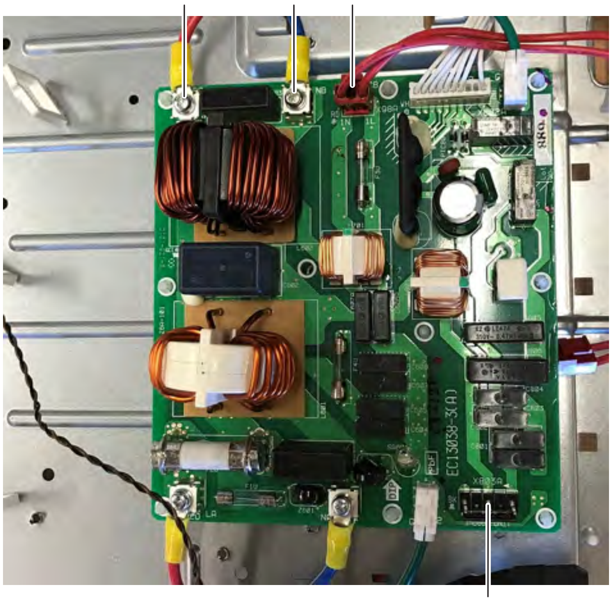
Prerequisite: First check the power supply to the noise filter PCB, see "Checking procedures" [▸ 194].

1 Measure the voltage between the output wires LB-NB of the noise filter PCB. The measured voltage MUST be 230 V AC.

2 Measure the voltage on the output connector X98A and between the pins 1-2 of output connector X803A.

Result: The measured voltage MUST be 230 V AC.

a b c



d

a LB
b NB
c Connector X98A
d Connector X803A

Is the output voltage on the noise filter PCB correct?	Action
Yes	Return to "Checking procedures" [▸ 194] of the noise filter PCB and continue with the next procedure.
No	Replace the noise filter PCB, see "Repair procedures" [▸ 200].

To check if the correct spare part is installed

Prerequisite: First perform all earlier checks of the noise filter PCB, see "Checking procedures" [▸ 194].

1 Visit your local spare parts webbank.

2 Enter the model name of your unit and check if the installed spare part number corresponds with the spare part number indicated in the webbank.

Is the correct spare part for the noise filter PCB installed?	Action
Yes	Return to "Checking procedures" [▸ 194] of the noise filter PCB and continue with the next procedure.
No	Replace the noise filter PCB, see "Repair procedures" [▸ 200].

To check the wiring of the noise filter PCB

Prerequisite: First perform all earlier checks of the noise filter PCB, see "Checking procedures" [▶ 194].

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

1. Check that all wires are properly connected and that all connectors are fully plugged-in.
2. Check that no connectors or wires are damaged.
3. Check that the wiring corresponds with the wiring diagram, see "6.2 Wiring diagram" [▶ 314].

INFORMATION

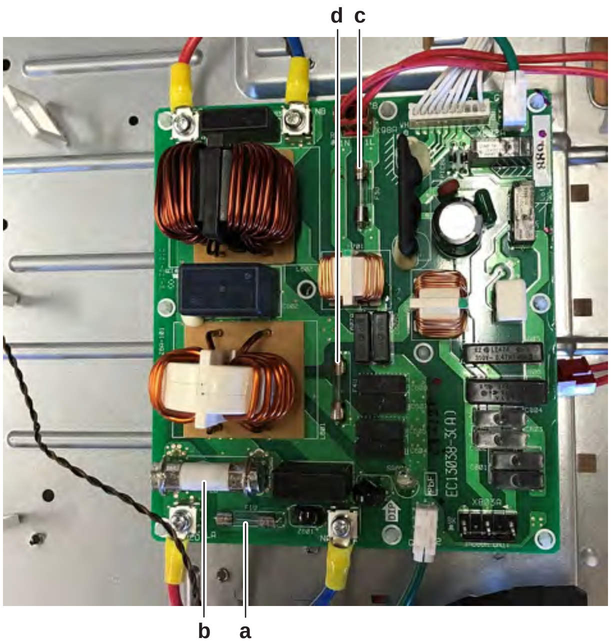
Correct the wiring as needed.

Is the problem solved?	Action
Yes	No further actions required.
No	Return to "Checking procedures" [▶ 194] of the noise filter PCB and continue with the next procedure.

To check the fuses of the noise filter PCB

Prerequisite: First perform all earlier checks of the noise filter PCB, see "Checking procedures" [▶ 194].

1. Measure the continuity of the fuse. If no continuity is measured, the fuse has blown.



a Fuse F1U
b Fuse F2U
c Fuse F3U
d Fuse F4U

Blown fuse on the noise filter PCB?	Action
Yes	Replace the noise filter PCB, see "Repair procedures" [▶ 200].
No	Return to "Checking procedures" [▶ 194] of the noise filter PCB and continue with the next procedure.

Problem solved?

After all checking procedures listed above have been performed:

Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

Repair procedures

To correct the wiring from the main power supply terminal to the noise filter PCB

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

1. Remove the required plate work, see "3.17 Plate work" [▶ 230].
2. Make sure that all wires are firmly and correctly connected, see "6.2 Wiring diagram" [▶ 314].
3. Check the continuity of all wires.
4. Replace any damaged or broken wires.

Is the problem solved?	Action
Yes	No further actions required.
No	Return to "Checking procedures" [▶ 194] of the noise filter PCB and continue with the next procedure.

To remove the noise filter PCB

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

1. Remove the required plate work, see "3.17 Plate work" [▶ 230].

DANGER: RISK OF ELECTROCUTION

Confirm the rectifier voltage is below 10 V DC before proceeding, see "To prevent electrical hazards" [▶ 285].

2. Remove the 3 screws from the main PCB heat sink cover.
3. Lift and pull the cover to remove it from the heat sink.

a Heat sink cover screw
b Heat sink cover
c Wires U, V and W
d Ground wire screw
e Main PCB mounting plate
f Main PCB mounting plate fixation screw

4 Disconnect all connectors from the main PCB.

5 Loosen the screws to disconnect the U, V and W wires.

6 Cut all cable ties that fix cables to the main PCB mounting plate.

7 Loosen the screw to disconnect the ground wires from the main PCB mounting plate.

8 Remove all main PCB mounting plate fixation screws.

9 Pull the refrigerant pipe forward and slide the main PCB mounting plate upwards so that the noise filter PCB on the back side is easily accessible.

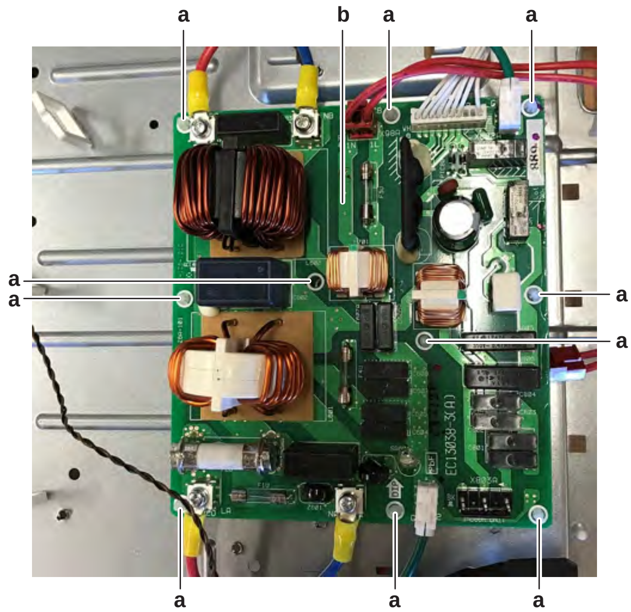
> **CAUTION**
>
> The noise filter PCB is still connected. Do NOT completely remove the main PCB mounting plate.

10 Disconnect all connectors and FASTON connectors from the noise filter PCB.

11 Loosen the screws to disconnect the LA, LB, NA and NB wires.

12 Carefully pull the PCB at the side and unlatch the PCB supports one by one using a small pair of pliers.

13 Remove the noise filter PCB from the main PCB mounting plate.

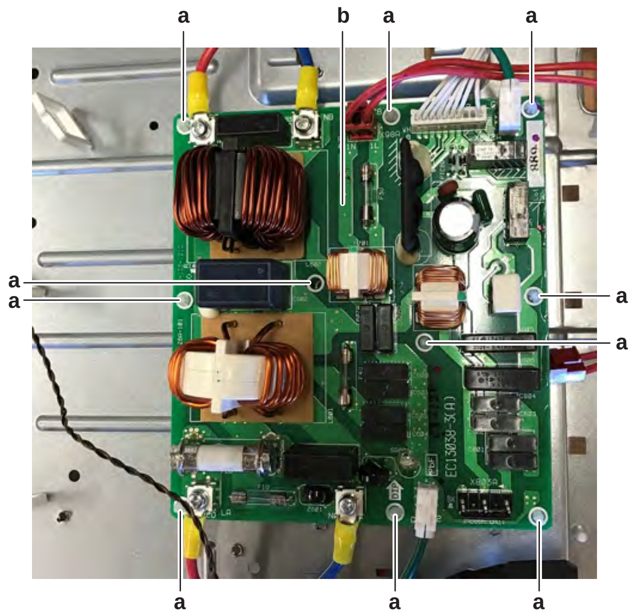


a PCB support
b Noise filter PCB

14 To install the new noise filter PCB, see "Repair procedures" [▶ 200].

To install the noise filter PCB

1 Install the noise filter PCB on its correct location.



a PCB support
b Noise filter PCB

2 Connect all connectors and FASTON connectors to the noise filter PCB.

3 Connect the LA, LB, NA and NB wires to the noise filter PCB and tighten the screws.

4 Remove the grease and apply new grease to the heat sink on the main PCB.

> **CAUTION**
>
> ALWAYS apply new grease on the PCB heat sink. NOT doing so may cause the PCB to fail due to insufficient cooling.

5 Pull the refrigerant pipe forward and install the main PCB mounting plate on its correct location. Install and tighten the fixation screws.

> **INFORMATION**
>
> Make sure that the refrigerant pipe is correctly installed on the main PCB heat sink. Do NOT touch the part of the refrigerant pipe that is mounted in the heat sink.

6 Install the heat sink cover. Close and slide it downwards to fix the 2 hooks.

7 Install and tighten the 3 screws so that the heat sink cover presses the refrigerant pipe.

a Heat sink cover screw
b Heat sink cover
c Wires U, V and W
d Ground wire screw
e Main PCB mounting plate
f Main PCB mounting plate fixation screw

8 Connect the ground wires to the main PCB mounting plate and tighten the screw.

9 Connect the U, V and W wires to the main PCB and tighten the screws.

10 Connect all connectors to the main PCB.

11 Fix the cables to the main PCB mounting plate using new tie straps.

Is the problem solved?	Action
Yes	No further actions required.
No	Return to "Checking procedures" [▶ 194] of the noise filter PCB and continue with the next procedure.

3.15.2 Single fan outdoor unit - three phase

Checking procedures

INFORMATION

It is recommended to perform the checks in the listed order.

To perform a functionality check of the noise filter PCB

INFORMATION

The noise filter PCB is mounted on the back side of the PCB mounting plate and therefore NOT easily accessible. Therefore, first perform the functionality check described below without dismounting the PCB mounting plate.

Prerequisite: Stop the unit operation via the user interface.

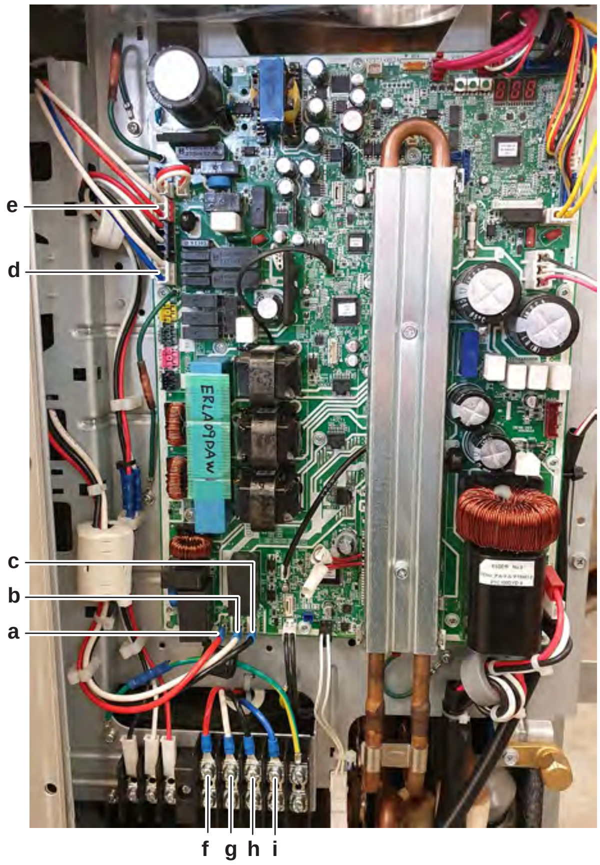
Prerequisite: Turn OFF the respective circuit breaker.

1 Remove the required plate work, see "3.17 Plate work" [▶ 230].

2 Turn ON the power of the unit.

3 Measure the output voltage of the noise filter PCB between L1C-L2C-L3C on the main PCB.

Result: All measurements MUST be 400 V AC ± 10%.



a L1C
b L2C
c L3C
d Connector X801A
e Connector X802A
f X1M: L1
g X1M: L2
h X1M: L3
i X1M: N

4 Measure the output voltage of the noise filter PCB on connectors X801A and X802A on the main PCB.

Result: All measurements MUST be 230 V AC ± 10%.

Is the measured output voltage correct?	Action
Yes	Noise filter PCB is OK. No need to perform other check procedures for the noise filter PCB. Return to the troubleshooting of the specific error and continue with the next procedure.
No	Continue with the next step.

5 Measure the power supply voltage to the noise filter PCB between the wires L1-L2-L3 on the terminal X1M.

Result: All measured voltages MUST be 400 V AC ± 10%.

6 Measure the power supply voltage to the noise filter PCB between each phase and N on the terminal X1M.

Result: All measured voltages MUST be 230 V AC ± 10%.

Are the measured voltages correct?	Action
Yes	Return to "Checking procedures" [▸ 204] of the PCB and continue with the next procedure.
No	Adjust the power supply to the unit, see "4.1.2 Repair procedures" [▸ 286].

To perform a power check of the noise filter PCB

Prerequisite: First perform a functionality check of the noise filter PCB, see "Checking procedures" [▸ 204].

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

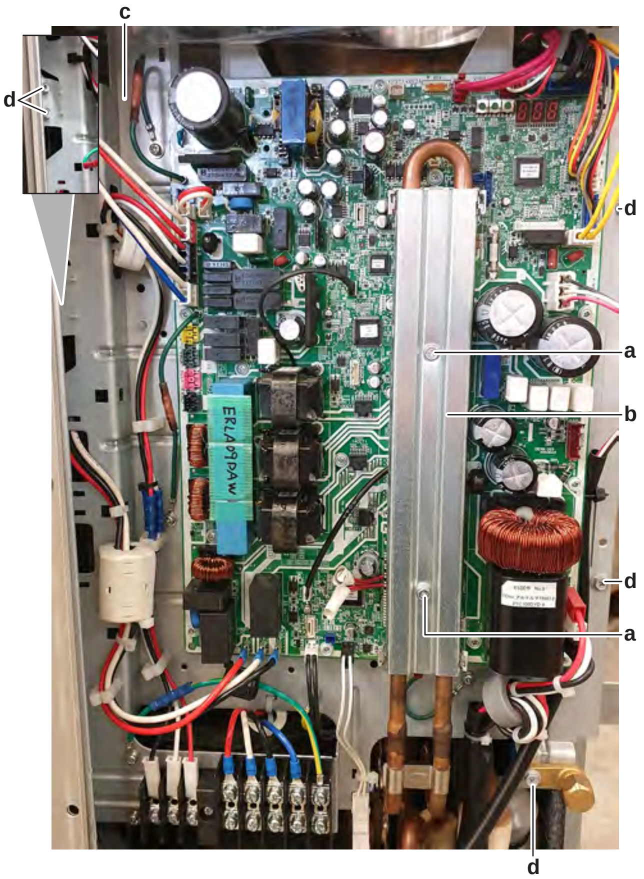
1 Remove the required plate work, see "3.17 Plate work" [▸ 230].

DANGER: RISK OF ELECTROCUTION

Confirm the rectifier voltage is below 10 V DC before proceeding, see "To prevent electrical hazards" [▸ 285].

2 Remove the 2 screws from the main PCB heat sink cover.

3 Lift and pull the cover to remove it from the heat sink.



a Heat sink cover screw
b Heat sink cover
c Main PCB mounting plate
d Main PCB mounting plate fixation screw

4 Disconnect all connectors from the main PCB.

5 Cut all cable ties that fix cables to the main PCB mounting plate.

6 Remove all main PCB mounting plate fixation screws.

7 Pull the refrigerant pipe forward and slide the main PCB mounting plate upwards so that the noise filter PCB on the back side is easily accessible.

CAUTION

The noise filter PCB is still connected. Do NOT completely remove the main PCB mounting plate.

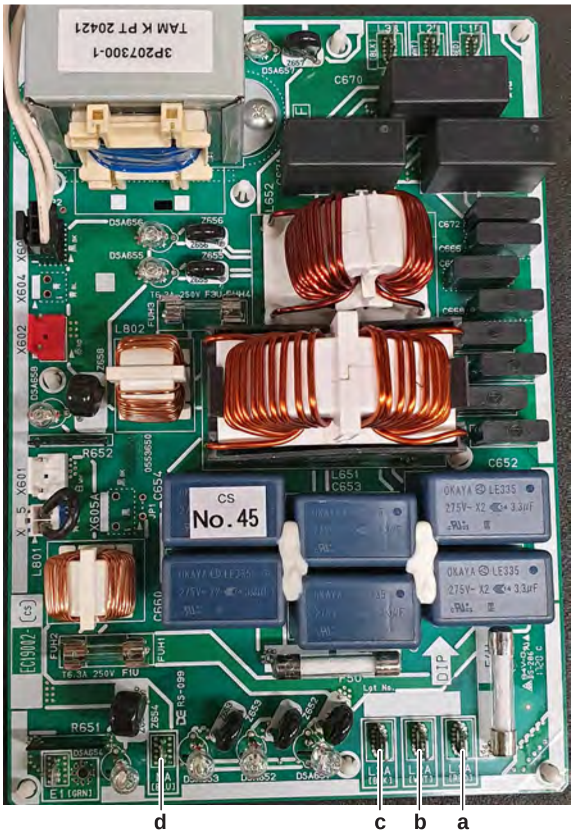
8 Turn ON the power of the unit.

9 Measure the voltage between the phases L1A-L2A-L3A on the noise filter PCB.

Result: All measurements MUST be 400 V AC ± 10%.

10 Measure the voltage between each phase and NA on the noise filter PCB.

Result: The measured voltages MUST be 230 V AC ± 10%.



a L1A
b L2A
c L3A
d NA

Is the measured voltage on the PCB correct?	Action
Yes	Return to "Checking procedures" [▶ 204] of the PCB and continue with the next procedure.
No	Continue with the next step.

11 Check the power supply to the unit, see "4.1.1 Checking procedures" [▶ 284].

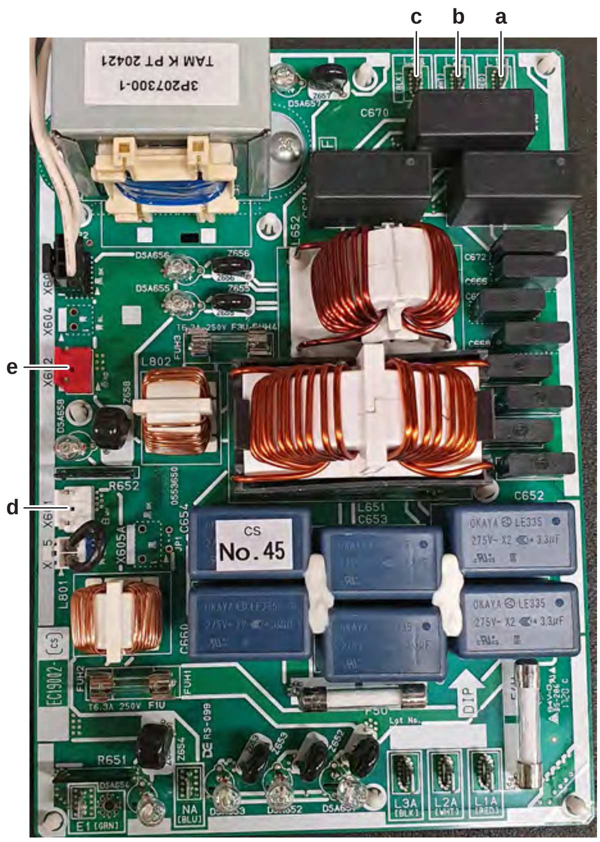
Does the unit receive power?	Action
Yes	Correct the wiring from the main power supply terminal to the noise filter PCB, see "Repair procedures" [▶ 211].
No	Adjust the power supply to the unit, see "4.1.2 Repair procedures" [▶ 286].

To perform an electrical check of the noise filter PCB

Prerequisite: First check the power supply to the noise filter PCB, see "Checking procedures" [▶ 204].

1 Measure the voltage between output wires L1B-L2B-L3B on the noise filter PCB.

Result: All measurements MUST be 400 V AC ± 10%.



a L1B
b L2B
c L3B
d Connector X601
e Connector X602

2 Measure the voltage on connectors X601 and X602 on the noise filter PCB.

Result: All measurements MUST be 230 V AC ± 10%.

Is the output voltage on the noise filter PCB correct?	Action
Yes	Return to "Checking procedures" [▶ 204] of the noise filter PCB and continue with the next procedure.
No	Replace the noise filter PCB, see "Repair procedures" [▶ 211].

To check if the correct spare part is installed

Prerequisite: First perform all earlier checks of the noise filter PCB, see "Checking procedures" [▶ 204].

1 Visit your local spare parts webbank.

2 Enter the model name of your unit and check if the installed spare part number corresponds with the spare part number indicated in the webbank.

Is the correct spare part for the noise filter PCB installed?	Action
Yes	Return to "Checking procedures" [▶ 204] of the noise filter PCB and continue with the next procedure.

Is the correct spare part for the noise filter PCB installed?	Action
No	Replace the noise filter PCB, see "Repair procedures" [▶ 211].

To check the wiring of the noise filter PCB

Prerequisite: First perform all earlier checks of the noise filter PCB, see "Checking procedures" [▶ 204].

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

1. Check that all wires are properly connected and that all connectors are fully plugged-in.
2. Check that no connectors or wires are damaged.
3. Check that the wiring corresponds with the wiring diagram, see "6.2 Wiring diagram" [▶ 314].

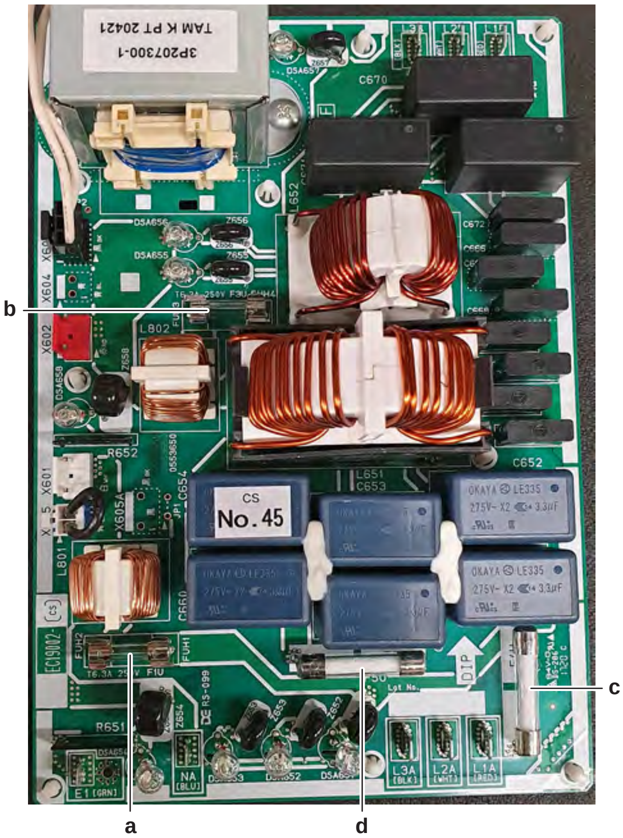
> **INFORMATION**
>
> Correct the wiring as needed.

Is the problem solved?	Action
Yes	No further actions required.
No	Return to "Checking procedures" [▶ 204] of the noise filter PCB and continue with the next procedure.

To check the fuses of the noise filter PCB

Prerequisite: First perform all earlier checks of the noise filter PCB, see "Checking procedures" [▶ 204].

1. Measure the continuity of the fuse. If no continuity is measured, the fuse has blown.



a Fuse F1U
b Fuse F3U
c Fuse F4U
d Fuse F5U

For fuses F4U and F5U

Blown fuse on the noise filter PCB?	Action
Yes	Replace the noise filter PCB, see "Repair procedures" [▶ 211].
No	Return to "Checking procedures" [▶ 204] of the noise filter PCB and continue with the next procedure.

For fuses F1U and F3U

Blown fuse on the noise filter PCB?	Action
Yes	Replace the blown fuse, see "Repair procedures" [▶ 211].
No	Return to "Checking procedures" [▶ 204] of the noise filter PCB and continue with the next procedure.

Problem solved?

After all checking procedures listed above have been performed:

Is the problem solved?	Action
Yes	No further actions required.

Is the problem solved?	Action
No	Return to the troubleshooting of the specific error and continue with the next procedure.

Repair procedures

To correct the wiring from the main power supply terminal to the noise filter PCB

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

1. Remove the required plate work, see "3.17 Plate work" [▶ 230].
2. Make sure that all wires are firmly and correctly connected, see "6.2 Wiring diagram" [▶ 314].
3. Check the continuity of all wires.
4. Replace any damaged or broken wires.

Is the problem solved?	Action
Yes	No further actions required.
No	Return to "Checking procedures" [▶ 204] of the noise filter PCB and continue with the next procedure.

To remove the noise filter PCB

Prerequisite: Stop the unit operation via the user interface.

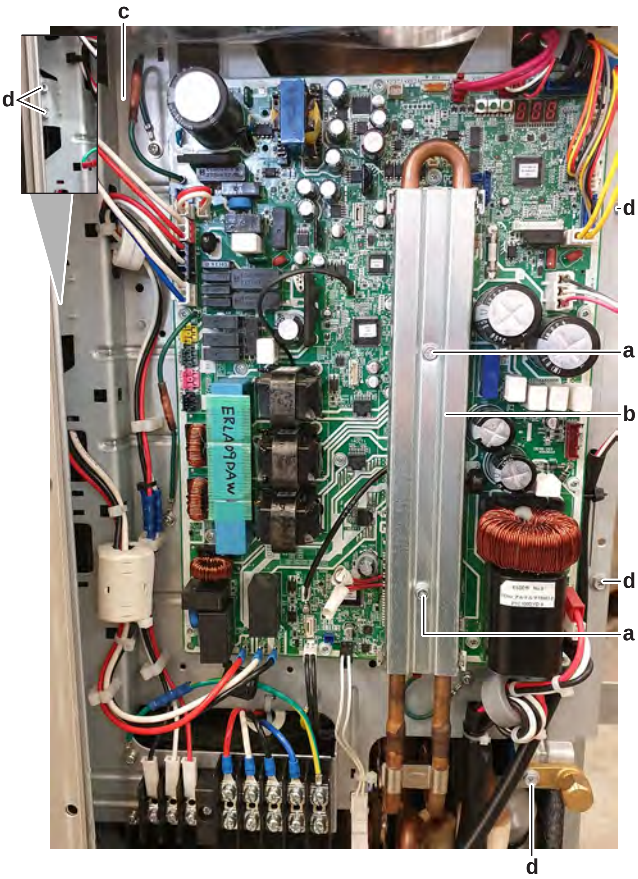
Prerequisite: Turn OFF the respective circuit breaker.

1. Remove the required plate work, see "3.17 Plate work" [▶ 230].

DANGER: RISK OF ELECTROCUTION

Confirm the rectifier voltage is below 10 V DC before proceeding, see "To prevent electrical hazards" [▶ 285].

2. Remove the 2 screws from the main PCB heat sink cover.
3. Lift and pull the cover to remove it from the heat sink.



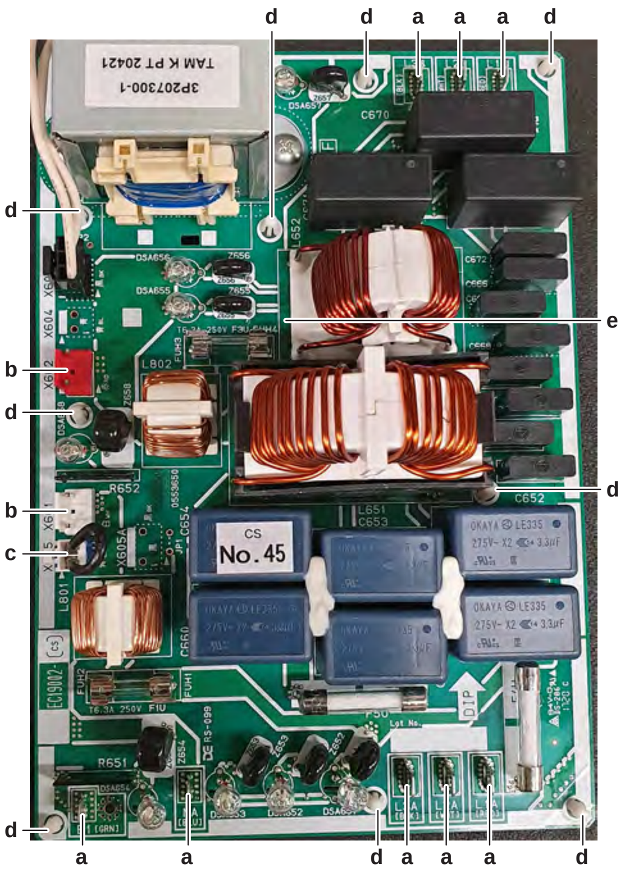
a Heat sink cover screw
b Heat sink cover
c Main PCB mounting plate
d Main PCB mounting plate fixation screw

4. Disconnect all connectors from the main PCB.
5. Cut all cable ties that fix cables to the main PCB mounting plate.
6. Remove all main PCB mounting plate fixation screws.
7. Pull the refrigerant pipe forward and slide the main PCB mounting plate upwards so that the noise filter PCB on the back side is easily accessible.

CAUTION

The noise filter PCB is still connected. Do NOT completely remove the main PCB mounting plate.

8. Disconnect all Faston connectors from the noise filter PCB.



a Faston connector
b Connector
c Bridge connector X605
d PCB support
e Noise filter PCB

9 Disconnect the 2 connectors from the noise filter PCB.

10 Remove the bridge connector X605 from the noise filter PCB and keep it for reuse.

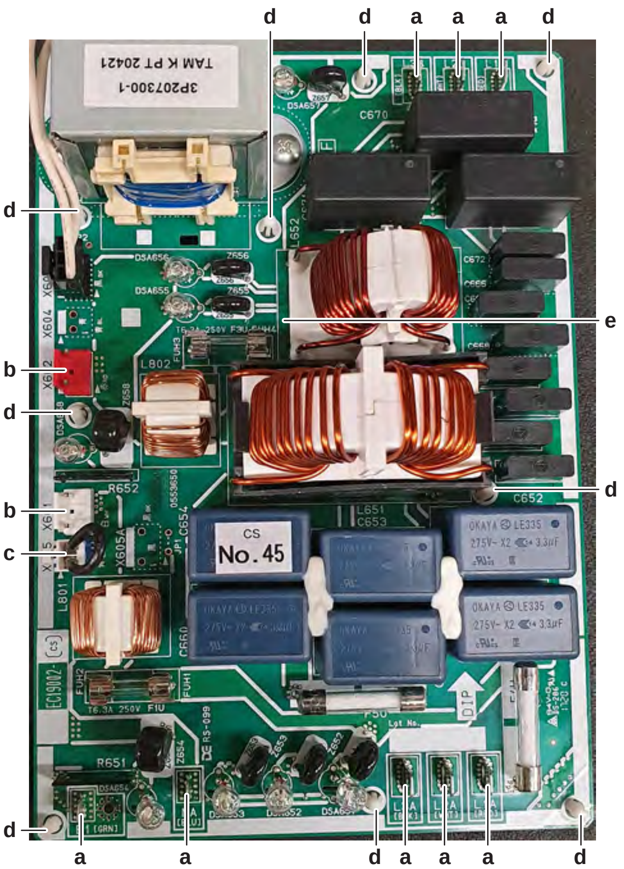
11 Carefully pull the PCB at the side and unlatch the PCB supports one by one using a small pair of pliers.

12 Remove the noise filter PCB from the main PCB mounting plate.

13 To install the new noise filter PCB, see "Repair procedures" [▶ 211].

To install the noise filter PCB

1 Install the noise filter PCB on its correct location.



a Faston connector
b Connector
c Bridge connector X605
d PCB support
e Noise filter PCB

2 Install the bridge connector X605 on the noise filter PCB.

3 Connect the 2 connectors to the noise filter PCB.

4 Connect all Faston connectors to the noise filter PCB.

5 Remove the grease and apply new grease to the heat sink on the main PCB.

CAUTION

ALWAYS apply new grease on the PCB heat sink. NOT doing so may cause the PCB to fail due to insufficient cooling.

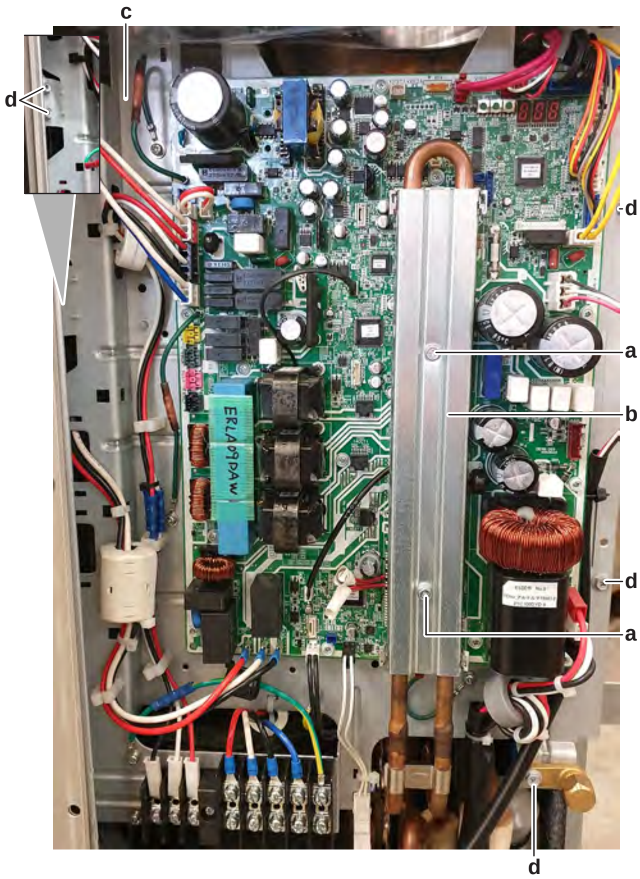
6 Pull the refrigerant pipe forward and install the main PCB mounting plate on its correct location. Install and tighten the fixation screws.

INFORMATION

Make sure that the refrigerant pipe is correctly installed on the main PCB heat sink. Do NOT touch the part of the refrigerant pipe that is mounted in the heat sink.

7 Install the heat sink cover. Close and slide it downwards to fix the 2 hooks.

8 Install and tighten the 2 screws so that the heat sink cover presses the refrigerant pipe.



a Heat sink cover screw
b Heat sink cover
c Main PCB mounting plate
d Main PCB mounting plate fixation screw

9 Connect all connectors to the main PCB.

10 Fix the cables to the main PCB mounting plate using new tie straps.

Is the problem solved?	Action
Yes	No further actions required.
No	Return to "Checking procedures" [▸ 204] of the noise filter PCB and continue with the next procedure.

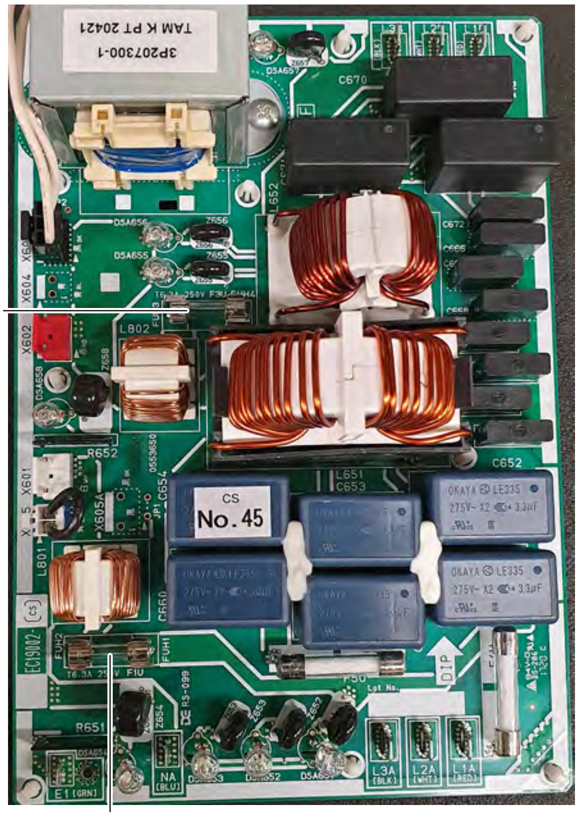
To remove a fuse of the noise filter PCB

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.17 Plate work" [▸ 230].

1 Remove the fuse from the PCB.



a Fuse F1U
b Fuse F3U

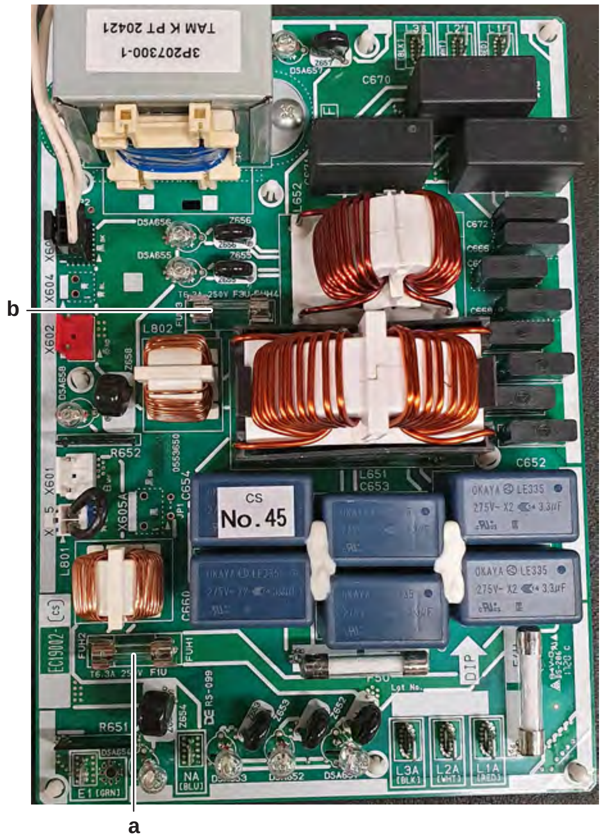
2 To install a fuse on the noise filter PCB, see "Repair procedures" [▶ 211].

To install a fuse on the noise filter PCB

> **WARNING**
>
> For continued protection against risk of fire, replace only with same type and rating of fuse.

1 Install the fuse on the correct location on the PCB.

> **CAUTION**
>
> Make sure the fuse is plugged-in correctly (contact with the fuse holder).



a Fuse F1U
b Fuse F3U

Is the problem solved?	Action
Yes	No further actions required.
No	Return to "Checking procedures" [▶ 204] of the noise filter PCB and continue with the next procedure.

3.16 Outdoor unit fan motor

3.16.1 Single phase outdoor unit

Checking procedures

> **INFORMATION**
> It is recommended to perform the checks in the listed order.

To perform a mechanical check of the propeller fan blade assembly

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.17 Plate work" [▶ 230].

1. If propeller fan blade touches the bellmounth, check if the fan motor is correctly mounted on its base, see "Repair procedures" [▶ 220].
2. Check the state of the propeller fan blade assembly for damage, deformations and cracks.

Is the propeller fan blade assembly damaged?	Action
Yes	Replace the propeller fan blade assembly, see "Repair procedures" [▸ 220].
No	Perform a mechanical check of the DC fan motor assembly, see "Checking procedures" [▸ 217].

To perform a mechanical check of the DC fan motor assembly

Prerequisite: First perform a mechanical check of the propeller fan blade assembly, see "Checking procedures" [▸ 217].

1. Visually check:
   - For any burnt-out part or wire. If found, replace the fan motor, see "Repair procedures" [▸ 220].
   - That fan motor fixation bolts are correctly installed and fixed. Correct as needed.
2. Manually rotate the fan motor shaft. Check that it rotates smoothly.
3. Check the friction of the DC fan motor shaft bearing.

Is the DC fan motor shaft friction normal?	Action
Yes	Perform an electrical check of the DC fan motor assembly, see "Checking procedures" [▸ 217].
No	Replace the DC fan motor assembly, see "Repair procedures" [▸ 220].

To perform an electrical check of the DC fan motor assembly

1. First perform a mechanical check of the DC fan motor assembly, see "Checking procedures" [▸ 217].

> **INFORMATION**
>
> Check the DC fan motor power supply (voltage) circuit on the PCB.

2. Turn ON the power of the unit.
3. Activate `Cooling` or `Heating` operation via the user interface.
4. Check the functioning of the outdoor unit fan.

Outdoor unit fan ...	Action
Rotates continuously (without interruption)	DC fan motor assembly is OK. Return to the troubleshooting of the specific error and continue with the next procedure.
Does not rotate or rotates for a short time	Continue with the next step.

> **INFORMATION**
>
> The DC fan motor connector MUST be plugged into the appropriate PCB.

5. Confirm via the service monitoring tool that the DC fan motor assembly receives an ON signal.

6 Turn OFF the unit via the user interface.

7 Turn OFF the respective circuit breaker.

> **DANGER: RISK OF ELECTROCUTION**
>
> Confirm the rectifier voltage is below 10 V DC before proceeding, see "To prevent electrical hazards" [▶ 285].

8 Disconnect the DC fan motor connector X106A from the appropriate PCB.

9 Turn ON the power of the unit.

10 With the DC fan motor connector X106A disconnected from the main PCB, measure the voltage on the connector pins 4-7 (= fan motor power supply) of the connector on the main PCB.

Result: The voltage MUST be 200~390 V DC.

11 Measure the voltage on the connector pins 4-3 (= fan motor control) of the connector on the main PCB.

Result: The voltage MUST be 15±10% V DC.

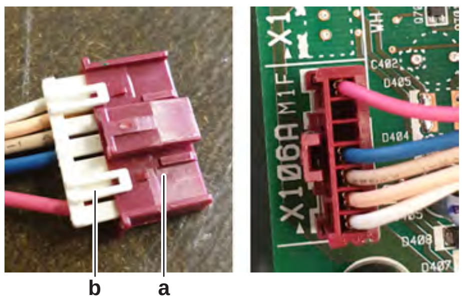
Are both measured voltages correct?	Action
Yes	Continue with the next step.
No	Perform a check of the main PCB, see "Checking procedures" [▶ 171].

12 Measure the voltage on the DC fan motor connector X106A pins 4-2 (= rotation command) on the main PCB.

Result: The measured voltage should be 0~7 V DC. It should NOT be 0 V DC.

Is the measured voltage 0 V DC?	Action
Yes	Perform a check of the main PCB, see "Checking procedures" [▶ 171].
No	Continue with the next step.

13 Connect the DC fan motor connector to the PCB. Remove the plastic insert from the connector for easier measurement.



a Connector X106A
b Plastic insert

> **CAUTION**
>
> Ensure that the system CANNOT start the fan. Disable all modes (heating, cooling, ...) on the unit. The unit MUST be kept powered.

14 Manually (slowly) rotate the fan blade propeller 1 turn and measure the voltage on the DC fan motor connector pins 4-1.

Result: 4 pulses MUST be measured.

Pulses are measured during fan blade propeller rotation?	Action
Yes	Continue with the next step.
No	Replace the DC fan motor, see "Repair procedures" [▶ 220].

15 Turn OFF the unit via the user interface.

16 Turn OFF the respective circuit breaker.

DANGER: RISK OF ELECTROCUTION

Confirm the rectifier voltage is below 10 V DC before proceeding, see "To prevent electrical hazards" [▶ 285].

17 Disconnect the DC fan motor connector X106A from the appropriate PCB.

18 Using a multi meter in diode test function, check the DC fan motor in reference with the table below.

Comm	VDC				
	7	4	3	2	1
7	/	0.800 V	1.300 V	OL	OL
4	OL	/	0.800 V	OL	OL
3	OL	0.475 V	/	OL	OL
2	OL	1.125 V	1.470 V	/	OL
1	OL	1.700 V	1.875 V	OL	/

INFORMATION

The measured values may deviate from the listed values. If you measure significantly less or close to 0 where a value is shown in the table, an internal short-circuit is present. When OL is expected, NO voltage MUST be measured.

Are the measured voltages correct?	Action
Yes	Perform a check of the main PCB, see "Checking procedures" [▶ 171].
No	Replace the DC fan motor, see "Repair procedures" [▶ 220].

Problem solved?

After all checking procedures listed above have been performed:

Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

Repair procedures

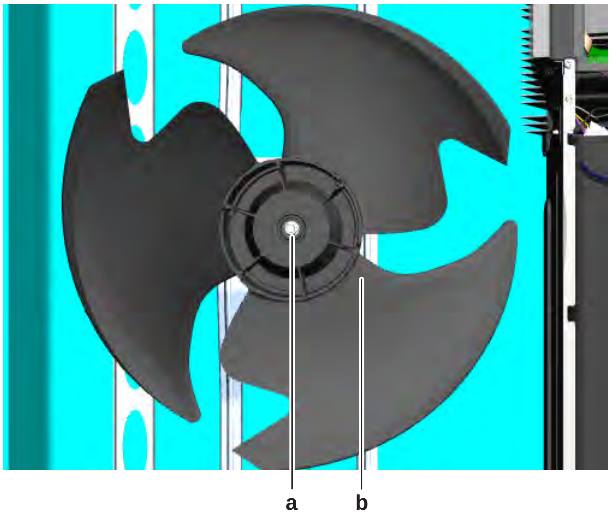
To remove the propeller fan blade assembly

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

1 Remove the required plate work, see "3.17 Plate work" [▶ 230].

2 Remove the nut that fixes the propeller fan blade assembly.



a Nut
b Propeller fan blade assembly

3 Pull and remove the propeller fan blade assembly from the DC fan motor assembly.

INFORMATION

Use a pulley remover if the propeller cannot be removed manually.

4 To install the propeller fan blade assembly, see "Repair procedures" [▶ 220].

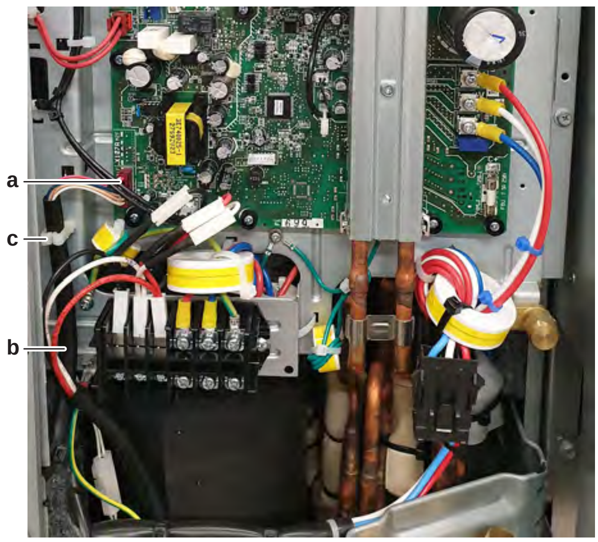
To remove the DC fan motor assembly

1 Remove the propeller fan blade assembly from the DC fan motor assembly, see "Repair procedures" [▶ 220].

DANGER: RISK OF ELECTROCUTION

Confirm the rectifier voltage is below 10 V DC before proceeding, see "To prevent electrical hazards" [▶ 285].

2 Disconnect the DC fan motor connector X106A from the main PCB.

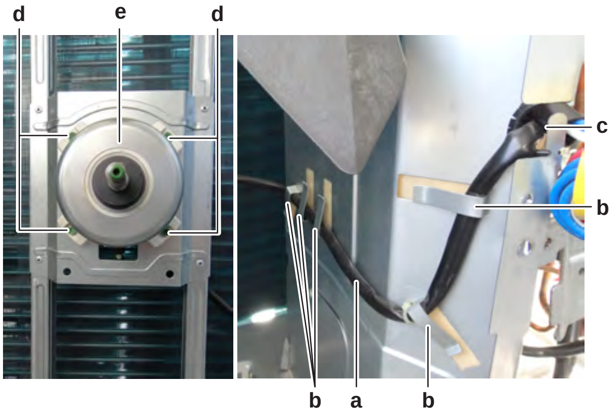


a DC fan motor connector X106A
b DC fan motor harness
c Wire clamp

3 Remove the DC fan motor harness from the wire clamp on the right side of the main PCB.

4 If applicable; cut the tie strap(s) that tie up the excessive DC fan motor harness.

5 Slightly bend the harness retainers to detach the DC fan motor harness.



a DC fan motor harness
b Harness retainer
c Opening in partition plate
d Screw
e DC fan motor assy

6 Guide the DC fan motor harness though the opening in the partition plate.

7 Remove the 4 screws that fix the DC fan motor assembly.

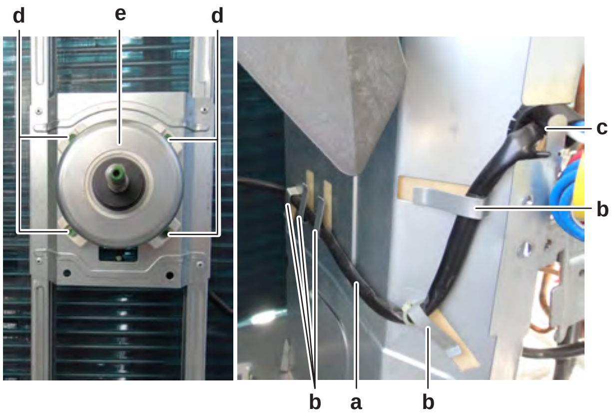
8 Remove the DC fan motor assembly from the unit.

9 To install the DC fan motor assembly, see "Repair procedures" [▶ 220].

To install the DC fan motor assembly

1 Install the DC fan motor assembly in the correct location.

2 Fix the DC fan motor assembly to the unit by tightening the screws.



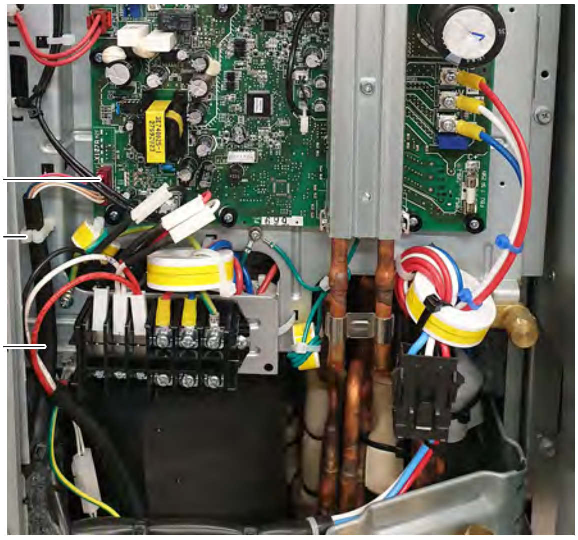
a DC fan motor harness
b Harness retainer
c Opening in partition plate
d Screw
e DC fan motor assy

3 Route the DC fan motor harness through the opening in the partition plate.

4 Route the DC fan motor harness through the harness retainers and bend the harness retainers to attach the DC fan motor harness.

> **CAUTION**
>
> Tie up the excessive DC fan motor harness using the tie straps to avoid the harness from being cut by the propeller fan blade.

5 Route the DC fan motor harness through the wire clamp on the right side of the main PCB.



- **a** DC fan motor connector X106A
- **b** DC fan motor harness
- **c** Wire clamp

6 Connect the DC fan motor connector to the connector X106A on the main PCB.

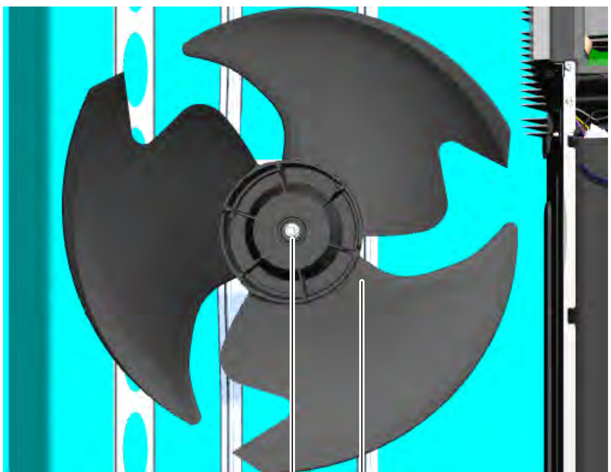
7 Install the propeller fan blade assembly, see "Repair procedures" [▶ 220].

To install the propeller fan blade assembly

1 Install the propeller fan blade assembly on the DC fan motor assembly.

> **CAUTION**
>
> Do NOT install a damaged propeller fan blade assembly.

2 Install and tighten the nut to fix the propeller fan blade assembly.



- **a** Nut
- **b** Propeller fan blade assembly

Is the problem solved?	Action
Yes	No further actions required.
No	Return to "Checking procedures" [▶ 217] of the outdoor unit fan motor and continue with the next procedure.

3.16.2 Three phase outdoor unit

Checking procedures

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

To perform a mechanical check of the propeller fan blade assembly

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.17 Plate work" [▶ 230].

1. If propeller fan blade touches the bellmouth, check if the fan motor is correctly mounted on its base, see "Repair procedures" [▶ 226].
2. Check the state of the propeller fan blade assembly for damage, deformations and cracks.

Is the propeller fan blade assembly damaged?	Action
Yes	Replace the propeller fan blade assembly, see "Repair procedures" [▶ 226].
No	Perform a mechanical check of the DC fan motor assembly, see "Checking procedures" [▶ 224].

To perform a mechanical check of the DC fan motor assembly

Prerequisite: First perform a mechanical check of the propeller fan blade assembly, see "Checking procedures" [▶ 224].

1. Visually check:
   - For any burnt-out part or wire. If found, replace the fan motor, see "Repair procedures" [▶ 226].
   - That fan motor fixation bolts are correctly installed and fixed. Correct as needed.
2. Manually rotate the fan motor shaft. Check that it rotates smoothly.
3. Check the friction of the DC fan motor shaft bearing.

Is the DC fan motor shaft friction normal?	Action
Yes	Perform an electrical check of the DC fan motor assembly, see "Checking procedures" [▶ 224].
No	Replace the DC fan motor assembly, see "Repair procedures" [▶ 226].

To perform an electrical check of the DC fan motor assembly

1. First perform a mechanical check of the DC fan motor assembly, see "Checking procedures" [▸ 224].

> **INFORMATION**
>
> Check the DC fan motor power supply (voltage) circuit on the PCB.

2. Turn ON the power of the unit.
3. Activate `Cooling` or `Heating` operation via the user interface.
4. Check the functioning of the outdoor unit fan.

Outdoor unit fan …	Action
Rotates continuously (without interruption)	DC fan motor assembly is OK. Return to the troubleshooting of the specific error and continue with the next procedure.
Does not rotate or rotates for a short time	Continue with the next step.

5. Turn OFF the unit via the user interface.
6. Turn OFF the respective circuit breaker.

> **DANGER: RISK OF ELECTROCUTION**
>
> Confirm the rectifier voltage is below 10 V DC before proceeding, see "To prevent electrical hazards" [▸ 285].

7. Check that the DC fan motor connector is properly connected to the PCB.
8. Unplug the DC fan motor connector and measure the resistance between the pins 1-2, 1-3, and 2-3 of the DC fan motor connector.

   Result: All measurements MUST be 7.6 Ω±10% at 20°C.

> **INFORMATION**
>
> Winding resistance values above are given for reference. You should NOT be reading a value in kΩ or a short-circuit. Make sure that the propeller fan blade does NOT rotate, as this could affect resistance measurements.

9. Set the Megger voltage to 500 V DC or 1000 V DC.
10. Measure the insulation resistance for the motor terminals. Measurements between each phase and fan motor body (e.g. axle) MUST be >1000 MΩ.

Are the measured resistance values correct?	Action
Yes	Perform a check of the main PCB, see "Checking procedures" [▸ 181].
No	Replace the DC fan motor, see "Repair procedures" [▸ 226].

Problem solved?

After all checking procedures listed above have been performed:

Is the problem solved?	Action
Yes	No further actions required.

Is the problem solved?	Action
No	Return to the troubleshooting of the specific error and continue with the next procedure.

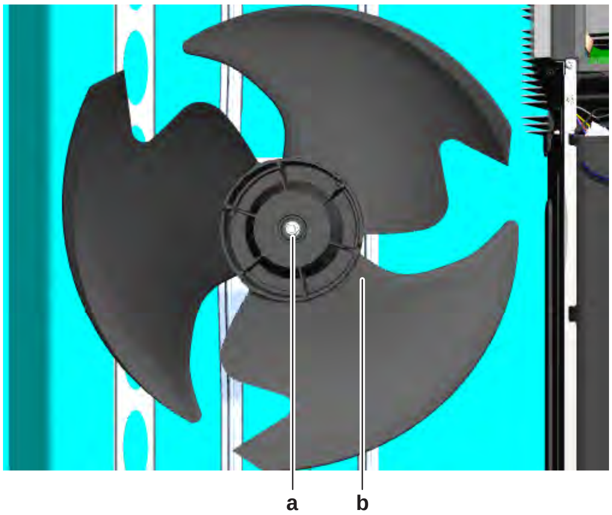
Repair procedures

To remove the propeller fan blade assembly

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

1. Remove the required plate work, see "3.17 Plate work" [▶ 230].
2. Remove the nut that fixes the propeller fan blade assembly.



a Nut
b Propeller fan blade assembly

3. Pull and remove the propeller fan blade assembly from the DC fan motor assembly.

> **INFORMATION**
>
> Use a pulley remover if the propeller cannot be removed manually.

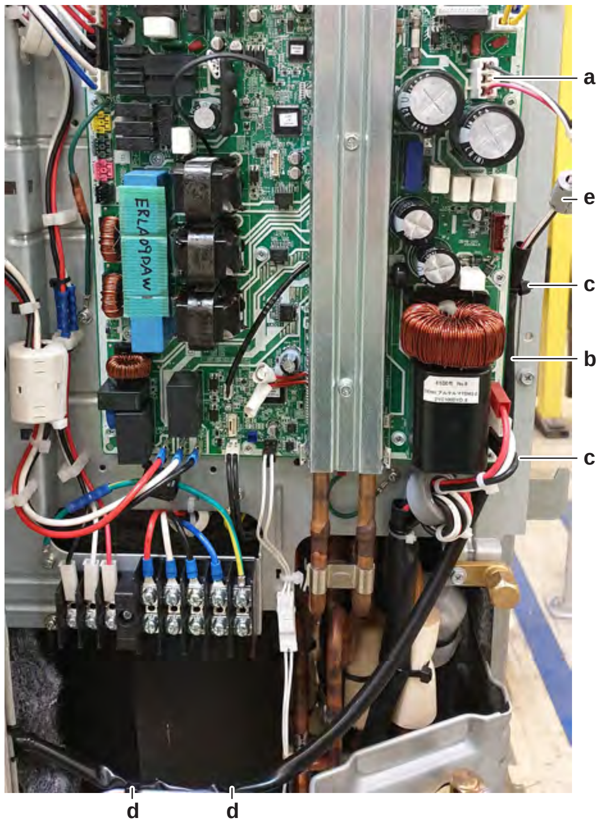
4. To install the propeller fan blade assembly, see "Repair procedures" [▶ 226].

To remove the DC fan motor assembly

1. Remove the propeller fan blade assembly from the DC fan motor assembly, see "Repair procedures" [▶ 226].

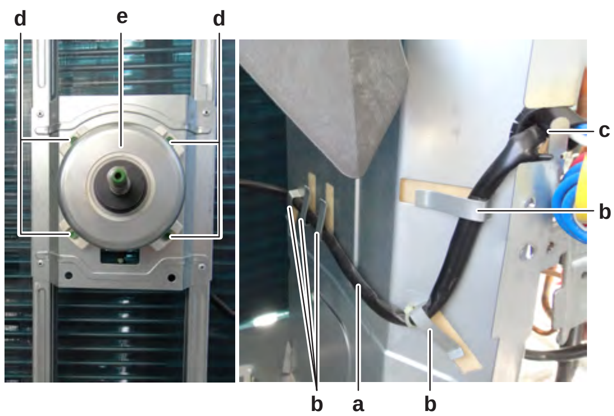
> **DANGER: RISK OF ELECTROCUTION**
>
> Confirm the rectifier voltage is below 10 V DC before proceeding, see "To prevent electrical hazards" [▶ 285].

2. Disconnect the DC fan motor connector X108A from the main PCB.



a DC fan motor connector X108A
b DC fan motor harness
c Tie strap (left side of PCB)
d Tie strap (on stop valve fixation plate)
e Ferrite core

3. On the left side of the main PCB, cut the tie straps that fix the DC fan motor harness.
4. Cut the 2 tie straps that fix the DC fan motor harness to the stop valves fixation plate.
5. Unlock the ferrite core to remove the DC fan motor harness from the core.
6. If applicable; cut the tie strap(s) that tie up the excessive DC fan motor harness.
7. Slightly bend the harness retainers to detach the DC fan motor harness.



a DC fan motor harness
b Harness retainer
c Opening in partition plate
d Screw
e DC fan motor assy

8. Guide the DC fan motor harness though the opening in the partition plate.

9 Remove the 4 screws that fix the DC fan motor assembly.

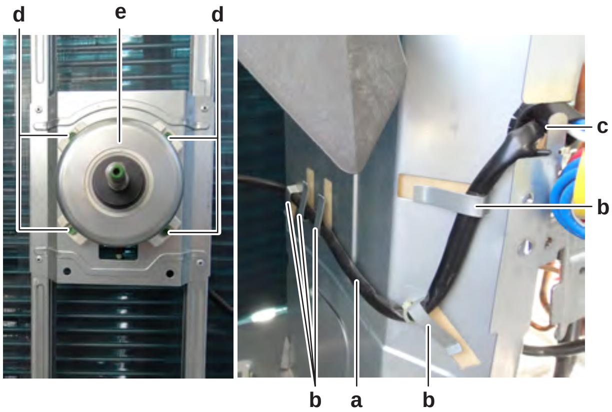
10 Remove the DC fan motor assembly from the unit.

11 To install the DC fan motor assembly, see "Repair procedures" [▸ 226].

To install the DC fan motor assembly

1 Install the DC fan motor assembly in the correct location.

2 Fix the DC fan motor assembly to the unit by tightening the screws.



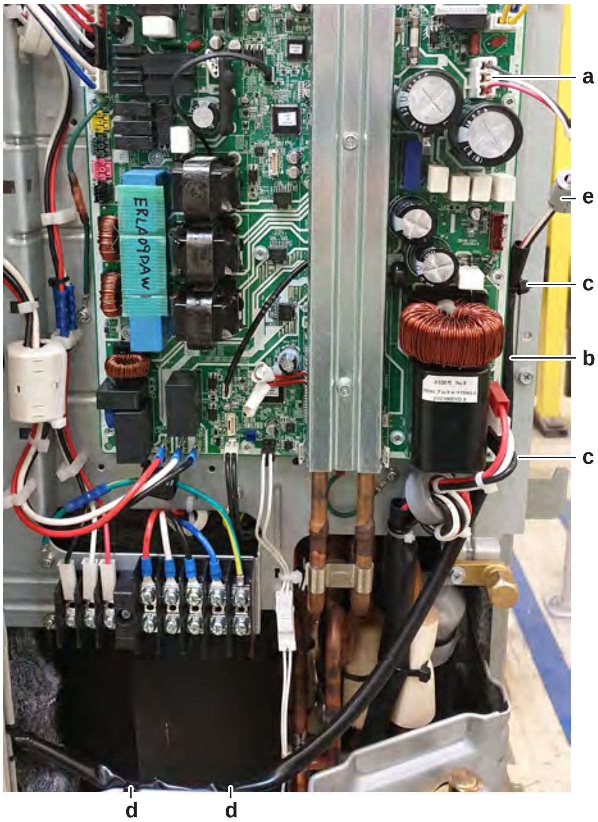
- **a** DC fan motor harness
- **b** Harness retainer
- **c** Opening in partition plate
- **d** Screw
- **e** DC fan motor assy

3 Route the DC fan motor harness through the opening in the partition plate.

4 Route the DC fan motor harness through the harness retainers and bend the harness retainers to attach the DC fan motor harness.

> **CAUTION**
>
> Tie up the excessive DC fan motor harness using the tie straps to avoid the harness from being cut by the propeller fan blade.

5 Route the DC fan motor harness through the ferrite core and lock the ferrite core.



a DC fan motor connector X108A
b DC fan motor harness
c Tie strap (left side of PCB)
d Tie strap (on stop valve fixation plate)
e Ferrite core

6 Connect the DC fan motor connector to the connector X108A on the main PCB.

7 On the left side of the main PCB, install new tie straps to fix the DC fan motor harness.

8 Install 2 new tie straps to fix the DC fan motor harness to the stop valves fixation plate.

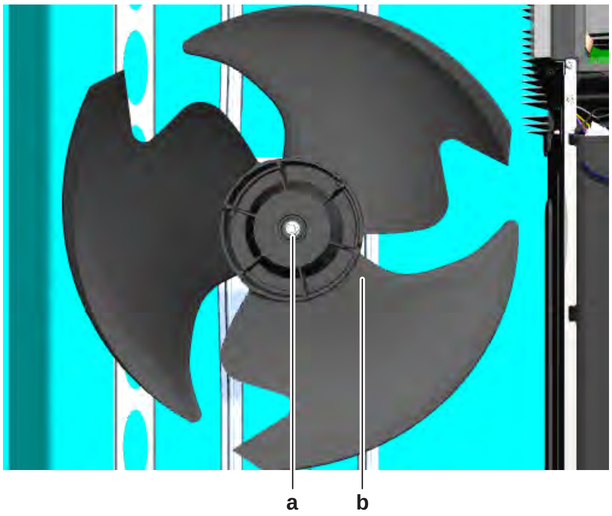
9 Install the propeller fan blade assembly, see "Repair procedures" [▶ 226].

To install the propeller fan blade assembly

1 Install the propeller fan blade assembly on the DC fan motor assembly.

> **CAUTION**
>
> Do NOT install a damaged propeller fan blade assembly.

2 Install and tighten the nut to fix the propeller fan blade assembly.



a Nut
b Propeller fan blade assembly

Is the problem solved?	Action
Yes	No further actions required.
No	Return to "Checking procedures" [▶ 224] of the outdoor unit fan motor and continue with the next procedure.

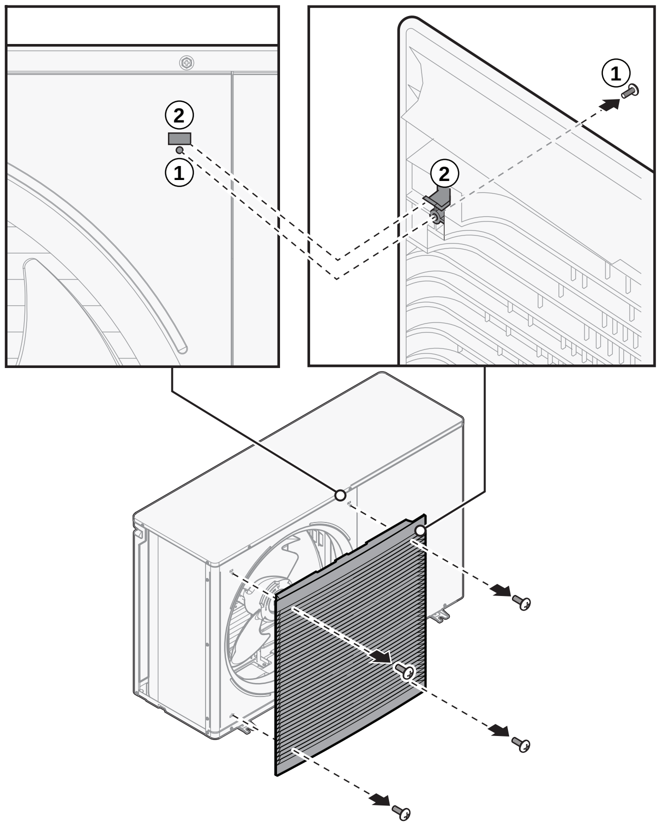
3.17 Plate work

INFORMATION

If required also remove the hydrobox for easier access.

3.17.1 To remove the discharge grille

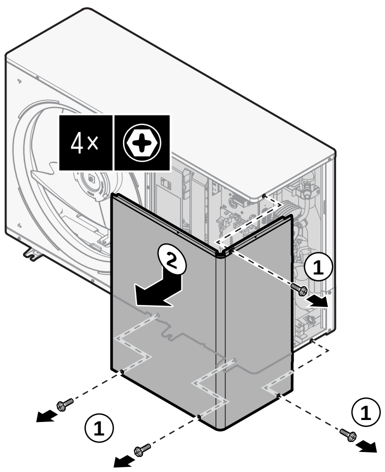
1. Remove the screws (4x).
2. Unhook the discharge grille from the outdoor unit.



3.17.2 To open the outdoor unit

DANGER: RISK OF ELECTROCUTION

DANGER: RISK OF BURNING/SCALDING



3.17.3 To remove the top plate

INFORMATION

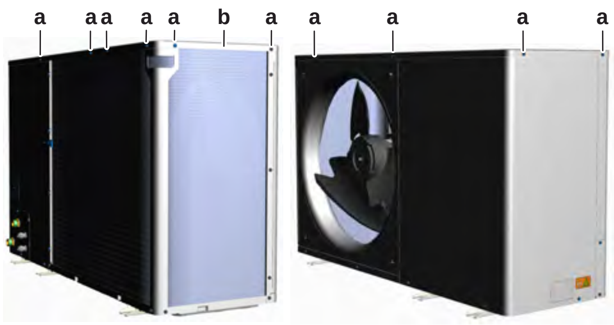
This procedure is just an example and may differ on some details for your actual unit.

Prerequisite: Stop the unit operation via the user interface.

1. Turn OFF the respective circuit breaker.

> **DANGER: RISK OF ELECTROCUTION**
>
> Wait for at least 10 minutes after the circuit breaker has been turned OFF, to be sure the rectifier voltage is below 10 V DC before proceeding.

2. Remove the discharge grille, see "3.17 Plate work" [▶ 230].
3. Loosen and remove the screws that fix the top plate.



a Screw
b Top plate

4. Remove the top plate.

3.17.4 To remove the switch box

Single phase unit

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

1. Remove the required plate work, see "3.17 Plate work" [▶ 230].

> **DANGER: RISK OF ELECTROCUTION**
>
> Confirm the rectifier voltage is below 10 V DC before proceeding, see "To prevent electrical hazards" [▶ 285].

2. Remove the protective cover sheet.
3. Disconnect the electrical power supply wiring from the wire terminal.
4. Disconnect the Faston connectors (power supply towards hydro box) from the wire terminal.

a Electrical power supply wiring
b Faston connectors (power supply towards hydro box)
c Service port
d Connector
e Tie strap
f DC fan motor harness
g Wire clip
h Compressor wiring

5 Remove the bolt to disconnect the service port from the switch box.

6 Disconnect the indicated connectors from the main PCB.

7 Remove the screw and disconnect the ground wire from the switch box (lower right corner).

8 Cut the tie straps that fix the wiring to the switch box.

9 Remove the DC fan motor harness from the wire clip and leave it aside.

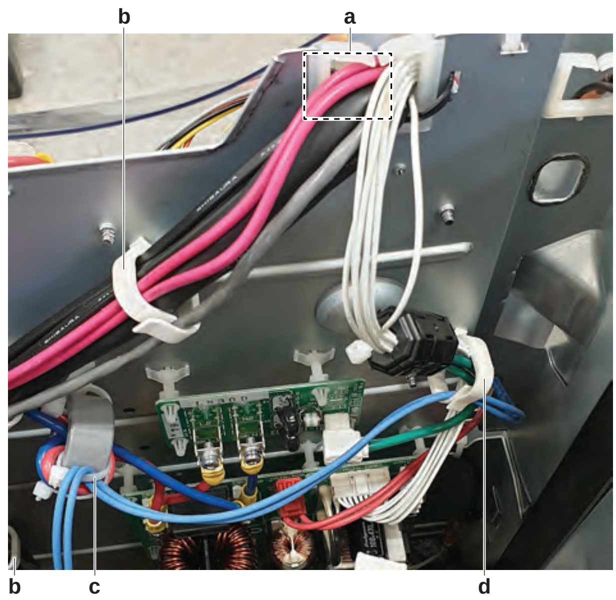
10 Remove the screws and disconnect the compressor wiring from the main PCB.

11 Disconnect the compressor thermal protector connector.

12 Route all wiring on the upper right side of the switch box through the hole towards the back side of the switch box.

13 Route the 4-way valve and high pressure switch wiring harness through the holes towards the back side of the switch box.

14 Remove all wiring from the wire clips on the back side of the switch box.



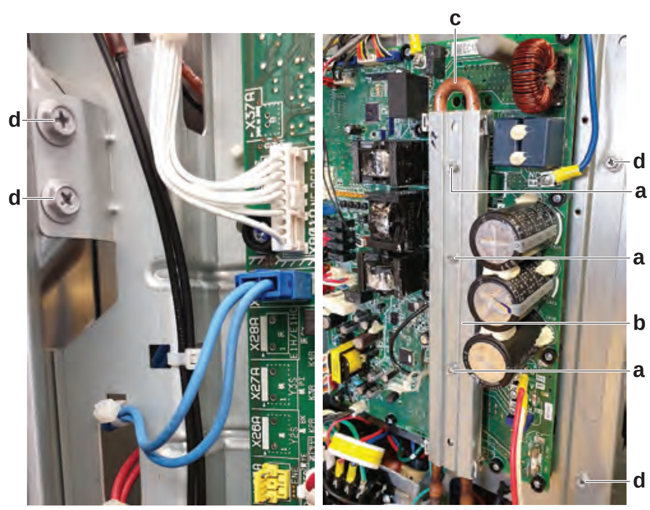
a Wiring to be routed towards back side of switch box
b Wire clip
c Tie strap (4-way valve wiring harness)
d Wire clip (4-way valve wiring harness)

15 Cut the tie strap and remove the 4-way valve wiring harness from the wire clip.

16 Disconnect the connector X803A from the noise filter PCB (on the back side of the switch box).

17 Remove the 3 bolts from the main PCB heat sink cover.

18 Lift and pull the cover to remove it from the heat sink.



a Bolt (heat sink cover)
b Heat sink cover
c Refrigerant pipe
d Fixation bolt (switch box)

19 Carefully pull the refrigerant pipe forward to separate it from the heat sink on the switch box.

20 Remove the 4 switch box fixation bolts.

21 Lift the switch box to unhook it from the retainers and remove the switch box from the unit.

> **CAUTION**
>
> Take care that the thermal interface grease (applied on the heat sink) does NOT smear everything.

22 To install the switch box, see "3.17 Plate work" [▶ 230].

Three phase unit

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

1 Remove the required plate work, see "3.17 Plate work" [▶ 230].

> **DANGER: RISK OF ELECTROCUTION**
>
> Confirm the rectifier voltage is below 10 V DC before proceeding, see "To prevent electrical hazards" [▶ 285].

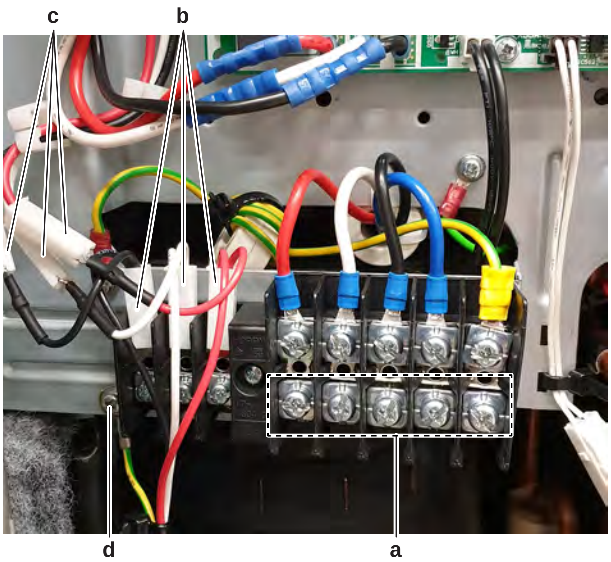
2 Remove the protective cover sheet.

3 Disconnect the electrical power supply wiring from the wire terminal.

4 Disconnect the Faston connectors (power supply towards hydro box) from the wire terminal.

5 Disconnect the intermediate connectors of the power supply wiring.

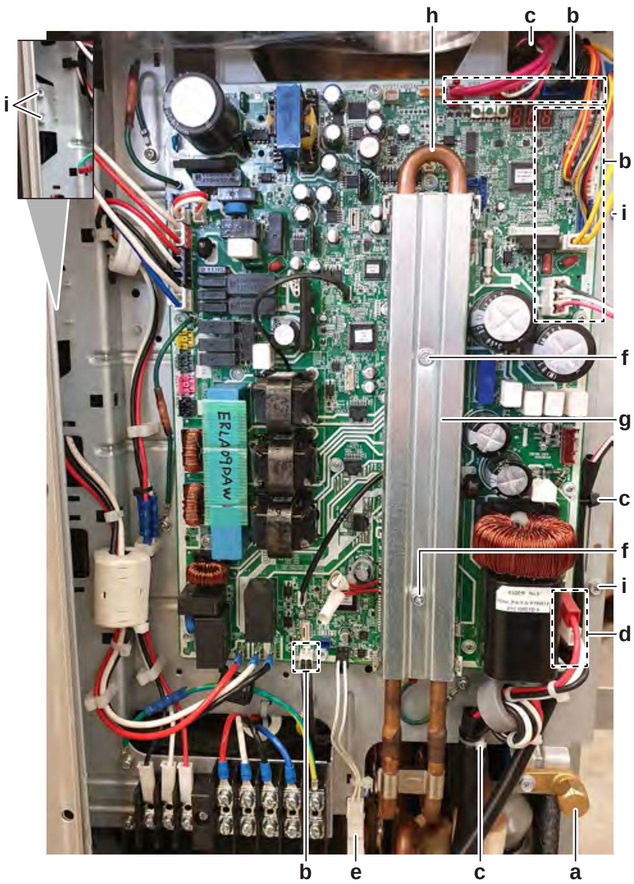
6 Remove the screw and disconnect the ground wire from the switch box.



- **a** Electrical power supply wiring
- **b** Faston connectors (power supply towards hydro box)
- **c** Intermediate connector (power supply wiring)
- **d** Screw (ground wire)

7 Remove the bolt to disconnect the service port from the switch box.

8 Disconnect the indicated connectors from the main PCB.



a Service port
b Connector
c Tie strap
d Faston connector (compressor)
e Connector (compressor thermal protector)
f Bolt (heat sink cover)
g Heat sink cover
h Refrigerant pipe
i Fixation bolt (switch box)

9 Cut the tie straps that fix the wiring to the switch box.

10 Disconnect the Faston connectors (compressor wiring) from the main PCB.

11 Disconnect the compressor thermal protector connector.

12 Route all wiring on the upper left side of the switch box through the hole towards the back side of the switch box.

13 Remove all wiring from the wire clips on the back side of the switch box.

14 Remove the 2 bolts from the main PCB heat sink cover.

15 Lift and pull the cover to remove it from the heat sink.

16 Carefully pull the refrigerant pipe forward to separate it from the heat sink on the switch box.

17 Remove the 4 switch box fixation bolts.

18 Lift the switch box to unhook it from the retainers and remove the switch box from the unit.

CAUTION

Take care that the thermal interface grease (applied on the heat sink) does NOT smear everything.

19 To install the switch box, see "3.17 Plate work" [▶ 230].

3.17.5 To install the switch box

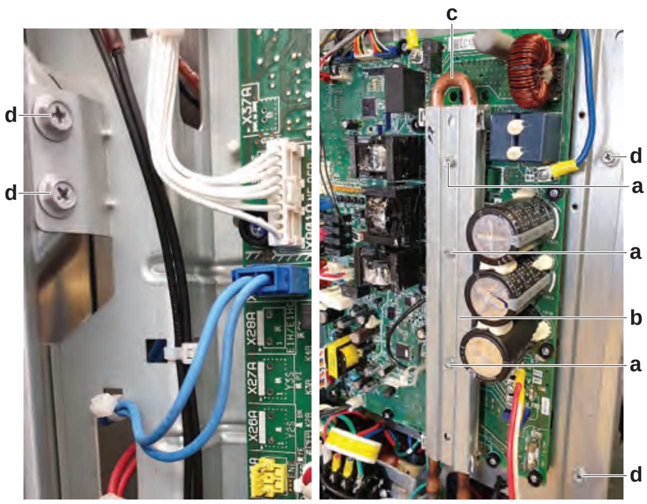
Single phase unit

1. Use a piece of cloth to remove the old thermal interface grease and clean the heat sink surface(s) and refrigerant pipe.
2. Apply new thermal interface grease to the refrigerant pipe contact surface of the heat sink (on the main PCB). Distribute the grease as evenly as possible.

CAUTION

ALWAYS apply new grease on the PCB heat sink. NOT doing so may cause the PCB to fail due to insufficient cooling.

3. Install the switch box on the correct location in the outdoor unit. Take the following into account:
   - Guide the sheet metal plate of the service port in front of the switch box mounting plate to correctly install and avoid pipe bending.
   - Slightly tilt the refrigerant pipe forward (±10°) and avoid that the thermal interface grease gets smeared everywhere.
   - Hook the switch box mounting plate in the support plate on the right hand side.
4. Install and tighten the 4 switch box fixation bolts.



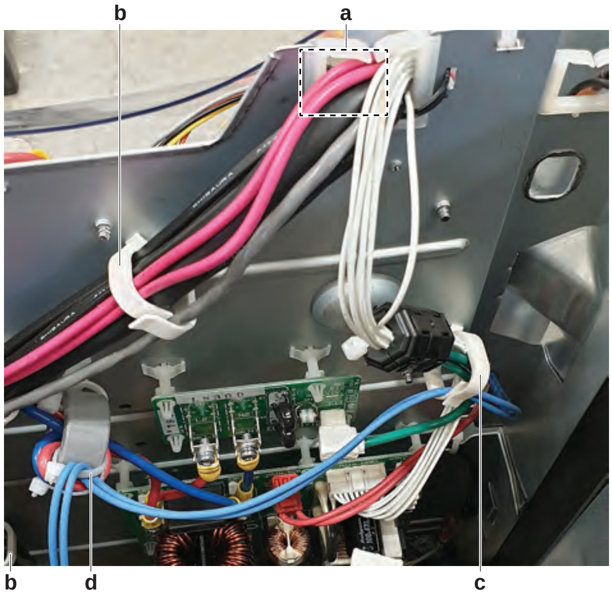
a Bolt (heat sink cover)
b Heat sink cover
c Refrigerant pipe
d Fixation bolt (switch box)

5. Correctly install the refrigerant pipe on the heat sink (proper contact with the thermal interface grease on the heat sink of the switch box). Install the heat sink cover.
6. Install the 3 bolts on the heat sink cover and tighten the bolts.

INFORMATION

Make sure that the refrigerant pipe is correctly installed on the main PCB heat sink. Do NOT touch the part of the refrigerant pipe that is mounted in the heat sink.

7. Connect the connector X803A to the noise filter PCB.
8. Route the wiring inside the wire clips on the back side of the switch box and route them through the hole (right upper side of switch box) towards the front of the switch box.



a Wiring to be routed through the hole towards front of switch box
b Wire clip
c Wire clip (4-way valve wiring harness)
d Tie strap (4-way valve wiring harness)

9 Route the 4-way valve wiring harness through the wire clip and through the hole towards the front of the switch box.

10 Install a new tie strap to fix the 4-way valve wiring harness.

11 Route the high pressure switch / compressor thermal protector wiring harness through the hole towards the front of the switch box.

12 Connect the compressor thermal protector connector.

13 Connect the compressor wiring to the main PCB using the screws.

14 Route the DC fan motor harness inside the wire clip on the switch box.

a Electrical power supply wiring
b Faston connectors (power supply towards hydro box)
c Service port
d Connector
e Tie strap
f DC fan motor harness
g Wire clip
h Compressor wiring

15 Connect the ground wire to the lower right corner of the switch box. Install and tighten the screw.

16 Connect all connectors to the main PCB.

> **WARNING**
>
> When reconnecting a connector to the PCB, make sure to connect it on the correct location and do NOT apply force, as this may damage the connector or connector pins of the PCB.

17 Install new tie straps to fix the wiring to the switch box.

18 Install the service port to the switch box. Install and tighten the bolt.

19 Connect the electrical power supply wiring to the wire terminal.

20 Connect the Faston connectors (power supply towards hydro box) to the wire terminal.

21 Install the protective cover sheet.

Three phase unit

1 Use a piece of cloth to remove the old thermal interface grease and clean the heat sink surface(s) and refrigerant pipe.

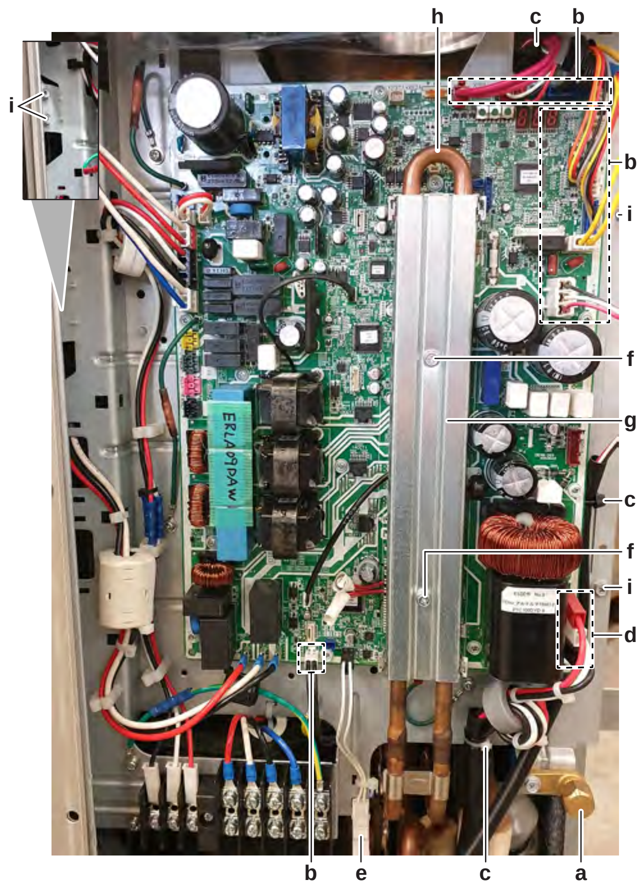
2 Apply new thermal interface grease to the refrigerant pipe contact surface of the heat sink (on the main PCB). Distribute the grease as evenly as possible.

> **CAUTION**
>
> ALWAYS apply new grease on the PCB heat sink. NOT doing so may cause the PCB to fail due to insufficient cooling.

3 Install the switch box on the correct location in the outdoor unit. Take the following into account:

- Guide the sheet metal plate of the service port in front of the switch box mounting plate to correctly install and avoid pipe bending.
- Slightly tilt the refrigerant pipe forward (±10°) and avoid that the thermal interface grease gets smeared everywhere.
- Hook the switch box mounting plate in the support plate on the right hand side.

4 Install and tighten the 4 switch box fixation bolts.



a Service port
b Connector
c Tie strap
d Faston connector (compressor)
e Connector (compressor thermal protector)
f Bolt (heat sink cover)
g Heat sink cover
h Refrigerant pipe
i Fixation bolt (switch box)

5 Correctly install the refrigerant pipe on the heat sink (proper contact with the thermal interface grease on the heat sink of the switch box). Install the heat sink cover.

6 Install the 2 bolts on the heat sink cover and tighten the bolts.

> **INFORMATION**
>
> Make sure that the refrigerant pipe is correctly installed on the main PCB heat sink. Do NOT touch the part of the refrigerant pipe that is mounted in the heat sink.

7 Route the wiring inside the wire clips on the back side of the switch box and route them through the hole (left upper side of switch box) towards the front of the switch box.

8 Connect the compressor thermal protector connector.

9 Connect the Faston connectors (compressor wiring) to the main PCB.

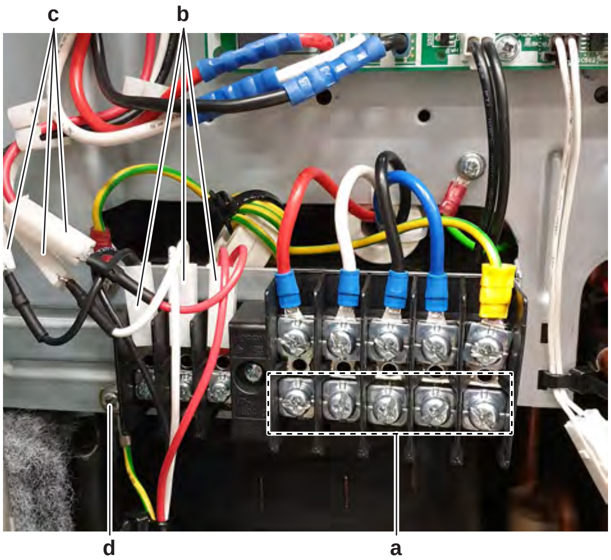
10 Connect all connectors to the main PCB.

> **WARNING**
>
> When reconnecting a connector to the PCB, make sure to connect it on the correct location and do NOT apply force, as this may damage the connector or connector pins of the PCB.

11 Install new tie straps to fix the wiring to the switch box.

12 Install the service port to the switch box. Install and tighten the bolt.

13 Connect the electrical power supply wiring to the wire terminal.



a Electrical power supply wiring
b Faston connectors (power supply towards hydro box)
c Intermediate connector (power supply wiring)
d Screw (ground wire)

14 Connect the Faston connectors (power supply towards hydro box) to the wire terminal.

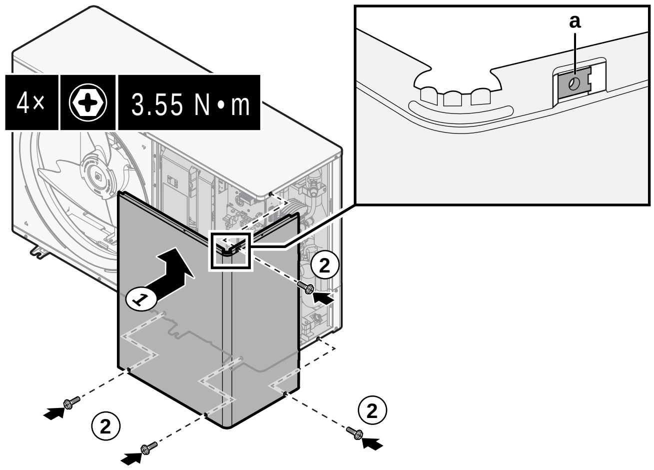
15 Connect the intermediate connectors (power supply wiring).

16 Connect the ground wire to the switch box. Install and tighten the screw.

17 Install the protective cover sheet.

3.17.6 To close the outdoor unit

> **NOTICE**
>
> **Speed nut.** Make sure the speed nut for the top screw is correctly attached to the service cover.



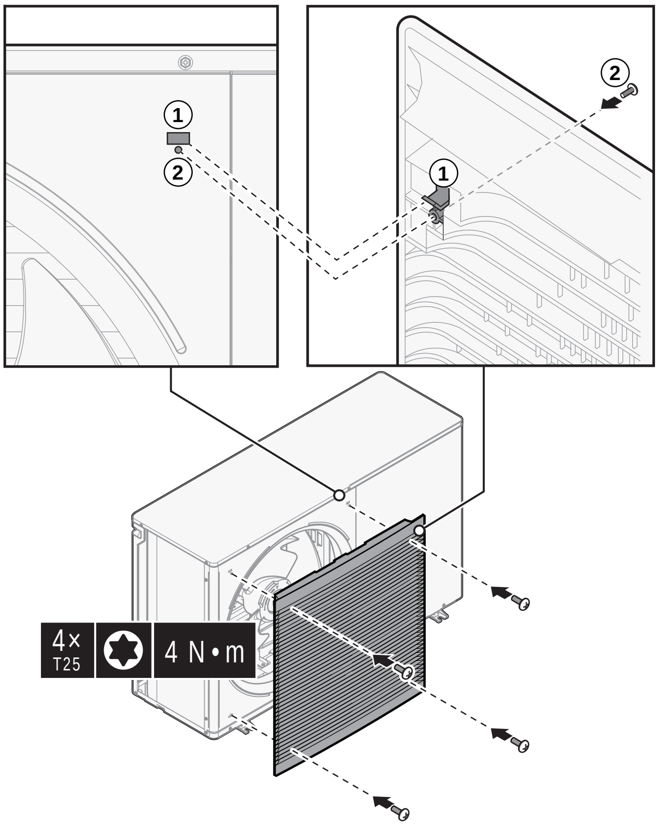
a Speed nut

3.17.7 To install the discharge grille

1 Insert the hooks. To prevent breaking the hooks:

- First insert the bottom hooks (2×).
- Then insert the top hooks (2×).

2 Insert and fix the screws (4×)(delivered as accessory).



3.18 Reactor

> **INFORMATION**
>
> Procedures are ONLY for reactors of the single phase outdoor unit.
>
> NO procedures available for reactors of the 3-phase outdoor unit.

3.18.1 Checking procedures

To perform an electrical check of the reactor

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

1 Remove the required plate work, see "3.17 Plate work" [▶ 230].

> **DANGER: RISK OF ELECTROCUTION**
>
> Confirm the rectifier voltage is below 10 V DC before proceeding, see "To prevent electrical hazards" [▶ 285].

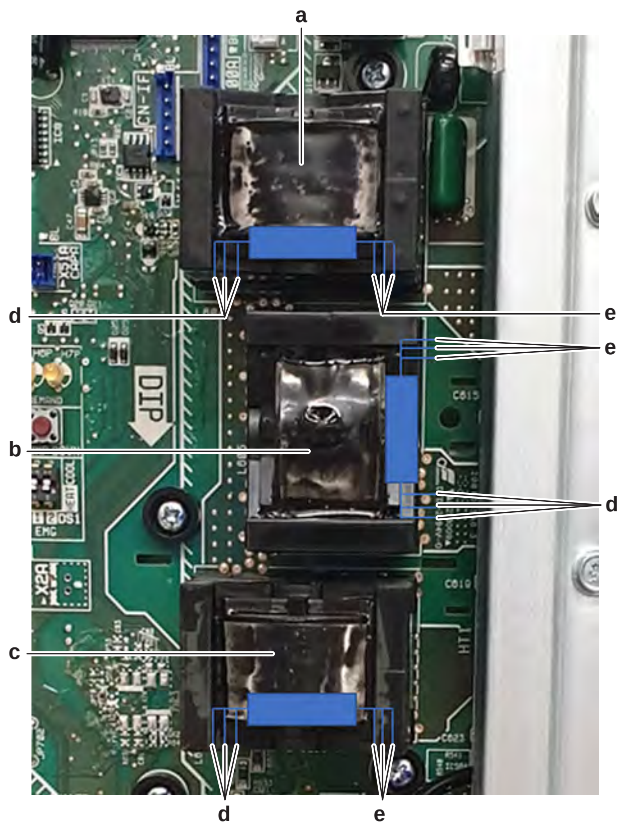
2 Visually check the reactor for any damage or burnt-out components. If any damage is found, replace the reactor, see "3.18.2 Repair procedures" [▶ 244].

3 Check that the reactors are firmly installed on the main PCB.

4 Measure the resistance of the reactor using a low ohm multi meter.

Result: The resistance MUST be as follows:

Measuring points	Resistance
d-e	24~36 mΩ



a L1R
b L2R
c L3R
d Measuring point
e Measuring point

Is the resistance measurement correct?	Action
Yes	Proceed with the next step.
No	Replace the reactor, see "3.18.2 Repair procedures" [▶ 244].

5 Measure the inductance of the reactor using an LCR meter.

Result: The inductance MUST be as follows:

Measuring points	Inductance
d-e	104~116 µH

Is the inductance measurement correct?	Action
Yes	Return to the troubleshooting of the specific error and continue with the next step.
No	Replace the reactor, see "3.18.2 Repair procedures" [▸ 244].

3.18.2 Repair procedures

As the reactors are part of the main PCB, replace the complete main PCB. See "3.14 Main PCB" [▸ 171].

3.19 Refrigerant pressure sensor

3.19.1 Checking procedures

To perform an electrical check of the refrigerant pressure sensor

Prerequisite: Stop the unit operation via the user interface.

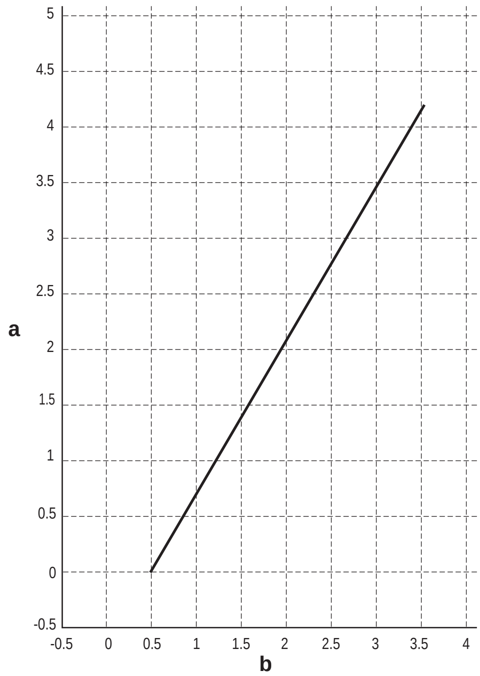
Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.17 Plate work" [▸ 230].

1 Turn ON the power of the unit.

2 Connect a pressure gauge to the gas service port. Read the pressure.

3 Using the graphic below, determine the expected sensor output voltage based on the pressure obtained in the previous step.



a Detected pressure (MPa)
b Output voltage (V)

V (DC)	Detected pressure MPa
0.5	0.01
0.6	0.15
0.7	0.29
0.8	0.42
0.9	0.56
1.0	0.70
1.1	0.84
1.2	0.98
1.3	1.11
1.4	1.25
1.5	1.39
1.6	1.53
1.7	1.67
1.8	1.80
1.9	1.94
2.0	2.08
2.1	2.22
2.2	2.36
2.3	2.49
2.4	2.63
2.5	2.77
2.6	2.91
2.7	3.05
2.8	3.18
2.9	3.32
3.0	3.46
3.1	3.60
3.2	3.74
3.3	3.87
3.4	4.01
3.5	4.15
3.6	4.29

4 Measure the voltage on X17A: pins 1–3 (= refrigerant pressure sensor output signal).

5 Check that the measured voltage is in line with the expected voltage through the read refrigerant pressure.

> **INFORMATION**
>
> Connect the service monitoring tool to monitor the high pressure.
>
> If the measured output voltage value matches the voltage determined through the measured pressure, but the pressure via the service monitoring tool is NOT correct, replace the applicable PCB.

The measured voltage is inside the expected range?	Action
Yes	Refrigerant pressure sensor is OK. Return to the troubleshooting of the specific error and continue with the next procedure.
No	Continue with the next step.

6. Unplug the refrigerant pressure sensor connector X17A and measure the voltage (power supply) between pins 3–4 on main PCB.

   Result: The measured voltage MUST be +5 V DC.

Is the measured voltage +5 V DC?	Then
Yes	Replace the refrigerant pressure sensor, see "3.19.2 Repair procedures" [▸ 246].
No	Perform a check of the main PCB, see "3.14 Main PCB" [▸ 171].

3.19.2 Repair procedures

To remove the refrigerant pressure sensor

Prerequisite: Stop the unit operation via the user interface.

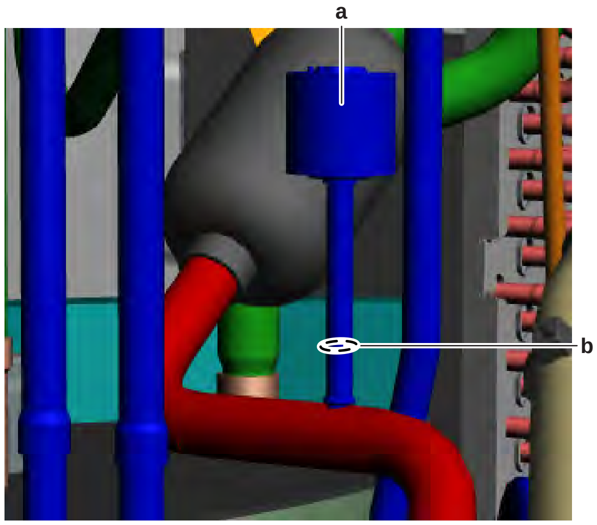
Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.17 Plate work" [▸ 230].

Prerequisite: Recuperate the refrigerant from the refrigerant circuit, see "4.2.2 Repair procedures" [▸ 291].

Prerequisite: If needed, remove any parts or insulation to create more space for the removal.

1. Cut all tie straps that fix the refrigerant pressure sensor harness.
2. Disconnect the refrigerant pressure sensor connector from the PCB.
3. Supply nitrogen to the refrigerant circuit. The nitrogen pressure MUST NOT exceed 0.02 MPa.
4. Wrap a wet rag around the components near the refrigerant pressure sensor. Heat the brazing point of the refrigerant pressure sensor pipe using an oxygen acetylene torch and remove the refrigerant pressure sensor pipe from the refrigerant pipe using pliers.



a Refrigerant pressure sensor
b Refrigerant pressure sensor pipe

5 Stop the nitrogen supply when the piping has cooled down.

6 Remove the refrigerant pressure sensor.

> **INFORMATION**
>
> It is ALSO possible to cut the component pipe(s) using a pipe cutter. Make sure to remove the remaining component pipe end(s) from the refrigerant pipes by heating the brazing point(s) of the component pipe(s) using an oxygen acetylene torch.

7 Install a plug or cap on the refrigerant piping to avoid dirt or impurities from entering the piping.

8 To install the refrigerant pressure sensor, see "3.19.2 Repair procedures" [▶ 246].

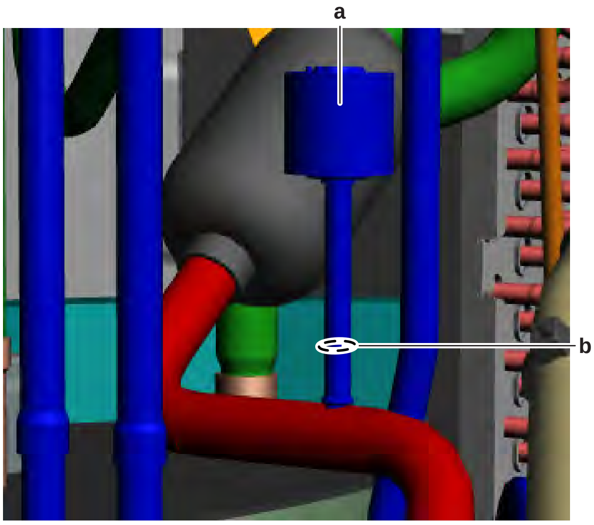
To install the refrigerant pressure sensor

1 Remove the plug or cap from the refrigerant piping and make sure it is clean.

2 Install the refrigerant pressure sensor in the correct location.

3 Supply nitrogen to the refrigerant circuit. The nitrogen pressure MUST NOT exceed 0.02 MPa.

4 Wrap a wet rag around the refrigerant pressure sensor and any other components near the pressure sensor and solder the refrigerant pressure sensor pipe to the refrigerant pipe.



a Refrigerant pressure sensor
b Refrigerant pressure sensor pipe

> **CAUTION**
> Overheating the pressure sensor will damage or destroy it.

5 After soldering is done, stop the nitrogen supply after the component has cooled-down.

6 Route the refrigerant pressure sensor harness towards the appropriate PCB.

7 Connect the refrigerant pressure sensor connector to the appropriate PCB.

8 Fix the refrigerant pressure sensor harness using new tie straps.

9 Perform a pressure test, see "4.2.1 Checking procedures" [▶ 286].

10 Add refrigerant to the refrigerant circuit, see "4.2.2 Repair procedures" [▶ 291].

Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

3.20 Thermistors

3.20.1 Refrigerant side thermistors

Checking procedures

> **INFORMATION**
> It is recommended to perform the checks in the listed order.

To perform a mechanical check of the specific thermistor

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.17 Plate work" [▶ 230].

1 Locate the thermistor and remove the insulation if needed. Check that the thermistor is correctly installed and that there is thermal contact between the thermistor and the piping or ambient (for air thermistor).

Is the thermistor correctly installed (thermal contact between the thermistor and the piping)?	Action
Yes	Perform an electrical check of the specific thermistor, see "Checking procedures" [▶ 248].
No	Correctly install the thermistor, see "Repair procedures" [▶ 251].

To perform an electrical check of the specific thermistor

1 First perform a mechanical check of the thermistor, see "Checking procedures" [▶ 248].

2 Locate the thermistor.

INFORMATION

Remove the thermistor from its holder if not reachable with a contact thermometer.

3 Measure the temperature using a contact thermometer.

Name	Symbol	Location (PCB)	Connector (pins)	Reference (table)
Air thermistor	R1T	Main	X11A: 1-3	A
Discharge pipe thermistor	R2T	Main	X12A: 1-2	B
Refrigerant liquid thermistor	R3T	Hydro	X7A: 1-2	A
Suction thermistor	R3T	Main	X12A: 3-4	A
Heat exchanger thermistor	R4T	Main	X12A: 5-6	A
Heat exchanger (middle) thermistor	R5T	Main	X12A: 7-8	A

4 Determine the thermistor resistance that matches the measured temperature.

Thermistor – Table A

T °C	kΩ	T °C	kΩ	T °C	kΩ	T °C	kΩ
–20	197.81	10	39.96	40	10.63	70	3.44

T °C	kΩ	T °C	kΩ	T °C	kΩ	T °C	kΩ
–19	186.53	11	38.08	41	10.21	71	3.32
–18	175.97	12	36.30	42	9.81	72	3.21
–17	166.07	13	34.62	43	9.42	73	3.11
–16	156.80	14	33.02	44	9.06	74	3.01
–15	148.10	15	31.50	45	8.71	75	2.91
–14	139.94	16	30.06	46	8.37	76	2.82
–13	132.28	17	28.70	47	8.05	77	2.72
–12	125.09	18	27.41	48	7.75	78	2.64
–11	118.34	19	26.18	49	7.46	79	2.55
–10	111.99	20	25.01	50	7.18	80	2.47
–9	106.03	21	23.91	51	6.91		
–8	100.41	22	22.85	52	6.65		
–7	95.14	23	21.85	53	6.41		
–6	90.17	24	20.90	54	6.65		
–5	85.49	25	20.00	55	6.41		
–4	81.08	26	19.14	56	6.18		
–3	76.93	27	18.32	57	5.95		
–2	73.01	28	17.54	58	5.74		
–1	69.32	29	16.80	59	5.14		
0	65.84	30	16.10	60	4.87		
1	62.54	31	15.43	61	4.70		
2	59.43	32	14.79	62	4.54		
3	56.49	33	14.18	63	4.38		
4	53.71	34	13.59	64	4.23		
5	51.09	35	13.04	65	4.08		
6	48.61	36	12.51	66	3.94		
7	46.26	37	12.01	67	3.81		
8	44.05	38	11.52	68	3.68		
9	41.95	39	11.06	69	3.56		

Thermistor – Table B

T °C	kΩ	T °C	kΩ	T °C	kΩ	T °C	kΩ
0	806.5	40	118.7	80	25.38	120	7.131
5	618.9	45	96.13	85	21.37	125	6.181
10	478.8	50	78.29	90	18.06	130	5.374
15	373.1	55	64.1	95	15.33	135	4.686
20	292.9	60	52.76	100	13.06	140	4.098
25	231.4	65	43.63	105	11.17	145	3.594
30	184.1	70	36.26	110	9.585	150	3.161
35	147.4	75	30.27	115	8.254		

5 Disconnect the thermistor connector from the appropriate PCB.

6 Measure the resistance between the appropriate pins of the thermistor connector.

7 Check that the measured resistance value matches the resistance determined through the measured temperature (earlier step in the procedure).

- E.g. R1T thermistor:
- Measured temperature with contact thermometer: 23.1°C,
- Resistance value determined through temperature (using the thermistor table A):
  Resistance at 23°C: 21.85 kΩ,
  Resistance at 24°C: 20.90 kΩ,
- Disconnect connector and measure resistance between X11A pin 1-3:
  Measured resistance: 21.86 kΩ,
- Measured resistance value is inside the range. R1T thermistor passes the check.

INFORMATION

All thermistors have a resistance tolerance of 3%.

INFORMATION

In most cases, the user interface allows to monitor the thermistors.

If the measured resistance value matches the resistance determined through the measured temperature, but the temperature for the corresponding thermistor is NOT correct on the user interface display, replace the applicable PCB.

Does the measured resistance of the thermistor match with the temperature determined resistance?	Action
Yes	Thermistor is OK. Return to the troubleshooting of the specific error and continue with the next procedure.
No	Replace the specific thermistor, see "Repair procedures" [▸ 251].

Repair procedures

To remove the thermistor

Prerequisite: Stop the unit operation via the user interface.

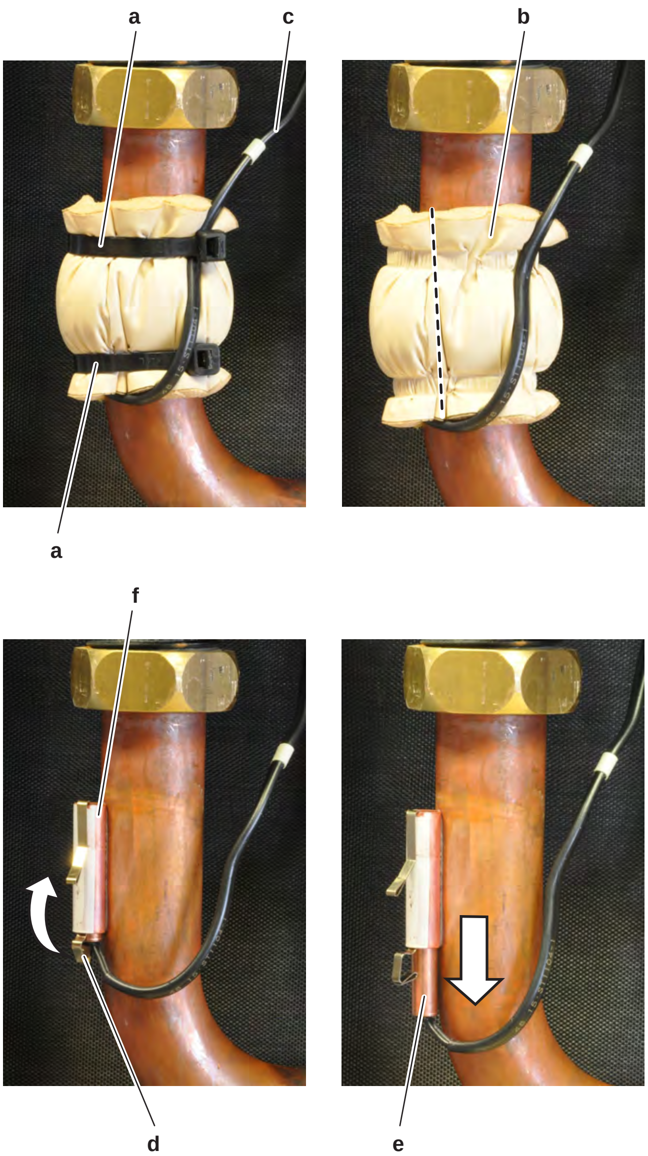
Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.17 Plate work" [▸ 230].

1 Locate the thermistor that needs to be removed.

2 Remove the thermistor from the thermistor holder as follows:

- For air (ambient) thermistor:
  Open the thermistor holder and remove the thermistor from the holder.
- For refrigerant piping thermistors:
  - Cut the tie straps that fix the insulation and the thermistor wire.
  - Cut and remove the insulation.
  - Pull the clip that fixes the thermistor.
  - Remove the thermistor from the thermistor holder.



a Tie strap
b Insulation
c Thermistor wire
d Clip
e Thermistor
f Thermistor holder

3 Cut all tie straps that fix the thermistor harness.

4 Disconnect the thermistor connector from the appropriate PCB and remove the thermistor.

> **INFORMATION**
>
> Some of the thermistors are wired to the same connector. See connector and pin information of the thermistors at the start of the electrical check procedure and "6.2 Wiring diagram" [▶ 314]. ALWAYS replace the complete set of thermistors wired to the same connector.

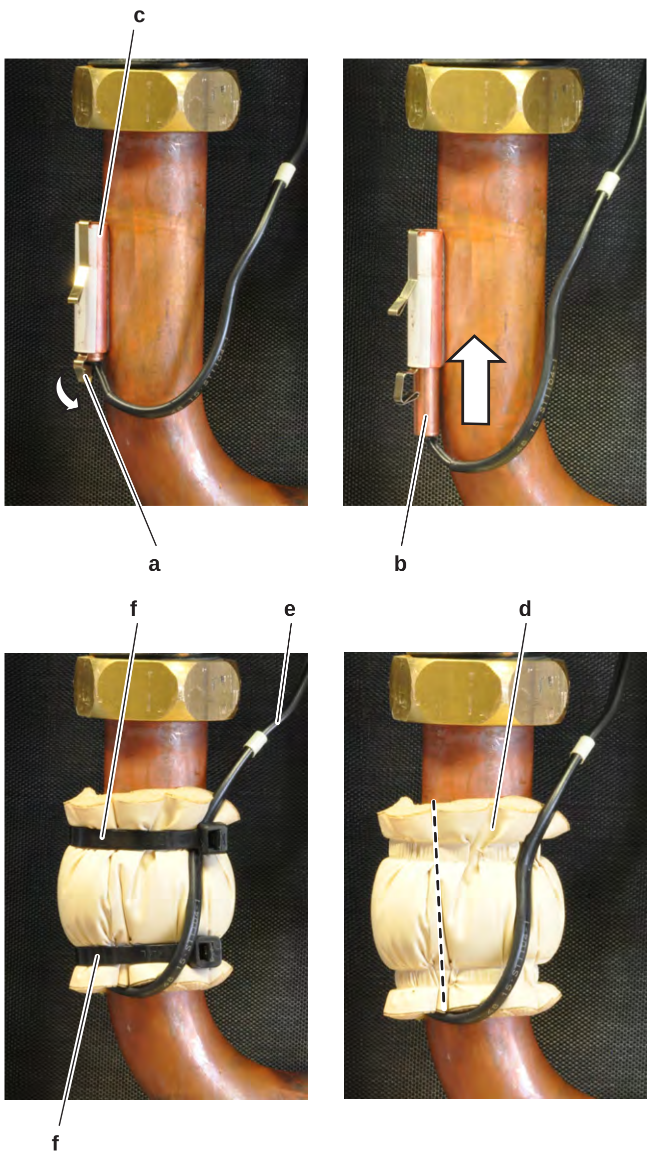
5 When removing the complete set of thermistors wired to the same connector:

- Remove all other thermistors wired to the connector from their thermistor holder,
- Disconnect the thermistor connector from the appropriate PCB,
- Remove the complete set of thermistors.

6 To install the thermistor, see "Repair procedures" [▶ 251].

To install the thermistor

1. Install the thermistor in the thermistor holder as follows:
   - For air (ambient) thermistor:
     Correctly install the thermistor in the holder and close the thermistor holder.
   - For refrigerant piping thermistors:
     Pull the clip and install the thermistor in the specific thermistor holder. Make sure the clip is in the correct position (blocking the thermistor).



a Clip
b Thermistor
c Thermistor holder
d Insulation
e Thermistor wire
f Tie strap

2. Route the thermistor harness towards the appropriate PCB.
3. Connect the thermistor connector to the appropriate PCB.

> **INFORMATION**
>
> Some of the thermistors are wired to the same connector. See connector and pin information of the thermistors at the start of the electrical check procedure and "6.2 Wiring diagram" [▸ 314]. ALWAYS replace the complete set of thermistors wired to the same connector.

4 When installing the complete set of thermistors wired to the same connector:
- Install all other thermistors wired to the connector in their thermistor holder,
- Route the thermistor harness of all thermistors towards the appropriate PCB,
- Connect the thermistor connector to the appropriate PCB.

> **WARNING**
>
> When reconnecting a connector to the PCB, make sure to connect it on the correct location and do NOT apply force, as this may damage the connector or connector pins of the PCB.

5 Fix the thermistor harness using new tie straps

6 Install the insulation around the thermistor.

7 Fix the insulation and the thermistor wire using new tie straps.

Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

3.20.2 Water side thermistors

Checking procedures

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

To perform a mechanical check of the specific thermistor

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

1 Remove the required plate work, see "3.17 Plate work" [▸ 230].

2 Locate the thermistor and remove the insulation if needed. Check that the thermistor is correctly installed and that there is thermal contact between the thermistor and the piping.

Is the thermistor correctly installed (thermal contact between the thermistor and the piping)?	Action
Yes	Perform an electrical check of the specific thermistor, see "Checking procedures" [▸ 254].
No	Correctly install the thermistor, see "Repair procedures" [▸ 258].

To perform an electrical check of the specific thermistor

1. First perform a mechanical check of the thermistor, see "Checking procedures" [▶ 254].
2. Locate the thermistor.

> **INFORMATION**
>
> Remove the thermistor from its holder if not reachable with a contact thermometer.

3. Measure the temperature using a contact thermometer.

Name	Symbol	Location (PCB)	Connector (pins)	Inter-mediate terminal (wires)	Reference (table)
Outlet water after plate type heat exchanger thermistor	R1T	Hydro	X5A: 1-2	–	A
Outlet water after backup heater thermistor	R2T	Hydro	X6A: 1-2	For units with built-in backup heater: -	A
				For units with backup heater kit: ▪ X5M: 1-2 ▪ X15M: 1-2	A
Inlet water thermistor	R4T	Hydro	X8A: 1-2	–	A
Domestic hot water tank thermistor (ONLY with optional domestic hot water tank installed)	R5T	Hydro	X9A: 1-2	–	For domestic hot water tank EKHWP: A
					For domestic hot water tank EKHWS or third party domestic hot water tank: B

4 Determine the thermistor resistance that matches the measured temperature.

Thermistor – Table A

T °C	kΩ	T °C	kΩ	T °C	kΩ	T °C	kΩ
–20	197.81	10	39.96	40	10.63	70	3.44
–19	186.53	11	38.08	41	10.21	71	3.32
–18	175.97	12	36.30	42	9.81	72	3.21
–17	166.07	13	34.62	43	9.42	73	3.11
–16	156.80	14	33.02	44	9.06	74	3.01
–15	148.10	15	31.50	45	8.71	75	2.91
–14	139.94	16	30.06	46	8.37	76	2.82
–13	132.28	17	28.70	47	8.05	77	2.72
–12	125.09	18	27.41	48	7.75	78	2.64
–11	118.34	19	26.18	49	7.46	79	2.55
–10	111.99	20	25.01	50	7.18	80	2.47
–9	106.03	21	23.91	51	6.91		
–8	100.41	22	22.85	52	6.65		
–7	95.14	23	21.85	53	6.41		
–6	90.17	24	20.90	54	6.65		
–5	85.49	25	20.00	55	6.41		
–4	81.08	26	19.14	56	6.18		
–3	76.93	27	18.32	57	5.95		
–2	73.01	28	17.54	58	5.74		
–1	69.32	29	16.80	59	5.14		
0	65.84	30	16.10	60	4.87		
1	62.54	31	15.43	61	4.70		
2	59.43	32	14.79	62	4.54		
3	56.49	33	14.18	63	4.38		
4	53.71	34	13.59	64	4.23		
5	51.09	35	13.04	65	4.08		
6	48.61	36	12.51	66	3.94		
7	46.26	37	12.01	67	3.81		
8	44.05	38	11.52	68	3.68		
9	41.95	39	11.06	69	3.56		

Thermistor – Table B

T °C	kΩ	T °C	kΩ	T °C	kΩ	T °C	kΩ
0	806.5	40	118.7	80	25.38	120	7.131
5	618.9	45	96.13	85	21.37	125	6.181
10	478.8	50	78.29	90	18.06	130	5.374
15	373.1	55	64.1	95	15.33	135	4.686
20	292.9	60	52.76	100	13.06	140	4.098
25	231.4	65	43.63	105	11.17	145	3.594
30	184.1	70	36.26	110	9.585	150	3.161
35	147.4	75	30.27	115	8.254		

5 Disconnect the thermistor connector from the appropriate PCB and measure the resistance between the appropriate pins of the thermistor connector.

6 Check that the measured resistance value matches the resistance determined through the measured temperature (earlier step in the procedure). E.g. R1T thermistor:

- Measured temperature with contact thermometer: 23.1°C,
- Resistance value determined through temperature (using the thermistor table A):
  Resistance at 23°C: 21.85 kΩ,
  Resistance at 24°C: 20.90 kΩ,
- Disconnect connector and measure resistance between X5A pin 1-2:
  Measured resistance: 21.86 kΩ,
- Measured resistance value is inside the range. R1T thermistor passes the check.

INFORMATION

All thermistors have a resistance tolerance of 3%.

INFORMATION

In most cases, the user interface allows to monitor the thermistors.

If the measured resistance value matches the resistance determined through the measured temperature, but the temperature for the corresponding thermistor is NOT correct on the user interface display, replace the applicable PCB.

INFORMATION

See the overview of the thermistors at the start of the procedure and the "6.2 Wiring diagram" [▶ 314] to determine if the specific thermistor is either:

- Directly connected to the PCB
- Connected to an intermediate connector which is connected to the PCB

For thermistors directly connected to the PCB

Does the measured resistance of the thermistor match with the temperature determined resistance?	Then
Yes	Thermistor is OK. Return to the troubleshooting of the specific error and continue with the next procedure.

Does the measured resistance of the thermistor match with the temperature determined resistance?	Then
No	Replace the specific thermistor, see "Repair procedures" [▶ 258].

For thermistors connected to an intermediate connector

Does the measured resistance of the thermistor match with the temperature determined resistance?	Action
Yes	Thermistor is OK. Return to the troubleshooting of the specific error and continue with the next procedure.
No	Continue with the next step.

7 Disconnect the thermistor from the intermediate connector and measure the resistance of the thermistor (between the appropriate pins of the connector).

Does the measured resistance of the thermistor match with the temperature determined resistance?	Action
Yes	Correct the wiring between the thermistor connector on the PCB and the intermediate connector, see "6.2 Wiring diagram" [▶ 314].
No	Replace the specific thermistor, see "Repair procedures" [▶ 258].

Repair procedures

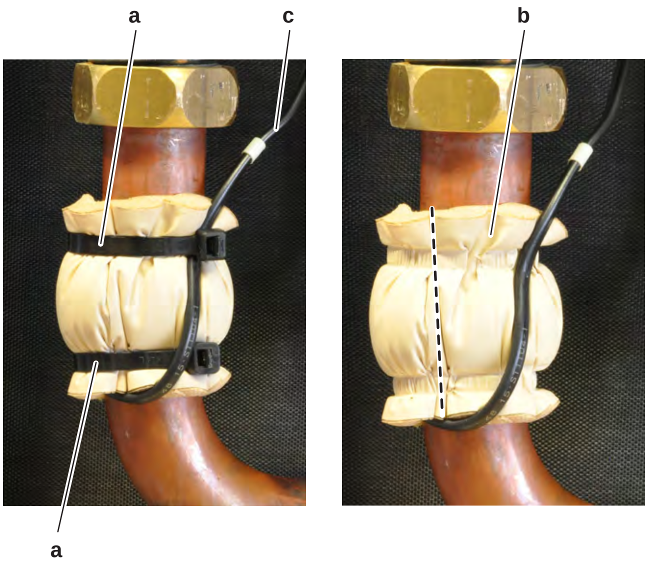
To remove the thermistor

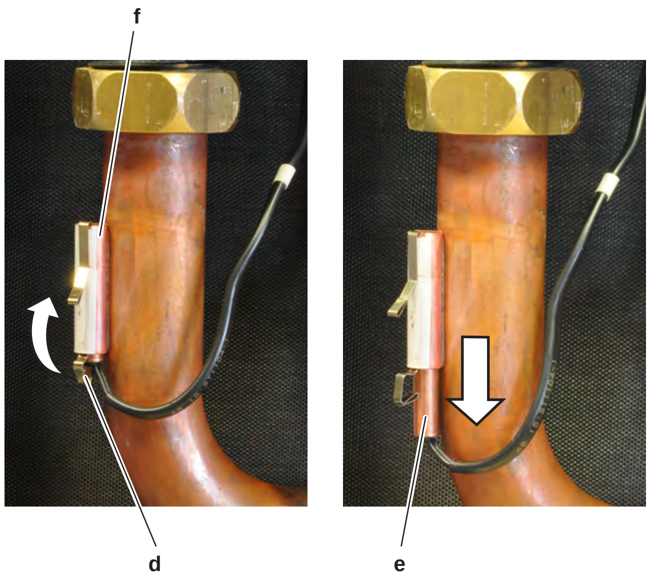
Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.17 Plate work" [▶ 230].

1. Locate the thermistor that needs to be removed.
2. Cut the tie straps that fix the insulation and the thermistor wire.





a Tie strap
b Insulation
c Thermistor wire
d Clip
e Thermistor
f Thermistor holder

3 Cut and remove the insulation.

4 Pull the clip that fixes the thermistor.

5 Remove the thermistor from the thermistor holder.

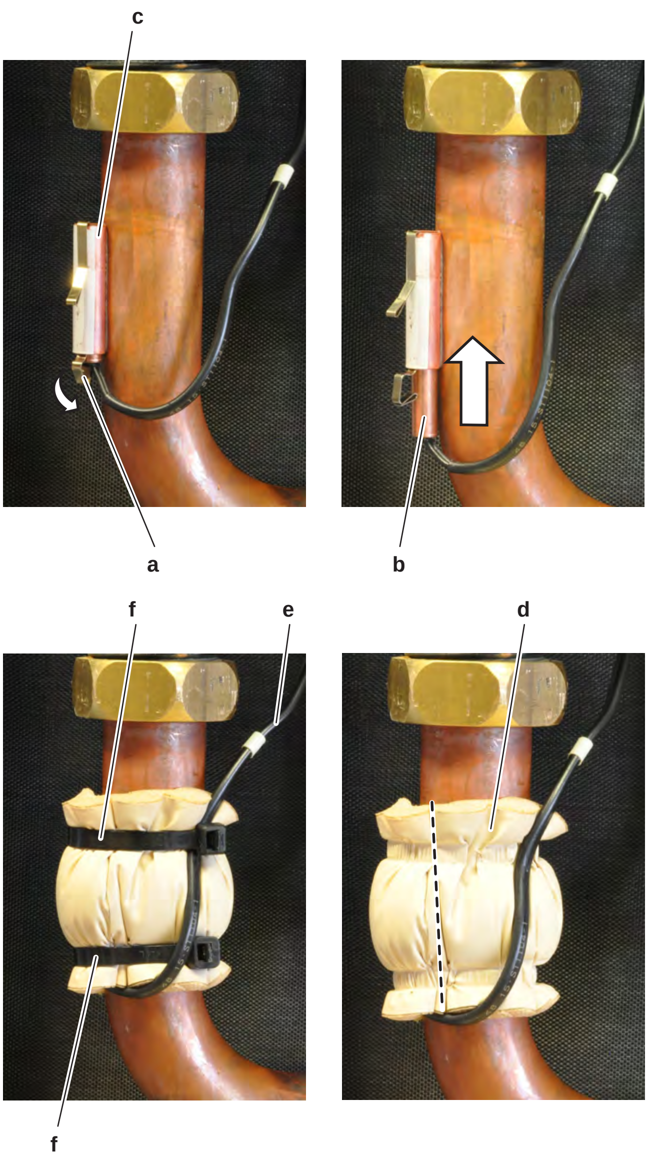
> **INFORMATION**
>
> See the overview of the thermistors at the start of the electrical check procedure and the "6.2 Wiring diagram" [▶ 314] to determine if the specific thermistor is either:
>
> - Directly connected to the PCB
> - Connected to an intermediate connector which is connected to the PCB

6 If connected to an intermediate connector, disconnect the thermistor connector from the intermediate connector. If directly connected to the PCB, disconnect the thermistor connector from the PCB.

7 To install the thermistor, see "Repair procedures" [▶ 258].

To install the thermistor

1 Pull the clip and install the thermistor in the specific thermistor holder. Make sure the clip is in the correct position (blocking the thermistor).



a Clip
b Thermistor
c Thermistor holder
d Insulation
e Thermistor wire
f Tie strap

2 Install the insulation around the thermistor.

3 Fix the insulation and the thermistor wire using new tie straps.

> **INFORMATION**
>
> See the overview of the thermistors at the start of the electrical check procedure and the "6.2 Wiring diagram" [▶ 314] to determine if the specific thermistor is either:
>
> - Directly connected to the PCB
> - Connected to an intermediate connector which is connected to the PCB

4 If connected to an intermediate connector, connect the thermistor connector to the intermediate connector. If directly connected to the PCB, connect the thermistor connector to the appropriate PCB.

> **WARNING**
> When reconnecting a connector to the PCB, make sure to connect it on the correct location and do NOT apply force, as this may damage the connector or connector pins of the PCB.

Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

3.20.3 Other thermistors

Checking procedures

To perform a mechanical check of the external thermistor

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.17 Plate work" [▸ 230].

1. Locate the thermistor.
2. Remove the insulation if needed. Check that the thermistor is correctly installed and that there is thermal contact between the thermistor and the piping or ambient.

Is the thermistor correctly installed (thermal contact between the thermistor and the piping or ambient)?	Action
Yes	Perform an electrical check of the specific thermistor, see "Checking procedures" [▸ 261].
No	Correctly install the thermistor, see "Repair procedures" [▸ 266].

To perform an electrical check of the external thermistor

Prerequisite: First perform a mechanical check of the thermistor, see "Checking procedures" [▸ 261].

1. Locate the thermistor:

> **INFORMATION**
> Remove the thermistor from its holder if not reachable with a contact thermometer.

2. Measure the temperature using a contact thermometer.

Name	Symbol	Location (PCB)	Connector (pins)	Unit terminal (wires)	Reference (table)
External indoor or outdoor ambient thermistor	R6T	Hydro	X22A: 1-2	X5M: 8-7	A

3 Determine the thermistor resistance that matches the measured temperature.

Thermistor – Table A

T °C	kΩ	T °C	kΩ	T °C	kΩ	T °C	kΩ
–20	197.81	10	39.96	40	10.63	70	3.44
–19	186.53	11	38.08	41	10.21	71	3.32
–18	175.97	12	36.30	42	9.81	72	3.21
–17	166.07	13	34.62	43	9.42	73	3.11
–16	156.80	14	33.02	44	9.06	74	3.01
–15	148.10	15	31.50	45	8.71	75	2.91
–14	139.94	16	30.06	46	8.37	76	2.82
–13	132.28	17	28.70	47	8.05	77	2.72
–12	125.09	18	27.41	48	7.75	78	2.64
–11	118.34	19	26.18	49	7.46	79	2.55
–10	111.99	20	25.01	50	7.18	80	2.47
–9	106.03	21	23.91	51	6.91		
–8	100.41	22	22.85	52	6.65		
–7	95.14	23	21.85	53	6.41		
–6	90.17	24	20.90	54	6.65		
–5	85.49	25	20.00	55	6.41		
–4	81.08	26	19.14	56	6.18		
–3	76.93	27	18.32	57	5.95		
–2	73.01	28	17.54	58	5.74		
–1	69.32	29	16.80	59	5.14		
0	65.84	30	16.10	60	4.87		
1	62.54	31	15.43	61	4.70		
2	59.43	32	14.79	62	4.54		
3	56.49	33	14.18	63	4.38		
4	53.71	34	13.59	64	4.23		
5	51.09	35	13.04	65	4.08		
6	48.61	36	12.51	66	3.94		
7	46.26	37	12.01	67	3.81		
8	44.05	38	11.52	68	3.68		
9	41.95	39	11.06	69	3.56		

4 Disconnect the thermistor connector from the appropriate PCB.

5 Measure the resistance between the appropriate pins of the thermistor.

6 Check that the measured resistance value matches the resistance determined through the measured temperature (earlier step in the procedure). E.g. R6T thermistor:

- Measured temperature with contact thermometer: 23.1°C,
- Resistance value determined through temperature (using the thermistor table A):
  Resistance at 23°C: 21.85 kΩ,
  Resistance at 24°C: 20.90 kΩ,
- Disconnect connector and measure resistance between X22A pin 1-2:
  Measured resistance: 21.86 kΩ,
- Measured resistance value is inside the range. R6T thermistor passes the check.

INFORMATION

All thermistors have a resistance tolerance of 3%.

INFORMATION

In most cases, the user interface allows to monitor the thermistors.

If the measured resistance value matches the resistance determined through the measured temperature, but the temperature for the corresponding thermistor is NOT correct on the user interface display, replace the applicable PCB.

Does the measured resistance of the thermistor match with the temperature determined resistance?	Action
Yes	Thermistor is OK. Return to the troubleshooting of the specific error and continue with the next procedure.
No	Continue with the next step.

INFORMATION

Make sure that the wiring between the wiring terminal on the unit and the thermistor is properly connected and NOT damaged (check continuity), see "6.2 Wiring diagram" [▶ 314].

7 Disconnect the thermistor wiring from the wiring terminal on the unit and measure the resistance of the thermistor (between the thermistor wires).

Does the measured resistance of the thermistor match with the temperature determined resistance?	Action
Yes	Correct the wiring between the wiring terminal on the unit and the thermistor connector on the PCB, see "6.2 Wiring diagram" [▶ 314].
No	Replace the specific thermistor, see "Repair procedures" [▶ 266].

To perform a mechanical check of the fin thermistor

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

1 Remove the required plate work, see "3.17 Plate work" [▶ 230].

DANGER: RISK OF ELECTROCUTION

Confirm the rectifier voltage is below 10 V DC before proceeding, see "To prevent electrical hazards" [▶ 285].

2 Locate the thermistor. Check that the thermistor is correctly installed and that there is thermal contact between the thermistor and the heat sink.

Is the thermistor correctly installed (thermal contact between the thermistor and the heat sink)?	Action
Yes	Perform an electrical check of the specific thermistor, see "Checking procedures" [▶ 261].
No	Replace the main PCB, see "3.14 Main PCB" [▶ 171].

To perform an electrical check of the fin thermistor

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.17 Plate work" [▶ 230].

1 Locate the thermistor on the appropriate PCB.

2 Measure the temperature using a contact thermometer.

Name	Symbol	Location (PCB)	Connector (pins)	Reference (table)
Radiation fin thermistor	R11T	Main (O/U)	X111A: 1-2	A

INFORMATION

The thermistors may vary according to the specific unit.

3 Determine the thermistor resistance that matches the measured temperature.

Thermistor – Table A

T °C	kΩ	T °C	kΩ	T °C	kΩ	T °C	kΩ
–20	197.81	10	39.96	40	10.63	70	3.44
–19	186.53	11	38.08	41	10.21	71	3.32
–18	175.97	12	36.30	42	9.81	72	3.21
–17	166.07	13	34.62	43	9.42	73	3.11
–16	156.80	14	33.02	44	9.06	74	3.01
–15	148.10	15	31.50	45	8.71	75	2.91
–14	139.94	16	30.06	46	8.37	76	2.82
–13	132.28	17	28.70	47	8.05	77	2.72
–12	125.09	18	27.41	48	7.75	78	2.64
–11	118.34	19	26.18	49	7.46	79	2.55
–10	111.99	20	25.01	50	7.18	80	2.47

T °C	kΩ	T °C	kΩ	T °C	kΩ	T °C	kΩ
–9	106.03	21	23.91	51	6.91		
–8	100.41	22	22.85	52	6.65		
–7	95.14	23	21.85	53	6.41		
–6	90.17	24	20.90	54	6.65		
–5	85.49	25	20.00	55	6.41		
–4	81.08	26	19.14	56	6.18		
–3	76.93	27	18.32	57	5.95		
–2	73.01	28	17.54	58	5.74		
–1	69.32	29	16.80	59	5.14		
0	65.84	30	16.10	60	4.87		
1	62.54	31	15.43	61	4.70		
2	59.43	32	14.79	62	4.54		
3	56.49	33	14.18	63	4.38		
4	53.71	34	13.59	64	4.23		
5	51.09	35	13.04	65	4.08		
6	48.61	36	12.51	66	3.94		
7	46.26	37	12.01	67	3.81		
8	44.05	38	11.52	68	3.68		
9	41.95	39	11.06	69	3.56		

4 Measure the resistance between the appropriate connection points of the thermistor.

5 Check that the measured resistance value matches the resistance determined through the measured temperature (earlier step in the procedure). E.g. R11T thermistor:

- Measured temperature with contact thermometer: 23.1°C,
- Resistance value determined through temperature (using the thermistor table A):
  Resistance at 20°C: 24.3 kΩ,
  Resistance at 25°C: 19.4 kΩ,
- Measure resistance between X111A pin 1-2:
  Measured resistance: 21.86 kΩ,
- Measured resistance value is inside the range. R11T thermistor passes the check.

INFORMATION

All thermistors have a resistance tolerance of 3%.

Does the measured resistance of the thermistor match with the temperature determined resistance?	Action
Yes	Thermistor is OK. Return to the troubleshooting of the specific error and continue with the next procedure.
No	Replace the specific PCB, see "3 Components" [▶ 86].

Repair procedures

To remove the external thermistor

1. See the documentation of the specific thermistor for more details.
2. To install the external thermistor, see "Repair procedures" [▶ 251].

To install the external thermistor

1. Install the specific thermistor. See the documentation of the specific thermistor if needed for more details.

Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

3.21 User interface

3.21.1 Checking procedures

> **INFORMATION**
> It is recommended to perform the checks in the listed order.

To check the correct functioning of the remote controller user interface

1. Check that information is shown and can be navigated through on the display of the remote controller user interface.
2. Check the display for the following items:
   - Pinhole, bright spot, black spot, white spot, black line, white line, foreign particle, bubble:
     The color of a small area is different from the remainder. The phenomenon does NOT change with voltage.
   - Contrast variation:
     The color of a small area is different from the remainder. The phenomenon changes with voltage.
   - Polarizer defect:
     Scratch, dirt, particle, bubble on polarizer or between polarizer and glass.
   - Dot defect:
     The pixel appears bright or dark abnormally.
   - Functional defect:
     No display, abnormal display, open or missing segment, short circuit, false viewing directon.
   - Glass defect:
     Glass cracks, shaved corner of glass, surplus glass.

Does the remote controller user interface function correctly?	Action
Yes	Return to the troubleshooting of the specific error and continue with the next procedure.

Does the remote controller user interface function correctly?	Action
No	Replace the remote controller user interface, see "3.21.2 Repair procedures" [▸ 268].

To check the settings

1. See the relevant documentation (installer reference guide, remote controller manual, ...) to check if the specific setting is correct.

Is the setting correct?	Action
Yes	Return to the troubleshooting of the specific error and continue with the next procedure.
No	Adjust the specific setting see "3.21.2 Repair procedures" [▸ 268].

To check the software and EEPROM version

1. Compare the software ID and EEPROM version of the remote controller user interface and the PCB with the ones provided in the Updater Tool. Re-install the software with the Updater Tool if versions do NOT match.

Is the installed software and EEPROM version correct?	Action
Yes	Return to the troubleshooting of the specific error and continue with the next procedure.
No	Re-install the software with the Updater Tool see "3.21.2 Repair procedures" [▸ 268].

To check the communication wiring between the remote controller and the unit PCB

1. Make sure that all wires between the remote controller user interface connector X1B and the connectors X18A and X48A on the hydro PCB are firmly and correctly connected, see "6.2 Wiring diagram" [▸ 314].
2. Check the continuity of all wires.
3. Replace any damaged or broken wires.

INFORMATION

Correct the wiring as needed.

Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

3.21.2 Repair procedures

To remove the user interface

1. See relevant manual of the user interface (remote controller) for the correct procedure.
2. To intall the user interface, see "3.21.2 Repair procedures" [▶ 268].

To install the user interface

1. See relevant manual of the user interface (remote controller) for the correct procedure.

Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

To adjust the settings

1. See the relevant documentation (installer reference guide, remote controller manual, …) to adjust the specific setting.

Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

To install the software

1. Install the software using the Updater Tool. See the Business Portal (http://www.mydaikin.eu) for more information about the Updater Tool.

Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

3.22 Water flow sensor

3.22.1 Checking procedures

To perform an electrical check of the water flow sensor

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.17 Plate work" [▶ 230].

1. Turn ON the power of the unit.
2. Activate `Installer` on the user interface. See the installer reference guide for the correct procedure.
3. Go to `Actuator test run` via the user interface.

4 Activate the `Pump`.

5 Select `Flow rate`.

Result: The displayed flow rate MUST be 5~60 l/min.

6 Measure the water flow with a calibrated external flow meter.

7 Measure the frequency on connector X34A between pins 2-3 (= flow sensor output signal) on the hydro PCB.

> **INFORMATION**
>
> The flow sensor connector MUST be plugged into X34A on hydro PCB.

8 Using the following formula, calculate the water flow rate:

Flow rate [l/min] = (output frequency [Hz]x0.3)−1.2

> **INFORMATION**
>
> There is an offset of 4 Hz. If the water flow is 0 l/min (pump is NOT running), the frequency output of the water flow sensor is 4 Hz.

9 Check that the calculated water flow rate is in line with the measured water flow.

> **INFORMATION**
>
> In most cases, the user interface allows to monitor the water flow.
>
> If the calculated water flow matches the measured water flow, but the water flow is NOT correct on the user interface display, replace the applicable PCB.

Do the measured and calculated water flow match?	Action
Yes	Water flow sensor is OK. Return to the troubleshooting of the specific error and continue with the next procedure.
No	Continue with the next step.

10 Unplug the water flow sensor connector X34A and measure the voltage (power supply) between pins 1-2 on hydro PCB.

Result: The measured voltage MUST be +5 V DC.

Is measured voltage +5 V DC?	Then
Yes	Continue with the next step.
No	Perform a check of the hydro PCB, see "3.12.1 Checking procedures" [▶ 160].

11 Disconnect the water flow sensor harness from the water flow sensor and from the connector X34A. Measure the continuity of the wiring harness.

Is continuity of the wiring harness correct?	Action
Yes	Replace the water flow sensor, see "3.22.2 Repair procedures" [▶ 270].
No	Replace the water flow sensor harness, see "3.22.2 Repair procedures" [▶ 270].

3.22.2 Repair procedures

To remove the water flow sensor wiring harness

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.17 Plate work" [▶ 230].

1. Disconnect the connector from the water flow sensor.
2. Disconnect the other end of the wiring harness from the hydro PCB.
3. Cut all tie straps that fix the wiring harness, and remove the wiring harness from the unit.
4. To install the water flow sensor wiring harness, see "3.22.2 Repair procedures" [▶ 270].

To install the water flow sensor wiring harness

1. Connect the wiring harness to the connector X4A on the hydro PCB.
2. Route the wiring harness towards the water flow sensor and connect the wiring harness to the water flow sensor.
3. Fix the wiring harness using new tie straps.

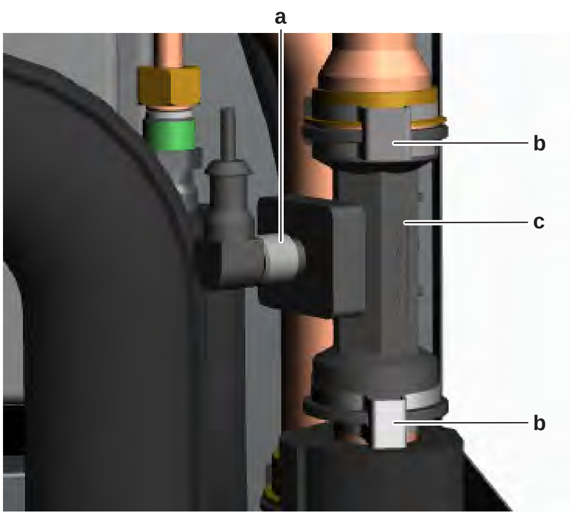
Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

To remove the water flow sensor

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

1. Remove the required plate work, see "3.17 Plate work" [▶ 230].
2. Drain the water circuit, see "4.3.2 Repair procedures" [▶ 302].
3. Loosen the water flow sensor connector nut.



a Water flow sensor connector nut
b Clip
c Water flow sensor

4. Unplug the water flow sensor harness from the water flow sensor.

5 Remove the 2 clips that fix the water flow sensor.

6 Remove the water flow sensor.

7 Clean any spilled water.

8 To install the new water flow sensor, see "3.22.2 Repair procedures" [▶ 270].

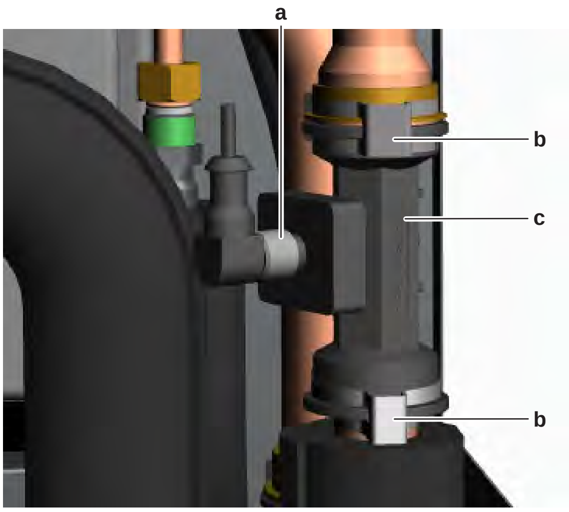
To install the water flow sensor

> **CAUTION**
>
> Check the condition of the O-rings and replace if needed. Apply water to the O-rings before installation.

1 Mount the O-rings on the water flow sensor.

2 Install the water flow sensor on the inlet pipe. Ensure that the O-ring does NOT get damaged.

3 Slide the clip over the connection until it snaps into place.



a Water flow sensor connector nut
b Clip
c Water flow sensor

4 Install the water flow sensor on the outlet pipe. Ensure that the O-ring does NOT get damaged.

5 Slide the clip over the connection until it snaps into place.

6 Connect the water flow sensor harness to the water flow sensor.

7 Tighten the water flow sensor connector nut.

> **INFORMATION**
>
> Replace all cable ties that were cut during removal.

8 Open the valve (if equipped) of the water circuit towards the expansion vessel.

> **CAUTION**
>
> Make sure to open the valve (if equipped) towards the expansion vessel, otherwise the overpressure will be generated.

9 Open the stop valves and add water to the water circuit if needed, see "4.3.2 Repair procedures" [▶ 302].

Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

3.23 Water pressure sensor

3.23.1 Checking procedures

To perform an electrical check of the water pressure sensor

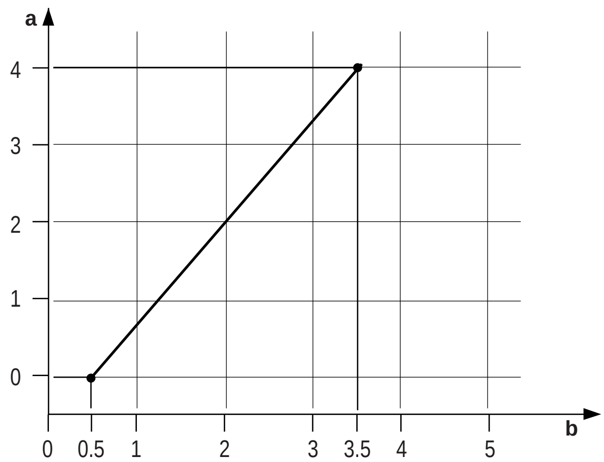
Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.17 Plate work" [▶ 230].

1. Turn ON the power of the unit.
2. Read the water pressure on the home screen of the user interface.

   Result: The pressure MUST be 1~2 bar.
3. Using the graphic below, determine the expected sensor output voltage based on the measured pressure.



a Pressure (bar)
b Output voltage (V)

V DC	Detected pressure (bar)
0.5	0.00
0.6	0.13
0.7	0.26
0.8	0.40
0.9	0.53
1.0	0.66
1.1	0.80
1.2	0.93
1.3	1.06
1.4	1.20

V DC	Detected pressure (bar)
1.5	1.33
1.6	1.46
1.7	1.59
1.8	1.73
1.9	1.86
2.0	1.99
2.1	2.13
2.2	2.26
2.3	2.39
2.4	2.53
2.5	2.66
2.6	2.79
2.7	2.9
2.8	3.06
2.9	3.19
3.0	3.32
3.1	3.46
3.2	3.59
3.3	3.72
3.4	3.86
3.5	3.99

INFORMATION

The water pressure sensor connector MUST be plugged into the appropriate PCB.

4 Measure the voltage on connector X60A between pins 2–3 (= water pressure sensor output) on the hydro PCB.

5 Check that the measured voltage is in line with the expected voltage through the measured water pressure.

INFORMATION

In most cases, the user interface allows to monitor the water pressure.

If the measured output voltage value matches the voltage determined through the measured water pressure, but the water pressure is NOT correct on the user interface display, replace the applicable PCB.

The measured voltage is inside the expected range?	Action
Yes	Water pressure sensor is OK. Return to the troubleshooting of the specific error and continue with the next procedure.
No	Continue with the next step.

6 With the water pressure sensor connector X7Y connected, measure the voltage between pin 1–2 (= water pressure output).

7 Check that the measured voltage is in line with the expected voltage through the measured water pressure.

The measured voltage is inside the expected range?	Action
Yes	Correct the wiring between the hydro PCB and the water pressure sensor connector X7Y, see "6.2 Wiring diagram" [▸ 314].
No	Continue with the next step.

8 Measure the voltage between pin 2–3 (= water pressure sensor power supply) of the water pressure sensor connector X7Y.

I measured voltage…	Then
Is +5 V DC	Skip the next step.
Is NOT +5 V DC	Continue with the next step in the procedure

9 Unplug the connector X60A and measure the voltage (power supply) between pin 3–4 on hydro PCB.

Is the measured voltage +5 V DC?	Action
Yes	Correct the wiring between the hydro PCB and the connector X7Y, see "6.2 Wiring diagram" [▸ 314].
No	Perform a check of the hydro PCB, see "3.12.1 Checking procedures" [▸ 160].

10 Disconnect the connector from the water pressure sensor and the connector X7Y and measure the continuity of the wiring harness.

Is continuity of the wiring harness correct?	Action
Yes	Replace the water pressure sensor, see "3.23.2 Repair procedures" [▸ 274].
No	Replace the water pressure sensor harness, see "3.23.2 Repair procedures" [▸ 274].

3.23.2 Repair procedures

To remove the water pressure sensor wiring harness

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.17 Plate work" [▸ 230].

1 Disconnect the connector from the water pressure sensor.

2 Disconnect the other end of the wiring harness from the connector X7Y.

3 Cut all tie straps that fix the wiring harness, and remove the wiring harness from the unit.

4 To install the water pressure sensor wiring harness, see "3.23.2 Repair procedures" [▸ 274].

To install the water pressure sensor wiring harness

1 Connect the wiring harness to the connector X7Y.

2 Route the wiring harness towards the water pressure sensor and connect the wiring harness to the water pressure sensor.

3 Fix the wiring harness using new tie straps.

Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

To remove the water pressure sensor

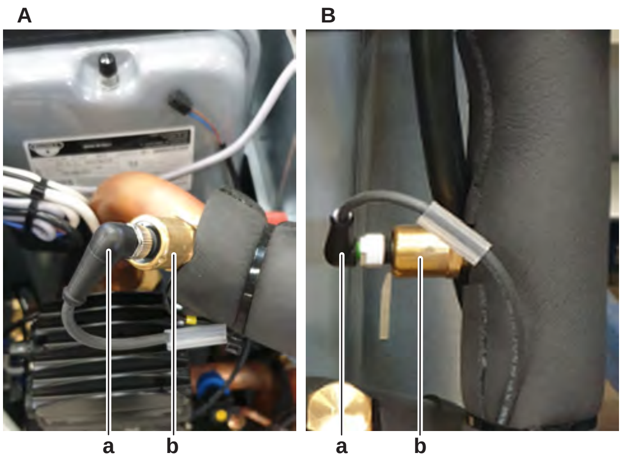
Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.17 Plate work" [▸ 230].

1 Drain water from the water circuit, see "4.3.2 Repair procedures" [▸ 302].

2 Disconnect the water pressure sensor connector from the water pressure sensor.



A Unit with backup heater
B Unit without backup heater
a Water pressure sensor harness
b Water pressure sensor

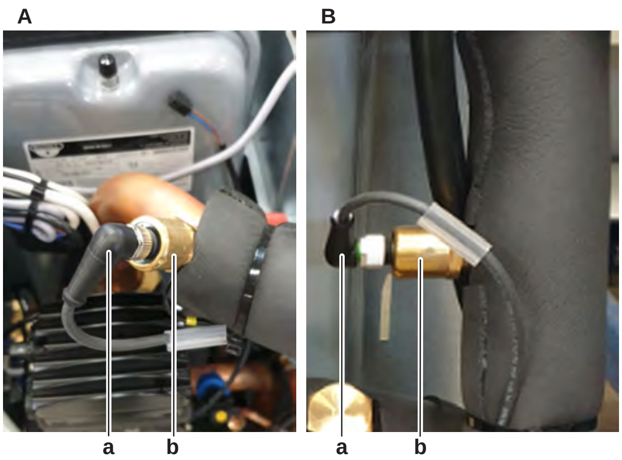
3 Screw the water pressure sensor out of the coupling piece.

4 To install the water pressure sensor, see "3.23.2 Repair procedures" [▸ 274].

To install the water pressure sensor

1 Check that a new O-ring is installed on the water pressure sensor.

2 Screw the water pressure sensor in the coupling piece.



A Unit with backup heater
B Unit without backup heater
a Water pressure sensor harness
b Water pressure sensor

3 Connect the water pressure sensor connector to the water pressure sensor.

> **INFORMATION**
>
> Replace all cable ties that were cut during removal.

4 Open the valve (if equipped) of the water circuit towards the expansion vessel.

> **CAUTION**
>
> Make sure to open the valve (if equipped) towards the expansion vessel, otherwise the overpressure will be generated.

5 Open the stop valves and add water to the water circuit if needed, see "4.3.2 Repair procedures" [▶ 302].

6 Purge the water circuit, see "4.3.2 Repair procedure" [▶ 302].

Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

3.24 Water pump

3.24.1 Checking procedures

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

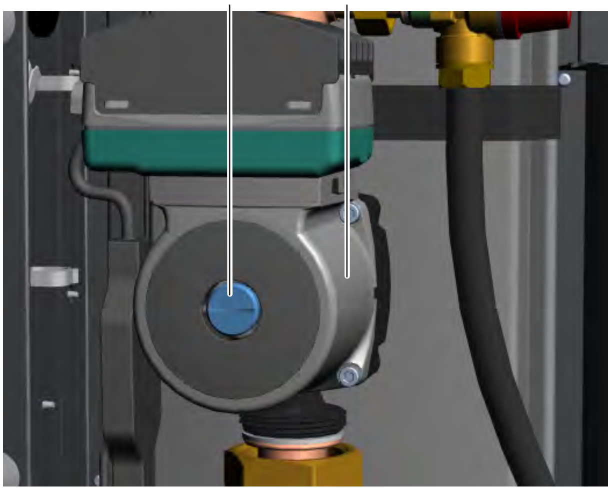
To perform a mechanical check of the water pump

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.17 Plate work" [▶ 230].

1 Remove the seal cover from the pump and insert a flat screwdriver in the slot of the rotor shaft of the water pump (through the hole in the pump motor cover); press and turn it to rotate the water pump rotor shaft.



a Seal
b Water pump motor

Does the rotor of the water pump motor rotate smoothly?	Action
Yes	Perform an electrical check of the water pump motor, see "3.24.1 Checking procedures" [▶ 276].
No	Continue with the next step.

2 Remove the water pump housing, see "3.24.2 Repair procedures" [▶ 279].

3 Check for impurities or any objects that may block the water pump.

Any impurities or objects found?	Action
Yes	Remove the impurities or objects that may block the water pump, see "3.24.2 Repair procedures" [▶ 279].
No	Replace the water pump housing, see "3.24.2 Repair procedures" [▶ 279].

To perform an electrical check of the water pump

1 First perform a mechanical check of the water pump, see "3.24.1 Checking procedures" [▶ 276].

2 Turn ON the power of the unit.

3 Activate `Installer` on the user interface. See the installer reference guide for the correct procedure.

4 Go to `Actuator test run` via the user interface.

5 Activate the `Pump`.

> **CAUTION**
>
> When the water pump is active and the connector PWM is disconnected from the PCB, the water pump motor will run at full speed.

6 Check if the pump is working (by listening or by touching the pump).

Is the water pump working?	Action
Yes	Return to the troubleshooting of the specific error and continue with the next procedure.
No	Perform the next step.

7 Stop the unit operation via the user interface.

8 Unplug the power supply connector from the water pump.

9 Turn ON the power of the unit.

Activate the water pump.

10 Remove the cap from the power supply connector and measure the voltage between L - N. The voltage MUST be 195~253 V AC.

Is the measured voltage correct?	Action
Yes	Skip the next step(s) and continue with the measurement of the PWM signal.
No	Continue with the next step.

11 Unplug the water pump connector X16A and measure the voltage between pins 3–5 on the hydro PCB. The measured voltage MUST be 195~253 V AC.

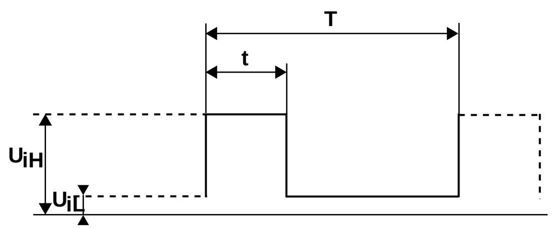
Is the measured voltage correct?	Action
Yes	Replace the power supply wiring harness between the water pump and the hydro PCB, see "3.24.2 Repair procedures" [▶ 279].
No	Perform a check of the hydro PCB, see "3.12.1 Checking procedures" [▶ 160].

12 Connect the power supply connector to the water pump.

13 Unplug the PWM signal connector from the water pump.

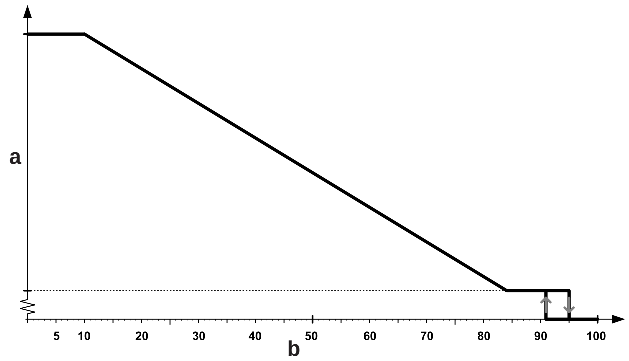
14 Remove the cap from the PWM signal connector and measure the PWM signal between the PWM-GND.

- When using an oscilloscope, the measured signal MUST look like the illustration shown below:



T Period of time of complete cycle
t Period of time of high-level input voltage
U_{IH} High-level input voltage
U_{IL} Low-level input voltage
d Duty cycle (t/T x 100) [%]

- When using any equipment that is capable to measure the duty cycle, the measured signal MUST show profile A (see illustration below). The PWM signal (duty cycle) is disproportional to the water pump speed (flow rate) in the range of 10% to 84% and the speed (flow rate) remains at its maximum value when the PWM signal (duty cycle) is below 10%.



a Pump speed
b PWM signal (duty cycle) [%]

Is the measured PWM signal correct?	Action
Yes	Replace the water pump housing, see "3.24.2 Repair procedures" [▶ 279].
No	Continue with the next step.

15 Unplug the water pump connector X25A and measure the PWM signal between pins 1-2 on the hydro PCB. The measured signal MUST be as mentioned in the previous step.

Is the measured PWM signal correct?	Action
Yes	Replace the PWM signal harness between the water pump and the hydro PCB, see "3.24.2 Repair procedures" [▶ 279].
No	Perform a check of the hydro PCB, see "3.12.1 Checking procedures" [▶ 160].

3.24.2 Repair procedures

To remove impurities from the water pump housing

Prerequisite: Remove the water pump housing, see "3.24.2 Repair procedures" [▶ 279].

1 Remove any impurities or objects that may block the water pump.

2 Install the water pump housing, see "3.24.2 Repair procedures" [▶ 279].

Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

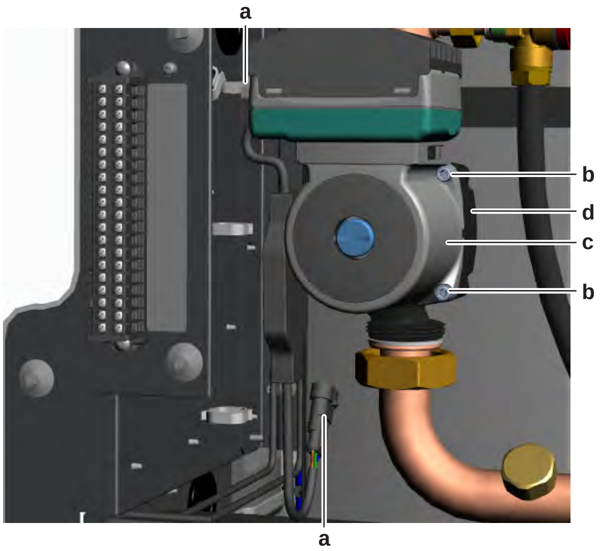
To remove the water pump motor

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.17 Plate work" [▶ 230].

1 Disconnect the connectors from the water pump motor.



a Connector
b Bolt
c Water pump motor
d Pump housing

2 Remove the 4 bolts that fix the water pump motor to the pump housing.

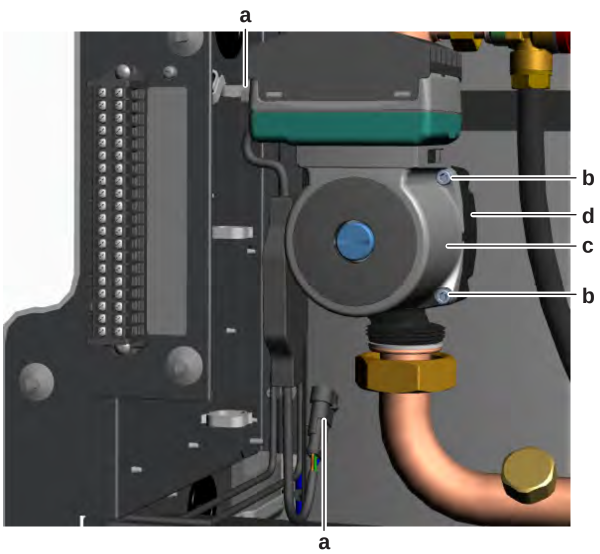
3 Separate the water pump motor from the pump housing.

4 Remove the water pump motor.

5 To install the water pump motor, see "3.24.2 Repair procedures" [▶ 279].

To install the water pump motor

1 Install the motor on the water pump housing.



a Connector
b Bolt
c Water pump motor
d Pump housing

> **CAUTION**
> Make sure to correctly install the water pump motor and the seal.

Fix the water pump motor by tightening the 4 bolts.

2 Connect the connectors to the water pump motor.

Is the problem solved?	Action
Yes	No further actions required.
No	Return to "3.24.1 Checking procedures" [▶ 276] of the water pump and continue with the next procedure.

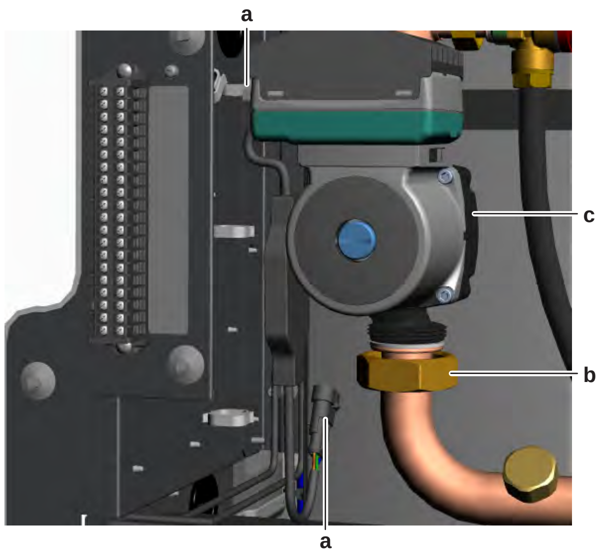
To remove the water pump housing

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.17 Plate work" [▶ 230].

1. Drain water from the water circuit, see "4.3.2 Repair procedures" [▶ 302].
2. Disconnect the connectors from the water pump motor.



a Connector
b Nut
c Water pump housing

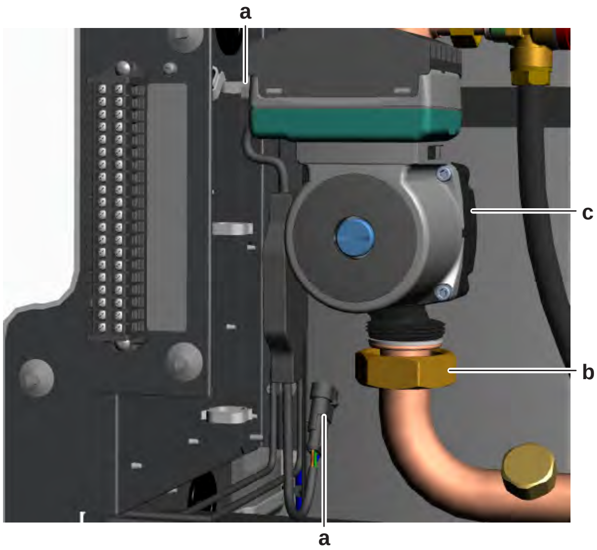
3. Unscrew the upper and lower nuts that fix the water pump housing to the water circuit pipes.

> **CAUTION**
>
> Use a counterforce when unscrewing or tightening the nuts to make sure NOT to damage the piping.

4. Remove the water pump housing.
5. To install the water pump housing, see "3.24.2 Repair procedures" [▶ 279].

To install the water pump housing

1. Install the water pump housing in the correct location.



a Connector
b Nut
c Water pump housing

2 Fix the water circuit pipes to the water pump housing by tightening the upper and lower nuts.

> **CAUTION**
> Use a counterforce when unscrewing or tightening the nuts to make sure NOT to damage the piping.

3 Connect the connectors to the water pump motor.

4 Open the valve (if equipped) of the water circuit towards the expansion vessel.

> **CAUTION**
> Make sure to open the valve (if equipped) towards the expansion vessel, otherwise the overpressure will be generated.

5 Open the stop valves and add water to the water circuit if needed, see "4.3.2 Repair procedures" [▸ 302].

Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

To remove the water pump wiring harness

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.17 Plate work" [▸ 230].

1 Disconnect the appropriate connector (power supply connector and/or PWM signal connector) from the water pump.

2 Disconnect the other end of the wiring harness from the appropriate connector:

- X16A on hydro PCB for power supply wiring harness
- X25A on hydro PCB for PWM signal wiring harness

3 Cut all tie straps that fix the wiring harness, and remove the wiring harness from the unit.

4 To install the water pump appropriate wiring harness, see "3.24.2 Repair procedures" [▶ 279].

To install the water pump wiring harness

1 Connect the wiring harness to the appropriate connector:

- X16A on hydro PCB for power supply wiring harness
- X25A on hydro PCB for PWM signal wiring harness

2 Route the wiring harness towards the water pump and connect the wiring harness to the appropriate connector (power supply and/or PWM signal) of the water pump.

3 Fix the wiring harness using new tie straps.

Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

4 Third party components

4.1 Electrical circuit

4.1.1 Checking procedures

To check the power supply of the unit

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.17 Plate work" [▶ 230].

1. Check that the power supply cables and earth connection are firmly fixed to the power supply terminal X1M.
2. Measure the insulation resistance between each power supply terminal and the ground using a megger device of 500 V DC. All measurements MUST be >1MΩ. If insulation resistance is <1MΩ, earth leakage is present.
3. Turn ON the power using the respective circuit breaker.

For single phase units

4. Measure the voltage between L and N on the power supply terminal X1M. The voltage MUST be 230 V AC ± 10%.

For three-phase units

5. Measure the voltage between the phases L1-L2-L3 on the power supply terminal X1M. The voltage MUST be 400 V AC ± 10%.
6. Measure the voltage between L1 and N on the power supply terminal X1M. The voltage MUST be 230 V AC ± 10%.
7. Unbalance between the phases MUST NOT exceed 2%.

Is the measured voltage (power supply) correct?	Action
Yes	Return to the troubleshooting of the specific error and continue with the next procedure.
No	Adjust the power supply, see "4.1.2 Repair procedures" [▶ 286].

To check if the power supply is conform with the regulations

1. Check that the power source is in line with the requirements described in the databook.

Is the power supply conform with the regulations?	Action
Yes	Return to the troubleshooting of the specific error and continue with the next procedure.
No	Adjust the power supply, see "4.1.2 Repair procedures" [▶ 286].

To prevent electrical hazards

To check the rectifier voltage

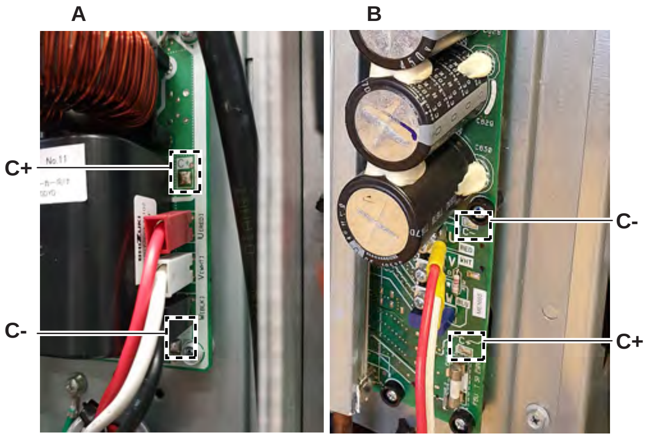
Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

1. Do NOT open the electrical component box cover for 10 minutes after turning off the power supply.
2. Remove the required plate work, see "3.17 Plate work" [▸ 230].

> **DANGER: RISK OF ELECTROCUTION**
>
> Do NOT touch any live parts or PCB's.

3. Measure the voltage between terminals on the terminal block for power supply with a tester and confirm that the power supply is shut off. In addition, measure points as shown in the figure, with a tester and confirm that the voltage of the capacitor in the main circuit is less than 10 V DC.



A 3-phase unit
B 1-phase unit

> **DANGER: RISK OF ELECTROCUTION**
>
> Confirm the rectifier voltage is below 10 V DC before proceeding.

To check the wiring between the outdoor unit and domestic hot water tank

1. Check that all wires are properly connected and that all connectors are fully plugged-in.
2. Check that no connectors or wires are damaged.
3. Check that the wiring corresponds with the wiring diagram, see "6.2 Wiring diagram" [▸ 314].

> **INFORMATION**
>
> Correct the wiring as needed.

Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

4.1.2 Repair procedures

To adjust the power supply

1. Make sure that the power source is in line with the requirements described in the databook.
2. Adjust the power supply within 50 Hz ± 3%.

Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

To correct the wiring between PCB's

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.17 Plate work" [▶ 230].

1. Make sure that all wires are firmly and correctly connected, see "6.2 Wiring diagram" [▶ 314].
2. Check the continuity of all wires.
3. Replace any damaged or broken wires.

Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

4.2 Refrigerant circuit

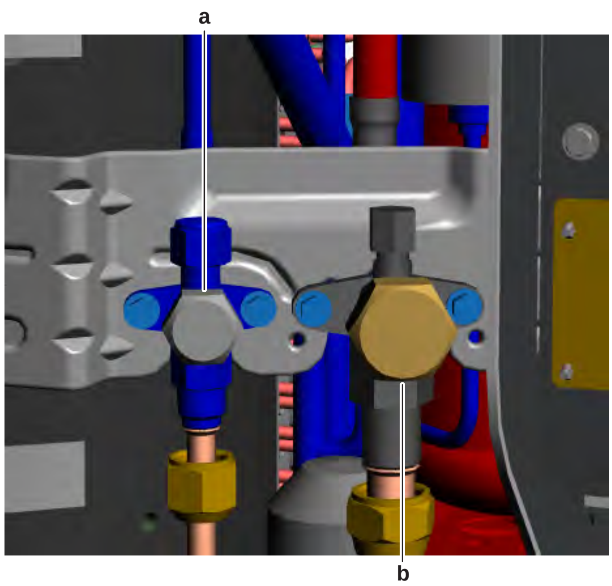
4.2.1 Checking procedures

> **INFORMATION**
>
> It is recommended to perform the checks in the listed order.

To check if the stop valves are open

Prerequisite: Remove the required plate work, see "3.17 Plate work" [▶ 230].

1. Remove the caps.



a Liquid stop valve
b Gas stop valve

2 Check if the stop valves are completely open.

The refrigerant circuit stop valves are open?	Action
Yes	Return to the troubleshooting of the specific error and continue with the next procedure.
No	Open the stop valves of the refrigerant circuit, see "4.2.2 Repair procedures" [▶ 291].

To check if the refrigerant circuit is clogged

1. Turn ON the power of the unit.
2. Activate `Heating` operation via the user interface.
3. Wait for the system to run at a more or less stable condition.
4. On the refrigerant liquid piping (between the refrigerant/water heat exchanger and the outdoor unit heat exchanger (coil)), using a contact thermometer, measure the temperature before and after every restricting device. If a big temperature difference is measured (>2.5~4K), an internal pipe obstruction may be present at this location.

> **INFORMATION**
>
> Focus on positions with a potential risk for clogging such as:
>
> - Filters
> - Valves
> - Brazing points
> - …

> **INFORMATION**
>
> A bigger temperature drop before and after the expansion valve can be normal, however excessive ice is indicating a malfunction of the expansion valve or internal obstruction of the valve (dirt or ice build up in case of humidity in the system).

Temperature drop found?	Action
Yes	Replace the clogged part, see "4.2.2 Repair procedures" [▶ 291].
No	Return to the troubleshooting of the specific error and continue with the next procedure.

To check if the refrigerant circuit is correctly charged

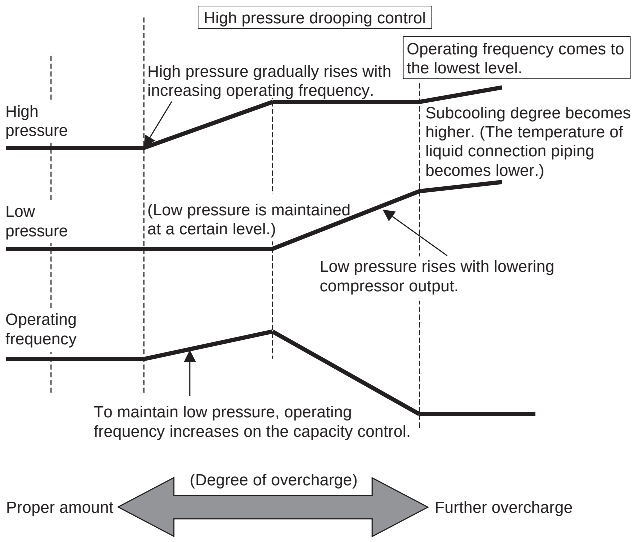
Due to the relationship to pressure control and electronic expansion valve control, the amount of refrigerant needs to be examined according to operating conditions.

Refer to the procedures shown below for correct examination.

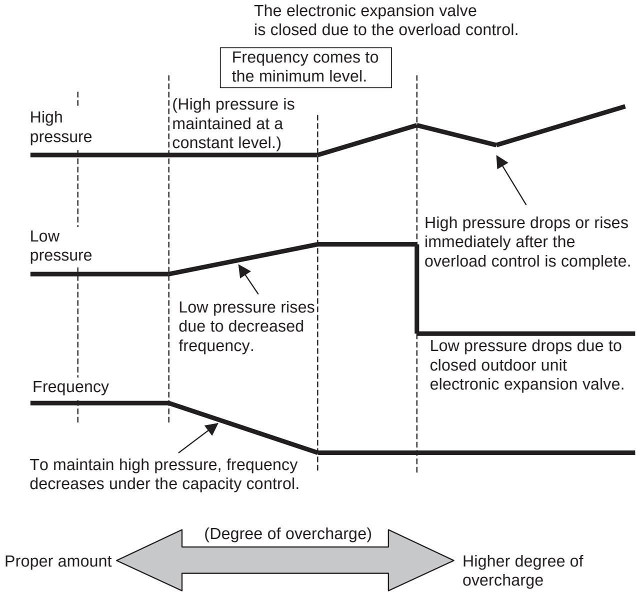
Refrigerant overcharge diagnosis

1. High pressure rises. Consequently, overload control is conducted to cause insufficient cooling capacity.
2. The superheated degree of suction gas lowers (or the wet operation is performed). Consequently, the compressor consumes more power and is noisy (before over-current relay trips).
3. The subcooling degree of refriferant in liquid form rises (values >4~5K are NOT normal).

Cooling



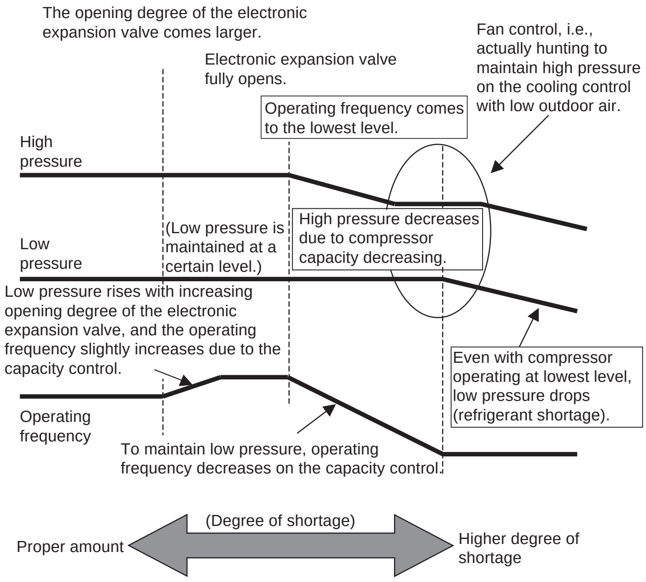
Heating



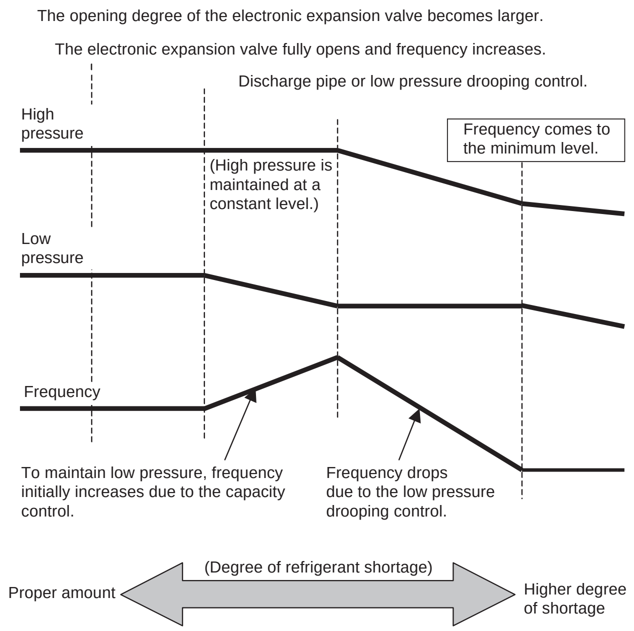
Refrigerant shortage diagnosis

1. The superheated degree of suction gas rises. Consequently, the compressor discharge gas temperature becomes higher than normal.
2. The superheated degree of suction gas rises. Consequently, the electronic expansion valve turns open more than normal or completely open for average output.
3. Low pressure drops to cause the unit not to reach cooling capacity (or heating capacity).

Cooling



Heating



Is the refrigerant circuit charged correctly?	Action
Yes	Return to the troubleshooting of the specific error and continue with the next procedure.
No	Add or recuperate refrigerant until correctly charged, see "4.2.2 Repair procedures" [▶ 291].

To check for non-condensables in the refrigerant circuit

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

1. Wait for the refrigerant to reach the outdoor temperature.
2. Connect a manometer to the service port.
3. Measure the pressure of the refrigerant. The measured pressure converted into saturated temperature MUST be in line with the expected pressure / saturated temperature at current ambient temperature.
4. If the measured pressure is significantly higher (>5K), non-condensables gasses are most likely present in the refrigerant.

Any non-condensables found in the refrigerant circuit?	Action
Yes	To replace the refrigerant, see "4.2.2 Repair procedures" [▶ 291].
No	Return to the troubleshooting of the specific error and continue with the next procedure.

To perform a pressure test of the refrigerant circuit

1. Perform a pressure test in line with local legislation.

Is the pressure in the refrigerant circuit correct?	Action
Yes	Return to the troubleshooting of the specific error and continue with the next procedure.
No	Replace the leaking part of the refrigerant circuit, see "4.2.2 Repair procedures" [▶ 291].

To check if the refrigerant field piping is conform with the regulations

1 Check if the refrigerant field piping is conform with the regulations. Adjust as needed. See installation manual for field piping specifications.

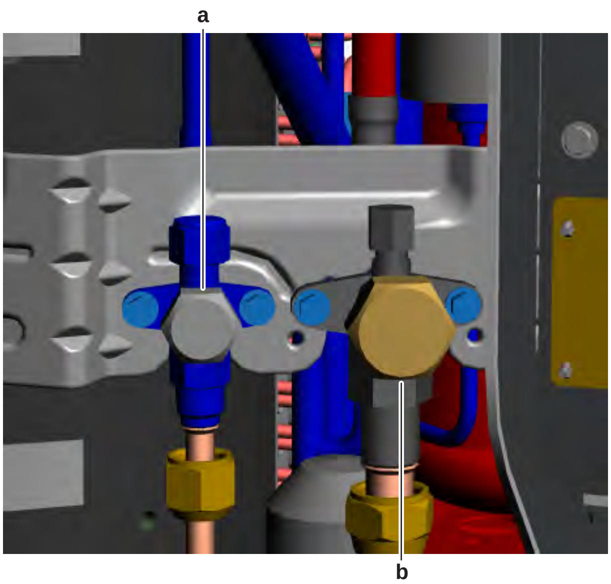
Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

4.2.2 Repair procedures

To open the stop valves of the refrigerant circuit

Prerequisite: Remove the required plate work, see "3.17 Plate work" [▶ 230].

1 Remove the caps.



a Liquid stop valve
b Gas stop valve

2 Completely open the stop valves by screwing the stop valve screw counterclockwise.

Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

To replace the clogged/leaking part of the refrigerant circuit

1 See the correct procedure for the component that needs to be repaired. See also "Repair information" [▶ 298] for more details.

Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

To recuperate the refrigerant

Prerequisite: Stop the unit operation via the user interface.

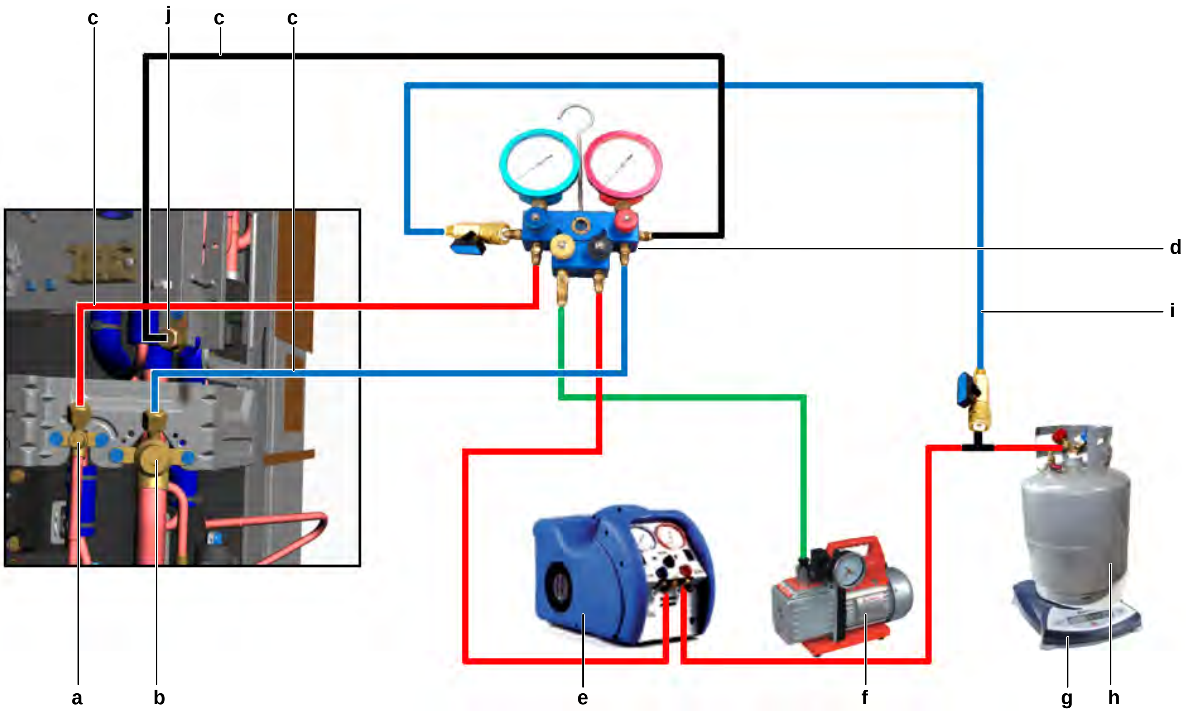
1 Necessary tools:

Service tool		Remark
	Refrigerant recovery unit	Compatible with the refrigerant to be recovered
	Scale	Read-out / 10 grams
	Manifold	Compatible with the refrigerant to be recovered
	Flexible hoses	Compatible with the refrigerant to be recovered

Service tool		Remark
	Recovery cylinder	Compatible with the refrigerant to be recovered
	Vacuum pump	2-stage, equipped with solenoid valve

2 Setup a vacuum line between recovery unit discharge and the recovery bottle. Without this additional setup, the discharge line from the recovery device to the refrigerant cylinder would not have been vacuumed.

3 Connect the vacuum pump, manifold, recovery unit, and refrigerant recovery cylinder to the service ports of the refrigerant circuit as shown below. Make sure the stop valves are open.



- **a** Liquid service port
- **b** Gas service port
- **c** Flexible hose
- **d** Manifold
- **e** Recovery unit
- **f** Vacuum pump
- **g** Scale
- **h** Recovery cylinder
- **i** Vacuum setup
- **j** Internal service port

4 Activate vacuum / recovery mode as described in "Recovery mode — In case of 1N~ models (7-LEDs display)" [▶ 294] or "Recovery mode — In case of 3N~ models (7-segments display)" [▶ 295].

5 To make sure that refrigerant cycle is completely connected and there are no dead-zones because of closed expansion valves, entering the vacuum / recovery mode ensures that:

- all outdoor unit expansion valves get fully opened.

6 To add refrigerant, see "4.2.2 Repair procedures" [▶ 291].

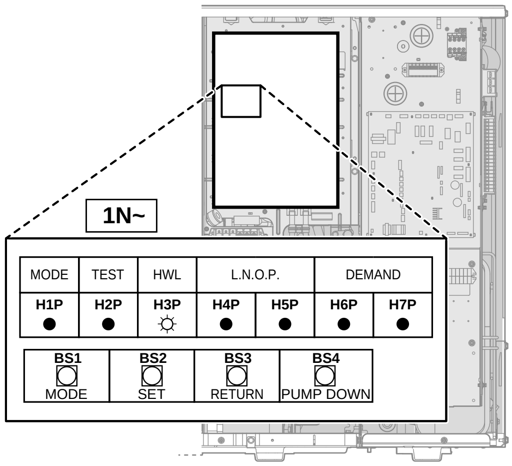
Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

Recovery mode — In case of 1N~ models (7-LEDs display)

Before recovering refrigerant, make sure the electronic expansion valves are open. When power is ON, this has to be done by using the recovery mode.

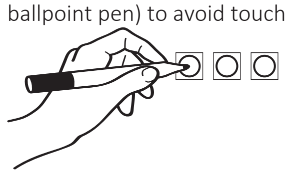
Components

To activate/deactivate the recovery mode, you need the following components:



H1P~H7P 7-LEDs display

BS1~BS4 Push buttons. Operate the push buttons with an insulated stick (such as a closed ballpoint pen) to avoid touching of live parts.



To activate the recovery mode

> **INFORMATION**
>
> If you get confused in the middle of the process, press BS1 to return to the default situation.

Before recovering refrigerant, activate the recovery mode as follows:

#	Action	7-LEDs display[a]						
		H1P	H2P	H3P	H4P	H5P	H6P	H7P
1	Start from the default situation.	●	●	●	●	●	●	●

#	Action	7-LEDs display[a]						
		H1P	H2P	H3P	H4P	H5P	H6P	H7P
2	Press and hold **BS1** for 5 seconds.	○	●	●	●	●	●	●
3	Press **BS2** 9 times.	○	●	●	○	●	●	○
4	Press **BS3** once.	○	●	●	●	●	●	◐
5	Press **BS2** once.	○	●	●	●	●	◐	●
6	Press **BS3** once.	○	●	●	●	●	○	●
7	Press **BS3** once. The flashing H1P indicates the recovery mode has been correctly selected and is activated.	◐	●	●	●	●	●	●
8	Press **BS1** once. H1P keeps flashing, indicating that you are in a mode that does not allow compressor operation.	◐	●	●	●	●	●	●

[a] ● = OFF, ○ = ON, and ◐ = flashing.

Result: The recovery mode is activated. The unit opens the electronic expansion valves.

To deactivate the recovery mode

After recovering refrigerant, deactivate the recovery mode as follows:

#	Procedure	7-LEDs display[a]						
		H1P	H2P	H3P	H4P	H5P	H6P	H7P
1	Press and hold **BS1** for 5 seconds.	◐	●	●	●	●	●	●
2	Press **BS2** 9 times.	◐	●	●	○	●	●	○
3	Press **BS3** once.	◐	●	●	●	●	◐	●
4	Press **BS2** once.	◐	●	●	●	●	●	◐
5	Press **BS3** once.	◐	●	●	●	●	●	○
6	Press **BS3** once.	◐	●	●	●	●	●	●
7	Press **BS1** once to return to the default situation.	●	●	●	●	●	●	●

[a] ● = OFF, ○ = ON, and ◐ = flashing.

Result: The recovery mode is deactivated. The unit returns the electronic expansion valves to their initial state.

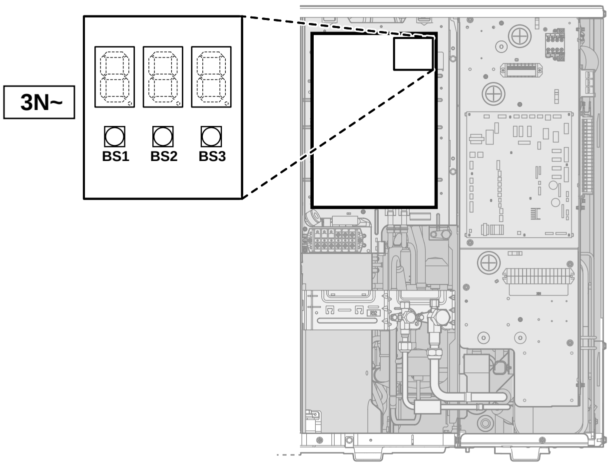
> **INFORMATION**
>
> **Power OFF**. When power is turned OFF and turned ON again, the recovery mode is deactivated automatically.

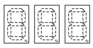
Recovery mode — In case of 3N~ models (7-segments display)

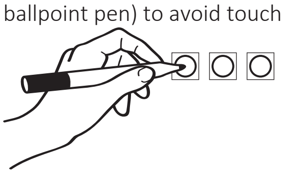
Before recovering refrigerant, make sure the electronic expansion valves are open. When power is ON, this has to be done by using the recovery mode.

Components

To activate/deactivate the recovery mode, you need the following components:



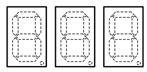
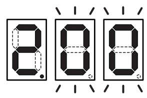
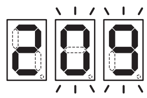
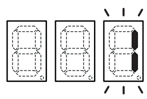
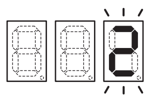
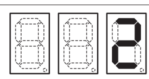
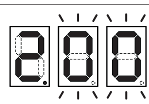
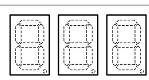
	7-segments display
BS1~BS3	Push buttons. Operate the push buttons with an insulated stick (such as a closed ballpoint pen) to avoid touching of live parts.



To activate the recovery mode

> **INFORMATION**
>
> If you get confused in the middle of the process, press BS1 to return to the default situation.

Before recovering refrigerant, activate the recovery mode as follows:

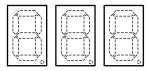
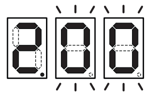
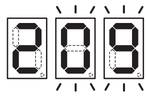
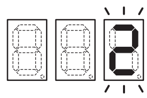
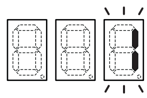
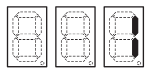
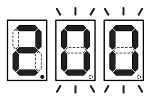
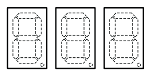
#		Action	7-segments display[a]
1		Start from the default situation.	
2		Select mode 2. Press and hold **BS1** for 5 seconds.	
3		Select setting 9. Press **BS2** 9 times.	
4		Select value 2.	
	a	Display the current value. Press **BS3** once.	
	b	Change the value to 2. Press **BS2** once.	
	c	Enter the value in the system. Press **BS3** once.	
	d	Confirm. Press **BS3** once.	
5		Return to the default situation. Press **BS1** once.	

[a] = OFF, = ON, and = flashing.

Result: The recovery mode is activated. The unit opens the electronic expansion valves.

To deactivate the recovery mode

After recovering refrigerant, deactivate the recovery mode as follows:

#		Procedure	7-segments display[a]
1		Start from the default situation.	
2		Select mode 2. Press and hold **BS1** for 5 seconds.	
3		Select setting 9. Press **BS2** 9 times.	
4		Select value 2.	
	a	Display the current value. Press **BS3** once.	
	b	Change the value to 2. Press **BS2** once.	
	c	Enter the value in the system. Press **BS3** once.	
	d	Confirm. Press **BS3** once.	
5		Return to the default situation. Press **BS1** once.	

[a] = OFF, = ON, and = flashing.

Result: The recovery mode is deactivated. The unit returns the electronic expansion valves to their initial state.

> **INFORMATION**
>
> **Power OFF**. When power is turned OFF and turned ON again, the recovery mode is deactivated automatically.

To add refrigerant

1 See the installer reference guide for the correct procedure.

Is the problem solved?	Action
Yes	No further actions required.
No	Perform a pressure test of the refrigerant circuit, see "4.2.1 Checking procedures" [▶ 286].

Repair information

Refrigerant piping handling

- Make sure that the applied pressure is never higher than the unit design pressure indicated on the nameplate (PS).
- Work according to the F-gas regulation and/or local regulations.
- Make sure the correct amount of refrigerant is charged after repair according to the F-gas regulation label on the unit (factory + additional where required).
- Make sure to use the appropriate equipment and tools according to the refrigerant and unit type.
- R32 can be charged in gas phase.
- Make sure to use a digital scale (no charging cylinder).
- Execute correct vacuum drying procedure after repair:
  - –0.1 MPa / –760 mm Hg / –750 Torr / –1 bar for at least 1 hour.
  - Connect the unit according to the available service ports.
  - Use related field setting where necessary to open expansion valve / solenoid valve.

To perform refrigerant pump down operation

The unit is equipped with an automatic pump down operation which will collect all refrigerant from the field piping and indoor unit in the outdoor unit. To protect the environment, make sure to perform the following pump down operation when relocating the unit.

DANGER: RISK OF EXPLOSION

Pump down – Refrigerant leakage. If you want to pump down the system, and there is a leak in the refrigerant circuit:

- Do NOT use the unit's automatic pump down function, with which you can collect all refrigerant from the system into the outdoor unit. **Possible consequence:** Self-combustion and explosion of the compressor because of air going into the operating compressor.
- Use a separate recovery system so that the unit's compressor does NOT have to operate.

CAUTION

Some outdoor units are equipped with a low pressure switch to protect the compressor by switching it off. NEVER short-circuit the low pressure switch during pump down operation.

1. Remove the refrigerant connection cover, see "3.17 Plate work" [▸ 230].
2. Remove the cap from the stop valves.
3. Perform pump down operation, see installer reference guide for the correct procedure.
4. After 5~10 minutes (after only 1~2 minutes in case temperature <–10°C), close the liquid stop valve using a hexagonal wrench.
5. Check the manifold if vacuum is reached. Close the gas stop valve and stop forced cooling operation.

Refrigerant piping repair

- Make sure to cover open pipe ends during repair so no dust or moisture can enter.

- Make sure to re-apply insulation removed during repair.
- Pipe expansion / flare making:
  - Remove any burrs on the cut surface using the correct tool such as reamer or scraper (note that excessive deburring can thin the pipe walls and cause cracking of the pipe).
  - Make sure the flare has the correct size (use a flare gauge).
  - Make sure no particles remain in the piping.
  - Apply just a drop of refrigerant oil on the inner surface of the flare.
  - Make sure the flare connection is tightened with the correct torque (torque values refer to installation manual).
- Brazing:
  - Use the correct brazing tool.
  - Use a phosphor copper filler metal (silver composition of 0 to 2%). Do not use flux material.
  - Flush the piping before brazing with nitrogen to avoid oxidation of the inside of the copper tubes (nitrogen purity ≥99.99%).

4.3 Water circuit

4.3.1 Checking procedures

To check for an external pump

1 Inspect the installation outside the unit and check for the presence of an external pump. This may have an impact on the water flow inside the unit.

An external pump was found in the installation?	Action
Yes	Remove the external pump from the installation, see "4.3.2 Repair procedures" [▸ 302].
No	Return to the troubleshooting of the specific error and continue with the next procedure.

To check the water pressure

1 Turn ON the power of the unit.

> **INFORMATION**
>
> Make sure that the water pressure sensor is functioning correctly.

2 Read the water pressure on the home screen of the user interface.

Result: The pressure MUST be 1~2 bar.

Is the water pressure correct?	Action
Yes	Return to the troubleshooting of the specific error and continue with the next procedure.

Is the water pressure correct?	Action
No	Add or remove water from the water circuit until the pressure is correct, see "4.3.2 Repair procedures" [▶ 302].

To check the water flow

Prerequisite: Turn ON the power of the unit.

1 Activate `Cooling` or `Heating` operation via the user interface.

> **INFORMATION**
>
> Make sure that the water flow sensor is functioning correctly.

2 Navigate to the information menu on the user interface, see installer reference guide for correct procedure.

3 Read the water flow in the information menu on the user interface.

Result: The water flow MUST be as shown in the table below:

If operation is…	Then the minimum required flow rate is…
Cooling	20 l/min
Heating/defrost when outdoor temperature is above –5°C	
Heating/defrost when outdoor temperature is below –5°C	22 l/min
Domestic hot water production	28 l/min

Is the water flow correct?	Action
Yes	Return to the troubleshooting of the specific error and continue with the next procedure.
No	Continue with the next step.

4 Check the water pressure, see "4.3.1 Checking procedures" [▶ 299].

Is the water pressure correct?	Action
Yes	Return to the troubleshooting of the specific error and continue with the next procedure.
No	Add or remove water from the water circuit until the pressure is correct, see "4.3.2 Repair procedures" [▶ 302].

To check if the water circuit stop valves are open

1 The stop valves are located outside the unit. Check that all valves are in open position (in line with the piping).

All valves are open?	Action
Yes	Return to the troubleshooting of the specific error and continue with the next procedure.

All valves are open?	Action
No	Open the specific valve(s) of the water circuit, see "4.3.2 Repair procedures" [▶ 302].

To check for an external heat source

1 Inspect the installation outside the unit and check for the presence of an external heat source. This may have an impact on the water temperature inside the unit.

An external heat source was found in the installation?	Action
Yes	Remove the external heat source from the installation, see "4.3.2 Repair procedures" [▶ 302].
No	Return to the troubleshooting of the specific error and continue with the next procedure.

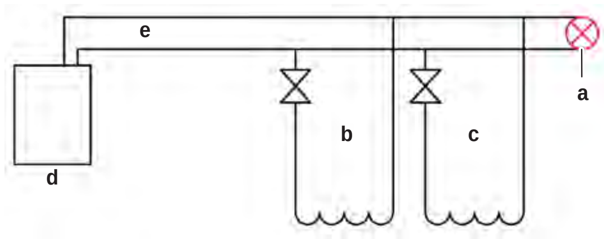
To check if the field installed air purge valves are installed on the correct locations

1 Check the installation outside the unit. All highest points of the installation MUST have air purge valves installed. The air purge valves MUST NOT be installed on other locations.

All air purge valves are installed on the correct locations?	Action
Yes	Return to the troubleshooting of the specific error and continue with the next procedure.
No	Install the specific air purge valve(s) on the correct location(s) in the water circuit, see "4.3.2 Repair procedures" [▶ 302].

To check if a by-pass is installed in the water circuit

1 A by-pass MUST be installed in the water circuit outside the unit. This is needed to make sure that water can still flow through the circuit even when all loops (underfloor heating, radiators, …) are shut-off (e.g. for anti-freeze function).



- **a** By-pass
- **b** Underfloor heating (cooling) circuit
- **c** Radiators circuit
- **d** Indoor or outdoor unit
- **e** Space heating (cooling) water circuit

Is a by-pass installed in the water circuit?	Action
Yes	Return to the troubleshooting of the specific error and continue with the next procedure.
No	Install a by-pass in the water circuit, see "4.3.2 Repair procedures" [▶ 302].

To check for a leaking field installed domestic hot water tap

1 Inspect the installation outside the unit and check for a leaking domestic hot water tap.

Was a leaking domestic hot water tap found in the installation?	Action
Yes	Replace the leaking domestic hot water tap, see "4.3.2 Repair procedures" [▶ 302].
No	Return to the troubleshooting of the specific error and continue with the next procedure.

To check for leaks in the water circuit

1 Inspect the installation outside the unit and check for leaks.

A leak was found in the installation?	Action
Yes	Repair the leak in the installation, see "4.3.2 Repair procedures" [▶ 302].
No	Return to the troubleshooting of the specific error and continue with the next procedure.

To check the main water supply and pressure

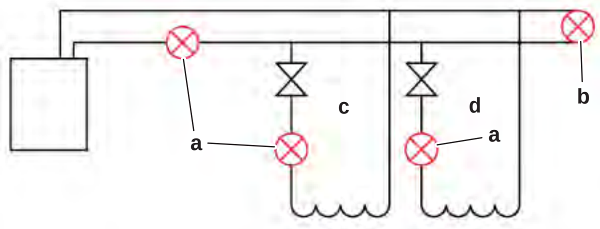
1 Check that the main water supply and pressure of the installation is within the expected range (>1 bar).

Main water supply and pressure within expected range?	Action
Yes	Return to the troubleshooting of the specific error and continue with the next procedure.
No	Adjust the main water supply of the installation, see "4.3.2 Repair procedures" [▶ 302].

4.3.2 Repair procedures

To remove the external pump from the water circuit

1 If an external pump is found in the installation outside the unit, the pump MUST be programmed as such that it ONLY works when the water pump of the unit is off. See the specific dealer manual of the external pump for this procedure.



a External pump
b By-pass
c Underfloor heating circuit
e Radiators circuit

2 If impossible to program as such, the external pump needs to be removed from the installation.

Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

To remove/drain water from the water circuit

> **INFORMATION**
>
> This procedure partially drains the water circuit, sufficient for component replacement.

Prerequisite: Stop the unit operation via the user interface.

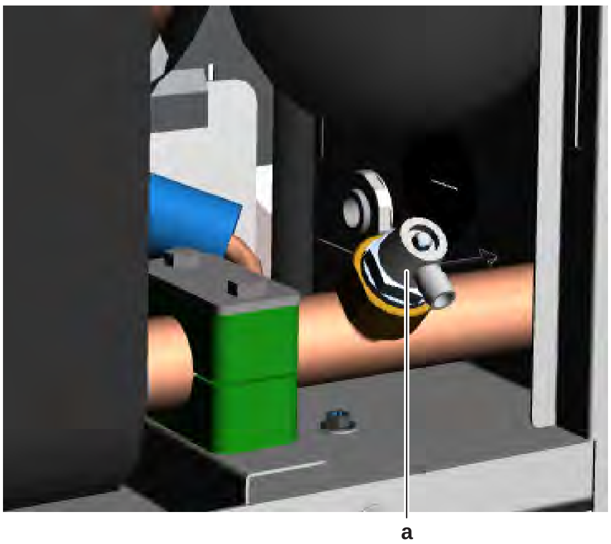
Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.17 Plate work" [▶ 230].

1 Close the stop valves of the water circuit.

2 Open the air purge valves, see "4.3.2 Repair procedures" [▶ 302].

3 Open the drain valve to drain water from the water circuit. Collect the drained water in a drain pan, bottle,….



a Drain valve

4 To add water to the water circuit, see "4.3.2 Repair procedures" [▶ 302].

Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

To add water to the water circuit

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.17 Plate work" [▸ 230].

1. To fill the water circuit, use a field supply filling kit. Make sure you comply with the applicable legislation.
2. Purge the water circuit, see "4.3.2 Repair procedures" [▸ 302].

Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

To open the stop valves of the water circuit

1. The stop valves are located outside the unit. Open the valves by placing them in line with the piping.

Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

To open the air purge valves of the water circuit

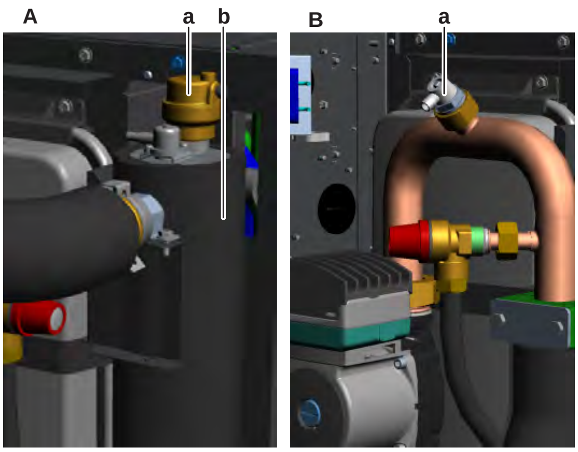
Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.17 Plate work" [▸ 230].

1. Place the air purge valve, installed inside the unit, in the open position by turning it clockwise.

> **INFORMATION**
>
> If a backup heater kit is installed, place the air purge valve of the backup heater kit in the open position.



A Unit with built-in backup heater
B Unit without backup heater
a Air purge valve
b Backup heater

2 Place all field installed air purge valves in the open position.

3 Purge the water circuit, see "4.3.2 Repair procedures" [▶ 302].

Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

To install the field installed air purge valves on the highest points of the water circuit

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

1 Install field installed air purge valves on all highest points of the installation outside the unit.

2 Purge the water circuit, see "4.3.2 Repair procedures" [▶ 302].

Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

To purge the water circuit

1 Check that all field installed air purge valves are installed in the correct locations, see "4.3.1 Checking procedures" [▶ 299].

2 See "To open the air purge valves of the water circuit" [▶ 304] for detailed information about the unit air purge valves.

3 See the installer reference guide for the correct air purge procedure.

Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

To remove the external heat source from the water circuit

1 Remove the external heat source from the installation outside the unit.

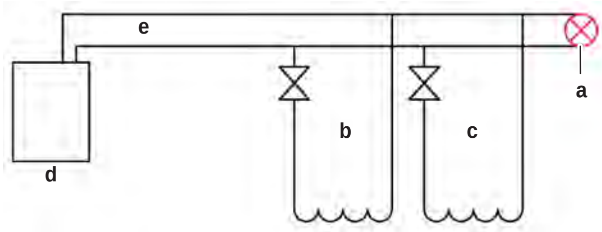
Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

To install a by-pass in the water circuit

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

1 Install a by-pass in the water circuit outside the installation as shown below.



a By-pass
b Underfloor heating (cooling) circuit
c Radiators circuit
d Indoor or outdoor unit
e Space heating (cooling) water circuit

Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

To replace the leaking domestic hot water tap in the water circuit

1 Replace the leaking domestic hot water tap in the water circuit with a correct one.

Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

To repair the leak in the water circuit

1 Repair the leak in the water circuit.

Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

To adjust the main water supply of the installation

1 Adjust the main water supply of the installation to be within the expected range (>1 bar).

Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

4.4 Manufacturer components

4.4.1 Checking procedures

To check the correct operation / setting of the manufacturer component

1 See the specific dealer manual to check for the correct installation, operation or setting of your component.

Does the component function correctly?	Action
Yes	Return to the troubleshooting of the specific error and continue with the next procedure.
No	Adjust the specific component, see "4.4.2 Repair procedures" [▸ 307].

4.4.2 Repair procedures

To adjust the manufacturer component

1 See the specific dealer manual to adjust your component.

Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

4.5 External factors

4.5.1 Checking procedures

To check the outdoor temperature

1 The temperature ranges for the different operation modes of the unit can be found in the databook on Business Portal.

> **INFORMATION**
>
> If the outdoor temperature is outside the range of operation, the unit may NOT operate or may NOT deliver the required capacity.

Is the outdoor temperature within the operating range?	Action
Yes	Return to the troubleshooting of the specific error and continue with the next procedure.
No	Wait for the outdoor temperature to return within the operating range.

To check the required space around the outdoor unit heat exchanger

1. Check if the space around the outdoor unit heat exchanger is sufficient. See the installation manual for the required space specifications. Adjust as needed.

Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

5 Maintenance

5.1 To clean the outdoor unit heat exchanger

1 Straighten the hair fins.

2 Clear the outdoor unit heat exchanger from dust, leaves,... using a fin-comb or compressed air/N_2.

CAUTION

Avoid bending or damaging the hair fins of the outdoor unit heat exchanger during the cleaning process.

Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

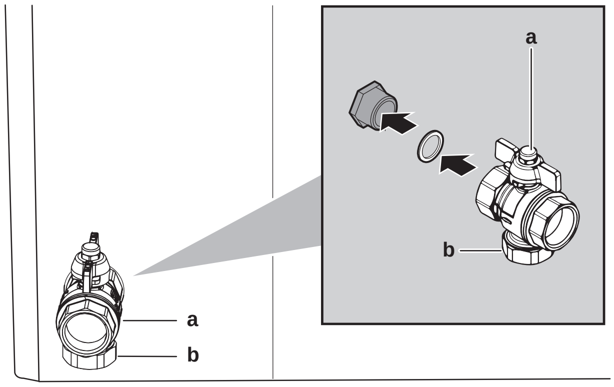
5.2 To clean the integrated filter of the shut-off valve

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

1 Close the shut-off valve.

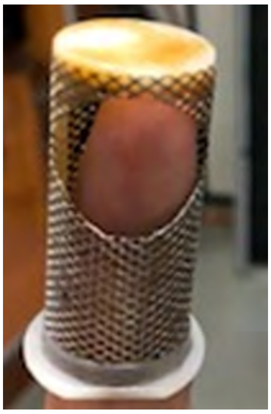
2 Unscrew the bottom cap.



a Shut-off valve
b Bottom cap

3 Pull the filter out of the shut-off valve.

4 Clean the filter with water and a soft brush.



a Filter

5 When cleaned, reinstall the filter in the shut-off valve.

> **NOTICE**
>
> Handle the water filter with care. Do NOT use excessive force when you reinsert the water filter so as NOT to damage the water filter mesh.

6 Screw the bottom cap back on.

7 Open the shut-off valve.

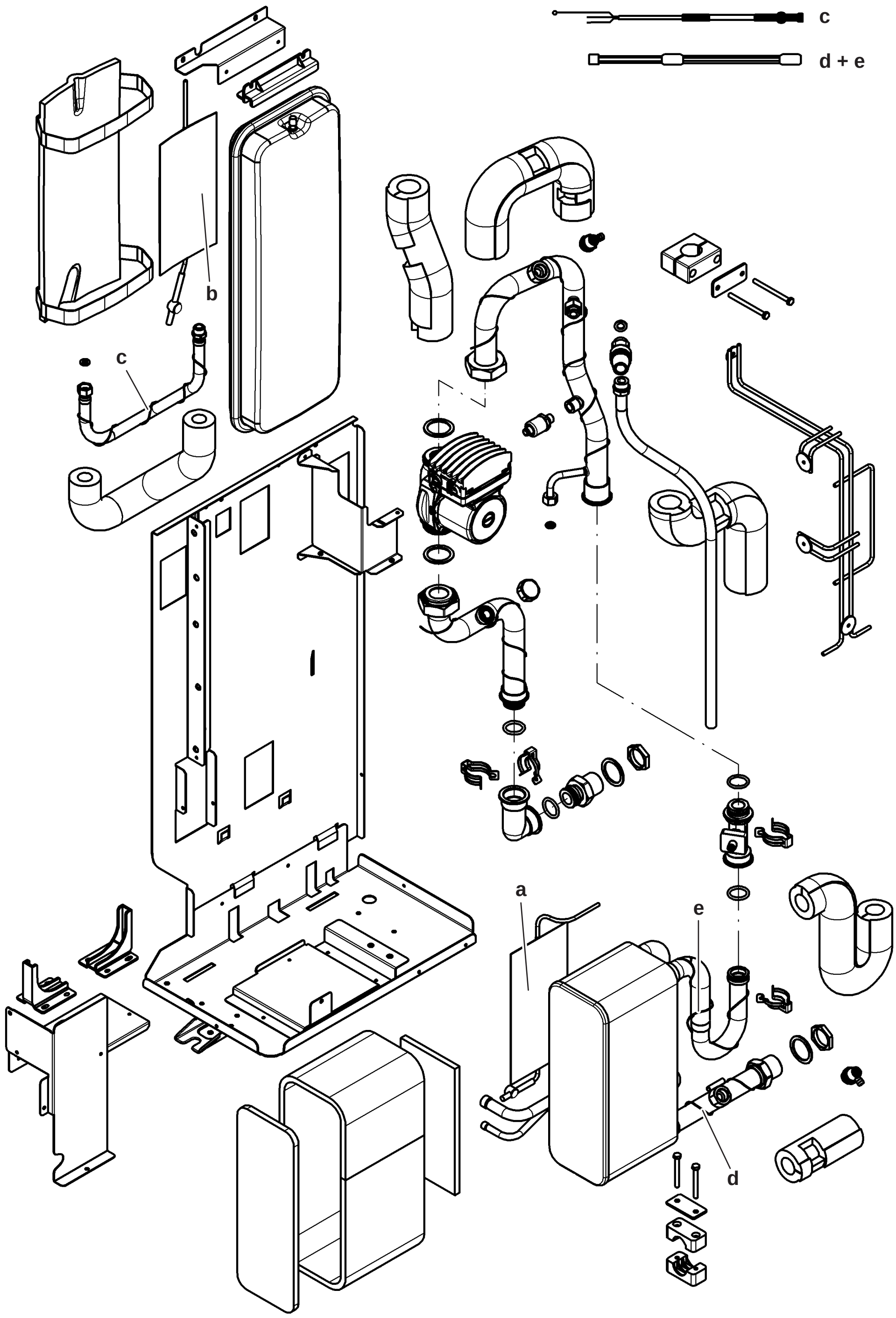
8 Make sure that the air purge valves are in the open position.

Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

5.3 To check the pipe heaters

The unit contains several pipe heaters to avoid freezing of the water circuit. Yearly check the correct functioning of these pipe heaters and repair as needed.

Below is an overview of the different pipe heaters and technical data. Also check the "6.2 Wiring diagram" [▶ 314] for more information.



- **a** E6H
- **b** E9H
- **c** E10H
- **d** E11H
- **e** E12H

Pipe heater	Location	Type	PCB	Connector	Intermediate connector	Control	Energized when…
E6H	Plate type heat exchanger	Aluminium foil heater	Hydro (A1P)	X2A + X28A	X7M: 7-8	Own bimetal thermostat (primary) + contact KCR on PCB (secondary)	Thermostat: ON: T <4°C OFF: T >9°C KCR contact: ON: outdoor T <5°C and inlet water T <6°C OFF: outdoor T >10°C or inlet water T >11°C
E9H	Expansion vessel	Aluminium foil heater	Hydro (A1P)	X24A	X7M: 1-2 + X13Y: 1-2	Own bimetal thermostat	ON: T <4°C OFF: T >9°C
E10H	Expansion vessel flex	Tape heater	Hydro (A1P)	X24A	X7M: 1-2 + X14Y: 1-2	Own bimetal thermostat	ON: T <4°C OFF: T >9°C
E11H	Water inlet	Tape heater	Hydro (A1P)	X2A + X28A	X7M: 3-4	Contact KCR on PCB	ON: outdoor T <5°C and inlet water T <6°C OFF: outdoor T >10°C or inlet water T >11°C
E12H	Water outlet after heat exchanger	Tape heater	Hydro (A1P)	X2A + X28A	X7M: 3-4	Contact KCR on PCB	ON: outdoor T <5°C and inlet water T <6°C OFF: outdoor T >10°C or inlet water T >11°C

Pipe heater	Power supply voltage	Power	Resistance	Current
E6H	230 V AC	50 W	970 Ω	0.23 A
E9H	230 V AC	50 W	970 Ω	0.23 A
E10H	230 V AC	16.6 W	3300 Ω	0.07 A
E11H	230 V AC	33 W	1600 Ω	0.15 A
E12H	230 V AC	33 W	1600 Ω	0.15 A

6 Technical data

6.1 Detailed information setting mode

6.1.1 Detailed information setting mode: Outdoor unit

See the installer reference guide on business portal for more information.

6.1.2 Detailed information setting mode: Remote controller

See the installer reference guide on business portal for more information.

6.2 Wiring diagram

6.2.1 Wiring diagram: Outdoor unit

The wiring diagram is delivered with the unit, located at the inside of the service cover.

Compressor module

Translation of text on wiring diagram:

English		Translation
(1) Connection diagram		(1) Connection diagram
Compressor SWB		Compressor switch box
Outdoor		Outdoor
(2) Compressor switch box layout		(2) Compressor switch box layout
Front		Front
Rear		Rear
(3) Legend		(3) Legend
	*: Optional; #: Field supply	
A1P		Printed circuit board (main)
A2P		Printed circuit board (noise filter)
A3P (only for 1N~ models)		Printed circuit board (flash)
Q1DI	#	Earth leakage circuit breaker
X1M		Terminal strip
(4) Notes		(4) Notes
X1M		Main terminal
—·—·—·		Earth wiring
-------		Field supply
①		Several wiring possibilities
		Option
		Wiring depending on model
		Switch box
		PCB

Hydro module

Translation of text on wiring diagram:

English	Translation
(1) Connection diagram	(1) Connection diagram
3 wire type SPDT	3 wire type SPDT
Booster heater power supply	Booster heater power supply
Compressor switch box	Compressor switch box

English	Translation
External BUH	External backup heater kit
For DHW tank option	For DHW tank option
For external BUH option	For external backup heater kit
Hydro SWB power supplied from compressor SWB	Hydro switch box power supplied from compressor switch box
Hydro	Hydro module
Normal kWh rate power supply	Normal kWh rate power supply
Only for normal power supply (standard)	Only for normal power supply (standard)
Only for preferential kWh rate power supply (outdoor)	Only for preferential kWh rate power supply (outdoor)
Outdoor	Outdoor
SWB1	Hydro switch box 1 (front side)
SWB2	Hydro switch box 2 (right side)
Use normal kWh rate power supply for hydro SWB	Use normal kWh rate power supply for hydro switch box
(2) Hydro SWB layout	(2) Hydro switch box layout
For external BUH option	For external backup heater kit
For internal BUH option	For models with integrated backup heater
SWB1	Hydro switch box 1 (front side)
SWB2	Hydro switch box 2 (right side)
SWB3	Hydro switch box 3 (behind SWB2)
(3) Notes	(3) Notes
X1M	Terminal (main)
X2M	Terminal (field wiring for AC)
X3M	Terminal (external backup heater kit)
X4M	Terminal (booster heater power supply)
X5M	Terminal (field wiring for DC)
X9M	Terminal (integrated backup heater power supply)
X10M	Terminal (high voltage Smart Grid)
—·—·—·—·	Earth wiring
-------	Field supply
①	Several wiring possibilities
	Option
	Wiring depending on model
	Switch box
	PCB

English		Translation
(4) Legend		(4) Legend
	*: Optional; #: Field supply	
A1P		Main PCB
A2P	*	ON/OFF thermostat (PC=power circuit)
A3P	*	Heat pump convector
A4P	*	Digital I/O PCB
A8P	*	Demand PCB
A11P		MMI (= standalone user interface delivered as accessory) – Main PCB
A14P	*	PCB of the dedicated Human Comfort Interface (BRC1HHDA used as room thermostat)
A15P	*	Receiver PCB (wireless ON/OFF thermostat)
CN* (A4P)	*	Connector
DS1 (A8P)	*	DIP switch
E*P (A9P)		Indication LED
F1B	#	Overcurrent fuse backup heater
F2B	#	Overcurrent fuse booster heater
F1U, F2U (A4P)		Fuse 5 A 250 V for digital I/O PCB
K1A, K2A	*	High voltage Smart Grid relay
K1M		Safety contactor backup heater
K3M	*	Contactor booster heater
K*R (A4P)		Relay on PCB
M2P	#	Domestic hot water pump
M2S	#	2-way valve for cooling mode
M3S	*	3-way valve for floorheating / domestic hot water
M4S	*	Bypass valve kit (for external backup heater kit)
PC (A15P)	*	Power circuit
PHC1 (A4P)	*	Optocoupler input circuit
Q2L	*	Thermal protector booster heater
Q4L	#	Safety thermostat
Q*DI	#	Earth leakage circuit breaker
R1H (A2P)	*	Humidity sensor
R1T (A2P)	*	Ambient sensor of the ON/OFF thermostat

English		Translation
R1T (A14P)	*	Ambient sensor of the dedicated Human Comfort Interface (BRC1HHDA used as room thermostat)
R2T (A2P)	*	External sensor (floor or ambient)
R5T	*	Domestic hot water thermistor
R6T	*	External indoor or outdoor ambient thermistor
S1L	*	Flow switch
S1S	#	Preferential kWh rate power supply contact
S*T		Thermostat
S2S	#	Electricity meter pulse input 1
S3S	#	Electricity meter pulse input 2
S4S	#	Smart Grid feed-in
S6S~S9S	*	Digital power limitation inputs
S10S, S11S	#	Low voltage Smart Grid contact
SS1 (A4P)	*	Selector switch
TR1		Power supply transformer
X4M	*	Terminal strip (booster heater power supply)
X8M	#	Terminal strip (power supply at client side)
X9M		Terminal strip (integrated backup heater power supply)
X10M	*	Terminal strip (Smart Grid power supply)
X*, X*A, X*Y		Connector
X*M		Terminal strip
(5) Option PCBs		(5) Option PCBs
Alarm output		Alarm output
Changeover to ext. heat source		Changeover to external heat source
Max. load		Maximum load
Min. load		Minimum load
Only for demand PCB option		Only for demand PCB option
Only for digital I/O PCB option		Only for digital I/O PCB option
Options: ext. heat source output, alarm output		Options: external heat source output, alarm output
Options: On/OFF output		Options: ON/OFF output
Power limitation digital inputs: 12 V DC / 12 mA detection (voltage supplied by PCB)		Power limitation digital inputs: 12 V DC / 12 mA detection (voltage supplied by PCB)

English	Translation
Space C/H On/OFF output	Space cooling/heating ON/OFF output
SWB	Hydro switch box 1 (front side)
(6) Options	(6) Options
Continuous	Continuous current
DHW pump output	Domestic hot water pump output
Electric pulse meter input: 12 V DC pulse detection (voltage supplied by PCB)	Electricity meter pulse input: 12 V DC pulse detection (voltage supplied by PCB)
Ext. ambient sensor option (indoor or outdoor)	External indoor or outdoor ambient thermistor
For cooling mode	For cooling mode
For HP tariff	For preferential kWh rate power supply
For HV smartgrid	For high voltage Smart Grid
For LV smartgrid	For low voltage Smart Grid
For safety thermostat	For safety thermostat
For smartgrid	For Smart Grid
Inrush	Inrush current
Max. load	Maximum load
MMI	Standalone user interface (delivered as accessory)
NO valve	Normal open valve
Only for ***	Only for ***
Preferential kWh rate power supply contact: 16 V DC detection (voltage supplied by PCB)	Preferential kWh rate power supply contact: 16 V DC detection (voltage supplied by PCB)
Remote user interface	Dedicated Human Comfort Interface (BRC1HHDA used as room thermostat)
Safety thermostat contact: 16 V DC detection (voltage supplied by PCB)	Safety thermostat contact: 16 V DC detection (voltage supplied by PCB)
SD card	Card slot for WLAN cartridge
Smartgrid contacts	Smart Grid contacts
Smartgrid PV power pulse meter	Smart Grid photovoltaic power pulse meter
SWB1	Hydro switch box 1 (front side)
SWB2	Hydro switch box 2 (right side)
WLAN cartridge	WLAN cartridge
(7) External On/OFF thermostats and heat pump convector	(7) External ON/OFF thermostats and heat pump convector
Additional LWT zone	Additional leaving water temperature zone
Main LWT zone	Main leaving water temperature zone

English	Translation
Only for external sensor (floor/ambient)	Only for external sensor (floor or ambient)
Only for heat pump convector	Only for heat pump convector
Only for wired On/OFF thermostat	Only for wired ON/OFF thermostat
Only for wireless On/OFF thermostat	Only for wireless ON/OFF thermostat

Hydro module — Integrated backup heater

Translation of text on wiring diagram:

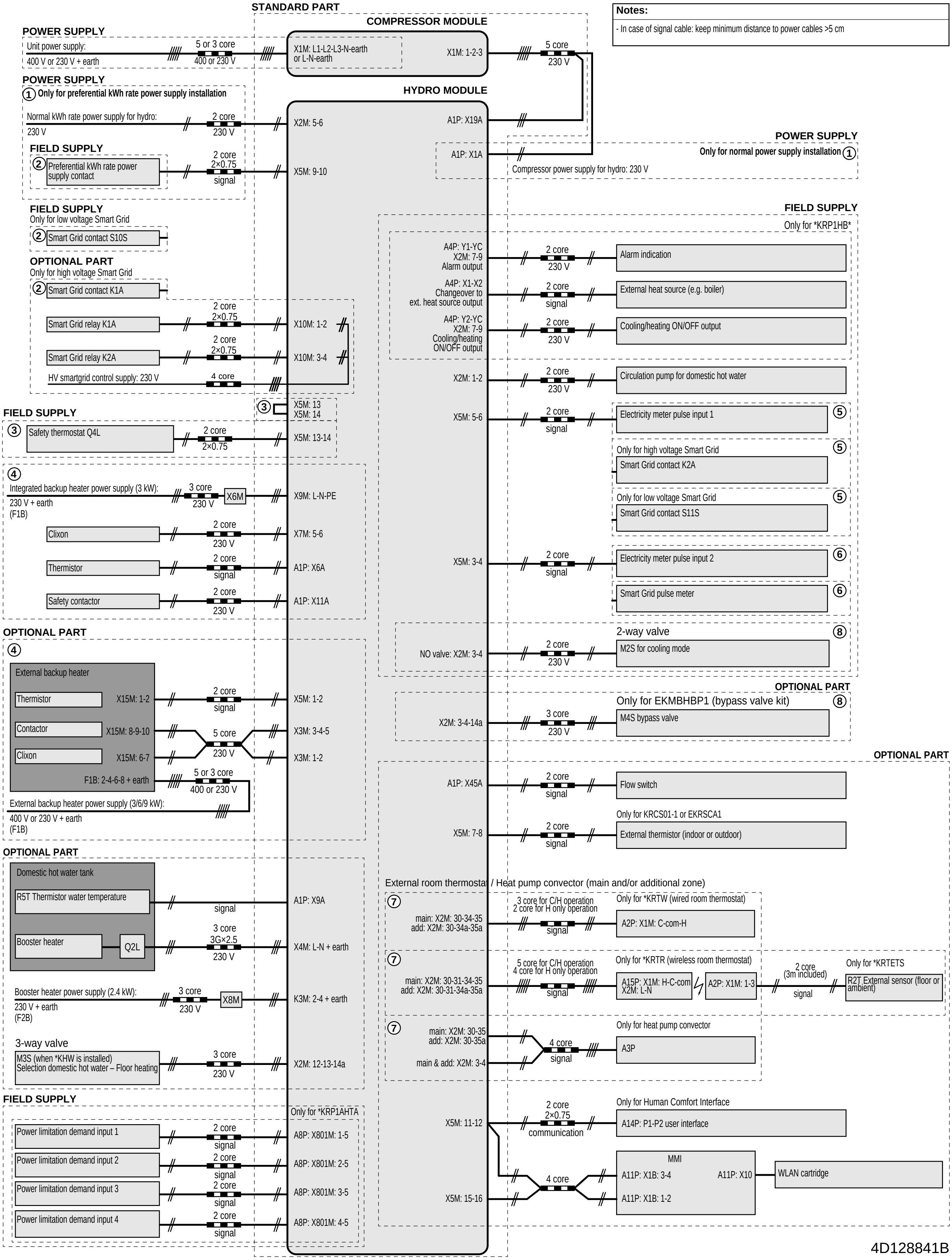
English	Translation
(1) Connection diagram	(1) Connection diagram
For internal BUH option	For models with integrated backup heater
Hydro	Hydro module
Outdoor	Outdoor
SWB2	Hydro switch box 2 (right side)
(2) Notes	(2) Notes
X1M	Terminal (main)
X2M	Terminal (field wiring for AC)
X4M	Terminal (booster heater power supply)
X5M	Terminal (field wiring for DC)
X9M	Terminal (integrated backup heater power supply)
X10M	Terminal (Smart Grid)
—·—·—·—	Earth wiring
- - - - - - -	Field supply
①	Several wiring possibilities
	Option
	Wiring depending on model
	Switch box
	PCB
(3) BUH switch box	(3) Backup heater switch box
SWB1	Hydro switch box 1 (front side)
SWB2	Hydro switch box 2 (right side)
SWB3	Hydro switch box 3 (behind SWB2)
(4) Legend	(4) Legend

	*: Optional; #: Field supply	
A1P		Main PCB
A4P	*	Digital I/O PCB
A8P	*	Demand PCB

English		Translation
F1B	#	Overcurrent fuse backup heater
K1A, K2A	*	High voltage Smart Grid relay
K1M		Safety contactor backup heater
K3M	*	Contactor booster heater
Q1DI	#	Earth leakage circuit breaker
TR1		Power supply transformer
X4M	*	Terminal strip (booster heater power supply)
X6M	#	Terminal strip (power supply at client side)
X9M		Terminal strip (integrated backup heater power supply)
X10M	*	Terminal (high voltage Smart Grid)
X*A		Connector
X*M		Terminal strip

Electrical connection diagram

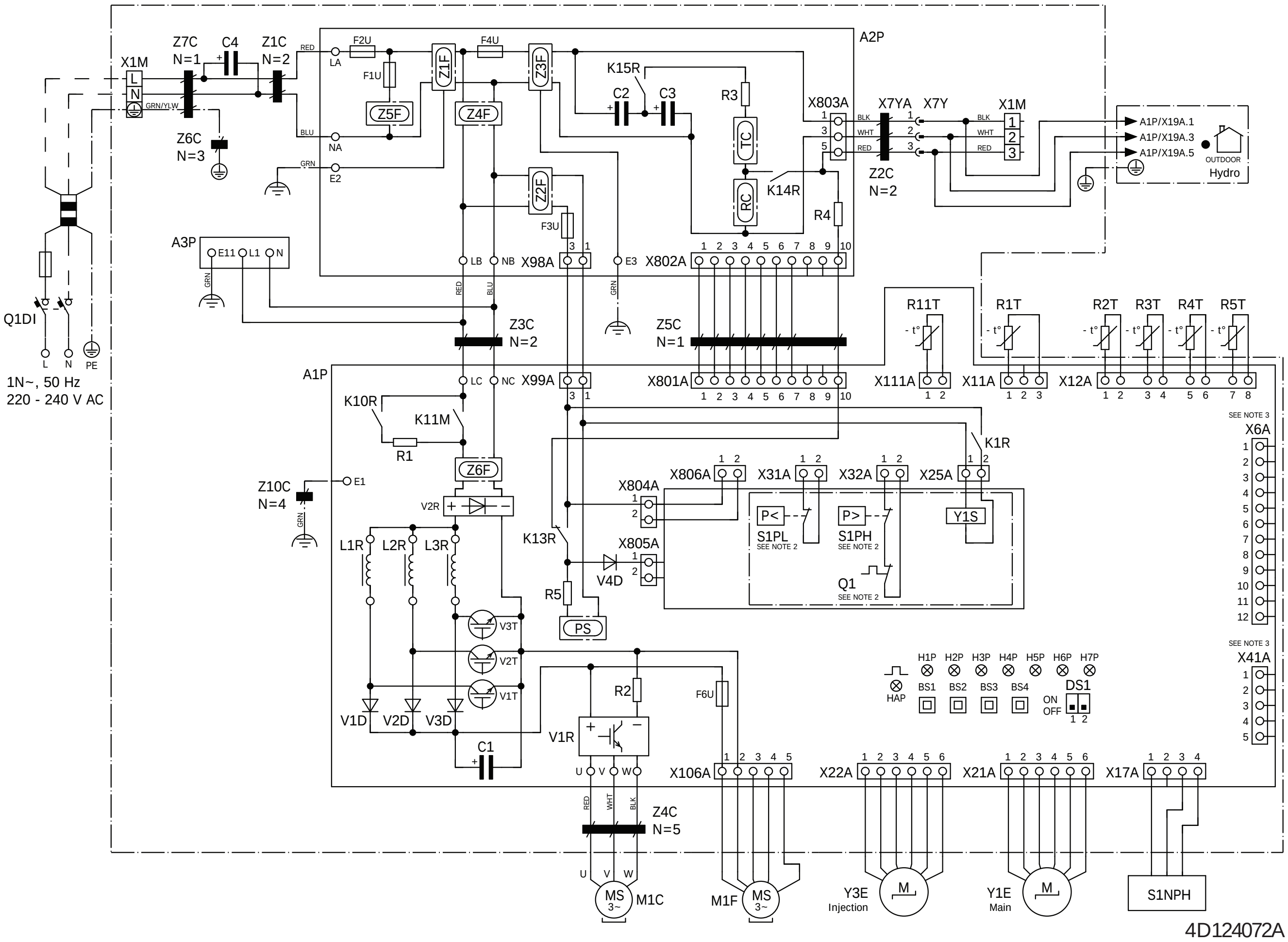
For more details, please check the unit wiring.



Single phase outdoor unit – compressor module

INFORMATION

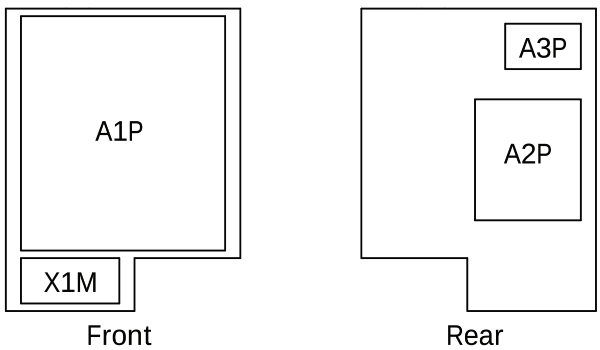
The diagrams shown in this manual may be incorrect due to changes/updates to the unit. Correct diagrams are supplied with the unit and can also be found in the technical data book.



4D124072A

INFORMATION

The diagrams shown in this manual may be incorrect due to changes/updates to the unit. Correct diagrams are supplied with the unit and can also be found in the technical data book.

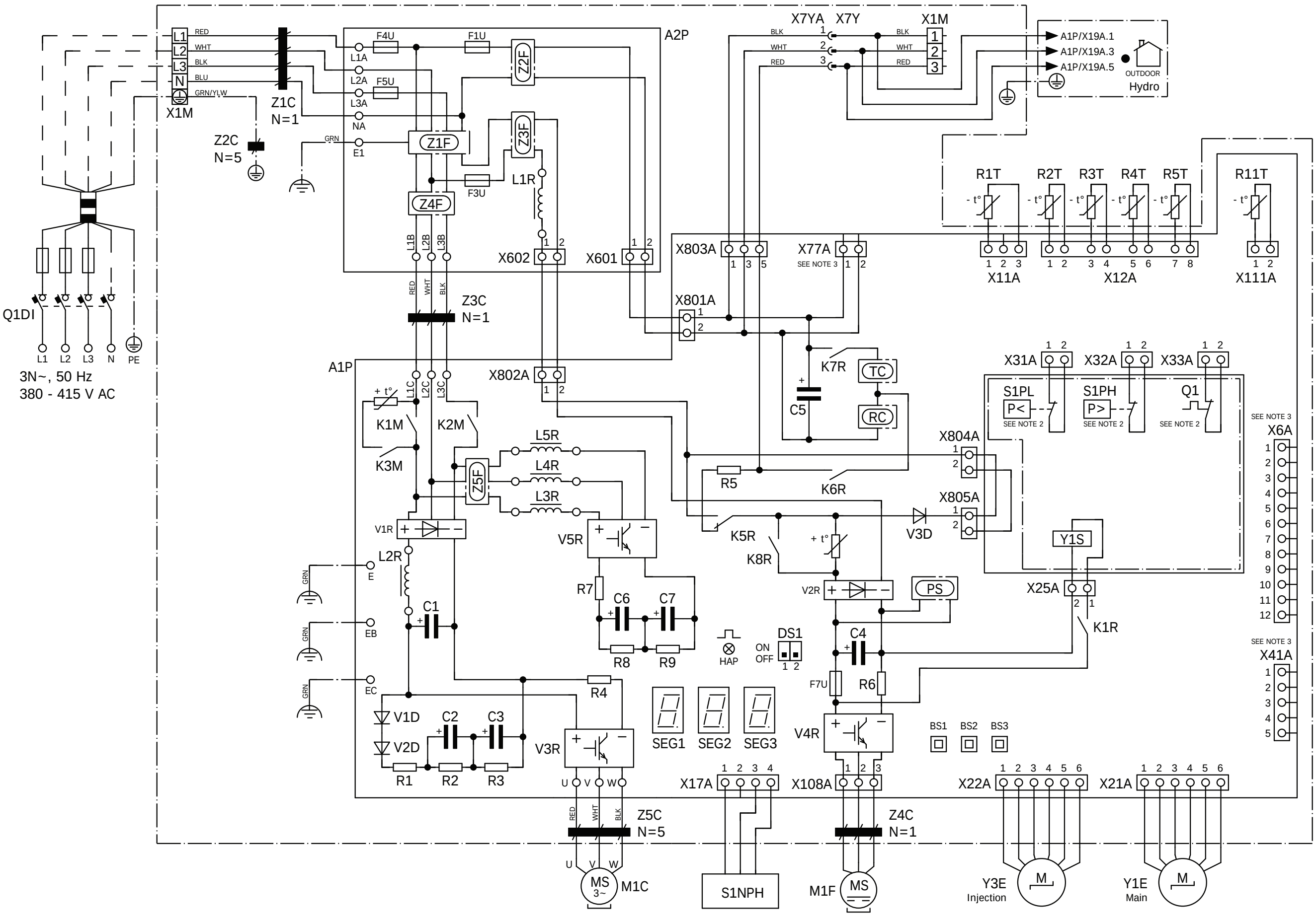


4D124072B

Three phase outdoor unit – compressor module

INFORMATION

The diagrams shown in this manual may be incorrect due to changes/updates to the unit. Correct diagrams are supplied with the unit and can also be found in the technical data book.



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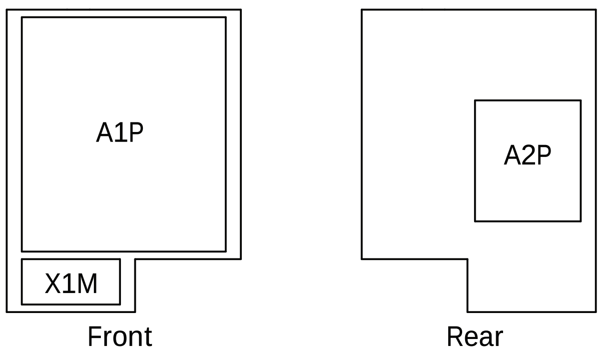
INFORMATION

The diagrams shown in this manual may be incorrect due to changes/updates to the unit. Correct diagrams are supplied with the unit and can also be found in the technical data book.

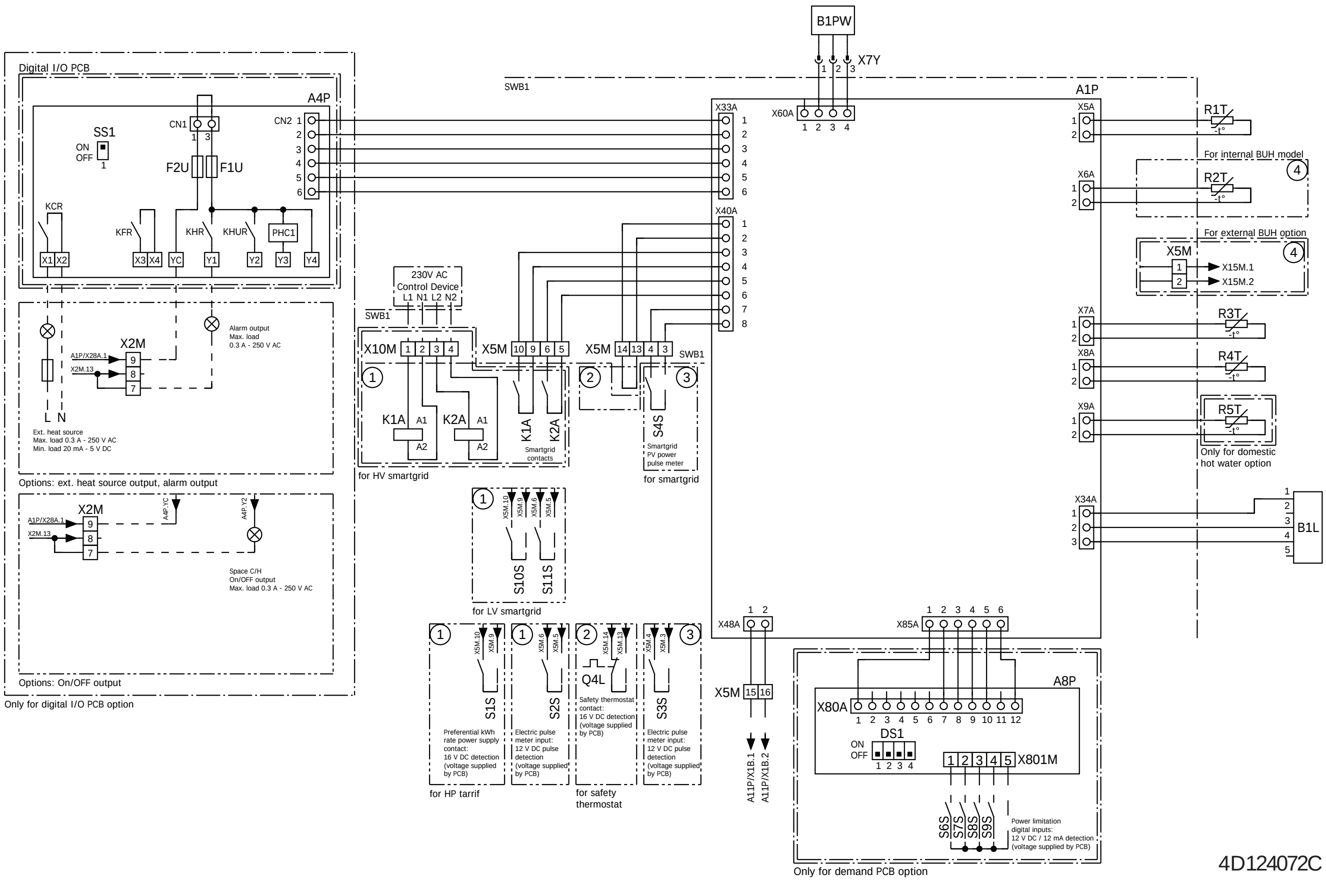


4D124072B

Hydro module

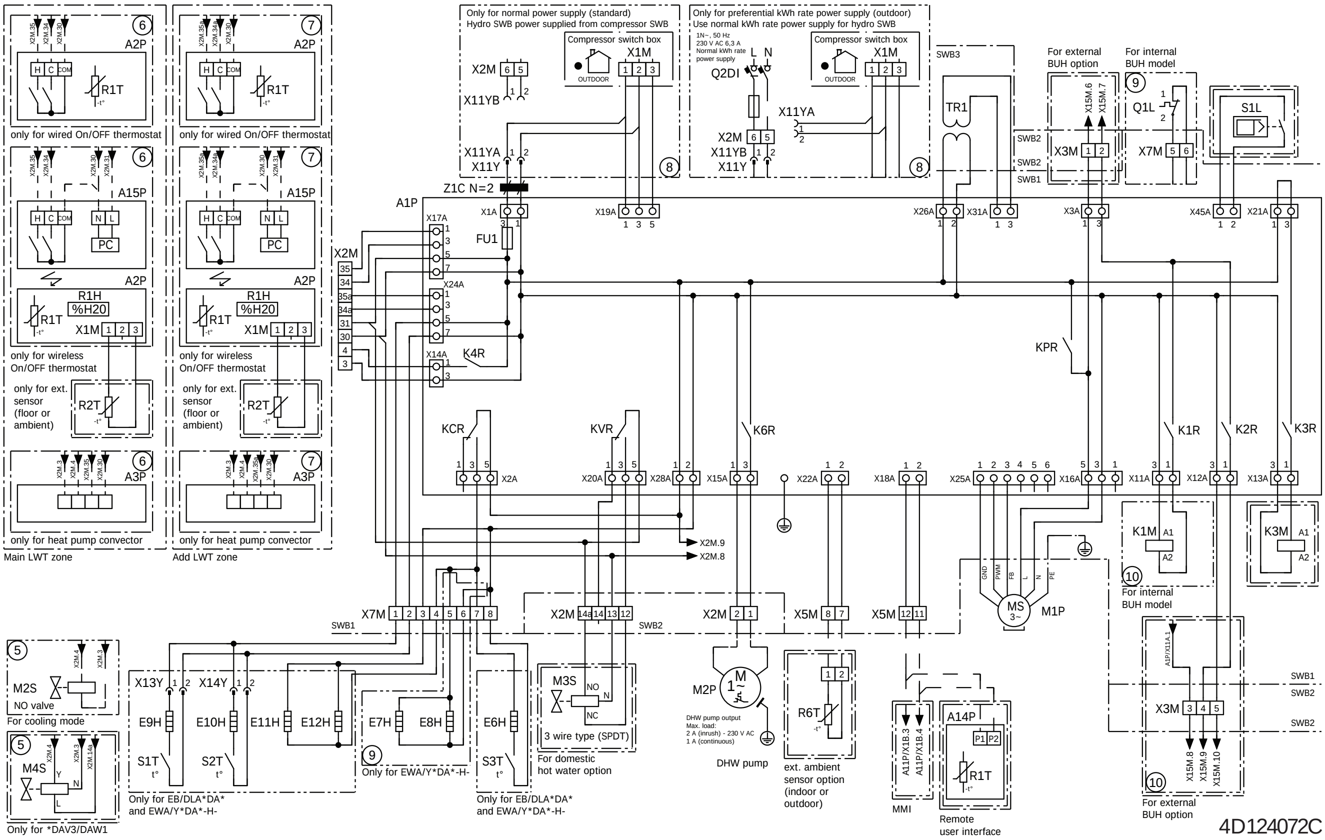
INFORMATION

The diagrams shown in this manual may be incorrect due to changes/updates to the unit. Correct diagrams are supplied with the unit and can also be found in the technical data book.



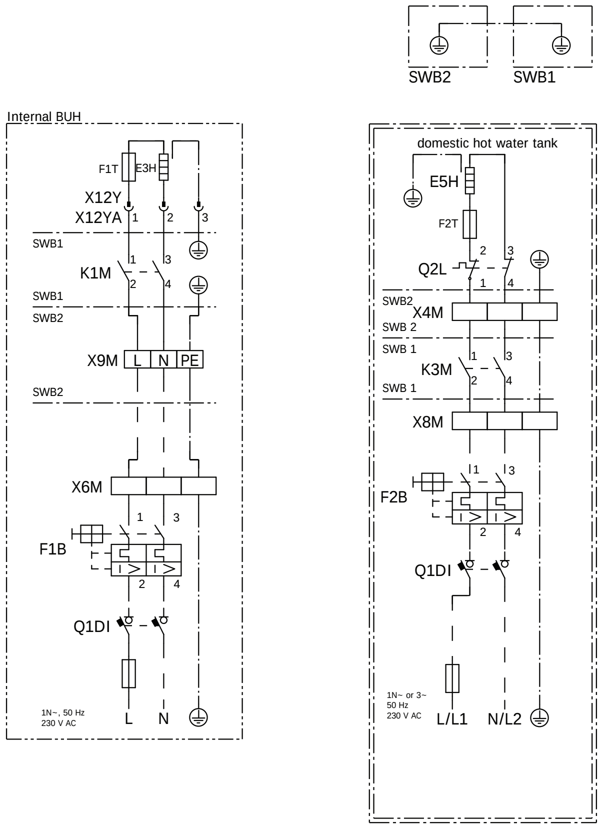
INFORMATION

The diagrams shown in this manual may be incorrect due to changes/updates to the unit. Correct diagrams are supplied with the unit and can also be found in the technical data book.



INFORMATION

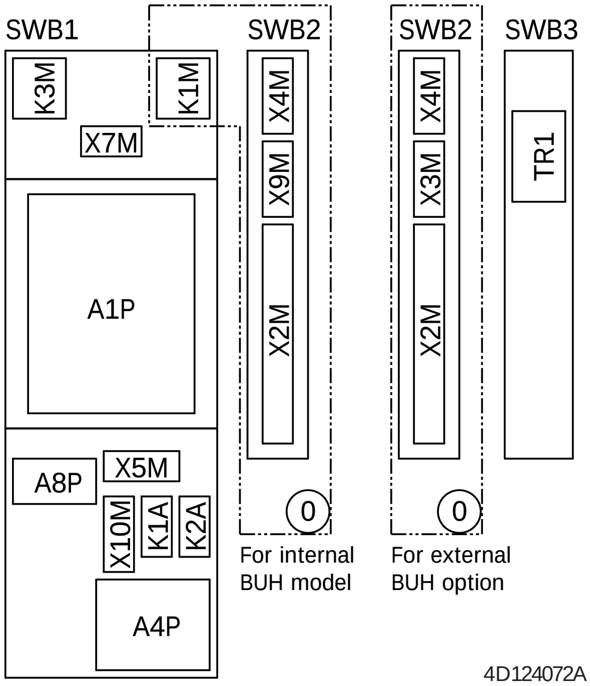
The diagrams shown in this manual may be incorrect due to changes/updates to the unit. Correct diagrams are supplied with the unit and can also be found in the technical data book.



4D124072A

INFORMATION

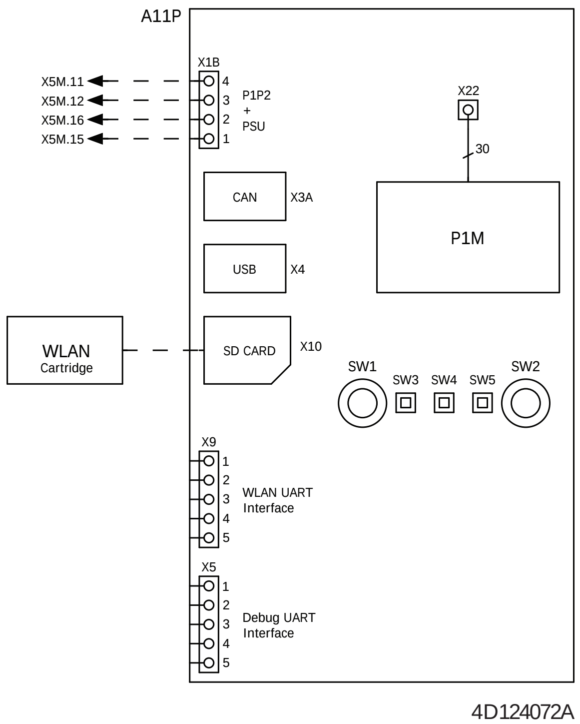
The diagrams shown in this manual may be incorrect due to changes/updates to the unit. Correct diagrams are supplied with the unit and can also be found in the technical data book.



Remote controller

INFORMATION

The diagrams shown in this manual may be incorrect due to changes/updates to the unit. Correct diagrams are supplied with the unit and can also be found in the technical data book.

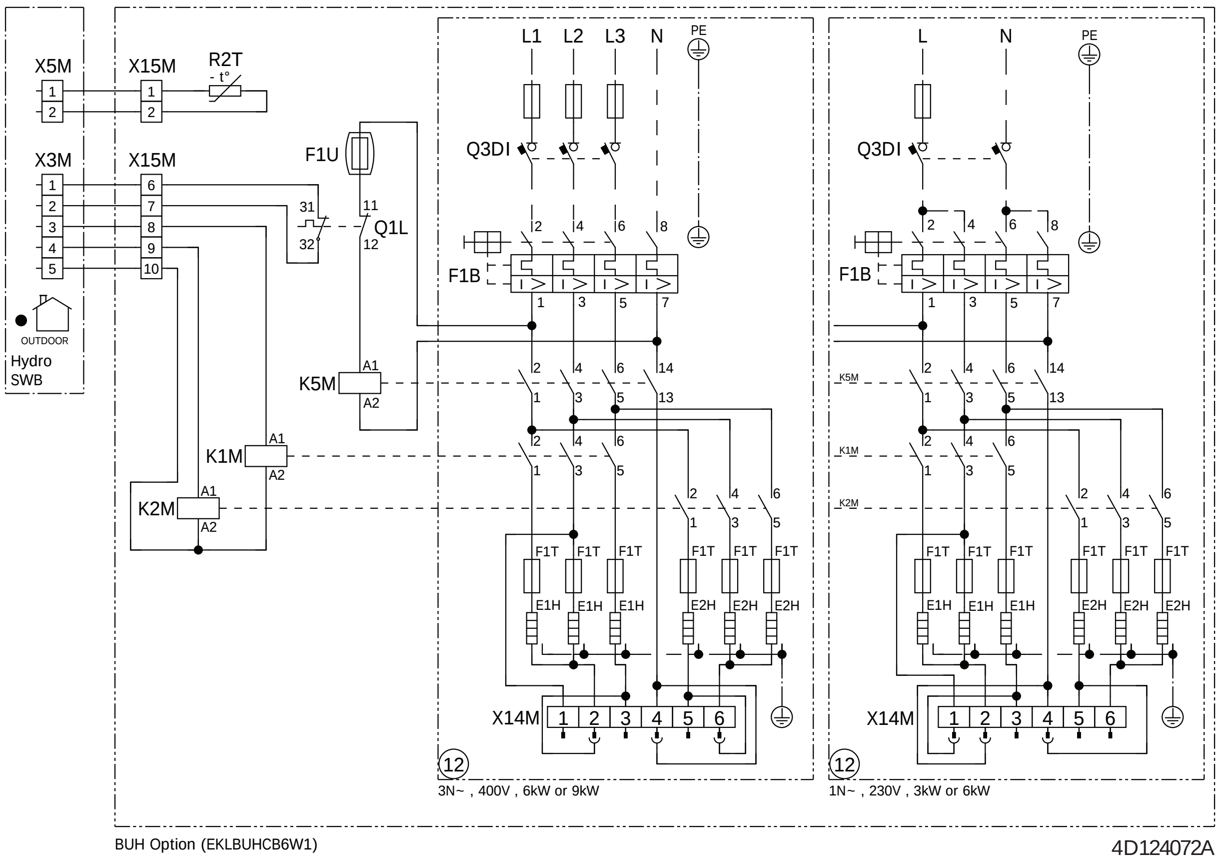


Backup heater kit

INFORMATION

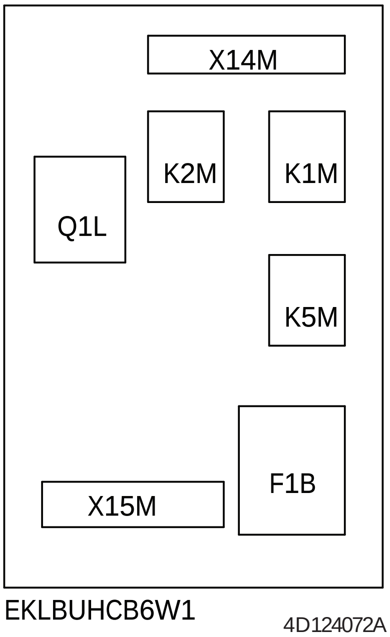
The diagrams shown in this manual may be incorrect due to changes/updates to the unit. Correct diagrams are supplied with the unit and can also be found in the technical data book.

(1) Connection diagram



INFORMATION

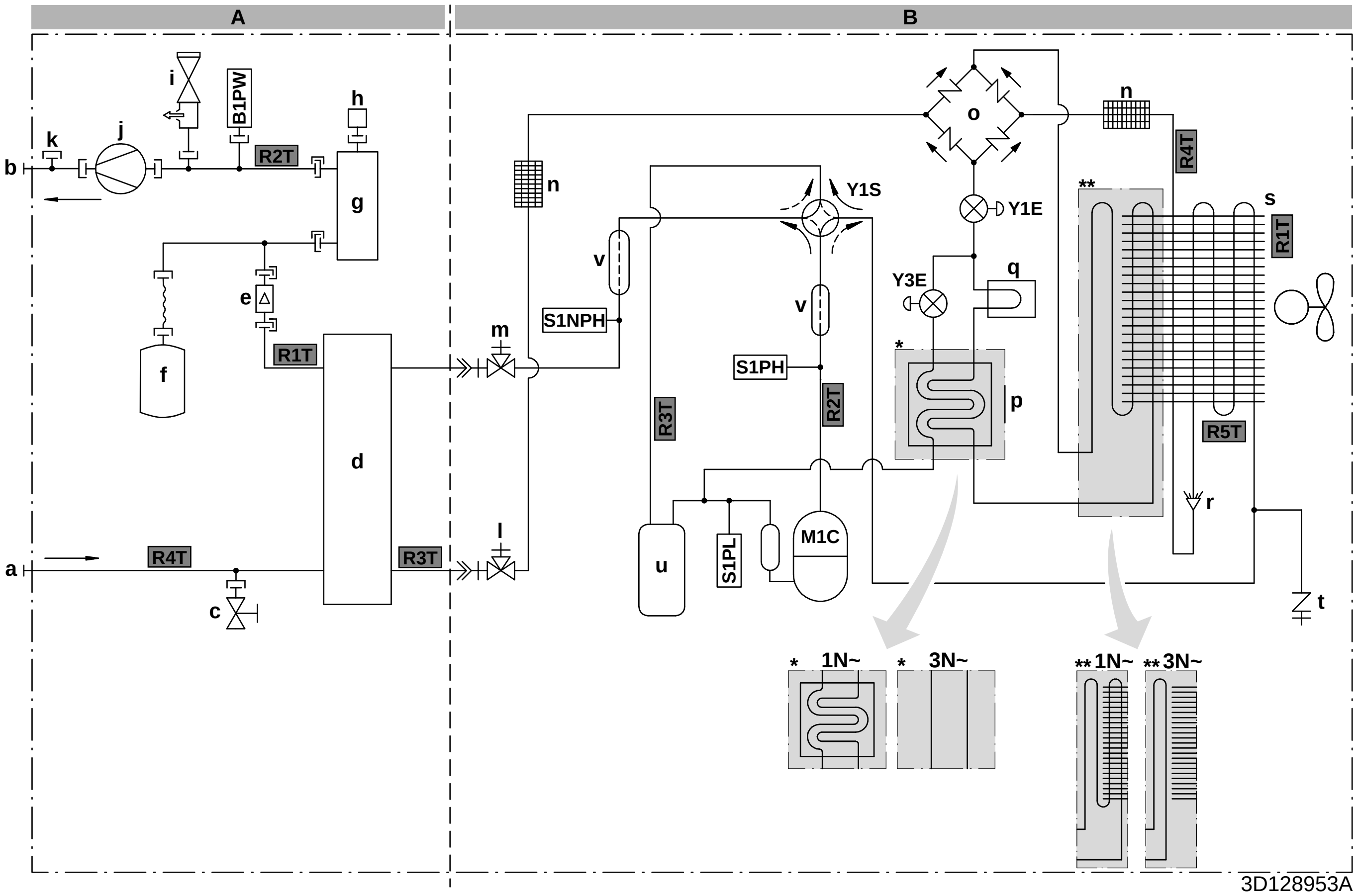
The diagrams shown in this manual may be incorrect due to changes/updates to the unit. Correct diagrams are supplied with the unit and can also be found in the technical data book.



6.3 Piping diagram

6.3.1 Piping diagram: Outdoor unit

EBLA09~16DA3V3 (1N~), EDLA09~16DA3V3 (1N~), EBLA09~16DA3W1 (3N~) and EDLA09~16DA3W1 (3N~)



A **Hydro module**
B **Compressor module**

a Water IN (screw connection, male, 1")
b Water OUT (screw connection, male, 1")
c Drain valve (water circuit)
d Plate heat exchanger
e Flow sensor
f Expansion vessel
g Backup heater
h Automatic air purge valve
i Safety valve
j Pump
k Connection for optional flow switch
l Liquid stop valve with service port
m Gas stop valve with service port
n Filter
o Rectifier
p Economiser
q Heat sink
r Distributor
s Heat exchanger
t Service port 5/16" flare
u Accumulator
v Muffler

B1PW Space heating water pressure sensor
M1C Compressor
S1PH High pressure switch
S1PL Low pressure switch
S1NPH Pressure sensor
Y1E Electronic expansion valve (main)
Y3E Electronic expansion valve (injection)
Y1S Solenoid valve (4-way valve)

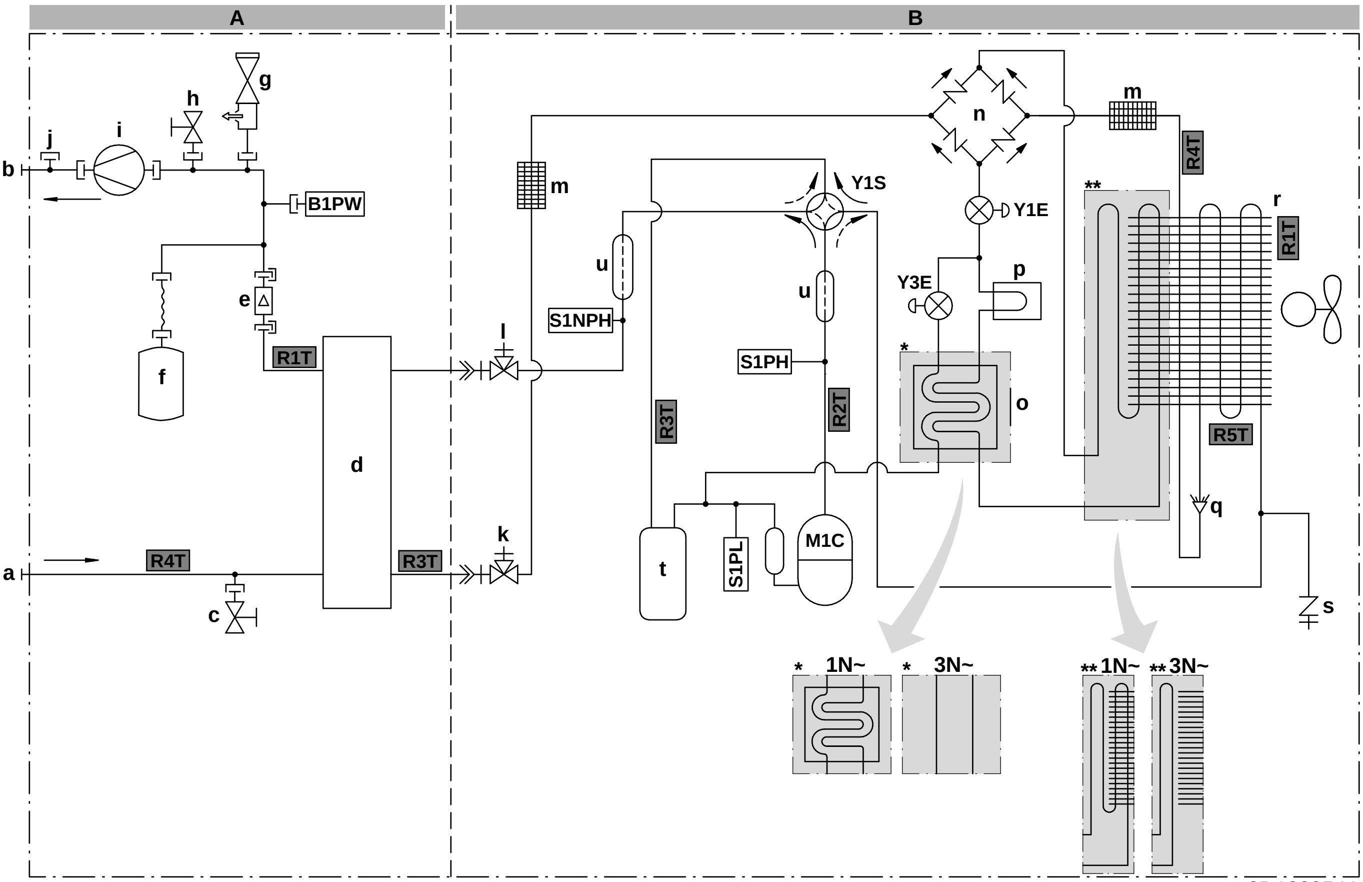
Thermistors (hydro module):
R1T Outlet water heat exchanger
R2T Outlet water backup heater
R3T Refrigerant liquid side
R4T Inlet water

Thermistors (compressor module):
R1T Outdoor air
R2T Compressor discharge
R3T Compressor suction
R4T Air heat exchanger
R5T Air heat exchanger, middle

Refrigerant flow:
Heating
Cooling

Connections:
Screw connection
Flare connection
Quick coupling
Brazed connection

EBLA09~16DAV3 (1N~), EDLA09~16DAV3 (1N~), EBLA09~16DAW1 (3N~) and EDLA09~16DAW1 (3N~)



3D128954A

A **Hydro module**
B **Compressor module**

- **a** Water IN (screw connection, male, 1")
- **b** Water OUT (screw connection, male, 1")
- **c** Drain valve (water circuit)
- **d** Plate heat exchanger
- **e** Flow sensor
- **f** Expansion vessel
- **g** Safety valve
- **h** Manual air purge valve
- **i** Pump
- **j** Connection for optional flow switch
- **k** Liquid stop valve with service port
- **l** Gas stop valve with service port
- **m** Filter
- **n** Rectifier
- **o** Economiser
- **p** Heat sink
- **q** Distributor
- **r** Heat exchanger
- **s** Service port 5/16" flare
- **t** Accumulator
- **u** Muffler

- **B1PW** Space heating water pressure sensor
- **M1C** Compressor
- **S1PH** High pressure switch
- **S1PL** Low pressure switch
- **S1NPH** Pressure sensor
- **Y1E** Electronic expansion valve (main)
- **Y3E** Electronic expansion valve (injection)
- **Y1S** Solenoid valve (4-way valve)

Thermistors (hydro module):

- **R1T** Outlet water heat exchanger
- **R3T** Refrigerant liquid side
- **R4T** Inlet water

Thermistors (compressor module):

- **R1T** Outdoor air
- **R2T** Compressor discharge
- **R3T** Compressor suction
- **R4T** Air heat exchanger
- **R5T** Air heat exchanger, middle

Refrigerant flow:

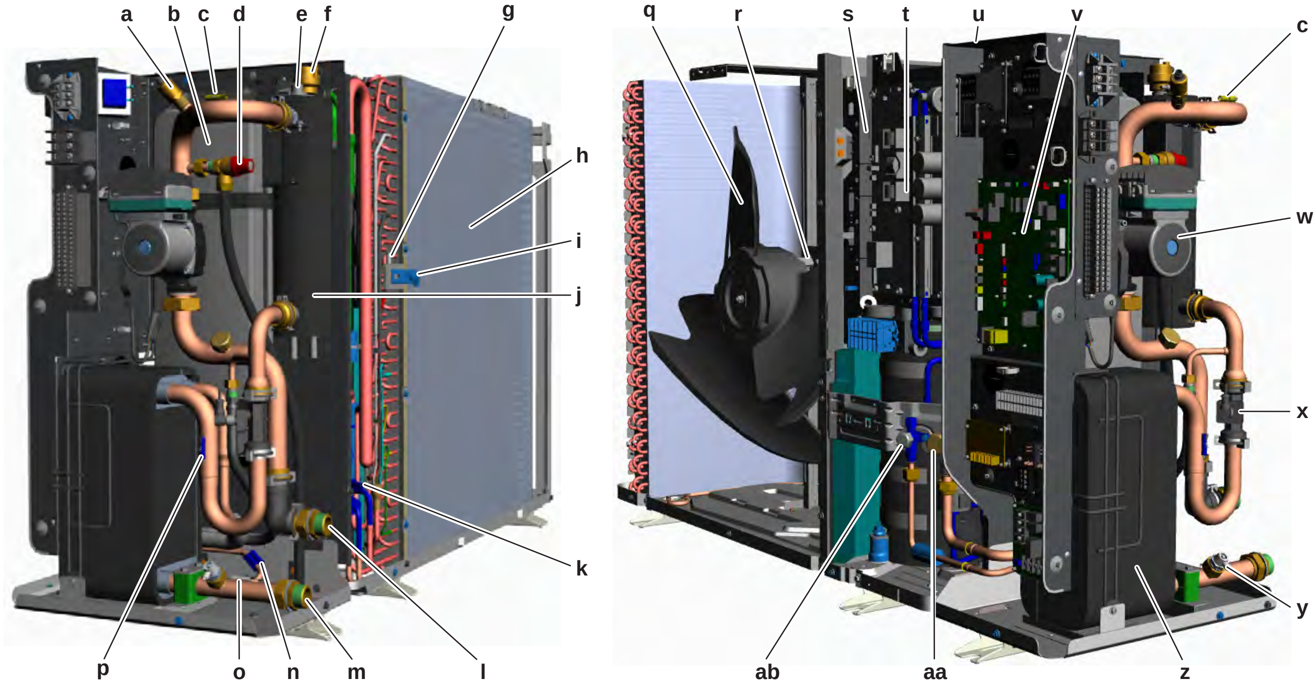
Heating
Cooling

Connections:

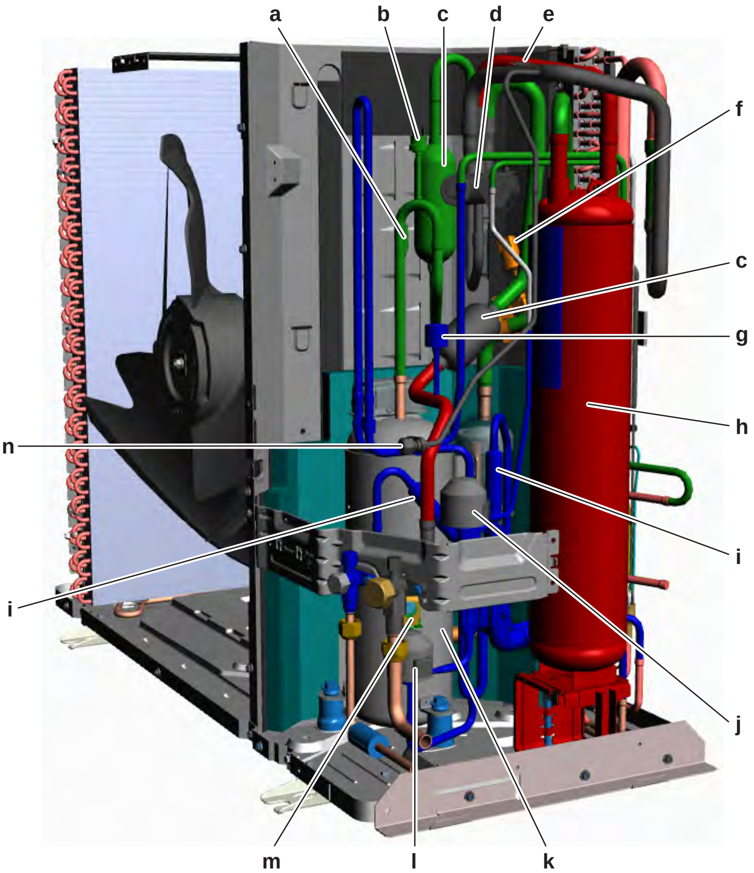
Screw connection
Flare connection
Quick coupling
Brazed connection

6.4 Component overview

6.4.1 Component overview: Single phase with backup heater

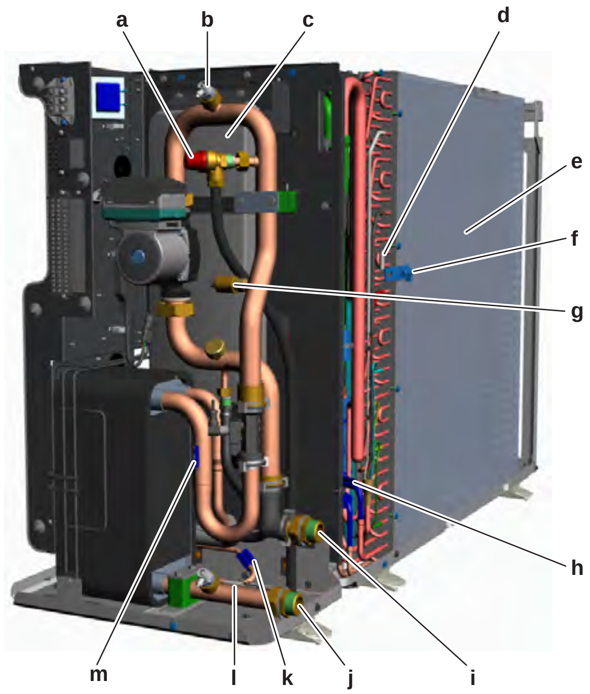


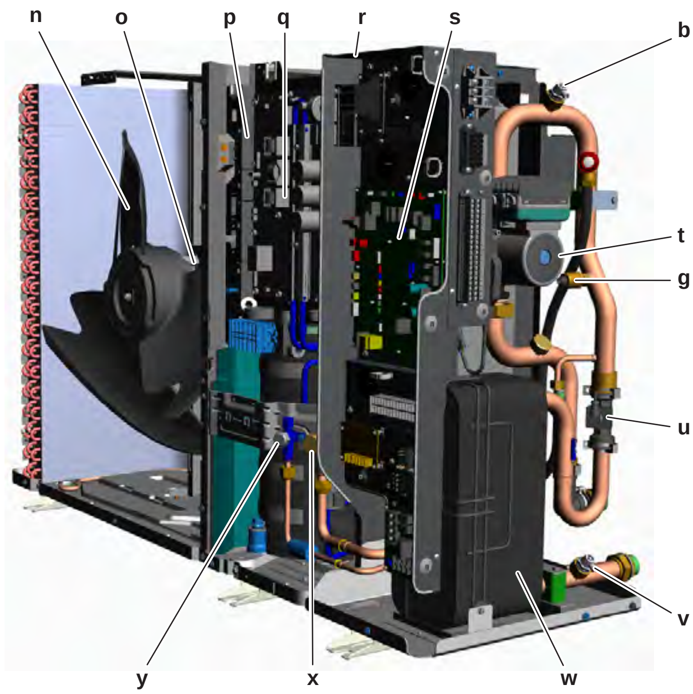
- **a** Water pressure sensor B1PW
- **b** Expansion vessel
- **c** Outlet water after backup heater thermistor R2T
- **d** Safety valve
- **e** Backup heater thermal protector
- **f** Automatic air purge valve
- **g** Heat exchanger (middle) thermistor R5T
- **h** Heat exchanger
- **i** Air thermistor R1T
- **j** Backup heater
- **k** Heat exchanger thermistor R4T
- **l** Water outlet
- **m** Water inlet
- **n** Refrigerant liquid thermistor R3T
- **o** Inlet water thermistor R4T
- **p** Outlet water after plate type heat exchanger thermistor R1T
- **q** Fan
- **r** Fan motor M1F
- **s** Switch box with noise filter PCB A2P on back side
- **t** Main PCB A1P
- **u** Hydro box
- **v** Hydro PCB A1P
- **w** Water pump
- **x** Water flow sensor B1L
- **y** Drain valve
- **z** Plate type heat exchanger
- **aa** Gas stop valve with service port
- **ab** Liquid stop valve with service port



a Discharge pipe thermistor R2T
b High pressure switch S1PH
c Muffler
d 4-way valve Y1S
e Suction thermistor R3T
f Low pressure switch S1PL
g Refrigerant pressure sensor S1NPH
h Accumulator
i Filter
j Expansion valve (injection) Y3E
k Compressor M1C
l Expansion valve (main) Y1E
m Compressor thermal protector
n Service port

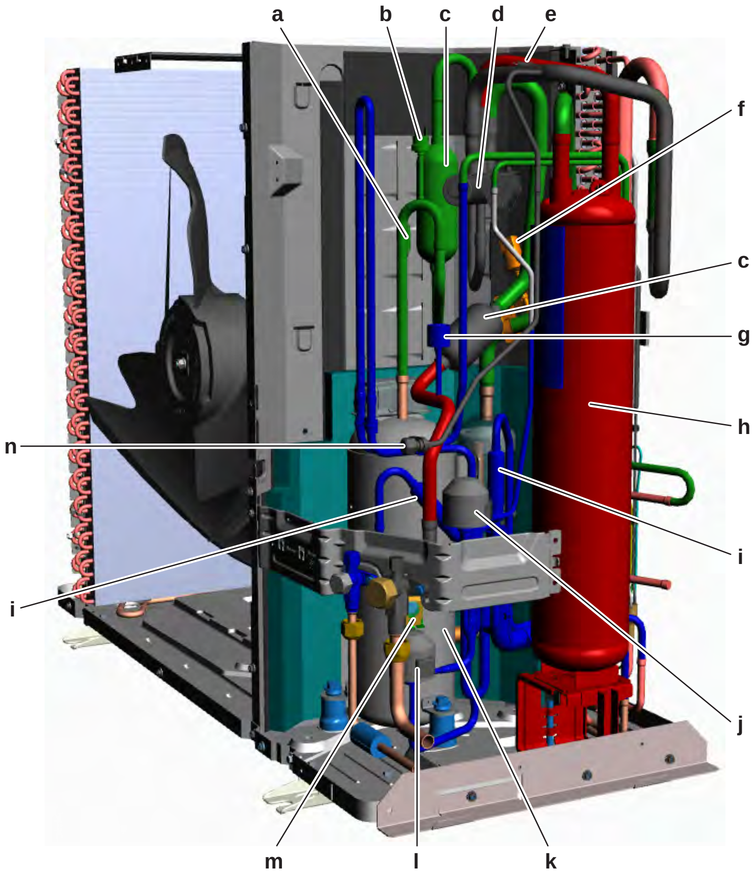
6.4.2 Component overview: Single phase without backup heater





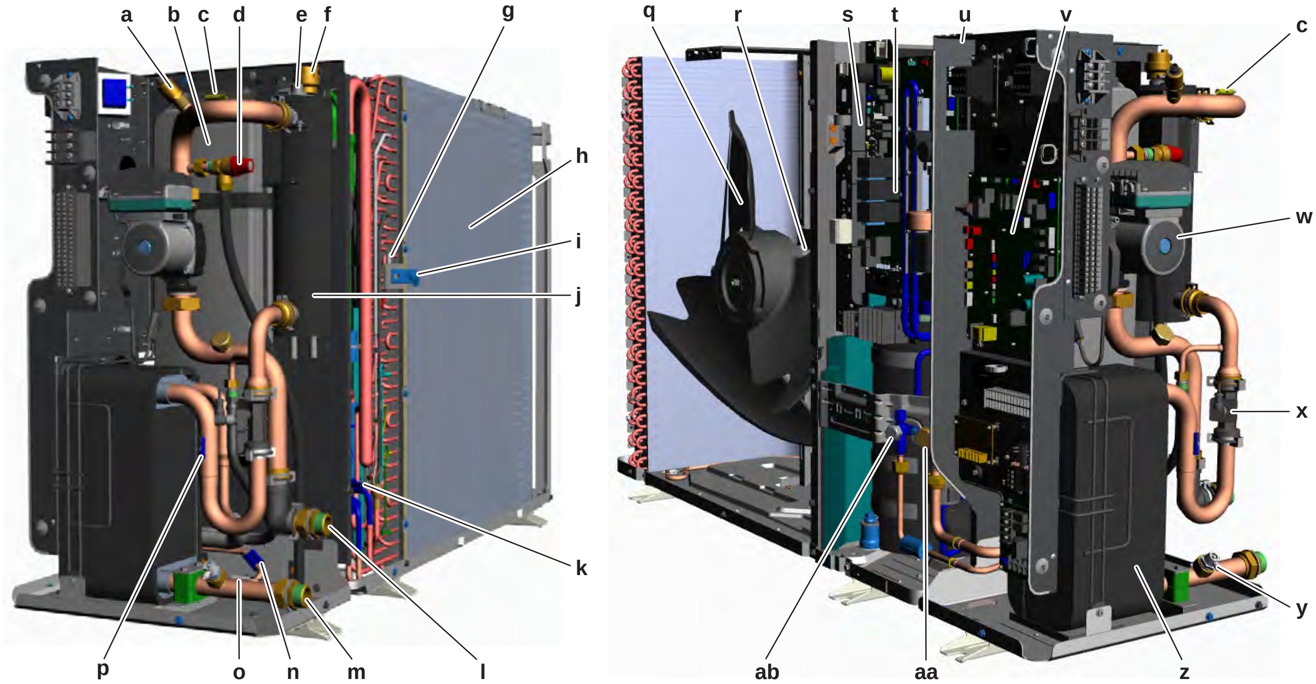
- **a** Safety valve
- **b** Manual air purge valve
- **c** Expansion vessel
- **d** Heat exchanger (middle) thermistor R5T
- **e** Heat exchanger
- **f** Air thermistor R1T
- **g** Water pressure sensor B1PW
- **h** Heat exchanger thermistor R4T
- **i** Water outlet
- **j** Water inlet
- **k** Refrigerant liquid thermistor R3T
- **l** Inlet water thermistor R4T
- **m** Outlet water after plate type heat exchanger thermistor R1T

- **n** Fan
- **o** Fan motor M1F
- **p** Switch box with noise filter PCB A2P on back side
- **q** Main PCB A1P
- **r** Hydro box
- **s** Hydro PCB A1P
- **t** Water pump
- **u** Water flow sensor B1L
- **v** Drain valve
- **w** Plate type heat exchanger
- **x** Gas stop valve with service port
- **y** Liquid stop valve with service port



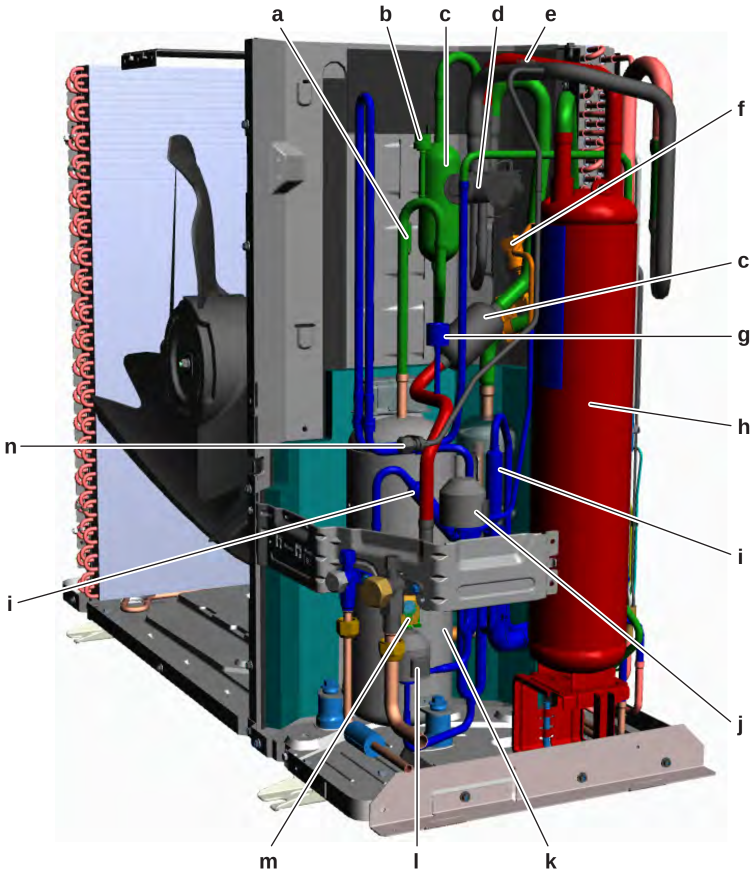
a	Discharge pipe thermistor R2T	**h**	Accumulator
b	High pressure switch S1PH	**i**	Filter
c	Muffler	**j**	Expansion valve (injection) Y3E
d	4-way valve Y1S	**k**	Compressor M1C
e	Suction thermistor R3T	**l**	Expansion valve (main) Y1E
f	Low pressure switch S1PL	**m**	Compressor thermal protector
g	Refrigerant pressure sensor S1NPH	**n**	Service port

6.4.3 Component overview: Three phase with backup heater



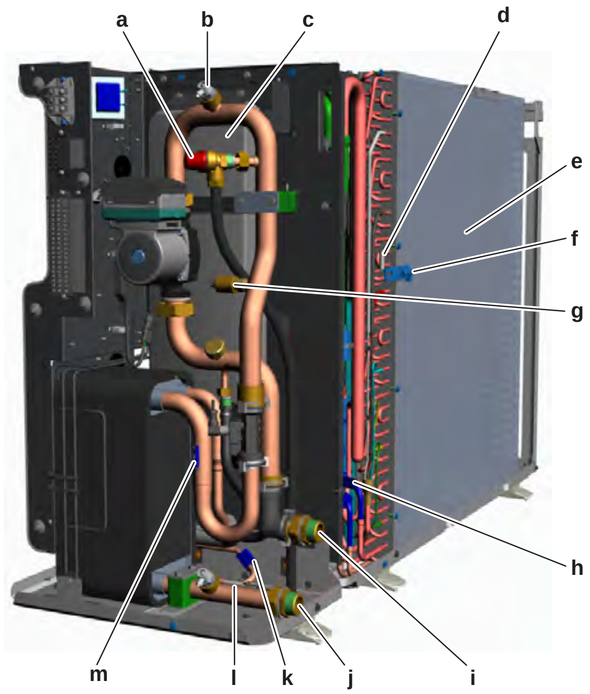
a Water pressure sensor B1PW
b Expansion vessel

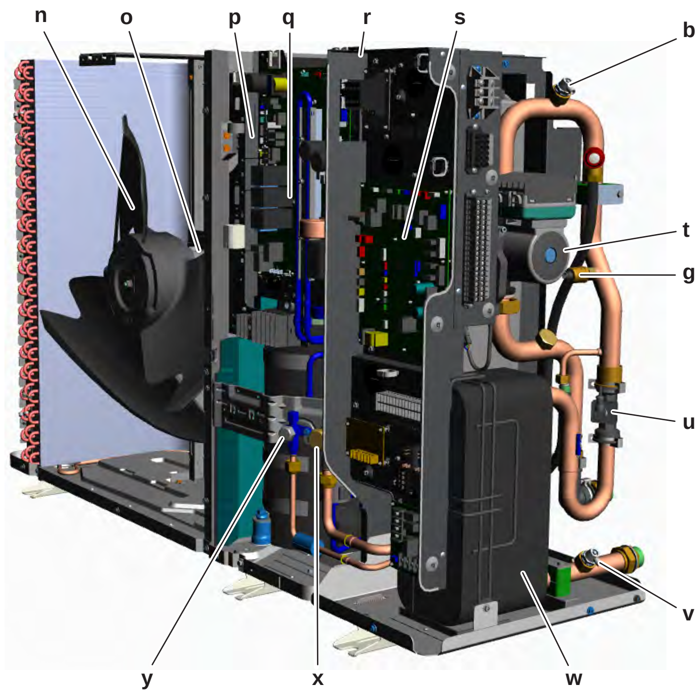
c Outlet water after backup heater thermistor R2T
d Safety valve
e Backup heater thermal protector
f Automatic air purge valve
g Heat exchanger (middle) thermistor R5T
h Heat exchanger
i Air thermistor R1T
j Backup heater
k Heat exchanger thermistor R4T
l Water outlet
m Water inlet
n Refrigerant liquid thermistor R3T
o Inlet water thermistor R4T
p Outlet water after plate type heat exchanger thermistor R1T
q Fan
r Fan motor M1F
s Switch box with noise filter PCB A2P on back side
t Main PCB A1P
u Hydro box
v Hydro PCB A1P
w Water pump
x Water flow sensor B1L
y Drain valve
z Plate type heat exchanger
aa Gas stop valve with service port
ab Liquid stop valve with service port



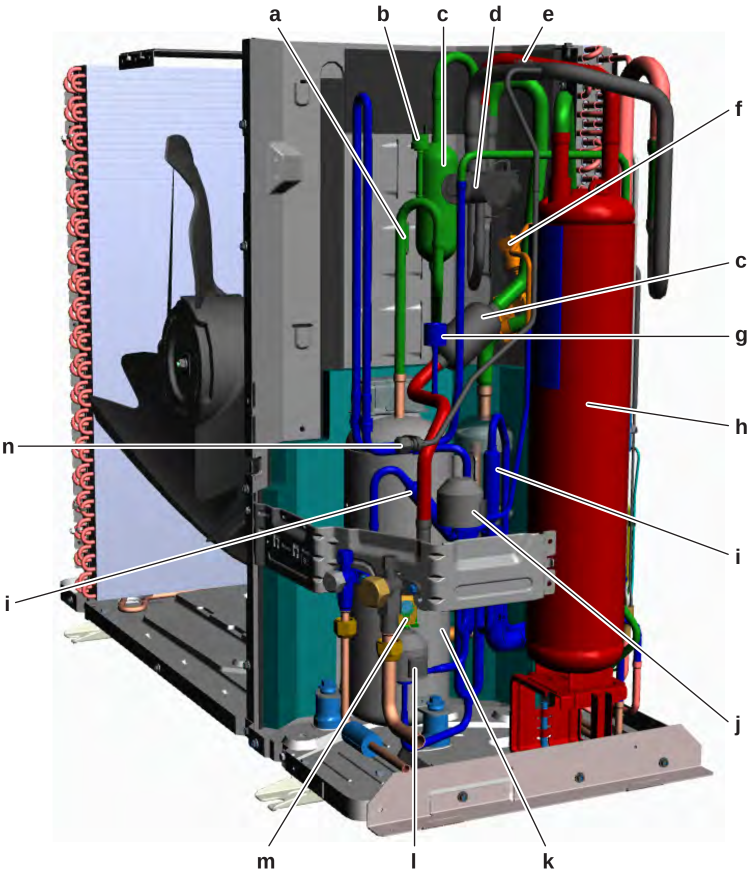
a	Discharge pipe thermistor R2T	**h**	Accumulator
b	High pressure switch S1PH	**i**	Filter
c	Muffler	**j**	Expansion valve (injection) Y3E
d	4-way valve Y1S	**k**	Compressor M1C
e	Suction thermistor R3T	**l**	Expansion valve (main) Y1E
f	Low pressure switch S1PL	**m**	Compressor thermal protector
g	Refrigerant pressure sensor S1NPH	**n**	Service port

6.4.4 Component overview: Three phase without backup heater



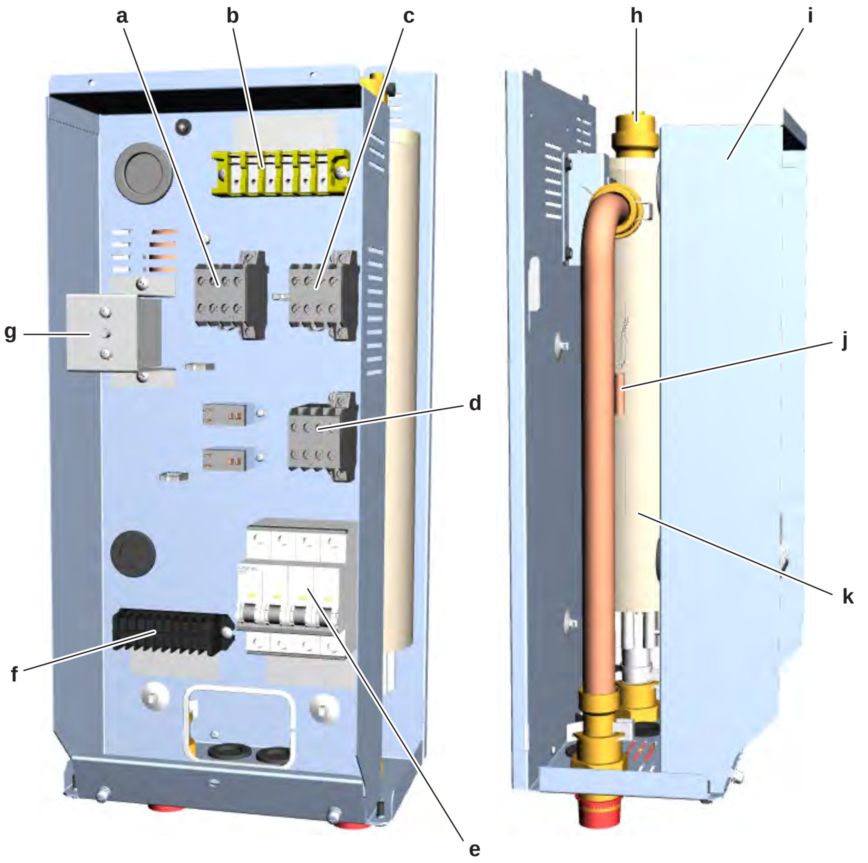


- **a** Safety valve
- **b** Manual air purge valve
- **c** Expansion vessel
- **d** Heat exchanger (middle) thermistor R5T
- **e** Heat exchanger
- **f** Air thermistor R1T
- **g** Water pressure sensor B1PW
- **h** Heat exchanger thermistor R4T
- **i** Water outlet
- **j** Water inlet
- **k** Refrigerant liquid thermistor R3T
- **l** Inlet water thermistor R4T
- **m** Outlet water after plate type heat exchanger thermistor R1T
- **n** Fan
- **o** Fan motor M1F
- **p** Switch box with noise filter PCB A2P on back side
- **q** Main PCB A1P
- **r** Hydro box
- **s** Hydro PCB A1P
- **t** Water pump
- **u** Water flow sensor B1L
- **v** Drain valve
- **w** Plate type heat exchanger
- **x** Gas stop valve with service port
- **y** Liquid stop valve with service port



a	Discharge pipe thermistor R2T	**h**	Accumulator
b	High pressure switch S1PH	**i**	Filter
c	Muffler	**j**	Expansion valve (injection) Y3E
d	4-way valve Y1S	**k**	Compressor M1C
e	Suction thermistor R3T	**l**	Expansion valve (main) Y1E
f	Low pressure switch S1PL	**m**	Compressor thermal protector
g	Refrigerant pressure sensor S1NPH	**n**	Service port

6.4.5 Component overview: Backup heater kit



- **a** Backup heater contactor K2M
- **b** Terminal strip X14M
- **c** Backup heater contactor K1M
- **d** Backup heater contactor K5M
- **e** Overcurrent fuse F1B
- **f** Terminal strip X15M
- **g** Backup heater thermal protector Q1L
- **h** Automatic air purge valve
- **i** Switch box
- **j** Outlet water after backup heater thermistor R2T
- **k** Backup heater

6.5 Field information report

See next page.

In case a problem occurred on the unit which could not be resolved by using the content of this service manual or in case you have a problem which could be resolved but of which the manufacturer should be notified, we advise you to contact your distributor.
To facilitate the investigation, additional information is required. Please fill out the following form before contacting your distributor.

FIELD INFORMATION REPORT	
Key person information	
Name:	Company name:
Your contact details Phone number:	E-mail address:
Site address:	
Your reference:	Date of visit:
Claim information	
Title:	
Problem description:	
Error code:	Trouble date:
Problem frequency:	
Investigation steps done:	
Insert picture of the trouble.	
Current situation (solved, not solved,…):	
Countermeasures taken:	
Comments and proposals:	
Part available for return (if applicable):	

Application information
Application (house, apartment, office,…):
New project or reimbursement:
Heat emitters (radiators / under floor heating / fan coils /…):
Hydraulic layout (simple schematic):

Unit / Installation information	
Model name:	Serial number:
Installation / commissioning date:	Software version hydro PCB A1P
	Software version hydro PCB A5P
Software version user interface:	Software version outdoor PCB:
Minimum water volume:	Maximum water volume:
Brine composition and mixture:	
Brine freeze up temperature:	
Space heating control (leaving water temperature, room thermostat, external room thermostat):	
Space heating setpoint:	
Domestic hot water control (reheat only, schedule only, reheat + schedule):	
Domestic hot water setpoint:	

Provide pictures of the field settings overview (viewable on the user interface).

6.6 Service tools

1. For an overview of the available service tools, check the Business Portal: http://www.mydaikin.eu.
2. Go to the tab After-sales support on the left navigation pane and select Technical support.

3. Click the button Service tools. An overview of the available service tools for the different products is shown. Also additional information on the service tools (instruction, latest software) can be found here.

6.7 Field settings

See next page.

Field settings table

[8.7.5] = ...**0221**

Applicable units

EDLA09DA3V3
EDLA11DA3V3
EDLA14DA3V3
EDLA16DA3V3
EBLA09DA3V3
EBLA11DA3V3
EBLA14DA3V3
EBLA16DA3V3
EDLA09DAV3
EDLA11DAV3
EDLA14DAV3
EDLA16DAV3
EBLA09DAV3
EBLA11DAV3
EBLA14DAV3
EBLA16DAV3
EDLA09DA3W1
EDLA11DA3W1
EDLA14DA3W1
EDLA16DA3W1
EBLA09DA3W1
EBLA11DA3W1
EBLA14DA3W1
EBLA16DA3W1
EDLA09DAW1
EDLA11DAW1
EDLA14DAW1
EDLA16DAW1
EBLA09DAW1
EBLA11DAW1
EBLA14DAW1
EBLA16DAW1

Notes

(*1) *V3/W1
(*2) *3V3/3W1
(*3) EDLA*
(*4) EBLA*

Field settings table

Breadcrumb	Field code	Setting name		Range, step **Default value**	Installer setting at variance with default value: Date	Value
Room						
└ Antifrost						
1.4.1	[2-06]	Room frost protection	R/W	0: Disabled **1: Enabled**		
1.4.2	[2-05]	Room antifrost temperature	R/W	4~16°C, step: 1°C **8°C**		
└ Setpoint range						
1.5.1	[3-07]	Heating minimum	R/W	12~18°C, step: 1°C **12°C**		
1.5.2	[3-06]	Heating maximum	R/W	18~30°C, step: 1°C **30°C**		
1.5.3	[3-09]	Cooling minimum	R/W	15~25°C, step: 1°C **15°C**		
1.5.4	[3-08]	Cooling maximum	R/W	25~35°C, step: 1°C **35°C**		
Room						
1.6	[2-09]	Room sensor offset	R/W	-5~5°C, step: 0,5°C **0°C**		
1.7	[2-0A]	Room sensor offset	R/W	-5~5°C, step: 0,5°C **0°C**		
└ Room comfort setpoint						
1.9.1	[9-0A]	Heating comfort setpoint	R/W	[3-07]～[3-06]°C, step: 0,5°C **23°C**		
1.9.2	[9-0B]	Cooling comfort setpoint	R/W	[3-09]～[3-08]°C, step: 0,5°C **23°C**		
Main zone						
2.4		Setpoint mode		0: Fixed 1: WD heating, fixed cooling **2: Weather dependent**		
└ Heating WD curve						
2.5	[1-00]	Low ambient temp. for LWT main zone heating WD curve.	R/W	-40~5°C, step: 1°C **-10°C**		
2.5	[1-01]	High ambient temp. for LWT main zone heating WD curve.	R/W	10~25°C, step: 1°C **15°C**		
2.5	[1-02]	Leaving water value for low ambient temp. for LWT main zone heating WD curve.	R/W	[9-01]~[9-00], step: 1°C **35°C**		
2.5	[1-03]	Leaving water value for high ambient temp. for LWT main zone heating WD curve.	R/W	[9-01]~min(45, [9-00])°C , step: 1°C **25°C**		
└ Cooling WD curve						
2.6	[1-06]	Low ambient temp. for LWT main zone cooling WD curve.	R/W	10~25°C, step: 1°C **20°C**		
2.6	[1-07]	High ambient temp. for LWT main zone cooling WD curve.	R/W	25~43°C, step: 1°C **35°C**		
2.6	[1-08]	Leaving water value for low ambient temp. for LWT main zone cooling WD curve.	R/W	[9-03]~[9-02]°C, step: 1°C **22°C**		
2.6	[1-09]	Leaving water value for high ambient temp. for LWT main zone cooling WD curve.	R/W	[9-03]~[9-02]°C, step: 1°C **18°C**		
Main zone						
2.7	[2-0C]	Emitter type	R/W	**0: Underfloor heating** 1: Fancoil unit 2: Radiator		
└ Setpoint range						
2.8.1	[9-01]	Heating minimum	R/W	15~37°C, step: 1°C **25°C**		
2.8.2	[9-00]	Heating maximum	R/W	[2-0C]=2: 37~60, step: 1°C **60°C** [2-0C]≠2: 37~55, step: 1°C **55°C**		
2.8.3	[9-03]	Cooling minimum	R/W	5~18°C, step: 1°C **7°C**		
2.8.4	[9-02]	Cooling maximum	R/W	18~22°C, step: 1°C **22°C**		
Main zone						
2.9	[C-07]	Control	R/W	**0: LWT control** 1: Ext RT control 2: RT control		
2.A	[C-05]	Thermostat type	R/W	0: - 1: 1 contact **2: 2 contacts**		
└ Delta T						
2.B.1	[1-0B]	Delta T heating	R/W	[2-0C] ≠2 (Radiator) 3~10°C, step: 1°C **5°C** [2-0C] = 2 (Radiator) 8°C		
2.B.2	[1-0D]	Delta T cooling	R/W	3~10°C, step: 1°C **5°C**		
└ Modulation						
2.C.1	[8-05]	Modulation	R/W	**0: No** 1: Yes		
2.C.2	[8-06]	Max modulation	R/W	0~10°C, step: 1°C **5°C**		
Additional zone						
3.4		Setpoint mode		0: Fixed 1: WD heating, fixed cooling **2: Weather dependent**		
└ Heating WD curve						
3.5	[0-00]	Leaving water value for high ambient temp. for LWT add zone heating WD curve.	R/W	[9-05]~min(45,[9-06])°C, step: 1°C **25°C**		
3.5	[0-01]	Leaving water value for low ambient temp. for LWT add zone heating WD curve.	R/W	[9-05]~[9-06]°C, step: 1°C **35°C**		
3.5	[0-02]	High ambient temp. for LWT add zone heating WD curve.	R/W	10~25°C, step: 1°C **15°C**		
3.5	[0-03]	Low ambient temp. for LWT add zone heating WD curve.	R/W	-40~5°C, step: 1°C **-10°C**		
└ Cooling WD curve						
3.6	[0-04]	Leaving water value for high ambient temp. for LWT add zone cooling WD curve.	R/W	[9-07]~[9-08]°C, step: 1°C **18°C**		
3.6	[0-05]	Leaving water value for low ambient temp. for LWT add zone cooling WD curve.	R/W	[9-07]~[9-08]°C, step: 1°C **22°C**		

(*1) *V3/W1
(*2) *3V3/3W1
(*3) EDLA*
(*4) EBLA*

(#) Setting is not applicable for this unit.

Field settings table

Breadcrumb	Field code	Setting name		Range, step **Default value**	Installer setting at variance with default value Date	Value
3.6	[0-06]	High ambient temp. for LWT add zone cooling WD curve.	R/W	25~43°C, step: 1°C **35°C**		
3.6	[0-07]	Low ambient temp. for LWT add zone cooling WD curve.	R/W	10~25°C, step: 1°C **20°C**		
Additional zone						
3.7	[2-0D]	Emitter type	R/W	**0: Underfloor heating** 1: Fancoil unit 2: Radiator		
└─ Setpoint range						
3.8.1	[9-05]	Heating minimum	R/W	15~37°C, step: 1°C **25°C**		
3.8.2	[9-06]	Heating maximum	R/W	[2-0D]=2: 37~60, step: 1°C **60°C** [2-0D]≠2: 37~55, step: 1°C **55°C**		
3.8.3	[9-07]	Cooling minimum	R/W	5~18°C, step: 1°C **7°C**		
3.8.4	[9-08]	Cooling maximum	R/W	18~22°C, step: 1°C **22°C**		
Additional zone						
3.A	[C-06]	Thermostat type	R/W	0: - 1: 1 contact **2: 2 contacts**		
└─ Delta T						
3.B.1	[1-0C]	Delta T heating	R/W	[2-0D] ≠2 (Radiator) 3~10°C, step: 1°C **5°C** [2-0D] = 2 (Radiator) 8°C		
3.B.2	[1-0E]	Delta T cooling	R/W	3~10°C, step: 1°C **5°C**		
Space heating / cooling └─ Operation range						
4.3.1	[4-02]	Space heating OFF temp	R/W	14~35°C, step: 1°C with BUH: **35°C** without BUH: **25°C**		
4.3.2	[F-01]	Space cooling OFF temp	R/W	10~35°C, step: 1°C **20°C**		
Space heating / cooling						
4.4	[7-02]	Number of zones	R/W	**0: 1 LWT zone** 1: 2 LWT zones		
4.5	[F-0D]	Pump operation mode	R/W	0: Continuous **1: Sample** 2: Request		
4.6	[E-02]	Unit type	R/W (*4) R/O (*3)	**0: Reversible-(*4)** **1: Heating only (*3)**		
4.7	[9-0D]	Pump limitation	R/W	0~8, step:1 0 : No limitation 1~4 : 80~50% 5~8 : 80~50% during sampling **6**		
Space heating / cooling						
4.9	[F-00]	Pump outside range	R/W	**0: Restricted** 1: Allowed		
4.A	[D-03]	Increase around 0°C	R/W	0: No **1: increase 2°C, span 4°C** 2: increase 4°C, span 4°C 3: increase 2°C, span 8°C 4: increase 4°C, span 8°C		
4.B	[9-04]	Overshoot	R/W	1~4°C, step: 1°C **4°C**		
4.C	[2-06]	Room frost protection	R/W	0: Disabled **1: Enabled**		
Tank						
5.2	[6-0A]	Comfort setpoint	R/W	30~[6-0E]°C, step: 1°C **50°C**		
5.3	[6-0B]	Eco setpoint	R/W	30~min(50, [6-0E])°C, step: 1°C **45°C**		
5.4	[6-0C]	Reheat setpoint	R/W	30~min(50, [6-0E])°C, step: 1°C **45°C**		
5.6	[6-0D]	Heat up mode	R/W	0: Reheat only **1: Reheat + sched.** 2: Scheduled only		
└─ Disinfection						
5.7.1	[2-01]	Activation	R/W	0: No **1: Yes**		
5.7.2	[2-00]	Operation day	R/W	0: Each day 1: Monday 2: Tuesday 3: Wednesday 4: Thursday **5: Friday** 6: Saturday 7: Sunday		
5.7.3	[2-02]	Start time	R/W	0~23 hour, step: 1 hour **1**		
5.7.4	[2-03]	Tank setpoint	R/W	55~75°C, step: 5°C **70°C**		
5.7.5	[2-04]	Duration	R/W	5~60 min, step: 5 min **10 min**		
Tank						
5.8	[6-0E]	Maximum	R/W	40~75°C, step: 1°C **60°C** [E-07]=0 40~80°C, step: 1°C **60°C** [E-07]=5		
5.9	[6-00]	Hysteresis	R/W	2~40°C, step: 1°C **27°C**		

(*1) *V3/W1
(*2) *3V3/3W1
(*3) EDLA*
(*4) EBLA*

(#) Setting is not applicable for this unit.

Field settings table					Installer setting at variance with default value	
Breadcrumb	Field code	Setting name		Range, step **Default value**	Date	Value
5.A	[6-08]	Hysteresis	R/W	2~20°C, step: 1°C **10°C**		
5.B		Setpoint mode	R/W	**0: Fixed** 1: Weather dependent		
└ WD curve						
5.C	[0-0B]	Leaving water value for high ambient temp. for DHW WD curve.	R/W	35~[6-0E]°C, step: 1°C **55°C**		
5.C	[0-0C]	Leaving water value for low ambient temp. for DHW WD curve.	R/W	45~[6-0E]°C, step: 1°C **55°C**		
5.C	[0-0D]	High ambient temp. for DHW WD curve.	R/W	10~25°C, step: 1°C **15°C**		
5.C	[0-0E]	Low ambient temp. for DHW WD curve.	R/W	-40~5°C, step: 1°C **-10°C**		
Tank						
5.D	[6-01]	Margin	R/W	0~10°C, step: 1°C **2°C**		
User settings └ Quiet						
7.4.1		Activation	R/W	0: OFF 1: Manual 2: Automatic		
└ Electricity price						
7.5.1		High	R/W	0,00~990/kWh **1/kWh**		
7.5.2		Medium	R/W	0,00~990/kWh **1/kWh**		
7.5.3		Low	R/W	0,00~990/kWh **1/kWh**		
User settings						
7.6		Gas price	R/W	0,00~990/kWh 0,00~290/MBtu **1,0/kWh**		
Installer settings └ Configuration wizard └ System						
9.1	[E-03]	BUH type	R/W (*1) R/O (*2)	**0: no BUH (*1)** 1: External BUH **2: 3V (*2)**		
9.1	[E-05] [E-06] [E-07]	Domestic hot water	R/W	**0: No DHW** 2: EKHW 7: EKHWP		
9.1	[4-06]	Emergency	R/W	0: Manual 1: Automatic(normal SH/DHW ON) 2: Auto red SH/DHW ON **3: Auto red SH/DHW OFF** 4: SH ON/DHW OFF		
9.1	[7-02]	Number of zones	R/W	**0: Single zone** 1: Dual zone		
└ Backup heater						
9.1	[5-0D]	Voltage	R/W (*1) R/O (*2)	**0: 230V, 1~** 1: 230V, 3~ 2: 400V, 3~		
9.1	[4-0A]	Configuration	R/W	**0: 1** 1: 1/1+2 2: 1/2 3: 1/2 + 1/1+2 in emergency		
9.1	[6-03]	Capacity step 1	R/W	0~10kW, step: 0,2kW **0kW (*1)** **3kW (*2)**		
9.1	[6-04]	Additional capacity step 2	R/O (*2) R/W (*1)	0~10kW, step: 0,2kW **0kW**		
└ Main zone						
9.1	[2-0C]	Emitter type	R/W	**0: Underfloor heating** 1: Fancoil unit 2: Radiator		
9.1	[C-07]	Control	R/W	**0: LWT control** 1: Ext RT control 2: RT control		
9.1		Setpoint mode	R/W	0: Fixed 1: WD heating, fixed cooling **2: Weather dependent**		
9.1		Schedule	R/W	**0: No** 1: Yes		
9.1	[1-00]	Low ambient temp. for LWT main zone heating WD curve.	R/W	-40~5°C, step: 1°C **-10°C**		
9.1	[1-01]	High ambient temp. for LWT main zone heating WD curve.	R/W	10~25°C, step: 1°C **15°C**		
9.1	[1-02]	Leaving water value for low ambient temp. for LWT main zone heating WD curve.	R/W	[9-01]~[9-00], step: 1°C **35°C**		
9.1	[1-03]	Leaving water value for high ambient temp. for LWT main zone heating WD curve.	R/W	[9-01]~min(45, [9-00])°C , step: 1°C **25°C**		
9.1	[1-06]	Low ambient temp. for LWT main zone cooling WD curve.	R/W	10~25°C, step: 1°C **20°C**		
9.1	[1-07]	High ambient temp. for LWT main zone cooling WD curve.	R/W	25~43°C, step: 1°C **35°C**		
9.1	[1-08]	Leaving water value for low ambient temp. for LWT main zone cooling WD curve.	R/W	[9-03]~[9-02]°C, step: 1°C **22°C**		
9.1	[1-09]	Leaving water value for high ambient temp. for LWT main zone cooling WD curve.	R/W	[9-03]~[9-02]°C, step: 1°C **18°C**		
└ Additional zone						
9.1	[2-0D]	Emitter type	R/W	**0: Underfloor heating** 1: Fancoil unit 2: Radiator		
9.1		Setpoint mode	R/W	0: Fixed 1: WD heating, fixed cooling **2: Weather dependent**		
9.1		Schedule	R/W	**0: No** 1: Yes		
9.1	[0-00]	Leaving water value for high ambient temp. for LWT add zone heating WD curve.	R/W	[9-05]~min(45,[9-06])°C, step: 1°C **25°C**		
9.1	[0-01]	Leaving water value for low ambient temp. for LWT add zone heating WD curve.	R/W	[9-05]~[9-06]°C, step: 1°C **35°C**		

(*1) *V3/W1
(*2) *3V3/3W1
(*3) EDLA*
(*4) EBLA*

(#) Setting is not applicable for this unit.

Field settings table

Breadcrumb	Field code	Setting name		Range, step **Default value**	Installer setting at variance with default value Date	Value
9.1	[0-02]	High ambient temp. for LWT add zone heating WD curve.	R/W	10~25°C, step: 1°C **15°C**		
9.1	[0-03]	Low ambient temp. for LWT add zone heating WD curve.	R/W	-40~5°C, step: 1°C **-10°C**		
9.1	[0-04]	Leaving water value for high ambient temp. for LWT add zone cooling WD curve.	R/W	[9-07]~[9-08]°C, step: 1°C **18°C**		
9.1	[0-05]	Leaving water value for low ambient temp. for LWT add zone cooling WD curve.	R/W	[9-07]~[9-08]°C, step: 1°C **22°C**		
9.1	[0-06]	High ambient temp. for LWT add zone cooling WD curve.	R/W	25~43°C, step: 1°C **35°C**		
9.1	[0-07]	Low ambient temp. for LWT add zone cooling WD curve.	R/W	10~25°C, step: 1°C **20°C**		
		└ Tank				
9.1	[6-0D]	Heat up mode	R/W	0: Reheat only **1: Reheat + sched.** 2: Scheduled only		
9.1	[6-0A]	Comfort setpoint	R/W	30~[6-0E]°C, step: 1°C **50°C**		
9.1	[6-0B]	Eco setpoint	R/W	30~min(50, [6-0E])°C, step: 1°C **45°C**		
9.1	[6-0C]	Reheat setpoint	R/W	30~min(50, [6-0E])°C, step: 1°C **45°C**		
	└ Domestic hot water					
9.2.1	[E-05] [E-06] [E-07]	Domestic hot water	R/W	**0: No DHW** 2: EKHW 7: EKHWP		
9.2.2	[D-02]	DHW pump	R/W	**0: No** 1: Secondary rtrn 2: Disinf. Shunt 3: Circulation Pump 4: Circulation Pump and disinf. Shunt		
9.2.4	[D-07]	Solar	R/W	**0: No** 1: Yes		
	└ Back up heater					
9.3.1	[E-03]	BUH type	R/W (*1) R/O (*2)	**0: no BUH (*1)** 1: External BUH **2: 3V (*2)**		
9.3.2	[5-0D]	Voltage	R/W (*1) R/O (*2)	**0: 230V, 1~** 1: 230V, 3~ 2: 400V, 3~		
9.3.3	[4-0A]	Configuration	R/W	**0: 1** 1: 1/1+2 2: 1/2 3: 1/2 + 1/1+2 in emergency		
9.3.4	[6-03]	Capacity step 1	R/W	0~10kW, step: 0,2kW **0kW (*1)** **3kW (*2)**		
9.3.5	[6-04]	Additional capacity step 2	R/O (*2) R/W (*1)	0~10kW, step: 0,2kW **0kW**		
9.3.6	[5-00]	Equilibrium	R/W	0: Allowed **1: Not allowed**		
9.3.7	[5-01]	Equilibrium temperature	R/W	-15~35°C, step: 1°C **0°C**		
9.3.8	[4-00]	Operation	R/W	0: Disabled **1: Enabled** 2: Only DHW		
	└ Booster heater					
9.4.1	[6-02]	Capacity	R/W	0~10kW, step: 0,2kW **3kW**		
9.4.3	[8-03]	BSH eco timer	R/W	20~95 min, step: 5 min **50 min**		
9.4.4	[4-03]	Operation	R/W	0: Restricted 1: Allowed 2: Overlap **3: Compressor off** 4: Legionella only		
	└ Emergency					
9.5.1	[4-06]	Emergency	R/W	0: Manual 1: Automatic(normal SH/DHW ON) 2: Auto red SH/DHW ON **3: Auto red SH/DHW OFF** 4: SH ON/DHW OFF		
9.5.2	[7-06]	HP Forced OFF	R/W	**0: Disabled** 1: Enabled		
	└ Balancing					
9.6.1	[5-02]	Space heating priority	R/W	**0: Disabled** 1: Enabled		
9.6.2	[5-03]	Priority temperature	R/W	-15~35°C, step: 1°C **0°C**		
9.6.3	[5-04]	Offset BSH setpoint	R/W	0~20°C, step: 1°C **10°C**		
9.6.4	[8-02]	Anti-recycle timer	R/W	0~10 hour, step: 0,5 hour **3 hour**		
9.6.5	[8-00]	Minimum running timer	R/W	0~20 min, step 1 min **1 min**		
9.6.6	[8-01]	Maximum running timer	R/W	5~95 min, step: 5 min **30 min**		
9.6.7	[8-04]	Additional timer	R/W	0~95 min, step: 5 min **95 min**		
Installer settings						
9.7	[4-04]	Water pipe freeze prevention		0: Intermittent (not to be used) **1: Continuous** 2: Off		
	└ Benefit kWh power supply					
9.8.2	[D-00]	Allow heater	R/W	**0: None** 1: BSH only 2: BUH only 3: All heaters		
9.8.3	[D-05]	Allow pump	R/W	0: Forced off **1: As normal**		

(*1) *V3/W1
(*2) *3V3/3W1
(*3) EDLA*
(*4) EBLA*

(#) Setting is not applicable for this unit.

Field settings table

Breadcrumb	Field code	Setting name		Range, step **Default value**	Installer setting at variance with default value Date	Value
9.8.4	[D-01]	Benefit kWh power supply	R/W	**0: No** 1: Active open 2: Active closed 3: Smart grid		
9.8.6		Allow electric heaters		0: No **1: Yes**		
9.8.7		Enable Room buffering		**0: No** 1: Yes		
9.8.8		Limit setting kW		0~20 kW, step: 0,5 kW **20 kW**		
└ Power consumption control						
9.9.1	[4-08]	Power consumption control	R/W	**0: No limitation** 1: Continuous 2: Digital inputs		
9.9.2	[4-09]	Type	R/W	0: Current **1: Power**		
9.9.3	[5-05]	Limit	R/W	0~50 A, step: 1 A **50 A**		
9.9.4	[5-05]	Limit 1	R/W	0~50 A, step: 1 A **50 A**		
9.9.5	[5-06]	Limit 2	R/W	0~50 A, step: 1 A **50 A**		
9.9.6	[5-07]	Limit 3	R/W	0~50 A, step: 1 A **50 A**		
9.9.7	[5-08]	Limit 4	R/W	0~50 A, step: 1 A **50 A**		
9.9.8	[5-09]	Limit	R/W	0~20 kW, step: 0,5 kW **20 kW**		
9.9.9	[5-09]	Limit 1	R/W	0~20 kW, step: 0,5 kW **20 kW**		
9.9.A	[5-0A]	Limit 2	R/W	0~20 kW, step: 0,5 kW **20 kW**		
9.9.B	[5-0B]	Limit 3	R/W	0~20 kW, step: 0,5 kW **20 kW**		
9.9.C	[5-0C]	Limit 4	R/W	0~20 kW, step: 0,5 kW **20 kW**		
9.9.D	[4-01]	Priority heater		**0: None** 1: BSH 2: BUH		
└ Energy metering						
9.A.1	[D-08]	Electricity meter 1	R/W	**0: No** 1: 0,1 pulse/kWh 2: 1 pulse/kWh 3: 10 pulse/kWh 4: 100 pulse/kWh 5: 1000 pulse/kWh		
9.A.2	[D-09]	Electricity meter 2 / PV meter	R/W	**0: No** 1: 0,1 pulse/kWh 2: 1 pulse/kWh 3: 10 pulse/kWh 4: 100 pulse/kWh 5: 1000 pulse/kWh 6: 100 pulse/kWh (PV meter) 7: 1000 pulse/kWh (PV meter)		
└ Sensors						
9.B.1	[C-08]	External sensor	R/W	**0: No** 1: Outdoor sensor 2: Room sensor		
9.B.2	[2-0B]	Ext. amb. sensor offset	R/W	-5~5°C, step: 0,5°C **0°C**		
9.B.3	[1-0A]	Averaging time	R/W	**0: No averaging** 1: 12 hours 2: 24 hours 3: 48 hours 4: 72 hours		
└ Bivalent						
9.C.1	[C-02]	Bivalent	R/W	**0: No** 1: Bivalent		
9.C.2	[7-05]	Boiler efficiency	R/W	**0: Very high** 1: High 2: Medium 3: Low 4: Very low		
9.C.3	[C-03]	Temperature	R/W	-25~25°C, step: 1°C **0°C**		
9.C.4	[C-04]	Hysteresis	R/W	2~10°C, step 1°C **3°C**		
Installer settings						
9.D	[C-09]	Alarm output	R/W	**0: Normally open** 1: Normally closed		
9.E	[3-00]	Auto restart	R/W	0: No **1: Yes**		
9.F	[E-08]	Power saving function	R/W	0: Disabled **1: Enabled**		
9.G		Disable protections	R/W	0: No **1: Yes**		
└ Overview field settings						
9.I	[0-00]	Leaving water value for high ambient temp. for LWT add zone heating WD curve.	R/W	[9-05]~min(45,[9-06])°C, step: 1°C **25°C**		
9.I	[0-01]	Leaving water value for low ambient temp. for LWT add zone heating WD curve.	R/W	[9-05]~[9-06]°C, step: 1°C **35°C**		
9.I	[0-02]	High ambient temp. for LWT add zone heating WD curve.	R/W	10~25°C, step: 1°C **15°C**		
9.I	[0-03]	Low ambient temp. for LWT add zone heating WD curve.	R/W	-40~5°C, step: 1°C **-10°C**		
9.I	[0-04]	Leaving water value for high ambient temp. for LWT add zone cooling WD curve.	R/W	[9-07]~[9-08]°C, step: 1°C **18°C**		
9.I	[0-05]	Leaving water value for low ambient temp. for LWT add zone cooling WD curve.	R/W	[9-07]~[9-08]°C, step: 1°C **22°C**		
9.I	[0-06]	High ambient temp. for LWT add zone cooling WD curve.	R/W	25~43°C, step: 1°C **35°C**		
9.I	[0-07]	Low ambient temp. for LWT add zone cooling WD curve.	R/W	10~25°C, step: 1°C **20°C**		

(*1) *V3/W1
(*2) *3V3/3W1
(*3) EDLA*
(*4) EBLA*

(#) Setting is not applicable for this unit.

Field settings table					Installer setting at variance with default value	
Breadcrumb	Field code	Setting name		Range, step **Default value**	Date	Value
9.I	[0-0B]	Leaving water value for high ambient temp. for DHW WD curve.	R/W	35~[6-0E]°C, step: 1°C **55°C**		
9.I	[0-0C]	Leaving water value for low ambient temp. for DHW WD curve.	R/W	45~[6-0E]°C, step: 1°C **55°C**		
9.I	[0-0D]	High ambient temp. for DHW WD curve.	R/W	10~25°C, step: 1°C **15°C**		
9.I	[0-0E]	Low ambient temp. for DHW WD curve.	R/W	-40~5°C, step: 1°C **-10°C**		
9.I	[1-00]	Low ambient temp. for LWT main zone heating WD curve.	R/W	-40~5°C, step: 1°C **-10°C**		
9.I	[1-01]	High ambient temp. for LWT main zone heating WD curve.	R/W	10~25°C, step: 1°C **15°C**		
9.I	[1-02]	Leaving water value for low ambient temp. for LWT main zone heating WD curve.	R/W	[9-01]~[9-00], step: 1°C **35°C**		
9.I	[1-03]	Leaving water value for high ambient temp. for LWT main zone heating WD curve.	R/W	[9-01]~min(45, [9-00])°C , step: 1°C **25°C**		
9.I	[1-04]	Weather dependent cooling of the main leaving water temperature zone.	R/W	0: Disabled **1: Enabled**		
9.I	[1-05]	Weather dependent cooling of the additional leaving water temperature zone	R/W	0: Disabled **1: Enabled**		
9.I	[1-06]	Low ambient temp. for LWT main zone cooling WD curve.	R/W	10~25°C, step: 1°C **20°C**		
9.I	[1-07]	High ambient temp. for LWT main zone cooling WD curve.	R/W	25~43°C, step: 1°C **35°C**		
9.I	[1-08]	Leaving water value for low ambient temp. for LWT main zone cooling WD curve.	R/W	[9-03]~[9-02]°C, step: 1°C **22°C**		
9.I	[1-09]	Leaving water value for high ambient temp. for LWT main zone cooling WD curve.	R/W	[9-03]~[9-02]°C, step: 1°C **18°C**		
9.I	[1-0A]	What is the averaging time for the outdoor temp?	R/W	**0: No averaging** 1: 12 hours 2: 24 hours 3: 48 hours 4: 72 hours		
9.I	[1-0B]	What is the desired delta T in heating for the main zone?	R/W	[2-0C] ≠2 (Radiator) 3~10°C, step: 1°C **5°C** [2-0C] = 2 (Radiator) 8°C		
9.I	[1-0C]	What is the desired delta T in heating for the additional zone?	R/W	[2-0D] ≠2 (Radiator) 3~10°C, step: 1°C **5°C** [2-0D] = 2 (Radiator) 8°C		
9.I	[1-0D]	What is the desired delta T in cooling for the main zone?	R/W	3~10°C, step: 1°C **5°C**		
9.I	[1-0E]	What is the desired delta T in cooling for the additional zone?	R/W	3~10°C, step: 1°C **5°C**		
9.I	[2-00]	When should the disinfection function be executed?	R/W	0: Each day 1: Monday 2: Tuesday 3: Wednesday 4: Thursday **5: Friday** 6: Saturday 7: Sunday		
9.I	[2-01]	Should the disinfection function be executed?	R/W	**0: No** 1: Yes		
9.I	[2-02]	When should the disinfection function start?	R/W	0~23 hour, step: 1 hour **1**		
9.I	[2-03]	What is the disinfection target temperature?	R/W	55~75°C, step: 5°C **70°C**		
9.I	[2-04]	How long must the tank temperature be maintained?	R/W	5~60 min, step: 5 min **10 min**		
9.I	[2-05]	Room antifrost temperature	R/W	4~16°C, step: 1°C **8°C**		
9.I	[2-06]	Room frost protection	R/W	0: Disabled **1: Enabled**		
9.I	[2-09]	Adjust the offset on the measured room temperature	R/W	-5~5°C, step: 0,5°C **0°C**		
9.I	[2-0A]	Adjust the offset on the measured room temperature	R/W	-5~5°C, step: 0,5°C **0°C**		
9.I	[2-0B]	What is the required offset on the measured outdoor temp.?	R/W	-5~5°C, step: 0,5°C **0°C**		
9.I	[2-0C]	What emitter type is connected to the main LWT zone?	R/W	**0: Underfloor heating** 1: Fancoil unit 2: Radiator		
9.I	[2-0D]	What emitter type is connected to the additional LWT zone?	R/W	**0: Underfloor heating** 1: Fancoil unit 2: Radiator		
9.I	[2-0E]	What is the maximum allowed current over the heatpump ?	R/W	20~50 A, step: 1 A **50 A**		
9.I	[3-00]	Is auto restart of the unit allowed?	R/W	0: No **1: Yes**		
9.I	[3-01]	--		**0**		
9.I	[3-02]	--		**1**		
9.I	[3-03]	--		**4**		
9.I	[3-04]	--		**2**		
9.I	[3-05]	--		**1**		
9.I	[3-06]	What is the maximum desired room temperature in heating?	R/W	18~30°C, step: 1°C **30°C**		
9.I	[3-07]	What is the mimimum desired room temperature in heating?	R/W	12~18°C, step: 1°C **12°C**		
9.I	[3-08]	What is the maximum desired room temperature in cooling?	R/W	25~35°C, step: 1°C **35°C**		
9.I	[3-09]	What is the minimum desired room temperature in cooling?	R/W	15~25°C, step: 1°C **15°C**		
9.I	[4-00]	What is the BUH operation mode?	R/W	0: Disabled **1: Enabled** 2: Only DHW		
9.I	[4-01]	Which electric heater has priority?	R/W	**0: None** 1: BSH 2: BUH		

(*1) *V3/W1
(*2) *3V3/3W1
(*3) EDLA*
(*4) EBLA*

(#) Setting is not applicable for this unit.

Field settings table					Installer setting at variance with default value	
Breadcrumb	Field code	Setting name		Range, step **Default value**	Date	Value
9.I	[4-02]	Below which outdoor temperature is heating allowed?	R/W	14~35°C, step: 1°C with BUH: **35°C** without BUH: **25°C**		
9.I	[4-03]	Operation permission of the booster heater.	R/W	0: Restricted 1: Allowed 2: Overlap **3: Compressor off** 4: Legionella only		
9.I	[4-04]	Water pipe freeze prevention		0: Intermittent (not to be used) **1: Continuous** 2: Off		
9.I	[4-05]	--		**0**		
9.I	[4-06]	Emergency	R/W	0: Manual 1: Automatic(normal SH/DHW ON) 2: Auto red SH/DHW ON **3: Auto red SH/DHW OFF** 4: SH ON/DHW OFF		
9.I	[4-07]	--		**6**		
9.I	[4-08]	Which power limitation mode is required on the system?	R/W	**0: No limitation** 1: Continuous 2: Digital inputs		
9.I	[4-09]	Which power limitation type is required?	R/W	0: Current **1: Power**		
9.I	[4-0A]	Backup heater configuration	R/W	**0: 1** 1: 1/1+2 2: 1/2 3: 1/2 + 1/1+2 in emergency		
9.I	[4-0B]	Automatic cooling/heating changeover hysteresis.	R/W	1~10°C, step: 0,5°C **1°C**		
9.I	[4-0D]	Automatic cooling/heating changeover offset.	R/W	1~10°C, step: 0,5°C **3°C**		
9.I	[4-0E]	--		**6**		
9.I	[5-00]	Is backup heater operation allowed above equilibrium temperature during space heating operation?	R/W	0: Allowed **1: Not allowed**		
9.I	[5-01]	What is the equilibrium temperature for the building?	R/W	-15~35°C, step: 1°C **0°C**		
9.I	[5-02]	Space heating priority.	R/W	**0: Disabled** 1: Enabled		
9.I	[5-03]	Space heating priority temperature.	R/W	-15~35°C, step: 1°C **0°C**		
9.I	[5-04]	Set point correction for domestic hot water temperature.	R/W	0~20°C, step: 1°C **10°C**		
9.I	[5-05]	What is the requested limit for DI1?	R/W	0~50 A, step: 1 A **50 A**		
9.I	[5-06]	What is the requested limit for DI2?	R/W	0~50 A, step: 1 A **50 A**		
9.I	[5-07]	What is the requested limit for DI3?	R/W	0~50 A, step: 1 A **50 A**		
9.I	[5-08]	What is the requested limit for DI4?	R/W	0~50 A, step: 1 A **50 A**		
9.I	[5-09]	What is the requested limit for DI1?	R/W	0~20 kW, step: 0,5 kW **20 kW**		
9.I	[5-0A]	What is the requested limit for DI2?	R/W	0~20 kW, step: 0,5 kW **20 kW**		
9.I	[5-0B]	What is the requested limit for DI3?	R/W	0~20 kW, step: 0,5 kW **20 kW**		
9.I	[5-0C]	What is the requested limit for DI4?	R/W	0~20 kW, step: 0,5 kW **20 kW**		
9.I	[5-0D]	Backup heater voltage	R/W (*1) R/O (*2)	**0: 230V, 1~** 1: 230V, 3~ 2: 400V, 3~		
9.I	[5-0E]	--		**1**		
9.I	[6-00]	The temperature difference determining the heat pump ON temperature.	R/W	2~40°C, step: 1°C **27°C**		
9.I	[6-01]	The temperature difference determining the heat pump OFF temperature.	R/W	0~10°C, step: 1°C **2°C**		
9.I	[6-02]	What is the capacity of the booster heater?	R/W	0~10kW, step: 0,2kW **3kW**		
9.I	[6-03]	What is the capacity of the backup heater step 1?	R/W	0~10kW, step: 0,2kW **0kW (*1)** **3kW (*2)**		
9.I	[6-04]	What is the capacity of the backup heater step 2?	R/O (*2) R/W (*1)	0~10kW, step: 0,2kW **0kW**		
9.I	[6-05]	--		**0**		
9.I	[6-06]	--		**0**		
9.I	[6-07]	What is the capacity of the bottom plate heater?	R/W	0~200W, step: 10W **0W**		
9.I	[6-08]	What is the hysteresis to be used in reheat mode?	R/W	2~20°C, step: 1°C **10°C**		
9.I	[6-09]	--		**0**		
9.I	[6-0A]	What is the desired comfort storage temperature?	R/W	30~[6-0E]°C, step: 1°C **50°C**		
9.I	[6-0B]	What is the desired eco storage temperature?	R/W	30~min(50, [6-0E])°C, step: 1°C **45°C**		
9.I	[6-0C]	What is the desired reheat temperature?	R/W	30~min(50, [6-0E])°C, step: 1°C **45°C**		
9.I	[6-0D]	What is the desired DHW production type?	R/W	0: Reheat only **1: Reheat + sched.** 2: Scheduled only		
9.I	[6-0E]	What is the maximum **DHW** temperature setpoint?	R/W	40~75°C, step: 1°C **60°C** [E-07]=0 40~80°C, step: 1°C **60°C** [E-07]=5		
9.I	[7-00]	Domestic hot water booster heater overshoot temperature.	R/W	0~4°C, step: 1°C **0°C**		
9.I	[7-01]	Domestic hot water booster heater hysteresis.	R/W	2~40°C, step: 1°C **2°C**		
9.I	[7-02]	How many leaving water temperature zones are there?	R/W	**0: 1 LWT zone** 1: 2 LWT zones		
9.I	[7-03]	--		**2.5**		
9.I	[7-04]	--		**0**		

(*1) *V3/W1
(*2) *3V3/3W1
(*3) EDLA*
(*4) EBLA*

(#) Setting is not applicable for this unit.

Field settings table					Installer setting at variance with default value	
Breadcrumb	Field code	Setting name		Range, step **Default value**	Date	Value
9.I	[7-05]	Boiler efficiency	R/W	**0: Very high** 1: High 2: Medium 3: Low 4: Very low		
9.I	[7-06]	HP Forced OFF	R/W	**0: Disabled** 1: Enabled		
9.I	[7-07]	BBR16 activation	R/W	**0: Disabled** 1: Enabled		
9.I	[8-00]	Minimum running time for domestic hot water operation.	R/O	0~20 min, step 1 min **1 min**		
9.I	[8-01]	Maximum running time for domestic hot water operation.	R/W	5~95 min, step: 5 min **30 min**		
9.I	[8-02]	Anti-recycling time.	R/W	0~10 hour, step: 0,5 hour **3 hour**		
9.I	[8-03]	Booster heater delay timer.	R/W	20~95 min, step: 5 min **50 min**		
9.I	[8-04]	Additional running time for the maximum running time.	R/W	0~95 min, step: 5 min **95 min**		
9.I	[8-05]	Allow modulation of the LWT to control the room temp?	R/W	**0: No** 1: Yes		
9.I	[8-06]	Leaving water temperature maximum modulation.	R/W	0~10°C, step: 1°C **5°C**		
9.I	[8-07]	What is the desired comfort main LWT in cooling?	R/W	[9-03]~[9-02], step: 1°C **18°C**		
9.I	[8-08]	What is the desired eco main LWT in cooling?	R/W	[9-03]~[9-02], step: 1°C **20°C**		
9.I	[8-09]	What is the desired comfort main LWT in heating?	R/W	[9-01]~[9-00], step: 1°C **35°C**		
9.I	[8-0A]	What is the desired eco main LWT in heating?	R/W	[9-01]~[9-00], step: 1°C **33°C**		
9.I	[8-0B]	--		**13**		
9.I	[8-0C]	--		**10**		
9.I	[8-0D]	--		**16**		
9.I	[9-00]	What is the maximum desired LWT for main zone in heating?	R/W	[2-0C]=2: 37~60, step: 1°C **60°C** [2-0C]≠2: 37~55, step: 1°C **55°C**		
9.I	[9-01]	What is the mimimum desired LWT for main zone in heating?	R/W	15~37°C, step: 1°C **25°C**		
9.I	[9-02]	What is the maximum desired LWT for main zone in cooling?	R/W	18~22°C, step: 1°C **22°C**		
9.I	[9-03]	What is the mimimum desired LWT for main zone in cooling?	R/W	5~18°C, step: 1°C **7°C**		
9.I	[9-04]	Leaving water temperature overshoot temperature.	R/W	1~4°C, step: 1°C **4°C**		
9.I	[9-05]	What is the mimimum desired LWT for add. zone in heating?	R/W	15~37°C, step: 1°C **25°C**		
9.I	[9-06]	What is the maximum desired LWT for add. zone in heating?	R/W	[2-0D]=2: 37~60, step: 1°C **60°C** [2-0D]≠2: 37~55, step: 1°C **55°C**		
9.I	[9-07]	What is the mimimum desired LWT for add. zone in cooling?	R/W	5~18°C, step: 1°C **7°C**		
9.I	[9-08]	What is the maximum desired LWT for add. zone in cooling?	R/W	18~22°C, step: 1°C **22°C**		
9.I	[9-09]	What is the allowed undershoot in cooling?	R/W	1~18°C, step: 1°C **18°C**		
9.I	[9-0A]	What is the room buffering temperature in heating?	R/W	[3-07]～[3-06]°C, step: 0,5°C **23°C**		
9.I	[9-0B]	What is the room buffering temperature in Cooling?	R/W	[3-09]～[3-08]°C, step: 0,5°C **23°C**		
9.I	[9-0C]	Room temperature hysteresis.	R/W	1~6°C, step: 0,5°C **1 °C**		
9.I	[9-0D]	Pump speed limitation	R/W	0~8, step:1 0 : No limitation 1~4 : 80~50% 5~8 : 80~50% during sampling **6**		
9.I	[9-0E]	--		**6**		
9.I	[C-00]	Domestic heating water priority.	R/W	0: Solar priority **1: Heat pump priority**		
9.I	[C-01]	--		**0**		
9.I	[C-02]	Is an external backup heat source connected?	R/W	**0: No** 1: Bivalent		
9.I	[C-03]	Bivalent activation temperature.	R/W	-25~25°C, step: 1°C **0°C**		
9.I	[C-04]	Bivalent hysteresis temperature.	R/W	2~10°C, step 1°C **3°C**		
9.I	[C-05]	What is the thermo request contact type for the main zone?	R/W	0: - 1: 1 contact **2: 2 contacts**		
9.I	[C-06]	What is the thermo request contact type for the add. zone?	R/W	0: - 1: 1 contact **2: 2 contacts**		
9.I	[C-07]	What is the unit control method in space operation?	R/W	**0: LWT control** 1: Ext RT control 2: RT control		
9.I	[C-08]	Which type of external sensor is installed?	R/W	**0: No** 1: Outdoor sensor 2: Room sensor		
9.I	[C-09]	What is the required alarm output contact type?	R/W	**0: Normally open** 1: Normally closed		
9.I	[C-0A]	--		**0**		
9.I	[C-0B]	--		**0**		
9.I	[C-0C]	--		**0**		
9.I	[C-0D]	--		**0**		
9.I	[C-0E]	--		**0**		

(*1) *V3/W1
(*2) *3V3/3W1
(*3) EDLA*
(*4) EBLA*

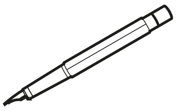
(#) Setting is not applicable for this unit.

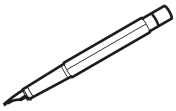
Field settings table

Breadcrumb	Field code	Setting name		Range, step **Default value**	Installer setting at variance with default value Date	Value
9.I	[D-00]	Which heaters are permitted if prefer. kWh rate PS is cut?	R/W	**0: None** 1: BSH only 2: BUH only 3: All heaters		
9.I	[D-01]	Contact type of preferential kWh rate PS installation?	R/W	**0: No** 1: Active open 2: Active closed 3: Smart grid		
9.I	[D-02]	Which type of DHW pump is installed?	R/W	**0: No** 1: Secondary rtrn 2: Disinf. Shunt 3: Circulation Pump 4: Circulation Pump and disinf. Shunt		
9.I	[D-03]	Leaving water temperature compensation around 0°C.	R/W	0: No **1: increase 2°C, span 4°C** 2: increase 4°C, span 4°C 3: increase 2°C, span 8°C 4: increase 4°C, span 8°C		
9.I	[D-04]	Is a demand PCB connected?	R/W	**0: No** 1: Pwr consmp ctrl		
9.I	[D-05]	Is the pump allowed to run if prefer. kWh rate PS is cut?	R/W	0: Forced off **1: As normal**		
9.I	[D-07]	Is a solar kit connected?	R/W	**0: No** 1: Yes		
9.I	[D-08]	Is an external kWh meter used for power measurement?	R/W	**0: No** 1: 0,1 pulse/kWh 2: 1 pulse/kWh 3: 10 pulse/kWh 4: 100 pulse/kWh 5: 1000 pulse/kWh		
9.I	[D-09]	Is an external kWh meter used for power measurement, kWh meter used for smart grid or a gas meter for hybrid unit?	R/W	**0: No** 1: 0,1 pulse/kWh 2: 1 pulse/kWh 3: 10 pulse/kWh 4: 100 pulse/kWh 5: 1000 pulse/kWh 6: 100 pulse/kWh (PV meter) 7: 1000 pulse/kWh (PV meter) 8: 1 pulse/m³ (gas meter) 9: 10 pulses/m³ (gas meter) 10: 100 pulses/m³ (gas meter)		
9.I	[D-0B]	--		**2**		
9.I	[D-0C]	--		**0**		
9.I	[D-0D]	--		**0**		
9.I	[D-0E]	--		**0**		
9.I	[E-00]	Which type of unit is installed?	R/W (*6) R/O (*7)	**0: Reversible (*4)** **1: Heating only (*3)**		
9.I	[E-01]	Which type of compressor is installed?	R/O	**1**		
9.I	[E-02]	What is the indoor unit software type?	R/W (*4) R/O (*3)	**0: Reversible (*4)** **1: Cooling only (*3)**		
9.I	[E-03]	What is the number of backup heater steps?	R/W (*1) R/O (*2)	**0: no BUH (*1)** 1: External BUH **2: 3V (*2)**		
9.I	[E-04]	Is the power saving function available on the outdoor unit?	R/O	0: No **1: Yes**		
9.I	[E-05]	Can the system prepare domestic hot water?	R/W	**0: No** 1: Yes		
9.I	[E-06]	Is a DHW tank installed in the system?	R/O	0: No **1: Yes**		
9.I	[E-07]	What kind of DHW tank is installed?	R/W	0~6 **0: EKHW** 5: EKHWP		
9.I	[E-08]	Power saving function for outdoor unit.	R/W	0: Disabled **1: Enabled**		
9.I	[E-09]	--		**1**		
9.I	[E-0B]	Is a bi-zone kit installed?		**0**		
9.I	[E-0C]	--		**0**		
9.I	[E-0D]	Is glycol present in the system?		**0: No** 1: Yes		
9.I	[E-0E]	--		**0**		
9.I	[F-00]	Pump operation allowed outside range.	R/W	**0: Disabled** 1: Enabled		
9.I	[F-01]	Above which outdoor temperature is cooling allowed?	R/W	10~35°C, step: 1°C **20°C**		
9.I	[F-02]	Bottom plate heater ON temperature.	R/W	3~10°C, step: 1°C **3°C**		
9.I	[F-03]	Bottom plate heater hysteresis.	R/W	2~5°C, step: 1°C **5°C**		
9.I	[F-04]	Is a bottom plate heater connected?	R/O	**0**		
9.I	[F-05]	--		**0**		
9.I	[F-09]	Pump operation during flow abnormality.	R/W	**0: Disabled** 1: Enabled		
9.I	[F-0A]	--		**0**		
9.I	[F-0B]	--		**0**		
9.I	[F-0C]	--		**1**		
9.I	[F-0D]	What is the pump operation mode?	R/W	0: Continuous **1: Sample** 2: Request		

(*1) *V3/W1
(*2) *3V3/3W1
(*3) EDLA*
(*4) EBLA*

(#) Setting is not applicable for this unit.





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