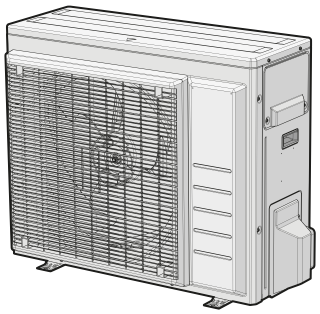
Service manual

Split Comfora R32



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1 Safety precautions

The precautions described in this document cover very important topics, follow them carefully.

All activities described in the service manual must be performed by an authorized person.

If you are NOT sure how to install, operate or service the unit, contact your dealer.

In accordance with the applicable legislation, it might be necessary to provide a logbook with the product containing at least:

information on maintenance, repair work, results of tests, stand-by periods, …

Also, at least, following information must be provided at an accessible place at the product:

- Instructions for shutting down the system in case of an emergency
- Name and address of fire department, police and hospital
- Name, address and day and night telephone numbers for obtaining service

In Europe, EN378 provides the necessary guidance for this logbook.

1.1 Meaning of warnings and symbols

DANGER

Indicates a situation that results in death or serious injury.

DANGER: RISK OF ELECTROCUTION

Indicates a situation that could result in electrocution.

DANGER: RISK OF BURNING/SCALDING

Indicates a situation that could result in burning/scalding because of extreme hot or cold temperatures.

DANGER: RISK OF EXPLOSION

Indicates a situation that could result in explosion.

WARNING

Indicates a situation that could result in death or serious injury.

WARNING: FLAMMABLE MATERIAL

CAUTION

Indicates a situation that could result in minor or moderate injury.

NOTICE

Indicates a situation that could result in equipment or property damage.

INFORMATION

Indicates useful tips or additional information.

1.2 Dangers

DANGER: RISK OF BURNING/SCALDING

- Do NOT touch the refrigerant piping, water piping or internal parts during and immediately after operation. It could be too hot or too cold. Give it time to return to normal temperature. If you MUST touch it, wear protective gloves.
- Do NOT touch any accidental leaking refrigerant.

DANGER: RISK OF ELECTROCUTION

- Turn OFF all power supply before removing the switch box cover, connecting electrical wiring or touching electrical parts.
- Where applicable, stop the equipment's operation first and allow (refrigerant) pressure to equalize, before turning OFF the power.
- Disconnect the power supply for more than 10 minutes, and measure the voltage at the terminals of main circuit capacitors or electrical components before servicing. The voltage MUST be less than 50 V DC before you can touch electrical components. For the location of the terminals, see the wiring diagram. If the measured voltage is still higher than 50 V DC, discharge the capacitors in a safe manner by using a dedicated capacitor discharge pen to avoid possibility of sparking.
- Do NOT touch electrical components with wet hands.
- Do NOT leave the unit unattended when the service cover is removed.
- Protect electric componennts from getting wet while the service cover is opened.

1.3 Warnings

WARNING

Improper installation or attachment of equipment or accessories could result in electrical shock, short-circuit, leaks, fire or other damage to the equipment. ONLY use accessories, optional equipment and spare parts made or approved by Daikin unless otherwise specified.

WARNING

Do NOT apply any permanent inductive or capacitance loads to the circuit without ensuring that this will NOT exceed the permissible voltage and current permitted for the equipment in use.

WARNING

If a fault exists that could compromise safety, Do NOT connect electrical supply to the circuit until it is satisfactorily dealt with. If the fault CANNOT be corrected immediately but it is necessary to continue operation, an adequate temporary solution MUST be used. This MUST be reported to the owner of the equipment so all parties are advised.

Initial safety checks MUST include that:

- capacitors are discharged: this MUST be done in a safe manner to avoid possibility of sparking,
- NO live electrical components and wiring are exposed while charging, recovering or purging the system.

WARNING

Make sure that the refrigerating piping and components are installed in a position where they are unlikely to be exposed to any corroding substance.

WARNING

Make sure installation, testing and applied materials comply with applicable legislation (on top of the instructions described in the Daikin documentation).

WARNING

Make sure the work site environment is clean and safe to work in. Beware of spilled fluids, like water, oil or other substances.

Protect bystanders from injury and property from possible damage cause by service works.

WARNING

If any work is to be conducted on the refrigerating equipment or any associated parts which involves brazing, an appropriate dry powder or CO_2 fire extinguisher MUST be present.

When charging the unit, an appropriate dry powder or CO_2 fire extinguisher MUST be present.

WARNING

No person carrying out work in relation to a refrigerating system which involves exposing any pipe work shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, MUST be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which refrigerant can possibly be released to the surrounding space. Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. "No Smoking" signs MUST be displayed.

WARNING

Tear apart and throw away plastic packaging bags so that nobody, especially children, can play with them. **Possible consequence:** suffocation.

WARNING

During tests, NEVER pressurise the product with a pressure higher than the maximum allowable pressure (as indicated on the nameplate of the unit).

WARNING

Make sure the total refrigerant charge is in accordance with the room size in which the unit is installed: please consult the detailed instructions on charging and allowed room sizes in the installation manual.

WARNING

- NEVER mix different refrigerants or allow air to enter the refrigerant system.
- NEVER charge recovered refrigerant from another unit. Use recovered refrigerant only on the same unit where it was recovered from, or have it recycled at a certified facility.

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.

WARNING

ALWAYS recover the refrigerant. Do NOT release them directly into the environment. Use a vacuum pump to evacuate the installation.

WARNING

Removal of refrigerant MUST be according to the following:

When breaking into the refrigerant circuit to make repairs, be sure to remove the refrigerant from the system first. The refrigerant charge MUST be recovered into the correct recovery cylinders.

WARNING

Take sufficient precautions in case of refrigerant leakage. If refrigerant gas leaks, ventilate the area immediately. Possible risks:

- Excessive refrigerant concentrations in a closed room can lead to oxygen deficiency.
- Toxic gas might be produced if refrigerant gas comes into contact with fire.

WARNING

- Under no circumstances, potential sources of ignition SHALL be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) MUST NOT be used.
- Ensure that the detector is NOT a potential source of ignition and is suitable for the detection of R32.
- If a leak is suspected, all naked flames MUST be removed or extinguished.
- Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine MUST be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work.
- If a leakage of refrigerant is found which requires brazing, all of the refrigerant MUST be recovered from the system, or isolated (by means of shut-off valves) in a part of the system remote from the leak.
- Only use the electronic leak tester for R32. The old flame leak tester CANNOT be used on a system with HFC refrigerant because there is no chlorine component in the refrigerant. In case of R32 (HFC) refrigerant, any flame in contact with (leaking) refrigerant is extremely dangerous.

WARNING

- In order to prevent oxygen deficiency and R32 combustion, keep the room well-ventilated for a healthy work environment. Do NOT work in a confined space. If a refrigerant leak is detected in a confined room or an inadequately ventilated location, do NOT start the work until the area has been ventilated appropriately.
- If the work area is NOT located in the open air, make sure the work area is adequately ventilated before breaking into the system or conducting any brazing. The ventilation MUST continue to operate during the period that the work is carried out to prevent accumulation of refrigerant in the work area. The ventilation should safely disperse any released refrigerant and preferably ventilate to the open air.

WARNING

Ensure that no external live wiring is exposed while charging, recovering or purging the system. Sparks created when live wiring is short-circuited might ignite the refrigerant if it is leaked into the room while charging, recovering or purging the system.

WARNING

Ensure that the unit is properly earthed prior to conducting maintenance or service or charging the system with refrigerant. Do NOT earth the unit to a utility pipe, surge absorber, or telephone earth. Incomplete earthing may cause electrical shock.

WARNING

- ONLY use copper wires.
- Make sure the field wiring complies with the national wiring regulations.
- All field wiring MUST be performed in accordance with the wiring diagram supplied with the product.
- NEVER squeeze bundled cables and make sure they do NOT come in contact with the piping and sharp edges. Make sure no external pressure is applied to the terminal connections.
- Make sure to install earth wiring. Do NOT earth the unit to a utility pipe, surge absorber, or telephone earth. Incomplete earth may cause electrical shock.
- Make sure to use a dedicated power circuit. NEVER use a power supply shared by another appliance.
- Make sure to install the required fuses or circuit breakers.
- Make sure to install an earth leakage protector. Failure to do so may cause electrical shock or fire.
- When installing the earth leakage protector, make sure it is compatible with the inverter (resistant to high frequency electric noise) to avoid unnecessary opening of the earth leakage protector.

WARNING

Make sure the markings on the unit remain visible and legible after inspection or repair work. Markings and signs that are illegible shall be corrected.

WARNING

- After finishing the electrical work, confirm that each electrical component and terminal inside the switch box is connected securely.
- Make sure all covers are closed before starting up the unit.

WARNING

- The area MUST be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially toxic or flammable atmospheres.
- Ensure that the leak detection equipment being used is suitable for use with all applicable refrigerants, i.e. non-sparking, adequately sealed or intrinsically safe.
- Prior to and during work, the area MUST be checked with an appropriate refrigerant detector capable of detecting R32 refrigerant, to ensure a work environment free of refrigerant.

WARNING

- Equipment MUST be labelled stating that it has been de-commissioned and emptied of refrigerant.
- The label MUST be dated and signed.
- For appliances containing flammable refrigerants, ensure that there are labels on the equipment stating the equipment contains flammable refrigerant.

WARNING

Before carrying out refrigerant recovery procedure, it is essential that the technician is completely familiar with the equipment and all its details. It is recommended good practice that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample MUST be taken in case analysis is required prior to re-use of recovered refrigerant. It is essential that electrical power is available before the task is commenced.

- Become familiar with the equipment and its operation.
- Isolate system electrically.
- Ensure that mechanical handling equipment is available, if required, for handling refrigerant cylinders.
- Ensure that all personal protective equipment is available and is used correctly.
- Ensure that the recovery process is supervised at all times by a competent person.
- Ensure that recovery equipment and cylinders are conform to the appropriate standards.
- If a vacuum is NOT possible, make a manifold so that refrigerant can be removed from various parts of the system.
- Make sure that cylinder is situated on the scales before recovery takes place.
- Start the recovery machine and operate in accordance with instructions.
- Do NOT overfill cylinders (no more than 60% volume liquid charge).
- Do NOT exceed the maximum working pressure of the cylinder, NOT even temporarily.
- When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed.
- Recovered refrigerant MUST NOT be charged into another refrigerating system unless it has been cleaned and checked.

WARNING

All maintenance staff and others working in the local area MUST be instructed on the nature of work being carried out.

WARNING

Provide adequate measures to prevent that the unit can be used as a shelter by small animals. Small animals that make contact with electrical parts can cause malfunctions, smoke or fire.

WARNING

Prior to start working on systems containing flammable refrigerant, safety checks are necessary to ensure that the risk of ignition is minimised. Therefore, some instructions should be followed.

Please refer to the service manual for more information.

WARNING

- In case refrigerant recovery is required, use the appropriate service ports.
- If applicable for your unit, use the appropriate recovery mode or field setting to smoothly recover the refrigerant.
- ONLY use leak free hoses, couplings and manifolds in good working condition.
- ONLY use recovery cylinders designated and labelled to recover R32. Note that thread connection to the cylinder is counter clock.
- Always use a calibrated scale in good condition prior and during the refrigerant recovery process to determine the weight of the recovered refrigerant into the external refrigerant cylinder.
- Read the operation instructions of the recovery unit prior to connecting the recovery unit. Verify the recovery unit is suited for R32 refrigerant, check that it is in good working condition, has been properly maintained and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release. Consult manufacturer if in doubt.
- Do NOT overfill the refrigerant cylinder, confirm with the supplier of the refrigerant cylinder about maximum filling ratio if NOT mentioned on the refrigerant cylinder itself. Generally the maximum filling amount should be limited to 60% of the maximum volume of the cylinder.
- Do NOT exceed the maximum working pressure of the refrigerant cylinder, NOT even temporarily.
- When the cylinders have been filled correctly, and the refrigerant recovery process is completed, make sure that the cylinders and the equipment are removed from site promptly and all stop valves on the equipment are (kept) closed.
- The recovered refrigerant MUST be returned to the refrigerant supplier in the correct recovery cylinder, and the relevant waste transfer note arranged. Do NOT mix refrigerants in recovery units and especially NOT in cylinders.
- Recovered refrigerant MUST NOT be charged into another refrigerant system unless it has been cleaned and checked.

WARNING

If compressor is to be removed, ensure that the compressor has been evacuated to an acceptable level to make sure that flammable refrigerant does NOT remain within the lubricant. The evacuation process MUST be carried out prior to returning the compressor to the supplier. During the refrigerant recovery, confirm that the crankcase heater of the compressor body is energized to accelerate this process. When oil is drained from a system, it MUST be carried out safely.

WARNING

Make sure the ventilation machinery and outlets are operating adequately and are NOT obstructed.

1.4 Cautions

CAUTION

Wear adequate personal protective equipment (protective gloves, safety glasses,…) when installing, maintaining or servicing the system.

CAUTION

To avoid injury, do NOT touch the air inlet or aluminium fins of the unit.

CAUTION

- Do NOT place any objects or equipment on top of the unit.
- Do NOT sit, climb or stand on the unit.

1.5 Notices

NOTICE

- Make sure water quality complies with EU directive 2020/2184.
- Check the system for leaks after each repair/modification of the water side.
- Check drainage system(s) after repairs.
- Be careful when tilting units as water may leak.

NOTICE

Make sure refrigerant piping installation complies with applicable legislation. In Europe, EN378 is the applicable standard.

NOTICE

Make sure the field piping and connections are NOT subjected to stress.

2 Troubleshooting

2.1 To display the error code on the user interface

1 Hold CANCEL for about 5 seconds.

Result: 00 blinks in the temperature display section.

2 Press CANCEL repeatedly until a continuous beep is heard.

Result: The code is now displayed on the display.

INFORMATION

- A short beep and 2 consecutive beeps indicate non-corresponding codes.
- To cancel the code display, hold CANCEL for 5 seconds. The code will also disappear from the display if the button is NOT pressed within 1 minute.

2.2 To reset the error code via remote controller

Prerequisite: Problem is solved.

1 Press the ON/OFF button of the remote controller to reset the error.

2.3 To reset the error code via outdoor unit

Prerequisite: Problem is solved.

1 Perform a power reset to reset the error code.

2.4 To perform a test run

INFORMATION

If the unit runs into an error during commissioning, see the service manual for the detailed troubleshooting guidelines.

Prerequisite: The power supply MUST be in the specified range.

Prerequisite: Test run may be performed in cooling or heating mode.

Prerequisite: Refer to the operation manual of the indoor unit for setting temperature, operation mode….

1 In cooling mode, select the lowest programmable temperature. In heating mode, select the highest programmable temperature. The test run can be disabled if necessary.

2 When the test run is finished, set the temperature to a normal level. In cooling mode: 26~28°C, in heating mode: 20~24°C.

3 Make sure that all functions and parts are working properly.

4 The system stops operating 3 minutes after the unit is turned OFF.

INFORMATION

- Even if the unit is turned OFF, it consumes electricity.
- When the power turns back on after a power break, the previously selected mode will be resumed.

2.4.1 To perform a test run in winter season

When operating the air conditioner in **Cooling** mode in winter, set it to test run operation using the following method.

1. Press TEMP, TEMP, and OFF simultaneously.
2. Press TEMP.
3. Select 17.
4. Press FAN.
5. Press COOL to switch the system on.

   Result: Test run operation will stop automatically after about 30 minutes.
6. To stop operation, press OFF.

INFORMATION

Some of the functions CANNOT be used in the test run operation mode.

If a power failure occurs during operation, the system automatically restarts immediately after power is restored.

2.5 Error based troubleshooting

2.5.1 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 "3.6 Main PCB" [▸ 77].

   Possible cause: Faulty main PCB.
2. Check if the power supply is compliant with the regulations. See "4.1 Electrical circuit" [▸ 108].

   Possible cause:
   - Faulty or disturbance of the power supply (power supply MUST be within range of nominal operating voltage ±4%),
   - Power drop,
   - Short circuit.

3 Perform a check of the outdoor unit fan motor. See "3.7 Outdoor unit fan motor" [▸ 86].

Possible cause: Faulty outdoor unit fan motor.

4 Perform a check of the compressor. See "3.2 Compressor" [▸ 51].

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

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

5 Wait until the rectifier voltage is below 10 V DC.

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.

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

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

2.5.2 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" [▸ 109].

Possible cause: Closed stop valve in the refrigerant circuit.

2 Perform a check of the high pressure switch. See "3.5 High pressure switch" [▸ 74].

Possible cause: Faulty high pressure switch.

3 Perform a check of the main PCB. See "3.6 Main PCB" [▸ 77].

Possible cause: Faulty main PCB.

4 Check if the refrigerant circuit is correctly charged. See "4.2 Refrigerant circuit" [▸ 109].

Possible cause: Refrigerant overcharge.

5 Check for the presence of non-condensables and/or humidity in the refrigerant circuit. See "4.2 Refrigerant circuit" [▸ 109].

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

6 Check if the refrigerant circuit is clogged. See "4.2 Refrigerant circuit" [▸ 109].

Possible cause: Clogged refrigerant circuit.

7 Perform a check of the outdoor unit fan motor. See "3.7 Outdoor unit fan motor" [▸ 86].

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.

2.5.3 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" [▸ 109].

Possible cause: Closed stop valve in the refrigerant circuit.

2 Perform a check of the discharge pipe thermistor. See "3.11 Thermistors" [▸ 100].

Possible cause: Faulty discharge pipe thermistor or connector fault.

3 Perform a check of the outdoor unit fan motor. See "3.7 Outdoor unit fan motor" [▸ 86].

Possible cause: Faulty outdoor unit fan motor.

4 Perform a check of the compressor. See "3.2 Compressor" [▸ 51].

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

5 Perform a check of the expansion valve. See "3.4 Expansion valve" [▸ 67].

Possible cause: Faulty expansion valve.

6 Perform a check of the 4-way valve. See "3.1 4-way valve" [▸ 45].

Possible cause: Faulty 4-way valve.

7 Perform a check of the main PCB. See "3.6 Main PCB" [▶ 77].

Possible cause: Faulty main PCB.

8 Check if the refrigerant circuit is correctly charged. See "4.2 Refrigerant circuit" [▶ 109].

Possible cause: Refrigerant shortage.

9 Check for the presence of non-condensables and/or humidity in the refrigerant circuit. See "4.2 Refrigerant circuit" [▶ 109].

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

10 Check if the refrigerant circuit is clogged. See "4.2 Refrigerant circuit" [▶ 109].

Possible cause: Clogged refrigerant circuit.

INFORMATION

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

2.5.4 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 "3.11 Thermistors" [▶ 100].

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" [▶ 109].

Possible cause: Closed stop valve in the refrigerant circuit.

3 Check if the refrigerant circuit is clogged. See "4.2 Refrigerant circuit" [▶ 109].

Possible cause: Clogged refrigerant circuit.

4 Check if the refrigerant circuit is correctly charged. See "4.2 Refrigerant circuit" [▶ 109].

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" [▶ 109].

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

6 Perform a check of the compressor. See "3.2 Compressor" [▶ 51].

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

7 Perform a check of the main PCB. See "3.6 Main PCB" [▸ 77].

Possible cause: Faulty main PCB.

8 Perform a check of the 4-way valve. See "3.1 4-way valve" [▸ 45].

Possible cause: Faulty 4-way valve.

9 Perform a check of the expansion valve. See "3.4 Expansion valve" [▸ 67].

Possible cause: Faulty expansion valve.

INFORMATION

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

2.5.5 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 "3.7 Outdoor unit fan motor" [▸ 86].

Possible cause: Faulty outdoor unit fan motor.

2 Perform a check of the main PCB. See "3.6 Main PCB" [▸ 77].

Possible cause: Faulty main PCB.

INFORMATION

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

2.5.6 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 "4.3 External factors" [▸ 118].

Possible cause: Outdoor temperature is out of operation range.

2 Perform a check of the compressor. See "3.2 Compressor" [▸ 51].

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

3 Perform a check of the main PCB. See "3.6 Main PCB" [▸ 77].

Possible cause: Faulty main PCB.

4 Check if the power supply is compliant with the regulations. See "4.1 Electrical circuit" [▸ 108].

Possible cause:
- Faulty or disturbance of the power supply (power supply MUST be within range of nominal operating voltage ±4%),
- Power drop,
- Short circuit.

INFORMATION

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

2.5.7 E9-00 – Expansion valve abnormality

Trigger	Effect	Reset
PCB detects expansion valve coil overcurrent or disconnection.	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 Perform a check of the expansion valve. See "3.4 Expansion valve" [▸ 67].

Possible cause: Faulty expansion valve.

2 Perform a check of the main PCB. See "3.6 Main PCB" [▸ 77].

Possible cause: Faulty main PCB.

INFORMATION

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

2.5.8 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 "3.1 4-way valve" [▸ 45].

Possible cause: Faulty 4-way valve.

2 Perform a check of the main PCB. See "3.6 Main PCB" [▸ 77].

Possible cause: Faulty main PCB.

3 Perform a check of the indoor unit air (room) thermistor. See "3.11 Thermistors" [▸ 100].

Possible cause: Faulty indoor unit air (room) thermistor.

4 Perform a check of the indoor unit main PCB. See Indoor unit PCB.

Possible cause: Faulty indoor unit main PCB.

5 Check that all stop valves of the refrigerant circuit are open. See "4.2 Refrigerant circuit" [▸ 109].

Possible cause: Closed stop valve in the refrigerant circuit.

6 Check if the refrigerant circuit is clogged. See "4.2 Refrigerant circuit" [▸ 109].

Possible cause: Clogged refrigerant circuit.

7 Check if the refrigerant circuit is correctly charged. See "4.2 Refrigerant circuit" [▸ 109].

Possible cause: Refrigerant overcharge or shortage.

8 Check for the presence of non-condensables and/or humidity in the refrigerant circuit. See "4.2 Refrigerant circuit" [▸ 109].

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.

2.5.9 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" [▸ 109].

   Possible cause: Closed stop valve in the refrigerant circuit.

2. Check if the refrigerant circuit is correctly charged. See "4.2 Refrigerant circuit" [▸ 109].

   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" [▸ 109].

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

4. Check if the refrigerant circuit is clogged. See "4.2 Refrigerant circuit" [▸ 109].

   Possible cause: Clogged refrigerant circuit.

5. Perform a check of the 4-way valve. See "3.1 4-way valve" [▸ 45].

   Possible cause: Faulty 4-way valve.

6. Perform a check of the expansion valve. See "3.4 Expansion valve" [▸ 67].

   Possible cause: Faulty expansion valve.

7. Perform a check of the main PCB. See "3.6 Main PCB" [▸ 77].

   Possible cause: Faulty main PCB.

8. Perform a check of all refrigerant side thermistors. See "3.11 Thermistors" [▸ 100].

   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.

2.5.10 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" [▶ 120].

Possible cause: Dirty outdoor heat exchanger.

2 Check that all stop valves of the refrigerant circuit are open. See "4.2 Refrigerant circuit" [▶ 109].

Possible cause: Closed stop valve in the refrigerant circuit.

3 Perform a check of the heat exchanger thermistor. See "3.11 Thermistors" [▶ 100].

Possible cause: Faulty heat exchanger thermistor.

4 Perform a check of the expansion valve. See "3.4 Expansion valve" [▶ 67].

Possible cause: Faulty expansion valve.

5 Perform a check of the main PCB. See "3.6 Main PCB" [▶ 77].

Possible cause: Faulty main PCB.

6 Check if the refrigerant circuit is correctly charged. See "4.2 Refrigerant circuit" [▶ 109].

Possible cause: Refrigerant overcharge.

7 Check for the presence of non-condensables and/or humidity in the refrigerant circuit. See "4.2 Refrigerant circuit" [▶ 109].

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

8 Check if the refrigerant circuit is clogged. See "4.2 Refrigerant circuit" [▶ 109].

Possible cause: Clogged refrigerant circuit.

9 Perform a check of the outdoor unit fan motor. See "3.7 Outdoor unit fan motor" [▶ 86].

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.

2.5.11 F8-00 – System shutdown due to compressor internal temperature abnormality

Trigger	Effect	Reset
Temperature discharge pipe thermistor exceeds the determined limit.	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" [▶ 109].

Possible cause: Closed stop valve in the refrigerant circuit.

2 Check if the refrigerant circuit is correctly charged. See "4.2 Refrigerant circuit" [▸ 109].

Possible cause: Refrigerant overcharge.

3 Check for the presence of non-condensables and/or humidity in the refrigerant circuit. See "4.2 Refrigerant circuit" [▸ 109].

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

4 Check if the refrigerant circuit is clogged. See "4.2 Refrigerant circuit" [▸ 109].

Possible cause: Clogged refrigerant circuit.

5 Perform a check of the discharge pipe thermistor. See "3.11 Thermistors" [▸ 100].

Possible cause: Faulty discharge pipe thermistor or connector fault.

INFORMATION

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

2.5.12 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 "3.6 Main PCB" [▸ 77].

Possible cause: Faulty main PCB.

2 Check if the power supply is compliant with the regulations. See "4.1 Electrical circuit" [▸ 108].

Possible cause:
- Faulty or disturbance of the power supply (power supply MUST be within range of nominal operating voltage ±4%),
- Power drop,
- Short circuit.

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

3 Wait until the rectifier voltage is below 10 V DC.

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.

4 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

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

2.5.13 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 "3.5 High pressure switch" [▸ 74].

Possible cause: Faulty high pressure switch.

2 Perform a check of the main PCB. See "3.6 Main PCB" [▸ 77].

Possible cause: Faulty main PCB.

3 Check if the power supply is compliant with the regulations. See "4.1 Electrical circuit" [▸ 108].

Possible cause:
- Faulty or disturbance of the power supply (power supply MUST be within range of nominal operating voltage ±4%),
- Power drop,
- Short circuit.

INFORMATION

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

2.5.14 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 "3.2 Compressor" [▸ 51].

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

2 Perform a check of the main PCB. See "3.6 Main PCB" [▸ 77].

Possible cause: Faulty main PCB.

3 Check that all stop valves of the refrigerant circuit are open. See "4.2 Refrigerant circuit" [▸ 109].

Possible cause: Closed stop valve in the refrigerant circuit.

4 Check if the refrigerant circuit is clogged. See "4.2 Refrigerant circuit" [▸ 109].

Possible cause: Clogged refrigerant circuit.

5 Check if the refrigerant circuit is correctly charged. See "4.2 Refrigerant circuit" [▸ 109].

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" [▸ 109].

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

7 Check if the power supply is compliant with the regulations. See "4.1 Electrical circuit" [▸ 108].

Possible cause:
- Faulty or disturbance of the power supply (power supply MUST be within range of nominal operating voltage ±4%),
- Power drop,
- Short circuit.

INFORMATION

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

2.5.15 H7-00 – Fan IPM temperature error

Trigger	Effect	Reset
PCB detects too high temperature of fan IPM.	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 "3.7 Outdoor unit fan motor" [▸ 86].

Possible cause: Faulty outdoor unit fan motor.

2 Check if the power supply is compliant with the regulations. See "4.1 Electrical circuit" [▸ 108].

Possible cause:
- Faulty or disturbance of the power supply (power supply MUST be within range of nominal operating voltage ±4%),
- Power drop,
- Short circuit.

3 Perform a check of the main PCB. See "3.6 Main PCB" [▸ 77].

Possible cause: Faulty main PCB.

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

4 Wait until the rectifier voltage is below 10 V DC.

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.

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

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

2.5.16 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 "3.6 Main PCB" [▸ 77].

Possible cause: Faulty main PCB.

2 Perform a check of the compressor. See "3.2 Compressor" [▸ 51].

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

3 Perform a check of the reactor. See "3.10 Reactor" [▸ 99].

Possible cause: Faulty reactor.

INFORMATION

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

2.5.17 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 "3.11 Thermistors" [▸ 100].

Possible cause: Faulty ambient air thermistor.

2 Perform a check of the main PCB. See "3.6 Main PCB" [▸ 77].

Possible cause: Faulty main PCB.

INFORMATION

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

2.5.18 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 "3.11 Thermistors" [▸ 100].

Possible cause: Faulty discharge pipe thermistor or connector fault.

2 Perform a check of the main PCB. See "3.6 Main PCB" [▸ 77].

Possible cause: Faulty main PCB.

INFORMATION

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

2.5.19 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 "3.11 Thermistors" [▸ 100].

Possible cause: Faulty heat exchanger thermistor.

2 Perform a check of the main PCB. See "3.6 Main PCB" [▸ 77].

Possible cause: Faulty main PCB.

INFORMATION

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

2.5.20 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 "3.6 Main PCB" [▸ 77].

Possible cause: Faulty main PCB.

2 Perform a check of the outdoor unit fan motor. See "3.7 Outdoor unit fan motor" [▸ 86].

Possible cause: Faulty outdoor unit fan motor.

3 Check if the power supply is compliant with the regulations. See "4.1 Electrical circuit" [▸ 108].

Possible cause:
- Faulty or disturbance of the power supply (power supply MUST be within range of nominal operating voltage ±4%),
- Power drop,
- Short circuit.

4 Clean the outdoor heat exchanger. See "5 Maintenance" [▸ 120].

Possible cause: Dirty outdoor heat exchanger.

INFORMATION

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

2.5.21 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 "3.7 Outdoor unit fan motor" [▸ 86].

Possible cause: Faulty outdoor unit fan motor.

2 Check if the power supply is compliant with the regulations. See "4.1 Electrical circuit" [▸ 108].

Possible cause:
- Faulty or disturbance of the power supply (power supply MUST be within range of nominal operating voltage ±4%),
- Power drop,
- Short circuit.

3 Perform a check of the main PCB. See "3.6 Main PCB" [▸ 77].

Possible cause: Faulty main PCB.

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

4 Wait until the rectifier voltage is below 10 V DC.

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.

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

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

2.5.22 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" [▸ 109].

Possible cause: Closed stop valve in the refrigerant circuit.

2 Check if the refrigerant circuit is clogged. See "4.2 Refrigerant circuit" [▸ 109].

Possible cause: Clogged refrigerant circuit.

3 Check if the refrigerant circuit is correctly charged. See "4.2 Refrigerant circuit" [▸ 109].

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" [▸ 109].

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

5 Perform a check of the main PCB. See "3.6 Main PCB" [▸ 77].

Possible cause: Faulty main PCB.

6 Perform a check of the compressor. See "3.2 Compressor" [▸ 51].

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

7 Check if the power supply is compliant with the regulations. See "4.1 Electrical circuit" [▸ 108].

Possible cause:
- Faulty or disturbance of the power supply (power supply MUST be within range of nominal operating voltage ±4%),
- Power drop,
- Short circuit.

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

8 Wait until the rectifier voltage is below 10 V DC.

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.

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

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

2.5.23 LA-00 – IGBT temperature error

Trigger	Effect	Reset
PCB detects too high temperature of IGBT.	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 "3.7 Outdoor unit fan motor" [▸ 86].

Possible cause: Faulty outdoor unit fan motor.

2 Check if the power supply is compliant with the regulations. See "4.1 Electrical circuit" [▸ 108].

Possible cause:
- Faulty or disturbance of the power supply (power supply MUST be within range of nominal operating voltage ±4%),
- Power drop,
- Short circuit.

3 Perform a check of the main PCB. See "3.6 Main PCB" [▸ 77].

Possible cause: Faulty main PCB.

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

4 Wait until the rectifier voltage is below 10 V DC.

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.

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

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

2.5.24 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 main PCB. See "3.6 Main PCB" [▸ 77].

Possible cause: Faulty main PCB.

INFORMATION

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

2.5.25 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 "3.11 Thermistors" [▸ 100].

Possible cause: Faulty refrigerant side thermistor(s).

2 Check that all stop valves of the refrigerant circuit are open. See "4.2 Refrigerant circuit" [▸ 109].

Possible cause: Closed stop valve in the refrigerant circuit.

3 Check if the refrigerant circuit is clogged. See "4.2 Refrigerant circuit" [▸ 109].

Possible cause: Clogged refrigerant circuit.

4 Check if the refrigerant circuit is correctly charged. See "4.2 Refrigerant circuit" [▸ 109].

Possible cause: Refrigerant shortage.

5 Check for the presence of non-condensables and/or humidity in the refrigerant circuit. See "4.2 Refrigerant circuit" [▸ 109].

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

6 Perform a check of the compressor. See "3.2 Compressor" [▸ 51].

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

7 Perform a check of the expansion valve. See "3.4 Expansion valve" [▸ 67].

Possible cause: Faulty expansion valve.

8 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" [▸ 109].

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.

2.5.26 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 compliant with the regulations. See "4.1 Electrical circuit" [▸ 108].

Possible cause:
- Faulty or disturbance of the power supply (power supply MUST be within range of nominal operating voltage ±4%),
- Power drop,
- Short circuit.

2 Perform a check of the compressor. See "3.2 Compressor" [▸ 51].

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

3 Perform a check of the outdoor unit fan motor. See "3.7 Outdoor unit fan motor" [▸ 86].

Possible cause: Faulty outdoor unit fan motor.

4 Perform a check of the main PCB. See "3.6 Main PCB" [▸ 77].

Possible cause: Faulty main PCB.

5 Wait until the compressor restarts.

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

6 Perform a check of the indoor unit main PCB. See Indoor unit PCB.

Possible cause: Faulty indoor unit main PCB.

7 Perform a check of the indoor unit power PCB. See Indoor unit power PCB.

Possible cause: Faulty indoor unit power PCB.

INFORMATION

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

2.5.27 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 compliant with the regulations. See "4.1 Electrical circuit" [▸ 108].

Possible cause:
- Faulty or disturbance of the power supply (power supply MUST be within range of nominal operating voltage ±4%),
- Power drop,
- Short circuit.

2 Perform a check of the power supply, connections, wiring,... between the outdoor unit and the indoor unit. See "4.1 Electrical circuit" [▸ 108].

Possible cause: Faulty wiring between the outdoor unit and the indoor unit.

3 Perform a check of the main PCB. See "3.6 Main PCB" [▸ 77].

Possible cause: Faulty main PCB.

4 Perform a check of the outdoor unit fan motor. See "3.7 Outdoor unit fan motor" [▸ 86].

Possible cause: Faulty outdoor unit fan motor.

5 Perform a check of the indoor unit main PCB. See Indoor unit PCB.

Possible cause: Faulty indoor unit main PCB.

6 Perform a check of the indoor unit power PCB. See Indoor unit power PCB.

Possible cause: Faulty indoor unit power PCB.

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

7 Wait until the rectifier voltage is below 10 V DC.

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.

8 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

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

2.5.28 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 for improper combination of the indoor unit and the outdoor unit. See the combination table in the Databook for more information.
2. Perform a check of the power supply, connections, wiring,... between the outdoor unit and the indoor unit. See "4.1 Electrical circuit" [▸ 108].

   Possible cause: Faulty wiring between the outdoor unit and the indoor unit.
3. Perform a check of the main PCB. See "3.6 Main PCB" [▸ 77].

   Possible cause: Faulty main PCB.
4. Perform a check of the indoor unit main PCB. See Indoor unit PCB.

   Possible cause: Faulty indoor unit main PCB.
5. Perform a check of the indoor unit power PCB. See Indoor unit power PCB.

   Possible cause: Faulty indoor unit power PCB.

INFORMATION

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

2.6 Symptom based troubleshooting

2.6.1 Operation does not start

Check	Detail
When the operation lamp is off, there is a power failure. Check the power supply.	▪ Is the power supply breaker ON? ▪ Do other electrical appliances work? ▪ Is the rated voltage (± 10%) supplied? ▪ Check the insulation of the electric system.
Check the type of the indoor unit.	Is the indoor unit type compatible with the outdoor unit?
Check the transmission between indoor and outdoor.	▪ Connection wires.
Check the outdoor temperature.	▪ Heating operation cannot be used when the outdoor temperature is 18°C WB or higher. ▪ Cooling operation cannot be used when the outdoor temperature is below −10°C DB.
When the operation lamp blinks, there may be an error code, activating the protection device. Diagnose with remote controller indication.	See "2.5 Error based troubleshooting" [▸ 15].
Check the remote controller addresses.	Are the address settings for the remote controller and indoor unit correct?
Check the operation circuit.	▪ Is the thermal fuse blown. ▪ Are wire size and wire connections OK?.
Check fan motor.	▪ Is the magnetic switch defective? ▪ Is the overcurrent relay defective?
Check compressor.	▪ Is the contact defective? ▪ Is the protection thermostat defective? ▪ Is the compressor itself defective?
Check remote controller.	▪ Are the batteries LOW? ▪ Are there incorrect settings?

2.6.2 Operation sometimes stops

Check	Detail
When the operation lamp is off, there is a power failure. Check the power supply.	▪ A power failure of 2 to 10 cycles stops air conditioner operation.

Check	Detail
Check the outdoor temperature.	▪ Heating operation cannot be used when the outdoor temperature is 18°C WB or higher. ▪ Cooling operation cannot be used when the outdoor temperature is below −10°C DB.
When the operation lamp blinks, there may be an error code, activating the protection device. Diagnose with remote controller indication.	See "2.5 Error based troubleshooting" [▸ 15].

2.6.3 Operation starts but the unit does not cool/heat

Check	Detail
Check the electrical power supply.	Is the rated voltage (± 10%) supplied?
Check for piping and wiring errors in the connection between the indoor unit and outdoor unit.	▪ Refrigerant piping is too long; is the length within specified range? ▪ Field piping is defective; is there a refrigerant leakage? ▪ Is there capacity loss over the condensor, saturation pressure or sound because of air mixed in to the circuit? ▪ Incorrect size of connection wiring.
When the operation lamp blinks, there may be a thermistor detection error code, activating the protection device.	▪ Check the resistance of all thermistors. ▪ Check the connection of all thermistors. ▪ Is there a malfunction in the room temperature thermistor or outdoor temperature thermistor?
Check for faulty operation of the electronic expansion valve.	Set the unit to cooling operation, and check the temperature of the liquid pipe to see if the electronic expansion valve works.
Diagnose by service port pressure and operating current.	Check for refrigerant shortage.
Check if the set temperature is appropriate.	thermostat "off" can be activated, set the appropriate temperature.
Check the type of the indoor and outdoor units.	Is the indoor unit type compatible with the outdoor unit?
Check the air filter.	Is the air filter clean?

Check	Detail
Check the installation conditions (specified in the installation manual).	▪ Does the installed model has sufficient capacity? ▪ Is there a short circuit air flow caused by insufficient installation space?
Check the outdoor temperature.	▪ Heating operation cannot be used when the outdoor temperature is 18°C WB or higher. ▪ Cooling operation cannot be used when the outdoor temperature is below −10°C DB.

2.6.4 Operating noise and vibrations

Check	Detail
Check the installation conditions (specified in the installation manual).	▪ Use general vibration prevention where needed. ▪ If the mounting wall is too thin, you must use cushion material or rubber, or change the installation place. ▪ Refrigerant piping is too short; is the length within specified range? ▪ Due to bad installation or general conditions there may be deformation of the unit. ▪ Are all the screws installed and tightened properly? ▪ Is all piping secured, fixed and supported by inserting a cushion material where needed? ▪ Install piping weights or correct by hand if any piping is in contact with other parts. ▪ Is the fan in contact with other parts? If so separate the fan from the other parts.
Check refrigerant charge.	▪ Is the unit filled with the specified refrigerant volume? ▪ Is there a flushing noise, due to refrigerant shortage? ▪ Is there air in the system?
Check the expansion valve.	If a passing sound is heard from the pressure reducing valve, apply sound insulation sheets of putty to reduce the valve noise.

2.6.5 Abnormal high pressure

In cooling mode

Check item	Detail
Does the outdoor unit fan run normally?	Visual inspection
Is the outdoor unit heat exchanger clogged?	Visual inspection
Is there clogging before or after the expansion valve (capillary)?	▪ Check if there is a temperature difference before and after expansion valve (capillary). ▪ Check if the main valve unit of expansion valve operates (by noise, vibration).
Is the High Pressure Switch normal?	Check continuity by using a tester.
Is the outdoor unit installed under such conditions that short circuit easily occurs?	Visual inspection
Is the piping length ≤5 m?	Visual inspection
Does air enter the refrigerant system?	Conduct refrigerant collection and vacuum drying, and then add proper amount refrigerant.
Is the refrigerant overcharged?	Conduct refrigerant collection and vacuum drying, and then add proper amount refrigerant.

In heating mode

Check item	Detail
Does the indoor unit fan run normally?	Visual inspection
Is the indoor unit heat exchanger clogged?	Visual inspection
Is the indoor unit installed under such conditions that short circuit easily occurs?	Visual inspection
Is there clogging before or after the expansion valve (capillary)?	▪ Check if there is a temperature difference before and after expansion valve (capillary). ▪ Check if the main valve unit of expansion valve operates (by noise, vibration).
Is the High Presure Switch normal?	Check continuity by using a tester.
Is the minimum piping length respected?	Visual inspection
Does air enter the refrigerant system?	Conduct refrigerant collection and vacuum drying, and then add proper amount refrigerant.

Check item	Detail
Is the refrigerant overcharged?	Conduct refrigerant collection and vacuum drying, and then add proper amount refrigerant.

2.6.6 Abnormal low pressure

Abnormally low pressure level is mostly caused by the evaporator side. The following contents are provided based on field checking of service engineer. Further, the number is listed in the order of degree of influence.

In cooling mode

Check item	Detail
Does the indoor unit fan run normally?	Visual inspection
Is the indoor unit heat exchanger clogged?	Visual inspection
Is the indoor unit installed under such conditions that short circuit easily occurs?	Visual inspection
Is there clogging before or after the expansion valve (capillary)?	▪ Check if there is a temperature difference before and after expansion valve (capillary). ▪ Check if the main valve unit of expansion valve operates (by noise, vibration).
Is the check valve (if applicable) clogged?	Check if there is a temperature difference before and after check valve. If YES, the check valve is clogged.
Is there a shortage of refrigerant?	Conduct refrigerant collection and vacuum drying, and then add proper amount refrigerant.

In heating mode

Check item	Detail
Does the outdoor unit fan run normally?	Visual inspection
Is the outdoor unit heat exchanger clogged?	Visual inspection
Is there clogging before or after the expansion valve (capillary)?	▪ Check if there is a temperature difference before and after expansion valve (capillary). ▪ Check if the main valve unit of expansion valve operates (by noise, vibration).
Is the check valve (if applicable) clogged?	Check if there is a temperature difference before and after check valve. If YES, the check valve is clogged.

Check item	Detail
Is the outdoor unit installed under such conditions that short circuit easily occurs?	Visual inspection
Is there a shortage of refrigerant?	Conduct refrigerant collection and vacuum drying, and then add proper amount refrigerant.

2.6.7 Indoor fan starts operating but the compressor does not operate

Check	Detail
Check the power supply.	▪ Is the rated voltage (± 10%) supplied? ▪ Check the insulation of the electric system.
Check the thermistor.	▪ Connection with PCB. ▪ Output.
Check PCB's HAP LED's (if applicable).	▪ if green led on the control PCB is not blinking, then the microprocessor is not working. ▪ if the green led on the main PCB is not blinking, then the microprocessor is not working. ▪ if first green LED on the service monitor PCB is not blinking, then the microprocessor is not working.
Check the magnetic switch.	
Check the power transistor.	
Check the compressor.	▪ Defective contact. ▪ Defective compressor. ▪ Defective protection thermostat.
Check the outdoor temperature.	▪ Heating operation cannot be used when the outdoor temperature is 18°C WB or higher. ▪ Cooling operation cannot be used when the outdoor temperature is below −10°C DB.

2.6.8 Operation starts and the unit stops immediately

Check	Detail
Check the power supply.	▪ Is the capacity of the safety breaker as specified? ▪ If the earth leakage breaker is too sensitive, then increase the set value of the earth leakage current of the breaker or replace the breaker. ▪ Is the circuit exclusive? ▪ Is the rated voltage (± 10%) supplied? ▪ Is there an incorrect size of connection wiring?
Check the refrigerant charge.	▪ Overcharge. ▪ Air in the system. ▪ Water in the system.
Check the fan motor.	▪ Check the magnetic switch. ▪ Check the overcurrent relay.
Check the four way valve coil.	▪ Is there a short circuit? ▪ Is the four way valve coil broken?
Check the outdoor PCB.	▪ Is there a short circuit? ▪ Is the outdoor PCB broken?
Check the heat exchanger.	Soiled heat exchanger, obstruction.
Check the airflow.	Soiled air filter, obstruction, installation space.

2.6.9 Operation stops, unit cannot start for a while

Check	Detail
Check if standby function is activated.	▪ Compressor delay timer is counting. ▪ Wait for minimum 3 minutes.
Check the power supply.	▪ Low voltage? ▪ Is the size of the power cable sufficient?
Check the refrigerant charge.	▪ Incorrect charge. ▪ Air in the system. ▪ Water in the system. ▪ Obstruction in the system.
Check compressor.	▪ Overcurrent relay. ▪ Protection thermostat.

2.6.10 Indoor unit discharges white mist

Check	Detail
Check installation conditions.	▪ Humid site. ▪ Dirty site. ▪ Oil mist.
Check installation conditions.	Dirty heat exchanger.
Air filter.	Dirty air filter.
Fan motor.	Defective fan motor.

3 Components

CAUTION

When replacing a component ALWAYS make sure the correct spare part for your unit is installed.

3.1 4-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 4-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 "3.9 Plate work" [▸ 94].

1 If applicable, remove the insulation from the 4-way valve.

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 "3.1.1 Checking procedures" [▸ 45].
No	Fix or replace the 4-way valve coil, see "3.1.2 Repair procedures" [▸ 48].

To perform an electrical check of the 4-way valve

1 First perform a mechanical check of the 4-way valve, see "3.1.1 Checking procedures" [▸ 45].

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 1,4 kΩ ± 10%.

Is the measured value correct?	Action
Yes	Continue with the next step.
No	Replace the 4-way valve coil, see "3.1.2 Repair procedures" [▸ 48].

When outdoor temperature is mild and unit can switch between heating and cooling

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 230 V AC.
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 0 V AC.

Are the measured voltages correct?	Action
Yes	Perform a position check of the 4-way valve, see "3.1.1 Checking procedures" [▸ 45].
No	Perform a check the main PCB, see "3.6 Main PCB" [▸ 77].

When outdoor temperature does not allow the unit to run in cooling or heating mode

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. The measured voltage MUST be:
   - 230 V AC when operating in **Heating** mode
   - 0 V AC when operating in **Cooling** mode

Is the measured voltage correct?	Action
Yes	Perform a position check of the 4-way valve, see "3.1.1 Checking procedures" [▸ 45].
No	Perform a check the main PCB, see "3.6 Main PCB" [▸ 77].

To perform a position check of the 4-way valve

1 First perform an electrical check of the 4-way valve, see "3.1.1 Checking procedures" [▸ 45].

When outdoor temperature is mild and unit can switch between heating and cooling

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" [▸ 126]).

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 "3.1.2 Repair procedures" [▸ 48].
No	Leaks may be found in the refrigerant circuit. Perform a pressure test of the refrigerant circuit, see "4.2.1 Checking procedures" [▸ 109].

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" [▸ 126]).

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 "3.1.2 Repair procedures" [▸ 48].

When outdoor temperature does not allow the unit to run in cooling or heating mode

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" [▸ 126]).

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 "3.1.2 Repair procedures" [▸ 48].
No	Leaks may be found in the refrigerant circuit. Perform a pressure test of the refrigerant circuit, see "4.2.1 Checking procedures" [▸ 109].

3.1.2 Repair procedures

To remove the 4-way valve coil

Prerequisite: Stop the unit operation via the user interface.

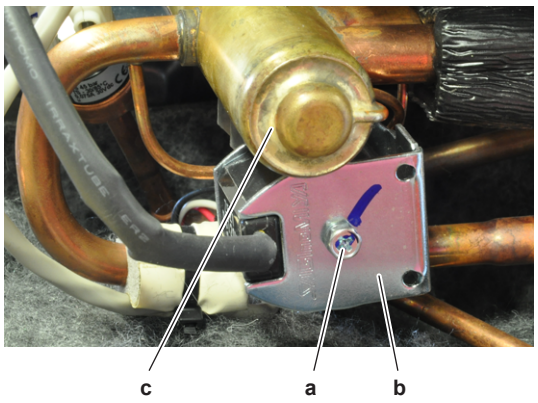
Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.9 Plate work" [▸ 94].

Prerequisite: If needed, remove any parts to create more space for the removal of the 4-way valve coil.

Prerequisite: If applicable, remove the insulation from the 4-way valve.

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 "3.1.2 Repair procedures" [▸ 48].

To remove the 4-way valve body

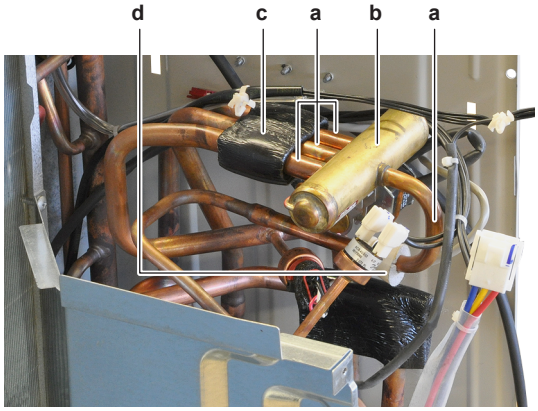
Prerequisite: Recuperate the refrigerant from the refrigerant circuit, see "4.2.2 Repair procedures" [▸ 114].

1 Remove the 4-way valve coil from the 4-way valve body, see "3.1.2 Repair procedures" [▸ 48].

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
c Putty
d Insulation

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 "3.1.2 Repair procedures" [▸ 48].

To install the 4-way valve body

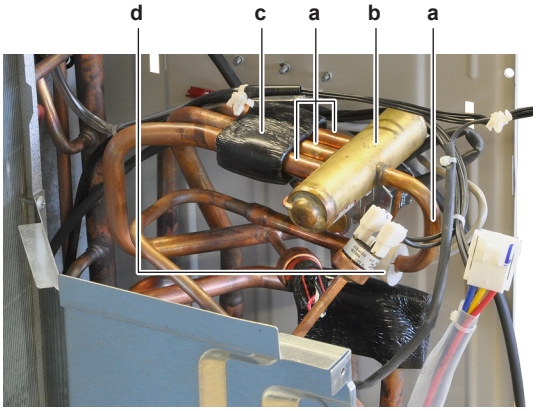
1 Remove the plugs or caps from the refrigerant piping and make sure they are clean.

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
c Putty
d Insulation

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.

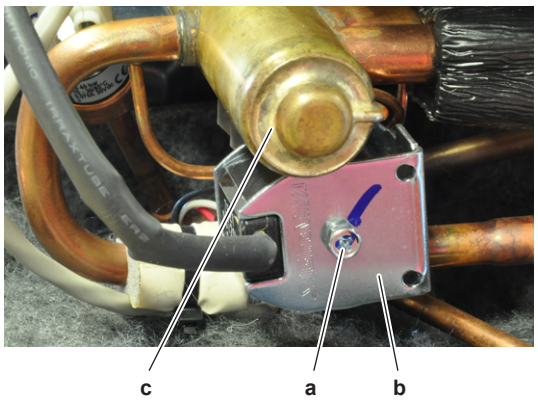
8 Install the 4-way valve coil on the 4-way valve body, see "3.1.2 Repair procedures" [▸ 48].

9 Perform a pressure test, see "4.2.1 Checking procedures" [▸ 109].

10 Add refrigerant to the refrigerant circuit, see "4.2.2 Repair procedures" [▸ 114].

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.

6 If applicable, install the insulation on the 4-way valve.

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 Compressor

3.2.1 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 "3.9 Plate work" [▸ 94].

1 Open the compressor insulation.

2 Turn ON the power using the respective circuit breaker.

3 Start the unit operation via the user interface.

CAUTION

NEVER operate the compressor with the compressor wire terminals cover removed.

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. ALWAYS measure at the PCB side. 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 "3.2.2 Repair procedures" [▸ 57].
No	Perform an mechanical check of the compressor, see "3.2.1 Checking procedures" [▸ 51].

To perform a mechanical check of the compressor

Prerequisite: First perform an auditive check of the compressor, see "3.2.1 Checking procedures" [▸ 51].

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

1 Before proceeding:

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 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.

a Damper

> **INFORMATION**
>
> The compressor dampers may look different.

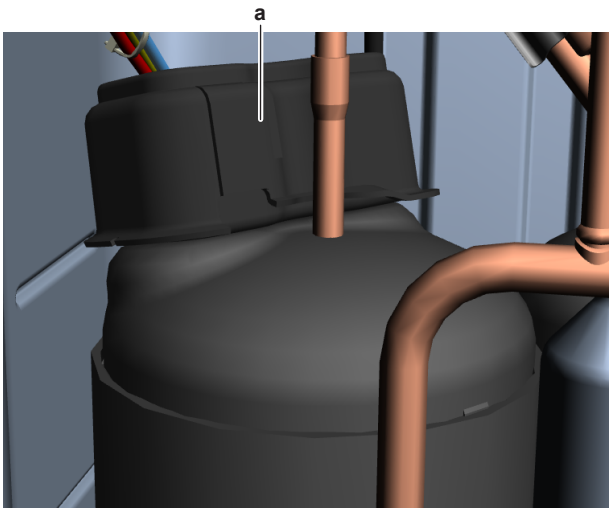
Compressor dampers are in a good condition?	Action
Yes	Perform an electrical check of the compressor, see "3.2.1 Checking procedures" [▸ 51].
No	Replace the compressor and/or damaged dampers, see "3.2.2 Repair procedures" [▸ 57].

To perform an electrical check of the compressor

1 First perform a mechanical check of the compressor, see "3.2.1 Checking procedures" [▸ 51].

> **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 cover of the compressor wire terminals.

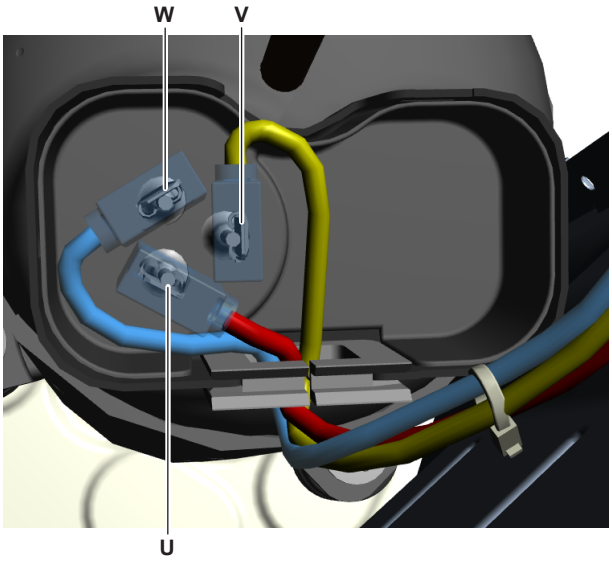


a Compressor wire terminals cover

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.



U 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 subtracted from the measured winding resistance.

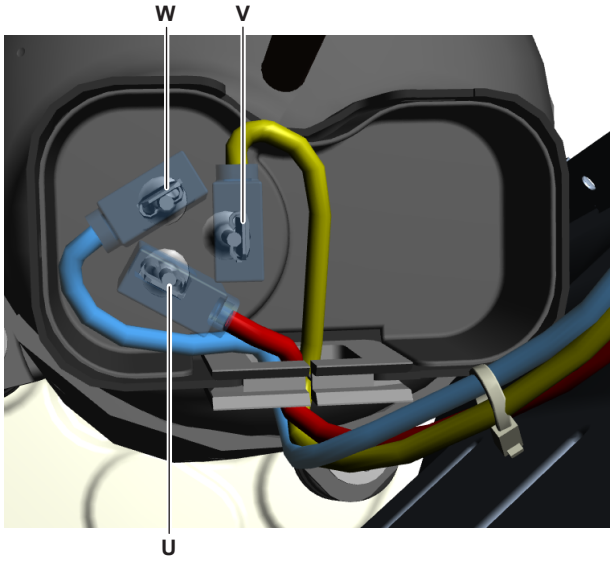
4 Measure the resistance between the compressor motor windings U-V, V-W and U-W.

Result: All measurements MUST be 1.114±5% Ω and equal.

Compressor motor winding measurements are correct?	Action
Yes	Continue with the next step.
No	Replace the compressor, see "3.2.2 Repair procedures" [▶ 57].

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" [▶ 122].

6 Connect the Faston connectors to the compressor wire terminals U, V and W



U Wire terminal U
V Wire terminal V
W Wire terminal W

7 Install the compressor wire terminals cover.

8 Install the compressor insulation.

9 Turn ON the power using the respective circuit breaker.

10 Start the unit operation via the user interface.

CAUTION

NEVER operate the compressor with the compressor wire terminals cover removed.

11 Wait for – or create condition to operate the compressor.

12 Once the compressor operates, measure the U-V-W inverter voltages. ALWAYS measure at the PCB side.

Result: 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" [▶ 45].

13 While compressor is operating, measure the current in each phase U, V and W. ALWAYS measure at the PCB side.

Result: All measurements MUST be the same.

Compressor motor winding current measurements are correct?	Action
Yes	Perform an insulation check of the compressor, see "3.2.1 Checking procedures" [▸ 51].
No	Preventively replace the compressor, see "3.2.2 Repair procedures" [▸ 57].

To perform an insulation check of the compressor

Prerequisite: First perform an electrical check of the compressor, see "3.2.1 Checking procedures" [▸ 51].

Prerequisite: Stop the unit operation via the user interface.

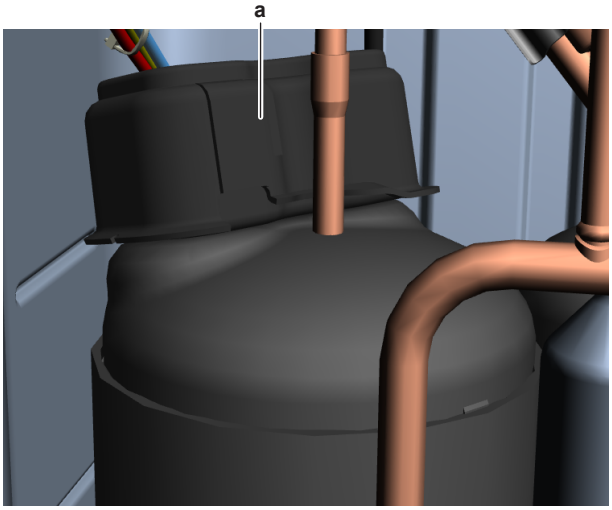
Prerequisite: Turn OFF the respective circuit breaker.

1 Before proceeding:

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 cover of the compressor wire terminals.

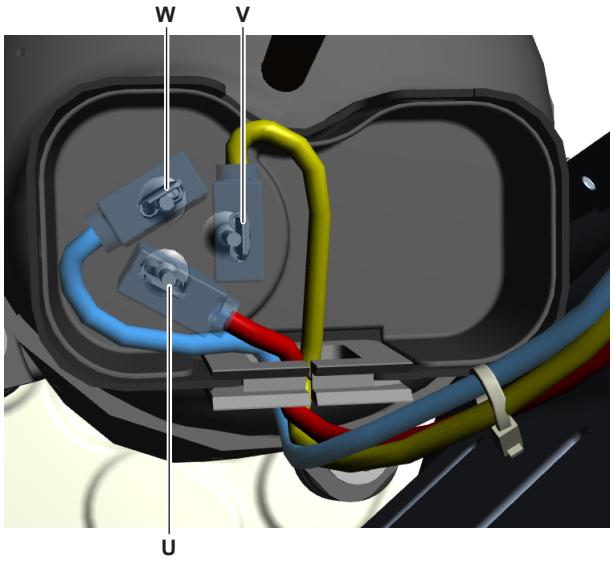


a Compressor wire terminals cover

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.



U 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.

6 If compressor is OK, completely assemble the compressor.

CAUTION

NEVER operate the compressor with the compressor wire terminals cover removed.

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 "3.2.2 Repair procedures" [▸ 57].

3.2.2 Repair procedures

To remove the compressor insulation

INFORMATION

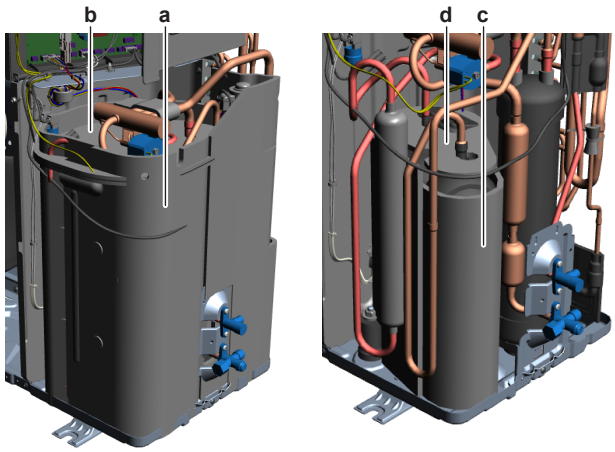
This procedure is just an example and may differ on some details for your actual unit.

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.9 Plate work" [▸ 94].

1 Open the outer insulation jacket.



a Outer insulation jacket
b Outer top insulation
c Inner insulation jacket
d Inner top insulation

2 Remove the outer top insulation.

3 Remove the outer insulation jacket.

4 Open the inner insulation jacket.

5 Remove the inner top insulation.

6 Remove the inner insulation jacket from the compressor.

7 To install the compressor insulation, see "3.2.2 Repair procedures" [▸ 57].

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 "3.9 Plate work" [▸ 94].

Prerequisite: Remove the compressor insulation.

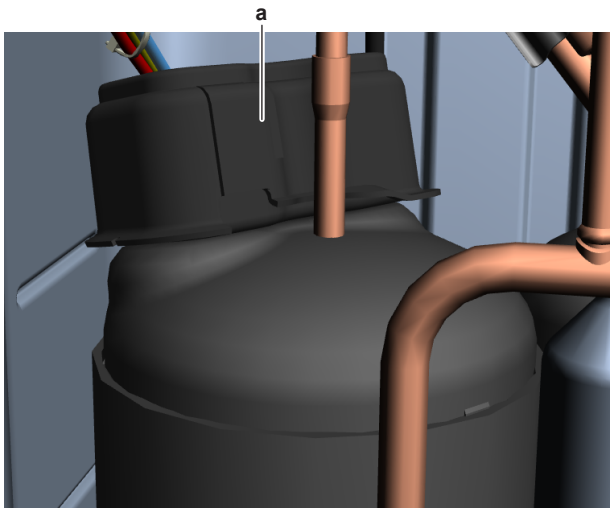
Prerequisite: Recuperate the refrigerant from the refrigerant circuit, see "4.2.2 Repair procedures" [▸ 114].

1 If needed, remove any parts to create more space for the removal of the compressor.

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.

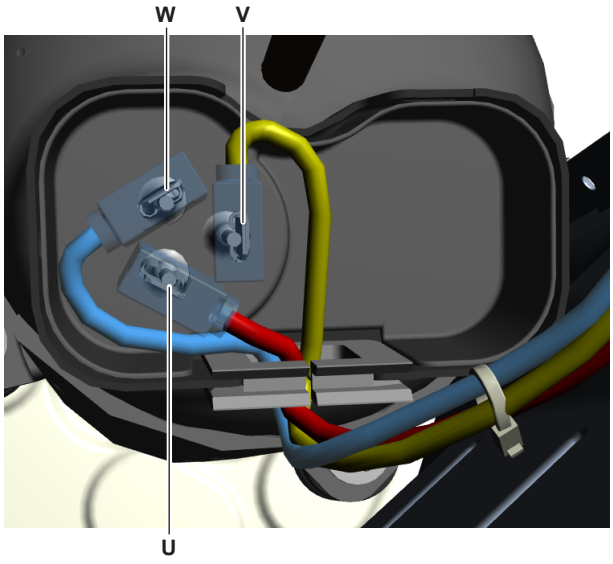
2 Remove the cover of the compressor wire terminals.



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.



U Wire terminal U
V Wire terminal V
W Wire terminal W

4 If applicable, remove the screw and disconnect the ground wire from the compressor.

5 Remove the compressor thermal protector, see "To remove the compressor thermal protector" [▸ 65].

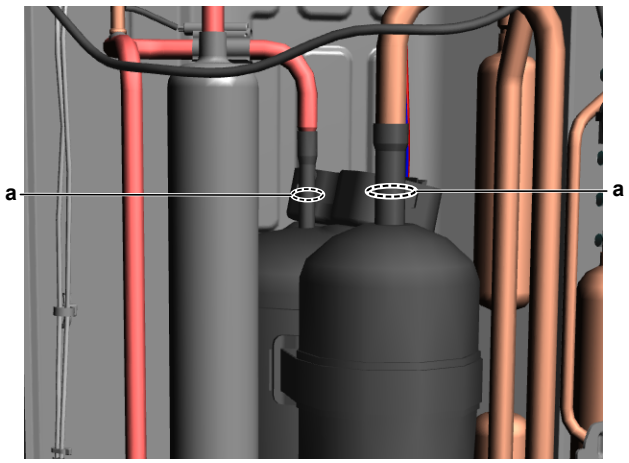
6 Remove the following thermistors from their holder:

- Suction thermistor
- Discharge pipe thermistor
- Compressor body thermistor (if applicable)

7 Remove the putty (if installed) from the compressor accumulator. Keep for reuse.

8 Supply nitrogen to the refrigerant circuit. The nitrogen pressure MUST NOT exceed 0.02 MPa.

9 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.



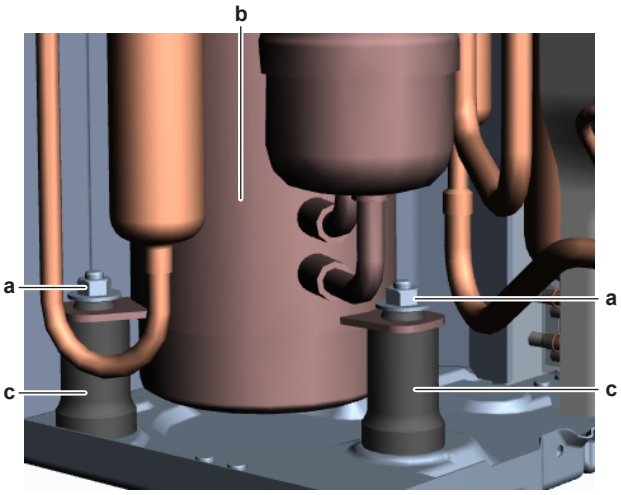
a Compressor pipe

10 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.

11 Remove the nuts and bolts and remove the compressor from the unit.



a Nut
b Compressor
c Damper

12 Remove the 3 dampers from the compressor.

INFORMATION

The compressor dampers may look different.

13 Remove the bushings and keep them for re-use.

14 Install plugs or caps on the open pipe ends of the refrigerant piping to avoid dirt or impurities from entering the piping.

INFORMATION

If the pipes that were removed together with the compressor are NOT included in the spare part compressor and are NOT damaged, heat the brazing points and remove the pipes from the compressor to reuse them on the spare part compressor. It is ALSO possible to order and install new pipes on the spare part compressor.

15 To install the compressor, see "3.2.2 Repair procedures" [▸ 57].

To install the compressor

INFORMATION

If the pipes that were removed together with the compressor are NOT included in the spare part compressor, install and solder the reused or new pipes to the spare part compressor before installing 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.

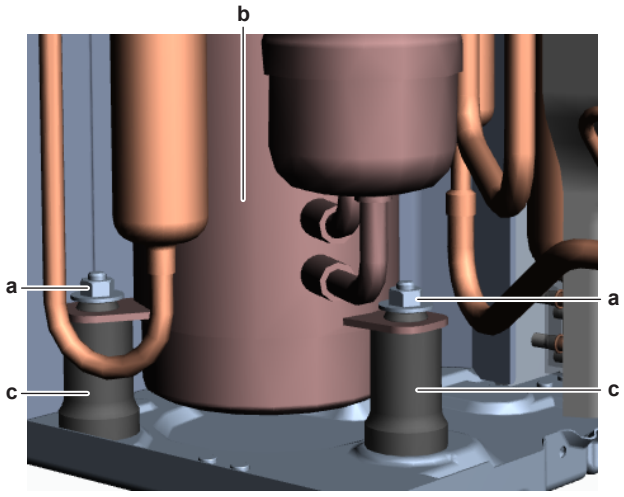
4 Remove the caps from the compressor pipes (of the new compressor).

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.



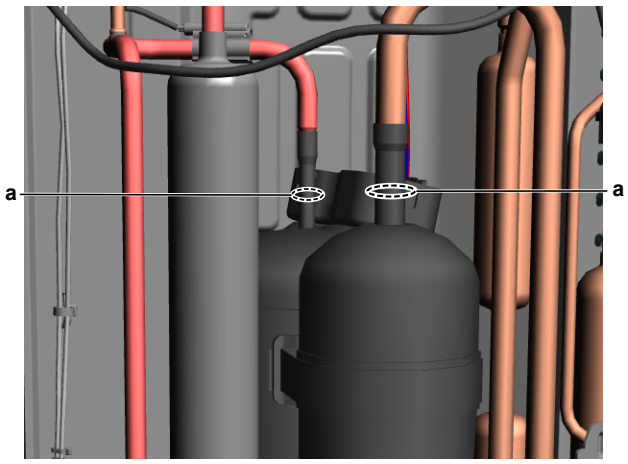
a Nut
b Compressor
c Damper

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

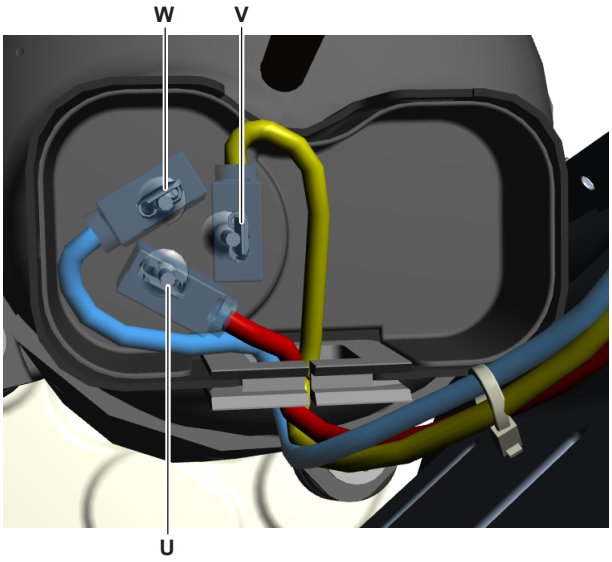
Overheating the compressor pipes (and the oil inside the compressor pipes) will damage or destroy the compressor.

9 After soldering is done, stop the nitrogen supply after the component has cooled-down.

10 Install the putty (as needed) on the compressor accumulator.

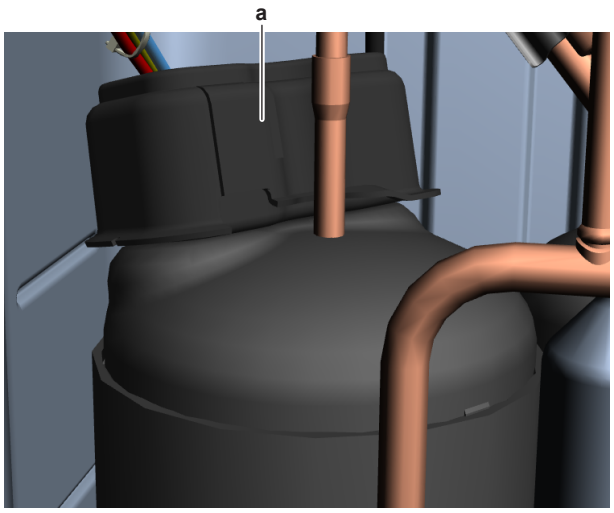
11 Install the compressor thermal protector, see "To install the compressor thermal protector" [▸ 66].

12 Connect the Faston connectors to the compressor wire terminals U, V and W



U Wire terminal U
V Wire terminal V
W Wire terminal W

13 Install the cover of the compressor wire terminals.



a Compressor wire terminals cover

14 If applicable, connect the ground wire to the compressor. Install and tighten the screw to fix the ground wire.

15 Install the following thermistors in their holder:

- Suction thermistor
- Discharge pipe thermistor
- Compressor body thermistor (if applicable)

16 Install the compressor insulation, see "3.2.2 Repair procedures" [▸ 57].

17 Perform a pressure test, see "4.2.1 Checking procedures" [▸ 109].

18 Add refrigerant to the refrigerant circuit, see "4.2.2 Repair procedures" [▸ 114].

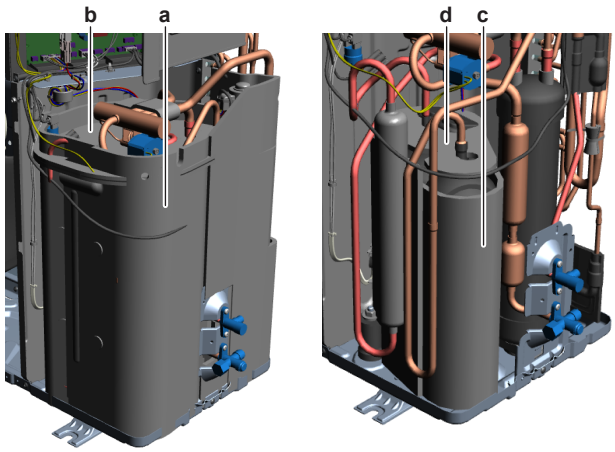
Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

To install the compressor insulation

INFORMATION

This procedure is just an example and may differ on some details for your actual unit.

1 Install the inner insulation jacket on the compressor. Make sure it is correctly fitted on the compressor and that the appropriate wiring harnesses (e.g. compressor thermal protector, if applicable) are correctly routed out of the insulation jacket.



a Outer insulation jacket
b Outer top insulation
c Inner insulation jacket
d Inner top insulation

2 Install the inner top insulation on the compressor.

3 Install the outer insulation jacket.

4 Properly fit the outer top insulation on the insulation jacket.

3.3 Compressor thermal protector

3.3.1 Checking procedures

To perform a mechanical check of the compressor thermal protector

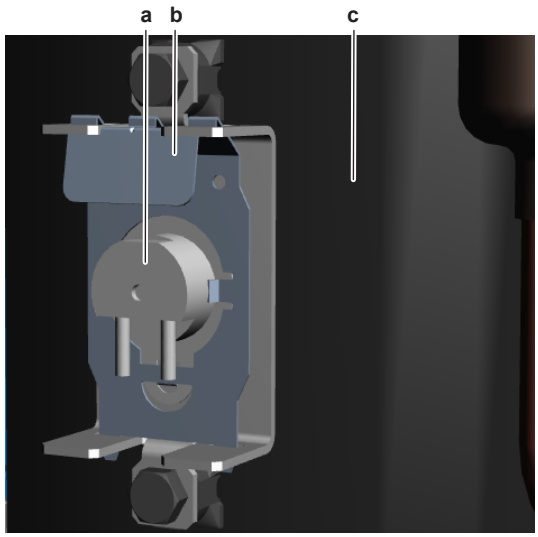
Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.9 Plate work" [▸ 94].

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).

4 Disconnect the connector X820A from the main PCB and measure the resistance between pins 3-4.

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 3-4 of the connector X820A.

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 "3.3.2 Repair procedures" [▸ 65].

3.3.2 Repair procedures

To remove the compressor thermal protector

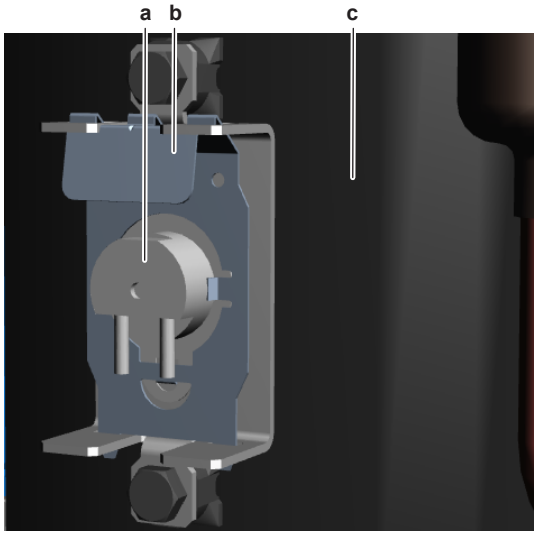
Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.9 Plate work" [▸ 94].

Prerequisite: Remove the compressor insulation.

1 Remove the compressor thermal protector with bracket from the compressor housing.



a Compressor thermal protector
b Bracket
c Compressor

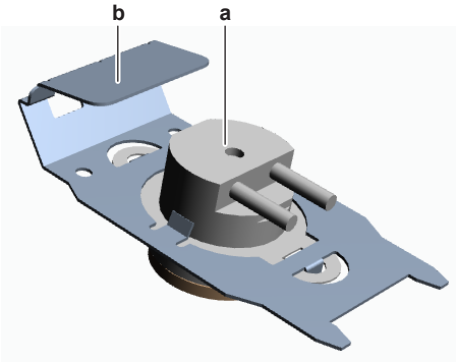
2 Disconnect the connector X820A from the main PCB.

3 Disconnect the Faston connectors from the high pressure switch.

> **INFORMATION**
>
> As the compressor thermal protector and the high pressure switch are both wired to the same connector, the high pressure switch wiring harness needs to be replaced along with the compressor thermal protector.

4 Cut all tie straps that fix the high pressure switch wiring harness and the compressor thermal protector wiring harness.

5 Separate the compressor thermal protector and the compressor thermal protector bracket.

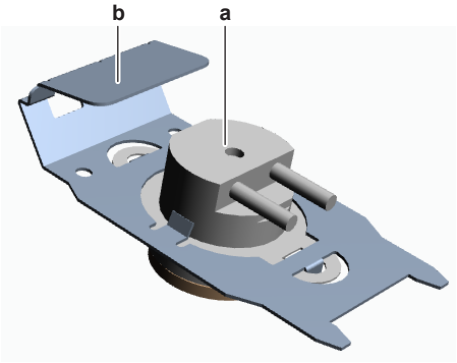


a Compressor thermal protector
b Bracket

6 To install the compressor thermal protector, see "3.2.2 Repair procedures" [▸ 57].

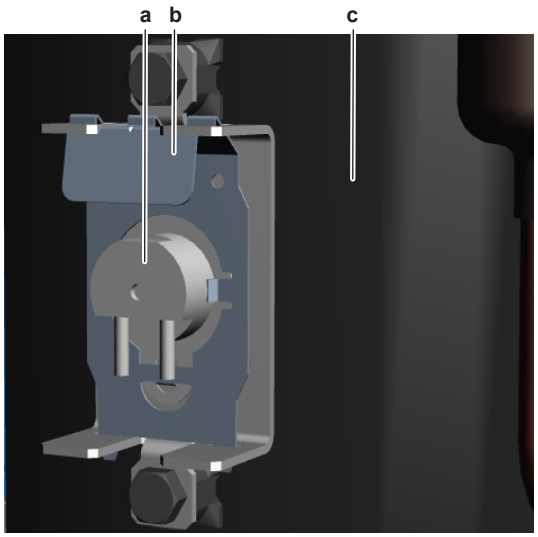
To install the compressor thermal protector

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 connector X820A to the main PCB.

4 Route the high pressure switch wiring harness towards the high pressure switch and connect the Faston connectors.

INFORMATION

As the compressor thermal protector and the high pressure switch are both wired to the same connector, the high pressure switch wiring harness needs to be replaced along with the compressor thermal protector.

5 Install new tie straps to fix the high pressure switch wiring harness and the compressor thermal protector wiring harness.

6 Install the compressor insulation, see "3.2.2 Repair procedures" [▸ 57].

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 Expansion valve

3.4.1 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 "3.4.1 Checking procedures" [▸ 67].

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

1 Remove the required plate work (see "3.9 Plate work" [▸ 94]).

2 Remove the expansion valve insulation (if applicable) 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 "3.4.2 Repair procedures" [▸ 71].

3 Remove the expansion valve coil from the expansion valve body, see "3.4.2 Repair procedures" [▸ 71].

4 Slide the expansion valve magnet over the expansion valve body and gently rotate the magnet clockwise/counterclockwise to manually close/open the expansion valve. Listen to check if the valve is closing/opening and manually close the valve when check is done.

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 correctly installed on 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 "3.4.1 Checking procedures" [▸ 67].
No	Replace the expansion valve body, see "3.4.2 Repair procedures" [▸ 71].

To perform an electrical check of the expansion valve

1 First perform a mechanical check of the expansion valve, see "3.4.1 Checking procedures" [▸ 67].

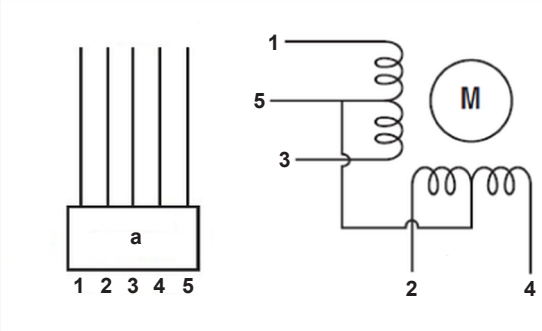
2 Disconnect the electrical connector of the expansion valve coil from the appropriate PCB and measure the resistance of all windings (between the pins of each phase (wire) and the common wire) using a multi meter. All measurements MUST be approximately the same.

Name	Symbol	Location (PCB)	Connector	Winding resistance
Main expansion valve	Y1E	Main	X700A	46±4 Ω

INFORMATION

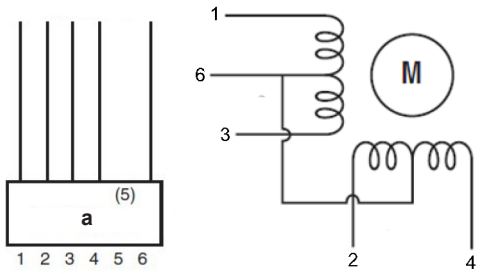
Below are shown examples of the resistance measurements in which the common wire is connected to pin 5 or to pin 6 of the expansion valve coil connector. Connections may differ according to the type of expansion valve.

- Connector pin 1-5,
- Connector pin 2-5,
- Connector pin 3-5,
- Connector pin 4-5.



a Connector

- 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 "3.4.1 Checking procedures" [▸ 67].
No	Replace the expansion valve coil, "3.4.2 Repair procedures" [▸ 71].

To perform an operation check of the expansion valve

Prerequisite: First perform an electrical check of the expansion valve, see "3.4.1 Checking procedures" [▸ 67].

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 (as their measurements control the operation of the expansion valve(s)).

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 "3.4.2 Repair procedures" [▶ 71].

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.

3.4.2 Repair procedures

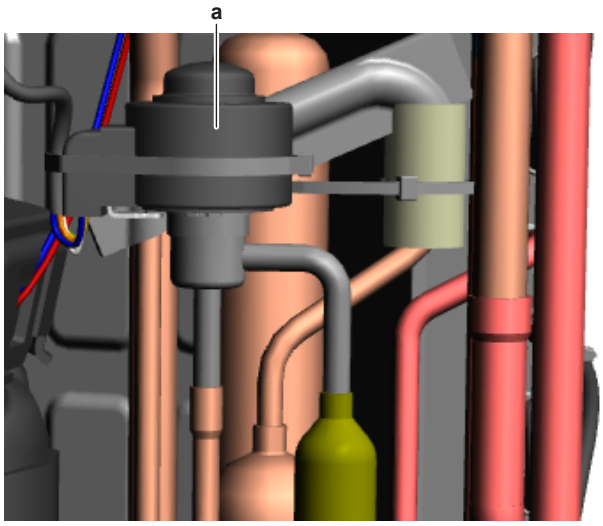
To remove the expansion valve coil

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.9 Plate work" [▸ 94].

1 If needed, remove any parts or insulation to create more space for the removal.



a Expansion valve coil

2 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.

3 Cut all tie straps that fix the expansion valve coil harness.

4 Disconnect the expansion valve coil connector from the main PCB.

5 To install the expansion valve coil, see "3.4.2 Repair procedures" [▸ 71].

To remove the expansion valve body

Prerequisite: Recuperate the refrigerant from the refrigerant circuit, see "4.2.2 Repair procedures" [▸ 114].

Prerequisite: If needed, remove any parts or insulation to create more space for the removal.

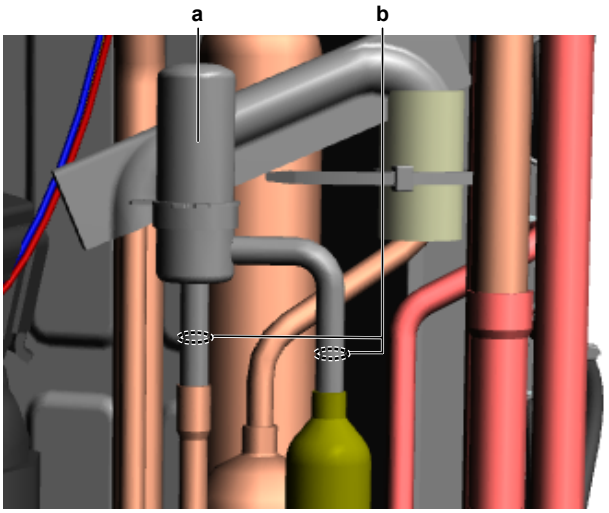
1 Remove the expansion valve coil, see "3.4.2 Repair procedures" [▸ 71].

2 Remove the putty (if installed). Keep for reuse.

3 Using a valve magnet, open the expansion valve.

4 Supply nitrogen to the refrigerant circuit. The nitrogen pressure MUST NOT exceed 0.02 MPa.

5 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

INFORMATION

The expansion valve and coil can have a different configuration / layout.

6 Stop the nitrogen supply when the piping has cooled down.

7 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.

8 Install plugs or caps on the open pipe ends of the refrigerant piping to avoid dirt or impurities from entering the piping.

9 To install the expansion valve body, see "3.4.2 Repair procedures" [▸ 71].

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.

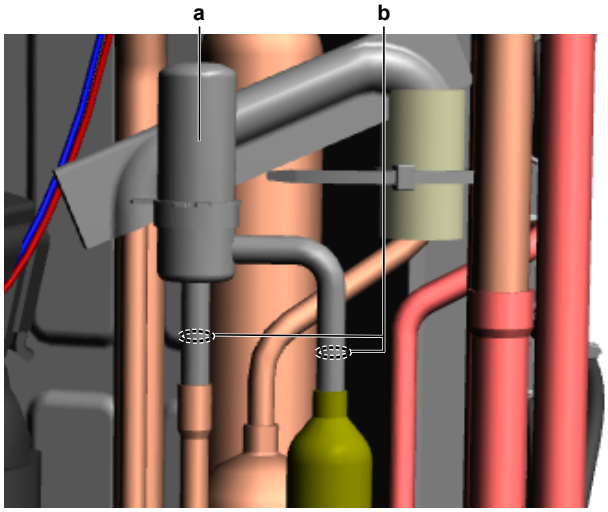
5 Supply nitrogen to the refrigerant circuit. The nitrogen pressure MUST NOT exceed 0.02 MPa.

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 Reinstall the putty (if needed).

9 Install the expansion valve coil, see "3.4.2 Repair procedures" [▸ 71].

10 Perform a pressure test, see "4.2.1 Checking procedures" [▸ 109].

11 Add refrigerant to the refrigerant circuit, see "4.2.2 Repair procedures" [▸ 114].

To install the expansion valve coil

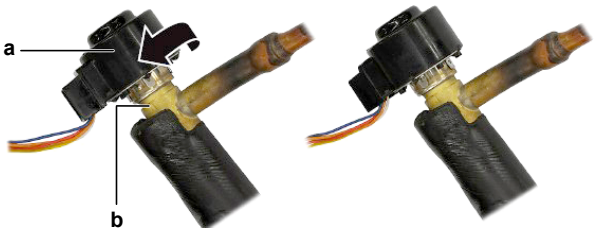
1 Install the expansion valve coil on the expansion valve body.

INFORMATION

Turn the expansion valve coil 1/8 turn clockwise to lock it on the expansion valve body.

INFORMATION

The correct alignment of the expansion valve coil is ensured by dimples.



a Expansion valve coil
b Pipe

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 "3.4.1 Checking procedures" [▸ 67] of the expansion valve and continue with the next procedure.

3.5 High pressure switch

3.5.1 Checking procedures

To perform an electrical check of the high pressure switch

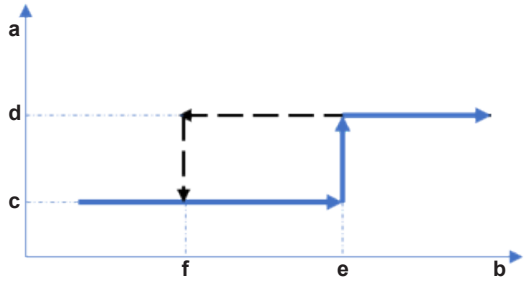
Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.9 Plate work" [▸ 94].

1 Recuperate the refrigerant from the refrigerant circuit, see "4.2.2 Repair procedures" [▸ 114].

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	4.03~4.15	3.05~3.35

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, replace the compressor thermal protector (as the high pressure switch wiring is part of the compressor thermal protector), see "3.3.2 Repair procedures" [▸ 65].

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.

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 "3.5.2 Repair procedures" [▸ 75].

3.5.2 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 "3.9 Plate work" [▸ 94].

Prerequisite: Recuperate the refrigerant from the refrigerant circuit, see "4.2.2 Repair procedures" [▸ 114].

1 If needed, remove any parts or putty (if installed) to create more space for the removal of the high pressure switch.

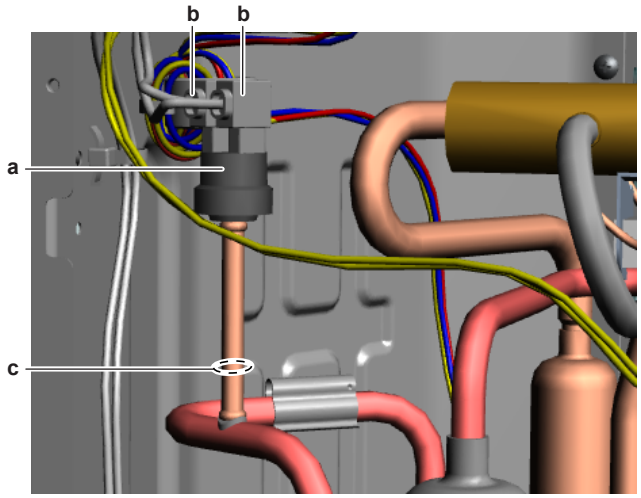
2 Remove nearby thermistors from their holder.

3 Remove the compressor insulation, see "3.2.2 Repair procedures" [▸ 57].

4 Disconnect the Faston connectors from the high pressure switch.

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 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

7 Stop the nitrogen supply when the piping has cooled down.

8 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.

9 Install a plug or cap on the refrigerant piping to avoid dirt or impurities from entering the piping.

10 To install the high pressure switch, see "3.5.2 Repair procedures" [▸ 75].

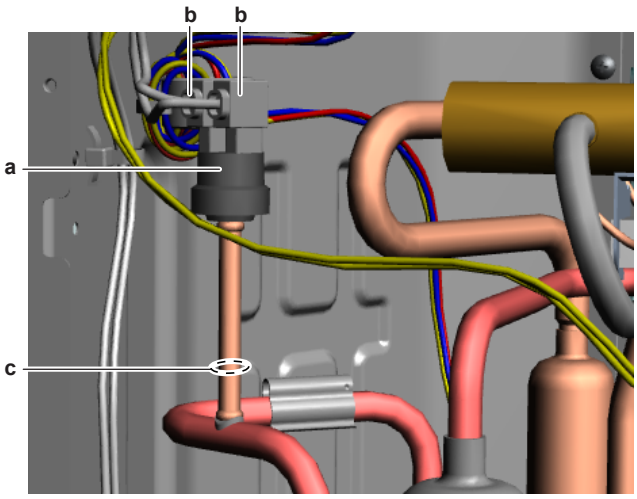
To install the high pressure switch

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 Re-install nearby thermistors in their holder.

7 Connect the Faston connectors to the high pressure switch.

8 Install the compressor insulation, see "3.2.2 Repair procedures" [▸ 57].

9 Install all removed parts or putty (as needed) that were removed for space creation purposes.

10 Perform a pressure test, see "4.2.1 Checking procedures" [▸ 109].

11 Add refrigerant to the refrigerant circuit, see "4.2.2 Repair procedures" [▸ 114].

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.

3.6 Main PCB

3.6.1 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.

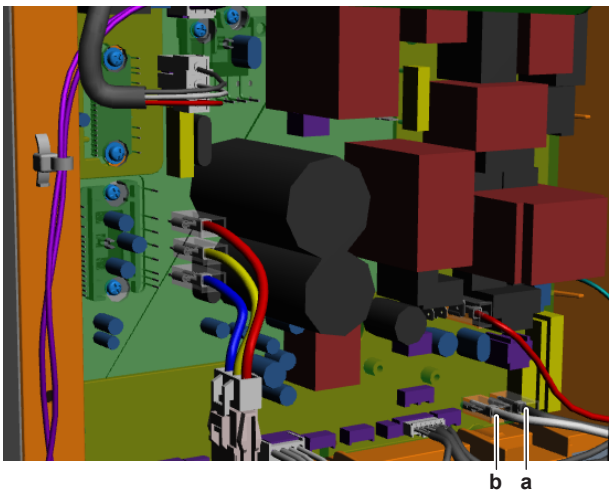
Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.9 Plate work" [▸ 94].

1 Turn ON the power of the unit.

2 Measure the voltage between the Faston connectors of the black and white wires on the main PCB.

Result: The measured voltage MUST be 230 V AC.



a Faston connector for black wire
b Faston connector for white wire

Is the measured voltage on the PCB correct?	Action
Yes	Return to "3.6.1 Checking procedures" [▸ 77] of the PCB and continue with the next procedure.
No	Continue with the next step.

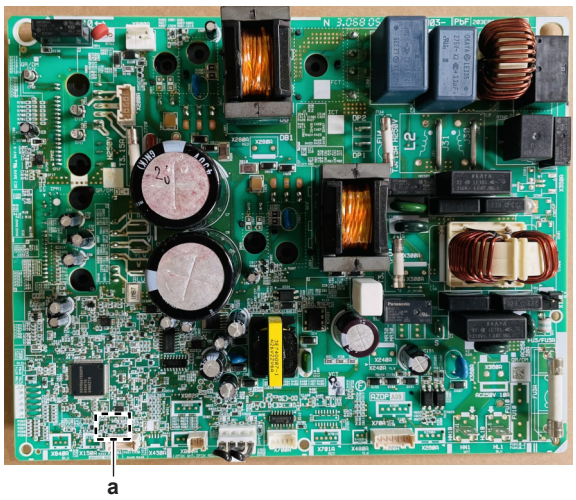
3 Check the power supply to the unit, see "4.1.1 Checking procedures" [▸ 108].

Does the unit receive power?	Action
Yes	Correct the wiring from the main power supply terminal to the main PCB, see "3.6.2 Repair procedures" [▸ 84].
No	Adjust the power supply to the unit, see "4.1.2 Repair procedures" [▸ 109].

To check the HAP LED of the main PCB

Prerequisite: First check the power supply to the main PCB, see "3.6.1 Checking procedures" [▸ 77].

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 "3.6.1 Checking procedures" [▸ 77] of the main PCB and continue with the next procedure.
No	Replace the main PCB, see "3.6.2 Repair procedures" [▸ 84].

To check if the correct spare part is installed

Prerequisite: First perform all earlier main PCB checks, see "3.6.1 Checking procedures" [▸ 77].

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 "3.6.1 Checking procedures" [▸ 77] of the main PCB and continue with the next procedure.
No	Replace the main PCB, see "3.6.2 Repair procedures" [▸ 84].

To check the wiring of the main PCB

Prerequisite: First perform all earlier main PCB checks, see "3.6.1 Checking procedures" [▸ 77].

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" [▸ 122].

INFORMATION

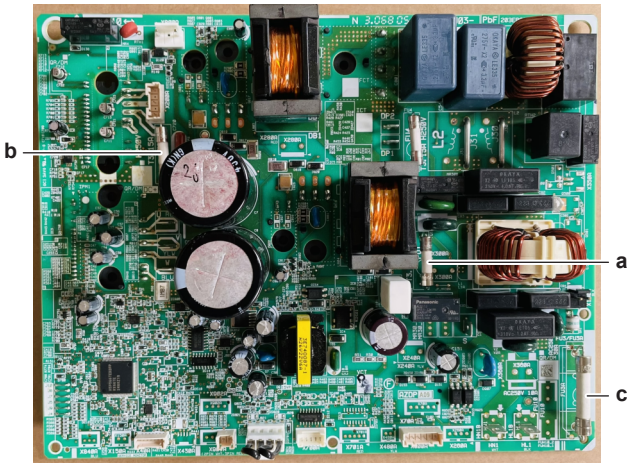
Correct the wiring as needed.

Is the problem solved?	Action
Yes	No further actions required.
No	Return to "3.6.1 Checking procedures" [▸ 77] 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 "3.6.1 Checking procedures" [▸ 77].

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

Blown fuse on the main PCB?	Action
Yes	Replace the main PCB, see "3.6.2 Repair procedures" [▸ 84].
No	Return to "3.6.1 Checking procedures" [▸ 77] of the main PCB and continue with the next procedure.

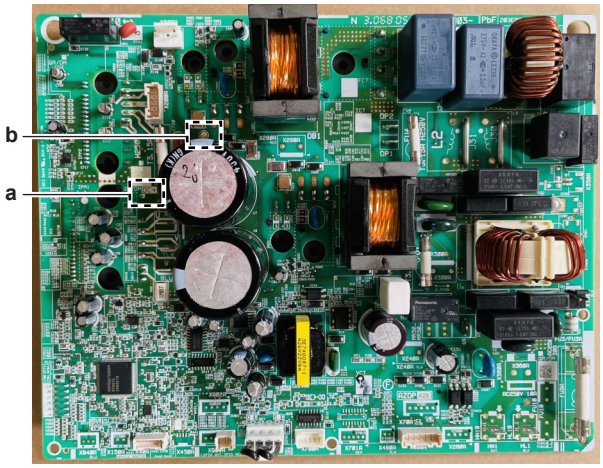
To check the rectifier voltage of the main PCB

Prerequisite: First perform all earlier main PCB checks, see "3.6.1 Checking procedures" [▸ 77].

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 approximately 300~350 V DC.



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 module, see "3.6.1 Checking procedures" [▸ 77].
No	Replace the main PCB, see "3.6.2 Repair procedures" [▸ 84].

To perform a diode module check

1 First check the rectifier voltage of the main PCB, see "3.6.1 Checking procedures" [▸ 77].

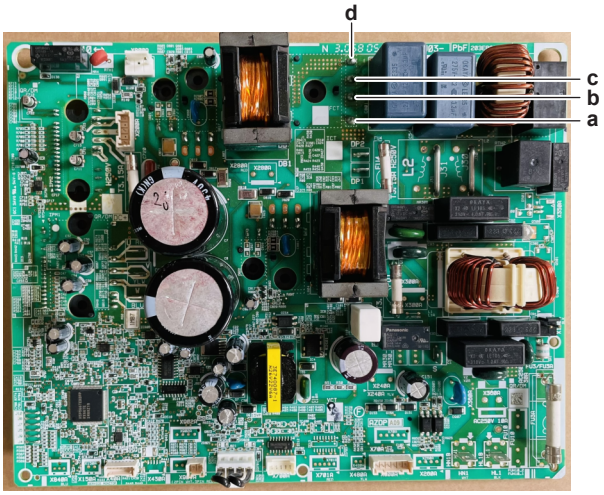
> **INFORMATION**
>
> If the rectifier voltage is OK, the diode module is OK. If rectifier voltage is NOT OK, replace the main PCB.
>
> Below procedure describes how to check the diode module itself.

Prerequisite: Stop the unit operation via the user interface.

2 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.

3 Check the diode module in reference with the image and the table below.



a V DC out (+)
b V AC in
c V AC in
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	0.51~0.52 V	b	d	O.L
b	a	0.51~0.52 V	a	b	O.L
d	c	0.51~0.52 V	c	d	O.L
c	a	0.51~0.52 V	a	c	O.L

4 If the diode module is NOT OK, replace the main PCB, see "3.6.2 Repair procedures" [▸ 84].

To perform a power module check

Prerequisite: First check the rectifier voltage of the main PCB, see "3.6.1 Checking procedures" [▸ 77].

Prerequisite: Stop the unit operation via the user interface.

1 Turn OFF the respective circuit breaker.

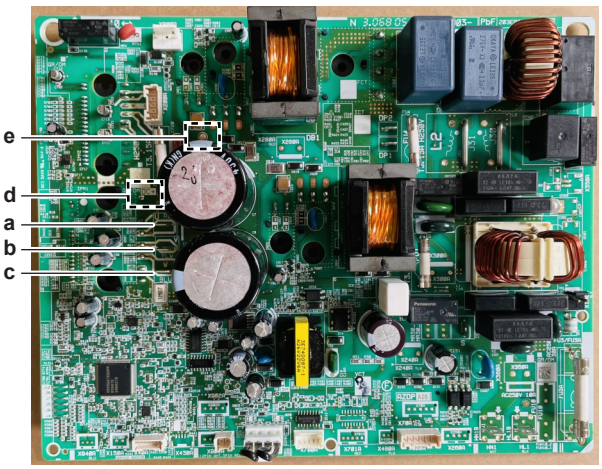
DANGER: RISK OF ELECTROCUTION

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.

Power module V2R for compressor

1 Disconnect the compressor Faston connectors from the main PCB.

2 Check the power module V2R in reference with the image and the table below.



a U
b V
c W
d DC+
e DC–

INFORMATION

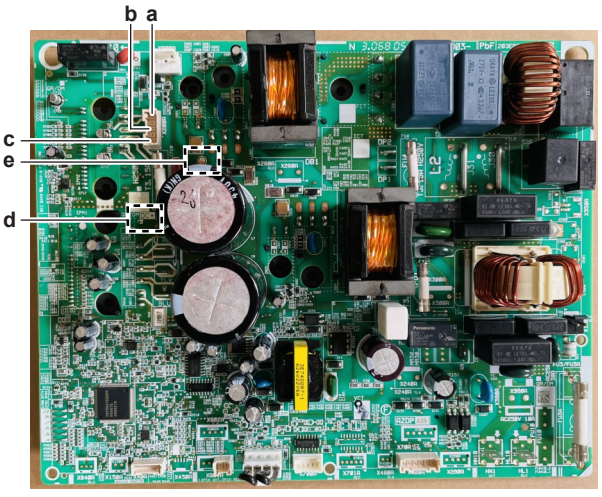
When measuring on the front of the main PCB, make sure to locally remove the protective varnish with the test leads of the multi meter.

VDC	Com	Ref	VDC	Com	Ref
U	DC+	0.501 V	DC+	U	O.L
V	DC+	0.501 V	DC+	V	O.L
W	DC+	0.501 V	DC+	W	O.L
DC–	U	0.501 V	U	DC–	O.L
DC–	V	0.501 V	V	DC–	O.L
DC–	W	0.501 V	W	DC–	O.L

Power module V3R for fan motor

1 Disconnect the fan motor connector 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 DC+
e DC–

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	DC+	0.501 V	DC+	U	O.L
V	DC+	0.501 V	DC+	V	O.L
W	DC+	0.501 V	DC+	W	O.L
DC–	U	0.501 V	U	DC–	O.L
DC–	V	0.501 V	V	DC–	O.L
DC–	W	0.501 V	W	DC–	O.L

Are the test results OK?	Action
Yes	Power module is OK. Return to "3.6.1 Checking procedures" [▸ 77] of the main PCB and continue with the next procedure.
No	Replace the main PCB, see "3.6.2 Repair procedures" [▸ 84].

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.

3.6.2 Repair procedures

To correct the wiring from the main power supply terminal to 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 "3.9 Plate work" [▸ 94].
2. Make sure that all wires are firmly and correctly connected, see "6.2 Wiring diagram" [▸ 122].
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 "3.6.1 Checking procedures" [▸ 77] of the PCB and continue with the next procedure.

To remove the main PCB

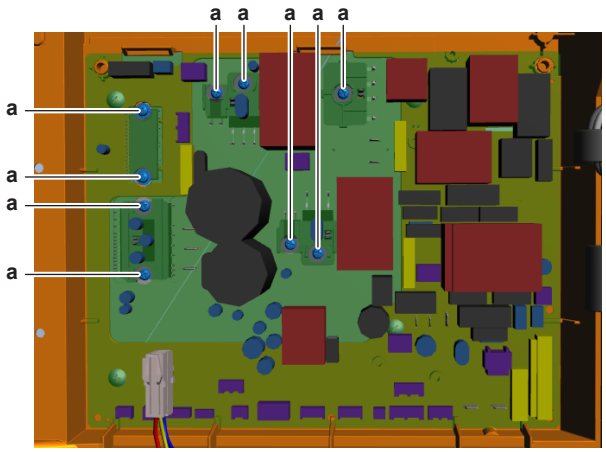
Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.9 Plate work" [▸ 94].

1 Disconnect all connectors and Faston connectors from the main PCB.

2 Remove the screws from the main PCB.



a Screw

3 Remove the main PCB from the unit.

4 To install the main PCB, see "3.6.2 Repair procedures" [▸ 84].

To install the main PCB

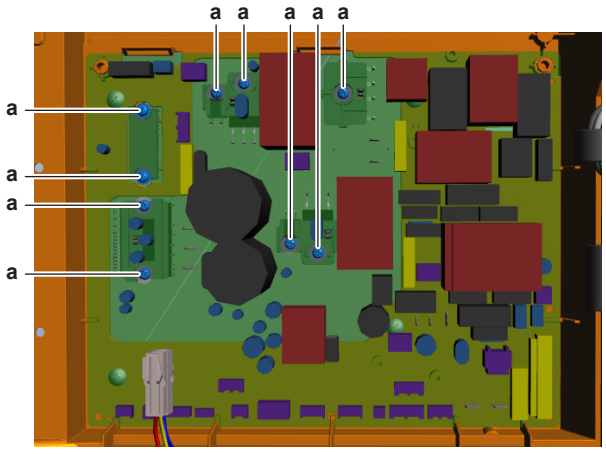
1 Apply grease to the heat sink contact surface of the PCB. Distribute the grease as evenly as possible.

CAUTION

ALWAYS apply new grease on the heat sink contact surface. NOT doing so may cause the PCB to fail due to insufficient cooling.

2 Install the main PCB in the correct location in the switch box.

3 Install and tighten the screws to fix the main PCB.



a Screw

4 Connect all connectors and Faston connectors to the main PCB.

INFORMATION

Use the wiring diagram and connection diagram for correct installation of the connectors, see "6.2 Wiring diagram" [▸ 122].

Is the problem solved?	Action
Yes	No further actions required.
No	Return to "3.6.1 Checking procedures" [▸ 77] of the PCB and continue with the next procedure.

3.7 Outdoor unit fan motor

3.7.1 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 "3.9 Plate work" [▸ 94].

1 If propeller fan blade touches the bell mounth, check if the fan motor is correctly mounted on its base, see "3.7.2 Repair procedures" [▸ 88].

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 "3.7.2 Repair procedures" [▸ 88].
No	Perform a mechanical check of the DC fan motor assembly, see "3.7.1 Checking procedures" [▸ 86].

To perform a mechanical check of the DC fan motor assembly

Prerequisite: First perform a mechanical check of the propeller fan blade assembly, see "3.7.1 Checking procedures" [▸ 86].

1 Visually check:

- For any burnt-out part or wire. If found, replace the fan motor, see "3.7.2 Repair procedures" [▸ 88].
- 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 "3.7.1 Checking procedures" [▸ 86].
No	Replace the DC fan motor assembly, see "3.7.2 Repair procedures" [▸ 88].

To perform an electrical check of the DC fan motor assembly

1 First perform a mechanical check of the DC fan motor assembly, see "3.7.1 Checking procedures" [▸ 86].

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

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.

7 Check that the DC fan motor connector is properly connected to the PCB.

8 Unplug the DC fan motor connector from the PCB and measure the resistance between the pins 1-3, 1-5, and 3-5 of the DC fan motor connector.

Result: All measurements MUST be 20.6~22.8 Ω 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.

Is the measured voltage on the DC fan motor connector on the main PCB correct?	Action
Yes	Replace the DC fan motor assembly, see "3.7.2 Repair procedures" [▸ 88].

Is the measured voltage on the DC fan motor connector on the main PCB correct?	Action
No	Perform a check of the main PCB, see "3.6 Main PCB" [▸ 77].

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.

3.7.2 Repair procedures

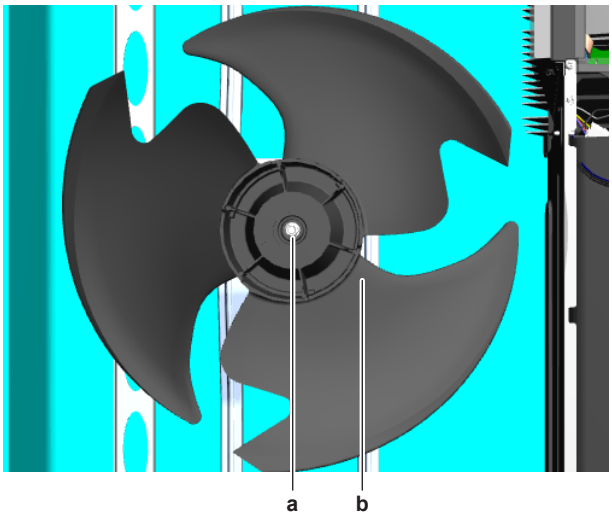
To remove the propeller fan blade assembly

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

1 Remove the required plate work, see "3.9 Plate work" [▸ 94].

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 "3.7.2 Repair procedures" [▸ 88].

To remove the DC fan motor assembly

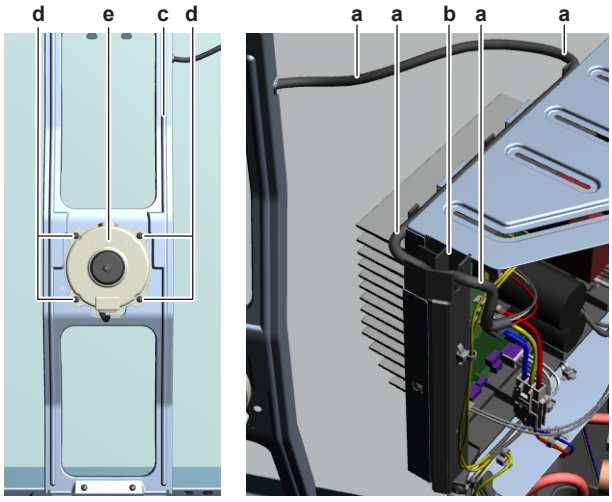
1 Remove the propeller fan blade assembly from the DC fan motor assembly, see "3.7.2 Repair procedures" [▸ 88].

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 Disconnect the DC fan motor connector from the main PCB.

3 Detach the DC fan motor harness from the switch box.



a DC fan motor harness
b Switch box
c Fan motor bracket
d Screw
e DC man motor assy

4 Slightly bend the harness retainers (at the back of the fan motor bracket) to detach the DC fan motor harness.

5 Remove the 4 screws that fix the DC fan motor assembly.

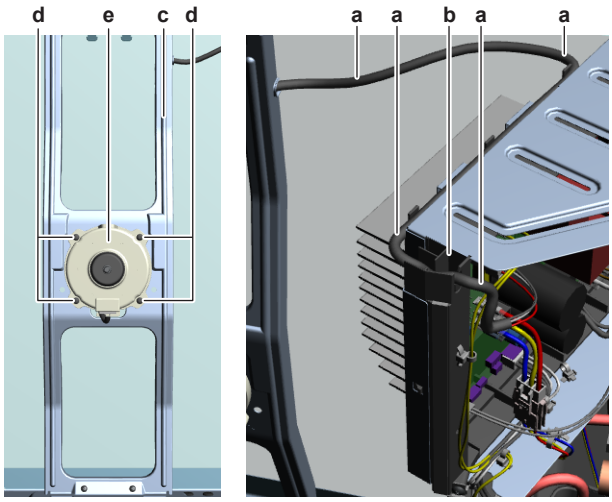
6 Remove the DC fan motor assembly from the unit.

7 To install the DC fan motor assembly, see "3.7.2 Repair procedures" [▸ 88].

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 Switch box
c Fan motor bracket
d Screw
e DC man motor assy

3 Route the DC fan motor harness through the harness retainers (at the back of the fan motor bracket) and bend the harness retainers to attach the DC fan motor harness.

4 Attach the DC fan motor harness to the switch box.

5 Connect the DC fan motor connector to the connector on the main PCB.

6 Install the propeller fan blade assembly, see "3.7.2 Repair procedures" [▸ 88].

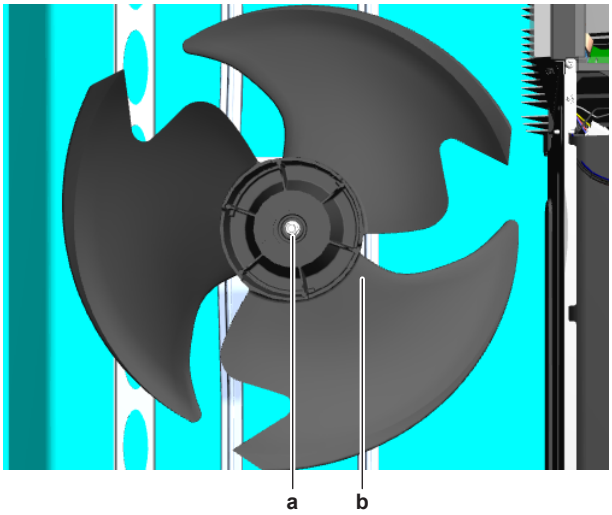
To install the propeller fan blade assembly

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 "3.7.1 Checking procedures" [▸ 86] of the outdoor unit fan motor and continue with the next procedure.

3.8 Outdoor unit heat exchanger

3.8.1 Checking procedures

To perform a mechanical check of the outdoor unit heat exchanger

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.9 Plate work" [▸ 94].

1 Visually check:

- For any signs of damage or corrosion. Replace the heat exchanger as needed, see "3.8.2 Repair procedures" [▸ 91].
- For bended air fins. Straighten as needed.

2 Check the heat exchanger for leaks. Use soap test method.

CAUTION

Do NOT use soap containing Chlorine or Sulfide as this may result in corrosion of the copper piping.

Any leaks found?	Action
Yes	Replace the outdoor unit heat exchanger, see "3.8.2 Repair procedures" [▸ 91].
No	Heat exchanger is OK. Return to the troubleshooting of the specific error and continue with the next step.

3.8.2 Repair procedures

To remove the outdoor unit heat exchanger

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

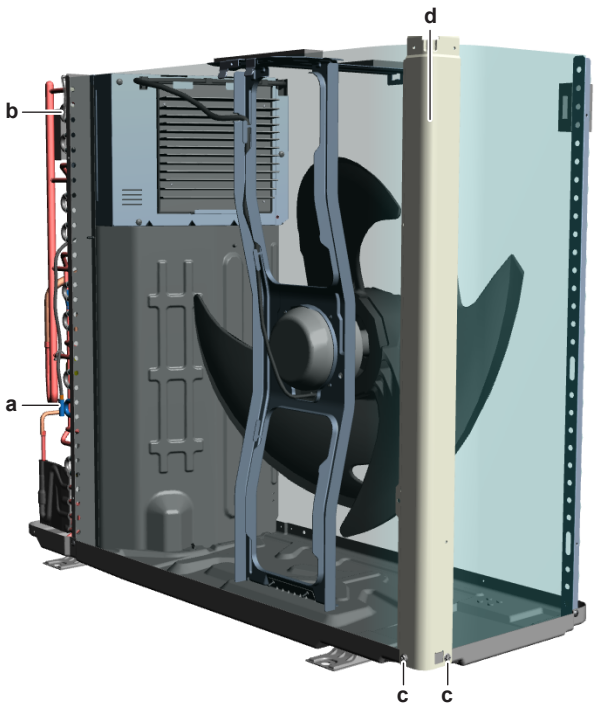
Prerequisite: Remove the required plate work, see "3.9 Plate work" [▸ 94].

Prerequisite: Recuperate the refrigerant from the refrigerant circuit, see "4.2.2 Repair procedures" [▸ 114].

1 If needed, remove any parts to create more space for the removal of the heat exchanger.

2 Remove the putty and insulation from the appropriate piping.

3 Remove the heat exchanger thermistor and air thermistor from their holder.



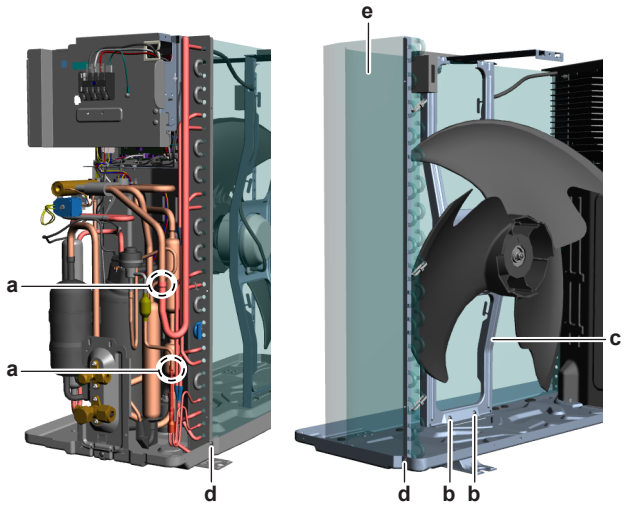
a Heat exchanger thermistor

b Outdoor air thermistor
c Screw
d Support plate

4 Remove the 2 screws and remove the support plate.

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 heat exchanger pipes. Heat the brazing point of the heat exchanger pipes using an oxygen acetylene torch and remove the heat exchanger pipes from the refrigerant pipes using pliers.



a Heat exchanger pipe
b Screw (fan motor mounting bracket)
c Fan motor mounting bracket
d Screw (heat exchanger)
e Heat exchanger

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 Install plugs or caps on the open pipe ends to avoid dirt or impurities from entering the piping.

9 Disconnect the DC fan motor connector from the main PCB.

10 Slightly bend the harness retainers and detach the DC fan motor harness from the switch box.

11 Carefully remove the 2 screws from the fan motor mounting bracket while supporting it. Remove the fan motor mounting bracket (with fan motor and propeller fan blade installed) from the unit.

12 Remove the 2 screws that fix the heat exchanger to the bottom plate of the unit.

13 Remove the heat exchanger from the unit.

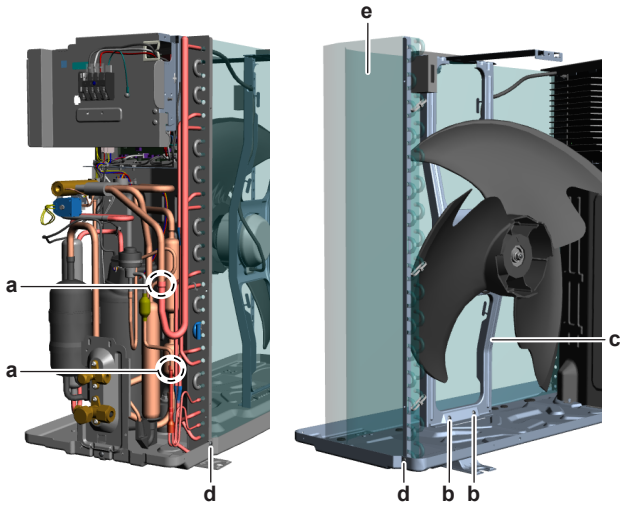
14 To install the outdoor unit heat exchanger, see "3.8.2 Repair procedures" [▸ 91].

To install the outdoor unit heat exchanger

1 Remove the plugs or caps from the refrigerant piping and make sure they are clean.

2 Install the heat exchanger in the correct location on the bottom plate. Make sure to correctly insert the pipe ends in the pipe expansions.

3 Install and tighten the 2 screws to fix the heat exchanger to the bottom plate.



a Heat exchanger pipe
b Screw (fan motor mounting bracket)
c Fan motor mounting bracket
d Screw (heat exchanger)
e Heat exchanger

4 Carefully install the fan motor mounting bracket (with fan motor and propeller fan blade installed) in the correct location. Install and tighten the 2 screws to fix the fan motor mounting bracket.

5 Route the DC fan motor harness through the harness retainers and bend the harness retainers to attach the DC fan motor harness to the switch box.

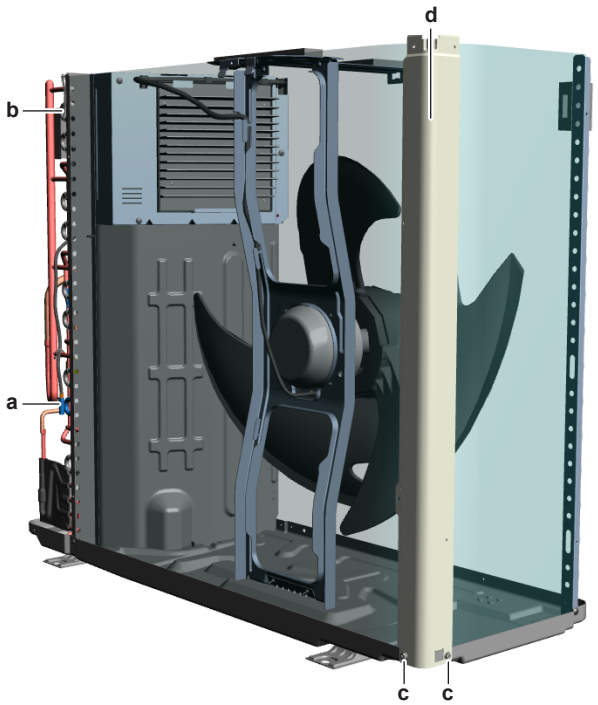
6 Connect the DC fan motor connector to the connector on the main PCB.

7 Supply nitrogen to the refrigerant circuit. The nitrogen pressure MUST NOT exceed 0.02 MPa.

8 Wrap a wet rag around the components near the heat exchanger and solder the heat exchanger pipes to the refrigerant pipes.

9 After soldering is done, stop the nitrogen supply after the component has cooled-down.

10 Install the support plate. Install and tighten the 2 screws to fix the support plate.



a Heat exchanger thermistor
b Outdoor air thermistor
c Screw
d Support plate

11 Install the heat exchanger thermistor and air thermistor in their holder.

12 Install the putty and insulation on the appropriate piping.

13 Perform a pressure test, see "4.2.1 Checking procedures" [▸ 109].

14 Add refrigerant to the refrigerant circuit, see "4.2.2 Repair procedures" [▸ 114].

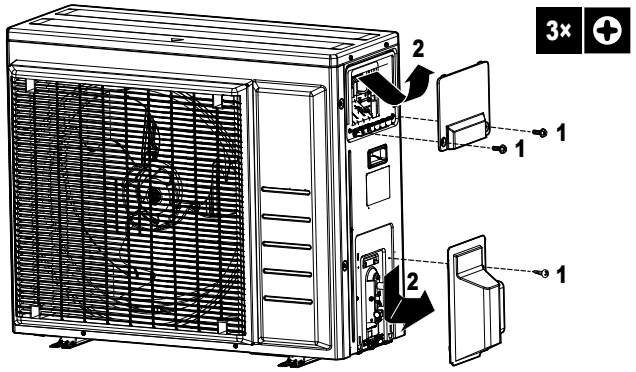
Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

3.9 Plate work

3.9.1 To remove the refrigerant connection cover

DANGER: RISK OF ELECTROCUTION

DANGER: RISK OF BURNING/SCALDING



3.9.2 To remove the top plate

INFORMATION

This procedure is just an example and may differ on some details for your actual unit.

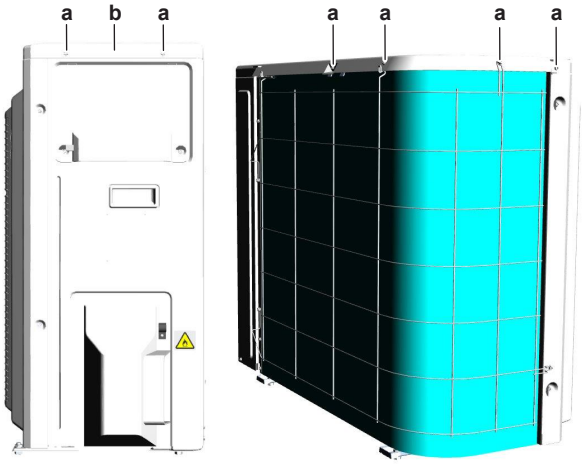
Prerequisite: Stop the unit operation via the user interface.

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 Loosen and remove the screws that fix the top plate.



a Screw
b Top plate

3 Remove the top plate.

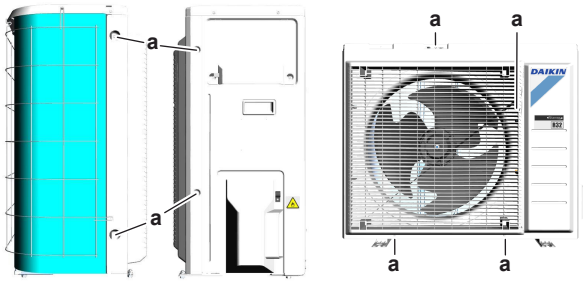
3.9.3 To remove the front plate

INFORMATION

This procedure is just an example and may differ on some details for your actual unit.

Prerequisite: Remove the top plate, see "3.9 Plate work" [▸ 94].

1 Loosen and remove the screws that fix the front plate.



a Screw
b Front plate

2 Remove the front plate.

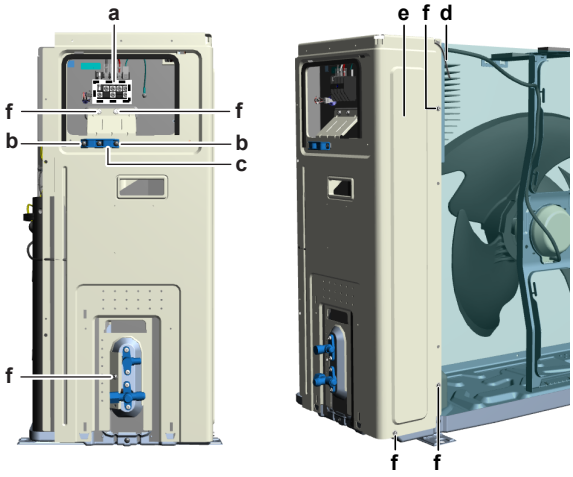
3.9.4 To remove the side plate

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the refrigerant connection cover, top plate and front plate, see "3.9 Plate work" [▸ 94].

1 Disconnect the electrical power supply wiring from the wire terminals.



a Wire terminals
b Screw (wire clamp)
c Wire clamp
d Air thermistor
e Side plate
f Screw (side plate)

2 Disconnect all ground wires.

3 Remove the 3 screws that fix the wire clamp.

4 Remove the wire clamp.

5 Detach the air thermistor from the side plate.

6 Remove the screws that fix the right side plate assembly.

7 Remove the side plate assembly.

INFORMATION

Re-connect the power supply wiring as needed to operate the unit with the side plate removed (e.g. component check).

3.9.5 To remove the switch box

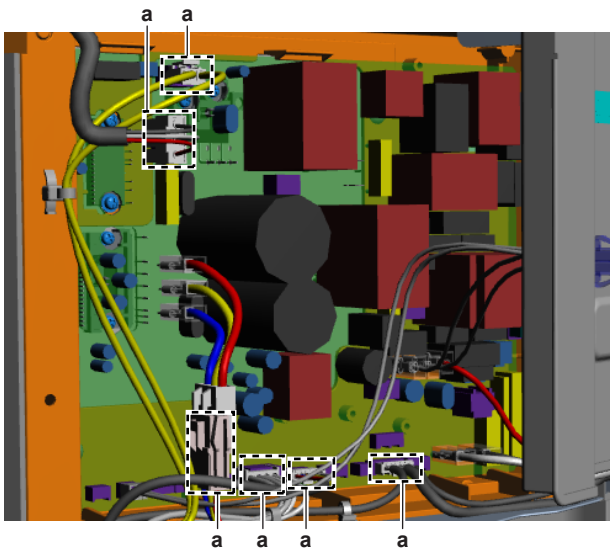
Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the top plate, front plate and side plate from the unit, see "3.9 Plate work" [▸ 94].

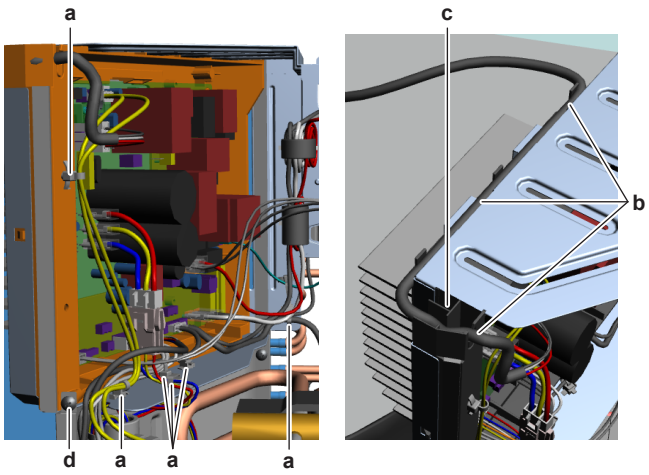
1 Remove the insulation on the upper side of the switch box.

2 Disconnect the indicated connectors from the main PCB.



a Connector (to be disconnected)

3 Unplug the cable clamps to detach the wiring harnesses from the switch box.



a Cable clamp
b Fan motor wiring harness
c Switch box
d Screw (switch box)

4 Route the fan motor wiring harness out of the harness retainers and detach it from the switch box.

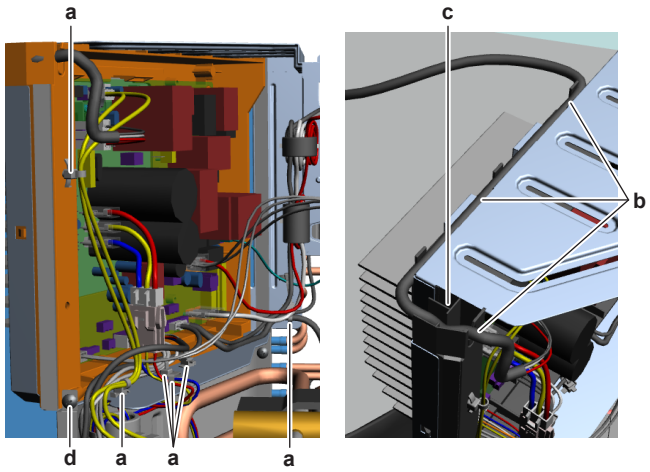
5 Remove the screw from the switch box.

6 Lift and remove the switch box from the outdoor unit.

7 To install the switch box, see "3.9 Plate work" [▸ 94].

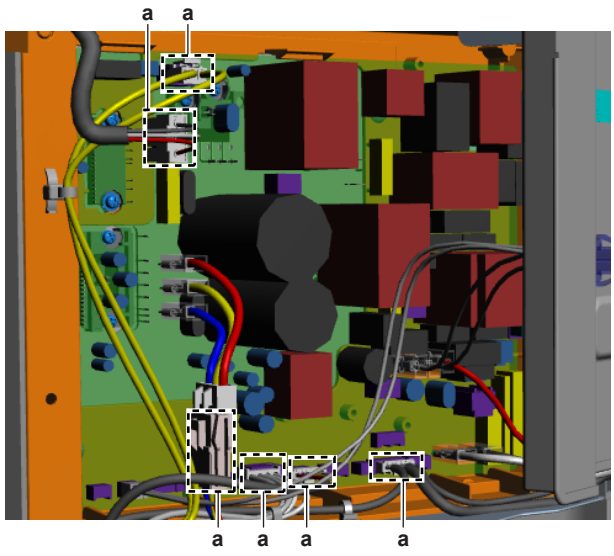
3.9.6 To install the switch box

1. Install the switch box on the correct location in the outdoor unit.
2. Install and tighten the screw to fix the switch box.



a Cable clamp
b Fan motor wiring harness
c Switch box
d Screw (switch box)

3. Route the fan motor wiring harness through the harness retainers to attach the fan motor wiring harness to the switch box.
4. Route the wiring harnesses to the correct location and plug the cable clamps to attach the wiring harnesses to the switch box.
5. Connect the indicated connectors to the main PCB.



a Connector (to be disconnected)

INFORMATION

Use the wiring diagram and connection diagram for correct installation of the connectors, see "6.2 Wiring diagram" [▸ 122].

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.

6 Install the insulation on the upper side of the switch box.

3.10 Reactor

3.10.1 Checking procedures

To perform an electrical check of the reactor

Prerequisite: Stop the unit operation via the user interface.

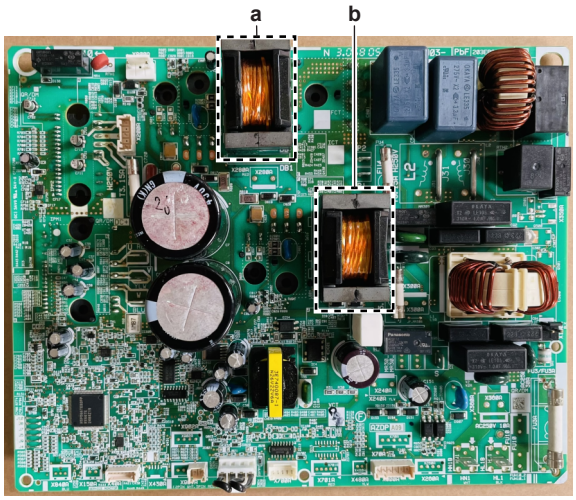
Prerequisite: Turn OFF the respective circuit breaker.

1 Remove the required plate work, see "3.9 Plate work" [▸ 94].

> **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 Visually check the reactor for any damage or burnt-out components. If any damage is found, replace the reactor, see "3.10.2 Repair procedures" [▸ 100].

3 Check that the reactors are firmly installed on the main PCB.



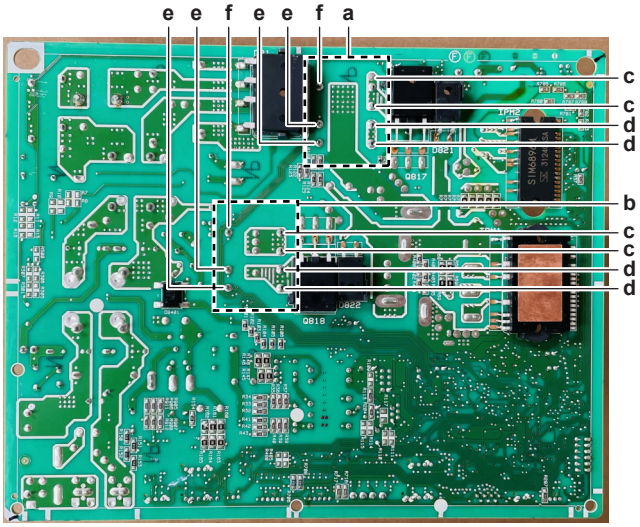
a Reactor L803
b Reactor L804

4 Remove the main PCB, see "3.6.2 Repair procedures" [▸ 84]. The reactor measuring points are ONLY reachable on the back side of the main PCB.

5 Measure the inductance of the reactor using an LCR meter.

Result: The inductance MUST be as follows:

Measuring points	Resistance
c-d	52 µH
e-f	52 µH



a L803
b L804
c Measuring point
d Measuring point
e Measuring point
f Measuring point

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 "3.10.2 Repair procedures" [▸ 100].

3.10.2 Repair procedures

As the reactors are part of the main PCB, replace the complete main PCB. See "3.6 Main PCB" [▸ 77].

3.11 Thermistors

3.11.1 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 "3.9 Plate work" [▸ 94].

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" [▸ 100].
No	Correctly install the thermistor, see "Repair procedures" [▸ 103].

To perform an electrical check of the specific thermistor

1 First perform a mechanical check of the thermistor, see "Checking procedures" [▸ 100].

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	R3T	Main (O/U)	X900A:1-2	A
Heat exchanger thermistor	R4T	Main (O/U)	X900A:3-4	A
Discharge pipe thermistor	R5T	Main (O/U)	X900A:5-6	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
–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		

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. R3T 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 X900A pin 1-2:
  Measured resistance: 21.80 kΩ,
- Measured resistance value is inside the range. R3T 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" [▸ 103].

Repair procedures

To remove the thermistor

Prerequisite: Stop the unit operation via the user interface.

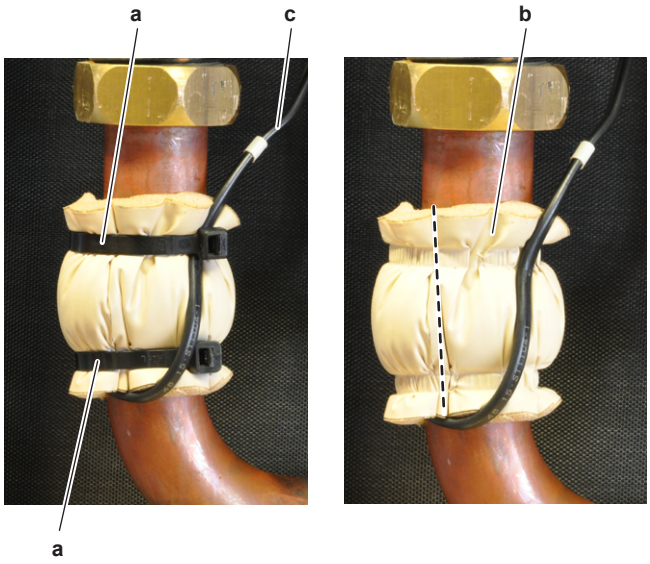
Prerequisite: Turn OFF the respective circuit breaker.

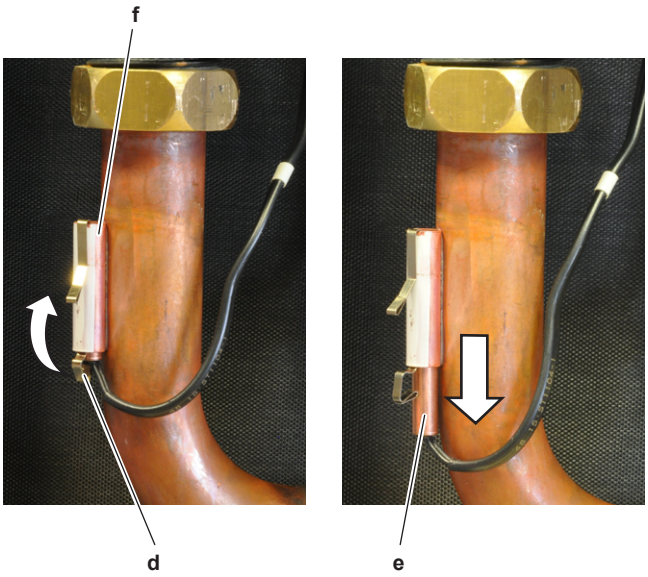
Prerequisite: Remove the required plate work, see "3.9 Plate work" [▸ 94].

1 Locate the thermistor that needs to be removed.

2 Remove the thermistor as follows:

- For outdoor unit air (ambient) thermistor:
  Remove the thermistor from the heat exchanger grille recess.
  Remove the protection tube.
- 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" [▸ 122]. 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:

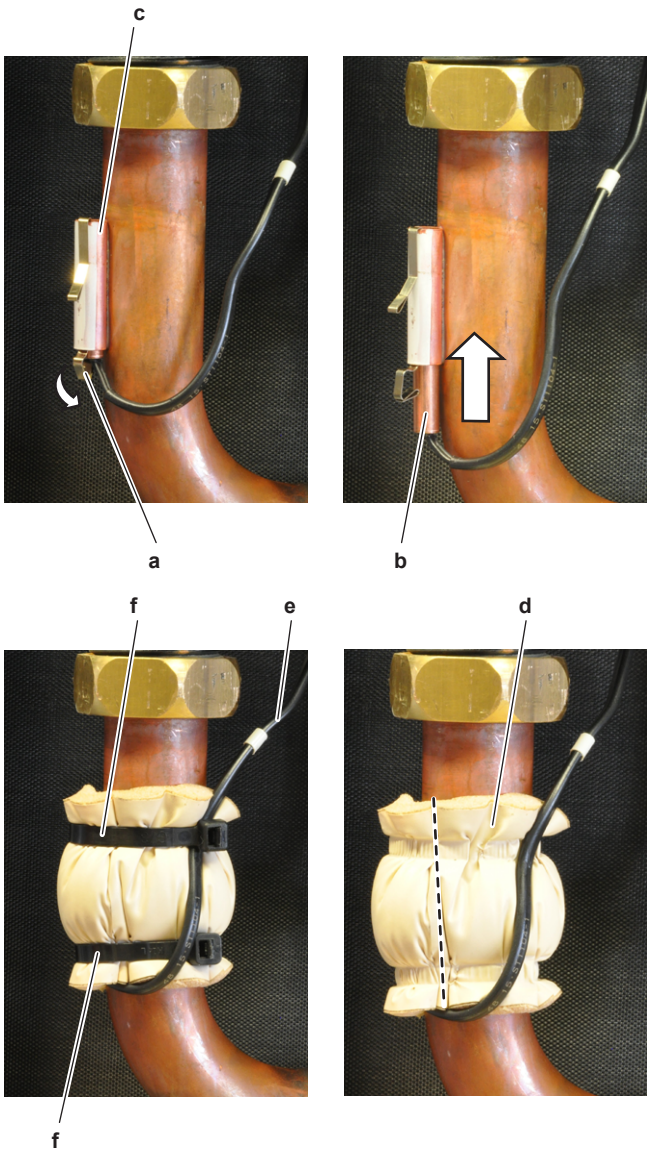
- Remove all other thermistors wired to the connector from their thermistor holder,
- Cut all tie straps that fix the thermistor wiring harness,
- Disconnect the thermistor connector,
- Remove the complete set of thermistors.

6 To install the thermistor, see "Repair procedures" [▸ 103].

To install the thermistor

1 Install the thermistor as follows:

- For air (ambient) thermistor:
  Insert the thermistor in the protection tube.
  Correctly install the thermistor in the heat exchanger grille recess.
- 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" [▸ 122]. 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 or intermediate connector,
- Connect the thermistor 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.

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.

3.11.2 Other thermistors

Checking procedures

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 "3.9 Plate work" [▸ 94].

1 Locate the thermistor on the appropriate PCB.

2 Measure the temperature using a contact thermometer.

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:

- 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 pin 1-2:
  Measured resistance: 21.86 kΩ,
- Measured resistance value is inside the range. 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" [▸ 45].

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 "3.9 Plate work" [▸ 94].

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 of the unit.
4. Measure the voltage between L and N on the power supply terminal X1M.

   Result: The voltage MUST be 230 V AC ± 10%.

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" [▸ 109].

To check if the power supply is compliant with the regulations

1. Check that the power source is in line with the requirements described in the databook.

Is the power supply compliant 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" [▸ 109].

To check the wiring between the outdoor unit and the indoor unit

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" [▸ 122].

> **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.

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 "3.9 Plate work" [▸ 94].

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" [▸ 114].

To check if the refrigerant circuit is clogged

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 Check that all field piping is done according to the refrigeration practice and installation manual:

- Correct piping diameters
- Piping distance limits are followed
- NO pipes are squeezed
- NO short radius bends

3 Connect a manometer to the service port.

4 Turn ON the power of the unit.

5 Activate `Heating` operation via the user interface.

6 Read the pressure on the pressure gauge. If, at the start of the unit operation, the pressure is high or very low, the refrigerant circuit might be clogged.

7 On the refrigerant liquid piping (between the indoor unit 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" [▸ 114].

Temperature drop found?	Action
No	Return to the troubleshooting of the specific error and continue with the next procedure.

To check if the refrigerant circuit is correctly charged

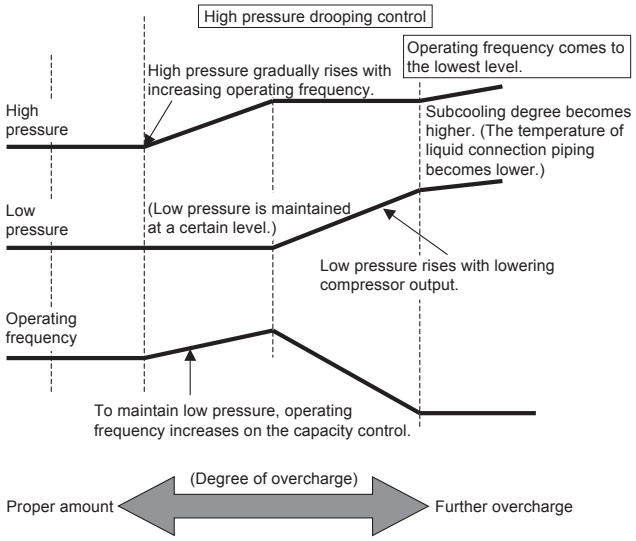
Due to the relationship to pressure control and electronic expansion valve control, the amount of refrigerant needs to be examined according to operating conditions.

Refer to the procedures shown below for correct examination.

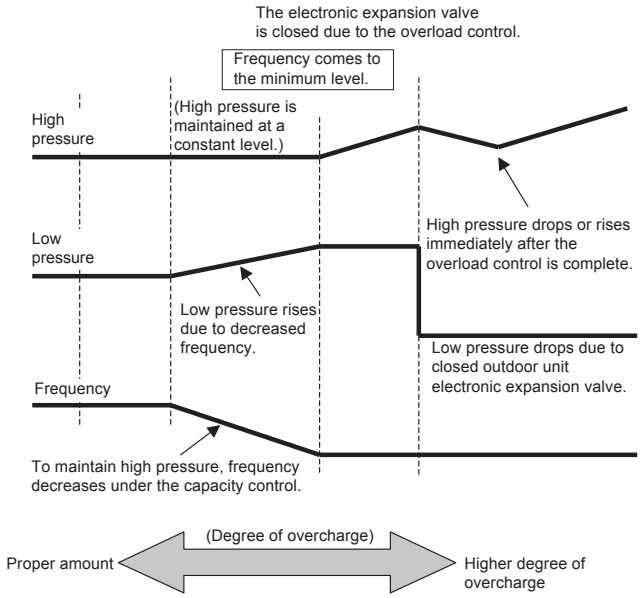
Refrigerant overcharge diagnosis

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 refrigerant in liquid form rises (values >4~5K are NOT normal).

Cooling



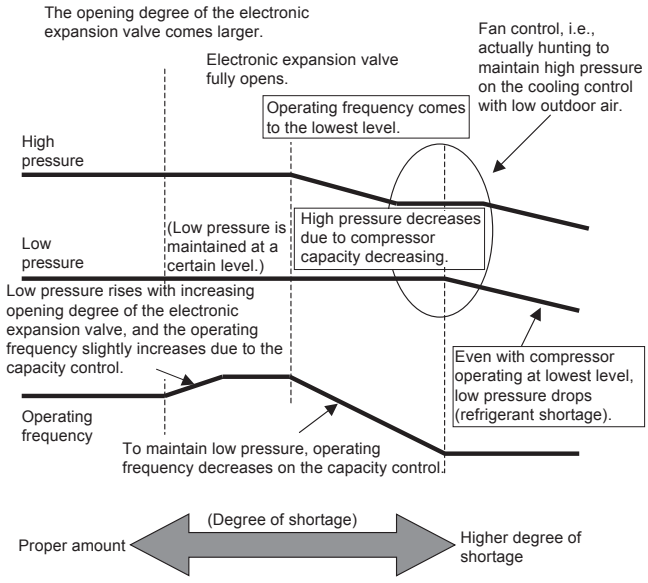
Heating



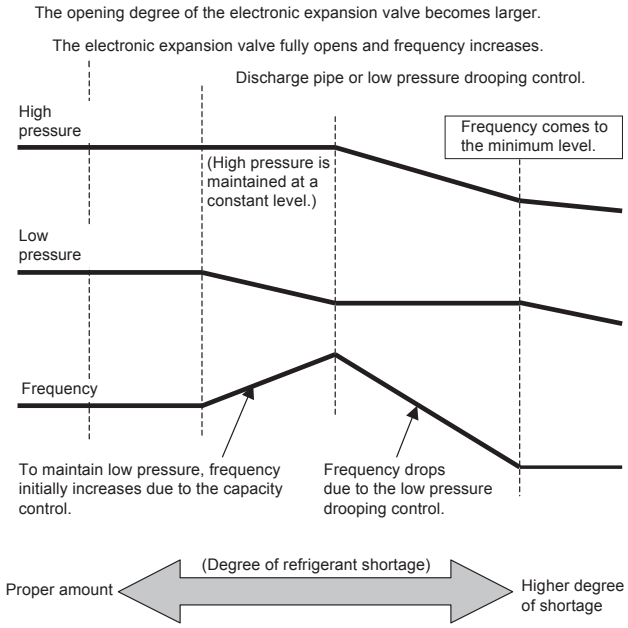
Refrigerant shortage diagnosis

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" [▸ 114].

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" [▸ 114].
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" [▸ 114].

To check if the refrigerant field piping is compliant with the regulations

1 Check if the refrigerant field piping is compliant 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 "3.9 Plate work" [▸ 94].

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" [▶ 116] for more details.

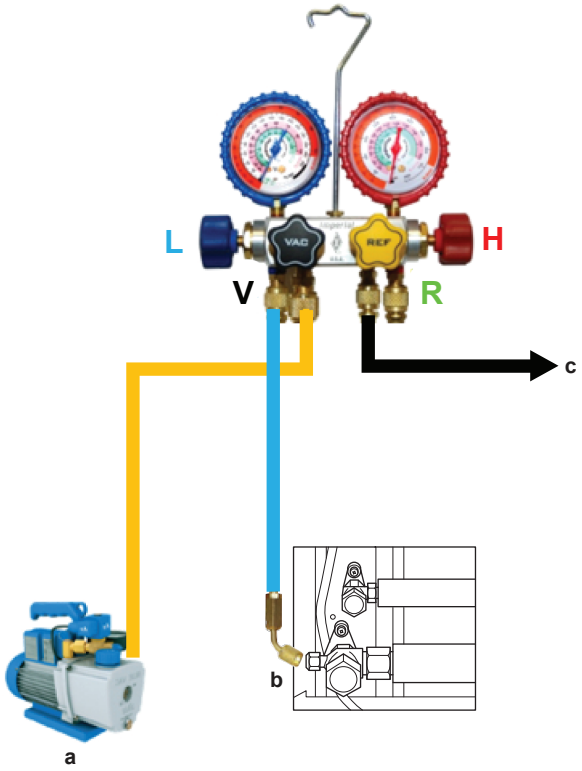
Is the problem solved?	Action
Yes	No further actions required.
No	Return to the troubleshooting of the specific error and continue with the next procedure.

To recuperate the refrigerant

Prerequisite: Stop the unit operation via the user interface.

1 Manually open all expansion valves.

2 Connect the vacuum pump, manifold, recovery unit, and refrigerant bottle to the service port of the refrigerant circuit as shown below.



a Vacuum pump
b Connect flexible hose to service port
c To recovery pump
L Low pressure
H High pressure
V Vacuum
R Refrigerant

3 To add refrigerant, see "4.2.2 Repair procedures" [▶ 114].

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 refrigerant

1 See the installer reference guide for the correct procedure.

Is the problem solved?	Action
Yes	No further actions required.
No	Return to troubleshooting of the specific error and continue with the next procedure.

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:
  - When using an electronic vacuum gauge with an absolute pressure readout, a pressure of minimal 2000 micron / 2 Torr / 266 Pa MUST be reached. This pressure should stay stable for 30 minutes when vacuum pump is NOT running. If vacuum pressure CANNOT be held, most likely there is still moisture in the system. Again run the vacuum pump for 1~2 hours to a pressure (absolute pressure readout) lower than 2000 micron / 2 torr / 266 Pa. If target pressure CANNOT be reached, again check for leaks.
  - 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 "3.9 Plate work" [▸ 94].

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%).

Refrigerant circuit vacuuming - general advice

The effectiveness of the vacuum drying depends on many factors. Besides following the correct procedures and using equipment that is well maintained, the ambient conditions at which the vacuum is done MUST be considered. If there is moisture in the refrigerant and the ambient temperature is lower, the vacuum pressure that MUST be reached to allow the evaporation of the moisture will need to be lower. In some cases the vacuum pump may NOT be able to achieve these pressures. If possible, heat the locations where moisture is expected.

As a general target, the values below CAN be used as reference to achieve a proper vacuum on the unit:

- Absolute pressure below 270 Pa MUST be reached. The time needed for the pressure to lower is also depending on the moisture amount. If it takes very long or it is hard to reach the pressure, this MIGHT be an indication of moisture presence, so the vacuum pump will need to run longer.

- After stopping the vacuum pump, the absolute pressure MUST be kept below 270 Pa for at least 30 minutes, without a significant increase of pressure. If pressure increases significantly, this is an indication of the presence of moisture in the system.
- If multiple vacuum cycles need to be performed, break the vacuum between the cycles using dry nitrogen.

Depending on the site conditions, as mentioned above, lower pressure values MIGHT be needed to allow the boiling of the moisture in the system. The table below shows the boiling point of water for different absolute pressures.

Pressure (absolute)		Boiling point
Micron / Torr	**Mbar / Pa**	**°C**
760000 / 760	1013 / 101325	100
50000 / 50	66 / 6666	38
10000 / 10	13 / 1333	11
2000 / 2	2.6 / 266	−10
1000 / 1	1.33 / 133	−18
500 / 0.5	0.66 / 66	−24

4.3 External factors

4.3.1 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.

Is the problem solved?	Action
No	Return to the troubleshooting of the specific error and continue with the next procedure.

To check for an external power source

1 Check for the presence of an external power source. This might cause electrical interference (electrical noise disturbance).

2 If an external power source was found, remove it.

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

NOTICE

General maintenance/inspection checklist. Next to the maintenance instructions in this chapter, a general maintenance/inspection checklist is also available on the Daikin Business Portal (authentication required).

The general maintenance/inspection checklist is complementary to the instructions in this chapter and can be used as a guideline and reporting template during maintenance.

5.1 To clean the outdoor unit heat exchanger

1. Straighten the air 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 air fins of the outdoor unit heat exchanger during the cleaning process.

Do NOT use a high-pressure washer.

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.

6 Technical data

6.1 Detailed information setting mode

6.1.1 Detailed information setting mode: Outdoor unit

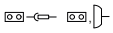
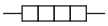
See the installer reference guide on business portal for more information.

6.2 Wiring diagram

6.2.1 Wiring diagram: Outdoor unit

Unified wiring diagram legend

For applied parts and numbering, refer to the wiring diagram on the unit. Part numbering is by Arabic numbers in ascending order for each part and is represented in the overview below by "*" in the part code.

Symbol	Meaning	Symbol	Meaning
	Circuit breaker		Protective earth
			Noiseless earth
			Protective earth (screw)
	Connection		Rectifier
	Connector		Relay connector
	Earth		Short-circuit connector
	Field wiring		Terminal
	Fuse		Terminal strip
	Indoor unit		Wire clamp
	Outdoor unit		Heater
	Residual current device		

Symbol	Colour	Symbol	Colour
BLK	Black	ORG	Orange
BLU	Blue	PNK	Pink
BRN	Brown	PRP, PPL	Purple
GRN	Green	RED	Red
GRY	Grey	WHT	White
SKY BLU	Sky blue	YLW	Yellow

Symbol	Meaning
A*P	Printed circuit board
BS*	Pushbutton ON/OFF, operation switch
BZ, H*O	Buzzer
C*	Capacitor
AC*, CN*, E*, HA*, HE*, HL*, HN*, HR*, MR*_A, MR*_B, S*, U, V, W, X*A, K*R_*, NE	Connection, connector
D*, V*D	Diode
DB*	Diode bridge
DS*	DIP switch

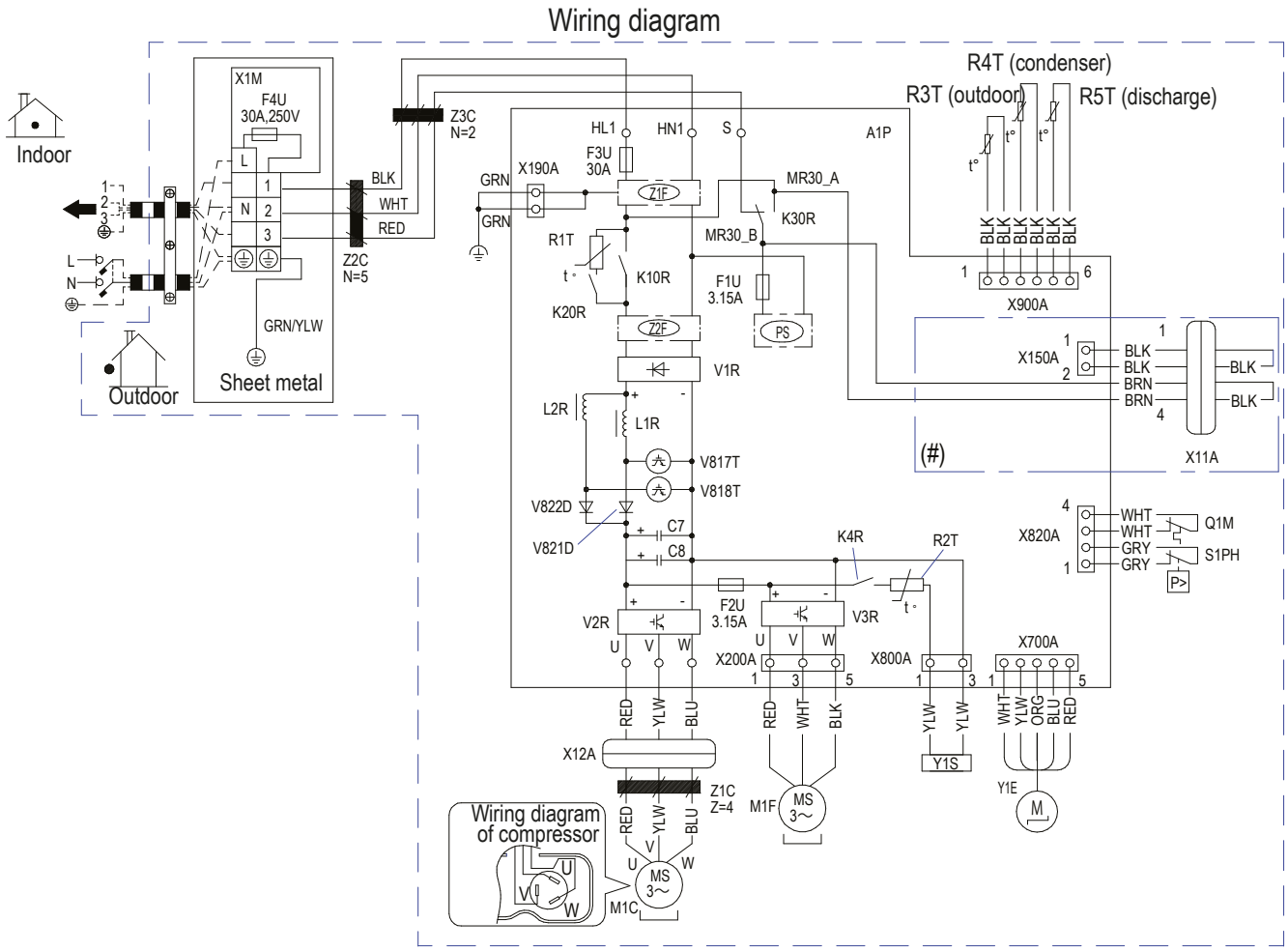
Symbol	Meaning
E*H	Heater
FU*, F*U, (for characteristics, refer to PCB inside your unit)	Fuse
FG*	Connector (frame ground)
H*	Harness
H*P, LED*, V*L	Pilot lamp, light emitting diode
HAP	Light emitting diode (service monitor green)
HIGH VOLTAGE	High voltage
IES	Intelligent eye sensor
IPM*	Intelligent power module
K*R, KCR, KFR, KHuR, K*M	Magnetic relay
L	Live
L*	Coil
L*R	Reactor
M*	Stepper motor
M*C	Compressor motor
M*F	Fan motor
M*P	Drain pump motor
M*S	Swing motor
MR*, MRCW*, MRM*, MRN*	Magnetic relay
N	Neutral
n=*, N=*	Number of passes through ferrite core
PAM	Pulse-amplitude modulation
PCB*	Printed circuit board
PM*	Power module
PS	Switching power supply
PTC*	PTC thermistor
Q*	Insulated gate bipolar transistor (IGBT)
Q*C	Circuit breaker
Q*DI, KLM	Earth leak circuit breaker
Q*L	Overload protector
Q*M	Thermo switch
Q*R	Residual current device
R*	Resistor
R*T	Thermistor
RC	Receiver
S*C	Limit switch

Symbol	Meaning
S*L	Float switch
S*NG	Refrigerant leak detector
S*NPH	Pressure sensor (high)
S*NPL	Pressure sensor (low)
S*PH, HPS*	Pressure switch (high)
S*PL	Pressure switch (low)
S*T	Thermostat
S*RH	Humidity sensor
S*W, SW*	Operation switch
SA*, F1S	Surge arrester
SR*, WLU	Signal receiver
SS*	Selector switch
SHEET METAL	Terminal strip fixed plate
T*R	Transformer
TC, TRC	Transmitter
V*, R*V	Varistor
V*R	Diode bridge, Insulated-gate bipolar transistor (IGBT) power module
WRC	Wireless remote controller
X*	Terminal
X*M	Terminal strip (block)
Y*E	Electronic expansion valve coil
Y*R, Y*S	Reversing solenoid valve coil
Z*C	Ferrite core
ZF, Z*F	Noise filter

Wiring diagram

INFORMATION

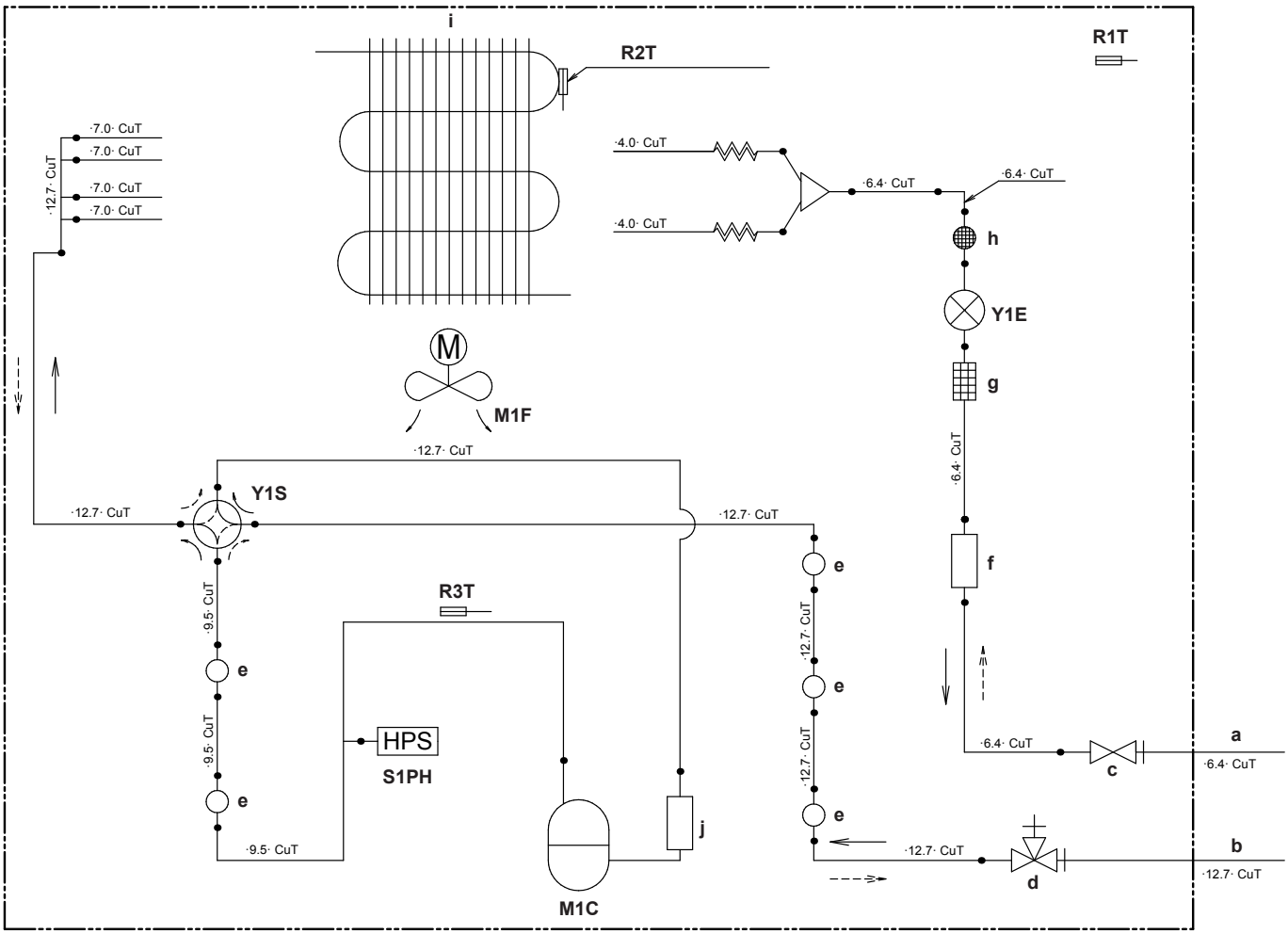
The diagrams shown in this manual may be incorrect due to changes/updates to the unit. Correct diagrams are supplied with the unit and can also be found in the technical data book.



6.3 Piping diagram

6.3.1 Piping diagram: Outdoor unit

RXP50N9

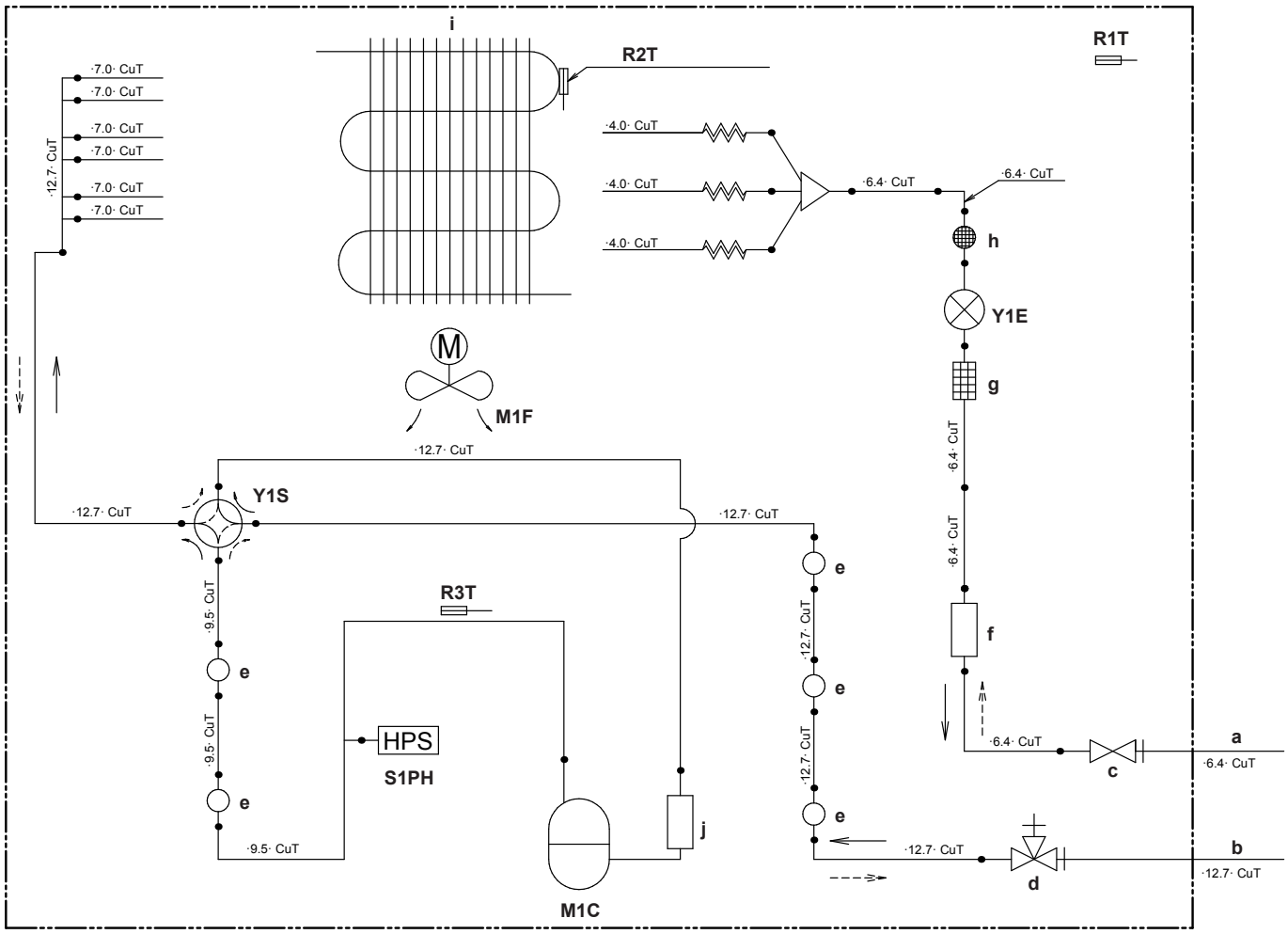


a Field piping (liquid: Ø6.4 mm flare connection)
b Field piping (gas: Ø12.7 mm flare connection)
c Stop valve (liquid)
d Stop valve (gas)
e Muffler
f Liquid receiver
g Filter
h Muffler with filter
i Heat exchanger
j Accumulator
M1C Compressor
M1F Fan
R1T Thermistor (outdoor air)
R2T Thermistor (heat exchanger)
R3T Thermistor (compressor discharge)
S1PH High pressure switch
Y1E Electronic expansion valve
Y1S Solenoid valve (4-way valve)
--► Heating
——► Cooling

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.

RXP60+71N9



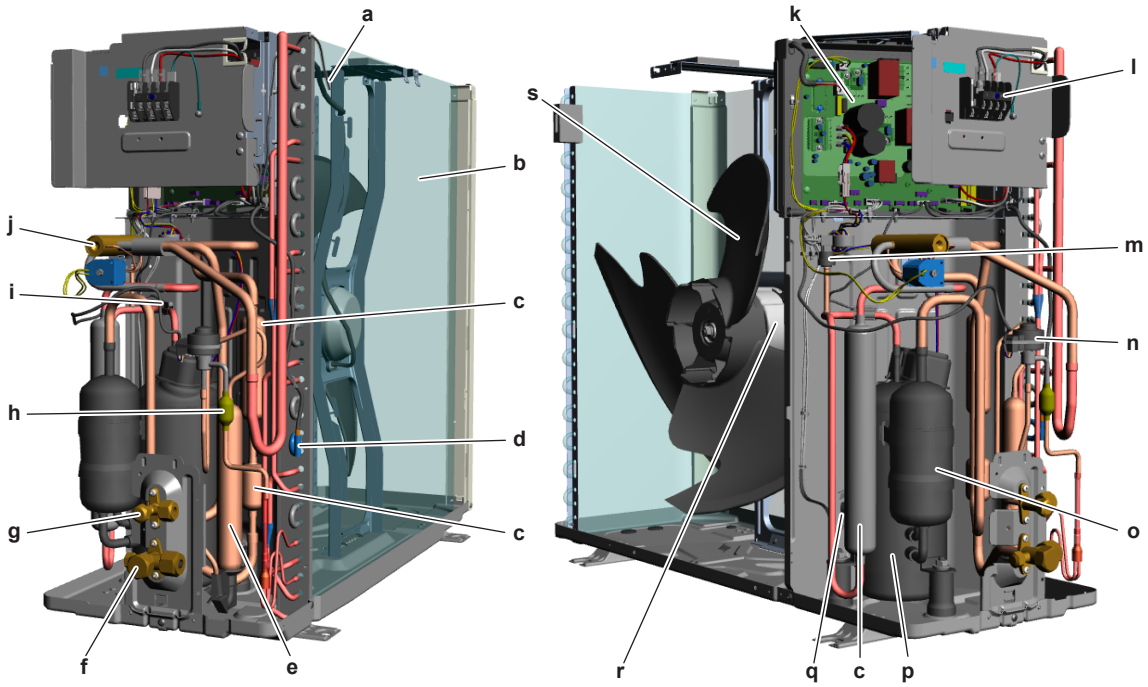
- **a** Field piping (liquid: Ø6.4 mm flare connection)
- **b** Field piping (gas: Ø12.7 mm flare connection)
- **c** Stop valve (liquid)
- **d** Stop valve (gas)
- **e** Muffler
- **f** Liquid receiver
- **g** Filter
- **h** Muffler with filter
- **i** Heat exchanger
- **j** Accumulator
- **M1C** Compressor
- **M1F** Fan
- **R1T** Thermistor (outdoor air)
- **R2T** Thermistor (heat exchanger)
- **R3T** Thermistor (compressor discharge)
- **S1PH** High pressure switch
- **Y1E** Electronic expansion valve
- **Y1S** Solenoid valve (4-way valve)
- --► Heating
- —► Cooling

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.

6.4 Component overview

6.4.1 Component overview: Outdoor unit



a Air thermistor R3T
b Heat exchanger
c Muffler
d Heat exchanger thermistor R4T
e Accumulator
f Stop valve with service port (gas)
g Stop valve (liquid)
h Muffler with filter
i Discharge pipe thermistor R5T
j 4-way valve Y1S
k Main + inverter PCB A1P
l Terminal block X1M
m High pressure switch S1PH
n Expansion valve Y1E
o Accumulator
p Compressor M1C
q Compressor thermal protector Q1M
r Fan
s Fan motor M1F

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):	

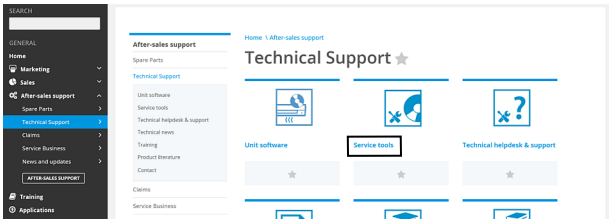
Application information	
Application (house, apartment, office,…):	
New project or reimbursement:	
Heat emitters (radiators / under floor heating / fan coils /…):	
Hydraulic layout (simple schematic):	
Unit / Installation information	
Model name:	Serial number:
Installation / commissioning date:	Software version main PCB:
Software version user interface:	Software version 2nd PCB (if applicable):
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 Daikin Business Portal (authentication required).

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

6.7.1 To set the facility settings

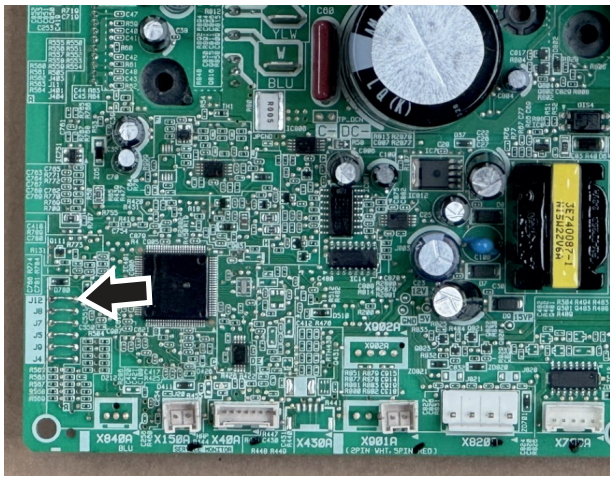
> **INFORMATION**
>
> These settings are only to be used for facilities such as equipment or computer rooms and never in a residence or office with people.

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.9 Plate work" [▸ 94].

1 Cut the jumper J12 on the main PCB using nippers or a similar tool to expand the operation range of the outdoor unit down to –15°C.



> **INFORMATION**
>
> The outdoor unit will stop operating when the temperature drops below –20°C and start back up once the temperature rises again.

2 Below is an overview of the other jumpers settings:

- J4: Not used on this unit
- J5: Not used on this unit
- J7: Not used on this unit
- J8: Cold region setting
- J9: Not used on this unit

6.7.2 To set the cold region settings

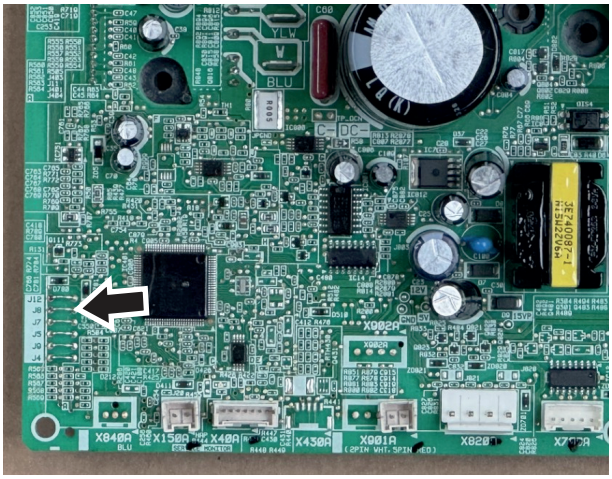
Cold region setting can be used in the event frost remains when the unit is used for heating operation under extremely low temperatures and severe environmental conditions, such as in Scandinavia.

Prerequisite: Stop the unit operation via the user interface.

Prerequisite: Turn OFF the respective circuit breaker.

Prerequisite: Remove the required plate work, see "3.9 Plate work" [▸ 94].

1 Cut the jumper J8 on the main PCB using nippers or a similar tool to improve the defrosting performance.



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