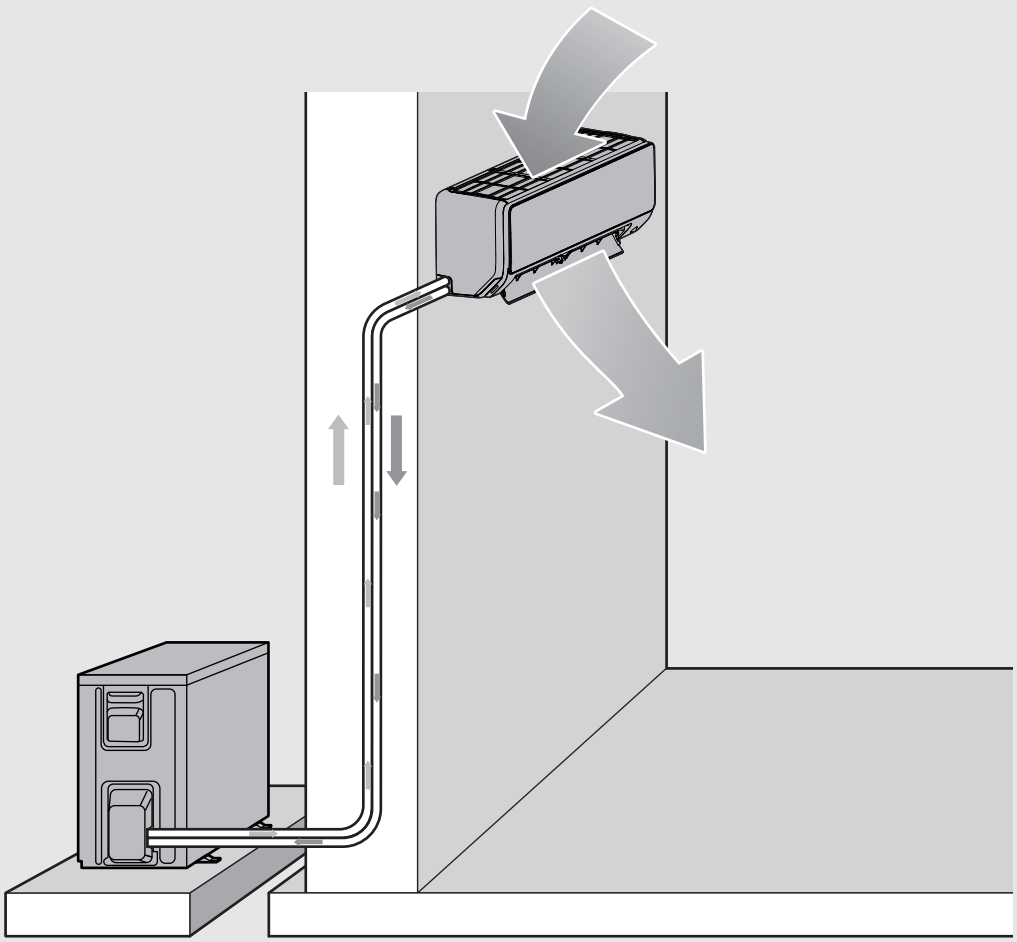
BOSCH

Service instructions

# Split air conditioner

# **Climate 6102i**

CL6102i W 25 HE | CL6102i W 35 HE | CL6102i W 55 HE| CL6102i W 70 HE |
CL6102i 25 HE | CL6102i 35 HE | CL6102i 55 HE | CL6102i 70 HE



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## Table of contents

# 1 Explanation of symbols and safety instructions

## 1.1 Explanation of symbols

**Warnings**

In warnings, signal words at the beginning of a warning are used to indicate the type and seriousness of the ensuing risk if measures for minimizing danger are not taken.

The following signal words are defined and can be used in this document:

**DANGER**

**DANGER** indicates that severe to life-threatening personal injury will occur.

**WARNING**

**WARNING** indicates a hazardous situation which, if not avoided, could result in serious personal injury or danger to life.

**CAUTION**

**CAUTION** indicates a hazardous situation which, if not avoided, could result in minor to moderate personal injury.

***NOTICE***

**ATTENTION** indicates that material damage may occur.

**Important information**

The info symbol indicates important information where there is no risk to people or property.

## 1.2 General safety instructions

### 1.2.1 Overview

This service manual is intended for service engineers. All instructions must be observed. Failure to comply with instructions may result in material damage and personal injury, including danger to life

- Read the installation manuals (outdoor unit, indoor unit, etc) prior to maintenance.
- Observe the safety instructions and warnings.
- Follow national and regional regulations, technical regulations and guidelines.

**⚠ Warning**

- Do not touch the refrigerant piping, water piping or internal parts during operations or when the operation has just been completed. This is because the temperature may be too high or too low. Let them recover to the normal temperature first. Wear protective gloves if you must come in contact with these.
- Do not touch any refrigerant that has accidentally leaked.

**⚠ Caution**

- Please wear the appropriate personal protective tools during installation, maintenance or repair of the system (protective gloves, safety glasses, etc.).
- Do not touch the air inlet or aluminium fin of the unit.

**⚠ Notice**
- Improper installation or connection of equipment and accessories may cause electric shocks, short circuits, leaks, fires, or other damage to the equipment. Use only accessories, equipment and spare parts made or approved by the manufacturer.
- Do not place any object or equipment on top of the unit.
- Do not sit, climb, or stand on the unit.

### 1.2.2 Refrigerant

**⚠ Warning**
- Take appropriate precautions to prevent refrigerant leakage. If the refrigerant gas leaks, ventilate the area immediately. Possible risk: An excessively high concentration of refrigerant in an enclosed area can lead to anoxia (oxygen deficiency). The refrigerant gas may produce a toxic gas if it comes in contact with fire.
- Refrigerant must be recovered. Do not release it to the environment. Use the vacuum pump to draw the refrigerant out from the unit.

**⚠ Notice**
- Do not charge refrigerant before the wiring layout is completed.
- Only charge the refrigerant after the leak tests and vacuum drying have been completed.
- When charging the system with refrigerant, do not exceed the allowable charge.

### 1.2.3 Electricity

**⚠ Notice**
- All electrical works and repairs must be done by a certified installer or electrician.

**⚠ Warning**
- Make sure you switch off the power of the unit before you open the electric control box, and access any circuit wiring or components inside. At the same time, this prevents the unit from being accidentally powered up during installation or maintenance work.
- Once you open the cover of the electric control box, do not let any liquid spill into the box, and do not touch the components in the box with wet hands.
- Cut off power supply more then 5 minutes prior to access the electrical parts. Measure the voltage of the main circuit capacitor or electrical component terminals to make sure the voltage is less than 36 V before you touch any circuit component. Refer to the connections and wiring on the nameplate for the master circuit terminals and connections.
- Make sure the wiring ends are not subjected to any external force. Do not pull or squeeze the cables and wires. At the same time, make sure the wiring ends are not in contact with the piping or sharp edges of the sheet metal.
- Make sure all terminals of the components are firmly connected before you close the cover of the electric control box. Before you power on and start the unit, check that the cover of the electric control box is seated correctly and secured with screws.

## 2 General information on servicing

Always use appropriate tools only. In case of uncertainty, consult the manufacturer about the tools to use with flammable refrigerants.

**⚠ DANGER**

**Fire hazard - Risk of injury or death**

Using other parts than those specified by the manufacturer may result in the ignition of refrigerant from a leak.
- Always replace components with the parts specified by the manufacturer.

**Preparing the work area**

Prior to beginning any work on systems containing flammable refrigerants, safety checks are necessary to ensure that the risk of ignition is minimised. For repairs to the refrigerating system, the following precautions are to be complied with prior to conducting work on the system.
- Undertake any works in a controlled area and a controlled procedure to minimise the risk of flammable gases or vapours being present while performing the task.
- Inform maintenance staff and other persons working in the area of the work being carried out.
- Work in confined spaces shall be avoided.
- Remove all possible ignition sources and put up a “No Smoking” sign.
- Section off the work area.
- Check area with a suitable refrigerant/leak detector before and while carrying out the work.
- If a leak detector needs recalibration, recalibrate in a refrigerant-free area.
- If any hot work is conducted on the refrigerating equipment or any associated parts, keep a dry powder or $CO_2$-filled fire extinguisher at hand.
- Ensure the work area is well ventilated before and while carrying out the work.

**Checking the refrigeration equipment**

The following checks are to be applied to installations using flammable refrigerants:
- Ensure the refrigerant charge is in accordance with the room size in which the refrigerant containing parts are installed.
- Check that the ventilation machinery and outlets are operating adequately and are not obstructed.
- Ensure all marking to the equipment is visible and legible. Any unintelligible signage must be corrected.
- Ensure only refrigerant pipes and components constructed from materials inherently resistant to being corroded, or which are suitably protected, are exposed. All others must be installed in a position where they are unlikely to be exposed to any corrosive substances.

**Checking electrical devices and cabling**

Electrical components must be fit for the purpose and correspond to the correct specification. The manufacturer’s maintenance and service guidelines must be followed at all times. If in doubt consult the manufacturer’s technical department for assistance.

*NOTICE*

**Temporary repairs to ensure continuing operation**

If a fault exists that could compromise safety, usually, no electrical supply should be connected to the circuit until it is satisfactorily dealt with.
However, if a fault cannot be corrected immediately, but it is necessary to continue operation, an adequate temporary solution must be sought.

- The owner of the equipment must be informed of this so that all parties are notified.

Repair and maintenance to electrical components should include initial safety checks and component inspection procedures.

- Capacitors must be discharged in a safe manner to avoid the possibility of sparking. After cutting off the power, wait 10 minutes for the capacitors to be discharged.
- Check that no live electrical components and wiring exposed while charging, recovering or purging the system.
- Ensure the device is continuously grounded.
- Check that cabling is not subject to wear and tear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects. Take into account the effects of aging or continual vibration from sources such as compressors or fans.

**Repairs to sealed components**

- Ensure all electrical supplies are disconnected from the equipment being worked on prior to any removal of sealed covers, etc.

**CAUTION**

**Potentially hazardous situations**

- If electrical supply is absolutely necessary during servicing, make sure to locate a permanently operating form of leak detection at the most critical point to warn of a potentially hazardous situation.

- Ensure particular attention is paid that
  - the casing is not altered to the point where the level of protection is compromised,
  - cables are undamaged,
  - there is not an excessive number of connections,
  - all terminals are made to original specification,
  - seals are undamaged and sealing materials have not degraded to the point of not preventing ingress of flammable atmospheres.
  - glands, etc are fitted correctly.
- Ensure the device is mounted securely.
- Ensure replacement parts are in accordance with the manufacturer's specifications.

**Repairs to intrinsically safe components**

Intrinsically safe components do not have to be isolated prior to working on them. They are the only components which can be worked on while live in the presence of a flammable atmosphere.

- Ensure not to exceed the permissible voltage and current permitted for the equipment in use when applying permanent inductive or capacitance loads to the circuit.
- Ensure that the test apparatus is at the correct rating.

**Leak detection methods**

Leak detection fluids are suitable for use with most refrigerants.
However, the use of detergents containing chlorine should be avoided, as the chlorine may react with the refrigerant and corrode the copper pipe-work.
The use of silicon sealant may inhibit the effectiveness of some types of leak detection equipment.

The following leak detection methods are deemed acceptable for systems containing flammable refrigerants.

- Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant. For this reason, use electronic leak detectors to detect flammable refrigerants.
- Ensure to recalibrate an inadequate sensitivity in a refrigerant-free area.
- Leak detection equipment should be set at a percentage of the LFL of the refrigerant and be calibrated to the refrigerant employed.
- Ensure the appropriate percentage of gas (25 % maximum).
- If a leakage of refrigerant is found which requires brazing, all of the refrigerant must be either recovered from the system or isolated by shutting-off valves in a part of the system away from the leak.

**Removal and evacuation**

When breaking into the refrigerant circuit to make repairs - or for any other purpose - conventional procedures may be used.
Do not use compressed air or oxygen for purging refrigerant systems.

Adhere to the following procedure when opening the refrigerant system:

- Remove refrigerant following local and national regulations. The refrigerant charge shall be recovered into the correct recovery cylinders.
- Evacuate.
- Flush the circuit with oxygen-free nitrogen.
- Evacuate.
- Continuously flush the circuit with oxygen-free nitrogen when opening it with a flame.
- Open the circuit by cutting or brazing.

**Removal and evacuation for appliances containing flammable refrigerants**

*NOTICE*

**Flushing pipes containing flammable refrigerants**

Make sure to always flush the system before doing any brazing on the pipework.

Correct flushing of the system is achieved with the following procedure:

- Vacuum the system.
- Fill the system with oxygen-free nitrogen until the design pressure is reached.
- Vent the system to atmospheric pressure.
- Repeat the above process until there is no refrigerant is left in the system.

Ensure that the outlet for the vacuum pump is away from any sources of ignition and that ventilation is available.

**Charging procedures**

Follow these requirements in addition to conventional charging procedures:

- Ensure that no contamination of different refrigerants occurs when using charging equipment.
- Keep hoses or lines as short as possible to minimise the amount of refrigerant contained in them.
- Keep refrigerant cylinders upright.
- Label the system when charging is complete (if not already labelled).
- Before recharging the system, pressure-test with oxygen-free nitrogen.
- Take extreme care not to overfill the refrigeration system.
- Leak-test the system on completing charging and prior to commissioning. A follow-up leak test is to be carried out before leaving the site.

**Decommissioning**

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its details.

- All refrigerants must be recovered safely.
- An oil and refrigerant sample should be taken prior to the task, in case analysis is required before reusing reclaimed refrigerant.
- Ensure that:
  - electrical power is available before starting the work,
  - the system is electrically isolated,
  - mechanical equipment for handling refrigerant recovery into cylinders is available (if required),
  - recovery equipment and cylinders conform to the appropriate standards,
  - all personal protective equipment is available and being used correctly,
  - the recovery process is supervised at all times by a competent person.
- Pump down refrigerant system, if possible.
- 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 manufacturer's instructions.
- Do not overfill cylinders (no more than 70 % of the water capacity, converted to refrigerant density at temperature of recovery).
- Never exceed the maximum working pressure of the cylinder, not even temporarily.
- Ensure that the cylinders and the equipment are removed from the site promptly and that all isolation valves on the equipment are closed off when the process is finished.

Recovered refrigerants should only be charged into another refrigeration system after they have been cleaned and checked first.

**Labelling**

- Ensure equipment label states that it has been decommissioned and emptied of refrigerant and that the label is dated and signed.
- Ensure equipment is labelled to state it contains flammable refrigerant.

**Recovery**

When removing refrigerant from a system, either for servicing or decommissioning, it is required to follow good practice so that all refrigerants are removed safely.

- Ensure only appropriate refrigerant recovery cylinders are employed and that they are appropriately labelled for the refrigerant. Cylinders must come complete with pressure relief valve and all associated shut-off valves in good working order.
- Ensure sufficient amount of cylinders for holding the total system charge is available.
- Ensure empty recovery cylinders are evacuated and, if possible, cooled before recovery takes place.
- Ensure recovery equipment is in good working order and suitable for the recovery of flammable refrigerants.
- Ensure instructions concerning the equipment at hand are included with it.
- Ensure that a set of calibrated weighing scales in good working order is at hand.
- Ensure hoses are complete with leak-free disconnect couplings and are in good condition.
- Before use, check that recovery machine is in satisfactory working order, has been properly maintained, and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release. Consult the manufacturer if in doubt.
- Ensure the recovered refrigerant is processed according to local legislation and is returned to the refrigerant supplier in the correct recovery cylinder, with the relevant waste transfer note attached.
- Do not mix refrigerants in recovery units and especially not in cylinders.

If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The compressor body shall not be heated by an open flame or other ignition sources to accelerate this process. Draining of oil from a system shall be carried out safely.

**Transportation, marking and storage**

- Ensure transport of equipment containing flammable refrigerants is in compliance with the transport regulations.
- Ensure the marking of the equipment using signs is in compliance with local regulations.
- Ensure the disposal of equipment containing flammable refrigerants is in compliance with national regulations.
- Ensure storage of equipment/appliances is in accordance with the manufacturer's instructions.

***NOTICE***

**Storage of packed (unsold) equipment:**

- Determine the maximum number of pieces of equipment permitted to be stored together according to local regulations.

# 3 Product Information

## 3.1 Model Reference

Refer to the following table to determine the specific indoor and outdoor unit model.

| Indoor Unit | Outdoor Unit | Capacity (kW) | Power Supply |
|---|---|---|---|
| CL6102i W 25 HE | CL6102i 25 HE | 2,7 | 220-240V~, 50Hz, 1Phase |
| CL6102i W 35 HE | CL6102i 35 HE | 3,5 | |
| CL6102i W 55 HE | CL6102i 55 HE | 5,3 | |
| CL6102i W 70 HE | CL6102i 70 HE | 7,0 | |

*Table 1*

## 3.2 Pipe Length and Drop Height

The length and elevation of connection pipe are shown in the table below. If the pipe length exceeds standard pipe length, additional refrigerant should be charged to ensure nominal cooling/heating capacity.

| Capacity (kW) | Standard Length | Max Pipe Length | Max Elevation | Additional Refrigerant |
|---|---|---|---|---|
| 2,7/3,5 | 5 m | 25 m | 10 m | 12g/m |
| 5,3 | | 30 m | 20 m | |
| 7 | | 50 m | 25 m | 24g/m |

*Table 2*

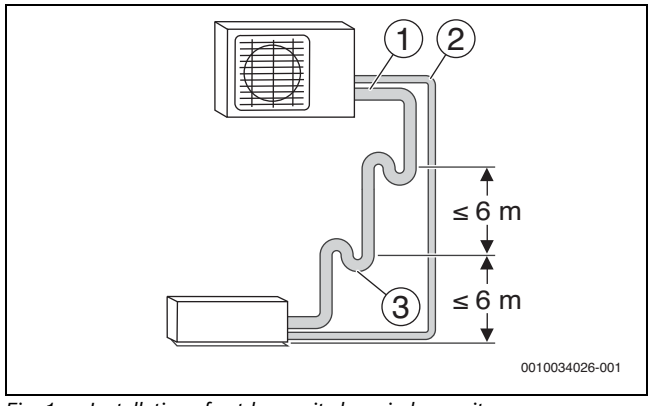



*Fig. 1 Installation of outdoor unit above indoor unit*

[1] Gas-side pipe
[2] Liquid-side pipe
[3] Siphon-shaped elbow as oil separator

If the outdoor unit is installed higher than the indoor unit, proper oil should return to the compressor along with the suction of refrigerant to keep lubrication of compressor. If the suction flow velocity drops below 7.62 m/s, oil won't return to the compressor. An oil trap should be installed every 6 m of vertical gas pipe in order to avoid a compressor damage.

## 3.3 Dimensions

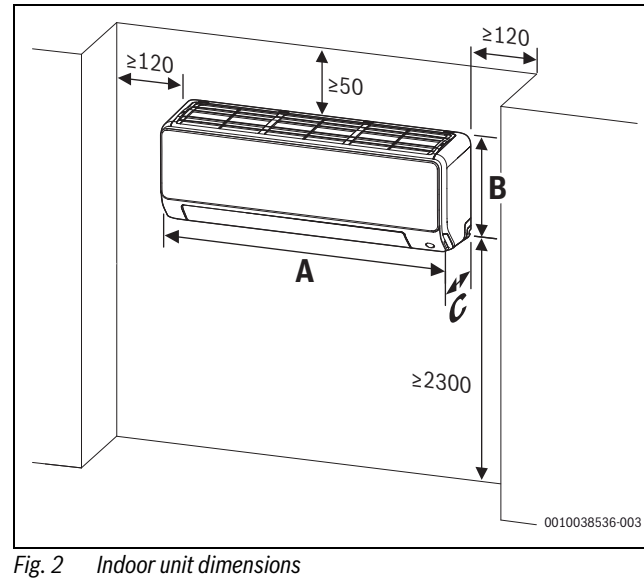



*Fig. 2 Indoor unit dimensions*

| | A [mm] | B [mm] | C [mm] |
|---|---|---|---|
| CL6102i W 25 HE | 795 | 295 | 225 |
| CL6102i W 35 HE | | | |
| CL6102i W 55 HE | 965 | 319 | 239 |
| CL6102i W 70 HE | 1140 | 275 | 370 |

*Table 3*

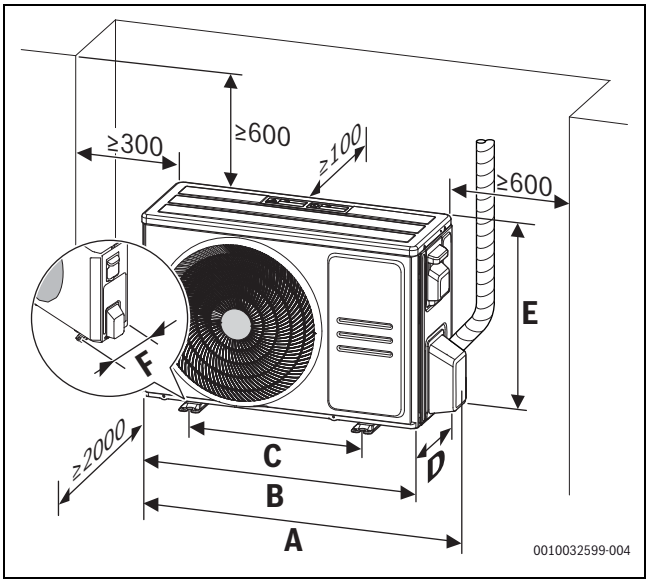



*Fig. 3 Outdoor unit dimensions*

| | A [mm] | B [mm] | C [mm] | D [mm] | E [mm] | F [mm] |
|---|---|---|---|---|---|---|
| CL6102i 25 HE | 874 | 805 | 511 | 330 | 554 | 317 |
| CL6102i 35 HE | 874 | 805 | 511 | 330 | 554 | 317 |
| CL6102i 55 HE | 955 | 890 | 663 | 342 | 673 | 348 |
| CL6102i 70 HE | 1030 | 946 | 673 | 410 | 810 | 403 |

*Table 4*

## 3.4 Electrical Wiring Diagrams

### 3.4.1 Indoor unit wiring diagram

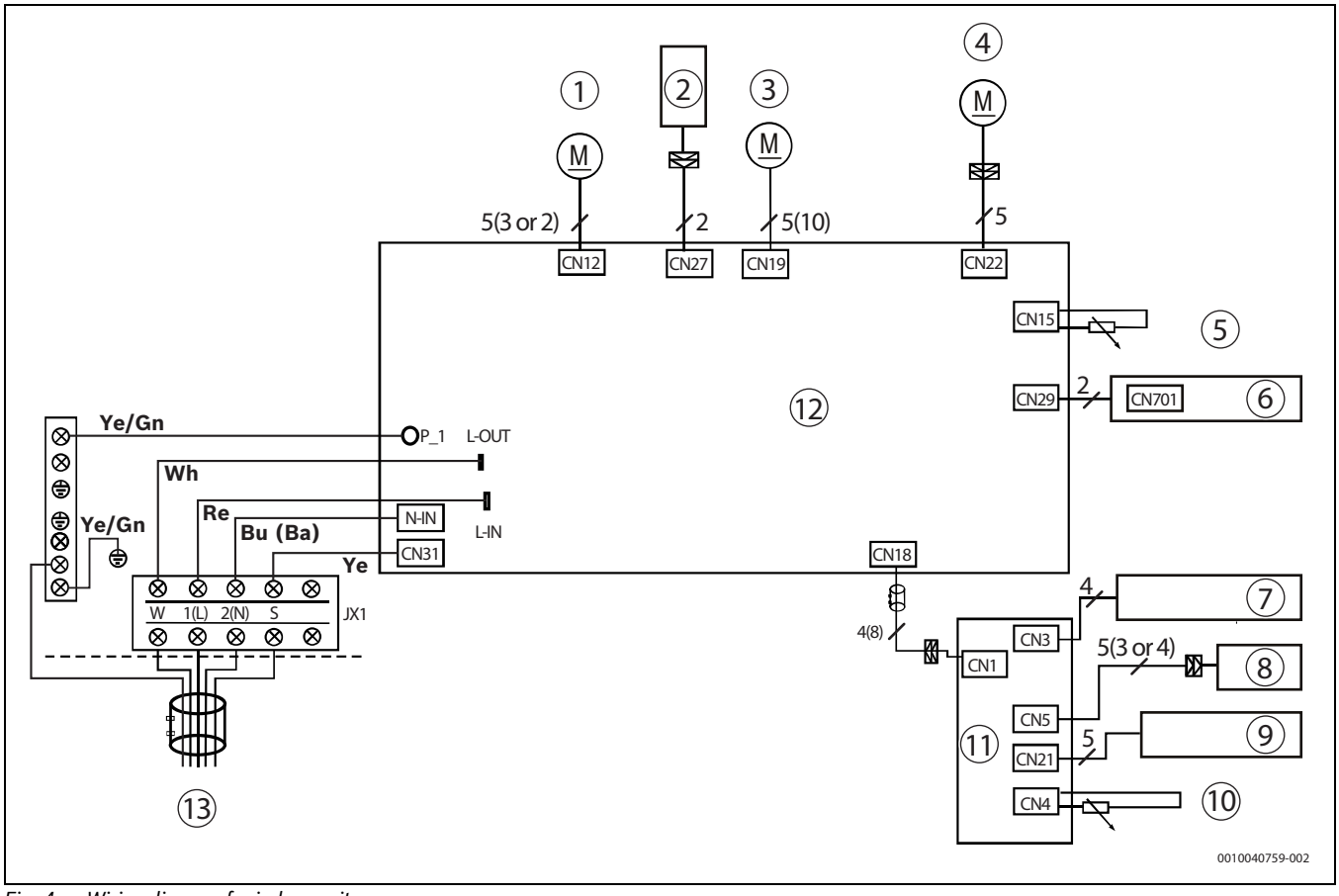



*Fig. 4 Wiring diagram for indoor unit*

[1] Fan motor
[2] Ion Generator
[3] Horizontal swing motor
[4] Vertical swing motor
[5] Pipe temperature sensor
[6] Switch board
[7] Wi-Fi gateway
[8] Human sensor
[9] Humidity sensor
[10] Room temperature sensor
[11] Display board
[12] Main board
[13] Communication/Power supply cable from outdoor unit

| | |
|---|---|
| Bu (Ba) | Blue or black wire |
| ENC3 | Network address switch |
| JX1 | Connector indoor unit |
| Re | Red wire |
| Ye | Yellow wire |
| Ye/Gn | Yellow and green wire |
| Wh | White wire |
| CN.. | Port code |
| ___ | Indicated element is optional |

### 3.4.2 Outdoor unit wiring diagram

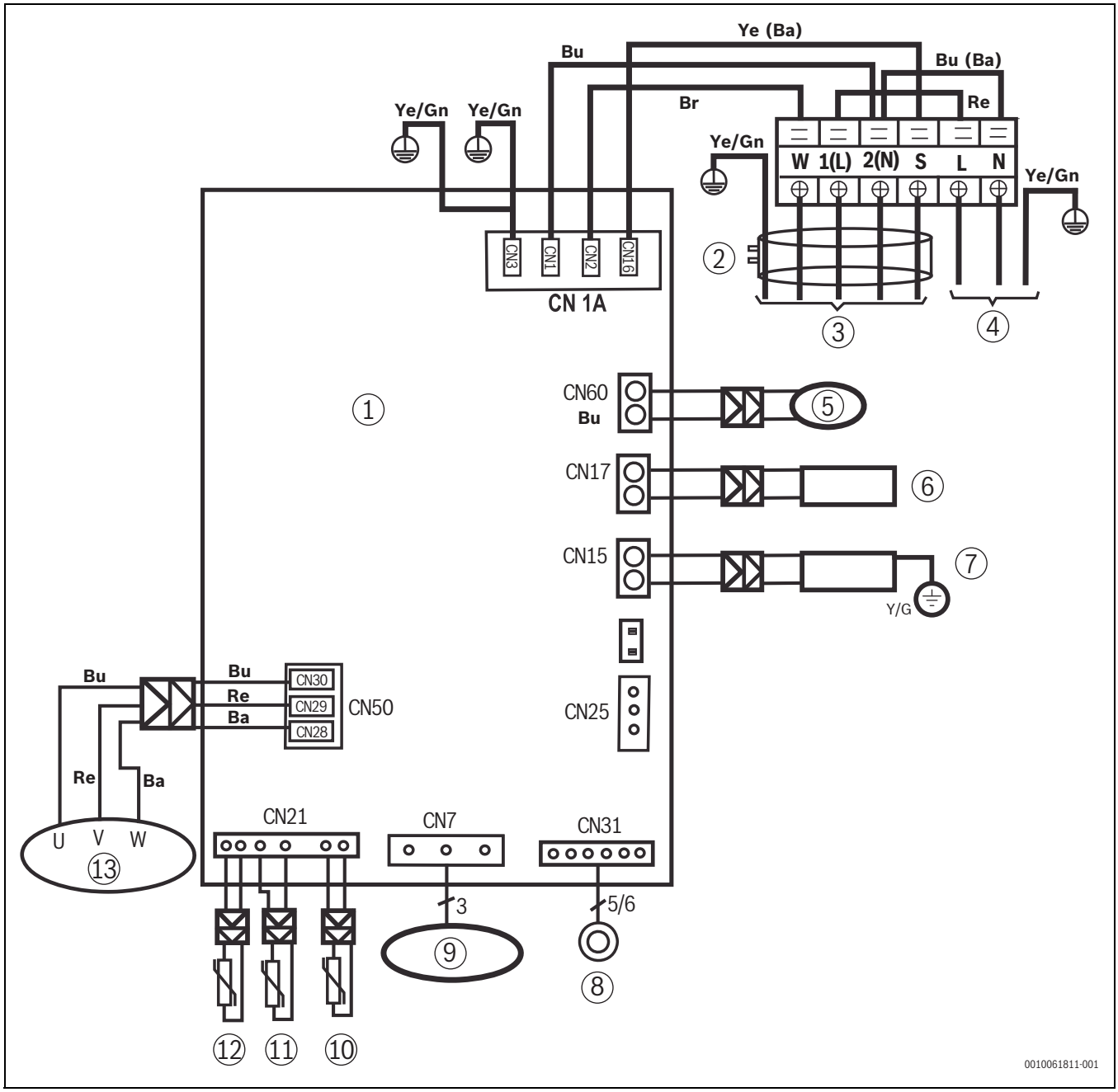



*Fig. 5 Wiring diagram for outdoor unit with 2,7 to 5,3kW*

[1] Main board
[2] Magnet ring
[3] Communication/power supply cable to indoor unit
[4] Power supply cable
[5] 4-way valve
[6] Crankcase heater
[7] Pan heater
[8] Electronic expansion valve
[9] Outdoor unit DC fan
[10] Ambient temperature sensor (T4)
[11] Condenser temperature sensor (T3)
[12] Discharge temperature sensor (TP)
[13] Compressor

| | |
|---|---|
| Br | Brown wire |
| Bu | Blue wire |
| Bu (Ba) | Blue or black wire |
| Bu (Wh) | Blue or white wire |
| Re | Red wire |
| Ye | Yellow wire |
| Ye (Ba) | Yellow or black wire |
| Ye/Gn | Yellow and green wire |
| Wh | White wire |
| CN.. | Port code |
| ___ | Indicated element is optional |

For standby control the cross section area of the communication cable must be selected to suit the maximum system current. The maximum system current is equal to the sum of indoor unit and outdoor unit rated current.

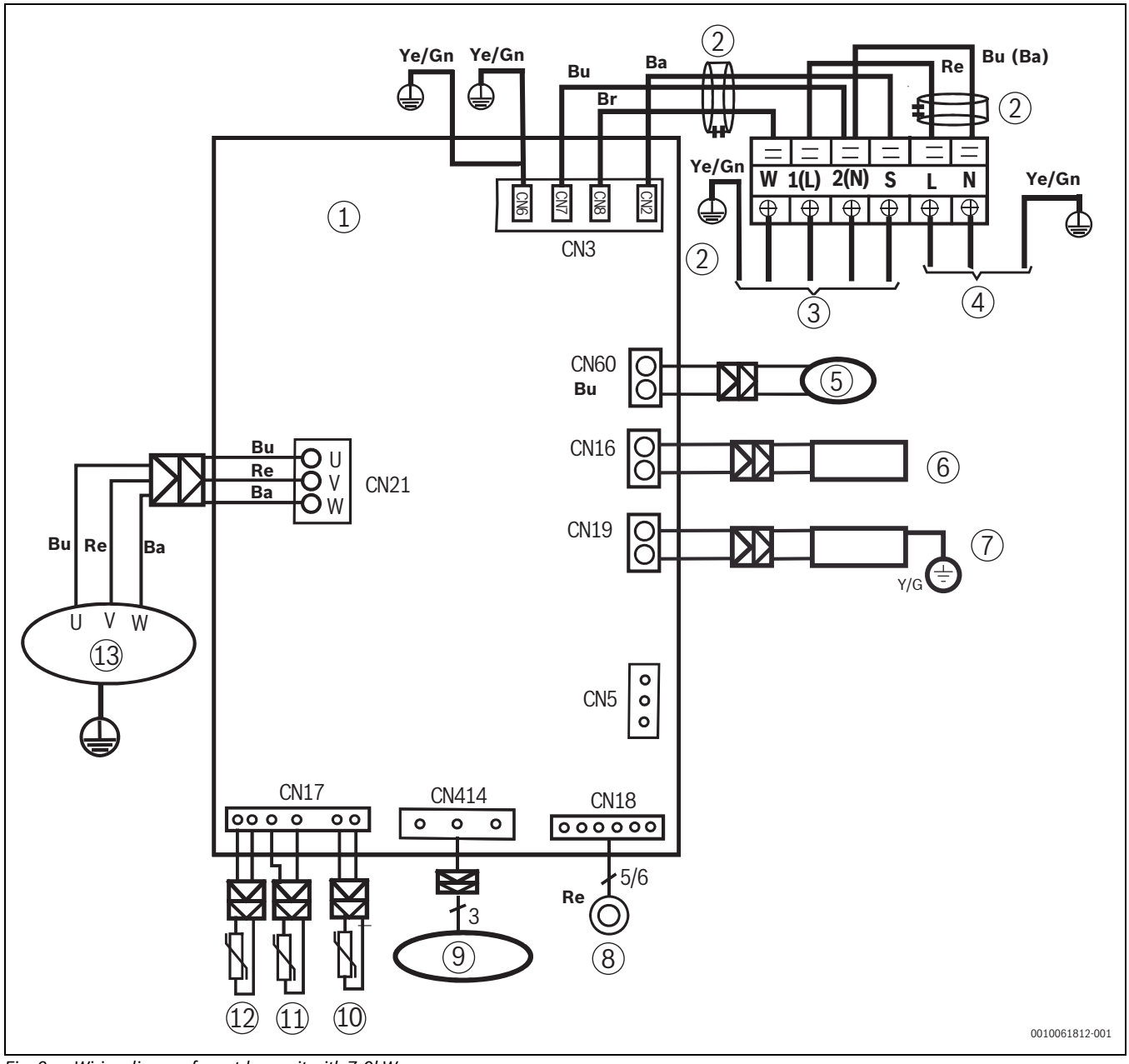



*Fig. 6 Wiring diagram for outdoor unit with 7,0kW*

[1] Outdoor main PCB
[2] Magnet ring
[3] Communication/power supply cable to indoor unit
[4] Power supply cable
[5] 4-way valve
[6] Crankcase heater
[7] Pan heater
[8] Electronic expansion valve
[9] Outdoor unit DC fan
[10] Ambient temperature sensor (T4)
[11] Condenser temperature sensor (T3)
[12] Discharge temperature sensor (TP)
[13] Compressor (ground wire of the compressor is contained in D box)

| | |
|---|---|
| Br | Brown wire |
| Bu | Blue wire |
| Bu (Ba) | Blue or black wire |
| Re | Red wire |
| Ye | Yellow wire |
| Ye/Gn | Yellow and green wire |
| Wh | White wire |
| CN.. | Port code |
| ___ | Indicated element is optional |

For standby control the cross section area of the communication cable must be selected to suit the maximum system current. The maximum system current is equal to the sum of indoor unit and outdoor unit rated current.

### 3.4.3 Outdoor unit main PCB ports

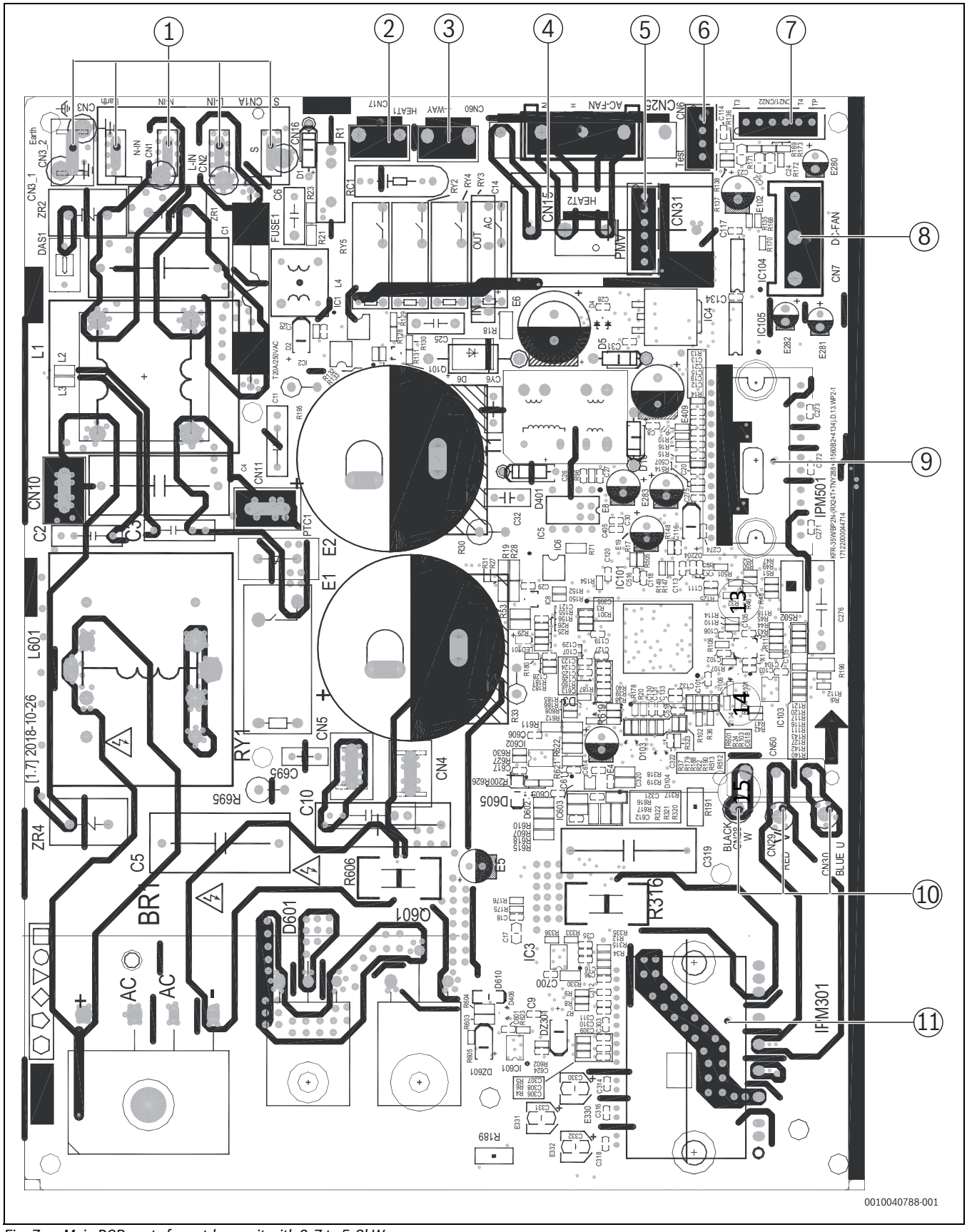



*Fig. 7 Main PCB ports for outdoor unit with 2,7 to 5,3kW*

| Label in Fig. 7 | Name | Port | Content | Port voltage |
|---|---|---|---|---|
| 1 | CN1A | CN3 | Earth: connect to Ground | |
| | | CN1 | N_in: connect to N-line | 208-230V AC |
| | | CN2 | L_in: connect to L-line | 208-230V AC |
| | | CN6 | S: connect to indoor unit communication | |
| 2 | Crankcase heater | CN17 | power output for compressor heater | 230V AC |
| 3 | 4-WAY | CN60 | connect to 4 way valve | 208-230V AC (when ON) |
| 4 | Pan heater | CN15 | power output for chassis heater | 230V AC |
| 5 | PMV | CN31 | connect to Electric Expansion Valve | |
| 6 | TESTPORT | CN6 | used for testing | |
| 7 | TP, T4, T3 | CN21/CN22 | connect to pipe temp. sensor T3, ambient temp. sensor T4, discharge temperature sensor TP | |
| 8 | DC-FAN | CN7 | connect to DC fan | |
| 9 | FAN_IPM | IPM 501 | IPM for DC fan | |
| 10 | W | CN28 | Compressor connection | • Standby: 0V AC<br>• Running: 10-200V AC |
| | V | CN29 | | |
| | U | CN30 | | |
| 11 | COMP_IPM | IPM 301 | IPM for compressor | |

*Table 5*

Actual appliance might differ. This section is for reference only.

### 3.4.4 Outdoor unit printed circuit board diagram

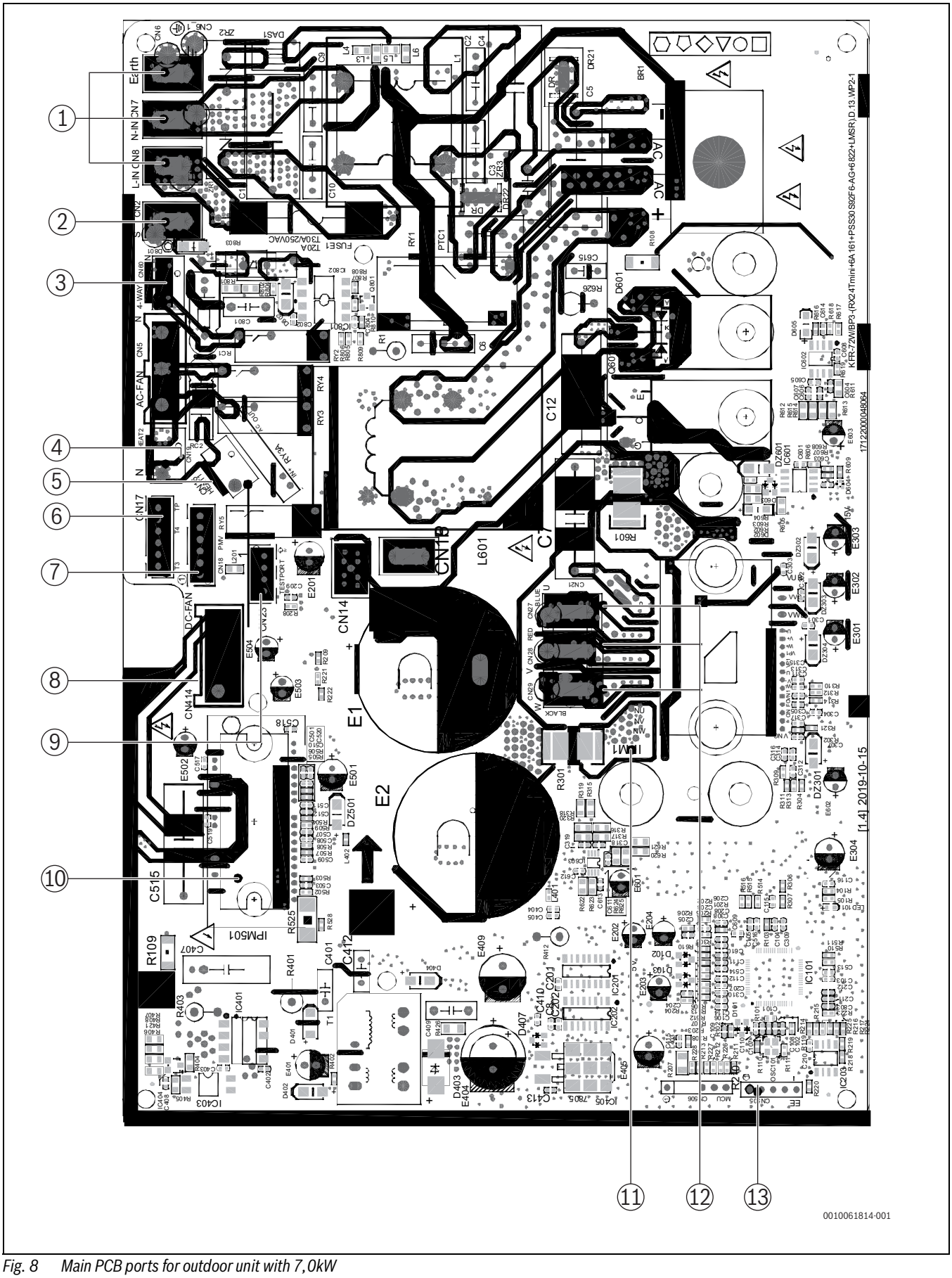



*Fig. 8 Main PCB ports for outdoor unit with 7,0kW*

| Label in Fig. 8 | Name | Port | Content | Port voltage |
|---|---|---|---|---|
| 1 | Power Supply | CN6 | Earth: connect to Ground | |
| | | CN7 | N_in: connect to N-line | 208-230V AC |
| | | CN8 | L_in: connect to L-line | 208-230V AC |
| 2 | S | CN2 | S: connect to indoor unit communication | |
| 3 | 4-WAY | CN60 | connect to 4 way valve | 208-230V AC (when ON) |
| 4 | Pan heater | CN19 | power output for chassis heater | 230V AC |
| 5 | Crankcase heater | CN16 | power output for compressor heater | 230V AC |
| 6 | TP, T4, T3 | CN17 | connect to pipe temp. sensor T3, ambient temp. sensor T4, discharge temp. sensor TP | |
| 7 | PMV | CN18 | connect to Electric Expansion Valve | |
| 8 | DC-FAN | CN414 | connect to DC fan | |
| 9 | TESTPORT | CN23 | used for testing | |
| 10 | FAN_IPM | IPM501 | IPM for DC fan | |
| 11 | COMP_IPM | IPM1 | IPM for compressor | |
| 12 | U | CN27 | Compressor connection | • Standby: 0V AC<br>• Running: 200-300V AC |
| | V | CN28 | | |
| | W | CN29 | | |
| 13 | EE_PORT | CN505 | EEPROM programer port | |

*Table 6*

Actual appliance might differ. This section is for reference only.

# 4 Product Features

## 4.1 Indoor unit display


| Symbol | Explanation |
|---|---|
| **Number** | Temperature display |
| | WLAN connection[1] active |
| | Displayed with some functions, if these are switched on. Indicates that the ON timer is active when the indoor unit is switched off. |
| **0F** | Displayed with some functions, if these are switched off. |
| **AP** | AP mode of WIFI connection |
| **dF** | Automatic defrosting active |
| **FC** | Forced cooling |
| **FP** | Frost protection active: the indoor unit keeps the room temperature at a minimum of 8 °C. |
| **CL** | The self-cleaning function is active (I clean) |
| **CP** | Remote switched off |
| **Ex, Px, Fx** | Fault code (“x” stands for any digit). |

1) Only available as accessory with IP-Gateway.

*Table 7 Symbols in the display*

## 4.2 Safety features

**Compressor three-minute delay at restart**

Compressor functions are delayed for up to 10 seconds upon first starting the unit and for up to 3 minutes upon subsequent restarts.

**Automatic shut-off based on discharge temperature**

If the compressor discharge temperature exceeds a certain level for a period of time, the compressor ceases operation.

**Automatic shutoff based on fan speed**

If the indoor fan speed registers below 200 RPM or over 2100 RPM for an extended period of time, the unit ceases operation. The corresponding error code will be displayed on the indoor unit.

**Inverter module protection**

The inverter module has an automatic shut-off mechanism based on the unit’s current, voltage and temperature. If automatic shut-off is initiated, the corresponding error code will be displayed on the indoor unit and the unit ceases operation.

**Indoor fan delayed operation**

- When the unit starts, the louver is automatically activated and the indoor fan will operate after a period of setting time or the louver is in place.
- If the unit is in heating mode, the indoor fan is regulated by the anti-cold air function.

**Compressor preheating**

The preheating function is automatically activated when the T4 sensor is lower than the setting temperature.

**Sensor redundancy and automatic shut-off**

- If one temperature sensor malfunctions, the unit continues operation and displays the corresponding error code, allowing for emergency use.
- If more than one temperature sensor is malfunctioning, the unit ceases operation.

## 4.3 Operating functions

**Abbreviations**

| Abbreviation | Element |
|---|---|
| T1 | Indoor room temperature |
| T2 | Coil temperature of indoor unit |
| T3 | Coil temperature of outdoor unit |
| T4 | Outdoor ambient temperature |
| $T_S$ | Set temperature |
| TP | Compressor discharge temperature |

*Table 8 Element abbreviations*

### 4.3.1 Automatic mode

In automatic mode, the unit automatically switches between heating, cooling, dehumidification or fan-only mode on the basis of T1,$T_S$ and T4 to maintain the desired temperature.

- This mode can be selected with the remote controller and the temperature can be set between 16...30 °C.
- If the setting temperature is modified, the machine selects a new running function.

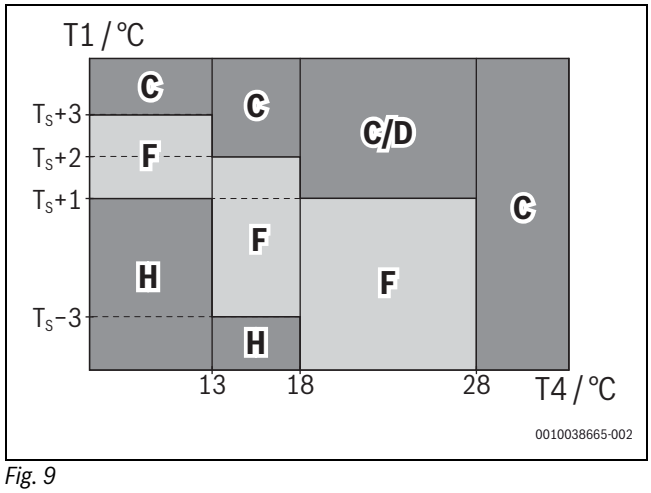



*Fig. 9*

C Cooling mode
D Dehumidification mode if relative humidity is higher than 85%
F Fan mode
H Heating mode
T1 Indoor room temperature
T4 Outdoor ambient temperature
$T_S$ Set temperature

### 4.3.2 Cooling mode

**Compressor Control**

While trying to reach the set temperature:

- When the compressor runs continuously for up to 120 minutes and the following conditions are satisfied, the compressor ceases operation:
  - Calculated frequency ($F_b$) is less than minimum limit frequency ($F_{min}$ = 12 Hz).
  - Compressor runs at $F_{min}$ for more than 10 minutes.
  - T1 ≤ ($T_S$ −2.5 °C).
- When the compressor runs continuously for more than 120 minutes and the following conditions are satisfied, the compressor ceases operation:
  - Calculated frequency ($F_b$) is less than minimum limit frequency ($F_{min}$ = 12 Hz).
  - Compressor runs at $F_{min}$ for more than 10 minutes.
  - T1 ≤ ($T_S$−2 °C).
- If one of the following conditions is satisfied, the measures above will not be considered.
  - Compressor running frequency ($F_r$) > test frequency ($F_T$).
  - Compressor running frequency = test frequency and T4 > 15 °C or T4 error.
  - When you change the set temperature.
  - Turbo or sleep function switched on or off.
  - Various frequency limit shutdowns occurred.

**Indoor Fan Control**

In cooling mode, the indoor fan operates continuously. The fan speed can be set to 1...100 % or to automatic mode. In auto fan mode the following tables apply.

| T1−$T_S$ [ °C] drops below value | Fan Speed decreases to value |
|---|---|
| ≤ 3.5 | 80 % |
| ≤ 1 | 60 % |
| ≤ 0.5 | 40 % |
| ≤ 0 | 20 % |
| ≤ −0.5 | 1 % |

*Table 9 Fan speed in auto fan mode*

| T1−$T_S$ [ °C] rises above value | Fan Speed increases to value |
|---|---|
| > 0 | 20 % |
| > 0.5 | 40 % |
| > 1 | 60 % |
| > 1.5 | 80 % |
| > 4 | 100 % |

*Table 10 Fan speed in auto fan mode*

**Outdoor Fan Control**

- The outdoor unit will run at a different fan speed according to T4 and compressor running frequency.
- The fan speeds are different for different outdoor units.

The temperature cannot be adjusted or displayed in fan mode.

**Condenser Overheating Protection**

When the condenser temperature exceeds a configured value, the compressor ceases operation.

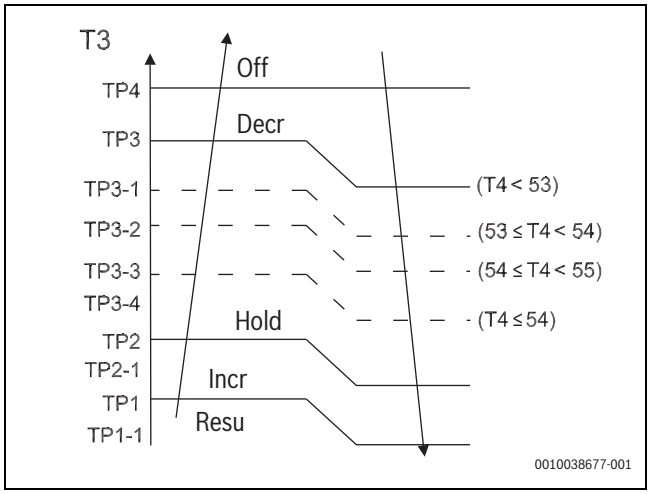



*Fig. 10 Condenser temperature protection*

Off Compressor turns off
Decr Compressor decreases performance
Hold Compressor holds current performance
Incr Compressor increases performance
Resu Compressor resumes without limitation to performance
TP Compressor discharge temperature
T3 Coil temperature of condenser

**Evaporator Low Temperature Protection**

If the coil temperature of the evaporator T2 falls below 4 °C, the compressor decreases the running frequency to the next lower level every 1 minute.

- If T2 decreases further below 0 °C, the compressor turns off.
- If T2 increases above 4 °C, the compressor keeps the current frequency.
- If T2 increases above 7 °C, the compressor resumes without frequency limitation.

### 4.3.3 Heating Mode

**Compressor Control**

While trying to reach the set temperature:

- If the following conditions are satisfied, the compressor ceases operation.
  - Calculated frequency ($F_b$) is less than minimum limit frequency ($F_{min}$ = 12 Hz).
  - Compressor runs at $F_{min}$ more than 10 minutes.
  - $T1 \geq T_S + 2$ °C
- If one of the following conditions is satisfied, the protective time will not be considered.
  - Compressor running frequency ($F_r$) is more than test frequency ($F_T$).
  - When compressor running frequency= test frequency, T4 ≥ 15 °C or T4 error.
  - When you change the set temperature.
  - Turbo or sleep function switched on or off.
- When the current is higher than the predefined safety limit, current protection will be activated and the compressor will stop.

**Indoor Fan Control**

In heating mode, the indoor fan operates continuously. The fan speed can be set between 1...100 %. Anti-cold air function has priority.

**Anti-cold air function:** The indoor fan is controlled by the indoor temperature T1 and the indoor unit coil temperature T2.

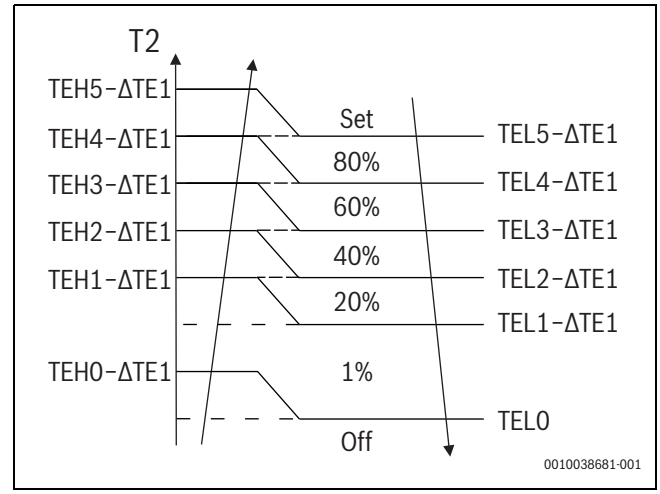



*Fig. 11 Anti-cold air function*

Off Compressor turns off
Set Set fan speed
TEH.. Evaporator coil temperature (rising)
TEL.. Evaporator coil temperature (decreasing)
T2 Indoor unit coil temperature

| T1 [ °C] | ΔTE1 [ °C] |
|---|---|
| ≥ 19 | 0 |
| ≥ 15 and < 19 | 19 – T1 = 0...4 |
| < 15 | 4 |

*Table 11*

In auto fan mode the following tables apply:

| $T1-T_S$ [ °C] drops below value | Fan Speed increases to value |
|---|---|
| ≤ 0.5 | 20 % |
| ≤ 0 | 60 % |
| ≤ −1.5 | 80 % |
| ≤ −3 | 100 % |

*Table 12 Fan speed in auto fan mode*

| $T1-T_S$ [ °C] rises above value | Fan Speed decreases to value |
|---|---|
| > −1.5 | 80 % |
| > 0 | 60 % |
| > 0.5 | 40 % |
| > 1 | 20 % |

*Table 13 Fan speed in auto fan mode*

**Outdoor Fan Control**

- The outdoor unit will be run at different fan speed according to T4 and compressor running frequency.
- The fan speeds are different for different outdoor units.

**Defrosting mode**

- The unit enters defrosting mode according to changes in the temperature value of T3, T4 and the compressor running time.
- In defrosting mode, the compressor continues to run, the indoor and outdoor motor will cease operation and the defrost light of the indoor unit will turn on. In the display, **dF** is displayed.
- In heating mode, if any of the following conditions is satisfied, defrosting ends and the machine switches to normal:
  - T3 rises above 16 °C[1)]
  - T3 stays above 6 °C[1)] for 80 seconds.
  - Unit runs for 15 minutes consecutively in defrosting mode.

1) 4 °C higher for some units

- If T4 is lower than or equal to −22°C and compressor running time is more than 8 hours, defrosting starts. It ends if following conditions are satisfied:
  - Unit runs for 10 minutes consecutively in defrosting mode.
  - T3 rises above 10 °C.

For some models:

- If T3 is lower than −3 °C, compressor running time is more than 120 minutes and if any of the following conditions is satisfied, defrosting starts:
  - T3 is lower than **TCDI1**+4 °C for 3 minutes.

For some models:

- If T3 or T4 is lower than −3 °C for 30 seconds and if any of the following conditions is satisfied, defrosting starts:
  - TS−T1 is lower than 5 °C and compressor running time is more than **90 minutes**.
  - Compressor running time is more than 120 minutes.

**Evaporator Overheating Protection**

If the coil temperature of the evaporator T2 rises above 52 °C, the compressor reacts as follows:

- Between 52 °C and 55,9 °C the compressor holds the current frequency.
- Between 56 °C and 60 °C, the compressor decreases the running frequency to the next lower level every 20 seconds.
- If the frequency is decreased to $F_{min}$ (12 Hz) and T2 is still above 56 °C, the compressor will stop.
- Above 60 °C the compressor turns off.
- Below 52 °C the compressor runs without limitation.

### 4.3.4 Dehumidification mode

If the room temperature is lower than 10 °C, the compressor ceases operations and does not resume until room temperature exceeds 12 °C.

- In drying mode, the unit operates the same as auto fan in cooling mode.
- All protections are activated and operate the same as in cooling mode.
- Low Room Temperature Protection.

### 4.3.5 Forced operation

**Forced cooling mode**

The compressor and outdoor fan continue to run (fixed at rated frequency), and the indoor fan runs at rated speed. After running for 30 minutes, the AC will switch to auto mode with a set temperature of 24 °C.

**Forced auto mode**

Forced auto mode operates the same as normal auto mode with a set temperature of 24 °C.

**Exiting forced operation**

The unit exits forced operation when it receives the following signals:

- ▶ Switch on/Switch off
- ▶ Timer on/Timer off
- ▶ Sleep mode
- ▶ Follow me
- ▶ Mode, fan speed or temperature settings are changed

**Forced defrosting mode**

- ▶ To enter forced defrosting, press the **AUTO/COOL** button for a few seconds when in forced cooling mode.
- ▶ Indoor fan will stop, defrosting lamp will light up.
- ▶ To quit this mode:
  - Quit normal defrosting.
  - Turn off by RC.
  - Press **AUTO/COOL button** again for a few seconds.

### 4.3.6 Timer

Timing range is 24 hours. Both of the following timers can be combined in any order:

- On-Timer on: When set, the unit will turn on automatically when reaching the set time.
- Off-Timer: When set, the unit will turn off automatically when reaching the set time.

Setting the timer will not change the operating mode. In case of a malfunction, timer settings are obsolete.

### 4.3.7 Sleep mode

The sleep function is available in cooling, heating or auto mode.

The operational process for sleep mode is as follows:

- When cooling, the temperature rises 1 °C (to max. 30 °C) every hour. After 2 hours, the temperature stops rising and the indoor fan is fixed at low speed.
- When heating, the temperature decreases 1 °C (to min. 16 °C) every hour. After 2 hours, the temperature stops decreasing and the indoor fan is fixed at low speed. Anti-cold air function takes priority.
- The unit exits this mode after 8 hours.

The timer can be set in this mode.

### 4.3.8 Auto-Restart

The indoor unit has an auto-restart module which allows the unit to restart automatically. The module stores the current settings and, in case of a sudden power failure, will restore those setting automatically within 3 minutes after return of power. If there is a power failure while the unit is running, the compressor starts 3 minutes after the unit restarts. If the unit was off before the power failure, the unit stands by.

### 4.3.9 Self-cleaning (I clean)

The unit has a self-cleaning function for the evaporator. The self-cleaning freezes dust, mould and grease. Everything is then quickly defrosted and dried with hot air. When this function is turned on, the indoor unit display shows **CL**. After 30 minutes, the self cleaning process is complete.

### 4.3.10 Follow Me function

- Once active, the remote control will send a soundless signal every 3 minutes to the unit. and the unit will set the temperature according to the measurements taken by the remote control.
- The unit will only change modes if the information given by the remote controller make it necessary.

The unit's temperature settings are ignored while the follow me function is active. If the unit does not receive a signal for 7 minutes, the function turns off automatically. The unit will then regulate temperature based on its own sensor and settings again.

### 4.3.11 Frost protection

In heating mode, the temperature can be set to as low as 8 °C, preventing the indoor area from freezing if unoccupied during severe cold weather.

### 4.3.12 Noise reduction

While this function is active, the indoor unit will run at only 1 % fan speed (faint breeze) to reduce noise to the lowest possible level.

#### 4.3.13 Energy saving functions

- The following energy saving functions can be selected at the unit:
  - **ECO**[1]: operation with fan speed **AUTO** and set temperature of at least 24 °C
  - **GEAR** (75%): reduce power consumption by 25 %
  - **GEAR** (50%): reduce power consumption by 50 %
  - None of the above symbols: normal operation
- When the energy saving function is in conflict with other modes or when the set temperature is adjusted to less than 24 °C, the function will turn off.
- After 8 hours after temperature sensor malfunction, the energy saving function turns off automatically.
- Fan speed and temperature can still be set on the remote controller.

#### 4.3.14 Indirect airflow function

This feature avoids direct airflow blowing on the body and makes you feel indulging in silky coolness.

The indirect airflow function is available under cooling mode, fan-only mode and drying mode.

#### 4.3.15 Wireless control function

The purpose of this function is to establish a connection via WLAN. If the unit is not displaying the function, the **LED** key must be pressed quickly seven times in succession instead.

To connect to WLAN an IP-Gateway (accessory) must be installed.

1) Only in cooling mode

## 5 Refrigerant

### 5.1 Recharge Refrigerant

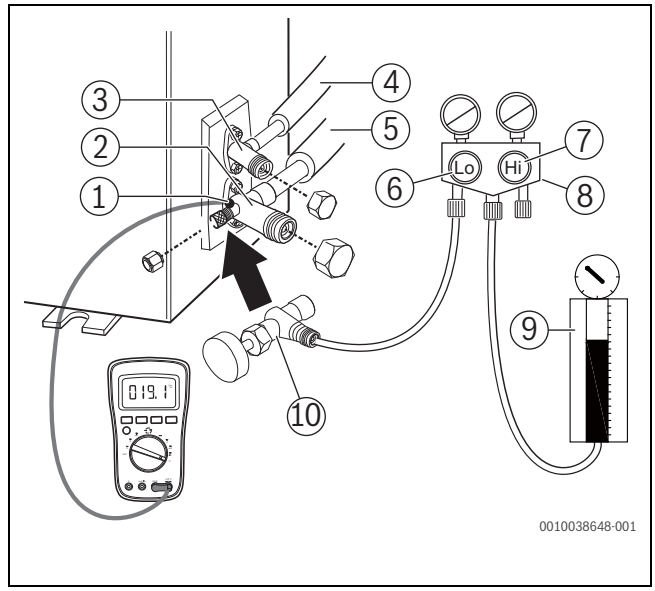



*Fig. 12 Refrigerant recharge*

[1] Temperature measuring point
[2] Gas valve
[3] Liquid valve
[4] Liquid pipe
[5] Gas pipe
[6] Low pressure control
[7] High pressure control
[8] Pressure gauge
[9] Refrigerant bottle
[10] Schrader valve opener

- ▶ Close the gas and the liquid valves.
- ▶ Connect the charge hose between pressure gauge and service port of the gas valve.
- ▶ Connect another charge hose between pressure gauge and valve on the refrigerant bottle.
- ▶ If necessary, invert the refrigerant bottle to ensure a complete liquid charge.
- ▶ Vacuum the set of gauges and charging hoses.
- ▶ Place the refrigerant bottle onto an electronic scale and record the starting weight.
- ▶ Fully open Schrader opening valve, gas valve and liquid valve.
- ▶ Operate the air conditioner in cooling mode to charge the system with liquid refrigerant.
- ▶ Slowly open the refrigerant bottle valve to charge the required amount of refrigerant.
- ▶ When the electronic scale displays the correct weight, close the refrigerant bottle valve and turn off the air conditioner.
- ▶ Unscrew and close the Schrader opening valve.
- ▶ Pump down and collect the refrigerant from the hoses into the system.
- ▶ Mount the caps of service port, gas and liquid valve.
- ▶ Use a torque wrench to tighten the caps to a torque of 18 Nm.
- ▶ Check for gas leakage.

## 5.2 Evacuate Refrigerant for Re-Installation

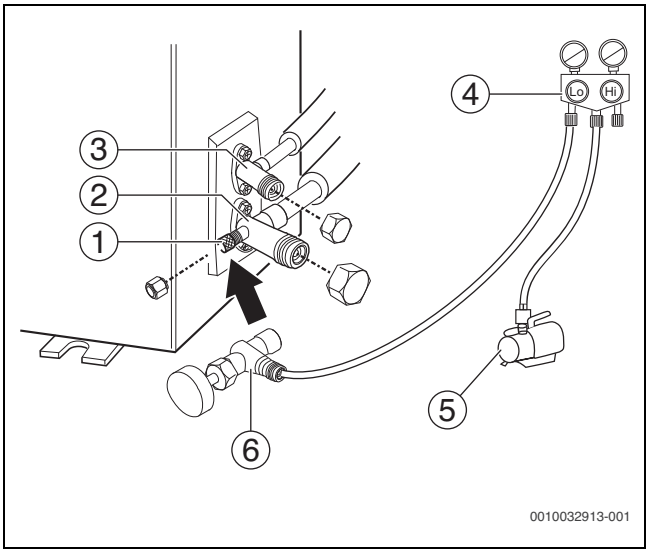



*Fig. 13*

[1] Schrader valve opener connection point (service port)
[2] Gas valve
[3] Liquid valve
[4] Pressure gauge
[5] Vacuum pump
[6] Schrader valve opener

### 5.2.1 Indoor Unit

**Collecting the refrigerant in the outdoor unit**

- ▶ Confirm that the liquid and gas valves are opened.
- ▶ Connect the charge hose between pressure gauge and service port of the gas valve.
- ▶ Connect another charge hose between pressure gauge and vacuum pump.
- ▶ Vacuum the set of gauges and charging hoses.
- ▶ Close the liquid valve.
- ▶ Operate the air conditioner in cooling mode. Cease operations when the gauge reaches 0.1 MPa. Close the gas valve so that the gauge rests between 0.3 MPa and 0.5 MPa.
- ▶ Disconnect the charge set and mount the caps of service port, liquid valve and gas valve.
- ▶ Use a torque wrench to tighten the caps to a torque of 18 Nm.
- ▶ Check for gas leakage.

**Air purging with vacuum pump**

- ▶ Tighten the flare nuts of the indoor and outdoor units, and confirm that liquid and gas valves are closed.
- ▶ Connect the charge hose between pressure gauge and service port of the gas valve.
- ▶ Connect another charge hose between pressure gauge and vacuum pump.
- ▶ Fully open the manifold valve.
- ▶ Using the vacuum pump, evacuate the system for at least 30 minutes.
- ▶ Check whether the compound meter indicates -0.1 MPa (approx. 500 microns).
  - – If the meter does not indicate above pressure after 30 minutes, continue evacuating for an additional 20 minutes.
  - – If the pressure does not achieve above pressure after 50 minutes, check for leakage.
  - – If the pressure successfully reaches above pressure, fully close the manifold valve, then cease vacuum pump operations.
- ▶ Wait for 5 minutes then check whether the gauge needle moves after turning off the vacuum pump. If the gauge needle moves backward, check wether there is gas leakage.
- ▶ Loosen the flare nut of the lower valve for 6 or 7 seconds and then tighten the flare nut again.
- ▶ Confirm the pressure display in the pressure indicator is slightly higher than the atmospheric pressure.
- ▶ Remove the charge hose from the gas valve.
- ▶ Fully open the liquid and gas valves and tighten their caps.

### 5.2.2 Outdoor Unit

**Evacuation for the whole system**

- ▶ Confirm that the liquid and gas valves are opened.
- ▶ Connect the vacuum pump to the gas valve's service port.
- ▶ Evacuate the system for approximately one hour. Confirm that the compound meter indicates -0.1 MPa (approx. 500 microns).
- ▶ Close the manifold valve on the charge set and turn off the vacuum pump.
- ▶ Wait for 5 minutes then check whether the gauge needle moves after turning off the vacuum pump.
- ▶ If the gauge needle moves backward, check whether there is gas leakage.
- ▶ Disconnect the charge hose from the vacuum pump.
- ▶ Mount the caps of service port, liquid valve and gas valve.
- ▶ Use a torque wrench to tighten the caps to a torque of 18 Nm.

**Refrigerant charging**

- ▶ Charge the refrigerant according to page 19.

## 5.3 Pressure on service port for refrigerant R32

### 5.3.1 Cooling chart

| Unit for pressure | DB/WB $T_{IDU}$ [°C] | DB $T_{ODU}$ [°C] | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | -17 | -15 | -9.44 | 7.22 | 23.89 | 29.44 | 35 | 40.56 | 46.11 | 48.89 |
| | | Pressure on service port | | | | | | | | | |
| bar | 21.11/15 | 6.5 | 6.6 | 7.4 | 8.2 | 8.4 | 8.0 | 8.3 | 8.8 | 10.3 | 10.8 |
| | 23.89/17.22 | 6.8 | 6.9 | 8.1 | 8.8 | 8.8 | 8.5 | 8.9 | 9.3 | 10.9 | 11.4 |
| | 26.67/19.44 | 7.2 | 7.3 | 8.7 | 9.7 | 9.5 | 9.1 | 9.3 | 9.8 | 11.4 | 12.1 |
| | 32.22/22.78 | 7.9 | 8.0 | 9.8 | 10.7 | 10.5 | 9.7 | 10.2 | 10.8 | 12.6 | 13.3 |
| MPa | 21.11/15 | 0.65 | 0.66 | 0.74 | 0.82 | 0.84 | 0.80 | 0.83 | 0.88 | 1.03 | 1.08 |
| | 23.89/17.22 | 0.68 | 0.69 | 0.81 | 0.88 | 0.88 | 0.85 | 0.89 | 0.93 | 1.09 | 1.14 |
| | 26.67/19.44 | 0.72 | 0.73 | 0.87 | 0.97 | 0.95 | 0.91 | 0.93 | 0.98 | 1.14 | 1.21 |
| | 32.22/22.78 | 0.79 | 0.80 | 0.98 | 1.07 | 1.05 | 0.97 | 1.02 | 1.08 | 1.26 | 1.33 |

*Table 14 Pressure on service port in cooling mode*

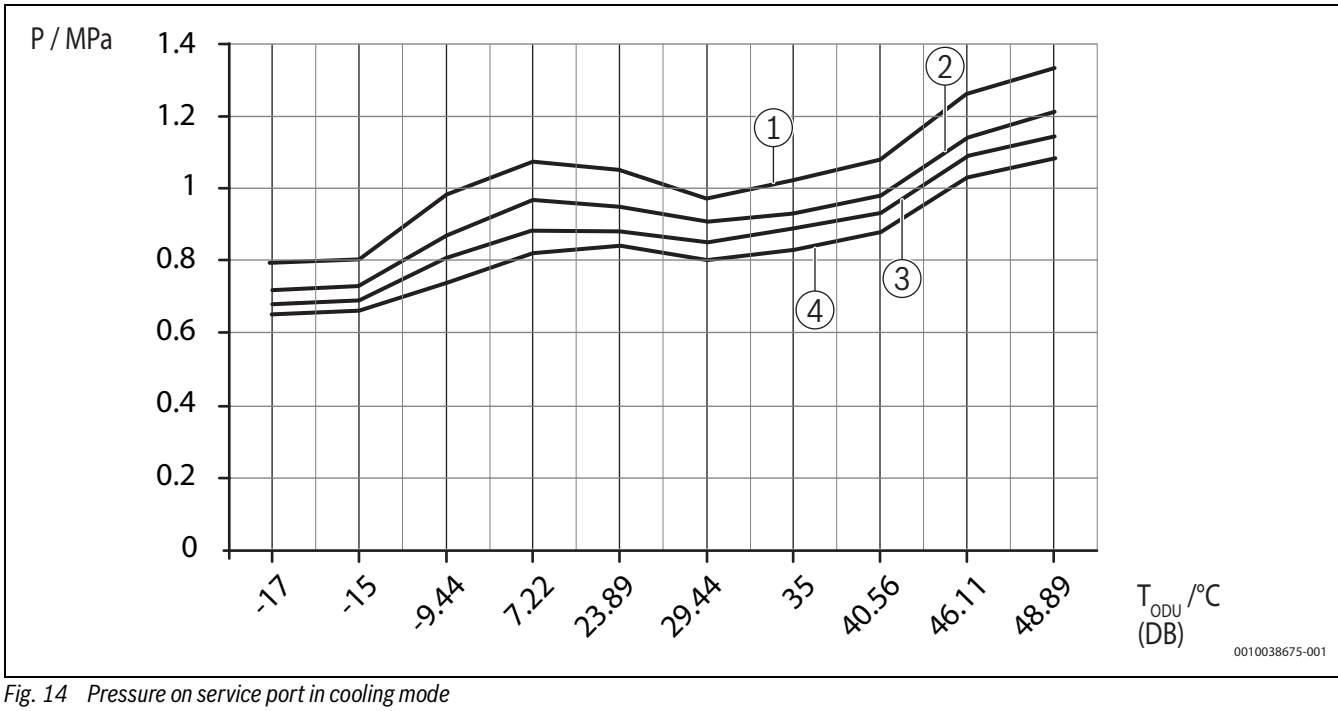



*Fig. 14 Pressure on service port in cooling mode*

**DB/WB $T_{IDU}$ [°C]:**

[1] 32.22/22.78
[2] 26.67/19.44
[3] 23.89/17.22
[4] 21.11/15

DB Dry bulb temperature
P Pressure on service port
$T_{IDU}$ Temperature at indoor unit
$T_{ODU}$ Temperature at outdoor unit
WB Wet bulb temperature

### 5.3.2 Heating chart

| Unit for pressure | DB $T_{IDU}$ °C | DB/WB $T_{ODU}$ °C | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 13.89/11.67 | 8.33/6.11 | 2.78/0.56 | -2.78/-5 | -8.33/-10.56 | -17/-19 | -27/-28 |
| | | Pressure on service port | | | | | | |
| bar | 12.78 | 30.9 | 29.1 | 25.8 | 23.3 | 21.2 | 18.9 | 16.8 |
| | 18.33 | 33.2 | 30.6 | 27.1 | 25.9 | 23.8 | 20.9 | 19.4 |
| | 23.89 | 34.5 | 32.1 | 28.4 | 26.8 | 25.4 | 21.9 | 20.4 |
| MPa | 12.78 | 3.09 | 2.91 | 2.58 | 2.33 | 2.12 | 1.89 | 1.68 |
| | 18.33 | 3.32 | 3.06 | 2.71 | 2.59 | 2.38 | 2.09 | 1.94 |
| | 23.89 | 3.45 | 3.21 | 2.84 | 2.68 | 2.54 | 2.19 | 2.04 |

*Table 15 Pressure on service port in heating mode*

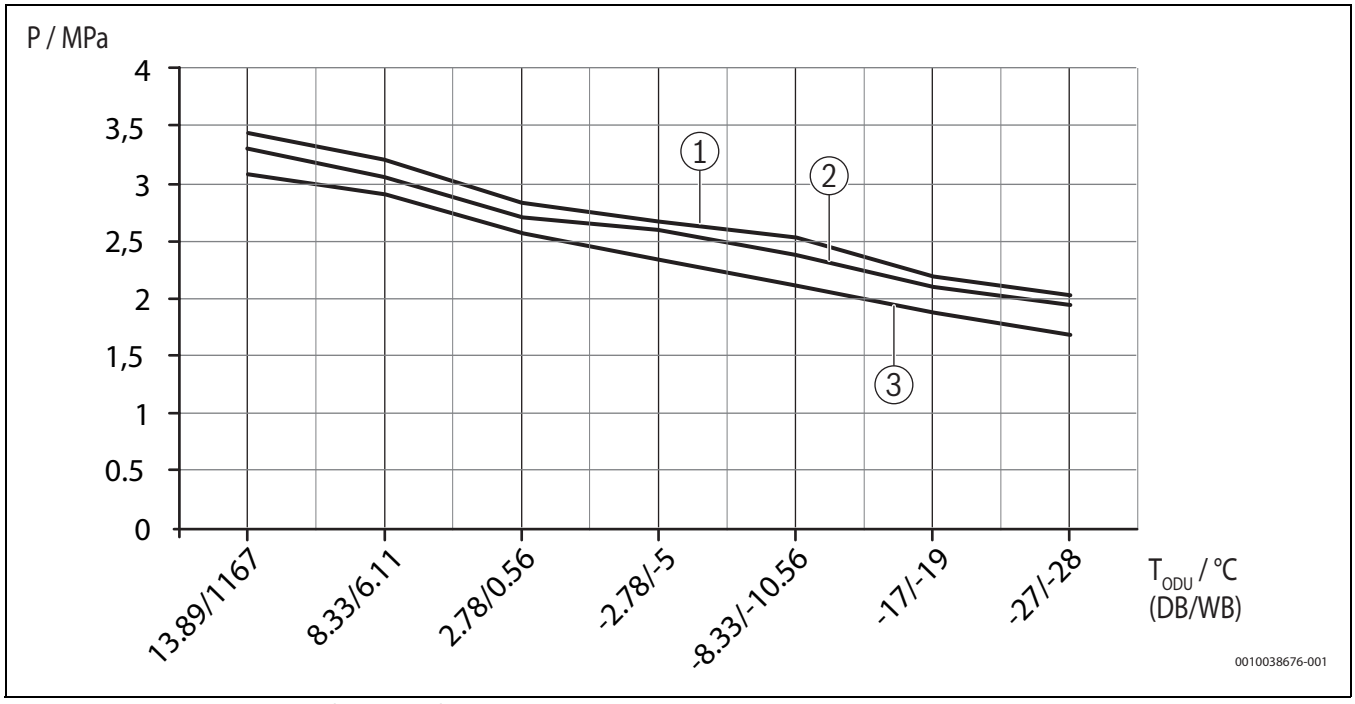



*Fig. 15 Pressure on service port in heating mode*

**DB $T_{IDU}$ [°C]:**

[1] 23.89
[2] 18.33
[3] 12.78

DB Dry bulb temperature
P Pressure on service port
$T_{IDU}$ Temperature at indoor unit
$T_{ODU}$ Temperature at outdoor unit
WB Wet bulb temperature

### 5.3.3 System pressure table

| Pressure | | Temperature |
|---|---|---|
| kPa | bar | °C |
| 100 | 1 | -51.909 |
| 150 | 1.5 | -43.635 |
| 200 | 2 | -37.323 |
| 250 | 2.5 | -32.15 |
| 300 | 3 | -27.731 |
| 350 | 3.5 | -23.85 |
| 400 | 4 | -20.378 |
| 450 | 4.5 | -17.225 |
| 500 | 5 | -14.331 |
| 550 | 5.5 | -11.65 |
| 600 | 6 | -9.150 |
| 650 | 6.5 | -6.805 |
| 700 | 7 | -4.593 |
| 750 | 7.5 | -2.498 |
| 800 | 8 | -0.506 |
| 850 | 8.5 | 1.393 |
| 900 | 9 | 3.209 |
| 950 | 9.5 | 4.951 |
| 1000 | 10 | 6.624 |
| 1050 | 10.5 | 8.235 |
| 1100 | 11 | 9.790 |
| 1150 | 11.5 | 11.291 |
| 1200 | 12 | 12.745 |
| 1250 | 12.5 | 14.153 |
| 1300 | 13 | 15.52 |
| 1350 | 13.5 | 16.847 |
| 1400 | 14 | 18.138 |
| 1450 | 14.5 | 19.395 |
| 1500 | 15 | 20.619 |
| 1550 | 15.5 | 21.813 |
| 1600 | 16 | 22.978 |
| 1650 | 16.5 | 24.116 |
| 1700 | 17 | 25.229 |
| 1750 | 17.5 | 26.317 |
| 1800 | 18 | 27.382 |
| 1850 | 18.5 | 28.425 |
| 1900 | 19 | 29.447 |
| 1950 | 19.5 | 30.448 |
| 2000 | 20 | 31.431 |
| 2050 | 20.5 | 32.395 |
| 2100 | 21 | 33.341 |
| 2150 | 21.5 | 34.271 |
| 2200 | 22 | 35.184 |
| 2250 | 22.5 | 36.082 |
| 2300 | 23 | 36.965 |
| 2350 | 23.5 | 37.834 |
| 2400 | 24 | 38.688 |
| 2450 | 24.5 | 39.529 |
| 2500 | 25 | 40.358 |
| 2550 | 25.5 | 41.173 |
| 2600 | 26 | 41.977 |
| 2650 | 26.5 | 42.769 |
| 2700 | 27 | 43.55 |
| 2750 | 27.5 | 44.32 |
| 2800 | 28 | 45.079 |
| 2850 | 28.5 | 45.828 |
| 2900 | 29 | 46.567 |
| 2950 | 29.5 | 47.296 |
| 3000 | 30 | 48.015 |
| 3050 | 30.5 | 48.726 |
| 3100 | 31 | 49.428 |
| 3150 | 31.5 | 50.121 |
| 3200 | 32 | 50.806 |
| 3250 | 32.5 | 51.482 |
| 3300 | 33 | 52.15 |
| 3350 | 33.5 | 52.811 |
| 3400 | 34 | 53.464 |
| 3450 | 34.5 | 54.11 |
| 3500 | 35 | 54.748 |

*Table 16 System pressure table*

# 6 Indoor Unit Disassembly

Figures are for reference only. Actual unit's appearance may vary.

## 6.1 Front Panel

- Put your hands at the 2 sides of filter, pull the filter gently along the vertical direction, and then remove it.

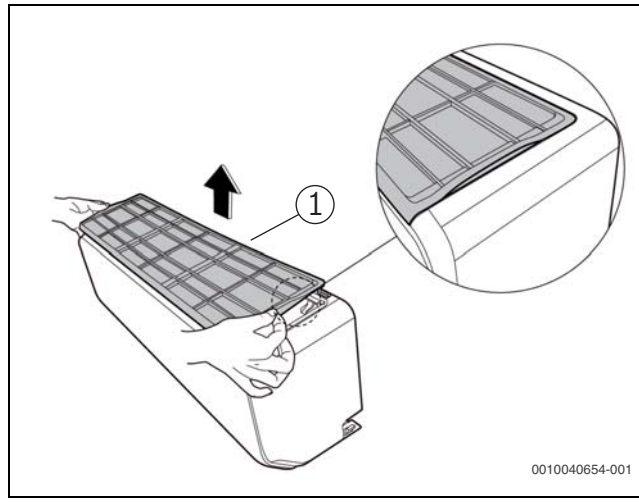



*Fig. 16*

[1] Filter

- Open the horizontal louver and push the locker towards right to open it.

▶ Bend the horizontal louver lightly to loosen the hooks [3], then remove the horizontal louver.

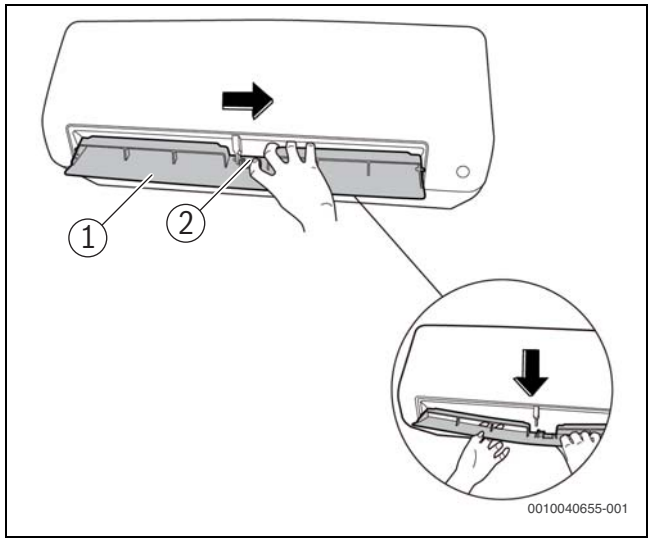



*Fig. 17*

[1] Horizontal louver
[2] Locker

▶ Open the panel assembly, move the mandril to fix the panel.

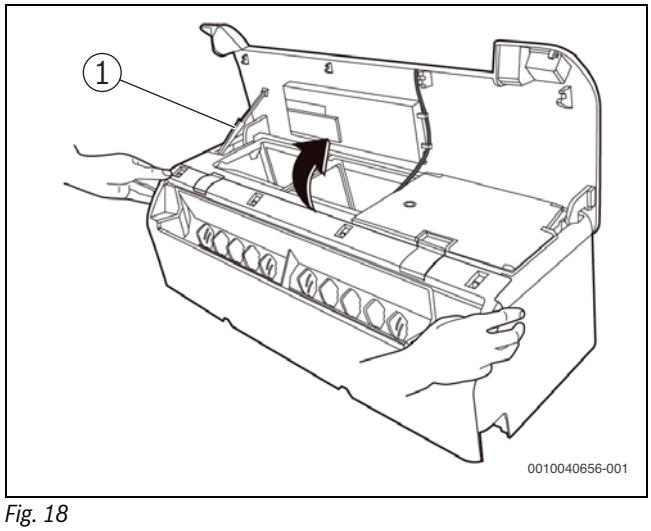



*Fig. 18*

[1] Mandril

▶ Open two stop blocks of panel frame assembly.

▶ Remove 1 fixing screw in the panel frame.

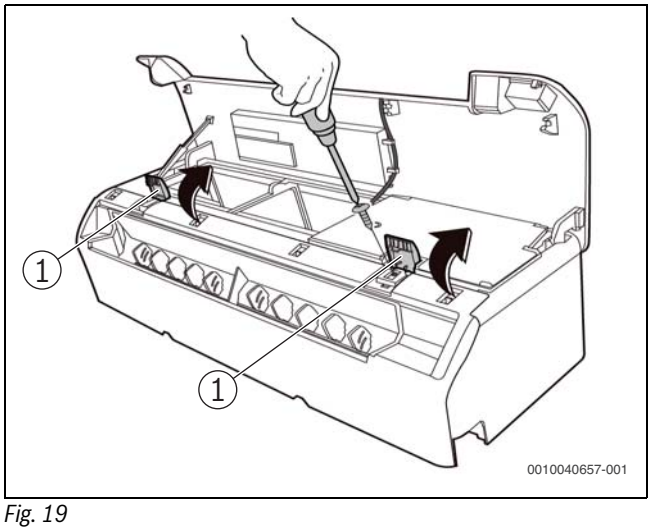



*Fig. 19*

[1] Stop blocks

▶ Pull two sides of the bottom panel along the direction indicated in right image to remove it.

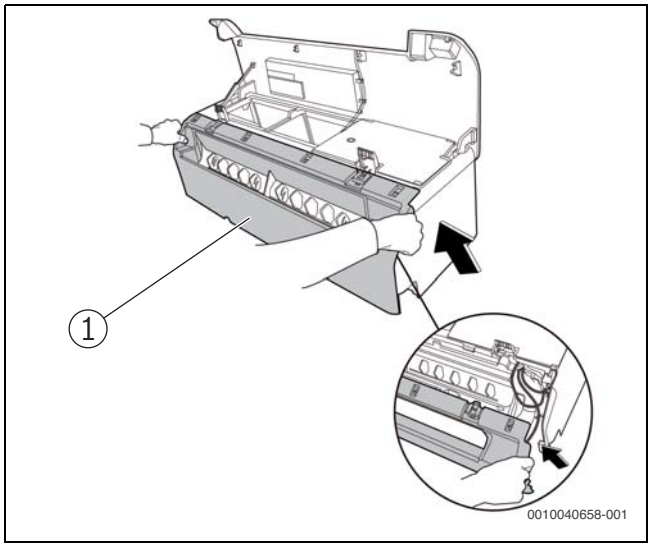



*Fig. 20*

[1] Bottom panel

▶ Pull the mandril to remove it and remove the panel.

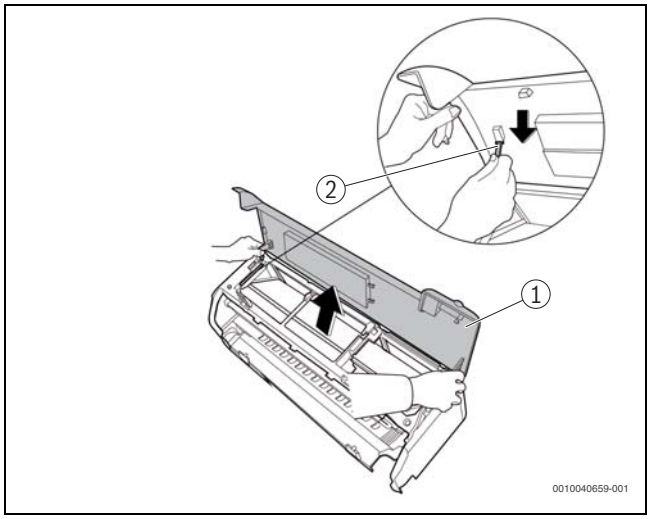



*Fig. 21*

[1] Panel
[2] Mandril

***NOTICE***

**Damage to the unit**

If you want to close the panel, you must first bend the middle of mandril, otherwise it will break.

▶ Models with 9 to 18 kBTU/h: Locate and bend the mandril located on the left.
▶ Models with 24 kBTU/h: Locate and bend the mandril located in the middle.

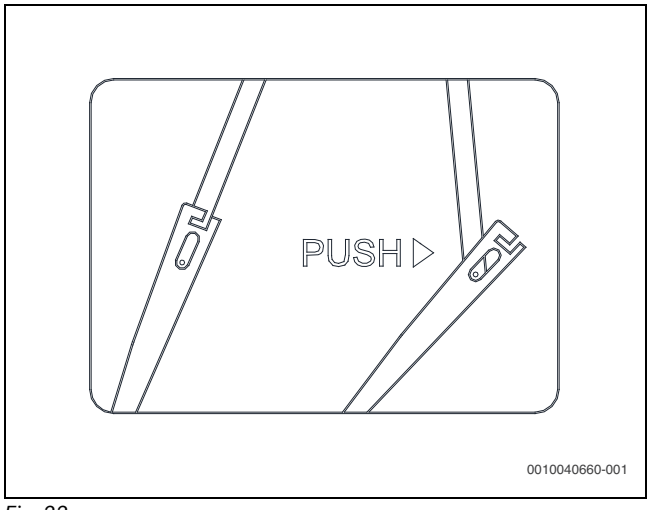



*Fig. 22*

▶ Remove 1 screw of the display board.
▶ Rotate the display board subassembly in the direction shown in picture 8.

▶ Pull the four clips to remove the display board.

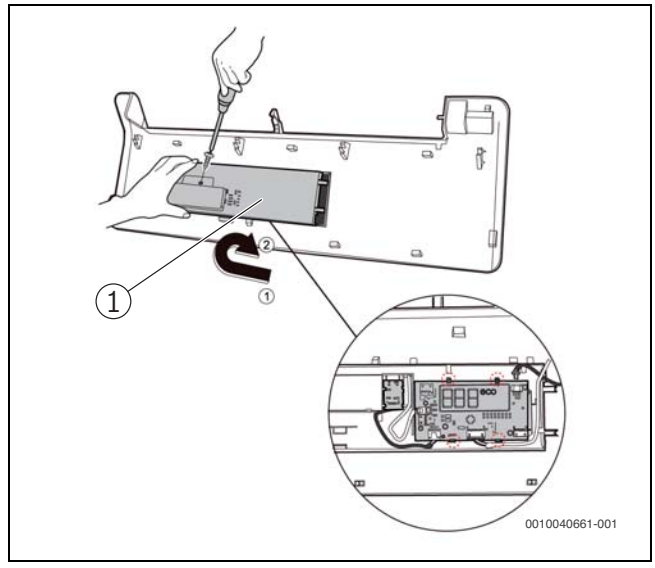



*Fig. 23*

[1] Display board

## 6.2 Electrical parts

Remove the front panel (→ chapter 6.1, p. 23) before disassembling electrical parts.

### 6.2.1 Main control board assembly

▶ Pull the two lifts of the cover of electronic control box with thumbs and then open it.
▶ Raise the mandril [2] to fix the cover[1].

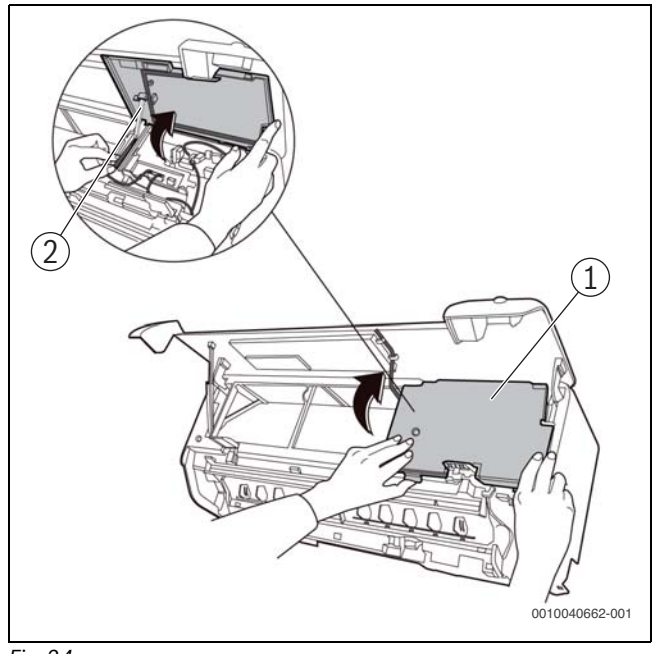



*Fig. 24*

[1] Cover of the electronic control box
[2] Mandril

▶ Pull the electrical control box holder to remove it.

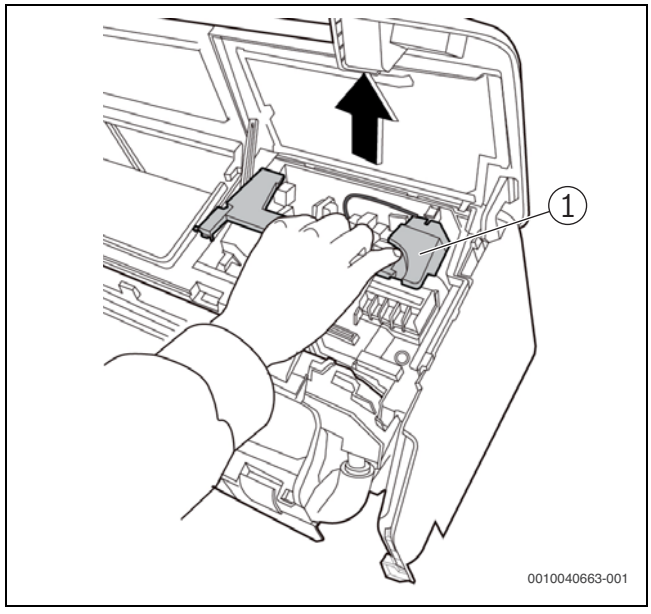



*Fig. 25*

[1] Electrical control box holder

▶ Disconnect the wires.

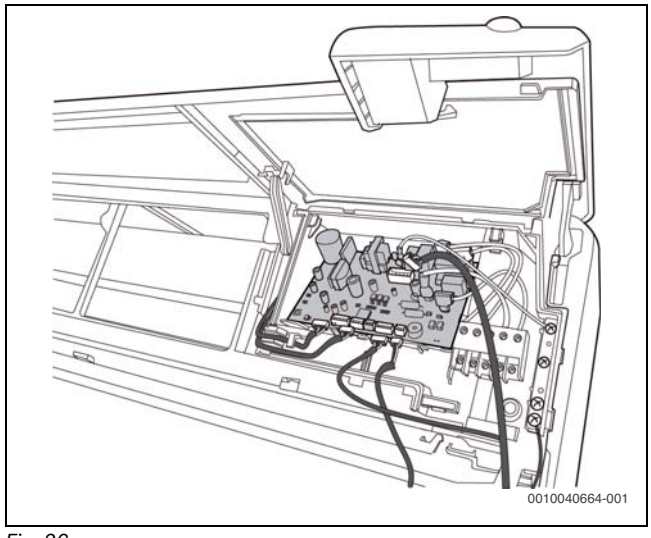



*Fig. 26*

▶ Remove one screw used for the ground connection.

▶ Pull two clips of the electronic control box along the direction shown in the picture below to remove the main control board.

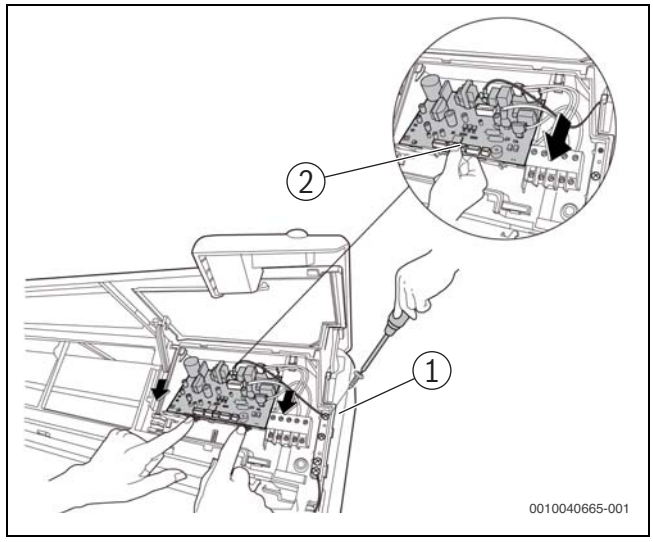



*Fig. 27*

[1] Ground Screw
[2] Clips of the electronic control box

### 6.2.2 Electrical control box subassembly

▶ Remove the other screw used for the ground connection.

▶ Collapse the mandril.

▶ Pull the cover of electronic control box along the direction indicated in right image to remove it.

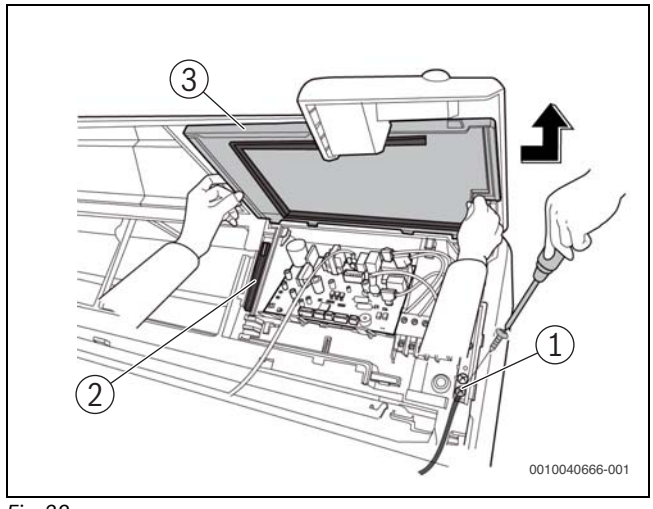



*Fig. 28*

[1] Ground Screw
[2] Mandril
[3] Electronic control box

▶ Remove one fixing screw then pull out the electronic control box subassembly.

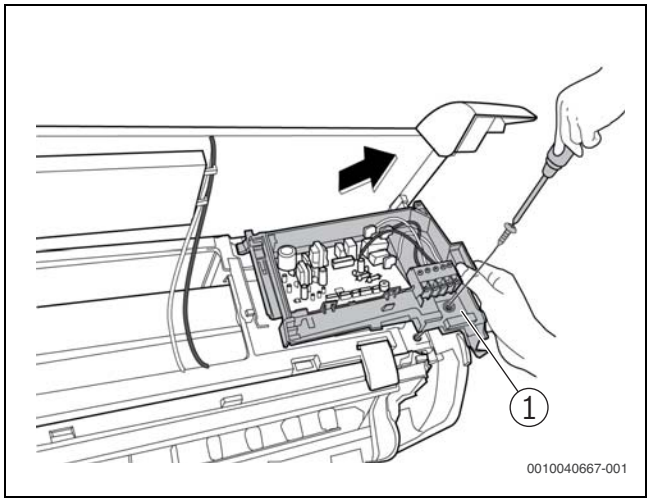



*Fig. 29*

[1] Electronic control box

## 6.3 Fan motor and fan

Remove the front panel (→ chapter 6.1, p. 23) before disassembling fan motor and fan.

▶ Open two fixing clips of chassis assembly and disconnect drain hose connection (→ chapter 6.5, p. 29).
▶ Remove chassis assembly along the direction shown.

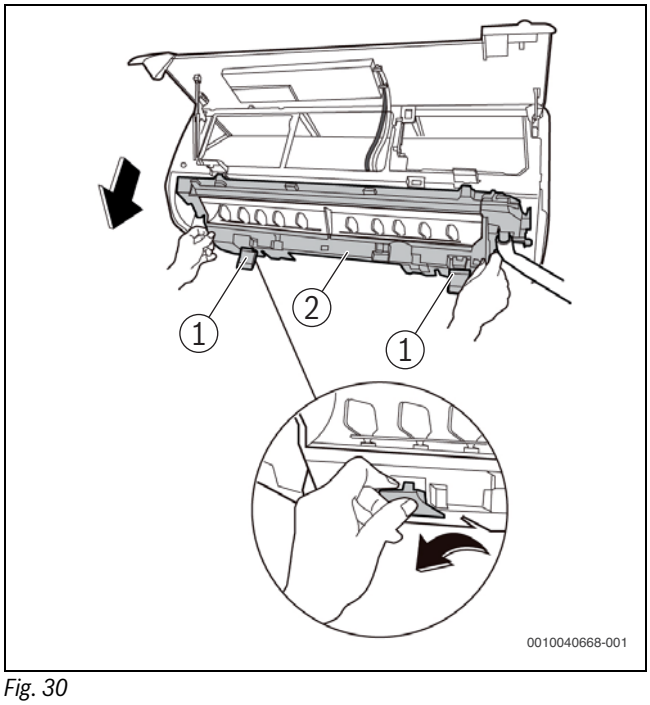



*Fig. 30*

[1] Fixing clips
[2] Chassis

▶ Remove the two screws and remove both fixing boards of the fan motor.

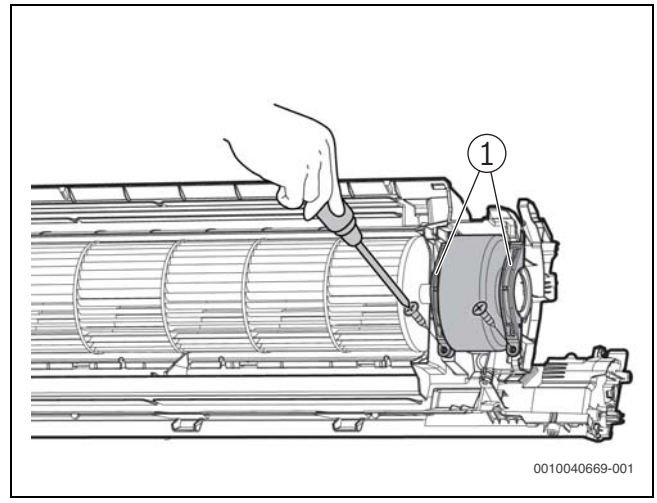



*Fig. 31*

[1] Fixing board

▶ Remove the bearing sleeve.

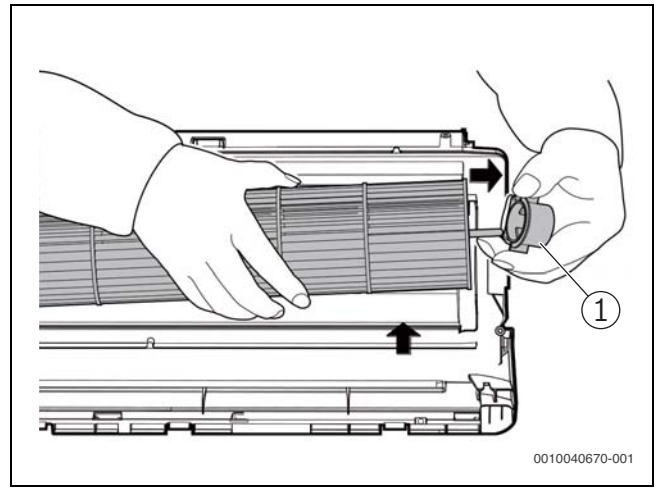



*Fig. 32*

[1] Bearing sleeve

▶ Remove the fixing screw.
▶ Pull out the fan motor and fan assembly from the side.

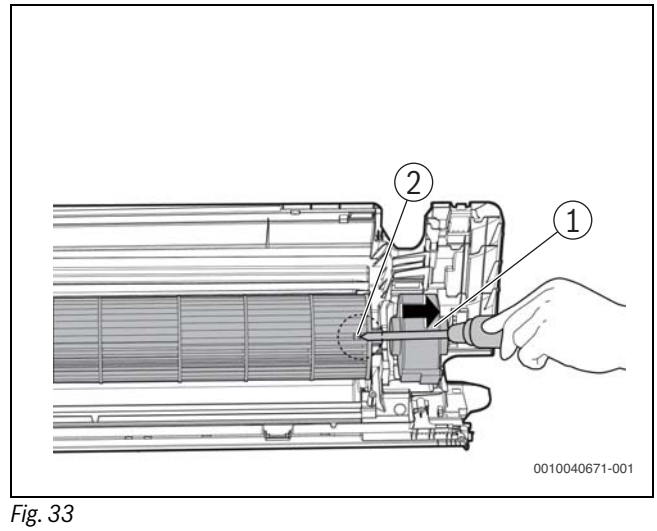



*Fig. 33*

[1] Fan motor
[2] Fixing screw

## 6.4 Step motors

Remove the front panel and chassis assembly (→ chapter 6.1, p. 23 and→chapter 6.3, p. 27)before disassembling step motor.

▶ Remove one screw to remove cover of louver motor.

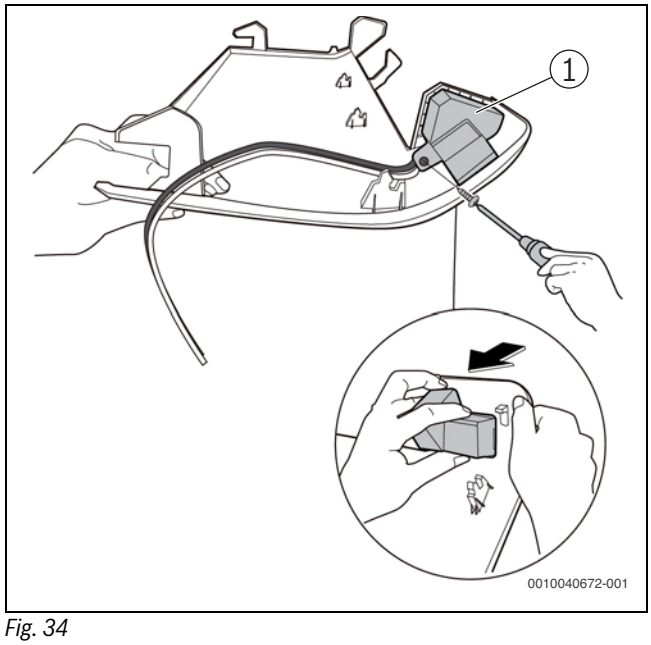



*Fig. 34*

[1] Cover of louver motor

▶ Open the cover of louver motor, pull out intelligent eye subassembly.

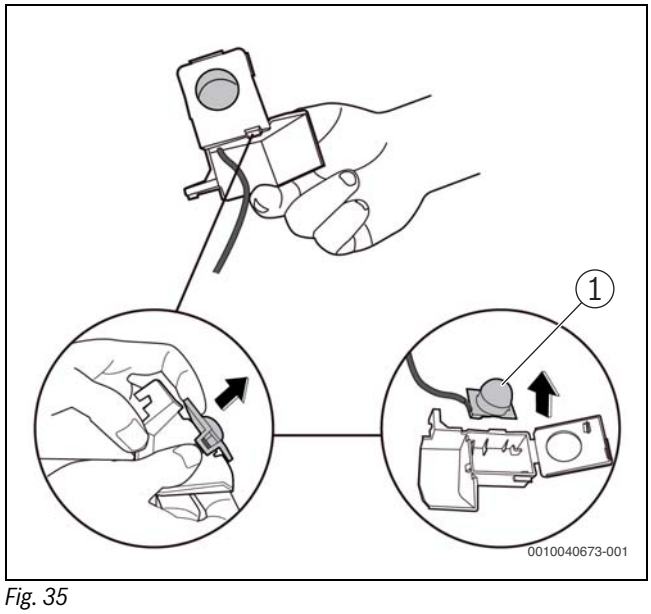



*Fig. 35*

[1] Intelligent eye

▶ Remove the two screws, then remove the vertical swing motor.

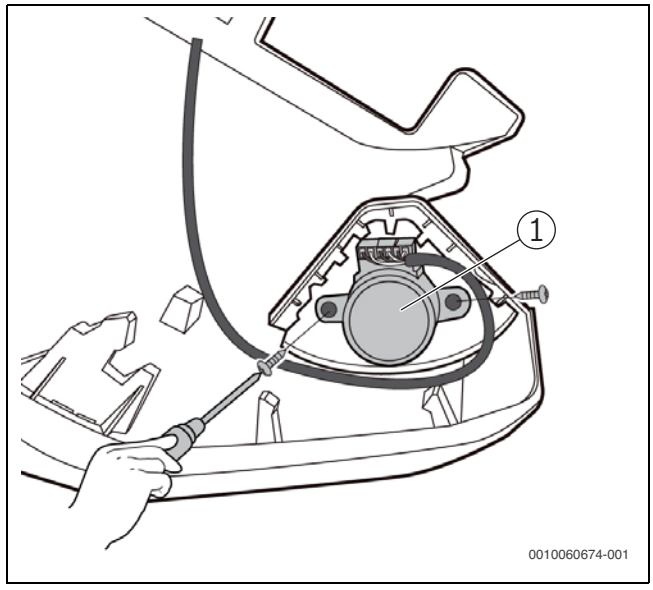



*Fig. 36*

[1] Swing motor

The vertical swing motor is located in panel assembly.

▶ Remove 2 screws, then remove the horizontal swing motor
▶ Remove 1 screw, then remove the ionizer generator.

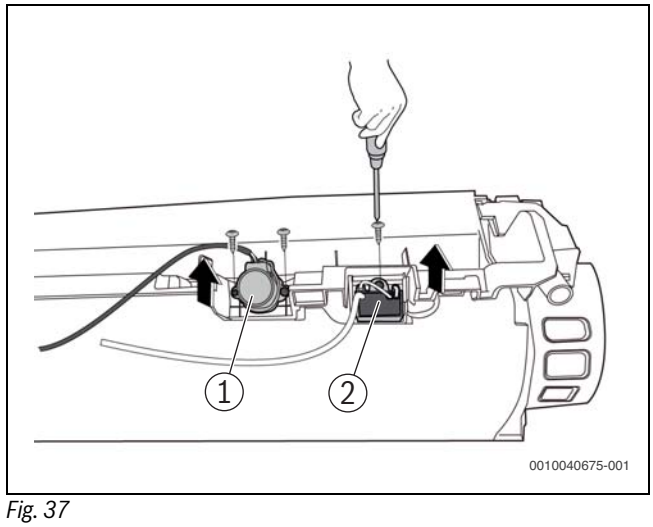



*Fig. 37*

[1] Horizontal swing motor
[2] Ionizer generator

The horizontal swing motor and ionizer generator are located in chassis assembly.

## 6.5 Drain Hose

- ▶ Rotate the fixed wire clockwise indicated in right image.
- ▶ Pull up the drain hose to remove it.

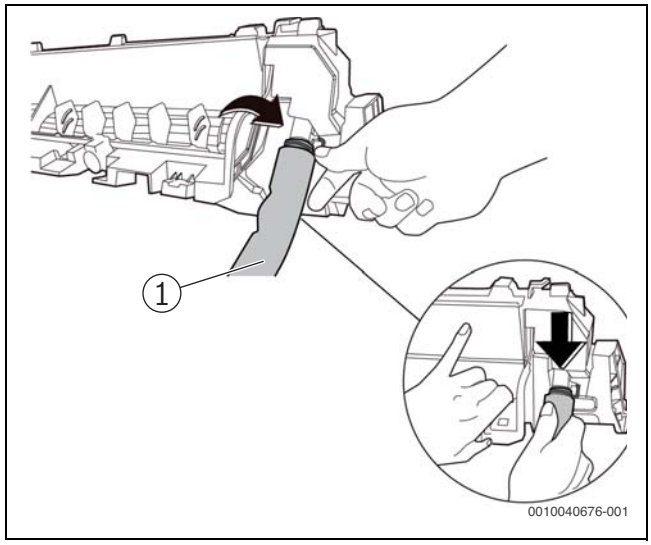



*Fig. 38*

[1] Drain hose

## 6.6 Evaporator

Remove the front panel, electrical parts and fan (→ chapter 6.1, p. to →chapter 6.3, p. 27) before disassembling evaporator.

- ▶ Remove the 2 screws then remove the panel frame assembly.

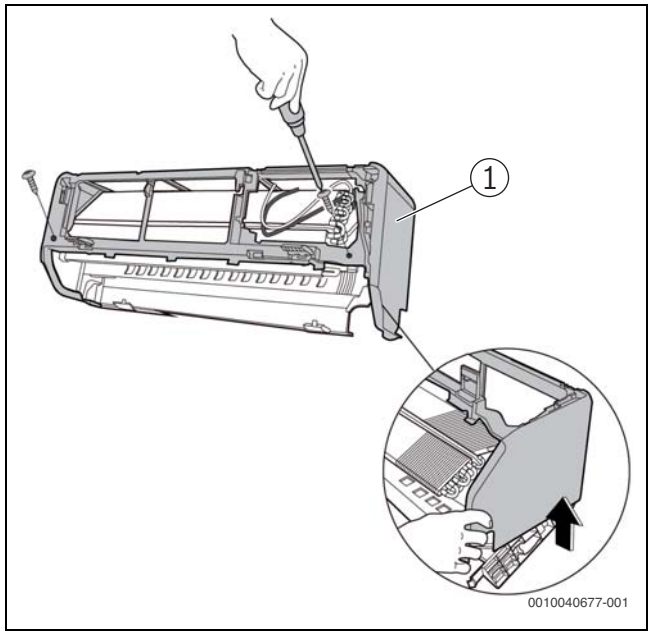



*Fig. 39*

[1] Panel frame

- ▶ Disassemble the pipe clamp board.

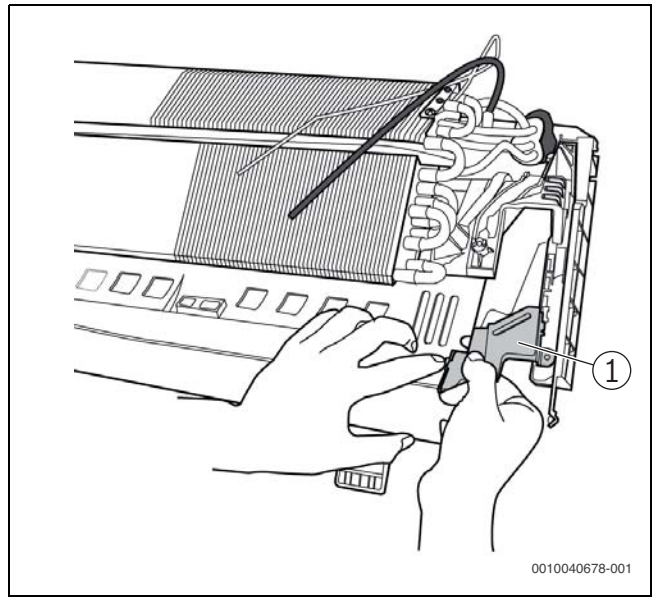



*Fig. 40*

[1] Pipe clamp board

- ▶ Remove the 1 screw on the evaporator located at the left fixed plate.
- ▶ Remove the 1 screw on the evaporator located on the right side.

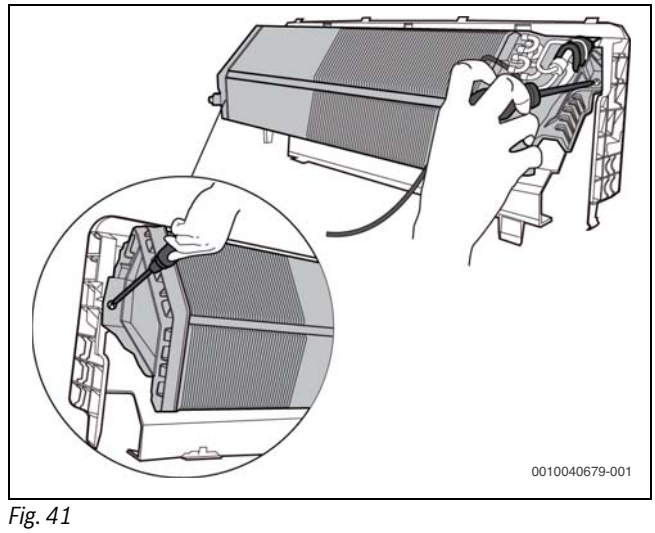



*Fig. 41*

▶ Bend the piping carefully, separate the chassis assembly and the evaporator then take the evaporator out.

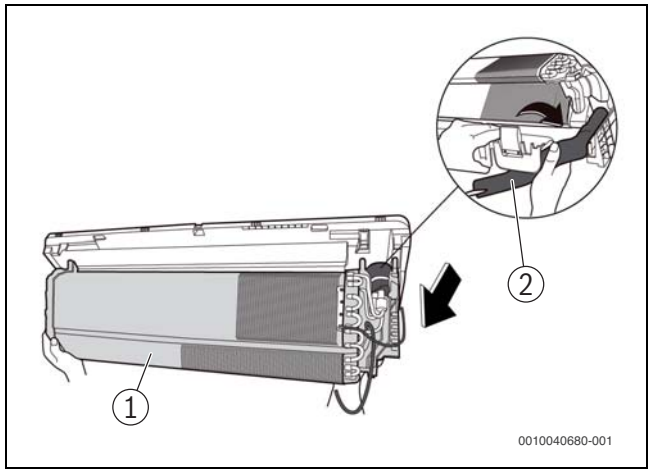



*Fig. 42*

[1] Evaporator
[2] Chassis

## 7 Outdoor Unit Disassembly

Figures are for reference only. Actual unit's appearance may vary.

### 7.1 Panel Plate

#### 7.1.1 CL6102i 25 HE , CL6102i 35 HE

▶ Turn off the air conditioner and the power breaker.
▶ Remove the screw of the big handle and then remove the big handle (1 screw).

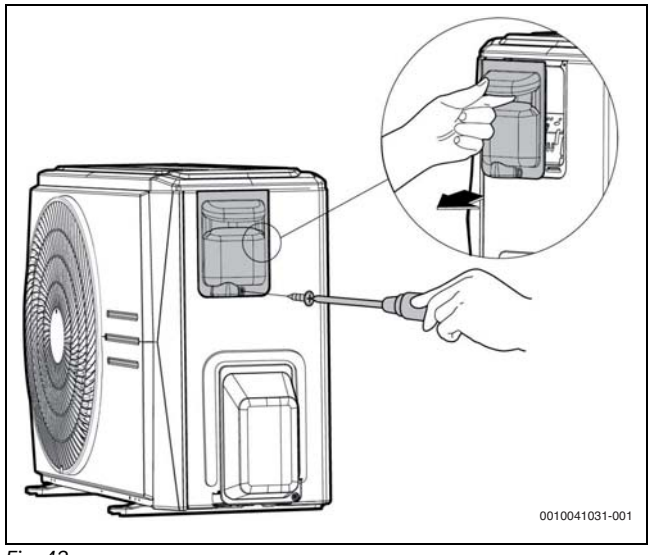



*Fig. 43*

▶ Remove the screws of the top cover [1] and then remove the top cover (4 screws). One of the screws is located underneath the big handle.

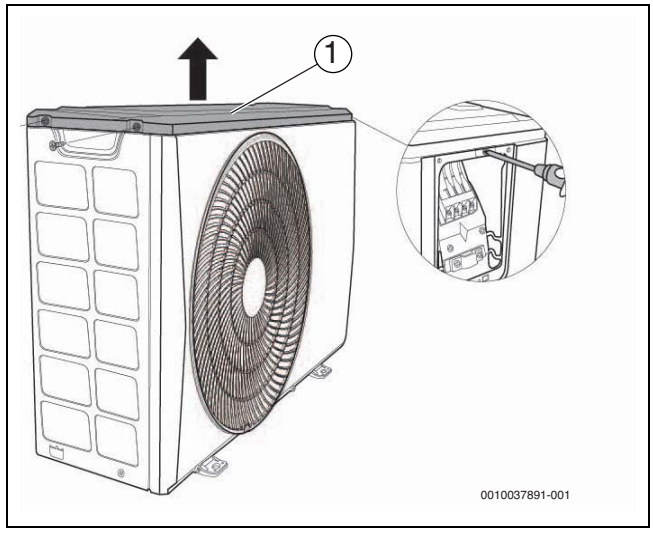



*Fig. 44*

[1] Top Cover

▶ Remove the screws of dust cover [1] and then remove the dust cover (2 screws).

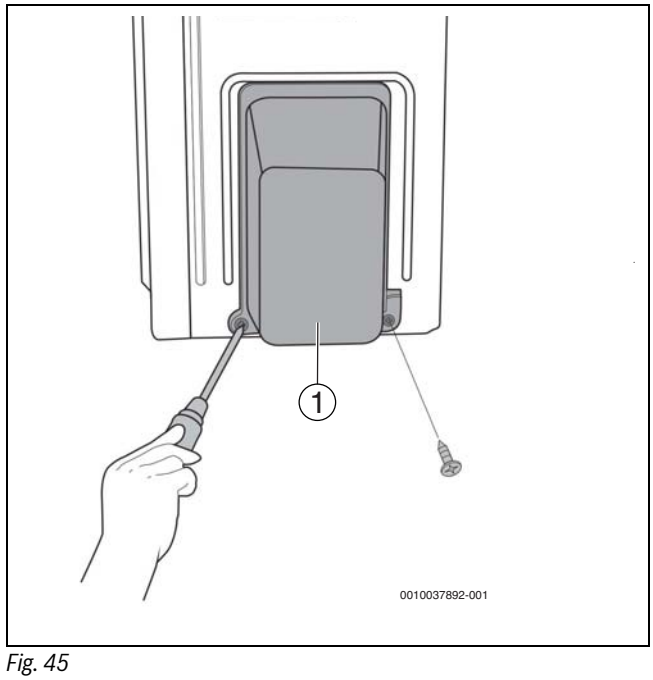



*Fig. 45*

[1] Dust Cover

▶ Remove the screws of the front panel [1] and then remove the front panel (9 screws).

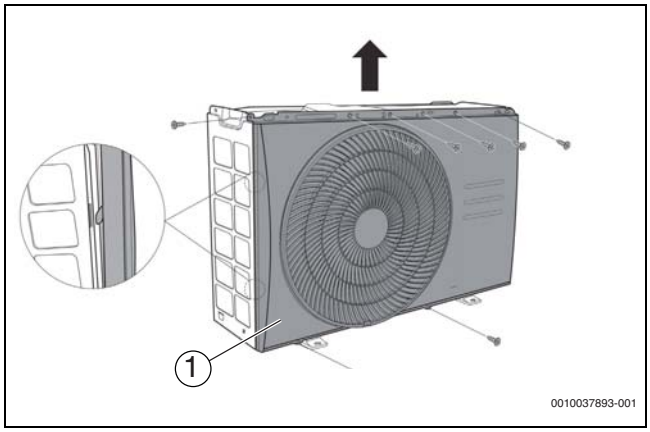



*Fig. 46*

[1] Front Panel

▶ Remove the screws of the right panel [1] (5 screws) and then remove the right panel.

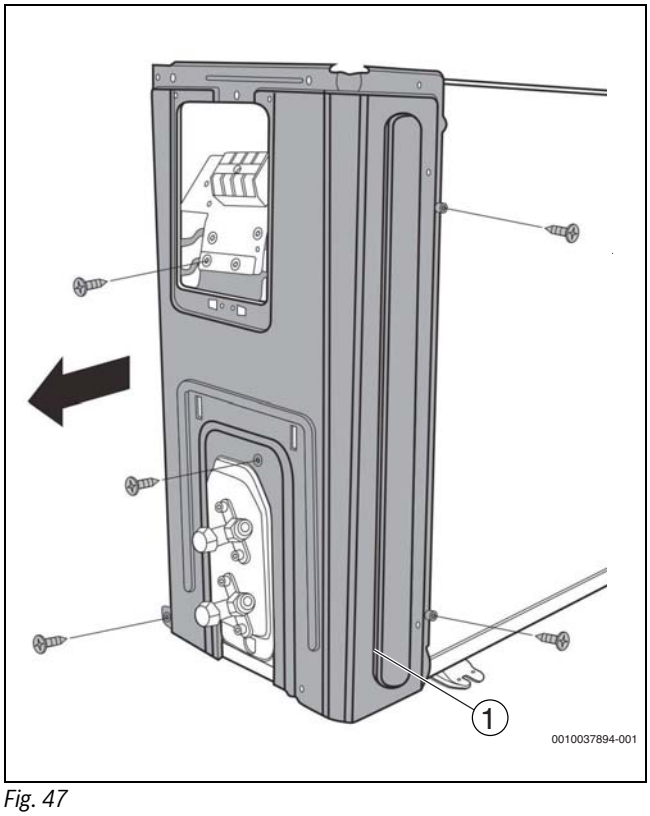



*Fig. 47*

[1] Right Panel

### 7.1.2 CL6102i 55 HE, CL6102i 70 HE

▶ Turn off the air conditioner and the power breaker.

▶ Remove the screw of the big handle and then remove the big handle (1 screw).

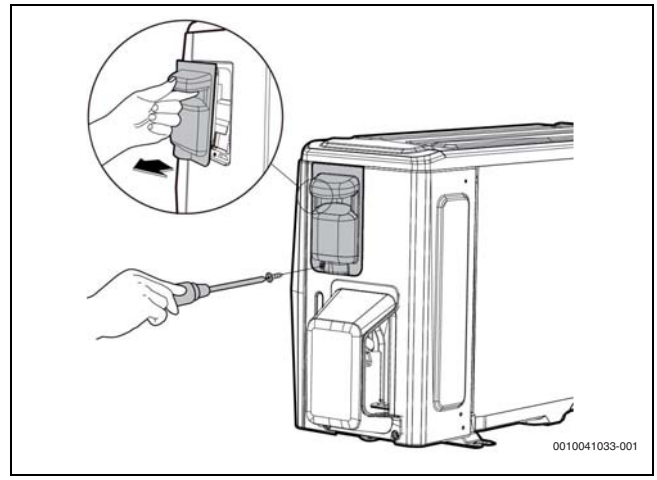



*Fig. 48*

▶ Remove the screws of the top cover and then remove the top cover [1] (3 screws). One of the screws is located underneath the big handle.

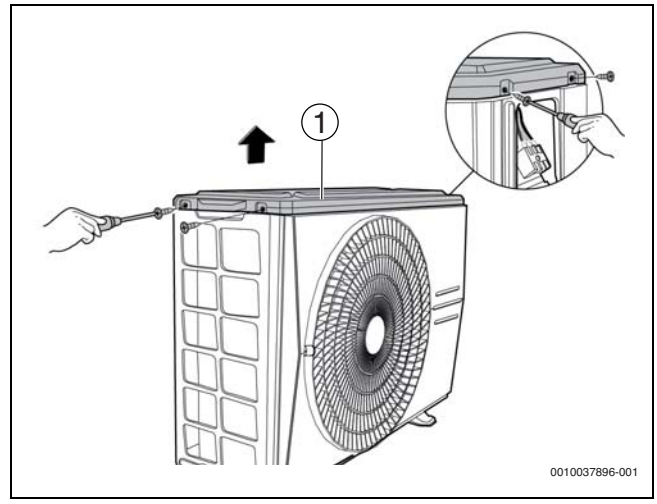



*Fig. 49*

[1] Top Cover

▶ Remove the screws of dust cover [1] and then remove the dust cover (2 screws).

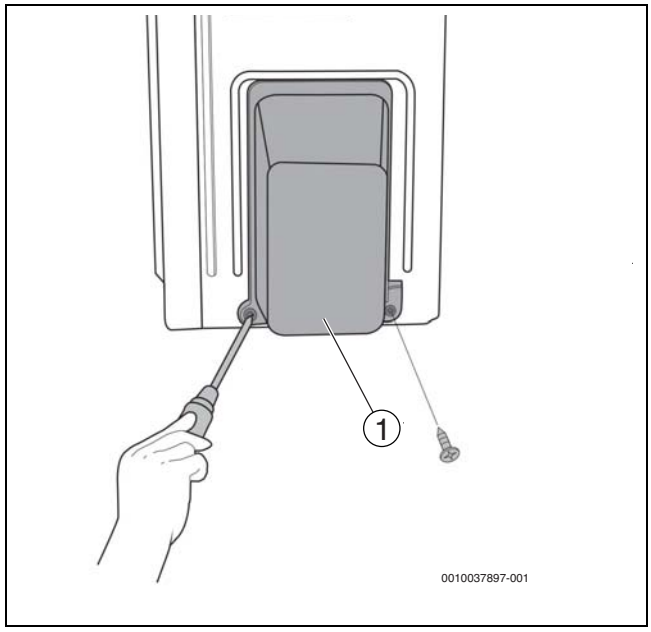



*Fig. 50*

[1] Dust Cover

▶ Remove the screws of the front panel [1] and then remove the front panel (9 screws).

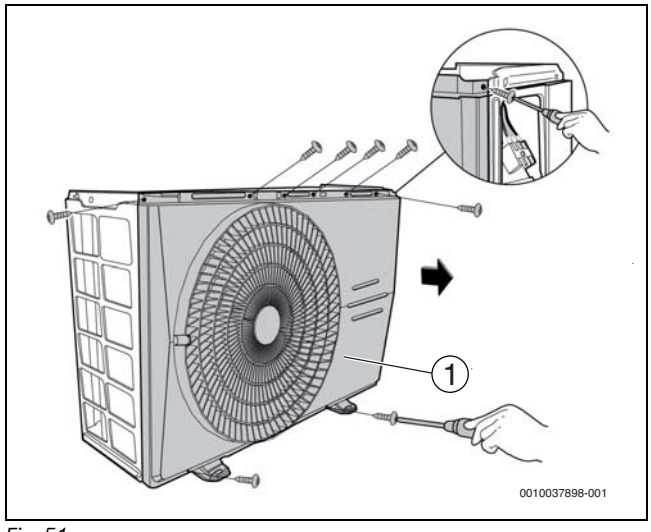



*Fig. 51*

[1] Front Panel

▶ Remove the screws of the right panel [1] (6 screws) and then remove the right panel.

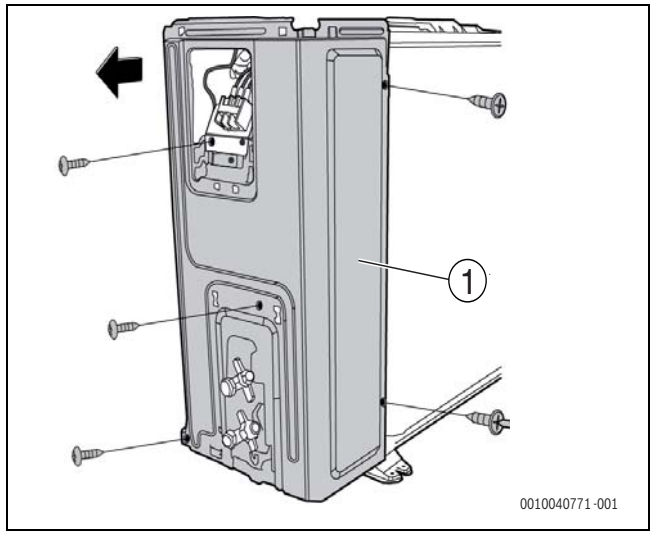



*Fig. 52*

[1] Right Panel

## 7.2 Electrical Parts

***NOTICE***

**Risk of static discharge.**

Static charges can destroy sensitive electronics parts.

▶ Wear antistatic gloves.

Disassemble panel plate (→ page 30) before disassembling electrical parts.

**CL6102i 25 HE , CL6102i 35 HE**

▶ Release the hooks, then open the electronic control box cover.

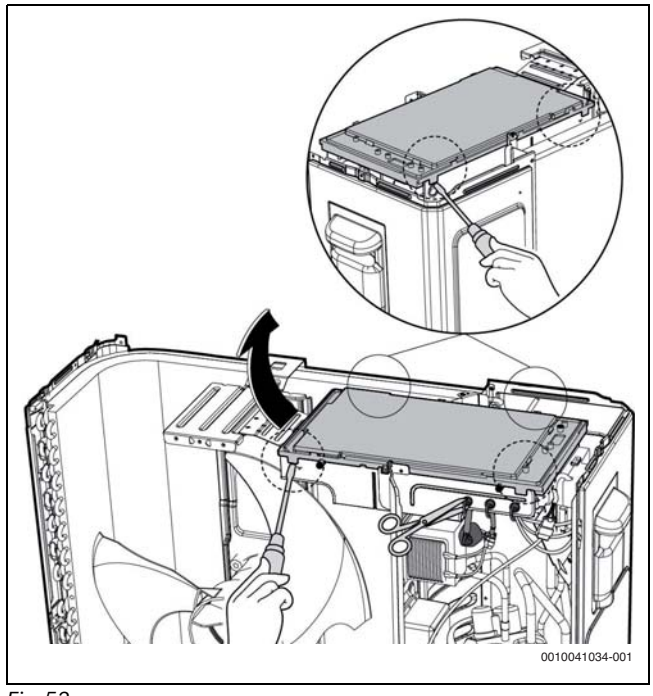



*Fig. 53*

▶ Disconnect the connector for fan motor from the electronic control board [7].

- ▶ Remove the connector for the compressor [6].
- ▶ Pull out the two blue wires connected with the four-way valve [3].
- ▶ Pull out connectors of the condenser coil temperature sensor (T3), outdoor ambient temperature sensor (T4) and discharge temperature sensor (TP) [5].
- ▶ Disconnect the electronic expansion valve wire [2].
- ▶ Remove the connector for the DR and reactor.
- ▶ Then remove the electronic control board.

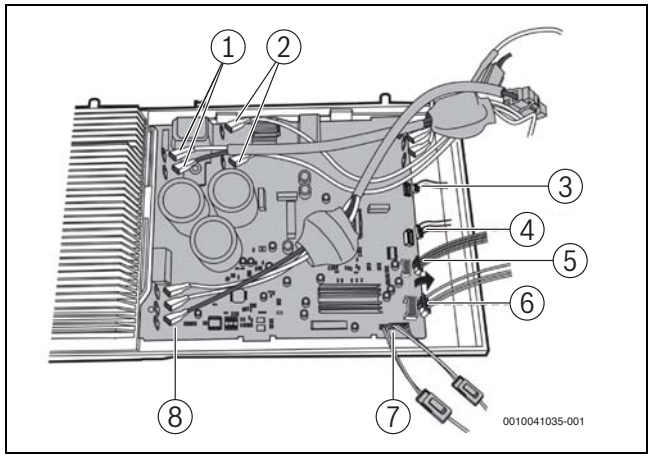



*Fig. 54*

[1] Reactor
[2] Drive
[3] Four-way valve
[4] Reserved
[5] Electronic expansion valve
[6] DC fan
[7] Temperature sensors T3, T4, TP
[8] Compressor

**CL6102i 55 HE, CL6102i 70 HE**

- ▶ Disconnect the connector for compressor and release the ground wire (1 screw).

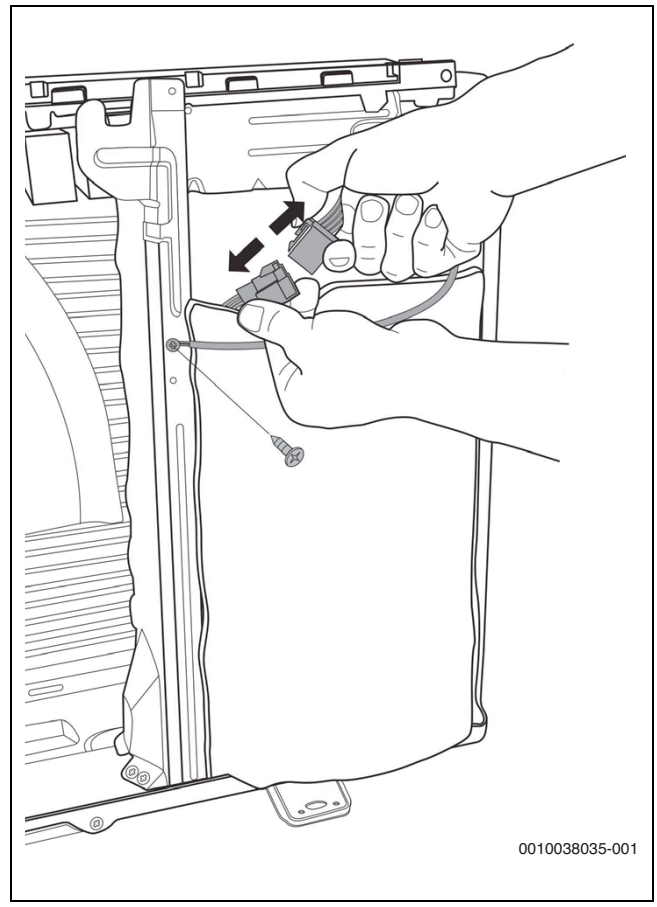



*Fig. 55*

- ▶ Pull out the wires from electrical supporting plate and turn over the electronic control assembly.

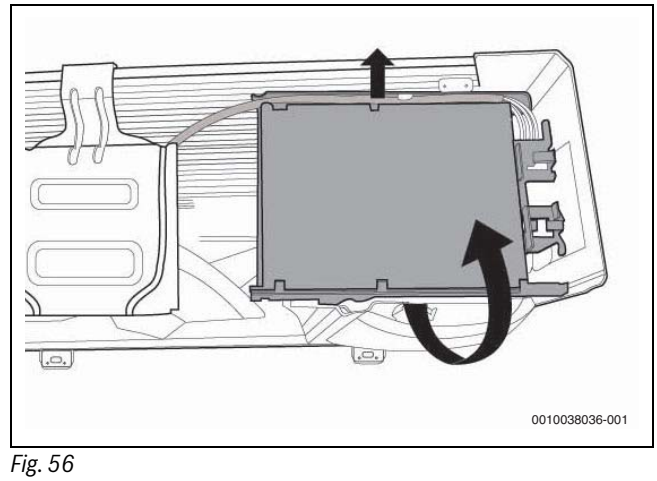



*Fig. 56*

▶ Remove the electronic installing box subassembly (4 hooks).

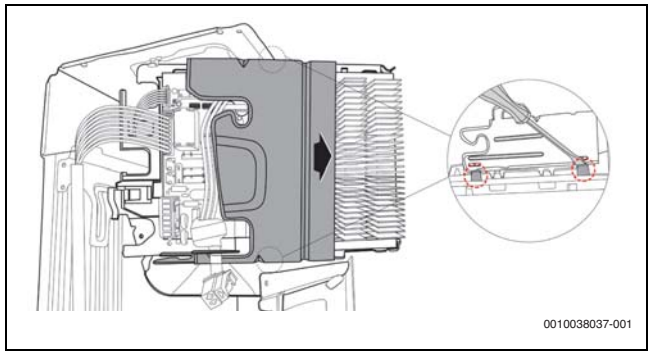



*Fig. 57*

▶ Remove the fixing board (2 hooks).

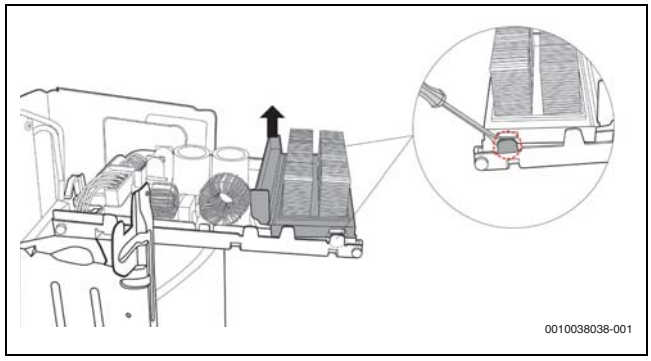



*Fig. 58*

▶ Disconnect the connectors from the electronic control board.

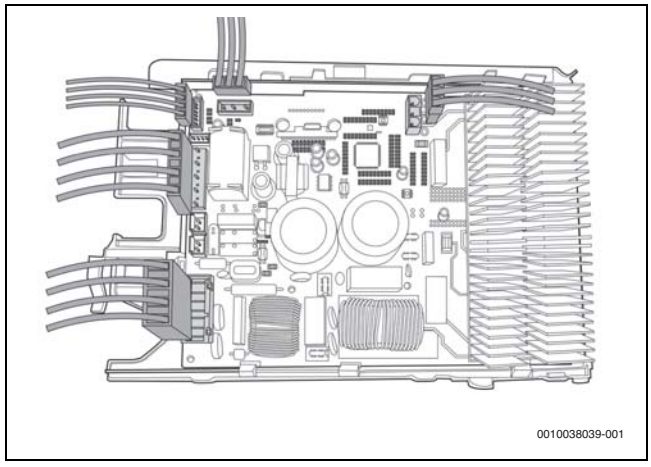



*Fig. 59*

▶ Then remove the electronic control board (4 hooks).

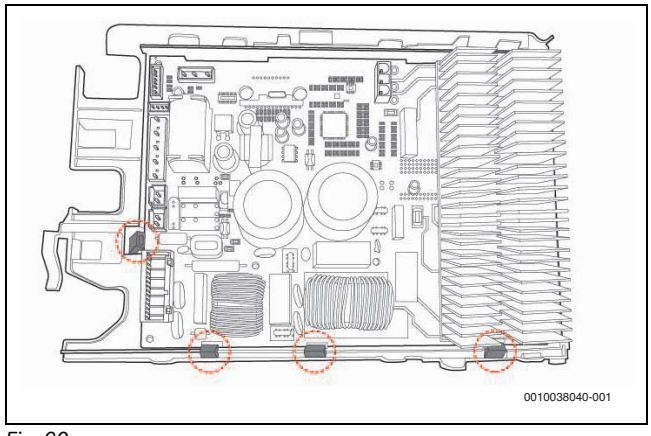



*Fig. 60*

## 7.3 Fan and fan motor

Remove the panel plate (→ page 30) before disassembling the fan and fan motor.

▶ Remove the nut securing the fan with a spanner.
▶ Remove the fan.

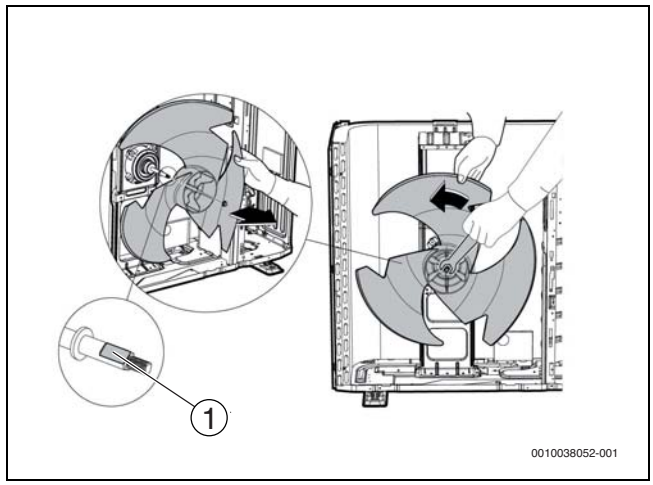



*Fig. 61*

[1] D-Cut

▶ Remove the connection of the fan motor on the PCB (→ page 32).
▶ Remove the fixing screws of the fan motor (4 screws).
▶ Remove the fan motor.

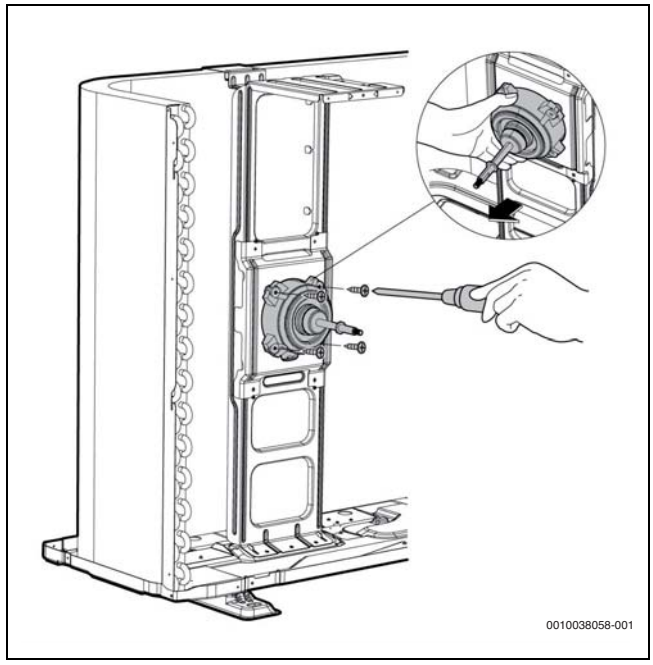



*Fig. 62*

## 7.4 Sound blanket

Remove the panel plate (→ page 30) before disassembling the sound blanket.

▶ Remove the sound blanket (side [2] and top [1]).

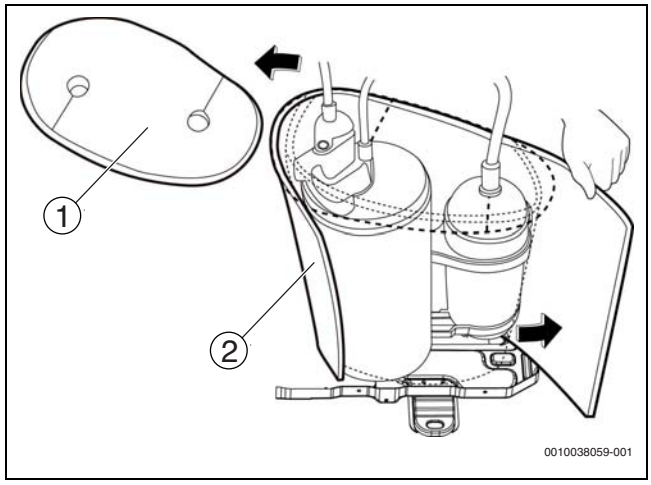



*Fig. 63*

[1] Sound Blanket (top)
[2] Sound Blanket (side)

## 7.5 Four-way valve

**WARNING**

**Refrigerant leakage**

▶ Evacuate the system and confirm that there is no refrigerant left in the system before removing the four-way valve.

Remove the panel plate (→ page 30) and disconnect the four way valve on the PCB (→ page 32) before disassembling the four-way valve.

▶ Heat up the brazed parts and then detach the four-way valve and the pipe.

▶ Remove the four-way valve assembly with pliers.

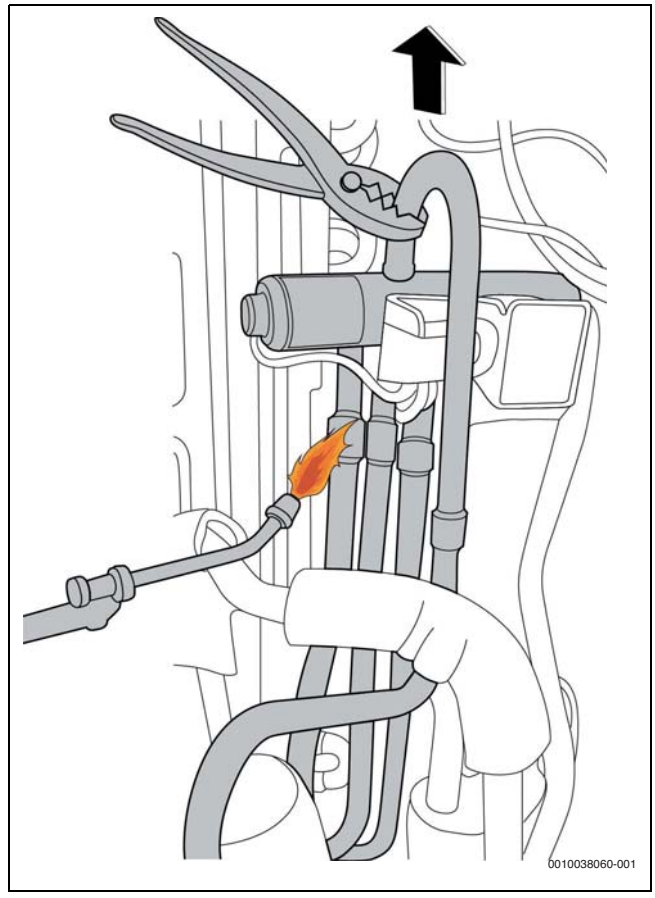



*Fig. 64*

## 7.6 Compressor

**WARNING**

**Refrigerant leakage**

▶ Evacuate the system and confirm that there is no refrigerant left in the system before removing the compressor.

Remove the panel plate (→ page 30) and disconnect the compressor on the PCB (→ page 32) before disassembling the compressor.

- ▶ Remove the flange nut of terminal cover [1] and remove the terminal cover.

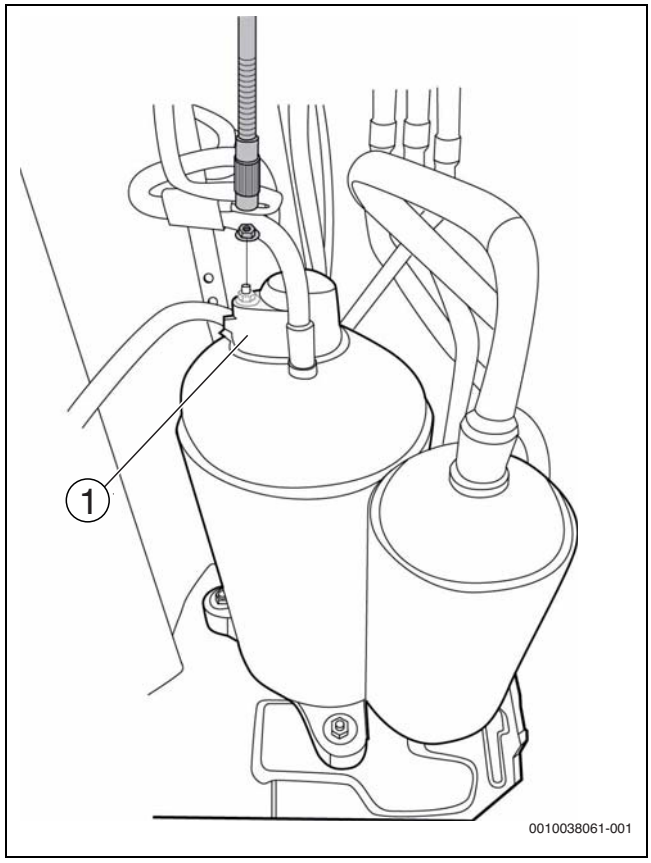



*Fig. 65*

[1] Terminal Cover

- ▶ Disconnect the connectors.

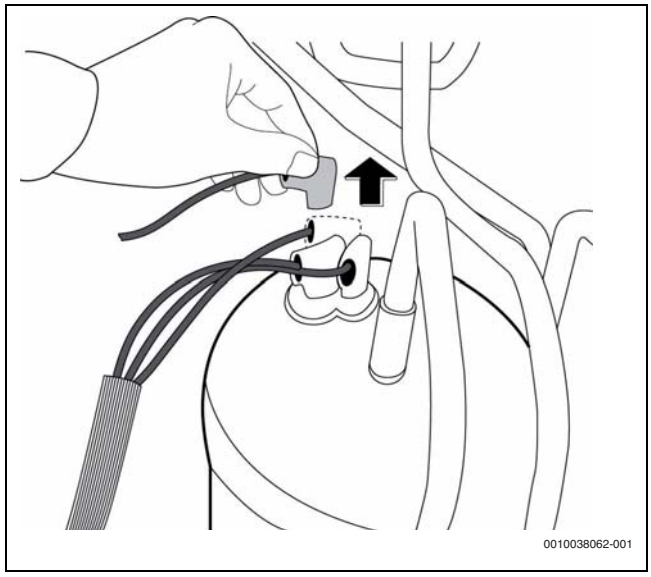



*Fig. 66*

- ▶ Remove the hex nuts and washers securing the compressor, located on the bottom plate.

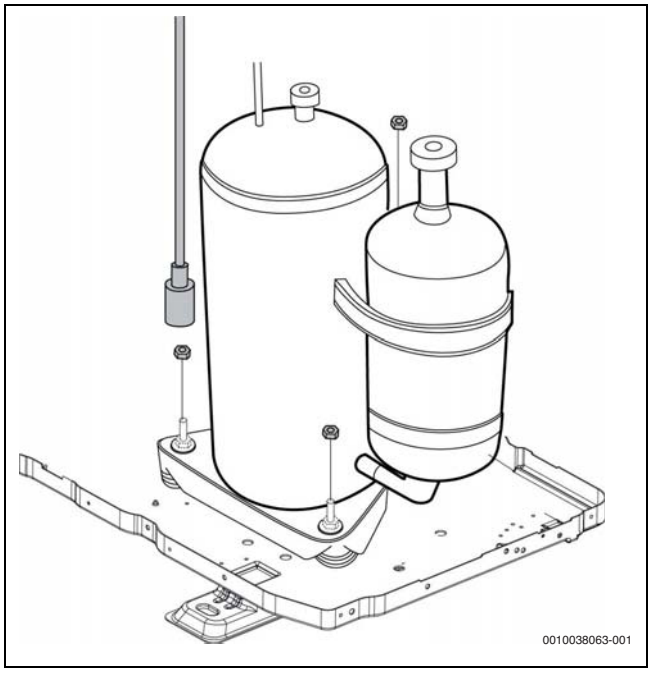



*Fig. 67*

- ▶ Heat up the brazed parts and then remove the discharge pipe [1] and the suction pipe [2].
- ▶ Lift the compressor from the base pan assembly with pliers.

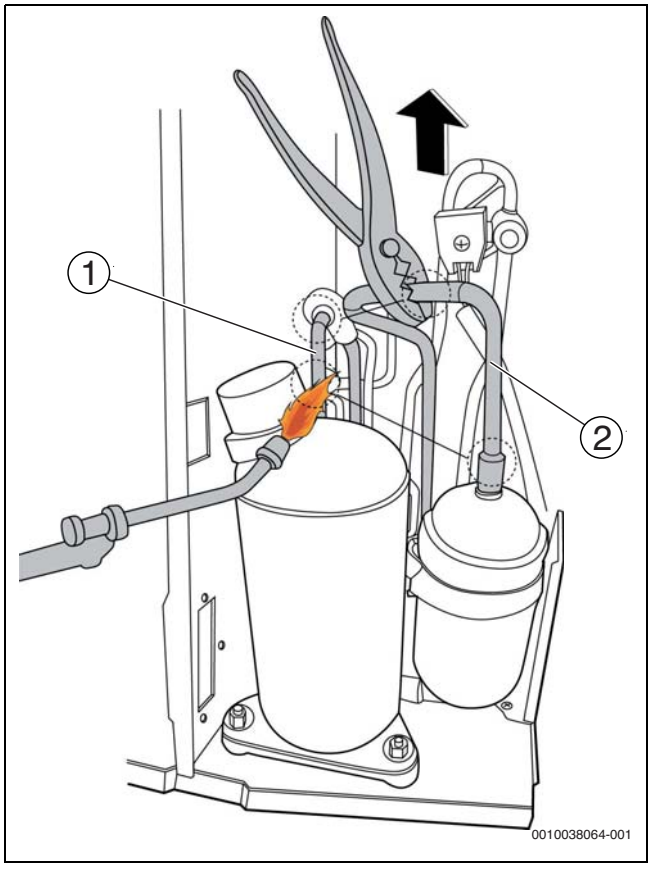



*Fig. 68*

[1] Discharge Pipe
[2] Suction Pipe

# 8 Diagnosis and troubleshooting

**WARNING**

- All electrical work must be carried out by competent and suitably qualified, certified and accredited professionals and in accordance with all applicable legislation (all national, local and other laws, standards, codes, rules, regulations and other legislation that apply in a given situation).
- Power-off all units before connecting or disconnecting any connections or wiring. Otherwise electric shock may occur, leading to damage to components, physical injury or death.

***NOTICE***

**Risk of static discharge.**

Static charges can destroy sensitive electronics parts.

- Wear antistatic gloves.

Test the voltage between P and N on the back of main PCB with multimeter. If the voltage is lower than 36 V, the capacitors are fully discharged.

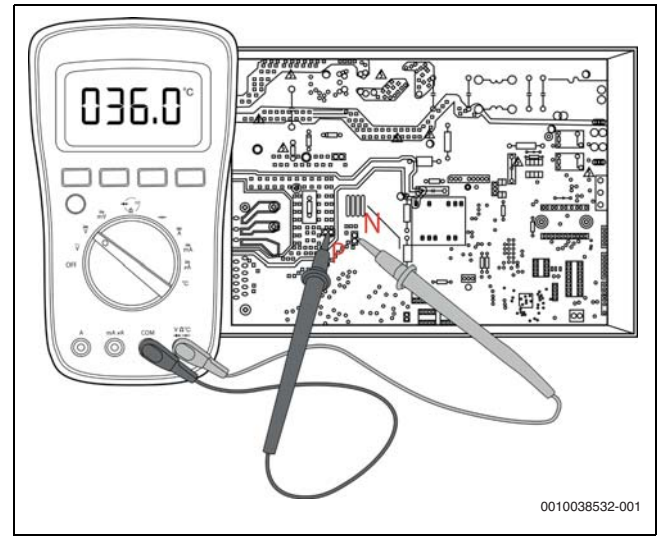



*Fig. 69 Voltage between P and N*

## 8.1 Error Codes

If a fault occurs during operation, a fault code appears in the display of the indoor unit (e.g. EH 02) or in the parameter information inquiry (→page 39).

The display board may show a garbled code or a code undefined by the service manual. For error codes not listed here:

- Ensure that this code is not a temperature reading.

If no error code is shown:

- Test the unit using the remote control.
- If the unit does not respond to the remote, replace the PCB.
- If the unit responds, replace the display board.

| Display | Error Information | Part possibly requiring replacement[1)] |
|---|---|---|
| EC 07 | Fan speed of outdoor unit outside the normal range | |
| EC 51 | Faulty parameter in the EEPROM of the outdoor unit | • Outdoor PCB |
| EC 52 | Temperature sensor error at T3 (condenser coil) | • Outdoor PCB<br>• T3 Sensor |
| EC 53 | Temperature sensor error at T4 (outside temperature) | • Outdoor PCB<br>• T4 Sensor |
| EC 54 | Temperature sensor error at TP (compressor discharge pipe) | • Outdoor PCB<br>• TP Sensor |
| EC 56 | Only multi-split units: Temperature sensor error at T2B (outlet of evaporator coil) | • Outdoor PCB<br>• T2B Sensor |
| EH 0A<br>EH 00 | Faulty parameter in the EEPROM of the indoor unit | • Indoor PCB |
| EH 0b | Communication error between main PCB of indoor unit and display | • Indoor PCB<br>• Display board |
| EH 03 | Fan speed of indoor unit outside the normal range | • Indoor PCB<br>• Indoor fan motor |
| EH 30 | Low voltage protection of indoor external fan | |
| EH 31 | Over voltage protection of indoor external fan | |
| EH 60 | Temperature sensor error at T1 (room temperature) | • Indoor PCB<br>• T1 sensor |
| EH 61 | Temperature sensor error at T2 (centre of evaporator coil) | • Indoor PCB<br>• T2 sensor |
| EL 0C | Insufficient or escaping refrigerant or temperature sensor error at T2 | • Indoor PCB<br>• T2 Sensor<br>• Additional refrigerant |
| EL 01[2)] | Communication error between indoor and outdoor unit | • Indoor PCB<br>• Outdoor PCB<br>• Reactor |

| Display | Error Information | Part possibly requiring replacement[1)] |
|---|---|---|
| EL 02 | Zero-crossing signal detection error (only for AC fan motor) | |
| PC 0A | Condenser high temperature protection | |
| PC 0F | PFC module malfunction | |
| PC 0l | Outdoor ambient temperature too low | |
| PC 00 | Fault at IPM module or IGBT overcurrent protection | • Outdoor PCB<br>• Outdoor fan motor<br>• Compressor<br>• IPM module board |
| PC 01 | Over- or undervoltage protection | • Outdoor PCB<br>• Reactor<br>• IPM module board |
| PC 04 | Inverter compressor module error | • Outdoor PCB<br>• Outdoor fan motor<br>• Compressor<br>• IPM module board |
| PC 06 | Compressor discharge temperature protection | |
| PC 08 | Protection against current overload | • Outdoor PCB<br>• Compressor |
| PC 09 | Anti-cold air in heating mode | |
| PC 10 | Low voltage protection | |
| PC 11 | Over voltage protection | |
| PC 12 | DC voltage protection | |
| PC 40 | Communication fault between main PCB of outdoor unit and main PCB of compressor drive | |
| PC 41 | Current Input detection protection | |
| PC 42 | Compressor start error | |
| PC 43 | Lack of phase (3 phase) protection | |
| PC 44 | No speed protection | |
| PC 45 | 341PWM error | |
| PC 46 | Compressor speed malfunction | |
| PC 49 | Compressor over current protection | |
| PH 90 | Evaporator coil temperature over high protection | |
| PH 91 | Evaporator coil temperature over low Protection | |
| LC 01 | Frequency limit caused by T3 | |
| LC 02 | Frequency limit caused by TP | |
| LC 03 | Frequency limit caused by current | |
| LC 05 | Frequency limit caused by voltage | |
| LC 06 | Frequency limit caused by PFC | |
| LH 00 | Frequency limit caused by T2 | |
| LH 07 | Frequency limit caused by remote controller | |
| –– | Conflicting operating mode of indoor units; operating mode of indoor units and outdoor unit must correspond. | |
| nA | no malfunction | |

1) If there is no time for checking to find the faulty part, try replacing the parts mentioned here.

2) Leak detection not active if in a system with multi-split air conditioner.

*Table 17*

## 8.2 Parameter information inquiry by remote control

To access parameter information inquiry:

▶ Press and hold the ⏻ key and the key for 7 seconds.

| Displayed code and explanation | | Additional information |
|---|---|---|
| 0 | Error code | Refer to error code table on page 37 |
| 1 | Room temperature | T1 temperature |
| 2 | Indoor coil temperature | T2 temperature |
| 3 | Outdoor coil temperature | T3 temperature |
| 4 | Ambient temperature | T4 temperature |
| 5 | Discharge temperature | TP temperature |
| 6 | Compressor Target Frequency FT | Targeted Frequency |
| 7 | Compressor Running Frequency Fr | Actual frequency |
| 8 | Unit Current dL | |
| 9 | Outdoor AC Voltage Uo | |
| 10 | Current indoor capacity test state Sn | |
| 11 | Reserved | |
| 12 | Set Speed Pr of the outdoor fan | Outdoor fan speed = value × 8 |
| 13 | Opening state Lr of electronic expansion valve | EXV opening angle = value × 8 |
| 14 | Actual Running Speed ir of the indoor fan | Indoor fan speed = value × 8 |
| 15 | Indoor Humidity Hu | |
| 16 | Set Temperature TT after compensation | |
| 17 | Reserved | |
| 18 | Reserved | |
| 19 | / | |
| 20 | Indoor Target Frequency oT | |
| 21...30 | Reserved | |

*Table 18 Information Inquiry*

## 8.3 Error Diagnosis and Troubleshooting Without Error Code

### 8.3.1 Remote Maintenance

When troubles occur, please check the following points with customers before field maintenance.

| Problem | Type | Possible causes of trouble | Test method / remedy |
|---|---|---|---|
| Unit will not start | Electrical | Power failure | ▶ Test voltage. |
| | | The main power tripped | ▶ Close the power switch. |
| | | Loose connections | ▶ Inspect connections - tighten. |
| | | Faulty transformer | ▶ Change the transformer. |
| The power switch is on but fan does not run | Electrical | Loose connections | ▶ Inspect connections - tighten. |
| | | Faulty transformer | ▶ Change the transformer. |
| | | The voltage is too high or too low | ▶ Test voltage. |
| | Other | Interference from cell phone towers and remote boosters | ▶ Reconnect the power or press ON/OFF button on remote control to restart operation. |
| The temperature on the display board cannot be set | Electrical | The remote control is powered off | ▶ Replace the battery of the remote control. |
| | | Broken remote control | ▶ Replace the remote control. |
| Unit is on but the airflow is not cold (hot) | Electrical | Set temperature is too high/low | ▶ Adjust the set temperature. |
| | Refrigerant | Ambient temperature is too high/low | ▶ Turn on the unit later. |
| | | Fan mode is active | ▶ Change to cooling/heating mode. |
| Unit runs, but shortly stops | Electrical | The voltage is too high or too low | ▶ Test voltage. |
| | Refrigerant | Set temperature is too high/low | ▶ Adjust the set temperature. |
| | | Ambient temperature is too high/low | ▶ Turn on the unit later. |
| The unit starts up and stops frequently | Electrical | The voltage is too high or too low | ▶ Test voltage. |
| | Refrigerant | Ambient temperature is too high/low | ▶ Turn on the unit later. |
| | | Frosting and defrosting frequently | ▶ Turn on the unit later. |
| | Other | The air inlet or outlet of either unit is blocked | ▶ Remove the obstacles. |
| Unit runs continuously but insufficient cooling (heating) | Refrigerant | Dirty air filter | ▶ Clean or replace filter. |
| | | Dirty condenser fins | ▶ Clean condenser fins. |
| | | Set temperature is too high/low | ▶ Adjust the set temperature. |
| | | Ambient temperature is too high/low. | ▶ Turn on the unit later. |
| | | Noise reduction function is activated (optional function) | ▶ Turn off noise reduction function. |
| | Other | Heavy load condition | ▶ Check heat load. |
| | | Bad air proof | ▶ Close all the windows and doors. |
| | | The air inlet or outlet of either unit is blocked | ▶ Remove the obstacles. |
| Unit is noisy | Other | Loosen hold down bolts and / or screws | ▶ Tighten bolts or screws. |
| | | Shipping plates remain attached | ▶ Remove them. |

*Table 19 Remote maintenance*

### 8.3.2 Field Maintenance

| Problem | Type | Possible causes of trouble | Test method / remedy |
|---|---|---|---|
| Unit will not start | Electrical | Power failure | ▶ Test voltage |
| | | Blown fuse or varistor | ▶ Inspect fuse type & size |
| | | Loose connections | ▶ Inspect connections - tighten |
| | | Shorted or broken wires | ▶ Test circuits with tester |
| | | Safety device opens | ▶ Test continuity of safety device |
| | | Faulty transformer | ▶ Check control circuit with tester |
| Compressor will not start but fan runs | Refrigerant | Compressor stuck | ▶ Replace the compressor |
| | Electrical | Shorted or broken wires | ▶ Test circuits with tester |
| | | Faulty thermostat / room temperature sensor | ▶ Test continuity of thermostat / sensor & wiring |
| | | Shorted or open capacitor | ▶ Check capacitor with tester |
| | | Faulty magnetic contactor for compressor | ▶ Test continuity of coil & contacts |
| | | Shorted or grounded compressor | ▶ Check resistance with multimeter |
| Compressor and condenser (outdoor) fan will not start | Electrical | Shorted or broken wires | ▶ Test circuits with tester |
| | | Faulty thermostat / room temperature sensor | ▶ Test continuity of thermostat / sensor & wiring |
| | | Faulty magnetic contactor for compressor | ▶ Test continuity of coil & contacts |
| Evaporator (indoor) fan will not start | Electrical | Shorted or broken wires | ▶ Test circuits with tester |
| | | Shorted or open capacitor | ▶ Check capacitor with tester |
| | | Faulty magnetic contactor for fan | ▶ Test continuity of coil & contacts |
| | | Shorted or grounded fan motor | ▶ Check resistance with multimeter |
| Condenser (Outdoor) fan will not start | Electrical | Shorted or broken wires | ▶ Test circuits with tester |
| | | Faulty thermostat / room temperature sensor | ▶ Test continuity of thermostat / sensor & wiring |
| | | Shorted or open capacitor | ▶ Check capacitor with tester |
| | | Faulty magnetic contactor for fan | ▶ Test continuity of coil & contacts |
| | | Shorted or grounded fan motor | ▶ Check resistance with multimeter |
| Unit runs, but shortly stops | Refrigerant | Shortage of refrigerant | ▶ Leak test |
| | | Restricted liquid line | ▶ Replace restricted part |
| | | Overcharge of refrigerant | ▶ Reduce charged refrigerant volume |
| | | Dirty or partially blocked condenser | ▶ Clean condenser or remove obstacle |
| | | Capillary tube closed completely | ▶ Replace capillary |
| | Electrical | Faulty magnetic contactor for compressor | ▶ Test continuity of coil & contacts |
| | | Low voltage | ▶ Test voltage |
| Compressor short cycling due to overload | Refrigerant | Shortage of refrigerant | ▶ Leak test |
| | | Overcharge of refrigerant | ▶ Reduce charged refrigerant volume |
| | | Dirty or partially blocked condenser | ▶ Clean condenser or remove obstacle |
| | Electrical | Faulty magnetic contactor for compressor | ▶ Test continuity of coil & contacts |
| | | Low voltage | ▶ Test voltage |
| High discharge pressure | Refrigerant | Overcharge of refrigerant | ▶ Change charged refrigerant volume |
| | | Dirty or partially blocked condenser | ▶ Clean condenser or remove obstacle |
| | | Air or incompressible gas in refrigerant cycle | ▶ Purge, evacuate and recharge |
| | | Limitation of the condensation air flow | ▶ Remove obstruction to air flow |
| | | High temperature condensing medium | ▶ Remove obstruction in air or water flow |
| | | Insufficient condensing medium | ▶ Remove obstruction in air or water flow |
| Low discharge pressure | Refrigerant | Shortage of refrigerant | ▶ Leak test |
| | | Inefficient compressor | ▶ Test compressor efficiency |
| High suction pressure | Refrigerant | Overcharge of refrigerant | ▶ Change charged refrigerant volume |
| | | Inefficient compressor | ▶ Test compressor efficiency |
| | | Temperature sensor is not installed correctly | ▶ Install the sensor properly |
| | Other | Heavy load condition | ▶ Check heat load |

| Problem | Type | Possible causes of trouble | Test method / remedy |
|---|---|---|---|
| Low suction pressure | Refrigerant | Shortage of refrigerant | ▶ Leak test |
| | | Restricted liquid line | ▶ Replace restricted part |
| | | Dirty air filter | ▶ Clean or replace |
| | | Dirty evaporator coil | ▶ Clean coil |
| | | Insufficient air through evaporator coil | ▶ Check fan |
| | | Capillary tube closed completely | ▶ Replace capillary |
| Unit runs continuously but insufficient cooling | Refrigerant | Shortage of refrigerant | ▶ Leak test |
| | | Restricted liquid line | ▶ Replace restricted part |
| | | Dirty air filter | ▶ Clean or replace |
| | | Dirty evaporator coil | ▶ Clean coil |
| | | Insufficient air through evaporator coil | ▶ Check fan |
| | | Dirty or partially blocked condenser | ▶ Clean condenser or remove obstacle |
| | | Air or incompressible gas in refrigerant cycle | ▶ Purge, evacuate and recharge |
| | | Short cycling of condensing air | ▶ Remove obstruction to air flow |
| | | Inefficient compressor | ▶ Test compressor efficiency |
| | Other | Heavy load condition | ▶ Check heat load |
| | | Poor choices of capacity | ▶ Choose AC of lager capacity or add the number of AC |
| Too cool | Electrical | Faulty thermostat / room temperature sensor | ▶ Test continuity of thermostat / sensor & wiring |
| | | Wrong setting place of temperature sensor | ▶ Place the temperature sensor at the central of the air inlet grille |
| Compressor is noisy | Refrigerant | Overcharge of refrigerant | ▶ Reduce charged refrigerant volume |
| | | Broken compressor internal parts | ▶ Replace compressor |
| | Other | Loosen hold down bolts and / or screws | ▶ Tighten bolts or screws |
| | | Shipping plates remain attached | ▶ Remove them |
| | | Contact of piping with other piping or external plate | ▶ Rectify piping so as not to contact each other or with external plate |
| Horizontal louver can not revolve | Electrical | Loose connections | ▶ Inspect connections - tighten |
| | | Shorted or broken wires | ▶ Test circuits with tester |
| | | Faulty stepping motor | ▶ Replace the stepping motor |

*Table 20 Field Maintenance*

## 8.4 Check Procedures

### 8.4.1 Before checking

**CAUTION**

**Risk of injury from electric shock!**

Electricity remains in capacitors even when the power supply is off.

- ▶ Ensure the capacitors are fully discharged before troubleshooting
- ▶ Be sure to turn off all power supplies or disconnect all wires to avoid electric shock.

**CAUTION**

**Danger of burns!**

During operation the compressor becomes hot.

- ▶ Operate after compressor and coil have returned to normal temperature in order to avoid injury.

### 8.4.2 Temperature Sensor Check

- ▶ Disconnect the temperature sensor from PCB (→ indoor and outdoor unit disassembly on page 23 and 30).
- ▶ Measure the resistance value of the sensor using a multi-meter.

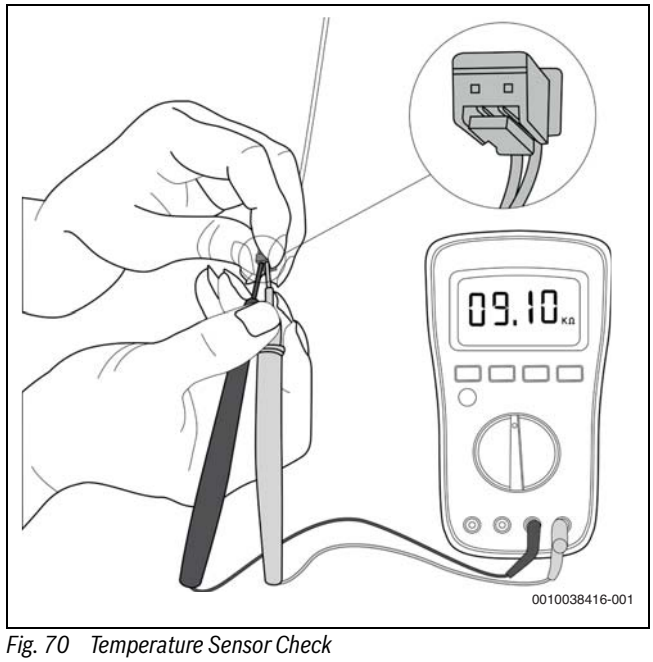



*Fig. 70 Temperature Sensor Check*

- ▶ Check corresponding temperature sensor resistance value table (→ chapter 9, p. 60.

The picture and the value are only for reference, actual condition and specific value may vary.

### 8.4.3 Compressor Check

- Disconnect the compressor power cord from outdoor PCB (→ outdoor unit disassembly on page 30).
- Measure the resistance value of each winding using a multi-meter.

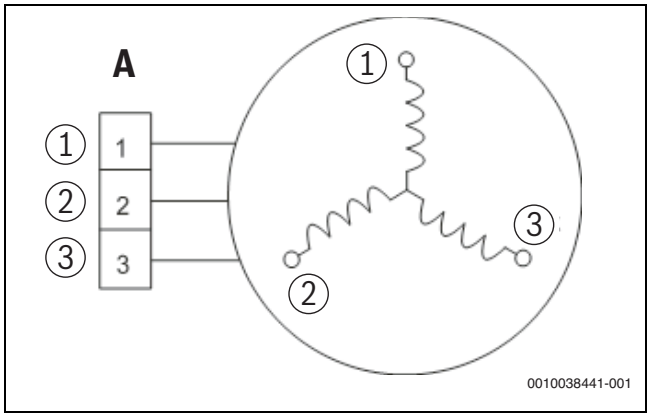



*Fig. 71 Compressor Check*

[1] Blue
[2] Red
[3] Black

- Check the resistance value of each winding in the following table.

| Compressor type | Blue-Red | Blue-Black | Red-Black |
|---|---|---|---|
| KSN98D64UFZ3 | | 2.70 Ω | |
| KTM240D46UKT2 | | 1.04 Ω | |

*Table 21 Resistance Value of each winding*

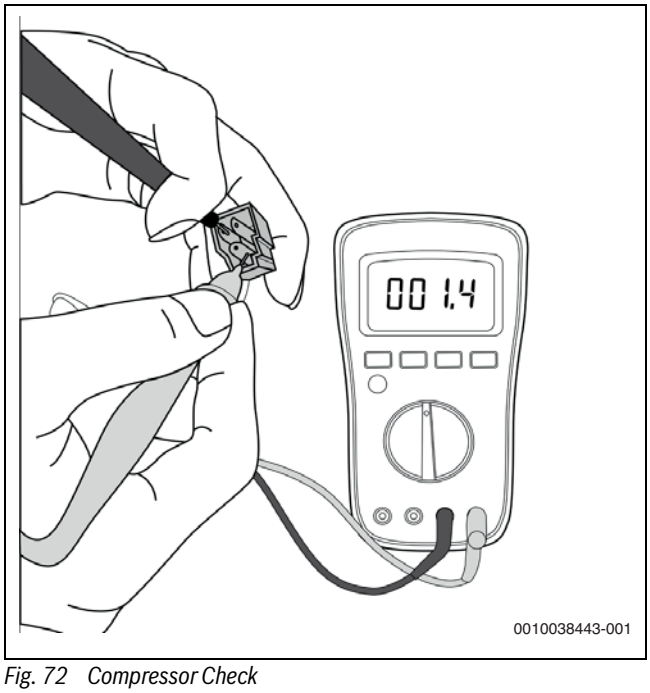



*Fig. 72 Compressor Check*

The picture and the value are only for reference, actual condition and specific value may vary.

### 8.4.4 IPM Continuity Check

- Turn off outdoor unit and disconnect power supply.
- Discharge electrolytic capacitors and ensure all energy-storage unit has been discharged.
- Disassemble outdoor PCB or disassemble IPM board.
- Measure the resistance value between P and U(V, W, N); U(V, W) and N.

| Digital tester | | Resistance value |
|---|---|---|
| (+)Red | (-)Black | |
| P | N | ∞ (Several MΩ) |
| | U | |
| | V | |
| | W | |
| | | |
| U | N | ∞ (Several MΩ) |
| V | | |
| W | | |
| – | | |

*Table 22*

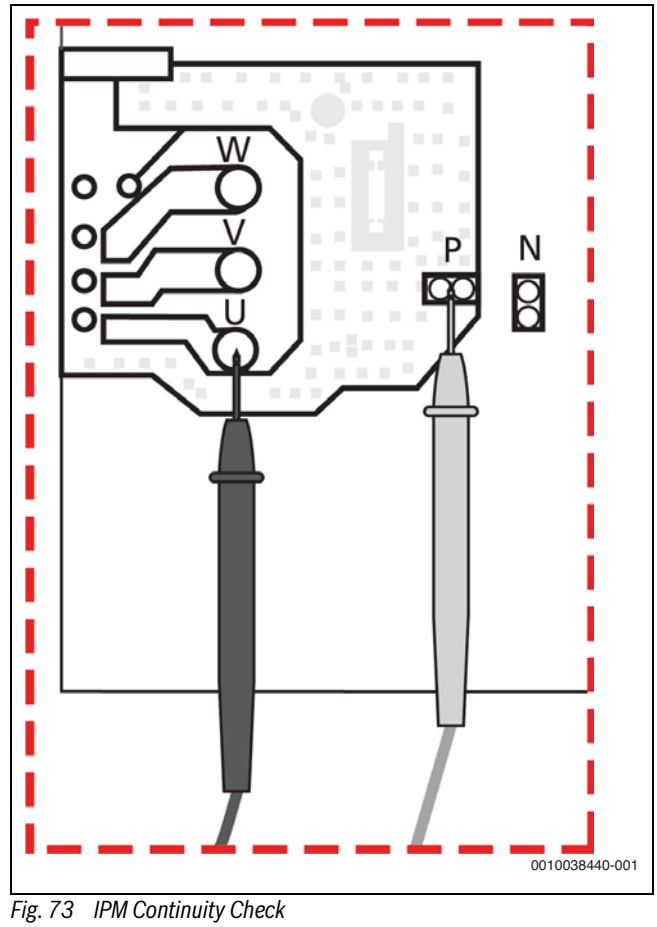



*Fig. 73 IPM Continuity Check*

The picture and the value are only for reference, actual condition and specific value may vary.

## 8.5 Troubleshooting by Error Code

### 8.5.1 Indoor units mode conflict (only multi-split)

When using multi-split air conditioners, all operation modes are possible, but with the following peculiarities:

If you operate more than one indoor unit, indoor units may go into standby due to an operation mode conflict. An operation mode conflict occurs when at least one indoor unit is in heating mode and at the same time at least one indoor unit is in another operation mode (e.g. cooling mode). Heating mode always has priority. All indoor units that are not in heating mode will go into standby because of the operation mode conflict.

Indoor units with operation mode conflict show "––" in the display or the operation light flashes and the timer light is on. For more information, see the technical documentation of the indoor units.

Avoiding the operation mode conflict:

- All indoor units are in heating mode or cooling/fan only mode.

### 8.5.2 EC 07: The outdoor fan speed is operating outside of the normal range

**Digital output**

- EC 07

**Description**

- When outdoor fan speed keeps too low (300 rpm) or too high for a certain time, the LED displays the failure code and the AC turns off.

**Recommended parts to prepare**

- Connection wires
- Fan assembly
- Fan motor
- Outdoor main PCB

**Additional information**

For certain models, outdoor PCB could not be removed separately. In this case, the outdoor electric control box should be replaced as a whole.

Outdoor DC Fan Motor

- ▶ Release the UVW connector.
- ▶ Measure the resistance of U-V, U-W, V-W. If the resistance is not equal to each other, the fan motor must has problems and need to be replaced. Otherwise the PCB must has problems and need to be replaced.

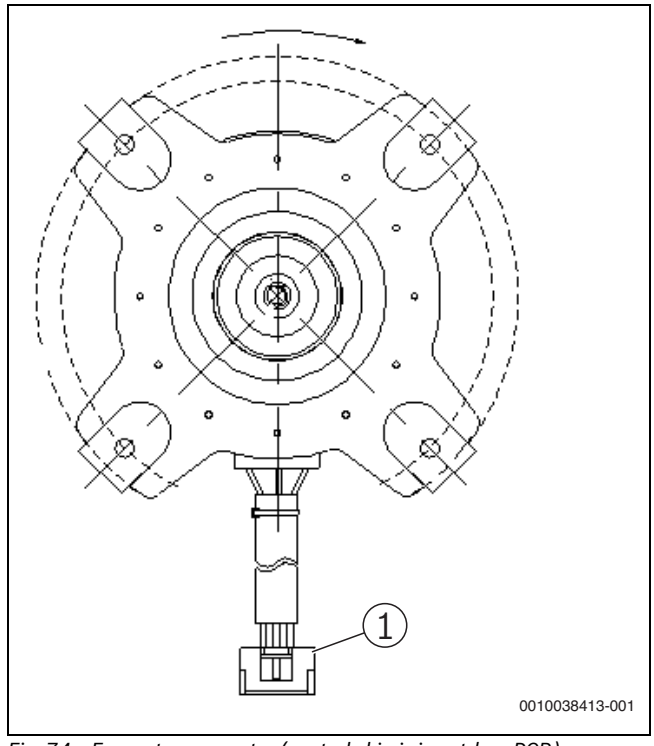
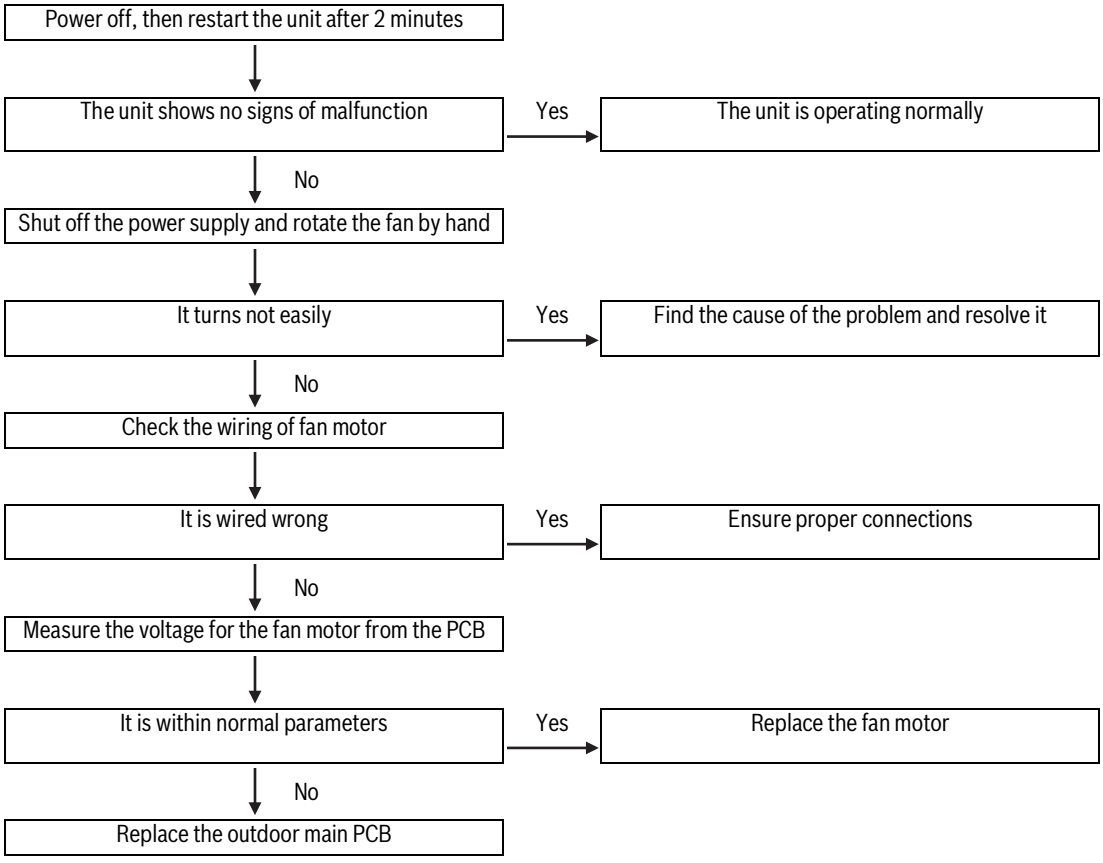



*Fig. 74 Fan motor connector (control chip is in outdoor PCB)*

[1] UVW connector

**Procedure**


Power off, then restart the unit after 2 minutes
The unit shows no signs of malfunction
Yes
The unit is operating normally
No
Shut off the power supply and rotate the fan by hand
It turns not easily
Yes
Find the cause of the problem and resolve it
No
Check the wiring of fan motor
It is wired wrong
Yes
Ensure proper connections
No
Measure the voltage for the fan motor from the PCB
It is within normal parameters
Yes
Replace the fan motor
No
Replace the outdoor main PCB

### 8.5.3 EC 51: Outdoor unit EEPROM parameter error or Compressor driven chip EEPROM parameter error

**Digital output**

- EC 51

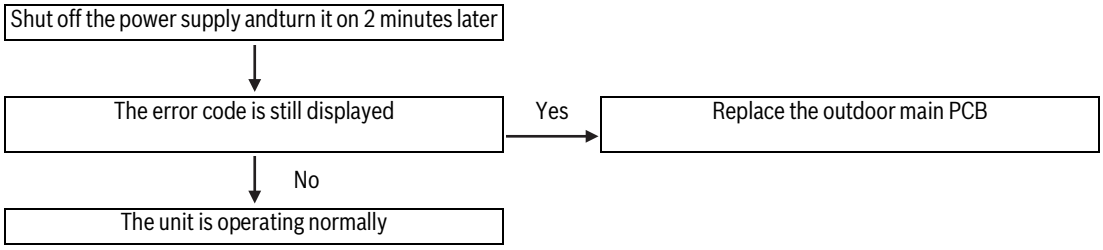
**Description**

- Outdoor PCB main chip does not receive feedback from EEPROM chip or compressor driven chip.

**Recommended parts to prepare**

- Outdoor PCB

**Procedure**




### 8.5.4 EC 52-54: Open circuit or short circuit of outdoor temperature sensor (T3, T4, TP)

**Digital output**

- EC 52
- EC 53
- EC 54

**Description**

- If the sampling voltage is lower than 0.06 V or higher than 4.94 V, the LED displays the failure code.

**Recommended parts to prepare**

- Connection wires
- Sensors
- Outdoor main PCB

**Additional information**

For certain models, outdoor PCB could not be removed separately. In this case, the outdoor electric control box should be replaced as a whole. For certain models, outdoor unit uses combination sensor, T3,T4 and TP are the same of sensor. The picture and the value are only for reference, actual appearance and value may vary.

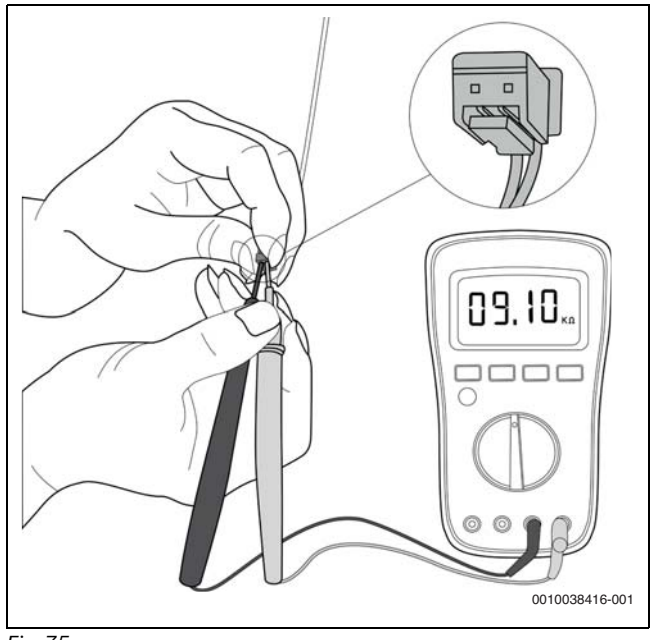
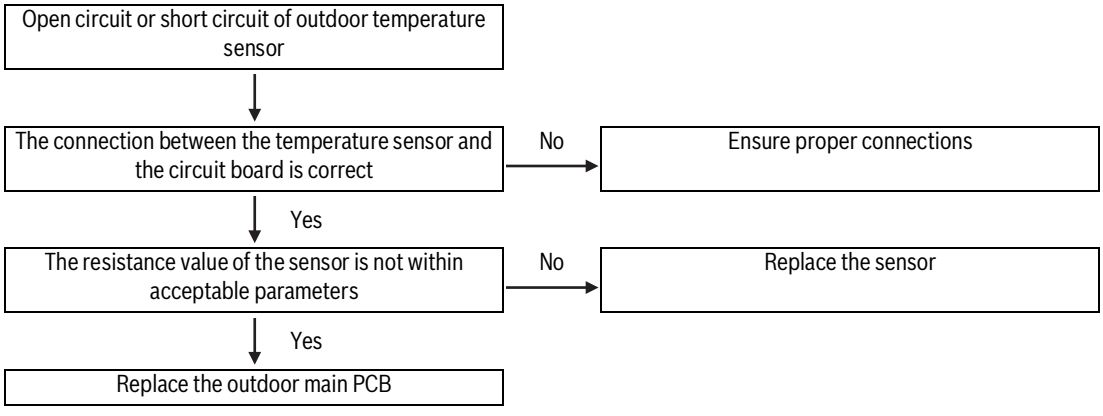



*Fig. 75*

**Procedure**



### 8.5.5 EH 00/EH 0A: Indoor unit EEPROM parameter error

**Digital output**

- EH 00/EH 0A

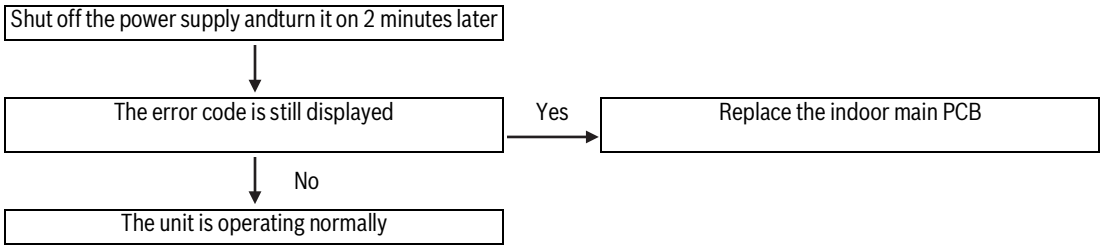
**Description**

- Indoor PCB main chip does not receive feedback from EEPROM chip.

**Recommended parts to prepare**

- Indoor PCB

**Procedure**




### 8.5.6 EH 0b: Indoor PCB / Display board communication error

**Digital output**

- EH 0b

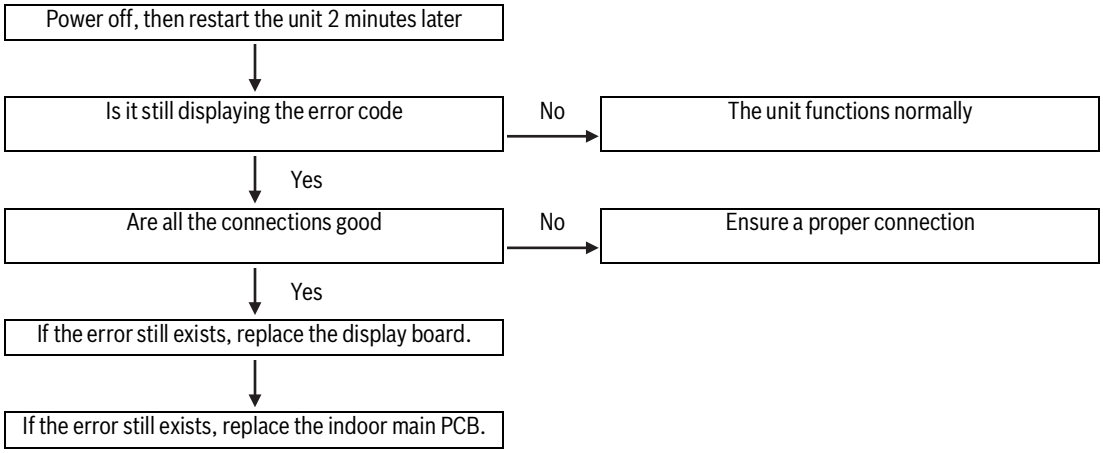
**Description**

- Indoor PCB does not receive feedback from the display board.

**Recommended parts to prepare**

- Connection wire
- Indoor PCB
- Display board

**Procedure**



### 8.5.7 EH 03: The Indoor fan speed is operating outside of normal range

**Digital output**

- EH 03

**Description**

- When indoor fan speed keeps too low or too high for a certain time, the LED displays the failure code and the AC turns off.

**Recommended parts to prepare**

- Connection wires
- Fan assembly
- Fan motor
- Indoor main PCB

**Additional information**

DC Fan Motor(control chip is in fan motor)

▶ Power on and when the unit is in standby, measure the voltage of pin1-pin3, pin4-pin3 in fan motor connector.

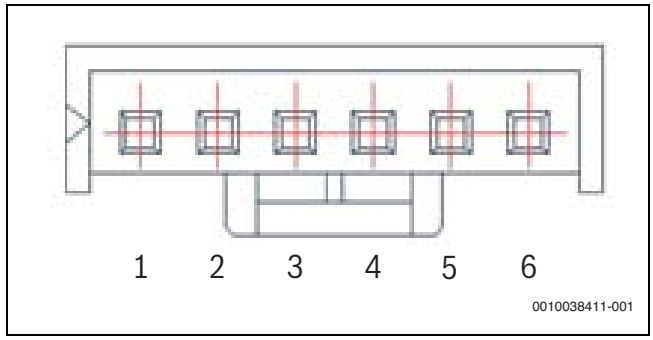


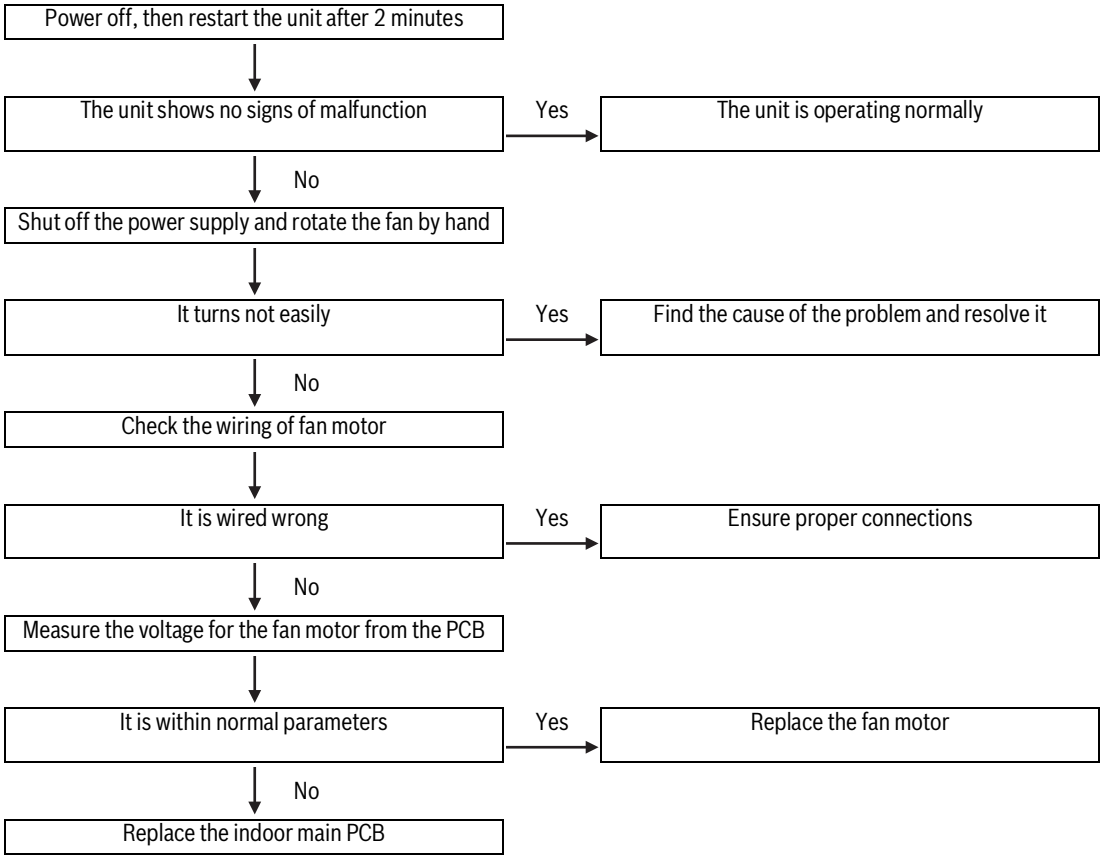

*Fig. 76 Fan motor connector*

| No. | Color | Signal | Voltage 220 - 240V |
|---|---|---|---|
| 1 | Red | Vs/Vm | 192 V - 380 V |
| 2 | – | – | – |
| 3 | Black | GND | 0 V |
| 4 | White | Vcc | 13.5 V - 16.5 V |
| 5 | Yellow | Vsp | 0 V - 6.5 V |
| 6 | Blue | FG | 13.5 V - 16.5 V |

*Table 23 DC motor voltage input and output*

If the measured voltage does not fit the values in the table, the PCB has problems and needs to be replaced.

**Procedure**



### 8.5.8 EH 60-61: Open circuit or short circuit of indoor temperature sensor (T1, T2)

**Digital output**

- EH 60
- EH 61

**Description**

- If the sampling voltage is lower than 0.06 V or higher than 4.94 V, the LED displays the failure code.

**Recommended parts to prepare**

- Connection wires
- Sensors
- Indoor main PCB

**Additional information**

The picture and the value are only for reference, actual appearance and value may vary.

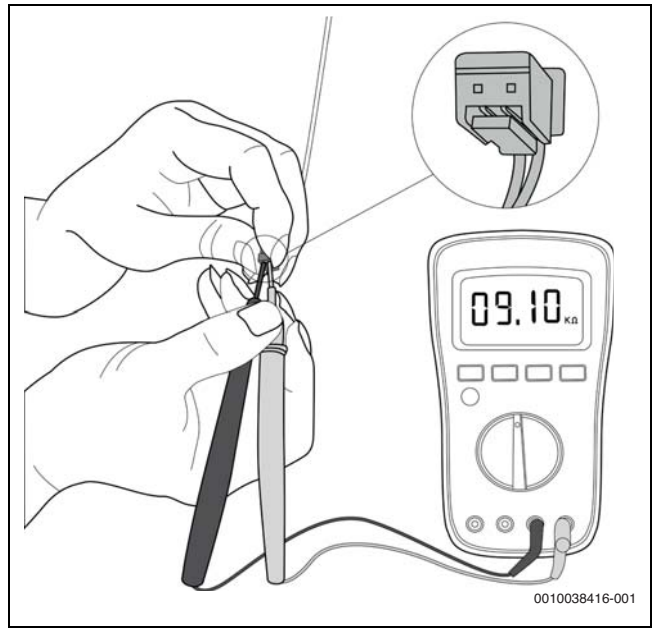
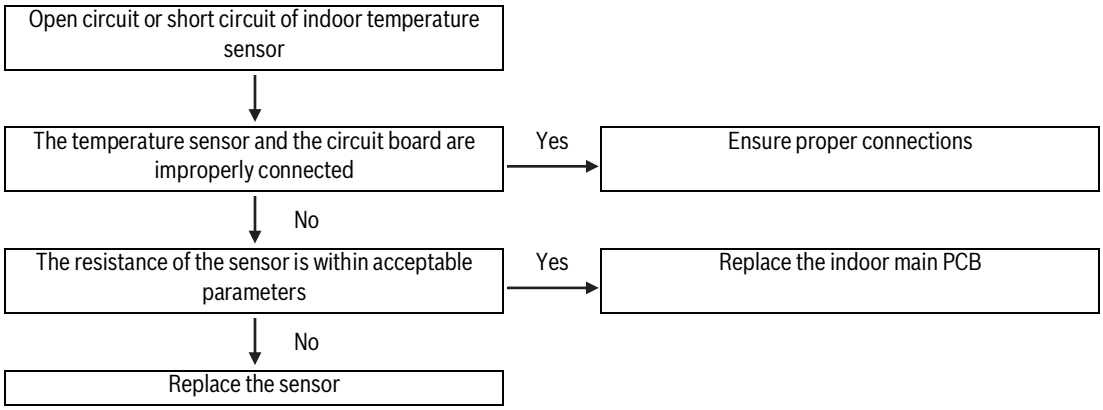



*Fig. 77*

**Procedure**



### 8.5.9 EL 0C: Refrigerant Leakage Detection

**Digital output**

- EL 0C

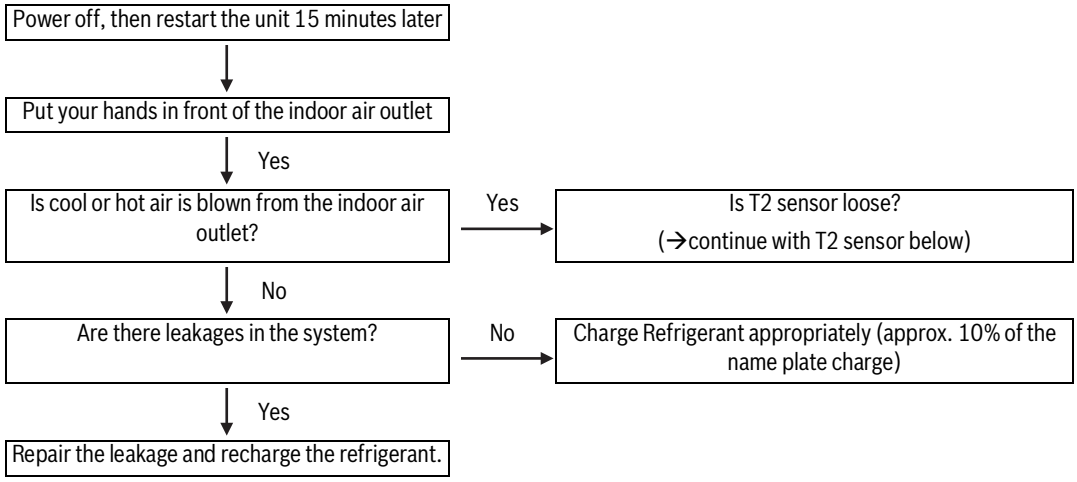
**Description**

Judging the abnormality of the refrigeration system according to the number of compressor stops anfd the changes in operating parameters caused by exessive exhaust temperature.

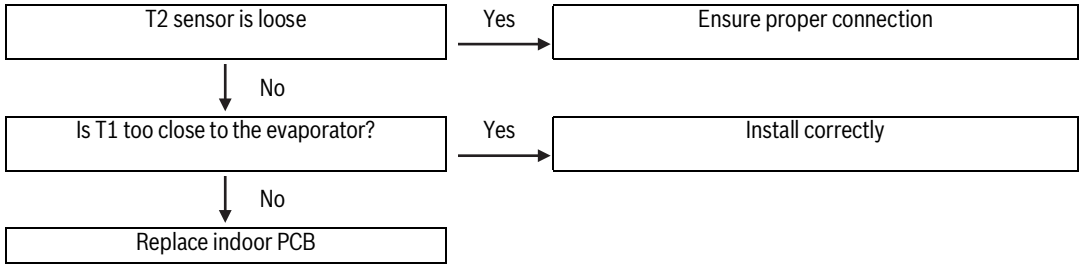
**Recommended parts to prepare**

- Indoor PCB
- Additional refrigerant

**Procedure**




**T2 sensor**



### 8.5.10 EL 01: Indoor and outdoor unit communication error diagnosis and solution

**Digital output**

- EL 01

**Description**

- Indoor unit can not communicate with outdoor unit.

**Recommended parts to prepare**

- Indoor PCB
- Outdoor PCB
- Short-circuited component

**Additional information**

- Use a multimeter to test the DC voltage between 2(N) and S port of outdoor unit. The red pin of multimeter connects with 2(N) port while the black pin is for S port.
- When AC is normal running, the voltage will move alternately from positive to negative values.
- If the outdoor unit has malfunction, the voltage has always a positive value.
- While if the indoor unit has malfunction, the voltage is fixed or has a value very close to zero.

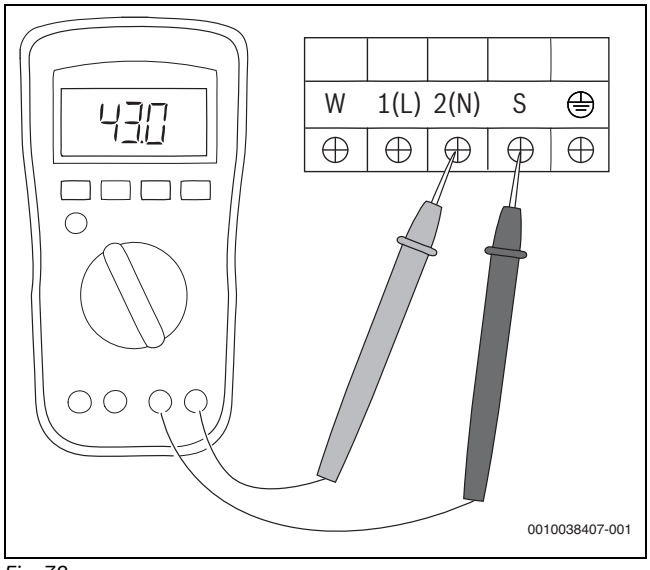
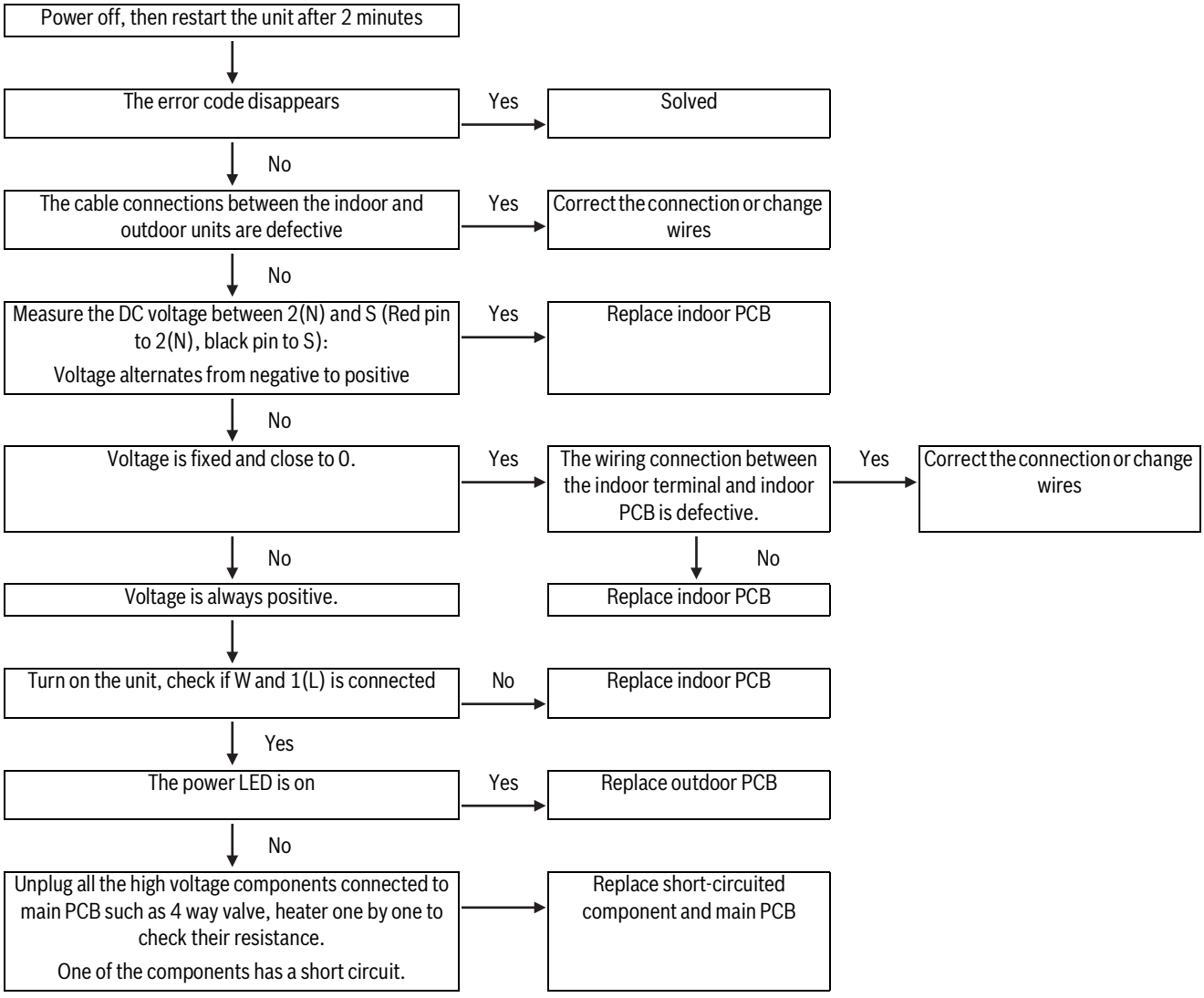



*Fig. 78*

- Use a multimeter to test the resistance of the reactor. Be sure that the capacitor is not connected during measurement.
- The normal value should be around zero ohm. Otherwise, the reactor may have malfunction.

The picture and the value are only for reference, actual condition and specific value may vary.

**Procedure**


Power off, then restart the unit after 2 minutes
The error code disappears
Yes
Solved
No
The cable connections between the indoor and outdoor units are defective
Yes
Correct the connection or change wires
No
Measure the DC voltage between 2(N) and S (Red pin to 2(N), black pin to S):
Voltage alternates from negative to positive
Yes
Replace indoor PCB
No
Voltage is fixed and close to 0.
Yes
The wiring connection between the indoor terminal and indoor PCB is defective.
Yes
Correct the connection or change wires
No
No
Voltage is always positive.
Replace indoor PCB
Turn on the unit, check if W and 1(L) is connected
No
Replace indoor PCB
Yes
The power LED is on
Yes
Replace outdoor PCB
No
Unplug all the high voltage components connected to main PCB such as 4 way valve, heater one by one to check their resistance.
One of the components has a short circuit.
Replace short-circuited component and main PCB

### 8.5.11 PC 08: Current overload protection

**Digital output**

- PC 08

**Description**

- An abnormal current rise is detected by checking the specified current detection circuit.

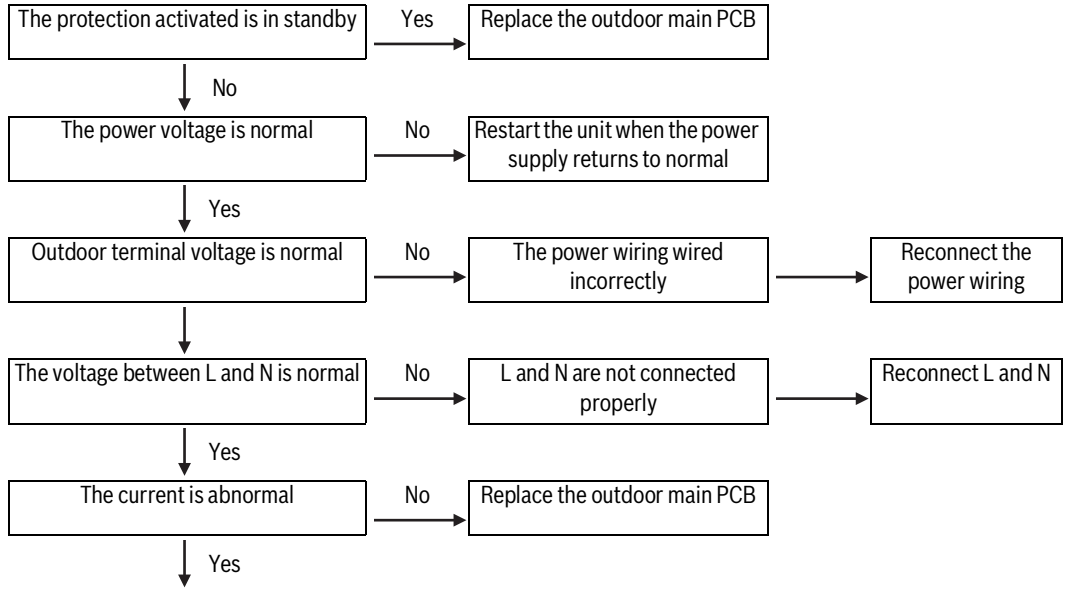
**Recommended parts to prepare**

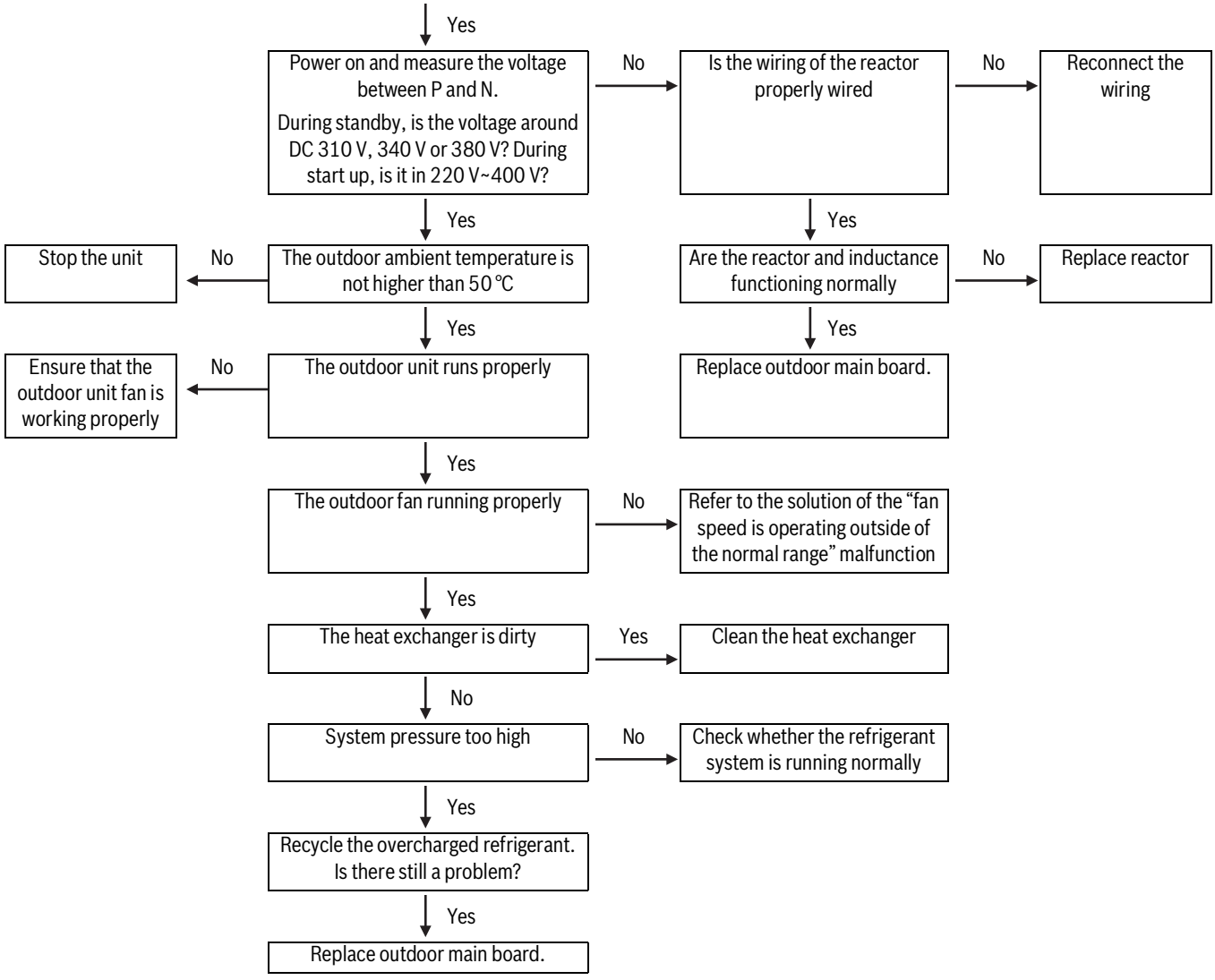
- Connection wires
- Reactor
- Outdoor fan
- Outdoor PCB

**Additional information**

For certain models, outdoor PCB could not be removed separately. In this case, the outdoor electric control box should be replaced as a whole.

**Procedure**




Yes
Power on and measure the voltage between P and N.
During standby, is the voltage around DC 310 V, 340 V or 380 V? During start up, is it in 220 V~400 V?
No
Is the wiring of the reactor properly wired
No
Reconnect the wiring
Yes
Yes
Stop the unit
No
The outdoor ambient temperature is not higher than 50 ℃
Are the reactor and inductance functioning normally
No
Replace reactor
Yes
Yes
Ensure that the outdoor unit fan is working properly
No
The outdoor unit runs properly
Replace outdoor main board.
Yes
The outdoor fan running properly
No
Refer to the solution of the “fan speed is operating outside of the normal range” malfunction
Yes
The heat exchanger is dirty
Yes
Clean the heat exchanger
No
System pressure too high
No
Check whether the refrigerant system is running normally
Yes
Recycle the overcharged refrigerant. Is there still a problem?
Yes
Replace outdoor main board.

### 8.5.12 PC 00: IPM malfunction or IGBT over-strong current protection

**Digital output**

- PC 00

**Description**

- When the voltage signal the IPM sends to the compressor drive chip is abnormal, the LED displays the failure code and the AC turns off.

**Recommended parts to prepare**

- Connection wires
- IPM module board
- Outdoor fan assembly
- Compressor
- Outdoor PCB

**Additional information**

**WARNING**

**Electricity remains in capacitors even when the power supply is off.**

▶ Ensure the capacitors are fully discharged before troubleshooting.

IPM Continuity Check

▶ Turn off outdoor unit and disconnect power supply.
▶ Discharge electrolytic capacitors and ensure all energy-storage unit has been discharged.
▶ Disassemble outdoor PCB or disassemble IPM board.
▶ Measure the resistance value between P and (U,V,W), N and (U,V,W).

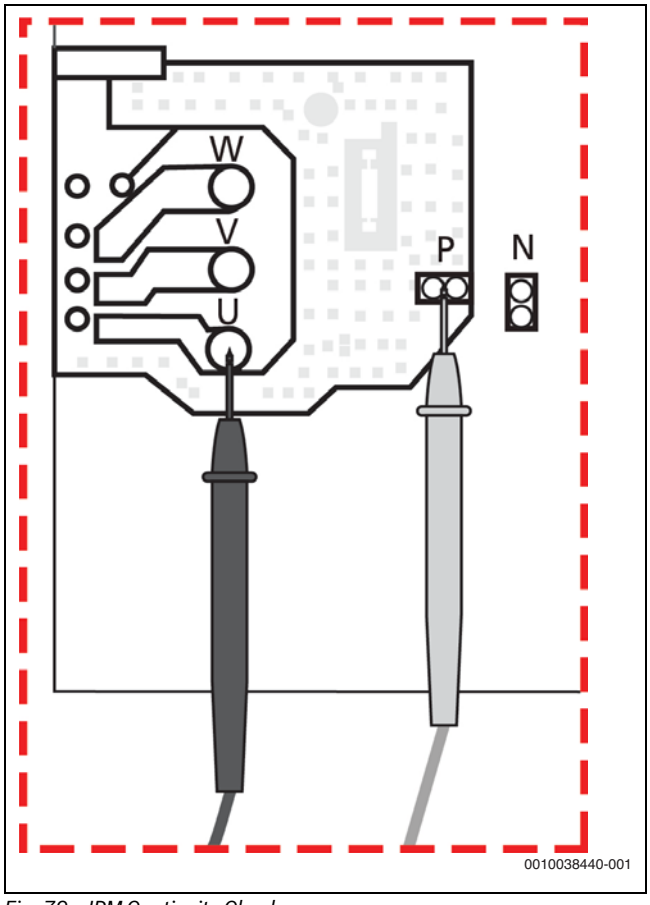



*Fig. 79 IPM Continuity Check*

| Digital tester | | Resistance value |
|---|---|---|
| (-) Black | (+) Red | |
| P | U | 15,6 MΩ |
| | V | |
| | W | |
| N | U | 15,6 MΩ |
| | V | |
| | W | |

*Table 24*

Compressor check

▶ Disconnect the compressor and check the resistance between U-V, V-W and U-W, and all 3 values should be equal.
▶ If not, the compressor is faulty and should be replaced.

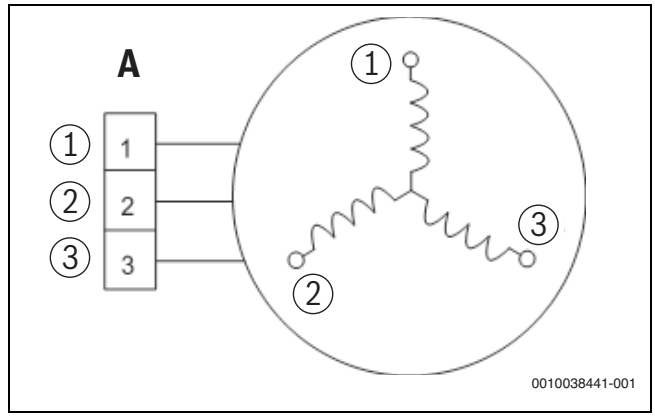



*Fig. 80 Compressor check*

[1] Blue
[2] Red
[3] Black

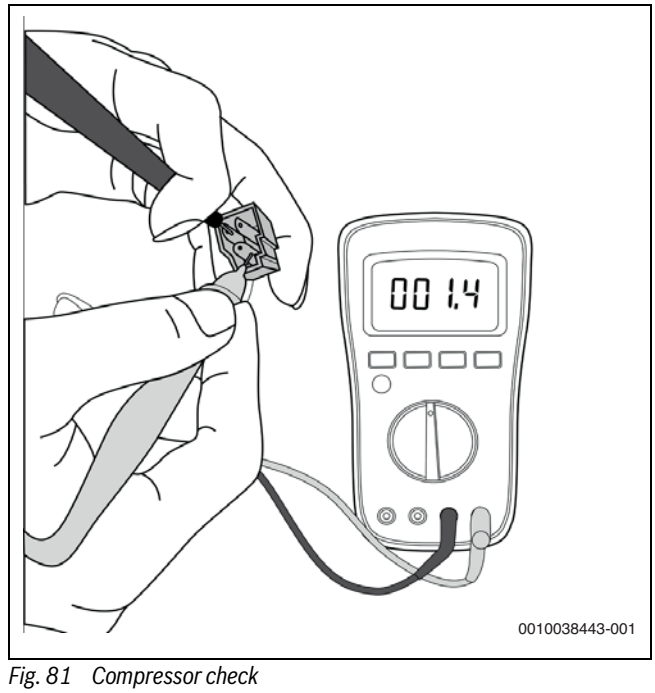
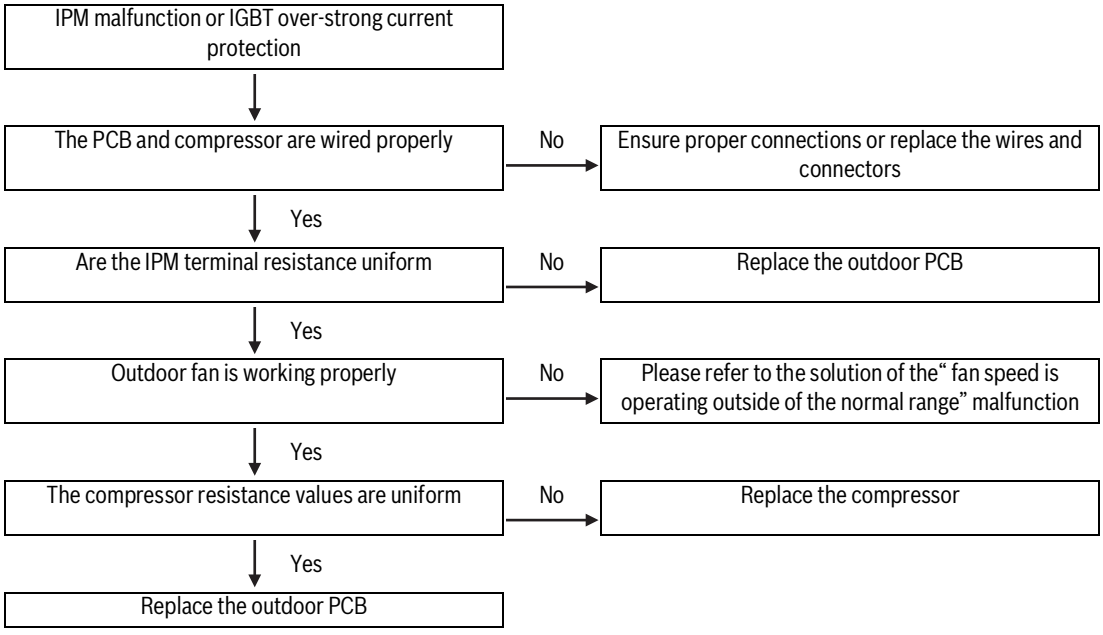



*Fig. 81 Compressor check*

The picture and the value are only for reference, actual condition and specific value may vary.

**Procedure**



### 8.5.13 PC 01: Over voltage or too low voltage protection

**Digital output**

- PC 01

**Description**

- Abnormal increases or decreases in voltage are detected by checking the specified voltage detection circuit.

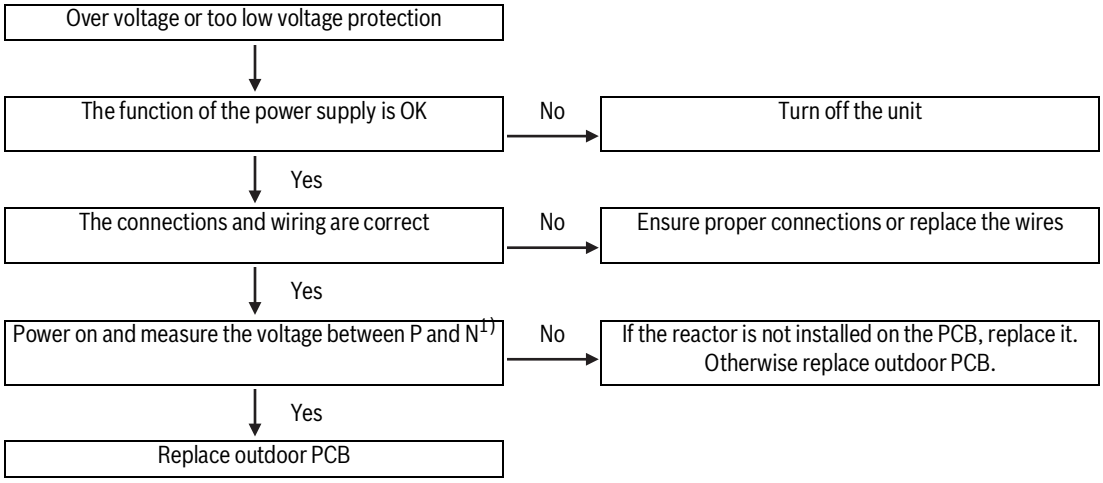
**Recommended parts to prepare**

- Power supply wires
- PCB
- Reactor

**Additional information**

For certain models, outdoor PCB could not be removed separately. In this case, the outdoor electric control box should be replaced as a whole.

**Procedure**




1) While the unit is in standby, is the voltage between P and N is around DC 310 V, 340 V or 380 V. When start up the unit, is it in 220 V~400 V.

### 8.5.14 PC 02: Top temperature protection of compressor or high temperature protection of IPM module or high pressure protection diagnosis and solution

**Digital output**

- PC 02

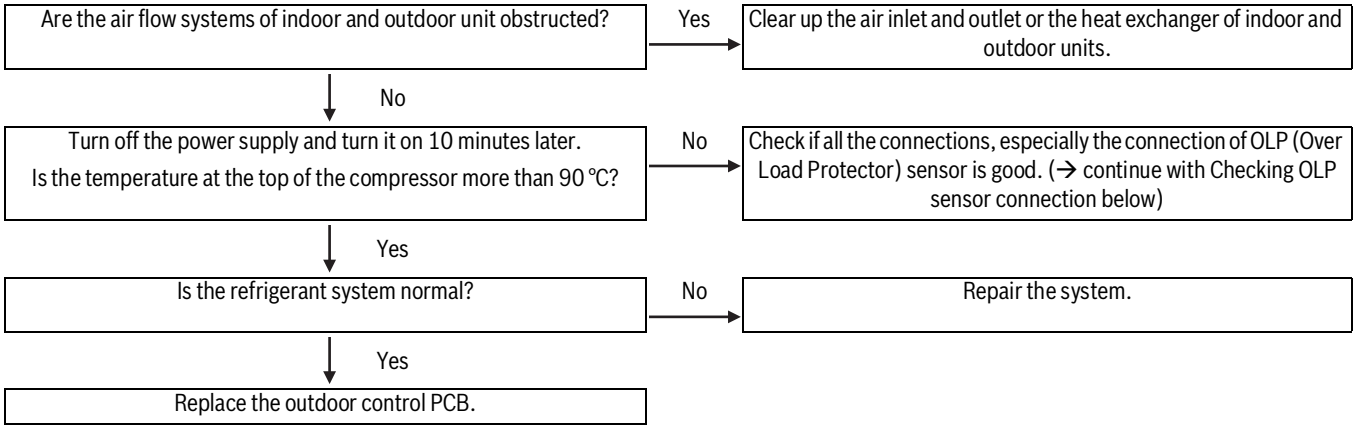
**Description**

- For some models with overload protection, If the sampling voltage is not 5V, the LED will display the failure.If the temperature of IPM module is higher than a certain value, the LED displays the failure code.For some models with high pressure switch, outdoor pressure switch cut off the system because high pressure is higher than 4.4 MPa, the LED displays the failure code.

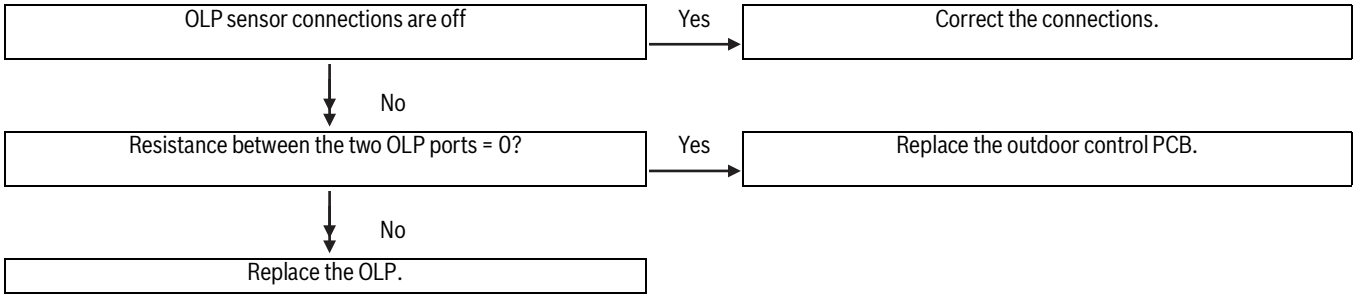
**Recommended parts to prepare**

- Connection wires
- Outdoor PCB
- IPM module board
- High pressure protector
- System blockages

**Procedure**




**Checking OLP sensor connection**




For certain models, the outdoor PCB can not be removed separately. In this case, the outdoor electric control box should be replaced as a whole.

### 8.5.15 PC 04: Inverter compressor drive error

**Digital output**

- PC 04

**Description**

- An abnormal inverter compressor drive is detected by a special detection circuit, including communication signal detection, voltage detection, compressor rotation speed signal detection and so on.

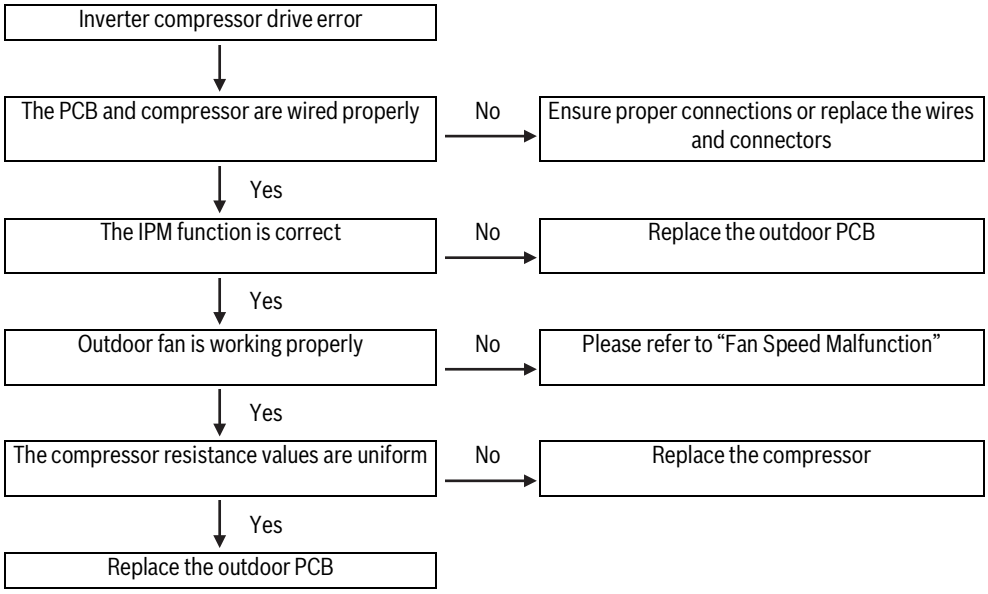
**Recommended parts to prepare**

- Connection wires
- Outdoor fan assembly
- Compressor
- Outdoor PCB

**Additional information**

For certain models, outdoor PCB could not be removed separately. In this case, the outdoor electric control box should be replaced as a whole.

**Procedure**



#### 8.5.16 PC 40: Communication error between outdoor main chip and compressor driven chip

**Digital output**

- PC 40

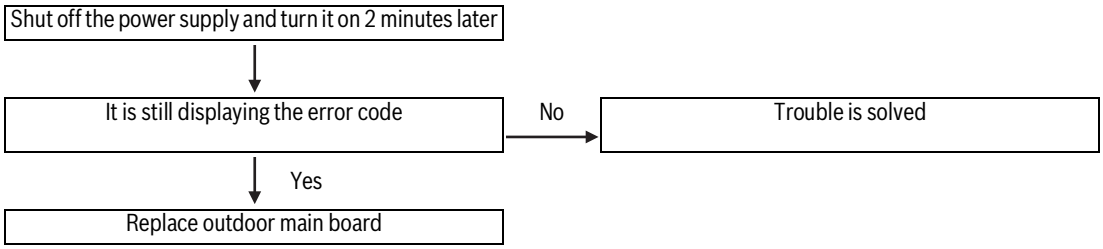
**Description**

- The main chip cannot detect the compressor driven chip.

**Recommended parts to prepare**

- Outdoor main PCB

**Procedure**




## 9 Appendix

### 9.1 Temperature Sensor Resistance Value Table for T1,T2,T3 and T4

| Temperature [°C] | Resistance [kΩ] |
|---|---|
| -20 | 115.3 |
| -18 | 101.5 |
| -16 | 89.59 |
| -14 | 79.31 |
| -12 | 70.17 |
| -10 | 62.28 |
| -8 | 56.37 |
| -6 | 49.32 |
| -4 | 44.00 |
| -2 | 39.82 |
| 0 | 35.20 |
| 2 | 31.56 |
| 4 | 28.35 |
| 6 | 25.50 |
| 8 | 22.57 |
| 10 | 20.72 |
| 12 | 18.72 |
| 14 | 16.93 |
| 16 | 15.34 |
| 18 | 13.92 |
| 20 | 12.64 |
| 22 | 11.50 |
| 24 | 10.47 |
| 26 | 9.551 |
| 28 | 8.720 |
| 30 | 7.971 |
| 32 | 7.295 |
| 34 | 6.684 |
| 36 | 6.131 |
| 38 | 5.630 |
| 40 | 5.175 |
| 42 | 4.763 |
| 44 | 4.387 |

| Temperature [°C] | Resistance [kΩ] |
|---|---|
| 46 | 4.046 |
| 48 | 3.735 |
| 50 | 3.451 |
| 52 | 3.192 |
| 54 | 2.959 |
| 56 | 2.738 |
| 58 | 2.540 |
| 60 | 2.358 |
| 62 | 2.191 |
| 64 | 2.037 |
| 66 | 1.896 |
| 68 | 1.766 |
| 70 | 1.647 |
| 72 | 1.537 |
| 74 | 1.435 |
| 76 | 1.341 |
| 78 | 1.254 |
| 80 | 1.174 |
| 82 | 1.100 |
| 84 | 1.031 |
| 86 | 0.9668 |
| 88 | 0.9075 |
| 90 | 0.8525 |
| 92 | 0.8013 |
| 94 | 0.7537 |
| 96 | 0.7094 |
| 98 | 0.6682 |
| 100 | 0.6297 |
| 102 | 0.5959 |
| 104 | 0.5604 |
| 106 | 0.5291 |
| 108 | 0.4999 |
| 110 | 0.4726 |

| Temperature [°C] | Resistance [kΩ] |
|---|---|
| 112 | 0.4470 |
| 114 | 0.4230 |
| 116 | 0.4006 |
| 118 | 0.3796 |
| 120 | 0.3598 |
| 122 | 0.3413 |
| 124 | 0.3239 |
| 126 | 0.3075 |
| 128 | 0.2922 |
| 130 | 0.2777 |
| 132 | 0.2641 |
| 134 | 0.2513 |
| 136 | 0.2392 |
| 138 | 0.2278 |

*Table 25*

## 9.2 Temperature Sensor Resistance Value Table for TP (T5)

| Temperature [°C] | Resistance [kΩ] |
|---|---|
| -20 | 542.7 |
| -18 | 483.0 |
| -16 | 430.5 |
| -14 | 384.3 |
| -12 | 343.6 |
| -10 | 307.7 |
| -8 | 275.9 |
| -6 | 247.8 |
| -4 | 222.8 |
| -2 | 200.7 |
| 0 | 180.9 |
| 2 | 163.3 |
| 4 | 147.6 |
| 6 | 133.5 |
| 8 | 121.0 |
| 10 | 109.8 |
| 12 | 99.69 |
| 14 | 90.66 |
| 16 | 82.54 |
| 18 | 75.24 |
| 20 | 68.66 |
| 22 | 62.73 |
| 24 | 57.37 |
| 26 | 52.53 |
| 28 | 48.14 |
| 30 | 44.17 |
| 32 | 40.57 |
| 34 | 37.30 |
| 36 | 34.32 |
| 38 | 31.62 |
| 40 | 29.15 |
| 42 | 26.90 |
| 44 | 24.85 |
| 46 | 22.89 |
| 48 | 21.26 |
| 50 | 19.69 |
| 52 | 18.26 |
| 54 | 16.94 |
| 56 | 15.73 |
| 58 | 14.62 |
| 60 | 13.59 |
| 62 | 12.65 |
| 64 | 11.79 |
| 66 | 10.99 |
| 68 | 10.25 |
| 70 | 9.569 |
| 72 | 8.980 |
| 74 | 8.358 |
| 76 | 7.820 |
| 78 | 7.321 |
| 80 | 6.859 |
| 82 | 6.430 |
| 84 | 6.033 |
| 86 | 5.663 |
| 88 | 5.320 |
| 90 | 5 |
| 92 | 4.703 |
| 94 | 4.426 |
| 96 | 4.167 |
| 98 | 3.927 |
| 100 | 3.702 |
| 102 | 3.492 |
| 104 | 3.296 |
| 106 | 3.113 |
| 108 | 2.941 |
| 110 | 2.781 |
| 112 | 2.630 |
| 114 | 2.489 |
| 116 | 2.357 |
| 118 | 2.233 |
| 120 | 2.117 |
| 122 | 2.007 |
| 124 | 1.905 |
| 126 | 1.808 |
| 128 | 1.717 |
| 130 | 1.632 |

*Table 26*

## 9.3 Complain Record Form

| | | | |
|---|---|---|---|
| Request No.:<br>Installation Date: | | Date:<br>Service Date: | |
| **Customer Information** | | | |
| Name | | Telephone No. | |
| Home Address | | | |
| Email | | | |
| | | | |
| **Product Information** | | | |
| Indoor Unit Model | | Outdoor Unit Model | |
| Serial No. of indoor unit | | Serial No. of outdoor unit | |
| Working Mode | ☐ Cooling ☐ Heating | ☐ Fan only ☐ Dry | |
| Setting temperature | _____ ℃ | Fan speed | ☐ Turbo ☐ Auto<br>☐ High ☐ Medium<br>☐ Low |
| Temperature of air inlet | _____ ℃ | Temperature of air outlet | _____ ℃ |
| | | | |
| **Installation / Condition Information** | | | |
| Indoor temperature | _____ ℃ | Indoor humidity | _____%RH |
| Outdoor temperature | _____ ℃ | Outdoor humidity | _____%RH |
| Length of Connecting pipe | | Pipe diameter | Gas pipe: Liquid pipe: |
| Length of Wiring | | wire diameter | |
| System Running Pressure | _____MPa or _____Bar | | |
| Room size (L*W*H) | | | |
| Photo of Installation of Indoor unit (Photo #1) | | Photo of Installation of Outdoor unit (Photo #2) | |
| | | | |
| **Failure Description** | | | |
| Error Code of Indoor unit: | | Code of Outdoor PCB: | |
| Unit does not start | | Less cooling or heating | |
| Remote control does not work | | Unit starts but stops shortly | |
| Indoor display shows nothing | | High noise | |
| No cooling or heating at all | | High vibration | |

| Parameter information inquiry | | | |
|---|---|---|---|
| **Parameter** | **Definition** | **Display value** | **Display value meaning** |
| T1 | Room temperature | | |
| T2 | Indoor coil temperature | | |
| T3 | Outdoor coil temperature | | |
| T4 | Ambient temperature | | |
| TP | Discharge temperature | | |
| FT | Targeted Frequency | | |
| Fr | Actual Frequency | | |
| dl | Compressor current | | |
| Uo | Outdoor AC voltage | | |
| Sn | Indoor capacity test | | |
| Pr | Outdoor fan speed | | |
| Lr | EXV opening steps | | |
| ir | Indoor fan speed | | |
| HU | Indoor humidity | | |
| TT | Adjusted setting temperature | | |
| oT | New calculated frequency | | |
| DT | Reserved | | |
| iF | Reserved | | |
| nA | Reserved | | |
| -- | Reserved | | |

| Approval from Manufacturer | |
|---|---|
| ☐ Approved | |
| ☐ More Proof needed | |
| ☐ Rejected | |

## 10 Environmental protection and disposal

Environmental protection is a fundamental corporate strategy of the Bosch Group.
The quality of our products, their economy and environmental safety are all of equal importance to us and all environmental protection legislation and regulations are strictly observed.
We use the best possible technology and materials for protecting the environment taking account of economic considerations.

**Packaging**

Where packaging is concerned, we participate in country-specific recycling processes that ensure optimum recycling.
All of our packaging materials are environmentally compatible and can be recycled.

**Used appliances**

Used appliances contain valuable materials that can be recycled.
The various assemblies can be easily dismantled. Synthetic materials are marked accordingly. Assemblies can therefore be sorted by composition and passed on for recycling or disposal.

**Old electrical and electronic devices**

This symbol means that the product cannot be disposed of with other waste, but must be taken to waste collection points for treatment, collection, recycling and disposal.

The symbol is valid for countries that have directives on electronic waste, e.g. "European Union Directive 2012/19/EC on end-of-life electrical and electronic appliances". These provisions define the regulatory framework of the directive valid for the return and recycling of used electronic appliances in each country.

Electronic appliances that may contain hazardous substances must be recycled responsibly in order to minimise possible damage to the environment and dangers to people's health. To this end, the recycling of electronic waste contributes to the preservation of natural resources.

For more information on the environmentally safe disposal of used electrical and electronic appliances, please contact the local authorities, waste disposal company or distributor from which you purchased the product.

You can find more information here:
www.bosch-homecomfortgroup.com/en/company/legal-topics/weee/

**Batteries**

Batteries must not be disposed together with your household waste.
Used batteries must be disposed of in local collection systems.

**Refrigerant R32**

The appliance contains fluorinated gas R32 (global warming potential 675[1)]) mild combustibility and low toxicity (A2L or A2).

Contained quantity is indicated on the equipment outdoor unit name label.

Refrigerant is hazardous to the environment and must be collected and disposed of separately.

## 11 Data Protection Notice

We, **Bosch Thermotechnology Ltd., Cotswold Way, Warndon, Worcester WR4 9SW, United Kingdom**, process product and installation information, technical and connection data, communication data, product registration and client history data to provide product functionality (art. 6 §1.1 (b) GDPR), to fulfil our duty of product surveillance and for product safety and security reasons (art. 6 §1.1 (f) GDPR), to safeguard our rights in connection with warranty and product registration questions (art. 6 §1.1 (f) GDPR) and to analyse the distribution of our products and to provide individualized information and offers related to the product (art. 6 §1.1 (f) GDPR). To provide services such as sales and marketing, contract management, payment management, programming, data hosting and hotline services, we may request and transfer data to external service providers and/or Bosch affiliates. In some cases, but only if adequate data protection is ensured, personal data may be transferred to recipients located outside the European Economic Area. Additional information is provided upon request. You can contact our Data Protection Officer under: Data Protection Officer for Information Security and Privacy (C/ISP), Robert Bosch GmbH, Postfach 30 02 20, 70442 Stuttgart, GERMANY.

You have the right to object to the processing of your personal data at any time on the basis of Art. 6 §1.1 (f) GDPR on grounds relating to your particular situation or if your data is used for direct marketing purposes. To exercise your rights, please contact us at **privacy.ttpo@bosch.com.** For more information, follow the QR code.

1) Based on ANNEX VI of REGULATION (EU) No 573/2024 of the European Parliament and of the Council of 7 February 2024.

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