# Operating and installation instructions

## REMKO ML-ARCTIC series

## Arctic heat pumps

ML 265 ARCTIC, ML 355 ARCTIC, ML 525 ARCTIC, ML 685 ARCTIC



0257-2021-04 Edition 2, en_GB

Read the instructions prior to performing any task!

R32
Refrigerant

CE

**Read these operating instructions carefully before commissioning / using this device!**

**These instructions are an integral part of the system and must always be kept near or on the device.**

Subject to modifications; No liability accepted for errors or misprints!

**Translation of the original**

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# 1 Safety and usage instructions

## 1.1 General safety notes

Carefully read the operating manual before commissioning the units or their components for the first time. It provides useful tips and notes such as hazard warnings to prevent injury and material damage. Failure to follow the directions in this manual can endanger persons, the environment and the equipment itself or its components and will void any claims for liability.

Store this manual and the information required for the operation of this system (e.g. refrigerant datasheet) in the vicinity of the unit.

The refrigerant used in the system is flammable. If applicable, observe the local safety conditions.



**Warning of inflammable substances!**

## 1.2 Identification of notes

This section provides an overview of all important safety aspects for proper protection of people and safe and fault-free operation.The instructions and safety notes contained within this manual must be observed in order to prevent accidents, personal injury and material damage.

Notes attached directly to the units must be observed in their entirety and be kept in a fully legible condition.

Safety notes in this manual are indicated by symbols. Safety notes are introduced with signal words which help to highlight the magnitude of the danger in question.

**DANGER!**

Contact with live parts poses an immediate danger of death due to electric shock. Damage to the insulation or individual components may pose a danger of death.

**DANGER!**

This combination of symbol and signal word warns of a situation in which there is immediate danger, which if not avoided may be fatal or cause serious injury.

**WARNING!**

This combination of symbol and signal word warns of a potentially hazardous situation, which if not avoided may be fatal or cause serious injury.

**CAUTION!**

This combination of symbol and signal word warns of a potentially hazardous situation, which if not avoided may cause injury or material and environmental damage.

**NOTICE!**

This combination of symbol and signal word warns of a potentially hazardous situation, which if not avoided may cause material and environmental damage.

*This symbol highlights useful tips and recommendations as well as information for efficient and fault-free operation.*

## 1.3 Personnel qualifications

Personnel responsible for commissioning, operation, maintenance, inspection and installation must be able to demonstrate that they hold a qualification which proves their ability to undertake the work.

## 1.4 Dangers of failure to observe the safety notes

Failure to observe the safety notes may pose a risk to people, the environment and the units. Failure to observe the safety notes may void any claims for damages.

In particular, failure to observe the safety notes may pose the following risks:

- The failure of important unit functions.
- The failure of prescribed methods of maintenance and repair.
- Danger to people on account of electrical and mechanical effects.

## 1.5 Safety-conscious working

The safety notes contained in this manual, the existing national regulations concerning accident prevention as well as any internal company working, operating and safety regulations must be observed.

## 1.6 Safety instructions for the operator

The operational safety of the units and components is only assured providing they are used as intended and in a fully assembled state.

- The units and components may only be set up, installed and maintained by qualified personnel.
- Protective covers (grills) over moving parts must not be removed from units that are in operation.
- Do not operate units or components with obvious defects or signs of damage.
- Contact with equipment parts or components can lead to burns or injury.
- The units and components must not be exposed to any mechanical load, extreme levels of humidity or extreme temperatures.
- Rooms in which refrigerant may escape shall be adequately aerated and ventilated. Otherwise, a risk of suffocation or fire exists.
- Do not leave children unsupervised when close to the system.
- Commissioning must be performed by authorised specialists exclusively. Deficient commissioning may lead to water leaks, electric shocks or fire. Commissioning must take place as described in the user manual.
- Only instruct authorised specialist personnel to perform maintenance or servicing.
- The system is filled with a flammable refrigerant. Never thaw any frozen unit components independently!
- Do not operate any further devices that produce high heat or naked flames in the same room.
- All housing parts and unit openings, e.g. air inlets and outlets, must be kept clear.
- The units must be inspected by a service technician to ensure that they are safe to use and fully functional at least once yearly. Visual inspections and cleaning may be performed by the operator when the units are disconnected from the mains.

## 1.7 Safety notes for installation, maintenance and inspection

- The refrigerant R32 used in the system is flammable. If applicable, observe the local safety conditions.
- Keep the cooling circuit clear of other gases and foreign substances. Only fill the cooling circuit with the refrigerant R32.
- Only use the accessories, components and appropriately marked parts provided. The use of non-standardised components may result in water leaks, electric shocks and fire.
- Only install and store the units in rooms larger than 4 $m^2$. With a failure to comply, leaks may result in the room filling with a flammable mixture!

  The minimum room size of 4 $m^2$ required for installation and storage pertains to the basic fill quantity of the unit. This varies according to the installation type and total fill quantity of the system. The calculation must take place in accordance with valid DIN standards. Make sure that the installation site is suitable for safe unit operation.
- Only mount the unit components on structurally suitable brickwork.
- The units must not be installed in rooms in which further devices that produce heat are operated (heaters, open hearths).
- Make sure the installation room is sufficiently ventilated.
- Interventions in the cooling circuit are only possible after completely draining the refrigerant. Never solder or grind unit components!
- Note that refrigerant may be odourless.
- Never operate the air conditioning unit in a humid room, such as a bathroom or laundry room. If the humidity is too high, this can cause short circuits on electrical parts.
- The product must be correctly earthed at all times, otherwise it may induce electric shocks.
- Attach the condensate drain as described in the operating manual. The inadequate drainage of condensate can lead to water damage in your apartment.
- All persons who intervene in the cooling circuit must hold a valid certificate from the chamber of industry and commerce, which confirms their ability to work with refrigerant.

- Appropriate hazard prevention measures must be taken to prevent risks to people when performing installation, repair, maintenance or cleaning work on the units.
- The setup, connection and operation of the units and its components must be undertaken in accordance with the usage and operating conditions stipulated in this manual and comply with all applicable regional regulations.
- Regional regulations and laws as well as the Water Ecology Act must be observed.
- The power supply should be adapted to the requirements of the units.
- Units may only be mounted at the points provided for this purpose at the factory. The units may only be secured or mounted on stable structures, walls or floors.
- The units and components should not be operated in areas where there is a heightened risk of damage. Observe the minimum clearances.
- The units and components must be kept at an adequate distance from flammable, explosive, combustible, abrasive and dirty areas or atmospheres.
- Safety devices may not be modified or bypassed.
- The connection of the indoor unit must be established as a permanent connection; a detachable, reusable connection is not permissible.

## 1.8 Unauthorised modification and changes

Modifications or changes to units and components are not permitted and may cause malfunctions. Safety devices may not be modified or bypassed. Original replacement parts and accessories authorised by the manufactured ensure safety. The use of other parts may invalidate liability for resulting consequences.

## 1.9 Intended use

Depending on the model, the units and the additional fittings with which they are equipped are only intended to be used as an air-conditioner for the purpose of cooling or heating the air in an enclosed space.

Any different or additional use is a non-intended use. The manufacturer/supplier assumes no liability for damages arising from a non-intended use. The user bears the sole risk in such cases. Intended use also includes working in accordance with the operating and installation instructions and complying with the maintenance requirements.

The threshold values specified in the technical data must not be exceeded.

## 1.10 Warranty

For warranty claims to be considered, it is essential that the ordering party or its representative complete and return the "certificate of warranty" to REMKO GmbH & Co. KG at the time when the units are purchased and commissioned.

The warranty conditions are detailed in the "General business and delivery conditions". Furthermore, only the parties to a contract can conclude special agreements beyond these conditions. In this case, contact your contractual partner in the first instance.

## 1.11 Transport and packaging

The devices are supplied in a sturdy shipping container. Please check the equipment immediately upon delivery and note any damage or missing parts on the delivery and inform the shipper and your contractual partner. For later complaints can not be guaranteed.

**⚠ WARNING!**

**Plastic films and bags etc. are dangerous toys for children!**

Why:

- Leave packaging material are not around.

- Packaging material may not be accessible to children!

## 1.12 Environmental protection and recycling

**Disposal of packaging**

All products are packed for transport in environmentally friendly materials. Make a valuable contribution to reducing waste and sustaining raw materials. Only dispose of packaging at approved collection points.



**Disposal of equipment and components**

Only recyclable materials are used in the manufacture of the devices and components. Help protect the environment by ensuring that the devices or components (for example batteries) are not disposed in household waste, but only in accordance with local regulations and in an environmentally safe manner, e.g. using certified firms and recycling specialists or at collection points.



# 2 Technical data

## 2.1 Unit data

| Series | | ML 265 DC ARCTIC | ML 355 DC ARCTIC | ML 525 DC ARCTIC | ML 685 DC ARCTIC |
|---|---|---|---|---|---|
| Operating mode | | Inverter wall-mounted room air conditioner combination for cooling and heating | | | |
| Nominal heat capacity [2] | kW | 2.6 (0.9-3.7) | 2.8 (0.8-4.8) | 5.3 (1.1-7.0) | 5.1 (1.5-9.4) |
| Energy efficiency ratio SCOP [4] | | 4.0 | 4.2 | 4.0 | 4.0 |
| Electrical rated power consumption, heating [2] | kW | 0.72 | 1.05 | 1.45 | 2.18 |
| Electrical rated current consumption, heating [2] | A | 3.44 | 4.5 | 6.4 | 9.5 |
| Power consumpt., annual, $Q_{HE}$ [3] | kWh | 875 | 922 | 1365 | 1785 |
| Energy efficiency ratio, heating [2] | | A+ | A+ | A+ | A+ |
| Nominal cooling output [1] | kW | 2.6 (0.9-3.2) | 3.5 (0.8-4.2) | 5.3 (1.7-6.2) | 7.2 (2.6-8.4) |
| Energy efficiency ratio SEER [1] | | 7.1 | 7.5 | 6.7 | 6.4 |
| Electrical rated power consumption, cooling [1] | kW | 0.75 | 1.05 | 1.46 | 2.40 |
| Electrical rated current consumption, cooling [1] | A | 3.25 | 4.74 | 6.35 | 10.55 |
| Power consumpt., annual, $Q_{CE}$ [3] | kWh | 128 | 175 | 290 | 394 |
| Energy efficiency ratio, cooling [1] | | A++ | A++ | A++ | A++ |
| Max. power consumption | kW | 2.1 | 2.2 | 2.6 | 3.6 |
| Max. current consumption | A | 9.5 | 10.0 | 11.5 | 16.0 |
| EDP no. | | 1636265 | 1636355 | 1636525 | 1636685 |

[1] Air inlet temp. TK 27 °C/FK 19 °C, outside temperature TK 35 °C, FK 24 °C, max. air flow volume, 5 m pipe length

[2] Air inlet temp. TK 20 °C, outside temperature TK 7 °C, FK 6 °C, max. air flow volume, 5 m pipe length

[3] The specified value is based on results from standard testing.
The actual consumption depends on the use and location of the unit

[4] The specified value is based on the average heating period

# REMKO ML-ARCTIC series

| Data specific to indoor unit | | ML 265 DC ARCTIC IT | ML 355 DC ARCTIC IT | ML 525 DC ARCTIC IT | ML 685 DC ARCTIC IT |
|---|---|---|---|---|---|
| Application area (room volume), approx. | $m^3$ | 80 | 110 | 160 | 230 |
| Adjustment range, room temperature | °C | +17 to +30 | | | |
| Air flow volume per stage | $m^3/h$ | 259/429/521 | 294/478/539 | 420/505/750 | 640/830/1020 |
| Sound pressure level per stage [5)] | dB(A) | 22/30/37 | 22/30/38 | 27/33/42 | 30/44/44 |
| Sound pressure level, Silent/Turbo mode [5)] | dB(A) | 20/39 | 21/41 | 26/45 | 26/46 |
| Sound power level max. | dB(A) | 53 | 55 | 57 | 62 |
| Enclosure class | IP | X0 | | | |
| Condensate drainage connection | mm | 16 | | | |
| Dimensions: H/W/D | mm | 297/802/189 | | 319/965/215 | 335/1080/226 |
| Weight | kg | 7.4 | 8.2 | 9.0 | 12.9 |
| EDP no. | | 1636267 | 1636357 | 1636527 | 1636687 |

[5)] At distance of 1 m in the open air; specified values are maximum values

| Data specific to outdoor unit | | ML 265 DC ARCTIC AT | ML 355 DC ARCTIC AT | ML 525 DC ARCTIC AT | ML 685 DC ARCTIC AT |
|---|---|---|---|---|---|
| Power supply | V/Ph/Hz | 230/1~/50 | | | |
| Operating range, heating | °C | -20 to +50 | | | |
| Operating range, cooling [7)] | °C | +5 to +30 | | | |
| Air flow rate, max. | $m^3/h$ | 2000 | 2000 | 2100 | 2700 |
| Enclosure class | IP | 20 | | | |
| Sound power level max. | dB(A) | 58 | 60 | 64 | 66 |
| Sound pressure level [5)] | dB(A) | 55 | | 58 | 59 |
| Refrigerant [6)] | | R32 | | | |
| Refrigerant, basic quantity | kg | 0.70 | 0.80 | 1.25 | 1.60 |
| $CO_2$ equivalent | t | 0.47 | 0.54 | 0.84 | 1.08 |
| Refrigerant, addit. quantity >5 m | g/m | 20 | | | 40 |
| Refrigerant piping, max. length | m | 25 | | 30 | 50 |
| Refrigerant piping, max. height | m | 10 | | 20 | 25 |
| Refrigerant connection, injection pipe | Inches (mm) | 1/4 (6.35) | | | 3/8 (9.52) |
| Refrigerant connection, suction pipe | Inches (mm) | 3/8 (9.52) | | 1/2 (12.7) | 5/8 (15.9) |
| Dimensions: H/W/D | mm | 555/770/300 | 555/770/300 | 554/800/333 | 702/845/363 |
| Weight | kg | 26.4 | 26.5 | 37.0 | 50.0 |
| EDP no. | | 1636266 | 1636356 | 1636526 | 1636686 |

[5)] At distance of 1 m in the open air; specified values are maximum values

[6)] Contains greenhouse gas according to Kyoto protocol, GWP 675

[7)] Expandable to -15 °C with WRK-1

## 2.2 Unit dimensions

### Outdoor units

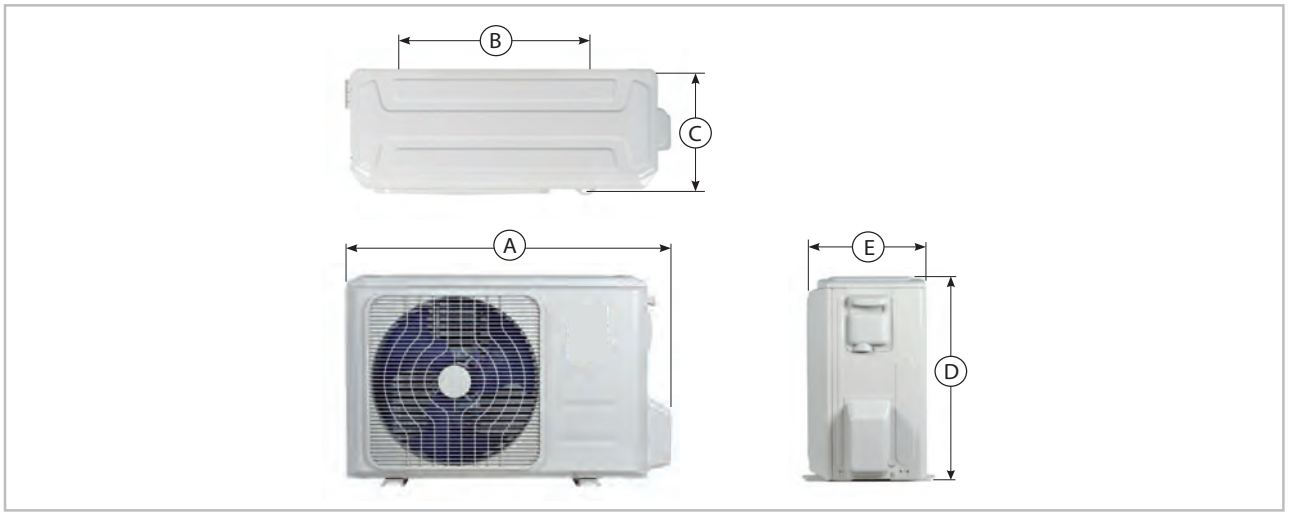



*Fig. 1: Outdoor unit dimensions ML 265 DC-685 DC ARCTIC AT*

| Measurements (mm) | A | B | C | D | E |
|---|---|---|---|---|---|
| ML 265 DC-355 DC ARCTIC AT | 770 | 487 | 298 | 555 | 300 |
| ML 525 DC ARCTIC AT | 800 | 514 | 340 | 554 | 333 |
| ML 685 DC ARCTIC AT | 845 | 540 | 350 | 702 | 363 |

### Indoor units

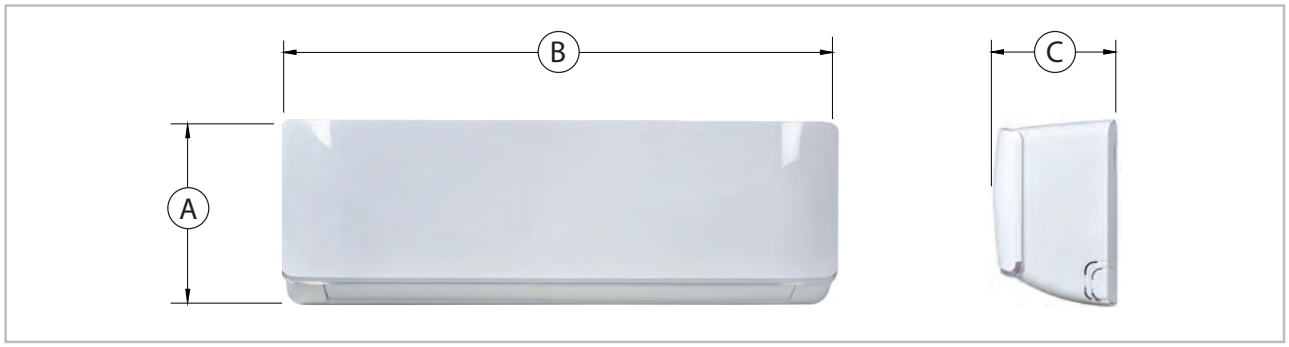



*Fig. 2: Indoor unit dimensions ML 265 DC-685 DC ARCTIC IT (All measurements in mm)*

| Measurements (mm) | A | B | C |
|---|---|---|---|
| ML 265 DC ARCTIC IT | 297 | 802 | 189 |
| ML 355 DC ARCTIC IT | 297 | 802 | 189 |
| ML 525 DC ARCTIC IT | 319 | 965 | 215 |
| ML 685 DC ARCTIC IT | 335 | 1080 | 226 |

We reserve the right to modify the dimensions and design as part of the ongoing technical development process.

# 3 Design and function

## 3.1 Unit description

The ML-ARCTIC series room air conditioners have a REMKO ML...AT outdoor unit as well as an ML...IT indoor unit.

In cooling mode, the outdoor unit serves to output the heat extracted by the indoor unit from the room being cooled. In heating mode, the heat taken up by the outdoor unit can be discharged by the indoor unit into the room to be heated. In both operating modes, the output produced by the compressor precisely matches requirements, and thereby regulates the nominal temperature with minimal temperature deviations. This "inverter technology" results in energy savings over conventional split systems and also reduces noise emissions to a particularly low level. The outdoor unit can be installed in an outdoor area or, providing that certain requirements are met, an indoor area. The indoor unit is designed to be mounted high up on the wall, in indoor areas. It is operated by an infrared remote control.

The outdoor unit consists of a cooling cycle with compressor, fin condenser, condenser fan, reversing valve and throttle element. The outdoor unit is controlled by the regulation of the indoor unit.

The indoor unit consists of a fin evaporator, evaporator fan, controller and condensate tray.

Floor brackets, wall brackets, refrigerant piping and condensate pumps are available as accessories.

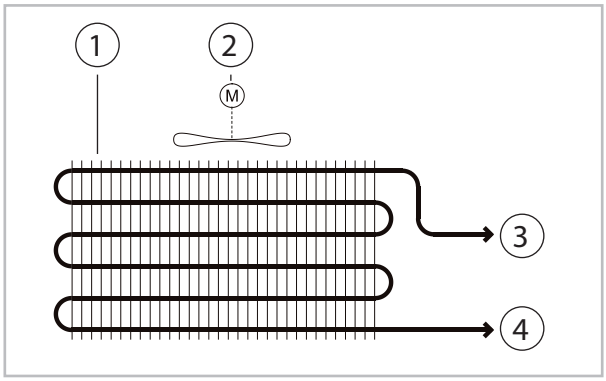



*Fig. 3: Cooling cycle diagram for indoor unit*

1: Evaporator
2: Evaporator fan
3: Suction pipe connection
4: Liquid pipe connection

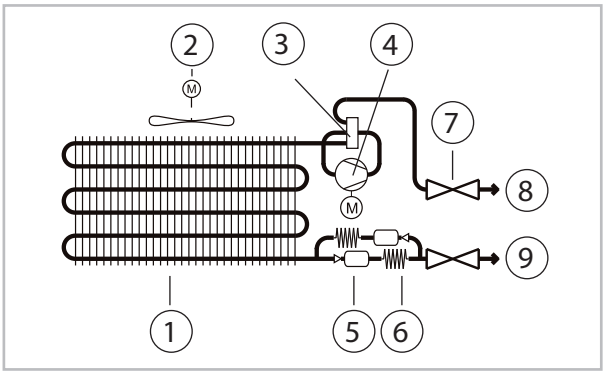



*Fig. 4: Cooling cycle diagram for outdoor unit*

1: Condenser
2: Condenser fan
3: Reversing valve
4: Compressor
5: Filter dryer
6: Capillary tube throttle element
7: Pressure gauge connection
8: Suction pipe connection valve
9: Liquid line connection valve

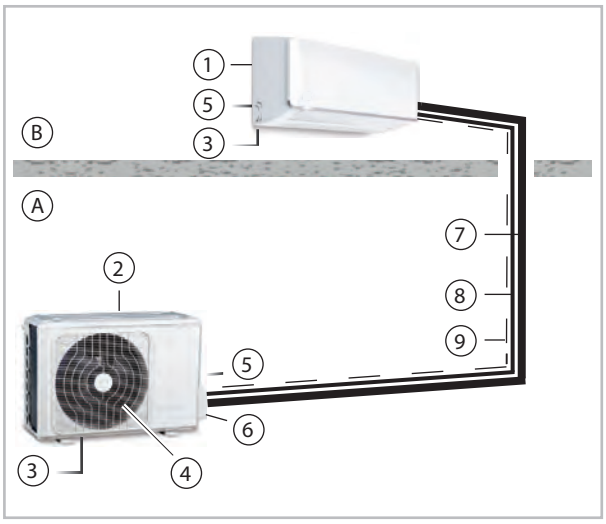



*Fig. 5: System layout*

A: Outdoor area
B: Indoor area
1: Indoor unit
2: Outdoor unit
3: Condensate drainage line
4: Condenser fan
5: Power supply cable
6: Shut-off valve
7: Suction pipe
8: Liquid line
9: Control line

Refrigerant piping is used to connect the indoor unit to the outdoor unit.

# 4 Operation

## 4.1 General notes

The indoor unit is easily operated using the standard infrared remote control. The indoor unit beeps to acknowledge the correct transmission of data. If it is not possible to program the indoor unit with the remote control, then it can also be manually operated.

### Manual mode

The indoor unit can also be switched on manually if the infrared remote control is lost/defective. Manual operation is intended for emergency operation and is not suitable for basic unit operation. Please replace the remote control. The key for manual activation is located below the housing cover on the right side.

The following settings apply for manual operation:

Pressing once: Automatic mode,

Pressing twice: Cooling mode,

Pressing three times: Unit OFF

### Infrared remote control

The infrared remote control sends the programmed settings a distance of up to 6 m to the receiver of the indoor unit. Data will only be received correctly if the remote control is pointed at the receiver and no objects are obstructing the transmission path.

Two AAA batteries must be inserted into the remote control in preparation. To do so, remove the flap from the battery compartment and insert the batteries the correct way around (see markings). Removing the batteries causes all stored data to be lost. The remote control will then access the default settings, which you are free to customise at any time.

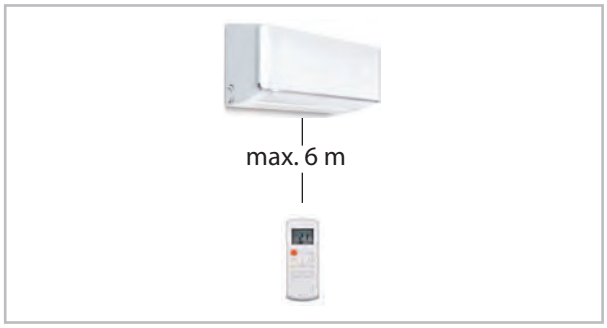



*Fig. 6: Maximum distance*

*Alarms are indicated by a code (see chapter Troubleshooting and customer service).*

**NOTICE!**

Immediately replace flat batteries with a new set, otherwise there is a risk of leakage. It is recommended that the batteries are removed if the equipment is shut down for longer periods.

*Help save on energy consumption in stand-by mode! If the device, system or component is not in use, we recommend disconnecting the power supply. Components with a safety function is excluded from our recommendation!*

## 4.2 Display on indoor unit

### Display

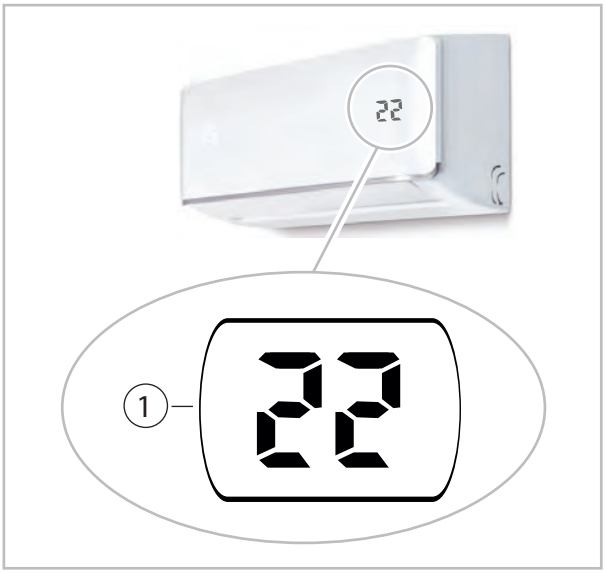



*Fig. 7: Display*

1: Display of coded error message and target temperature

## 4.3 Keys on the remote control




*Fig. 8: Keys on the remote control*

① **"ON/OFF" key**

Press this key to switch the air conditioning unit on and off.

② **Operating mode selection**

This key is used to set the desired operating mode. The automatic, cooling, dehumidification, heating and recirculation modes are available.

③ **Fan speed**

Use this key to select the desired fan speed. The automatic, low, medium and high functions are available. Note: In the dehumidification mode, the fan speed cannot be set manually.

④ **"SLEEP" key**

Activates/deactivates the "SLEEP" function.

Pressing this key will automatically increase or decrease the target temperature by 1 °C within an hour in cooling and heating mode respectively. Press this key to maintain the most convenient temperature and save energy. This function is only available in "Cooling", "Heating" and "Auto" modes. If the unit is working in "SLEEP" mode, this activity is interrupted by pressing the "MODE", "FAN", "Speed" or "ON/OFF" keys.

⑤ **"FRESH" key**

Press this key to activate/deactivate the ion generator (air freshener).

⑥ **"TURBO" key**

Activation of the turbo function makes it possible to reach the setpoint in cooling or heating mode as fast as possible.

⑦ **"SELF CLEAN" key (not available)**

This activates the self-clean function on the unit.

⑧ **“ARROW UP” and “ARROW DOWN” keys**

“ARROW UP” key

Press the key in order to increase the setpoint in 1 °C steps to a maximum 30°C.

“ARROW DOWN” key

Press the key in order to reduce the setpoint in 1°C steps to a minimum 17°C.

⑨ **“SILENCE/FP” key**

Activates/deactivates the silent mode. Pressing the key for longer than 2 seconds activates the unit's frost protection function.

In silent unit mode, the compressor runs at a lower frequency, and the indoor unit fan rotates at a slower speed. This obtains particularly silent unit operation.

The frost protection function can only be activated in heating mode. The unit operates with a fixed setpoint of 8°C. The indoor unit displays "FP". Pressing the ON/OFF, SLEEP, FP, Mode, FAN or up or down arrow key, the frost protection function is deactivated.

### ⑩ "TIMER ON" key

Press this key to activate the unit start delay time. Each press of this key increases the delay time by 30 minutes. When the set time on the display exceeds 10.0, each press of the button increases the set time by 60 minutes. To deactivate the delay time, set the time to 0.0.

### ⑪ "TIMER OFF" key

This key can be used to program the delayed switch-off time. Each press of this key increases the switch-off time by 30 minutes. When the set time on the display exceeds 10.0, each press of the button increases the set time by 60 minutes. To deactivate the switch-off time, set the time to 0.0.

### ⑫ 3-D swing mode

Press this key to start or stop the swing mode. With the 2-point key, you can adjust the horizontal fin on the left side and the vertical fin on the right side. Press this key once to change the angle by 6 degrees. Pressing the key for 2 seconds stops the swing function. When the swing function is stopped, LC appears on the display for three seconds.

### ⑬ "FOLLOW ME" key

This key can be used to activate/deactivate the FOLLOW ME function. In this mode, the room temperature is measured on the remote control. This sends a signal to the indoor unit every 3 minutes. If the remote control does not send a signal to the indoor unit for 7 minutes, this mode is automatically deactivated.

### ⑭ "LED" key

This activates/deactivates the display on the indoor unit.

### Indicators on the LCD

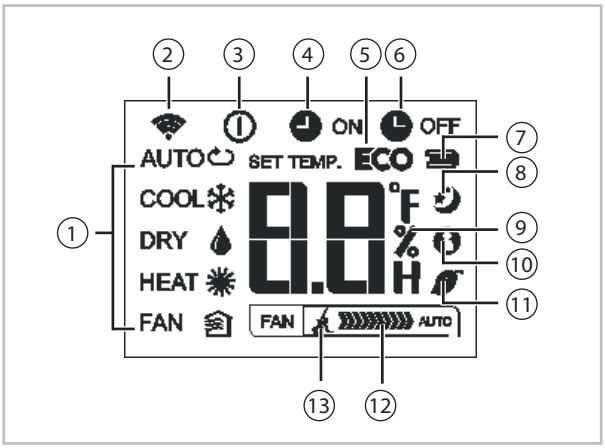



*Fig. 9: Indicators on the LCD*

1: Mode indicator - shows the current operating modes, including Auto (↻), Cooling (❄), Dehumidification (💧), Heating (☀), Fan (≋) and back to Auto (↻) mode.
2: Signal transmission symbol. This symbol appears when signals are being transmitted from the remote control to the indoor unit.
3: ON/OFF symbol. This symbol appears when the "ON/OFF" key is pressed. Pressing this key again causes the indicator to go out.
4: TIMER ON symbol. This symbol appears when TIMER ON is switched on.
5: ECO function (not available)
6: TIMER OFF symbol. This symbol appears when TIMER OFF is switched on.
7: Battery charge status (weak)
8: Sleep symbol. This symbol appears when the "Sleep" function is activated. Pressing this key again causes the indicator to go out.
9: Temperature/Timer symbol. Shows the temperature setting (-17°C~30°C). If "FAN" mode is selected, the temperature setting is not displayed. In Timer mode, the ON and OFF settings appear for the TIMER.
10: FOLLOW ME symbol. This symbol appears when the "Follow me" function is activated.
11: Display of ion generator active (optional)
12: Fan speed symbol. This is where the selected fan speeds are displayed: AUTO (no indicator) and the three fan speed settings: (slow), (medium) and (fast). The fan speed is set to "Automatic" when either "Auto" or "Dehumidification" mode is activated.
13: Silent mode active (optional)

*The illustration of the LCD with all of the symbols present is only intended to provide a clearer overview. During operation, only those symbols relevant to the respective functions appear on the display.*

### Key functions

A symbol is shown on the display to indicate that the settings are being transferred.

### “Auto” mode (please observe notes!)

Make sure that the indoor unit is connected to the power supply, and is switched on.

The operating mode indicator on the display of the indoor unit begins to flash.

1. Press the **"MODE"** key to select "Auto" mode.
2. Press the **"Arrow up/down"** key to set the desired temperature. The temperature can be set between 17 and 30°C, in increments of 1°C.
3. Press the **"ON/OFF"** key to switch on the air conditioning unit.




*Fig. 10: "Auto" mode*

### "Cooling", "Heating" and "Recirculation" mode

Make sure that the indoor unit is connected to the power supply, and is switched on.

1. Press the **"MODE"** key to select from operating modes "Cooling", "Heating" or "Recirculation".
2. Press the **"Arrow up/down"** key to set the desired temperature. The temperature can be set between 17 and 30°C, in increments of 1°C.
3. Press the **"FAN"** key to select from the four fan speeds (Auto, slow, medium and fast).
4. Press the **"ON/OFF"** key to switch on the air conditioning unit.




*Fig. 11: "Cooling", "Heating" and "Recirculation" mode*

### "Dehumidification" mode

Make sure that the indoor unit is connected to the power supply, and is switched on.

The operating mode indicator on the display of the indoor unit begins to flash.

1. Press the **"MODE"** key to select "Dehumidification" mode.
2. The temperature setting on the remote control has no effect on unit operation.
3. Press the **"ON/OFF"** key to switch on the air conditioning unit.




*Fig. 12: "Dehumidification" mode*

*In the "Dehumidification" mode, manual selection of the fan speed is not possible! Please note that temperature pre-selection is not possible and the dehumidified room can cool dramatically!*

### "Timer" mode

Press the "TIMER ON" key to set the "switch-on time" and the "TIMER OFF" key to set the "switch-off" time for the unit.

Setting the "switch-on time"

1. Press the "TIMER ON" key. The remote control shows "TIMER ON", the last "switch-on time" setting and the symbol "H" appear on the display. The unit is now ready to reset the "switch-on time" and to start "TIMER ON" mode.
2. Press the "TIMER ON" key again to set the desired "switch-on time". Each time the key is pressed, the time is increased by half an hour between 0 and 10 hours, and by an hour between 10 and 24 hours.
3. Once these settings have been made, there is a one second delay before the remote control transmits the signal to the indoor unit. Then, after approx. two seconds, the "H" symbol disappears from the LCD display, and the set temperature appears again on the display.




*Fig. 13: "Timer" mode*

Setting the “switch-off time”

1. Press the "TIMER OFF" key. The remote control shows "TIMER OFF", the last "switch-off time" setting and the symbol "H" appear on the display. The unit is now ready to reset the "switch-off time" and to stop "TIMER OFF" mode.
2. Press the "TIMER OFF" key again to set the desired "switch-off time". Each time the key is pressed, the time is increased by half an hour between 0 and 10 hours, and by an hour between 10 and 24 hours.
3. Once these settings have been made, there is a one second delay before the remote control transmits the signal to the indoor unit. Then, after approx. two seconds, the "H" symbol disappears from the LCD display, and the set temperature appears again on the display.

– *When Timer mode is selected, the remote control automatically transfers the timer signal to the indoor unit for the specified period of time. Therefore, you should hold the remote control in a location where it can transfer the signal to the indoor unit without interference.*
– *The effective operation for the time settings by the remote control for the timer function is restricted to the following settings:*
*0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 4.5, 5.0, 5.5, 6.0, 6.5, 7.0, 7.5, 8.0, 8.5, 9.0, 9.5, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23 and 24.*

**Example TIMER function settings**

**"TIMER ON" (Auto on mode)**

**Example:**

You want the air conditioning unit to switch on 2 hours from the time it was programmed

1. Press the "TIMER ON" key. The last operating time setting for the timer, and the "H" symbols, appear on the display.
2. Press the "TIMER ON" key until the desired start time is shown in the "TIMER ON" area on the remote control.
3. Wait for 3 seconds and the temperature appears again in this area of the digital display. The "TIMER ON" indicator stays lit, and this function is activated.

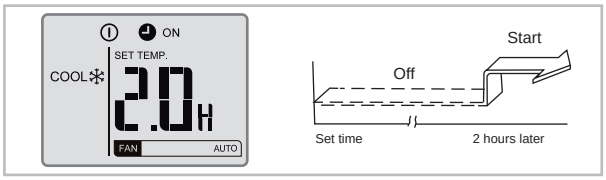



*Fig. 14: "TIMER ON" example*

**"TIMER OFF" (Auto off mode)**

**Example:**

You want the air conditioning unit to switch off 4 hours from the time it was programmed.

1. Press the "TIMER OFF" key. The last operating time setting for the timer, and the "H" symbols, appear on the display.
2. Press the "TIMER OFF" key until "4H" is shown in the "TIMER OFF" area on the remote control.
3. Wait for 3 seconds and the temperature appears again in this area of the digital display. The "TIMER OFF" indicator stays lit, and this function is activated.

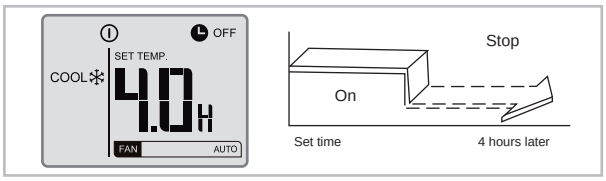



*Fig. 15: "TIMER OFF" example*

**Combined TIMER (setting "TIMER ON" and "TIMER OFF" at the same time)**

"TIMER OFF ⇨ "TIMER ON"

(On ⇨ Stop ⇨ Start)

**Example:**

You want the air conditioning unit to switch off in two hours from the time it was programmed, and switch back on ten hours later.

1. Press the "TIMER OFF" key.
2. Press the "TIMER OFF" key again until the desired stop time is shown in the "TIMER OFF" area on the remote control.
3. Press the "TIMER ON" key.
4. Press the "TIMER ON" key again until "10H" is shown in the "TIMER ON" area on the remote control.
5. Wait for 3 seconds and the temperature appears again in this area of the digital display. The "TIMER ON" and "TIMER OFF" indicators stay lit, and this function is activated.

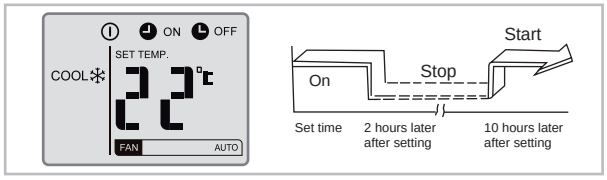



*Fig. 16: "TIMER OFF" / "TIMER ON" example*

"TIMER ON ⇨ "TIMER OFF"

(Off ⇨ Start ⇨ Stop)

**Example:**

You want the air conditioning unit to switch on in two hours from the time it was programmed, and switch back off five hours later.

1. Press the "TIMER ON" key.
2. Press the "TIMER ON" key again until "2.0H" is shown in the "TIMER ON" area on the remote control.
3. Press the "TIMER OFF" key.
4. Press the "TIMER OFF" key again until "5.0H" is shown in the "TIMER OFF" area on the remote control.
5. Wait for 3 seconds and the temperature appears again in this area of the digital display. The "TIMER ON" and "TIMER OFF" indicators stay lit, and this function is activated.

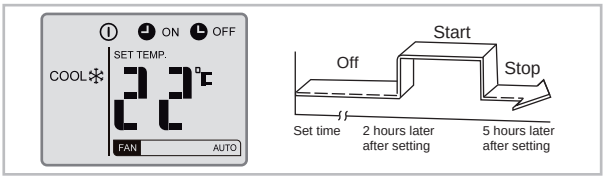



*Fig. 17: "TIMER ON" / "TIMER OFF" example*

## SLEEP function

The sleep function saves energy while you sleep. This function is activated by pressing the key on the remote control. Press the key before going to sleep. In cooling mode, the unit automatically increases the set room temperature by 1 °C after 1 hour. After one more hour, the room temperature is increased by an additional 1 °C. In heating mode, the room temperature is decreased within the first two hours of operation by 2°C. After 7 hours of unit operation, the unit switches off automatically in cooling and heating mode.

This function is not available in the modes recirculation and dehumidification!




*Fig. 18: "Sleep" function*

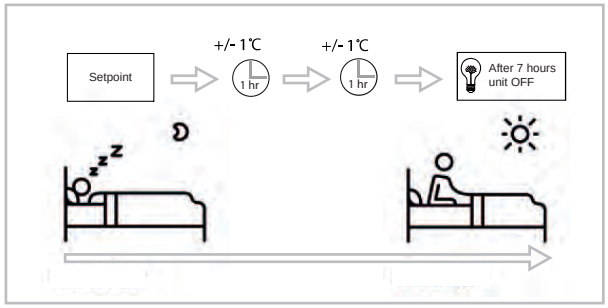



*Fig. 19: Sleep mode*

# 5 Installation instructions for qualified personnel

## 5.1 Important notes prior to installation

- Transport the unit in its original packaging as close as possible to the installation location. You avoid transport damage by doing so.
- Check the contents of the packaging for completeness and check the unit for visible transport damage. Report any damage immediately to your contractual partner and the shipping company.
- Lift the unit on the corners and not on the refrigerant or condensate drainage connections.
- The refrigerant piping (liquid and suction pipe), valves and connections must be insulated to make them vapour diffusion proof. If necessary also insulate the condensate drainage line.
- Select an installation location which allows air to freely flow through the air inlet and outlet (see section "Minimum clearances")
- Do not install the unit in the immediate vicinity of devices which generate intensive thermal radiation. Installation in the vicinity of thermal radiation reduces the unit output.
- Only open the shut-off valves on the refrigerant piping after installation is complete.
- Seal off open refrigerant piping with suitable caps or adhesive strips to prevent the infiltration of moisture and never kink or compress the refrigerant piping.
- Avoid unnecessary bends. This minimises the pressure loss in the refrigerant piping and ensures that the compressor oil can flow back without obstruction.
- Make special preparations regarding the oil return if the outdoor unit is located above the indoor unit (see section "Oil return measures").
- Add refrigerant if the basic length of the refrigerant piping exceeds 5 metres. For the quantity of additional refrigerant, refer to chapter "Adding refrigerant".
- Perform all electrical wiring in accordance with applicable DIN and VDE standards.
- Ensure the electrical cables are properly connected to the terminals, otherwise there is a risk of fire.
- Only use the fasteners contained in the scope of delivery with the units.
- Use four supports and the associated hooks to attach the ceiling cassette (only applies to ceiling cassettes).
- Use the insulated condensate hose in the scope of delivery as a junction piece to the continuing condensate drain. Secure the condensate drain with the supplied clamps.

## 5.2 Wall openings

- A wall opening of at least 70mm diameter and 10mm incline from the inside to the outside must be created.
- To prevent damage to the lines, the interior of the wall opening should be padded or, for example, lined with PVC pipe (see figure).
- After installation has been completed, use a suitable sealing compound to close off the wall opening, taking account of fire protection regulations (responsibility of customer). Do not use cement or lime containing substances!

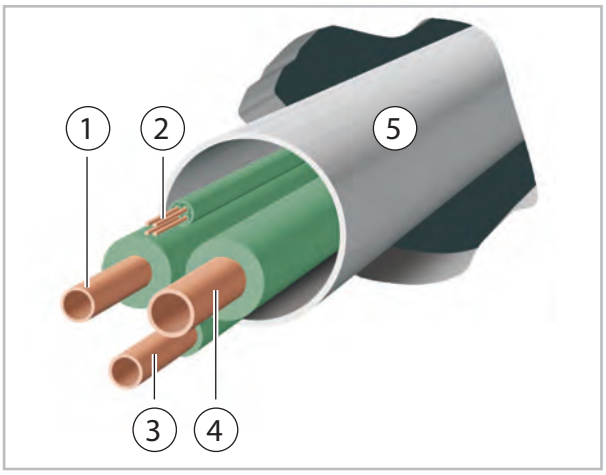



*Fig. 20: Wall opening*

1: Liquid line
2: Control line
3: Condensate drainage line
4: Suction pipe
5: PVC pipe

## 5.3 Installation materials

The indoor unit is attached to the wall by a wall bracket and 4 screws (to be provided by the customer).

The outdoor unit is attached by 4 screws and a wall bracket to the wall or fixed by a floor bracket to the ground.

## 5.4 Selection of installation location

**Indoor unit**

The indoor unit is designed for horizontal wall installation above doors. However, it can also be used in the upper wall area (min. 1.75m above the floor).

**Outdoor unit**

The outdoor unit is designed for horizontal installation on a base in outdoor areas. The installation site must be level, flat and firm. The unit should also be secured to prevent it from tipping over. The outdoor unit can be set up outside as well as inside a building. For external installation, please observe the following notes to protect the unit from the influence of the weather.

Rain

For floor or roof set-up, the unit should be installed with at least 10cm ground clearance. A floor bracket is available as an optional accessory.

Sun

The condenser on the outdoor unit emits heat. Exposure to sunlight further increases the temperature of the fins and reduces the heat released by the finned heat exchanger. The outdoor unit should be installed on to the north side of the building whenever possible. If necessary, take measures to provide sufficient shade (responsibility of customer). One possible solution is to build a small roofed area over the unit. These measures should not affect the flow of warm outlet air.

Wind

If the unit is being installed in windy areas, ensure that the warm outlet air is discharged in the prevailing wind direction. If this is not the possible, it may be necessary to install a windbreak (to be provided by the customer). Ensure that the windbreak does not adversely affect the air intake to the unit. An additional stabilization is recommended. This can, for example, be realized with ropes or other structures.

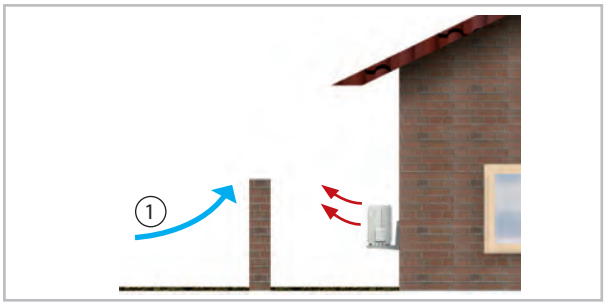



*Fig. 21: Windbreak*

1: Wind

Snow

The unit should be wall-mounted in areas of heavy snowfall. Installation should be at least 20cm above the expected level of snow to prevent snow from entering the outdoor unit. An optional wall bracket is available as an accessory.

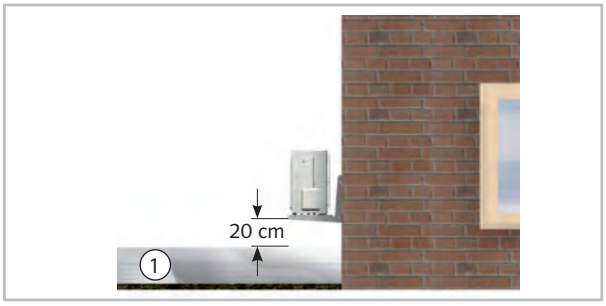



*Fig. 22: Minimum clearance to snow*

1: Snow

Installation inside buildings

- Ensure that heat can dissipate adequately when placing the outdoor unit in cellars, lofts, adjoining rooms or halls (Fig. 23).
- Install an additional fan with a rated flow comparative to that of the outdoor unit being installed in the room and which can compensate any additional pressure loss in ventilation ducts (Fig. 23).
- Comply with any regulations and conditions affecting the statics of the building. If necessary, fit acoustic installation.

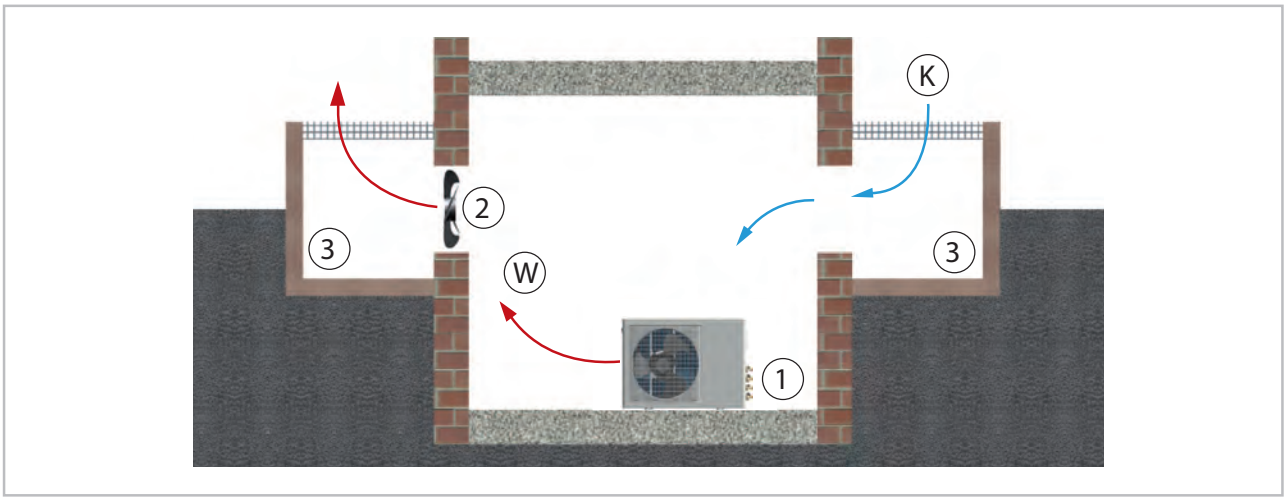



*Fig. 23: Installation inside buildings*

K: Cold fresh air / W: Warm air
1: Outdoor unit / 2: Additional fan
3: Air shaft

## 5.5 Minimum clearances

Observe the minimum clearances to allow access for maintenance and repair work and facilitate optimum air distribution.

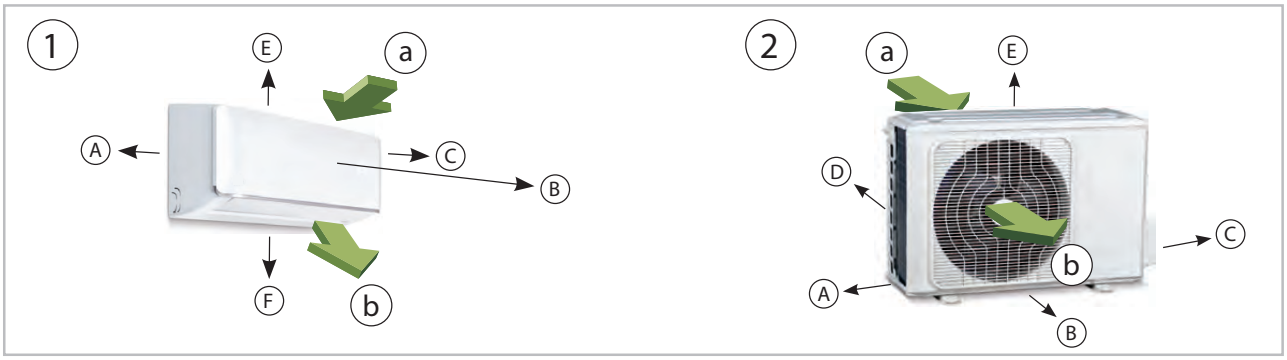



*Fig. 24: Minimum clearances of the indoor unit and outdoor unit*

1: Indoor unit / 2: Outdoor unit
a: Air inlet / b: Air outlet

| Measure-ments (mm) | Indoor units | Outdoor units |
|---|---|---|
| | ML 265 DC-685 DC ARCTIC IT | ML 265 DC-685 DC ARCTIC AT |
| A | 120 | 150 |
| B | 1500 | 700 |
| C | 120 | 400 |
| D | - | 150 |
| E | 120 | 200 |
| F | 1700 | - |

## 5.6 Wall bracket

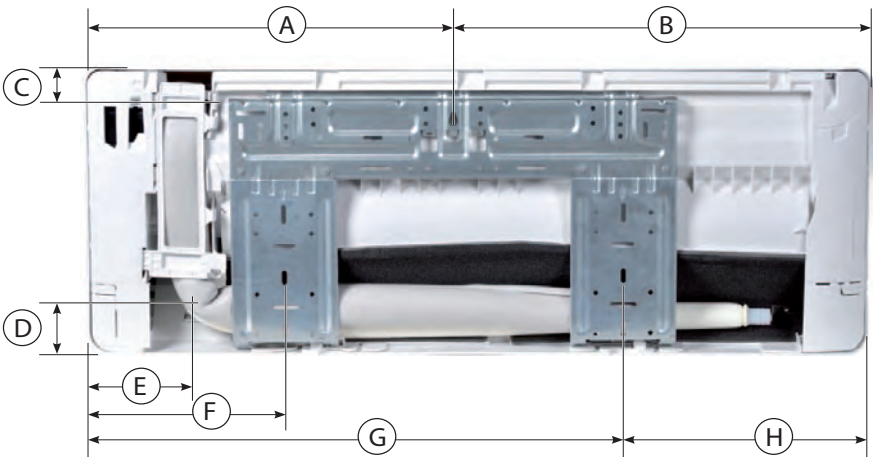



*Fig. 25: Indoor unit wall bracket (rear view)*

| Measurements (mm) | A | B | C | D | E | F | G | H |
|---|---|---|---|---|---|---|---|---|
| ML 265 DC ARCTIC IT | 375 | 427 | 43 | 44 | 111 | 204 | 545 | 257 |
| ML 355 DC ARCTIC IT | 375 | 427 | 43 | 44 | 111 | 204 | 545 | 257 |
| ML 525 DC ARCTIC IT | 543 | 423 | 53 | 55 | 111 | 135 | 821 | 144 |
| ML 685 DC ARCTIC IT | 527 | 553 | 53.5 | 47 | 44 | 219 | 780 | 300 |

## 5.7 Connection variants for the indoor unit

The following connection variants can be used for the refrigerant, condensate and control lines.

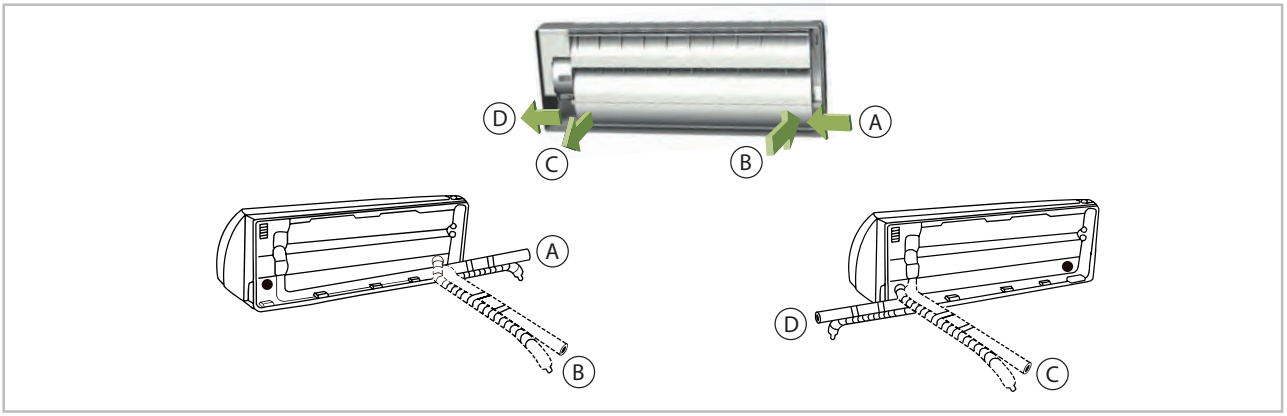



*Fig. 26: Connection variant (view from the rear)*

A: Infeed of the refrigerant piping at the wall, left
B: Infeed of the refrigerant piping through the wall, left
C: Outlet through the wall, right
D: Outlet at the wall, right (the refrigerant piping must be bent through 180 degrees for this)

**! NOTICE!**

A flare connection may only be established outside the room. Detachable, reusable connections are not permissible inside!

## 5.8 Connection of the indoor unit when the refrigerant piping is installed under the plaster

If the customer routes the refrigerant piping to the unit underneath the plaster, observe the following note. The principal connection options can be found in the "Connection variants for the indoor unit" and "Wall bracket" chapters.

If the refrigerant piping is routed underneath the plaster, ensure that the customer-fitted refrigerant piping does not protrude from the wall at a 90° angle. As a result of the required bending radius, the unit would then be very difficult to connect or would possibly be impossible to fasten to the wall mount.

For this reason, route the customer-fitted refrigerant piping with as flat an angle as possible (<30°) out of the wall, from the left and into the unit. (see Fig. 27).



*Fig. 27: Under the plaster installation (View from above)*

## 5.9 Oil return measures

If the outdoor unit is installed at a higher level than the indoor unit, suitable oil return measures must be taken. Usually, an oil pump bend is installed for every 7 metres of height difference.

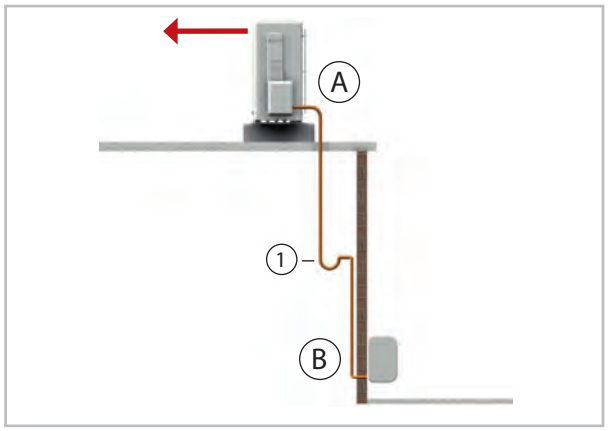



*Fig. 28: Oil return measures*

A: Outdoor unit
B: Indoor unit
1: 1 x oil pump bend in suction pipe to outdoor unit every 7 metres of height difference, radius: 50 mm

# 6 Installation

## 6.1 Installation of the indoor unit

**! NOTICE!**

Installation should only be performed by authorised specialists.

The unit is attached by means of a wall bracket, considering the air discharge side located in the lower part.

1. Mark the mounting points on the structurally permissible building sections according to the dimensions of the wall bracket.
2. If necessary, remove the break out opening of the housing.
3. Connect the refrigerant piping, electrical cables and condensate drainage line to the indoor unit as described below.
4. Hang the indoor unit onto the wall bracket by tilting it back slightly and by pressing the bottom part of the unit against the bracket.
5. Check again that the unit is level. (Fig. 29)

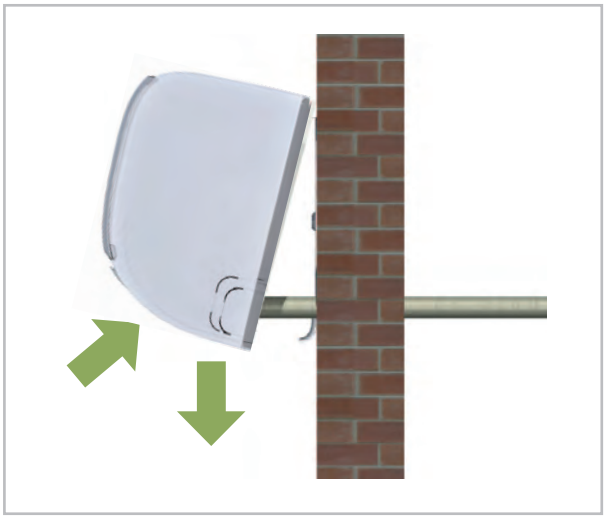


*Fig. 29: Horizontal positioning*

The wall bracket for the units must be attached with suitable screws and anchors.

## 6.2 Connecting the refrigerant piping

The refrigerant piping is connected (responsibility of the customer) on the back side of the units.

Please note that a flare connection is only permissible outside the enclosed room. If this is not possible on site, the connection of the indoor unit must be established as a permanent connection (e.g. soldered).

It may be necessary to fit a reducer or flared adapter to the indoor unit. These fittings are included with the indoor unit as an accessory kit. Once installed, the connections should be insulated to make them vapour diffusion proof.

**! NOTICE!**

Installation should only be performed by authorised specialists.

**! NOTICE!**

The unit is factory filled with dry nitrogen for leak testing purposes. The pressurised nitrogen is released when the union nuts are undone.

**! NOTICE!**

Use only tools which are approved for use in an HVAC environment. (z. B.: bending pliers, pipe/tubing cutters, de-burrers and flaring tools). Do not cut refrigerant pipes with a saw.

**! NOTICE!**

All work must be carried out in a way that prevents dirt, particles, water etc. from entering, refrigerant lines!

The following instructions describe the installation of the cooling cycle and the assembly of the indoor unit and the outdoor unit.

1. The required pipe diameters are given in the table "Technical data".
2. Install the indoor unit and connect the refrigerant piping as described in the operating manual for the indoor unit.
3. Use the wall or floor brackets to fit the outdoor unit against structural parts approved to support the static load (refer to the installation instructions for the brackets).
4. Ensure that structure-borne sound is not transferred to parts of the building. Use vibration dampers to reduce the effects of structure-borne sound!
5. Lay the refrigerant piping from the indoor unit to the outdoor unit. Ensure that the fastenings are adequate and if necessary, take appropriate oil return measures!
6. Remove the factory-fitted protective caps and union nuts on the connections. These should be used later in the installation process.
7. Before flanging the refrigerant piping, ensure that the union nut is fitted on the pipe.
8. Prepare the laid refrigerant pipings as shown below (Fig. 30 and Fig. 31).
9. Verify that the shape of the flange is correct (Fig. 32).
10. First connect and hand-tighten the refrigerant piping to ensure it is correctly seated.
11. Then tighten the fittings with 2 appropriately-sized open-ended spanners. Use one spanner to counter the force when tightening the fitting (Fig. 33).
12. Use insulation hoses which are designed for this temperature range and are diffusion proof.
13. Observe the permitted bending radius for the refrigerant piping during installation. Never bend a pipe twice in the same place. Brittleness and cracking can result.
14. Apply appropriate heat insulation to the installed refrigerant piping, including connector.
15. Take the same action at the shut-off valves for all subsequent refrigerant piping.

*Label the refrigerant piping (injection and suction pipes) as well as the associated electrical control lines of each interior unit with a letter. Only connect the lines to their associated connections.*

**NOTICE!**

Always pay attention to the affiliation of the electrical lines and refrigerant piping! The connections of the individual circuits must not be mixed up. Mixing up the assignment of control lines and refrigerant piping can have fatal consequences (compressor damage)!

Commissioning of the individual circuits must be carried out successively.

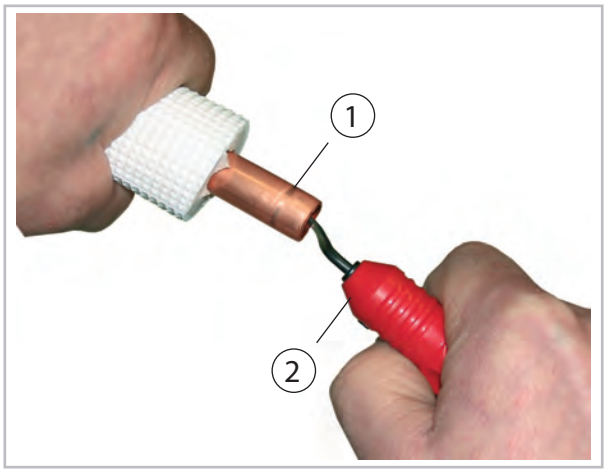



*Fig. 30: Deburring the refrigerant piping*

1: Refrigerant piping
2: Deburrer

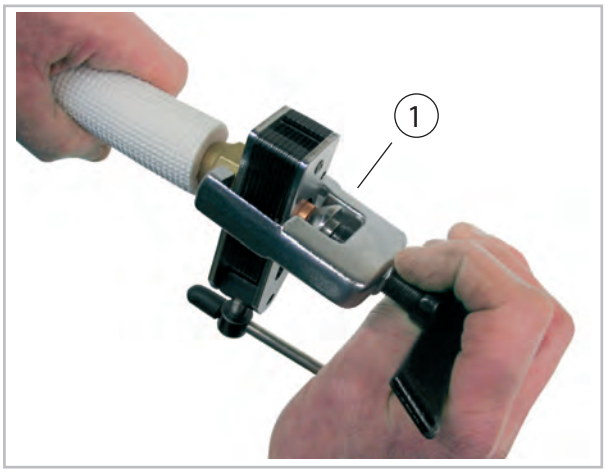



*Fig. 31: Flanging the refrigerant piping*

1: Flanging tool

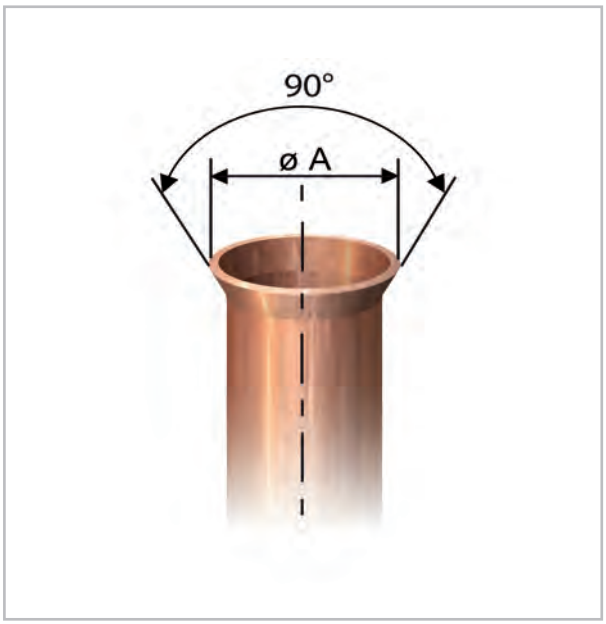



*Fig. 32: Correct flange shape*

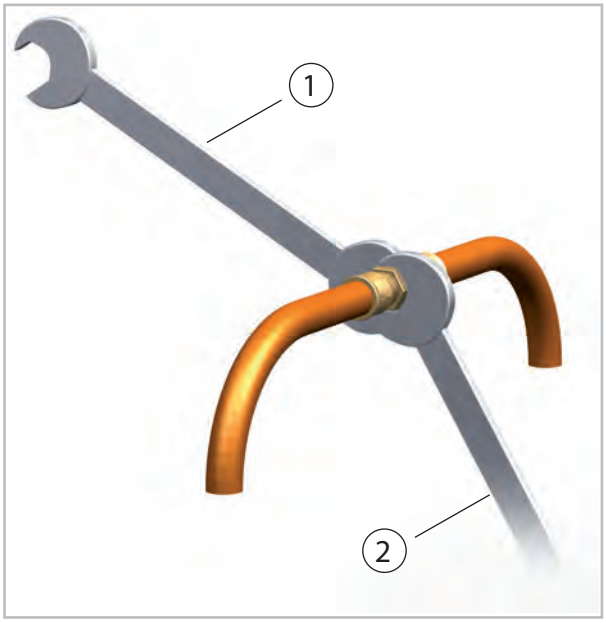



*Fig. 33: Tightening the fitting*

1: Tighten with the first open-ended spanner
2: Counter with the second open-ended spanner

| Pipe dimension in inches | Tightening torque in Nm |
|---|---|
| 1/4" | 15-20 |
| 3/8" | 33-40 |
| 1/2" | 50-60 |
| 5/8" | 65-75 |
| 3/4" | 95-105 |

## 6.3 Additional notes on connecting the refrigerant piping

- When combining the outdoor unit with some indoor units, the procedure for connecting the refrigerant piping may differ. Install the provided reducer or expansion fittings to the indoor unit.
- If the basic length of the connecting line exceeds 5m, add refrigerant when commissioning the system for the first time (see chapter "Adding refrigerant").

## 6.4 Leak testing

Once all the connections have been made, the pressure gauge station is attached to the Schrader valve as follows (if fitted):

red = small valve = high pressure

blue = large valve = suction pressure

Once the connection has been made successfully, the leak test is carried out with dry nitrogen.

Leak testing involves spraying a leak detection spray onto the connections. If bubbles are visible, the connections have not been made properly. In that case, tighten the connection or, if necessary, create a new flange.

After completing a successful leak test, the excess pressure in the refrigerant piping is removed and a vacuum pump with an absolute final partial pressure of min. 10 mbar is used to remove all of the air and empty the pipes. Any moisture present in the pipes will also be removed.

**! NOTICE!**

A vacuum of at least 20 mbar must be produced!

The time required to generate the vacuum is dependent on the final pressure pipe volume of the indoor units and the length of the refrigerant piping. However, the process will take at least **60 minutes**. Once any foreign gases and humidity have been completely extracted from the system, the valves on the pressure gauge station are closed and the valves on the outdoor unit are opened as described in the "Commissioning" section.

## 6.5 Adding refrigerant

The units contain a basic quantity of refrigerant. In addition, an additional amount of refrigerant must be added for refrigerant piping lengths exceeding 5 metres per circuit. Refer to the following chart:

| | Up to and incl. 5 m | From 5 m to max. length |
|---|---|---|
| ML 265 DC | 0 g/m | 20 g/m |
| ML 355 DC | | |
| ML 525 DC | | |
| ML 685 DC | | 40 g/m |

**⚠ CAUTION!**

Wear protective clothing when handling refrigerant.

**⚠ DANGER!**

Only refrigerant in a liquid state may be used to fill the cooling cycle!

**! NOTICE!**

Check the overheating to determine the refrigerant fill quantity.

**! NOTICE!**

The escape of refrigerant contributes to climatic change. In the event of escape, refrigerant with a low greenhouse potential has a lesser impact on global warming than those with a high greenhouse potential.
This unit contains refrigerant with a greenhouse potential of 675. That means the escape of 1 kg of this refrigerant has an effect on global warming that is 675 times greater than 1 kg $CO_2$, based on 100 years. Do not conduct any work on the refrigerant circuit or dismantle the unit - always enlist the help of qualified experts.

## 6.6 Condensate drainage connection and safe drainage

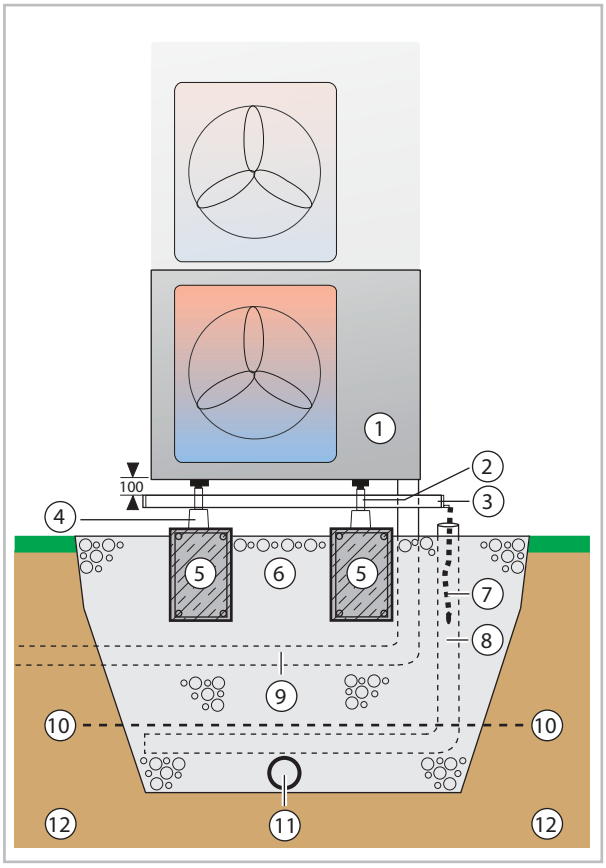



*Fig. 34: Condensate drainage, seepage of condensate and strip foundation (cross-section)*

1: Outdoor unit
2: Leg
3: Condensate collection tray
4: Floor bracket
5: Reinforced strip foundation HxWxD = 300x200x800mm
6: Gravel layer for seepage
7: Condensate drainage heating
8: Drainage channel
9: Conduit for refrigerant piping and electrical connecting line (temperature-resistant up to at least 60°C)
10: Frost line
11: Drainage pipe
12: Soil

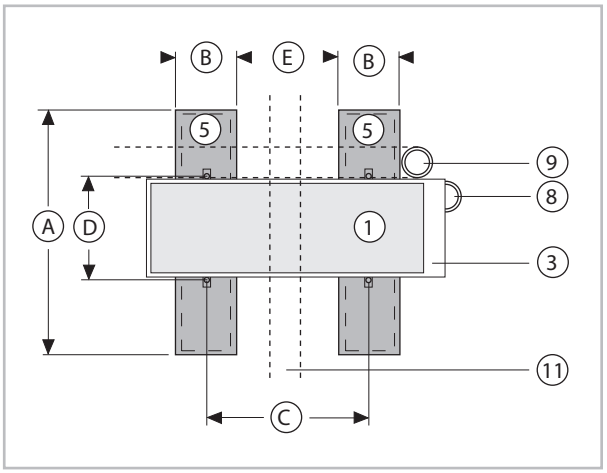



*Fig. 35: Dimensions for the strip foundation (plan view)*

For the designations of 1, 3, 5, 8, 9 and 11, please refer to the legend for the Fig. 34

**dimensioning of the strip foundation (in mm)**

| Dimension | ML 265 DC AT<br>ML 355 DC AT | ML 525 DC AT | ML 685 DC AT |
|---|---|---|---|
| A | 800 | | |
| B | 200 | | |
| C | 487 | 514 | 540 |
| D | 300 | 333 | 350 |
| E | 287 | 314 | 340 |

### Condensate drainage connection

Due to the dew point shortfall on the evaporator, condensation is created on the indoor unit in cooling mode and on the outdoor unit in heating mode.

Below the evaporator is a collection tray, which must be connected to a drain.

- The condensate drainage line should have an incline of min. 2% (Fig. 36). This is the responsibility of the customer. If necessary, fit vapour-diffusion-proof insulation.
- Route the unit's condensate drainage line freely into the drain line. If the condensate runs directly into a sewer pipe, fit a trap to prevent any unpleasant odours.
- When operating the unit at outside temperatures below 0 °C, ensure the condensate drainage line is laid to protect it against frost. The lower part of the housing and condensate tray is also to be kept frost free in order to ensure permanent draining of the condensate. If necessary, fit a pipe heater.
- Following installation, check that the condensate run off is unobstructed and ensure that the line is durably leak tight.

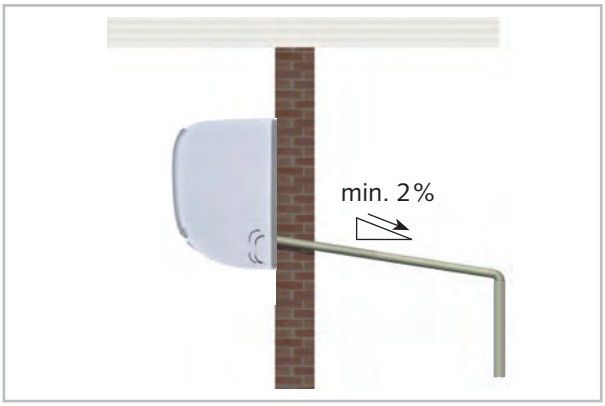



*Fig. 36: Condensate drainage connection - Indoor unit*

The condensate hose is designed to be connected on the right and the left side (view from front). Remove the stopper from the corresponding connection.

### Safe drainage in the event of leakages

The REMKO oil separator OA 2.2 fulfils the following list of requirements from regional regulations and laws.

**! NOTICE!**

Local regulations or environmental laws, for example the German Water Resource Law (WHG), can require suitable precautions to protect against uncontrolled draining in case of leakage to provide for safe disposal of escaping refrigerator oil or hazardous media.

**! NOTICE!**

If condensate is removed via a duct in accordance with DIN EN 1717, ensure that any microbiological contamination present on the wastewater side (bacteria, fungi, viruses) cannot enter the unit connected to it.

# 7 Electrical wiring

## 7.1 General Information

A protected power supply cable is to be connected to the outdoor unit and a five-core control line to the indoor unit respectively.

**DANGER!**

All electrical installation work is to be performed by specialist companies. Disconnect the power supply when connecting the electrical terminals.

**WARNING!**

All electric lines are in accordance VDE regulations to dimension and to lay.

**NOTICE!**

The electrical connection of the units must be carried out in accordance with VDE regulations. We recommend using an FI circuit breaker that is sensitive to all currents, as increased leakage currents can occur.

*We recommend using shielded wires for the control lines.*

*Check all plugged and clamped terminals to verify that they are seated correctly and make permanent contact. Tighten as required.*

## 7.2 Connecting the indoor unit

- We recommend that a mains/repair switch be installed near the outdoor unit.
- The terminal blocks for making the connections are located at the rear of the unit. When the unit is installed, measurements can be made from the front by removing the cover.
- If an optional condensate pump is used as an accessory in conjunction with the unit, it may be necessary to install an additional relay with a higher contact rating after the switch-off contact on the pump to switch off the compressor.

Make the connection as follows:

1. Open the air inlet grill.
2. Remove the covers on the right-hand side (Fig. 37).
3. Connect the customer-laid control line to the terminals (Fig. 37).
4. Re-assemble the unit.

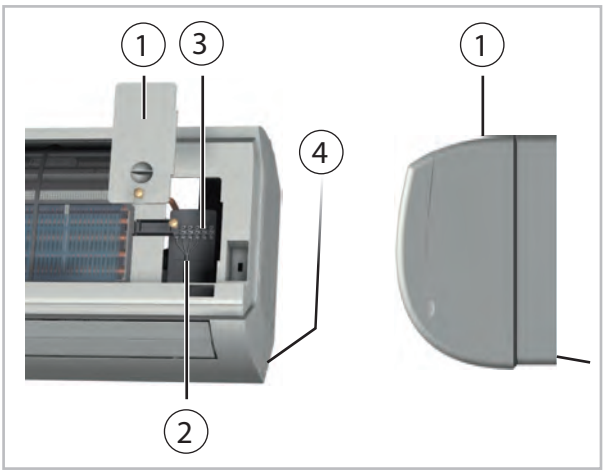



*Fig. 37: Connecting the indoor unit*

1: Cover
2: Strain relief
3: Terminal block for control line
4: Control line from outdoor unit

## 7.3 Connecting the outdoor unit

Proceed as follows to connect the line:

1. Remove the side-panel cover.
2. Choose a cable-section according to the relevant specifications.
3. Connect the lines as shown on the electrical connection diagram.
4. Fix the line in the strain relief and re-assemble the unit.



*Fig. 38: Connecting the outdoor unit*

## 7.4 Electrical wiring diagram

**Connection ML 265 DC-685 DC**

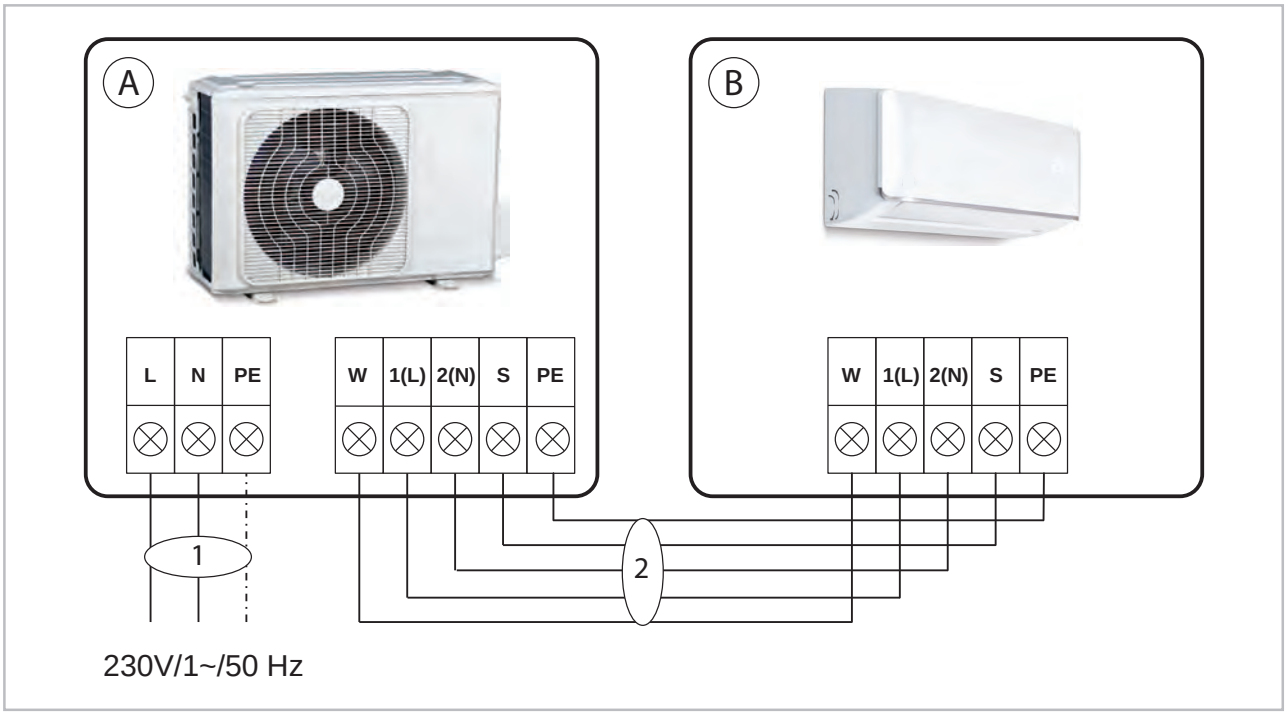



*Fig. 39: Electrical wiring diagram*

A: Outdoor unit ML 265 DC-685 DC AT
B: Indoor unit ML 265 DC-685 DC IT

1: Power supply cable
2: Communication line

**Connection of optional condensate pump KP 6/KP 8**

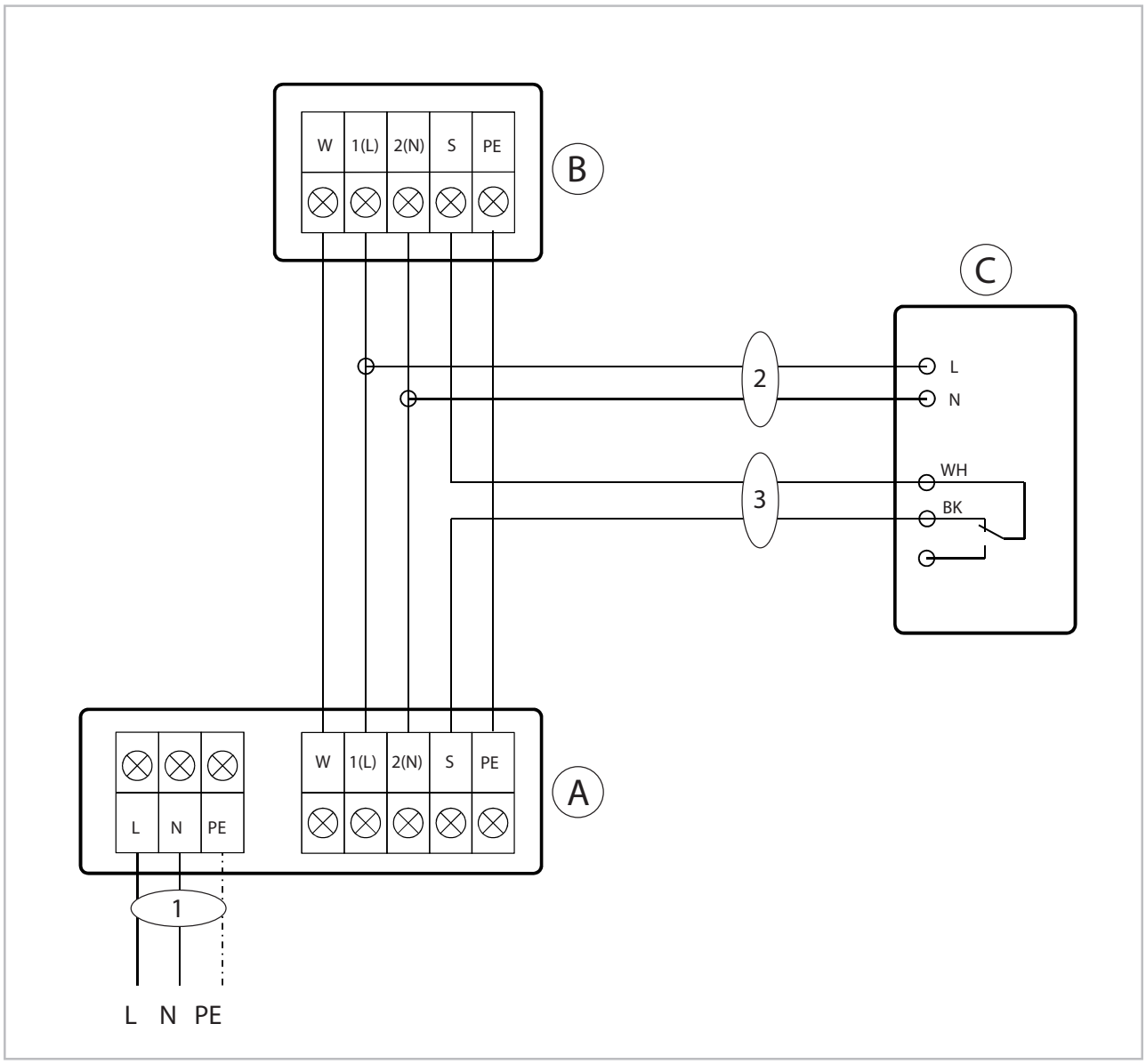



*Fig. 40: Electrical wiring diagram*

A: Outdoor unit
B: Indoor unit
C: KP6/KP8 condensate pump
1: Power supply cable
2: Condensate pump supply
3: Condensate pump fault contact
BK: black
WH: white

## 7.5 Electrical drawings

**Indoor units ML 265 DC-685 DC IT**

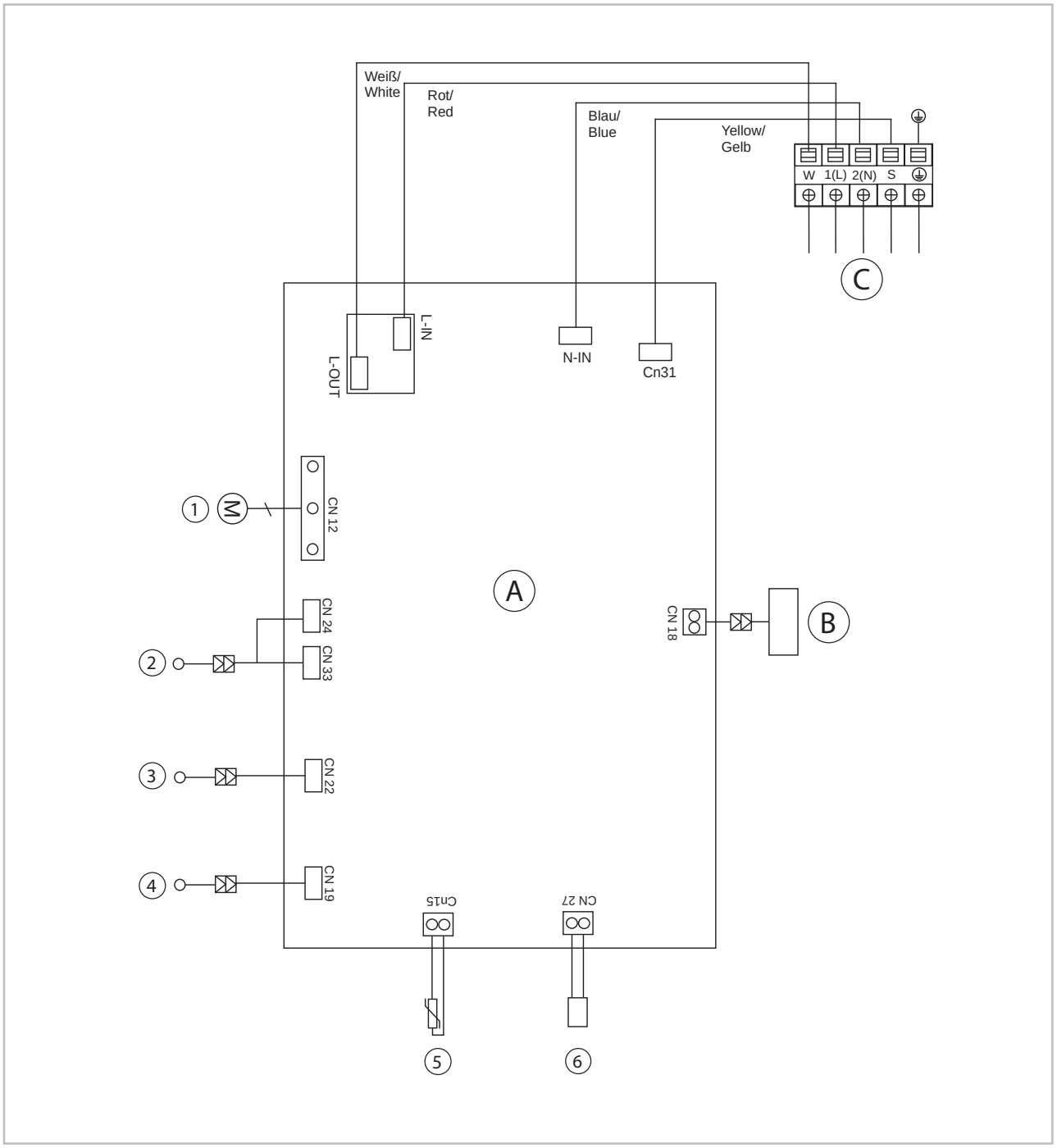



*Fig. 41: Electrical drawings*

A: Control board
B: Display circuit board
C: Control line from outdoor unit
1: DC fan motor
2: Engine trim + LED board
3: Fin motor, vertical
4: Fin motor, horizontal
5: Temperature probe, evaporator T2
6: Ion generator (not present)

## Outdoor units ML 265 DC-355 DC AT

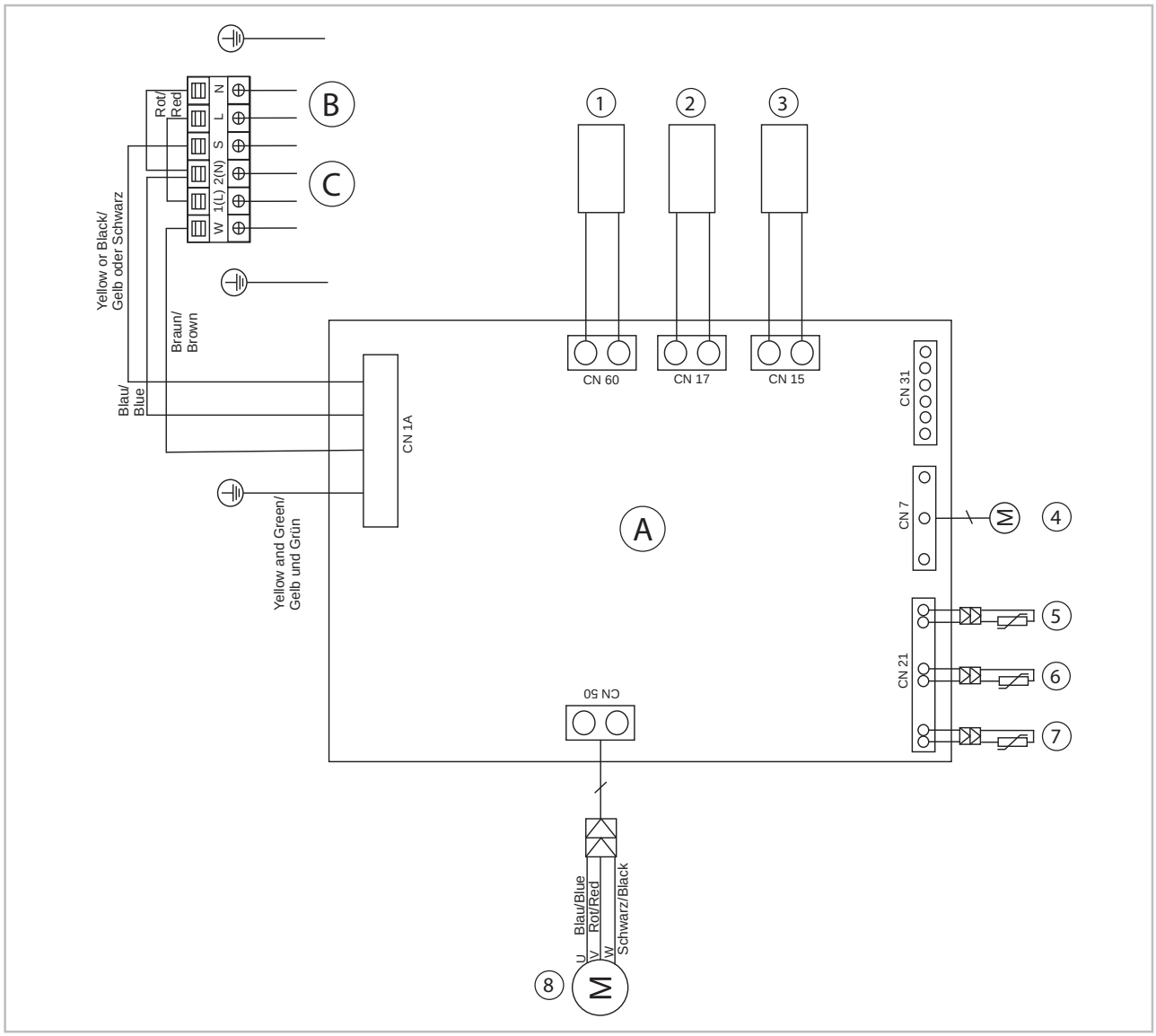



*Fig. 42: Electrical drawings*

A: Control board
B: Power supply cable
C: Lines to indoor unit
1: Reversing valve
2: Crankcase heating
3: Condensate tray heating
4: Condenser/DC fan
5: Temperature probe for condenser air inlet T4
6: Temperature probe for heat gas line compressor T5
7: Temperature probe for condenser outlet T3
8: Compressor

**Outdoor unit ML 525 DC AT**

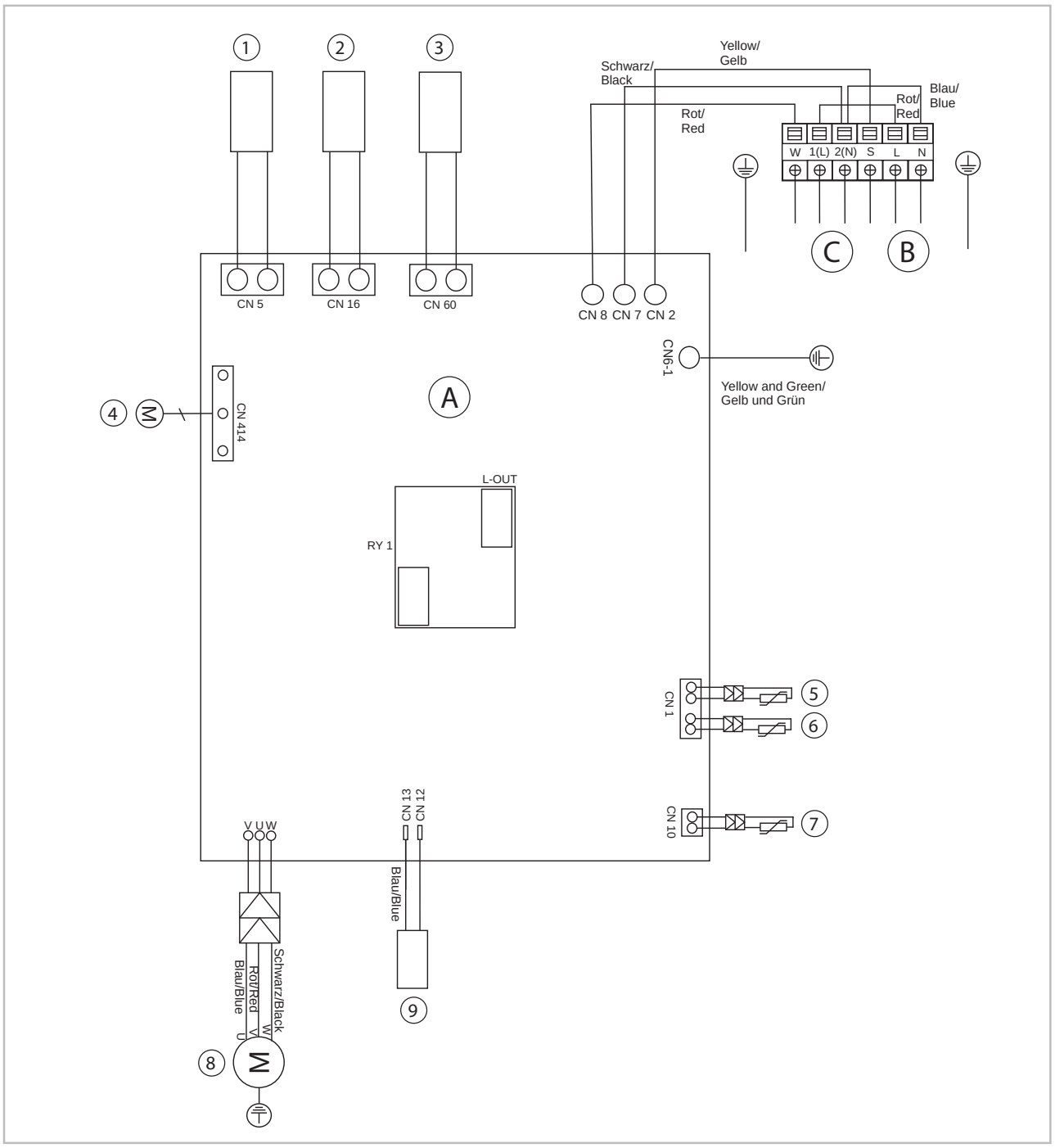



*Fig. 43: Electrical drawings*

A: Control board
B: Power supply cable
C: Control line to indoor unit
1: Condensate tray heating
2: Crankcase heating
3: Reversing valve
4: Condenser/DC fan
5: Temperature probe for condenser air inlet T4
6: Temperature probe for heat gas line compressor T5
7: Temperature probe for condenser outlet T3
8: Compressor
9: Transformer

**Outdoor unit ML 685 DC AT**

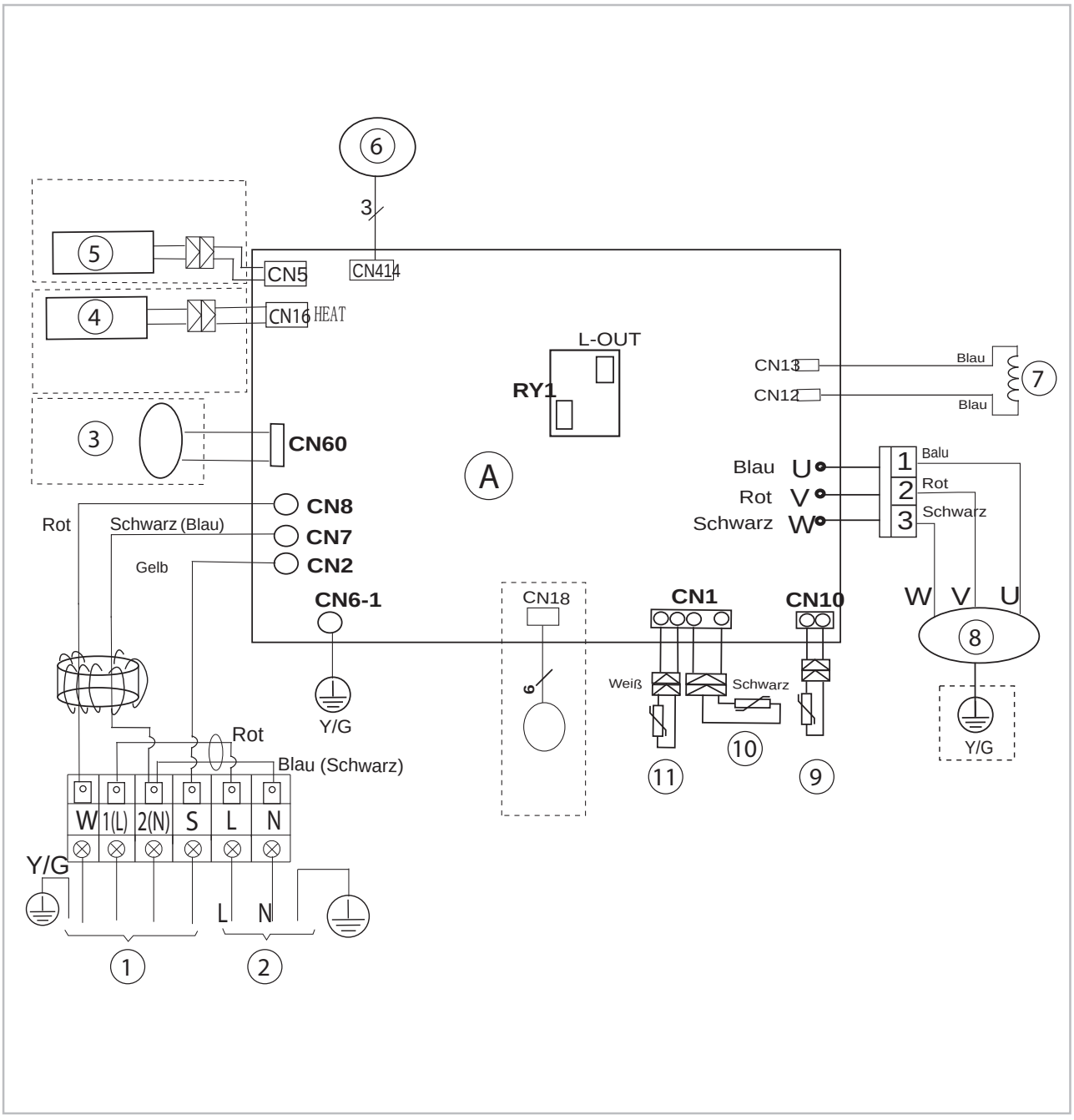



*Fig. 44: Electrical drawings*

A: Control board
1: Supply line to the indoor unit
2: Power supply cable
3: 4-way valve (optional)
4: Crankcase heating (optional)
5: Condensate tray heating (optional)
6: Fan motor (optional)
7: Transformer
8: Compressor
9: Heat gas probe
10: Condenser temperature probe
11: Temperature probe for condenser outlet

## 7.6 Connection of a superordinate controller provided by the customer

Units of type ML-ARCTIC can be controlled by a superordinate controller.

In order to realise this function, the supplied multi-function board must be inserted into the unit and connected by plug to the adapter board (pre-assembled to the unit trim). Depending on the slot (CN403 or CN404), the functions described below are implemented. The multifunction board can be located behind the cover of the connection terminals of the indoor unit.



*Fig. 45: Installation position of the adapter board*

**Connection of a REMKO multi-central controller (MCC-1) or a REMKO Smart Control Touch unit (SC-1):**

Optionally, the MCC-1 Multi-Central Controller or a Smart Control Touch unit can be connected to the indoor unit The connection is made using the multi-function board provided on the connection terminals X, Y and E.

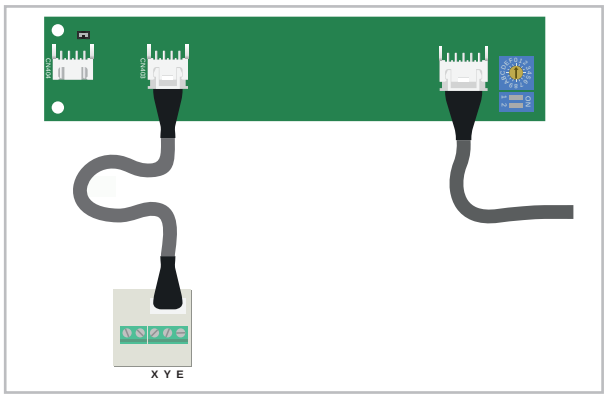



*Fig. 46: Connect to the adapter board*

The four-pin plug on the multifunction board must be connected to the CN403 contact on the adapter board.

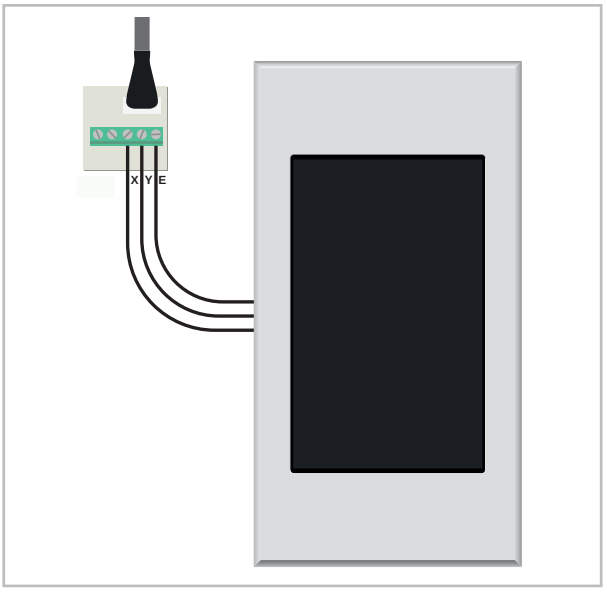



*Fig. 47: Connecting the controller*

The controller (MCC-1 or SC-1) can then be connected to contacts X, Y and E on the multifunction board. Further information on the connections can be found in the operating instructions of the respective controller.

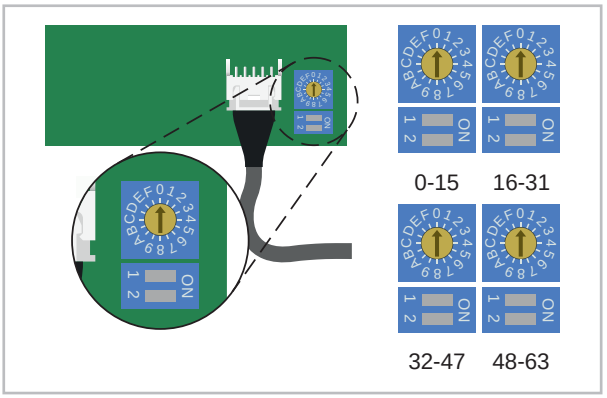



*Fig. 48: Connection terminals*

In order for the multifunction controller MCC-1 to recognise the indoor unit, an address must be assigned to the unit via the DIP switch of the adapter board. Addresses 0-63 can be assigned. The DIP switch defines the address range. The rotary switch has 16 positions with which the specific address can be set.

Different addresses must be assigned for the connected indoor units.

**Activation and deactivation via an external enabling contact:**

Optionally, the system can be switched by an external controller. The connection also takes place via the multifunction board.

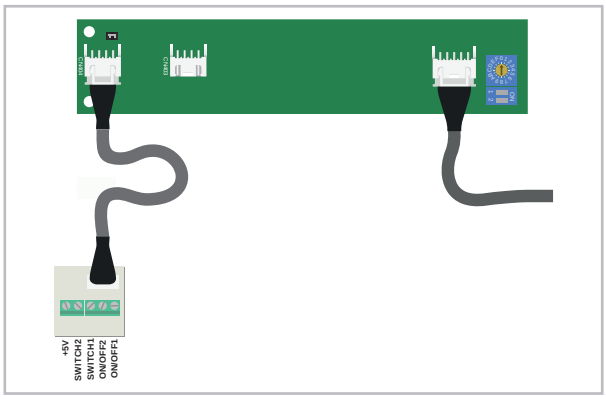



*Fig. 49: Connect to the adapter board*

The four-pin plug on the multifunction board must be connected to the CN404 contact on the adapter board. The following functions are then available:

**Connection terminals +5V:**

Non functional

**Connection terminals SWITCH1 & SWITCH2, external lock/enable:**

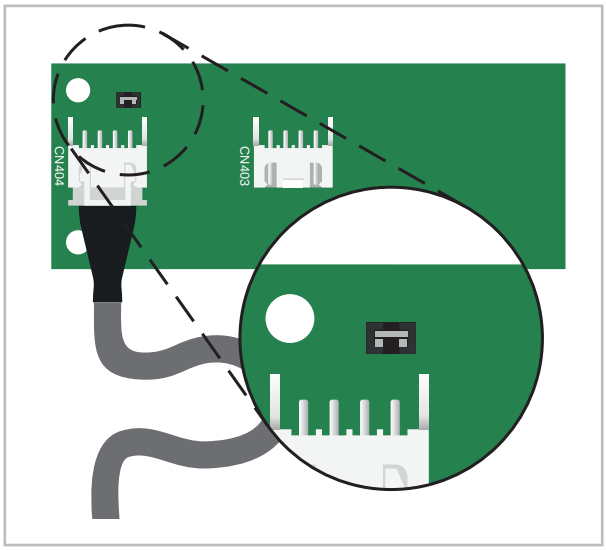



*Fig. 50: Jumper*

To use the SWITCH1 and SWITCH2 terminals, the jumper above the CN404 slot must first be removed.

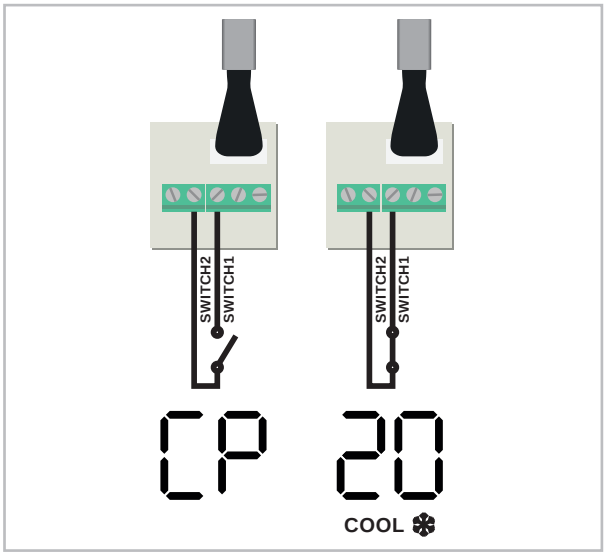



*Fig. 51: Connection terminal SWITCH1 & SWITCH2*

If the contact between the SWITCH1 and SWITCH2 terminals is open, the system is in stand-by mode and can no longer be operated by remote control. If the contact is closed, the system starts up again with the previous settings.

**Connection terminal ON/OFF1+ON & ON/OFF2, external activation/deactivation:**

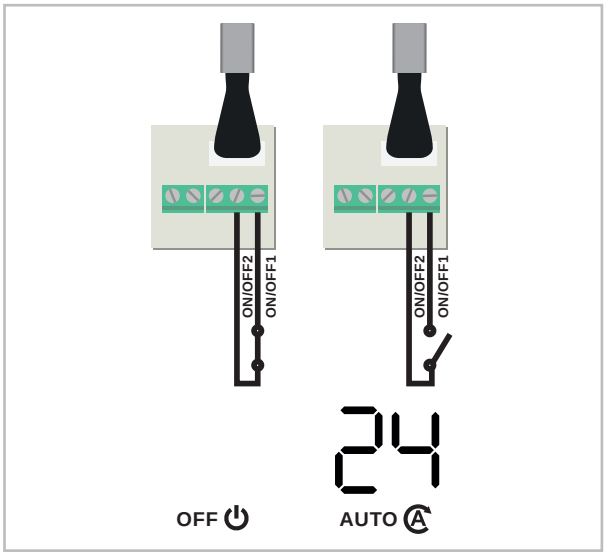



*Fig. 52: Connection terminal ON/OFF1 & ON/OFF2*

If the contact between the terminals ON/ OFF1 and ON/OFF2 is closed, the system is deactivated. If the contact is opened, the system is activated again and goes into automatic mode (setpoint 24°C). The system can be activated with the remote control even when the contact is closed. The system always reacts to the last input (remote control or ON/OFF contact).

# 8 Before commissioning

After leak testing has been successfully completed, connect the vacuum pump via the pressure gauge station to the valve connections on the outdoor unit (see chapter "Leak testing") and create a vacuum.

Perform the following checks prior to putting the unit into operation for the first time and after any work on the cooling cycle. Record the results in the commissioning report:

- Check all refrigerant piping and valves for leak-tightness using leak detection spray or soapy water.
- Check the refrigerant piping and insulation for damage.
- Check the electrical connection between the indoor unit and the outdoor unit for correct polarity.
- Check that all fastenings, mountings, etc. are firm and at the correct level.

# 9 Commissioning

**! NOTICE!**

Commissioning should only be performed by specially trained personnel and documented after the certificate has been issued. Observe the operating manuals for the indoor unit and outdoor unit when commissioning the entire system.

Once all the components have been connected and tested, the system can be put into operation. A functional check should be performed to verify its correct function and identify any unusual operating behaviour prior to handing it over to the operator.

**! NOTICE!**

Check that the shut-off valves and valve caps are tight after carrying out any work on the cooling cycle. Use appropriate sealant products as necessary.

**Functional checks and test run**

Check the following points:

- Leak-tightness of the refrigerant piping.
- Compressor and fan running smoothly.
- In cooling mode, cold air output by the indoor unit, and warm air output by the outdoor unit.
- Function test of the indoor unit and all program sequences.
- Check of the surface temperature of the suction pipe and that the vaporiser is not overheating. To measure the temperature, hold the thermometer to the suction pipe and subtract the boiling point temperature reading on the pressure gauge from the measured temperature.
- Record the measured temperatures in the commissioning report.

### Function test of the cooling and heating modes

1. Remove the protective caps from the valves.
2. Start the commissioning procedure by briefly opening the shut-off valves on the outdoor unit until the pressure gauge indicates a pressure of approx. 2 bar.
3. Check all connections for leaks with leak detection spray and suitable leak detectors.
4. If no leaks are found, fully open the shut-off valves by turning them anti-clockwise using a spanner. If leaks are found, remedy the faulty connection. It is imperative that the vacuum creation and drying steps are repeated.
5. Activate the main circuit breaker or fuse (to be provided by the customer).
6. Press the test knob on the outdoor unit and wait until a frequency of min. 50 Hz is established.
7. Use the remote control to switch on the unit and select the cooling mode, maximum fan speed and lowest target temperature.
8. Check the overheating, outside, inside, outlet and vaporisation temperatures and record the measured values in the commissioning report. Check the correct function and settings of all regulation, control and safety devices.
9. Check the unit control system using the functions described in the chapter "Operation". Timer, temperature setting, fan speeds and switching to ventilation or dehumidification mode.
10. Check the correct function of the condensate drainage by pouring distilled water into the condensate tray. A bottle with a spout is recommended for pouring the water into the condensation tray.
11. Switch the indoor unit to heating mode.
12. During the test run, check the functionality of all of the previously described safety devices.
13. Record the measured values into the commissioning report and familiarise the operator with the system.
14. Remove the pressure gauge. Check that seals have been fitted in the sealing caps.
15. Re-install all disassembled parts.

# 10 Troubleshooting, fault analysis and customer service

## 10.1 Troubleshooting and customer service

The unit and components are manufactured using state-of-the-art production methods and tested several times to verify their correct function. However, if alarms should occur, please check the functions as detailed in the list below. For systems with an indoor unit and outdoor unit, refer to the chapter "Troubleshooting and customer service" in both operating manuals. Please inform your dealer if the unit is still not working correctly after all function checks have been performed!

**Operational malfunctions**

| Malfunction | Possible causes | Checks | Remedial measures |
|---|---|---|---|
| The unit does not start or switches itself off | Power failure, under-voltage, defective mains fuse / main switch in OFF position | Does all other electrical equipment function correctly? | Check the voltage and if necessary, wait for it to come back on |
| | Damaged power supply | Does all other elec. equipment function correctly? | Repair by specialist firm |
| | Wait time after switching on is too short | Have approx. 5 minutes elapsed since the restart? | Schedule longer wait times |
| | Temperature outside operating range | Are the fans in the indoor unit and outdoor unit working correctly? | Observe temperature ranges of indoor unit and outdoor unit |
| | Electrical surges caused by thunderstorms | Have there been lightning strikes in the area recently? | Switch off the mains breaker and switch it back on. Have it inspected by a specialist |
| | Malfunction of the external condensate pump | Has the pump shut down due to a malfunction? | Check and if necessary clean the pump |
| The unit does not respond to the remote control | Transmission distance too far / receiver affected by interference | Does the indoor unit beep when pressing a key? | Reduce the distance to less than 6 m or change position |
| | Defective remote control | Is the unit running in manual mode? | Replace the remote control |
| | Receiver or transmitter unit exposed to excessive solar radiation | Does it function correctly in the shade? | Place the receiver and/or transmitter unit in the shade |
| | Electromagnetic fields are interfering with transmission | Does it function after removing potential sources of interference? | Signal is not transmitted when interference sources are operational |
| | Key in remote control jammed / two buttons pressed at same time | Does the “Transmitting” symbol appear on the display? | Release the key / only press one key |
| | Batteries in remote control are flat | Have new batteries been inserted? Is the display incomplete? | Insert new batteries |
| The unit works at reduced or no cooling capacity | Filter is dirty / air inlet / outlet opening is blocked by debris | Have the filters been cleaned? | Clean the filters |

| Malfunction | Possible causes | Checks | Remedial measures |
|---|---|---|---|
| | Windows and doors open. Heating / cooling load has increased | Have structural / usage modifications been made? | Close windows and doors / install additional units |
| | Cooling mode is not set | Does the cooling symbol appear on the display? | Correct the settings for the unit |
| | Fins on outdoor unit blocked by foreign objects | Does the fan of the outdoor unit work? Are the exchanger fins unobstructed? | Check the fan or winter fan speed control, reduce the air resistance |
| | Leaking cooling cycle | Are there signs of frost on the exchanger fins of the indoor unit? | Repair by specialist |
| Condensate discharge on unit | Drainage pipe on collection container clogged / damaged | Can the condensate drain off without any obstruction? | Clean the drainage pipe and collection container |
| | Faulty external condensate pump or float | Is the collection tray full of water and the pump not running? | Call out a specialist to replace the pump |
| | Condensate has not drained away and has collected in the condensate drainage line | Is there an incline on the condensate drainage line? Check there is no blockage in the pipe. | Route the condensate drainage line with an incline and clean. |
| | Condensate does not drain off | Are the condensate drainage lines unblocked and is there a steady incline? Are the condensate pump and liquid level switch functioning correctly? | Route the condensate drainage line with an incline and clean it. If the liquid level switch or the condensate pump is defective, have them replaced |

***NOTE***

*If the outdoor unit makes noises at low outside temperatures, even although it is switched off, this is not a malfunction. This is the winding of the compressor being run briefly in order to heat up the oil within it and also to guarantee the viscosity at low ambient temperatures. If you do not use the unit in the winter then you can switch off the breaker. Switch it back on again at least 12 hours before the next time that the unit will be required!*

**Fault display on the indoor unit**

| Display | Error description |
|---|---|
| E0 | EEPROM error, indoor unit |
| E1 | Communication error between indoor unit and outdoor unit |
| E3 | Fan speed control indoor unit disabled |
| E4 | Room temperature probe T1 defective |
| E5 | Temperature probe, evaporator T2 defective |
| F0 | Overflow protection |
| F1 | Temperature probe air inlet outdoor unit T4 defective |
| F2 | Temperature probe, evaporator outlet T3 defective |
| F3 | Temperature probe, heat gas line T5 defective |
| F4 | EEPROM error, outdoor unit |
| F5 | Condenser fan speed control probe not working |
| P0 | Compressor actuation error |
| P1 | Over-voltage or under-voltage error |
| P2 | Compressor overheating protection (heat gas temperature too high) |
| P4 | Inverter control disabled |
| EC | No cooling capacity after 30 minutes |
| CP | No external enable |
| -- | Mode conflict |

Für die Fehlerbehebung siehe Troubleshooting auf den nachfolgenden Seiten.

## 10.2 Indoor unit fault analysis

| Error code: | E0/F4 |
|---|---|
| Reason: | The control board of the outdoor unit or indoor unit cannot read the unit memory (EEPROM) |
| Cause: | ■ Installation error<br>■ Control boards of outdoor unit or indoor unit defective |

| | |
|---|---|
| Switch off voltage, switch on again 2 minutes later. Is the error still present? | |
| ↓YES | |
| Replace the circuit boards of the outdoor unit and indoor unit in turn, in order to locate the defective EEPROM | |

| Error code: | E1 |
|---|---|
| Reason: | The indoor unit does not receive a signal from the outdoor unit within 110 seconds. The check is performed 4 times in a row, then error E1 is displayed. |
| Cause: | ■ Electrical connection not configured correctly<br>■ Control boards outdoor unit or indoor unit defective |

| | | |
|---|---|---|
| Switch off voltage, switch on again 2 minutes later. Is the error still present? | | |
| ↓YES | | |
| Measure the voltage between the “S” and “N” terminals of the outdoor unit. Does the valve fluctuate between -25 V and 25 V? | NO → | Check electrical connections in the indoor unit. Are they OK? |
| ↓YES | | ↓YES |
| Check electrical connections in the outdoor unit. Are they OK? | | Replace the control boards of the indoor unit. Is the error rectified? |
| ↓YES | | ↓NO |
| Is the transformer OK? | | Replace the control boards of the outdoor unit |
| | NO → | Replace the transformer |
| ↓YES | | |
| Replace the control boards of the outdoor unit. Is the error rectified? | | |
| ↓NO | | |
| Replace the control boards of the indoor unit | | |



Check the transformer (must not be connected to a condenser) with a multimeter. The normal value is approx. 0 Ohm. If the value deviates, replace the transformer.

*Fig. 53: Transformer measurement*

# REMKO ML-ARCTIC series

| Error code: | E3/F5 |
|---|---|
| Reason: | If the fan speed of the indoor unit/outdoor unit falls below 300 rpm, the unit switches off and the display shows error code E3 or F5 |
| Cause: | ■ Electrical connection faulty<br>■ Evaporator fan wheel defective<br>■ Evaporator fan motor defective<br>■ Control board faulty |

| | | |
|---|---|---|
| Switch off voltage, switch on again 2 minutes later. Is the error still present? | NO → | The unit operates normally. |
| ↓YES | | |
| De-energise the unit and attempt to turn the fan wheel by hand. Does it rotate freely? | NO → | Check the motor and the fan wheel bearing, and replace the defective parts. |
| ↓YES | | |
| Check the electrical connections. Are these correctly implemented? | NO → | Correctly establish the electrical connection |
| ↓YES | | |
| Measure the voltage at the corresponding connector plug on the control board (see section ↬ *'Procedure' on page 49*). Does the measured voltage lie within the tolerance range? | NO → | Replace the control board. |
| ↓YES | | |
| Replace the fan motor. Is the error rectified? | NO → | |

**Procedure**

DC fan motor of the indoor unit (control chip is installed in the motor):

Switch on the voltage to the unit. In standby mode, measure the unit between terminals 1-3 and 4-3 of the connector plug. Check the measured values against those listed in the table below. If these differ, there is a problem with the control board and it must be replaced.

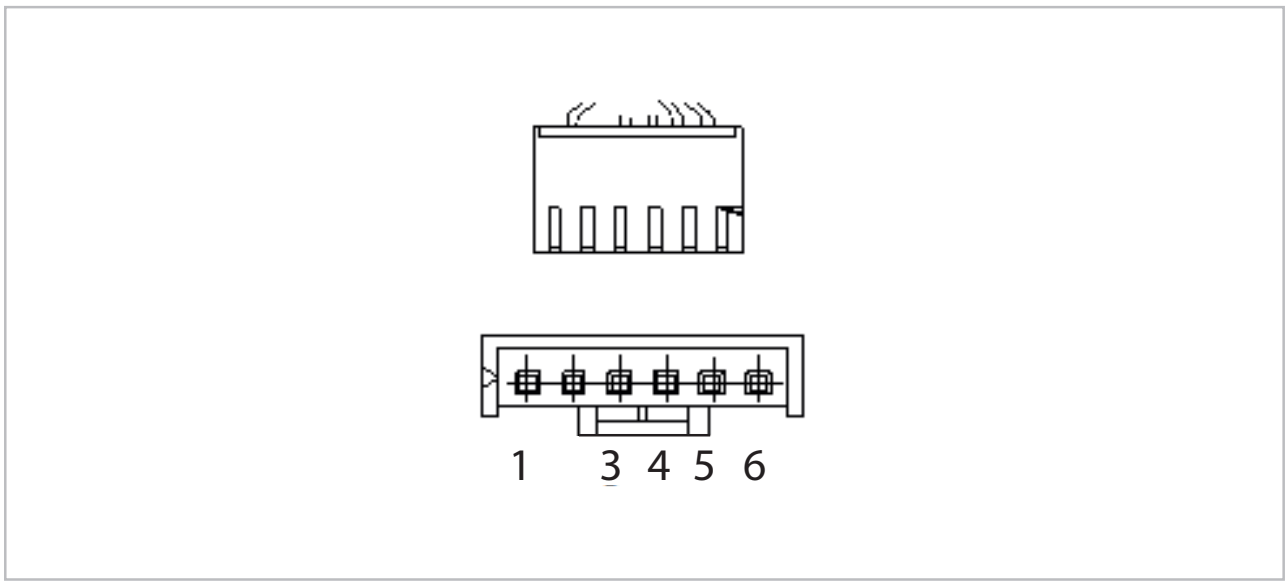



*Fig. 54: Motor measurements*

| Terminal | Colour | Voltage |
|---|---|---|
| 1 | Red | 280V~380V |
| 2 | --- | --- |
| 3 | Black | 0 V |
| 4 | White | 14-17.5V |
| 5 | Yellow | 0~5.6V |
| 6 | Blue | 14-17.5V |

DC fan motor of the outdoor unit (control chip is installed in the motor):

Measure the resistance between terminals 1-3 and 4-3. This should be roughly identical. If the resistance deviates significantly, assume that the motor is defective and must be replaced.

| Error code: | EC |
|---|---|
| Reason: | The evaporator probe T2 measures the actual value with the compressor start and takes this as the reference value $T_{Start}$. If, 5 minutes after the compressor start, the value $T_{Start}$ has not dropped by 2 °C for at least 4 seconds then the system assumes that the refrigerant is low. The measurement is performed a total of 3 times before the display shows the error code "EC". |
| Cause: | ■ Refrigerant low or cooling circuit blocked<br>■ Evaporator probe T2 defective<br>■ Indoor unit control board defective |

Switch off voltage, switch on again 2 minutes later. Is the error still present?

↓YES

Check whether the indoor unit blows out cold air.

↓NO

Check the cooling circuit for leaks. Did you find a leak?

↓NO

Check the cooling circuit for any blockages. Are the shut-off valves on the outdoor unit open?

JOO →

Check the position and function of the evaporator probe T2. Is it correctly seated and with the correct resistance?

↓YES

Exchange the control boards of the indoor unit.

JOO →

Remedy leaks and put the unit back into operation.

| Error code: | E4 / E5 / F1 / F2 / F3 |
|---|---|
| Reason: | If the test voltage of the probes is lower than 0.06 V or higher than 4.94 V then the display shows the error code of the corresponding probe. |
| Cause: | ■ Electrical connection faulty<br>■ Temperature probe defective<br>■ Control board defective |

| | | |
|---|---|---|
| Check the connecting cable between the control board and the temperature probe. Is it OK and correctly connected? | NO → | Establish a proper connection. |
| ↓ YES | | |
| Check the probe for correct resistance, depending on the temperature (see resistance table) | NO → | Replace the probe. |
| ↓ YES | | |
| Replace the corresponding control board. | | |

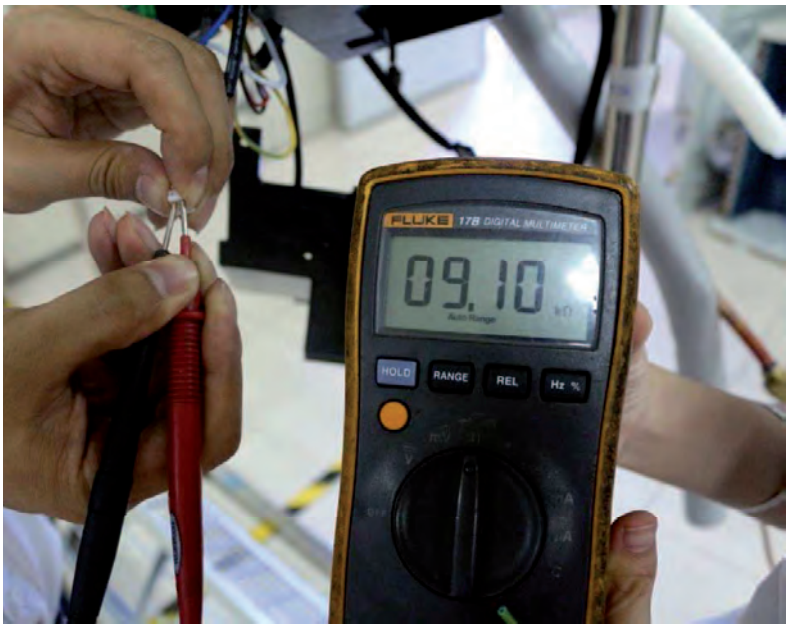



*Fig. 55: Check the probes*

| Error code: | F0 |
|---|---|
| Reason: | Safety shutdown due to overly high current consumption of individual unit components |
| Cause: | ■ Faulty power supply<br>■ Cooling circuit blocked<br>■ Faulty control board<br>■ Electrical connections faulty<br>■ Compressor defective |

| | | |
|---|---|---|
| Check the supply voltage. Is this correct? | NO → | Switch the unit off and ensure correct supply voltage. |
| ↓YES | | |
| Check the cooling circuit for any blockages. Is the cooling circuit OK? | NO → | Remove the blockage (shut-off valve open?) |
| ↓YES | | |
| Check the winding resistances of the compressor. Are they OK? | NO → | Replace the compressor. |
| ↓YES | | |
| Check the electrical connections. Are these correctly implemented? | NO → | Replace or correct the electrical connections. |
| ↓YES | | |
| Does the transformer operate fault-free? (See ↬ *on page 47*) | NO → | Replace the transformer or control boards of the outdoor unit. |
| ↓YES | | |
| Replace the outdoor unit. | | |

| Error code: | P0 |
|---|---|
| Reason: | If the power supply to the compressor controller is faulty, the display shows the error code “P0” and the unit switches off |
| Cause: | ■ Electrical connection faulty<br>■ Faulty control board<br>■ Condenser fan motor defective or blocked<br>■ Compressor defective |

| | | |
|---|---|---|
| Check the connecting cables between the control board and compressor? Are they faulty? | JOO → | Establish a correct connection between the control board and compressor. |
| ↓NO | | |
| Check the inverter controller (see section ↬ *‘Check the inverter controller’ on page 53*). Error rectified? | NO → | Replace the control board. |
| ↓YES | | |
| Check the condenser fan motor. Is it working correctly? | NO → | See troubleshooting fault F5 |
| ↓YES | | |
| Check the winding resistances of the compressor. Are they OK? | NO → | Replace the compressor. |
| ↓YES | | |
| Exchange the control boards of the outdoor unit. | | |

**Check the inverter controller**

Switch off the power supply to the unit. Wait until the capacitors are fully discharged and disconnect the compressor from the control board.

Check the resistances at the outputs of the control board with the aid of a digital voltmeter as follows:

| | ML 265 DC | ML 355 DC | ML 525 DC | ML 685 DC |
|---|---|---|---|---|
| blue - red | 1.57 Ω (20°C/68°F) | 1.82 Ω (20°C/68°F) | 1.72 Ω (20°C/68°F) | 0.75 Ω (20°C/68°F) |
| blue - black | | | | |
| red - blue | | | | |

| Error code: | P1 |
|---|---|
| Reason: | Overvoltage or undervoltage protection has tripped |
| Cause: | ■ Faulty supply voltage<br>■ Refrigerant low or cooling circuit blocked<br>■ Faulty control board |

| | | |
|---|---|---|
| Check the power supply. Is the supply voltage correct? | NO → | Switch the unit off and have the power supply checked/corrected. |
| ↓YES | | |
| Check the electrical connections. Are they OK? | NO → | Replace the electrical connections. |
| ↓YES | | |
| Switch the power on and put the unit into standby mode. Measure the voltage on the board, at contacts "P" and "N". This should be approx. 310V, 340V or 380V DC. Now start the unit. The voltage between "P" and "N" should now be between 220-400V. Is the correct voltage applied? | NO → | Replace the control board. |
| ↓YES | | |
| Check the transformer. Is a defect present? | NO → | Replace the control board. |
| ↓YES | | |
| Replace the transformer. | | |

| Error code: | P2 (with units with a thermal contact) |
|---|---|
| Reason: | If the test voltage of the thermal contact does not lie at 5 V, then the display shows the error message “P2” |
| Cause: | ■ Faulty supply voltage<br>■ Refrigerant low or cooling circuit blocked<br>■ Faulty control board |

| | | | | |
|---|---|---|---|---|
| Check the air flow volumes of the indoor unit and outdoor unit. Are they blocked or dirty? | JOO → | Clean the filter or heat exchanger and ensure a sufficient air flow volume. | | |
| ↓NO | | | | |
| Switch off the power supply to the unit and switch it on again after 10 mins. Does the unit start up? | | | | |
| ↓YES | | | | |
| Check the temperature of the compressor. Has it heated up? | NO → | Check the thermal contact. Is it correctly connected? | | |
| | | ↓YES | | ↓NO |
| | | Measure the resistance of the thermal contact. Is it 0? | | Connect it correctly. |
| ↓YES | | ↓YES | NO → | Replace the thermal contact. |
| Check the cooling circuit. Is this OK? | JOO → | Replace the control board of the outdoor unit. | | |

| Error code: | P4 |
|---|---|
| Reason: | Safety shutdown of inverter controller. Internal system monitoring triggered (e.g. communication problem between board and compressor, the compressor speed is not OK) |
| Cause: | ■ Faulty electrical connections<br>■ Inverter regulation on board defective<br>■ Condenser fan motor defective<br>■ Compressor defective<br>■ Control board defective |

| | | |
|---|---|---|
| Check the electrical connection between the control board and compressor. Are these correctly implemented? | JOO → | Establish a proper connection. |
| ↓NO | | |
| Check the inverter controller. Is this functional? | NO → | Replace the control board. |
| ↓YES | | |
| Check the condenser fan motor. Is this OK? | NO → | Follow the instructions for troubleshooting fault F5 |
| ↓YES | | |
| Check the winding resistances of the compressor. Are they OK? | NO → | Replace the compressor |
| ↓YES | | |
| Replace the control boards of the outdoor unit. | | |

**Check the individual components**

**Check the temperature probes**

Disconnect the temperature probe from the control board and measure the resistance on the plug's contacts.

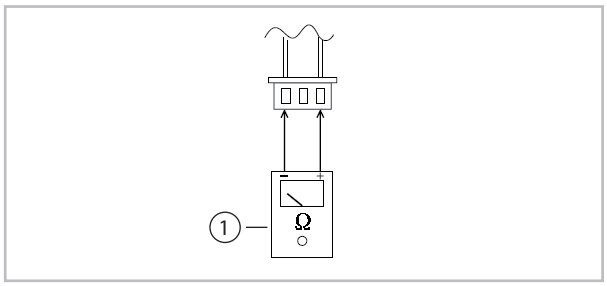



*Fig. 56: Check temperature probes*

1: Multimeter

## 10.3 Resistances of the temperature probes

**Probe T1, T2, T3 and T4**

| Temp. (°C) | Resistance (kΩ) | Temp. (°C) | Resistance (kΩ) |
|---|---|---|---|
| -20 | 115.27 | 12 | 18.72 |
| -19 | 108.15 | 13 | 17.80 |
| -18 | 101.52 | 14 | 16.93 |
| -17 | 96.34 | 15 | 16.12 |
| -16 | 89.59 | 16 | 15.34 |
| -15 | 84.22 | 17 | 14.62 |
| -14 | 79.31 | 18 | 13.92 |
| -13 | 74.54 | 19 | 13.26 |
| -12 | 70.17 | 20 | 12.64 |
| -11 | 66.09 | 21 | 12.06 |
| -10 | 62.28 | 22 | 11.50 |
| -9 | 58.71 | 23 | 10.97 |
| -8 | 56.37 | 24 | 10.47 |
| -7 | 52.24 | 25 | 10.00 |
| -6 | 49.32 | 26 | 9.55 |
| -5 | 46.57 | 27 | 9.12 |
| -4 | 44.00 | 28 | 8.72 |
| -3 | 41.59 | 29 | 8.34 |
| -2 | 39.82 | 30 | 7.97 |
| -1 | 37.20 | 31 | 7.62 |
| 0 | 35.20 | 32 | 7.29 |
| 1 | 33.33 | 33 | 6.98 |
| 2 | 31.56 | 34 | 6.68 |
| 3 | 29.91 | 35 | 6.40 |
| 4 | 28.35 | 36 | 6.13 |
| 5 | 26.88 | 37 | 5.87 |
| 6 | 25.50 | 38 | 5.63 |
| 7 | 24.19 | 39 | 5.40 |
| 8 | 22.57 | 40 | 5.18 |
| 9 | 21.81 | 41 | 4.96 |
| 10 | 20.72 | 42 | 4.76 |
| 11 | 19.69 | 43 | 4.57 |
| 44 | 4.39 | 79 | 1.21 |
| 45 | 4.21 | 80 | 1.17 |
| 46 | 4.05 | 81 | 1.14 |
| 47 | 3.89 | 82 | 1.10 |
| 48 | 3.73 | 83 | 1.06 |
| 49 | 3.59 | 84 | 1.03 |
| 50 | 3.45 | 85 | 1.00 |
| 51 | 3.32 | 86 | 0.97 |
| 52 | 3.19 | 87 | 0.94 |
| 53 | 3.07 | 88 | 0.91 |
| 54 | 2.96 | 89 | 0.88 |
| 55 | 2.84 | 90 | 0.85 |
| 56 | 2.74 | 91 | 0.83 |
| 57 | 2.64 | 92 | 0.80 |
| 58 | 2.54 | 93 | 0.78 |
| 59 | 2.45 | 94 | 0.75 |
| 60 | 2.36 | 95 | 0.73 |
| 61 | 2.27 | 96 | 0.71 |
| 62 | 2.19 | 97 | 0.69 |
| 63 | 2.11 | 98 | 0.67 |
| 64 | 2.04 | 99 | 0.65 |
| 65 | 1.97 | 100 | 0.63 |
| 66 | 1.90 | 101 | 0.61 |
| 67 | 1.83 | 102 | 0.59 |
| 68 | 1.77 | 103 | 0.58 |
| 69 | 1.71 | 104 | 0.56 |
| 70 | 1.65 | 105 | 0.54 |
| 71 | 1.59 | 106 | 0.53 |
| 72 | 1.54 | 107 | 0.51 |
| 73 | 1.48 | 108 | 0.50 |
| 74 | 1.43 | 109 | 0.48 |
| 75 | 1.39 | 110 | 0.47 |
| 76 | 1.34 | 111 | 0.46 |
| 77 | 1.29 | 112 | 0.45 |
| 78 | 1.25 | 113 | 0.43 |

# REMKO ML-ARCTIC series

| Temp. (°C) | Resistance (kΩ) | Temp. (°C) | Resistance (kΩ) |
|---|---|---|---|
| 114 | 0.42 | 127 | 0.30 |
| 115 | 0.41 | 128 | 0.29 |
| 116 | 0.40 | 129 | 0.28 |
| 117 | 0.39 | 130 | 0.28 |
| 118 | 0.38 | 131 | 0.27 |
| 119 | 0.37 | 132 | 0.26 |
| 120 | 0.36 | 133 | 0.26 |
| 121 | 0.35 | 134 | 0.25 |
| 122 | 0.34 | 135 | 0.25 |
| 123 | 0.33 | 136 | 0.24 |
| 124 | 0.32 | 137 | 0.23 |
| 125 | 0.32 | 138 | 0.23 |
| 126 | 0.31 | 139 | 0.22 |

**Probe T5**

| Temp. (°C) | Resistance (kΩ) | Temp. (°C) | Resistance (kΩ) |
|---|---|---|---|
| -20 | 542.7 | -2 | 200.7 |
| -19 | 511.9 | -1 | 190.5 |
| -18 | 483.0 | 0 | 180.9 |
| -17 | 455.9 | 1 | 171.9 |
| -16 | 430.5 | 2 | 163.3 |
| -15 | 406.7 | 3 | 155.2 |
| -14 | 384.3 | 4 | 147.6 |
| -13 | 363.3 | 5 | 140.4 |
| -12 | 343.6 | 6 | 133.5 |
| -11 | 325.1 | 7 | 127.1 |
| -10 | 307.7 | 8 | 121.0 |
| -9 | 291.3 | 9 | 115.2 |
| -8 | 275.9 | 10 | 109.8 |
| -7 | 261.4 | 11 | 104.6 |
| -6 | 247.8 | 12 | 99.69 |
| -5 | 234.9 | 13 | 95.05 |
| -4 | 222.8 | 14 | 90.66 |
| -3 | 211.4 | 15 | 86.49 |
| 16 | 82.54 | 51 | 18.96 |
| 17 | 78.79 | 52 | 18.26 |
| 18 | 75.24 | 53 | 17.58 |
| 19 | 71.86 | 54 | 16.94 |
| 20 | 68.66 | 55 | 16.32 |
| 21 | 65.62 | 56 | 15.73 |
| 22 | 62.73 | 57 | 15.16 |
| 23 | 59.98 | 58 | 14.62 |
| 24 | 57.37 | 59 | 14.09 |
| 25 | 54.89 | 60 | 13.59 |
| 26 | 52.53 | 61 | 13.11 |
| 27 | 50.28 | 62 | 12.65 |
| 28 | 48.14 | 63 | 12.21 |
| 29 | 46.11 | 64 | 11.79 |
| 30 | 44.17 | 65 | 11.38 |
| 31 | 42.33 | 66 | 10.99 |
| 32 | 40.57 | 67 | 10.61 |
| 33 | 38.89 | 68 | 10.25 |
| 34 | 37.30 | 69 | 9.90 |
| 35 | 35.78 | 70 | 9.57 |
| 36 | 34.32 | 71 | 9.25 |
| 37 | 32.94 | 72 | 8.94 |
| 38 | 31.62 | 73 | 8.64 |
| 39 | 30.36 | 74 | 8.36 |
| 40 | 29.15 | 75 | 8.08 |
| 41 | 28.00 | 76 | 7.82 |
| 42 | 26.90 | 77 | 7.57 |
| 43 | 25.86 | 78 | 7.32 |
| 44 | 24.85 | 79 | 7.09 |
| 45 | 23.89 | 80 | 6.86 |
| 46 | 22.89 | 81 | 6.64 |
| 47 | 22.10 | 82 | 6.43 |
| 48 | 21.26 | 83 | 6.23 |
| 49 | 20.46 | 84 | 6.03 |
| 50 | 19.69 | 85 | 5.84 |

| Temp. (°C) | Resistance (kΩ) | Temp. (°C) | Resistance (kΩ) |
|---|---|---|---|
| 86 | 5.66 | 109 | 2.86 |
| 87 | 5.49 | 110 | 2.78 |
| 88 | 5.32 | 111 | 2.70 |
| 89 | 5.16 | 112 | 2.63 |
| 90 | 5.00 | 113 | 2.56 |
| 91 | 4.85 | 114 | 2.49 |
| 92 | 4.70 | 115 | 2.42 |
| 93 | 4.56 | 116 | 2.36 |
| 94 | 4.43 | 117 | 2.29 |
| 95 | 4.29 | 118 | 2.23 |
| 96 | 4.17 | 119 | 2.17 |
| 97 | 4.05 | 120 | 2.12 |
| 98 | 3.93 | 121 | 2.06 |
| 99 | 3.81 | 122 | 2.01 |
| 100 | 3.70 | 123 | 1.96 |
| 101 | 3.60 | 124 | 1.91 |
| 102 | 3.49 | 125 | 1.86 |
| 103 | 3.39 | 126 | 1.81 |
| 104 | 3.30 | 127 | 1.76 |
| 105 | 3.20 | 128 | 1.72 |
| 106 | 3.11 | 129 | 1.67 |
| 107 | 3.03 | 130 | 1.63 |
| 108 | 2.94 | | |

# 11 Care and maintenance

Regular care and observation of some basic points will ensure trouble-free operation and a long service life.

**DANGER!**

Prior to performing any work, ensure the equipment is disconnected from the voltage supply and secured to prevent accidental switch-on!

**Care**

- Ensure the unit is protected against dirt, mould and other deposits.
- Only clean the unit using a damp cloth. Do not use any caustic, abrasive or solvent-based cleaning products. Do not use a jet of water.
- Clean the fins on the unit prior to long shut-down periods.

**Maintenance**

- It is recommended that you take out a maintenance contract with an annual service from an appropriate specialist firm.

*This enables you to ensure the operational reliability of the plant at all times!*

**NOTICE!**

Statutory regulations require an annual leak test for the cooling cycle dependant on the refrigerant quantity. Inspection and documentation of the work performed is to be carried out by specialist technicians.

| Type of task<br>Checks/maintenance/inspection | Commissioning | Monthly | Every 6 months | Yearly |
|---|---|---|---|---|
| General | ● | | | ● |
| Check voltage and current | ● | | | ● |
| Check function of compressor/fans | ● | | | ● |
| Dirt on condenser/evaporator | ● | ● | | |
| Check refrigerant fill quantity | ● | | ● | |
| Check condensate drainage | ● | | ● | |
| Check insulation | ● | | | ● |
| Check moving parts | ● | | | ● |
| Sealing test for cooling cycle | ● | | | ●[1)] |

[1)] See note

### Cleaning the housing

1. Disconnect the power supply to the unit.
2. Open and fold the air inlet grill on the front side upwards.
3. Clean the grill and cover with a soft, damp cloth.
4. Switch the power supply back on.

### Air filter for indoor unit

Clean the air filter at intervals of no more than 2 weeks. Reduce this interval if the air is especially dirty.

### Cleaning the filter

1. Disconnect the power supply to the unit.
2. Open the front side of the unit by folding the grill upwards and allowing it to engage (Fig. 57).
3. Raise the filter and pull it out in a downwards direction (Fig. 57).
4. Clean the filter with a commercially available vacuum cleaner (Fig. 58). To do so, turn the dirty side so it is facing upwards.
5. Dirt can also be removed by carefully cleaning with lukewarm water and mild cleaning agents (Fig. 59). The dirty side should be face down.
6. If water is used, let the filter dry out properly in the air before fitting it back into the unit.
7. Carefully insert the filter. Ensure that it locates correctly.
8. Close the front side as described above in reverse order.
9. Switch the power supply back on.
10. Switch the unit back on.

### Cleaning the condensate pump (accessories)

The indoor unit may contain an optional integrated or separate condensate pump, which pumps out any accumulated condensate into higher positioned drains.

Observe the care and maintenance instructions in the separate operating manual.

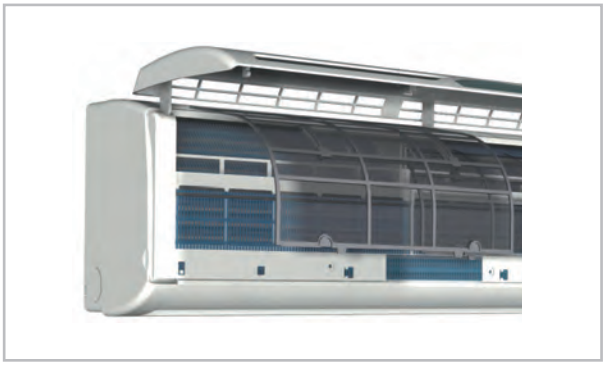


*Fig. 57: Folding the grill upwards*



*Fig. 58: Cleaning with a vacuum cleaner*



*Fig. 59: Cleaning with lukewarm water*

# 12 Shutdown

**Temporary shutdown**

1. Let the indoor unit run for 2 to 3 hours in recirculation mode, or in cooling mode at maximum temperature, to extract any residual humidity from the unit.
2. Shut down the system using the remote control.
3. Switch off the electrical power supply to the unit.
4. Cover the unit as far as possible with plastic foil in order to protect it from the influences of weather.

**Permanent shutdown**

Ensure that units and components are disposed of in accordance with local regulations, e.g. through authorised disposal and recycling specialists or at collection points.

REMKO GmbH & Co. KG or your contractual partner will be pleased to provide a list of certified firms in your area.

# 13 Exploded view and spare parts lists

## 13.1 Exploded view - Indoor unit

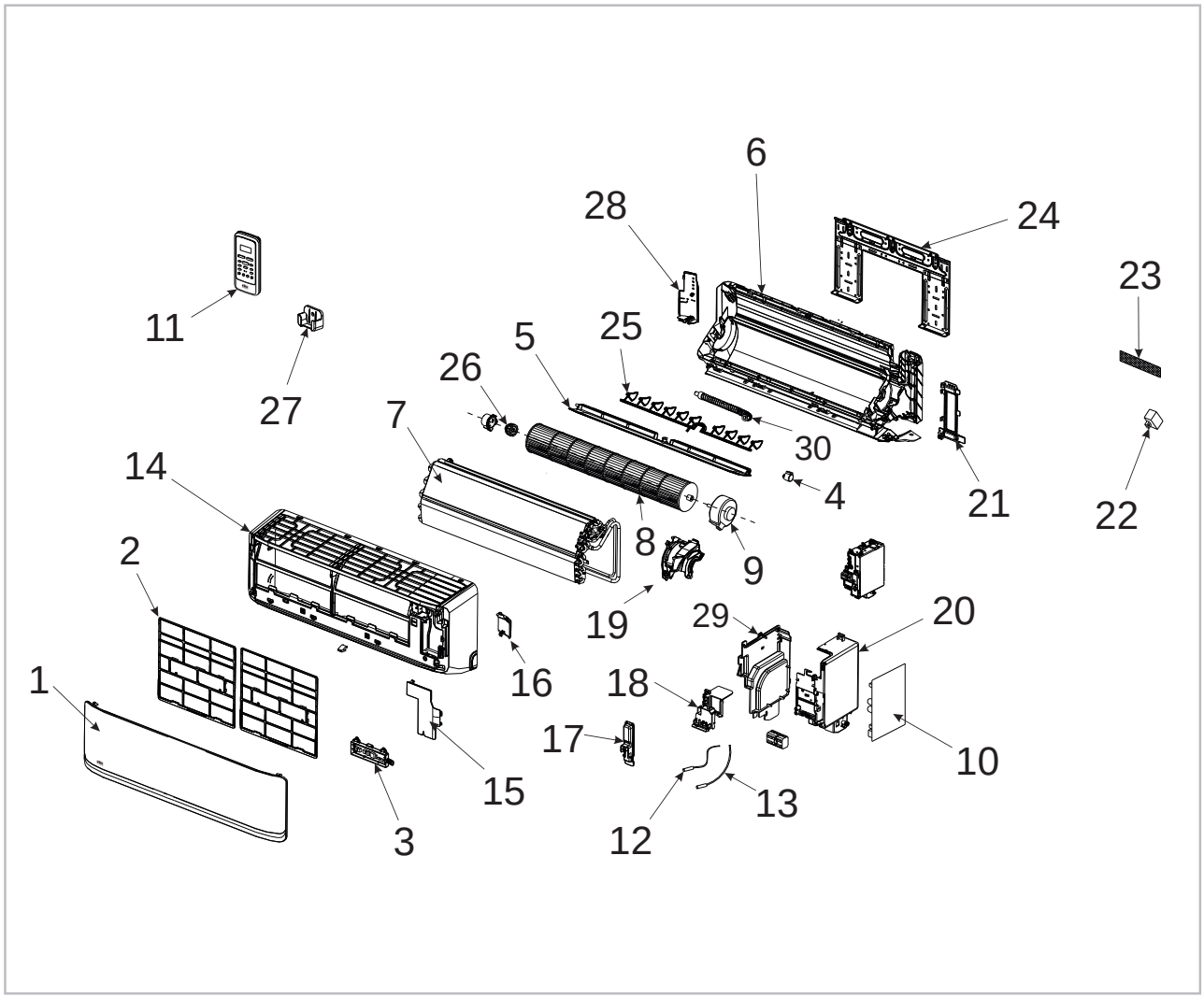



*Fig. 60: Exploded view of the unit ML 265 DC-685 DC IT*

We reserve the right to modify the dimensions and design as part of the ongoing technical development process.

## 13.2 Spare parts list - Indoor unit

***IMPORTANT!***

*To ensure the correct delivery of spare parts, please always the device type with the corresponding serial number (see type plate)*

| No. | Designation |
|---|---|
| 1 | Unit trim |
| 2 | Air filter, single |
| 3 | Circuit board, display |
| 4 | Fin motor |
| 5 | Air outlet flap, horizontal |
| 6 | Housing back incl. condensate tray |
| 7 | Evaporator |
| 8 | Fan wheel |
| 9 | Fan motor |
| 10 | Control board |
| 11 | IR remote control |
| 12 | Room temperature probe T1 |
| 13 | Temperature probe, evaporator T2 |
| 14 | Housing front |
| 15 | Plastic covering, terminal block |
| 16 | Plastic covering, board |
| 17 | Housing part, electronics module |
| 18 | Housing part, electronics module |
| 19 | Plastic holder, fan motor |
| 20 | Housing cover, electronics module |
| 21 | Housing part, housing back right |
| 22 | Ion generator |
| 23 | Fine dust filter |
| 24 | Wall bracket |
| 25 | Air outlet fins, vertical |
| 26 | Bearing, fan wheel |
| 27 | IR remote control holder |
| 28 | Housing back, electronics module |
| 29 | Housing part, housing back left |
| 30 | Condensate hose |

## 13.3 Exploded view of the outdoor unit

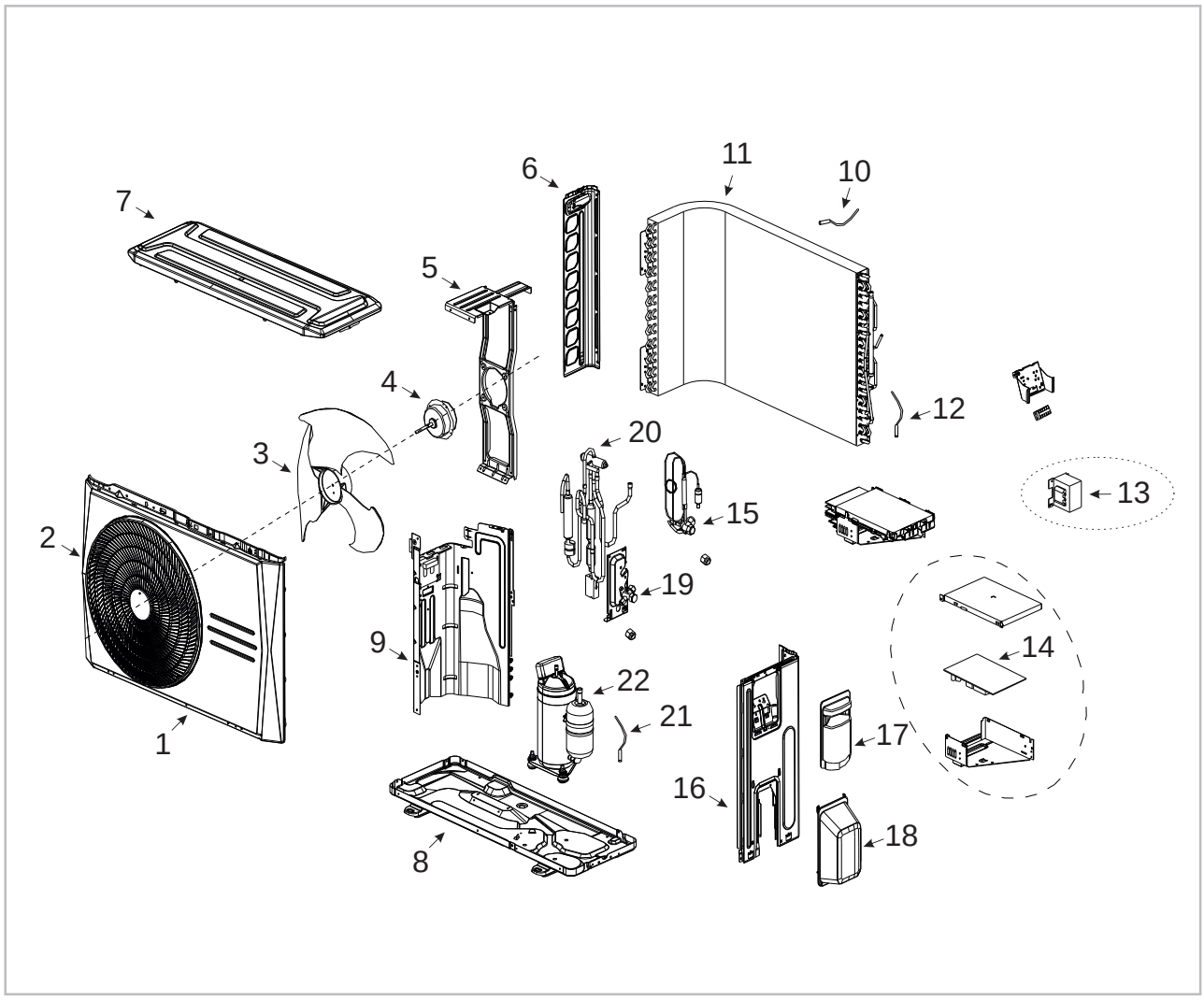



*Fig. 61: Exploded view of the outdoor units ML 265 DC-685 DC AT*

We reserve the right to modify the dimensions and design as part of the ongoing technical development process.

## 13.4 Spare parts list - Outdoor unit

***IMPORTANT!***

*To ensure the correct delivery of spare parts, please always the device type with the corresponding serial number (see type plate)*

| No. | Designation |
|---|---|
| 1 | Front panel, left |
| 2 | Protection grid, front plate |
| 3 | Fan blade |
| 4 | Fan motor |
| 5 | Fan motor bracket |
| 6 | Corner panel |
| 7 | Housing cover |
| 8 | Base plate |
| 9 | Partitioning panel |
| 10 | Air probe condenser |
| 11 | Condenser |
| 12 | Condenser pipe placement probe |
| 13 | Inductor |
| 14 | Control board |
| 15 | Shut-off valve, injection pipe |
| 16 | Side section, housing, right |
| 17 | Plastic covering, terminal block |
| 18 | Plastic covering, pipe connections |
| 19 | Shut-off valve, suction pipe |
| 20 | 4-way valve |
| 21 | Compressor pipe placement probe |
| 22 | Compressor |
| 23 | Crankcase heating |
| 24 | Condensate tray heating |

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We reserve the right to make technical changes, and provide no guarantee as to the accuracy of this data!