

Operating and installation instructions

REMKO MVD series

Ceiling cassettes for cooling or heating

MVD 222, MVD 282, MVD 362, MVD 452





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 for the first time. It contains useful tips and notes such as hazard warnings to prevent personal injury and material damage. Failure to follow the directions in this manual not only presents a danger to people, the environment and the system itself, but will void any claims for liability.

Keep this operating manual and the refrigerant data sheet near to the units.

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 notes 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 (grille) 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 certain unit parts or components may lead to burns or injury.
- The units and components must not be exposed to any mechanical load, extreme levels of humidity or extreme temperature.
- Spaces in which refrigerant can leak sufficient to load and vent. Otherwise there is danger of suffocation.
- All housing parts and device openings, e.g. air inlets and outlets, must be free from foreign objects, fluids or gases.
- The units must be inspected by a service technician at least once annually. 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

- 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.
- Local regulations and laws such as 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.
- Mobile units must be set up securely on suitable surfaces and in an upright position. Stationary units must be permanently installed for operation.
- 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 must not be altered or bypassed.

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 manufacturer 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.

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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		MVD 222	MVD 282	MVD 362	MVD 452
Operating mode		Ceiling cassette for inverter multisplit outdoor units for cooling or heating			
Nominal cooling output ¹⁾	kW	2.20	2.80	3.61	4.50
El. rated power consump., cooling ¹⁾	W	35	35	40	50
Nominal heat capacity ²⁾	kW	2.50	3.20	4.00	5.00
El. rated power consump., heating ²⁾	W	35	35	40	50
Application area (room vol.), approx.	m³	70	90	110	140
Refrigerant piping		R410A			
Max. operating pressure	kPa	44			
Adjustment range, room temperature	°C	+17 to +30			
Air flow volume per stage	m³/h	405/441/462/503/ 524/552/576		400/434/478/516/ 541/573/604	
Sound pressure level per stage ³⁾	dB (A)	35/34/33/29/26/23/22		28/29/30/32/35/38/41	
Sound power per stage	dB (A)	38/39/42/45/49/50/51		43/44/45/47/50/53/56	
Power supply	V/Ph/Hz	230/1~/50			
Enclosure class		IP X0			
Refrigerant liquid pipe connection	Inches (mm)	1/4 (6.35)			
Refrigerant suction pipe connection	Inches (mm)	1/2 (12.70)			
Condensate drainage connection	mm	25			
Condensate pump, flow rate, max.	mm WS	500			
Cassette dimensions					
Length/width/depth	mm	630/570/260			
Weight	kg	18.0		19.2	
Cover dimensions					
Length/width/depth	mm	647/647/50			
Weight	kg	2.5			
EDP no.		1623552	1623557	1623562	1623567

¹⁾ Air intake temperature TK 27 °C / FK 19 °C, outside temperature TK 35 °C, FK 24 °C, 7.5 m pipe length

²⁾ Air intake temperature TK 20 °C, outside temperature TK 7 °C, FK 6 °C, 7.5 m pipe length

³⁾ Frontal measurement, distance 1 m, measured in semi-anechoic chamber

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2.2 Unit dimensions

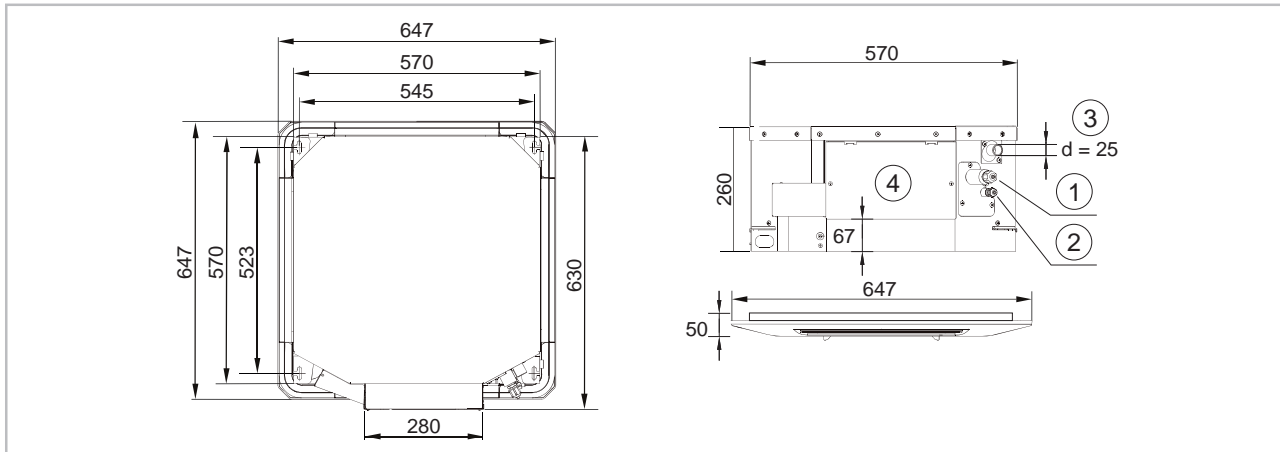


Fig. 1: Dimensions MVD 222-452 (all measurements in mm)

- 1: Suction gas pipe connection
- 2: Liquid pipe connection
- 3: Condensate drainage line connection
- 4: Housing, electronic expansion valve

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 indoor unit is used to extract heat from the indoor room being cooled. The outdoor unit then expels this heat to the outside.

If combined heating/cooling units are operated as heaters, the heat absorbed by the outdoor unit can be discharged by the indoor unit into the room being heated.

The unit series has the "Heating" priority, i.e. the units that are in heating or automatic mode can switch off other units in the system that are running in cooling mode.

The unit is designed to be mounted high up on the wall, in an indoor area.

It is operated by an infrared remote control.

The indoor unit consists of a fin evaporator, evaporator fan, controller and condensate tray. The indoor unit can be combined with REMKO outdoor units from the MVV range that provide sufficient combination options. The outdoor unit is controlled by the regulation of the indoor unit.

A cabled remote control and a condensate pump are available as accessories.

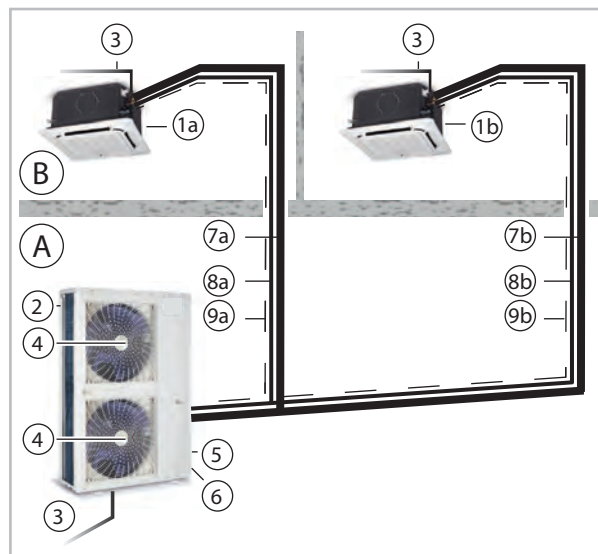


Fig. 2: System layout

- A: Outdoor area
- B: Indoor area
- 1 a,b: Indoor units
- 2: Outdoor unit
- 3: Condensate drainage line
- 4: Condenser fan
- 5: Mains cable
- 6: Shut-off valve
- 7 a,b: Suction pipes
- 8 a,b: Liquid pipes
- 9 a,b: Control lines

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

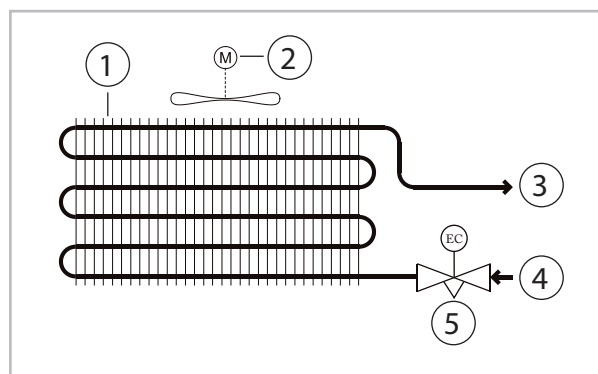


Fig. 3: Cooling cycle schematic

- 1: Evaporator
- 2: Evaporator fan
- 3: Suction pipe connection
- 4: Liquid pipe connection
- 5: Expansion valve

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3.2 Combinations

The MVD 222-452 indoor units can be used together with the MVV series outdoor units.

Selection of the indoor units to be connected takes place solely according to the maximum refrigerating capacity of all indoor units to be connected. Max. 130 %.

The power factor takes into account the fact that all indoor units are never required to deliver 100% capacity at the same time.

The design of the system and the inclusion of the power factor must always take place with consideration to the local conditions!

Outdoor unit Type	Power	Power factor	Maximum refrigerating capacity of the indoor units to be connected
MVV 1200 DC	12.0 kW	130 %	15.6 kW
MVV 1600 DC	16.0 kW	130 %	20.8 kW
MVV 2000 DC	20.0 kW	130 %	26.0 kW
MVV 1200 DC Duo	24.0 kW	130 %	31.2 kW
MVV 1600 DC Duo	32.0 kW	130 %	41.6 kW
MVV 2000 DC Duo	40.0 kW	130 %	52.0 kW

In the following you will find example installations for the MVV series with the indoor units from the MVW, MVD series and MXV

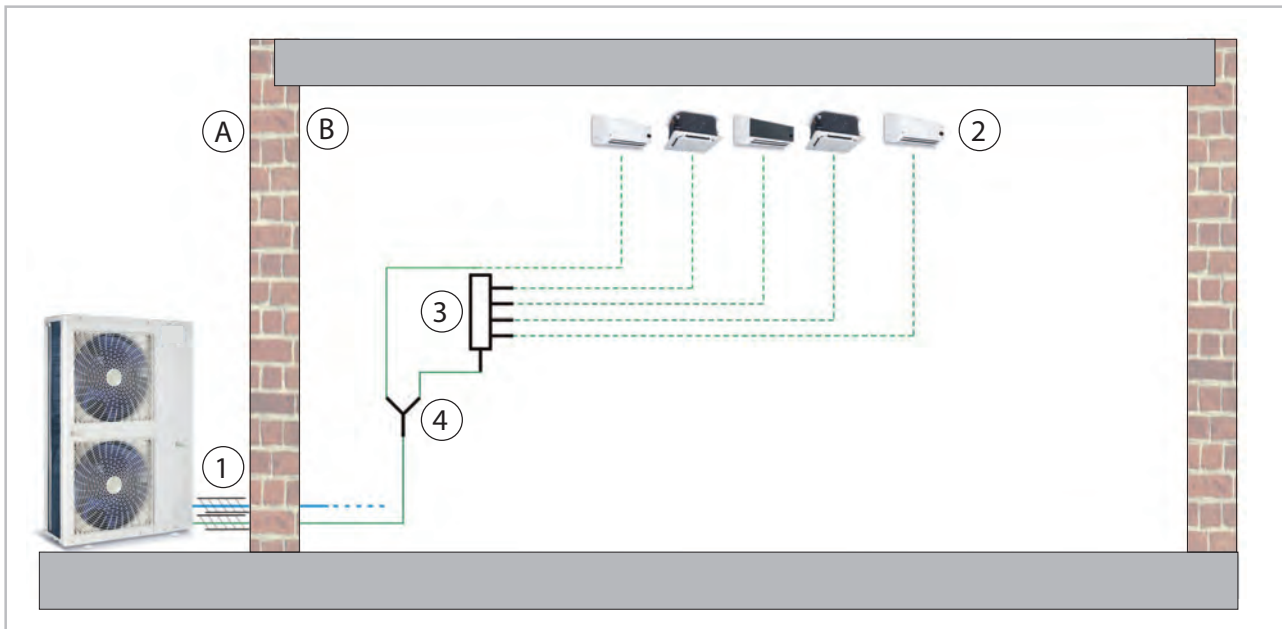


Fig. 4: connection possibilities on one level

- A: Outdoor area
- B: Indoor area
- 1: Outdoor unit

- 2: Indoor units of the series MVW, MVD or MXV
- 3: Distributor
- 4: Y-distributor

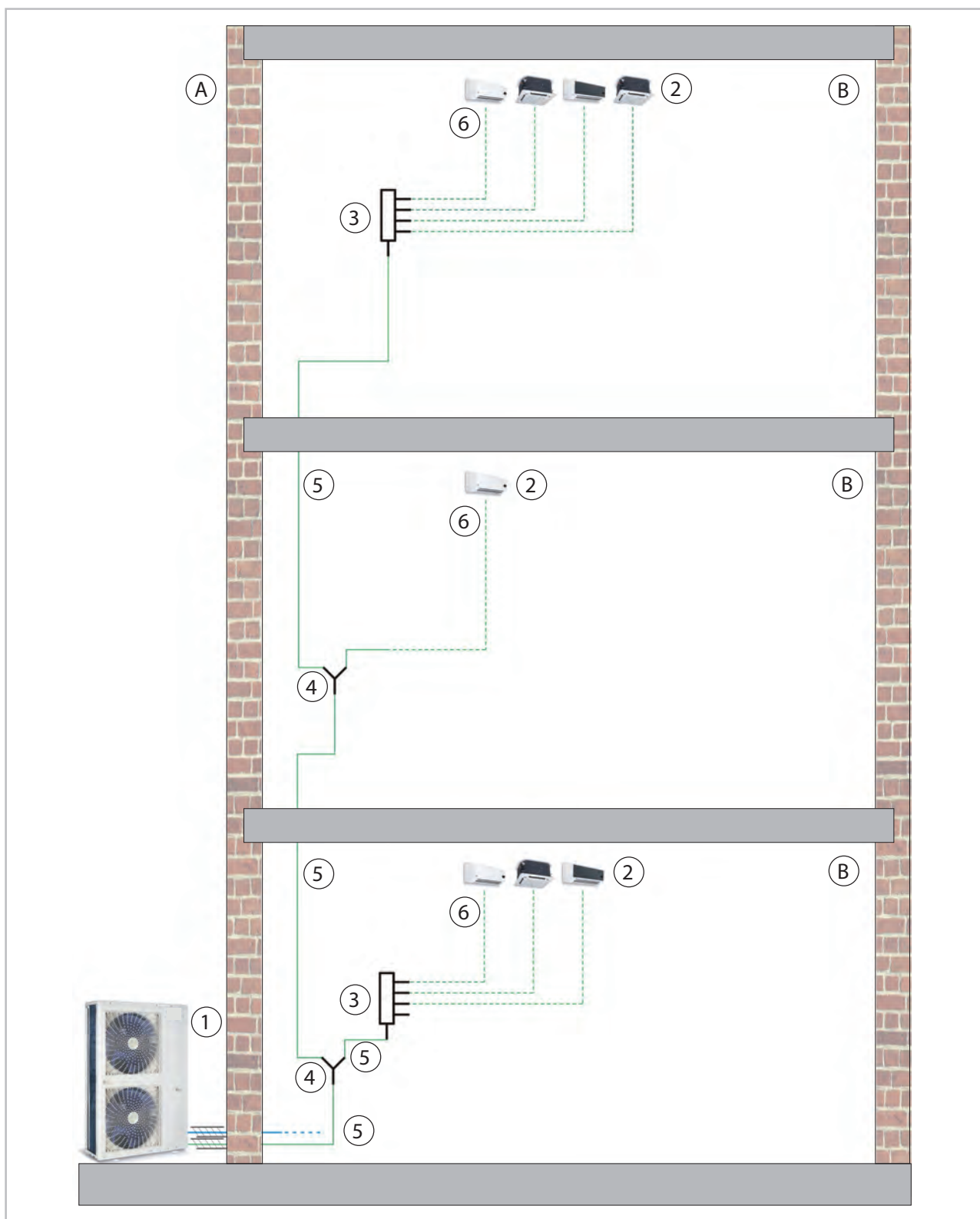


Fig. 5: Connection possibilities on multiple levels

- | | |
|---|-------------------|
| A: Outdoor area | 3: Distributor |
| B: Indoor area | 4: Y-distributor |
| 1: Outdoor unit | 5: Main line |
| 2: Indoor units of the series MVW, MVD or MXV | 6: Ancillary line |

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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. The indoor units can also be operated from a central point with the Multi-Central-Controller MCC-1. The indoor unit can also be operated via an optional cabled remote control.

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.

First insert the supplied batteries (2 each, type AAA) into the remote control. To do so, pull off the flap of the battery compartment and insert the batteries correctly by polarisation (see marks).

The indoor unit indicator is located on a display on the front panel of the ceiling cassette. Operating messages, error codes and other information can be read off via the display.

! 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

The indoor unit indicator is located on a display on the front panel of the ceiling cassette. Operating messages, error codes and other information can be read off via the display.



Fig. 6: Maximum distance



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

4.3 Keys on the remote control

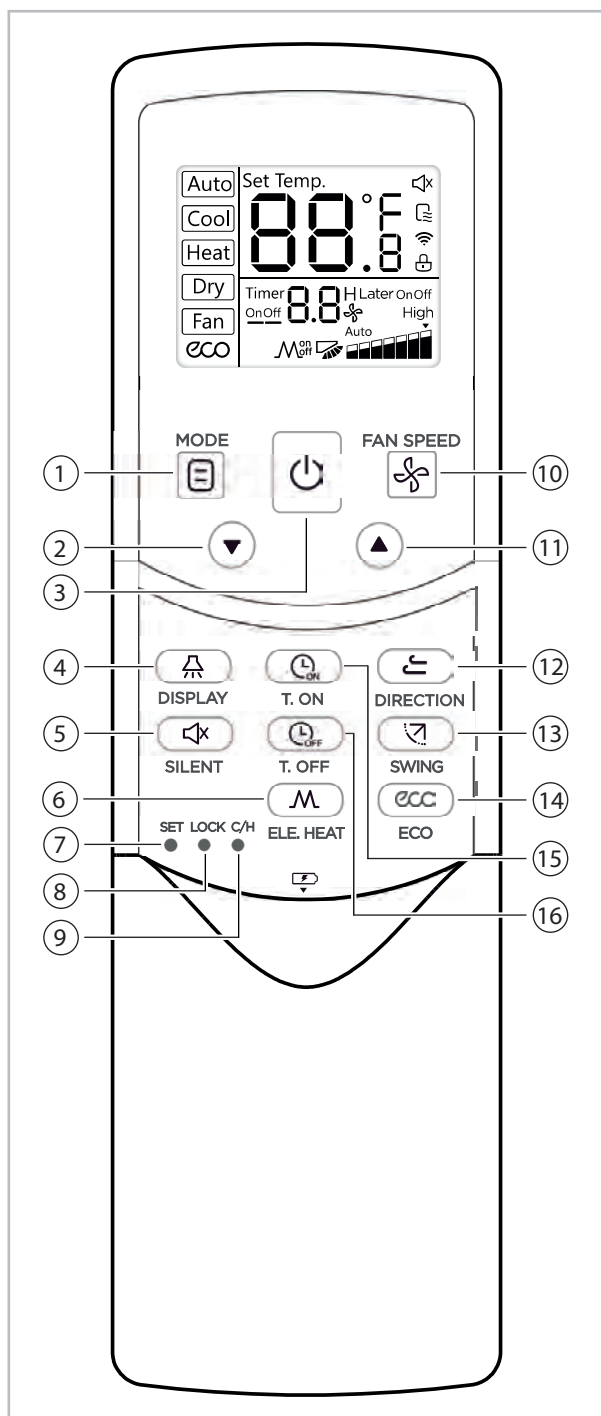


Fig. 7: Keys on the remote control

① "Mode" key

Operating mode selection (Auto ⇒ Cooling ⇒ Heating ⇒ Dehumidification ⇒ Recirculation)

② "Arrow down" key

Decreases the selected temperature or timer settings.

③ "On/Off" key

Switches the unit on or off.

④ "Display" key

Switches the display of the indoor unit on or off (if fitted).

⑤ "Silent" key

Switches the particularly low-noise operating mode on or off (if fitted).

⑥ "Ele. Heat" key (not fitted)

Switches the electric auxiliary heater on or off.

⑦ "Set" key

Allows the remote control parameters to be changed.

⑧ "Lock" key

Switches the child lock of the IR remote control on or off.

⑨ "C/H" key

Enables the pre-selection of the operating mode Settings (Cooling, Cooling and Heating only).

⑩ "Fan speed" key

Sets the fan speed.

⑪ "Arrow up" key

Increases the selected temperature or timer settings.

⑫ "Direction" key

Allows the air discharge fin to be adjusted.

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⑬ “Swing” key

Switches the automatic upward and downward movement of the air discharge fin on and off.

⑭ “Eco” key

Turns the power save mode on (if fitted).

⑮ “Timer on” key

Sets the time after which the unit is to switch on.

⑯ “Timer off” key

Sets the time after which the unit is to switch off.

Remote control display

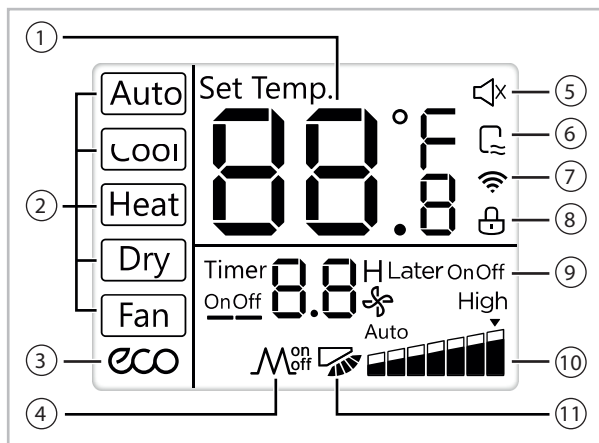


Fig. 8: Indicators on the LCD

① Temperature

Shows the currently set setpoint.

② Operating mode

Shows the currently active operating mode.

③ ECO

Appears when the power save function is active.

④ Electric auxiliary heater

Appears when the electric auxiliary heater is active (not fitted).

⑤ Low-noise operating mode

Appears when the Low-noise operating mode is active.

⑥ Unit status

Appears when the unit is switched on.

⑦ Signal transmission indicator

Appears briefly during signal transmission to the indoor unit.



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.

Set or change operating modes


Switch unit on or off

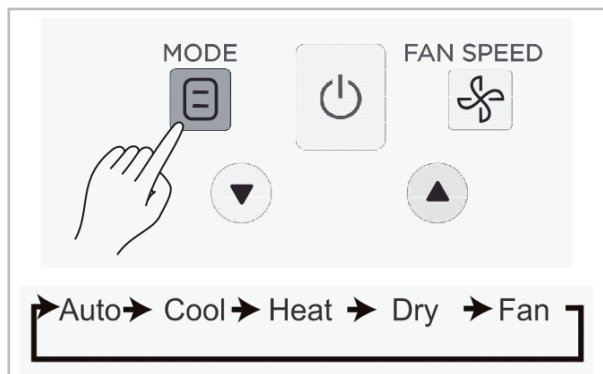
1. Press the key. The symbol for the active unit status appears on the display of the IR remote control . The unit switches itself on.





2. Press the key again. The symbol disappears and the unit switches off.

Select the operating mode and temperature

1. Press the  key several times to select the desired operating mode. The selection appears on the display of the IR remote control.



2. In the “Automatic”, “Cooling”, “Dehumidifying” or “Heating” operating modes, the desired temperature can be set in 1 °C steps using the  and  arrow keys.



The temperature cannot be set in the “Recirculation” operating mode!

Setting the fan speed

1. In the standard setting, the fan speed can be set in 7 stages via the IR remote control.




- A: Low
B: Medium
C: Up

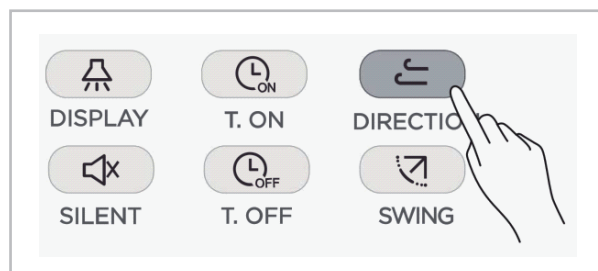
2. Optionally, the IR remote control can be programmed (see section ...) so that only 3 fan stages can be set:



- A: Low
B: Medium
C: Up

Individually adjusting the air discharge fin

1. Use the  key to move the air discharge fin to 5 different positions.





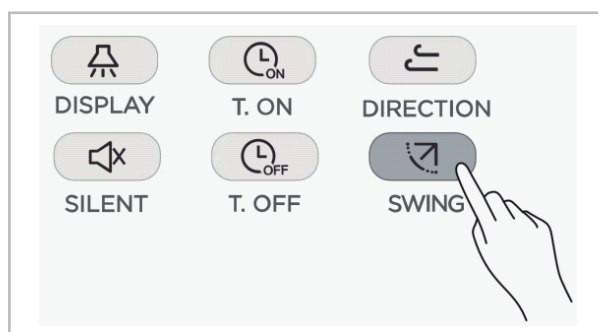
2. The fin setting changes by approx. 6° each time the key is pressed. If the unit is switched off, the key has no function. When the unit is switched on, the air discharge fin returns to the fixed position.




This function is only available for units with vertical air discharge fins!

Using the air discharge fin with the swing function

1. As soon as the unit is switched on, the  key can be used to activate the swing function. The symbol appears on the remote control display for 15 seconds .




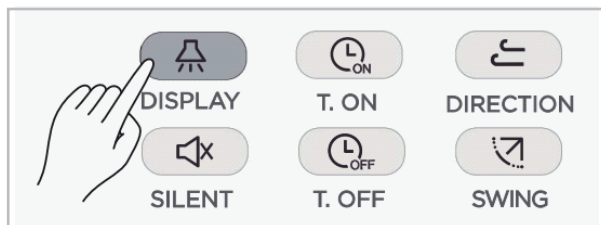
2. If the swing function is active, it can be deactivated again by pressing the  key again.

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Switching the indoor unit display off





This function enables the display illumination of the indoor unit to be switched off.

1. When the remote control is on or off, the  key can be used to switch the unit display on or off.



Activating the low-noise operating mode

The "Silent" function is used to activate the quietest operating mode of the unit.






1. If the indoor unit is working in cooling or heating mode, the "Silent" function of the unit can be activated with the  key. The following symbol appears on the remote control display .
2. If the "Silent" function is active, it can be deactivated by pressing the  key again. The  symbol on the remote control goes out.

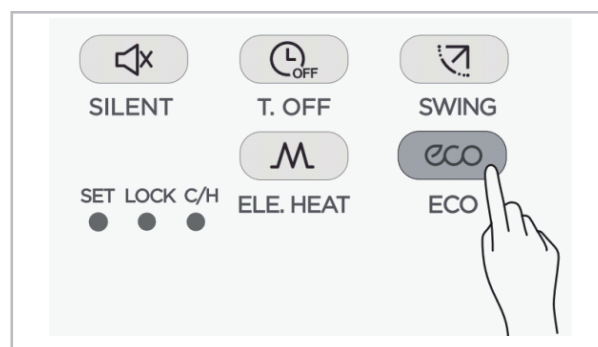


After 8 hours of unit operation, the "Silent" function is automatically deactivated. The energy saving function and the "Silent" function cannot be activated at the same time.

Energy saving function

If the unit is in the cooling or heating mode, the energy saving function can be activated with the IR remote control (if the unit model is equipped with this function).

1. The energy saving function can be activated by pressing the  key. The following symbol appears on the remote control display .
2. The energy saving function can be deactivated again by pressing the  or  keys. The  symbol on the IR remote control display goes out.






If the energy saving function is active in cooling mode, the fan speed is set to automatic and the temperature setpoint to 26 °C. In heating mode, the fan also works in automatic mode, the setpoint does not change.


After 8 hours of unit operation, the energy saving function is automatically deactivated.



The "Energy saving function" and "Low noise operating mode" cannot be operated simultaneously!

Activate/deactivate delayed switching on and off

1. The unit switch-on delay can be activated with the  key. After pressing this key, "Timer on" and "0.0h Later On" appear on the IR remote control display.

The time can be set by pressing the  or  keys.

2. The unit switch-off delay can be activated with the  key. After pressing this key, "Timer off" and "0.0h Later Off" appear on the IR remote control display.

The time can be set by pressing the  or  keys.








The time is set in 0.5 hour increments by pressing the key for a longer period of time. If the setting is greater than 10 hours, the settings are made in 1 hour increments. The maximum switch-on or switch-off delay is 24 hours.

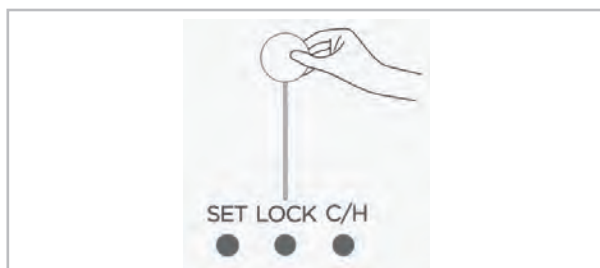
To exit the setting mode, the time must be reset to 0.0h.

The "Switch-on delay" and "Switch-off delay" functions can also be combined.


Locking the IR remote control

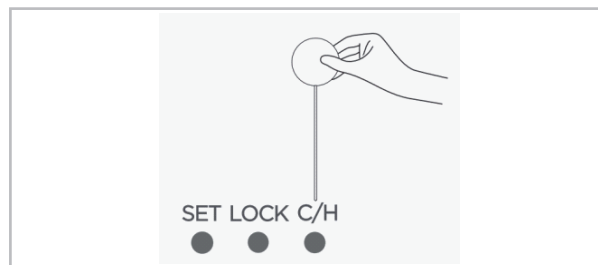
By pressing the  key (pin required), all functions of the IR remote control can be disabled (except Lock, Cooling or Heating only, and the Addressing function).

1. After pressing the  key, the lock symbol  appears on the IR remote control display. The IR remote control can no longer be operated.
2. The key lock can be deactivated by pressing the  key again. The  symbol goes out.



Activating the "Cooling only" function

The IR remote control is factory programmed for the cooling and heating functions. The "Cooling only" function can be activated or deactivated by pressing the  key. Selecting the heating mode is then no longer possible when the function is activated.

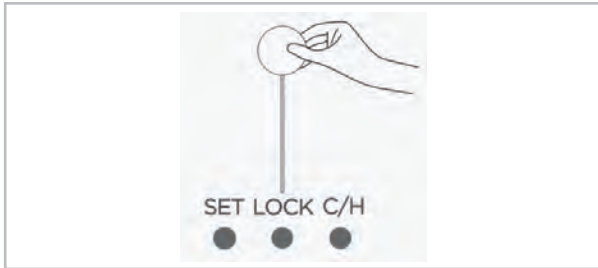


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Manual unit addressing

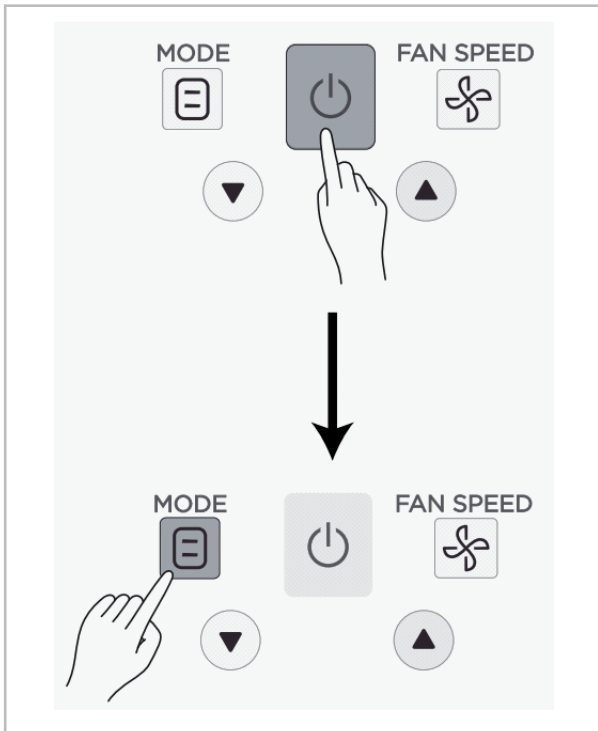
The MVV series outdoor units automatically assign addresses to the indoor units during commissioning. However, these can also be assigned manually (for example, for arrangement on the Multi-Central-Controller).

By pressing the ^{LOCK} key for longer than 5 seconds the addressing mode of the IR remote control is activated. The addressing mode can be exited by pressing the ^{LOCK} key again for longer than 5 seconds.







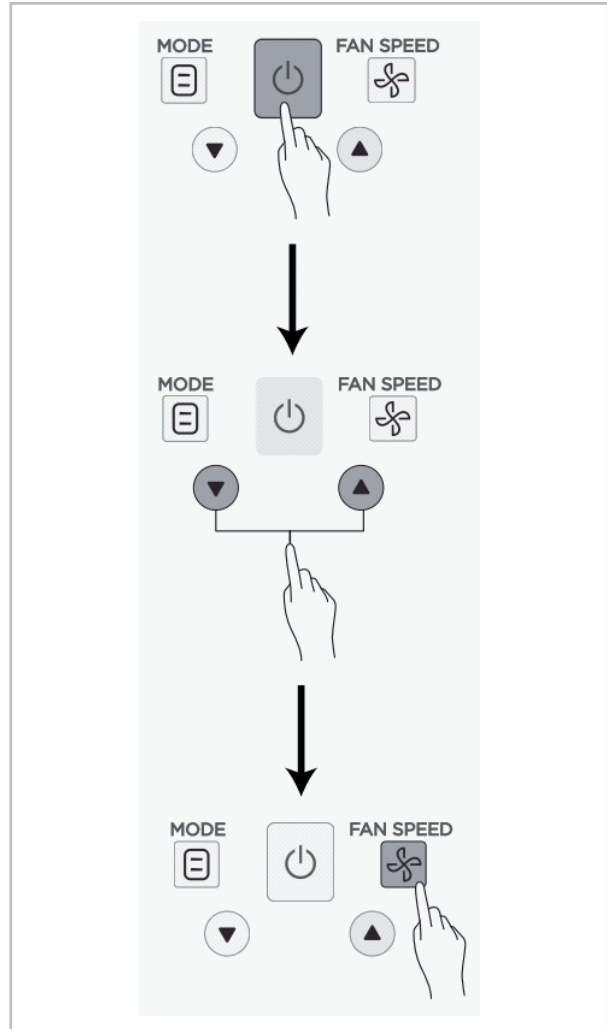
1. Querying the unit address

If the addressing mode (see above) is active, the signal transmission must be activated by pressing the  key. The  key can then be used to query the unit address. The address appears directly on the display or is coded as an LED flashing code (for ceiling cassettes).





2. Assigning the unit address




If the addressing mode (see above) is active, the signal transmission must be activated by pressing the  key. Use the arrow keys   to preselect the desired address, then press the  key to transfer it to the unit.

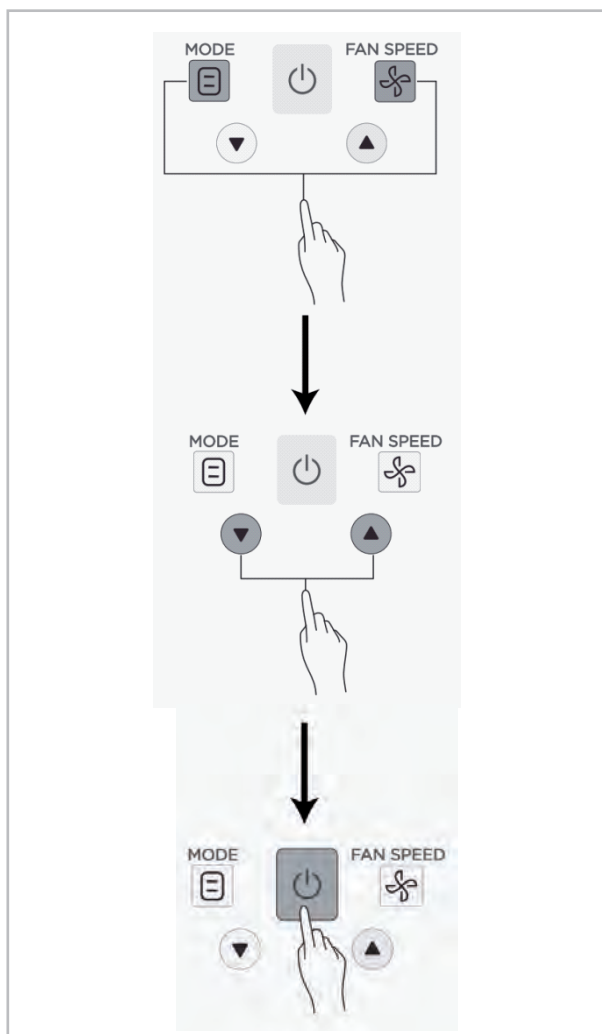


Changing the parameters for fan functions

1. Pressing the  and  keys simultaneously for 5 seconds displays the parameter level on the IR remote control.



2. Using the arrow keys   the desired parameter can now be selected.
3. By pressing the  key or waiting for 5 seconds, the selected parameter becomes active.



Selectable parameters

Parameter	Definition
00	7 fan stages, temperature increments of 0.5 °C
01	3 fan stages, temperature increments of 1.0 °C
02	7 fan stages, temperature increments of 1.0 °C (factory setting)
03	3 fan stages, temperature increments of 0.5 °C

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5 Installation Instructions for qualified personnel

Important notes prior to installation

Observe the operating manuals for the indoor unit and the outdoor unit when installing the entire system.

- 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.
- Install the refrigerant piping from the indoor unit to the outdoor unit.
- 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.
- Only use the union nuts supplied with the refrigerant piping and remove these shortly before connecting the refrigerant piping.
- Install 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.
- Service openings should be provided in the suspended ceiling to allow for maintenance access.

Installation materials

The indoor unit is suspended from the corners of the units by means of hangers. Wall plugs, trapezoidal sheet metal supports, steel profiles, fixing clamps for refrigerant and condensate drainage lines (as well as laying ducts) and connection fittings for condensate drainage lines must be provided by the customer.

Selecting the installation location

The indoor unit is specifically designed for horizontal mounting in suspended ceilings with Euro-raster dimensions. However, it can also be installed in suspended ceilings with different dimensions. Take into account the installation height of the equipment.

Minimum clearances

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

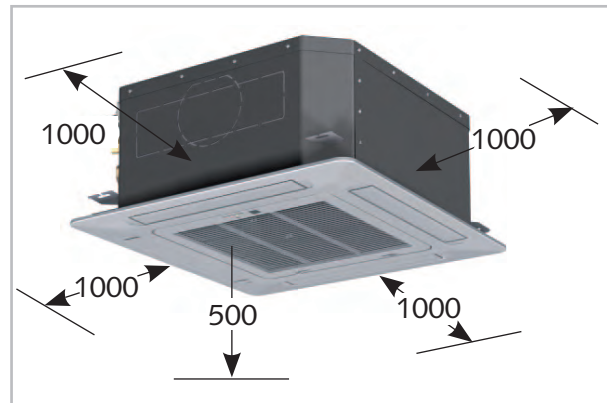


Fig. 9: Minimum clearances MVD 222-452 (all measurements in mm)

6 Installation

! NOTICE!

Installation should only be performed by authorised specialists.

Unit installation

The unit is mounted with the cover face down on four threaded rods. Take into account the ceiling grid and any other installations.

1. Use the dimensions of the ceiling cassette to mark the fixing points for the threaded rods on structural parts approved to support the static load above the suspended ceiling (Fig. 10).
2. Fit the indoor unit onto the threaded rods and use the lower nuts to level the unit (Fig. 11).
3. Adhere to a ceiling clearance of at least 35 mm. Connect the refrigerant piping, electrical cables and condensate drainage line to the indoor unit as described below.
4. Check again that the unit is level.
5. The final task is to tighten the counter nuts and attach the cover.

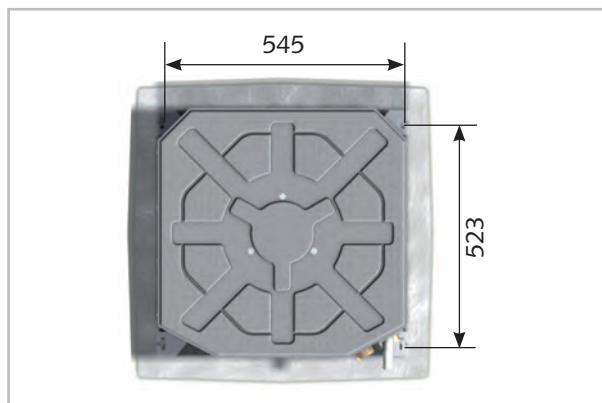


Fig. 10: Hooking in the unit (MVD 222-452)

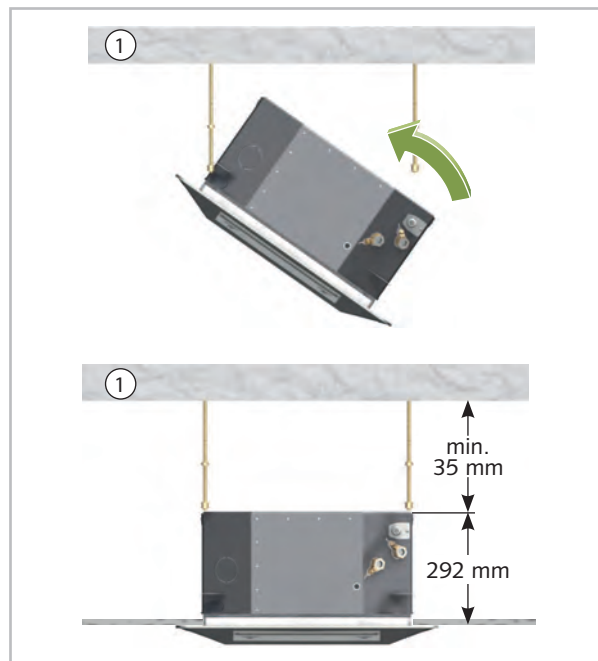


Fig. 11: Hooking in the unit (MVD 222-452)

1: Structural component

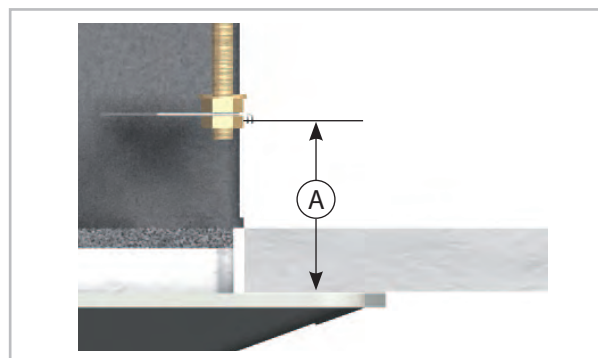


Fig. 12: Fastening the unit

A: Distance A

	MVD 222-452
Distance A	60 mm
Suspended unit	545 mm x 523 mm

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Connection of refrigerant piping

The refrigerant piping connection provided by the customer is established at the connection of the expansion valve of the indoor unit, inside the suspended ceiling. Connection of the refrigerant piping can take place with a flange.

DANGER!

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

CAUTION!

Wear protective clothing when handling refrigerant.

NOTICE!

Check the overheating to determine the refrigerant fill quantity.

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!

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 device contains refrigerant with a greenhouse potential of 2088. That means the escape of 1 kg of this refrigerant has an effect on global warming that is 2088 times greater than 1 kg CO₂, based on 100 years. Do not conduct any work on the refrigerant circuit or dismantle the device - always enlist the help of qualified experts.

Calculation of the supplementary refrigerant to be added

The refrigerant quantity to be added is dependent on the dimensioning and length of **all liquid pipes**, as well as the number of Y-pieces and distribution units used. In the following you will find an example and a blank drawing for calculating the refrigerant quantity to be added.

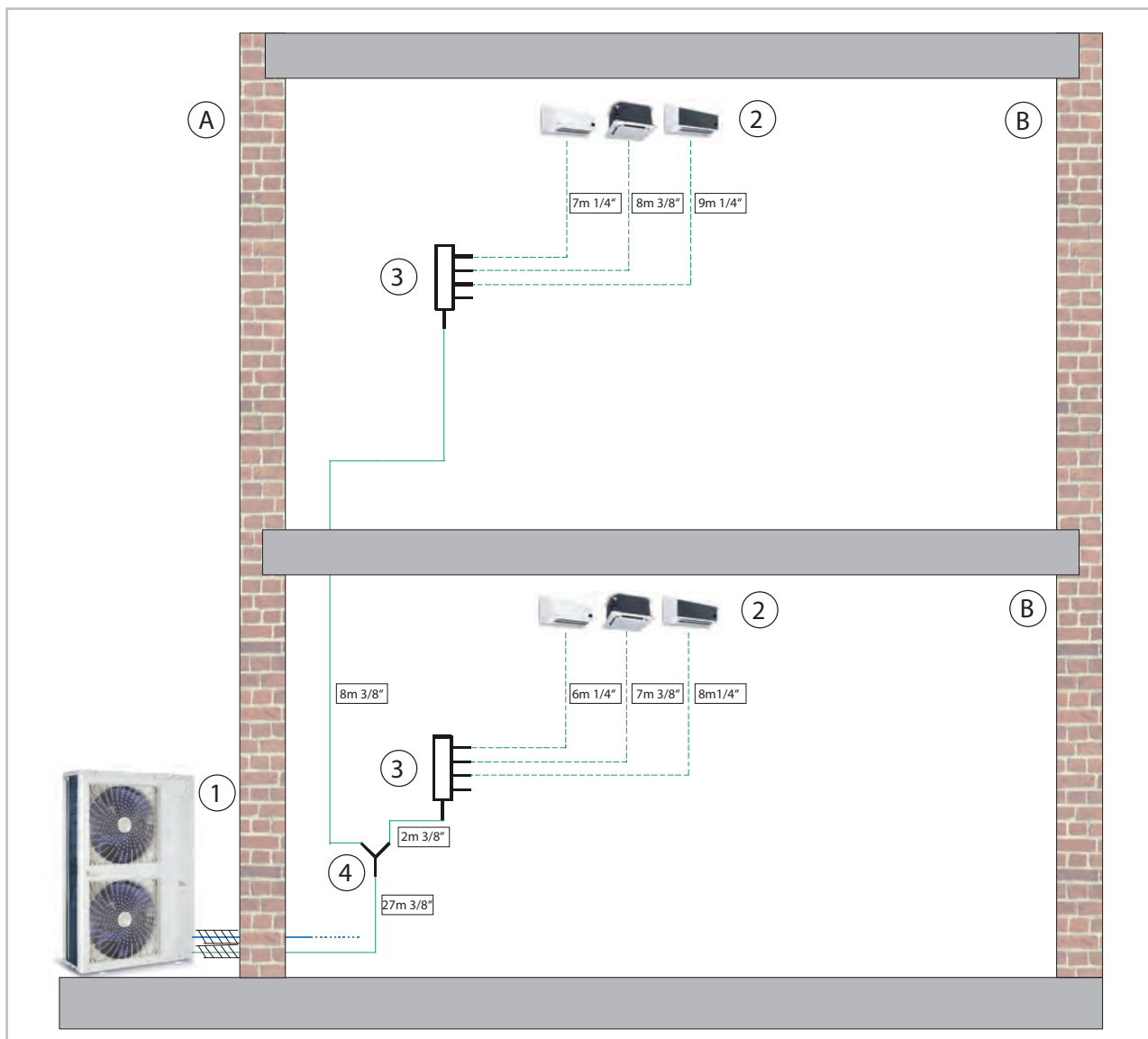


Fig. 13: Example combination for calculating the supplementary refrigerant to be added

A: Outdoor area
B: Indoor area
1: Outdoor unit

2: Indoor units of the series MVD , MVW or MXV
3: Distributor
4: Y-piece

Component	Number	Fill factor	Filling quantity
Length of the liquid pipe 1/4"	30 m	0.023 kg/m	0.69 kg
Length of the liquid pipe 3/8"	52 m	0.060 kg/m	3.12
Number of distribution units	2	0.1 kg/unit	0.2 kg
Number of Y-pieces	1	0.1 kg/unit	0.1 kg
Sum			4.11 kg

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The following sketch and the empty table are provided for calculating the refrigerant quantity to be added and must be completed by the installer.

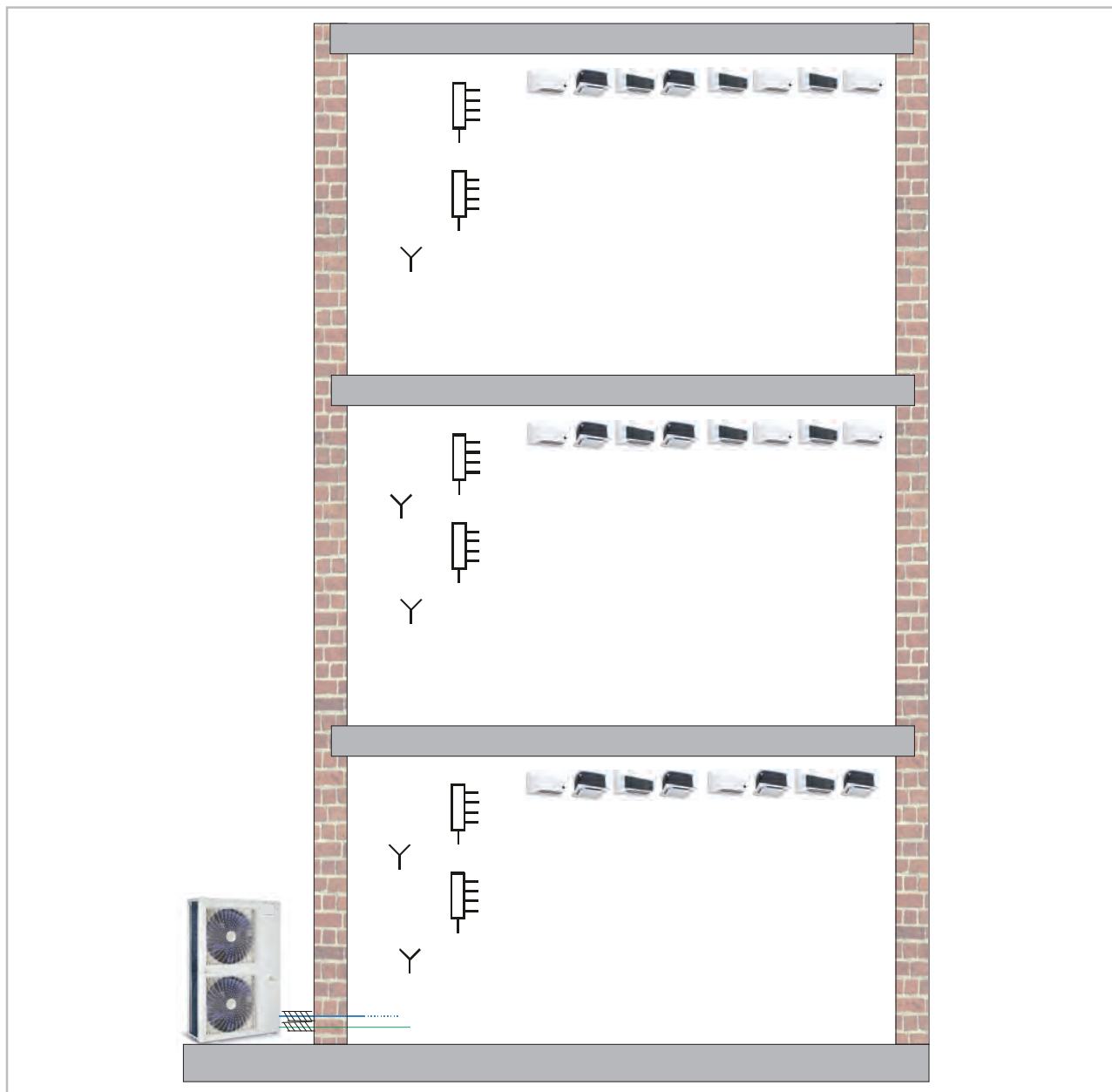


Fig. 14: Sketch for determining the refrigerant quantity to be added

Component	Number	Fill factor	Filling quantity
Length of the liquid pipe 1/4"	m	0.023 kg/m	kg
Length of the liquid pipe 3/8"	m	0.060 kg/m	kg
Number of distribution units		0.1 kg/unit	kg
Number of Y-pieces		0.1 kg/unit	kg
Sum			kg

! NOTICE!

When configuring and topping up the system with refrigerant, observe the practical limit value for refrigerants according to DIN EN 378-1! Practical limit value R410A: 0.44 kg/m³ room volume of the smallest room. If this is exceeded, implement suitable measures for reducing the possible refrigerant concentration per DIN EN 378-1.

Example:

The calculation of the refrigerant quantity to be added provides the following:

Refrigerant quantity to be added: 4.11 kg

Basic fill quantity of the outdoor unit: 3.9 kg

Total fill quantity: 8.01 kg

Practical limit value R410A: 0.44 kg/m³

$8.01 \text{ kg} / (0.44 \text{ kg/m}^3) = 18.20 \text{ m}^3$

This equates to a min. room size of the smallest air conditioned room of approx. 2.7 x 2.7 x 2.5 m.

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7 Condensate drainage connection and safe drainage

- The condensate drainage line should have an incline of min. 2%. This is the responsibility of the customer. If necessary, fit vapour-diffusion-proof insulation.
- If the level of the condensate drainage line on the unit is above that of the outlet, route the pipe vertically upwards and then with an incline to the drain.
- 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 4 °C, ensure the condensate drainage line is laid to protect it against frost. 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.

Condensate drainage connection

If the temperature falls below the dew point, condensate will form on the cooling fins during cooling mode. A collection tray together with a condensate pump and liquid level switch are fitted as standard below the cooling fins. If the liquid level switch trips a protective shutdown due to inadequate removal of the condensate, the pump will switch on immediately and run on for approx. three minutes.

Safe drainage in the event of leakages

Local regulations or environmental laws, for example the German Water Resource Act (WHG), can require suitable precautions to protect against uncontrolled drainage in case of leakage to provide for safe disposal of escaping air conditioning fluid or hazardous media.

! NOTICE!

The maximum capacity of the condensate pump is 500 mm WS. External influences, such as air-side back pressure, contamination, or wear may cause a reduction in performance. To ensure safe operation function, we recommend a maximum conveyor height of 450 mm should not be exceeded!

! NOTICE!

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

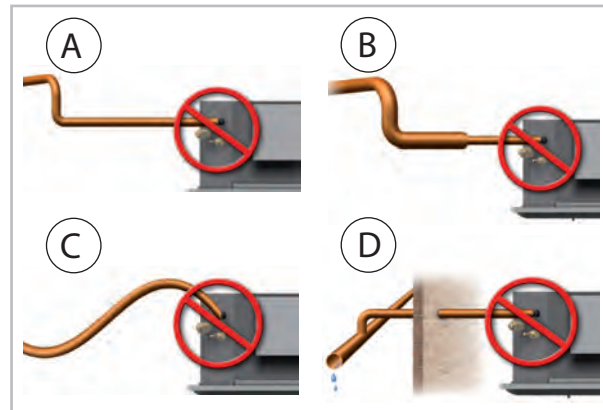


Fig. 15: Condensate drainage connection - incorrect!

- A: Riser pipe too far away
- B: Condensate drainage line too large/small
- C: No incline
- D: Cannot freely drain away

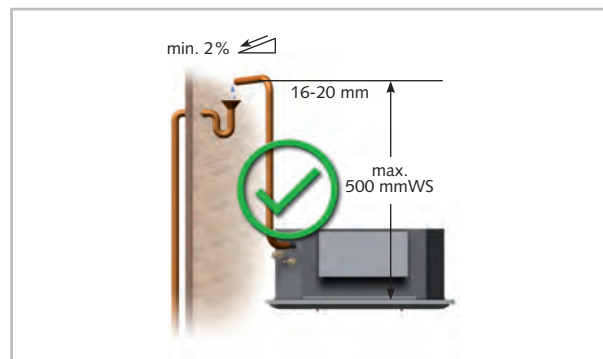


Fig. 16: Condensate drainage connection - correct!

8 Electrical wiring

8.1 General connection and safety instructions

The units require a protected power supply cable connected to the outdoor unit and indoor unit, as well as a four-core control line connected from the outdoor unit to the indoor unit.

DANGER!

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

NOTICE!

All lines are to be spatially separated from each other. The connection of the communication line between the indoor unit and outdoor unit must be established via a shielded wire. The same applies to the connection of a wired remote control!

NOTICE!

The electrical connection for the units must be made at a separate feedpoint with a residual current device in accordance with local regulations and should be laid out by an electrician.

The units' scope of delivery includes a five metre long, four-core control line for connecting the indoor unit to the outdoor unit. The control line to the outdoor unit contains a data cable which serves to realise communication between the indoor unit and the outdoor unit. This is used for controlling the cooling and heating capacity and for forwarding alarm codes to the indoor unit. If the length is insufficient, you can extend the control lines on the indoor unit.

- We recommend installing a main / repair switch on the building close to the unit. This is the responsibility of the customer.
- The terminal blocks for establishing the connections are located inside the unit. These can be accessed after opening the cover.
- If a condensate pump, which is available as an accessory, is used in conjunction with the unit, the pump switch-off contact switches off the power supply to the indoor unit if necessary.

8.2 Unit connection

Make the connection as follows:

1. ➤ Open the air inlet grill.
2. ➤ Loosen the switch cabinet's cover (Fig. 18).
3. ➤ Feed the de-energised cable through the edge protection rings on the control box and clamp the cable in the strain relief.
4. ➤ Then connect the cable in accordance with the connection diagram (see).
5. ➤ Connect the electrical plugs on the cover to the mating connectors on the cassette. It is not possible to incorrectly connect these.
6. ➤ Mount all removed parts.



Fig. 17: Switch cabinet access

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- 1: Infeed for the power supply and control line
- 2: Terminal block



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

Fig. 18: Unit connection

8.3 Electrical wiring diagram

Connection MVV 1200-2000 DC and MXD/MVD/MXV indoor units

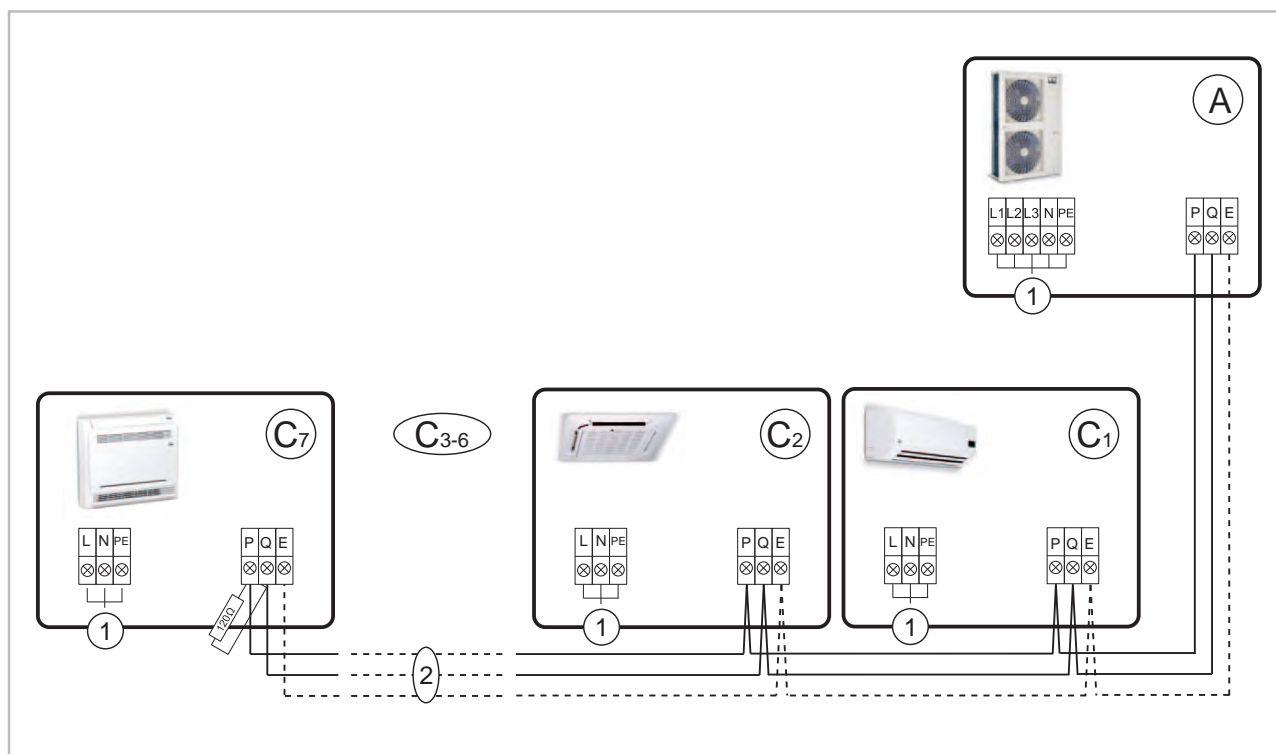


Fig. 19: Electrical wiring diagram

A: Outdoor unit MVV 1200-2000 DC

C1-7: Indoor units MXD/MVD/MXV

1: Mains cable

2: Control lines

	Minimum cross section	Line configuration
Indoor unit supply	3 x 1.5 mm ²	
Outdoor unit supply	5 x 2.5 mm ²	
Communication line	3 x 0.75 mm ²	shielded ¹⁾
Central remote control	3 x 0.75 mm ²	shielded ¹⁾

¹⁾ The control lines require continuous lubrication. Additional clamping points (such as branch boxes) must therefore not be used!

The control is always connected with the indoor units and outdoor units in series. Furthermore, the last indoor unit in series must be equipped with a fixed resistor (see Fig. 19).

Information for the connection of accessories can be found in the respective assembly and operating manuals.

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8.4 Electrical drawings

MVD 222-452

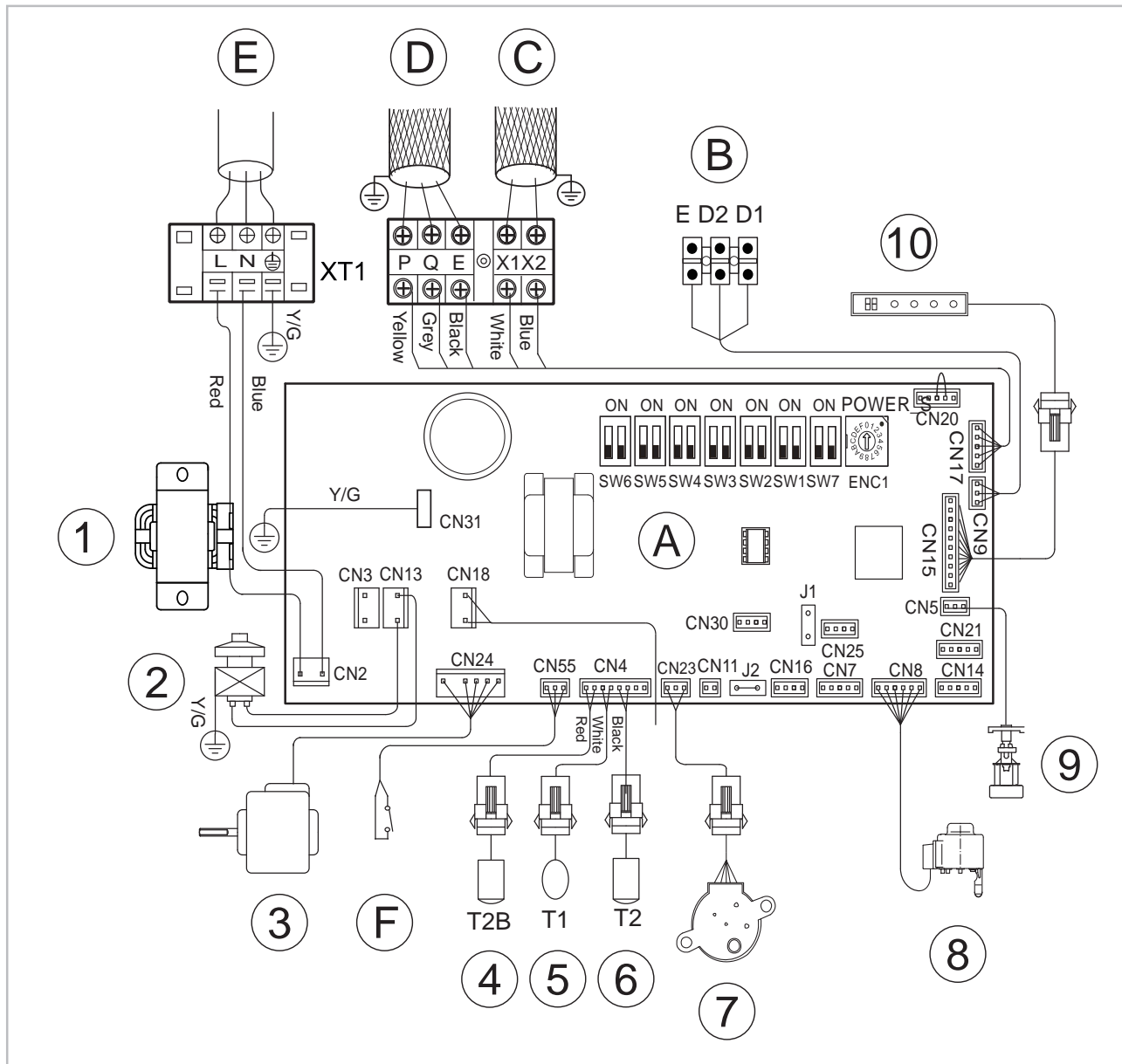












Fig. 20: Electrical drawings

- | | |
|--|--|
| A: Control board | 3: Fan motor |
| B: Connection for wired remote control | 4: Suction gas temperature sensor |
| C: Connection for wired remote control | 5: Room temperature sensor |
| D: Control line | 6: Evaporator package temperature sensor |
| E: Mains cable | 7: Finned servomotor |
| F: External activation contact | 8: Electronic expansion valve |
| 1: Choke | 9: Condensate liquid level switch |
| 2: Condensate pump | 10: Display |

8.5 DIP switch, functions

Switch	Function	Setting ¹⁾	Description
SW1_1	Control behaviour in cooling mode	ON 	The cooling request is terminated when the measured temperature actual value is equal to the set temperature setpoint value (factory setting)
		ON 	Cooling request is terminated when measured temperature actual value is 2 °C lower than the set temperature setpoint value
SW1_2	E-valve position in stand-by mode (heating operation)	ON 	Injection valve stops at 96 steps (factory setting, greater opening degree for oil return in larger systems)
		ON 	Injection valve stops at 72 steps (smaller opening degree for oil return with smaller systems)
SW2	Non functional		
SW3_1	Addressing mode	ON 	Save unit address (factory setting)
		ON 	Reset the unit address
SW3_2	Non functional		
SW4	Fan behaviour in heating mode	ON 	After reaching the setpoint, the fan switches off for 4 minutes and back on again for 1 minute. This procedure is repeated (factory setting)
		ON 	After reaching the setpoint, the fan switches off for 8 minutes and back on again for 1 minute. This procedure is repeated
		ON 	After reaching the setpoint, the fan switches off for 12 minutes and back on again for 1 minute. This procedure is repeated
		ON 	After reaching the setpoint, the fan switches off for 16 minutes and back on again for 1 minute. This procedure is repeated

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DIP switch functions (continued)

Switch	Function	Setting ¹⁾	Description
SW5	Cold air avoidance in heating mode		The fan does not run when the heat exchanger fluid temperature is 15 °C or colder (factory setting)
			The fan does not run when the heat exchanger fluid temperature is 20 °C or colder
			The fan does not run when the heat exchanger fluid temperature is 24 °C or colder
			The fan does not run when the heat exchanger fluid temperature is 26 °C or colder
SW6	Control behaviour in heating mode		Cooling request is terminated when measured temperature actual value is 6 °C higher than the set temperature setpoint value (factory setting)
			Cooling request is terminated when measured temperature actual value is 2 °C higher than the set temperature setpoint value
			Cooling request is terminated when measured temperature actual value is 4 °C higher than the set temperature setpoint value
			The cooling request is terminated when the measured temperature actual value is equal to the set temperature setpoint value
SW7	Non functional		
J1	Automatic restart after power failure		Unit runs independently in the last operating mode
			Unit does not restart
ENC1	Power setting (depending on unit type)		0: 1.8kW or 2.2kW; 1: 2.8kW; 2: 3.6kW; 3: 4.5kW; 4: 5.6kW; 5: 7.1kW; 6: 8.0kW; 7: 9.0kW; 8: 10.0kW/11.2kW; 9: 11.2kW; A: 12.5kW; B: 14.0kW

¹⁾ The black mark represents the DIP switch

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.

Function test of the operating modes

1. ➤ Switch the power supply on.
2. ➤ Use the remote control to switch on the unit and select the cooling mode, maximum fan speed and lowest target temperature.
3. ➤ Measure and record all the required values in the commissioning report and check the safety functions.
4. ➤ Check the unit control system using the functions described in the "Operation" chapter.
5. ➤ Check that the condensate drainage line is functioning correctly by pouring distilled water into the condensate tray. A bottle with a spout is recommended for pouring the water into the condensate tray.

Final tasks

- Mount all removed parts.
- Familiarise the operator with the system.

! 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.

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10 Troubleshooting and customer service

10.1 Troubleshooting

The unit and components are manufactured using state-of-the-art production methods and tested several times to verify that they function correctly. However, if malfunctions 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 electrical 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?	Take into account the temperature range for the 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
	Remote control is faulty	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 on remote control stuck/dual key operation	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

Malfunction	Possible causes	Checks	Remedial measures
The unit is running but only provides reduced or no cooling or heating capacity	Filter is dirty/air inlet/outlet opening is blocked by debris	Have the filters been cleaned?	Clean the filters
	Windows and doors open. Heating/cooling load has increased	Have structural/usage modifications been made?	Close windows and doors/install additional units
	Neither cooling nor heating mode has been set	Does the cooling symbol appear on the display?	Correct the settings for the unit
	Fins on outdoor unit blocked by foreign objects	Is the fan on the outdoor component running? Are the 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
	Outdoor unit iced up	Check outdoor unit. Has the cassette probe on the outdoor unit been correctly positioned?	De-ice and fit the probe at the point where the most ice forms
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 and is it clear?	Route the condensate drainage line with an incline and clean it
	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
	Float is stuck or jammed due to excessive dirt	Are the LEDs on the receiver unit of the indoor unit flashing?	Should be cleaned by specialist firm



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Malfunction indicated by display

Error	Description	Cause	Details
FE	Addressing conflict	Addressing was changed / deleted	🔗 <i>on page 37</i>
dd	Mode conflict	Indoor units are set in various operating modes	🔗 <i>on page 37</i>
E1	Communication error between indoor unit and outdoor unit	Power supply defective, communication line defective	🔗 <i>on page 38</i>
E2	Fault with probe T1	Probe defective, connection defective	🔗 <i>on page 38</i>
E4	Fault with probe T2B	Probe defective, connection defective	🔗 <i>on page 39</i>
E5	Fault with probe T2A	Probe defective, connection defective	
E6/EC	DC fan fault	DC fan defective, connection defective	🔗 <i>on page 40</i>
E7	EEPROM error	EEPROM contact problem	🔗 <i>on page 40</i>
Ed	Outdoor unit error	Power supply faulty, outdoor unit faulty,	🔗 <i>on page 40</i>
E9	Cabled remote control communication fault	Cabled remote control power supply defective, control line faulty	
Eb	EEV fault	Electronic expansion valve faulty, connection faulty	
EE	Condensate tray liquid level switch triggered	Condensate drain faulty, liquid level switch faulty	

10.2 Fault analysis

Error code FE: Addressing conflict

The DIP switch setting was changed on the outdoor unit	YES →	Switch off the power supply to the system, switch the DIP switch setting on the outdoor unit back to factory settings, switch on system again, wait 8 minutes	→	Outdoor unit MVV 1200 DC 	Outdoor unit MVV 1600-2000 DC 
↓NO					
Has manual addressing taken place via the infrared remote control?	NO →				
↓YES					
Carry out manual addressing again (see chapter "Addressing the individual indoor units")					

Error code dd: Mode conflict

Are all indoor units set to the same operating mode?	NO →	Set all indoor units to the same operating mode
↓YES		
Is the communication line correctly wired?	NO →	Correctly wire communication line
↓YES		
Has shielded cable been used?	NO →	Use shielded cable
↓YES		
Is a fixed resistor (120 Ohm) installed on the last indoor unit in the series?	NO →	Install fixed resistor (120 Ohm) on the last indoor unit in the series
↓YES		
Is the power supply to all units OK?	NO →	Ensure correct power supply
↓YES		
Check the circuit board on the indoor unit or outdoor unit and replace if necessary		

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Error code E1: Communication error between indoor unit and outdoor unit

Switch off power to the system for 1 minute, re-establish power supply, start system		
↓YES		
Is the communication line correctly wired?	NO →	Correctly wire communication line
↓YES		
Has shielded cable been used?	NO →	Use shielded cable
↓YES		
Is a fixed resistor (120 Ohm) installed on the last indoor unit in the series?	NO →	Install fixed resistor (120 Ohm) on the last indoor unit in the series
↓YES		
Is the power supply to all units OK?	NO →	Ensure correct power supply
↓YES		
Check the circuit board on the indoor unit or outdoor unit and replace if necessary		

Error code E2: Fault with T1 probe, ambient air

Is the probe correctly mounted on the circuit board?	NO →	Correctly mount the probe on the circuit board
↓YES		
Is the probe visibly damaged?	YES →	Replace probe
↓NO		
Are the probe resistance values OK? (🔗 on page 41)	NO →	Replace probe
↓YES		
Replace indoor unit circuit board		

Error code E3: Fault with T2 probe, evaporator centre

Is the probe correctly mounted on the circuit board?	NO →	Correctly mount the probe on the circuit board
↓YES		
Is the probe visibly damaged?	YES →	Replace probe
↓NO		
Are the probe resistance values OK? (↗ on page 41)	NO →	Replace probe
↓YES		
Replace indoor unit circuit board		

Error code E4: Fault with T2B probe, evaporator output

Is the probe correctly mounted on the circuit board?	NO →	Correctly mount the probe on the circuit board
↓YES		
Is the probe visibly damaged?	YES →	Replace probe
↓NO		
Are the probe resistance values OK? (↗ on page 41)	NO →	Replace probe
↓YES		
Replace indoor unit circuit board		

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Error code E6/EC: Fault with DC motor output

Fault description: No motor recognised by control board, specific speed difference between actual speed and target speed.

Possible causes:

- The connection between the control board and motor is defective
- DC motor is defective
- Control board is defective

Is the fan roller jammed?	YES →	Remedy blockage, replace motor
↓NO		
Is the electrical connection between the control board and motor defective?	YES →	Establish electrical connection
↓NO		
Is the power supply to the ceiling cassette defective?	YES →	Have the power supply checked/repared by a specialist company
↓NO		
Is 310V DC present between the black and red connecting line at contact CN24? Is 15V DC present between the black and white connection?	YES →	Replace the control board
↓NO		
Connect motor to contact CN24 or repair the connection. Supply power and set the fan to a low fan setting. Check if faults are still present.	YES →	Replace the control board
↓YES		
Replace motor		

Error code E7: EEPROM error

Is the EEPROM correctly mounted on the circuit board?	NO →	Correctly mount the EEPROM on the circuit board
↓YES		
Replace indoor unit circuit board		

Error code Ed: Outdoor unit fault

Read off the error code on the outdoor unit and search for the cause in the operating instructions for the outdoor unit

10.3 Resistances of the temperature probes

Temp. (°C)	Resistance (Ohm)	Temp. (°C)	Resistance (Ohm)
-20	115.27	13	17.80
-19	108.15	14	16.93
-18	101.52	15	16.12
-17	96.34	16	15.34
-16	89.59	17	14.62
-15	84.22	18	13.92
-14	79.31	19	13.26
-13	74.54	20	12.64
-12	70.17	21	12.06
-11	66.09	22	11.50
-10	62.28	23	10.97
-9	58.71	24	10.47
-8	56.37	25	10.00
-7	52.24	26	9.55
-6	49.32	27	9.12
-5	46.57	28	8.72
-4	44.00	29	8.34
-3	41.59	30	7.97
-2	39.82	31	7.62
-1	37.20	32	7.29
0	35.20	33	6.98
1	33.33	34	6.68
2	31.56	35	6.40
3	29.91	36	6.13
4	28.35	37	5.87
5	26.88	38	5.63
6	25.50	39	5.40
7	24.19	40	5.18
8	22.57	41	4.96
9	21.81	42	4.76
10	20.72	43	4.57
11	19.69	44	4.39
12	18.72	45	4.21

Temp. (°C)	Resistance (Ohm)	Temp. (°C)	Resistance (Ohm)
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
79	1.21	114	0.42
80	1.17	115	0.41

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

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!

Cleaning the cover on the indoor unit

- Disconnect the power supply to the unit.
- Open and fold down the air inlet guard on the cover. The filter is held in place by the flaps screwed in at the side of the guard (Fig. 21 on page 44).
- Clean the grill and cover with a soft, damp cloth.
- Switch the power supply back on.

Type of task Checks/maintenance/inspection	Commis- sioning	Monthly	Half- yearly	Yearly
General	●			●
Check voltage and current	●			●
Check function of compressor/fans	●			●
Dirt on condenser/evaporator	●	●		
Check the refrigerant volume	●		●	
Check condensate drainage	●		●	
Check insulation	●			●
Check moving parts	●			●
Sealing test for cooling cycle	●			● ¹⁾

¹⁾ see note

! 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.

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

- Disconnect the power supply to the unit.
- Open and fold down the air inlet guard on the cover. The filter is held in place by the flaps screwed in at the side of the guard (Fig. 21).
- Tilt the filter and lift it out (Fig. 21).
- Clean the filter with a commercially available vacuum cleaner (Fig. 22). To do so, turn the dirty side so it is facing upwards.
- Dirt can also be removed by carefully cleaning with lukewarm water and mild cleaning agents. The dirty side should be face down (Fig. 23).
- If water is used, let the filter dry out properly in the air before fitting it back into the unit.
- Carefully insert the filter. Ensure that it locates correctly.
- Close the cover as described above but in reverse order.
- Switch the power supply back on.
- Switch the unit back on.

Cleaning the condensate pump

The indoor unit includes a built-in condensate pump for pumping the condensate to a drain at a higher level.

The pump is more or less maintenance-free. The condensate drainage lines should be checked for dirt at regular intervals. Clean them as required.

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If an external pump is also used, observe the maintenance and care instructions in the separate operating instructions.



Fig. 21: Pull out the filter



Fig. 22: Cleaning with a vacuum cleaner



Fig. 23: Cleaning with lukewarm water

12 Shut-down

Temporary shut-down

1. ➤ Allow the indoor unit to run for 2 to 3 hours in air circulation mode or in cooling mode at the maximum temperature setting in order to remove any residual moisture from the unit.
2. ➤ Shut down the system using the remote control.
3. ➤ Switch off the voltage supply to the unit.
4. ➤ Check the unit for visible signs of damage and clean it as described in the chapter "Care and maintenance"

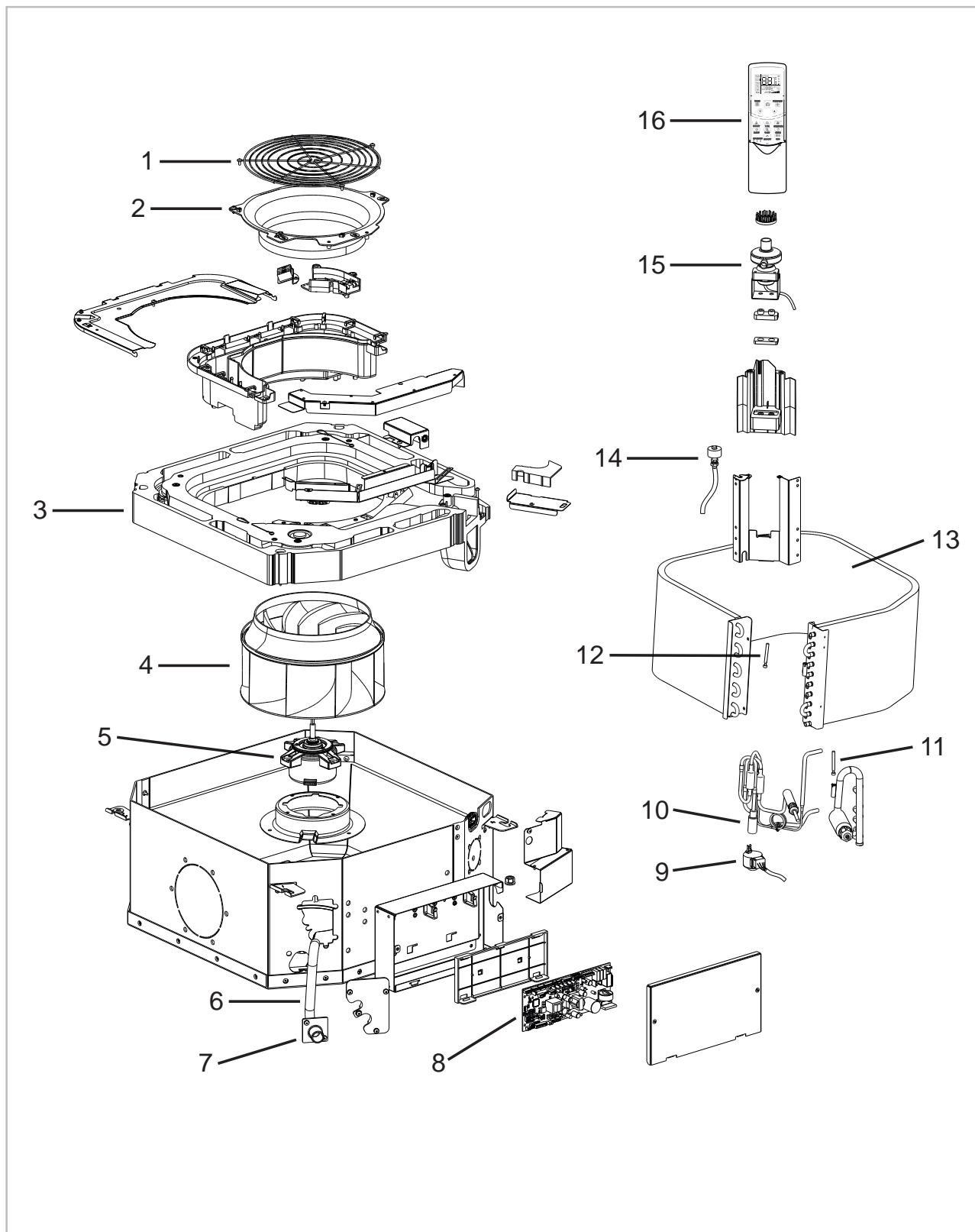
Permanent shut-down

Ensure that equipment and components are disposed of in accordance with the applicable 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 near you.

13 Exploded view of the unit and spare parts list

13.1 Exploded view of the unit MVD 222-452



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

REMKO MVD series

13.2 Spare parts list MVD 222-452

No.	Designation	MVD 222	MVD 282	MVD 362	MVD 452
1	Protection grid	On request by providing the serial number			
2	Air inlet nozzle				
3	Condensate tray				
4	Fan wheel				
5	Evaporator fan motor				
6	Condensate hose				
7	Condensate connection				
8	Control board				
9	EEV coil				
10	EEV valve body				
11	T2B probe, evaporator outlet				
12	T2 probe, evaporator centre				
13	Evaporator				
14	Liquid level switch				
15	Condensation pump cpl.				
16	IR remote control				
	Spare parts not illustrated				
	Air inlet grill	On request by providing the serial number			
	Air filter				
	Fin motor				
	Display board				
	Probe, ambient air T1				
	Complete panel				

When ordering spare parts, please always state the serial no., unit number and unit type (see name plate)!

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