Operating and installation instructions

REMKO KWK series (DM)

Cold water wall and ceiling units

KWK 135 EC (DM), KWK 175 EC (DM), KWK 225 EC (DM), KWK 265 EC (DM), KWK 345 EC (DM), KWK 395 EC (DM), KWK 525 EC (DM), KWK 605 EC (DM), KWK 735 EC (DM), KWK 875 EC (DM)





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Read the instructions prior to performing any task!

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.

CE

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 manufactured ensure safety. The use of other parts may invalidate liability for resulting consequences.

1.9 Intended use

Depending on the model and the equipment, the units are only intended to be used as a cold water drain to cool or warm the operating medium water or a water-glycol mixture within a closed medium cycle.

Any different or additional use is a non-intended use. The manufacturer/supplier assumes no liability for damages arising from 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 KWK 135-265 EC (DM)

Series		KWK 135 EC (DM)	KWK 175 EC (DM)	KWK 225 EC (DM)	KWK 265 EC (DM)
Operating mode		Chilled water units for wall and ceiling mounting, 2-conductor version			
Nominal cooling output [1]	kW	1.31	1.75	2.18	2.60
Nominal heat capacity [2]	kW	1.63	2.06	2.58	2.95
Application area (room volume), approx. [3]	m^3 [3]	40	50	60	80
Operating range - indoor unit	°C	+15 to +35			
Min./max. airflow volume	m^3/h	84-298	98-321	133-394	147-432
Min./max. sound pressure level [3]	dB (A)	19-38		20-42	
Min./max. sound power level	dB (A)	27-46		28-50	
Power supply	V/Ph/ Hz	230/1~ /50			
Enclosure class	IP	X0			
Electrical rated power consumption [1]	W	31	33	35	36
Electrical rated current consumption [1]	A	0.13	0.14	0.15	0.16
Operating medium		max. 35% ethylene glycol, max. 35% propylene glycol			
Operating limits, medium - cooling	°C	+4 to +18			
Operating limits, medium - heating	°C	+35 to +80			
Operating pressure, medium, max.	kPa	1500			
Nominal flow rate, medium - cooling [1]	m^3/h	0.23	0.30	0.37	0.45
Nominal flow rate, medium - heating [2]	m^3/h	0.28	0.35	0.44	0.51
Rated pressure drop, intern.-cooling [1]	kPa	14.4	17.1	18.3	19.4
Rated pressure drop, intern.-heating [2]	kPa	18.0	20.2	21.7	22.1
Medium connection, inlet	Inches	1/2			
Medium connection, outlet	Inches	1/2			
Medium volume	l	0.7		1.0	
Condensate drainage connection	mm	20			
Dimensions					
Height	mm	477			
Width	mm	670		870	
Depth	mm	220			
Weight	kg	13.8 (15.0)	14.3 (15.5)	16.7 (18.3)	17.5 (19.1)

REMKO KWK series (DM)

Series		KWK 135 EC (DM)	KWK 175 EC (DM)	KWK 225 EC (DM)	KWK 265 EC (DM)
Operating weight, approx.	kg	14.5 (15.7)	15.0 (16.2)	17.7 (19.3)	18.5 (20.1)
Standard colour		similar to RAL 9016			
Serial number		1972... (1982...)	1973... (1983...)	1974... (1984...)	1975... (1985...)
EDP no.		1664400 (1664500)	1664410 (1664510)	1664420 (1664520)	1664430 (1664530=

[1)] Air inlet temperature TK 27 °C / FK 19 °C, medium inlet 7 ℃, medium outlet 12 °C, 0% glycol concentration, max. air flow volume

[2)] Air inlet temperature TK 20 °C, medium inlet 45 °C, medium outlet 40 °C, 0% glycol concentration, max. air flow volume

[3)] Distance of 1.0 m in a 100 m[3)] space with a reverberation time of 0.3 s

2.2 Unit data KWK 345-525 EC (DM)

Series		KWK 345 EC (DM)	KWK 395 EC (DM)	KWK 525 EC (DM)
Operating mode		Chilled water units for wall and ceiling mounting, 2-conductor version		
Nominal cooling output [1]	kW	3.43	3.89	5.22
Nominal heat capacity [2]	kW	3.81	4.3	5.69
Application area (room volume), approx. [3]	m³[3]	100	140	170
Operating range - indoor unit	°C	+15 to +35		
Air flow volume per stage	m³/h	196-580	217-623	320-882
Sound pressure level per stage [3]	dB (A)	21-38		18-46
Sound power level per stage	dB (A)	29-46		26.54
Power supply	V/Ph/Hz	230/1~ /50		
Enclosure class	IP	X0		
Electrical rated power consumption [1]	W	35	36	58
Electrical rated current consumption [1]	A	0.15	0.16	0.25
Operating medium		max. 35% ethylene glycol, max. 35% propylene glycol		
Operating limits, medium - cooling	°C	+4 to +18		
Operating limits, medium - heating	°C	+35 to +80		
Operating pressure, medium, max.	kPa	1500		
Nominal flow rate, medium - cooling [1]	m³/h	0.59	0.67	0.90
Nominal flow rate, medium - heating [2]	m³/h	0.65	0.74	0.98
Rated pressure drop, internal - cooling [1]	kPa	26.8	27.5	25.7
Rated pressure drop, internal - heating [2]	kPa	29.8	30.4	28.0
Medium connection, inlet	Inches	1/2		
Medium connection, outlet	Inches	1/2		
Medium volume	l	1.4		1.7
Condensate drainage connection	mm	20		
Dimensions				
Height	mm	477		
Width	mm	670	1070	1270
Depth	mm	220		
Weight	kg	22.8 (24.8)	23.8 (25.8)	26.3 (28.7)
Operating weight, approx.	kg	24.2 (26.2)	25.2 (27.2)	28.0 (30.4)
Standard colour		similar to RAL 9016		

REMKO KWK series (DM)

Series		KWK 345 EC (DM)	KWK 395 EC (DM)	KWK 525 EC (DM)
Serial number		1976... (1986...)	1977... (1987...)	1978... (1988...)
EDP no.		1664440 (1664540)	1664450 (1664550)	1664460 (1664560)

[1)] Air inlet temperature TK 27 °C / FK 19 °C, medium inlet 7 °C, medium outlet 12 °C, 0% glycol concentration, max. air flow volume

[2)] Air inlet temperature TK 20 °C, medium inlet 45 °C, medium outlet 40 °C, 0% glycol concentration, max. air flow volume

[3)] Distance of 1.0 m in a 100 m[3)] space with a reverberation time of 0.3 s

2.3 Unit data KWK 605-875 EC (DM)

Series		KWK 605 EC (DM)	KWK 735 EC (DM)	KWK 875 EC (DM)
Operating mode		Chilled water units for wall and ceiling mounting, 2-conductor version		
Nominal cooling output [1]	kW	6.06	7.34	8.78
Nominal heat capacity [2]	kW	6.44	7.76	9.16
Application area (room volume), approx. [3]	m³[3]	190	230	270
Operating range - indoor unit	°C	+15 to +35		
Air flow volume per stage	m³/h	344-924	378-1225	405-1232
Sound pressure level per stage [3]	dB (A)	18-46	20-52	
Sound power level per stage	dB (A)	26-45	28-60	
Power supply	V/Ph/Hz	230/1~ /50		
Enclosure class	IP	X0		
Electrical rated power consumption [1]	W	61	77	82
Electrical rated current consumption [1]	A	0.27	0.33	0.36
Operating medium		max. 35% ethylene glycol, max. 35% propylene glycol		
Operating limits, medium - cooling	°C	+4 to +18		
Operating limits, medium - heating	°C	+35 to +80		
Operating pressure, medium, max.	kPa	1500		
Nominal flow rate, medium - cooling [1]	m³/h	1.04	1.26	1.51
Nominal flow rate, medium - heating [2]	m³/h	1.11	1.33	1.57
Rated pressure drop, internal - cooling [1]	kPa	27.6	27.7	27.8
Rated pressure drop, internal - heating [2]	kPa	29.4	29.3	29.0
Medium connection, inlet	Inches	1/2		
Medium connection, outlet	Inches	1/2		
Medium volume	l	1.7	2.0	
Condensate drainage connection	mm	20		
Dimensions				
Height	mm	477		
Width	mm	1270	1470	
Depth	mm	220		
Weight	kg	27.8 (30.2)	30.3 (33.1)	31.8 (34.6)
Operating weight, approx.	kg	29.5 (31.9)	32.0 (35.1)	33.5 (36.6)
Standard colour		similar to RAL 9016		

REMKO KWK series (DM)

Series		KWK 605 EC (DM)	KWK 735 EC (DM)	KWK 875 EC (DM)
Serial number		1979... (1989...)	1970... (1990...)	1981... (1991...)
EDP no.		1664470 (1664570)	1664480 (1664580)	1664490 (1664590)

[1)] Air inlet temperature TK 27 °C / FK 19 °C, medium inlet 7 ℃, medium outlet 12 °C, 0% glycol concentration, max. air flow volume

[2)] Air inlet temperature TK 20 °C, medium inlet 45 °C, medium outlet 40 °C, 0% glycol concentration, max. air flow volume

[3)] Distance of 1.0 m in a 100 m[3)] space with a reverberation time of 0.3 s

2.4 Unit dimensions

Dimensions KWK 135 EC - KWK 875 EC

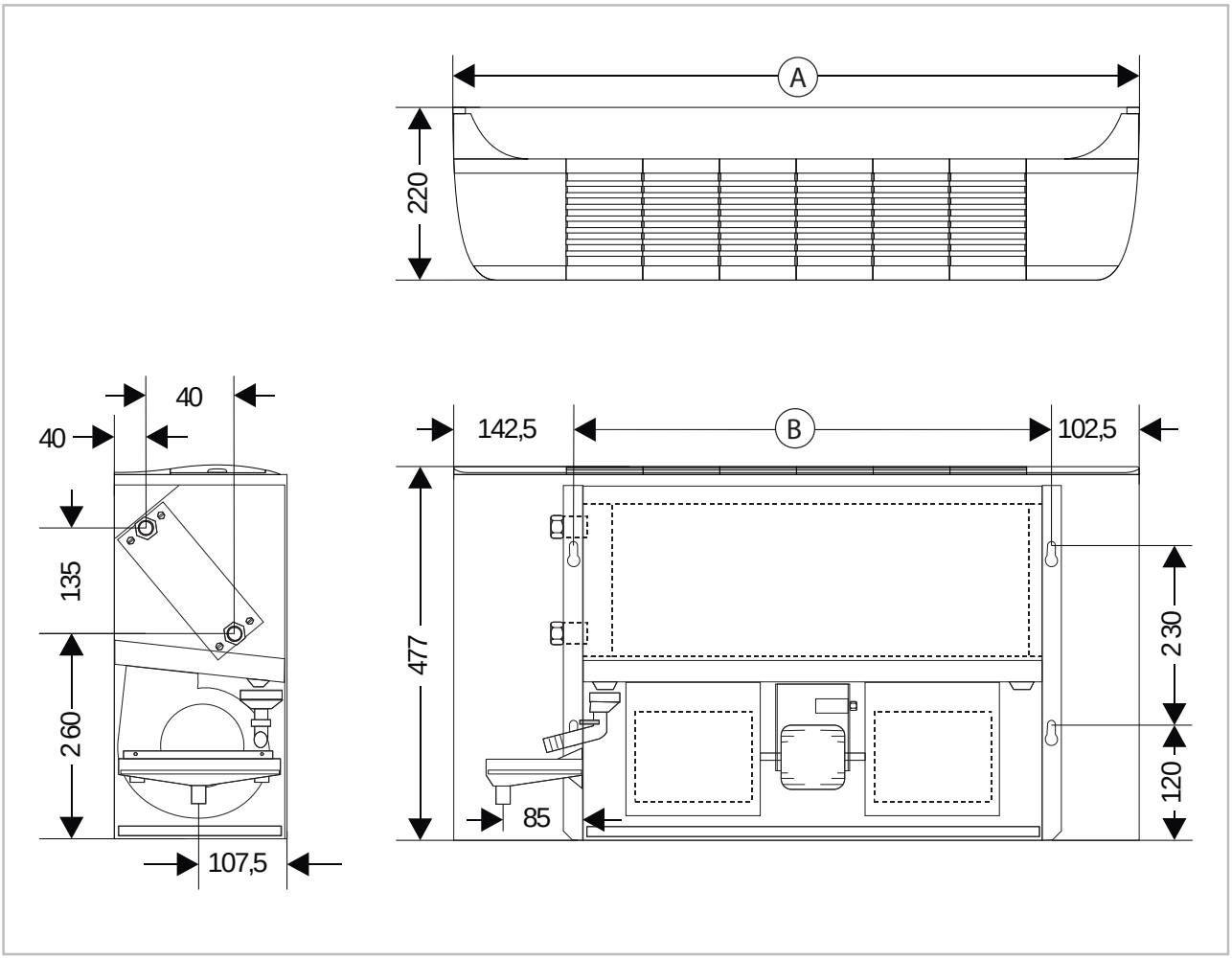


Fig. 1: Unit dimensions (all measurements in mm)

Dimen-sion	KWK 135 EC	KWK 175 EC	KWK 225 EC	KWK 265 EC	KWK 345 EC	KWK 395 EC	KWK 525 EC	KWK 605 EC	KWK 735 EC	KWK 875 EC
A	670	670	870	870	1070	1070	1270	1270	1470	1470
B	425	425	625	625	825	825	1025	1025	1225	1225

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

REMKO KWK series (DM)

Dimensions KWK 135 EC (DM) - KWK 875 EC (DM)

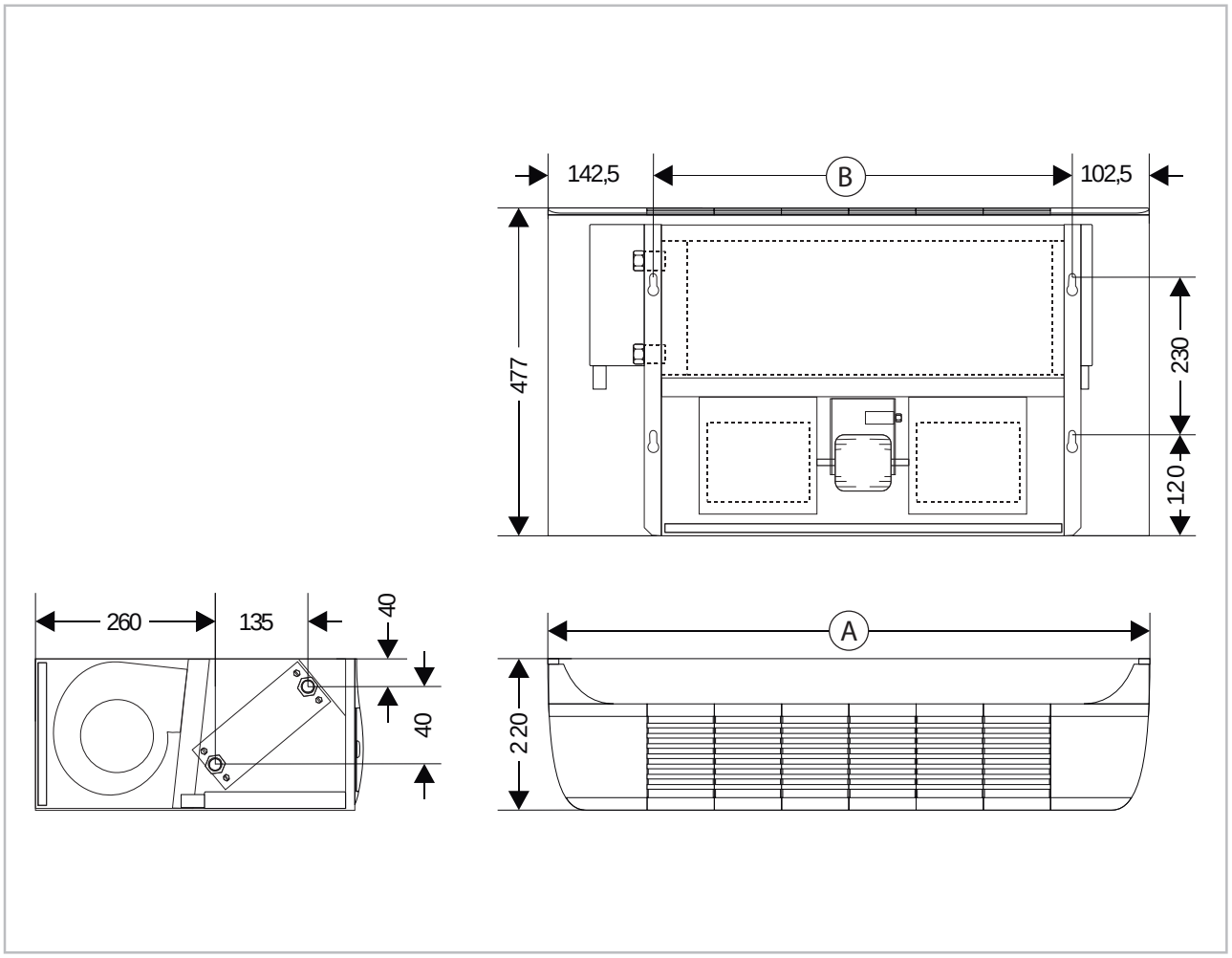


Fig. 2: Unit dimensions (all measurements in mm)

Dimen-sion	KWK 135 EC (DM)	KWK 175 EC (DM)	KWK 225 EC (DM)	KWK 265 EC (DM)	KWK 345 EC (DM)	KWK 395 EC (DM)	KWK 525 EC (DM)	KWK 605 EC (DM)	KWK 735 EC (DM)	KWK 875 EC (DM)
A	670	670	870	870	1070	1070	1270	1270	1470	1470
B	425	425	625	625	825	825	1025	1025	1225	1225

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

In cooling mode the unit (chilled water outlet) extracts the heat from the interior room to be cooled into the fin register and passes it on to the cold operating medium - water or a mix of water and glycol - within a closed medium cycle. As a result of the heat exchange the medium heats up and the emergent air cools the room down.

In heating mode, a warm operating medium warms the room to be heated. The medium cools down as a result of the heat exchange.

A valve assembly, which routes the operating medium through the register (energy is given up) or past the resister (energy is not given up), is used to control the cooling or heating capacity.

The unit is designed for use indoors in the lower wall area (vertical installation) and for ceiling installation (horizontal installation). Operation is either individually or in groups using room temperature regulation or via the building management system. The unit consists of a fin heat exchanger, circulation fan and two condensate trays for horizontal and vertical installation.

The available accessories include room temperature controllers for installation in the unit or on the wall, heating coil for connection to a 4-wire system, valve assembly cooling, fan modules, air inlet plinth, duct parts, grille and condensate pumps.

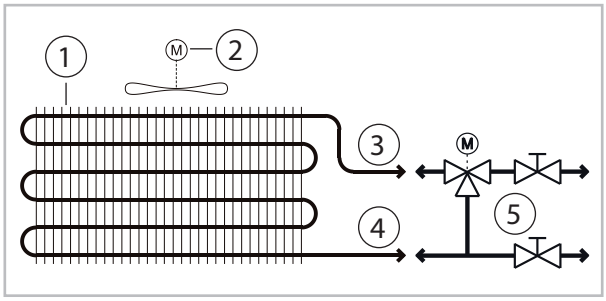


Fig. 3: Diagram of a 2-conductor system medium cycle

1: Cooling register
2: Recirculating fan
3: Medium inlet connection
4: Medium outlet connection
5: Valve assembly (accessory)

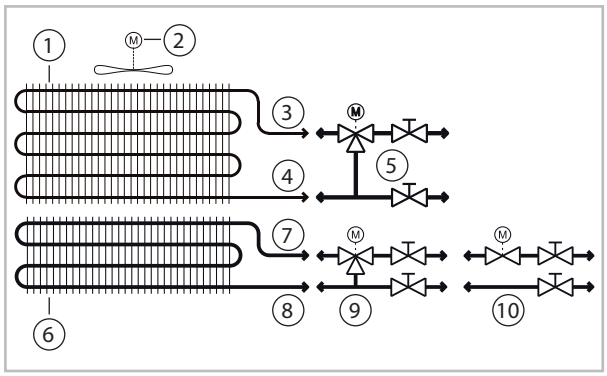


Fig. 4: Diagram of a 4-conductor system medium cycle (with heating register)

1: Cooling register
2: Recirculating fan
3: Cooling register connection medium inlet
4: Cooling register connection medium outlet
5: Valve assembly (accessory)
6: Heating register (accessory)
7: Heating register connection medium outlet
8: Heating register connection medium inlet
9: 3-way valve assembly heating (accessory)
10: 2-way valve assembly heating (accessory)

3.2 System layout

The unit is designed for a 2-conductor system. The unit can easily be upgraded to a 4-conductor system using a heating coil available as an accessory.

The 2-conductor system has 2 medium pipes (conductors: supply and return flow) for cooling using a cold medium and 2 medium pipes for heating using a warm medium. In cooling mode the combined cooling register/heating register in the indoor unit extracts the heat from the room air by absorbing it into the operating medium. A circulation pump transports the heated medium to a chiller which extracts the heat from the medium in an evaporator and then passes it on to the outside air via a cooling cycle in a condenser. The cooled operating medium is then fed in once again to the unit medium circuit.

With 2-conductor systems, which are used for cooling or heating, the heating capacity of cold water air-conditioning systems can be generated through a chiller with heat pump function or, in the case of heating systems, through a boiler or heat pump and fed into the circuit. In heating operation, the indoor unit can deliver the heat from the operating medium to the room air.

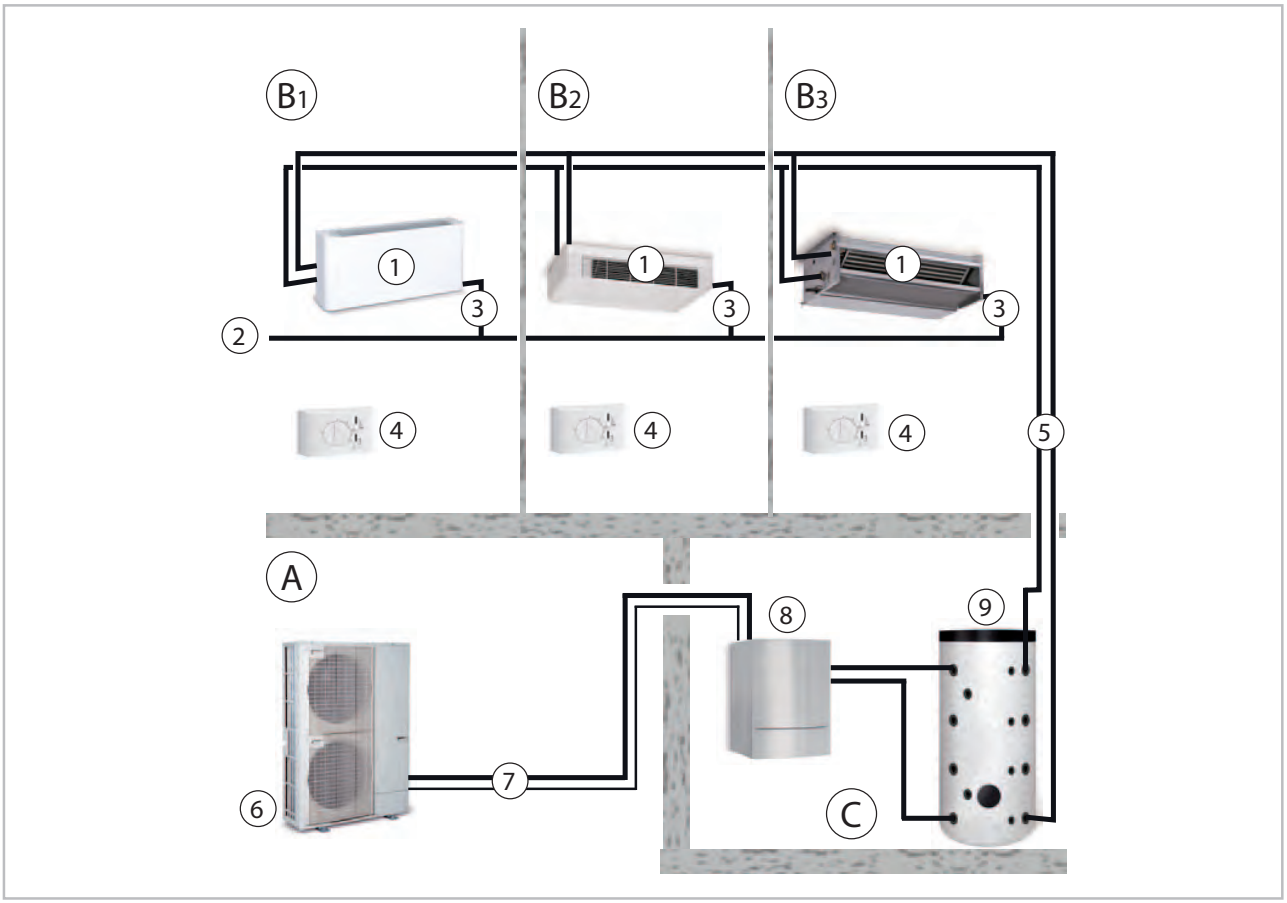


Fig. 5: Example of system layout of 2-conductor system (heat pump system)

A: Outdoor area
B1-3: Indoor area 1, 2, 3
C: Heating room
1: Chilled / heating water outlet
2: Condensate collecting drainage
3: Condensate drainage line
4: Room temperature controller
5: Medium piping, cooling or heating mode
6: Inverter heat pump outdoor unit
7: Refrigerant piping
8: Inverter heat pump indoor unit
9: Buffer tank

With 4-conductor systems, which are used for cooling and heating, in one system, both cooling capacity from a chiller and heating capacity from a separate heating system on the indoor units in an another system are simultaneously present.

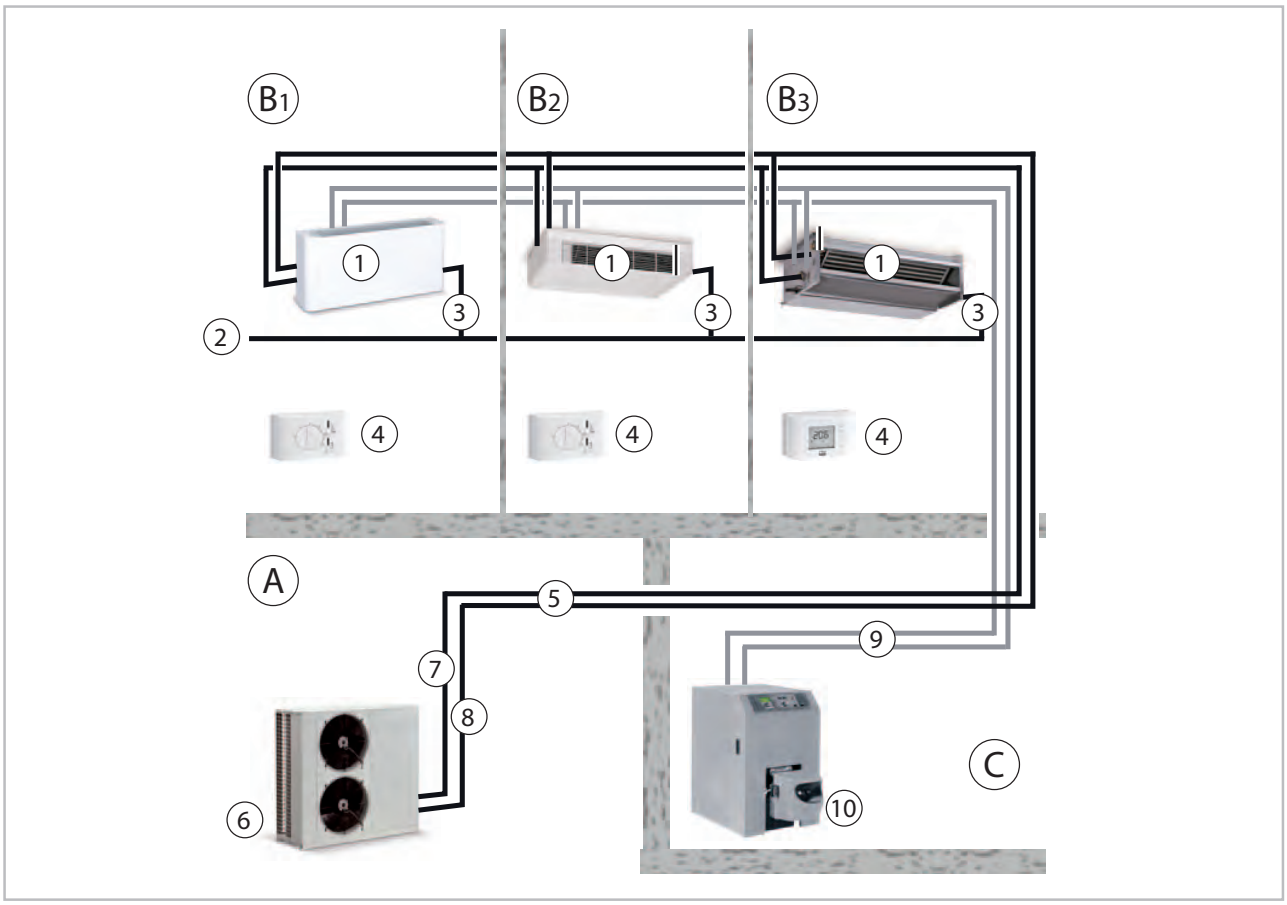


Fig. 6: Example of system layout of 4-conductor system (cold water air conditioning system)

A: Outdoor area
B1-3: Indoor area 1, 2, 3
C: Heating room
1: Chilled / heating water outlet
2: Condensate collecting drainage
3: Condensate drainage line
4: Room temperature controller
5: Medium piping cooling mode
6: Chiller
7: Medium outlet
8: Medium inlet
9: Medium piping heating mode
10: Boiler

4 Operation

The unit can be easily operated with the room temperature controller available as an accessory or regulation to be provided by the customer. It is also possible to activate the system using a building management system.

Use the separate operating manuals for this purpose.

The controller is connected to one or more units by a cable. If a group controller is used the maximum current load must be observed.



Fig. 7: Room temperature controller - recessed installation



Fig. 8: Precision room temperature controller - surface-mounted installation



Fig. 9: Room temperature controller - surface-mounted installation

Example controls

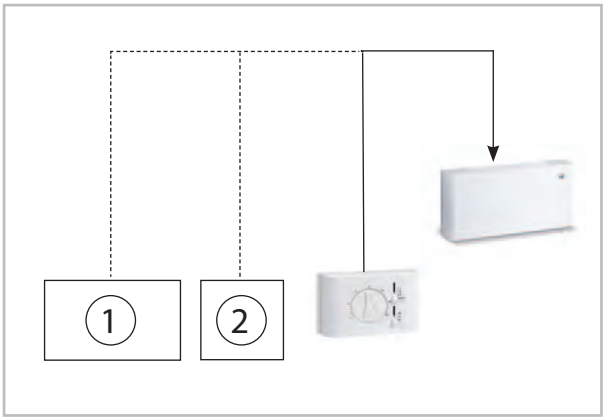


Fig. 10: Individual control

1: Regulation provided by the customer
2: Building management system

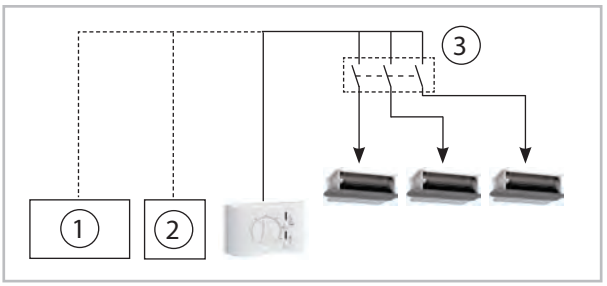


Fig. 11: Group activation

1: Regulation provided by the customer
2: Building management system
3: Switching relay

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!

5 Installation instructions for qualified personnel

Important notes prior to installation

Observe the operating manuals for the indoor unit and the chiller or heating system when installing the entire system.

- The indoor units and chillers work independently. A connecting line between the two is not necessary.
- 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.
- 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.
- Lift the unit at the corners and not by the medium or condensate drainage connections.
- The medium connection lines, valves and connections must have vapour density insulation. If necessary also insulate the condensate drainage line. In dual systems with cooling and heating modes, the requirements of the current energy savings ordinance (EnEV) are to be complied with.
- 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 lines.
- 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.
- Only install the valve assembly or other attachments once the indoor unit has been installed.

Installation materials

The indoor unit is attached using 4 bolts to be provided by the customer.

Selecting the installation location

Wall / ceiling unit

The indoor unit is designed for vertical wall installation, for instance underneath windows. However, it can also be used in the upper wall area (max. 1.25 m above floor level).

The unit is also designed for horizontal ceiling installation. In this case particular attention must be paid to the condensate drainage (see the Chapter "Condensate drainage connection").

Connection variants

The following connection variants can be used for the medium and condensate pipes and the control lines.

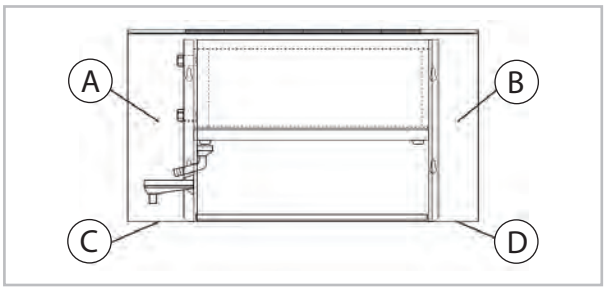


Fig. 12: Connection variants

A: Outlet through the wall, left
B: Outlet through the wall, right
C: Outlet through the floor, left
D: Outlet on the wall, right

Minimum clearances

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

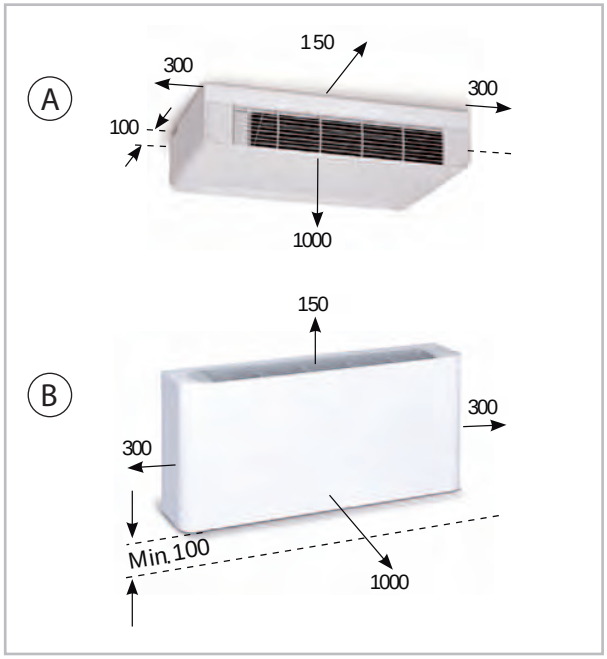


Fig. 13: Minimum clearances (all measurements in mm)

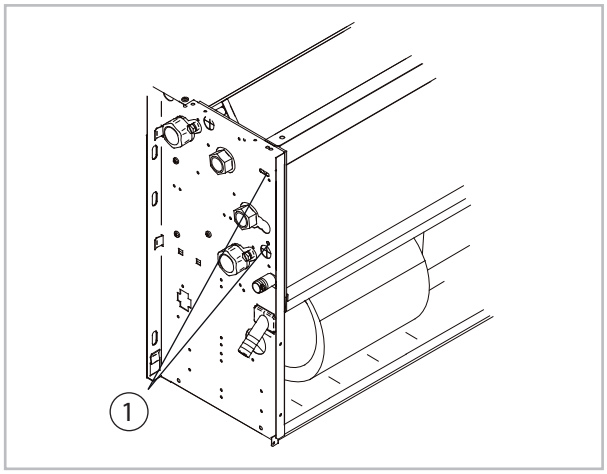
A: KWK 135 EC - KWK 875 EC DM
B: KWK 135 EC - KWK 875 EC

Changing medium connection side

The connection side of the heat exchanger and the condensate drainage line are installed at the factory on the left-hand side of the unit. It is possible to change this to the right-hand side.

1. Dismantle the condensate tray by removing the four self-tapping screws from the tray bracket

2. Remove the screws from the heat exchanger mounting on the side housing frame

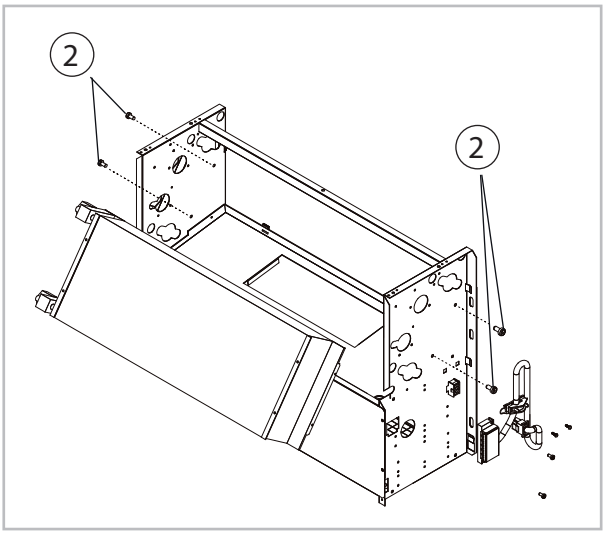


1: Condensate tray bolts

3. Pull the heat exchanger out of the unit's mounting. Be careful as it is easy to be cut by the fins. Do not bend any fins and do not damage the insulation

4. Cut the insulation of the side stay plate to accommodate the brass connections on the new connection side

5. Feed the connections through the newly created holes up to the stop



2: Heat exchanger mounting bolts

6. Place the tear-resistant plastic film on the pipe bend side between the stay plate insulation and the heat exchanger mounting. The film protects the insulation of the stay plate against damage

7. Let the heat exchanger slide into the retainer (keep the same air duct) and after installing the heat exchanger remove the film and screw the unit back together in reverse order

Installation variants - wall/ceiling mounted units

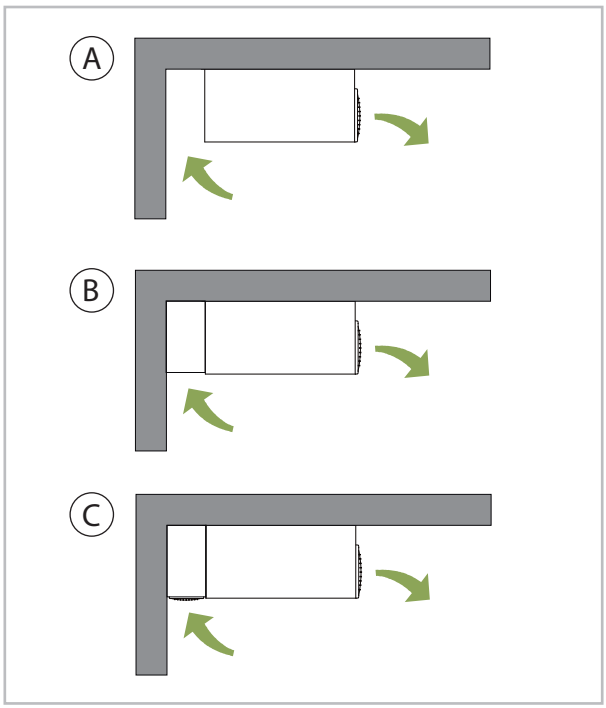
Installation on a wall:

The unit is secured to the wall by the unit housing. The air inlet is, for example, at floor level or, for example, via an air inlet plinth etc. The air outlet is directly from the housing.

Installation beneath the ceiling:

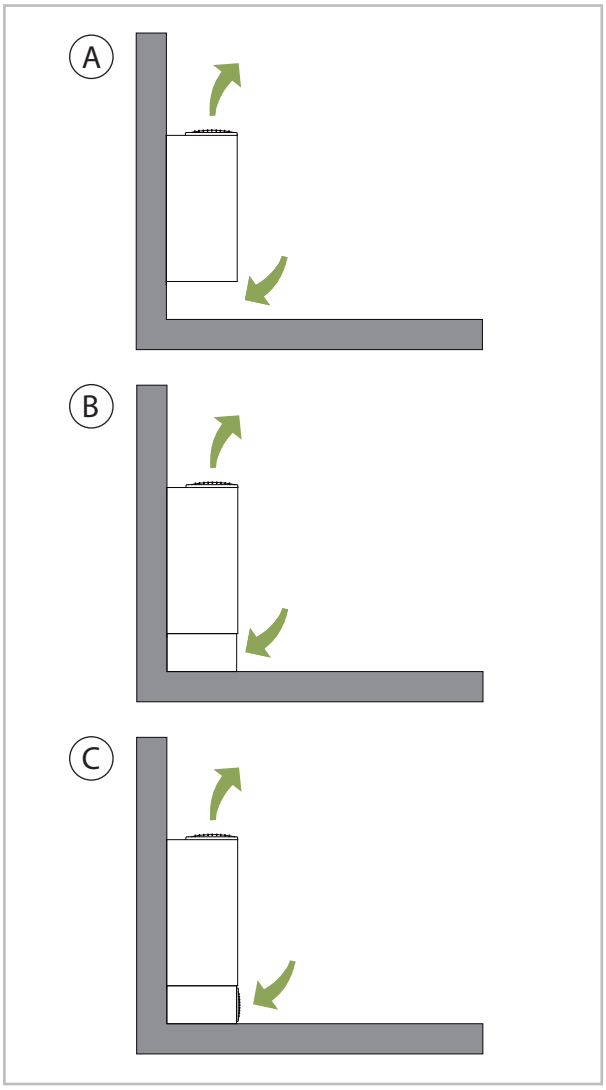
The unit is secured beneath the ceiling by the unit housing. The air inlet is, for example, at floor level or, for example, via an air inlet plinth etc. The air outlet is directly from the housing.

Installation examples KWK 135 EC - KWK 875 EC DM



A: Basic unit
B: with plinth
C: with air inlet plinth

Installation examples KWK 135 EC - KWK 875 EC



A: Basic unit
B: with plinth
C: with air inlet plinth

6 Installation

6.1 Unit installation

Wall installation KWK EC

! NOTICE!

Installation and commissioning should only be performed by trained specialists.

The unit is attached by means of mounting holes in the housing while also taking account of the air outlet side located in the upper part of the unit.

1. Mark the mounting points according to the mounting's dimensions on structurally acceptable building components and secure the unit
2. Check again that the unit is level
3. Connect the medium pipes, electrical cables and condensate drainage line to the unit as described below

Wall installation KWK EC (DM)

The unit is attached by means of mounting holes in the housing while also taking account of the air outlet side directed towards the centre of the room.

1. Mark the mounting points according to the mounting's dimensions on structurally acceptable building components and secure the unit
2. Check again that the unit is level
3. Connect the medium pipes, electrical cables and condensate drainage line to the unit as described below

Installing the feet / air inlet plinth (accessory) only for KWK

If the feet or plinth available as accessories (KWK) are to be used for units for wall or ceiling mounting, these must be installed before the unit is installed. Follow the separate installation instructions.

! NOTICE!

The air ducting must then be selected such that no short-circuit can occur on the air side.

! NOTICE!

If the unit is not mounted positively, vibration can occur.

Selecting the hydraulic connection

2-conductor cooling system

Wall installation without valve assembly:

when the fan is switched off the flow of air from the air inlet can be ignored without sacrificing comfort. In this application case, use of a valve assembly is not absolutely essential.

Ceiling installation without valve assembly:

a valve assembly must be used in this application case to prevent the flow of cold air from the air outlet when the fan is switched off.

Wall installation with valve assembly:

in order to prevent any flow of cold air and severe condensate formation, for **reasons of comfort** a valve assembly can be used in this application case.

Ceiling installation with valve assembly:

in order to prevent any flow of cold air and permanent flow-generated noise, for reasons of comfort a valve assembly is recommended in this application case.

2-conductor system for cooling and heating

As the 2-conductor system must cool and heat equally, for reasons of convection during winter operation, a valve assembly is stipulated for all installation methods for this system operation to avoid undesirable heat emission.

4-conductor system for cooling and heating

As the 4-conductor system must cool and heat equally, two valve assemblies are stipulated for this system operation for the cooling and heating register.

Connection of the medium pipings

- The connection of the lines on-site takes place on the rear or underside of the unit.
- For the purpose of servicing, connections must be equipped with shut-off valves and the medium flow rate adjusted using valves for hydronic balancing.
- Additional automatic bleed valves are to be provided in the supply and return flow at the installation’s highest point.
- The medium pipings may not exert any structural load on the unit.
- The line connections may not generate any thermal or mechanical stresses on the unit. If necessary, cool the piping or support with the second tool.

Necessary system components

Valve assembly for 2 or 4-conductor systems (accessory)

In 2 or 4-conductor systems, cold or warm medium is fed through the heat exchanger(s) into the unit and cold or warm air can be discharged. Regulation is provided by a 3-way valve assembly. It consists of the electrically actuated valve head and the valve body. If the head is electrically activated, it actuates the body, which routes the medium into the register. If the temperature is reached, the head is switched off and the medium is fed past the heat exchanger through the bypass. The bypass serves to ensure the minimum medium flow rate for the chiller.

The time between being fully open and fully closed can be approx. three minutes.

Valves for hydronic balancing

The calculated individual pressure losses in the pipeline network layout for each individual unit are adjusted to the entire system with hydronic balancing valves to be provided by the customer. The nominal flow rates for the medium adjust to the values needed as a consequence of the pressure loss.

Anti-freeze protection (accessories)

A water glycol mix is generally used as the medium for a cold water system. Depending on the glycol type and quantity used, the viscosity changes, the pressure loss increases and the unit's cooling or heating capacity reduces.

All system components must be approved for use with glycol.

NOTICE!

The product and safety data sheets of the glycol type used must be observed during use and disposal.

Diaphragm expansion vessel (MAG)

To avoid pressure fluctuations during standstill because of temperature changes, diaphragm expansion vessels filled with nitrogen (moisture neutral) must be integrated in the system.

No moisture can condense in the nitrogen filler.

Safety valve

Safety valves limit excess operating pressure due to excess warming or overfilling of the operating medium. The valve outlet requires unobstructed draining into a drain line. Applicable local disposal ordinances must be observed if glycol is used.

Automatic bleed valves

The unit has one or two manual bleed valves on the collector pipe of the register. The unit can be bled separately after the system has been filled. Automatic bleed valves must also be installed at the next highest point in the collective lines.

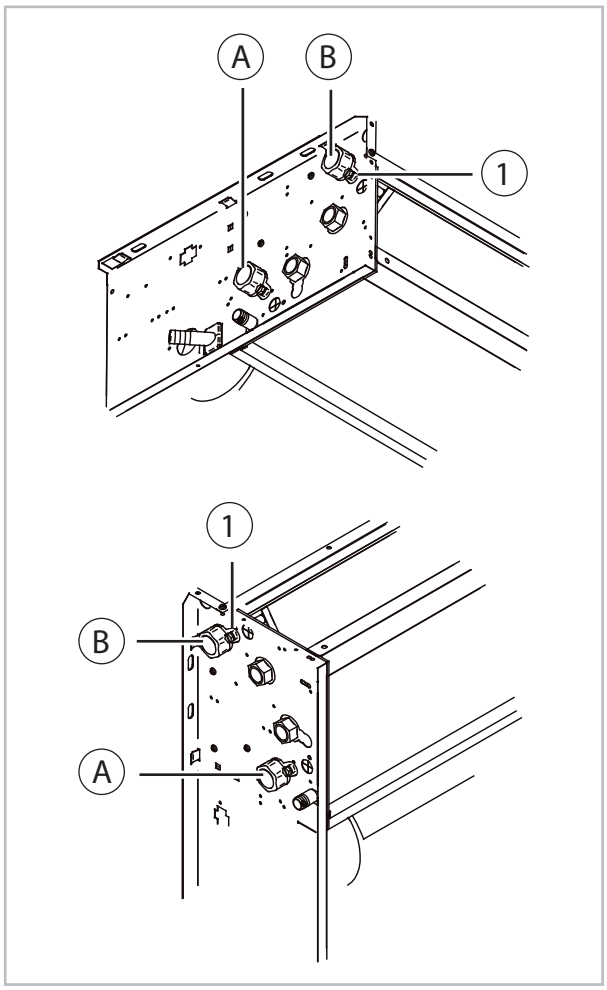
NOTICE!

Glycol-tolerant air bleeding valves are necessary when using media that contain glycol.

NOTICE!

During manual bleeding, any glycol mixtures which escape must be disposed of separately. Do not feed them into the condensate tray!

REMKO KWK series (DM)



1: Manual bleeding valve
A: Outlet
B: Inlet

Vertical mounting

The condensate drainage line can be connected at the funnel nozzle. The position of the nozzle can be selected to be on the left or right. The condensate drainage connection of the condensate tray which is not used must be permanently sealed. If a valve assembly is used, the connection must be made to the additional condensate tray.

Horizontal mounting

The condensate drainage line can be connected directly to the condensate tray. If a valve assembly is used, the condensate is conveyed to the unit's pan and is drained from there.

Possible accessories

- Room temperature controller

  The room temperature controller operates the unit. The controller can be wall-mounted or installed in the unit, as required. Follow the separate installation instructions.
- Switch relay for 4 units

  If several units are to be controlled together in a group, a switch relay is necessary if room temperature regulation is used. Follow the separate installation instructions.
- Condensate pump

  If the condensate which forms is to be removed by a condensate pump, this can be placed in the unit. Follow the separate installation instructions.

6.2 Condensate drainage connection

If the temperature falls below the dew point, condensate will form on the cooling fins during cooling mode. Below the heat exchanger is a collection tray which must be connected to a drain.

- 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.
- 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. 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.

! NOTICE!

The condensate drainage connection of the condensate tray which is not used must be permanently sealed (a cap or similar).

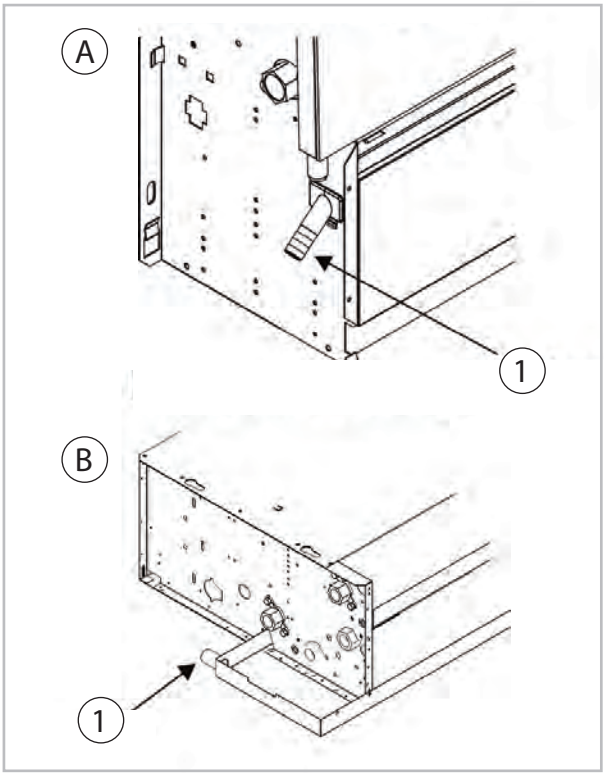


Fig. 14: Condensate drainage connection without valve assembly

A: Vertical mounting / B: Horizontal mounting
1: Condensate drainage connection

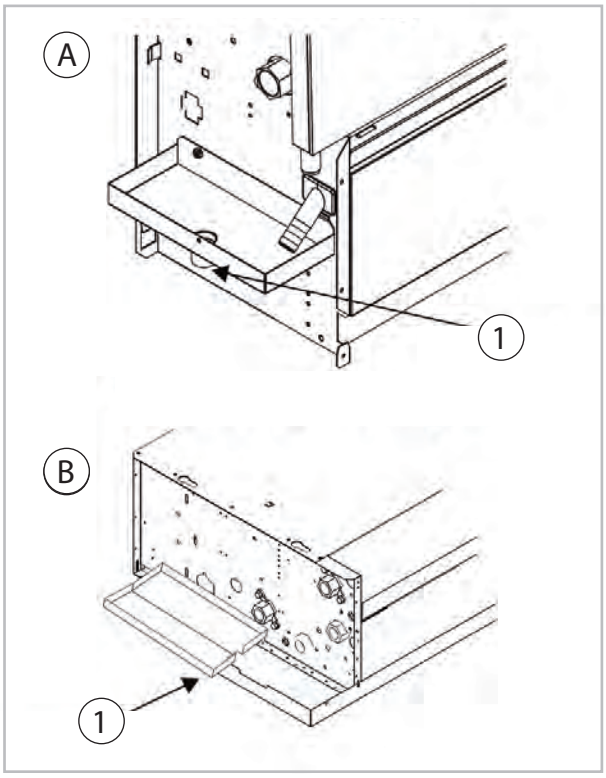


Fig. 15: Condensate drainage connection with valve assembly

A: Vertical mounting
B: Horizontal mounting
1: Condensate drainage connection

6.3 Leak testing

The leak test is carried out after the connection has been made.

1. Flush the system twice with tap water.
2. Clean the sieve insert on the dirt trap.
3. Fill the system with water again and bleed the unit at the manual bleed valves.
4. Adjust the test pressure to at least 200 kPa (2.0 bar).
5. Check the connections after a period of at least 24 hours for leaking water. If leaks are visible, the connection has not been properly made. Tighten the connection or establish a new connection.
6. After a successful leak test, remove the excess pressure from the medium piping if a water-glycol mixture is used or adjust the non-circulating pressure to the required system pressure.

7 Electrical wiring

General connection and safety instructions

DANGER!

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

- We recommend installing a main / repair switch on the building close to the indoor unit. This is the responsibility of the customer.
- The power supply is made at the indoor unit, a control line to the chiller is not necessary.
- 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 or the valve if necessary.
- The terminal block for making the connections and the plug are located behind the unit's housing on the right side of the unit.

Proceed as follows to establish the connection:

1. Open the unit cover.
2. Insert the cables into the unit.
3. Connect the unit with the controller and power supply. See electrical drawings.
4. Mount all removed parts.

NOTICE!

Check all plug and terminal connections to verify that they are tight and make a permanent contact. Tighten as required.

NOTICE!

When using a controller from the accessories range, observe the associated operating manual.

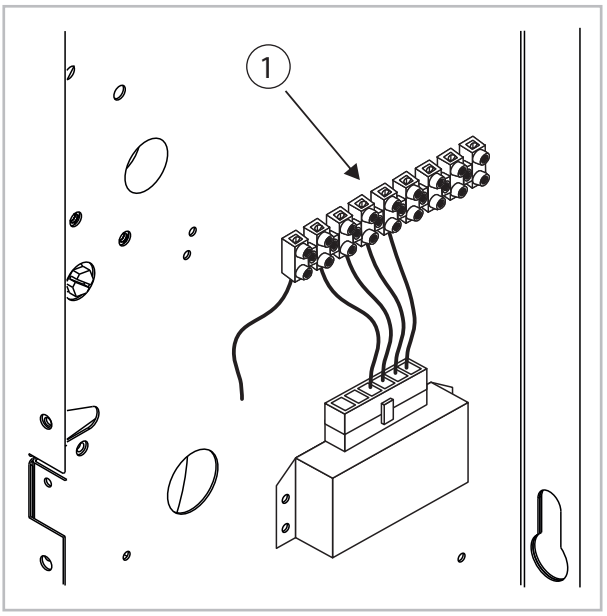


Fig. 16: Electrical wiring

1: Connection terminals

Electrical drawings

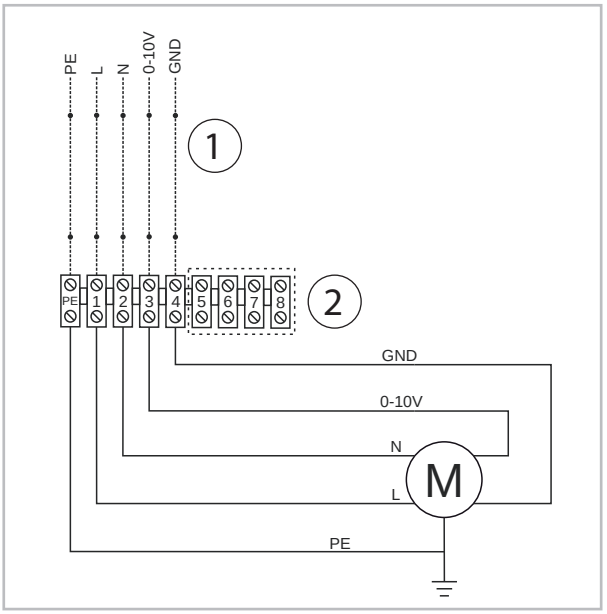


Fig. 17: Electrical drawings

1: Controller provided by the customer (accessories)
2: Medium valve connection terminals (accessories)

8 Before commissioning

Anti-freeze protection for the medium

If a water-glycol mixture is used, it is to be pre-mixed before being put in the system. The desired concentration is then to be checked.

Bleeding the system

- Air may still be in the pipe lines after the leak testing. This is carried during operation of the circulation pump to the automatic bleeding valves or to the cold water drain. In this case it is necessary to bleed the system again.
- The non-circulating pressure must then be adjusted to the required system pressure.

! NOTICE!

During manual bleeding, any glycol mixtures which escape must be disposed of separately. Do not feed them into the condensate tray!

Diaphragm expansion vessel

- The preliminary pressure for the diaphragm expansion vessel must be adjusted individually to the system layout, the volume of the medium and the installation site.

Valves for hydronic balancing

- The calculated excess pressure in the pipe network layout at the individual cold water outlets must be adjusted with the valves for hydronic balancing.

Safety valve

- The safety valves and their correct function must be checked.
- The drain line for the valves is to be checked for function and leak tightness.

9 Commissioning

! NOTICE!

Commissioning should only be performed by specially trained personnel and documented after the certificate has been issued.

! NOTICE!

Observe the manuals for the unit and all other components when commissioning the entire system.

Function test for cooling operating mode

1. Switch the power supply on.
2. Open all shut-off valves if necessary.
3. Switch on the chiller and the corresponding circulation pump. The outlet temperature must be between +4 and +18 °C.
4. Use the controller to switch on the unit and select the cooling mode, maximum fan speed and lowest target temperature.
5. Measure and record all the required values in the commissioning report and check the safety functions.
6. Check the unit control system using the functions described in the "Operation" chapter.
7. 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.

Function test of heating operating mode

1. Switch the power supply on.
2. Open all shut-off valves if necessary.
3. Switch on the heating system and the corresponding circulation pump. The outlet temperature must lie between +35 and +70 °C.
4. Use the controller to switch on the unit and select the heating mode, maximum fan speed and highest target temperature.
5. Measure and record all the required values in the commissioning report and check the safety functions.
6. Check the unit control system using the functions described in the "Operation" chapter.

Final tasks

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

10 Shutdown

Temporary shutdown

1. Let the unit run for 2 to 3 hours in circulation mode, or in cooling mode at maximum temperature, to extract any residual humidity from the unit.
2. Put the system out of operation using the controller.
3. Switch off the power supply to the unit.
4. Check the unit for visible signs of damage and clean it as described in the “Care and maintenance” chapter.

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.

11 Troubleshooting and customer service

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, undervoltage	Does all other electrical equipment function correctly?	Check voltage and if necessary wait until turned on again
	Defective mains fuse/main switch turned off	Are all lighting circuits functioning correctly?	Replace the mains fuse. Close main circuit breaker
	Damaged power supply	Does all other electrical equipment function correctly?	Repair by specialist firm
	Malfunction of the external condensate pump	Has the pump shut down due to a malfunction?	Check the pump and clean it if necessary
	Regulation not activated	Has the operating mode / controller been correctly set?	Check the setting and operation
	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
The unit is running but only provides reduced or no cooling or heating capacity	Valve assembly jammed, not working, not yet fully activated	Is electrical power present at the valve head or has the time period of 3 minutes after activation passed?	Have the valve head replaced or wait for time period to pass
	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
	Cooling mode is not set	Does the "cooling" symbol appear on the display?	Correct the settings for the unit
	Medium temperature in cooling mode too high	Is the inlet temperature approx. + 5 - + 10 °C and is the circulation pump working?	Reduce the medium temperature
	Medium temperature in heating mode too low	Is the inlet temperature approx. + 24 - + 45 °C and is the circulation pump working?	Increase the medium temperature

Operational malfunctions (continued)

Malfunction	Possible causes	Checks	Remedial measures
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
	Insulation missing from components carrying the medium	Do all the medium-carrying components outside the drip area have vapour diffusion barrier insulation?	Have vapour density insulation properly installed
	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 cannot be discharged. Faulty external condensate pump or float	Are the condensate drainage lines clear and is there an incline? Are the condensate pump and liquid level switch functioning correctly?	Route the condensate drainage line with an incline and clean it. Replace the faulty liquid level switch or condensate pump
Medium outlets on the unit	Medium cycle / bleeding valve leaking	Can any leaks be seen on components carrying medium?	Have leaks sealed by a specialist company

12 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 housing

1. Disconnect the power supply to the unit.
2. Clean the grill and housing using a soft, damp cloth.
3. Switch the power supply back on.

Type of task Checks/maintenance/inspection	Commissioning	Monthly	Half-yearly	Yearly
General	●			●
Medium cycle bleeding	●		●	
Check medium filling	●		●	
Contamination of fin register	●	●		
Filter contamination	●	●		
Check voltage and current	●			●
Check function of fan	●			●
Check condensate drainage	●		●	
Check insulation	●			●

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.

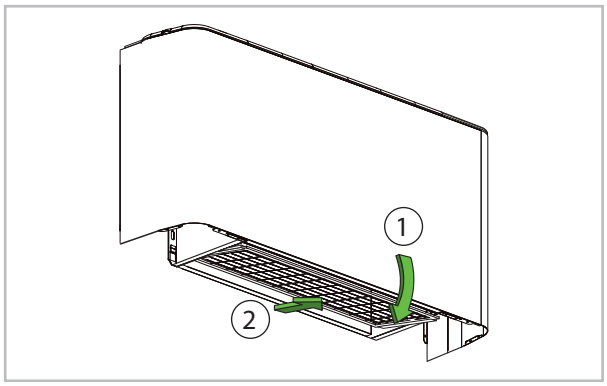


Fig. 18: Filter removal

Cleaning the filter

1. Disconnect the power supply to the unit.
2. If necessary remove the unit's cover. Observe the following section "Removal of the unit's cover".
3. Fold the filter downwards [1] and pull it out towards the front [2].
4. Clean the filter with a commercially available vacuum cleaner (Fig. 19). 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. 20). 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. Switch the power supply back on.
9. Switch the unit back on.



Fig. 19: Cleaning with a vacuum cleaner



Fig. 20: Cleaning with lukewarm water

Cleaning the condensate pump (accessories)

An optional integrated or separate condensate pump may be in the indoor unit, which pumps out any accumulated condensate into higher positioned drains.

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

Cleaning the air-side components

1. Disconnect the power supply to the unit.
2. Clean all components such as ducts and grills using suitable cleaning agents including anti-bacterial agents if appropriate.
3. Switch the power supply back on.

In certain types of use the units and components are subject to a special hygiene maintenance and inspection requirement.

Removing the unit cover on the KWK (DM)

The cover can be removed to clean the fan. Proceed as follows:

1. Disconnect the power supply to the unit.
2. Loosen the screws on the cover [1].
3. Remove the cover from the unit.
4. Clean the filter / fan as described above and re-assemble the unit in reverse order.

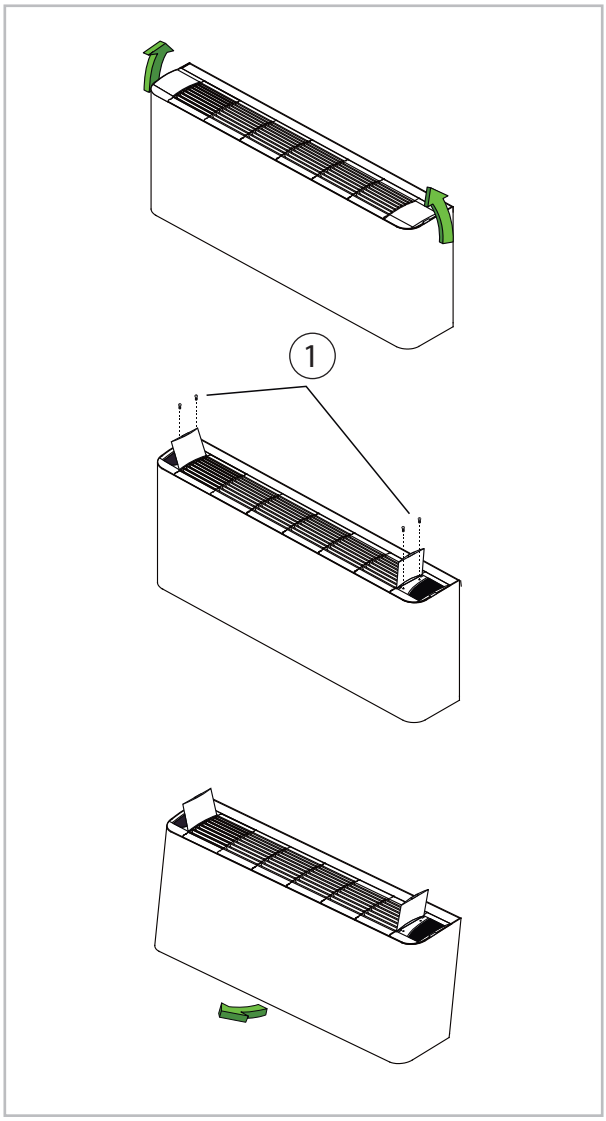


Fig. 21: Removing the unit's cover

13 General view of unit and spare parts

13.1 Exploded view of the unit KWK 135 EC - KWK 875 EC

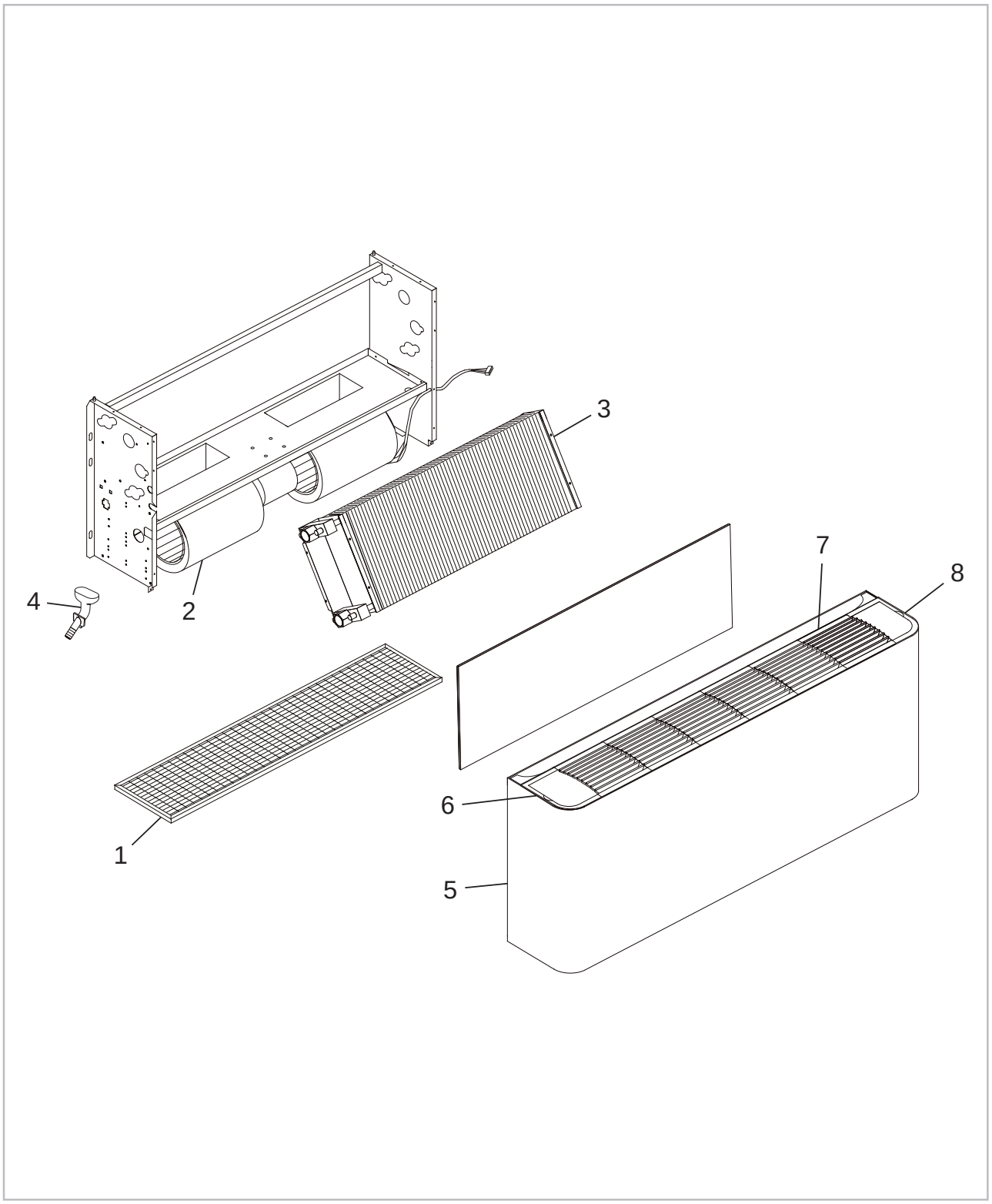


Fig. 22: Exploded view of the unit

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

13.2 Spare parts list KWK 135 EC - KWK 875 EC

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	Air filter
2	Valve unit incl. control board
3	Heat exchanger
4	Condensate connection
5	Unit cover with air outlet grid
6	Housing flap, left
7	Air outlet grid
8	Housing flap, right

13.3 Exploded view of the unit KWK 135 EC - KWK 875 EC DM

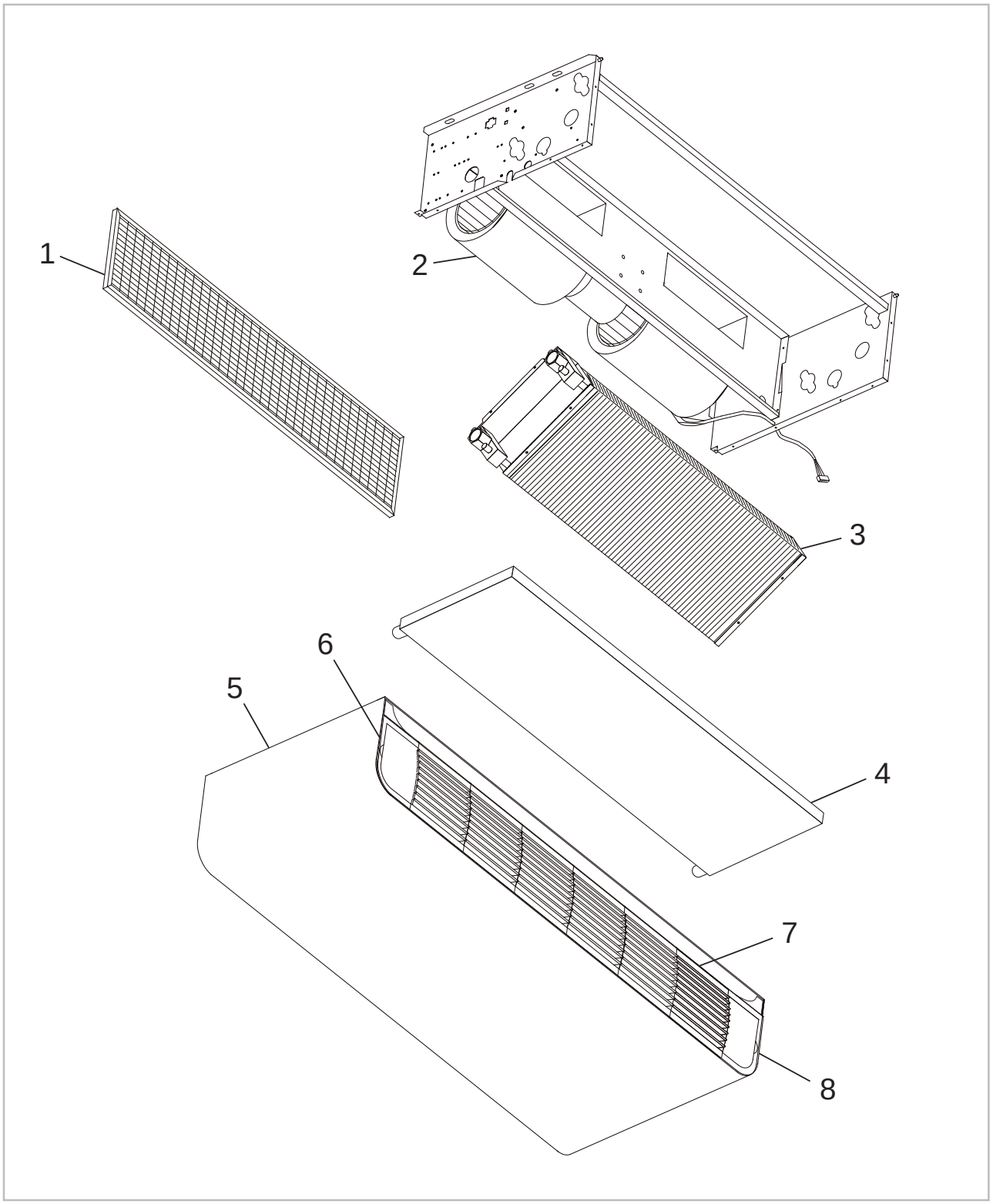


Fig. 23: Exploded view of the unit

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

13.4 Spare parts list KWK 135 EC - KWK 875 EC DM

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	Air filter
2	Valve unit incl. control board
3	Heat exchanger
4	Condensate tray
5	Unit cover with air outlet grid
6	Housing flap, left
7	Air outlet grid
8	Housing flap, right

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REMKO QUALITY WITH SYSTEMS

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