



All on board

MONOBLOCK AIR HANDLING UNITS

OPERATION AND MAINTENANCE MANUAL

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1. General remarks.

The OMM describes the correct and safe use of the units in all phases of operation. The nameplate contains basic information and technical parameters of the unit.

This Operation and Maintenance Manual is a set of recommendations and guidelines intended to present procedures, methods and notes leading to the correct installation, commissioning and operation of the unit. Failure to follow the recommendations below may result in a life-threatening risk due to incorrect transport and assembly and may lead to damage to the unit or its malfunction. The manufacturer is not responsible for incorrect installation or malfunction of the unit. At the same time, the warranty provided by the manufacturer will not be recognised in the event of gross negligence or failure to comply with the following set of recommendations.

NOTE: All activities performed during connection must be carried out by qualified personnel with approvals and certificates to work with live equipment, in accordance with applicable law in a given country.

NOTE: All maintenance operations on the delivered unit must be carried out by qualified personnel with approvals and certificates to work with pressure equipment, in accordance with applicable law in a given country.

2. Purpose and construction.

The XK and XD AHU series is designed for air treatment in the capacity range from 1,000 m³/h to 46,000 m³/h in various configurations of functional sets. The AHUs are intended for installation in the ventilation network, in air conditioning, ventilation, heating and exhaust systems. The ventilation network means ventilation ducts and, in the case of units installed outdoors, also elements such as intake vent and exhaust terminal. The XK, XD AHUs consist of one or several multifunctional blocks. All air processing functions performed by the AHU are marked with graphic symbols placed on the cover plates on the operating side.

The AHUs are manufactured in the left-hand and right-hand versions. The execution sides are determined depending on the direction of air flow in relation to the operating side (inspection panels, exchanger stub pipes, etc.). In the case of supply and exhaust air handling units, the execution side is determined by the direction of air flow in the supply section.

XK, XD AHUs are the optimum solution for efficient and comfortable air conditioning in large buildings. In order to reduce operating costs, the AHUs are equipped as standard with a recuperator, a mixing chamber with the free cooling function and a heating module. The sequence of use of the individual elements was defined as a function of reducing electricity costs. The use of electronically commutated (EC) fans dramatically improves the energy efficiency of the unit.

The XK, XD air handling units are a versatile solution for the air treatment process in commercial facilities with an area of 300 m² to 2,000 m². The use of optional multi-stage or inverter condensing systems enables the optimisation of cooling requirements. The use of 50 mm insulation and axial fans with reduced sound power levels guarantees low sound pressure levels.

2.1. Unit codification.

The units are marked with a code indicating the basic parameters, configuration and equipment:

XD_1_ - _2_ - _3_ - _4_ - _5_

- XD – monoblock AHU
- 1 – cooling capacity [kW]
- 2 – air capacity [m³/h]
- 3 – AHU configuration: N – supply, NW – supply and exhaust, NWR/P – supply and exhaust with heat recovery R – with a rotary exchanger / P – with a plate exchanger
- 4 – type of heater: HG – gas, HW – water, HE – electric
- 5 – configuration of supply and exhaust outlets: H – front, U – top, V – bottom

XK_1_ - _2_ - _3_ - _4_ - _5_

- XK – compact AHU
- 1 – air capacity [m³/h]
- 2 – AHU configuration: N – supply, NW – supply and exhaust, NWR/P – supply and exhaust with heat recovery R – with a rotary exchanger / P – with a plate exchanger
- 3 – type of heater: HG – gas, HW – water, HE – electric
- 4 – type of cooler: CF – freon, CW – water
- 5 – configuration of supply and exhaust outlets: H – front, U – top, V – bottom

C_1

- C – condensing unit
- 1 – cooling capacity [kW], number of circuits

2.2. Technical data.

2.2.1. XD series.

Ventilation		XD 25–35	XD 40–70	XD 80–130	XD 140–180
Nominal capacity	m³/h	5,500	12,000	23,000	30,000
Nominal displacement pressure	Pa	350	350	450	450
Capacity range in cooling mode	m³/h	3,500–6,000	8,000–13,000	16,000–27,000	26,000–33,000
Supply fan	-	1 radial EC	1 radial EC	1 or 2 radial EC	2 radial EC
Exhaust fan	-	1 radial EC	1 radial EC	1 or 2 radial EC	2 radial EC
Cassette filters		G4-F5			
Heat recovery					
Type of recovery exchanger	-	rotary hygroscopic			
Ventilation air flow according to ECODESIGN requirements	m³/h	up to 5,500	up to 8,000	up to 17,500	up to 27,000
Heat recovery efficiency according to ECODESIGN requirements	%	73.0	73.0	73.0	73.0
Heat recovery capacity for conditions 1)	kW	77.4	109.8	236	358.4
Cooling					
Heat recovery capacity for conditions 2)	kW	11.7	15.8	34.0	51.4
Cooling capacity for conditions 3)	kW	26.7	40.5–57.8	75.2–96.2	112.6–144.4
EER 4)	-	3.26	3.02	3.22	3.28
Scroll compressor type	-	on / off [inverter]	on / off [inverter]	on / off	on/off
Number of compressors	-	1	1	2	3
Number of cooling circuits	-	1	1	2	3
Condenser fans	-	2 axis AC	2–4 axis AC	2–4 axis AC	4–6 axis AC
Heating					
Water heater power for medium water 80/60	kW	35	74	146	169
Adjustment	-	3D valve with a small circulation pump option			
Gas heater power	kW	24–43	52–75	72–110	72–144
Adjustment	-	2-stage module with variable adjustment option, in variable adjustment option			
Electric heater power	kW	18-36-48	individual selection		
Number of adjustment levels	-	2	individual selection		
Technical data					
Weight of nominal configuration with gas heater module	kg	590–660	870–1,160	1,960–2,360	2,380–2,760
Dimensions with the cooling module, L x B x H	mm	2,100 x 2,200 x 1,265	2,350 x 2,150 x 1,515	[2,350 + 800] x 3,250 x 1,890	[2,350 + 800] x 4,050 x 1,890
Dimensions without the cooling module, L x B x H	mm	2,100 x 1,100 x 1,265	2,350 x 1,350 x 1,515	[2,350 + 800] x 1,900 x 1,890	[2,350 + 800] x 1,900 x 1,890
Description of the structure	-	Self-supporting, Frame, Standard ALUZINK, 50mm insulation			
Configuration of supply outlets	-	front, bottom	front, bottom, top	front, bottom, top	front, bottom, top
Configuration of exhaust outlets	-	front, top	bottom, top	bottom	bottom
Supply duct connections	mm	700 x 400	900 x 500	1,500 x 500	depending on configuration
Supply duct connections	mm	700 x 400	900 x 500	1,500 x 500	depending on configuration
Electric power [50hz]	V	3 x 400	3 x 400	3 x 400	3 x 400
Power consumption / Starting current	A	22 / 87	38 / 144	75 / 166	129 / 177

1. Outdoor temp. -20°C / Return temp. +20°C

2. Outdoor temp. +32°C / Return temp. +24°C

3. Conditions Tout = 35°C [TS]. Temp. before exchanger 28°C [TS]

4. Net EER = cooling capacity / total electrical power consumption of the unit

2.2.2. XK series.

Ventilation		XK 010	XK 025	XK 060	XK 100	XK 200	XK 300
Capacity range in cooling mode	m³/h	500–1,300	1,500–3,300	3,500–7,500	7,000–14,000	16,000–27,000	25,000–34,000
Capacity range in heating mode	m³/h	500–1,300	1,500–3,300	3,500–7,500	7,000–15,000	16,000–35,000	25,000–46,000
Nominal displacement pressure	Pa	200	300	400	500	600	600
Nominal air capacity	m³/h	1,000	2,500	6,000	10,000	20,000	30,000
Supply fan	-	radial EC	radial EC	radial EC	radial EC	2 radial EC	3 radial EC
Exhaust fan	-	radial EC	radial EC	radial EC	radial EC	2 radial EC	3 radial EC
Ventilation filters	-	G4, G5	G4, F5	G4, F5, F7, F9	G4, F5, F7, F9	G4, F5, F7, F9	G4, F5, F7, F9
Heat and cooling recovery							
Type of recovery exchanger	-	Rotary hygroscopic					
Air flow according to ECODESIGN requirements	m³/h	-	up to 3,300	up to 6,600	up to 9,000	up to 18,500	up to 28,000
Efficiency according to ECODESIGN requirements	%	-	73.0	73.0	73.0	73.0	73.0
Cooling recovery capacity for conditions 1)	kW	-	38.8	77.4	109.8	236	358
Type of recovery exchanger	-	Countercurrent airtight					
Air flow according to ECODESIGN requirements	m³/h	1,300	up to 3,300	up to 6,600	up to 9,000	up to 18,500	up to 28,000
Efficiency according to ECODESIGN requirements	%	82.0	77.0	76.0	77.0	-	-
Cooling recovery capacity for conditions 1)	kW	18.1	42.1	83.4	115.8	-	-
Heating							
Water heater power for medium water 80/60	kW	option	19	37	77	146	198
Adjustment	-	3D valve					
Gas heater power	kW	-	12 - 24	24–43	43 - 75	75 - 210	105 - 430
Adjustment	-	-	2-stage module with modulation option			2/4-stage module with modulation option	
Electric heater power	kW	06 - Feb	18-36	individual selection			
Adjustment	-	individual selection					
Technical data							
Description of the structure	-	Self-supporting, frame. Standard ALUZINK, 50mm insulation					
Weight of the base configuration with recovery	kg	180	330	490	770	1,590	2,380
Dimensions of the base configuration with recovery LxBxH	mm	2,050 x 900 x 500	2,350 x 900 x 1,045	2,350 x 1,200 x 1,365	2,350 x 1,350 x 1,515	3,050 x 1,900 x 1,890	3,150 x 2,200 x 2,385
Supply and exhaust connections	mm	315	600 x 300	800 x 400	900 x 500	1,500 x 500	1,800 x 600
Cooling							
Freon cooler power	kW	5	14	34	60	128	188
Water cooler power	kW	According to individual selection					

1. Outdoor temp. -20°C / Return temp. +20°C
2. Outdoor temp. +32°C / Return temp. +24°C

3. Conditions Tout = 36°C [TS]. Temp. before exchanger 28°C [TS]
4. Net EER — cooling capacity / total electrical power consumption of the unit

The detailed equipment of the units, including operating parameters, dimensions and weight, is shown on a selection sheet prepared on individual request.

2.2.3. C unit series....

R410a CONDENSING UNIT	C201	C251	C301	C302	C351	C352	C401	C402	C452	C501	C502	C602
COOLING	Evaporation temp. 7°C, Outdoor temp. 35°C											
Cooling capacity	18.90	24.70	28.90	29.20	34.20	35.10	39.10	37.90	44.90	48.90	49.40	58.70
EER	3.11	3.06	3.03	3.22	3.25	3.15	3.18	3.18	3.14	3.13	3.18	3.11
CONFIGURATION												
Number of compressors/circuits	1/1	1/1	1/1	2/2	1/1	2/2	1/1	2/2	2/2	1/1	2/2	2/2
Number of condenser fans	2	2	2	2	2	2	3	4	4	3	4	4
Adjustment steps	1	1	1	2	1	2	1	2	2	1	2	2
ELECTRICAL DATA												
Voltage	400V / 50Hz											
Full load current	8.44	10.70	12.50	12.40	15.50	15.90	17.10	16.90	18.50	21.40	21.30	24.80
ACOUSTIC DATA												
Sound power LwA dB	76.00	76.00	76.00	77.00	77.00	77.00	79.00	81.00	81.00	80.00	82.00	82.00
Sound pressure at a distance of 1m dB[A]	57.00	57.00	57.00	57.00	57.00	58.00	59.00	60.00	60.00	59.00	60.00	60.00
DIMENSIONS	2,350x800x1,515											
WEIGHT	170.00			221.00			258.00			277.00		311.00

R410a CONDENSING UNIT	C702	C802	C902	C1002	C1202	C1203	C1403	C1503	C1703	C1604	C1804	C2004
COOLING	Evaporation temp. 7°C, Condensation temp. 35°C											
Cooling capacity	68.50	78.30	88.00	97.80	118.60	116.20	135.70	146.70	167.50	156.40	176.10	195.60
EER	3.22	3.18	3.15	3.22	3.12	3.18	3.21	3.16	3.12	3.20	3.20	3.19
CONFIGURATION												
Number of compressors/circuits	2/2	2/2	2/2	2/2	2/2	3/3	3/3	3/3	3/3	4/4	4/4	4/4
Number of condenser fans	4	4	4	2	2	5	5	6	6	6	6	4
Number of compressors/circuits	2/2	2/2	2/2	2/2	2/2	3/3	3/3	3/3	3/3	4/4	4/4	4/4
Adjustment steps	2	2	2	2	2	3	3	3	3	4	4	4
ELECTRICAL DATA												
Voltage	400V / 50Hz											
Full load current	31.80	34.20	38.50	42.80	49.60	51.10	59.90	64.20	70.90	68.40	77.00	85.60
ACOUSTIC DATA												
Sound power LwA dB(A)	83.00	83.00	84.00	86.00	86.00	87.00	88.00	88.00	88.00	89.00	90.00	90.00
Sound pressure at a distance of 1m dB[A]	60.00	60.00	61.00	63.00	63.00	63.00	64.00	64.00	64.00	64.00	65.00	65.00
DIMENSIONS	2,350x800x1,880			2,350x1,350x1,880		2,350x2,150x1,880				2,350x2,700x1,880		
WEIGHT	396.00			580.00		870.00		960.00		1660.00		

3. Transport and storage.

The XK, XD series monoblock AHUs are equipped with elements that allow loading. The following drawings show the transport options for the unit. Thanks to this solution, no special equipment is required for transport and loading. The unit has built-in transport handles that are fixed directly to the unit's support frame in each corner. However, please note that vertical transport should be carried out using a traverse and conveyor belts as shown in the drawings below. Straps attached to a single point (crane hook) as the only means of attachment are not permitted as this may result in damage to the unit casing and loss of warranty. The manufacturer shall not be responsible for failure to follow the above instructions and, consequently, for damage to the unit.

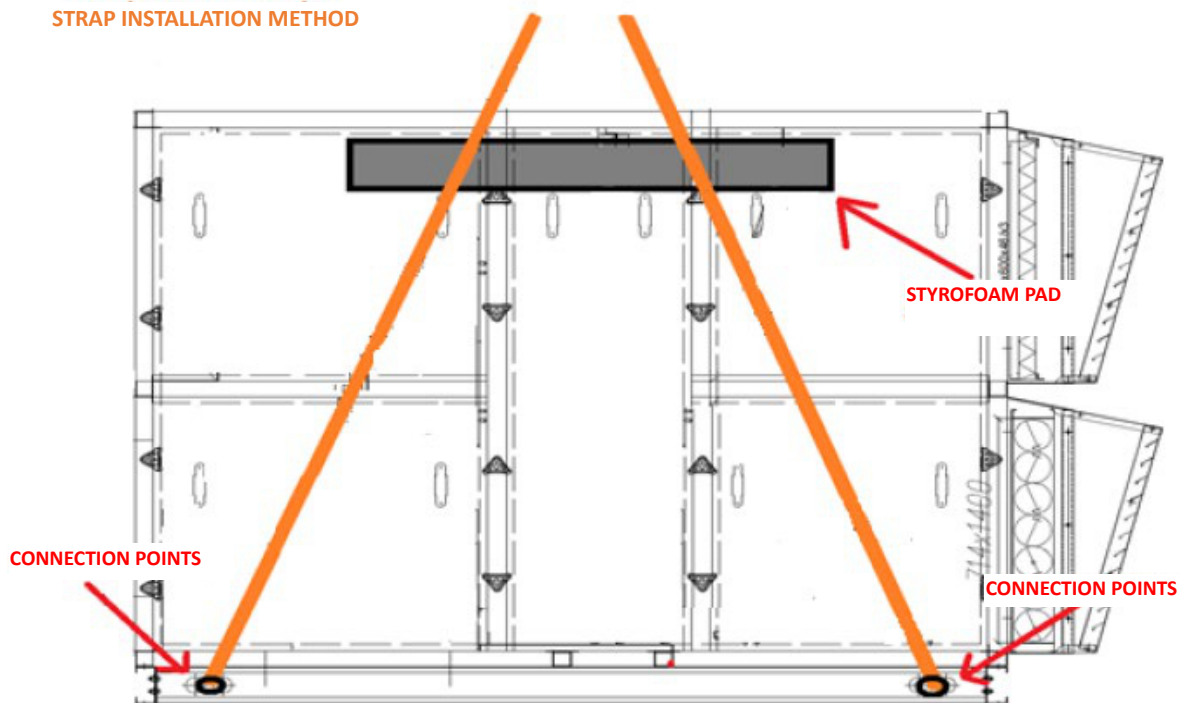


Fig. 1. Vertical transport method, strap attachment points.

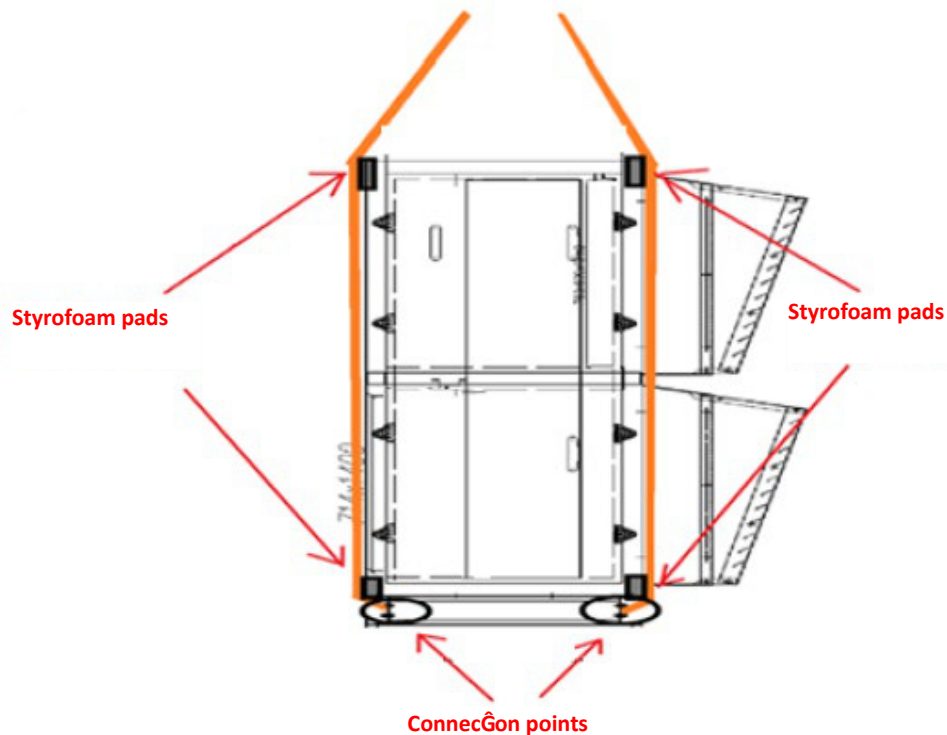


Fig. 2. Vertical transport method, strap attachment points.

The XK, XD series AHU is wrapped in foil for transport and has protection for corners and protruding elements. Due to their size and frame structure, the units are not transported on pallets. During transport, ensure that the means of securing the load do not damage the AHU. Elements of the outer shell of the AHU are exposed to dents and damage to the paint finish if the unit is not properly secured. It is not permitted to secure the load during transport by wrapping the unit in straps with tensioning mechanisms. The only permissible attachment of the unit is to anchor it to the vehicle using attachment points in the unit's supporting frame, i.e. mounting eyes and holes used for forklift transport. The units should be stored in their original packaging in a dry place, protected from the weather and within a temperature range of -25°C to +50°C. The unit can be transported by forklift or crane in their normal operating position, taking particular care to protect the sides and protruding parts from damage. Before lifting the unit, ensure that the doors and inspection panels are closed. For transport, the unit has a removable intake vent cover which is packed inside the unit. The siphon for draining condensate from the evaporator is also removed. For XD units, an optional cooling unit in a separate block is provided for installation, connection and commissioning after delivery by Ratherm or an Authorised Ratherm Service Centre.

4. Foundation, assembly and connection of related installations

4.1. Foundation.

The AHU should be placed on:

- foundation screed
- a steel foundation frame embedded in the concrete of the floor
- a specially prepared rigid steel structure

The foundation, frame or steel structure must be flat and level and should be strong enough to support the weight of the AHU. The height of the screed or foundation frame must allow for the installation of a siphon to drain condensate from the drip tray.

The manufacturer determines the support of the unit along the outline of the unit according to the dimensions of the frame. The unit can be mounted on a frame with support on all longer profiles of the unit frame. Detailed dimensions and weights are shown on the selection card prepared on individual request.

4.2. Place of foundation.

The AHU should be positioned so that the connection of associated installations (ventilation ducts, pipelines, cable trays) does not cause collisions with inspection panels. For efficient installation, operation and maintenance of the air handling units, a distance of the width of the unit + 1.5 m must be maintained between the operating side and existing built-in elements at the installation site (walls, supports, piping, etc.).

In the service area, systems, piping and support structures must be installed in such a way that they can be easily disassembled and assembled for service, repair and overhaul.

When installing an outdoor AHU with a condensing unit, the ground under the condensing unit (roof, frame, floor) must take into account the influence of weather conditions (e.g. precipitation). The casing of the condensing unit is not watertight.

4.3. Connection of AHU blocks.

Adjacent AHU blocks should be levelled so that the blocks fit closely together vertically and horizontally. Before anchoring the AHU on site, the individual AHU blocks should be bolted together in the order shown on the overall dimensional drawing included in the AHU documentation. Before screwing, the contact points of the block frame profiles should be covered with the self-adhesive seal supplied with the AHU. The AHU blocks are joined together using M8x35 bolts or screws (supplied with the AHUs).

If the AHU is installed outdoors, an intake vent should be installed at the outdoor air inlet and an exhaust terminal should be installed at the exhaust air outlet (the intake vent and exhaust terminal accessories supplied as standard, intended for installation on the duct/AHU).

4.4. Connection of ventilation ducts.

Ventilation ducts should be connected to the AHU with flexible connections (not supplied) that prevent the transmission of vibrations and small deviations in the concentricity of the duct and the AHU outlet. Ducts connected to the AHU must be supported or suspended on their own supports.

4.5. Connection of heaters and coolers.

Exchangers should be connected in such a way as to avoid stresses that could cause mechanical damage or leakage. The weight of the pipeline and thermal stresses cannot be transferred to the exchanger stub pipes. Depending on local conditions, compensation should be used in the supply and return pipeline system to compensate for longitudinal expansion of the pipelines. When installing the power supply system to exchangers with threaded connections, the exchanger stub pipe should be locked with an additional wrench.

The power supply installation should be arranged so that it does not obstruct access to other parts of the AHU. The method used to connect the exchangers to the power supply system should allow easy disassembly of the pipelines to remove the exchanger from the AHU without collision during maintenance and repair work.

The supply and return stub pipes of the exchangers should be connected so that the exchanger operates in the countercurrent system. Operation in a co-current system reduces the average temperature difference which affects the efficiency of the exchanger. In the case of heaters, the drop in efficiency can be up to 10% and in the case of coolers up to 25%.

CONNECTION OF ROOFTOP HEATERS

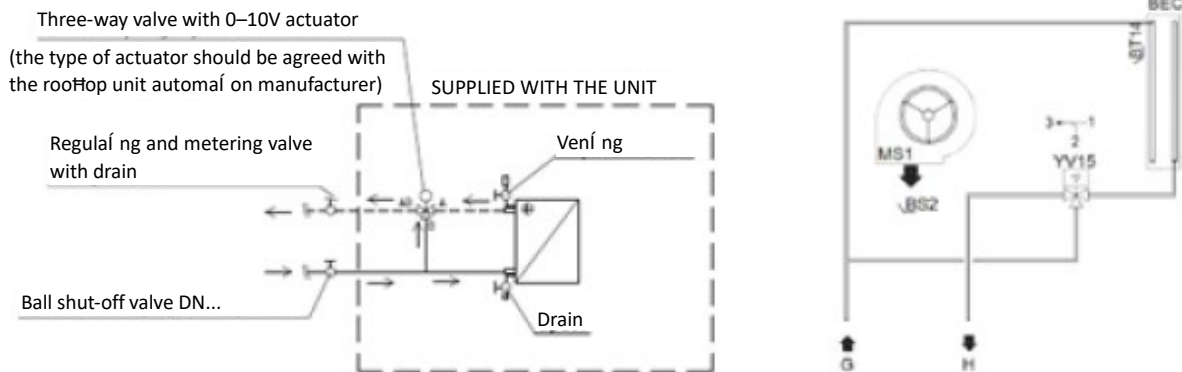


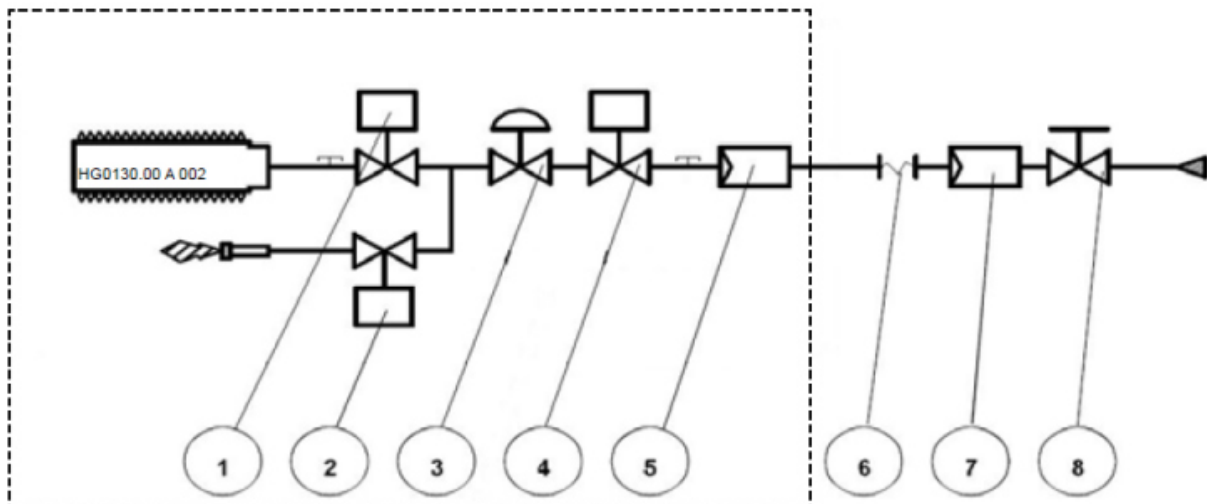
Diagram 1. Connection of heaters.

The AHUs are supplied as standard with a three-way valve and actuator — assembly by the installer.

The connection of the freon cooler to the power supply with the cooling unit may only be carried out by a qualified refrigeration installer in accordance with the regulations for freon cooling units in a given country. If the cooling unit block is supplied by Ratherm, the freon cooler must be connected by an Authorised Ratherm Service Centre or the warranty will be invalidated.

4.6. Connection of gas heaters.

The connection of gas heaters to the gas fuel supply must only be carried out by a qualified gas installer in accordance with the regulations in force in a given country.



- 1 Main burner solenoid valve
- 2 Pilot burner solenoid valve
- 3 Pressure stabiliser
- 4 Safety solenoid valve
- 5 Gas filter (small section)
- 6 Anti-vibration connector
- 7 Gas filter (large section)
- 8 Gas valve

Diagram 2. Connection of gas burner

4.7. Connection of the cooling module.

The condensing unit must be connected by suitably qualified and authorised personnel, in accordance with the standards and regulations in force in the country where the unit is installed.

The connection of the optional condensing unit supplied by Ratherm must be carried out by an Authorised Ratherm Service Centre or the warranty will be invalidated.

The condensing unit supplied by Ratherm is a separate block designed to be connected to the AHU casing and hydraulically connected to the evaporator. For service purposes, the condensing system is filled with inert gas at a pressure of 0.5 bar. Optional:

- the unit block (casing) can be connected to the AHU to form a monoblock,
- the unit block (installation) can be hydraulically connected to the evaporator, with the refrigerant charge in the condensing unit,

4.8. Condensate draining.

The drip trays of the cooling section, the plate heat exchanger and the rotary heat exchanger are fitted with condensate drain stub pipes leading to the outside of the AHU casing. Siphons should be connected to the drain stub pipes to drain the water condensing on the exchangers at different pressure levels in the section and at ambient pressure. The AHUs are supplied as standard with ball siphons for use in areas of the AHU where negative pressure occurs. The ball siphon cannot be installed in the discharge section of the air handling unit. There is no need to use drain siphons in sections where overpressure occurs. Drain siphons or siphon components for sections where overpressure occurs are not supplied.

Due to the different pressures prevailing in the sections during operation of the AHU, it is not permitted to connect several condensate drain stub pipes to one siphon.

It is permissible to connect siphons of different sections to one drain collector, provided that the collector is connected to the environment (vent). The siphons must be filled with water before starting the AHU. In a cold environment, the water outlet should be insulated and, if necessary, a suitable heating system should be used.

4.9. Electrical connections and controls.

The electrical connections of the AHU's equipment should be made by suitably qualified and authorised persons and should be made in accordance with the relevant standards and regulations in force in the country where the unit is installed. The cross-sections and type of power cables (e.g. shielded cables) and individual elements of the functional equipment should be selected according to the rated current and the conditions specific to the location of the AHU (e.g. ambient temperature, cable arrangement, distance from the power supply cabinet). Before connecting the power supply, check that the voltage and frequency of the mains supply correspond to the data on the nameplates of the equipment. The permissible deviations of the supply voltage and its frequency from the values specified on the nameplate are $\pm 5\%$.

The units are supplied as standard with power and control wiring and a built-in switchgear. The installer's connection scope includes: main power supply, water heater pump power supply, room unit, water heater/cooler actuator, supply air temperature sensor (AHUs with electric/gas heaters), external temperature sensor (indoor AHUs). The condensing unit (optional) is factory-supplied from the AHU switchgear.

Control information is provided in separate documents supplied by Ratherm.

5. Preparations for commissioning.

Commissioning of the air handling unit after putting the ventilation system into operation must only be carried out by suitably qualified and trained personnel.

AHUs equipped with an optional condensing unit and/or gas heater must be commissioned by an Authorised Ratherm Service Centre.

Thoroughly clean the interior of the units and the duct system before commissioning. Check that:

- no elements of units and systems, automation or automation equipment have been damaged during assembly works,
- all ventilation equipment is mechanically installed and connected to the ventilation network,
- the earth cables connecting the AHU to the ventilation ducts are installed,
- the hydraulic and freon system is fully installed and ready for operation and that the heating or cooling medium is available during commissioning,
- the power receivers are wired and ready for use,
- siphons and condensate drainage from drip trays are installed,
- all automation elements are installed and wired.

5.1. Electrical system.

Before closing the connection boxes of the power receivers, check:

- that, based on electrical diagrams, the wire connections and connections between terminals are correct,
- that the protections applied to all the power receivers are correct,
- that all bolts are tightened and that all fasteners and electrical connections (including unused auxiliary terminals, if any) are correctly fitted,
- that wires and cables comply with all requirements regarding protection, arrangement, cross-section, etc.,
- that the earthing and protective connections are correct,
- that there are no loose wires left inside the junction boxes,
- the condition of the seals and sealing surfaces.

5.2. Filters.

Air filters in air handling units prevent dust and particles from entering the ventilated room. In addition, they effectively protect other functional elements of the AHU, especially heat exchangers, from contamination.

The AHU must always be operated with filters installed.

Before closing the filter section:

- remove the film protecting the filters,
- mount the filters in the guides so that the safety screen is on the side opposite to the air pressure,
- check the condition of the filters and the tightness of the fixing in the guides,
- check the settings of the differential pressure switches (if installed) that determine the allowable static pressure differential that qualifies the filter for replacement. The permissible pressure differential is 250 Pa.

5.3. Water and glycol heaters.

Check:

- the condition of the heater fins,
- the correct connection of the inlet and outlet pipelines,
- that the antifreeze sensor is securely attached to the water return stub pipe from the heater,
- that the heater control valve is installed in accordance with the markings on its casing.

5.4. Electric heaters.

Check:

- that the electrical connections are correct according to the electrical diagram,
- that the heaters do not come into contact with the elements inside the heating section,
- that the heaters are not damaged.

5.5. Gas heaters.

Check:

- that the electrical connections are correct according to the electrical diagram,
- the tightness of the connections of the gas installation supplying fuel to the burner,
- that the pressure parameter and gas type are correct — the heaters are factory set to run on G20 gas, it is possible to change the gas fuel, which requires modification of the gas distribution system in terms of the heater and CO₂ emission regulation,
- that the boiler does not come into contact with the elements inside the heating section,
- the flue pipe and the heater intake vent are unobstructed.

Feeding the heater with a pressure higher than 60 mbar is strictly forbidden and may result in damage to the heater's gas valve!

5.6. Water, glycol and freon coolers.

Similarly to water heaters, check:

- the condition of the cooler fins,
- the correct connection of the inlet and outlet pipelines,
- the method of positioning the drop separator in relation to the direction of air flow,
- that the siphon is correctly installed — fill the siphon with water before starting the AHU,
- that the condensate drainage system is unobstructed.

5.7. Plate exchanger.

Check:

- the condition of the exchanger fins (dirt, mechanical damage),
- the operation of the damper mounted on the plate exchanger (before starting the AHU, the part of the damper serving the exchanger bypass should be closed),
- for AHUs with a drop separator, that the siphon is correctly installed and that the condensate drainage system is unobstructed; before starting the AHU, fill the siphon with water.

5.8. Rotary exchanger.

Before starting the exchanger, check:

- after removing the V-belt, that the exchanger rotor turns without resistance,
- the gap between the rotor and the casing and adjust the seal brushes if necessary,

5.9. Fan unit.

Check:

- that there are no objects around the fan that could be sucked into the rotor after it has started,
- that the fan rotor turns freely without rubbing against any parts of the casing,
- that the motor is correctly positioned and that the installation and operating conditions correspond to the data on the nameplate (supply voltage, current, frequency, winding connections),
- all bolts, fasteners and electrical connections are securely tightened,
- that all dampers in the ventilation duct network are set in accordance with the design,
- that the direction of rotation of the rotor matches the arrow on the fan casing (pulse switch on the fan). If the direction of rotation is reversed, any two phases in the switchgear power supply must be interchanged.

Once the above checks have been carried out, carefully close all the inspection panels on the unit.

It is not permitted to operate the unit with the inspection panels open.

6. Commissioning and adjustment.

AHUs equipped with a cooling module and/or gas heater must be commissioned by an Authorised Ratherm Service Centre or the warranty will be invalidated.

The purpose of commissioning is to confirm that the air handling unit has been constructed in accordance with the design and is suitable for operation.

The commissioning and adjustment of the air handling and air conditioning unit must only be carried out by **a qualified commissioning team** equipped with a set of basic measuring instruments.

After carrying out the activities described in point 5, you can start the first run.

After starting, check that:

- there are no disturbing noises or unnatural mechanical sounds,
- the vibrations of the AHU that can be considered too strong are not noticeable.

The AHU should operate for approximately 30 minutes. After this time, turn it off and inspect each section. Pay particular attention to:

- the filters (for damage),
- the efficiency of the condensate drainage,
- the fan unit.

Replace or clean the pre-filters after commissioning.

Achieving the intended effects of the operation of the air handling or air conditioning unit depends, among other things, on making adjustments and taking control measurements.

6.1. Air volume measurement and AHU capacity adjustment.

The measurement of the air volume is the basic measurement for:

- the commissioning and acceptance of the AHU,
- when the system is not performing to the design assumptions,
- the periodic control of the operation of the AHU,
- the replacement of the fan assembly elements.

Before making any measurements or adjustments:

- check that the dampers on all grilles or diffusers are positioned according to the design,
- set the supply air and recirculation air dampers (if any) to one of the extreme positions, i.e. either 100% supply air or maximum recirculation,
- measure the current drawn by the fan motor. If necessary, reduce the fan speed.

The determination of the air flow rate is based on the measurement of the average air flow velocity in the measurement cross-section of the ventilation duct.

Important factors affecting measurement accuracy are:

- the position of the measurement cross-section in relation to the elements,
- the number and location of measurement points in the measurement cross-section,
- a relatively stable and unobstructed air flow.

It is particularly inadvisable to locate the measurement cross-section directly behind:

- network elements that cause deformation of the velocity field (elbows, reducers, tees, dampers, etc.),
- a fan, where there may be velocities of the opposite sign in the cross section.

The measurement should be made on a section of duct with parallel walls and straight sections of at least 6 fan diameters or equivalent upstream and at least 3 diameters downstream of the measurement point. In a real ventilation system, it can be difficult to find such a long, straight section. In such a case, the measurement cross-section should be determined at the point where the least flow disturbance is expected and the mesh of measurement points should be refined. The location of the measurement cross-section should be determined at the system design stage.

We consider the measured capacity to be appropriate if it is within $\pm 10\%$ of the assumed capacity. In the case of larger disproportions, a capacity close to that of the design can be achieved by:

- regulating the ventilation duct network,
- changing the fan speed.

In systems with dampers that automatically change the proportions of supply, recirculation and exhaust air or the proportions of flow through the bypass, the capacity should be measured and the main damper adjusted at one of the extreme positions. Then check the air proportions and the total capacity in the second extreme position and make any necessary adjustments to obtain the correct proportions while maintaining the same total capacity.

7. Operation and maintenance.

Persons responsible for the operation of the AHU should read this documentation before commencing any operation or maintenance. In the absence of personnel with specific technical knowledge, the periodic inspection of the air handling units should be carried out by an Authorised Ratherm Service Centre. During the warranty period, inspections of the AHUs with a cooling module and/or gas heater must be carried out by an Authorised Ratherm Service Centre or the warranty will be invalidated.

Any damage to the AHU or its components resulting from failure to comply with the guidelines contained in the documentation will not be subject to warranty repairs.

The basic technical data of the air handling unit, such as the kind, type and dimensions of the main elements (filters, heat exchangers, fans, electric motors) are given on the Technical Data Card supplied with each unit.

Maintenance work on the AHU should only be carried out when the unit is not in operation. To ensure safe operation of the unit, a service switch must be installed outside the fan section to disconnect power to the fan motor during service. The power supply circuit must be disconnected in a de-energised state. The service switch should be located close to the fan section inspection panels.

Careful, regular maintenance and inspection of the technical condition of the AHU and its equipment is necessary to detect faults at an early stage before major damage occurs.

This documentation provides only general instructions regarding the control periods for the correct operation of the AHU due to various external operating conditions. The frequency of inspections must therefore be adapted to the existing conditions (contamination, number of starts, load, etc.).

From the time of commissioning, the persons operating the air handling unit should keep up to date records in the "Inspection and Maintenance Table" at the end of the documentation, which should record work resulting from normal, routine operation of the unit. A carefully kept register is the only reliable document that confirms the operating status of the unit, the date of periodic inspections and any irregularities observed in the operation of the unit. If it is necessary to contact Ratherm representatives, it is essential to use the unit's factory numbers, which can be found on the AHU casing.

The length of time between each activity was determined assuming "non-stop" operation of the AHU and in an installation characterised by low dust levels and no other conditions that would interfere with the normal operation of the unit. In environments with high levels of dust in the supply and/or exhaust air, inspections should be carried out more frequently.

Spare parts and accessories for the AHU should be ordered from Ratherm. When ordering, please quote the unit type and serial number. This information can be found on the nameplate on the fan part.

7.1. Dampers.

If the damper is found to be excessively dirty and in heavy use, it should be cleaned in one of the following ways:

- using an industrial vacuum cleaner with a soft nozzle,
- blowing with compressed air,
- washing with pressurised water with detergents that do not attack aluminium.

Particular attention should be paid to the tightness of the damper after closing it, especially from the outside air side, otherwise the water heater may freeze.

7.2. Filters.

Under standard operating conditions of the AHU, the filters should be changed three times a year. An indicator that the filter needs to be changed (in addition to a visual check of their function) is an increase in pressure drop above 250 Pa.

The degree of filtration varies for each type of filter, so it is extremely important to install filters of the same filtration class when replacing them.

If the final pressure difference across the filter exceeds the value specified for it, the filter should be replaced. Sectional filters (FD) and pocket filters (FK) are for single use only. Metal filters (FMW) can be regenerated by washing in warm water with detergent or by blowing out with compressed air.

When replacing the filter, you should also clean the filtration section by vacuuming or wet wiping.

When ordering a new set of filters from Ratherm, please specify the filter type, filtration class and size of the air handling unit, or the size and number of filters as listed on the unit's technical data sheet.

The AHUs must always be operated with air filters fitted.

7.3. Heat exchangers.

7.3.1. Water or glycol heater.

Water heaters are equipped with an anti-freeze system during operation. An alternative in winter is to fill the heater with a non-freezing agent (e.g. glycol solution). If the heating medium supply is switched off or the AHU is not in operation and the air temperature could drop below +5°C, the heater should be emptied.

To do this:

- close the valves on the heating medium inlet and outlet (disconnect the heater from the heating system),
- unscrew the drain and vent plugs from the connection stub pipes,
- blow out the heater with compressed air supplied to the vent,
- repeat blowing several times at short intervals until only air comes out of the drain plug with no visible drops of water,
- screw in the drain and vent plug.

Heater fins should be checked for contamination at least every four months. Dust remaining on the heater surface reduces the heater's heat capacity and increases the pressure drop on the air side. Even if the AHU is fitted with filters, over time dust will build up on the heater fins on the air intake side. If excessive dirt is detected, the following methods can be used for cleaning:

- using a vacuum cleaner with a soft nozzle on the air intake side,
- blowing with a jet of compressed air in the opposite direction to the normal airflow, directing the jet parallel to the arrangement of the fins,
- washing with warm water and detergents that do not corrode aluminium and copper.

Before cleaning, protect adjacent parts of the AHU from any dirt released.

To achieve full thermal efficiency, the heater must be well ventilated. Vent plugs located in the heater stub pipes are used for this purpose.

When the unit is not in use, the flow of heating medium should be reduced to a minimum so that the temperature inside the unit does not exceed + 60°C. An increase in temperature above this value may cause damage to some elements or sub-assemblies (motor, bearings, plastic elements, etc.) installed in parts adjacent to the heater.

7.3.2. Electric and gas heater.

During operation of the air handling unit, dust may accumulate on the heating elements when the heater is not in use. When the heater is restarted, heavy contamination can cause a smell of burning dust and even a fire hazard. Periodically (every 4 months), and especially before the start of the heating season, check the electrical and gas connections, the technical condition of the heating elements, and check the heating elements for deformation or damage and the degree of contamination. Any dirt should be removed using a vacuum cleaner with a soft nozzle, a soft brush or compressed air.

Wet cleaning of electric and gas heaters is unacceptable!

You should also check that the temperature rise protection in the event of a loss of airflow is activated.

7.3.3. Water or glycol cooler.

The cooler should be checked for contamination every four months. If necessary, the cooler can be cleaned using the methods described for water heaters.

Before cleaning, protect adjacent parts of the AHU.

When checking the level of contamination, you should also check that the drop separator is clean and that the condensate tray drain and water siphon are unobstructed. The water siphon must be filled with water before starting the AHU.

If the drop separator is dirty, wash it with warm water and detergent.

In the case of a glycol cooler, the level and density of the glycol in the circuit should also be checked. To achieve full thermal efficiency, the cooler must be well ventilated. Vent plugs located in the cooler stub pipes are used for this purpose.

7.3.4. Freon cooler and cooling module.

Maintenance of the freon cooler and condenser covers the same range of activities as for the water heater, water cooler and fan units. When washing the freon cooler with warm water, empty the cooling system by sucking the freon into the tank. Otherwise there is a high risk of an uncontrolled increase in freon pressure and damage to the cooling system. As part of the cooling module inspection, the system leakage and pressure parameter of the cooling system must be checked and the result reported in accordance with the regulations in force in a given country.

7.3.5. Plate exchanger.

Maintenance of the exchanger consists of checking its technical condition and the degree of contamination of the aluminium plates every four months. Before cleaning, protect adjacent parts.

Cleaning required should be carried out using one of the following methods:

- vacuuming with a soft nozzle,
- blowing the ducts with a jet of air in the opposite direction to the normal air flow,
- washing the entire length of the air ducts with water and detergents that do not corrode aluminium,
- for more severe contamination, the exchangers can be cleaned by flushing with a high-pressure water jet.

When cleaning by mechanical means to remove dirt, take special care and ensure that the exchanger plates are not deformed or damaged.

If the exchanger is operated at negative temperatures, it must be thoroughly dried before the AHU is restarted.

In addition, check:

- functioning of the damper,
- condition of the drop separator,
- condition of the drip tray,
- that the condensate drainage system is unobstructed,
- the water siphon must be filled with water before starting the AHU,
- the correct installation of the anti-frost system (if fitted to the exchanger),
- that the bypass damper closes fully when defrosting is not required.

7.3.6. Rotary exchanger.

Maintenance of the exchanger consists of checking its technical condition and the degree of contamination of the rotor every four months. When servicing the rotary exchanger, check that:

- the rotor turns without resistance. The noticeable resistance may be caused by excessive pressure from the sealing brushes and rubbing against the edge of the rotor. In this situation, the brush setting should be corrected. Worn brush seals should be replaced. If the previously removed brush seal is to be reinstalled, it should be installed so that its position in relation to the direction of rotation of the rotor remains unchanged. After replacing or adjusting the sealing brushes, the exchanger should run for 30 minutes to allow the brushes to adapt to the rotor surface. After this time, measure the motor current and compare it with the rated current to check that the motor is not overloaded.
- the drive belt is undamaged, clean and does not slip on the cylindrical part of the rotor. If there is any slack despite the maximum tension provided by the tensioning system, the belt must be shortened or replaced,
- the air inlet openings are not covered with dust or otherwise contaminated. To clean the rotor, use one of the methods previously described for other exchangers.

The rotor and drive motor bearings are continuously lubricated during operation. The amount of grease in the bearings when the exchanger is installed is sufficient for long term operation and there is no need to lubricate them during operation. It is recommended that the motor and gearbox are cleaned of dust deposits from time to time to prevent the formation of an insulating layer on the motor surface, which would increase the operating temperature of the drive.

7.3.7. Fan unit.

Before starting any work (breakdown, maintenance, servicing) on the air handling unit, and in particular before opening the fan section inspection panels and removing covers from live parts, ensure that:

- the unit has been properly disconnected from the power supply. This applies to both the main and auxiliary circuits,
- the rotor is at rest,
- the fan has cooled down and that the surface temperature does not present a risk of burns,
- the fan is secured against accidental start-up.

The fans are designed to move dust-free or slightly dusty air. They are not designed for aggressive gases, vapours or very dusty air. Operating the fan in an unsuitable environment may result in bearing damage, corrosion, rotor imbalance and vibration.

The fan and drive motor in the unit are selected for the operating parameters of the AHU specified in the design. The fan speed is selected so that the air flow and fan stagnation pressure are appropriate for the associated ventilation system. A smaller flow of pumped air means disruptions in proper operation and leads to an imbalance of the entire ventilation system. This can be caused by:

- dust deposits on the fan rotor blades,
- the fan rotating in the wrong direction. If the fan rotates in the wrong direction, the air flow will be significantly less efficient.

When servicing the fan unit, check that:

- the rotor turns easily,
- it is balanced and that there is no rubbing,
- the rotor is securely mounted on the axis,
- it has not moved in relation to the inlet funnel,
- all bolts securing the structural elements of the fan assembly are tightened,
- electrical connections are not loose or tarnished,
- the power consumption parameters do not exceed the rated values,

Fan units should be inspected every 4 months.

8. Health and Safety Instructions.

1. The AHUs should be connected and commissioned by qualified personnel under conditions that comply with applicable regulations, particularly those relating to the operation of electrical equipment.
2. Do not switch on the mains voltage before connecting the AHU to the protective system.
3. It is forbidden to carry out renovation and maintenance work without first switching off the power supply to the air handling unit.
4. It is forbidden to operate the AHU with the inspection panel removed from any part of the unit.
5. The person operating, repairing or maintaining the unit must be suitably qualified and authorised in accordance with the regulations in force in the country where the unit is installed.
6. The place where the AHU is installed must be equipped with the necessary safety devices to ensure safe operation and the necessary fire protection equipment according to local regulations.

9. Warranty

Details of the warranty can be found in the GWC (General Warranty Conditions) and are confirmed when the unit is ordered (duration, scope of warranty, scope and frequency of warranty inspections).



KARTA GWARANCYJNA

Typ, model.....
(Typ, model zgodny z numerem na tabliczce znamionowej)

Numer seryjny.....
(Numer seryjny zgodny z numerem na tabliczce znamionowej)

Data sprzedaży..... Nr dowodu zakupu.....

Warunki gwarancji przedstawione są w Ogólnych Warunkach Gwarancji (OWG)

	
Miejsce i data sprzedaży (wydania)	Podpis i pieczęć
Miejsce i data pierwszego uruchomienia, nr protokołu z uruchomienia	Podpis i pieczęć

Miejsce na adnotacje

11. General Warranty Conditions

I. General information

These warranty conditions are the basis for the claims of the customer indicated in the warranty card; the manufacturer guarantees the owner (Customer) trouble-free operation of the sold air handling units, hereinafter referred to as units

II. Warranty period

1. The warranty for the units is 18 months from the date of commissioning, but no later than 2 years from the date of sale
2. The condition for the recognition of the warranty is the execution of two technical inspections per year, the first before the cooling season and the second before the heating season, by an authorised RATHERM HVAC service centre, and the orders should be sent electronically to Ratherm sp. z o. o. at the following addresses: info@ratherm.pl, rz@ratherm.pl, ps@ratherm.pl

III. Warranty coverage

1. The manufacturer will, at its discretion, either replace the units or their defective parts or repair them at the place of installation or elsewhere, after sending them for repair.
2. In the event that the warranty service is performed at the place of installation of the unit in the country of the manufacturer's headquarters, the manufacturer will cover the costs of transport of the authorised service centre personnel and of transport of spare parts only within a radius of 300 km from the service centre location in that country.
4. The warranty service does not change the warranty period, the warranty for the replaced parts ends at the end of the unit warranty period.
5. The manufacturer's liability under the implied warranty for unit defects is excluded.
6. These warranty conditions are binding on the parties to any contracts relating to the units, unless otherwise specified in the contract with the consent of the manufacturer.

IV. The warranty does not cover:

1. Unit parts subject to normal wear and tear, consumables (filters, seals, V-belts, bulbs, fuses, bearings, etc.)
2. Damage not attributable to the manufacturer and defects in the units caused by reasons other than those inherent in the units.
3. Damage to units due to environmental influences, improper transport and storage.
4. Mechanical damage resulting from improper handling and operation of the unit.
5. Units whose installation was not carried out by the Authorised RATHERM HVAC Service Centre or was carried out under conditions incompatible with the OMM.
6. Units whose commissioning, connection of the unit supplied by Ratherm or servicing was carried out by persons not authorised by the Manufacturer in each case. Applies to units equipped with a Ratherm cooling unit and/or gas heater.
7. Units in which modifications, changes in operating parameters, repairs or replacement of equipment parts have been made without the manufacturer's written consent.
8. Damage and defects in the casing and construction components that do not affect the functionality and correct operation of the units.
9. Damage and defects to units resulting from use and operation not in accordance with the building/construction design.
10. Units whose purchase has not been financially settled with Ratherm, including additional services.

V. The manufacturer shall not be liable for

1. Damage caused by unit downtime while waiting for warranty service.
2. Any damage to the Customer's property other than the units.

VI. Complaints

1. Complaints should be reported by telephone or e-mail to the following address: info@ratherm.pl, to the service centre phone number or to the address on the manufacturer's website or on a sticker placed on the unit. The complaint notification must include the unit's serial number, the location where the unit is installed, a contact telephone number and, if possible, a brief description of the fault.

VII. Warranty service

1. The services provided under this warranty will be provided within 14 days from the date of notification. In exceptional cases, this period may be extended, in particular if the warranty service requires parts or sub-assemblies to be brought in from a sub-supplier and if the service centre is prevented from working due to bad weather conditions.
2. Parts which the service centre removes from the unit as part of the warranty service and replaces with new parts become the property of the manufacturer
3. Costs incurred as a result of unjustified complaints or the interruption of the service centre's work at the Customer's request shall be borne by the Customer.
4. The manufacturer has the right to refuse to perform the warranty service if the Customer withholds payment for the unit or previous service.
5. The Customer is obliged to cooperate with HVAC RATHERM technicians in the performance of the warranty service performed at the unit's place of installation by:
 - a) enabling timely access to the unit;
 - b) presenting the documents supplied with the unit;
 - c) taking the measures necessary for the protection of persons and property and observing health and safety regulations at the place of performance of the warranty service;
 - d) ensuring that work can begin immediately on arrival of the service and can be carried out without undue delay;
 - e) providing, free of charge, all possible assistance for the performance of the service (e.g. providing a source of electricity or lighting at the place of performance).
6. The Customer is obliged to immediately accept and acknowledge the warranty service on the Service Card document. In the event of any doubt as to the quality or completeness of the warranty service, the Customer shall be entitled to lodge a complaint.



DEKLARACJA ZGODNOŚCI

Ratherm sp. z o.o., ul. Agrestowa 3, 83-010 Rekcin, deklaruje zgodność serii produktów:

Centrale klimatyzacyjne, wentylacyjne XD, XK, XB.

z Dyrektywami Wspólnoty Europejskiej:

2006/42/WE	Dyrektywa maszynowa.
2014/30/UE	Dyrektywa kompatybilności elektromagnetycznej EMC.
2014/35/UE	Dyrektywa niskonapięciowa LVD.
EU 1253/2014	Dyrektywa „Ecodesign”.

Zgodność produktów z wymaganiami dyrektyw została sprawdzona na podstawie następujących norm zharmonizowanych:

PN-EN 60335-1	Elektryczny sprzęt do użytku domowego i podobnego - Bezpieczeństwo użytkowania – Część 1: Wymagania ogólne.
PN-EN 60335-2-40	Elektryczny sprzęt do użytku domowego i podobnego - Bezpieczeństwo użytkowania – Część 2-40: Wymagania szczegółowe dotyczące elektrycznych pomp ciepła, klimatyzatorów i osuszaczy.
PN-EN 61000-6-1	Kompatybilność elektromagnetyczna (EMC) - Część 6-1: Normy ogólne - Odporność w środowiskach: mieszkalnym, handlowym i lekko uprzemysłowionym.
PN-EN 61000-6-2	Kompatybilność elektromagnetyczna (EMC) - Część 6-2: Normy ogólne - Odporność w środowiskach przemysłowych.
PN-EN 61000-6-3	Kompatybilność elektromagnetyczna (EMC) - Część 6-3: Normy ogólne - Norma emisji w środowiskach: mieszkalnym, handlowym i lekko uprzemysłowionym.
PN-EN 61000-6-4	Kompatybilność elektromagnetyczna (EMC) - Część 6-4: Normy ogólne - Norma emisji w środowiskach przemysłowych.
PN-EN 1886	Wentylacja budynków - Centrale wentylacyjne i klimatyzacyjne - Właściwości mechaniczne.

30.05.2025

HVAC Ratherm
RATHERM Sp. z o.o.
 Agrestowa 3, 83-010 Rekcin
 NIP 569-203-65-17
www.ratherm.pl

Prezes Zarządu
 Radostaw Opaliński



NARODOWY INSTYTUT ZDROWIA PUBLICZNEGO PZH
– Państwowy Instytut Badawczy
National Institute of Public Health NIH – National Research Institute

ATEST HIGIENICZNY**B.BK.60112.0158.2025****HYGIENIC CERTIFICATE**

ORYGINAŁ

NATIONAL INSTITUTE OF PUBLIC HEALTH NIH – NATIONAL RESEARCH INSTITUTE

Wyrób / product: **Bezszkieletowe centrale wentylacyjne i klimatyzacyjne Ratherm Serii R-BOX typu XB, Wydajność 500 – 18 000 m³/h**

Zawierający / containing: stal ocynkowaną, aluminium, miedź, wełnę mineralną i inne materiały zgodnie z dokumentacją przedstawioną do niniejszej oceny

Przeznaczony do / destined: systemów wentylacyjnych budynków użyteczności publicznej (m.in. obiektów podmiotów wykonujących działalność leczniczą, usługowo-handlowych), laboratoriów, obiektów kubaturowych oraz zakładów przemysłowych

Wymieniony wyżej produkt odpowiada wymaganiom higienicznym przy spełnieniu następujących warunków / the above-named product is acceptable according to hygienic criteria with the following conditions:

Zastosowanie i wykonanie wyrobów, w tym rodzaje wymienników ciepła i technologia nawilżania powietrza, muszą być zgodne z aktualnymi przepisami dotyczącymi obiektu, w którym są one montowane. Zastosowanie w obiektach podmiotów wykonujących działalność leczniczą z wyłączeniem pomieszczeń o podwyższonych wymaganiach higienicznych. W trakcie prac montażowych i eksploatacji włókna wełny mineralnej nie mogą przedostawać się do powietrza nawiewanego do pomieszczeń. Czynniki chłodnicze muszą być zgodne z przepisami aktualnymi w dniu sprzedaży wyrobu. Atest dotyczy ww. wyrobów w wielkościach niestandardowych, które muszą być wykonane z materiałów identycznych jak modele katalogowe. Atest nie obejmuje wymiennych filtrów powietrza innych niż dostarczane przez producenta. Montaż i eksploatacja wyrobów zgodnie z zaleceniami producenta. Atest higieniczny nie dotyczy parametrów technicznych, walorów użytkowych i oceny właściwości alergizujących wyrobu.

Wytwórca / producer:

Ratherm Sp. z o.o.
83-010 Rekcin k/Gdańska
Agrestowa 3

Niniejszy dokument wydano na wniosek / this certificate issued for:

Ratherm Sp. z o.o.
83-010 Rekcin k/Gdańska
ul. Agrestowa 3



Atest może być zmieniony lub unieważniony po przedstawieniu stosownych dowodów przez którąkolwiek stronę. Niniejszy atest traci ważność po 2030.06.04 lub w przypadku zmian w recepturze albo w technologii wytwarzania wyrobu.

The certificate may be corrected or cancelled after appropriate motivation. The certificate loses its validity after 2030.06.04 or in the case of changes in composition or in technology of production.

Data wydania atestu higienicznego: 4 czerwca 2025

The date of issue of the certificate: 4th June 2025

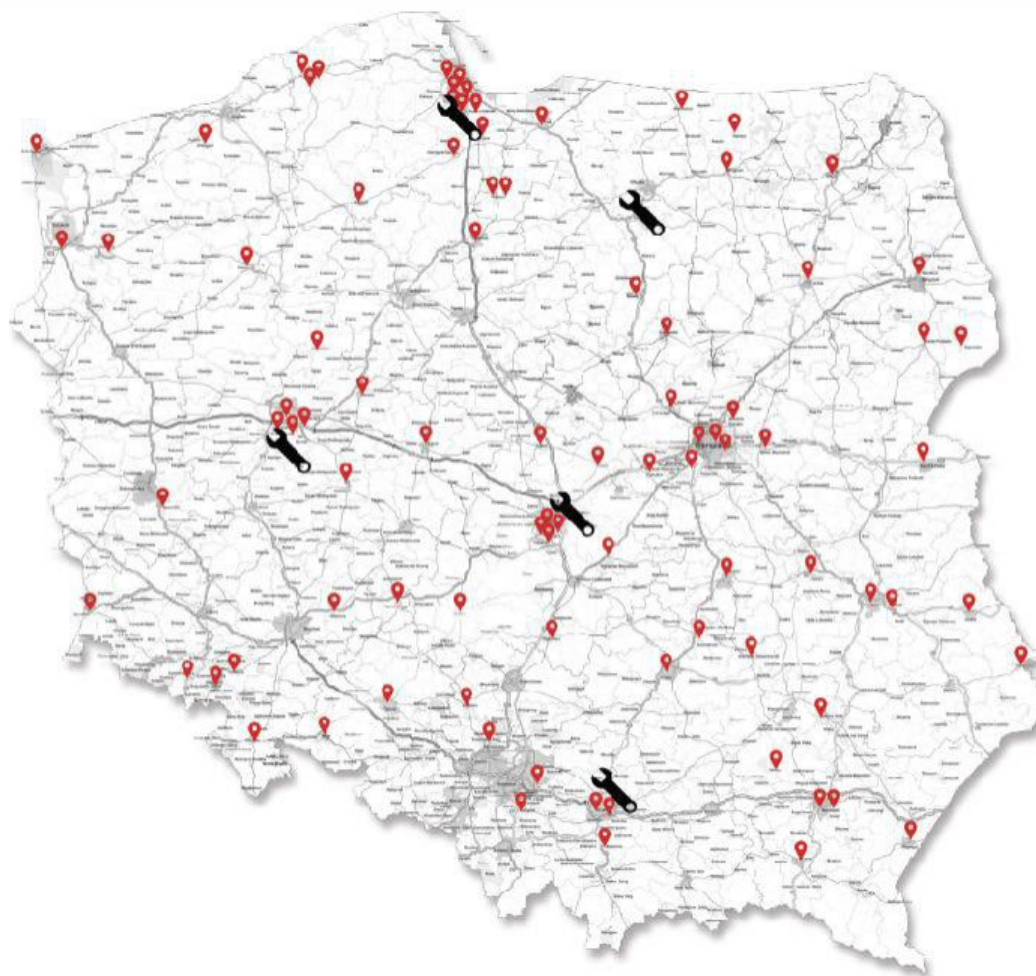
p.o. Kierownika
Zakładu Bezpieczeństwa Zdrowotnego
Środowiska

Maciej Szczęch
dr n. med. Maciej Szczęch

Kontakt w sprawie niniejszego atestu higienicznego / To contact regarding this hygienic certificate
Zakład Bezpieczeństwa Zdrowotnego Środowiska NIZP PZH - PIB / Department of Environmental Health and Safety NIPH NIH - NRI
00-791 Warszawa, ul. Chocimska 24 / 00-791 Warsaw, Chocimska 24, Poland
e-mail: sekretariat-bk@pzh.gov.pl tel. +48 22 54-21-354, +48 22 54-21-349

14. Faults — causes and removal

If there are any faults in the operation of the units, they must be reported immediately to the manufacturer or the service partner designated by the manufacturer.



Location of service points

RATHERM sp. z o.o.
Agrestowa 3, 83-010 Rekcin
www.ratherm.pl

Technical Support Department tel. 531 414 012, 574 519 119, info@ratherm.pl

15. Scope of Service Activities — List.

The scope of service activities performed as part of the inspections — depending on the equipment:

- Checking the physical condition of the AHU, siphon and condensate drain
- Checking the operation of multi-leaf dampers
- Cassette filter replacement
- Inspection of sensors, room units and regulators, tightening of power and control terminals
- Checking the exchanger fins for contamination
- Checking the settings of duct dampers and diffuser control blades
- Air flow control of randomly selected diffusers
- Checking the condition of CT cut-off valves, heat sources
- Checking the cooling circuit filling against factory specification, checking for leaks
- Checking the operating modes of the units
- Checking that the air conditioning condensate drainage is unobstructed,
- Checking operating modes, CT power supply
- Checking the condition of CT cut-off valves

Companies authorised to carry out warranty inspections — Authorised Ratherm Service Centres.