**Compact air handling unit with heat recovery and integrated controls**

Compact air handling unit with highly efficient heat recovery and integrated microprocessor controls, factory tested and started-up.

Available in the versions:

V - vertical duct connection

H - horizontal duct connection

**Housing**

Frameless, double wall galvanized sheet steel housing with anti-fingerprint coating. The mineral wool used as heat and sound insulation is non-flammable according to building material class DIN EN 13501-1, class A1. Depending on the device version, insulation boards with a density of 110kg/m³ of the WLG 040 in a thickness of up to 50mm are used. The large doors of the V and H variants are equipped with hinges and lockable locks as standard, and the operating doors of the F variants can be removed. All installation components are easily accessible from the operator side. All floor and side panels are always hygienically sealed against each other.

All devices (except for the F variants) are delivered with a retractable base frame. The variant H is also suitable for outdoor installation with optionally available accessories. The housings are smooth inside and easy to clean.

Housing quality EN 1886

Mechanical stability: D2

Housing leakage over pressure (+700Pa): L2

Filter bypass leakage: F9

Heat transfer class: T3

Thermal bridging factor: TB3

Material class EN 13501-1 housing: A1

Consistent high quality assurance is demonstrated by the certification

according to ISO 9001:2015.

Supplier information: ruck Ventilatoren GmbH

 Max-Planck-Straße 5

 97944 Boxberg

Tel. 07930-9211300

www.ruck.eu

**Fans (EBM)**

Direct drive single suction fans with backward curved hollow profiled high-performance radial impellers with circular diffuser, mounted on an GreenTech EC external rotor motor with integrated control electronics. Motor impeller statically and dynamically balanced in two planes, according to DIN ISO 1940, balance quality G 6.3. The GreenTech EC external rotor motor exceeds efficiency class IE4, magnets without use of rare earths, maintenance-free ball bearings with long-term lubrication, theoretically nominal life of at least 40,000 operating hours. Fan can be used on all conventional power supply networks with unchanged air flow. Integrated electronics, low-noise commutation logic; 100% speed controllable; All fans have a RS485/MODBUS RTU interface, no installation with shielded cables necessary. The fan units are extractable, the cables with plug connection can be separated without tools for maintenance purposes.

**Heat recovery (Rotor)**

consisting of a regenerative rotary heat exchanger with an aluminum storage mass. Rotor designed as a condensation rotor for optimum utilization of the sensible heat energy contained in the exhaust air. A transfer of latent heat energy and thus a moisture recovery is conditionally possible. The rotary heat exchanger requires no energy-consuming measures to be protected against freezing. The countercurrent air flows causes a self-cleaning effect of dry impurities. The performance data of the design software for rotary heat exchangers have been measured according to EN 308 and certified by "EUROVENT Certification".

Sealing of the rotor mass by maintenance-free all-round brush seals. Drive by means of motor with reduction gear steplessly adjustable in speed via control by frequency converter. Rotors up to diameter 2450mm are delivered in one piece. Changing the drive belt is possible without removing the rotor. The rotor can be removed for maintenance.

**Direct evaporator (DX-coil)**

The air cooling is done via an integrated DX-coil which is installed space-saving in the isolated equipment housing. Sheet steel frames and panels, copper pipes and collectors, aluminum fins (0,1 - 0,15mm), minimum lamellar spacing 2,5mm. With spreader spider for multiple injection, suction via copper collector pipe leading out for solder connection. The test pressure is 45bar, operating pressure max. 43bar and thus suitable for reverse operation. The connections are led out of the housing, insulated and sealed with plastic rosettes. The cooler room is equipped with a condensate tray made of stainless steel (at least 1.4301) with all round inclination. The use of a droplet separator is omitted for energetic reasons. Optional is available a control ball valve dimensioned to the cooler capacity. The setpoint specification is programmed via the control panel (supply air temperature control). The register can be pulled out laterally on galvanized guide rails for inspection purposes.

**Air heater (PWW)**

The after heating is done via an integrated pump warm water - heating register which is installed space-saving in the isolated equipment housing. Sheet steel frames and panels, copper pipes and collectors, aluminum fins (0,1 - 0,15mm), minimum lamellar spacing 2,1mm. The register is suitable for water, as well as water/glycol mixtures up to max. 120°C, the test pressure is 18bar, operating pressure max. 16bar. The connections are led out of the housing, insulated and sealed with plastic rosettes. Optional is available a control ball valve dimensioned to the cooler capacity. The setpoint specification is programmed via the control panel (supply air temperature control). The register can be pulled out laterally on galvanized guide rails for inspection purposes.

**Panel filters**

Compact panel filters with long service life, easy filter change by quick release frame.

Supply air filter F7 according to EN779:2012 (new, ISO ePM2.5 ≥ 70%), consisting of an abrasion-resistant and water-repellent polypropylene fiber, polystyrene frame, fully incinerable.

Extract air filter M5 according to EN779:2012 (new ISO ePM10 ≥ 65%), filter frame made of polystyrene extruded profiles, fully incinerable, synthetic fiber fleece with intrinsically stiff folds and additional spacers made of plastic.

The high filter-tightness class is achieved by a quick-release device that acts on the filter frame on an EPDM crown seal. It is structurally ensured that the operating door can only be closed when the filter is clamped.

**Controls**

Control cabinet with controls components and all required field devices are integrated in the base unit.

Integrated CONSTANT AIR VOLUME system with nozzle pressure measuring points on both fans. The control system compensates for the outside air-dependent density change of the air. As a result, regardless of the fan position, a constant year-round volume flow in the supply air and extract air on the room side is ensured. The energy savings for fans and reheating are up to 15%.

Each of the three supply air and exhaust air streams can be steplessly adjusted. Via the remote control unit the volume flows can be set in a user-friendly manner in three stages. Combined PV constant volume flow / constant pressure control for VAV systems in non-residential buildings.

In the case of an air volume zone control of several volume flow controllers, the control ensures a constant inlet pressure in the supply air with a traced extract air volume flow. The control mode ensures the same supply air and exhaust air volume flows, even in case of zone control, and prevents underpressure or overpressure in the rooms. In addition, unequal volume flows are avoided, which can adversely affect the heat recovery.

Both filters are equipped with differential pressure monitoring. The degree of contamination of the filter is displayed via the remote control unit.

Integrated free building cooling

The integrated controls activates the free cooling of the building in the event of an increased internal heat load during the transition period or on hot summer days. The room is cooled by switching off the heat recovery with cool outside air and without additional energy requirements.

Model: ROTOK 4200 H WDJR

Device version: indoor installation

Compliance with the regulation (EU) no. 1253/2014

The tendered compact device fulfills the requirements of the ErP Directive 2009/125/EC of the European Parliament for the sector "Non Residential". Both recovery grade of the energy recovery and also the required values for the SFPint are maintained at the below specified operating point.

**Air performance supply air (ErP2018)**

Volumetric flow: 3938 m³/h

External pressure loss: 480 Pa

SFP class: SFP3

Specific fan power: 1185 W/(m³/s)

(SFPV SUP according EN 16798-3)

**Heat recovery condensate rotor**

Power: 32,4 KW

Outdoor air inlet: -12°C/90%rf

Supply air outlet: 12,4 °C

Extract air inlet: 20°C/40%rf

Heat recovery rate (wet) ηWRG: 76,1 %

Heat recovery rate (dry) ηWRG acc. to EN 308: 60,0 %

Heat recovery rate dry ErP Lot 6: 76,3 %

Pressure drop supply air: 70 Pa

Pressure drop extract air: 79 Pa

**Cooling**

**DX-coil - cooling register**

Outdoor air inlet: 32°C/40%rf

Air temperature outlet: 20 °C

Pressure drop air: 39 Pa

Power: 22,2 kW

Condensate flow: 8 l/h

Cooling agent: R410A

Evaporation temperature: 6°C

Mass flow: 355 kg/h

Δp medium: 0,91 kPa

**Heating**

**Pump warm water - heating register**

Outdoor air inlet: 5 °C

Air temperature outlet: 22 °C

Pressure drop air: 18 Pa

Heat power: 22,6 kW

Heat power max.: 32,5 kW

Temperature medium: 60/40°C

Water flow: 0,99 m³/h

Δp medium: 4,86 kPa

Glycol content: 0%

**Filter unit outdoor air**

Filter class according to EN 779: F7

Filter class according to ISO16890: ISO ePM2,5 ≥ 70%

Dimensions: 2 x 633/572/96 mm

Filter surface: 16,35 m²

**Filter unit extract air**

Filter class according to EN 779: M5

Filter class according to ISO16890: ISO ePM10 ≥ 65%

Dimensions: 2 x 633/572/96 mm

Filter surface: 8,15 m²

**Controls**

DDC, command, control unit and control board are integrated in the housing and wired ready for operation with all pre-assembled field devices. All operating and status parameters can be parameterized via the convenient touch remote control unit with graphical display, via the RUCKVIEW software or the MODBUS communication interface.

Fans functions

• Operating mode V constant volume control

• Operating mode P constant pressure control

• Operating mode PV constant volume / constant pressure control

Temperature control functions

• Operating mode supply air temperature control

• Operating mode extract air temperature control

• Operating mode room air temperature control

• Free cooling via outside air bypass (free night cooling)

• Heat recovery without after heating

• Warm water heating (at PWW version)

• Cooling DX-coil

• Heating warm water and cooling cold water

 (at PWW version)

• Heating condenser and cooling DX-coil

 (at DX-coil version)

Monitoring functions:

• Temperature monitoring supply, extract, exhaust, outdoor air

• Frost protection monitoring of the warm water heating coils (at PWW version)

• Air filters monitoring via pressure difference

• Automatic adjustment of ventilation capacity at very low outside temperatures

• Plausibility check of the sensor against cable break

Inputs:

• MODBUS RTU interface

• Motion sensor potential-free contact

• Frost protection thermostat potential-free contact

• Fire detector potential-free contact

• Unit enable, potential-free contact

• Pressure sensor SEN P for P and PV control

• Control input for external volume flow control

• Control input for external CO2, VOC or humidity sensors

Outputs:

• Fan supply air (0-10V)

• Fan extract air (0-10V)

• Valve heating circuit (0-10V and 3-point control) (at PWW version)

• Valve cooling circuit (0-10V and 3-point control)

• Enable cooling device

• Circulation pump heating circuit (at PWW version)

• Fault indication with error code displayed on the remote control unit and potential-free output contact

• Bypass damper (3-point control)

• Outside air damper (open/close or spring return)

• Extract air damper (open/close or spring return)

**Data according to EN 13053/A1:2017**

WRG class: H1

Speed class: V1

Electrical power consumption: P1

**Electrical data overall device**

Voltage: 400V 3~

Current: 4,0 A

Power consumption: 2688 W

**General data**

Insulation thickness 50mm

Conveyed medium temperature: 40°C

Weight: 543 kg

Length/width/height: 2050/1370/1454mm

Duct connection: 1000/500mm

**Scope of supply:**

1x ROTOK 4200 H WDJR

1x BDT-Touch, remote control unit

1x control cable length 10m

1x Installation and operation manual

**Optional accessories:**

**COM2-Option**

Expansion board for connecting several compact devices via Modbus, with switchable terminal resistor and switchable pull-up and pull-down resistor, factory mounted and wired in the compact device

 Art.no.: 128549

**SEN P1000**

Differential pressure sensor Measuring range +/- 1000Pa accessories for operating mode P (constant pressure control), 2 pieces necessary (monitoring supply / extract air),

Assembly on site

 Art.no.: 126080

**CLIMASET01**

Mounting accessories for pressure devices / pressure sensors, consist-ing of 2m hose, two measuring nipples with screw flange and screws, temperature resistant up to +70°C

 Art.no.: 111314

**SEN CO2-Option**

Combined temperature / CO2 sensor with attractive wall-mounted housing, measurement via long-term stable 2-beam infrared cell, factory mounted and wired in the compact unit

 Art.no.: 127338

**STK xx (heating)**

Three-way ball valve with 230V actuator, 3-point control or open/close to match the regulations of the ruck compact units, internal thread connection, mounting and wiring on-site

STK 02 connection DN20 (IG), kvs, 4,0 m³/h Art.no.: 112935

**RUCKVIEW**

The ruckview control system has so far replaced very complex and object-related BUS control systems for ventilation units. With its easy handling, end users can quickly set, operate and manage the ventilation units for the highest level of efficiency. With the ruckview software, up to 30 ruck ventilation units can be monitored and controlled via a PC. Furthermore, all parameters and actual values can be easily read out for the service technician, which greatly simplifies commissioning and maintenance. The included Team Viewer remote monitoring program allows access to your ventilation system via the Internet.

Scope of delivery ruckview software:

• ruckview control software for ruck air handling units with MOD-BUS RTU

• Connection box for MOD-BUS cable

• USB-data cable for connection box

• Remote monitoring software OEM Version

• USB-Stick, user manual

Software requirements

• Operating system Windows XP, Windows Vista, Windows7,

 Windows 8, Windows 10

 Art.no.: 130247

**Replacement panel filters**

Supply air filter F7 according to EN779:2012 (new, ISO ePM2.5 ≥ 70%), consisting of an abrasion-resistant and water-repellent polypropylene fiber, polystyrene frame, fully incinerable.

Extract air filter M5 according to EN779:2012 (new ISO ePM10 ≥ 65%), filter frame made of polystyrene extruded profiles, fully incinerable, synthetic fiber fleece with intrinsically stiff folds and additional spacers made of plastic.

LFP50 F7 Art.no.: 138611, 2 piece pro filter change necessary

LFP50 M5 Art.no.: 138612, 2 piece pro filter change necessary

**VS – Flexible connectors**

with standard profile flange P20/P30, galvanized sheet steel, plastic tape (PVC) for structure-borne noise decoupling, temperature-resistant up to 70°C

VS10050 Art.no.: 141362

**MAK-ROTO K H**

Combined outdoor and exhaust air damper for mounting on ventilation unit. Ready-to-install motorized double flap, housing made of galvanized sheet steel, slats AlMg3, actuator 230V/50Hz attached to shut-off damper

MAK R 4200 H01 actuator with spring return Art.no.: 140981

MAK R 4200 H02 actuator open/close 3-point Art.no.: 140982

**RD – rain cover**

Made of galvanized sheet steel, including roof rack with slope to the rear side of the unit, as well as weather protection for device switch.

RD ROTO K 4200 H Art.no.: 141199