



04

Units

- VENTUS Compact

FLOOR-MOUNTED UNITS

		Unit size							
		VVS021c	VVS030c	VVS040c	VVS055c	VVS075c	VVS100c	VVS120c	VVS150c
AIRFLOW [m³/h]		840 - 2310	900 - 3300	1200 - 4400	1650 - 6050	2250 - 8250	3000 - 11000	3600 - 13200	4500 - 16500
LENGTH [mm]	L1	1040	1120	1120	1040	1120	1040	1040	1040
	L2	1240	1400	1400	1240	1400	1240	1240	1240
WIDTH [mm]		967	967	1174	1345	1486	1666	1897	2091
HEIGHT [mm]		991	1255	1255	1525	1765	1965	2039	2241

182 cm



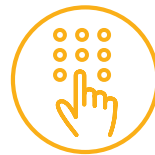
HIGHLY EFFICIENT
ROTARY
HEAT WHEELS



ENERGY SAVING
AND SILENT
EC MOTORS



WIRING
AND CONFIGURATION
IN PLUG&PLAY STANDARD



INTEGRATED
MULTIFUNCTIONAL
CONTROLS



MINI-PLEAT
PANEL FILTERS



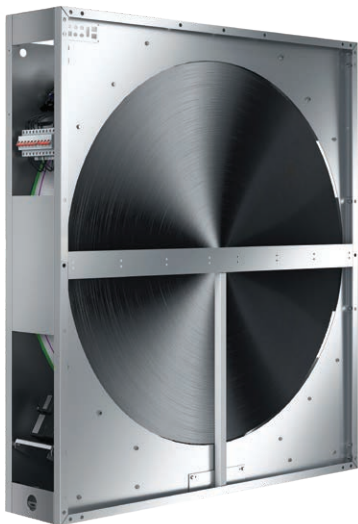
up to **86%**
of energy recovery
efficiency



FLOOR-MOUNTED UNITS

CASING

- » Anticorrosive coating: Aluzinc, AZ 150.



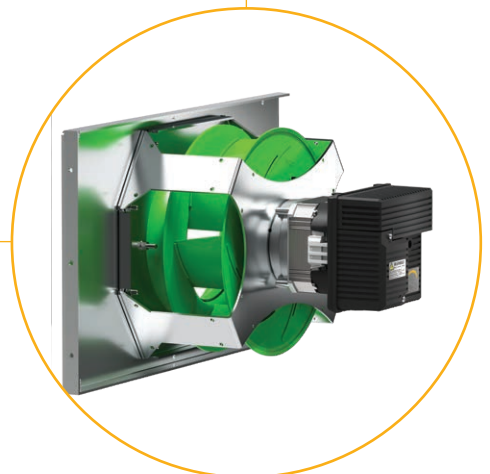
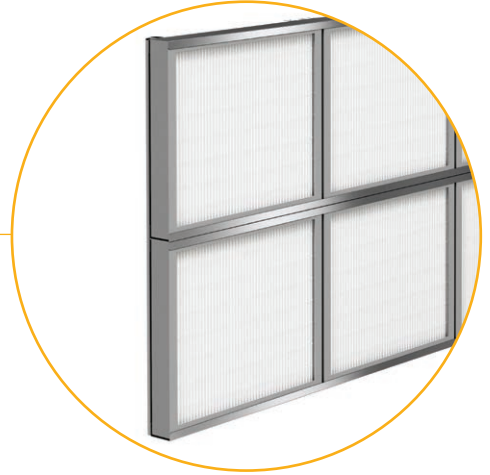
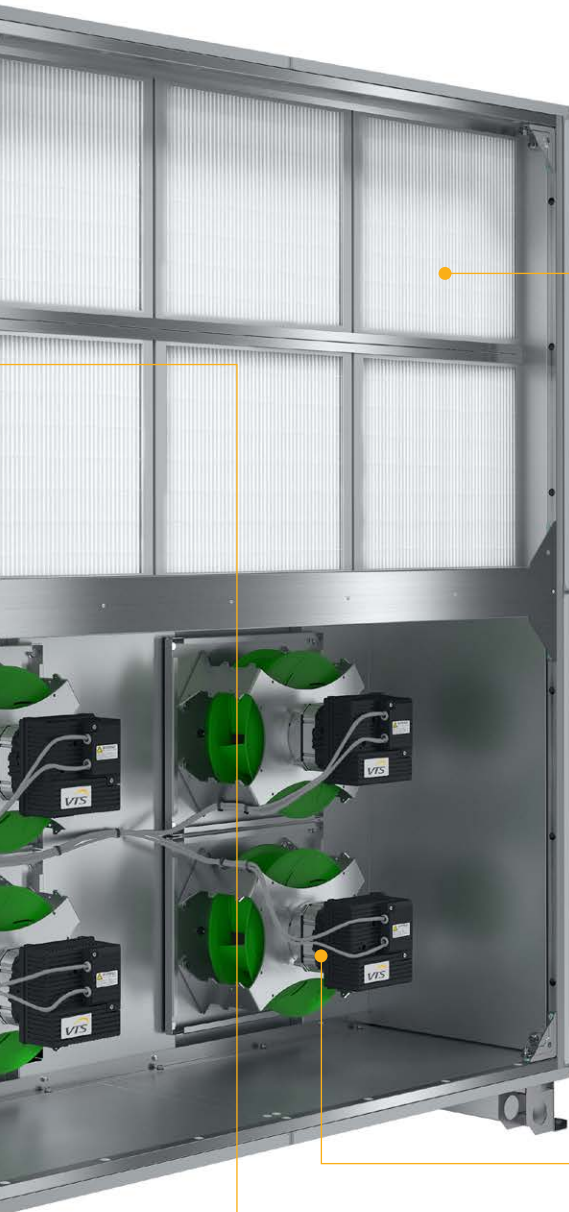
ENERGY RECOVERY

- » Highly efficiency Rotary Heat Wheel with EC motor.
- » Thermal efficiency reaching 86%.

MINI-PLEAT FILTERS

» Highly absorptive compact filters with expanded filtration are:

- Supply – class EU7.
- Return – class EU 5.



CONTROLS

» Multifunctional controls, factory installed in the AHU casing – configured and ready to run.

EC MOTORS

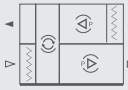

» Effective, silent and low vibrations fan equipped with IE4 class EC motor









VVS 021c-150c

- FLOOR MOUNTED COMPACT UNITS

Nominal parameters		Recommended airflow range							
Unit size		VVS021c	VVS030c	VVS040c	VVS055c	VVS075c	VVS100c	VVS120c	VVS150c
16 000	<div><div></div><div>[m³/h]</div></div>								
12 000									
8 000									
4 000									
0									
Min airflow		806	1 167	1 958	2 878	3 805	4 863	5 815	5 815
Max airflow		2 310	3 300	4 400	6 050	8 250	11 000	13 200	16 500
H _{fd}	<div><div></div><div>[mm]</div></div>	90	90	90	90	90	90	90	90
H		538	670	670	805	925	1025	1062	1163
W		967	967	1174	1345	1486	1666	1897	2091
H _i		368	500	500	635	755	855	892	993
W _i		887	887	1094	1265	1406	1586	1817	2011
H ₂		986	1250	1250	1520	1760	1960	2034	2236
I		40	40	40	40	40	40	40	40

Selected configurations		Dimension of base configuration						
	Lt	1 040	1 120	1 120	1 040	1 120	1 040	1 040
	Lt	1 240	1 400	1 400	1 240	1 400	1 240	1 240

Selected configurations			Other configuration functions - typical lengths.								
			Function version	VVS021c	VVS030c	VVS040c	VVS055c	VVS075c	VVS100c	VVS120c	VVS150c
 V	L	[mm]	F9	240	240	240	240	240	240	240	240
 H	L		H(hw) (1R-2R)	240	240	240	240	240	240	240	240
			H(el)	420	420	420	420	420	420	420	420
 C	L		C (2R-4R)	370	370	370	450	450	650	650	670
			C (6R)	550	550	550	630	630	830	830	850
 HC	L		H(hw) + C	550	550	550	630	630	830	830	850
			H(el) + C	700	700	700	780	780	980	980	1000
 S	L		S(s3)	1080	1080	1080	1080	1080	1080	1080	1080
 F	L	E	550	550	550	630	630	650	650	670	



COMPONENTS

DIRECT DRIVE PLUG FAN SET



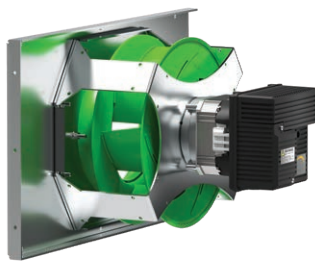
Design and application

- » Single inlet, radial, backward curved, free running fan.
- » Impeller made of SAN (styrene/acrylonitrile) construction material with 20% glass fiber.
- » Direct drive – fan impeller installed directly on motor shaft.
- » Fan section consisting of single or multiple fans (fan array) in order to ensure optimum working parameters.

Specification

- » Low and medium pressure ventilation systems with fan static pressure not exceeding 2000 Pascals.
- » Maximum fan set working temperature: 60°C.

> EC MOTORS



- » Set of fan and motor mounted on common rail, fixed to the AHU fan diaphragm.
- » EC motors are Permanent Magnet motor, characterised by much higher efficiency vs traditional inductive AC motors.
- » EC motors (Electronically Commutated) – where mechanical commutator switching the windings has been replaced with electronic one.
- » Change of revolutions is done by means of changing the frequency rate of windings switching (rate or magnetic field rotating).
- » Highly inductive permanent magnets have applied in EC motors used by VTS, which enabled to achieve high torque at relatively small dimensions, together with reaching IE4 efficiency class.
- » Available Energy classes: IE4.
- » Rated voltage: EC motors of nominal capacity exceeding 0,75kW - 3x400V AC.
- » Rated voltage: EC motors of nominal capacity equal or less 0,75kW - 1x230V AC.
- » Motor winding insulation class: F.
- » Protection degree: IP54.
- » Maximum working ambient temperature: 55°C.
- » Lifespan:
 - 70 000 hours at load not exceeding 70% of nominal capacity at ambient temperature not exceeding 35°C,
 - 30 000 hours at 100% capacity load at ambient temperature not exceeding 55°C.

CASING > SUSPENDED COMPACT UNITS



Design and application

- » Casing structure made of „sandwich“ panels mounted to internal supporting structure.
- » "Sandwich" double skin panels made of rigid polyurethane foam.
- » Indoor and outdoor application
- » Inspection panels mounted on top and bottom of the unit (maintenance from bottom).
- » Casing designed to be suspended above false ceilings, equipped with elements facilitating its installation.

Specification

- » Working temperature range: $(-40)^{\circ}\text{C} \div (+60)^{\circ}\text{C}$.
- » Panel thickness: 30mm.
- » Thermal conductivity: $\lambda = 0,022 \text{ W/mK}$.
- » Casing fire resistance: Inflammable material, non-fire spreading.
- » Humidity absorption: 0,04%.
- » PPU density: $\rho = 42 \text{ kg/m}^3$.

CASING > FLOOR MOUNTED COMPACT UNITS



Design and application

- » Casing structure made of „sandwich“ panels mounted to internal supporting structure.
- » "Sandwich" double skin panels made of rigid polyurethane foam.
- » Indoor and outdoor application.
- » Inspection panels mounted on AHU side. For additional air treatment functions, inspection panels are on both AHU sides.
- » Casing supported on base rails or blocks.

Specification

- » Working temperature range: $(-40)^{\circ}\text{C} \div (+60)^{\circ}\text{C}$.
- » Panel thickness: 30mm.
- » Thermal conductivity: $\lambda = 0,022 \text{ W/mK}$.
- » Casing fire resistance: Inflammable material, non-fire spreading.
- » Humidity absorption: 0,04%.
- » PPU density: $\rho = 42 \text{ kg/m}^3$.

MINI PLEAT FILTERS



Design and application

- » Mini-pleat filters are special type of panel filters. They are design to provide many times larger active filtration surface followed by higher dust-holding capacity than typical panel ones, at the same outer filter cartridge dimensions. Filters consist of ultra-thin microfibers, coated with special, condensed binder. Mini-pleat are characterized by much longer life span the typical, commonly used ones.
- » Applied as initial or secondary stage of air filtration.

Specification

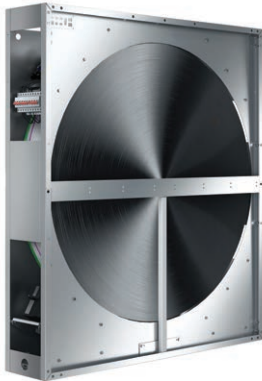
- » Max working temperature: $(+70)^{\circ}\text{C}$, 100% RH.i.

Available filtration classes

- » ISO ePM10 50% (ISO 16890) - M5 (EN779),
- » ISO ePM2,5 65% (ISO 16890) - F7 (EN779),
- » ISO ePM1 70% (ISO 16890) - F9 (EN779)."



ROTARY HEAT WHEEL



Design and application

- » Rotor made of aluminum with shaft suspended on bearings, installed in steel housing.
- » Rotor filling – two layers of alternately winded aluminium foil – one flat, the other – corrugated – making small ducts for the air.
- » Rotor drive system with smooth revolutions control enabling to maintain highest recovery efficiency and to adjust degree of recovery performance.
- » Purge zone reducing the cross-contamination effect of contaminated exhaust air to supply to absolute minimum.
- » Set of gaskets installed both on the wheel outer edge and bar separating supply from exhaust air being an additional protection against cross-contamination.
- » Rotary heat wheel recovers sensible heat from return air to supply, which passes the unit in opposite direction. The process enables heat recovery in winter time, same as cool recovery in summer.
- » Humidity recovery from return to supply in case the rotor pad temperature is lower than dew point of return air – typically during winter season.

Specification

- » Up to 86% of energy recovery, depending on airflow rate and its velocity in the heat wheel window.

MIXIN SECTION



Design and application

- » Section equipped with two air inlets/outlets aided with dampers, enabling regulation of fresh and recirculation air share (recirculation).

Specification

- » Direct Energy recovery (sensible and latent heat) resulting from partial mixing of fresh air with return one.
- » Control of fresh air share in entire airflow supplied to handled spaces.
- » Working temperature range: $-40 \div +70^{\circ}\text{C}$.

WATER HEATER



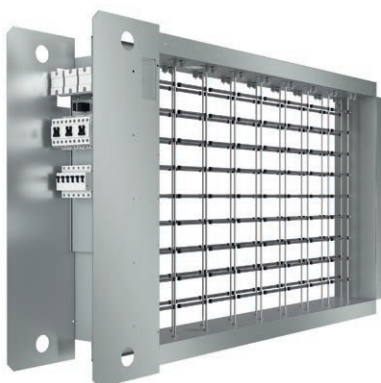
Design and application

- » Block of copper pipes integrated with another block of aluminum fins, creating expanded heat exchange surface. Pipes are bonded to the collectors, equipped with headers (for connecting entire coil to the medium supply system).
- » Heating of the air supplied to the handled spaces.
- » Re-heating of the air as a part of air dehumidifying process.
- » The coil can be applied if heating medium is available (local boiler or district heating system).
- » Coil headers are equipped with medium damping valve and air vent.
- » Connecting the coil in parallel medium flow vs air, will result in its capacity reduction by over a dozen percent.

Specification

- » Max glycol concentration: 50%.
- » Max medium temperature: 150°C .
- » Max medium working pressure: $1,6\text{MPa} = 16\text{bar}$ (test: 21bar).
- » Heating capacity: parameter resulting from individual performance calculation of selected unit (CCOL).
- » Medium side pressure drop – parameter resulting from individual performance calculation of selected unit (CCOL).

ELECTRIC HEATER



Design and application

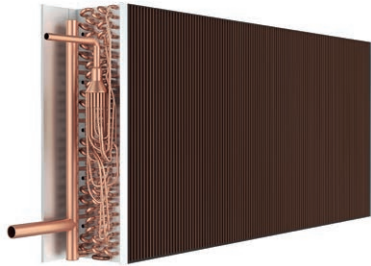
- » Set of resistive heating elements made of CR-Ni-Fe alloy, $6\text{ kW}/400\text{V}$ each.
- » Coils mounted on hot-dip galvanized steel frame.
- » Heater is equipped with power terminals and thermostat protecting against overheating.
- » In case of AHU with complete controls, heater is equipped with integrated capacity control module.
- » Heating capacity can be modified by means of smooth regulation module (HE module, set of Solid State Relays as optional parts of AHU controls) or by means of automatic engaging of next heating sections.

Specification

- » Max permissible ambient temperature around heating elements: 65°C .



DIRECT EXPANSION COIL AS CONDENSER IN HEAT PUMP CIRCUIT



Design and application

- » Block of copper pipes integrated with another block of aluminum fins, creating expanded heat exchange surface. Pipes are bonded to the collectors, equipped with headers (for connecting entire coil to the cooling system circuit).
- » Heating of the air supplied to the handled spaces.
- » Re-heating of the air as a part of air dehumidifying process.

Specification

- » Max medium temperature: 60°C.
- » Max medium working pressure: 3,84MPa = 38,4bar (test: 50bar).
- » Heating capacity: parameter resulting from individual performance calculation of selected unit (CCOL).

WATER COOLER



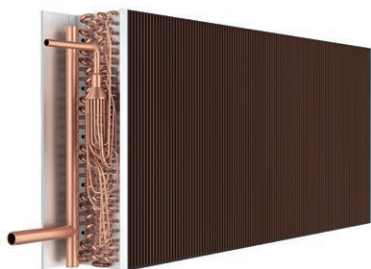
Design and application

- » Block of copper pipes integrated with another block of aluminum fins, creating expanded heat exchange surface. Pipes are bonded to the collectors, equipped with headers (for connecting entire coil to the medium supply system).
- » Cooling of the air supplied to handled spaces
- » Cooling and dehumidifying of the air as a part of air complex dehumidifying process in summer season.
- » Coil can be applied in complex air conditioning systems consisting of few or over a dozen of units supplied from common chilling source (chiller) or in case of single unit of relatively high cooling capacity.

Specification

- » Max glyccol concentration: 50%.
- » Min supplying medium temperature: +2°C.
- » max medium working pressure: 1,6MPa = 16bar (test: 21bar).
- » Cooling capacity: parameter resulting from individual parameters of selected unit (CCOL).
- » Medium pressure drop / flow rate: parameter resulting from individual performance calculation of selected unit (CCOL).
- » For reversed operationg mode (heating) max medium working temperature: 140°C.

DX COOLING COIL



Design and application

- » Block of copper pipes integrated with another block of aluminum fins, creating expanded heat exchange surface. Pipes are bonded to the collectors, equipped with headers (for connecting entire coil to the cooling system circuit).
- » DX cooler is also available as heater execution (so calleed Condenser).
- » Cooling and dehumidifying of the air as a part of air complex dehumidifying process in summer season.
- » Coil usually applied for smallerd cooling capacity systems vs water coolers or for individual air conditioning systems.

Specification

- » Min. Refrigerant evaporation temperature: +3°C.
- » Max refrigerant working pressure: 2,2MPa=22bar (test: 29 bar).
- » Cooling capacity - parameter resulting from individual performance calculation of selected unit (CCOL).



AIR DAMPER



Design and application

- » Blades made of aluminium with rubber gasket on the edges.
- » Aluminum frame.
- » Blades drive realized by means of gears made of composite material, installed on frame internal side.
- » Damper is equipped with square pivot, fitted for actuator (dampers of cross section greater than 4 m² have 2 linked pivots).

Specification

- » Air leakage at closed damper: 50m³/h*m² - at 100 Pascals of pressure difference.
- » Workint temperature range: -40 ÷ +70°C.

FLEXIBLE CONNECTION



Design and application

- » Flexible connection made of 1 mm thick and 30 mm wide hot-dip galvanized steel profiles and polyester fabric coated with PVC.
- » Flame resistance: UL94 - HB [ISO 1210].
- » Flexible connection resistant to UV radiation
- » Working temperature range: -30°C do +70°C.
- » Max connection length (fully spread position): 110 mm.
- » Flexible connection installed on each AHU/Duct joint eliminates transfer of possible AHU vibrations to the ventilation ductwork.

Specification

- » Max air face velocity: 5m/s.
- » Working conditions: -40 ÷ +70°C.



CONTROLS

VENTUS COMPACT AIR HANDLING UNITS IN PLUG&PLAY STANDARD



Savings



Comfort



Safety

Ventus Compact – range of floor-mounted units with rotary heat wheel and suspended with hexagonal recuperator. Equipped with complete, factory mounted controls, pre-configured in accordance to actual selection and ready to run just after connecting to mains.

Controls is capable to regulate all user parameters: air temperature, its humidity, maximum permissible CO₂ concentration and the flow rate. Also, controls support preventive and securing functions like protection of the water heater against freezing or energy recovery system against icing, protection of motors against overloading, monitoring of air filters actual status of contamination and many other. Applied algorithms can optimize performance of all air treatment components in order to minimize consumption of all energy media supplied to the unit. The system includes control and power supply circuits:



USER



HMI Basic

- » Engaging and disengaging the AHU, change of operational modes.
- » Change of temperature, airflow, humidity, max CO₂ level settings, etc.
- » Errors reporting.
- » Time schedule setting.



HMI Advanced

- » All users and service functions except visualization
 - AHU engaging and disengaging,
 - Change of operational modes.
- » Change of temperature, airflow, humidity, max CO₂ level settings, etc.
- » Parameters setting and reporting.
- » Errors reporting.
- » Time schedule setting.



BMS

- » User function like in HMI Advanced.
- » User's customized visualization (BMS).



Remote visualization

- » All user function like in HMI Advanced:
- » Clear interface of schedule programming, presenting unit's operating time individually for each day of the week.
- » Energy consumption analysing module.
- » Individual parameters monitoring of each functional block.
- » Filing of all AHU's parameters recorded in few minutes intervals.



PAREMETERS REGULATION FUNCTIONS

Temperature and humidity regulation

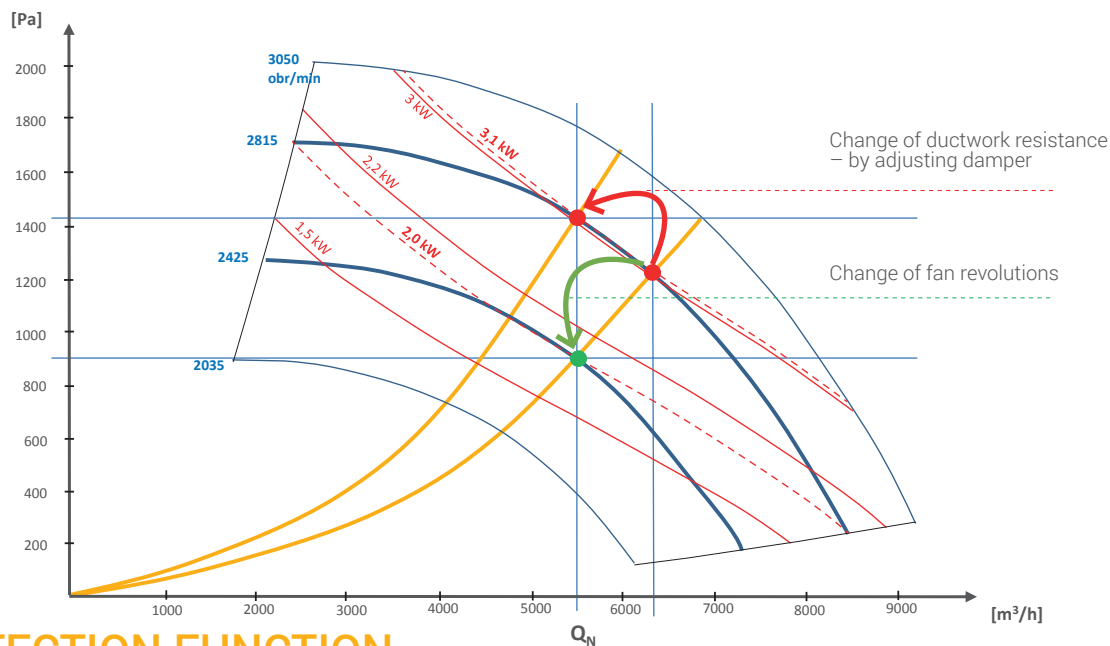
- » Regulation of supply, return air temperature and humidity in handled spaces.
- » Control of water coils valves (heater, cooler) and condensing unit.
- » Control of rotary heat wheel revolutions and mixing box (Ventus floor-mounted Compact units), bypass-damper of hexagonal counterflow energy recovery system (suspended VENTUS Compact units).

Airflow rate regulation

- » Constant Air Volume (CAV) available as standard
- » Constant static pressure maintenance in trunk duct (Variable Air Volume – VAV) available as option.
- » Getting of constant revolutions for each fan individually – VFD setting for AC motors or constant revolutions percentage in case of EC motors.

CO₂ regulation

- » By means of mixing box – for units with air recirculation.
- » By means of airflow rate change – for all types of supply and exhaust units (function can be engaged together with mixing box control).



PROTECTION FUNCTION

- » Protection against rotary heat wheel icing (VENTUS Compact floor mounted units), by means of wheel revolutions reduction.
- » Protection against hexagonal counterflow recuperator icing (VENTUS Compact suspended units) by means of by-pass damper opening:
 - optimizing of icing protection function by change of minimum return air temperature threshold downstream the energy recovery unit vs return air parameters,
 - minimizing of recovery efficiency drop during defrosting.
- » Anti-freezing protection of water heater:
 - antifreeze thermostat installed downstream the heater,
 - strap-on return water temperature sensor
- » Fans overload protection (functions realized by EC motors drives)
- » Fire alarm input – AHU immediate disengaging in case of lack of external start permission from overall fire protection system.

TIME SCHEDULE FUNCTIONS

- » Weekly schedule operational modes programming.
- » Clear visualization of schedule settings by means of web-browser (computers and mobile devices).

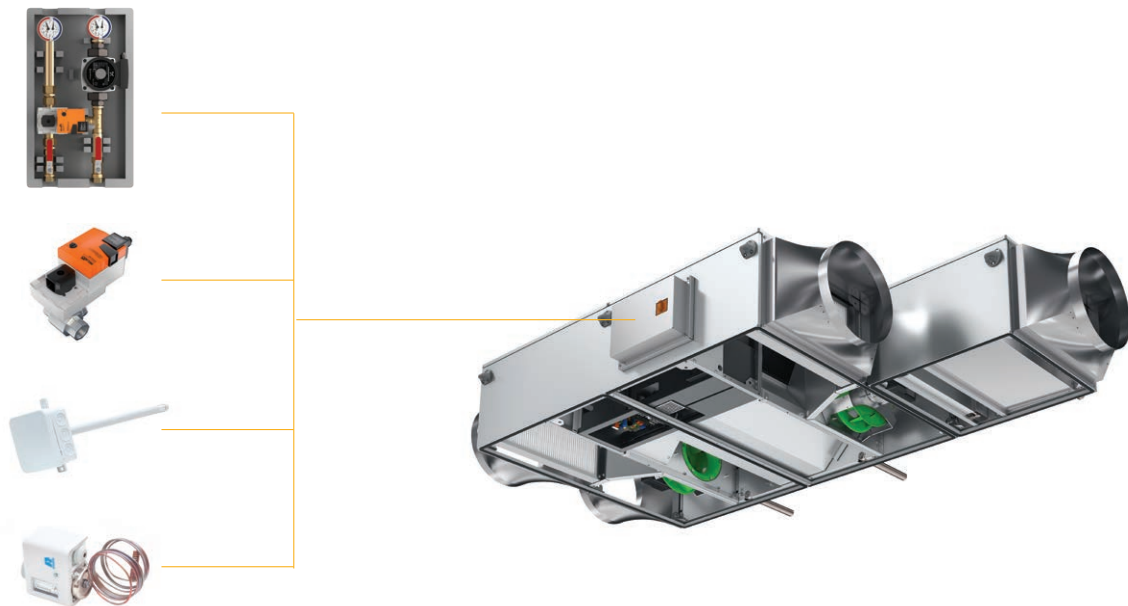


PREVENTIVE FUNCTIONS

- » Constant filter contamination status control:
 - constant monitoring of filter pressure drop by means of static pressure transducers,
 - evaluation of filter contamination status for vs actual airflow rate.
- » Fans shutting-down delay – fan's run out for systems with electric heater.
- » Water heater pre-heating before fan's start up.
- » Periodical heater pump engaging in summer – to prevent against limescale accumulation.

CONTROL CIRCUITS

- » All control circuits installed inside the base unit are fully wired and configured in accordance to its technical selection.
- » Control of fans operation is done by means of digital communication based using ModBUS protocol. Each of the fan is adequately programmed with individual address enabling its recognition by the control system (fans should never be swapped).
- » Control elements handling external modules (antifreeze thermostat of the water heater, valves for heater and cooler, supply air temperature sensor) should be connected to terminal block.
- » Clear and easy to ready description of terminal block facilitates correct connecting of control peripheral components.



POWER SUPPLY AND PROTECTION CIRCUITS

- » Fan's power supply, rotary heat wheel and control circuits are fully wired.
- » All electrical protection circuits of fans, rotary heat wheel drive, control circuits and water heater pump are installed inside the AHU.
- » The only to be by the user is connecting the AHU to mains (to the main switch located in the connecting box) and optionally – crossing the power supply to the pump of the water heater.
- » Water heater power supply terminals are crossed to the terminal block located on AHU outer wall.