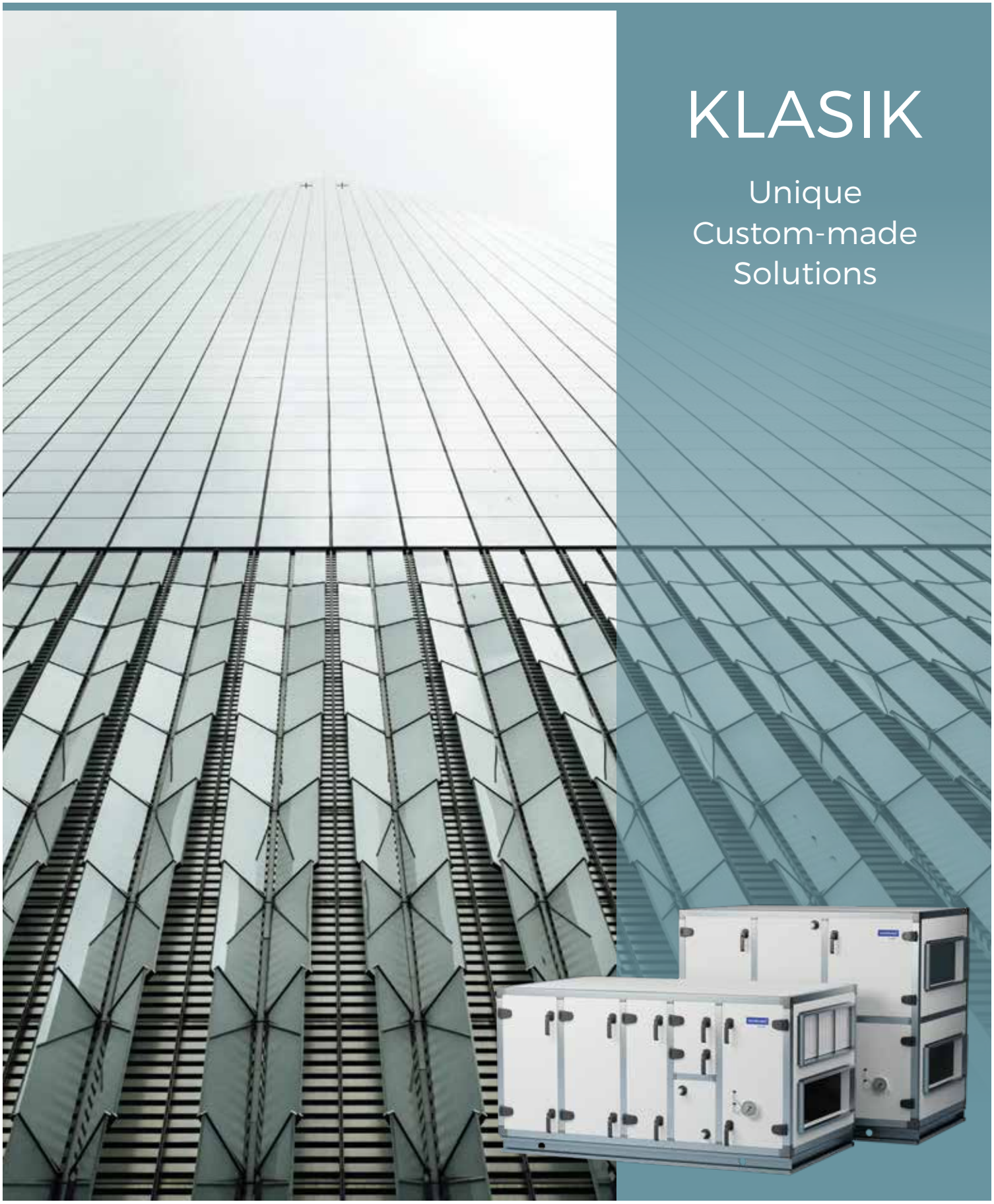
komfovent®

KLASIK

Unique
Custom-made
Solutions



The series of unique ventilation units:
non-standard dimensions, hygienic applications,
a wide selection of internal components and
many other complex solutions

KLASIK review

THE WIDEST RANGE OF OPTIONS

KLASIK selection software offers the widest range of options – the dimensions of the equipment, the design solutions, the technical parameters of the heat exchangers, fans and other elements are presented there.

ENERGY SAVING COMPONENTS

It is possible to choose the most efficient components – non-freezing condensing or sorption rotary heat exchanger, counterflow plate heat exchanger, Super Premium IE4 class EC fans or Ultra Premium IE5 class PM fan.

MODULAR OR MONO-BLOCK CONSTRUCTION

KLASIK units consist of modules, as a result the transportation and installation of the unit is facilitated. Non-standard dimensions units and monoblocks are produced on request.

CONFORMITY WITH INTERNATIONAL STANDARDS

All KLASIK units are designed and made according EN (EN 13053, EN 13779, EN 1886), VDI (VDI 6022, VDI 3803/1), RLT (RLT 01) standards.

C5 CONTROL SYSTEM

KLASIK air handling units can be ordered with an integrated and factory preset and tested C5 control system or order only automation box, which will be installed in the object. Automatic system C5 is designed for all thermodynamic processes (heating, cooling, ventilation, humidification, etc.) and has many safety and energy saving functions (CAV, VAV, DCV, timers, control according to temperature, humidity, CO_2 or air quality sensors).

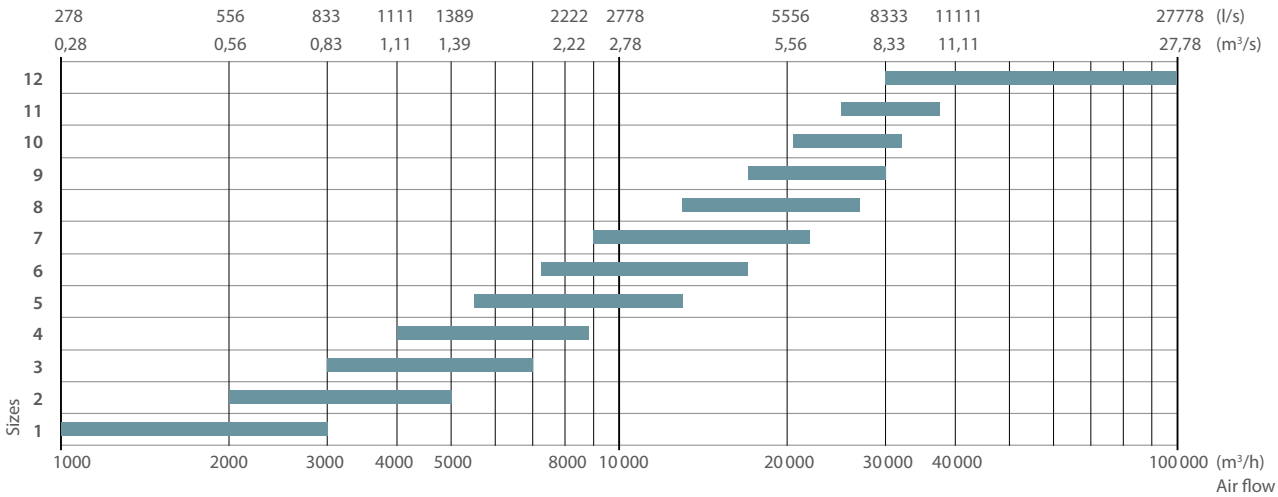
SELECTION SOFTWARE

The KLASIK air handling unit software is designed to select the most sophisticated units with specific requirements. The widest selection of components: heat exchangers – rotary, plate cross and counter-flow, run around; heaters – electric, water, DX and gas, coolers – water, DX and adiabatic. The dimensions of the unit and other technical characteristics can be precisely adjusted according to the project requirements.

QUALITY CERTIFICATES

KLASIK selection software and units are tested in the largest independent laboratories: EUROVENT, TÜV, RLT.

Sizes and capacities of KLASIK units



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Unit types

The KLASIK series offers a variety of modifications: a wide range of performance; rotary; run-around; plate cross or counterflow heat exchangers;; water or freon heater / cooler; gas or electric heaters; adiabatic humidifier.

KLASIK R

Air handling units with a rotary heat exchanger.
Temperature efficiency and energy saving up to 86 %.
On request, a low profile unit with two parallel rotors can be manufactured.

KLASIK CF

Air handling units with a counterflow plate heat exchanger.
Temperature efficiency and energy saving up to 92 % in wet conditions and up to 88 % in dry conditions.
Upon request, it is possible to manufacture a low profile with fan / filters sections located side by side.

KLASIK P

Air handling units with a cross-flow plate heat exchanger.
Temperature efficiency and economy of energy up to 75 % wet.
The units can be used for the heat utilization of technological equipment. There is a wide selection of different efficiency and pressure drop heat exchangers.

KLASIK S

Supply or exhaust air handling unit without heat recovery.
On request, explosion-, corrosion- or high-temperature-resistant units can be ordered.

KLASIK RA

Air handling units with run-around coil heat exchanger.

Purpose
Ventilation units with separate air flow heat exchangers are used in cases where there must be 100 % of supplied and extract air flow separation:
- the extracted air is technologically contaminated with an aggressive, pungent odour or poisonous substances;
- the risk of biological contamination (medical institutions);
- high temperature of extract air.

Advantages
- The supply and extract air sections can be separated from each other.
- Compact size.
- The heat exchanger can be integrated into existing supply – extract ventilation system.

Specialized pipework package units LCHX for run around coil heat exchangers
- Depending on the operating conditions, the unit is filled with the corresponding concentration of ethylene glycol solution.
- Unit control signal 0 ... 10 V.

Maximum performance of the LCHX units

DN (mm)	20	25	32	40	50	65
Liquid flow (m^3/h)	1,8	3,6	6,8	11	18	25

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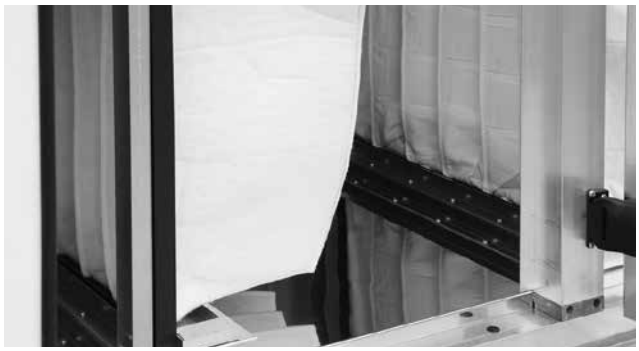
KLASIK design

CASING

"Standart2"
Air handling units of the KLASIK series have a reliable and stable design. Casing frameworks are made of aluminium profiles and solid cast aluminium corner pieces. Covering panels are made of double-skin galvanized or stainless sheet steel and is filled with fireproof thermal and sound insulation – 50 mm thickness mineral wool. On request, casing can be painted.
KLASIK gaskets and sealing are used to ensure perfect casing tightness and sound insulation.
All doors are hinged and equipped with handles which can be locked. Variable accessories such as adjustable feet, inspection windows, sections lighting, etc. are available at the customers' request.
Casing classification in conformance with standard EN 1886 and approved by Eurovent: thermal transmittance class T3; thermal bridging factor TB4; casing strength class D2; casing air leakage class L1; filter bypass leakage class F9.

"Standart2 TB"
Casing frameworks are made of aluminium profiles with thermal break system and plastic corners. Covering panels are made from double-skin galvanized or stainless sheet. The panels are 60 mm thickness: 50 mm mineral wool are used for thermal and sound insulation and 10 mm of polyurethane foam.
Casing classification in conformance with standard EN 1886 and approved by Eurovent : thermal transmittance class T2; thermal bridging factor TB2; casing strength class D1; casing air leakage class L1; filter bypass leakage class F9.



FILTERS

KLASIK units pocket synthetic or fibreglass filters with a class of filtration from G4 up to F9 are used.
Filters have big filtration surface which results in longer terms of exploitation.
Filters are fastened by a clamping mechanism which secures tightness and simplifies the filter replacement procedure.

AIR DAMPERS

Closing air dampers installed in the air handling units are produced from aluminium or galvanized steel blades with rubber sealing complying to standard tightness – Class 2. Higher Class 3 or Class 4 dampers are offered as an option.

HEAT EXCHANGERS

Rotary heat exchanger
Temperature efficiency – up to 86 %. Depending on required temperature efficiency ŋ (%), the height of a wave of a rotor can be L, ML or SL.
Rotors may be offered of four types:
- aluminium;
- aluminium with a sorption (zeolite) coating;
- aluminium with an epoxy paint covering on embossed rotor edges;
- aluminium with deep epoxy coating.

The drive of a rotor is supplied with the frequency converter, allowing support for an optimum heat exchanger operating mode, smoothly changing speed of rotation of a rotor. Rotary heat exchanger can be equipped with purge sector on customers' request. A reduced height units with two rotors are also available.

Counter flow plate heat exchanger
Made of seawater-resistant aluminum plates. Temperature efficiency is 92% for condensation and up to 88% for dry air. An automatic bypass is integrated in the heat exchanger. The heat recovery section has stainless steel (AISI 304) sloping trays and a condensate drain trap.

Plate heat exchanger
Temperature efficiency – up to 75 % wet.
Heat exchanger is tight, both air flows are separated, use of heat of polluted air is possible. Plate heat exchangers with aluminium lamellas are used in KLASIK units.
There is a built-in bypass with damper for heat recovery regulation and exchanger frost protection.
Each unit with plate heat exchanger is equipped with stainless steel sloping drain tray and water trap.

Run-around type heat exchanger
Temperature efficiency – up to 70 %.
In such a system coupled coils are placed in the supply and exhaust air. Coils are connected with pipes through a specialized PPU LCHX unit and are filled with a water-glycol mixture, which circulates around and transfers heat from one airflow to another. Air handling units with such heat recovery are used in cases when air streams must be absolutely separated or when on design features or other requirements the unit must be installed on different floors. Heat exchangers are made of copper pipes with aluminium fins.

FANS

Fans are statically and dynamically balanced according to standard ISO 1940, corresponding to class G2,5/6,3 (at the maximal rotations).
Thus, even at the maximum rotation of the fan, vibration is minimal and meets modern requirements for ventilating equipment.
Depending on air volume and required static pressure, several types of fans are used in equipment.

Plug fans with EC/PM motor
Highly efficient in all operating areas, EC/PM motors are available in all types of KLASIK units and correspond to the IE4/IE5 Super/Ultra premium efficiency level. High efficiency is determined by low energy consumption, high efficiency factor and the best values of the SFP factor. By using EC/PM fans in KLASIK units the following advantages are achieved:

- extremely high efficiency up to 94 %;
- valuable energy saving up to 20 % comparing with AC IE3 class motors;
- integrated motor controller, no need for a frequency converter;
- very smooth and silent operation;
- long-life;
- compact construction.

PM type motors correspond to the *Ultra Premium* Efficiency Class IE5 and ensure high efficiency in a wide operation range with reliable performance, durability, relatively low cost and electrical stability. Their operation is extremely smooth and silent, ensuring the highest efficiency, energy saving and accuracy in operation.

COOLERS AND HUMIDIFIERS

Water Air Coolers
Air coolers are made of copper tubes and aluminum fins (spacing 2,2; 2,6; 3,0; 3,4 mm) in galvanized steel casing insulated with a mineral wool. Air cooler section assembled with stainless steel sloping drain tray and water trap manifold pipes are covered with a condensation-proof material.
Maximum operating pressure – 21 bar.

Direct Evaporation Air Coolers
DX air coolers are made of copper tubes and aluminum fins (spacing 2,2; 2,6; 3,0; 3,4 mm) in galvanized steel casing insulated with a mineral wool. Air cooler section assembled with stainless steel sloping drain tray and water trap manifold pipes are covered with a condensation-proof material.
Maximum operating pressure – 42 bar.
Power of direct evaporation air cooler can be divided into stages. It is necessary to indicate this when ordering.

Adiabatic humidifiers
Application areas: museums, light industry, paper industry, textile industry, wood industry, poultry farms, data centres.
Advantages: Hygienic Certificate VDI 6022, optimal performance and minimal operating costs, wide range of sizes and performance, easy maintenance, durability.
Technical characteristics:

- Airflow from 425 to 55 000 m^3/h,
- Efficiency – up to 97 % RH.

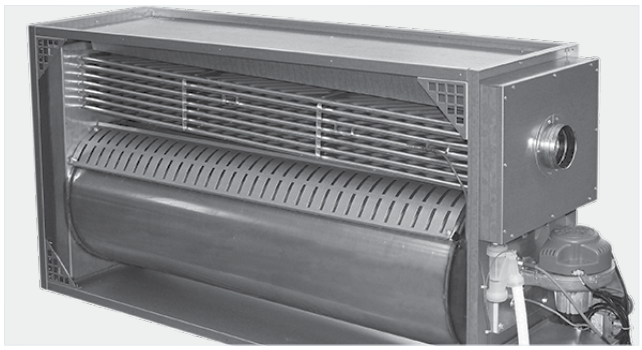
AIR HEATERS

Hot water air heaters
Heaters are made of copper tubes and aluminum fins (spacing 2,2; 2,6; 3,0; 3,4 mm) in galvanized steel casing insulated with a mineral wool. As an option can be order with a threat joint to connect a freezing sensor. Capillary antifreeze sensor can also be ordered.
Maximum operating pressure – 21 bar.
Maximum water temperature +130° C.
Heated air temperature up to +40° C.

Electric air heaters
Three-phase (400V/50 Hz) stainless steel heating elements are used in production.
Two level protection ensures protection from overheating. Protection class IP54 in accordance with IEC 34-5.
Heated air temperature up to +40°C.

SOUND ATTENUATOR SECTION

Integrated or separated silencers may be offered with air handling units. Integrated silencers have completely insulated casing. Sound attenuator splitters with resonating panels is mounted inside the section. Its elements can easily be removed through the door without using tools. The elements should be removed one by one, not as a whole block, thus providing easy dry or semi-moist cleaning for the purpose of sanitation of the ventilation system. The elements of the sound attenuator are filled with a special acoustic mineral wool.
The mineral wool is covered with a fibreglass mat preventing cotton particles from getting into an air channel when the airflow is running at high speed.
The fibreglass mat is maximally resistant to the occurrence of dust inside the air channel.



CONDENSING GAS HEATERS

Advantages of gas condensing heaters:
- there is no risk of freezing;
- no circulation pumps required;
- high temperature efficiency – up to 106 %;
- simpler installation;
- wide range from 22 to 125 kW.

ADDITIONAL ACCESSORIES

KLASIK air handling units can be outdoor type.
For such outdoor performance there is complete set enclosed consisting of:
- a protective roof,
- intake and exhaust air hoods,
- external grilles.

Also such additional elements are available: inspection window, sections lighting.

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KLASIK units for hygienic application

Purpose
Hygienic ventilation units are designed for premises where sterile conditions are mandatory – such as hospitals, clinics, medical or pharmaceutical industry, clean rooms and etc.

RLT01 general requirements for hygienic application units

General requirements	Mechanical performance	Performance data	Hygiene requirements
EN 13053 EN 16798-3 VDI 3803-1 RLT 01	EN 13053 DIN 1751 EN 13501-1 RLT 01	EN 13053 EN 16798-3 VDI 3803-5 RLT 01	EN 13053 VDI 6022 DIN 1946/4 RLT 01

Casing
- Double-sealed panels filled with insulating material.
- Insulation class A1 or A2-s1 d0.
- All materials used are durable, with no accumulated humidity that might provide a supportive medium for microorganisms reproduction.
- Interior surfaces are smooth, without adsorption properties. No porous materials are used.
- Mechanical resistance not less than D2 class.
- Tightness is not worse than class L3 (leakage allowed not more than 2 % of the nominal air flow).
- The passage through the F7 air filters shall not exceed 2 % of the nominal air flow.
- Thermal conductivity is not higher than T4.
- Cold bridges are no worse than TB3.

Heat exchangers
- The system for supplying and discharging air should be recuperated, except where there is not enough room for it or the payback time is too long.
- Depending on the quality of the exhaust air quality, such types of heat exchangers are recommended: ETA2 – rotary or plate with overpressure; ETA3 – rotary or plate with overpressure; ETA4 – Separate Flow (Run Around coil) or Heat Pipe.
- A stainless steel or aluminium condensate tray is designed. Rotary heat exchanger condensate tray is necessary in exceptional cases.
- A rotor is recommended to be fitted with a purge section.
- To reduce the need for frost it is recommended to use adiabatic cooling by humidifying exhaust air.

Air filters
- Only filters that are tested in accordance with EN 779 or EN 1822 can be used.
- Each filter must be marked accordingly. Recommended is class ISO ePM2,5 ≥ 50 % in the extract air before the heat recovery unit. In case of single-stage supply air filtering min. ISO ePM1 ≥ 50 %.
- The surface of the bag-type air filter must have at least 10 m^2 for 1 m^2 openings the area.
- Max. permitted maximum final pressure loss:
  Filter class ISO ePM1 ≥ 70 % 300 Pa.
  Filter class ISO ePM1 ≥ 50 % 200 Pa.
  Filter class ISO ePM2,5 ≥ 50 % 200 Pa.
  Filter class ISO ePM10 ≥ 50 % 200 Pa.

Dampers
- Air leakage class 2 for dampers that are closed while the system is in operation, e.g. mixing dampers or bypass dampers.
- Air velocity for dampers max. 8 m/s (except recirculation air and bypass dampers).
- The position of the damper must be visible from the outside of the damper.

Fans
- Fans with backward curved blades are preferred. Energy saving motors are recommended.
- Fan impeller generally protected against corrosion.
- It is recommended to use fans without belt drive (especially open impeller). Base frame of fan and motor in hot-dip galvanized steel sheeting.

Cooling coils
- Installation rails for cooling coils in stainless steel or aluminium.
- Condensate tray in stainless steel (AISI 304) or aluminium.
- Minimum fin spacing: 2 mm for cooling coil without dehumidification; 2,5 mm for cooling coil with dehumidification.

Humidifier section
- Humidifiers must not be placed directly upstream of filters or attenuator (exception: steam humidifiers).
- All components are demountable. All parts in contact with water accessible for inspection and cleaning and consisting of corrosion-resistant and disinfectant resistant material.
- Sealing compounds not be of material that can be metabolised.

Sound attenuator section
- Pressure drop max. 80 Pa.
- Surface quality material permanently abrasion-resistant and made of material that is durable when exposed to cleaning processes (e.g. glass fibre).
- Splitters demountable for cleaning without having to remove other parts.

Control system C5 for KLASIK units

Various operating modes

- 5 different operation modes: *Comfort1*, *Comfort2*, *Economy1*, *Economy2*, and *Special*. User may set supply and extract air volumes as well as air temperature for each of mode separately.
- Temperature control modes: Supply air / Extract air / Room / Balance. Possibility to select which temperature to maintain.
- Flow control modes: Constant Air Volume (CAV), Variable Air Volume (VAV), Directly Controlled Volume (DCV).
- Universal operating schedule with up to 20 events, for each of them the user can assign weekday(s) and one of five operating modes.
- Holliday scheduling allows the user to change operating mode or switch off the air handing unit on some dates of the year. Up to 10 events are possible.

"Komfovent C5" app

Application is designed to control air handling units with integrated C5 control system. User-friendly interface is intuitive for both experienced and less experienced users.
As the application fully replicates a control panel functions, you will have an access to all monitoring and control possibilities available in the control panel.
The application is available on Google Play and App Store.

Detailed information for the user

- Air flow indication (m^3/h, m^3/s, l/s).
- Thermal efficiency of the heat exchanger (%).
- Heat exchanger energy recovery (kW).
- Thermal energy savings indicator (%).
- Air heater energy consumption (kWh).
- Heat exchanger recovered energy counter (kWh).
- Fan's energy consumption (kWh).
- SFP factor of PM fans.
- Clogging level of filters (%).

Extended control possibilities

- Controlling up to 30 units connected into a network from one panel.
- Ability to connect the controller to the Internet network and manage it via a standard internet browser without any accessories.
- Possibility to control air handling unit by Smartphone via Android OS or iOS application software.
- Ability to control the unit not only by a control panel or a computer, but also by different external devices (switch, timer, etc.) and systems (e.g. the smart house system).

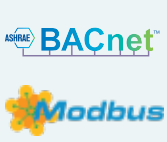
Control options

App "Komfovent C5"

Control panel

Webserver

Connectivity & Protocols



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KLASIK SELECTION SOFTWARE

- For units from 250 to 100 000 m³/h.
- Solutions to the most complex projects.
- Wide range of modifications.
- Eurovent, TÜV, RLT certified.

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