

# Systemair KA

Modular air handling units



# Systemair KA

Systemair KA units are designed as a modular air handling units. Each function (module) is carefully calculated and placed into Eurovent certified air handling unit casing. It is the world of unlimited possibilities, allowing the customer to decide on price range and quality.

The designing of unit starts in the airCalc++ tool, which is frequently updated and allows optimization of every option.

Unit configuration with numerous options and solutions is without a doubt one of the main advantages compared to compact units.

Quality, optimization, reliability and efficient calculation of modules ensures the best performance with a low pressure loss that is crucial for the safe operation and energy efficiency of the units.

**EUROVENT** certified KA units are available in different versions and meet both comfort requirements as well as the most demanding ventilation needs. The hygienic units are **TÜV NORD** certified.



## Highest flexibility for infinite solutions.



## Standard unit



## Indoor unit

The casing design is suitable for indoor installation.



## Double stage unit

Bidirectional air handling units where supply and extract are positioned one above the other in separated modules.



### Hygienic unit

Unit for facilities with higher hygiene requirements to allow full cleaning and avoid the growth of microorganisms.



## Outdoor unit

The casing design has additional weather protection and is suitable for outdoor installation.



## Stacked unit

Bidirectional air handling units where supply and extract are positioned one above the other in one module.



### Corrosion resistant unit

The casing design has additional protection against corrosion. Depending on the corrosive environment, both the interior and exterior can be protected.



## Supply unit

For air supply only.



## Side by side

Bidirectional air handling units where supply and extract are positioned one beside the other in separated modules.



## Extract unit

For air extract only.

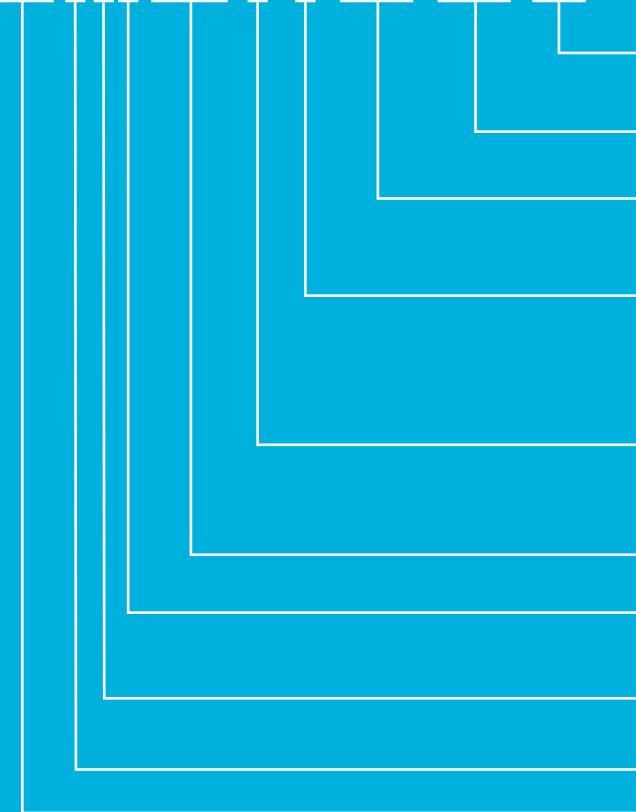


### In-line unit

Bidirectional air handling units where the supply and extract part are positioned in-line.

# How to select KA unit

# KA HSI-2-2-S-R-50F-TB2-L2

	Air leakage class	L1 L2	
	Thermal break class	TB2 TB3	
	Panel execution	50F 50P	50 mm fully glued 50 mm partially glued
	Service side	L R T B	Left Right Top Bottom
	Design	S E I D P C	Supply Extract In-line Double stage Parallel Stacked
	Cross section		Width-Hight
	Installation	I O	Indoor Outdoor
	Execution	S H P	Standard Hygienic Corrosion resistant
	Profile type	H	THOR 50 mm profile
	Product name		



# Standard

## For basic comfort ventilation demands

The standard version air handling units are made in accordance with the general technical, safety, hygienic and medical requirements which are laid down by the EU and domestic rules, regulations and standards. They can also be aligned with any special requirements that are made by the clients.

The units are always produced according to the Ecodesign Directive, Machinery Directive, Low Voltage Directive, EMC Directive and other directives covering functional elements.

Essential requirements, stated in the standards EN 1886, EN 13053, EN 16798-3 and VDI 6022, have been accounted for. Adjustments in order to meet the requirements of other standards are also possible.

Units are especially designed for ventilation of residential and educational buildings, business premises, shopping centers, industrial facilities, etc.

If there are no additional requirements, the basic version includes the following components and materials:

- **casing frame** is made of aluminium EN AW-6060 (AlMgSi) quality with interrupted thermal bridge and corner pieces made of nylon (PA6+GF20%) reinforced by glass fibers,
- **internal panel sheet** is made of ZnAlMg coated steel,
- **internal fastening material** is made of galvanized steel,

### INDOOR UNIT

- **external panel sheet** is made of ZnAlMg coated steel,
- **external fastening material** is made of galvanized steel,

### OUTDOOR UNIT

- **external panel sheet** is made of galvanized prepainted steel RAL 9006,

- **external fastening** material is Ruspert protected and stainless steel,
- **built-in elements** are made of ZnAlMg coated steel
- **heat exchangers:** frame - galvanized steel, lamella package - CuAl, collecting pipes - painted steel or copper,
- **droplet separator:** frame - aluminium EN AW-6060 (AlMgSi), lamellas - polypropylene, spacer sections - nylon,
- **drip trays** for collecting and drainage of condensate are always 3-way sloped towards drainage for efficient water removal and made from stainless steel AISI 304 (1.4301) or AlMg3,
- **tightness class 2 dampers** in accordance with EN 1751: frame and blades aluminium EN AW-6060 (AlMgSi), gear polypropylene (PA6+GF30%), damper gaskets - EPDM,
- **air tight flexible connections:** frame galvanized steel, non-hygroscopic canvas.

# The air you breathe is our responsibility.

No matter if the option you choose is standard, hygienic, corrosion resistant or totally custom-made.







# Hygienic

For higher hygienic ventilation demands

Next to requirements for a standard version, additional requirements stated in the standards and guidelines for medical facilities have been taken into account.

The air handling units in the hygienic version are certified by TÜV NORD Systems GmbH & Co. KG, Hamburg in accordance with the following standards:

DIN 1946-4-4, EN 1886, EN 13053, VDI 6022 -1, ÖNORM H6021, ÖNORM H6020, EN 16798-3, EN 1751, VDI 3083-1, SWKI VA 104-1 and SWKI 99-3.

Units are specially designed for: medical facilities, hospitals, pharmaceutical and food industry facilities, electronics industrial plants, etc.

If there are no additional requirements, the basic hygienic version includes the following components and materials:

- **casing frame** is made of aluminium EN AW-6060 (AlMgSi) quality with interrupted thermal bridge and corner pieces made of nylon (PA6+GF20%) reinforced by glass fibers,
- **internal panel sheet:**  
**side and top** are made of galvanized prepainted steel RAL9006,  
**bottom** is made of stainless steel AISI 304 (1.4301),
- **internal fastening material** is Ruspert protected and stainless steel,

#### INDOOR UNIT

- **external panel sheet** is made of ZnAlMg coated steel,
- **external fastening material** is made of galvanized steel,

#### OUTDOOR UNIT

- **external panel sheet** is made of galvanized prepainted steel RAL 9006,

- **external fastening material** is Ruspert protected and stainless steel,
- **built-in elements** are made of stainless steel AISI 304 (1.4301),
- **heat exchangers:** heater frame galvanized steel, cooler frame - stainless steel AISI 304 (1.4301), lamella package - copper/aluminium, collecting pipes - copper,
- **droplet separator:** frame - aluminium EN AW-6060 (AlMgSi), lamellas - polypropylene, spacer sections - nylon,
- **drip trays** for collecting and drainage of condensate are always 3-way sloped towards drainage for faster water removal and made from stainless steel AISI 304 (1.4301) or AlMg3,
- **tightness class 2 dampers** in accordance with EN 1751: frame and blades aluminium EN AW-6060 (AlMgSi), gear polypropylene (PA6+GF30%), damper gaskets - EPDM,
- **air tight flexible connections:** frame galvanized steel, non-hygroscopic canvas.



# Installation

Choosing the appropriate installation increases the lifetime of the unit and decreases long-term costs due to corrosion and rust damage.



## Indoor Installation

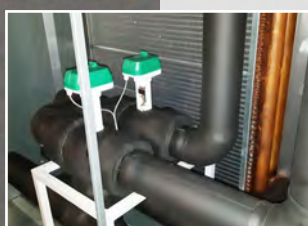
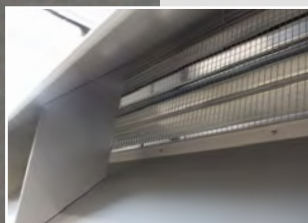
Not protected against outdoor atmospheric conditions such as rain, snow, extreme temperatures, etc.. Indoor units are available in standard, hygienic and corrosion resistant executions in all module design options.





## Outdoor Installation

- **Waterproof roof** is made of galvanized prepainted steel RAL9006. The design of the roof closes all possible gaps, prevents any water from accessing the unit from the top and protects the panels.
- **External panel sheet** is made of galvanized prepainted steel RAL9006. Panels are installed with Ruspert protected screws. Other fastening material is Ruspert protected or stainless steel.
- **Weather protection hoods** protect the outdoor and exhaust air openings. There are no sharp edges on the hood that could injure people. Drainage channels keep water on the outer side of the weather hood, so it has no chance to enter unit through outdoor opening. A protective steel grill is installed on each opening, preventing the entry of small animals, leaves or other nuisances.
- (optional) **A condensate tray on the fresh air intake opening** can serve as extra protection of the internal casing, especially in windy and stormy climates or during the melting of snow caught in the unit.
- **The dampers** with the actuator are always placed inside the casing, allowing extra protection of actuator and electric parts,
- **the heating and cooling coils** are designed with internal collecting pipe connections and accessible empty section (usually downstream of the coil or in between of heating and cooling coil). It protects the hydraulic circuit from freezing conditions during winter.



# Our strengths



## Side maintenance filter frames

Side maintenance filter frames are made of ZnAlMg coated steel for standard version or of stainless steel AISI 304 (1.4301) for hygienic version. They excel at easy maintenance which allows the change of filters, deinstallation of moving parts for cleaning and change of electrical parts. There are no sharp edges.



## Drip tray with 3-way slope

The drip tray is made of stainless steel AISI 304 (1.4301) or AlMg3. It has no elevation from the bottom panel sheet, making it incredibly easy to clean. The same 3-way slope solution comes with the standard and hygienic versions of unit.



## Airtight flexible connections

Flexible connections are airtight and easily assembled. On both sides there is a preinstalled gasket that perfectly seals the connection to the duct. The frame is made of galvanized steel and canvas is non-hygroscopic.





## Electric cabinet

The electric control cabinet is installed in an empty section of the casing in such a manner that it does not obstruct the airflow. It is well protected from outdoor weather conditions. On a fixed panel next to the cabinet there is safety switch and several electric cable glands.

## ZnAlMg coated steel

Otherwise named also as Hot-dip galvanized steel with ZM120 coating or DX51D + ZM120 OTC.

Extra protection comes with 1-2% Mg and 1-2% Al+Zn combination. The coating comes with 9 micrometer Zinc-magnesium (ZM) made for best cathodic corrosion protection (corrender). It protects material against white rust formation, is chromium free and allows your unit to come with anti-fingertip look.



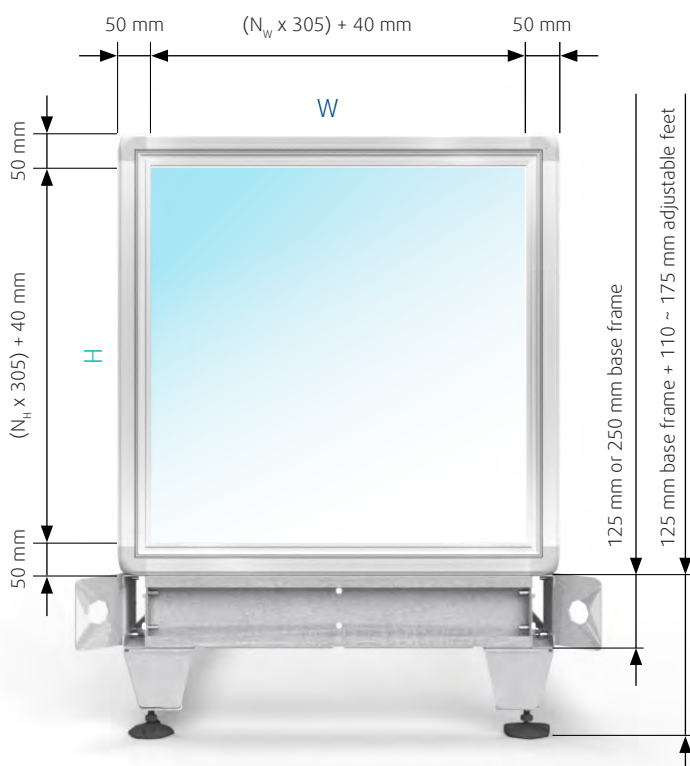
## Ruspert protected screws

Ruspert protected screws are covered with a three-layer-coated-film allowing maximum corrosion resistance. The 1st layer is made of metallic zinc, the 2nd of high-grade anti-corrosion chemical conversion film, and the 3rd outer layer is a baked ceramic surface coating. All three layers combined by the Ruspert treatment are not only incredibly anti-corrosive but also bonded in an extremely rigid combination.



# Modul sizes

We are able to offer you custom-made units from as small as 1.000 m<sup>3</sup>/h up to 100.000 m<sup>3</sup>/h. All you need to do is ask.



Whether it is a standard double-stage unit or perhaps a hygienic version in side-by-side execution, KA models allow you to choose from over 50 different combinations of module sizes with different cross-section dimensions for low internal air velocity and pressure drop.

## Example of selection:

Unit: KA HSI-3-2-D-L

Width:  $\frac{(3 \times 305) + 40}{\text{Inner width}} + \frac{50}{\text{Panel}} + \frac{50}{\text{Maximal width}} = 1055 \text{ mm}$

Height:  $\frac{(2 \times 305) + 40}{\text{Inner height}} + \frac{50}{\text{Panel}} + \frac{50}{\text{Maximal height}} = 750 \text{ mm}$

Nominal air flow: 5587 m<sup>3</sup>/h

## Modul sizes and air flows

Module height (H)	9	2785				31400	37500	43600	49700	55800	62000	74200
	8	2480			22500	28000	33400	38800	44300	49700	55200	66100
	7	2175			19700	24500	29300	34100	38800	43600	48400	57900
	6	1870		12900	17000	21100	25200	29300	33400	37500	41600	49800
	5	1565		10800	14200	17600	21100	24500	27900	31400	34800	
	4	1260	5900	8700	11400	14200	17000	19700	22500			
	3	955	4500	6600	8700	10800	12900					
	2	650	3000	4500	5900	7300						
	1.5	550	2600	3800	5000							
	1	345	1600									
$N_H$		650	955	1260	1565	1870	2175	2480	2785	3090	3700	
$N_W$		2	3	4	5	6	7	8	9	10	12	
Modul width (W)												

NOTE: If you have a request for not listed dimensions, you are always welcome to check it with our sales team.

- Module size
- Module dimension [mm]
- Standard size - air volume flow at air velocity 2,0 m/s [m<sup>3</sup>/h]
- Special size - air volume flow at air velocity 2,0 m/s [m<sup>3</sup>/h]

# Design & Modul combination

Some installation requirements may represent a major challenge for the AHUs to fit perfectly. KA units can be modified to fit into almost any space.

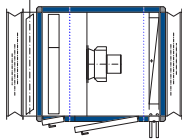
No matter the obstacles **we will find a solution for you!**



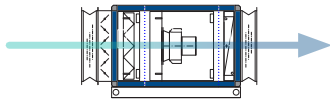
## The single module design

For supply or exhaust air handling units, and also for the combined air handling units.

Top view



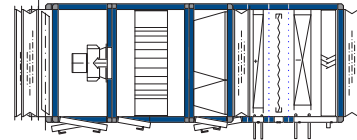
Side view



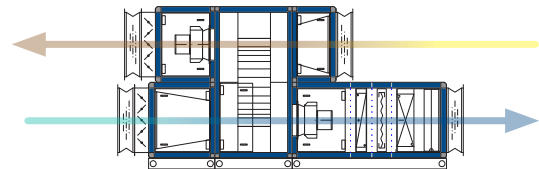
## The double-stage and stacked module design

Bidirectional air handling units where supply and extract are positioned one above the other.

Top view



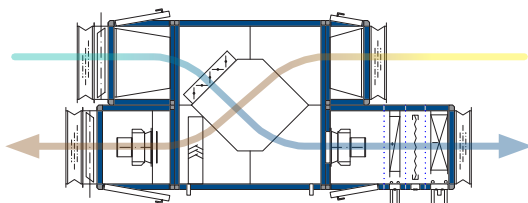
Side view



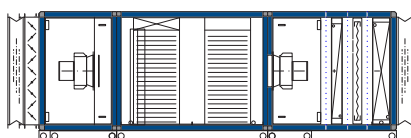
## The side by side module design

Bidirectional air handling units where supply and extract are positioned one beside the other.

Top view



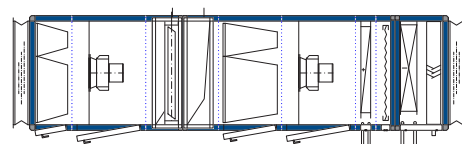
Side view



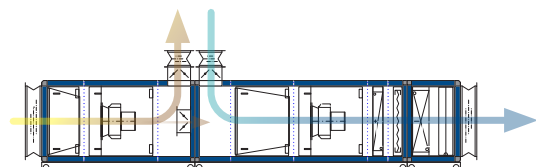
## The in-line module design

For bidirectional air handling units which are installed in-line.

Top view



Side view





# Casing

**Modular design makes it possible to configure a completely customized unit for almost any application.**

The casing consists of a mounting frame, panels and a base frame. The height and width values depend on the required air flow, type of unit and geometry required. The length depends on the: built-in functional elements, purpose of use, installation type, position of the intake and exhaust section and any special customer requirements. The casing interior is smooth, all exposed interior integrated elements have a smooth edge finish or rounded edges.

## Mechanical properties in accordance with EN 1886:

- Thermal transmittance class **T2**
- Thermal bridging class **TB2 / TB3**
- Mechanical strength casing class **D1**
- Casing air leakage class **L1 / L2**

## Doors and removable panels

Doors with hinges and removable panels are available to access the interior of the air handling unit.

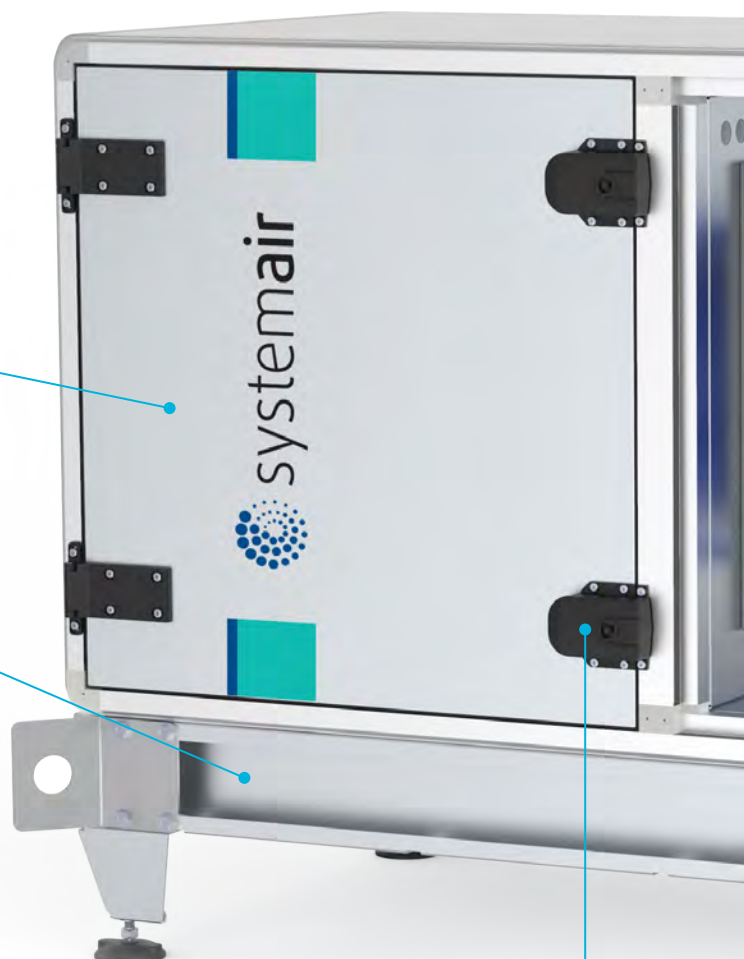
## Base frame

The galvanized steel base frame protects the lower section of the air handling unit against corrosion and damage, ensures structural strength and rigidity, and enables the unit transport and assembly on the building. The following base frame versions are possible:

- 125 mm base frame (no feet),
- 250 mm base frame (no feet),
- 125 mm base frame + 110~175 mm adjustable feet.

The base frame comes with lifting brackets for easier lifting and installation.

- 125 mm intermediate base frame between lower and upper part in two stage design for bigger sizes - available as an option



## Handles and hinges

Strong and robust hinges and handles increase the lifetime of your unit casing, increase security with regard to the unit's moving parts and increase casing airtightness.

### Panels

Double-shell insulated panels come with an interrupted thermal bridge. The panels are bolted onto the frame from the outside.

#### Insulation:

- Material type: rockwool
- Insulation thickness: 50 mm
- Insulation density: 100 kg/m<sup>3</sup>
- Non-combustible, class A1 according to EN 13501-1

#### Possible materials for internal panel jacket, external panel jacket and internal built-in elements:

- ZnAlMg coated steel,
- galvanized prepainted steel sheet RAL 9006,
- stainless steel sheet AISI 304 (material No. 1.4301),
- Stainless steel sheet AISI 316L (material No. 1.4404).

### Frame profiles and corners

The aluminium profile frame (AlMgSi) is made of hollowed aluminium sections (EN AW-6060) and rounded nylon corners (PA6+GF20%).

#### Possible versions of aluminium sections:

- with an interrupted thermal bridge,
- painted aluminium RAL9006,
- anodized aluminium.

### Joints and sealing tapes

Self-adhesive sealing tape is used for joints between the fixed non-removable panels and the frame.

Self-adhesive or foamed sealing tape on doors, depending on standard or hygienic execution.

All sealing tapes and the poured PU sealing compound have a closed-cell structure and are resistant to molds and other microorganisms.

Depending on the purpose of use and the requirements of the client, the following sealing options are available:

- sealant is applied to the bottom openings of internal casing (standard)
- sealant is applied to all fixed panel openings of internal casing (hygienic)
- sealant is applied to all fixed panel openings of external casing (outdoor)

### Eurovent certification

KA units are constructed in accordance with European standards and certified by Eurovent.



### Assembly brackets

Aluminium (EN AB 46100) brackets for precise coupling of housing sections.



# Components

Proper components ensure the reliable energy-efficient operation and long lifetime of the unit.

KA units are equipped with advanced and factory tested components such as fans, heat exchangers, heaters, coolers, filters, protection equipment, control system, etc.. They can be

modified for the higher hygiene requirements in certified hygienic execution or outdoor execution, where units can be exposed to the external weather conditions.

All components and body design can be modified in airCalc++ selection software, where all calculations can be performed in accordance with the latest ERP 2018 directive.



## Fans

Plug fan used has the impeller fitted with air foiled blades. Both impeller and motor are statically and dynamically balanced. The inlet of fan is through fan wall inside the unit and outlet is open towards supply or exhaust air of AHU. The plug fan can be supplied with EC motor or AC motor with frequency inverter when necessary. It is possible to choose from several fan sizes and number of fans for each cross section of the unit.





# Heat exchangers

When there is a demand for heat exchanger by ERP directive or just a request from customer, one can decide from several options. Decision should be based on air quality or industrial process and include optimal energy efficiency, requested results and price.



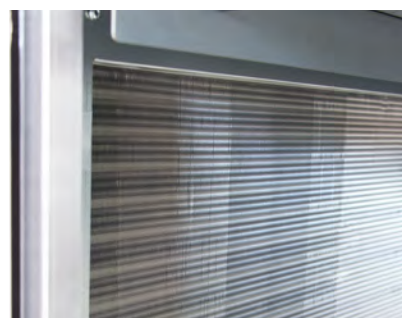
## Plate

Plate heat exchanger is available in cross flow and counter flow options. Heat transfer takes place directly through a partition wall, without any transfer of medium or moisture. Plate heat exchanger comes with by-pass for frost protection or for free cooling option in summer at night. Under whole section there is sloped drip tray for condensate drainage. Each section comes with extra space for optional installation of droplet separator if required.



## Rotary

Rotary heat exchanger is available in condensation, sorption and enthalpy versions. **Condensation rotor** is a cost-efficient solution to recover heat and is suitable for standard applications in comfort ventilation. **Sorption rotors** are especially designed for summer season cooling recovery and dehumidification of supply air. **Enthalpy rotors** are designed for better transfer of sensible energy (temperature) as well as latent energy (humidity). There is 2,5° purge sector installed as standard but can be adjusted on request. Should you require **desiccant rotor** (drying wheel), we can also supply it as special request.



## Run-around

Run-around coil heat exchanger is used when complete separation of supply and extract air flows is required. They are also commonly requested when supply and extract unit are at different locations. It consists of water cooling coil with drip tray in extract segment, water heating coil in supply segment. 3-way ball valve can be supplied from our side for installation into hydraulic circuit.



## Heating & cooling

### Heating coil

Heating coil is used to increase air temperature for comfort or industrial applications. Heating can be applied by hot water (or mixture of water and antifreeze), condensation of refrigerant, electricity or steam. Water heating coils consist of copper tubes and aluminium fins and have antifreeze protection by thermostat and PT sensor. Electric heaters consist of stainless steel and aluzinc and have built-in safety control system.

On request, it is possible to supply an **indirect gas air heater** with a built-in overpressure gas burner (chimney elements are not included).



### Cooling coil

Cooling coil is used to decrease air temperature for comfort, dehumidification or industrial applications. Cooling can be applied by cold water (or mixture of water and antifreeze) or evaporation of refrigerant. Cooling coils consist of copper tubes and aluminium fins. Under whole section there is sloped drip tray for condensate drainage.

Cooling coils that can be used for heating as well are called **change-over coils**. They have same applications as cooling coil and protections as heating coil.



### Droplet separator

Droplet separator is used for sections where air velocity can separate condensate drops from previous component (cooling coil, plate heat exchanger or humidifier). Frame is made of aluminium and droplet trap blades from polypropylene. Under whole section there is sloped drip tray for condensate drainage. It is easily removed and cleaned for every unit without interfering with other installations.







## Filters

Panel and bag filters are most commonly used filters in air handling units. There are several different options from Coarse 65% (G4) up to ePM1 85% (F9) according to EN ISO 16890. Bag filters come in lengths from 300 to 635mm synthetic or from glass fiber, giving you chance to chose optimal filtration and pressure drop over whole unit. Filter installation and maintenance comes in two options: side removable or dirty side removable.

Besides standard filtration we also offer metal filters, carbon filters, HEPA and EPA filters and several other custom made options if requested.



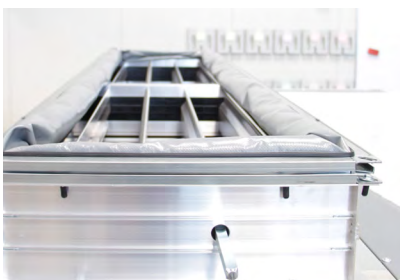
## Humidifier

Humidifier is used when there is request for higher moisture of the air. It is available in steam or evaporative humidifier options. **Steam humidifier** comes as single section with integrated steam pipes and drip tray, fully made of stainless steel. Humidification unit and connections are placed externally on site. It is possible to choose between electric steam humidifiers or direct steam humidifiers. **Evaporative humidifier** is integrated within the unit. It is made of stainless steel and works with natural moisturing of air as it passes wet surface. It is possible to choose between circulation or direct water.



## Sound attenuator

The sound attenuator is used for reducing sound power on connections of the unit. Splitters are removable as standard for either installation and connection of the unit or later on for cleaning.



## Dampers

The dampers are used for closing of unit air connections, by-pass on heat exchangers or air mixing of inside of unit. Blades are made of aluminium and are aerodynamically shaped so they have lower pressure drop when opened.





# Controls

**The efficient AHU operation is ensured by a sophisticated control system that monitors and controls the operation of the installed components.**

The desire of every user is a fully automatic operation of the air handling unit according to their needs. However, it is important that the control system allows easy adjustment of the working parameters either via a hand-held terminal or a building management system, which allows the parameters to be set via a computer or smartphone.

Components, such as electric cabinet, control and measuring devices (sensors, motor drives, differential pressure switches, thermostats, etc.), remote control management, WEB server, etc., provide full functionality of the KA air handling units, with the possibility of:

- fan speed control,
- automatic by-pass damper and rotary heat exchanger control (cold and heat recovery),
- heating and cooling coil pump and valves control,
- outdoor air and exhaust air damper control,
- mixing chamber control,
- humidification (humidification level) or dehumidification system control,
- alarming of measured parameters (temperature, humidity, pressure) with alarm limits management,
- weekly operating schedule (the intensity of ventilation, supply air temperature and humidity),
- WEB server and ethernet or Modbus interface for remote access or connection to the BacNet or Cloud as standard,
- night cooling,
- custom control modification on request.

**Different implementations of the control system are available:**

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## Without a control system

Air handling units manufactured in the factory without a control system. The complete control system is to be implemented by the customer; the customer is also responsible for commissioning the unit, providing the control system operation and maintenance instructions, training the operating personnel, issuing the declaration of conformity for the entire unit, and affixing the CE label on the device.

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## Partially integrated control system

Air handling units manufactured in the factory, including the integration and wiring of some of the control system elements, such as control damper drives, frequency converters, service switches, interior lighting, etc. The complete control system is to be implemented by the customer; the customer is also responsible for commissioning the unit, providing the control system operation and maintenance instructions, training the operating personnel, issuing the declaration of conformity for the entire unit, and affixing the CE label on the device.

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## Fully integrated control system

Air handling units manufactured in the factory, including the implementation of the control system either in the factory or on the site of installation, including the commissioning, training of operating personnel, and issuing the control system operating and maintenance instructions. The manufacturer issues the declaration of conformity for the entire unit and provides the CE label for the device.

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# Fully adjustable

Factory-installed control system allows easy monitoring and adjustment of operating parameters for both maintainers and users. Access to some settings may be restricted and assigned to certain users only.





# KA configuration with airCalc++

Effective and powerful selection tool.

Quick selection and thermodynamic calculation of the unit can be made in **airCalc++**. By using this application we can provide useful information about the unit such as:

- technical data for all modules,
- heat recovery and coil calculations,
- energy consumption,
- acoustics information,
- detailed technical drawings, dimensions and weights,
- Mollier diagram,
- prices.



Calculation is performed according to ErP 2018.



# Directives and certifications



## Eurovent certification

Eurovent certification ensures conformity between the calculated performance in airCalc++ and the measured performance at independent test laboratories.



## Ecodesign Directive

The Ecodesign Directive 1253/2014 prescribes the minimum requirements regarding heat recovery efficiency, fan efficiency, SFP internal values, and operation of the air handling unit. The airCalc++ selection software will tell you if the requirements for 2018 are fulfilled.



## Machinery Directive

KA air handling units are manufactured according to the safety demands of the EU Machinery Directive 2006/42/EC. This is confirmed through the issuance of corresponding Declaration of Conformity and CE label.

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# Standards

## EN 1886:2007

Ventilation for buildings – Air handling units – Mechanical performance.

## EN 13053:2019

Ventilation for buildings – Air handling units – Rating and performance for units, components and sections.

## EN 16798-3:2017

Energy performance of buildings – Ventilation of buildings – Part 3: For non-residential buildings – Performance requirements for ventilation and room-conditioning systems.

## EN 1751:2014

Ventilation for buildings – Air terminal devices – Aerodynamic testing of damper and valves.

## EN 308:1997

Heat exchangers – Test procedures for establishing the performance of air-to-air and flue gas heat recovery devices.

## EN ISO 12100:2010

Safety of machinery – General principles for design – Risk assessment and risk reduction.

## EN ISO 13857:2019

Safety of machinery – Safety distances to prevent hazard zones being reached by upper and lower limbs.

## EN 60204-1:2018

Safety of machinery – Electrical equipment of machines – Part 1: General requirements.

## EN 60034-1:2010

Rotating electrical machines – Part 1: Rating and performance.

## EN 16890-1:2016

Air filters for general ventilation – Part 1: Technical specifications, requirements and classification system based upon particulate matter efficiency (ePM).

