BLAUAIR

Modular Air Handling Units

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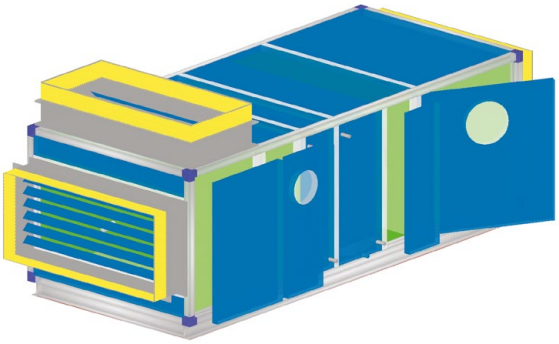
BLAUBERG Ventilatoren

CONTENT

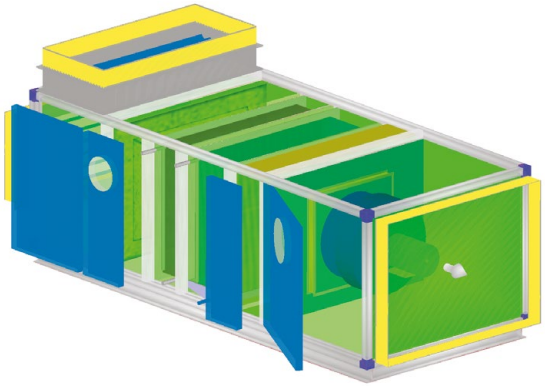
BlauAir air handling unit selection program

Advantages of the program

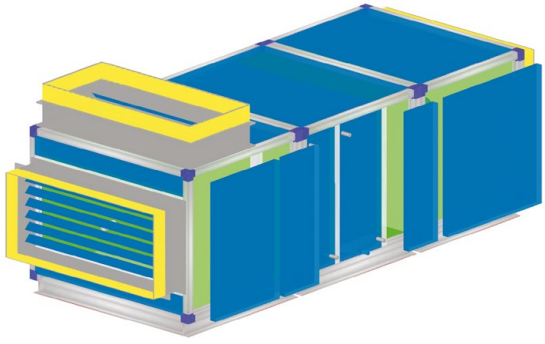
- Flexible system designed to create commercial offers, which are in complete accordance with the customer requirements.
- Flexible system allows to arrange sections in a non-standard way, considering all the design peculiarities.



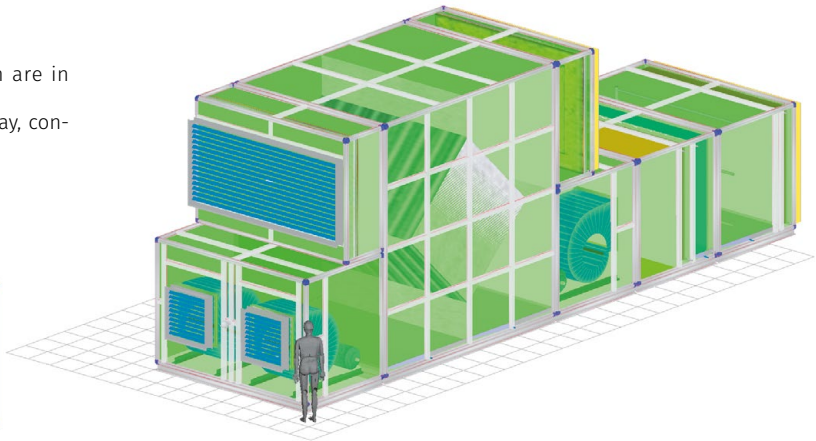
Example of an air supply unit arrangement with a mixing chamber



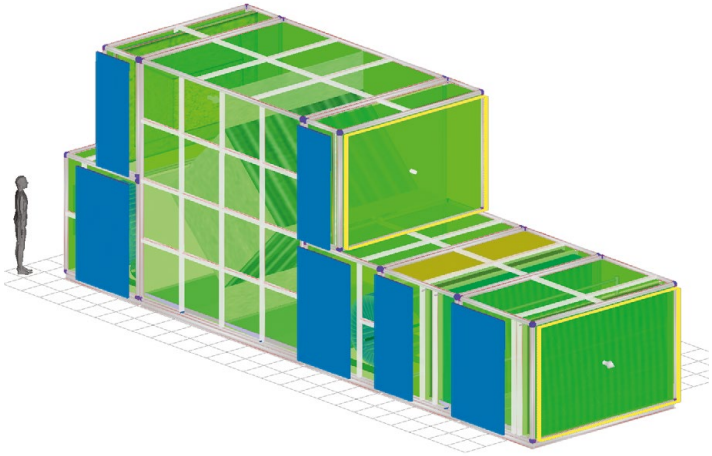
Combined units construction

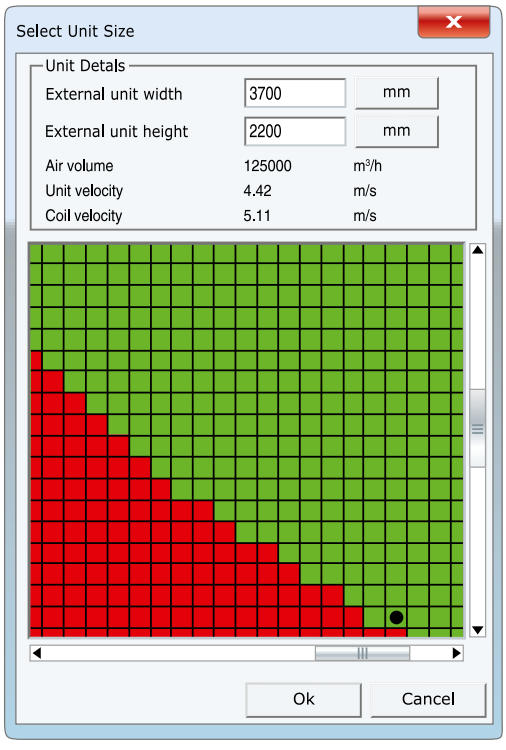


Separate units construction



14 standard sizes
With a performance range from 1500 m³/h to 128000 m³/h





- Non-standard sizes are available upon request.
- Selection of functional elements, such as heat exchangers, filters, fans, standby motors, etc. is available.
- Detailed technical description of selected units, including fan curves and representation of processes in the Mollier diagram for heat exchangers.
- Integration with CAD-system allows to generate a set of design documentation for automated manufacturing.
- A layout of units and separate sections drawings is in .dwg, .dxf, .pdf.

Unit designation

Size

BL02 BL03 BL04 BL06 BL09 BL12 BL15

BL20 BL27 BL35 BL45 BL55 BL65 BL85

Service Access Side

- **L** — Left side
- **R** — Right side

Supply Units

- **SU** — Indoor mounting
- **SU/O** — Outdoor mounting

Exhaust Units

- **EXH** — Indoor mounting
- **EXH/O** — Outdoor mounting

Heat Recovery Units

Rotary Heat Exchanger

- **SE/R** — Indoor mounting
- **SE/R/O** — Outdoor mounting

Plate Heat Exchanger

- **SE/P** — Indoor mounting
- **SE/P/O** — Outdoor mounting

Separate sections

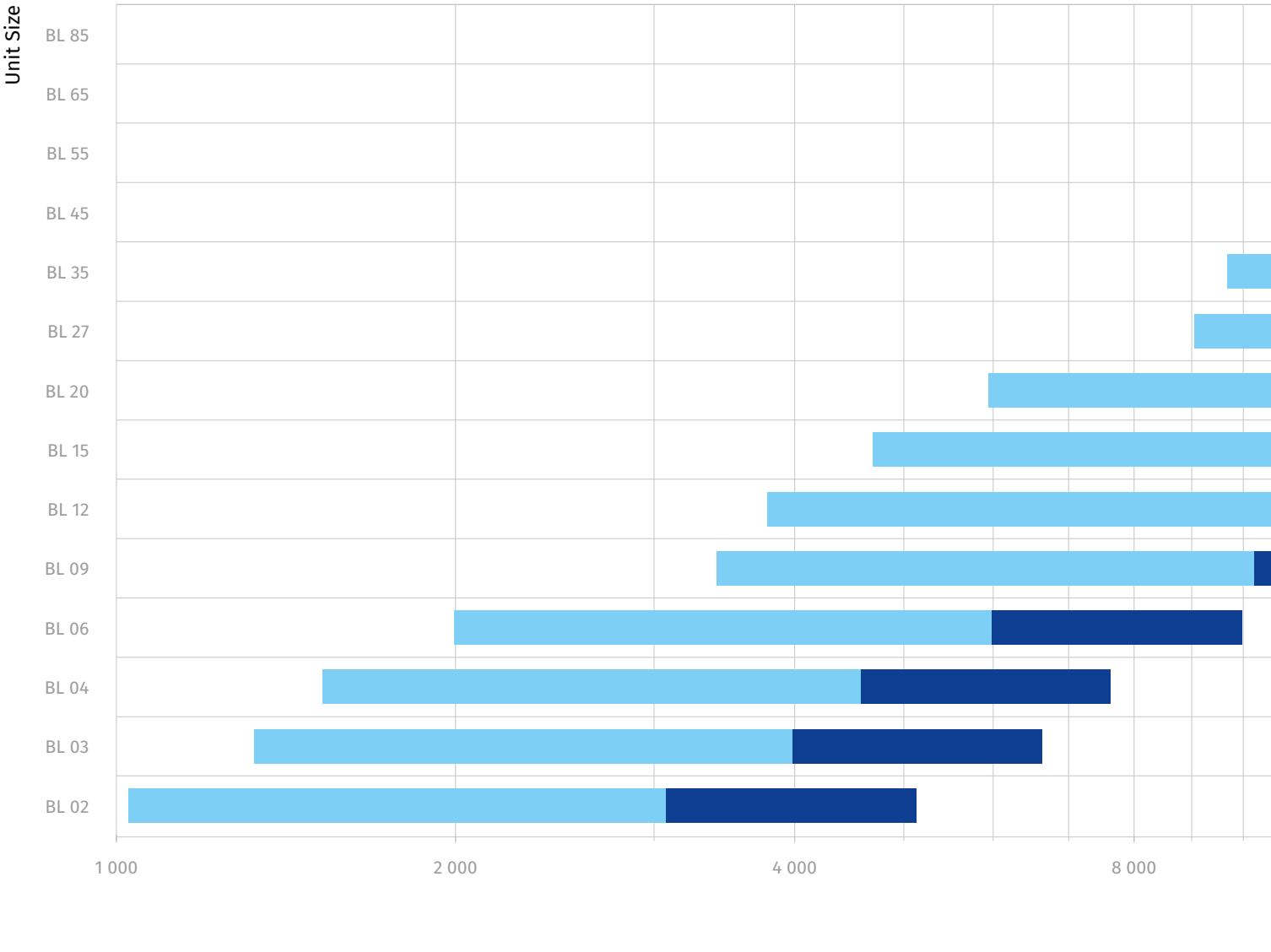
- **H** — Water heater
- **E** — Electric heater
- **C** — Cooling section (water coil)
- **DX** — Cooling section (evaporator)
- **F** — Pocket filter
- **FC** — Panel filter
- **SP** — Centrifugal fan in a spiral casing
- **EC** — Fan with EC motor
- **S** — Silencer
- **HU** — Humidifier
- **MC** — Mixing chamber
- **A** — Control system
- **IB** — Inspection block
- **D** — Air damper
- **B** — Non-standard section
- **AW** — Galvanized weather protection hood
- **MB** — Base frame
- **FLC** — Flexible connection
- **RF** — Rooftop

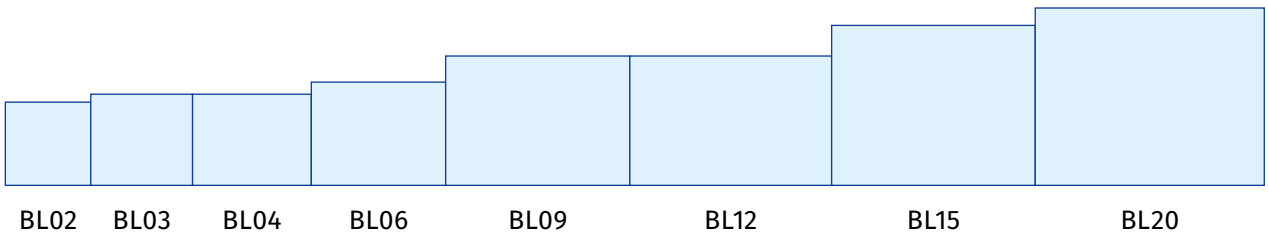
Unit's designation example

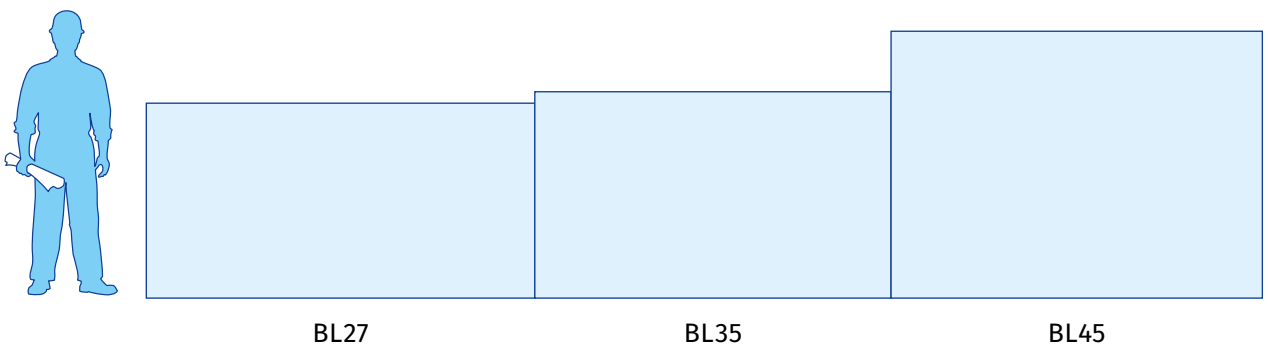
BL 09 L/SE/P/O-H-C-S
A heat recovery air handling unit for outdoor mounting equipped with a plate heat exchanger, a water heater, a cooling section and a silencer.
Total capacity: 9000 m³/h. Service access side: left.

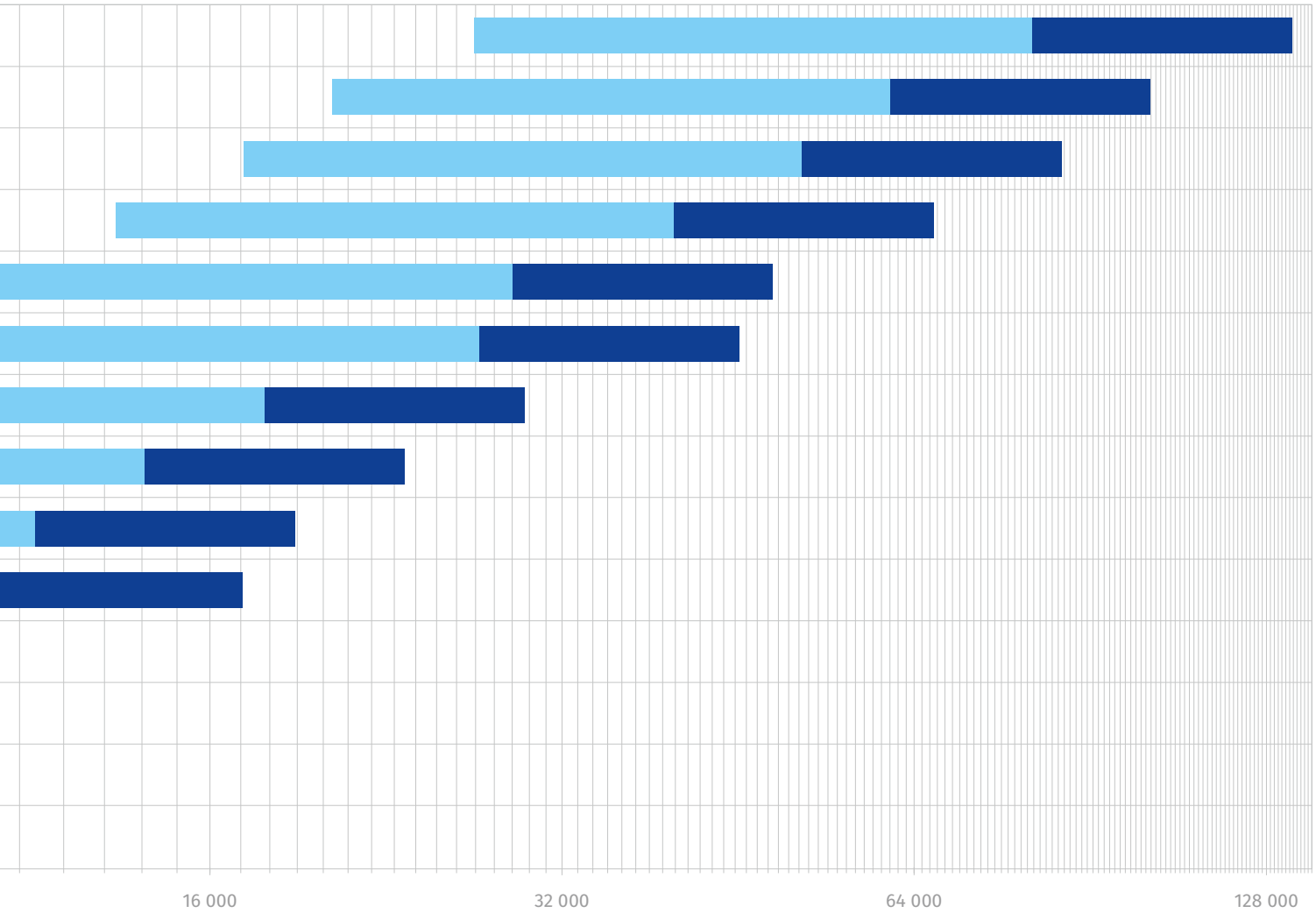
BL 15 R/SU/O-FC-E-DX-S-A
Air supply unit for outdoor mounting equipped with a panel filter, an electric heater, a cooling section and a silencer.
Supplied with a high-tech control system.
Total capacity: 15000 m³/h. Service access side: right.

Size selection









Unit size	BL 02	BL 03	BL 04	BL 06	BL 09	BL 12	BL 15	BL 20	BL 27	BL 35	BL 45	BL 55	BL 65	BL 85
Nominal air flow [m³/h]	2000	3000	4000	6000	9000	12000	15000	20000	27000	35000	45000	55000	65000	85000
Cross section height [mm]	500	550	550	630	790	790	980	1080	1160	1240	1612	1900	1892	2200
Cross section width [mm]	570	670	770	880	1200	1330	1330	1530	2170	2170	2292	2500	2992	3400

Casing types

- Unit casing provides thermal and sound insulation, as well as protection and resistance to external influence.
- BlauAir series are available in several types of casing, general properties of which are:
  - High mechanical strength. Class D1, according to EN 1886.
  - Corrosion resistance. Class C4, according to ISO 12944.
  - Thermal insulation. Class T3, according to EN 1886.
  - Protection from thermal bridges. Class TB3, according to EN 1886.
- Mineral wool basalt fiber insulation with 90 kg/m³ density is applied for casings. Unlike other types of insulating materials, this one is completely non-flammable and environmentally friendly.

Classic frame design – high strength

The classic casing design, based on aluminum profile frame and joined by means of cast corners, provides high durability of the unit. Different frame thickness should be used depending on the unit size.

Frame type	Recommended area of performance	Aluminum profile thickness	Thermal insulation thickness
30-25	up to 20000 m³/h	30 mm	25 mm
50-50	20000-45000 m³/h	50 mm	50 mm
70-50	more than 45000 m³/h	70 mm	50 mm

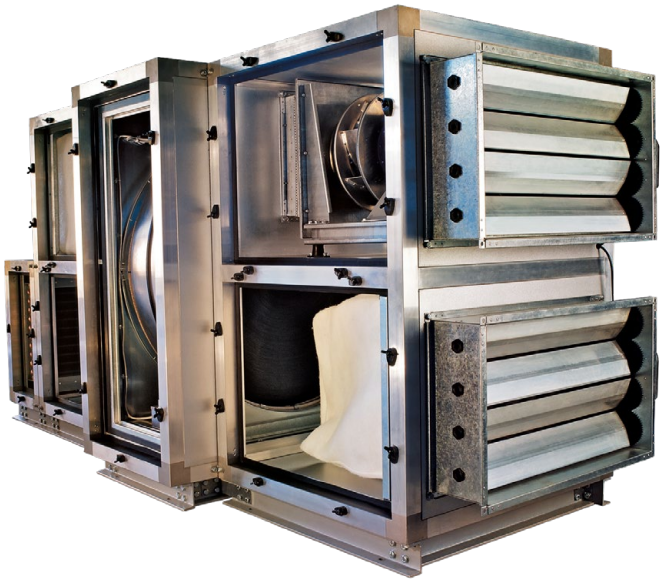
- Casing panels are made of steel sheets with a layer of thermal and acoustic insulation from mineral wool. The thickness of the insulation depends on the type of frame (25 or 50 mm).
- Casing panel material varies depending on the unit application:

EXTERNAL PANEL SURFACE MATERIAL:

- Zinc-aluminium coating (standard);
- Galvanized steel with polymeric coating (high corrosion resistance);
- Galvanized steel (for internal realization units).

INNER PANEL SURFACE MATERIAL:

- Zinc-aluminium coating (standard);
- Stainless steel (for units in hygienic design);
- Galvanized steel



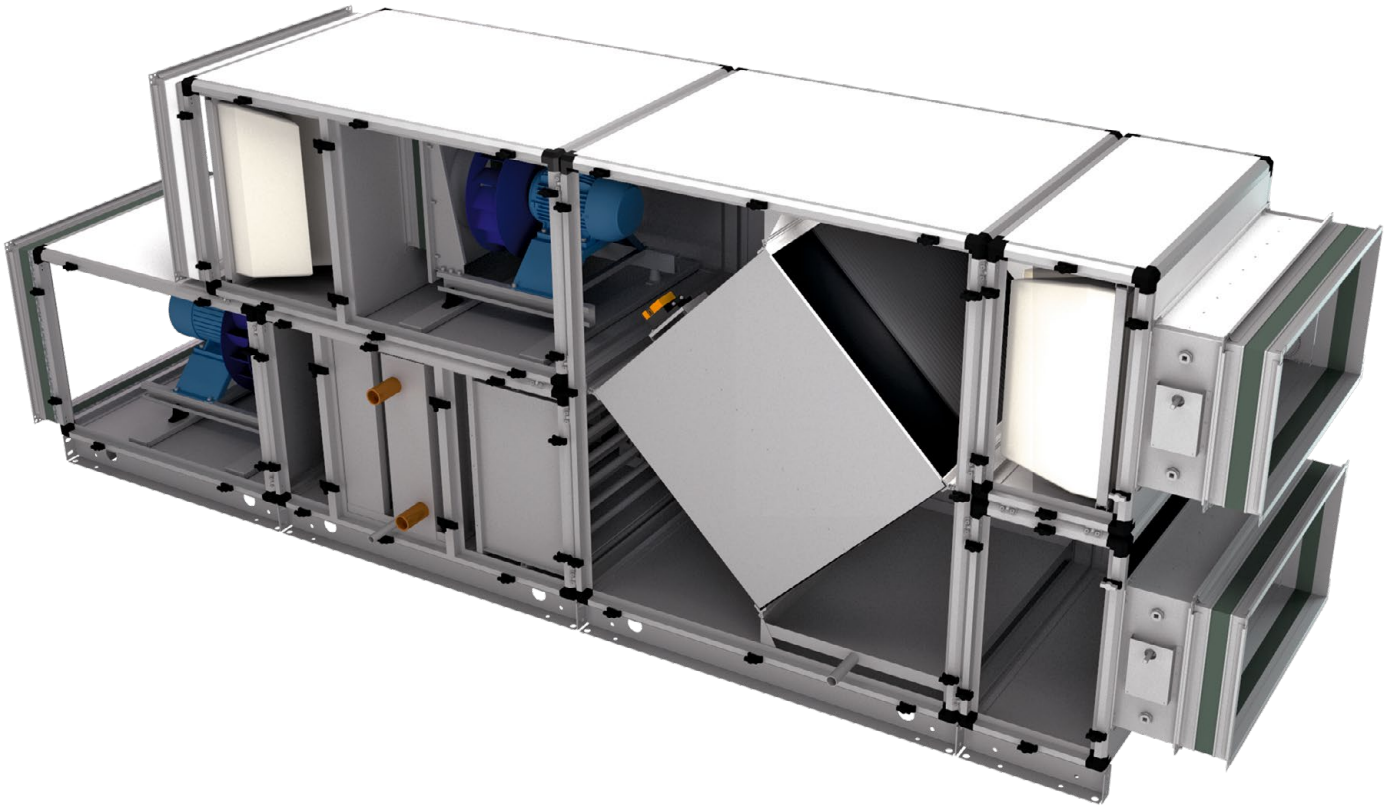
Classic unit design with 50 mm zinc-aluminium panels in the 50 mm profile frame.

EXTERNAL REALIZATION:

The unit is additionally protected against atmospheric precipitation.

- Weather protection hoods are provided at the inlet and outlet air pipes.
- Air damper actuators are supplied with protective visors.
- Flat or gable roof.
- An inspection window is supplied with a protective grille.
- The visor length is 300 mm.
- All joints are sealed.

All these elements protect the unit against external influence of water, send, leaves, etc.



Frameless units – high thermal insulation

- Frameless design casing system excludes thermal brigdes, usuall for aluminum or steel frame. This significantly increases thermal resistance and reduces heat loss, especially for outdoor installation. It also prevents condensation on the surface when air cooling is on.
- Casing panels are made of sheet steel with a layer of 40 mm thermal and acoustic insulation from mineral wool.
- Casing material varies depending on unit application:

EXTERNAL PANEL SURFACE MATERIAL:

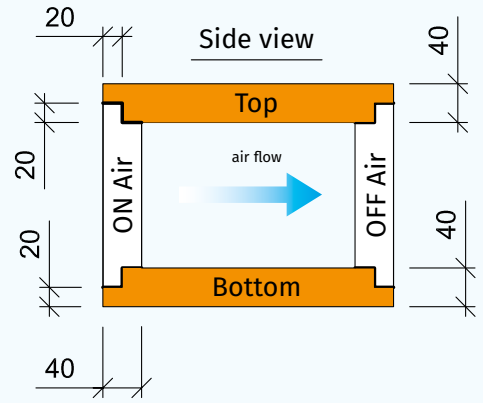
- Zinc-aluminium coating (standard);
- Galvanized steel with polymeric coating (high corrosion resistance);
- Galvanized steel (for indoor units).

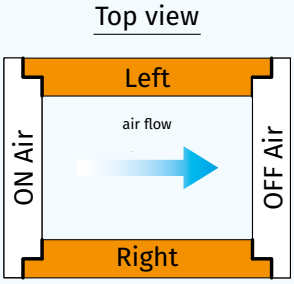
INNER PANEL SURFACE MATERIAL:

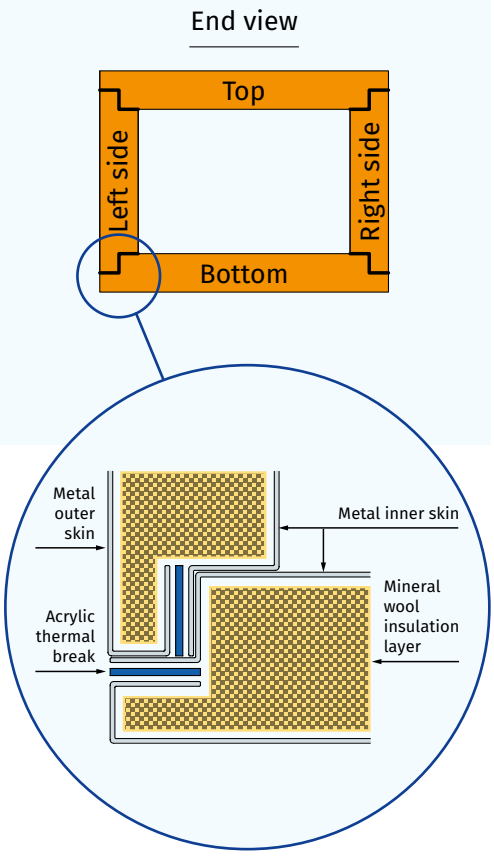
- Zinc aluminium (standard);
- Stainless steel (for hygienic units);
- Galvanized steel.

BENEFITS OF FRAMELESS CASING:

- better thermal resistance;
- lower weight of the unit;
- no thermal bridges;
- suitable for outdoor installation;
- higher mechanical strength (compared to a 30 mm aluminum profile frame).







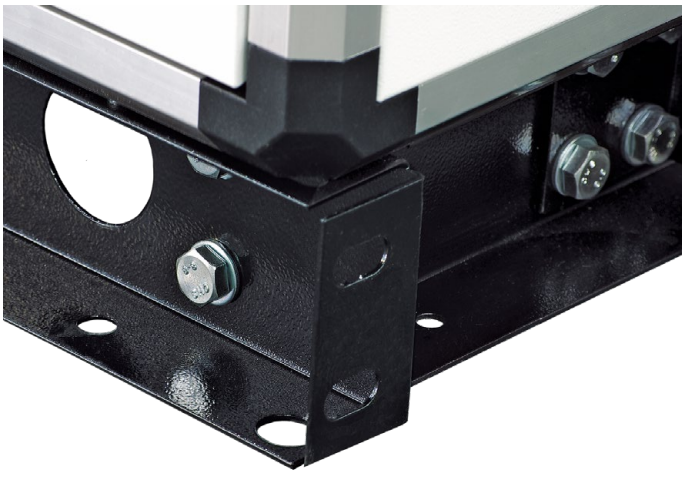
Frameless unite close up

Frameless casing connection

Base frame types

For both classic and frameless unit casing there are several types of base frame avaliable.

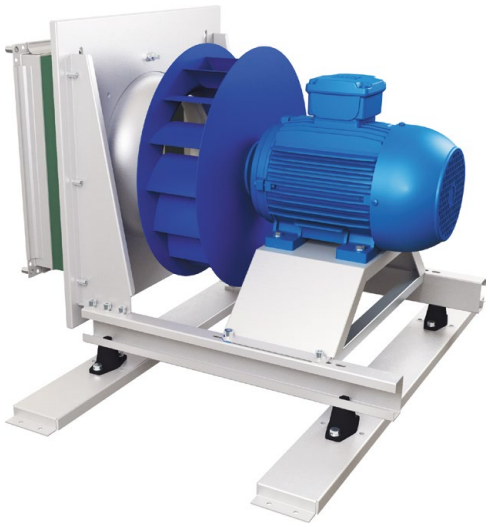
Type	Application
Adjustable legs made of 2 mm thick galvanized sheet steel	Single-deck units with air capacity up to 20000 m³/h, or double-deck units – up to 15000 m³/h
Solid base frame made of 2 mm thick galvanized sheet steel	Single-deck units with air capacity up to 35000 m³/h, or double-deck units – up to 25000 m³/h
Solid base frame made of 3 mm thick painted galvanized sheet steel	For units with maximum performance of up to 50000 m³/h
Solid base frame made of 4 mm thick painted galvanized sheet steel	For units with maximum performance of up to 128000 m³/h



Solid base frame

Adjustable legs

Sections



Fan section types:

- Plug fan with asynchronous motor (standard);
- Plug fan with an energy-saving electronically commutated motor (EC motor);
- Belt driven fan in a spiral casing.

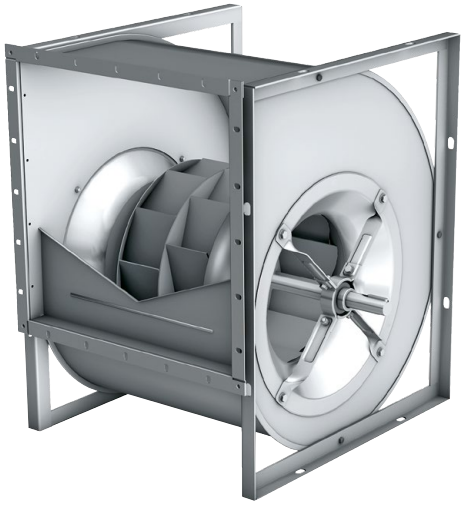
Fan sections are equipped with an inspection window.

PLUG FAN

Plug fans are used in case of low or medium air performance and pressure. Direct driven motor and backward curved impeller ensures high performance, reliability and easy maintenance due to the absence of belt drive.
The impeller is made of high-strength composite material or sheet steel with protective polymer coating.
For correct fan operation, soft start, current protection and smooth speed control, it is recommended to use variable frequency drive. It can be supplied loose or mounted inside the fan section as an option.
Motor and impeller are isolated from section housing with rubber anti-vibration mounts and flexible duct connectors.
The engine complies with energy efficiency classes IE1, IE2, and IE3, depending on the project requirements.
As an option the fan can be delivered in EX-proof realization.

PLUG FANS WITH ENERGY-SAVING ELECTRONICALLY COMMUTATED MOTORS (EC MOTOR)

Electronically commutated direct current motors (EC motors) with an external rotor, equipped with a backward curved impeller, are used. Such motors are the most progressive solution for energy saving. EC motors are characterized by high performance throughout the whole range of rotation speed. The advantage of an electronically driven motor is its high energy conversion efficiency (up to 90%).



BELT-DRIVEN FANS:

For units that require high pressure and airflow it is recommended to use belt driven fans in spiral housing.
The fan and gear blocks are located on the single frame, which is separated from the body of the machine with anti-vibration mounts.
The engine meets IE1, IE2, and IE3 energy efficiency classes, depending on the project requirements.

SOUND ATTENUATORS:

- Silencer unit consists of easily removable sound-absorbing 100 mm thick panels, with the length of 600 mm or 1200 mm. Noise absorption is in accordance to ISO 7235.
- Sound absorbing panels are available in two variants: pointed, with reduced resistance and rectangular, with a larger area of sound absorption.
- Panels are made of high density mineral wool with protection felt cover.

THE DISTANCE BETWEEN THE PLATES:

- 100 mm (standard);
- 150 mm – lowered air pressure drop;
- 75 mm – increased noise reduction.

AIR FILTERS

Units include the following filter elements:

- Panel-type preliminary filters, G3 and G4 class, in accordance to EN779. Filter depth is 50 mm. Reinforced with a steel mesh. Panel frame is made of galvanized steel.
- Pocket filters with pocket depth of 300 and 600 mm; G3, G4, F5 (M5), F7 or F9 class in accordance to EN779.
- High efficiency filters: EPA – filters (E10-E11) and HEPA – filters of classes H12-H14, in accordance to EN1822.
- Filters, based upon active carbon (unlike the filters of other types) are used for absorption of unpleasant ordour, gases and toxic evaporations.

All filters have easily removable cassettes that can quickly and easily be replaced.

In the case of two stages of filtration, unit contains a compact section in which panel and pocket filters are installed close to each other.

Electric heater

Section consists of electric tubular heating elements (heaters) with spiral fins, which are set (in sufficient quantity) into removable cassette frames, made of galvanized steel.
Heaters are protected from overheating by thermal switches with automatic reset to + 50 °C and with a manual reset to + 90 °C. Heaters are grouped according to the «triangle» scheme, three heaters in each group. Groups of heaters are then connected in parallel into 380 V power supply network.

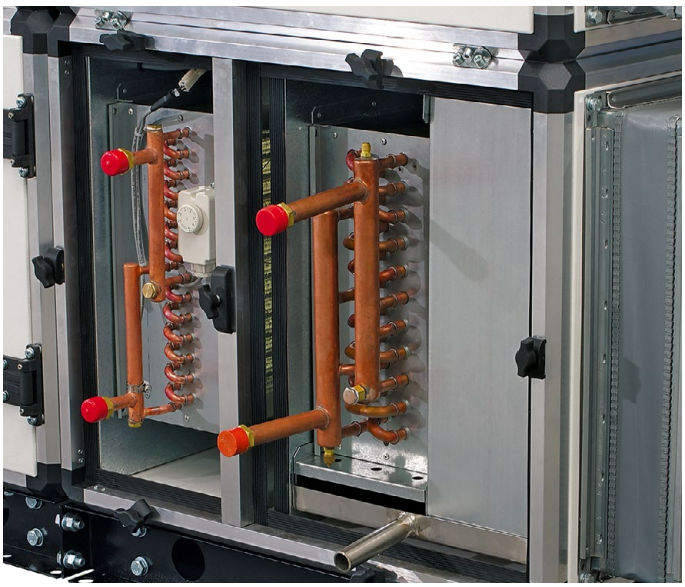
OPTION:
Unit with a built-in electric heater triac controller allows keeping the supply air temperature at a set level with accuracy of ± 1 °C.

RECOMMENDED ACCESSORIES:
Fan Pressure switch DTV 500 – additional protection from overheating in case of low air flow. The sensor can be pre-mounted inside unit, or supplied loose as a separate item.
External Triac controller RNS provides smooth control of heaters up to 75 kW (25 kW triac + two steps to 25 kW).

Water cooling coil

Heat exchanger complies with EN 13053, EN 1216
Unit consists of copper tubes with aluminum finning.
Section is equipped with a removable drain pan.
For water or glycol mixtures up to 50% glycol concentration.
Maximum working pressure of the cooling medium is up to 16 bar (1.6 MPa).
Drain and air bleeder valves are provided for each coil.

RECOMMENDED ACCESSORIES:
Three-way valve with electric actuator.



DX cooling coil

Complies with EN 13053, EN 1216
Copper tubes with aluminum finning.
Section is equipped with a removable drain pan made of stainless steel.
For refrigerants R22, R407, R410A, and others.
Drain and air bleeder valves are provided for each coil.

Water heating coil

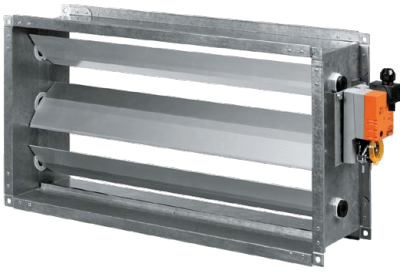
All heaters comply with the standards EN 13053, EN 1216. Heat exchanger consists of copper tubes with aluminum finning.
Maximum temperature of heat transfer fluid: 150 °C.
For water or glycol mixtures up to 50% glycol concentration.
Maximum operating pressure of the heat transfer fluid is up to 16 bar (1.6 MPa).
Drain and air bleeder valves are provided for each coil.

Rotary heat exchanger

A rotary heat exchanger is a rotating cylinder, filled with the layers of corrugated aluminum ribbon. The ribbon is placed so, as to allow supply and extract air flows pass through it. As a result, the ribbon is heated and cooled in turns, thus conveying heat and moisture from the warm air flow to the cold one.
The advantages of a rotary regenerator are: high efficiency, keeping comfortable humidity and low risk of frosting.
Rotary regenerators in BlauAir units are of two types:
Condensation type (standard);
Enthalpy type. The additional hygroscopic coating is applied to the tape, which provides additional moisture transfer from one stream to another. This feature is especially useful when using a rotor in summer in combination with the air conditioning system.

Plate heat exchanger

A plate heat exchanger is a heat exchanger, transferring heat from the exhaust air flow to the outdoor supply air flow.
Heat exchanger is made of profiled aluminum plates, packed with elastic heat-resistant sealant. The sealing provides a reliable separation of supply and exhaust air, not allowing moisture, dirt, and microorganisms to transfer between flows.
To avoid frosting, the heat exchanger provides active protection by means of the bypass channel.
Drain pan is installed under the heat exchanger.



Air dampers

Louvers are made of aluminum profile.
The dampers can be mounted inside, or outside of the section. The frame around the perimeter of the damper is made of galvanized steel.
The rotation is provided by cog wheels, made of polycarbonate. To be protected against external environmental influence, the wheels are set inside of a frame. Square rod is provided for automatic actuator mounting. If damper height is more than 1200 mm, two rods should be used. Air tightness class is 3, according to EN 1751.

OPTION: THE «NORTHERN» EXECUTION
For the regions with the outside air temperature -40 °C, the dampers are supplied with an electric heater between the blades. Heating protects blades and cog wheels from icing.

RECOMMENDED ACCESSORIES – ELECTRIC ACTUATORS:
- Two-position control (ON/OFF) or smooth opening regulation from 0 to 100 % on signal 0...10 V from the automation system.
- Actuator with a return spring closes the damper when power supply is off.

Flexible anti-vibration insert

- Flexible connectors are two flanges interconnected by an antvibration element. The inserts are made of galvanized steel and polyethylene tape, reinforced with polyamide fiber.

APPLICATION:
- In unit and air ducts connections to reduce vibration in the air ducts.

Pressure switch DTV 500

- Pressure differential switch indicates an error in case of clogging of air filters, breaking of belts in centrifugal fans, low air flow through electric heaters, etc.

Thermal switch F3000

- Duct thermostat indicates the threat of freezing of unit elements, such as plate heat exchanger, liquid heating coil, etc.

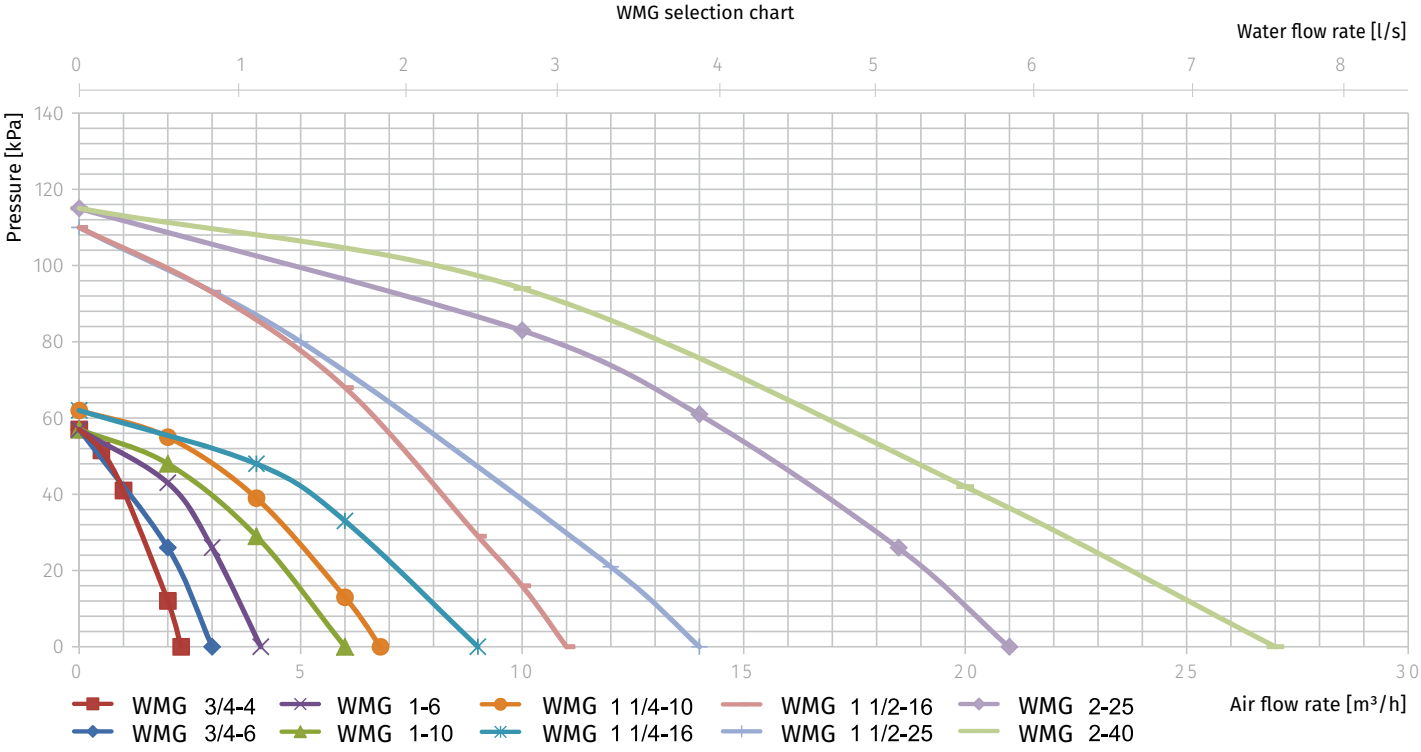
Variable frequency drive

Inverters provide smooth regulation, soft start, and active overheating protection of asynchronous fan motors.
Inverters can be supplied loose or mounted inside the fan section.
It is recommended to use VFD for both belt driven and direct driven free pressure plug fans.

Water mixing set WMG

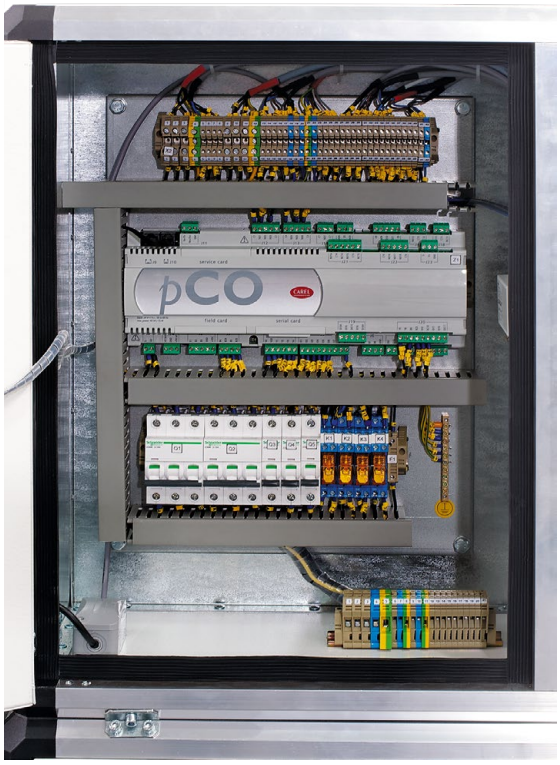
WMG is designated for regulating the heat transfer fluid parameters. WMG consists of a 3-way valve with a modulating electric actuator (0-10 V) and a circulation pump.

WMG selection chart



Technical data

	WMG 3/4-4	WMG 3/4-6	WMG 1-6	WMG 1-10	WMG 1 1/4-10	WMG 1 1/4-16	WMG 1 1/2-16	WMG 1 1/2-25	WMG 2-25	WMG 2-40
Circulation pump	DAB VA65/180		DAB A50/180XM		DAB A56/180XM		DAB BPH 120/250.40M		DAB BPH 120/280.50T	
Three-way valve with electric actuator	Belimo R317	Belimo R318	Belimo R322	Belimo R323	Belimo R329	Belimo R331	Belimo R338	Belimo R339G	Belimo R348	Belimo R349G
Electric actuator	Belimo LR24A-SR						Belimo NR24A-SR	Belimo SR24A-SR	Belimo NR24A-SR	Belimo SR24A-SR
Connection	Thread						Flange			
Three-way valve nominal diameter	DN 20	DN 20	DN 25	DN 25	DN 32	DN 32	DN 40	DN 40	DN 50	DN 50
Three-way valve K_{vs}	4	6.3	6.3	10	10	16	16	25	25	40



Control system

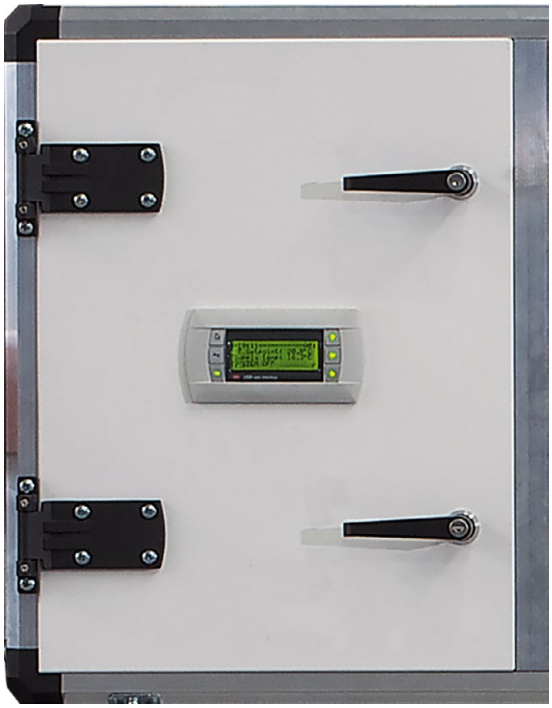
- BlauAir control system provides maximum reliability, easy operation and installation.

CONTROL SYSTEM IS AVAILABLE IN THREE VERSIONS:

- Control block in a polymer casing, with external fan speed and electric heater controls;
- Control block in a metal casing. Fan speed and triac electric heater controllers (if included) are installed inside the switchboard;
- Plug-and-play unit in a separate unit section. All control elements are pre-mounted inside the unit.

CONTROL BLOCK PROVIDES (DEPENDING ON MODEL) THE FOLLOWING FUNCTIONS:

- Power supply of all the unit elements.
- Active overload protection.
- Operation and error light signals.
- Start and stop of the system.
- Water or electric heater control. The system includes the necessary external and supply air temperature sensors, water (glycol) heater frosting protection sensors, electric heater overheating protection (safety and emergency thermostats).
- Air blowing of electric heaters, water coils pre-heating during cold season.
- Water cooling coil mixing valve or condenser unit block control.
- Smooth bypass valve control of a plate heat exchanger (active frosting protection).
- Air damper actuator control.
- Smooth rotary heat exchanger VFD control.
- Air filters clogging alarm.
- Fan capacity control:
  - Smooth regulation, by VFD, which provide soft start, fan stop and overheating protection;
  - Stair-step regulation, by an autotransformer;
  - Without regulation.
- Demand controlled ventilation, by CO_2, temperature, RH level sensors, etc.
- Daily and weekly schedule.
- Air ventilation system shut-down on the fire alarm signal.
- Integration into building management systems through installation of one more interface unit.



Plug-and-play unit: full electric wiring

Additional option – full factory electric wiring includes:

- Installation of air damper actuators. Routing of contacts from actuators to the terminal box.
- Installation of differential pressure switches in filter sections. Installation of a relay actuation threshold to the necessary level (final pressure drop according to the selection)
- Installation of frost protection thermostats in water heating coils sections.
- Installation of the VFD in the rotary heat exchanger section.
- Installation of bypass damper actuators in the plate heat exchanger section.
- Routing of all electric contacts in the electric heater sections.
- Routing of all electric contacts in the fan sections.
- Installation and adjustment of all temperature and humidity sensors inside the unit.
- All the electric contacts are routed to the junction box, which is mounted in one of the sections.

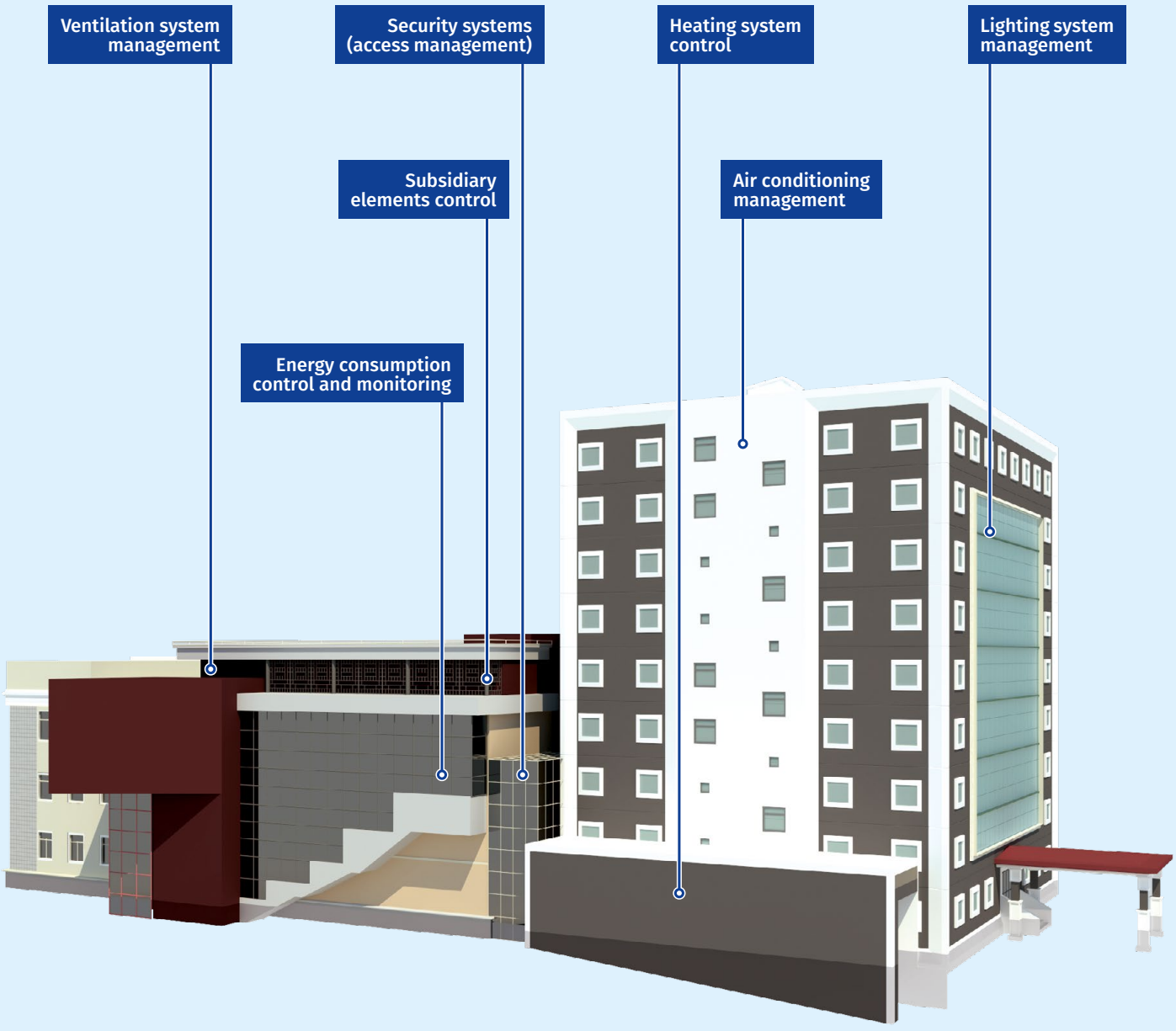
Plug-and-play option implies the possibility of shipment in separate blocks. In this case joints and connection boxes are installed between the sections.

Building Management Systems

BlauAir units control system can be easily integrated into building management systems (SCADA, BMS, «smart house»).
All the information processed by a programmable logic controller, is easily accessible via standard communication protocols:

- MODBUS TCP
- LON WORKS

Any other protocol can be used according to customer's choice and project requirements.



Inquiry form

Air handling units (AHU) are rather complicated pieces of equipment to specify and order, because a vast array of choices is available, and that is why there is no single number identifier (e.g., a «20 000 m³/h unit») that adequately describes a desired product.

THE SELECTION OF THE UNIT YOU NEED CAN BE DONE BY ONE OF TWO OPTIONS:

- Use Blauberg AHU Selection program and send us the data file;
- Fill up and send us an inquiry form.

In addition to size and type, in order to give you the optimal solution, our engineers must properly determine an air-handling unit's required supply air temperature and volume; outside air temperatures in summer and winter; air filtration rate; heating and cooling air capacities; humidification and dehumidification capacities; supply and exhaust air volume requirements; and required pressure capabilities of the fan(s). The more detailed information we receive- the better solution we can offer for your individual request.

BlauAir technical specification inquiry form

Company ..... /Building ..... Tel./Fax:

Contact person ..... E-mail:

Tel./Fax .....

E-mail ..... "....."....20.....

General

Unit: Exhaust ☐ Supply ☐ Supply & exhaust ☐ Supply & exhaust with heat recovery ☐

Mounting: Outdoor ☐ Indoor ☐ **Access side:** Left ☐ Right ☐

Supply & exhaust parts: Lineary ☐ Side by side ☐ One on the other ☐

Capacity and pressure	Supply	Exhaust
Capacity	..... m³/h	..... m³/h
Pressure (system resistance)	..... Pa	..... Pa

Air parameters		Winter		Summer	
Supply	Inlet air temperature and relative humidity	..... °C	..... %	..... °C	..... %
	Outlet air temperature and relative humidity	..... °C	..... %	..... °C	..... %
Exhaust	Inlet air temperature and relative humidity	..... °C	..... %	..... °C	..... %
	Outlet air temperature and relative humidity	..... °C	..... %	..... °C	..... %

Sections required

Fan Belt - driven ☐ Plug fan ☐

Filter Supply G4 ☐ F7 ☐ Other .....
Exhaust G4 ☐ F7 ☐ Other .....

			Liquid	Electric
Heater	☐	Air temp. before / after	..... °C / ..... °C	
	☐	Heater power	..... kWt	
Mixing set	☐	Water temp. before / after	..... °C / ..... °C	

			Liquid	Freon
Cooling section	☐	Air temp. before / after	..... °C / ..... °C	
	☐	Heater power	..... kWt	
Mixing set	☐	Heat transfer fluid temp. before / after	..... °C / ..... °C	

Heat exchanger ☐ ☐ Inlet temperature .... °C Outlet temperature .... °C
Plate ☐ ☐ Inlet humidity .... % Outlet humidity .... %
Rotary ☐ ☐ Efficiency .....

Silencer ☐ Supply ☐ 1200 mm long ☐ Other .....
Exhaust ☐

Air damper ☐ Supply ☐ Exhaust ☐

Mixing section ☐ Circulating air .... %
Inlet air temperature .... °C
Inlet air humidity .... °C

Accessories: Flexible connection (inlet) ☐ Flexible connection (outlet) ☐ Mounting base frame ☐

Control system ☐

Additional information:

Blauberg Ventilatoren GmbH
Aidenbachstr. 52
D-81379 Munich

info@blaubergventilatoren.de
www.blaubergventilatoren.de

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