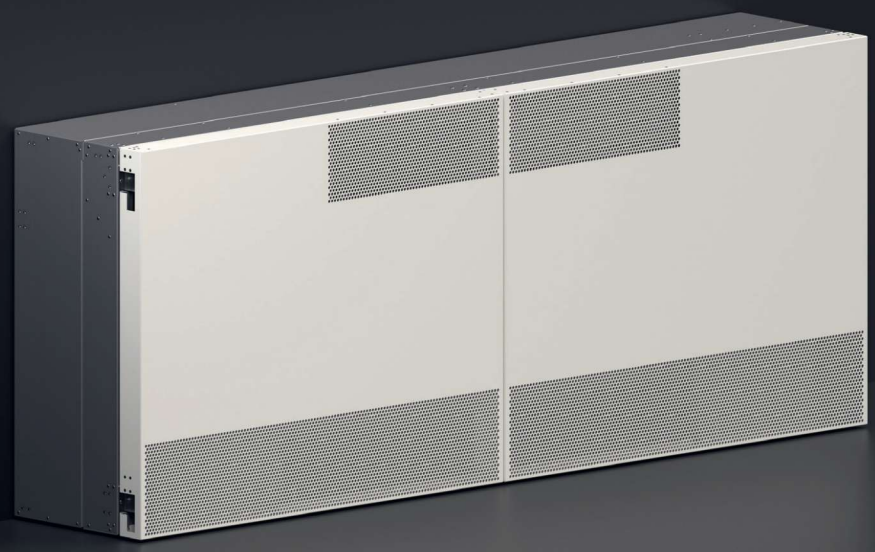
USER MANUAL

AIR DISTRIBUTION

WiVent ventilation system with decentralised **WiVent-B** ventilation unit



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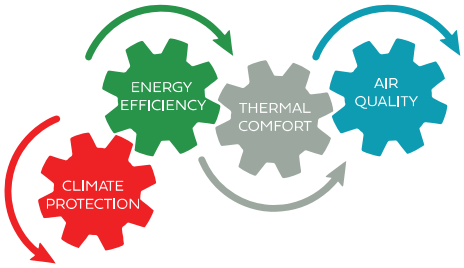
Contents

1 General principles

Nowadays people spend up to 90% of the day inside buildings. A pleasant anc quality is a prerequisite for our well-being, productivity and health protection.



Alongside health-related aspects, buildings and their technical equipment are required to meet ever-increasing demands for climate protection. Directives and regulations, e.g. the European Energy Performance of Buildings Directive EPBD [1] or the European Ecodesign for Sustainable Products Regulation ESPR [2], demand constant improvement in energy efficiency and continuous reduction of energy consumption.

The Gebäudeenergiegesetz (German Buildings Energy Act) GEG [3] combines these aspects. Saving energy in buildings requires a permanently airtight building envelope. At the same time however, the minimum air change level required for health purposes must also be ensured.

For new builds or renovations a calculation of the energy efficiency is carried out for each building. In the process, the energy requirement for ventilation also has to be determined. Rooms must be categorised in the respective zones in accordance with the use profile. Almost all buildings include rooms with broad window areas and limited room depth which at the same time may be designated for variable occupancy with a heavily fluctuating to high number of people. Examples include meeting rooms, training rooms, conference rooms and classrooms in schools or rooms in day care centres. With maximum and thus intensive occupancy the quantity of thermal and material loads naturally increases. As a result, a higher air change is required. It is a challenge to achieve it whilst adhering to the requirements for comfort, air quality, energy efficiency, acoustics and health protection.

The combination of high occupancy and a large façade width already has two crucial prerequisites for decentralised ventilation. When positioned in the parapet area, this kind of ventilation enables outdoor air to be introduced into the room by the shortest route following a displacement air principle. In the process it is distributed over a large area as supply air with a low flow impulse and with a minimum negative temperature difference. This ensures that there is effective, comfortable ventilation with high ventilation efficiency. However, effective room ventilation and energy-efficient operation also have to be ensured in partial load operation or for heating. To do so, it has to be possible to switch from low-impulse to strong-impulse ventilation. The WiVent ventilation system meets this requirement using decentralised WiVent-B ventilation units. It ensures requirement-based and energy-efficient operation and provides a comfortable indoor climate with good air quality at all times.

2 Standards and directives

2.1 Selection of individual guidelines

Energy aspects: The European Energy Performance of Buildings Directive EPBD [1] includes minimum requirements for the energy efficiency of building services systems, e.g. ventilation and air conditioning systems. These requirements are implemented in national guidelines like the Gebäudeenergiegesetz (German Buildings Energy Act) GEG [3]. This law specifies, for example, requirement-based air flow control for supply air and exhaust air systems according to DIN V 18599-7 [4] and DIN V 18599-10 [5].

DIN EN 16798-3 [6] formulates additional performance requirements for ventilation and air conditioning systems. These requirements can also be applied to ventilation units. They include energy consumption, space requirements, aspects of heat reclamation and filter replacement, for example. The requirements for control are of particular relevance. Various categories are available for this purpose, as is the case with DIN V 18599-7 and 10. In the process requirement-based control of the air flow opens up the large potential for reduction of energy consumption as a whole.

The aims of the European Ecodesign for Sustainable Products Regulation ESPR [2] include continuously reducing the energy consumption of products. The regulation (EU) no. 1253/2014 [7] is definitive with regard to requirements for ventilation units. The essential requirements are for a multi-level or regulated actuator, a minimum transfer dimension and thermal bypass for heat reclamation, a limitation of the specific fan output and compulsory information on a filter change.

Aspects for health protection and air quality:

Various regulations also include fundamental quality requirements for air quality in indoor spaces. The Technischen Regeln für Arbeitsstätten (technical rules for places of work) describe measures and practical implementation help for the safety and health of employees. Section 6.3 of ASR A3.6 on ventilation [8], for example, indicates that loads must be reliably discharged and a CO_2 concentration of 1000 ppm must be adhered to. If exceeded, action must be taken.

The documentation of the Federal Environment Office includes similar requirements. The guide on indoor room hygiene in school buildings [9] makes a distinction between harmless, conspicuous and unacceptable CO_2 concentrations. Part I of the requirements for ventilation concepts in buildings for education institutions [10] also outlines the requirement for adherence to a CO_2 guide value of 1000 ppm.

VDI directive 6040-1 [11] also formulates a target of not exceeding a time-weighted average CO_2 concentration of 1000 ppm during times of use for the special case of classrooms and common rooms.

CO_2 concentration [ml/m³] or [ppm]	Hygienic assessment	Measures
< 1000	Hygienically harmless	• No measures required
1000 ... 2000	Hygienically conspicuous	• Check and improve ventilation performance • Set up ventilation plan • Take ventilations measures
> 2000	Hygienically unacceptable	• Further reaching measures required: • e.g. increased ventilation • e.g. reduction of the number of people in the room

The listed regulations use the CO_2 concentration in indoor air as an indicator for the indoor air quality.

Up to a CO_2 concentration of 1000 ppm is defined as sufficient air quality. The development of specific ventilation measures is required above 1000 ppm. Concentrations of more the 2000 ppm are hygienically unacceptable and make effective and further reaching measures compulsory.

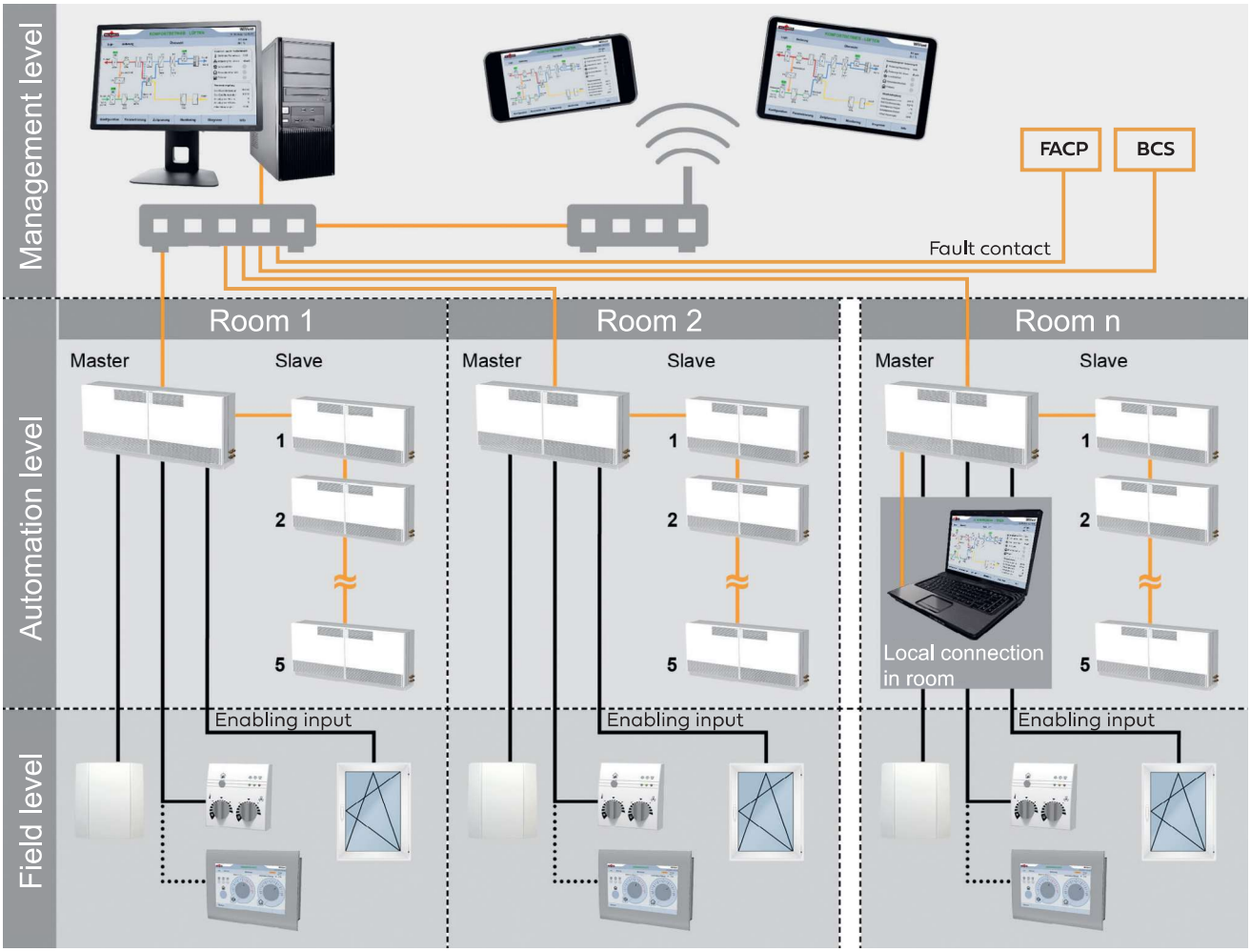
Aspects of thermal comfort:

In addition to the basic requirement for good air quality indoors, additional regulations formulate criteria for the comfort perception of room users. Currently DIN EN 16798-1 [12] and DIN EN ISO 7730 [13] contain different categories relating to the requirements for the indoor climate. The scale of the air change rate which has to be provided in a room whilst maintaining thermal comfort, i.e. prevention of draughts and critical air temperatures, is defined in accordance with the selected category.

List of sources for [1] to [13] ⇒ see page 33

3 System configuration

3.1 Building system arrangement



3.2 System description

The WiVent ventilation system is an effective and efficient system in the field of decentralised ventilation for non-residential buildings. It is used for requirement-based ventilation and temperature control for indoor rooms. The decentralised WiVent-B ventilation units for positioning in the parapet area are an essential component. One master unit can be combined with up to 5 slave units to form a ventilation belt. Suitable accessories complete the installation. The integrated WiVent software is used for configuration, parametrisation, operation and monitoring of the system. An indoor air sensor in each room supplements the system to form a complete solution. It detects both the room temperature and CO_2 concentration, and makes the data available to the WiVent software. This way, automatic operation of control in each room is performed self-sufficiently and is requirement-based.

An analogue or digital room control unit is available for possible user intervention. Both units make it possible to override the setpoints of automatic mode or trigger forced controls. LED status indicators and plain text displays provide information on current operating statuses. An enabling input is available for processing external signals and can be used for hybrid ventilation operation to switch between mechanical and natural ventilation, using a control signal or a window contact, for example. An additional fault contact can be used to integrate a central fire alarm system, for example, which switches off the WiVent-B ventilation unit when released or in the event of a fault. For communication with a higher-level building management system, the communication protocols BACnet and Modbus are available.

Integration into a network enables centralised and thus convenient access to all the units installed in the building whilst the web visualisation provides a smart solution for use of the comprehensive functions of the WiVent software using a graphic interface on various terminals, such as a PC, tablet or smartphone. An HTML editor can be used to design individual software and system views. However, it is also possible to gain simple access to the system without a network connection, in particular for commissioning locally. For this purpose, a connection is made to a master unit, using a laptop for instance, locally and thus in the room itself.

4 Decentralised ventilation

A decision to choose the decentralised WiVent ventilation system is always made at an early stage of planning and depends on the object. The more suitable the conditions for the system are when it comes to a new build, renovation or upgrade, the more it unfolds its potential. By establishing individual schedules in combination with requirement-based operation the system provides not only energy- and cost-efficient operation but also the highest degree of convenience and indoor air quality for the room users.

	Prerequisites and characteristics	Advantages and benefits
From a construction point of view	• The option of feeding outdoor and exit air through the façade of individual rooms • The option of discharging condensation when the operative design requires it	• System with low space requirement thanks to the omission of a central ventilation control system and air distribution system • System with minor encroachment into the basic structure of the building in individual rooms only, in particular for renovations and upgrades
From a system/control point of view	• Sources for thermal and material loads are in place, e.g. people • CO_2 concentration can be used as an indicator of indoor air quality • For rooms with variable occupancy and heavily fluctuating to high number of people • Technology in individual rooms, accessible for cleaning and servicing • Local connection of all ventilation units, for example to supply voltage and network and to heating and cooling medium as necessary	• Complete system, ready for connection and operation, with minimal installation work • Energy-efficient operation in each individual room • Requirement-based ventilation and temperature control • Reduced number of operating hours and increased service lives thanks to optimised ventilation schedule • Very good ventilation of rooms, even in the case of heavily fluctuating and high occupancy • Option of enabling and disabling user intervention • Control, monitoring and analysis of user and operating behaviour locally and from a central point • Hybrid operation, switching between mechanical ventilation and window ventilation can be implemented
WiVent-B	• A parapet as the installation location offers sufficient space for a ventilation belt, for example • Maximum penetration depth of supply air around 8 m	• Window sill above the space-saving ventilation belt • Highly effective ventilation thanks to displacement air and mixed air flow • Minimum energy consumption for air conveyance thanks to short, hygienically optimised air ways with low pressure drops

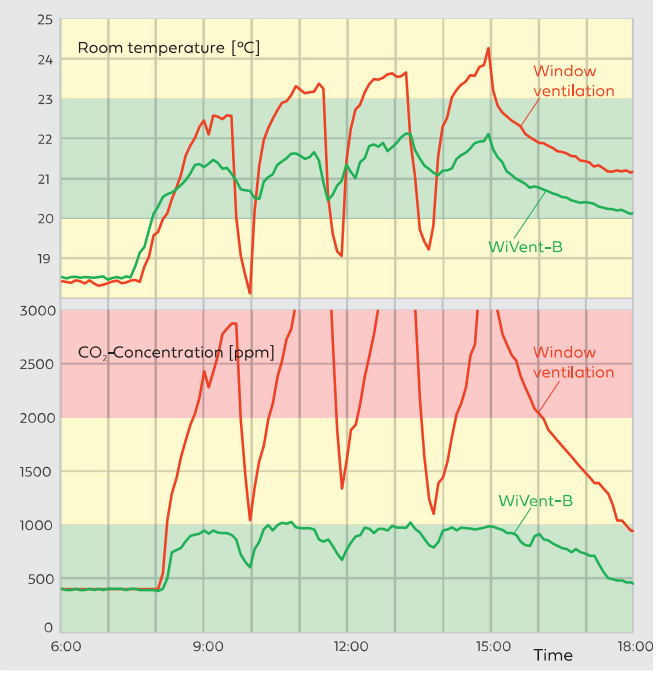
5 Indoor climate

In rooms with a high occupancy large quantities of thermal and material loads cause the air quality to deteriorate within a short space of time.

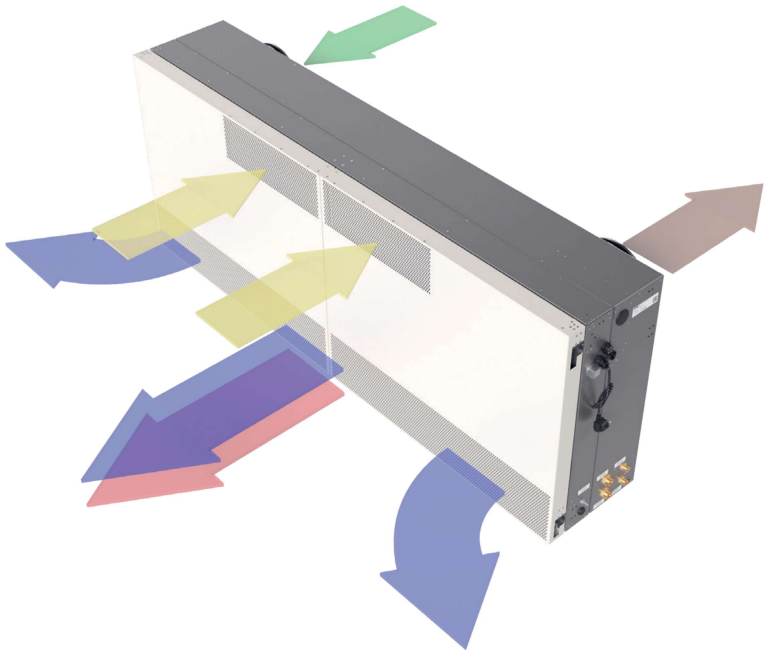
The limits are quickly reached with window ventilation only, even when ventilating cyclically with short bursts, due to the thermal comfort and energy aspects. It is performed in an uncontrolled manner and without metering, causes ventilation heat losses, draughts and temperatures below the desired level.

The chart shows a classroom in spring. Window ventilation cannot ensure the parameters for comfort and air quality. At the moment of short ventilation bursts the room temperature drops below the comfort limit. During lessons the CO_2 concentration increases above an acceptable level due to the lack of ventilation.

The WiVent ventilation system solves this problem using the WiVent-B ventilation units. The limits or window ventilation are overcome, adhering to the energy requirements, and a pleasant, comfortable indoor climate with good air quality is created.



6 Installation, temperature control and ventilation concept

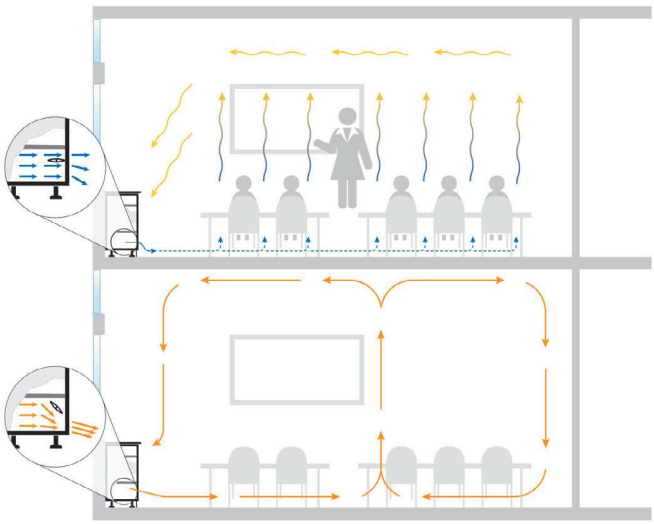


WiVent-B ventilation units are the essential components of the WiVent ventilation system. They are installed under a window façade on the parapet with a master and slave design and combined using accessories, such as a cover plate and floor panel, to form a ventilation belt. Thanks to this space-saving installation location, the air ways can be kept short, radiators can be replaced and the area required for installation can be reclaimed as window sill space.

The integrated unit software can be used to set up typical daily and weekly sequences. To do so, the various operating modes are combined to set up an individual schedule. The software then follows this sequence in automatic mode whilst an indoor air sensor continually records the condition of the air in the room. Temperature control and ventilation are activated when the parametrisable threshold values for each operating mode for temperature or CO_2 concentration are exceeded. Scheduling and the indoor air sensor thus make for energy-efficient operation with requirement-based air flow control.

WiVent-B ventilation units provide the room users with a stable indoor climate with good air quality even when occupancy varies and loads fluctuate. A special switching flap is also used to switch between low-turbulence displacement air flow and strong-impulse mixed air flow.

Flow principle:



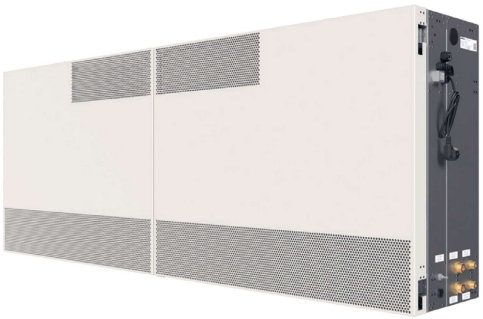
Displacement air flow
When operating with displacement air flow the opened switching flap for the supply air provides the complete outflow cross section across the full width of the unit.

The supply air, with a low flow impulse and minimum negative temperature difference, is distributed with low turbulence and over a large area at floor level and forms a sea of fresh air throughout the room. The air rises to the breathing area when confronted by heat sources, such as people, thus providing good air quality.

Mixed air flow
When operating with mixed air flow the closed switching flap reduces the outflow cross section.

The resultant increased supply air flow impulse changes the type of the flow in the room. Stable air rolls are formed in the room, providing quick and effective heating, for example.

7 Components



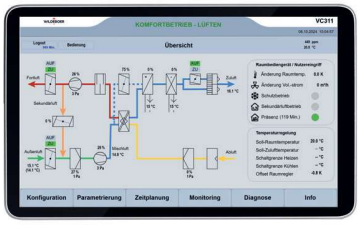
WiVent-B ventilation unit (scope of delivery)

Decentralised ventilation unit, ready for connection, as master or slave version for requirement-based ventilation and temperature control for rooms. For horizontal installation on the parapet of a façade and integration into a ventilation belt. The master unit contains the integrated control electronics in rugged industrial quality and is used to connect further components, such as slave units, an indoor air sensor and room control unit. ⇒ See pages 8 and 9

Comprehensive choices, options and additional accessories are available for the ventilation units. For example, filters of different classifications, heat and enthalpy exchangers, different RAL colours for the unit doors, a cooling unit, façade feedthroughs, cover plates and floor panels.
⇒ See pages 20 to 22

Indoor air sensor (scope of delivery)

Surface-mounted version of indoor air sensor with sensors for detecting the temperature and the CO_2 concentration of the air in the room.
The recording of the condition of the air in the room is a prerequisite for requirement-based air flow control. In the process the CO_2 concentration serves as the indicator for the indoor air quality.



Web visualisation (scope of delivery)

Web-based visualisation provides straightforward, convenient and mobile access to the WiVent software, for example with various terminals, such as a PC, tablet or smartphone.
It offers all options for configuring, parametrising, operating and monitoring the system, including user intervention, and can thus replace a room control unit. ⇒ See pages 13 to 17

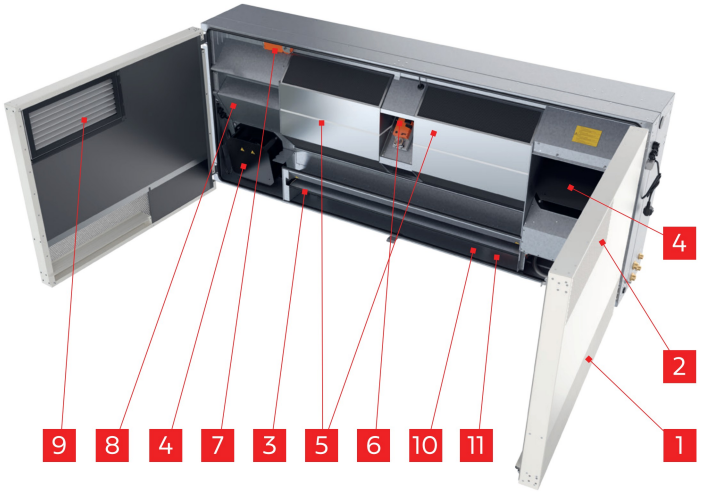
Analogue room control unit (optional accessories)

Surface-mounted version of room control unit for user intervention using rotary knob and buttons and for information on the current operating status of the units with LED status displays.
The unit allows the room user to override automatic operation. In the process the set points for the room temperature and the volumetric flow rate can be changed individually. Forced controls can also be triggered to systematically change to individual operating modes. ⇒ See pages 12 and 13

Digital room control unit (optional accessories)

The flush-mounted version of the digital room control unit has a 7-inch touchscreen display and, in addition to all the functions of the analogue room control unit, also provides complete access to the WiVent software. As well as user access, these include options for configuration, parametrisation, operation and monitoring of the system. Comprehensive information on the current operating status of the units is visualised. For example, plain text displays in the functional diagram and clear illustrations of all operating parameters for sensors and actuators.
⇒ See pages 13 to 17
Connection kits with different cable lengths are available for the connection to a master unit. ⇒ See page 21

8 Unit description



Unit construction

The WiVent-B ventilation unit is ready for connection and comprises a stable, galvanized sheet steel frame. It has supply air and exhaust air openings at the front only in the unit doors which are rugged and thus perfectly suited for everyday use. They are equipped with concealed closure and hinge technology and come with a high-quality powder coating in colour RAL 9010 or the colour of your choice. The modular construction of the ventilation unit allows complete and straightforward access to all components and air ways inside the unit when the doors are open. Individual modules, such as fans, heat exchangers, condensation discharge, switching flap, heating and cooling units, can be removed without the use of tools, they are partially elastically mounted and thus acoustically decoupled.

The ventilation unit is characterised by thermally separate air ways on the inside of the unit with low flow velocities and low pressure drops. In the interest of a resolutely hygienic design all the surfaces are smooth, suitable for cleaning, hard-wearing and protected from corrosion. The closed-cell seals do not absorb any moisture, they are resistant to microbes and thus do not promote the growth of microorganisms (fungi, bacteria).

Hygiene

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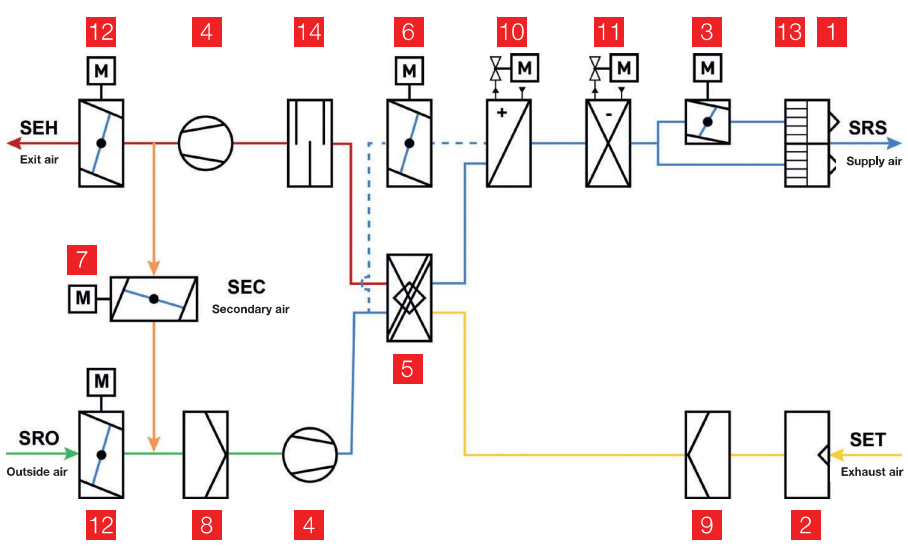
WiVent-B ventilation units (without cooling unit)
- meet the hygiene requirements according to VDI 6022-1, VDI 3803-2, SWKI VA104-01, ÖNORM H 6021.
- materials in the air stream are resistant to microbes, and therefore do not promote the growth of micro-organisms (fungi, bacteria),
- materials in the air stream are resistant to cleaning agents and disinfectants,
- are suitable for cleaning and satisfy the requirements for surface and geometric design.

Unit construction		Characteristics
1, 2	Openings for supply air 1 and exhaust air 2	• Front-facing opening surfaces prevent the entry of soiling and any resultant damage • Window sill can be used as a storage surface above a unit
3	Switching flap	• Displacement air flow with open switching flap • Mixed air flow with closed switching flap
4	Fans with EC actuator	• Optimised operation thanks to speed control • Energy-efficient operation, low electrical power consumption
5	Heat exchanger, optionally enthalpy exchanger With stainless steel condensation tray	• Highly effective recuperative heat reclamation using cross counter flow method • Additional moisture reclamation possible, for increasing the relative humidity of the supply air and reducing the amount of condensation in the enthalpy exchanger • Accessible, suitable for cleaning, hygienic
6	Bypass flap with electrical actuator	• Automatic bypass flap control for metering of reclamation by heat exchanger or enthalpy exchanger
7	Secondary air flap with electrical actuator	• Automatic control of outdoor air and secondary air content • Facilitates anti-freezing strategy without electrical preheating
8, 9	Outdoor air filter 8 and exhaust air filter 9	• Regular automatic filter drying for increased hygiene level • Automatic filter monitoring provides current soiling levels for timely requirement-based filter change
10, 11	Heating unit 10 and cooling unit 11 With control valves with electric motor	• For temperature control of the supply air • Cooling unit for active cooling available for additional selection • Control valves with integrated differential pressure controller and connections for checking the current differential pressure

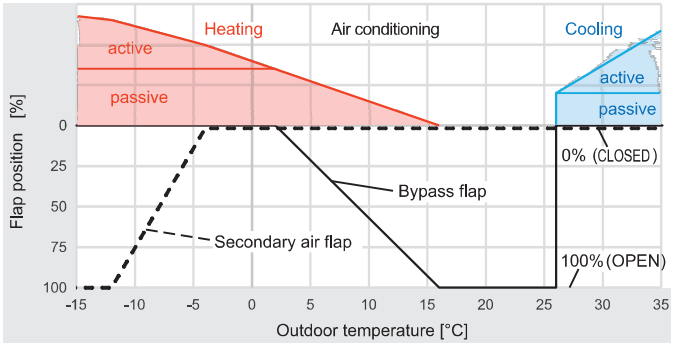
8.1 Functional diagram



1 Supply air opening
2 Exhaust air opening
3 Switching flap
4 Fan
5 Heat/enthalpy exchanger
6 Bypass flap
7 Secondary air flap
8 Outdoor air filter
9 Exhaust air filter
10 Heating unit
11 Cooling unit (optional)
12 Façade sealing cap
13 Rectifier
14 Sound attenuator

8.2 Functional description

The WiVent-B ventilation unit is connected to the outdoor environment by motor-driven and automatically closing outdoor air and exit air flaps. Both air flows are conveyed by speed-controlled EC fans. The outdoor air and exhaust air are filtered upon entry to the unit and pass through the adjustable heat reclamation within the unit. The switching flap and rectifier ensure that the supply air has the ideal flow type.



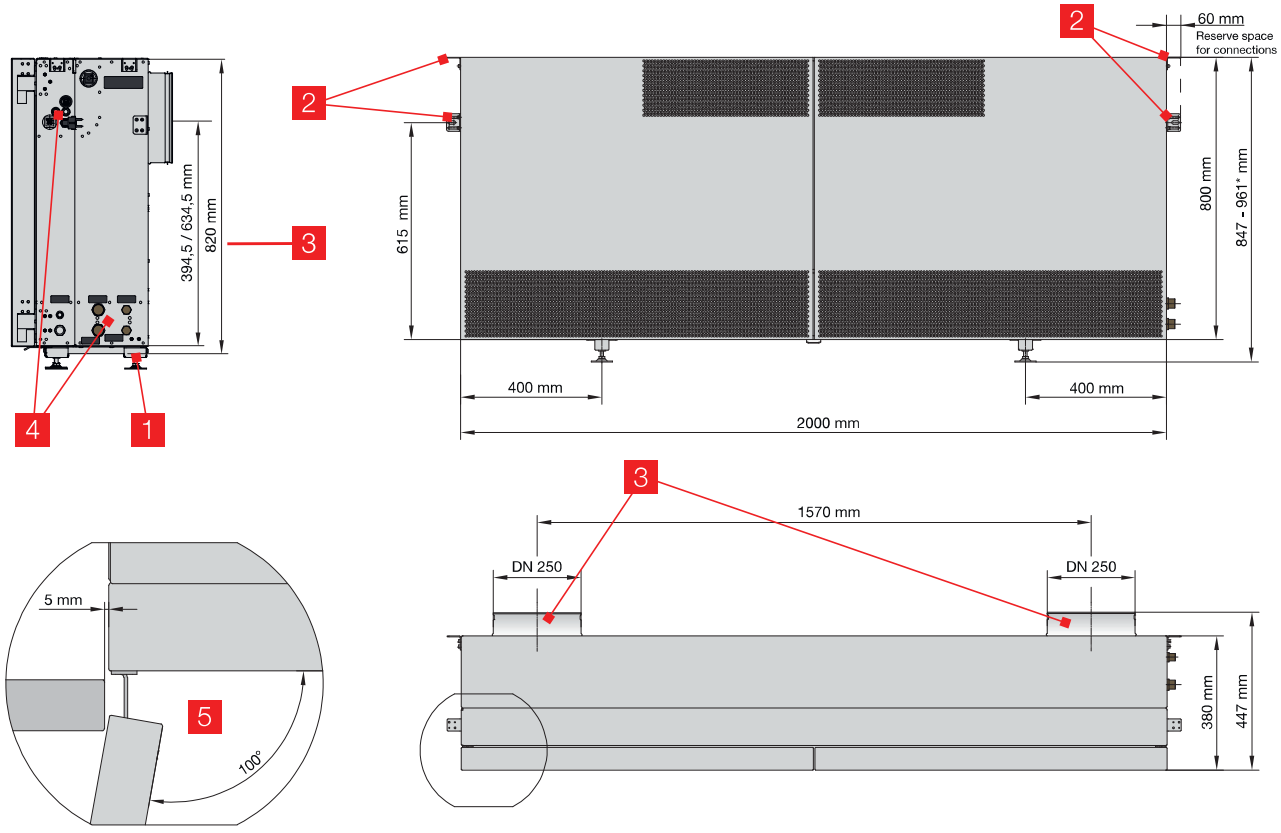
- **Bypass flap:** A bypass flap automatically regulates the content of supply air which flows through the heat exchanger for passive heating in the interest of optimum use of the heat reclamation. This achieves a constant ideal supply air temperature even at different outdoor air temperatures. On cold days the bypass flap remains closed so that heat reclamation is used fully. If the outdoor air temperatures increase, the heat reclamation is gradually reduced by opening the bypass flap continuously variably. It ultimately remains completely open when the outdoor air temperatures are mild.

On hot days the heat exchanger is used for passive cooling instead of heat reclamation. This is beneficial if the exhaust air from a room is cooler than the outdoor air. In this case the bypass closes so that the temperature of the outdoor air is reduced in the heat exchanger.

- **Heating unit:** If the outdoor air temperatures are very low, the heating of the supply air is not sufficient even using the maximum heat reclamation. A downstream heater battery with control valve is therefore integrated into the ventilation unit for active heating. This heating unit heats the supply air to the required exit temperature.
- **Secondary air flap:** For purely secondary air operation the secondary air flap opens completely when the outdoor air and exit air flap is closed. In addition, this flap is used to prevent freezing in the heat exchanger or enthalpy exchanger and to prevent frost damage in the unit. If the outdoor air temperatures drop significantly, the secondary air flap is opened gradually and the ventilation unit transitions from metered operation to purely secondary air operation.
- **Cooling unit:** An additional cooling battery with control valve can be selected for the ventilation unit for active room cooling. This cooling unit can be used to reduce the temperature of the warmer outdoor air in order to convey into the room as cooled supply air.

9 Data sheet

9.1 Dimensions and details



* Depending on the mounted unit feet

For further dimensions on the connections, see installation and operating instructions

Technical details		
1	Unit feet with unit mount (optional accessories)	• Height-adjustable unit feet with offset height of 47 to 161 mm
2	Fastening bracket	• For fastening to the building parapet on site (Ø ≤ 10 mm) • For fastening to a window sill on site (Ø ≤ 5.5 mm) • For installation of cover plates and floor panels as accessories
3	Outdoor air and exit air connection with façade feedthrough	• Two different heights for arrangement of the outdoor air and exit air connections • Thermally separate outdoor air and exit air connections, flaps and connection area made of thermally insulating material • Motor-driven outdoor air and exit air flap, closes automatically • Pipe and weather-resistant louvre (DN 250) for feeding through a parapet and connecting to a façade (accessories)
4	Supply connections	• All connections (viewed from the front) on the right-hand side of the ventilation unit • Connections for: Voltage supply, indoor air sensor, room control unit, master-slave connection, external enabling contact, network, heating and cooling medium, condensation
5	Doors of the ventilation unit	• Doors as unit front with concealed closure and hinge system • Two concealed compression latches as a safeguard to prevent unauthorised opening • Door can be opened to 90° to remove modules • Cover plates and floor panels (accessories) for exact installation and ensuring a minimum gap of 5 mm to allow the doors sufficient free movement

9.2 Technical Data

Main dimensions, weight	
Width*	2000 mm
Height	820 mm
Depth	380 mm
Weight, depending on version	143 ... 158 kg
Connections and features	
Outdoor air, exit air	DN250
Flap leak tightness (DIN EN 1751)	Class 2
Wind influence according to VDMA 24390	Device category 1
Heating unit	
External thread, flat-sealing	½ inch
Heating medium, maximum	75°C, 4 bar
Minimum differential pressure at control valve	15 kPa
Maximum pressure drop	25 kPa
Cooling unit	
External thread, flat-sealing	¾ inch
Cooling medium, minimum	16°C, 4 bar
Minimum differential pressure at control valve	15 kPa
Maximum pressure drop	29 kPa
Hose inner diameter for condensation discharge	
When discharging using incline / pump	16 mm / 6 mm

Filter classes	
For outdoor air	ISO ePM1 70% or ISO ePM10 50%
For exhaust air	ISO ePM10 50% or ISO Coarse 85%
Additional acoustic data to supplement the table	
Weighted sound attenuation dimension R_W with closed / open façade sealing cap	44 dB / 37 dB (closed / open)
Additional electrical data to supplement the table	
Supply voltage	230 V AC, 50 Hz
Connection cable	3.2 m
Standby (master / slave)	15 W / 9 W
Specific fan power	Category SFP 0
Maximum effective/apparent power	193 W / 312 VA
Protection rating (DIN EN 60730-1)	I
Network communication	Ethernet

The following table contains technical data in accordance with the quality and testing directive for decentralised ventilation units VDMA 24390 [14]. This directive contains specifications of the testing instruments which have to be used for testing ventilation units and the boundary conditions and operating conditions under which they are tested. Also the quality requirements which have to be adhered to.
Further technical data which equates to operation in practice can be found in the design example.

⇒ See pages 18 and 19

Operation points			Min	$Ü_{min}$	Nom	$Ü_{max}$	Max
WiVent-B ventilation unit	Supply air / exhaust air volume flow rate	[m³/h]	100	180[2]	300[2]	420[2]	500
	Degree of temperature change (with WT)	[%]	92	88	86	84	83
	Degree of temperature change (with ET)	[%]	89	86	81	77	75
	Degree of moisture change (with ET)	[%]	83	75	64	56	51
	Sound power level L_{WA}	[dB(A)]	29	38	43	51	54
	Sound pressure level L_{pA} (with ΔL_R = -8 dB)	[dB(A)]	21	30	35	43	46
	Electrical power consumption, master / slave	[W]	22 / 16	28 / 22	48 / 42	85 / 79	130 / 124
Technical data[1]) according to VDMA 24390 – Winter / heating scenario	Outdoor air temperature	[°C]	-12.0[3]				
	Supply air temperature	[°C]	26.8	31.6	38.2	34.5	33.1
	Exhaust air temperature / room temperature	[°C]	22.0				
	Heater battery inlet temperature	[°C]	19.9	18.9	18.4	17.8	17.6
	Heating water outflow temperature	[°C]	60.0				
	Heating water flow	[l/h]	10	25	160[4]	160[4]	160[4]
	Water heating power	[W]	226	753	1957	2304	2550[5]
	Room heating power	[W]	156	563	1583	1713	1806[6]
Technical data[1]) according to VDMA 24390 – Summer / cooling scenario	Outdoor air temperature	[°C]	36.0[7]				
	Supply air temperature	[°C]	21.0				
	Exhaust air temperature / room air temperature	[°C]	26.0				
	Cooling battery inlet temperature	[°C]	26.8	27.2	27.4	27.6	27.7
	Cooling water outflow temperature	[°C]	16.0				
	Cooling water flow	[l/h]	230	240	290	370	390[4]
	Water cooling power	[W]	191	368	633	914	1105[5]
	Room cooling power	[W]	165	297	495	693	825[6]

[1] Data for unit with heat exchanger (aluminium)

[2] Preconfigured in the factory

[3] Secondary air is added to increase the mixing temperature to at least min. -4 °C

[4] Maximum heating and cooling water flow

[5] Connected load of heating and cooling water under indicated conditions

[6] Amount for covering the room heating load or room cooling load

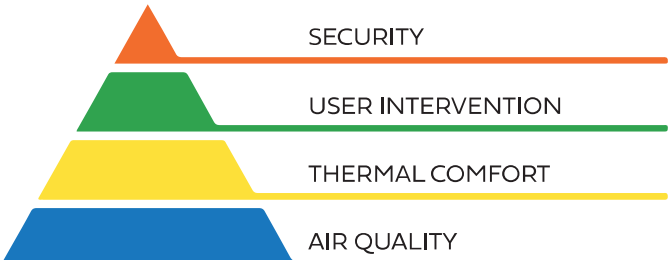
[7] Temperature increase of the façade boundary layer taken into account

Nomenclature ⇒ see page 19

List of sources for [14] ⇒ See page 33

10 WiVent software

Hierarchy of the WiVent software



For the hierarchically structured WiVent software the safety of the room users, rooms and the ventilation units has top priority. When switching on, the WiVent-B ventilation units therefore immediately switch to automatic and safety mode until another operating mode is requested. Further different operating modes are available for actual ventilation operation. The WiVent-B ventilation units are generally time-controlled and requirement-based, but can also be influenced by user interventions.

In ventilation mode the supply air volume flow and the room temperature are controlled as parameters of thermal comfort and the CO_2 concentration is controlled as an indicator of air quality. Temperature control and ventilation are activated when the recorded values drop below the parametrised threshold values for the active operating mode. If an outside air temperature below -4 °C or -12 °C or a wind pressure outside ± 50 Pa restricts operation with outside air, the air temperature is controlled with priority over the CO_2 concentration.

Operating modes in automatic operation

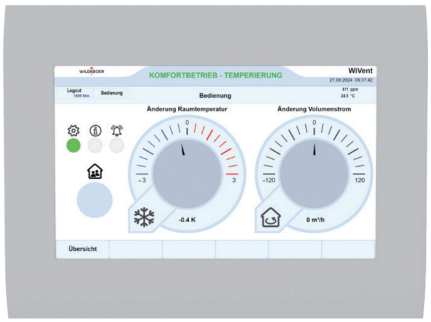
The WiVent software provides various operating modes for flexible organisation of ventilation operation. Many operating modes can be combined using a schedule to form typical daily and weekly sequences. All operating modes can also be adjusted to your own requirements using individual parameters. The integrated holiday schedule is used to define absence days on which safety mode is activated automatically. Preinstalled holiday calendars from all German federal states can be called upon for this purpose. Individual operating modes can be overridden (Ü) or forced (Z) by the user.

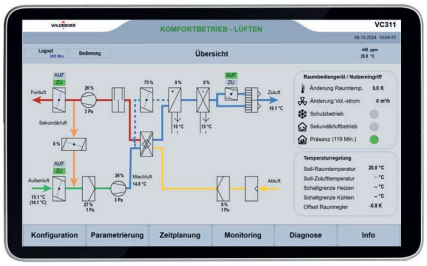
Operating modes					
Automatic mode	Daily and weekly sequences	Basic ventilation	Preconditioning of a room for subsequent use: • Basic ventilation with outdoor air for air renewal		
		Heating	Preconditioning of a room for subsequent use: • Heating in secondary air mode		
		Comfort mode	Ensuring the thermal comfort and air quality when using the room: • If the air quality is sufficient with temperature control either in secondary air mode or, if the outdoor air temperatures are suitable, with outdoor air • If the air quality is dropping as a result of requirement-based air change with outdoor air	Ü	Z
		Outdoor air mode	Continuous air renewal in the room: • Performed exclusively with outdoor air regardless of the CO_2 concentration • For example, for discharge of moisture or odour loads	Ü	
		Standby	Keeping a room ready for subsequent use: • Holding of a reduced standby temperature in secondary air mode • If required/if outdoor air temperature is suitable, air change is performed with outdoor air		
		Ventilation during breaks	Quick air change in a room ready for subsequent use: • Keeping the standby temperature constant • Volume flow rate set high		
		Night ventilation	Cooling of a room with outdoor air at night: • Reduction of the room temperature during the cooler night following hot days		
	Adjustable	Secondary air mode	Preventing outdoor air from being introduced into a room, temperature control using secondary air: • To prevent troublesome odours or substances being introduced from outside	Ü	Z
		Safety mode	Protection of the room and ventilation unit: • Always active if no other operating mode is requested • Maintains a minimum temperature in the room using secondary air operation		Z
		Filter drying and filter monitoring	Drying the filers and determining their pressure drop: • Is performed at set points in time in secondary air mode regardless of the outside air conditions		
OFF			Complete deactivation of automatic operation: • Any ventilation, temperature control and safety function is cancelled		Z

User intervention

The option of user intervention increases the acceptance of a ventilation system considerably as room users or authorised persons can influence the ventilation. For this purpose the WiVent software allows interventions into automatic operation. In individual operating modes the set points can be overridden (Ü) or operating modes can be forced (Z). This type of user intervention and the setting up of a possible password are performed using the WiVent software.

User interventions[1)] can be performed using the analogue or digital room control unit and using the web visualisation. The analogue room control unit uses rotary knobs and a button for this purpose; the digital room control unit and the web visualisation use a graphic interface.





User intervention for overriding set points

A user intervention can be used to override the set points for room temperature and the volume flow rate in operating modes comfort mode and outdoor air mode. In secondary air mode on the other hand only the room temperature can be overridden. The range of change to the set points is parametrisable in the WiVent software.

The following is preconfigured in the factory:

- A change in the outside temperature related room temperature of ± 3 K.
- A change in the nominal volume flow rate by ± 120 m³/h in the range between Ümin and Ümax.

User intervention to trigger forced controls

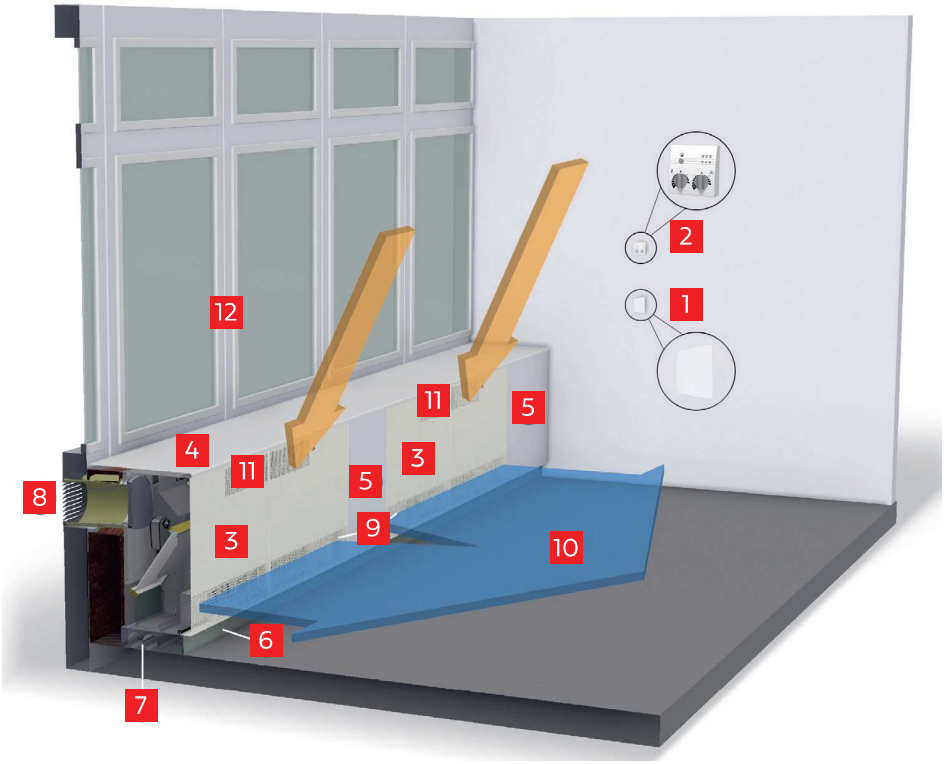
The following forced controls can be triggered by a user intervention and thus change the operating mode compared to a sequence according to the schedule:

- Comfort mode: The ventilation unit can be set to comfort mode for a limited time. It then works with the set points for the room temperature and volume flow rate. The duration of the operation is parametrisable. It is set to two hours in the factory.
- Secondary air mode: The ventilation unit can be forced into secondary air mode. In the process it controls the room temperature in accordance with the set point for room temperature but without outdoor air. A possible set point for the volume flow rate is ignored.
- Safety mode: When forcing this operating mode a minimum temperature is maintained in the room, if necessary using secondary air operation. Possible set points for the room temperature and volume flow rate are ignored.
- Off: Forces full deactivation of the ventilation units so that no operating mode of automatic operation is active. In the process any ventilation and temperature control function is cancelled and thus also the protection of the room and units. The ventilation units have to be switched back on again to return to automatic operation.

[1)] User interventions always remain ineffective if safety is set as the top priority above the user's wishes.

11 Planning, installation and operating instructions

Installation example



1 Indoor air sensor
Room control unit (accessories)
2
3 WiVent-B ventilation unit
Window sill (provided by the user)
4
5 Cover plate (accessories)
6 Floor panel (accessories)
7 Supply lines
8 Façade breakthrough
9 Supply air opening
10 Displacement air flow
11 Exhaust air flow
Window contact (provided by the user)
12

Planning

When planning for installation of the WiVent ventilation system, the following has to be observed:

- WiVent-B ventilation units are designed for attachment to parapets. In the process the position of the units determines the position of the façade breakthroughs for outdoor air and exit air. The respective openings must be made on site taking into account the structural requirements for the parapet and façade.
- Spacing between two ventilation units of at least 500 mm to prevent air short circuits on the façade side and in the interest of convenient connection of all supply and communication lines.
- Maximum distance between the bottom edge of the units and the floor of 160 mm for the use of floor panels (accessories) and in the interest of stable air stream guidance for mixed air flow with good room ventilation.
- Option of shutting off, venting and possible draining of water media.
- Provide an indoor air sensor in the circulation area of the indoor air free from interfering influences from windows and doors.
- Position the room control unit where it is easily accessible.

Installation

For installation of the WiVent-B ventilation units the following steps are required:

- Set up the ventilation units and align them with the unit feet.
- Lay a pipe with weather-resistant louvre (accessories) or on-site alternative with a slight incline towards the outside to drain rainwater, insulate on the room side and connect hermetically to the connections on the ventilation units.
- Fasten the ventilation units to the parapet and window sill using fastening brackets.
- Establish electrical connections, including voltage supply, indoor air sensor, room control unit, master-slave connection, external enabling contact and network.
- Establish media connections, including heating and cooling medium and condensation discharge.
- Install cover plates (accessories) between the units and as a termination at the wall and floor panels (accessories) as a skirting board. If on-site covers are installed, a gap of 5 mm must be ensured to allows the unit doors sufficient free movement. ⇒ See pages 10 and 21

Commissioning

The WiVent ventilation system is quick and easy to configure within the scope of initial commissioning:

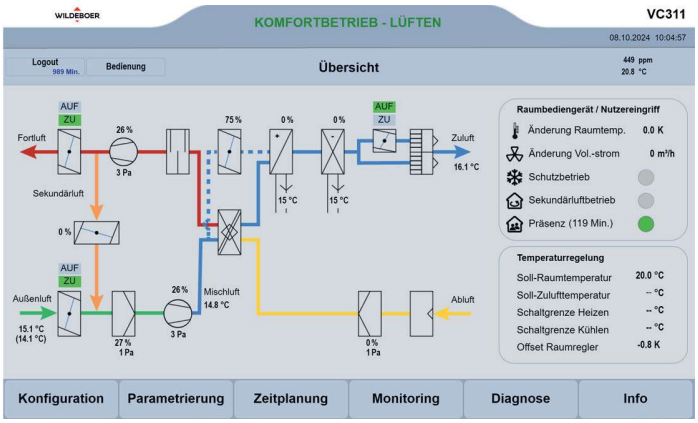
- Addressing of all WiVent-B master units and numbering of all slave units.
- Selection of a possible room control unit.
- Disabling or enabling of user intervention and setting up possible password protection.
- In the process the option of resetting to the factory settings is available.

The WiVent software first starts with preconfigured parameters and can then be parametrised to individual wishes and requirements.

Example 1: Setting up of daily and weekly sequences

This includes:

- Setting individual limit values and threshold values, for example for the outdoor temperature-related room temperature and the CO_2 concentration.
- Setting up the schedule with typical daily and weekly sequences. ⇒ See example 1
- Setting up the schedule for holidays, individually or based on preconfigured holiday dates.
- Determining the setting values of individual operating modes, for example the conditions for night ventilation and the points in time for filter monitoring and filter drying.
- Adjusting the control parameters.



Example 2: Visualisation of the operating mode and current operating data

Operation:

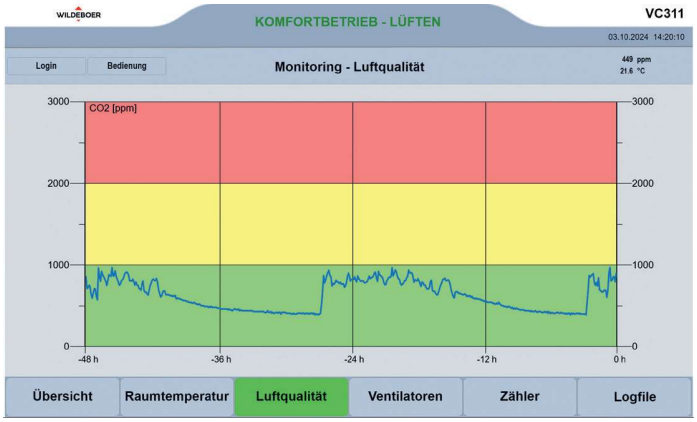
In automatic operation the operating modes are processed in accordance with the established schedule.

Regular filter drying is integrated into this sequence. This extends the service life of the filters and increases the hygiene level as a whole in conjunction with running the condensation and drip tray dry.

Condensation on the cooling unit, which is available for additional selection, is prevented by outflow temperatures of at least 16 °C.

During automatic operation the WiVent software provides the option of user intervention. Moreover, in conjunction with either a digital room control unit or the web visualisation, it supplies extensive additional operating information:

- Visualisation of the operating mode and all current operating data, for example room temperature, CO_2 concentration, fan data, flap positions, filter pressures, media temperatures. ⇒ See example 2
- Monitoring of the progress of temperature and CO_2 concentration in the room in the form of a graphic display. ⇒ See example 3
- Diagnosis of filter statuses, switching frequencies, flap cycles and operating hours.

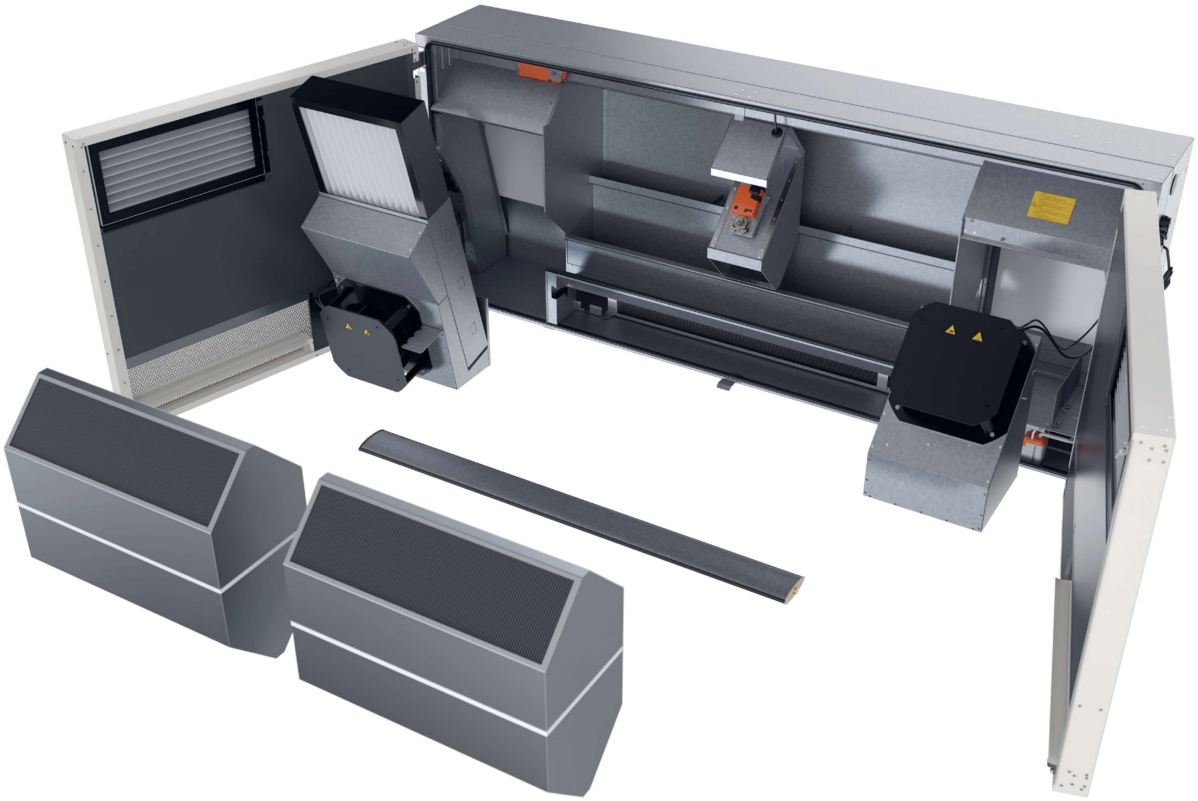


Example 3: Monitoring of the CO_2 concentration

Cleaning and servicing

The WiVent-B ventilation unit can be opened to change the filter, for cleaning and servicing. In the process the compact and modular construction allows easy access to all components and air ways inside the unit:

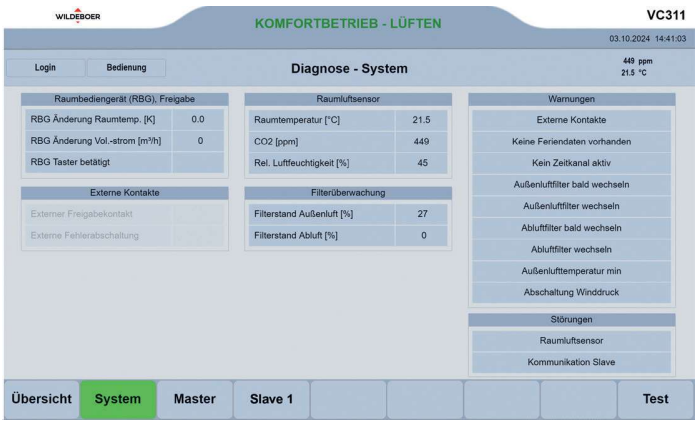
- Outdoor air and exhaust air filters are directly accessible and easy to remove from the ventilation unit or the unit doors directly and to replace with new ones.
- Individual modules can be removed without tools so that all the surfaces and air ways and the outdoor air and exit air flap can be subjected to a visual inspection.
- If necessary, the hygienic design throughout allows quick and straightforward cleaning thanks to the surfaces being smooth and suitable for cleaning.



Diagnosis

The WiVent software provides a diagnosis function for monitoring the WiVent ventilation system. All the sensors and actuators of master and slave units, the indoor air sensor and room control unit can be checked for plausibility and to make sure they are fully functional. Possible warnings and faults are also displayed.

⇒ See example 4



Example 4: Diagnosis of the ventilation system

- All information on the indoor air sensor, room control unit and the ventilation units is displayed. For example data on the sensors for temperature, pressure and filter monitoring, and warnings and fault messages. Further data from both the master unit and the slave units is taken into account for specific analyses.
- A manual controller can be used to actuate all the actuators on the ventilation units. These include the fans, all flaps and the control valves. This makes it possible to test the actuators after installation, for example.

Operation using web visualisation

Integrating the WiVent-B ventilation units into a network enables convenient use of the web visualisation. For this purpose, access to the web server has to be set up on site for the controller of each individual master unit. All the functions of the WiVent software are then available at a central point in a very simple manner.

The web-based visualisation works with all common web browsers. It thus provides the on-site option of using an HTML editor to set up individual views based on the WiVent software structure and making these available on various terminals, such as a PC, tablet or smartphone. This way, for example, the favourites bar in a browser can be used to set up clear access to the units in various rooms. It is also possible to combine multiple different views of the WiVent software for the ventilation units of just one room or to show a clear overview of the units in multiple rooms simultaneously.

⇒ See example 5

Example 5: Access to the ventilation units in one room, multiple different software views.

BCS interface

The BCS interface makes for simple integration into existing building management systems with all units being controlled from a central point and the option of remote access to operating modes and room temperature.

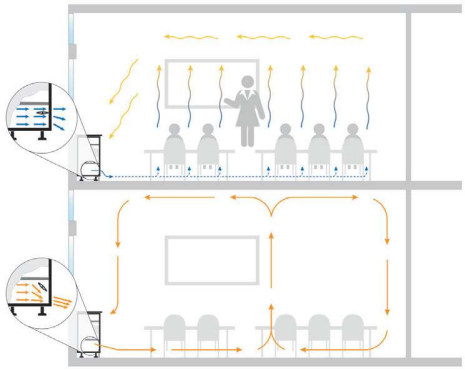
The BCS interface offers comprehensive access to operating data, such as room temperature, CO_2 values and unit run times. The reading out of operating statuses makes for precise control which can be matched to the specific requirements of building management and optimised. The integrated 48-hour monitoring can be upgraded with the BCS interface using external long-term storage of measured values, e.g. based on optimisation of the energy efficiency. Early detection of warnings or faults and anticipatory planning of maintenance work is thus made easier.

Thanks to compatibility with the communication protocols BACnet IP and Modbus TCP/IP, the BCS interface makes for smooth data exchange between the central building management system and the WiVent-B ventilation units.

Further planning, installation and operating instructions:

For information on WiVent-B ventilation unit with accessories	⇒ see installation and operating instructions for specialist staff
For information on WiVent software	⇒ see operating instructions for specialist staff, WiVent-SW-02
For information on the BACnet interface	⇒ see BACnet interface documentation
For information on the Modbus interface	⇒ see Modbus interface documentation

12 Design example



Example: Seminar and conference room
The task is to ventilate a seminar and conference room which is characterised by a variable occupancy with a heavily fluctuating to high number of people.

If there is a high occupancy, the WiVent-B ventilation units use the displacement air flow (QL) with increased ventilation efficiency and when the occupancy is low, they use mixed air flow (ML) for good room ventilation. Both statuses between which the ventilation units switch automatically are taken into account in the example and in the tables for the winter and summer scenarios.

Specified:

B x T x H:	8.05 m x 6.90 m x 3.10 m
Building emissions:	building low in harmful substances
Number of room users:	maximum 23 people
Room attenuation ΔL_R:	- 8 dB

Required:

Ventilation rate:	Category II according to DIN EN 15251
Avg. CO_2 concentration:	≦ 1000 ppm
Sound pressure level L_{pA}:	≦ 40 dB(A)

Ventilation rate according to DIN EN 16798-3 [6], number of WiVent-B ventilation units:

Ventilation rate due to building emissions:	0.7 l/s/m² · (8.05 m · 6.90 m)	=	140 m³/h
Ventilation rate due to human emissions:	7 l/s/person · 23 persons	=	580 m³/h
Ventilation efficiency ev:	with 23 persons displacement air flow (DF)	=	1.2
Required outdoor air volume flow rate:	(140 m³/h + 580 m³/h) / 1.2	=	600 m³/h
Number of ventilation units	with nominal volume flow rate 300 m³/h	=	2 pc.
Sound power level L_{WA}	per unit (nominal volume flow rate)	=	43 dB(A)
Sound pressure level L_{pA} in the room	2 units, $L_{WA\ total}$ = 46 dB(A), room attenuation - 8 dB	=	38 dB(A)

Operating statuses in winter, i.e. heating scenario, and in summer, i.e. cooling scenario
The numerical values in the following tables apply for typical operating modes and statuses, each relating to an individual WiVent-B ventilation unit. They represent examples of momentary values which arise in particular at the beginning of an operating mode.

Operating modes				Basic ventilation	Heating	Comfort mode			Outdoor air mode			Standby	Ventilation during breaks	Night ventilation[4]	Secondary air mode	Safety mode	Filter drying monitoring
Room		Number of persons	[-]	0	0	23			5			0	0	-	5	0	0
WiVent-B[1]		Supply air / exhaust air volume flow rate	[m³/h]	300	500	180	300	420	180	300	420	300	450	-	300	300	300
		Flow type	[-]	ML	ML	QL			ML			ML	ML	-	ML	ML	ML
		Bypass flap	[-]	CLOSED	-	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED[5]	CLOSED	-	-	-	-
Winter / heating scenario	Without outdoor air[2]	Supply air temperature t_{SRS}	[°C]	-	30.4	-			-			27.0	-	-	26.0	23.0	20.0
		Exhaust air temperature $t_{SET} = t_{IDA}$	[°C]		16.0							20.0			22.0	16.0	20.0
		Heating water flow	[l/h]		160							21.7			11.5	22.5	-
		Outflow temperature	[°C]		60.0							60.0			60.0	60.0	-
		Return flow temperature	[°C]		47.8							34.0			32.0	34.6	-
		Unit / room heating power	[W]		2444							704			401	713	-
	With outdoor air[3]	Outdoor air temperature t_{SRO}	[°C]	-4.0	-	-4.0			-4.0			-4.0	-4.0	-	-	-	-
		Supply air temperature t_{SRS}	[°C]	16.0		19.0			26.4	35.5	32.9	27.0	22.0				
		Exhaust air temperature $t_{SET} = t_{IDA}$	[°C]	16.0		22.0			22.0			20.0	22.0				
		Heating water flow	[l/h]	12		0.3	3	8	40	160	160	80	30				
		Outflow temperature	[°C]	60.0		60.0			60.0			60.0	60.0				
		Return flow temperature	[°C]	37.5		36.9	39.5	40.5	49.1	49.7	47.3	47.5	40.0				
		Passive heating with WT	[W]	1891		1509	2458	3361	1509	2458	3361	2269	3601				
		Active heating with heating unit	[W]	308		8	70	179	496	1884	2318	1139	686				
		Unit heating power	[W]	2199		1517	2528	3540	2005	4342	5679	3408	4287				
		Room heating power	[W]	0		-180[6]	-301[6]	-421[6]	256	1354	1530	708	0				

Design example

WiVent-B decentralised ventilation unit

Operating modes				Basic ventilation	Heating	Comfort mode			Outdoor air mode			Standby	Ventilation during breaks	Night ventilation[4]	Secondary air mode	Safety mode	Filter drying monitoring
Room		Number of persons	[-]	0	-	23			5			0	0	0	5	0	0
WiVent-B[1]		Supply air / exhaust air volume flow rate	[m³/h]	300	0	180	300	420	180	300	420	300	450	300	300	300	300
		Flow type	[-]	ML	-	QL			ML			ML	ML	ML	ML	ML	ML
		Bypass flap	[-]	CLOSED	-	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	OPEN	-	-	-
Summer / cooling scenario	Without outdoor air[2]	Supply air temperature t_{SRS}	[°C]	-	-	21.0			-			21.0	-	-	21.0	-	24.0
		Exhaust air temperature $t_{SET} = t_{IDA}$	[°C]			23.0						26.0			26.0		24.0
		Heating water flow	[l/h]			200	250	315				290			290		-
		Outflow temperature	[°C]			16.0						16.0			16.0		-
		Return flow temperature	[°C]			16.5	16.7	16.8				17.5			17.5		-
		Unit / room heating power	[W]			-306	-509	-713				-509			-509		-
	With outdoor air[3]	Outdoor air temperature t_{SRO}	[°C]	24.0	-	36.0			36.0			36.0	36.0	17.0	-	-	-
		Supply air temperature t_{SRS}	[°C]	22.3		21.0			21.0			21.0	21.0	19.0			
		Exhaust air temperature $t_{SET} = t_{IDA}$	[°C]	22.0		26.0			26.0			26.0	26.0	25.0			
		Heating water flow	[l/h]	-		240	290	370	240	290	370	290	210	-			
		Outflow temperature	[°C]	-		16.0			16.0			16.0	16.0	-			
		Return flow temperature	[°C]	-		17.3	17.8	18.0	17.3	17.8	18.0	17.8	20	-			
		Passive heating with WT	[W]	-163		-500	-815	-1115	-500	-815	-1115	-815	-1194	-			
		Active heating with heating unit	[W]	-		-353	-607	-876	-353	-607	-876	-607	-938	-			
		Unit heating power	[W]	-163		-853	-1422	-1990	-853	-1422	-1990	-1422	-2133	189[9]			
		Room heating power	[W]	28[8]		-297	-495	-693	-297	-495	-693	-495	-711	596[9]			

[1] Ventilation unit with heat exchanger WT and cooling unit

[2] Façade sealing caps CLOSED, secondary air flap OPEN

[3] Façade sealing caps CLOSED, secondary air flap OPEN

[4] Not in winter scenario

[5] For operation with outdoor air

[6] High number of persons, QL with $t_{SRS} < t_{IDA}$

[7] Not in summer scenario

[8] Passive cooling, $t_{SRO} > t_{SRS} > t_{IDA}$

[9] Night cooling, $t_{SRO} < t_{SRS} < t_{IDA}$

Nomenclature

Technical variables:

B	[mm]	Width
H	[mm]	Height
T	[mm]	Depth
DN	[mm]	Nominal diameter
CO_2	[ppm]	Carbon dioxide
t_{SRO}	[°C]	Outdoor air temperature
t_{SRS}	[°C]	Supply air temperature
t_{SET}	[°C]	Exhaust air temperature
t_{IDA}	[°C]	Room temperature
V	[m³/h]	Volume flow rate
ε_V	[-]	Ventilation efficiency
L_{WA}	[dB(A)]	Sound power level, A-weighted
L_{pA}	[dB(A)]	Sound pressure level, A-weighted
R_W	[dB]	Sound reduction index
ΔL_R	[dB]	Acoustic room attenuation

Terms and abbreviations:

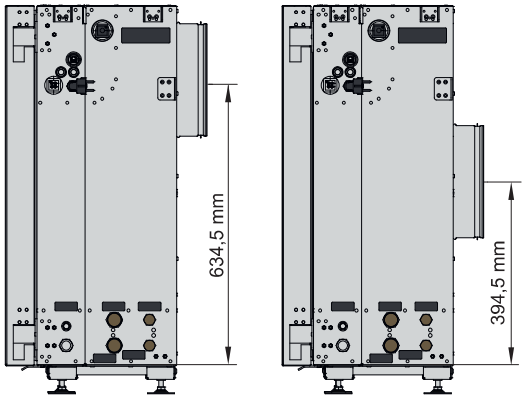
SRO	Single room outdoor air
SRS	Single room supply air
SET	Single room exhaust air
SEH	Single room exit air
SEC	Secondary air
ML	Mixed air flow
QL	Displacement air flow
Ü	Override
$Ü_{min, max}$	Limits of override
Z	Forced control
M	Electric motor actuator for flaps or valves
EC	Electronically commutated
SFP	Specific fan power
WT	Heat exchanger
ET	Enthalpy exchanger

Miscellaneous:

0 ... 100%	Flap position 0% = CLOSED, 100% = OPEN

13 Selection, options, accessories

Selection



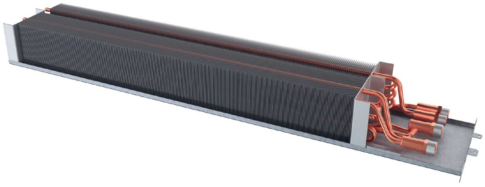
WiVent-B ventilation unit master or slave version

The ventilation unit is available as a master and slave unit version. A master unit is always supplied with integrated controller and an indoor air sensor (surface-mounted version). If further slave units are combined with a master unit in a ventilation belt, they have to be selected to be technically identical to the master unit.

Figures and description ⇒ See pages 6 to 11

Connection position

For the connections for outdoor air and exit air there are two positions on the ventilation unit for selection: Top or middle. The connections are positioned in the factory in accordance with the specification in the order. ⇒ See page 23



Heating and cooling unit

Heating and cooling units are made up of the respective water-activated batteries together with factory-mounted control valves.

There are two options available for temperature control of the supply air:

- One battery, for heating only, 2-conductor version.
- Two separate batteries for heating and cooling, each as 2-conductor.

Heater and cooling batteries are made up of cooper pipes and burled high-performance aluminium blades. They are equipped with a control valve with measuring nipples and integrated differential pressure controller in the factory. This allows the given differential pressure to be checked and offsets fluctuating media pressures immediately. The electrical actuator is equipped with a function for valve block protection.

Heater and cooling batteries are housed in a drip tray and are connected with flexible hoses for sampling.

Heat/moisture reclamation

The following are available as cross counter flow heat exchangers:

- Heat exchanger made of aluminium for heat reclamation, suitable for cleaning
- Enthalpy exchanger with polymer membrane for heat reclamation and additional moisture reclamation, suitable for cleaning

Filters for outdoor air and exhaust air

Filter[1)] according to DIN EN ISO 16890-1 with filter cell design with stable plastic frame and folded non-woven material, fully incinerable. The following is available:

• Outside air:	ISO ePM1 70%	(F7 according to withdrawn EN 779)
	ISO ePM10 50%	(M5 according to withdrawn EN 779)
• Exhaust air:	ISO ePM10 50%	(M5 according to withdrawn EN 779)
	ISO Coarse 85%	(G4 according to withdrawn EN 779)

[1)] Filters can also be supplied as replacement filters.

Selection, options, accessories

WiVent-B decentralised ventilation unit

Selection:

Options:

Accessories:

Condensation discharge

Condensation discharge on the heat exchanger for heat/moisture reclamation:

- Condensation discharge using incline: Hose nozzle for connecting an on-site condensation hose (16 mm inner diameter)
- Condensation discharge using a pump: Hose nozzle for connecting an on-site condensation hose (6 mm inner diameter). The delivery head of the condensation pump integrated into the ventilation unit is 8 m at 4 l/h for a hose length of 30 m.

RAL colour:

Unit doors are powder-coated in colour RAL 9010 (pure white) as standard. Other special colours as per RAL CLASSIC available optionally.

Room control unit

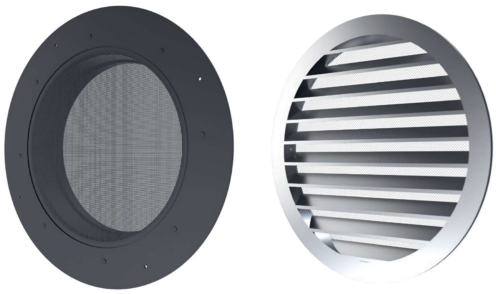
The ventilation system can be operated:

- With analogue room control unit for user intervention, dimensions (B x H x T) 85 mm x 85 mm x 25 mm, surface-mounted version.
- With digital room control unit for user intervention and access to the WiVent software, dimensions (B x H x T) 315 mm x 238 mm x 87 mm, on-site installation in surface-mounted or flush-mounted boxes or control cabinets.
- Without room control unit (web visualisation required instead).

Connection kit

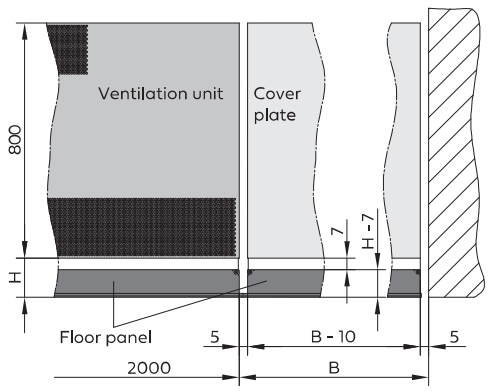
The cable length for the ready-wired connection kit for the digital room control unit has to be selected. 5 m, 10 m and 20 m are available.

Façade feedthrough



Two options are available as the air conveyance system for outdoor air and exit air through the parapet and façade and for the façade connection:

- **Cover element with fly screen,** colour RAL 9005 (jet black) with galvanized pipe DN250, included loose, length 500 mm, to be shortened on-site. To supplement an on-site weather protection element.
- **Weather-resistant louvre with fly screen,** colour RAL 9006 (white aluminium) or special colour according to RAL CLASSIC, with galvanized pipe DN250, included loose, length 500 mm, to be shortened on-site. The pressure drop of the louvre is accounted for in the unit characteristic curve.



Cover plate and floor panels as supplement for ventilation belt:

For completion of ventilation belt and to ensure that the unit doors have free movement. Default colour RAL 9010 (pure white) or special colour according to RAL CLASSIC. Fastening material included. Cover plates with or without acoustic insulation have to be defined by the nominal width[1)] B between the units and as termination at the wall, and floor panels by the nominal height[1)] H. The actual width of floor panels matches the width of the ventilation unit or cover plate. They terminate at the floor with a black plastic strip.

- Cover plate, dimensions: B = 110 to 2000 mm, H = 800 mm
- Floor panel, dimensions: B = 110 to 2000 mm, H = 35 to 160 mm

[1)] Nominal width B and nominal height H match the on-site measurement. The actual width is 10 mm less than the nominal width, the actual height is 7 mm less than the nominal height.

Accessories

Terminating plate on the unit

For installation directly on the unit and as a termination directly at the façade, in the nominal depth 380 ... 600 mm and the nominal width 60 mm. Default colour RAL 9010 (pure white) or special colour according to RAL CLASSIC. Cover sheets terminate at the floor with a floor panel. In design left/right and with/without acoustic insulation.

Floor panel for terminating plate

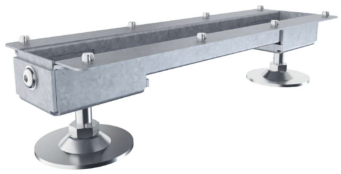
For installation directly underneath the cover sheet, floor panels in the nominal height (35 ...160 mm) correspond in nominal depth to the end plate and the ventilation unit, default colour RAL 7016 or special colour according to RAL CLASSIC. Design left/right.

Termination unit remote from the unit

For installation on the unit and as a termination directly at the façade, in the nominal width 170 ... 2000 mm and in the nominal depth 150 ... 600 mm, default colour RAL 9010 (pure white) or special colour according to RAL CLASSIC. In design left/right and with/without acoustic insulation

Floor panel for termination unit

For installation directly beneath the termination unit, default colour RAL 7016 or special colour according to RAL CLASSIC. Floor panels in nominal height (35 ... 160 mm) match the nominal width and nominal depth of the termination unit. In design left / right.



Unit feet set

The following unit feet sets are available for adjusting to different parapet heights:

- Unit feet set 1: 47 ... 67 mm
- Unit feet set 2: 62 ... 82 mm
- Unit feet set 3: 77 ... 127 mm
- Unit feet set 4: 111 ... 161 mm

Installation set

In order to make on-site installation easier, the installation set contains the drilling templates for cover plates and façade feedthroughs, a hexagon screwdriver for opening the ventilation unit and an actuation tool for connecting electrical lines.

14 Ordering data

Ventilation unit WiVent-B **WVB** - - - - - - - - -

Unit version
- Master unit with room air sensor **M**
- Slave unit **S**

⇒ See pages 6 to 11 and 20

Connection position
- Top **O**
- Middle **M**

⇒ See pages 10 and 20

Heat/moisture reclamation
- Aluminium heat exchanger **W**
- Plastic enthalpy exchanger **E**

⇒ See pages 8, 9 and 20

Heating and cooling unit
- Heating only **H**
- Heating and cooling **HK**

⇒ See pages 8, 9 and 20

Colour

ST[1] RAL 9010 (pure white)
SF[2] RAL ....

⇒ See pages 8 and 21

Room control unit

For connection to a master unit
- **_** Without
- **A** Analogue
- **5** Digital, 5 m cable length
- **1** Digital, 10 m cable length
- **2** Digital, 20 m cable length

⇒ See pages 7, 13 and 21

Condensation discharge
- **G** Using incline
- **P** Using condensation pump

⇒ See page 21

Exhaust air filter
- **E1** ISO ePM10 50%
- **E2** ISO Coarse 85%

⇒ See pages 8 and 20

Outdoor air filter
- **O1** ISO ePM1 70%
- **O2** ISO ePM10 50%

⇒ See pages 8 and 20

Accessories **WVZUB** - -

Façade feedthrough

For air conveyance for outdoor air and exit air through parapet and façade with pipe and fly wire

Design
- With cover element RAL 9005 (jet black) **AE**
- With weather-resistant louvre Colour can be selected **WG**

⇒ See page 21

Colour

For weather-resistant louvre WG only

AL[1] RAL 9006 (white aluminium)
SF[2] RAL ....

⇒ See page 21

[1] Standard colour
[2] Also specify RAL colour

Ordering data

WiVent-B decentralised ventilation unit

Accessories **WVZUB – BL** - -

Floor panel
For installation underneath the ventilation unit, width to suit ventilation unit

Nominal height H
From 35 mm to 160 mm
Can be selected in 1 mm increments, actual height is 7 mm less than nominal height

⇒ See page 21

Colour
SA[1] RAL 7016 (anthracite grey)
ST RAL 9010 (pure white)
SF[2] RAL ....

⇒ See page 21

Accessories **WVZUB – AB** - - - -

Cover plate
For installation between ventilation units and for closure with the wall

Nominal width B
From 110 mm to 2000 mm
Can be selected in 1 mm increments, actual width is 10 mm less than nominal width

⇒ See page 21

Acoustic insulation
With insulation **D**
Without insulation **–**

Installation accessories
M with installation accessories
– without installation accessories
Installation accessories available for order separately

⇒ See page 27

Colour
ST[1] RAL 9010 (pure white)
SF[2] RAL ....

⇒ See page 21

Accessories **WVZUB – BB** - - -

Floor panel for cover plate
For installation underneath cover plates

Nominal width B
From 110 mm to 2000 mm
Can be selected in 1 mm increments, actual width is 10 mm less than nominal width

⇒ See page 21

Nominal height H
From 35 mm to 160 mm
Can be selected in 1 mm increments, actual height is 7 mm less than nominal height

⇒ See page 21

Colour
SA[1] RAL 7016 (anthracite grey)
ST RAL 9010 (pure white)
SF[2] RAL ....

⇒ See page 21

Ordering data

WiVent-B decentralised ventilation unit

Accessories **WVZUB – AA** - - - - -

Cover sheet on the unit
For installation directly on the unit and as a termination at the façade

Nominal depth T
From 380 mm to 600 mm
Can be selected in 1 mm increments, actual width 60 mm

Design
On the right side of the unit **R**
On the left side of the unit **L**

Acoustic insulation
With insulation **D**
Without insulation **–**

Installation accessories
M with installation accessories
– without installation accessories
Installation accessories available for order separately

⇒ See page 27

Colour
ST[1] RAL 9010 (pure white)
SF[2] RAL ....

⇒ See page 21

Accessories **WVZUB – BA** - - - -

Floor panel for terminating plate
For installation underneath the cover sheet on the unit, depth to suit the cover sheet

Nominal height H
From 35 mm to 160 mm
Can be selected in 1 mm increments, actual height is 7 mm less than nominal height

⇒ see page 21

Nominal depth T
From 380 mm to 600 mm
Can be selected in 1 mm increments

Colour
SA[1] RAL 7016 (anthracite grey)
ST RAL 9010 (pure white)
SF[2] RAL ....

⇒ See page 21

Design
R On the right of the unit
L On the left of the unit

Ordering data

WiVent-B decentralised ventilation unit

Accessories **WVZUB – AF** - - - - - -

Termination unit remote from the unit
For installation remote from the unit and as a termination at the façade

Nominal width B
From 170 mm to 2000 mm
Can be selected in 1 mm increments

Nominal depth T
From 150 mm to 600 mm
Can be selected in 1 mm increments

Design
On the right side of the unit **R**
On the left side of the unit **L**

Installation accessories
M with installation accessories
_ without installation accessories
Installation accessories available for order separately

⇒ See page 27

Colour
ST[1] RAL 9010 (pure white)
SF[2] RAL ....

⇒ See page 21

Acoustic insulation
D with insulation
_ without insulation

Accessories **WVZUB – BF** - - - - -

Floor panel for termination unit
For installation underneath the termination unit remote from the unit, width and depth to suit the termination unit

Nominal width B
From 170 mm to 2000 mm
Can be selected in 1 mm increments

Nominal height H
From 35 mm to 160 mm
Can be selected in 1 mm increments, actual height is 7 mm less than nominal height

Nominal depth T
From 150 mm to 600 mm
Can be selected in 1 mm increments

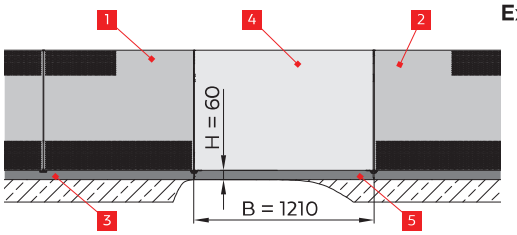
Colour
SA[1] RAL 7016 (anthracite grey)
ST RAL 9010 (pure white)
SF[2] RAL ....

⇒ See page 21

Design
R On the right of the unit
L On the left of the unit

Ordering data

WiVent-B decentralised ventilation unit



Example:

1	Master unit	WVB - M - O - W - HK - O1 - E1 - P - A - SF RAL 6033
2	Slave unit	WVB - S - O - W - HK - O1 - E1 - P - _ - SF RAL 6033
3	Floor panel	WVZUB - BL - 60 - SA
4	Cover plate	WVZUB - AB - 1210 - D - SF RAL 6033 - M
5	Floor panel for Cover plate	WVZUB - BB - 1210 - 60 - SA

Further documents/download from www.oxomi.de:

For information on WiVent-B ventilation unit with accessories ⇒ see installation and operating instructions for specialist staff
For information on WiVent Software ⇒ see operating instructions for specialist staff, WiVent-SW-02

Description	Ordering data
Unit feet for WiVent-B, height 47 ... 67 mm (pack of 5)	ZUB 0523
Unit feet for WiVent-B, height 62 ... 82 mm (pack of 5)	ZUB 0524
Unit feet for WiVent-B, height 77 ... 127 mm (pack of 5)	ZUB 0525
Unit feet for WiVent-B, height 111 ... 161 mm (pack of 5)	ZUB 0526
Indoor air sensor	ZUB 0527
Installation set for WiVent-B	ZUB 0528
Hexagon screwdriver size 4	ZUB 0529
Actuating tool	ZUB 0530
Installation accessories for cover plate	ZUB 0531
Installation accessories for cover sheet right	ZUB 0532
Installation accessories for cover sheet left	ZUB 0533
Installation accessories for termination unit right	ZUB 0534
Installation accessories for termination unit left	ZUB 0535
Installation accessories for floor panel BL	ZUB 0536
Installation accessories for WiVent-B ventilation unit	ZUB 0537
Outdoor air filter ISO ePM1 70% (pack of 2)	ZUB 0538
Outdoor air filter ISO ePM1 70% (pack of 4)	ZUB 0539
Outdoor air filter ISO ePM10 50% (pack of 2)	ZUB 0540
Outdoor air filter ISO ePM10 50% (pack of 8)	ZUB 0541
Exhaust air filter ISO ePM10 50% (pack of 4)	ZUB 0542
Exhaust air filter ISO ePM10 50% (pack of 14)	ZUB 0543
Exhaust air filter ISO Coarse 85% (pack of 4)	ZUB 0544
Exhaust air filter ISO Coarse 85% (pack of 14)	ZUB 0545

15 Specification text

1. WiVent ventilation system
1.1 WiVent-B ventilation unit
Decentralised ventilation unit with integrated BCS interface (BACnet IP | Modbus TCP/IP) for requirement-based ventilation and temperature control of rooms. Ready for connection as master and slave unit version of supply air, exhaust air and secondary air mode. Unit with integrated controller with time-controlled ventilation schedule and with use of indoor air temperature as parameter for thermal comfort and CO_2 concentration as an indicator for room air quality.
Energy-efficient operation thanks to highly effective, recuperative and metered heat reclamation for passive heating and cooling using a principle of cross counter flow. Fans with EC actuators and continuously variable speed control. Frost protection strategy without preheating battery thanks to metered addition of secondary air to outdoor air using integrated, automatic and continuously regulating secondary air operation flap to prevent freezing in the heat exchanger and to protect the ventilation unit.
Adjustable flow type thanks to special switching flap. For switching between low-turbulence displacement air flow for increased ventilation efficiency in regular operation thanks to the formation of a sea of fresh air and strong-impulse mixed air flow as a result of the change in the outflow cross section.
Unit housing for horizontal installation on the parapet of a façade. Multiple units can be combined in a space-saving manner to form a surface-finished ventilation belt and prepared for direct installation of a window sill. Unit levelling using height-adjustable unit feet with offset height of 47 to 161 mm.
Unit housing made of galvanized sheet steel with front-facing supply air and exhaust air openings which prevent soiling. Surface-finished unit doors which open at the front specially suited for visible installation. Secured with locking and hinge technology to prevent unauthorised opening. Unit doors powder-coated in colour RAL 9010 or RAL special colour. Connection area for outdoor air and exit air and motor-driven façade sealing caps which close without power, thermally separate from the outdoor air. Placement of the connection position DN 250
- top.
- middle.

Thermal separate air conveyance inside the unit and modular construction for tool-free access to all components and air ways. All-round hygienic design with smooth, easy-to-clean, hard-wearing surfaces with corrosion protection. Ventilation unit lined with insulating materials, 20 to 60 mm made of special closed-cell foams. All insulating materials and seals are resistant to microbes and do not absorb moisture.
Energy-efficient radial fans with EC actuators and backward-curved blades and noise-reduced inlet grating. Heat reclamation via
- Aluminium heat exchanger,
- Enthalpy exchanger with polymer membrane for additional moisture reclamation,

metered using continuously variable bypass flap. Condensation discharge via
- inclined connection.
- Condensation pump for active discharge.

Stainless steel condensation tray. Water-activated heater battery made of copper pipes with pressed on aluminium blades with control valve with electric motor and integrated differential pressure controller for active heating for maximum 75°C operating temperature and maximum 4 bar operating pressure, connection pipes on the water side with external thread, flat-sealing in 1/2 inch.
- Active cooling of supply air by water-activated cooling battery with motor-driven control valve and integrated differential pressure controller.

Filter according to DIN ISO 16890 as filter cell with inserted plug-in solution for tool-free filter change.
Outdoor air filter
- ISO ePM1 70%
- ISO ePM10 50%

Exhaust air filter
- ISO ePM10 50%
- ISO Coarse 85%

Eurovent-certified. Filter fully incinerable. Meets the requirements of EU ordinance 1253/2014 (ErP).
Software ready for operation for individual room control via a master unit with up to 5 slave units. For configuration, parametrisation, operation and monitoring of ventilation units. With the parametrisable operating modes basic ventilation, heating, comfort mode, outdoor air mode, standby, night ventilation which can be combined with daily and weekly schedules, and further parametrisable operating modes secondary air mode, safety mode, filter drying and filter monitoring. Filter monitoring with indication of the level of soiling and the requirement-based required filter change. With enabling input for hybrid ventilation operation, switching between mechanical and natural ventilation. With fault contact, e.g. for a central fire alarm system, to switch of the WiVent-B ventilation unit when released or in the event of a fault.
Integrated holiday calendar with holidays from all German states for the next four years. Option of user intervention for overriding the set points of the operating modes in automatic operation or to trigger forced controls. Simple access to the software for the ventilation units using web visualisation. Either using a terminal, such as a laptop, by connecting to a master unit directly via an integrated network socket in the room or using various terminals simply, conveniently and remotely via Ethernet to all the ventilation units in the network. Certificate as proof of conformity to the hygiene requirements according to VDI 6022-1, VDI 3803-2, SWKI VA104-01 und ÖNORM H 6021.
- As master unit version with integrated unit controller and with indoor air sensor for detecting the temperature and the CO_2 concentration in the room air.
- As slave unit version.

Technical data according to quality and testing directive for decentralised ventilation units VDMA 24390:

Dimensions (B x H x T):	**2000 mm x 820 mm x 380 mm**
Weight:	**143 to 158 kg (depending on version)**
Outdoor/exit air flaps:	**DN 250**
Outdoor air, exit air flap leak tightness:	**Class 2 according to DIN EN 1751**
Supply voltage:	**230 V AC 50 Hz**
Volume flow range:	**100 m³/h to 500 m³/h**
• Heat reclamation:	Up to 92% (heat exchanger)
• Heat/moisture reclamation:	Up to 89%/83% (enthalpy exchanger)

Technical data for the nominal volume flow rate of 300 m³/h according to VDMA 24390:
Sound power level
for environment according to ISO 3741: **43 dB(A)**
Sound pressure level with room attenuation - 8 dB: **35 dB(A)**
Electrical power consumption: **48 W / 42 W (master / slave)**
Specific fan power: **SFP 0 according to DIN EN 16798-3**
- Heat reclamation: 86 % (heat exchanger)
- Heat/moisture reclamation: 84%/64% (enthalpy exchanger)

Room heating power: **1583 W**
Room cooling power: 495 W
Colour: **RAL .....**
Manufacturer: **WILDEBOER**
Type: **WiVent-B**
Quantity: ..... PC. Unit price: ..... € Amount: ..... €

1.2 Accessories
1.2.1 Analogue room control unit
Analogue room control unit for user intervention for overriding the set points of automatic operation for room temperature and supply air volume flow and for triggering forced controls. Surface-mounted version.
Manufacturer: **WILDEBOER**

1.2.2 Digital room control unit
Digital room control unit with 7-inch touchscreen for full access to the WiVent software and for user intervention for overriding the set points of automatic operation for room temperature and supply air volume flow and for triggering forced controls. On-site installation in surface-mounted or flush-mounted boxes or control cabinets. With ready-wired connection kit for digital room control unit for connection to the WiVent-B ventilation unit as master unit version.
- 5 m
- 10 m
- 20 m

Manufacturer: **WILDEBOER**
Quantity: ..... PC. Unit price: ..... € Amount: ..... €

1.2.3. Façade feedthrough and cover element with fly screen
Cover element with fly screen made of galvanized steel, colour RAL 9005 for air conveyance of outdoor and exit air through parapet and façade. With galvanized sheet steel pipe, length 500 mm.
Size: **DN250**
Manufacturer: **WILDEBOER**
Quantity: ..... PC. Unit price: ..... € Amount: ..... €

1.2.4. Façade feedthrough and weather-resistant louvre with fly screen
Weather-resistant louvre with fly screen made of die-cast aluminium with 4 mm thickness, colour RAL 9006 / RAL special colour **for air conveyance of outdoor and exit air through parapet and façade. Galvanized sheet steel pipe, length 500 mm.**
Size: DN250
Colour: RAL ......
Manufacturer: WILDEBOER
Quantity: ..... PC. Unit price: ..... € Amount: ..... €

1.2.5. Floor panel for the ventilation unit
Floor panel for installation underneath the ventilation unit for termination at the floor, nominal width 2000 mm, made of galvanized sheet steel with 1.25 mm sheet thickness, double-edged for increased stability, with high-quality powder coating in colour RAL 7016 / RAL 9010 / RAL special colour.
Colour: RAL ......
Nominal height: ..... mm
Manufacturer: WILDEBOER
Quantity: ..... PC. Unit price: ..... € Amount: ..... €

1.2.6. Cover plate
Cover plate for installation between ventilation units and for connection to the wall made of galvanized sheet steel with 1.25 mm sheet thickness, double-edged for increased stability, high-quality powder coating in colour RAL 9010 / RAL special colour, **nominal height 800 mm.** With acoustic insulation.
Colour: RAL ......
Nominal width: ..... mm
Manufacturer: WILDEBOER
Quantity: ..... PC. Unit price: ..... € Amount: ..... €

1.2.7. Floor panel for cover plate
Floor panel for installation underneath cover plates made of galvanized sheet steel with 1.25 mm sheet thickness, double-edged for increased stability, with high-quality powder coating in colour RAL 7016 / RAL 9010 / RAL special colour. **Nominal width identical to cover plate.**
Colour: RAL ......
Nominal height: ..... mm
Nominal width: ..... mm
Manufacturer: WILDEBOER
Quantity: ..... PC. Unit price: ..... € Amount: ..... €

1.2.8. Cover sheet for installation directly on the unit and as a termination at the façade, in the nominal depth 380 ... 600 mm and the nominal width 60 mm. Cover sheets made of galvanized sheet steel with 1.25 mm sheet thickness, double-edged for increased stability, with high-quality powder coating in colour RAL 9010 / RAL special colour. **In design** left/right. With acoustic insulation.
Colour: RAL ......
Nominal depth: ..... mm
Manufacturer: WILDEBOER
Quantity: ..... PC. Unit price: ..... € Amount: ..... €

1.2.9. Floor panel for installation underneath cover sheets, nominal width identical to cover sheet, and nominal height identical to the ventilation unit floor panel, made of galvanized sheet steel with 1.25 mm sheet thickness, double-edged for increased stability, with high-quality powder coating in colour RAL 7016 / RAL 9010 / RAL special colour. **In design** left/right.

Colour: RAL ......
Nominal depth: ..... mm
Nominal height: ..... mm
Manufacturer: WILDEBOER
Quantity: ..... PC. Unit price: ..... € Amount: ..... €

1.2.10. Termination unit for installation on the unit and as a termination directly at the façade, in the nominal width 170 ... 2000 mm and in the nominal depth 150 ... 600 mm made of galvanized sheet steel with 1.25 mm sheet thickness, double-edged for increased stability, with high-quality powder coating in colour RAL 9010 / RAL special colour. **In design** left/right. With acoustic insulation.

Colour: RAL ......
Nominal depth: ..... mm
Nominal width: ..... mm
Quantity: ..... PC. Unit price: ..... € Amount: ..... €

1.2.11. Floor panel for installation underneath the termination unit, depth and width identical to termination unit, made of galvanized sheet steel with 1.25 mm sheet thickness, double-edged for increased stability, with high-quality powder coating in colour RAL 7016 / RAL 9010 / RAL special colour. **In design** left/right.

Colour: RAL ......
Nominal depth: ..... mm
Nominal width: ..... mm
Nominal height: ..... mm
Manufacturer: WILDEBOER
Quantity: ..... PC. Unit price: ..... € Amount: ..... €

1.2.12. Replacement outdoor air filter F7
Replacement outdoor air filter ISO ePM1 70% (Cl. F7) for the above-mentioned ventilation unit
Manufacturer: WILDEBOER
Quantity: ..... PC. Unit price: ..... € Amount: ..... €

1.2.13. Replacement outdoor air filter M5
Replacement outdoor air filter ISO ePM10 50% (Cl. M5) for the above-mentioned ventilation unit
Manufacturer: WILDEBOER
Quantity: ..... PC. Unit price: ..... € Amount: ..... €

1.2.14. Replacement exhaust air filter M5
Replacement exhaust air filter ISO ePM10 50% (Cl. M5) for the above-mentioned ventilation unit
Manufacturer: WILDEBOER
Quantity: ..... PC. Unit price: ..... € Amount: ..... €

1.2.15. Replacement exhaust air filter G4
Replacement exhaust air filter ISO Coarse 85% (Cl. G4) for the above-mentioned ventilation unit
Manufacturer: WILDEBOER
Quantity: ..... PC. Unit price: ..... € Amount: ..... €

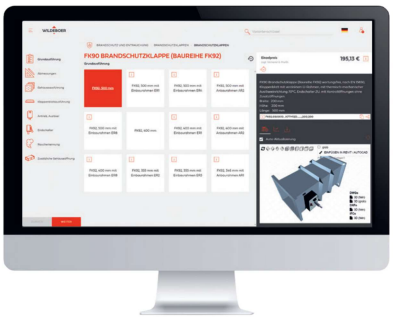
Select texts not highlighted in bold as required!

16 List of sources

No.	Abbreviation	Description
[1]	EPBD	Energy Performance of buildings directive Directive (EU) 2024/1275 on the overall efficiency of buildings
[2]	ESPR	Ecodesign for sustainable products regulation Regulation 2024/1781 for creating a framework for the definition of Ecodesign regulation for sustainable products
[3]	GEG	Gebäudeenergiegesetz (German Buildings Energy Act) Law on energy saving and use of renewable energies for heating and cooling in buildings
[4]	DIN V 18599-7:2018-09	Energy efficiency of buildings - Calculation of the net, final and primary energy demand for heating, cooling, ventilation, domestic hot water and lighting, Part 7: Final energy demand of air-handling and air-conditioning systems for non-residential buildings
[5]	DIN V 18599-10:2018-09	Energy efficiency of buildings - Calculation of the net, final and primary energy demand for heating, cooling, ventilation, domestic hot water and lighting, Part 10: Boundary conditions of use, climatic data
[6]	DIN EN 16798-3:2017-11	Energy performance of buildings - Ventilation for buildings Part 3: For non-residential buildings - Performance requirements for ventilation and room-conditioning systems
[7]	EU 1253/2014	Regulation (EU) no. 1253/2014 of the Commission from 7 July 2014 for implementation of Directive 2009/125/EC of the European Parliament and Council in relation to requirements for environmentally friendly design of ventilation systems
[8]	ASR A3.6	Technische Regeln für Arbeitsstätten, Lüftung (Technical Rules for Places of Work, Ventilation) issue 2012-01, last amended 2018
[9]	UBA guide	Guide for indoor room hygiene in school buildings, 2008-08
[10]	UBA brochure	Requirements for ventilation concepts in buildings, 2017-11 Part 1: Education institutions
[11]	VDI 6040, sheet 1:2011-06	Air conditioning - schools - requirements
[12]	DIN EN 16798-1:2022-03	Overall efficiency of buildings Part 1: Indoor environmental input parameters for design and assessment of energy performance of buildings addressing indoor air quality, thermal environment, lighting and acoustics
[13]	DIN EN ISO 7730 rectification 1: 2007-06	Ergonomics of the thermal environment - Analytical determination and interpretation of thermal comfort using calculation of the PMV and PPD indices and local thermal comfort criteria
[14]	VDMA 24390:2007-03	Decentralised ventilation units, quality and testing directive

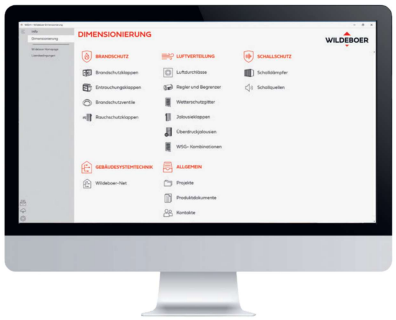
17 Wildeboer makes it easy

17.1 Wildeboer Connect



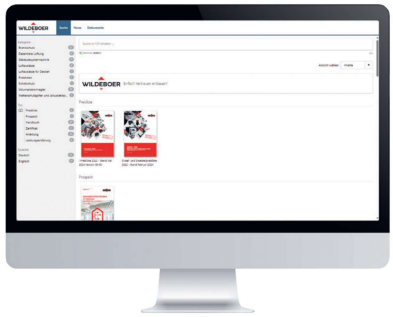
- High-performance configurator with customer-specific net prices
  - Quick, intuitive product configuration of Wildeboer products
  - Access to prices and unique version keys for ordering products
  - Easy calculation of operating point data for configured products
  - Interface to Autodesk Revit and AutoCAD for transferring CAD geometries
  - Download of CAD data, data sheets, specification texts and further product documents in common data formats
- Transparent real-time order tracking
  - View of detailed order information
  - Access to order documents
  - Access to shipment tracking

17.2 WiDim dimensioning software



- Functional, modern and intuitive dimensioning of Wildeboer products
- Conveniently collect operating point data, 3D product views, suitable accessories and current revision documents in a single project
- Project can be output in various formats
- A GAEB interface and an interface based on VDI 3805 facilitate a continuous planning process

17.3 Documents online



- Paperless and environmentally friendly online access to Wildeboer documents
- All documents in one central location and always up to date
- Supporting interactive formats and content

Notes

Always there for you

Locations & contact

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Find out more at
www.wildeboer.de/downloads

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