

Decentralised school ventilation unit, cabinet version

School ventilation unit

WZA

with supply air, and extract air
with heat and humidity recovery functions

Outside air supply through a façade connection





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School Ventilation Unit WZA

Decentralised school ventilation unit, cabinet version, with supply air and extract air with heat and humidity recovery functions. Outside air supply via a façade connection.

Operating principle

Air is fed in and extracted from a building in a controlled manner by EC radial fans. High-efficiency enthalpic heat exchangers ensure heat and humidity recovery.

Air supply

The supply air is fed into the room by the mixed air principle through a highly inductive air outlet on top of the unit. This ensures the draught-free 'flushing' of the room in winter and in summer.

Easy to install

The structural measures needed to install the unit are confined to the actual installation space itself and can be done independently of the existing heating system. The unit can be flexibly positioned in the room, as required.

Ease of commissioning

No electrician is needed for installation, thanks to this "plug-and-go" solution. It is ready for operation as soon as it has been installed. All air deflections with shut-off dampers are factory-wired.

Intuitive operation

The illuminated one-touch operation button enables users to operate the two parametrisable operating levels plus automatic ventilation and shock ventilation intuitively and simply. Individual adaptation to any usage situation is possible at any time.

Quiet operation

Sophisticated insulating lining in the basic unit and in the housing ensure low sound levels and guarantee quiet operation

Air quality constantly monitored

A CO₂ sensor and continuous air volume control guarantee good indoor conditions and comfortable operation at all times.



School ventilation units WZA are the ideal decentralised solution for ease of installation in existing buildings

School ventilation unit WZA

Controlled and energy-efficient ventilation of new and refurbished education facilities, such as schools and daycare centres

Product benefits

- > enthalpic heat exchanger for excellent comfort
- > no condensate drain or condensate pump needed
- > air volume flow up to 1,000 m³/h
- > electrical components including shut-off dampers factory-wired, delivered plug-and go



Features

- > wall-mounted
- > connection on the right or left
- > highly inductive built-in air outlet
- > 100 % outside air | 100 % extract air
- > humidity and heat recovery by an enthalpic heat exchanger
- > optional electric heating coil
- > delivery in three packaging units for ease of transport

Air volume flow	Degree of temperature change ¹⁾	Degree of humidity change ²⁾	Supply air temperature ²⁾	Supply air relative humidity	Electrical power consumption ³⁾	Sound pressure level ⁴⁾	Sound power level
m ³ /h	%	%	°C	%	W	dB(A)	dB(A)
1000	71	57	17.0	37	312	39	51
800	74	61	17.5	36	176	35	47
600	78	66	18.2	35	100	29	41
400	84	72	19.2	33	56	22	34

¹⁾ according to EN 308

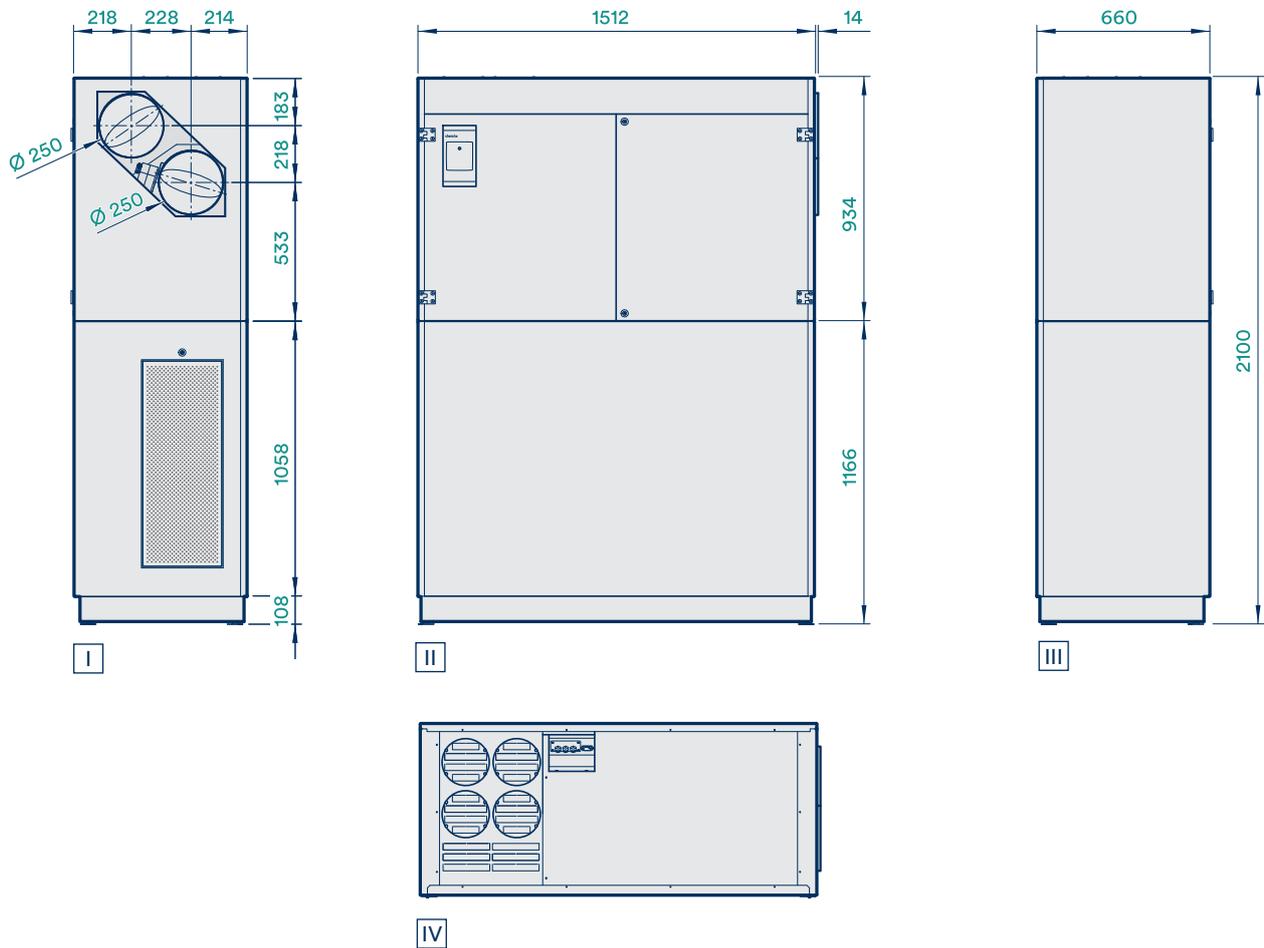
²⁾ with outside air temperature 5 °C, 70 % relative humidity; extract air temperature 22 °C, 30 % relative humidity

³⁾ power consumption of optional electric heating coil (1.0 kW) not included

⁴⁾ The sound pressure level was calculated based on an assumed room insulation of 12 dB(A). This corresponds to the centre of the room, a room volume of 200 m³ and a reverberation time of 0.5 s (in accordance with VDI 2081).

School ventilation unit WZA

with enthalpic heat exchanger | built-in air outlet | connection on the right



I Side view, connection side

II Front view

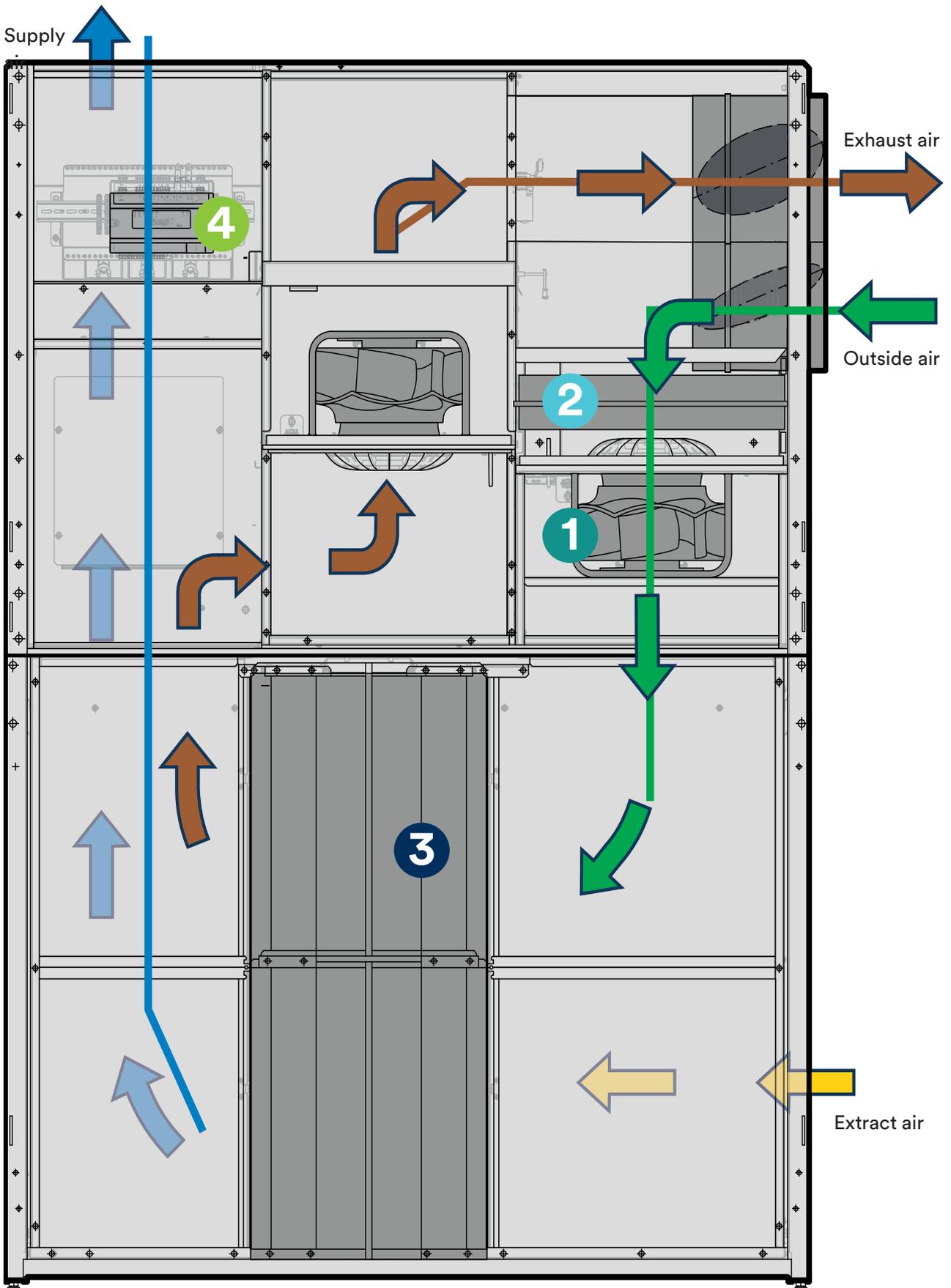
III Side view, room side

IV Plan view

Dimensions in mm

Component weights

Functional unit	136 kg
Enthalpic unit	143 kg
Casing	119 kg





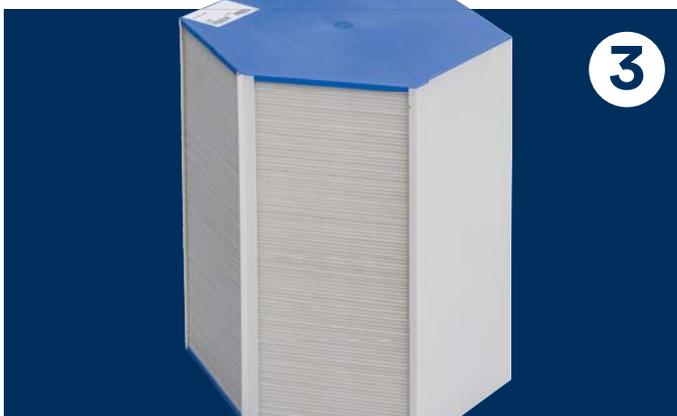
Radial fan

- > continuously variable EC single-phase radial fans
- > excellent efficiency through the use of GreenTech EC technology
- > quiet operation thanks to optimised air flow guidance with guide grille



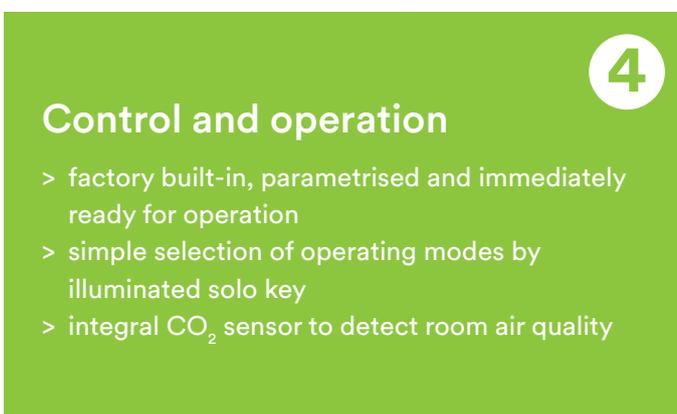
Outside air filter

- > with continuous differential pressure monitoring including display in the control unit if the permitted end pressure difference is exceeded
- > supply air and extract air filters can be simply removed and replaced through large-sized revision openings



Enthalpic heat exchanger

- > room air humidity and heat is recovered from the extract air/exhaust air
- > mucous membranes do not dry out, thanks to sufficiently moist room air
- > frost-proof operation is ensured as low as an outside temperature of -10 °C



Control and operation

- > factory built-in, parametrised and immediately ready for operation
- > simple selection of operating modes by illuminated solo key
- > integral CO₂ sensor to detect room air quality



Information on planning and design

Air volume flow

The control unit with solo key features a built-in CO₂ sensor. It continuously regulates the requisite air volume flow according to the room air quality in automatic operation.

The air volume flow on each air route is balanced by measuring the effective pressure at the fans. This avoids overpressure or underpressure in the rooms.

In view of infection protection, automatic operation can be overridden with Level 1 or Level 2 to ensure that the required air volume flow is constantly moved.

Air supply

The units with built-in supply air outlet feature a highly inductive air outlet on top of the unit opposite the connection side for air infeed in a mixed air principle. The supply air is discharged towards the ceiling at a high pulse rate and penetrates deep into the room using the Coanda effect. This ensures that the entire room is 'flushed through' with lower temperatures in winter and also with higher temperatures in summer, thereby dissipating viruses or pollutants. Adjustment options enable the air outlet to be adapted to the situation and position in the room.



Heat and humidity recovery

The high-efficiency enthalpic heat exchanger recovers humidity as well as heat. This is an aspect that should not be neglected in terms of the health of the occupants.

Relative air humidity of between 40 and 60 % is recommended for a comfortable interior climate (Dr. Hugentobler, TGA Kongress). This prevents people's mucous membranes from drying out and significantly reduces the risk of respiratory infections. The integral enthalpic heat exchangers achieve between 57 and 72 % humidity recovery, with the result that the school ventilation unit WZA has a direct positive impact on an individual's infection defences.

Condensate and condensate drainage

No condensate is produced in the heat recovery process, thanks to the aforementioned humidity recovery. There is therefore no need for a condensate drain, condensate pump or connection to a local sewage system. The incursions into the building structure are thereby considerably minimised.

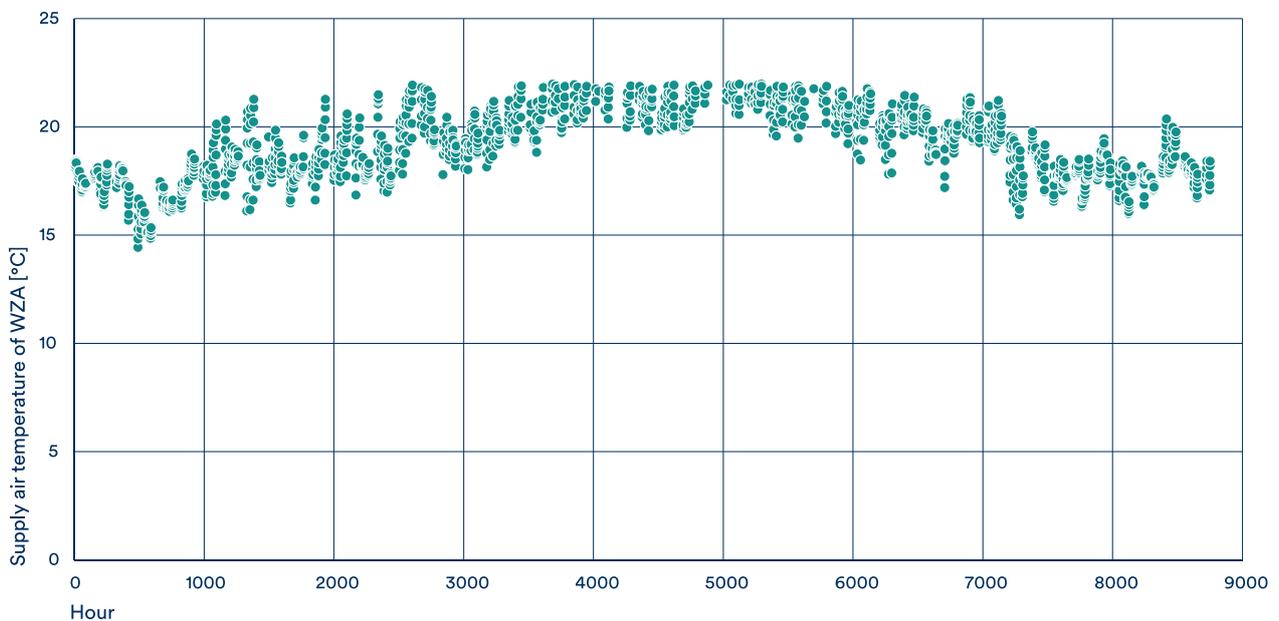
As the enthalpic heat exchanger cannot freeze, the units can be reliably operated as low as outside temperatures of -10 °C without this leading to bypass mode or imbalance. There is no need to pre-warm the outside air.

Electrical connection

All the necessary components including integrated shut-off valves for the outside and extract are factory-fitted and wired. The unit is supplied with an IEC power plug and is ready to use once connected to a traditional 230 V standard European socket.

Supply air temperature and comfort

The temperature of the discharged supply air depends on the air volume flow required, the occupation time, and the room and outside temperatures. Apart from the temperature, the supply of the air is an important criterion for comfort. During the year (say in Kampmann's home town of Lingen, room temperature 22 °C, air volume flow 800 m³/h) a minimum of comfort category B according to ISO 7730 is maintained during normal occupancy times.



Supply air temperature of WZA during the year in the town of Lingen with 800 m³/h

Electrical supplementary heating coil (optional)

On request, it is possible to equip the units on site with a supplementary heating coil (1.0 kW). This raises the supply air temperature depending on the air volume flow by between 3 - 6 K if required.

Influence of the air supply on operation and comfort

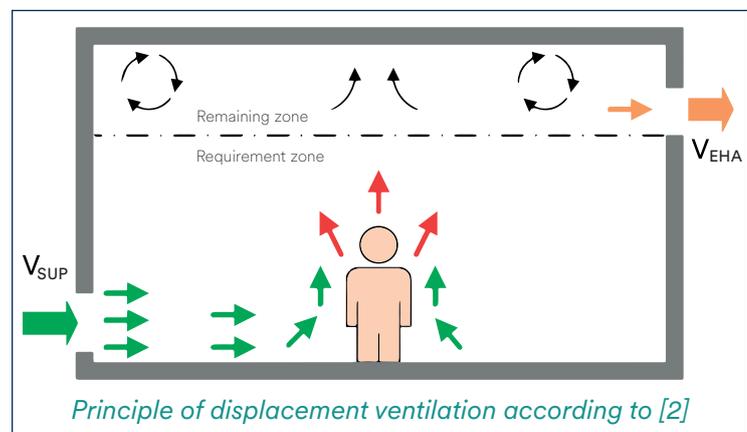
Various ventilation models are available for ventilation and/or to feed supply air into the room depending on the situation in the room. The most popular models are mixed ventilation and displacement ventilation.

With displacement ventilation, the supply air is fed into the room at a low pulse rate and undertemperature. A pool of cold air spreads in the room, which rises up heat sources providing stratified ventilation.

Particularly in small rooms with high occupancy levels, the pool of cold air cannot spread out fully in view of the up-currents rising up the individuals and the furniture. This results in not everyone equally benefiting from the unpolluted supply air. The room can also become uncomfortable due to draughts close to the air outlet in view of the high air volumes required.

Displacement ventilation is only suitable to a limited extent for classrooms in view of the absence of undertemperature during the transitional months and in summer, and the aforementioned physical conditions. [1]

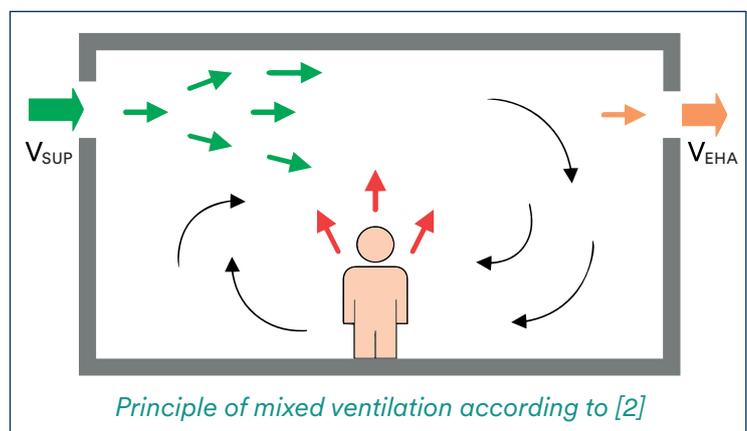
With mixed ventilation, the room air and its pollutants are dissipated evenly at each point in the room. The supply air is also fed into the room at a high pulse rate to ensure that the high inductive effect fully mixes the room air. This approach achieves even temperatures and pollutant concentrations at all positions throughout the room.



The principle is ideal for undertemperatures in winter, and for overtemperatures in summer. The even air distribution – and thus also the CO₂ distribution – favour CO₂-based automatic control of the centralised unit.

A mixed air flow guarantees the room air quality as well as the thermal comfort in a classroom, and is therefore universally recommended in schools. [1]

[1] Berg, A., Henzler, T. u. Stergiaropoulos, K.: Untersuchungen zur Optimierung maschineller Luftführungskonzepte in Schulen zwecks Verbesserung der Innenraumluftqualität, Behaglichkeit und Energieeffizienz (OLiS). Schlussbericht DBU-Forschungsprojekt. Universität Stuttgart: Institut für Gebäudeenergetik, Thermotechnik und Energiespeicherung (IGTE) 2021



[2] Rietschel, H. u. Fitzner, K.: Raumklimattechnik Band 2: Raumluft- und Raumkühltechnik. VDI-Buch. Berlin, Heidelberg: Springer-Verlag 2008

Description of controls

Control unit and operating modes

The control unit enables the unit to be operated in four parametrisable operating modes:

- > Level 1 (400 m³/h) for extremely quiet operation
- > Level 2 (800 m³/h) for preventative ventilation with raised viral loads
- > Shock ventilation (1000 m³/h)
- > CO₂ automatic mode

The operating modes are colour-coded and can be selected on the control unit using the solo key.



CO₂ automatic mode

The CO₂ sensor built into the control unit detects the room air quality and continuously and automatically regulates the air volume flow required. The unit automatically switches from standby to CO₂ automatic operation and/or back to standby when the threshold value is transgressed (no one in the room).

This operating mode guarantees continuously adjusted and efficient operation outside of periods during which there is a high viral load.

Shock ventilation

In shock ventilation operating mode 1000 m³/h of outside air are required for the parametrised time. This mode is ideal, among other things, for higher air changes during breaks.

Connectivity

It is possible to adjust the factory parameters on a service dashboard by LAN or WiFi.

Fault alarms can also be read and acknowledged. Other options on request:

- > integration via BACnet IP
- > integration via Modbus TCP

Operating modes at a glance

Automatic ventilation (white)

- > continuous air volume regulation according to the CO₂ content
- > automatic switching-on from standby mode
- > automatic switching-off to standby mode

Shock ventilation (blue)

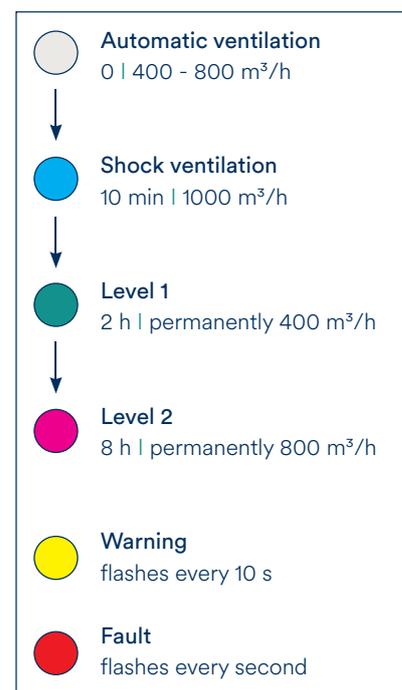
- > ventilation at permanently 1000 m³/h
- > change to automatic ventilation after 10 minutes
- > ideal for higher air change levels in breaks

Stage 1 (turquoise)

- > ventilation at permanently 400 m³/h
- > change to automatic ventilation after 2 hours
- > ideal for high concentration phases with reduced occupation

Stage 2 (magenta)

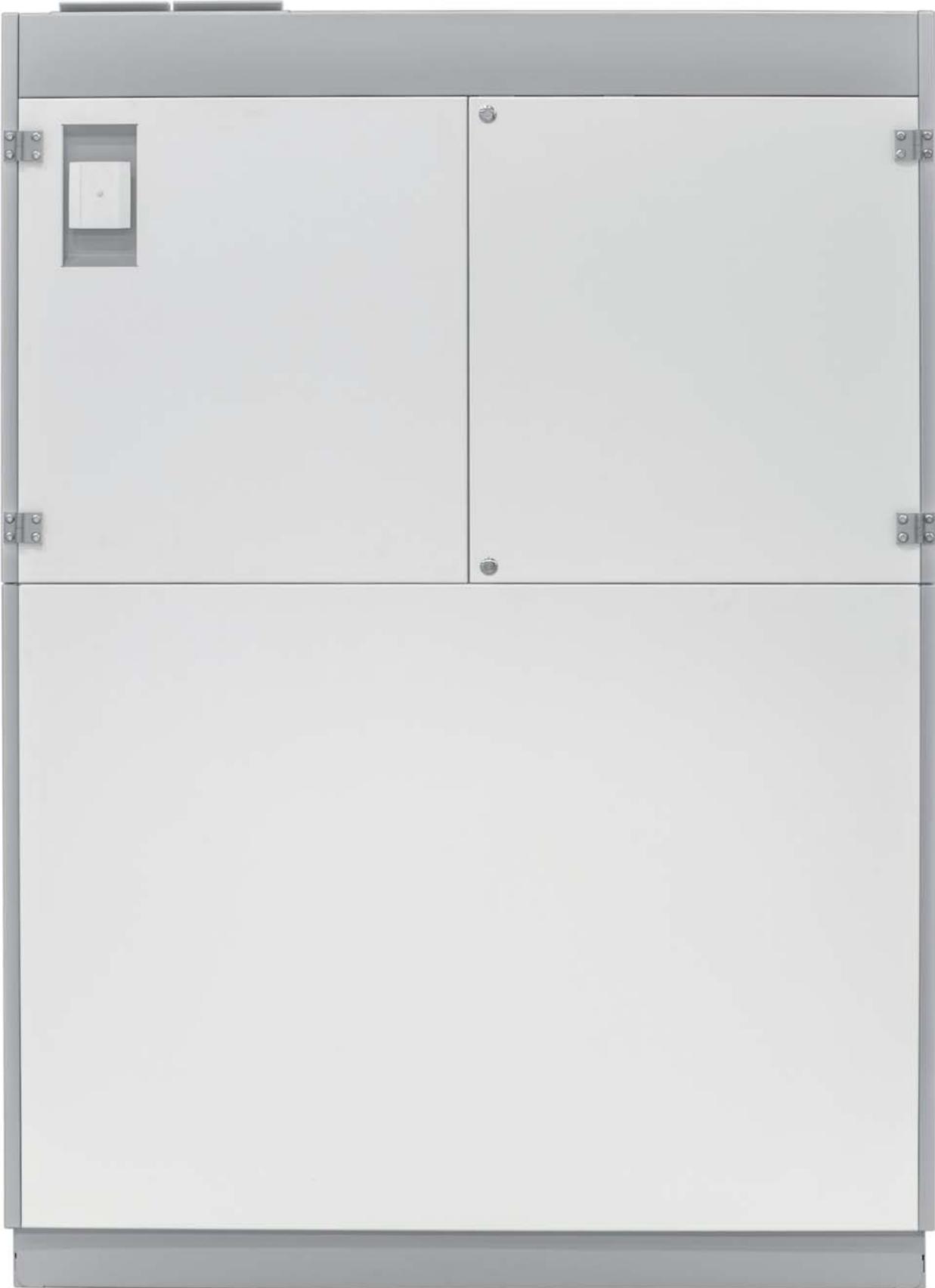
- > ventilation at permanently 800 m³/h
- > change to automatic ventilation after 8 hours
- > ideal for preventative ventilation in the event of raised viral loads



Ordering information

School ventilation unit WZA Heat exchanger model: enthalpic heat exchanger					
Height	Width	Depth	Connection side	Supply air outlet	Article number
mm	mm	mm			
2100	1512	660	on left	built-in	683001073110JC
2100	1512	660	on left	external	683001073210JC
2100	1512	660	on right	built-in	683001074110JC
2100	1512	660	on right	external	683001074210JC

School ventilation unit WZA Replacement filter accessory					
		Height	Width	Depth	Article number
		mm	mm	mm	
Outside air filter	as a replacement filter for simple insertion into the unit, filter quality class ISO ePM1>55% (F7)	592	490	92	683001020710
Extract air filter	as a replacement filter for simple insertion into the extract air grille, filter quality class ISO Coarse	779	292	5	683001020010
Weather hood, vertical	with short circuit-free discharge of exhaust air and intake of outside air	700	444	122	683001042010
Weather hood, horizontal	with short circuit-free discharge of exhaust air and intake of outside air	440	1200	122	683001041010
Electric supplementary heating coil 1 kW	for retrofitting in the supply air outlet to raise the supply air temperature by 3 - 6 K	290	420	70	683001030110





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