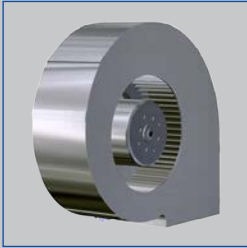


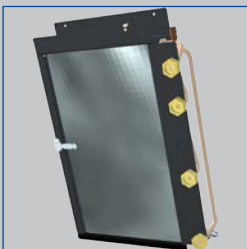
Label ErP



Fan



Levelling foot



Heat exchanger



Tested to VDI 6022

Vertical units

Type FSL-V-ZAB/SEK



Supply and extract air unit with heat exchanger and heat recovery, secondary air option, for vertical installation on an external wall, e.g. adjacent to a window

Ready-to-operate decentralised ventilation unit that provides good comfort levels, used for the ventilation of rooms

- Acoustically optimised EC fans with low specific fan powers, SFP-1 according to EN 13779
- Plate heat exchanger for heat recovery (air/air), including bypass damper with electric actuator (open-close)
- Heat exchanger for heating and cooling as 2-pipe or 4-pipe system
- Unit base of approx. 0.13 m²
- Reduction of fine dust and pollen contamination due to integral filters that conform to VDI 6022 – F7 fresh air filter and G3 extract air filter
- Condensate drip tray with condensate drain
- Motorised shut-off damper, normally closed (NC)
- Automatic switching to secondary air mode (based on air quality)

Optional equipment and accessories

- Modular control system FSL-CONTROL II, specially for decentralised ventilation systems
- Demand-based fresh air volume, free cooling and night purge, depending on control strategy
- Variable heat recovery
- Powder-coated RAL 9005

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	Technical data	V-Z/S – 6
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Application

Application

- Ventilation of rooms, preferably rooms with a depth up to 6 m
- 2-pipe or 4-pipe heat exchangers enable good comfort levels
- Inducing displacement flow
- Energy-efficient solution since water is used for heating and cooling
- For new buildings, refurbishment projects and revitalisation projects
- Vertical installation on the façade or on an external wall
- Typical installation locations include offices and meeting rooms

Special characteristics

- Motorised shut-off dampers for fresh, normally closed (NC) in order to prevent uncontrolled airflows
- Recuperative heat exchanger for recovery, including bypass damper with electric variable actuator
- Heat exchanger as 2-pipe or 4-pipe system, with G $\frac{1}{2}$ " union nuts and flat seals
- Meets the hygiene requirements of VDI 6022

- Filter class: F7 for fresh air, G3 for extract air
- Easy filter change with quick release fasteners, no tools required
- Condensate drip tray with or without condensate drain
- Compact construction, hence particularly suitable for refurbishment projects
- Demand-based ventilation and extract ventilation is possible by means of monitoring the room air quality and with dedicated control equipment
- 4 levelling feet
- Automatic switching to secondary air mode (only with an air quality sensor) if the room air quality (measured with the integral VOC sensor, for example) is between the previously defined range. The fresh air damper closes, the self-powered secondary air damper opens and the extract air fan is switched off. The unit always starts in secondary air mode, which is more energy efficient.

Nominal sizes

- 396 × 1800 × 319 mm (B × H × T)

Description

Construction

- Powder-coated RAL 9005, black

Useful additions

- Modular control system FSL-CONTROL II, specially for decentralised ventilation systems
- Connecting hoses

Construction features

- 2 energy-efficient EC fans with low specific fan powers, SFP = 1 according to EN 13779
- Fresh air flow rate: up to 150 m³/h
- Cross flow plate heat exchanger
- Motorised shut-off dampers for fresh, normally closed (NC) in order to prevent uncontrolled airflows
- The supply air is discharged to the room as an inducing displacement flow from the lower front part of the unit
- Extract air is taken in to the upper part of the unit

Materials and surfaces

- Casing, filter chamber cover, fans and levelling feet are made of galvanised sheet steel
- Heat exchanger with copper tubes and aluminium fins
- Casing powder-coated, black (RAL 9005)
- F7 filter medium made of moisture-resistant glass fibre paper (certified by Eurovent)
- Mineral wool lining to DIN 4102, fire rating class A, faced with glass fibre fabric as a protection against erosion, effective with airflow velocities up to 20 m/s
- Closed cell sealing strips

Standards and guidelines

- Façade ventilation units of Type FSL-V-ZAB/SEK conform to VDI 6035 and VDMA 24390
- Hygiene certificate to VDI 6022
- Heating/cooling fluid conforms to VDI 2035
- Energy efficiency class A

Maintenance

- VDI 6022, Part 1, applies (Hygiene requirements for ventilation and air-conditioning systems and units)
- The heat exchanger can be vacuumed with an industrial vacuum cleaner if necessary
- It can also be cleaned with commercial, non-aggressive cleaning agents

Functional description

Decentralised supply and extract air units for room ventilation and for dissipating cooling loads and heat loads.

An EC centrifugal fan takes in the fresh air which then flows through the motorised shut-off damper and the F7 filter.

Once the fresh air has passed the fan, it flows through the recuperative heat exchanger for heat recovery; it is possible to bypass the heat exchanger in order to protect it, or when it is sensible with regard to energy efficiency.

If necessary, the air is heated or cooled by the heat exchanger before it is discharged to the room

as a displacement flow.

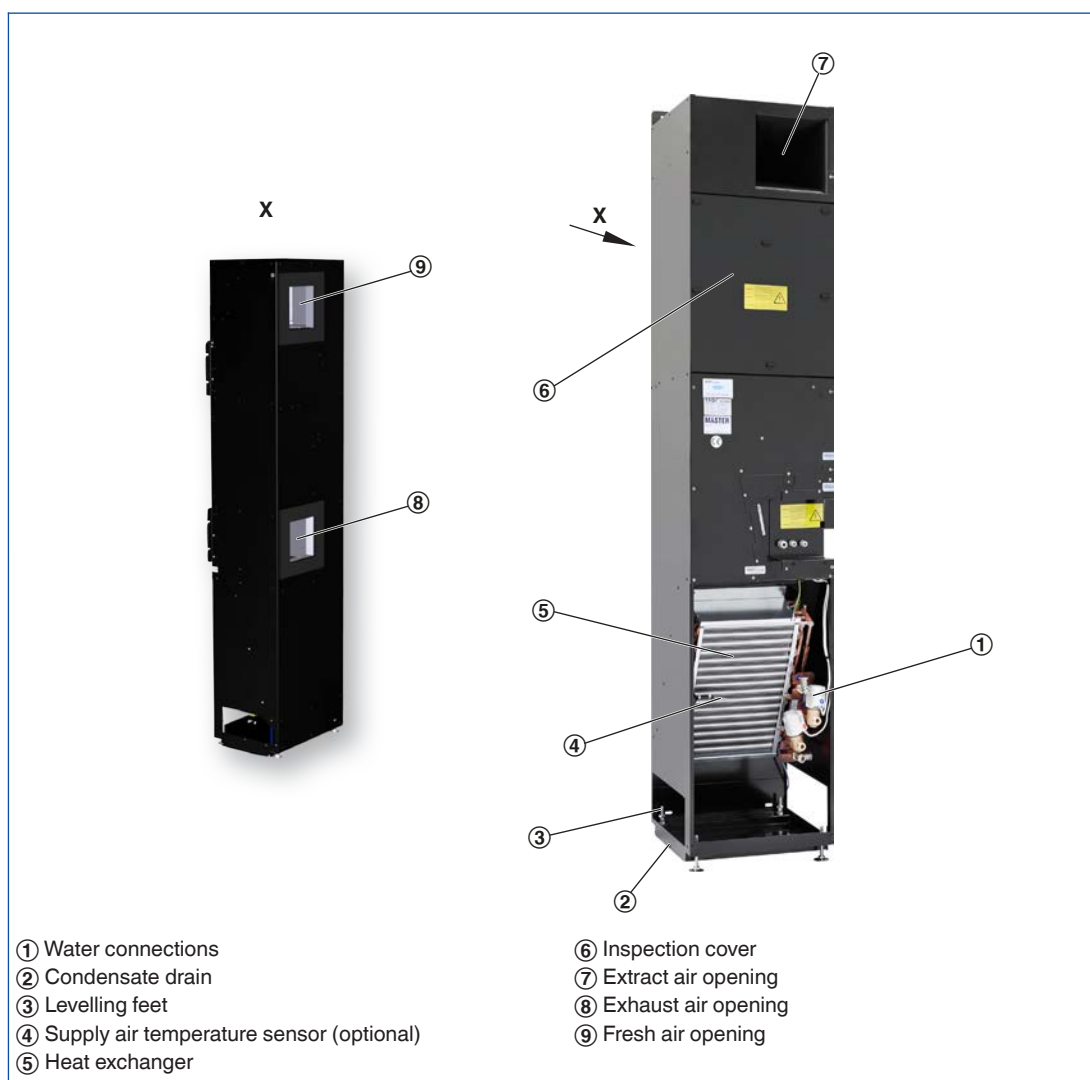
The extract air first passes a G3 filter (that protects the unit), then flows through the heat exchanger (for heat recovery), the extract air fan and the motorised shut-off damper before it is discharged to the outside as exhaust air.

Automatic switching to secondary air mode (only with an air quality sensor) if the room air quality is sufficient.

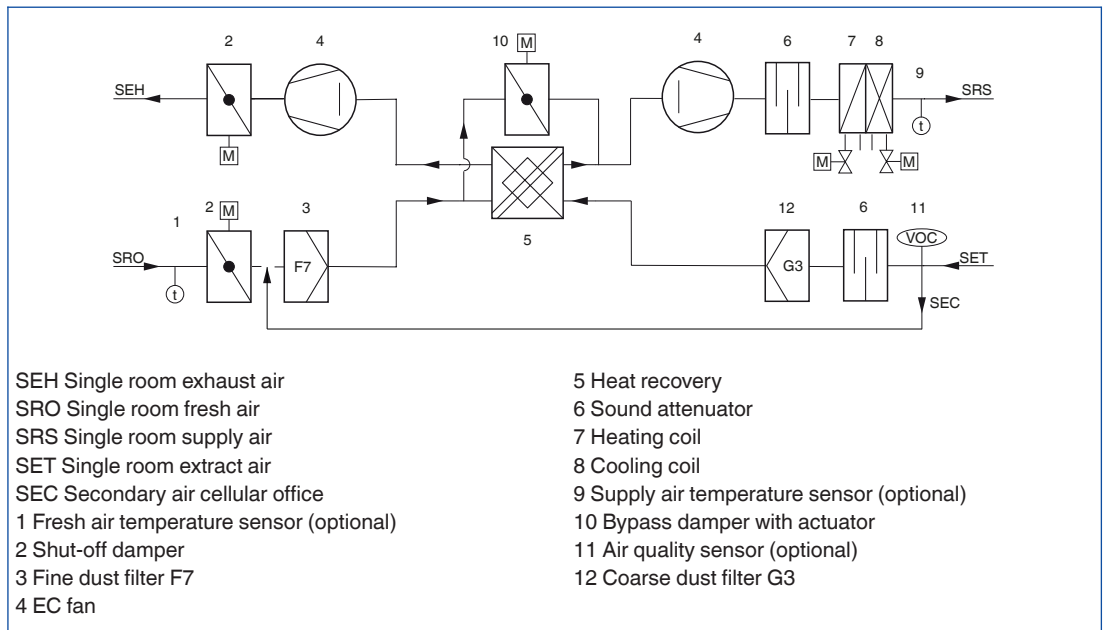
The fresh air damper closes, the self-powered secondary air damper opens and the extract air fan is switched off.

The unit always starts in secondary air mode, which is more energy efficient.

Schematic illustration of FSL-V-ZAB/SEK



Ventilation diagram for FSL-V-ZAB/SEK



Width	396 mm
Height	1800 mm
Depth	319 mm
Fresh air flow rate	150 m ³ /h
Supply air flow rate	Up to 150 m ³ /h
Cooling capacity	Up to 720 W
Heating capacity	Up to 2650 W
Room cooling capacity	Up to 400 W
Room heating capacity	Up to 750 W
Max. operating pressure, water side	6 bar
Max. operating temperature	75 °C
Sound power level	27 – 44 dB(A)
Supply voltage	230 V AC ±10 %, 50/60 Hz

FSL-V-ZAB/SEK (sizing examples)

Supply air flow rate	m ³ /h	60	90	120	150
Total cooling capacity	W	287	409	563	688
Room cooling capacity	W	174	240	337	406
Temperature of the air in the unit	°C	32.0	32.0	32.0	32.0
Rel. humidity	%	40.0	40.0	40.0	40.0
Water content of the dry air	g/kg	11.9	11.9	11.9	0.0
Supply air temperature	°C	17.3	18.0	17.6	17.9
Condensation	g/h	0	0	0	0
Chilled water flow rate	l/h	30	40	80	100
Water temperature, inlet	°C	16	16	16	16
Water temperature, outlet	°C	24.2	24.8	22.0	21.9
Pressure drop – water side	kPa	1.5	2.4	8.5	12.7
Total heating capacity	W	1070	1620	2050	2460
Room heating capacity	W	269	412	449	471
Temperature of the air in the unit	°C	-12.0	-12.0	-12.0	-12.0
Supply air temperature	°C	35.4	35.7	33.2	31.4
Hot water flow rate	l/h	30	60	80	100
Water temperature, inlet	°C	50	50	50	50
Water temperature, outlet	°C	19.1	26.6	27.8	28.7
Sound power level L _{WA}	dB(A)	27	33	39	44
Sound pressure level with 8 dB system attenuation	dB(A)	19	25	31	36

Decentralised supply and extract air units of Type FSL-V-ZAB/SEK, with heat recovery and heat exchanger, for vertical installation on the façade system or on an external wall, e.g. adjacent to a window.

Special characteristics

- Motorised shut-off dampers for fresh, normally closed (NC) in order to prevent uncontrolled airflows
- Recuperative heat exchanger for recovery, including bypass damper with electric variable actuator
- Heat exchanger as 2-pipe or 4-pipe system, with G½" union nuts and flat seals
- Meets the hygiene requirements of VDI 6022
- Filter class: F7 for fresh air, G3 for extract air
- Easy filter change with quick release fasteners, no tools required
- Condensate drip tray with or without condensate drain
- Compact construction, hence particularly suitable for refurbishment projects
- Demand-based ventilation and extract ventilation is possible by means of monitoring the room air quality and with dedicated control equipment
- 4 levelling feet
- Automatic switching to secondary air mode (only with an air quality sensor) if the room air quality (measured with the integral VOC sensor, for example) is between the previously defined range. The fresh air damper closes, the self-powered secondary air damper opens and the extract air fan is switched off. The unit always starts in secondary air mode, which is more energy efficient.

Materials and surfaces

- Casing, filter chamber cover, fans and levelling feet are made of galvanised sheet steel
- Heat exchanger with copper tubes and

aluminium fins

- Casing powder-coated, black (RAL 9005)
- F7 filter medium made of moisture-resistant glass fibre paper (certified by Eurovent)
- Mineral wool lining to DIN 4102, fire rating class A, faced with glass fibre fabric as a protection against erosion, effective with airflow velocities up to 20 m/s
- Closed cell sealing strips

Construction

- Powder-coated RAL 9005, black

Technical data

- Width: 396 mm
- Height: 1800 mm
- Depth: 319 mm
- Fresh air flow rate: 150 m³/h
- Supply air flow rate: up to 150 m³/h
- Cooling capacity: up to 720 W
- Heating capacity: up to 2650 W
- Room cooling capacity: up to 400 W
- Room heating capacity: up to 750 W
- Max. operating pressure: 6 bar
- Max. operating temperature: 75 °C
- Sound power level: 27 – 44 dB(A)
- Supply voltage: 230 V AC ±10 %, 50/60 Hz
- Rating: 87 VA
- Power consumption: nominal volume flow rate 27 W

Sizing data

Fresh air

- \dot{V} _____ [m³/h]

Supply air

- \dot{V} _____ [m³/h]

Room cooling capacity

- \dot{Q} _____ [W]

Room heating capacity

- \dot{Q} _____ [W]

- L_{WA} _____ [dB(A)]

Decentralised ventilation units are technically advanced products of high quality; they offer a wide range of configuration options. For specification details regarding your project please contact your nearest TROX branch or subsidiary.

FSL-V-ZAB/SEK

FSL - V - ZAB/SEK - 4 / 396 x 1800 x 319 / R / MA - T / B / V / Z / A / HV - R - 0,4 / KV - R - 0,4

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1 Type

FSL-V-ZAB/SEK Vertical ventilation units

2 Heat exchanger

2 2-pipe
4 4-pipe

3 Dimensions [mm]

B x H x T
396 x 1800 x 319

4 Control equipment

No entry: none
R With

5 Control function

MA Master (room module and control module)
SL Slave (control module)

6 Real time clock

No entry: none
master only
T With

7 Interface

No entry: none
master only
B BACnet MS/TP or Modbus RTU
L LonWorks LON-FTT10

8 Air quality sensor

No entry: none
master only
V VOC sensor

9 Supply air temperature sensor

Z With

10 Fresh air temperature sensor

No entry: none
master only
A With

11 Heating valve

HV With

12 Lockshield – heating circuit

R With

13 kVS value – heating valve

0,25
0,40
0,63
1,00
F0,50

14 Cooling valve

For 4-pipe systems only
with
KV

15 Lockshield – cooling circuit

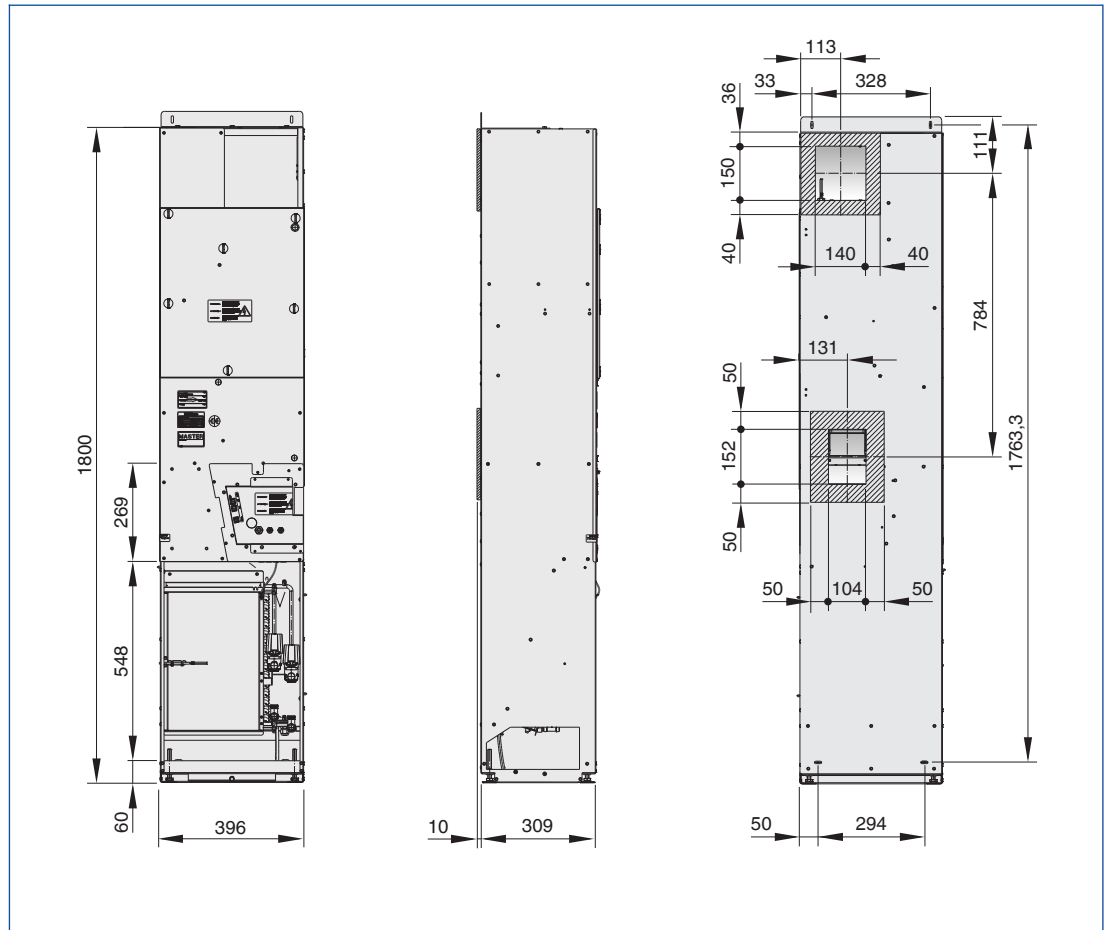
R With

16 kVS value – cooling valve

0,25
0,40
0,63
1,00
F0,50

Weight upon request

FSL-V-ZAB/SEK



Installation example



Installation example



Installation example



Installation and commissioning

- Vertical installation on the façade or on an external wall
- Level adjustment using the 4 levelling feet (+40 mm)
- The fresh air connection is provided by two ventilation openings in the façade system or external wall (to be provided by others), preferably sloping towards the outside
- Weather protection for the fresh air and exhaust air openings to be provided by others
- Installation and connections to be performed by others; fixing, connection and sealing material to be provided by others
- The water flow and return connections are on the right-hand side of the unit when seen from the room
- Vents and drainage by others
- The electrical connection is on the right when seen from the room
- The under sill trim must not obstruct installation or deinstallation of the unit or maintenance access on the front of the unit

L_N [mm]

Nominal length

L_{WA} [dB(A)]

Sound power level

t_{Pr} [°C]

Primary air temperature

t_{wV} [C°]

Water flow temperature – cooling/heating

t_R [C°]

Room temperature

t_R [C°]

Room temperature

t_{AN} [C°]

Secondary air intake temperature

Q_{Pr} [W]

Thermal output – primary air

Q_{tot} [W]

Thermal output – total

Q_w [W]

Thermal output – water side, cooling/heating

\dot{V}_{Pr} [l/s]

Primary air volume flow rate

\dot{V}_{Pr} [m³/h]

Primary air volume flow rate

\dot{V}_w [l/h]

Water flow rate – cooling/heating

\dot{V} [l/h]

Volume flow rate

Δt_w [K]

Temperature difference – water

Δp_w [kPa]

Pressure drop, water side

Δp_t [Pa]

Total pressure drop, air side

$\Delta t_{Pr} = t_{Pr} - t_R$ [K]

Difference between primary air temperature and room temperature

$\Delta t_{RWV} = t_{wV} - t_R$ [K]

Difference between water flow temperature and room temperature

Δt_{Wm-Ref} [K]

Difference between mean water temperature and reference temperature

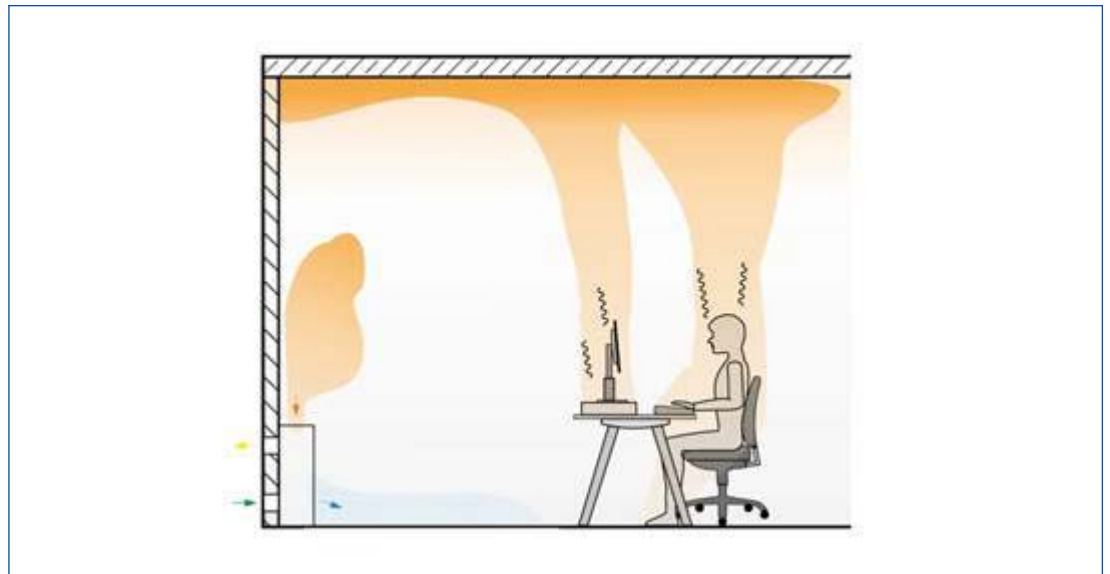
L_N [mm]

Nominal length

Inducing displacement flow

The supply air is discharged near the external wall and with a medium velocity between 1.0 and 1.5 m/s. Due to the induction effect the supply air velocity is rapidly reduced such that, in cooling mode, the supply air displaces the room air over the entire floor area. The convection from people and other heat sources causes the fresh air from the pool to rise and create comfortable conditions in the occupied zone.

Schematic illustration of inducing displacement flow ventilation



Heat exchanger

The maximum water-side operating pressure for all heat exchangers is 6 bar.

The maximum water flow temperature (heating circuit) for all heat exchangers is 75 °C; if flexible hoses are used, the water flow temperature should not exceed 55 °C. Units for other pressures

and temperatures are available on request.

The water flow temperature (cooling circuit) should be at least 16 °C such that it does not permanently fall below the dew point. For units with a condensate drip tray the water flow temperature may be reduced to 15 °C.

Heat exchanger as 2-pipe system

Air-water systems with a 2-pipe heat exchanger may be used for either heating or cooling. In

changeover mode it is possible to use all units within a water circuit exclusively for cooling in summer and exclusively for heating in winter.

Wärmeübertrager 2-Leiter-System



Heat exchanger as 4-pipe system

Air-water systems with a 4-pipe heat exchanger may be used for both heating and cooling. Depending on the season, i.e. especially in spring

and autumn, it may be possible that an office has to be heated in the morning and cooled in the afternoon.

Wärmeübertrager 4-Leiter-System

