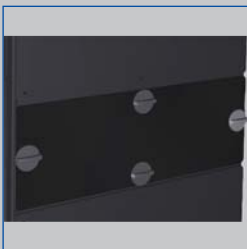




Eurovent-certified F7 filter



Centrifugal fan



Filter chamber cover



Levelling foot



Tested to VDI 6022

# Vertical units

## Type FSL-V-ZUS



### Secondary air unit for supply air, with heat exchanger, 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 fan with low specific fan powers, SFP = 1 according to EN 13779
- Heat exchanger for heating and cooling as 2-pipe or 4-pipe system
- Unit base of approx. 0.11 m<sup>2</sup>
- Reduction of fine dust and pollen contamination due to integral filters that conform to VDI 6022 – F7 fresh air filter
- Easy filter change, no tools required
- Condensate drip tray with or without condensate drain
- Motorised shut-off damper, normally closed (NC)
- Self-powered secondary air damper for adding secondary air to increase the thermal output

#### Optional equipment and accessories

- Modular control system X-AIRCONTROL, specially for decentralised ventilation systems
- Free cooling and night purge, depending on control strategy
- Various fixing systems to fix the unit to the floor or wall
- Powder coating in many different colours, e.g. RAL CLASSIC

Type		Page
FSL-V-ZUS	General information	6.2 – 2
	Order code	6.2 – 6
	Quick sizing	6.2 – 7
	Dimensions	6.2 – 8
	Specification text	6.2 – 9
	Basic information and nomenclature	9.2 – 1

## Installation examples

### Installation example



### Installation example



## Description



FSL-V-ZUS  
(Feldbergstraße project)

### Application

- Ventilation and extract 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 as a medium for heating and cooling
- For new buildings and refurbishment projects
- Vertical installation on an external wall
- Typical installation locations include offices and meeting rooms

### Variants

- Feldbergstraße project (Frankfurt, Germany)

### Construction

- Powder-coated RAL 9005, black, gloss level 70 %
- P1: Powder-coated in any other RAL colour, gloss level 70 %

### Nominal sizes

- 352 × 1880 × 301 mm (B × H × T)

### Useful additions

- Modular control system X-AIRCONTROL, specially for decentralised ventilation systems
- Connecting hoses

### Special features

- Motorised shut-off dampers for fresh air and exhaust air, normally closed (NC) in order to prevent uncontrolled airflows
- 4 levelling feet
- Acoustically optimised EC fan
- 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
- Easy filter change with quick release fasteners, no tools required
- Condensate drip tray with or without condensate drain
- Secondary air addition by means of TROX Compact controller
- Compact construction, hence particularly suitable for refurbishment projects
- Demand-based ventilation is possible by means of monitoring the room air quality and with dedicated control equipment

**Construction features**

- Energy-efficient EC fan with low specific fan powers, SFP = 1 according to EN 13779
- Mechanical self-powered volume flow controller to limit the fresh air flow rate and add secondary air if necessary
- Motorised shut-off dampers for fresh air and exhaust air, 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

**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 is powder-coated RAL 9005, black, or in any other RAL colour
- 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

**Installation and commissioning**

- Vertical installation on an external wall
- Level adjustment using the 4 levelling feet (+45 mm)
- The fresh air connection is provided by a ventilation opening in the external wall (to be provided by others)
- Weather protection for the fresh air opening 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

**Standards and guidelines**

- Façade ventilation units of Type FSL-V-ZUS conform to VDI 6035 and VDMA 24390
- Hygiene certificate to VDI 6022
- Heating/cooling medium conforms to VDI 2035

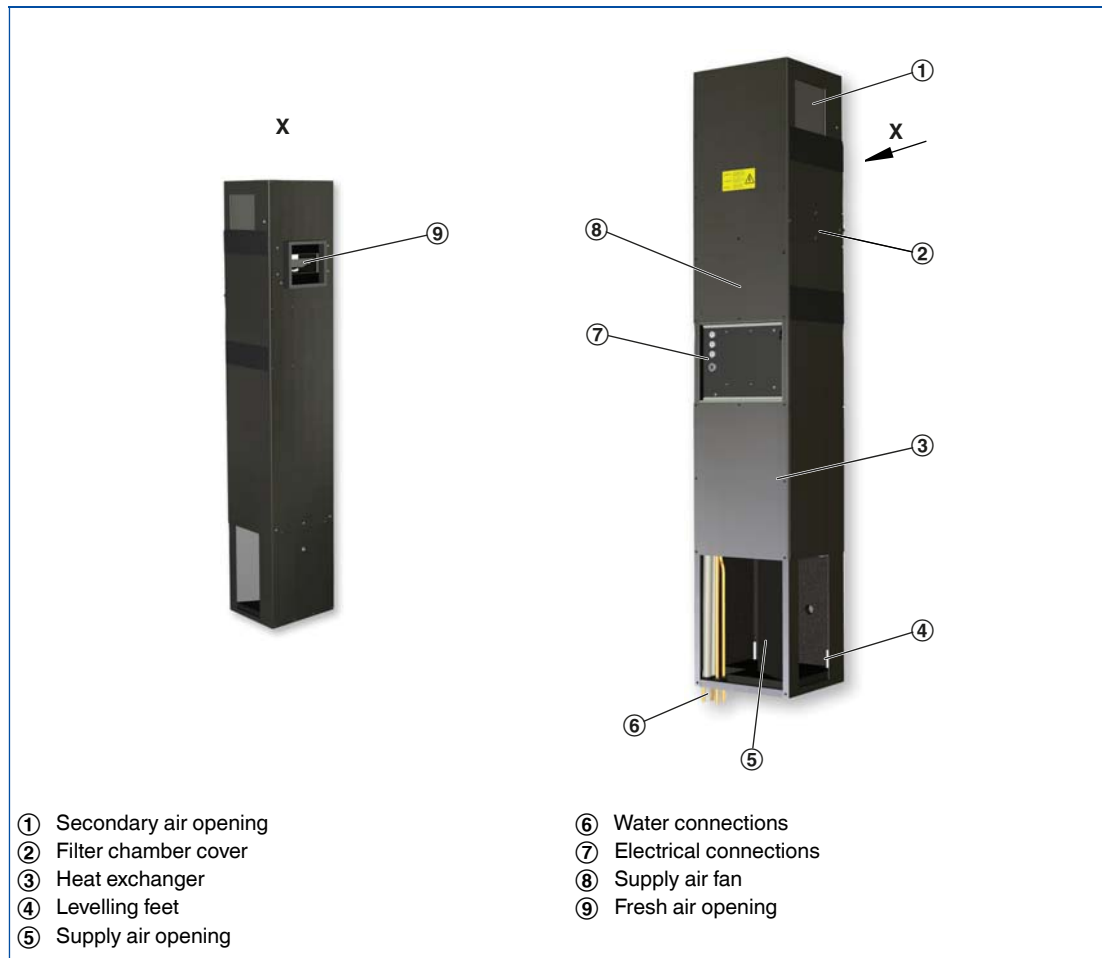
**Maintenance**

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

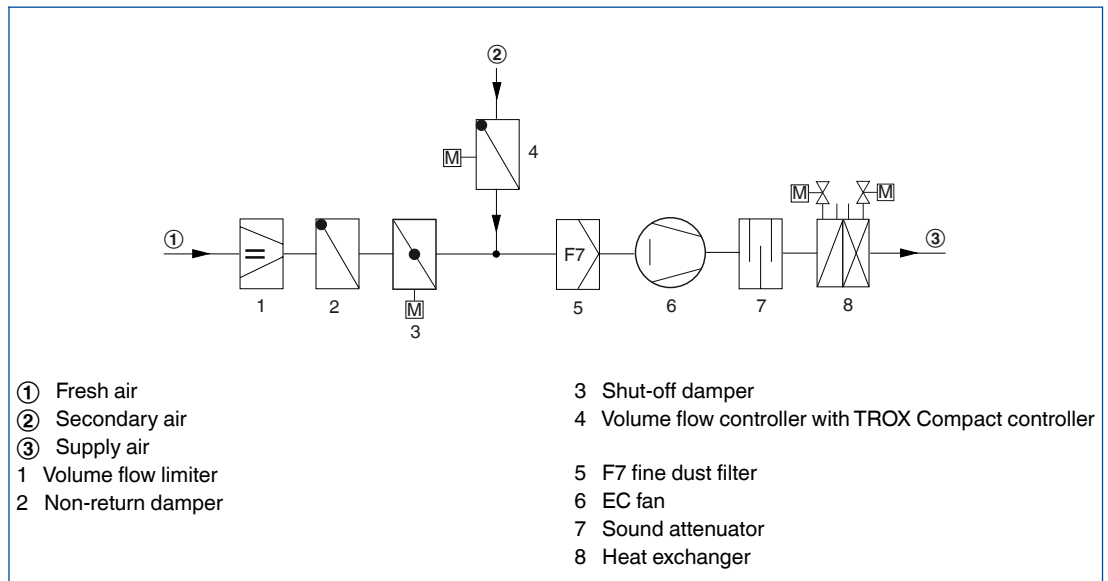
**Technical data**

<b>Width</b>	352 mm
<b>Height</b>	1880 mm
<b>Depth</b>	301 mm
<b>Fresh air flow rate</b>	75 m <sup>3</sup> /h
<b>Supply air flow rate</b>	Up to 210 m <sup>3</sup> /h
<b>Cooling capacity</b>	Up to 660 W
<b>Heating capacity</b>	Up to 1980 W
<b>Max. operating pressure, water side</b>	6 bar
<b>Max. operating temperature</b>	75 °C
<b>Sound power level</b>	33 – 40 dB(A)
<b>Supply voltage</b>	230 V AC ±10 %, 50/60 Hz

Schematic illustration of FSL-V-ZUS



Ventilation diagram for FSL-V-ZUS



**Function**

**Functional description**

Decentralised supply air and secondary air units ventilate the room and dissipate cooling loads and heat loads.

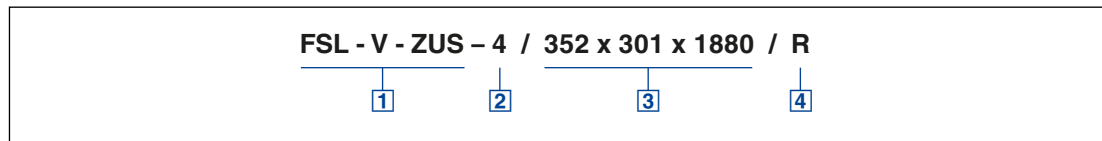
An EC centrifugal fan takes in the fresh air which then flows through the motorised shut-off damper, the volume flow limiter and the F7 filter.

If necessary, the air is heated or cooled by the heat exchanger before it is discharged to the room as an inducing displacement flow.

If necessary, secondary air is added to the fresh air in order to increase the thermal output.

Order code

FSL-V-ZUS



**1 Type**

**FSL-V-ZUS** Vertical ventilation units

**2 Heat exchanger**

**2** 2-pipe

**4** 4-pipe

**6 Dimensions [mm]**

B x H x T

**352 x 1880 x 301**

**3 Control**

No entry: none

**R** With

Order information

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

Quick sizing

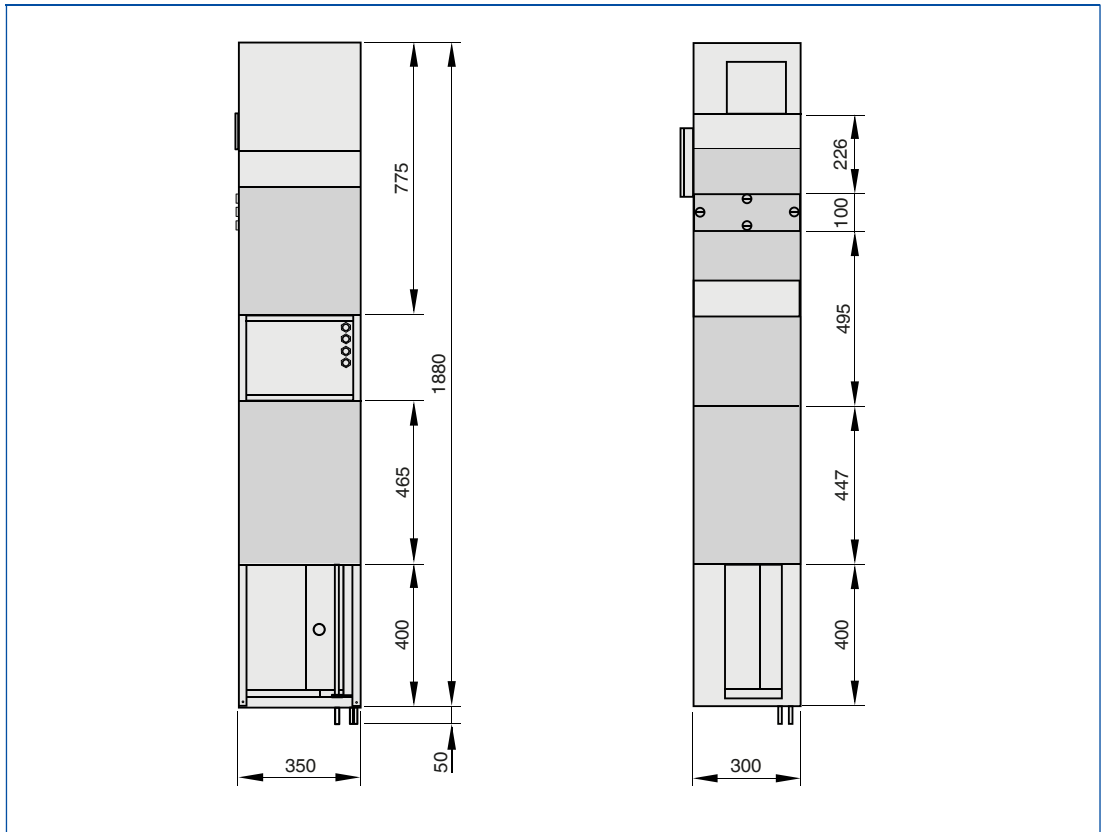
FSL-V-ZUS

Supply air flow rate	m <sup>3</sup> /h	75	150	210
Fresh air flow rate	m <sup>3</sup> /h	75	75	75
Total cooling capacity	W	340	490	660
Internal cooling capacity	W	200	400	533
Temperature of the air in the unit	°C	32.0	29.0	28.1
Rel. humidity	%	40.0	44.7	46.3
Water content of the dry air	g/kg	11.9	11.2	11
Supply air temperature	°C	18	18	18.4
Condensation	g/h	0	0	0
Chilled water flow rate	l/h	75	210	300
Water temperature, inlet	°C	16	16	16
Water temperature, outlet	°C	19.9	18.0	17.9
Pressure drop, water side	kPa	<3	<9	<16
Total heating capacity	W	1330	1690	1980
Internal heating capacity	W	376	812	1136
Temperature of the air in the unit	°C	-12.0	4.0	8.6
Supply air temperature	°C	35	36.2	36.2
Hot water flow rate	l/h	100	150	200
Water temperature, inlet	°C	60	60	60
Water temperature, outlet	°C	48.4	50.1	51.3
Pressure drop, water side	kPa	<5	<9	<15
Sound power level L <sub>WA</sub>	dB (A)	33	37	40
Sound pressure level with 8 dB room attenuation	dB (A)	25	29	32

Dimensions

Weight upon request

FSL-V-ZUS





## Description

This specification text describes the general properties of the product. Texts for variants can be generated with our Easy Product Finder design programme.

Decentralised supply air and secondary air units of Type FSL-V-ZUS, with heat exchanger, for vertical installation on an external wall, e.g. adjacent to a window.

## Special features

- Motorised shut-off dampers for fresh air and exhaust air, normally closed (NC) in order to prevent uncontrolled airflows
- 4 levelling feet
- Acoustically optimised EC fan
- 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
- Easy filter change with quick release fasteners, no tools required
- Condensate drip tray with or without condensate drain
- Secondary air addition by means of TROX Compact controller
- Compact construction, hence particularly suitable for refurbishment projects
- Demand-based ventilation is possible by means of monitoring the room air quality and with dedicated control equipment

## 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 is powder-coated RAL 9005, black, or in any other RAL colour
- 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, gloss level 70 %
- P1: Powder-coated in any other RAL colour, gloss level 70 %

## Technical data

- Width: 352 mm
- Height: 1880 mm
- Depth: 301 mm
- Fresh air flow rate: 75 m³/h
- Supply air flow rate: up to 210 m³/h
- Cooling capacity: up to 660 W
- Heating capacity: up to 1980 W
- Max. operating pressure: 6 bar
- Max. operating temperature: 75 °C
- Sound power level: 33 – 40 dB(A)
- Supply voltage: 230 V AC ±10 %, 50/60 Hz
- Rating: 30 VA
- Power consumption: 18 W with boost level, 11 W with medium speed (nominal volume flow rate)

## Order options

### 1 Type

FSL-V-ZUS Vertical ventilation units

### 2 Heat exchanger

- 2 2-pipe
- 4 4-pipe

### 6 Dimensions [mm]

B × H × T

- 352 × 1880 × 301

### 3 Control

- R No entry: none
- With

# Decentralised ventilation

## Basic information and nomenclature



- Product selection
- Principal dimensions
- Nomenclature

# Decentralised ventilation

## Basic information and nomenclature

### Product selection

	Façade ventilation units						
	FSL-U-SEK	FSL-U-ZUS	FSL-U-ZAB	FSL-U-ZAS	FSL-B-SEK	FSL-B-ZUS	FSL-B-ZAB
<b>Installation details</b>							
Under floor (false floor)	●	●	●	●			
Under the sill					●	●	●
<b>Ventilation functions</b>							
Secondary air	●	●		●	●	●	
Supply air			●	●		●	●
Extract air							●
<b>Heat exchanger</b>							
2-pipe or 4-pipe heat exchanger	●	●	●	●	●	●	●
F7 filter			●	●			●
Heat recovery with bypass							
●	Possible						
	Not possible						

### Product selection

	Façade ventilation units					
	FSL-B-ZAS	SCHOOLAIR-B	FSL-V-ZUS	FSL-V-ZAB	SCHOOLAIR-V	SCHOOLAIR-D
<b>Installation details</b>						
Under the sill	●	●				
Vertical installation on an external wall, e.g. adjacent to a window			●	●	●	
Ceiling						●
<b>Ventilation functions</b>						
Secondary air	●		●			
Supply air	●	●		●	●	●
Extract air		●		●	●	●
<b>Heat exchanger</b>						
2-pipe or 4-pipe heat exchanger	●	●	●	●	●	●
F7 filter						
Heat recovery with bypass						
●	Possible					
	Not possible					

# Decentralised ventilation

## Basic information and nomenclature

### Principal dimensions

$L_N$  [mm]  
Nominal length

### Nomenclature

$t_R$  [°C]  
Room temperature

$t_{Pr}$  [°C]  
Primary air temperature

$t_{wK}$  [°C]  
Water flow temperature – cooling

$\dot{V}_{wK}$  [l/h]  
Water flow rate – cooling

$t_{wH}$  [°C]  
Water flow temperature – heating

$t_{wV}$  [°C]  
Water flow temperature

$\dot{V}_{wH}$  [l/h]  
Water flow rate – heating

$\dot{V}_{Pr}$  [m<sup>3</sup>/h]  
Primary air volume flow rate

$\Delta p_r$  [Pa]

Pressure drop, air side of the induction unit

$\dot{Q}_{tot}$  [W]  
Thermal output – total

$\dot{Q}_{wK}$  [W]  
Thermal output, cooling (cooling capacity) – water side

$\dot{Q}_{wH}$  [W]  
Thermal output, heating (heating capacity) – water side

$\dot{Q}_{Pr}$  [W]  
Thermal output – air side

$\Delta t_w$  [K]  
Temperature difference – water circuit

$\Delta p_w$  [kPa]  
Pressure drop – water side

$L_{WA}$  [dB(A)]  
Sound power level

# Decentralised ventilation

## Basic information and nomenclature

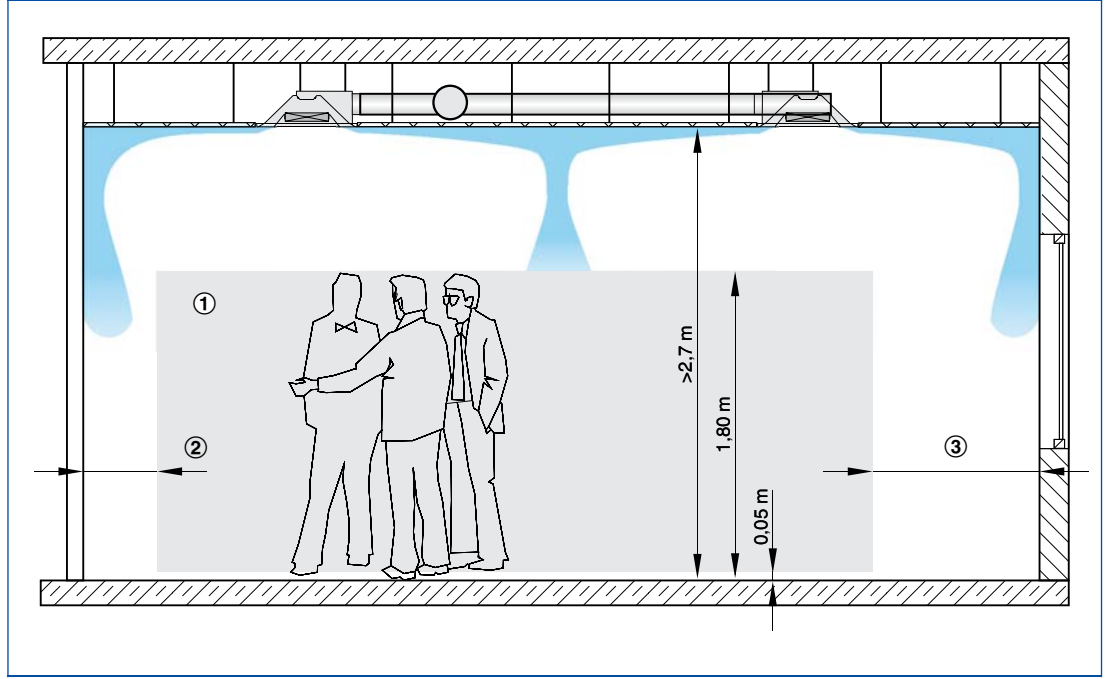
### Types of ventilation

#### Mixed flow

The supply air is discharged from the diffuser into the space with a velocity between 2 and 5 m/s. The resulting air jet mixes with the room air, ventilating the entire space. Mixed flow systems typically provide a uniform temperature

distribution and air quality within the space. The originally high velocity of the turbulent air jet decreases rapidly due to the high induction levels of mixed flow systems.

#### Schematic illustration of mixed flow ventilation

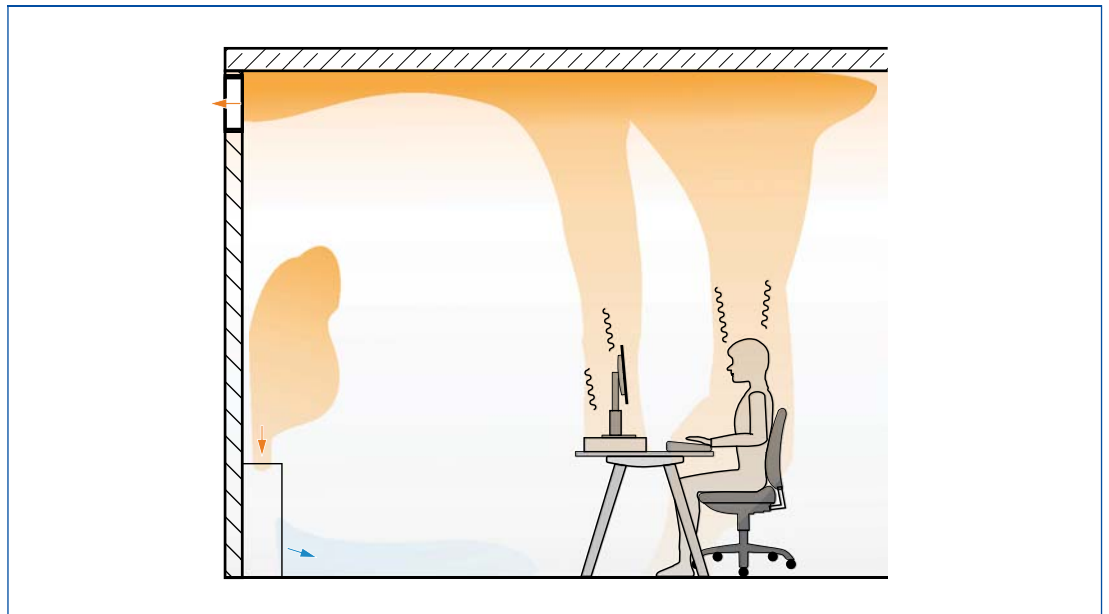


#### Displacement flow

Die Zuluft strömt möglichst bodennah mit velocity between 0.15 and 0.20 m/s and as close as possible to the floor; the result is a pool of fresh 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. Displacement flow ventilation is characterised by low airflow velocities and low turbulence. The air quality in the occupied zone is very high. The extract air should ideally be removed near the ceiling.

#### Schematic illustration of displacement flow ventilation



# Decentralised ventilation

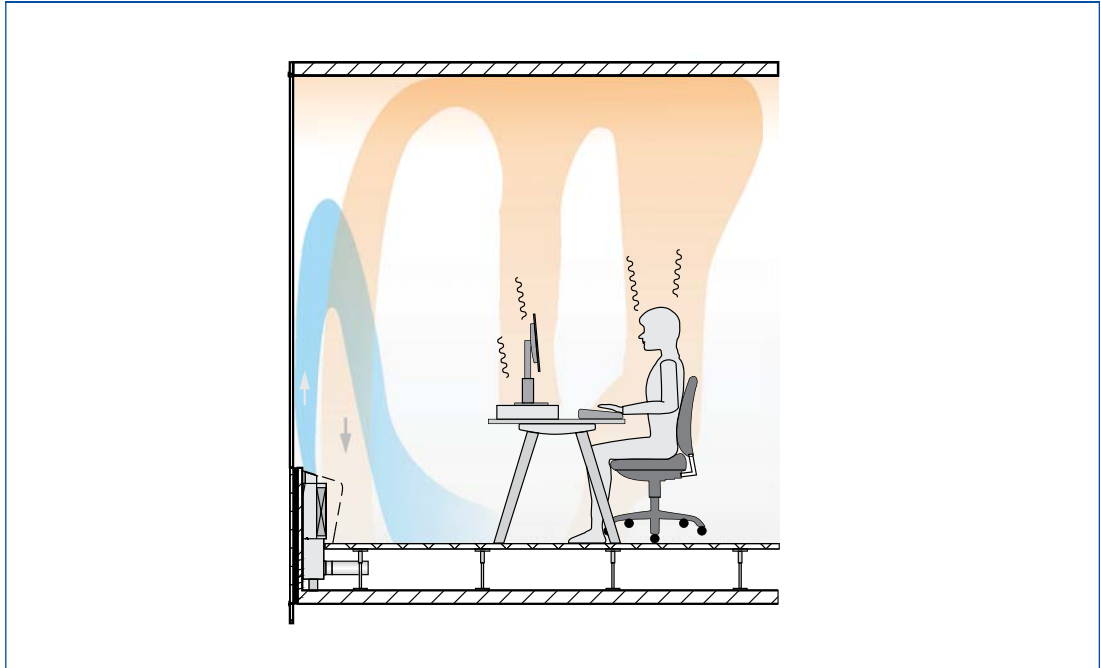
## Basic information and nomenclature

### 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



# Decentralised ventilation

## Basic information and nomenclature

### Heat exchanger

#### 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.

#### Heat exchanger as 2-pipe 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.

#### Heat exchanger as 4-pipe system

