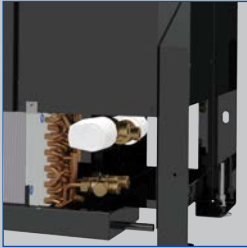


Cross counter flow heat exchanger for heat recovery



Water connection



Filter chamber cover



Levelling foot



Tested to VDI 6022

# Under sill units

## Type SCHOOLAIR-B



### Supply and extract air unit with heat exchanger and heat recovery, secondary air option, for installation under the sill

Ready-to-operate decentralised ventilation unit that provides good comfort levels, used for the ventilation and extract ventilation of rooms such as classrooms in schools

- 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 with electric actuator
- Highly efficient heat exchanger for heating and cooling as 2-pipe or 4-pipe system
- Heat recovery all year round
- 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
- Easy filter change, no tools required
- Condensate drip tray with condensate drain
- Motorised shut-off dampers, normally closed (NC)
- Installation without interruption to the operations of the respective school

#### 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
- Various fixing systems to fix the unit to the floor or wall
- Variable heat recovery
- Powder-coated RAL 9005 (black)

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## Application

### Application

- Ventilation and extract ventilation of rooms with a depth up to approx. 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
- Installation under the sill
- Typical applications include classrooms in schools, playrooms in daycare facilities, meeting rooms and offices with a high air change rate

### Special characteristics

- Decentralised ventilation unit for high volume flow rates
- Motorised shut-off dampers for fresh air and exhaust air, normally closed (NC) in order to prevent uncontrolled airflows and the carry over of smoke

- Demand-based ventilation and extract ventilation is possible by means of monitoring the room air quality and with dedicated control equipment
- For demand-based ventilation
- Recuperative heat recovery with motorised variable bypass all year round
- 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 condensate drain
- Compact construction, hence particularly suitable for refurbishment projects

### Nominal sizes

- SCHOOLAIR-B: 1590 × 650 × 420 mm (B × H × T)
- SCHOOLAIR-B-HE: 2090 × 750 × 420 mm (B × H × T)

## Description

### Variants

- SCHOOLAIR-B – volume flow rates: 150, 200, 250 and 320 m<sup>3</sup>/h, with cross flow plate heat exchanger for heat recovery
- SCHOOLAIR-B-HE – volume flow rates: 200, 250, 300 and 400 m<sup>3</sup>/h, with cross counter flow plate heat exchanger for heat recovery

### Construction

- Powder-coated RAL 9005, black

### Accessories

- Outer casing made of wood, with integral supply air and extract air grilles

### 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 400 m<sup>3</sup>/h, depending

on construction variant

- Cross flow or counter flow plate heat exchanger
- Motorised shut-off dampers for fresh air and exhaust air, normally closed (NC) in order to prevent uncontrolled airflows and the carry over of smoke
- 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
- Plate heat exchanger (heat recovery) made of aluminium
- 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 SCHOOLAIR-B conform to VDI 6035 and VDMA 24390
- Hygiene certificate to VDI 6022
- Heating/cooling fluid conforms to VDI 2035
- Meets the requirements of EU directive 1253/2014 (ErP).

#### 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 recuperative heat exchanger when it is sensible with regard to

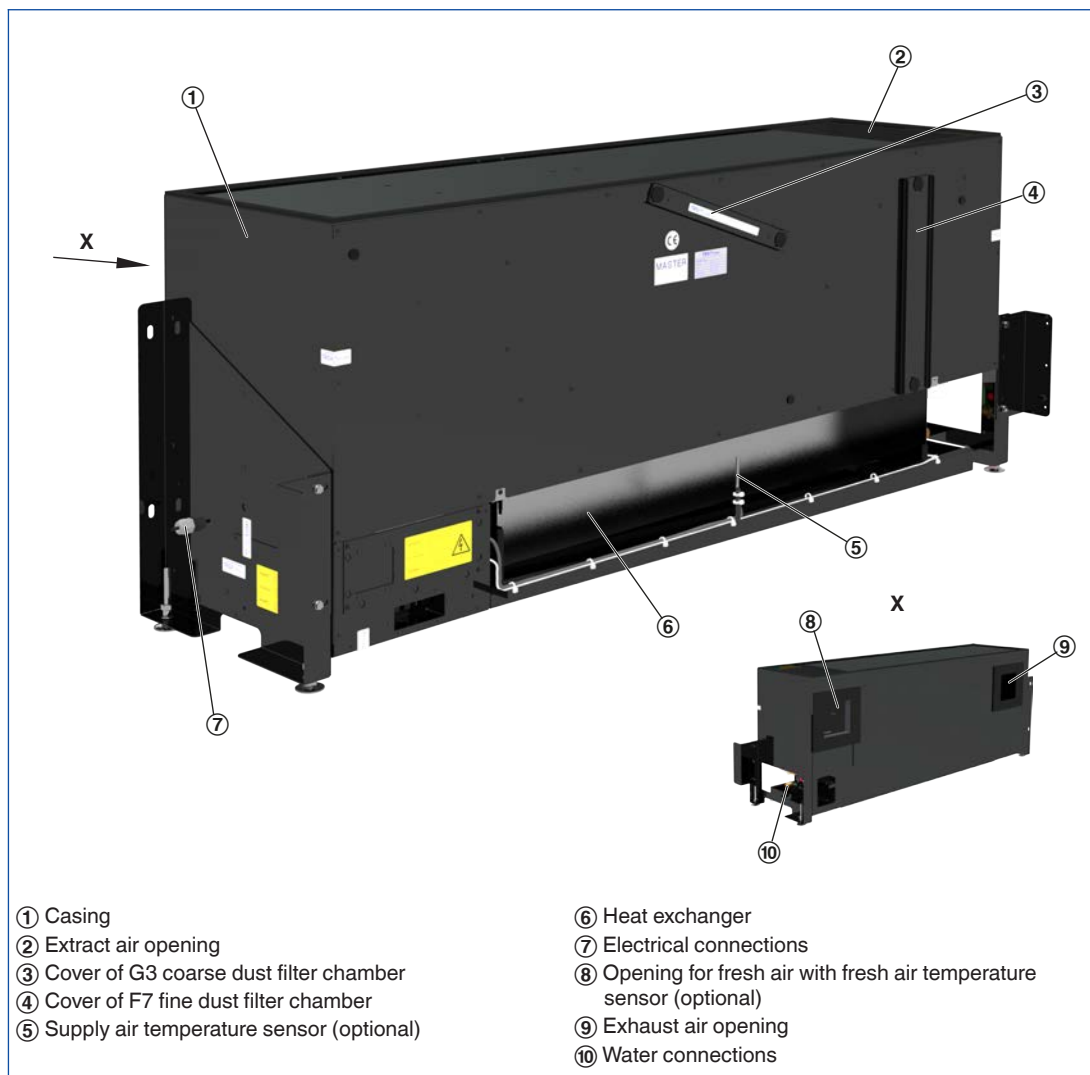
energy efficiency.

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

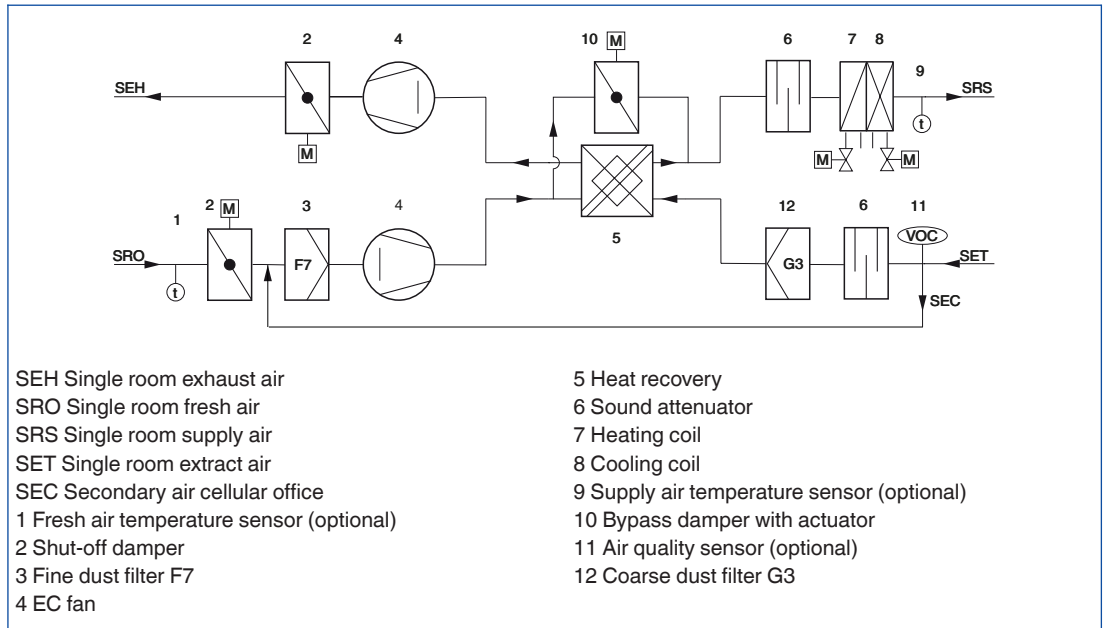
The extract air first passes a G3 filter (that protects the unit), then flows through the heat exchanger (for heat recovery), the extract air fan and the motorised shut-off damper before it is discharged to the outside as exhaust air.

If the room air quality is good, the unit can be operated in secondary mode only.

**Schematic illustration of SCHOOLAIR-B**



Ventilation diagram for SCHOOLAIR-B (optional control)



<b>Width</b>	1590 mm SCHOOLAIR-B, 2090 mm SCHOOLAIR-B-HE
<b>Height</b>	650 mm SCHOOLAIR-B, 750 mm SCHOOLAIR-B-HE
<b>Depth</b>	420 mm
<b>Volume flow rate</b>	150, 200, 250 m <sup>3</sup> /h (boost: 320 m <sup>3</sup> /h) with SCHOOLAIR-B
<b>Volume flow rate</b>	150, 225, 300 m <sup>3</sup> /h (boost: 400 m <sup>3</sup> /h) with SCHOOLAIR-B-HE
<b>Cooling capacity</b>	Up to 1750 W
<b>Heating capacity</b>	Up to 6500 W
<b>Room cooling capacity</b>	Up to 1000 W
<b>Room heating capacity</b>	Up to 1700 W
<b>Sound power level</b>	32 – 49 dB(A) (depending on variant)
<b>Max. operating pressure, water side</b>	6 bar
<b>Max. operating temperature</b>	75 °C
<b>Supply voltage</b>	230 V AC ±10%; 50/60 Hz
<b>Weight</b>	70 kg (SCHOOLAIR-B), 125 kg (SCHOOLAIR-B-HE)

Beispielhafte technische Daten

SCHOOLAIR-B (sizing examples)

Supply air flow rate	m <sup>3</sup> /h	150	200	250	320
Fresh air flow rate	m <sup>3</sup> /h	150	200	250	320
Total cooling capacity	W	687	913	1130	1390
Room cooling capacity	W	401	534	668	791
Temperature of the air in the unit	°C	32	32	32	32
Rel. humidity	%	40	40	40	40
Water content of the dry air	g/kg	11.9	11.9	11.9	11.9
Supply air temperature	°C	18	18	18	18.6
Condensation	g/h	0	0	0	0
Chilled water flow rate	l/h	90	150	220	250
Water temperature, inlet	°C	16	16	16	16
Water temperature, outlet	°C	22.6	21.2	20.4	20.8
Pressure drop – water side	kPa	<3	<3	<3	<5
Total heating capacity	W	2910	3780	4660	5810
Room heating capacity	W	972	1202	1445	1721
Temperature of the air in the unit	°C	-12	-12	-12	-12
Supply air temperature	°C	39.4	38.0	37.3	36.1
Hot water flow rate	l/h	70	100	140	200
Water temperature, inlet	°C	60	60	60	60
Water temperature, outlet	°C	24	27.3	31.2	34.8
Pressure drop – water side	kPa	<3	<3	<3	<5
Sound power level L <sub>WA</sub>	dB(A)	29	34	38	43
Sound pressure level with 8 dB system attenuation	dB(A)	21	26	30	35

SCHOOLAIR-B-HE (sizing examples)

Supply air flow rate	m <sup>3</sup> /h	150	225	300	400
Heating capacity (without heat recovery)	W	2920	4060	5310	6530
Internal heating capacity	W	927	1105	1383	1363
Temperature of the air in the unit	°C	-12	-12	-12	-12
Supply air temperature	°C	39.5	35.7	34.8	31.2
Hot water flow rate	l/h	80	120	200	250
Water temperature, inlet	°C	60	60	60	60
Water temperature, outlet	°C	28.4	30.7	37.0	37.3
Pressure drop – water side	kPa	<3	<4	<15	<22
Sound power level L <sub>WA</sub>	dB(A)	33	40	44	49
Sound pressure level with 8 dB system attenuation	dB(A)	25	32	36	41

Decentralised ventilation unit with supply and extract air function, with heat exchanger and heat recovery, secondary air option (based on air quality), for installation under a sill.

#### Special characteristics

- Decentralised ventilation unit for high volume flow rates
- Motorised shut-off dampers for fresh air and exhaust air, normally closed (NC) in order to prevent uncontrolled airflows and the carry over of smoke
- Demand-based ventilation and extract ventilation is possible by means of monitoring the room air quality and with dedicated control equipment
- For demand-based ventilation
- Recuperative heat recovery with motorised variable bypass all year round
- 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 condensate drain
- Compact construction, hence particularly suitable for refurbishment projects

#### 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
- Plate heat exchanger (heat recovery) made of aluminium
- 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: 1590 mm SCHOOLAIR-B, 2090 mm SCHOOLAIR-B-HE
- Height: 650 mm SCHOOLAIR-B, 750 mm SCHOOLAIR-B-HE
- Depth: 420 mm
- Volume flow rates: 150, 200, 250 m³/h (boost: 320 m³/h) with SCHOOLAIR-B
- Volume flow rate: 150, 225, 300 m³/h (boost 400 m³/h) with SCHOOLAIR-B-HE
- Cooling capacity: up to 1750 W
- Heating capacity: up to 6500 W
- Room cooling capacity: up to 1000 W
- Room heating capacity: up to 1700 W
- Sound power level: 32 – 49 dB(A) (depending on variant)
- Max. operating pressure: 6 bar
- Max. operating temperature: 75 °C
- Supply voltage: 230 V AC ±10%; 50/60 Hz
- Weight: 70 kg (SCHOOLAIR-B), 125 kg SCHOOLAIR-B-HE
- Rating: 116 VA (SCHOOLAIR-B), 236 VA (SCHOOLAIR-B-HE)
- Power consumption: 52 W (SCHOOLAIR-B) and 138 W (SCHOOLAIR-B-HE) with boost level; 38 W (SCHOOLAIR-B) or 75 W (SCHOOLAIR-B-HE) with medium speed (nominal volume flow rate)

#### 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.

**SCHOOLAIR-B**

SCHOOLAIR - B - HE - 4 / KM / 1590 x 650 x 420 / R / MA - T / B / V / Z / A / HV - R - 0,4 / KV - R - 0,4	
1	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

**1** Type

**SCHOOLAIR-B** Under sill unit

**2** Variant

No entry: standard

**HE** High heat recovery percentage

**3** Heat exchanger

**2** 2-pipe

**4** 4-pipe

**4** Condensate drip tray

No entry: none

**KM** with condensate drain

**5** Dimensions [mm]

B x H x T

**1590 x 650 x 420** (SCHOOLAIR-B)

**2090 x 750 x 420** (SCHOOLAIR-B-HE)

**6** Control system

No entry: none

**R** With

**7** **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

**11** Lockshield – heating circuit

**R** With

**15** kVS value – heating valve

**0,25**

**0,40**

**0,63**

**1,00**

**F0,50**

**16** Cooling valve

For 4-pipe systems only

**KV** with

**15** Lockshield – cooling circuit

**R** With

**16** kVS value – cooling valve

**0,25**

**0,40**

**0,63**

**1,00**

**F0,50**

Product examples

SCHOOLAIR-B

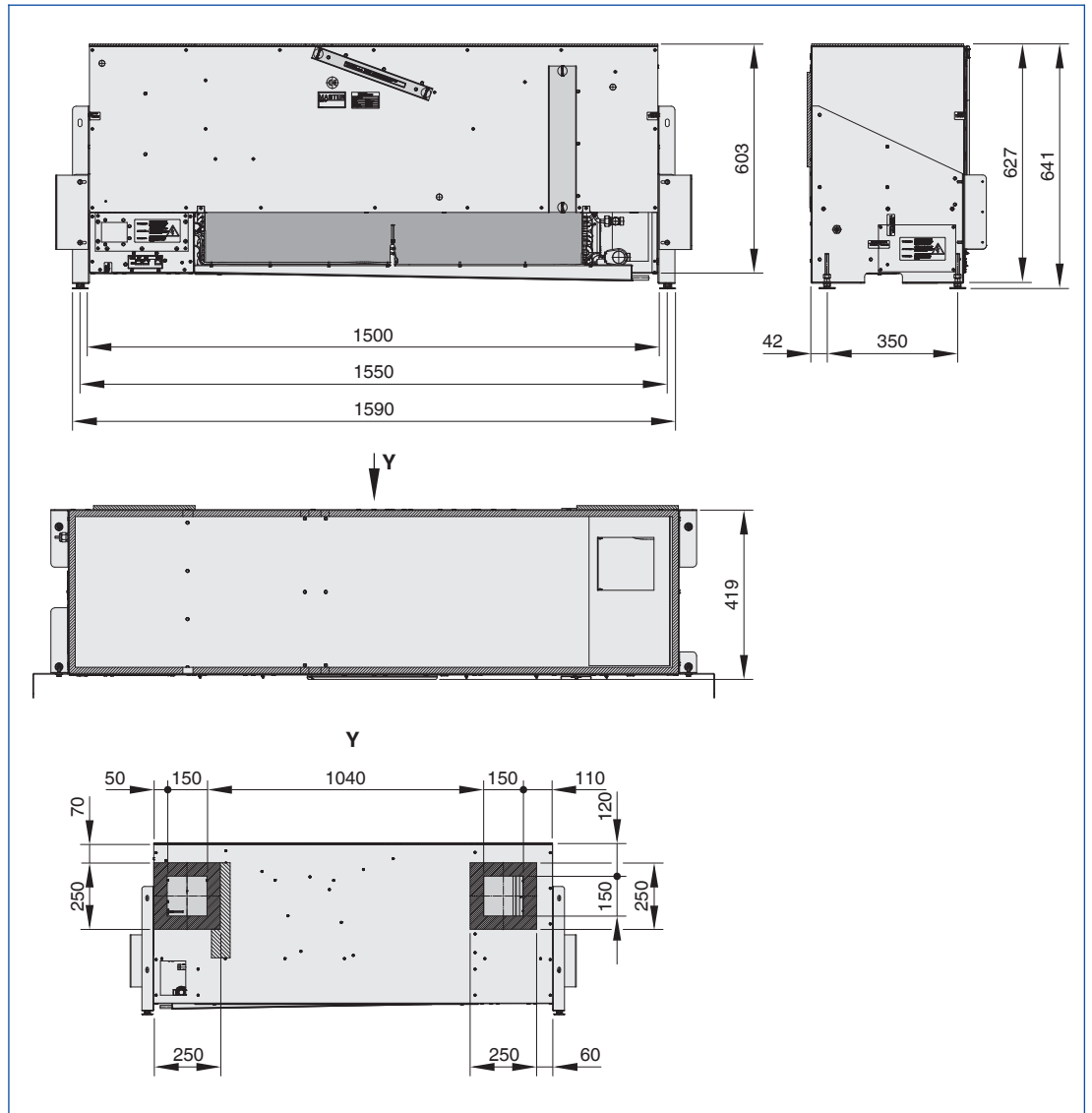


SCHOOLAIR-B-HE

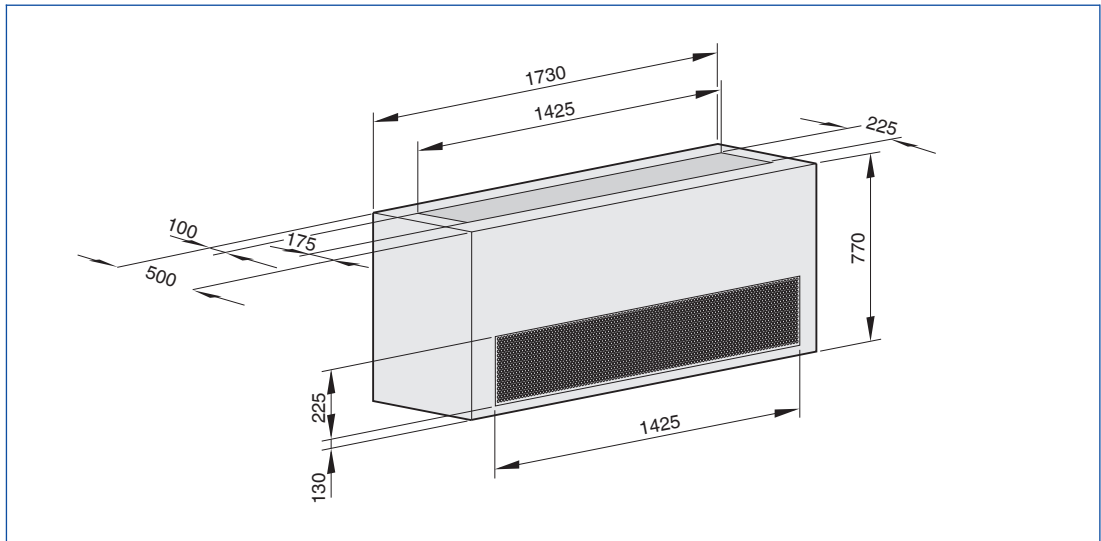


Weight: 70 kg

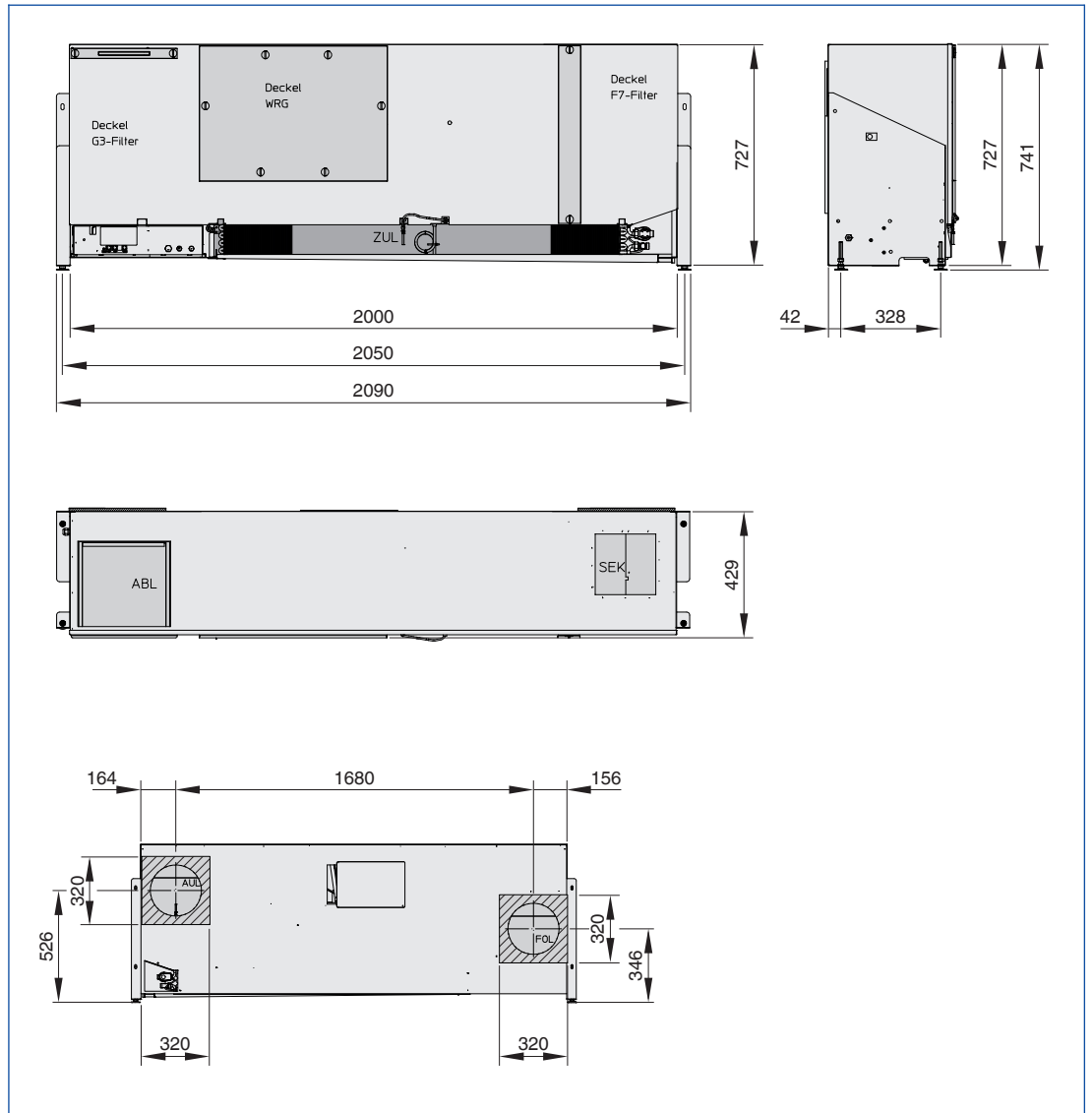
SCHOOLAIR-B



SCHOOLAIR-B with outer casing



SCHOOLAIR-B-HE



Installation example



Installation example



Installation example



**Installation and commissioning**

- Under sill installation standing on the floor
- Level adjustment using the 4 levelling feet (+40 mm)
- 2 mounting brackets at the side to screw-fix the unit to the wall
- Fresh air and exhaust air connections are 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 left-hand side of the unit when seen from the room
- We recommend using flexible hoses to connect the unit to the pipework as they facilitate removing the heat exchanger for cleaning.
- 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

$\Delta t_W$  [K]

Temperature difference – water

$\Delta p_W$  [kPa]

Pressure drop, water side

$\Delta p_t$  [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

$\Delta t_{Wm-Ref}$  [K]

Difference between mean water temperature and reference temperature

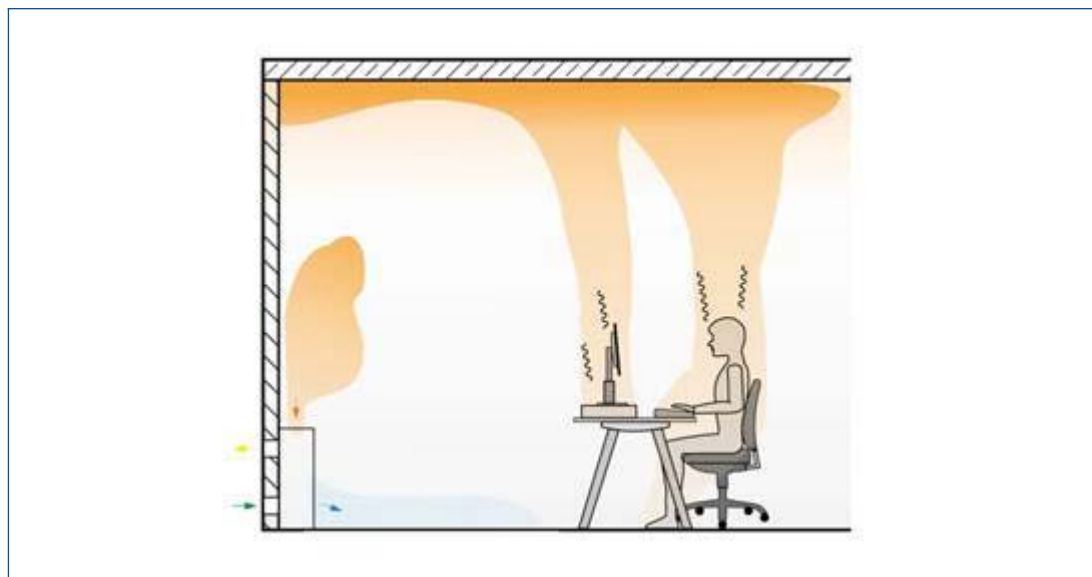
$L_N$  [mm]

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

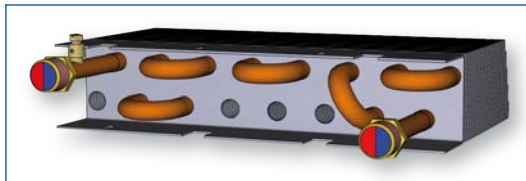
and temperatures are available on request.  
The water flow temperature (cooling circuit) should be at least 16 °C such that it does not permanently fall below the dew point. For units with a condensate drip tray the water flow temperature may be reduced to 15 °C.

#### 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

