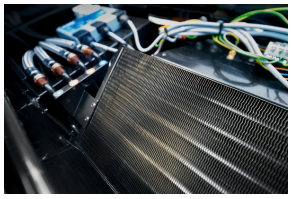
TROX® TECHNIK
The art of handling air

FSL-U-ZAS

TESTED TO VDI 6022

Conforms to VDI 6022

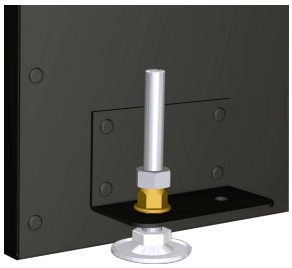


Heat exchanger

Filter change

WATER CONNECTIONS

Water connections



Levelling foot

X-CUBE ROOMAIR-U-ZAS

UNDERFLOOR VENTILATION UNIT WITH SUPPLY AND EXTRACT AIR FUNCTION, SECONDARY AIR ADMIXTURE, OPTION TO SWITCH TO SECONDARY AIR MODE, HEAT RECOVERY SYSTEM (HRS), AND HEATING AND COOLING FUNCTION

Ready-to-operate decentralised ventilation units that provide good comfort levels and are used for the ventilation of internal spaces

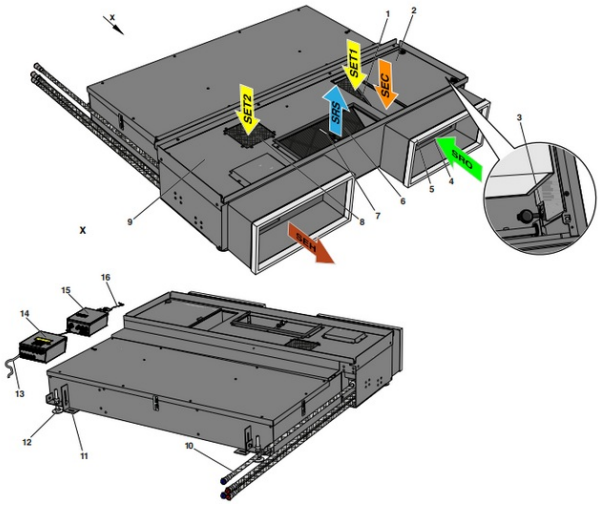
- Acoustically optimised EC fans with low specific fan power, in accordance with DIN EN 16798-3, SFP = 0
- Cross flow heat recovery unit (heat recovery efficiency 60 %)
- With highly efficient 2- or 4-pipe heat exchanger for heating and/or cooling
- Fixed water connections on the casing
- Choice of right side or left side heat exchanger connections
- Reduction of fine dust and pollen contamination thanks to integrated air filters in accordance with VDI 6022 - filter classes ISO ePM1 65 %/ISO Coarse 60 %

- Complete maintenance and replacement of all components possible after removing the ventilation grille
- Condensation-free operation all year round
- Motorised shut-off dampers, normally closed (NC)
- Motorised secondary air admixture to increase the thermal output
- Installation in system floor (cavity or raised floor)
- Modular control system FSL-CONTROL III, specially for decentralised ventilation systems
- Controller box of the individual room control accessible after removing the ventilation grille
- Particularly low height of only 150 mm in the area of the system floor (cavity or raised floor)
- Project-specific height of the upper edge of the ventilation grille can be customised on request

TECHNICAL INFORMATION

Function, Technical Data, Quick Sizing, Specification Text, Order Code

Underfloor unit for decentralised ventilation for installation in the system floor (cavity or raised floor). The casing is made of painted sheet steel and provides noise and thermal insulation. The supply air opening in the floor can be covered with either a linear grille or a roll down grille. The outdoor air is drawn in by an EC centrifugal fan and flows through the motorised shut-off damper and the fine dust filter. The outdoor air then flows through the recuperative cross-flow heat recovery unit. There, part of the extract air heat is transferred to the outdoor air flow. The filtered and heated outdoor air is then directed into the rooms as supply air. If necessary, the air is heated or cooled by the heat exchanger before it is supplied into the room as a displacement flow. The extract air first passes through the extract air filter, then flows through the heat recovery unit, 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 sufficient, FSL-CONTROL III closes the outdoor air dampers and changes to secondary air operation mode, which is more energy efficient. The control system compares the room air quality setpoint value to the actual value measured by the CO_2 sensor, and switches automatically between outdoor air and secondary air operation. In case of a power failure, the outdoor air and exhaust air dampers are closed to ensure fire protection, frost protection and to avoid draughts. This is ensured by a capacitor in each actuator. The supply air flows into the room close to the façade, at medium velocity. Due to the induction effect, the supply air velocity is rapidly reduced after entering the room. As a result, in cooling mode, the supply air spreads out like a displacement flow over the entire floor area. Near heat sources such as people or equipment, a lift current is formed by natural convection, so that the air is exchanged primarily in these areas.



1 extract air/secondary air filter as flat filter medium (coarse dust filter), filter class according to ISO 16890: ISO Coarse 60 %

2 filter covers for outdoor air filters (Mini pleat filters), class ISO ePM 1 65 % (fine dust filters)

3 Service socket

4 Spigot (optional) / seal on the wall side

5 Outdoor air temperature sensor

6 2- or 4-pipe heat exchanger

7 Supply air temperature sensor

8 Bypass air filter as flat filter medium (coarse dust filter), filter class according to ISO 16890: ISO Coarse 60 %

9 Inspection access panel

10 Water connections

11 Mounting bracket (sliding)

12 Levelling feet

13 Supply voltage connecting cable

14 Controller box for internal electrical wiring (230 V - opening only by qualified technician)

15 Terminal box for connection installation by the customer (protective extra-low voltage)

16 Steel wire, connection of terminal box and controller box to the ventilation unit

SEH Single room exhaust air

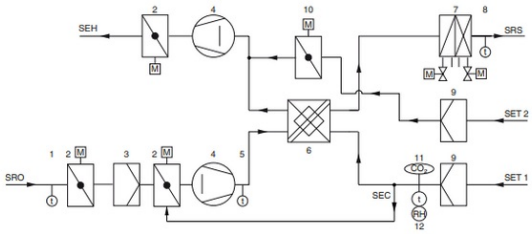
SET 1 Single room extract air

SET 2 Single room extract air (summer bypass, night purge)

SRO Single room outdoor air

SRS Single room supply air

SEC Secondary air



1 Outdoor air temperature sensor (optional)

2 Shut-off damper with actuator (exhaust air and outdoor air)

3 Outdoor air filter

4 Fan (supply air and extract air)

5 Mixed air temperature sensor

6 Cross flow heat recovery unit

7 2- or 4-pipe heat exchanger

8 Supply air temperature sensor

9 Extract air filter

10 Bypass damper with actuator

11 CO2 sensor (optional)

12 Extract air temperature sensor/Humidity sensor

SEH Single room exhaust air

SET 1 Single room extract air

SET 2 Single room extract air (summer bypass, night purge)

SRO Single room outdoor air

SRS Single room supply air

SEC Secondary air

Width	1150 mm
Height	150 mm below the system floor (cavity or raised floor), upper edge of ventilation grille project-specific, at least 196 mm
Depth	860 mm
Depth ventilation grilles	340 mm
Outdoor air flow rate	0 – 120 m³/h
Supply air flow rate	60 – 200 m³/h
Nominal volume flow rate	120 m³/h
Sound power level	28 – 47 dB(A)
Degree of heat recovery efficiency	60 %
Maximum operating pressure, water side	6 bar
Maximum operating temperature	75 °C
Supply voltage	230 V AC ±10 %, 50/60 Hz
Power rating	326 VA
Weight	75 kg

,

X-CUBE/ROOMAIR-U-ZAS: 4-Leiter-Ausführung

Zuluftvolumenstrom	m³/h	60	90	120
Gesamtkühlleistung	W	200	310	410
Raumkühlleistung	W	160	240	313
Temperatur der Luft im Gerät	°C	28	28,4	28,6
relative Feuchte	%	50	49	48,6
Wassergehalt der trockenen Luft	g/kg	11,9	11,9	11,9
Zulufttemperatur	°C	18	18	18,2
Kondensat	g/h			
Kaltwassermenge	l/h	70	150	250
Wassereintrittstemperatur	°C	16	16	16
Wasseraustrittstemperatur	°C	18,4	17,8	17,4
Druckverlust wasserseitig	kPa	1,7	6,4	15,7
Gesamtheizleistung	W	800	1240	1760
Raumheizleistung	W	351	499	689
Temperatur der Luft im Gerät	°C	10,1	8,4	7,4
Zulufttemperatur	°C	38,5	37,6	38,2
Warmwassermenge	l/h	40	70	150
Wassereintrittstemperatur	°C	60	60	60
Wasseraustrittstemperatur	°C	42,5	44,6	49,8
Druckverlust wasserseitig	kPa	0,4	1	3,5
Schallleistungspegel $L_{w,a}$	dB(A)	28	36	43
Schalldruckpegel inklusive 8 dB Systemdämpfung	dB(A)	20	28	35
Wirkleistung P_{el}	W	20	24	34

Luftseitige Daten Kühlbetrieb:

- Temperatur/relative Feuchte Außenluft: 32 °C/40 %
- Temperatur/relative Feuchte Raumluft: 26 °C/50 %

Luftseitige Daten Heizbetrieb:

- Temperatur/relative Feuchte Außenluft: -12 °C/90 %
- Temperatur/relative Feuchte Raumluft: 21 °C/40 %

Mindestmenge Außenluft = 60 m³/h
Kondensatfreier Betrieb durch SEC-Beimischung in Stufe 1 = 21 m³/h
Kondensatfreier Betrieb durch SEC-Beimischung in Stufe 2 = 31 m³/h
Kondensatfreier Betrieb durch SEC-Beimischung in Stufe 3 = 42 m³/h

- Alle Angaben unter Berücksichtigung der WRG!

X-CUBE/ROOMAIR-U-ZAS: 2-Leiter-Ausführung

Zuluftvolumenstrom	m³/h	60	90	120
Außenluftvolumenstrom	m³/h	60	90	120
Gesamtheizleistung	W	860	860	1090
Raumheizleistung	W	295	442	609
Temperatur der Luft im Gerät	°C	8,3	8,3	9,2
Zulufttemperatur	°C	34,7	34,7	35,2
Warmwassermenge	l/h	70	70	120
Wassereintrittstemperatur	°C	50	50	50
Wasseraustrittstemperatur	°C	39,3	39,3	35,2
Druckverlust wasserseitig	kPa	1,1	1,1	2,7
Schallleistungspegel $L_{w,a}$	dB(A)	28	36	43
Schalldruckpegel inklusive 8 dB Systemdämpfung	dB(A)	20	28	35
Wirkleistung P_{el}	W	20	24	34

Luftseitige Daten Heizbetrieb:

- Temperatur/relative Feuchte Außenluft: -16 °C/90 %
- Temperatur/relative Feuchte Raumluft: 20 °C/35 %

Alle Angaben unter Berücksichtigung der WRG!

X-CUBE/ROOMAIR-U-ZAS-4-AR/1150x196x830/C3

Underfloor ventilation unit for installation in system floor (cavity or raised floor)

Special features:

- Particularly low installation height in the area of the system floor (cavity or raised floor) 150 mm
- Heat recovery - thus lower dimensioning of the heating system necessary
- Condensate-free operation all year round: no drainage of condensate necessary, no waste water pipe on the façade and no condensate pump
- Complete maintenance and replacement of all components possible via the ventilation grille: no inspection openings required
- Controller box of the individual room control accessible via the ventilation grille: no additional inspection opening required
- Water connection points on the casing
- Minimum outdoor air volume and secondary air admixture possible to increase the output in all ventilation stages: thus saving of energy
- Height of the ventilation grille can be customised on request

Unit description:

Please note:

The described underfloor ventilation unit variant is equipped with individual room control. The supplied controllers contain the parameters of the standard control for operation according to our control description.

X-CUBE/ROOMAIR-U-ZAS - Master device

Decentralised underfloor ventilation unit TROX X-CUBE/ROOMAIR-U-ZAS with supply and extract air function, secondary air admixture, switchover option to secondary air mode, heat recovery as well as heating and cooling function for installation in system floor (cavity or raised floor):

- Device casing made of galvanised sheet steel, self-supporting, visible surfaces powder-coated (RAL 9005, jet black)
- Casing height in the grille area at least 175 mm (without mounting frame of the ventilation grille) and minimum height of 150 mm in the area of the system floor (cavity or raised floor)
- Sound and heat-insulating lining on the suction and discharge side made of mineral wool faced with glass fibre scrim (building material class A, non-combustible according to DIN 4102, T1), abrasion-resistant up to air velocities of 20 m/s, or closed-cell insulation material
- Meets the hygiene requirements of VDI 6022
- Connection to the on-site outdoor air and exhaust air openings in the façade by means of a circumferential, closed-cell sealing tape on the rear of the unit (10 mm thick). The intake and discharge resistance of the on-site construction should not exceed 20 Pa at nominal volume flow rate
- Unit exhaust air opening 120 × 100 mm
- Unit outdoor air opening: 180 × 60 mm
- Distance of the openings from the bottom edge of the unit approx. 20 mm
- Height-adjustable levelling feet (+40 mm) to compensate for structural tolerances
- With mounting frame for the ventilation grille (width approx. 340 mm) directly on the façade (can be offered separately)
- Maintenance of all components after removal of the ventilation grille. No inspection opening required in the floor area
- Condensate-free operation all year round thanks to motorised secondary air admixture
- Heat recovery all year round
- Motorised summer bypass that enables free cooling directly with outdoor air
- Meets all requirements of EU directive 1253/2014 (ErP)
- Demand-controlled operation for outdoor and secondary air by recording and analysing the room air quality using a mixed gas sensor
- Use of 2 energy-saving EC centrifugal fans, suitable for up to 5 speed levels; supply and extract air fan in category SFP 0 (< 300 W/m³/s) according to DIN EN 16798-3:2017-11. Signalling via integrated control (when ordering the following items); electrical power consumption of the entire unit at nominal volume flow 120 m³/h = 34 W. A connected load of 326 VA must be taken into account when dimensioning the connection cable.
- The unit can switch up to 5 levels in outdoor air operation (60 - 120 m³/h supply/extract air operation). Total supply air volume flow of up to 250 m³/h possible via secondary air admixture depending on the selected speed level. Control via individual room control. Volume flow level correction possible subsequently by adjusting the control voltage.
- Utilisation of secondary air to save energy (only in conjunction with air quality sensor): Automatic switchover to secondary air operation takes place when the room air quality (measured, for example, by the unit's internal CO_2 sensor) is within the defined limits. For this purpose, the shut-off dampers are closed, the self-powered secondary air damper opens and the extract air fan is switched off

- Maximum constructive separation of the supply air discharge from the extract air and secondary air intake situation to reduce air short circuits
- Separate exhaust air and secondary air intake and air duct routing
- Sound power level in supply and extract air mode at 60/90/120/150 m³/h = 28/35/43/48 dB(A) (corresponds to a sound pressure level of 20/27/35/40 dB(A) with a room attenuation of 8 dB). The measurement data refer to sound power measurements of a single unit in a reverberation chamber according to accuracy class 1. Results may vary, depending on the installation situation
- Sound power level in supply air, extract air and secondary air mode - example:

  - Outdoor air volume flow = exhaust air volume flow = 120 m³/h

  - Supply air volume flow 120/150 m³/h = 41/45 dB(A) (corresponds to a sound pressure level of = 33/37 dB(A) with a room attenuation of 8 dB)

  - The measurement data refer to sound power measurements of a single unit in a reverberation chamber according to accuracy class 1. Results may vary, depending on the installation situation

- 4-pipe aluminium-copper tube heat exchanger for air heating and cooling, matched to the project-specific data, easily removable for cleaning (the on-site connection to the main pipework is crucial, not included in the TROX scope of delivery), drainage and venting option per heating/cooling circuit, arranged on the right-hand side of the room. We recommend a connection to the on-site pipe network with flexible hoses (not included in the TROX scope of delivery) so that the heat exchanger can be easily removed for cleaning; including pre-assembled valves and lockshields
- Maximum optimised heat exchanger area of 350 × 175 mm outlet area
- The transfer points are the fixed connections on the appliance wall, designed as G ½" external threads with a flat seal. We recommend additional shut-off devices in the on-site supply lines
- Easy-to-clean condensate tray made of galvanised sheet steel (powder-coated, RAL 9005) as an emergency tray if the temperature falls below the dew point in summer. We recommend an outdoor temperature and humidity-controlled adjustment of the cooling circuit flow temperature
- Integrated recuperative cross-flow heat recuperator in seawater-resistant aluminium design, with high efficiency
- Electrical components contained in the unit are fully wired with FSL-CONTROL III. Control components must be installed in separately mounted control casings (2 pieces). Cable for connection (connection not in the TROX supply package) of the power supply (L, N, PE) with wire end ferrules led approx. 1 m out of the unit: As a transfer point to the on-site electrical installation:
  - Supply voltage (230 V): 3 wires, 3 × 1.5 mm² (L, N, PE)
- Integration with bus system as an option, connection of control panels etc. in the customer area of the control system. As a transfer point to the on-site measurement/control/regulation system:
  - Rail mount terminals type Wago 260 for the on-site connection of

    - Digital inputs DI
    - Digital outputs DO
    - Master-slave connection RS485
    - RS485 (Modbus/BACnet)
    - Room control panel
    - RJ45 socket as service access to the user interface
    - Optional connection to MCE/BACS via Ethernet (Modbus/BACnet)
- The following sensors are included in the unit as part of the single room control system (the actual room temperature is captured at the control panel):
    - Indoor air quality sensor CO_2
    - Supply air temperature measurement downstream of the heat exchanger
    - Mixed air temperature detection upstream of the heat recovery unit
    - Outdoor air temperature measurement in the outdoor air intake
- With electromotive bypass for night cooling or as summer bypass, 24 V actuator, open - close
- Motorised shut-off dampers in outside air and exhaust air areas, normally closed in inactive state via energy storage (capacitor), 230 V actuator, open/closed, activation via integrated single room control unit
- Outdoor air filter as Mini Pleat filter, class ePM1 (fine dust filter):
    - Filter class to ISO16890: ISO ePM1 65%
    - Eurovent-certified
    - ePM1 filter media made of high-quality, wet-strength glass fibre paper, and laid in tight pleats. The spacers are made of thermoplastic hot-melt adhesive and ensure that the pleats are evenly spaced (4 mm) from each other
    - The frame is made of moisture-resistant non-woven fibre with pull-out brackets and must not reduce the flow cross-section (filter size = flow cross-section)
    - Filter area ≥ 1.1 m²
- Extract air filter, class G3 (coarse dust filter), flat filter medium, filter class according to ISO 16890: ISO coarse 60%
- Filters can be changed without tools, as the filter inserts are located directly below the ventilation grille
- The supply air volume flow creates a velocity profile that ensures airflow velocities of less than 0.15 m/s outside the close range

Installed components:

- Cross-flow heat recovery
- 2- or 4-pipe heat exchanger for heating and cooling
- EC-centrifugal fans
- Electric motorised actuator for outdoor air and exhaust air dampers
- Electric motorised actuator for the bypass damper of the heat recovery system
- Electric motorised actuator for secondary air admixture
- Temperature sensors for recording the outside air, mixed air, supply air and room air temperature (in the control panel)
- CO_2 sensor for recording indoor air quality
- ISO ePM1/ISO Coarse filter media
- Valves and electromotive valve actuators Heating/cooling

Dimensions and weight:

- Width (4-pipe heat exchanger version) approx. 1150 mm (in the grille area), 1000 mm (in the raised floor area); without levelling feet
- Height: approx. 150 mm (in the floor area; without height adjustment)
- Height: approx. 175 mm (in the area of the ventilation grille; without height adjustment and without mounting frame of the ventilation grille)
- Depth: approx. 830 mm (of which approx. 340 mm in the area of the ventilation grille and approx. 490 mm in the raised floor area; without overhang of cable gland and façade seal)
- Weight: approx. 75 kg

Construction

Technical data

- Width: 1100 mm
- Height: 150 mm below the raised floor, total height including ventilation grille at least 196 mm
- Depth: 860 mm

- Depth of ventilation grille: 340 mm
- Fresh air flow rate: 0 – 33 l/s or 0 – 120 m³ /h
- Supply air flow rate: 42 l/s or 150 m³ /h max.
- Cooling capacity: 730 W max.
- Heating capacity: 1980 W max.
- Flow temperature – heating: 60 °C max.
- Max. operating pressure, water side: 6 bar
- Sound power level: 43 dB(A) at 33 l/s or 120 m³ /h
- Supply voltage: 230 V AC ±10 %, 50/60 Hz

RA-U-ZAS	–	4	–	AR	/	1150 × 196 × 830	/	C3	/	MA	–	T	/	MR	/	C	/	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

1 Type
RA-U-ZAS decentralised underfloor ventilation unit X-CUBE/ROOMAIR-U-ZAS

2 Heat exchanger
2 2-pipe
4 4-pipe

3 Arrangement of water connections
AR Right-hand version
AL Left-hand version

4 Dimensions [mm]
Width × height × depth
1100 × 196 × 830 (only with heat exchanger 2)
1150 × 196 × 830 (only with heat exchanger 4)

5 Control system
C3 with FSL-CONTROL III

6 Control function
MA Master
SL Slave

7 Real time clock
Only with control function MA
No entry: without real time clock
T with real time clock

8 Interface
No entry: without interface
MT with Modbus TCP
MR with Modbus RTU (only with control function MA)
BI with BACnet IP
BM with BACnet MS/TP (only with control function MA)

9 Air quality sensor
Only with control function MA
No entry: without air quality sensor
C with CO_2 sensor
V with VOC sensor

10 Supply air temperature sensor
Z with supply air temperature sensor

11 Outdoor air temperature sensor
Only with control function MA
No entry: without outdoor air temperature sensor
A with outdoor air temperature sensor

12 Heating valve
HV with heating valve

13 Lockshield – heating circuit
R with lockshield

14 kVS value – heating valve
0.25, 0.40, 0.63, 1.00

15 Cooling valve
With heat exchanger '4' only
KV with cooling valve

16 Lockshield cooling circuit only with heat exchanger 4
R with lockshield

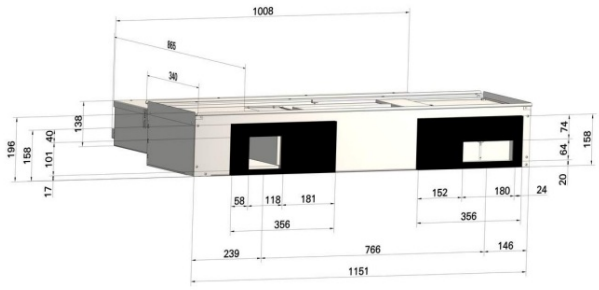
17 kVS value cooling valve only with heat exchanger 4
0.25, 0.40, 0.63, 1.00Order example: RA-U-ZAS-4-AR-1150x196x830/C3-MA-T/C/Z/A/HV-R-0.40/KV-R-0.40

RA-U-ZAS decentralised underfloor ventilation unit X-CUBE/ROOMAIR-U-ZAS

4	with 4-pipe heat exchanger
AR	Water connections on the right-hand side, room end
C3	with FSL-CONTROL III
MA	in Master construction
T	with real time clock
C	with CO_2 sensor
Z	with supply air temperature sensor
A	with outdoor air temperature sensor

HV-R-0.40 with straight-way valve (heating circuit) kvs 0.40 and lockshield
KV-R-0.40 with straight-way valve (cooling circuit) kvs 0.40 and lockshield

Dimensions, Produktdetails



Installation and commissioning

- Installation on the floor in front of the outside wall
- Level adjustment using the 4 levelling feet (+40 mm)
- 2 slotted holes in the mounting brackets for levelling feet, for screwing to the building structure
- The outdoor air intake or exhaust air discharge takes place via 2 façade openings. The façade openings must be professionally provided by the customer and ideally have a slope to the outside
- Free area of ventilation openings: 0.015 m² for each outside air opening and exhaust air opening, and 0.05 m² for each supply air opening and extract air opening
- Weather protection for the outdoor air and exhaust air openings to be provided by others
- Installation and connections to be performed by others. Fixing, connecting and sealing material not included
- Water connections for flow and return are located either on the right or left side of the appliance, as seen from the room
- The customer must ensure that the unit can be drained and vented.
- The control boxes are accessed after removing the ventilation grille, as seen from the room on the left-hand side of the appliance (version ../KR/..) or right-hand side (version ../KL/..)