

Hoval RoofVent® KH | KC | KHC

Operating instructions

Original
operating manual
4 219 614-en-02



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1 Use

1.1 Intended use

RoofVent® units are supply and extract air handling units for heating and cooling spaces up to 25 m in height with central heat and cold supply. They have the following functions:

- Fresh air supply
- Extract air removal
- Heating (with connection to a hot water supply)
- Cooling (with connection to a water chiller)
 - RoofVent® KC, KHC only
- Energy recovery with highly efficient plate heat exchanger
- Filtering of the fresh air and the extract air
- Air distribution and destratification with adjustable Air-Injector

A system usually consists of several RoofVent® units. These are installed distributed throughout the hall roof. The individual units are regulated individually and controlled based on zones. The system flexibly adjusts to local requirements.

Intended use also includes compliance with the operating instructions. Any usage over and above this use is considered to be not as intended. The manufacturer can accept no liability for damage resulting from improper use.

1.2 User group

The units are only allowed to be installed, operated and maintained by authorised and instructed personnel who are well acquainted with the units and are informed about possible dangers.

The operating instructions are for operating engineers as well as specialists in building, heating and ventilation technology.

2 Safety

2.1 Symbols



Caution

This symbol warns against risk of injury. Please heed all instructions designated by this symbol to prevent injuries and/or death.



Attention

This symbol warns against property damage. Please heed the respective instructions to prevent risk of damage to the unit and its functions.



Notice

This symbol denotes information about the economic use of the equipment or special tips.

2.2 Operational safety

RoofVent® units are state-of-the-art design and are safe to operate. All control and safety valves are checked at the factory. Nevertheless, hazards may emanate from the units if they are used incorrectly or not used as intended. Therefore:

- The unit may only be installed, operated and serviced by authorised, trained and instructed skilled personnel:
 - Specialists as defined by these operating instructions are those persons who, based on their training, knowledge and experience as well as their knowledge of the relevant regulations and guidelines, can carry out the work assigned to them and recognise potential hazards.
- Please read the operating instructions before unpacking, installing, commissioning and before maintaining the equipment.
- Store the operating instructions so that they are easily accessible.
- Observe any attached information and warning signs.
- Immediately replace damaged or removed informational and warning signs.
- Follow the local safety and accident prevention regulations at all times.
- Observe the particular dangers involved in working on the roof and on electrical systems.
- When working on the unit, objects (e.g. tools) could be dropped. Block off the area underneath the unit.
- Do not attach additional loads to the unit.
- When working in the unit, take precautions against unprotected, sharp metal edges.
- Observe the dangers involved when working on the hot water supply.
- Wear suitable protective equipment (helmet, gloves, mouth protection, goggles).
- Following maintenance work, professionally reassemble all dismantled protective devices.
- Ensure that all access doors are properly closed to prevent water entry through the roof unit.
- Replacement parts must comply with the technical requirements of the system manufacturer. Hoval recommends the use of original spare parts.
- Unauthorised reconfiguration or modification of the unit is not permitted.
- Shut down the unit immediately, if any defects are ascertained that limit the operational safety.

2.3 Decommissioning

- Disconnect the power supply with the main switch in the control panel.



Caution

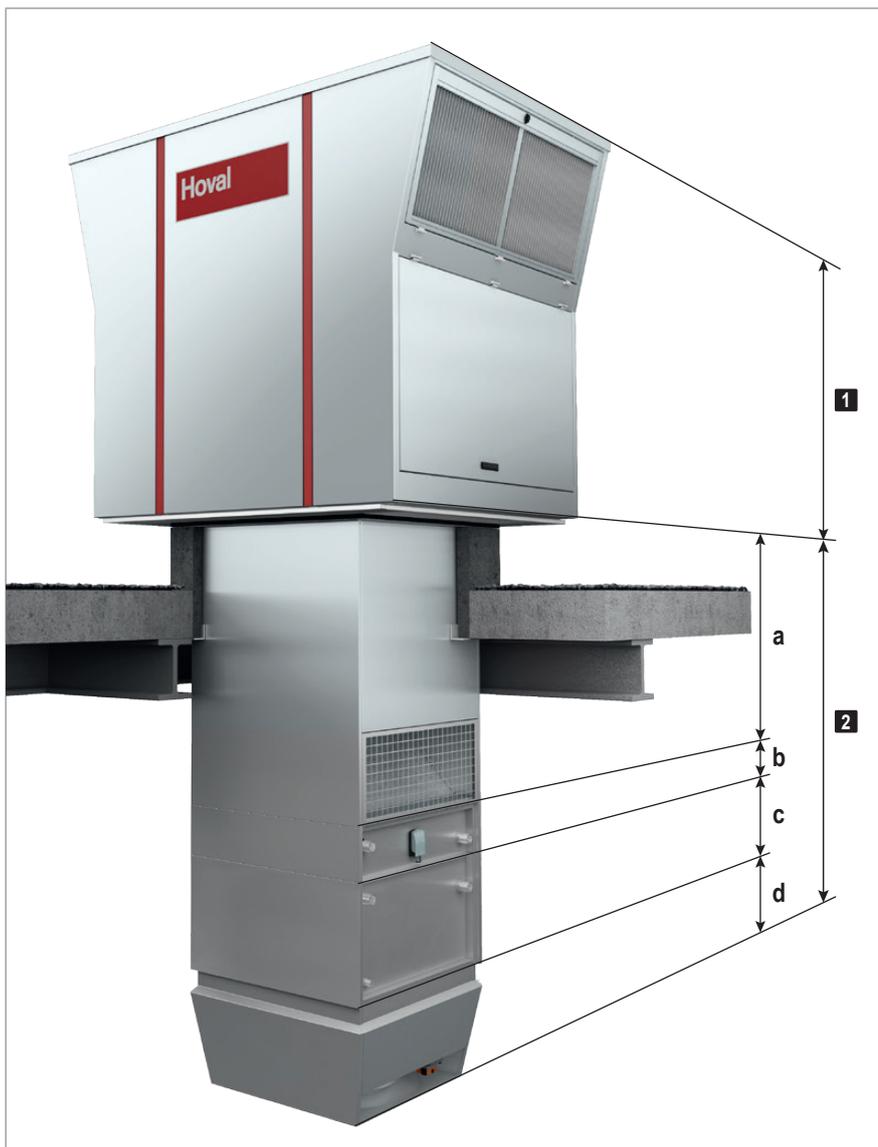
The use of condensers can pose a danger of fatal injury from directly touching live parts even after the unit is switched off. Only open the access doors after waiting 3 minutes.

3 Construction and operation

3.1 Construction

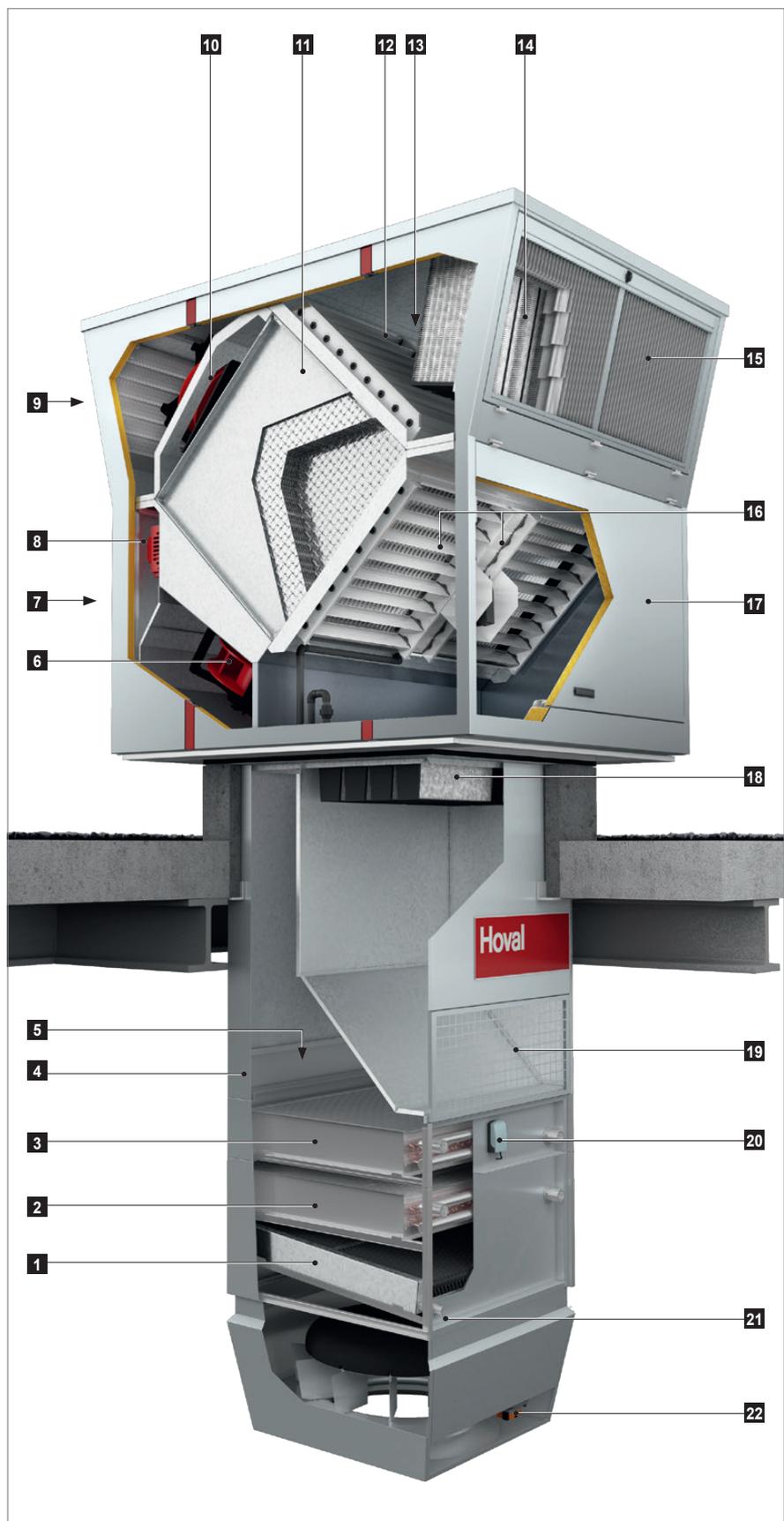
RoofVent® units consist of the following components:

- Roof unit with energy recovery
- Below-roof unit



- | | |
|----------|---|
| 1 | Roof unit with energy recovery |
| 2 | Below-roof unit |
| a | Connection module |
| b | Heating section (RoofVent® KH, KHC only) |
| c | Cooling section (RoofVent® KC, KHC only) |
| d | Air-Injector |

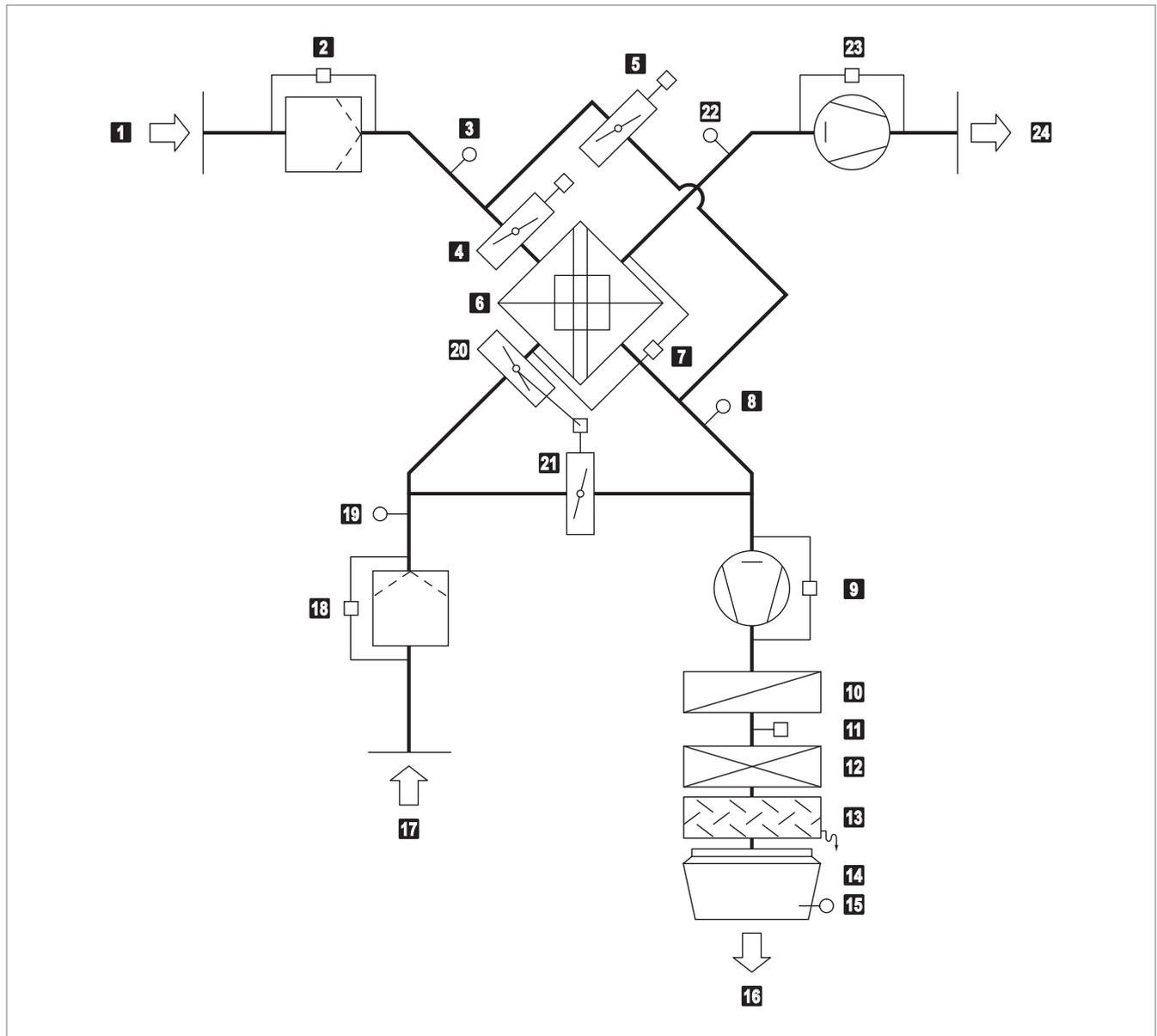
Fig. 1: Components



- 1 Condensate separator (RoofVent® KC, KHC only)
- 2 Cooling coil (RoofVent® KC, KHC only)
- 3 Heating coil (RoofVent® KH, KHC only)
- 4 Access panel, coil
- 5 Access panel, connection box
- 6 Supply air fan
- 7 Supply air access door
- 8 Control block
- 9 Exhaust air access door
- 10 Exhaust air fan
- 11 Plate heat exchanger with bypass (for performance control and as recirculation bypass)
- 12 Fresh air damper with actuator
- 13 Bypass damper with actuator
- 14 Fresh air filter
- 15 Fresh air access door
- 16 Extract air and recirculation dampers with actuator
- 17 Extract air access door
- 18 Extract air filter
- 19 Extract air grille
- 20 Frost controller
- 21 Condensate connection (RoofVent® KC, KHC only)
- 22 Actuator Air-Injector

Fig. 2: Construction

3.2 Function diagram



- | | |
|--|--|
| 1 Fresh air | 13 Condensate separator (RoofVent® KC, KHC only) |
| 2 Fresh air filter with differential pressure switch | 14 Air-Injector with actuator |
| 3 Temperature sensor air inlet ER (optional) | 15 Supply air temperature sensor |
| 4 Fresh air damper with actuator | 16 Supply air |
| 5 Bypass damper with actuator | 17 Extract air |
| 6 Plate heat exchanger | 18 Extract air filter with differential pressure switch |
| 7 De-icing switch for plate heat exchanger (only in ColdClimate design) | 19 Extract air temperature sensor |
| 8 Temperature sensor air outlet ER (optional) | 20 Extract air damper with actuator |
| 9 Supply air fan with flow rate monitoring | 21 Recirculation damper (opposed to the extract air damper) |
| 10 Heating coil (RoofVent® KH, KHC only) | 22 Exhaust air temperature sensor |
| 11 Frost controller | 23 Exhaust air fan with flow rate monitoring |
| 12 Cooling coil (RoofVent® KC, KHC only) | 24 Exhaust air |

Fig. 3: RoofVent® function diagram

3.3 Operating modes

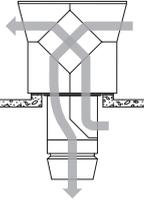
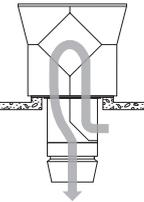
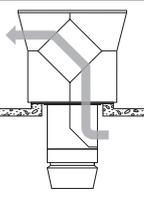
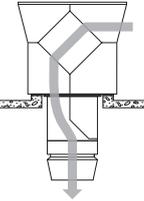
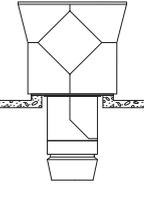
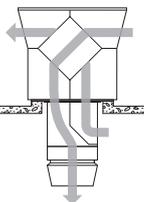
The units have the following operating modes:

- Ventilation
- Ventilation (reduced)
- Air quality
- Recirculation
- Exhaust air
- Supply air
- Standby

The TopTronic® C control system regulates these operating modes automatically for each control zone in accordance with the specifications in the calendar. The following points also apply:

- The operating mode of a control zone can be switched over manually.
- Each RoofVent® unit can operate individually in a local operating mode: Off, Recirculation, Supply air, Exhaust air, Ventilation.

| Code | Operating mode | | Description |
|--------|---|--|--|
| VE | <p>Ventilation</p> <p>The unit blows fresh air into the room and exhausts polluted room air. The room temperature set value day is active. Depending on the temperature conditions, the system continuously controls:</p> <ul style="list-style-type: none"> ■ the energy recovery ■ the heating/cooling | | <p>Supply air fan on ¹⁾</p> <p>Exhaust air fan on ¹⁾</p> <p>Energy recovery 0-100 %</p> <p>Extract air damper open</p> <p>Recirculation damper closed</p> <p>Heating/cooling 0-100 %</p> <p>¹⁾ Adjustable flow rate</p> |
| VEL | <p>Ventilation (reduced)</p> <p>As VE, but the unit only operates with the set minimum values for the supply and exhaust air volumes</p> | | <p>Supply air fan MIN</p> <p>Exhaust air fan MIN</p> <p>Energy recovery 0-100 %</p> <p>Extract air damper open</p> <p>Recirculation damper closed</p> <p>Heating/cooling 0-100 %</p> |
| AQ | <p>Air quality</p> <p>This is the operating mode for demand-controlled ventilation of the room. The room temperature set value day is active. Depending on the temperature conditions, the system continuously controls:</p> <ul style="list-style-type: none"> ■ the energy recovery ■ the heating/cooling <p>Depending on the room air quality or room air humidity, the system operates in one of the following operating states:</p> | | |
| AQ_REC | <ul style="list-style-type: none"> ■ Air quality Recirculation: When air quality is good and air humidity appropriate, the unit heats or cools in recirculation operation. | | Like REC |
| AQ_ECO | <ul style="list-style-type: none"> ■ Air quality Mixed air: When ventilation requirements are medium, the unit heats or cools in mixed air operation. The supply and exhaust air volume is based on the air quality. | | <p>Supply air fan MIN-MAX</p> <p>Exhaust air fan MIN-MAX</p> <p>Energy recovery 0-100 %</p> <p>Extract air damper 50 %</p> <p>Recirculation damper 50 %</p> <p>Heating/cooling 0-100 %</p> |

| Code | Operating mode | | Description |
|-------|--|--|---|
| AQ_VE | <ul style="list-style-type: none"> Air quality Ventilation: When ventilation requirements are high or the room air humidity is too high, the unit heats or cools in pure ventilation operation. The supply and exhaust air volume is based on the air quality. |  | Supply air fan MIN-MAX Exhaust air fan MIN-MAX Energy recovery 0-100 % Extract air damper open Recirculation damper closed Heating/cooling 0-100 % |
| REC | Recirculation On/Off recirculation operation with TempTronic algorithm: During heat or cool demand, the unit draws in room air, heats or cools it and blows it back into the room. The room temperature set value day is active. The flow rate is controlled in 2 stages. |  | Supply air fan 0 / MIN / MAX ¹⁾ Exhaust air fan off Energy recovery 0 % Extract air damper closed Recirculation damper open Heating/cooling on ¹⁾ 1) Depending on heat or cool demand |
| DES | <ul style="list-style-type: none"> Destratification: To avoid heat build-up under the ceiling, it may be appropriate to switch on the fan when there is no heat demand (either in permanent operation or in on/off operation depending on the temperature stratification, as desired). | | |
| EA | Exhaust air The unit extracts spent room air. There is no room temperature control. Unfiltered fresh air enters the room through open windows and doors or another system provides air supply. |  | Supply air fan off Exhaust air fan on ¹⁾ Energy recovery 0 % Extract air damper open Recirculation damper closed Heating/cooling off 1) Adjustable flow rate |
| SA | Supply air The unit blows fresh air into the room. The room temperature set value day is active. Depending on the temperature conditions, the system controls the heating/cooling. Spent room air passes through open windows and doors or another system provides extraction. |  | Supply air fan on ¹⁾ Exhaust air fan off Energy recovery 0 % ²⁾ Extract air damper open Recirculation damper closed Heating/cooling 0-100 % 1) Adjustable flow rate 2) Fresh air and bypass dampers are open |
| ST | Standby The unit is ready for operation. The following operating modes are activated if required: |  | |
| CPR | <ul style="list-style-type: none"> Cooling protection: If the room temperature drops below the set value for cooling protection, the unit heats up the room in recirculation operation. |  | Supply air fan MAX Exhaust air fan off Energy recovery 0 % Extract air damper closed Recirculation damper open Heating/cooling on |
| OPR | <ul style="list-style-type: none"> Overheating protection: If the room temperature rises above the set value for overheating protection, the unit cools down the room in recirculation operation. If the temperatures also permit fresh air cooling, the unit automatically switches to night cooling (NCS) to save energy. | | |
| NCS | <ul style="list-style-type: none"> Night cooling: If the room temperature exceeds the set value for night cooling and the current fresh air temperature permits it, the unit blows cool fresh air into the room and extracts warmer room air. | | |
| | |  | Supply air fan on ¹⁾ Exhaust air fan on ¹⁾ Energy recovery 0 % Extract air damper open Recirculation damper closed Heating/cooling off 1) Adjustable flow rate |

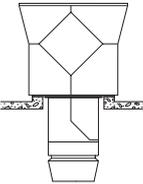
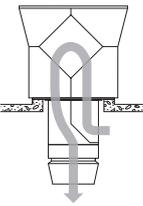
| Code | Operating mode | | Description |
|-------|--|--|---|
| L_OFF | Off (local operating mode) The unit is switched off. Frost protection remains active. |  | Supply air fan off Exhaust air fan off Energy recovery 0 % Extract air damper closed Recirculation damper open Heating/cooling off |
| - | Forced heating The unit draws in room air, warms it and blows it back into the room. For example, forced heating is suitable for heating the hall before taking the control system into operation or if the controller fails during the heating period. Connecting a room thermostat makes it possible to specify a room temperature set value. Forced heating can be activated and set as required by the Hoval service technician. |  | Supply air fan MAX Exhaust air fan off Energy recovery 0 % Extract air damper closed Recirculation damper open Heating/cooling on |

Table 1: Operating modes of RoofVent® units (heating and cooling vary depending on unit type)

4 Type code

KH - 9 B C - K1 / ST . -- / V0 . D1 . LU / AF . SI / M . KP . -- . SD / TC . EM . PH . RF

Unit type

- KH Unit with heating section
- KC Unit with heating/cooling section
- KHC Unit with heating and cooling section

Unit size

- 6 Size 6
- 9 Size 9

Heating section

- without heating section
- A with coil type A
- B with coil type B
- C with coil type C

Heating/cooling section

- without heating/cooling section
- C with coil type C
- D with coil type D

Heat recovery

- K1 Temperature efficiency 57 %

Design

- ST Standard
- CC ColdClimate design

Reserve

Connection module

- V0 Standard
- V1 Length + 250 mm
- V2 Length + 500 mm
- V3 Length + 1000 mm

Air outlet

- D1 Design with 1 Air-Injector
- D2 Design with 2 Air-Injectors
- D0 Design without Air-Injector

Paint finish

- without
- LU Paint finish of below-roof unit

KH - 9 B C - K1 / ST . -- / V0 . D1 . LU / AF . SI / M . KP . -- . SD / TC . EM . PH . RF

Silencers outside

- without
- AF Fresh air and exhaust air silencer

Silencers inside

- without
- SI Supply air and extract air silencer

Hydraulics

- without
- M Mixing valve

Condensate pump

- without
- KP Condensate pump

Reserve

Socket

- without
- SD Socket in the unit

Control system

- TC TopTronic® C
- FR Control block without controller

Energy monitoring

- without
- EM Energy monitoring

Pump control

- without
- PH Heating pump
- PK Heating or cooling pump
- PP Heating pump and cooling pump

Return temperature sensor

- without
- RF Return temperature sensor

Table 2: Type code

5 Technical data

5.1 Application limits

| | | | | |
|---|---------|------|------|------|
| Fresh air temperature | min. | °C | -30 | |
| Extract air temperature | max. | °C | 40 | |
| Moisture content of extract air | max. | g/kg | 15 | |
| Units in ColdClimate design: | | | | |
| Fresh air temperature | min. | °C | -40 | |
| Extract air temperature | max. | °C | 40 | |
| Extract air relative humidity | max. | %rh | 40 | |
| Moisture content of extract air | max. | g/kg | 4 | |
| Supply air temperature | max. | °C | 60 | |
| Temperature of the heating medium ¹⁾ | max. | °C | 90 | |
| Pressure of the heating/cooling medium | max. | kPa | 800 | |
| Air flow rate | Size 6: | min. | m³/h | 3100 |
| | Size 9: | min. | m³/h | 5000 |
| Condensate quantity | Size 6: | max. | kg/h | 90 |
| | Size 9: | max. | kg/h | 150 |

¹⁾ Design for higher temperatures on request

Table 3: Application limits



Notice

The increase of moisture content in the room is limited to a maximum of 2 g/kg.

5.2 Heat recovery system (HRS)

| Unit size | | 6 | 9 |
|-----------------------------|---|----|----|
| Temperature efficiency, dry | % | 57 | 57 |
| Temperature efficiency, wet | % | 61 | 64 |

Table 4: Thermal transfer level of the plate heat exchanger

5.3 Air filtration

| Filter | Fresh air | Extract air |
|---|----------------|----------------|
| Class acc. to ISO 16890 | ISO coarse 55% | ISO coarse 55% |
| Class acc. to EN 779 | G4 | G4 |
| Factory setting of differential pressure switches | 250 Pa | 300 Pa |

Table 5: Air filtration

5.4 Electrical connection

| Unit type | | KH-6 | KH-9 | KC-6 | KC-9 | KHC-6 | KHC-9 |
|-----------------------------|------|---------|---------|---------|---------|---------|---------|
| Supply voltage | V AC | 3 × 400 | 3 × 400 | 3 × 400 | 3 × 400 | 3 × 400 | 3 × 400 |
| Permitted voltage tolerance | % | ± 5 | ± 5 | ± 5 | ± 5 | ± 5 | ± 5 |
| Frequency | Hz | 50 | 50 | 50 | 50 | 50 | 50 |
| Connected load | kW | 6.88 | 10.68 | 6.98 | 10.78 | 7.18 | 10.98 |
| Current consumption max. | A | 11.67 | 17.67 | 11.67 | 17.67 | 12.02 | 18.02 |
| Series fuse | A | 13 | 20 | 13 | 20 | 13 | 20 |

Table 6: Electrical connection

5.5 Flow rate, product parameters

| Unit type | | KH-6 | | | KH-9 | | | |
|--------------------------------|-------------|------|------|------|-------|------|------|----|
| Nominal air flow rate | m³/h | 7500 | | | 11000 | | | |
| | m³/s | 2.08 | | | 3.06 | | | |
| Floor area covered | m² | 727 | | | 1283 | | | |
| Static efficiency of the fans | % | 73.4 | | | 68.7 | | | |
| Coil type | | A | B | C | A | B | C | |
| Nominal external pressure | Supply air | Pa | 290 | 260 | 190 | 170 | 150 | 80 |
| | Extract air | Pa | 170 | 170 | 170 | 70 | 70 | 70 |
| Effective electric power input | kW | 3.84 | 3.91 | 4.08 | 7.02 | 7.09 | 7.33 | |

| Unit type | | KC-6 | | | KC-9 | | | |
|--------------------------------|-------------|------|-----|--|-------|------|-----|--|
| Nominal air flow rate | m³/h | 7000 | | | 10500 | | | |
| | m³/s | 1.94 | | | 2.92 | | | |
| Floor area covered | m² | 661 | | | 1194 | | | |
| Static efficiency of the fans | % | 73.4 | | | 68.7 | | | |
| Coil type | | C | | | C | D | | |
| Nominal external pressure | Supply air | Pa | 340 | | | 180 | 130 | |
| | Extract air | Pa | 390 | | | 250 | 250 | |
| Effective electric power input | kW | 3.47 | | | 6.71 | 6.88 | | |

| Unit type | | KHC-6 | | | | KHC-9 | | | | | |
|--------------------------------|-------------|-------|------|------|------|-------|------|------|------|------|-----|
| Nominal air flow rate | m³/h | 7000 | | | | 10500 | | | | | |
| | m³/s | 1.94 | | | | 2.92 | | | | | |
| Floor area covered | m² | 661 | | | | 1194 | | | | | |
| Static efficiency of the fans | % | 73.4 | | | | 68.7 | | | | | |
| Coil type | | AC | BC | CC | AC | AD | BC | BD | CC | CD | |
| Nominal external pressure | Supply air | Pa | 310 | 280 | 230 | 140 | 90 | 120 | 70 | 60 | 10 |
| | Extract air | Pa | 390 | 390 | 390 | 250 | 250 | 250 | 250 | 250 | 250 |
| Effective electric power input | kW | 3.54 | 3.61 | 3.72 | 6.84 | 7.02 | 6.91 | 7.09 | 7.12 | 7.30 | |

Table 7: Technical data

5.6 Heat output

| Fresh air temp. | | -15 °C | | | | | |
|--|--|--------|-----------------|------------------|----------------|-----------------|----------------|
| Size | Type | Q | Q _{TG} | H _{max} | t _s | Δp _w | m _w |
| | | kW | kW | m | °C | kPa | l/h |
| KH-6 | A | 46.0 | 13.7 | 25.0 | 23.4 | 12 | 1974 |
| | B | 67.2 | 34.9 | 18.9 | 31.8 | 23 | 2885 |
| | C | 110.2 | 78.0 | 13.0 | 48.9 | 28 | 4736 |
| KH-9 | A | 87.2 | 39.9 | 22.1 | 28.8 | 15 | 3748 |
| | B | 102.3 | 54.9 | 19.0 | 32.8 | 20 | 4393 |
| | C | 171.1 | 123.8 | 13.0 | 51.4 | 30 | 7531 |
| KC-6 | C | 105.4 | 75.3 | 12.0 | 50.0 | 26 | 4530 |
| KC-9 | C | 166.9 | 121.7 | 12.3 | 52.4 | 29 | 7171 |
| | D | – | – | – | – | – | – |
| KHC-6 | A | 44.6 | 14.5 | 25.0 | 24.2 | 12 | 1918 |
| | B | 64.5 | 34.4 | 17.3 | 32.6 | 21 | 2772 |
| | C | 105.4 | 75.3 | 12.0 | 50.0 | 26 | 4530 |
| KHC-9 | A | 77.3 | 32.1 | 23.0 | 27.1 | 13 | 3321 |
| | B | 99.6 | 54.4 | 17.9 | 33.4 | 20 | 4280 |
| | C | 166.9 | 121.7 | 12.3 | 52.4 | 29 | 7171 |
| Legend: | Type = Type of coil Q = Coil heat output Q _{TG} = Output to cover fabric heat losses H _{max} = Maximum mounting height t _s = Supply air temperature Δp _w = Water pressure drop m _w = Water quantity | | | | | | |
| Reference: | Heating medium: 80/60 °C Room air: 18 °C Extract air: 20 °C / 20 % rel. humidity | | | | | | |
| – These operating conditions are not permissible, because the maximum supply air temperature of 60 °C is exceeded. | | | | | | | |

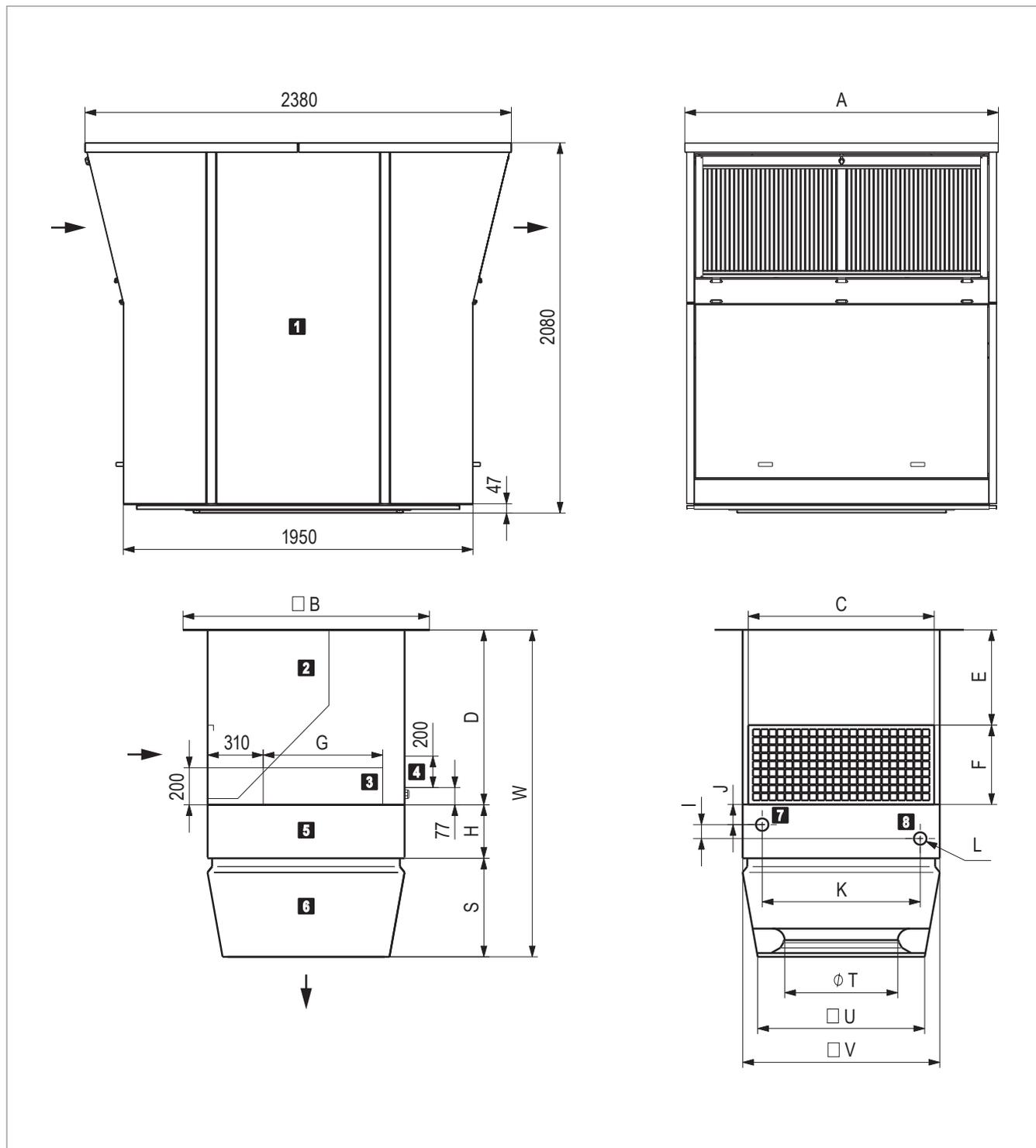
Table 8: RoofVent® KH / KC / KHC heat output

5.7 Cooling capacity

| Size | Type | Q _{sen} | Q _{tot} | Q _{TG} | t _s | Δp _w | m _w | m _c | Q _{sen} | Q _{tot} | Q _{TG} | t _s | Δp _w | m _w | m _c |
|-----------------------------|---|---------------------|------------------|-----------------|---|-----------------|----------------|----------------|---------------------|------------------|-----------------|----------------|-----------------|----------------|----------------|
| | | kW | kW | kW | °C | kPa | l/h | kg/h | kW | kW | kW | °C | kPa | l/h | kg/h |
| Fresh air conditions | | 32 °C / 40 % | | | | | | | 32 °C / 60 % | | | | | | |
| KC-6 KHC-6 | C | 29.2 | 42.1 | 20.4 | 17.3 | 56 | 6022 | 18.9 | 26.6 | 56.4 | 17.9 | 18.4 | 101 | 8073 | 43.7 |
| KC-9 KHC-9 | C | 46.0 | 66.3 | 32.8 | 16.7 | 61 | 9493 | 29.8 | 42.0 | 87.7 | 28.8 | 17.8 | 107 | 12560 | 67.2 |
| | D | 56.2 | 84.3 | 43.1 | 13.8 | 58 | 12065 | 41.2 | 52.5 | 112.5 | 39.3 | 14.9 | 104 | 16113 | 88.3 |
| Legend: | Type = Type of coil | | | | t _s = Supply air temperature | | | | | | | | | | |
| | Q _{sen} = Sensible cooling capacity | | | | Δp _w = Water pressure drop | | | | | | | | | | |
| | Q _{tot} = Total cooling capacity | | | | m _w = Water quantity | | | | | | | | | | |
| | Q _{TG} = Output for coverage of transmission sensible gains (→ sensible cooling load) | | | | m _c = Condensate quantity | | | | | | | | | | |
| Reference: | Cooling medium: 6/12 °C | | | | | | | | | | | | | | |
| | Room air: 26 °C | | | | | | | | | | | | | | |
| | Extract air: 28 °C / 50 % rel. humidity | | | | | | | | | | | | | | |

Table 9: RoofVent® KC / KHC cooling capacity

5.8 RoofVent® KH dimensions and weights



- | | |
|---|--------------------------|
| 1 Roof unit with energy recovery | 5 Heating section |
| 2 Connection module | 6 Air-Injector |
| 3 Coil access panel | 7 Return |
| 4 Connection box access panel | 8 Flow |

Fig. 4: RoofVent® KH dimensional drawing (dimensions in mm)

| Unit type | | KH-6 | | | | KH-9 | | | |
|-------------------|----|------|------|------|------|------|------|------|------|
| A | mm | 1400 | | | | 1750 | | | |
| B | mm | 1040 | | | | 1240 | | | |
| C | mm | 848 | | | | 1048 | | | |
| F | mm | 410 | | | | 450 | | | |
| G | mm | 470 | | | | 670 | | | |
| H | mm | 270 | | | | 300 | | | |
| S | mm | 490 | | | | 570 | | | |
| T | mm | 500 | | | | 630 | | | |
| U | mm | 767 | | | | 937 | | | |
| V | mm | 900 | | | | 1100 | | | |
| Connection module | | V0 | V1 | V2 | V3 | V0 | V1 | V2 | V3 |
| D | mm | 940 | 1190 | 1440 | 1940 | 980 | 1230 | 1480 | 1980 |
| E | mm | 530 | 780 | 1030 | 1530 | 530 | 780 | 1030 | 1530 |
| W | mm | 1700 | 1950 | 2200 | 2700 | 1850 | 2100 | 2350 | 2850 |

Table 10: RoofVent® KH dimensions

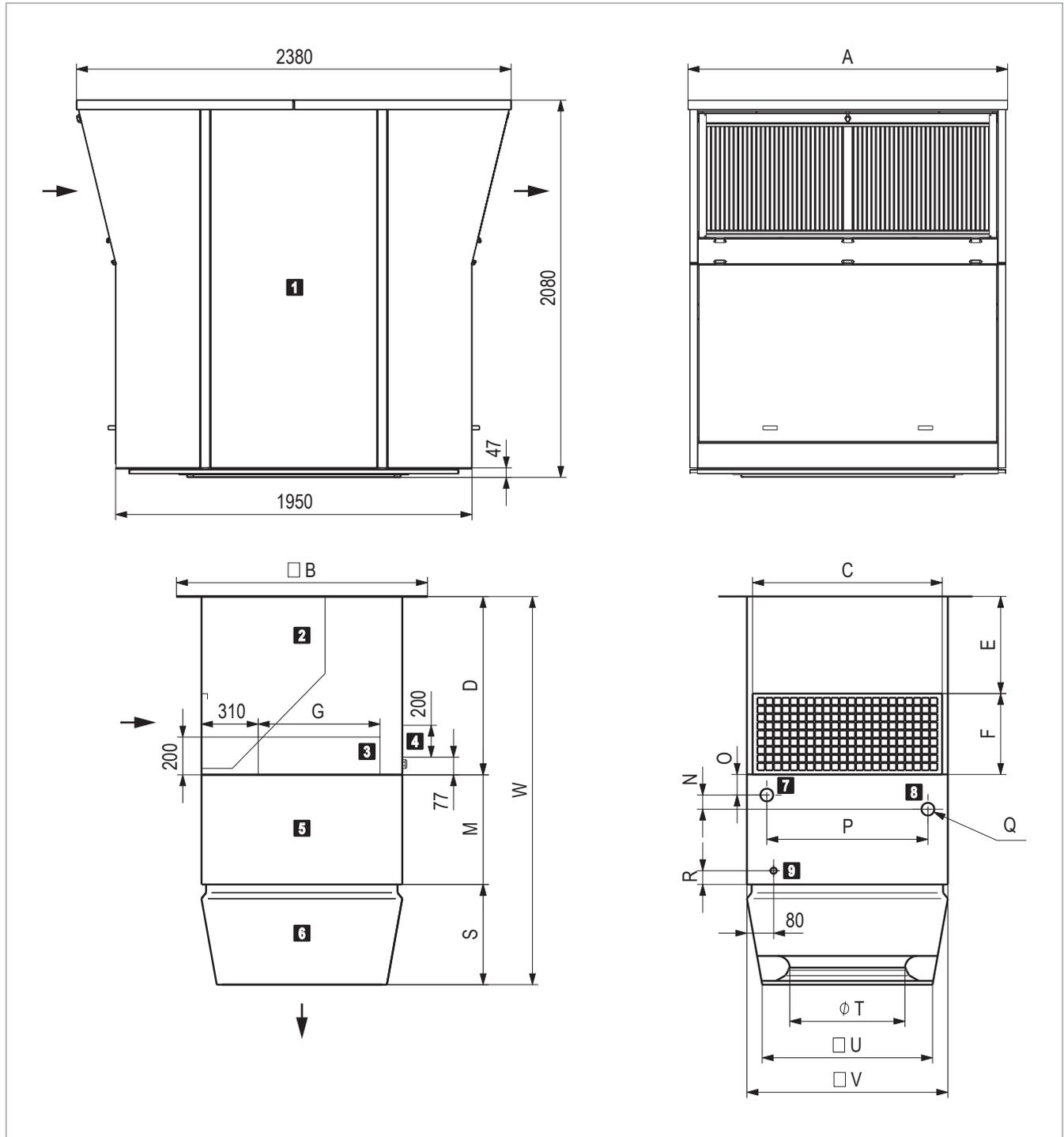
| Unit type | | KH-6A | KH-6B | KH-6C | KH-9A | KH-9B | KH-9C |
|---------------------------|----|-------|-------|-------|-------|-------|-------|
| I | mm | 78 | 78 | 78 | 78 | 78 | 78 |
| J | mm | 101 | 101 | 101 | 111 | 111 | 111 |
| K | mm | 758 | 758 | 758 | 882 | 882 | 882 |
| L (internal thread) | " | Rp 1¼ | Rp 1¼ | Rp 1¼ | Rp 1½ | Rp 1½ | Rp 1½ |
| Water content of the coil | l | 4.6 | 4.6 | 7.9 | 7.4 | 7.4 | 12.4 |

Table 11: Dimensions for hydraulic connection

| Unit type | | KH-6A | KH-6B | KH-6C | KH-9A | KH-9B | KH-9C |
|----------------------|-----------|-------|-------|-------|-------|-------|-------|
| Total | kg | 709 | 709 | 716 | 895 | 895 | 905 |
| Roof unit | kg | 567 | 567 | 567 | 701 | 701 | 701 |
| Below-roof unit | kg | 142 | 142 | 149 | 194 | 194 | 204 |
| Air-Injector | kg | 37 | 37 | 37 | 56 | 56 | 56 |
| Heating section | kg | 30 | 30 | 37 | 44 | 44 | 54 |
| Connection module V0 | kg | 75 | | | 94 | | |
| Additional weight V1 | kg | + 11 | | | + 13 | | |
| Additional weight V2 | kg | + 22 | | | + 26 | | |
| Additional weight V3 | kg | + 44 | | | + 52 | | |

Table 12: RoofVent® KH weights

5.9 RoofVent® KC dimensions and weights



- | | |
|---|--|
| <ul style="list-style-type: none"> 1 Roof unit with energy recovery 2 Connection module 3 Coil access panel 4 Connection box access panel 5 Heating/cooling section | <ul style="list-style-type: none"> 6 Air-Injector 7 Return 8 Flow 9 Condensate connection G1" (external) |
|---|--|

Fig. 5: RoofVent® KC dimensional drawing (dimensions in mm)

| Unit type | | KC-6 | | | | KC-9 | | | |
|-------------------|----|------|------|------|------|------|------|------|------|
| A | mm | 1400 | | | | 1750 | | | |
| B | mm | 1040 | | | | 1240 | | | |
| C | mm | 848 | | | | 1048 | | | |
| F | mm | 410 | | | | 450 | | | |
| G | mm | 470 | | | | 670 | | | |
| M | mm | 620 | | | | 610 | | | |
| S | mm | 490 | | | | 570 | | | |
| T | mm | 500 | | | | 630 | | | |
| U | mm | 767 | | | | 937 | | | |
| V | mm | 900 | | | | 1100 | | | |
| Connection module | | V0 | V1 | V2 | V3 | V0 | V1 | V2 | V3 |
| D | mm | 940 | 1190 | 1440 | 1940 | 980 | 1230 | 1480 | 1980 |
| E | mm | 530 | 780 | 1030 | 1530 | 530 | 780 | 1030 | 1530 |
| W | mm | 2050 | 2300 | 2550 | 3050 | 2160 | 2410 | 2660 | 3160 |

Table 13: RoofVent® KC dimensions

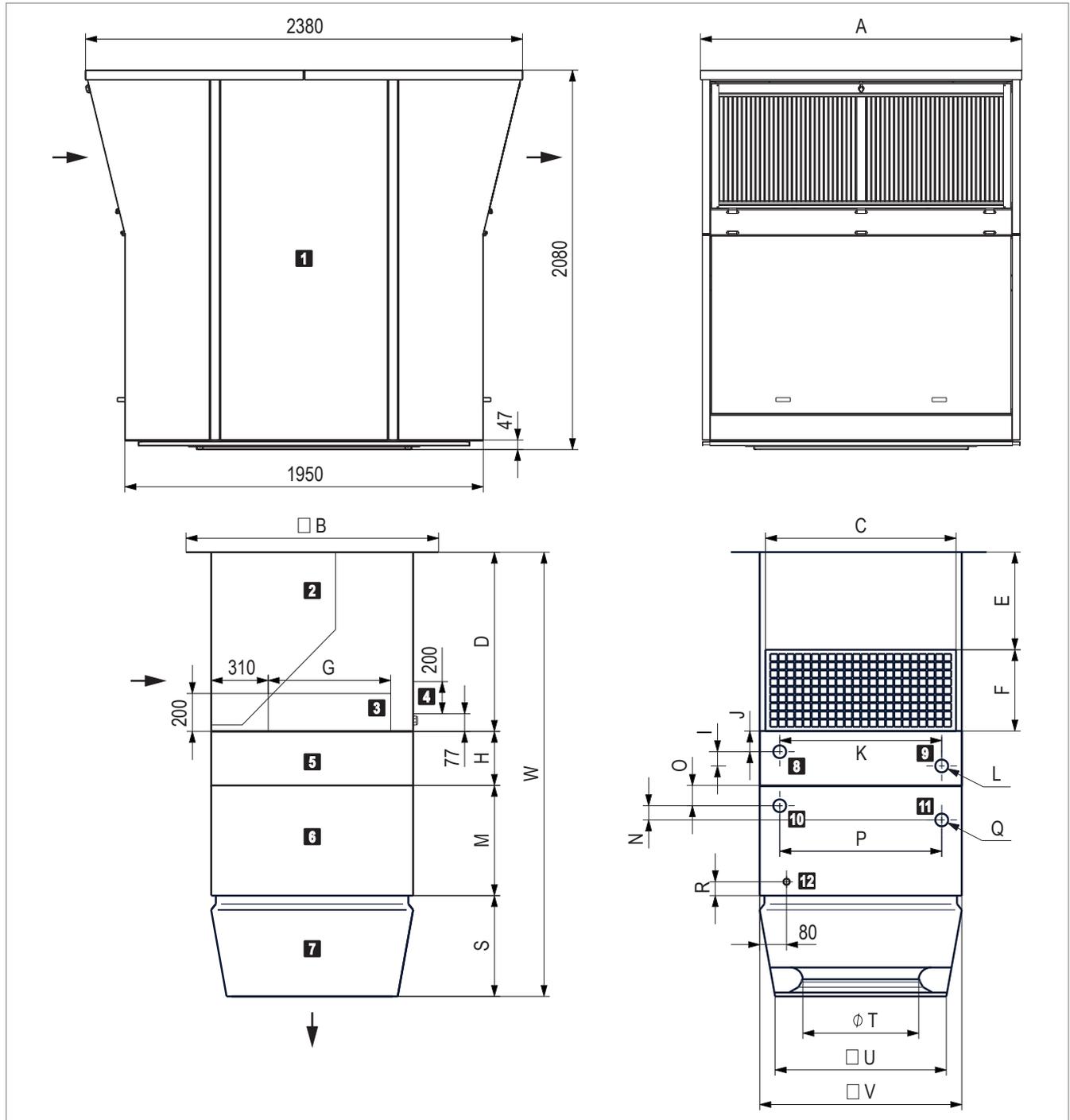
| Unit type | | KC-6-C | KC-9-C | KC-9-D |
|---------------------------|----|--------|--------|--------|
| N | mm | 78 | 78 | 95 |
| O | mm | 123 | 92 | 83 |
| P | mm | 758 | 882 | 882 |
| Q (internal thread) | " | Rp 1¼ | Rp 1½ | Rp 2 |
| R | mm | 54 | 53 | 53 |
| Water content of the coil | l | 7.9 | 12.4 | 19.2 |

Table 14: Dimensions for hydraulic connection

| Unit type | | KC-6-C | KC-9-C | KC-9-D |
|-------------------------|-----------|--------|--------|--------|
| Total | kg | 749 | 953 | 972 |
| Roof unit | kg | 567 | 701 | 701 |
| Below-roof unit | kg | 182 | 252 | 271 |
| Air-Injector | kg | 37 | 56 | 56 |
| Heating/cooling section | kg | 70 | 102 | 121 |
| Connection module V0 | kg | 75 | 94 | |
| Additional weight V1 | kg | + 11 | + 11 | |
| Additional weight V2 | kg | + 22 | + 22 | |
| Additional weight V3 | kg | + 44 | + 44 | |

Table 15: RoofVent® KC weights

5.10 RoofVent® KHC dimensions and weights



- | | |
|---|---|
| <ul style="list-style-type: none"> 1 Roof unit with energy recovery 2 Connection module 3 Coil access panel 4 Connection box access panel 5 Heating section 6 Cooling section | <ul style="list-style-type: none"> 7 Air-Injector 8 Heating circuit return 9 Heating circuit flow 10 Cooling circuit return 11 Cooling circuit flow 12 Condensate connection G1" (external) |
|---|---|

Fig. 6: RoofVent® KHC dimensional drawing (dimensions in mm)

| Unit type | | KHC-6 | | | | KHC-9 | | | |
|-------------------|----|-------|------|------|------|-------|------|------|------|
| A | mm | 1400 | | | | 1750 | | | |
| B | mm | 1040 | | | | 1240 | | | |
| C | mm | 848 | | | | 1048 | | | |
| F | mm | 410 | | | | 450 | | | |
| G | mm | 470 | | | | 670 | | | |
| H | mm | 270 | | | | 300 | | | |
| M | mm | 620 | | | | 610 | | | |
| S | mm | 490 | | | | 570 | | | |
| T | mm | 500 | | | | 630 | | | |
| U | mm | 767 | | | | 937 | | | |
| V | mm | 900 | | | | 1100 | | | |
| Connection module | | V0 | V1 | V2 | V3 | V0 | V1 | V2 | V3 |
| D | mm | 940 | 1190 | 1440 | 1940 | 980 | 1230 | 1480 | 1980 |
| E | mm | 530 | 780 | 1030 | 1530 | 530 | 780 | 1030 | 1530 |
| W | mm | 2320 | 2570 | 2820 | 3320 | 2460 | 2710 | 2960 | 3460 |

Table 16: RoofVent® KHC dimensions

| Unit type | | KHC-6 | | | KHC-9 | | |
|---------------------------|----|-------|-------|-------|-------|-------|-------|
| Heating coil type | | A | B | C | A | B | C |
| I | mm | 78 | 78 | 78 | 78 | 78 | 78 |
| J | mm | 101 | 101 | 101 | 111 | 111 | 111 |
| K | mm | 758 | 758 | 758 | 882 | 882 | 882 |
| L (internal thread) | " | Rp 1¼ | Rp 1¼ | Rp 1¼ | Rp 1½ | Rp 1½ | Rp 1½ |
| Water content of the coil | l | 4.6 | 4.6 | 7.9 | 7.4 | 7.4 | 12.4 |

Table 17: Dimensions for hydraulic connection of the heating section

| Unit type | | KHC-6 | | KHC-9 |
|---------------------------|----|-------|-------|-------|
| Cooling coil type | | C | C | D |
| N | mm | 78 | 78 | 95 |
| O | mm | 123 | 92 | 83 |
| P | mm | 758 | 882 | 882 |
| Q (internal thread) | " | Rp 1¼ | Rp 1½ | Rp 2 |
| R | mm | 54 | 53 | 53 |
| Water content of the coil | l | 7.9 | 12.4 | 19.2 |

Table 18: Dimensions for hydraulic connection of the cooling section

| Unit type | KHC | 6-AC | 6-BC | 6-CC | 9-AC | 9-AD | 9-BC | 9-BD | 9-CC | 9-CD |
|----------------------|-----------|------|------|------|------|------|------|------|------|------|
| Total | kg | 779 | 779 | 786 | 997 | 1016 | 997 | 1016 | 1007 | 1026 |
| Roof unit | kg | 567 | 567 | 567 | 701 | 701 | 701 | 701 | 701 | 701 |
| Below-roof unit | kg | 212 | 212 | 219 | 296 | 315 | 296 | 315 | 306 | 325 |
| Air-Injector | kg | 37 | 37 | 37 | 56 | 56 | 56 | 56 | 56 | 56 |
| Heating section | kg | 30 | 30 | 37 | 44 | 44 | 44 | 44 | 54 | 54 |
| Cooling section | kg | 70 | 70 | 70 | 102 | 121 | 102 | 121 | 102 | 121 |
| Connection module V0 | kg | 75 | | | 94 | | | | | |
| Additional weight V1 | kg | + 11 | | | + 13 | | | | | |
| Additional weight V2 | kg | + 22 | | | + 26 | | | | | |
| Additional weight V3 | kg | + 44 | | | + 52 | | | | | |

Table 19: RoofVent® KHC weights

6 Options

6.1 ColdClimate design

RoofVent® units in ColdClimate design are suitable for use in regions where outside temperatures fall below -30 °C . The minimum outside temperature allowed is -40 °C .

The following features ensure trouble-free operation of the system:

Plate heat exchanger

- To protect the plate heat exchanger against freezing, a differential pressure sensor is installed for monitoring its pressure drop. When the pressure difference becomes too high due to ice formation a special de-icing switch overrides the automatic unit control:
 - The alarm 'De-icing energy recovery' is shown.
 - The unit runs in local 'Exhaust air' mode until the ice has defrosted and then switches back to automatic mode.
- The plate heat exchanger is fitted with a drop eliminator on the extract air side.
- The condensate drain is provided with a heating cable.

Fresh air and bypass dampers

Actuators and gear wheels of the fresh air and bypass dampers are provided with a heating facility.

Frost control

In addition to the air temperature, the water temperature in the heating/cooling coil is also monitored by the frost controller. For this, the capillary end of the frost controller is inserted in an immersion sleeve in the return manifold of the heating coil.

- If the water temperature falls below 11 °C , the mixing valve steadily opens.
- On reaching a water temperature of 5 °C or lower the mixing valve is fully open, the unit switches off and a frost alarm is activated.

Requirements for on-site installations

Hydraulic circuit:

A mixing system must be installed in the load circuit. (For mixing valve and pump specifications please refer to section 6.13)

Electrical installation:

At low outside temperatures, a cold start of the fans can cause damage to the unit. Therefore:

- A continuous power supply for the fans must be ensured so that they do not cool down too much.
- After a power failure, there is a waiting period of 20 minutes before the fans start up again.

6.2 Connection module

The connection module is available in 4 lengths for adapting the RoofVent® unit to local conditions.

6.3 Design with 2 Air-Injectors

A supply air duct can be connected to the RoofVent® unit for distributing the supply air over a very wide area. 2 Air-Injectors can be installed on this.

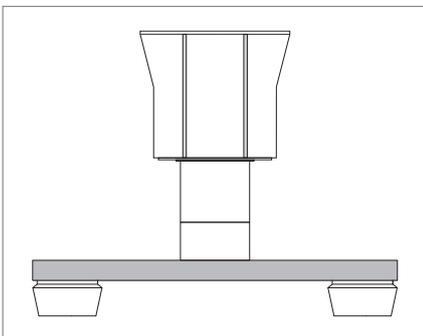


Fig. 7: RoofVent® unit with supply air duct and 2 Air-Injectors

6.4 Design without Air-Injector

RoofVent® units in the design without Air-Injector are suitable for connecting to an air distribution system supplied by the client.

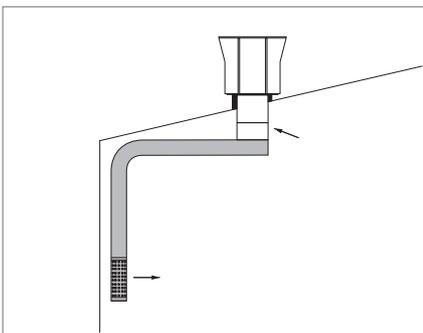


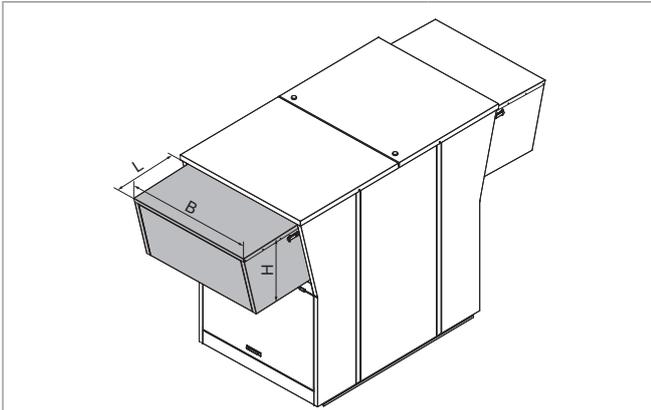
Fig. 8: Connection to an air distribution system supplied by the client

6.5 Paint finish of below-roof unit

The entire below-roof unit is painted in any colour. If the below-roof unit is equipped with a supply air silencer, this is also painted.

6.6 Fresh air and exhaust air silencers

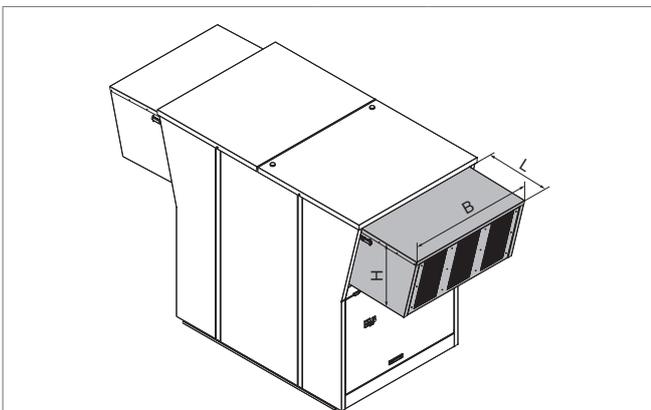
The fresh air silencer reduces noise emissions from RoofVent® units on the fresh air side. It consists of an aluminium casing with a bird screen and acoustic insulation lining and is configured as an add-on part for the roof unit which can be folded downwards.



| Size | | 6 | 9 |
|---------------|----|------|------|
| L | mm | 625 | 625 |
| B | mm | 1280 | 1630 |
| H | mm | 650 | 650 |
| Weight | kg | 30 | 42 |
| Pressure drop | Pa | 10 | 10 |

Fig. 9: Technical data fresh air silencer

The exhaust air silencer reduces noise emissions from RoofVent® units on the exhaust air side. It consists of an aluminium casing with a bird screen and sound attenuation splitters and is configured as an add-on part for the roof unit which can be folded downwards.

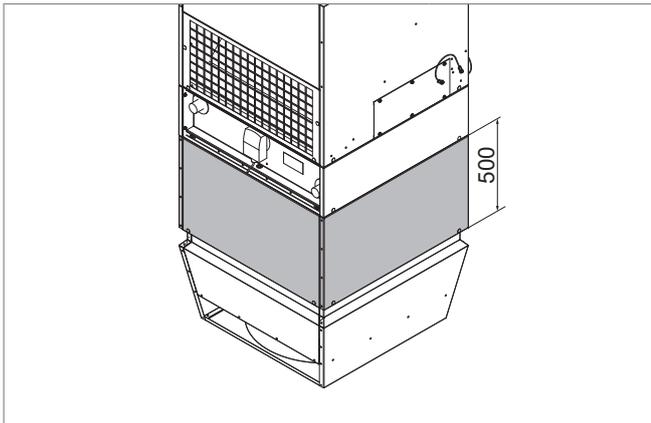


| Size | | 6 | 9 |
|---------------|----|------|------|
| L | mm | 625 | 625 |
| B | mm | 1280 | 1630 |
| H | mm | 650 | 650 |
| Weight | kg | 52 | 68 |
| Pressure drop | Pa | 50 | 53 |

Fig. 10: Technical data exhaust air silencer

6.7 Supply air and extract air silencers

Supply air and extract air silencers reduce the noise from RoofVent® units within the room. The supply air silencer is designed as a separated component and is installed above the Air-Injector. The extract air silencer consists of acoustic insulation lining in the connection module.



| Size | | 6 | 9 |
|---------------------------|----|----|----|
| Weight | kg | 53 | 80 |
| Supply air pressure drop | Pa | 22 | 26 |
| Extract air pressure drop | Pa | 0 | 0 |

Fig. 11: Technical data supply air and extract air silencers

6.8 Mixing valve

Mixing valves which are optimally matched to the units are available for easy installation of RoofVent® units. They have the following specifications:

- 3-way mixing valve with modulating rotary actuator (run time 9 s)
- Flow characteristic:
 - Equal percentage control path
 - Linear bypass
- Integrated position control and response

6.9 Condensate pump

The condensate pump is installed directly under the condensate drain connection; the supplied container is prepared for installation on the unit. It pumps the condensate through a flexible hose to a delivery head of 3 m, thus enabling discharge of the condensate

- through waste water pipes directly below the ceiling,
- onto the roof.

6.10 Socket

For maintenance work, a socket (1-phase, 230 V AC, 50 Hz) can be installed in the roof unit, next to the control block.

6.11 Energy monitoring

Energy monitoring makes it possible to display the energy saved by heat and cool recovery. For this purpose, 2 additional temperature sensors are installed in the RoofVent® units; they record the air inlet and air outlet temperatures of the plate heat exchanger.

6.12 Return temperature sensor

The return temperature sensor monitors the return temperature of the heating medium. If necessary, it triggers frost pre-control at the heating valve to prevent the system possibly being shut down due to frost.

6.13 Pump control

Instead of the diverting system, a mixing or injection circuit can also be installed in the load circuit.

Please note the following:

- Not only the mixing valves but also the pumps in the load circuit are controlled directly by the control block.
- Terminals for wiring the mixing valves and the pumps in the load circuit are located in the connection box.
- Make sure that valves and pumps which meet the following requirements are provided on site.

Requirements for mixing valves

- Use 3-way mixing valves with the following flow characteristics:
 - Equal percentage control path
 - Linear bypass
- The valve authority must be ≥ 0.5 .
- The maximum run time of the valve actuator is 45 s.
- The valve actuator must be continuous, i.e. the stroke changes in proportion to the control voltage (0...10 VDC or 2...10 VDC).
- The valve actuator must be designed with a position response (0...10 VDC or 2...10 VDC).
- The maximum power consumption is 20 VA.
- Install the valve close to the unit (max. distance 2 m).

Requirements for pumps

- Voltage 230 V AC
- Total current . . . max. 6.3 A for all pumps
(heating pump, cooling pump, condensate pump)

Requirements on changeover valves

Use changeover valves conforming to the following specification for heating and cooling in the 2-pipe system:

- 3-way changeover valves
- Supply voltage 24 V AC
- 1-wire control (0/24 V AC)
- Position response via limit switches (0°/90°)
- Power consumption max. 44 VA

7 Transport and installation



Caution

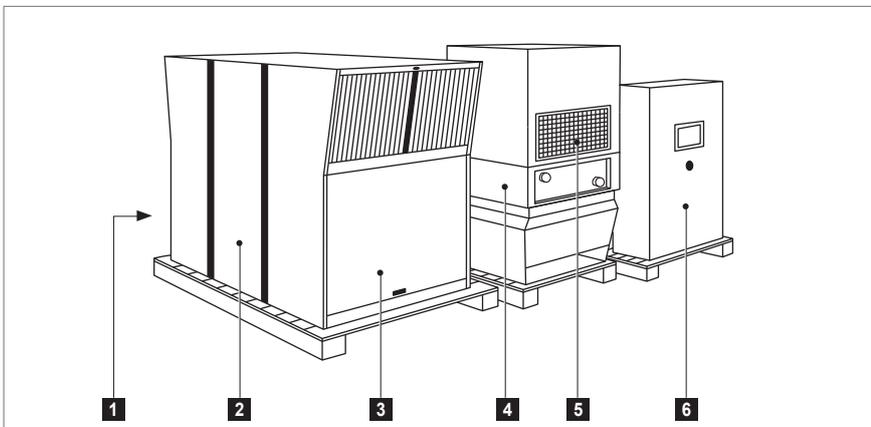
Risk of injury from incorrect handling. Transport, assembly and installation work may only be performed by specialists. Observe safety and accident prevention regulations.

7.1 Scope of delivery

The scope of delivery includes:

- RoofVent® unit, delivered as standard in 2 parts on pallets (roof unit, below-roof unit)
- Accessories
- Optional components
- Zone control panel

Associated parts are labelled with the same unit number and serial number. Depending on the unit size, the below-roof unit can also be delivered in multiple parts.



- | | |
|---|---------------------------|
| 1 | Supply air access door |
| 2 | RoofVent® roof unit |
| 3 | Extract air access door |
| 4 | RoofVent® below-roof unit |
| 5 | Extract air grille |
| 6 | Zone control panel |

Fig. 12: Delivery of the components on pallets

Accessories

The following accessories are supplied separately:

- Transport eyes for lifting the below-roof unit and the roof unit (2 each, attached to the pallet of the first roof unit)
- Screws for assembling the units and for fixing the fan protecting plate (attached to the pallet of the roof unit)
- If the below-roof unit is delivered in multiple parts: Screws for assembling the below-roof unit (behind the extract air grille)
- Extract air filter (behind the extract air access door)
- PG screw joint for electrical connection (behind the connection box access panel; this is located in the below-roof unit opposite the extract air grille)
- Trap (only for RoofVent® KC, KHC; behind the extract air grille)
- Electrical diagram and 2 keys for the access doors (behind the supply air access door)
- Fresh air temperature sensor and room air temperature sensor (in the zone control panel)

Options

The following optional components are supplied separately:

- Fresh air and exhaust air silencer (on separate pallet; bolts, hinges and screws enclosed)
- Mixing valve (behind the extract air grille)
- Condensate pump (behind the extract air grille)
- Return temperature sensor (behind the extract air grille)
- Additional room temperature sensors, combination sensor room air quality, temperature and humidity (in zone control panel)
- Version with 2 Air-Injectors or without Air-Injector: A supply air temperature sensor is enclosed behind the extract air grille.

Preparation

- The units are delivered screwed onto the pallet. To loosen the screws, the inspection doors must be opened. When unloading the units, make sure that there is enough space to open the inspection doors.
- Use a forklift with a sufficiently long fork to unload (at least 1.8 m).
- Check the consignment against the delivery documents and the order confirmation to ensure that it is complete. Report missing parts and any damage immediately in writing.

7.2 Storage

If you do not install the unit immediately:

- Remove the packaging film to avoid water vapour condensation.
- Store the unit in a dry, dust-free room.
- Keep the storage temperature between -25°C and $+50^{\circ}\text{C}$.
- Avoid too long storage periods. After a storage period of more than 1 year:
 - Check that the bearings of the fans move smoothly before installing the unit.

7.3 Requirements for the installation site

RoofVent® unit

- Make sure that the roof has sufficient load-bearing capacity and that the roof frames correspond to the specifications in the design handbook.
- Position the units according to the system layout. In doing so, ensure that the units are aligned to one another, the minimum and maximum distances are observed and that the correct coil connections are correctly positioned. Units must not draw in exhaust air from other units as fresh air.
- All air inlet and air outlet openings must be freely accessible. The supply air jet must be free to spread out unhindered.
- The access doors in the roof unit and the access panels in the below-roof unit must be easily accessible.
- The Air-Injector must be easily accessible.
- Clearance of at least 0.9 m is required for maintenance work around the heating/cooling section.

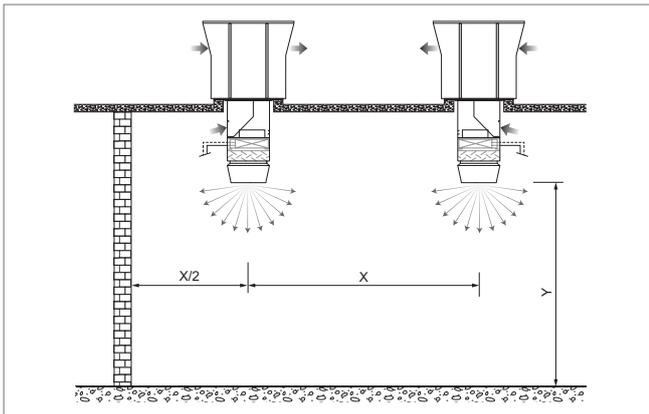


Fig. 13: Minimum and maximum distances

| Unit type | | | KH-6 | KH-9 | KC-6 KHC-6 | KC-9 KHC-9 |
|-------------------|--------------------|---|----------------|------|---------------|---------------|
| Distance X | min. | m | 14 | 18 | 12 | 17 |
| | max. | m | 27 | 36 | 25 | 35 |
| Mounting height Y | min. | m | 4 | 5 | 4 | 5 |
| | max. ¹⁾ | m | Approx. 9...25 | | | |

1) The maximum mounting height varies depending on the boundary conditions (for values, see table of heat outputs or calculation with the 'HK-Select' selection program).

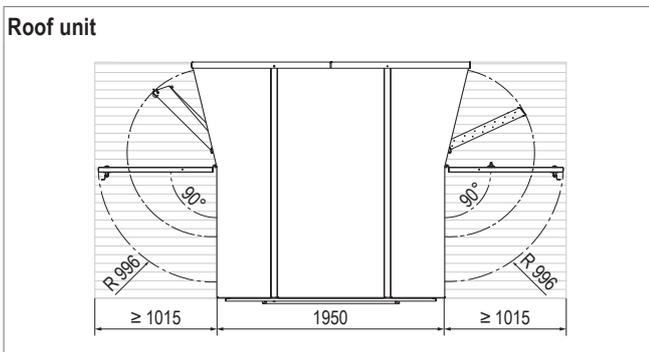
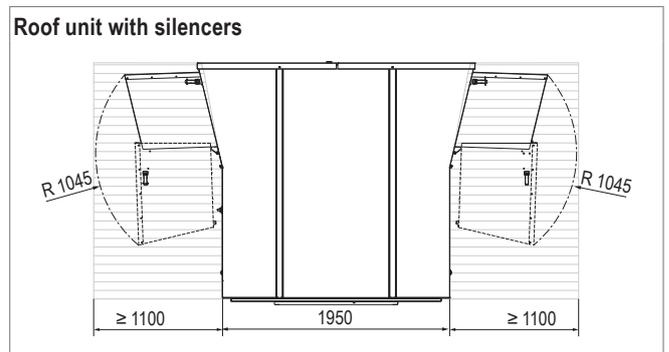


Fig. 14: Space requirements for maintenance on the roof (dimensions in mm)



Notice

If side access is not possible, proportionally more space is required for opening the access doors.

7.4 Installation



Caution

Risk of injury caused by falling load and improper handling.

During installation:

- Wear personal protective equipment.
- Do not stand under suspended loads.
- Use cranes or forklifts with sufficient load-bearing capacity.



Caution

Provide suitable protective devices and make sure the units can be accessed easily. The maximum roof load of the RoofVent® units is 80 kg.

Preparation

- The units are assembled from roof level. Make sure that the following items are on hand for the assembly:
 - Crane for installing the below-roof unit
 - Crane or helicopter for assembly on the roof
 - Ladder for screwing in the transport eyes
 - Lifting gear (minimum length of the lifting ropes: 2 m for the below-roof unit, 3 m for the roof unit)
 - Sealing compound for the roof frame (e.g. Sikaflex® 221)
 - Adhesive for securing screws (e.g. Loctite® 243, medium strength, soluble)
- Below-roof unit:
 - Remove the below-roof unit from the packaging film.
 - Remove the mounting bracket or wooden slats with which the below-roof unit is fixed to the pallet.
- Roof unit:
 - Remove the roof unit from the packaging film.
 - Open the extract air access door.
 - Behind this, loosen what is fixing the unit to pallet (2 screws).
 - Open the supply air access door.
 - Unscrew the fan protecting plate; this is only reattached when the unit is installed on the roof.
 - Behind the fan protecting plate, loosen what is fixing the unit to the pallet (2 screws).



1 Extract air access door

2 Supply air access door

3 Fan protecting plate

Fig. 15: The fan protecting plate is temporarily attached with 4 screws during delivery.

Assembling the below-roof unit

The below-roof unit must only be assembled at the building site if it must be delivered in multiple parts due to the unit version. Proceed as follows:

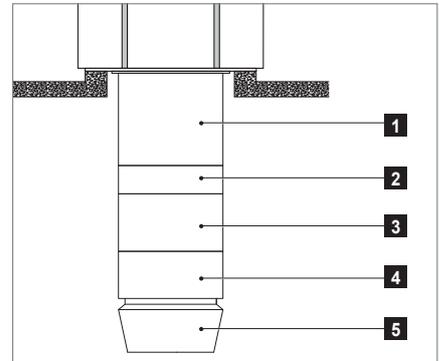
- Make sure that the correct unit components match up (observe the unit number and RoofVent® serial number).
- Screw in the transport eyes into the connection module frame and attach the lifting gear.
- Lift the connection module complete with mounted components and rotate it into the correct position.
 - The standard position of the coil connections is underneath the extract air grille. If another orientation is required, you can mount the heating or cooling section turned round on the connection module.



Notice

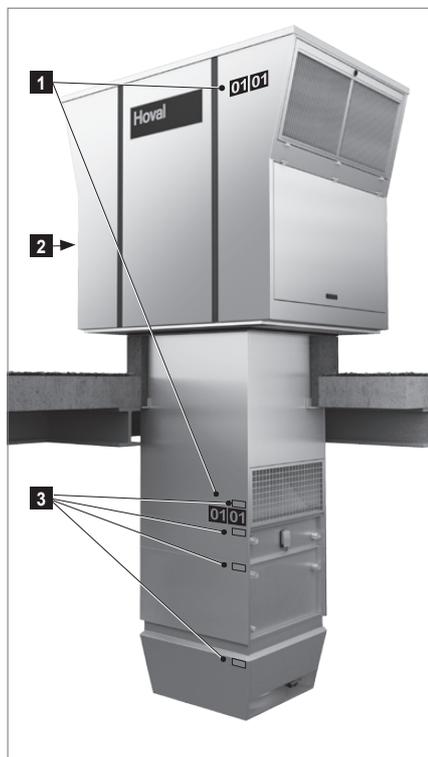
Never change the orientation of the supply air silencer (option) relating to the component above it. The correct position is marked on the unit.

- Place the connection module on the bottom part.
- Screw the components together; use the supplied screws and protective plugs to do so.



- 1 Connection module
- 2 Heating section
- 3 Cooling section
- 4 Supply air silencer (option)
- 5 Air-Injector

Fig. 16: The components of the below-roof unit vary depending on unit type.



- 1 Unit number
- 2 Type plate with serial number (behind the access door)
- 3 Serial number

Fig. 17: Identification of the unit components



Fig. 18: Transport eye in connection module

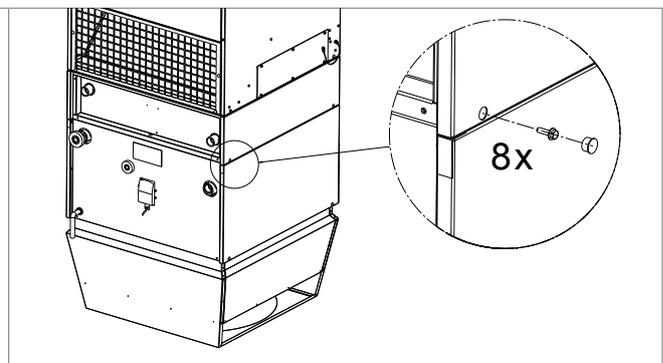


Fig. 19: Below-roof unit screw connection with M6 x 20 screws and protective plugs (8 per component)

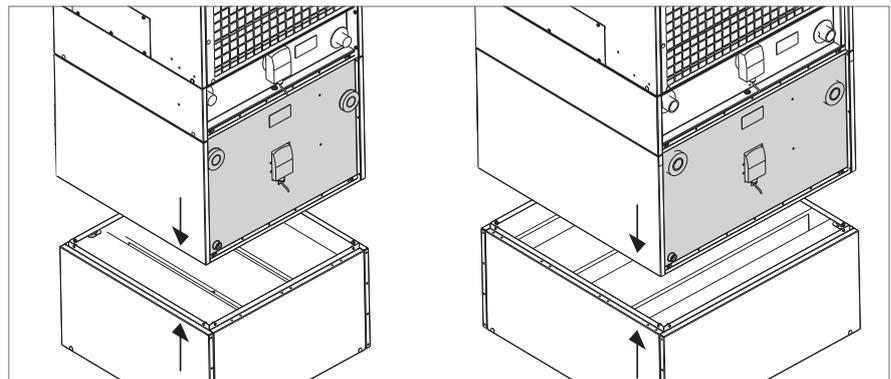
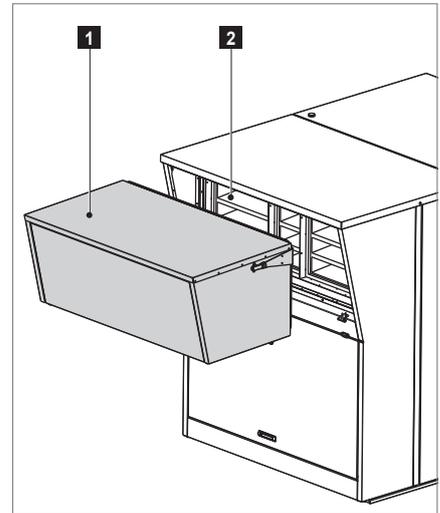


Fig. 20: Correct orientation of the supply air silencer:
 For size 6: Sound attenuation splitters cross to coil connection side
 For size 9: Sound attenuation splitters parallel to coil connection side

Installing fresh air and exhaust air silencers

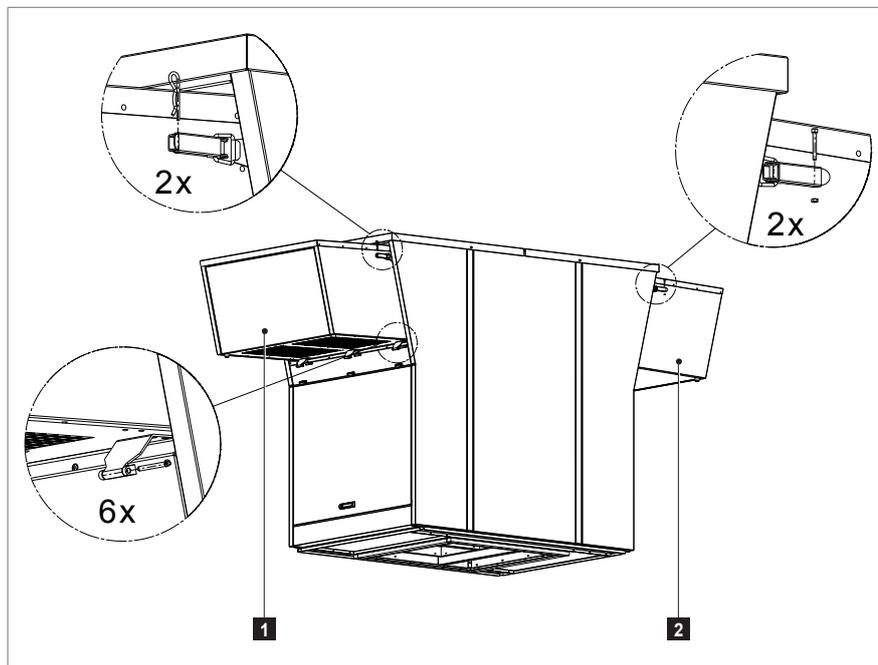
Fresh air and exhaust air silencers (optional) are supplied separately and must be installed on the roof unit at the building site. The installation material is provided. Proceed as follows:

- Fresh air silencer
 - Lift the silencer and position it on the air inlet opening of the unit.
 - Insert the bolts into the hinges and insert the safety washers.
 - Fold the silencer up and hook the clamping lock in on both sides.
 - Secure the clamping locks with cotter pins.
- Exhaust air silencer
 - Lift the silencer and position it on the air outlet opening of the unit.
 - Insert the bolts into the hinges and insert the safety washers.
 - Fold the silencer up and hook the clamping lock in on both sides.
 - Secure the clamping locks with screws.



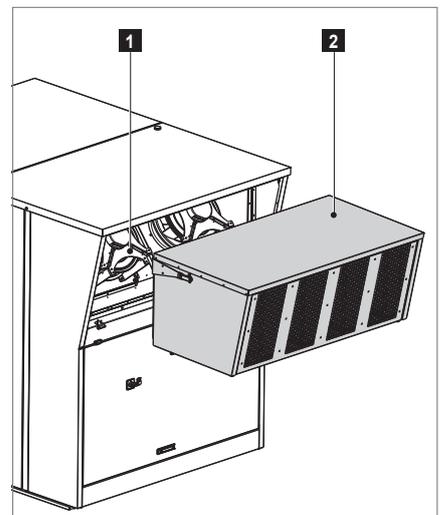
1 Fresh air silencer
2 Fresh air filter

Fig. 21: Air inlet opening



1 Fresh air silencer
2 Exhaust air silencer

Fig. 23: Installing fresh air and exhaust air silencers



1 Exhaust air fan
2 Exhaust air silencer

Fig. 22: Air outlet opening

Installing the below-roof unit

- Apply sealing compound to the roof frame.
- Screw in the transport eyes into the connection module frame and attach the lifting gear.
 - Heed the minimum length of the lifting ropes (see Fig. 24).
- Transport the below-roof unit to the roof frame using a helicopter or crane.
- Turn the below-roof unit to the desired position.
- Hang the below-roof unit into the roof frame from above.
- Check the sealing strip on the connection module flange. Improve the seal if necessary.
- Remove the transport eyes.

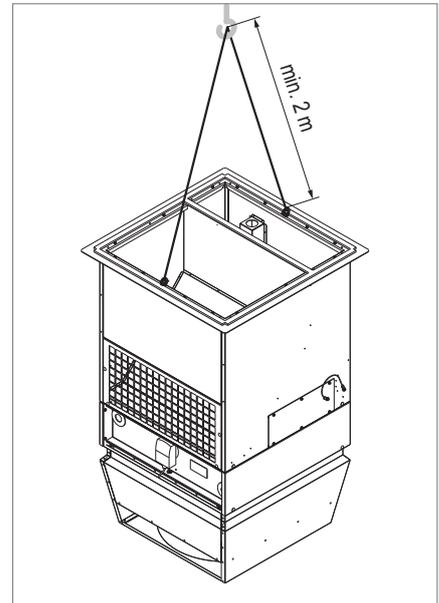


Fig. 24: Minimum length of the lifting ropes

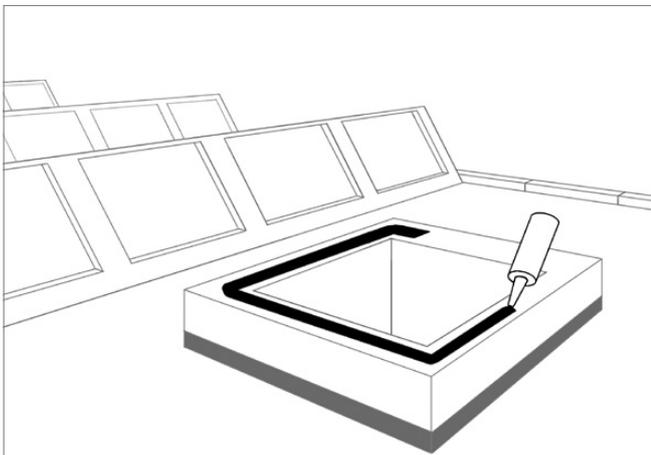


Fig. 25: Applying sealing compound to the roof frame

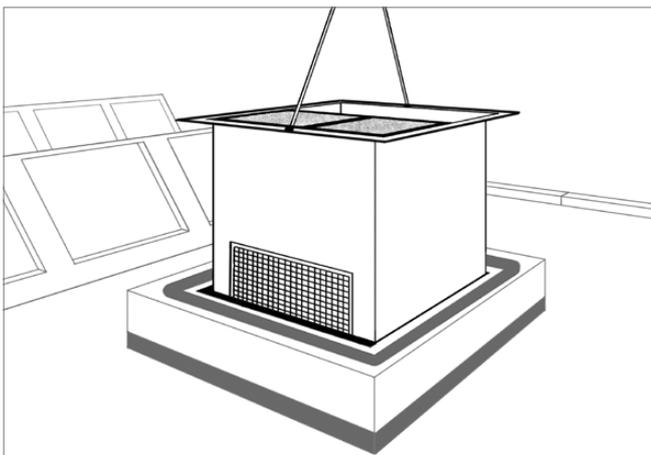


Fig. 26: Hanging the below-roof unit

Installing the roof unit

- Remove the cover caps on the unit roof.
- Screw in the transport eyes and attach the lifting gear.
 - Heed the minimum length of the lifting ropes (see Fig. 27).
- Transport the roof unit onto the roof.
- Open the supply air access door and the exhaust air access door and position the roof unit correctly in relation to the below-roof unit, placing the roof unit on top of the below-roof unit. The centring bolts on the connection module support the correct positioning.
- Screw the roof unit to the below-roof unit:
 - To do this, use the supplied M6 x 30 screws.
 - Secure the screw connection using medium-strength, soluble adhesive (e.g. Loctite® 243).
- Remove the transport eyes and attach the cover caps.
 - Keep the transport eyes for when disassembling the units at a later date at the end of their service life.
- Reattach the fan protecting plate on the supply air side:
 - Temporarily screw the protecting plate tight using 4 M5 x 16 screws; it must be removed again for electrical installation later.



Attention

Risk of damage to the unit due to condensation. If the electrical installation is not carried out until the next day or later and cold weather is to be expected: Tighten the fan protecting plate with all screws to prevent condensation.

- Install the extract air filter and attach the elements using the filter brackets.

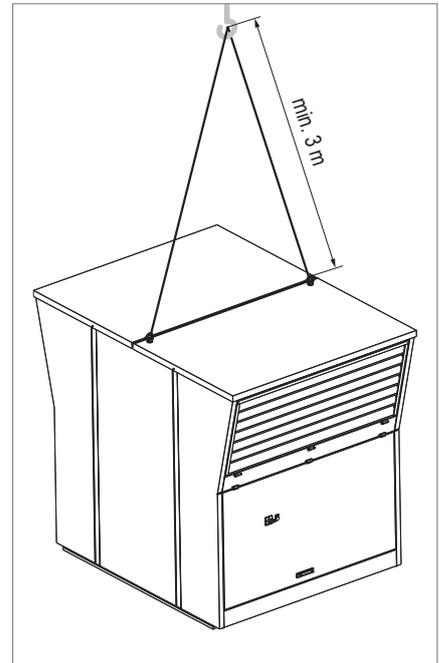
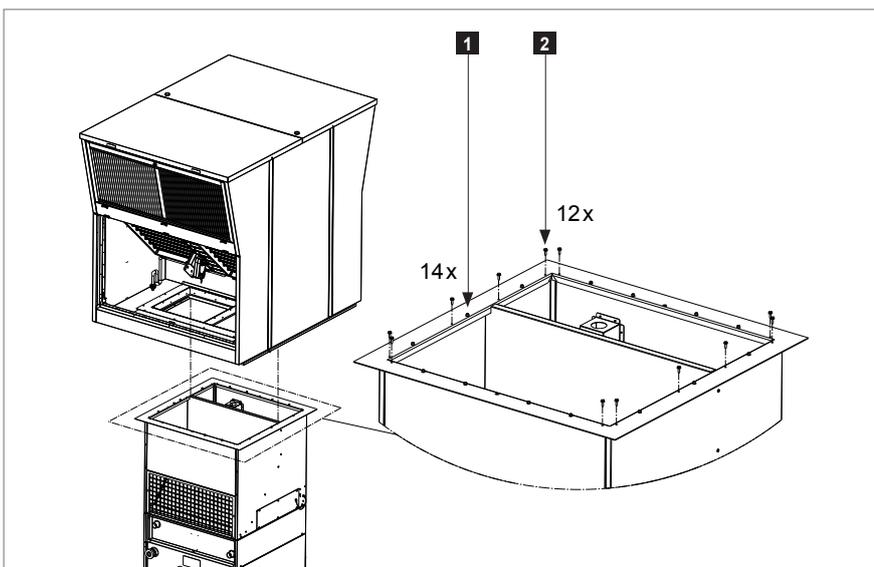


Fig. 27: Minimum length of the lifting ropes



1 Centring bolts

2 M6 x 30 screws

Fig. 28: Placing and screwing the roof unit

7.5 Connecting air ducts and Air-Injectors



Attention

Danger of damaging the units. The unit must not be subjected to the weight of the ducts. Suspend the ducts from the ceiling or support them on the floor.

Connecting the supply air duct

- Connect RoofVent® units without Air-Injectors or with 2 Air-Injectors to a on-site air duct.
- For units with 2 Air-Injectors: Install the two Air-Injectors on the supply air duct:
 - Stick the compression tape onto the Air-Injectors.
 - Attach the Air-Injectors to the supply air duct with a perforated angle plate and blind rivet nuts.
 - Do not install any add-ons or fittings in the direct outlet area. The supply air jet must be free to spread out unhindered.

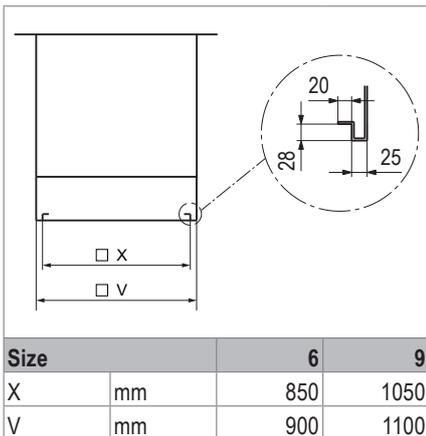


Fig. 29: Connection dimensions supply air duct (in mm)

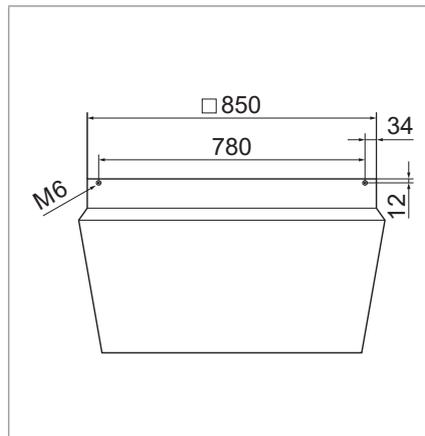
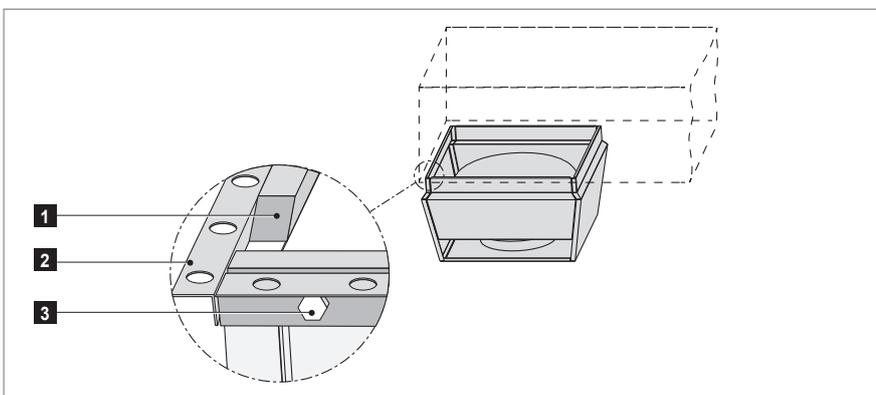


Fig. 30: Hole pattern for Air-Injector (in mm)



- 1** Compression tape (on site)
- 2** Perforated angle plate (on site)
- 3** Blind rivet nuts (on site)

Fig. 31: Installing the Air-Injectors on the supply air duct

7.6 Hydraulic installation

- Connect the heating or cooling coil in accordance with the hydraulic diagram.
- Depending on local conditions, check whether compensators for linear expansion are required for the supply and return lines and/or articulated connections are required for the units.
- Insulate the hydraulic lines.
- Hydraulically balance the pipework for the the individual units within a control zone to ensure even distribution.

**Attention**

Danger of damaging the units. Do not fasten any loads to the coil, e.g. by means of the flow or return lines.

**Attention**

Danger of malfunctions. The condensate separator in cooling units only functions while the fan is running. No coolant must be allowed to circulate in the coil when the unit is switched off.

Return temperature sensor (option)

- Install the return temperature sensor on the return line, directly after the screw connection.
- Attach the sensor with the clamping band.
- Insulate the sensor.



Fig. 32: Return temperature sensor

7.7 Condensate connection

Condensate arising in cooling units must be removed via a condensate-proof line.

- Install and insulate the supplied trap on the condensate connection of the unit.
- Dimension the slope and cross-section of the condensate line so that no condensate backflow takes place.
- Make sure that the condensate is drained in compliance with local regulations.

Condensate pump (option)

- Remove the transport locking device from the condensate pump.
- Install the condensate pump directly under the condensate drain connection; the supplied container is prepared for installation on the unit.
- Connect the condensate pump to a condensate-resistant waste water pipe. To do this, use a hose and attach it using a hose clamp or use a pipe with an inner diameter of 9 mm.
- Route the condensate line from the pump directly upwards.



Notice

This line must not exceed the delivery head of the pump:
 – head of 3 m up to a condensate quantity of max. 150 l/h
 – head of 4 m up to a condensate quantity of max. 70 l/h
 Consider the condensate quantity expected in your application.
 (It can be calculated with the selection program HK-Select).

- Install an odour trap at the highest point.
- Route the line with a constant incline downwards and then vertically downwards, and if possible down to below the condensate pump. This will create a siphon effect and thus improve the effectiveness of the condensate pump.
- Make sure that the condensate is drained in compliance with local regulations.

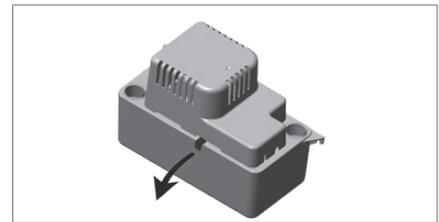


Fig. 33: Removal of the transport locking device

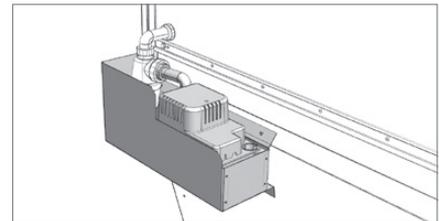


Fig. 34: Installation on the unit

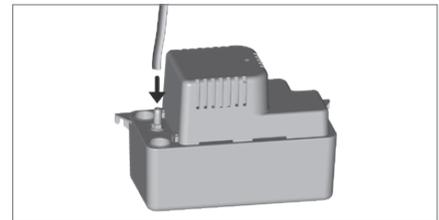


Fig. 35: Connection of the condensate pump

7.8 Electrical installation



Caution

Danger of electric shocks. The electrical installation must only be carried out by a qualified electrician.

Please note the following:

- Observe all relevant regulations.
- Choose the dimensions of the cable cross sections in line with the applicable regulations.
- Route signal and bus lines separately from mains cables.
- Make sure the lightning protection system for the units or for the entire building is planned and carried out by professionals.
- Provide overload protection equipment on site in the mains connection line of the zone control panel.
- Carry out the electrical installation according to the wiring diagram.
- Secure all connections against working loose.
- When installing cables, observe the following points:
 - Fasten the cables in place with cable mounts and cable ties or with cable conduits/ducts.
 - Use blind rivets.
 - Drill holes with a maximum diameter of 5 mm Ø.
 - The maximum drilling depth is 10 mm. Use a drill bit with a depth stop.
 - The maximum load resulting from cable holders and cable guides is 10 kg.
 - All access panels must be easily removable.
 - Do not drill any holes in the connection module around the connection box and cable duct leading to the roof unit.

Proceed as follows:

- Connect the connection box in the below-roof unit to the control block in the roof unit.
 - Unscrew the fan protecting plate.
 - Detach the wiring harness from the below-roof unit frame.



Attention

Danger of damaging the unit: Dropping the cables may damage the heating coil. Detach the wiring harness carefully.

- Pull the wiring harness upwards and fasten it using a cable bushing and a cable clamp.
- Depending on the length of the connection module, the wiring harness has a little excess length. Fix it with the cable clamps in the roof unit (see Fig. 36).
- Connect the cable to the control block according to wiring diagram.
- Screw the fan protecting plate tightly again. To do this, use the supplied M5 x 16 screws.
- Connect the power supply to the connection box.
- Connect the zone bus to the connection box.
- Connect the unit frame with the foundation earth electrode and attach an earthing label.
- Connect the electrical components of the below-roof unit to the connection box (see Fig. 37).
- Wire up the mixing valve to the connection box.

Options

- Wire up the condensate pump to the connection box.
- Wire up the return temperature sensor to the connection box.

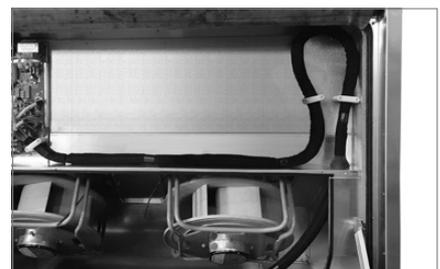


Fig. 36: Fixing the wiring harness in the roof unit

- Injection system / Mixing system / ColdClimate design:
 - Wire up the pump and mixing valve to the connection box.
- Design with 2 Air-Injectors:
 - Install the enclosed supply air temperature sensor in the supply air duct and wire it up to the connection box.
 - Wire up both actuators to the connection box.
- Design without Air-Injector:
 - Install the enclosed supply air temperature sensor in the supply air duct and wire it up to the connection box.

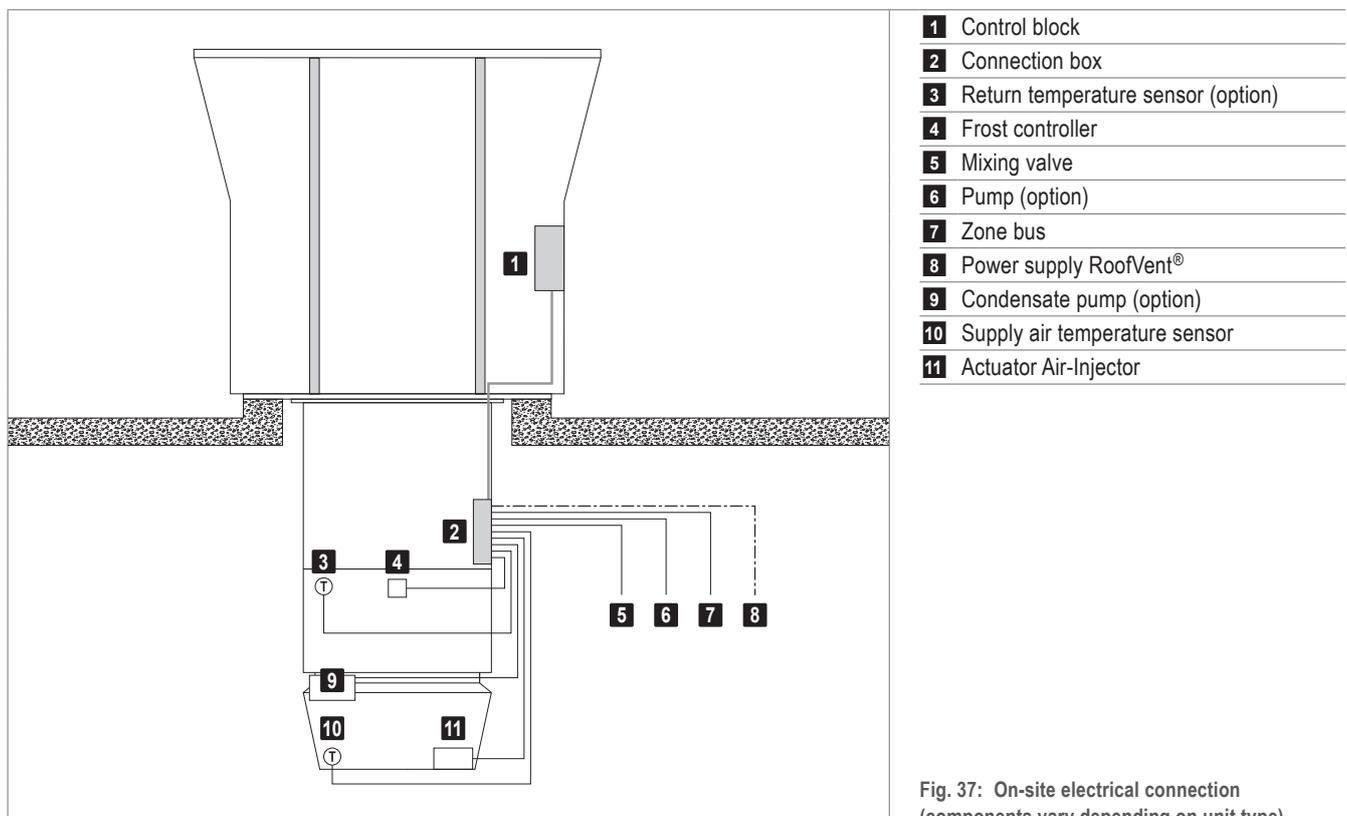
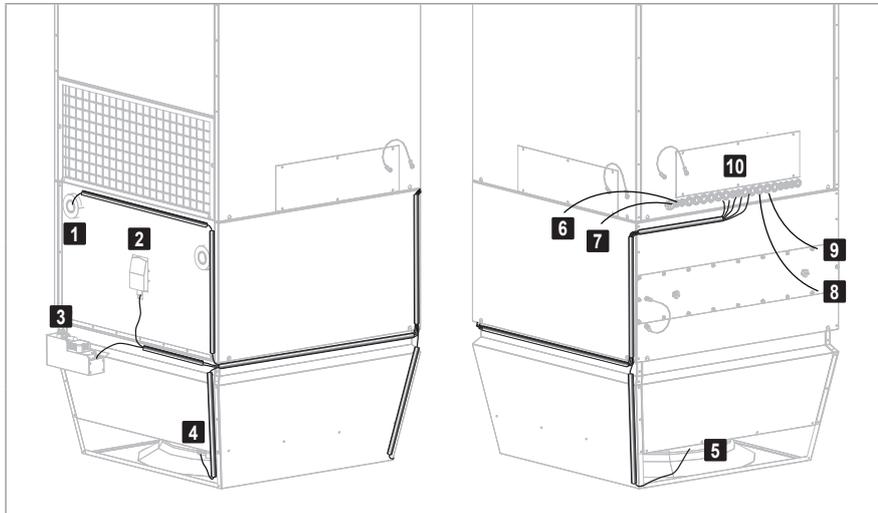


Fig. 37: On-site electrical connection
(components vary depending on unit type)

Temperature sensors

The room air sensor and the fresh air temperature sensor are supplied loose in the control panel:

- Install the room air temperature sensor at a representative position in the occupied area at a height of about 1.5 m. The measured values must not be distorted by the presence of sources of heat or cold (machines, direct sunlight, windows, doors, etc.).
- Install the fresh air temperature sensor at least 3 m above the ground on a north-facing wall, so that it is protected from direct sunlight. Provide cover for the sensor and thermally insulate it from the building.



- | | |
|----|------------------------------------|
| 1 | Return temperature sensor (option) |
| 2 | Frost controller |
| 3 | Condensate pump (option) |
| 4 | Actuator Air-Injector |
| 5 | Supply air temperature sensor |
| 6 | Power supply RoofVent® |
| 7 | Zone bus |
| 8 | Mixing valve |
| 9 | Pump (option) |
| 10 | Connection box |

Fig. 38: Cable routing on the below-roof unit (components vary depending on unit type)

8 Operation

8.1 Initial commissioning



Attention

Risk of damage to property as a result of performing initial commissioning on your own authority. Initial commissioning must be performed by the manufacturer's customer service technicians.



Attention

At low outside temperatures, a cold start of the fans can cause damage to the unit. Do not perform commissioning at temperatures below $-15\text{ }^{\circ}\text{C}$.

8.2 Checklist to prepare for commissioning:

- Mechanical installation
 - Indoor climate units
 - Zone control panels
 - Operator terminals
- Hydraulic installation
 - Indoor climate units (heating/cooling coil, condensate connection)
 - Complete heating/cooling circuit
 - Hydraulic balancing
 - Provision of the heating/cooling medium during commissioning
- Electrical installation
 - Power supply for indoor climate units, zone control panels, hydraulic pumps and valves
 - Wiring of mixing valve, pump, condensate pump, return temperature sensor, door contact, forced off to the unit control box

- Laying of bus cables conforming to wiring diagram
- Installation and wiring of all sensors (room temperature sensor, fresh air sensor, ...)
- Wiring of external operator terminals
- Wiring of external inputs and outputs
- Organisational matters
 - Access to all system components during commissioning (indoor climate units, operator terminals, valves, ...)
 - Provision of a suitable working platform
 - Organisation of commissioning and training (date, presence of all of the respective trade groups and of the operating personnel)

The unit is checked at the factory and preset according to the specifications on the type label.

8.3 Operation

The system runs fully automatically depending on the programmed operating times and temperature conditions.

- Observe the operating instructions for the control system.
- Check alarm displays daily.
- Correct changes to operating times in the programming accordingly.
- Ensure free air outlet and unhindered dispersion of the supply air.

For units in ColdClimate design:

At low outside temperatures, a cold start of the fans can cause damage to the unit.

Therefore:

- A continuous power supply for the fans must be ensured so that they do not cool down too much.
- After a power failure, there is a waiting period of 20 minutes before the fans start up again.

9 Maintenance and repair



Caution

Risk of injury from incorrect work. Maintenance work must be carried out by trained personnel.

9.1 Safety

Before performing any work on the unit:

- Turn the isolation switch on the unit to the 'Off' position and secure it against being switched back on.



Caution

Danger of electric shocks. The unit controller and the service socket are still live.

- Wait at least 3 minutes after switching the unit off.



Caution

The use of condensers can pose a danger of fatal injury from directly touching live parts even after the unit is switched off. Only open the access doors after waiting 3 minutes.

- Observe the accident prevention regulations.
- Observe the particular dangers involved when working on electrical systems.
- When working in the unit, take precautions against unprotected, sharp metal edges.
- Immediately replace damaged or removed informational and warning signs.
- Following maintenance work, professionally reassemble all dismantled protective devices.
- Replacement parts must comply with the technical requirements of the unit manufacturer. Hoval recommends the use of original spare parts.

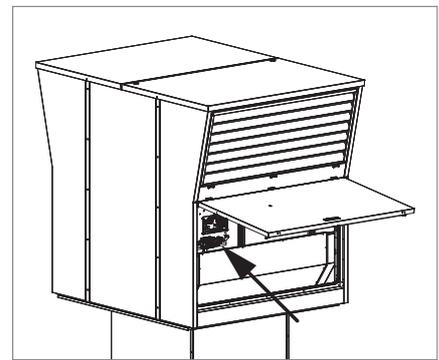


Fig. 39: Position of the isolation switch behind the supply air access door

9.2 Maintenance

Maintenance schedule

| Activity | Procedure | Interval | | | | | | | | | | | | | | | | | | | | | | |
|------------------|--|--------------|--------|----------|------|---|-----------|---------|---|-------------|---------|---|---|-----------|---------|---|---------|---|-------------|---------|---|---------|---|---|
| Clean unit | <ul style="list-style-type: none"> ■ Clean inside of RoofVent® unit with vacuum cleaner. ■ Remove the siphon, clean it and rinse the condensate drain. | 1 × annually | | | | | | | | | | | | | | | | | | | | | | |
| Functional check | <ul style="list-style-type: none"> ■ Check function of the fan and actuators. ■ Check function of the Air-Injector. ■ Check function of the control system. | 1 × annually | | | | | | | | | | | | | | | | | | | | | | |
| Filter change | <ul style="list-style-type: none"> ■ Renew air filter. <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Unit size</th> <th>Filter</th> <th>Mat. No.</th> <th>Qty.</th> </tr> </thead> <tbody> <tr> <td rowspan="2">6</td> <td>Fresh air</td> <td>2076260</td> <td>2</td> </tr> <tr> <td>Extract air</td> <td>2076261</td> <td>1</td> </tr> <tr> <td rowspan="4">9</td> <td rowspan="2">Fresh air</td> <td>2076260</td> <td>2</td> </tr> <tr> <td>2076262</td> <td>1</td> </tr> <tr> <td rowspan="2">Extract air</td> <td>2076260</td> <td>1</td> </tr> <tr> <td>2076263</td> <td>1</td> </tr> </tbody> </table> | Unit size | Filter | Mat. No. | Qty. | 6 | Fresh air | 2076260 | 2 | Extract air | 2076261 | 1 | 9 | Fresh air | 2076260 | 2 | 2076262 | 1 | Extract air | 2076260 | 1 | 2076263 | 1 | When the filter alarm is displayed, at least 1 × annually |
| Unit size | Filter | Mat. No. | Qty. | | | | | | | | | | | | | | | | | | | | | |
| 6 | Fresh air | 2076260 | 2 | | | | | | | | | | | | | | | | | | | | | |
| | Extract air | 2076261 | 1 | | | | | | | | | | | | | | | | | | | | | |
| 9 | Fresh air | 2076260 | 2 | | | | | | | | | | | | | | | | | | | | | |
| | | 2076262 | 1 | | | | | | | | | | | | | | | | | | | | | |
| | Extract air | 2076260 | 1 | | | | | | | | | | | | | | | | | | | | | |
| | | 2076263 | 1 | | | | | | | | | | | | | | | | | | | | | |

Table 20: Maintenance schedule

Changing the filter



Caution

Crushing hazard from closing dampers. Only open the access doors when the 'Filter change' illuminated button is constantly illuminated (waiting period of approx. 2 min).

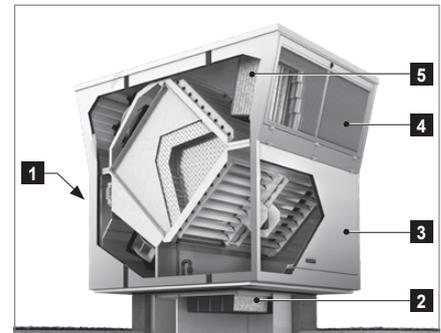
- Press the 'Filter change' illuminated button.
- Wait until the button is constantly illuminated.
 - The button flashes whilst the speed of rotation of the fans is reduced and the dampers close; it illuminates constantly as soon as the access doors may be opened.
- Changing the extract air filter:
 - Open the extract air access door.
 - Release the filter brackets and remove the filter elements.
 - Insert the new filter elements. When doing this, only hold the frame.
 - Fix the filter elements in place with the filter brackets.
 - Close the access door.
- Changing the fresh air filter:
 - Open the fresh air access door. Release the safety loops and fold the access door down completely.
 - Release the filter brackets and remove the filter elements.
 - Insert the new filter elements. When doing this, only hold the frame.
 - Fix the filter elements in place with the filter brackets.
 - Fold the access door up and reattach the safety loops. Close the access door.
- Changing the fresh air filter when a fresh air silencer is installed:
 - Open the clamping lock of the fresh air silencer on both sides. Fold the silencer down.
 - Release the filter brackets and remove the filter elements.
 - Insert the new filter elements. When doing this, only hold the frame.
 - Fix the filter elements in place with the filter brackets.
 - Fold the silencer up and hook the clamping lock in on both sides. Secure the clamping locks with cotter pins.
- Press the 'Filter change' illuminated button again to set the unit back to normal operation. The button goes out.



Notice

If the 'Filter change' illuminated button is not pressed again, the unit automatically switches back to normal operation after 30 min. The button goes out.

- Dispose of the filters in accordance with local regulations.
 - The filters are fully incinerable; the disposal of used filters depends on the contents.



- | | |
|---|----------------------------------|
| 1 | Filter change illuminated button |
| 2 | Extract air filter |
| 3 | Extract air access door |
| 4 | Fresh air access door |
| 5 | Fresh air filter |

Fig. 40: Changing the filter

9.3 Repair

If required, contact Hoval customer service.

Product service life

| Component | Service life |
|--|---|
| EC motors of the supply air and exhaust air fans | approx. 30'000 to 40'000 hours depending on the application and environmental conditions |
| Damper actuators with spring return | at least 60'000 emergency positions |

Table 21: Product service life

10 Dismantling



Caution

- Risk of injury caused by falling load and improper handling.
- Wear protective equipment (fall protection, helmet, safety shoes).
 - Do not stand under suspended loads.
 - Use cranes or helicopters with sufficient load-bearing capacity.
 - Do not lift the two-part unit in one piece.

- Disconnect the power supply to the unit.
- Wait at least 3 minutes after switching the unit off.



Caution

The use of condensers can pose a danger of fatal injury from directly touching live parts even after the unit is switched off. Only open the access doors after waiting 3 minutes.

- Drain the heating or cooling circuit.
- Dismantle all media connections.
- Disconnect the unit from any fastenings.
- Open the supply air access door and the extract air access door.
- Unscrew the fan protecting plate.
- Disconnect the screw connection between the roof unit and below-roof unit.
- Remove the cover caps on the unit roof.
- Screw in the transport eyes and attach the lifting gear.
- Remove the roof unit.
- Screw in the transport eyes into the connection module frame and attach the lifting gear.
- Remove the below-roof unit.

11 Disposal

- Recycle metal components.
- Recycle plastic parts.
- Dispose of electric and electronic parts via hazardous waste.
- Dispose of oil-fouled parts in accordance with local regulations.
- Dispose of the filters in accordance with local regulations.
 - The filters are fully incinerable; the disposal of used filters depends on the contents.

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