

## Description of the unit



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## Description of the unit



### General

The SILVER C RX/PX/CX air handling units are complete with direct-driven supply air and extract air fans, supply air and extract air filters and heat exchanger. The heat exchanger is either a rotary heat exchanger (RX), counter-flow heat exchanger (PX) or coil heat exchanger (CX).

The SILVER C SD single-direction units are supply air/extract air handling units with one direct-driven supply air or extract air fan. A filter is available as an option for all sizes. The coil heat exchanger and unmounted pipework package can be selected for the size 004-120 units.

If supplementary function sections such as dampers and air coolers are required, they must be installed in the ductwork (duct accessories). Unit sections such as e.g. the multisection and air bypass section can be installed in the air handling unit arrangement of the size 004-120 RX/PX/CX units.

### Application area

The SILVER C units are designed for use in comfort ventilation applications. Depending on the variant selected, the SILVER C units can be utilised in buildings such as office buildings, schools, day nurseries, public buildings, shops, residential buildings, etc.

SILVER C units equipped with counterflow-/coil heat exchanger (PX/CX) and separate supply air and extract air handling units (SD) can also be used for the ventilation of moderately humid buildings; however not where the humidity is continuously high, such as in indoor swimming baths.

The separate SILVER C supply air and extract air handling units (SD) are designed for applications in which the supply air and extract air flows need to be completely separated from one another or where, due to limited available space, separate units for supply air and extract air respectively are needed. They can also be used individually if only one of the variants is needed.

The SILVER C units equipped with the roof, air intake section and exhaust air hood accessories can be installed outdoors.

The SILVER C is designed and tested for temperatures, in the surroundings and the air stream, from -40°C to +40°C. However, for SILVER C RX the temperature difference between the outdoor air and extract air must not exceed 70°C. On all SILVER C CX and SD with a pipework package from Swegon placed outdoors, the expansion vessel must be equipped with anti-freeze resistance and insulated when the design outdoor temperature is lower than -10 °C.

SILVER C conforms to the requirements set out in the hygiene design regulations VDI 6022, see the separate guide.

Swegon recommends that the floor in the ventilation room be supplied with a sealing layer in cases where there is a risk of condensation in the air handling unit. For example, condensation can form in air handling units with plate heat exchangers, coil heat exchangers and/or air coolers.

### Certification

Swegon AB has a certified Quality Assurance System that conforms to ISO 9001 Standard and a certified Environmental Management System to ISO 14001. The SILVER C air handling system is also certificated by Eurovent, No. AHU-14-09-003.



www.eurovent-certification.com

*Sensor designations and colours of arrows in this publication conform to IEC 81346-1*

# Description of the unit

## Mechanical design

### Casing of the SILVER C RX/PX/CX

Composed of flush-mounted cover panels and inspection doors. External galvanised sheet steel, pre-painted with corrosion-resistant paint in Swegon's own grey metallic (closest comparable RAL, 9007). Internally Magnelis-treated, recycled and renewably produced sheet steel with a low CO<sub>2</sub> footprint. The entire housing is made of sheet steel with a surface treatment that meets environment class C5 requirements. Panel thickness 52 mm with intermediate mineral wool insulation that is fire class A1-compliant.

The inspection doors are hung on hinges and are fitted with flush-mounted door handles. The door handles must be opened in two steps to equalise the pressure before the door can be opened completely.

### Casing performance as per EN 1886

The housing's construction offers a high tightness class, minimised thermal bridges and high thermal insulation.

Casing air leakage: L1(M).

Thermal bridges: TB2.

Thermal transmission: T2.

Mechanical strength: D1.

Filter leakage: F9.

Fire-resistance class insulation: A1

### Applicable to sizes 004/005 and 007/008 inside a common casing:

Common casing with two inspection doors. One of the door handles of each inspection door can be locked.

Circular duct connections for insertion joints fitted with a rubber seal ring as standard.

The SILVER C RX with rotary heat exchanger can be mounted on base beams, a foundation or on a stand. Pre-fitted base beams are obtainable as optional equipment; a stand supplied unmounted is available as an accessory.

SILVER C PX units with counterflow heat exchanger are supplied with base beams. A set of legs (four legs) to be secured with screwed into the base beams is available as an accessory.

### Applicable to sizes 004/005 and 007/008 in split version as well as size 011-120:

The basic arrangement of the size 004-080 units consists of three unit sections (two fan/filter sections and one heat exchanger section). The size 100/120 units consist of five (RX) or six (CX) sections.

Each section/unit section has one or two inspection doors. One of the handles for each one of both outer inspection doors is lockable. On the size 120 units, the inspection door of the heat exchanger section (SILVER C RX) is also lockable.



SILVER C RX, size 008



SILVER C PX, size 030

The size 014-120 units are equipped with rectangular duct connections for slip-clamp jointing as standard. The size 004-012 units are equipped with circular duct connections for insertion joints fitted with a rubber seal ring as standard.

The unit is equipped with base beams.

# Description of the Air Handling Unit

## Mechanical Design

### Casing of the SILVER C SD

Composed of flush-mounted cover panels and inspection doors. External galvanised sheet steel, pre-painted with corrosion-resistant paint in Swegon's own grey metallic (closest comparable RAL, 9007). Internally Magnelis-treated, recycled and renewably produced sheet steel with a low CO<sub>2</sub> footprint. The entire housing is made of sheet steel with a surface treatment that meets environment class C5 requirements. Panel thickness 52 mm with intermediate mineral wool insulation that is fire class A1-compliant.

The inspection doors are hung on hinges and are fitted with flush-mounted door handles. The door handles must be opened in two steps to equalise the pressure before the door can be opened completely.

### Casing performance as per EN 1886

The housing's construction offers a high tightness class, minimised thermal bridges and high thermal insulation.

Casing air leakage: L1(M).

Thermal bridges: TB2.

Thermal transmission: T2.

Mechanical strength: D1.

Filter leakage: F9.

Fire-resistance class insulation: A1

### Applicable to sizes 004-012, common casing:

Composed of one or two sections depending on the variant selected. Possible variants are fan (with space for a filter) or fan (with space for a filter) + coil heat exchanger.

The fan section casing has one (sizes 004-008) or two (sizes 012) inspection doors. The handles are lockable.

Space for a pleated filter of filter class ePM10 60% (M5) or ePM1 50% (F7) is available and can be ordered as an accessory.

Circular duct connections for insertion joints fitted with a rubber seal ring as standard.

The SILVER C SD size 004-008 without coil heat exchanger can be mounted on base beams, a foundation or on a stand. Prefitted base beams are obtainable as optional equipment; a stand supplied unmounted is available as an accessory.

SILVER C SD size 004-008 with coil heat exchanger and SILVER C SD size 11/12 is equipped with base beams.

### Applicable to sizes 004-012, split version and size 014-120:

Composed of one to three sections depending on the variant selected. Possible variants are fan, filter + fan or filter + coil heat exchanger + fan.

The sections for fan and filter have their own inspection door. One of the door handles of the outer inspection door can be locked.



Sizes 004/005 and 008



Size 030  
Version with coil heat exchanger shown.

The size 004-012 units are equipped with circular duct connections for insertion joints fitted with a rubber seal ring as standard. The size 014-120 units are equipped with rectangular duct connections for slip-clamp jointing as standard.

The unit is equipped with base beams.

# Description of the unit

## Mechanical design

### Fans

The direct-driven fans are of Wing+ type, unique axial-centrifugal fans with the focus on excellent power efficiency, uniform airflow and low noise level. The Wing+ is patented. Functional sections such as air coolers and bends can be connected directly against the air handling unit without appreciable pressure losses. This saves space in the fan room.

The fans are driven by highly efficient EC/PM motors with efficiency class IE5, which together with the motor control system (optional) give very high overall efficiency.

The fans are approved for continuous operation in temperatures of up to 40°C.

The fans are tested for, and can manage operation for one hour at 70°C.

The fan motors can be selected with or without motor control system (0-10 V or via Modbus communication for variable speed regulation) and the fans have measurement tapping for continuous measurement and regulation of the air flow.

The fans are effectively vibration-isolated from the casing by means of rubber bushings/flexible connections.

The fans are fixed in their positions by means of locking knobs/screws and clamping bands. These fasteners can easily be loosened, after which the entire fan assembly can be withdrawn for inspection and maintenance.

### Filters

The filter material is glass fibre. The filter holder has a filter locking system designed for effective sealing and complies with the requirements for bypass leakage to Class ePM1 85% (F9). All filters can be selected as ePM10 60% (M5) or ePM1 60% (F7) filters.

The separate SILVER C SD supply air and extract air handling units in sizes 004-012 in a common casing can have pleated filters as an option.

The units in other sizes/variants have bag filters of ample proportions on both the supply air and outdoor air sides.

### Pre-filter inside air handling units

As an optional extra, pre-filters can be mounted inside the air handling unit to special order (does not apply to the type RX Top units).

The pre-filter is used in ventilation systems, in which the extract air and/or the outdoor air is heavily polluted and it is desirable to prevent the fine filter inside the SILVER C unit from becoming clogged after a short period of use.

The filters are of woven aluminium type or Class Coarse 65% (G4) compact filters.

Hose nipples for measuring the pressure drop across filters are provided.





## Description of the unit

### Mechanical design

#### Heat exchanger

##### Rotary heat exchanger

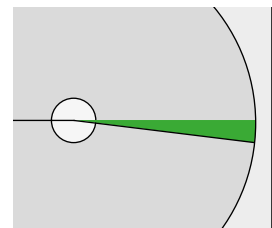
Rotary heat exchanger RECOeconomic regulates the heating requirement by automatically and variably controlling the speed of the heat exchanger. Motor control system (0 -10 V or via Modbus) is included.

The rotary heat exchanger is available in three versions, MPE (Maximum Pressure Efficiency), STE (Standard Temperature efficiency) and MTE (Maximum Temperature Efficiency). In the MPE version, the focus is on low pressure drop across the heat exchanger and in the MTE version the maximum temperature efficiency is prioritised. In the STE version, the heat exchanger is a balance between pressure drop and temperature efficiency, which means a lower pressure drop than in the MTE version and a higher temperature efficiency than in the MPE version.

The rotary heat exchanger effectively recovers cooling energy as well.

It is available in a sorption version (RECOsorpctic) for moisture recovery, which reduces operating and investment costs for cooling and improves indoor comfort levels in the winter, as well as in an epoxy-treated version.

Purging sector, commissioning plates and pressure measurement tappings as standard, ensure that the extract air will not be carried over to the supply air.



*Renblåsningssektor*

## Description of the unit

### Mechanical design

#### Counterflow heat exchanger

The counterflow heat exchanger is as standard equipped with bypass dampers and heat exchanger dampers, including mounted damper actuators.

The counterflow heat exchanger is available in two versions: Normal efficiency (MPE, Maximum Pressure Efficiency) and high efficiency (MTE, Maximum Temperature Efficiency) respectively. In the MPE version, the focus is on low pressure drop across the heat exchanger. In the MTE version, priority is given to high temperature efficiency.

Internal leakage between air streams conforms to the provisions of Ductwork leakage class L2.

Controls for section defrosting and temperature sensors can be obtained as an accessory.



#### Coil heat exchangers

The coil heat exchanger is supplied in empty condition from the factory. Unmounted pipework package is available as accessory.

## Description of the unit

### Mechanical design

#### Duct connections

Are for sizes 004/005, 007/008 and 011/012 circular and designed for connection to ducts with nipples fitted with a rubber ring seal. Duct bends fit directly into duct connections. The duct connections are horizontally and vertically offset to enable ducts to be run in any direction without being in the way of one another.

The size 014-120 units have rectangular duct connections with a fixed connection frame for slip-clamp joint connection. Type METU connection frames are available as an accessories.

SILVER C RX/PX are also available in a top-fed variant, SILVER C RX/PX Top, with all the duct connections upward. SILVER C RX/PX Top is available in sizes 004-030.

To further reduce pressure losses, a full face end connection with larger rectangular duct connection is also offered as an accessory (all sizes).

The Wing+ fans of the unit produce a uniform airflow immediately downstream of the outlet, making it possible to connect duct bends and functional sections, such as air coolers, directly against the unit without appreciable pressure losses.

If insulated duct accessories are selected, they should be docked directly against the air handling unit. The air handling unit is then supplied without end connection panel for the relevant inlet/outlet.

#### Commissioning plates (Applies to SILVER C with rotary heat exchanger only)

To ensure that purging through the heat exchanger works as intended, the unit is supplied with commissioning plates. Using these, the correct pressure balance can be set so that the purging airflow passes in the right direction.

The commissioning plates are supplied uninstalled, and must be positioned at the extract air inlet of the unit.

#### Environmental Product Declaration

Swegon AB has a certified environmental management system that conforms to ISO 14001 Standard and is registered on the REPA Register, no. 5560778465.

A Building Material Declaration with a complete list of constituent materials is available on Swegon's home page.



*Circular duct connections*



*Circular duct connections  
SILVER C RX Top*



*Rectangular duct connections*



*Rectangular duct connection  
SILVER C RX Top*

### Wiring

On the size 004-020 SILVER C RX units, the electrical and control equipment must be wired via the junction hood on the top of the air handling unit.

On all the other variants/sizes, the electrical and control equipment must be wired via the panel on the centre section of the air handling unit.

#### Use of an earth fault circuit breaker

The earth fault circuit breaker, if required, should only serve the air handling unit and must be of a type designed for use with the control system of the EC motor.

#### Power supply to junction box

Power supply to junction box (accessory) can be selected for the SILVER C RX 004-120, PX 004-030, CX 035-040 and SD 004-080. Depending on the variant/size selected, the wiring terminals are located on the DIN rail in the air handling unit's junction box or in the electrical equipment cubicle in the center section of the AHU.



## Description of the unit

### Delivery Version

#### **RX/PX/CX, sizes 004-080**

The SILVER C RX/PX/CX units are composed of unit sections.

The unit sections are as follows:

- Fan/filter section
- Heat exchanger section (RX, PX, CX and RX/HC respectively)
- Air recirculation section
- Air bypass section
- Multisection
- Duct crossover section (PX)

The basic arrangement of the SILVER C RX/PX/CX units consists of two fan/filter sections and one heat exchanger section. The other air handling unit sections are optional, see also the section entitled Complements and Accessories.

The unit sections in an air handling unit arrangement are delivered separately or already fitted together with one or several other unit sections as specified below:

- The fan/filter section with the fan in the upper section is always supplied already fitted together with another unit section, with the exception of CX (all sizes) and RX/HC size 014-080.
- The heat exchanger section, RX, is always supplied already fitted together with another unit section.
- The air recirculation, air bypass, multi and duct crossover sections are always supplied already fitted together with another unit section, with the exception of size 035/040.
- The max. length of a delivery unit is 3,000 mm.
- An air handling unit arrangement may at most to be divided into four delivery units (sizes 004-060).

See also Swegon's air handling unit software: AHU Design.

## Description of the unit

### Possible combinations for air direction, PX Top, size 004-008

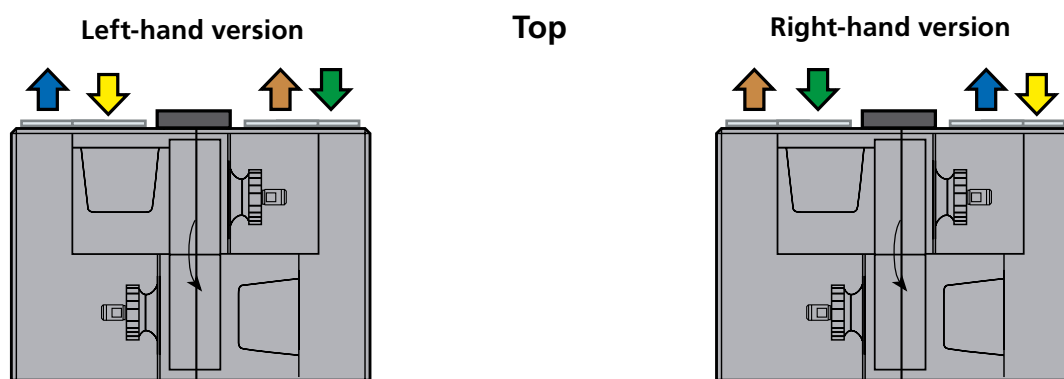
SILVER C RX Top 004-008 can also be delivered as L-concept with top fed duct connections in combination with side fed duct connections.

For the L-concept the side fed duct connections are to have the same performance as a side fed standard RX in a

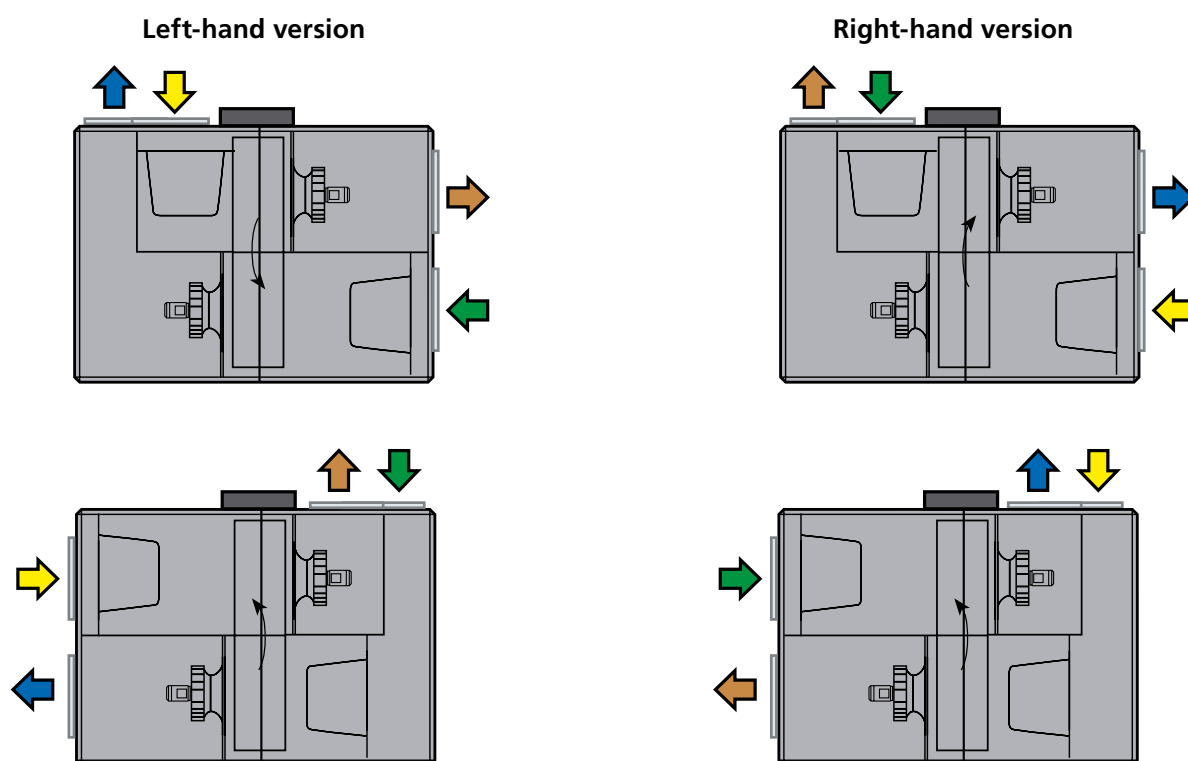
common casing, and top fed duct connections the same performance as a RX Top, see the section Sizing, installation, measurements and weight for SILVER C RX.



Dimensions and weight deviate, see the following page.

#### Basic variant



#### Possible combinations of air directions



 Outdoor air
  Supply air
  Extract air
  Exhaust air

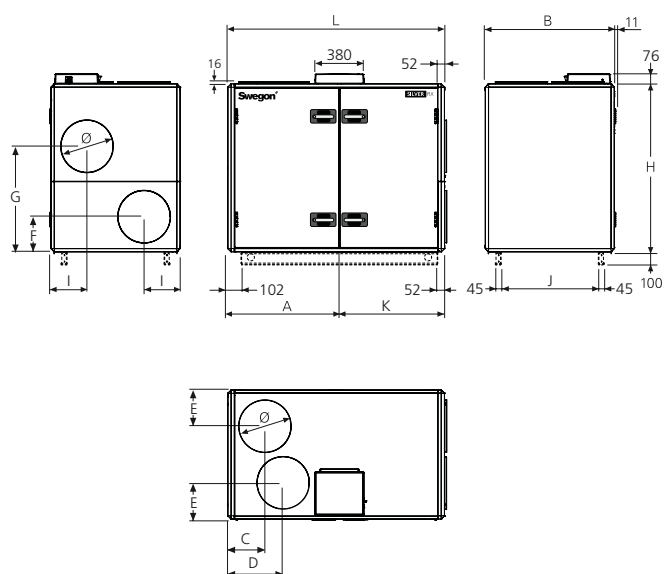
## Description of the unit

### Possible combinations for air direction, PX Top, size 004-008

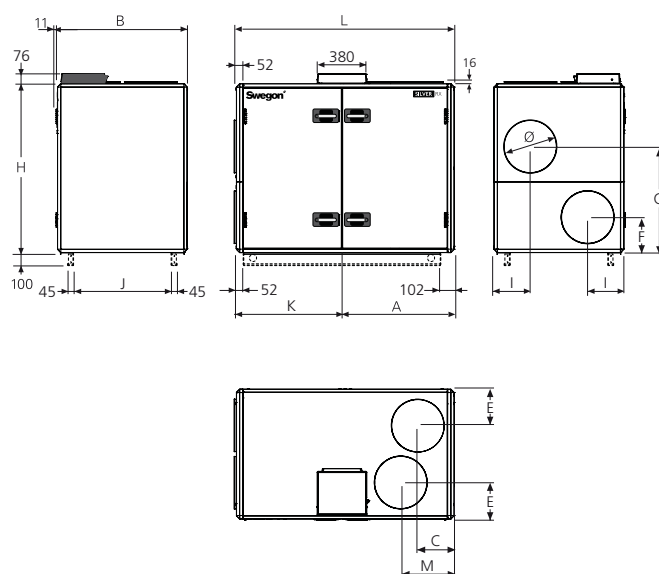
#### Dimensions

Diagrams show the L-concept with top fed duct connections in combination with side fed duct connections.

Top fed left, side fed right



Top fed right, side fed left



Size	A	B	C	D	E	F	G	H	I	J	K	L	M	Ø	Weight, kg
004	800	825	238	393	237	230	690	1085	240	579	750	1550	393	315	288-295
005	800	825	238	393	237	230	690	1085	240	579	750	1550	393	315	288-303
007	860	995	286	426	280	271	814	1295	278	749	810	1670	406	400	346-364
008	860	995	286	426	280	271	814	1295	278	749	810	1670	406	400	360-370

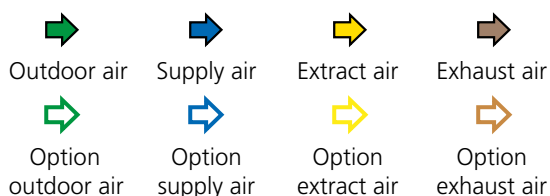
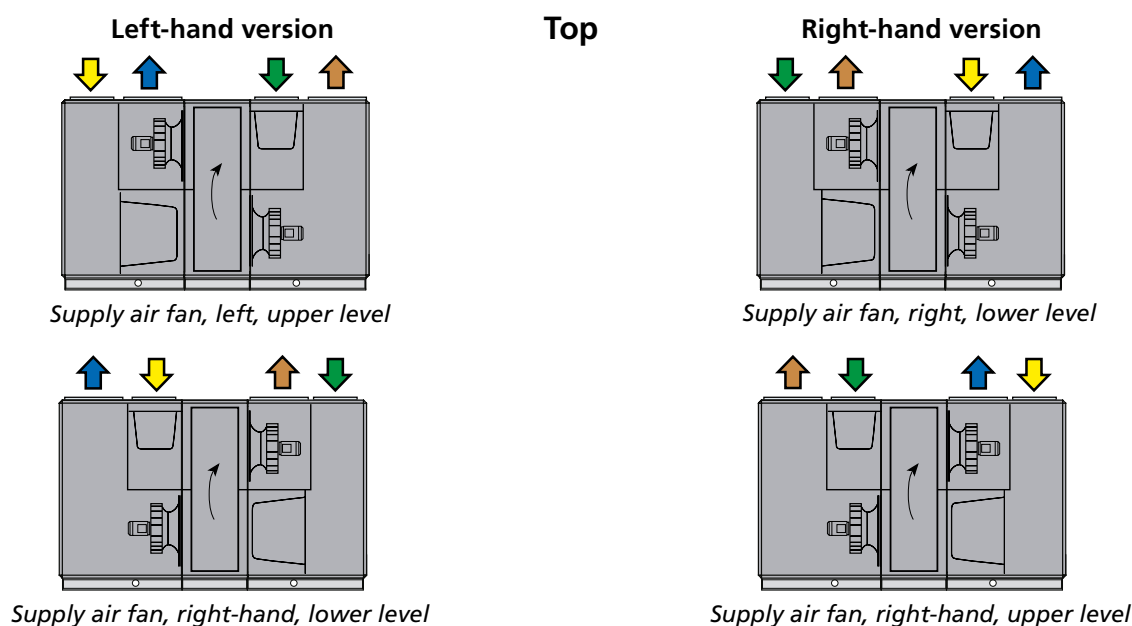
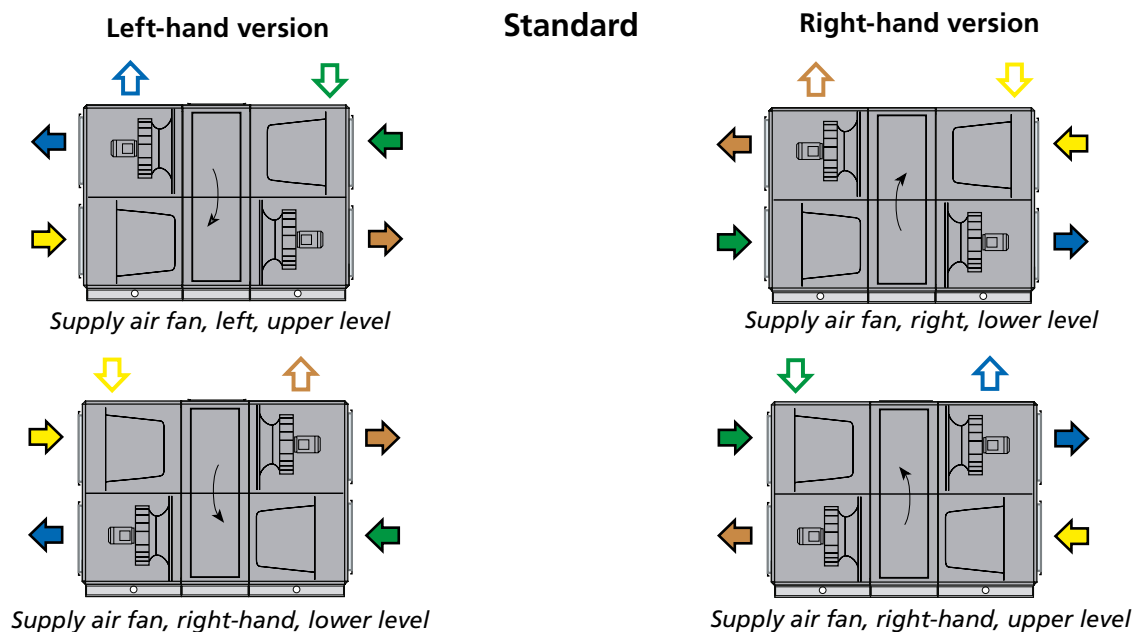
## Description of the unit

### Possible combinations for filter/fan sections, RX, size 011-030

Filter/fan sections for basic variants of standard RX and RX Top can be combined in a number of different ways, see below and the next page.

Note that performance, dimensions and weight are different depending on whether the filter/fan section is RX standard or RX Top, see section Sizing, installation, dimensions and weights for SILVER C RX.

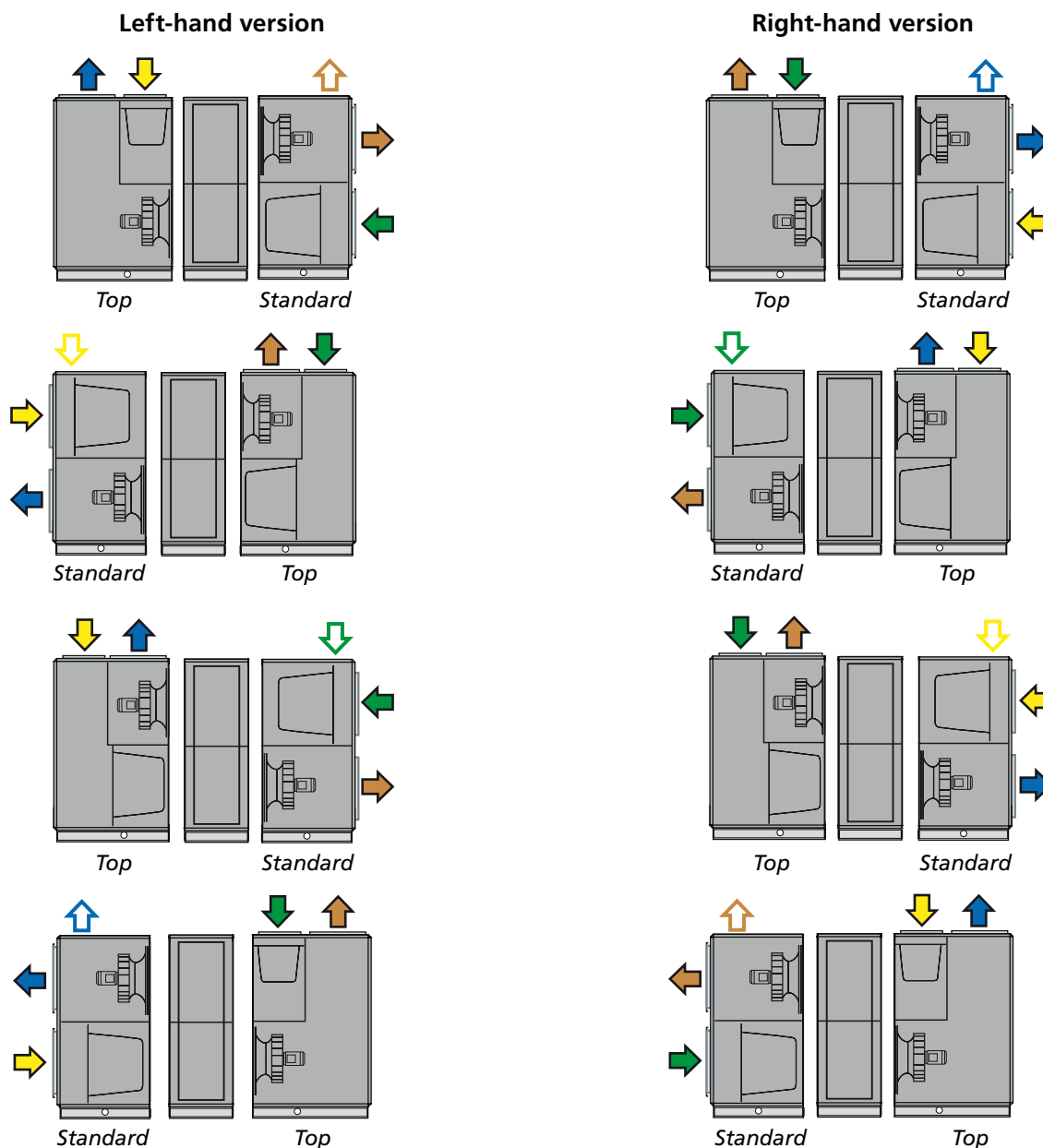
#### Basic variants



# Description of the unit

## Possible combinations for filter/fan sections, RX, size 011-030

### Combinations



## Description of the unit

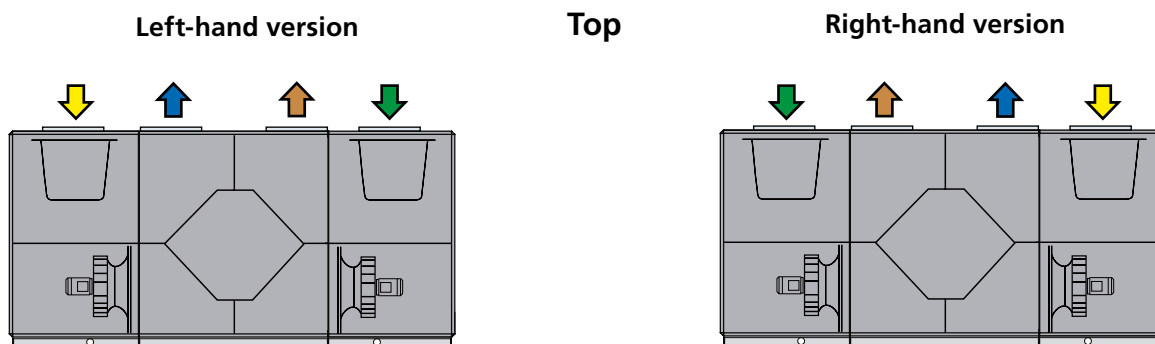
### Possible combinations for filter/fan sections, PX, size 004-008

PX Top size 004-008 has, from PX standard side fed air handling units, a deviating height measurement. However, it is possible to order a side-fed filter/fan section with a height measurement adapted to each size of PX Top.

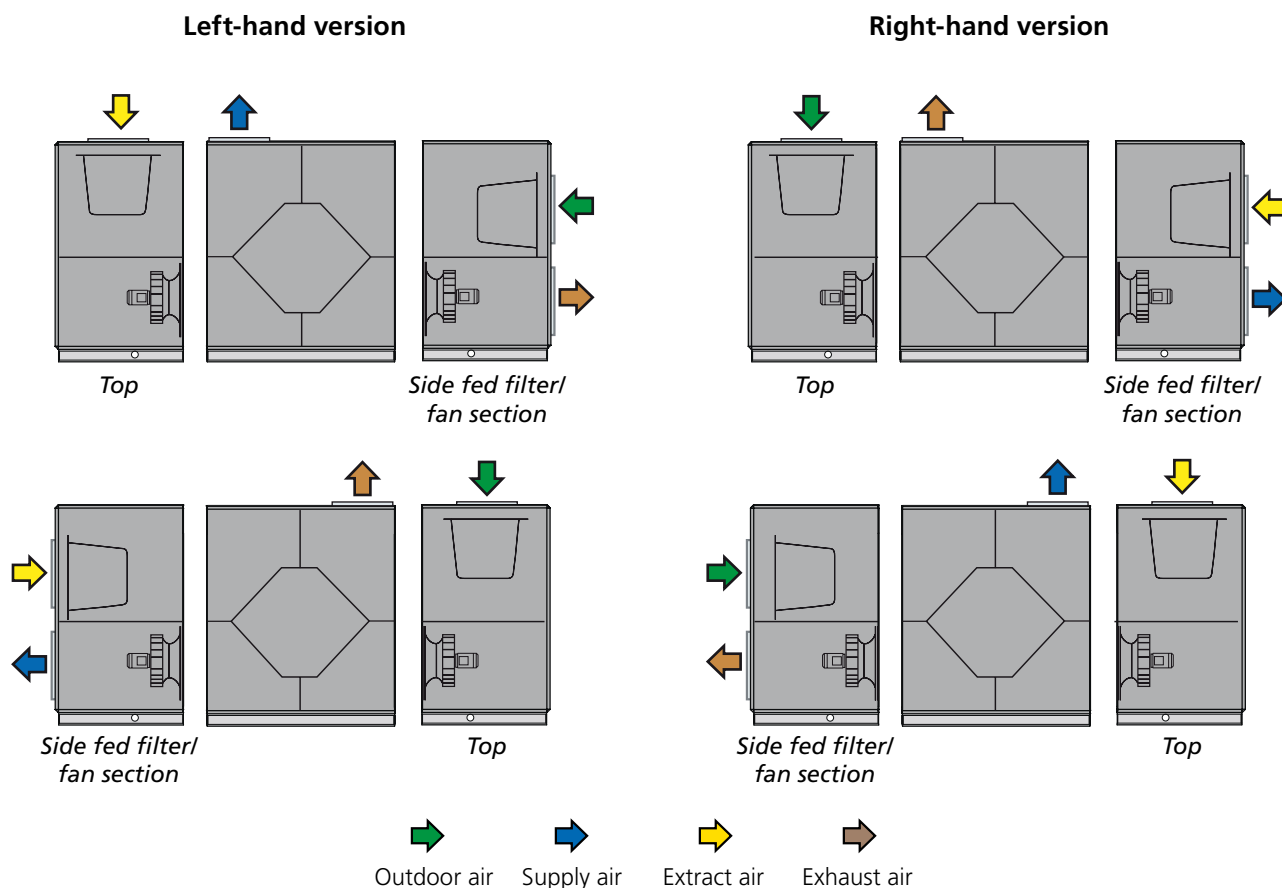
These side fed filter/fan sections have the same performance as a PX standard side fed filter/fan section, see the section Sizing, installation, dimensions and weights for SILVER C PX.

Dimensions and weight deviate, see the following page.

#### Basic variant



#### Combinations





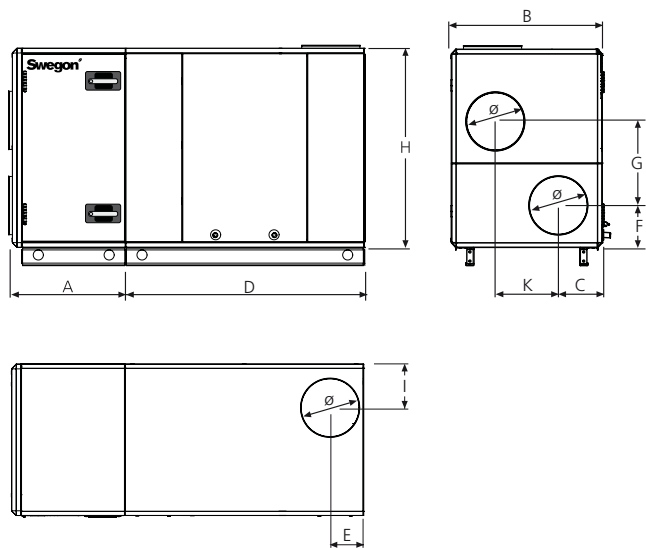
## Description of the unit

### Possible combinations for filter/fan sections, PX, size 004-008

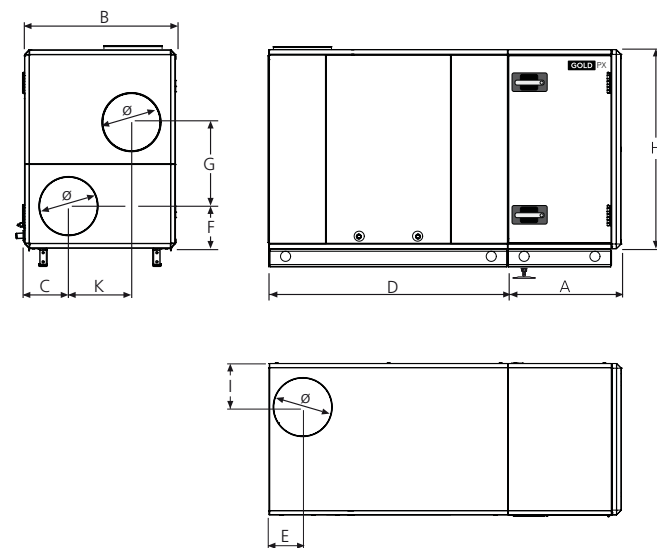
#### Dimensions

The diagrams show side fed filter/fan sections with a height measurement adapted to each size of PX Top and centre section.

Filter/fan section to the left of the centre section



Filter/fan section to the right of the centre section



SILVER C	A	B	C	D	E	F	G	H	I	K	Ø	kg*
004	617	825	240	1300	181	230	460	1085	238	345	315	93-115
005	617	825	240	1300	181	230	460	1085	238	345	315	93-119
007	647	995	278	1517	230	271	543	1295	278	440	400	112-150
008	647	995	278	1517	230	271	543	1295	278	440	400	119-154

\* Only filter/fan section

## Description of the unit

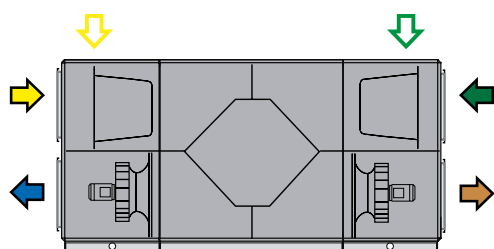
### Possible combinations for filter/fan sections, PX, size 011-030

Filter/fan sections for basic variants of standard PX and PX Top can be combined in a number of different ways, see below and the next page.

Note that performance, dimensions and weight are different depending on whether the filter/fan section is PX standard or PX Top, see section Sizing, installation, dimensions and weights for SILVER C PX.

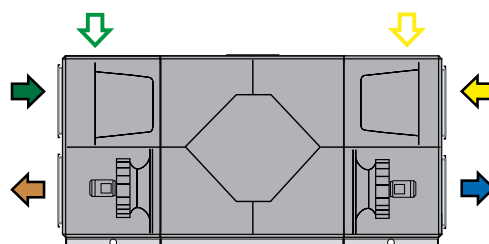
#### Basic variants

Left-hand version

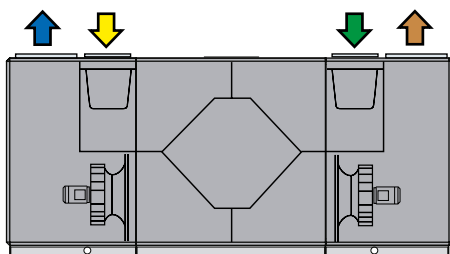


Standard

Right-hand version

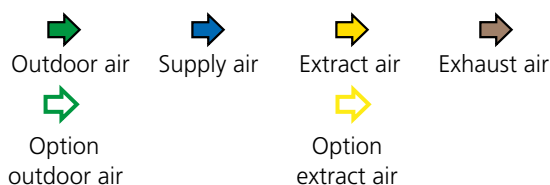
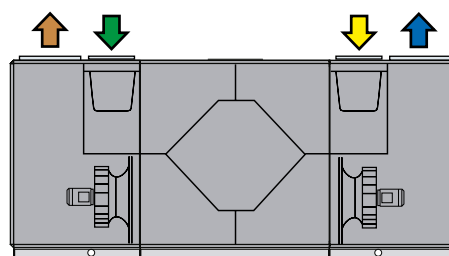


Left-hand version



Top

Right-hand version

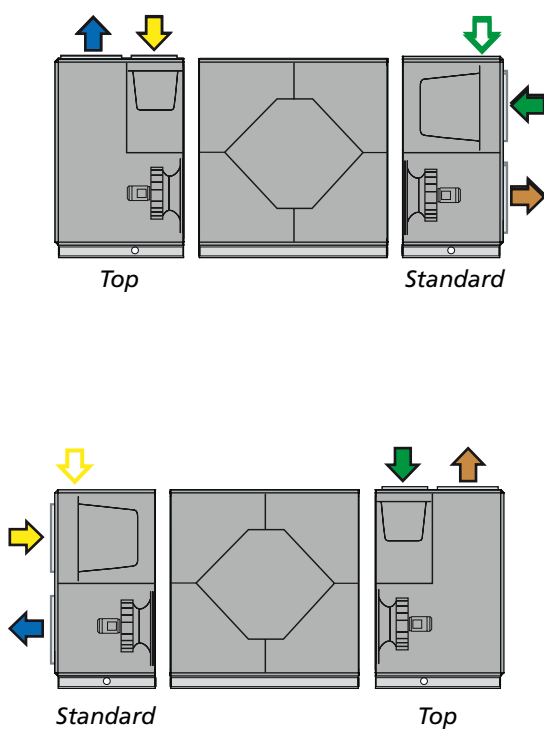


## Description of the unit

Possible combinations for filter/fan sections, PX, size 011-030

### Combinations

Left-hand version



Right-hand version

