Topvex FC

Compact Air Handling Unit

GB Installation instructions

Document in original language

125917-EN_GB
2015-03-16 A001

Contents

1 Declaration of Conformity

Manufacturer

Systemair AB
Industrivägen 3
SE-739 30 Skinnskatteberg SWEDEN Office:
+46 222 440 00 Fax: +46 222 440 99

hereby confirms that the following products:

Air handling units

Topvex FC02 EL	Topvex FC02	Topvex FC02 HWL	Topvex FC02 HWH
Topvex FC04 EL	Topvex FC04	Topvex FC04 HWL	Topvex FC04 HWH
Topvex FC06 EL	Topvex FC06	Topvex FC06 HWL	Topvex FC06 HWH

(The declaration applies only to product in the condition it was delivered in and installed in the facility in accordance with the included installation instructions. The insurance does not cover components that are added or actions carried out subsequently on the product)

Comply with all applicable requirements in the following directives

- **Machinery Directive 2006/42/EC**
- **Low Voltage Directive 2006/95/EC**
- **EMC Directive 2004/108/EC**

The following harmonized standards are applied in applicable parts:

EN ISO 12100:2010	Safety of machinery - General principles for design - Risk assessment and risk reduction
EN 13857	Safety of machinery – Safety distances to prevent hazard zones being reached by upper or lower limbs
EN 60204-1	Safety of machinery – Electrical equipment of machines – Part 1: General requirements
EN 60335-1	Household and similar electrical appliances – Safety Part 1: General requirements
EN 60335-2-40	Safety of household and similar electrical appliances - Part 2-40: Particular requirements for electrical heat pumps, air-conditioners and dehumidifiers
EN 50106:2007	Safety of household and similar appliances – Particular rules for routine tests referring to appliances under the scope of EN 60 335-1 and EN 60967
EN 60529	Degrees of protection provided by enclosures (IP Code)
EN 62233	Measurement methods for electromagnetic fields of household appliances and similar apparatus with regard to human exposure
EN 61000-6-2	Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity for industrial environments
EN 61000-6-3	Electromagnetic compatibility (EMC) – Part 6-3: Generic standards – Emission standards for residential, commercial and light-industrial environments

The complete technical documentation is available.

Skinnskatteberg, 12-03-2015

Mats Sándor
Technical Director

2 Warnings

The following admonitions will be presented in the different sections of the document.

⚠ Danger

- Make sure that the Mains supply to the unit is disconnected before performing any maintenance or electrical work!
- All electrical connections must be carried out by an authorized installer and in accordance with local rules and regulations.

⚠ Warning

- The door handles are only intended to be used during the installation and service. These must be removed before the unit is put into operation to ensure the required level of safety for the unit.

  The unit must be duct connected or in some other way provided with protection so that it is not possible to come in contact with the fans through the duct connections
- The unit is heavy. Be careful during transport and mounting. Risk of injury through pinching. Use protective clothing.
- Beware of sharp edges during mounting and maintenance. Make sure that a proper lifting device is used. Use protective clothing.
- The units electrical connection to the mains supply must be preceded by an all pole circuit breaker with a minimum 3 mm gap.

Caution

- If the unit is installed in a cold place make sure that all joints are covered with insulation, and tape well
- Duct connections/duct ends should be covered during storage and installation
- Do not connect tumble dryers to the ventilation system
- Take care not to damage the water battery when connecting water pipes to connectors. Use a spanner to tighten the connection.

3 Product information

3.1 General

This installation manual concerns air handling unit type Topvex FC manufactured by Systemair AB. The units include the following model options:

- **Model:** Topvex FC02, Topvex FC04, Topvex FC06
- **Heating coil: EL** (Electric), **HWL** (Water coil, low power), **HWH** (Water coil, high power) or **None**.
- **Right or left models: R** (Right) **L** (Left). The side where the supply air is located when facing the electrical box when the unit is installed.
- **Airflow control (as accessories): CAV** – Constant Air Volume, **VAV** – Variable Air Volume = Constant duct pressure control

This manual consists of basic information and recommendations concerning the design, installation, start-up and operation, to ensure a proper fail-free operation of the unit.

The key to proper and safe operating of the unit is to read this manual thoroughly, use the unit according to given guidelines and follow all safety requirements.

3.2 Technical data

3.2.1 Dimensions and weight

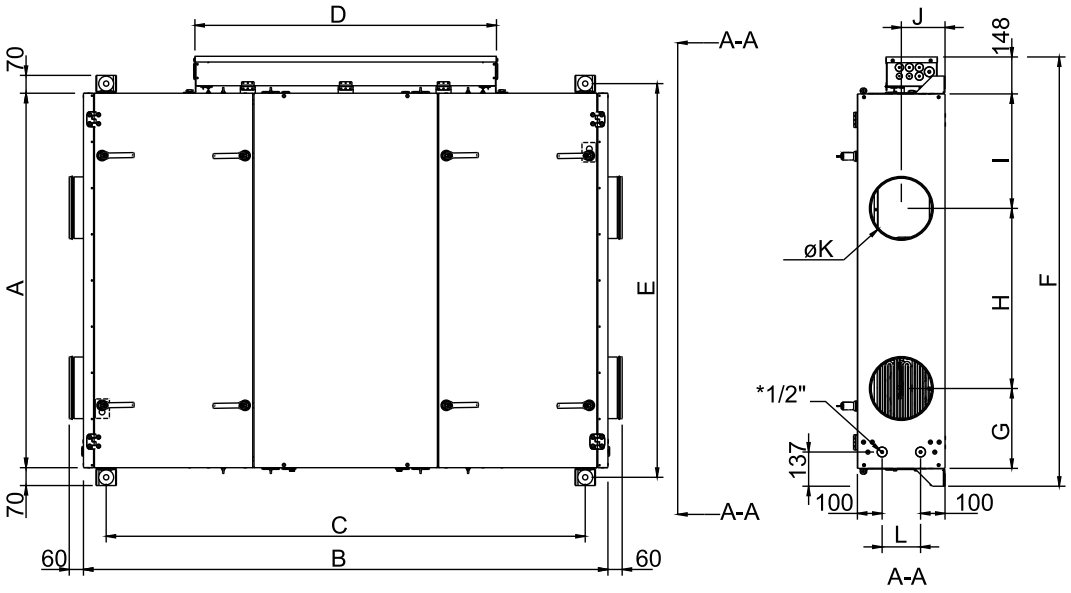


Fig. 1 Dimensions Topvex FC02 (mm) drawn as right hand unit

* = male

Model	A	B	C	D	E	F
Topvex FC02	1500	2101	1919	1208	1577	1720

Model	G	H	I	J	øK	L	Weight, kg
Topvex FC02	320	722	459	175	250	154	350

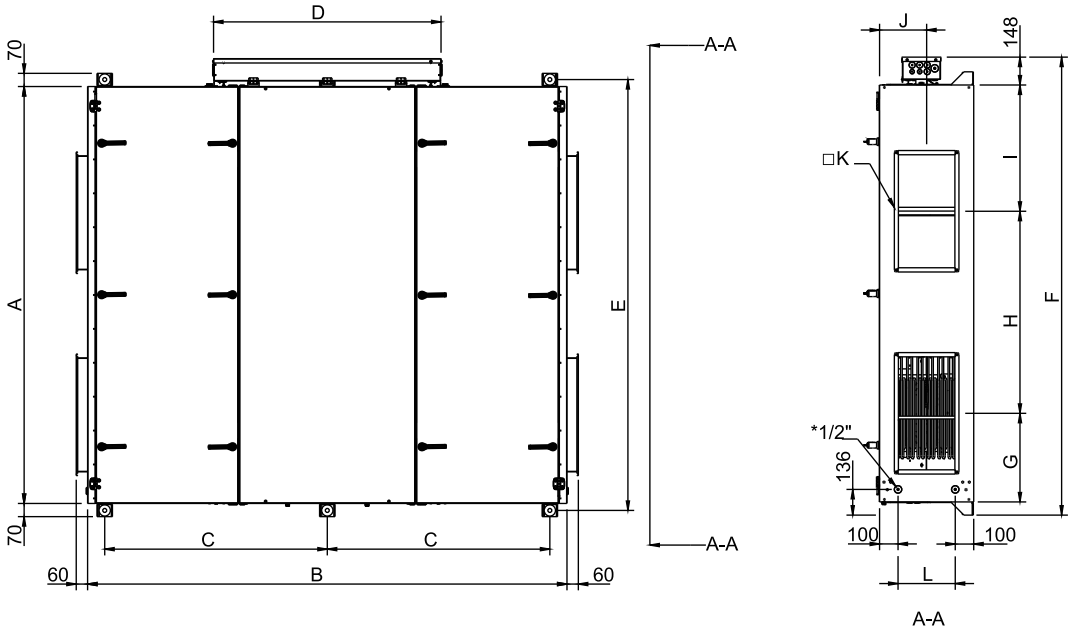


Fig. 2 Dimensions Topvex FC04, Topvex FC06 (mm) drawn as right hand unit

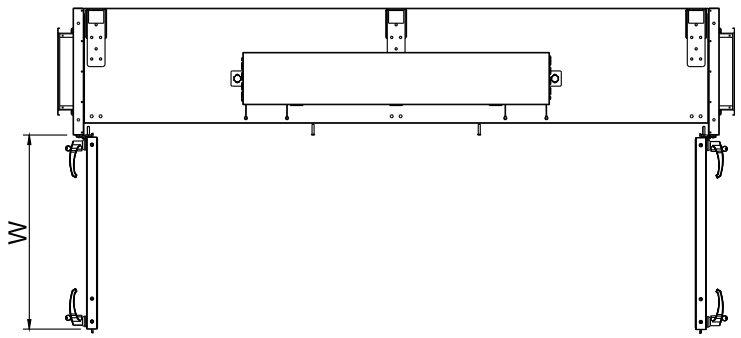
* = male

Model	A	B	C	D	E	F
Topvex FC04	2024	2561	1190	1204	2098	2242
Topvex FC06	2214	2546	1182	1208	2288	2432

Model	G	H	I	J	□K	L	Weight, kg
Topvex FC04	516	979	600	200	250x500	200	480
Topvex FC06	471	1073	671	250	300x600	300	550

3.2.1.1 Space required

Image shows Topvex FC06



Model	W (mm)
Topvex FC02	644
Topvex FC04	774
Topvex FC06	765

In case the sliding door application is installed the required space corresponds to the height of the sliding door support bars (60 mm).

3.2.2 Electrical data Topvex FC

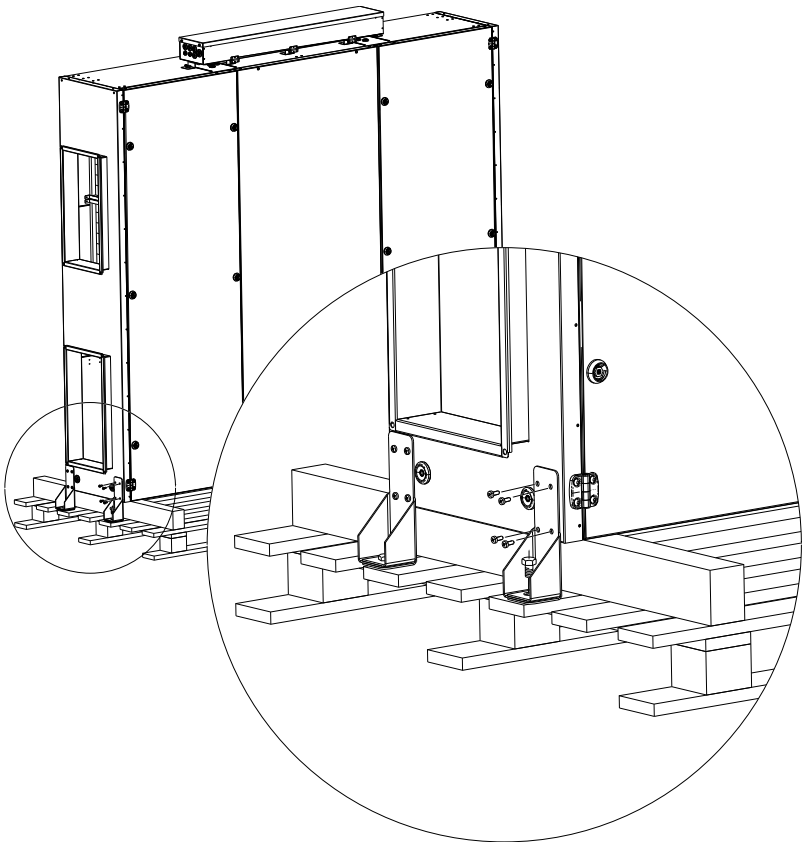
Model	Fans (W tot.) 230V 1~ and 400 V 3N~	El Heating battery (kW tot.)	Fuse (mains) (A) for 230 V 1~ and 400 V 3~
Topvex FC02 EL	1040	5	3x13
Topvex FC02 None, HWL, HWH	1040	-	10
Topvex FC04 EL	1536	10	3x25
Topvex FC04 None, HWL, HWH	1536	-	10
Topvex FC06 EL	5134	16	3x35
Topvex FC06 None, HWL, HWH	5134	-	3x10

3.3 Transport and storage

Topvex FC is delivered in one piece standing on a pallet for easy transportation using a forklift. The unit should be stored and transported in such a way that it is protected against physical damage that can harm panels, handles, display etc. It should be covered so that dust, rain and snow cannot enter and damage the unit and its components. The appliance is delivered complete with all necessary components, wrapped in plastic on a pallet for easy transportation.

At delivery the unit is fastened to the pallet with mounting brackets. Unscrew the brackets from the pallet and fastened them on the units upper side for roof installation. Do not lift the unit in the mounting brackets, they are only intended for mounting the unit in the roof.

When transporting the Topvex FC units use a forklift placed on the gable of the unit.



Note:

Necessary parts like control panel, supply air sensor, handles, **drainage pipe with drain trap** and electrical safety switch are placed loosely inside the unit. The unit must not be put into operation before the enclosed parts are removed and installed properly.

⚠ Warning

The unit is heavy. Be careful during transport and mounting. Risk of injury through pinching. Use protective clothing.

Be careful so the unit don't tip over.

4 Installation

4.1 Unpacking

Verify that all ordered equipment are delivered before starting the installation. Any discrepancies from the ordered equipment must be reported to the supplier of Systemair products.

4.2 Where/how to install

Topvex FC are meant for indoor installation. The electronic components should not be exposed to lower temperature than 0° C and higher than +50° C.

If the unit is installed in a cold place it is important that the unit is not shut-off by the main switch. As long as the main voltage is on the electrical cabinet will be kept warm also in cold climates. Although the unit is turned off by the control system the current is on.

When choosing the location it should be kept in mind that the unit requires maintenance regularly and that the inspection doors should be easily accessible. Leave free space for opening the doors and for taking out the main components (chapter 3.2.1.1.)

Note:

If there is not sufficient space to open the inspection doors, it is possible to mount rails and use existing doors as sliding doors (accessory) chapter 4.6.

The outdoor air intake of the building should if possible be put in the northern or eastern side of the building and away from other exhaust outlets like kitchen fan outcasts or laundry room outlets.

⚠ Warning

- The door handles are only intended to be used during the installation and service. Handles must be removed before the unit is put into operation to ensure the required level of safety for the unit.
- The unit must be duct connected or in some other way provided with protection so that it is not possible to come in contact with the fans through the duct connections

Caution

Do not lift the unit in the mounting brackets. Only intended for mounting in roof.

4.3 Condensation drain

The unit must be connected to the condensation drain. A transition, tube and drain trap are enclosed upon delivery. Connect the drainage on the units extract side (pos 2, figure 3). The drainage on the supply side (pos 1) must be connected if the unit will be used with cooling equipment or if it will run extensively where the outdoor climate is very humid. On left hand units the positions of the connection are reversed.

See table 1 how the height “H” corresponds to different maximum negative pressures.

If the unit is mounted in a tight area that makes it difficult to have the appropriate height, a pump is available as an accessory.

Note:

When installed in a non heated place the drain pipe and trap needs to be insulated well to prevent the water from freezing.

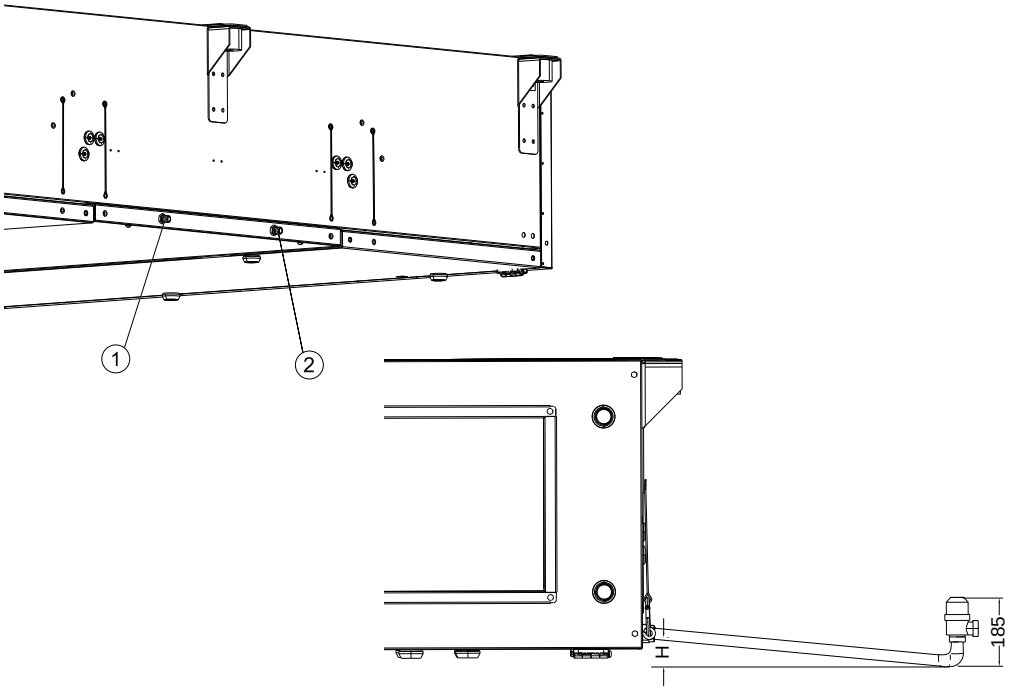


Fig. 3 Drainage connection, right hand unit

Table 1:

H (mm)	Max. Negative pressure (Pa)
65	300
95[1]	600
135	1000

1. *Normal conditions*

4.4 Installing the unit

The units are design for ceiling installation. Left and right connections are possible.

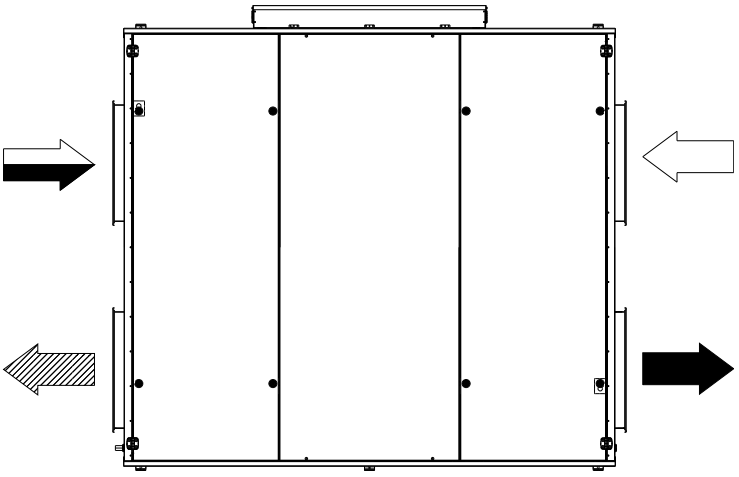


Fig. 4 Installing position, left hand unit

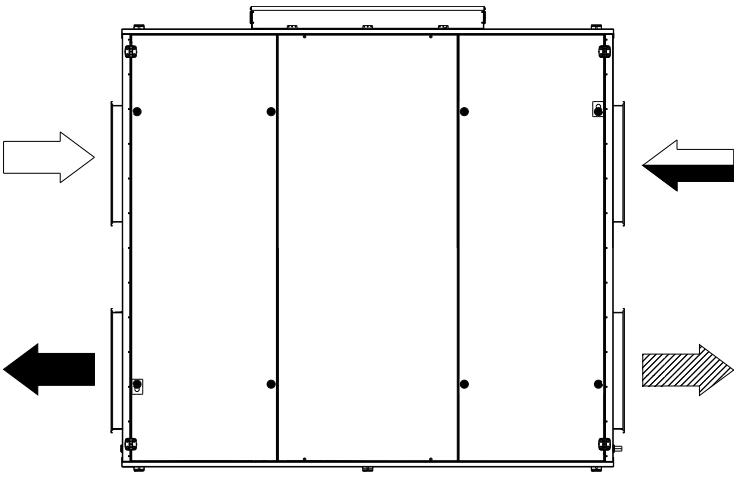


Fig. 5 Installing position, right hand unit

Table 2: Symbol description

Symbol	Description
	Supply air
	Exhaust air
	Outdoor air
	Extract air

4.4.1 Installation procedure

1

Prepare the surface where the unit is to be mounted. Make sure that the surface is flat, levelled and that it carries the weight of the unit. Perform the installation in accordance with local rules and regulations.

Install the unit with 0-3° lean towards drainage connections.

2

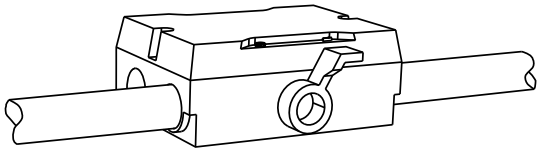
Lift the unit in place.

> **⚠ Warning**
>
> Beware of sharp edges during mounting and maintenance. Make sure that a proper lifting device is used. Use protective clothing.

3

Connect the unit electrically to the mains through the all pole circuit breaker (safety switch), which is enclosed inside the unit on delivery. The wiring is led directly to the electrical connection box. Consider that the electrical box can be tilted before leading the wire.

See enclosed wiring diagram, and chapter 4.7.2.2 for more information.



> **Warning**
>
> The units electrical connection to the mains supply must be preceded by an all pole circuit breaker with a minimum 3 mm gap.

> **⚠ Danger**
>
> - Make sure that the Mains supply to the unit is disconnected before performing any maintenance or electrical work!
> - All electrical connections must be carried out by an authorized installer and in accordance with local rules and regulations.

4.5 Supply air sensor

The supply air sensor is fitted in the duct ca. 3 m after the unit in the supply air duct (figure 6). See table 3 to which terminals the sensor needs to be connected in the electrical connection box. All other temperature sensors are built in to the unit from factory. The supply air sensor is enclosed in the unit package on delivery.

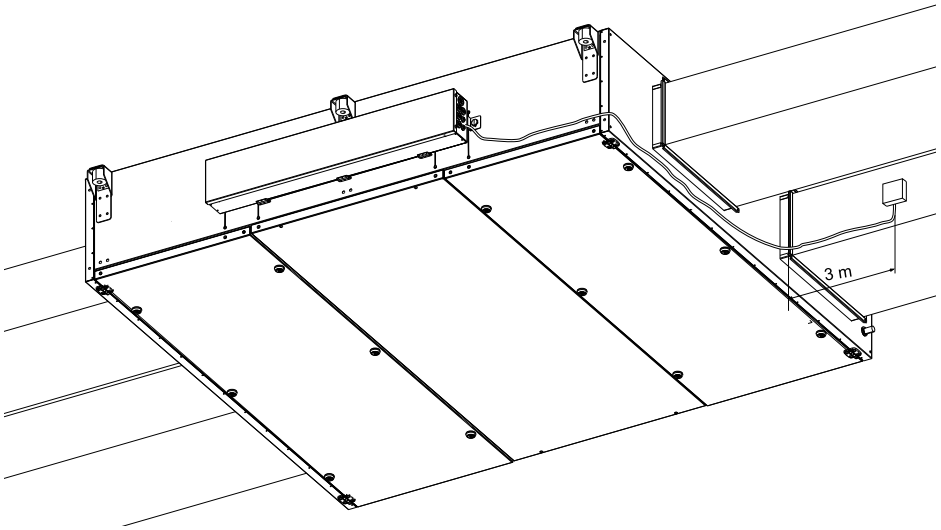


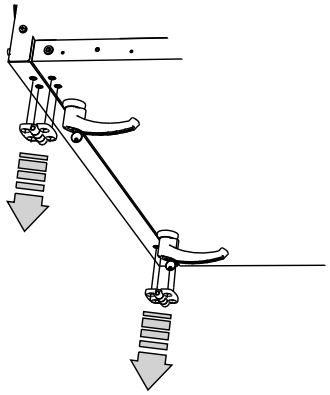
Fig. 6 Installed supply air sensor (right hand connected unit)

4.6 Mounting the sliding door kit

A sliding door kit for the inspections doors can be acquired as an accessory and can be mounted on the units. The kit is installed according to below procedure.

1 Hinges

Close the hatch with all 4 or 6 handles (depending on model) and unscrew the 2 hinges.

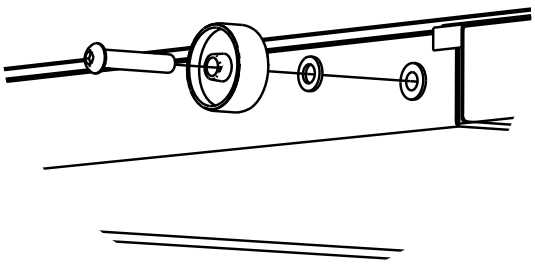


2 Repeat procedure

Repeat on the other hatch.

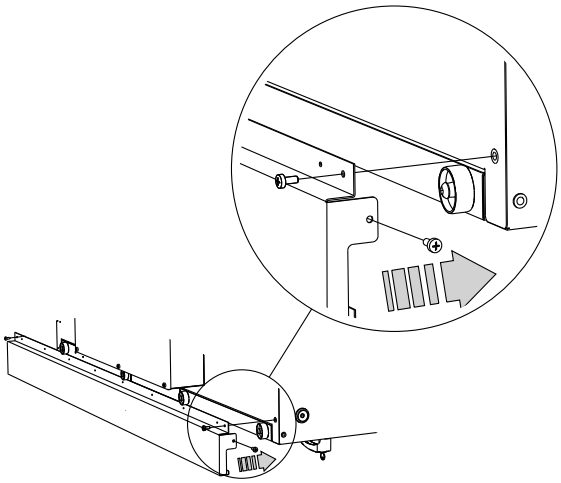
3 Mount the wheels

Mount the wheels in the prepared threaded inserts on the side of the inspection hatch with the enclosed screws and washers.



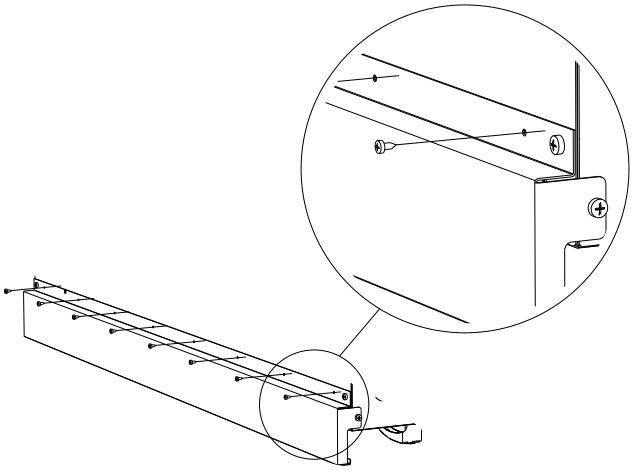
4 Sliding door support rails

Mount the sliding door rails on each side of the unit. Fasten it to the casing with screws in the prepared threaded inserts.



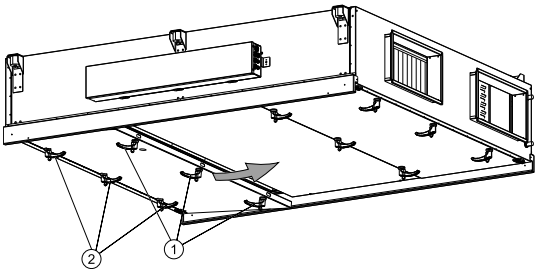
5 Fasten with BSS screws

Fasten the rail to the side of the casing with the enclosed BSS screws.



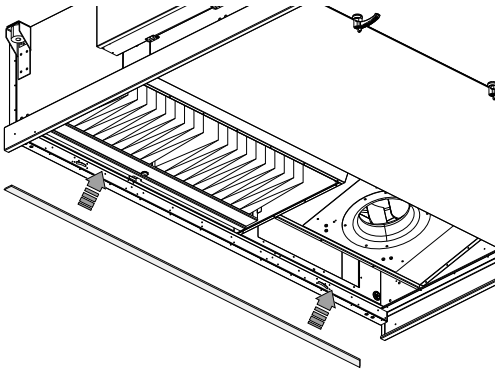
6 Open hatch

Open the hatch by unlocking the inner handles (pos. 1) followed by the outer handles (pos. 2). The hatch can now be pushed toward the centre of the unit. Only one hatch at the time can be opened like this.



7 Apply seal

Apply the enclosed self adhesive seal strip to the inner frame of the unit casing.



8 Close hatch

Close the hatch with the handles. Make sure the hatch closes properly.

Repeat the procedure on the other hatch.

9 Remove Handles

After the hatch is closed, the handles need to be removed before the unit is put in operation.

⚠ Warning

The door handles are only intended to be used during the installation and service. Handles must be removed before the unit is put into operation to ensure the required level of safety for the unit.

4.7 Connections

4.7.1 Ducting

4.7.1.1 Air connections principles

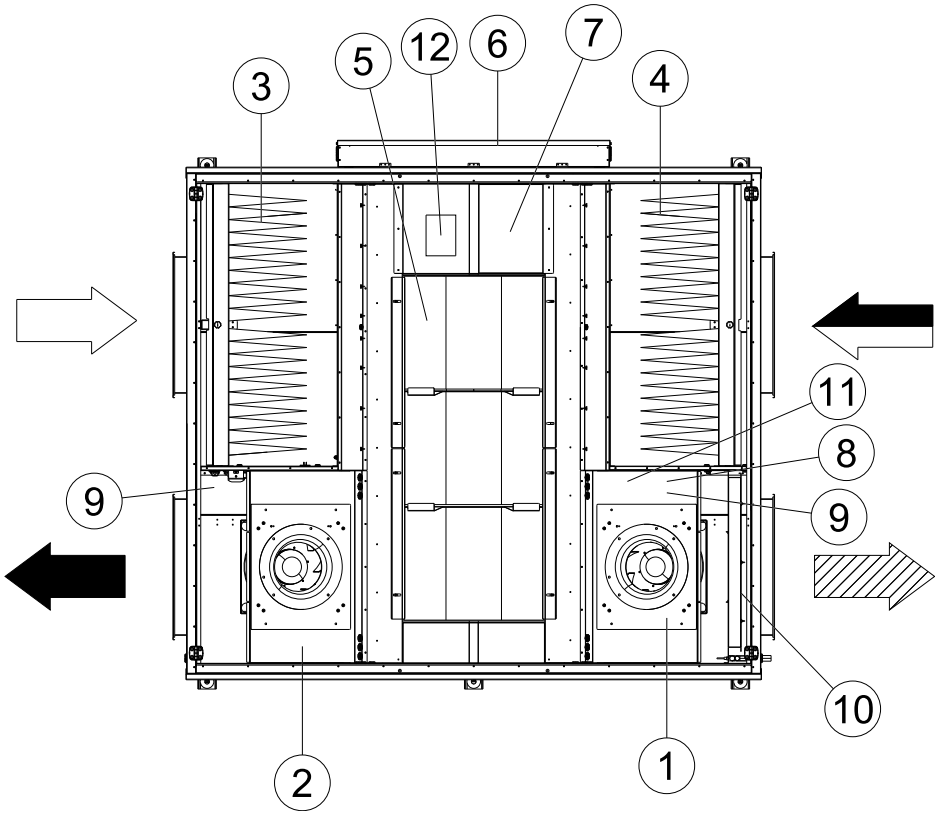


Fig. 7 Connections and basic components in right hand connected units

Position	Description	Symbol
A	Connection supply air	
B	Connection exhaust air	
C	Connection outdoor air	
D	Connection extract air	
1	Fan supply air	
2	Fan extract air	
3	Filter supply air	
4	Filter extract air	
5	Heat exchanger	
6	Electrical connection box	
7	Damper by-pass outdoor air	
8	Pressure transmitter fans (accessory)	
9	Pressure guard filter	
10	Re-heater battery	
11	Differential pressure sensor – airflow	
12	Differential pressure sensor – deicing	

4.7.1.2 Condensation and Heat Insulation

Outdoor air duct and discharge ducts must always be well insulated against condensation. Correct insulation installation on ducts connected to the unit is especially important. All ducts installed in cold rooms/areas must be well insulated. Use insulating covering (minimum 100 mm mineral wool) with plastic diffusion barrier. In areas with extremely low outdoor temperatures during the winter, additional insulation must be installed. Total insulation thickness must be at least 150 mm.

⚠ Caution

- If the unit is installed in a cold place make sure that all joints are covered with insulation, and tape well
- Duct connections/duct ends should be covered during storage and installation
- Do not connect tumble dryers to the ventilation system

4.7.1.3 Silencers

To avoid fan noise being transferred via the duct system, silencers should be installed both on supply and extract air.

To avoid noise being transferred between rooms via the duct system and also to reduce noise from the duct system itself, installation of silencers before every inlet diffuser is recommended.

4.7.2 Electric connections

All electric connections are made in the electrical connection box which can be found on the long side of the unit. The electrical box can be tilted for easy access by loosening the grip screw (figure 8, pos 1). The hatch is removed by unscrewing four screws (figure 8).

The unit must not be put into operation before all the electrical safety precautions have been read and understood. See the enclosed wiring diagram for internal and external wiring.

All external connections to possible accessories are made to terminals inside the electrical connection box (table 3).

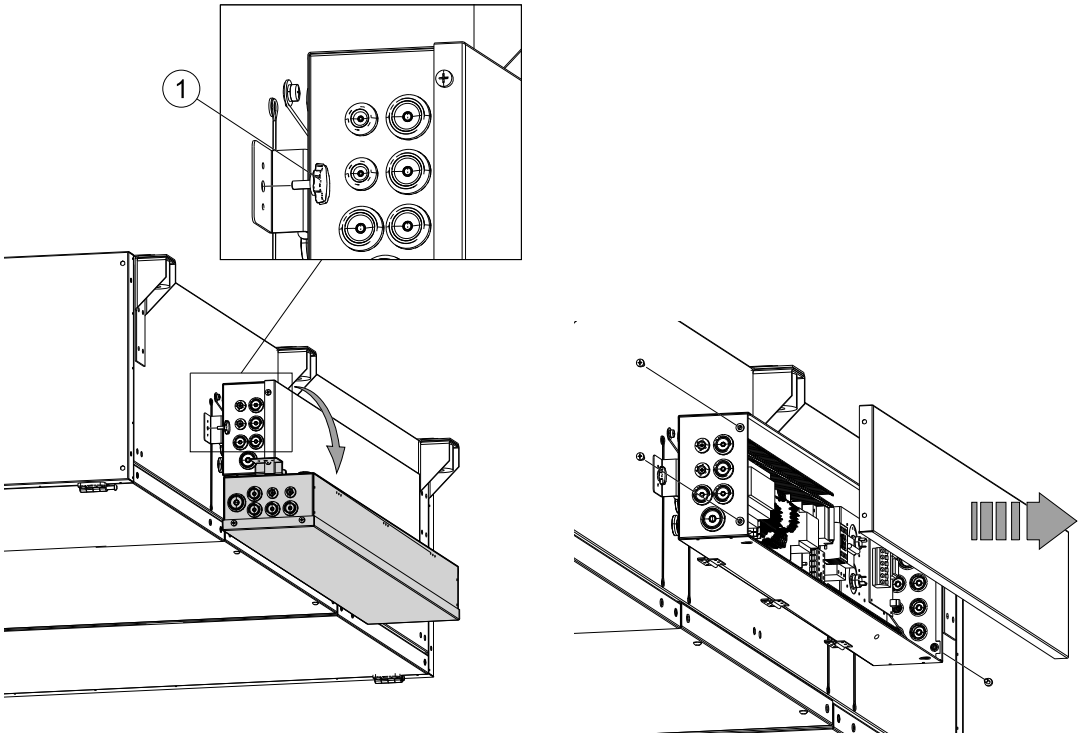


Fig. 8

⚠ Danger

- Make sure that the Mains supply to the unit is disconnected before performing any maintenance or electrical work!
- All electrical connections must be carried out by an authorized installer and in accordance with local rules and regulations.

⚠ Warning

The units electrical connection to the mains supply must be preceded by an all pole circuit breaker with a minimum 3 mm gap.

4.7.2.1 Electrical connection box, Components

Topvex FC is equipped with a built in regulator and internal wiring (figure 9).

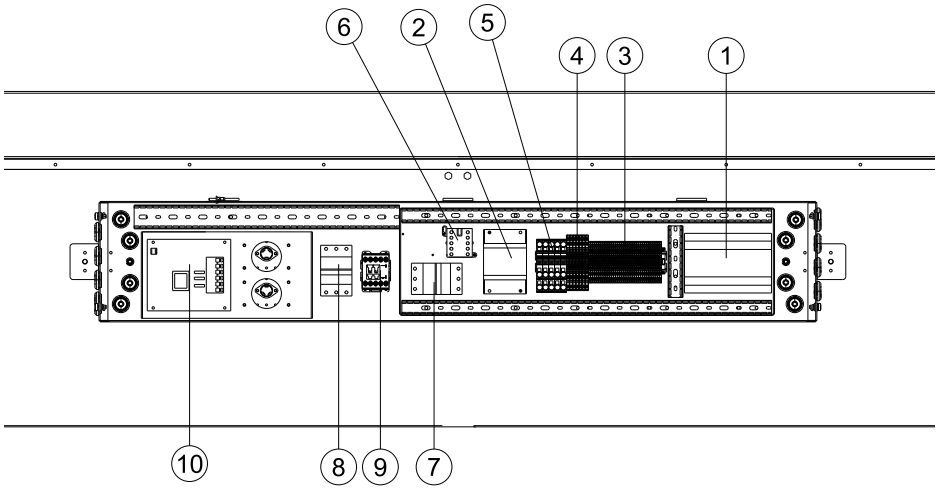


Fig. 9 Electric components

Position	Description
1	Regulator E-28
2	Transformer 230/24V AC
3	Terminals for internal and external components
4	Terminals for internal wiring
5	Terminals for mains supply to the unit
6	Contactor (K2) On/Off Pump control water (HW units only, not present in EL-units)
7	Automatic fuse
8	Automatic fuse for heater (EL units only)
9	Contactor (K3) EL heater (EL units only)
10	TTC El heater control (EL units only)

4.7.2.2 Topvex FC02-06 External Connections

Table 3: Connections to external functions

Terminal block		Description	Remark
	PE	Ground	
N	N	Earthed neutral (supply voltage)	
L1	L1	Phase (supply voltage)	Used for phase 230V 1~ if the unit has this mains supply 400V 3~
L2	L2	Phase (supply voltage)	400V 3~
L3	L3	Phase (supply voltage)	400V 3~
1	G	Mains supply (Water valve actuator)	24V AC
2	G0	Reference (Water valve actuator mains supply)	24V AC
10	DO ref	DO reference	G (24V AC)
12[1]	DO 2	Outdoor/Exhaust air damper	24V AC Max. 2,0 A continuous load
WP	L1	Circulation pump hot water system	230V AC
14[1]	DO 4	Cooling pump	24V AC
15[1]	DO 5	DX Cooling step 1	24V AC
16[1]	DO 6	DX Cooling step 2	24V AC
17[1]	DO 7	Alarm output for DO signals	24V AC
30	AI Ref	Supply air sensor reference	neutral
31	AI 1	Sensor supply air	
40	Agnd	UI reference	neutral
41[2]	UAI 1/(UDI 1)	Pressure transmitter extract air	
42[2]	UAI 2/(UDI 2)	Pressure transmitter supply air	
44	UAI 3/(UDI 3)	Frost protection sensor water heating battery	Use terminal 40 as reference
4[3]	DI ref	External function reference	+ 24V DC
50/60	B	Exo-line B	Modbus, Exo-line connection
51/61	A	Exo-line A	Modbus, Exo-line connection
52/62	N	Exo-line N	Modbus, Exo-line connection
53/63	E	Exo-line E	Exo-line connection
74[3]	DI 4	Extended running	Normally open contact Use terminal 4 as reference
75[3]	DI 5	Fire alarm	Normally open contact Use terminal 4 as reference

Connections to external functions cont'd

Terminal block		Description	Remark
76[3]	DI 6	External stop	Normally open contact Use terminal 4 as reference
90	Agnd	AO Reference	neutral
93	AO 3	Control signal, Heating	0–10V DC
94	AO 4	Control signal, Cooling	0–10V DC

1. *Maximum current load for all DO combined: 8A*
2. *Connection to external pressure sensor in case of pressure controlled unit (VAV)*
3. *These inputs may only be wired to voltage free contacts*

4.7.2.3 BMS Connection

BMS Connection

Communication possibilities for controller E283 WEB.

- RS485(Modbus): 50-51-52 or 60-61-62
- RS485(Exoline): 50-51-52-53 or 60-61-62-63
- TCP/IP Exoline
- TCP/IP Modbus
- TCP/IP WEB
- BACnet/IP

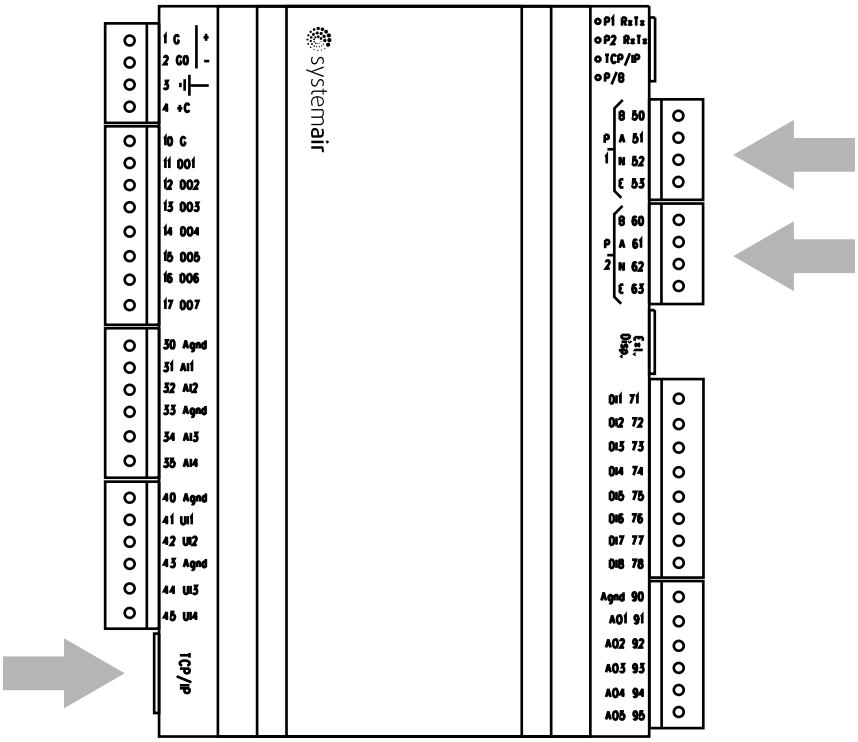


Fig. 10 BMS connection on the controller

4.8 Installing the Control Panel

4.8.1 Dimensions

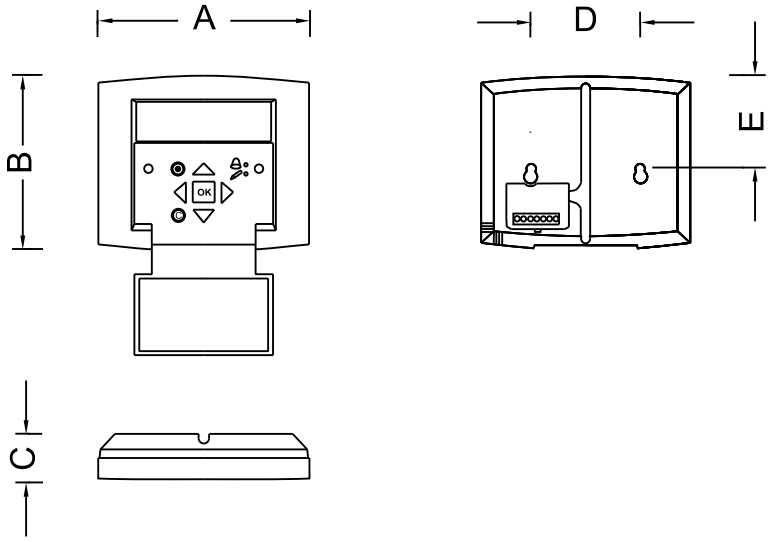


Fig. 11 Control panel dimensions

Position	Dimensions (mm)
A	115.0
B	94.0
C	26.0
D	c/c 60.0
E	50.5

4.8.2 General information

The control panel is delivered connected to the Corrigo control unit situated in the electrical connection box. Cable length is 10 m. In case the control panel needs to be detached from the signal cable it is possible to loosen the wires on the back of the control panel (figure 12).

A set of self-adhesive magnet strips are included in the package to facilitate installation on a metal surface.

4.8.3 Installation

1

Find an appropriate place to install the control panel. Maximum length between control panel and unit is 100 m.

2

If needed, drill two holes in the wall to hang the control panel (center to center: 60 mm) (pos.1, figure 12).

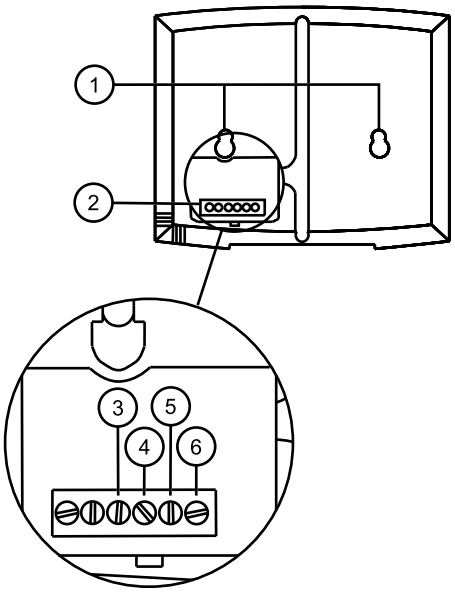


Fig. 12 Control panel wire connections

Position	Description
1	Mounting holes
2	Connection block
3	Connection to brown cable
4	Connection to yellow cable
5	Connection to white cable
6	Connection to black cable

4.9 Additional Equipment

For information concerning additional external equipment such as valve actuators, motorized dampers, E-tool, roof units, wall grilles etc. see technical catalogue and their enclosed instructions.

For electrical connections of external components see enclosed wiring chart.

Systemair AB
Industrivägen 3
SE-739 30 Skinnskatteberg, Sweden

Phone +46 222 440 00

Fax +46 222 440 99

125917