S P CAD HE 450 Counter Flow High Efficiency Heat Recovery Unit Instruction Manual

CAD HE 325/450/575 EC V BASIC

Contents

GENERAL INFORMATION

1.1 Introduction

This product was manufactured according to rigorous technical safety rules in compliance with DC standards. The DC declaration and the manual can be downloaded from the Internet.

Before installing and using this product, carefully read these instructions, which contain important indications to

ensure your safety and that of the users during the installation, commissioning and servicing of this product.
Once the installation is terminated, store the manual on a place where it is accessible.
The installation of this product (implementation, connections, commissioning, and maintenance) and all other interventions must be performed by a professional, applying the recognized rules of good practice, standards and safety regulations in force.
It must conform to the prescriptions related to Electromagnetic Compatibility (EMC) and the Low Voltage Directive (LVD).
S&P shall not be held responsible for possible injuries and/or damages caused by the noncompliance with safety instructions or following a modification of the product.
The CAD HE 325/450/575 Units are designed for dual flow air ventilation and air treatment applications in public and private buildings:

- Indoor installation
- Minimum recommended ambient temperature where the unit is installed >10ºC
- Working temperature: -25°C / +40°C.
- Relative humidity: max 95% non-condensing.
- Atmosphere not potentially explosive.
- Atmosphere with low salt content, without corrosive chemical agents.

1.2 Acceptance – Storage

In case of missing, non-conforming, or totally or partially damaged delivered products, the Purchaser must make written reservation on the transporter's receipt and confirm them within seventy-two (72) hours by sending a recommended letter to the transporter, as well as a copy to S&P. Acceptance of the unit without any reservation will deprive the purchaser of any subsequent recourse against us.
The product must be stored in an area protected from bad weather, shocks and stains due to splashing or splattering of any kind during its transport from the supplier to the end customer and onto the worksite before installation.

1.3 Warranty and Liability

Warranty
The unit supplied by S&P is warranted 2 years. Parts only starting from the invoicing date.
S&P agrees to replace the parts or the unit whose operation is recognized defective by our departments except for all damages and interests or penalties such as operating losses, commercial prejudice, or other immaterial or indirect damages.
The following are not covered by our warranty: defects resulting from an abnormal usage or a usage not conforming to the recommendations of our manuals; faults observed as a consequence to normal wear; incidents caused by negligence, lack of monitoring, or servicing; faults due to the incorrect installation of the devices or to bad storage conditions before mounting.
In any case, S&P will not be responsible for transformed unit, repaired even partially.

TECHNICAL INFORMATION

2.1 General information

Extraction of stale air and supply of fresh air in public/private premises with heat recovery by a counter flow aluminium heat exchanger.
Condensation forms during the heat exchange process is recovered in the condensate tray, which must be connected to a waste water drain.
The CAD HE 325/450/575 has a 100% heat exchanger bypass system which allows free cooling by night. The principle of free-cooling uses free energy from the outdoor air to ventilate and cool buildings when outdoor air temperature is lower than the exhaust air temperature, during the night in summer for example. The system operates automatically or can be used manually.

2.2 Description

Outdoor air (ODA):

Install the fresh air intake (wall or roof) at a sufficient distance from any are high pollution (trees, exhaust fumes, road, etc).

⚠ This duct must be sealed and insulated to prevent condensation.

Supply air (SUP):

To avoid thermal losses and optimize the performance of the installation, it is recommended to use insulated ducts.

Extract air (ETA):

To avoid thermal losses and optimize the performance of the installation, it is recommended to use insulated ducts.

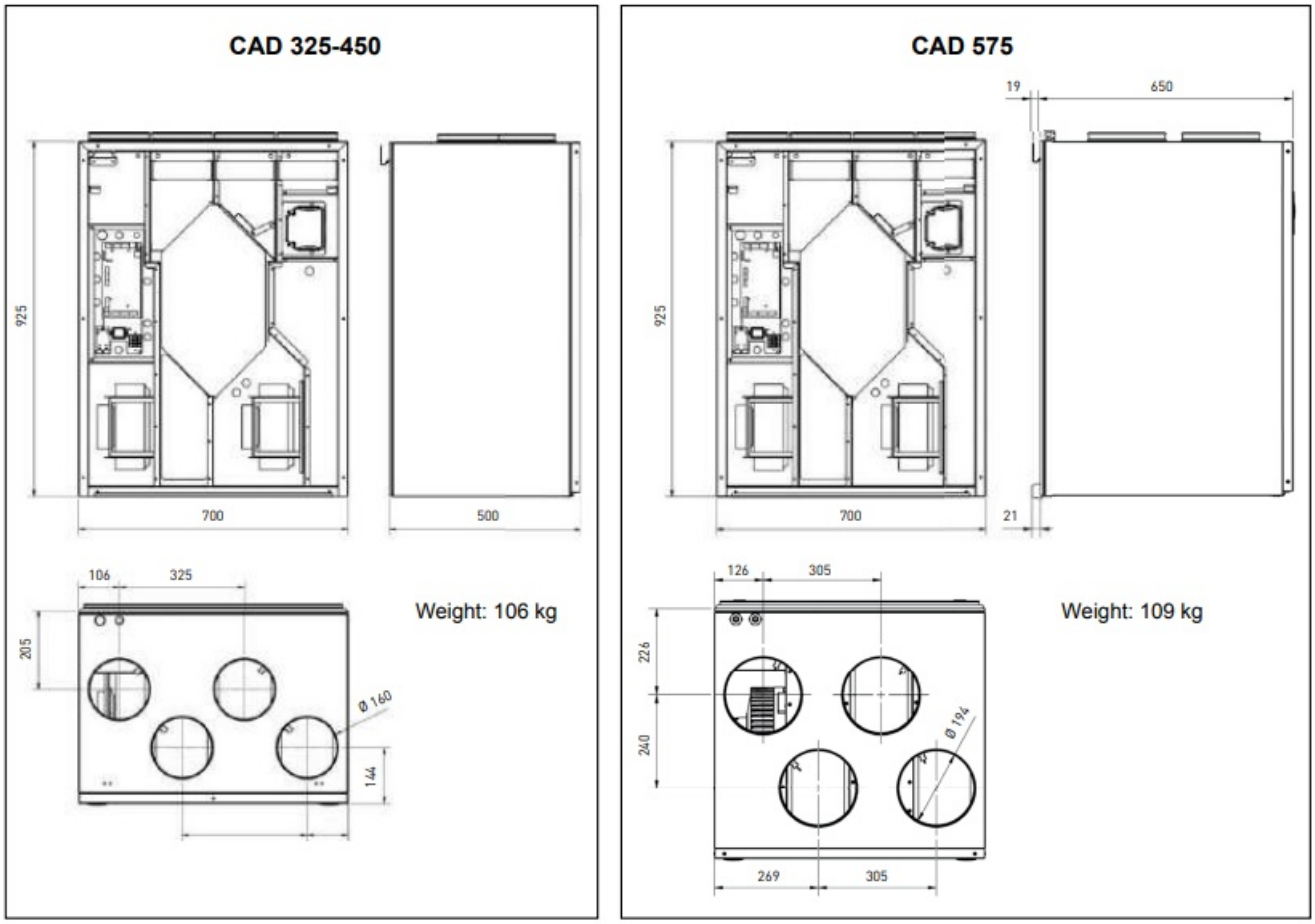
Exhaust air (EHA):

This duct must be sealed and insulated to prevent condensation.

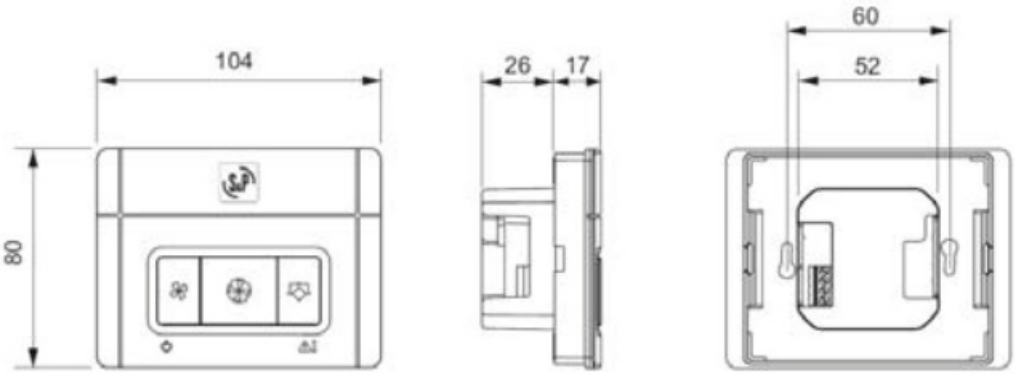
By-pass:

The CAD HE 325/450/575 has a 100% heat exchanger bypass system which allows free cooling by night. The principle of free-cooling uses free energy from the outdoor air to ventilate and cool buildings when outdoor air temperature is lower than the exhaust air temperature.

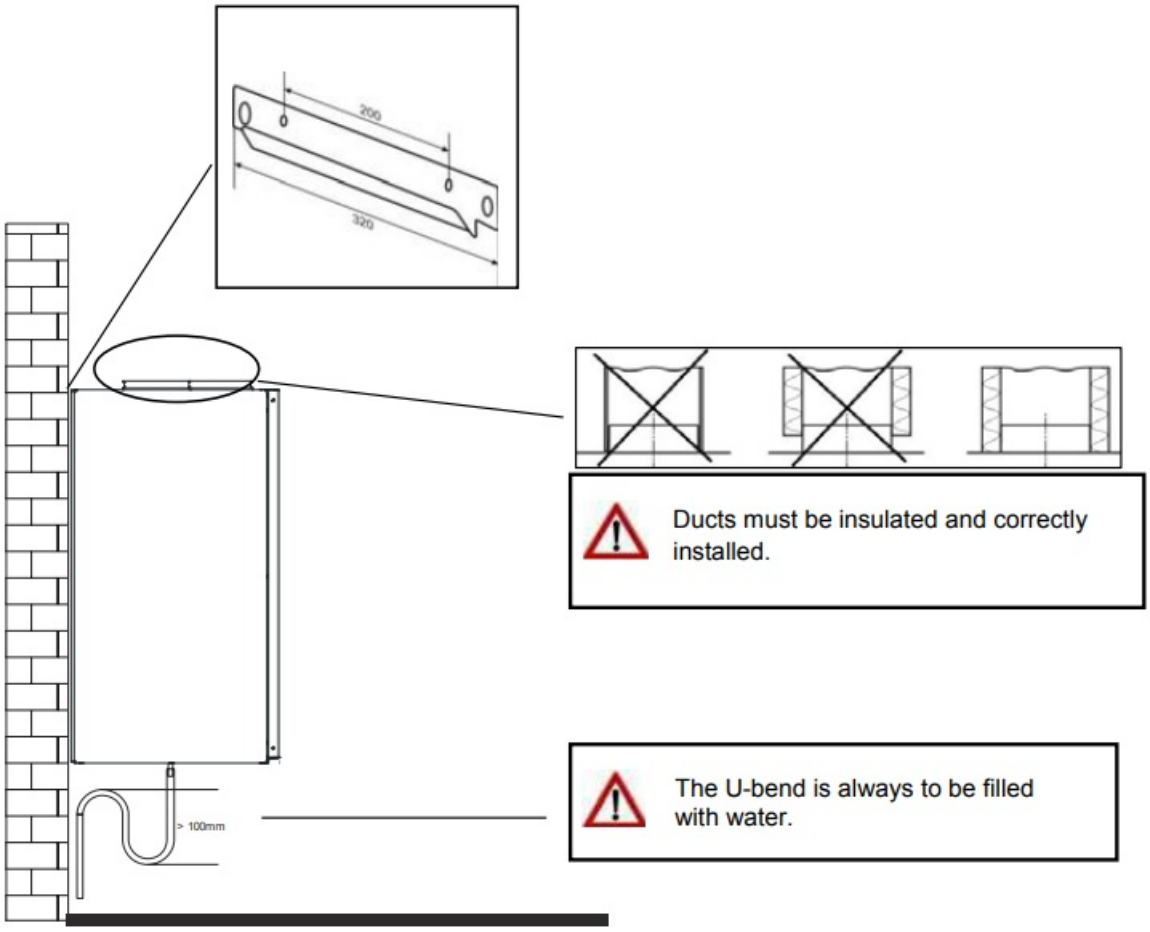
2.3 Dimensions (in mm)



Remote control via cable (1,5m included)
Optional:
Max. cable length: 50m (control wire type min. H05VV F 4G 0,25)



INSTALLATION

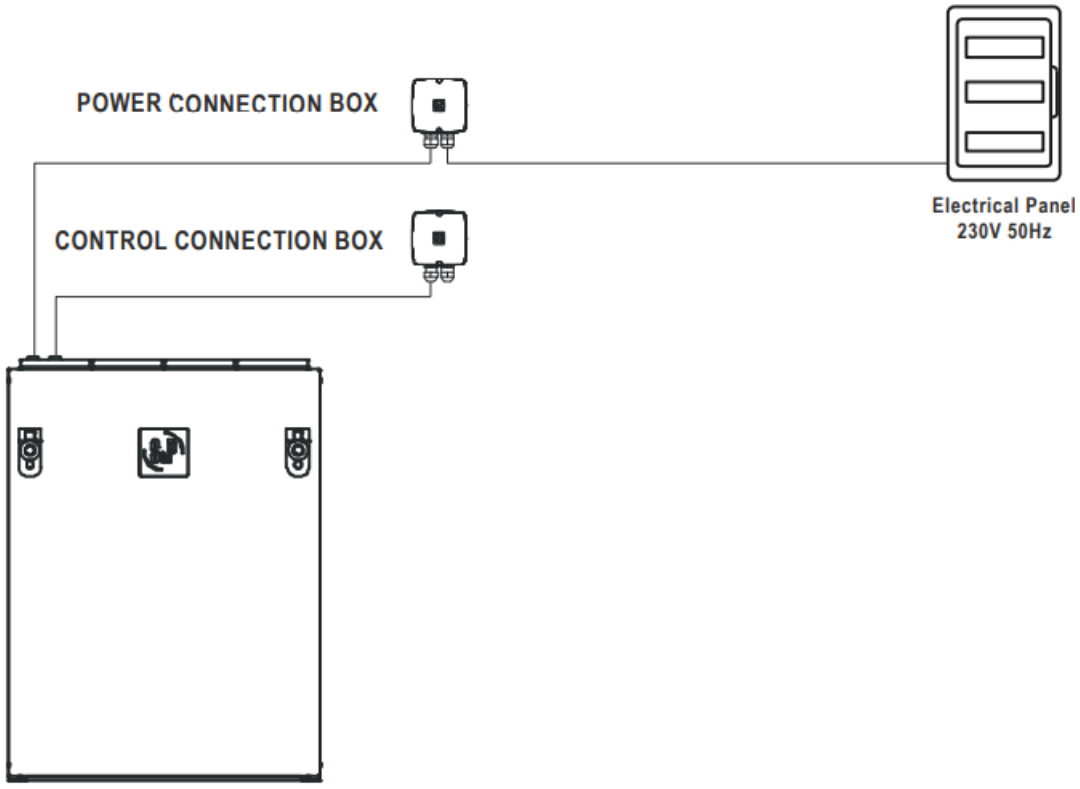


The CAD HE 325/450/575 heat recovery unit is designed for indoor installation.
We recommend a min. temperature of >10ºC in the room where the unit is installed to guarantee a good efficiency of the unit.

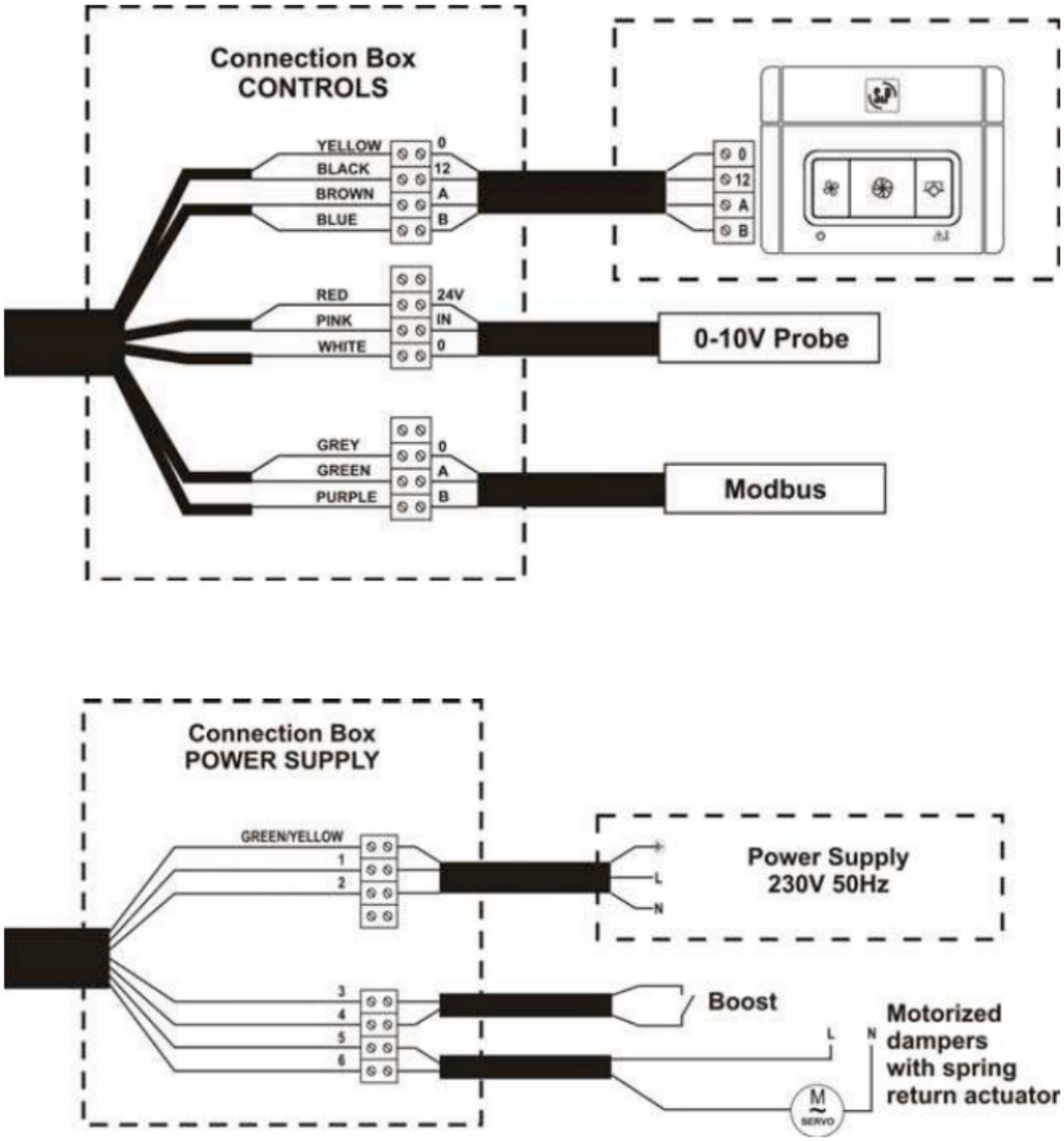
In areas where temperatures can be below -10º C in the winter time, it is necessary to install a pre-heating device.

CHARACTERISTICS AND ELECTRICAL CONNECTIONS

	Power (V/Hz)	Power (W)	Absorbed current (A)	Working temperature (°C)
CAD 325	230/50	230	1,3	from -25 to 40
CAD 325 PH	230/50	1730	8,1	from -25 to 40
CAD 450	230/50	345	2,08	from -25 to 40
CAD 450 PH	230/50	1845	9.	from -25 to 40
CAD 575	230/50	362	3.	from -25 to 40
CAD 575 PH	230/50	1862	9,3	from -25 to 40

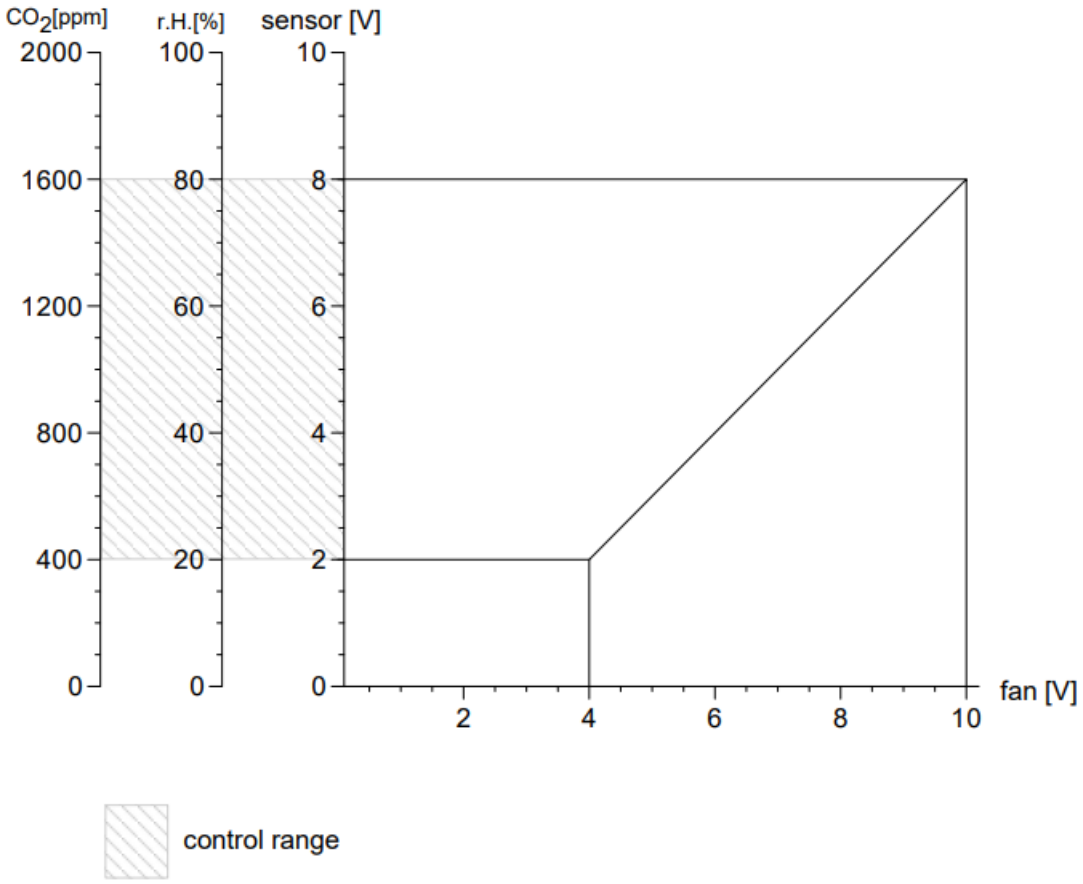


Yellow/ amarillo/ jaune/ giallo/ Geel



4.1. Sensor connection

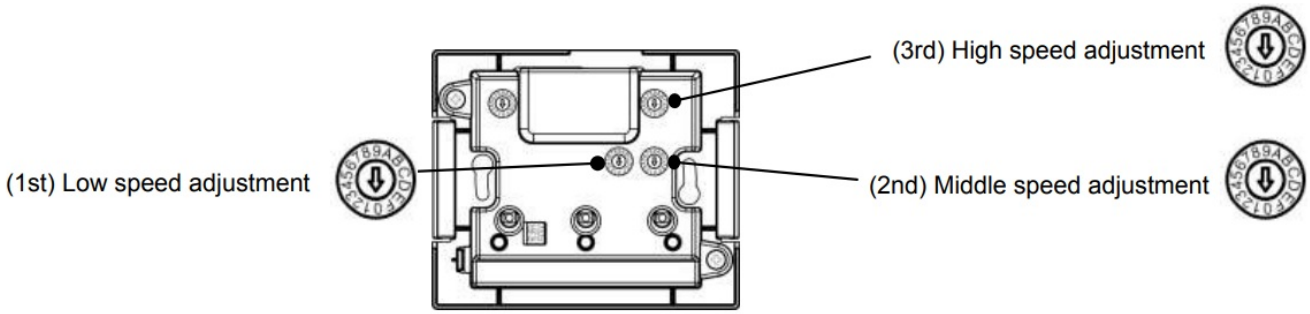
The CAD HE can work in proportional mode controlled by a sensor 0-10V (see electrical scheme).
The output control voltage for the sensor is adjusted between 2V and 8V. The 2V output signal correspond with the output signal to the fans of 4V and the 8V output signal correspond with the 10V output signal to the fans.
The chart below show the working range of the recommended S&P sensors.
CO2 sensors: SCO2-AD 0/10V; SCO2-G 0/10V
Relative humidity sensors (r.H.): SHT-A 0-10V; SHT-G 0/10V



REMOTE CONTROL ADJUSTMENTS —- INSTALLER

The remote control allows:
Adjust the airflows (1° speed, 2 speed, 37 speed)
Timer for adjusting the filter maintenance period (6, 9, 12 or 15 months) (factory setting 9 months)
Adjust the balance of supply/extraction airflows

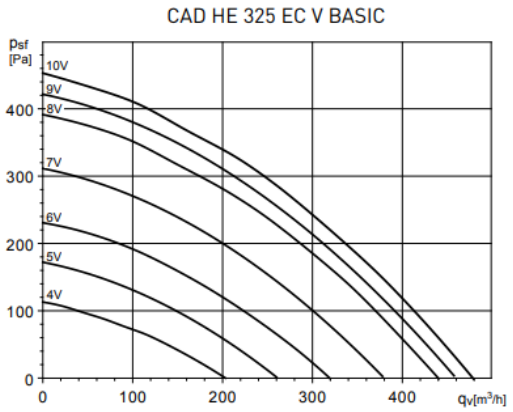
Adjustment of the airflows

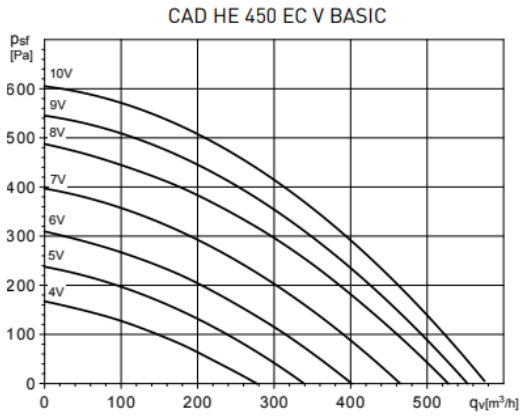


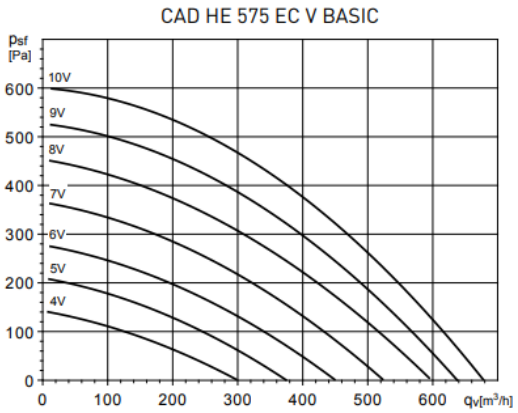
To adjust the airflow turn the potentiometer carefully clock wise with a small screw driver. The potentiometer has 16 positions (from 0 to F). To each of these positions are assigned an output voltage to the fans. As higher the output voltage as higher the airflow and vice versa.
To adjust the airflow turn the potentiometer carefully clock wise with a small screw driver. The

Position Potentiometer	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Assigned Voltage	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10

Factory setting: 1st speed = 3; 2nd speed = 7 and 3rd speed = F.



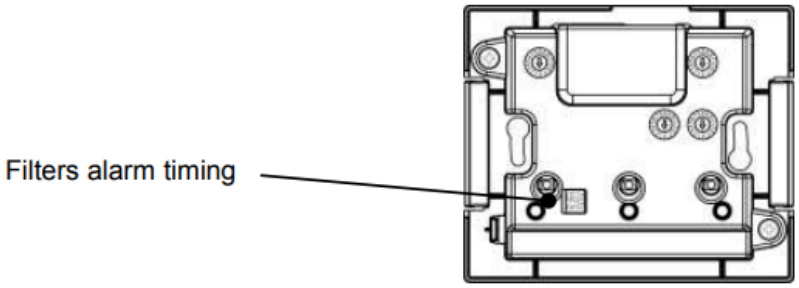


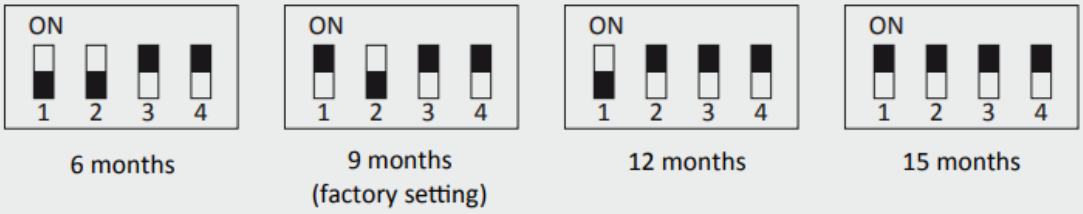


Adjustment of the filter maintenance period

It is possible to set the period to 6, 9, 12 or 15 months (9 months factory setting). The filter clogging depends on the pollution of the area where the unit is installed. We recommend checking the time in which the filter clogs and adjusting this period. It is advisable to do this after the second filter change. Of course, after the installation, the extract air is dusty and not representative. During the second filter check, if you notice that the filters are clean you can increase the time (12 or 15, months), if you notice that the filters are very dirty you should decrease the time (6 months).

Open the box and adjust the timing as shown. To do this, set the micro contacts 1 and 2 as shown in the drawings below to adjust the month.



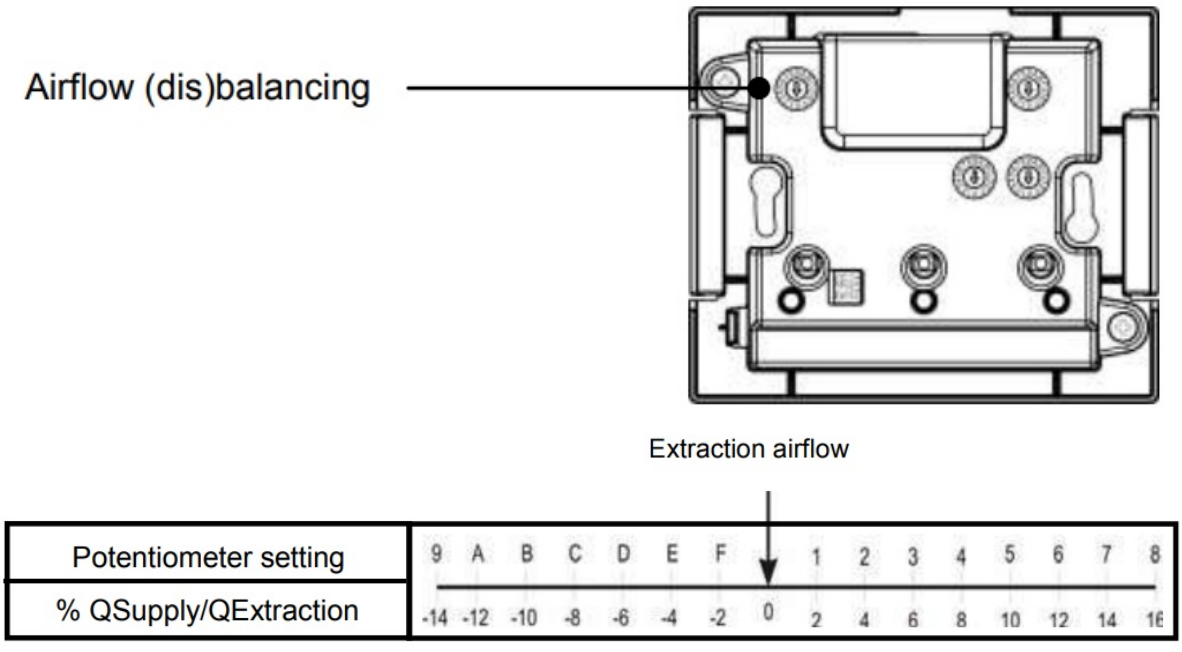


The black colour indicates the dip switch position.

Supply/extraction airflow adjustment

In the case that in the building is a chimney, gas oven or any apparatus which needs combustion air and there is no additional supply air opening for this, it is necessary to adjust the unit in the way that the combustion is not affected. It is necessary to adda supplementary air supply equal to the extract airflow due to the natural draught of the chimney.

This feature can be used also to balance once the installation is finished the two airflows.



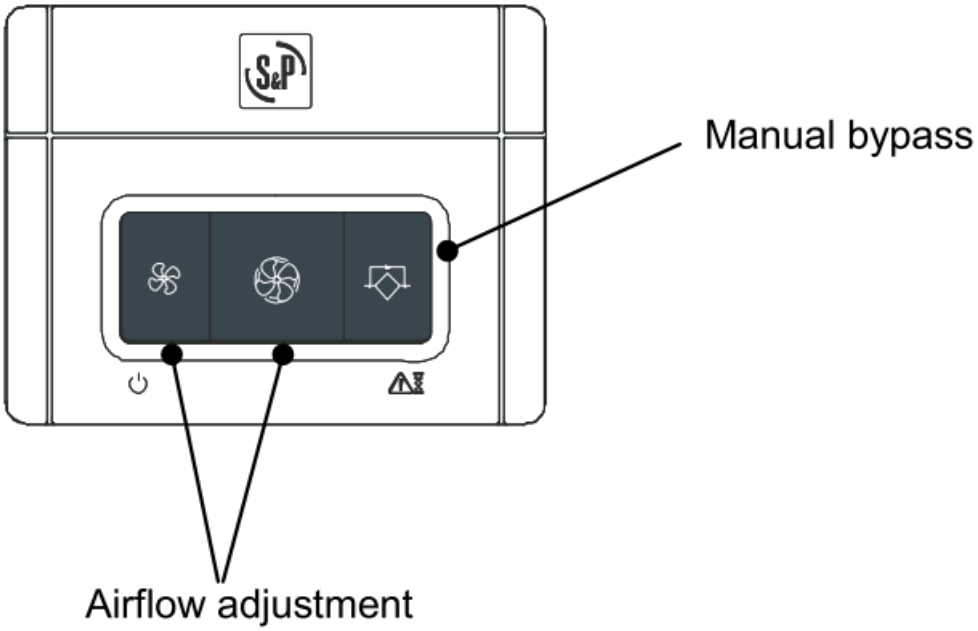
Example:

- Minimum calculated airflow = 90m/h
- Supply airflow necessary = 99 m3/h

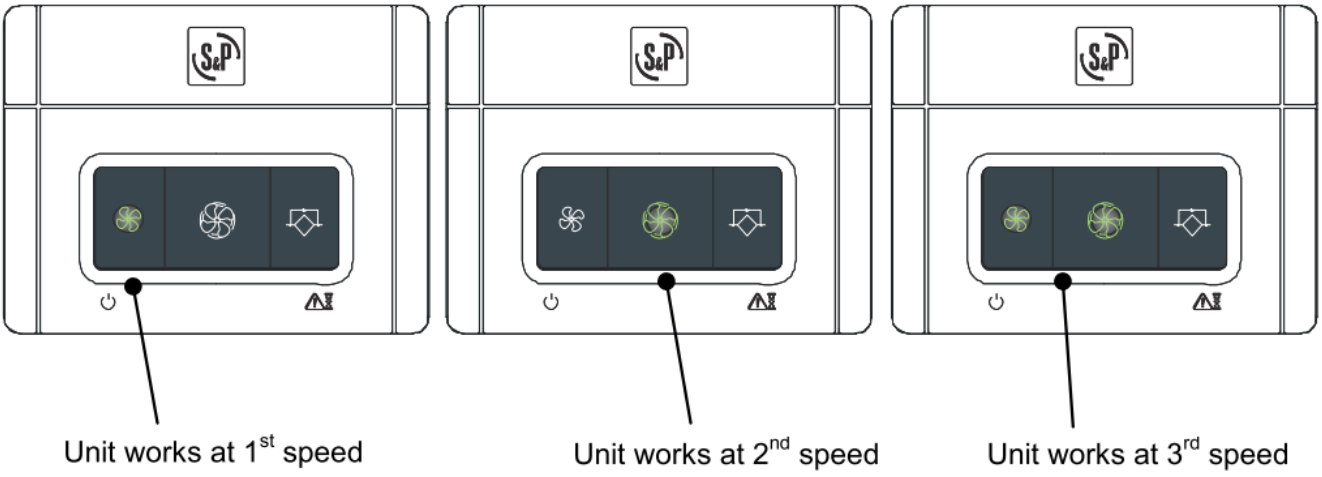
  → Potentiometer position 5 = +10% 3

The adjustment is made on the supply airflow compared with extraction airflow.

REMOTE CONTROL ADJUSTMENTS- USER



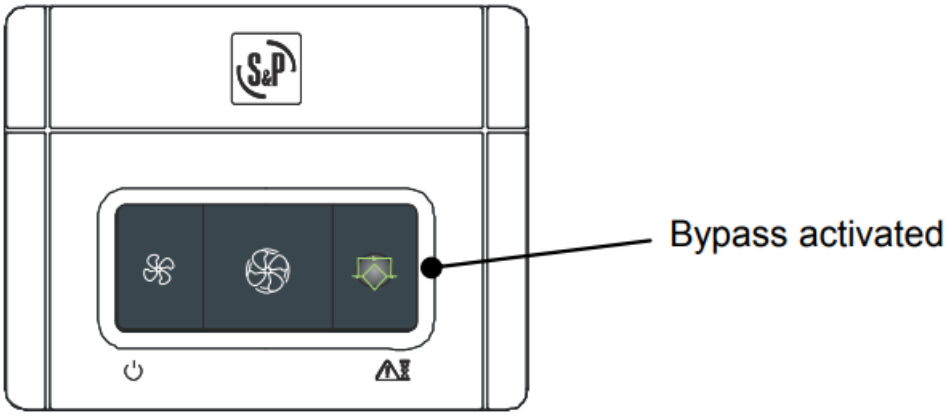
Speed adjustment:
Pressing the “airflow adjustment” buttons you can change the speed. The LED will be green illuminated (see pictures below).



Automatic bypass:
The CAD HE 325/450/575 works with a pre-programmed automatic bypass.
The following conditions have to be fulfilled to open/close the bypass.

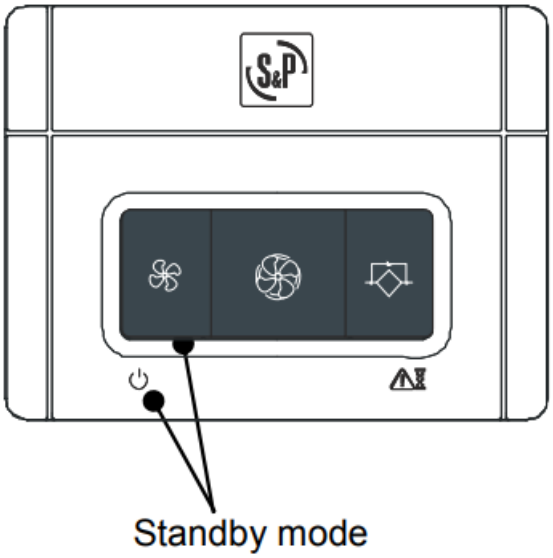
Tint = indoor temperature
Text = outdoor temperature

Manual bypass:
Pressing the button “manual bypass” the bypass will open for 8 hours. During the bypass activated the button is green illuminated. To deactivate (close) within the 8 the bypass you have to push the button again (illumination is off).



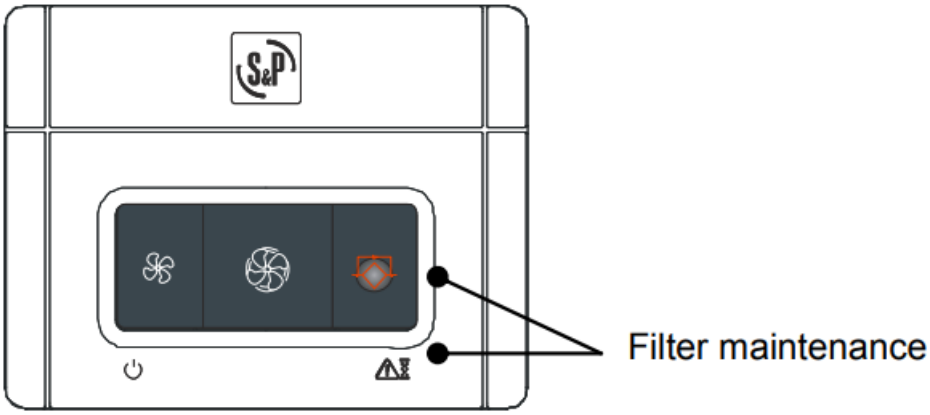
Standby function:

Push and hold the button for 3 seconds, the unit will switch into the standby mode. (see drawing below). To switch the unit on push the button again.

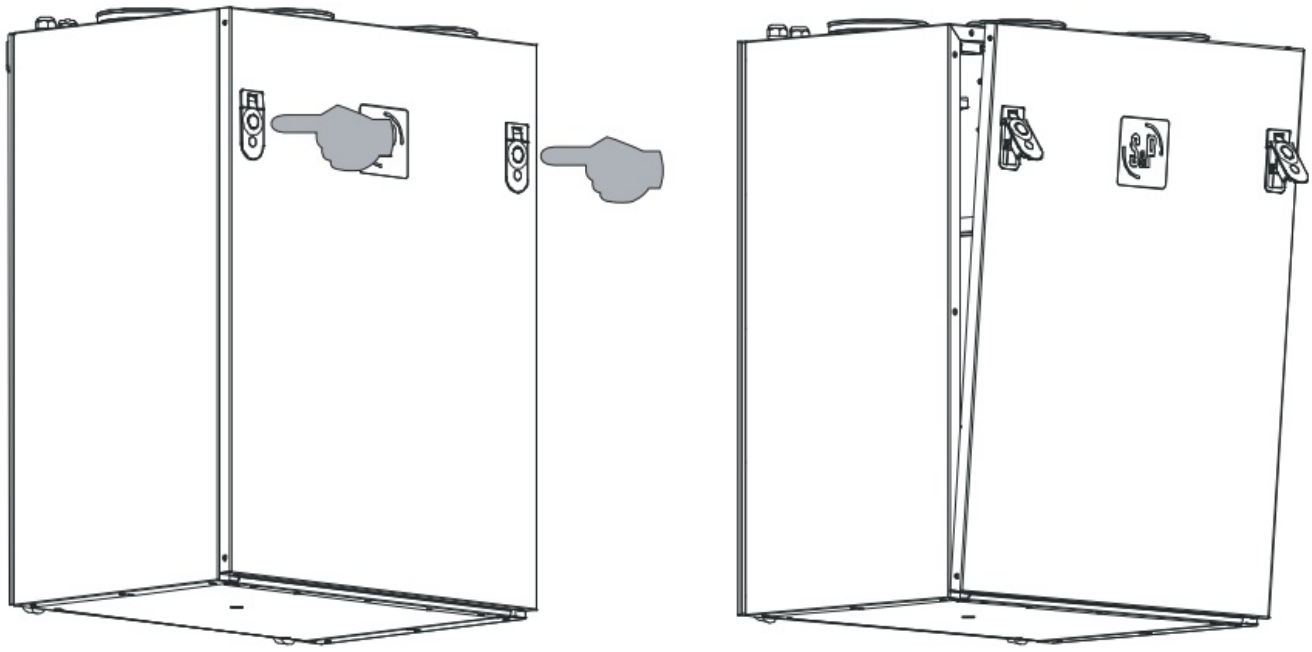


Maintenance and replacement of the filter:

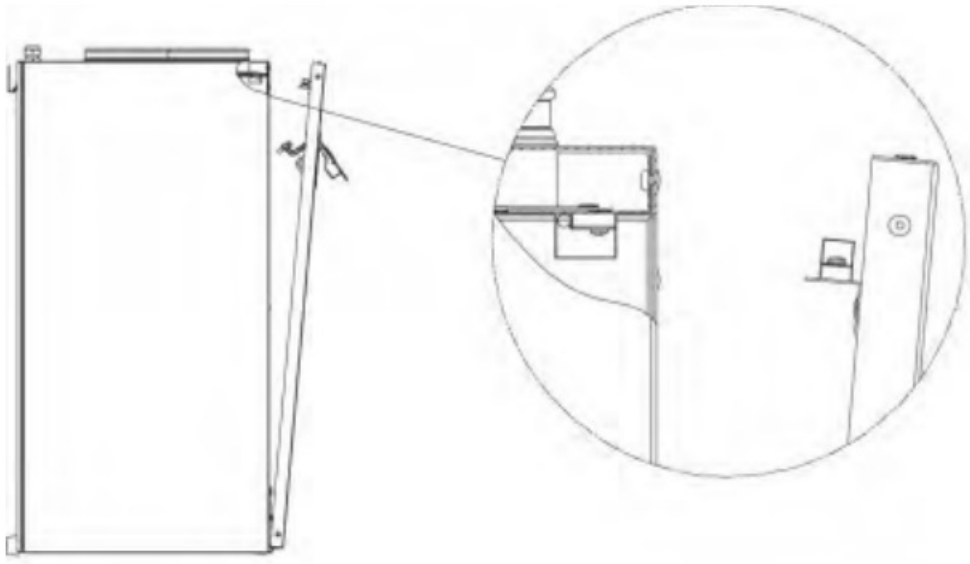
When the button is red illuminated, please check the filter as a maintenance is necessary. After the filter change press the button during 3 seconds in order to reset the filter alarm.



For opening the unit press the buttons to release the door.



For security reasons the unit has an integrated electro magnetic door switch which disconnects the power supply when the door is opened.
For maintenance purposes an additional safety isolator switch should be installed.



⚠ Once the door is opened you can access the filters to change them.

FROST PROTECTION MODE

CAD HE 325/450/575 EC V BASIC:
All standard units have an automatic frost protection system installed. In the case that the exhaust air (EHA) temperature fall below 5°C and the outdoor air temperature is less than 0°C the defrost mode will start. The supply fan decreases the velocity whilst the exhaust fan works on the nominal airflow. This unbalance avoids the building of ice into the exchanger.
In case that this unbalance will not be enough the unit stops during 2 hours. Every 2 hours the CAD will start-up for a short time to check if the temperature conditions are favourable to return to work normal.
We recommend not to use this unit in combination with devices which are using combustion air unless there is a security device installed which would switch of the unit in case of pressure difference in the house.
CAD HE 325/450/575 EC V BASIC PH:
In the “PH” units there is installed an electric heater element as a pre-heater. This pre-heater avoids the ice

building in the exchanger without unbalancing the airflows and works fully autonomous without any need for adjustments from user side.

Function:

In the case that the exhaust air (EHA) fall below 5°C the frost protection starts activating the pre-heater. The pre-heater is working proportional in dependency of the temperatures measured by the unit. If the power of the pre-heater is not enough to keep the exhaust temperature (EHA) above 3°C the velocity of both fans will be reduced proportionally in order to increase the temperature for the supply air. If this is still not enough, to the avoid freezing of the exchanger, the unit stops during 2 hours. Every 2 hours the CAD will start-up for a short time to check if the temperature conditions are favourable to return to work normal.

Technical datas:

Electrical supply: ~230 Vac 50 Hz
Power: 1500 W
Absorbed current: 6,8 A

Thermal difference at nominal airflow:

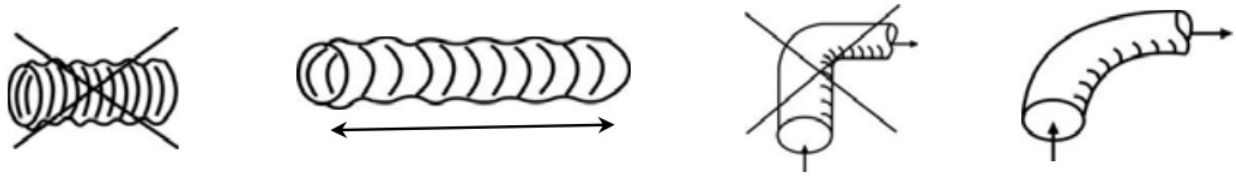
$$\Delta T = \frac{P}{C_P \cdot \rho \cdot Q} = \frac{P\ (W)}{0{,}36 \cdot Q\ \left(\frac{m^3}{h}\right)} = \frac{1500}{0{,}36 \cdot 450} = \mathbf{9{,}3\ °C}$$

P: Electric power
P: Electric power
Q: Airflow
Cp: Specific heat of air
Cp(0°C)=1006 lj/kj. K
P: air density

SWITCHING ON THE CAD HE 325/450/575

To start your CAD HE 325/450/575 unit use the following process:

1. Verify that all system components are correctly installed and connected: Fresh air intake duct insulated and connected correctly (Do not use a fresh air intake equipped with insect screen)
   Fresh air and exhaust ducts insulated and connected correctly Fresh air and exhaust vents connected
   Flow regulators mounted in the right direction (if installed)
   Air outlet using insulated duct and connected to the outside (Using a roof cowl or outlet without an insect screen)
   Insulated flexible ducts taut and large radius bends (if installed)



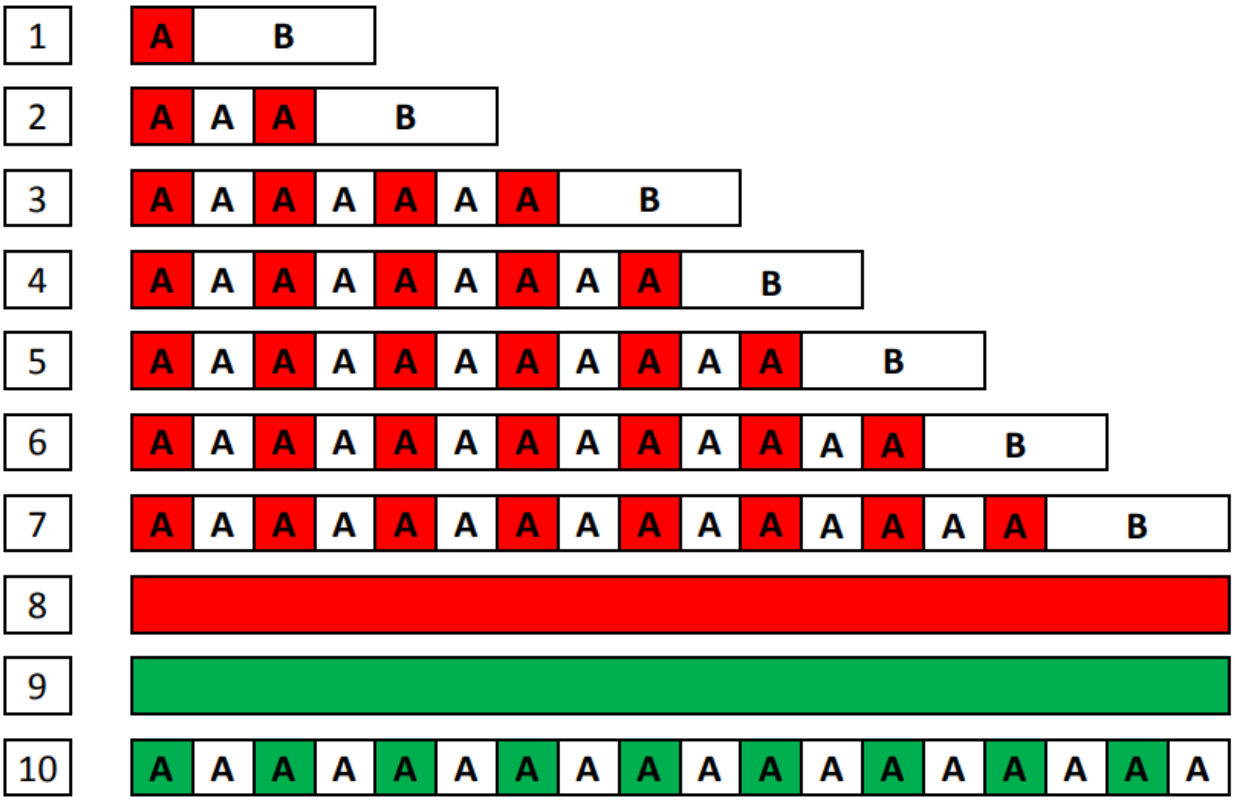
   Check that the unused spigots on plenums are sealed (if installed) Condensation drain well connected (siphon)
   Check that all connections are sealed (on the CAD HE 325/450/575, on plenums and vents) Check the setting of the power circuit breaker
2. Turn on the CAD HE 325/450/575.
3. Check the airflows.

ALARM INDEX

Through the LED located in the user control  it is possible to supervise the status of the unit. This Led will show the alarm (check see table) in case of produce the failure of some critical components of the unit or simply by notification (replacement filters, by-pass manual mode, supply temperature <11ºC). Depending on risk level of the alarm generated, the control will manage the response required. If it is necessary, the unit will be stopped for safety reasons.

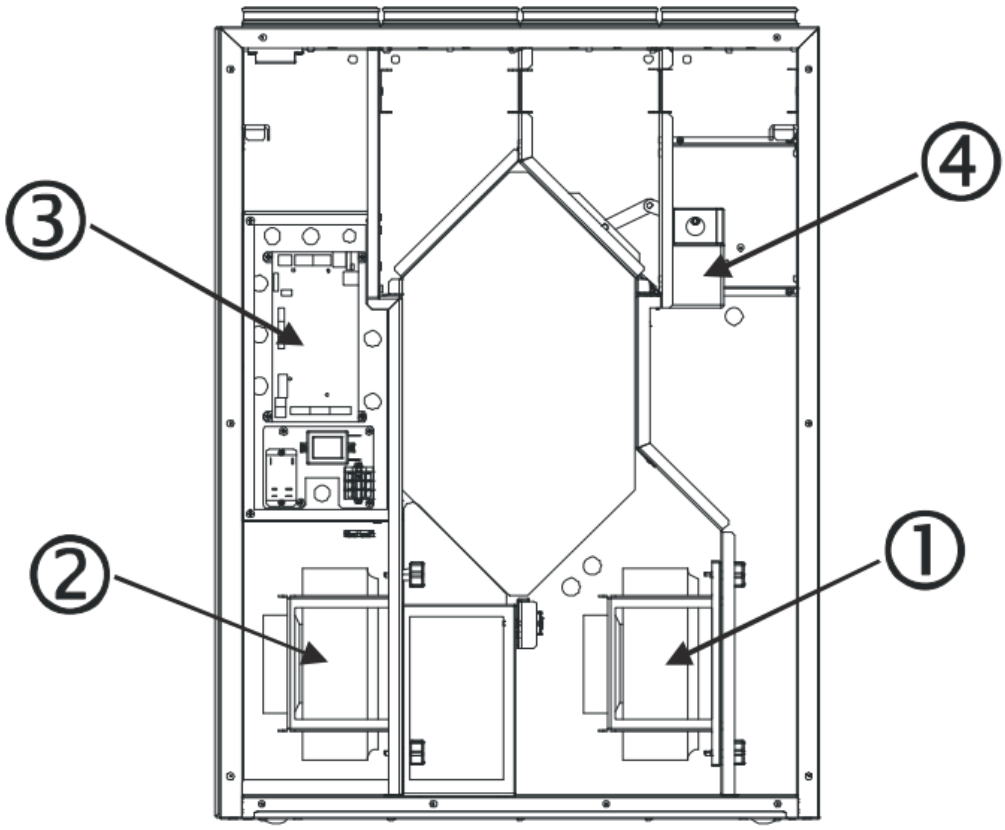
Priority	Alarm/State	LED	ACTION
1	Extract fan Failure	Red LED, 1 blink	Unit stops
2	Supply fan failure	Red LED, 2 blinks	Unit stops
3	Supply air temperature <11°C	Red LED, 4 blinks	Unit stops. Every 2 hours the unit starts for 5 minutes to check if conditions allow normal operation.
4	ODA Sensor failure (fresh air)	Red LED, 5 blinks	Normal operation
5	SUP sensor failure (supply)	Red LED, 6 blinks	Normal operation
6	ETA sensor failure (extract)	Red LED, 7 blinks	Normal operation
7	EHA sensor failure (exhaust)	Red LED, 8 blinks	Normal operation
8	Dirty filter failure	Red LED continuous	Normal operation
9	ON Bypass manual mode	Green LED continuous	Normal operation
10	Active defrost	Green LED blinking	Defrost management

Blink: A=0,75s; Interval : B= 3s



SPARE PARTS

	CAD 325	CAD 450	CAD 575	
1	R153708007	R153667001	R153815001	Supply air fan
2	R153708001	R153667007	R153815007	Extract air fan
3		R153667016	R153667016	Main control circuit
4		R153667009	R153667009	Servomotor



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Documents / Resources

	S P CAD HE 450 Counter Flow High Efficiency Heat Recovery Unit [pdf] Instruction Manual CAD HE 450 Counter Flow High Efficiency Heat Recovery Unit, CAD HE 450, Counter Flow Hig h Efficiency Heat Recovery Unit, Flow High Efficiency Heat Recovery Unit, High Efficiency Heat Recovery Unit, Efficiency Heat Recovery Unit, Heat Recovery Unit, Recovery Unit, Unit

References

- Ventilation Systems – S&P
- Ventilation Systems – S&P
- Homepage – S&P
- User Manual