Recovery Units

Energy Efficient THE Energy Plus Smart PS

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INTRODUCTION

The high-performance heat recovery units of the **Energy Efficient THE and Energy Plus Smart PS** series have been designed to allow you to save energy in the ventilation systems of public and private premises, such as bars, restaurants, offices, shops, etc. They allow you to recover heat from the exhaust air and transfer it to the air introduced into the environment.

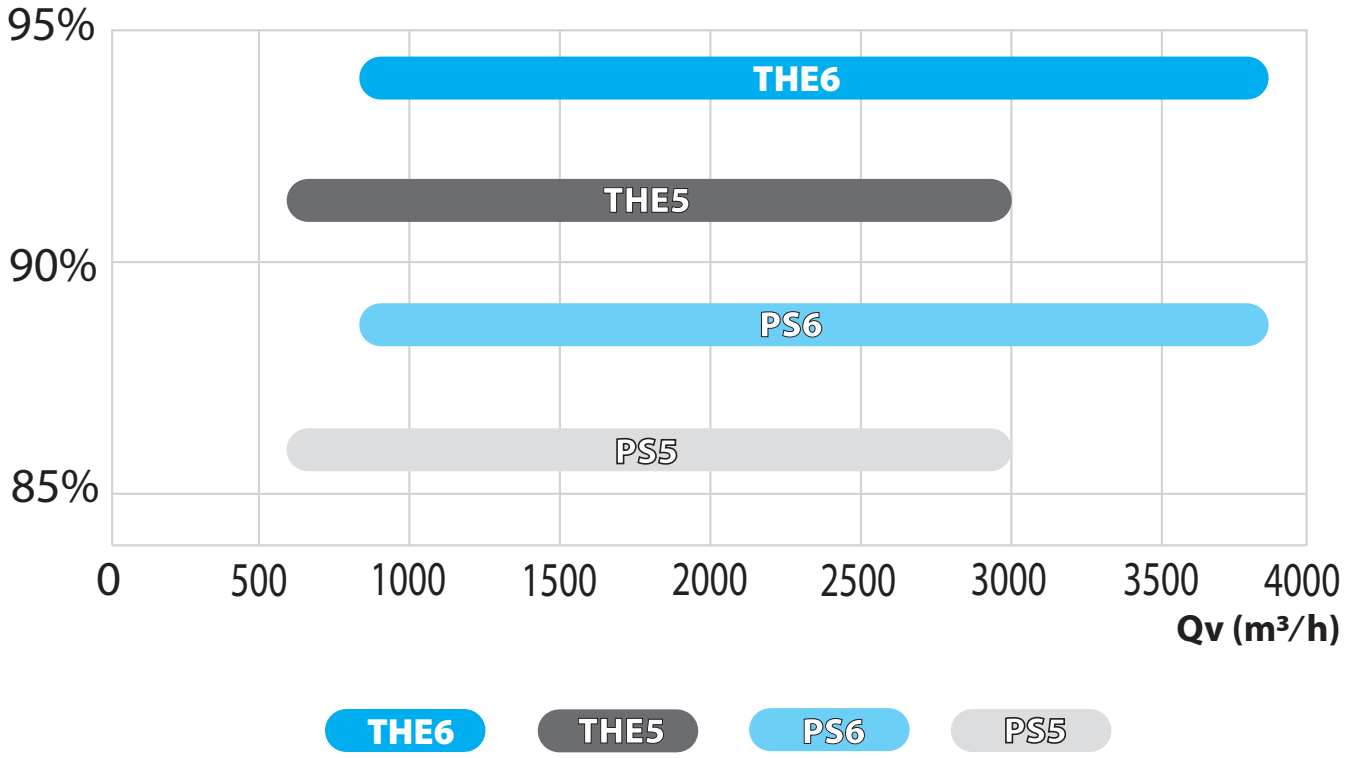
The Energy Efficient THE series has a maximum recovery efficiency (*) between 90% and 95% while the Energy Plus Smart PS series has a maximum recovery efficiency (*) between 85% and 90%.

The heat exchange between the exhaust air and the inlet air takes place through a static heat exchanger with countercurrent flow, sized to obtain a heat recovery up to 94%.

The series includes 4 construction models suitable for horizontal installation and cover a range of flow rates from 700 to 4000 m^3/h.

Both ceiling-mounted and floor-mounted models are available.

Maximum heat recovery efficiency with balanced flow rates*



Qv = air flow
* = Air conditions: EAT=-10 and ti=20 °C, Ur 50%

CONSTRUCTION FEATURES

Construction features

The **Energy Efficient THE and Energy Plus Smart PS** units are available in two versions:
Ceiling installation version:

- **ENY-THE5-S**
- **ENY-THE6-S**
- **ENY-PS5-S**
- **ENY-PS6-S**

Floor installation version:

- **ENY-THE5-P**
- **ENY-THE6-P**
- **ENY-PS5-P**
- **ENY-PS6-P**

and they are equipped with centrifugal plug fans with electronic control (EC) permanent magnet synchronous motor, which ensure variable flow control, so as to reduce power consumption to the minimum necessary.

The **Energy Efficient THE and Energy Plus Smart PS** units comply with the regulatory requirements of the European Ecodesign Directive (EU Regulation 1253/14). Conformity is related to both heat recovery energy performance and the intrinsic energy consumption parameter SFPint in the nominal conditions declared by the manufacturer.

Regulation and control system

The units are fully equipped with the electronics and sensors necessary for operation:

- electronic board equipped with RS-485 port for Modbus communication to external supervision. The electronic board, together with the terminal block for connection to the power supply and a line fuse, is inside the electrical panel positioned on the side of the machine and easily accessible.
- wall control for managing the unit and signalling alarms
- n° 4 temperature probes, for each point of interface of the air flows with the unit
- n° 2 differential pressure switches to indicate filter replacement
- n° 1 actuator for the regulation of the by-pass damper, managed by the automated free cooling and free heating logic based on the detected temperatures
- possible integrations with:

- humidity and CO_2 sensors for the automatic regulation of the flow rate
- pressure transducer for constant flow control
- post and pre hydronic and electrical treatments

External panels

External double sandwich panels made of 24 mm sheet steel, pre-insulated with polyurethane foam 45 kg/m^3.
The polyurethane foam uses a water-based foaming agent (GWP-0).
The sheets are made of Magnelis®, a material that offers excellent corrosion resistance even in hostile environments and offers complete edge protection thanks to its self-protection properties.

Recovery Unit

Heat recovery units are high efficiency static exchangers featuring aluminium plates with countercurrent exchange.

The static heat recovery units do not feature moving parts and guarantee high reliability and safe operation.

The heat exchanger performances are EUROVENT certified

EUROVENT CERTIFIED PERFORMANCE www.eurovent-certification.com

EC centrifugal fans (plug fan type)

Centrifugal supply and return plug-type fans with an electronically-controlled (EC) permanent magnet synchronous motor.

The impellers are designed to ensure an optimal air flow, which crosses the internal components with low noise.

Air filters

Air filters with pleated micro cells, 48 mm thick, fine filtration efficiency ePM_1 55% (F7).

The optional ePM filters$_1$ 70% (F8) and ePM_1 85% (F9) are available as an accessory for the inlet air flow.
Access to the unit's filters is ensured by specific openings on the panels, which allow for inspection, cleaning and replacement.

By-pass damper

By-pass damper with servo control.

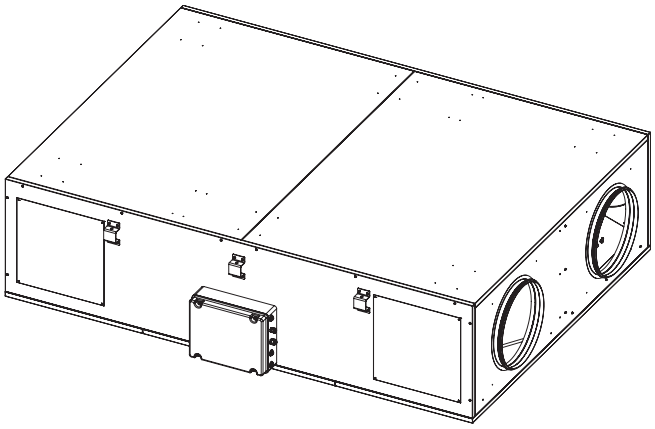
All the units are equipped with an automatic bypass system that totally disables use of the heat recovery unit to permit free-cooling (or free-heating).

The system is controlled by logic based on the feedback of the integrated temperature sensors.

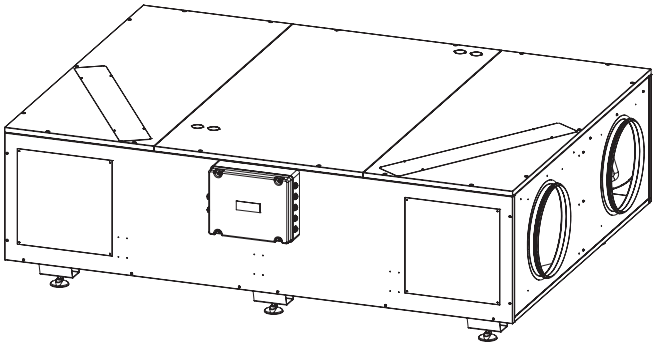
Support and coupling systems

The ceiling-mounted model is equipped with hanging brackets, the floor-mounted model is equipped with support feet.

Ceiling installation model



Floor installation model



Maintenance

Easy maintenance thanks to fast panel disassembly for accessing the ventilation and heat exchange sections for maintenance.

Provision for constant flow control (accessory)

Possible constant flow control by using the pressure transducer (accessory).

The pressure transducer can be installed inside the unit and connected to the control board: the fans reach the flow rate set on the T-EP control.

Provision for connection to air quality sensors (not supplied)

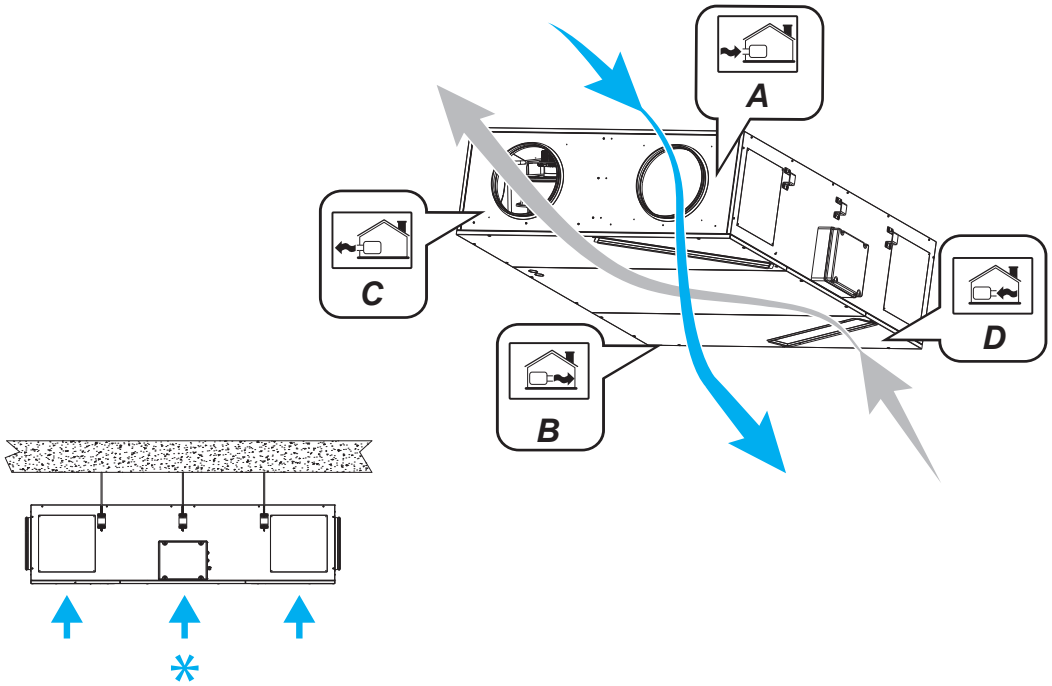
Possibility of variable flow control according to the measured concentration of CO_2 and relative humidity (rH).

Flow control also works with both sensors connected at the same time.

A 24 VDC power supply is available inside the unit's electrical panel to power the IAQ sensors.
The power supply is supplied as standard with ENY-THE units, and is available as an accessory for ENY-PS units.

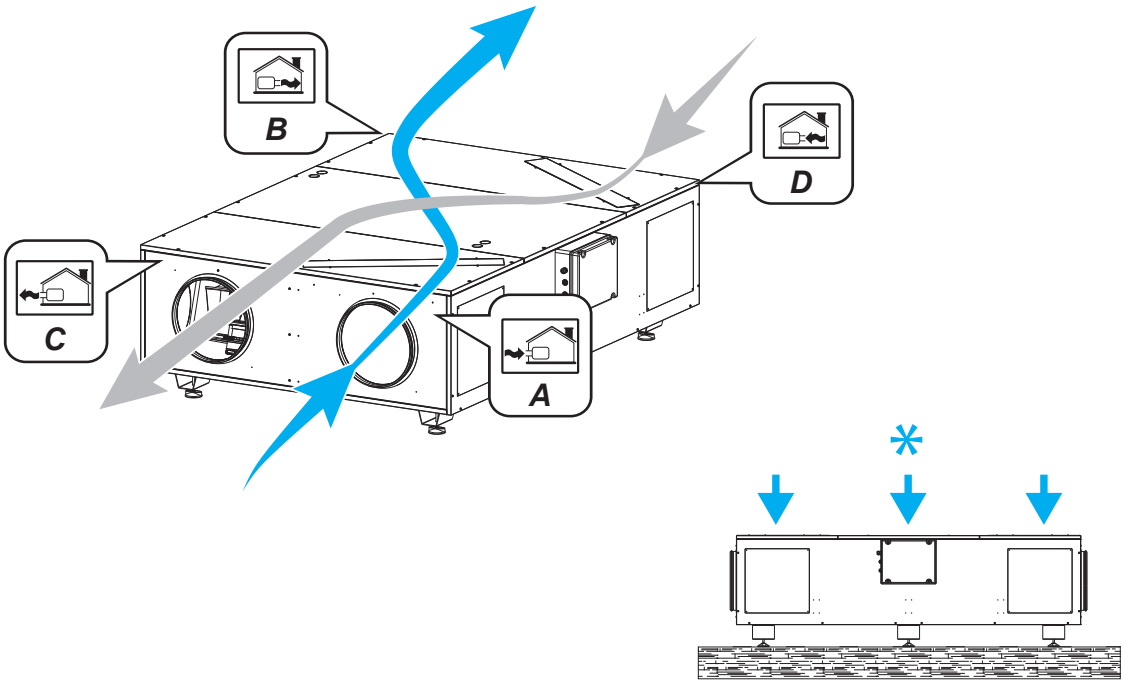
CHARACTERISTIC FLOW AND REVERSIBILITY CONFIGURATION

Ceiling unit



A = fresh air
B = supply air
C = exhausted air
D = extracted air
* = inspection side

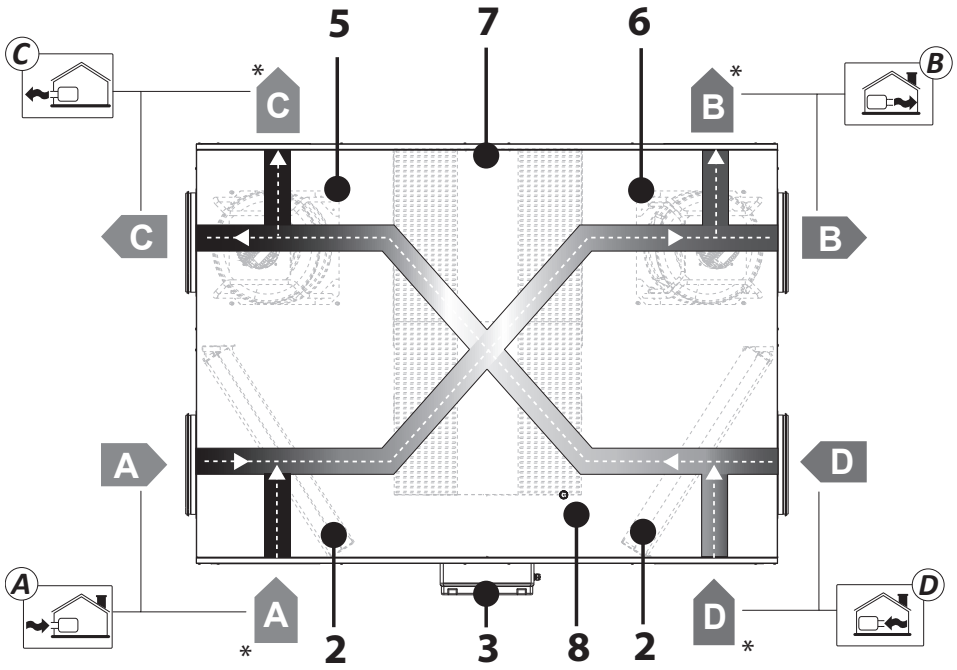
Floor unit



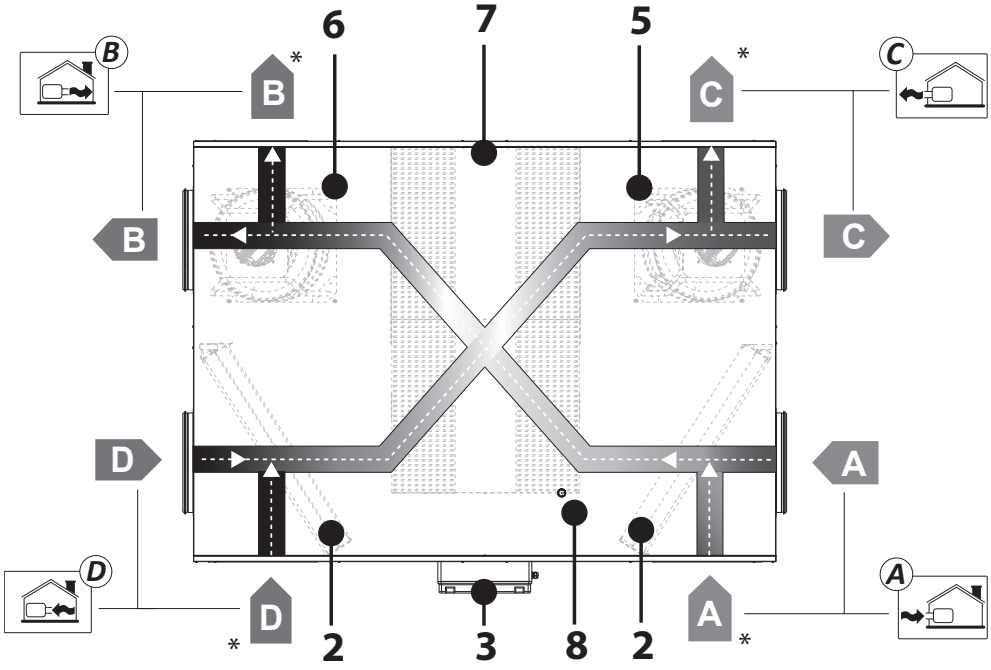
A = fresh air
B = supply air
C = exhausted air
D = extracted air
* = inspection side

Identification of flows

Standard flows as per factory settings



Inverted flows



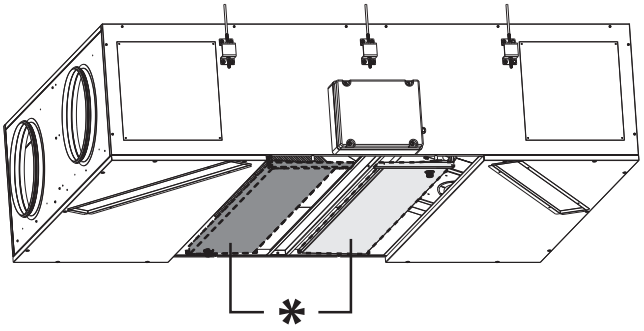
A = fresh air
B = supply air
C = exhausted air
D = extracted air
2 = filters
3 = control panel
5 = air fan (expulsion)
6 = air fan (supply)
7 = recovery unit
8 = drain tray
* = optional side connection flows

Flow reversibility

The **Energy Efficient THE and Energy Plus Smart PS** units feature a perfectly symmetrical configuration which allows the airflow circuits to be easily inverted, acting either as external/inlet air flows or internal/exhaust air return flows:

- The operating and automatic control logics can be easily reconfigured by activating the DIP switch on the electronic board dedicated to inverting the flow function.
- Thanks to the perfect geometric symmetry, the optional F8 and F9 filters can be mounted in both designated compartments.
- In the event of flow inversion, for ceiling installation machines, the condensate collection tray must be removed from the standard position and e applied to the opposite side of the heat exchanger.

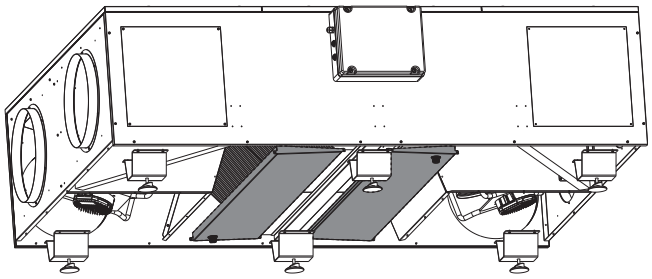
Flow reversibility for ceiling installation model



* = condensate collection tray to fit on both sides

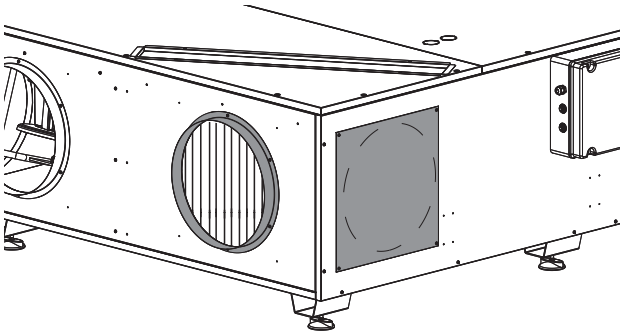
- In the event of floor installation, in which the lower inspection panels cannot be removed, the machine is supplied with two collection trays set-up for both possible configurations.

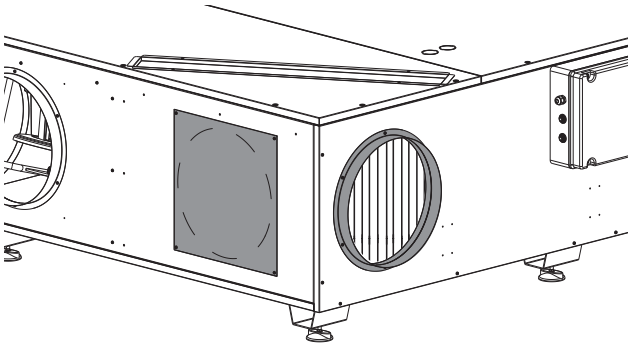
Flow reversibility for floor installation model



Connections

The Energy Efficient THE and Energy Plus Smart PS units are supplied as standard with the air connections on the front side, with the possibility of subsequently moving each individual connection to the side.





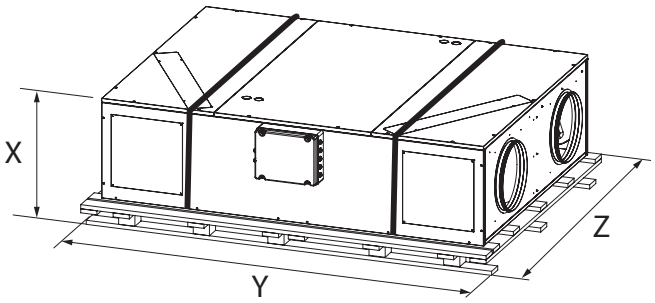
For size 6, it is necessary to use the optional accessory (code 9022024) to move the connections on the side.

CHARACTERISTIC TECHNICAL DATA

Characteristic technical data

		High efficiency THE version		PS version	
		THE 5	THE 6	PS 5	PS 6
Nominal supply and extract air flow rate	m^3/h	3000	3850	2900	4000
	m^3/s	0,83	1,07	0,81	1,11
Nominal available static pressure	Pa	140	150	150	150
Minimum flow rate	m^3/h	500	600	500	600
Maximum heat recovery efficiency (1)	%	90	90	84	84
Total heat recovered (1)	kW	27	34	25	33
Heat recovery efficiency (2)	%	88	88	82	82
Total heat recovered (2)	kW	22	28	20	27
Heat recovery efficiency (3) according to EN 308	%	83	84	77	76
Total heat recovered (3)	kW	13	16	11	15
Sound power level of the unit	dBA	65	68	62	68
Rated power input current	kW	1,8	1,8	1,7	1,8
Maximum total power input current	A	2,9	2,8	7	2,8
Power supply	V	400	400	230	400
	Ph	3Ph+N	3Ph+N	1Ph+N	3Ph+N
Protection	-	IP20	IP20	IP20	IP20
Weight	kg	290	310	265	300

(1) **Air conditions: TAE** = -10 and ti = 20 °C, Ur 50%.
(2) **Air conditions: TAE** = -5 and ti = 20 °C, Ur 50%.
(3) **Air conditions: TAE** = 5 and ti = 25 °C, Ur 28%. Efficiencies in dry conditions according to Reg. EU 1253-14.

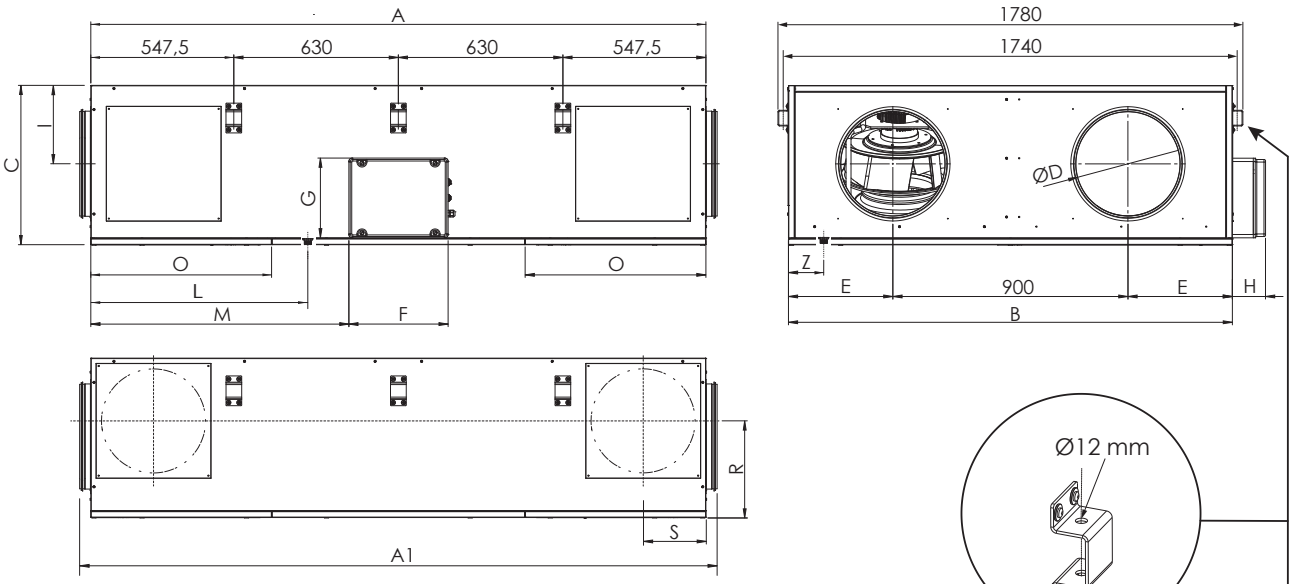


Packed unit external dimensions

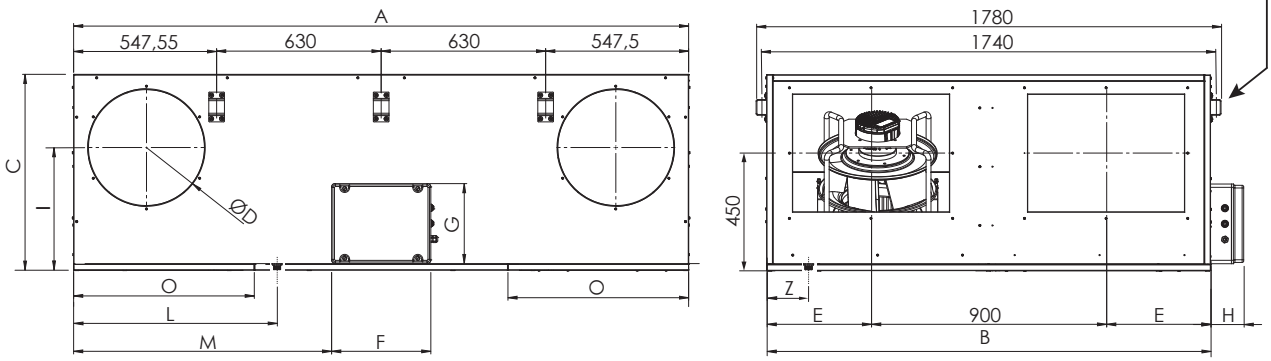
Model		THE 5	THE 6	PS 5	PS 6
X	mm	735	880	735	880
Y	mm	2500	2500	2500	2500
Z	mm	1880	1880	1880	1880
Weight	kg	340	360	315	350

Ceiling unit dimesions

Mod. THE 4-5 / PS 5



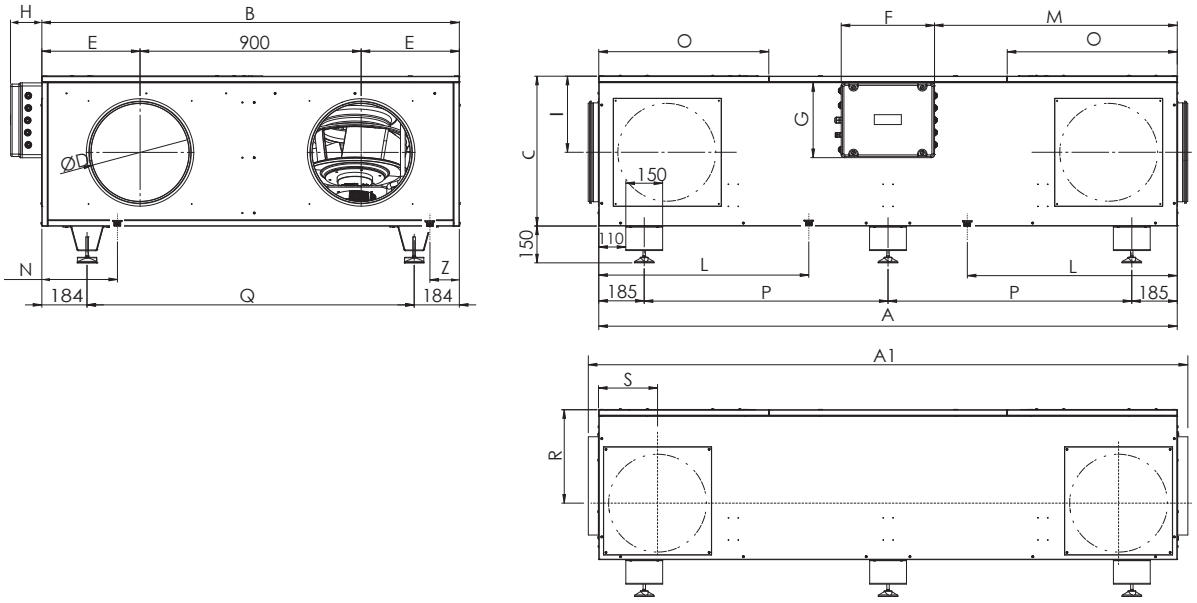
Mod. THE 6 / PS 6



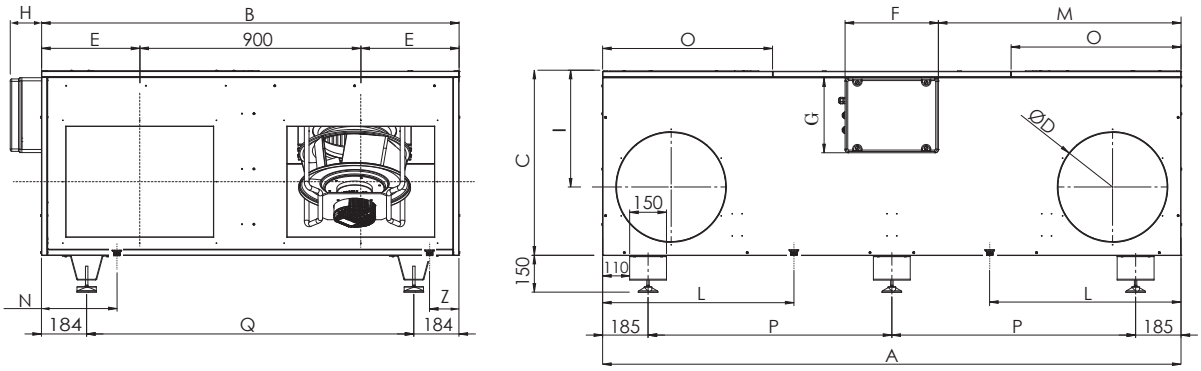
Model		THE 5	THE 6		PS 5	PS 6
A	mm	2355	2355		2355	2355
A1	mm	2475	2355		2475	2355
B	mm	1700	1700		1700	1700
C	mm	610	750		610	750
ØD	mm	DN400	600x450 / DN450		DN400	600x450 / DN450
E	mm	400	400		400	400
F	mm	380	380		305	380
G	mm	305	305		225	305
H	mm	127	127		127	127
I	mm	310	300		310	300
L	mm	854±3	791±3		854±3	791±3
M	mm	987	987		1000	987
O	mm	692	692		692	692
R	mm	310	471		310	471
S	mm	279	279		279	279
Z	mm	84	84		84	84
Weight	kg	290	310		265	300

Floor unit dimensions

Mod. THE 4-5 / PS 5



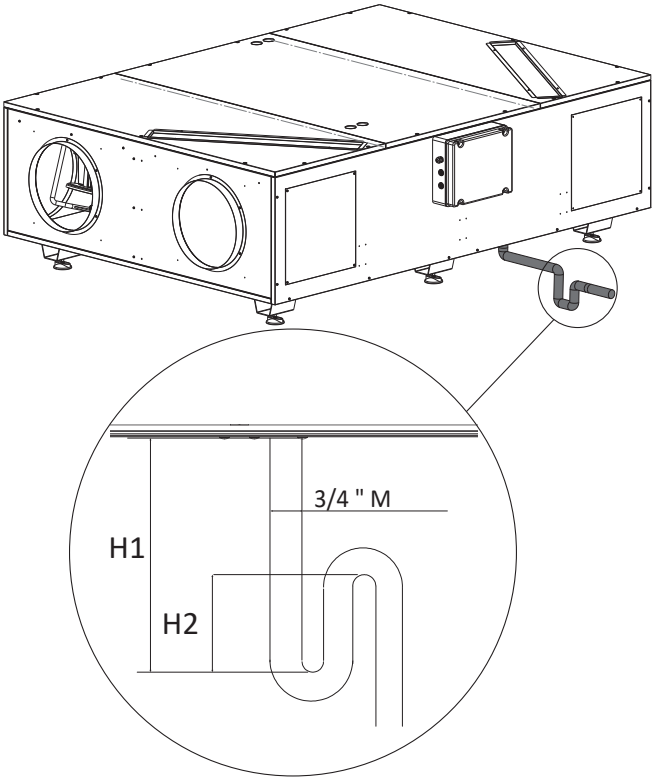
Mod. THE 6 / PS 6

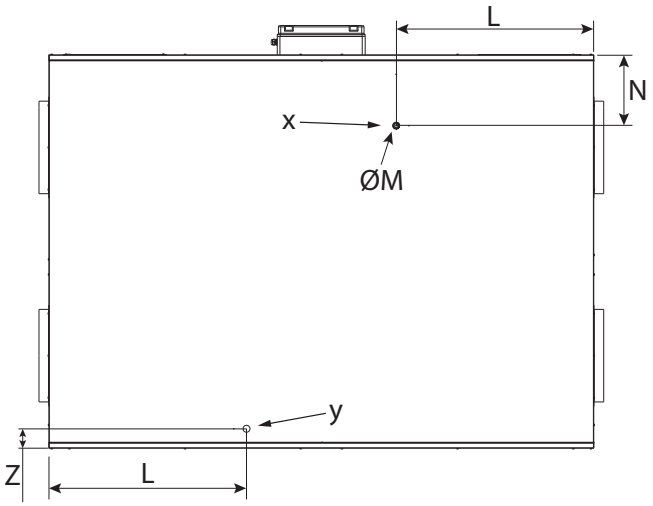


Model		THE 5	THE 6	PS 5	PS 6
A	mm	2355	2355	2355	2355
A1	mm	2475	2355	2475	2355
B	mm	1700	1700	1700	1700
C	mm	610	750	610	750
ØD	mm	DN400	600x450 / DN450	DN400	600x450 / DN450
E	mm	400	400	400	400
F	mm	380	380	305	380
G	mm	305	305	225	305
H	mm	127	127	127	127
I	mm	310	300	310	300
L	mm	854±3	791±3	854±3	791±3
M	mm	987	987	1000	987
O	mm	692	692	692	692
P	mm	993	993	993	993
Q	mm	1332	1332	1332	1332
R	mm	310	471	310	471
S	mm	279	279	279	279
Z	mm	84	84	84	84
Weight	kg	290	310	265	300

Condensate drainage

Standard version
(not provided by Sabiana)





x = condensate drain of standard flows
y = condensate drain of inverted flows

Model			THE 5	THE 6	PS 5	PS 6
Dimensions	L	mm	854±3	791±3	854±3	791±3
	ØM	"	3/4 male			
	N	mm	306			
	Z	mm	84			

The system must be pressurised as follows:
H1 = 2P
H2 = H1 /2
where P = max operating pressure of the heat recovery unit in mm, approx (1 mm approx = 9.81 Pa).

PERFORMANCE AND OPERATING LOGICS

Thermal performance

Internal air conditions: ti = 20 °C - URi = 50%

Model	Qv	TAE: -10°C			TAE: -5°C			TAE: 0°C			TAE: 5°C			TAE: 10°C		
	Qv	Ef	Ph	mw	Ef	Ph	mw	Ef	Ph	mw	Ef	Ph	mw	Ef	Ph	mw
	m^3/h	%	kW	kg/h	%	kW	kg/h	%	kW	kg/h	%	kW	kg/h	%	kW	kg/h
THE 5	600	94,5	5,7	2,5	93,5	4,7	1,9	93,0	3,8	1,3	92,5	2,8	0,5	92,5	1,9	0,0
	1200	92,5	11,1	4,9	91,0	9,2	3,6	90,0	7,3	2,4	88,5	5,4	0,9	88,0	3,6	0,0
	2000	91,5	18,2	7,8	89,0	14,9	5,8	87,5	11,8	3,7	85,5	8,7	1,2	84,5	5,7	0,0
	2500	90,8	22,5	9,7	88,3	18,5	7,2	86,5	14,6	4,5	84,3	10,7	1,3	83,3	7,0	0,0
	3000	90,0	26,8	11,5	87,5	22,0	8,5	85,5	17,3	5,2	83,0	12,6	1,4	82,0	8,3	0,0
	3300	89,5	29,4	12,6	87,0	24,1	9,3	85,0	18,9	5,7	82,5	13,8	1,5	81,5	9,1	0,0
THE 6	800	95,0	7,7	3,4	94,0	6,3	2,5	93,5	5,0	1,7	93,5	3,8	0,8	93,0	2,5	0,0
	1600	93,0	14,9	6,5	91,5	12,3	4,9	90,5	9,8	3,2	89,5	7,3	1,2	89,0	4,8	0,0
	2200	91,5	20,3	8,8	90,0	16,7	6,6	89,0	13,2	4,2	87,5	9,8	1,5	86,5	6,5	0,0
	3000	90,5	27,3	11,7	89,0	22,4	8,7	87,5	17,7	5,5	85,5	13,0	1,8	84,5	8,6	0,0
	3800	90,0	34,1	14,6	88,0	28,0	10,9	86,0	22,0	6,7	83,5	16,1	2,0	82,5	10,7	0,0
	4300	89,5	38,4	16,5	87,0	31,5	12,1	85,0	24,7	7,5	82,5	18,0	2,0	82,0	11,9	0,0
PS 5	600	92,0	5,5	2,4	90,5	4,6	1,8	89,5	3,6	1,2	89,0	2,7	0,4	87,0	1,8	0,0
	1400	88,0	12,4	5,3	86,0	10,1	3,8	84,0	7,9	2,4	82,0	5,8	0,6	80,0	3,8	0,0
	2000	86,0	17,3	7,3	84,0	14,1	5,3	81,5	11,0	3,1	79,5	7,9	0,5	77,5	5,3	0,0
	2500	85,0	21,4	9,0	83,0	17,4	6,5	80,5	13,6	3,8	78,0	9,7	0,5	76,0	6,4	0,0
	3000	84,5	25,5	10,6	82,0	20,7	7,6	79,5	16,0	4,3	77,0	11,4	0,3	74,5	7,6	0,0
	3300	84,0	27,8	11,6	81,5	22,6	8,2	79,0	17,5	4,7	76,0	12,5	0,3	74,0	8,3	0,0
PS 6	800	92,0	7,4	3,2	91,0	6,1	2,4	90,0	4,9	1,6	88,5	3,6	0,6	88,0	2,4	0,0
	1600	89,0	14,3	6,1	87,0	11,7	4,5	85,5	9,2	2,8	83,0	6,7	0,8	82,0	4,5	0,0
	2200	87,0	19,3	8,2	85,0	15,8	6,0	83,0	12,3	3,6	80,5	8,9	0,8	79,0	5,9	0,0
	3000	85,5	25,8	10,9	83,5	21,1	7,8	81,0	16,4	4,6	77,5	11,8	0,7	76,5	7,8	0,0
	3800	84,5	32,3	13,5	82,0	26,2	9,7	79,0	20,3	5,5	76,0	14,5	0,4	75,0	9,7	0,0
	4200	84,0	35,5	14,8	81,5	28,8	10,6	78,5	22,3	6,0	75,5	15,9	0,4	74,5	15,9	0,0

t_i = Internal air temperature
UR_i = Internal relative humidity
EAT = Fresh air temperature
Qv = Supply air flow rate
Ph = Heat recovery on the inlet flow
Ef = Heat recovery efficiency with balanced flow rates
m_w =Condensate production

Main operating logics

Management and control board

To the management and control board the following is connected:

- PT1000 temperature probes placed on 4 air transit points;
- Inlet air circuit fan motor controlled with 0-10 V signal;
- Exhaust air circuit fan motor controlled with 0-10 V signal;
- By-pass gate movement actuator;
- Contacts of the filter differential pressure switches.

On the electronic board there is moreover the following:

- Dry contact terminals for remote machine ON/OFF control;
- Terminals for connecting the remote control T-EP;
- Terminals for RS485 connection with external Modbus system connection;
- 24 VDC power supply inside the electrical panel for powering the IAQ sensors (optional for ENY-PS units).
- Terminals for connecting the 0-10 V signal of a remote CO_2 measurement sensor (range 0-2000 ppm);
- Terminals for connecting the 0-10 V signal of a remote humidity measurement sensor
- Machine setting configuration Dip:
- Air inlet/exhaust direction;
- Presence of external air pre-heating electrical coil with antifreeze function;
- Presence of electrical and/or water coil for post-heating/cooling treatment;
- Crystall filter presence.
- Address configuration Dip in Modbus connection.

The electronic board can moreover manage:

- External air pre-heating electrical resistance in antifreeze mode; PWM signal;
- External air pre-heating water coil in antifreeze mode; ON/OFF signal;
- Post-heating electrical coil: ON/OFF signal;
- Post-heating water coil: ON/OFF signal;
- Post-cooling water coil: ON/OFF signal;
- Eventual Crystall filter mounted on the air inlet duct: ON/OFF signal.

Antifreeze logic, electrical pre-heating resistance

In the event of installation in cold climates (indicatively with air temperatures below -5 ° C) to prevent the formation of ice inside the heat exchanger, you must install the electrical resistance accessory (BEP).
This is managed automatically by the control board, mounted on the machine, by means of a PWM signal in order to optimise the power consumption according to actual needs.

Alternatively, a 230 V ON-OFF voltage output is available which can be used to enable the activation of an ON-OFF pre-heating resistor or an ON-OFF valve.
The controller activates the heater below outside ambient temperatures critical for ice formation in the heat exchanger and modulates the heater power to keep the expulsion air temperature above freezing point.

Free-cooling / free-heating operating logic with by-pass damper

The following indoor air setpoint temperatures are defined:
$t_{heating}$ normally 20 °C
$t_{cooling}$ normally 26 °C

The following are also defined:
t_i = internal air temperature (return air)
EAT = Fresh air temperature

FREE-COOLING CONDITION
EAT > $t_{heating}$ and simultaneously t_i > EAT

Example:
In a summer condition it can happen that t_i = 25 °C, consistent with an operating setpoint $t_{cooling}$ = 26 °C ± 2 °C.
This condition can occur during the evening of a day with high solar radiation during which, however, the fresh air temperature is fairly cool, EAT = 21 °C.
There is no need for heating, because the winter setpoint is $t_{heating}$ = 20 °C.
EAT = 21 °C >20 °C and t_i = 25 °C > EAT: fresh air can be used to cool the room free of charge.

FREE-HEATING CONDITION
EAT < $t_{cooling}$ and simultaneously t_i < EAT

Example:
In a Mediterranean winter condition it can happen that t_i = 21 °C, consistent with an operating setpoint $t_{heating}$ = 20 °C ± 2 °C.
This condition may occur during the sunny afternoon of a day characterised by a cold morning.
The fresh air temperature heats up and reaches the value of TAE = 23 °C. There is no need to cool, since the summer setpoint is $t_{cooling}$ = 26 °C.
EAT = 23 °C <26 °C e t_i = 21 °C < EAT: fresh air can be used to heat the room free of charge.
In all the remaining conditions it is convenient to maintain the heat recovery active to save on heating in the winter and on air conditioning in the summer.

Operating logics with post-treatment elements

Downstream of the heat recovery unit, on the ambient air inlet duct, it is possible to install a post-heating resistance or a post-heating and/or cooling coil.

The machine's controller is able to manage 230 volt outputs for the ON/OFF control of the heater or the water supply cut-off valve of the after-treatment coil.
You may control post-heating only or heating and/or cooling function both in the 2 and 4 pipe configuration.
It is also possible to manage a PWM output to use the BEP resistor as a modulating after-treatment element.
In this case, the PWM signal cannot also be used for the preheating logic, which is replaced by an ON/OFF control.
The after-treatment elements are controlled according to the temperature of the supply or extract air.
In order to control the inlet temperature, the accessory probe T2 must be installed downstream of the coil.

Control by IAQ sensors

A variable flow mode (AUTO) is available, according to a control based on the ambient air quality index reading (humidity or CO_2).
This way, the minimum unit flow rate required to obtain the necessary air quality, improving internal comfort and energy consumption.

The central air quality sensors can be placed directly in the room or in the air extraction ducts.

It is possible to check the flow rate based on the reading, even simultaneously, of:

- Internal relative humidity, i.e. a measurement of indoor air salubrity compared to the risk of mould proliferation. The units can be equipped with a humidity sensor positioned in the air extraction duct.
- Concentration of carbon dioxide, i.e. a measurement of the level of internal occupation. The CO_2 sensor, not supplied, is a 0-10 V type commonly available on the market, to install directly inside the occupied room or inside the outlet duct.

Regardless of the type selected, the AUTO mode is only available if the sensor is physically connected to the main control board.
In case the CO_2 sensor and the humidity sensor are simultaneously connected to the main electronic board, the AUTO mode will regulate the flow rate in order to satisfy both requests.
This implies that the flow rate used will be the highest between those required by humidity and CO_2 control.

Constant flow control (accessory)

A pressure transducer accessory is available that allows automatic flow rate calibration and maintenance by means of differential pressure transducers connected to the suction nozzles of the centrifugal fans.
The pressure drop measured by this type of sensors is directly related to the flow rate of the fans, so that it can be considered as a direct flow rate measurement.

T-EP control

The Energy Efficient THE and Energy Plus Smart PS units work in combination with the T-EP control panel.
The use of the interface is very intuitive and thanks to the icons on the screen, the two keys and the touchpad, it is possible to view and change the operating status of the unit, view the values read by the temperature sensors and air quality sensor (if any), and view any alarms.

The connection wirings must not exceed 20 metres in length.

The use of the interface is simplified by the presence of two sub-menus:

- **User Settings Menu** where the user can select the operating mode and set the clock.
- **Technical Settings Menu** where the installer can calibrate the flow rates, change the unit operating parameters and monitor the operating status.

The **user settings menu** is used to select the following unit operating modes:

- **Manual Mode**: customised selection of desired air flow rate in manual mode:

- 100% - Nominal ventilation (standard).
- 70% - Reduced ventilation (nighttime).
- 45% - humidity control for high humidity rate environments.
- 25% - humidity control for low humidity rate environments.

When this function is active on the main screen, the icon will also be active.

- **Weekly Programme Mode**

- **Automatic Mode**: speed controlled by means of an automatic control cycle relating to ambient instantaneous humidity and CO_2 variations. This mode is only available for the Pro version or for units equipped with an air quality sensor (humidity or CO_2).

When this function is active on the main screen, the icon AUTO will also be active.

The user menu is also used to set the clock and perform weekly programming.

The **technical settings menu** is used to:
- Confirm or edit the operating parameters.
- Monitor the operating conditions.
- Set the nominal calibration speed of the fans.
- Enter and select the weekly program available to the user.

The Energy Efficient THE and Energy Plus Smart PS Units not equipped with electric antifreeze resistance, come with an **antifreeze function**, which, with a preventive logic, automatically sets the supply fan at minimum for 10 minutes every hour when the fresh air drops below - 5°C.
Also, if the temperature drops below -10° C, the unit stops automatically and a "**FROST**" alarm appears on the display.
When the alarm is active, the unit switches off and restarts automatically when the critical climatic condition disappears.
The Frost alert remains until the next time the unit is switched off and back on.
For units equipped with an electric resistance, the activation of the electric resistance is signalled on the T-EP with the activation of the icon .

For more information about the electric resistance intervention logic, please refer to the dedicated chapters.

Energy Efficient THE and Energy Plus Smart PS units are equipped with a **visual warning signal when the filter needs replacing**.
The signal is displayed via an icon on the main screen of the T-EP panel.

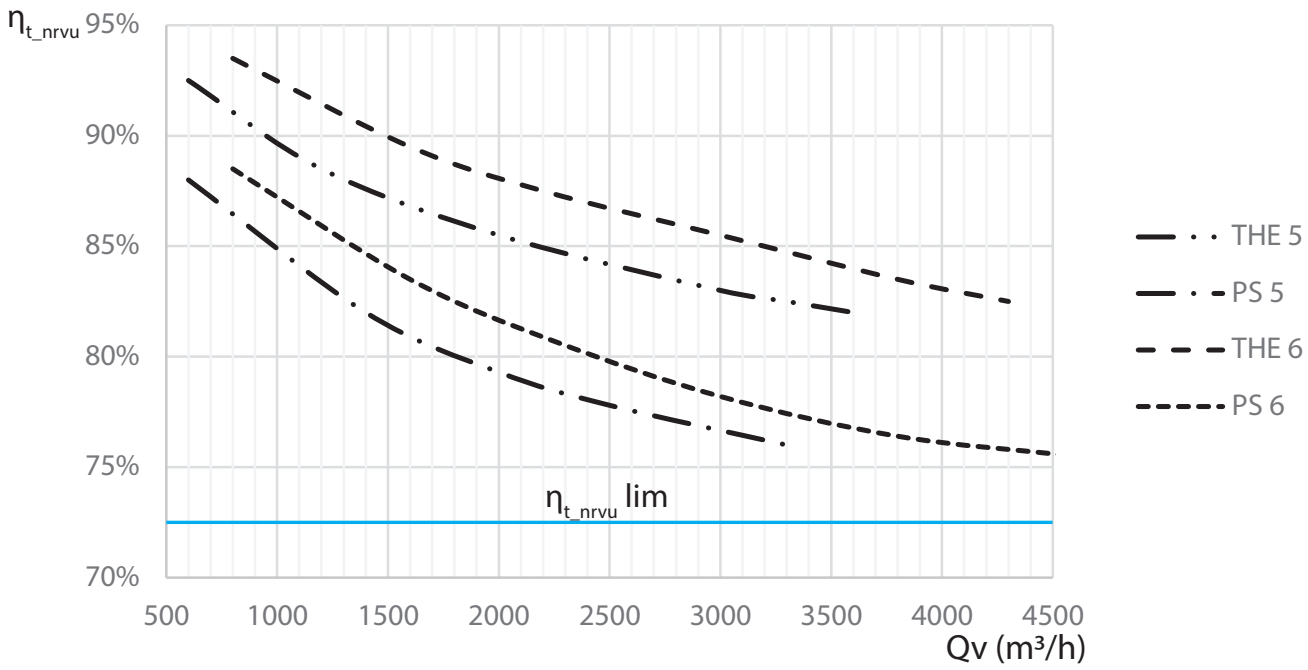
When it is necessary to replace the filters the icon will switch on.

Through 3 different dry contacts, the electronic board is also used to control:
- the **remote ON/OFF** function (contact C1-C1 closed = unit OFF).
- the "**Fire Alarm**" mode (contact C2-C2 open = fan off).

Interfacing with Modbus protocol

The machines are equipped with a Modbus communication port that enables the units to be included in a supervisory network, which can be consulted from an operating control unit for their remote tracking, control and monitoring.
Thanks to the interfacing with the Modbus protocol, finally, the network can be integrated into the more complex context of a global Building Management System.
The Technical Manual for interfacing units with Modbus protocol is available on request.

Thermal efficiency

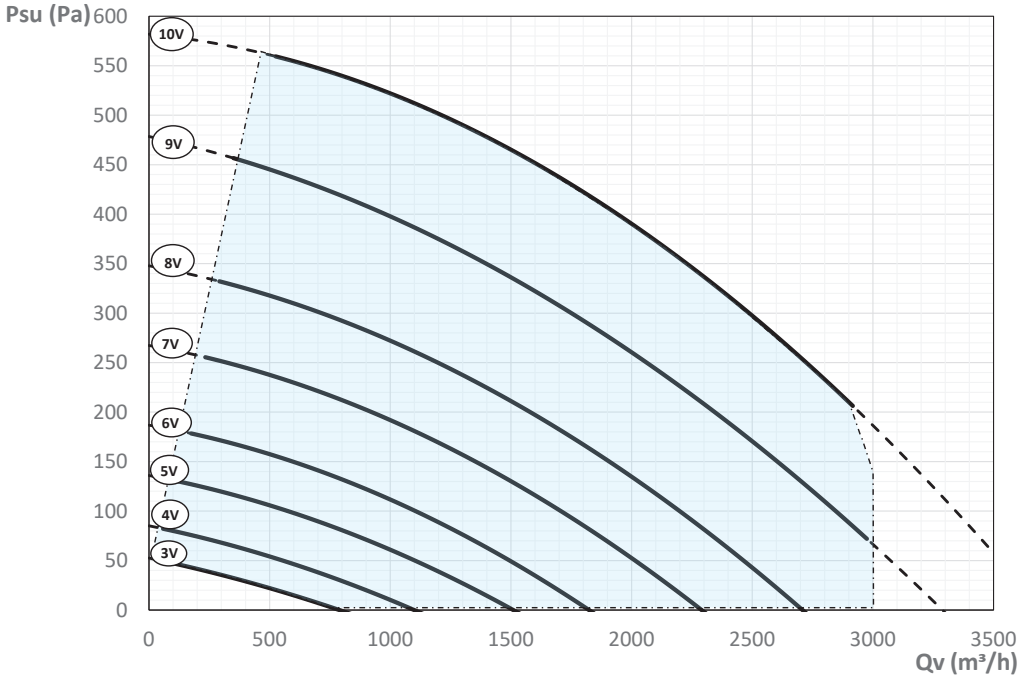


Qv = air flow
η_{t_nrvu} = heat recovered

THE AERAULIC PERFORMANCE

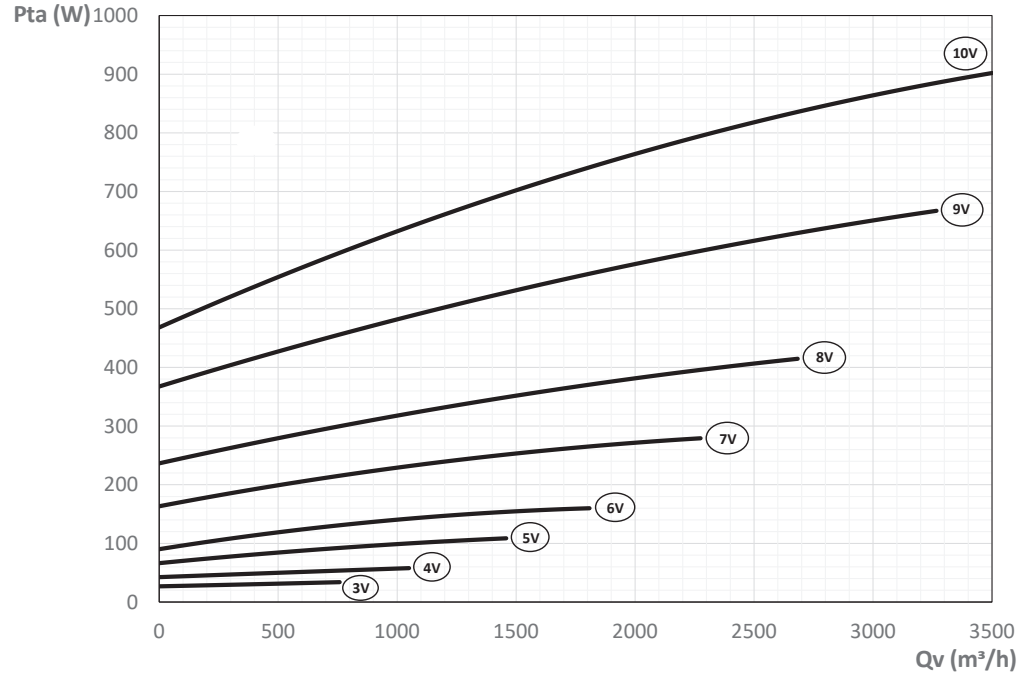
THE 5

Flow rate / available static pressure with ePM1 55% (F7) in both flows



= EU 1253/2014 Reg. working range ($SFP_{int} < SFP_{int,lim}$)
Psu = available static pressure
Qv = air flow

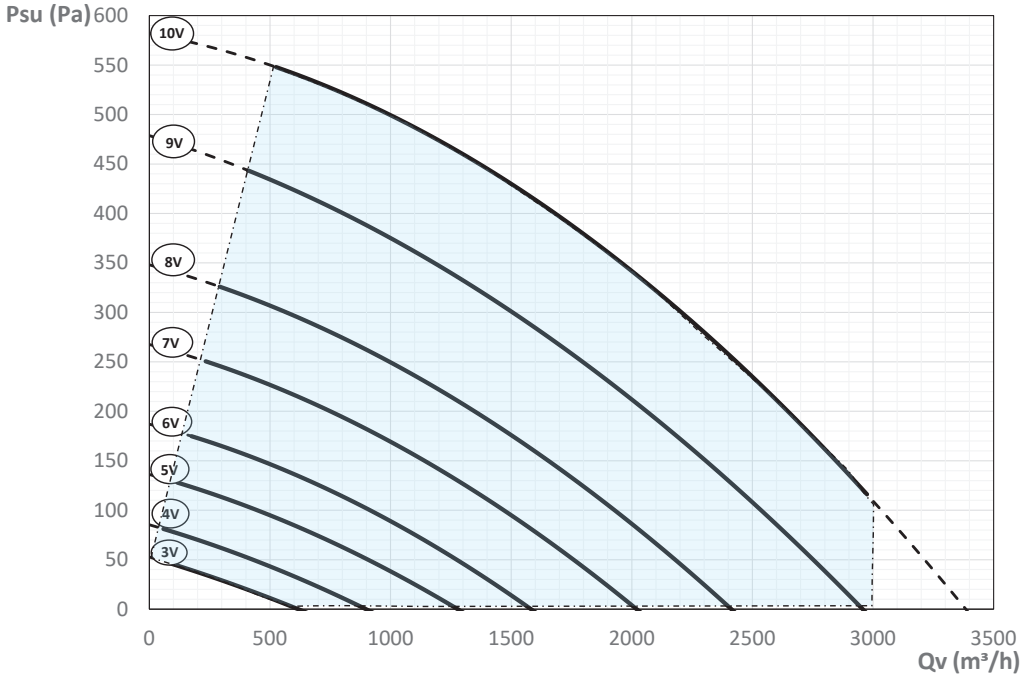
Flow rate / electric power input current with ePM1 55% (F7) in both flows



Pta = power input current
Qv = air flow

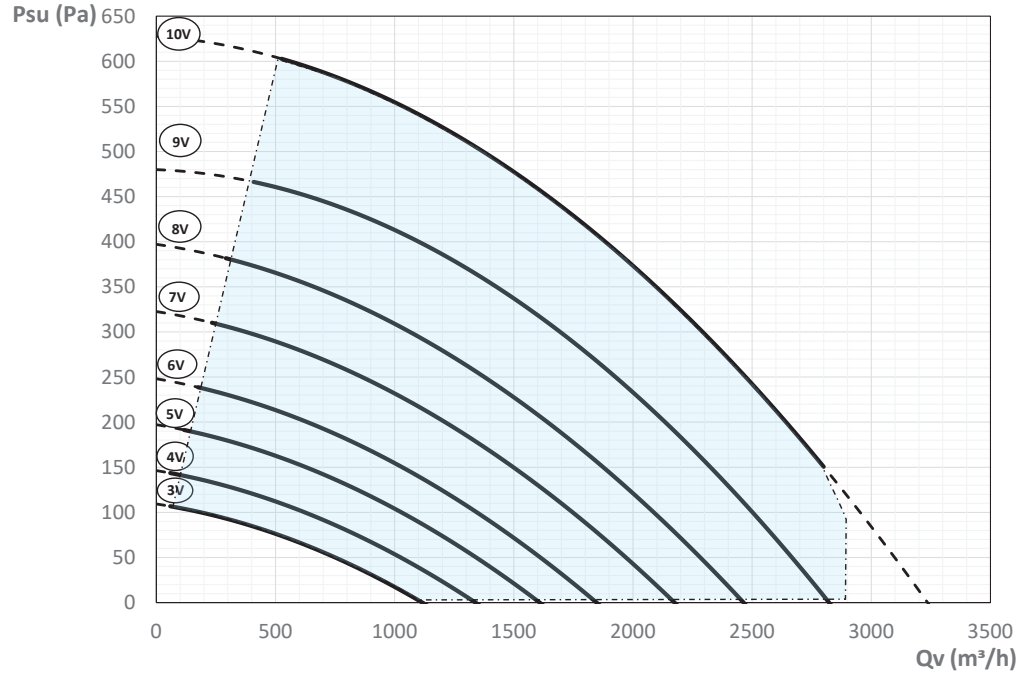
THE 5

Flow rate / available static pressure with filter ePM1 55% (F7) + ePM1 70% (F8; optional) fresh air side



= EU 1253/2014 Reg. working range ($SFP_{int} < SFP_{int,lim}$)
Psu = available static pressure
Qv = air flow

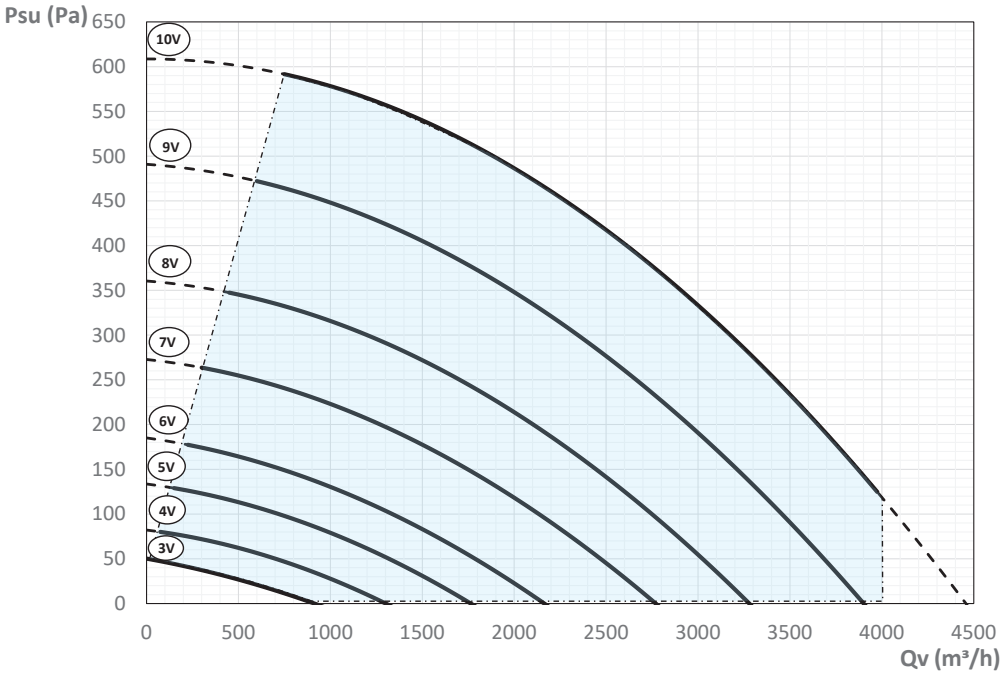
Flow rate / available static pressure with filter ePM1 55% (F7) + ePM1 85% (F9; optional) fresh air side



= EU 1253/2014 Reg. working range ($SFP_{int} < SFP_{int,lim}$)
Psu = available static pressure
Qv = air flow

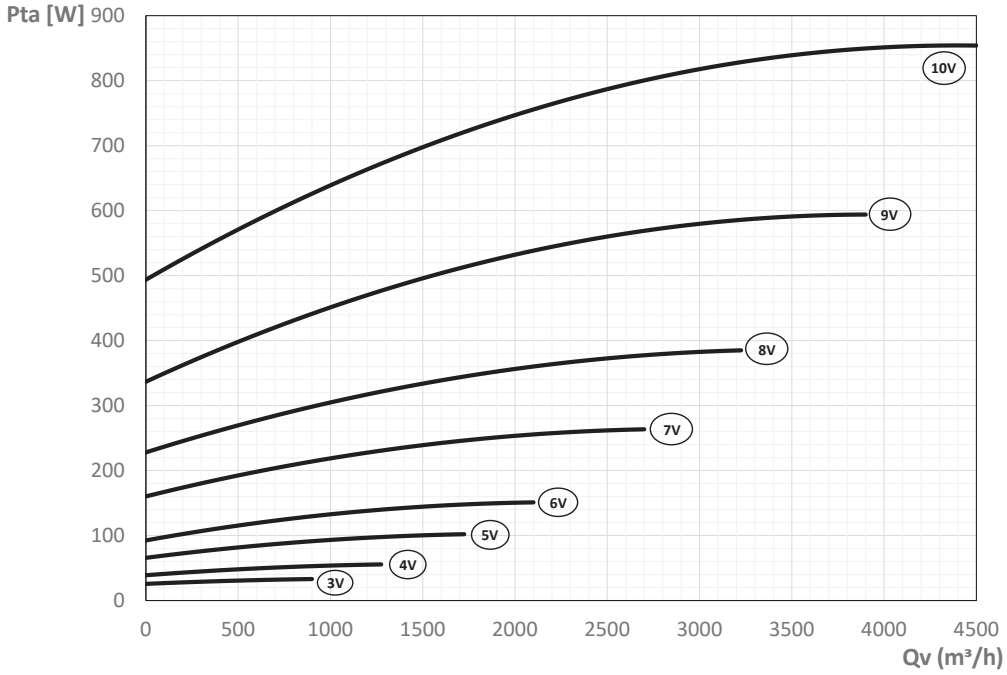
THE 6

Flow rate / available static pressure with ePM1 55% (F7) in both flows



= EU 1253/2014 Reg. working range ($SFP_{int} < SFP_{int,lim}$)
Psu = available static pressure
Qv = air flow

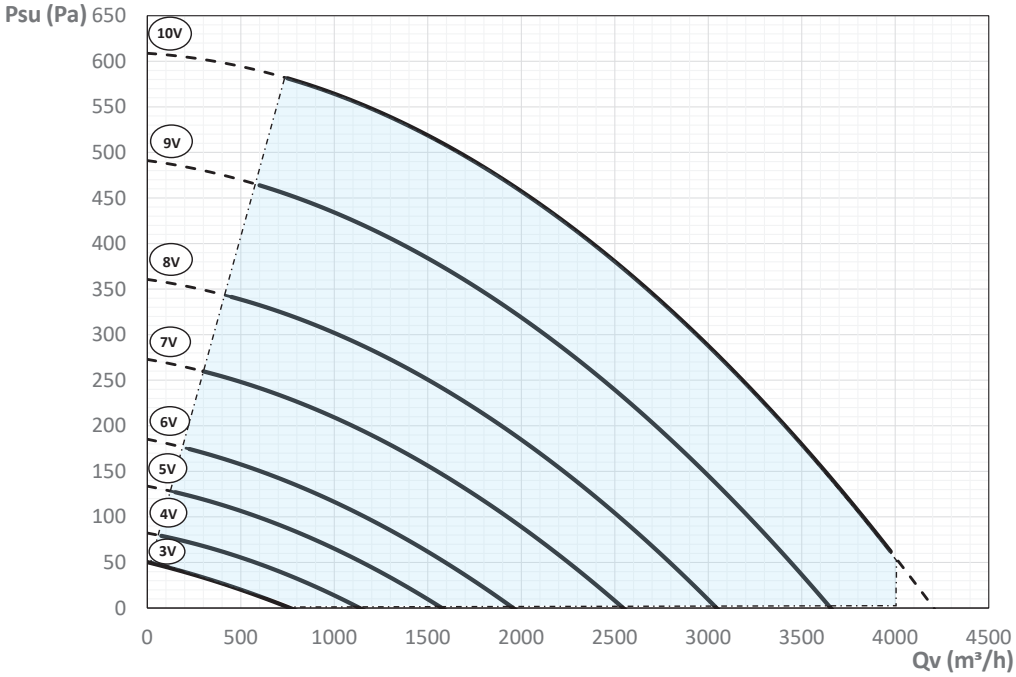
Flow rate / electric power input current with ePM1 55% (F7) in both flows



Pta = power input current
Qv = air flow

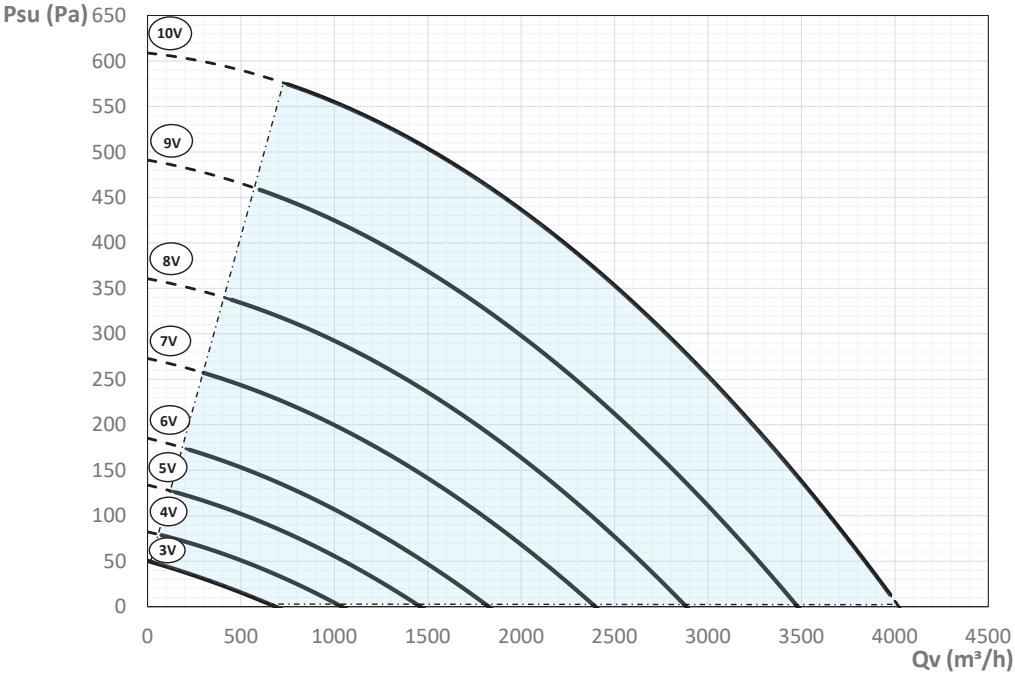
THE 6

Flow rate / available static pressure with filter ePM1 55% (F7) + ePM1 70% (F8; optional) fresh air side



= EU 1253/2014 Reg. working range ($SFP_{int} < SFP_{int,lim}$)
Psu = available static pressure
Qv = air flow

Flow rate / available static pressure with filter ePM1 55% (F7) + ePM1 85% (F9; optional) fresh air side

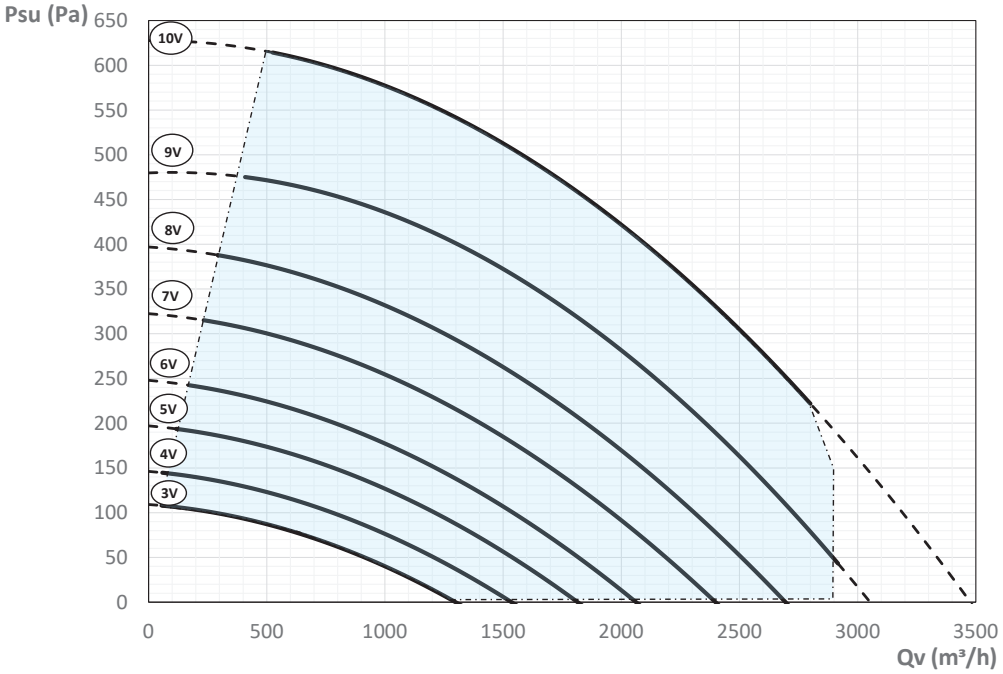


= EU 1253/2014 Reg. working range ($SFP_{int} < SFP_{int,lim}$)
Psu = available static pressure
Qv = air flow

PS AERAULIC PERFORMANCE

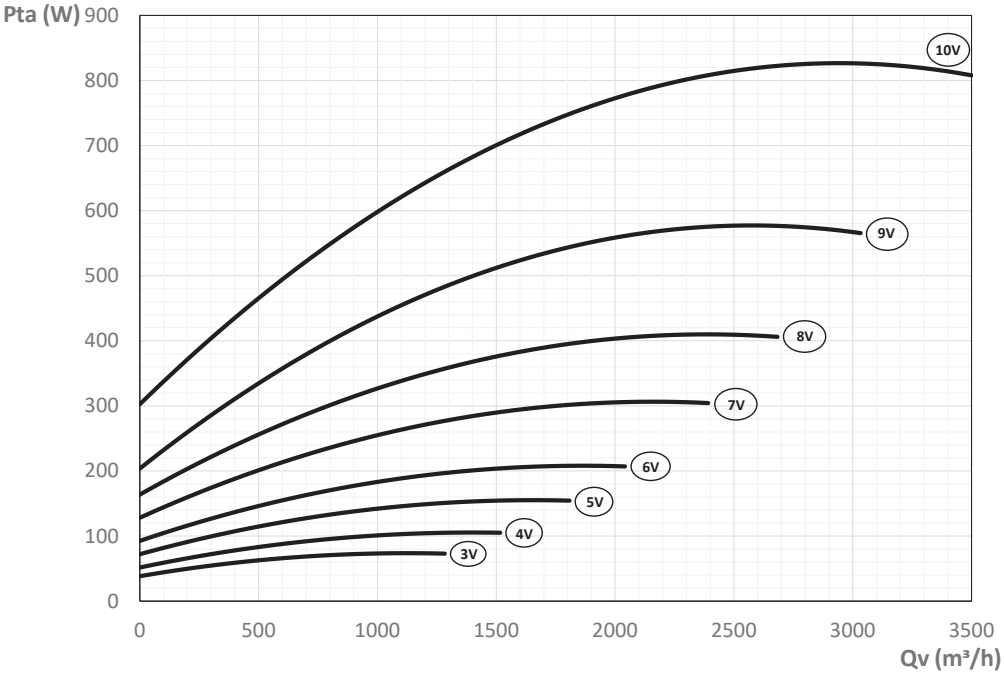
PS 5

Flow rate / available static pressure with ePM1 55% (F7) in both flows



= EU 1253/2014 Reg. working range ($SFP_{int} < SFP_{int,lim}$)
Psu = available static pressure
Qv = air flow

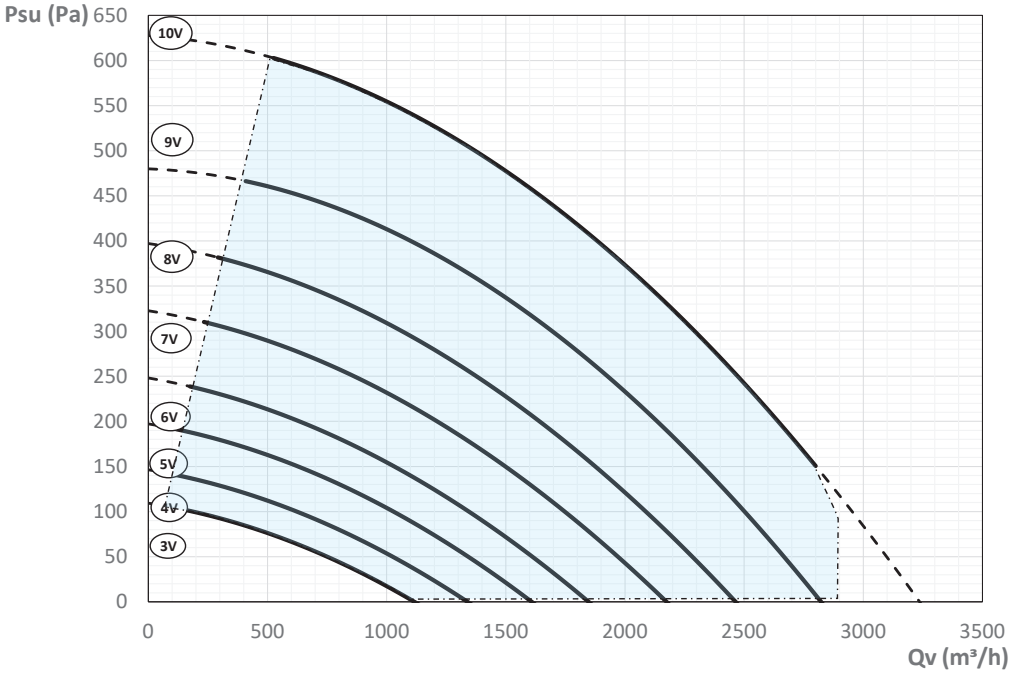
Flow rate / electric power input current with ePM1 55% (F7) in both flows



Pta = power input current
Qv = air flow

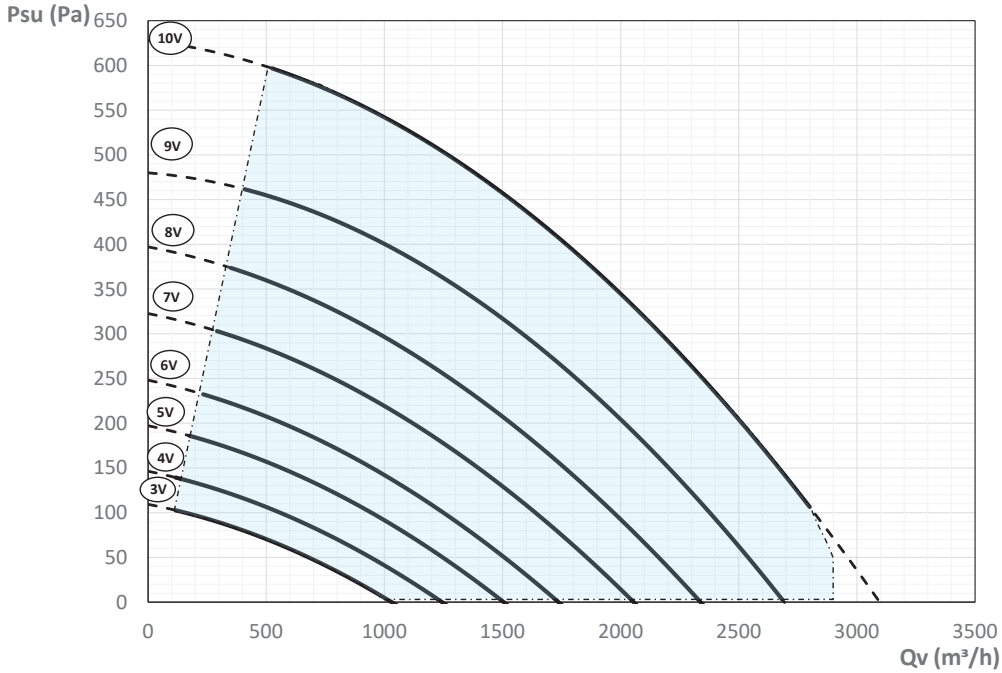
PS 5

Flow rate / available static pressure with filter ePM1 55% (F7) + ePM1 70% (F8; optional) fresh air side



= EU 1253/2014 Reg. working range ($SFP_{int} < SFP_{int,lim}$)
Psu = available static pressure
Qv = air flow

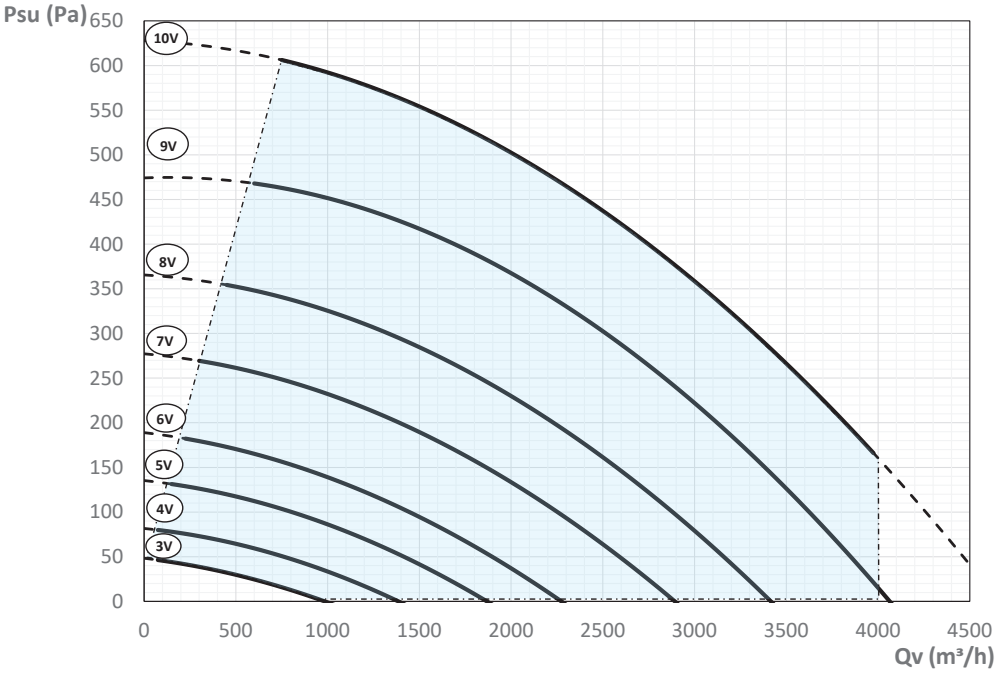
Flow rate / available static pressure with filter ePM1 55% (F7) + ePM1 85% (F9; optional) fresh air side



= EU 1253/2014 Reg. working range ($SFP_{int} < SFP_{int,lim}$)
Psu = available static pressure
Qv = air flow

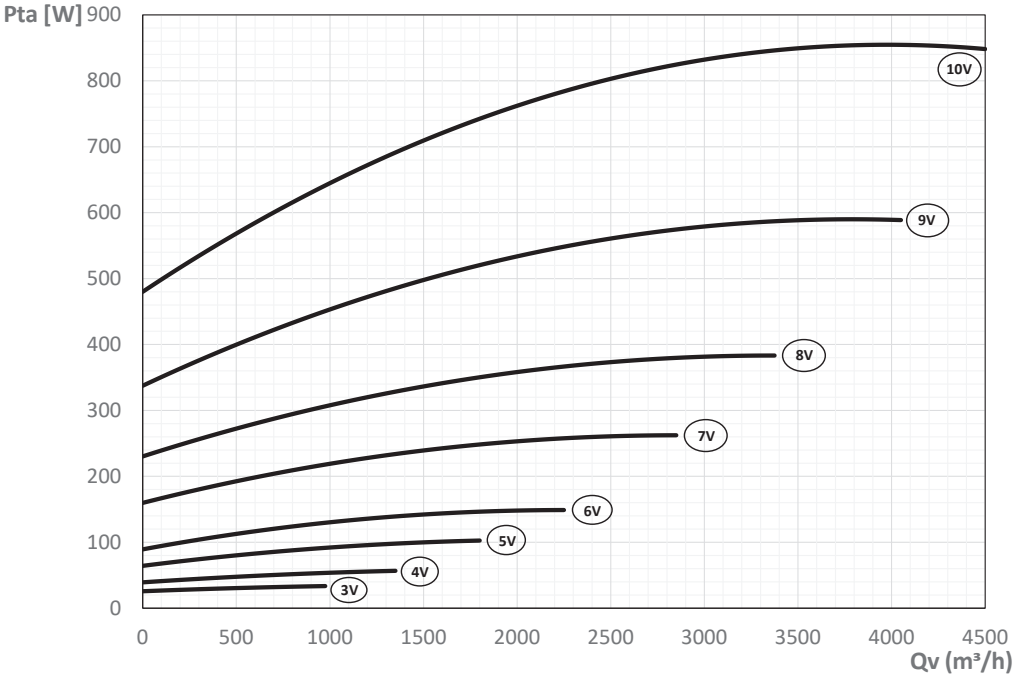
PS 6

Flow rate / available static pressure with ePM1 55% (F7) in both flows



= EU 1253/2014 Reg. working range ($SFP_{int} < SFP_{int,lim}$)
Psu = available static pressure
Qv = air flow

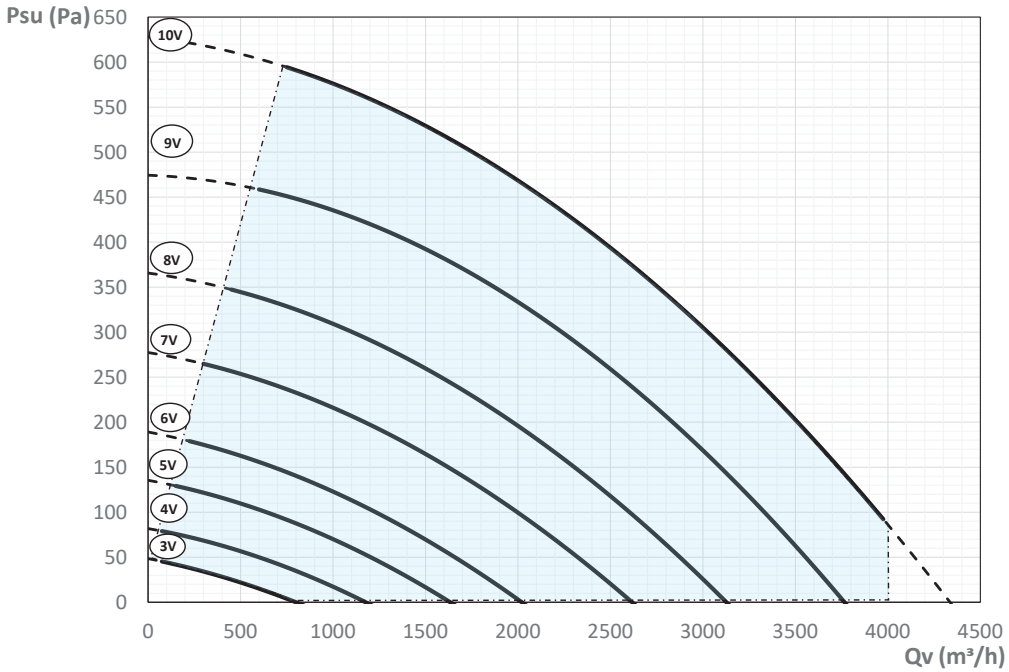
Flow rate / electric power input current with ePM1 55% (F7) in both flows



Pta = power input current
Qv = air flow

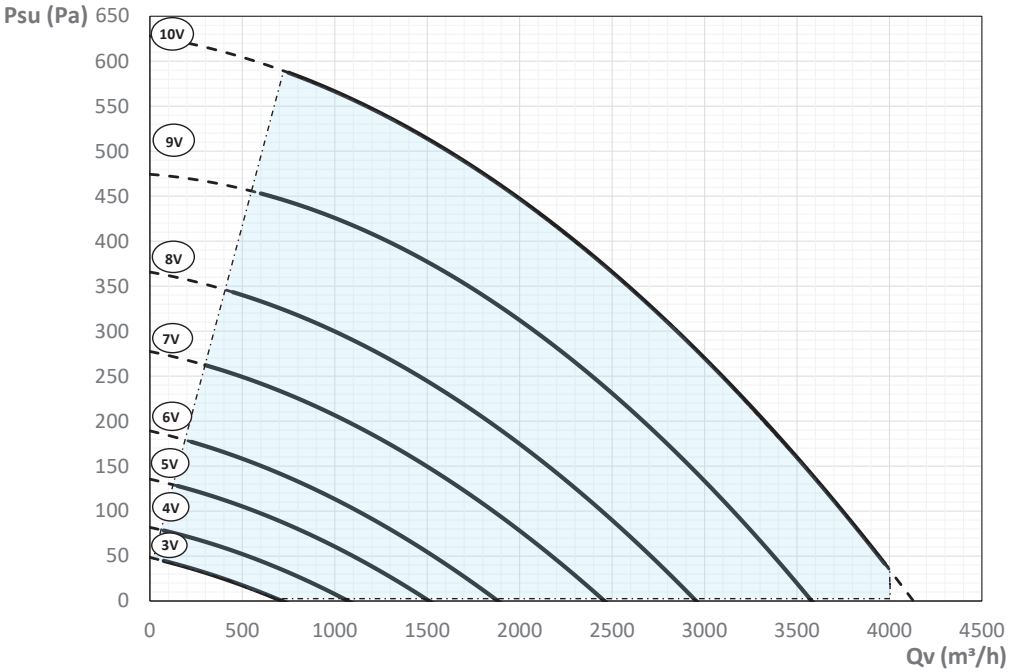
PS 6

Flow rate / available static pressure with filter ePM1 55% (F7) + ePM1 70% (F8; optional) fresh air side



= EU 1253/2014 Reg. working range ($SFP_{int} < SFP_{int,lim}$)
Psu = available static pressure
Qv = air flow

Flow rate / available static pressure with filter ePM1 55% (F7) + ePM1 85% (F9; optional) fresh air side



= EU 1253/2014 Reg. working range ($SFP_{int} < SFP_{int,lim}$)
Psu = available static pressure
Qv = air flow

EU 1253-14 REG. ANNEX V

Requirements relating to information for NRVU indicated in Article 4, paragraph 2.

Trade name of manufacturer	Energy Efficient THE		Energy Plus Smart PS	
Manufacturer model ID	**THE 5**	**THE 6**	**PS 5**	**PS 6**
HRS type	Static Countercurrent	Static Countercurrent	Static Countercurrent	Static Countercurrent
Heat recovery efficiency (%)	83	84	77	76
Nominal flow rate of the NRVU (m^3/s)	0,83	1,07	0,81	1,11
Effective power input current (W)	1520	1705	1385	1715
SFPint ($W/m^3/s$)	1301	1120	1091	1018
SFPint_lim 2018 ($W/m^3/s$)	1305	1225	1099	1023
Nominal external pressure Δps, ext (Pa)	140	150	150	150
Front speed at design flow rate (m/s)	1,62	1,66	1,57	1,72
Internal pressure drop of ventilation components Δps, int (Pa)	349	362	260	305
Static efficiency of fans used as per Regulation (EU) No. 327/2011	60	61	53	62
Declared maximum percentage of external leakage (%) EN 13141-7	<1,5%	<1,5%	<1,5%	<1,5%
Declared maximum percentage of internal leakage (%) EN 13141-7	<3%	<3%	<3%	<3%
Energy performance or preferably energy classification of filters	Integrated filters supplied with the units: F7 - ePM1 55%			
Description of the visual filter warning signal for NRVUs intended to be used with filters	Each filtration section is equipped with a differential pressure switch that opens the circuit of an ohmic line directly reported to the electronic board. When the limit fouling is reached, beyond which it is advisable to replace the filter, the signal is perceived by the board and is sent back to the user interface display with the ID indication of the filter to replace. The filter replacement alarm is enabled for information purposes only and does not affect any of the functions of the unit. ventilation that remains unchanged.			
Sound power level at the enclosure (dB(A))	65	68	62	68
Internet address with disassembly instructions	www.sabiana.it			

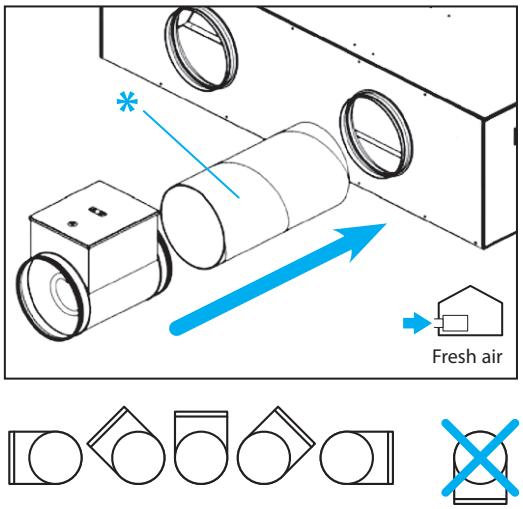
ACCESSORIES

BEP Antifreeze electric heater

(to be placed on the "Fresh air" inlet duct)

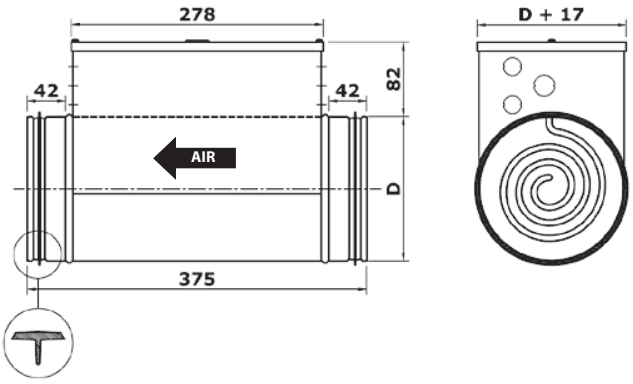
Electric heating coil consisting of armoured elements inserted inside a galvanised sheet metal duct section with circular flanges and rubber gasket.
The electric coil can be used in environments with air temperatures between -20 °C and +40 °C and is equipped with a double safety thermostat: one with automatic reset and one with manual reset.
The purpose of the pre-heating resistance is to prevent the heat exchanger from freezing and is controlled from the control board with PWM modulating logic according to the external and exhaust air temperature.
IP protection rating IP 43.

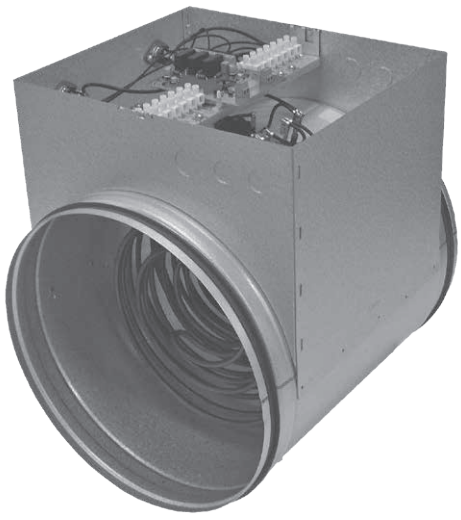
Model	THE 5	THE 6	PS 5	PS 6
Resistance abbreviation	BEP 40/9/T	BEP 64/12/T	BEP 40/9/T	BEP 64/12/T
Code	9022413	9022621	9022413	9022621
Nominal electric power input (kW)	9	12	9	12
Power supply voltage (V/Hz/Ph)	400V 50Hz 3ph + N + Pe			
Electric heater power input current (A)	13	17,3	13	17,3
Connection size (mm)	Φ 400	600x400	Φ 400	600x400
Minimum air flow rate (m^3/h)	690	690	690	690



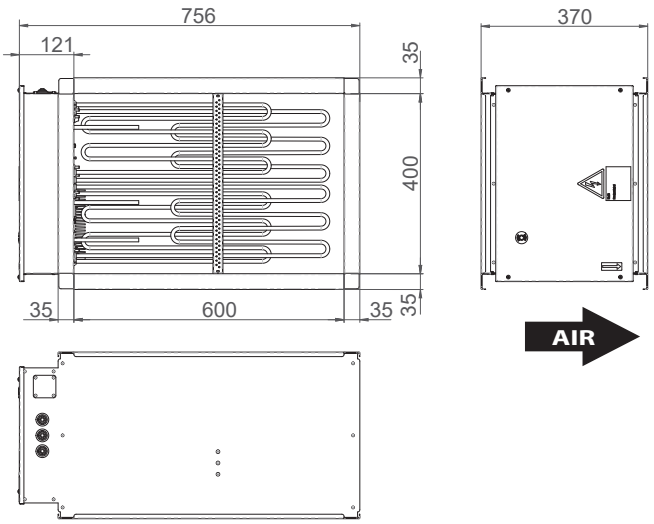
* = duct fitted by the installer; example of circular connection

Electric heater for THE5 / PS5





Electric heater for THE6 / PS6



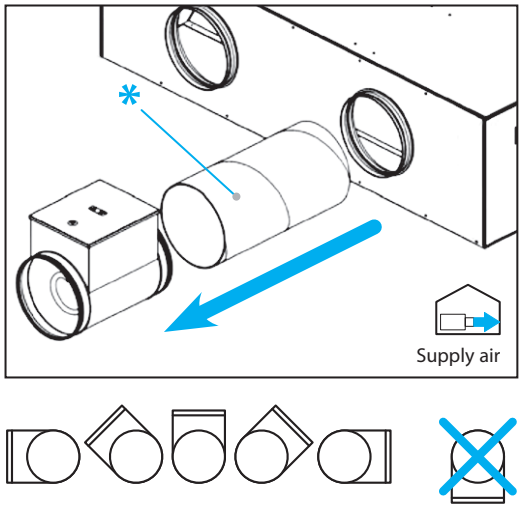
BER post heating electric heater

(to be placed on the "Supply Air" duct)

Electric heating coil consisting of armoured elements inserted inside a galvanised sheet metal duct section with circular flanges and rubber gasket.
The electric coil can be used in environments with air temperatures between -20 °C and +40 °C and is equipped with a double safety thermostat: one with automatic reset and one with manual reset.

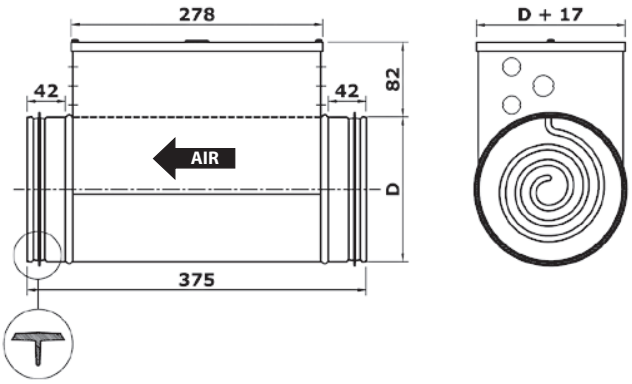
Operation is controlled by the ON/OFF logic control based on the inlet temperature, by installing the ENP PT2 accessory probe downstream of the resistance, or ambient air.
An adjustable thermostat, which acts as a limit, is placed on the outlet of the heating element.
IP protection rating IP 43.

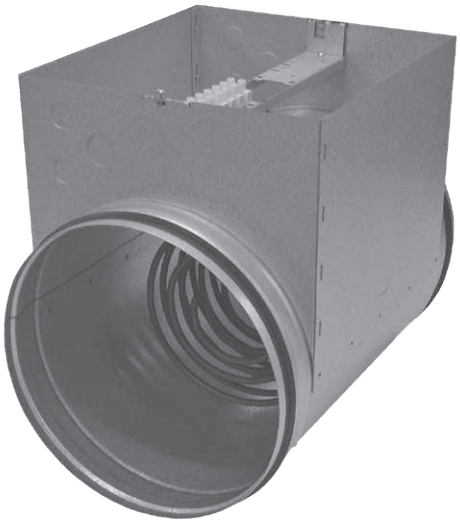
Model	THE 5	THE 6	PS 5	PS 6
Resistance abbreviation	BER 40/6/T	BER 64/9/T	BER 40/6/T	BER 64/9/T
Code	9022414	9022613	9022414	9022613
Nominal electric power input (kW)	6	9	6	9
Power supply voltage (V/Hz/Ph)	400V 50Hz 3ph + N + Pe			
Electric heater power input current (A)	8,7	13	8,7	13
Connection size (mm)	Φ 400	600x400	Φ 400	600x400
Minimum air flow rate (m^3/h)	690	690	690	690



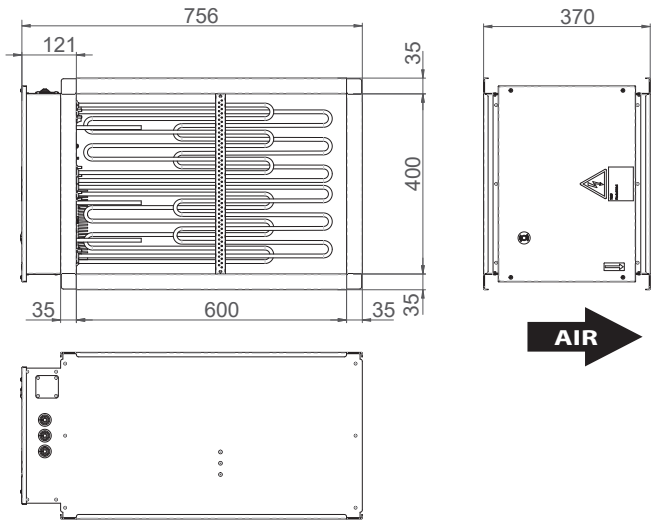
* = duct fitted by the installer; example of circular connection

Electric heater for THE5 / PS5



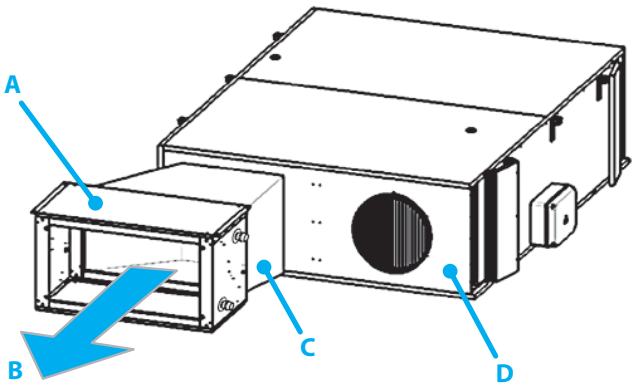


Electric heater for THE6 / PS6



Air handling section with 4 row coil - Ocean ECM SBF

The Ocean ECM SBF or Ocean ECM SFE-DP sections can be combined with the Energy Efficient THE and Energy Plus Smart PS recovery units; this combination is made possible by using the appropriate connection plenum.
The SBF sections are equipped with a 4 row coil suitable for chilled water supply.
The table below shows the recommended combinations. When ordering, indicate the connection side of the coil section; in the figure, the connection side is left.
In order to control the air supply temperature, the accessory probe ENP PT2 must be installed downstream of the coil.



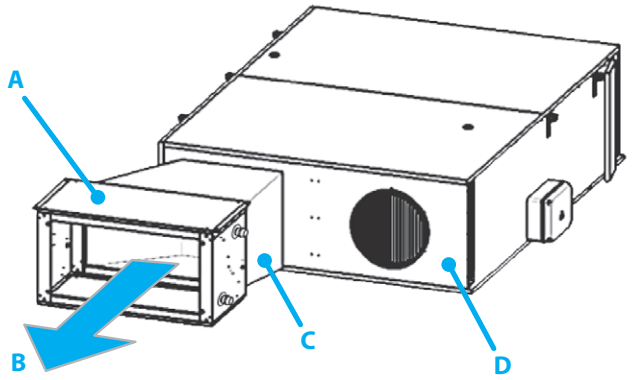
A = Ocean ECM SBF section
B = air flow
C = plenum
D = Energy Efficient THE and Energy Plus Smart PS

For recovery unit	Connecting plenum			Air handling section with 4 row coil - Ocean ECM			Flat flange for duct connection *	
	ID	Code		ID	Code		ID	Code
THE/PS 5	ENP 5	9035245	+	SBF 44	0035374	+	FMP/FRP 4	9035224
THE/PS 6	ENP 6	9035246	+	SBF 54	0035375	+	FMP/FRP 5	9035225

* = To connect the ducts, two flat flanges are required, to be mounted on both inlets of the Ocean section.

Section with pre-filter and Crystall electrostatic filter - Ocean ECM SFE-DP

SFE DP sections are equipped with a Crystall electrostatic filter suitable for purifying the air.
The table below shows the recommended combinations.

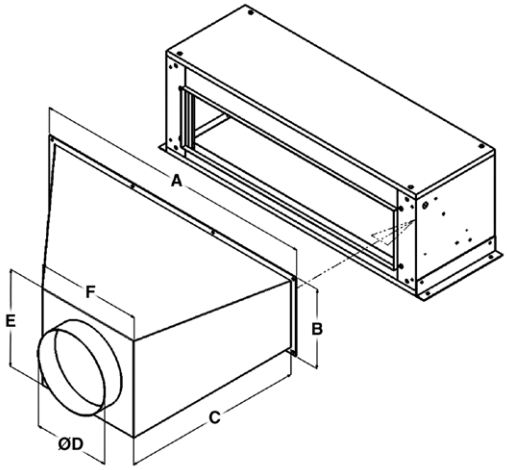


A = Ocean ECM SBF section
B = air flow
C = plenum
D = Energy Efficient THE and Energy Plus Smart PS

For recovery unit	Connecting plenum			Section with pre-filter and Crystall electrostatic filter - Ocean ECM			Flat flange for duct connection *	
	ID	Code		ID	Code		ID	Code
THE/PS 5	ENP 5	9035245	+	SFE-DP-4	0035744	+	FMP/FRP-4	9035224
THE/PS 6	ENP 6	9035246	+	SFE-DP-5	0035745	+	FMP/FRP-5	9035225

*** To connect the ducts, two flat flanges are required, to be mounted on both inlets of the Ocean section.**

Connecting Plenum for air treatment Section with ECM Ocean 4-row coil and the Section with pre-filter and electrostatic filter



For recovery unit			THE 5	THE 6	PS 5	PS 6
Connecting plenum	ID		ENP 5	ENP 6	ENP 5	ENP 6
	Code		9035245	9035246	9035245	9035246
Dimensions	A	mm	1367	1367	1367	1367
	B	mm	340	395	340	395
	C	mm	600	600	600	600
	D	mm	400	450	400	450
	E	mm	472	522	472	522
	F	mm	492	542	492	542
Ocean ECM model			4	5	4	5

Accessory probe for post-treatment based on the inlet temperature

The Energy Efficient THE and Energy Plus Smart PS units offer the possibility of regulating the operation of post-treatments in two different modes.

Room temperature control uses the T3 temperature probe, positioned on the exhaust air flow.

To use this logic, no changes to the positioning of the unit's probes are required.

Controlling the inlet temperature allows you to keep the temperature of the air introduced into the rooms constant.

To use this logic, it is mandatory to move the T2 probe inside the unit, positioning it downstream of the post-treatment elements.

It will then be necessary to order the accessory temperature probe.

Description	ID	Code
Post treatment 5 m PT1000 sensor	ENP PT2	9022511

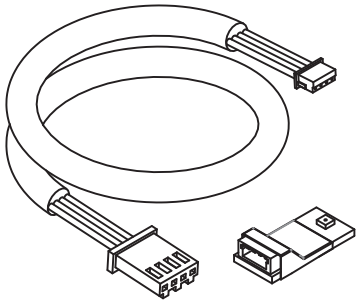
Constant flow control

Pressure transducer for the constant flow control.

ID	Code
ENP-DP-S	9022021
ENP-DP-M	9022022

Humidity sensor

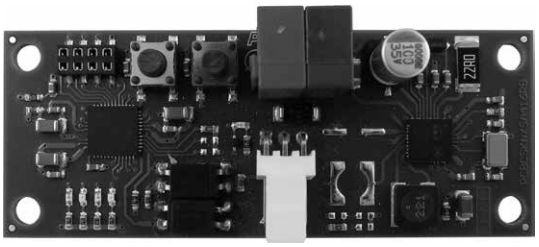
Sensor mounted inside the unit to measure the humidity in the air extracted from the room.



ID	Code
ENP-SU	9022020

KNX Interface kit

The Energy Efficient THE and Energy Plus Smart PS units, in addition to a Modbus system, have the possibility of being monitored and controlled by a KNX supervision system.
The connection of the recovery unit to the Konnex building automation standard is possible thanks to the KNX interface board, available as an accessory.
This board is supplied with the cable for connecting the board itself to the electronic board of the Energy Efficient THE and Energy Plus Smart PS units, and the fixing support for quick and easy installation inside the ventilation unit.



ID	Code
KNX-RVU	9021109

24 VDC power supply for IAQ sensors

In the ENY-THE units, a 24 VDC power supply is available as standard inside the electrical panel to power the IAQ sensors.
For ENY-PS units the power supply is optional.

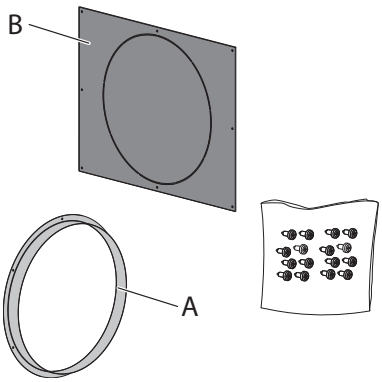
ID	Code
ENP-ALM	9022023

Adapter for DN 450 connections or for the use of ENY-THE/PS6 lateral connections

It is possible to change the duct side from the front connection to the side connection.
Using the kit it is also possible to transform the front connection from rectangular to circular.
Kit composition:

A. circular spigot
B. rectangular panel

Accessory hardware is included in the kit.



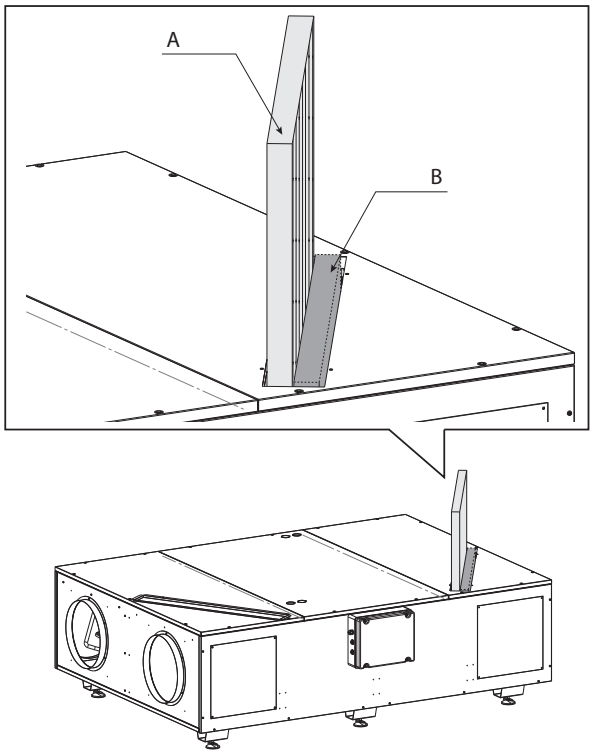
ID	Code
ENP-AD-6	9022024

Optional filters ePM1 70% (F8) and ePM1 85% (F9)

Supply air side (optional) filters available in two versions:

- ePM_1 70% (F8) in accordance with ISO 16890 (class F8 in accordance with EN 779)
- ePM_1 85% (F9) in accordance to ISO 16890 (class F9 in accordance with EN 779)

Filter size table		Class ISO 16890	Code
THE/PS 5	Filter 550x935x48 mm	ePM1 70%	6022438
		ePM1 85%	6022439
THE/PS 6	Filter 690x935x48 mm	ePM1 70%	6022638
		ePM1 85%	6022639



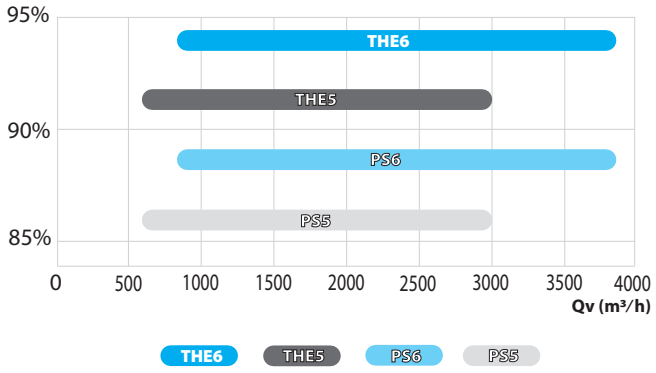
A = optional filter
B = standard filter ePM_1 55% (F7)

SELECTION EXAMPLE

The aim here is to install a primary air ventilation system with very high thermal recovery performance in an average-sized store.
The ventilation unit is to be inserted in a 4-pipe central air conditioning system provided by the owner and used for water terminals.
The store is located in a climate area characterised by cold winter temperatures (climate area E, design temperature -8°C).
Primary air is to be used as the energy carrier for summer air conditioning.
The design data for selection of the machine are summarised below:

- **Useful surface area: 400 m²**
- **Crowding index: 0,25 pers/m²**
- **Circulation flow per capita: 25 m³/h pers**
- **Total circulation flow: 2500 m³/h**

Using the quick selection table you can immediately identify the most suitable Energy Efficient THE and Energy Plus Smart PS model and the necessary accessories:



Supply configuration selected:

- Model = ENY-TH5
- Antifreeze resistance = BEP35/6/T CHANGE VALUE
- Cooling water coil = BAE 3

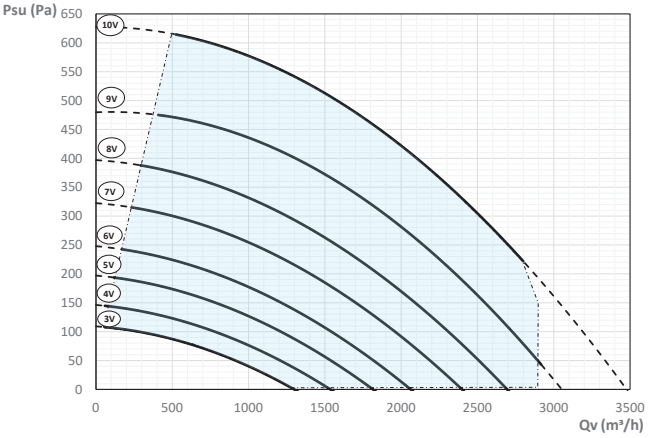
After selecting the most appropriate model in the **Energy Efficient THE and Energy Plus Smart PS** range, it is possible to identify the parameters for correct calibration of the machine and, therefore, the characteristic performance parameters.
The control voltage at which to control the EC fan motors depends on:

- the design static pressure of the supply and return air circuits of the machine with the addition of the pressure drops due to the accessories.
- design imbalance between the supply and return air flow rate. In this case, the supply/return ratio is 80% due to the presence of extractors in the bathrooms and the desire to ensure overpressure in the space in relation to outside.

Qr = 2500*0,8 = 2000 m³/h

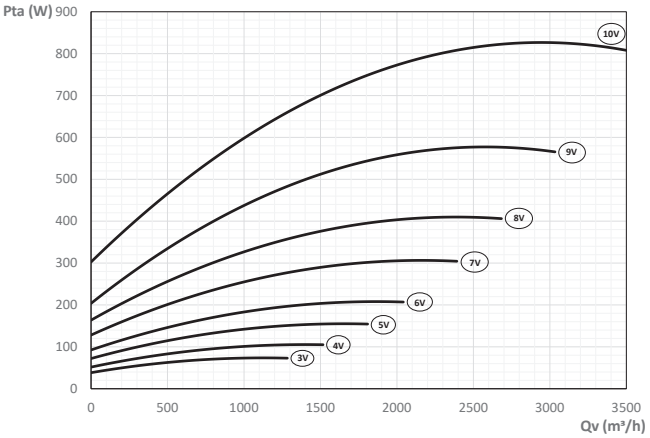
The Flow Rate/Actual Static Pressure diagrams allow you to identify the calibration control voltage for the two circuits and estimate the power absorbed by the machine with the resistance disabled.

Flow rate / available static pressure with ePM1 55% (F7) in both flows



= EU 1253/2014 Reg. working range ($SFP_{int} < SFP_{int,lim}$)
Psu = available static pressure
Qv = air flow

Flow rate / electric power input current with ePM1 55% (F7) in both flows



Pta = power input current
Qv = air flow

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Vincenzo Delacqua
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