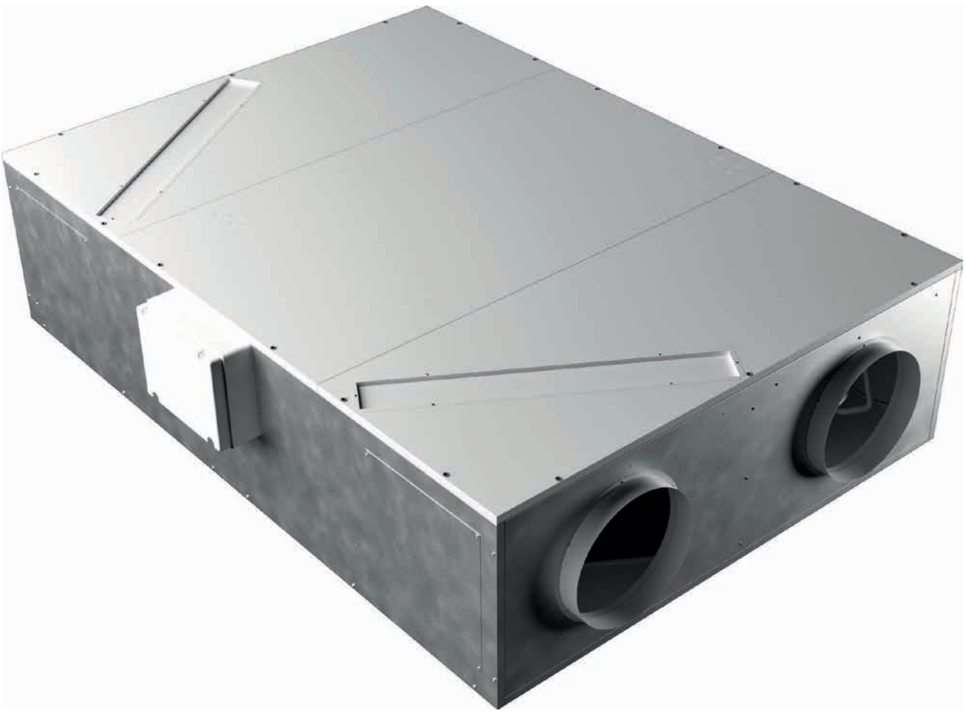
Recovery Units

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%.

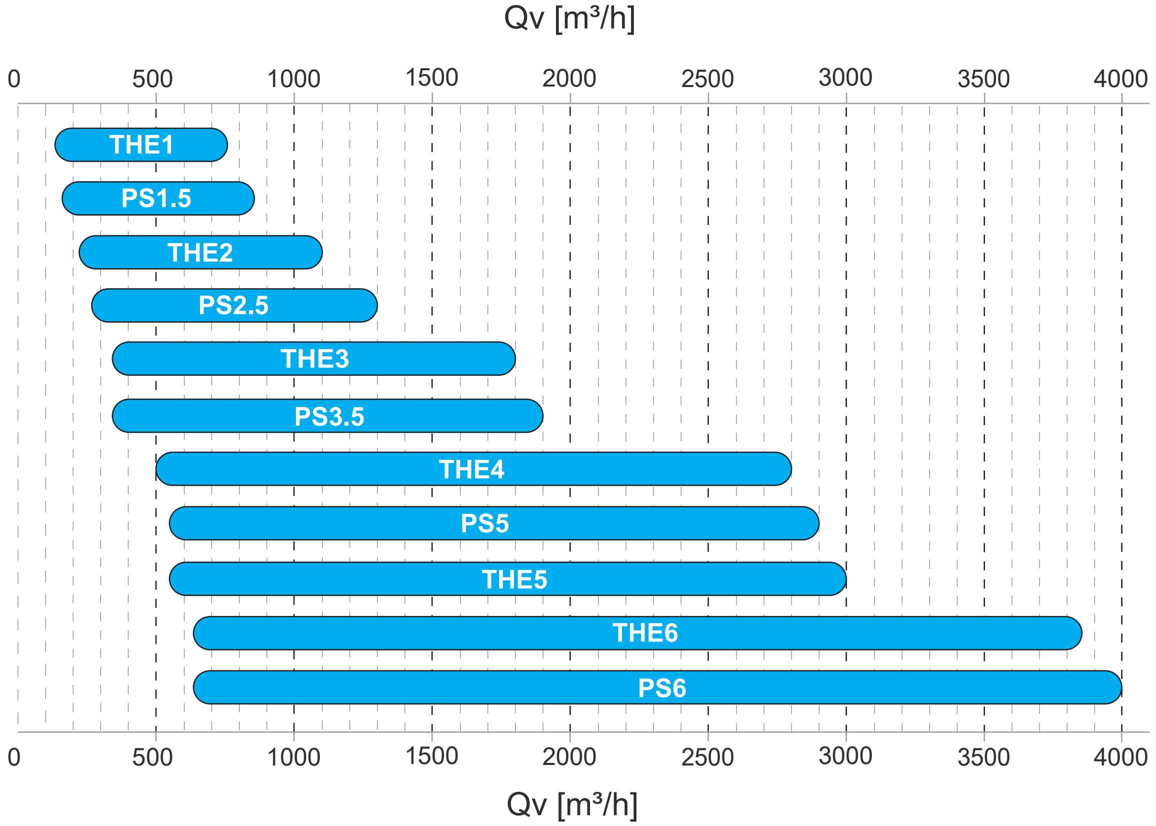
The heat exchange between the exhaust air and the inlet air takes place through a static heat exchanger with countercurrent flow, sized to obtain a heat recovery up to 94%.

The series includes 11 construction models suitable for internal horizontal installation and cover a range of flow rates from 150 to 4000 m³/h.

Their reduced thickness makes them ideal for the ceiling and floor installation on proper feet.

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

Minimum/maximum air flow rate



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

CONSTRUCTION FEATURES

Construction features

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

- for ceiling installation ENY-THE size from 1 to 6 and ENY-PS size from 1.5 to 6
- for floor installation ENY-THE size from 1 to 6 and ENY-PS size from 1.5 to 6

ENY - THE 5 - S

model
THE Energy Efficient
PS Energy Plus Smart

size 1...6

version
P floor
S ceiling

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.

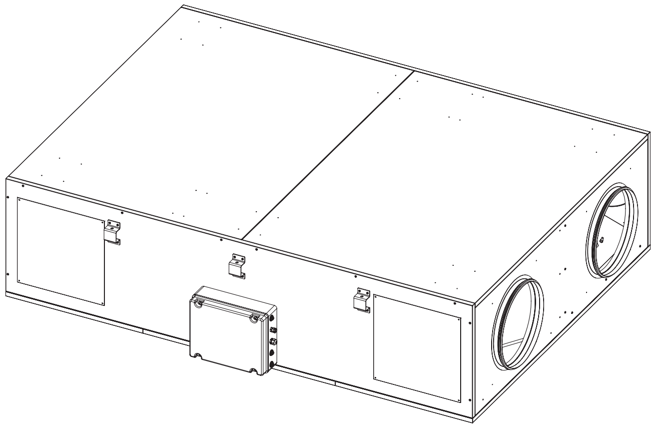
All the units are equipped with an automatic bypass system that totally disables use of the heat recovery unit to permit free-cooling (or free-heating).

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

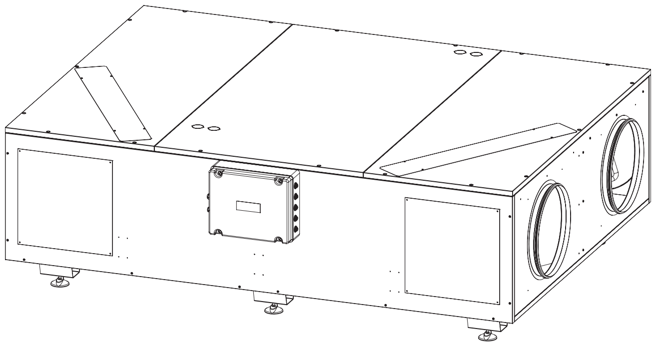
Support and coupling systems

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

Very easy maintenance thanks to fast disassembly of the panels (upper or lower in accordance with the version) 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)

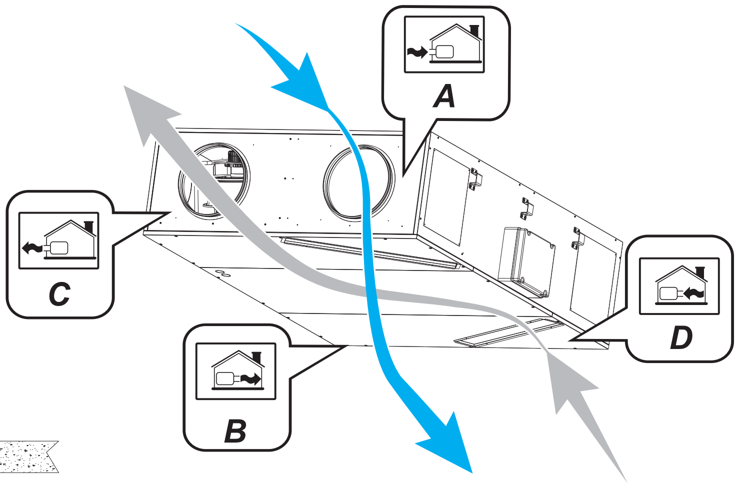
Possibility of variable flow control according to the measured concentration of CO_2 and relative humidity (rH).

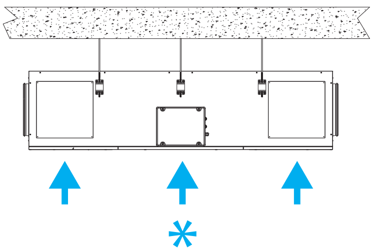
Flow control also works with both sensors connected at the same time.

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

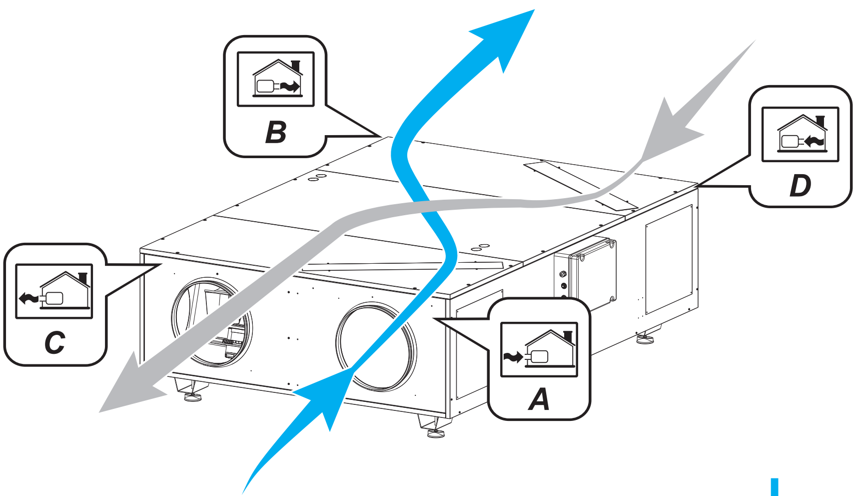
Ceiling unit

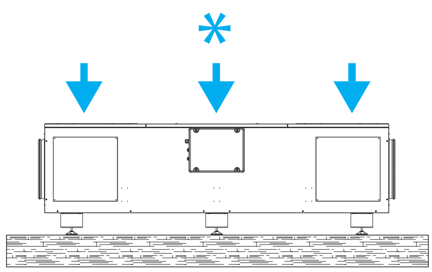




A = fresh air
B = supply air
C = exhausted air
D = extracted air
* = inspection side

Floor unit

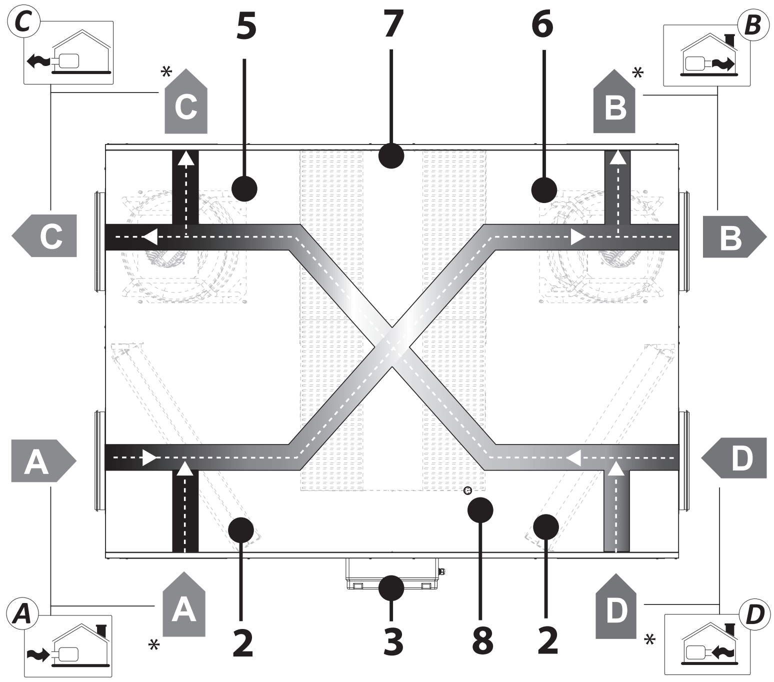




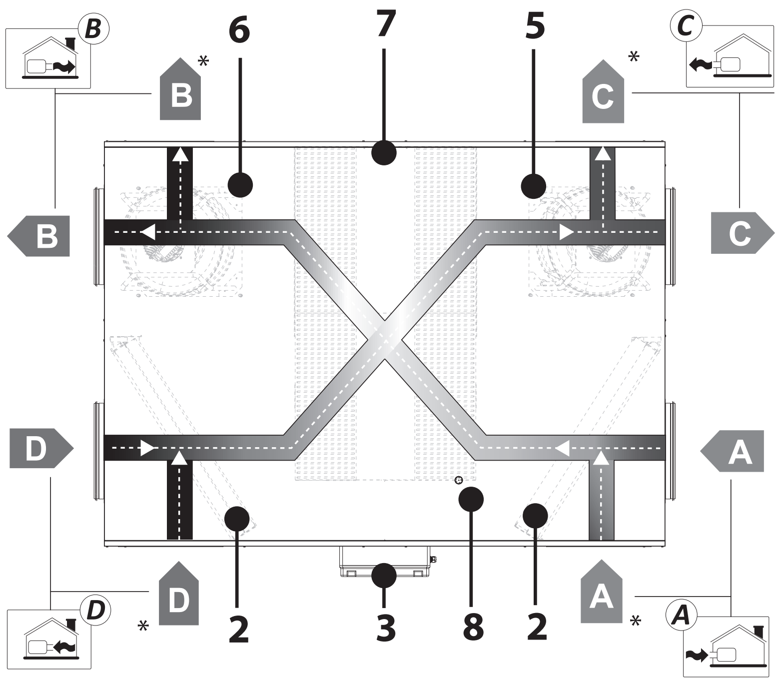
A = fresh air
B = supply air
C = exhausted air
D = extracted air
* = inspection side

Identification of flows

Standard flows as per factory settings



Inverted flows



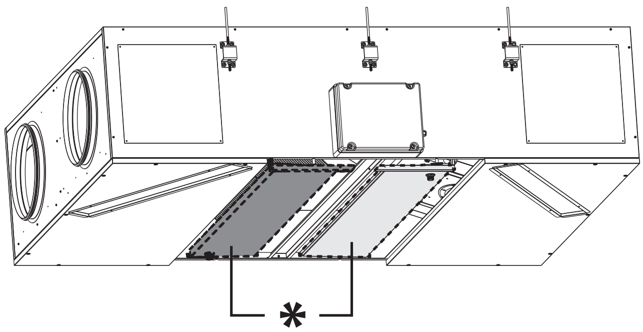
A = fresh air
B = supply air
C = exhausted air
D = extracted air
2 = filters
3 = control panel
5 = air fan (expulsion)
6 = air fan (supply)
7 = recovery unit
8 = drain tray
* = optional side connection flows

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.

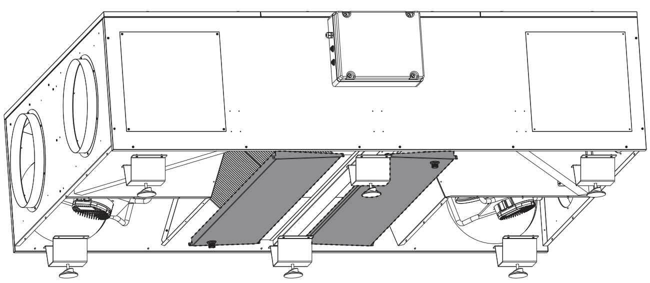
Flow reversibility for ceiling installation model



* = condensate collection tray to fit on both sides

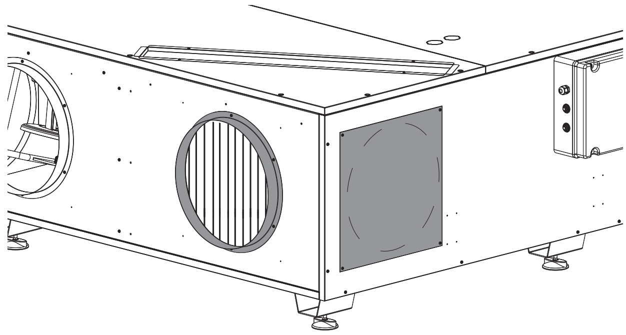
- In the event of floor installation, in which the lower inspection panels cannot be removed, the machine is supplied with two collection trays set-up for both possible configurations.

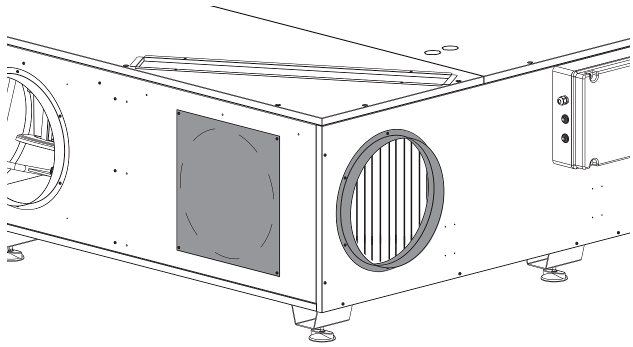
Flow reversibility for floor installation model



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

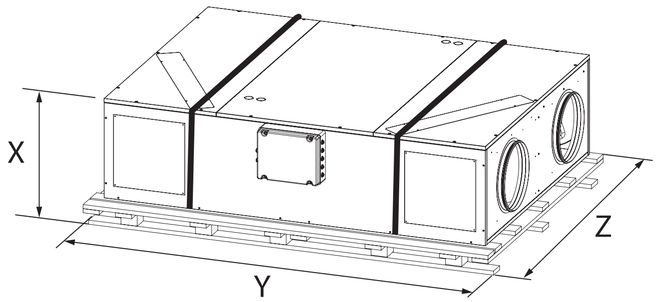
Characteristic technical data

		High efficiency THE version					
		THE 1	THE 2	THE 3	THE 4	THE 5	THE 6
Nominal supply and extract air flow rate	m^3/h	720	1100	1800	2800	3000	3850
	m^3/s	0,200	0,306	0,500	0,778	0,83	1,07
Nominal available static pressure	Pa	140	150	180	150	140	150
Minimum flow rate	m^3/h	150	300	400	500	500	600
Maximum heat recovery efficiency (1)	%	90	90	90	90	90	90
Total heat recovered (1)	kW	6,5	9,9	16,3	25,3	27,1	34,8
Heat recovery efficiency (2)	%	87	88	87	88	87	88
Total heat recovered (2)	kW	5,2	8,1	13,1	20,6	21,8	28,3
Heat recovery efficiency (3) according to EN 308	%	82	83	81	84	83	84
Total heat recovered (3)	kW	4,0	6,2	10,0	16,1	17,0	22,1
Unit sound power level	dB(A)	56	63	62	62	65	68
Rated power input current	kW	0,3	0,77	1,3	1,7	1,8	1,8
Maximum total power input current	A	1,2	3,6	5,6	7	2,9	2,8
Power supply	V	230	230	230	230	400	400
	Ph	1Ph+N	1Ph+N	1Ph+N	1Ph+N	3Ph+N	3Ph+N
Protection	-	IP20	IP20	IP20	IP20	IP20	IP20
Weight	kg	110	150	180	290	290	310

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

		PS version				
		PS1.5	PS2.5	PS3.5	PS5	PS6
Nominal supply and extract air flow rate	m^3/h	850	1300	1900	2900	4000
	m^3/s	0,236	0,361	0,528	0,806	1,111
Nominal available static pressure	Pa	140	140	180	150	150
Minimum flow rate	m^3/h	180	300	400	500	600
Maximum heat recovery efficiency (1)	%	89	86	84	84	84
Total heat recovered (1)	kW	7,6	11,2	16,0	24,4	33,7
Heat recovery efficiency (2)	%	86	84	82	82	82
Total heat recovered (2)	kW	6,1	9,1	13,0	19,8	27,4
Heat recovery efficiency (3) according to EN 308	%	81,5	80	77	77	76
Total heat recovered (3)	kW	4,7	7,1	10,0	15,3	20,8
Unit sound power level	dB(A)	60	62	62	62	68
Rated power input current	kW	0,77	1,3	1,3	1,7	1,8
Maximum total power input current	A	3,6	5,6	5,6	7	2,8
Power supply	V	230	230	230	230	400
	Ph	1Ph+N	1Ph+N	1Ph+N	1Ph+N	3Ph+N
Protection	-	IP20	IP20	IP20	IP20	IP20
Weight (kg)	kg	110	150	175	265	300

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



Packed unit external dimensions

Model		THE 1	THE 2	THE 3	THE 4	THE 5	THE 6
X	mm	469	510	595	735	735	880
Y	mm	1845	1895	2245	2500	2500	2500
Z	mm	1030	1330	1430	1880	1880	1880

Model		PS 1.5	PS 2.5	PS 3.5	PS 5	PS 6
X	mm	469	510	595	735	880
Y	mm	1845	1895	2245	2500	2500
Z	mm	1030	1330	1430	1880	1880

Weight with packaging

Model		THE 1	THE 2	THE 3	THE 4	THE 5	THE 6
Weight	kg	120	164	190	300	340	360

Model		PS 1.5	PS 2.5	PS 3.5	PS 5	PS 6
Weight	kg	130	170	195	315	350

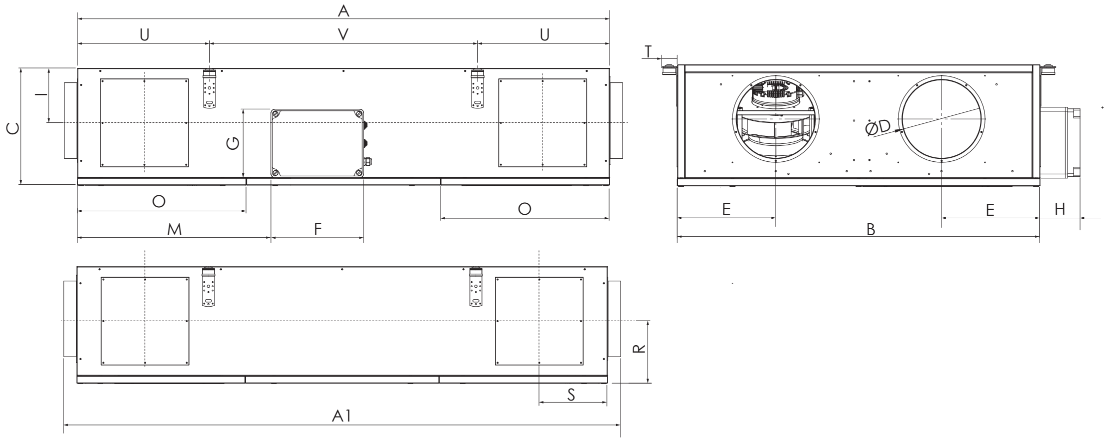
Weights without packaging

Model		THE 1	THE 2	THE 3	THE 4	THE 5	THE 6
Weight	kg	110	150	180	290	290	310

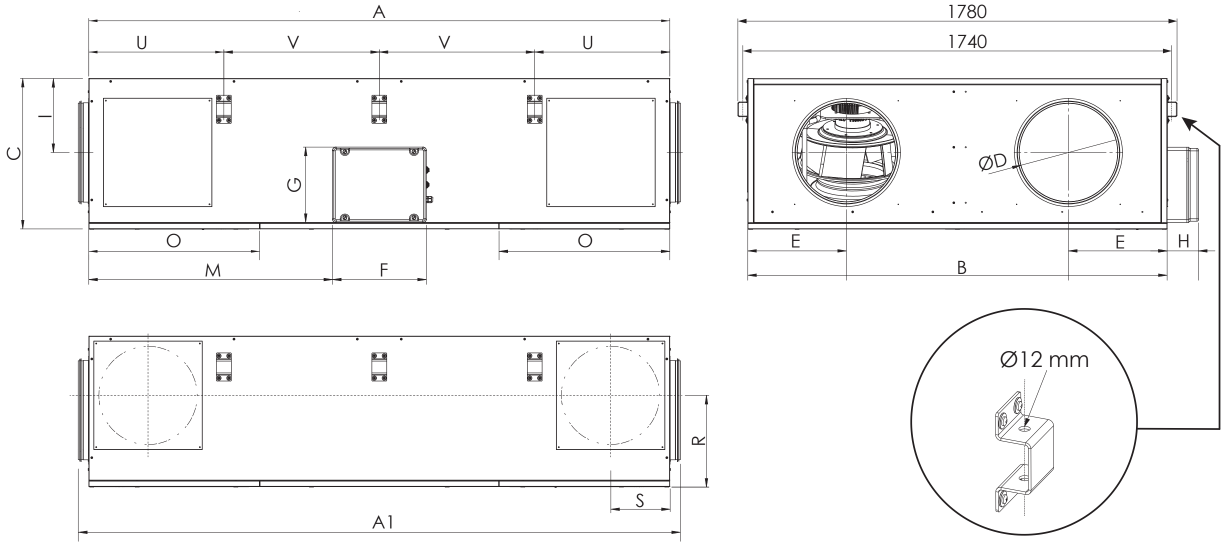
Model		PS1.5	PS2.5	PS3.5	PS5	PS6
Weight	kg	110	150	175	265	300

Ceiling unit dimesions - Mod. THE 1÷5 / PS 1.5÷5

THE 1÷3 / PS 1.5÷3.5



THE 4-5 / PS 5

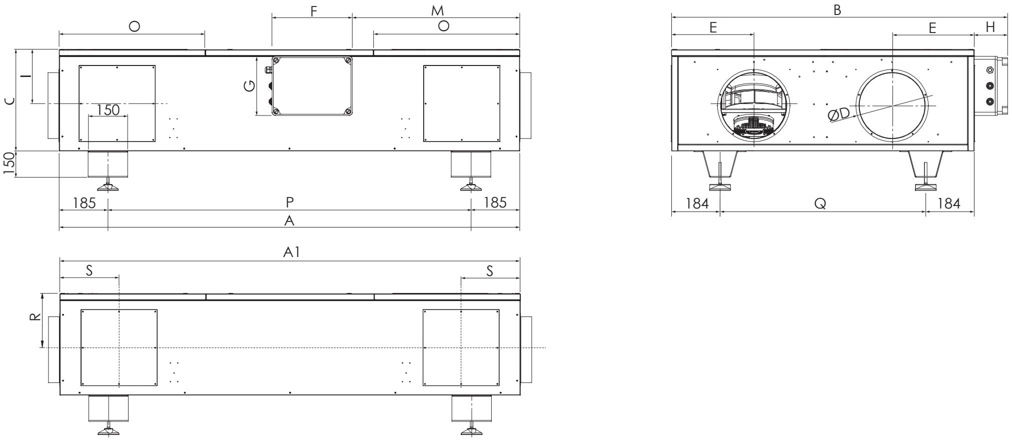


Model		THE 1 / PS 1.5	THE 2 / PS 2.5	THE 3 / PS 3.5	THE 4 / THE 5 / PS 5
A	mm	1700	1750	2100	2355
A1	mm	1786	1836	2186	2475
B	mm	850	1150	1250	1700
C	mm	344	384	470	610
ØD	mm	250	250	355	DN400
E	mm	194	312	310	400
F	mm	305	305	305	380
G	mm	225	225	225	305
H	mm	127	127	127	127
I	mm	153	180	223	310
M	mm	623	636	796	987
O	mm	530	554	630	692
R	mm	191	205	236	310
S	mm	175	220	220	279
T	mm	50	50	40	40
U	mm	434	434	460	548
V	mm	832	882	1180	630

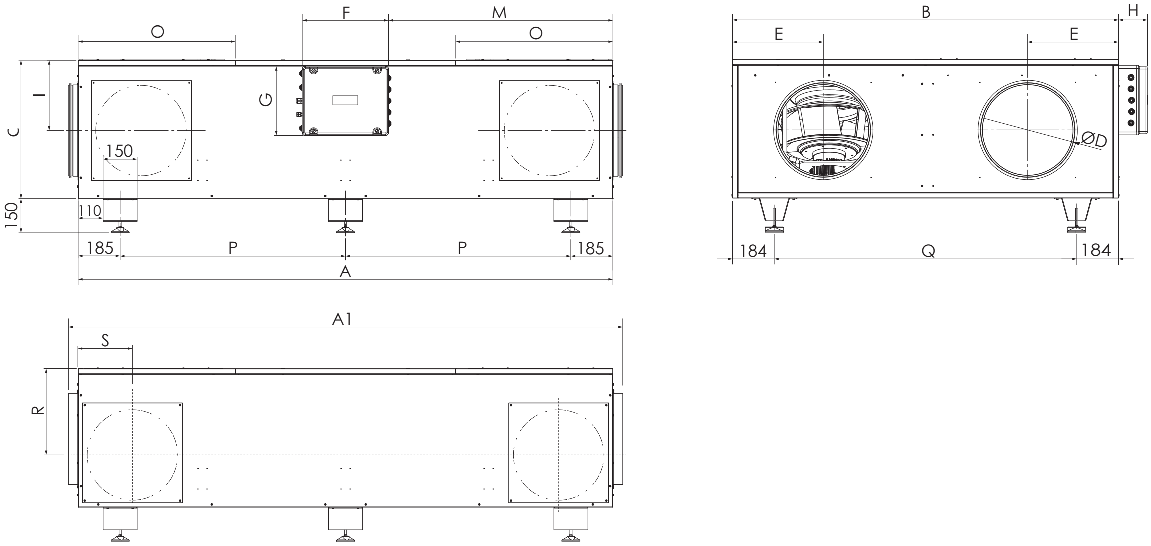
For the dimensions related to the condensate drain see p. 15.

Floor unit dimensions - Mod. THE 1÷5 / PS 1.5÷5

THE 1÷3 / PS 1.5÷3.5



THE 4-5 / PS 5

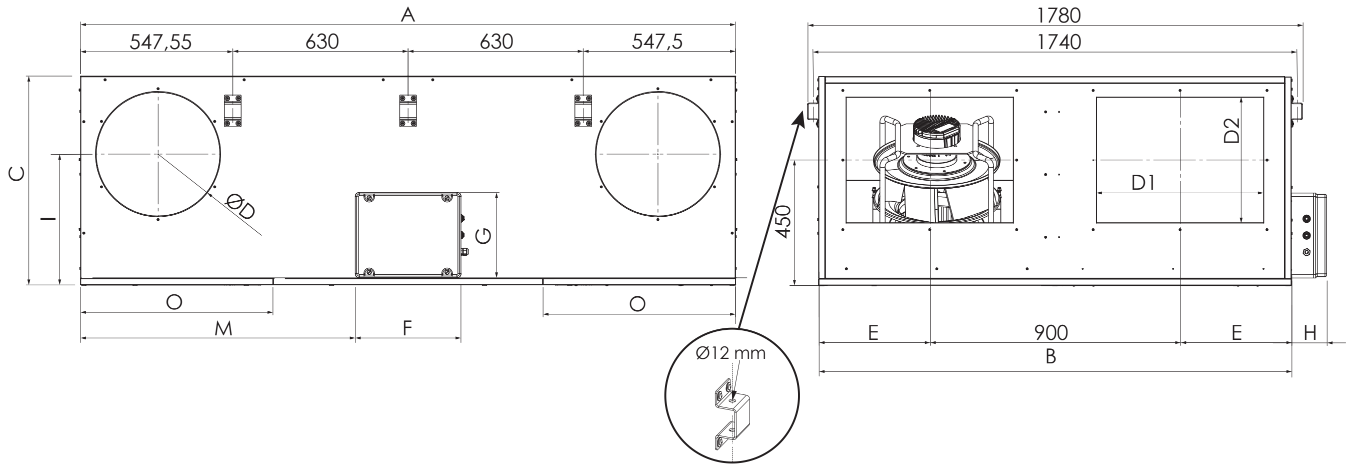


Model		THE 1 / PS 1.5	THE 2 / PS 2.5	THE 3 / PS 3.5	THE 4 / THE 5 / PS 5
A	mm	1700	1750	2100	2355
A1	mm	1786	1836	2186	2475
B	mm	850	1150	1250	1700
C	mm	344	384	470	610
ØD	mm	250	250	355	400
E	mm	194	312	310	400
F	mm	305	305	305	380
G	mm	225	225	225	305
H	mm	127	127	127	127
I	mm	153	180	223	310
M	mm	623	636	796	987
O	mm	530	554	630	692
P	mm	1330	1380	1730	993
Q	mm	482	782	882	1332
R	mm	191	205	236	310
S	mm	175	220	220	279

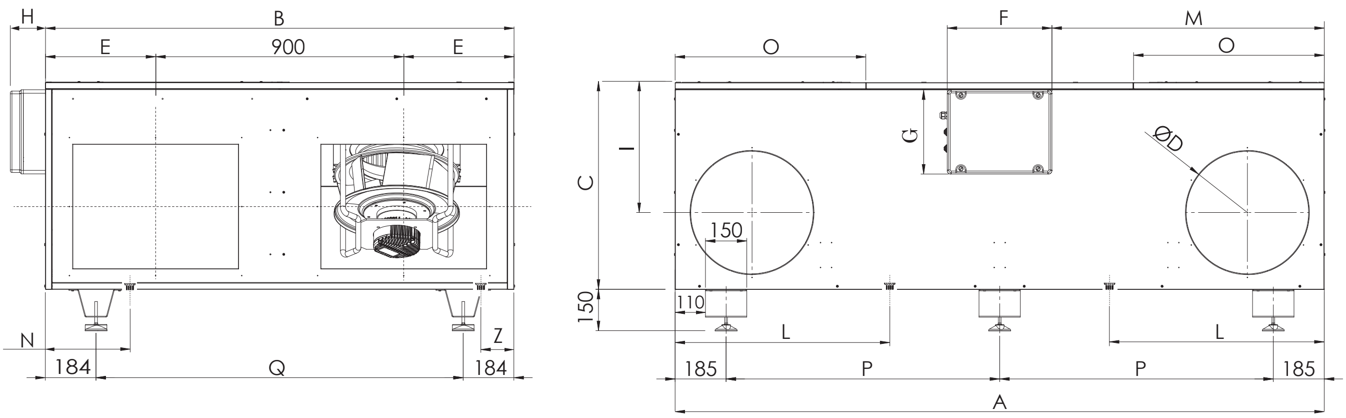
For the dimensions related to the condensate drain see p. 15.

Dimensions - Mod. THE 6 / PS 6

Ceiling unit dimesions



Floor unit dimensions

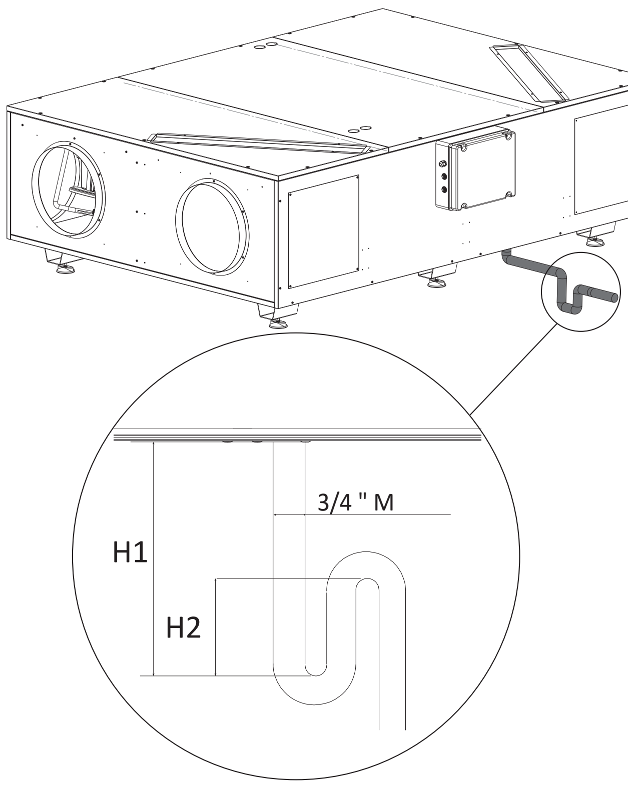


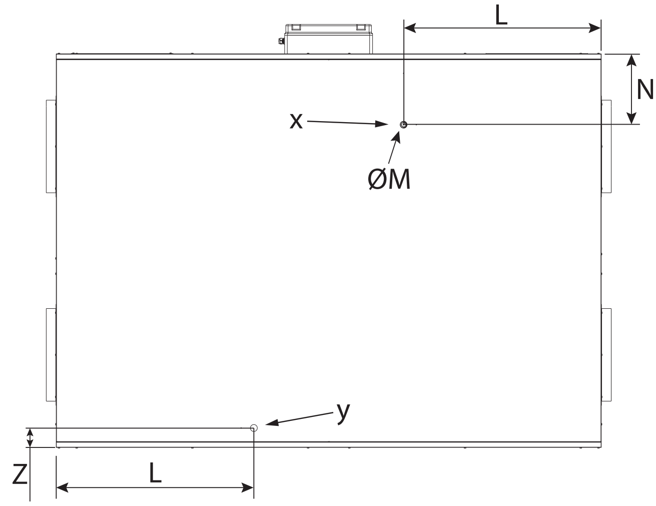
Model		THE 6 / PS 6
A	mm	2355
A1	mm	2355
B	mm	1700
C	mm	750
D1-D2 / ØD	mm	front connection 600x450 / lateral connection DN450
E	mm	400
F	mm	380
G	mm	305
H	mm	127
I	mm	300
M	mm	987
O	mm	692
R	mm	471
S	mm	279

For the dimensions related to the condensate drain see p. 15.

Condensate drainage

Standard version
(not provided by Sabiana)





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

Model			THE 1	THE 2	THE 3	THE 4	THE 5	THE 6
Dimensions	L	mm	656	676	788	854	854	791
	ØM	"	3/4 male					
	N	mm	185	185	251	306	306	
	Z	mm	83	83	73	84	84	

Model			PS 1.5	PS 2.5	PS 3.5	PS 5	PS 6
Dimensions	L	mm	656	676	788	854	791
	ØM	"	3/4 male				
	N	mm	185	185	251	306	
	Z	mm	83	83	73	84	

Dimensions ± 3 mm

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

THE thermal performances

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		
		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 1	100	96,8	1,0	0,4	94,8	0,8	0,3	94,6	0,6	0,2	94,6	0,5	0,1	94,4	0,3	-
	300	93,5	2,8	1,2	91,1	2,3	0,9	90,0	1,8	0,6	88,6	1,3	0,2	88,0	0,9	-
	500	91,5	4,6	2,0	88,8	3,7	1,5	87,4	2,9	0,9	85,3	2,2	0,3	84,3	1,5	-
	700	90,2	6,3	2,7	87,3	5,1	2,0	85,6	4,0	1,2	83,1	2,9	0,3	81,9	1,9	-
	900	89,1	8,0	3,4	86,3	6,5	2,5	84,2	5,1	1,5	81,4	3,7	0,4	80,3	2,4	-
	1000	88,7	8,8	3,8	85,8	7,2	2,7	83,8	5,6	1,7	80,5	4,1	0,4	79,6	2,7	-
THE 2	200	95,4	1,9	0,8	94,1	1,6	0,6	92,9	1,3	0,4	92,5	0,9	0,2	92,3	0,6	-
	400	93,3	3,7	1,6	91,7	3,1	1,2	90,3	2,4	0,8	88,9	1,8	0,3	88,3	1,2	-
	600	91,9	5,5	2,4	90,3	4,5	1,8	88,4	3,6	1,1	86,6	2,6	0,4	85,8	1,7	-
	800	91,1	7,3	3,2	89,1	6,0	2,3	87,3	4,7	1,5	85,2	3,5	0,5	84,1	2,3	-
	1000	90,3	9,0	3,9	88,4	7,4	2,9	86,3	5,8	1,8	83,9	4,3	0,5	82,9	2,8	-
	1200	89,8	10,8	4,6	87,6	8,8	3,4	85,6	6,9	2,1	83,1	5,1	0,6	81,9	3,3	-
THE 3	300	97,4	2,9	1,3	95,1	2,4	1,0	92,6	1,9	0,6	92,1	1,4	0,3	91,9	0,9	-
	500	95,5	4,7	2,0	93,0	3,9	1,5	90,3	3,0	1,0	89,2	2,3	0,4	88,7	1,5	-
	800	93,4	7,3	3,2	90,9	6,0	2,4	87,8	4,7	1,5	86,2	3,5	0,5	85,4	2,3	-
	1000	92,5	9,1	3,9	89,8	7,5	2,9	86,7	5,8	1,8	84,6	4,3	0,6	83,8	2,8	-
	1500	90,8	13,4	5,7	87,8	11,0	4,2	84,4	8,5	2,6	82,0	6,2	0,7	81,1	4,1	-
	1900	89,7	16,8	7,1	86,7	13,7	5,2	83,3	10,7	3,1	80,4	7,8	0,7	76,9	5,1	-
THE 4	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	-
	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	-
	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	-
	2500	90,8	22,5	9,7	88,3	18,4	7,2	86,5	14,6	4,5	84,3	10,6	1,3	83,3	7,0	-
	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	-
	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	-
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	-
	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	-
	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	-
	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	-
	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	-
	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	-
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	-
	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	-
	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	-
	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	-
	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	-
	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	-

t_i = Internal air temperature
RH_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

PS thermal performances

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		
		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
PS 1.5	100	96,4	1,0	0,4	94,8	0,8	0,3	94,6	0,6	0,2	94,6	0,5	1,4	94,4	0,3	-
	300	93,0	2,8	1,2	91,1	2,3	0,9	90,0	1,8	0,6	88,6	1,3	3,4	88,0	0,9	-
	500	91,0	4,6	2,0	88,8	3,7	1,5	87,4	2,9	0,9	85,3	2,2	4,1	84,3	1,5	-
	700	89,7	6,3	2,7	87,3	5,1	2,0	85,6	4,0	1,2	83,1	2,9	5,9	81,9	1,9	-
	900	88,7	8,0	3,4	86,3	6,5	2,5	84,2	5,1	1,5	81,4	3,7	6,6	80,3	2,4	-
	1000	88,3	8,8	3,8	85,8	7,2	2,7	83,8	5,6	1,7	80,5	4,1	7,7	79,6	2,7	-
PS 2.5	250	93,2	2,3	1,0	92,2	1,9	0,8	91,2	1,5	0,5	90,1	1,1	0,2	89,7	0,8	-
	500	90,7	4,6	2,0	89,4	3,8	1,5	87,9	3,0	0,9	86,0	2,2	0,3	85,0	1,4	-
	750	89,3	6,7	2,9	87,8	5,5	2,1	85,9	4,3	1,3	83,5	3,2	0,4	82,4	2,1	-
	1000	88,2	8,9	3,8	86,6	7,3	2,8	84,6	5,7	1,7	81,8	4,2	0,4	80,7	2,7	-
	1200	87,7	10,6	4,5	85,8	8,7	3,3	83,9	6,8	2,0	80,6	4,9	0,4	79,9	3,3	-
	1400	87,3	12,3	5,2	85,4	10,1	3,8	83,1	7,9	2,3	79,9	5,7	0,5	79,0	3,8	-
PS 3.5	300	93,6	2,8	1,2	92,5	2,3	0,9	V	1,8	0,6	89,9	1,4	0,3	89,5	0,9	-
	800	88,9	7,2	3,1	87,2	5,9	2,3	85,0	4,6	1,4	82,6	3,4	0,4	81,8	2,2	-
	1000	87,7	8,8	3,8	85,9	7,2	2,7	83,6	5,6	1,7	81,0	4,1	0,4	80,0	2,7	-
	1500	85,8	13,0	5,5	83,7	10,6	3,9	80,9	8,2	2,3	77,6	5,9	0,4	77,0	3,9	-
	1700	85,1	14,6	6,1	83,2	11,9	4,4	80,2	9,2	2,6	76,8	6,6	0,4	76,2	4,4	-
	2000	84,4	17,0	7,1	82,3	13,8	5,1	79,2	10,7	2,9	75,5	7,7	0,3	75,1	5,1	-
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	-
	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	-
	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	-
	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	-
	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	-
	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	-
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	-
	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	-
	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	-
	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	-
	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	-
	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	-

ti = Internal air temperature
RHi = 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
mw = 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 EAT = 23 °C. There is no need to cool, since the summer setpoint is $t_{cooling}$ = 26 °C.
EAT = 23 °C <26 °C and 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.

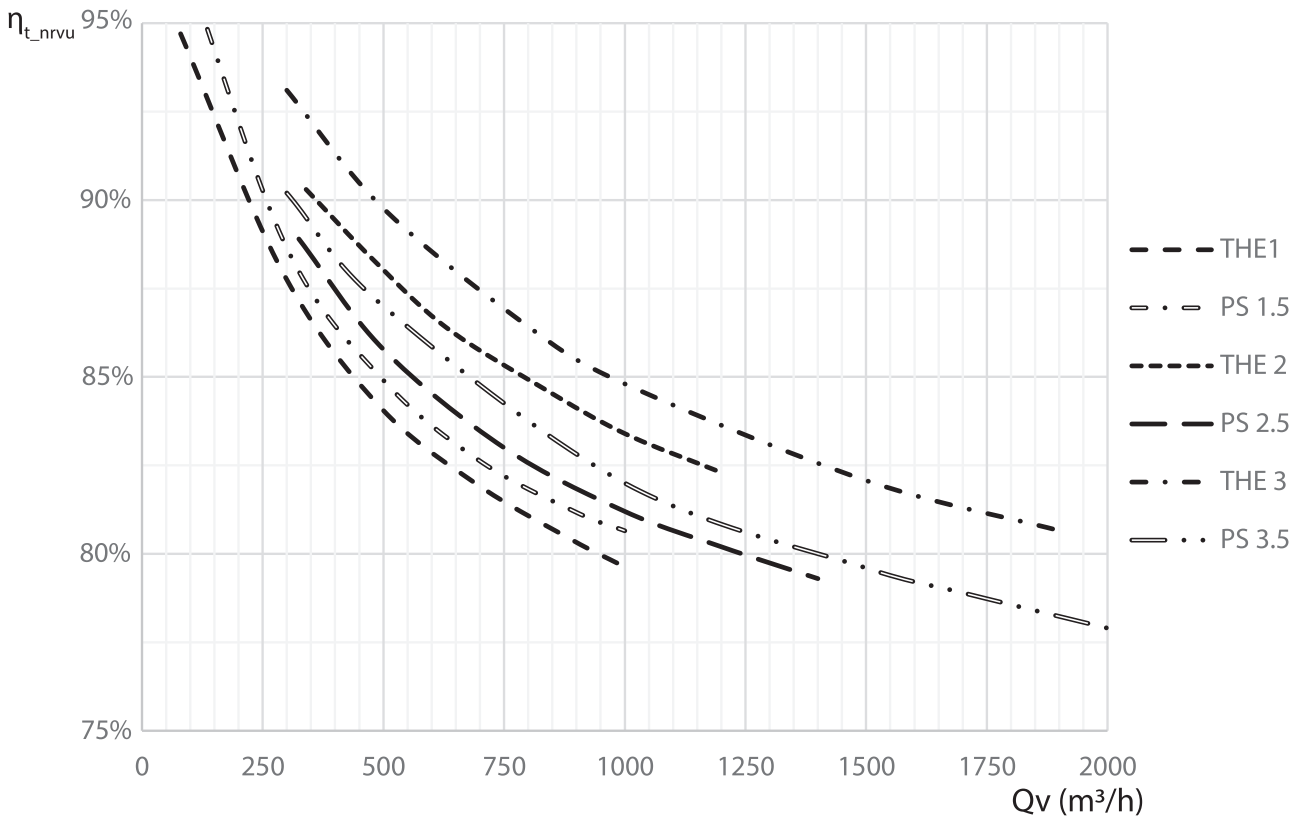
When it is necessary to replace the filters the icon will switch on.

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).

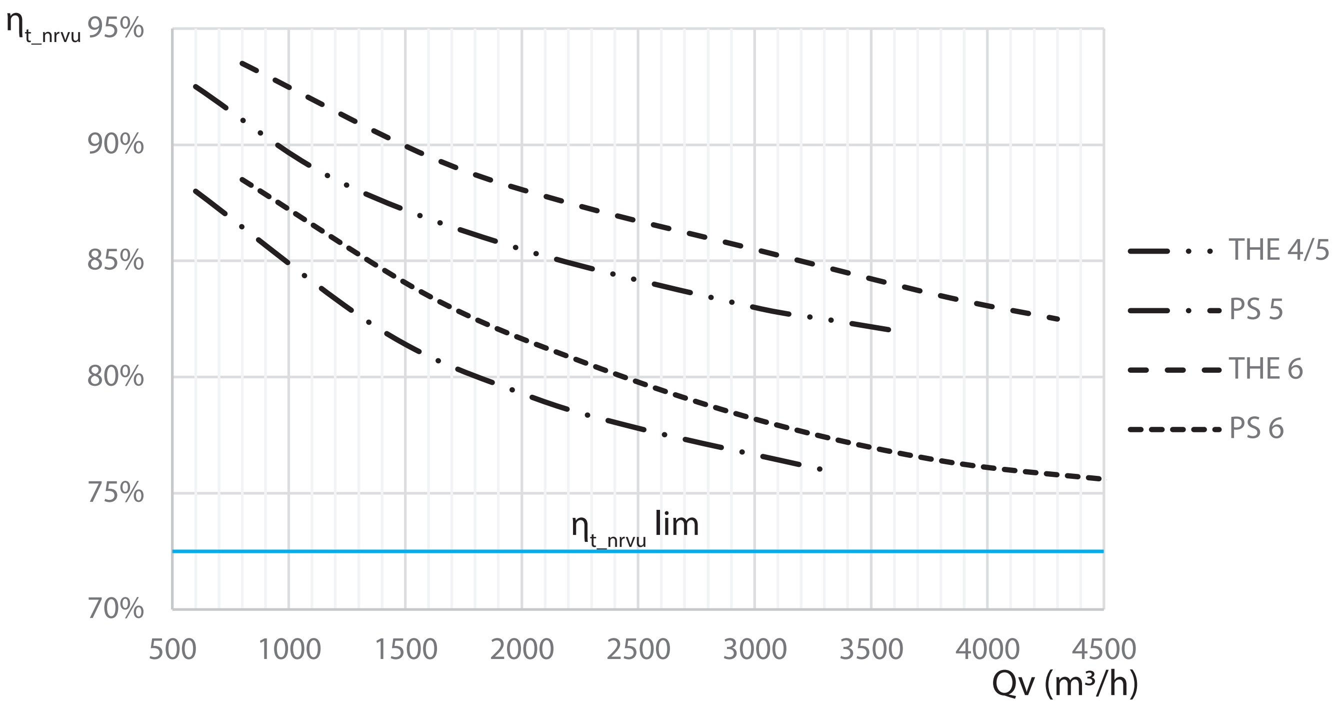
Interfacing with Modbus protocol

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
ηt_nrvu = heat recovered

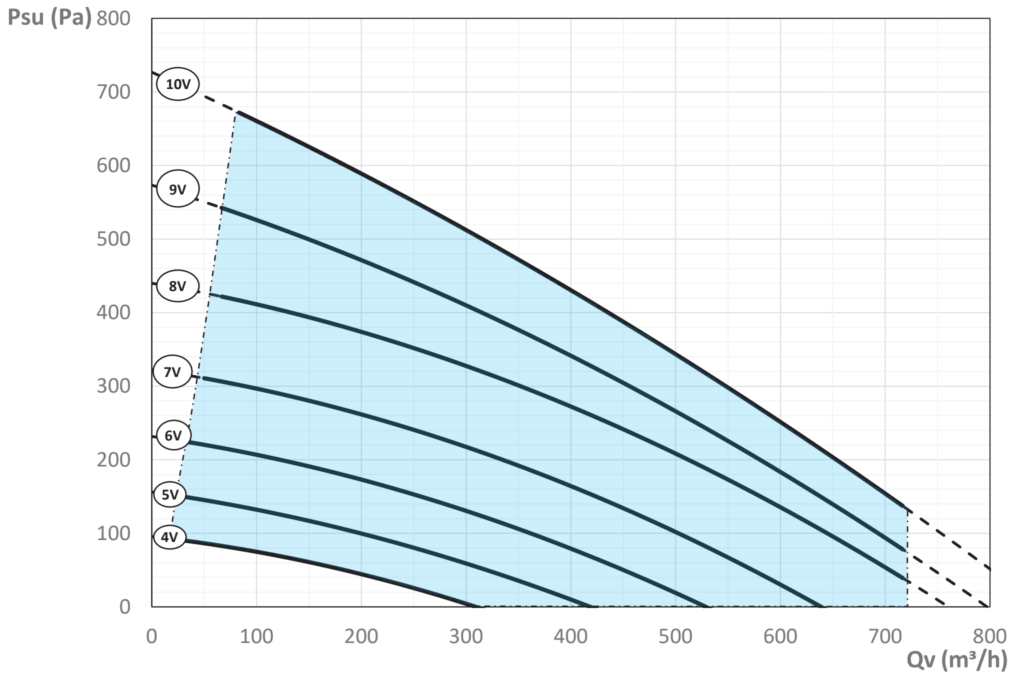


Qv = air flow
η_{t_nrvu} = heat recovered

THE AERAULIC PERFORMANCE

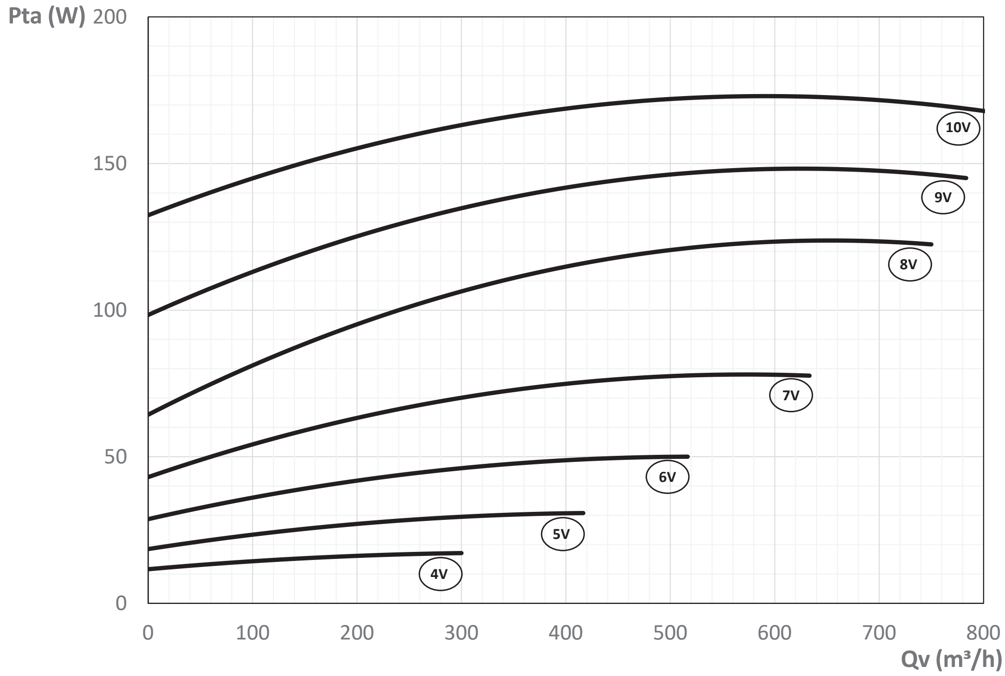
THE 1

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

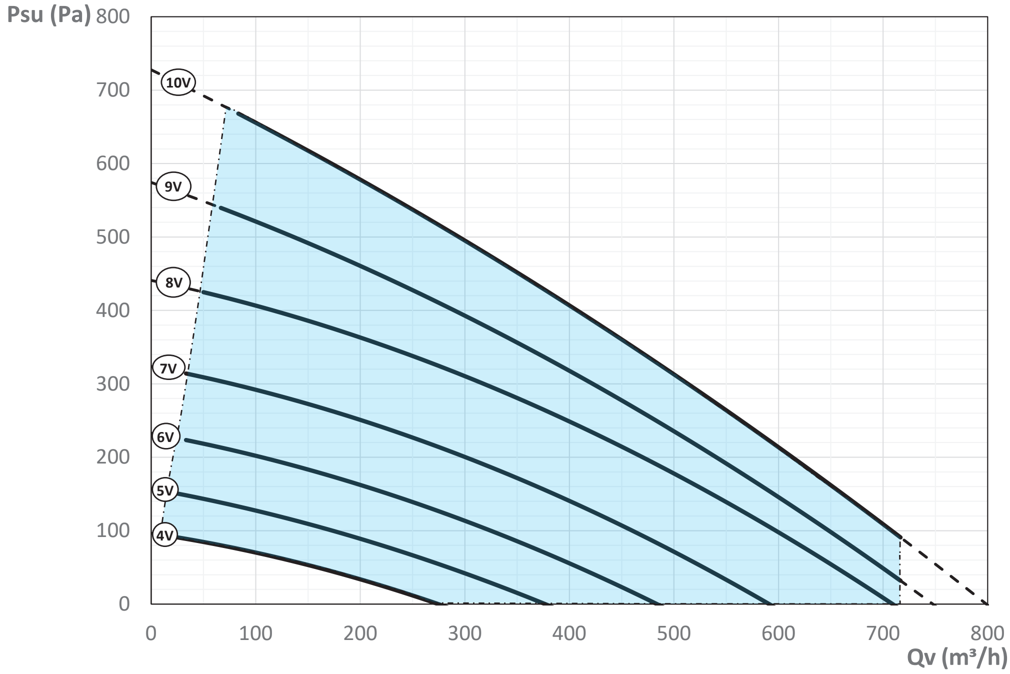
Flow rate / electric power input current with ePM1 55% (F7) in both flows



Pta = power input current
Qv = air flow

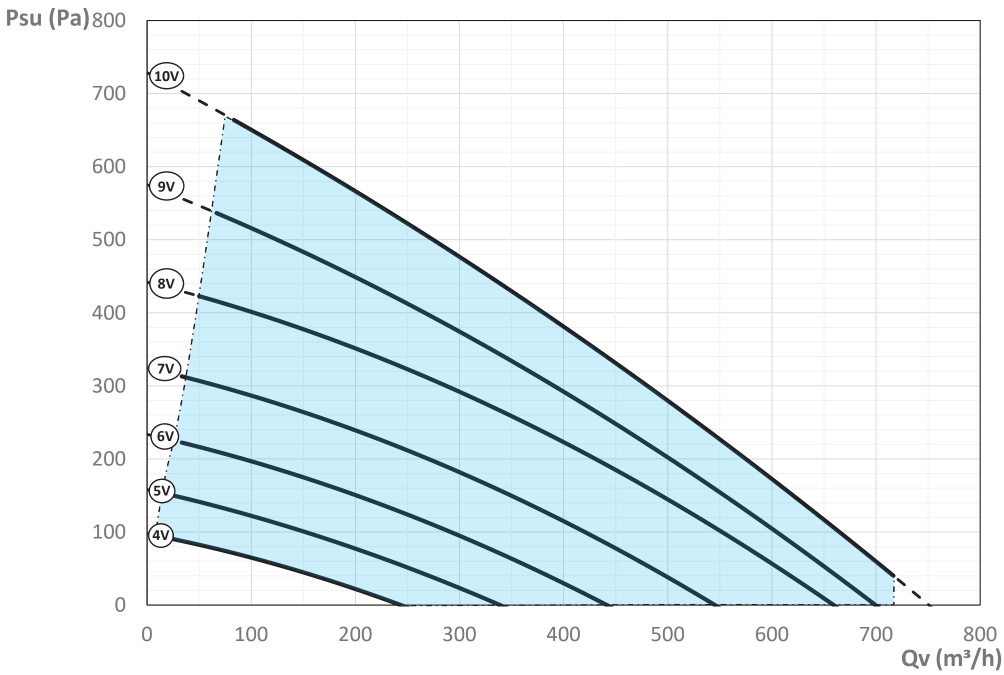
THE 1

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

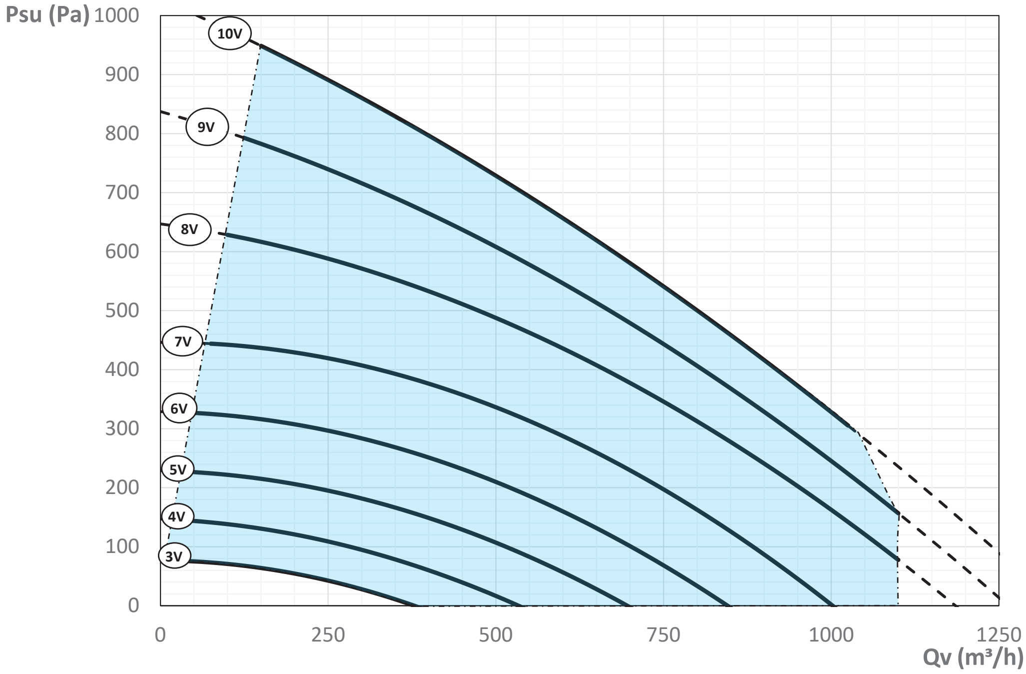
Flow rate / available static pressure with filter ePM1 55% (F7) + ePM1 85% (F9; optional) fresh air side



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

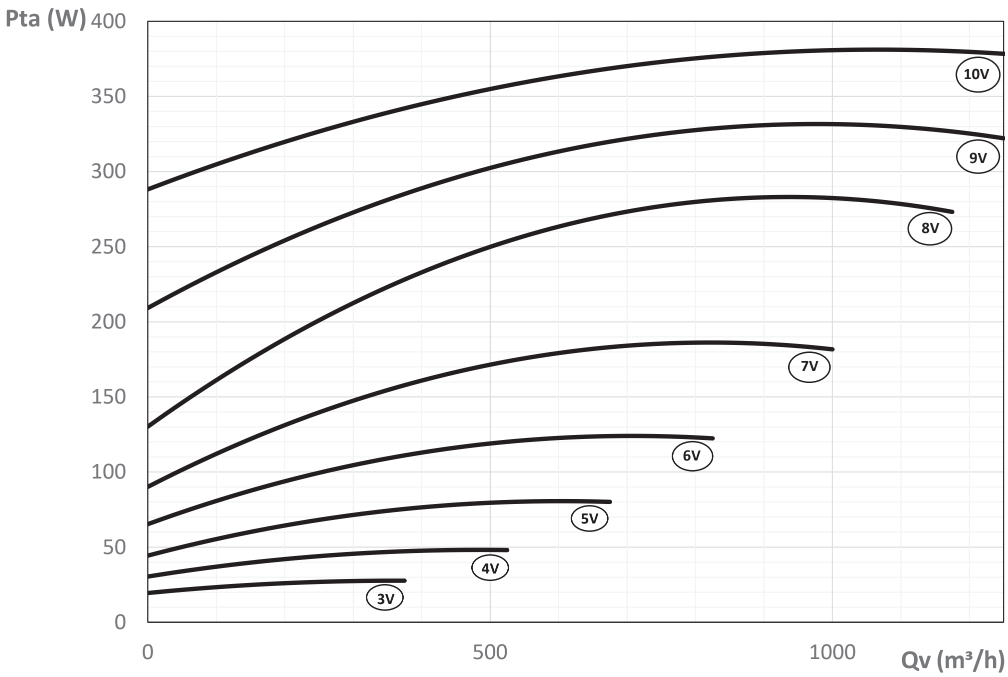
THE 2

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

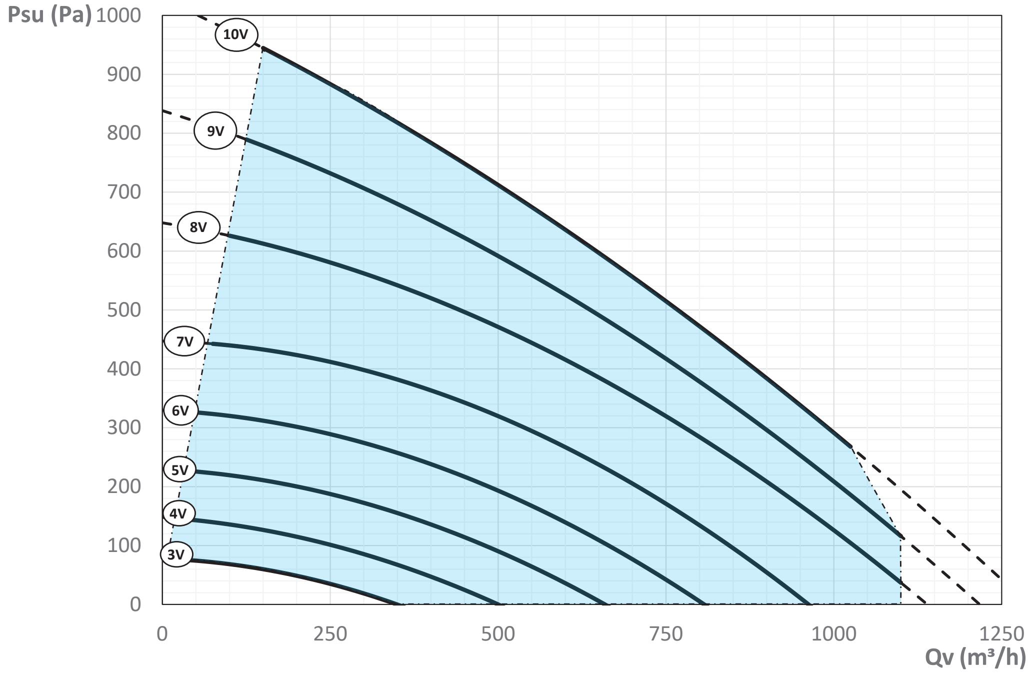
Flow rate / electric power input current with ePM1 55% (F7) in both flows



Pta = power input current
Qv = air flow

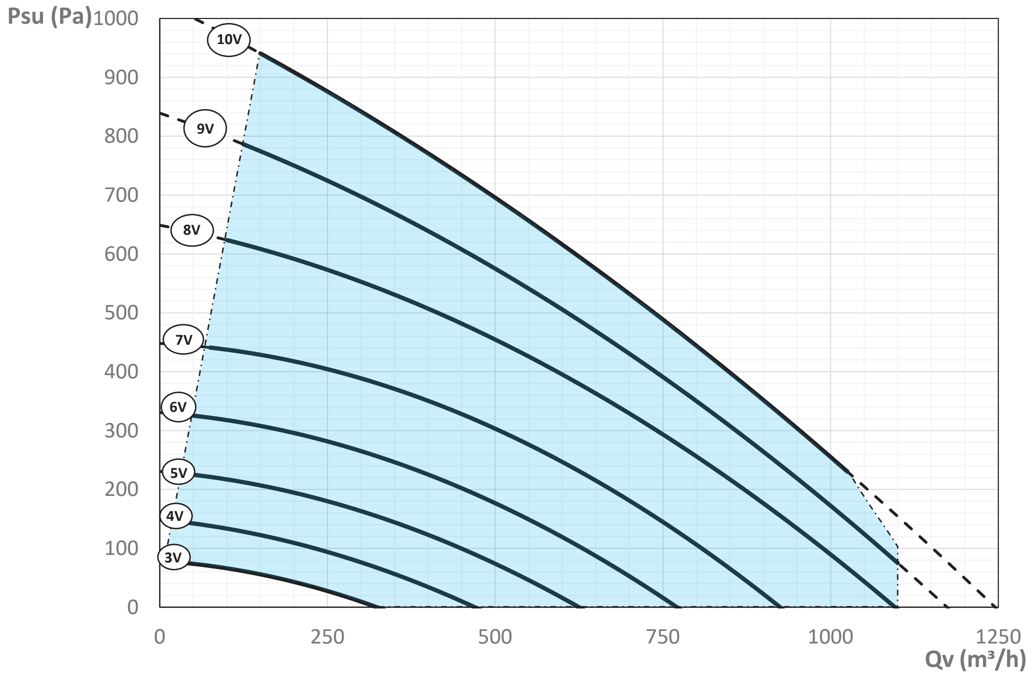
THE 2

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

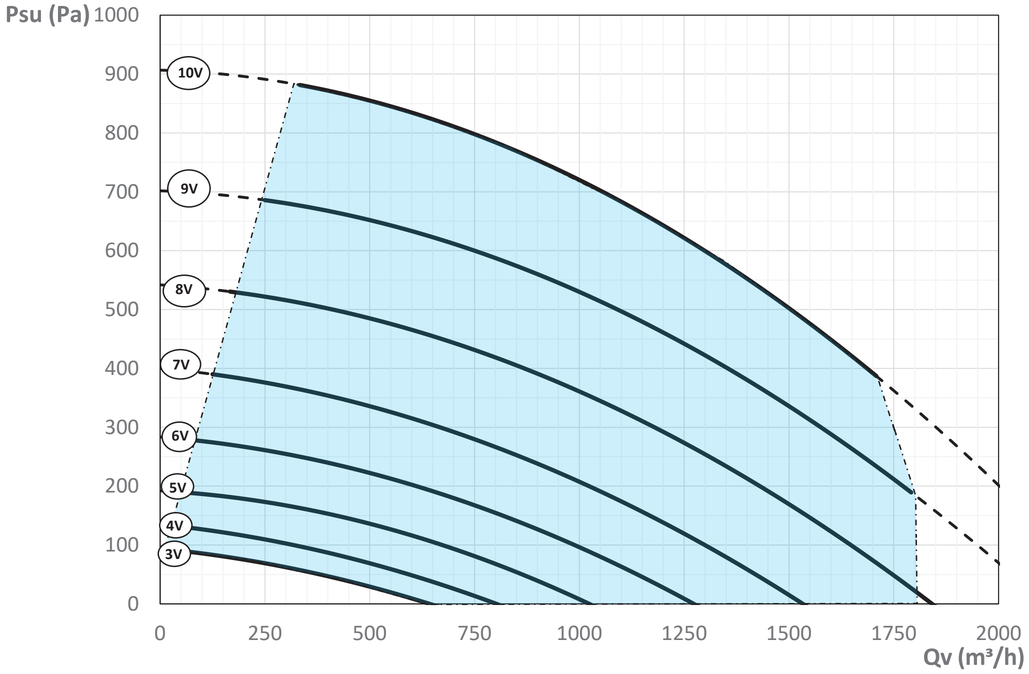
Flow rate / available static pressure with filter ePM1 55% (F7) + ePM1 85% (F9; optional) fresh air side



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

THE 3

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

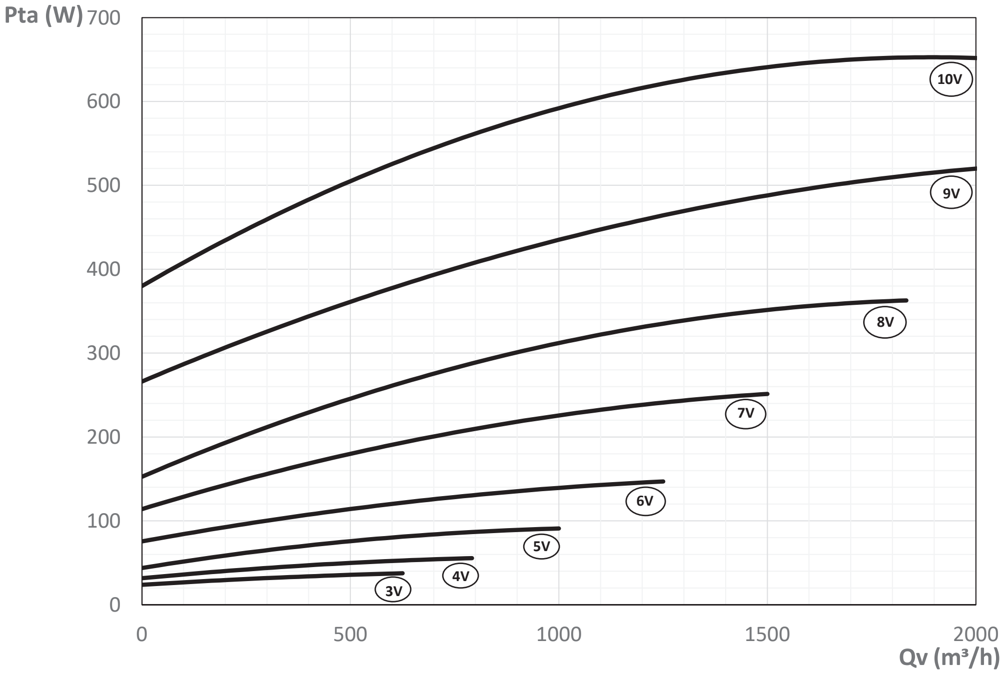


= EU 1253/2014 Reg. working range ($SFP_{int} < SFP_{int,lim}$)

Psu = available static pressure

Qv = air flow

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

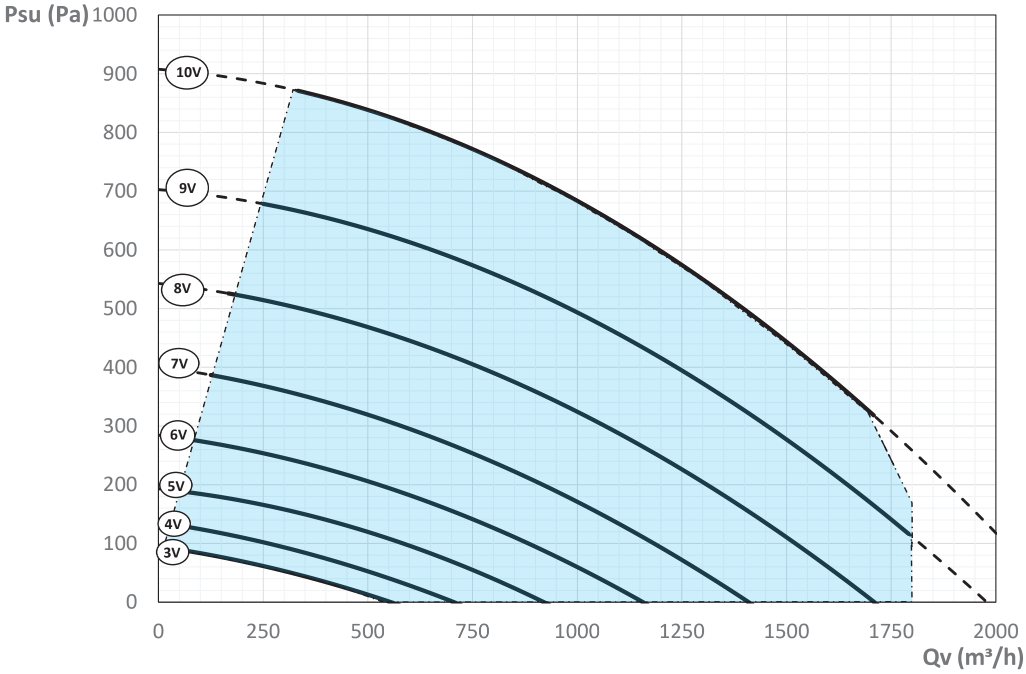


Pta = power input current

Qv = air flow

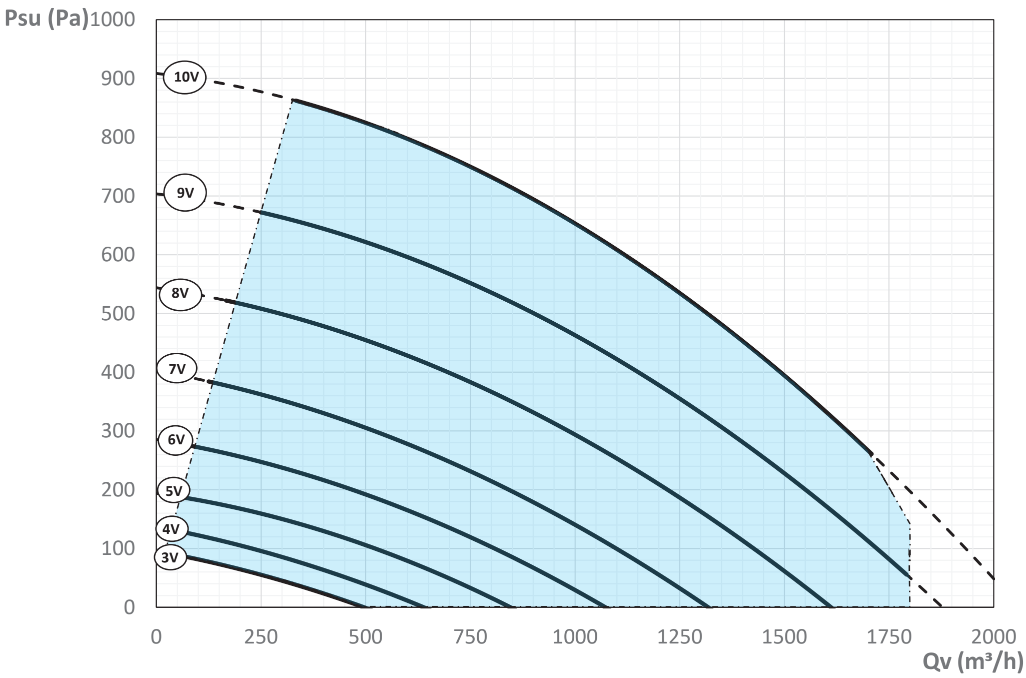
THE 3

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

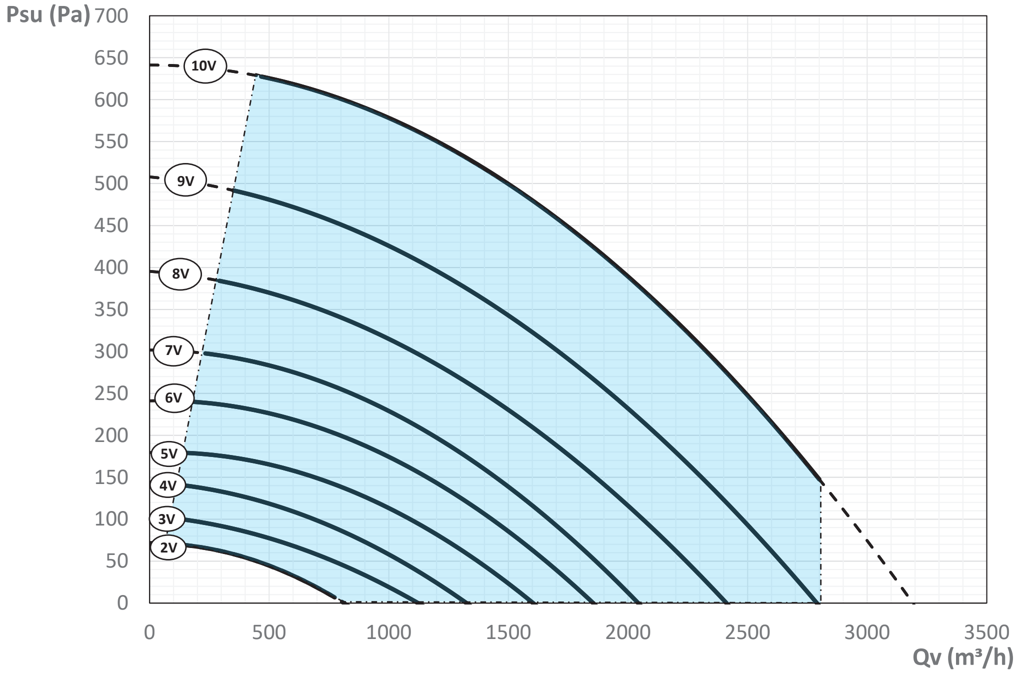
Flow rate / available static pressure with filter ePM1 55% (F7) + ePM1 85% (F9; optional) fresh air side



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

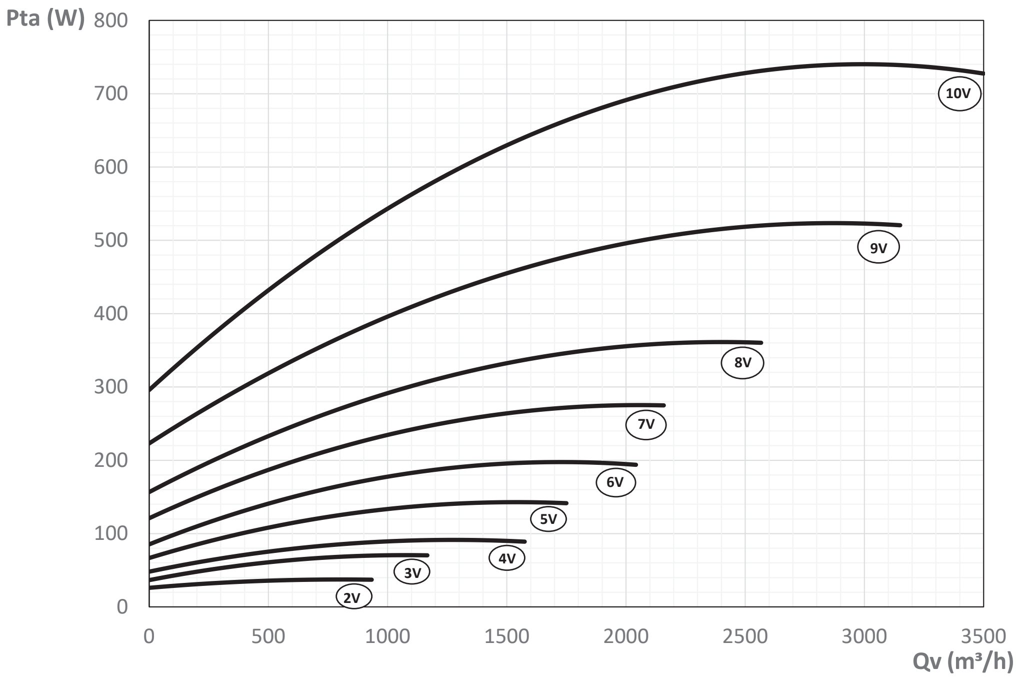
THE 4

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

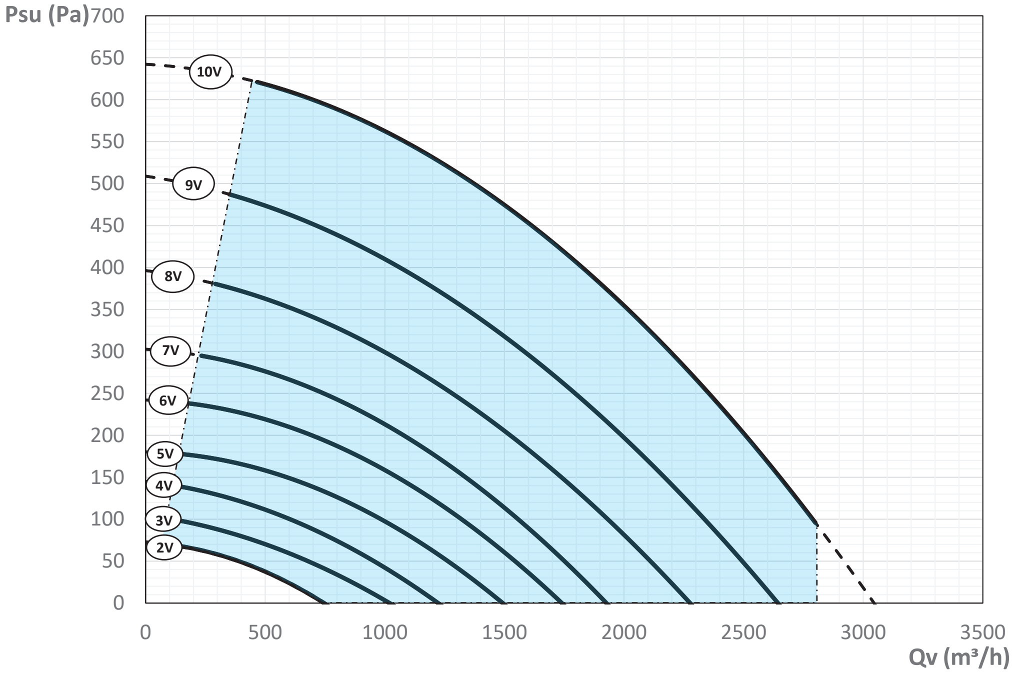
Flow rate / electric power input current with ePM1 55% (F7) in both flows



Pta = power input current
Qv = air flow

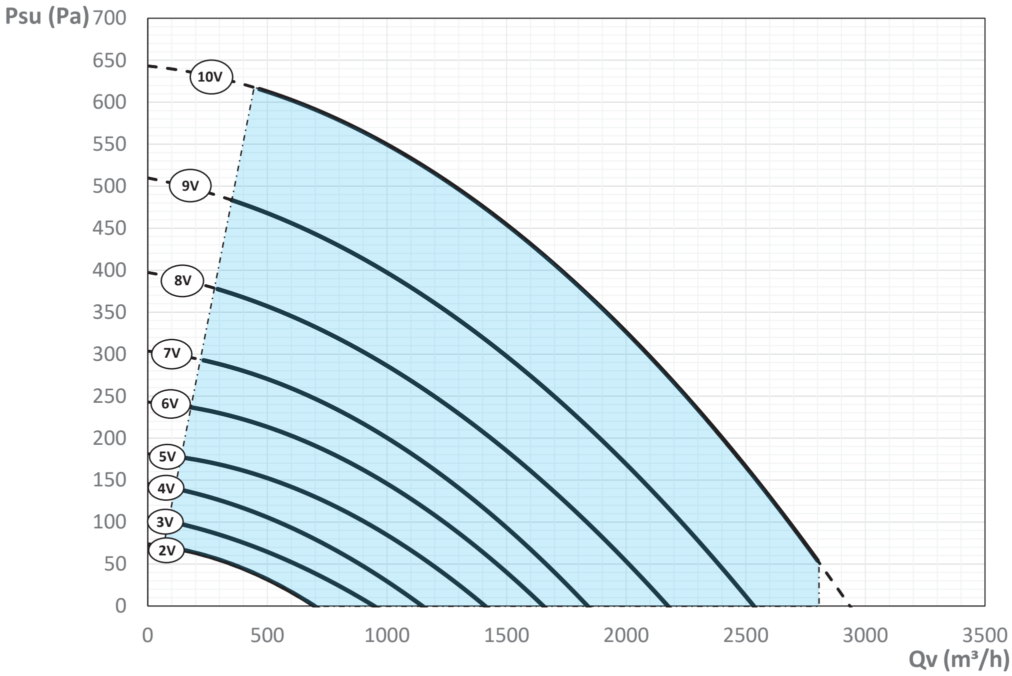
THE 4

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

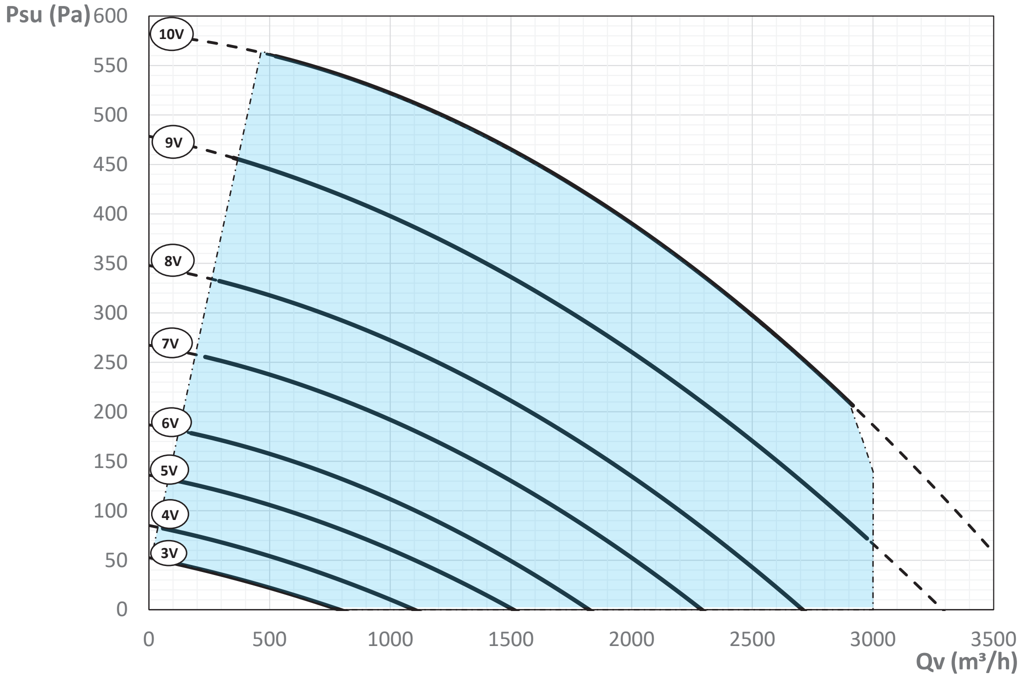
Flow rate / available static pressure with filter ePM1 55% (F7) + ePM1 85% (F9; optional) fresh air side



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

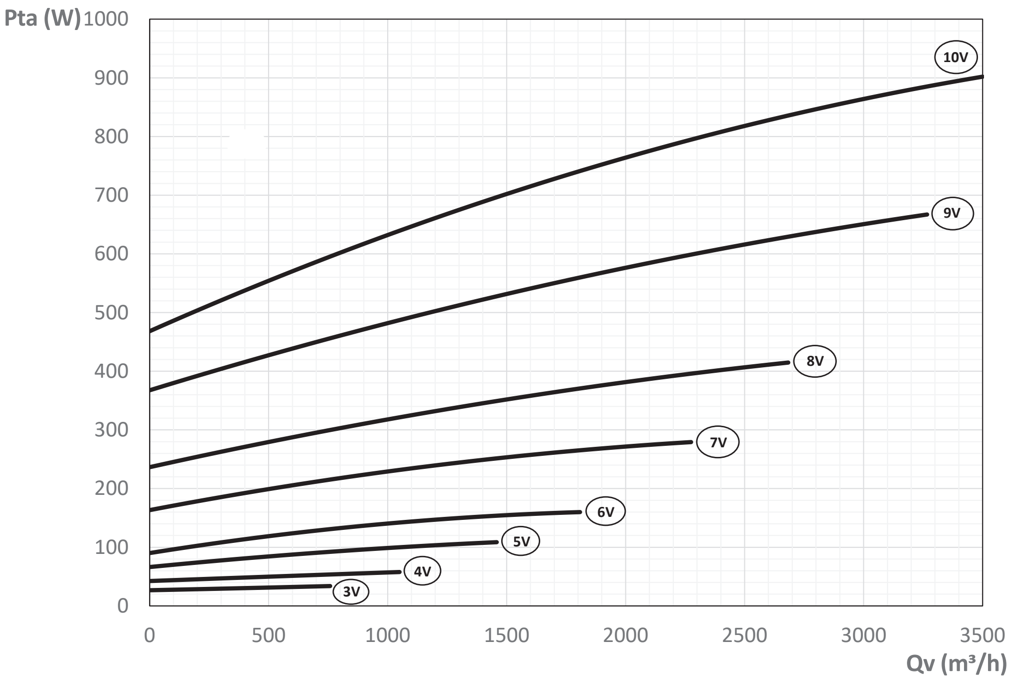
THE 5

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

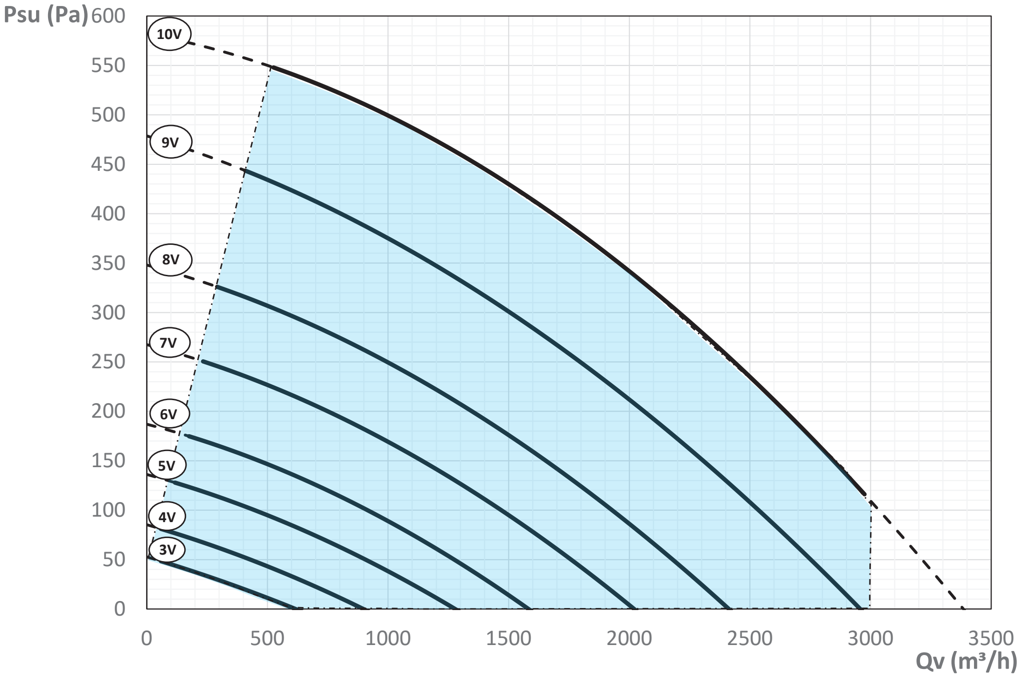
Flow rate / electric power input current with ePM1 55% (F7) in both flows



Pta = power input current
Qv = air flow

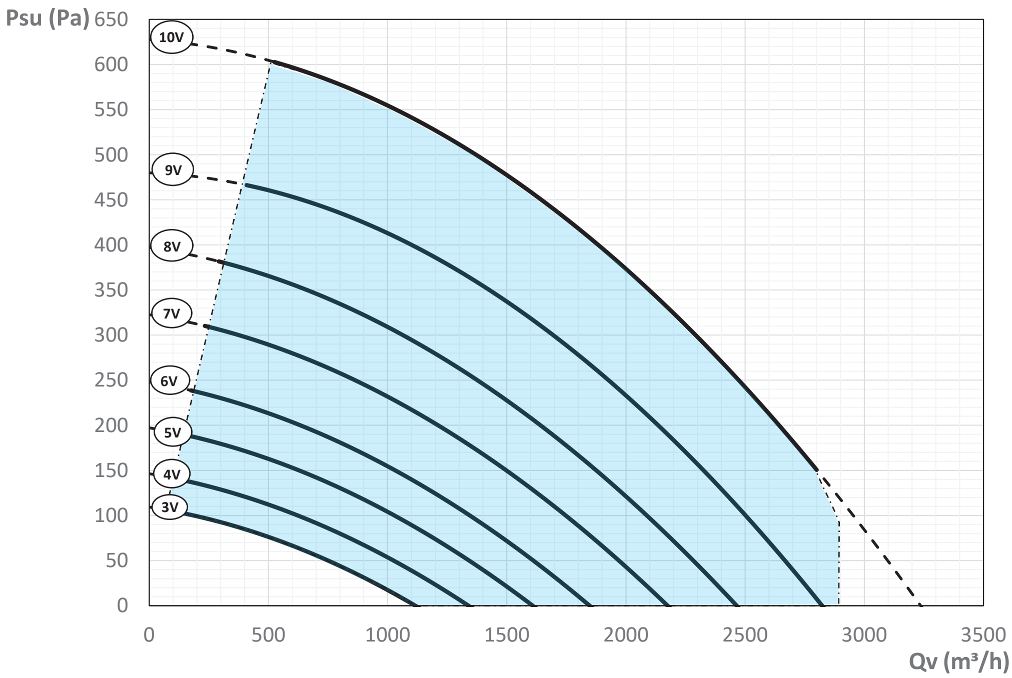
THE 5

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

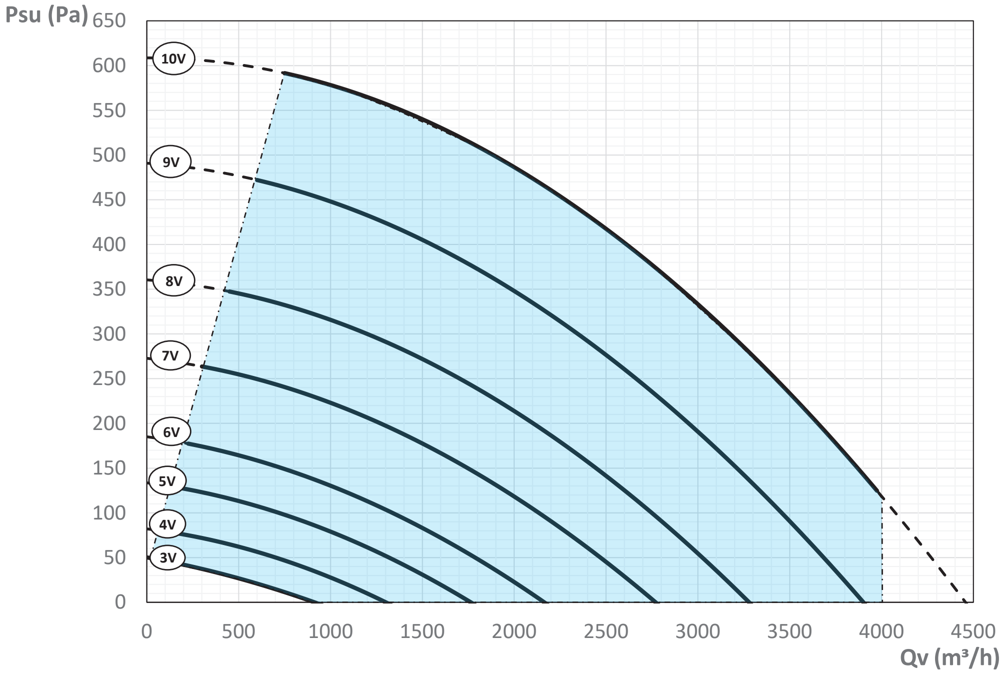
Flow rate / available static pressure with filter ePM1 55% (F7) + ePM1 85% (F9; optional) fresh air side



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

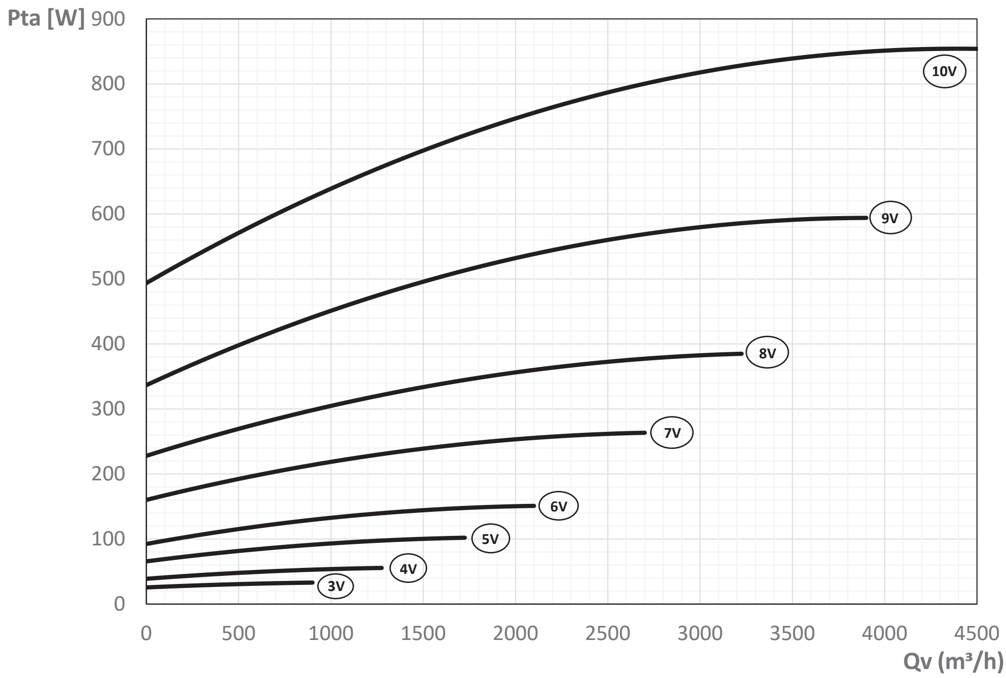
THE 6

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

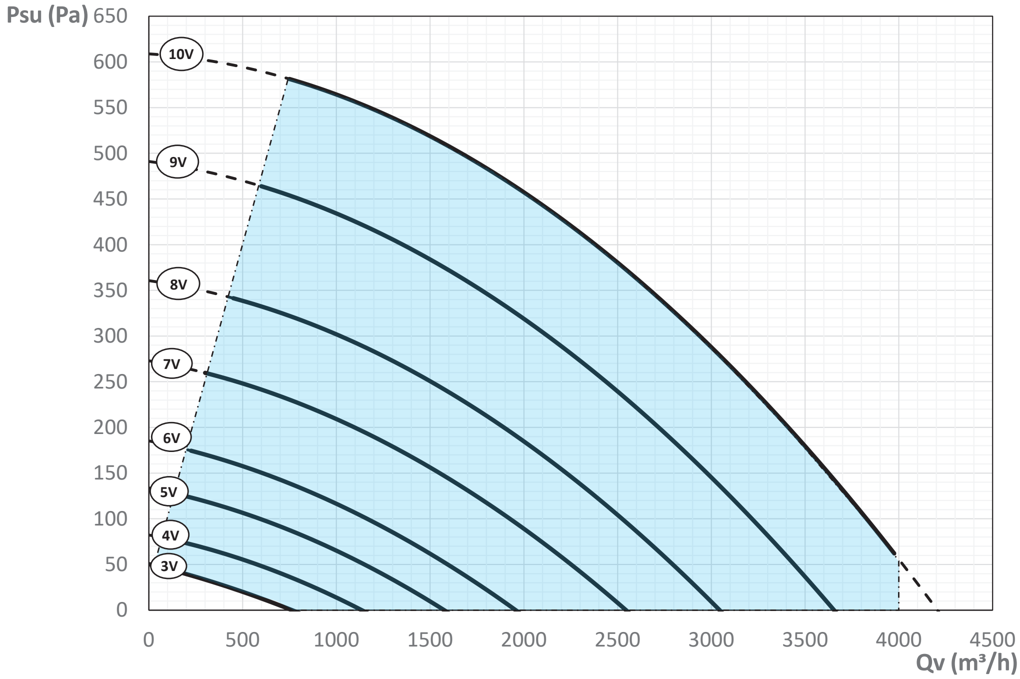
Flow rate / electric power input current with ePM1 55% (F7) in both flows



Pta = power input current
Qv = air flow

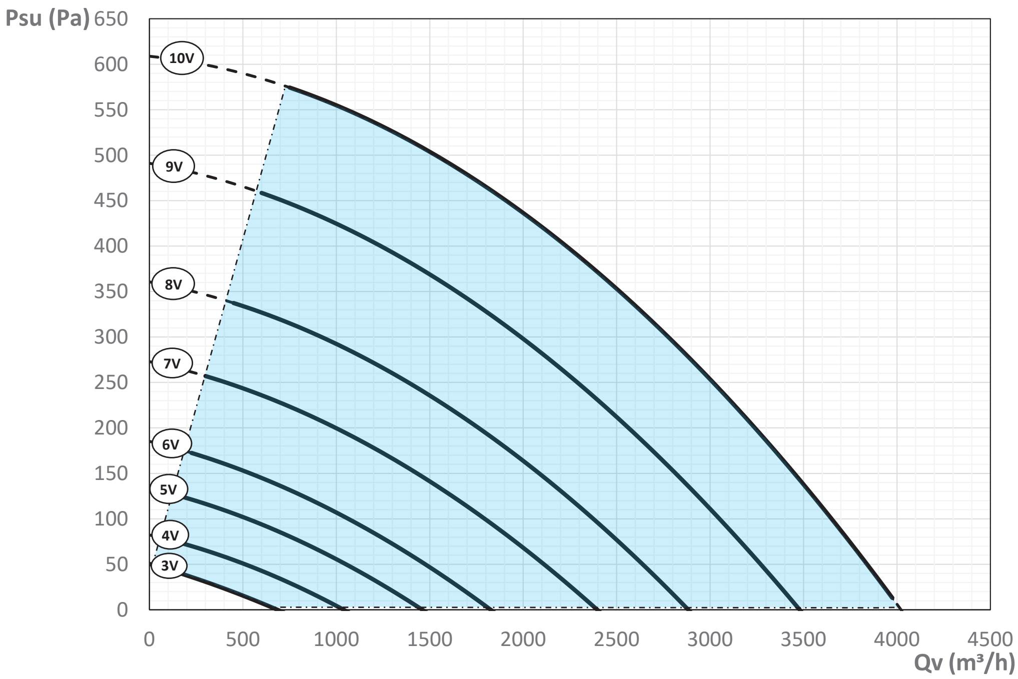
THE 6

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

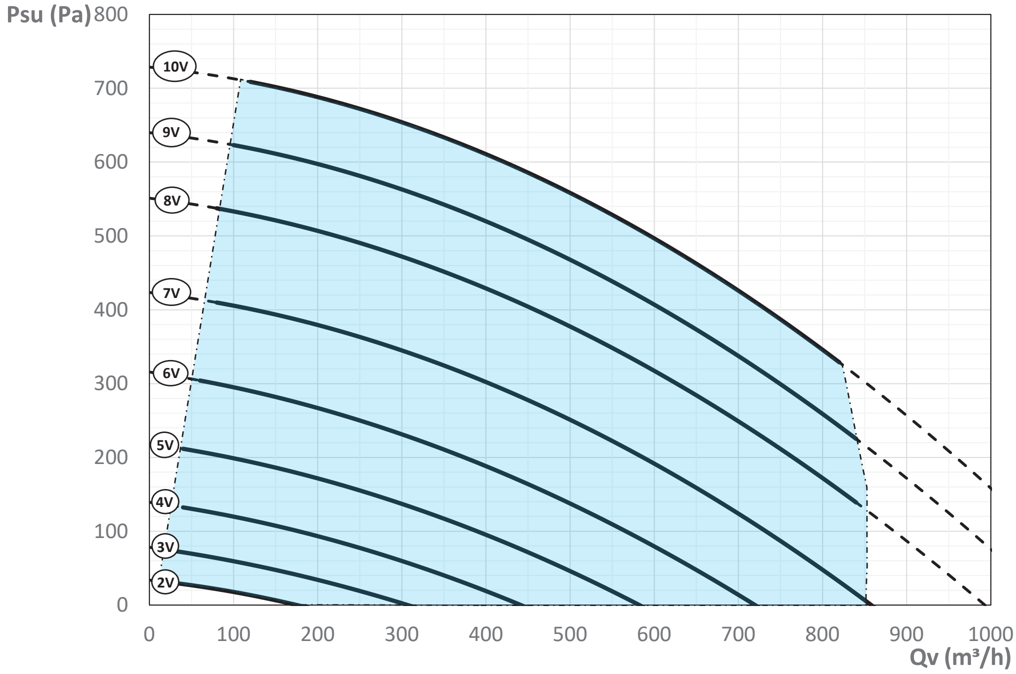


= EU 1253/2014 Reg. working range ($SFP_{int} < SFP_{int,lim}$)
Psu = available static pressure
Qv = air flow

PS AERAULIC PERFORMANCE

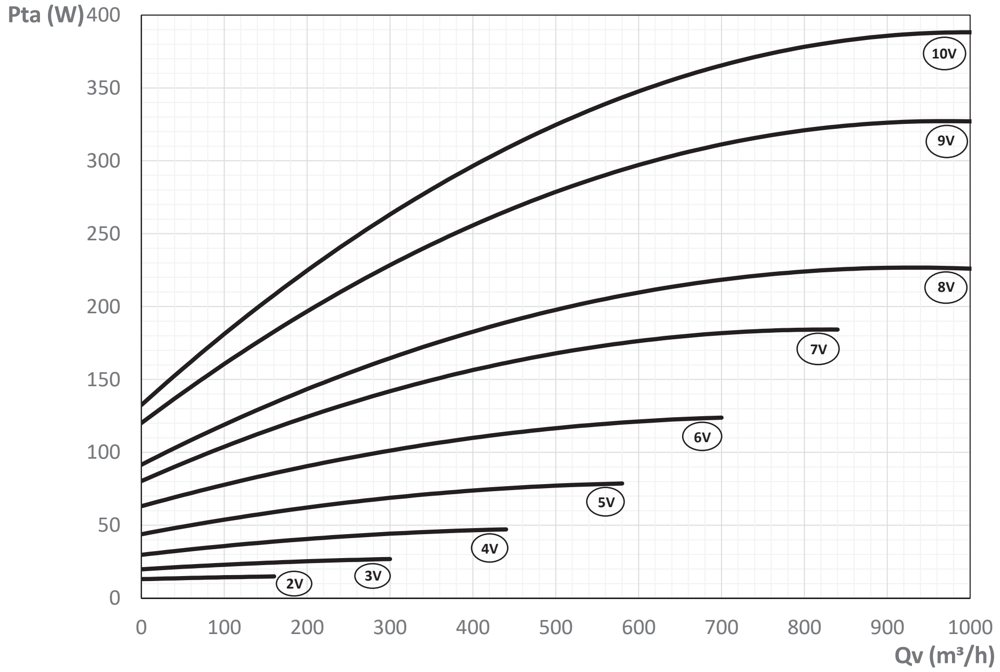
PS 1.5

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

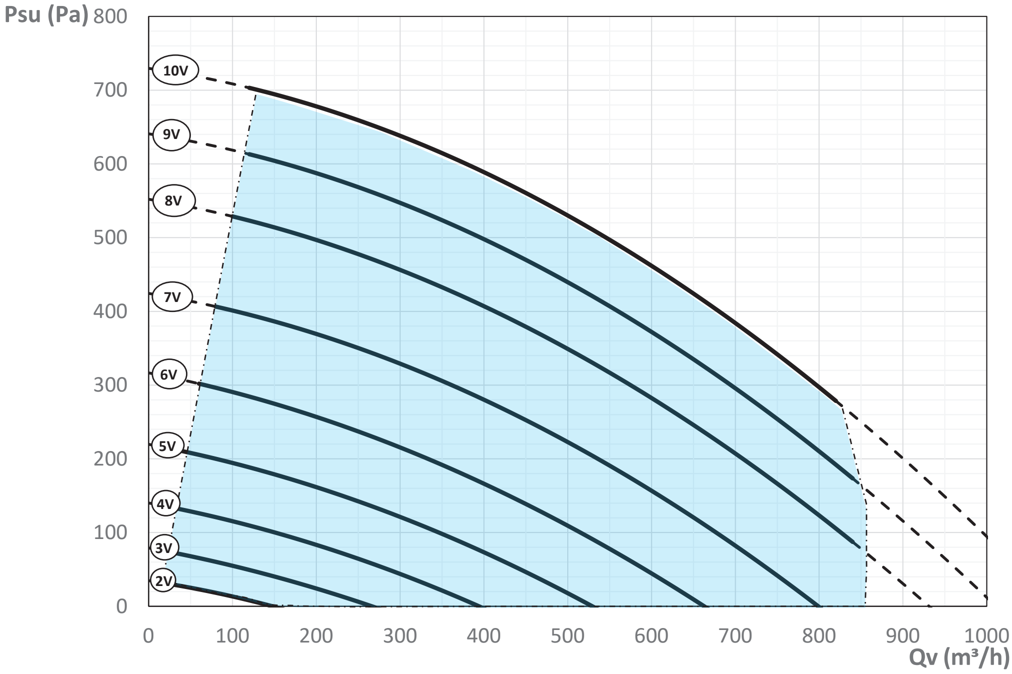
Flow rate / electric power input current with ePM1 55% (F7) in both flows



Pta = power input current
Qv = air flow

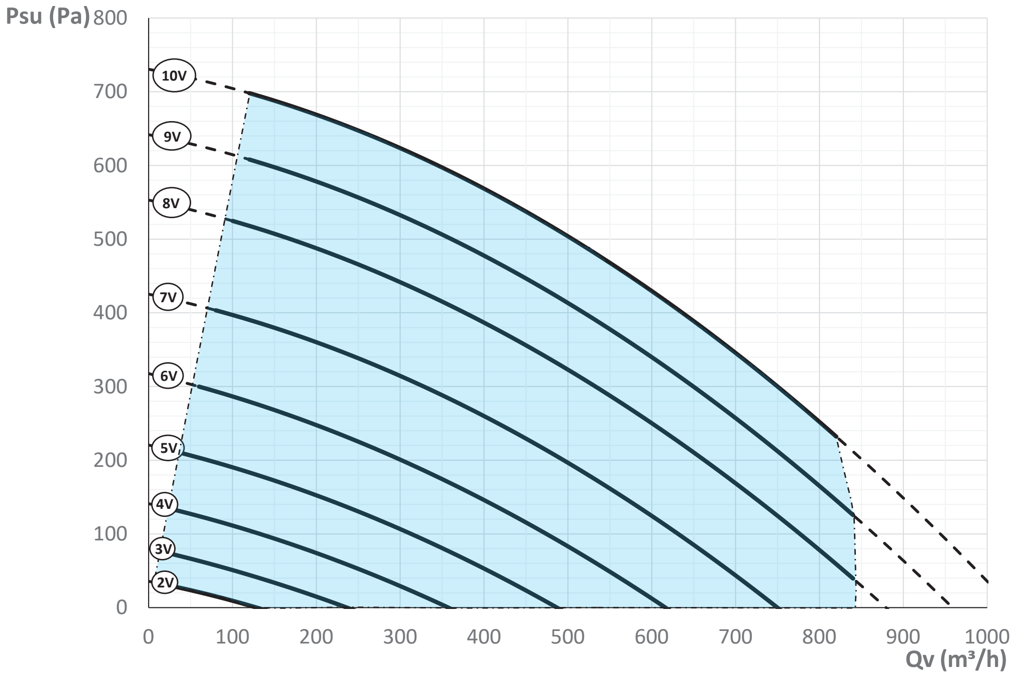
PS 1.5

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

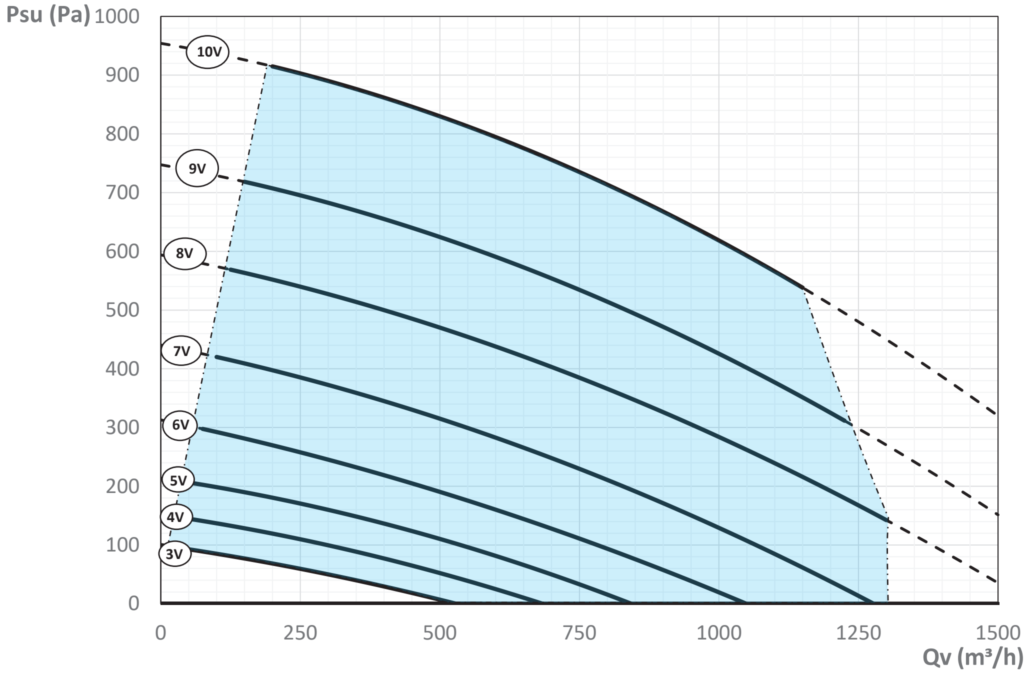
Flow rate / available static pressure with filter ePM1 55% (F7) + ePM1 85% (F9; optional) fresh air side



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

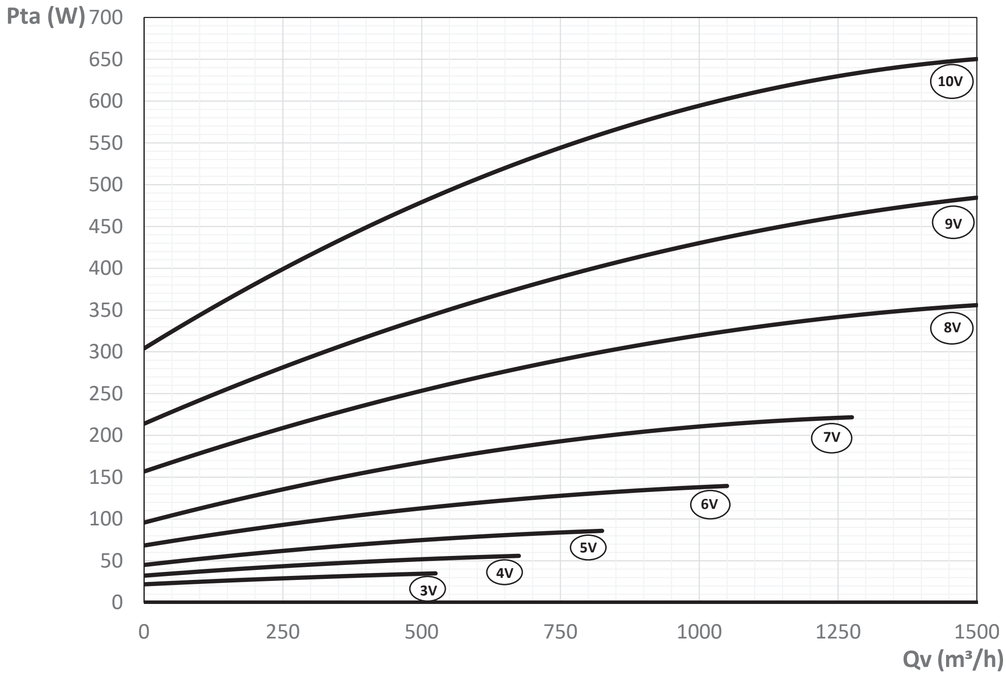
PS 2.5

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

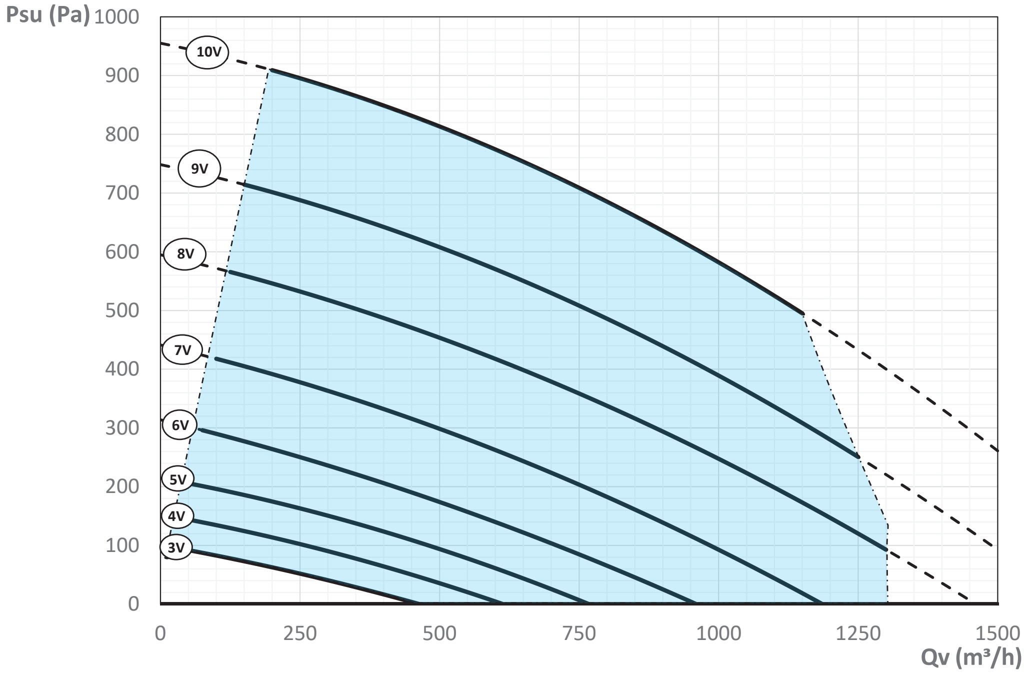
Flow rate / electric power input current with ePM1 55% (F7) in both flows



Pta = power input current
Qv = air flow

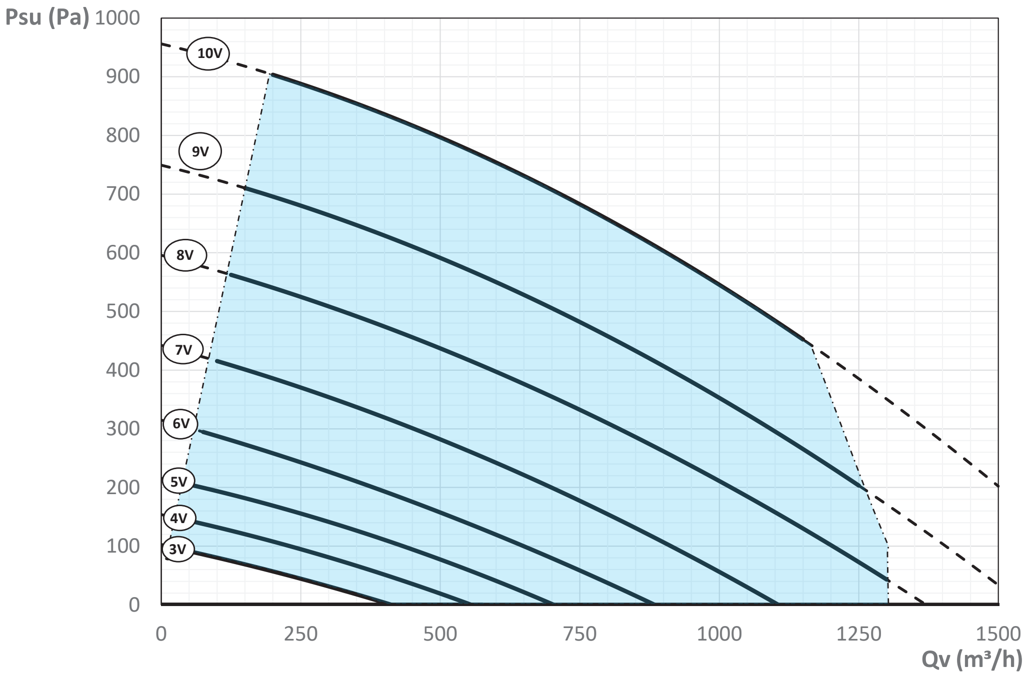
PS 2.5

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

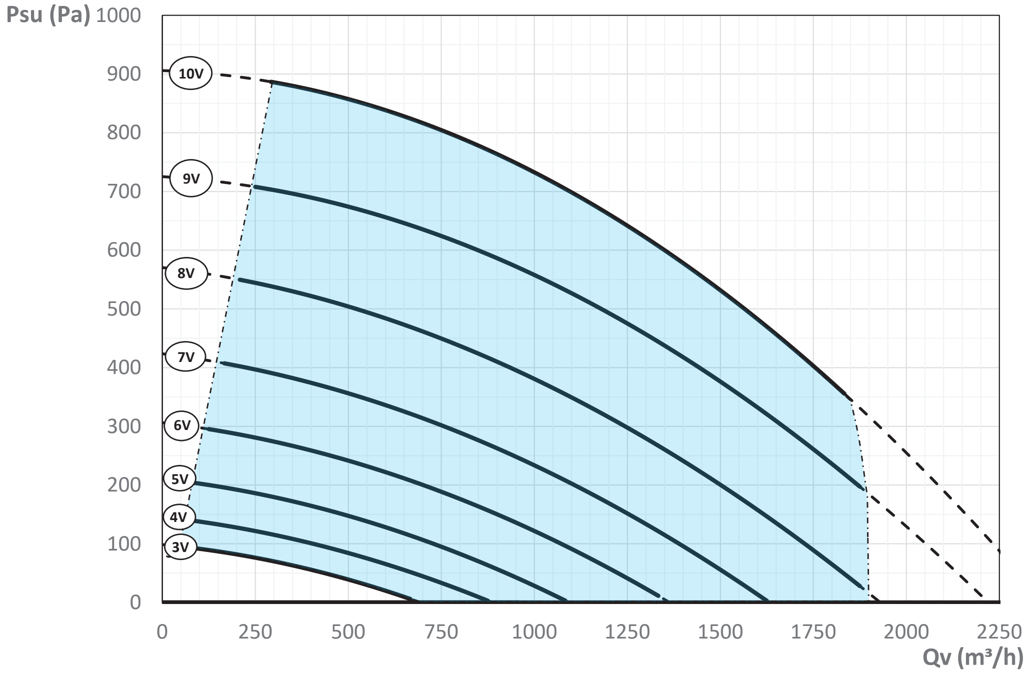
Flow rate / available static pressure with filter ePM1 55% (F7) + ePM1 85% (F9; optional) fresh air side



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

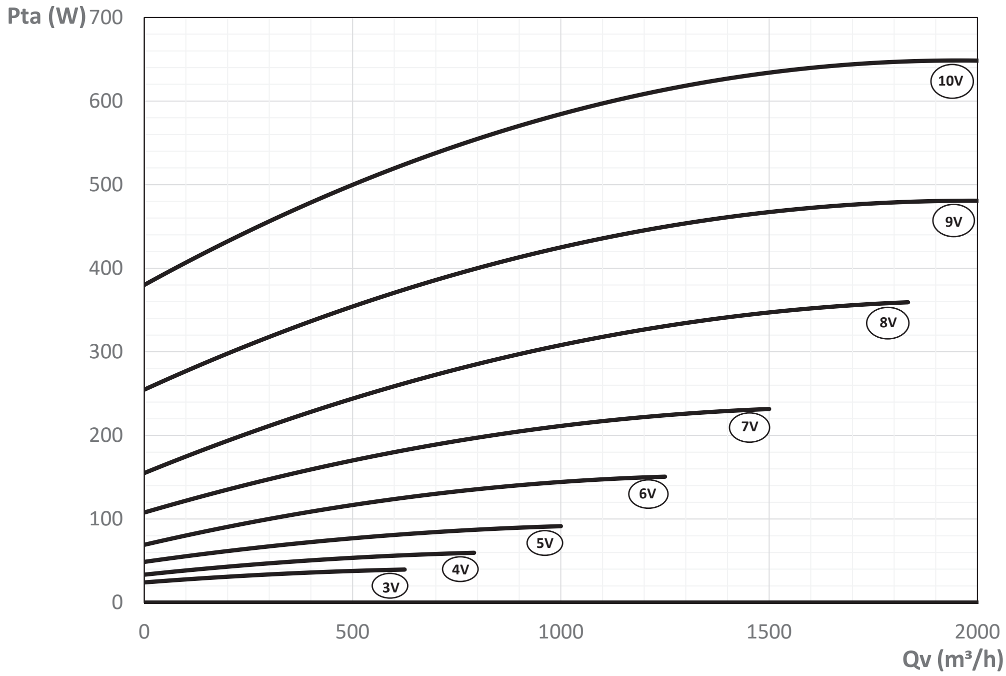
PS 3.5

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

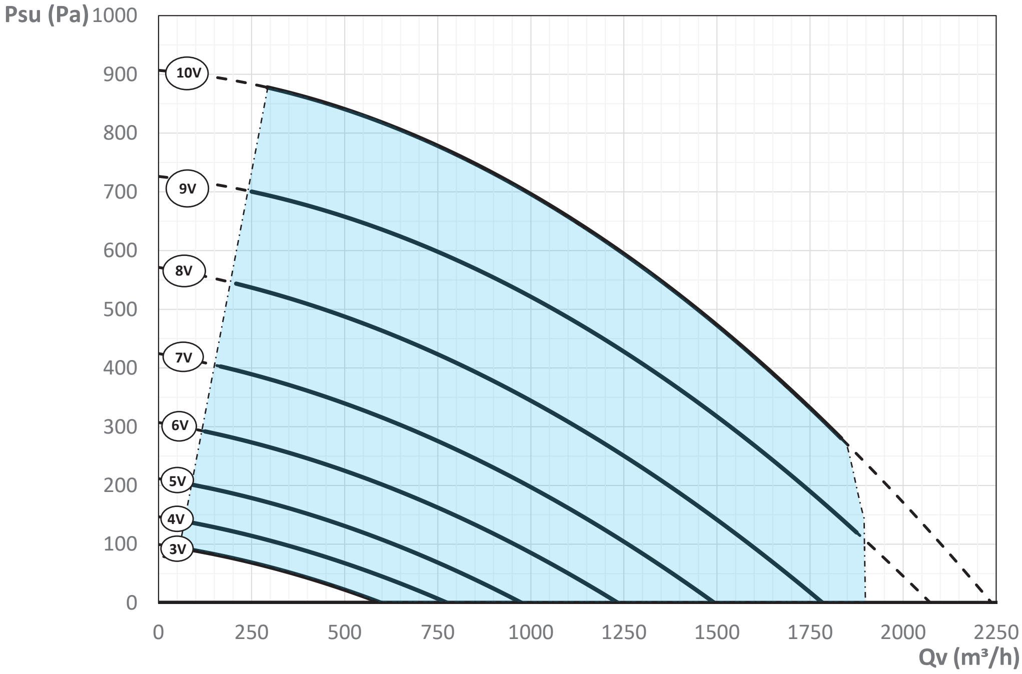
Flow rate / electric power input current with ePM1 55% (F7) in both flows



Pta = power input current
Qv = air flow

PS 3.5

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



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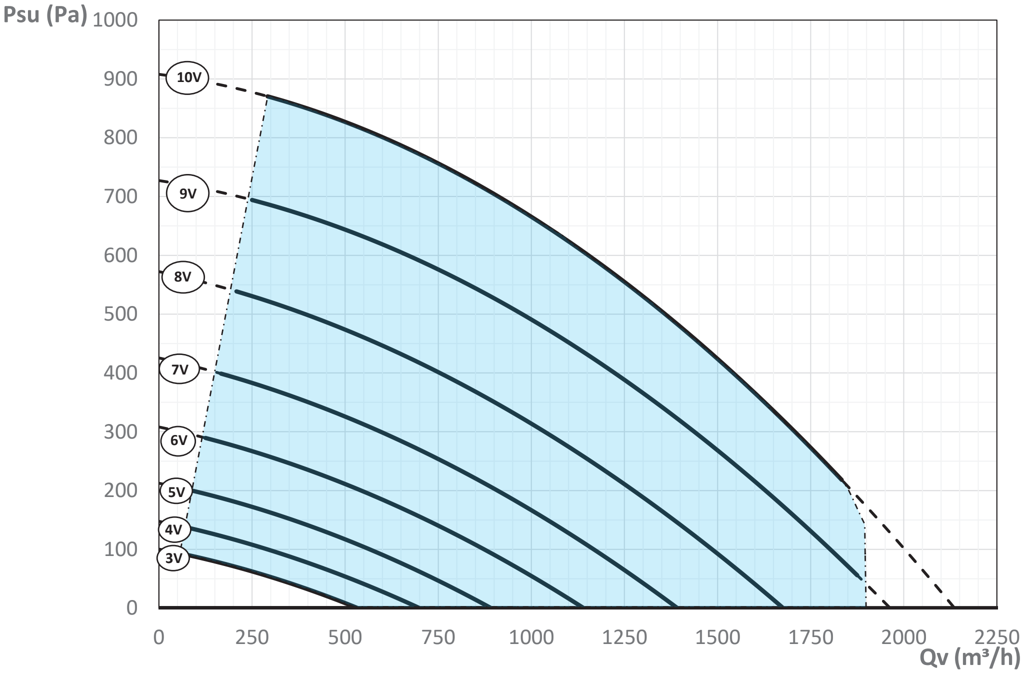
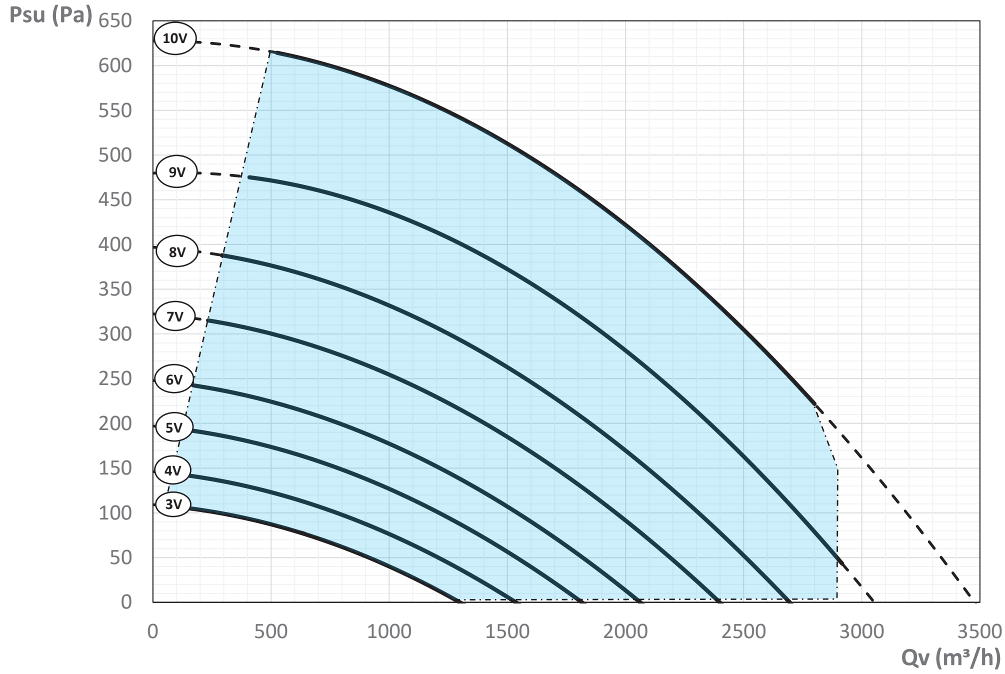
Flow rate / available static pressure with filter ePM1 55% (F7) + ePM1 85% (F9; optional) fresh air side



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

PS 5

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



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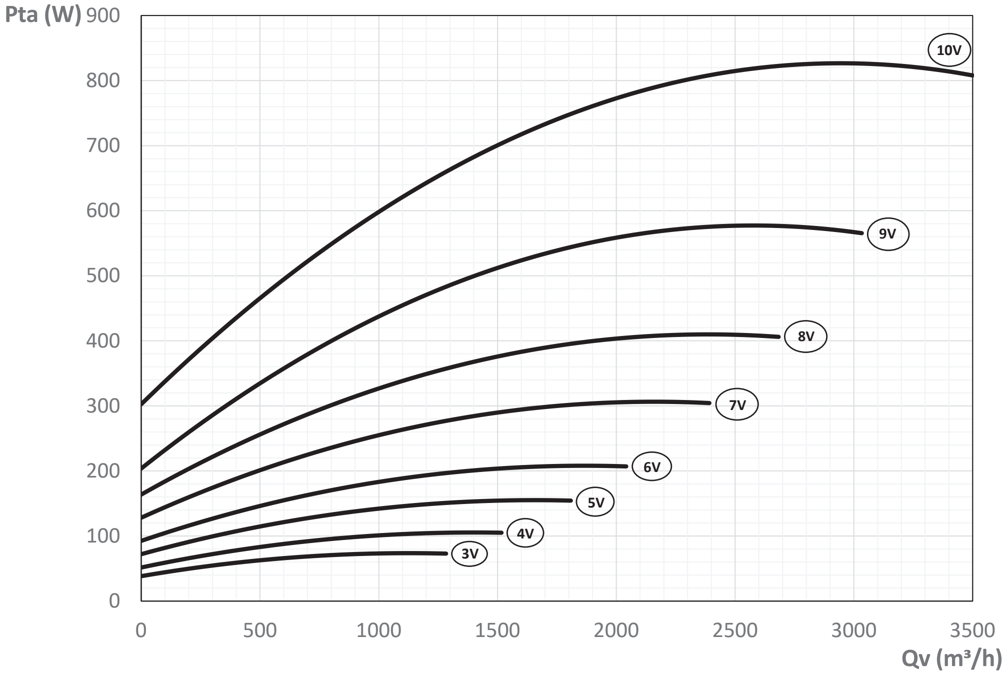
Psu = available static pressure

Qv = air flow

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

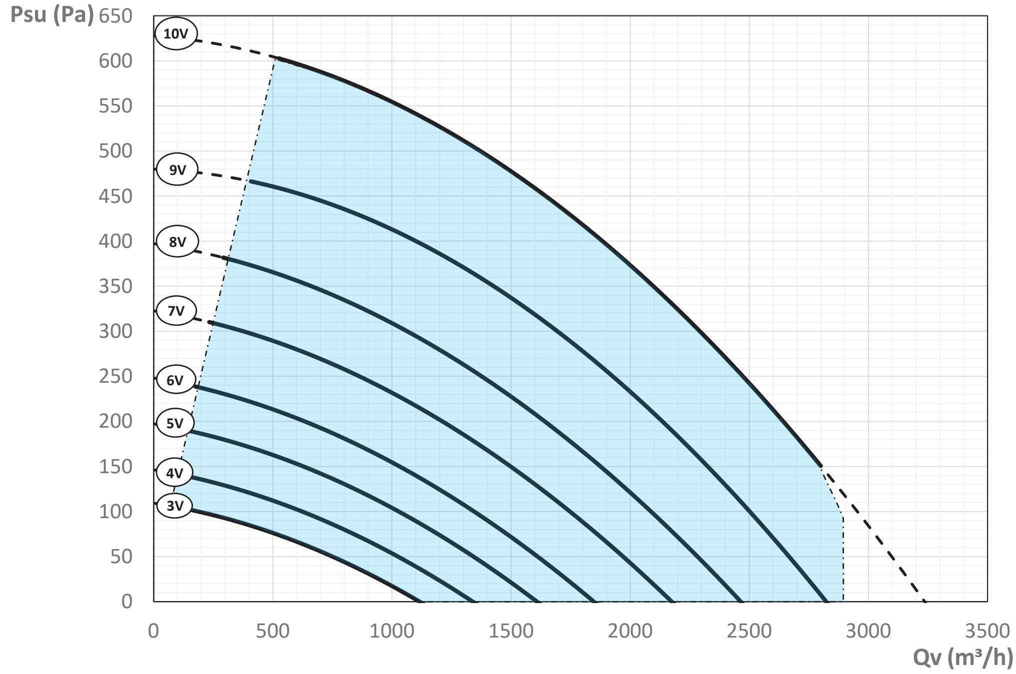


Pta = power input current

Qv = air flow

PS 5

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



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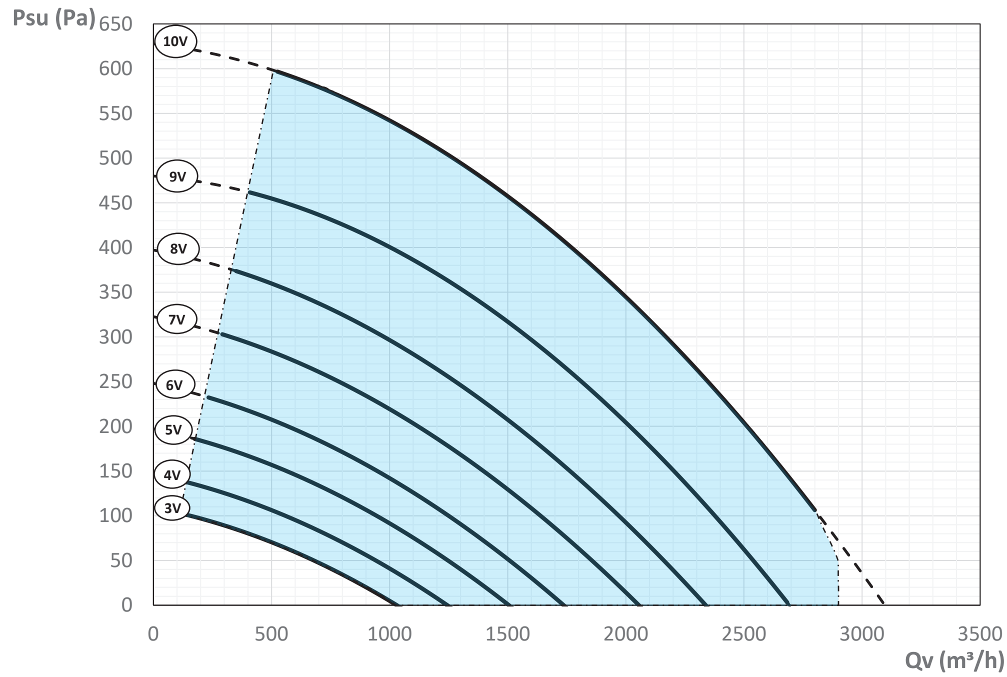
Psu = available static pressure
Qv = air flow

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



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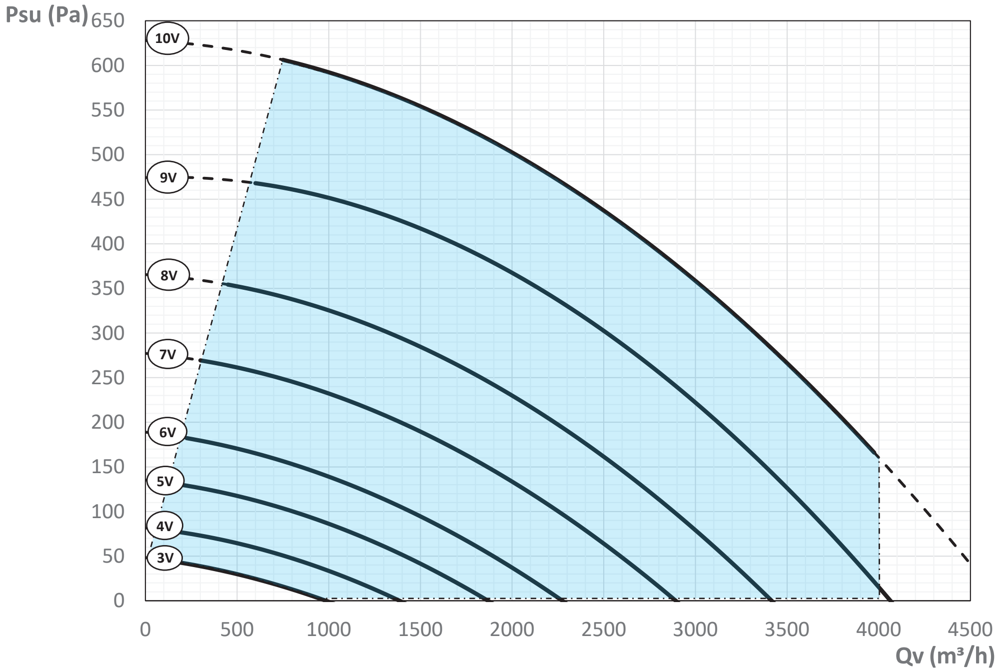
Psu = available static pressure
Qv = air flow

PS 6

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



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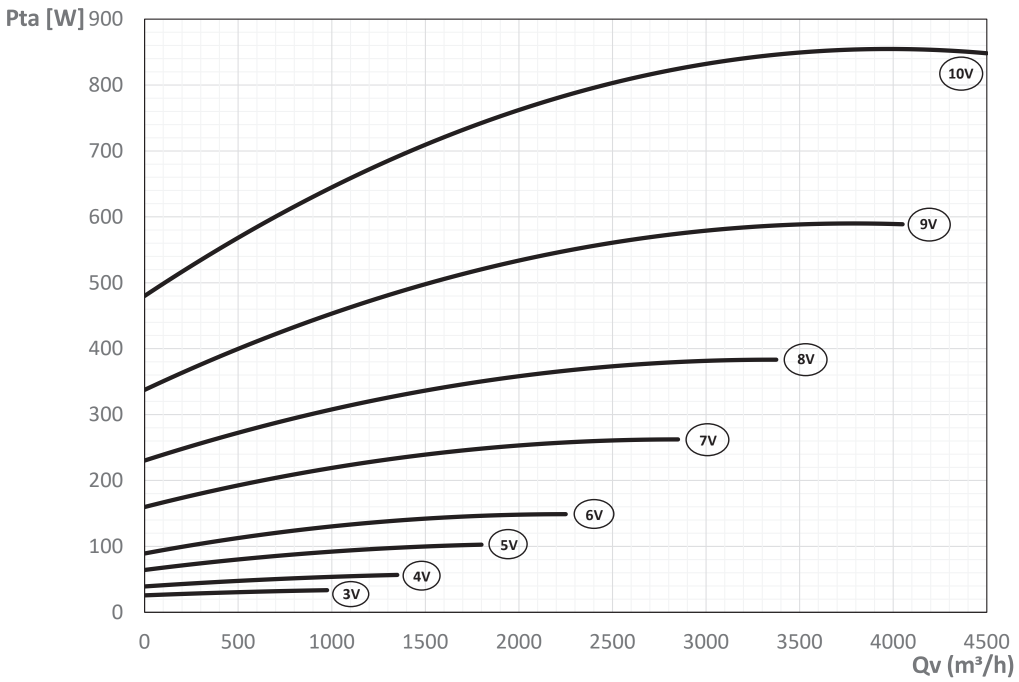
Psu = available static pressure
Qv = air flow

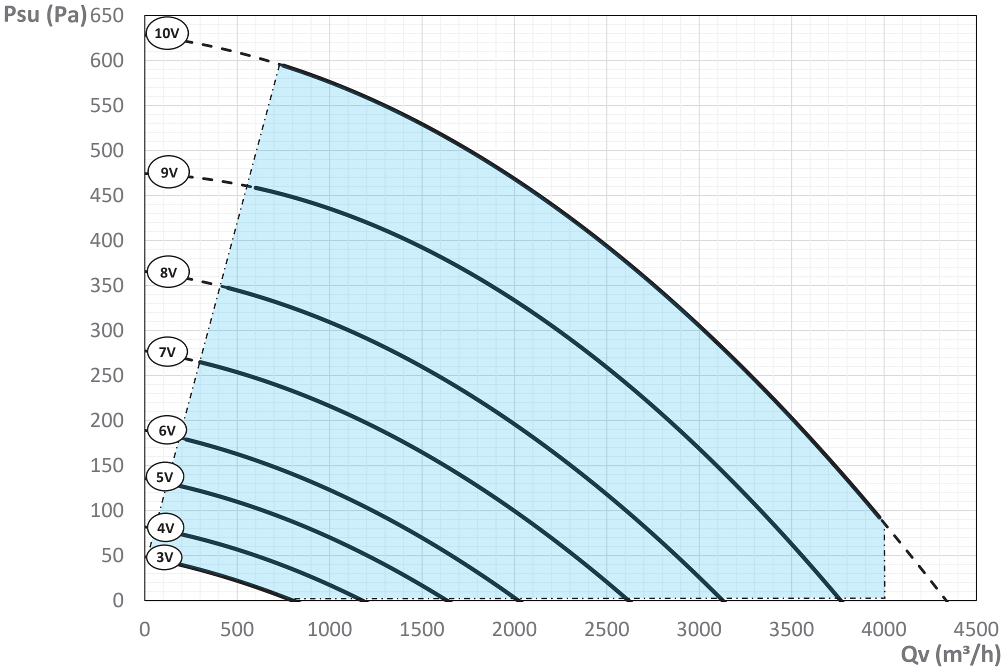
Flow rate / electric power input current with ePM1 55% (F7) in both flows



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



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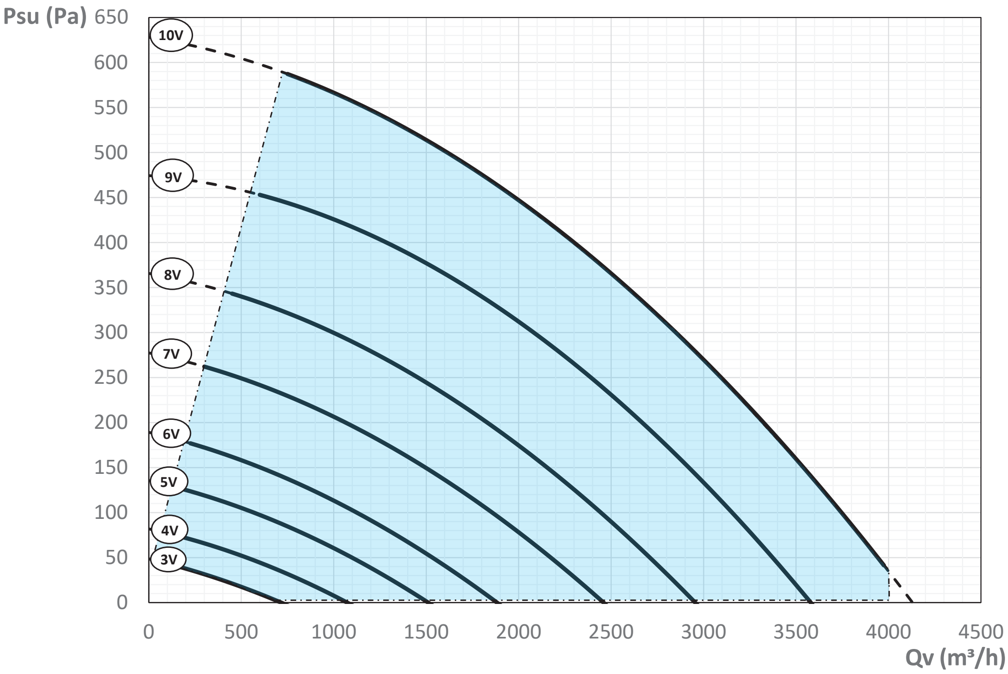
Psu = available static pressure
Qv = air flow

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



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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**					
Manufacturer model ID	**THE 1**	**THE 2**	**THE 3**	**THE 4**	**THE 5**	**THE 6**
HRS type	Static Countercurrent					
Heat recovery efficiency (%)	82	83	81	84	83	84
Nominal flow rate of the NRVU (m^3/s)	0,200	0,306	0,500	0,778	0,833	1,069
Effective power input current (W)	339	611	976	1479	1520	1705
SFPint ($W/m^3/s$)	1233	1349	1253	1309	1301	1120
SFPint_lim 2018 ($W/m^3/s$)	1321	1354	1265	1313	1305	1225
Nominal external pressure Δps, ext (Pa)	140	150	180	150	140	150
Front speed at design flow rate (m/s)	1,67	1,63	1,71	1,51	1,62	1,66
Internal pressure drop of ventilation components Δps, int (Pa)	308	310	318	325	349	362
Static efficiency of fans used as per Regulation (UE) n. 327/2011 (%)	58	51	54	51	69	69
Declared maximum percentage of external leakage (%) EN 13141-7	<1,5	<1,5	<1,5	<1,5	<1,5%	<1,5%
Declared maximum percentage of internal leakage (%) EN 13141-7	<3	<3	<3	<3	<3%	<3%
Energy performance or preferably energy classification of filters	Filters supplied fitted in the unit: ePM1 55% (F7)					
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 the functionality of the ventilation unit, which remains unchanged.					
Sound power level at the enclosure (dB(A))	56	63	62	62	65	68
Internet address with disassembly instructions	www.sabiana.it					

Trade name of manufacturer	**Energy Plus Smart PS**				
Manufacturer model ID	**PS 1.5**	**PS 2.5**	**PS 3.5**	**PS 5**	**PS 6**
HRS type	Static Countercurrent				
Heat recovery efficiency (%)	81,5	80	77	77	76
Nominal flow rate of the NRVU (m^3/s)	0,236	0,361	0,528	0,806	1,111
Effective power input current (W)	471	652	1014	1385	1715
SFPint ($W/m^3/s$)	1314	1254	1171	1091	1018
SFPint_lim 2018 ($W/m^3/s$)	1320	1256	1171	1099	1023
Nominal external pressure Δps, ext (Pa)	140	140	180	150	150
Front speed at design flow rate (m/s)	1,89	1,93	1,80	1,57	1,72
Internal pressure drop of ventilation components Δps, int (Pa)	271	315	283	260	305
Static efficiency of fans used as per Regulation (UE) n. 327/2011 (%)	51	54	54	51	69
Declared maximum percentage of external leakage (%) EN 13141-7	<1,5	<1,5	<1,5	<1,5%	<1,5%
Declared maximum percentage of internal leakage (%) EN 13141-7	<3	<3	<3	<3%	<3%
Energy performance or preferably energy classification of filters	Filters supplied fitted in the unit: ePM1 55% (F7)				
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 the functionality of the ventilation unit, which remains unchanged.				
Sound power level at the enclosure (dB(A))	60	62	62	62	68
Internet address with disassembly instructions	www.sabiana.it				

ACCESSORIES

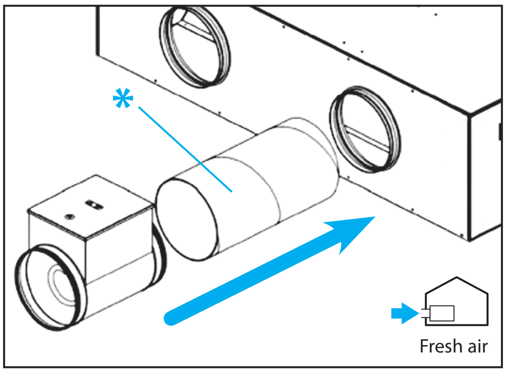
BEP electric heater with PWM control

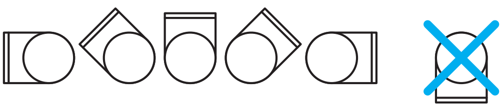
Electric heating coil consisting of armoured elements inserted inside a galvanised sheet metal duct section with circular flanges and rubber gasket.
The electric coil can be used in environments with air temperatures between -20 °C and +40 °C and is equipped with a double safety thermostat: one with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

The electric heater can be used as unit pre-heating element with the heat exchanger anti-freeze function or as modulating post-heating element with set point based on the air outlet temperature or on the indoor air temperature. In both cases the electric heater is regulated by the unit control board.
IP protection rating IP 43.

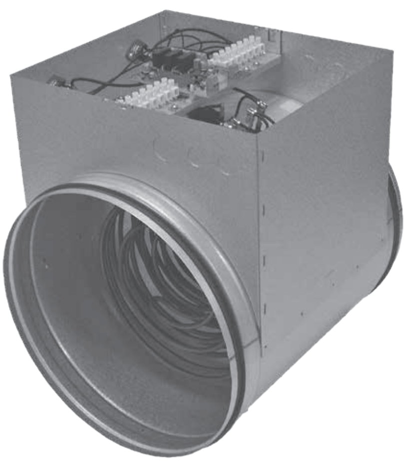
Model	THE 1 PS 1.5	THE 2 PS 2.5	THE 3 PS 3.5	THE 4	THE 5 PS 5	THE 6 PS 6
Resistance abbreviation	BEP 25/2/M	BEP 25/3/M	BEP 35/6/T	BEP 40/9/T	BEP 40/9/T	BEP 64/12/T
Code	9022113	9022213	9022313	9022413	9022413	9022621
Nominal electric power input (kW)	2,1	3,0	6,0	9,0	9,0	12,0
Power supply voltage (V/Hz/Ph)	230V 50Hz 1Ph + Pe		400V 50Hz 3Ph + Pe		400V 50Hz 3ph + N + Pe	
Electric heater power input current (A)	9,1	13,0	8,7	13,0	13,0	17,3
Connection size (mm)	Φ 250	Φ 250	Φ 355	Φ 400	Φ 400	600x400
Minimum air flow rate (m^3/h)	270	300	600	690	690	690

Anti-freeze electric heater installation example

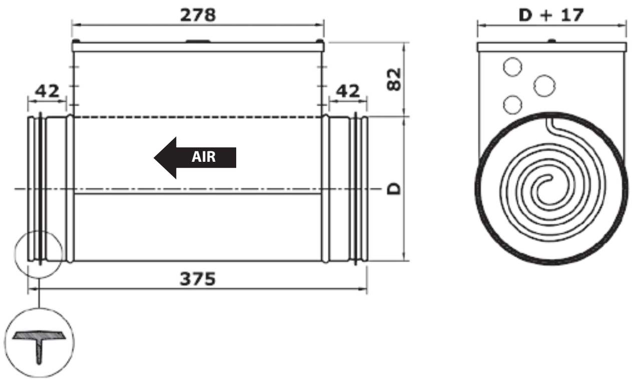




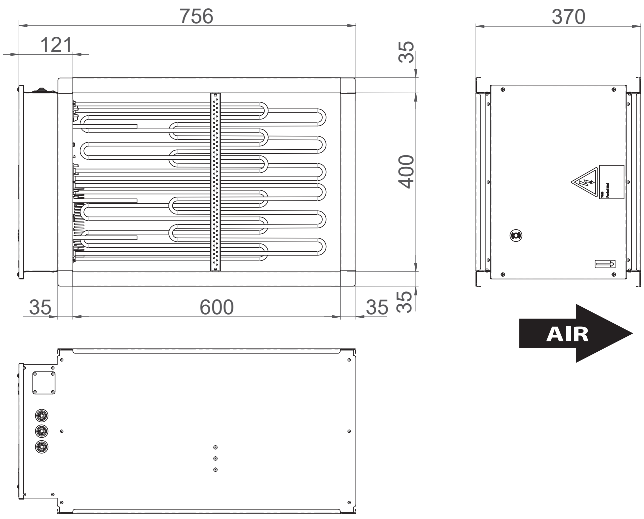
* = duct fitted by the installer; example of circular connection



Electric heater for THE5 / PS5



Electric heater for THE6 / PS6

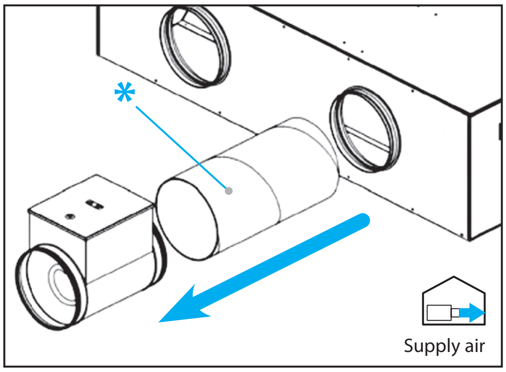


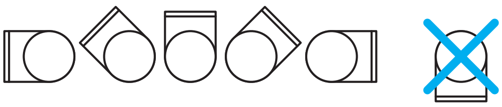
BER electric heater with ON/OFF control

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.
The electric heater can be also used as ON/OFF pre-heating element with anti-freeze function for the heat exchanger.
An adjustable thermostat, which acts as a limit, is placed on the outlet of the heating element.
IP protection rating IP 43.

Model	THE 1 PS 1.5	THE 2 PS 2.5	THE 3 PS 3.5	THE 4	THE 5 PS 5	THE 6 PS 6
Resistance abbreviation	BER 25/2/M	BER 25/3/M	BER 35/5/T	BER 40/6/T	BER 40/6/T	BER 64/9/T
Code	9022114	9022214	9022314	9022414	9022414	9022613
Nominal electric power input (kW)	2,1	3,0	4,5	6,0	6,0	9,0
Power supply voltage (V/Hz/Ph)	230V 50Hz 1Ph + Pe		400V 50Hz 3Ph + Pe		400V 50Hz 3ph + N + Pe	
Electric heater power input current (A)	9,1	13,0	7,2	8,7	8,7	13,0
Connection size (mm)	Φ 250	Φ 250	Φ 355	Φ 400	Φ 400	600x400
Minimum air flow rate (m^3/h)	270	300	600	690	690	690

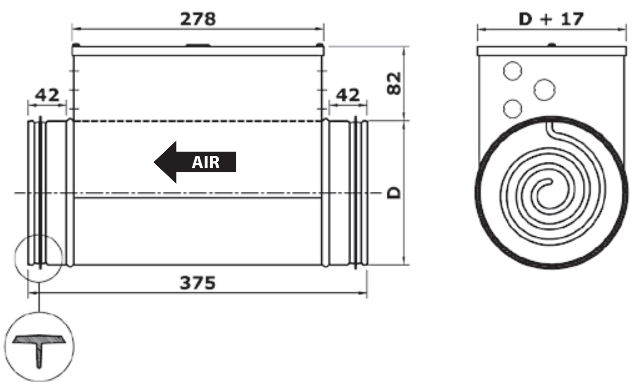
Post-heating electric heater installation example



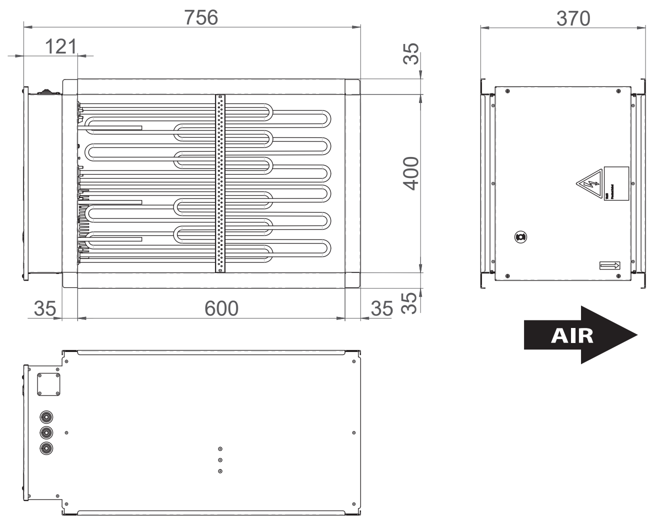


* = duct fitted by the installer; example of circular connection

Electric heater for THE5 / PS5

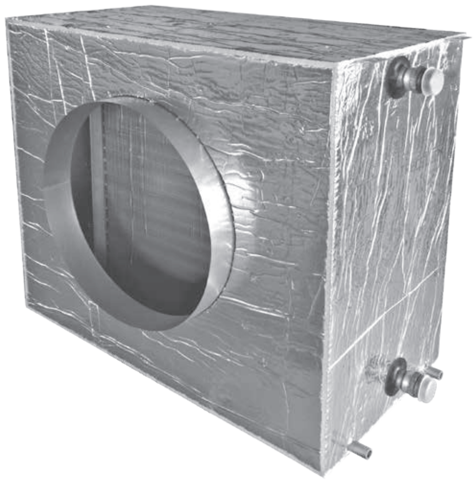


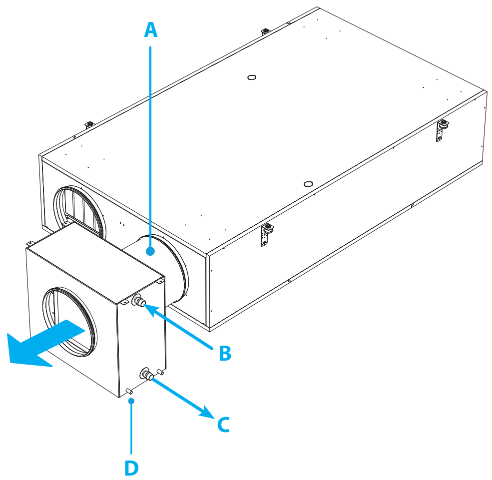
Electric heater for THE6 / PS6



Water coil

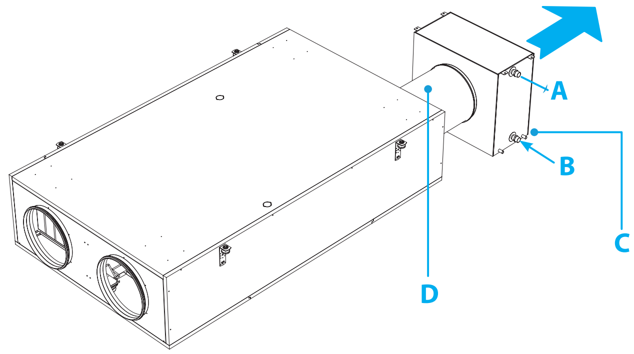
It consists of an externally insulated galvanised sheet metal structure complete with circular flanges that facilitate connection to the recovery unit or application on a circular duct.
Inside the section a finned coil is mounted on a special galvanised sheet metal supporting frame, 3/8" mandrel copper pipes, 2.5 mm pitch aluminium finning, and laterally projecting brass manifolds.
Inside the section is the condensate collection tray with 16 mm drain connection.
The treatment section is suitable for both post-heating and cooling of supply air.
In order to control the inlet temperature, the PT 1000 accessory probe must be installed downstream of the coil.





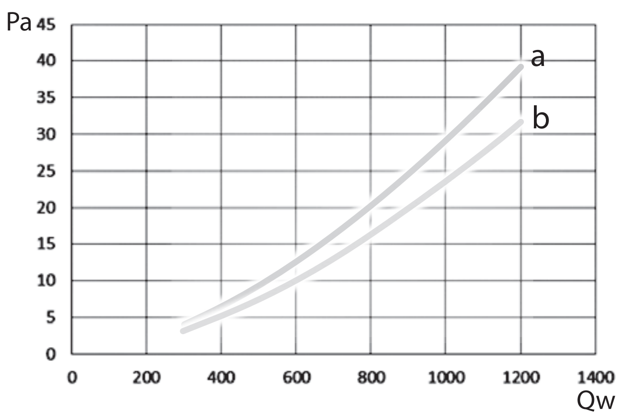
A = duct fitted by the installer
B = water inlet
C = water outlet
D = condensate drain

Inverted flow version



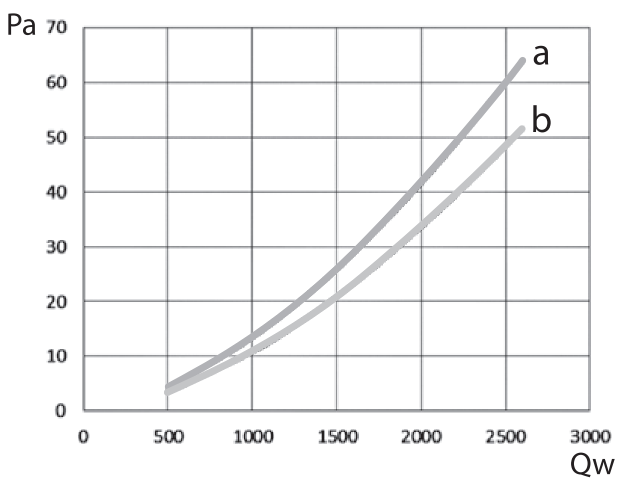
A = water outlet
B = water inlet
C = condensate drain
D = duct fitted by the installer

Air side pressure drop ENY-THE1-2 / ENY-PS-1.5-2.5

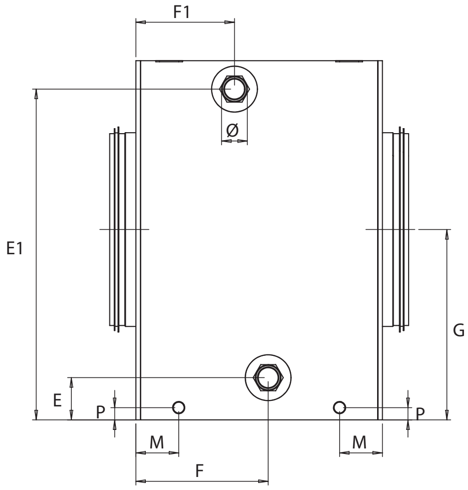


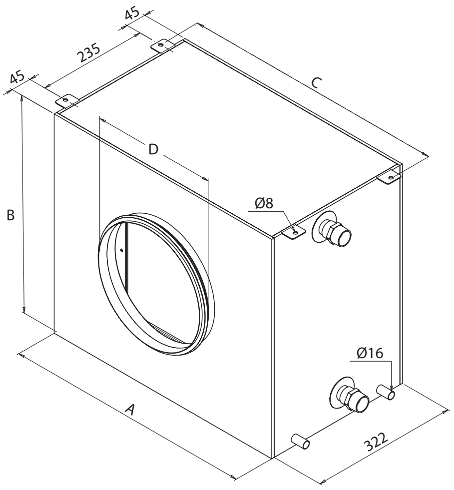
a = cold b = hot

Air side pressure drop ENY-THE3÷5 / ENY-PS-3.5-5



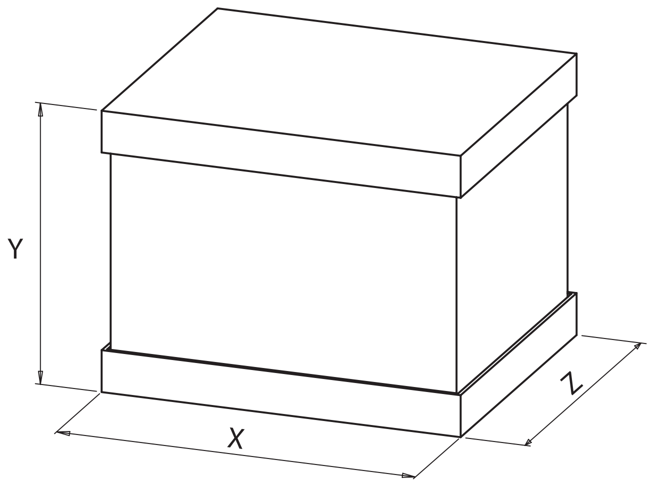
a = cold b = hot





For recovery unit			ENY-THE1-2 ENY-PS1.5-2.5	ENY-THE3 ENY-PS3.5	ENY-THE4-5 ENY-PS5
Coil indentification			**BAE 1-2**	**BAE 3**	**BAE 4**
Code			**9022012**	**9022013**	**9022014**
Dimensions	A	mm	536	645	645
	B	mm	468	568	568
	C	mm	567	676	676
	D	mm	250	355	400
	E	mm	55	55	55
	F	mm	180	180	180
	E1	mm	431	531	531
	F1	mm	133	133	133
	G	mm	250	300	300
Diameter		Ø	1″	1″	1″
Condensate drain	M	mm	56	56	56
	P	mm	16	16	16

Packaging dimensions



Model			ENY-TH4
Dimensions	X	mm	800
	Y	mm	540
	Z	mm	700

BAE water coil capacity

Water coil heating capacity table - THE 1 / PS 1.5

WT °C / °C	AT °C			Qv											
				250 m^3/h		300 m^3/h		400 m^3/h		500 m^3/h		600 m^3/h		700 m^3/h	
80/70	11	Ph (kW)	LAT (°C)	5,07	69,6	5,91	67,9	7,48	65,0	8,94	62,5	10,29	60,5	11,54	58,6
		Qw (l/h)	Dp(c) (kPa)	436	1,1	509	1,4	644	2,2	768	3,0	885	3,8	993	4,7
	15	Ph (kW)	LAT (°C)	4,70	70,0	5,48	68,4	6,94	65,7	8,28	63,4	9,53	61,5	10,70	59,7
		Qw (l/h)	Dp(c) (kPa)	404	0,9	471	1,2	596	1,9	712	2,6	820	3,3	920	4,1
70/60	11	Ph (kW)	LAT (°C)	4,27	60,3	4,97	58,8	6,28	56,3	7,49	54,2	8,61	52,4	9,66	50,8
		Qw (l/h)	Dp(c) (kPa)	367	0,8	428	1,1	540	1,6	644	2,2	740	2,9	831	3,5
	15	Ph (kW)	LAT (°C)	3,91	60,8	4,55	59,4	5,75	57,0	6,85	55,1	7,87	53,3	8,83	51,9
		Qw (l/h)	Dp(c) (kPa)	336	0,7	391	0,9	494	1,4	589	1,9	677	2,4	759	3,0
60/50	11	Ph (kW)	LAT (°C)	3,46	51,0	4,03	49,7	5,07	47,6	6,03	45,8	6,93	44,3	7,76	43,0
		Qw (l/h)	Dp(c) (kPa)	298	0,6	346	0,8	436	1,1	519	1,6	596	2,0	667	2,5
	15	Ph (kW)	LAT (°C)	3,11	51,4	3,61	50,2	4,55	48,3	5,41	46,6	6,20	45,2	6,95	44,0
		Qw (l/h)	Dp(c) (kPa)	268	0,5	311	0,6	391	0,9	465	1,3	533	1,6	598	2,0
45/40	11	Ph (kW)	LAT (°C)	2,47	39,5	2,87	38,6	3,63	37,2	4,33	36,0	4,98	34,9	5,58	34,0
		Qw (l/h)	Dp(c) (kPa)	424	1,1	494	1,5	624	2,3	744	3,1	856	4,0	960	5,0
	15	Ph (kW)	LAT (°C)	2,13	39,9	2,48	39,1	3,12	37,9	3,72	36,8	4,28	35,9	4,80	35,1
		Qw (l/h)	Dp(c) (kPa)	366	0,9	426	1,1	537	1,7	640	2,4	736	3,1	825	3,8

WT = water temperature
AT = air temperature
Qv = air flow
Ph = heat recovered
LAT = leaving air temperature
Qw = water flow rate
Dp(c) = water side pressure drop

Water coil heating capacity table - THE 2 / PS 2.5

WT °C / °C	AT °C			Qv											
				400 m^3/h		550 m^3/h		700 m^3/h		850 m^3/h		1000 m^3/h		1150 m^3/h	
80/70	11	Ph (kW)	LAT (°C)	7,48	65,0	9,62	61,5	11,54	58,6	13,30	56,1	14,90	54,0	16,41	52,2
		Qw (l/h)	Dp(c) (kPa)	644	2,2	828	3,4	993	4,7	1144	6,1	1282	7,4	1412	8,9
	15	Ph (kW)	LAT (°C)	6,94	65,7	8,92	62,4	10,70	59,7	12,32	57,4	13,82	55,4	15,21	53,7
		Qw (l/h)	Dp(c) (kPa)	596	1,9	767	3,0	920	4,1	1060	5,3	1189	6,5	1308	7,7
70/60	11	Ph (kW)	LAT (°C)	6,28	56,3	8,05	53,2	9,66	50,8	11,10	48,7	12,44	46,9	13,69	45,3
		Qw (l/h)	Dp(c) (kPa)	540	1,6	693	2,5	831	3,5	955	4,5	1070	5,6	1177	6,6
	15	Ph (kW)	LAT (°C)	5,75	57,0	7,37	54,2	8,83	51,9	10,16	50,0	11,38	48,3	12,50	46,8
		Qw (l/h)	Dp(c) (kPa)	494	1,4	634	2,2	759	3,0	874	3,9	978	4,7	1075	5,6
60/50	11	Ph (kW)	LAT (°C)	5,07	47,6	6,49	45,0	7,76	43,0	8,91	41,2	9,97	39,8	10,95	38,5
		Qw (l/h)	Dp(c) (kPa)	436	1,1	558	1,8	667	2,5	766	3,2	857	3,9	942	4,6
	15	Ph (kW)	LAT (°C)	4,55	48,3	5,81	45,9	6,95	44,0	7,98	42,5	8,92	41,1	9,80	39,9
		Qw (l/h)	Dp(c) (kPa)	391	0,9	500	1,5	598	2,0	686	2,6	767	3,2	842	3,7
45/40	11	Ph (kW)	LAT (°C)	3,63	37,2	4,66	35,4	5,58	34,0	6,43	32,8	7,19	31,8	7,92	30,9
		Qw (l/h)	Dp(c) (kPa)	624	2,3	801	3,6	960	5,0	1106	6,4	1237	7,8	1362	9,3
	15	Ph (kW)	LAT (°C)	3,12	37,9	4,00	36,3	4,80	35,1	5,52	34,0	6,18	33,1	6,80	32,3
		Qw (l/h)	Dp(c) (kPa)	537	1,7	689	2,7	825	3,8	949	4,8	1063	5,9	1169	7,1

WT = water temperature
AT = air temperature
Qv = air flow
Ph = heat recovered
LAT = leaving air temperature
Qw = water flow rate
Dp(c) = water side pressure drop

Water coil heating capacity table - THE 3 / PS 3.5

WT °C / °C	AT °C			Qv											
				700 m^3/h		900 m^3/h		1100 m^3/h		1300 m^3/h		1500 m^3/h		1700 m^3/h	
80/70	11	Ph (kW)	LAT (°C)	12,97	64,4	15,79	61,6	18,40	59,2	20,80	57,2	23,02	55,3	25,14	53,7
		Qw (l/h)	Dp(c) (kPa)	1115	2,5	1358	3,5	1582	4,7	1789	5,8	1980	7,0	2162	8,2
	15	Ph (kW)	LAT (°C)	12,02	65,2	14,64	62,6	17,04	60,3	19,28	58,4	21,35	56,6	23,30	55,1
		Qw (l/h)	Dp(c) (kPa)	1033	2,2	1259	3,1	1466	4,1	1658	5,1	1836	6,1	2003	7,1
70/60	11	Ph (kW)	LAT (°C)	10,89	55,9	13,25	53,5	15,41	51,4	17,41	49,6	19,27	48,0	21,00	46,6
		Qw (l/h)	Dp(c) (kPa)	937	1,9	1139	2,7	1326	3,5	1497	4,4	1657	5,2	1806	6,1
	15	Ph (kW)	LAT (°C)	9,97	56,7	12,12	54,4	14,10	52,5	15,93	50,9	17,63	49,4	19,21	48,1
		Qw (l/h)	Dp(c) (kPa)	858	1,6	1042	2,3	1212	3,0	1370	3,7	1516	4,5	1652	5,2
60/50	11	Ph (kW)	LAT (°C)	8,81	47,3	10,69	45,3	12,43	43,6	14,02	42,1	15,49	40,8	16,86	39,6
		Qw (l/h)	Dp(c) (kPa)	758	1,3	919	1,9	1069	2,5	1206	3,0	1332	3,6	1450	4,3
	15	Ph (kW)	LAT (°C)	7,91	48,0	9,60	46,2	11,14	44,6	12,57	43,3	13,88	42,1	15,12	41,0
		Qw (l/h)	Dp(c) (kPa)	680	1,1	826	1,5	958	2,0	1081	2,5	1194	3,0	1300	3,5
45/40	11	Ph (kW)	LAT (°C)	6,30	37,0	7,67	35,6	8,91	34,4	10,07	33,3	11,15	32,4	12,15	31,6
		Qw (l/h)	Dp(c) (kPa)	1084	2,6	1319	3,7	1533	4,9	1732	6,1	1918	7,4	2090	8,6
	15	Ph (kW)	LAT (°C)	5,43	37,7	6,60	36,4	7,67	35,4	8,67	34,5	9,58	33,7	10,45	33,0
		Qw (l/h)	Dp(c) (kPa)	933	2,0	1135	2,9	1320	3,8	1491	4,7	1649	5,6	1798	6,6

WT = water temperature
AT = air temperature
Qv = air flow
Ph = heat recovered
LAT = leaving air temperature
Qw = water flow rate
Dp(c) = water side pressure drop

Water coil heating capacity table - THE 4 / THE 5 / PS 5

WT °C/°C	AT °C			Qv											
				900 m^3/h		1200 m^3/h		1500 m^3/h		1800 m^3/h		2100 m^3/h		2400 m^3/h	
80/70	11	Ph (kW)	LAT (°C)	15.79	61.6	19.62	58.2	23.02	55.3	26.13	52.9	28.99	50.8	31.68	49.1
		Qw (l/h)	Dp(c) (kPa)	1358	3.5	1688	5.2	1980	7.0	2247	8.8	2493	10.6	2724	12.4
	15	Ph (kW)	LAT (°C)	14.64	62.6	18.19	59.3	21.35	56.6	24.22	54.4	26.89	52.5	29.35	50.8
		Qw (l/h)	Dp(c) (kPa)	1259	3.1	1564	4.6	1836	6.1	2083	7.6	2312	9.2	2524	10.8
70/60	11	Ph (kW)	LAT (°C)	13.25	53.5	16.43	50.5	19.27	48.0	21.84	46.0	24.20	44.2	26.41	42.7
		Qw (l/h)	Dp(c) (kPa)	1139	2.7	1413	3.9	1657	5.2	1878	6.5	2081	7.9	2272	9.2
	15	Ph (kW)	LAT (°C)	12.12	54.4	15.03	51.6	17.63	49.4	19.98	47.5	22.13	45.8	24.15	44.4
		Qw (l/h)	Dp(c) (kPa)	1042	2.3	1292	3.3	1516	4.5	1718	5.6	1903	6.7	2077	7.8
60/50	11	Ph (kW)	LAT (°C)	10.69	45.3	13.24	42.8	15.49	40.8	17.53	39.1	19.42	37.7	21.18	36.5
		Qw (l/h)	Dp(c) (kPa)	919	1.9	1138	2.8	1332	3.6	1507	4.6	1670	5.5	1822	6.4
	15	Ph (kW)	LAT (°C)	9.60	46.2	11.86	43.9	13.88	42.1	15.71	40.5	17.40	39.2	18.97	38.1
		Qw (l/h)	Dp(c) (kPa)	826	1.5	1020	2.3	1194	3.0	1351	3.7	1496	4.5	1631	5.3
45/40	11	Ph (kW)	LAT (°C)	7.67	35.6	9.50	33.8	11.15	32.4	12.64	31.3	14.02	30.3	15.30	29.4
		Qw (l/h)	Dp(c) (kPa)	1319	3.7	1635	5.5	1918	7.4	2174	9.2	2411	11.1	2632	13.0
	15	Ph (kW)	LAT (°C)	6.60	36.4	8.18	35.0	9.58	33.7	10.87	32.7	12.05	31.8	13.15	31.0
		Qw (l/h)	Dp(c) (kPa)	1135	2.9	1408	4.2	1649	5.6	1870	7.0	2073	8.5	2262	9.9

WT = water temperature
AT = air temperature
Qv = air flow
Ph = heat recovered
LAT = leaving air temperature
Qw = water flow rate
Dp(c) = water side pressure drop

Water coil cooling capacity table - THE 1 / PS 1.5

WT °C / °C	AT °C			Qv											
				250 m^3/h		300 m^3/h		400 m^3/h		500 m^3/h		600 m^3/h		700 m^3/h	
7/12	32 40% Rh	Pc (kW)	Ps (kW)	2,03	1,46	2,31	1,69	2,81	2,12	3,24	2,51	3,62	2,87	3,96	3,21
		LAT (°C)	C (l/h)	14,0	0,8	14,6	0,9	15,6	1,0	16,6	1,0	17,3	1,0	17,9	1,0
		Qw (l/h)	Dp(c) (kPa)	349	1,5	398	1,9	484	2,7	557	3,5	622	4,3	680	5,0
	27 50% Rh	Pc (kW)	Ps (kW)	1,57	1,13	1,79	1,30	2,16	1,62	2,49	1,92	2,77	2,20	3,03	2,46
		LAT (°C)	C (l/h)	13,3	0,6	13,9	0,7	14,7	0,8	15,4	0,8	15,9	0,8	16,4	0,8
		Qw (l/h)	Dp(c) (kPa)	270	1,0	308	1,2	372	1,7	428	2,2	477	2,7	522	3,1
	25 50% Rh	Pc (kW)	Ps (kW)	1,21	1,01	1,38	1,17	1,68	1,47	1,94	1,76	2,17	2,03	2,39	2,28
		LAT (°C)	C (l/h)	12,9	0,3	13,3	0,3	13,9	0,3	14,4	0,3	14,8	0,2	15,2	0,1
		Qw (l/h)	Dp(c) (kPa)	209	0,6	238	0,8	289	1,1	334	1,4	374	1,7	410	2,0
10/15	32 40% Rh	Pc (kW)	Ps (kW)	1,48	1,28	1,68	1,49	2,05	1,90	2,38	2,28	2,66	2,64	2,93	2,93
		LAT (°C)	C (l/h)	16,2	0,3	16,7	0,3	17,4	0,2	18,0	0,1	18,5	0,0	18,9	0,0
		Qw (l/h)	Dp(c) (kPa)	245	0,8	290	1,1	353	1,5	409	2,0	457	2,4	503	2,9
	27 50% Rh	Pc (kW)	Ps (kW)	1,07	0,95	1,22	1,11	1,48	1,42	1,72	1,70	1,93	1,93	2,12	2,12
		LAT (°C)	C (l/h)	15,5	0,2	15,8	0,1	16,3	0,0	16,7	0,0	17,1	0,0	17,4	0,0
		Qw (l/h)	Dp(c) (kPa)	183	0,5	209	0,6	255	0,8	295	1,1	331	1,4	365	1,6
	25 50% Rh	Pc (kW)	Ps (kW)	0,79	0,79	0,91	0,91	1,12	1,12	1,31	1,31	1,48	1,48	1,64	1,64
		LAT (°C)	C (l/h)	14,7	0,0	14,9	0,0	15,3	0,0	15,6	0,0	15,9	0,0	16,1	0,0
		Qw (l/h)	Dp(c) (kPa)	137	0,3	157	0,4	193	0,5	225	0,7	254	0,8	281	1,0

WT = water temperature
AT = air temperature
Rh = relative humidity
Qv = air flow
Pc = total heat recovered
Ps = sensitive power
LAT = leaving air temperature
C = condensate
Qw = water flow rate
Dp(c) = water side pressure drop

Water coil cooling capacity table - THE 2 / PS 2.5

WT °C / °C	AT °C			Qv											
				400 m^3/h		550 m^3/h		700 m^3/h		850 m^3/h		1000 m^3/h		1150 m^3/h	
7/12	32 40% Rh	Pc (kW)	Ps (kW)	2,81	2,12	3,43	2,69	3,96	3,21	4,42	3,70	4,82	4,16	5,36	4,69
		LAT (°C)	C (l/h)	15,7	1,0	16,9	1,0	17,9	1,0	18,6	1,0	19,2	0,9	19,5	0,9
		Qw (l/h)	Dp(c) (kPa)	484	2,7	590	3,9	680	5,0	759	6,1	829	7,2	922	8,7
	27 50% Rh	Pc (kW)	Ps (kW)	2,16	1,62	2,63	2,06	3,03	2,46	3,38	2,82	3,76	3,21	3,97	3,50
		LAT (°C)	C (l/h)	14,7	0,8	15,6	0,8	16,4	0,8	16,9	0,8	17,3	0,8	17,8	0,7
		Qw (l/h)	Dp(c) (kPa)	372	1,7	453	2,4	522	3,1	581	3,8	647	4,6	683	5,1
	25 50% Rh	Pc (kW)	Ps (kW)	1,68	1,47	2,06	1,89	2,39	2,28	2,67	2,65	2,93	2,93	3,17	3,17
		LAT (°C)	C (l/h)	13,9	0,3	14,6	0,2	15,2	0,1	15,6	0,0	16,0	0,0	16,3	0,0
		Qw (l/h)	Dp(c) (kPa)	289	1,1	354	1,6	410	2,0	459	2,5	505	2,9	545	3,4
10/15	32 40% Rh	Pc (kW)	Ps (kW)	2,05	1,90	2,52	2,46	2,93	2,93	3,29	3,29	3,61	3,61	3,91	3,91
		LAT (°C)	C (l/h)	17,4	0,2	18,2	0,0	18,9	0,0	19,4	0,0	19,8	0,0	20,2	0,0
		Qw (l/h)	Dp(c) (kPa)	353	1,5	434	2,2	503	2,9	565	3,6	620	4,2	672	4,9
	27 50% Rh	Pc (kW)	Ps (kW)	1,48	1,42	1,82	1,82	2,12	2,12	2,38	2,38	2,62	2,62	2,84	2,84
		LAT (°C)	C (l/h)	16,3	0,0	16,9	0,0	17,4	0,0	17,7	0,0	18,1	0,0	18,3	0,0
		Qw (l/h)	Dp(c) (kPa)	255	0,8	314	1,2	365	1,6	410	2,0	451	2,4	488	2,7
	25 50% Rh	Pc (kW)	Ps (kW)	1,12	1,12	1,39	1,39	1,64	1,64	1,85	1,85	2,05	2,05	2,24	2,24
		LAT (°C)	C (l/h)	15,3	0,0	15,7	0,0	16,1	0,0	16,4	0,0	16,6	0,0	16,8	0,0
		Qw (l/h)	Dp(c) (kPa)	193	0,5	240	0,8	281	1,0	319	1,3	353	1,5	385	1,8

WT = water temperature
AT = air temperature
Rh = relative humidity
Qv = air flow
Pc = total heat recovered
Ps = sensitive power
LAT = leaving air temperature
C = condensate
Qw = water flow rate
Dp(c) = water side pressure drop

Water coil cooling capacity table - THE 3 / PS 3.5

WT °C / °C	AT °C			Qv											
				700 m^3/h		900 m^3/h		1100 m^3/h		1300 m^3/h		1500 m^3/h		1700 m^3/h	
7/12	32 40% Rh	Pc (kW)	Ps (kW)	4,99	3,69	5,83	4,45	6,57	5,15	7,23	5,80	7,81	6,42	8,34	7,00
		LAT (°C)	C (l/h)	15,7	1,8	16,8	1,9	17,6	2,0	18,3	2,0	18,8	2,0	19,3	1,9
		Qw (l/h)	Dp(c) (kPa)	858	4,8	1002	6,3	1131	7,9	1243	9,3	1344	10,7	1435	12,1
	27 50% Rh	Pc (kW)	Ps (kW)	3,86	2,84	4,50	3,42	5,06	3,95	5,56	4,45	6,12	4,97	6,60	5,45
		LAT (°C)	C (l/h)	14,7	1,4	15,5	1,5	16,1	1,6	16,6	1,6	17,0	1,6	17,3	1,6
		Qw (l/h)	Dp(c) (kPa)	664	3,0	774	4,0	871	4,9	957	5,8	1052	6,9	1135	7,9
	25 50% Rh	Pc (kW)	Ps (kW)	3,01	2,58	3,52	3,14	3,99	3,66	4,40	4,15	4,77	4,62	5,12	5,07
		LAT (°C)	C (l/h)	13,9	0,6	14,5	0,5	15,0	0,5	15,4	0,3	15,7	0,2	16,0	0,0
		Qw (l/h)	Dp(c) (kPa)	517	1,9	606	2,6	686	3,2	756	3,8	821	4,4	880	5,0
10/15	32 40% Rh	Pc (kW)	Ps (kW)	3,66	3,32	4,29	4,06	4,86	4,76	5,38	5,38	5,84	5,84	6,27	6,27
		LAT (°C)	C (l/h)	17,4	0,5	18,1	0,3	18,7	0,1	19,1	0,0	19,6	0,0	20,0	0,0
		Qw (l/h)	Dp(c) (kPa)	629	2,7	738	3,6	837	4,5	926	5,4	1005	6,3	1079	7,1
	27 50% Rh	Pc (kW)	Ps (kW)	2,65	2,48	3,12	3,04	3,54	3,54	3,92	3,92	4,26	4,26	4,59	4,59
		LAT (°C)	C (l/h)	16,3	0,2	16,8	0,1	17,2	0,0	17,5	0,0	17,4	0,0	18,1	0,0
		Qw (l/h)	Dp(c) (kPa)	456	1,5	537	2,0	609	2,5	674	3,1	733	3,6	789	4,1
	25 50% Rh	Pc (kW)	Ps (kW)	2,01	2,01	2,39	2,39	2,73	2,73	3,04	3,04	3,33	3,33	3,59	3,59
		LAT (°C)	C (l/h)	15,3	0,0	15,6	0,0	16,0	0,0	16,2	0,0	16,4	0,0	16,6	0,0
		Qw (l/h)	Dp(c) (kPa)	346	0,9	411	1,3	469	1,6	523	1,9	572	2,3	618	2,6

WT = water temperature
AT = air temperature
Rh = relative humidity
Qv = air flow
Pc = total heat recovered
Ps = sensitive power
LAT = leaving air temperature
C = condensate
Qw = water flow rate
Dp(c) = water side pressure drop

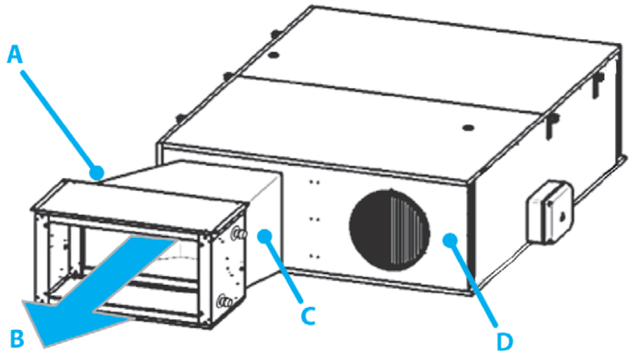
Water coil cooling capacity table - THE 4 / THE 5 / PS 5

WT °C / °C	AT °C			Qv											
				900 m^3/h		1200 m^3/h		1500 m^3/h		1800 m^3/h		2100 m^3/h		2400 m^3/h	
7/12	32 40% Rh	Pc (kW)	Ps (kW)	5,83	4,45	6,91	5,48	7,81	6,42	8,61	7,29	9,30	8,11	10,40	9,17
		LAT (°C)	C (l/h)	16,8	1,9	17,9	2,0	18,8	2,0	19,5	1,8	20,1	1,7	20,2	1,7
		Qw (l/h)	Dp(c) (kPa)	1002	6,3	1189	8,6	1344	10,7	1481	12,8	1600	14,7	1789	18,0
	27 50% Rh	Pc (kW)	Ps (kW)	4,50	3,42	5,32	4,20	6,12	4,97	6,64	5,59	7,15	6,19	7,71	6,83
		LAT (°C)	C (l/h)	15,5	1,5	16,4	1,6	17,0	1,6	17,6	1,5	18,1	1,3	18,4	1,2
		Qw (l/h)	Dp(c) (kPa)	774	4,0	915	5,4	1052	6,9	1143	8,0	1229	9,2	1327	10,5
	25 50% Rh	Pc (kW)	Ps (kW)	3,52	3,14	4,20	3,91	4,77	4,62	5,29	5,29	5,75	5,75	6,17	6,17
		LAT (°C)	C (l/h)	14,5	0,5	15,2	0,4	15,7	0,2	16,2	0,0	16,5	0,0	16,8	0,0
		Qw (l/h)	Dp(c) (kPa)	606	2,6	722	3,5	821	4,4	909	5,3	990	6,2	1061	7,0
10/15	32 40% Rh	Pc (kW)	Ps (kW)	4,29	4,06	5,13	5,10	5,84	5,84	6,48	6,48	7,06	7,06	7,58	7,58
		LAT (°C)	C (l/h)	18,1	0,3	18,9	0,0	19,6	0,0	20,1	0,0	20,5	0,0	50,8	0,0
		Qw (l/h)	Dp(c) (kPa)	738	3,6	882	5,0	1005	6,3	1115	7,6	1214	8,8	1304	10,0
	27 50% Rh	Pc (kW)	Ps (kW)	3,12	3,04	3,73	3,73	4,26	4,26	4,74	4,74	5,17	5,17	5,56	5,56
		LAT (°C)	C (l/h)	16,8	0,1	17,4	0,0	17,8	0,0	18,2	0,0	18,5	0,0	18,8	0,0
		Qw (l/h)	Dp(c) (kPa)	537	2,0	642	2,8	733	3,6	815	4,3	889	5,0	957	5,7
	25 50% Rh	Pc (kW)	Ps (kW)	2,39	2,39	2,89	2,89	3,33	3,33	3,72	3,72	4,09	4,09	4,43	4,43
		LAT (°C)	C (l/h)	15,6	0,0	16,1	0,0	16,4	0,0	16,7	0,0	17,0	0,0	17,2	0,0
		Qw (l/h)	Dp(c) (kPa)	411	1,3	496	1,8	572	2,3	641	2,8	703	3,3	761	3,8

WT = water temperature
AT = air temperature
Rh = relative humidity
Qv = air flow
Pc = total heat recovered
Ps = sensitive power
LAT = leaving air temperature
C = condensate
Qw = water flow rate
Dp(c) = water side pressure drop

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 inlet temperature, the PT 1000 accessory probe must be installed downstream of the coil.



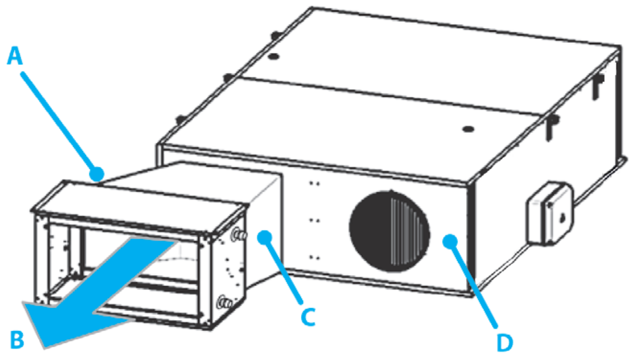
A = Ocean ECM SBF section
B = air flow
C = connecting plenum
D = Energy Efficient THE and Energy Plus Smart PS

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 1 / PS 1.5	ENP 1-2	9035241	+	SBF 14	0035371	+	FMP/FRP 1-2	9035221
THE 2 / PS 2.5	ENP 1-2	9035241	+	SBF 14	0035371	+	FMP/FRP 1-2	9035221
THE 3 / PS 3.5	ENP 3	9035243	+	SBF 24	0035372	+	FMP/FRP 1-2	9035221
THE 4	ENP 4	9035244	+	SBF 34	0035373	+	FMP/FRP 3	9035223
THE 5 / PS 5	ENP 5	9035245	+	SBF 44	0035374	+	FMP/FRP 4	9035224
THE 6 / 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.

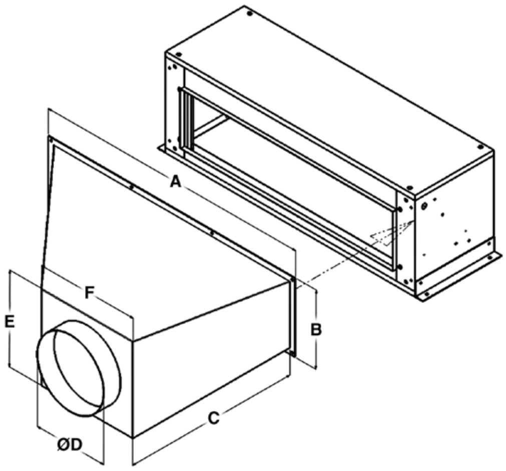


A = Ocean ECM SBF section
B = air flow
C = connecting plenum
D = Energy Efficient THE and Energy Plus Smart PS

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 1 / PS 1.5	ENP 1-2	9035241	+	SFE-DP 1-2	0035741	+	FMP/FRP 1-2	9035221
THE 2 / PS 2.5	ENP 1-2	9035241	+	SFE-DP 1-2	0035741	+	FMP/FRP 1-2	9035221
THE 3 / PS 3.5	ENP 3	9035243	+	SFE-DP 1-2	0035741	+	FMP/FRP 1-2	9035221
THE 4	ENP 4	9035244	+	SFE-DP 3	0035743	+	FMP/FRP 3	9035223
THE 5 / PS 5	ENP 5	9035245	+	SFE-DP-4	0035744	+	FMP/FRP 4	9035224
THE 6 / 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 1 PS 1.5	THE 2 PS 2.5	THE 3 PS 3.5	THE 4	THE 5 PS 5	THE 6 PS 6
Connecting plenum	ID		ENP 1-2	ENP 1-2	ENP 3	ENP 4	ENP 5	ENP 6
	Code		9035241	9035241	9035243	9035244	9035245	9035246
Dimensions	A	mm	1050	1050	1050	1050	1367	1367
	B	mm	270	270	270	337	340	395
	C	mm	600	600	600	600	600	600
	D	mm	250	250	355	400	400	450
	E	mm	350	350	428	473	472	522
	F	mm	370	370	448	493	492	542
Ocean ECM model			1	1	2	3	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

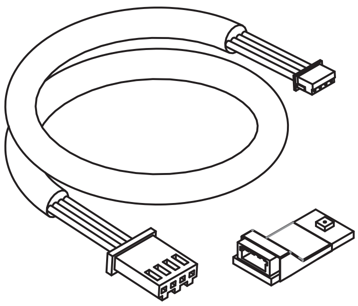
Constant flow control

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.

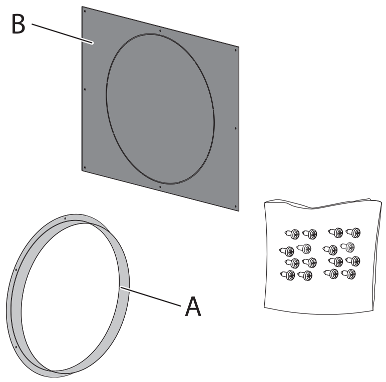
ID	Code
ENP-ALM	9022023

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 cylindrical.
Kit composition:

A. cylindrical spigot
B. rectangular panel

Accessory hardware is included in the kit.



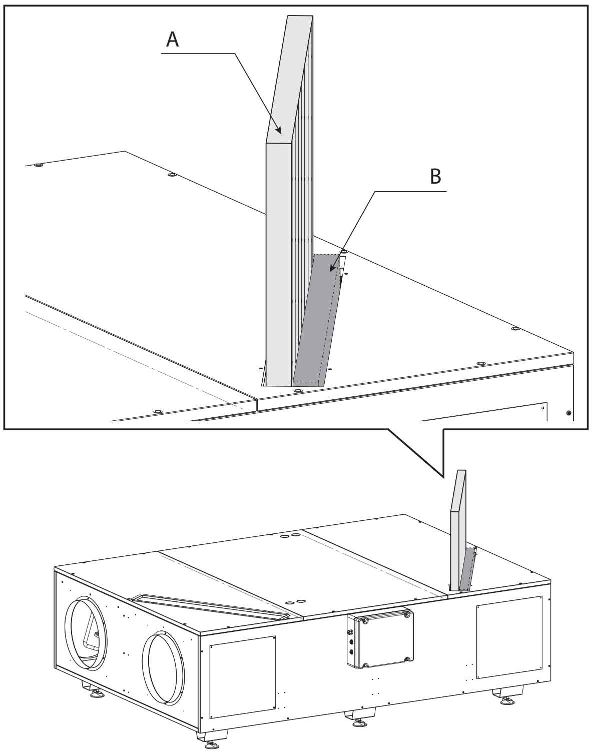
ID	Code
ENP-AD-6	9022024

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 1 / PS 1.5	287X435X48	ePM1 70%	6022069
		ePM1 85%	6022070
THE 2 / PS 2.5	330X568X48	ePM1 70%	6022071
		ePM1 85%	6022072
THE 3 / PS 3.5	410X715X48	ePM1 70%	6022073
		ePM1 85%	6022074
THE 4 / THE 5 / PS 5	550x935x48 mm	ePM1 70%	6022438
		ePM1 85%	6022439
THE 6 / PS 6	690x935x48 mm	ePM1 70%	6022638
		ePM1 85%	6022639



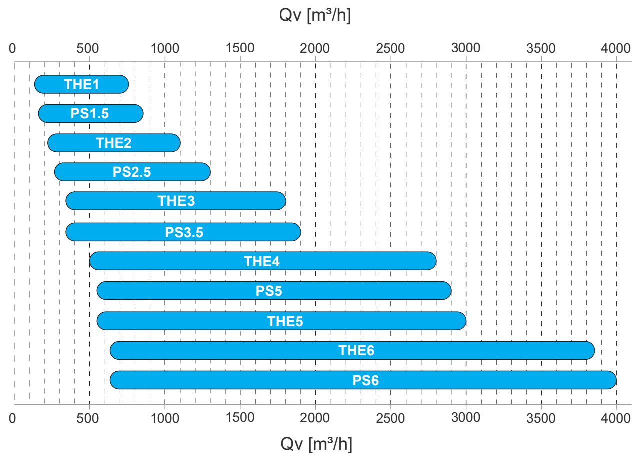
A = optional filter
B = standard filter ePM_1 55% (F7)

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

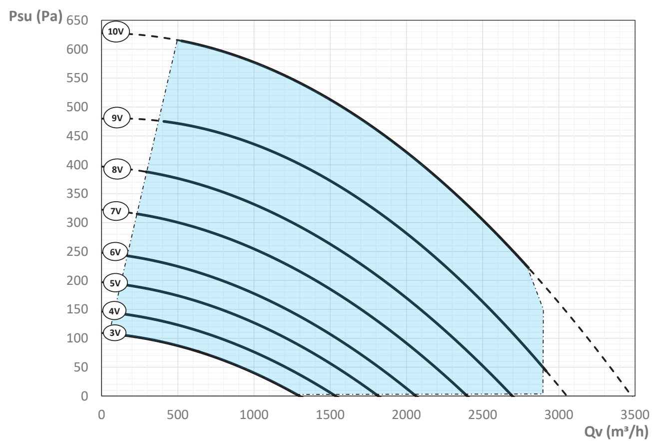
After selecting the most appropriate model in the **Energy Efficient THE and Energy Plus Smart PS** range, it is possible to identify the parameters for correct calibration of the machine and, therefore, the characteristic performance parameters.
The control voltage at which to control the EC fan motors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

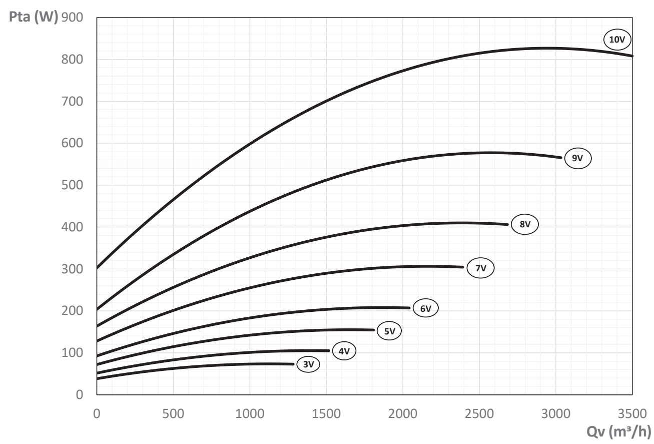
The Flow Rate/Actual Static Pressure diagrams allow you to identify the calibration control voltage for the two circuits and estimate the power absorbed by the machine with the resistance disabled.

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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For Operative Units see Annex/Annexes

has implemented and maintains a/an

Quality Management System

for the following scope:

Design, production and service of heating and air conditioning equipment (unit heaters, radiant panels, fan coil units and air handling units). Design and production of chimneys.

which fulfils the requirements of the following standard:

ISO 9001:2015

Issued on:	**2024-04-10**
First issued on:	**1996-06-10**
Expires on:	**2027-04-09**

Registration Number:
IT-4000 ICIM-9001-000545-10

Alex Stoichitoiu
President of IQNET

Mario Romersi
President of CISQ

CISQ

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CERTIFICATE No.

SI CERTIFICA CHE IL SISTEMA DI GESTIONE PER LA QUALITÀ DI
WE HEREBY CERTIFY THAT THE QUALITY MANAGEMENT SYSTEM OPERATED BY

SABIANA S.P.A.

SEDE CENTRALE / *HEADQUARTER*

VIA PIAVE, 53 20011 CORBETTA MI IT - Italia

PER LE UNITÀ OPERATIVE VEDERE L'ALLEGATO
FOR OPERATIVE UNITS SEE ATTACHMENT

È CONFORME ALLA NORMA / *IS IN COMPLIANCE WITH THE STANDARD*

UNI EN ISO 9001:2015

Sistema di Gestione per la Qualità / *Quality Management System*

PER LE SEGUENTI ATTIVITÀ / *FOR THE FOLLOWING ACTIVITIES*

EA: 18

Progettazione, produzione e assistenza di apparecchiature per il riscaldamento e il condizionamento dell'aria (aerotermi, termostrisce radianti, ventilconvettori e unità trattamento aria). Progettazione e produzione di canne fumarie.

Design, production and service of heating and air conditioning equipment (unit heaters, radiant panels, fan coil units and air handling units). Design and production of chimneys.

Riferirsi alla documentazione del Sistema di Gestione per la Qualità aziendale per l'applicabilità dei requisiti della norma di riferimento.
Refer to the documentation of the Quality Management System for details of application to reference standard requirements.

Il presente certificato è soggetto al rispetto del documento ICIM "Regolamento per la certificazione dei sistemi di gestione" e al relativo Schema specifico.
The use and the validity of this certificate shall satisfy the requirements of the ICIM document "Rules for the certification of company management systems" and specific Scheme.

Per informazioni puntuali e aggiornate circa eventuali variazioni intervenute nello stato della certificazione di cui al presente certificato, si prega di contattare il n° telefonico +39 02 725341 o indirizzo e-mail info@icim.it.
For timely and updated information about any changes in the certification status referred to in this certificate, please contact the number +39 02 725341 or email address info@icim.it.

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