



**HIGH EFFICIENCY
HEAT RECOVERY
VENTILATION
TANGRA EVB - HiE**

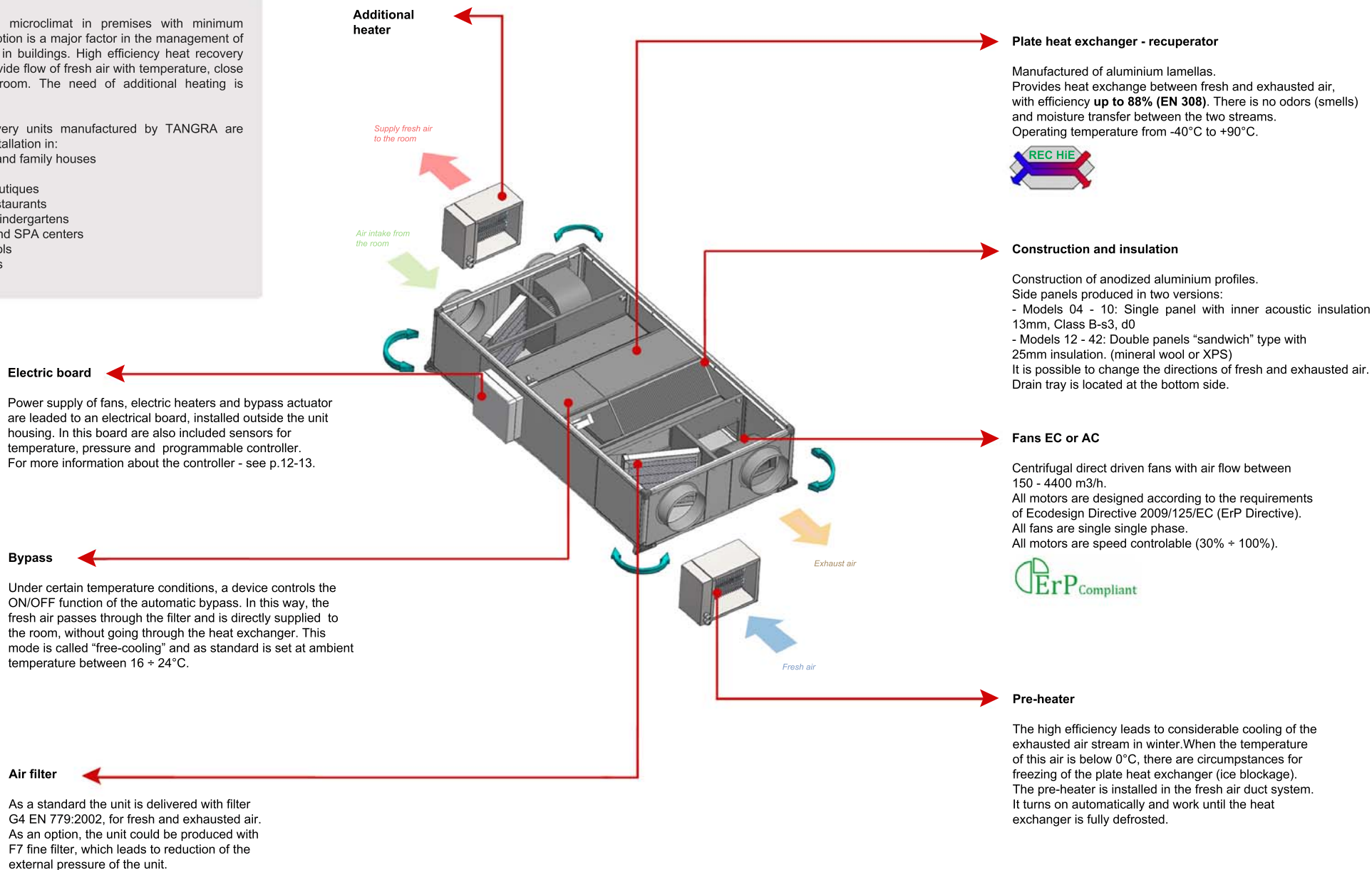


Description

Maintaining the microclimat in premises with minimum energy consumption is a major factor in the management of operation costs in buildings. High efficiency heat recovery installations provide flow of fresh air with temperature, close to this in the room. The need of additional heating is minimized.

The heat recovery units manufactured by TANGRA are designed for installation in:

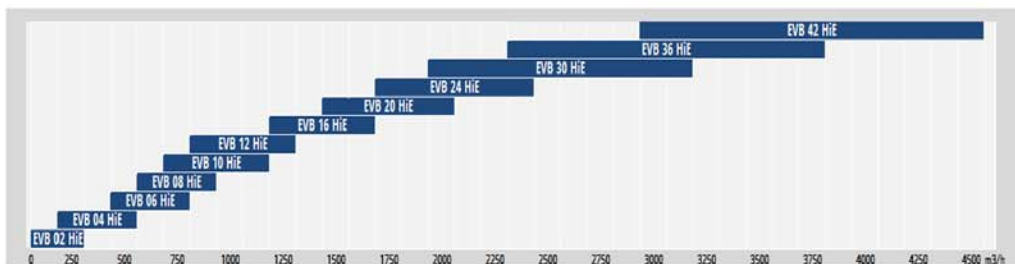
- Appartments and family houses
- Offices
- Stores and boutiques
- Hotels and restaurants
- Schools and kindergartens
- Sports halls and SPA centers
- Swimming pools
- Small factories



Efficiency up to **88%** (EN 308)

Product range

The product range offers 12 models with air flow from 150 up to 4400 m3/h.

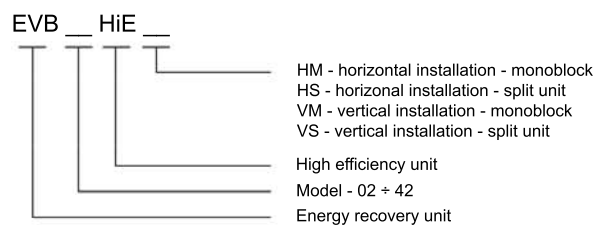


Energy efficiency classes

Model	Nominal air flow [m3/h]	External static pressure (Pa)	Speed class EN 15053	Thermal efficiency EN 308	Heat recovery class EN 13053	Specific fan power (SFP) EN 13779	Class of power input EN 13053
EVB 02 HiE	160	140	V 1	84.5	H 1	1.21	P 1
EVB 04 HiE	400	250	V 1	79.5	H 1	1.86	P 1
EVB 06 HiE	600	250	V 1	78.4	H 1	1.82	P 1
EVB 08 HiE	800	200	V 1	78.4	H 1	1.53	P 1
EVB 10 HiE	1000	150	V 1	78.4	H 1	1.21	P 1
EVB 12 HiE	1200	250	V 1	78.6	H 1	1.95	P 1
EVB 16 HiE	1600	250	V 1	78.3	H 1	1.78	P 1
EVB 20 HiE	2000	250	V 1	78.0	H 1	1.70	P 1
EVB 24 HiE	2400	200	V 1	78.3	H 1	1.64	P 1
EVB 30 HiE	3000	200	V 1	78.1	H 1	1.80	P 1
EVB 36 HiE	3600	250	V 1 ÷ V 2	77.7	H 1	1.76	P 1
EVB 42 HiE	4200	200	V 1	80.4	H 1	1.50	P 1

Heat recovery units could be designed as monoblock or split units, allowing easy transport and installation. According to the room specification, they could be produced for horizontal or vertical installation.

Model / Size	02	04	06	08	10	12	16	20	24	30	36	42
EVB HiE HM	●	●	●	●	●	●	●	●	●	●		
EVB HiE HS					●	●	●	●	●	●	●	
EVB HiE VM		●	●	●	●	●	●	●	●	●		
EVB HiE VS									●	●	●	●



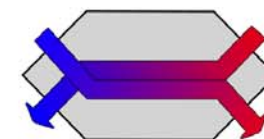
Why high efficiency heat recovery?

Heat recovery in ventilation system is exceptionally profitable investment. It becomes more clear from the comparison between systems with crossflow and high efficiency counterflow heat exchanger.

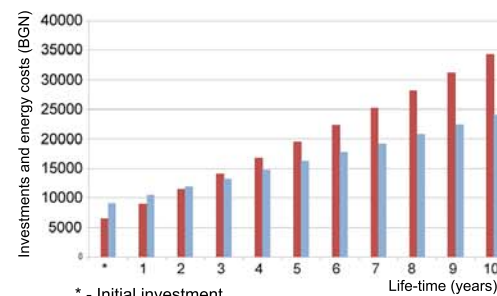
The payback period is between 2 and 4 years, depending on the running time of the system.



Crossflow heat exchanger REC AL
Efficiency 50 - 55%



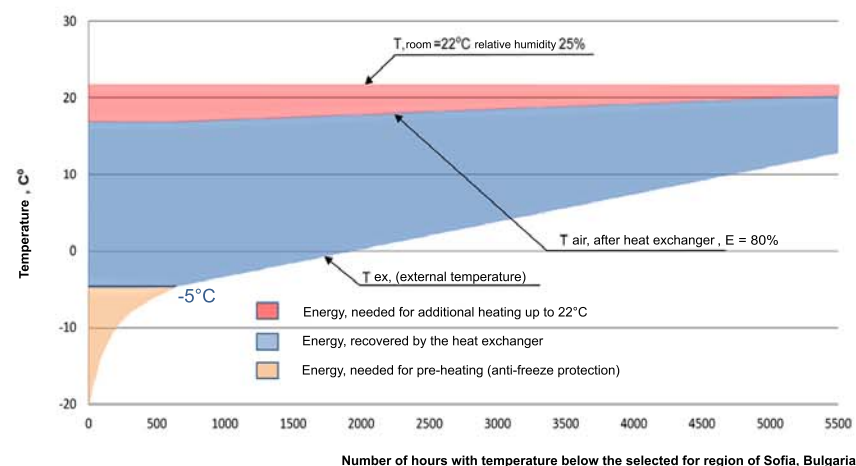
High efficient counterflow heat exchanger REC HiE
Efficiency 79 - 88%



- S1 - System with 50% heat recovery and electrical heater
- S2 - System with 80% heat recovery, pre-heater and additional electrical heater

- The graphic shows the initial investment and the accumulation of energy costs for
- 10 hours running time of the system
 - climate data for Sofia
 - 10 years period operation period

Annual division of energy costs



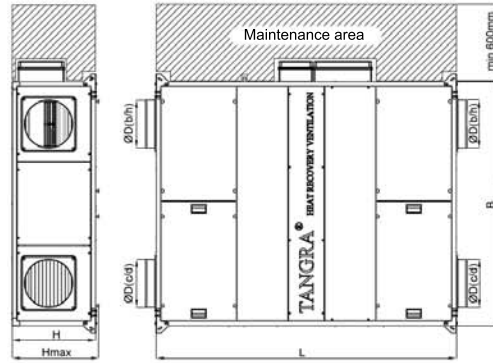
There are circumstances for freezing of the heat exchanger when the external air temperatures is below -5°C, which requires the installation of pre-heater.

Dimensions

EVB __ HIE HM

02 04 06 08 10 12 16 20 24

Horizontal installation
Monoblock



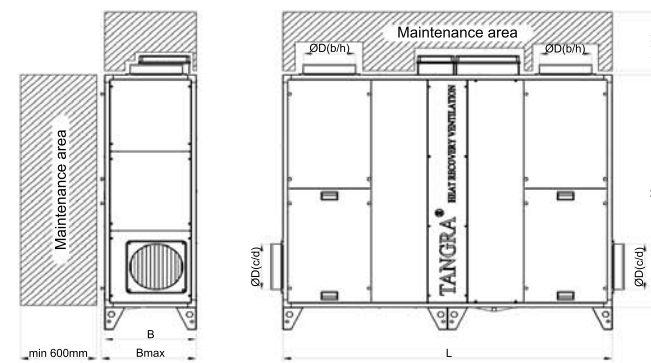
Model	Air flow [m3/h]	B [mm]	H [mm]	H max [mm]	L [mm]	b [mm]	h [mm]	ØD [mm]	c [mm]	d [mm]	Weight [kg]
EVB 02 HIE HM	200	590	335	355	1300	-	-	150	-	-	55
EVB 04 HIE HM	400	690	370	400	1580	-	-	200	-	-	90
EVB 06 HIE HM	600	790	370	400	1580	-	-	250	-	-	100
EVB 08 HIE HM	800	1090	370	400	1680	-	-	250	-	-	125
EVB 10 HIE HM	1000	1290	370	400	1680	-	-	250	-	-	145
EVB 12 HIE HM	1200	1115	590	610	2200	300	300	315	300	300	225
EVB 16 HIE HM	1600	1315	590	610	2200	300	300	315	300	300	239
EVB 20 HIE HM	2000	1515	590	610	2200	400	400	355	400	400	250 *
EVB 24 HIE HM	2400	1815	590	610	2280	400	400	355	400	400	269 *

* - Please, note the weight

EVB __ HiE VM

02 04 06 08 10 12 16 20 24

Vertical installation
Monoblock



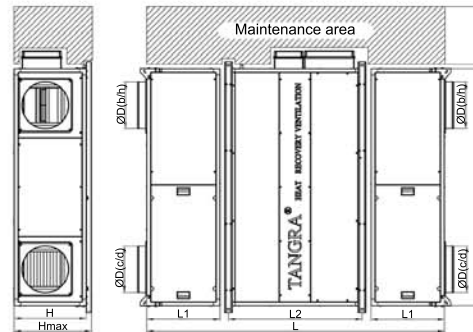
Model	Air flow [m3/h]	B [mm]	B max [mm]	H [mm]	L [mm]	b [mm]	h [mm]	ØD [mm]	c [mm]	d [mm]	Weight [kg]
EVB 02 HIE VM	200	335	355	590	1300	-	-	150	-	-	55
EVB 04 HIE VM	400	370	400	690	1580	-	-	200	-	-	90
EVB 06 HIE VM	600	370	400	790	1580	-	-	250	-	-	100
EVB 08 HIE VM	800	370	400	1090	1680	-	-	250	-	-	125
EVB 10 HIE VM	1000	370	400	1290	1680	-	-	250	-	-	145
EVB 12 HIE VM	1200	590	610	1115	2200	300	300	315	300	300	225
EVB 16 HIE VM	1600	590	610	1315	2200	300	300	315	300	300	239
EVB 20 HIE VM	2000	590	610	1515	2200	400	400	355	400	400	250 *
EVB 24 HIE VM	2400	590	610	1815	2280	400	400	355	400	400	269 *

* - Please, note the weight

EVB __ HIE HS

12 16 20 24 30 36

Horizontal installation
Split unit



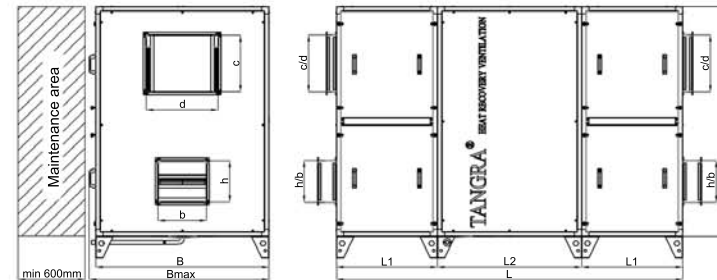
Model	Air flow [m3/h]	B [mm]	H [mm]	H max [mm]	L [mm]	L1 [mm]	L2 [mm]	b [mm]	h [mm]	ØD [mm]	c [mm]	d [mm]	Weight [kg]
EVB 12 HIE HS	1200	1115	590	630	2440	560	1320	300	300	315	300	300	240
EVB 16 HIE HS	1600	1315	590	630	2440	560	1320	300	300	315	300	300	250
EVB 20 HIE HS	2000	1515	590	630	2440	560	1320	400	400	355	400	400	275
EVB 24 HIE HS	2400	1815	590	630	2440	560	1320	400	400	355	400	400	295
EVB 30 HIE HS	3000	2115	590	630	2640	660	1320	400	400	355	400	400	345
EVB 36 HIE HS	3600	2315	590	630	2640	660	1320	400	400	355	400	400	385

Side panels of the supply and suction side of the unit are interchangeable. In this way, it is possible to make different configurations. As standard this units are produced with round connections.

EVB __ HiE VS

24 30 36 42

Vertical installation
Split unit

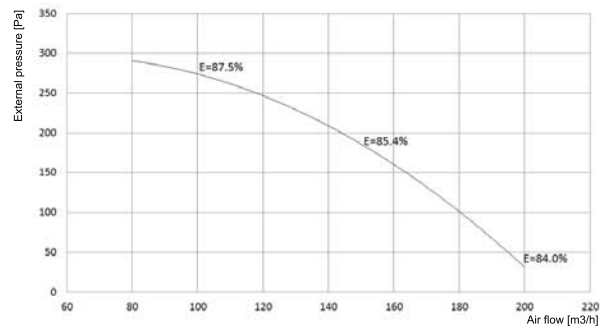


Model	Air flow [m3/h]	B [mm]	B max [mm]	H [mm]	L [mm]	L1 [mm]	L2 [mm]	b [mm]	h [mm]	ØD [mm]	c [mm]	d [mm]	Weight [kg]
EVB 24 HIE VS	2400	1200	1240	1115	2440	560	1320	400	400	355	400	400	290
EVB 30 HIE VS	3000	1200	1240	1215	2540	610	1320	400	400	355	400	400	350
EVB 36 HIE VS	3600	1200	1240	1315	2640	660	1320	400	400	355	400	400	390
EVB 42 HIE VS	4200	1200	1240	1515	2640	660	1320	400	500	400	400	500	410

Side panels of the supply and suction side of the unit are interchangeable. In this way, it is possible to make different configurations. As standard this units are produced with round connections.

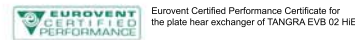
Technical data

EVB 02 HiE

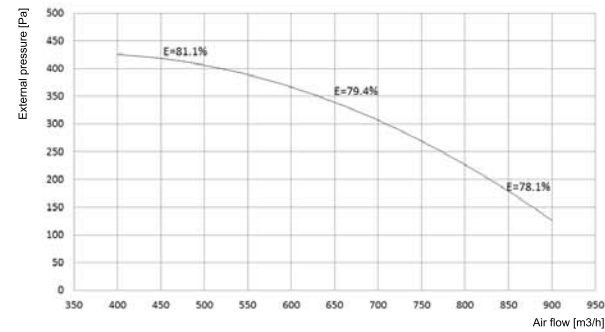


	EC	AC
Absorbed power [W]	2 x 27	-
Voltage [V]	230	-
Operation temperature [C°]	-40 C° + 60 C°	-
Nominal abs. current [A]	2 x 0.27	-
Level of protection	IP 54	-
Pre-heater capacity [kW]*	0.75	-
Additional heater capacity [kW]*	0.75	-

* Power supply 230V, 1phase+N+PE/50Hz.
** Power supply 380V is also possible on request.



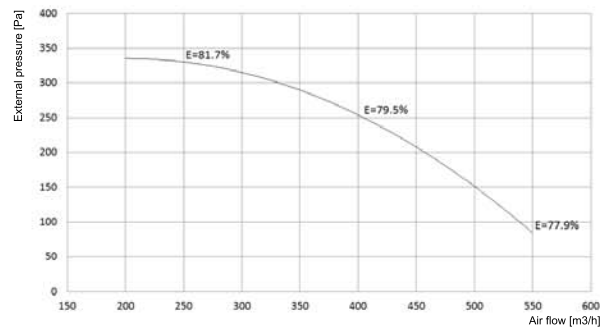
EVB 08 HiE



	EC	AC
Absorbed power [W]	2 x 170	2 x 350
Voltage [V]	230	230
Operation temperature [C°]	-25 C° + 60 C°	-20 C° + 55 C°
Nominal abs. current [A]	2 x 1.35	2 x 1.5
Level of protection	IP 54	IP 44
Pre-heater capacity [kW]*	2.25	2.25
Additional heater capacity [kW]*	2.25	2.25

* Power supply 230V, 1phase+N+PE/50Hz.
** Power supply 380V is also possible on request.

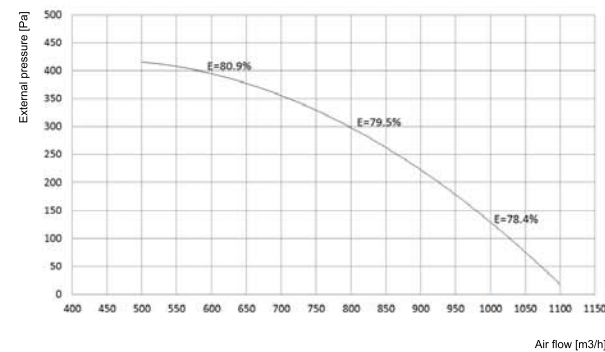
EVB 04 HiE



	EC	AC
Absorbed power [W]	2 x 115	2 x 300
Voltage [V]	230	230
Operation temperature [C°]	-25 C° + 60 C°	-20 C° + 40 C°
Nominal abs. current [A]	2 x 1.35	2 x 0.85
Level of protection	IP 54	IP 44
Pre-heater capacity [kW]*	1.50	1.50
Additional heater capacity [kW]*	1.50	1.50

* Power supply 230V, 1phase+N+PE/50Hz.
** Power supply 380V is also possible on request.

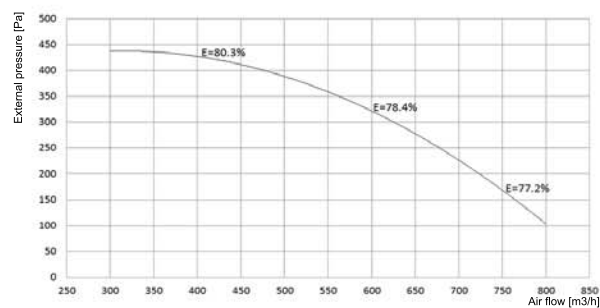
EVB 10 HiE



	EC	AC
Absorbed power [W]	2 x 170	2 x 350
Voltage [V]	230	230
Operation temperature [C°]	-25 C° + 60 C°	-20 C° + 55 C°
Nominal abs. current [A]	2 x 1.35	2 x 1.5
Level of protection	IP 54	IP 44
Pre-heater capacity [kW]*	2.25	2.25
Additional heater capacity [kW]*	2.25	2.25

* Power supply 230V, 1phase+N+PE/50Hz.
** Power supply 380V is also possible on request.

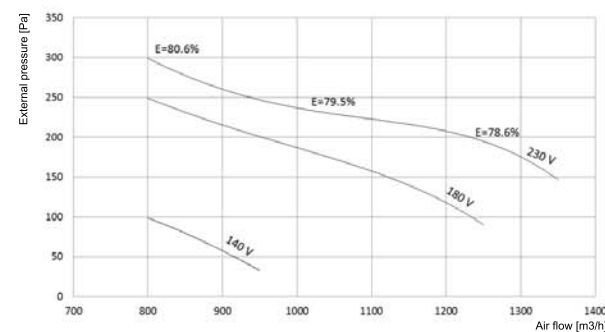
EVB 06 HiE



	EC	AC
Absorbed power [W]	2 x 169	2 x 350
Voltage [V]	230	230
Operation temperature [C°]	-25 C° + 60 C°	-20 C° + 55 C°
Nominal abs. current [A]	2 x 1.35	2 x 1.5
Level of protection	IP 54	IP 44
Pre-heater capacity [kW]*	1.50	1.50
Additional heater capacity [kW]*	1.50	1.50

* Power supply 230V, 1phase+N+PE/50Hz.
** Power supply 380V is also possible on request.

EVB 12 HiE



	EC	AC
Absorbed power [W]	2 x 240	2 x 373
Voltage [V]	230	230
Operation temperature [C°]	-25 C° + 40 C°	-20 C° + 40 C°
Nominal abs. current [A]	2 x 2.8	2 x 3.65
Level of protection	IP 54	IP 20
Pre-heater capacity [kW]*	3	3
Additional heater capacity [kW]*	3	3

* Power supply 380V, 3phase
** Power supply 230V is also possible on request.

Note: Efficiency data are valid at equal mass flows of both flows and at 22°C and 25% relative humidity of the exhaust air; Outdoor temperature -5°C
If the relative humidity rised, the efficiency will increase with 3+5%. For exact data, please use the selection program at: www.tangra.bg

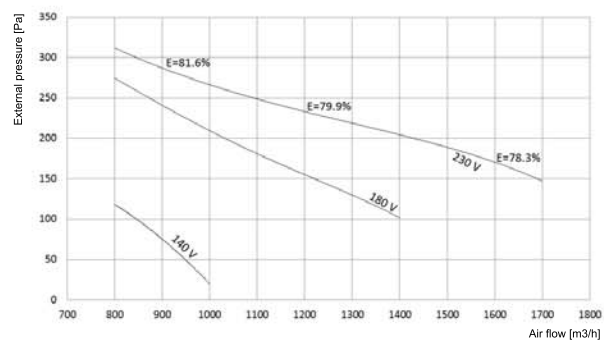
We reserve the right to introduce alternations both in design and technical data without prior notice, due to continued product development.

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If the relative humidity rised, the efficiency will increase with 3+5%. For exact data, please use the selection program at: www.tangra.bg

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Technical data

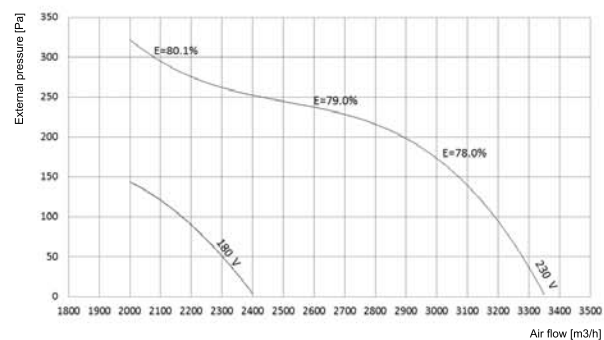
EVB 16 HiE



	EC	AC
Absorbed power [W]	2 x 340	2 x 373
Voltage [V]	230	230
Operation temperature [C°]	-20 C° + 40 C°	-20 C° + 40 C°
Nominal abs. current [A]	2 x 2.8	2 x 3.65
Level of protection	IP 54	IP 20
Pre-heater capacity [kW]*	3	3
Additional heater capacity [kW]*	3	3

* Power supply 380V, 3phase
 ** Power supply 230V is also possible on request.

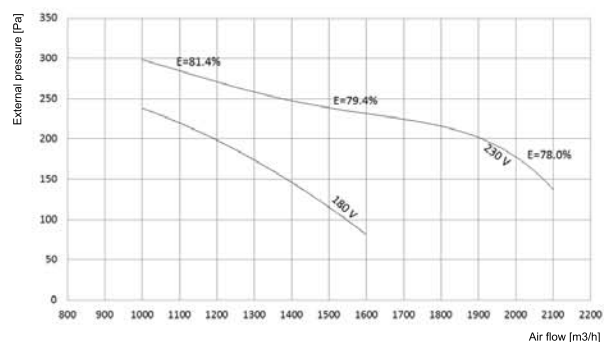
EVB 30 HiE



	EC	AC
Absorbed power [W]	2 x 655	2 x 550
Voltage [V]	230	230
Operation temperature [C°]	-20 C° + 40 C°	-20 C° + 40 C°
Nominal abs. current [A]	2 x 3.1	2 x 4.3
Level of protection	IP 54	IP 20
Pre-heater capacity [kW]*	6	6
Additional heater capacity [kW]*	6	6

* Power supply 380V, 3phase
 ** Power supply 230V is also possible on request.

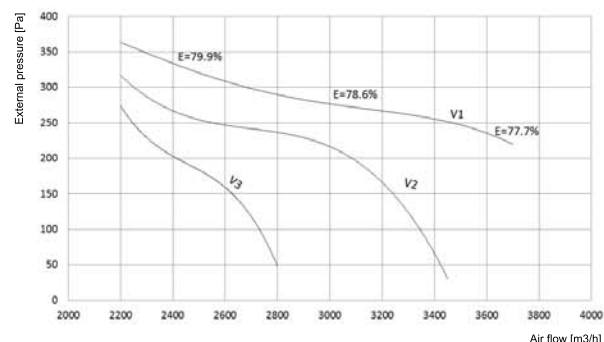
EVB 20 HiE



	EC	AC
Absorbed power [W]	2 x 448	2 x 373
Voltage [V]	230	230
Operation temperature [C°]	-20 C° + 40 C°	-20 C° + 40 C°
Nominal abs. current [A]	2 x 2.8	2 x 3.65
Level of protection	IP 54	IP 20
Pre-heater capacity [kW]*	5	5
Additional heater capacity [kW]*	5	5

* Power supply 380V, 3phase
 ** Power supply 230V is also possible on request.

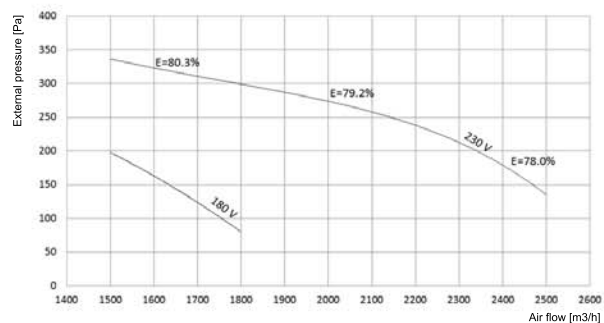
EVB 36 HiE



	EC	AC
Absorbed power [W]	2 x 900	2 x 750
Voltage [V]	230	230
Operation temperature [C°]	-20 C° + 40 C°	-20 C° + 40 C°
Nominal abs. current [A]	2 x 1.63	2 x 7.8
Level of protection	IP 54	IP 20
Pre-heater capacity [kW]*	9	9
Additional heater capacity [kW]*	9	9

* Power supply 380V, 3phase
 ** Power supply 230V is also possible on request.

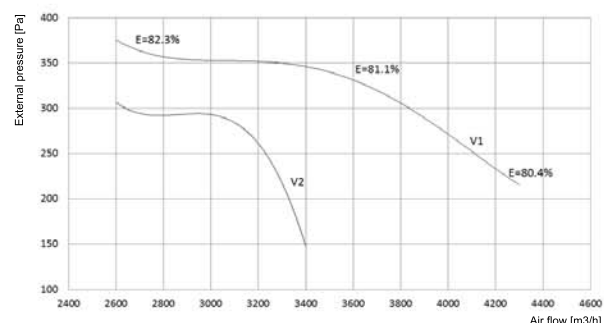
EVB 24 HiE



	EC	AC
Absorbed power [W]	2 x 450	2 x 373
Voltage [V]	230	230
Operation temperature [C°]	-20 C° + 40 C°	-20 C° + 40 C°
Nominal abs. current [A]	2 x 3.1	2 x 3.58
Level of protection	IP 54	IP 20
Pre-heater capacity [kW]*	6	6
Additional heater capacity [kW]*	6	6

* Power supply 380V, 3phase
 ** Power supply 230V is also possible on request.

EVB 42 HiE



	EC	AC
Absorbed power [W]	-	2 x 750
Voltage [V]	-	230
Operation temperature [C°]	-	-20 C° + 40 C°
Nominal abs. current [A]	-	2 x 7.8
Level of protection	-	IP 20
Pre-heater capacity [kW]*	-	12
Additional heater capacity [kW]*	-	12

* Power supply 380V, 3phase
 ** Power supply 230V is also possible on request.

Note: Efficiency data are valid at equal mass flows of both flows and at 22°C and 25% relative humidity of the exhaust air; Outdoor temperature -5°C
 If the relative humidity rised, the efficiency will increase with 3+5%. For exact data, please use the selection program at: www.tangra.bg

We reserve the right to introduce alternations both in design and technical data without prior notice, due to continued product development.

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 If the relative humidity rised, the efficiency will increase with 3+5%. For exact data, please use the selection program at: www.tangra.bg

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Acoustic data Lw (dB)

Model/Hz	63	125	250	500	1000	2000	4000	8000
EVB 02 HiE	41	50	50	55	59	57	56	55
EVB 04 HiE	46	57	57	62	66	65	65	64
EVB 06 HiE	47	56	61	66	67	65	64	62
EVB 10 HiE	47	56	61	66	67	65	64	62
EVB 12 HiE	46	59	67	72	76	74	70	60
EVB 16 HiE	47	59	68	73	77	75	71	61
EVB 20 HiE	47	59	68	73	77	75	71	61
EVB 24 HiE	48	57	64	69	74	74	72	63
EVB 30 HiE	51	62	69	70	75	76	71	64
EVB 36 HiE	55	66	72	74	79	78	75	67
EVB 42 HiE	55	66	72	74	79	78	75	67

These values are measured at the fan exit at maximum speed.

Control

High efficiency heat recovery ventilation systems allows several options for control:

TANGRA Speed Control



- On/Off switch
- Speed control of the two fans
- Automatic bypass operates according to signals T1 and T2
- Anti-freeze protection (pre-heater) starts on/off automatically

Air Quality sensor SQA



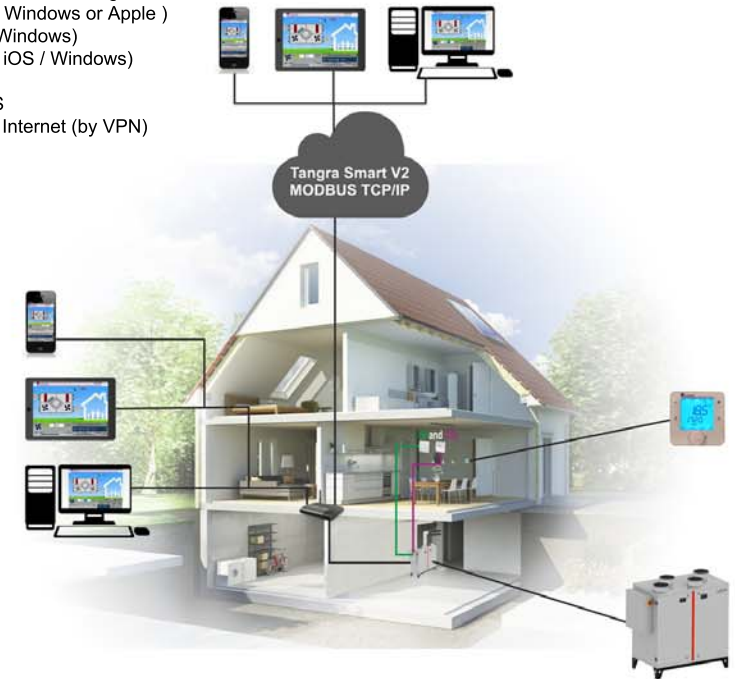
- Air quality sensor with integrated timer. Starts On/Off the unit automatically for certain time.
- Automatic bypass operates according to signals T1 and T2
- Anti-freeze protection (pre-heater) starts on/off automatically

TANGRA SMART v2 Internet of things

TANGRA Smart v2 is designed to control heat recovery ventilation systems and compact air handling units through LAN cable to the local network or own WiFi network. When the system is connected, it will be accessible through IP (internet protocol).

The system will be able to control through:

- Personal computer PC (Windows or Apple)
- Tablet (Android / iOS / Windows)
- Smart phone (Android / iOS / Windows)
- Display TANGRA tH
- Modbus TCP/IP for BMS
- Remote access through Internet (by VPN)



Control of the system:

- On/Off and Manual/Auto/Timer.
 - o at Manual mode the fans are controlled smoothly from 30% to 100% by the customer
 - o at Auto mode, the control of the system is done through humidistat (rH) or air quality sensor (CO2).
 - o at Timer mode, the customer can set 4 programs for speed of fans and temperature supply for each day of the week.
- By-pass - Intelligent automatic bypass operation.
- Antifreeze protection (Pre-heater) - On/Off or smoothly by SSR.
- Control of the additional electric or water heater: smoothly with SSR for the electric heater or 0-10V for the actuator of heating coil.
- Control of the additional water cooler: manual change of the mode (heating/cooling) and smoothly control of the actuator 0-10V for cooling.
- Signal for dirty air filters - automatic signal when the filter is dirty.
- Visualization of the 5 temperatures of the air in the system.
- Visualization of the approximately saved energy from the unit. (kW/h)
- Visualization of the efficiency of the system (%)
- Logs:
 - o Efficiency for the last 24h. (%)
 - o Approximately saved energy for the last 24h. (W)
 - o Errors and alarms



Installation

The calculation of fresh air volume is based on the room area, number of people and room category.

Category	Fresh air quantity per person [m ³ /h]	Air volume for 1m ² floor area [m ³ /h]
A	36.0	6.1 + 57.8
B	25.2	4.3 + 40.3
C	14.4	2.5 + 23.0

The lowest requirements of fresh air per 1sq.m are in open space office areas and the highest are in high halls, kindergartens and restaurants.

Additional components

Sound attenuator - with rectangular or round shape. Reduce the noise level, transferred by the duct system.



Filter F7 - As a standard, the unit is produced with filter G4 EN 779:2002, for fresh and exhausted air. As an option it is possible to produce the unit with filter, class F7, which leads to reduction of the external pressure of the unit.



Electric heaters:
 - Pre-heater - work in On/Off or smoothly with SSR (antifreeze protection).
 - The capacity of the additional heater is automatically regulated until the selected temperature of supply air is achieved.



Heat recovery ventilation systems are produced with centrifugal fans with AC or EC motors. All the fans are ErP compliant. The fans with EC motors are with lower electric consumption.



Duct system

Made of rectangular or round ducts, sized according to the air volume which is needed for room ventilation. All ducts should be thermally insulated.



Heat recovery unit

Heat recovery unit with efficiency up to 88%.

- horizontal installation



-vertical installation



Supply and suction ventilation grills

Ensure supply and suction of air into the room. Recommended air velocity <1m/s.





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