ECV-H / ECV-V

Packaged Type Heat Recovery Unit

eneko®

ErP 2018

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ECV-H / ECV-V
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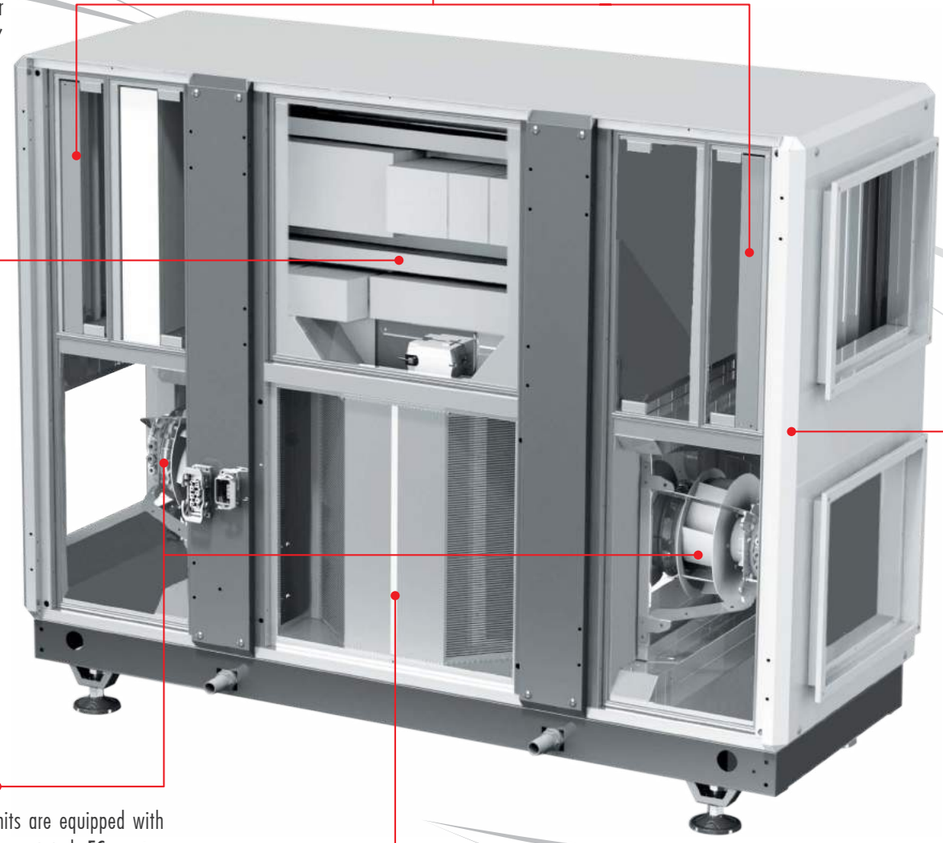
eel eneko energylab

The technical specifications and the performance data declared with this logo have been developed by the tests performed in Eneko Energy Laboratory which is established with the development Project support of Tübitak by regarding relevant standards.

Control System Plug&Play

ENECON control unit is developed for controlling of heat recovery units' equipments, meeting the demands coming from the customers and is user friendly designed. ENECON is capable of controlling the standard equipments and optional accessories. ENECON Control unit can perform the basic functions without any control panel; it is more functional used with Basic and Pro-Panel. Besides, the control unit can switch on/off via BMS, gets fault signal and controls all the functions via ModBus. Alternatives different from Enecon controller are listed in "Control System" part.



Exhaust and Supply Air Filters

To increase indoor air quality and to protect the equipments used in unit, F class filter (according to EN 779 standard) is used for supply air streams; M class filter is used for exhaust air streams. A choice of pre-filters (G2-G4) and final filters (F6-F9) are available optionally. Optional filters reduce the available static pressure of the unit.

Casing & Insulation

The unit's casing is made up of double skinned high corrosion resistive 200 gr/m² galvanize coated steel. **50 mm thickness and 70kg/m3 density of Rockwool** insulation between the walls is used for thermal and sound insulation. The case of unit is painted by electrostatic powdered paint. The unit is constructed in sections to ease transportation, mounting and commissioning.

Exhaust and Supply Fans

The fans in heat recovery units are equipped with innovative Electronically Commutated **EC motor** technology. EC motors have higher efficiency and simple speed control than AC motors and can be connected directly to the AC mains. Fan blades have high aerodynamic efficient backward curved design. EC motors reduce the energy consumption and increase the energy efficiency of the unit. With EC Fans it is also possible to reduce maintenance costs as the fans are direct drive; free of belt and pulley.

Heat Recovery Exchanger (Aluminum)

ECV-H heat recovery ventilation units have aluminum counterflow, high efficient plate heat recovery exchangers. Plate heat recovery exchangers have plates that are produced improved surface areas to provide high efficient and leakage free design. With the optimization of exchanger heat transfer is increased and pressure drop is decreased. Heat recovery exchanger has Eurovent certification.

ECV-V 200/300/400/500/700
Packaged Type Heat Recovery Unit

ErP 2018

Control System
Plug&Play

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Casing & Insulation
The unit's casing is made up of double skinned high corrosion resistive 200 gr/m² galvanize coated steel. 50 mm thickness and 70kg/m3 density of Rockwool insulation between the walls is used for thermal and sound insulation. The case of unit is painted by electrostatic powdered paint. The unit is constructed in sections to ease transportation, mounting and commissioning.

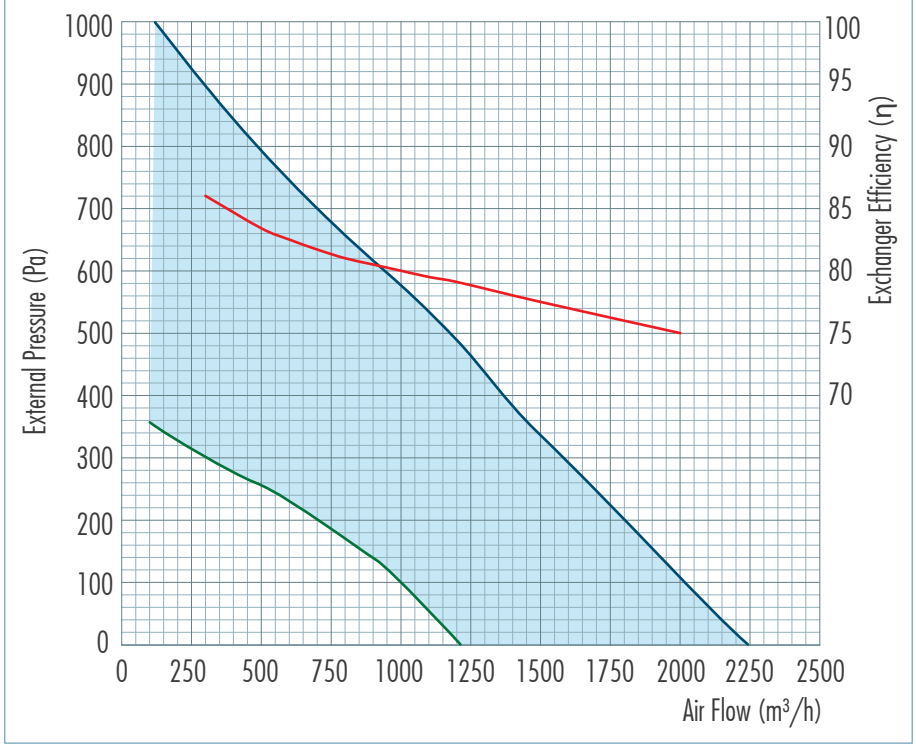
Exhaust and Supply Fans
The fans in heat recovery units are equipped with innovative Electronically Commutated EC motor technology. EC motors have higher efficiency and simple speed control than AC motors and can be connected directly to the AC mains. Fan blades have high aerodynamic efficient backward curved design. EC motors reduce the energy consumption and increase the energy efficiency of the unit. With EC Fans it is also possible to reduce maintenance costs as the fans are direct drive; free of belt and pulley.

Heat Recovery Exchanger (Aluminum)
ECV-V heat recovery ventilation units have aluminum counterflow, high efficient plate heat recovery exchangers. Plate heat recovery exchangers have plates that are produced improved surface areas to provide high efficient and leakage free design. With the optimization of exchanger heat transfer is increased and pressure drop is decreased. Heat recovery exchanger has Eurovent certification.

Performance Data

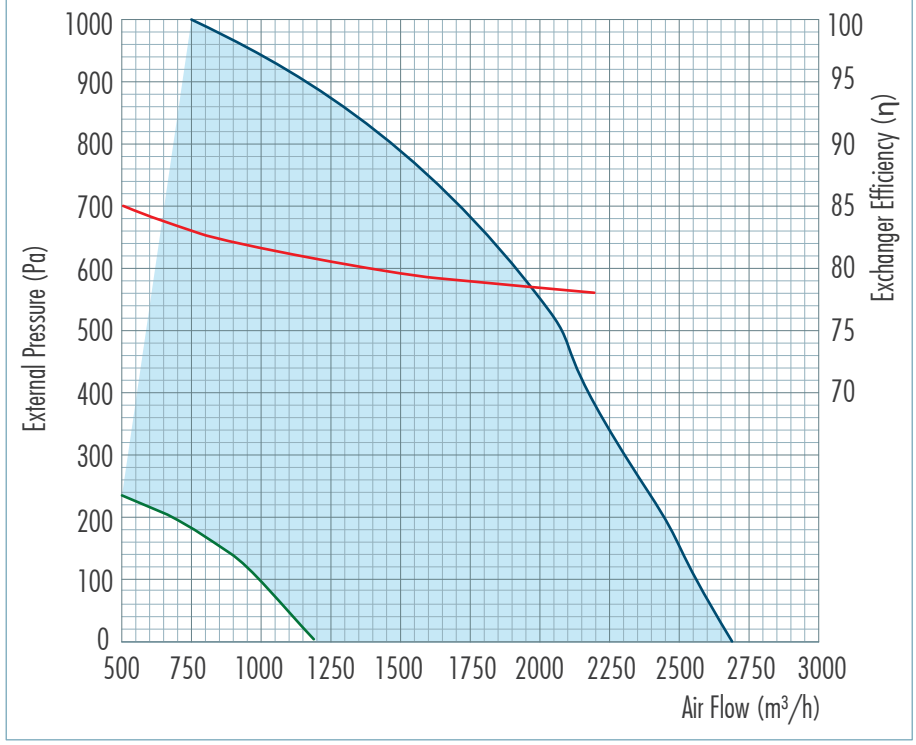
ECV-H 200 / ECV-V 200

PERFORMANCE CURVE



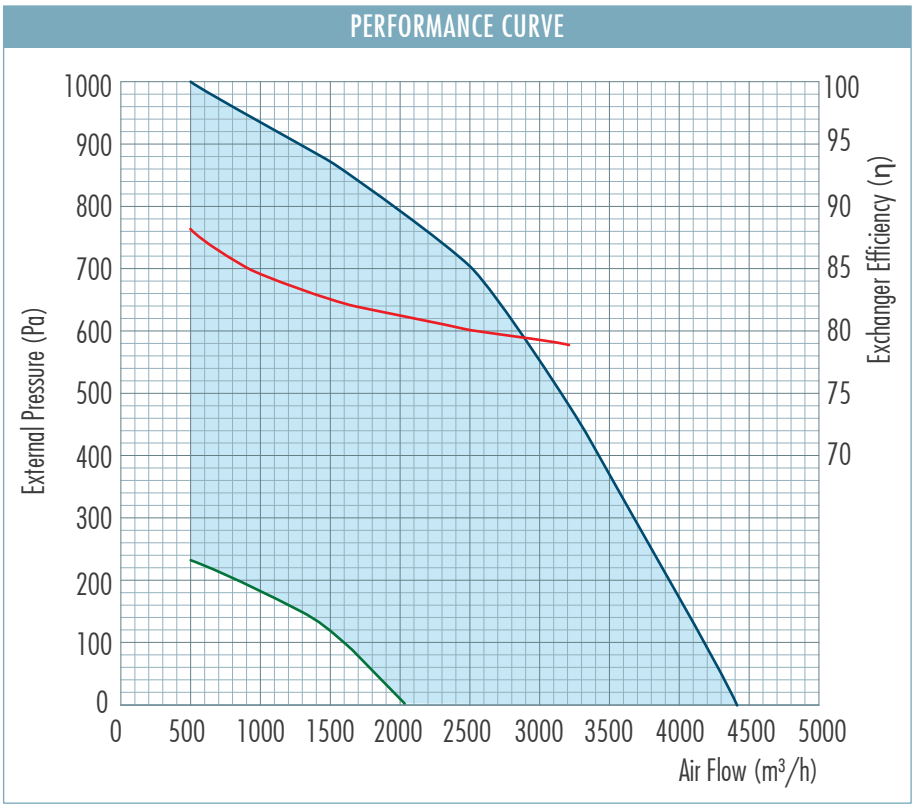
ECV-H 300 / ECV-V 300

PERFORMANCE CURVE

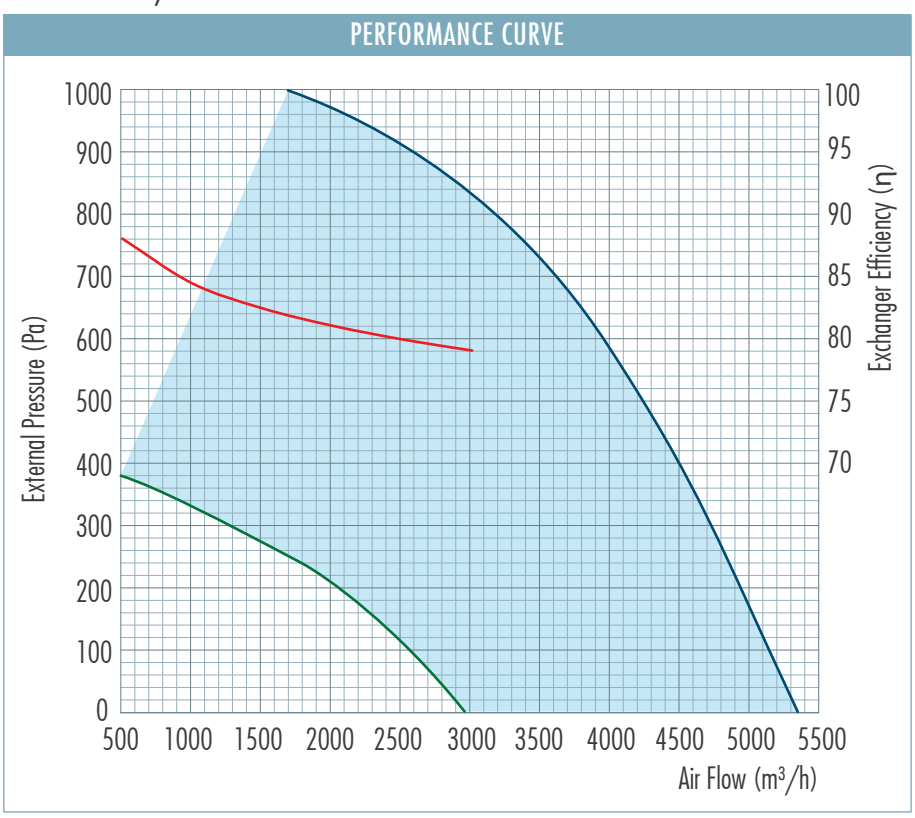


Note: Efficiency values are calculated according to EN 308 standard.

ECV-H 400 / ECV-V 400



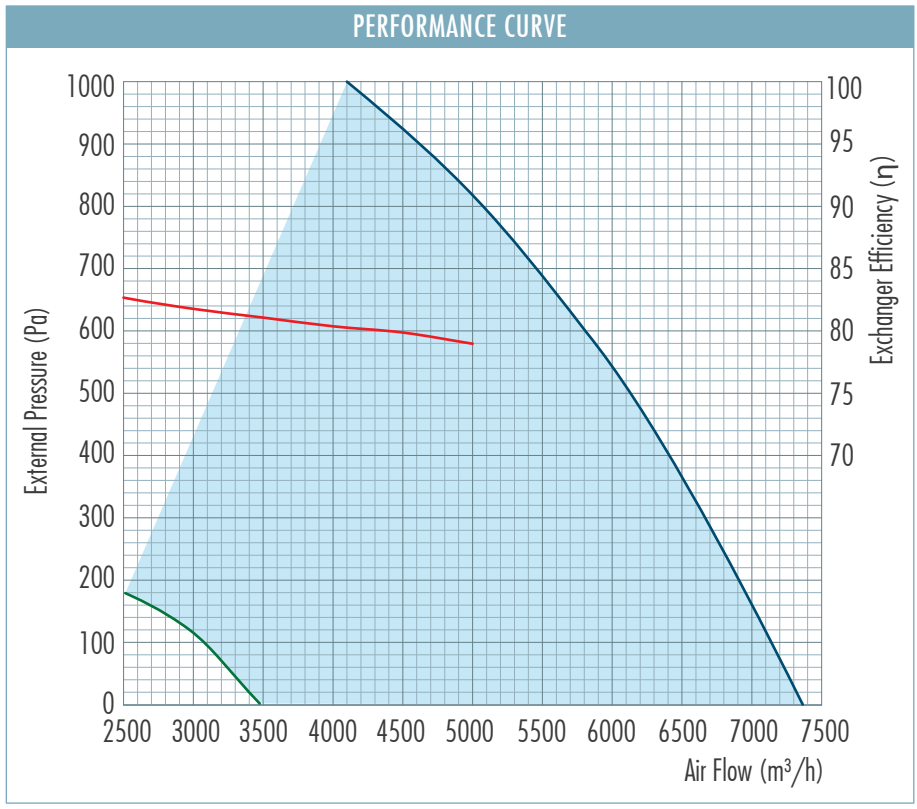
ECV-H 500 / ECV-V 500



Note: Efficiency values are calculated according to EN 308 standard.

Performance Data

ECV-H 700 / ECV-V 700



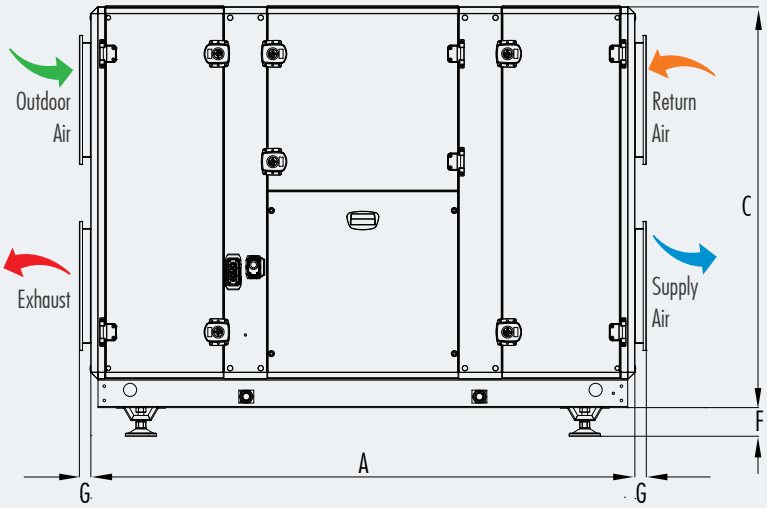
Note: Efficiency values are calculated according to EN 308 standard.

		ECV-H 200 ECV-V 200	ECV-H 300 ECV-V 300	ECV-H 400 ECV-V 400	ECV-H 500 ECV-V 500	ECV-H 700 ECV-V 700
Declared typology		NRVU				
Type of drive installed or intented to be installed		variable speed drive				
Type of HRS (run around, other, none)		regenerative				
Thermal efficiency of heat recovery [1]	%	78	78	79	78	79
Nominal flow rate	m^3/h	1500	2000	3000	3500	4500
Maximum flow rate	m^3/h	2240	2690	4410	5350	7360
Effective electric power input	W	723	1023	1344	1570	2245
SFP_{int} [1]	$W(m^3/s)$	960.5	1075.7	916.1	930.6	1891.4
Face velocity at design flow rate	m/s	1.5	1.6	1.6	1.9	2.3
Nominal external pressure ($\Delta P_{s,ext}$) [1]	Pa	200	200	200	200	200
Internal pressure drop of ventilation components($\Delta P_{s,int}$)	Pa	238	271	253	262	197
Internal pressure drop of non-ventilation components($\Delta P_{s,add}$)	Pa	There is no "non-ventilation" components				
Static efficiency of fans used in accordance with Regulation (EU) No. 327/2001		51.5	52	57.3	58.4	44.9
Declared maximum external leakage rate	%	Less than %3				
Declared maximum internal leakage rate	%	NA				
Energy classification of the filters (Energy performance) [2]	Kwh	NA				
Description of visual filter warning for NRVUs intented for use with filters [3]		www.eneko.com.tr				
Sound power level (L_{WA})		NA				
Internet adress for pre-/dis-assembly instructions		www.eneko.com.tr				

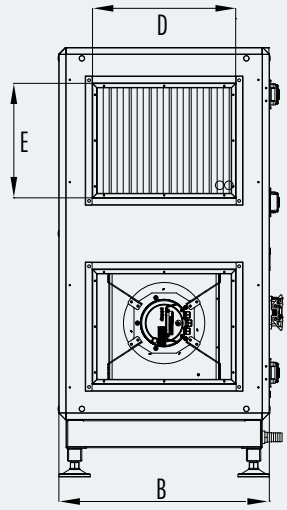
[1] Measured at balanced flow, EN 308.
[2] Declared information about the calculated annual energy consumption.
[3] Including test pointing out the importance of regular filter changes for performance and energy efficiency of the unit.

Unit Dimensions

ECV-H Unit Dimensions



* Front View

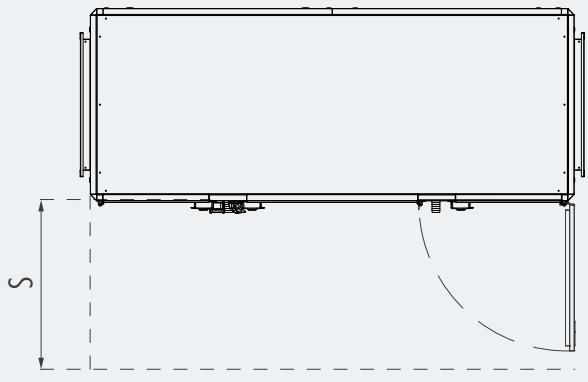


* Side View

	ECV-H 200	ECV-H 300	ECV-H 400	ECV-H 500	ECV-H 700
A	1900	1900	2150	2150	2150
B	735	735	895	895	895
C	1240	1400	1645	1645	1745
DxE	500x400	500x400	600x500	600x500	600x600
F	100	100	100	100	100
G	40	40	40	40	40

*All measurement values are mm.

ECV-H Unit Service Space



Top View

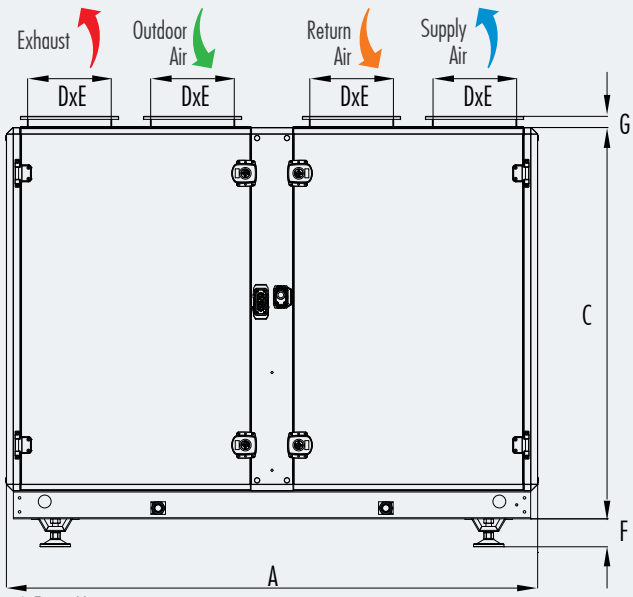
A clear space must be provided in front of the unit for service.

	ECV-H 200	ECV-H 300	ECV-H 400	ECV-H 500	ECV-H 700
S	800	800	900	900	900

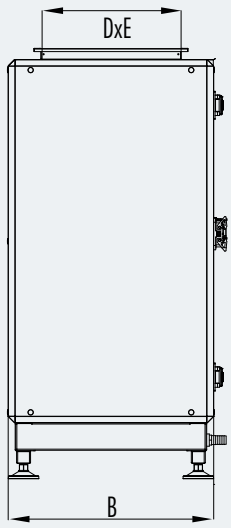
"S" values indicate the size of the service area.

*All measurement values are mm.

ECV-V Unit Dimensions



* Front View

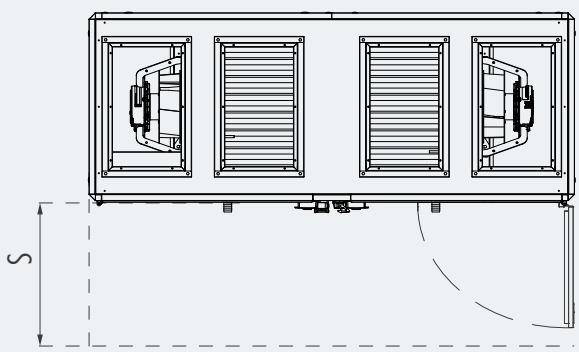


* Side View

	ECV-V 200	ECV-V 300	ECV-V 400	ECV-V 500	ECV-V 700
A	1900	1900	2150	2150	2150
B	735	735	895	895	895
C	1240	1400	1645	1645	1745
DxE	500x300	500x300	650x400	650x400	650x400
F	100	100	100	100	100
G	40	40	40	40	40

*All measurement values are mm.

ECV-V Unit Service Space



Top View

A clear space must be provided in front of the unit for service.

	ECV-V 200	ECV-V 300	ECV-V 400	ECV-V 500	ECV-V 700
S	900	900	1000	1000	1000

"S" values indicate the size of the service area.

*All measurement values are mm.

Control System

Automation Options		Control Cards				
Standard	Optional	Standard - Pro	Alternative 1	Alternative 2		
				Type 1	Type 2	Type 3
OA Temperature Sensor		✓	✓	✓	✓	✓
RA Temperature Sensor		✓	✓	✓	✓	✓
SA Fan Control		✓	✓	✓	✓	✓
RA Fan Control		✓	✓	✓	✓	✓
ByPass Damper		✓	✓	✓	✓	✓
SA Temperature Sensor		✓	✓	✓	✓	✓
Modbus RTU		✓	✓	✓	✓	✓
Filter Contamination Info (DPS)		✓	✓	✓	✓	✓
Weekly Timer		✓	✓	✓	✓	✓
	On/Off Damper Control	✓	✓	✓	✓	✓
	Proportional Damper Control	✗	✓	✓	✓	✓
	Airflow Control		✓		✓	
	Humidity Control	≡	✓	≡	✓	≡
	CO2 Control		✓		✓	
	On/Off Heating Coil	✓	✓	✓	✓	✓
	Proportional Heating Coil	✗	✓	✓	✓	✓
	On/Off Cooling Coil	✓	✓	✓	✓	✓
	Proportional Cooling Coil	✗	✓	✓	✓	✓
	Electrical Pre-Heater	✓	✓	✓	✓	✓
	Electrical After-Heater	✓	✓	✓	✓	✓
	BacNET MSTP	✗	✓	✓	✓	✓
	Web Browser (TCP/IP)	✗	✓	✗	✓	✗

≡ Only one of them of defined functions is selectable for this control card.

Control Panel			Control Cards				
Panel Type		Panel Descriptions	Standard - Pro	Alternative 1	Alternative 2		
					Type 1	Type 2	Type 3
	Standard-Pro	Wall-mounted type, Max:50 m communication ability	✓	✗	✗	✗	✗
	Alternative-1	Wall-mounted type hand panel, IP 30 protection class, Max:100 m communication ability	✗	✓	✗	✗	✗
	Alternative-2.1	Wall-mounted type room panel, IP 30 protection class, Max:700 m communication ability	✗	✗	✗	✗	✓
	Alternative-2.2	**Hand Panel 1:** Wall-mounted type, IP 65 protection class for only front side of panel, Max:50 m communication ability **Hand Panel 2:** Magnet type, IP 65 protection class for whole panel, Max:50 m communication ability	✗	✗	✓	✓	✓
	Alternative-2.3	Magnet type, IP 31 protection class, Max:700 m communication ability	✗	✗	✓	✓	✓

Duct Type Electric Heaters

Electric heaters are optionally supplied in cold climates for supply air and in extreme climates for both supply and outdoor air sides against freezing. Electric heaters are manufactured according to circular or rectangular duct systems.
Standard types are produced of stainless steel heating elements and galvanized metal casing. Stainless steel casing is also avaliable. Electric heaters are equipped with two circuit cutting thermostats. Factory setting for the automatically operating one is 70 °C and for the manual operating 110 °C.
Electric heaters capacity can be controlled up to 2 or 3 steps with control system of unit according to the set temperature from the room control panel and room (or supply air) temperature. Speed controls shall not be used with Electric heater installations. Eneko electric heaters are connected in Delta connection in standard models.

Heating Capacity Calculation

$Q = 0{,}33 \times V \times (T_2 - T_1)$

Q : Heating Capacity (W)
V : Air Flow through electric heater (m^3/h)
T_1 : Air temperature before the heater (°C)
T_2 : Air temperature after the heater (°C)

Electrical Heater Capacity

Unit Model		Capacity (pre-heater) (kW) (Outdoor air between 0°C and -5°C)*	Capacity (pre-heater) (kW) (Outdoor air between -5°C and -15°C)*	Capacity (after-heater) (kW) (Heating the supply air to 25°C)*
ECV-H ECV-V	200	5	12	5-6
	300	5	12	5-8
	400	6	20	6-12
	500	8	25	8-15
	700	12	34	12-20

* All pre-heaters and after-heaters are duct type.

Duct Type Heating Coil

Duct type heating/cooling coils are assembled in cabin as suitable to mount inside duct and have standard capacity. Coils consist of copper tubes and aluminum fins. Inlets and outlets of cabin are suitable for circular duct connections as in heat recovery ventilation units. Additionally, cooling coils have drain pan and extra insulation to prevent condensation of cabin.

Both heating and cooling coils can be controlled separately as on/off or proportionately via unit automation system.
All values are calculated according to EN 308 standard.

		90°C/70°C Water				80°C/60°C Water			
Unit Model ECV-H / ECV-V	Air flow (m^3/h)	Air side pressure drop (Pa)	Capacity (kW)	Fluid side pressure drop (kPa)	Supply air temperature (°C)	Air side pressure drop (Pa)	Capacity (kW)	Fluid side pressure drop (kPa)	Supply air temperature (°C)
200	1100	49	12.4	1.5	55	48	9.8	1	47.8
	1710	28	13.7	1.8	44	27	10.9	1.2	39
300	1700	9	11	3.6	39.4	9	8.9	2.5	35.7
	2430	17	13.5	5.2	36.6	17	10.9	3.6	33.4
400	2200	6	14.8	2.5	41.9	6	11.8	1.7	37.8
	3740	15	20.8	4.8	36.7	15	16.7	3.2	33.4
500	3250	9	22.1	8.7	40.2	8	18	6	36.5
	5200	19	28.9	10.5	36.5	19	23.5	9.9	33.4
700	3900	73	44.1	7.5	55.4	72	35.8	5.1	49
	6900	190	65.2	11	48.1	188	53	7.5	42.9

		70°C/50°C Water				60°C/40°C Water			
Unit Model ECV-H / ECV-V	Air flow (m^3/h)	Air side pressure drop (Pa)	Capacity (kW)	Fluid side pressure drop (kPa)	Supply air temperature (°C)	Air side pressure drop (Pa)	Capacity (kW)	Fluid side pressure drop (kPa)	Supply air temperature (°C)
200	1100	48	6.9	0.5	40.2	47	2.9	0.1	29.2
	1710	27	7.9	0.7	33.8	27	4.1	0.2	27.2
300	1700	9	6.8	1.5	32	9	4.6	0.8	28.1
	2430	16	8.3	2.2	30.2	16	5.6	1.1	26.9
400	2200	6	8.7	1	33.7	6	5.4	0.4	29.1
	3740	15	12.6	1.9	30	15	8.2	0.9	26.6
500	3250	8	13.9	3.8	32.7	8	9.7	2	28.8
	5200	19	18.1	6.2	30.3	18	12.6	3.2	27.1
700	3900	71	27.3	3.1	42.4	70	18.5	3.2	35.6
	6900	186	40.7	6.6	37.5	184	28	3.3	32

Duct Type Cooling Coil

		7°C/12°C Water				6°C/10°C Water			
Unit Model ECV-H / ECV-V	Air flow (m^3/h)	Air side pressure drop (Pa)	Capacity (kW)	Fluid side pressure drop (kPa)	Supply air temperature (°C)	Air side pressure drop (Pa)	Capacity (kW)	Fluid side pressure drop (kPa)	Supply air temperature (°C)
200	1100	28	4.4	4.1	14.6	33	5.8	6.4	12.9
	1710	59	6.4	8.4	15.7	67	7.9	11.2	14.5
300	1700	35	6.8	4.9	14.5	40	8.7	11.3	13.1
	2430	65	9.2	8.3	15.7	74	11.3	14.6	14.5
400	2200	25	9.6	7.3	13.8	28	12.6	13.3	12
	3740	61	14.9	12.1	15.3	69	18.6	27.3	14
500	3250	34	14	9.7	14.2	39	18	23.2	12.5
	5200	76	20.2	19	15.7	87	25.2	33.3	14.4
700	3900	25	15.1	4.8	14.4	28	19.7	5.9	12.8
	6900	66	24.7	5.9	16	75	30.5	13.2	14.9

Duct Type DX Coil

		R407C,5°C/54°C			
Unit Model ECV-H / ECV-V	Air flow (m^3/h)	Air side pressure drop (Pa)	Capacity (kW)	Fluid side pressure drop (kPa)	Supply air temperature (°C)
200	1100	36	6.5	4.7	13
	1710	76	8.5	7.9	15.2
300	1700	45	9.5	8.1	13.5
	2430	83	12	12.8	15.2
400	2200	31	13.7	13.1	12.2
	3740	77	19.6	23.6	14.7
500	3250	43	19.3	23.7	12.9
	5200	96	26.3	43.4	15.2
700	3900	32	22.8	25.8	12.8
	6900	86	32.9	52.5	15.6

General Terms and Conditions of Sale

GENERAL

The sale of all Products of ENEKO shall exclusively be made on the basis of these General Terms and Conditions of Sales. Any other conditions and General Conditions of Purchase of the Buyer are not accepted.

OFFERS

Our offers are non-binding and without obligation. Contracts for delivery and all other agreements (including subsidiary agreements) as well as declarations of our representatives shall only become legally binding for us after written confirmation. We do not render planning service. Proposals made and information provided by our representatives shall be non-binding. Illustrations, drawings, dimensions and weights or other performance data shall only be binding if this is expressly agreed in writing.

TERMS OF ORDER

Purchase orders shall be sent to ENEKO in written form and shall be non-binding unless they are accepted by written confirmation (order confirmation) from ENEKO. Each order shall include properly identified Products ordered and relevant shipping dates.

PRICE OF THE GOODS

Prices are net Ex Works according to current Incoterms unless stated otherwise and do not include any kind of taxes.Prices are valid at the date of delivery will be applied.We reserve the right to adjust prices for confirmed orders as well to reflect any increase in our costs for any reason beyond our control like force majeure, shortage of primary material or labor strikes, official orders, transportation or similar problems.In this case, a new price agreement shall be required for higher rates. If such an agreement is not made, we shall be entitled to withdraw from the contract by written notice within 15 days.

TERMS OF PAYMENT

Payments shall be carried out according to the contractual terms as defined and set forth in the order confirmation. If the payment conditions have not been agreed upon conclusion of the contract, the payment terms and payment dates specified in our invoices shall be binding. Deadlines for discounts and periods allowed for payment shall begin to run upon receipt of the invoice. Payments by draft, bills of Exchange or anyway extended payments shall mean neither credit novation, nor prejudice to the Retention of Title agreement, nor to territorial competence.If buyer fails to make payment by due date, we are entitled to charge the buyer with a relevant interest on the unpaid amount.

TERMS OF DELIVERY

Delivery time information is only approximate. We shall only be in default if the performance is due and a written demand for payment was issued. Delivery day is the day of dispatch Ex Works.We shall also not be liable with regard to bindingly agreed periods and dates in the event of delays an delivery and of performance due to force majeure and events which considerably complicate or make delivery impossible not only temporarily-strike lockout, breakdown, delay in supply with important raw and auxiliary materials even if the delay occurs at our supplier, in particular. These delays entitle us to postpone delivery for the period of the impediment plus a reasonable start-up period or to withdraw from the contract as a whole or in part.If delivery time is extended or we are released from our delivery commitment, the buyer may not derive a claim for damages from it. However, we may only rely on the circumstances mentioned if we notify the buyer immediately.We shall be entitled to make part deliveries. Any part delivery shall be considered as independent transaction.In case of default, our liability is limited to contract-typical foreseeable damage.

SHIPMENT

Shipment is made for the buyer's account.Mode of shipment and shipping route, transport and packaging and other securities respectively shall be at our choice. We shall be entitled, however, not obliged to insure deliveries in the name and for account of the buyer.Risk passes to the buyer when shipment is handed over to the person performing the transport or left our Works for shipment. If shipment is delayed upon buyer's request, risk passes to the buyer with the ready for shipment note.If ordered goods are rejected after the ready for shipment note, we shall be entitled to request payment and store the goods at buyer's expense.Discharge of the goods is made at buyer's expense.

RETENTION OF TITLE

In any event ENEKO shall retain full ownership of all materials supplied whilst the payment conditions of the entire amount have not been complied with, said materials may be removed from the customer at our request. Should the customer be declared bankrupt or insolvent and has not made paid the entire amount of payments. ENEKO shall be entitled to recover the goods. ENEKO may interrupt the supply without incurring any liability whatsoever if he had notice of or became aware of a decrease in the creditworthiness of the purchaser or if any of the existing negotiable instruments or debts were not properly complied with, shall result as being unpaid and protested.

WARRANTY

ENEKO Products are under warranty (defect in material or workmanship)for 2 years from the date of sale reflected on the invoice. Under this warranty, ENEKO is under the obligation to replace the part requested under warranty.

The followings are excluded from ENEKO warranty:

- Normal wear and tear
- Defective assembly or handling
- Third party compensation

Parts the subject of a claim shall be sent to our warehouse as carriage paid with relevant report completely filled in, wherein the parts shall be subjected to analysis.

LIABILITY

ENEKO, for any losses/damages, shall only be responsible within the limits of the law.Owing to basic obligations undertaken by simple negligence, if the contract is violated, ENEKO's liability shall be limited to compensate for losses which are emerged specific and predictable. ENEKO shall not carry any responsibility in case of a single negligence in breach of non-essential contractual obligations.

PROPERTY RIGHTS

The purchaser in no event and under no circumstances whatsoever shall publish or use the trademark, trade name or logo of ENEKO without a prior written permission.

GOVERNING LAW AND JURISDICTION

This agreement shall be governed with all aspects of the Turkish Law.The courts of Izmir/Turkey shall have an exclusive jurisdiction to adjudicate any dispute arising under or in connection with this agreement.

Notes

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