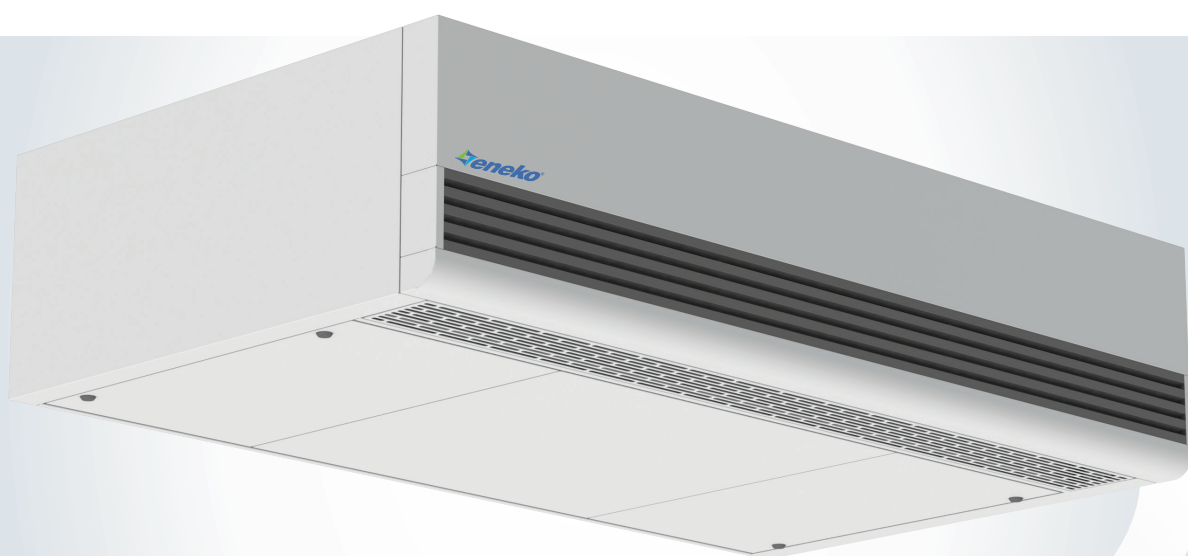


ESU

Decentralized Heat Recovery Unit



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ESU

Decentralized Heat Recovery Unit

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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.

Supply and Exhaust Air Filter

To increase indoor air quality and to protect the equipments used in unit, ISO ePM 1 >50% (F7), & ISO ePM 10 >50% (M5) class filters (according to ISO 16890 standard) are used for both exhaust and supply air streams.

Casing & Insulation

The ESU features a sheet metal casing with a 200 g/m² galvanized coating, providing high corrosion resistance. The exterior surface is finished with a protective paint coating. The internal insulation is designed to ensure maximum sound attenuation, enabling low-noise and comfortable operation.

Service Area

All service doors are at the bottom surface of the unit and supported by a sliding rail mechanism. This structure allows fast, safe and ergonomic service and maintenance operations even in applications with limited headroom. Thanks to its compact design, maintenance efficiency is increased by providing maximum accessibility with minimum space.

Control System

Control unit is developed for controlling of heat recovery units' equipments, meeting the demands coming from the customers and is user-friendly designed. Control unit is capable of commanding the equipments in standard unit and optional accessories. Control unit can be performed the basic functions without any control panel, with Standard Panel can be also used more functional. Besides, the control unit can control the all functions via ModBus and switch on/off via BMS as optional.

Supply and Exhaust Fan

The fans in heat recovery units are equipped with innovative Electronically Commutated EC motor technology. EC motors have higher efficiency and simple speed control. Fan blades have high aerodynamic efficient backward curved design. Using the EC motors reduce the energy consumption and increase the energy efficiency of the unit. With EC Fans, maintenance costs are reduced as the fans are directly connected to the motors; the belt and pulley problems are eliminated.

Heat Recovery Exchanger

ESU heat recovery ventilation units have aluminum counterflow, high efficiency 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.

Technical Specifications

Unit Type			ESU 700	ESU 1100
Manufacturer			Eneko	
ERP			ERP 2018	
Heat Recovery Efficiency ¹	(%)		83,3	81,7
Nominal Air Flow Range ¹	(m ³ /h)		700	950
Maximum Air Flow Range	(m ³ /h)	(at 150 Pa)	865	1010
Maximum Air Flow Range	(m ³ /h)	(at 0 Pa)	1020	1340
Nominal External Pressure	(Pa)		50	50
Unit Voltage	(V)		230	230
Key Points			1)Low Noise 2)Easy Service access 3)Compact structure 4)Continuously meets the need for fresh air inside 5)Elegant and modern design 6) Room type CO2 sensor 7)Integrated on/off preheater 8)Integrated proportional afterheater 9)Integrated DX/Changeover/heating/cooling coil 10)Integrated control system	
Bypass			%100 Proportional Bypass	
Fan			EC Fan	
Fan Material			Composite	
Heat Recovery Type			Counterflow Heat Exchanger	
Installation			For indoor use only	
Installation Version			Horizontal	
Supply Air Filter			ISO ePM1 >50% (F7)	
Exhaust Air Filter			ISO ePM10 >50% (M5)	
Duct Connections Type			Round	
Duct Connections Version			Horizontal/Vertical	
Casing Material			The outer casing is made of painted galvanised steel; sound insulation has been used for the internal insulation.	
Service Access			All service access is provided from the bottom thanks to the sliding panel design	
Accessories			See for accessories page	

¹ EN 308 condition (OA = 5°C & 72%, RA = 25°C & 28%).

■ Sound Performance Data

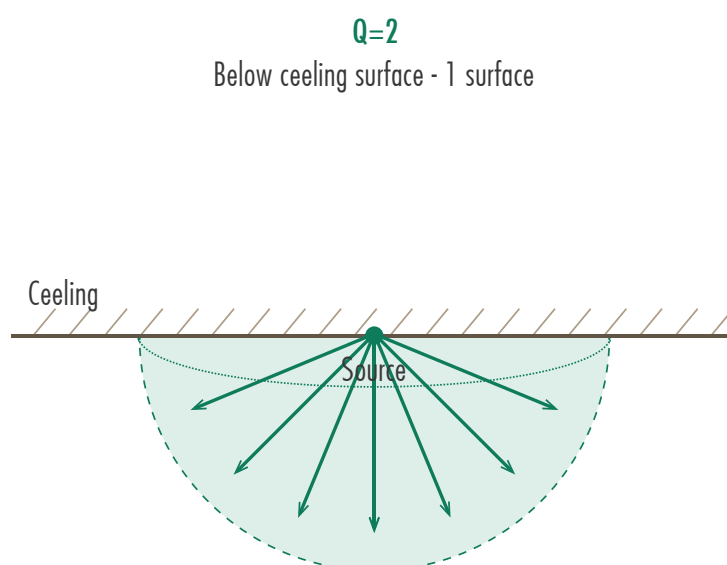
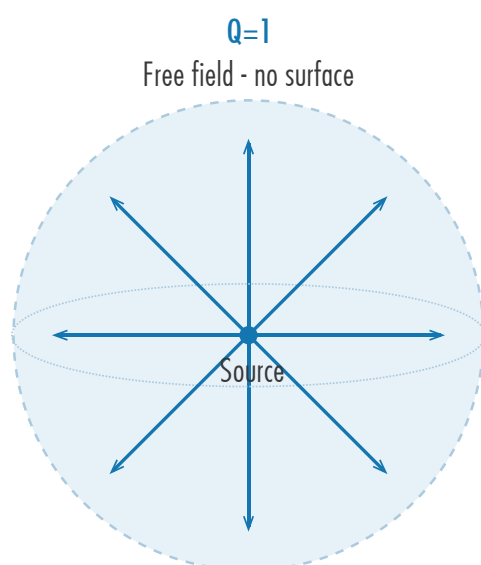
Directivity factor (Q)

Directivity factor (Q) describes how a sound source distributes its acoustic energy in different directions depending on its environment. Surrounding surfaces (such as floors and walls) reflect sound waves, causing them to concentrate in specific directions.

As the number of reflecting surfaces increases, the effective sound radiation volume decreases and sound becomes more directional. As a result, for the same sound power, the measured sound pressure level (dB) increases.

Q = 1: Under free-field conditions, sound propagates uniformly in all directions, resulting in the lowest measured sound level.

Q = 2: In the presence of a single reflecting surface (floor), sound energy is directed into half-sphere, leading to an increase in the measured sound level.



Unit Model		0 Pa	50 Pa	100 Pa
700	Sound Pressure Levels (1,5 m) (dBA)	35,63	35,34	35,11
	Sound Pressure Levels (3 m) (dBA)	29,61	29,32	29,09
1100	Sound Pressure Levels (1,5 m) (dBA)	29,64	29,96	30,34
	Sound Pressure Levels (3 m) (dBA)	23,62	23,94	24,32

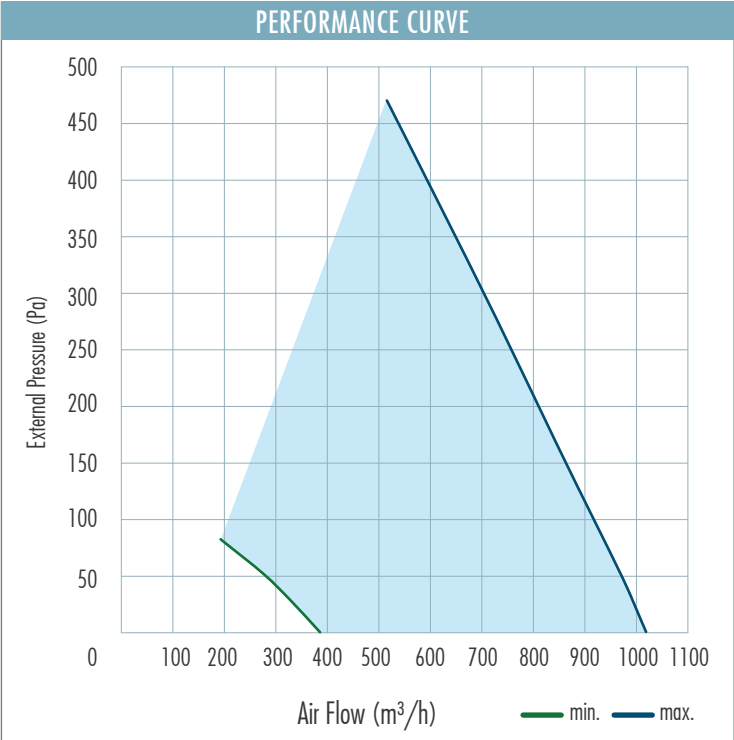
The maximum flow rates at the specified pressures have been taken as a basis. (Q=1)

Unit Model		0 Pa	50 Pa	100 Pa
700	Sound Pressure Levels (1,5 m) (dBA)	38,64	38,35	38,12
	Sound Pressure Levels (3 m) (dBA)	32,62	32,33	32,10
1100	Sound Pressure Levels (1,5 m) (dBA)	32,65	32,97	33,35
	Sound Pressure Levels (3 m) (dBA)	26,63	26,95	27,33

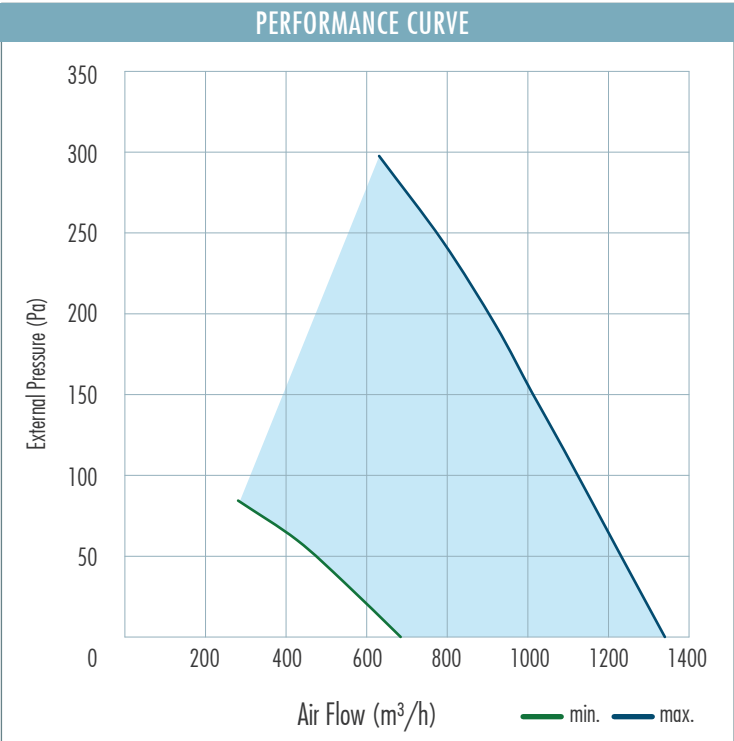
The maximum flow rates at the specified pressures have been taken as a basis. (Q=2)

Performance Data

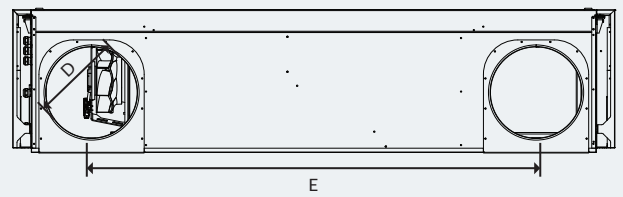
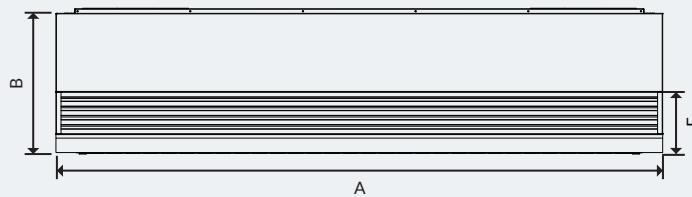
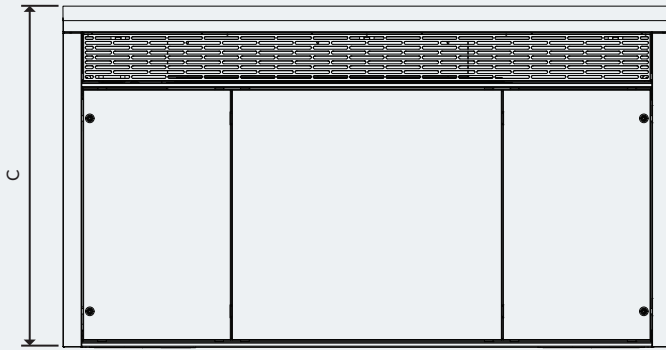
ESU 700



ESU 1100



ESU Unit Dimensions

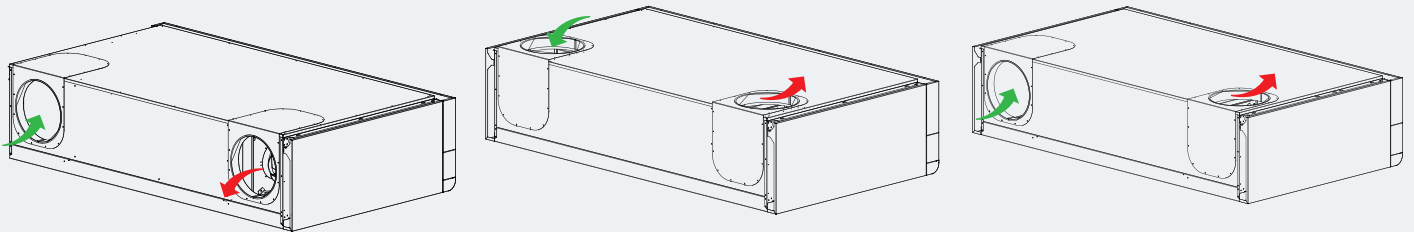


	A	B	C	ØD	E	F	Unit Weight
ESU 700	2100	500	1180	315	1550	230	190
ESU 1100	2550	568	1300	315	2000	230	266

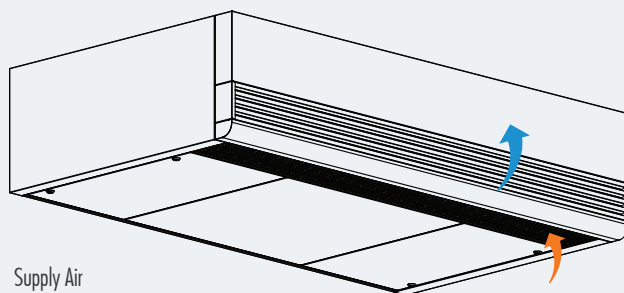
*All measurement values are mm. Unit weight is kg.

*A minimum clearance of 500 mm must be left underneath the unit for service access.

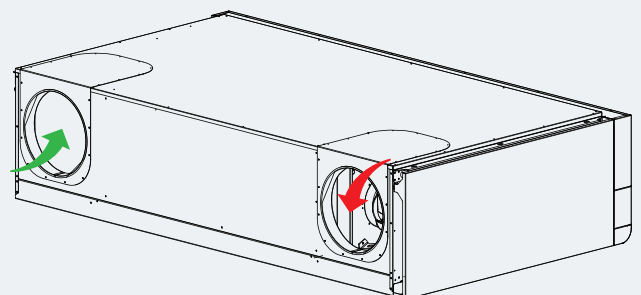
ESU - Duct Connection Alternative



Installation



- Supply Air
- Outdoor Air
- Return Air
- Exhaust Air



Control System

Automation Options		Control Card
Standard	Optional	Carrigo (Standard)
Outdoor Temperature		✓
Supply Temperature		✓
Extract Temperature		✓
Exhaust Temperature		✓
Frost Protection by Exhaust Temperature		✓
Supply Fan Control		✓
Exhaust Fan Control		✓
Fan Alarm		✓
External Low Speed		✓
External Normal Speed		✓
External High Speed		✓
Fire Alarm		✓
Bypass Damper(Proportional)		✓
Dirty Filter Control (DPS)		✓
Modbus RTU		☹
MODBUS IP		
BacNET IP		
BacNET MSTP		
Weekly Timer		✓
Constant Flow		☹
	Constant Pressure	☹
	Outdoor Damper(Proportional)	✗
	Humidity Control	☹
	CO2 Control	☹
	Dx Coil Control(On/Off)	
	Dx Coil Control(Proportional)	
	Water Cooling Coil Control(On/Off)	
	Water Cooling Coil Control(Proportional)	
	Electrical After-Heater (1 STEP)	
	Water Heating Coil Control(On/Off)	
	Water Heating Coil Control(Proportional)	
	Electrical Pre-Heater (1 STEP)	✓
	Outdoor Damper (On-Off)	✓
	Freeze Protection	✓
	Exchanger Freezing Pressure Control	✗
	Web Browser (TCP/IP)	✗
	Dirty Filter Control (Time)	✗

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

⚠ The optional features in the table vary according to the product.

⚠ Technical staff should be consulted for IO information.

Panel Type	Panel Descriptions	Standard
	Wall-mounted type hand panel, IP 30 protection class, Max:100 m communication ability	✓
	Wall-mounted type hand panel, IP 30 protection class, Max:100 m communication ability	✗
	Differential Pressure Switch	
	CO ₂ Sensor	
	Humidity Sensor	

*The sensor images are representative.

■ Selection of Electrical Cable Cross-Section

Unit Model	Unit Voltage (V)	Unit Power Input (kW)	Current (A)	Fuse (A)	Cable Cross-Section (mm ²) for 50M and PF=0.8
ESU 700	230	0,48	3,78	2x25	2,5
ESU 1100	230	0,38	2,98	2x32	4

The data in the table shows the maximum power/current values. Please check unit label for updated values.

■ Cable Cross-Section Formulas

1

$$I_{\text{current}} = \frac{P}{U \cdot \cos Q}$$

$$I_{\text{cable}} > I_{\text{current}}$$

2

$$\%e = \frac{100 \cdot P \cdot L}{k \cdot S \cdot U^2}, \quad S = \frac{100 \cdot P \cdot L}{k \cdot \%e \cdot U^2}$$

$$\%e = \%3$$

3

$$I_{\text{cable}} > I_{\text{fuse}} \geq I_{\text{current}}$$

$$\text{Cable Cross-Section } S = \text{Max } (S1, S2, S3, 1.5 \text{ mm}^2)$$

P : Power

I : Current

U : Voltage

S : Conductor cross section

k : Conductor coefficient

L : Conductor length

%e: The voltage drop

■ Example of Cable Cross-Section Calculation

P : 1 kW

L : 50m

U : 230V

%e : %3

PF: CosQ : 0.8

k : 56m / Ω

1

$$I_{\text{current}} = \frac{1000 \text{ W}}{230 \cdot 0,8} = 5.43 \text{ A}$$

The cable will be used, is selected from the cable cross-section table so that the equivalent ampere value in the table should be higher than calculated "I_{current}" value.

$$S1 = 1.5 \text{ mm}^2$$

2

$$\%e = \%3$$

$$S = \frac{100 \cdot 1000 \cdot 50}{56 \cdot 3 \cdot 230^2} = 0.56 \text{ mm}^2$$

$$S2 \geq 0.56 \text{ mm}^2 \geq 0.75 \text{ mm}^2$$

$$S2 = 0.75 \text{ mm}^2$$

3

$$I_{\text{cable}} > I_{\text{fuse}} \geq I_{\text{current}}$$

$$I_{\text{cable}} > 10A \geq 5.43A$$

"I_{fuse}" which will be higher than "I_{current}", is selected.

The cable will be used, is selected from the cable cross-section table so that the equivalent ampere value in the table should be higher than selected "I_{fuse}" value.

$$I_{\text{cable}} = 24A$$

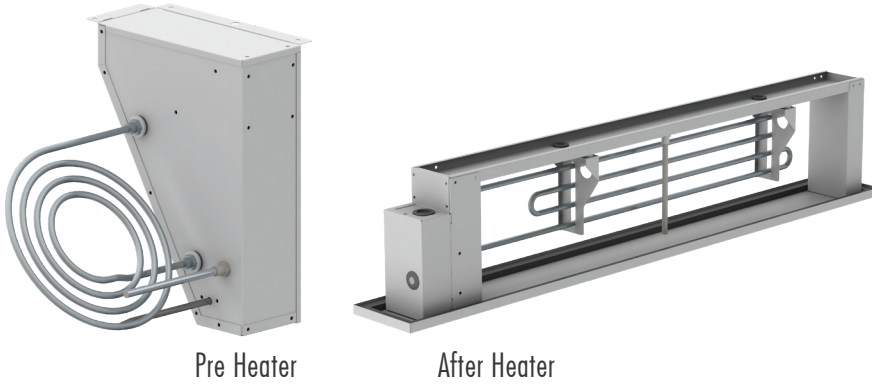
$$S3 = 1.5 \text{ mm}^2$$

$$\text{Cable cross-section } S = \text{Max } (S1, S2, S3, 1.5 \text{ mm}^2)$$

$$S = \text{Max } (1.5, 0.75, 1.5, 1.5)$$

$$S = 1.5 \text{ mm}^2$$

■ Integrated Electrical Heaters



It is used at the outlet of the heat recovery unit in cold climates, and at the fresh air inlet to prevent freezing in very cold climates. As standard, it features a galvanized steel casing with stainless steel heating elements. An optional stainless steel casing is also available. The electric heater is equipped with two high temperature protection devices. When the internal temperature of the electric heater reaches 70°C, the automatic high temperature protection is activated and the heater is automatically switched off. If the 70°C automatic protection does not activate or if the internal temperature of the electric heater reaches 110°C, the second protection is triggered and the heater remains disabled until a manual reset is performed. The electric heaters operate in single-stage mode. The electric heaters are supplied from the control panel.

Heating Capacity Calculation

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

Q : Heating Capacity (W)

V : Air Flow through electric heater (m³/h)

T₁ : Air temperature before the heater (°C)

T₂ : Air temperature after the heater (°C)

Electrical Heater Capacity (kW)		
Unit Model	Pre Heater	After Heater
ESU 700	1,6	2,3
ESU 1100	2,0	3,0

All heaters 1-/230V/50Hz

■ Duct Type Circular External Damper



A backdraft damper prevents reverse airflow in the ventilation system by allowing air to flow in only one direction. It blocks unwanted air infiltration from the outside when the fan is stopped or the system is shut down. This helps reduce heat losses, improves system efficiency, and contributes to maintaining indoor comfort conditions. Thanks to its low pressure drop design, it ensures quiet operation without negatively affecting system performance. It is used as a reliable and efficient solution in heat recovery units and ventilation systems.

Unit Model	ØD
ESU 700	315
ESU 1100	315

■ Integrated Cooling Coil

7°C/12°C Water				
Unit Model	Air Flow (m³/h)	Air side pressure drop (Pa)	Capacity (kW)	Fluid side pressure drop (kPa)
ESU				
700	700	15,9	2,3	27,1
1100	950	6,9	4,0	37,6

■ Integrated Heating Coil

90°C/70°C Water					80°C/60°C Water		
Unit Model	Air Flow (m³/h)	Air side pressure drop (Pa)	Capacity (kW)	Fluid side pressure drop (kPa)	Air side pressure drop (Pa)	Capacity (kW)	Fluid side pressure drop (kPa)
ESU							
700	700	10,5	4,9	7,1	10,4	4,0	4,9
1100	950	4,5	7,9	8,4	4,4	6,6	6,0

70°C/50 °C Water					60°C/40 °C Water		
Unit Model	Air Flow (m³/h)	Air side pressure drop (Pa)	Capacity (kW)	Fluid side pressure drop (kPa)	Air side pressure drop (Pa)	Capacity (kW)	Fluid side pressure drop (kPa)
ESU							
700	700	10,3	3,0	3,0	10,1	2,0	1,5
1100	950	4,4	5,2	4,0	4,3	3,8	2,3

■ Integrated DX Coil

R32 - 7°C/48°C				
Unit Model	Air Flow (m³/h)	Air side pressure drop (Pa)	Capacity (kW)	Fluid side pressure drop (kPa)
ESU				
700	700	16,0	1,5	29,9
1100	950	14,2	3,7	16,5



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.



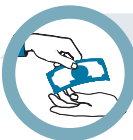
TERMS OF ORDER

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 on 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.



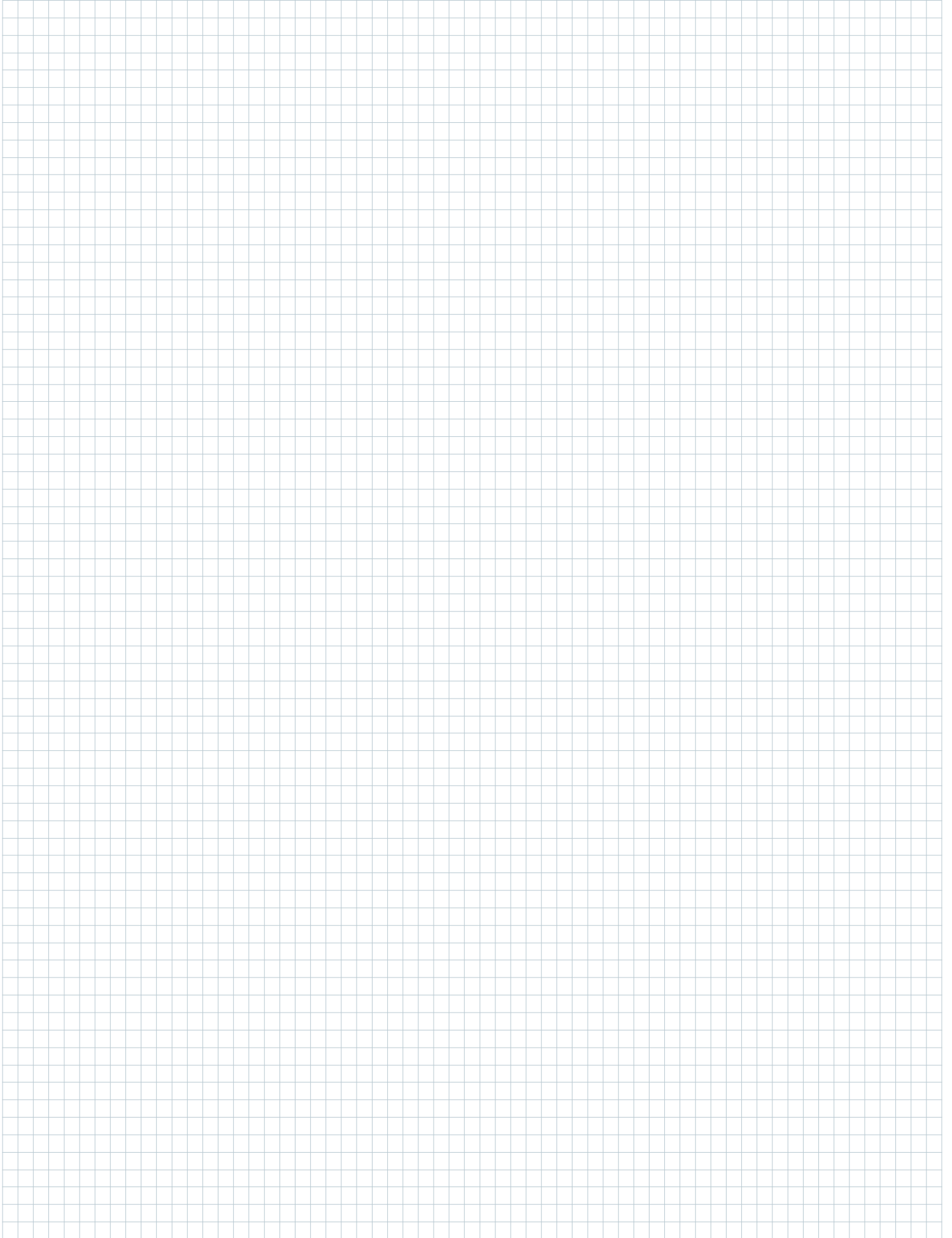
PROPERTY RIGHTS

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.





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