ENVU-PRO (650/1000/2000/2500/3500/4000)

Ceiling Type Heat Recovery Units

Assembly & Maintenance Guide

CE

EN

INDEX

INTRODUCTION

This document has been prepared and given to customer as a guide for easy installation&operation units manufactured by ENEKO A.Ş. The manual contains description of the unit, components and basic informations and recommendations for proper and fail free operation. Please read the instructions and warnings given in this manual before starting installation, operation and maintenance works and keep this manual near the unit, within easy reach of service personnel.

Any damage, failure or hazard occurred because of use except this purpose is beyond the responsibility ofmanufacturer.

For technical service and questions, please contact with following information.

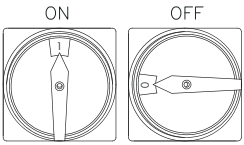
+90 232 328 20 80 / 103-152
www.eneko.com.tr
+90 536 713 10 00
servis@eneko.com.tr

PROHIBITED

- This unit has to be used under proper conditions according to its technical specification and design purpose. (Otherwise responsibility belongs to practitioner)
- Unauthorized personnel must not interfere in unit and/or must not use unoriginal spare parts. (Otherwise responsibility of failure that may occur belongs to practitioner)
- Do not install this product in a refrigerated warehouse, heated swimming pool or other location where temperature and humidity are significantly different. (Failure to heed this warning may result in electrical shock or malfunctioning.)
- Do not install this product where it will be directly exposed to rain. (Failure to heed this warning may result in electrical shock or malfunctioning.)
- Do not install this product in a location where acid, alkali or organic solvent vapors, paints or other toxic gases, gases containing corrosive components or high concentrations of oily smoke are present (Failure to heed this warning may result not only in malfunctioning but also fire, power leakage and electrical shock.)
- Do not use this product outside the range of its rated voltage and control capacity.

ATTENTION

- Install this product in an environment where the temperature ranges from -5 °C to +40 °C and the relative humidity is less than 60%. If condensation is expected to form, heat up the fresh outside air by a duct heater etc.
- Select an adequately sturdy position for installing the product and install it properly and securely.
- Use the designated electrical wires for the terminal board connections and connect the wires securely so that they will not be disconnected. (Failure to ensure proper connections may result in fire.)
- When passing metal ducts through wooden buildings clad with metal laths, wire laths or metal, these ducts must be installed in such a way that they will not make electrical contact with metal laths, wire laths or metal sheets. (Power leakage can cause ignition.)
- The outside ducts must be tilted at a gradient (1/30 or more) downwards toward the outdoor area from the main unit, and properly insulated. (The entry of rain water may cause power leaks, fire or damage to household property.)
- Gloves should be worn while installation. (Failure to heed this warning may result in injury.)
- A dedicated circuit breaker must be installed at the origin of mains power supply. This circuit breaker must be provided with a means for locking (lock and key).
- The body of the unit, room control panel and cables keep away the unit 3 m. distance.
- Do not open the service doors until the supply voltage has been disconnected at the isolation switch and the fans have stopped.



ATTENTION

- The ENVU-PRO unit is not to be used to transport solid particles or in areas where there is a risk of explosive gases.
- If one or more of the inlets/outlets is not connected to a duct: Fit a protective net to the inlets/outlets with a maximum mesh width of 20 mm.

- This product must not be disassembled under any circumstances. Only authorized repair technicans are qualified to conduct disassembly and repairs.
  (Failure to heed this warning may result in fire, electrical shock or injury.)

- Connect the product properly to the ground. (Malfunctioning or power leaks can cause electrical shock.)

- An isolator switch having minimum contact gap of 3 mm in all poles must be provided as a means of disconnecting the power supply.

NOTE: The installations, which is not available for installation and operation manual, is out of guarantee.

CHECK LIST

In the event of unit failure and pre-commissioning checks to be made are determined as follows; after checking this information, please contact our company in case failure continues.

Controls	√
Make sure that the unit receives power and electrical grounding is made!	
Make sure that the electricity cables are drawn from in the correct cross section! (Please check whether there is heating on cables or not.)	
Please check whether the cables in unit control panel are shielded (shielded magnetic field) or not; make sure shielding is grounded. If not, please change them!	
Make sure that fresh air and exhaust air filters are clean and they do not block the flow of air!	
Make sure there is the connection of drainage on the unit, check any possible clogging in drainage line and clean if necessary!	
Please check whether the diameter of the air duct connection of the unit and the diameter of the spigot are the same. If the duct connection is smaller, change it with the correct one.	
Make sure the electrical connections of the unit are made as suggested on the unit and in this guide, check if there is incorrect connection.	
Make sure during the installation of the unit there is enough space for the service and if there is not enough space, re-install again.	
In extremely cold climate applications, frost may occur on the exchanger, apply electric heater in fresh air intake section of the unit to get the temperature to -5 °C and above.	
After installing the unit, make sure that it does not create an abnormal sound or vibration, if there is, make sure that rubber pads are used.	
Create a downward slope when connecting the drainage line. To effectively discharge water condensed in the exchanger and coils, connect a single 1” diameter drain hose to the drain outlet located on the side of the unit.	

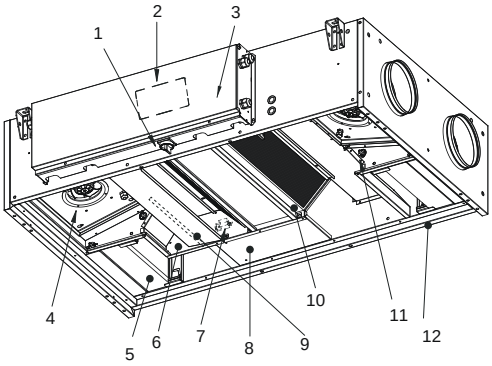
Product Model Identifier		ENVU-PRO650 LC/RC	ENVU-PRO1000 LC/RC	ENVU-PRO2000 LC/RC	ENVU-PRO2500 LC/RC	ENVU-PRO3500 LC/RC	ENVU-PRO4000 LM/RM
Nominal Airflow	m^3/h	630	970	1840	2200	3120	3720
Thermal efficiency of HRS[1]	%	84,4	87,4	86,5	85,8	84,4	84,6
External pressure drop	PA	100	150	200	300	300	300
Unit voltage	(V/Hz/f)	230 / 50 / 1 ~				400 / 50 / 3 ~	
Unit power input	kW	0,37	0,48	1,04	1,5	2,24	2,66
Current	A	2,98	3,78	4,58	6,58	3,58	4,2
Sound pressure level @3m	Lpa	26	23,5	30,1	26,9	33,5	36
Supply air filter		ISO ePM1 >50% (F7)					
Exhaust air filter		ISO ePM10 >50% (M5)					
Duct connections		Round		Rectangular			
On/Off heater electrical		3,00 kW	5,00 kW	8,00 kW	11,00 kW	14,00 kW	18,00 kW
		One step					
Proportional Heater Electrical (Low Capacity)				4,00 kW	5,50 kW	7,00 kW	9,00 kW
Proportional Heater Electrical (High Capacity)		3,00 kW	5,00 kW	8,00 kW	11,00 kW	14,00 kW	18,00 kW
Internet adress for pre-/dis-assembly instructions		www.eneko.com.tr					

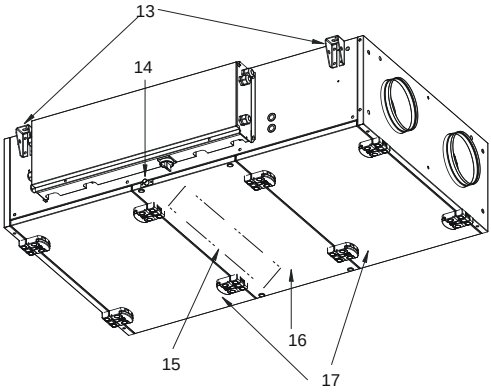
1*Wet efficiency refered to nominal airflow, outdoor (-5ºC/80% RH) and indoor conditions (20ºC/50%RH).

Construction of the ENVU-PRO unit

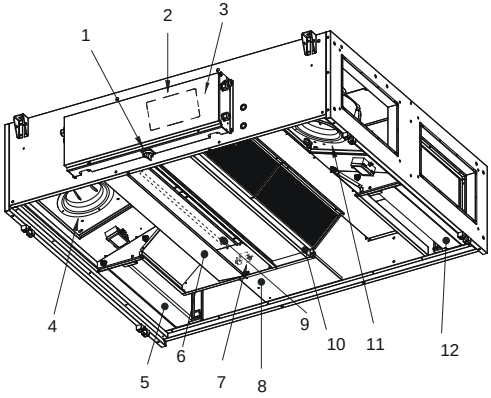
The drawings below shows an overview of the Envu-pro unit construction. First two drawings show a Envu-pro unit with circuler inlets / outlets. Last four drawings show a Envu-pro unit with rectangular.

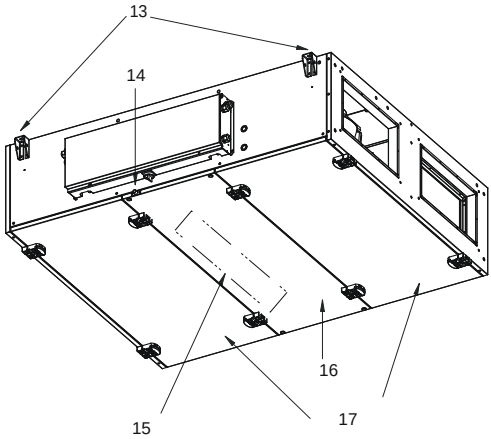
ENVU-PRO 650/1000



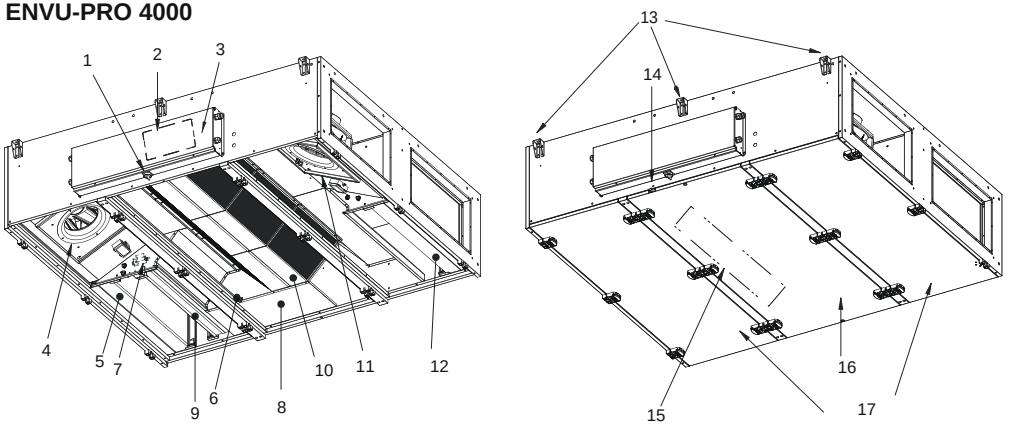


ENVU-PRO 2000/2500/3500



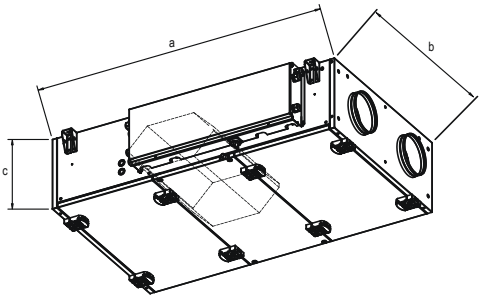


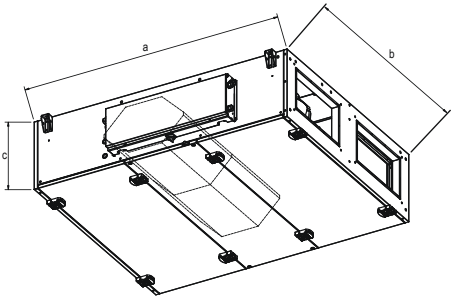
ENVU-PRO 4000

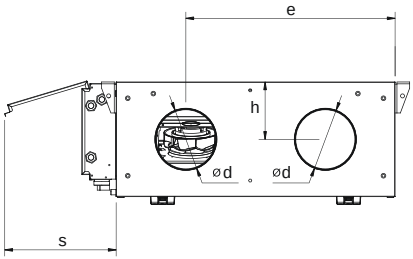


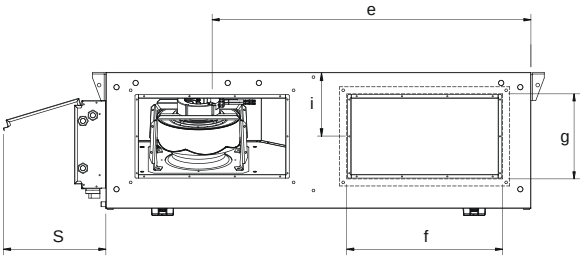
Pos.	Part	Function
1	Isolation Switch	Connects/disconnects current.
2	Control Panel	Control system.
3	Connection box	Connection of accessories and power supply.
4	Exhaust Air Fan	Removes the stale air.
5	Supply Air Filter	Filters the supply air.
6	Additional Condensation Tray (Optional)	Collects condensed water and drains it from the counterflow heat exchanger to the condesation tray.
7	Bypass Motor	Opens/closes bypass damper.
8	Bypass Duct	Directs air around the counterflow heat exchanger.
9	Bypass Damper	Opens/closes bypass duct and heat exchanger.
10	Counterflow Heat Exchanger	Enables heat exchange between stale and fresh air.
11	Supply Air Fan	Blows fresh air into the room.
12	Exhaust Air Filter	Filters the exhaust air.
13	Suspension Clamps	Clamps for fitting the unit to the ceiling (2 or 3 at each side depending on unit size).
14	Condensation Outlet Pipe	Transfers condensed water from the condensation tray. External condensation outlet is connected to it via siphon.
15	Condensation Tray	Collects condensed water and drains it from the counterflow heat exchanger to the condesation outlet.
16	Middle Panel/Door	Counterflow heat exchanger cover for inspection and service.
17	Door	Sliding doors/hinged doors for inspection and service (Hinged doors can open left or right side, depending on user's as choice).

UNIT DIMENSIONS









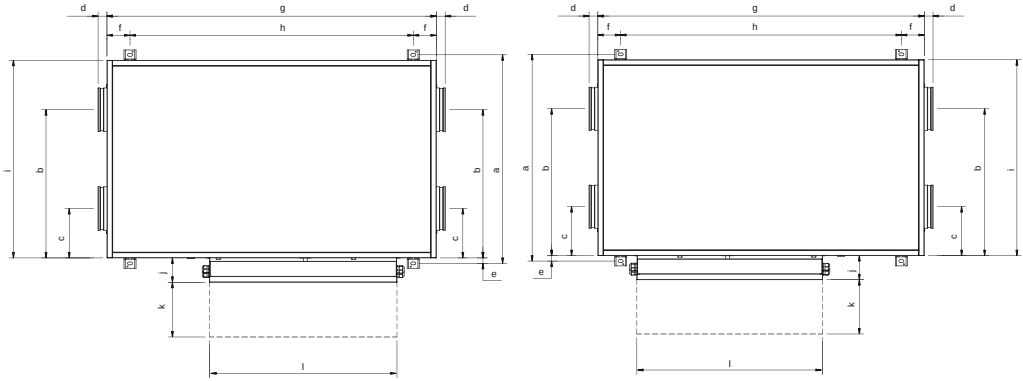
	ENVU-PRO650 LC/RC	ENVU-PRO1000 LC/RC	ENVU-PRO2000 LC/RC	ENVU-PRO2500 LC/RC	ENVU-PRO3500 LC/RC	ENVU-PRO4000 LM/RM
a	900	1150	1500	1650	1650	1970
b	1500	1600	1800	2000	2100	2250
c	370	400	480	565	580	580
Ød	200	250	-	-	-	-
e	675	863	1125	1238	1238	1478
f	-	-	517	567	567	717
g	-	-	267	367	367	367
h	185	200	267	367	367	367
i	-	-	226	283	290	290
s	370	370	300	400	400	400
Unit weight	125	164	230	286	320	370

* All measurement values are mm.

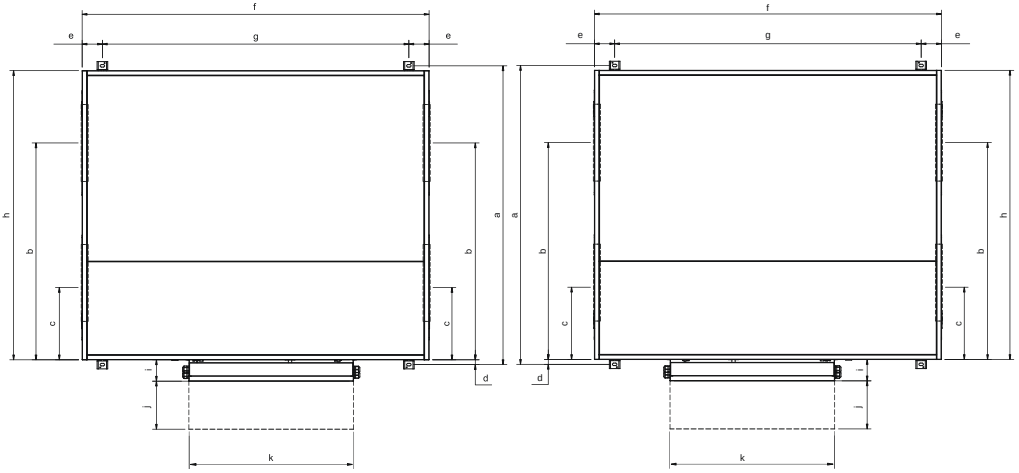
* The gaps of the maintenance area values are specified as "S" on the table. The dimensions on page 11 regarding the door opening distance should be considered.

* Unit weight is kg.

Top view



Model	a	b	c	d	e	f	g	h	i	j	k	l
ENVU-PRO650LC/RC	950	675	225	40	25	105	1500	1290	900	110	260	852
ENVU-PRO1000LC/RC	1200	863	288	60	25	105	1600	1390	1150	110	260	852



Model	a	b	c	d	e	f	g	h	i	j	k
ENVU-PRO 2000LC/RC	1550	1125	375	25	105	1800	1590	1500	110	260	852
ENVU-PRO 2500LC/RC	1700	1238	413	25	105	2000	1790	1650	110	260	927
ENVU-PRO 3500LC/RC	1700	1238	413	25	105	2100	1890	1650	110	260	927
ENVU-PRO 4000LC/RC	2020	1478	493	25	105	2250	2040	1970	110	260	1002

Positioning

The ENVU-PRO unit is designed for indoor fitting. The unit may be positioned with the side opposite the connection box up against a rear wall.

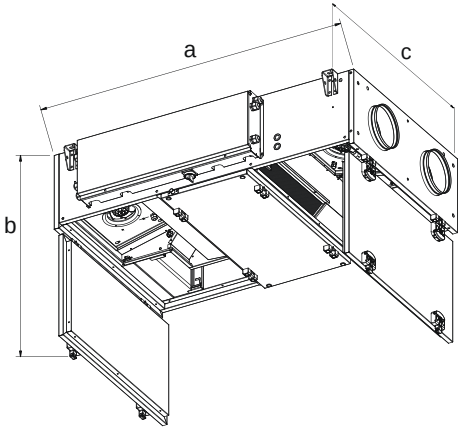
Space requirements

Envu-pro with hinged doors (standard)

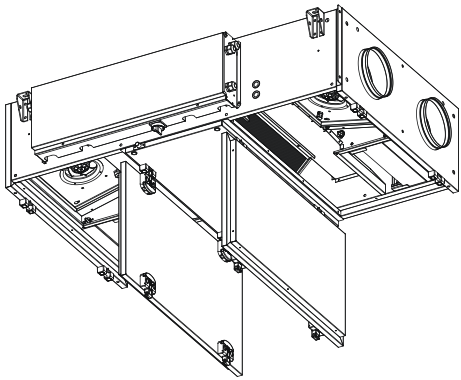
The cabinet has three hinged doors. The drawing below indicates how much space is needed for opening the doors and servicing the unit, i.e. changing filters, cleaning, servicing, etc.

Opening outside,

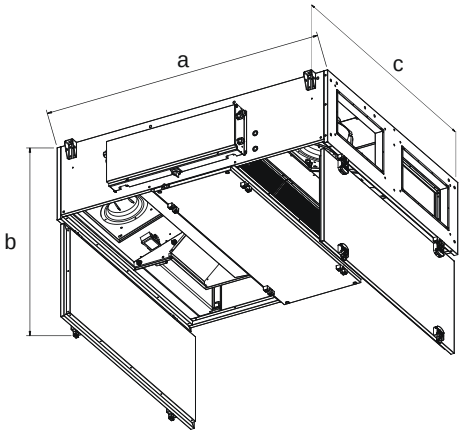
ENVU-PRO 650/1000

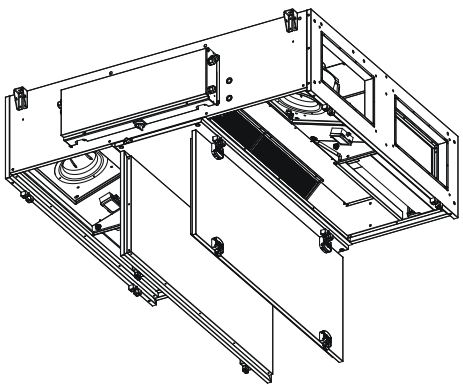


Opening inside,

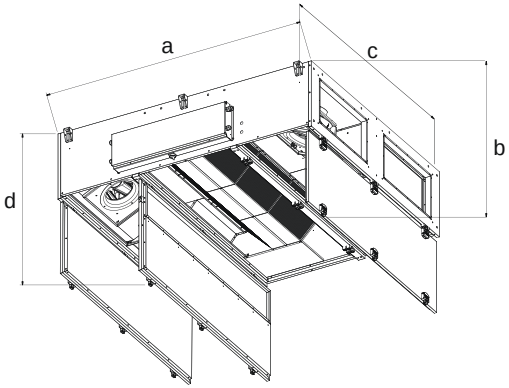


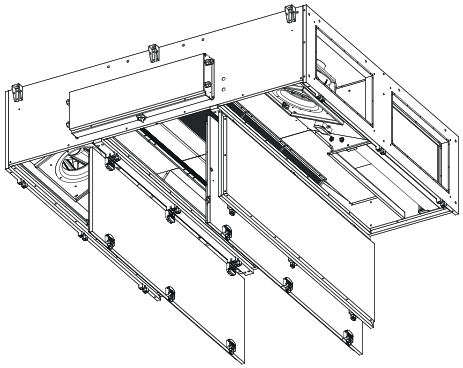
ENVU-PRO 2000/2500/3500





ENVU-PRO 4000





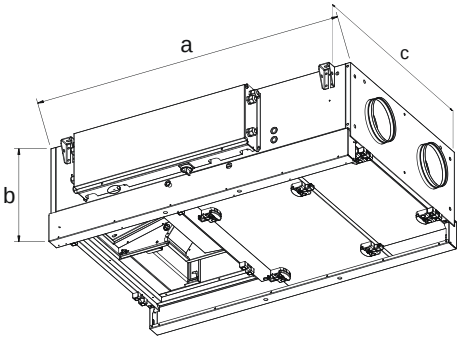
Model	a	b	c	d
ENVU-PRO 650 LC / RC	1500	940	994	-
ENVU-PRO 1000 LC / RC	1600	1000	1244	-
ENVU-PRO 2000 LC / RC	1800	1160	1594	-
ENVU-PRO 2500 LC / RC	2000	1300	1744	-
ENVU-PRO 3500 LC / RC	2100	1365	1744	-
ENVU-PRO 4000 LM / RM	2250	1275	2064	1450

Envu-pro with sliding rails (accessory)

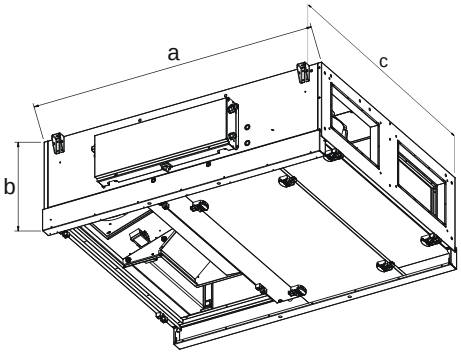
The cabinet has 2/3 doors which can be individually released and slide sideways allow filter change and cleaning.

Note: Sliding rail accessory is optional.

ENVU-PRO 650/1000



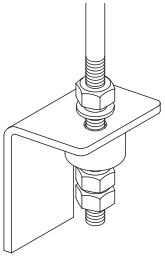
ENVU-PRO 2000/3500/4000



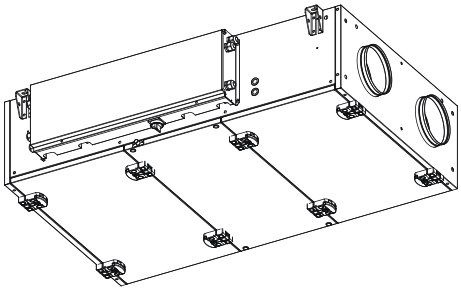
Note: For all units in ENVU-PRO Range, dimensions are identical for both left and right units.

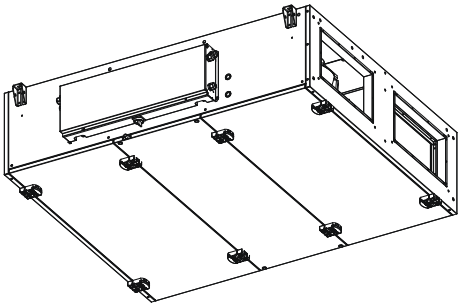
Model	a	b	c
ENVU-PRO 650 LC / RC	1500	475	994
ENVU-PRO 1000 LC / RC	1600	505	1244
ENVU-PRO 2000 LC / RC	1800	585	1594
ENVU-PRO 2500 LC / RC	2000	670	1744
ENVU-PRO 3500 LC / RC	2100	685	1744
ENVU-PRO 4000 LM / RM	2250	685	2064

Preparing The Sling Bolts



Note: Rubber suspension chocks provided inside the unit's package need to be used below the suspension clamps as shown in the given figure above. Same action needs to be taken with the unit accessories which have suspension clamps.

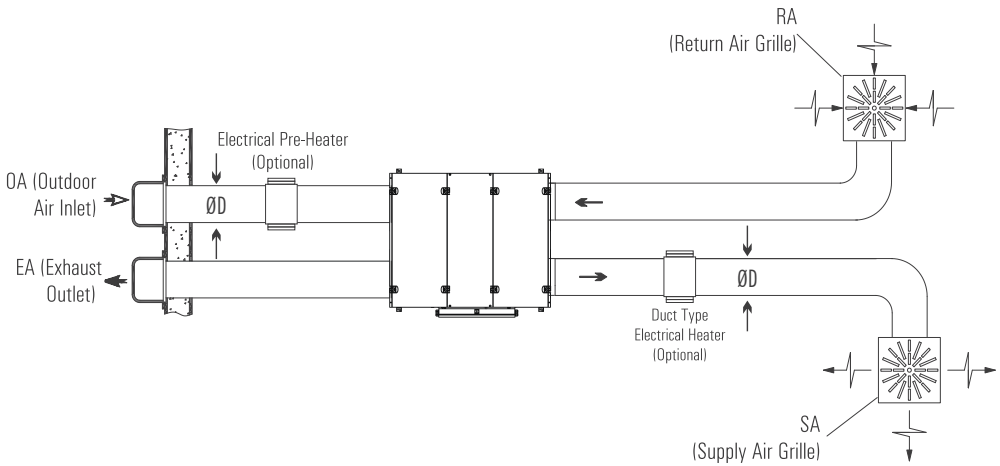




The table below shows the unit's dimensions, and is intended to indicate how large an opening has to be for the unit to pass through:

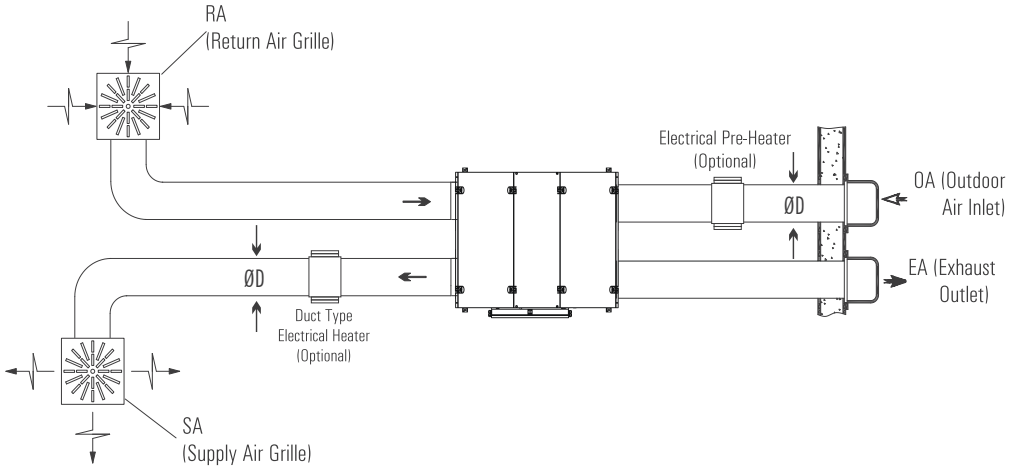
Note: +100 mm for fitting through passages (tolerance).
For all units in Envu-pro Range, dimensions are identical for both left and right units.

Model	Length	Width	Height
ENVU-PRO 650 LC / RC	1580	1010	395
ENVU-PRO 1000 LC / RC	1720	1260	425
ENVU-PRO 2000 LC / RC	1800	1610	505
ENVU-PRO 2500 LC / RC	2000	1760	590
ENVU-PRO 3500 LC / RC	2100	1760	605
ENVU-PRO 4000 LM / RM	2250	2080	605



*Drain pipe must be installed

*The device direction is left
*View from bottom

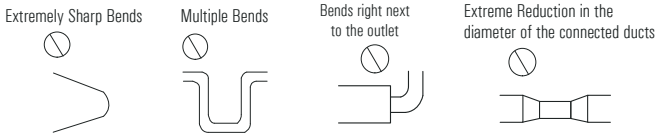


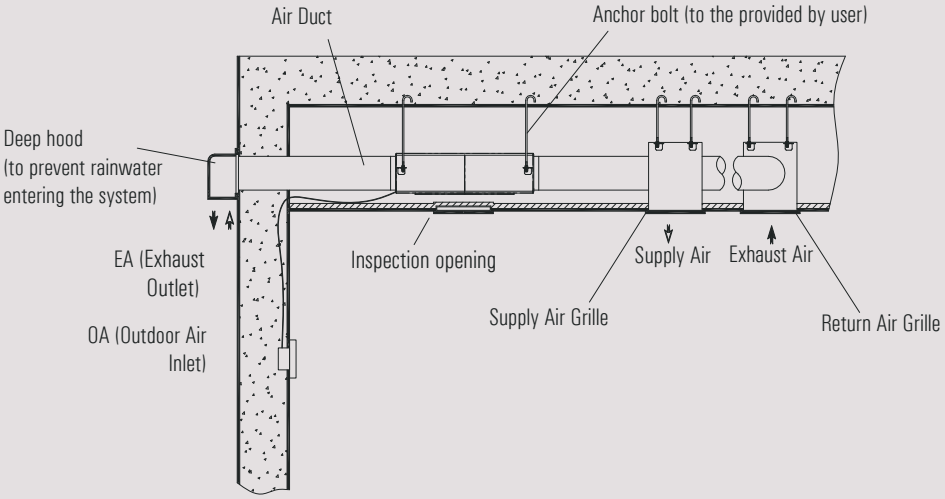
*Drain pipe must be installed

*The device direction is right
*View from bottom

! CAUTION

Check these warnings before installation.





Unit Model	Unit Voltage (V)	Unit Power Input (kW)	Current (A)	Fuse (A)	Cable Cross-Section (mm²) for 50M and PF=0.8
ENVU-PRO 650 LC / RC	230	0.37	2.98	2x4	1
ENVU-PRO 1000 LC / RC	230	0.48	3.78	2x6	1
ENVU-PRO 2000 LC / RC	230	1.04	4.58	2x6	2.5
ENVU-PRO 2500 LC / RC	230	1.50	6.58	2x10	4
ENVU-PRO 3500 LC / RC	400	2.24	3.58	3x4	2.5
ENVU-PRO 4000 LM / RM	400	2.66	4.20	3x6	2.5

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

Cable Cross-Section Formulas

1

$I_{current} = \frac{P}{U.Cos\Omega}$

$I_{cable} > I_{current}$

2

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

$\%e = \%3$

3

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

Cable Cross-Section S = Max (S1, S2, S3, 1.5mm²)

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 : **CosΩ**: 0.8 **k** : 56m / Ω

1

$I_{current} = \frac{1000\ W}{230.0,8} = 5.43\ A$

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 mm²

2

%e = %3

$S = \frac{100.1000.50}{56.3.230^2} = 0.56\ mm^2$

S2 ≥ 0.56 mm² ≥ 0.75mm²

S2 = 0.75mm²

3

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

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

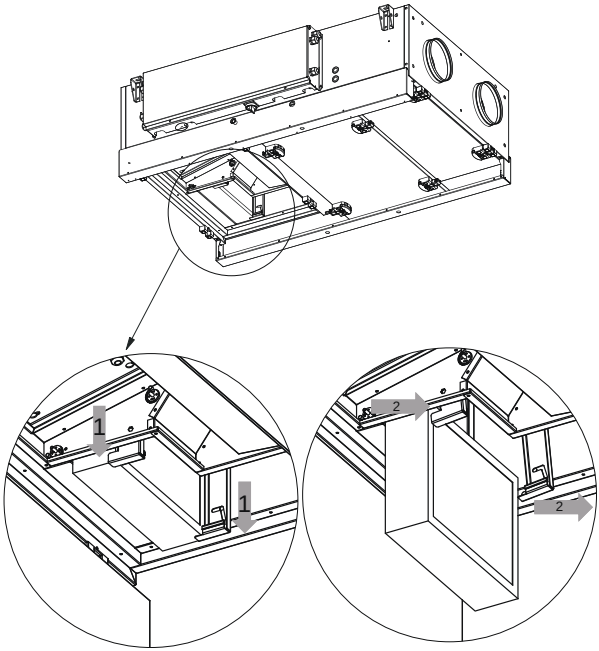
"I_{fuse}"which will be higher than "$I_{current}$", is selected.

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_{cable} = 24A
S3 = 1.5 mm²
Cable cross-section S = Max (S1, S2, S3, 1.5 mm²)
S = Max (1.5, 0.75, 1.5, 1.5)
S = 1.5 mm²

How to change filters

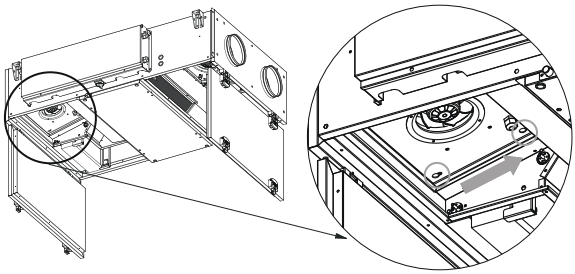
The Envu-pro unit doors must be opened to allow servicing and cleaning. Disconnect the power at the isolation switch before opening the doors.



1.Disconnect power to the unit.
2. Open the unit doors.
3. Pull filter clamps in downward (Arrow 1) direction. Then, push filter clamps in sideway (Arrow 2) direction. Filter is now free and can be removed in downwards (Arrow 1) direction.
4. Put the filter in a plastic bag and seal it tightly. Arrange for disposal according to local waste disposal regulations.

Note: When a filter alarm is received, the filter should be changed. If the filter does not give an alarm, it should still be changed every max 6 months.

How to service the motor

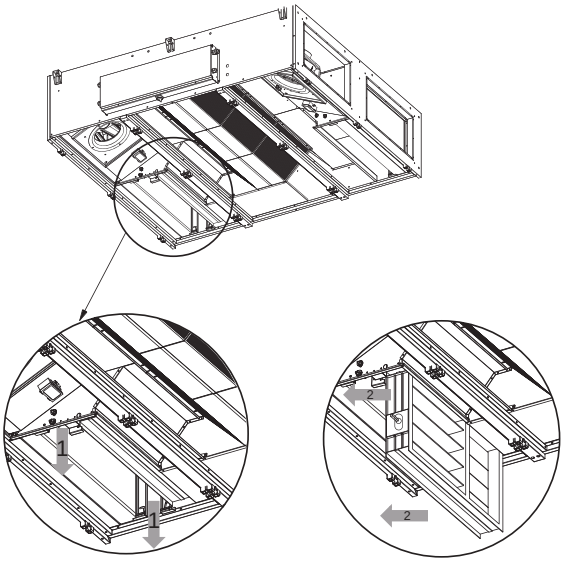


1.Disconnect power to the unit.
2. Open the unit doors.
3. Detach sockets and the pressure hose from the pressure transmitter.
4. Loosen the four screws on the corners as shown with circles in the drawing. Then, slide the fan in the arrow's direction to remove the fan.
5.The motor section can now be removed.
6.Pull the motor downwards.
7. Clean the impeller:
- by vacuum cleaning.
- by wiping with a cloth dipped in soap and water and well wrung out.

Note: Clean all blades on the fan impeller carefully to avoid disrupting the balance.
8. After cleaning, check Envu-pro unit whether it operates without vibration.

How to service the bypass damper

Disconnect power at the isolation switch before opening the doors.

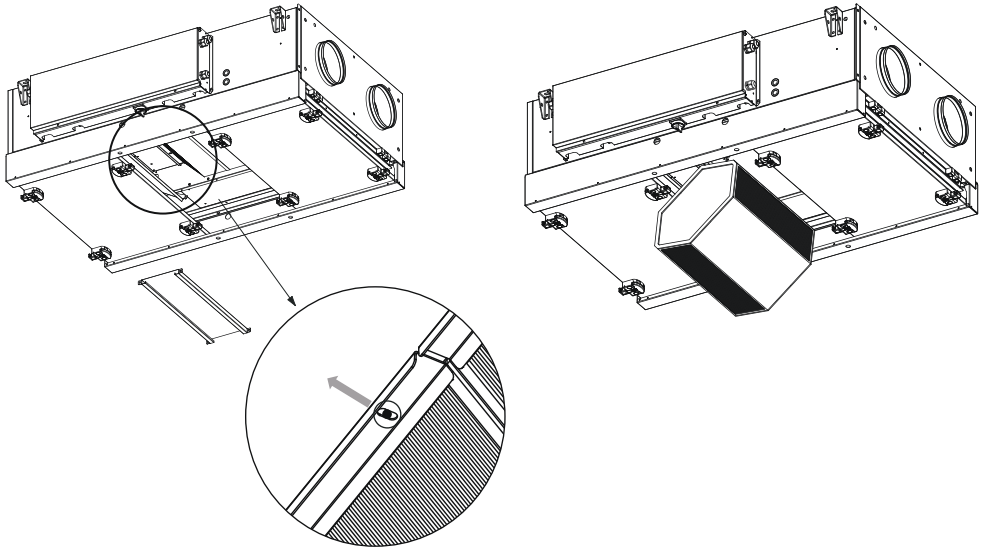


1.Disconnect power to the unit.
2. Open the unit doors.
3. Detach the bypass damper motor socket.
4. Pull damper clamps in downward (Arrow 1) direction. Then, push damper clamps in sideway (Arrow 2) direction. Damper is now free and can be removed in downwards (Arrow 1) direction.
5. The bypass damper section can now be removed.

Note 1: Instructions given in the table are not valid for Envu-pro 650/1000/2000 models. In the 650/1000/2000 series models, only the damper motor is being removed.
For all Envu-pro 2500/3500/4000 units, bypass damper service instructions given in the table are identical.

How to remove the counterflow heat exchangers

Note: The counter flow heat exchanger fins can easily be damaged - avoid contact with the fins.



1.Disconnect power to the unit.
2. Open the unit doors.
3. Unscrew 2 screws which holds the additional condensation tray and move the tray downwards.
4. Unscrew 4 screws which holds the additional sheet metal part and remove it.
5. Loosen the rail screws shown with a circle and slide the rails sideways as shown with an arrow to remove the heat exchanger. Remember to hold the heat exchanger from the bottom.
6. The heat exchanger is now free and can be removed. Remove the heat exchanger by rotating to fit it through the opening between doors as shown in the drawing.

Step	Action
1	Clean the exchanger by flushing with warm water (a high-pressure cleaner can be used). Max. water temperature: 90 ℃.
2	Check seal and replace if it is worn or deformed.
3	Be careful to avoid damages to heat exchanger fins.

Condensation drain

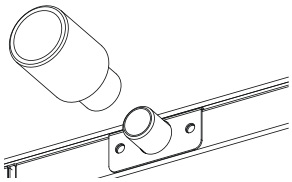
Risk of frost

Drain the condensation outlet into a floor gully or similar. The condensation outlet must be fitted with a water trap. See below.

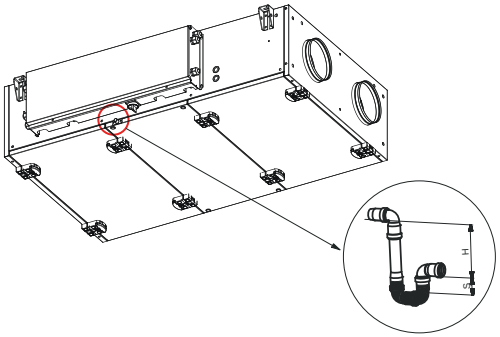
Where there is a risk of frost: Insulate the condensation outlet and protect it against frost - if necessary, using a heating cable.

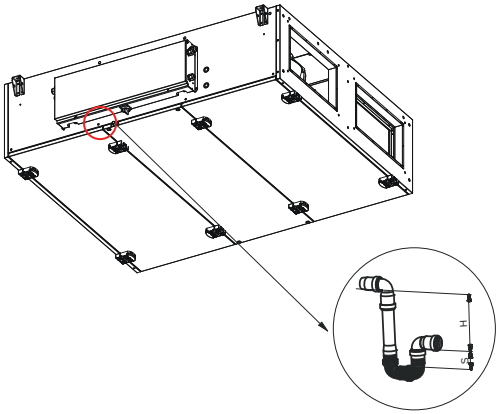
Water trap

The following drawing shows an example of how the drain from the condensation could be made.



Note: Condensation drainage siphon adaptor provided inside the unit package needs to be assembled to drainage outlet before assembling the siphon. Same action needs to be taken with "changeover coil box" accessory.





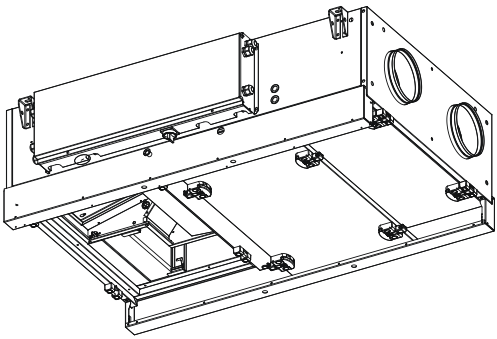
ENVU-PRO Unit Model	S (mm)	H (mm)
ENVU-PRO 650 LC / RC	20	33
ENVU-PRO 1000 LC / RC	25	41
ENVU-PRO 2000 LC / RC	25	42
ENVU-PRO 2500 LC / RC	29	48
ENVU-PRO 3500 LC / RC	35	58
ENVU-PRO 4000 LM / RM	34	57

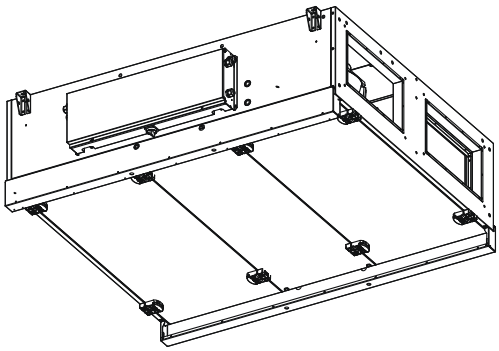
Note 1: The condensation outlet must be dismounted before the middle panel/door can be opened. For this reason, the pipe layout must allow the drain tube to be disconnected.

Dimensions indicate the minimum required values.

Note 2: Check that the unit hangs horizontally or slopes towards the condensation drain. Clean and vacuum clean the Envu-pro unit to remove metal shavings, etc.

Maintenance with sliding rails (accessory)





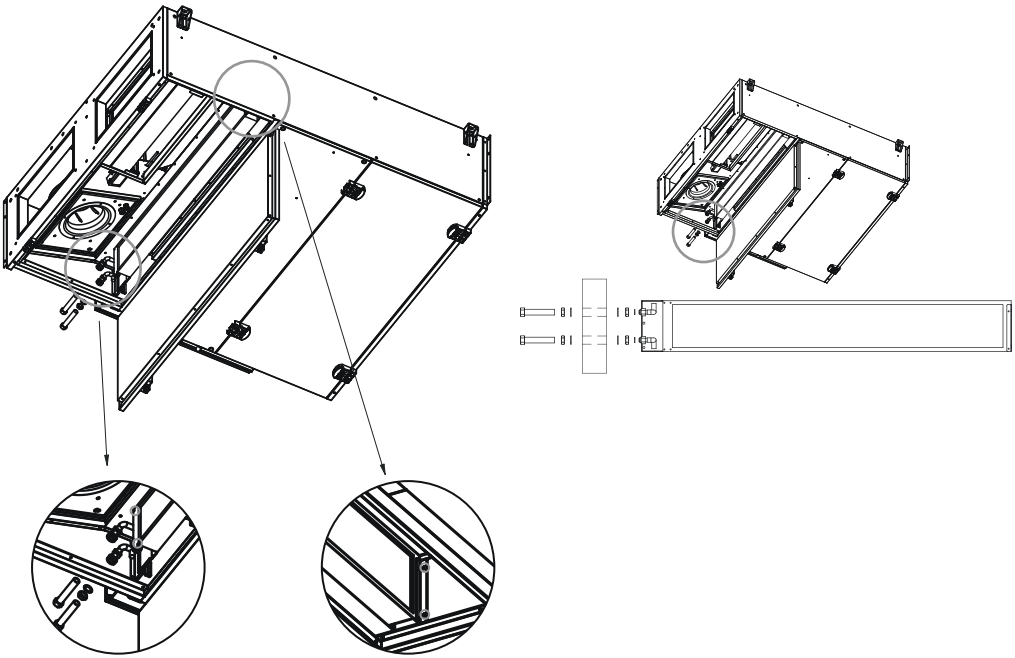
Filtering changes, motor cleaning, testing etc. Follow the steps below.

1. First dismount one door
2. Place it on the sliding rail and slide it under the other door
3. Carry out servicing and remount the door
4. Repeat with the other door.

Follow the steps below for heat exchanger service.

1. First dismount one door
2. Place it on the sliding rail and slide it under the other door
3. Carry out servicing and remount the door
4. Repeat with the other door.

How to connect the heating coil to the unit (accessory)



1.Switch off the power supply to the unit with the isolation switch. **Note:** If there is any electrical heater connected to the unit, switch off power to the electrical heater with the isolation switch on the heater.
2. Open the heating coil package.
3. Loosen the connection bolts on the unit to assemble the heating coil inside. Place the heating coil inside ventilation unit.
4. Tighten bolts on the unit to assemble the heating coil. For the holes given in the second figure, use screws to assemble the heating coil.
5. Connect the pipes provided inside the heating coil package to the heating coil pipes. Use the rubber gaskets provided inside the package.
6. Connect the piping to the heating coil pipes. Use a double wrench while connecting piping to the changeover coil box to prevent any damage to the pipes.
Note: Remember to put anti-freeze inside the coil. Attach the freezing temperature sensor provided inside the coil box package to the water outlet pipe of the changeover coil box. Use plastic clamps to attach the sensor to the pipe.
7. Connect the temperature sensor to the ventilation unit e-box.
8. Connect the 3-way valve provided inside the heating coil package to the heating coil.
9. Assemble the 3-way valve actuator provided inside the heating coil package to the 3-way valve.
10. Connect the 3-way valve actuator to the ventilation unit e-box with the communication cable provided inside the heating coil package.

Warranty Certificate

* If the unit is used according to the instructions given in user manual and interfered in only authorized technical service that we authorize about any maintenance and repair reasons, all spare parts will be under warranty for 2 years against material, labor and production faults except motor components.
* Identifying of parts replaced and determining troubleshooting technical procedure applied, will belong to our company.
* After ex-works of goods, all faults during loading, unloading and shipment will be out of guarantee. If a falsify has been made on documents or any falsify and changing have been made on serial number, goods will be out of guarantee.

Terms of Guarantee

1. Guarantee period is 2 years as from the time of delivery.
2. All spare parts except motor components are under warranty.
3. If the goods break down during guarantee period, the time spent for maintenance will be added to guarantee period. Maintenance period is 30 days at most. 30 days begin with the notice to a service station. If there is no service station, 30 days begin with the notice to the seller, dealer, agency, agent, importer or manufacturer of the goods.
4. If production fault occurs during guarantee period; the cost of new spare part and labor will not be claimed from the customer.
5. If a fault occurs because of not using or assembling according to the instructions given in user manual, goods will be out of guarantee.

UNIT TYPE

SERIAL NO

SIGNATURE:

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