



# ENERGY BOX PA - H / PA - V

200 / 300 / 400 / 500 / 700

Packaged Type Heat Recovery Unit



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## 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 -10 °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.



- ◆ This product must not be disassembled under any circumstances. Only authorized repair technicians 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.

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.

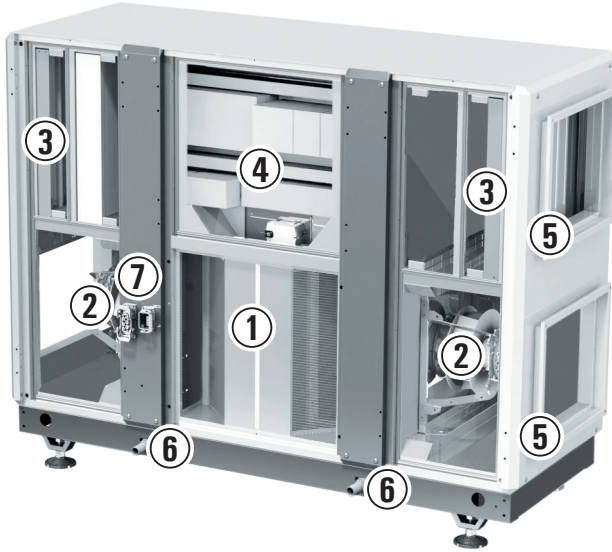
Make sure the electrical connections of the unit are made as suggested on the unit and in this guide, check if there is incorrect connection.

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 -8 °C and above.

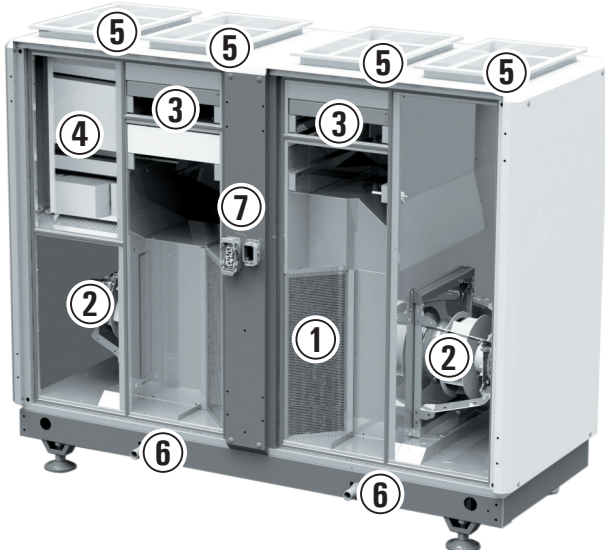
After installing the unit, make sure that it does not create an abnormal sound or vibration, if there is, make sure that rubber pads are used.

## PA - H Series Units



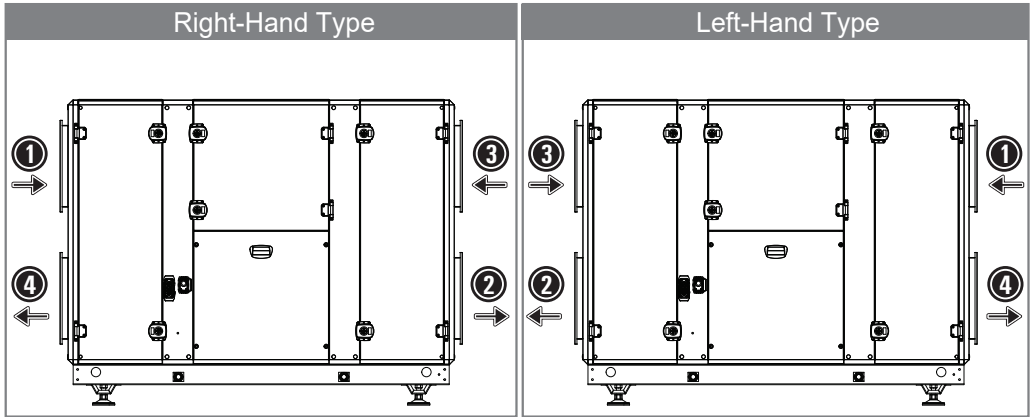
- ① Heat Recovery Exchanger (Aluminum)
- ② Exhaust and supply air fans
- ③ Exhaust and supply air filters
- ④ Control
- ⑤ Duct connections
- ⑥ Drainage Outlet
- ⑦ Supply and signal connection

## PA - V Series Units



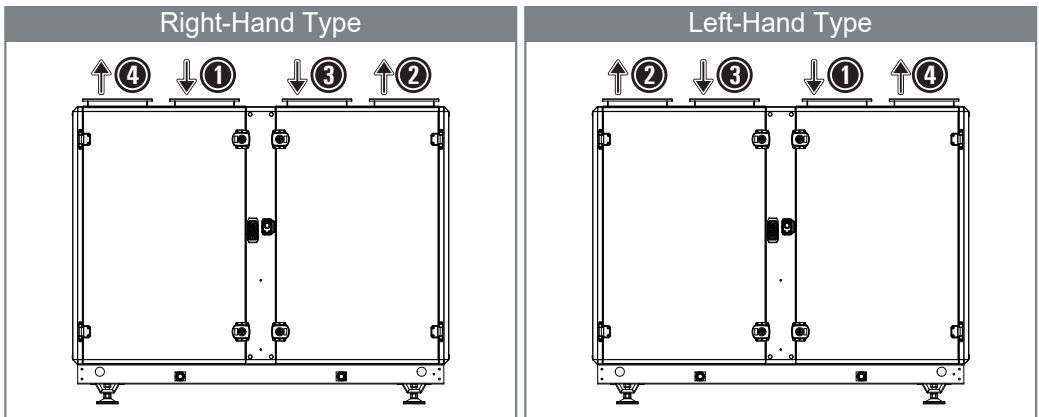
- ① Heat Recovery Exchanger (Aluminum)
- ② Exhaust and supply air fans
- ③ Exhaust and supply air filters
- ④ Control
- ⑤ Duct connections
- ⑥ Drainage Outlet
- ⑦ Supply and signal connection

## PA - H Series Units



- ① Outdoor air - OA   
 ② Supply air - SA   
 ③ Return air - RA   
 ④ Exhaust air - EA

## PA - V Series Units



- ① Outdoor air - OA   
 ② Supply air - SA   
 ③ Return air - RA   
 ④ Exhaust air - EA

## PA - H Series Technical Specifications

		PA - H 200	PA - H 300	PA - H 400	PA - H 500	PA - H 700
Declared typology		NRVU / BVU				
Type of drive installed or intended to be installed		variable speed drive				
Type of HRS		Counterflow plate heat exchanger				
Thermal efficiency of heat recovery <sup>1</sup>	%	78,33	78,3	78,7	79,1	79,2
Nominal flow rate	m <sup>3</sup> /h	1.400	1.950	3.250	3.350	3.650
Maximum flow rate	m <sup>3</sup> /h	1.650	2.250	3.600	5.800	6.300
Effective electric power input	W	810	1.100	1.800	2.000	4.400
SFPint <sup>1</sup>	W(m <sup>3</sup> /s)	1.177	1.170	1.110	1.136	1.100
Face velocity at design flow rate	m/s	1,26	1,5	1,65	1,7	1,73
Nominal external pressure ( $\Delta P_s, ext$ ) <sup>1</sup>	Pa	200	200	200	200	200
Internal pressure drop of ventilation components ( $\Delta P_s, int$ )(ODA/EHA)	Pa	355 / 335	359 / 339	350 / 330	321 / 301	315 / 295
Internal pressure drop of non-ventilation components ( $\Delta P_s, add$ )(ODA/EHA)	Pa	There is no "non-ventilation" components				
Static efficiency of fans used in accordance with Regulation (EU) No. 327/2001 (Supply Fan/Exhaust Fan)	%	58,6 / 58,5	59,8 / 59,7	61,5 / 61,1	54,9 / 54,5	55,6 / 55,1
Declared maximum external leakage rate	%	Less than 3%				
Declared maximum internal leakage rate	%	Less than 3%				
Energy classification of the filters (Energy performance) <sup>2</sup> (Supply/Exhaust Air Side)	Kwh	482 / 403	696 / 588	1.154 / 984	1.342 / 1.147	1.455 / 1.248

<sup>1</sup> Measured at balanced flow, EN 308.

<sup>2</sup> Declared information about the calculated annual energy consumption.

## PA - V Series Technical Specifications

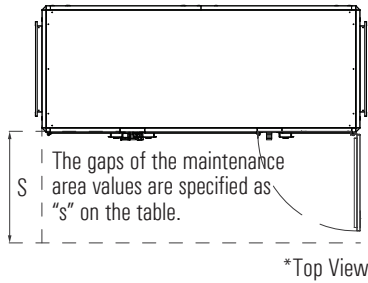
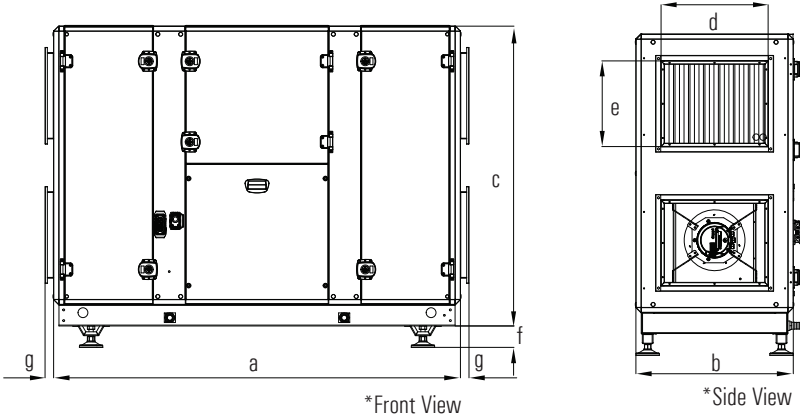
		PA - V 200	PA - V 300	PA - V 400	PA - V 500	PA - V 700
Declared typology		NRVU / BVU				
Type of drive installed or intended to be installed		variable speed drive				
Type of HRS (run around, other, none)		Counterflow plate heat exchanger				
Thermal efficiency of heat recovery <sup>1</sup>	%	78,5	78,6	78,9	79,4	79,4
Nominal flow rate	m <sup>3</sup> /h	1.350	1.850	3.150	3.200	3.500
Maximum flow rate	m <sup>3</sup> /h	1.600	2.200	3.450	5.600	6.050
Effective electric power input	W	830	1.400	1.800	2.050	4.400
SFPint <sup>1</sup>	W(m <sup>3</sup> /s)	1.169	1.160	1.114	1.156	1.138
Face velocity at design flow rate	m/s	1,68	2,3	2,5	2,6	2,8
Nominal external pressure ( $\Delta P_{s,ext}$ ) <sup>1</sup>	Pa	200	200	200	200	200
Internal pressure drop of ventilation components ( $\Delta P_{s,int}$ )(ODA/EHA)	Pa	351 / 331	358 / 338	360 / 340	328 / 308	330 / 310
Internal pressure drop of non-ventilation components ( $\Delta P_{s,add}$ )(ODA/EHA)	Pa	There is no "non-ventilation" components				
Static efficiency of fans used in accordance with Regulation (EU) No. 327/2001 (Supply Fan/Exhaust Fan)	%	58,2 / 58,5	60 / 60,1	63 / 62,7	55,1 / 54,8	56,3 / 56
Declared maximum external leakage rate	%	Less than 3%				
Declared maximum internal leakage rate	%	Less than 3%				
Energy classification of the filters (Energy performance) <sup>2</sup> (Supply/Exhaust Air Side)	Kwh	510 / 430	755 / 652	1.283 / 1.122	1.500 / 1.314	1.668 / 1.468

<sup>1</sup> Measured at balanced flow, EN 308.

<sup>2</sup> Declared information about the calculated annual energy consumption.



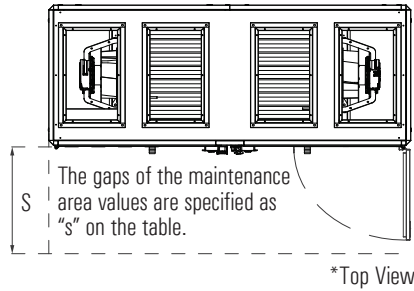
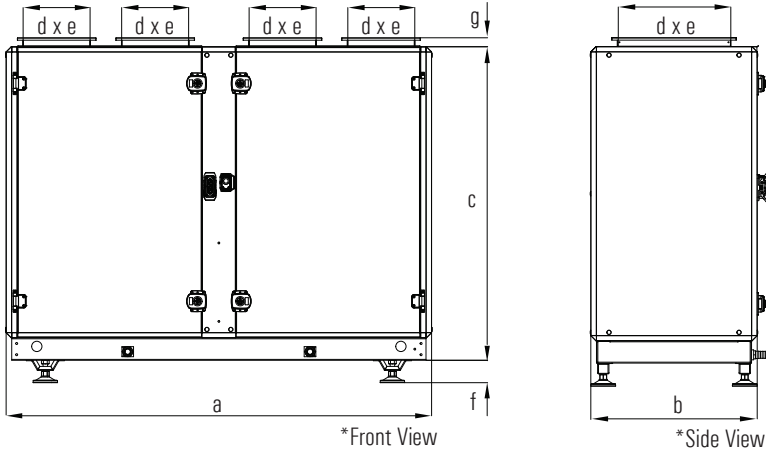
## PA - H Series Unit Dimensions



	PA - H 200	PA - H 300	PA - H 400	PA - H 500	PA - H 700
a	1.900	1.900	2.150	2.150	2.150
b	735	735	895	895	895
c	1.240	1.400	1.645	1.645	1.745
d x e	500 x 400	500 x 400	600 x 500	600 x 500	600 x 600
f	100	100	100	100	100
g	40	40	40	40	40
S	800	800	900	900	900
weight (kg)	275	305	420	425	485

\*All measurement values are in mm.

## PA - V Series Unit Dimensions



	PA - V 200	PA - V 300	PA - V 400	PA - V 500	PA - V 700
<b>a</b>	1.900	1.900	2.150	2.150	2.150
<b>b</b>	735	735	895	895	895
<b>c</b>	1.240	1.400	1.645	1.645	1.745
<b>d x e</b>	500 x 300	500 x 300	700 x 400	700 x 400	700 x 400
<b>f</b>	100	100	100	100	100
<b>g</b>	40	40	40	40	40
<b>S</b>	900	900	1.000	1.000	1.000
<b>weight (kg)</b>	275	305	420	425	485

\*All measurement values are in mm.

## Lifting Considerations

- Do not lift the unit when it is windy and while a personnel is working under the unit.
- Use lifting chain as shown below. Lifting chains must be capable of supporting the entire weight of the device.
- Lifting chains may not be the same length. Set lifting chains to balance the device.
- If possible, create a parallel loop straps to the air flow direction.
- For your safety, when unit is lifted up, you may use appropriate equipment method such as belts, straps.
- Determine center of gravity of unit and test it by lifting up about 500 mm. If lifting point is not appropriate, re-determine it to prevent falls. Not lifting the unit properly may cause serious injury even death.



Failure to follow the instructions above may cause damage of equipment, serious injury, or even death. Subassemblies and parts of unit are equipped as shipped from the factory.



Please place minimum 4 pipes into carrying holes which are located on the unit and affix them to the carrying handle then carry the units as it is shown in figure a.

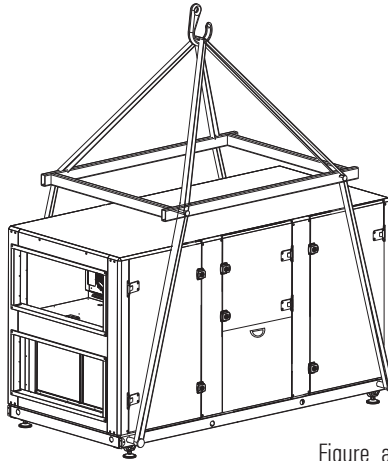


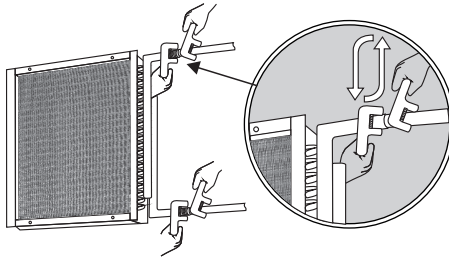
Figure a

## Assembly of Duct Connections

- Ductwork connections should be connected to the unit by flexible duct connectors. Air tightness should be maintained to achieve required air flow conditions. Incorrect ductwork connections can change airflow conditions.
- Make sure that duct connections are connected in correct way using suitable duct sizes. Incorrect assembly directly affects the airflow and sound level.
- Insulate the ductworks or use insulated ductworks.
- Do not allow use elbow joints greater than 90° along with ducting.
- Do not allow use different duct size other than stated in the project.
- Make sure that all ductwork connections are air tight.
- If the ductwork connections are passing through a metal surface wall or metal construction area, make sure that there is ground connection between duct and these surfaces.

## Coil Connections

- Use a double wrench while attaching piping to DX / Heating / Cooling coils to prevent damage. It can be damaged fragile copper pipe of the coils while using a single wrench. In this case, unit can be damaged seriously.
- The pipes of coils must be supported separately and insulated thermally.
- Coils, filters and drop eliminators are demounted carefully while connecting piping to coils.
- Please check whether or not to crush on the heat exchanger surface.
- Please check the drainage system is available.



Use counter-holding for the connection!


## Drainage Connections

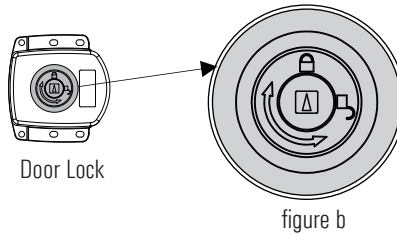
- If there is more than one drain pan, mount siphon to each individual section.
- Never connect the drain pan outlet to drain system without siphon.
- Using only one siphon for all drainage connected to common line may cause overflow in the condensation pan. Avoid applications prevent the flow of water in the drain line.
- Drain line should never be on higher level than the condensate pan.

## Air Dampers

- Please make sure that the damper flaps are in the closed position in case of power failure during operation. Observe whether all damper flaps are in positions suitable for the unit operating principle or not.
- Check that all damper flaps move easily or not.
- Be careful that the damper motor does not force the damper further than the open and fully closed positions. Duct load should never place on dampers.

## Unit Service Door

- Service doors of the unit are designed to prevent air leakage and to interfere with the unit components. Be careful that the unit doors are locked correctly to make sure there is no air leakage.
- Make sure that the unit doors are locked by inserting the lock key in the middle of the door lock and turning it in the direction of  in figure b.



## Inner Casing

- The inner surface of the unit consists of corrosion-resistant galvanized / stainless steel. Also, cleaning and disinfection is easy because the inner surface of the unit is smooth.
- The galvanized steel design prevents oxidation of the inner surface of the unit caused by humidity or condensation in the air.
- The inner surface of the unit is resistant to disinfectant and similar applications.
- By applying mastic sealant to the gaps at the panel profile joints of the unit, sealing is increased, and dust and dirt accumulation is prevented.

## Drop Eliminator

For the drop eliminator to perform its function, it must be checked whether the position is suitable for the airflow direction or not. Check whether the drop eliminator moves smoothly on the slide mechanism. Check whether there is a gap between the drop eliminator outlet and the drain pan.



Please find in the table below the basic problems that you may encounter with the unit and their solutions.

Problem	Control
Unit doesn't work.	<ul style="list-style-type: none"> <li>- Make sure there is energy in the power supply and the main switch on the unit panel is turned on.</li> <li>- Make sure the fan connectors are plugged in emergency stop may be pressed, please check.</li> <li>- Fire alarm might be working, please check.</li> <li>- If the device is in auto mode, the time program may not have been made, set the time program.</li> </ul>
Air flow is not enough.	<ul style="list-style-type: none"> <li>- Make sure that the air dampers installed in the unit or air ducts are open.</li> <li>- Check the duct pressure. If there is a higher pressure loss than specified in the project, the fan or motor may be inadequate.</li> <li>- Check the fan rotation direction.</li> <li>- Check whether the filters are extremely dirty or clogged.</li> <li>- Remove any air leaks from the unit's casing or air ducts.</li> </ul>
There is odor in the environment.	<ul style="list-style-type: none"> <li>- Check whether there is enough level of water in the drainage line.</li> <li>- Make sure the drainage line is not connected directly to the sewage line.</li> <li>- Make sure the filters has been replaced on time.</li> <li>- Make sure inside the unit and ducts are clean.</li> </ul>
Although filter is not full, there is a filter full alert appears.	<ul style="list-style-type: none"> <li>- Check the inlet-outlet hoses of the differential pressure switch. (Hoses may be disconnected, crushed, or torn)</li> </ul>
Sensors differ from what they should be and show instant variability.	<ul style="list-style-type: none"> <li>- Interference may have occurred. Check the unit grounding line. The grounding line may be poor or the ground connection may not be exist. Reinforce the grounding.</li> </ul>

Problem	Control
<p>Unit works noisy.</p>	<ul style="list-style-type: none"> <li>- The air flow may be higher than it should be. Measure the flow and adjust the flow to the appropriate values.</li> <li>- Make sure that the duct sections and conduits are selected according to the air velocity.</li> <li>- Make sure that the fan blade does not rub against the suction nozzle or any surrounding parts. Check the fan balance.</li> <li>- Make sure that the fixing bolts of the fan-motor system are not loose and that the vibration pads work.</li> <li>- Check that the components(exchanger, coil box, filter, damper etc.) inside the device sit vibratively and do not shake.</li> <li>- Make sure that the channels plugged into the unit input-output do not cause sudden contraction and expansion. Use transition channels with an appropriate angle.</li> </ul>
<p>Heating and cooling of the unit has poor performance.</p>	<ul style="list-style-type: none"> <li>- Check the dirtiness of the filter and internal equipment (coils).</li> <li>- Check that the fluid regime from cold and hot fluid providers complies with the project design requirements.</li> <li>- There may not be enough fluid in the cold and hot water battery. The inlet water strainer may be clogged. The control valve motor may be installed loose or locked / malfunction. Please check.</li> <li>- Check for air leaks on the device or in the duct system.</li> <li>- Check the duct insulation and conduit designs. Check the unit blowing temperature.</li> <li>- If the unit has a rotor, make sure that the rotor is working. Even if it is working information, check it visually. The strap may be broken.</li> </ul>

Unit Model	Unit Voltage (V)	Unit Power Input (kW)	Current (A)	Fuse (A)	Cable Cross-Section (mm <sup>2</sup> ) for 50 m and PF=0.8
<b>PA - H / PA - V</b>					
<b>200</b>	400	1,04	4,8	3 x 6	2,5
<b>300</b>	400	2,24	3,6	3 x 4	2,5
<b>400</b>	400	2,24	3,6	3 x 4	2,5
<b>500</b>	400	6,14	9,6	3 x 10	2,5
<b>700</b>	400	5,84	9,2	3 x 10	2,5

## Cable Cross-Section Formulas

**1**

$$I_{\text{current}} = \frac{P}{\sqrt{3} \times U \times \text{Cos}\Omega}$$

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

**2**

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

$\%e = \%3$

**3**

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

Cable Cross-Section  $S = \text{Max}(S1, S2, S3, 1,5 \text{ mm}^2)$

\* It is suitable for units with 400V supply voltage.

**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** : 5,68 kW      **L** : 50 m  
**U** : 400V      **%e** : %3  
**PF**: CosΩ : 0,8      **k** : 56 m / Ω

**1**

$$I_{\text{current}} = \frac{5.680 \text{ W}}{\sqrt{3} \times 400 \times 0,8} = 10,25 \text{ A}$$

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 "Icurrent" value.

$S1 = 1,5 \text{ mm}^2$

**2**

$\%e = \%3$

$$S = \frac{100 \times 5.680 \times 50}{56 \times 3 \times 400^2}$$

$S2 \geq 1 \text{ mm}^2$

$S2 = 1 \text{ mm}^2$

**3**

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

$I_{\text{cable}} > 16 \text{ A} \geq 10,25 \text{ A}$

"I fuse" which will be higher than "Icurrent", 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.

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

$S3 = 1,5 \text{ mm}^2$

Cable cross-section  $S = \text{Max}(S1, S2, S3, 1,5 \text{ mm}^2)$

$S = \text{Max}(1,5, 1,5, 1,5, 1,5)$

$S = 1,5 \text{ mm}^2$



## Cable Cross-Section Formulas

**1**

$$I_{\text{current}} = \frac{P}{U \times \cos\Omega}$$

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

**2**

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

$$\%e = \%3$$

**3**

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

$$\text{Cable Cross-Section } S = \text{Max} (S1, S2, S3, 1,5 \text{ mm}^2)$$

\* It is suitable for units with 230V supply voltage.

**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** : 1,5 kW

**L** : 50 m

**U** : 230V

**%e**: %3

**PF: CosΩ** : 0,8

**k** : 56 m / Ω

**1**

$$I_{\text{current}} = \frac{1.500 \text{ W}}{230 \times 0,8} = 8,15 \text{ A}$$

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<sub>current</sub>" value.

$$S1 = 1,5 \text{ mm}^2$$

**2**

$$\%e = \%3$$

$$S = \frac{100 \times 1.500 \times 50}{56 \times 3 \times 230^2} = 0,84 \text{ mm}^2$$

$$S2 \geq 1 \text{ mm}^2$$

$$S2 = 1 \text{ mm}^2$$

**3**

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

$$I_{\text{cable}} > 10A \geq 8,15A$$

"I<sub>fuse</sub>" which will be higher than "I<sub>current</sub>", 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<sub>fuse</sub>" value.

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

$$S3 = 1,5 \text{ mm}^2$$

$$\text{Cable cross-section } S = \text{Max} (S1, S2, S3, 1,5 \text{ mm}^2)$$

$$S = \text{Max} (1,5, 1, 1,5, 1,5)$$

$$S = 1,5 \text{ mm}^2$$



TURN OFF all the power switches before the maintenance is performed.

Do not operate the system without the air filter to protect the components of the unit against being clogged.



Please, read the instructions carefully on this manual before operating the system.

## Filter Maintenance

### To clean up G class filters;

- Turn off the unit.
- Remove dirty filters.
- Use a vacuum cleaner to clean the dust from the air filter.
- Place the filters in the filter slots.
- Close the service cover and be sure it is closed tightly.

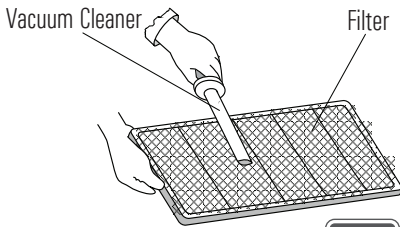
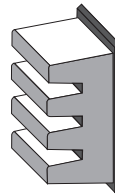


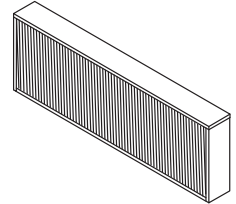
Figure-1

### To clean up F/M class filters;

- Turn off the unit.
- Remove dirty filters.
- Place new bag filters in the filter slots.
- Close the service cover and be sure it is closed tightly.



F Class Filter



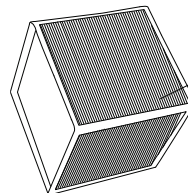
M Class Filter

Figure-2

## Heat Exchanger

### For units with aluminum plate heat exchanger;

- Clean heat exchanger with warm water or vapor.
- If necessary, use warm water with natural detergent or soap powder to remove dirt.
- After cleaning, leave the heat exchanger to dry before placing them back in the unit.
- Be sure the screws of service cover are tightened securely and heat exchanger cannot fall out of its slots.

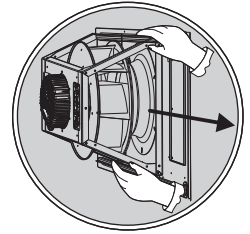


Aluminium Plate  
Heat Recovery Exchanger

Figure-3

## Fan Maintenance

- Turn off the power of the unit.
- Remove the fan out of the unit carefully.
- Clean the fan with vacuum cleaner.
- Clean the dirty areas of the fan with warm water with natural detergent or soap powder.
- Dry wet surfaces to prevent corrosion on metal surfaces.
- Place cleaned fan in the slots.



Fan Module

## Coils (Heating / Cooling / DX)

- It should be checked once every 6 months whether there is any dust accumulation and leakage (leakage) on the air inlet side of the coils.
- In the return section of the coils, water condensation can be seen. It must be checked if the condensate drain is working or not.
- If water freezes in the pipes inside the battery, the pipes will be seriously damaged. Therefore, if there is a danger of freezing in the battery, antifreeze should be added to the circulation water or partial water circulation should be provided in the pipes if the battery will not be operated for a short time.
- If there is serious contamination in the coils, the coil parts should have disassembled and cleaned with compressed air or water in the opposite direction of the air flow.

## Service Doors

- All unit service doors have leakproof gaskets.
- Make sure that there are leakproof gaskets on unit service doors.
- Always replace when the leakproof gaskets are worn or damaged.

## Drop Eliminator

- Droplet Eliminator is made of galvanized coated steel / stainless steel and can be completely withdrawn and disassembled. For easy cleaning it is possible to take out all blades by pulling out.

## Maintenance Period

### Every year;

- Paint the exterior surface of casing to prevent corrosion on metal surfaces of the unit.
- Clean fan propeller and fan shaft of the fan.
- If the unit has drain pan, check and clean the drain pan.
- If the unit has damper, check the connection of damper, set screw and rigging.
- Check all electrical connections and isolation.
- Check if there is any damaged cable connections.
- Check if there is any damaged on all gaskets around door and buffer. Check the situation of all isolation materials.
- Check all connections to prevent fracture and leakage, and if there is any repair it.

### Every 3-6 months;

- Clean or change clogged or dirty filters. If the pressure drop of a bag filter is higher than 200 Pa, change the bag filter.
- Check all electrical connections.
- Check the accumulated dirt on coils. If the unit has damper, clean damper and its components.



Clean up the heat exchanger more than once per year.



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