



HYBRICOOL FLAT-V

Installation Operation Manual

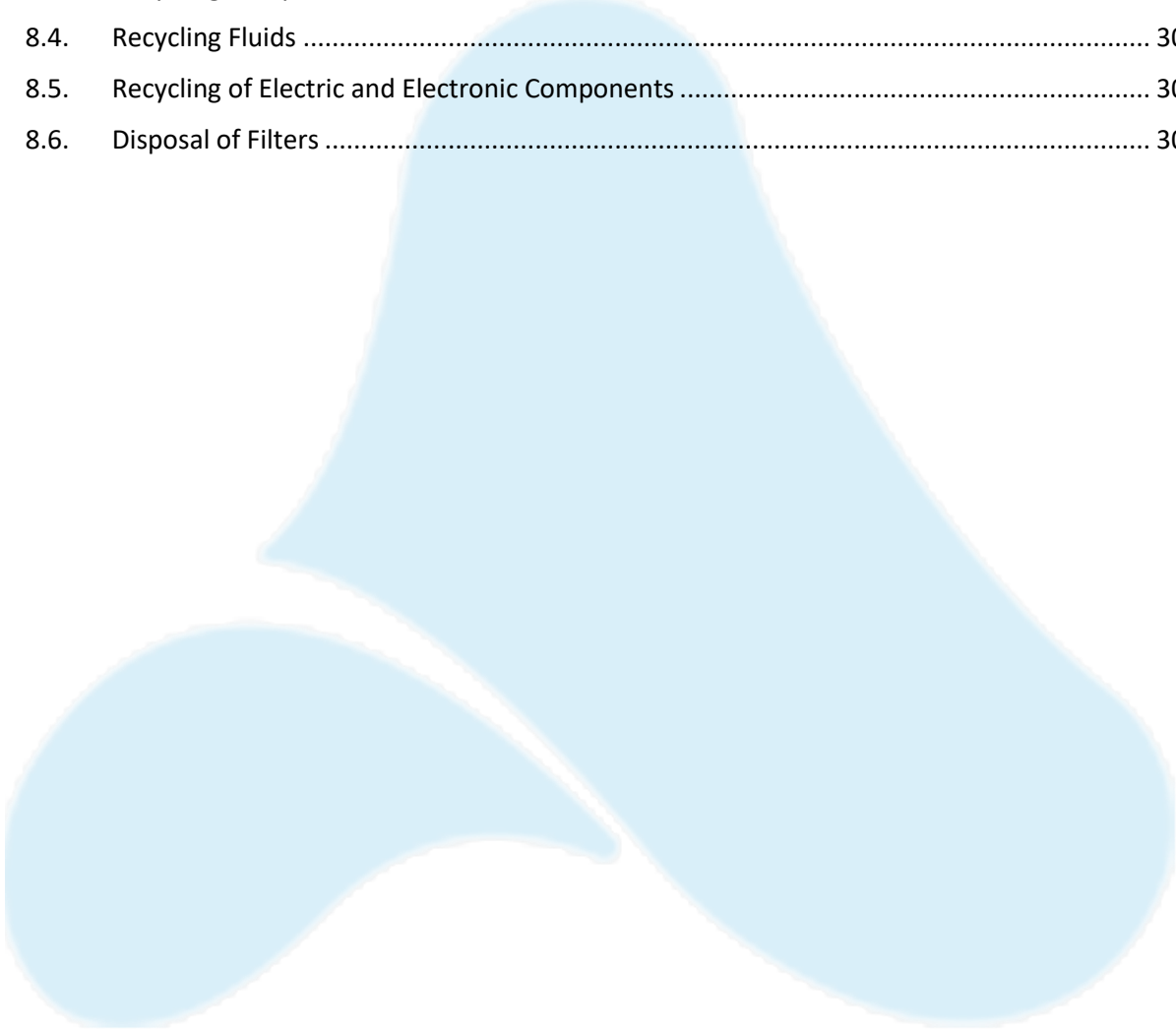


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FOREWORD

AIOLOS AIR HybriCool Flat-V vertical type air conditioning units with 100% fresh air and adiabatic cooling system are used in the areas such as classrooms, offices, cafes, shops, common and individual living areas by supplying 100% fresh air and by this way make the areas, where it is used healthier and more comfortable.

Cooling the air is a process that requires much more costs and hardware compared to heating. At this point HybriCool Flat-V vertical type air conditioning units with 100% fresh air and adiabatic cooling system cool the outside air by using the evaporation energy of water. This process reduces additional costs, equipment for air conditioning and brings the initial investment and operation cost significantly down.

HybriCool Flat-V vertical type air conditioning units can adapt itself to every kind of environments by providing a wide range of solutions in accordance with the use and purposes. In addition to natural cooling, an integrated compressor, condenser, and evaporator can meet the indoor cooling requirements with cooling and heating with heat pump without any additional equipment by supplying 100% fresh air in the area, where it is used. It is also possible to use HybriCool Flat-V unit by adding chilled water coil (CWC) and / or hot water coil (HWC) in areas, where a central cooling and / or hot water supply are provided. AIOLOS AIR HybriCool Flat-V Air Conditioning Unit is proposed to provide the most appropriate solution to your use and location, standard equipment are as follows:

- On the fresh air side G2 (ISO Coarse) Filter + F7 (ISO ePM1) Filter
- Proportional speed-controlled EC Fans
- Adiabatic cooling system
- MCC panel, factory mounted automation hardware
- Communication with building automation system via BACnet MS/TP, Modbus RTU

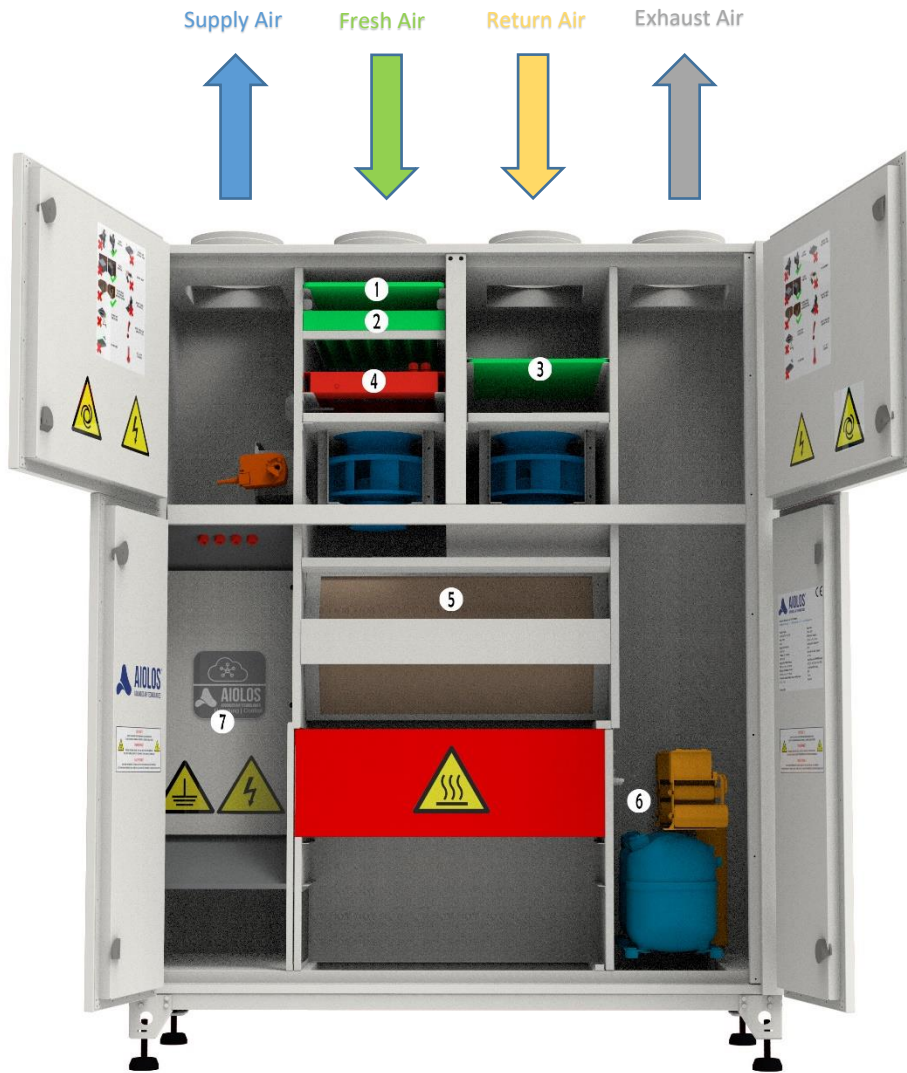
Optional equipment are as follows:

- Cooling and/or heating with integrated DX compressor, condenser, and evaporator
- Electrical heater
- Chilled water coil (CWC)
- Hot water coil (HWC)
- Compact water softening unit

HybriCool Flat-V vertical type air conditioning unit with adiabatic cooling can be controlled and managed via its independent software with help of well positioned internal sensors and via room controller. In addition, all to this, pollution status of filters to be seen, daily, weekly time schedule can be done.

We bring together the solutions of the 21st century varying and developing ventilation and energy efficiency needs more efficiently with less energy. As AIOLOS AIR family, we appreciate you preferring us.

HYBRICOOL FLAT-V BASIC EQUIPMENTS



Part Number	Description
1	Fresh Air G2 (ISO Coarse) Filter
2	F7 (ePM ₁) Compact Filter
3	Return Air G2 (ISO Coarse) Filter
4	Preheater
5	Heat Exchanger
6	Compressor system
7	Automation Panel

HYBRICOOL FLAT-V AIR CONDITIONING UNIT TECHNICAL SPECIFICATIONS

HybriCool Flat-V Models	HF-V 10
Air Volume (m ³ /h)	1000
Out of Unit Static Pressure (Pa) @Nominal Air Volume	300
EER Adiabatic Modul (kW/kW)	6,5
EER Adiabatic + DX (kW/kW)	3,8
Adiabatic System Summer Operation Data	
Air Entrance Temperature (°C)	35
Air Outlet Temperature (°C)	21,1
Cooling Capacity (kW)	4,8
Water Consumption (l/h)	3
Water Supply (l/h)	6
Heat Recovery Heat Exchanger Winter Operation Data	
Air Entrance Temperature (°C)	-3
Air Outlet Temperature (°C)	16,9
HR Capacity (kW)	7
HR Heat Exchanger Efficiency (%)	82
Filtering	
Pre-Filtering	G2 ISO Coarse
Final Filtering	F7 ISO ePm ₁ %50
Integrated DX Cooling	
Compressor Type	Hermetic
Cooling Refrigerant	R 134a
Cooling Capacity (kW)	7,2
Air Outlet Temperature (°C)	14
Condenser, Evaporator Cooling Water Supply (l/h)	6
Electrical Specifications	
Fan Motor Power (kW) x Pieces (with Cooling)	0,78 x 2
Fan Motor Power (kW) x Pieces (Only HR)	0,50 x 2
Fan Power Consumption (kW) @ 0 Pa	0,37
Compressor Power Consumption (kW)	2,37
Electrical Power Supply	230V / 1PH @50 Hz
Control	24V AC
Operation Conditions and Dimensions	
Operation Temperature Range (°C)	-20 - +50
Operation Humidity Range (R.H.)	%10 - %90
Width x Length x Height (mm)	1600x600x1981

Note: AiolosAir A.Ş. reserves the right all the values in the table to make a change without information. Technical specifications of HybriCool Flat-V unit can vary according to usage conditions. Please confirm the specifications of the product you have ordered from AiolosAir A.Ş.

1. SECURITY PRECAUTIONS

1.1. General

HybriCool Flat-V air conditioning units with adiabatic cooling system are manufactured and assembled by following AiolosAir quality directives. To ensure the safe operation and use of the unit, please read this document carefully and follow the instructions and consider the alerts on this unit. Any changes in the design and / or assembly of HybriCool Flat-V air conditioning unit without giving an information to AiolosAir or written permission of AiolosAir will eliminate the warranty and the one who makes the change will be responsible from any possible damages.

1.2. Applications

HybriCool Flat-V Air Conditioning Unit is designed for the purpose of conditioning and directing air unless the project is decided in the projecting phase.

1.3. Warning Labels

Electric Voltage



These labels indicate that there is a dangerous electrical current, which may be dangerous for the user or installer behind these access doors, covers or panels. Only the authorised personnel should be allowed to work on these parts. These labels can be found on the control panel of electric heater.

Lifting Place



These labels show the points of unit to be lifted by a crane. The unit must be connected to crane with a rope, which passes under the wooden pallet. If the unit is desired to be lifted or carried with a forklift, hand forklift or pallet jack under the wooden pallet.

Grounding



This label shows the connection points, from which the unit must be grounded and located on the electric panel.

- It is necessary to ground the electrical parts in the air conditioning unit.

- The electrical assembly of the unit must be connected to each other according to national standards, where the unit to be used.

Rotating Components



This label indicates that there is a rotating component behind the access door, cover or panel, which may cause an injury. Fan section is indicated by this label.

Hot Surfaces



This label shows that there are hot surfaces behind these access covers, doors, or panels, which may cause to heavy burns if any contact occurs.

Some equipment, such as steam humidifiers, vapour coil, electrical heater and compressor's surface, copper piping line to the condenser with the models with compressor may have hot surfaces. If there is a component with hot surface behind any access covers, doors, or panels, so have a potential risk is marked by this label.

Fan Cell Access Door



This label is found on the fan section's door or cover and explains, that before opening the access door, cover of the fan cell, minimum two minutes before the power should be cut off.

Notice: All access doors, covers or panels must be closed before the unit is activated.

Product Label



On this label the information about the unit and its order are written. This label is generally found on the fan section access door or on unit, where easy to see.

Lifting and Transportation



A label, which shows how to lift, and transport will be done, is found on the cover of air conditioning unit. Detailed information about this section is described on the following capital. Packaging materials should be discarded in accordance with the relevant regulations.

2. Transportation and Lifting Directives

2.1. General

Transportation and lifting of the HybriCool Flat-V air conditioning unit must always be carried out in accordance with the instructions below. Failure to follow these instructions may cause irreparable damage to the device and endanger the lives of people in the vicinity of the device. AiolosAir does not assume any liability for the consequences resulting from failure to comply with these instructions.

Carrying and transportation activities should be carried out by expert personnel. Lifting must be carried out in accordance with the relevant regulations using certified lifting equipment.

2.2. Transportation and Storage

Air conditioning units should only be lifted by using the specified lifting methods. In according to the lifting conditions if it is unable to lift it up, the unit

can be lifted with a pallet jack, hand forklift or a crane by passing through under the wooden pallet, which is located under the unit's foot. The carrying and lifting are only allowed, when the required instruction, which are described in chapter 2.4 are followed. This situation is also valid for the storage and marked by a warning label.



Lifting by hand forklift



Carrying by pallet jack



Lifting and carrying by forklift

Units are shipped to the field in one piece. If the protective packaging on the units is removed, dirt may enter the parts of the unit.

Necessary precautions should be taken in the construction site environment and protective packaging should not be removed until the units are installed.

Filters of units waiting outside for a long time lose their properties in case of exposure to the sun. For this, the filters should be stored in the shade and in places free from moisture.

2.3. Carrying and Lifting

Air conditioning units are manufactured as a single, independently of considering the required size from worksite and transported to the field. Before starting the transportation and installation of the unit, be sure to review the documents containing the dimensions, weights, and assembly sequence of the unit.

The weight for each transport segment is given on the unit. The points to be used for transportation are marked with the relevant labels on the body.

The following method is recommended for vertical lifting and moving of the air conditioning unit:

Application

Slip the carrying rope through the wooden pallet, which is under the unit and connect rope to crane, then lift it up. Take the necessary precautions to avoid damages on unit.



Lifting by crane

Note: For all uninstalling methods, make sure that the load is balanced during lifting.

2.4. Horizontal Carrying

For horizontal transportation of unit, a suitable forklift, hand forklift or pallet jack can be used in accordance with the instructions. **FOR THE HORIZONTAL CARRYING ALWAYS LIFT WITH SUITABLE TRANSPORTATION VEICLE BY IT'S FORKS ARE PASSING THROUGH THE WIDTH OF UNIT ACCORDING TO THE WARNING SIGNS.**

The following method is recommended for horizontal lifting and moving of the air conditioning unit:

Application

The forks of lifting vehicle should pass through the wooden pallet and by this way unit can be carefully and balanced done. Lifting and carrying work should be carried out by experts. **AIOLOS AIR IS NOT RESPONSIBLE FOR DAMAGES OR INJURIES CAUSED BY NON-SPECIALIST PERSONNEL OR CAUSED BY AN INCORRECT FORKLIFT SELECTION.**



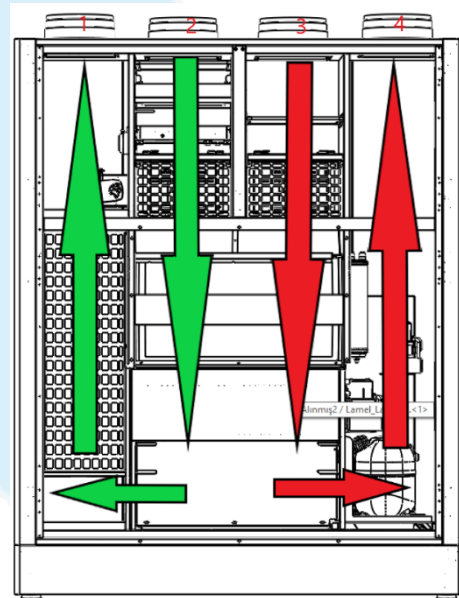
Carrying by pallet jack

Note: The forklift must be selected in accordance with the weight and dimensions of the air conditioning unit.

3. MOUNTING INSTRUCTIONS

3.1. General

The Area, where HybriCool Flat-V unit is going to be mounted, has been considered as an indoor, so the floor should carry the weight of unit, ventilation duct system should be installed properly and drain precautions should be also taken. The ground concrete body must be made smoothly and, in the scales, to prevent a problem while the operation of the unit.



- | | | | |
|---|-------------------|---|--------------------|
| 1 | Supply Air Outlet | 3 | Return Air Inlet |
| 2 | Fresh Air Inlet | 4 | Exhaust Air Outlet |

3.2. Security

This Section provides an overview of all important safety aspects for protection against person.

Power Cable

- Do not lay nearby any heater.
- Do not put under any heavy objects, which might change the cross section of power cable.
- Use the given voltage, otherwise it may lead to fire and electric strike.

- Do not use device, if power plug or power cable is damaged.
- Before maintenance cut the electricity of device.

Intended Usage

- Intended use also includes compliance with all information in this manual.
- Any use that goes beyond the intended use or that is different counts as misuse.
- Any modification to the device or the use of non-original spare parts will void the warranty and the manufacturer's liability.

Operation Limitations

Operation voltage 230V 50 Hz
Operation Current On the Product Label

Data	Value
Environment Temperature (°C)	5 to +30
Relative Humidity (%)	10 to 90
Air Intake Temperature (°C)	-20 to +50

Electric Current Hazards



DANGER!

Danger of death through electric current

Any contact with live parts poses an intermediate risk of fatal injury from electric shock. Damage to the insulation or individual components can be fatal.

- Only authorised electricians are allowed to work with electrical components.
- Any damages to the insulation of power supply must be repaired immediately.
- Keep away humidity from live parts. It may cause short circuit.
- Must be grounded properly.

Transportation, Storage and Packaging

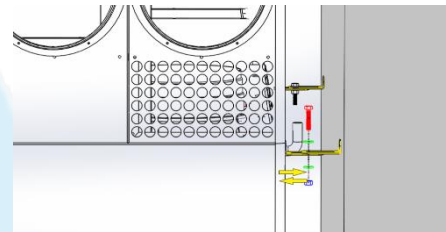
Air conditioning units should only be lifted by using the specified lifting methods. According to the lifting conditions if it is unable to lift it up, the unit can be lifted with a pallet jack, hand forklift or a crane by passing through under the wooden pallet, which is located under the unit's foot. The carrying and lifting are only allowed, when the required instructions, as described in the second chapter **under Transportation and Lifting Directives** are followed. This situation is also valid for the storage and marked by a warning label.

Units are shipped to the field in one piece. If the protective packaging on the units is removed, dirt may enter the parts of unit. Necessary precautions should be taken in the construction

site environment and protective packaging should not be removed until units are installed. If unit's filters are waiting outside for a long time, they lose their properties in case of exposure to the sun. For this, filters should be stored in the shadow and inner places free from moisture.

3.3. Mounting Steps

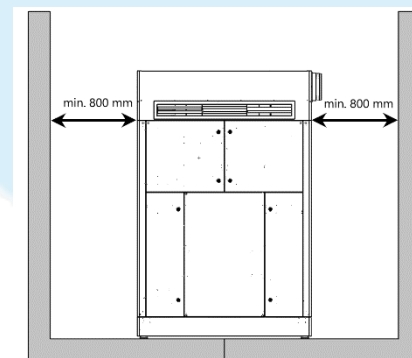
Fixing to Wall



In order to a proper mounting of unit, installation's process has to follow these steps:

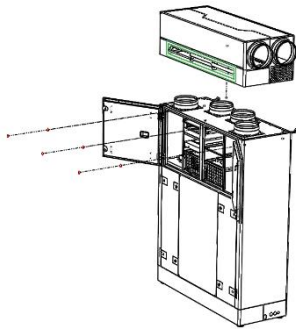
1. Stand the unit in front of the wall, where it is going to be fixed.
2. Adjust the height of unit by turning feet.
3. Mount wall fixing part to wall (above yellow parts)
4. Adjust the required distance from wall by moving unit with wall fixing parts (down yellow parts)
5. Fix these yellow parts to each other by using two M8x20 hex headed bolts with four rings and two hex headed nuts for each unit.

Distance from Side Walls



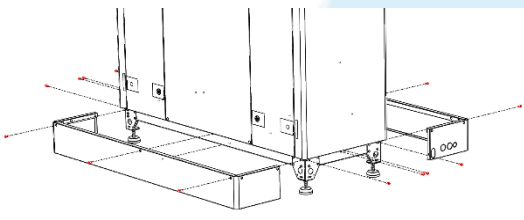
Recommended minimum distance from the inner surface of wall

Plenum Box Installation

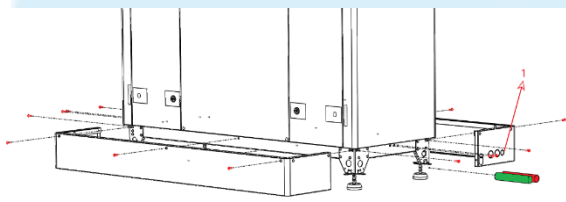


1. Apply gasket to the connection surfaces to prevent air leakage.
2. Place plenum box onto the unit.
3. Use six pieces of M6x20 socket head cap screws for fixing plenum box to unit.

Base Plate Installation



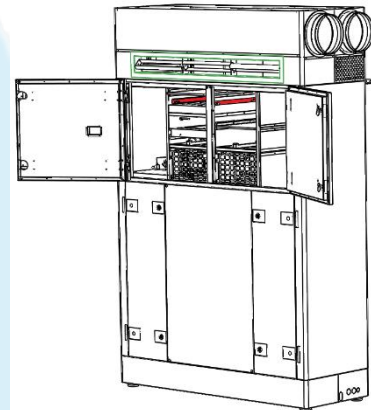
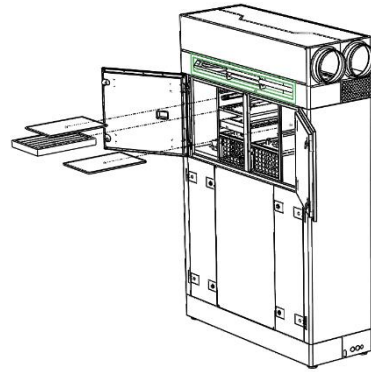
1. Adjust the unit's height
2. Place front and back plates and mount them with 14 pieces of M6x20 pan cross headed screws
3. At the same time install the drainage from left of right side of the unit.



1. Green pipe indicates IEC water supply.
2. Red pipe indicates drainage outlet.

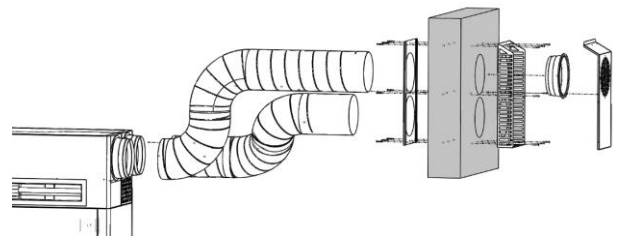
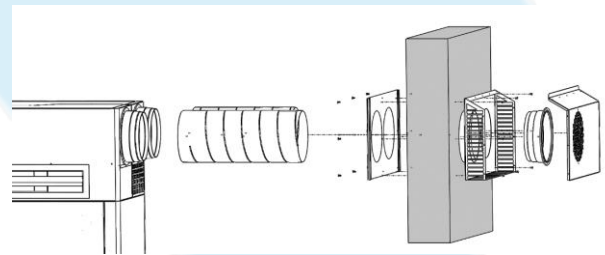
Note: The opening, which is shown by 1 is an option for electrical connection from bottom.

Filter Installation



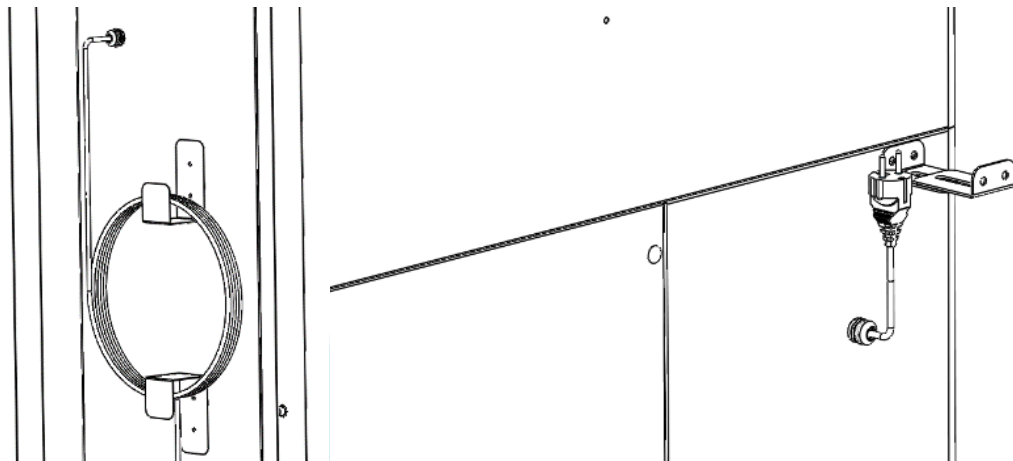
1. Check filters for the correct type and size
2. Place thin filters (G2 ISO Coarse) and thick filters (F7 ePM₁) as shown
3. To lock F7 filter push red locking plates down. Vice versa is applied to remove F7 filter safely.

Vertical and Horizontal Louver Installation



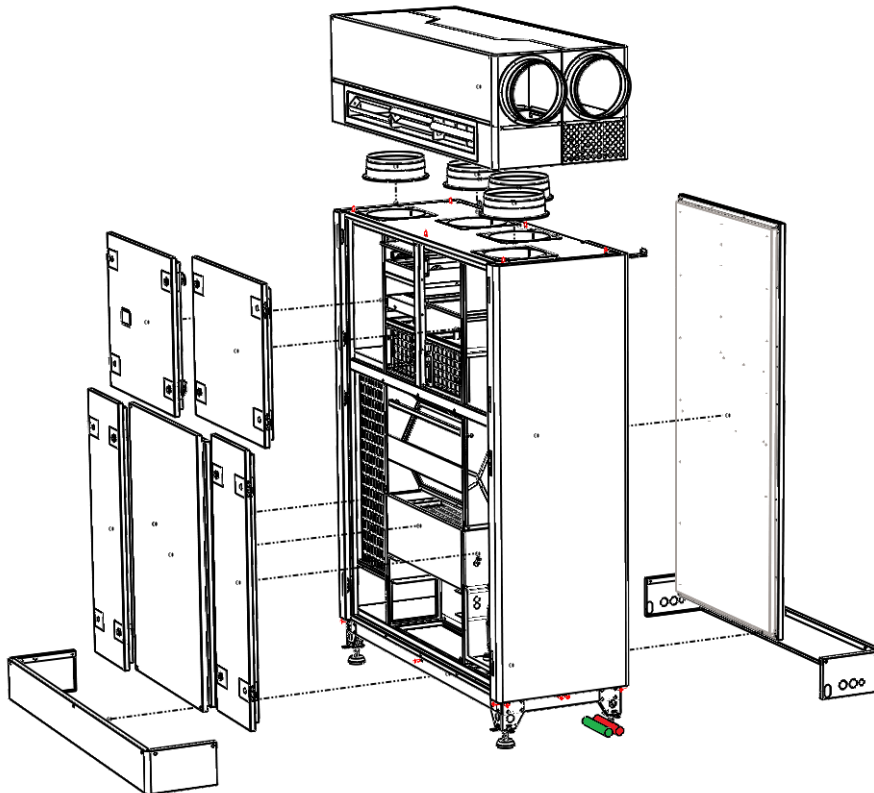
1. Use Ø250 mm flex duct
2. Open holes in the wall
3. Place and fix indoor and outdoor mounting plates as shown
4. Connect and fix flex duct with sleeve
5. Protect outside plate with cover and fix

Connection with Power Supply



1. Make sure all other connections and mountings are correctly and safely done.
2. 5-meter-long power cable is already placed inside the unit.
3. Take the power cable of unit and plug it in to the nearest 230V 50Hz power supply.

3.4. Exploded View



4. COMMISSIONING CHECKLIST

4.1. Checklist

General information about the planning required for commissioning the air conditioning unit is given in the table below. Details about each part of this table will be given on the following pages.

ATTENTION!

Before starting the air conditioning unit, make sure that all parts have the correct electrical voltage and make the connections in accordance with the relevant regulations. The door and access / conservation covers should be closed, the air conditioning unit should be grounded.

4.2. Commissioning Checkpoints

FUNCTION	COMPONENTS	CHECKPOINTS	STATUS
General			
Indoor Unit Assembly			
	Inner and Outer Panels	Damage	
	Connections	Connection according to regulation	
Outdoor Unit Assembly			
	Door/Access and Enclosure Covers	Damage / Must be closed before operation	
	Grounding	Connection according to regulation	
Dampers			
		Proper assembly	
	Damper Actuator	Proper assembly	
Filters			
		Correct filter type and size	
		Deformation on surface	
	Pressure Differential Sensor / Switch	Smooth operation / Automation connection	
Heaters			
		Leakage	
		Freezing thermostat operation	
	Hot Water coil	Correct assembly	
	Motorised Valve	Correct assembly Correct automation connection	
	Electric Heater	Correct connection / Safety equipment	
	Steam Humidifier	Correct connection / safety equipment	
Coolers			
		Leakage	
	Chilled Water Coil	Correct assembly	
	Motorised Valve	Correct assembly Correct automation connection	
	Drift Eliminator	Proper placement	
	Drainage	Correct connection	
Adiabatic Cooling system			
		Damage	
		Leakage	
	Nozzle	Congestion	
	Solenoid Valve	Correct automation connection Leakage Damage	
	Water Supply	Softened water	
Fan			
		Damage	
		Correct electric connection	

		Grounding	
		Correct automation connection	
		Correct rotating direction	
Compressor			
		Damage	
		Leakage	
		Correct automation connection	
		Proper gas charge pressure and control	
Condenser			
		Damage	
		Leakage	
		Correct assembly	
Evaporatör			
		Damage	
		Leakage	
		Correct assembly	
Control Panel			
		Correct automation connection	
	Sensors	Accurate measurement control	
		Correct automation connection	
Electric Panel			
		Compliant connection with regulations	
		Grounding	
	Maintenance Switch	Correct connection	
		Function test	

5. COMMISSIONING AND OPERATION INSTRUCTIONS

5.1. Casing

Order code, unit type, serial number, etc. The label containing the unit information is located on an easily visible place on the unit. In this way, the customer can easily read the unit information.



Aiolos Air Hava Soğutma Sistemleri A.Ş.
 İstanbul / Turkey
info@aiolosair.com
www.aiolosair.com



Ürün Kodu / Product Type :
 HBRICOOLFLAT-V
 Üretim Yılı / Min. Year :
 2018
 Ventilasyon Motor Gücü / Supply Air Volume :
 130 m³/h
 Aspirasyon Motor Gücü / Exhaust Air Volume :
 130 m³/h
 Ventilasyon Motor Gücü / Supply Fan Motor Power :
 130 W x 2 Ad. (2 Motor)
 Aspirasyon Motor Gücü / Exhaust Fan Motor Power :
 130 W x 2 Ad. (2 Motor)
 Akışkanlı Kontrol Üstünlüğüne Başvuru / Adilbattı Modeli/Water Flow and Pressure :
 12 l/h - 7 bar
 Üretim Yeri / Production Place :
 Marmar in Turkey

Seri No. / Serial No :
 100000001
 Elektrik Bağ. / Main Elec. Supply :
 220 V, 50 Hz, 1 Phase
 Akışkanlı Kontrol Üstünlüğüne Başvuru / Adilbattı Modeli/Water Flow and Pressure :
 12 l/h - 7 bar
 Üretim Yeri / Production Place :
 Marmar in Turkey

5.2. Body Panels

Check the panels of the air conditioning units for damage. If there is, remove any dirt and stains from the surfaces and eliminate the possibility of damage in the long term. Check the sealing gaskets on the unit, if any, and repair if necessary.

5.3. Door, Access and Enclosure Covers

In addition to the door handle and locks, check the overall operation of the nut and rivet system, and then determine whether the hinges and movement mechanisms are moving properly.

5.4. Grounding

Make sure that the air conditioning unit is properly grounded and in accordance with the relevant regulations. There is a label on the body or the electrical panel indicating the grounding location of the unit.

5.5. Air Conditioning Unit

Installation and Connection

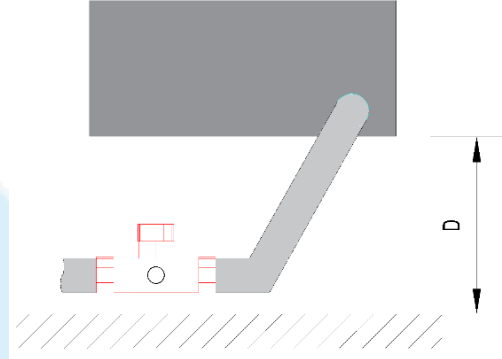
Since the room where the air conditioning unit will be installed is a wet place, it should be kept in mind that the floor should be waterproof and drainage measures should be taken. To avoid any problem in the operation of the unit, the concrete base of the device should be made smooth and in balance.

5.6. Drainage

A drainage system should be used at the drain outlet of the unit to ensure a constant flow of water from the drainpipe of the air conditioning unit.

Proper drainage application is important in order to avoid air suction or leakage from the drain to the unit and to discharge water inside the unit without

overflowing. In drainage dimensions, the static pressure in the area where the drainage will be applied should be taken into account. **AIOLOSAIR IS NOT RESPONSIBLE FOR FAILURES CAUSED BY WRONG DRAINAGE USAGE.**

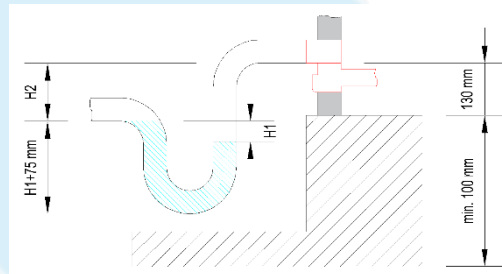


Negative pressure drainage

At the pipe outlet of the condensation pan, the minimum distance from the lower point of the pipe to the floor, D [mm] is calculated with the following formula:

$$D \geq \frac{|P|}{10} + 50 \text{ [mm]}$$

P [Pa]: It is the negative pressure in the device and the pressure value here should be used within the absolute value.



Positive pressure drainage application

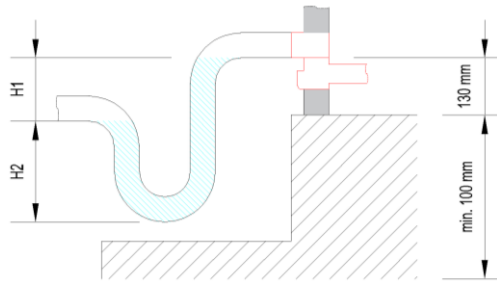
P [Pa]: It is the maximum pressure in the cooling coil and H1 is calculated by the following formula:

$$H1 \geq \frac{|P|}{10} + 50 \text{ [mm]}$$

H2= 50 mm

The inside of the positive pressure drainage must be filled with water before the device is put into operation, and the negative pressure drainage can only be used in negative pressure drainage outlets.

If negative pressure drainage is not supplied from the factory should be made according to the figure below.



U-shaped negative pressure drainage application

P [Pa]: It is the maximum pressure in the cooling coil.
 H1 and H2 are calculated by the following formulas:

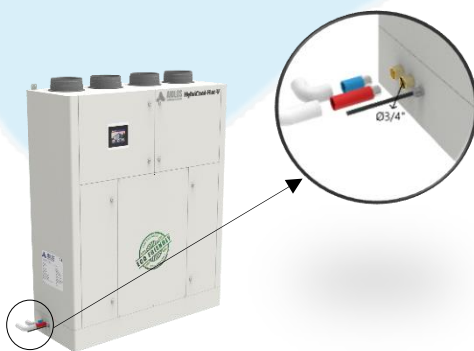
$$H1 \geq \frac{|P|}{10} + 50 \text{ [mm]}$$

$$H2 \geq 0,5 \times H1 \text{ [mm]}$$

Drainage outlets should not be raised along the drainage drain line or at the end of the line. If the line must be raised due to any obstacle on the floor, H2 height should be taken into account in the drainage calculation. Drain line is generally designed ¾" scale. Female connection on ¾" scale is ready for the male connection with same size on both sides of casing.



Water supply, Drainage and Electrical cable showing



Water supply and electrical cable from right side



Water supply from left side, electrical cable from right side as standard

5.7. Air Damper

Check if the damper is adjusted to the correct angle, opened with the required angle, and works properly.

5.8. Air Filters

Check whether the appropriate size and correct filters specific to the application are installed.

Check that the filters are placed properly and make sure that they are protected under appropriate conditions.

Set the filter impurity pressure switches or the filter gauges if used

5.9. Heaters

5.9.1. General

- i. Check and ensure that connections meet the requirements according to the sizing project.
- ii. Leakage control must be done and be ensure there is no leakage.
- iii. Be sure that the heater produces enough heat to prevent freezing.

Attention: In coils where water is used as a heater or coolant, no water should be left in the circuits to prevent damage to the coil against the possibility of freezing at temperatures below 0°C. It should be ensured, that some precautions such as setting up hot water boiler, circulation pump operation and starting the freezing scenario of automation in case when the temperature drops below under 5°C.

5.9.2. Electric Heater

- i. Make sure that the electrical heater is connected in accordance with the manufacturer's instructions. The wiring diagram is located inside the electrical junction box.
- ii. Check the current in the electrical heater.
- iii. Check whether the safety devices shown in the electrical diagram are installed.

- iv. Check if the electric heater is grounded in accordance with local instructions.
- v. The electric heater should only be operated if the specified minimum air volume rate is achieved.
- vi. The electric heater must be turned off at least 5 minutes before power is cut from the air handling unit.
- vii. Make sure that nothing is left in the electric heater compartment.
- viii. The following notices are posted on the panel:
Electrical Voltage and Hot Surface.



5.10. Cooling Coil

- i. Check the connections based on the sizing projects and check the leakage and tightness of the connections.
- ii. If fins are damaged during the transportation, fix them.
- iii. Check if the drop eliminator behind the cooler is properly connected.
- iv. A substance that blocks water flow should not be put into the ceiling.
- v. Check that the condensed water is drained, and the drainage is working after a while after the cooling coil is switched on. If necessary, clean the drainage.

Attention: In coils where water is used as a refrigerant, against the possibility of freezing at temperatures below 0°C, no water should be left in the circuits to prevent damage to the coils. If water is to be left, glycol must be added at a rate that is safely calculated according to the lowest possible air temperature. AiolosAir is not responsible for water freeze damage caused by failure to take precautions.

5.11. Adiabatic Cooling System

- i. Check the nozzle valves on the module and make sure that distilled, dirt-free and demineralised water is supplied to the system.
- ii. Adiabatic module water inlet pressure min. Check it is 3 bar.
- iii. Check the water nozzles.
- iv. Make sure that the air-tight heat exchanger cover is tightly closed and airtight.
- v. Before the device is started, check that the adiabatic module drainage drain is made

properly with proper drainage and pipe connection.

Attention: When switched into winter operation, the remaining water in the adiabatic cooling module pipes must be drained. For this, it should be checked that the solenoid valve on the adiabatic cooling module water supply is open and the water flows through the pipes in reverse flow. AiolosAir is not responsible for any damage caused by failure to take precautions.

5.12. EC Fan

- i. Check whether the fan can move freely without getting caught in the mounting frame, elastic connection, or wiring.
- ii. Check the mains voltage of the electric motor.
- iii. Check and/or connect the engine according to the relevant regulations and with the help of the information provided by the manufacturer and by authorized persons.
- iv. Check the fan rotation direction. This direction should be the direction indicated on the case.
- v. Measure the current drawn by the electric motor for all phases.
- vi. The current drawn in all phases should be approximately the same and match the information on the product label.
- vii. Check that the flexible connections are properly fitted.
- viii. Make sure that the grounding is done correctly.

Attention: Before working on the fan, it must be ensured that the electricity is cut off. Warning signs regarding rotating parts, electrical voltage and open doors are affixed to the door.



5.13. Sensors

Sensors are hardware that allows the unit to be monitored and interpreted in detail over a single system.

- i. Make sure that the temperature of the inlet and outlet air is measured correctly.
- ii. Check that the air volume is measured correctly.

5.14. Control System

5.14.1. Operation Scenarios

HybriCool Flat-V air conditioning units work at maximum capacity in accordance with the ready prepared scenarios via room controller.

General Operation Scenario

The general operation logic of AIOLOS AIR HybriCool Flat-V vertical type air conditioning unit with 100% fresh air and adiabatic cooling system is described below:

IEC Operation System

High efficiency counter-flow heat exchangers are used in HybriCool series. So, the heat exchange will proceed at the highest level.

This heat exchange begins with the saturation of exhaust, return, air right before entering the heat exchanger. Fresh air, which passes through heat exchanger and saturated return air make heat exchange via lamella of heat exchanger without physically mixing each other in accordance with the thermodynamically. By this way, the inlet air is cooled in summer and heated in winter.

DX+ Heat Pump Operation System

Compressors with high COP values are used in HybriCool series. So, the highest cooling capacity with the lowest energy consumption is provided.

A main factor in DX system is room temperature. Operation systems of compressors are depended on firstly room temperature, then the set value of room temperature. They keep working on the same logic both summer and winter seasons.

Summer operation mode (Cooling): Let's take room temperature's set value 22°C. Whenever room temperature increases 2°C above this set value (24°C) compressor starts working. If there are more than one compressor, both starts working. If system with two compressors reaches the set value, (ex. 22°C), the first compressor stops working. When the room temperature decreases 1°C below the set value (22°C), the second compressor also stops working. If there is a system with single

compressor, when the room temperature decreases 1°C below the set value, compressor stops working.

Winter operation mode (Heat Pump): Let's take room temperature's set value 24°C. Whenever room temperature decreases 2°C below this set value (22°C) compressor starts working. If there are more than one compressor, both starts working. If system with two compressors reaches the set value, (ex. 24°C), the first compressor stops working. When the room temperature increases 1°C above the set value (24°C), the second compressor also stops working (25°C). If there is a system with single compressor, when the room temperature increases 1°C above the set value (25°C), compressor stops working.

6 minutes of brakes are necessary for each start and stop of compressors.

Coil Operation System

HybriCool series can be adjusted into coil system, if necessary.

Heating and cooling coils serve depending on the operation scenarios of unit. In summer mode cooling coil (CWC), in winter mode heating coil (HWC) are activated.

Summer operation mode (Cooling): CWC coil is activated on cooling mode. After setting up a set value for room temperature (E.g. 24°C), whenever room temperature increases above this set value, CWC coil controls the room temperature by increasing its capacity, which is controlled by a proportional valve.

Winter operation mode (Heating): HWC coil is activated on cooling mode. After setting up a set value for room temperature (E.g. 22°C), whenever room temperature decreases below this set value, HWC coil controls the room temperature by increasing its capacity, which is controlled by a proportional valve.

Hot Gas Re-Heat Operation System

Hot gas re-heat system is used in HybriCool series for controlling the humidity and temperature in the room more sensitively. With this application the humidity in the room can be controlled much more sensitively. The working principle of this system is almost the same as DX + Heat Pump system. With only one difference, the supply air is cooled much more than required by evaporator and is transferred to the hot gas re-heat coil. Here, the supply air is heated again by hot gas re-heat coil, which is

controlled proportionally, according to required temperature and humidity values.

Electric Heater Operation System

HybriCool series are only equipped with electric heater only for heating.

The Electric heater is used on the fresh air side to protect heat exchanger against freezing, defrost and as an additional heating capacity in winter season.

Electric heater works below described circumstances in winter season:

- If supply air temperature is under the set temperature value, electric heater starts working. When set value and supply air temperature are equal, electric heater switches into standby mode.
- If room or return air temperature is 5°C lower than a room set temperature value, electric heater starts working and whenever both temperatures are equal, stops working.
- Electric heater stays active during defrost mode.
- Electric heater starts operating for 10 minutes when exhaust air temperature decreases below 3°C on the models without compressor, then stops working. After an hour starts working again if the necessary conditions occur.

Freezing Protection System

Although HybriCool series is optional, we have a freeze protection, and we recommend that the temperatures in winter are high or where the risk of falling is high.

These freezing protections are possible to separate into two parts: Firstly, the necessary system protection against freezing on the heat exchanger and then for the condenser on the exhaust air side on the models with compressor.

Heat exchanger freezing protection: When the outdoor temperature falls below -5°C, electric heater, which is used for preheating, works for 10 minutes, and heats the cold outdoor air, before entering the heat exchanger. So, this process prevents the possible freezing in the exchanger. This process repeats itself once in each hour.

Condenser freezing protection: Frost and freezing occur on the surface of condenser, since the evaporation temperature of the refrigerant passing through the condenser

decreases in winter. With the help of temperature sensors on the condenser, the freezing can be sensed, and the system works for 15 minutes on defrost mode (ice melting). During this period, compressors are on standby mode, air volume is decreased to 25% of nominal air volume and electric heaters are activated. By this way the air temperature that feeds the room works for a while at ambient temperature levels and above temperatures. At the end of defrost mode unit returns automatically to its normal operating values.

Note: During defrost mode, it is unable to provide normal heating capacity of the unit. At design stage this situation must be considered.

Free Cooling System

Free cooling system is a standard for each HybriCool series and provides fresh air into a room without any power consumption except EC fans (if there are any compressors, will be shut down).

This system mostly works in spring and autumn. When outside temperature is 6°C lower than room temperature, the Damper will be opened and fresh air passes through. But when outdoor air decreases below 10°C, damper will be closed, and unit returns to its normal operation conditions.

Constant Air Volume and Variable Pressure Control System

Air volume remains constant with the help of pressure differential sensors on fans.

The values of these sensors can be tracked dynamically and with the calculation below air volume can be calculated manually:

$$V \left[\frac{m^3}{h} \right] = k * \sqrt{\Delta P}$$

This formula above is used for a single fan, if there are more than one, this formula should be multiplied by n:

$$V \left[\frac{m^3}{h} \right] = n * k * \sqrt{\Delta P}$$

Here: n is quantity of fans, k is fan constant, ΔP describes pressure difference.

“k” values of fans are shown in the table below.

Model	HF-06	HF-12	HF-20	HF-30	HF-40	HF-50
K Factor	71		60	95		121

The air flow remains constant without any effect from the pressure changes on the system with the help of self-controlled EC fans and the unit operates stable.

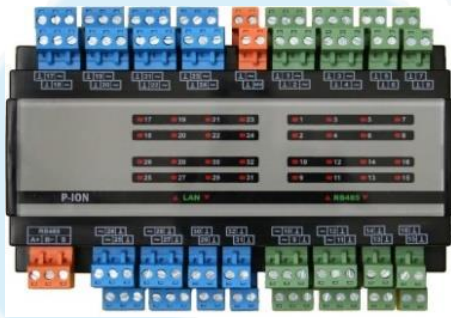
Constant Temperature Control System

The unit arranges to keep the ambient temperature constant depending on the ambient temperature with the aid of the thermostat or the sensor at the return air of the unit.

5.14.2. Controller

Controllers are universal programmable controllers that can be used to manage a variety of building systems including heating, ventilation, air-conditioning (HVAC) systems. Basic and advanced control strategies can be programmed by Sedona Framework™ for optimized performance.

Controller is based on Sedona Framework, has 16 universal inputs and 16 flex inputs/outputs. Any flex I/O point can be configured as analogue output, digital input, or pulse input. With the help of these flex points the capacity can be used at maximum. In addition to these connections, the controller has RJ45 Ethernet, 1 piece mini-USB (for updates), 1-piece RS485 connections. There are status LED for all inputs and outputs and up to 8 additional relay outputs via optional relay modules.



Technical Specifications	
General	32-bit microcontroller, 13-bit A/D converter flash memory
Nominal Voltage	24 VAC +%10-%15, 50/60 Hz
Power Consumption	6 VA
Universal Input Configuration	0(2) -10 VDC 0(4) -20 mA (500 Ohm resistor required) PT1000 NTC 10K3A1 Voltage-free contact Resistance (0-330 kOhm)
Flex Point Configuration	Voltage output, 0(2)-10 VDC, 2 mA max Digital input (voltage-free contact) Pulse input (max 20 Hz, %50 duty cycle, max 50 Ohm contact)

RJ45 Ethernet Connection	Ethernet 10/100 Base-T, BACnet IP slave, IP, TCP, UDP, HTTP, Sedona Sox support
RS485 Connection	Modbus RTU master, Modbus RTU slave, Modbus TCP master, Modbus TCP slave, BACnet MSTP slave
Operation Temperature	0- 50 °C
Storage Temperature	-25- +75 °C
Relative Humidity	%5%95 RH, non-condensing
Weight	570 gr (Gross 750 gr)
Dimension	157,5 x 122 x 57,5 mm (including terminals)
Mounting	Suitable 35 mm DIN rail mounting
Protection Standard	IP 20 according to EN 60529 IP 20
Connections	Plug-in terminals, max 1 x 2,5 mm ²

5.14.2.1. Controller Specifications

5.14.2.1.1. General

Control panels are universal programmable controllers that can be used to manage a variety of building systems including heating, ventilation, air-conditioning (HVAC) systems. Basic and advanced control strategies can be programmed by Sedona Framework™ for optimized performance.

5.14.2.1.2. Universal Inputs

All universal inputs can be configured as analogue or voltage free digital inputs.

Analogue inputs are optimized for resistive type temperature sensors (e.g., PT1000) and 0-10 VDC devices. 13-bit A/D converters assure high resolution measurements. For (0)4-20 mA input signals, external 500 Ohm resistors are required.

Reading the value of resistance is possible directly from analogue input. By this way, different types of thermal sensors can be added in or directly used.

All inputs are protected against short circuits to ground and against direct connection up to 50 VAC.

Interface 1


- 1) Operation mode selection
- 2) Operation type selection
- 3) Unit reset button
- 4) Timing schedule
- 5) Unit on/off button
- 6) Next menu display
- 7) Previous menu display

Interface 2


- 1) Existing defrost temperature and defrost set temperature values showing (only units with compressors)
- 2) Return air temperature value and room temperature showing
- 3) Supply air temperature, return air temperature and fresh air temperature values
- 4) Temperature set value
- 5) Modul communication condition (describes the communication situation between room controller and unit)

Interface 3 – Only Units with Compressors


- 1) Compressor situation and failure alarm
- 2) Min. Limit and max. Limit failure alarms of high-pressure switch (YBA).
- 3) Min. Limit and max. Limit failure alarms of low-pressure switch (ABA).
- 4) YBA transmitter min limit 5 min continuous and max limit 3 times in 60 min alarms
- 5) 4-way valve on/off and operation mode

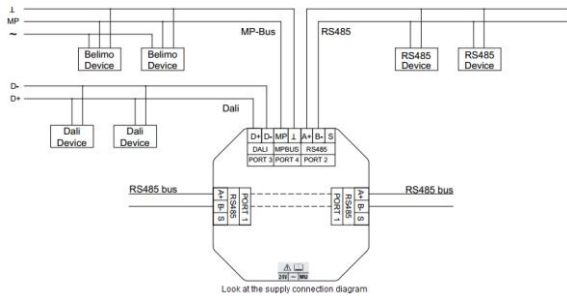
Interface 4


- 1) Aspirator fan condition and its air flow rate
- 2) Aspirator fan air flow rate set value
- 3) Ventilator fan condition and its air flow rate
- 4) Ventilator fan air flow rate set value
- 5) Bypass damper on/off

Interface 5 – Only Units with Compressors


- 1) High pressure transmitter (YBA) max set value
- 2) High pressure transmitter (YBA) min set value
- 3) Low pressure transmitter (YBA) max set value
- 4) Low pressure transmitter (YBA) min set value
- 5) Reading pressure values on the YBA and ABA transmitters

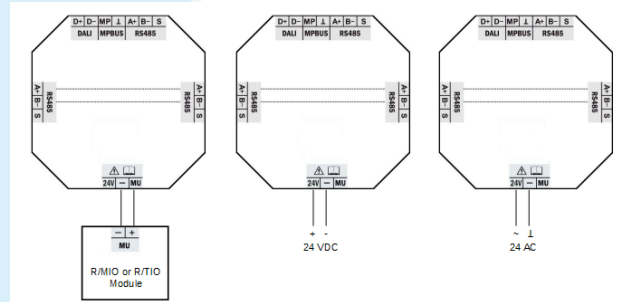
5.14.3.2. Wiring Schema



5.14.3.3. Model Selection

	L0-S-D	L0-S-BD	L1-S-D	L1-S-BD	L0-W-D	L0-W-BD	L1-W-D	L1-WBD
	Port 1 Modbus Slave/Master				WIFI			
	Special I/O module		Port 2 Modbus Master		Special I/O module		Port 2 Modbus Master	
Port 3 DALI	✓	✓	✓	✓	✓	✓	✓	✓
Port 4 Belimo MP-Bus	-	✓	-	✓	-	✓	-	✓
Supply	Only 24V DC		24V AC/DC		Only 24V DC		24V AC/DC	

5.14.3.4. Power Supply Options



6. MAINTENANCE CHECKLIST

6.1. Checkpoints and Recommended Maintenance Intervals Checklist

General information about the planning required for the inspection and maintenance of the air conditioning unit is given in the checklist below. On the following pages, more detailed explanations will be made about each section in this list.

ATTENTION!

Before any inspection or maintenance, do not forget to de-energize all parts and ensure that the fan is deactivated before opening the door and access / cover covers.

FUNCTION	COMPONENTS	CHECKPOINTS	Monthly	For 3 Months	For 6 Months	Annually	Notes
Body							
Inner Unit	Interior panels	Contamination and damage					
	Exterior panels						
Door, Access / Enclosure Covers	Hinges	Operation of hinges and locks					
	Locks						
	Door sealing						
Dampers	Damper blades	Tightness					
		Connections					
	Damper control	Damper actuator					
Fresh Air Inlet	Ventilation duct with wire mesh	Tightness, Clogging and contamination control					
Filters	Coarse filter	Pressure drop and tightness control in addition to filter condition control					
	Cassette filter						
	Carbon filter						
	Differential – Pressure sensor / switch						
Heaters / Coolers	Coil	Contamination					
		Leakage					
	Electric heater	Connections					
	Motorised valve	Operation condition					
	Drift eliminator	Contamination and clogging control					
Drainpipe							
	Drainage						
Adiabatic cooling system	Water line	Contamination and clogging control					
		Leakage control					
	Water nozzle	Connection and operation					
	Drainpipe	Contamination and clogging control					
Drift eliminator							
Compressor		Assembly					
		connections					
		Proper operation					
	Condenser	Assembly					
		Connections					
	Evaporator	Connections					
		Surface and blade control					

Fan		Connection and operation					
		Tightness					
Solenoid Valve		Connection					
		Operation control					
Control Panel		Wiring and connection control					
		Software and update check					
Sensors		Detection control					
		Connection control					
Electric Panel		Grounding control					
		Electrical leakage control					
		Connection control					

7. MAINTENANCE INSTRUCTIONS

7.1. General

The smooth inner and outer surfaces of the panels make maintenance operations extremely easy.

In dry sections, the body of the air conditioning unit should be checked from inside and outside once a year. For the maintenance of other sections, please see the relevant sections.

Maintenance and cleaning or changes should only be carried out by authorized personnel under a qualified supervisor.

The inlet and outlet parts of the air conditioning unit components are accessible for cleaning purposes, but it is recommended that they be easily and safely removed; This should be considered when modifying fittings for pipes and ducts.

Do not open any access panels or touch electrical components in the applied position unless necessary for measurement, testing or adjustment. Such operations should only be carried out by an authorized qualified electrician, equipped with the appropriate tools, and using suitable protective equipment against electric shock. Before removing any panels from the housing or before removing any part of the unit, isolate it from the main electrical power supply and remove fuses.

Personnel must take occupational health and safety requirements and regulations into consideration when working or performing maintenance on the unit.

While the experts are working on the units or doing maintenance, it is necessary to consider occupational health and safety precautions regulations.

7.2. Storage

HybriCool Flat-V air conditioning units must be stored and installed in closed areas. These operations are not recommended in open areas.

Storage process must be built in dust-proof, clean and dry conditions (if necessary, covered with waterproof materials on decks).

Before installation, the components should be checked for contamination and cleaned if they are.

7.3. Body

Control of panels from outside. If the paint is damaged, if necessary, scrape off its rust and touch up with high quality anti-abrasive primer and topcoat paint.

Control of the panel and the unit from inside; Clean the dirt. After removing the rust, if necessary, the damages on the paint topcoats, apply a coat of high-quality paint on the anti-abrasive primer.

In the fresh air intake sections, signs of wear can be seen, wet parts are formed in these areas and are under the influence of pollutants such as mould, rain, and airborne dirt. Therefore, these areas should also be controlled.

7.4. Door, Access and Enclosure Covers

Check locks, hinges and sealing gaskets on all doors, access and enclosure covers. If any damage is observed, ensure that necessary precautions are taken.

7.5. Grounding

Be sure that the grounding and installation of the unit is properly done.

7.6. Dampers

Dampers come as factory-mounted in the relevant part of the unit. Before commissioning the unit, it is recommended to check the bolt connections for looseness and if necessary, tighten them. Blow off excessive dirt deposits using compressed air.

7.7. Fresh Air Inlet

Especially the fresh air intake becomes polluted because of the penetration of pollutants in the air. Maintenance intervals must be observed. Accumulated contaminants can cause irreparable damage to panels. Clean the outer air intake section thoroughly and repair any damage you may detect, as specified in the section "7.3 Body".

7.8. Air Filters

Filters must be regularly controlled for over contamination, pressure drop and damage. Because the filters are side mounted, they should be checked, if they correctly mounted. Filters should be changed at necessary intervals, and these specified intervals are the maximum. The replacement schedule is determined depending on the type and quality of the filter used and the pollution level of the ambient air. The pressure loss over the

contaminated filter can be measured through the system with the aid of a differential pressure sensor. Instructions for the maintenance of special filters are available on request.

Prolonged operating times because of restricted air flow due to dirty filters can have a negative effect on the heating and cooling outlets; In addition, this can cause unnecessary stress on the motor or motors, resulting in reduced product life. Filters should only be replaced with filters that meet the specifications specified on the filter stickers on the covers of the filter functions.

The filters of the air conditioning unit are 'disposable' type and should not be washed. Light dust deposits and dirt on the filter frames can be carefully cleaned. The filter frame can then be washed or cleaned with hot soapy water and a soft cloth.

Since different categories of filters are used in the HybriCool Flat Air Conditioning unit, knowing, and specifying the technical features of these filters will be beneficial for both usage and maintenance.

i. **G2 Coarse Filter:**

G2 filters have an average efficiency in pre-filtration since the rate of holding large particles is between 65% and 80%. However, since the air passing through this filter is clean, a very high efficiency filter is not required. They have a value between 1-4 according to ASHREA MERV 52.2.

Approximate Equivalent Rating for Filters According to the ASHRAE Standard 52.2 (MERV) and ISO 16890	
ASHRAE MERV (Standard 52.2)	ISO 16890 Classification
1-6	ISO Coarse Filtration
7-8	ISO Coarse Filtration > %95
9-10	ePM ₁₀
11-12	ePM _{2,5}
13-16	ePM ₁

Rating according to ASHREA MERV and ISO16890

ii. **F7 (ePM₁₀) Filter:**

The efficiency of F7 filters is between 13-16 values according to ASHREA MERV 52.22, the higher the value compared to ASHREA MERV, the higher the filter efficiency.

EN 779:2012 Filter Class	EN ISO 16890 – Average efficiency range according to the real test results		
	ePM ₁	ePM _{2,5}	ePM ₁₀
M5	%5 - %35	%10 - %45	%40 - %70
M6	%10 - %40	%20 - %50	%60 - %80
F7	%40 - %65	%65 - %75	%80 - %90
F8	%65 - %90	%75 - %95	%90 - %100
F9	%80 - %90	%85 - %95	%90 - %100

Efficiency ranges of EN779: 2012 class filters according to EN ISO 16890

The used filters are very sensitive. For this reason, it should be very careful and sensitive during transportation and assembly. How to behave when working with filters is schematically explained in the figure below.



Image15. Issues to be considered when working with filters

7.9. Heaters

During normal operation, the electric heater or hot water coils reach high operating temperatures. Make sure that all heating equipment is cool enough to allow safe use for cleaning purposes.

Take care not to damage the entire coil and related components, including the fins, during maintenance. Cleaning methods should not cause wear of the coil surface or fins, significant damage, displacement, or impediment to heat transfer.

Coils should be thoroughly rinsed with clean water to remove invisible dirt residues.

7.9.1. Coils

On the fresh air inlet side contamination and leakage control must be done at least once a year

and if necessary, the cleaning works can be carried on opposite direction of air flow direction by using vacuum cleaner.

7.9.2. Electric Heaters

They should be checked for contamination at the most specified intervals and cleaned with compressed air if necessary. Check the connections inside the control box. Check the operation of the thermostat.

7.10. Coolers

They should be checked for contamination at the most specified intervals and if necessary, they should be cleaned by using compressed air against the air flow and using suitable chemical fluids or using a vacuum cleaner without damaging the surface.

Take care not to damage the entire coil and related components, including the fins, during maintenance. Cleaning methods should not cause wear of the coil surface or fins, significant damage, displacement, or impediment to heat transfer.

Coils must be thoroughly rinsed with clean water to remove invisible dirt residues.

Drop eliminator should be checked at specified intervals and specified checks should be made to see if it works properly.

Clean the condensation pan siphon and verify that it is working properly.

7.11. Adiabatic Cooling System

It should be checked and maintained at specified intervals. The cleanliness of the air ducts and the pipes should be checked to make sure that there are no problems.

The connections of the water nozzles and the condition of contamination should also be checked at specified intervals and cleaned appropriately if necessary.

In the process of cleaning the adiabatic cooling module; Clean the entire module and related components, including the coverslips, without damage. Cleaning methods should not cause the lamellae to wear, cause significant damage, warp, or impediment of heat transfer.

7.12. Fan

Check and maintain the fan at specified intervals.

Make sure that the connections between the unit body and the fan and the tightness are smooth. If there is a loosening or sealing problem, ensure that necessary precautions are taken.

Electrical components and internal body of fans should be cleaned with a soft brush, paint brush or a vacuum cleaner. The dirt, dust, etc. in motor, propeller, fan casing and shafts should be cleaned by brushing.

To keep the engine ventilation function working at maximum efficiency, use a vacuum cleaner and brush it to remove dust from the engine vents.

Pay attention to the insulation of the terminal box while making the motor cable connections. No moisture should get into the box.

7.13. Control Panel

Control panel connected to the automation system must be checked regularly and the necessary updates must be installed, if any.

7.14. Electric Panel

The control of the electrical panel should be carried out in the specified periods by taking the necessary measures. The grounding connections of the panel, panel connections should be made properly and there should be no electrical leakage.

HybriCool Flat-V Air Conditioning unit has voltage protection equipment inside the electrical panel. Thanks to this equipment, the air conditioning unit is protected at high and low voltage values. At high or low voltages, the unit shuts down and the unit stays off until the voltage corrects itself. After the voltage is restored, the unit is switched on by giving a run command either from the on-off switch on it or through the automation system.

7.15. Cleaning

Inlet and outlet parts of the air conditioning unit components are accessible for cleaning purposes. However, when the functions of the internal components that are accessed via removable panels need to be taken out for cleaning or maintenance purposes, the components can be easily taken out by the rail mechanism. Particular attention should be paid to supporting the panel sufficiently when especially working at heights. The covers should only be opened by authorized persons.

Before starting any cleaning procedure, HVAC system cleaning technicians should visually inspect the unit to determine if there are any unusual foreign objects and try to find the causes. If damaged system components are detected during the inspection, they must be documented and brought to the manufacturer's attention. If new parts need to be installed, use only original AiolosAir spare parts. If necessary, replace missing or damaged fasteners and gaskets (in appropriate specifications and sizes).

7.16. Mechanical Cleaning

It should be cleaned using mechanical cleaning methods designed to remove the source, designed to remove contaminants from the HVAC system and safely clean contaminants within the facility. No cleaning method or combination of methods can be used that could damage the air conditioning unit components or negatively alter the integrity of the system.

During mechanical cleaning:

- Vacuum units
- Mechanical brushes and hand brushes
- Pressurized water and air sources
- Steam
- Other tools

Using these tools, adhered particles and residues can be removed and removed in a controlled manner.

As compressed air or water can be used to clean the coils, it is recommended to clean the heating and cooling functions first. Do not use compressed air when cleaning foreign materials in other functions (except heating and cooling coils), as foreign matter can be taken into other parts of the air handling unit by air. Instead, use a vacuum cleaner to remove foreign matter.

All methods, which are used during cleaning with a vacuum collecting equipment. Vacuum collecting equipment should have enough power to keep all the areas under negative pressure, where are at the mean while cleaning, thereby all the remains are collected, and the closed area protected.

Clean all interior surfaces and components. Clean visible contaminants and debris from surfaces inside the air conditioning unit.

You can also wash the internal parts of the air conditioning unit (except filters, electrical

components). After flushing, clean the condensate collectors and drainpipes. Make sure that a properly working drain system is in place before starting the wash operations.

Do not use flammable liquids for cleaning in any part of the unit. If chlorinated hydrocarbon non-flammable liquids are used for cleaning, safety precautions must be taken against toxic vapours that may be released.

The places where the outer panels and grills are located should be cleaned from inside and outside using hot soapy water and a soft cloth. The use of abrasive or strong detergents should be avoided in order not to damage the painted surface.

Door seals should be checked and replaced if necessary.

If, for any reason, the sealing materials used in the air conditioning unit need to be changed, care must be taken that they have closed pores; they must not absorb moisture or emit odour in any way and form a nutritious substrate especially for microorganisms.

Plastic materials used in the air, with high relative humidity values or high amounts of water, are normal for the intended use, should not form a nutritious substrate for microorganisms.

7.17. Wiring

The unit should be checked for loose connections or frayed wires. Clean and tighten all connections or repair or replace any worn or damaged wires and cables. Take care not to damage the wiring facility while working on the unit. When reconnecting wires and cables, make sure they are not damaged by friction or contact with a hot surface. Always refer to the appropriate electrical diagram when installing parts or new parts that were previously removed. Do not spill cleaning agents on the motor and cables. Check the system after wiring to avoid any possible leakage.

7.18. Compressor, Evaporator and Condenser

Check and maintain the compressor, evaporator, and condenser at specified intervals. Check the installation, proper operation and connections to the unit and make sure that it works properly. In case of a possible problem, take the necessary measures or ensure that they are taken.

For the maintenance of this combination, first cut the electrical connection. Since these units work with gas, make sure there is no leakage.

Make sure that the compressor is working at the correct pressure value and clean the dust and dirt on it with a slightly damp cloth.

For the evaporator and condenser, clean the dirt without damaging the product with clean water and a broom to prevent contamination that may occur between the plates.

Filters must be disposed of in accordance with the relevant regulations.

8. TAKING AIR CONDITIONING UNIT OFF

The information on these application pages is provided as a guide for cleaning and maintenance technicians. Please also see other sections of the connection, installation, operation, and maintenance instructions.

8.1. Turning Unit Off

Disconnect the power of the air conditioning unit and wait for the unit to discharge its mechanical and electrical energy.

8.2. Disassembling the Unit

Dismantling of the unit must be done by competent persons.

Use original lifting equipment and correct lifting points.

Components must be recycled or disposed of according to the material type, in accordance with relevant local regulations.

8.3. Recycling Components

All metal components, suitable plastic parts, glass and rock wool, electrical components.

8.4. Recycling Fluids

Thermal fluids, refrigerants, compressor oil. Recycling of fluids should be done in accordance with regulations.

8.5. Recycling of Electric and Electronic Components

Electronic components must be removed by authorized persons and recycled in accordance with relevant local regulations.

8.6. Disposal of Filters

Filters are for single use only and should never be thrown into the garbage together with domestic wastes after being disassembled.