

# freesc<sup>o</sup>o

*Nothing like the Sun*



# FreescOO, a new idea of air conditioning

FreescOO façade is the first worldwide plug and play compact HVAC system providing room comfort with cooling, dehumidification, heating and ventilation using low grade thermal energy, water and very few electricity. In case of scarcity of water, to drive the freescOO units condensed water from additional AC split units or rain water can be used. It is properly designed to be integrated within the building façade or wall mounted.



FreescOO is the ideal solution for those who have already invested in solar thermal systems or intend to invest in NZEB buildings by having available the necessary low grade solar thermal energy to feed the process. Nevertheless, FreescOO can be also integrated even with alternative heat sources (heat pumps, boilers or district heating networks). Thanks to the low electricity needed, freescOO can be coupled with small PV panels also for remote applications.

## Furthermore:

- The freescOO concept is modular and scalable. The smallest unit is configured as a fancoil to be mounted on the external wall of the building, but the same concept can be applied for larger HVAC units.
- FreescOO in new (or major renovation) buildings: FreescOO is an essential HVAC device for any high-performance building, and indispensable for the European nZEB parameters and Passivhaus Standard.
- FreescOO in retrofit: substitution of existing low efficiency fan coils, AC splits in public/private/commercial buildings where minimum parameters of ventilation to guarantee comfort conditions are not satisfied (especially in crowded indoor areas)

Main advantages of the technology are:

- **Nominal Energy Efficiency Ratio (EER) > 12** EER is ratio between the cooling energy provided by the system and the electricity required to operate it (electricity is only used to drive the three

fans, the circulation pumps and some auxiliaries) when the system is working at full load in nominal conditions.

- **Freescoo uses low enthalpy heat:** minimum temperature required for the operation of the system is **55°C**. For this reason, Freescoo can be integrated with any kind of heating distribution systems
- **High thermal efficiency** Thermal efficiency is the ratio between the cooling capacity and driving heat source (solar heat). Thermal efficiency for DEC solutions based on adsorbent rotors is  $<0.8$  whereas freescoo can reach about 1.
- **Energy savings and CO<sub>2</sub> emission reduction (up to 70-80%)**
- **Free solar heat:** freescoo can be connected with solar thermal systems, providing air conditioning in summer and wintertime almost for free.
- **Variable fan speed**
- **Total absence of harmful refrigerant fluids:** the system uses only water as refrigerant fluid (GWP = 0)
- **Air purification:** desiccant material + polyester-based air filters provide air purification

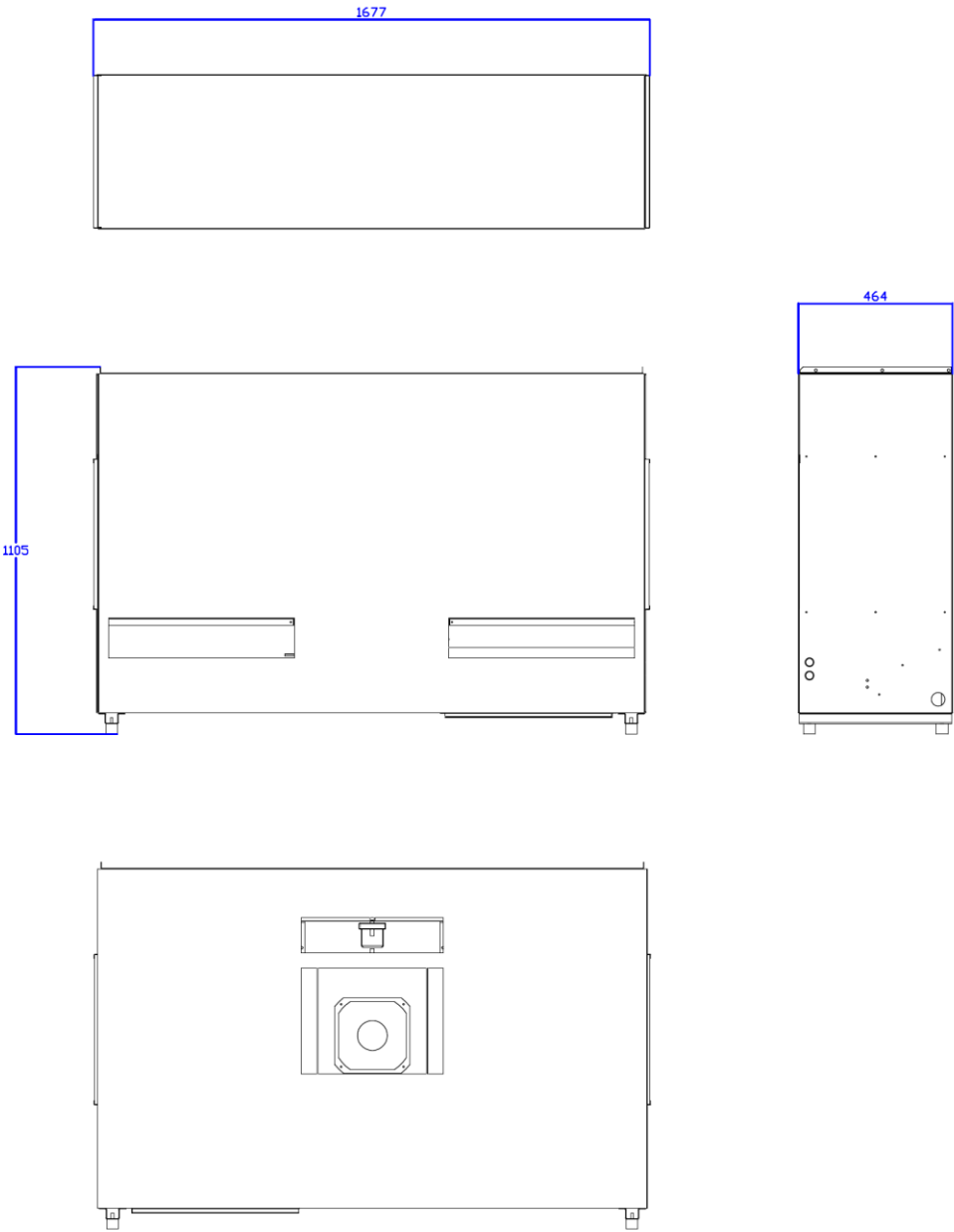
# Technical data

Services	
Cooling	YES
Dehumidification	YES
Air change	YES
Heating	YES
Heat recovery	YES
Off – grid operation	Possible if coupled with PV
Kind of installation	Wall mounted
Overall dimensions	1105 x 1677 x 464 mm
Overall weight	130 kg
Cooling performance <sup>(1)</sup>	
Total cooling power due to the handling of ambient air	4,5 kW
Total cooling power delivered to the building	1,9 kW
Return air temperature from the building at design condition	27°C
Supply air temperature at design condition	26°C
Dehumidification rate at design condition	Up to 10 g/kg
Maximum air flow rate	400 m <sup>3</sup> /h
Percentage of fresh air (standard setting) <sup>(2)</sup>	100%
Heat required	4,1 kW
Inlet temperature at design condition	70 °C
Outlet temperature at design condition	62 °C
Water flow rate	440 kg/h
Power absorbed	0,250 kW
Internal pressure drop	9 kPa
Water consumption	2 l/kWh
Rated EER	18
Heating performance <sup>(3)</sup>	
Total heating power delivered to the building	2,0 kW
Heat required	2,1 kW
Inlet temperature at design condition	50 °C
Outlet temperature at design condition	45 °C
Water flow rate	350 kg/h
Internal pressure drop	9 kPa
Power absorbed	0,13 kW
Air flow rate	350 m <sup>3</sup> /h
Percentage of fresh air	100%

Performance data are based on measurements carried out at our laboratory.

- (1) Design conditions: outdoor air at 35°C and 16 g/kg, indoor air at 27°C and 12 g/kg, regeneration temperature of 70°C – ventilation mode (100% of fresh air)
- (2) The flow rate of fresh air can be varied according to the specific need
- (3) Design conditions: outdoor air 0°C and 3 g/kg, indoor air 20°C and 3 g/kg, heat temperature of 65°C – ventilation mode

# Dimensions



[www.freescoo.com](http://www.freescoo.com)

**SOLARINVENT**

**SOLARINVENT SRL**

Via Salvatore Crimi 88 95030 Sant'Agata Li Battiati (CT)  
+39 095 6761761 mobile +39 345 4102054 VAT 05158080878  
[info@solarinvent.com](mailto:info@solarinvent.com)



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