



**Use and maintenance manual**  
**INTEGRATED STORAGE COLLECTOR SFERASOL™**

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The development of continuous product improvement may result, without notice, any changes or modifications as described in this manual.

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# 1

## Sferasol™.



SFERASOL™ is planned to produce sanitary warm water with the aid of the direct and diffused solar energy. Water temperature supplied by a SFERASOL™ panel depends on several external factors, varying according to the season, the place and the time of the day.

Depending on weather conditions, the main parameters influencing SFERASOL™ efficiency parameters are feed water, solar energy and environmental temperature.

SFERASOL™ surface heats the thermal liquid by means of the solar energy that circulates in the two hemispheres. The liquid is then conveyed to the internal exchanger heating the water contained in the boiler.

Water temperature of mains supply is not constant during the year.

During seasons with few sun exposure and low environmental temperature, SFERASOL™ ensures pre-heating of water and must be supported by the main hot water heating system.

As far as heating losses during night hours, these are minimized by the thermal insulation of the water accumulating tank.

In addition, the spherical shape of SFERASOL™ panel allows an air formation in the captators which reduces any further thermal losses.

## 2

### Safety basic instructions.



SFERASOL™ has been manufactured respecting safety rules and in accordance with Machinery Directives:

2006/42CE

2006/95/CE

2004/108/CE

Final user could be in danger if the machine components are damaged or worn out or if SFERASOL™ is improperly used.

Use SFERASOL™ exclusively when all the components and safety protections are perfectly functioning.

Use the machine only in accordance with the present instructions.

Always remember safety rules and risks during the machine working and follow the rules of the present user and maintenance booklet.

Each defect that should compromise safety should be immediately eliminated.

## 3

### Before starting Sferasol™.

Before starting the machine, staff should read the use and maintenance booklet, in particular "safety basic instructions".

Occasional users (especially for maintenance and repairing) should read the present user manual before starting operations.

More than reading use and maintenance booklet, it is necessary to follow all standard rules connected to accident prevention and environment protection, like safety clothes and accessories.

The use and maintenance booklet has to be stored in an easy to use position for an easy consulting.

Each machine modification must be done only under manufacturer approval.

The present rule shall be applied also with the safety device installation. Spare parts requirements shall be in accordance with the manufacturer specifications.

# 4

## Technical features.



- Storage water tank in AISI 304 S.S., thickness 2,0 mm. Capacity 150 litres. Our boilers are duly checked after assembly and welding, in order to ensure tightness and quality.
- Heat exchanger made in AISI 304 S.S.
- Thermal insulation in high density Ecological Polyurethane CFC free.
- Cathode protection with magnesium anode, to be replaced periodically to prevent corrosion and scale deposits due to electromechanical reactions.
- Electrical heating element ( optional supplied on request only).
- Expansion pot.
- Re-circulating pump for the thermal fluid in the SFERASOL.
- Thermostat sets at 3° Delta T.
- Absorbers in metal coated with black mat heat-resistant paint.
- Transparent covering made in shockproof plastic material (methacrylate), ultraviolet-rays resistant and it optimizes the effect greenhouse.
- Inlet - outlet water AISI 304 S.S. connections.
- Inlet - outlet water copper connections.
- Safety valve.
- Base made in AISI 304 S.S., 20 mm. thickness. Pre-bored for floor fixing.
- Inspection door in AISI 304 S.S., for electronic board and pump inspection. To enable installation, always keep it "SOUTH" oriented. .
- Thermal fluid, mix of mono propylene glycol, non toxic, ensures anti-freezing and anti-scale protection.

# 5

## Transport and storage.



Follow basic rules for operation with cranes and fork lifts, loading charges machineries, etc.

Each lifting operation must be done with machineries with a sufficient loading power.

Move or lift SFERASOL™ panel with maximum care ensuring lifting systems to the apposite hook on the top of SFERASOL™ panel and follow the instructions below.

Check that lifting powers are suitable for the machine weight.

Take care during lifting and be sure that no unbalancing is present.

SFERASOL™ unit net weight with water storage tank SF-S (empty): 130 Kg.

During transport ensure that SFERASOL™ panel is always vertically positioned. SFERASOL™ panel should be slipping protected during transport to avoid damages.

If SFERASOL™ panel has already worked, disconnect all connections before moving the machine.

In case a fork lift or crane are not available, SFERASOL™ panel should be handled considering the weight of the appliance.

Use the special white plastic cover supplied for the appliance storage.

SFERASOL™ can be stored following the same conditions for transport. No particular care is necessary, but storage place must be clean and the appliance should be covered in case of a quite long non working period, protecting it from shocks or tumbles.

N.B.: Do not leave packaging material in the environment.

They must be disposed in accordance to local environmental rules currently in force.

# 6

## Sferasol™ positioning.



### **Installation area requirements.**

Follow carefully instructions below before connecting and starting SFERASOL™ panel.

Manufacturer will not be responsible for damages caused by the failure in respecting the following requirements

### **Packing removal.**

SFERASOL™ packing must be removed in the installation place to avoid shocks during transport. Keep the appliance covered until the boiler is filled with sanitary water, in order to avoid filling liquid boiling

### **Installation place and base.**

Choose carefully installation place and base before installation.

Basement on which the machine will be positioned must be planned so that is suitable to hold the machine weight. Before machine positioning the area must be cleaned and planarity must be checked by a level device. Each difference from optimal condition should be modified by the use of thickness sheets.

### **Connections.**

Customer shall agree with the Installation Service all necessary plumbing and electrical connections to ensure correct installation in accordance with Electrical and Plumbing Regulations currently in force.

### **Grounding.**

SFERASOL™ must be connected to the general ground network.

### **Orienting and shading.**

Correct installation is fundamental for maximum efficiency of the solar system.

During installation follow the indications below in order to ensure maximum efficiency of the solar system.





- 
- SFERASOL™ must be installed in a place with total daytime sunlight. If not possible, sunlight should be at least from 11 a.m. to sunset.
  - When installed, SFERASOL™ inspection door must be always SOUTH-side oriented
  - In order to avoid temperature losses due to piping length, SFERASOL™ panel should be positioned next to the Storage tank and/or to the collection point.
  - After installation, ensure that SFERASOL™ is protected against wind which reduces the greenhouse effect obtained by the spherical shape of the system.
  - Any changes to the optimal orientation would reduce SFERASOL™ efficiency, with no responsibility of SFERASOL™ panel.
  - In case optimal installation is not possible, the number of SFERASOL™ panels required would increase to compensate efficiency losses.
  - Shading (due to trees, buildings or any other obstacles) should be avoided in order to ensure at least 4-6 hours of complete sunshine exposure during maximum sun thermal radiation.
  - Basement on which the machine will be positioned must be planned so that is suitable to hold the machine weight
  - A well corresponding to the appliance base should be advisable and lay underground a piping connection for water and electrical connection (min. diam. 100 mm.).
  - Fix SFERASOL™ to the support foot through 4 wedges diam. 8 mm in the apposite holes on the base, ensuring that 3 mm. washers are fitted with the wedges.

This operation avoids any condensate stagnancy inside the support foot. To this purpose, do not seal the support foot to the base with mortar or silicon. SFERASOL™ efficiency can be further improved by following previous suggestions, thanks to its innovative shape, exploiting also the shaded part of the appliance.

Exploiting diffused energy, it is advisable to use light colors for any walls next to the appliance, and to create a 1,5 diam.white gravel circle in case of installation on lawn.

The above advices enable a reflection phenomenon of sunlight which optimizes the appliance efficiency.



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**Connection requirements.**

Electrical connections must be done by specialized electrician or by instructed staff only.

Plumbing connections must be done by specialized thermohydraulic staff or by instructed staff only.



**Warning:**

During all installation and connection operations, the appliance must be covered by the special white polyethylene packaging to avoid damages during these operations.

**Plumbing connections.**

Place the connection lines so that they will be safe for the operating staff and avoiding any voltage risk.

Ensure that cold water pressure is less than 6 bar.

**Electrical connections.**

Electrical connections must be done by specialized electrician or by instructed staff only.

All operations on electrical devices (connections, maintenance, etc.), must be done with electrical supply excluded through apposite switches.

# 7 | Sferasol™ installation.



## Installation and connections

SFERASOL™ installation is very easy and can be carried out by specialized staff following the instructions below:

- Make cold water piping and heated water suction piping connections in the apposite well located in the support base. Piping can be made in hot-dip zinc coated carbon steel, sanitary copper or polypropilene and must be duly insulated. Piping diameter shall be in compliance with the technical data sheet enclosed. Piping insulation is vital in areas where cold emperatures in winter season are particularly severe.
- Arrange an electrical supply cable with adequate section for the installed power.



**WARNING:**

When installing the appliance on the base, the inspection door placed on the support must "South" oriented

- Connect the cold water piping to the non-return valve fitted in the inlet cold water circuit to Sferasol.
- Fill in SFERASOL™ with cold water (complete filling is reached when water is out coming without air bubbles).
- Connect warm water piping to the outlet heated water circuit connection to SFERASOL™.
- An apposite pressure gear must be fitted if pressure is exceeding 6 bar.
- Remove the plug from the board.
- Pass the end of the cable through the cable fastening and bring it to the electrical part.
- Fit a bipolar power supply sectionalising switch.
- Connect 220V-50 Hz power supply to the socket placed on the side of the control board: connect the black cable (phase) to clamp 1, the neutral cable to clamp 3 and the ground cable to the relevant clamp .
- Close the pin cover.
- Ensure that the socket is firmly fastened.
- After installation and connection operations, remove the apposite plastic cover and start SFERASOL™ panel.



**WARNING:**

Circulator functioning is assured by electrical power supply

# 8

## Start-up.



### Staff in charge.

Start up operations must be done by allowed staff after the complete reading of the present use and maintenance booklet.

All the electrical connections must be done by specialized operators.

Ensure that water flow can be stopped by means of a manual device (for example a spherical valve).

Start-up operation must be reported. Such report shall be duly filled in and signed by Customer and operating staff in charge. Always keep start-up report together with the instruction booklet.

### Start-up.

For SFERASOL™ start-up follow the indications below:

- Set the thermostat of the control board at 3 °C
- Give power tension to the board.
- Open inlet cold water valve.

**Note: circulator rotation speed is set by Manufacturer at first speed (950 RPM); such setting must not be change.**

### Working principles.

As soon as a temperature difference between thermal liquid and storage tank water, the control board activates circulating pump, which moves thermal liquid until same storage tank temperature is reached with minimum power consumption. Thermal re-balancing is then obtained.

The whole system can be switched off through the apposite switch fitted by the installer.

### Instructions after installation.

Maximum efficiency of SFERASOL™ panel is reached after half day full sunshine from installation. For this reason, we suggest to avoid warm water consumption during the first two days after installation, even if sunlight exposure conditions are optimum.

# 9

## Maintenance.



Maintenance operations enable to keep the machine in perfect working conditions.

The most important components of the machine must be kept clean for inspection.

Inspections must be done in order to keep the machine in perfect functioning. Inspections are split in monthly or annual inspections.

During inspections safety advices must be carefully followed.

### Safety advices.



#### **WARNING:**

#### **Lesion risk!**

#### **Check**

**Ensure that power is switched off before opening inspection doors.**

**Always check that the machine is maintained switched off during operation (main switch position "0")**

### Monthly inspection.

- Check that re circulating pump is working properly.
- Check that no electrical cable is damaged.
- In case of damage, cables must be replaced by specialized staff.
- Check tightness of connections (no losses) and ensure that no damages are present (flexible hoses, etc.)
- In case of damage, connections must be replaced by specialized staff.

### Annual inspection.

- Magnesium anode must be carefully checked by Authorized Service Centre. Any relevant labour costs and component expenses shall be at Customer's charge.
- Thermal liquid of the closed circuit must be carefully checked by Authorized Service Centre. Any relevant re-filling or replacement shall be done by Authorized Centre and any labour costs or component expenses shall be at Customer's charge.

### Other controls.

Methachrylate spherical bowls must be periodically cleaned with a damp soft mop (NOT ABRASIVE). Do not use cleaning solvents or acid substances, use neutral cleaning detergents only.



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## Storage.

No particular care is necessary but storage place must be clean and the machine should be covered in case of a quite long non working period.

- In case of quite long non working period of the appliance, this one must be covered with the white plastic cover supplied, without disconnecting power supply.
- To re-start the appliance after a long non working period, follow instructions indicated in relevant paragraph.

## Extra-ordinary maintenance.

In case of breakings or damages to the appliance or to any other components, revert to the Authorized Service Centre.

# 10 | Level Control.

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You will find a plug with dipstick to measure the glycol level in the Sferasol™. Set the Sferasol™ SF -S, as required by the O & M manual, unscrew the eyebolt and remove the brass cap [ Key 27] .

Insert and tighten plug with dipstick .

NOTE: measurement of the level of glycol in the expansion vase should always be made with Sferasol™ SF -S turned off.

Keep the brass cap and the lifting eye for future transit.

# 11

## Troubleshooting and spare parts.



In case a satisfying warm water quantity is not assured, follow instructions below:

1. Consider weather conditions .
2. Consider domestic water .
3. Check carefully tightness of all connections of the system and fasten or replace any loose connections.
4. Check thermal liquid level and tap up if necessary.

If efficiency is not enough, contact the Reseller.

### TROUBLESHOOTING.

FAILURE	POSSIBLE ROOT CAUSE	WHAT TO DO
<b>Circulation pump does not run</b>	Control Unit out of order	Replace Control Unit.
	Circulation Pump out of order.	Replace Circulation Pump.
	Temp sensor interrupted. (infinite resistance)	Replace Sensor.
	Outer temp sensor short circuited. (resistance = 0)	Replace Sensor.
	Inner or outer temp sensors interrupted or unplugged. (infinite resistance)	Replace Sensor.
<b>Circulation pump always on</b>	Inner or outer temp sensors short circuited	Replace Sensors.
	Outer sensor interrupted (infinite resistance)	Replace Sensor.
	Inner temp sensor short circuited. (res.= 0)	Replace Sensor.
	Control Unit out of order	Replace Control Unit.

Spare parts must be in compliance with Manufacturer specifications requirements. Original spare parts satisfy such requirement.



## 12 | Sferasol™ without tank inside SF-A.

**SFERASOL™** can be supplied without storage tank also. This is an ideal solution for swimming-pools systems, systems with centralized storage and solutions in which only primary circuit is needed.

The appliance without storage tank is supplied without the following:

- Water storage tank
- Heat exchanger
- Expansion pot
- Circulating pump
- Differential thermostat (**SFERASOL™** panel is supplied with two sensors, one already connected the panel and the other to be connected inside the tank, which will be fitted in case of swimming-pools systems, inside the thermal exchanger)
- Thermal fluid. (Primary circuit will be closed and will be charged, but regarding TOTAL primary circuit, necessary quantity of thermal liquid shall be quantified depending on the realized system).

All missing components can be supplied by Sferasol Energy S.r.l. excepting the storage tank.



**WARNING:**

**During installation of the system primary circuit must not be higher than 0,5 bar. Captators would be seriously damaged if the above value has overcome.**

Regarding **SFERASOL™** without storage tank, always consider that dimensioning is not made by Sferasol S.r.l., so any damages occurred or any malfunctioning to the final system shall not be attributable to Sferasol Energy S.r.l.

During installation of a **SFERASOL™** panel without storage tank, follow instructions relevant to **SFERASOL™** with storage water tank



# 13 | Sferasol™ Data Sheet SF-S



Integrated Storage Collector SFERASOL™ made by:

- 2 external metachrylate hemispheres
- 2 internal steel 09/10 P06 hemispheres
- 1 water tank in INOX AISI 304 stainless steel
- 1 heat exchanger in INOX AISI 304 stainless steel, length 8.20 m
- 1 INOX AISI 304 stainless steel basement
- 1 30W – 1.300 rpm Circulation Pump
- 1 Electronic Control Unit

### System Classification

System Model: .....SFERASOL™  
System Code: ..... SF-S  
Classification: .....forced circulation, integrated with storage tank

### Collector System

Nr. of Collectors: .....1  
Gross Collector Surface: .....4,524 m<sup>2</sup>

### Collector Data

Type: .....Spherical  
Gross total surface: .....4,524 m<sup>2</sup>  
Aperture surface: .....1,130 m<sup>2</sup>  
Net total surface: .....0,891 m<sup>2</sup>  
Nr. of coverages: .....1  
Coverage Material: .....Merthacrylate  
Coverage thickness: .....3 mm  
Structure material: .....INOX AISI 304 Stainless Steel  
Net mass: .....130 kg  
Outer dimensions: .....1200\*1200\*1600 mm

### Absorber

Material: .....09/10 P06 steel  
Surface treatment: .....black selective paint - high opacity  
Connections: .....copper pipes Ø 8mm

### Thermalconvector fluid

Type:mixture of monopropylene glycol + water  
Antifreeze protection: ..... YES

### Storage

Capacity: .....150 liters  
Storage material: ..... INOX AISI 304 steel  
Dimensions: ..... Ø 600mm – H 850mm  
Isolation ..... polyurethane 45 kg/m<sup>3</sup>  
Isolation thickness: .....50 mm  
Heat Exchanger: .....Ø 27mm - INOX AISI 304  
Length: .....8200 mm  
Operating pressure: .....system pressure – max 6 bar

Protection against Corrosion: .....Magnesium anode, L 600mm  
Electric RESistance (optional) .....400W – 1200W

### Connections

Hot water: .....Ø ½" R  
Cold water: .....Ø ½" R

# 14 | Sferasol™ Data Sheet SF-A



## Product

Integrated Storage Collector SFERASOL™ made by:

- 2 external metachrylate hemispheres
- 2 internal steel 09/10 P06 hemispheres
- 1 INOX AISI 304 stainless steel basement
- 1 INOX AISI 304 stainless steel structure

## System Classification

System Model: .....SFERASOL™  
System Code:..... SF-A  
Classification:.....forced circulation

## Collector System

Nr. of Collectors:.....1  
Gross Collector Surface:.....4.524 m<sup>2</sup>

## Collector Data

Type: .....Spherical  
Gross total surface:.....4.524 m<sup>2</sup>  
Aperture surface:.....1.130 m<sup>2</sup>  
Net total surface:.....0.891 m<sup>2</sup>  
Nr. of coverages:.....1  
Coverage Material:.....Merthacrylate  
Coverage thickness:.....3 mm  
Structure material:.....INOX AISI 304 Stainless Steel  
Net mass:.....80 kg  
Outer dimensions:.....1200\*1200\*1600 mm

## Absorber

Material:.....09/10 P06 steel  
Surface treatment:.....black selective paint - high opacity  
Connections:.....copper pipes Ø 8mm

## Thermalconvector fluid

Type: .....mixture of monopropylene glycol + water  
Antifreeze protection:.....YES

## Connections

Inlet glycol:.....Ø 1/4"R  
Outlet glycol:.....Ø 1/4"R

## Operating pressure

**Maximum:.....0.5 Bar**



Thank you for choosing SFERASOL™

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