

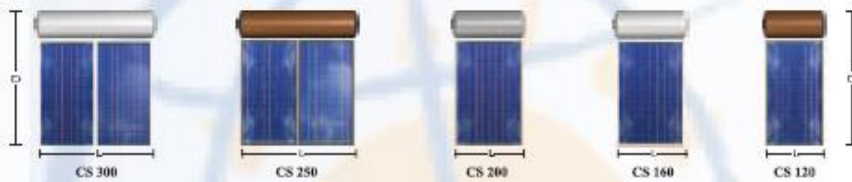
# STANDARDIZATION WATER-HEATERS



## AVAILABLE STANDARD WATER-HEATERS

Model	STAINLESS STEEL					ENAMELLED				
	CS 120	CS 160	CS 200	CS 250	CS 300	CS 120	CS 160	CS 200	CS 250	CS 300
Number of collectors	1	1	1	2	2	1	1	1	2	2
Collectors' Model	CS-M	CS-L	CS-L	CS-M	CS-M	CS-M	CS-L	CS-L	CS-M	CS-M
Collectors total gross surface	2,0	2,56	2,56	4,0	4,0	2,0	2,56	2,56	4,0	4,0
Collectors total aperture surface (m <sup>2</sup> )	1,83	2,30	2,30	3,66	3,66	1,83	2,30	2,30	3,66	3,66
Support base's weight (kg)	20	20	20	21	21	20	20	20	21	21
Net weight (kg)	104	126	139	172	180	112	135	148	180	187
Gross weight (kg)	222	280	335	412	472	230	289	344	420	479
Indicatory number of users*	☺☺	☺☺☺☺	☺☺☺☺	☺☺☺☺☺☺	☺☺☺☺☺☺	☺☺	☺☺☺☺	☺☺☺☺	☺☺☺☺☺☺	☺☺☺☺☺☺

\*If the water-heaters are orientated properly

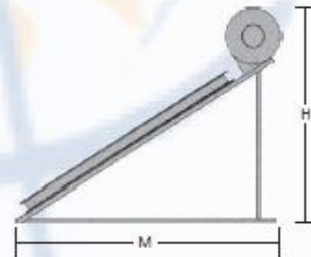


**5 years GUARANTEE**

## DIMENSIONS OF THE SOLAR WATER-HEATERS

Model	H (mm)	M (mm)	L (mm)	D (mm)
CS-120	1910	2130	1110	2580
CS-160	1910	2130	1390	2580
CS-200	1960	2130	1390	2630
CS-250*	1960	2130	2150	2580
CS-300	1960	2130	2150	2630

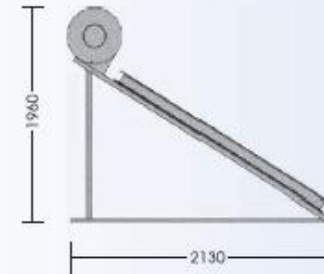
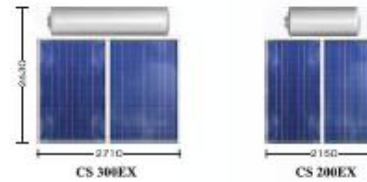
\*The H of the CS-250 INOX model is 1,910 mm



## EXTENDED COSMOSOLAR WATER-HEATERS

Model	STAINLESS STEEL		ENAMELLED	
	CS 200 EX	CS 300 EX	CS 200 EX	CS 300 EX
Number of collectors	2	2	2	2
Collectors' Model	CS-M	CS-L	CS-M	CS-L
Collectors total gross surface	4,0	5,12	4,0	5,12
Collectors total aperture surface (m <sup>2</sup> )	3,66	4,60	3,66	4,60
Support base's weight (kg)	21	21	21	21
Net weight (kg)	165	206	174	213
Gross weight (kg)	363	498	370	505
Indicatory number of users*	☺☺☺☺☺☺	☺☺☺☺☺☺	☺☺☺☺☺☺	☺☺☺☺☺☺

\*If the water-heaters are orientated properly



These water-heaters are only available when ordered, because the connections and the size of the connecting pipes are subject to change.

## COSMOSOLAR WATER-HEATER SET

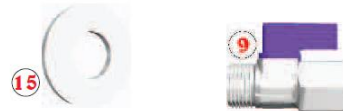
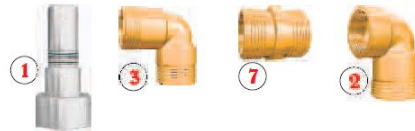
For better protection and in order to ease the loading and unloading procedure, the COSMOSOLAR products are delivered on pallets.

### No OF COLLIS PER SYSTEM

Model	Storage Tank (No)	Collector (No)	Support Base (No)	Accessories (No)	Total number of collis per water heater (No)
CS-120	1	1	1	1	4
CS-160	1	1	1	1	4
CS-200	1	1	1	1	4
CS-250	1	2	1	1	5
CS-300	1	2	1	1	5

# PARTS AND COMPONENTS OF THE COSMOSOLAR WATER HEATERS

1. Safety valve 1,5 bar for the closed circuit. Unit 1.
2. Elbow raccord MF 3/4" x 3/4". Units 2.
3. Elbow raccord MM 3/4" x 3/4". Unit 1.
4. Elbow raccord MF 1/2" x 1/2". Unit 1.
5. Small stainless steel hose with insulation. Unit 1.
6. Rubber washers for water-proof protection. Part. 4 for water-heaters with one collector and part 8 for water-heaters with two collectors.
7. Pipe unions (double MM 3/4" x 3/4"). Only for models with two collectors. Units 2
8. Non-return and safety valve 13 Bar. Unit 1.
9. Spherical valve FM 1/2". Unit. 1.
10. Big stainless steel hose with insulation. Unit 1.
11. Collector's side covers. Part. 4 for water-heaters with one collector and Part 2 for those with two collectors.
12. Screws and relative nuts:
  - Ø M 8 in order to screw the collectors at the binding angles. Part. 4 for water-heaters with one collector and Part 12 for those with two collectors.
  - Ø 3/8" for all other uses. Part. 30 for water-heaters with one collector and Part 38 for those with two collectors.
13. Bolts and bolt-nuts: 5/16" x 80 / Ø 10. Part. 8 for all water-heaters.
14. Filling system: pipe union with side inlet (T -type), Mx Mx Sewage raccord (3/4" x 3/4" x 3/4").
15. Metallic washers Ø 8 x 24 in order to tighten the collectors at the hooks (Part. 4 for water-heaters with one collector and Part 12 for those with two collectors).
16. Metallic washers Ø 10 x 20 for the Storage Tank and the tightening of the collectors angle, which hold the base (Part. 12 for water-heaters with one collector and Part 20 for those with two collectors).
17. Non-toxic propylene glycol: 2 lt for water-heaters with one collector and 3 lt for water-heaters with two collectors.



## GENERAL INSTALLATION RULES

Installation should in any case take place under certain rules according to the plumbing and electrical installations.

### INSTALLATION SITE

Be sure that the roof, flat or tiled one, where the installation will take place, is solid enough in order to stand the weight of the solar water-heater. Relevant weights are reported to the charts "Available standard and extended Cosmosolar water-heaters" page 8 and 9 accordingly. If the roof is not compatible with the available Cosmosolar support base, another base has to be used, based on the plans of the installer and always according to the buyer's preferences.

### ORIENTATION

The ideal orientation is achieved when the collector/s is heading close to the Equator (South for the north hemisphere, north for the south hemisphere). Details on INDEX II, page 27.

### INCLINATION

Cosmosolar support base's angle is 40 degrees. Details on INDEX I, page 26.

### SHADING

Please try to avoid collector/s being shaded by any objects. Details on INDEX III, page 28.

### LEVELLING

In order to avoid any air bubbles in the interior of the closed circuit, it is necessary to level the water-heater. Details on INDEX IV, page 28.

### ANTIFREEZE PROTECTION

Ensure that the water-heater can stand low temperatures by mixing the supplied antifreeze fluid thus, that it can stand the lowest temperature of the past, concerning the installation site, plus a safety margin (See MIXING CHART AND RELEVANT FREEZING POINTS, Page 24). Protect the central water pipes (cold and hot) and in cases of areas with unusual climate changes, protect the outer parts with grounding, according to the weather conditions of the installation area. In areas of heavy snowfalls, predispose your installation so that it will be possible to close down the vertical pipes, in cases that the water-heater is not used during the winter.

### GROUNDING

The grounding of the water-heater is obligatory, not taking account whether the electrical resistance is connected or not.

### LINKAGE WITH THE CENTRAL SYSTEM

All connections are bound to have inter-electrical joints or at least interrupting parts by using non-metallic pipes between the storage tank and the main water supply.

### SPECIAL CLIMATE CONDITIONS

In case that at the installation site strong winds blow, secure the heater accordingly, by tightening the storage tank and the collectors with metallic strips and supporting the base through the addition of side counter-plates.

### HEAVY SNOWFALLS

Please note that snow should not be gathered behind the storage tank, so that the roof's static resistance is not negatively affected.

### KEEP THE ENVIRONMENT CLEAN

We are working in order to enjoy a clean environment. Please clean up the installation site, after this takes place.

# ASSEMBLING OF THE SUPPORT

## WATER-HEATERS WITH ONE COLLECTOR

**Step 1:** By using the plates A, B, C make up an orthogonal triangle, which has as its vertical axis plate A, as its horizontal axis plate B and plate C as its hypotenuse.

**Step 2:** Make up a cross by using the plates D.

### ATTENTION

4 cross-plates D are delivered. In order to make up a cross, assemble the parts by two.

**Step 3:** Screw the cross on the vertical axis of the triangle and use it as a support mean, leaving the unfinished base to bend forward.

**Step 4:** By using the second plates of A, B and C make up the second orthogonal triangle that also has as its vertical axis plate A, as its horizontal axis plate B and as its hypotenuse plate C.

**Step 5:** Join also the second triangle on the cross, by screwing tightly the cross on the vertical axis of the triangle. Now the base is ready to be lifted.

**Step 6:** Screw the supporting counter-plates H1 and H2 on each triangle. The H1 must be screwed on the outer side of each triangle.

**Step 7:** Join the lower rail-plate E and the binding angles at the diagonal sides of the orthogonal triangles (plates C) by screwing tightly the relevant screws.

### ATTENTION

The binding collector's angles G have to be placed on the rail of the lower rail-plate E so that their long side is situated at the lowest point.

**Step 8:** Join the upper rail-plate E and the binding angles G at the diagonal side of the orthogonal triangles (plates C), letting loose the relevant screws.

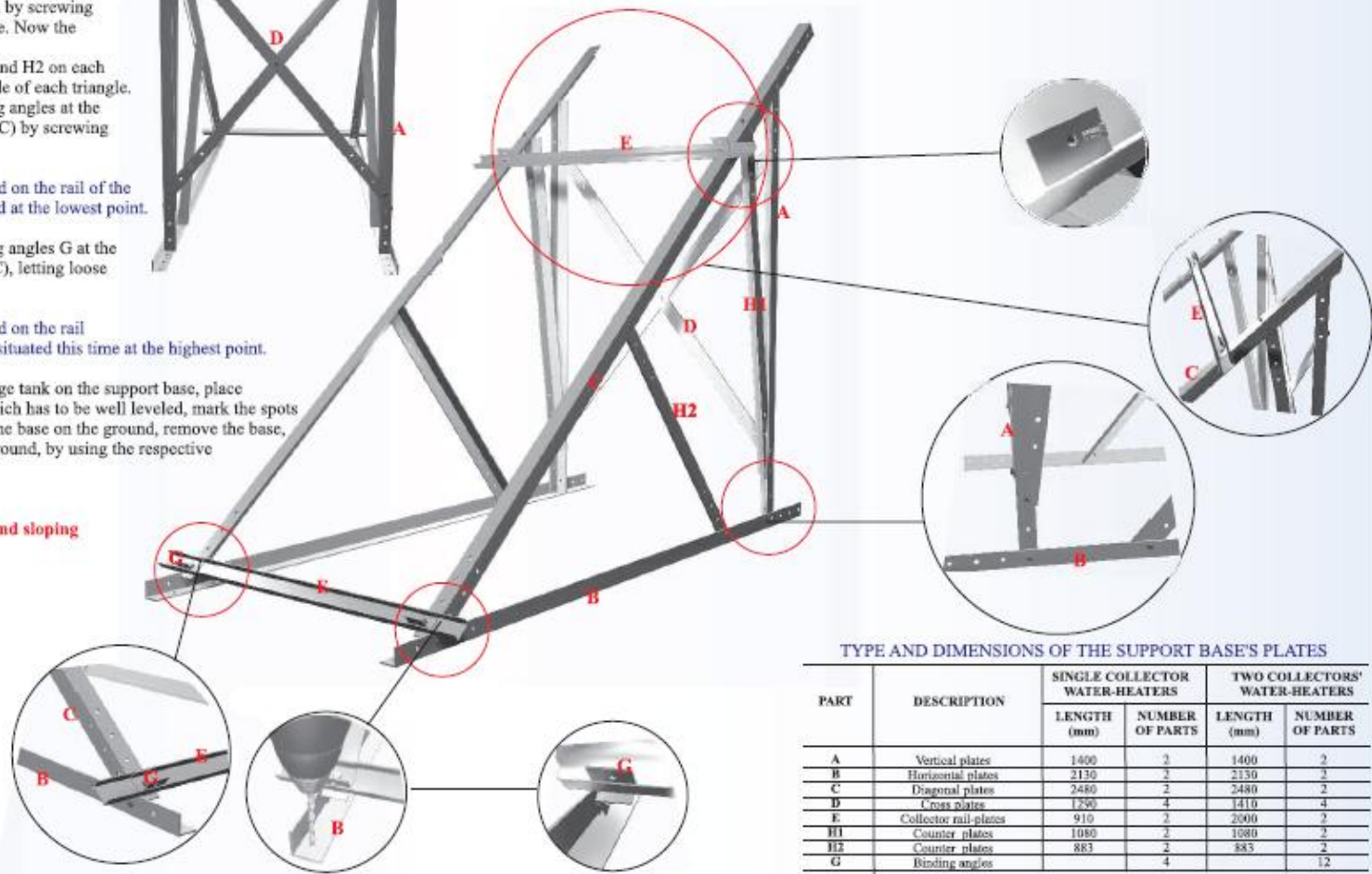
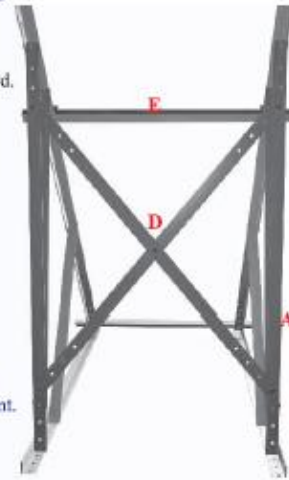
### ATTENTION

The binding collector's angles G have to be placed on the rail of the lower rail-plate E so that their long side is situated this time at the highest point.

**Step 9:** Before placing the collector and the storage tank on the support base, place the base at the installation site of your choice, which has to be well leveled, mark the spots where you will make the holes in order to place the base on the ground, remove the base, make the holes and, then, place the base on the ground, by using the respective bolts and bolt-nuts.

### ATTENTION

Always abide by the general rules of bearing and sloping



# BASE ON A FLAT SURFACE

**Step 10:** Place the collector on the base so that the outer sides of the binding angles G are inserted in the respective openings on the collector's frame, at first on the lower side and then on the upper side.

**Step 11:** Carefully place the collector on the binding angles by using the respective screws and metallic washers. Now, place the two screws/storage tank's brake on the third opening of the diagonal sides (plates C) commencing from the top side.

**Step 12:** Place the storage tank on the support base so that its plate holders (already installed) touch the diagonals (plates C) with that side, which has the resistance's flange placed on the left. The storage tank's proper position on the base is set when the lower angles of the plate holders meet the screws/storage tank's brake. Place the respective screws and tie up the storage tank on the base, always paying attention to the relevant leveling.

**Step 13:** Carefully check that all screws are tightly screwed.

TYPE AND DIMENSIONS OF THE SUPPORT BASE'S PLATES

PART	DESCRIPTION	SINGLE COLLECTOR WATER-HEATERS		TWO COLLECTORS' WATER-HEATERS	
		LENGTH (mm)	NUMBER OF PARTS	LENGTH (mm)	NUMBER OF PARTS
A	Vertical plates	1400	2	1400	2
B	Horizontal plates	2130	2	2130	2
C	Diagonal plates	2480	2	2480	2
D	Cross plates	1290	4	1410	4
E	Collector rail-plates	910	2	2000	2
H1	Counter plates	1080	2	1080	2
H2	Counter plates	883	2	883	2
G	Binding angles		4		12

# ASSEMBLING OF THE SUPPORT

## SINGLE COLLECTOR WATER-HEATERS

### Step 1:

By using the counter-plates H2= 883 mm and the two horizontal plates B=2130mm, form up an orthogonal rectangle. Please note that the internal angle of the plates is heading the interior of the orthogonal rectangle. The holes, which have to be used for the shaping of the orthogonal rectangle, are the outer holes of the four plates.

### Step 2:

Place C=2480mm (hypotenuses) on the two plates B in a way that the internal angle of the plates is heading the roof, while the side that contains the oval holes is on the top. Screw plates C on the plates B. The holes, which have to be used, are:  
Top side: forth side-hole (side that has only round holes) of plate C with the first side hole of plate B,  
Low side: use the holes that match.

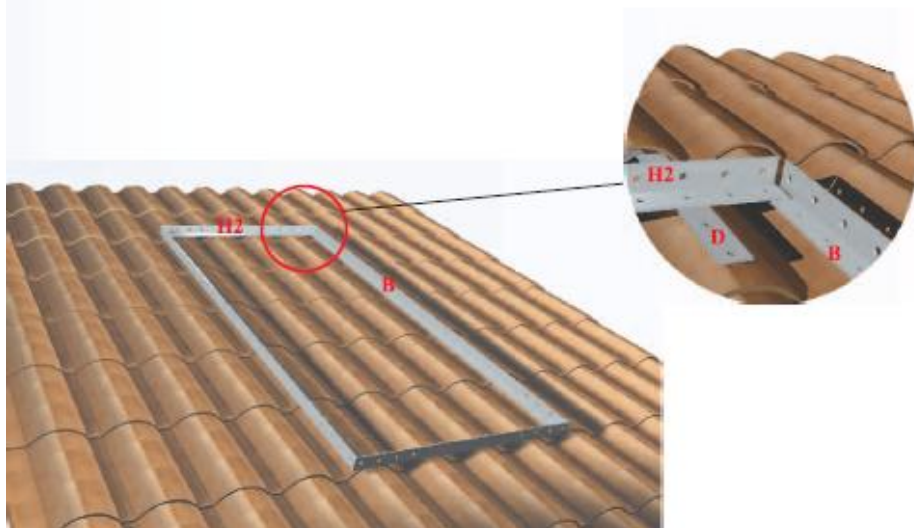
**Note: Steps 1 and 2 can take place on the roof or on the ground, depending on weather conditions.**

### Step 3:

After the selection of the water-heater's location site, remove the tile from the specific spots and position the 4 cross-plates D=1290mm, wrap them up around the internal roof-posts and screw them tightly. Place the tiles again leaving a part of plates D sticking out in order to attach upon the plates H2. Screw tightly the four plates D on plates H2. Plates H2 have six available holes; use the most suitable ones.

### Step 4:

Place lower rail-plate E and the binding angles G on plates C, while screwing tightly the respective screws.



# BASE ON A TILE ROOF

### ATTENTION

The binding angles G have to be inserted in the rail of the lower rail-plate E, so that the long side of the angle is located on the lower side.

### Step 5:

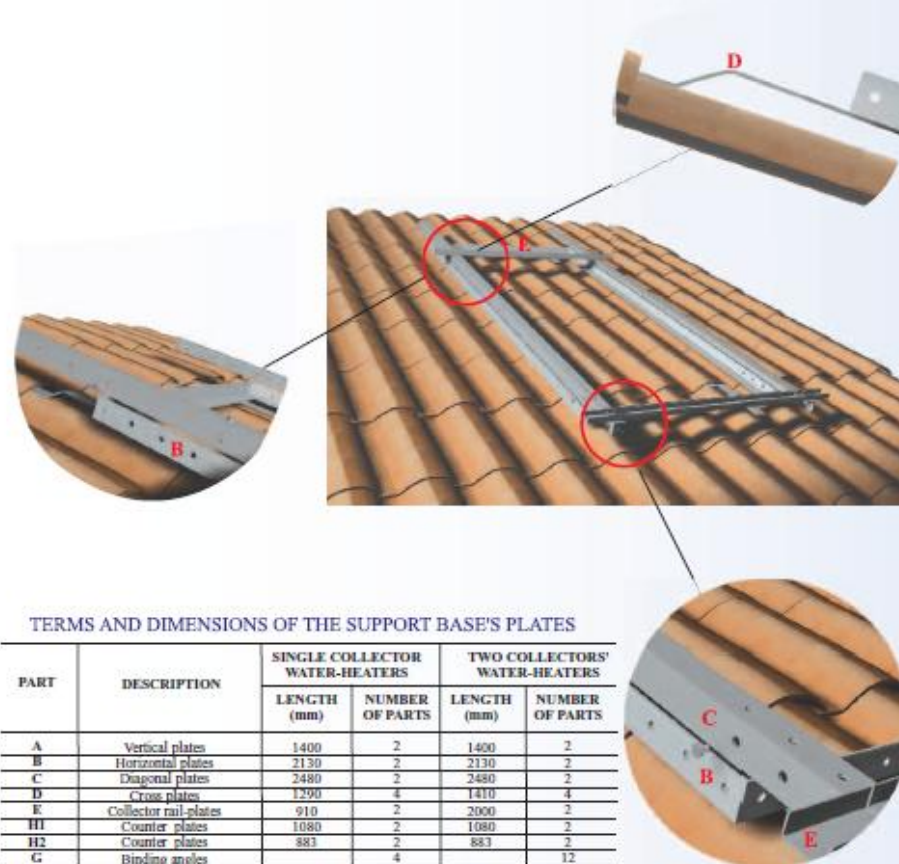
Place the top rail-plate E and the binding angles G on plate C, leaving the respective screws loose.

### ATTENTION

The binding angles G have to be inserted in the rail of the top rail-plate E, so that the long side of the angle is located on the top-side.

### Step 6:

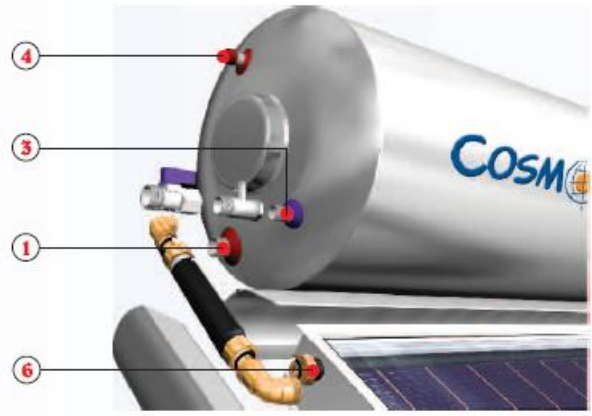
Collectors and storage tanks are placed on the support base at the same way that these are placed on a flat roof.



TERMS AND DIMENSIONS OF THE SUPPORT BASE'S PLATES

PART	DESCRIPTION	SINGLE COLLECTOR WATER-HEATERS		TWO COLLECTORS' WATER-HEATERS	
		LENGTH (mm)	NUMBER OF PARTS	LENGTH (mm)	NUMBER OF PARTS
A	Vertical plates	1400	2	1400	2
B	Horizontal plates	2130	2	2130	2
C	Diagonal plates	2480	2	2480	2
D	Cross plates	1290	4	1310	4
E	Collector rail-plates	910	2	2000	2
H1	Counter plates	1080	2	1080	2
H2	Counter plates	883	2	883	2
G	Binding angles		4		12

# HYDRAULIC LINKAGE



**Step 1:**  
Please ensure that two collector's water-heaters are connected in parallel.

**Step 2:**  
Connect the elbow raccord MM $\frac{3}{4}$ " x  $\frac{3}{4}$ " on the outlet pipe of the collector (it is placed on the collector's left side No 6 of the above picture). Do not forget the rubber washers.

**Step 3:**  
Connect the elbow raccord MM $\frac{3}{4}$ " x  $\frac{3}{4}$ " on the jacket outlet of the storage tank (indicator JACKET OUTLET No 2 of the right page top picture). Do not forget the rubber washers.

**Step 4:**  
Connect the T-type filling system (MxMx sewage Raccord,  $\frac{3}{4}$ " x  $\frac{3}{4}$ " x  $\frac{3}{4}$ ") on the inlet of the collector/s (it is placed on the right low side of the collector No 7 of the right page bottom picture) so, that the sewage raccord is heading towards the low side of the collector. Do not forget the rubber washers.

**Step 5:**  
Connect the short insulated hose on the jacket inlet of the storage tank (indicator JACKET INLET No 1 of the above picture) and on the outlet of the collector (No 6 of the above picture). Do not forget the rubber washers.

**Step 6:**  
Connect the long insulated hose on the jacket outlet of the storage tank (indicator JACKET OUTLET No 2 of the right page top picture) and on the inlet of the collector (No 7 of the right bottom picture). Do not forget the rubber washers.

**Step 7:**  
Connect the non-return valve and the spherical valve with the inlet of the cold water supply at the storage tank (indicator COLD INLET No 3 of the above picture). Leave the spherical valve off.

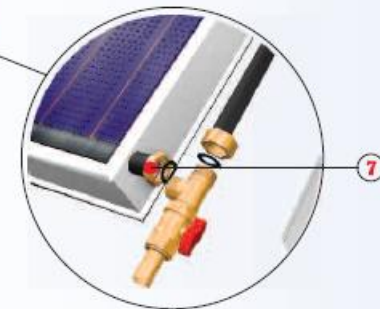
**Step 8:**  
Connect the above spherical valve with the cold water supply and the hot water outlet (indicator **HOT OUTLET** No 4 of the left page picture) at the hot water-supply.

**Step 9:**

The safety valve has to be connected with the only available storage tank's outlet (No 5 of the above picture) by using the elbow raccord FM  $\frac{1}{2}$ " x  $\frac{1}{2}$ " so, that the valve is positioned vertically.

**ATTENTION!**

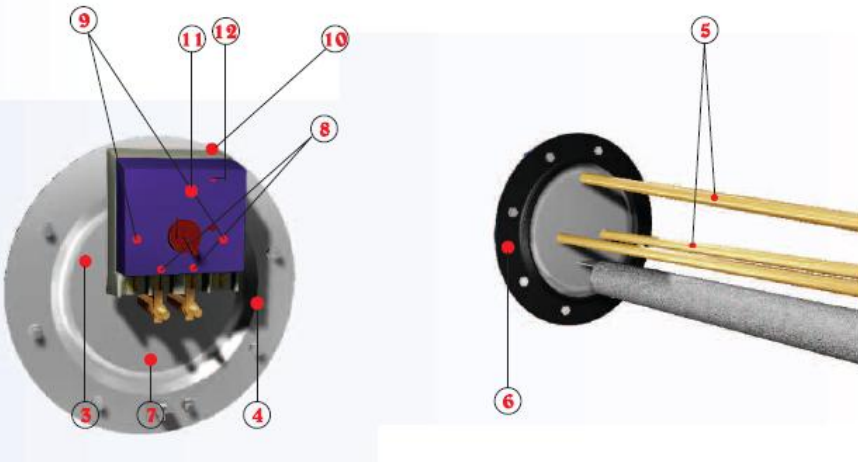
The safety valve should be placed after the filling of the closed circuit, while the elbow raccord of the safety valve should be placed before the filling of the closed circuit.



# ELECTRICAL BACK-UP

## ELECTRICAL RESISTANCE AND THERMOSTAT PARTS

- |   |  |
|---|--|
| 1. Electrical back up's tap.                            | 7. Ground terminal.  |
| 2. Wire introduction hole.                              | 8. Thermostat electrical resistance connection (performed by the manufacturer) |
| 3. Flange with electrical resistance and magnesium rod. | 9. Terminals' nuts.  |
| 4. Holes' positions for screws (8).                     | 10. Thermostat.  |
| 5. Electrical resistance with incorporated thermostat.  | 11. Temperature adjuster.  |
| 6. Rubber insulation washer.                            | 12. Thermal safety switch.   |



## ELECTRICAL RESISTANCE CONNECTIONS AND THERMOSTAT

- Step 1:** Shut down the main power switch  
**Step 2:** Remove the tap located on the left storage tank's side by unscrewing the three screws.  
**Step 3:** The thermostat's connection to the electrical resistance has already been performed by the manufacturer. Please check whether the nuts of the terminals are well screwed.

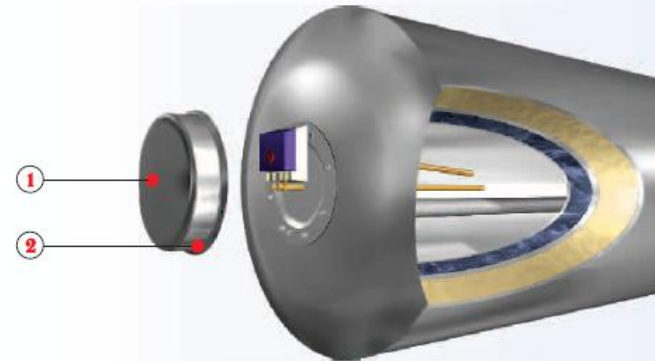
**NOTE**  
 The thermostat is set at 60°C but can be set to a different temperature through the temperature adjuster.  
 Do not set the thermostat above 75°C.

- Step 4:** Verify the location of the thermostat's thermal safety switch. The thermal switch is red and is working when pressed.  
**Step 5:** Place the external cord in the respective hole, of the resistance's tap and proceed with the electrical connections, following the electrical connections' chart seen below:

## ELECTRICAL CONNECTIONS CHART



# INSTALLATION OF THE ELECTRICAL RESISTANCE



## GENERAL RULES

- All the electrical connections must be performed according to the local laws in vigour.
- All the connections should be made by authorized electricians.
- Do not switch on the electrical back-up while the storage tank is empty.

**NOTE**  
 The power of the electrical back-up depends on the local conditions of the destination country.

## HEAT EXCHANGER INSTALLATION

A set of both an electrical resistance and a heat exchanger is available upon request (serpentine). For the water-heaters with a stainless steel storage tank, the heat exchanger is being fixed inside the storage tank by the manufacturer, so is available upon request.

For the water-heaters with an enameled storage tank, the electrical resistance and heat exchanger set can be installed by the technician or the factory, when ordered.

The electrical connections of the set previously described are similar with that of the plain electrical resistance.

The water connections of the heat exchanger is simply recommended to the connection with cold (out) and hot (in) water at the heating system.

# PUTTING THE WATER-HEATER

# INTO OPERATION

The solar water-heater is now fully installed. Now, it can be put into operation through the following procedure:

## BE SURE THAT CONNECTIONS ARE WATERPROOF

Before filling up the water-heater with water and the closed circuit with a mix of propylene glycol and water, all hydraulic connections have to be carefully checked, so as to be sure that these are tightly screwed and there are no leaks.

Hydraulic connection's check can take place through the following procedure, which can be proved useful for the cleaning of the closed circuit and removal of any dirt.

- Connect the sewage raccord of the filling/emptying water-heater's system with the water distributor by using a plastic pipe.
- Connect the safety valve's elbow raccord to a sewage using a plastic pipe.
- Switch on the water distributor and the filling/emptying system's distributor and let water flow inside the closed circuit for a few minutes.
- Switch off the water distributor and the filling/emptying system's distributor.
- Please check carefully all raccord connections and be sure that there are no leaks.

## EMPTYING THE CLOSED CIRCUIT

- Disconnect the plastic pipe from the water distributor and connect it to a sewage.
- Disconnect the plastic pipe from the safety valve.
- Switch on the filling/emptying system's distributor and empty all the water out of the closed circuit.

In case the outside temperature falls below freezing point, the washing up and waterproof check procedure for the hydraulic connections has to take place with a great deal of concern or even be postponed when the weather conditions improve.

## CLOSED CIRCUIT FILLING UP

### THERMAL FLUID

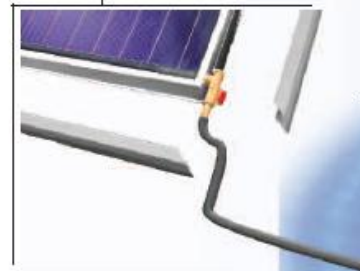
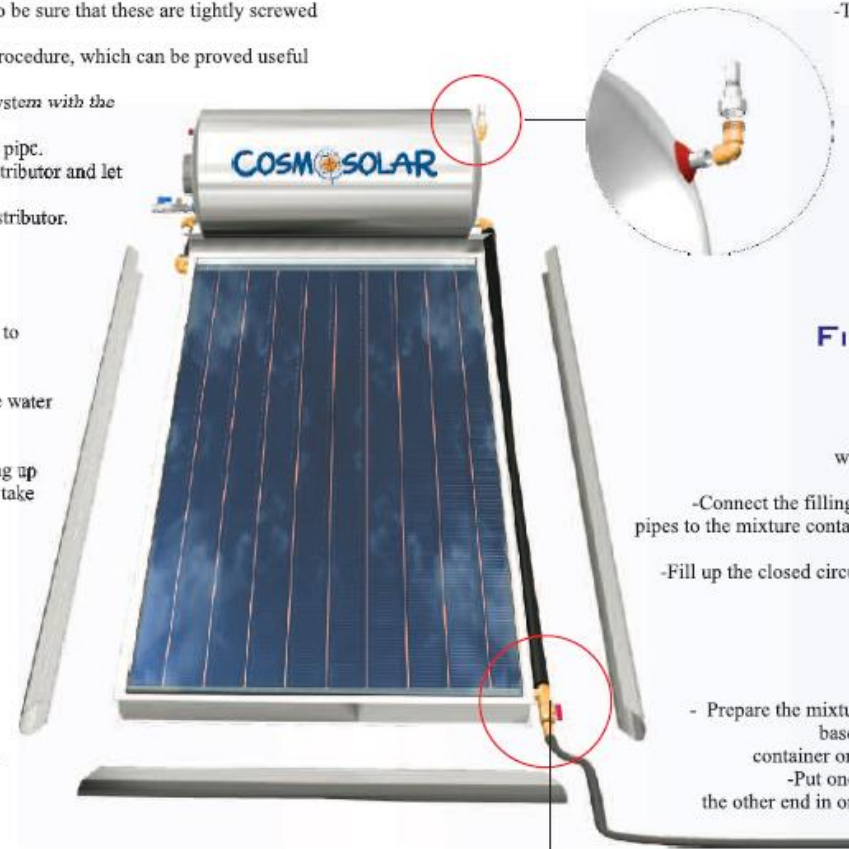
Non-toxic propylene glycol is used as a thermal fluid. Propylene glycol has to be mixed with water (preferably non-mineralized) by pouring propylene glycol to a container filled with water and not the opposite. The concentration of propylene glycol in the mixture is set, based on the following chart, which takes account of the minimum temperature the antifreeze has to stand.

### MIXING CHART AND RESPECTIVE FREEZING POINTS

Propylene glycol WEIGHT %	FREEZING POINT °C
10	-3,5
16	-6,3
20	-8
26	-12
30	-15
36	-20
40	-24
45	-30
50	-36
80	-47

### CAPACITY OF THE CLOSED CIRCUIT

Type	Enamelled	Stainless Steel
CS-120	7	7
CS-160	8	8
CS-200	8,3	8,3
CS-250	10,4	12
CS-300	11	11
CS-200EX	9,8	9,8
CS-300EX	11,7	11,7



## FILLING PROCEDURE

The closed circuit filling procedure has to take place with a storage tank filled with water.

### FILLING THE STORAGE TANK WITH WATER

- Turn on a hot water supply distributor at the house.
- Turn on the spherical valve and fill at the storage tank with water from the central water supply.
- When the storage tank is full, switch off the hot water distributor at the house, which was left on.

### IMPORTANT NOTE

The connection of a pressure reducer on the cold water inlet will increase the expected life of the storage tank.

## FILLING-UP THE CLOSED CIRCUIT

### FILLING WITH PRESSURE

- Prepare the propylene glycol/water mix in a container, where the quantity and percentage is set based on the above mixing-and freezing point-chart.
- Connect the filling pump (e.g. manual pump or other) with the aid of plastic pipes to the mixture container and to the sewage raccord of the filling/emptying set.
- Turn on the distributor of the filling/emptying set.
- Fill up the closed circuit with the mixture with the help of the pump, until water overflows from the safety valve's elbow raccord.
- Turn off the distributor of the filling/emptying set.
- Connect the safety valve.

### FILLING-UP WITH GRAVITY

- Prepare the mixture in a container, where the quantity and percentage is set based on the above mixing and freezing point chart. Place the container on the storage tank or at a spot higher than the storage tank.
- Put one end of the plastic pipe in the container, suck a little from the other end in order to achieve thermosifonism and then connect the latter to the sewage raccord of the filling/emptying set.
- Turn on the distributor of the filling/emptying set and let the closed circuit fill up until water overflows out of the safety valve's hatch.
- Turn off the distributor of the filling/emptying set.
- Connect the safety valve.

The water-heater is ready to work. Uncover the collectors, clean up the water-heater and the collectors' surface and the water-heater will automatically commence to work.