# ENG Technical Manual

ENERGIE®

# ECO

**200esm | 250esm | 300esm**
**300esms**
**250i | 300i |250is | 300is |500is**
**250ix | 300ix**
**250isx | 300isx | 500isx**

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Directives
**2006/95/CE**

European Certification
**EN 60335-1**
**EN 60335-2-21**
**EN 60335-2-40**

CE

Esteemed Client,

We would like to thank you for your choice when you acquired an equipment for sanitary water heating.

The thermodynamic solar system **Eco** will surely meet all your expectations and provide many years of comfort with maximum power saving.

Our organization dedicates much time, energy and economic resources in order to develop innovations that will promote power saving in our products.

Your choice has demonstrated your good sense and concern with power consumption, a matter that affects the environment.

We have taken on a permanent commitment to conceive innovative and efficient products so that this rational use of energy can actively contribute to the preservation of the environment and natural resources of the planet.

Keep this manual whose objective is to inform, alert and advise about the use and maintenance of this equipment.

Our services are always at your disposal. Feel free to call upon us!

# INDEX

# 1. IMPORTANT

## 1.1. Symbols

| | |
|---|---|
|  | Every process that the supplier believes to be conducive to harmful danger and/or material damage, will be signalled with a danger sign.<br>For a better characterization of the danger, the symbol will be followed by one of these words:<br>• **DANGER**: when there is the possibility of harm to the operator and/or people in the vicinity of the equipment.<br>• **WARNING**: when there is the possibility of material damage to the equipment and/or attached materials. |
|  | All the information that the supplier believes to be an asset for better performance and preservation of the equipment, will be signalled together with the information sign. |

## 1.2. Pre-installation Information

**WARNING / DANGER**

The electrical installation of the equipment must comply with the national regulations for electrical installations in effect.

**Eco** will only operate after receiving its load of coolant.

The maximum water pressure into the hydraulic circuit inlet is 0.3 Mpa and the minimum pressure is 0.1 MPa.

The power supply is 230 V, 50 Hz, and the power supply cable is plugged into a socket with earth wiring.

If the power supply cable is damaged, it must be replaced by the manufacturer, by its customer service, or by staff with similar training in order to avoid any danger.

**Eco** will only operate if the storage water heater is filled with water.

**DANGER**

This device can be used by 8 year old children and older, or people with physical, sensorial or mental handicaps, or lacking experience / knowledge, if they received training regarding the running of the device in a safe way and are aware of the dangers involved.
Children must not play with the appliance.

## 1.3. Safety information

**When installing**:

- The installation of a thermodynamic equipment for heating sanitary water must be carried out by staff with suitable training and qualified for this purpose;
- The device should not be installed in places that present a risk of impact, shock or explosion;
- Keep the equipment packed until you reach the place and moment of installation;
- Make sure all hydraulic couplings are watertight before connecting the equipment to the power supply.

**Maintenance of the equipment:**

- Equipment maintenance should be carried out by customer service, except operations of general and continuous cleaning which could/should be carried out by the user;

- Power supply to the equipment must be disconnected when doing maintenance operations;
- The supplier recommends at least one annual inspection to the equipment, by a qualified technician;

- Cleaning and maintenance must not be carried out by children unless they are under supervision.

**High pressure and temperature:**

- The principle for running this equipment is directly linked to high temperature and pressure; thus, the processes that imply contact with the equipment must be thought out with caution to prevent the risk of burns and projection of material;

**Cooling Fluid**

- The cooling fluid employed in the whole process is R134a, CFC-free, non-inflammable and without harmful effects for the ozone layer;
- However, according to the law, the fluid in this equipment cannot be released into the environment;
- Handling of the fluid in the equipment must be carried out by a qualified technician.

**Information for the Client**

- The Installer must inform the client about the running of the equipment, its dangers, rights and duties of the client;

# 2. PACKAGE

## 2.1. Contents

The equipment is supplied in three packages, one for the thermodynamic panel and its attachment elements, one for the storage water heater and another for the thermodynamic block together with the hood and elements to attach to the storage water heater.

The packages contain:

I. Thermodynamic panel + its attachment elements
II. Storage Water Heater
III. Thermodynamic block + attachment elements
IV. Hood + Electronic panel
V. Installation manual and Warranty
VI. Dielectric joints (except stainless steel tank)

## 2.2. Transport

| | |
|---|---|
| **WARNING** | ➢ Transporting the equipment must be carried out with an inclination below 45º;<br>➢ The equipment must be raised and lowered with extreme care to avoid impact that could damage the material;<br>➢ Make sure the belts and/or transportation straps do not damage the material;<br>Always use means of transportation suitable for the equipment (pallet lift, forklift, etc…); |

The equipment must be transported in its original package to the place of installation. Check, before beginning transport of the external unit, if the path you will travel is unobstructed, in order to prevent collisions that could cause damage to the device.

The packages contain the following information symbols:

| | |
|---|---|
|  | Fragile, handle with extreme caution |
|  | Make sure the arrows are always up |
|  | Keep the package dry |
|  | Do not stack packages |

# 3. SPECIFICATIONS

## 3.1. Running principle

The thermodynamic solar system **Eco**, is an equipment based upon the principle of cooling by compression – Principle of Carnot – which we designate **Thermodynamic Solar Systems**: solar panel and heat-pump. The **solar panel**, the main component, placed outside, is in charge of collecting the energy from:

- ✓ Diffuse and direct solar radiation.
- ✓ External air, by natural convection.
- ✓ The wind effect (almost invariably available).
- ✓ Rainwater.

The temperature gradient caused by the external agents mentioned, ensures the **klea** (ecological cooling fluid) will evaporate inside the solar panel.

The absence of glass in the panel allows for an increased thermal exchange by convection.

After circulation in the panel, the klea is aspirated by the system's mechanical component, the **compressor**, which will increase its temperature and pressure; it is then transferred to the water circuit through a **heat exchanger**.

Before the Klea returns to the solar panel it is necessary that there should be a narrowing, that is, reduce the pressure and ensure that it is again in a liquid state, thus completing the cycle.

The easy way we combine technology with a law of Nature (change of state of a fluid), demonstrates the true potential of the Thermodynamic Solar System - Eco.

## 3.2. Technical features (x1 panel)

| | | | Unid | 250i | 300i | 200esm | 250esm | 300esm | 250ix | 300ix |
|---|---|---|---|---|---|---|---|---|---|---|
| HOT WATER CYLINDER | Dry Weight | | Kg | 62 | 74 | 73 | 83 | 95 | 69 | 81 |
| | Capacity | | lts | 250 | 300 | 200 | 250 | 300 | 250 | 300 |
| | Internal Protection | | - | Stain. Steel | | Enamelled | | | Stain. Steel | |
| | Cathodic Protection | | - | Magnesium Anode (1"1/4 Female) | | | | | | |
| | Hydraulic Joints | Water – Inlet and Outlet | inch | 3/4" Male | | | | | | |
| | | TP Valve | | 1/2" Female | | | | | | |
| | | Recirculation | | 3/4" Male | | | | | | |
| | | Coil – Inlet and Outlet | | Not Applicable | | | | | 1" Male | |
| | Maximum Pressure | | bar | 7 | | | | | | |
| | Test Pressure | | bar | 10 | | | | | | |
| | Maximum Water Temperature | | °C | 80 | | | | | | |
| | Heat Loss (EN 12897) | | kWh/24h | 1,01 | 1,17 | 1,04 | 1,2 | 1,39 | 1,01 | 1,17 |
| | Exchanger Output Power [1] | | kW | Not Applicable | | | | | a)30,0; b)18,0 | |

| | | | |
|---|---|---|---|
| THERMODYNAMIC SOLAR PANEL | Material | - | Solokote Anodized Aluminium |
| | Dimensions (L x W x H) | mm | 2000 x 800 x 20 |
| | Weigh | kg | 8 |
| | Max Working Pressure | bar | 12 |
| | Test Pressure | bar | 15 |
| | Max Exposure Pressure | °C | 120 |
| | Min Running Temperature | °C | - 5 |
| | Min Exposure Temperature | °C | - 40 |

| | | | |
|---|---|---|---|
| THERMODYNAMIC BLOCK | Width / Height / Depth | mm | 320 / 710 / 280 |
| | Weight | kg | 17,5 |
| | Absorved Power (Med/Max) | W | 390 - 550 |
| | Thermal Power (Med/Max) | W | 1690 / 2900 |
| | Electrical Backup Power | W | 1500 |
| | Compressor Type | - | Hermetic |
| | Compressor Noise Level | dB | 39 |
| | Refrigerant / Qt.[2] | - / g | R134a / 1100[2] |
| | Piping Material | - | Copper (DHP ISO1337) |
| | Line (Liq. \| Asp.) | inch | 1/4" \| 3/8" |
| | Power Supply | V / Hz | 230 monophase / 50 |
| | Fuse (Main \| Elect. Heater) | A | 10 \| 10 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Performance | Performance Coeficient (COP) [3] | EN 255 – 3 (air 7 ºC / air 20 ºC) | 3,4 / 4,6 | | 3,3 / 4,5 | 3,4 / 4,6 | | | |
| | | EN 16147 (air 7 ºC) | 2,9 | | 2,8 | 2,9 | | | |
| | Amount of Useful Water at 40 ºC | lts | 317 | 369 | 242 | 321 | 374 | 308 | 360 |

1) a) Primary (Tin=90 ºC; Tout=80 ºC); Production DHW (Tin=10 ºC; Tout=60 ºC)
b) Primary (Tin=70 ºC; Tout=60 ºC); Production DHW (Tin=10 ºC; Tout=60 ºC)
2) The amount of fluid must be checked by the installer. In some cases it is necessary to add or remove fluid in order to ensure the correct running of the system.
3) Water temperature from 10 ºC to 54 ºC

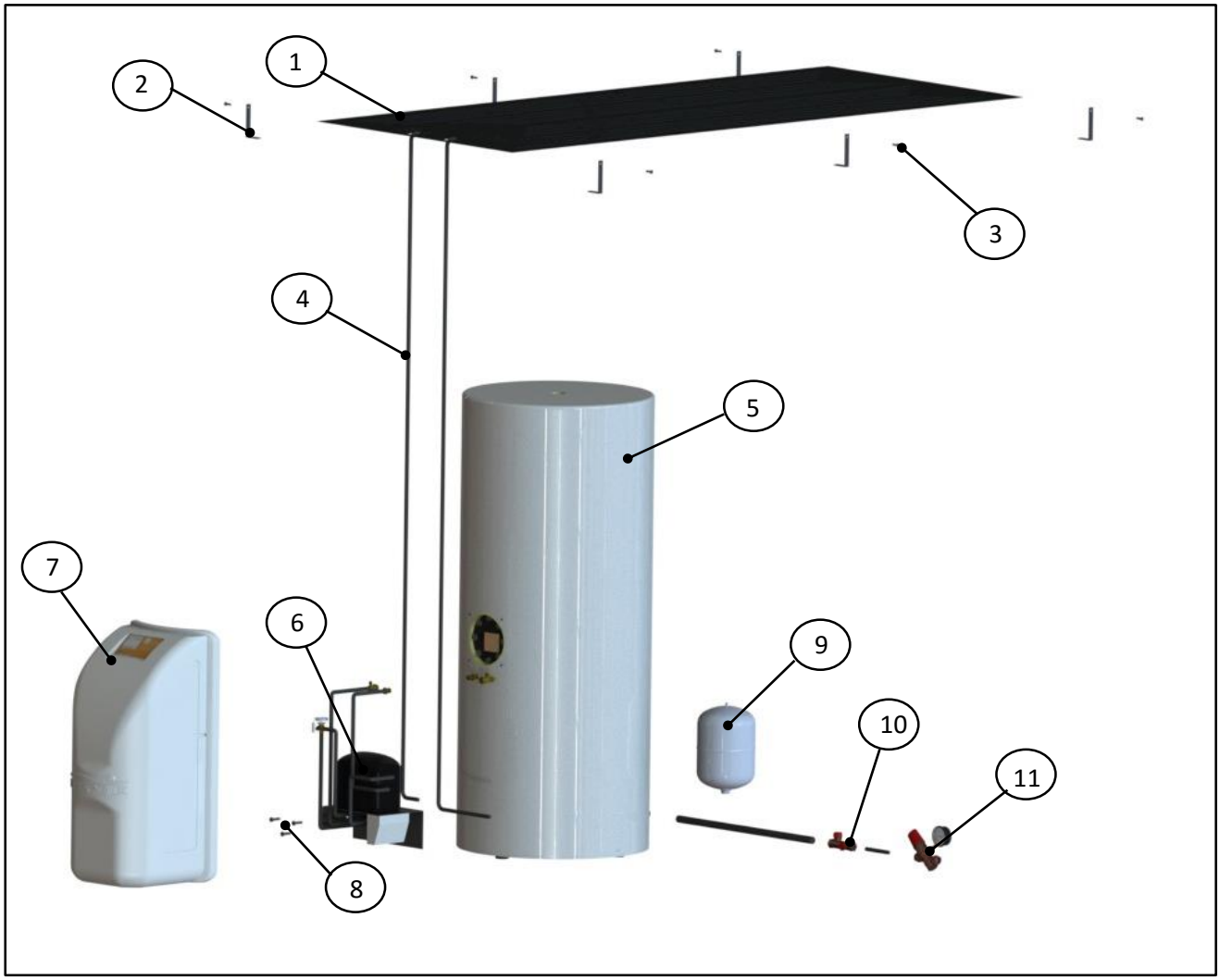
## 3.3. Technical features (2x panels)

| | | | Unid | 250is | 300is | 300esms | 250isx | 300isx | 500is | 500isx |
|---|---|---|---|---|---|---|---|---|---|---|
| HOT WATER CYLINDER | Dry Weight | | Kg | 62 | 74 | 95 | 69 | 81 | 110 | 121 |
| | Capacity | | lts | 250 | 300 | 300 | 250 | 300 | 455 | 455 |
| | Internal Protection | | - | Stain. Steel | | Enamelled | Stain. Steel | | Stain. Steel | |
| | Cathodic Protection | | - | Magnesium Anode (1"1/4 Female) | | | | | | |
| | Hydraulic Joints | Inlet | inch | 3/4" Male | | | 3/4" Male | | 1" Male | |
| | | Outlet | | 3/4" Male | | | 3/4" Male | | 1" Male | |
| | | TP Valve | | 1/2" Female | | | 1/2" Female | | 1/2" Female | |
| | | Recirculation | | 3/4" Male | | | 3/4" Male | | 3/4" Male | |
| | | Coil – Inlet and Outlet | | Not Applicable | | | 1" Male | | N/A | 1" Male |
| | Maximum Pressure | | bar | 7 | | | | | | |
| | Test Pressure | | bar | 10 | | | | | | |
| | Maximum Temperature | | °C | 80 | | | | | | |
| | Heat Loss (EN 12897) | | kWh/24h | 1,01 | 1,17 | 1,39 | 1,01 | 1,17 | 1,81 | |
| | Exchanger Output Power[1] | | kW | Not Applicable | | | a)30,0; b)18,0 | | N/A | a)54,2; b)32,5 |
| THERMODINAMIC SOLAR PANEL | Material | | - | Solokote Anodized Aluminium | | | | | | |
| | Dimensions (L x W x H) | | mm | 2000 x 800 x 20 | | | | | | |
| | Weight | | kg | 8 | | | | | | |
| | Max. working pressure | | bar | 12 | | | | | | |
| | Test pressure | | bar | 15 | | | | | | |
| | Max. exposure temp. | | °C | 120 | | | | | | |
| | Min. running temperature | | °C | - 5 | | | | | | |
| | Min. exposure temp. | | °C | - 40 | | | | | | |
| THERMODYNAMIC BLOCK | Width / Height / Depth | | mm | 320 / 710 / 280 | | | | | | |
| | Weight | | kg | 20,5 | | | | | | |
| | Absorbed power (Med/Max) | | W | 595 / 890 | | | | | | |
| | Thermal power (Med/Max) | | W | 2800 / 4550 | | | | | | |
| | Electrical Backup Power | | W | 1500 | | | | | 2200 | |
| | Compressor Type | | - | Hermetic | | | | | | |
| | Compressor Noise Level | | dB | 39 | | | | | | |
| | Refrigerant / Qt.[2] | | - / g | R134a / 1300[2] | | | | | | |
| | Piping Material | | - | Copper (DHP ISO1337) | | | | | | |
| | Line (Liq. \| Asp.) | | inch | 3/8" \| 1/2" | | | | | | |
| | Power Supply | | V / Hz | 230 Monophase / 50 | | | | | | |
| | Fuse (Main \| Elect. Heater) | | A | 10 \| 10 | | | | | | |
| Performance | Performance Coeficient (COP) [3] | EN 255 – 3 (air 7 ºC / air 20 ºC) | | 3,5 / 4,7 | | | | | | |
| | | EN 16147 (air 7 ºC) | | 3,0 | | | | | | |
| | Amount of Useful Water at 40 ºC | | lts | 317 | 369 | 374 | 308 | 360 | 537 | 525 |

1) a) Primary (Tin=90 ºC; Tout=80 ºC); Production DHW (Tin=10 ºC; Tout=60 ºC)
b) Primary (Tin=70 ºC; Tout=60 ºC); Production DHW (Tin=10 ºC; Tout=60 ºC)
2) The amount of fluid must be checked by the installer. In some cases it is necessary to add or remove fluid in order to ensure the correct running of the system.
3) Water temperature from 10 ºC to 54 ºC

## 3.4. Main Components

### 3.4.1. General diagram of assembly




[1] Thermodynamic Solar Panel
[2] L-shaped fastenings for attachment of Aluminium Panel
[3] Set of bolt, female, washer and bushing (6x or 8x)

[4] Copper pipes
[5] Water storage heater
[6] Thermodynamic block
[7] Hood + Display
[8] Bolts CHC M8
[9] Expansion tank
[10] Safety device
[11] Pressure reduction valve

### 3.4.2. Thermodynamic Solar Panel

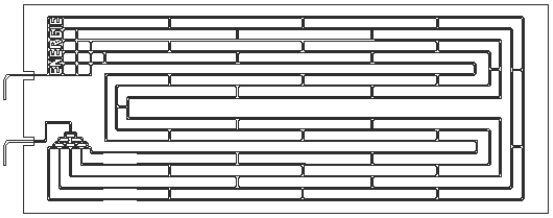
The solar panel is a roll-bond type plate manufactured in double channel pressed aluminium, with a post-press anodization-oxidation that creates a dark tone aspect. There are two types of panels available: left and right (designated according to side of connections).

The panel has a standard dimension of 2000 mm x 800 mm x 20 mm.

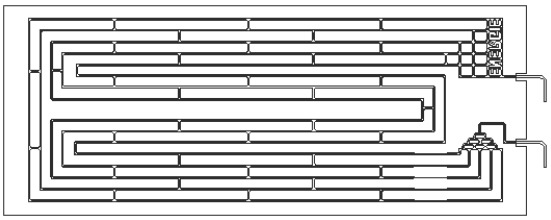
The panel connections are Flare SAE (threaded) type. These connections are used only in the equipments with one panel.

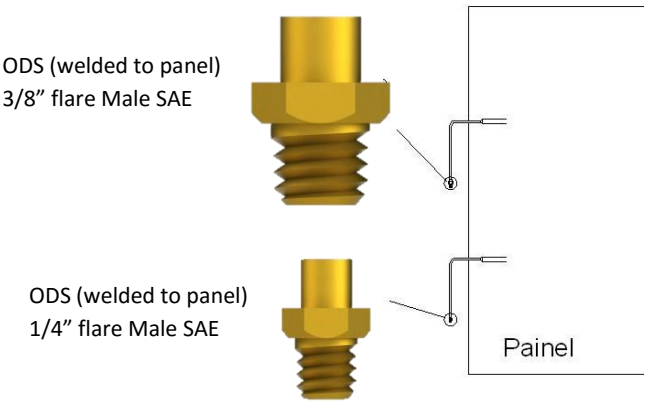
- ✓ 3/8'' Aspiration (upper part)
- ✓ 1/4'' Liquid (lower part)

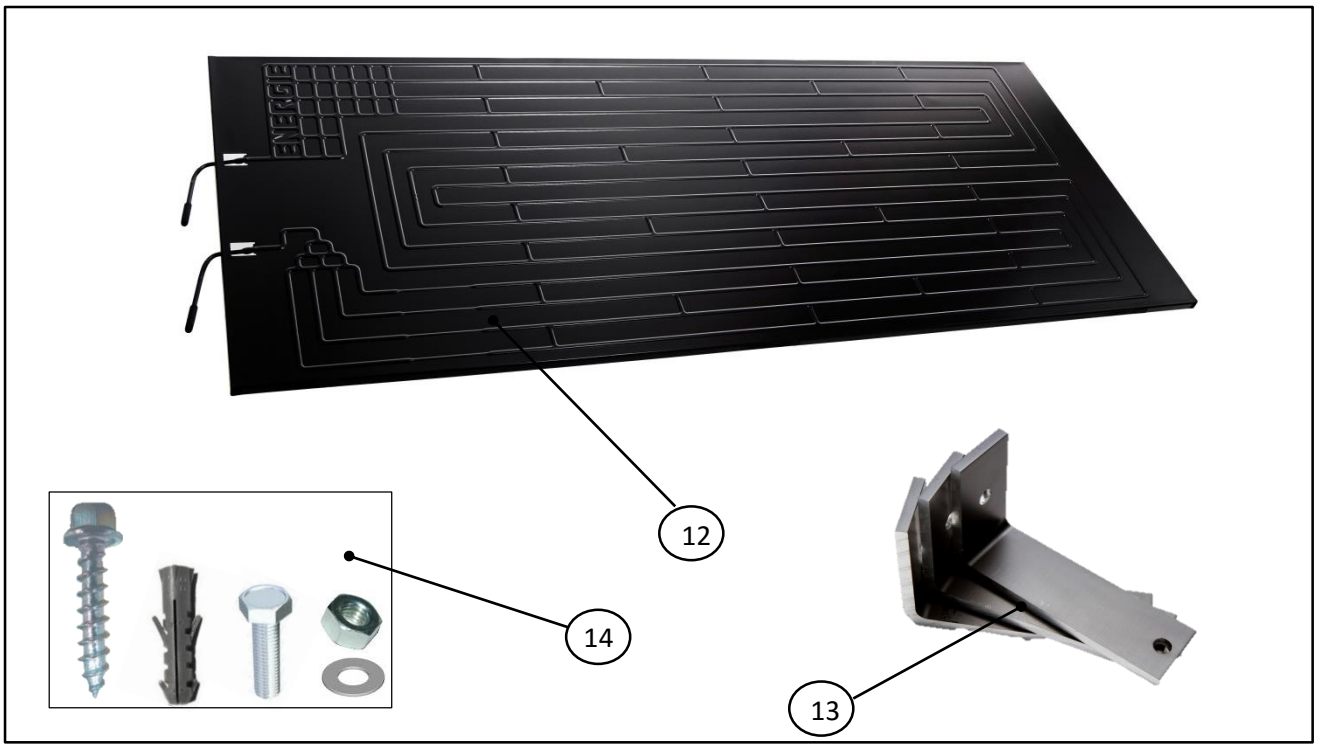
Left Panel



Right Panel





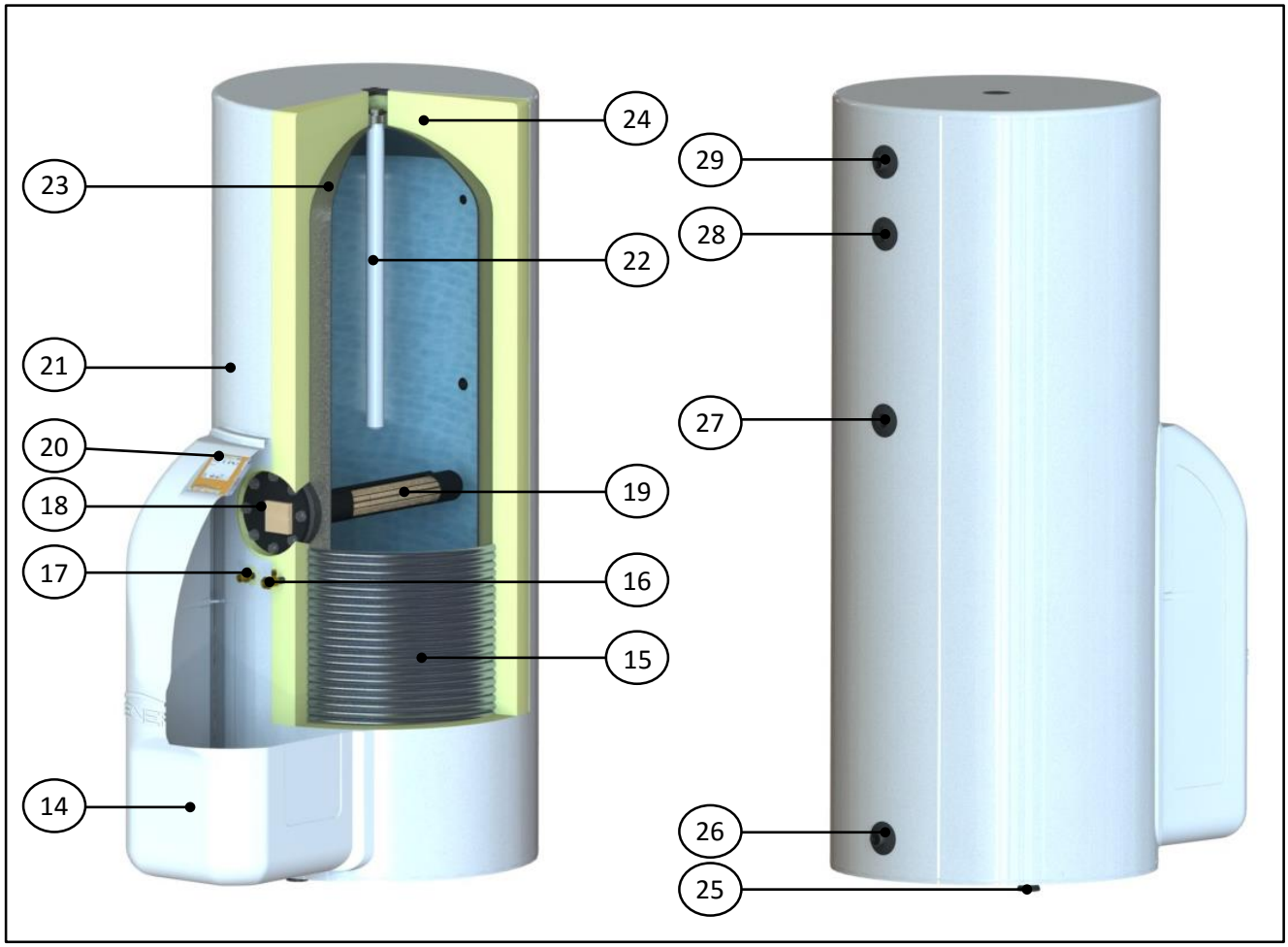

[12] Thermodynamic Solar Panel
[13] Aluminium L-shaped fastenings for attachment of Thermodynamic Panel (6x or 12x)
[14] Elements for attachment of Thermodynamic Panel

### 3.4.3. Storage Water Heater

The hot storage water heater is vertical and rests on the floor. The tank is made of carbon steel with enamel coating or in stainless steel. The thermal insulation is of expanded polyurethane with a thickness of 40 mm.

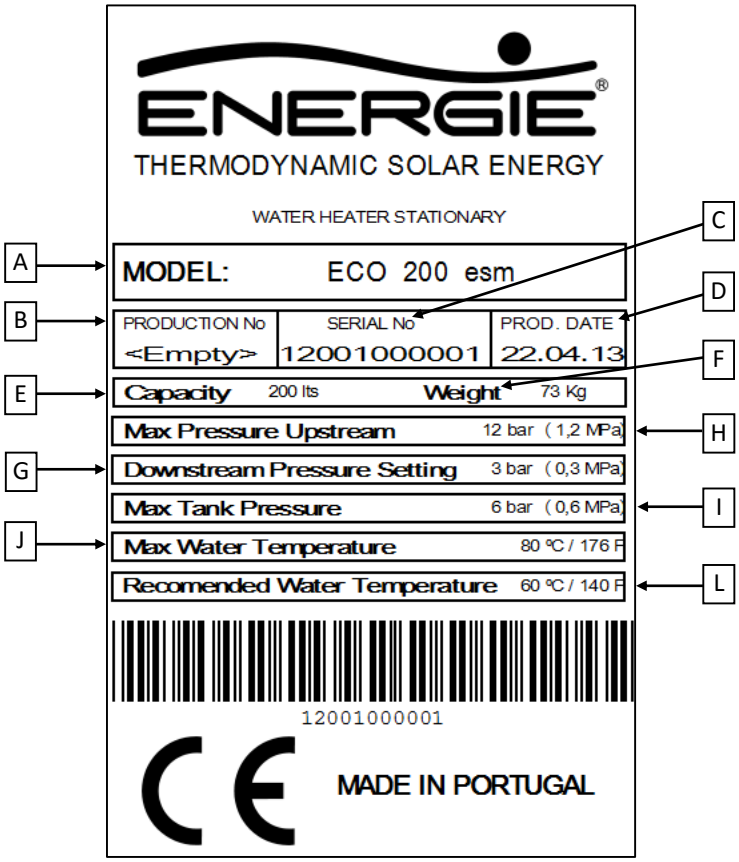
The storage water heater has a cold water inlet, hot water outlet, AQS return and an outlet for the expansion valve. It also comes equipped with a magnesium anode in the upper section.

There is, in the central part of the storage water heater, a flanged opening for placing the support resistance, as well as safety thermostat and temperature probe.



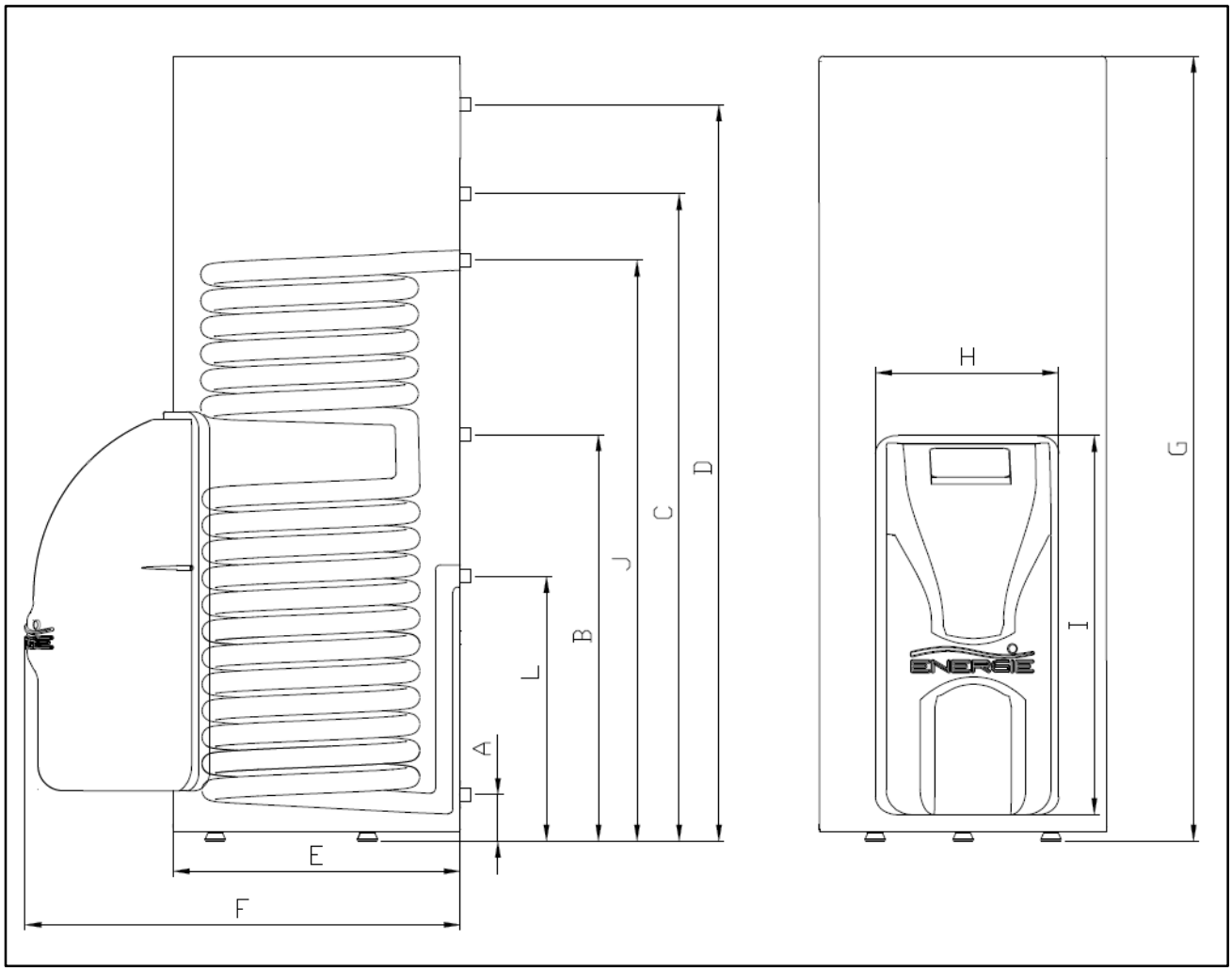

[14] Hood of Eco
[15] Condenser / Coil
[16] "One-Shot" Female Valve
[17] "One-Shot" Male Valve
[18] Temperature Probe + Safety Thermostat
[19] Resistance
[20] Display
[21] External Sheet
[22] Magnesium Anode
[23] Tank
[24] Polyurethane Insulation
[25] Adjustable support foot
[26] Cold water inlet
[27] Recirculation
[28] TPR Valve
[29] Hot water outlet

## Seal with features




[A] Model
[B] Production number
[C] Serial number
[D] Production date
[E] Volume
[F] Weight
[G] Downstream pressure of pressure throttle valve
[H] Upstream Maximum Pressure of pressure throttle valve
[I] Maximum pressure in Storage Water Heater
[J] Maximum Temperature in Storage Water Heater
[L] Recommended Temperature in Storage Water Heater

## Dimensions of Storage Water Heater




| Version | A | B | C | D | E | F | G | H | I |
|---|---|---|---|---|---|---|---|---|---|
| 250i | 89mm | 830mm | 1341mm | 1469mm | 580mm | 880mm | 1545mm | 370mm | 765mm |
| 300i | 89mm | 830mm | 1558mm | 1686mm | 580mm | 880mm | 1765mm | 370mm | 765mm |
| 200esm | 89mm | 665mm | 1161mm | 1289mm | 580mm | 880mm | 1365mm | 370mm | 765mm |
| 250esm | 89mm | 830mm | 1341mm | 1469mm | 580mm | 880mm | 1545mm | 370mm | 765mm |
| 300esm | 89mm | 830mm | 1558mm | 1686mm | 580mm | 880mm | 1765mm | 370mm | 765mm |
| 250ix | 89mm | 830mm | 1341mm | 1469mm | 580mm | 880mm | 1545mm | 370mm | 765mm |
| 300ix | 89mm | 830mm | 1558mm | 1686mm | 580mm | 880mm | 1765mm | 370mm | 765mm |
| 500is | 92mm | 772mm | 1784mm | 1927mm | 650mm | 950mm | 1990mm | 370mm | 765mm |
| 500isx | 92mm | 772mm | 1784mm | 1927mm | 650mm | 950mm | 1990mm | 370mm | 765mm |

| Version | J | L |
|---|---|---|
| 250i | ---------- | --------- |
| 300i | ---------- | --------- |
| 200esm | ---------- | --------- |
| 250esm | ---------- | --------- |
| 300esm | ---------- | --------- |
| 250ix | 1266mm | 696mm |
| 300ix | 1266mm | 696mm |
| 500is | ---------- | ---------- |
| 500isx | 1515mm | 625mm |

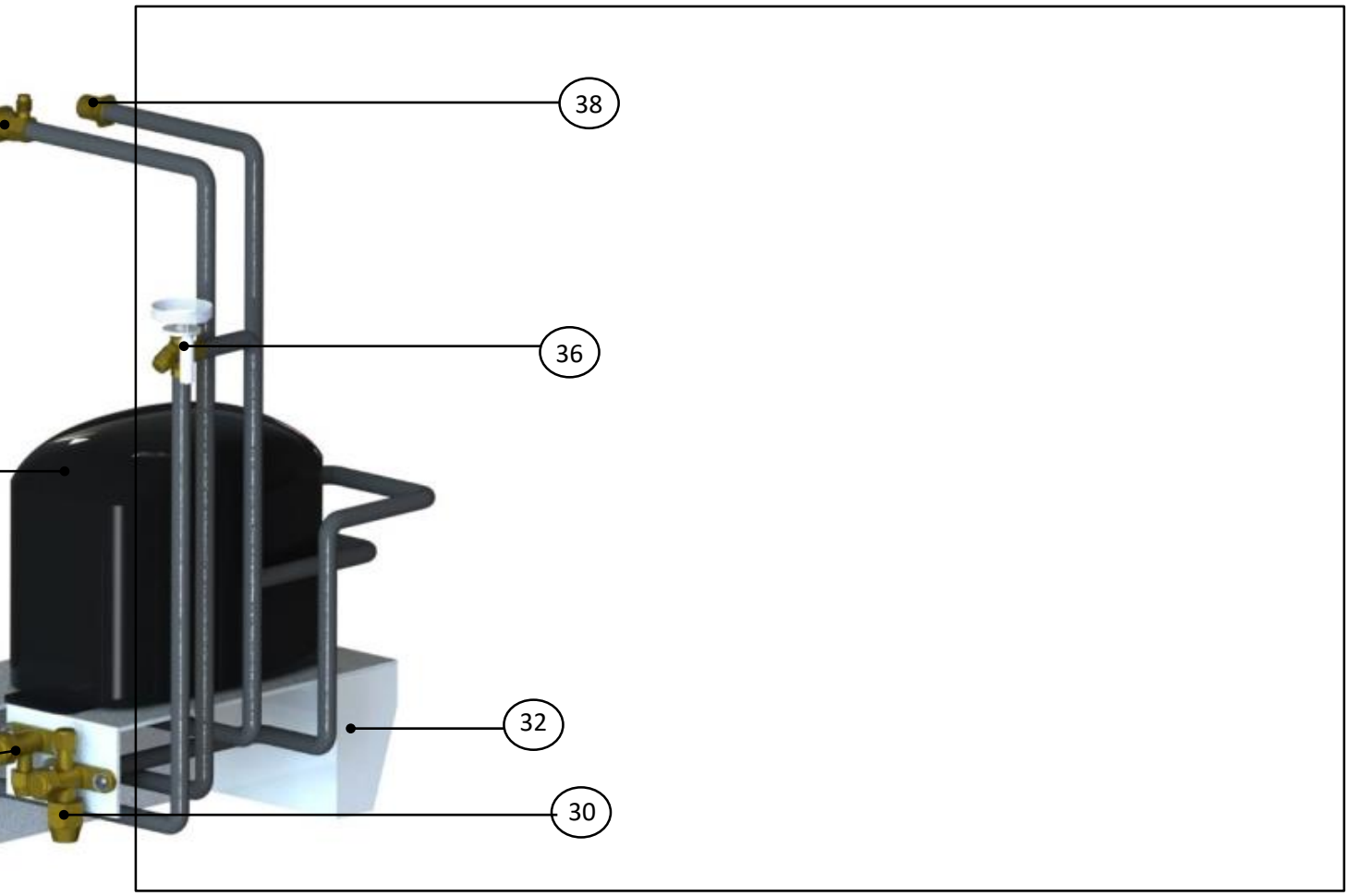
### 3.4.4. Thermodynamic Block

We call Thermodynamic Block to the equipment set on a galvanized steel structure, that contains two of the main elements for running the thermodynamic cycle: compressor and expansion valve.

The lateral section of the block has two valves of 2 and 3 ways conceived for connecting to the panel (3/8''- Aspiration; 1/4''- Liquid). The structure

where the Thermodynamic Block rests is attached to the storage water heater through three M8 bolts.

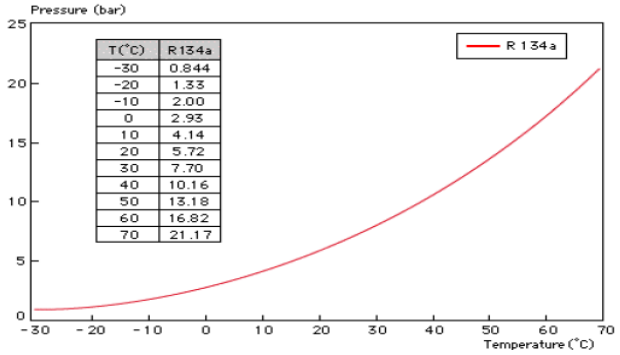
The thermodynamic block is also connected to the condenser / coil that surrounds the storage water heater through two “One-Shot” valves.




[30] 3-Way Valve (Aspiration)
[31] 2-Way Valve (Liquid)
[32] Electric / Electronic circuit box
[33] Liquid Tank
[34] Support structure for Thermodynamic Block
[35] Compressor
[36] Expansion Valve
[37] “One-Shot” Female Valve
[38] “One-Shot” Male Valve

### 3.4.5. Cooling Fluid

The R134a is a HFC coolant, thus not harmful to the ozone layer. It has great chemical and thermal stability, low toxicity, non-inflammable, and is compatible with most materials.
The following graphic depicts the behaviour of pressure according to temperature variation.




| T(°C) | R134a |
|---|---|
| -30 | 0.844 |
| -20 | 1.33 |
| -10 | 2.00 |
| 0 | 2.93 |
| 10 | 4.14 |
| 20 | 5.72 |
| 30 | 7.70 |
| 40 | 10.16 |
| 50 | 13.18 |
| 60 | 16.82 |
| 70 | 21.17 |

## 3.5. Safety and Control Devices

### 3.5.1. Pressure gauge of high/low pressure

In case of running outside the range of pressures recommended and defined by the supplier, the equipment will switch off and indicate error in the electronic panel.

### 3.5.2. Safety Thermostat

The safety thermostat is set by the supplier to ensure that the water temperature in the storage water heater does not exceed the standard value. Should the temperature exceed this value, the thermostat switches off the support resistance. Switching on is done manually by qualified staff, after analyzing the reasons for the switch off.

### 3.5.3. Temperature Sensor

The temperature sensor has the purpose of measuring the values of temperature of water in the storage water heater in order to control the thermodynamic solar system.

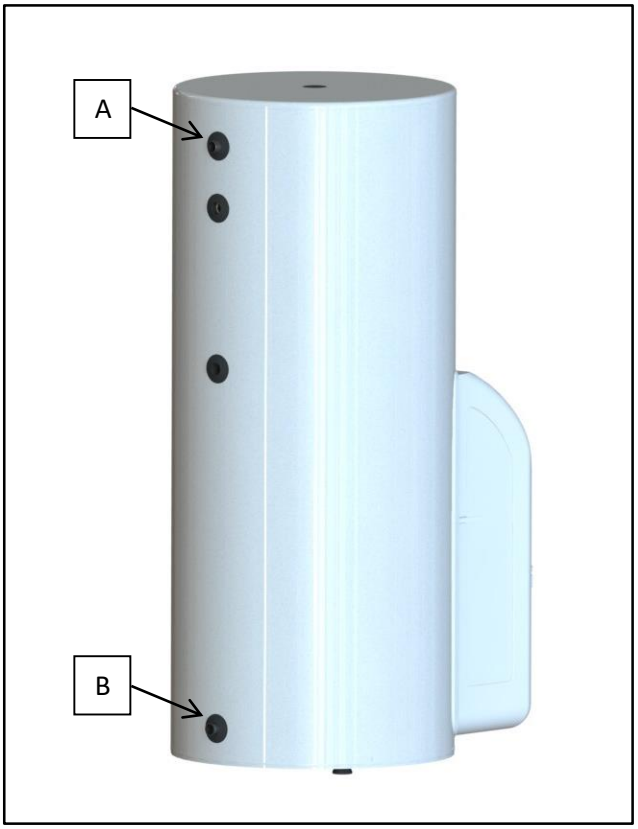
### 3.5.4. Protection against corrosion

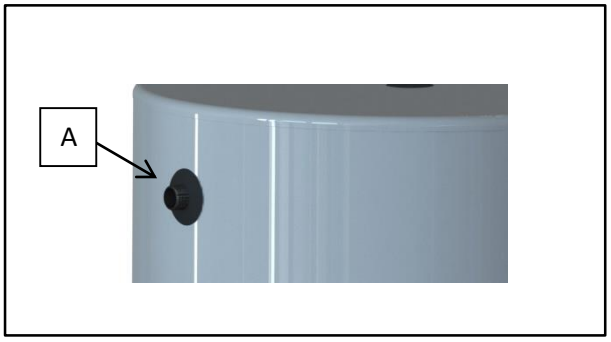
The storage water heater in this equipment can be of two types: Stainless steel or Enamelled.

Besides being resistant to corrosion, the storage water heater has in addition a magnesium anode that should be checked periodically according to information by the installer.

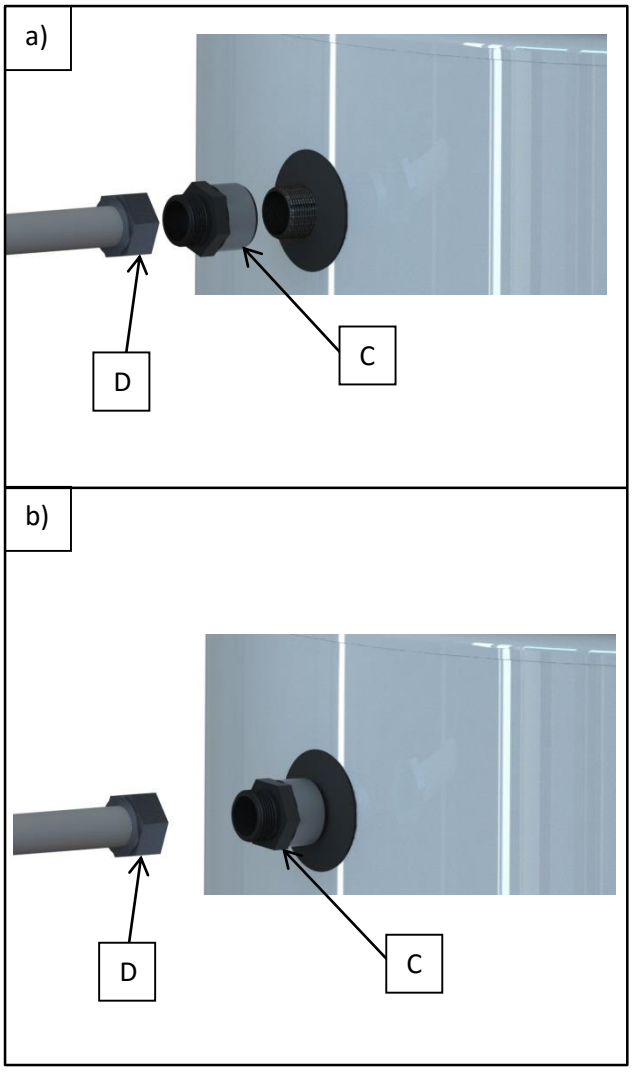
### 3.5.5. Dielectric Joint (except stainless steel tank)

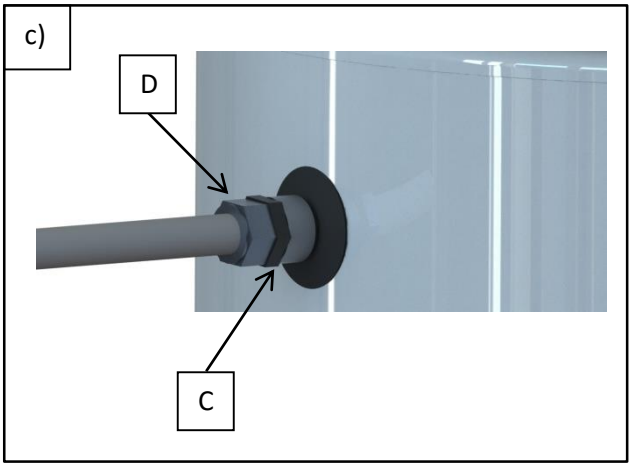
Your **Eco** equipment contains two dieletric joint. These joints prevent electron exchange between the pipes of water inlet and outlet and the storage water heater itself. This creates further protection against corrosion that could take place between these points (**A** and **B**).






So the installer must tighten the joints (**C**) in the water inlet and outlet (**A** and **B**), before attaching the piping (**D**), as demonstrated in the following sequence:




### 3.5.6. Expansion Vessel

The expansion vessel is a device whose purpose is to compensate for the increase in water volume due to temperature rise.

| | |
|---|---|
| | Installing this device is recommended procedure for a correct installation of the equipment.<br><br>Installing this device is the responsibility of the installer.<br><br>As a general rule it is installed in the cold water pipe. |

### 3.5.7. Safety Device

The safety device allows the system to be protected against anomaly situations: cold water supply, hot water flowing back, emptying the storage water heater and high pressure. The valve is calibrated to activate at 0.7 Mpa.

In order to drain the water in the storage water heater, you should close the supply valve and open the discharge valve.

The safety valve discharge pipe must be open into the atmosphere, because the valve may drip water or even discharge water.

The safety valve must be opened regularly to remove impurities and check that it is not blocked. The discharge pipe must be installed in a vertical position

### 3.5.8. Pressure Reducing Valve

The pressure reducing valve must always be installed upstream from the safety device, and ready to activate in situations when the pressure in the circuit exceeds 3 bar. This valve comes with a pressure gauge.


# 4. INSTALATION

**Assembly sequence:**

- Solar panel
- Storage water heater
- Thermodynamic block
- Cooling connection (aspiration, liquid)
- Hydraulic connections
- Electric connections
- Nitrogen load
- Vacuum
- Installation start-up

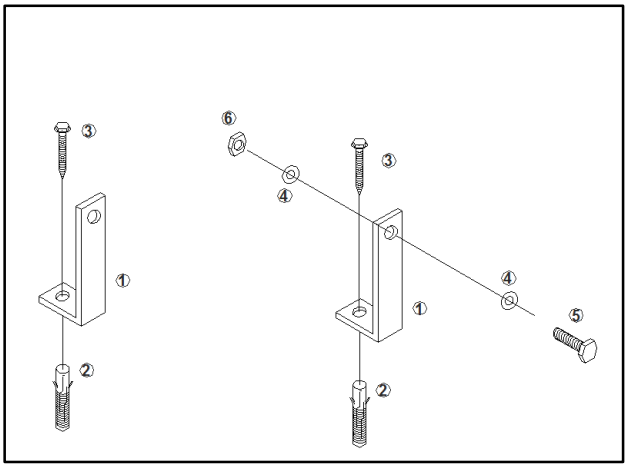
## 4.1. Attachment of Panel

The nature of the site and the inclination angle where the panels are installed are important factors to take into account. In order to benefit the most from the sunlight exposure, the panels

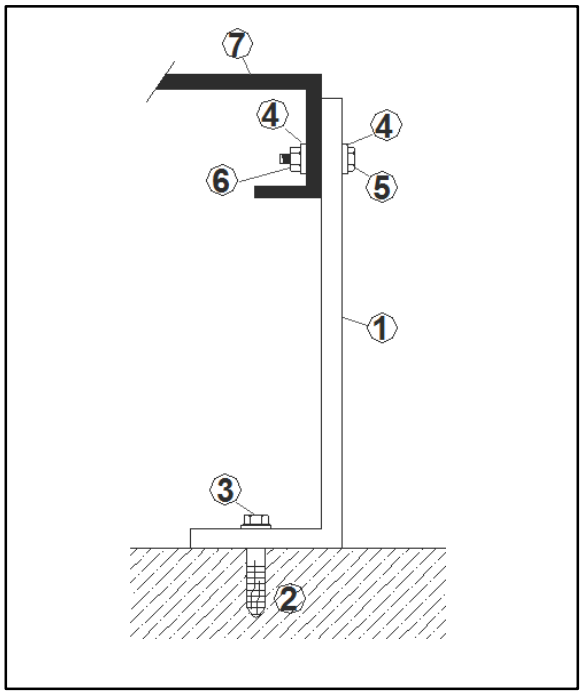
Should have a pitch between 10º and 85 relative to the horizontal plane, and preferably oriented to the south.

The panel already comes with 6 holes for M8 in the lateral skirts. The distance between holes in the place where the panel rests, should coincide with the holes made in the panel.

Attachment of L-shaped fastenings:



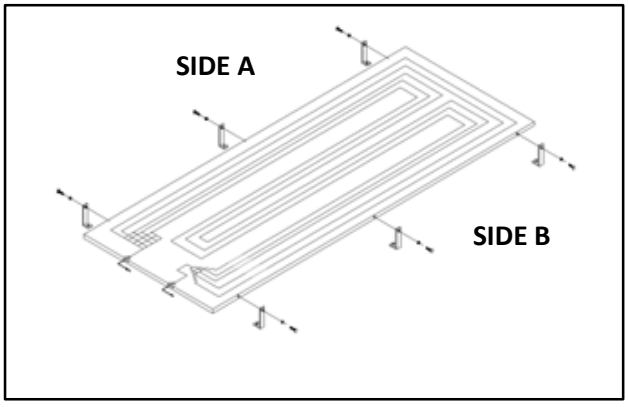
Attachment of L-shaped fastenings and panel:




[1] Aluminium L-shaped fastening
[2] Plastic Bushing
[3] Self-thread bolt M6x40
[4] Washer M6
[5] Bolt M6x20
[6] Nut M6
[7] Panel

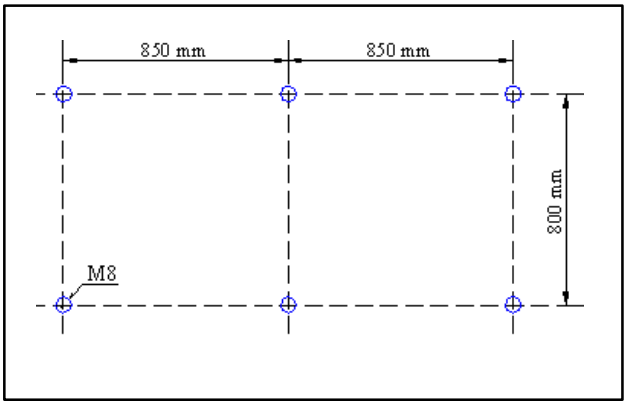
The system comes with a pack of six: L-shaped fastenings, bolts, females, washers, bushings.

It holds 3 small L-shaped fastenings (side A) and 3 large L-shaped fastenings (side B) that should be attached as depicted in the picture. The desired pitch of the panel should be adjusted.

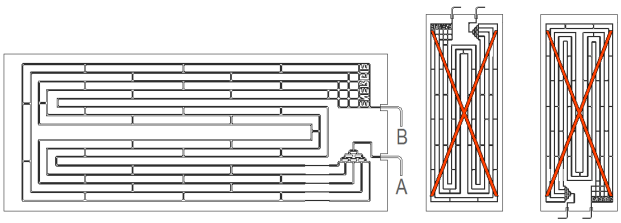



The profile should be attached to the base (e.g. rooftile) through a plastic bushing and a self-thread M6 bolt which have been supplied.

The attachment of the panel to the L-shaped fastenings is done through M6 bolts and its females and washers.




| | |
|---|---|
| **WARNING** | The panel must be installed facing down, the connections must be turned down. |




- ✓ A – Liquid inlet
- ✓ B – Vapour outlet (aspiration)

## 4.2. Set-up of the Storage Water Heater

- Keep the equipment sheltered in places susceptible to ice crystals
- Choose the position closer to the main user points
- Always insulate the piping
- The temperature around the equipment must not exceed 40 °C
- The storage water heater must never be kept outside, and avoid exposure to sunlight
- Make sure the support surface is enough to accommodate the weight of the storage water heater filled with water
- Make sure that those sides with electrical appliances have at least a 500 mm gap for the purpose of maintenance.

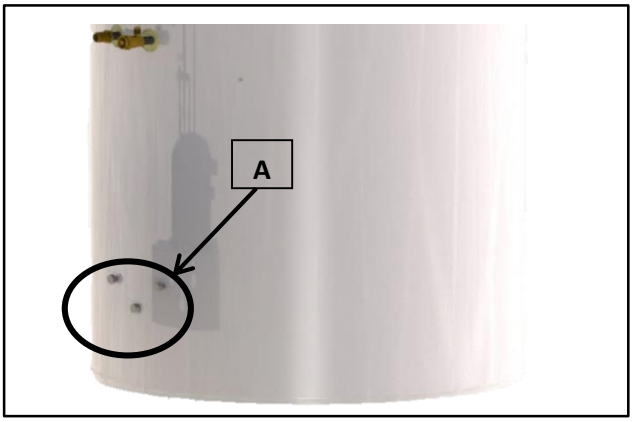
| | |
|---|---|
| Resistance of floor | 320 Kg on the surface taken by the storage water heater |
| Necessary surface | 900mm × 600mm or 800 x 800 – depending on the set-up of the storage water heater |
| Height clearance minimum | 1.8 m |

## 4.3. Installation of Thermodynamic Block

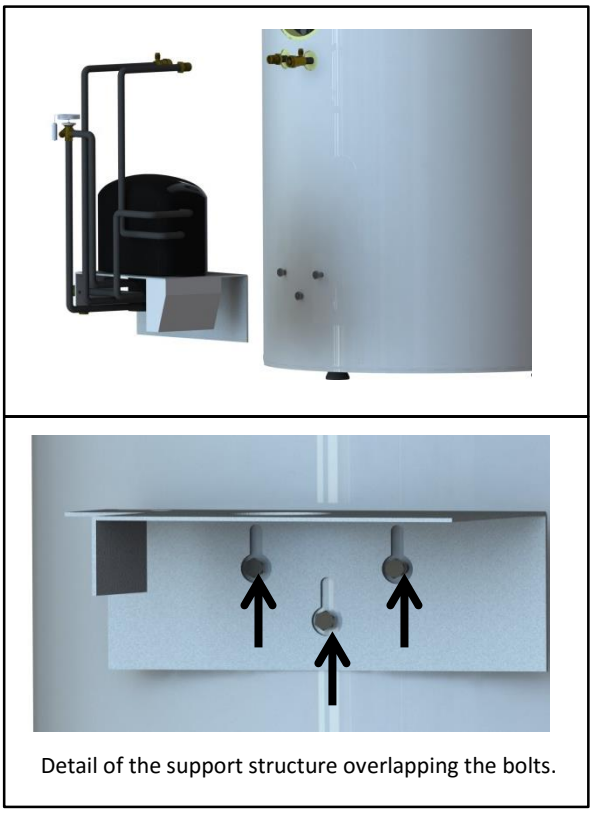
When installing the thermodynamic block, you must:

a) Tighten the three M8 bolts (**A**), in the storage water heater

| | |
|---|---|
| | Do not fully tighten the bolts in order to make it easy to introduce the thermodynamic block, and only fully secure after the attachment of the block onto the storage water heater. |

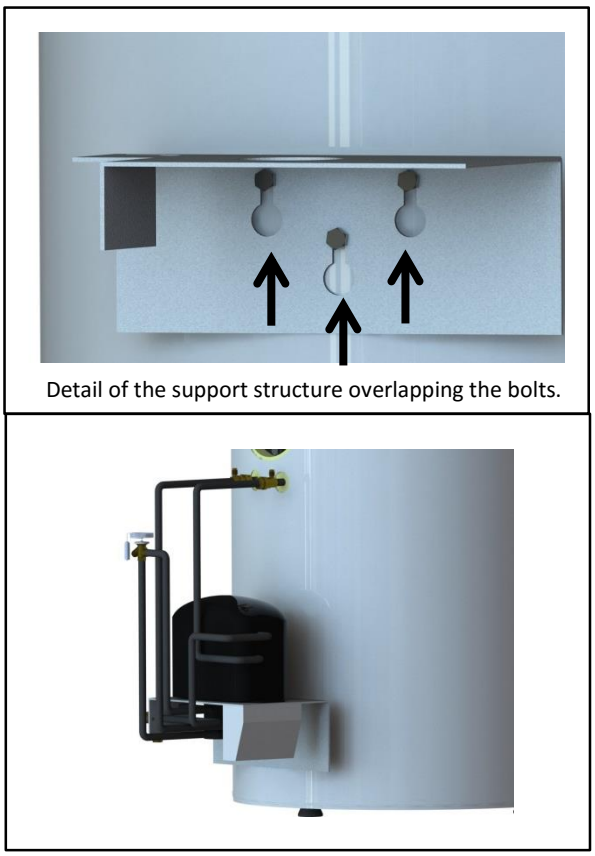



b) Aim the metallic structure with the orifices to the three M8 bolts previously mentioned.



Detail of the support structure overlapping the bolts.

c) Allow the structure to rest carefully over the bolts, then tighten them completely.



Detail of the support structure overlapping the bolts.

## 4.4. Refrigerant Connections

| | |
|---|---|
| **DANGER** | The cooling fluid couplings must be done by a qualified technician, with a professional certificate of qualifications for this purpose. |

| | |
|---|---|
| | The thermodynamic unit holds a pre-load of fluid R134a. |

| | |
|---|---|
| **DANGER** | The cooling fluid couplings must be thermally insulated in order to prevent burns and to ensure an optimal system performance. |

| DIAMETER OF THE PIPES | | |
|---|---|---|
| | GAS (aspiration) | LIQUID (panel inlet) |
| Nº panels | Inches | Inches |
| 1 | 3/8'' | 1/4'' |
| 2 | 1/2" | 3/8" |

The piping used must be copper without seams of the refrigeration type (Cu DHP type according to standard ISO1337)

### 4.4.1. Connection to the Panel (x1)

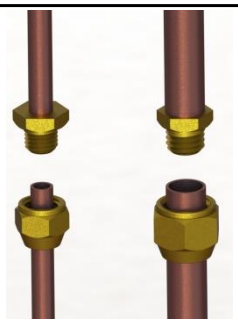
a) Prepare the copper pipe, removing the protective caps from the extremities.

b) Place the extremity of the pipe upside down, cut the appropriate size of pipe and sand the rough edge.

c) Remove the females from the couplings in the panes and insert them in the pipe.

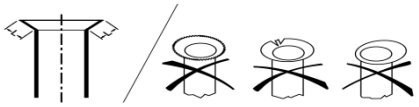
$c_1$)

$c_2$)



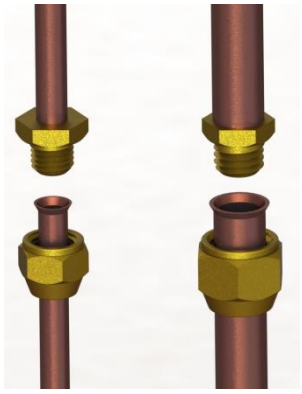
d) Flange the pipe with the appropriate tool shaping a conic edge, make sure that there are no rough edges or imperfections and that the vertical of the walls is uniform.

**WARNING**

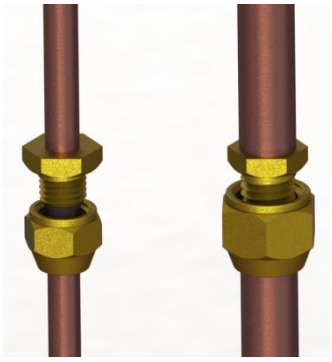


e) Tighten the female coupling with your hands, turning it a few times. Then fully tighten applying a torque in conformity with the table.

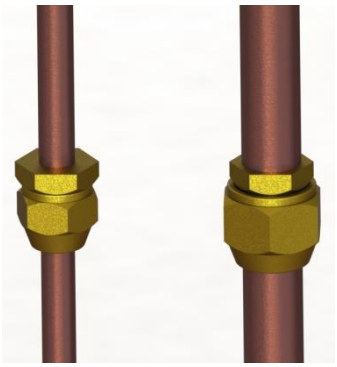
e1)



e2)



e3)

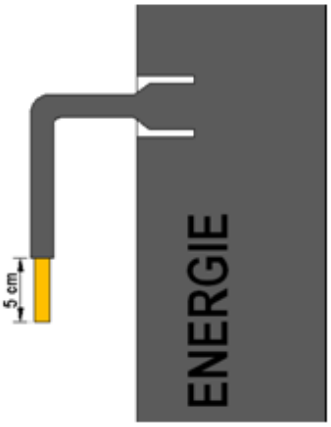


| Diameter of the Pipe (inches) | Applied Torque (Nm) | Wrench nº |
|---|---|---|
| 1/4” | 14 to 16 | 19 |
| 3/8” | 33 to 42 | 21 |

### 4.4.2. Connection to the Panels (x2)

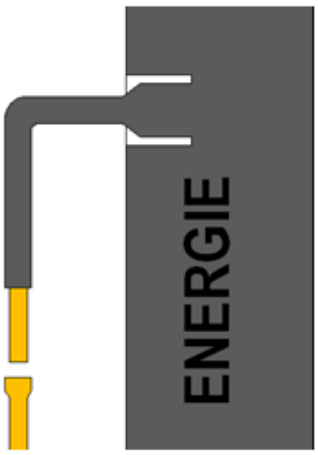
Remove the protecting caps from the ends of the copper piping.

Place the end of the tube so that it is pointing downwards, cutting the pipe at the intended point, making sure to clean off any burrs (e.g. with a reamer).
Next, remove the covers from the panel connections, and with the aid of a cutting tool such as a penknife, remove **5 cm** of the thermoretractable sleeve.



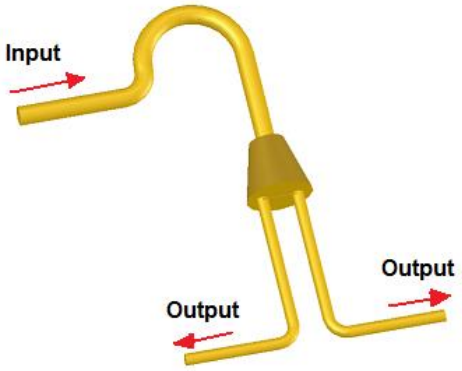

*Removal of thermoretractable sleeve*

A 3/8” piping expansion area must be made, with the aid of an appropriate tool, for proper connection to the panel.




*Piping expansion (3/8")*

Line up the liquid and suction tubes, but before commencing the welding operation, make sure to protect the thermoretractable sleeve by using a damp cloth.
The type of solder recommended for welding the pipes is type oxyacetylene (Oxygen/Acetylene). Other types of gases can also be used, such as propane for example.
After carrying out the panel connection welding operations, but before installing the Thermodynamic Block, make sure the apparatus has been cleaned with nitrogen.
For installations with two or more panels, it is essential that the fluid is homogenously distributed *(panel entry).* The equipment already comes installed with a ***liquid distributor*** so that this process can be accurately put into effect.



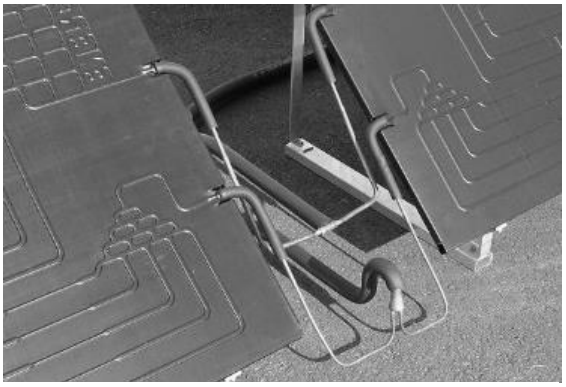

*Liquid distributor*

This distributor is placed between the two panels. The panel connecting pipes (1/4") must be exactly the same length, their extremities connecting directly to the panels.

*Liquid distributor (liquid line)*

The same level of pipe symmetry exactness is not required in relation to the suction connections ***(Panel exit)***.

This must be done by "denting" or with a "T" connection (in accordance with the following image), being properly insulated.



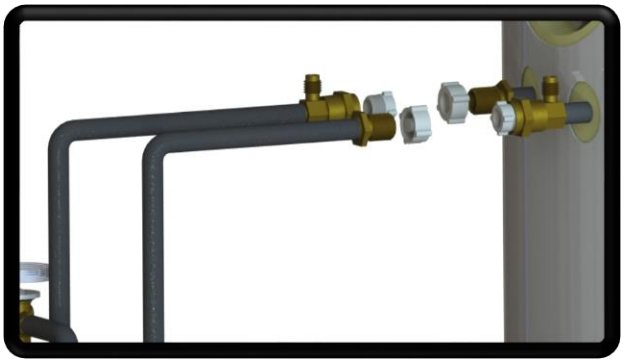
*Suction Line*

### 4.4.3. Connection of Thermodynamic Block and Storage Water Heater

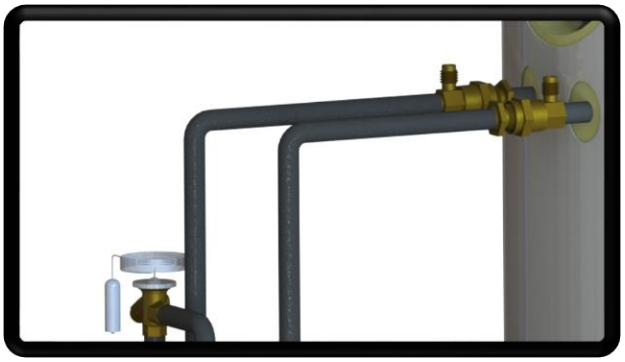
After securing the thermodynamic block to the storage water heater with its bolts, we can proceed with making the refrigeration couplings between the block and the storage water heater.

Procedure for making the refrigeration couplings:

a) Remove the protection caps from the "one-shot" valves on the pipes of the condenser and thermodynamic block.



b) Tighten the valves with your hand making a few turns



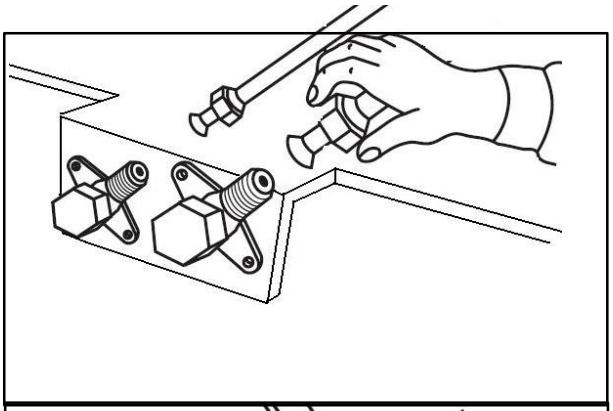
c) Tighten with a suitable wrench, applying a torque in conformity with the diameter of the pipe employed (according to table in point 4.4.1. Insufficient torque will cause leaks of cooling fluid. Excessive torque on the coupling will damage the edge of the pipe and cause leaks.

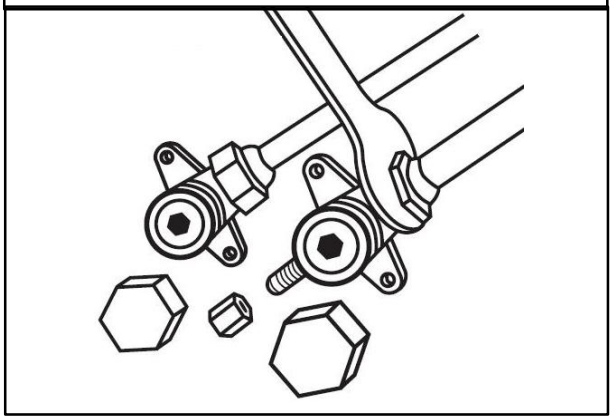
### 4.4.4. Connection of Thermodynamic Block and Thermodynamic Panel

Some of the steps are the repetition of the steps carried out for the connection to the panel.

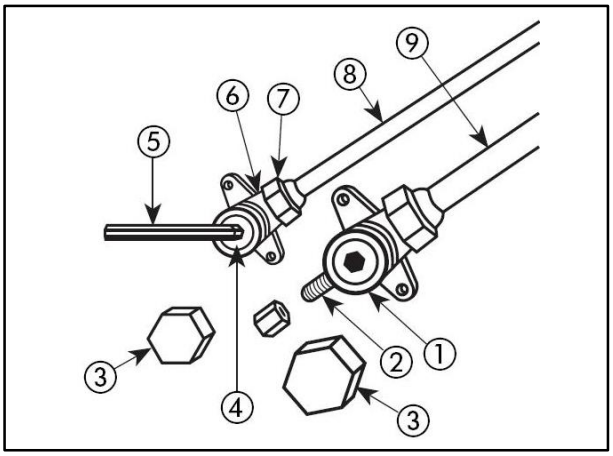
Cut the required measure of the pipe with the edge turned upside down. Sand any remaining rough edges.

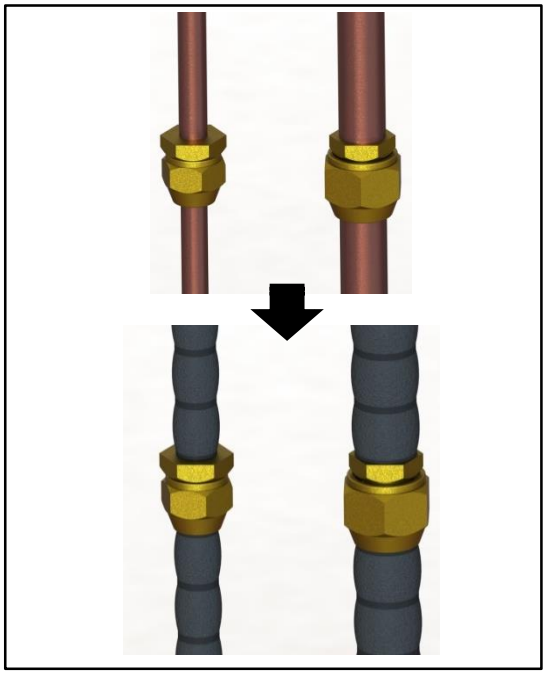
Shape a conic edge in the pipe and do not forget to place the female coupling on the side of the pipe.





Tighten the female coupling with your hand, giving it a few turns, and secure with wrench applying the torque as before.





| Caption: | |
|---|---|
| 1 | 3-Way Valve |
| 2 | Pressure intake |
| 3 | Valve socket |
| 4 | Valve needle |
| 5 | Hexagonal tip wrench (Allen Key) |
| 6 | 2-Way Valves |
| 7 | Conic nut |
| 8 | Liquid line (small diameter) |
| 9 | Gas line (large diameter) |

### 4.4.5. Load of Nitrogen

a) After finishing the couplings, make sure there are no leaks. For this purpose, inject a load of nitrogen with a pressure of 10 bar through the pressure inlet (3-way valve).

b) Brush every coupling in soap foam and make sure that the pressure in the pressure gauge is constant.

### 4.4.6. Create Vacuum

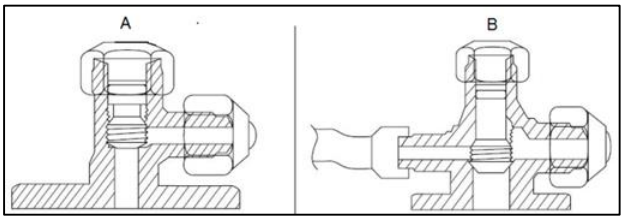
a) During the whole procedure, employ, connections, vacuum pump and pressure gauges suitable for fluid R134a.

b) Employ a vacuum pump only to remove the air and humidity inside the piping.

c) Never use the system coolant to purge the connection pipes.

d) The valves must be completely shut during the vacuum process, in order to create vacuum only in the piping.

**Shut Valves**




A – 2-Way Valve B – 3-Way Valve

e) Create a vacuum with the vacuum pump plugged to the inlet of the 3-way pressure valve as depicted, keeping the valves completely shut until there is a vacuum of 50 Pa (0.5mbar).

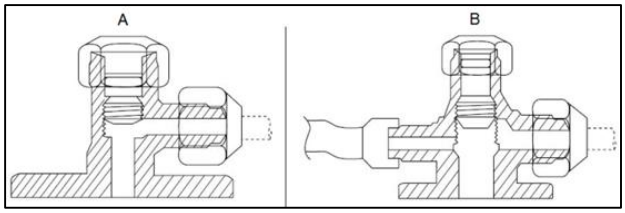
f) Once the vacuum procedure is over, shut the vacuum pump valves. The vacuum pressure gauge should indicate the same reading after the pump has stopped, ensuring the installation is in a vacuum and ready for running the coolant.

| | |
|---|---|
| | Every coupling must be insulated! |

g) After concluding the vacuum procedure you must open the two valves so that the coolant may circulate throughout the whole system; the installation keeps the

vacuum steady and is ready for running the coolant.

**Open Valves**




A – 2-Way Valve B – 3-Way Valve

| | |
|---|---|
| | We recommend the use of a thread sealant in every existing threaded coupling. |

### 4.4.7. Load of Complementary Cooling Fluid

| | |
|---|---|
| | The warranty does not apply to distances longer than what has been established for the pre-load (12m) |

Your unit has been pre-loaded for connections up to 12 m between the panel and the storage water heater. Longer distances will decrease the performance of your equipment.

Before carrying out an additional load of gas into you equipment, you must prepare all the equipment and tools necessary for the operation, such as:

- Gas bottles and their hoses
- Hexagonal-tip wrench to open the 3-way valve
- Scale with precision of 10 g

To carry out a complementary load of gas, follow these steps:

a) Place the cooling fluid tank on a scale with a 10 g precision and take note of the weight.
b) Connect the hose of the cooling fluid tank (R134a) to the inlet of the 3-way valve
c) Switch off the compressor on the electronic panel.
d) Open carefully and only slightly the handle of the cooling fluid tank, notice the variation of the figure indicated in the scale (as you load fluid into the circuit, the figure for the weight in the scale will decrease).
e) When your reach the figure intended for the injection of cooling fluid into the circuit, close the tank handle and remove the hose connected to the 3-way valve.
f) Switch on the compressor again and check how it runs.

| | |
|---|---|
| | After concluding the vacuum, do not remove the hoses while the system is not completely pressurized by the coolant. |

### 4.4.8. Checking good running condition

To check whether your equipment is running correctly, start it and wait at least 20-30 minutes and then check these conditions:

- Superheating, without solar radiation directly over the panel, should be within the range 5ºC to 10ºC.
- The gradient between the gas temperature at the condenser inlet and the condensation temperature must be within the range 40ºC to 45ºC.

## 4.5. Hydraulic Couplings

**WARNING / DANGER**

The water you use may contain impurities and/or substances damaging to the system and even harmful to your health. Make sure you use water with quality fitting for home consumption. The following table indicates some parameters according to which water must be subjected to chemical treatment.

| Hardness (ºdH) | pH | Treatment |
|---|---|---|
| 3,0 up to 20,0 | 6,5 up to 8,5 | No |
| 3,0 up to 20,0 | <6,5 up to >8,5 | Yes |
| <3,0 or >20,0 | ---------- | Yes |

To assemble the couplings of the hydraulic circuit you must:

a) Connect the water inlet and outlet of the equipment with a pipe and fittings that can cope with constant temperature / pressure of 75 ºC / 7 bar. For this reason we recommend the use of piping with resistance to high temperature and pressure. We recommend the use of pipe type PEX, PPR, MULTICAMADA, amongst others.
b) It is necessary to install a safety device at the cold water inlet of the appliance. The safety device must be in compliance with the standard EN 1487:2002, maximum pressure 7 bar (0.7 MPa)
c) Besides this device, other components will be necessary to ensure the interruption of the hydraulic load, installed according to this sequence:
   - Retainer valve / gate valve
   - Pressure throttle valve (in case the cold water inlet pressure exceeds 4.5 bar)
   - Safety valve / discharge valve
   - Expansion tank

The safety/discharge valve must be connected with piping whose diameter is not less than the cold water inlet coupling. The discharge must be connected to a sewage siphon or, if this is not possible, elevated to a distance of at least 20 mm from the pavement to allow visual inspection.

All the above recommendations have been made to ensure the safety of people, animals and others.

We recommend the installation of a shut-off / section valve between the gate valve and the coupling to the storage water heater for the purpose of maintenance, safety or emergency.
The Manufacturer is not responsible for damage related to not following these recommendations / warnings.

## 4.6. Electric Connections

To establish the electric connection of the equipment, check these conditions:

a) The thermodynamic equipment must be plugged to the power supply only after filling the storage water heater (see chapter “5. First Use”).
b) The thermodynamic equipment must be connected to a monophase voltage (230 V AC/50Hz).
c) The connections must comply with the standards of installation in effect in the territory or country where the thermodynamic equipment has been installed.
d) Earth wiring is obligatory.

It’s recommended that the installation includes:

- Bipolar circuit-breaker with connection cable with section equal to or exceeding 2.5 mm
- Protection differential circuit breaker of 30 mA

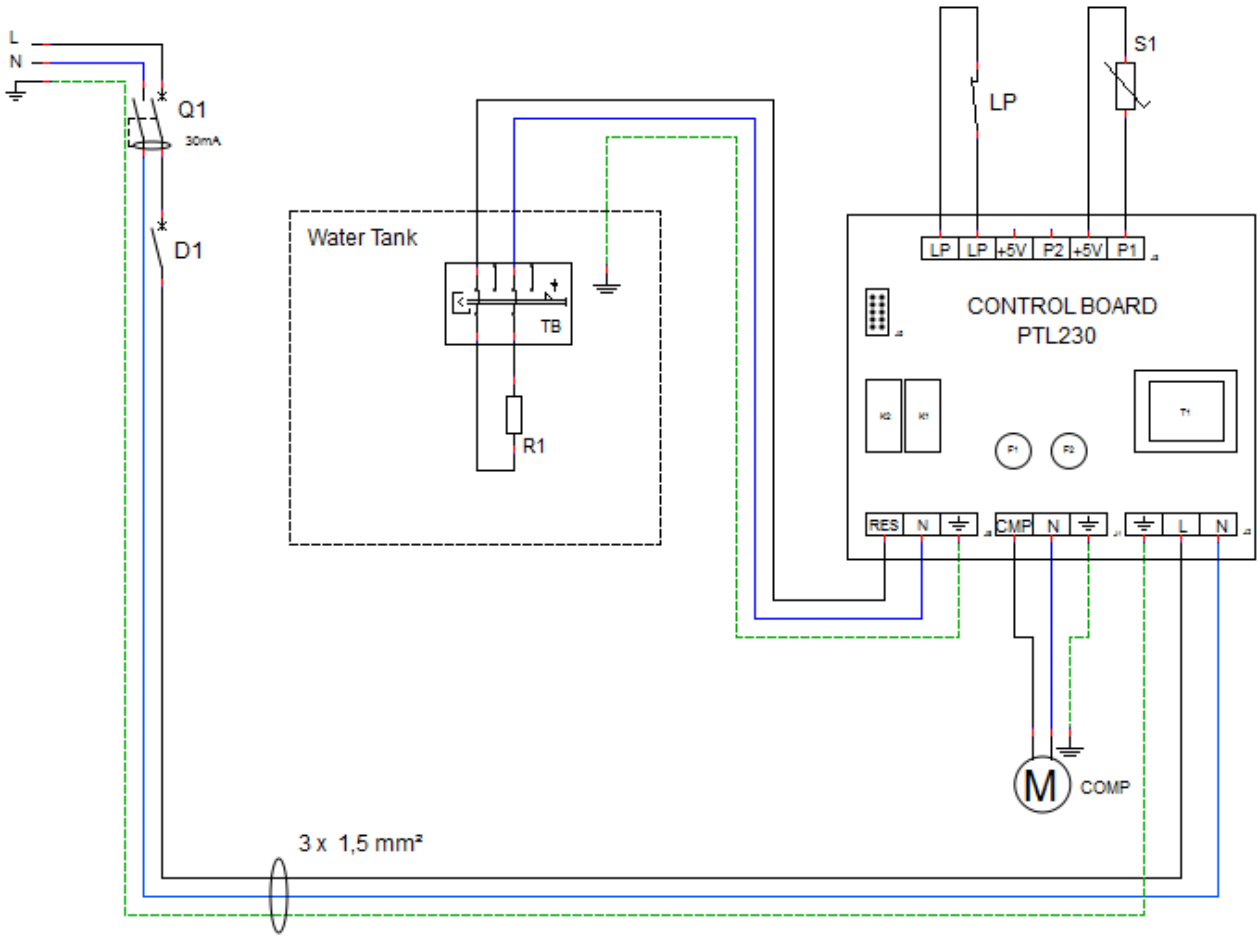
**WARNING**

The safety thermostat of this thermodynamic equipment must not, under any circumstance, undergo any repair outside the installations of the manufacturer.

Not complying with this clause invalidates the warranty of the equipment.

| | |
|---|---|

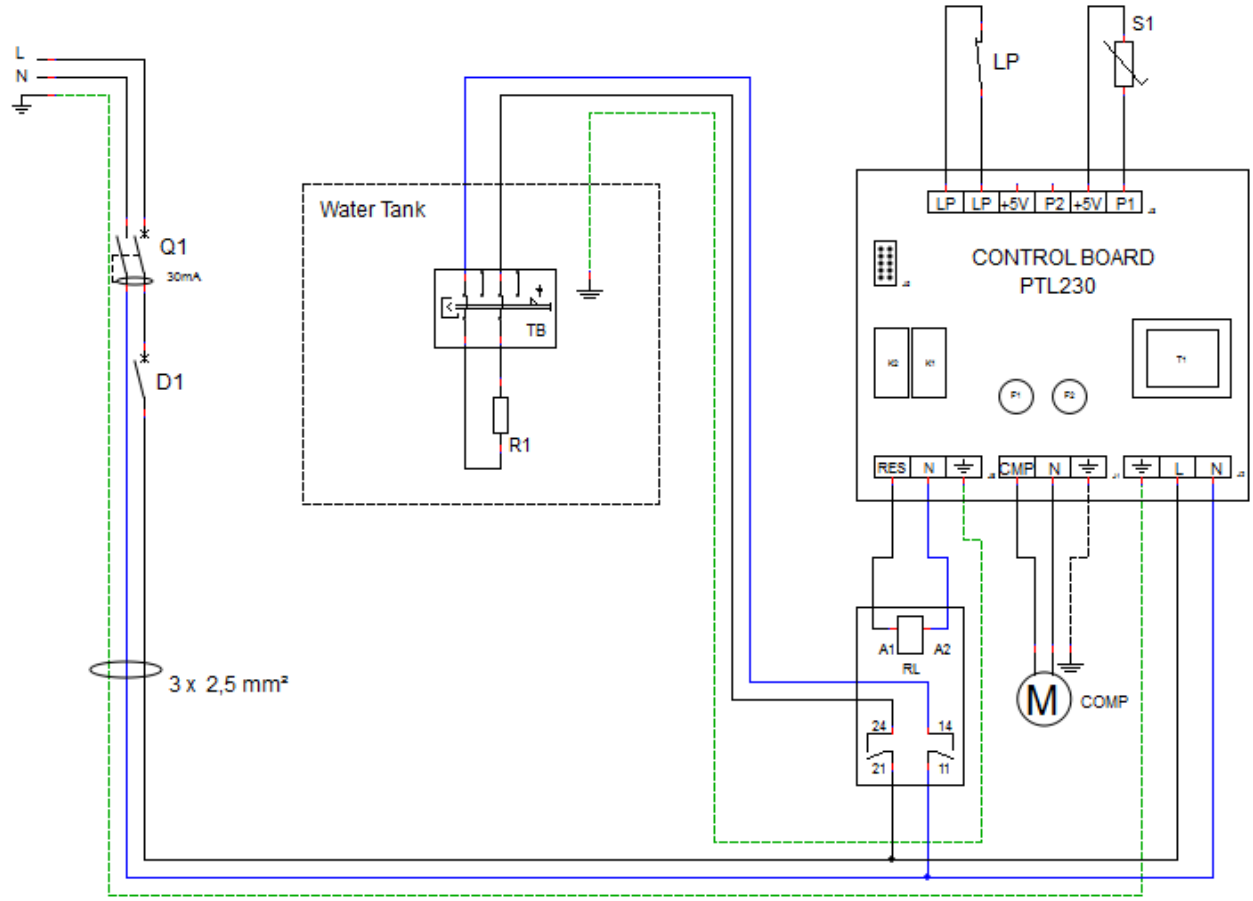
## Electric diagram (1 panel):




**Legend:**

Q1 – Differential
D1 – Circuit-breaker
LP – Low pressure gauge
S1 – Temperature probe
Comp – Compressor
R1 – Resistance
TB – Safety thermostat

## Electric diagram (2 panels):




**Legend:**

Q1 – Differential
D1 – Circuit-breaker
LP – Low pressure gauge
S1 – Temperature probe
Comp – Compressor
R1 – Resistance
RL – Relay
TB – Safety thermostat

# 5. FIRST USE

## 5.1. Filling the tank

a) Open hot water tap(s).

b) Open tap/cold water section valve next to safety device (this procedure also serves the purpose of checking whether the discharge valve is shut off).

c) Once there is a flow from the hot water tap(s), shut it. Your storage water heater is now full.

d) Check the tightening in the pipes.

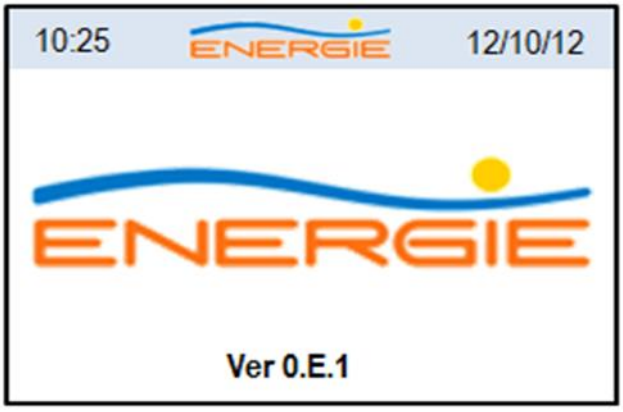
e) Carry out successive discharges through the safety valve to ensure the good running condition of all hydraulic components in the installation.

## 5.2. Start-up of the System

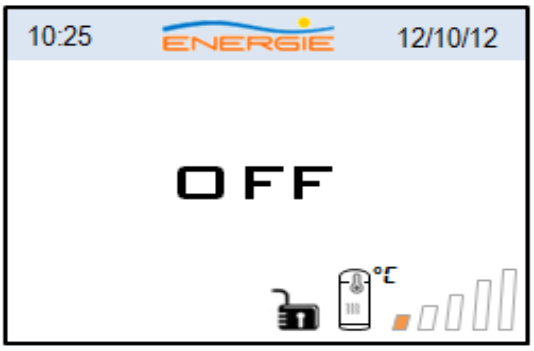
Before starting the **Eco**, check whether the installation is set up according to the recommendations and that everything is in conformity, then you may plug your equipment to the power supply.

After switching on your equipment you should wait a few seconds until the controller begins to work.

Then you may start your equipment following these instructions:




Controller Initiation



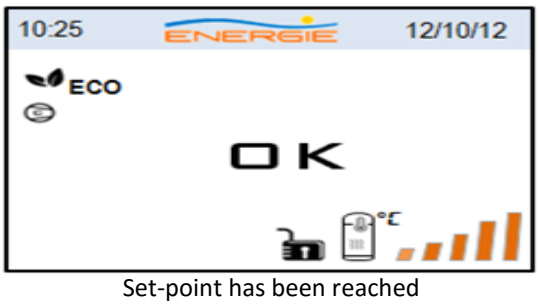

System is shut off **(OFF)** →Press key **ON/OFF**



Press key **COMP** to start-up the system



Equipment is running




Set-point has been reached

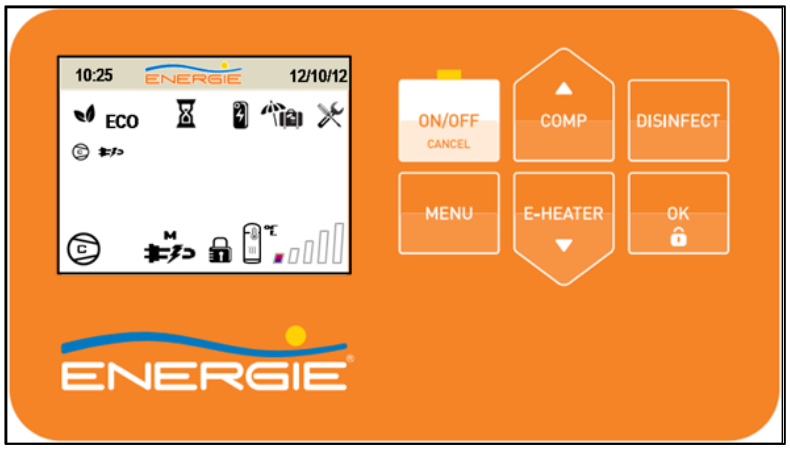
| | |
|---|---|
| | To reinitiate the appliance, switch it off and switch on again using the key **ON/OFF.** |

# 6. SYSTEM OPERATION

## 6.1. Control Panel

The control panel of the Thermodynamic Solar system **Eco** is simple and intuitive. It enables the configuration of several operating parameters according to the operating mode selected by the user.

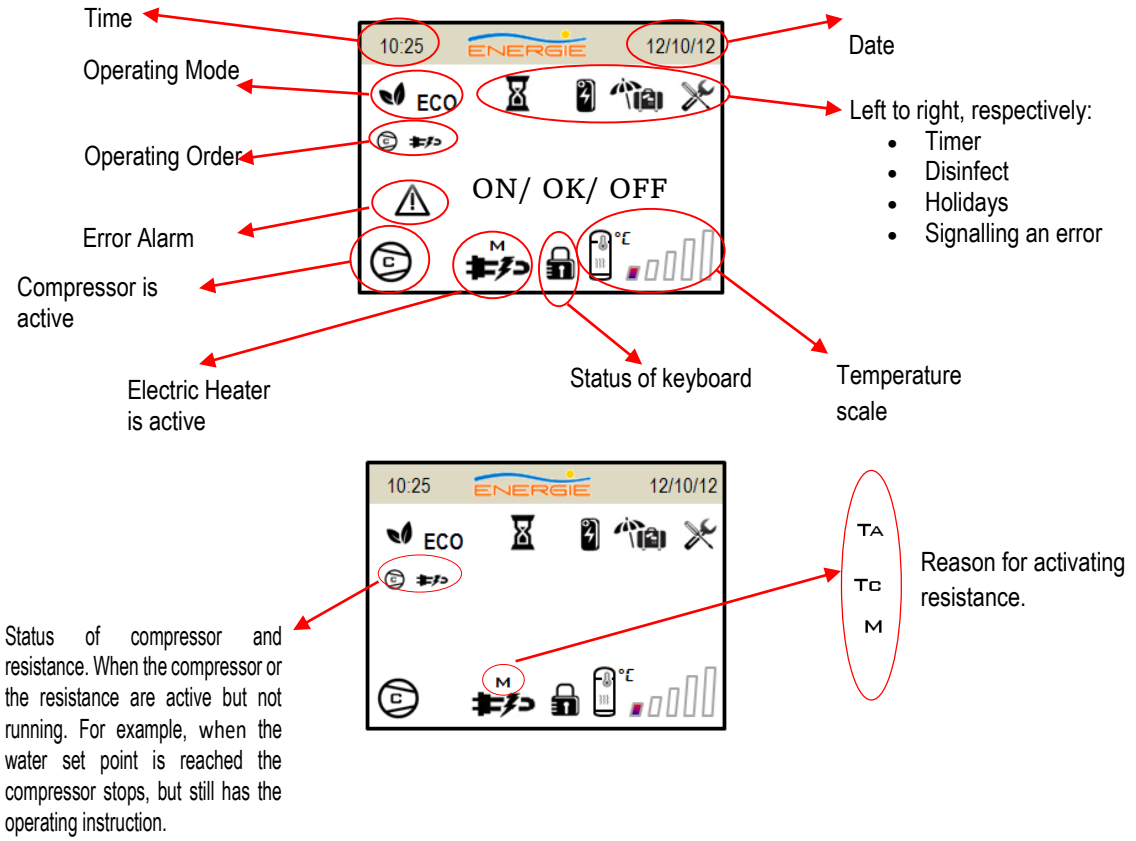
It comprises six command keys (ON / OFF / CANCEL, MENU, COMP ▲, E-HEATER ▼, DISINFECT and OK / LOCK) that enable checking the running of the equipment, consult and change parameters.




## 6.2. Keys (Functions)

| KEY | FUNCTION | DESCRIPTION |
|---|---|---|
| ON/OFF CANCEL | (ON/OFF) Switch on/off | Switch on and off controller |
| | (CANCEL) Exit | ESC function to exit menu, submenu or cancel a function. |
| OK / 🔒 | (OK) Confirmation | Confirm parameters within menus or submenus |
| | (LOCK) Locked / Unlocked | Lock or unlock keyboard |
| MENU | MENU | Enter menu. |
| COMP | ON/OFF Compressor | Pressing the key allows you to switch on and off the Compressor. |
| E-HEATER | ON/OFF Electrical Resistance | Pressing the key allows you to switch on and off the electrical resistance. |
| ▲ ▼ | Alter Values | It allows you to alter value of parameter (Inside Menu) |
| | Navigate through Menus/Submenus | Function to run through menus and submenus (inside Menu) |
| DISINFECT | (DISINFECT) Anti-Legionella | Press this key and the system will automatically create a thermal shock in the water to neutralize bacteria (Legionella). |

## 6.3. Description




## 6.4. Symbols

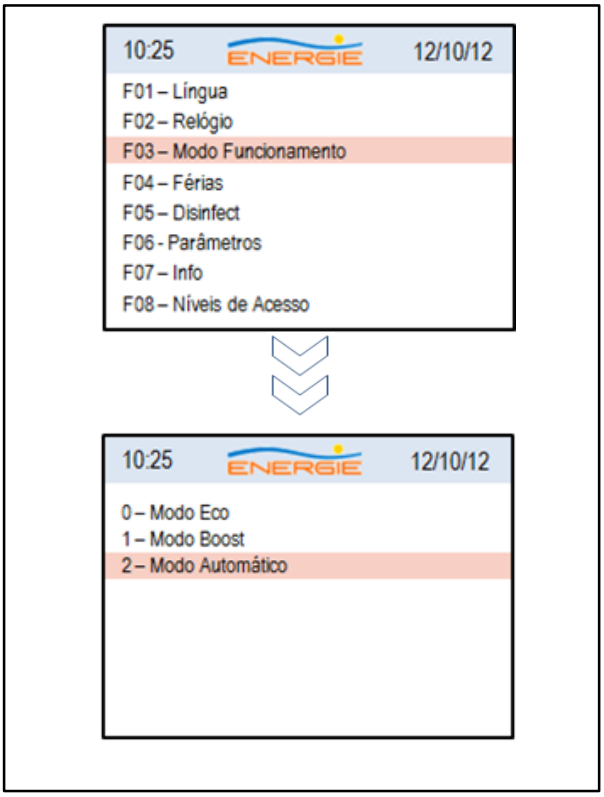
| | |
|---|---|
| ECO | Equipment in ECO operating mode |
| AUTO | Equipment in AUTO operating mode |
| BOOST | Equipment in BOOST operating mode |
| | Compressor |
| | Electrical resistance |
| | Unblocked keyboard |
| | Blocked keyboard |
| | Timer activated after error of LP |
| | Disinfect function is active |
| | Holiday mode is active |
| | Error alarm (visible on display during error) |
| | Error memory (visible on display during 24h) |
| | Water temperature scale in storage water heater |
| **TA** | Resistance is activated when P02 < P08 and/or P07 < Temp. S3 (Auto Mode) |
| **TC** | Resistance is activated when time for continuous running of Compressor is over T05 (Auto Mode) |
| **LP** | Resistance is activated by opening of LP contact (Auto/Boost Mode) |
| **M** | Resistance is activated manually |

## 6.5. Operating Modes

**Eco** is programmed to work in 3 running modes, **ECO, AUTO and BOOST**, which are summarized in this table:

| Mod. | Symbols (display) | Operation |
|---|---|---|
| ECO | ECO | Normal running as Thermodynamic System |
| AUTO | AUTO | Optimized management of running of Thermodynamic System and/or Electrical Resistance (support) |
| BOOST | BOOST | Running of Thermodynamic System + Electrical Resistance (support) |

**Eco** comes set by default to work in the **"ECO"** operating mode. If the user wishes to alter the operating mode, he/she must follow these procedures:
Unblock the keyboard and press the key **Menu**. Using keys ▲ ▼ run through menu and select **F03**, access submenu and select the operating mode.




| | |
|---|---|
| | In order to change the operating mode you do not need to reinitiate the equipment |

### 6.5.1. ECO Operating Mode

In **ECO operating mode**, the equipment runs only as a Thermodynamic System to heat the water in the storage water heater. Thus we could generate a greater efficiency, and savings for the user.

Every time the user feels it necessary, he/she may switch on the support resistance, using this mode, manually pressing the key **(E-HEATER)**. In these circunstances the equipment will automatically change operating mode to **BOOST** and indicates the reason of its activation (over the resistance). If you switch off the resistance manually, the equipment will begin to run again in **ECO** mode.

### 6.5.2. AUTO Operating Mode

In **AUTO oerating mode,** the equipment will run as a Heat Pump and/or Resistance, and the operation of the resistance is managed in an optimized way for the purpose of keeping up the efficiency of the equipment.

The resistance will start every time:

- The user activates it manually (key **E-Heater**).
- The contact LP opens (low external temperature, lack of fluid, leak in the circuit, etc.).
- The time for running the compressor exceeds parameter T05*
- The water temperature is below P08*

* Parameter is adjustable (**ON / OFF**)

### 6.5.3. BOOST Operating Mode

In **BOOST operating mode,** the equipment runs as a Thermodynamic System + Resistance, and the

running of the electrical resistance is simultaneous with the Thermodynamic System. This mode enables the user to obtain hot water in less time.

| | |
|---|---|
|  | The user can change the operating mode when he wishes, he need only press simultaneously the keys **MENU + OK/LOCK** for 3 seconds and select the mode that suits his needs with the cursor. |

## 6.6. Extra Functions

### 6.6.1. DISINFECT Function

**Eco'**s electronic control features the **Disinfect** function, which consists of a water heating cycle up to 65ºC, for a period of time long enough to prevent the formation of germs inside the tank.

The **Disinfect** function can be set automatically or manually. In automatic mode, the user has the possibility of setting the function every week or every month. When automatic mode is not activated, the user must activate it manually on the key **Disinfect**.

At the end of the function, the system returns to the operating mode that was selected at the beginning.

The Disinfect function is added:

- When you press the key disinfect for 3 seconds.
- On the penultimate day of the holiday period (during the holidays the value attributed to the parameter disinfect must be null).
- As a function of the setting adopted in the parameter disinfect.
- The function disinfect is cancelled when you press the key CANCEL or COMP

### 6.6.2. HOLIDAYS Function

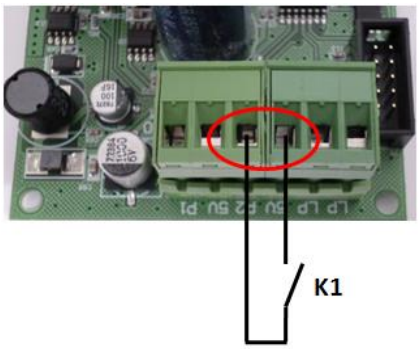
To activate the **Holidays** function you need to access the menu and set the number of days on holiday that you wish, and your equipment will automatically enter **Standby** mode until the last day of holidays. On the last day, the equipment will begin the **Disinfect** function to eliminate any formation of germs that appeared in the storage water heater during the time you were absent. After the holidays and once the program **Disinfect** is over, the equipment will resume the mode selected (**ECO**, **AUTO** or **BOOST**).

| | |
|---|---|
|  | If you set your equipment to enter Holiday mode and turn it off with the key ON/OFF, the function becomes inactive. When you return from your holidays you must remember to switch on your equipment and cancel the days of holidays introduced (Value=0). If you do not carry out this operation, your equipment will not restart until the days of holidays selected have expired. |

### 6.6.3. PV Function

The PV Function enables the possibility of reaching higher water temperatures when an alternative electric energy source it's available (solar PV, wind, other…), increasing the efficiency of the thermodynamic solar system and maximizing the alternative electric energy source.

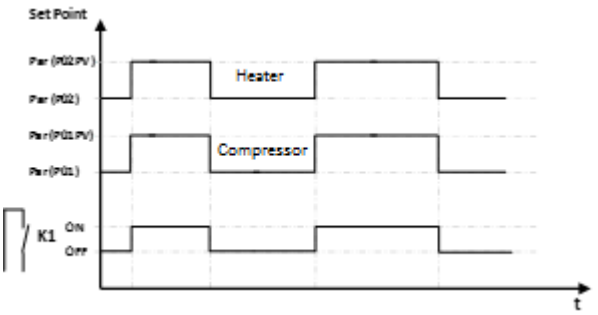
Just need to connect a wire from the PV inverter to the control board of the equipment. This connection on the board must be done to the terminals 5V/P2. Be carefull that this is a dry contact (without tension). Applying tension to this conctact will cause irreversible damage to the equipment.




When the contact K1 closes, it activate the PV Function and all the heat sources (heat pump and electric heater) will be adjusted to the new working parameters.

The compressor assume parameters P01PV / H01PV and the electric heater assume P02PV / H02PV.

**Note:** When the contact K1 it's open, the equipment will assume the previous working mode (Eco, Auto or Boost) and its parameters.




The K1 contact can be used to take advantage of tariff with variable price. To do that, just connect a timer to the 5V/P2 contacts instead of a inverter.

## 7. System Menu

Every time it becomes mecessary to alter or set new parameters in the running of the equipment, the user must access the **Menu**.

To access the menu, the key MENU must be pressed for 3 seconds.

After access use the keys **COMP ▲** and **E-HEATER ▼**, to navigate the menus and submenus.

In order to confirm values / parameters press the key **OK/LOCK**. Press the key **CANCEL** to exit the menu.

# 8. PARAMETERS DESCRIPTION

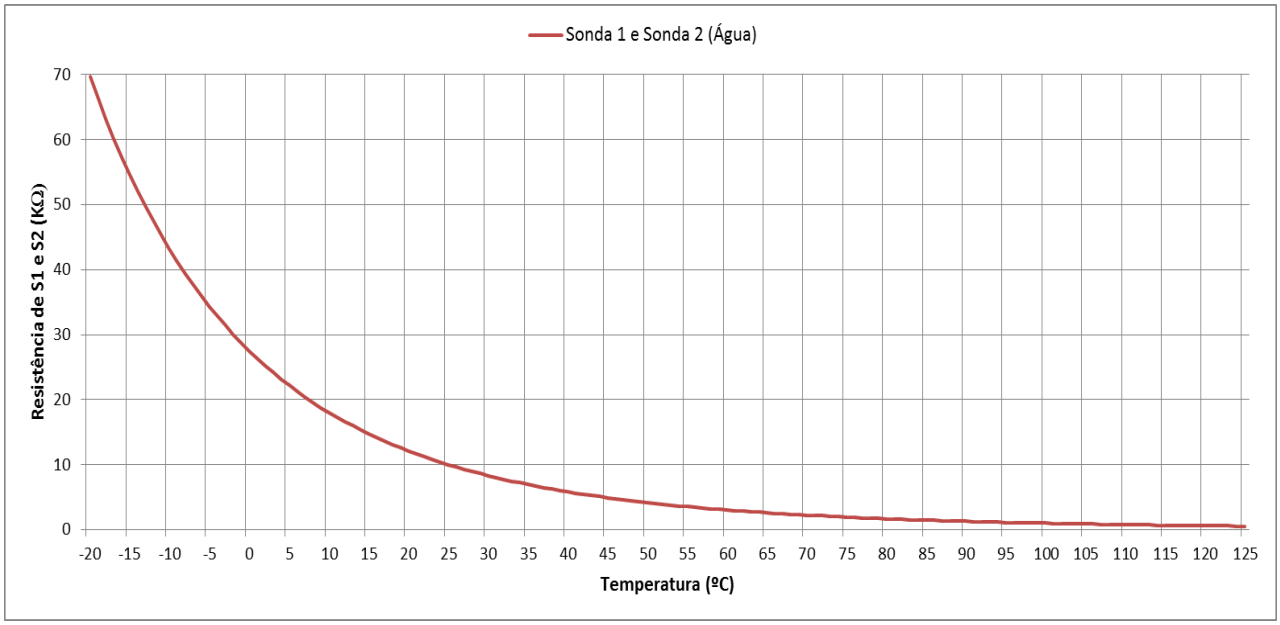
| | | | Values | | |
|---|---|---|---|---|---|
| **Code** | **Type** | **Description** | **Min** | **Max** | **Default** |
| **F01** | Language | Português<br>English<br>Français<br>Deutsch<br>Italiano<br>Espanol | *** | *** | English |
| **F02** | Clock | Date and Time | | | |
| **F03** | Mode | Eco mode<br>Boost mode<br>Automatic mode | *** | *** | Eco |
| **F04** | Holidays | Number of days | 1 | 99 | 0 |
| **F05** | Disinfect | **0** – Disinfect function inactive<br>**1** – Disinfect function active once a week (weekly)<br>**2** – Disinfect function active once a month (monthly) | 0 | 2 | 0 |
| **F06** | Parameters | **P01** – Setpoint compressor | 10 | 55 | 52 °C |
| | | **P01PV** – Setpoint compressor with contact K1 open | 10 | 55 | 52 °C |
| | | **H01** - Gradient P01 | 1 | 10 | 3 °C |
| | | **H01PV** - Gradient P01PV | 1 | 10 | 3 °C |
| | | **P02** - Setpoint electric heater | 10 | 60 | 53 °C |
| | | **P02PV** – Setpoint electric heater with contact K1 open | 10 | 60 | 55 °C |
| | | **H02** - Gradient P02PV | 1 | 10 | 3 °C |
| | | **H02PV** - Gradient P02 | 1 | 10 | 3 °C |
| | | **P05** – Safety Temperature | 70 | 80 | 70 °C |
| | | **P06** - Setpoint anti-legionela (disinfect) | 60 | 69 | 65 °C |
| | | **P08** – Minimum water temperature to activate electrical backup (parameter active and configurable only in AUTO mode) | 5/<br>OFF | 40/<br>ON | 16 °C/<br>ON |
| | | **T01** (timer) – Delay time of the compressor | 1 | 20 | 2 min |
| | | **T05** (timer) – Maximum time the compressor running straight without stopping (parameter active and configurable only in AUTO mode) | 6/<br>OFF | 15/<br>ON | 12 h/<br>ON |
| | | **T07** (timer) – Delay time of the compressor after the LP error Low pressure) | 1 | 20 | 10 min |
| **F07** | Info | Show settings adopted in the parameter list | | | |
| **F08** | Levels of access | Level 1 | Password: 0022 | | |
| | | Level 2 | Password: ???? | | |
| **F09** | Test Outputs | **CO** - N.O. contact<br>Turn on the compressor output | OFF | ON | OFF |
| | | **RE** - N.O. contact<br>Turn on the electric heater output | OFF | ON | OFF |
| **F10** | Errors | **Elist** – Errors list | *** | *** | *** |
| | | **Ereset** – Erase errors list | Manufacturer level | | |
| **F11** | Restore Values | Reset all the parameters to the manufacturer parameters | *** | *** | *** |
| **F12** | System | Probes configuration | Manufacturer level | | |

# 9. TABLE OF ERRORS

The installation, assembly and repair of **Eco** can only be carried out by qualified technicians.

| Symbols | Description | Problem / Checking |
|---|---|---|
| Er01 – S1 | Anomaly detected in probe 1 | Damaged probe – Measure internal resistance of probe which is approximately 10 KΩ at the temperature of 25 ºC.<br>Probe disconnected from controller – Check that the connector is well attached to the electronic plate and/or the connection terminals are secure. |
| Er02 – S2 | Anomaly detected in probe 2 | |
| Er03 – TA | Anomaly detected in water temperature | Water temperature in storage water heater is too hot – Check that there is no anomaly in the electronic board, such as a damaged relay.<br>Temperature probes in short-circuit – Measure internal resistance of probe, it should be approximately 10 KΩ at the temperature of 25 ºC, check that the connector is well attached to the electronic plate and the connection terminals are in good condition. |
| LP (may not be an error) | Protection system is activated | Check low pressure gauge – Check that the connector is well attached to the electronic plate and that the connection terminals are secure, or that the pressure gauge is running. Lack of refrigerant fluid in the circuit – Load of fluid incomplete or leak. Low external temperature |
| Error "Lo" | Temperature probe is damaged or in short-circuit | - Check the connections of the temperature probe.<br>- Replace with new probe. |
| LINK ERROR | Communication failure | Connection cable between display and command panel – Check the cable is in good condition or that the plugs are correctly inserted (display and command panel) |

# 10. GRAPHIC OF PROBES



# 11. RESOLUTION OF PROBLEMS

| PROBLEM | POSSIBLE CAUSES | HOW TO PROCEED |
|---|---|---|
| **Failure in electronic board** | Power supply failure | Check the power supply<br>Check the corresponding circuit breaker |
| | Cable damaged or disconnected | Check the integrity of the electronic board's electric circuit |
| **Low water temperature** | Equipment is switched off | Press the key ON/OFF. |
| | Absence of power supply or damaged cable | Check the connection of equipment to the socket<br>Check that the corresponding circuit-breaker is connected<br>Check the integrity of the cables<br>Check that the electrical cable is disconnected from the electronic.<br>Check electric protection (circuit-breaker RES) |
| | Error in the running of components | Check the presence of error on electronic board and consult the table of errors |
| | Use of large amount of hot water | Set the appliance for "BOOST" mode and wait for water heating |
| | Low temperature programmed as the set-point | Adjust the temperature of the set-point |
| | ECO mode is selected and outside temperature quite low | Alter the equipment to "AUTO" mode to initiate automatic management of system<br>Alter the equipment to "BOOST" mode for a fast water heating |
| | Support resistance is off | Make sure the support resistance has power supply |
| | Compressor is off | Switch on compressor with key "**COMP**" |
| | Return of hot water into the cold water circuit (safety device incorrectly installed or damaged) | Shut off the cold water supply valve to switch off the safety device. Open a hot water tap. Wait 10 minutes and if you get hot water, replace the faulty plumbing and/or proceed with the correct positioning of the safety device.<br>Clean the filter of the safety device. |
| **Water is too hot and/or there is steam** | Problem with the probe | Check error display on electronic board |
| | Problem with the thermostat | Check correct running of thermostat |

| | | |
|---|---|---|
| **Slow running of Thermodynamic Solar System and excessive running of support resistance (AUTO)** | Outside air temperature is very low | The running of the equipment depends on weather conditions |
| | Inlet water temperature is very low | The running of the equipment depends on the inlet water temperature |
| | Low value for Set-point | Increase the value of Set-point |
| | Installation has low electric voltage | Make sure the installation is supplied with the indicated value for voltage |
| | Problems with the thermodynamic solar system | Check the error display in the electronic board |
| **Low hot water flow rate** | Loss or clogging of hydraulic circuit | Check the condition of the hydraulic circuit |
| **Loss of water through safety device** | Absence or incorrect dimensioning of expansion tank (if leak is not continuous) | Installation and/or correct dimensioning of expansion tank |
| | Pressure in circuit is high (if the leak is continuous) | Check the throttle valve (if there is one installed)<br>Installation of a throttle valve (if it lacks one) |

| | | |
|---|---|---|
| **Power consumption is abnormally high and constant** | Loss or obstruction in cooling circuit | Check that the piping is not damaged<br>Employ equipment suitable for checking leaks in the circuit |
| | Dire environmental conditions | |
| **Support resistance does not work** | Thermostat failure | Check the condition of the thermostat |
| | Defective resistance | Check the condition of the resistance |
| **Bad odour** | Absence of siphon or siphon without water | Install and make sure the siphon has water |
| **Others** | | Contact customer service |

# 12. SYSTEM MAINTENANANCE

| | |
|---|---|
|  DANGER | Before undertaking any maintenance operation on the equipment, make sure it is not plugged to the power supply! |

## 12.1. General Inspection

During the equipment's useful life, the owner should carry out a general inspection of the equipment, according to the place where the equipment is set up:

- External cleaning of equipment and surrounding areas with a wet cloth
- Visual inspection of the whole equipment, with the purpose of detecting possible leaks and damaged devices

## 12.2. Magnesium Anode

This equipment has a magnesium anode that together with the building material of the tank will provide an effective protection against corrosion.

The internal shielding of the tank will ensure an effective protection against corrosion contributing to a water quality within the parameters considered normal. However, the characteristics of the water change according to the installation.

In your living area, the quality of the water can be aggressive to your equipment. So together with the equipment there is a magnesium anode that wears over time (disposable device), thus protecting your equipment.

The wear of the anode always depends on the characteristics of the water you use. Thus, checking the condition of the anode is very important, particularly in the first years of the installation, so that you will have a good perception of the useful life left for the appliance.

| | |
|---|---|
|  | Seek advice with your installer about how you should proceed to control the anode's condition. |

To check the condition of your anode follow these steps:

- Shut off water supply
- Remove pressure (for example, open a hot water tap)
- Unplug the appliance from the power supply
- Unscrew the anode with a suitable tool
- Check the level of wear of the anode and replace it, if necessary

## 12.3. Cleaning Filter of Throttle Valve

For a periodic cleaning of the filter of the throttle valve, you should:

1- Shut off the water supply.
2- Turn anti-clockwise until you remove tension from the spring
3- Remove the handle
4- Remove filter and clean

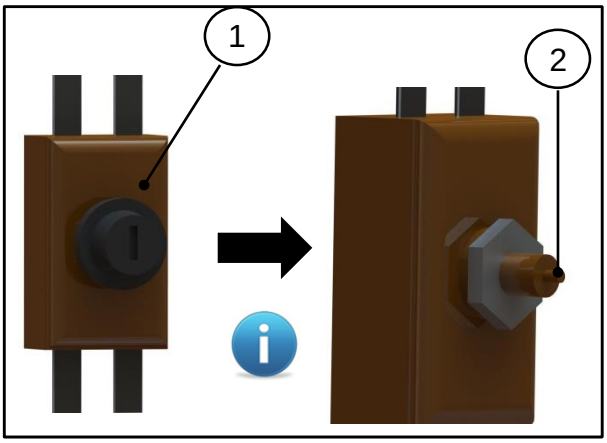
## 12.4. Safety Thermostat

The safety thermostat is deactivated whenever there is an anomaly in the system, so that every time you plan to activate it, determine what happened that caused it to change its status mode.

If you could not determine what happened and it is still deactivated, contact customer service to have your problem solved.

If everything is in order and you intend to reactivate the thermostat, follow this procedure:

- Remove the hood, unscrewing the four bolts
- Remove the lid (1)
- Press key (2) to reactivate the thermostat
- Replace the lid (1) and then the hood, then screwing the four bolts.




## 12.5. Empty the Storage Water Heater

| | |
|---|---|
| **DANGER** | Remember that the water in the storage water heater is at high temperature, so there is an associated risk of burns.<br>Before emptying the storage water heater allow the water temperature to drop to a level that will avoid burns. |

After ensuring the water temperature is on a safe level that will avoid burns, follow this procedure:

- Unplug the system from the power supply
- Shut off the water supply valve and open a hot water tap
- Open the system discharge valve

END

## Notes

# Warranty

This warranty covers all defects to the confirmed materials, excluding the payment of any type of personal damage indemnity caused directly or indirectly by the materials.
The periods indicated below start from the purchase date of the apparatus, 6 months at the latest from the leaving date from our storage warehouses.

**Water Cylinder**
**(domestic and industrial use)**
5 Years: Stainless Steel (2 + 3 years)*
5 Years: Enamelled (2 + 3 years)*

Manufacturer Warranty

**Thermodynamic solar panel**
10 Years

Against Production
Defects and corrosion

**Electrical components and Moving parts:**
- **Thermodynamic Block**
- **Solar Block**
- **Solarbox**
- **Split**
- **Monobloc (except cylinder)**
- **Combi Block**
- **Agrotherm**
- **DHW**

2 Years

*The warranty extension of 3 years, against corrosion of the internal tank (Enamelled / Stainless Steel), is conditioned to the submission of:

- Warranty and Check Sheet at maximum 15 days after the installation.
- Documental evidence of the magnesium anode replacement.
- Pictures of the installation where it's shown safety group, expansion vessel, hydraulic and electrical connections

In case of warranty, the parts replaced are property of the manufacturer.
A repair under the warranty is not reason for an extension of its term.

**Warranty Exclusions**

The warranty ceases to be effective when the apparatus is no longer connected, used or assembled in accordance with manufacturer instructions, or if there has been any form of intervention by unauthorized technicians, has the appearance of modifications and/or if the series number appears to have been removed or erased. The equipment should be installed by qualified technicians according to the rules in effects and/or the rules of the trade, or the instructions of our technical services. Further exclusions from warranty:

- Hot water tanks have been operating in water with the following indexes:
  - Active chlorine > 0.2 ppm
  - Chlorides > 50 mg/l (Inox)
  - Hardness > 200 mg/l
  - Condutibility > 600 μS/cm (20 ºC)
  - PH < 5,5 or PH > 9 (Sorensen at 20ºC).
  - If one of the water parameters has a greater value than stipulated by directive 236/98 (Portugal) or equivalent standard in the costumer's country
- Parts are subject to natural wear and tear – levers, switches, resistances, programmers, thermostats, etc.
- Breakdown due to incorrect handling, electrical discharges, flooding, humidity or by improper use of the apparatus.
- The warranty lapses if it is transferred to another owner, even if within the guarantee period.
- The warranty lapses if this certificate is incorrectly filled in, if it is violated or if it is returned after more than 15 days have passed since the purchase date of the apparatus.

**ATTENTION:** Technical assistance costs even within the warranty period shall be supported by the customer (Km and assistance time). In cases where there is no justifiable breakdown and subsequent need for technical assistance, the client will pay for lost technical assistance time.

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