

Installation Instructions and Use & Care Guide



Thermodynamic Solar Water Heater

Eco 200esm | Eco 250esm | Eco 300esm



⚠ WARNING

This manual must be used by a qualified installer/service technician. Read all instructions in this manual before installing. Perform steps in the given order. Failure to comply could result in substantial property damage, severe personal injury, or death.

NOTICE: ENERGIE reserves the right to make product changes or updates without notice and will not be held liable for typographical errors in literature.

CONSUMER INFORMATION: PLEASE KEEP ALL INSTRUCTIONS FOR FUTURE REFERENCE

Dear Customer,

We would like to thank you for choosing an Energie water heater.

We dedicate great part of our time developing innovations that promote savings.

The thermodynamic solar water heater **Eco** will surely meet all your expectations and provide many years of comfort with maximum savings.

We have taken on a permanent commitment to conceive innovative and efficient products so that the 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 at your disposal.

SPECIAL ATTENTION BOXES

The following defined terms are used throughout this manual to bring attention to the presence of hazards of various risk levels, or to important product information.

DANGER

DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

CAUTION

CAUTION used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.

FOREWORD

This manual is intended to be used in conjunction with other literature provided with the equipment. This includes all related control information. It is important that these manual, all other documents included with this system, and additional publications.

Installation should be made in accordance with the regulations of the local code authorities and utility companies which pertain to this type of water heating equipment.

FOR THE INSTALLER

WARNING

This manual must only be used by a qualified installer/service technician. Read all instructions in this manual before installing. Perform steps in the order given. Failure to comply could result in substantial property damage, severe personal injury, or death.

This water heater must be installed by qualified and licensed personnel. The installer should be guided by the instructions furnished with the water heater, and with local codes and utility company requirements. In the absence of local codes, preference should be given to the National Electrical Code, ANSI/NFPA 70.

INSTALLATIONS MUST COMPLY WITH:

Local, state, provincial, and national codes, laws, regulations and ordinances.

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1. GENERAL SAFETY INFORMATION

WARNING

For your safety, the information in this manual must be followed to minimize the risk of fire, explosion, electric shock, and to prevent property damage, personal injury, or death.

1.1. PRECAUTIONS

When installing:

- The installation of the water heater must be carried out by staff with suitable training and qualified for this purpose;
- This water heater is for indoor installation only;
- Ensure the water heater is installed on a floor that can support its full filled weight (800 lbs).
- The device must not be installed in places that presents risk of impact, shock or explosion;
- Keep the equipment packed until it reach the place and moment of installation;
- Make sure all hydraulic couplings are watertight before connecting the equipment to the power supply.

WARNING

INSTALLER – Read all instructions in this manual before installing. Be sure to understand all instructions before installing or operating this water heater, as this may save time and cost. Perform steps in the order given. Should you have problems understanding the instructions in this manual, or any questions, STOP and get help from a qualified service technician or local electric utility.

FAILURE TO ADHERE TO THE GUIDELINES ON THIS PAGE CAN RESULT IN SUBSTANTIAL PROPERTY DAMAGE, SEVERE PERSONAL INJURY, OR DEATH.

WARNING

NOTE: If the water heater is exposed to the following, do not operate until all corrective steps have been made by a qualified serviceman:

1. FIRE
2. DAMAGE
3. WATER

Any claims for damage or shortage in shipment must be filed immediately against the transportation company by the consignee

DO NOT USE THIS WATER HEATER IF ANY PART HAS BEEN UNDERWATER. Immediately call a qualified service technician. Replace any part of the control unit that has been under water.

1.2. WATER TEMPERATURE ADJUSTEMENT

DANGER

Water temperature over 125 °F can instantly cause severe burns or death from scalds. Children, disabled, and the elderly are at the highest risk of being scalded. See instruction manual before setting temperature at the water heater. Feel water before bathing or showering! Temperature limiting valves are available.

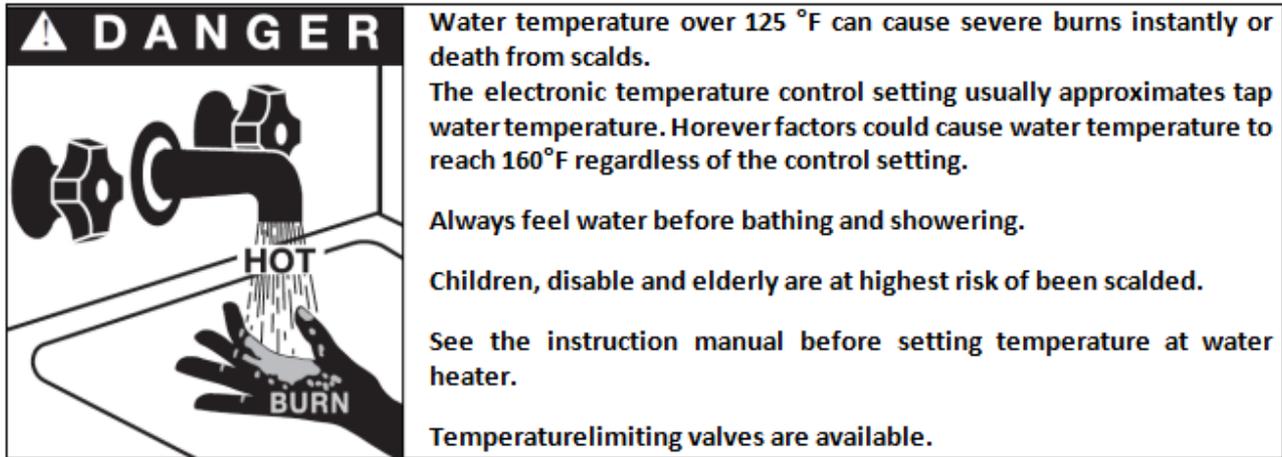


Figure 1

Safety and energy conservation are factors to be considered when selecting the water temperature setting via the water heater user interface. Water temperatures above 125 °F can cause severe burns or death from scalding. Be sure to read and follow the warnings outlined on the label pictured in Figure 1. This label is also located on the water heater near the top of the tank.

Mixing valves for reducing point-of-use water temperature by mixing hot and cold water in branch water lines are available. Contact a licensed plumber or the local plumbing authority for further information.

NOTE: Households with small children, disabled, or elderly persons may require a 120°F or lower thermostat setting to prevent contact with “HOT” water.

Aproximate time / temperature relationships in sacalds	
Teperature	Time to produce a serious burn
120°F (49°C)	More than 5 minutes
125°F (52°C)	1½ to 2 minutes
130°F (54°C)	About 30 seconds
135°F (57°C)	About 10 seconds
140°F (60°C)	Less than 5 seconds
145°F (63°C)	Less than 3 seconds
150°F (65°C)	About 1½ seconds
155°F (68°C)	About 1 second

Table 1: Table Courtesy of Shriners Burn Institute

1.3. COMBUSTIBLE MATERIALS

⚠ WARNING

Gasoline, as well as other flammable materials and liquids (adhesives, solvents, etc.), and the vapors these items produce are extremely dangerous. **DO NOT** handle, use, or store gasoline or other flammable or combustible materials anywhere near or in the vicinity of the water heater. The arc drawn in the water heater controls can ignite these vapors. Failure to follow these instructions can result in property damage, serious personal injury, or death.

1.4. MAINTENANCE CONSIDERATIONS

- To avoid electric shock, disconnect electrical supply before performing maintenance.
- To avoid severe burns, allow water heater to cool before performing maintenance.

1.5. HYDROGEN GAS

Hydrogen gas can be produced in a hot water system that has not been used for a long period of time (generally two weeks or more). HYDROGEN GAS IS EXTREMELY FLAMMABLE! To dissipate such gas and reduce the risk of injury, it is recommended that the kitchen sink hot water faucet be opened for several minutes before using any electrical water heater connected to the hot water system. If hydrogen is present, there will be an unusual sound, such as air escaping through the pipe as water begins to flow.

Do not smoke or use an open flame near the faucet while it is open. Failure to follow this warning could result in property damage, severe personal injury, or death.

1.6. SAFETY CONSIDERATIONS

1. Turn off power to the water heater if it has been subjected to overheating, fire, flood, or physical damage.
2. **Do Not** turn on water heater unless it is filled with water.
3. **Do Not** turn on water heater if cold water supply shut-off valve is closed.
4. **Do Not** store or use gasoline or other flammable vapors or liquids, such as adhesives or paint thinner, in the vicinity of this or any other water heater. Open doors and windows for ventilation if such flammables must be stored near the water heater.

NOTE: Flammable vapors may be drawn by air currents from surrounding areas to the water heater.

5. If there is any difficulty in understanding or following the Control Instructions or the Maintenance and Cleaning Sections, it is recommended that a qualified person or serviceman perform the work.

1.7. SAFETY CONTROLS

The water heater is equipped with one temperature-limiting control (SP) that are located above the heating element in contact with the tank surface. If for any reason the water temperature becomes excessively high, the temperature-limiting control (SP) breaks the electrical circuit to the heating element (UE). Once the control opens, it must be reset manually. **Resetting the temperature limiting controls should only be done by a qualified service technician.**

CAUTION

The cause of the high temperature condition must be investigated by a qualified service technician and corrective action must be taken before placing the water heater in service again.

To reset the temperature-limiting control:

1. Turn off the power to the water heater.
2. Remove the access jacket . DO NOT remove the thermostat..
3. Press the red RESET button.
4. Replace the access jacket before turning on power to the water heater.

WARNING

This water heater must be properly grounded before usage. Failure to comply could result in substantial property damage, severe personal injury, or death.

2. UNIT TRANSPORT

CAUTION

- **Transporting the equipment must be carried out with an inclination below 45°;**
- **The equipment must be raised and lowered with extreme care to avoid impact that could damage the material;**
- **Make sure the belts and/or transportation straps do not damage the material;**
- **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, if the path you will travel is unobstructed, in order to prevent collisions that could cause damage to the device.

3. PACKAGE

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 group together with the hood and elements to attach to the storage water heater.

4. INSTALLATION INSTRUCTIONS

4.1. DETERMINING WATER HEATER LOCATION

The location chosen for the water heater must take the following into consideration:

- **LOCAL INSTALLATION REGULATIONS**
This water heater must be installed in accordance with these instructions, local codes, utility codes, and utility company requirements or, in the absence of local codes, the latest edition of the National Electrical Code.
- **POWER REQUIREMENTS**
Check the markings on the rating plate of the water heater to verify the power supply corresponds to the water heater requirements (240V/15A).
- **LOCATION**
Locate the water heater indoors, in a clean, dry area as near as practical to the area of greatest heated water demand. Long uninsulated water lines can waste heat, energy and money. The water heater and water lines should be protected from freezing temperatures and highly corrosive atmospheres. Do not install the water heater in outdoor or unprotected areas.

CAUTION

The water heater should not be located in an area where leakage of the tank or connections will result in damage to the area adjacent to it or to lower floors of the structure. Where such areas cannot be avoided, it is recommended that a suitable, adequately drained catch pan be installed under the water heater.

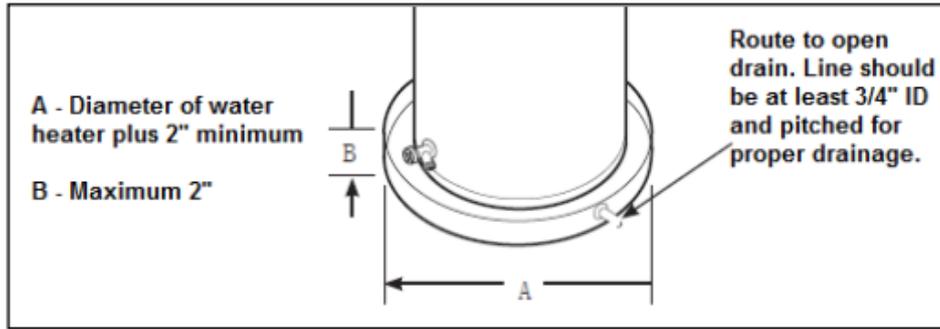


Figure 2: Catch pan detail

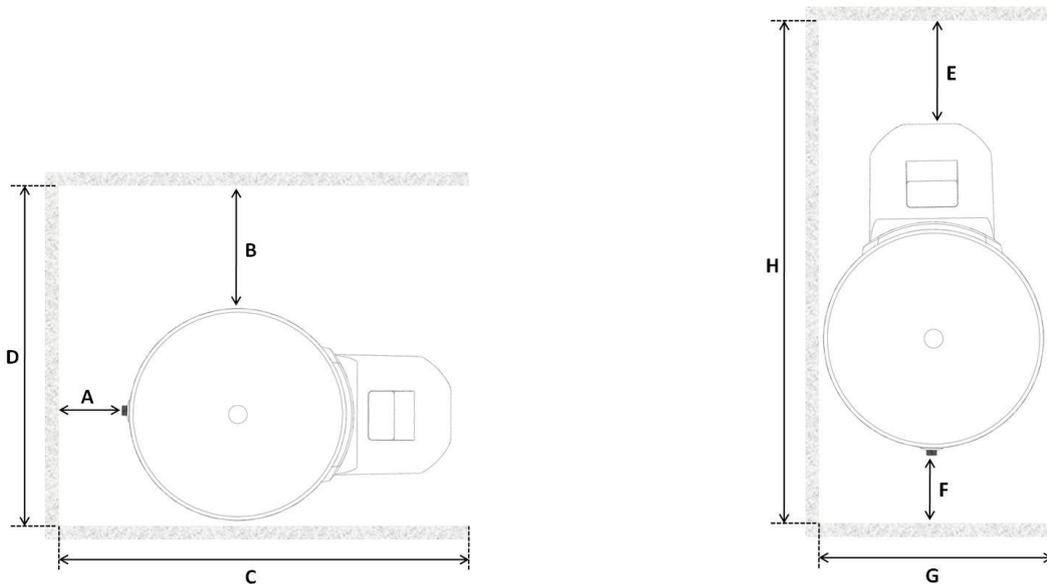
Note: the auxiliary catch pan must conform to local codes.

⚠ DANGER

This water heater **SHOULD NOT** be installed in a space where liquids which give off flammable vapors are used or stored. Such liquids include gasoline, LP gas (butane and propane), paint or adhesives and thinners, solvents, or removers. Because of natural air movement in a room or other enclosed space, flammable vapors can be carried from where flammable liquids are being used or stored. The operation of the control system within the water heater can ignite these vapors, causing an explosion or fire which may result in property damage, as well as potentially severe burns or death to those in range

4.2. REQUIRED CLEARANCES

In the event service is needed, there must be atleast the following measures.



A → 10" (inch)

B → 16" (inch)

C → 44" (inch)

D → 46" (inch)

E → 14" (inch)

F → 10" (inch)

G → 23" (inch)

4.3. THERMAL EXPANSION

Determine if a check valve exists in the inlet water line. It may have been installed in the cold water line as a separate backflow preventer, or may be part of a pressure-reducing valve, water meter, or water softener. A check valve located in the cold water inlet line can cause what is referred to as a “closed water system”. A cold water inlet line with no check valve or backflow prevention device is referred to as an “open water system”.

As water is heated, it expands in volume and creates an increase in the pressure within the water system. This action is referred to as “thermal expansion”. In an open water system, expanding water which exceeds the capacity of the water heater flows back into the city main, where pressure is easily dissipated.

A closed water system prevents the expanding water from flowing back into the main supply line, and the resulting thermal expansion can create a rapid and dangerous pressure increase in the water heater and system piping. This pressure increase can quickly reach the safety limit of the relief valve, causing it to operate during each heating cycle. Thermal expansion, and the resulting rapid and repeated expansion and contraction of components in the water heater and piping system, can cause premature failure of the relief valve and possibly the water heater itself. Replacing the relief valve will not correct this problem.

The suggested method of controlling thermal expansion is to install an expansion tank in the cold water line between the water heater and the check valve. The expansion tank is designed with an air cushion built in that compresses as the system pressure increases, thereby relieving the thermal expansion and eliminating the repeated operation of the relief valve.

Other methods of controlling thermal expansion are available. Contact your installing contractor, water supplier, or plumbing inspector for additional information regarding this subject.

4.4. WATER CONNECTIONS

The installation of unions or flexible copper connectors is recommended on the hot and cold water connections so that the water heater may be easily disconnected for servicing if necessary. The HOT and COLD water connections are 3/4”.

NOTE: Install a shut-off valve in the cold water line near the water heater. This will enable easier service and maintenance of the water heater.

IMPORTANT: Do not apply heat to the HOT or COLD water connections will permanently damage the connections and tubes.

Please note the following:

- The system should be installed only with piping that is suitable for potable (drinkable) water such as copper, CPVC, or polybutylene. This water heater must not be installed using iron piping or PVC water piping.
- Use only pumps, valves, or fittings that are compatible with potable water.
- Use only full flow ball or gate valves. The use of valves that may cause excessive restriction to water flow is not recommended.
- Use only 95/5 tin-antimony or other equivalent solder. Any lead based solder must not be used.
- Piping that has been treated with chromates, boiler seal, or other chemicals must not be used.
- Chemicals that may contaminate the potable water supply must not be added to the piping system.

4.5. TP RELIEF VALVE

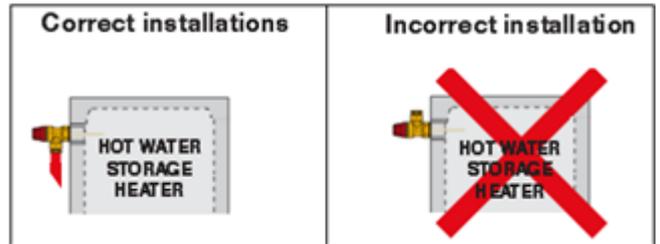
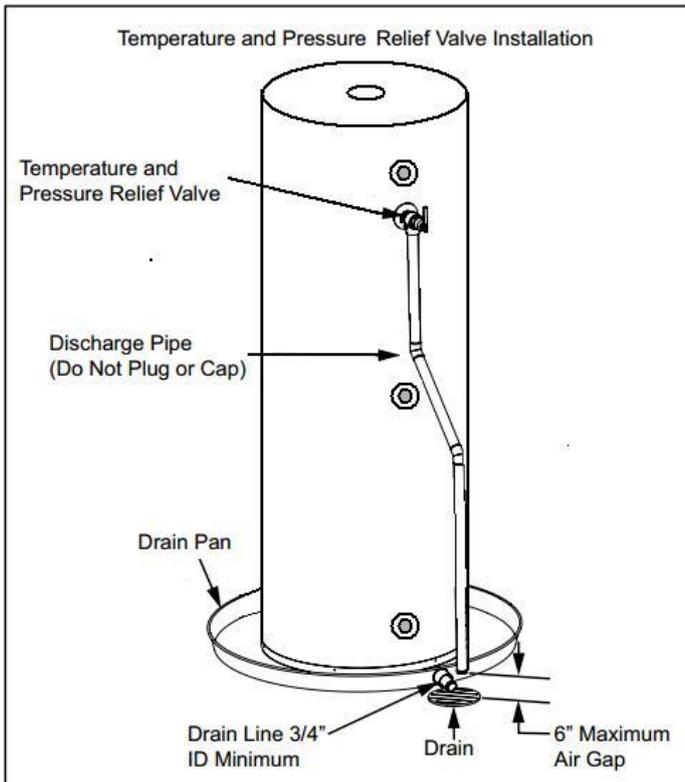
⚠ WARNING

The pressure rating of the relief valve must not exceed 100 PSI, the maximum working pressure of the water heater as marked on the rating plate. Failure to follow this warning could result in explosion, property damage, personal injury, or death.

Connect the outlet of the TP relief valve to a suitable open drain so that the discharge water cannot contact live electrical parts or persons and to eliminate potential water damage.

Piping should be of a type approved for hot water distribution. The discharge line must be no smaller than the outlet of the valve and must pitch downward from the valve to allow complete drainage (by gravity) of the relief valve and discharge line. The end of the discharge line should not be threaded or concealed and should be protected from freezing. No valve of any type, restriction or reducer coupling should be installed in the discharge line.

Shall terminate a maximum of 6 in. (152mm) above a floor drain or external to the building.



⚠ WARNING

- The TP relief valve must be installed by qualified technical personnel in accordance with current regulations.
- Must be installed observing the direction of flow indicated by the arrow on the valve body.
- Any use other than the intended use is prohibited.

Failure to follow this warning could result in explosion, property damage, personal injury, or death.

4.6. ELECTRICAL CONNECTIONS

The voltage requirements and wattage load for the water heater are specified on the rating label on the front of the water heater.

⚠ WARNING

Proper ground connection is essential. The presence of water in the piping and water heater does not provide sufficient conduction for a ground. Nonmetallic piping, dielectric unions, flexible connectors, etc., can cause the water heater to be electrically isolated. Improper grounding could result in severe personal injury or death due to electric shock.

- The water heater requires nominal 220-240 VAC /50-60Hz for proper operation. DO NOT use a 208 VAC service.
- Wiring size and connections comply with all applicable codes or in the absence of local or state codes follow NFPA-70, the National Electrical Code-current edition.
- Water heater and electrical supply are properly grounded.
- Wiring enclosed in approved conduit (if required by local codes).
- Dedicated circuit with proper overload fuse or circuit breaker protection installed.

The water heater warranty does not cover any damage or defect caused by installation, attachment, or use of any type of energy-saving or other unapproved devices (other than those authorized by the manufacturer) in conjunction with the water heater. The use of unauthorized energy-saving devices may shorten the life of the water heater and may endanger life and property.

ENERGIE EST, disclaims any responsibility for such loss or injury resulting from the use of such unauthorized devices.

⚠ WARNING

If the power cable is damaged it should be replaced by the manufacturer, post-sales assistance or similar qualified personnel in order to avoid hazardous situations.

5. 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**.

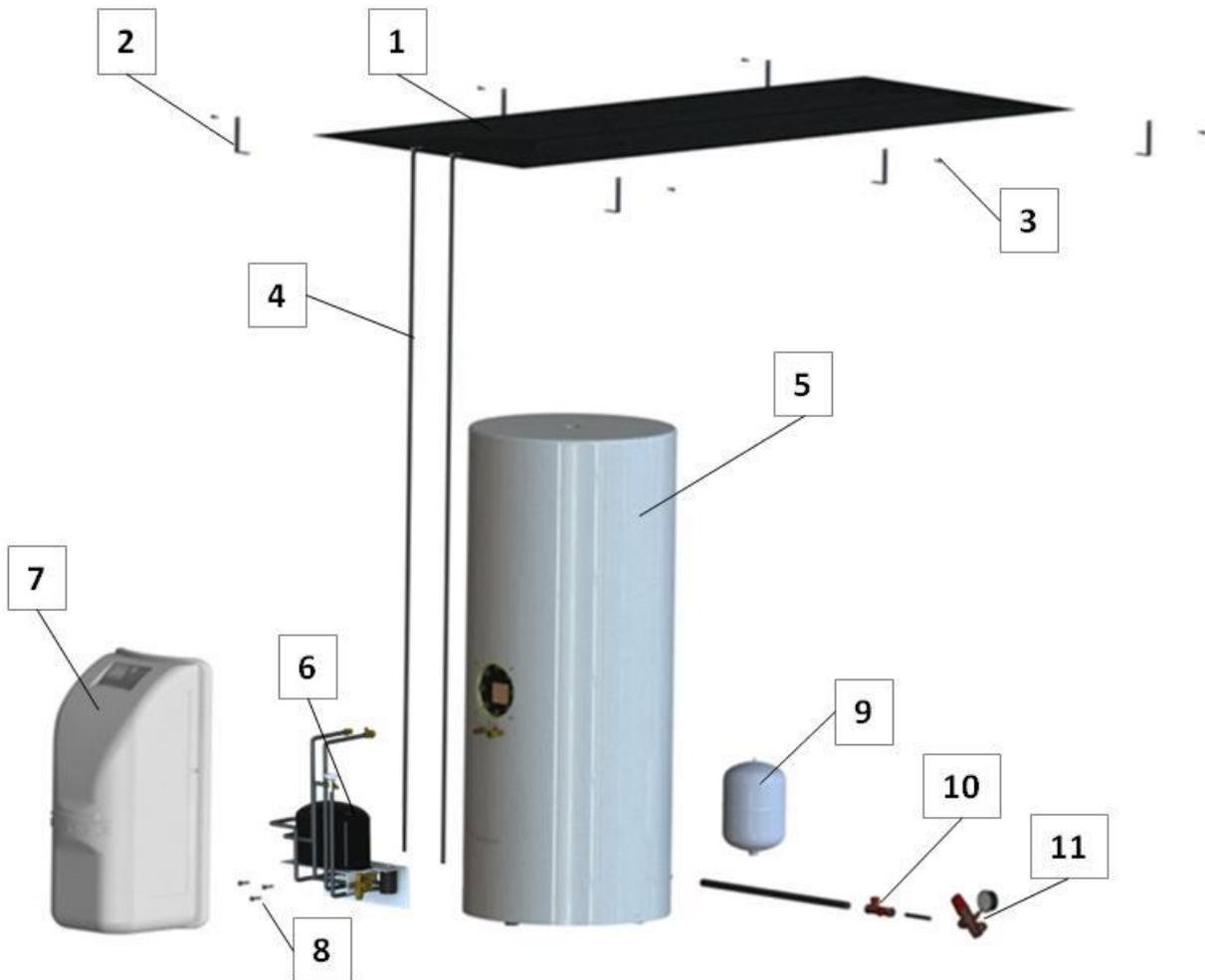
Before the Klea returns to the solar panel it is necessary that there should be a narrowing, that is, reduce the pressure and ensure that it is again in a liquid state, thus completing the cycle.

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

6. TECHNICAL FEATURES

		Unit	200	250	300
STORAGE WATER HEATER	Dry weight	Kg / lb	73 / 160	83 / 182.9	95 / 209.4
	Volume	Lts / gal	200 / 52,8	250 / 66	300 / 79.25
	Type of internal protection	-	Enamelled		
	Cathodic protection	-	Magnesium anode (1"1/4 Female)		
	Hydraulic joints (Cold Hot TPR valve Recirculation)	in	¾" Male ¾" Male ½" Female ¾" Female		
	Maximum pressure	bar / psi	6 / 87		
	Test pressure	bar / psi	10 / 145		
	Maximum water temperature	°C/°F	80 / 176		
	Recommended water temperature	°C/°F	60 / 140		
THERMODYNAMIC SOLAR PANEL	Material	-	Solokote Hydrofobic Anodized Aluminium		
	Dimensions (L x A x e)	mm / ft	2000 x 800 x 20 / 6.56x 2.63 x 0.065		
	Weight	Kg / lb	8 / 17,6		
	Maximum working pressure	bar / psi	10 / 145		
	Test pressure	bar / psi	12 / 174		
	Maximum exposure temperature	°C/°F	120 / 248		
	Minimum running temperature	°C/°F	- 5 / 23		
	Minimum exposure temperature	°C/°F	- 40 / -40		
THERMODYNAMIC GROUP	Width	mm / ft	320 / 1.049		
	Height	mm / ft	710 / 2.329		
	Depth	mm / ft	280 / 0.918		
	Weight	Kg / lb	18 / 40		
	Absorbed power (Average/Max)	W	390 - 550		
	Thermal power (Average/Max)	W	1690 / 2900		
	Element	W	1500		
	Compressor Type	-	Danfoss		
	Compressor Noise Level	dB	39		
COOLING COUPLINGS	Cooling Fluid / Amount	- / Kg / lb	R134a / 1 / 2,2		
	Piping Material	-	Copper (DHP ISO1337)		
	Line of liquid	in	1/4"		
	Line of aspiration	in	3/8"		
POWER SUPPLY	Power feed	VAC / Hz	220-240 / 50-60		
	Current	A	15		

7. MAIN COMPONENTS, GENERAL DIAGRAM OF ASSEMBLY



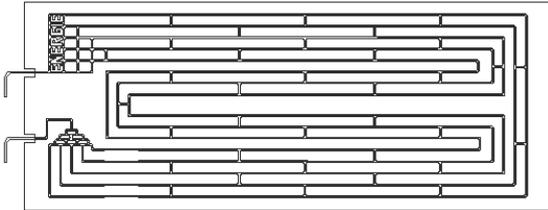
- [1] Thermodynamic solar panel
- [2] L-shaped fastenings for attachment of aluminium panel
- [3] Set of bolts, female, washer and bushing (6x or 8x)
- [4] Refrigerant copper pipes
- [5] Water storage heater
- [6] Thermodynamic group
- [7] Hood + Display
- [8] Bolts CHC M8
- [9] Expansion tank
- [10] Safety group
- [11] Pressure reduction valve

8. SPECIFICATIONS

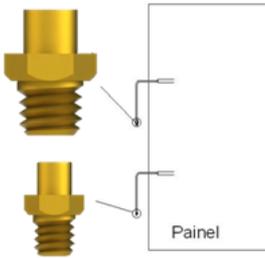
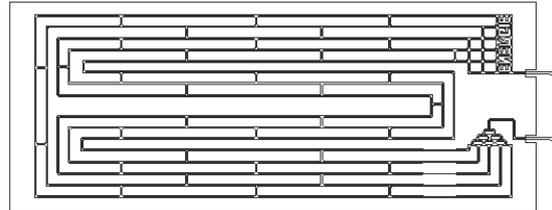
8.1. SOLAR PANEL

The solar panel is a manufactured in double channel pressed aluminium, with a post-press anodization-oxidation followed by a hydrophobic paiture. There are two types of panels available: left and right panels (according connections side).

Left Panel



Right Panel

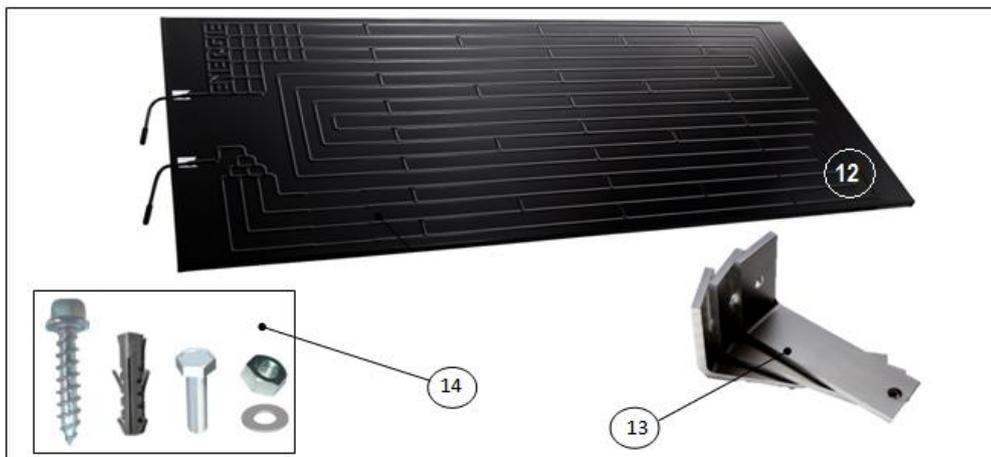


The panel connections are Flare SAE (threaded) type:

- ✓ 3/8" Flare male SAE (Aspiration upper part)
- ✓ 1/4" Flare male SAE (Liquid lower part)

The solar panel has standard dimensions:

Thermodynamic Solar Panel	
Widht	2000 mm (6.562 ft)
Height	800 mm (2.625 ft)
Thickness	20 mm (0.066 ft)
Weight	8 kg (16.637 lbs)
Gross area / Absorver area	1.6 m ² (1.914 sq yd)



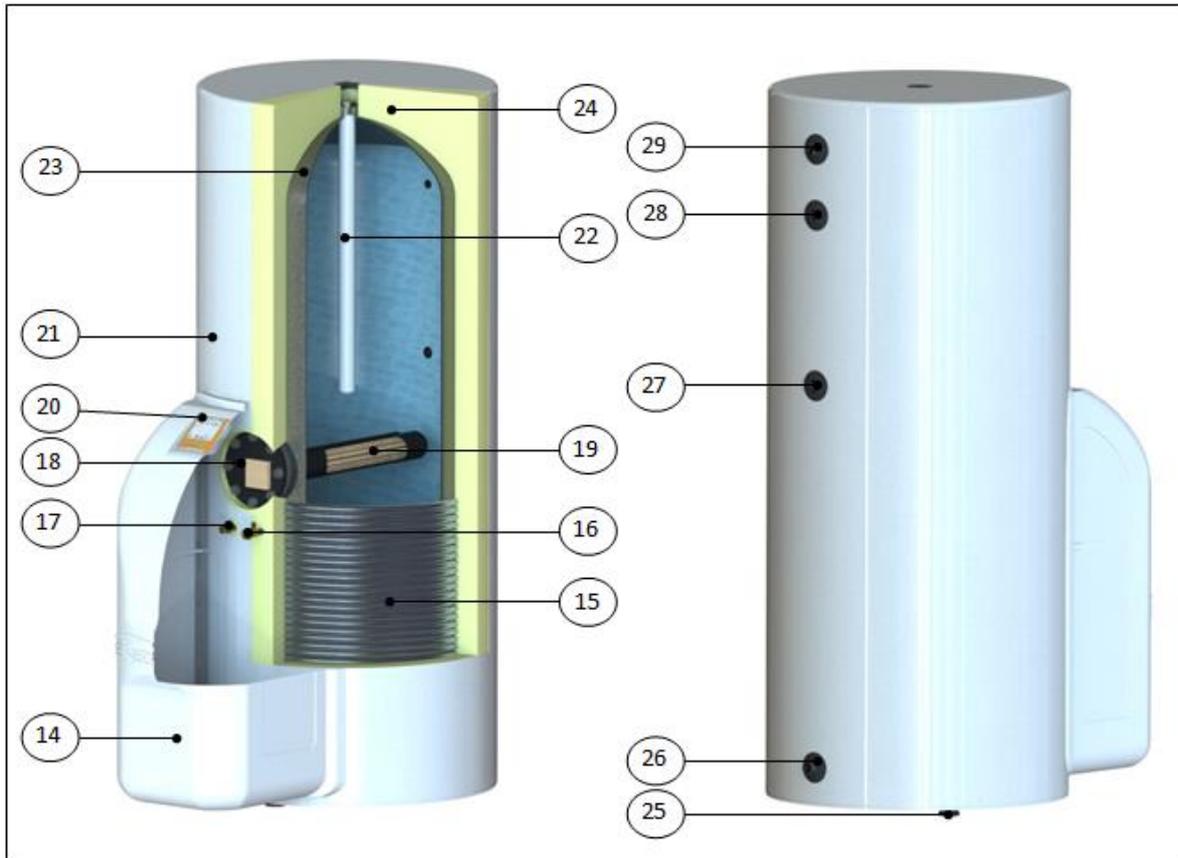
- [12] Thermodynamic Solar Panel
- [13] Aluminium L-shaped fastenings for attachment of Thermodynamic Solar Panel (6x or 12x)
- [14] Fixing elements

8.2. STORAGE WATER HEATER

The storage water heater is vertical and rests on the floor. The tank is made of carbon steel with enamel coating or made of stainless steel. The thermal insulation is made of expanded polyurethane with a average thickness of 45 mm.

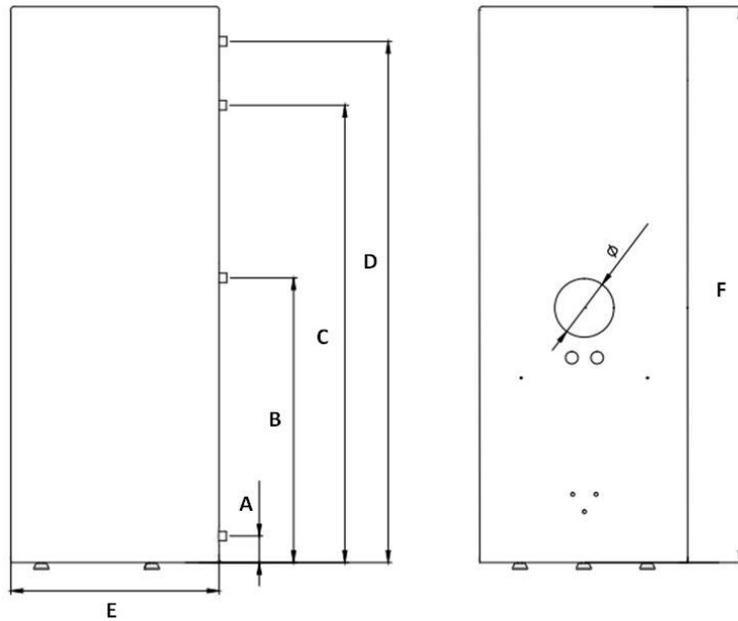
The storage water heater has a cold water inlet, hot water outlet and return inlet. It also supplied with a magnesium anode on the top.

There is in the central part of the storage water heater, a flanged opening with a safety thermostat, temperature probe and element.



- | | |
|--|---|
| <ul style="list-style-type: none"> [14] Hood [15] Condenser / Coil [16] One-Shot Female Valve [17] One-Shot Male Valve [18] Temperature Probe + Safety Thermostat [19] Element [20] Display [21] External Sheet [22] Magnesium Anode [23] Tank [24] Polyurethane Insulation | <ul style="list-style-type: none"> [25] Adjustable feet [26] Cold water inlet + Dielectric Thread (3/4") [27] Recirculation (3/4") [28] TP Relief Valve [29] Hot water outlet + Dielectric Thread (3/4") |
|--|---|

8.3. DIMENSIONS STORAGE WATER HEATER



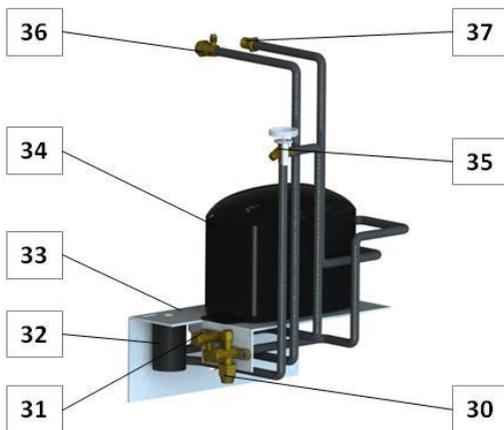
Version	A (mm/ft)	B (mm/ft)	C (mm/ft)	D (mm/ft)	E (mm/ft)	F (mm/ft)
200	74 / 0.242	650 / 2.132	1146 / 3.759	1274 / 4.179	580 / 1.902	1350 / 4.429
250	74 / 0.242	815 / 2.673	1326 / 4.350	1454 / 4.770	580 / 1.902	1530 / 5.019
300	74 / 0.242	815 / 2.673	1543 / 5.062	1671 / 5.482	580 / 1.902	1750 / 5.741

8.4. THERMODYNAMIC GROUP

The Thermodynamic Group is the equipment set on a galvanized steel structure that contains two of the main parts of the system: compressor and expansion valve.

The lateral section of the group 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 Group rests is attached to the storage water heater through three M8 bolts.

The thermodynamic Group is also connected to the condenser / coil that surround the storage water heater through two *One-Shot* valves.

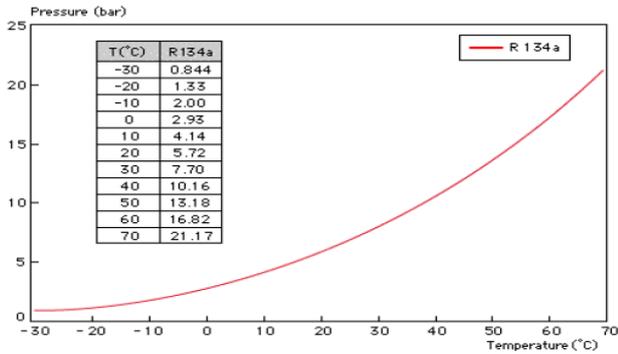


- [30] 3-Way Valve (Aspiration)
- [31] 2-Way Valve (Liquid)
- [32] Liquid Tank
- [33] Support structure for Thermodynamic Group
- [34] Compressor
- [35] Expansion Valve
- [36] "One-Shot" Female Valve
- [37] "One-Shot" Male Valve

8.5. 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.



CAUTION

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.

8.6. PROTECTION AGAINST CORROSION

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

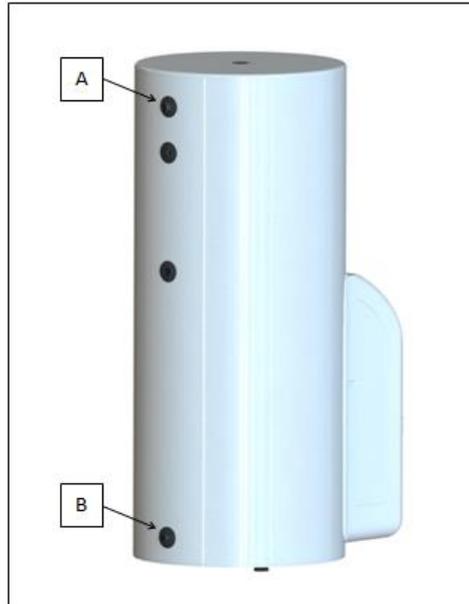
Besides being resistant to corrosion, the storage water heater has in addition a magnesium anode that should be checked periodically according to information by the installer.

CAUTION

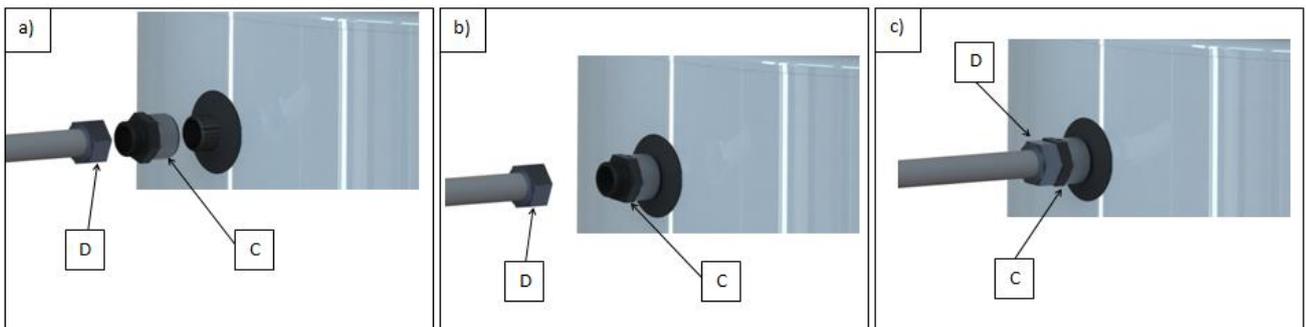
The magnesium anode should be replaced by the manufacturer, post-sales assistance or similar qualified personnel in order to avoid hazardous situations.

8.7. BIPOLAR SOCKET

Your **Eco** equipment contains two bipolar sockets. These sockets 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 sockets (C) in the water inlet and outlet (A and B), before attaching the piping (D), as demonstrated in the following sequence:



9. INSTALLATION

Assembly sequence:

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

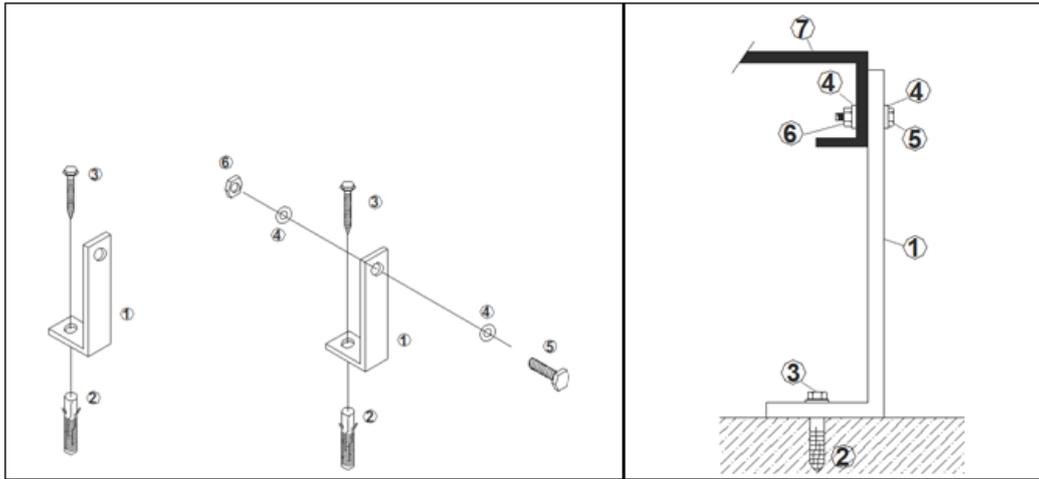
9.1. ATTACHMENT SOLAR PANNEL

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 10° 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:

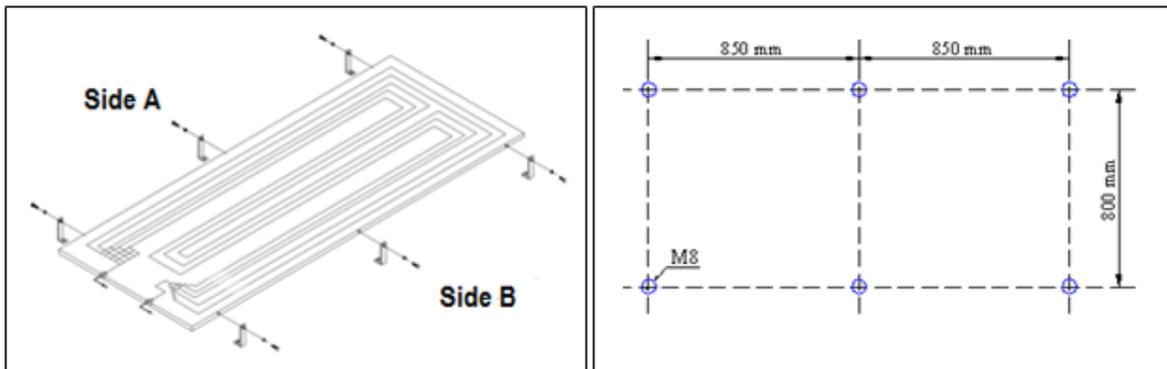
Attachment of L-shaped fastenings and panel:



- [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.

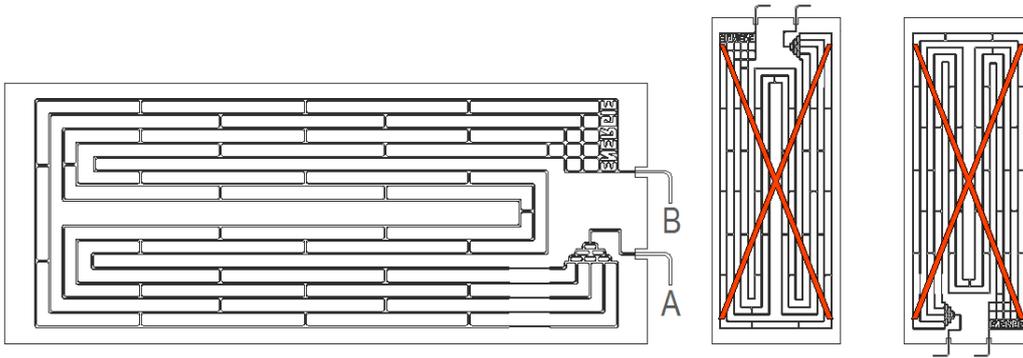
It holds 3 small L-shaped fastenings (side A) and 3 large L-shaped fastenings (side B) that should be attached as depicted in the picture. The desired pitch of the panel should be adjusted.



The profile should be attached to the base (e.g. roof tile) 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.

The panel must be installed facing down, that is, the connections must be turned down.



[A] Liquid inlet

[B] Vapour outlet (aspiration)

9.2. 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 (Min. 710 lb)

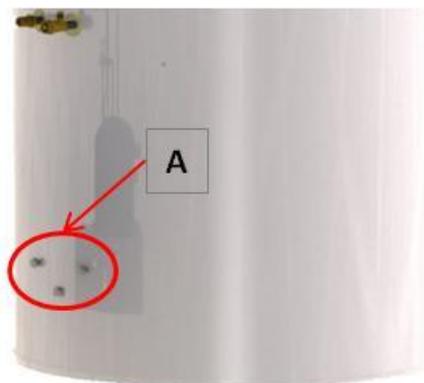
9.3. INSTALLATION THERMODYNAMIC GROUP

When installing the thermodynamic Group, you must:

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

INFO

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

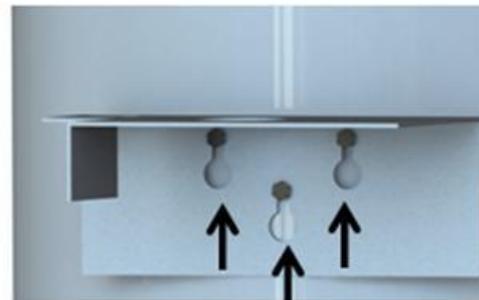


- Aim the metallic structure with the orifices to the three M8 bolts previously mentioned.



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.

9.4. SET-COOLANT COUPLINGS

⚠ WARNING

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

Failure to follow this warning could result in property damage, personal injury, or death.

⚠ WARNING

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

Failure to follow this warning could result in property damage or personal injury.

INFO

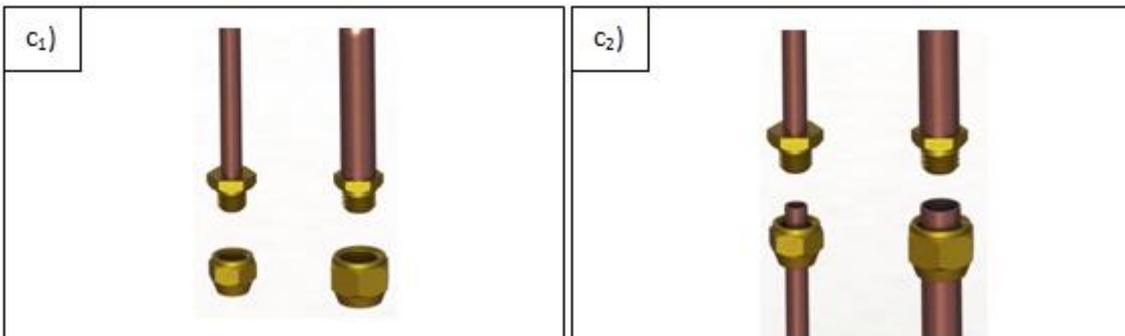
The thermodynamic unit holds a pre-load of fluid R134a (1000g).

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

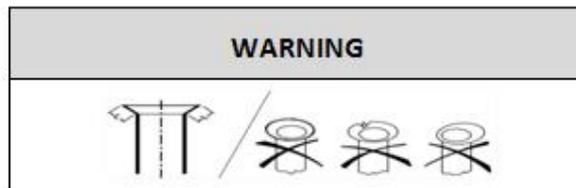
DIAMETER OF THE PIPES			
GAS (aspiration)		LIQUID (panel inlet)	
mm / ft	Inches	Mm / ft	Inches
9,52 / 0.0303	3/8"	6,35 / 0.0208	1/4"

9.5. CONNECTION TO THE PANNEL

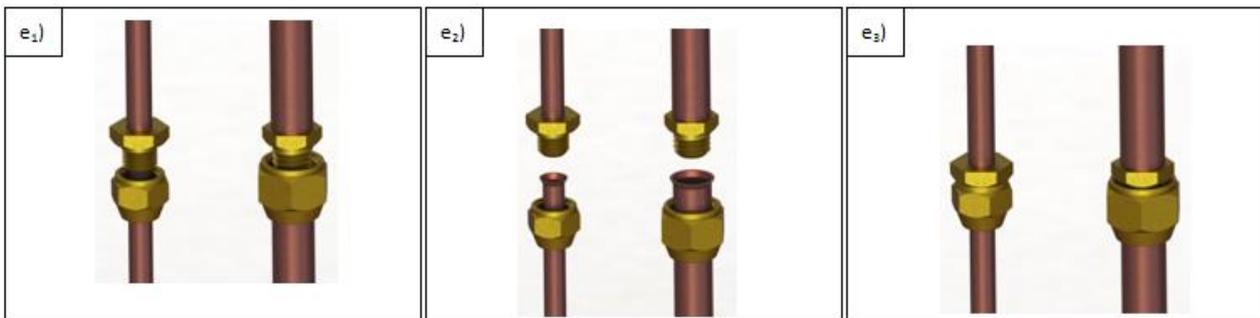
- a) Prepare the copper pipe, removing the protective caps from the extremities.
- b) Place the extremities of the pipe upside down, cut the appropriate size of pipe and sand the rough edge.
- c) Remove the females from the couplings in the panes and insert them in the pipe.



- 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.



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



INFO

Diameter of the Pipe (inches)	Applied Torque (Nm)	Wrench n°
1/4"	14 to 16	19
3/8"	33 to 42	21

9.6. CONNECTION OF THERMODYNAMIC GROUP AND STORAGE WATER HEATER

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



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

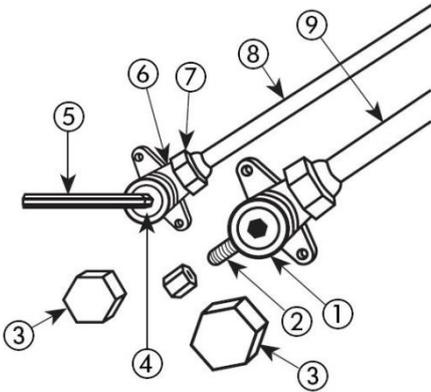


- c) Tighten with a suitable wrench, applying a torque in conformity with the diameter of the pipe employed (according to table in point 4.4.1. Insufficient torque will cause leaks of cooling fluid. Excessive torque on the coupling will damage the edge of the pipe and cause leaks.



9.7. CONNECTION OF THERMODYNAMIC GROUP AND PANEL

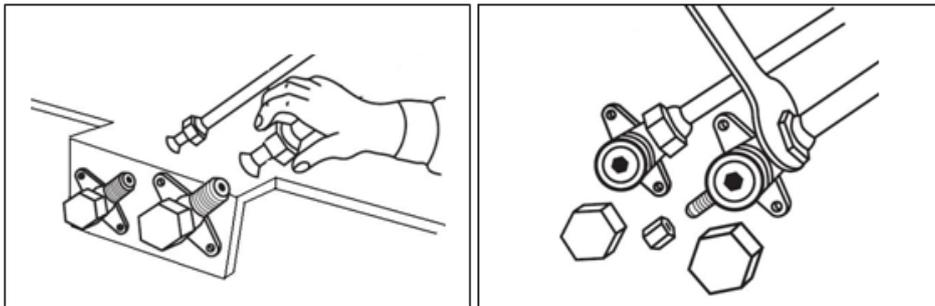
Some of the steps are the repetition of the steps carried out for the connection to the panel.
 Cut the required measure of the pipe with the edge turned upside down. Sand any remaining rough edges.
 Shape a conic edge in the pipe and do not forget to place the female coupling on the side of the pipe.



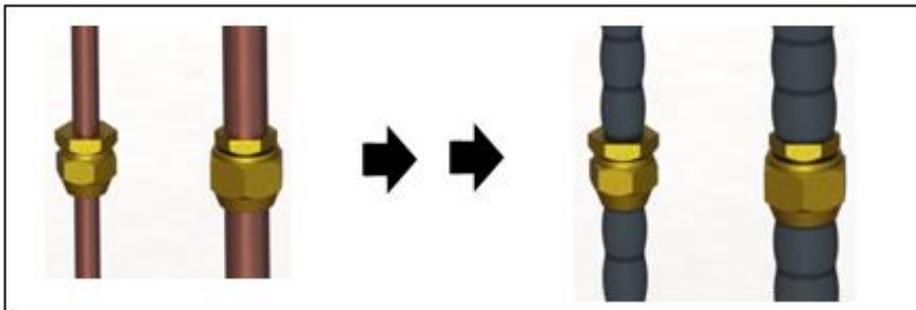
Caption:

- [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)

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



NOTE: Every coupling must be insulated



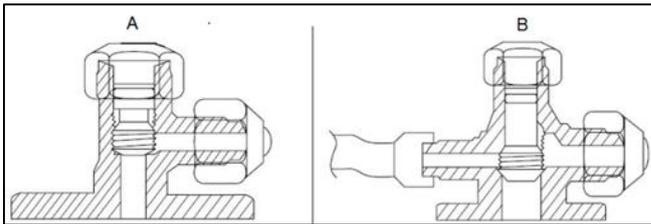
9.8. NITROGEN LOAD

- 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.

9.9. 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.

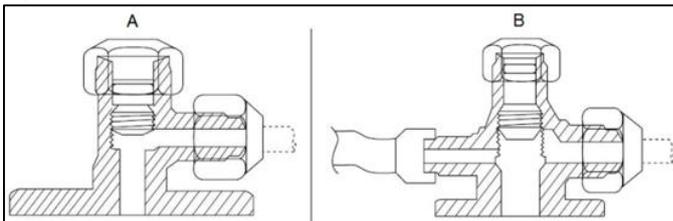
Shut valves



- [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.
- 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

IMPORTANT:

- After concluding the vacuum, do not remove the hoses while the system is not completely pressurized by the coolant.
- We recommend the use of a thread sealant in every existing threaded coupling.

9.10. LOAD OF COMPLEMENTARY COOLING FLUID

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 your 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 you 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.

9.11. 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:

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

10. SYSTEM START-UP

The Eco commissioning is assured by the correct installation achieved and by the respect of all installation instructions. Increasing water temperature from 10° C to 55° C (50° F to 131° F) will vary between 4 to 8 hours, depending on weather conditions and type of installation.

It is always possible to do a tune of thermal expansion valve to adapt the system to a suitable outside weather conditions by the temperatures extrapolation method.

Fill the hot water tank with water and purge the existing air, opening a hot water tap/faucet.

Check if the valves are properly working and if the system is filled with fluid.

Once the tank is full, energize the water heater. Press the POWER button on the user interface to turn the water heater on. Once powered, the control will display a reminder to ensure the water heater is full.

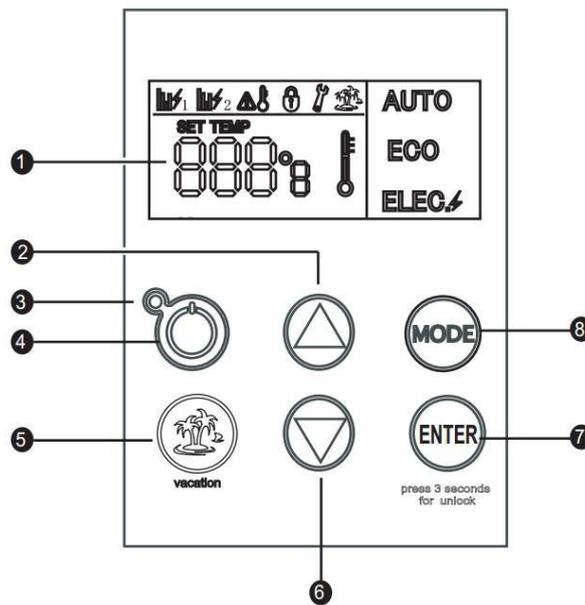
Press POWER again to acknowledge that the water heater is full.

11. START-UP WHAT TO EXPECT

NOTE: The following table outlines what can be expected next.

Elapsed time	Comments
0-3 minutes	The compressor is off. This 3 minute off time prevents compressor damage.
3-8 minutes	Compressor turns on and runs for 5 minutes. This 5 minute period ensures the tank is full of water
8-30 minutes	Compressor turns off. Element turns on for about 20 minutes. Quickly provides initial amount of hot water for user.
30 minutes	Heater element turns off and compressor turns back on. Uses efficient heat pump for majority of heating.

12. CONTROLS OVERVIEW



1 – Display

2 – UP button.

Use up arrow to increase value or turn page up

3 – Running light.

An illuminated lamp means the unit is running, an emitted lamp means the unit stop running, and a flashing lamp means the unit is in error or under protection.

4 – Power button.

For starting or shutting down the unit, note: when the unit is stand-by, the function still can be used.

5 – Vacation button.

Use this button during times of no water usage, such as vacation for an extended period of time.

6 – Dow button.

For decrease the value or turn page down.

7 – Enter button.

For confirm or unlock the key. After change the setpoint temperature through ▲ ▼ keys, consumer need press this key in 10 seconds to confirm; or else, the setpoint temperature can not change. When the panel is locked, we can press this key for 3 seconds to deactivate the lock.

8 – Mode button.

For users to choose operating mode, auto mode, economic mode and electric mode

Detailed description on the control function:

1. Auto-Confirm Function

10 seconds after pressing control pad keys, the auto-confirm function automatically accepts entered data and returns the water heater into operating mode.

2. Auto-Lock Function

If control pad keys have not been pressed for 1 minute, the control pad will automatically lock. To unlock the control pad, press and hold the ENTER key for 3 seconds.

3. Diagnostic Function

This function allows service technicians or users to view water heater parameters. To open the Diagnostic Function, unlock the control. Once the control is unlocked, press **ENTER and the UP** arrow simultaneously for 1 second. This will allow the user to view the water heater parameters. To exit, press ENTER and UP.

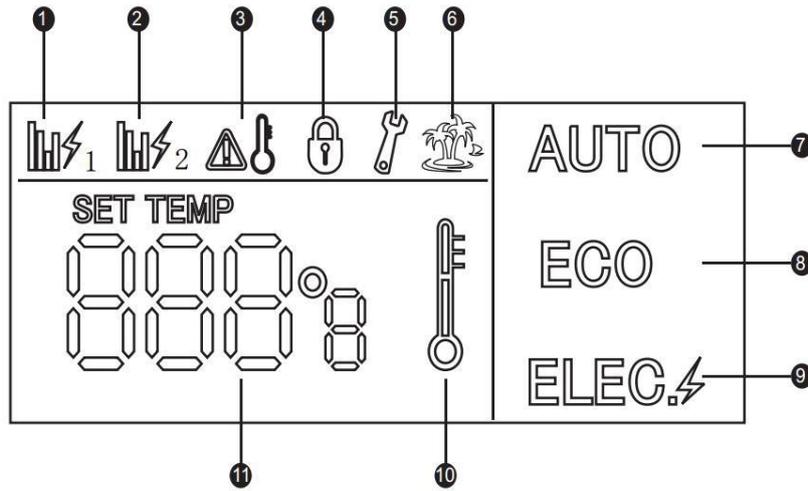
The following table is a descriptive list of the terms that will be found in the Diagnostic Function mode.

TERMS	DEFINITION	DISPLAY CODE
T2	Water Tank Temperature	2
T3a	NOT APPLIED	31
T3b	NOT APPLIED	32
T4	Compressor Discharge Temperature	4
T5	NOT APPLIED	5
Malfunction Protection Code	The most recent error	7
Malfunction Protection Code	Second most recent error	8
Malfunction Protection Code	Third most recent error	9
Heat pump protection counter	Heat Pump Protection Counter	C

4. Screen Save

To extend display life, the display will dim when there is no operation for a period of time. Press any key to light the screen.

13.DISPLAY OVERVIEW



1. Peak Load Shifting Mode 1

When in this mode, this icon will light. The heat pump mode will run, and users can set water temperature.

2. Peak Load Shifting Mode 2

When in this mode, this icon will light. The heat pump mode will run. Users cannot set water temperature.

Water temperature is automatically set at 110 °F.

3. High Temperature Setting

If the temperature set by user or actual temperature is above 120 °F, this icon lights. This icon will shut off if water temperature is less than 120 °F, or when the display is in screen save mode.

4. Lock Icon

This icon lights when the key pad is locked, and will shut off when the key pad is unlocked.

5. Alarm Icon

The alarm icon will flash and an alarm will sound when the water heater is in error and under protection, and continue to flash and sound until the reason for the error is solved or the water heater is reset.

6. Vacation

The Vacation icon lights when this feature this feature is in use. Vacation Mode greatly reduces energy usage.

7. Auto Mode Icon

This icon will flash slowly when the water heater is in Auto Mode.

8. Economy Mode Icon

This icon will flash slowly when the water heater is in Economy Mode.

9. Electric Mode Icon

This icon will flash slowly when the water heater is in Electric Mode.

10 – Water temperature icon

There are 3 phases:

- When $140^{\circ}\text{F} \geq \text{TS} \geq 120^{\circ}\text{F}$, all 3 phases will be illuminated.

- When $120^{\circ}\text{F} \geq \text{TS} \geq 110^{\circ}\text{F}$, lower 2 phases will be illuminated.
- When $110^{\circ}\text{F} \geq \text{TS} \geq 100^{\circ}\text{F}$, lowest phase will be illuminated.

Note: TS is preset water temperature.

11. Main Screen

The display will light once the power supply is connected. During normal usage, this shows water temperature. Error or protection codes are displayed when the water heater is under error or protection.

The main screen returns to normal when error or protection is cleared. Pressing ENTER and UP simultaneously will query the water heater. Parameters display on this screen.

14. SETTING THE WATER TEMPERATURE

The temperature of the water in the water heater can be regulated by adjusting the temperature setting up or down using the arrow keys on the control panel.

Consider safety and energy conservation when selecting the water heater temperature setting. The lower the temperature setting, the greater the savings in energy and operating costs.

To comply with safety regulations, water temperature is factory set at 120 °F. This is the recommended starting set point.

Water temperatures above 125 °F can cause severe burns or death from scalding. Be sure to read and follow the warnings outlined in this manual and on the label located on the water heater near the upper element access panel.

Mixing valves for reducing point-of-use water temperature by mixing hot and cold water in branch water lines are available. Contact a licensed plumber or the local plumbing authority for further information.

To Adjust the Temperature first, unlock the key pad by pressing and holding the ENTER key for 3 seconds. Next, press the UP or DOWN arrows on the control panel key pad to increase or decrease the water temperature. If increasing the water temperature beyond 120 °F, a CAUTION triangle and thermometer icon will appear on the appliance display to warn the user that raising the water temperature also increases scalding risk.

After the desired temperature setting has been selected, press ENTER to accept the setting. If the water temperature setting is changed and the ENTER key is not pressed to accept it after 10 seconds of no control activity, the control will automatically revert to the previous temperature setting.

15. ADJUSTING THE FUNCTION MODE

This water heater defaults to the Auto operating Mode. The Auto Mode is the recommended setting for this water heater, but can be changed if desired. Available modes are listed below and can be found by pressing the MODE button when the water heating control is unlocked.

Economy Mode

The Economy Mode is the most energy efficient. This mode takes heat from the surrounding air to heat the water. It takes more time to heat water in Economy Mode, so this mode may NOT be sufficient in a high-demand situation, such as a large household or company.

Standard Electric Mode

This mode uses only the resistance element to heat water. It takes less time to heat water, but Standard Electric Mode is also the LEAST efficient operating mode on the water heater.

Auto Mode – FACTORY RECOMMENDED SETTING

Auto Mode combines the energy efficiency of the Economy Mode with the recovery speed and power of Electric Mode. Auto Mode is recommended for normal water usage.

To access any of these modes:

1. Press and hold the ENTER key for three seconds to unlock the key pad.
2. Press the MODE button.
3. Select the desired operating mode by using the UP and DOWN keys to scroll through the options.
4. Once you've selected an operating mode, press the ENTER key or wait ten seconds for the AutoConfirm Function to automatically accept the mode.

16. ABOUT THE USER INTERFACE FEATURE BUTTONS

Vacation Mode

This feature is used when you will be away from home for an extended period of time. In this mode, the unit will drop the water temperature down to 50 °F and use the most efficient heating mode to conserve energy while the water heater is sitting idle. The unit will automatically resume heating one day before your return, so hot water will be available.

To use Vacation Mode:

1. Press and hold the ENTER key for three seconds to unlock the key pad.
2. Press the VACATION button.
3. Press the UP and DOWN arrow keys to select the # of days you will be away (default is 7 days). Then, press the ENTER key or wait ten seconds for the Auto-Confirm Function to automatically accept the number of days.

For example, if you will be gone 14 days, select 14 with the key pad. The water heater will then automatically drop the water temperature to 50 °F for 13 days. At the end of the 13th day, the water heater will automatically return to the previous operating mode and heat the water to the original temperature setting.

The green light will be lit when this feature is on, indicating that the control is locked.

Control Lock

The key pad can be locked out to prevent accidental key inputs. Simply press and hold the ENTER button for three seconds. The display will show "controls are locked" and the green light will be lit. No other key presses will be allowed when the controls are locked.

To deactivate the lock, press and hold the ENTER key for three seconds. The green light will fade and the screen will go to the default display.

17. USING THE BUTTONS IN COMBINATION

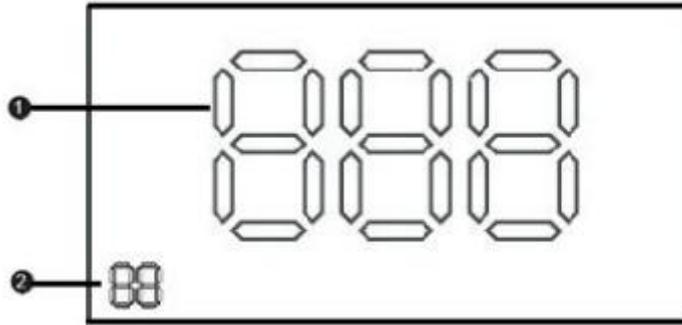
1. Temperature Measurement Conversion

The display defaults to temperature readings in Fahrenheit (F). To show the temperature in Celsius (°C) press and hold the ENTER and MODE buttons simultaneously for one second. To change from °C to °F, repeat the process.

2. Diagnostic Function

To query appliance diagnostics, press and hold the ENTER and UP buttons together for one second.

After opening the Diagnostic Function, use the UP and DOWN arrows to scroll through the diagnostics.



Diagnostic Function Screen Shot

To exit appliance diagnostics, press and hold the ENTER and UP buttons together for one second; otherwise, the appliance will exit automatically after one minute of no activity.

3. Clear Malfunction

To clear malfunction, press and hold ENTER and DOWN simultaneously for one second.

4. Clear Alarm

To clear alarm, press and hold ENTER and VACATION simultaneously for one second.

18. HEATING ELEMENT REPLACEMENT

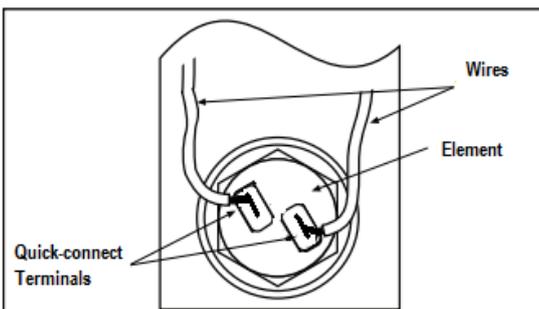


Replacement heating elements must be of the same style and Voltage/wattage rating as the ones originally in the water heater. This information can be found on the flange or terminal block of the element or on the water heater data plate.

IMPORTANT: Before replacing any element, confirm that you have the correct replacement element (wattage). This water heater has a folded 1500 watt upper element. DO NOT replace the element(s) with a

wattage, style or shape different than the elements specified.

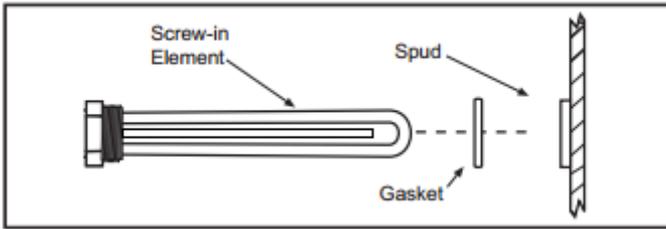
1. Press the power button on the user interface module to place the water heater in Standby Mode.
2. Turn off the power to the water heater.
3. Drain the water heater.
4. Remove the access cover.
5. Disconnect the electrical wires from the heating element



6. Remove the screw-in element(s) by turning the element counter clockwise with a 1-1/4 inch socket wrench. Remove the existing gasket.

7. Clean the area where the gasket(s) fits to the tank and internal threads. If you are replacing the bottom element, remove any accumulated sediment on the bottom of the tank.

8. Make sure the replacement element has the correct voltage and wattage rating by matching it to the rating plate on the water heater. Position the new gasket on the element and insert it into the water heater tank.



NOTE: Apply a light coat of hand dishwashing soap and water to the gasket. Tighten the element by turning it clockwise until secure.

9. Close the drain valve and open the nearest hot water faucet. Then open the cold water shut off valve and allow the tank to fill completely with water. To purge the lines of any excess air and sediment, keep the hot water faucet open for 3 minutes after a constant flow of water is obtained.

10. Check for leaks around the element.

11. Reconnect the electrical wires to the element.

12. Replace the protective cover removed earlier. Make sure the cover is securely engaged on the attachment point(s).

15. Reconnect electrical power to the water heater at the circuit breaker/fuse box.

16. Press the power button to turn the water heater on. Set the desired water temperature and operating mode.

19. MAINTENANCE PROCEDURES

19.1. MAGNESIUM ANODE

The anode must be removed in order to check its state.

If the magnesium anode is letting water pass it will be necessary to change it. The period between changing the anode is always dependent of the water quality in each location. In areas with raised concentrations of soluble solids, the anode needs to be changed with less regularity, whereas in situations with low concentration, the anode needs to be changed with greater regularity. Therefore the magnesium anode state shall be checked at least one time per year.

19.2. PRESSURE REDUCING VALVE FILTER

The following procedure shall be done for periodic (maximum once every two years) cleaning of the pressure reduction valve filter:

1. Close the passage of water from the network.
2. Turn in an anti-clockwise direction after relieving the spring's tension.
3. Draw back the lever/handle.
4. Remove the filter and clean it.

19.3. TEMPERATURE AND PRESSURE RELIEF VALVE

At least once a year, lift and release the lever handle on the temperature and pressure relief valve, located on the back left side of the water heater, to make sure the valve operates freely. Allow several gallons of water to flush through the discharge line to an open drain.

21. MAINTENANCE CHECKLIST AND ERROR CODES

21.1. TROUBLESHOOTING CHART

PROBLEM	POSSIBLE CAUSES	WHAT TO DO
Water dripping down the outside of the water heater	Inlet/Outlet water connections are not tightened	Tighten the inlet and outlet pipe connections
Not enough or no hot water	Water usage may have exceeded the capacity of the water heater	Wait for the water heater to recover after abnormal demand
	Electric supply may be off	Make sure electric supply to water heater and disconnect switch, if used, are in the ON position
	Water temperature may be set too low	See Setting the Water Temperature
	Leaking or open hot water faucets	Make sure all faucets are closed
	Electric service to your home may be interrupted.	Contact the local electric utility
	Improper wiring	Do not attempt to repair wiring. Call for service
	Manual reset limit (SP)	A tripped SP could mean there is a serious issue with the water heater. Call for service
	Cold water inlet temperature may be colder during winter months	This is normal. Colder inlet water takes longer to heat
Water is too hot	Water temperature is set too high	See Setting the Water Temperature
	 For your safety, DO NOT attempt repair of electrical wiring, controls, heating elements, or safety devices. Refer repairs to qualified service personnel.	
Relief valve producing popping noise or draining	Pressure buildup caused by thermal expansion to a closed system	This unacceptable condition must be corrected. Contact the water supplier or plumbing contractor for service. Do not plug the relief valve outlet

21.2. ERROR CODES

The following table describes error codes and possible solutions. If your water heater displays an error code, call a qualified service agent to fix the problem.

ERROR CODE	DESCRIPTION	WHAT TO DO
ALL	ALL	Inspect for proximity to high voltage power sources.
E0	T2 sensor error	<ol style="list-style-type: none"> 1. Check if sensor wires are correctly connected and/ or damaged. 2. Check if T2 sensor is damaged. 3. Check T2 sensor resistance. 4. Check actual temperature in Celsius 0°C ~ 60°C (tolerance +5°C).
E1	Not applied	Not applied
E2	Not applied	Not applied
E3	Not applied	Not applied
E4	Not applied	Not applied
E5	T4 sensor error	<ol style="list-style-type: none"> 1. Check if sensor wires are correctly connected and/ or damaged. 2. Check if T4 sensor is damaged. 3. Check T4 sensor resistance. 4. Check actual temperature, range is 86°F to 230°F. 5. Check for refrigerant leakage or damaged piping.
E6	Not applied	Not applied
E7	Heat pump error	<ol style="list-style-type: none"> 1. Powering the water heater off and restart. 2. Press ENTER and UP to enter Diagnostic Function and check error code history.
E8	Water temperature too high (T2 greater than 165°F)	<ol style="list-style-type: none"> 1. Check if sensor wires are correctly connected and/or damaged. 2. Check if T2 sensor is damaged. 3. Power water heater off and restart. 4. Replace T2 sensor
P0	Not applied	Not applied
P1	Not applied	Not applied
P2	Run condition E	Checked continuously. T4 sensor must be greater than 240°F
P4	High compressor current	<ol style="list-style-type: none"> 1. Ensure compressor operating current and voltage match the rating label. 2. Check if compressor or related connections are damaged.
P5	Not applied	Not applied
P6	Run condition A	Checked 5 minutes from compressor startup. T4 temperature must increase greater than 15°F.
P7	Run condition B	Checked every 30 minutes. T4 temperature should be greater than 100°F.
P8	Upper element error	<ol style="list-style-type: none"> 1. Powering the water heater off and restart. 2. Check electrical supply voltage. 3. Remove cover and check element connections and/ or damage. 4. Check for damage to power wire through current sensor loop in control board.
PA	Not applied	Not applied

