Energie Eco Owner's Manual

Thermodynamic Solar System

Eco Enamel 200esm/250esm/250esms/300esm/300esms
Eco Stainless 250i/300i/250is/300is/500is
Eco Stainless with coil 250ix/300ix/250isx/300isx/500isx

"Solar enhanced thermodynamic
The smartest way to heat water"

www.taec.co.nz

The Energie Eco Solar Thermodynamic Systems

Comply with the requirements of **AS/NZS 2712:2007**

As tested by Applied Research Services
P.O. Box 867, Nelson, New Zealand.
Report number 13-3627

Manual updated May 2024, version 3.1

The Alternative Energy Company Limited

03 540 3003
18 Warren Place, Mapua, Nelson, New Zealand 7005
info@taec.co.nz

Very important!

Please read the following instruction manual thoroughly before any installation works or operation of the solar system proceeds! Failure to install the equipment as detailed in this manual invalidates the warranty and could endanger people and damage property.

The following safety warnings must be heeded: -


This appliance must be installed to our installation instructions, AS/NZS 3500, and to the New Zealand Building Code G12 Water supplies.


The fixing of the solar panel and cylinder must comply with the current relevant selections of the New Zealand Building Code and must not compromise the structural integrity of the building.


Materials and fittings used to install this appliance must meet the requirements of AS/NZS 3500.4: 2003 Section 2.


The electrical installation of the equipment must comply with the current AS/NZ standards and the New Zealand national electrical regulations.


The electrical input is: 240v~/50 Hz.


All hot water pipes must be installed to satisfy the requirements of New Zealand Building Code Clause H1.3.4, (except where connected to a heat dissipation device).


The Eco Thermodynamic Solar System shall only be used for heating fresh water to the temperature limits indicated.


The minimum permitted water pressure for use in the circuit is 100 kPa.
The maximum permitted water pressure for use in the circuit is 300 kPa.


This system must have a water softener installed if the water PH levels are less than 6.5 or are greater than 8.5 as per AS/NZS 3500.4 Appendix B.


The Eco system must only be switched on once the hot water cylinder is filled with water.

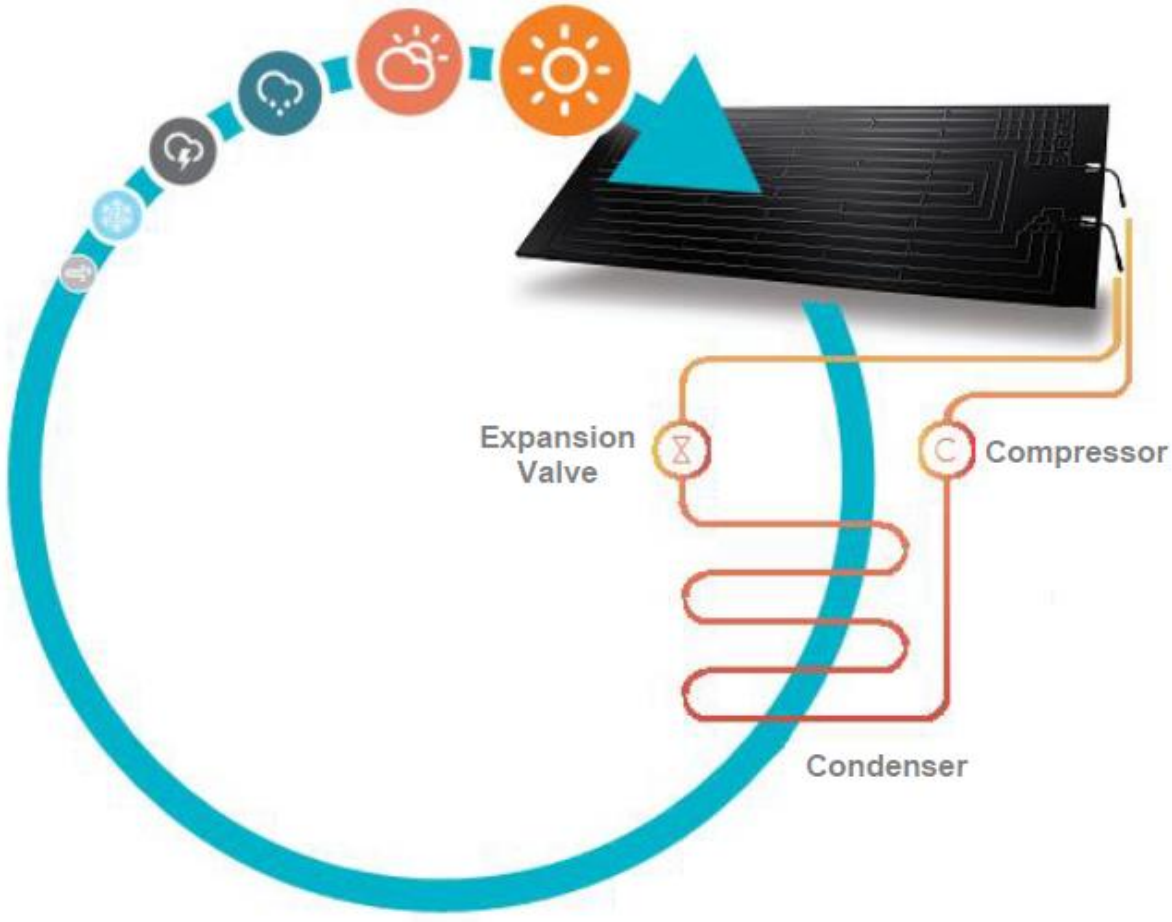

The Eco compressor 'COMP' must not be activated before the installation has been completed and the refrigerant supply has been fully loaded.

Table of contents

1 Introduction

1.1 Principle of Operation

The Ecotop solar thermodynamic system operates on the basis of the Carnot cycle, or heat pump cycle.
A cold liquid is pumped through the Solar panel, or heat collector, which absorbs heat from the atmosphere. This liquid evaporates and becomes a vapour. This vapour returns to the compressor, located on top of the hot water cylinder. The gas is compressed, which makes the gas hot. This hot gas travels through a coil around the outside of the hot water cylinder. The water absorbs the heat from the gas, causing the gas to condense back into a liquid. The liquid then passes through an expansion valve to decrease the pressure, making the liquid very cold. This liquid travels to the solar panel and the cycle repeats.
When the sun is shining on the panel, the heat from the sun is absorbed into the system making the system very efficient. When there is no sun, the panel still absorbs heat from the atmosphere.



1.2 Technical Features (Single 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

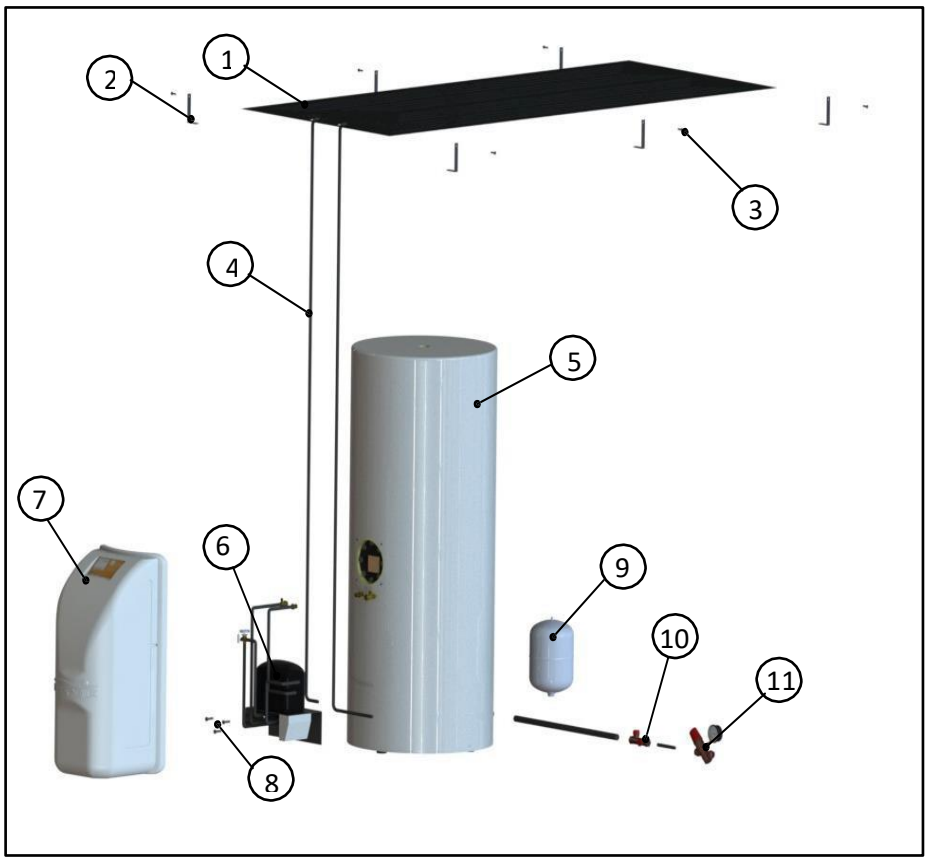
1) a) Primary (Tin=90 ºC; Tout=80 ºC); Production DHW (Tin=10 ºC; Tout=60 ºC)
b) Primary (Tin=70 ºC; Tout=60 ºC); Production DHW (Tin=10 ºC; Tout=60 ºC)
2) The amount of fluid must be checked by the installer. In some cases it is necessary to add or remove fluid in order to ensure the correct running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

1.3 Technical Features (Two panels)

			Unid	250is	300is	300esms	250isx	300isx	450is	450isx
HOT WATER CYLINDER	Dry Weight		Kg	62	74	95	69	81	110	121
	Capacity		lts	250	300	300	250	300	445	445
	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	530	517

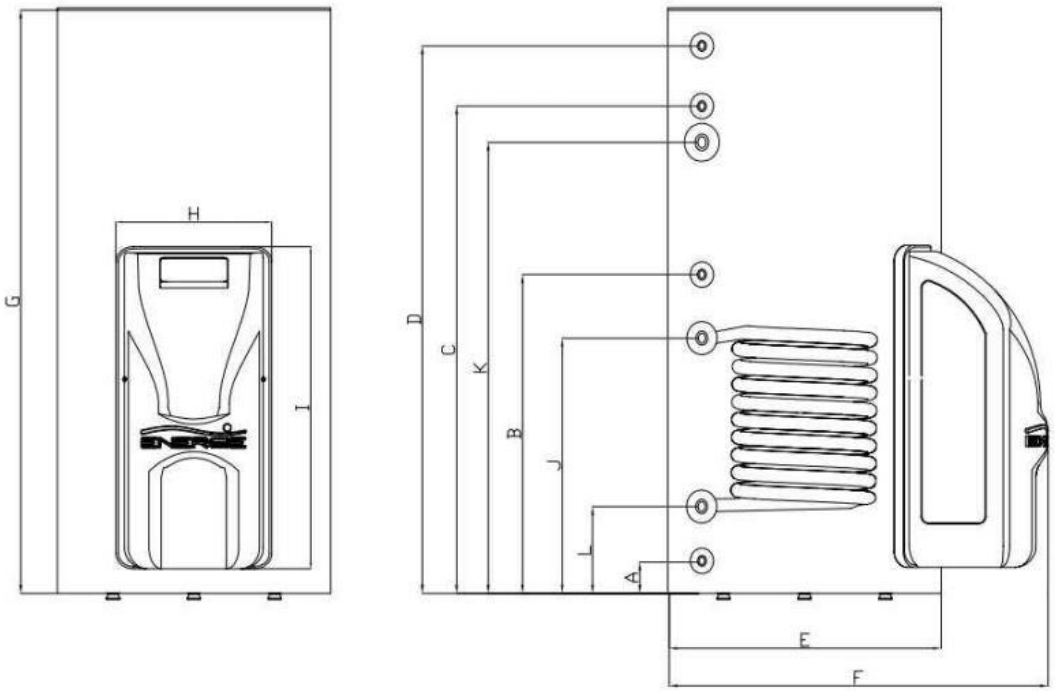
1) a) Primary (Tin=90 ºC; Tout=80 ºC); Production DHW (Tin=10 ºC; Tout=60 ºC)
b) Primary (Tin=70 ºC; Tout=60 ºC); Production DHW (Tin=10 ºC; Tout=60 ºC)
2) The amount of fluid must be checked by the installer. In some cases it is necessary to add or remove fluid in order to ensure the correct running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

1.4 The main components of the system



1 Thermodynamic Solar Panel
2 L-shaped brackets for attachment of Aluminum Panel
3 Bolts, washer and fixings (6x)
4 Copper insulated pair coil pipes
5 Eco hot water cylinder
6 Thermodynamic block
7 Cover with controller display
8 Block securing bolts M8
9 Expansion tank (not supplied with the Eco system, but is considered best practice)
10 Drain valve
11 Pressure reduction valve

1.5 Dimensions of Hot Water Cylinder



Model	A	B	C	D	E	F	G	H	I	J	K	L
200esm	89	830	1161	1289	580	880	1364	370	765	---	1000	---
250esm	89	830	1341	1467	580	880	1543	370	765	---	1000	---
250i	89	830	1333	1469	580	880	1545	370	765	---	1000	---
250ix	89	830	1333	1469	580	880	1545	370	765	696	1000	205
300esm	92	772	1172	1315	650	950	1415	370	765	---	1154	---
300i	92	772	1172	1315	650	950	1415	370	765	---	1154	---
300ix	92	772	1172	1315	650	950	1415	370	765	621	1154	221
500is	92	772	1784	1927	650	950	1990	370	765	---	1154	---
500isx	92	772	1784	1927	650	950	1990	370	765	1515	1154	625

Important note:
The plumbing connections on the **250L** Eco stainless steel cylinder are at an angle of 45° to the right of the compressor and control panel at the front. The diameter of the cylinder is 580mm.

The plumbing connections on the **250L** Eco enamel cylinder are at an angle of 180° (at the back) of the compressor and control panel at the front. The diameter of the cylinder is 580mm.

The plumbing connections on the **300L and 500L** Eco cylinder are at an angle 135° clockwise from the compressor and control panel at the front. The diameter of the cylinder is 650mm.

The refrigeration connections are at the bottom left side of the compressor.

The position of the plumbing ports has changed over time, so the following may not be correct for the model you have.

1.6 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.

1.7 Refrigeration gas

The refrigeration gas used in the Eco system is R134a. This is CFC free, is non-inflammable and does not harm the ozone layer. This gas is common in fridges, and automotive air conditioning systems.

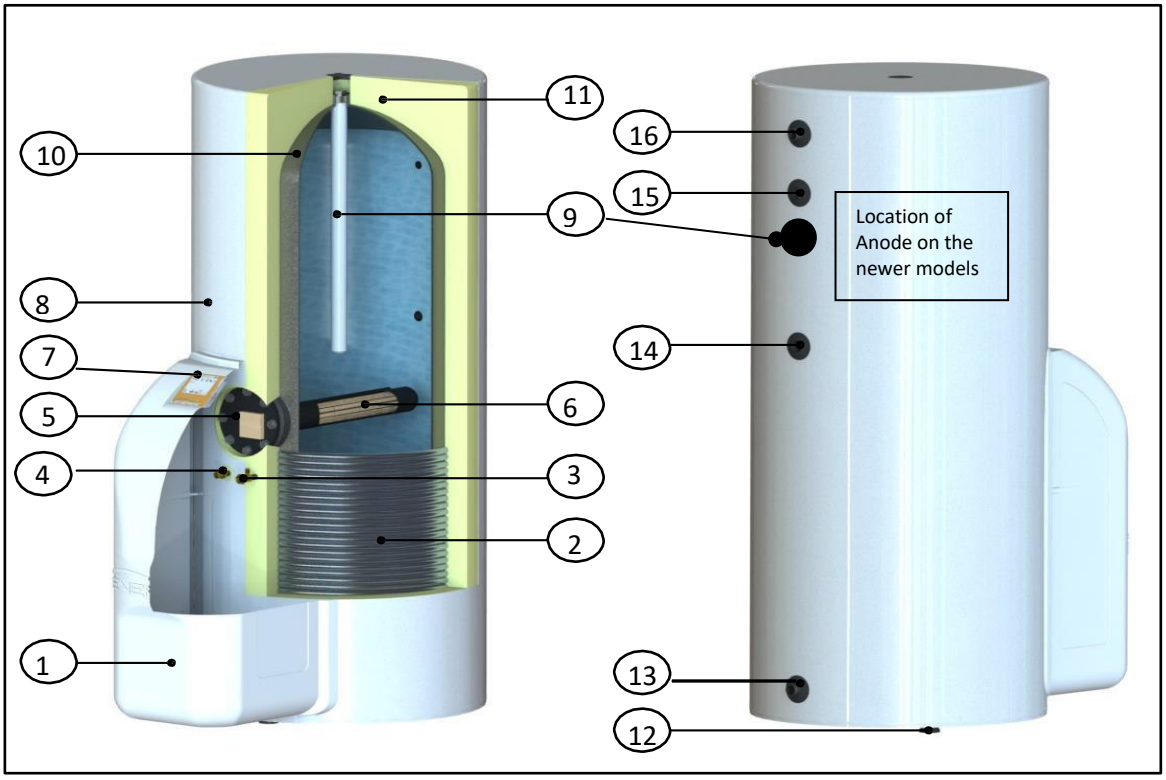
- The system comes preloaded with the required refrigerant gas. No additional gas should be required for the installation.
- Legally, in New Zealand the refrigerant in this system cannot be released into the environment.
- **Handling of the refrigerant must be carried out by an approved refrigeration technician.**

A replacement gas is available, R513a. This has a GWP of 573 (lower than R32) and is not classed as flammable. This is a direct drop-in replacement for R134a.

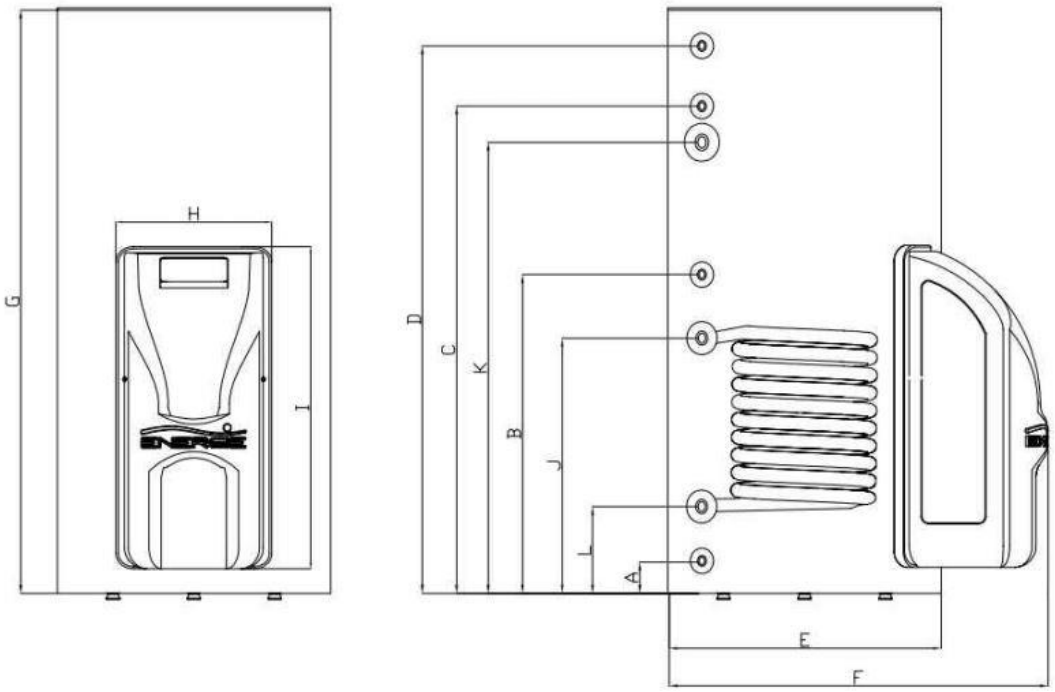
2 Hot Water Cylinder

The Eco cylinder is made either of carbon steel with enamel coating or of stainless steel. The thermal insulation is of expanded polyurethane with a thickness of 50 mm.

The hot water cylinder has a cold-water inlet, hot water outlet, recirculation port and an outlet for the TPR valve. It also comes equipped with a magnesium anode, either in the center at the top, or at the rear, under the TPR valve port.
There is, in the central part of the hot water cylinder, a flanged opening for the support electrical resistance (immersion heater) as well as safety thermostat and temperature probe.



2.1 Dimensions of Hot Water Cylinder



Model	A	B	C	D	E	F	G	H	I	J	K	L
200esm	89	830	1161	1289	580	880	1364	370	765	---	1000	---
250esm	89	830	1341	1467	580	880	1543	370	765	---	1000	---
250i	89	830	1333	1469	580	880	1545	370	765	---	1000	---
250ix	89	830	1333	1469	580	880	1545	370	765	696	1000	205
300esm	92	772	1172	1315	650	950	1415	370	765	---	1154	---
300i	92	772	1172	1315	650	950	1415	370	765	---	1154	---
300ix	92	772	1172	1315	650	950	1415	370	765	621	1154	221
500is	92	772	1784	1927	650	950	1990	370	765	---	1154	---
500isx	92	772	1784	1927	650	950	1990	370	765	1515	1154	625

Important note:
The plumbing connections on the **250L** Eco stainless steel cylinder are at an angle of 45° to the right of the compressor and control panel at the front. The diameter of the cylinder is 580mm.

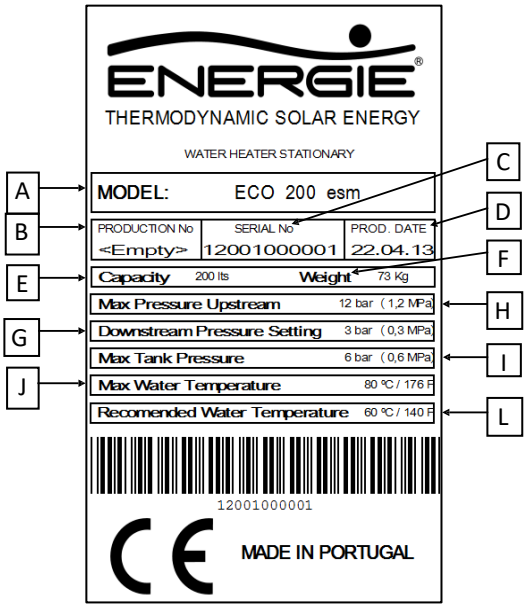
The plumbing connections on the **250L** Eco enamel cylinder are at an angle of 180° (at the back) of the compressor and control panel at the front. The diameter of the cylinder is 580mm.

The plumbing connections on the **300L and 500L** Eco cylinder are at an angle 135° clockwise from the compressor and control panel at the front. The diameter of the cylinder is 650mm.

The refrigeration connections are at the bottom left side of the compressor.

The position of the plumbing ports has changed over time, so the following may not be correct for the model you have.

2.2 Cylinder Labelling



A. Model
B. Production number
C. Serial number
D. Production date
E. Volume
F. Weight
G. Downstream pressure of PRV
H. Upstream maximum pressure of PRV
I. Maximum pressure in hot water cylinder
J. Maximum temperature in hot water cylinder
K. Recommended temperature in hot water cylinder

2.3 Hot Water Cylinder Location

The hot water cylinder should be installed in a cool, dry location with easy access and protection from weather. The electronic control panel must be sheltered from water and the weather
The location must allow for the installation of the plumbing connections and future access.
It should also allow for access to the thermodynamic block and enough room to remove the cover for future maintenance to the system.
The cylinder should have a safe tray, manufactured to AS/NZS 3500.4 Clause 2.5, installed to collect any leaked water and prevent water damage to the home.

The Eco hot water cylinder should be vertical and resting on the floor. The Eco cylinder has three adjustable feet to ensure vertical installation.
following the guidelines in the NZ building code (in regard to distance from edge of roof and member spacing etc.).

The location of the hot water cylinder must have nearby:

- A cold water supply
- Hot water point
- Drainage.
- Recirculation (if it exists).
- Electrical point. The 1 panel system can use a standard 10A socket, the 2 panel system must be wired back to the main fuse box, 230 V/50Hz

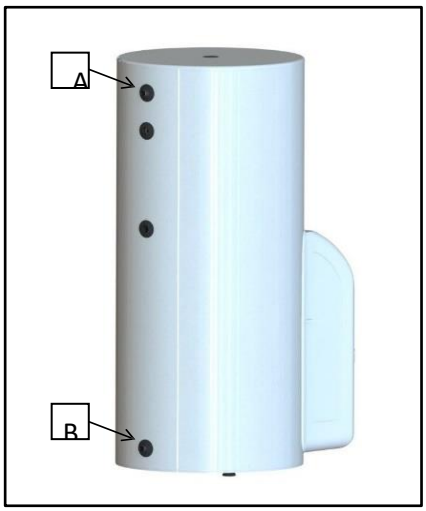
Please note that the hot water cylinders have the plumbing connections at the back of the device while the compressor is at the front, so be sure to leave space between the cylinder and the wall

- Always insulate the hot distribution piping.
- The temperature around the equipment must not exceed 40 °C.
- The hot water cylinder should not be located outside, and avoid exposure to sunlight.
- The control panel must not be exposed to water or the weather.
- Make sure the floor is strong enough to accommodate the weight of the hot water cylinder filled with water.
- Make sure the access is available to the Thermodynamic block have at least a 500 mm gap for the purpose of maintenance.

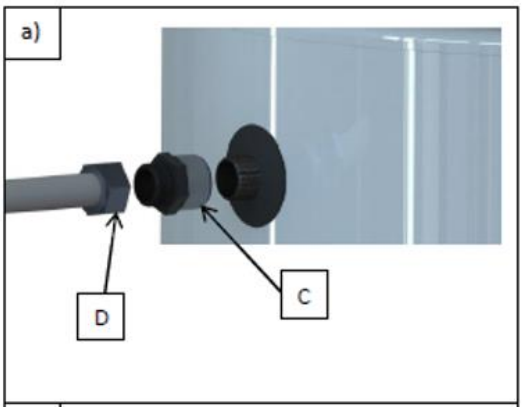
It is the cylinder installers' responsibility to ensure that the tempering valve supplied is installed to the Eco cylinder. Installation of a tempering valve is a requirement of NZ Building Code G12 and AS/NZS 3500.4.

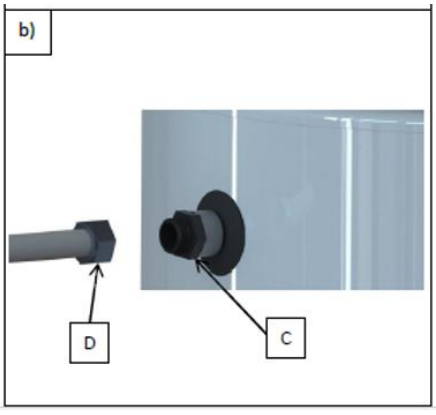
2.4 Bipolar Sockets

Your Eco enamel cylinder contains two bipolar sockets. These sockets must be installed as they prevent electron exchange between the pipes of water inlet and outlet pipes and the hot water cylinder itself. This further protects against corrosion that could take place.



The installer must tighten the bipolar sockets (C) on the water inlet and outlet (A and B), before attaching the piping (D), as shown in the following diagrams:





Note: Stainless steel cylinders do not require this additional protection.

2.5 Water quality requirements

WARNING

The water you use may contain impurities and/or substances damaging to the system and even harmful to your health. The following table indicates when water **must** be chemically treated.

Hardness (°dH)	pH	Treatment
3.0 to 20.0	6.5 to 8.5	No
	< 6.5 or > 8.5	Yes
< 3.0 or > 20.0		Yes

3 System Operation

3.1 Important notes

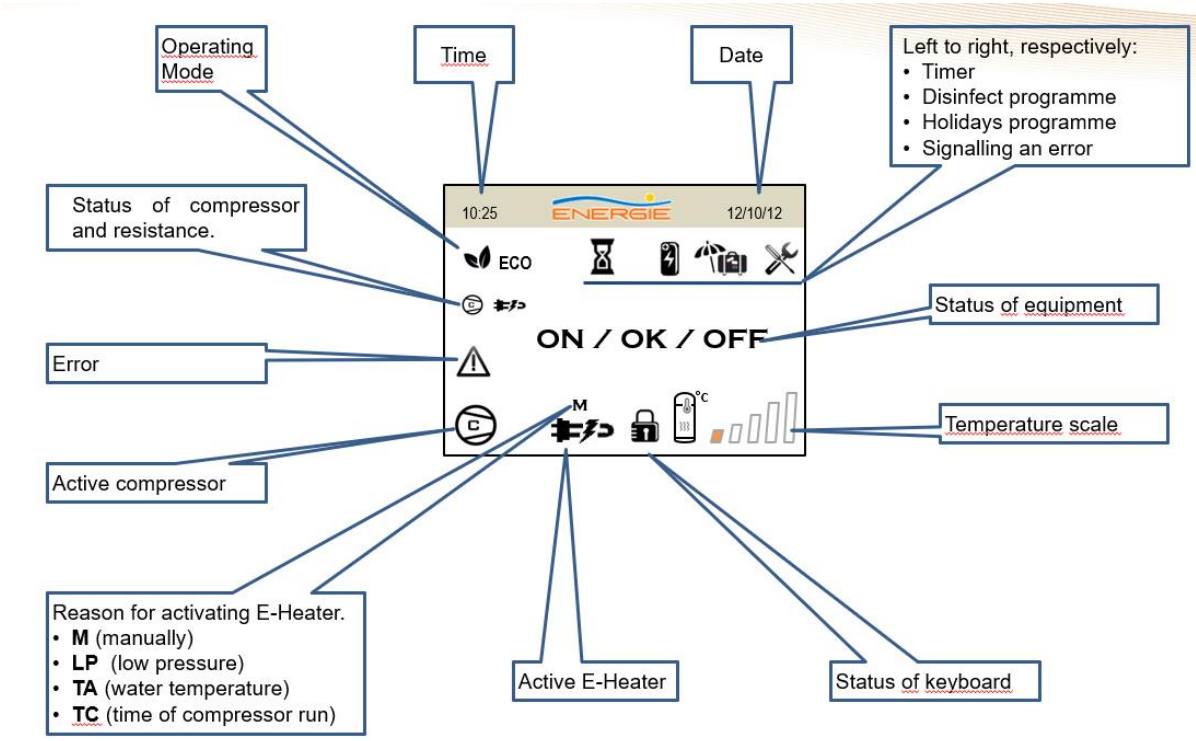
If the system status is OFF, it will not heat the water.

If the system is ON but the red light on the ON/OFF button is flashing, it will not heat the water.
When the red light is flashing the system is in Standby, and both the compressor and the electrical element are not activated.
Either the compressor or the electrical element needs to be activated for the water to be heated.

If the system is OFF, turn it on with the ON/OFF button. The red light should now be flashing, and the system is in Standby.
To activate the compressor, first unlock the display screen so the small lock has a tick over it. Press the COMP button for a few seconds. You should see a small round symbol in the top left below the Eco Mode. This means that the Compressor is active.
To activate the electrical element, press the E-HEATER button. A small zigzag symbol should be visible next to the compressor symbol.
If the system is turned OFF, this will deactivate the compressor, and the electrical element. These will need to be manually reactivated when the system is turned back on. The mode (Eco, Auto or Boost) will be remembered.

3.2 Control Panel

The control panel of the Thermodynamic Solar system Eco is simple and intelligent. It allows you to configure several operating parameters according to the operating mode you select.
It comprises six command keys (ON / OFF / CANCEL, MENU, COMP ▲, E-HEATER ▼, DISINFECT and OK / LOCK) which allow you to monitor and change settings.



3.3 Control panel symbols

ECO	Equipment in ECO operating mode
AUTO	Equipment in AUTO operating mode
BOOST	Equipment in BOOST operating mode
	Compressor
	Electrical resistance
	Unlocked keyboard
	Locked 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 hot water cylinder.
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

3.4 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
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	Function to run through menus and submenus
DISINFECT	(DISINFECT) Anti-Legionella	This function will heat the water with the electrical element to prevent the formation of germs inside the tank (Legionella). Note that the disinfect mode will stop when it reaches its set point, or is manually turned off

3.5 Operating Modes

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

Mode	Symbols (display)	Operation
ECO	ECO	Normal running as Thermodynamic System
AUTO	AUTO	Optimized running of operation of Thermodynamic System and/or Electrical heater (support)
BOOST	BOOST	Running of Thermodynamic System + Electrical Heater (support)

Note that the electrical heater is sometimes referred to as “Immersion heater”, or “Resistance” in the Eco system.

ECO Operating Mode

In ECO operating mode, the equipment runs only as a Thermodynamic System to heat the water in the hot water cylinder maximising savings for the user.

If required, the electrical heater (immersion heater) may be activated by manually pressing the key (E-HEATER). The system will automatically change operating mode to BOOST and indicates the reason of its activation. If you manually switch off the E heater, the equipment will revert to ECO mode.

AUTO Operating Mode

In AUTO operating mode, the equipment will run as a thermodynamic system and/or electrical heater, (emersion heater) and the operation of the electrical heater is managed in an optimized way to keep the water hot.

The electrical heater will start every time:

- The user activates it manually (pressing the E-HEATER button).
- The LP activates (Low Pressure. This may be due to low ambient temperature, or a problem with system, etc.).
- The compressor running time exceeds parameter T05 (default is 12 hours)
- The water temperature is below P08 (default is 16°C)

If the element is on, the reason for the element will also be shown, MA (manual), TA etc.

P08 can be used as an automatic backup. If the temperature drops below this value the element will activate until this value is reached again, then the element will turn off.

To change the P08 value:

1. Press the Menu button to enter the menu.
2. Select "F08- Levels of access"
3. Enter the password 0022.
4. Now go to F06 – Parameters, and select P08.
5. Change this value to the required temperature, press OK to save.
6. Go back to the main display using the ON/OFF button .

BOOST Operating Mode

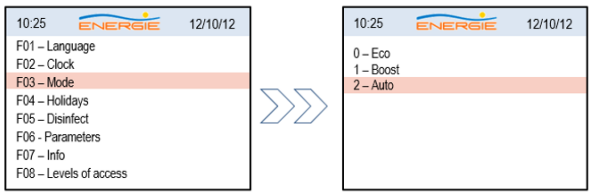
In BOOST operating mode, the equipment runs as a Thermodynamic System + electrical heater, (emersion heater) simultaneously.

This mode enables the fastest recovery of hot water, but is not the most economical.

Once the panel is unlocked (pressure the OK button), the user can change the operating mode when he/she wishes; he/she need only press simultaneously the keys MENU + OK/LOCK for 3 seconds and select the mode that suits users' needs with the cursor.
After changing modes, check that the compressor is turned on.

The 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:

Unlock the keyboard and press the key **Menu**. Using keys ▲ ▼ run through menu and select **F03**, access submenu and select the operating mode.



NOTE: After change the operating mode you don't need to restart the equipment.

3.6 Menu parameters

Every time it becomes necessary to alter the settings, the user must access the **Menu**
The OK key must first be pressed to unlock the system
To access the menu, the key **MENU** must be pressed for 3 seconds.
After accessing, 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.

F01 – Language
> Portugues
> English
> Français
> Italiano
> Espanol

F02 –Clock
> Date
> Time

F03 – Mode
> Eco
> Boost
> Auto

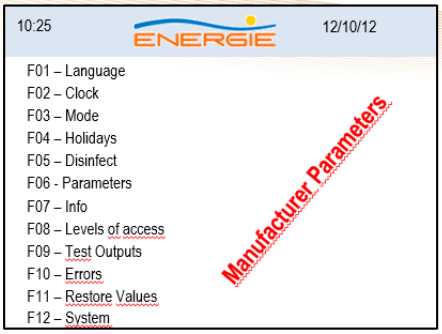
F04 – Holidays
> Number days

F05 – Disinfect
> Inactive
> Weekly
> Monthly

F06 – Parameters
> P01 Setpoint Comp
> H01 Gradient P01
> P02 Setpoint H-Heater
> H02 Gradient P02
> P05 Safety Temp.
> P06 Setpoint Disinfect
> P08 Water Temp ON H-Heater
> T01 Delay time Comp.
> T05 Max Time Comp. ON
> **T07 Delay Time Comp. (LP)**

F07 – Info
> Temp. Probe 1
> Temp. Probe 2
> P01 Setpoint Comp
> H01 Gradient P01
> P02 Setpoint H-Heater
> H02 Gradient P02
> P05 Safety Temp.
> P06 Setpoint Disinfect
> P08 Water Temp ON H-Heater
> T01 Delay time Comp.
> T05 Max Time Comp. ON
> T07 Delay Time Comp. (LP)

F08 – Levels of access
> Password



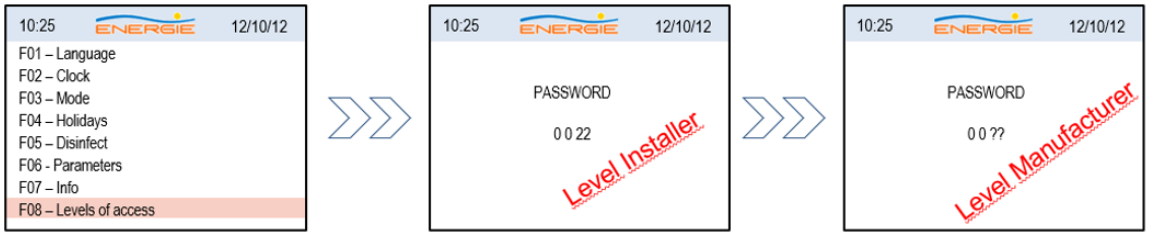
F09 – Test Outputs
> Compressor
> Electric Heater

F10 – Errors
> List errors
> **Reset errors**

F11 – Restore Values
> OK

F12 – System
> Eco – 1 probe (par P01)
> Eco – 2 probes (par P01 and P02)

Access levels



3.7 Parameters Description

Code	Type	Description	Values		
			Min	Max	Default
F01	Language	Portuguese English French Dutch Italian	***	***	English
F02	Clock	Date and Time			
F03	Mode	ECO mode AUTO mode BOOST mode	***	***	ECO
F04	Holidays	Number of days	1	99	0
F05	Disinfect	**0** – Disinfect function inactive **1** – Disinfect function active once a week (weekly) **2** – Disinfect function active once a month (monthly)	0	2	0
F06	Parameters	**P01** – Setpoint Probe 1 (compressor)	10	55	53 °C
		H01 - Gradient P01	1	10	3 °C
		P02 - Setpoint Probe 2 (electric heater)	10	60	53 °C
		H02 - Gradient P02	1	10	3 °C
		P05 – Safety Temperature	70	80	70 °C
		P06 - Setpoint anti-legionella (disinfect)	60	69	65 °C
		P08 – Minimum water temperature to activate electrical backup (Only visible in Installer level, parameter active and configurable only in AUTO)	5 / OFF	40 / ON	16 / 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 / OFF	15 / ON	12h / 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 Turn on the compressor output	OFF	ON	OFF
		RE - N.O. contact Turn on the electric heater output	OFF	ON	OFF
F10	Errors	**Elist** – Errors list	***	***	***
		E Reset – Erase errors list	Manufacturer level		
F11	Restore	Reset all the parameters to the manufacturer	***	***	***
F12	System	Probes configuration	Manufacturer level		

3.8 Disinfect Function

Eco's electronic control features a **Disinfect** function, which consists of a water heating cycle increasing the temperature to a higher temperature for a period long enough to prevent the formation of germs inside the tank. The **Disinfect** function can be set automatically or manually.

The NZ Building Code G12 regulation regarding protection of hot water storage from Legionella is daily to greater 60°C, or weekly to greater than 60°C for 1 hour).

The installer must set the disinfect function to at least weekly as required by NZ Building Code. The Set point should be set to at least 62°C when using the weekly function.

When automatic mode is not activated, the user must activate it manually on the key Disinfect.
At the end of the function, when the temperature reaches the Disinfect setpoint the system returns to the original operating mode.

The **Disinfect** function is activated:

- When you press the "DISINFECT" key for 3 seconds
- On the penultimate day of the holiday period (see section 9.7). During the holidays the value attributed to the parameter disinfect must be nil)
- Automatically at midnight when the time period set in the **disinfec**t function is reached.

Note that you can view the number of days until the next disinfect cycle:

1. Press the Menu button to enter the menu.
2. Go to "F07 – Info", using the down arrow and press OK.
3. Use the down arrow to scroll down to "Proximo Disinfect".
4. Go back to the main display using the ON/OFF button.

The disinfect function is cancelled when you press the CANCEL (ON/OFF) or DISINFECT keys

	The NZ building code requires the temperature to be raised daily to >60°C daily, or weekly to >60°C for one-hour. It is recommended that the installer sets the disinfect function to weekly with a set point of 65°C

3.9 Holidays Function

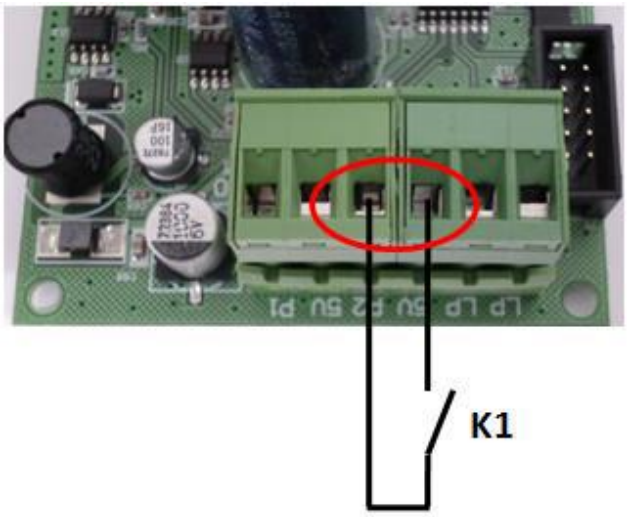
To activate the **Holidays** function you need to access the menu and set the number of days you will be on holiday, and your equipment will automatically enter Standby mode until the last day of holidays. On the last day, the equipment will begin the Disinfect function to eliminate any formation of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

	If you set your equipment to **Holiday** mode **DO NOT turn it off with the key ON/OFF, or the function will become inactive**. If you do switch it OFF, or you come home early when you return from your holidays you must remember to switch on your equipment and cancel the days of holidays introduced (set the value to 0). If you do not set the value to 0, your equipment will not restart until the days of holidays selected have expired.

3.10 PV Function

The **PV function** enables the possibility of reaching higher water temperatures when an alternative electric energy source is available (solar PV, wind, hydro) increasing the efficiency of the thermodynamic solar system and maximising the alternative electric energy source.

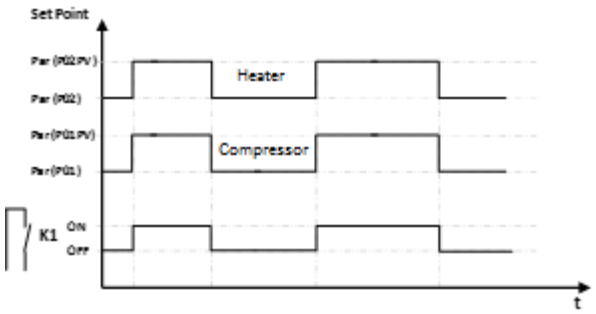
Connect a wire from the PV inverter to the control board of the equipment. This connection on the control board must be done to the terminals 5V/P2.



Be careful that this is a dry contact (without power). Applying power to this contact may cause irreversible damage to the equipment.

When the contact K1 closes, it activates the PV function and all the heat sources (both thermodynamic and electric heater) will be adjusted to the new working parameters.
The compressor assumes parameters P01PV / H01PV and the electric heater assumes P02PV / H02PV.

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



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

3.11 Table of Errors

The installation, assembly and repair of Eco **must** 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. Probe disconnected from controller – Check that the connector is properly attached to the electronic plate and/or the connection terminals are secure.
Er02–S2	Anomaly detected in probe 1	
Er03–TA	Anomaly detected in water temperature	Water temperature in hot water cylinder is too hot – Check that there is no anomaly in the electronic board, such as a damaged relay. Temperature probes 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 properly attached to the electronic plate and that the connection terminals are secure, and that the pressure gauge is running. Lack of cooling fluid in the circuit – Load of fluid incomplete or leaking. Low external temperatures.
Error "Lo"	Temperature probe is damaged or in short-circuit	- Check the connections of the temperature probe. - 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)

4 Problem Solving

PROBLEM	POSSIBLE CAUSES	HOW TO PROCEED
No power to control board	**Power supply failure**	Check the power supply
		• Check the main circuit breaker • Check the control boards fuses.
	Cable damaged or disconnected	Check the integrity of the electronic board's electric circuit (see sect 5.5)
Low water temperature	**Equipment is switched off**	Press the key ON/OFF.
	Compressor and E heater are off (On/Off key is flashing)	Switch on compressor with key "**COMP"**
	Absence of power supply or damaged cable	• Check the equipment is plugged in and switched on at the socket • Check that the corresponding circuit-breaker is connected • Check the integrity of the cables • Check that the electrical cable is not disconnected from the electronic board. • Check electric protection (residual current circuit-breaker)
	ECO mode is selected, and outside temperature is very low	• Alter the equipment to "AUTO" mode to initiate automatic management of system • Alter the equipment to "BOOST" mode to reheat water faster
	Error on the display panel	Check the presence of error on electronic board and consult the table of errors
	Have used of large amount of hot water	Set the appliance for "BOOST" mode and wait for water heating
	Water leak in plumbing	Check and fix leak
	Low temperature programmed as the set-point	Adjust the temperature of the set-point
	Electrical heater is not working (Safety thermo switch activated)	Make sure the support resistance is operating. Reinstate the safety switch (see sect 5.3)
	Cold water feeding to hot water line. Plumbing not set up correctly **Tempering valve set low**	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.

PROBLEM	POSSIBLE CAUSES	HOW TO PROCEED
Water is too hot / steam present at	**Problem with the probe**	Check error display on electronic board
	Problem with the thermostat	Check correct running of thermostat
	Faulty control board	Replace board
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-points	Increase the value of Set-point for compressor
	Installation has low electric voltage	Make sure the installation is supplied with the correct voltage
	Problems with the thermodynamic solar system	Check the error display in the electronic board
Low hot water flow rate	**Loss or clogging of hot water 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 pressure reducing valve
	No PRV fitted, wrong PRV fitted	Install correct pressure reducing valve
Power consumption abnormally high	**Loss or obstruction in cooling circuit**	Check that the piping is not damaged
Electrical element does not work	**Thermostat switch failure (Safety switch activated)**	• Reinstate the safety switch (see sect 5.3) • Replace safety switch
	Defective electrical element	• Check the condition of the element • Replace element (see sect 5.4)
Other		Contact the supplier 03 540 3003

5 System Maintenance

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

5.1 General Inspection

During the equipment's useful life, the owner should carry out a general inspection of the equipment:

- External cleaning of equipment with a damp cloth
- Visual inspection of the whole system, with the purpose to detect possible leaks and damaged devices

5.2 Magnesium Anode

The construction of the tank will ensure an effective protection against corrosion under normal circumstances. For added protection against corrosion, the Eco system has a magnesium anode that provides an additional protection against corrosion.
The magnesium anode is designed to wear over time (sacrificial device) and corrode before your cylinder does, this protecting your tank.

The wear of the anode always depends on the characteristics of the water you use. Checking the condition of the anode is very important, particularly in the first few years of the installation so that you will have a good idea of how long it will be before it may need replacing.

The anode can be located either in the centre at the top of the cylinder, or towards the rear, at 135° from the front cowling, below the TPR valve.

Checking the anode should be done by a qualified technician or plumber.
To check the condition of your anode, follow these steps:

1. Turn off the power to the system, and unplug.
2. Shut off water supply to the system.
3. Remove pressure (for example, open a hot water tap or prv)
4. If required drain the system to make sure the water level is below the location of the anode
5. Unscrew the anode with a suitable tool.
6. Check the level of wear of the anode and if necessary, replace it
7. When replacing the anode, use thread tape of sealant to ensure it does not leak.

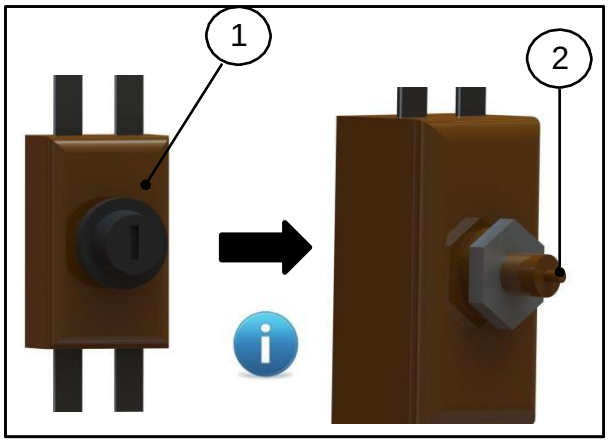
5.3 Safety Thermostat

There is a safety thermostat located next to the electrical element. This is a safety system, designed to open at 80°C, or 16 amps current. If it activates you need to establish the reason that it deactivated so that you can address the problem.
This switch stops the element from running, but the compressor will still work.

Note that there may be no indication on the control panel that this has been activated, so if you suspect that the electrical element is not working, may need to manually check this safety switch.
If you cannot determine what happened and it is still deactivated, contact customer services.

If the fault has been cured and you intend to reactivate the thermostat, please follow this procedure:

- **Before checking the switch, turn off the power to the system. There may be 240v power active at the switch or the electrical element.**
- Remove the compressor cover, unscrewing the two screws.
- Remove the plastic cover over the electric heater.
- If the small button (2) is protruding, the switch has been activated.
- Press the small button to reactivate the thermostat. Check it stays in
- Replace the lid (1) and then the cover, with the 2 screws.
- Turn the power back on to the system.

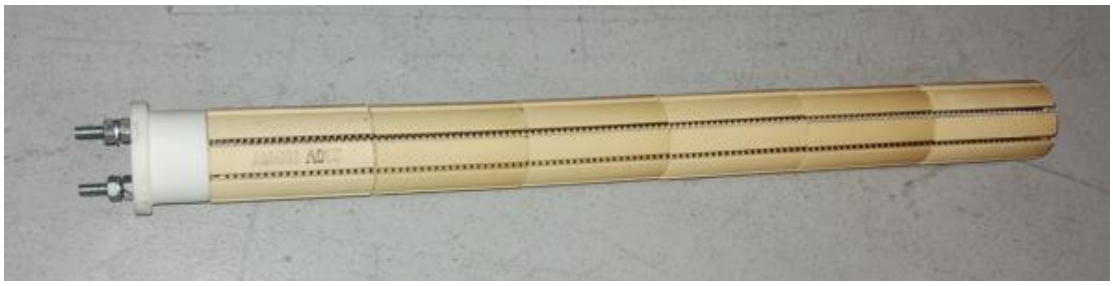


1. Safety switch
2. Safety pin activated (out)

⚠	**When performing a mega test on the wiring you must isolate the system before the test.** **If the system is included in the mega test, the safety switch may be activated and possibly damaged.**

5.4 Replacing the electrical element

The Electrical element is mounted in a ceramic casing. It can be removed and replaced without draining the water from the cylinder.



1. **Before accessing the element, turn off the power to the system. There may be 240v power active at the switch or the electrical element.**
2. Remove the rectangular cover halfway up the front of the cylinder, unscrewing the 4 screws.
3. Unscrew the wires from the two terminals on the element. Loosen the holding bracket if required.
4. Slide the element carefully out of the pocket and check for any damage.
5. Gently slide the new element into the pocket
6. When fitting the new element, either wire can be fitted to either terminal.
7. **Make sure the wire connections are good and not loose.**

Note: There are a few different models of element depending on the model and year of your system. Please contact The Alternative Energy Company for more details and a replacement element.

5.5 Checking the control board fuses, and replacing the board

There are two relays and fuses located in the control board. These control the compressor and electrical heater. If these are not working, you should check the fuses and relays. The control board may also need replacing.

1. Firstly, check that the power is turned off to the system.
2. The white cowling cover will have to be removed from the side of the cylinder to gain access to the compressor unit. This has two screws, one each side.
3. The controller board is located at the bottom of the compressor unit under a black plastic cover, hanging under the right-hand corner of the metal frame that the compressor sits on.
4. There is one screw at the top centre holding the black plastic cover in place over the controller, remove the screw and gently slid the black cover down. Do not use excessive force.
5. The fuses are located in the two black cylinders. Use a screwdriver to push, twist and release the fuse. The fuses are 10A, 5x20mm normal blow. There are are spare fuses taped to the inside of the compressor cover.
6. The main power supply wiring needs to be unscrewed with a screwdriver, but all the other connections can be unplugged.

7. Note that the plugs for the COMP and RES are interchangeable. The plug with the orange and yellow wires goes in the left hand 'COMP' port, while the plug with the blue and brown wires go into the right hand 'RES' port.
8. There is one screw in the bottom left corner of the board to hold the controller in place.
9. The controller will then slide out of the backing plate and the new controller fitted.
10. Don't forget to fit the plug with the ribbon cable for the display.

5.6 Checking good thermodynamic running conditions

Firstly, check for any signs of compressor oil on the pipework etc as this will indicate a slight gas leak in the system.

To check whether the equipment is running correctly, connect a pressure gauge to the low side of the system (the schrader valve on the vapour line from the panel to the compressor). If possible, also connect a gauge on the high side (the schrader valve on the line between the compressor and the cylinder).

The low pressure of the system will depend on running conditions: ambient temperature, water temperature, and solar radiation, but should normally be between 1 and 2 bar (15 to 30 psi). However, it may be higher (up to 3 bar, 45 psi) in the sun and warm weather. The water temperature will also affect the system pressures.

The low-pressure switch activates at around 0.25 bar (5 psi). The lowest pressure occurs soon after start-up, so it is good the measure this. Note that there is a 3-minute delay on the activation of the low-pressure switch and a LP alarm.

The superheat should be around 10°C. The Super heat is the difference between the evaporation temperature and the actual temperature of the gas returning from the solar panel. The evaporation temperature can be determined from the measured pressure using refrigeration tables for R134a.
This test should ideally be done with no sun on the panel and the water in the cylinder between 40°C and 50°C. The superheat may be lower when cold and higher with sun on the panel.

The evaporation temperature of the liquid going from the expansion valve to the panel should be below the ambient temperature on the panel. However, the pressure, and therefore the evaporation temperature is further reduced by a restrictor at the panel.

The temperature of the pipe going from the compressor to the cylinder should be greater than the water temperature of the cylinder. Typically, this will be 60°C to 80°C depending again on the conditions. If the water is cold, it will be lower. The system should be run for 15 minutes to stabilise before measuring.

In some cases, the expansion valve may be adjusted slightly to improve the running conditions, but be careful, make small changes and leave the system to settle for 5 minutes after each change.

5.7 Additional load of R134a refrigerant

Your unit has been pre-loaded for pipe runs of up to 12 m between the panel and the hot water cylinder. Longer distances will decrease the performance of your equipment.

The loading of additional refrigerant should only be carried out by qualified refrigeration technician with the correct equipment.

To load more gas, follow these steps:

1 Connect the gauges and hoses from the refrigeration bottle to the low-pressure valve on the line from the panel to the compressor.
2 Before adding refrigerant, bleed the gauges and hoses to remove any air from the hoses.
3 Place the refrigerant tank on a scale upside down and take note of the weight. You should only load the refrigerant in a liquid state.
4 Ideally, add the refrigerant with the compressor stopped, however, you may need to have the compressor running to reduce the low side pressure. In this case, add the refrigerant very slowly to avoid liquid passing through the compressor.
5 Add a small amount of refrigerant (0.1kg) at a time, and let the system settle for 5 minutes.

It is very important to load the refrigerant very slowly, as to avoid flooding the compressor with liquid.

5.8 Re-gassing the system

If, for any reason the system needs to be re-gassed, firstly any remaining gas in the system will have to be removed. This should be collected and recycled in an approved way.

- Do not run the compressor when removing the gas as this may damage the compressor.
- Once the system has been emptied you should always pressure test the system with nitrogen as per section 5.2, then vacuum the system as per section 5.3.
- The refrigerant should be introduced into the valves next to the cylinder. Follow the steps in section 7.2.

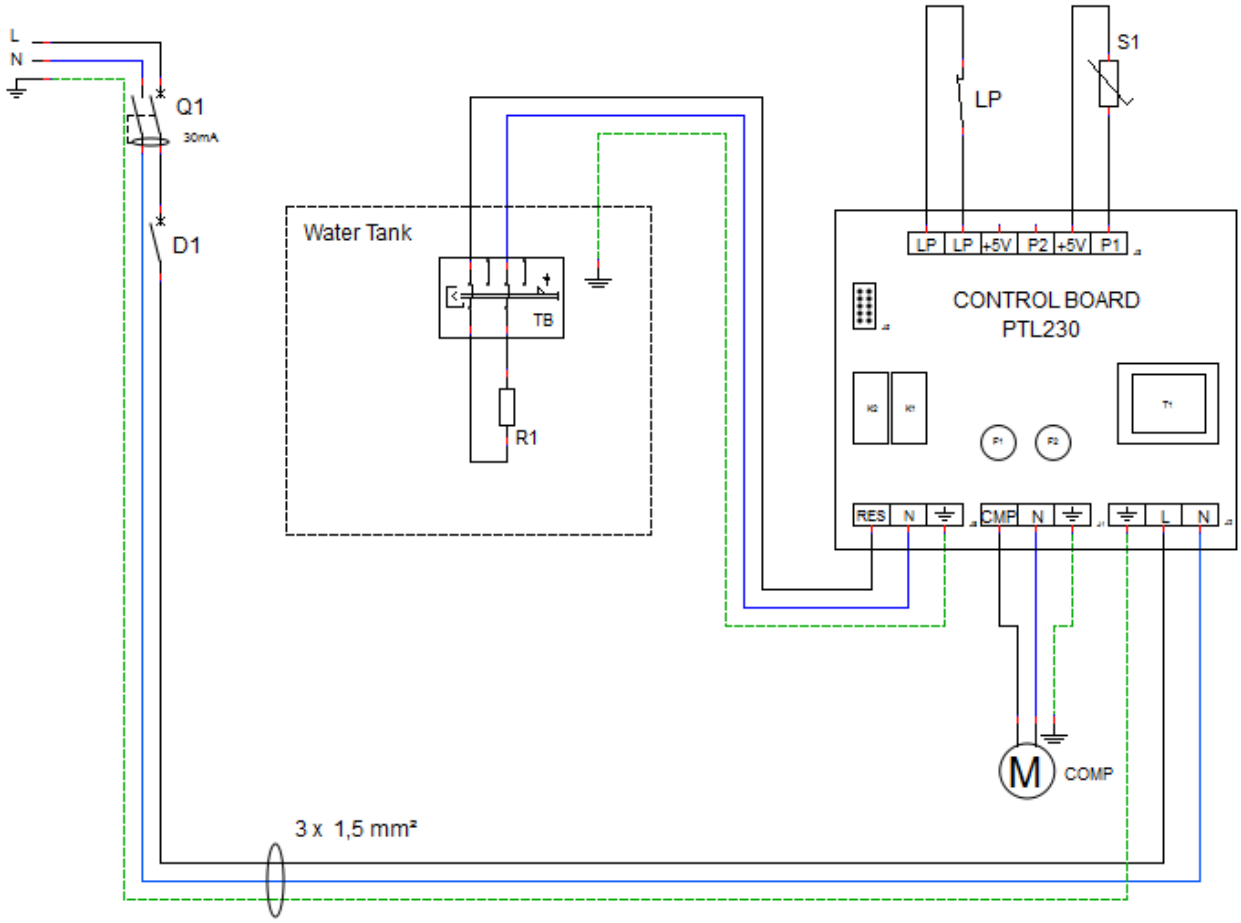
	1 panel system	2 panel system
Required refrigerant load	1.1kg	1.3kg

It is very important the liquid is added slowly, and that no liquid should pass through the panel to the compressor when it is running as this may damage to the compressor.

You should replace the in line filter every time you remove and re-gas the system.

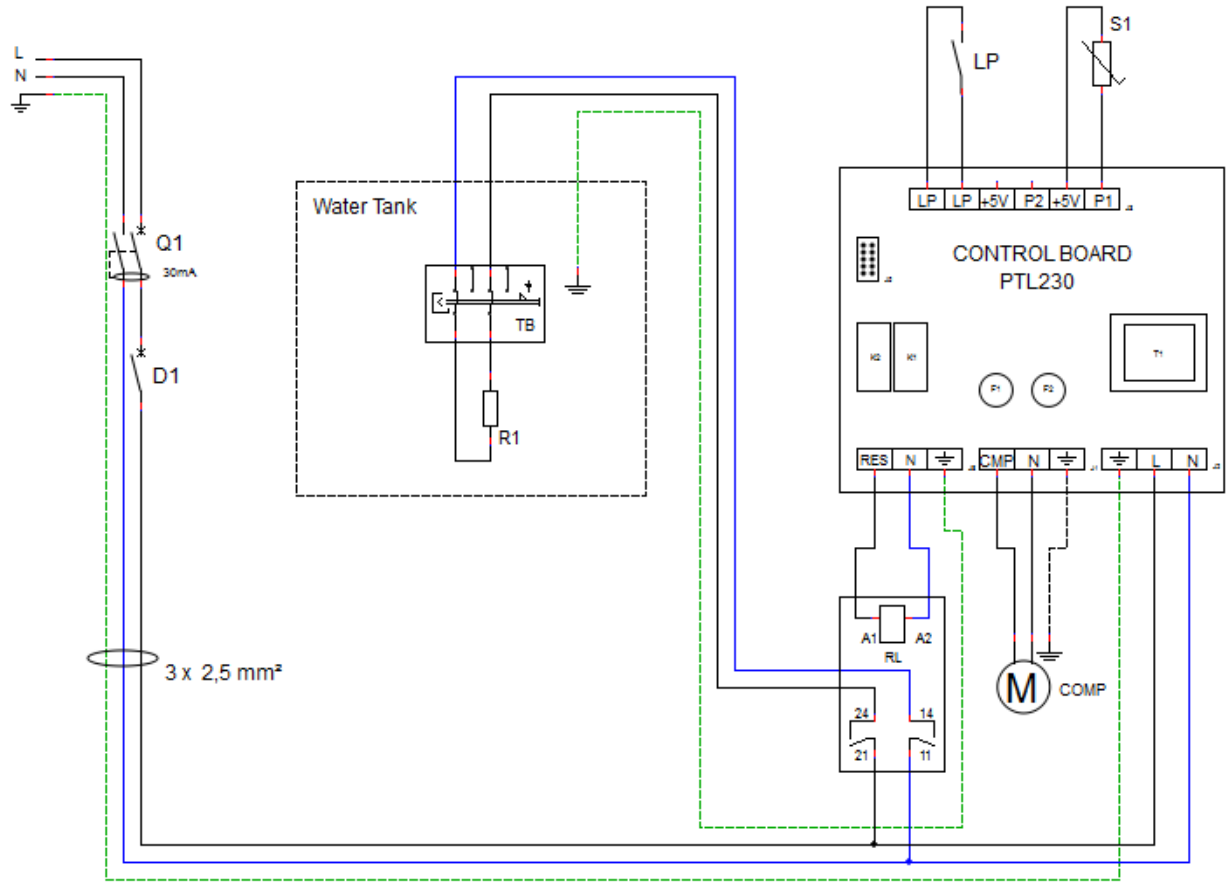
6 Electrical diagrams

Electric diagram (1 panel):



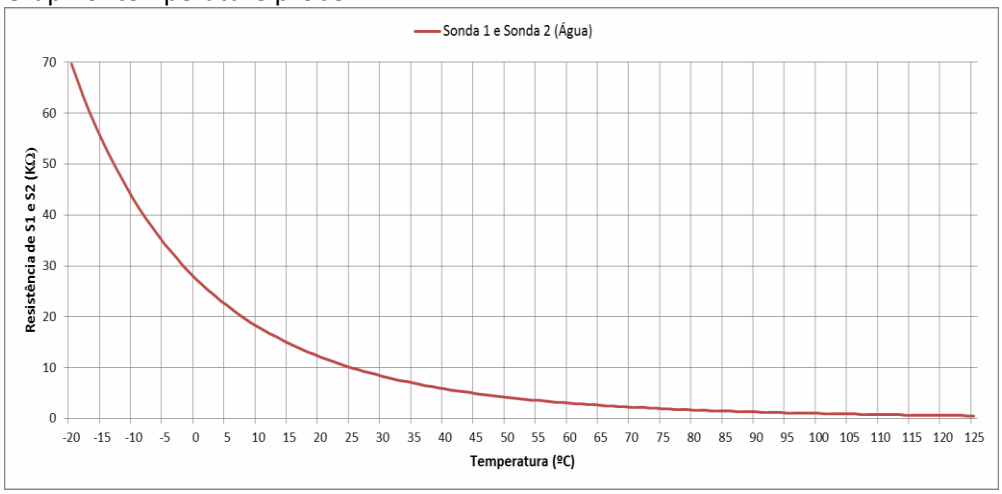
Legend:
Q1 – Differential
D1 – Circuit-breaker
LP – Low pressure gauge S1 – Temperature probe Comp – Compressor
R1 – Resistance
TB – Safety thermostat

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

Graph of temperature probe



7 Energie/The Alternative Energy Company Guarantee

This guarantee covers all defects to the goods supplied by Energie. It excludes the payment of any damage caused directly or indirectly by the supplied goods.
The guarantee starts from the Installation of the goods.

Solar Panel	**10 Years**
Water Cylinder	**5 years**
Electrical Components	**5 years**

In case of guarantee, the parts replaced are property of the manufacturer. A repair under the guarantee does not extend the guarantee.

Guarantee Exclusions

The guarantee is invalid if the apparatus is no longer in use, or is not assembled in accordance with the manufacturer's instructions, or if the equipment has been altered or modified without authorisation, or if the serial number has been removed or erased.

The equipment should only be installed by qualified installers according to the NZ Standards, the NZ Building Code and good trade practises, or the instructions of our technical services.

Further exclusions from guarantee:

- Hot water tanks that have been operating in water with the following indexes:
  - Active chlorine > 0.2 ppm
  - PH < 6 or > 8.5 (Sorensen scale at 25° C).
  - Hardness < 3.0 or > 20.0 °dH (< 50ppm or > 350ppm)
  - If one of the water parameters has a greater value than stipulated by directive 236/98 (Portugal).
- Breakdown due to incorrect use, electrical discharges, flooding, or humidity.
- The guarantee lapses if it is transferred to another owner, even if within the guarantee period.

ATTENTION: In cases where there is no justifiable breakdown and technical assistance has been requested, the client will pay for lost technical assistance time and travel.

Note: The Guarantee form must be properly completed, signed and stamped by the installer/reseller and returned to ENERGIE, otherwise the guarantee will not be validated.

Thank you for choosing the Energie Solar Thermodynamic Hot Water system.

We are always trying to improve our service and welcome feedback from our valued clients.

Please contact us at The Alternative Energy Company with your comments.

The Alternative Energy Company Limited

03 540 3003
18 Warren Place, Mapua, Nelson, New Zealand 7005
info@taec.co.nz