



Owner's Manual

Thermodynamic Solar System

EcoTop Stainless 250i/300i/300is



*“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

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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 Ecotop 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 500 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 Ecotop system must only be switched on once the hot water cylinder is filled with water.



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

Table of contents

Table of contents	7
Introduction	8
1.1 Principle of Operation	8
1.2 Technical Features.....	9
1.3 The Solar Panel	10
1.4 Refrigeration Gas.....	10
2 Hot Water Cylinder	11
2.1 Dimensions of the Hot Water Cylinder.....	11
2.2 Thermodynamic Block.....	12
2.3 Cylinder Labelling	13
2.4 Water quality requirements	13
3 System Operation	14
3.1 Important notes:.....	14
3.2 Control panel	14
3.3 Control panel symbols.....	15
3.4 Parameters Description.....	16
3.5 Operating Modes.....	17
3.6 Holidays Function	18
3.7 Disinfect Function.....	19
3.8 Crono (Sleep) Function	20
3.9 TCC Function.....	21
3.10 Wifi module	22
3.11 Table of Errors	23
4 Problem Solving	24
5 System Maintenance	26
5.1 General Inspection	26
5.2 Magnesium Anode.....	26
5.3 Safety Thermostat	27
5.4 Replacing the Electrical Element	28
5.5 Checking the control board fuses, and replacing the board	28
5.6 Checking good thermodynamic running conditions	29
5.7 Additional load of R134a refrigerant.....	30
5.8 Re-gassing the system	30
6 Electrical diagram.....	31
7 Energie Guarantee	32

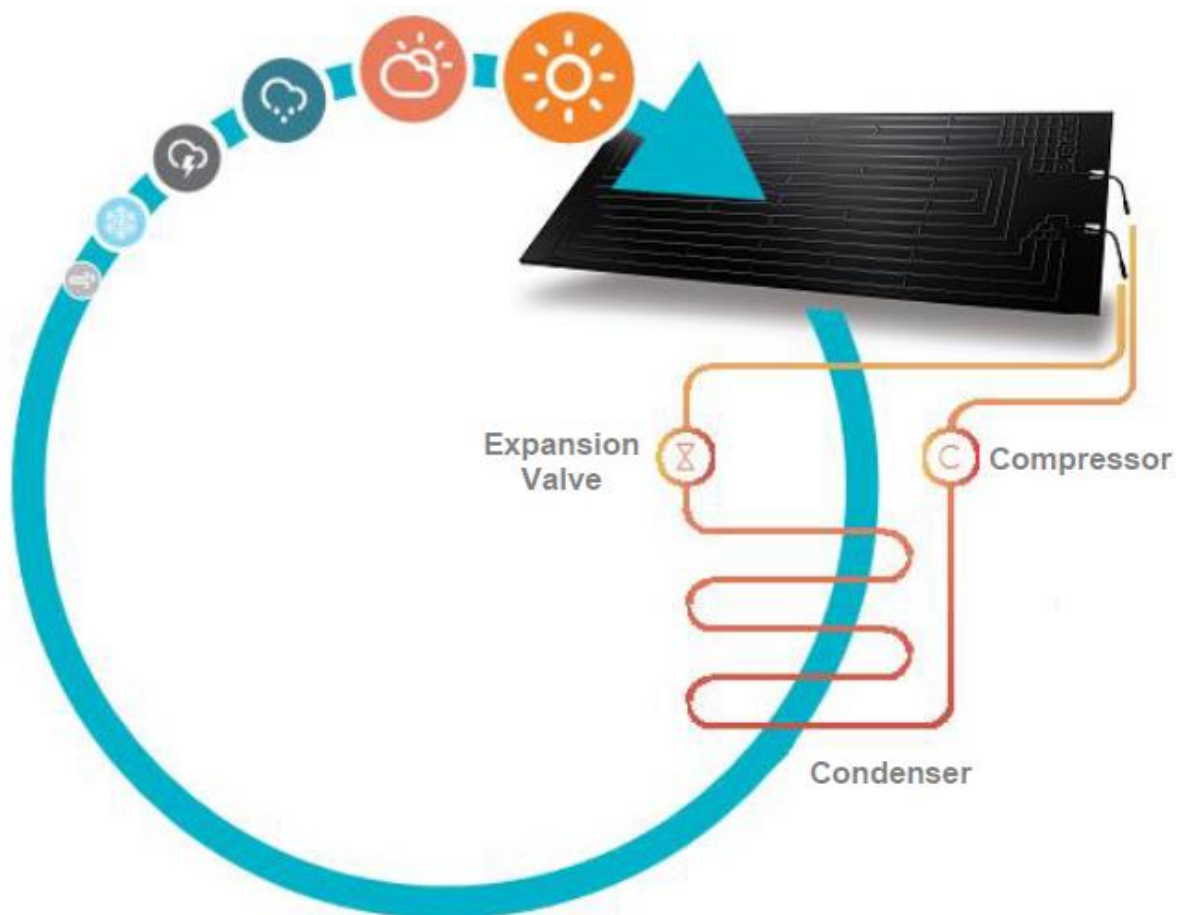
Introduction

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

	Model ⁽¹⁾	250i	300i	3001s
Hot Water Cylinder	Dry weight	64kg	74kg	76kg
	Water capacity	250L	300L	
	Cylinder material	Stainless steel AISI 444		
	Cathodic protection	Magnesium anode (1¼" thread)		
	Inlet and outlet water	¾" BSP male		
	Recirculation water	¾" BSP male		
	TPR valve connection	½" BSP female		
	Insulation	50mm High density polyurethane		
	Maximum water pressure	7 bar		
Maximum water temperature	80°C			
Thermodynamic Solar Panel	Number of panels	1		2
	Material	Solokote Anodised Aluminium		
	Panel Dimensions	2000mm x 800mm x 20mm		
	Solar surface area	1.6m ²		3.2m ²
	Weight	8kg		2 x 8kg
	Max working pressure	12 bar		
	Max working temperature	120°C		
Thermodynamic Block	Power supply	240 vac, 10 amp		240 vac, 15 amp
	Power consumption (input)	350–500w		500–800W
	Thermal power output	1.25 - 2.1kw		2.8 - 4.5kw
	Electrical element power	1.5kw		
	Refrigerant type	R134a or R513a		
	Refrigerant load ⁽²⁾	1.1kg		1.3kg
	Refrigeration pipe connections	Liquid ¼", ⅜" Vapour		Liquid ⅜", ½" Vapour
	Fuse (located in control board)	10 amp, cartridge, 5 x20mm		
Performance	Performance Coefficient (COP) ⁽³⁾			
	Without solar gain			
	COP at ambient 14°C	3.7		3.8
	COP at ambient 7°C	3.3		3.4
	COP at ambient 2°C	2.9		3.0
Sound level	39dB		45dB	

- 1) Model numbering: I = stainless steel, S = 2 panels
- 2) The system should be checked by the installer and more reffridgerant may be required.
- 3) According to EN16147. Without solar gain.

1.3 The 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.

1.4 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.

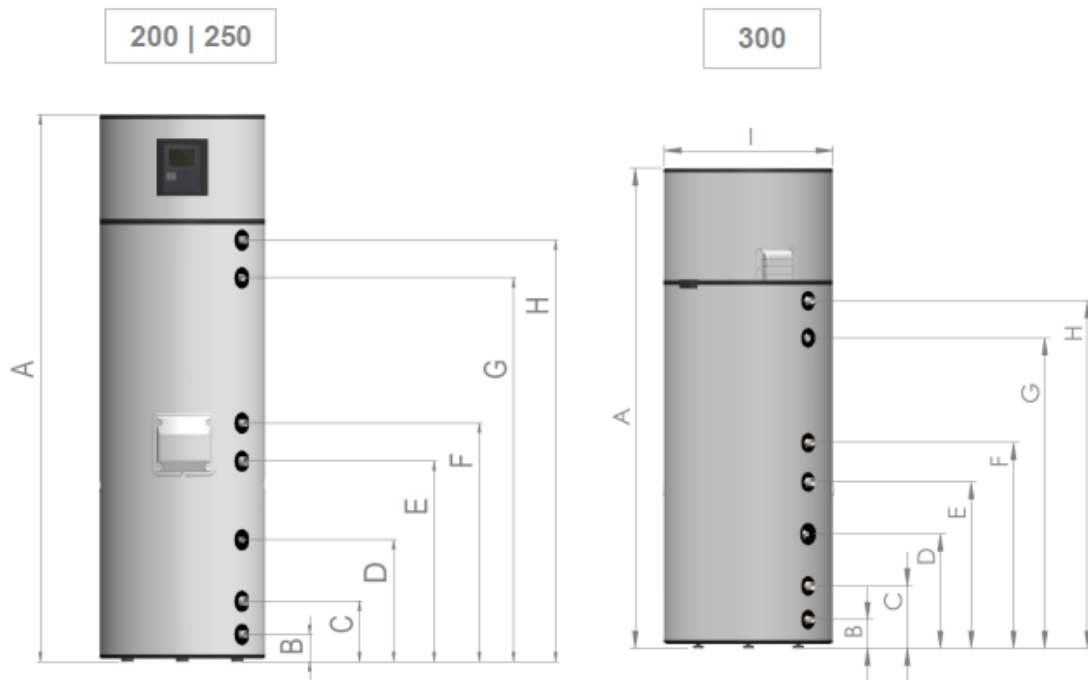
- The system comes preloaded with the required refrigerant gas. No additional gas should be required for the installation.
- Legally, in New Zealand the refrigerant in this system cannot be released into the environment.
- **Handling of the refrigerant must be carried out by an approved refrigeration 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 EcoTop cylinder is made of AISI 444 stainless steel. This is a high-quality, chlorine resistant stainless steel. The thermal insulation is of expanded polyurethane with a thickness of 50 mm.

2.1 Dimensions of the Hot Water Cylinder



	∅ Pol.	200 l/IX mm	250 l/IX mm	300 l/IX mm	Obs.
A	-	1615	1915	1775	-
B	G ¾" M	131	131	107	Cold Water
C	G 1" M	231	231	236	Support Coil
D	-	435	435	436	Instrumentation
E	G 1" M	690	690	636	Support Coil
F	G ½" F	-	840	855	Recirculation
G	G ½" F	905	1205	1065	PT Valve
H	G ¾" M	1030	1325	1190	Hot Water
I	-	∅ 580	∅ 580	∅ 650	-

Important note:

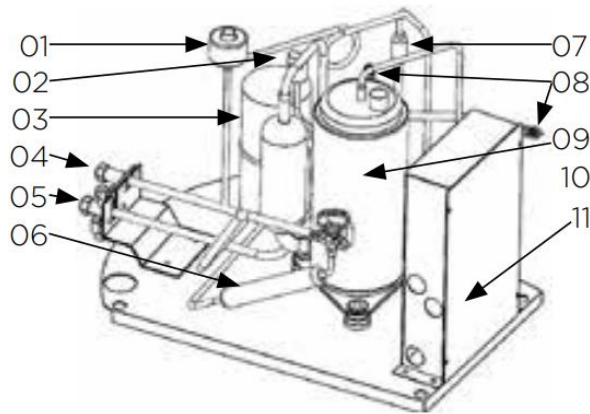
The plumbing connections on the **250lt** EcoTop cylinder are at an angle of 45° to the right of the control panel (the front right). The diameter of the cylinder is 580mm.

The plumbing connections on the **300lt** EcoTop cylinder are at an angle 135° clockwise from the control panel (at the back left). The diameter of the cylinder is 650mm.

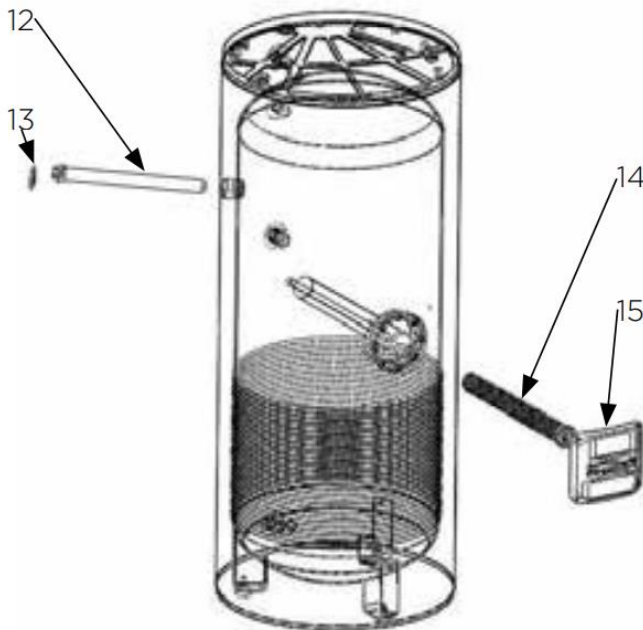
The refrigeration connections are at the back left of the system for both the 250L and the 300L models.

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 mounted at the back side. There is, in the central part of the hot water cylinder, a support electrical heater (immersion heater) as well as safety thermostat and temperature probe.

2.2 Thermodynamic Block

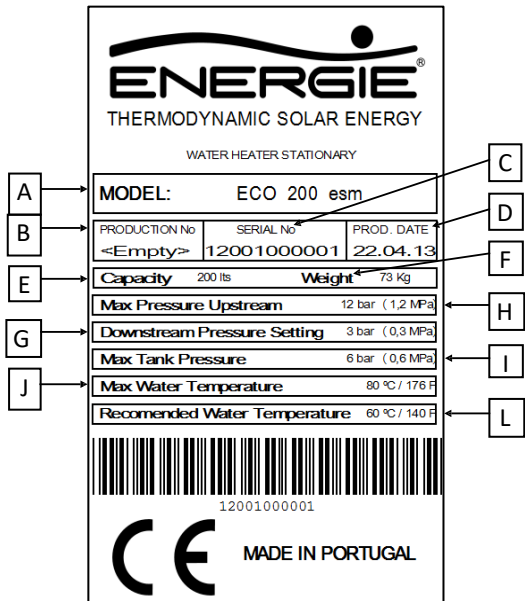


- 1. Solenoid valve
- 2. Low pressure switch
- 3. Liquid tank
- 4. 2-way valve
- 5. 3-way valve
- 6. Filter dehumidifier
- 7. Unidirectional valve
- 8. Load/read valve
- 9. Compressor
- 10. Thermostatic expansion valve
- 11. Electronic circuit board



- 12. Anode
- 13. Anode cover
- 14. Electrical heater
- 15. Electrical heater cover

2.3 Cylinder Labelling



ENERGIE[®]
THERMODYNAMIC SOLAR ENERGY
WATER HEATER STATIONARY

A. Model → MODEL: ECO 200 esm

B. Production number → PRODUCTION No: <Empty>

C. Serial number → SERIAL No: 12001000001

D. Production date → PROD. DATE: 22.04.13

E. Volume → Capacity: 200 lts

F. Weight → Weight: 73 Kg

G. Downstream pressure of PRV → Downstream Pressure Setting: 3 bar (0,3 MPa)

H. Upstream maximum pressure of PRV → Max Pressure Upstream: 12 bar (1,2 MPa)

I. Maximum pressure in hot water cylinder → Max Tank Pressure: 6 bar (0,6 MPa)

J. Maximum temperature in hot water cylinder → Max Water Temperature: 80 °C / 176 °F

K. Recommended temperature in hot water cylinder → Recommended Water Temperature: 60 °C / 140 °F

12001000001
CE MADE IN PORTUGAL

2.4 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.
If it is not treated when required, **the warranty will be invalid.**

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 CP 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 CP symbol.

If the system is turned OFF, this will deactivate the Compressor, the Electrical element and the Crono (sleep) function. These will need to be manually reactivated when the system is turned back on. The mode (Eco, Auto or Boost) will be remembered.

To reactivate the Crono function (Sleep), go to section 3.8 below.

3.2 Control panel

The control panel of the EcoTop 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.



KEY	FUNCTION	DESCRIPTION
ON/OFF CANCEL	(ON/OFF) Switch on/off	Switch on and off controller
	(CANCEL) Exit	ESC function to exit menu, submenu or cancel a function.
▲ COMP	▲	Function to run through menus and submenus (inside Menu). It allows you to alter value of parameter.
	COMP	Switch on / off the Compressor.
DISINFECT	Activate anti-legionella cycle	Press this key and the system will automatically create a thermal shock in the water to neutralize bacteria (Legionella).
MENU	MENU	Access the menu.
▼ E-HEATER	E-Heater	Pressing the key allows you to switch on and off the electrical resistance.
	▼	Function to run through menus and submenus (inside Menu). It allows you to alter value of parameter.
OK Padlock	OK	Confirm parameters within menus or submenus
	Padlock	Lock or unlock keyboard



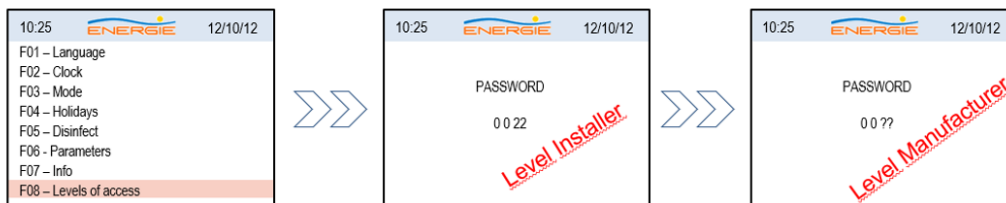
	Equipment in ECO operating mode		Active Chrono
	Equipment in AUTO operating mode		Active Impressed Current Anode
	Equipment in BOOST operating mode		Compressor active and running
	Contact TCC active		Resistance is active and running
	Compressor active		Chrono active seven days a week
	Electrical resistance active		Crono active weekend
	Unblocked keyboard		Chrono active except weekend
	Blocked keyboard	TA	TA Resistance is activated when S1 < P08 (Auto Mode)
	Disinfect function is active	TC	Resistance when time for continuous running of Compressor is over T05 (Auto Mode)
	Holiday mode is active	LP	Resistance is activated by opening of LP contact (Auto/Boost Mode)
	Error alarm (visible on display during error)	M	Resistance is activated manually

3.3 Control panel symbols

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

1. To access the menu, press the **MENU** key for 3 seconds.
2. After accessing, use the keys **COMP ▲** and **E-HEATER ▼** to navigate the menus and submenus.
3. In order to enter or confirm values / parameters press the **OK** key.
4. Press the **ON/OFF (Cancel)** key to return or exit the menu.

Access levels





3.4 Parameters Description

Code	Type	Description	Values		
			Min	Max	Default
F01	Language	Menu language	***	***	English
F02	Clock	Date and Time			
F03	Chrono	ON / OFF Chrono			Chrono OFF
F04	Mode	ECO mode, AUTO mode, BOOST mode	***	***	ECO
F05	Holidays	Number of days	1	99	0
F06	Disinfect	0 – Disinfect function inactive 1 – Disinfect function active once a week (weekly) 2 – Disinfect function active once a month (monthly)	0	2	0
		Number of days	0	99	0
F07	Parameters	P01 – Setpoint for compressor	10	55	53 °C
		H01 - Gradient P01 (diff between start and stop)	1	10	3 °C
		P02 - Setpoint for 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°C / 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
		P01TCC Setpoint compressor (when TCC active)	10	55	53 °C
		H01TCC Gradient P01TCC (when TCC active)	1	10	3 °C
		P02TCC Setpoint compressor (when TCC active)	10	60	53 °C
H02TCC Gradient P02TCC (when TCC active)	1	10	3 °C		
F08	Info	Show settings adopted in the parameter list			
F09	Efficiency	Energy consumption Compressor (Instantaneous W) Support Compressor (daily kWhr) Support (daily kWhr) Compressor (accumulated kWhr) Support (accumulated kWhr) Energy saving (kWhr)	***	***	***
F10	Levels of access	Level 1	Password: 0022		
		Level 2	Password: ????		
F11	Test Outputs	Compressor Electrical backup Solenoid valve	OFF	ON	OFF
F12	Errors	Errors list	***	***	***
		Erase errors list	Manufacturer level		
F13	Restore	Reset all the parameters to the manufacturer	***	***	***
F14	System	Probes configuration	***	***	1 probe (S1)
		Delete counters	***	***	***
		Anode ACI ON/OFF	OFF	ON	OFF

3.5 Operating Modes

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

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

Note that the electrical heater is sometimes referred to as “Immersion heater”, or “Resistance” in the EcoTop 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 “E-HEATER” button. The system will change the operating mode to BOOST which will run both the compressor and the element. Note that the Boost mode will stay active until you press the E-HEATER button to turn the element off. The system 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 external temperature, 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

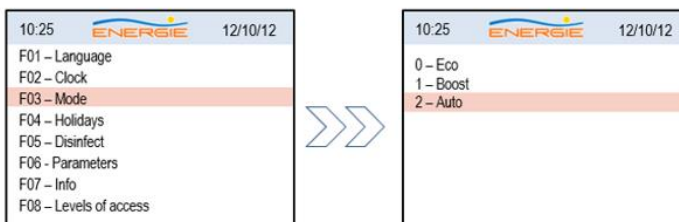
BOOST Operating Mode

In BOOST operating mode, the equipment runs as a thermodynamic system and an electrical heater, (emersion heater) simultaneously.

This mode enables the fastest recovery of hot water.

The Ecotop system comes set 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.



Once the panel is unlocked (press 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.

Note: After changing modes, check that the compressor is still activated.

3.6 Holidays Function

To activate the **Holiday** 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.

3.7 Disinfect Function

The Ecotop 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 than 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 Disinfect mode is not activated, the user will need to 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 3.6). During the holidays the value attributed to the parameter disinfect must be nil)
- Automatically at midnight, when the time period set in the **disinfect** 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 “F08 – Info”, using the down arrow and press OK.
3. Use the down arrow to scroll down to “Next 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.

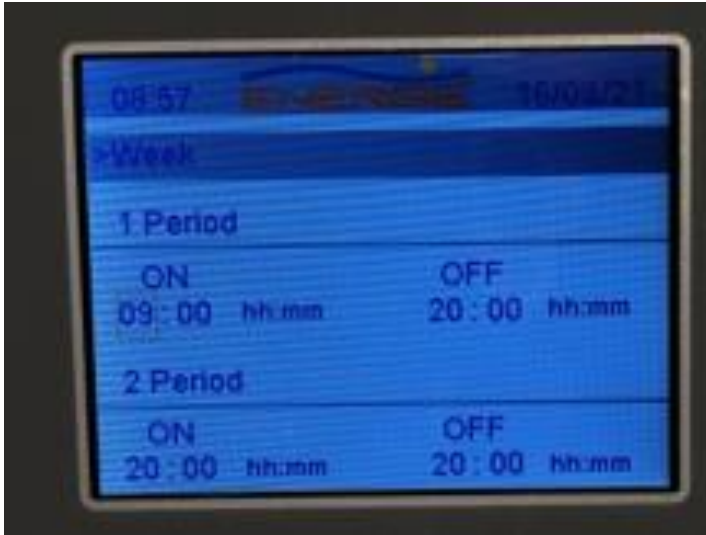
	<p>The NZ building code requires the temperature to be raised daily to >60°C daily, or weekly to >60°C for one-hour. It is recommended that the installer sets the disinfect function to weekly with a set point of at least 62°C</p>
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3.8 Crono (Sleep) Function

The Crono, or Sleep function allows you to program the system to only operate only at the desired time.

To set the hours of operation, perform the following procedure:

1. First, unlock the display, so the padlock has a tick
2. Enter the Menu and select the parameter F03- CRONO



3. First select “Week” and set the operating hours for each period. Use the up and down buttons to change the times and the OK to progress to the next step. ON is when the system wakes up and will start, and OFF is when the system goes to sleep. Note that both the 1st and 2nd periods must have a time set up. You can set the ON and OFF times to be the same time for the second period. Press OK to save the values

4. Next select WEEEKEND and set these times in the same way. Press OK to save.
5. Select Modality, and make sure “M-01 ON/OFF” is ticked. Press OK to save
6. Select “ON/OFF crono” and make sure that the Week and/or Weekend is ticked to ON as required. Press OK to save



7. Go back to the main display and there should be a clock at the bottom of the screen show the Crono function is active.

Note that if the system is turned to OFF, the Crono function will be deactivated. When the system is turned back on, the Crono function must also be turned back on

The Crono function is quite complex, and can be set up in a number of ways. It is easy to get it wrong, so check that it has been set up correctly.

3.9 TCC Function

The TCC **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.

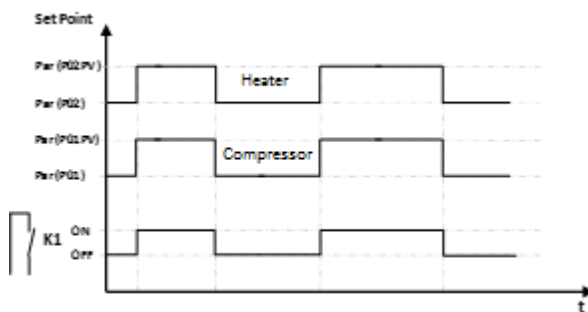
Firstly, turn the power off to the system.
 Undo the three screws and remove the top cover from the system, then undo the four screws and remove the cover plate on the electronic control unit.
 Connect a pair of wires from an inverter relay to terminals 1 and 2 on the inputs at the top left of the control board.
 These are the two connections on the left of the green input block in the picture



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

When the contact K1 closes, it activates the TCC function and the compressor and electric heater will operate to the TCC set points. This function will be indicated on the display.
 The compressor will operate to parameters P01TCC and H01TCC and the electric heater will operate to P02TCC and H02TCC.

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. Other options are a temperature switch, or a wifi switch. To do this, connect a timer or switch to the 1 and 2 contacts.

Note that this relay or switch must be a dry contact switch. It must have no power supply on it.

3.10 Wifi module

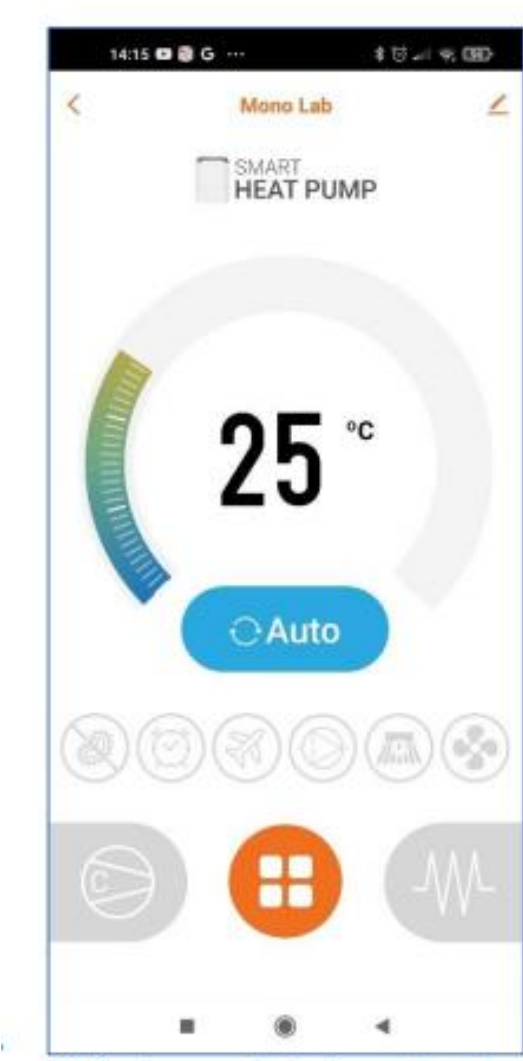
An additional wifi module is available that can give you information and control features.

This is only available on the Ecotop and Aquapura models and requires version 5.6 or later. To check the version of your systems, turn the system off and on again. The version will show when the system starts up.

The wifi module is a separate unit that plugs into the control board and connects to your wifi modem.

The wifi app operates on the “Smart Life” app, available on Play store for Android, or the App Store for Apple.

For more information on the wifi module, including a operation and configuration, contact The Alternative Energy Company.



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 °C.
Er02-S2	Anomaly detected in probe 2	Probe disconnected from controller – Check that the connector is properly attached to the electronic plate and/or the connection terminals are secure.
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 °C, check that the connector is well attached to the electronic plate and the connection terminals are in good condition.
E10-ACI	Impressed current anode	Deposit without water Disconnect impressed anode
E11-LT	Low water temperature warning	Temperature in storage tank less than 0°C
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.
LINKERROR	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	<ul style="list-style-type: none"> • 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
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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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 5 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 tap	Problem with the probe	Check error display on electronic board
	Problem with the	Check correct running of thermostat
	Faulty control board	Replace board. See section 5.5
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	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	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)	<ul style="list-style-type: none"> • Reinststate the safety switch (see sect 5.3) • Replace safety switch
	Defective electrical element	<ul style="list-style-type: none"> • Check the condition of the element • Replace element
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 is located towards the rear of the cylinder, at 135° from the front (control panel). On the 300L model this is 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. 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 or sealant to ensure it does not leak.

5.3 Safety Thermostat

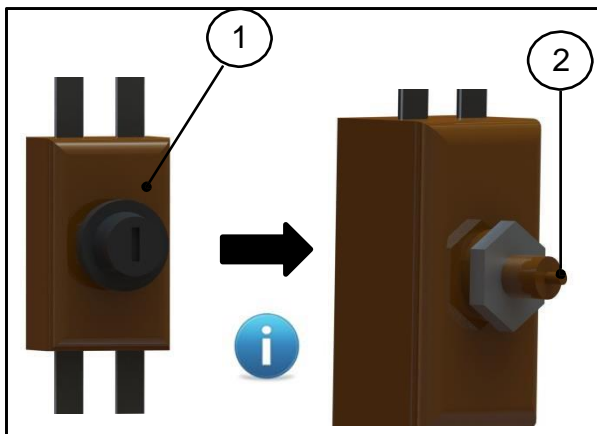
There is a safety thermostat located next to the control panel. This is a safety system, designed to open at 80°C, or 16 amps current. If it activates you need to establish the reason that it deactivated so that you can address the problem.

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 3 screws.
- If the small button (2) is protruding, the safety switch has been activated.
- Press the small button to reactivate the thermostat. Check it stays in
- Replace the cover, with the 3 screws.
- Turn the power back on to the system.

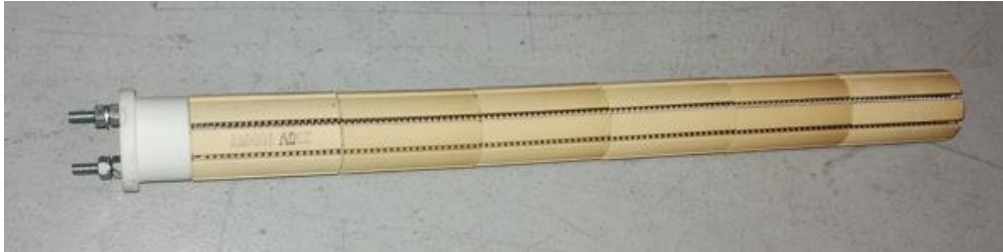


1. Safety switch
2. Safety pin activated (out)

	<p>When performing a mega test on the wiring you must isolate the system before the test.</p> <p>If the system is included in the mega test, the safety switch may be activated and possibly damaged. See section 10.3</p>
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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 fuses located in the control board. These protect the compressor and electrical heater. If the compressor or element are not working, you should check the fuses. If the fuses are OK, check the power to the compressor and element. The relays in the control board may have failed and the control board may need replacing.

Note: This work should only be done by a qualified electrician

1. Firstly, check that the power is turned off to the system.
2. Remove the cover on top of the cylinder. This has 3 screws to hold it on and sometimes the screw might be against the wall.
3. Disconnect the ribbon cable from the display on the cover. Do not damage the cable.
4. The controller board is located inside the metal box beside the compressor unit.
5. Undo the 4 screws to remove the metal cover plate to access the control board.
6. The fuses are in the two black cylinders on the control board. Use a flat head screwdriver to push, twist anticlockwise and release the fuse. The fuses are 10A, 5x20mm normal blow. There are spare fuses taped to the inside of the control board box.

7. To change the control board, the main power supply wiring needs to be unscrewed with an electrical screwdriver, but all the other connections should be able to be unplugged.
8. There are 4 plastic clips to hold the controller in place. Gently compress these to release the board and fit the new board.
9. Don't forget to fit the plug the ribbon cable back into the display before refitting the cover! The system will still run but there will not but any 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.

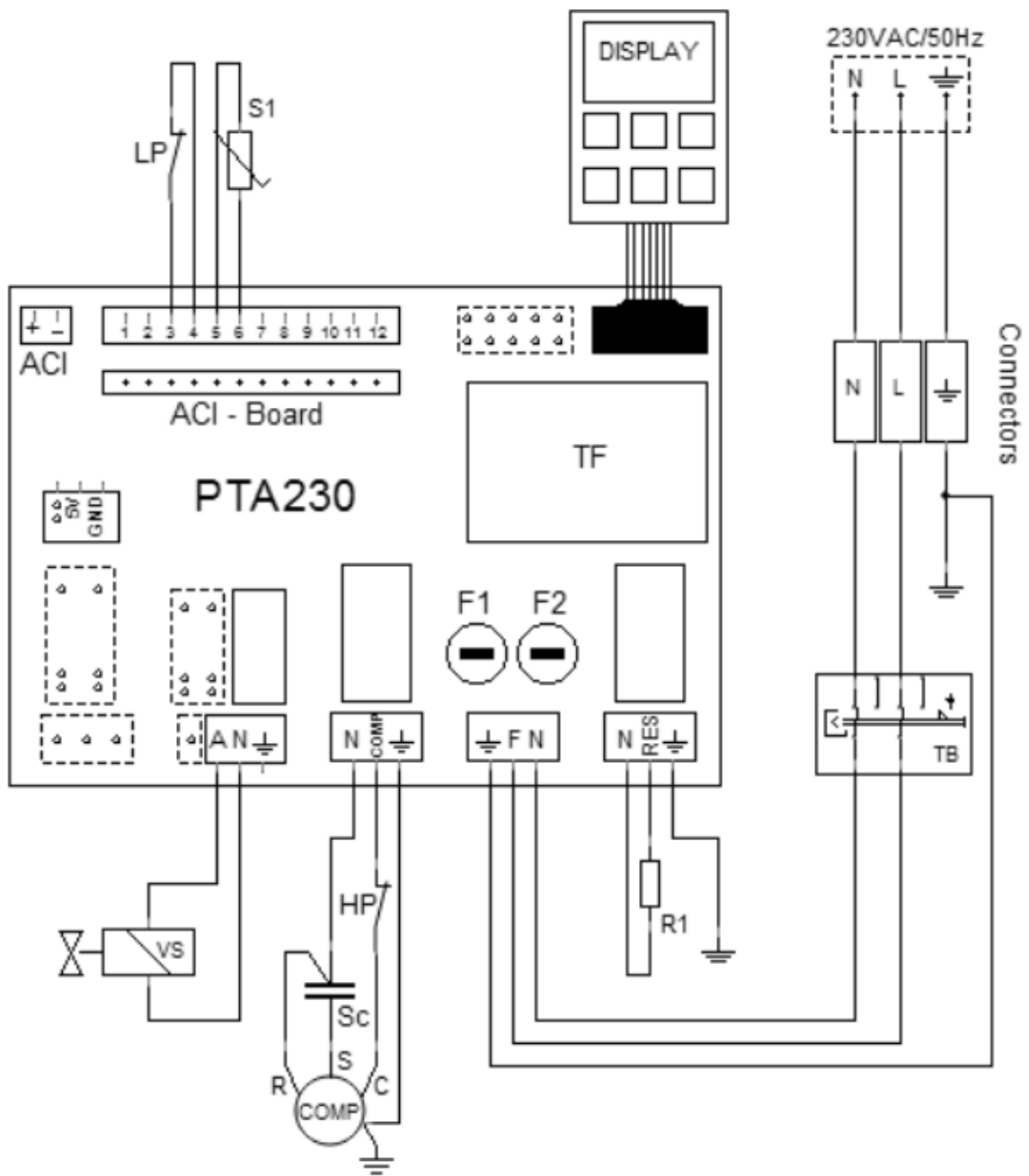
- Do not run the compressor when removing the gas as this may damage the compressor.
- Once the system has been emptied you should always pressure test the system with nitrogen as per section 5.2, then vacuum the system as per section 5.3.
- The refrigerant should be introduced into the valves next to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



Legend:

S1 Temperature probe
ACI Anode Connection CI
LH Low pressure gauge
HP High pressure gauge
VS Solenoid Valve

Comp Compressor
TB safety thermostat
F2 General Fuse
F1 Compressor Fuse
R1 Support Resistance

7 Energie 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.



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