



ecoSMART e-system



EN

USER MANUAL

MODEL:

SERVICE CONTACT:

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1. General information

Thank you for purchasing our *ecoSMART e-system* device.

This manual contains information about general performance of the system and how to use the controller functions. The user can also find information on how to deal with anomalous performance and some of the most common malfunctions that can be solved without external assistance.

For best performance of the *ecoSMART* equipment and your ECOFOREST heat pump, read this manual carefully before using. Keep this manual for future reference.

This manual contains two different kinds of warnings that should be heeded, as shown below.



NOTE

- Indicates a situation that may cause material damage or malfunctioning of the equipment. May also be used to indicate practices which are recommended or not recommended for the equipment.



DANGER!

- Warning of imminent or potential danger which, if not avoided, may result in injury or even death. May also be used to warn of unsafe practices.

The *ecoSMART e-system* has been designed to work with ecoGEO heat pumps and a serie of commercial trades and installations designed for the production of energy from renewable sources or similar equipment.

The manufacturer is not responsible for any material damage and/or personal injury resulting from improper use or incorrect installation of the equipment. ECOFOREST equipment must be installed by a licensed installer in accordance with applicable local regulations and in accordance with the instructions described in the installation manual.

1.1. Safety considerations

The detailed instructions in this section cover important aspects for your safety; as such they must be strictly complied with



DANGER!

- All the installation and maintenance work must be performed by an authorised technician following local regulations and according to the instructions described in the installation manual.
- Improper installation or use of the equipment could cause electrocution, short circuits, leakage of working fluids, fire or other personal injury and/or material damage.
- Keep the plastic bags included in the packaging out of the reach of children, as they could result in injury through asphyxia.
- This equipment should not be handled by people with physical, sensory or psychological disabilities, children and people with no suitable experience or knowledge, unless it is under the supervision or direction of a person responsible for their safety.
- If equipment malfunction is detected, contact your technical service to solve any problems that may have appeared.
- Do not touch any of the internal components during or immediately after operation. You must completely disconnect the equipment and isolate it from all electrical circuits before any handling or maintenance work.
- Install a RCD (Residual Current Device) on each AC line leaving the system.
- The RCD must be of the quadripolar type, with a maximum residual current equal to 300mA, class A.
- Take every precaution to prevent the storage system from turn-on uncontrollably.
- If it is unavoidable to carry out any operation under voltage, it is totally forbidden to do so without the appropriate PPE: anti-electrocution gloves and safety shoes.
- Do not install or handle the *e-system* near flammable materials or in potentially flammable atmospheres

1.2. Steps to follow in case of fire

Electrical devices may ultimately cause a fire due to faulty installation or improper use of the equipment. The measures taken must ensure the safety of persons in the first place, as well as prevent further material damage. In case of fire inside or near the *e-system*, follow the instructions below:

-Disconnect the *e-system* and isolate it from the mains by turning off the magneto-thermal switch on the general switchboard, downstream from your energy meter.

-The fire must be extinguished by means of convectional agents, as this is a system considered to be of low voltage, with output voltages of less than 600Vac.

-In the event of a fire in the batteries, only dry powder extinguishers may be used. Liquid fire extinguishers are prohibited.



-
- Remember that, with the exception of small, localised fires, only the fire brigade is equipped and authorised to intervene in fire-extinguishing manoeuvres. If the fire has spread, you must leave the site and get to safety immediately.
-

1.3. Maintenance

The *ecoSMART* equipments do not require specific maintenance after commissioning. The internal controller monitors a large number of parameters and will produce a warning if any problem arises, in which case we recommend you contact your distributor.

DANGER!

-
- All maintenance work must be performed by an authorised technician. Improper handling of the equipment as a whole can result in personal injury and/or damage to materials.
 - Do not spill water or other liquids directly on the device to clean it, as this could cause an electric shock or fire.
 - Do not manipulate or bypass the electrical protections of the devices. It could cause irreversible damage to the equipment.
 - Do not make any changes to the electrical connection and communication lines to the storage system without the express permission of the manufacturer.
-

2. System diagram

The smart energy management system *ecoSMART* regulates the energy flow between the heat pump and your self-consumption installation in an efficient way. The control is able to adjusting the consumption of the heat pump to the electrical generation at any given time, ensuring that the comfort of the home, configured in the heat pump, is not compromised. In this way we are able to considerably reduce dependence on the electricity grid to supply the pump, which means a huge improvement in the total efficiency of the installation and significant savings in the electricity bill.

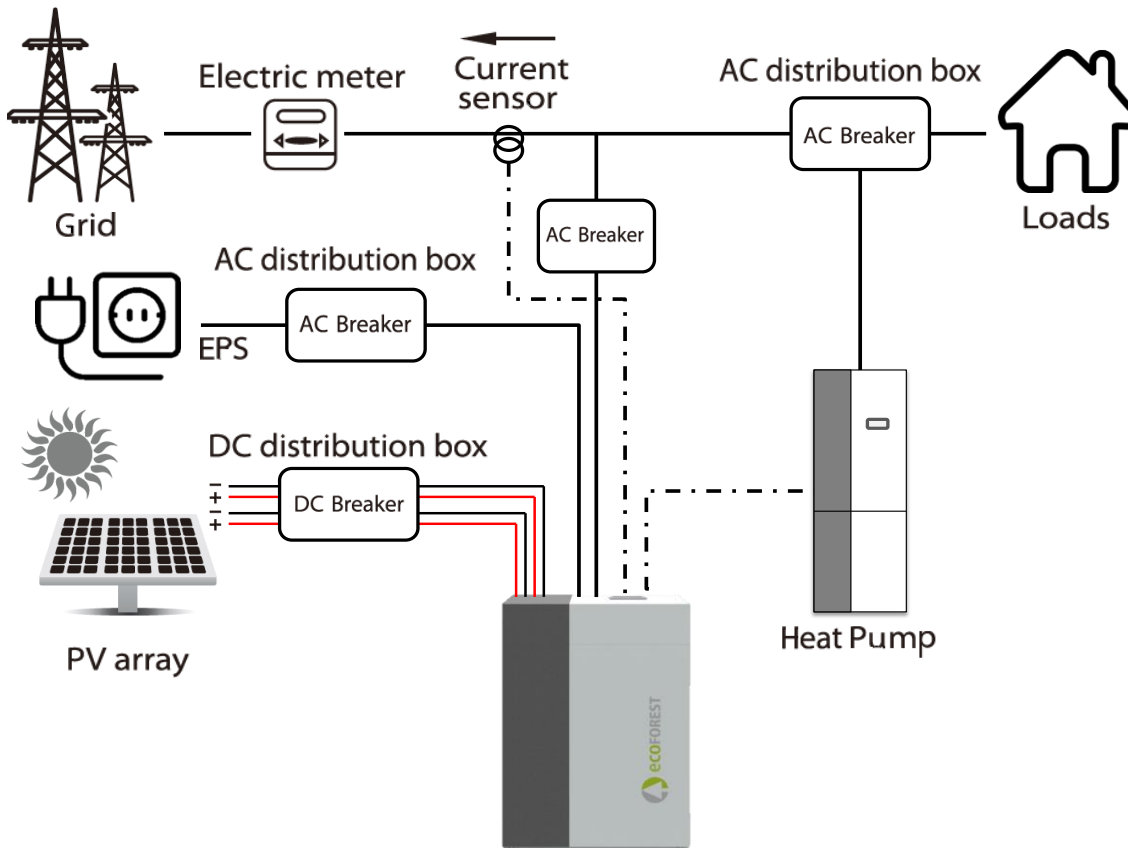


Figure 2.1. General diagram of the *e-system*

The proprietary software incorporated in the *ecoSMART e-system* allows to choose from a range of functions to maximise the performance of your installation.

Control of electrical surplus.

The *ecoSMART e-system* is able to determine when we are facing an energy surplus situation. In this case, and under a series of configurable conditions for the beginning and end of the regulation, the control will adjust the consumption of the heat pump to take advantage of this surplus in the production and storage of thermal energy, so that it is obtained with less consumption when the electricity production from renewable sources falls.

Consumption control through heat pump regulation.

When the electrical consumption of your installation approaches a maximum value that can be configured by the installer, the heat pump can limit its power to try to keep total consumption below the limit.

Control of non-critical loads.

It is possible to program the activation and deactivation of up to four non-critical loads by enabling four output relays supplied at 230V, configuring a series of parameters associated with the energy balance between the electrical grid and the consumption of the installation.

Battery electrical storage

The *ecoSMART e-system* manages the charge and discharge of a bank of lithium-ion batteries of up to 12kWh capacity, which allows to accumulate part of the surplus to supply the electrical consumption of your home when there is no production or to charge the batteries from the grid when the energy is cheaper. As it is a modular system, you can adapt the capacity of the bank to your particular needs.

“Plug&play” system.

The *ecoSMART e-system* integrates all the necessary elements for the start-up and correct operation of a photovoltaic self-consumption system (with the exception of the PV modules) inside the case, which reduces costs, minimises the space required and facilitates its installation.

Smart, versatile and intuitive management.

The system continuously monitor the operation of the installation and alerts us if there are any problems. The application interface allows to easily visualise and control the functions of the *e-system*.

3. Controller guide



NOTE

- Depending on the software version and configuration established by the technical service, there may be screens or contents that are not shown.
- If the following screen appears when accessing menu, this means that the service requested has not been enabled by the technical service.



3.1. Control panel

The energy manager control panel has a screen with 6 buttons, like the one shown in the illustration below. The buttons are used to move through the various user menus and to adjust the parameters.



Figure 3.1. Control panel

The general functions of each of the buttons and operation is indicated below.



The ALARMS menu can be accessed directly from anywhere in the application.



The list of user menus can be accessed from anywhere in the application.



The user can return to the previous menu from anywhere in the application.



This allows the user to move through the menu lists.

This allows the user to move from one screen to another inside a menu.

This is used to adjust the settings of the parameters contained in a screen.



This allows the user to access the selected menu.

This is used to move from one adjustable parameter to another in the same screen.

This is used to access the INFORMATION menu directly from the main screen.

3.2. Main screen

The main screen of the application contains a series of fields with information about *e-system* operation.



Figure 3.2. Description of the main screen

3.3. Controller status

The status indicates the availability of the control to attend the different functions of the *e-system*.



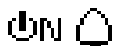
ON status

The controller is on and available to activate all its functions.



OFF status from control panel

The heat pump is switched off from the front panel of the controller and is therefore not available to activate any of its functions.



Estado de EMERGENCIA por alarma activa

The controller is in a state of emergency because of an active alarm. The controller still run but the alarm warns us of abnormal behavior and registers it.

3.4. Operating modes

The operating modes active in the *ecoSMART e-system* are reflected in the main screen and give a quick reading of the behavior of the control at any time.



SURPLUS CONTROL Mode

When the comfort conditions are met, the control system regulates the heat pump consumption in order to use the only the excess electricity



CONSUMPTION CONTROL Mode

The control unit regulates the consumption of the heat pump in order to adjust the total consumption of the system to the maximum limit set by the installer.

3.5. Señales de salida activas en el controlador

The main display also shows the signals at the active outputs sent by the controller at the bottom of the screen.



REGULATION signal

An output for speed control of the heat pump compressor has been activated.



NON CRITICAL LOAD ACTIVE signal

Relay output to non-critical load enabled (up to four loads).

3.6. List of installer menu

Follow the instructions below to browse through the various user menus. Each menu has a series of screens that are used to change heat pump STATUS and OPERATION MODE, adjust comfort parameters and view desired information.

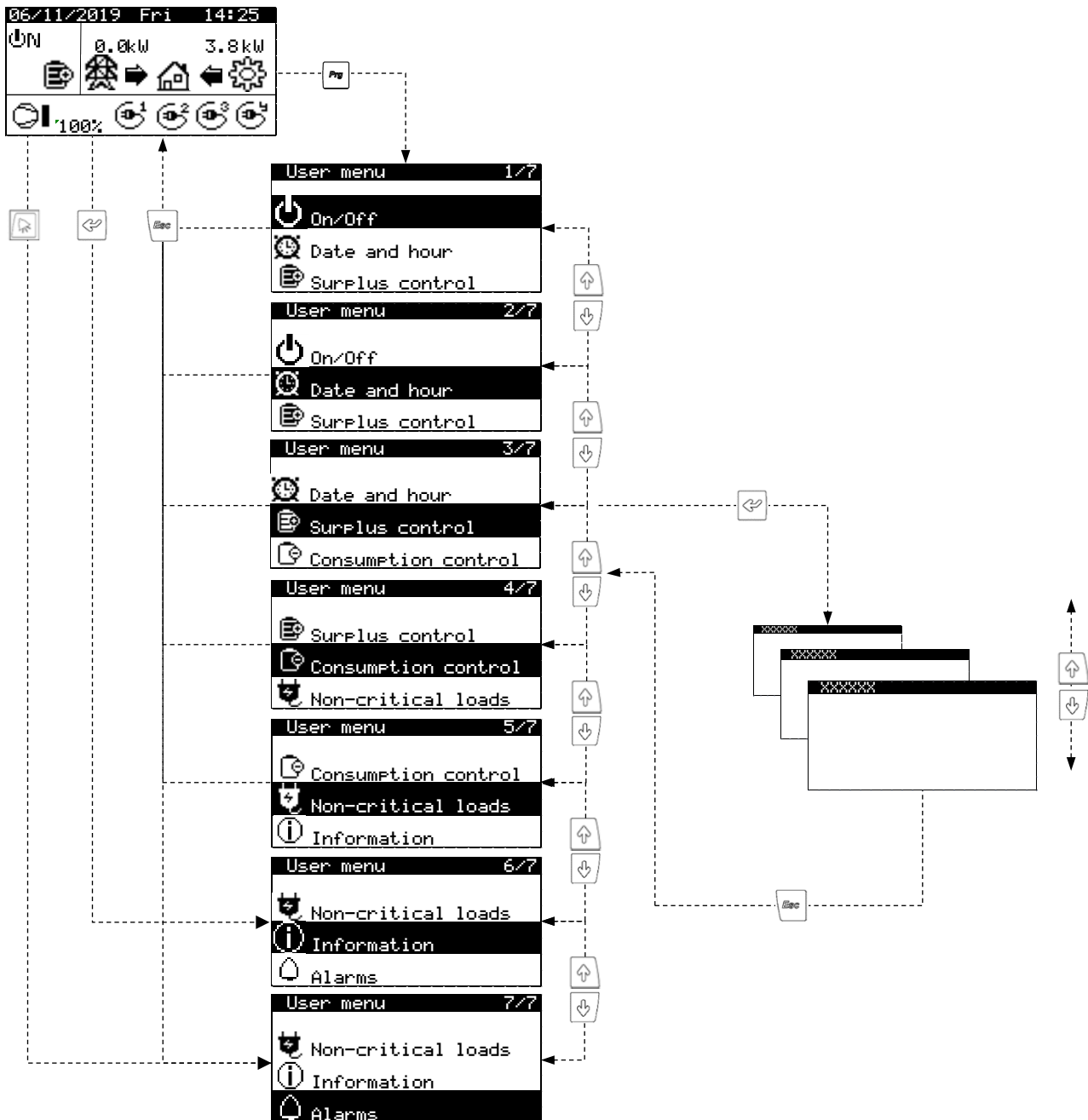


Figure 3.3. Browsing through the list of user menus.

3.7. Parameters adjustment

Take the following steps to change a parameter:











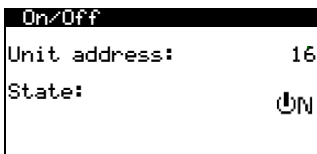
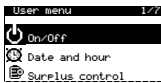
1. Search for the screen containing the parameter that needs adjusting (figure 5.4).
2. With the cursor in position 1 press on  to enter the screen and move the cursor to the parameter in position 2.
3. Adjust the parameter in position 2 using buttons  .
4. Press  to accept and move the cursor to position 3.
5. Adjust the parameter in position 3 with buttons  .
6. Press  to accept and return to position 1.
7. With the cursor in position 1 again, press buttons   to go to the previous or next screen, or  to return to the list of user menus.



Figure 3.4. Adjusting comfort parameters

3.8. ON/OFF Menu

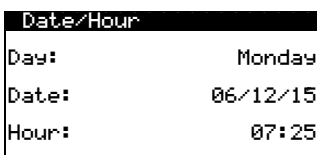
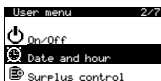


On/Off

Shows the unit address.

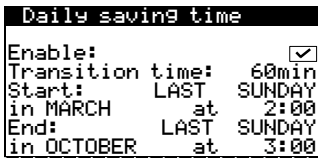
Used to switch the energy manager on / off or to activate the EMERGENCY status.

3.9. SCHEDULE Menu



Date/Time

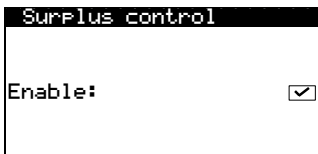
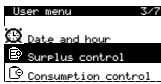
This is used to adjust the day of the week, date (DD/MM/YY) and time (HH:MM 24-hour format) of the controller.



Daily saving time

The settings of automatic daylight time change between seasons (autumn-winter / spring-summer) can be adjusted.

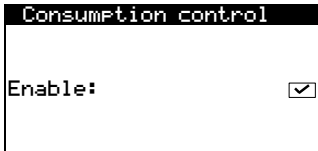
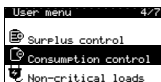
3.10. SURPLUS CONFIGURATION Menu



Surplus control

Enables de control of electrical surplus.

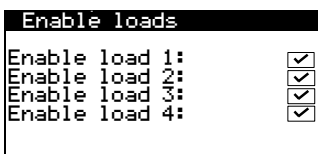
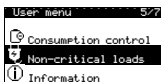
3.11. CONSUMPTION CONTROL Menu



Consumption control

Enables de consumption control throught the heat pump power regulation.

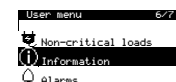
3.12. NON-CRITICAL LOADS Menu




Enable loads

It allows enabling up to four independent non-critical loads through the output relays of the manager.

3.13. INFORMATION Menu



Press  for quick access to the information menú from the main screen

Grid balance	
Real:	0.7kW
Surplus:	0.0kW
Consum. limit:	-4.4kW

Grid balance

Displays information regarding the actual instantaneous balance read at the border, the set for surplus regulation and the configured consumption limit.

Power meters	
Consumption:	3862W
Generation:	4567W
Grid:	695W
Batteries:	10W
Batt. level:	100%

Power meters

Allows to visualize in real time the power flow exchanged in each point of the installation.

Maximeters	
SEPTEMBER	
Consumption:	5.6kW
Generation:	4.9kW
Grid:	2.1kW

Maximeters

Allows to visualize for every month the values of the maximum power in the different points of the installation: maximum total power consumed by the installation, maximum power generated in the source and maximum power consumed from the electrical network.

Grid meters	
SEPTEMBER	
Consumption:	28.3kWh
Injection:	6.3kWh

Grid meters

Allows to visualize for every month the values of consumed and injected energy to the grid.

Installation meters	
SEPTEMBER	
Generation:	628.7kWh
Useful:	99%
Consumption:	873.2kWh
Solar:	72%

Installation meters

Allows to visualize for each month the values of electrical energy generated by the panels with their useful use coefficient (energy generated used in the installation, that is to say, that it is not dumped to the grid) and the total energy consumed by the installation with its solar coverage ratio (self-consumed generated energy) for the same.

Heat pump meters	
SEPTEMBER	
Consumption:	322.7kWh
Production:	1968.5kWh
Solar:	72%
Surplus:	38%

Heat pump meters


Allows to visualize the electrical energy consumed and thermal energy produced by the heat pump for each month. It also shows the ratio of energy consumed by the pump that has been covered by solar generation and the ratio of thermal energy produced in surplus regulation.

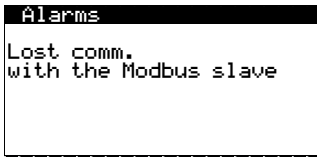
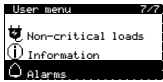
Version	
Ver.:	BC15_EM_U03B26_E
Date:	02/10/19
Bios:	6.24 25/02/14
Boot:	4.05 04/02/13

Version


Includes information about *e-system* software version and the controller software.

3.14. ALARMS Menu

Press  for quick access to the alarms menú from the main screen.



Alarms

This screen displays the active alarms. The button  illuminates.

Reset alarms

It allows us to reset alarms once solved.

4. Symbols



e-system On/Off Status.



Alarm.



e-system surplus control mode active.



e-system consumption control mode active.



Active heat pump compressor regulation.



Active non-critical load.





Generated power.



Consumption/Injection from/to the public grid.

5. Alarms and troubleshooting

5.1. Active alarms

An alarm icon  on the main display screen indicates a malfunction of the *e-system*. In this case, the red alarm LED on the display  remains on. It can also happen that the display does not show any alarm signal, but the LED flashes, which means that there has been an alarm that has already been solved. In both cases, you can access the alarm log to check the status of the machine.

Alarm message	Diagnosis	Steps
Loss of com. with the heat pump.	Communication with the heat pump has been lost.	-Check that the inverter is on and powered. -Check the connection of the heat pump with the controller in the panel. Make sure the wires are not damaged. -Check the pLAN port settings in the installer menu.
Loss of communication with the inverter.	Communication with the inverter has been lost.	-Check that the inverter is on and powered. -Check the connection of the inverter with the controller in the panel. Make sure the wires are not damaged.
Inverter failure.	There has been a problem with the solar inverter.	-Access the alarm log to view the failure code.

Table 5.1. List of alarms on the control panel

In the event that your *e-system* registers a communication alarm, and once you have made sure that the wires connection is correct, on many occasions the solution could be to reset the default values of the equipment. If the problem persists, please contact the ECOFOREST technical service.

6. Technical specifications

DC Input		
Max. DC recommended power	5.000	W
Number of MPPT's	2	
Strings per MPPT	1/1	
MPPT voltage range	125-530	V
DC max. voltage	550	V
DC rated voltage	360	V
Max. current per MPPT	12	A
Max. short circuit current per MPPT	15	A
DC Internal charger regulator		
Battery type	Lithium-ion	
Battery capacity range	2.400-12.000	Wh
Max. number of modules in parallel	5	
Rated battery range	48	V
Battery voltage range	40-60	V
Charge max. current	50	A
Recharge curve	3-stage adapter with maintenance	
Over-current/temperature protection	Yes	
Interfaz de comunicación	Can/RS232	
Electronic AC power supply		
Max. voltage	63	W
Rated voltage	230	V
Max. current	0,5	A
AC Output		
Waveform	Sinusoidal monofásica	
AC rated power	4.600	W
AC rated voltage	230	V
AC rated voltage range	180-270	V
Frequency	50-60	Hz
AC rated current	20	A
Max. AC current	21,7	A
Total harmonic distortion (THD)	<3	%
Power factor	1	—
EPS CA Output		
EPS power	2.000	VA
EPS voltage	230	V
Frequency	50-60	Hz
EPS current	11	A
Total harmonic distortion (THD)	<3	%
Connection time	<5	s

Battery module		
Type	LiFePO4	
Rated voltage	48	V
Rated capacity	2.400	Wh
Usable capacity	2.200	Wh
DOD	90	%
Charge voltage	52,5-54	V
Discharge voltage	45-54	V
Recommended charge/discharge current	25	A
Max. charge/discharge current	50	A
Charge/discharge peak current (15 s)	100	A
Work temperature	Charge	0-50 °C
	Discharge	-10-50 °C
Dimensions WxHxD	440x88,5x410	mm
Weight	24	Kg
Desing life (25°C)	>10	year
Life cycle (25°C, 90% DOD)	>4.500	cycles
Communication interfaces	RS232, RS485, CAN	
Certifications	TüV/CE/UN38.3	
Efficiency		
Max. Invertir efficiency	97,6	%
Euro efficiency	97	%
MPPT efficiency	99,9	%
Safety and protections		
Overload protection	Yes	
Overtemperature protection	Yes	
Overvoltage/undervoltage protection	Yes	
Overload protection category	III (grid side) II (PV side)	
DC isolation impedance	Yes	
DC injection monitoring	Yes	
Anti-islanding protection	Yes	
PV overcurrent protection	Fuses 12A DC (positive and negative pole)	
Battery overcurrent protection	DC Fuse 50A	
AC line protection	External installation	
EPS line protection	External installation	
Others		
Inverter topology	Transforless	
Protection class	IP20 (indoor use)	
Operating temperature range	-20-60	°C
Sound emission	<40	dB
Standby consumption	<42	W
Dimensions WxHxD	720x1058x710	mm
Weight (only with one module)	118	Kg
EMC Standard	IEC61000-6-1/2/3/4	

7. Warranty and technical service

7.1. Manufacturer's warranty

ECOFOREST is liable for lack of conformity of the product or its spare parts, in compliance with the current regulations of the country where the product is purchased. The warranty is only valid in the country where the product is purchased.

In addition, with previous consent from ECOFOREST, the local authorised distributor can offer an extension of the warranty established by current legislation.

Conditions and validity of the warranty

In order for this warranty to be considered valid the following conditions must be verified.

- ECOFOREST must allow the product under warranty to be sold in the country where it is going to be installed.
- The product under warranty must be used exclusively for the purpose that it was designed for.
- All installation, start-up and repair work carried out on the equipment must be performed by a technical service authorised by ECOFOREST.
- All replacement of parts must be carried out by a technical service authorised by ECOFOREST and always with original ECOFOREST spare parts.
- The purchaser must inform in writing the establishment that sold the product of the lack of conformity, as well as the serial number of the product and the date of purchase, within 30 (thirty) days since you became aware of said nonconformity.
- For the warranty to be effective, the purchaser must present a legal document that supports the date of purchase duly stamped and signed from the establishment that made the sale.

Disclaimer of warranty

The warranty does not include product non-conformities derived from:

- Weather conditions, chemical agents, improper use and other causes that do not depend directly on the product.
- Installation and/or handling of the equipment by unauthorised personnel.
- Installation, maintenance or repair not adjusted to the procedures described in the documentation for this purpose by ECOFOREST.
- Improper transportation of the product.
- Parts wear due to normal equipment operation, unless due to a manufacturing defect.

Request for service under warranty

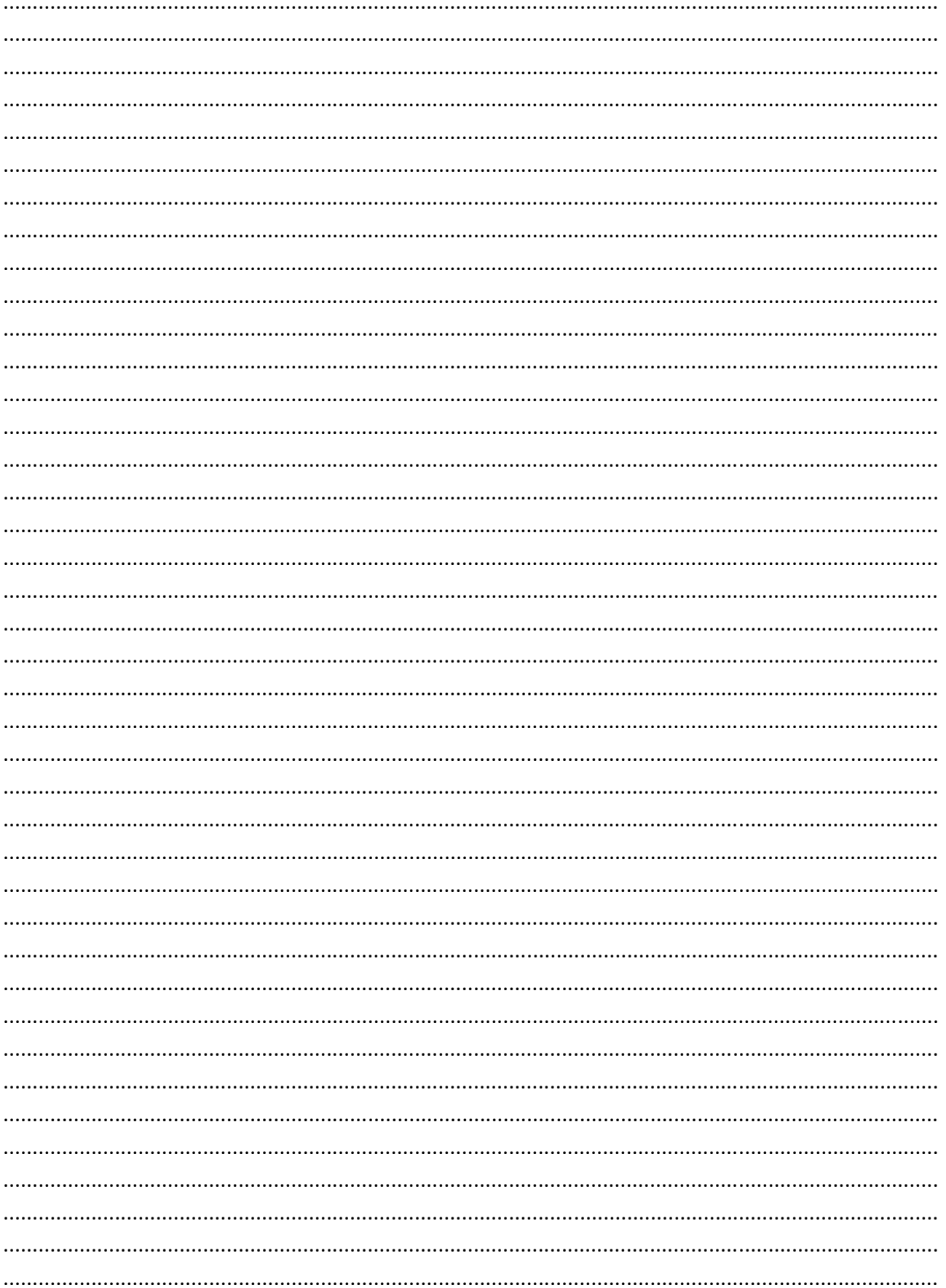
A request for service during the warranty period must be presented at the establishment where the product was purchased, indicating in writing the reason for the non-compliance, serial number and date of purchase of the product.

Product returns will only be accepted if previously accepted in writing by ECOFOREST.

The product must be returned in its original packaging and with a legal document that supports the date of purchase from the establishment that made the sale.

7.2. Authorised distributors and technical service

ECOFOREST has an extensive network of authorised companies that distribute and perform the technical service on its products. This network will provide our customers with all the information and technical support they need, anywhere and under any circumstance.



ECOFOREST GEOTERMIA, S.L.

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Fax: +34 986 262 186

e-mail: Info@ecoforest.es

<http://www.ecoforest.es>



ecoforest
estufas | calderas | pellets | geotermia

The manufacturer reserves the right to make any necessary changes to the contents of this manual without prior notice.