ATON
GREEN STORAGE

ZON.E

User Manual

Rev. 1.02

INDEX

1. Introduction

The present manual is addressed to the end customer and describes the main functions of the system ZON.E

READ THE PRESENT MANUAL BEFORE STARTING ANY OPERATION

Before starting any operation, it is compulsory to read the present User Manual.

The guarantee of good functioning and the full compliance of the performances of the storage system are strongly connected to the correct commitment of all instructions that are contained in this Manual.

1.1 Pictograms and warnings on the system

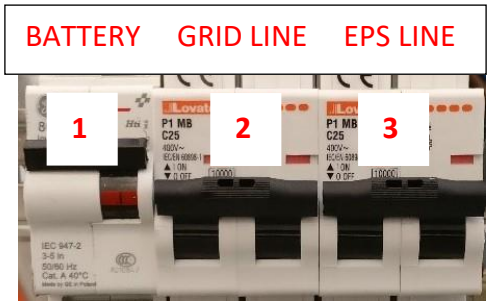
	Electrocution hazard – presence of electricity. It is therefore forbidden to try to enter the inner parts of the system. All the works executed on the system must be done by qualified technical staff. Placed nearby the electrical panel.
	Risk of burns due to hot surfaces. Some areas of the product may get hot during the functioning. Avoid the direct contact with the body during the functioning. Before executing any activity on the product, switch it off and leave it cool enough.
	Respect all the indications given in the manuals and in the technical datasheets.
	RAEE / WEEE Waste Do not dispose the product together with household waste, but respect all the local and European laws regarding the disposal of electronical waste applicable in the country of installation.
	CE Mark The product is compliant with the requirements applicable by the EU Directives.
	Appliance Class I The chassis of the machine is connected to the protection conductor of the product. The protection conductor of the product must be connected to the earthing protection conductor of the house.
	It is forbidden to block or cover the air intakes of the system. Placed nearby the electrical panel.

2. Description of the system

Picture 1 - System ZON.E

In Picture 1 the following parts of the system ZON.E are showed:

- *Led lights bar of the system* (1):
  It is composed of nr.6 multicolour led lights:
  - *2 led lights* of status describe the different phases of functioning of the system;
  - *4 led lights* indicate the level of the energy stored in the battery (SoC).
- *Antenna with magnetic base*: placed nearby the system, it receives the signal for a GPRS communication module (or Wifi as optional) that allows to send the data about the functioning of the system to a portal accessible from internet. It supplies moreover the data to the remote assistance service.
- *Electrical panel* (2): it allows to switch on and off the system.
- *CT sensors* (not visible on the picture): there are two electricity sensors in order to control the energy produced by the system, the energy used by the household appliances and the one exchanged with the public grid.

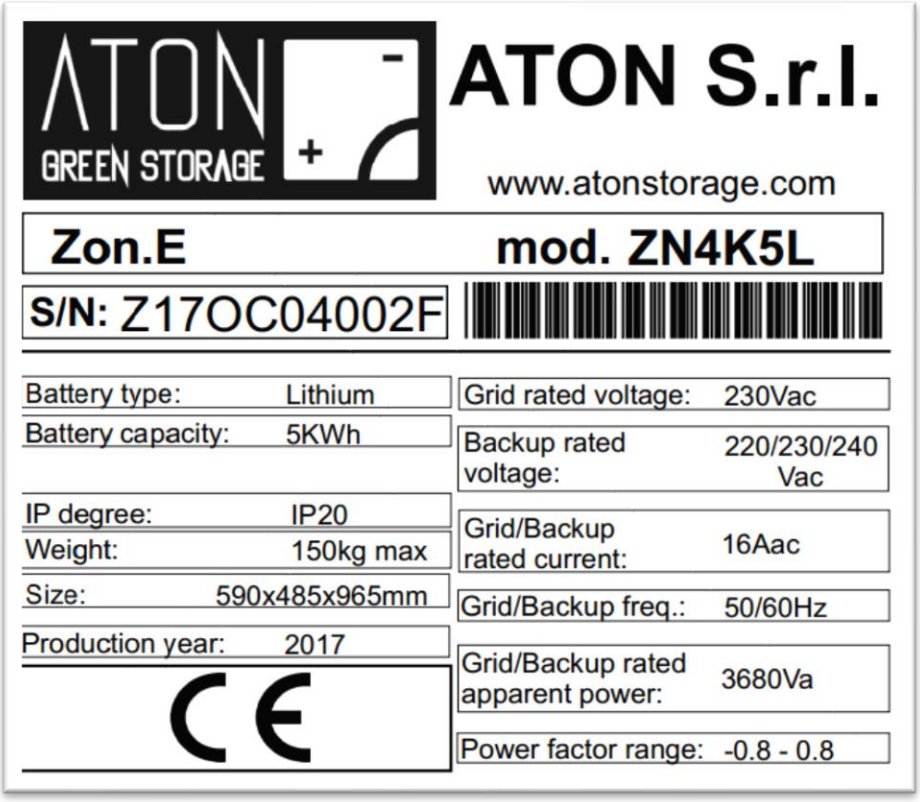


Picture 2 - Electrical panel of ZON.E

The electrical panel, as shown in Picture 2 has the following parts that the user can access:

- *Disconnector BATTERY* (1): it connects the storage system to the internal battery.
- *Disconnector GRID LINE* (2): it connects the storage system to the electrical grid.
- *Disconnector EPS LINE* (3): it connects the storage system to the privileged household appliances in EPS mode (please read the paragraph "3 Functioning" for further details on the different functioning modes of the system.

2.1 Identification plate



Picture 3 - Identification plate of ZON.E

The CE identification plate shows the following data (Picture 3):

- Identification of the producer;
- Type of product and model;
- S/N: Serial Number of the product;
- Battery type: the type of batteries installed inside the storage system;
- Battery capacity: the nominal storage capacity of the batteries;
- IP degree: IP protection degree that the external casing of the product has against the penetration of solid and liquid agents;
- Weight: the total weight of the storage system;
- Size: the dimensions of the storage system;
- Production year: the year in which the storage system is manufactured;

- Grid rated voltage: voltage range on the outlet Grid;
- Backup rated voltage: voltage range on the outlet Backup;
- Grid/Backup rated current: the maximum value of current supplied by the inverter to the outlets Grid and Backup;
- Grid/Backup freq.: the frequency range of the voltage coming from the inverter (it can be set up);
- Grid/Backup rated apparent power: the maximum value of apparent power supplied by the inverter to the outlets Grid and Backup;
- Power factor range: the power factor range within the inverter is set up.

2.2 Safety and maintenance

GENERAL WARNINGS

Despite the design in full compliance with the essential safety requirements and the installation of the proper safety devices, for a correct use of the storage system please take into consideration all the rules about accidents prevention listed in the present manual.

- The end user is not allowed to execute any reparation, replacement or other intervention on the system, for his own safety, the protection of the household appliances and the storage system itself.
- It is strictly forbidden to try to access the inner parts of the system and each intervention not executed by authorized staff will invalidate the guarantee and the liability of the producer.
- Do not move the system because this may cause disconnections and false contacts.
- Do not alter in any way the system, including plates and instructions.
- The connection of the system to the grid and the PV panels is of permanent type and cannot be altered, except by authorized staff.
- Do not put powders or liquids on the inner parts of the system.
- Keep the system away from flames or heat sources.
- Do not store inflammable materials nearby the system.
- In order to clean the system, use a normal duster and do not use inflammable or toxic solvents.
- Always ensure proper ventilation, avoiding to block the air intakes of the system.

The system does not require any maintenance provided by the end user apart from always ensuring proper ventilation, avoiding to block the air intakes of the system, and the execution of the following visual checks:
- Parts that are mechanically damaged;
- Damaged electrical cables connected to the system.

In these cases, do not intervene on the system but please contact your authorized dealer.

2.2.1 Maintenance on the AC lines of the building

ATTENTION

Before executing any operation of maintenance on the AC lines of the building, lower the disconnectors GRID LINE and EPS LINE.

2.3 Description of the safety systems and devices

The safety systems and devices installed on the storage system are the following:
- Protection casing of the battery space, battery charger and inverter,
- Protection against direct and indirect electrical contacts,
- Magneto-thermal breakers.

In order that the protection system is efficient against the indirect contacts, it is necessary that the protection equipment (earthing) of the general electrical installation of the building is duly dimensioned and efficient.

NOTE: The customer is liable for guaranteeing the efficiency according to the existing rules relating to the earthing of the general electrical installation of the building.

3. Functioning

ZON.E is a system for the storage of the energy produced from photovoltaic panels and the supply of the stored energy.

The electric energy produced by the PV panels and transformed by the inverter, if not consumed immediately, is used to recharge the battery; in case of overproduction, the excess is given to the public grid.

Vice versa, in case the electric energy produced by the PV panels is not enough to supply completely the household appliances, the system takes the energy from the battery; an eventual need of more energy is supplied by the public grid.

It is possible to take the energy from the grid until the charge of this latter is higher than 20%. The power capable to be taken is gradually limited when the battery approaches this limit.

3.1 ON-GRID mode

During the on-Grid mode, the electrical energy produced from the PV panels, if not consumed immediately, will charge the battery of the system and, if there will be an overproduction, it will be transferred to the public grid. On the contrary, in case the electrical energy produced from the PV panels is not enough to satisfy the needs of the consumptions, the lacking part will be supplied by the battery and, if even this will not be enough, from the public grid.

During the on-Grid mode, it is possible to take energy from the battery as long as the charge of this latter is more than 20% and the power able to be taken from the battery gradually reduces when the battery approaches this percentage.

This threshold guarantees a long life of the battery and an energy reserve in case of blackout of the public grid (EPS mode).

3.2 EPS mode

During the installation phase, it is possible to set the system so that in case of blackout of the public grid it supplies a part of the consumptions (the so called privileged household appliances).

NOTE: The distinction between privileged and non-privileged household appliances is set by the installator (under supervision of the final user) and can be modified only by qualified technical staff.

In case of blackout of the public grid, only the *privileged* consumptions are authorized to use the energy (energy produced from the PV panels and/or supplied by the battery).

During this mode, called EPS mode, it is possible to take energy from the battery as long as the charge of this latter is more than 10% and the power able to be taken from the battery gradually reduces together with the battery status.

This mode is showed through the status 074 – EPS MODE.

3.3 Monthly recharge of the battery

In order to protect the battery life, on the first day of each month the system makes automatically a recharge of the battery group up to 90%. During this activity, the system prefers to charge the battery, obviously from the panels, rather than supply energy to the consumptions. The stored energy will not be wasted away, because it is completely available for the consumptions at the end of this recharge phase.

NOTE: If, during the 15 days before the first day of each month, the battery has already done a recharge up to 90%, the above mentioned recharge will not be executed.

3.4 Winter functioning of the battery (Winter mode)

In order to protect the battery life, if the temperature of the battery goes down under 0°C degrees, it will be activated a charge/discharge function as described below.

The winter functioning stops automatically when the room temperature is above 5°C.

This mode is showed through the status 041 – WINTER MODE.

ROOM TEMPERATURE [°C]	MAX. CHARGE CURRENT OF THE BATTERY [A]	MAX. DISCHARGE CURRENT OF THE BATTERY [A]	MIN. DISCHARGE VOLTAGE OF THE BATTERY[V]	MAX. CHARGE VOLTAGE OF THE BATTERY [V]
-10 ≤roomT. ≤ 0	4	13	47	52.5
roomT. < -10	0 – INACTIVE BATTERY	0 - INACTIVE BATTERY	INACTIVE BATTERY	INACTIVE BATTERY

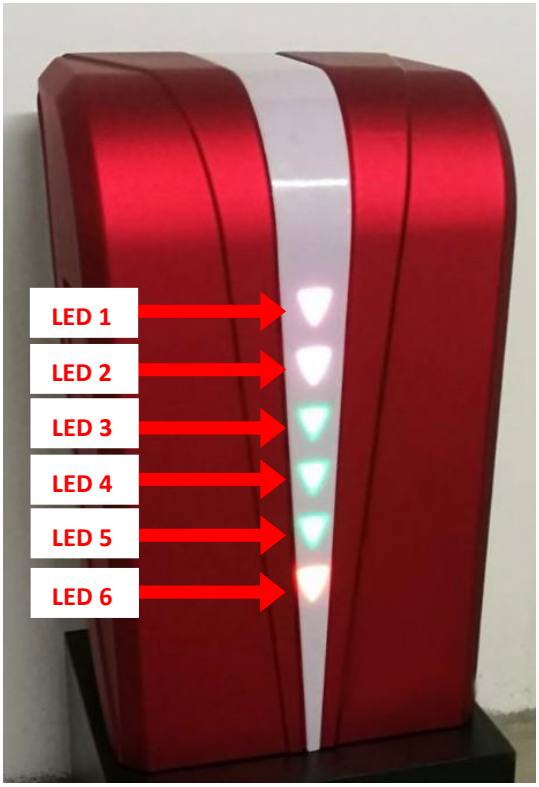
4. Connectivity of the system

The system is able to communicate the data relating to its functioning through GPRS, LAN or WiFi. This service allows the user of the system to check his PV installation through the webpage www.atonstorage.com, and the remote assistance to check in real time the presence of eventual problems.
In case the service is active, the producer reserves the chance to update the Firmware of the system in order to improve its performance, and the relating updated User Manual can be downloaded at the page www.atonstorage.com.
The connectivity of the system and therefore the remote assistance service are subject to the presence of internet connectivity and this will be checked during the installation phase.

NOTE: The user of the system must check and guarantee the continuity of the internet connectivity in order to have the chance to exploit the service of remote assistance.

For further information about the remote assistance service, please contact your authorized dealer.

5. Statuses and problems of the system



Picture 4 - Status led lights of the system

ZON.E is equipped with 6 multicolour led lights:

- N. 4 LED (Picture 4) of them show the quantity of energy stored in the battery:

Energia Soc%	**Led 6** *(at the bottom)*	**Led 5**	**Led 4**	**Led 3**
Soc ≥ 90%	green	green	green	green
60% ≤ Soc < 90%	green	green	green	off
30% ≤ Soc < 60%	green	green	off	off
20% ≤ Soc < 30%	green	off	off	off
Soc < 20%	orange	off	off	off

- N.2 led (Picture 4) describe the different functioning phases of the system:

Status	**Led 2**	**Led 1** *(at the top)*
OFF	off	off
Energy is coming from the PV panels	yellow	----
In activity	---	Light blue
Problem	---	red
Lacking grid	---	Flashing red

NOTE: In case the first status led shows the presence of a problem, switch off the system following the procedure described in the paragraph 6 "Switch off and on the system", then wait 10 minutes and switch on the system again.
If the problem keeps on, please contact your authorized dealer.

ATTENTION

In case of a different problem that is not listed in the table above, do not intervene in any way on the system and do not hesitate to contact your dealer.

6. Switch off and on the system

ATTENZIONE

See Picture 2 - Electrical panel of ZON.E in order to switch off the system lower the disconnectors in the following order:

1. *Disconnector EPS LINE*
2. *Disconnector GRID LINE*
3. *Disconnector BATTERY*

In order to switch on the system again, raise the disconnectors in the following order:

1. *Disconnector BATTERY*
2. *Disconnector GRID LINE*
3. *Disconnector EPS LINE*

7. Removal and disposal of the system

Aton is not liable for any possible disposal of the storage system, or parts of it, that will be done in disrespect of the existing rules and laws in force in the country where the system was installed.
The materials that are parts of the packaging must be removed and disposed according to the rules and laws in force in the country where the system was installed.

According to the European Directive 2002/96/CE concerning waste from electrical and electronic equipment and the relating application in the national legal system, the used electrical equipments and the batteries must be collected separately and disposed with respect for the environment. Please deliver the used equipment to your authorized dealer, or eventually look for a special waste disposal centre nearby in your area.

Appendix – Technical datasheets

Model	ZN2K2.5L	ZN3K2.5L	ZN4K5L	ZN5K5L
AC Output (On-grid)				
Wave form	Sinusoidal single phase	Sinusoidal single phase	Sinusoidal single phase	Sinusoidal single phase
Nominal output power to utility grid [W] [1]	2000	3000	3680	4600
Max. output apparent power to utility grid [VA] [1]	2200	3300	4050	5100
Max. input apparent power from utility grid [VA] [1]	4000	6000	7360	9200
Rated voltage [V]	230	230	230	230
Rated frequency [Hz]	50/60	50/60	50/60	50/60
Maximum discharge current [A]	8,7	14	16	20
Maximum charge current [A]	17,4	28	32	40
Adjustable displacement factor	0,8 overexcited 0,8 underexcited	0,8 overexcited 0,8 underexcited	0,8 overexcited 0,8 underexcited	0,8 overexcited 0,8 underexcited
Total harmonic distortion (THD)	<3%	<3%	<3%	<3%
AC Output (EPS-Back up)				
Wave form	Sinusoidal single phase	Sinusoidal single phase	Sinusoidal single phase	Sinusoidal single phase
Maximum apparent power in discharge [VA][1]	2000	3000	3680	5000
Maximum apparent peak power in discharge (10 sec) [VA][1]	2400	3600	4416	5500
Rated voltage [V]	230 (+/-2%)	230 (+/-2%)	230 (+/-2%)	230 (+/-2%)
Rated frequency [Hz]	50/60 (+/-0.2%)	50/60 (+/-0.2%)	50/60 (+/-0.2%)	50/60 (+/-0.2%)
Maximum discharge current [A]	8,7	13,1	16	22,8
Total harmonic distortion (THD)	<3%	<3%	<3%	<3%
Battery				
Battery type		LiFePO4		
Rated voltage [V]		48 – 51,2		
Maximum charge current [A][1]	41,5	62,5	75	100
Maximum discharge current [A][1]	41,5	62,5	75	100
Nr. of battery modules standard configuration	1	1	2	2
Maximum permissible energy [kWh]	2,4	2,4	4,8	4,8
Usable energy [kWh]	1,92	1,92	3,84	3,84
DoD [kWh]	80%	80%	80%	80%
Minimum number of working cycles @ 25°C	4000	4000	4000	4000

Number of battery modules at maximum capacity[12]	4	4	4	4
Maximum permissible energy at maximum capacity [kWh] [1]	9,6	9,6	9,6	9,6
Efficiency				
Maximum conversion efficiency	95,5%	95,5%	95,5%	95,5%
Protections				
Anti-islanding	Yes	Yes	Yes	Yes
Overvoltage protection	Yes	Yes	Yes	Yes
Short circuit protection in output	Yes	Yes	Yes	Yes
Overtemperature protection	Yes	Yes	Yes	Yes
AC lines protection	Magneto-thermal breaker	Magneto-thermal breaker	Magneto-thermal breaker	Magneto-thermal breaker
Battery protection	Magneto-thermal breaker	Magneto-thermal breaker	Magneto-thermal breaker	Magneto-thermal breaker
General data				
Working temperature range for normal functioning [°C]	from -5 to +45	from -5 to +45	from -5 to +45	from -5 to +45
Inverter type	HF insulated	HF insulated	HF insulated	HF insulated
Relative humidity	0 % ÷ 95 %	0 % ÷ 95 %	0 % ÷ 95 %	0 % ÷ 95 %
Maximum altitude [m]	< 2000	< 2000	< 2000	< 2000
Cooling	Natural convection (Fanless)	Natural convection (Fanless)	Natural convection (Fanless)	Natural convection (Fanless)
Noise annoyance [dB]	< 25	< 25	< 25	< 25
Weight [kg] (standard nr. of batteries)	81	81	104	104
Dimensions [Length x width x H.] [mm]	590x485x965	590x485x965	590x485x965	590x485x965
Assembly	On the floor	On the floor	On the floor	On the floor
Protection type	IP20	IP20	IP20	IP20

Interfaces				
GPRS (standard)	2G Dual band	2G Dual band	2G Dual band	2G Dual band
WiFi (optional)	2.4 GHz IEEE Std. 802.11 b/g	2.4 GHz IEEE Std. 802.11 b/g	2.4 GHz IEEE Std. 802.11 b/g	2.4 GHz IEEE Std. 802.11 b/g
LAN (optional)	10/100 Mbps	10/100 Mbps	10/100 Mbps	10/100 Mbps
Wireless home automation (optional)	EnOcean 868 MHz	EnOcean 868 MHz	EnOcean 868 MHz	EnOcean 868 MHz
Certifications and Regulations				
Certifications	CE, CEI0-21/2017, VDE-AR-N4105, DIN VDE 0126-1-1/A1 VFR2014, ERDF-NOI-RES_13E			

[1]Limited from BMS to 35 A for each battery module and from the rated voltage of the battery module.

[2] Expandable up to 19,2 kWh with nr. 2 modules of expansion (4 battery modules)

Safety Regulations				IEC62477 & IEC62040
EMC Compatibility				EN61000-6-1, EN61000-6-2, EN61000-6-3, EN61000-6-4
Spare parts and accessories				
Inverter	ATZ-2K	ATZ-3K	ATZ-4K	ATZ-5K
Battery module	US2000B	US2000B	US2000B	US2000B
Control card	ATN820 + ATN823	ATN820 + ATN823	ATN820 + ATN823	ATN820 + ATN823
GPRS communication card equipped with antenna and connection cable	ATN811	ATN811	ATN811	ATN811
WiFi communication card equipped with antenna and connection cable	ATN813	ATN813	ATN813	ATN813
LAN communication card (only applicable on SLOT1 card ATN820)	ATN816	ATN816	ATN816	ATN816
Communication card RS485	AT814 + ATN105 + GD814-105	AT814 + ATN105 + GD814-105	AT814 + ATN105 + GD814-105	AT814 + ATN105 + GD814-105
Single phase power meter	C.Gavazzi EM111DINA V81XS1PFB			
Three-phase power meter	C.Gavazzi EM24DINA V93XISX	C.Gavazzi EM24DINA V93XISX	C.Gavazzi EM24DINA V93XISX	C.Gavazzi EM24DINA V93XISX
Led card	ATN821	ATN821	ATN821	ATN821
Led lights bar (led lights are not supplied)	-	-	-	-
Upper panel	-	-	-	-
Right panel	-			
Left panel	-			
Front panel	-			

Number of battery modules, nominal storage capacity and weight

Model ZON.E	Nr. of battery modules	Nominal storage capacity [kWh]	Total weight [kg]
ZN2K2.5L	1	2,5	81
ZN2K5L	2	5	104
ZN2K7.5L	3	7,5	127
ZN2K10L	4	10	150
ZN3K2.5L	1	2,5	81
ZN3K5L	2	5	104
ZN3K7.5L	3	7,5	127
ZN3K10L	4	10	150
ZN4K2.5L	1	2,5	81
ZN4K5L	2	5	104
ZN4K7.5L	3	7,5	127
ZN4K10L	4	10	150
ZN5K2.5L	1	2,5	81
ZN5K5L	2	5	104
ZN5K7.5L	3	7,5	127
ZN5K10L	4	10	150

Weights for the transport

	ZN2KxxL	ZN3KxxL	ZN4KxxL	ZN5KxxL
Weight of the base structure without batteries [kg]	49,5	49,5	49,5	49,5
Weight with one battery module [kg]	72,5	72,5	72,5	72,5
Weight with two battery modules [kg]	95,5	95,5	95,5	95,5
Weight with three battery modules [kg]	118,5	118,5	118,5	118,5
Weight with four battery modules [kg]	141,5	141,5	141,5	141,5

Credentials for access to remote control

To access the remote control of Aton storage systems it is necessary to authenticate using the credentials shown below that are generated when the device is installed.

USERNAME:	
PASSWORD:	

You can access the remote control of your storage system in the following ways:

WEB:

You should connect to www.atonstorage.com/atonTC/ from your PC, Mac, smartphone or tablet. Enter the credentials shown above and click on LOGIN. The site manual can be downloaded at www.atonstorage.com/downloads/TC-ENG.pdf

App OS:

You should connect to the address https://itunes.apple.com/it/app/aton-storage/id1124468302?mt=8 or search for "Aton Storage" in the Apple App Store. You will find our free app for tracking. Once the app has been downloaded and launched, enter the credentials listed above and tap the "Login" button.

App Android:

You should connect to https://play.google.com/store/apps/details?id=com.atonstorage.atonstorage or search for "Aton Storage" in the Google Play Store. You will find our free app for tracking. Once the app has been downloaded and launched, enter the credentials listed above and tap the "Login" button.

Kindly thanks for choosing the Aton storage systems.

If the storage system does not function as described in the present manual, do not hesitate to contact your dealer or an authorised assistance centre.

Stamp of the Dealer / authorised assistance centre