

# RA.Store-3

## User Manual

Rev. 1.08



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## 1. Introduction

The present manual is addressed to the end customer and describes the main functions of the system RA.Store-3.



### 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.

## 2. Description of the system



Picture 1 - RA.Store-3 system

In Picture 1, the following parts of the RA.Store-3 system are showed:

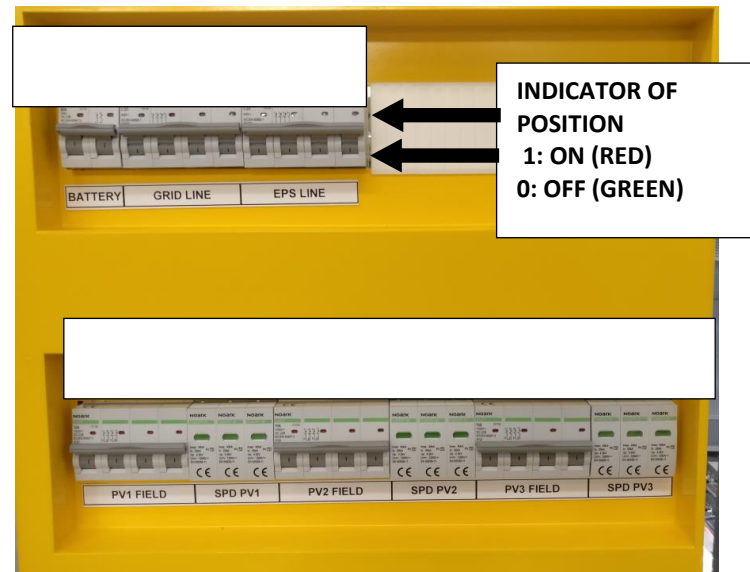
- *Interface board* (1): it allows the communication between the user and the system.
- *Antenna* (2): A GPRS communication module (or WiFi, as an optional) allows to send the data about the functioning of the system to a portal accessible from internet, and the assistance service to execute any control in remote assistance.
- *Electrical panel* (3): it allows to switch on and off the system.
- *CT sensor* (not visible on the picture): there is an electricity sensor in order to control the energy exchanged with the public grid.



Picture 2 – Interface board

The interface board shows the following parts (Picture 2):

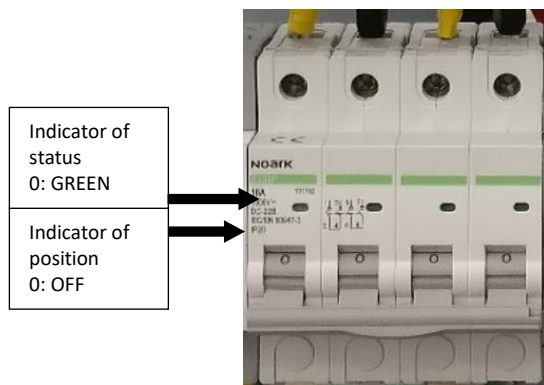
- *Graphic display with capacitive keyboard* (6): it shows information regarding to the functioning of the system and it allows to interact with it,
- *Key Enter* (8) and *key Esc* (7): together with the display they allow to interact with the system.
- *Status led lights of the system:*
  - *Active system* (3): switched on if the system is active and switched off if the system is not active.
  - *Solar* (1): switched on if the PV panels are supplying energy to the system, switched off in the opposite case.
  - *Grid* (4): switched on if the public electric grid functions correctly, switched off in case of blackout, and flashing in case of blackout and run down battery.
  - *WiFi Communication* (5): switched on if the system is communicating the data regarding its functioning through the WiFi card (optional), flashing if the system cannot communicate its data, and switched off if the WiFi communication is not activated.
  - *Fault* (2): switched on or flashing if there is an active alarm, switched off in the opposite case.
- *Status led lights of the battery* (9): the led lights represent visually the amount of energy in the battery. Moreover the discharge and recharge phases are indicated with particular sequences of switching on of the led lights.



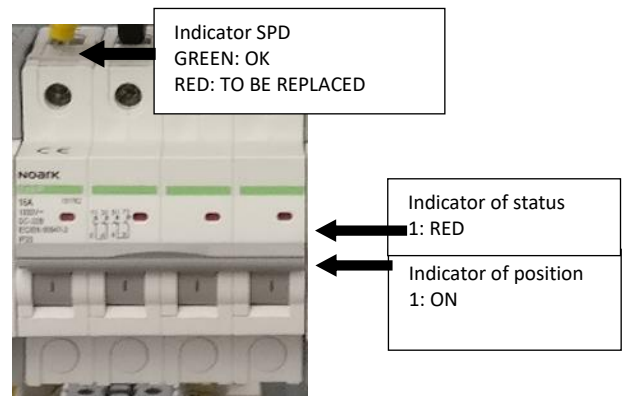
Picture 3 – Front side of the electrical panel

The electrical panel, as shown in Picture 3, is composed of two types of equipments:

- Automatic magneto-thermal breakers (Picture 4 and Picture 5): they isolate and protect the electrical lines on which they are installed.
- Lightning arrestor SPD (Picture 6): it protects the system from overvoltages due to atmospheric origin.



Picture 4 - Automatic magneto-thermal breaker in position of OFF – Switched off



Picture 5 - Automatic magneto-thermal breaker in position of ON – Switched on



Picture 6 – Lightning arrester SPD

On the electrical panel the user can access the following parts:

- **Magneto-thermal breaker BATTERY (1):** it protects the electrical line of the batteries.

In position of “1 - ON”:

- It activates and switches on the control and management card of the storage system;
- It activates the function of charge and discharge of the batteries.

In position of “0 - OFF”:

- It deactivates and switches off control and management card of the storage system;
- It deactivates the function of charge and discharge of the batteries.

- **Magneto-thermal breaker GRID LINE (2):** it connects the storage system to the house and the public electrical grid. This outlet is supplied during normal conditions, i.e. when the national grid is at 400 Vac.

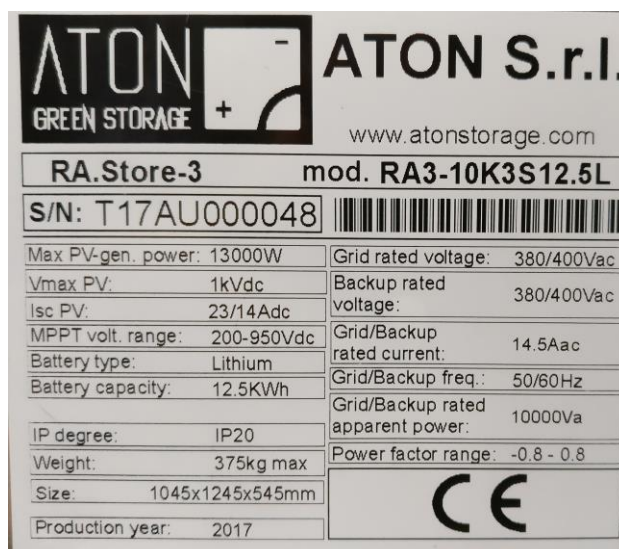
In position of “1 - ON”:

- It allows the supply of energy from the storage system to the house and the public electrical grid;

In position of “0 - OFF”:

- It prevents the supply of energy from the storage system to the house and the public electrical grid.
- *Magneto-thermal breaker EPS LINE* (3): it connects the storage system to the house when there is a blackout, i.e when the national grid is temporarily at 0 Vac.
- In position of "1 - ON":
  - It allows the supply of energy from the storage system to the house or only a part of it;
- In position of "0 - OFF":
  - It prevents the supply of energy from the storage system to the house or only a part of it.
- *Disconnecter panels string 1 "PV1 FIELD"*(4): it connects the storage system to the first PV panels string.
- In position of "1 - ON":
  - It allows the supply of energy from the PV string connected to the entry of the storage system n.1 towards this latter;
  - In position of "0 - OFF":
    - It does not allow the supply of energy from the PV string connected to the entry of the storage system n.1 towards this latter;
- *Lightning arrestor "SPD PV1"*(5): it protects the system from overvoltages due to atmospheric origin coming from the string 1.
- *Disconnecter panels string 2 "PV2 FIELD"* (6): it connects the storage system to the second PV panels string.
- In position of "1 - ON":
  - It allows the supply of energy from the PV string connected to the entry of the storage system n.2 to this latter;
  - In position of "0 - OFF":
    - It does not allow the supply of energy from the PV string connected to the entry of the storage system n.2 to this latter;
- *Lightning arrestor "SPD PV2"* (7): it protects the system from overvoltages due to atmospheric origin coming from the string 2.
- *Disconnecter panels string 3 "PV3 FIELD"* (8): it connects the storage system to the third PV panels string.
- In position of "1 - ON":
  - It allows the supply of energy from the PV string connected to the entry of the storage system n.3 to this latter;
  - In position of "0 - OFF":
    - It does not allow the supply of energy from the PV string connected to the entry of the storage system n.3 to this latter;
- *Lightning arrestor "SPD PV3"* (9): it protects the system from overvoltages due to atmospheric origin coming from the string 3.

## 2.1 Identification plate




Picture 7 - Identification plate

The CE identification plate shows the following data (Picture 7):

- Identification of the producer;
- Type of product and model;
- S/N: Serial Number of the product;
- Max PV-gen. power: the maximum power that can be produced by the PV panels towards the inverter;
- Isc PV: the maximum current value of short circuit for each entry on the DC side;
- MPPT volt. range: voltage range of MPPT;
- Battery type: the type of batteries installed in the storage system;
- Battery capacity: the nominal storage capacity of the batteries;
- IP degree: IP protection degree;
- 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/Backup rated voltage: the voltage value available on the outlets "Grid" and "Backup";
- Grid/Backup rated current: the maximum value of current produced by the inverter on the outlets Grid and Backup;
- Grid/Backup rated apparent power: the maximum value of apparent power produced by the inverter on the outlets Grid and Backup;
- Grid/Backup freq.: the frequency range of the voltage coming from the inverter (it can be set up);
- 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

	<p style="text-align: center;"><b>ATTENTION</b></p> <p>Before executing any operation of maintenance on the AC lines of the building, lower the disconnectors GRID and EPS (Picture 3).</p>
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### 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;
- Fuses.

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.**

## 2.4 Pictograms and warnings on the system

	<p>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.</p> <p>Placed nearby the electrical panel.</p>
	<p>Risk of burns due to hot surfaces.</p> <p>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.</p>
	<p>Respect all the indications given in the manuals and in the technical datasheets.</p>
	<p>RAEE / WEEE Waste</p> <p>Do not dispose the product together with household waste, but respecting all the local and European laws regarding the disposal of electronical waste applicable in the country of installation.</p>
	<p>CE Mark</p> <p>The product is compliant with the requirements applicable by the EU Directives.</p>
	<p>Appliance Class I</p> <p>The chassis of the system 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.</p>
	<p>Refer to the present manual – please always read this manual (and the installation manual in case of technical authorized staff) before starting each operation on the system.</p> <p>Placed nearby the electrical panel.</p>
	<p>It is forbidden to block or cover the air intakes of the system.</p> <p>Placed nearby the electrical panel.</p>

### 3. Functioning

Ra.Store-3 is a system for the storage of the energy produced from photovoltaic panels and the supply of the stored energy.

It is possible to distinguish two different functioning modes of the system: the *on-Grid* mode and the *EPS* mode. The *on-Grid* mode is used by the system when the public electrical grid is functioning correctly, whereas in case of blackout the system activates automatically the *EPS* mode in order to solve the problem occurred, and then at last come back to the *on-Grid* mode when the problem is solved.

In order to use the functioning mode called *EPS* it is necessary to install an external commutation electrical panel between the two AC electrical lines of the storage system.

#### 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 consumptions is set by the installer (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.

In this mode, it is moreover active the *EPS electrical socket* in the electric panel of the system (picture 2, indicator 7).

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.**

This mode is showed through the status 065 – *RIGEN.RICARICA*

#### 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 functioning 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

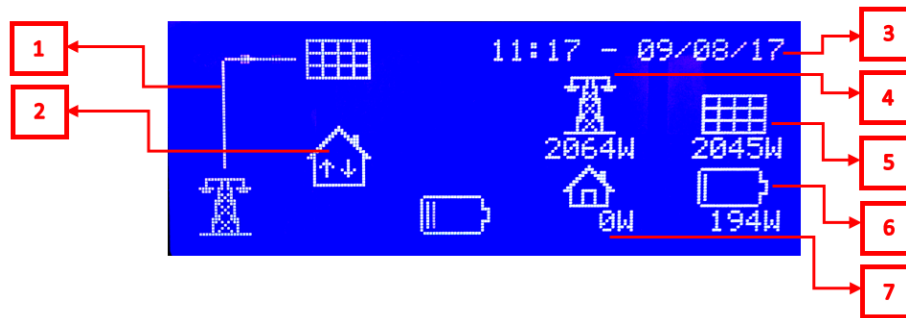
#### 4. Screens of the display

On the display are showed the functioning data of the system in real time and in statistical format. The main screen shows the data of produced and consumed power in real time and, by pressing on the keys Esc and Enter (Picture 2, indicators 7 and 8), the user can access the other screens.

**NOTE: after 30 seconds from the last pressure of a key, the display goes back to the main screen.**

The elements of the different screens are described as follows.

## 4.1 Main screen



Picture 8 – Main screen

The interface board shows the following parts (Picture 8):

- *Flux line of the energy* (1): it shows the progress of the electric energy between PV panels, electrical grid, the consumer (house), the battery. The flux is shown by the indicating line.
- *Communication with the storage system* (2): the presence of the 2 arrows in alternating direction shows that the communication has been done.
- *Date and time* (3): indication of date and time.
- *Indication of instantaneous active power of electrical grid* (4): it shows the active power given to or purchased from the national electrical grid expressed in Watt. If the visualized power is positive, then it means that the system is giving energy to the electrical grid. If the visualized power is negative, then it means that the system is taking energy from the electrical grid.
- *Indication of instantaneous active power of PV panels* (5): it shows the active power produced by the PV panels expressed in Watt.
- *Indication of instantaneous active power of battery* (6): it shows the active power given or taken from the battery expressed in Watt. If the visualized power is positive, then it means that the system is charging the battery. If the visualized power is negative, then it means that the system is discharging the battery.
- *Indication of instantaneous active power of the house* (7): it shows the active power requested by the house expressed in Watt. It is always expressed with a positive number.

## 4.2 Statistical data screen

By pressing the Enter key repeatedly, the user can access the following screens.

DAY (KWh)					
Thu 14	2.0	0.7	3.4	2.6	0.0
Wed 13	0.2	1.3	8.4	7.0	0.0
Tue 12	0.0	0.0	0.0	0.0	0.0

Picture 9 - Statistical data screen

Please refer to Picture 9: regarding what is showed, the showed statistical data indicate:

- DAY for the data relating to the last three days,
  - MONTH for the data relating to the last three months,
  - YEAR for the data relating to the last three years.
- It indicates the measure unity with which the data are expressed.
  - Energy supplied by the PV panels in the indicated period.
  - Energy supplied by the battery to the household appliances in the indicated period.
  - Energy purchased from the public electrical grid in the indicated period.
  - Energy sold to the public electrical grid in the indicated period.
  - Energy used by the household appliances in the indicated period.

## 4.3 Numerical data screen

By pressing the Enter key again, the user can access the following screen with the main functioning data in numeric format. The user can see a table, as shown in the following picture (Picture 10).

	1	2			
14:51 - 14/09/17			87%		
VV	371.7	0.0	250.1	417.8	418.3
iA	0.0	0.0	0.0	1.2	-1.2
PW	0	0	0	523	-523

Picture 10 - Numerical data screen

In the table the following data are showed:

- Current, voltage and power supplied by the PV panels string 1.
- Current, voltage and power supplied by the PV panels string 2 (if available).
- Charge status, current, voltage and power exchanged with the battery (with minus, it means that the energy is taken from the battery).
- Current, voltage and power exchanged with the public electrical grid (with minus, it means that the energy is taken from the public electrical grid).

5. Current, voltage and power supplied to the household appliances.



#### 4.4 Configuration screen

By pressing the Enter key again, the user can access the configuration screen.



Picture 11 – Configuration screen

Through WiFi or GPRS, the system is able to communicate its own functioning data.

By pressing on the WiFi icon (1) (Picture 11), it is possible to see and set up the parameters regarding the WiFi connectivity of the system (please refer to the paragraph “WiFi connectivity of the system” for further details).

By pressing on the Gprs icon (2) it is possible to switch on and off the Gprs communication.

Finally by pressing on the “i” icon (3) the user can access the following menu (Picture 12)



Picture 12 – User Menu

Use the keys “arrow up”, “arrow down” in the display and “Enter” to select an item. Press the “Esc” key to go back to the previous menu.

By selecting the item “Info”, it is possible to see the serial numbers of the main components of the system and the Directive (item “Safety”) that the system is compliant with in order to connect it to the public grid (CEI-021 in Italy, VDE0126 in Germany, etc.).



Picture 13 - Menu Info

The item “FW Version” shows the firmwares of the system used during the certification phase.

- FW Manager v2.07.xx
- FW Inverter v2.02.xx



- FW Charger v2.03.xx
- FW Controller v1.00.xx.yy



Picture 14 - Menu FW Version

In order to execute the Self Test (Directive CEI-021), select the item “**Self Test**”, then “**Start Test**”.



Picture 15 – Screen for the Self Test

The test will start and the messages “<\* WAIT TESTING...1\*>”, “<\* WAIT TESTING...2\*>”, “<\* WAIT TESTING...3\*>”... are showed.

In case the test will not be successful, the message “<\*\*\* TEST FAILED \*\*\*>” will be showed, whereas if the test ends correctly the screen with the test results will be showed.

## 5. 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](http://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](http://www.atonstorage.com).

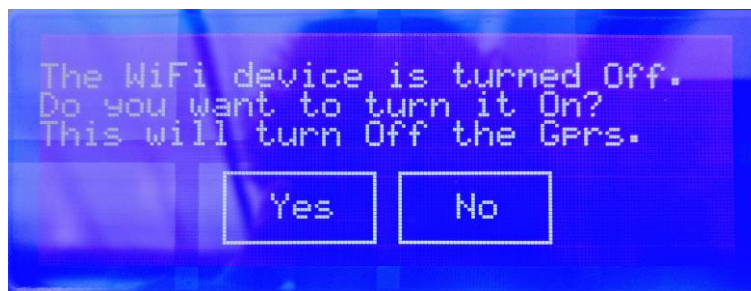
The connectivity of the system and therefore the remote assistance service are subject to the presence of internet connectivity and this will be checked during the installation phase.

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.

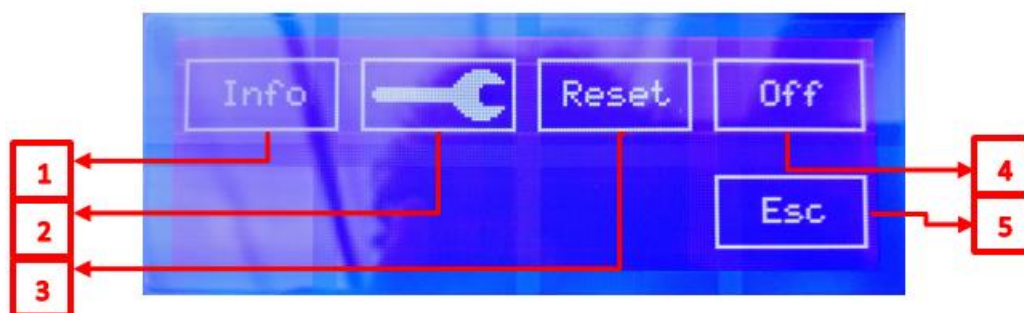
For further information about the remote assistance service, please contact your authorized dealer.

### 5.1 Modification of the WiFi connectivity

It is possible to see and set up the parameters regarding the WiFi communication, for ex. in case your router is replaced or your password changed and the system must be reconnected to the internet. In case the WiFi device is off, the screen in Picture 12, Picture 16 will appear (Press “Yes” to switch on the device), otherwise the screen in Picture 17 will appear.



Picture 16 – Switch on the WiFi device



Picture 17 – Configuration of the WiFi device

By pressing “Info” (1), all the information regarding the configuration of the WiFi device is showed.

By pressing on the symbol “Wrench” (2), the procedure of configuration of the WiFi device is started.

By pressing “Reset” (3), the device is reset to the original set up.

By pressing “Off” (4), the WiFi device is switched off.

By pressing “Esc” (5), the system goes back to the configuration screen (Picture 17).

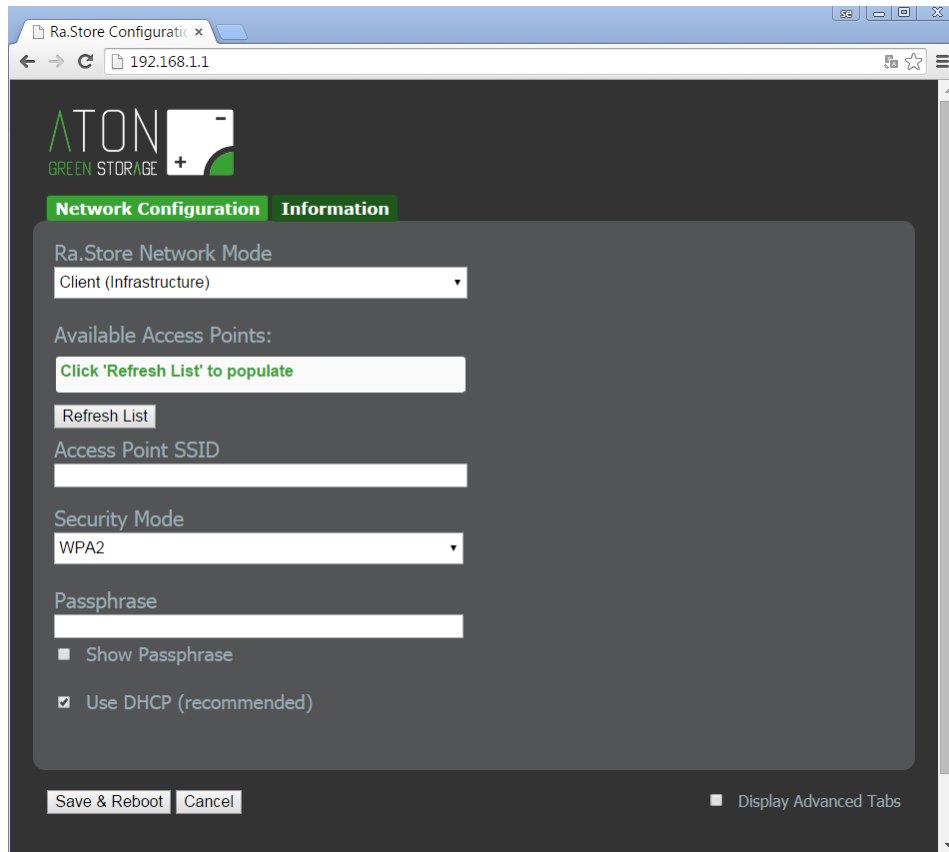
The procedure to be followed in order to connect the system RA.Store-3 to an existing WiFi line foresees the use of any device equipped with WiFi connectivity (indicated as PC hereunder) and Web Browser:

1. Press on the symbol “Wrench” in Picture 17, then wait that on the display the message “Ra\_Config WiFi network enabled” appears.
2. Connect the PC to the WiFi network **Ra\_Config** (Picture 18).



Picture 18

3. Launch the Web Browser of the PC
4. Digit **192.168.1.1** in the address bar. The page showed in Picture 19 will appear.

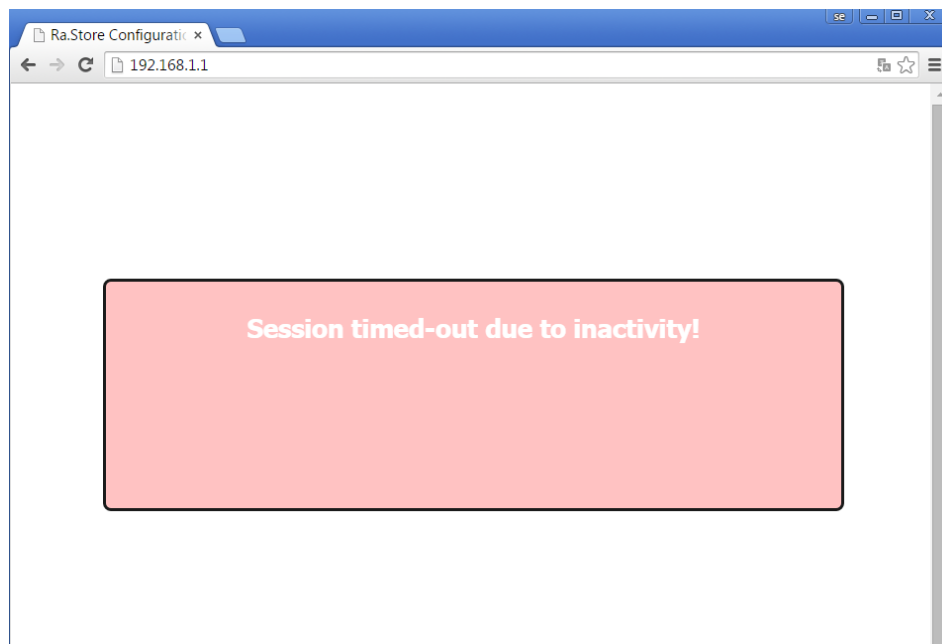


The screenshot shows a web browser window with the address bar displaying "192.168.1.1". The page title is "Ra.Store Configuration". The interface features the ATON Green Storage logo at the top left. Below the logo, there are two tabs: "Network Configuration" (highlighted in green) and "Information". The "Network Configuration" tab contains the following fields and controls:

- Ra.Store Network Mode:** A dropdown menu currently set to "Client (Infrastructure)".
- Available Access Points:** A section with a button labeled "Click 'Refresh List' to populate".
- Refresh List:** A button to refresh the list of available access points.
- Access Point SSID:** A text input field.
- Security Mode:** A dropdown menu currently set to "WPA2".
- Passphrase:** A text input field.
- Show Passphrase:** A checkbox that is currently unchecked.
- Use DHCP (recommended):** A checkbox that is currently checked.
- Save & Reboot:** A button at the bottom left.
- Cancel:** A button at the bottom left.
- Display Advanced Tabs:** A checkbox at the bottom right.

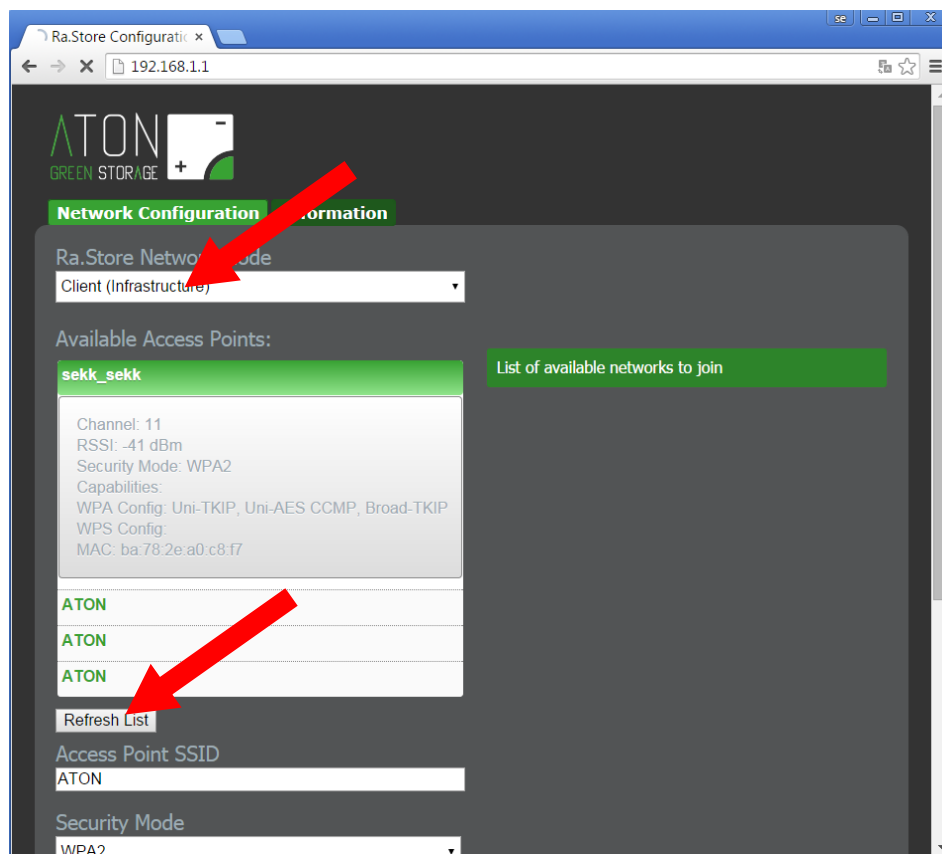
Picture 19 – Configuration screen of the WiFi network

**NOTE:** if in any moment of the procedure, a table with a red background should appear (Picture 20) please go back to point 1.



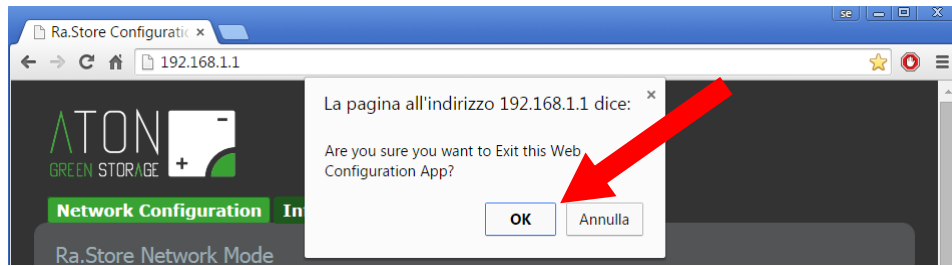
Picture 20 - Session of timed-out configuration due to inactivity

5. Select in the field **RA.Store Network Mode** the item **Client (Infrastructure)** (Picture 17).
6. Click on the button **Refresh List**. The module will scan the available networks and will show in **Available Access Points** a list of the ones found (Picture 21).



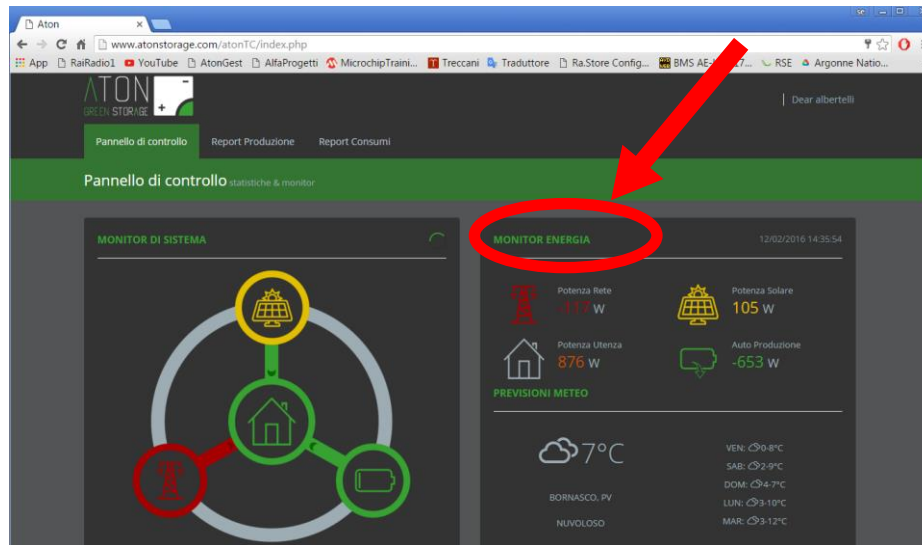
Picture 21 – Configuration screen of the WiFi network

7. Select with a click the network among the ones listed and the fields **Access Point SSID** and **Security Mode** will be filled in automatically (for the WiFi networks without password select the item “Open”). If the wished WiFi network will not be showed in the list, click on **Refresh List** in order to execute the searching again.
8. Digit the password of the WiFi network in the field **Passphrase** (put the tick on **Show Passphrase** to visualize the written password).
9. **(Optional)** The module uses DHCP as default. If you wish to give the module a static IP, remove the tick on **Check to enable DHCP** and insert a static IP, subnet mask, and gateway.
10. Click on **Save & Reboot** in order to save the given settings.
11. Press **OK** in the pop-up window in order to confirm the exit (Picture 18), then close the Web Browser.



Picture 22

12. Check on the Aton portal, or on the App for mobile devices, that the shown data of the screen update regularly. Otherwise go back to the point 1.



Picture 23- Aton portal: check that the shown data update regularly

13. Wait some more minutes and check that the “communication led light” switches on (Picture 24).



Picture 24 – Led light of communication switches on if the configuration has been done successfully



## 6. Statuses of the system

#	Code	Description
68	WAITING...	The system waits (WAITING) that the status of the public grid goes back to the range of the parameters fixed by the Directive in force (for ex. CEI-021). In such status, the system does not supply energy to the household appliances and does not take it from the PV panels. When the status of the public grid goes back to the range of the parameters fixed by the Directive in force, the system checks (CHECKING) that the grid stays stable for one minute. Then the system starts to supply energy to the household appliances and takes it from the PV panels (on-Grid mode).
69	CHECKING...	
76	ENERGY SAVING	In case the battery is run down and the PV panels do not supply energy, for ex. at night or during a very cloudy day, the system stays in standby in order to reduce its consumption.
77	ENERGY SAVING	
66	OFF MODE...	
2	Grid Lost. Err	Blackout of the public grid, so the system is supplying only the privileged household appliances.
63	Eps Mode	
74	EPS-MODE...	
75	SELF TEST...	Upon a request, the system is executing the Self Test regarding the Rule CEI-0-21
73	UPDATE...	An update of the system is in progress
64	VOOUT OFF	The systema has disabled the supply of energy
65	RIGEN. CHARGE	The system is executing the monthly recharge of the battery up to 90% (see paragraph <u>"Monthly Recharge of the battery"</u> )

## 7. Problems of the system

#	Code	Description and intervention
3	Grid voltage	<p>The values of voltage and frequency of the public grid are not included in the set up ranges. The system will supply again the energy as soon as these values will go back in the normal range:</p> <ul style="list-style-type: none"> <li>- If the problem keeps on, please do not hesitate to contact your dealer.</li> </ul>
4	Grid Frequency	
5	PLL lost	
12	10m avg gr. H	
28	Overload Fault	<p>The required power in EPS mode is higher than the permissible power of the system:</p> <ul style="list-style-type: none"> <li>- Reduce the required power.</li> <li>- If the problem keeps on, please do not hesitate to contact your dealer.</li> </ul>
29	EPS OCP	
14	Temp. Over	<p>The temperature is not included in the set up range. The system will supply again the energy as soon as this value will go back in the normal range:</p> <ul style="list-style-type: none"> <li>- If possible, in case of "Temp. Over" and/or "Charger Tem.H" reduce the temperature of the room where the system is located.</li> <li>- If possible, in case of "Charger Tem.L" increase the temperature of the room where the system is located.</li> <li>- If the problem keeps on, please do not hesitate to contact your dealer.</li> </ul>
40	Charger Tem.H	
41	Charger Tem.L	
11	Pv volt. high	<p>The string voltage of the PV panels exceeds the set up value:</p> <ul style="list-style-type: none"> <li>- Do not hesitate to contact your dealer.</li> </ul>
1	HW protection	<p>System Error:</p> <ul style="list-style-type: none"> <li>- Read the procedures described in the paragraph <u>"Switch off and on the system"</u>, switch off the system then wait 10 minutes and switch on the system again.</li> <li>- If the problem keeps on, please do not hesitate to contact your dealer.</li> </ul>
6	Bus volt.high	
8	Invert OCP	
9	DCI OCP	
10	Residual Cur.	
13	Isolation Err	
15	Fan1 Speed	
16	Fan2 Speed	
17	Spi Comms	
18	Sci Comms	
19	Can Comms	
20	PV Config Err	
21	E2prom Fault	
22	Relay Fault	
23	Sample Cons.	

24	Resid.Curr.D.	<p>System Error:</p> <ul style="list-style-type: none"> <li>- Read the procedures described in the paragraph <u>"Switch off and on the system"</u>, switch off the system then wait 10 minutes and switch on the system again.</li> <li>- If the problem keeps on, please do not hesitate to contact your dealer.</li> </ul>
25	Fan1 Device	
26	Fan2 Device	
27	HCT AC Dev.	
30	DCI Device	
31	Other Dev.	
32	Eps Relay	
33	Boost Over C.	
34	Batt.Over C.	
35	Batt.Over V.	
36	Boost Over V.	
37	BUS Over Volt	
38	Charger FAN	
39	HW Protect	
42	Awaken Fault	
43	Curr. S.Boost	
44	Curr. S.Batt.	
45	EEPROM WR	
46	UnRecover FAN	
48	Charger Can	
49	Internet IC	
50	Rtc Error	
51	E2prom Error	
52	Can Comms	
71	FAULT...	
72	PERM.FAULT...	
53	CT Error	<p>System Error:</p> <ul style="list-style-type: none"> <li>- Read the procedures described in the paragraph <u>"Switch off and on the system"</u>, switch off the system then wait 10 minutes and switch on the system again.</li> <li>- If the problem keeps on, please do not hesitate to contact your dealer.</li> </ul>
58	Err Comm. ETH	
59	E2C Fault	
60	Flash Fault	
61	Rtc Fault	
67	WiFi Warning	
81	BMS Discon.	
82	BMS Alarm	
83	BMS OverVolt.	
84	BMS LowerVol.	
85	BMS Ch.OverC.	
86	BMS Dis.OverC	
87	BMS TemHighW.	
88	BMS TemLowW.	
89	BMS CellImbl.	



**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.

## 8. Switch off and on the system

### ATTENTION

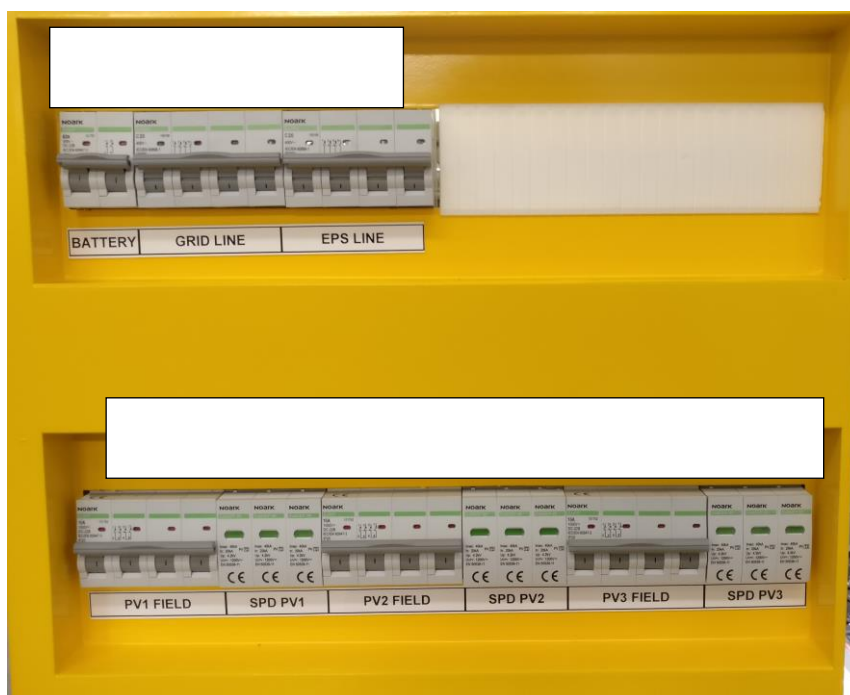
See Picture 25, in order to switch off the system lower the disconnectors in the following order:

- a) *Disconnecter PV3 FIELD (8)*
- b) *Disconnecter PV2 FIELD (6)*
- c) *Disconnecter PV1 FIELD (4)*
- d) *Magneto-thermal breaker EPS LINE (3)*
- e) *Magneto-thermal breaker GRID LINE (2)*
- f) *Magneto-thermal breaker BATTERY (1)*



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

- g) *Magneto-thermal breaker BATTERY (1)*
- h) *Magneto-thermal breaker GRID LINE (2)*
- i) *Magneto-thermal breaker EPS LINE (3)*
- j) *Disconnecter PV1 FIELD (4)*
- k) *Disconnecter PV2 FIELD (6)*
- l) *Disconnecter PV3 FIELD (8)*



Picture 25 – Front of the electrical panel

### 8.1 Prolonged stop

During a prolonged stop the battery modules discharge automatically up to the minimum energy level.

This process deeply damages the battery modules so they can be stored for a limited period of time (max. 4 months).

In the specific case a very deep discharge, ie batteries that have not undergone a charge / discharge cycle for more than a month, the discharge of the batteries can become irreversible; once the photovoltaic generator is restored they will not be able to recover.

If the batteries are discharged beyond this minimum threshold, it is necessary to recharge them individually with a slow charging procedure.

**To avoid this, before a scheduled prolonged stop, you must contact the retailer.**

### 8.3 RA.Store-3Bplus

To deactivate the RA.Store-3Bplus expansion, lower the lever of the switches present within the accumulator electrical panel (green status indicator).

To activate the RA.Store-3Bplus expansion, raise the lever of the switches present within the electrical panel of the accumulator (red status indicator).

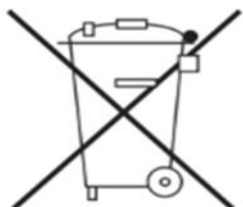
## 9. Removal and disposal of the system

Do not dispose of the product with household waste, but in compliance with local and EU regulations for the disposal of electronic waste applicable in the country of installation.

All electrical and electronic products must be disposed of separately from the municipal waste collection system, through specific collection facilities installed by public bodies or local authorities.

Correct disposal of the obsolete unit contributes to preventing possible negative consequences on the health of individuals and the environment.

For more detailed information on the disposal of obsolete equipment, contact the office of the municipality of residence, the waste disposal service or the point of sale where the product was purchased.



WEEE Mark: means to dispose of the product in compliance with the current directives for electronic



Building component	Material and/or waste type
Chassis, brackets, supports	Alluminium / Iron
External panels	Alluminium / Iron
Electrical cables	Copper / Rubber
Terminals	Alluminium / Copper / PVC
Electronical cards	RAEE
Inverter	RAEE
BMS	RAEE
Battery modules	LiFEPO4

## A. Appendix – Technical datasheets

RA.Store-3 - Model	5K	6K	8K	10K
Input DC side (PV)				
Max DC input power [W]	6000	8000	10000	12000
Absolute maximum DC input Voltage [V]	1000			
MPPT Voltage range [V]	200 ÷ 950			
Nr. of independent MPP trackers	2			
Nr. of strings each MPP input A/B	1/1		1 / 2	
Max DC input current (each string/each MPP) [A]	11/11		11/20	
Max short circuit current (each string/each MPP) [A]	14/14		14/23	
Compatible with amorphous PV modules	No			
AC Output/Input (On-grid)				
Wave form	Threephase 3P+N			
Maximum active power output @ cosφ=1 [W]	5000	6000	8000	10000
Maximum apparent power output [VA]	5000	6000	8000	10000
AC Grid Voltage range [V]	342 ÷ 440			
Rated grid frequency [Hz]	50/60			
Nominal Input AC current [A]	7,2	8,7	10,1	10,1
Nominal Output AC current [A]	7,2	8,7	11,6	14,5
Max Input AC current [A]	8,0	9,6	11,2	11,2
Max Output AC current [A]	8,0	9,6	12,8	16,0
Displacement power factor	0,8 leading ÷ 0,8 lagging			
Total Harmonic Distortion THDi	<2%			
EPS-Back up				
Wave form	Threephase 3P+N			
Rated apparent power output [VA]*	5000	6000	8000	10000
No continuative Peak power (60 sec) [VA]	10000	12000	14000	14000
Rated Voltage [V]	400			
Rated Frequency [Hz]	50/60			
Rated current output [A]	7,2	8,7	11,6	14,5
Neutral connection while on EPS	Grounded (TN system)			

\* Limited at 1150 VA each installed battery module, without PV power input.



Battery				
Battery type		LiFePO4		
Nominal Voltage each battery module [V]		48		
Nominal minimum batteries Voltage [V]		192	240	
Battery Voltage range [V]		170 ÷ 500		
Max charge current [A]		25		
Max discharge current [A]		25		
Max storable energy each battery [kWh]		2,4		
Standard number of batteries		4	5	
Nominal power charge/discharge [W]		4800	6000	
Maximum storable energy [kWh]		9,6	12	
Usable energy [kWh]		7,68	9,8	
DoD	80%	80%	80%	80%
Number of working cycle	4000	4000	4000	4000
Maintenance		No maintenance requested		
Single battery module weight [kg]		24		
Battery options				
Number of additional battery / total		1 ÷ 4 / 5 ÷ 8		1 ÷ 3 / 6 ÷ 8
Maximum storable energy [kWh]		19,2		
Maximum usable energy [kWh]		15,36		
Storable energy [kWh]		2,4 kWh * N° modules		
Usable energy [kWh]		1,92 kWh * N° modules		
Nominal power charge/discharge [VA]		1200 W * N° modules		
Nominal Battery Voltage [Vdc]		48 V * N° modules		
RA.Store-3BPlus Battery options				
Minimum number of additional modules		5		
Max number of additional modules		16		
Modules allowed configuration		5,6,7,8,10,12,14,16		
Maximum total number of batteries		24		
Maximum nominal energy [kWh]		57,6		
Maximum usable energy [kWh]		46,08		

Safety and protection		
Overload protection	YES	
Overtemperature protection	YES	
AC line protection	Magnetermic circuit breaker	
Battery protection	Magnetermic circuit breaker	
DC – PV line protection	Switch + SPD	
Switch time to EPS mode	5 s	
General Data		
Temperature Range [°C]	from -5 to +45 °C	
Relative Humidity	0 % ÷ 95 % non - condensing	
Installation environment	Indoor	
Degree of pollution	2	
Weight [kg] (with standard number of batteries)	261	285
Placement	Floor	
IP grade	IP20	
Class of isolation	I	
Size and Weight		
Size [L. x H x P] [mm]	1045x1245x545	
Weight [kg] (standard nr. of batteries)	261	285
Weight with 6 batteries [kg]	309	
Weight with 7 batteries [kg]	333	
Weight with 8 batteries [kg]	357	
Interfaces		
GPRS (standard)	2G Dual band	
WiFi (optional)	2.4 GHz IEEE Std. 802.11 b/g	
LAN (optional)	10/100 Mbps Ethernet	
HMI	Display LCD	
Certifications and standards		
Certifications	CE / VDE0126-1-1A1:2012 / VDE-AR-N4105 / G59-3 / AS4777 / EN50438 / CEI 0-21 / IEC62619 / ISO13849-2 / SN29500 / IEC615086 / IEC 62109-1 / -2	
Warranty		
On the system, battery included	7 years (ask for extensions to 10 years)	

## 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/](http://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](http://www.atonstorage.com/downloads/TC-ENG.pdf)

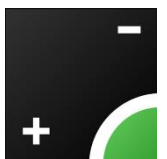
### App OS:



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

