

RA.Store-K-F

Installation manual

Rev. 1.12



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1 Introduction

The present manual describes the procedures of installation and setting up of the system RA.Store-K-F.

It is absolutely compulsory to stick to the following instructions:

- Read this entire document before starting the installation phase.
- Keep a copy of this document nearby the product.



READ THE PRESENT MANUAL BEFORE STARTING ANY OPERATION








Before starting any operation, it is compulsory to read the present Installation 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 Symbols contained in the manual

NOTICE	It indicates actions that can cause material damages.
CAUTION	It indicates a dangerous situation that leads to a potential risk if the safety rules are not respected.
WARNING	It indicates a dangerous situation that leads to potential death or severe injuries if the safety rules are not respected.
DANGER	It indicates an extremely dangerous situation that leads to certain death or severe injuries if the safety rules are not respected.

1.2 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>Alternating current</p>
	<p>Direct current</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 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.</p>
	<p>It is forbidden to block or cover the air intakes of the system.</p> <p>Placed nearby the electrical panel.</p>
	<p>Attention, risk of danger.</p>

1.3 Technicians authorized to install the storage system

The present manual is addressed to technical staff that is authorized to install the system RA.Store-K-F and must be in possession of all the technical and safety requirements foreseen by the law in force for the realization of electric works.

1.4 Use

The product RA.Store-K-F is a storage system that must be used to store electrical energy produced from PV panels. The inappropriate use of this machine can lead to death or risk of severe injuries for users and third parties, as well as damages to the product itself and to other valuable objects.

1.5 Safety

In order to avoid any damages to people and objects during transport, installation and use, the next points must be followed:

- The storage system must be installed in fully compliance with the instructions contained in the present manual.
- The storage system must be installed exclusively by authorized and qualified staff, duly trained to execute electrical works in compliance with the law in force in the country of installation. Moreover that staff must be qualified, trained and authorized by Aton Srl.
- The storage system must be installed in an appropriate place according to the specifications indicated in this document.
- The transport and warehousing conditions indicated in this document must be respected.
- Use the storage system in its original condition. Any alteration of any type is strictly forbidden because it can limit the functioning or cause damages to people and/or objects.

1.5.1 Possible damages and risks due to non-compliance of installation specifications

The non-compliance of the instructions contained in this manual can cause damages to people and/or objects.

The machine must not be opened during the functioning.

The realization of works on the internal electrical system of the machine during the functioning can cause short-circuits and/or discharge arcs, creating then a risk of burns and /or electrocution.

1.5.2 Damages due to explosive atmosphere and inflammables materials

Do not install nor use the storage system in an atmosphere classified as potentially explosive or nearby materials that are highly inflammable.

1.5.3 Damages due to modifications on the product

Do not tamper with or bypass the protection devices.

Do not alter in any way the storage system.

Do not execute any modification on the electrical and/or data lines connected to the storage system.

1.5.4 Instructions to follow in case of fire

An initial fire can start on the electrical machines despite fireproof materials and an accurate engineering.

An initial fire nearby the storage system can start the fire even on this latter, causing the possible release of the material contained in the batteries.

In case of fire nearby the storage system or inside it, follow these instructions:

- Only the firemen equipped with the proper protection devices are authorized to enter the place where the storage system is located.
- The risk of electrocution is available during the phases of fire extinguishing because the storage system is switched on and in functioning.
- Before starting the fire extinguishing phases:
 1. Switch off the storage system.
 2. Insulate the electrical system of the user from the national electrical grid by lowering the magneto-thermal breaker downstream the electricity meter.
 3. The output voltage of the storage system is 230 Vac (classified as low voltage).
 4. The battery modules have a maximum voltage of 54 Vdc.
 5. The battery modules contain metallic lithium (LiFePO₄), **NO WATER!** Only dry powder fire extinguisher can be used; if possible, move the battery pack to a safe area before it catches fire.

1.6 Warnings

The following paragraphs contain specific warnings that must be always respected by executing any operation on the storage system.

DANGER

Risk of death due to electrocution!

Enter in direct contact with the internal components of the storage system can cause a risk of death due to electrocution.

- Do not touch internal components except when it is expressly required and according to the ways indicated in this manual.
- Do not remove any plastic cover or screen.
- Do not reach with fingers or tools any part covered by plastic screens.



IT IS STRICTLY FORBIDDEN

It is strictly forbidden to execute any operation without any of the following PPE:

- Anti-electrocution gloves
- Insulating carpet (for ex. for measuring on cables under tension)
- Safety shoes



ATTENTION

Each intervention non-compliant with what is described in this manual and in the technical datasheets of the system implies the guarantee forfeiture and discharges the producer any liability.

DANGER

Risk of death due to electrocution!

When the storage system is handled, follow these instructions:

- Switch off the storage system.
- Insulate and disconnect all the electrical lines connected to the storage system.
- Take every precaution to avoid the turning-on of the storage system during the electrical operations on it.
- Only technical staff in possession of the requirements described in the paragraph “1.5 Safety” is authorized to execute the handling activities.

WARNING

Risk of fire!

It is possible that very high short-circuit currents can develop.

During any operation on the battery modules, respect these instructions:

- Never execute any intervention on battery modules that are switched on.
- Before starting any operation, be sure to have completed the procedure of “Switch off the batteries” as described in the technical appendix.
- People who execute these operations are not allowed to wear any metal piece of jewellery.

NOTICE

Damage on battery modules due to deep discharge!

If disconnected from the public grid and PV panels, battery modules may discharge beyond their maximal limit and cause damages to the modules. Do not disconnect the storage system from the public grid and PV panels for long periods of time.

2 Transport, warehousing and long period of non-use

2.1 Warehousing

The term “warehousing” means the condition in which the storage system stays when it is electrically disconnected from external electrical grids and the battery modules cannot be charged in an independent way.

2.2 Environmental conditions of warehousing

Please see technical appendix.

2.3 Warehousing and long period of non-use of battery modules

During the warehousing and long period of non-use, the battery modules discharge automatically to the minimum level of energy.

This process of deep discharge can damage the battery modules. For this reason the battery modules and the storage systems can be kept in the warehouse for a limited time by respecting anyway these instructions:

- The battery modules must have a good charge level before the warehousing (equal to or higher than 85% of the rated capacity).
- Do not keep the battery modules in the warehouse for a period of time longer than 6 months.
- During the warehousing period, the orange pole of the module must not be connected to other battery modules.

2.4 Transport of the battery modules

The lithium-ion batteries are dangerous products. During the transport, respect these instructions:

- Respect all the general regulations regarding transport according to the type of transport.
- Respect all the legal regulations.
- Consult an expert in dangerous transport matters.

The data of the battery modules regarding the transport are delivered in the following way:

- Class of dangerous wares: 9
- UN Number: UN3480 'lithium-ion batteries'
- Weight of the battery module (packaging included): 24 kg

2.5 Inspection ways to check damages due to transport

CAUTION

Risk of injuries due to the use and handling of damaged battery modules!

Remove the packaging from the battery modules immediately after the transport and check by sight if there is any damage.

In case of any damage (deformation and/or damages on the external casing, liquid leakage towards outside):

- Do not use the battery module.
- Call immediately Aton in order to receive assistance.

2.6 Setting up of the temperature after transport

If the temperature of the storage system is highly lower in comparison with the room temperature in the installation place at the moment of the delivery, a condensation can be created inside the storage system that can be damaged.

Check inside the storage system before starting the installation.

Start with the installation steps only in absence of condensation inside the storage system.

If the system is transported at temperatures lower than 0 °C, proceed according to the following steps:

- Place the storage system in a room appropriate to install it.
- Remove the external cover carters of the storage system.
- Wait 24 hours.
- Check that there is no condensation.
- Continue with the installation.

3 Installation

3.1 Procedure of installation

The procedure of installation is composed of four parts:

1. Placement of the machine
2. Wiring
3. Commissioning with functional test
4. Insertion of the installation data with check of data communication

The insertion part of the installation data is described in details in the specific manual "Website – Manual for the registration on the portal" and can be done before the installation and commissioning phases, having previous knowledge of the serial number of the system.

Then check only the data communication to ATON server: it is possible only after having finished the installation, with the storage system in function.

3.2 Positioning of the machine at the point suitable for installation

WARNING

Possible damages deriving from non-compliance with specifications!

Observe all the instructions provided in this paragraph and in the technical appendix concerning the positioning of the storage system in the installation environment and environmental characteristics. Failure to comply with the instructions provided may cause irreparable damage to the storage system and to the surrounding environment.

ATTENTION



Install the system

- in a room that must be: dry, covered with a roof, not floodable, not potentially explosive, without any rodents and inflammable materials nearby,
- sheltered from the direct rays of the sun,
- at a distance of 10 cm at least from the walls of the building in order to maintain a correct ventilation,
- on a surface capable to bear its weight.

The storage system must be placed and installed at a minimum distance of 10 cm from any wall or surface in order to allow the right ventilation and heat dissipation.

The sides of the storage system that are equipped with electrical panels must be placed at a minimum distance of 1 mt from any wall or surface to allow the operator to carry out maneuvers on the protections contained therein.

The storage system must not be positioned in such a way as to prevent access, even partial to:

- connection boxes for electrical, hydraulic or cooling systems;
- room ventilation openings;
- safety exits.

The natural ventilation is sufficient for the correct functioning of the storage system. Forced ventilation is not required.

The room intended to house the storage system must comply with the relative ambient temperature and relative humidity specifications provided in the technical appendix.

No auxiliary or additional forms of ventilation are required for the room as there is no emission of gas or other substances.

3.2.1 Handling of the system

The machine RA.Store-K-F can be handled mechanically with a pallet jack, and in this case it is not necessary to disassemble its parts in order to reduce its weight.

If the handling needs some manual operations, disassemble some parts in order to reduce the weight of each single component.

The operations for the manual handling are:

- Removal of the external plastic parts
- Removal of the batteries
- Application of auxiliary handles on the basic structure
- Transport of the basic structure, batteries and plastic parts separated
- Disassembly of the auxiliary handles and reassembly of the batteries
- Reassembly of the plastic parts

Before executing the manual handling operations, please read the “Appendix D - Weights for the transport”.

3.2.2 Preliminary stages

Be sure that all the protections on the electrical panel of the storage system are OFF, as shown in the following image.

COMPONENT
NAME
EXTERNAL
LABEL

BATTERY GDS1 SPV1 GDS2 SPV2 GRID EPS

COMPONENT
NAME
ELECTRICAL
SCHEME

QB1 QPV1 SPV1 QPV2 SPV2 QG1 QE2



Picture 1 – Starting position of the protections of the RA.Store-K-F electrical panel

COMPONENT
STATUS

OFF OFF OFF OFF OFF

Insulate the cables that come down from the PV panels strings.

3.2.2.1 Removal of the plastic parts

Unscrew the two screws that fix the upper panel to the rest of the structure, and then remove it by pushing as shown in the following picture (Picture 2).



Picture 2 - Removal of the fixing screws of the upper panel

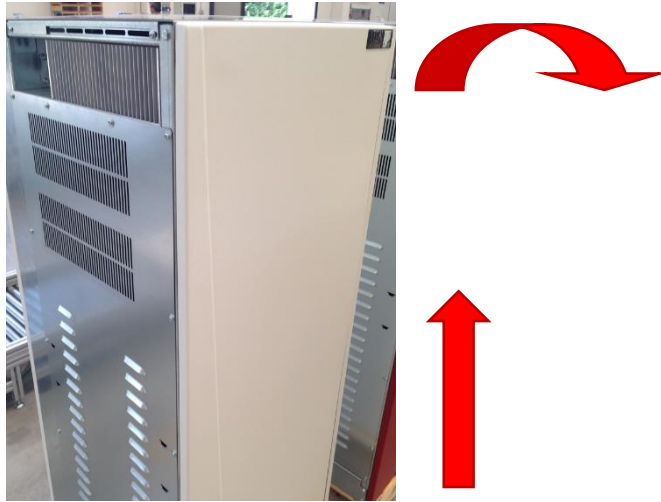


Picture 3 - Removal of the front panel



Picture 4 - Removal of the front panel

Pull towards you the upper part of the panels so that the pins go out from the runners, then lift it.



Picture 5 - Removal of the side panels

Unscrew the 2 screws that fix the upper grid to the frame, and remove it from its housing.

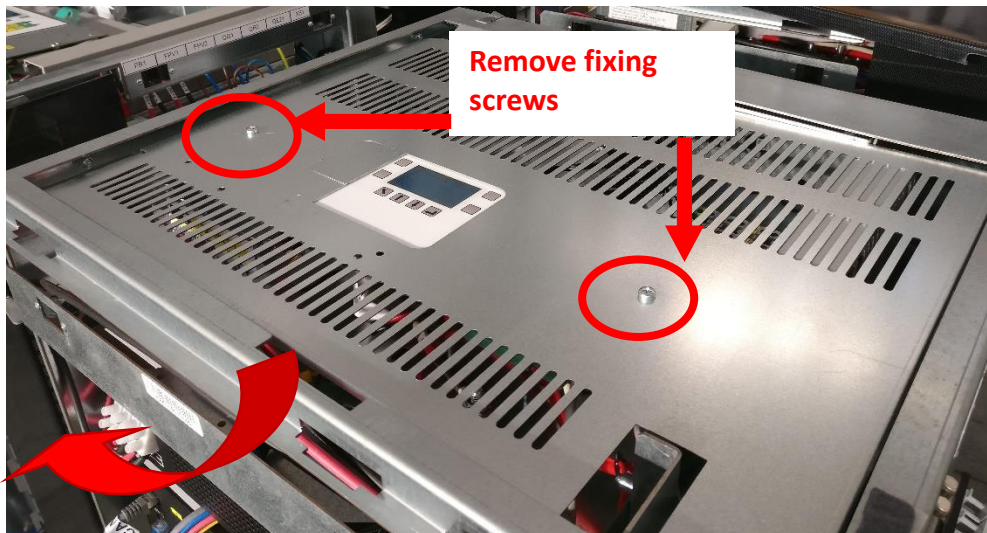
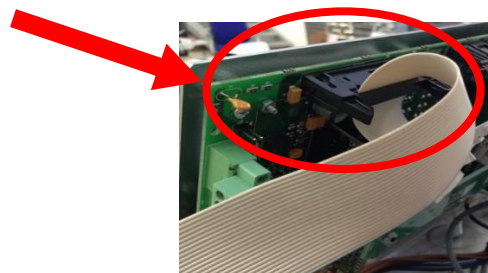


Figura 6 - Removing the top protection

The control card is placed in the upper part of the system. Disconnect the connector showed in the following picture (Picture 7)



Picture 7 – Removal of the connector Flat Ribbon of the led lights angle

Unscrew the screw that fixes the panel with the led lights in the upper internal part and remove such panel.



Picture 8 – Disassembly of the led lights angle



Picture 9 - Disassembly of the led lights angle

3.2.2.2 Removal of the batteries

WARNING

Very high short circuit currents may develop. During the works on the battery modules, respect these precautions:

- **Before executing any work, please be sure that the breaker “0/1” available on each battery module is on position “0”.**

When working on the battery modules, the following precautions must be observed:

- Do not wear any metal piece of jewellery.
- Use tools with insulated handles up to 1000 Vdc
- Use insulated boots and insulated gloves for a maximum utilization voltage of 1000 Vdc.
- Do not rest tools or metal parts on top of batteries.
- Before starting any activity, switch off the storage system.
- Put on “OFF” all the protections contained in the electrical panel of the storage system.
- Use only the supplied cables that are protected by direct contacts.

NOTICE

Damages to the battery modules caused by short circuit!

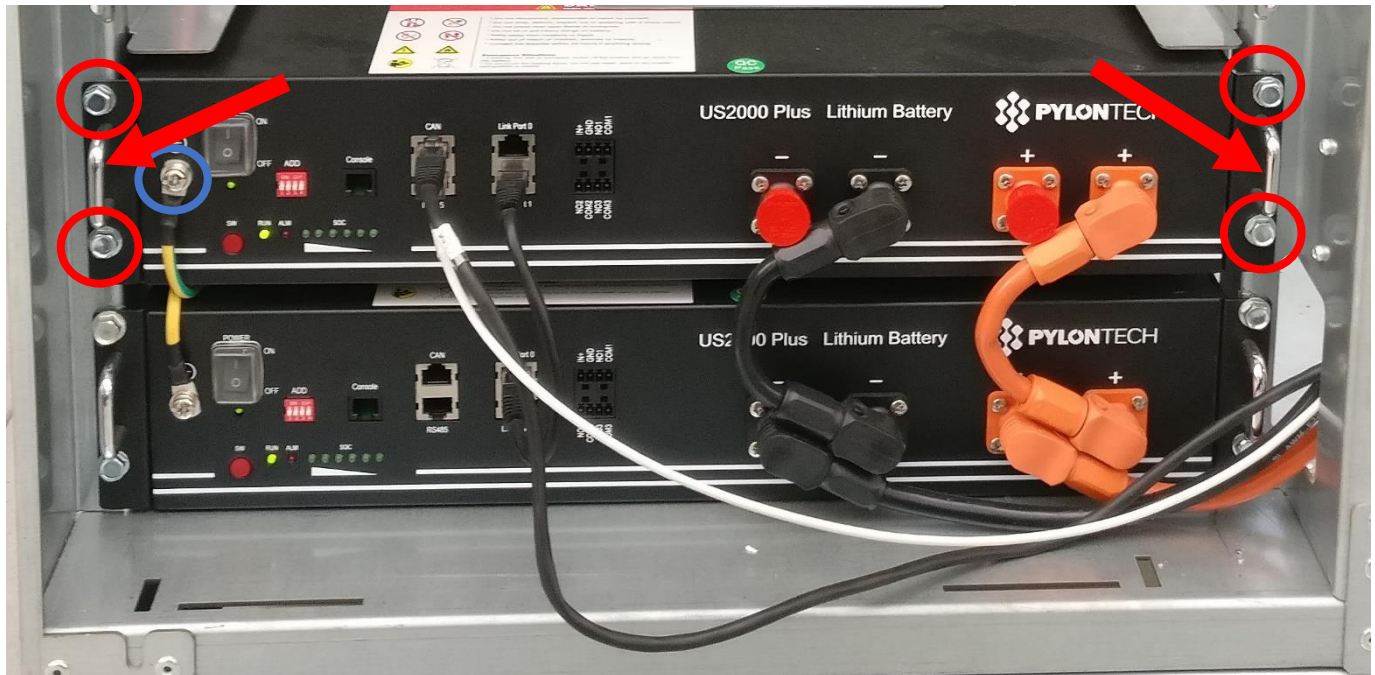
If during the works on the battery modules, a short circuit happens, follow these instructions:

- Do not install the battery modules involved by the short circuit.
- Contact Aton Srl.

In case of manual handling of the storage system, in order to prevent possible deformations to the frame, it is recommended to remove the batteries from the storage system.

In Picture 10 are showed:

- the handles with which the battery and the BMS (2 front handles shown by the red arrows),
- the screws that keep it together with the structure (2 screws shown by the red circles),
- the screws that create the equipotential bond on earth (1 screw shown by a blue circle).



Picture 10 – Wiring of the battery modules US2000B



ATTENTION

The handling of each battery must be executed by two people.

Wiring and fixing accessories to be removed:

- for each battery module unscrew the 2 screws that keep it together with the chassis and the screw for the equipotential bond;
- disconnect all wiring related to data signals;
- remove the red and black patch cords that connect the battery modules;
- remove the battery from its slot by using the frontal handles;
- remove completely the battery from its slot and put it on the floor.

CAUTION

Danger of explosion!

The battery modules inside the storage system may explode if:

- Exposed directly to sources of heat or open flame
- Do not expose the battery modules to direct sources of heat or open flames.

CAUTION

Danger of emission of toxic and harmful gases!

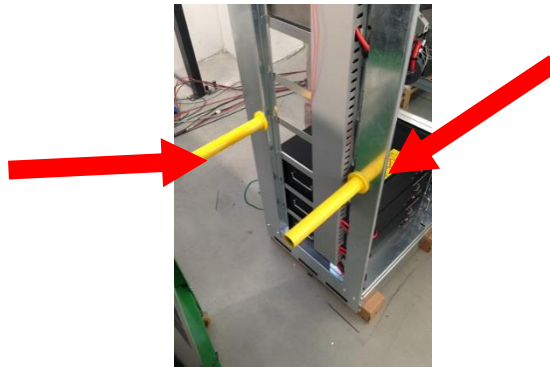
Do not open or damage the batteries. The released electrolyte is harmful to the skin and eyes. It could be toxic.

3.2.2.3 Application of auxiliary handles on the basic structure

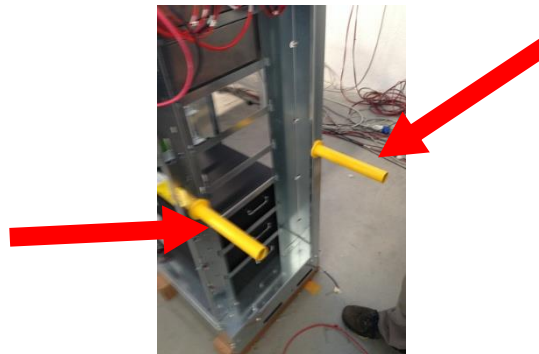
Fix to the structure the adequate provided handles in the 4 points showed in the following pictures (Picture 12, Picture 13).



Picture 11 - yellow handles for the handling



Picture 12 - Application of the handles to the structure (left side)



Picture 13 - Application of the handles to the structure (right side)

3.2.2.4 Transport of the basic structure, batteries and plastic parts separated

Lift the structure and move it in the chosen location.



ATTENTION

The handling of the structure must be executed by 4 people and each person holds a different handle.

Move in the desired location the batteries and the plastic parts.

Reassemble in the right location the batteries and the plastic parts previously disassembled.



ATTENTION

Place the system

- in a room that must be: dry, covered with a roof, not floodable, not potentially explosive, without any rodents and inflammable materials nearby,
- sheltered from the direct rays of the sun,
- at a distance of 10 cm at least from the walls of the building in order to maintain a correct ventilation,
- on a surface capable to bear its weight.

3.2.2.5 Disassembly of the handles and reassembly of the batteries

Unscrew the 4 handles used for the transport and keep them for the next installation.

For each battery, reconnect the earth cable previously disconnected and place it again inside the structure (inverted procedure compared to the removal).

For each battery and the BMS, screw the 4 screws that keep it together with the chassis.

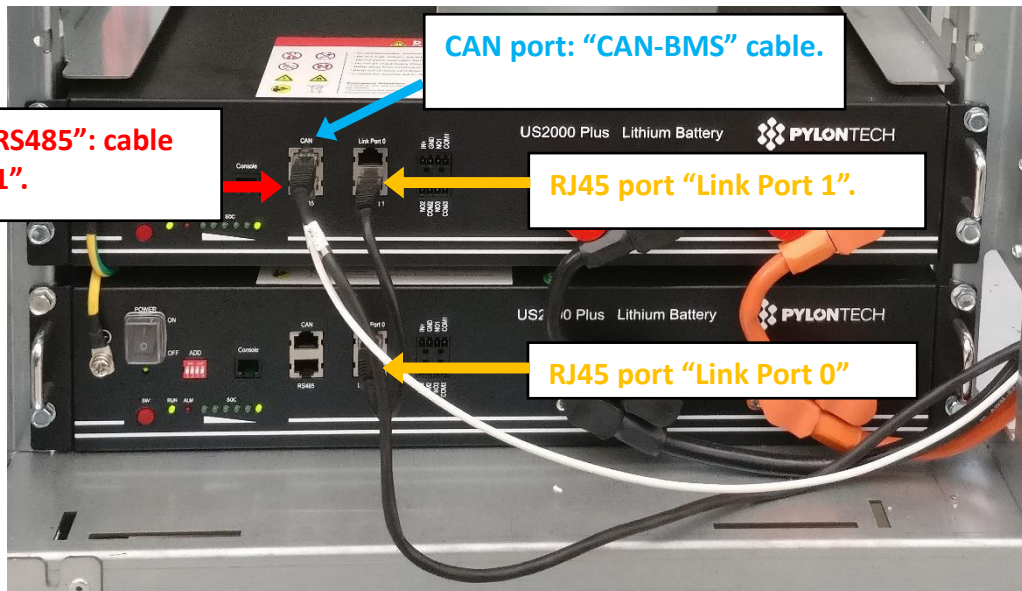
3.2.2.6 Connection and switching on of the batteries

Connect the supply cables of the batteries respecting their polarity (the black cable must be inserted in the negative terminal and the red one in the positive terminal).

Restore the connection between the "CAN" port of the battery placed at the top and the "BMS" port of the inverter.

Restore the connection between the "RS485" port of the battery placed at the top and the "BMS" port of the management card of the product ATN820.

Restore the connection between the "Link Port" ports available on the batteries (the battery at the top has the connector RJ45 plugged in the port "Link Port 1"; the other connector RJ45 is plugged in the battery placed under the port "Link Port 0").



Picture 14 – Restore of the connections: data signals cables

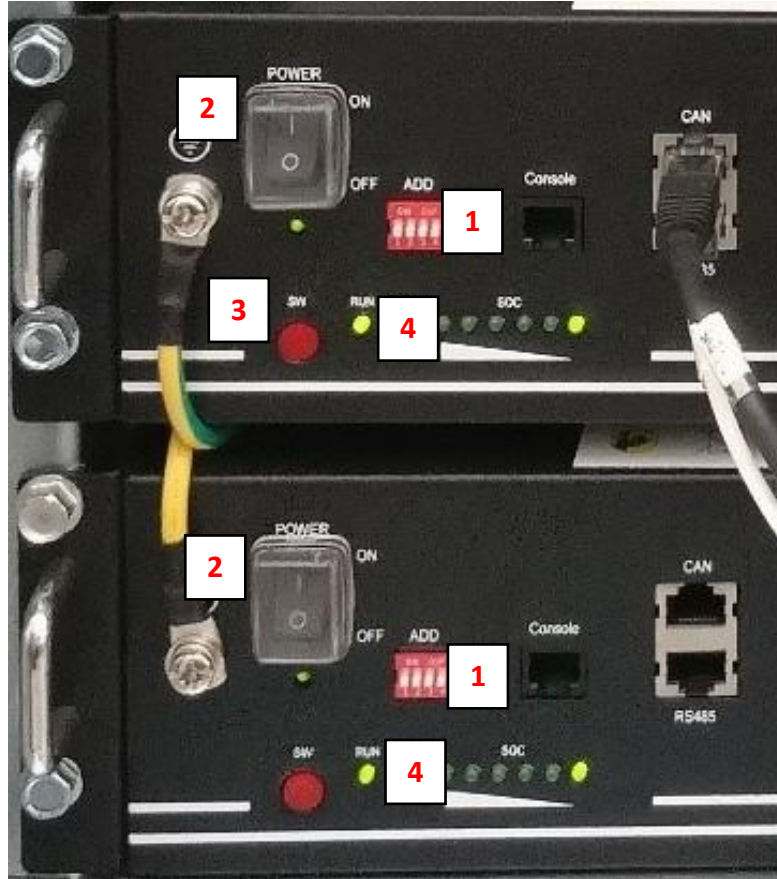


Picture 12A - Restore of the connections: data signals cables

To switch on the batteries:

1. Check that the 4 DIP SWITCH selector switches of the selector named "ADD" are in "low" position (0 OFF)
2. Put on "1" the breakers of all batteries
3. Press the red button of the first battery at the top
4. Check that the led lights of all batteries are switched on.

For the procedure of switching off, follow the steps indicated in "Appendix B – Switch off and on the batteries".



Picture 15 – Switch-on of the batteries

3.2.2.7 Reassembly of the plastic parts

Put again in the same position the panel equipped with the led lights and screw the screw that keeps it together in the internal and upper part.

Reconnect the flat cable to the control card.

For all the other plastic parts that close, the reassembly will be done at the end of the testing phase.

3.3 Wiring

DANGER

Danger of death from electrocution!

The following points must be respected when carrying out electrical work on the storage system or on the electrical system during installation:

- Switch off the storage device.
- Isolate, disconnect or secure the electrical circuits where work will subsequently be carried out.
- Take all necessary precautions to prevent unauthorized ignition.
- At the end of the operations to secure the storage system and the circuits involved in the work, actual electrical measurements to ensure that all the parts in which it will operate will be at a potential of 0 V.
- Only personnel with the prerequisites referred to in “1.5 Safety” can perform electrical work.

DANGER

Danger of death from electrocution!

The following points must be respected when carrying out electrical work on the storage system or on the electrical system during installation:

- This product creates an alternating current of functioning with a direct component.
- In order to protect the product from indirect contacts, install a RCD (residual current device) on each electrical line in alternating current in output from the storage system.
- The RCD or RCDs must be of bipolar type, with maximum residual current equal to 300 mA, class A.

NOTICE

Length of the electrical and data cables

All the electrical and data cables in entry and exit of the storage system must be checked by qualified technicians in order to respect the electrical regulations in force.

3.3.1 Preliminary stages

Make sure that all the protections inside the electrical panels are in the OFF position.

Insulate the cables that come down from the PV panels strings.

3.3.2 Ground connection of the storage system

The storage system, being in the first class of IEC overvoltage Category Ratings (Class I), needs to be connected to the protection conductor of the user's electrical system. The connection must be made on the screw on the back side of the machine that shows the characteristic symbol of the equipotential bonding to the ground installation.

The minimum cross-section of the yellow-green cable that is used to make the equipotential bond between the mass of the storage system and the user's ground system must be:

- greater than or equal to 2.5 mm² if the cable is mechanically protected
- greater than or equal to 4 mm² if the cable is not mechanically protected.

In addition, the terminal that is connected to the screw on the frame of the storage system must have an eyelet terminal with an 8 mm hole.

SCREW TO BE USED TO CONNECT THE MASS OF THE MACHINE TO THE EARTH GROUNDING SYSTEM



Picture 16 - Screw for the connection of the mass of the storage system to the user's earthing system

3.3.3 Placement of the antenna

Move the antenna with magnet base from inside to outside the structure.

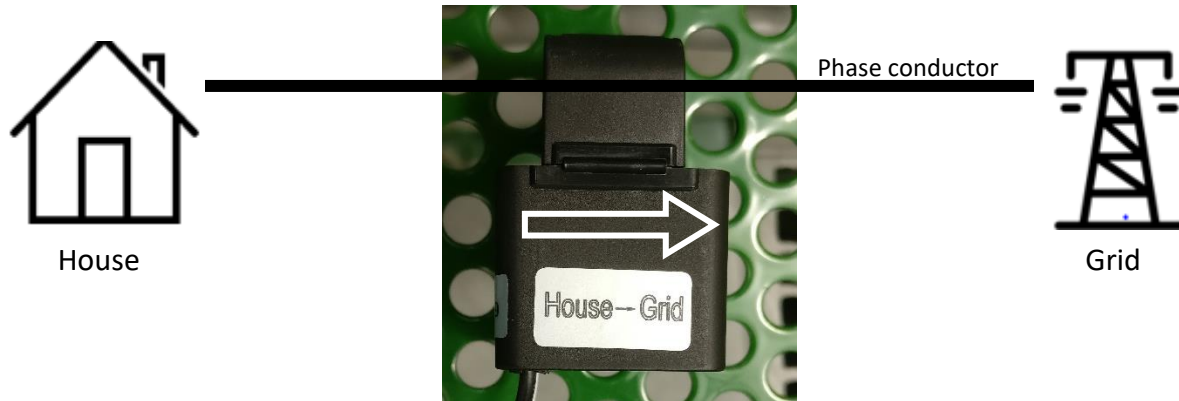


Picture 17 - Antenna

NOTE: The antenna cable will have to pass through one of the pre-drilled slots on the back panel.

3.3.4 Placement and connection of the CT sensor

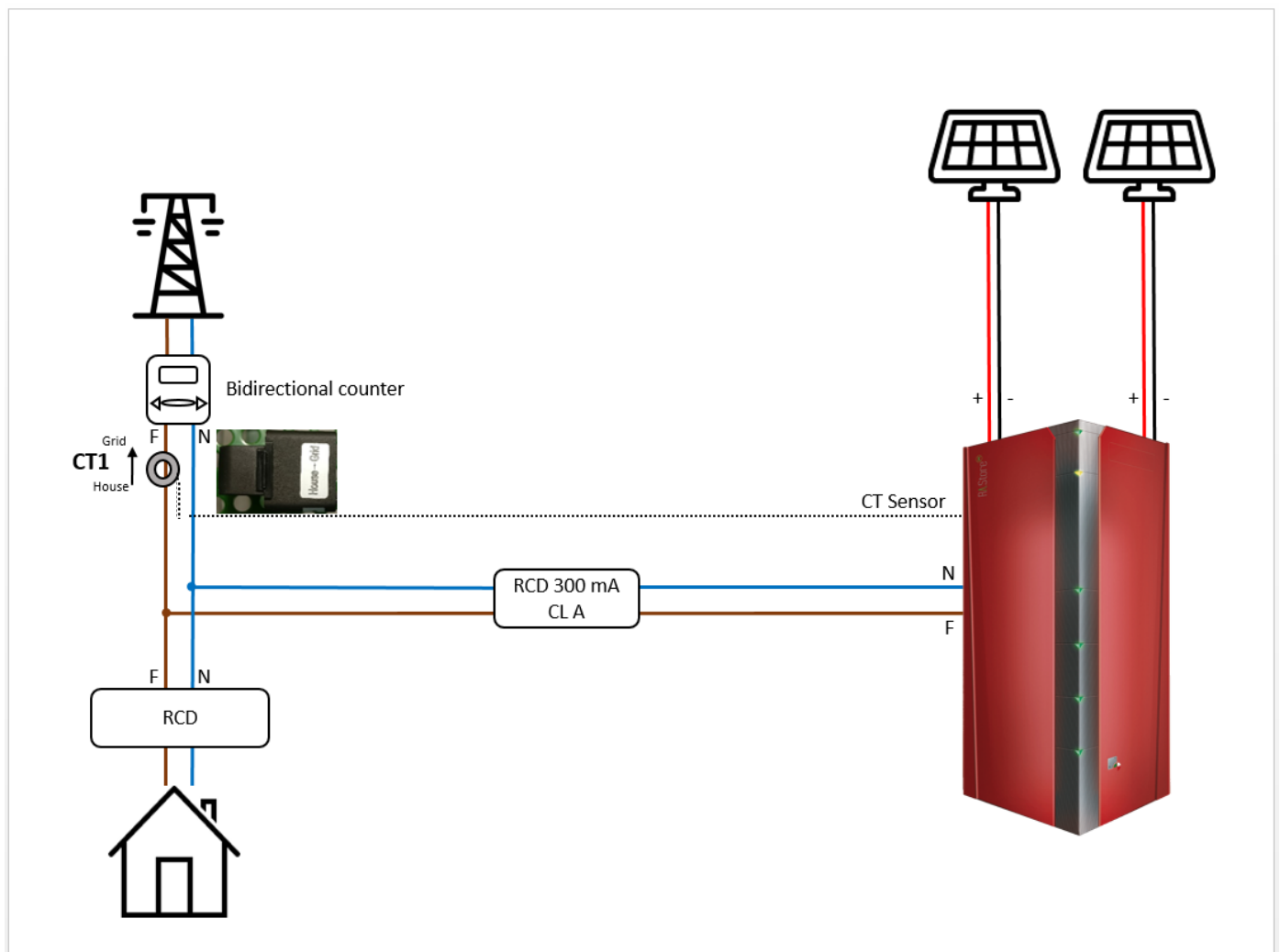
Here you can see the CT sensor



Picture 18 – CT sensor

The CT sensor must include the phase cable that connects to the bidirectional meter (M1).

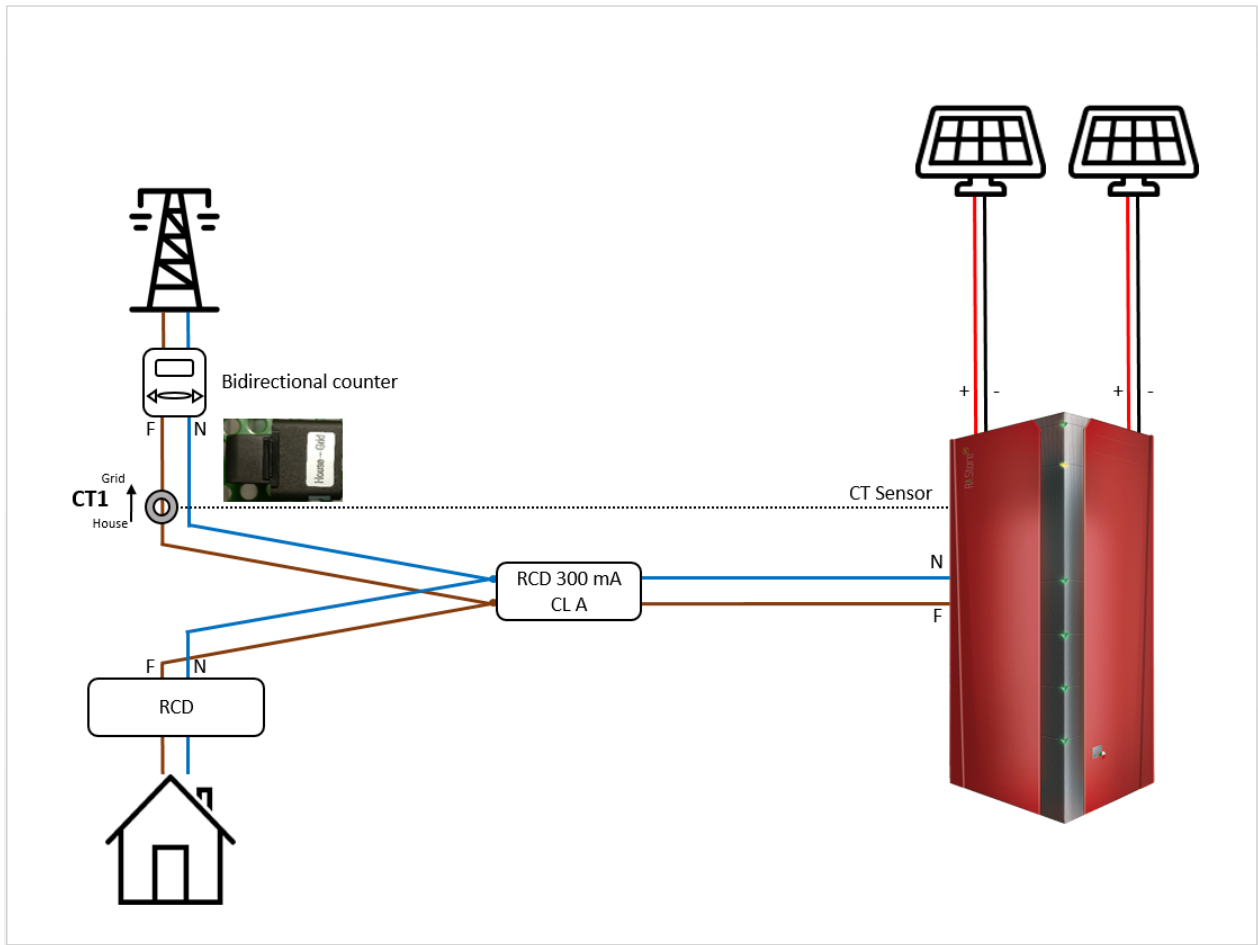
It must be placed so that the writing “House” goes towards the house (customer) and the writing “Grid” goes towards the bidirectional meter (M1).



Picture 19 – Placement of the CT sensor

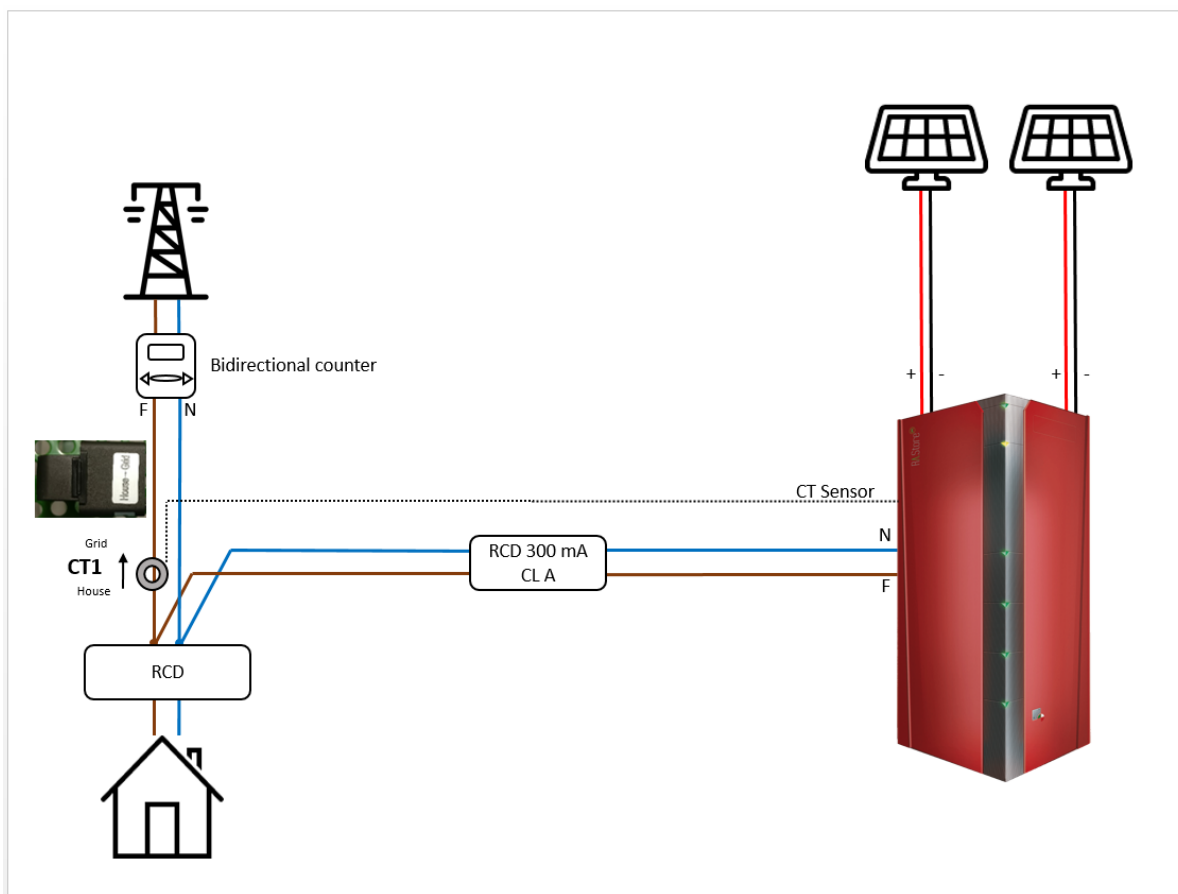
In the following pictures, there is a more detailed explanation of the different placements of the CT sensor according to the various configurations of the parallel between public grid and GRID line of the inverter.

1. Parallel on the disconnector of the GRID line.



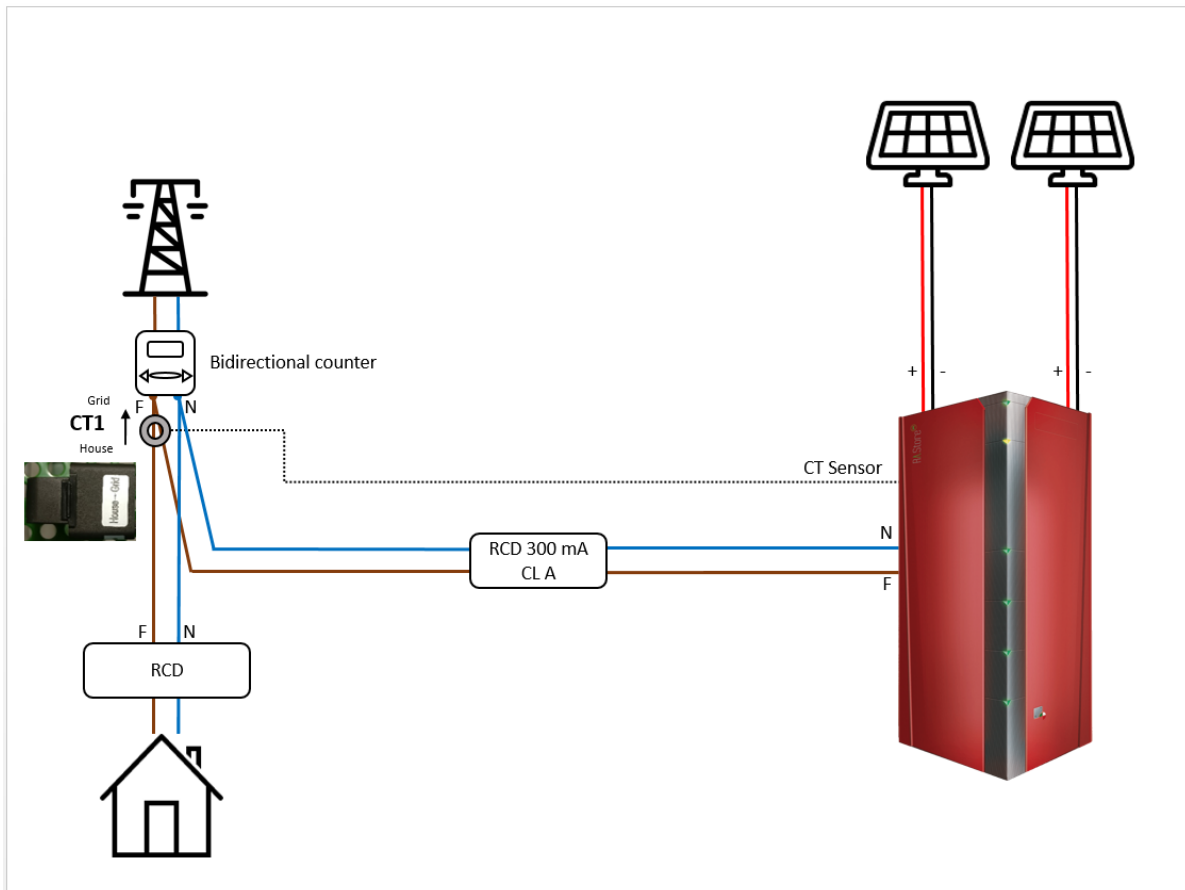
Picture 20 – Example of placement of CT nr.1: parallel on the disconnector of the Grid line

2. Parallel on the differential breaker upstream the house.



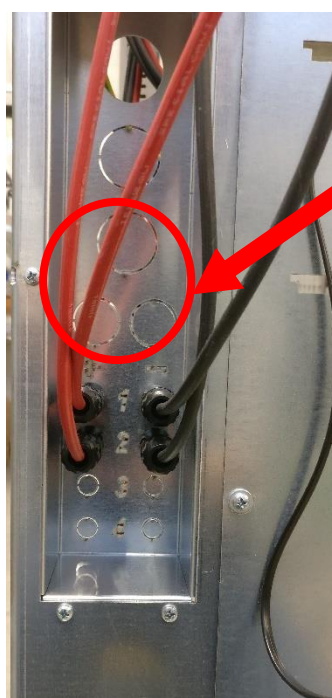
Picture 21 - Example of placement of CT nr.2: parallel on the differential breaker upstream the house

3. Parallel on the differential breaker downstream the public grid. In this case the sensor must be placed so that it can measure the voltage available on the two cables (the ring will be closed on two cables).



Picture 22 - Example of placement of CT nr.3: parallel on the differential breaker downstream the meter M1

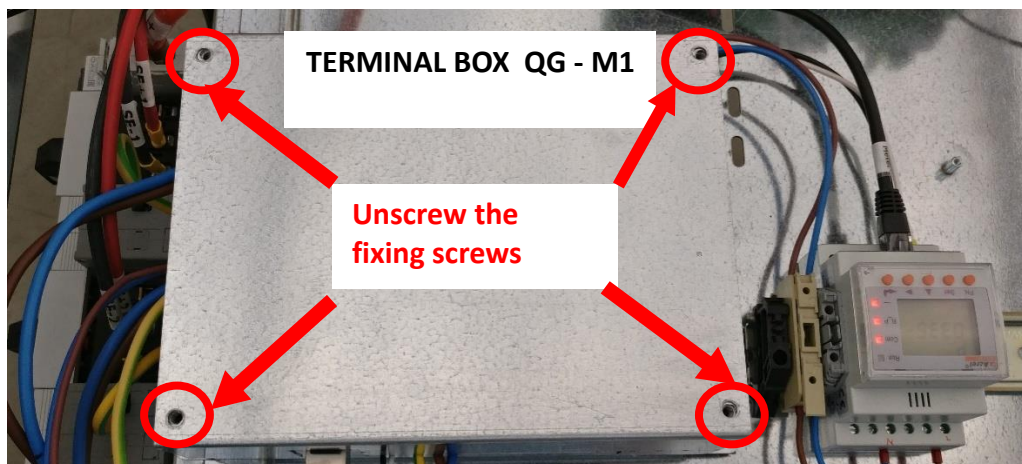
Put the other end of the cable of the CT sensor through a slot placed in the back part of the structure and sheathe the cable (Picture 23).



**Slot of the CT cable –
Complete with cable glands**

Picture 23 – Installation of cable glands for CT cable

To access the terminal box of the connections **QG - M1**, unscrew the 4 screws that fix the lid of the casing box and remove it (Picture 24).



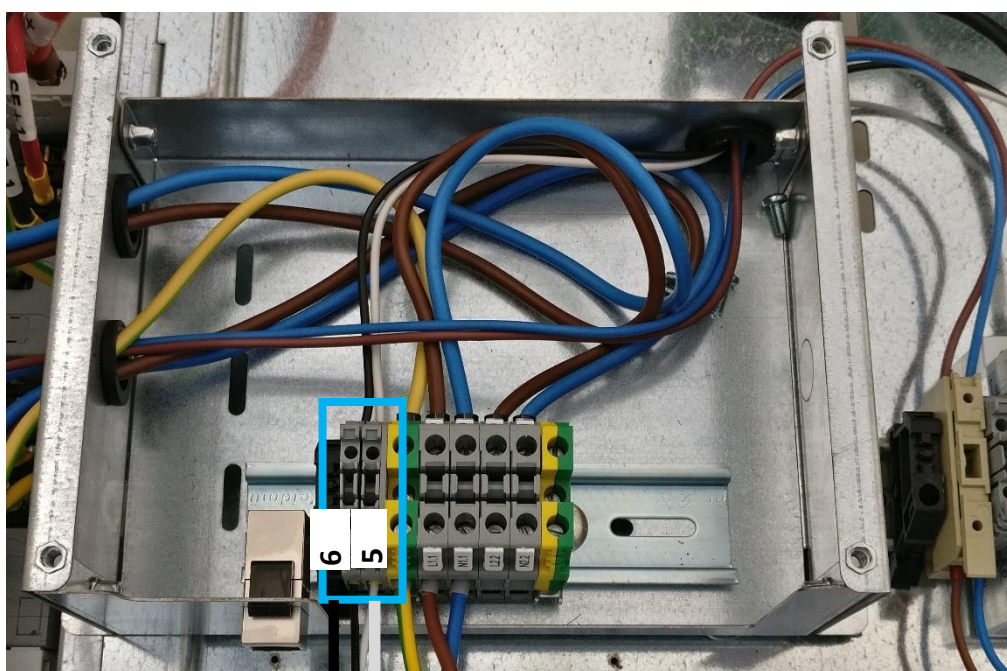
Picture 24 – Removal of the lid of the terminal box QG - M1

Then connect the end to the CT entry in the terminal box QG-M1 by following these indications (Picture 25):

Line Meter Terminal box QG - M1:

Terminal "5" of the terminal box QG - M1 **connected** to the white conductor of the CT sensor

Terminal "6" of the terminal box QG - M1 **connected** to the black conductor of the CT sensor



Picture 25 – Connection of the CT sensor in the terminal box QG - M1

WHITE conductor CT cable: Scheme reference:
Terminal box QG-M1: Terminal "5" (White)

Black conductor CT cable: Scheme reference:
Terminal box QG-M1: Terminal "6" (Black)

3.3.5 Connection of PV panels cables

It is possible to connect one or two independent strings of panels.

Some PV panels that need a pole connected to earthing (for example the ones with amorphous technology, etc..) are not suitable for the present storage system.

DANGER

Danger of death from electrocution!

When the strings of photovoltaic panels are exposed to light, the cables connected to them and to the storage system are live (up to 550 Vdc).

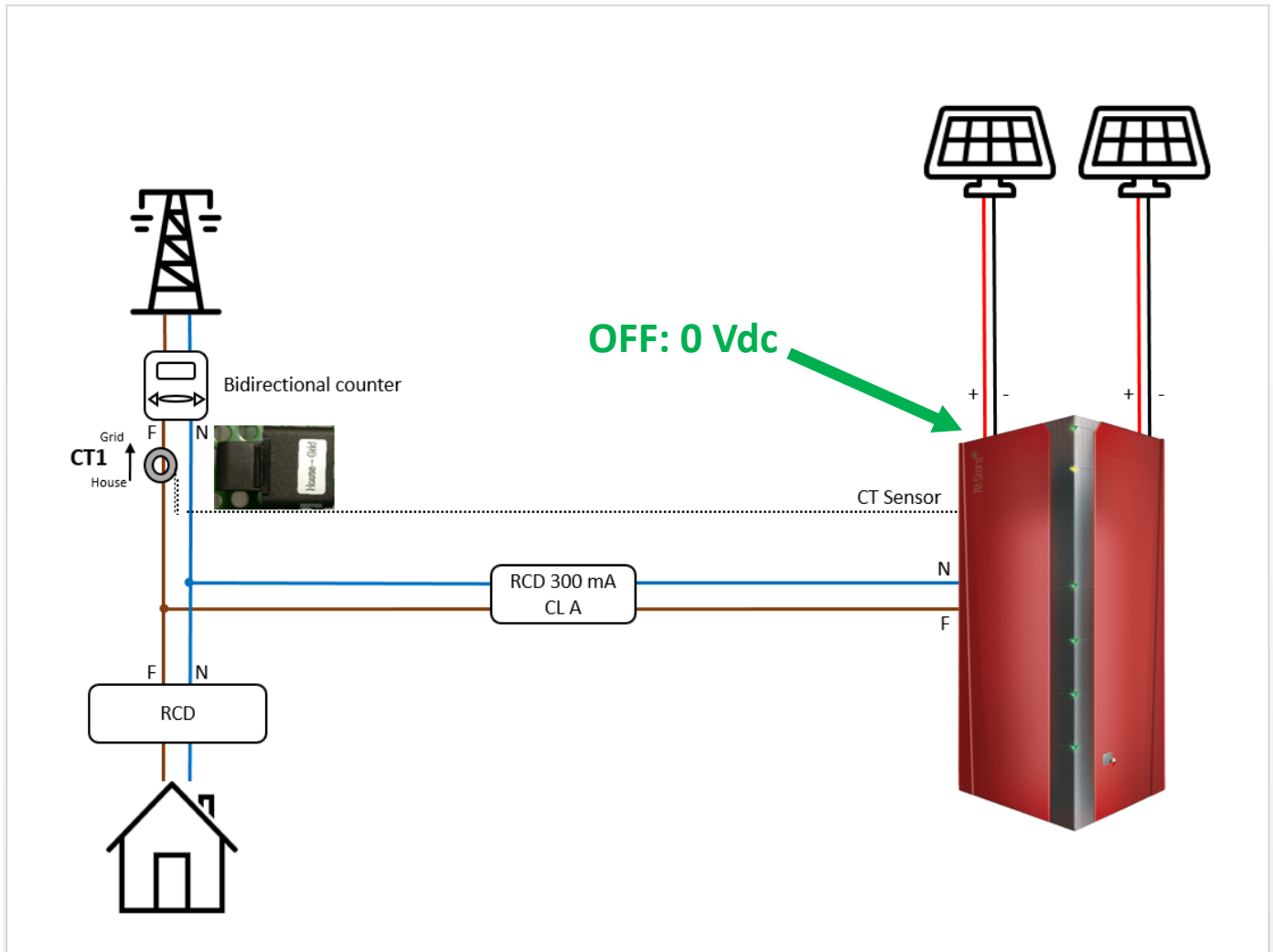


ATTENTION

Electrocution risk. Use insulating gloves and carpet foreseen for works done on hazardous electrical components.

Before starting with the connection procedure, do the following checks on the electrical cables that come down from the PV panels:

- Check with a tester that on each line (string) is available a current lower than 550 Vdc.
- Check with a tester the right polarity of the cables (red cable = pole “+”; black cable = pole “-”).
- Insulate the cable tract that will be connected to the connector type MC4 (Picture 26 e Picture 27).
- Before starting the installation of the connector MC4, check with a tester that the potential difference between the cable that is going to be connected and the Pe protective conductor of the electrical installation is equal to 0 V.



Picture 26 - Secure the derivation cables from the string panels before the connection with MC4 connectors

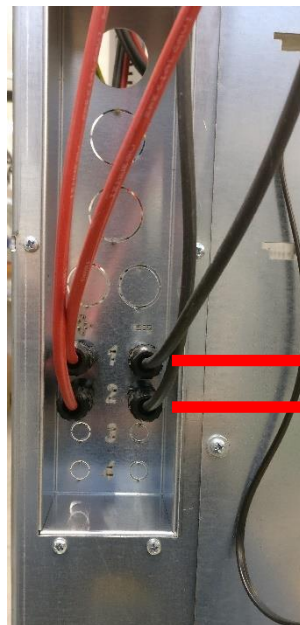
Equip the derivation cables from the string panel with the connectors type MC4, as shown in the following picture.



Picture 27 - Derivation cables from the string panel equipped with MC4 connectors

Label the cables deriving from the panels strings (string 1, string 2) and connect them to the connectors placed on the back side of the storage system (Picture 28).

Restore the connection of the strings and check with a tester that on each line (string) just connected is available a current lower than 550 Vdc (Picture 29).

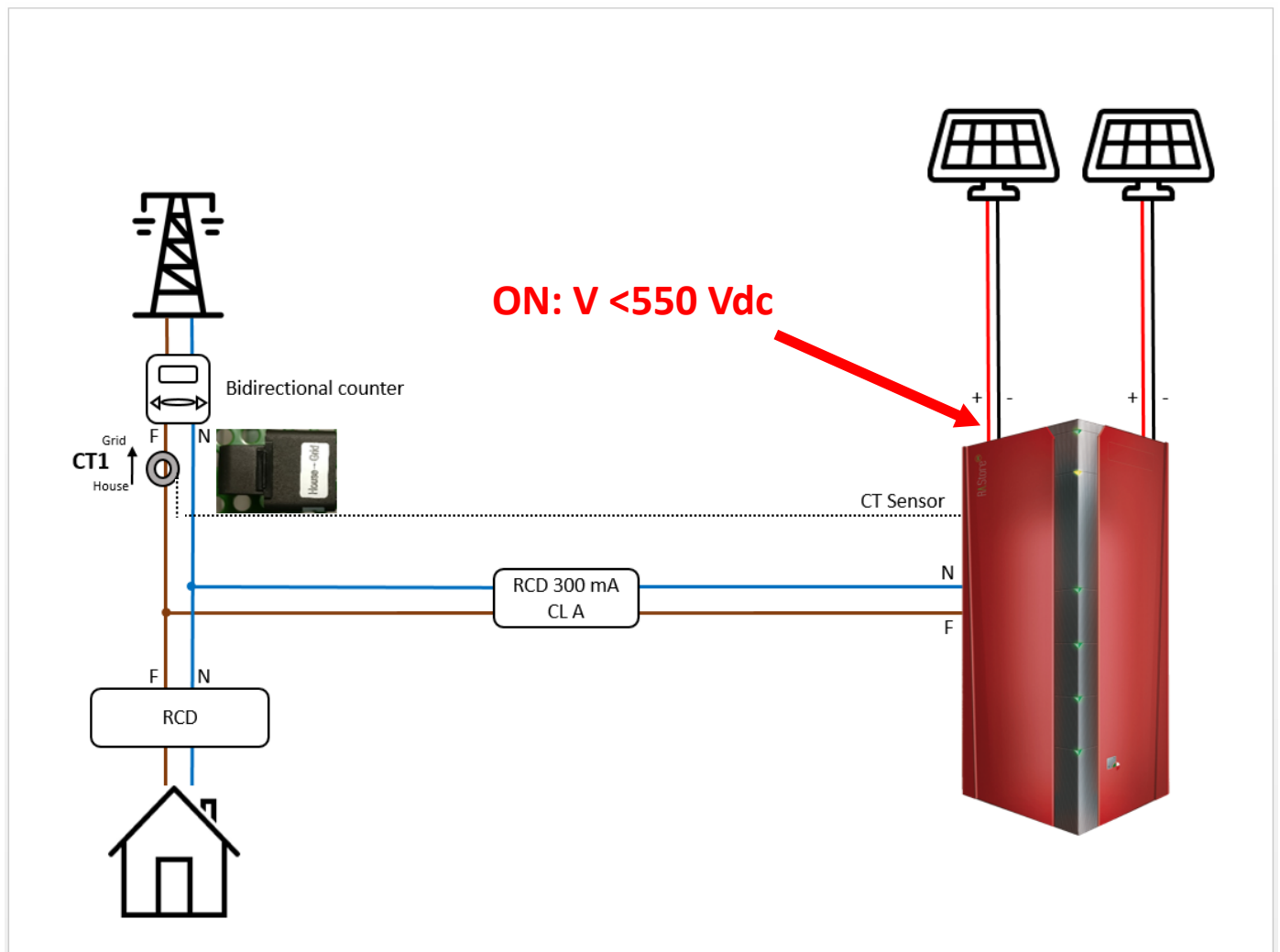


ENTRY
STRING 1

ENTRY
STRING 2

Picture 28 - RA.Store-K-F: MC4 connectors connected

(MPPT1: connectors serigraphy "1"; MPPT2: connectors serigraphy "2")



Picture 29 – Restore of the strings and check that on the MC4 connectors $V < 550 \text{ Vdc}$

3.3.6 Connection of GRID and EPS cables



ATTENTION

Electrocution risk. Use insulating gloves and carpet foreseen for works done on hazardous electrical components.

3.3.6.1 Specifications and electrical protections required

The RA.Store-K-F storage system is set up on the "QG-M1" terminal board to be connected to two output power lines: "GRID" and "EPS".

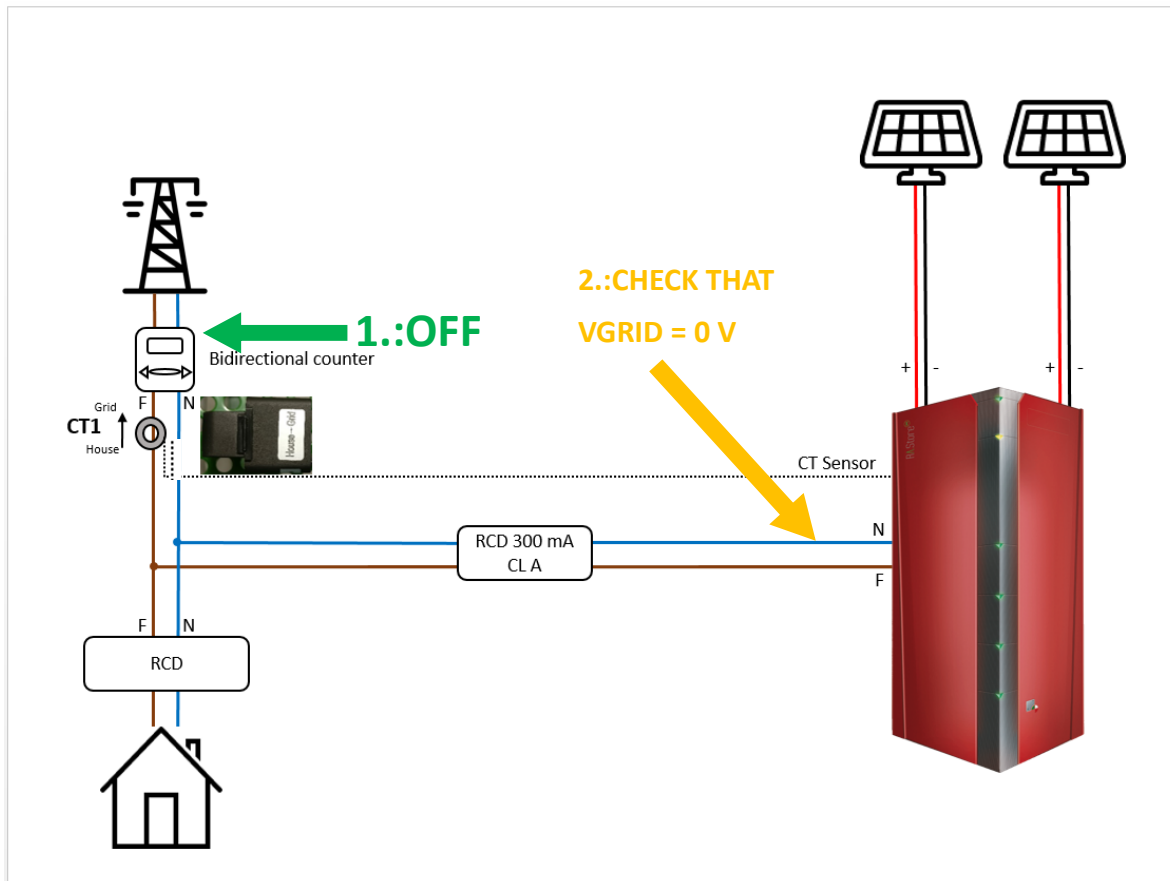
Aton, in order to protect the accumulation system from overvoltages coming from the national electricity grid, requires the installer to prepare on the "GRID" power line in derivation from the terminal block "QG-M1" (terminals "R1.1", "S1. 1", "T1.1", "N1.1") an electrical panel containing:

- A Surge Protection Device Type 2, bipolar, with maximum discharge current $I_{max} = 40 \text{ kA}$ and rated discharge current $I_n = 15 \text{ kA}$;
- a bipolar fuse holder suitable for sectioning with a capacity of 32 A to protect and dissect the overvoltage arrester;
- An differential magnetothermal bipolar type, with maximum residual current equal to 300 mA, class A, installed on the "GRID" line in derivation from the RA.Store-K-F terminal.
- An differential magnetothermal bipolar type, with maximum residual current equal to 300 mA, class A, installed on the "EPS" line in derivation from the RA.Store-K-F terminal.

Inform the customer that the energy supply to the house will be disconnected for the time being due to the installation. The terminals regarding the electrical line called EPS (terminals L2.2 and N2.2) must be connected only if the commutation panel is available (delivered separately).

Proceed as follows:

1. Lower the general (bidirectional) meter downstream the public grid.
2. Open the disconnectors inside the string panels (**OFF**).
3. Check with a tester the real lack of voltage on-site and the lack of electricity at the ends of the GRID cables.
4. Insert the GRID and EPS cables inside the slots on the rear panel, protecting the cable with a suitable cable gland.



Picture 30 - GRID line connection

Label the cables of the GRID line and EPS line.

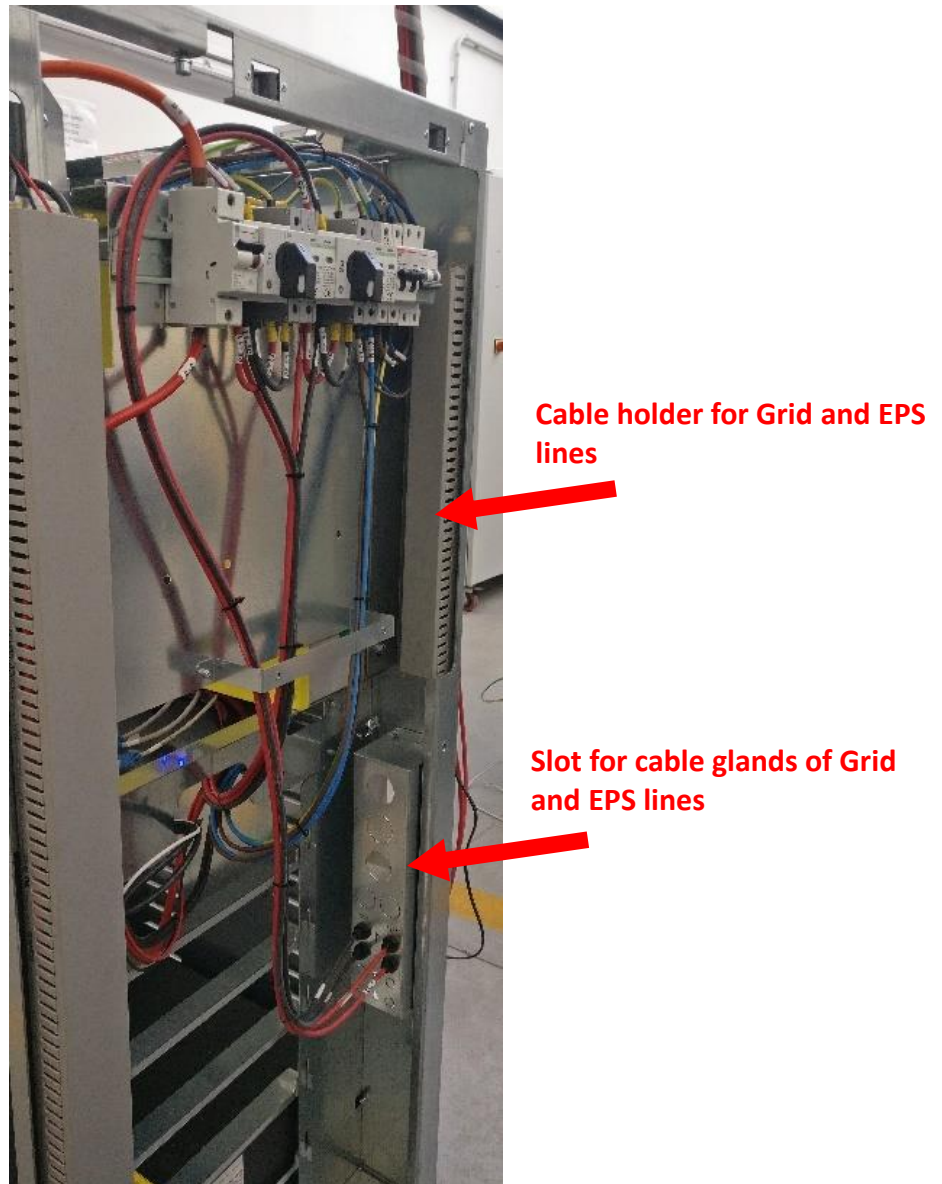
Sheathe the cables and pass them through a slot located on the back of the structure (Picture 31).



Slots of Grid and EPS cables –
Complete with cable glands

Picture 31 – Slots of Grid and EPS cables

Put the cables of the GRID line and EPS line in the suitable cable holder indicated in Picture 32.



Picture 32 – Cable holder of Grid and EPS lines

3.3.6.2 Grid Line

The power line called "GRID" (terminal block "QG-M1", terminals "L1.1", "N1.1") is the line that must be connected in parallel to the electrical line connecting the three-phase energy meter to the general panel low voltage of the utility (for the electrical connection follow the instructions given in the wiring diagram supplied with the product).

The "GRID" line supplies or withdraws energy only when the national grid is active ($V_{grid} = 230 \text{ Vac}$).

3.3.6.3 EPS Line (AC Back up)

The power line called "EPS" (terminal block "QG-M1", terminals "L2.2", "N2.2") is the ac line of back-up that must be connected only in the presence of the switchboard, external to accumulation system, between the lines "EPS" and "GRID" (for the electrical connection follow the instructions given in the wiring diagram supplied with the product).

Without the switchboard the connection of the EPS line can not be realized.

The "EPS" line does not require any setting or activation; it supplies energy only when the national grid is not active ($V_{grid} = 0 \text{ Vac}$).

IT IS STRICTLY FORBIDDEN



It is strictly forbidden to execute any operation without any of the following PPE:

- Anti-electrocution gloves
- Insulating carpet (for ex. for measuring on cables under tension)
- Safety shoes

Connect the GRID line and the EPS line (if any) to the terminals respecting the indications of the wiring diagrams and in Picture 33:

Grid line - terminal box QG - M1:

PHASE (conductor color black or brown or gray): terminal L1.1

NEUTRAL (conductor color blue): terminal N1.1

GROUND (conductor color greenyellow): terminal GND

Tightening torque to be applied to the line wiring terminals "Grid": 1,7 Nm.

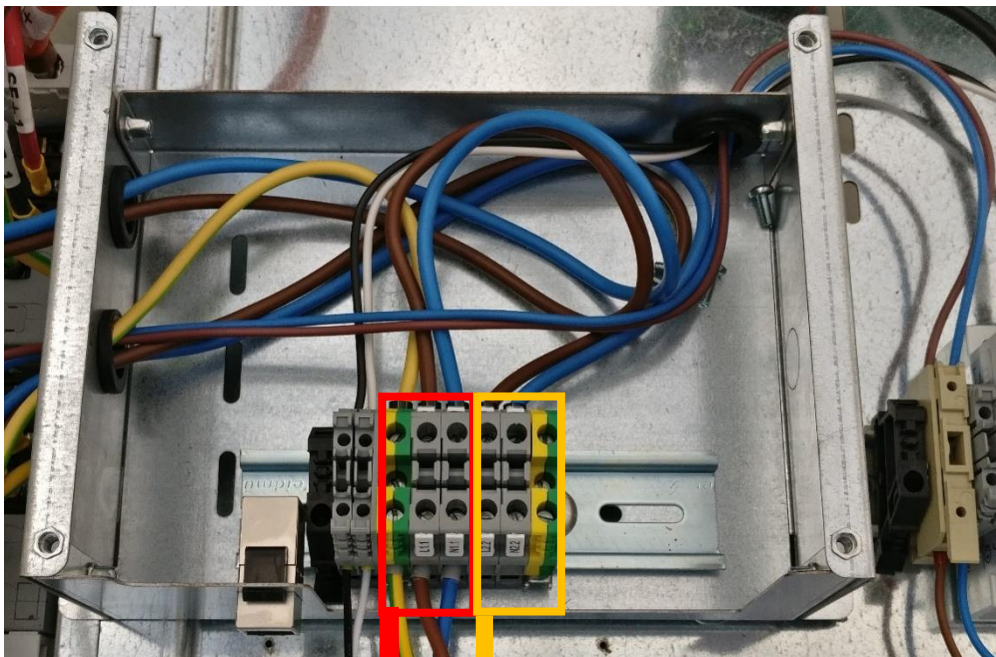
Linea EPS morsettiera QG - M1 (Without the switchboard the connection of the EPS line can not be realized):

PHASE (conductor color black or brown or gray): terminal L2.2

NEUTRAL (conductor color blue): terminal N2.2

GROUND (conductor color greenyellow): morsetto GND

Tightening torque to be applied to the line wiring terminals "EPS": 1,7 Nm.



Picture 33 Terminal box QG-M1: Connections of the GRID and EPS lines

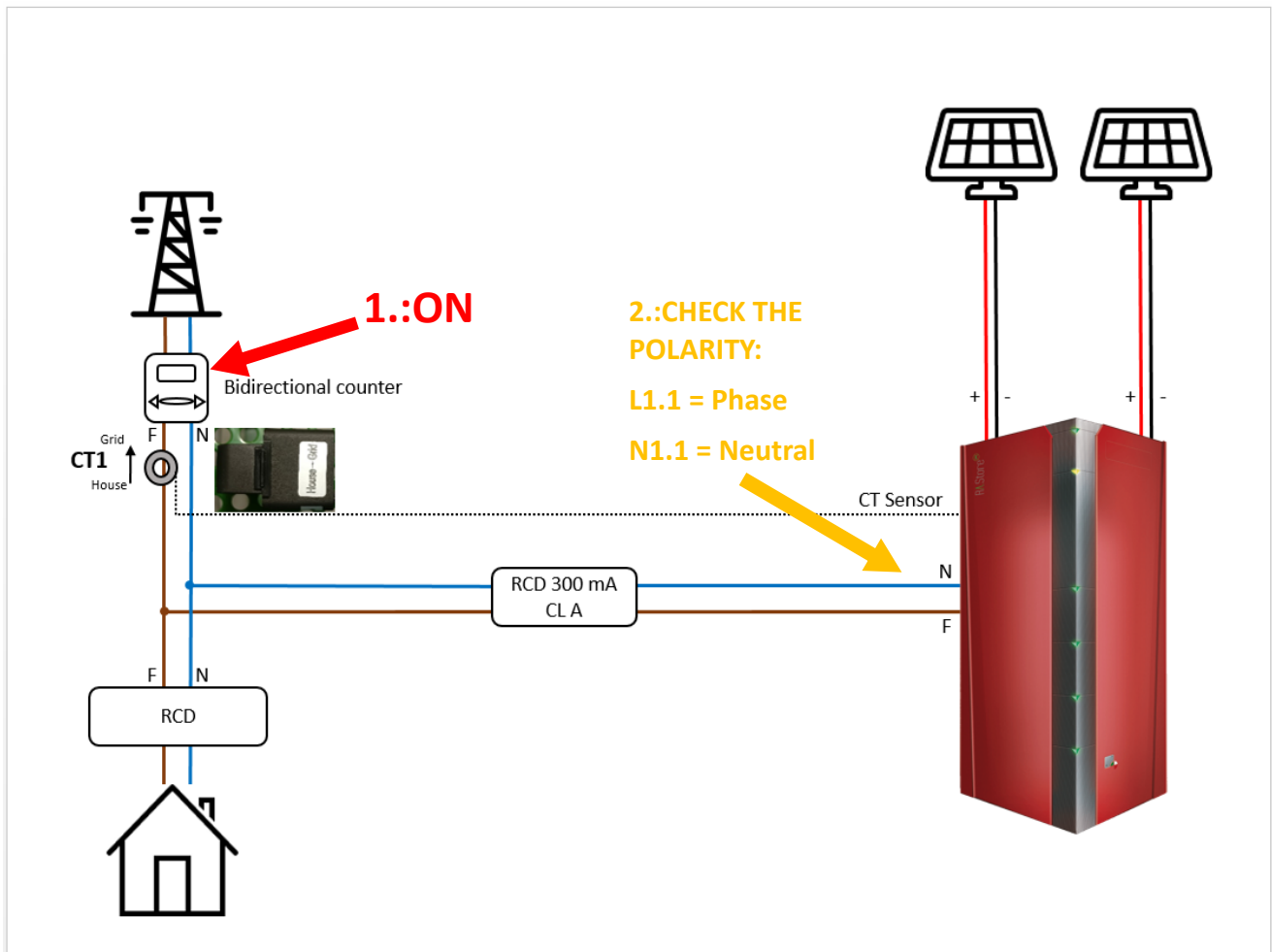
EPS LINE ENTRY (CONNECT ONLY IF THE EXTERNAL COMMUTATION PANEL GRID / EPS IS AVAILABLE)

GRID LINE ENTRY

Inform the customer that the electricity supply is now available in the house.

Reconnect the electrical supply line of the house.

Check the correspondence of phase and neutral on the terminals of the GRID line (L1.1 and N1.1) and EPS line (L2.2 and N2.2).



Picture 34 – Check of the correct connection of Phase and Neutral of the Grid and EPS lines in the terminal box QG - M1

3.4 Commissioning

3.4.1 Commissioning of the electrical panel and check of the correct installation of the CT

In Picture 35 it is shown the position that the protections must have before starting the commissioning phase.

COMPONENT
NAME
EXTERNAL
LABEL

BATTERY

GDS1

SPV1

GDS2

SPV2

GRID

EPS

COMPONENT
NAME
ELECTRICAL
SCHEME

QB1

QPV1

SPV1

QPV2

SPV2

QG1

QE2



Picture 35 – Starting position of the protections of the RA.Store-K-F electrical panel

COMPONENT
STATUS

OFF

OFF

OFF

OFF

OFF

1. Put on ON the breaker “QG1 GRID” and “QB1 BATTERY” (Picture 36).

COMPONENT
NAME
EXTERNAL
LABEL

BATTERY

GDS1

SPV1

GDS2

SPV2

GRID

EPS

COMPONENT
NAME
ELECTRICAL
SCHEME

QB1

QPV1

SPV1

QPV2

SPV2

QG1

QE2



Picture 36 – All the breakers of the electrical panel in “ON” position

COMPONENT
STATUS

ON

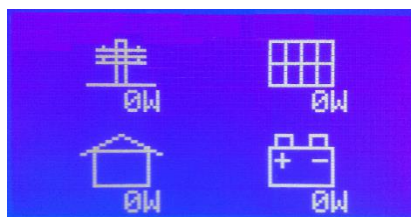
OFF

OFF

ON

OFF

Wait until the display shows the screen with the symbols of HOUSE, PYLON, PV PANEL and BATTERY.



Picture 37 – Display at the switching on: main screen

- Before the inverter connects to the grid (it usually takes at least 30 seconds), check on the display of RA.Store-K-F that:

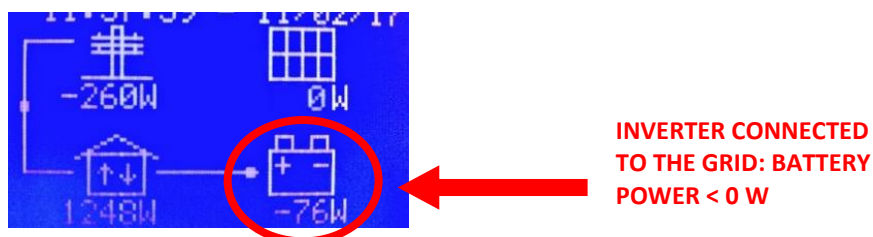
the power placed under the icon of the pylon of the GRID must be negative and equal as absolute value to the power place under the icon of the HOUSE (but with positive sign +) as shown in the example below (Picture 38, Check n.1).



Picture 38 - Check nr. 1

If the check is not possible because the inverter is linked up to the grid and the screen has changed as the following in Picture 39 (battery power < 0 W), lower (OFF) the magneto-thermal breaker QG1 (GRID LINE); wait a minute and raise it, then check the condition described in the previous point "2".

INVERTER CONNECTED TO THE GRID! THE CHECKING TIME IS OVER!



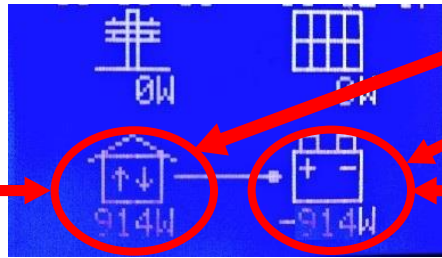
Picture 39 – Inverter connected to the grid

If the power shown under the icons ELECTRICITY PYLON and HOUSE is "0 W", check that the CT sensor is correctly installed and there are no interruptions on the cable or any wrong connections (check eventual junctions or the connection of the CT connector on the terminal box of the RA-K-F).

If, after checking Test 1 and after the inverter has been connected to the network for a few minutes, the powers displayed below the user and battery icon are the same but opposite sign (Positive Putence, Negative Pbattery), as shown in Picture 40, the CT sensor is installed correctly.

**INVERTER CONNECTED
TO THE GRID ! CT OK**

**POSITIVE POWER OF
THE HOUSE (+)**



**SAME ABSOLUTE VALUE
OF POWER**

**NEGATIVE POWER OF
THE BATTERY (-)**

Picture 40 – Inverter connected to the grid

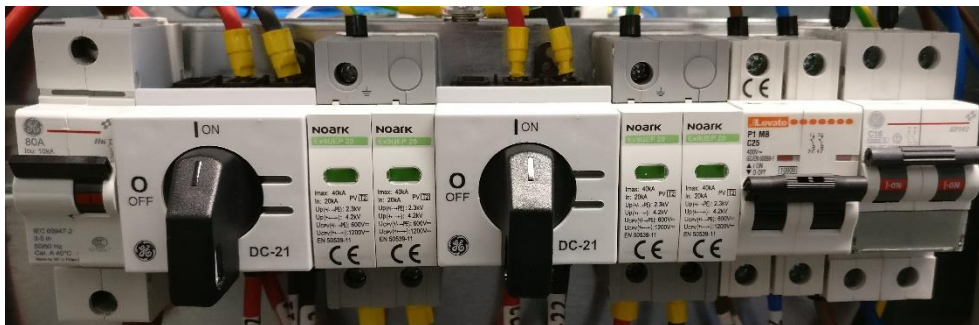
- Then raise the wall disconnectors of the PV panels on eventual external string panels (be also sure that the differential breaker placed upstream the house and the breaker placed downstream the RA.Store-K-F are raised).
- Close the 2 rotary disconnectors “QPV1” e “QPV2”, as shown in Picture 41 (“QE2 EPS” can be in position of “OFF” or “ON”, it has no importance because it is insignificant).

**COMPONENT
NAME
EXTERNAL
LABEL**

BATTERY GDS1 SPV1 GDS2 SPV2 GRID EPS

**COMPONENT
NAME
ELECTRICAL
SCHEME**

QB1 QPV1 SPV1 QPV2 SPV2 QG1 QE2



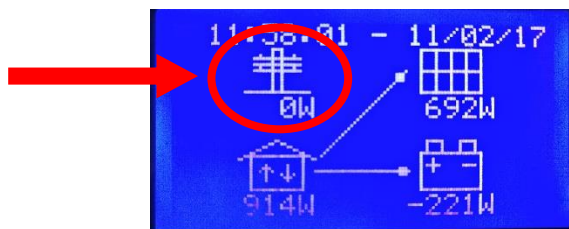
Picture 41 - All the breakers of the electrical panel in “ON” position

**COMPONENT
STATUS**

ON ON ON ON OFF

5. Wait until a power appears under the icon PV PANEL and check that:
in a few minutes the power showed under the PYLON icon is equal to 0 W, as shown in the following picture (Picture 42, Check n.2).

**INVERTER CONNECTED TO
THE GRID, PV PANELS IN
GENERATION: PYLON
POWER = 0 W**



Picture 42 - Check nr. 2

If the power showed under the icon PYLON will not reduced to zero, check the installation position of the CT sensor because it is not correct and repeat the checks from the beginning of the paragraph “3.4 Placement and connection of the CT sensor”.

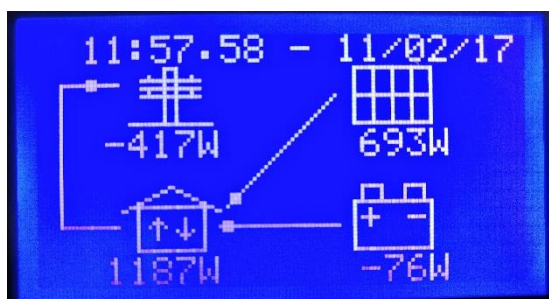
If the above mentioned conditions are satisfied, it means that the installation is correct and the system can be put on service.

IMPORTANT: Inform the customer that when the maintenance of the lines of the house is necessary, it is **COMPULSORY** to lower the disconnectors QG1 e QE2 (only if the GRID / EPS commutation panel is available).

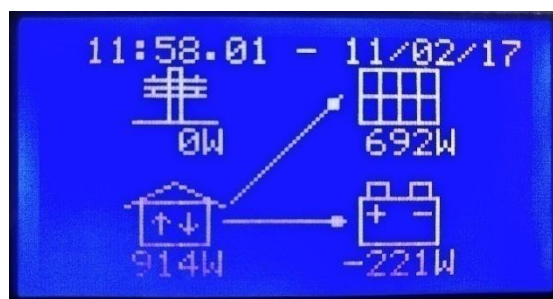
 	<p style="text-align: center;">ATTENTION</p> <p>Before doing any maintenance on the AC lines of the building, lower the disconnectors GRID and EPS placed on the electrical panel on the storage system.</p>
------	---

3.4.2 Functioning test in ON-GRID mode

By switching on and off some household appliances with known watt consumption (e.g. hairdryer), check on the display of Ra.Store-K-F that the energy is taken from the battery and the PV panels and given to the house (the arrow goes from the battery towards the house) and that the values shown on the display are compatible with the activated household appliances (Picture 43 and Picture 44).



Picture 43 – Screen before the power showed under the icon PYLON is reduced to zero by the storage system



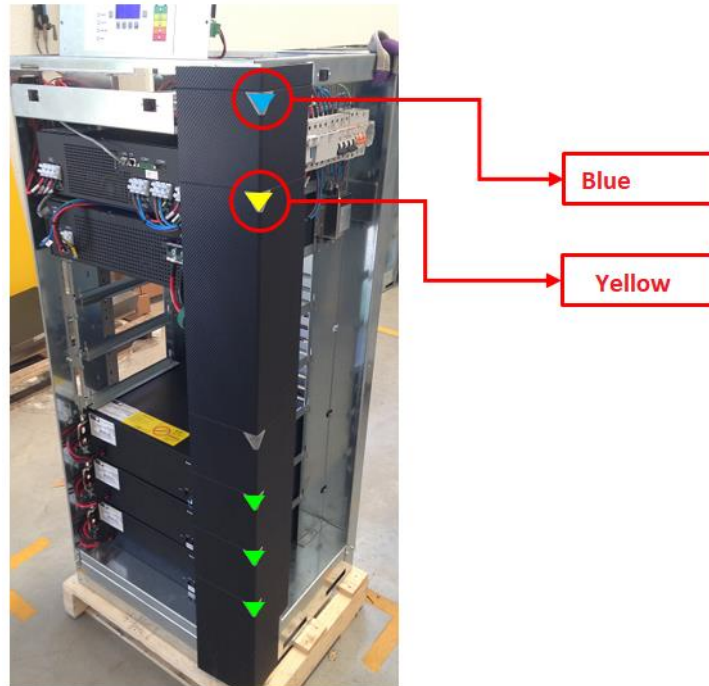
Picture 44 - Screen after the power showed under the icon PYLON is reduced to zero by the storage system

To execute a supplementary check, measure with a current clamp the current on the public grid (the PYLON icon in the previous pictures) and the current on the household appliances line (the HOUSE icon in the previous pictures),

calculate the relative powers by multiplying the measured data by the line voltage and compare such powers with the ones showed on the display of RA.Store-K-F.

In case such values are not compatible with the activated household appliances, check the placement of the CT sensor (see paragraph “3.3.4 Placement and connection of the CT”).

Check moreover that the first led light at the top is light blue and the second one is yellow (Picture 45).



Picture 45 – Check the colours of the first (light blue) and second (yellow) led lights

3.4.3 Statuses and problems of the system (meaning of the led lights)



Picture 46 – Status led lights of the storage system

RA.Store-K-F is equipped with 6 multicolour led lights:

- Nr. 4 (ref.1 of Picture 46) of them show the quantity of energy stored in the battery:

Energy Soc%	Led 6 (at the bottom)	Led 5	Led 4	Led 3
$Soc \geq 90\%$	green	green	green	green
$60\% \leq Soc < 90\%$	green	green	green	OFF
$30\% \leq Soc < 60\%$	green	green	OFF	OFF
$20\% \leq Soc < 30\%$	green	OFF	OFF	OFF
$Soc < 20\%$	orange	OFF	OFF	OFF

- Nr.2 (ref. 2 of Picture 46) show the statuses of functioning:

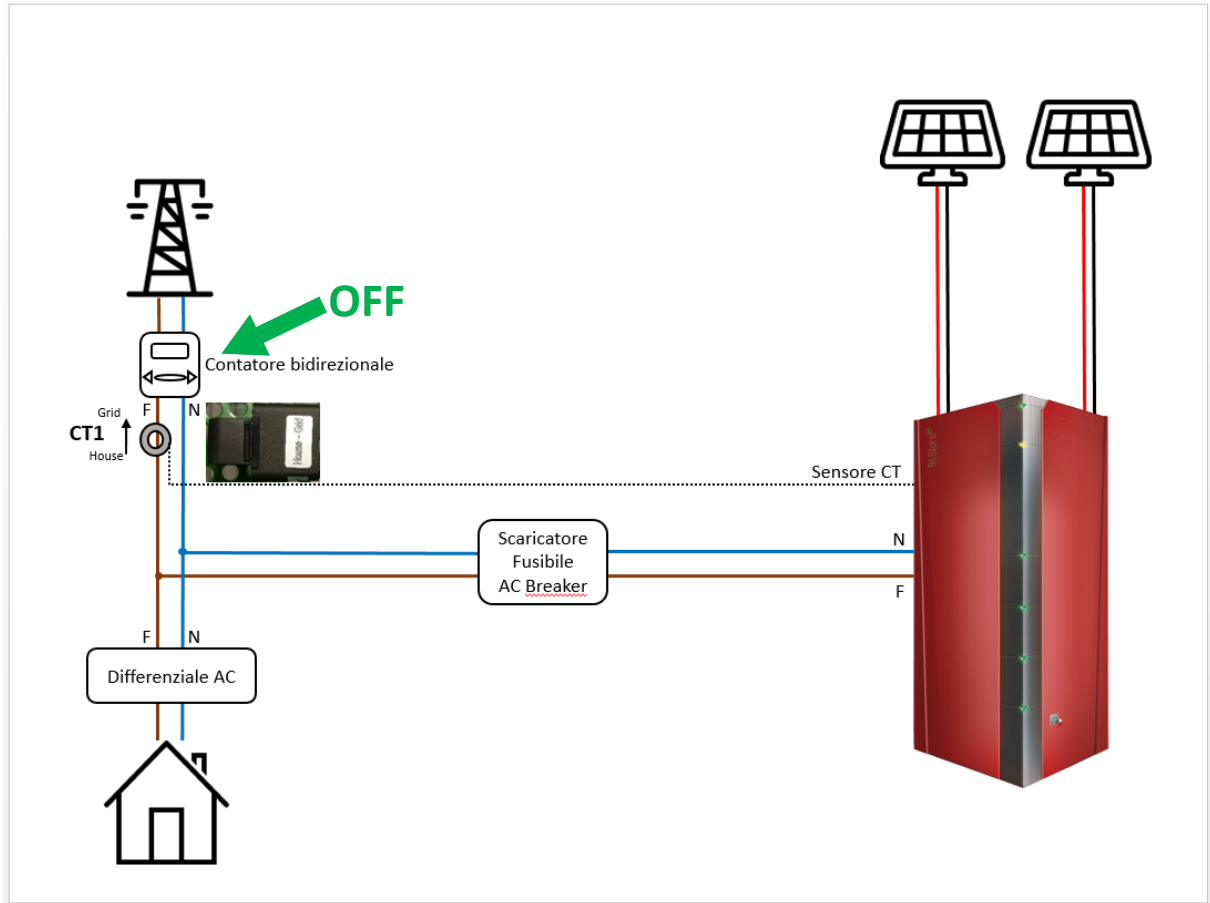
Status	Led 2	Led 1 (up)
OFF	OFF	OFF
Supply of energy from the PV panels	yellow	----
In activity	---	Light blue
Problem	---	red
Lacking grid	---	Flashing red

3.4.4 Functioning in EPS mode (EPS)

(only if the automatic GRID LINE/EPS LINE commutation panel is available on the machine)

Inform the customer that the energy supply to the non-privileged household appliances will be disconnected and to the privileged household appliances will be disconnected for 5 seconds.

Lower the general (bidirectional) meter downstream the public grid.



Picture 47 – Simulation of a blackout of the national electrical grid in order to test the EPS function of the storage system

Moreover check that the first led at the top (in the following picture indicated with nr.2) is red and the second one (in the following picture indicated with nr.3) is yellow.



Picture 48 – Led lights check in EPS function

Check on the display that, under the battery icon, a positive electric power is shown (for ex. 410 W).

After the commutation of the EPS panel has been done, check that the privileged household appliances fed by the magneto-thermal breaker “EPS LINE” (if available) are functioning.

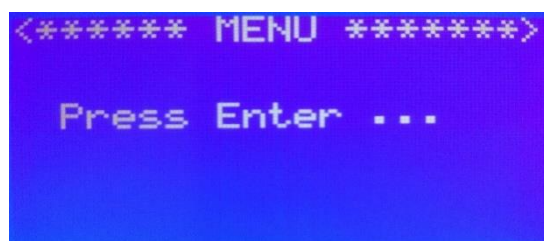
Reconnect the electrical supply line of the house.

3.4.5 General information (FW, Bios etc.) and Self test

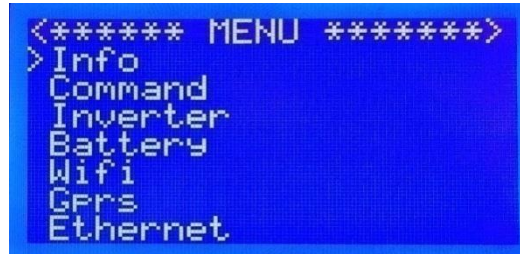
Press two times the key “arrow up” until the screen “Press Enter...” is shown, then press the “Enter” key (Picture 49 and Picture 50).



Picture 49 - Display and keyboard of Ra.Store-K-F



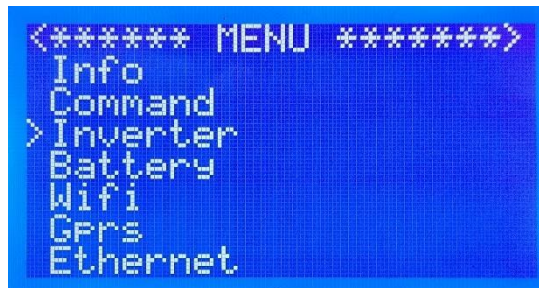
Picture 50 – Access to the setting up menu



Picture 51 – Main setting up menu

Use the arrow keys “**arrow up**” and “**arrow down**” to select an item, and the “**Esc**” key to exit.

Place the cursor next to the writing “**Inverter**”, and press the “**Enter**” key (Picture 52).



Picture 52 – Access to the menu “Inverter”

To execute the Self Test (Directive CEI-021) select the item “**Self Test**”, then “**Start Test**” (Picture 53 and Picture 54).

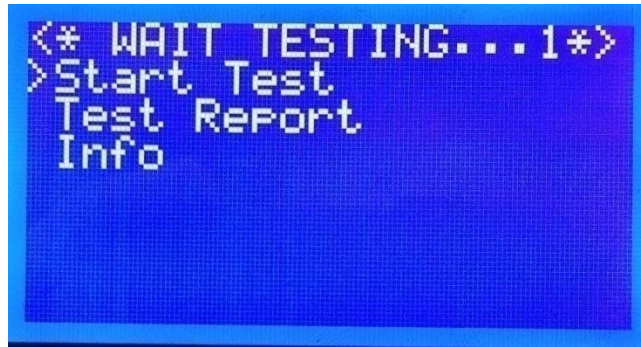


Picture 53 – Access to the menu “Self Test”



Picture 54 – Order of starting the Self Test

The test will begin and the messages “< * WAIT TESTING...1*>”, “< * WAIT TESTING...2*>”, “< * WAIT TESTING...3*>” ... will be displayed (Picture 55).



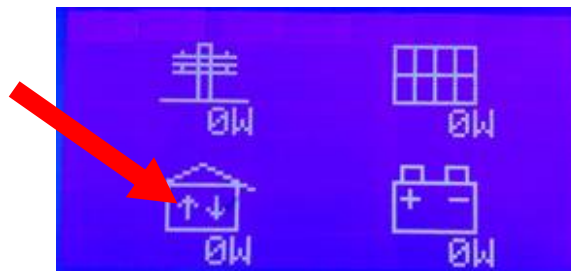
Picture 55 - Self Test in progress

In case the test will fail, the message “<*** **TEST FAILED** ***>” will be displayed, whereas if the test reaches in the right way its end, the screen with the test results will be displayed (use the “**arrow up**” and “**arrow down**” keys in order to see all the test results).

Press repeatedly the “**ESC**” key until you go back to the main screen.

3.4.6 Communication of the system

Check on the display that inside the symbol of the house appear two arrows with alternate directions (Picture 56).

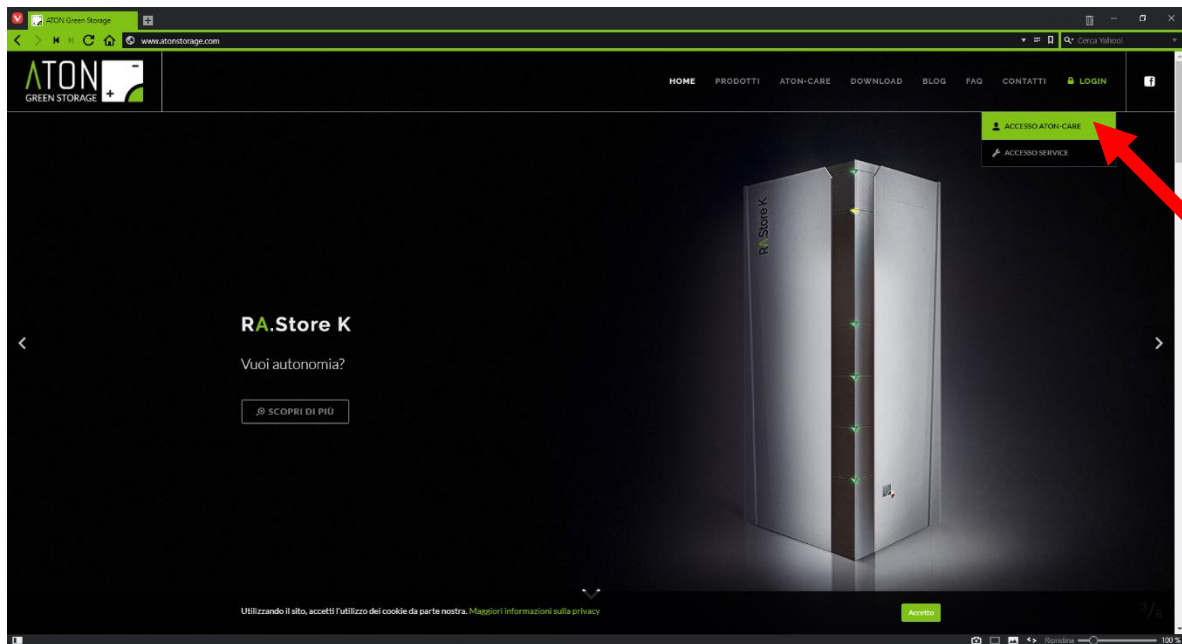


Picture 56 – Check of the active communication with Aton portal

In case these arrows are not displayed, contact the technical support.

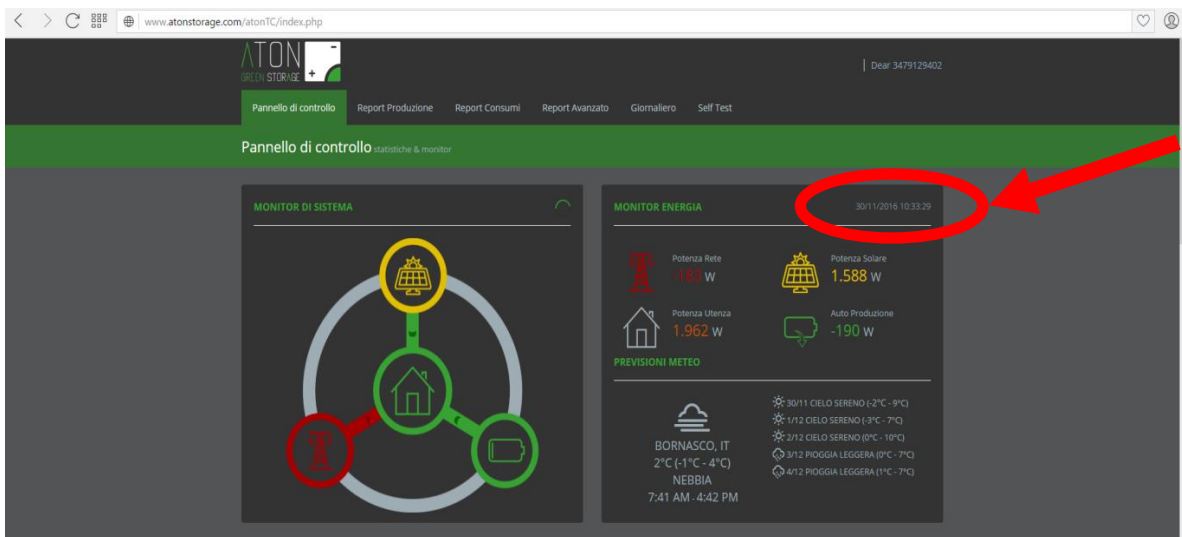
3.4.7 Communication test with Aton portal

Connect through a PC, Smartphone or tablet to the website www.atonstorage.com, click on the “LOGIN” e “ACCESSO ATON-CARE” button, then insert Username and Password (created during the registration of the machine on the portal) that refer only to the machine you are going to install.



Picture 57 – Access to Aton web portal

Access the website with the customer credentials, then wait some minutes and check that the date of the screen updates.



Picture 58 – Remote control of our product

If this does not happen, contact the technical support.

3.4.8 Access to Aton portal for the final customer

Tell the final customer the access data (Username and Password) to Aton portal that have been created during the registration of the machine.

3.5 Reassembly of the structure

Put each of the three side panels in the runners at the bottom and the pins at the top must enter the adequate runners.

Replace the upper panel and screw the two screws that keep it together with the rest of the structure.



Picture 59 – Replacement of the upper panel in its location

4 Replacement parts and maintenance

Aton storage systems do not require maintenance.

Only in the event of failure of one or more internal components is the intervention of a technician who performs the replacement in order to restore normal operation.

As written in the initial paragraph, only the technical personnel authorized directly by Aton to the installation of the system can also perform the operations of replacing the internal components.

Even authorized technical personnel, before proceeding with the replacement of internal components to the storage system, must always contact Aton technical assistance to verify the compatibility of the item that is going to be installed with the other components present on the energy storage system.

The installation of components that do not come from Aton is not permitted.

It is not possible to completely replace the battery or a part of it with non-homogeneous battery modules.

5 Replacement of a battery module

This type of activity is one of the activities that can only be carried out by technical personnel directly authorized by Aton.

The technical personnel authorized to carry out the work, before proceeding with the replacement of the battery module, must always contact Aton technical assistance to verify the compatibility of the item that is going to be installed with the other components present on the energy storage system.

The installation of components that do not come from Aton is not permitted.

It is not possible to completely replace the battery or a part of it with non-homogeneous battery modules.

Before proceeding with the work it is necessary to read and respect the indications written in the paragraph “1 Introduction”.

CAUTION

Danger of explosion!

The battery modules inside the storage system may explode if:

- Exposed directly to sources of heat or open flames
- Do not expose the battery modules to direct sources of heat or open flames.

Complete the deactivation procedure of the accumulator as indicated in the technical appendix “Appendix A - Switch off and on the system”.

Then start with the removal of the plastic parts, as described in the paragraph “3.2.2.1 Removal of the plastic parts”.

Finish the procedure of switching off the battery modules as described in the technical Appendix “Appendix B – Switch off and on the batteries”.

On the battery module that must be replaced, execute the following steps (Picture 60):

- Unscrew the 4 screws that keep it together with the structure (indicated with a red circle) and the screw for the equipotential bond (indicated with a blue circle);
- Disconnect all the connections regarding the “positive” and “negative” poles (indicated with a green circle);
- Disconnect all the connections regarding the data signals (indicated with a brown circle);
- Remove the battery from its slot by using the frontal handles (indicated with a red arrow);
- remove completely the battery from its slot and put it on the floor;

On the battery module that must be installed, execute the following steps (Picture 60):

- Put the battery module to be installed in the slot where the battery module to be replaced has already been removed
- Connect all the connections regarding the data signals (indicated with a brown circle);
- Connect all the connections regarding the “positive” and “negative” poles (indicated with a green circle);
- Screw the 4 screws that keep it together with the structure (indicated with a red circle) and the screw for the equipotential bond (indicated with a blue circle);

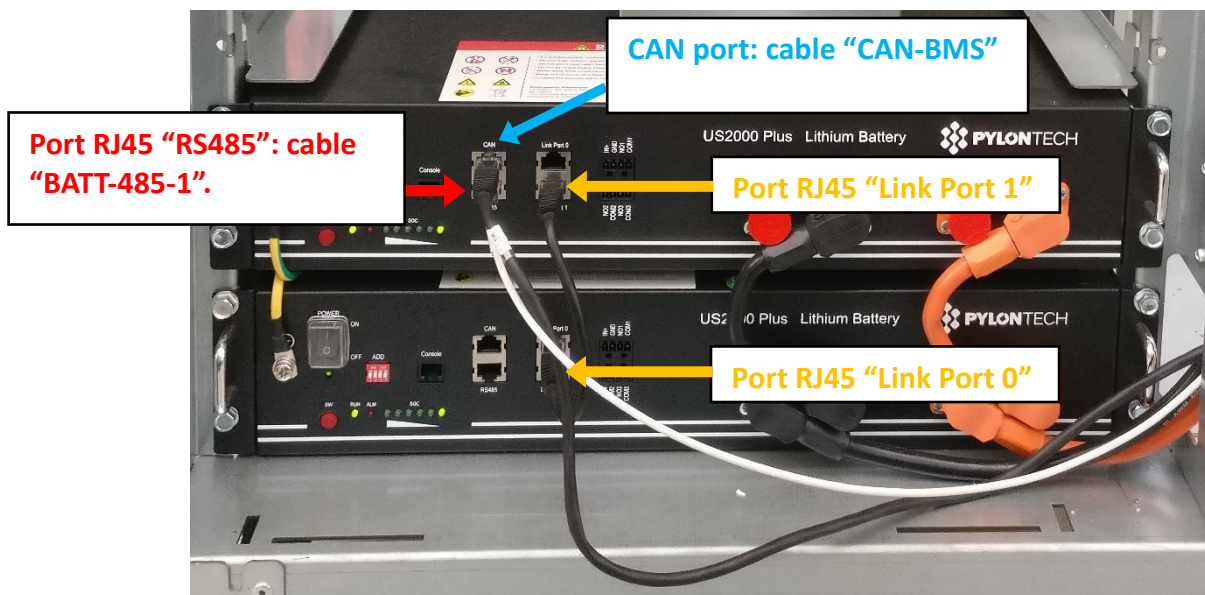
Finish the procedure of switching on the battery modules as described in the technical Appendix “Appendix B – Switch off and on the batteries”.

Then place again the plastic parts in their location, as described in the paragraph “3.5 Reassembly of the structure”.

Finish the procedure of switching on the storage system as described in the technical “Appendix A - Switch off and on the system”



Picture 60 – Replacement of battery module – Removal module screws, equipotential bond screw, signal and power connections



Picture 61 – Connection restore: data signals cables



Picture 62 - Connection restore: data signals cables

Appendix A - Switch off and on the system

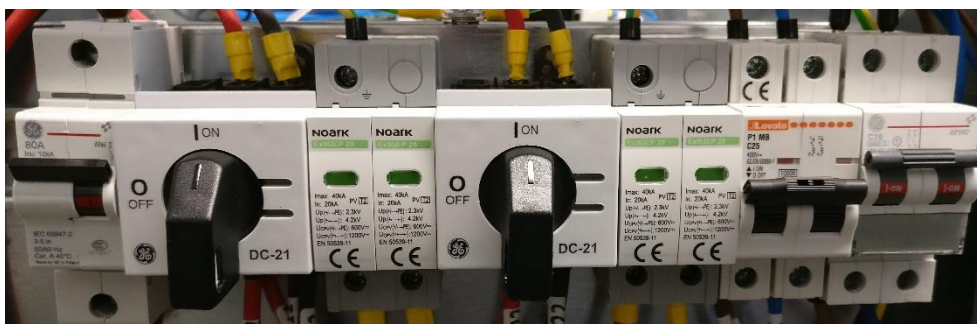
In order to switch off the system, lower the disconnectors in the following order:

1. QE2 (EPS)
2. QG1 (GRID)
3. QPV2 (PV2 FIELD)
4. QPV1 (PV1 FIELD)
5. QB1 (BATTERY)

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

1. QB1 (BATTERY)
2. QPV1 (PV1 FIELD)
3. QPV2 (PV2 FIELD)
4. QG1 (GRID)
5. QE2 (EPS)

COMPONENT NAME	BATTERY	GDS1	SPV1	GDS2	SPV2	GRID	EPS
ELECTRICAL SCHEME	QB1	QPV1	SPV1	QPV2	SPV2	QG1	QE2

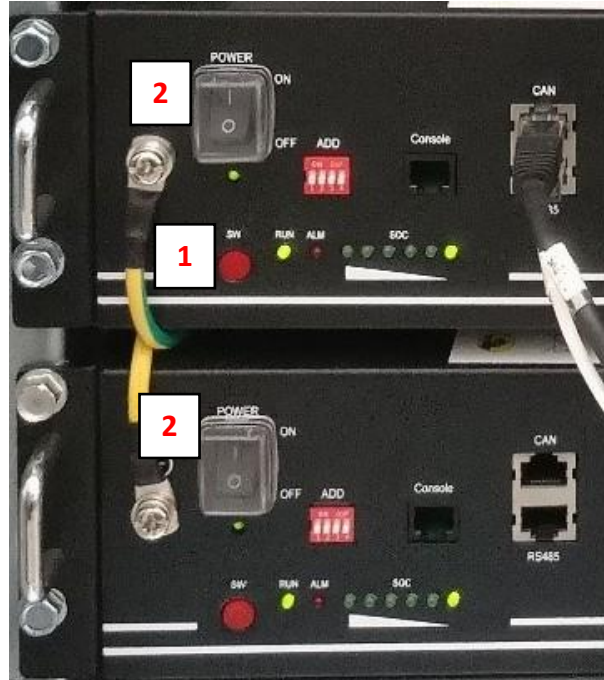


Picture 63 - Appendix A: electrical panel of RA.Store-K-F

Appendix B – Switch off and on the batteries

In order to switch off:

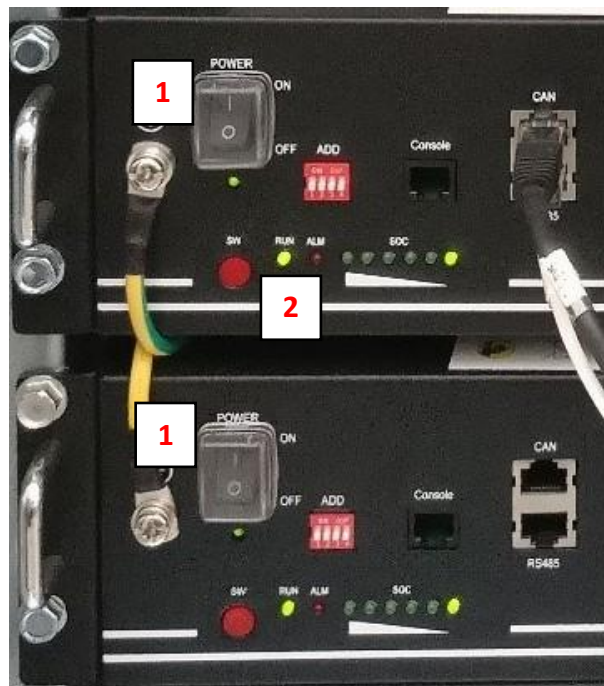
1. press once the red button “SW” of the first battery starting from the top;
2. Put the breakers on each battery in the position “0”.



Picture 64 - battery shutdown sequence

In order to switch on the batteries:

1. place on 1 the breakers of all batteries;
2. press the red button “SW” of the first battery at the top and check that all the led lights of all the batteries are switched on.



Picture 65 - battery shutdown sequence

Appendix C - Technical datasheets

Model	RAK3K2SHxFL	RAK4K2SHxFL	RAK5K2SHxFL
DC Input			
Maximum input power DC [W]	4000	4600	6000
Maximum input voltage DC [V]	580	580	580
MPP voltage range [V]	125-550	125-550	125-550
Maximum current for string input DC [A]	11	11	11
Maximum current of short circuit for each DC entry [A]	13,8	13,8	13,8
Number of MPP independent strings	2	2	2
Maximum power to battery [W]	3125	3750	5000
AC Output			
Wave form	Sinusoidal single phase	Sinusoidal single phase	Sinusoidal single phase
Maximum output power [W]	3000	3680	4600
Rated voltage [V]	230	230	230
Rated frequency [Hz]	50/60	50/60	50/60
Maximum output current [A]	14	16	24.5
Total harmonic distortion (THD)	<3%	<3%	<3%
Adjustable displacement factor	0,8 overexcited 0,8 underexcited	0,8 overexcited 0,8 underexcited	0,8 overexcited 0,8 underexcited
Contribution to the short circuit current[A]	21	24	36.5
AC Output (EPS-Back up)			
Wave form	Sinusoidal single phase	Sinusoidal single phase	Sinusoidal single phase
Maximum apparent power in discharge [VA]	3000	3680	4600
Maximum apparent peak power in discharge (10 sec) [VA]	4500	5520	6900
Rated voltage [V]	230 (+/-2%)	230 (+/-2%)	230 (+/-2%)
Rated frequency [Hz]	50/60 (+/-0.2%)	50/60 (+/-0.2%)	50/60 (+/-0.2%)
Maximum discharge power [A]	14	16	20
Total harmonic distortion (THD)	<3%	<3%	<3%
Battery			
Battery type	LiFePO4	LiFePO4	LiFePO4
Rated voltage [V]	48	48	48
Maximum charge current [A]	62,5	75	100
Maximum discharge current [A]	62,5	75	100
Minimum number of battery modules	0	0	0

Nr. of battery modules standard configuration	2	2	3
Maximum permissible energy for each battery module [kWh]	4,8	4,8	7,2
Usable energy for each battery module [kWh]	3,84	3,84	5,76
DoD [%]	80%	80%	80%
Minimum number of working cycles @ 25°C	4000	4000	4000
Number of battery modules at maximum capacity	6	6	6
Maximum permissible energy at maximum capacity [kWh]	2,4	2,4	2,4
Efficiency			
Maximum conversion efficiency	95,5%	95,5%	95,5%
Protections			
Anti-islanding	Yes	Yes	Yes
Overvoltage protection	Yes	Yes	Yes
Short circuit protection in output	Yes	Yes	Yes
Overtemperature protection	Yes	Yes	Yes
AC lines protection	Magneto-thermal breaker	Magneto-thermal breaker	Magneto-thermal breaker
Battery protection	Magneto-thermal breaker	Magneto-thermal breaker	Magneto-thermal breaker
External protections on the PV generator side (DC)	SPD	SPD	SPD
General data			
Working temperature range for normal functioning [°C]	from -5 to +45	from -5 to +45	from -5 to +45
Inverter type	HF insulated	HF insulated	HF insulated
Relative humidity	0 % ÷ 95 %	0 % ÷ 95 %	0 % ÷ 95 %
Maximum altitude [m]	< 2000	< 2000	< 2000
Cooling	Natural convection (Fanless)	Natural convection (Fanless)	Natural convection (Fanless)
Noise annoyance [dB]	< 25	< 25	< 25
Weight [kg] (standard nr. of batteries)	85	85	109
Dimensions [Length x width x H.]	650x550x1400	650x550x1400	650x550x1400
Assembly	On the floor	On the floor	On the floor
Protection type	IP20	IP20	IP20
Pollution degree	4	4	4

Room conditions of use	Indoor	Indoor	Indoor
AC overvoltage category	III	III	III
DC overvoltage category	II	II	II
Torque of the terminals [Nm]	1,7	1,7	1,7
Connection of a pole of the strings on earth	Not allowed	Not allowed	Not allowed
Minimum insulation resistance towards the floor of the string (Vdc test: 1000 Vdc) [MΩ]	1	1	1

Interfaces

GPRS (standard)	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
LAN (optional)	10/100 Mbps	10/100 Mbps	10/100 Mbps
Wireless home automation (optional)	EnOcean 868 MHz	EnOcean 868 MHz	EnOcean 868 MHz

Certifications and Regulations

Certifications	CE; CEI0-21/2017; IEC62109-1 : 2010; IEC62109-2 : 2011; EN62109-1 : 2010; EN62109-1 : 2011; Direttiva Bassa Tensione (LVD) 2014/35/EU; VDE-AR-N4105/08.11, DIN VDE V 0124-100/10.13; UTE C 15-712-1/07.13; ERDF-NOI-RES_13E; DIN V VDE V 0126-1-1:2006+A1; VFR 2014; SEI REF 04: 2010; CRAE Annexe 14.		
Safety Regulations	IEC62477 & IEC62040		
EMC Compatibility	EN61000-6-1, EN61000-6-2, EN61000-6-3, EN61000-6-4		

Spare parts and accessories			
Inverter	ATG-3K-TL	ATG-4K-T	ATG-5K-T
Battery module		US2000B	
Control card		ATN820F	
GPRS communication card equipped with antenna and connection cable (only applicable on SLOT5)		ATN811	
WiFi communication card equipped with antenna and connection cable (only applicable on SLOT3)		ATN813	
LAN communication card (only applicable on SLOT3)		ATN816	
LAN communication card (only applicable on SLOT6)		AP842	
Communication card RS485		AT814 + ATN105 + CV814-105	
Three-phase power meter for installation on three- phase power grid		Acrel DTSD1352/20(80)A	
Single phase power meter (external inverter)		C.Gavazzi EM111DINA V81XS1PFB	
Three-phase power meter (external inverter)		C.Gavazzi EM24DINA V93XISX	
Led card		ATN821	
Led angle panel (led lights not included)		MRASTOREKANGOLODESTRO	
Upper panel		MRASTOREKTETTO	
Right panel		MSTONFIANCODXPLASTIC	
Left panel		MSTONFIANCOSXPLASTIC	
Front panel		MSTONFRONTALEPLASTIC	

Please use only original spare parts and accessories ATON.

Number of battery modules, nominal storage capacity and weight

Model RA-K	Nr. of battery modules	Nominal storage capacity [kWh]	Total weight [kg]
RAK3K2SH2.5FL	1	2,4	115
RAK3K2SH5FL	2	4,8	138
RAK3K2SH7.5FL	3	7,2	161
RAK3K2SH10FL	4	9,6	184
RAK3K2SH12.5FL	5	12	207
RAK3K2SH15FL	6	14.4	230
RAK4K2H2.5FL	1	2,4	115
RAK4K2SH5FL	2	4,8	138
RAK4K2SH7.5FL	3	7,2	161
RAK4K2SH10FL	4	9,6	184
RAK4K2SH12.5FL	5	12	207
RAK4K2SH15FL	6	14.4	230
RAK5K2SH2.5FL	1	2,4	119
RAK5K2SH5FL	2	4,8	142
RAK5K2SH7.5FL	3	7,2	165
RAK5K2SH10FL	4	9,6	188
RAK5K2SH12.5FL	5	12	211
RAK5K2SH15FL	6	14.4	234

Appendix D - Weights for the transport

	RK3K2SHxFL	RK4K2SHxFL	RK5K2SHxFL
Weight of the base structure without batteries [kg]	78	80	82
Weight with one battery module [kg]	101	103	105
Weight with two battery modules [kg]	124	126	128
Weight with three battery modules [kg]	147	149	151
Weight with four battery modules [kg]	170	172	174
Weight with five battery modules [kg]	193	195	197
Weight with six battery modules [kg]	216	218	220
Weight of the plastic parts [kg]	14	14	14

Appendix E – Check of the CT sensor placement

STEP 0

Position of the protections on the electrical panel RA-K-F

COMPONENT
NAME
EXTERNAL
LABEL

BATTERY GDS1

SPV1

GDS2

SPV2

GRID

EPS

COMPONENT
NAME
ELECTRICAL
SCHEME

QB1

QPV1

SPV1

QPV2

SPV2

QG1

QE2



Starting position of the electrical panel protections of RA.Store-K-F

COMPONENT
STATUS

OFF

OFFOFF

OFFOFF

STEP 1

PUT ON **ON** THE MAGNETO-THERMAL BREAKER **QB1** (BATTERY) AND **QG1** (GRID LINE)

QB1

QG1

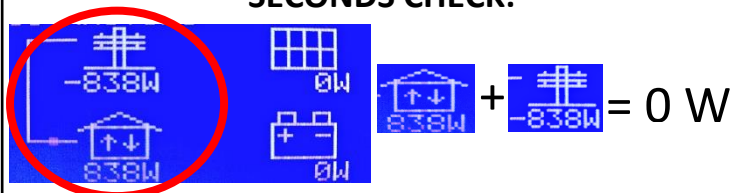


ON

ON

STEP 2

WITHIN 30
SECONDS CHECK:



THE ALGEBRAIC SUM OF THE HOUSE
POWER AND GRID POWER IS 0 W

NO

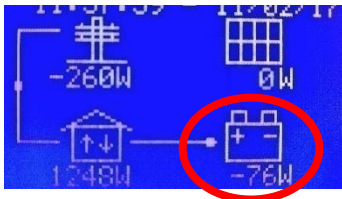
Move or turn the CT

YES

THE INVERTER IS ON
GRID

STEP 3

CHECK:



$\neq 0 \text{ W}$

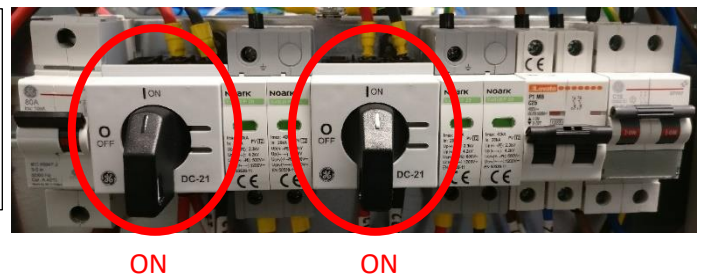
THE POWER SUPPLIED BY THE BATTERY
IS DIFFERENT FROM 0 W

NO

Wait 30 seconds
or 5 minutes (the
inverter is not
ON-GRID)

YES

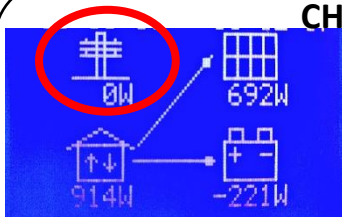
PUT ON **ON** THE
DISCONNECTORS **QPV1** (PV1
FILED) AND **QPV2** (PV2 FILED)



Wait 2 minutes

STEP 4

CHECK:



$= 0 \text{ W}$

THE POWER SUPPLIED BY THE GRID IS
EQUAL TO 0 W

NO

Move or turn the CT

YES

The CT is correctly installed

Repeat the
procedure from
STEP 0