

USER MANUAL



UNINTERRUPTIBLE POWER SUPPLY (UPS)

**SLC TWIN PRO2 A**

**1, 2 and 3 kVA**

**SALICRU**

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## 1. INTRODUCTION.

### 1.1. THANK YOU LETTER.

We thank you in advance for the trust placed in us in the purchasing of this product. Read this instruction manual carefully in order to familiarise yourself with its content, since the more you know and understand the device the greater your satisfaction, level of safety and optimisation of its functionalities will be.

We remain at your disposal for any additional information or queries that you may wish to make.

Yours sincerely.

**SALICRU**

- The device described here **is capable of causing significant physical injury if improperly handled**. For this reason, its installation, maintenance and/or repair must be carried out exclusively by our staff or **qualified personnel**.
- Although no effort has been spared to ensure that the information in this user manual is complete and accurate, we accept no liability for any errors or omissions that may exist.  
The images included in this document are for illustrative purposes and may not exactly represent the parts of the device shown; therefore they are not contractual. However, any divergence that may arise will be remedied or solved with the correct labelling on the unit.
- Following our policy of constant evolution, **we reserve the right to modify the characteristics, operations or actions described in this document without prior notice**.
- **Reproduction, copying, assignment to third parties, modification or total or partial translation** of this manual or document, in any form or by any means, **without previous written permission by us is prohibited**, with the company reserving full and exclusive property rights over it.

## 2. SAFETY INFORMATION.

### 2.1. USING THIS MANUAL.

The documentation of any standard equipment is available to the customer on our website for download ([www.salicru.com](http://www.salicru.com)).



The operation of the device described in this document is based on the original factory settings and configuration. Section 7.3 shows the screens tree, the variables and the original configuration. Take into consideration that any modification of them can lead to changes in the behaviour of the device.

- For devices 'powered by socket,' this is the website for obtaining the user manual and '**Safety Instructions**' EK266\*08.
- For devices with 'permanent connection' via terminals, a CD-ROM or pen drive containing all necessary information for connection and startup, including '**Safety Instructions**' EK266\*08, may be supplied with it.

Before carrying out any action on the device relating to its installation or startup, change of location, configuration or handling of any kind, carefully read the safety instructions.

The purpose of the user manual is to provide information regarding safety and explanations of the procedures for installation and operation of the equipment. Read it carefully and follow the steps indicated in the order established.



**Compliance with the 'Safety Instructions' is obligatory and the user is legally responsible** for compliance and enforcement.

The device is delivered properly labelled for correct identification of each of its parts, which, together with the instructions described in this user manual, allows installation and startup operations to be performed in a simple and organised manner without any doubts whatsoever.

Finally, once the equipment is installed and operating, it is recommended to save the documentation downloaded from the website, CD-ROM or Pen Drive in a safe and easy-to-access place, for any future queries or doubts that may arise.

The following terms are used interchangeably in the document to refer to:

- '**SLC TWIN PRO2 A,' 'TWIN PRO2 A,' 'TWIN A,' 'PRO2 A,' 'device,' 'unit' and 'UPS'** - Uninterruptible power supply.  
Depending on the context of the phrase, it can refer either to the actual UPS itself or to the UPS and the batteries, regardless of whether it is all assembled in the same cabinet or not.
- '**Batteries' or 'accumulators'**.- Group or set of elements that stores the flow of electrons by electrochemical means.
- '**TSS'** - Technical Service and Support.
- '**Customer,' 'installer,' 'operator' or 'user'** - These are used interchangeably and by extension to refer to the installer and/or operator who will carry out the corresponding actions, and the same person may be responsible for carrying out the respective actions when acting on behalf, or in representation, of the above.

#### 2.1.1. Conventions and symbols used.

Some symbols may be used and appear on the device, batteries and/or in the context of the user manual.

For more information, see section 1.1.1 of document EK266\*08 on '**Safety instructions**'.

### 3. QUALITY ASSURANCE AND STANDARDS.

#### 3.1. STATEMENT BY THE MANAGEMENT.

Our goal is customer satisfaction, therefore this Management has decided to establish a Quality and Environment Policy, through the implementation of a Quality and Environmental Management System that will enable us to comply with the requirements demanded in the **ISO 9001** and **ISO 14001** and also by our Customers and Stakeholders.

Likewise, the management of the company is committed to the development and improvement of the Quality and Environmental Management System, through:

- Communication to the entire company of the importance of satisfying both the customer's requirements as well as legal and regulatory requirements.
- The dissemination of the Quality and Environment Policy and the setting of the Quality and Environment objectives.
- Conducting reviews by the Management.
- Providing the necessary resources.

#### 3.2. STANDARDS.

This product is designed, manufactured and sold in accordance with Quality Management Standard **EN ISO 9001**.

The **CE** marking indicates conformity with EC Directives:

- **2014/35/EU**. - Low voltage safety.
- **2014/30/EU**. - Electromagnetic compatibility [EMC].
- **2011/65/EU**. - Restriction of the use of hazardous substances in electrical and electronic equipment [RoHS].

In accordance with the specifications of the harmonised standards:

- **EN-IEC 62040-1**. Uninterruptible power supplies [UPS]. Part 1-1: General and safety requirements.
- **EN-IEC 62040-2**. Uninterruptible power supplies [UPS]. Part 2: Electromagnetic compatibility requirements [EMC].



#### **WARNING!**

**SLC TWIN PRO2 A 1, 2 and 3kVA**. This is a category C2 UPS. In a residential environment, this product may cause radio interference, in which case the user must take additional measures.

It is not appropriate to use this device with basic life support applications, where a failure of the former can render vital equipment out of service or significantly affect its safety or effectiveness. It is also not recommended in medical applications, commercial transport, nuclear installations, or other applications or loads, where a failure of the product can lead to personal or material damages.



The EC declaration of conformity of the product is available to the customer upon express request to our offices.

And **UL, CSA and FCC**, according to the specifications of the standards:

- **UL 1778**
- **CSA C22.2 NO.107.3.-14**
- **FCC part 15 Subpart B**



#### **ELECTROMAGNETIC COMPATIBILITY WARNING (FCC):**

- **SLC-1000-TWIN PRO2 A**. This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:




- Reorient or relocate the receiving antenna.
  - Increase the separation between the equipment and receiver.
  - Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
  - Ask the dealer or an experienced radio / TV technician for help.
- **SLC-2000-TWIN PRO2 A** and **SLC-3000 TWIN PRO2 A**. This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation+ of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.



The manufacturer is not liable in the event of modification or intervention on the device by the user.



#### **BATTERIES WARNING (UL):**

- Servicing of batteries should be performed or supervised by personnel knowledgeable about batteries and the required precautions.
- Batteries should not be replaced by the operator or user.
- When replacing batteries, replace with the same type and number of batteries or battery packs.
-  **Caution:** Do not dispose of batteries in fire. The batteries may explode.
-  **Caution:** Do not open or mutilate batteries. Released electrolyte is harmful to the skin and eyes. It may be toxic.
-  **Caution:** A battery can present a risk of electrical shock and high short-circuit current. The following precautions should be observed when working on batteries:
  - a. Remove watches, rings, or other metal objects.
  - b. Use tools with insulated handles.
  - c. Wear rubber gloves and boots.
  - d. Do not lay tools or metal parts on top of batteries.
  - e. Disconnect charging source prior to connecting or disconnecting battery terminals.

- f. Determine if battery is inadvertently grounded. If inadvertently grounded, remove source from ground. Contact of any part of a grounded battery can result in electrical shock. The likelihood of such shock can be reduced if such ground are removed during installation and maintenance (applicable to equipment and remote battery supplies not having a grounded supply circuit).

### 3.3. ENVIRONMENT.

This product has been designed to respect the environment and manufactured in accordance with **ISO 14001**.

#### **Recycling of the device at the end of its useful life:**

Our company undertakes to use the services of authorised and regulatory companies to treat the set of products recovered at the end of their useful life (contact your distributor).

#### **Packaging:**

For the recycling of the packaging there must be compliance with the legal requirements in force, in accordance with the specific regulations of the country where the device is installed.

#### **Batteries:**


Batteries pose a serious danger to health and the environment. The disposal of them shall be carried out in accordance with the laws in force.

## 4. PRESENTATION.

### 4.1. VIEWS.

#### 4.1.1. Views of the device.

Figures 1 to 4 show illustrations of the devices according to box size in relation to the power rating of the model. However, because the product is constantly evolving, discrepancies or slight contradictions may arise. If in any doubt, the labelling on the device itself will always prevail.

 The nameplate of the device shows all of the values relating to its main properties and characteristics. Act accordingly for its installation.

#### 4.1.2. Front views of the UPS.

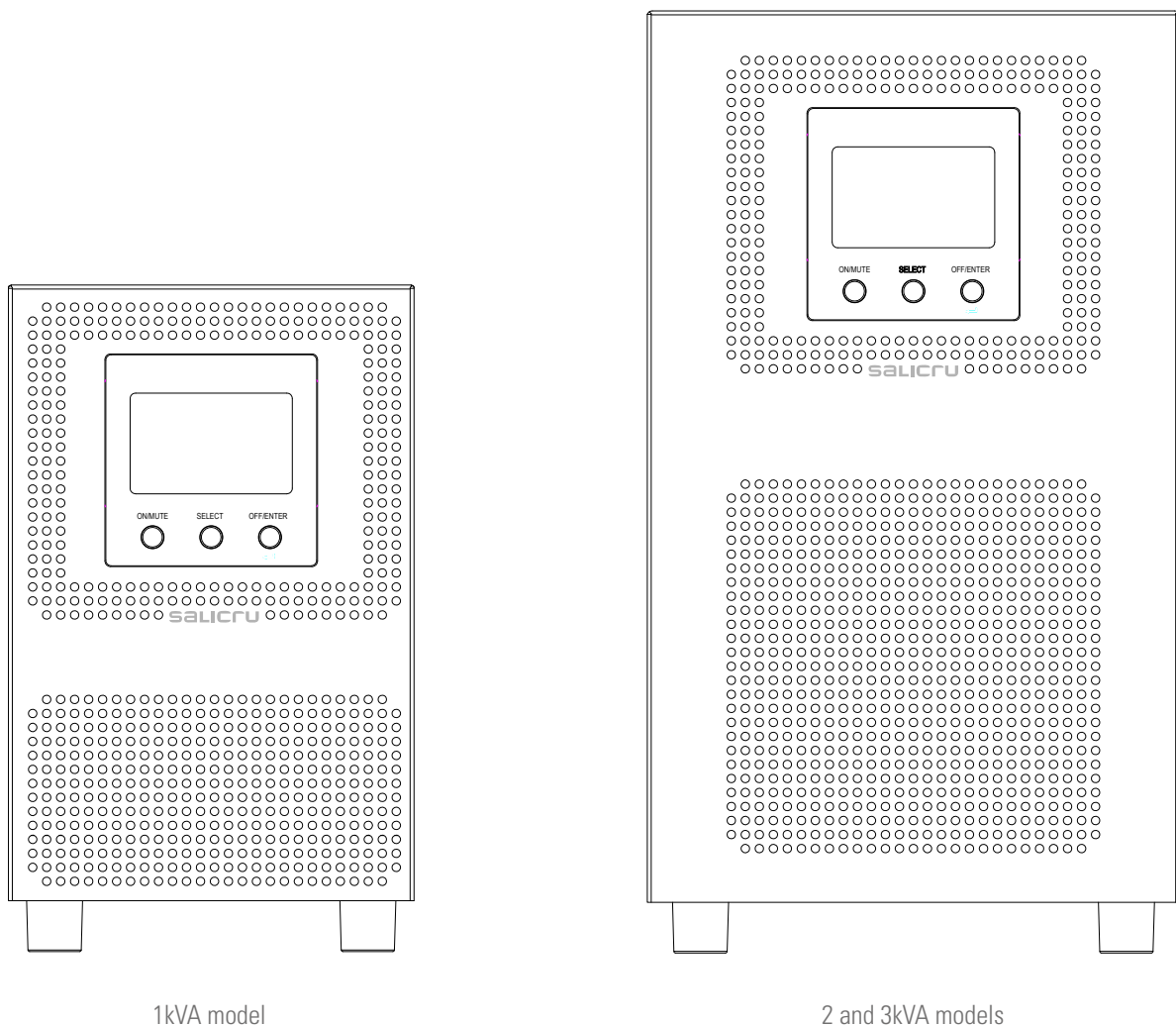
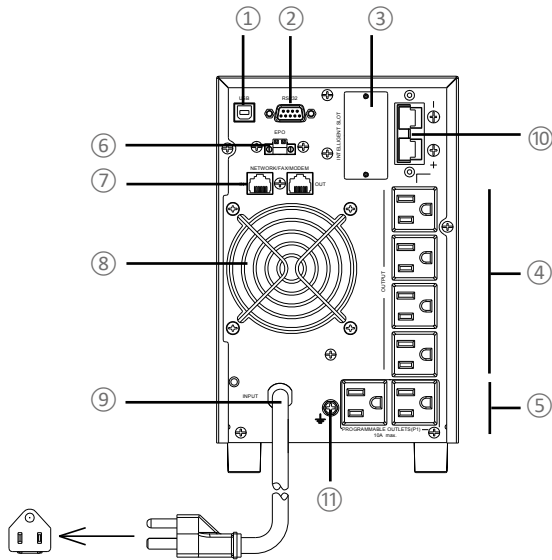
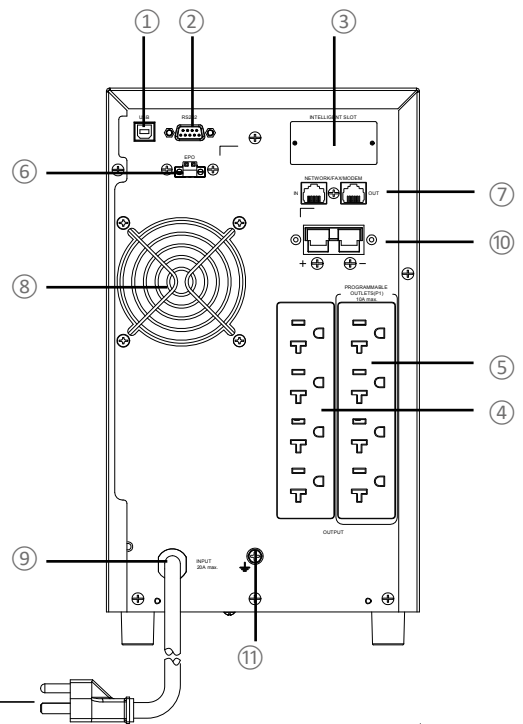


Fig. 1. Front views of the UPS, 1 to 3kVA models.

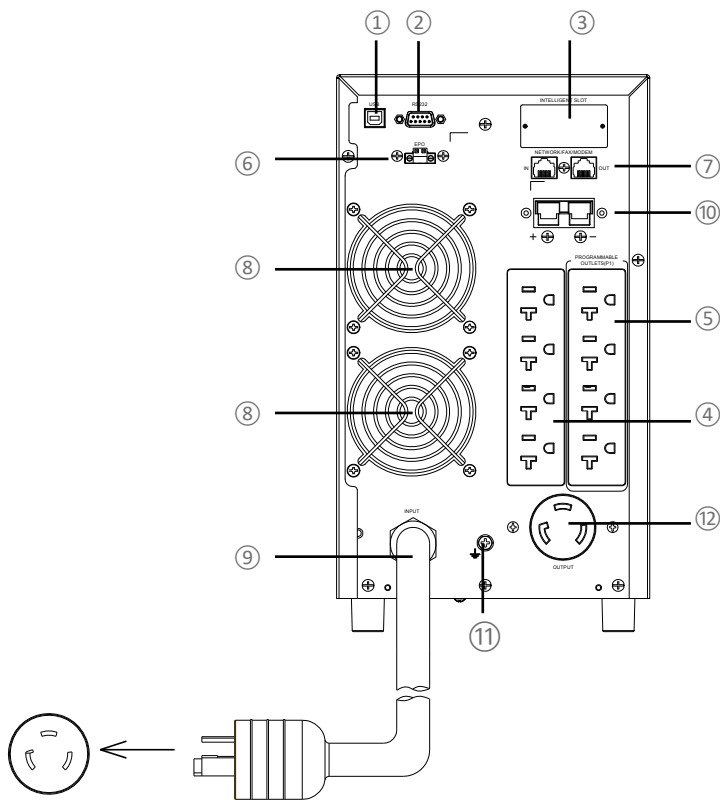
### 4.1.3. Rear views of the UPS.



1kVA model



2kVA model

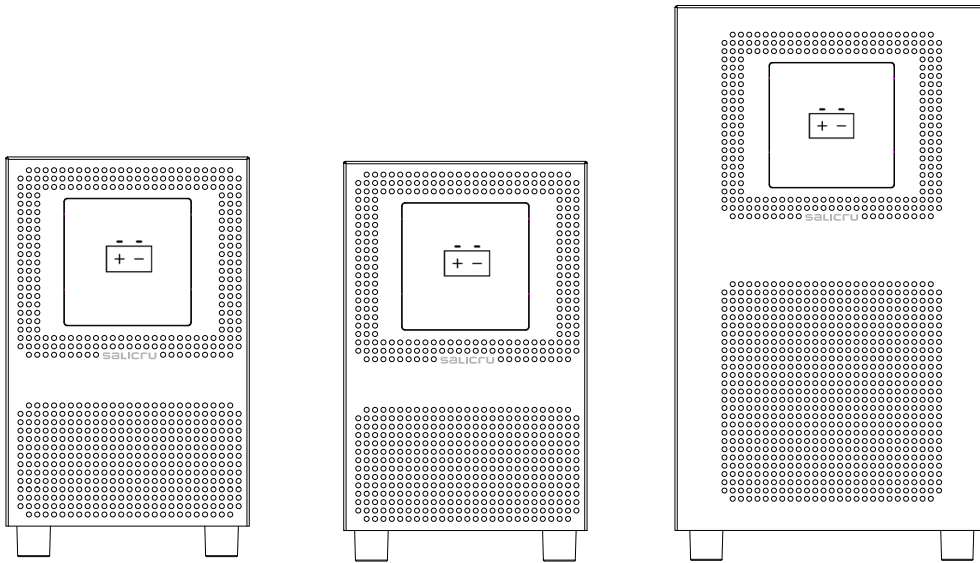


3kVA model

- ① USB port with HID
- ② RS-232 serial port
- ③ Smart slot for SNMP, AS400 and MODBUS cards
- ④ NEMA output sockets, 5-15R (**1 kVA**) and 5-20R (**2/3 kVA**)
- ⑤ Programmable NEMA output sockets, 5-15R (**1 kVA**) and 5-20R (**2/3 kVA**)
- ⑥ EPO terminals
- ⑦ Network filtering / fax / modem sockets
- ⑧ Fan
- ⑨ AC Input cord. NEMA 5-15P (**1 kVA**), NEMA 5-20P (**2 kVA**) and NEMA L5-30P (**3 kVA**).
- ⑩ External battery connector
- ⑪ Earth connection
- ⑫ NEMA 5-30R output socket, **max. 30 A**
- ⑬ Battery connector (**out**)
- ⑭ Battery connector (**in**)
- ⑮ Battery protection circuit breaker

Fig. 2. Rear views, 1, 2 and 3kVA models

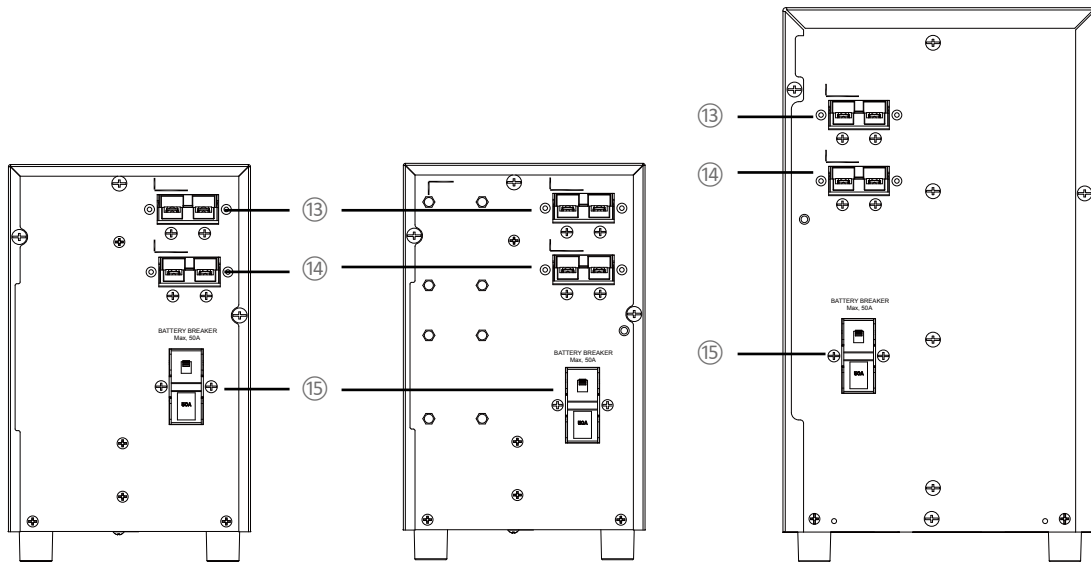
4.1.4. Front view of battery module.



Battery model 2 x 3 batt / 2 x 4 batt / 2 x 6 batt

Fig. 3. Front view of battery module.

4.1.5. Rear view of battery module



Battery model 2 x 3 batt / 2 x 4 batt / 2 x 6 batt

Fig. 4. Rear view of the battery module.



### 4.3. OPERATING PRINCIPLE.

This manual describes the installation and operation of SLC TWIN PRO2 A series UPSs as devices that can operate separately. SLC TWIN PRO2 A series UPSs ensure optimum protection of any critical load, maintaining the supply voltage of the loads between the specified parameters without interruption during failure, deterioration or fluctuation of mains power, and come in a range of models available from 1kVA to 3kVA, enabling end users to select the model that best suits their needs.

Thanks to their pulse width modulation (**PWM**) and double-conversion technology, SLC TWIN PRO2 A series UPSs are compact, cool, silent and high performance.

The double-conversion principle eliminates all mains power disturbances. A rectifier converts the AC current of the mains into DC current, thereby maintaining optimum battery charge level and powering the inverter, which, in turn, generates a suitable AC sine-wave voltage for continuously powering the loads. In the event of failure of the UPS's mains power, the batteries supply clean power to the inverter.

The design and construction of the SLC TWIN PRO2 A series UPS has been carried out in accordance with international standards.

Thus, this series has been designed to maximise the availability of critical loads and to ensure that your business is protected from variations in power distribution line voltage, frequency, electrical noise, cuts and micro-cuts. This is the primary goal of SLC TWIN PRO2 A series UPSs.

This manual applies to the standardised models shown in Tab. 1.

Model	Power (VA)	Type
<b>SLC-1000-TWIN PRO2 A</b>	1000	Standard
<b>SLC-2000-TWIN PRO2 A</b>	2000	
<b>SLC-3000-TWIN PRO2 A</b>	3000	
<b>SLC-1000-TWIN PRO2 A B1</b>	1000	Standard with extended backup
<b>SLC-2000-TWIN PRO2 A B1</b>	2000	
<b>SLC-3000-TWIN PRO2 A B1</b>	3000	

Tab. 1. Basic standardised models.

#### 4.3.1. Notable features.

- Genuine on-line with double-conversion technology and output frequency separate from the mains.
- Output power factor 0.9 and pure sine waveform, suitable for almost all kinds of loads.
- Input power factor > 0.99 and high overall performance between 0.89 and 0.91 depending on the model. A greater energy saving and a lower cost of user installation (**wiring**) are obtained, as well as a low distortion in the input current and a reduction of the pollution in the power supply network
- Great adaptability to the worst conditions of the mains. Wide input voltage, frequency and waveform ranges, thus avoiding excessive dependence on limited battery power.
- Possibility of extending autonomy easily and quickly by adding battery modules. Each of them has two connectors for connection to the device and / or other identical modules.
- Charger current setting up to 8 A to decrease battery recharge time.
- High performance selectable mode > 0.97 [ECO-MODE]. Energy saving, which reverts economically to the user.

- Possibility of starting up the equipment without a power supply or a discharged battery. Take care of the last aspect, since autonomy will be reduced the more downloaded.
- The intelligent battery management technology is very useful to extend the life of the batteries and optimize the recharge time.
- Standard communication options via RS 232 or USB serial port.
- Remote emergency stop control signal [EPO].
- Interface between user and equipment through control panel with LCD screen, easy to use.
- Optional connectivity cards available to improve communication capabilities.

### 4.4. OPTIONAL EXTRAS.

Depending on the configuration chosen, the device can include any of the following options:

#### 4.4.1. Isolation transformer:

The isolation transformer provides galvanic isolation to completely isolate the output from the input.

The placement of an electrostatic screen between the primary and secondary windings of the transformer provides a high level of electrical noise attenuation.

The isolation transformer can be installed at the input or output of the SLC TWIN PRO2 A series UPS and will always be located in an enclosure external to the device.

#### 4.4.2. Exterior manual maintenance bypass.

The purpose of this option is to electrically isolate the device from the mains and the critical loads without cutting the power to the latter. This way, maintenance or repair operations on the device can be carried out without interruptions to the power supply of the protected system, while preventing unnecessary hazards for technical personnel, since it enables the UPS to be fully disconnected from the installation.

#### 4.4.3. Communications card.

The UPS has on its back an "intelligent slot" for the insertion of one of the communication cards mentioned in this section.

##### 4.4.3.1. Integration into computer networks using an SNMP adapter.

Large computer systems based on LANs and WANs that integrate servers into different operating systems must include the ease of control and administration available to the system manager. This facility is obtained through the SNMP adapter, universally supported by leading software and hardware manufacturers.

The connection of the UPS to the SNMP is internal while that of the SNMP to the computer network is made through an RJ45 10 base connector.

##### 4.4.3.2. MODBUS protocol.











Large computer systems based on LANs and WANs often require that communication with any element that is integrated into the computer network be made through a standard industrial protocol. One of the most used standard industrial protocols on the market

is the MODBUS protocol. The SLC TWIN PRO2 A series can also be integrated into these types of environment using the external SNMP adapter with MODBUS protocol.

#### 4.4.3.3. Relay interface.

- The UPS has a relay interface card option that provides digital signals in the form of potential-free contacts, with a maximum applicable voltage and current of 240 V AC or 30 V DC and 1A.
- This communication port makes possible a dialogue between the equipment with other machines or devices, through the relays supplied in the terminal strip arranged on the same card, with a single common terminal for all of them.  
By default, all contacts are normally open, and can be modified one by one, as indicated in the information supplied with the option.
- The most common use of these types of ports is to provide the necessary information to the file closing software.
- For more information contact our **S.S.T.** or with our nearest distributor.


## 5. INSTALLATION.

-  Read and respect the Safety Information, described in Chapter 2 of this document. Failure to obey some of the instructions described in this manual can result in a serious or very serious accident to persons in direct contact or in the vicinity, as well as faults in the device and/or loads connected to it.
-  All of the device's connections, including those related to control (interface, remote control, etc.), should be made with all of the switches in standby and without mains power present (UPS power supply line disconnecter set to 'Off').
-  It should never be forgotten that a UPS is a generator of electrical energy, and as such, the user must take all necessary precautions against direct or indirect contact.
-  The battery circuit is not isolated from the input voltage. Dangerous voltages can occur between the terminals of the battery bank and the earth. Check that no input voltage exists before handling them.
-  All of the contacts or specific earth terminals () of the plugs, sockets and/or connectors of the device's input or output are electrically connected to each other, with the protection cable extended to the loads when connecting them to the UPS.
-  As the device has class I protection against electric shock, it is essential to install a protective earth conductor (connect earth ). The socket that supplies power to the device must have a properly connected earth cable (-  During discharge, the equipment operates in IT (isolated earth) neutral mode. This means that the neutral is not directly connected to earth, providing an additional layer of safety and stability in critical situations. To ensure optimal and safe operation, follow the guidelines in the user manual and contact your distributor if you have any questions.


### 5.1. RECEPTION OF THE DEVICE.

- Any handling of the device must be carried out in accordance with the weights shown in the technical specifications according to the model, indicated in Chapter 9. 'Annexes'. Pay attention to section 1.2.1. of the EK266\*08 '**Safety instructions**' in all matters relating to the handling, movement and siting of the unit.

#### 5.1.1. Inspection.

- On reception of the device, check that it has not been damaged during transportation (knocks, falls, etc.) and that the characteristics of the device correspond to those on the order. To do so, it is recommended to unpack the UPS and carry out an initial visual inspection.
- If it has been damaged, notify your supplier or, in their absence, our company.  
 Never start up a device if it has been externally damaged.
- Also check that the information on the label affixed to the packaging matches that specified on the order, for which it will be necessary to unpack the device (see Section 5.1.2). If there are discrepancies, report the issue as soon as possible, quoting the device's manufacturing number and any delivery note references.


#### 5.1.2. Unpacking.

- The packaging of the device consists of a cardboard box, expanded polystyrene [EPS] or polyethylene foam [EPE] corners, polyethylene cover and strapping, all of which are recyclable materials; consequently, if it requires disposal, it must be carried out in accordance with current laws. We recommend keeping the packaging in case it needs to be used in the future.
- Proceed as follows:
  - Cut the straps around the cardboard box if any.
  - Remove the accessories (cables, documentation, etc. )
  - Remove the device or battery module from the box. This may require the help of another person depending on the weight of the model.
  - Remove the protective corners from the device and the plastic bag.  
 Do not leave the plastic bag within the reach of children to avoid the danger of suffocation.
  - Inspect the device before proceeding and, in the event of finding damage, contact the supplier or, failing that, our firm.

#### 5.1.3. Checking the contents.

- Check the contents of the packaging. The contents will vary depending on whether you are inspecting a UPS or battery module.
  - Device:
    - The device itself.
    - Quick guide on paper.
    - Information for warranty registration.
    - 1 USB cable.
  - Battery module:
    - The module itself.
    - Information for warranty registration.
    - 1 cable for connection between the device and battery module or between modules.
- Once the reception is completed, it is advisable to re-pack the UPS until it is put into service in order to protect it against mechanical shock, dust, dirt, etc.

#### 5.1.4. Storage.

- The device should be stored in a dry, ventilated location protected from rain, dust, water splashes and chemical agents. It is advisable to keep the device and battery unit/s in their original packaging as it has been specifically designed to ensure maximum protection during transportation and storage.
-  For devices that contain Pb-Ca batteries, the charging times indicated in Tab. 2 of document EK266\*08, determined by the temperature to which they are exposed, must be respected, otherwise the warranty may be invalidated.
- After this period, connect the device to the mains together with the battery unit if applicable, start it according to the instructions described in this manual and charge for 12 hours.
- Then shut down the device, disconnect it and store the UPS and batteries in their original packaging, noting the new date for recharging the batteries on the respective label.
- Do not store the devices where the ambient temperature exceeds 50°C or drops below -15°C, as this may cause degradation of the electrical characteristics of the batteries.


#### 5.1.5. Transfer to the installation site.

- Although the weight of the device is not excessive, it is rec-


ommended to move the UPS by forklift, pallet jack or the most appropriate means of transportation considering the distance to the installation site.

If the distance is considerable, it is recommended to transport the device in its packaging to the installation site and then unpack it there.

#### 5.1.6. Preliminary considerations before connection.

- Check that the information on the device's nameplate is that required for installation.
- A bad connection or operation can cause faults in the UPS and/or the loads connected to it. Read the instructions in this manual carefully and follow the steps indicated in the order established.
- All of the devices have a cable with plug for connection to the power supply. Similarly, 'N' NEMA 5-15R output sockets are supplied depending on the model for connection to the loads [outputs]. For other connections, a connector for connection to the batteries [B1 version] and connectors for the communications are used.
- The cross section of the input line cables will be determined by the current indicated on the nameplate of each device, in compliance with local and/or national low-voltage electrotechnical regulations.
- The protections of the distribution board should have the following characteristics:
  - For the input line, a type-B differential circuit breaker and C-curve circuit breaker.
  - For the output (powering loads), a C-curve circuit breaker.As for size, they should at least be the current indicated on the nameplate of the UPS.
- Only rated currents are printed on the nameplate of the device as indicated by the EN-IEC 62040-1 safety standard. For the calculation of the input current, the power factor and the device's own performance have been considered. Overload conditions are considered a non-permanent and exceptional working mode.
- If peripheral input or output elements, such as transformers or autotransformers, are added to the UPS, the currents indicated on the nameplates of these elements must be taken into consideration when determining appropriate cross sections, in compliance with local and/or national low voltage electrotechnical regulations.
-  When a device incorporates a galvanic isolation transformer as standard, as an optional extra or installed independently, either at the input, output or both, it must be fitted with protection against indirect contact (differential circuit breaker) at the output of each transformer, since, due to its own insulation properties, it will prevent the tripping of the protections placed on the primary of the isolation transformer in case of electric shock on the secondary (output of the isolation transformer).
- We remind you that all the isolation transformers installed or factory supplied, have the output neutral earthed through a jumper between the neutral terminal and earth. If the isolated output neutral is required, this jumper must be removed, taking the precautions indicated in the respective local and/or national low voltage regulations.
- All standard UPSs incorporate the batteries in the same box as the device, except the B1s. In the first, battery protection is by means of internal fuses and is not accessible to the user. Similarly, the battery modules also have internal protections by means of fuses and, as in the case of the device itself, they are not accessible to the user either.

## 5.2. CONNECTIONS.

-  The cross sections of the cables used to power the device and loads must be in accordance with the rated current indicated on the device's nameplate and comply with the low voltage electrotechnical regulations or legislation of the respective country.
- The installation must be equipped with input protections suitable for the current of the device and indicated on the nameplate (type-B differential circuit breakers, C-curve circuit breaker or equivalent). Overload conditions are considered a non-permanent and exceptional working mode, and these currents should not be taken into account in the application of the protections.
- To insert optional cards, it is necessary to remove the screws from the smart slot cover and cover itself.


### 5.2.1. Connection of the input.

Cable entry with integrated NEMA plug according to model:




- For 1 kVA equipment: NEMA 5-15P plug.
- For 2 kVA equipment: NEMA 5-20P plug.
- For 3 kVA equipment: NEMA L5-30P plug.

Plug it into an AC power socket.

### 5.2.2. Connection of the output.


- The equipment has NEMA female sockets, distributed as follows according to power:
  - 1 kVA model. 1 group of 4 NEMA 5-15R sockets identified as "OUTPUT" and 1 group of 2 NEMA 5-15R sockets as "OUTPUT PROGRAMMABLE (P1)", configurable through the control panel and / or ViewPower.
  - 2 and 3 kVA models. 2 groups of 4 NEMA 5-20R sockets identified as "OUTPUT" and "OUTPUT PROGRAMMABLE (P1)", configurable through the control panel and / or ViewPower. The 3kVA model also has an additional NEMA 5-30R 30 A socket.
- Connect the loads to the NEMA sockets.
  -  The sum of the loads connected to the different NEMA 5-15R sockets must not under any circumstances exceed the rated power of the device.
- It is important to consider the two groups of available sockets, general outputs for "Critical Loads" and programmable outputs for "Non-Critical" loads. By definition it is understood as "Critical Loads" those that when they stop working or when they work improperly can cause economic damages. The NEMA sockets indicated as programmable can be programmed through the control panel (codes 9 and 10 settings menu Fig. 11). In this case, the backup time of critical devices can be extended by setting a shorter backup time for non-critical devices.
- If, in addition to the more sensitive loads, it is necessary to connect inductive loads of high consumption such as laser printers or CRT monitors, the starting points of these peripherals will be taken into account to avoid blocking the equipment under the worst conditions. We advise against connecting loads of this type, due to the amount of energy resources they absorb from the UPS.

5.2.3. Connection to B1 external batteries (backup extension).

- 
**Failure to comply with the instructions in this section and the EK266\*08 safety instructions carries a high risk of electric shock and even death.**
- All standard UPSs incorporate the batteries in the same box as the device, except the B1 models. Battery protection is by means of internal fuses and is not accessible to the user. The accumulator modules also have internal battery protections by means of fuses that are not accessible to the user.
- 
**NECESSARY ADJUSTMENTS WHEN ADDING BATTERY MODULES TO B1 MODELS.**  
 B1 models have factory default settings for connection to a single battery module.  
 Whether battery modules are added to an already available device or if the acquired device has more than one module, it is necessary to change the parameter "12" to the corresponding value.  
 Section 7.4.2.1 of this document indicates the steps to follow to adjust this setting and that of the load current.
- 
**IMPORTANT FOR SAFETY:** If you install batteries on your own, you must provide the battery pack with bipolar magnetothermal protection or sectional fuses of the caliber indicated in Tab. 2.

Models	Batteries ( $U_{\text{element}} \times \text{No.}$ ) = $U_{\text{rated}} / U_{\text{float}}$	Protection features	
		Voltage DC (V)	Current (A)
SLC-1000- TWIN PRO2 A B1	(12 V x 3) = 36 V / 40.95 V	125	40
SLC-2000- TWIN PRO2 A B1	(12 V x 4) = 48 V / 54.6 V		63
SLC-3000- TWIN PRO2 A B1	(12 V x 6) = 72 V / 81.9 V		

Tab. 2. Protection features between UPS and battery module.

- 
**Before starting the connection process between battery module or modules and device, check that the device and loads are set to 'Off.'**
- The connection of external batteries to the device is carried out by means of a polarised connector on B1 models.

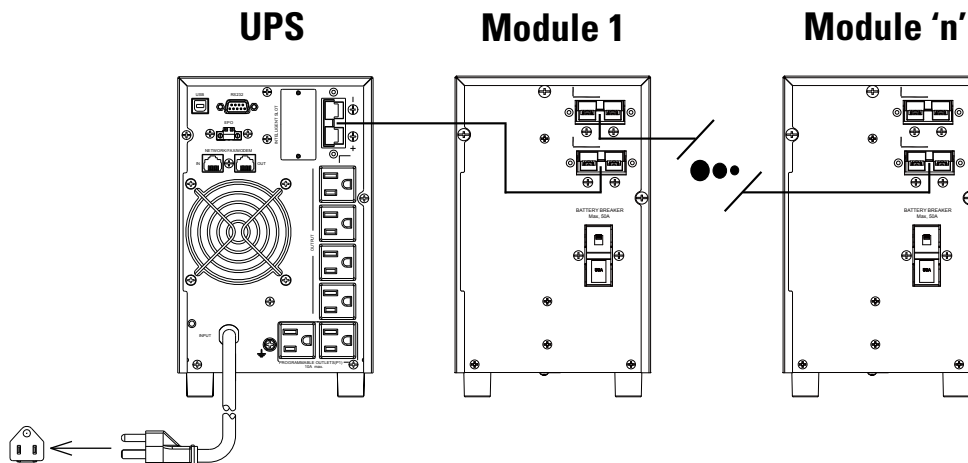



Fig. 5. Connection between device and 'n' battery modules.

- To connect the device to the battery module, use the hose supplied with the latter and connect it between both units using the connectors.  
 When more than one battery module is supplied for the same device, the connection between modules should be made through the hose supplied with the second battery module.  
 Fig. 11 shows an example of the connection of an SLC-TWIN PRO2 A B1 with 'N' battery modules. Except for the rear view of the model, it is applicable to the entire range indicated in this manual. Connect the available modules according to each case.
- If for any reason the user manufactures the battery connection hose, the following cable colour conventions must be observed: red for positive, black for negative, as well as the connection correlation (+ with + and - with -).
- 
 Each battery module is independent for each device. **It is strictly forbidden to connect two devices to the same battery module.**

5.2.4. Terminals for EPO (Emergency Power Off).

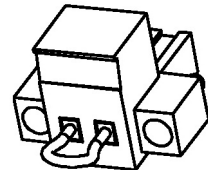
- All of the UPSs have two terminals for the installation of an external emergency power off [EPO] output button.
- The device is dispatched from the factory with its EPO circuit set to closed [NC] by default. This means that the UPS will cut the output power supply, emergency power off, when the circuit is opened:
  - Either by removing the female connector from the socket where it is inserted. This connector has a cable connected as a jumper that closes the circuit [Fig. A],
 

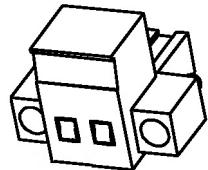

Fig. A
  - or by pressing the button installed external to the device belonging to the user. The connection on the button must be in the normally closed contact in order to open the circuit when activated.
 

Fig. B

- The reverse open circuit feature [NO] can be modified at the factory or later on-site by our TSS.  
Except for specific cases, we advise against this type of connection in view of the purpose of the EPO button, since it will not act upon an emergency request if either of the two cables that run from the button to the UPS are disconnected [damaged].  
By contrast, this anomaly would immediately be detected in a closed EPO circuit, with the inconvenience of an unexpected cut in the powering of the loads, but a guarantee of effective emergency functionality.
- In order to recover the normal operating status of the UPS, it is necessary to insert the connector with the jumper in its receptacle or to deactivate the EPO button and later eliminate the EPO status on the control panel. The device will be operational.

### 5.2.5. Communication port.

#### 5.2.5.1. RS232 port and USB interface.

-  The communications line [COM] constitutes a very low voltage safety circuit. To preserve the quality, it must be installed separately from other lines carrying dangerous voltages (power distribution line).
- The USB interface is useful for the monitoring software and updating the firmware.
- It is not possible to use both RS232 and USB ports at the same time.
- The RS232 port consists of serial data transmission, so that a large amount of information can be sent via a communication cable of only 3 wires.
- The USB port offers the 'smart battery' feature, supported by the HID (human interface device) power device class, without the need for software installation. Operating systems such as Windows/Linux/Mac OS include management and monitoring of the energy of this function. When a computer is connected to the UPS via the USB port, the UPS is recognised by the operating system as a 'HID UPS battery,' and the user can configure the action to be taken in the event of a low battery alarm, such as stopping the computer automatically. This feature is ideal for powering network-attached storage -NAS- systems with a UPS. The USB port is compatible with the USB 1.1 protocol for communication software.

Pin #	Description	Input / Output
2	TXD for RS232	Output
3	RXD for RS232	Input
5	GND for RS232	Ground

Table 3. DB9, RS232 connector pinout

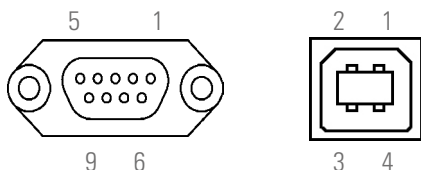



Fig. 6. DB9 connectors for RS232 and USB

#### 5.2.5.2. Smart slot.

- The UPS has a slot behind the cover indicated on the device views as 'Smart Slot' that enables any of the following cards to be inserted:
  - Relay interface to terminals.
  - SNMP adapter.
- The corresponding documentation is supplied with each option. Read it before starting installation.

#### 5.2.6. Protection against voltage spikes for the modem / ADSL / Fax / ... line.

-  The communications line -COM- constitutes a very low safety voltage circuit. To conserve quality, it must be installed separately from other lines that carry dangerous voltages (power distribution line).
- Connect the main line for the Modem / ADSL / Fax / ... to the RJ45 connector of the equipment, identified as "Input".
- Connect the Modem / ADSL / Fax / ... itself to the RJ45 connector of the unit, identified as "Output".

#### 5.2.7. Software.

- **Download of free ViewPower software.**  
ViewPower is a UPS monitoring software which provides a user-friendly interface for monitoring and control. It features an auto shutdown function for systems consisting of several PCs in case of power failure. The software enables users to monitor and control any UPS in the same LAN through an RS-232 or USB communications port, regardless of how far away they are from each other.
- **Installation procedure:**
  - Go to the web page: <http://support.salicru.com>
  - Select the required operating system and follow the instructions described on the web page to download the software.

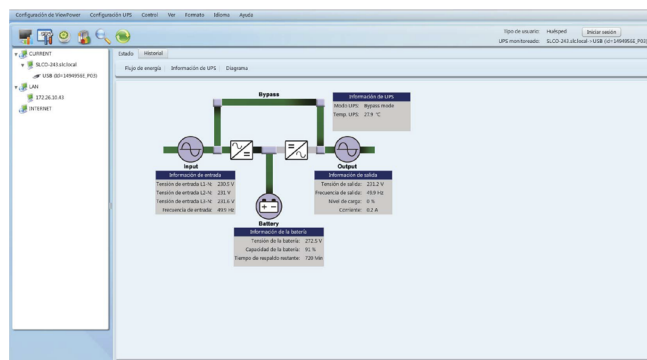





Fig. 7. View of the monitoring software's main screen.

### 5.2.8. Considerations before startup.


-  It is recommended to charge the batteries for at least 12 hours before using the UPS for the first time. By supplying power to the device, the battery charger will operate automatically.
-  In devices with extended backup [B1], a higher performance charger is incorporated. It is recommended to charge the batteries for at least 12 hours before using the UPS for the first time.
-  In devices with extended backup and without an additional charger, it is, however, recommended to leave a minimum of 12 h x each battery module.
- Although the device can operate correctly without charging the batteries for the indicated time, the risk of a prolonged power cut during the first hours of operation and the UPS's available backup time should be assessed.
- Do not start up the device and loads completely until indicated in Chapter 6.  
When it is done, however, it should be carried out gradually to avoid possible difficulties, if not at the first startup.
- If, in addition to the more sensitive loads, it is necessary to connect high-consumption inductive loads, such as for laser printers or CRT monitors, the starting up of these peripherals will need to be taken into account to prevent the device from crashing.  
We do not recommend connecting loads of this type due to the amount of power they absorb from the UPS.

## 6. OPERATION.


### 6.1. UPS STARTUP AND SHUTDOWN.

#### 6.1.1. Preliminary checks.

- Make sure that all of the connections have been made correctly, following the instructions on the labelling of the device and in Chapter 5.
- Check that the power supply voltage is correct.
- Check that the UPS is '**OFF**.'
- Make sure that all of the loads are 'Off.'
- It is very important to proceed in the established order.
- For views of the UPS, see Fig. 1 to 4.
- Set the protection of the distribution board to 'ON.'

 The operation of the device described in this document is based on the original factory settings and configuration. Fig. 11 shows the screens tree, the variables and the original configuration. Take into consideration that any modification of them can lead to changes in the behaviour of the device.


#### 6.1.2. UPS startup with mains voltage.

-  When applying input voltage to the UPS, the output sockets supply power through the static bypass without the device running.
- To start the UPS, press the '**ON**' button on the front panel for more than 1 second, the inverter will start up while the status of the UPS will be displayed on the LCD on the front panel.
- Start the load or loads.


#### 6.1.3. UPS startup without mains voltage (battery mode)

- To start the device without mains voltage (**cold start**), press the '**ON**' button on the front panel for more than 1 second. The inverter will start up while the status of the UPS will be displayed on the front panel LCD display.  
The UPS's operating time will depend on the level of battery charge and the consumption of the loads connected to the output.
- Start the load or loads.

#### 6.1.4. Turn off the UPS with mains voltage (in inverter mode).

- Stop the UPS's inverter by pressing the '**OFF**' button on the front panel for more than 1 second.
-  Even if the inverter is '**OFF**,' the device will supply output voltage through its static bypass.
- To carry out a complete shutdown, it is necessary to set the distribution board protection to 'OFF'.

#### 6.1.5. Turn off the UPS without mains voltage (in battery mode).

- Stop the UPS's inverter by pressing the '**OFF**' button for more than 1 second. The UPS will shut down.
-  With no mains power present, no output voltage will be available; however, take into consideration that, when it is restored, the device will immediately supply output voltage through its static bypass.

- To carry out a complete shutdown, it is necessary to set the distribution board protection to 'OFF'.


#### 6.1.6. Battery test function.

- To carry out a battery test with the device running and power supply present, press the '**ON**' button on the front panel for more than 1 second, and the automatic test will start.
- This test detects if the batteries are low, open or not connected.

#### 6.1.7. Alarm mute.

- The audible alarm is activated when the device operates in battery mode. If it is a nuisance, it can be muted by pressing the '**ON**/'**MUTE**' button for more than 1 second.  
The alarm will activate automatically if the battery is low (end of backup). When this happens, the loads must be deactivated and the UPS stopped, since the device will shortly stop supplying output voltage.

#### 6.1.8. EPO (emergency power off).

- It is also known as RPO (Remote Power Off).  
 Check that the connector in Fig. A is inserted before proceeding with the startup.  
When the device output is activated, it does not supply voltage and code 'EP' is displayed on the LCD screen.  
It is a special situation in which the UPS output voltage is cut immediately, as a preventative safety or emergency measure.  
The EPO condition leaves the loads without power supply, but not for the UPS. To do this, it will be necessary to first release the EPO condition and then stop the device using the '**OFF**' button, see Tab. 6. To start the UPS, press the '**ON**' button, see Tab. 6.

## 7. CONTROL PANEL WITH LCD DISPLAY.

### 7.1. GENERAL INFORMATION FOR THE SERIES.

#### 7.1.1. Information represented by the display.

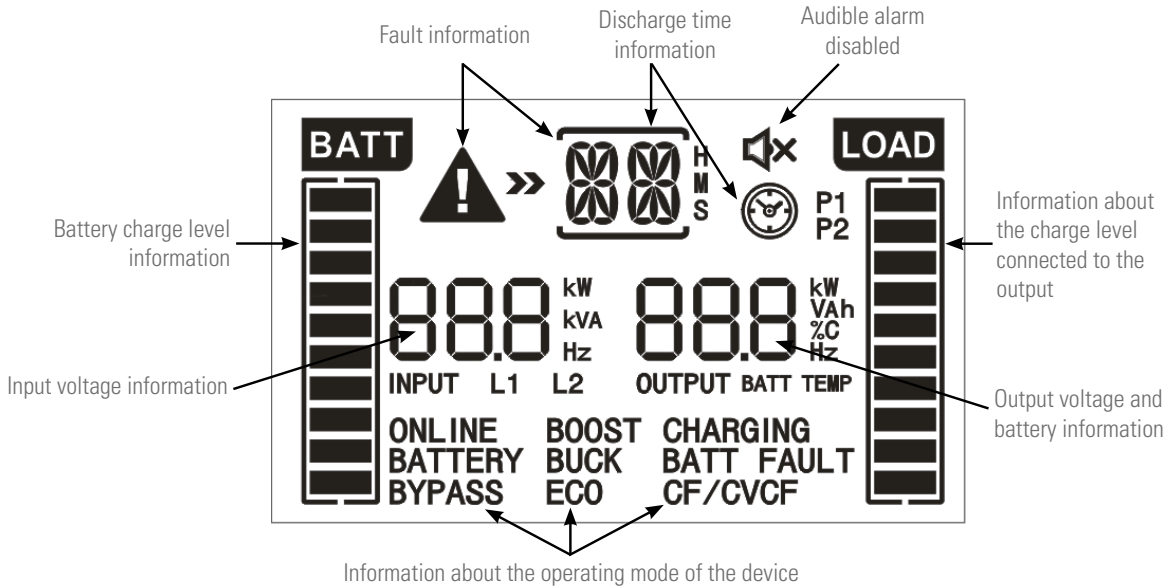


Fig. 8. Graphic and textual information shown on the display.

#### 7.1.2. Common messages shown on the LCD display.

Display	Meaning
<b>Backup time information.</b>	
	Indicates the backup time in digital clock mode. H - Hours, M - Minutes, S - Seconds.
<b>Fault information.</b>	
	Indicates as a warning that a fault has occurred.
	Indicates a numerical code from the settings menu shown in Table 13 of Section 7.2.4.4.
<b>Audible alarm information.</b>	
	Indicates that the audible alarm is disabled.
<b>Information on output voltage.</b>	
	Indicates the output voltage or frequency. V AC - Output voltage, Hz - Output frequency.
<b>Information about the charge level connected to the output.</b>	
	Indicates the charge level connected to the output as a %, by displaying four equivalent segments respectively in the following proportion: 0-25%, 26-50%, 51-75% and 76-100%.
<b>Information about programmable outputs</b>	
<b>P1</b>	Indicates that the programmable outputs are activated.
<b>Information about the operating mode of the device.</b>	
<b>BATTERY</b>	Indicates that the device is supplying output voltage from the battery (battery mode).

<b>BYPASS</b>	Indicates that the device is activated in BYPASS mode.
<b>ECO</b>	Indicates that the device is supplying output voltage from the bypass (ECO mode).
<b>CHARGING</b>	Indicates that the device is in charging mode.
<b>CF/CVCF</b>	Indicates that the device is in converter mode.
<b>ONLINE</b>	Indicates that the inverter is working.
<b>P1</b>	Indicates that the output is activated.
<b>Information about battery charge level.</b>	
	Indicates the battery charge level as a %, by displaying four equivalent segments respectively in the following proportion: 0-25%, 26-50%, 51-75% and 76-100%.
	Indicates that the battery is not connected.
	Indicates low battery voltage level.
<b>Information about input and battery voltage.</b>	
	Indicates the input voltage, frequency or battery voltage. V AC - Input voltage, V DC - Battery voltage, Hz - Input frequency.

Tab. 4. Information shown on the LCD panel of the control panel and its meaning.

### 7.1.3. Common abbreviations shown on the display.

Code	On display	Meaning
ENA	ENA	Enabled.
DIS	DIS	Disabled.
ON	ON	Startup.
EPO	EP	Emergency power off.
ESC	ESC	Escape.
HLS	HLS	Upper voltage limit for transfer to battery mode.
LLS	LLS	Lower voltage limit for transfer to battery mode.
AO	AO	EPO normally open.
AC	AC	EPO normally closed.
EAT	EAT	Estimated backup time.
RAT	RAT	Current time in backup mode.
Ok	OK	Ok.
SD	SD	Shutdown.
BL	BL	Battery low.
OL	OL	Overload.
OI	OI	Input overcurrent
NC	NC	Battery not connected
OC	OC	Battery overcharge
SF	SF	Connection error. Rotate the connection of the input, phase and neutral cables.
TP	TP	Overtemperature.
CH	CH	Charger
BF	BF	Battery failure, low voltage.
BV	BV	Bypass voltage out of range.
FU	FU	Bypass frequency out of range.
BR	BR	Replace batteries.
EE	EE	Internal EEPROM error.

Tab. 5. Abbreviations shown on the LCD display.

## 7.2. CONTROL PANEL.

### 7.2.1. Composition of the control panel with LCD display.

- The control panel consists of:
  - Three buttons with the functions described in Tab.Tab. 66.
  - An LCD display with backlighting.

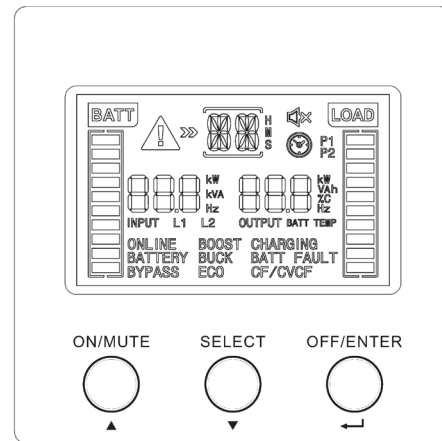


Fig. 9. View of the control panel.

Button	Description
ON/MUTE △	<p><b>- Starting up the UPS.</b> Press the button for at least 2 seconds.</p> <p><b>- Muting the alarm.</b> Press the button for at least 3 seconds to mute or unmute the audible alarm.</p> <p><b>- Button to navigate upwards.</b> When this button is pressed in UPS settings mode, it will move upwards through the menu structure in relation to the point where it is located, accessing the previous variable with each press.</p> <p><b>- Activating the battery test.</b> Press this button for 3 seconds while in normal or frequency converter (CF) mode. At the end of the test, it returns to the respective mode.</p>
SELECT ▽	<p><b>- Parameter reading.</b> Through this key you can read the following values: voltage, frequency and input intensity, voltage, intensity and battery capacity, ambient temperature, voltage and output frequency and intensity and percentage of charge.</p> <p><b>- Settings or configuration mode.</b> Press this key for at least 3 sec. to access this mode, when the UPS inverter is stopped (bypass mode).</p> <p><b>- Key to navigate down.</b> When you press on this key from the UPS settings mode, you will scroll down the menu structure in relation to where you are, by accessing the next variable with each press.</p>
OFF/ENTER ↵	<p><b>- UPS shutdown.</b> Press this button for at least 2 seconds.</p> <p><b>- Confirmation of selection.</b> Press this button to confirm selection in the device's settings mode.</p>
ON/MUTE + SELECT ▽	<p><b>- Transfer to bypass mode.</b> With normal main power, press ON / Mute and Select at the same time for 3 seconds to transfer to bypass mode. This action will be ineffective if the input voltage is outside the acceptable range. Similarly you can return to Online mode.</p> <p><b>- Exit the setting / configuration mode or return to the top menu.</b> In setup mode, press ON / Mute and Select simultaneously for 0.2 seconds to return to the top menu. If you are already there, press these two buttons at the same time to exit the configuration mode.</p>

Tab. 6. Functionality of the control panel buttons.

7.2.2. Audible alarms.

Description	Alarm modulation or tone	Possibility of muting
<b>State of the UPS</b>		
Bypass mode	Beep every 10 seconds.	No
Battery mode	Beep every 5 seconds.	Yes
Fault	Continuous.	No
<b>Warning</b>		
Overload	Beep every second.	Yes
End of backup	Beep every 2 seconds.	No
<b>Faults</b>		
All	Continuous.	No

Tab. 7. Audible alarms.

7.2.3. Location of the adjustment parameters on the display.

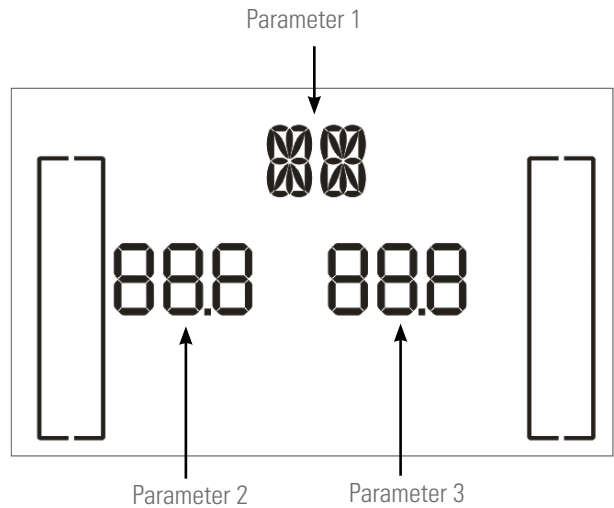


Fig. 10. Arrangement of the parameters on the LCD display.

- Parameter 1: Code of the settings menu. For more information, consult Tab. 8Tab. 8.
- Parameters 2 and 3 are the configuration or value options for each settings menu.
  - i** Select with buttons '▽' or '△' to modify the menus or parameters.
  - i** All of the parameter settings are saved when the UPS is completely shut down and provided that it has connected batteries, whether internal or external. If a complete shutdown is not carried out, the setting will not be saved to the memory.

7.2.4. Settings.

Tab.Tab. 88 shows a summary of parameter 1's adjustable codes for each operating mode and Fig. 110 shows the structure of the menu tree with the operating mode for the settings.

Code	Description	Bypass mode / No output mode	Mode AC	Mode ECO	Mode CF	Battery mode	Battery batteries
01	Output voltage.	YES	-	-	-	-	-
02	Frequency converter state.	YES	-	-	-	-	-
03	Output frequency.	YES	-	-	-	-	-
04	ECO enable/disable mode.	YES	-	-	-	-	-
06	Bypass state (UPS 'Off').	YES	YES	-	-	-	-
09	Programmable output state.	YES	YES	YES	YES	YES	YES
10	Programmable output configuration.	YES	YES	YES	YES	YES	YES
11	Backup limitation configuration.	YES	YES	YES	YES	YES	YES
12	Total battery pack Ah configuration.	YES	YES	YES	YES	YES	YES
15	EPO logical configuration.	YES	YES	-	YES	YES	-
17	Viewable backup time configuration.	YES					

Tab. 8. Parameter 1 codes list. Description and settings

#### 7.2.4.1. Ah configuration of parameter '12'.

- Standard models are configured with factory default settings, so it is not necessary to perform any actions to adjust this parameter. For extended backup models, however, it is necessary to adjust the value to the total capacity of the battery pack. Any alteration of the battery pack will entail a readjustment, so it will be necessary to adapt the value in the event of future expansions.
- There are basically two reasons to perform the adjustment without it affecting the correct functioning of the device if it is not done, although it is more than recommended:
  - a. The charging current of the batteries is directly related to the capacity of the battery pack.  
The charger will adapt the charging factor automatically according to the value of the total capacity entered, up to the maximum of the current that is possible.  
This results in faster charging and therefore greater availability and more immediate backup in the event of frequent mains failures.
  - b. Entering the value in Ah is vital for the control to be able to calculate and show the backup available on the LCD display, without further alterations.

The settings values are determined as follows:

##### 1. Devices with backup extension.

They are configured by a standard model plus the battery module or modules. The capacity of the batteries of both is indicated in the following Tab. 98 and 9.

Example for an SLC 2000 TWIN RT2 A and backup extension module 698BU000003:

$$9 \text{ Ah} + 18 \text{ Ah} = 27 \text{ Ah (value for parameter 12)}.$$

UPS model	Internal batteries	
	Voltage (V)	Capacity (Ah)
SLC 1000 TWIN RT2 A	36	7
SLC 2000 TWIN RT2 A	48	9
SLC 3000 TWIN RT2 A	72	

Tab. 9. Characteristics of batteries in standard devices.

Code	Battery module	
	Voltage (V)	Capacity (Ah)
699BY000001	36	14 (2 x 7)
699BY000002	48	18 (2 x 9)
699BY000003	72	

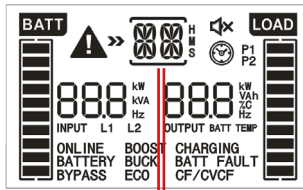
Tab. 10. Characteristics of batteries in modules.

##### 2. B1 equipment.

B1 models do not have batteries in the same box, so a battery module or well the user will have them.

Example for an SLC 2000 TWIN PRO2 A B1 and three modules of extension of autonomy 698BY000002:

$$(3 \times 18 \text{ Ah}) = 54 \text{ Ah (value for parameter 12)}.$$



- The values indicated with(\*) are factory default settings.
- The settings can only be made in 'byPA' or 'STby' mode.
- To carry out any modification of the configuration, follow the indicated sequence with the inverter necessarily Off.
- To exit the main menu from any position, press buttons ▽ + △ together.

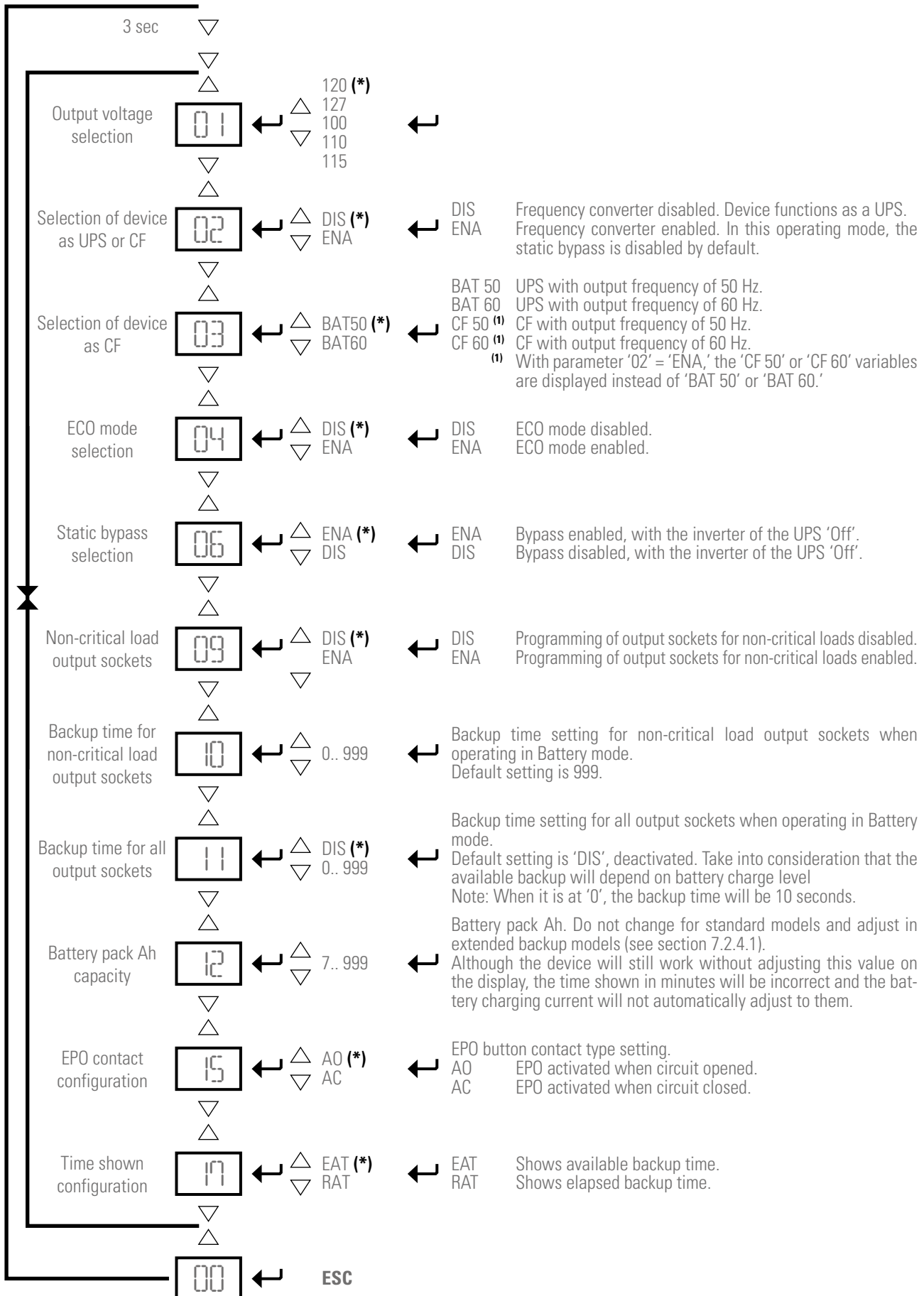
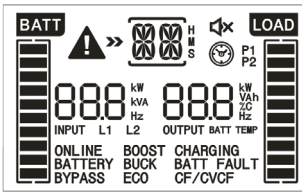
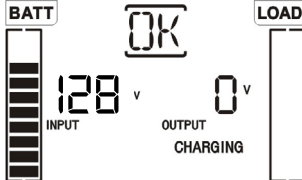
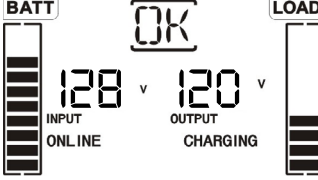


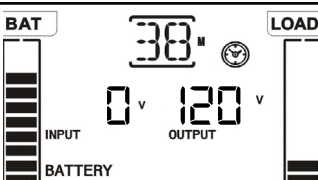
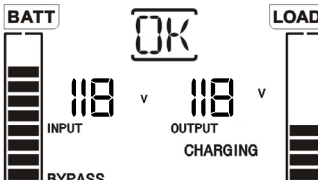


Fig. 11. Settings menu.

7.2.4.2. Operating mode / Description of state.

Operating mode / state	
UPS startup	<p>Description. When the UPS is started, the display screen of this mode is displayed for a few seconds to initialise the CPU and system.</p> 
No output mode	<p>Description. The UPS is off and no output voltage is available, but it is charging the batteries.</p> 
AC mode	<p>Description. If the input voltage is within the range of the device, the UPS will supply stable AC sine-wave voltage to the load or loads, and charge the batteries.</p> 
ECO mode	<p>Description. If the input voltage is within the regulation ranges and ECO mode is activated, the UPS supplies the output voltage from the bypass in ECO mode (energy saving).</p> 
CF mode	<p>Description. When the input frequency is between 46 and 64 Hz, the UPS can be set to a constant output frequency of 50 or 60 Hz. The device will still charge the batteries in this mode.</p> 
Battery mode	<p>Description. When the input / frequency voltage is not within the predefined range of the device or there is an AC mains failure, the UPS powers the loads from the batteries for a limited time due to their own capacity and activates the audible alarm modulated every 5 seconds.</p> 
Bypass mode	<p>Description. When the input voltage is within the range but the UPS is overloaded, the system will automatically transfer to bypass mode or the transfer to this mode can be forced through the front panel. The audible alarm beeps every 10 seconds.</p> 

Operating mode / state		
	Description.	When an error occurs, the ERROR icon and the fault code are displayed.
Error or fault state	LCD display.	

Tab. 11. Operating modes.

7.2.4.3. Warning or alert codes.

Code	Warning or alert description
bL	Low battery
OL	Overload
OI	Input overcurrent
NC	Battery not connected
OC	Battery overcharge
SF	Input socket connection fault
EP	EPO enabled
TP	Overtemperature
CH	Charger fault
bF	Battery fault
bV	Static bypass voltage out of range
FU	Unstable static bypass frequency
bR	Replace batteries
EE	EEPROM error

Tab. 12. Warning or alert code.

7.2.4.4. Error or fault codes.

Code	Error or failure description
01	DC bus startup fault.
02	DC bus overvoltage.
03	DC bus undervoltage.
11	Inverter soft start fault
12	High voltage in the inverter
13	Low voltage in the inverter
14	Inverter output short-circuited
27	Battery voltage too high
28	Battery voltage too low
2A	Battery charger short-circuited at its output
41	Overtemperature
43	Output overload
45	Charger fault
49	Input overcurrent

Tab. 13. Error or fault code.

7.2.4.5. Warning or alert indicators.

Code	Icon (flashing)	Audible alarm
Low battery voltage.		Modulated every 2 seconds
Overload.		Modulated every 1 seconds
Input overcurrent		Modulated twice every 10 seconds
Disconnected battery		Modulated every 2 seconds
Battery overcharge		Modulated every 2 seconds
Input socket connection fault		Modulated every 2 seconds
EPO enabled		Modulated every 2 seconds
Overtemperature		Modulated every 2 seconds
Charger fault		Modulated every 2 seconds
Battery fault	<b>BATT FAULT</b>	Modulated every 2 seconds (The UPS disconnects to warn the user that the batteries are incorrect).
Static bypass voltage out of range	<b>BYPASS</b>	Modulated every 2 seconds
Unstable static bypass frequency	<b>BYPASS</b>	Modulated every 2 seconds
Replace batteries		Modulated every 2 seconds
EEPROM error		Modulated every 2 seconds

Tab. 14. Warning or alert indicators.

## 8. MAINTENANCE, WARRANTY AND SERVICE.

### 8.1. BATTERY MAINTENANCE.

- Pay attention to all of the safety instructions concerning batteries indicated in section 1.2.3. of manual EK266\*08.
- The service life of the batteries depends on the ambient temperature and other factors such as the number of charges and discharges, as well as their depth.

The service life is designed to be between 3 and 5 years if the ambient temperature is between 10 and 20°C. Different types of battery with different service lives are available upon request.

- The **SLC TWIN PRO2 A** UPS series requires only minimal maintenance. The battery used in the standard models is lead acid, sealed, valve regulated and maintenance free. The only requirement is to charge the batteries regularly to extend their life expectancy.

While the UPS is connected to the mains supply, whether or not it is running, it will keep the batteries charged and also offer protection from overcharging and deep discharge.

#### 8.1.1. Notes for the installation and replacement of the battery.

- If it is necessary to replace the connection of any cable, make sure that original materials are acquired through authorised distributors or service centres in order to prevent fire hazards such as overheating or sparks due to insufficient gauge.
- Do not short-circuit the + and - poles of the batteries, danger of electrocution or fire.
- Ensure that there is no voltage before touching the batteries. The battery circuit is not isolated from the input circuit. There may be dangerous voltages between the battery terminals and earth.

- Even if the input circuit breaker of the protection panel is disconnected, the internal components of the UPS are still connected to the batteries, meaning that dangerous voltages are present. Because of this, before carrying out any repair or maintenance work, remove the internal battery fuses and/or disconnect the connection connectors between them and the UPS.
- The batteries contain dangerous voltages. Maintenance and replacement of the batteries should be carried out by qualified personnel familiar with them. No other person should handle them.

### 8.2. UPS TROUBLESHOOTING GUIDE.









If the UPS does not work properly, check the information shown on the LCD screen of the control panel. Try to resolve the issue using the steps shown in Tab. 15. If the issue persists, contact our Technical Service and Support (**TSS**).

If it is necessary to contact our Technical Service and Support (**TSS**), provide the following information:

- UPS model and serial number.
- Date on which the issue occurred.
- Full description of the issue, including any information provided by the LCD and state of the alarm.
- Power supply conditions, type of load and level of load applied to the UPS, ambient temperature, ventilation conditions.
- Battery information (capacity and number of batteries) if the device is a [B1] with external batteries.
- Any other information considered relevant.

#### 8.2.1. Troubleshooting guide. Warning indications.

If the UPS is not working properly, before calling our **TSS**, try to resolve the issue using the information in the following table:

Symptom	Possible cause	Solution
No alarms or indications on the LCD display and normal mains voltage.	The input power cable is not connected correctly.	Check that the power cables are firmly connected to the network.
The icon  and the warning code  flash on the LCD display and the audible alarm modulated every second is active.	The EPO function is activated.	Close the EPO signal circuit to deactivate it.
The icon  and the warning code  flash on the LCD display and the audible alarm modulated every two seconds is active.	Neutral ground fault detection. Inverted phase and neutral wires.	Disconnect the input plug from the AC power outlet and reverse the phase connection and the neutral supply (rotate the plug 180°).
The icon  and the warning code  flash on the LCD display and the audible alarm modulated every two seconds is active.	The batteries, internal or external, are incorrectly connected.	Verify that all batteries are well connected.
Fault code 27 and the <b>BATT FAULT</b> message are displayed on the LCD display. The alarm sounds continuously.	The battery voltage is too high or the charger is damaged.	Contact the distributor, the seller or the <b>T.S.S.</b>
Fault code 28 and the <b>BATT FAULT</b> message are displayed on the LCD display. The alarm sounds continuously.	The battery voltage is too low or the charger is damaged.	Contact the distributor, the seller or the <b>T.S.S.</b>
The icon  <b>LOAD</b> and the warning code  flash on the LCD display and the audible alarm modulated every second is active.	The UPS is overloaded.	Disconnect excess loads from the outlets.
	The UPS is overloaded. Connected loads are fed directly from the input network through the Bypass.	Disconnect excess loads from the outlets.
	After repeated overloads, the UPS is locked in Bypass mode. Connected loads are fed directly from the input network.	Disconnect excess loads from the output sockets, stop the equipment and restart it.
El código de fallo 49 se muestra en el display LCD. La alarma acústica suena continuamente.	UPS input overcurrent.	Disconnect excess loads from the outlets.

Symptom	Possible cause	Solution
Fault code 43 is shown on the LCD display. The audible alarm sounds continuously.	The UPS automatically shuts down as a result of an overload on the equipment output.	Disconnect excess loads from the output sockets and restart it.
Fault code 14 is shown on the LCD display. The audible alarm sounds continuously.	The UPS automatically shuts down as a result of a short circuit at its output.	Check the output wiring and that the connected loads are not short-circuited.
The fault code 01, 02, 03, 11, 12, 13 and 41 is shown on the LCD display. The audible alarm sounds continuously.	An internal UPS fault has occurred. One of the two possibilities can occur: 1. The load is still powered, but directly from the input network through the bypass. 2. The load is no longer fed.	Contact the distributor or the seller and failing that with the <b>T.S.S.</b>
The autonomy time is shorter than expected.	The batteries are not fully charged.	Charge the batteries for at least 5 hours and then check their charge status. If the problem persists, contact the distributor or the seller and, failing that, the <b>T.S.S.</b>
	Defective batteries.	Contact the distributor or the seller and failing that with the <b>T.S.S.</b> for battery replacement.
Fault code 2A is shown on the LCD display. The audible alarm sounds continuously.	Charger shorted at its output.	Check if the connection of the external battery pack connected to the UPS is shorted.
Fault code 45 is shown on the LCD display. At the same time the acoustic alarm sounds continuously.	The charger does not supply output and the battery voltage is less than 10 V per element.	Contact the distributor or the seller and failing that with the <b>T.S.S.</b>

Tab. 15. Troubleshooting guide. Other circumstances or conditions.

### 8.3. WARRANTY CONDITIONS.

#### 8.3.1. Terms of the warranty.

On our website you will find the warranty conditions for the product you have purchased where you can also register it. It is recommended to do so as soon as possible to include it in the database of our Technical Service and Support (**TSS**). Among other advantages, it will streamline any regulatory procedures for the intervention of **TSS** in the event of a fault.

#### 8.3.2. Exclusions.

**Our company** will not be bound by the warranty if it notices that the defect in the product does not exist or was caused by improper use, negligence, improper installation and/or verification, attempts at unauthorised repair or modification, or any other cause beyond the intended use, or by accident, fire, lightning or other hazards. Nor shall it cover any compensation for damages.

### 8.4. TECHNICAL SERVICES NETWORK.

Information about our national and international Technical Service and Support (**TSS**) centres can be found on our website.

## 9. ANNEXES.

### 9.1. GENERAL TECHNICAL SPECIFICATIONS.

Models	TWIN PRO2 A		
Available power ratings (kVA / kW) <sup>(1) (3)</sup>	1 / 0,9	2 / 1,8	3 / 2,7
<b>Technology</b>	<b>On-line double-conversion, PFC, double DC bus</b>		
<b>Rectifier</b>			
Input type	Single-phase		
Number of cables	3 cables - Phase R (L) + Neutral (N) and earth		
Rated voltage	100 <sup>(2)</sup> / 110 / 115 / 120 / 127 V AC		
Input voltage range with 100% load	87 .. 150 V AC		
Input voltage range with 40% load	55 .. 150 V AC		
Frequency	50 / 60 Hz (auto-detectable)		
Input frequency range	± 10 Hz (40.. 60 / 50.. 70 Hz)		
Power factor	> 0.99 at full load		
Total harmonic distortion (THDi), at full load	≤ 5% (100 .. 130 V AC)		
<b>Inverter</b>			
Technology	PWM		
Waveform	Pure sine wave		
Rated voltage	100 <sup>(2)</sup> / 110 / 115 / 120 / 127 V AC		
Output voltage accuracy (battery mode)	± 1%		
Total harmonic distortion (THDv), with linear load	< 2%		
Frequency	With mains present, synchronised to rated of input (± 3 Hz) With mains absent, in backup mode 50 / 60 ± 0.05 Hz		
Frequency synchronous speed	1 Hz/sec.		
Power factor	0,9		
Transfer time, inverter to battery	0 ms		
Transfer time, inverter to bypass	< 4 ms		
Transfer time, inverter to ECO	< 4 ms		
Transfer time, ECO to battery	< 10 ms		
Performance at full load, in line mode with battery 100% charged	> 89%	> 91%	
Performance at full load, in ECO mode	> 96%	> 97%	
Overload line mode	100.. 130%, 5 min.		
	> 130.. 140%, 30 sec.		
	> 140.. 150%, 1,5 sec.		
Overload battery mode	110.. 130%, 2 min.		
	> 130.. 140%, 10 sec.		
	> 140.. 150%, 1,5 sec.		
Crest factor	3:1		
<b>Static bypass</b>			
Type	Mixed (thyristors in antiparallel + relay)		
Rated voltage	85.. 140 V ± 2%		
Rated frequency	50 / 60 Hz ± 3 Hz		
Overload	110.. 120%, 30 min.		
	120.. 130%, 10 min.		
	> 130 %, 1 min.		
<b>Batteries</b>			
Voltage / capacity	12 V DC / 7 Ah	12 V DC / 9 Ah	
Number of batteries in series / group voltage	3 / 36 V DC	4 / 48 V DC	6 / 72 V DC
<b>Internal battery charger</b>			
Charge type	I / U (constant current / constant voltage)		
Constant current / constant voltage	1 / 2 / 4 / 6 / 8 A adjustable / 13.65 V DC battery		
Float voltage, element / group	13.65 V DC		
Maximum charging current	1 / 2 / 4 / 6 / 8 A adjustable		
Recharge time	4 hours to 90%		
Voltage/temperature compensation	-18 mV /°C per battery from 30°C		

Models	TWIN PRO2 A		
Available power ratings (kVA / kW) <sup>(1) (3)</sup>	1 / 0,9	2 / 1,8	3 / 2,7
<b>General</b>			
Communication ports	2 (RS232 -DB9- and USB, mutually exclusive)		
Monitoring software	ViewPower (free download)		
Noise level at 1 m.	< 50 dB		
Operating temperature	0.. 40 °C		
Storage temperature	- 15.. + 50 °C		
Storage temperature without batteries	- 20.. + 70 °C		
Operating altitude	2,400 masl		
Relative humidity	20.. 95% non-condensing		
Protection rating	IP20		
Dimensions -Depth x Width x Height- (mm) - UPS	397 x 145 x 220	421 x 190 x 318	
Dimensions -Depth x Width x Height- (mm) - UPS - B1	397 x 145 x 220	421 x 190 x 318	
Weight (kg) -Standard device	13	20.3	28
Weight (kg) -B1 device	6.6	9.9	12.3
Safety	EN-IEC 62040-1; UL1778 ; CSA C22.2		
Functionning	EN-IEC 62040-1		
Electromagnetic compatibility (EMC)	IEC 62040-2 ; CFR47 FCC Part15, Subpart B, Class B (1 kVA), Class A (2 and 3 kVA)		
Marking	CE ; TÜV ; FCC		
Quality system	ISO 9001 and ISO 14001		

(1) The output power is limited depending on the maximum input current of the equipment according to the following table:

Power (VA)	Input I <sub>MAX</sub> (A)
1000	12
2000	16
3000	24

In case of exceeding these current limits, the device reports this situation through the LCD display with the warning code "O1" (Over current input).

(2) 20% power derating when the output voltage is set to 100Vac.

(3) As a frequency converter, the power supplied will be 80% of the nominal.

Tab. 16. General technical specifications.

## 9.2. GLOSSARY.

- **AC.-** Alternating current is electric current in which the magnitude and direction vary cyclically. The waveform of the most commonly used alternating current is that of a sine wave, since this achieves a more efficient transmission of energy. In certain applications, however, other periodic waveforms are used, such as triangular or square.
- **Bypass.-** Manual or automatic, this is the physical connection between the input of an electrical device and its output.
- **DC.-** Direct current is the continuous flow of electrons through a conductor between two points with different potential. Unlike AC, in DC, electrical loads always circulate in the same direction from the point of greatest potential to the lowest. Although DC is commonly identified as a continuous current (for example, that supplied by a battery), any current that always maintains the same polarity is continuous.
- **DSP.-** Digital signal processor. A DSP is a processor or microprocessor-based system that has a set of instructions, hardware and optimised software for applications that require numerical operations at very high speed. Because of this, it is especially useful

for the processing and representation of analogue signals in real time: in a system that works in this way -real time- samples are usually received from an analogue/digital converter [ADC].

- **Power factor.-** The power factor, PF, of an AC circuit is defined as the ratio between active power, P, and apparent power, S, or as the cosine of the angle formed by the current and voltage factors, designated in this case as cos f, where f is the value of the angle.
- **GND.-** This stands for GROUND or EARTH and, as the name indicates, refers to the potential of the surface of the Earth.
- **EMI filter.-** Filter capable of significantly reducing electromagnetic interference, EMI, which is the disturbance that occurs in a radio receiver or in any other electrical circuit caused by electromagnetic radiation coming from an external source. Electromagnetic interference is also known as radio frequency interference, RFI. This disturbance can interrupt, degrade or limit the performance of the circuit
- **IGBT.-** An insulated gate bipolar transistor is a semiconductor device that is generally used as a controlled switch in power electronics circuits. This device possesses the characteristics of

the gate signals of field effect transistors with the capacity for high current and low saturation voltage of the bipolar transistor, combining an isolated FET gate for input and control and a bipolar transistor as a single switch in a single device. The IGBT's excitation circuit is similar to that of the MOSFET, while the conducting characteristics are similar to those of the BJT.

- **Interface.-** In electronics, telecommunications and hardware, an interface (electronics) is the port (physical circuit) through which signals are sent or received from one system or subsystem to another.
- **kVA.-** A volt-ampere is the unit used for apparent power in electrical current. In DC, it is practically equal to real power but, in AC, it can differ from this depending on the power factor.
- **LCD.-** Liquid crystal display, a device invented by Jack Janning, who was an employee of NCR. It is an electrical system for data presentation formed by 2 transparent conductive layers and a special crystalline material in the middle (liquid crystal) which have the ability to orientate light as it passes through.
- **LED.-** Light-emitting diode, a semiconductor device [diode] that emits light that is almost monochromatic, that is to say, it has a very narrow spectrum when it is polarised directly and is penetrated by an electric current. The colour, wavelength, depends on the semiconductor material used in the construction of the diode, and can vary from ultraviolet, passing through the visible light spectrum, to infrared, the latter called IRED (infra-red emitting diode).
- **Circuit breaker.-** A circuit breaker is a device capable of interrupting the electrical current of a circuit when it exceeds certain maximum values.
- **On-line mode.-** A device is said to be on-line when it is connected to a system, is operative, and normally has its power supply connected.
- **Inverter.-** An inverter is a circuit used to convert DC into AC. The function of an inverter is to change a DC input voltage to a symmetrical AC output voltage, with the magnitude and frequency desired by the user or designer.
- **Rectifier.-** In electronics, a rectifier is the element or circuit that converts AC into DC. This is done by using rectifier diodes, whether solid state semiconductors, vacuum valves or gaseous valves, such as those containing mercury vapour. Depending on the characteristics of the AC power that they use, they are classified as single-phase when they are powered by a mains phase or three-phase when they are powered by three phases. Depending on the type of rectification, they can be half wave when only one of the half cycles of the current is used or full wave when both half cycles are used.
- **Relay.-** A relay is an electromechanical device that functions as a switch controlled by an electrical circuit in which, by means of an electromagnet, a set of one or several contacts is activated to enable other independent electrical circuits to be opened or closed.
- **SCR.-** Silicon controlled rectifier, commonly known as a thyristor, a 4-layer semiconductor device that works as an almost ideal switch.
- **THD.-** Total harmonic distortion. Harmonic distortion occurs when the output signal of a system does not equal the signal that entered it. This lack of linearity affects the waveform because the device has introduced harmonics that were not in the input signal. Since they are harmonic, that is to say, multiples of the input signal, this distortion is not so dissonant and is less easy to detect.





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Information about the technical support and service network (TSS), the sales network and the warranty is available on our website:

**[www.salicru.com](http://www.salicru.com)**

#### **Product range**

Uninterruptible Power Supplies (UPS)  
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