

# UPS USER MANUAL

## MANUEL DE L'UTILISATEUR DE L'ASI

### UTILIZZO DELL'UPS

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Rev.	Descrizione Description	Data Date	Emesso Issued	Approvato Approved	Lingua Language	Pagina Page	di Pag. of Pag.
B	VR 31-17	17.02.17	R. Soldani	G. Senesi	E/I	1	164
					Codice / Code <b>OMG38225</b>		

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**ENGLISH LANGUAGE**



## 1 SCOPE

The instructions contained in the operating manual are applicable to the UPS systems listed below.

- *BSL46* KEOR HPE 60 kVA
- *BSM46* KEOR HPE 80 kVA
- *BSK93* KEOR HPE 100 kVA
- *BSM47* KEOR HPE 125 kVA
- *BSM10* KEOR HPE 160 kVA



### Storing documentation

This manual and any other supporting technical documentation relating to the product must be stored and made accessible to personnel in the immediate vicinity of the UPS.



### Further information

In the event that the information provided in this manual is not sufficiently exhaustive, please contact the manufacturer of the device, whose details are available in the "Contacts" section.

## 2 SAFETY RULES AND WARNINGS



### **Injury hazard due to electric shock!**

Always respect all the safety instructions and, in particular:

- any work on the unit must be carried out by qualified personnel;
- internal components can only be accessed after disconnecting the device from supply sources;
- always use protective devices designed for each type of activity;
- the instructions contained in the manuals must be strictly followed.



### **Injury hazard due to device failure**

Potentially hazardous situations may arise in case of UPS failure.

- Do not use the device if visibly damaged.
- Maintain the device regularly to identify possible failure.



### **Possible device damage**

Whenever work is carried out on the device, make sure all actions are taken in order to avoid electrostatic discharges which might damage the electronic components of the system.



### **Read the technical documentation**

Before installing and using the device, make sure you have read and understood all the instructions contained in the present manual and in the technical supporting documentation.

## 3 GENERAL UPS DESCRIPTION

### 3.1 TYPOLOGY

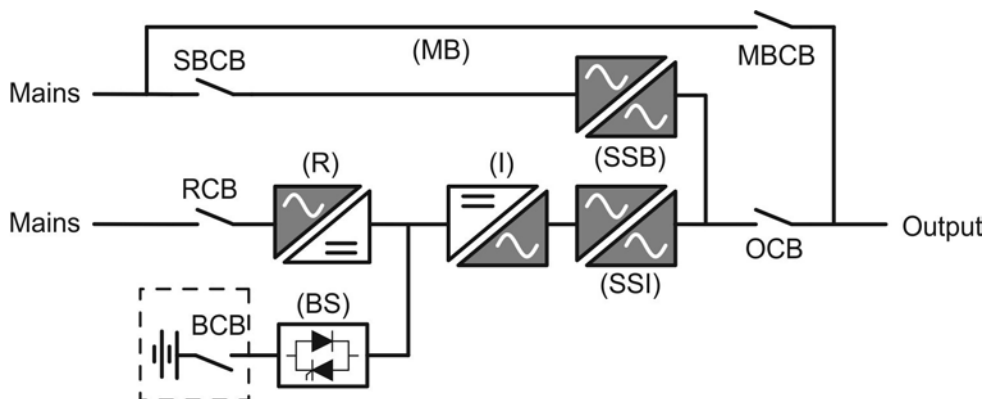
The UPS described in this manual is on-line, double conversion; the inverter included in the UPS always supplies energy to the load, whether mains is available or not (according to the battery autonomy time).

This configuration guarantees the best service to the User, as it supplies clean power uninterruptedly, ensuring voltage and frequency stabilization at nominal value. Thanks to the double conversion, it makes the load completely immune from micro-interruptions and from excessive mains variations, and prevents damage to critical loads (Computer - Instrumentation - Scientific equipment etc.).



#### Output voltage present

The line connected to the UPS output is energized even during mains failure, therefore in compliance with the prescriptions of IEC EN62040-1, the installer will have to identify the line or the plugs supplied by the UPS making the User aware of this fact.



Picture 1 – Block diagram

The UPS uses IGBT technology with a high switching frequency in order to allow a low distortion of the current re-injected into the supply line, as well as high quality and stability of output voltage. The components used assure high reliability, very high efficiency and maintenance easiness.

### 3.2 SYSTEM DESCRIPTION

#### 3.2.1 Rectifier

It converts the three-phase voltage of the AC mains into continuous DC voltage.

It uses a three-phase fully-controlled IGBT bridge with a low harmonic absorption.

The control electronics uses a 32 bit  $\mu$ P of latest generation that allows to reduce the distortion of the current absorbed by mains (THDi) to less than 3%. This ensures that the rectifier does not distort the supply mains, with regard to the other loads. It also avoids cable overheating due to the harmonics circulation.

The rectifier is so sized as to supply the inverter at full load and the battery at the maximum charging current.

### 3.2.2 Inverter

It converts the direct voltage coming from the rectifier or from the DC battery into alternating AC voltage stabilized in amplitude and frequency.

The inverter uses IGBT technology with a high switching frequency of approximately 8 kHz.

The control electronics uses a 32 Bit  $\mu$ P of latest generation that, thanks to its processing capability, generates an excellent output sine-wave.

Moreover, the fully digital control of the output sine-wave allows to achieve high performances, among which a very low voltage distortion even in presence of high-distorting loads.

### 3.2.3 Battery and battery charger

The battery is installed outside the UPS. It is generally housed in an external battery cabinet.

The battery charger logic is completely integrated in the rectifier's control electronics.

The battery is charged, according to the DIN 41773 Standard, every time it has been partially or completely discharged. When its full capacity is restored, it is disconnected from the DC bus by means of a static switch, in order to save energy, reduce the stress due to the AC ripple thus increasing the lifetime. This operating mode is called *Green Conversion*.

It is however periodically charged but the prevailing state is of complete rest.

### 3.2.4 Static bypass

The Static Bypass allows to transfer the load between Inverter and Emergency Mains, and vice-versa, in a very short time, and uses SCR's as power commutation elements.

### 3.2.5 Manual bypass

The Manual Bypass is used to cut off the UPS completely, supplying the load directly from the input mains in case of maintenance or serious failure.



#### **Follow the procedures contained in the manual**

The sequence of manual bypass switching and return must be carried out with respect to the procedure indicated in the installation and start-up section. The manufacturer cannot accept responsibility for damages arising from incorrect operation.

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#### **External manual bypass**

In the UPS system the manual bypass isolator is optional and installed outside the unit.

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### 3.3 OPERATING STATUS

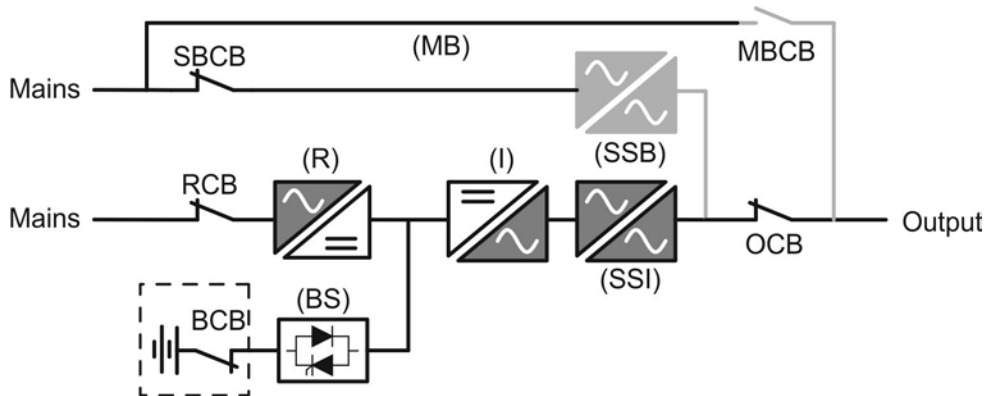
The UPS has five different operating modes, as described below:

- Normal operation
- Green Conversion
- Bypass operation
- Battery operation
- Manual bypass

#### 3.3.1 Normal operation

During normal operation all the circuit breakers/isolators are closed, except for MBCB (maintenance bypass).

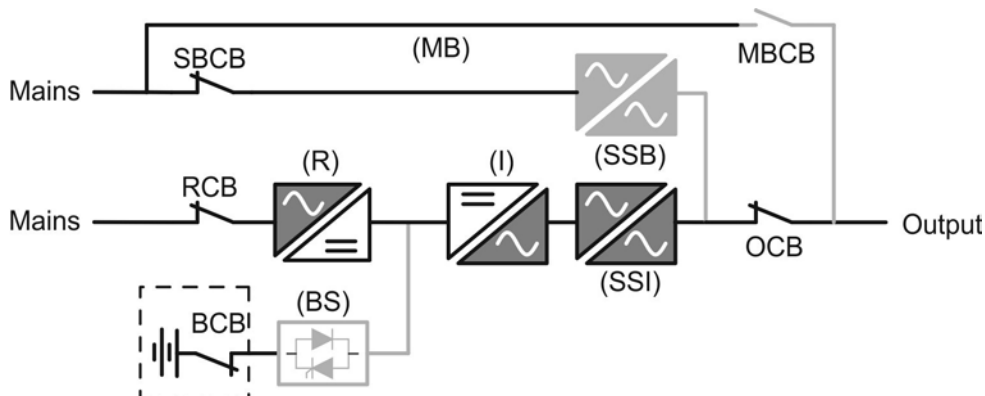
The rectifier is supplied by the AC three-phase input voltage which, on its turn, feeds the inverter and compensates mains voltage as well as load variations, keeping the DC voltage constant. At the same time, it provides to charge the battery. The inverter converts the DC voltage into an AC sine-wave with stabilized voltage and frequency, and also supplies the load via its static switch SSI.



Picture 2 – Normal operation

#### 3.3.2 Green Conversion

During the operation in *Green Conversion* mode the battery is disconnected from the DC bus by means of a static switch (see picture) and the rectifier works at reduced DC voltage; a control algorithm provides to periodically re-connect the battery for recharge purposes (intermittent charging).



Picture 3 – Green Conversion

When the *Green Conversion* algorithm is active the rectifier operates at reduced DC voltage and supplies the inverter alone, since the battery is disconnected from the DC bus. The battery charge is controlled by a specific algorithm. In case no mains outage events have occurred, and so no battery discharges have occurred too, the control logic provides to start a charging cycle once every 25 days. The battery-charger restores the capacity lost due to the self-discharge and remains in floating charge for additional 12 hours. As this time has elapsed the battery static switch is opened and the battery is disconnected from the DC bus.

In case a discharge event occurs, the control logic provides to calculate the capacity which has been lost during the discharge; as the mains is restored a charging cycle is started, which is extended for an additional time that depends on the percentage of lost capacity, referred to the rated value.

- Lost capacity < 10% → Additional charge for **12 hours**
- Lost capacity between 10% and 20% → Additional charge for **48 hours**
- Lost capacity > 20% → Additional charge for **96 hours**

Such values complies with the recommendations of the main battery manufacturers.

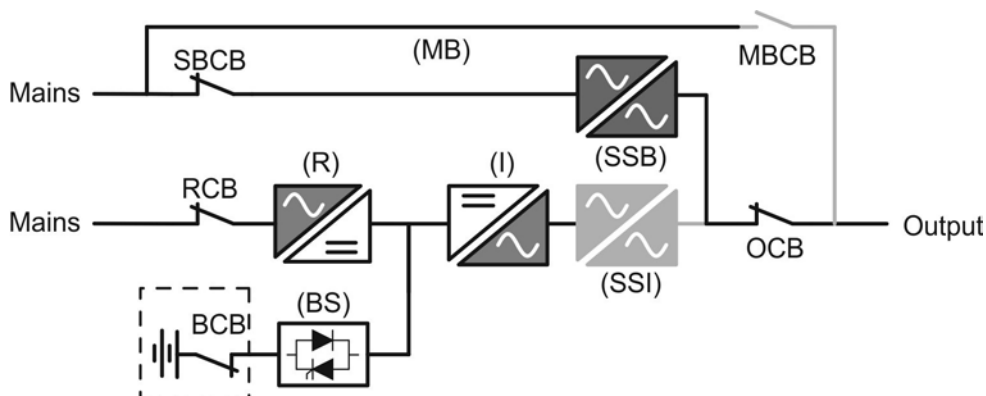


### Set the right battery capacity

The UPS front panel allows the setting of the battery parameters, including the rated capacity. Considering the importance that such value assumes for the correct execution of the charge control algorithm, it is highly recommended to verify the correctness of the programmed value.

### 3.3.3 Bypass operation

The load can be switched to bypass either automatically or manually. The manual changeover is due to the BYPASS SWITCH which forces the load to bypass. In case of failure of the bypass line, the load is switched back to inverter without interruption.



Picture 4 – Load supplied by bypass

### 3.3.4 Battery operation

In case of power failure or rectifier fault, the battery feeds the inverter without interruption. The battery voltage drops based on the amplitude of the discharging current. The voltage drop has no effect on the output voltage, which is kept constant by changing the PWM modulation. An alarm is activated when the battery is near the minimum discharge value.

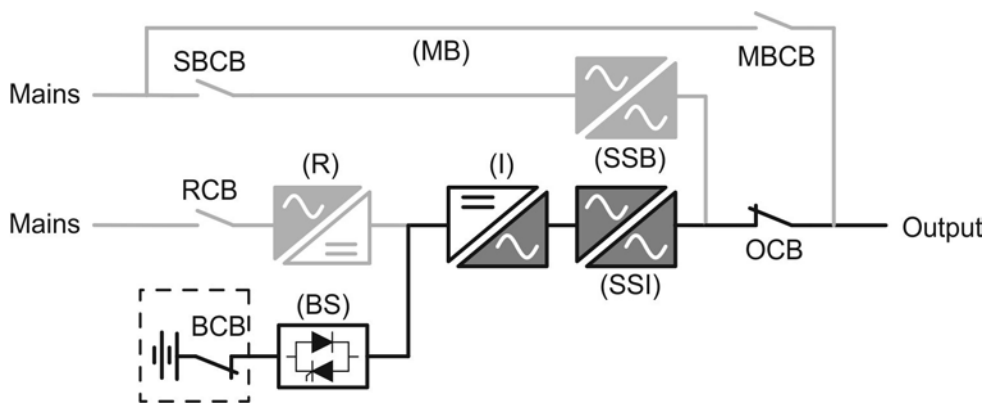


In case the supply is restored before the battery is completely discharged, the system will be switched back to normal operation automatically. In the opposite case, the inverter shuts down and the load is switched to the bypass line (bypass operation). If the bypass line is not available or is out of tolerance, the loads supply is interrupted as soon as the battery reaches the discharge limit threshold (*black-out*).

As soon as the supply is restored, the rectifier will recharge the battery. In the standard configuration, the loads are supplied again via static switch SSB when mains is available again. The inverter is restarted when the battery has partially restored its capacity.

The system restart from the *black-out* condition can be customized based on the requirements of the plant, in three different modes:

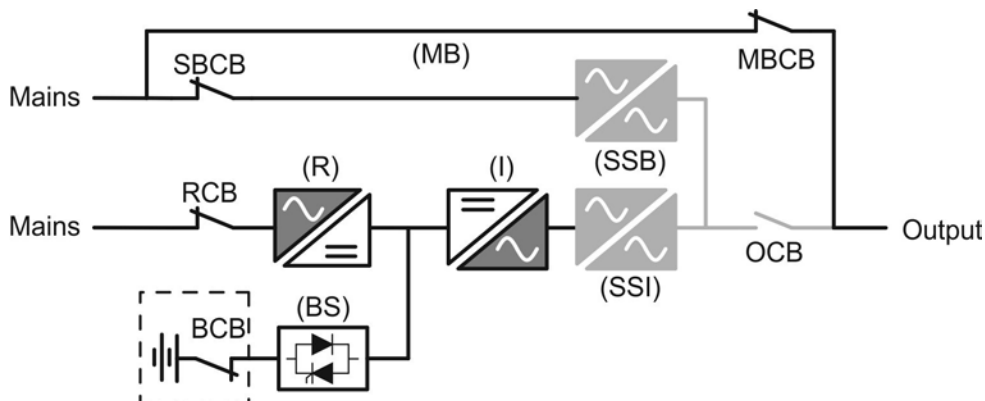
- Bypass → loads are supplied as soon as the bypass line is available (factory configuration).
- Inverter → loads are supplied by the inverter (even if the bypass line is available) when the battery voltage has reached a programmed threshold, after the rectifier restart.
- Man. Inverter → the output supply is NOT restored automatically. The system requires a confirmation to restart which can only be done manually by the user via the front panel.



Picture 5 – Battery operation

### 3.3.5 Manual bypass

The manual bypass operation is necessary whenever the UPS functionality is tested, or during maintenance or repair work.



Picture 6 – Manual bypass for functional checks



### Follow the procedures contained in the manual

The sequence of manual bypass switching and return must be carried out with respect to the procedure indicated in the installation and start-up section. The manufacturer cannot accept responsibility for damages arising from incorrect operation.

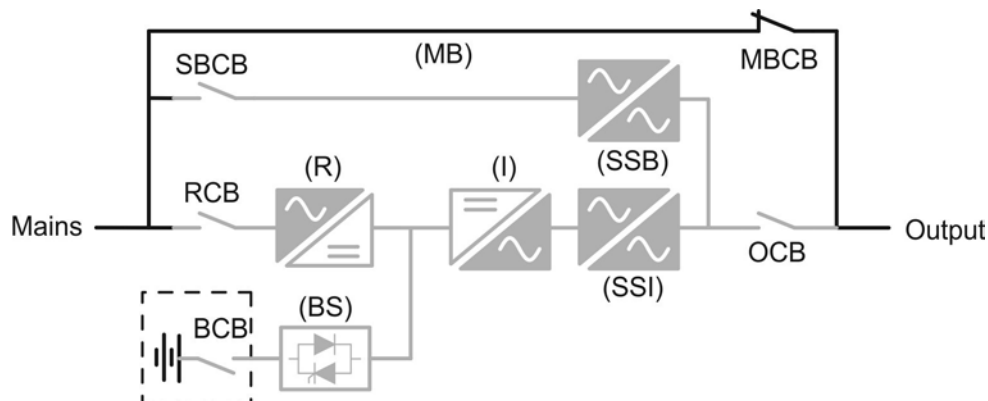


### Wiring of the auxiliary contacts

Carry out a proper electrical installation by wiring the auxiliary contacts of the manual bypass and output isolators to the dedicated terminals on board the UPS. This will allow the control logic to acquire the status of the switches and guide the operator during the start-up and manual bypass procedures.

For further information refer to the section "Installation and start-up".

During the manual bypass due to repair or maintenance, the UPS is completely shut down and the load is directly supplied by the bypass line.



Picture 7 – Manual bypass for repair or maintenance works

### 3.4 CONTROL AND OPERATION DEVICES

The control and operation devices of the UPS are indicated below:

- Isolator on rectifier input (RCB)
- Isolator on bypass input (SBCB)
- Isolator on UPS output (OCB)
- Manual bypass isolator (MBCB)
- Battery Isolator / Circuit breaker (BCB) - External, inside the battery cabinet
- Emergency power off button (EPO)
- Normal/Bypass selector
- LCD control panel



#### **Check the personnel training**

The use of the operation and control devices of the UPS is intended for authorized personnel only. We recommend to check the training of the personnel responsible for the use and maintenance of the system.

---

#### 3.4.1 Isolators

The isolators provided on the UPS are used to isolate the power components of the device from the AC supply line, from the storage battery and from the load.



#### **Voltage present on terminals**

The isolators do not isolate the UPS completely, since AC voltage is still present on the UPS input terminals. Before carrying out any maintenance on the unit:

- Isolate the device completely by operating the external circuit breakers;
  - Wait at least 5 minutes in order to allow the capacitors to discharge.
-

### 3.4.2 Emergency power off command (EPO)

The emergency power off command is used to disconnect the UPS output immediately, interrupting the loads supply. It also shuts down the inverter.



#### **Operate the command only in case of real emergency**

The components of the system are subject to a high stress when the emergency power off command is operated under load presence.

- Use the emergency power off button only in case of real emergency.
- 



#### **Supply reset**

Reset the output supply only when the causes which led to the emergency shutdown have been eliminated and you are sure that there is no hazard to persons and things.

---

### 3.4.3 Normal/Bypass selector

The Normal/Bypass selector is installed externally, on the rear of UPS. It is generally used during the manual bypass procedure, when it is necessary to isolate the UPS for maintenance or repair.



#### **Follow the procedures contained in the manual**

The Normal/Bypass selector shall only be operated in accordance with the procedures specified in the installation and start-up section. The manufacturer cannot accept responsibility for damages arising from incorrect operation.

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### 3.4.4 LCD control panel

The control panel of the UPS is used in order to:

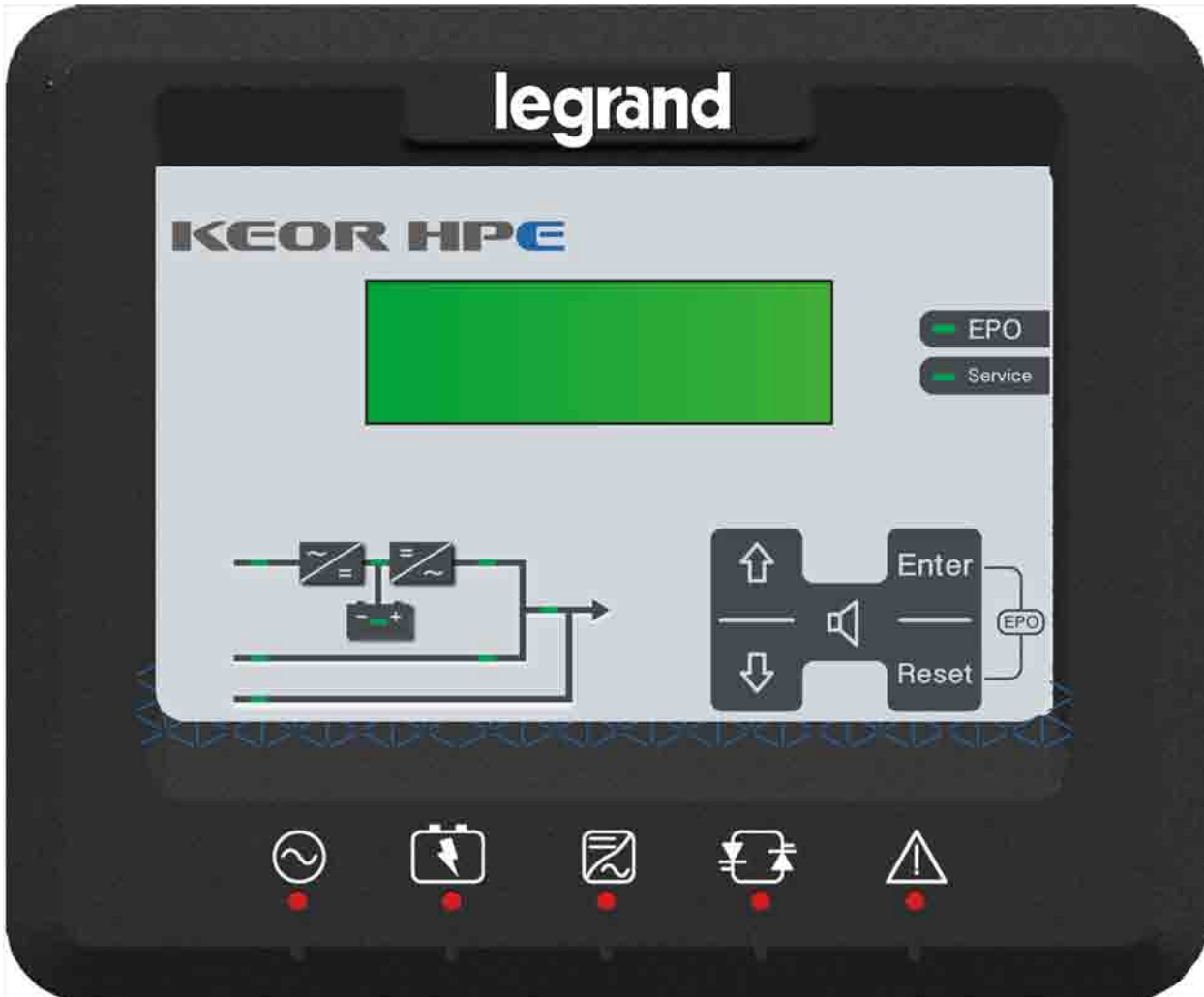
- Check the operating parameters of the device
- Check the alarms present
- Access the event log
- Display the information on the device
- Modify the operating parameters

The menu which allows to change the parameters is password-protected in order to prevent access to unauthorized personnel.

## 4 FRONT PANEL

The front panel of the UPS, consisting of four rows alphanumeric display plus 5 function keys, allows the complete monitoring of the UPS status.






The mimic flow helps to understand the operating status of the UPS.



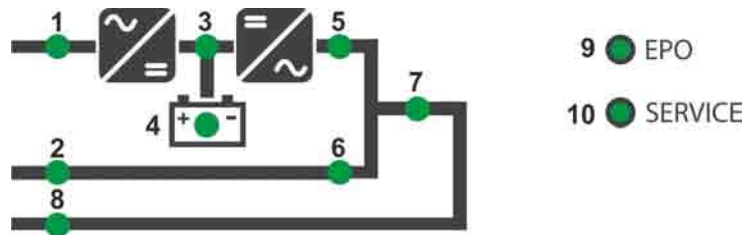
Picture 8 – UPS front panel

## 4.1 FUNCTION BUTTONS

The front panel of the UPS is provided with 5 buttons whose functions are indicated in the following table:

Button	Assigned functions
	<ul style="list-style-type: none"><li>➤ Scrolls up the menus</li><li>➤ Increases the values by one unit</li><li>➤ Selects a value</li></ul>
	<ul style="list-style-type: none"><li>➤ Scrolls down the menus</li><li>➤ Decreases the values by one unit</li><li>➤ Selects a value</li></ul>
	<ul style="list-style-type: none"><li>➤ Selects a menu</li><li>➤ Confirms changes</li></ul>
	<ul style="list-style-type: none"><li>➤ Silences the buzzer (activated due to an alarm or a failure)</li></ul>
	<ul style="list-style-type: none"><li>➤ Returns to the previous menu</li></ul>

## 4.2 MIMIC PANEL LED'S



Picture 9 – UPS mimic panel

<b>LED 1</b>		GREEN	AC line on rectifier input within tolerance
		GREEN	AC mains failure / Wrong phase rotation
<b>LED 2</b>		GREEN	AC bypass line within tolerance
		GREEN	Wrong phase rotation
		OFF	AC bypass line out of tolerance / failure
<b>LED 3</b>		GREEN	Rectifier off or faulty
		RED	DC voltage out of tolerance
		GREEN	Rectifier on and DC voltage within tolerance
<b>LED 4</b>		GREEN	Circuit breaker BCB closed and battery charging
		GREEN	Battery discharging or under TEST
		ORANGE	Circuit breaker BCB open
		RED	Battery fault (following a battery test)
		OFF	Battery not available
<b>LED 5</b>		GREEN	Inverter voltage within tolerance and static switch closed
		GREEN	Inverter overload or short-circuit
		OFF	Inverter off or voltage out of tolerance
<b>LED 6</b>		ORANGE	Re-transfer blocked
		ORANGE	Static bypass switch closed
		OFF	Static bypass switch open
<b>LED 7</b>		GREEN	Output circuit breaker OCB closed
		OFF	Output circuit breaker OCB open
<b>LED 8</b>		ORANGE	Manual bypass switch MCB closed
		OFF	Manual bypass switch MCB open
<b>LED 9</b>		RED	Emergency power off (EPO) activated
		OFF	Normal operation
<b>LED 10</b>		ORANGE	Maintenance request (slow blinking)
		ORANGE	Critical alarm (fast blinking)
		OFF	Normal operation

### 4.3 LED'S BAR



Picture 10 – LED's bar

<b>LED 11</b>		GREEN	AC line on rectifier input within tolerance
		GREEN	Wrong phase rotation (fast blinking)
		GREEN	Unbalanced AC voltage (slow blinking)
		OFF	AC mains failure
<b>LED 12</b>		GREEN	Circuit breaker BCB closed and battery charging
		ORANGE	Battery discharging or under TEST (fast blinking)
		ORANGE	Circuit breaker BCB open (slow blinking)
		RED	End of battery autonomy / Battery fault
<b>LED 13</b>		GREEN	Inverter voltage within tolerance and static switch closed
		ORANGE	Inverter overload or short-circuit
		RED	Inverter critical alarm
		OFF	Inverter off
<b>LED 14</b>		GREEN	AC bypass line within tolerance
		RED	Wrong phase rotation (fast blinking)
		RED	AC bypass line out of tolerance / failure
<b>LED 15</b>		GREEN	Programmed maintenance required (slow blinking)
		GREEN	Critical alarm (fast blinking)



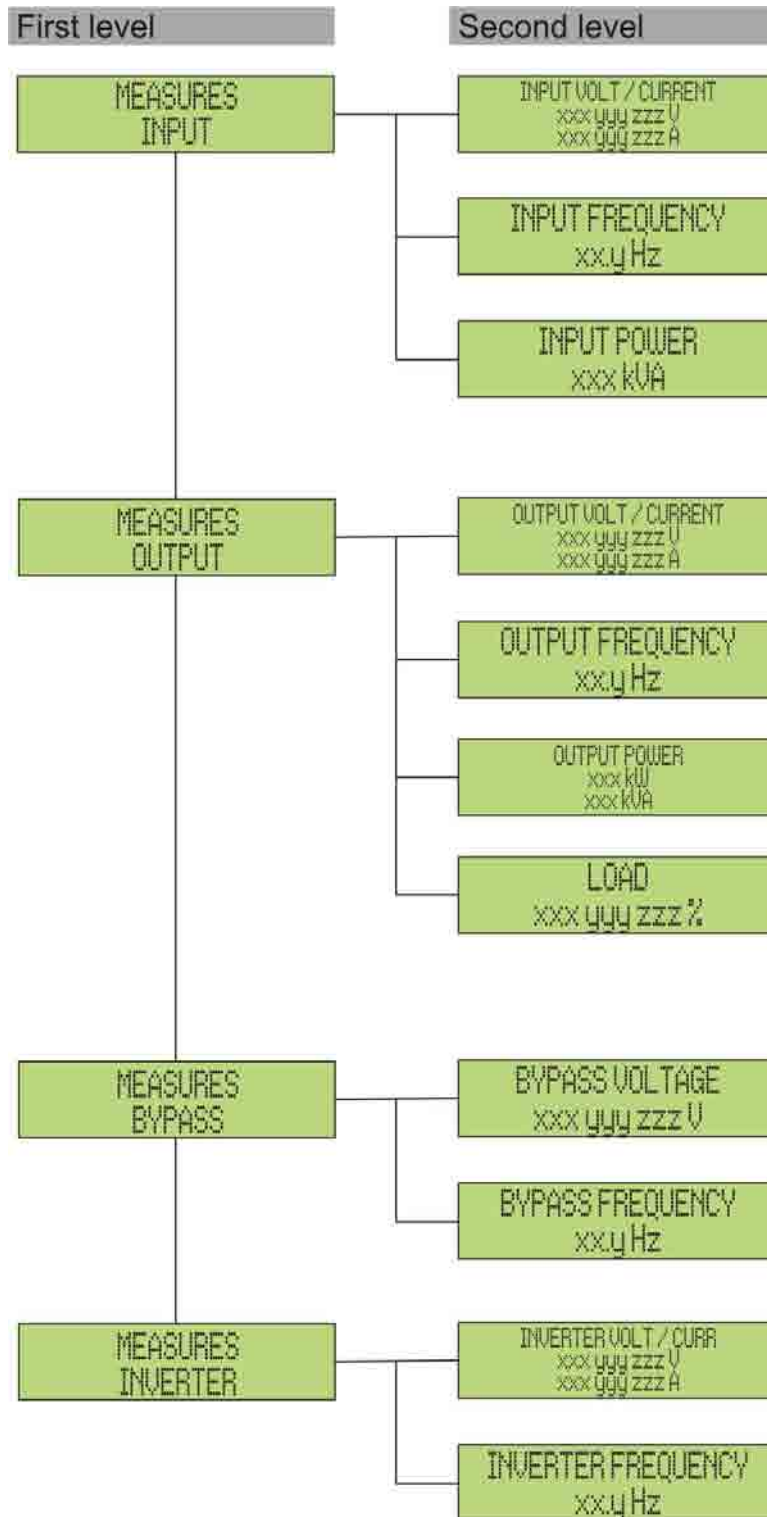
## 5 HANDLING THE LCD PANEL

### 5.1 MAIN MENUS

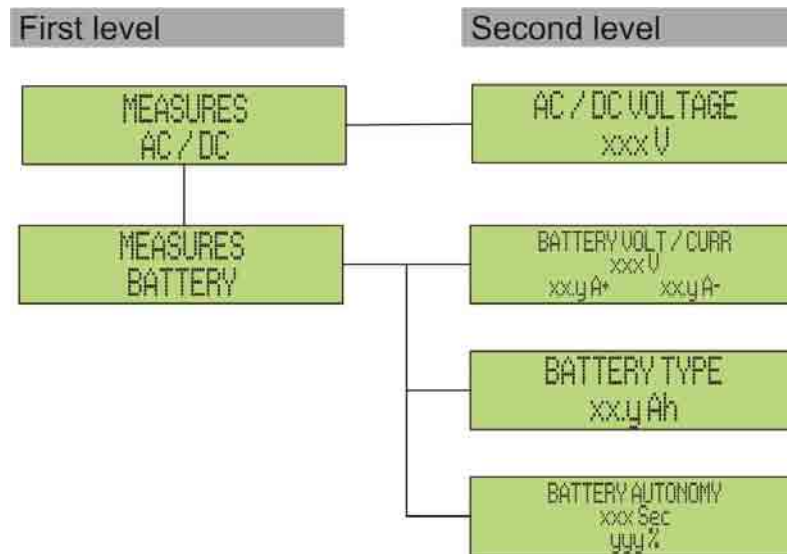
UPS NAME xxx kVA	Main screen (nominal power of the UPS)
UPS NAME MEASURES	UPS measures regarding basic parameters (voltage, current, etc.)
UPS NAME ALARMS	UPS operating status, possible alarms present and alarms history
UPS NAME SPECIAL	Setting of parameters and special functions
UPS NAME INFO	General information regarding the UPS

## 5.2 MEASURE DISPLAY

The MEASURES menu is structured as follows:



Picture 11 – Structure of MEASURES menu (1 of 2)



Picture 12 – Structure of MEASURES menu (2 of 2)

Sub-menu	Displayed data	Accuracy
INPUT	Rectifier input voltage <sup>(1) (2)</sup>	1 V
	Rectifier input current <sup>(3)</sup>	1 A
	Frequency	0.1 Hz
	Input power	1 kVA
OUTPUT	Voltage <sup>(1) (2)</sup>	1 V
	Current <sup>(3)</sup>	1 A
	Frequency	0.1 Hz
	Active power	1 kW
	Apparent power	1 kVA
	Load percentage	1 %
BYPASS	Voltage <sup>(1) (2)</sup>	1 V
	Frequency	0.1 Hz
INVERTER	Voltage <sup>(1) (2)</sup>	1 V
	Frequency	0.1 Hz
AC/DC	Rectifier output voltage	1 V
BATTERY	Voltage and current	1 V / 1 A
	Nominal capacity	1 Ah
	Residual autonomy	1 min / 1 %

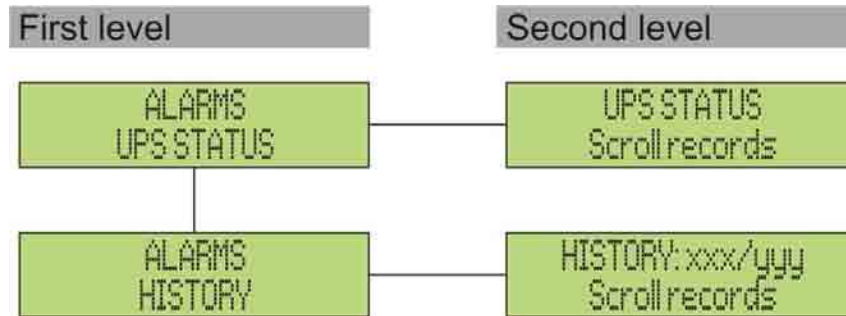
<sup>(1)</sup> The voltage measures are always referred to the phase-to-neutral value

<sup>(2)</sup> The three voltages are displayed in one screen as "xxx yyy zzz V"

<sup>(3)</sup> The three line currents are displayed in one screen as "xxx yyy zzz A"


### 5.3 BASIC DIAGNOSTICS

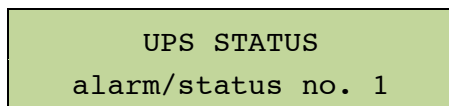
The ALARMS menu allows to display the current operating status of the device and to access the event log, based on the following structure.



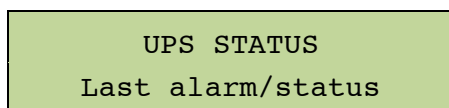
Picture 13 – Structure of ALARMS menu


Sub-menu	Displayed data
UPS STATUS	Alarms present and operating statuses
HISTORY	Event log

The LCD panel displays the ALARMS menu automatically whenever an alarm occurs. The audible indicator, if enabled, is activated to show the occurred failure. The audible alarm is silenced pressing the key  (BUZZER).



Display of the first alarm present (if no alarm is present, the operating status is displayed)



Press the key  to browse the menu and to go to the next alarm/status (in alphabetical order)

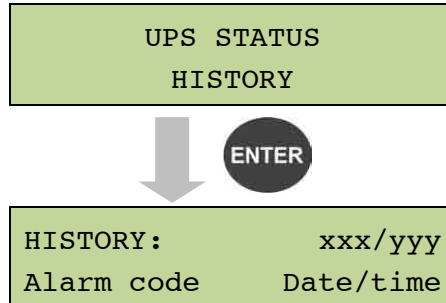


#### Automatic erasure of alarms

Should an alarm occur and then the conditions that originated it no longer exist, the alarm will be automatically cancelled and the system restarted.

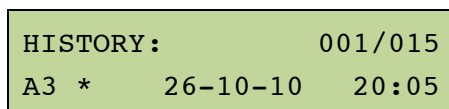
### 5.3.1 Display of alarms history

All the events are recorded in the alarms history.



The first event shown is the latest one in order of time; a new event makes all the other events automatically shift one position, clearing the oldest event.

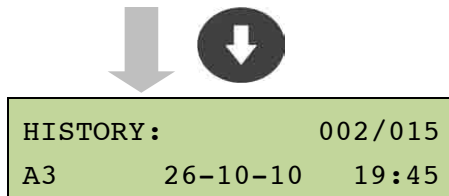
The quantity of stored events is displayed on the first line (xxx/yyy), which contains the data currently displayed (position in the list) and the total number of stored data (maximum number equal to 500) respectively. An asterisk indicates the automatic reset of the alarm.



```
HISTORY: 001/015
A3 * 26-10-10 20:05
```

Latest event stored (in order of time)

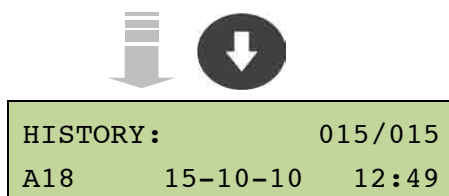
- E.g.: automatic reset of alarm "A3 – BOOSTER STOPPED"



```
HISTORY: 002/015
A3 26-10-10 19:45
```

Immediately prior event

- E.g.: alarm "A3 – BOOSTER STOPPED"



```
HISTORY: 015/015
A18 15-10-10 12:49
```

First event stored (in order of time)

### 5.3.2 Alarms and operating status

#### ALARMS

<b>A1</b>	MAINS FAULT	<b>A28</b>	CRITICAL FAULT
<b>A2</b>	INPUT WRONG SEQ	<b>A29</b>	MAINTENANCE REQ
<b>A3</b>	BOOSTER STOPPED	<b>A30</b>	COMMON ALARM
<b>A4</b>	BOOSTER FAULT	<b>A31</b>	MBCB BUS CLOSED
<b>A5</b>	DC VOLTAGE FAULT	<b>A32</b>	EPO BUS CLOSED
<b>A6</b>	BATTERY IN TEST	<b>A33</b>	ASYMMETRIC LOAD
<b>A7</b>	BCB OPEN	<b>A34</b>	SERVICE REQUIRED
<b>A8</b>	BATTERY DISCHARGE	<b>A35</b>	DIESEL MODE
<b>A9</b>	BATTERY AUT END	<b>A36</b>	DC FASTSHUTDOWN
<b>A10</b>	BATTERY FAULT	<b>A38</b>	INV --> LOAD
<b>A11</b>	SHORT CIRCUIT	<b>A39</b>	INV ERROR LOOP
<b>A12</b>	STOP TIMEOUT SC	<b>A40</b>	SSI FAULT
<b>A13</b>	INV OUT OF TOL	<b>A41</b>	RECT ERROR LOOP
<b>A14</b>	BYPASS WR SEQ	<b>A43</b>	CURR ERROR LOOP
<b>A15</b>	BYPASS FAULT	<b>A46</b>	PAR LOST REDUND
<b>A16</b>	BYPASS --> LOAD	<b>A45</b>	HIGH TEMP SSW
<b>A17</b>	RETRANSFER BLOCK	<b>A47</b>	SEND PARAM ERROR
<b>A18</b>	MBCB CLOSED	<b>A48</b>	RCV PARAM ERROR
<b>A19</b>	OCB OPEN	<b>A49</b>	TEST MODE ERROR
<b>A20</b>	OVERLOAD	<b>A50</b>	SSW BLOCKED
<b>A21</b>	THERMAL IMAGE	<b>A51</b>	BATT TEMPERATURE
<b>A22</b>	BYPASS SWITCH	<b>A52</b>	INVERTER BLOCK
<b>A23</b>	EPO PRESSED	<b>A53</b>	FIRMWARE ERROR
<b>A24</b>	HIGH TEMPERATURE	<b>A54</b>	CAN ERROR
<b>A25</b>	INVERTER OFF	<b>A55</b>	PAR CABLE DISC
<b>A26</b>	COMMUNIC ERROR	<b>A56</b>	MAINS UNBALANCE
<b>A27</b>	EEPROM ERROR	<b>A63</b>	START SEQ BLOCK

---

## STATUSES

<b>S1</b>	BOOSTER OK	<b>S12</b>	BATT STANDBY
<b>S2</b>	BATTERY OK	<b>S13</b>	BATT CHARGING
<b>S3</b>	INVERTER OK	<b>S14</b>	BATT FLOATING
<b>S4</b>	INVERTER --> LOAD		
<b>S5</b>	INV BYPASS SYNC		
<b>S6</b>	BYPASS OK		
<b>S7</b>	BYPASS --> LOAD		
<b>S9</b>	INV MASTER SYNC		



### Display and recording mode of alarms

- The statuses are always displayed in ascending order when the ALARMS – STATUSES menu is entered.
- The alarms are shown when they are present and must be silenced with the buzzer.
- The alarms remain displayed whilst they are present and they are automatically stored in the event log with date and time.



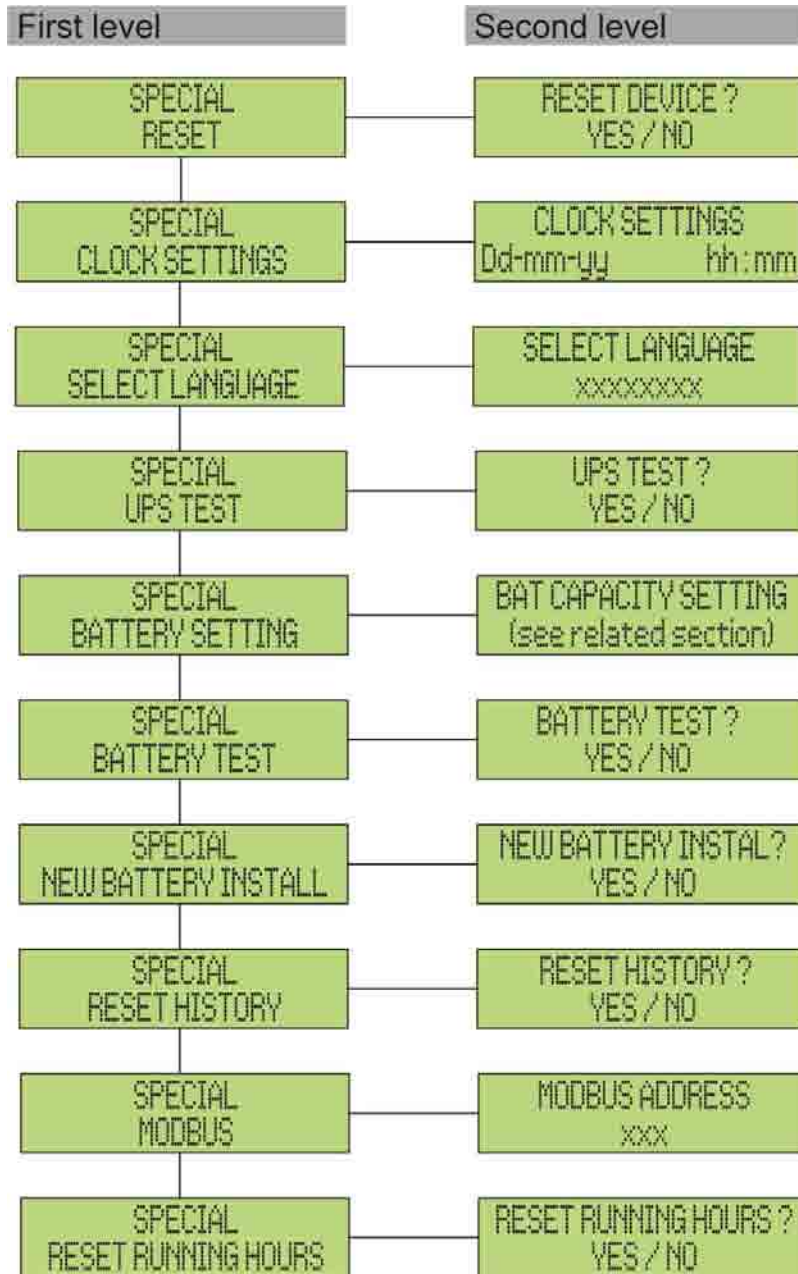
### Description of alarms and statuses

For a more detailed description of the alarms and statuses, see the “Faults and alarms” section of the present manual.

---

## 6 SETTINGS AND ADVANCED OPERATIONS

Some operating parameters of the UPS can be set via the SPECIAL menu, which is structured as follows:



Picture 14 – Structure of SPECIAL menu



Sub-menu	Programmable data
RESET	Reset of failure conditions
CLOCK SETTINGS	System date and time
SELECT LANGUAGE	Display language setting
UPS TEST	Performs a commutation test
BATTERY SETTING	Battery parameter setting
BATTERY TEST	Performs a battery test
NEW BATTERY INSTALL	Sets autonomy to 100%
RESET HISTORY	Event log reset
MODBUS	MODBUS address of device
RESET RUNNING HOURS	Reset the hour counter related to the UPS running time



### Password-protected access

The SETTINGS menu is protected by a password set by the factory in order to prevent access to unauthorized personnel.

- We recommend minimum disclosure of the access password.
- Changes to the operating parameters and starting operations on the UPS may be potentially dangerous for the device and for persons.

## 6.1 SETTING DATE AND TIME

Date and time may be set via the CLOCK menu.

CLOCK SETTINGS	
DD-MM-YY	hh : mm

The single digits can be modified via the arrow keys (▲ / ▼) and confirmed by pressing ◀ (ENTER).



### Setting the current date and time correctly

The correct setting of the date and time is essential for the recording of the event log.

## 6.2 DISPLAY LANGUAGE SETTING

The table below shows the languages which can be set for the display.

Parameter	Standard	Range
LANGUAGE	ITALIAN	ITALIAN GERMAN FRENCH ENGLISH PORTUGUESE SPANISH POLISH TURKISH

The parameters are changed via the arrow buttons (▲ / ▼) to increase the digits, and the ◀ button is used to confirm the entry.

## 6.3 NEW BATTERY INSTALLATION


The NEW BATTERY INSTALLATION menu is used in case battery circuit breaker BCB is not closed, when requested, in the start-up phase. In this case the system will start considering the battery completely discharged and activating the alarm "A10 – BATTERY FAULT".

To set the battery autonomy to 100% it is necessary to access the menu and press the ◀ button to confirm.


## 6.4 BATTERY CONFIGURATION

In case the UPS has been tested without knowing the characteristic data of the storage battery, the BATTERY CONFIGURATION menu allows to set such data. In particular, the following data can be set:

- Battery capacity in Ampere-hours (Ah)
- Recharging current in Amperes (A)
- Nominal autonomy in minutes

Access the menu by pressing the  button (ENTER).

BAT CAPACITY SETTING  
0120

The single digits can be modified via the arrow keys (▲ / ▼) and confirmed by pressing  (ENTER).




CONFIRM BATT CAP.?  
YES

Confirmation screen of the parameter set



BAT RECHAR CURR SET  
18

The single digits can be modified via the arrow keys (▲ / ▼) and confirmed by pressing  (ENTER).




CONFIRM RECHAR CURR?  
YES

Confirmation screen of the parameter set



AUTONOMY BAT SETTING  
0020

The single digits can be modified via the arrow keys (▲ / ▼) and confirmed by pressing  (ENTER).



CONFIRM AUTON BATT?  
YES

Confirmation screen of the parameter set



SAVE BATT SETTINGS?  
YES

Confirmation screen for the configuration



BATT SETTINGS SAVED  
PRESS "ENTER"



### Setting all the parameters

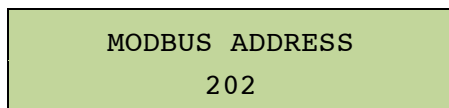
To save all the parameters it is necessary to reach the end of the guided procedure until the last screen previously shown.

If the procedure is interrupted earlier, none of the parameters previously set will be saved.

## 6.5 SETTING THE MODBUS PARAMETERS

The parameters regarding the communication via RS485 interface can be set in the MODBUS menu.

### ➤ Modbus address

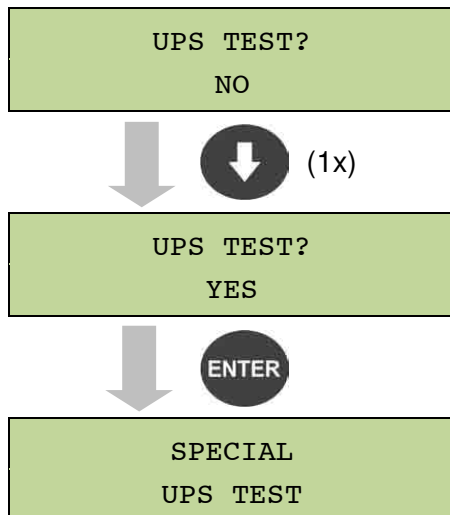


The single digits can be modified via the arrow keys (▲ / ▼) and confirmed by pressing ◀ (ENTER).

Parameter	Standard	Range
MODBUS ADDRESS	1	1 .... 247

## 6.6 UPS TEST

The UPS TEST menu allows to carry out a switching test of the inverter. The inverter is switched off and the load is transferred to the bypass supply. The inverter supply is automatically restored after a few seconds.



The value on the second line is ready to be changed

The parameter is changed. The change is confirmed by pressing ◀ (ENTER)

The system performs a test and returns to the previous screen

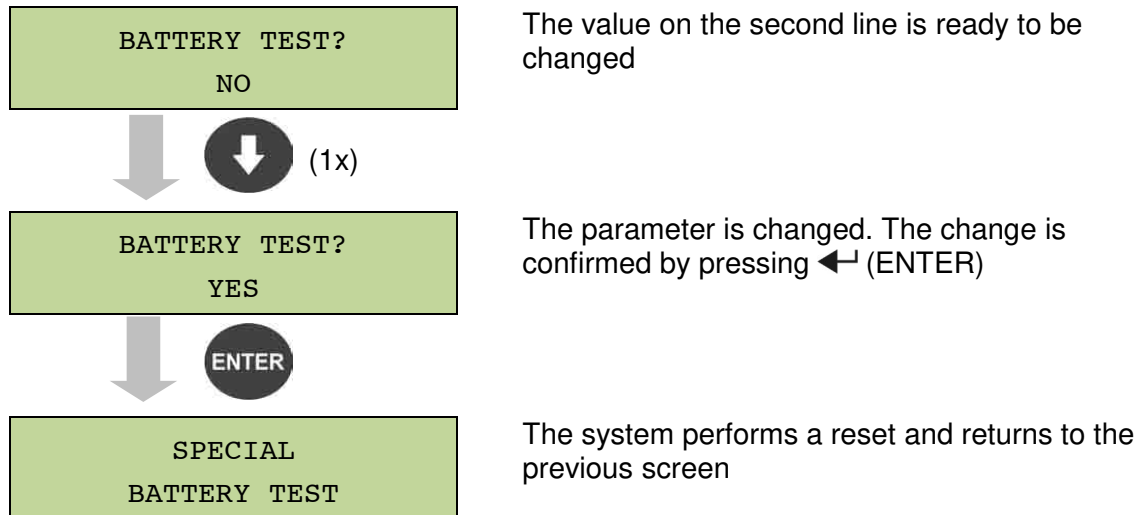


### Possible loss of supply

In case of power failure while the test is being performed, the immediate operation of the inverter is not guaranteed.

## 6.7 BATTERY TEST

The BATTERY TEST menu allows to carry out a short discharge test of the battery. In case the battery is not efficient, the alarm "A10 – Battery fault" is generated at the end of the test.



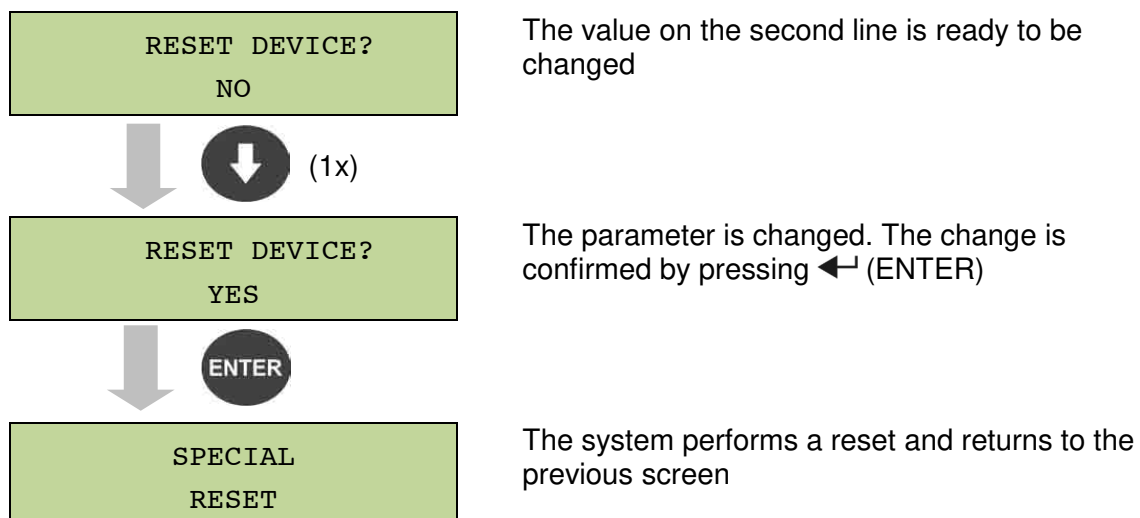
### Possible loss of supply

This test can affect the continuity of supply to the loads if the battery is not fully charged.

## 6.8 SYSTEM RESET

The UPS is equipped with internal protections which block the system or some of its sections. The alarm can be cleared and normal operation can be resumed via the RESET menu. In case the failure persists, the UPS will return to the previous failure condition.

In some cases the RESET is necessary to simply reset a failure signal, then the UPS will resume operation.



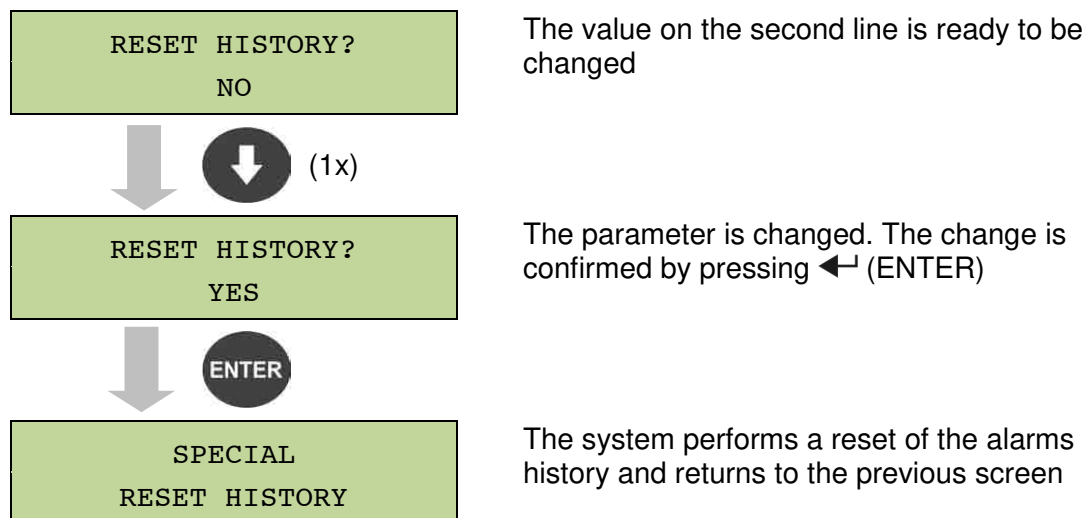
The failure conditions which impose a manual reset are:

- Static switch re-transfer block (alarm A17)
- Inverter shutdown due to the operation of the IGBT desaturation sensor (alarm A44)
- Inverter shutdown due to short-circuit timeout (alarm 12)
- Inverter shutdown due to thermal image protection (alarm 21)
- Inverter shutdown due to the operation of the quick disconnect sensor (alarm A36)
- Inverter shutdown due to voltage control loop error (alarm A39)
- Booster shutdown due to voltage control loop error (alarm A41)
- Booster shutdown due to current control loop error (alarm A43)
- Static switch blocked (alarm A50)
- Booster shutdown due to the operation of the load symmetry sensor (alarm A33)
- Activation of the battery fault alarm (alarm A10)
- Scheduled maintenance request (alarm A29).

For a description of the UPS status in each of the failure conditions listed above, please refer to the "Faults and alarms" section.

## 6.9 ALARMS HISTORY RESET

Access the RESET HISTORY menu.

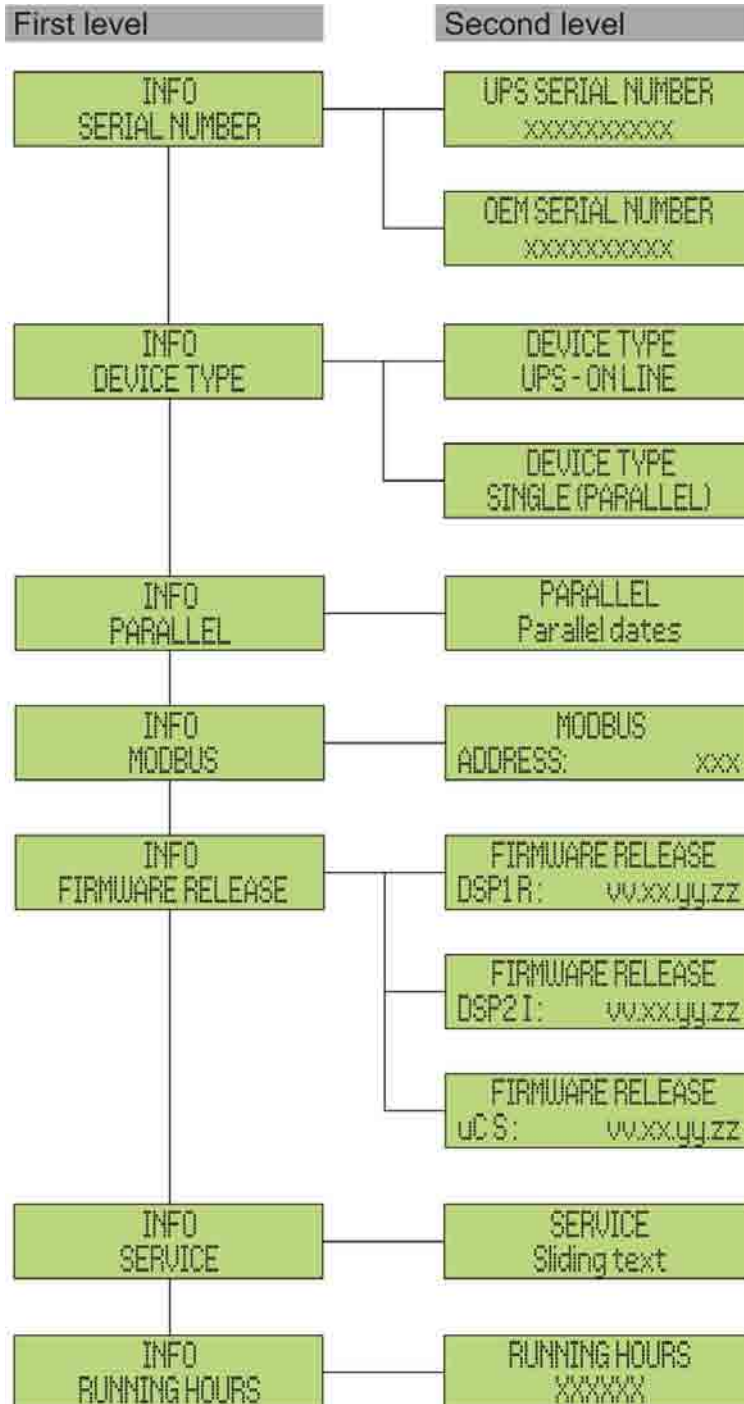


### Loss of data

The alarms history contains very important data to monitor the device behaviour over time. We recommend to save the data before deleting it.

## 7 SYSTEM INFORMATION

The INFO menu provides general information regarding the UPS based on the structure indicated below.



Picture 15 – Structure of INFO menu

All data shown in the various sections are set by the factory via a special interface software and cannot be altered, except by personnel authorized by the manufacturer.

The only adjustable parameters are the MODBUS settings (see SPECIAL menu).

Sub-menu	Displayed data
SERIAL NUMBER	Device serial number given by the manufacturer and by an OEM distributor, if any
DEVICE TYPE	The device type can be: <ul style="list-style-type: none"> <li>➤ ON LINE - UPS</li> <li>➤ FREQUENCY CONVERTER</li> <li>➤ ECO MODE - UPS</li> <li>➤ SINGLE UPS</li> <li>➤ PARALLEL</li> </ul>
PARALLEL <sup>(1)</sup>	Data regarding the parallel configuration
MODBUS	MODBUS address of device
FIRMWARE RELEASE	Firmware versions installed on the system
SERVICE	Scrolling text string with information regarding technical service
RUNNING HOURS	Dates related to hours number of UPS running time

<sup>(1)</sup> the menu is only active if the UPS belongs to a Parallel or Load Sync system

## 7.1 PARALLEL OPERATION INFORMATION

The PARALLEL menu is only active if the UPS belongs to a parallel or load-sync system.

### 7.1.1 UPS position

```

PARALLEL
  2 / 6
    
```

The first number on the second line identifies the *position* of that specific UPS within the parallel system. The second number represents the total number of UPS units.

### 7.1.2 Master / Slave priority

```

PARALLEL
  MASTER
    
```

The string on the second line may have two values, "MASTER" or "SLAVE". Only one *MASTER UPS* can be present in the system; if not there will be a conflict on the data communication bus.



### 7.1.3 Communication bus monitoring

```
PARALLEL
1- [ M   2-   3- S   4- S
   ]     S
```

The second line of this menu gives a general indication regarding the communication between the UPS units composing the system.

- The numbers represent the single UPS units.
- The letters M and S stand for MASTER and SLAVE respectively.
- The brackets [ ] around a letter indicate that we are working on that specific UPS unit.
- A question mark next to a number indicates that that UPS unit is not communicating on the data bus.

Let us assume to have the following situation:

- system composed of 4 UPS units;
- UPS2 is currently the MASTER UPS;
- we are checking the data communication on UPS3;
- UPS4 is not communicating.

The menu will be as shown below.

```
PARALLEL
1- S   2-   3- [   4- ?
      M   S ]
```

In case there are more than four paralleled devices, the menu will be as follows.

```
PARALLEL
1- S   2-   3- [   ....
      M   S ]
```

The dots indicate the presence of a further menu which shows the status of the other UPS units in the system.

### 7.1.4 Parallel type

```
PARALLEL
REDUNDANT+x
```

The string on the second line may have two values, "POWER" or "REDUNDANT+x".

- POWER means that the parallel system is so set as to require the presence of all the UPS units to feed the load.

- REDUNDANT+x means that the system is redundant and the redundancy index is indicated by number "X". For example, in a system composed of 3 UPS units, "REDUNDANT+2" means that only one of the UPS units is sufficient to feed the load.

### 7.1.5 Message statistics

The statistics section regarding the messages exchanged on the communication buses consists of three different menus.

```
CAN STATISTICS SSW
MSG RX: 32564
100.0%
```

Number of messages received and percentage of reception accuracy regarding the status of the static switches. The messages are exchanged between all the UPS units, therefore the number will increase on all of them.

```
CAN STATISTICS INV
SYNC RX: 15849
100.0%
```

Number of messages received and percentage of reception accuracy regarding the synchronism signals. The messages are sent by the MASTER UPS, therefore the number will only increase on the SLAVE UPS units.

```
CAN STATISTICS INV
MSG RX: 9277
99.9%
```

Number of messages received and percentage of reception accuracy regarding the status of the system. The messages are exchanged between all the UPS units, therefore the number will increase on all of them.

## 7.2 SERVICE INFORMATION

The SERVICE menu provides important information regarding the technical service on the UPS.

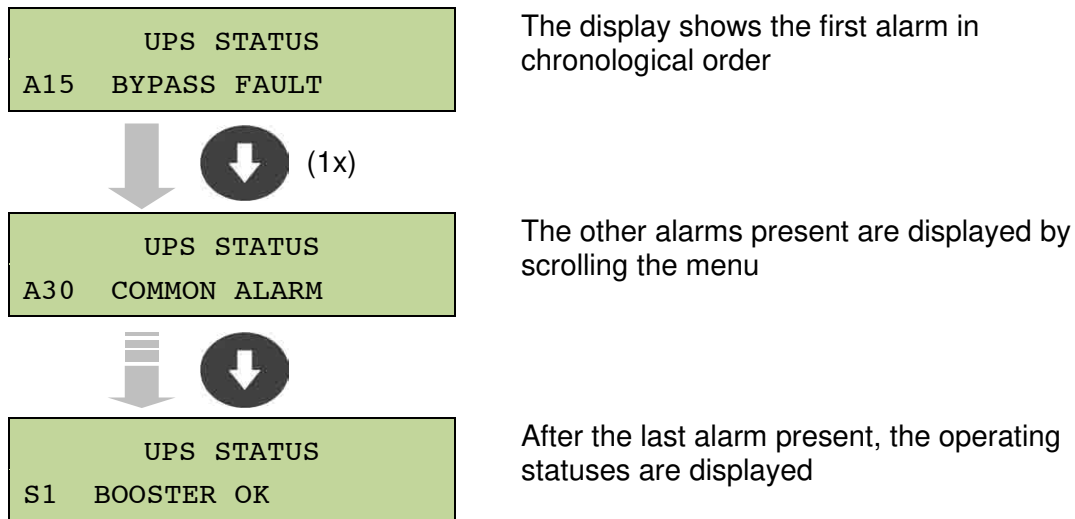
The information is displayed via a text string of max. 60 characters which scrolls on the second display line.

However, please also see the addresses and contact numbers indicated in the present manual.

## 8 FAULTS AND ALARMS

As indicated in the previous chapters, the system is provided with basic diagnostics which allow immediate visualization of the operating conditions.

The LCD panel displays the alarms screen immediately, and an audible indicator is activated (if enabled). Each screen displays the alphanumeric alarm code and a short description of the alarm.



### **Injury hazard due to electric shock!**

Before carrying out any operation on the UPS, make sure that all the safety precautions are adhered to:

- Any work on the unit must be carried out by qualified personnel;
- Internal components can only be accessed after disconnecting the device from supply sources;
- Always use protective devices designed for each type of activity;
- The instructions contained in the manuals must be strictly followed;
- In case of doubt or impossibility of solving the problem, please contact Borri immediately.

## 8.1 OPERATING STATUS DEFINITION

Status	<b>S1</b>	<b>BOOSTER OK</b>
Description	The rectifier section is working properly.	
Operating condition	The rectifier supplies the inverter and keeps the battery charged.	

Status	<b>S2</b>	<b>BATTERY OK</b>
Description	The battery is connected to the UPS.	
Operating condition	The battery is kept charged by the rectifier and is ready to feed the inverter.	

Status	<b>S3</b>	<b>INVERTER OK</b>
Description	The inverter voltage and frequency are within the allowed range.	
Operating condition	The inverter is ready to feed the load.	

Status	<b>S4</b>	<b>INVERTER --&gt; LOAD</b>
Description	The inverter feeds the load.	
Operating condition	The load is fed via the static inverter switch.	

Status	<b>S5</b>	<b>INV BYPASS SYNC</b>
Description	The inverter is synchronized with the bypass.	
Operating condition	The synchronization between the inverter and the bypass is locked, and the static switch can change over from one source to the other.	

Status	<b>S6</b>	<b>BYPASS OK</b>
Description	The bypass voltage and frequency are within the allowed range.	
Operating condition	The bypass line is ready for changeover in case of inverter failure.	

Status	<b>S7</b>	<b>BYPASS --&gt; LOAD</b>
Description	Load fed by the bypass line.	
Operating condition	The load is fed by the bypass via the static switch, waiting for the inverter to restart.	

Status	<b>S9</b>	<b>INV MASTER SYNC</b>
Description	The inverter is synchronized with the MASTER UPS.	
Operating condition	This status is only present on the SLAVE UPS units, and shows that the inverter is synchronized with the signal sent by the MASTER UPS.	

Status	<b>S12</b>	<b>BATT STANDBY</b>
Description	The battery is in standby mode.	
Operating condition	The battery static switch is open and the battery is disconnected from the DC bus.	

Status	<b>S13</b>	<b>BATT CHARGING</b>
Description	The battery is charging.	
Operating condition	The battery is connected to the DC bus and absorbing charging current.	

Status	<b>S14</b>	<b>BATT FLOATING</b>
Description	The battery cyclic charge is activated.	
Operating condition	The battery static switch is closed and the battery is connected to the DC bus for the cyclic charge (no discharge has occurred over the last 25 days).	

## 8.2 TROUBLESHOOTING

Alarm	<b>A1</b>	<b>MAINS FAULT</b>
Description	The voltage or frequency of the input line are out of tolerance.	
Possible causes	<ul style="list-style-type: none"> <li>➤ Mains instability or failure.</li> <li>➤ Wrong phase rotation.</li> </ul>	
Solutions	<ol style="list-style-type: none"> <li>1. Check the connections to the mains.</li> <li>2. Check the stability of mains voltage.</li> <li>3. If the alarm persists, contact our Technical Support Service.</li> </ol>	

Alarm	<b>A2</b>	<b>INPUT WRONG SEQ</b>
Description	The phase rotation on the rectifier input line is wrong.	
Possible causes	<ul style="list-style-type: none"> <li>➤ Wrong connection of power cables.</li> </ul>	
Solutions	<ol style="list-style-type: none"> <li>1. Check the phase rotation.</li> <li>2. If the alarm persists, contact our Technical Support Service.</li> </ol>	

Alarm	<b>A3</b>	<b>BOOSTER STOPPED</b>
Description	The rectifier has been temporarily disconnected and the inverter is fed by the battery.	
Possible causes	<ul style="list-style-type: none"> <li>➤ Instability of the AC line voltage or frequency.</li> <li>➤ Possible fault in the rectifier control circuit.</li> </ul>	
Solutions	<ol style="list-style-type: none"> <li>1. Check the parameters of the AC line voltage.</li> <li>2. Restart the device.</li> <li>3. If the alarm persists, contact our Technical Support Service.</li> </ol>	

Alarm	<b>A4</b>	<b>BOOSTER FAULT</b>
Description	The rectifier has been disconnected due to an internal fault.	
Possible causes	<ul style="list-style-type: none"> <li>➤ Possible fault in the rectifier control circuit.</li> </ul>	
Solutions	<ol style="list-style-type: none"> <li>1. Check which alarms are present and carry out the indicated procedures.</li> <li>2. Restart the device.</li> <li>3. If the alarm persists, contact our Technical Support Service.</li> </ol>	

Alarm	<b>A5</b> <b>DC VOLTAGE FAULT</b>
Description	The measured DC voltage is out of tolerance.
Possible causes	<ul style="list-style-type: none"> <li>➤ The battery has reached the discharge voltage due to a power failure.</li> <li>➤ Measuring circuit failure.</li> </ul>
Solutions	<ol style="list-style-type: none"> <li>1. Check the actual value of the measured DC voltage.</li> <li>2. In case of mains failure, wait for the AC voltage to be restored.</li> <li>3. Check which alarms are present and carry out the indicated procedures.</li> <li>4. Restart the device.</li> <li>5. If the alarm persists, contact our Technical Support Service.</li> </ol>

Alarm	<b>A6</b> <b>BATTERY IN TEST</b>
Description	The rectifier voltage is reduced to start a short controlled discharge of the battery.
Possible causes	<ul style="list-style-type: none"> <li>➤ A battery test has been started automatically (if set), or manually by the user.</li> </ul>
Solutions	<ol style="list-style-type: none"> <li>1. Wait for the test to end, and check possible battery faults.</li> </ol>

Alarm	<b>A7</b> <b>BCB OPEN</b>
Description	The battery isolator is open.
Possible causes	<ul style="list-style-type: none"> <li>➤ Battery isolator open.</li> </ul>
Solutions	<ol style="list-style-type: none"> <li>1. Check the status of the battery isolator.</li> <li>2. Check the functionality of the auxiliary contact of the isolator.</li> <li>3. Check the connection between the auxiliary contact of the isolator and the auxiliary terminals of the UPS (if provided).</li> <li>4. If the alarm persists, contact our Technical Support Service.</li> </ol>

Alarm	<b>A8</b> <b>BATTERY DISCHARGE</b>
Description	The battery is discharging.
Possible causes	<ul style="list-style-type: none"> <li>➤ The battery is discharging due to a mains failure.</li> <li>➤ Rectifier failure.</li> </ul>
Solutions	<ol style="list-style-type: none"> <li>1. Check which alarms are present and carry out the indicated procedures.</li> <li>2. If the alarm persists, contact our Technical Support Service.</li> </ol>



Alarm	<b>A9</b> <b>BATTERY AUT END</b>
Description	The battery has reached the pre-alarm discharge level.
Possible causes	<ul style="list-style-type: none"> <li>➤ The battery is discharging due to a mains failure.</li> <li>➤ Rectifier failure.</li> </ul>
Solutions	<ol style="list-style-type: none"> <li>1. Check which alarms are present and carry out the indicated procedures.</li> <li>2. If the alarm persists, contact our Technical Support Service.</li> </ol>

Alarm	<b>A10</b> <b>BATTERY FAULT</b>
Description	Fault following a battery test.
Possible causes	<ul style="list-style-type: none"> <li>➤ Battery fault.</li> </ul>
Solutions	<ol style="list-style-type: none"> <li>1. Check the battery.</li> <li>2. Reset the system.</li> <li>3. If the alarm persists, contact our Technical Support Service.</li> </ol>

Alarm	<b>A11</b> <b>SHORT CIRCUIT</b>
Description	The current sensor has detected a short-circuit at the output.
Possible causes	<ul style="list-style-type: none"> <li>➤ Load problem.</li> <li>➤ Measuring circuit failure.</li> </ul>
Solutions	<ol style="list-style-type: none"> <li>1. Check the loads connected to the UPS output.</li> <li>2. If the alarm persists, contact our Technical Support Service.</li> </ol>

Alarm	<b>A12</b> <b>STOP TIMEOUT SC</b>
Description	Inverter shutdown due to an extended short-circuit during a power failure, or due to an overcurrent on the inverter bridge input.
Possible causes	<ul style="list-style-type: none"> <li>➤ Short-circuit on the loads during a power failure.</li> <li>➤ Inverter bridge fault.</li> <li>➤ Temporary current peak.</li> </ul>
Solutions	<ol style="list-style-type: none"> <li>1. Reset the system.</li> <li>2. If the alarm persists, contact our Technical Support Service.</li> </ol>

Alarm	<b>A13</b> INV OUT OF TOL
Description	The inverter voltage or frequency are out of tolerance.
Possible causes	<ul style="list-style-type: none"><li>➤ Inverter shutdown due to an alarm.</li><li>➤ Inverter failure.</li></ul>
Solutions	<ol style="list-style-type: none"><li>1. Check which alarms are present and carry out the indicated procedures.</li><li>2. If the alarm persists, contact our Technical Support Service.</li></ol>

Alarm	<b>A14</b> BYPASS WR SEQ
Description	The phase rotation of the bypass line is wrong.
Possible causes	<ul style="list-style-type: none"><li>➤ Wrong connection of power cables.</li></ul>
Solutions	<ol style="list-style-type: none"><li>1. Check the phase rotation.</li><li>2. If the alarm persists, contact our Technical Support Service.</li></ol>

Alarm	<b>A15</b> BYPASS FAULT
Description	The voltage or frequency of the bypass line are out of tolerance.
Possible causes	<ul style="list-style-type: none"><li>➤ Bypass line instability or failure.</li><li>➤ Wrong phase rotation.</li></ul>
Solutions	<ol style="list-style-type: none"><li>1. Check the connections to the mains.</li><li>2. Check the stability of mains voltage.</li><li>3. If the alarm persists, contact our Technical Support Service.</li></ol>

Alarm	<b>A16</b> BYPASS --> LOAD
Description	The load is fed by the bypass line.
Possible causes	<ul style="list-style-type: none"><li>➤ Temporary changeover due to inverter failure.</li></ul>
Solutions	<ol style="list-style-type: none"><li>1. Verify the inverter status and check whether other alarms are present.</li><li>2. If the alarm persists, contact our Technical Support Service.</li></ol>

Alarm	<b>A17</b> <b>RETRANSFER BLOCK</b>
Description	The load is blocked on the bypass line.
Possible causes	<ul style="list-style-type: none"> <li>➤ Very frequent changeovers due to load in-rush currents.</li> <li>➤ Static switch problems.</li> </ul>
Solutions	<ol style="list-style-type: none"> <li>1. Reset the system.</li> <li>2. Check the in-rush currents of the loads.</li> <li>3. If the alarm persists, contact our Technical Support Service.</li> </ol>

Alarm	<b>A18</b> <b>MBCB CLOSED</b>
Description	The manual bypass isolator is closed.
Possible causes	<ul style="list-style-type: none"> <li>➤ Manual bypass isolator closed.</li> </ul>
Solutions	<ol style="list-style-type: none"> <li>1. Check the status of the manual bypass isolator.</li> <li>2. Check the functionality of the auxiliary contact of the isolator.</li> <li>3. If the alarm persists, contact our Technical Support Service.</li> </ol>

Alarm	<b>A19</b> <b>OCB OPEN</b>
Description	The output isolator is open.
Possible causes	<ul style="list-style-type: none"> <li>➤ Output isolator open.</li> </ul>
Solutions	<ol style="list-style-type: none"> <li>1. Check the status of the output isolator.</li> <li>2. Check the functionality of the auxiliary contact of the isolator.</li> <li>3. If the alarm persists, contact our Technical Support Service.</li> </ol>

Alarm	<b>A20</b> <b>OVERLOAD</b>
Description	The current sensor has detected an overload at the output. If the alarm persists, the thermal image protection will be activated (alarm A21).
Possible causes	<ul style="list-style-type: none"> <li>➤ Output overload.</li> <li>➤ Measuring circuit failure.</li> </ul>
Solutions	<ol style="list-style-type: none"> <li>1. Check the loads connected to the UPS output.</li> <li>2. Contact our Technical Support Service.</li> </ol>

Alarm	<b>A21</b> THERMAL IMAGE
Description	The thermal image protection has been activated after an extended inverter overload. The inverter is shut down for 30 minutes and then restarted.
Possible causes	<ul style="list-style-type: none"> <li>➤ Output overload.</li> <li>➤ Measuring circuit failure.</li> </ul>
Solutions	<ol style="list-style-type: none"> <li>1. Check the loads connected to the UPS output.</li> <li>2. Should you need to restore the inverter supply immediately, reset the system.</li> <li>3. If the alarm persists, contact our Technical Support Service.</li> </ol>

Alarm	<b>A22</b> BYPASS SWITCH
Description	The "Normal/Bypass" selector has been operated.
Possible causes	<ul style="list-style-type: none"> <li>➤ Maintenance operation.</li> </ul>
Solutions	<ol style="list-style-type: none"> <li>1. Check the selector position.</li> <li>2. If the alarm persists, contact our Technical Support Service.</li> </ol>

Alarm	<b>A23</b> EPO PRESSED
Description	The system is blocked due to the activation of the emergency power off button.
Possible causes	<ul style="list-style-type: none"> <li>➤ Activation of the (local or remote) emergency power off button.</li> </ul>
Solutions	<ol style="list-style-type: none"> <li>1. Release the emergency power off button and reset the alarm.</li> <li>2. If the alarm persists, contact our Technical Support Service.</li> </ol>

Alarm	<b>A24</b> HIGH TEMPERATURE
Description	High temperature of the heat sink on the inverter bridge or tripping of the DC fuses which protect the inverter bridge.
Possible causes	<ul style="list-style-type: none"> <li>➤ Fault of the heat sink cooling fans.</li> <li>➤ The room temperature or cooling air temperature is too high.</li> <li>➤ Tripping of the DC protection fuses.</li> </ul>
Solutions	<ol style="list-style-type: none"> <li>1. Check the fans operation.</li> <li>2. Clean the ventilation grids and the air filters, if any.</li> <li>3. Check the air conditioning system (if present).</li> <li>4. Check the status of the DC fuses on the inverter bridge input.</li> <li>5. If the alarm persists, contact our Technical Support Service.</li> </ol>

Alarm	<b>A25</b> <b>INVERTER OFF</b>
Description	The inverter is blocked due an operation failure.
Possible causes	➤ Various.
Solutions	<ol style="list-style-type: none"> <li>1. Reset the system.</li> <li>2. If the alarm persists, contact our Technical Support Service.</li> </ol>

Alarm	<b>A26</b> <b>COMMUNIC ERROR</b>
Description	Internal error.
Possible causes	➤ Microcontroller communication problems.
Solutions	<ol style="list-style-type: none"> <li>1. If the alarm persists, contact our Technical Support Service.</li> </ol>

Alarm	<b>A27</b> <b>EEPROM ERROR</b>
Description	The controller has detected an error in the parameters stored in EEPROM.
Possible causes	➤ Wrong parameters entered during programming.
Solutions	<ol style="list-style-type: none"> <li>1. Contact our Technical Support Service.</li> </ol>

Alarm	<b>A28</b> <b>CRITICAL FAULT</b>
Description	An alarm has been activated which causes the shutdown of part of the UPS (rectifier, inverter, static switch).
Possible causes	➤ System failure.
Solutions	<ol style="list-style-type: none"> <li>1. Check which alarms are present and carry out the indicated procedures.</li> <li>2. If the alarm persists, contact our Technical Support Service.</li> </ol>

Alarm	<b>A29</b> <b>MAINTENANCE REQ</b>
Description	It is necessary to carry out maintenance work.
Possible causes	➤ The time limit since the last maintenance work has elapsed.
Solutions	<ol style="list-style-type: none"> <li>1. Contact our Technical Support Service.</li> </ol>

Alarm	<b>A30</b> <b>COMMON ALARM</b>
Description	Common alarm.
Possible causes	➤ At least one alarm is present.
Solutions	1. Check which alarms are present and carry out the indicated procedures.

Alarm	<b>A31</b> <b>MBCB BUS CLOSED</b>
Description	The manual bypass isolator is closed.
Possible causes	➤ Manual bypass isolator closed.
Solutions	1. Check the status of the manual bypass isolator. 2. Check the functionality of the auxiliary contact of the isolator. 3. If the alarm persists, contact our Technical Support Service.

Alarm	<b>A32</b> <b>EPO BUS CLOSED</b>
Description	The system is blocked due to the activation of the emergency power off button.
Possible causes	➤ Activation of the (local or remote) emergency power off button.
Solutions	1. Release the emergency power off button and reset the alarm. 2. If the alarm persists, contact our Technical Support Service.

Alarm	<b>A33</b> <b>ASYMMETRIC LOAD</b>
Description	The positive and negative voltages measured on the DC capacitors towards the middle point are different.
Possible causes	➤ Possible failure on the measuring circuit. ➤ Possible fault of DC capacitors.
Solutions	1. Reset the system. 2. If the alarm persists, contact our Technical Support Service.

Alarm	<b>A34</b> <b>SERVICE REQUIRED</b>
Description	A UPS check is necessary.
Possible causes	➤ Possible UPS fault.
Solutions	1. If the alarm persists, contact our Technical Support Service.

Alarm	<b>A35</b> <b>DIESEL MODE</b>
Description	The UPS is supplied by the diesel generator.
Possible causes	➤ The auxiliary contact which activates the diesel generator connected to the UPS is closed, and imposes this operating mode.
Solutions	<ol style="list-style-type: none"> <li>1. Wait for the diesel generator to stop as soon as the mains voltage is restored.</li> <li>2. Check the connection of the auxiliary contact which signals the diesel generator start, to terminals XD1/XD2.</li> <li>3. If the alarm persists, contact our Technical Support Service.</li> </ol>

Alarm	<b>A36</b> <b>DC FASTSHUTDOWN</b>
Description	Inverter shutdown due to the operation of the protection sensor as a result of sudden DC voltage variations.
Possible causes	➤ Battery fault.
Solutions	<ol style="list-style-type: none"> <li>1. Check the battery.</li> <li>2. Reset the system.</li> <li>3. If the alarm persists, contact our Technical Support Service.</li> </ol>

Alarm	<b>A38</b> <b>INV --&gt; LOAD</b>
Description	The load is fed by the inverter. This alarm is active for UPS systems in "ECO" mode, where the preferential supply is from the bypass line.
Possible causes	➤ Temporary changeover due to bypass line failure.
Solutions	<ol style="list-style-type: none"> <li>1. Verify the status of the bypass line and check whether other alarms are present.</li> <li>2. If the alarm persists, contact our Technical Support Service.</li> </ol>

Alarm	<b>A39</b> <b>INV ERROR LOOP</b>
Description	The control is not able to regulate the inverter voltage precisely.
Possible causes	➤ Regulation system failure.
Solutions	<ol style="list-style-type: none"> <li>1. Reset the system.</li> <li>2. If the alarm persists, contact our Technical Support Service.</li> </ol>

Alarm	<b>A40</b> <b>SSI FAULT</b>
Description	The system has detected a failure in the static inverter switch.
Possible causes	<ul style="list-style-type: none"><li>➤ Possible problems on the loads.</li><li>➤ Static switch fault.</li></ul>
Solutions	<ol style="list-style-type: none"><li>1. Check the absorption of the loads and the presence of DC components, if any, on AC current.</li><li>2. If the alarm persists, contact our Technical Support Service.</li></ol>

Alarm	<b>A41</b> <b>RECT ERROR LOOP</b>
Description	The control is not able to regulate the rectifier output voltage precisely.
Possible causes	<ul style="list-style-type: none"><li>➤ Regulation system failure.</li></ul>
Solutions	<ol style="list-style-type: none"><li>1. Reset the system.</li><li>2. If the alarm persists, contact our Technical Support Service.</li></ol>

Alarm	<b>A43</b> <b>CURR ERROR LOOP</b>
Description	The control is not able to regulate the rectifier output current precisely.
Possible causes	<ul style="list-style-type: none"><li>➤ Regulation system failure.</li></ul>
Solutions	<ol style="list-style-type: none"><li>1. Reset the system.</li><li>2. If the alarm persists, contact our Technical Support Service.</li></ol>

Alarm	<b>A45</b> <b>HIGH TEMPERATURE SSW</b>
Description	High temperature of the heat sink on the static switch.
Possible causes	<ul style="list-style-type: none"><li>➤ Fault of the heat sink cooling fans.</li><li>➤ The room temperature or cooling air temperature is too high.</li></ul>
Solutions	<ol style="list-style-type: none"><li>1. Check the fans operation.</li><li>2. Clean the ventilation grids and the air filters, if any.</li><li>3. Check the air conditioning system (if present).</li><li>4. If the alarm persists, contact our Technical Support Service.</li></ol>



Alarm	<b>A46</b> <b>PAR LOST REDUND</b>
Description	This alarm is only active on PARALLEL systems. Continuity is not ensured in the event of a fault on one of the UPS units.
Possible causes	<ul style="list-style-type: none"> <li>➤ The total load is higher than the maximum expected value.</li> <li>➤ Possible failure on the measuring circuit.</li> </ul>
Solutions	<ol style="list-style-type: none"> <li>1. Check the load fed by the system.</li> <li>2. If the alarm persists, contact our Technical Support Service.</li> </ol>

Alarm	<b>A47</b> <b>SEND PARAM ERROR</b>
Description	Internal error.
Possible causes	<ul style="list-style-type: none"> <li>➤ Microcontroller communication problems.</li> </ul>
Solutions	<ol style="list-style-type: none"> <li>1. Contact our Technical Support Service.</li> </ol>

Alarm	<b>A48</b> <b>RCV PARAM ERROR</b>
Description	Internal error.
Possible causes	<ul style="list-style-type: none"> <li>➤ Microcontroller communication problems.</li> </ul>
Solutions	<ol style="list-style-type: none"> <li>1. Contact our Technical Support Service.</li> </ol>

Alarm	<b>A49</b> <b>TEST MODE ERROR</b>
Description	Internal error.
Possible causes	<ul style="list-style-type: none"> <li>➤ Microcontroller communication problems.</li> </ul>
Solutions	<ol style="list-style-type: none"> <li>1. Contact our Technical Support Service.</li> </ol>

Alarm	<b>A50</b> <b>SSW BLOCKED</b>
Description	The static switch is blocked. The load is no longer supplied.
Possible causes	<ul style="list-style-type: none"> <li>➤ Loads failure.</li> <li>➤ Possible UPS fault.</li> </ul>
Solutions	<ol style="list-style-type: none"> <li>1. Check the loads for possible failures.</li> <li>2. Reset the system.</li> <li>3. If the alarm persists, contact our Technical Support Service.</li> </ol>

Alarm	<b>A51</b> <b>BATT TEMPERATURE</b>
Description	The battery temperature is out of tolerance. This alarm is only active when the temperature probe is installed and enabled on the battery.
Possible causes	<ul style="list-style-type: none"> <li>➤ Anomalous temperature in the battery cabinet.</li> <li>➤ Possible failure on the measuring circuit.</li> </ul>
Solutions	<ol style="list-style-type: none"> <li>1. Check the temperature on the batteries and remove the cause of the alarm, if any.</li> <li>2. If the alarm persists, contact our Technical Support Service.</li> </ol>

Alarm	<b>A53</b> <b>FIRMWARE ERROR</b>
Description	The controller has detected an incompatibility in the control software.
Possible causes	<ul style="list-style-type: none"> <li>➤ The software update was not performed properly.</li> </ul>
Solutions	<ol style="list-style-type: none"> <li>1. Contact our Technical Support Service.</li> </ol>

Alarm	<b>A54</b> <b>CAN ERROR</b>
Description	Internal error.
Possible causes	<ul style="list-style-type: none"> <li>➤ Microcontroller communication problems.</li> </ul>
Solutions	<ol style="list-style-type: none"> <li>1. Contact our Technical Support Service.</li> </ol>

Alarm	<b>A55</b> <b>PAR CABLE DISC</b>
Description	Parallel cable doesn't communicate.
Possible causes	<ul style="list-style-type: none"> <li>➤ Parallel cable disconnected or damaged.</li> </ul>
Solutions	<ol style="list-style-type: none"> <li>1. Check the connection of cable</li> <li>2. Contact our Technical Support Service.</li> </ol>

Alarm	<b>A56</b> <b>MAINS UNBALANCE</b>
Description	The rectifier input voltage is unbalanced.
Possible causes	<ul style="list-style-type: none"> <li>➤ Problems on the LV or MV distribution network</li> <li>➤ Defect of the measuring circuit</li> </ul>
Solutions	<ol style="list-style-type: none"> <li>1. Check the input voltage</li> <li>2. Contact our Technical Support Service.</li> </ol>

Alarm	<b>A63</b> <b>START SEQ BLOCK</b>
Description	During the UPS start-up a failure prevented the proper execution of the sequence.
Possible causes	<ul style="list-style-type: none"><li>➤ Control devices in wrong position or operated improperly.</li><li>➤ Possible internal fault.</li></ul>
Solutions	<ol style="list-style-type: none"><li>1. Make sure the position of the control devices (isolators, selectors) is as specified in the procedures (see "Installation and start-up" section).</li><li>2. If the alarm persists, contact our Technical Support Service.</li></ol>