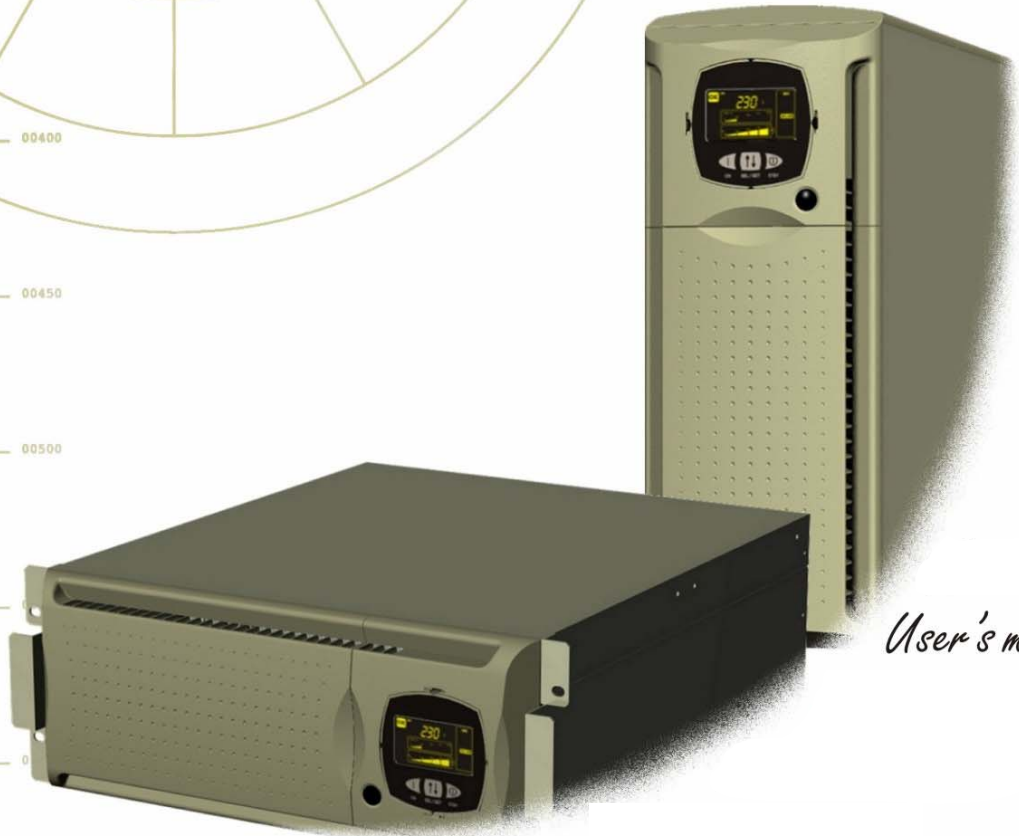


DLD 500 - DLD 600

# Dialog Dual



*User's manual*

RIELLO ELETTRONICA  
 **riello ups**





This part of the manual contains precautions that must be adhered to strictly since they regard SAFETY.

- a) THE UPS MUST NOT OPERATE WITHOUT AN EARTH CONNECTION. The first connection to be carried out is the earth conductor, which has to be connected to the terminal marked ⊕.
- b) Avoid connecting the output neutral to the input neutral or to earth as this could cause malfunctions.
- c) DANGEROUS electrical voltages are generated inside the UPS. All installation and maintenance operations must be carried out EXCLUSIVELY by authorized personnel.
- d) The UPS contains an internal power source: the batteries. The terminals and the output sockets may be powered even when the UPS is not connected to the mains.
- e) The total battery voltage can generate an electric shock. Replaced batteries should be considered as TOXIC WASTE and treated as such. Do not throw the battery packs into fire: they may explode. Do not try to open the battery packs: they do not require any maintenance. Furthermore the electrolyte is dangerous if it comes into contact with the skin or the eyes and may be toxic.
- f) Do not switch the UPS on if there is any leak of liquid, or if a residual white powder is noted.
- g) Do not allow water, liquids in general and/or other foreign bodies to get into the UPS.
- h) In the event of dangerous conditions switch the UPS off with the switch located on the front panel and open the magneto-thermal protection installed upstream of the UPS. Isolate the battery by removing the lower part of the front panel and disconnecting the two battery pack connectors.
- i) The UPS generates a leakage current of less than 2 mA.  
**Warning:** the leakage current of the load is added to that of the UPS on the earth protection conductor.
- j) For battery expansion use exclusively connectors supplied by or authorized by the manufacturers.
- k) The UPSs of this series have been designed for professional use and are therefore not suitable for use in a domestic environment.

**WARNING:** this Uninterruptible Power System (UPS) is a class A product (in accordance with standard EN50091-2: UPS - EMC requirement). It may cause radio interference in domestic environments: the user may need to take additional measures against this.



## INTRODUCTION

Thanks you for choosing our product.

Our manufacturer are renowned specialists in the development and production of uninterruptible power supplies (UPS). The UPS in this range are high quality products, designed and built with care in order to give you the best performance.

This equipment can be installed by anyone, subject to **CAREFULLY AND THOROUGHLY READING THIS MANUAL.**

The manual contains detailed instructions on how to use and install the UPS.

**For information on using and getting the best performance from your UPS, this manual should be kept safely in the vicinity of the UPS and CONSULTED BEFORE TAKING ANY ACTION ON THE UPS.**

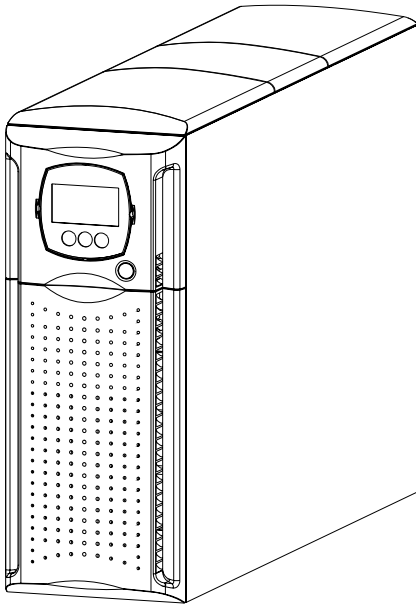
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Microsoft, Windows, and the Windows logo are trademarks, or registered trademarks of Microsoft Corporation in the United States and/or other countries.

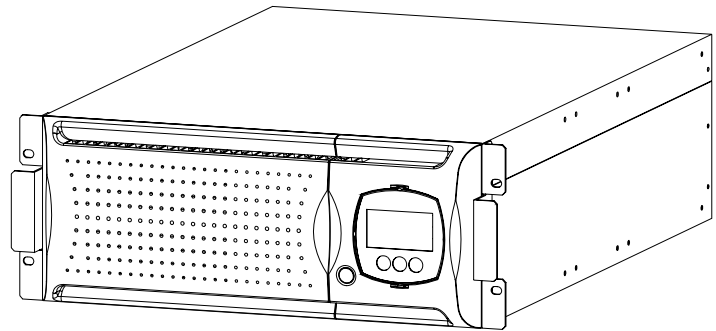
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# PRESENTATION

This new family of UPSs has been designed with versatility in mind. These UPSs can in fact be installed either in a tower version or in a rack version, according to requirements. The 2 different versions of the product are shown below:



**Tower**



**Rack**

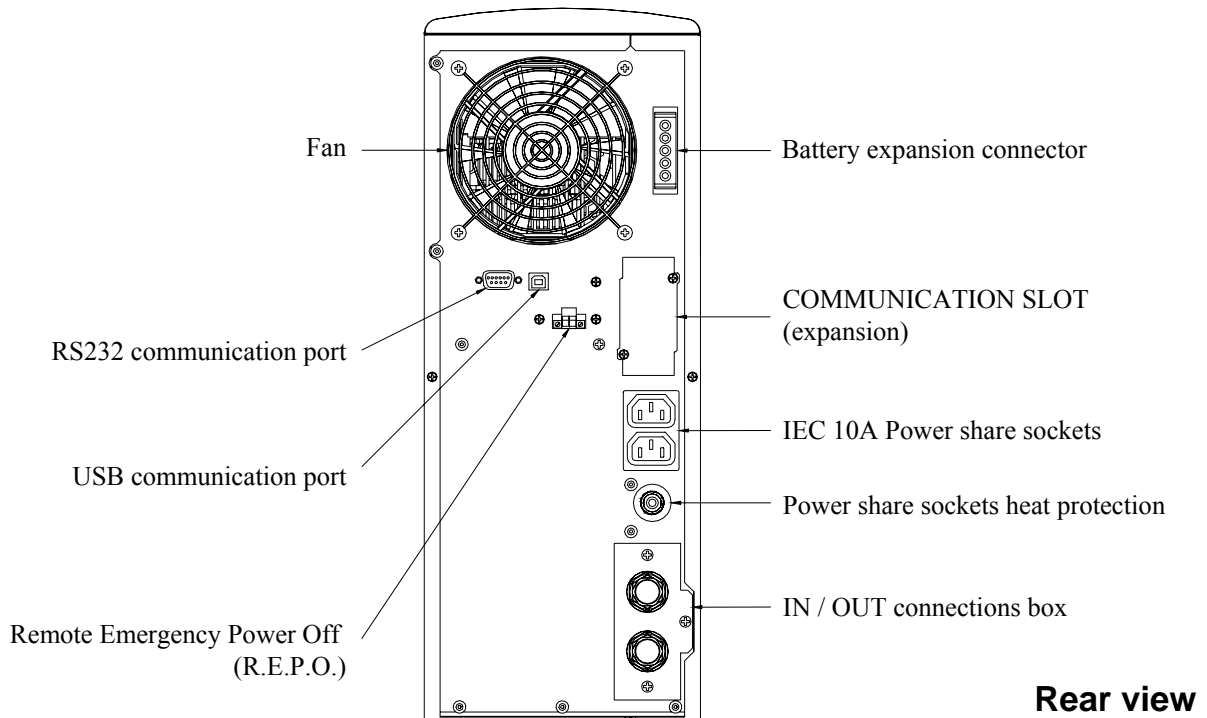
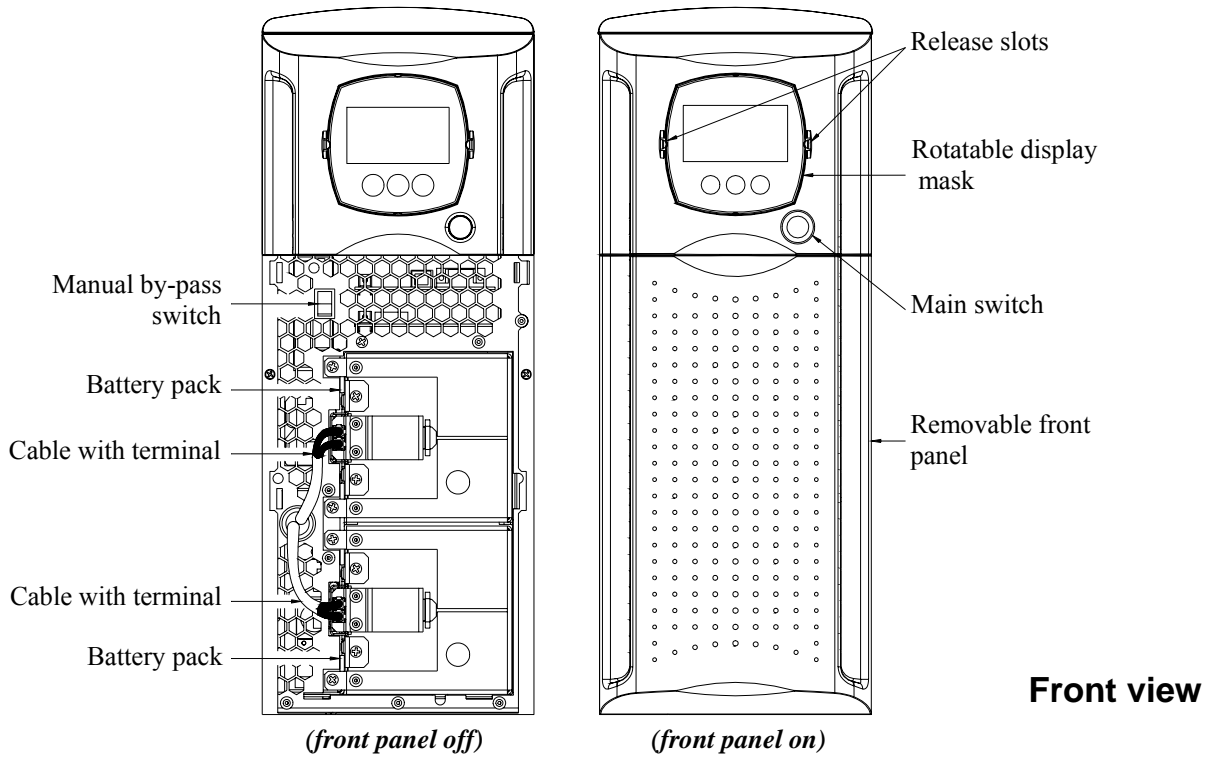
The UPS is also provided with two dedicated battery packs that allow the easy hot swap replacement of the batteries in full safety thanks to the protected connection system.

		<i>DLD 500</i>	<i>DLD 600</i>
Nominal power	[VA]	5000	6000
Nominal voltage	[Vac]	220 / 230 / 240	
Dimensions H x L x D	[mm]	455 x 175 x 660 <sup>(1)</sup>	
Weight	[Kg]	64	

<sup>(1)</sup> The H dimension is different in the rack version with handles mounted: 483mm x 175mm x 660mm (H x L x D)

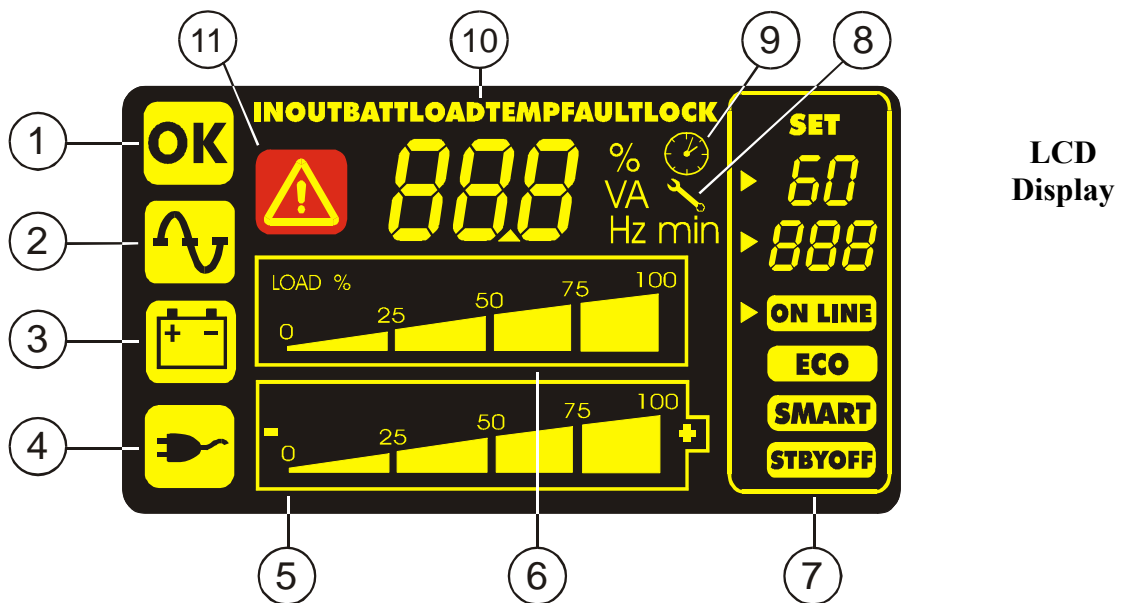
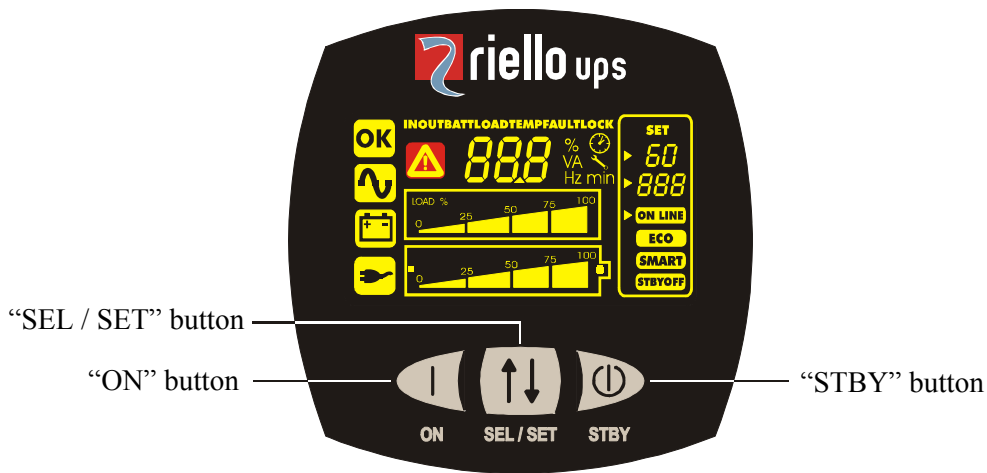
Note: 175mm = 4U  
483mm = 19"

UPS VIEWS





## DISPLAY MASK VIEW

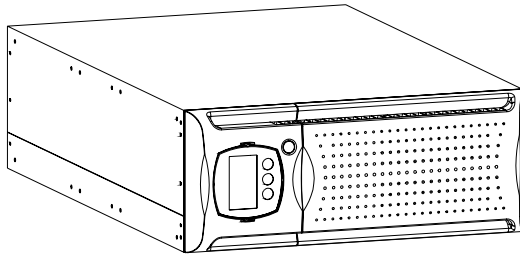


- |                              |                               |
|------------------------------|-------------------------------|
| ① Operating normally         | ⑦ Configuration area          |
| ② Operating on mains power   | ⑧ Maintenance action required |
| ③ Operating on battery power | ⑨ Timer                       |
| ④ Load powered from bypass   | ⑩ Measurements display area   |
| ⑤ Battery back-up indicator  | ⑪ Stand-by/alarm              |
| ⑥ Load level indicator       |                               |

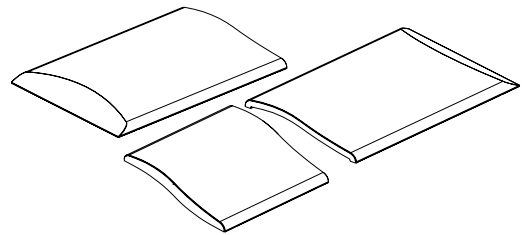
### OPENING THE PACKING AND CHECKING CONTENTS

After opening the pack, the first thing to do is make a check of the contents.  
The pack should contain:

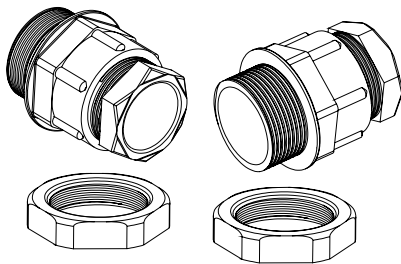
- ❑ UPS



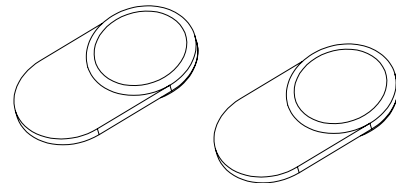
- ❑ 3 plastic covers (top panels)



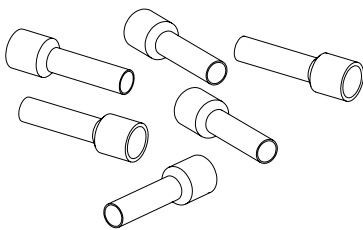
- ❑ 2 cable guides



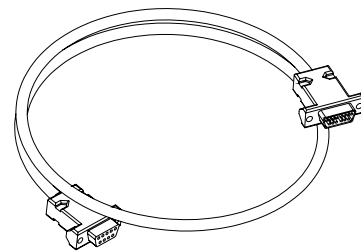
- ❑ 2 plastic keys to release display



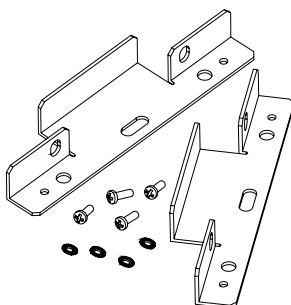
- ❑ Probes for cables – terminal board connection



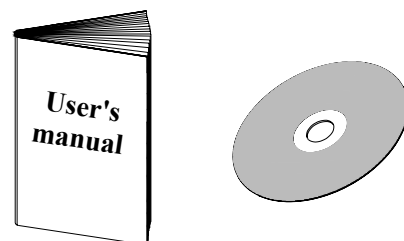
- ❑ RS232 serial cable



- ❑ Handles kit



- ❑ User manual + CD-ROM with software



## TOWER VERSION

This chapter describes the operations required to prepare the UPS for use in the tower version.

**WARNING:** *for your safety and that of your product, the information set out below should be carefully followed.*



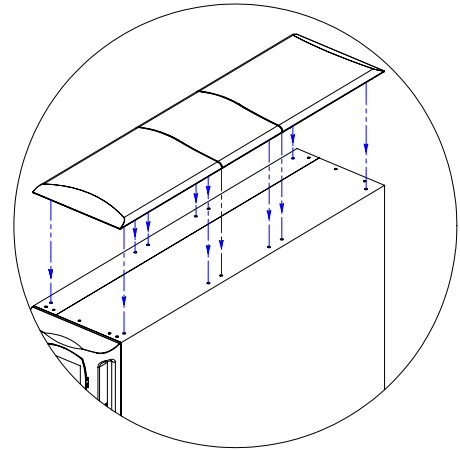
**BEFORE CARRYING OUT THE FOLLOWING SEQUENCE OF OPERATIONS,  
ENSURE THAT THE UPS IS COMPLETELY SWITCHED OFF AND NOT  
CONNECTED TO THE ELECTRICITY MAINS OR TO ANY LOAD**



Once removed from the packaging, the UPS is ready for installation in tower configuration.

All that is needed to complete this configuration is to mount the three plastic covers provided in the upper part of the UPS, as described below:

The three covers have an interlocking system: locate the cover mounting holes in the upper part of the UPS and very carefully engage them by exerting gentle pressure (see figure at side).



## RACK VERSION

This following describes the work needed to convert the UPS into rack version.

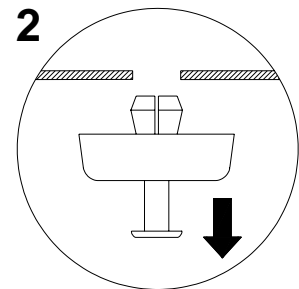
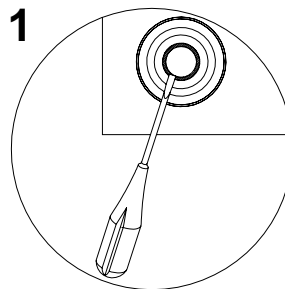
**WARNING:** *for your own safety and that of your product, it is important that you follow the instructions given below exactly.*



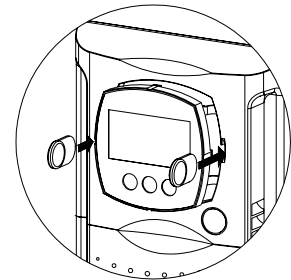
**BEFORE PROCEEDING TO PERFORM THE SEQUENCE OF OPERATIONS DESCRIBED, MAKE SURE THAT THE UPS IS SWITCHED OFF COMPLETELY AND IS NOT CONNECTED TO THE ELECTRICAL MAINS OR LOAD OF ANY KIND**



- 1 - First and foremost, remove the 4 feet on the bottom of the UPS. Set the UPS horizontal, taking the utmost care and using a small, flat blade screwdriver lift gently the pin placed in the centre of the foot. Once raised, take the pin out from the base of the UPS. Repeat this sequence for the other remaining feet. The exact sequence is depicted in the figure to the side:

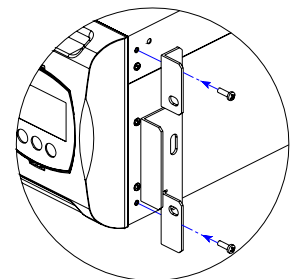


- 2 - With all the feet removed, now proceed to rotate the display mask. Slip the keys provided into the release slots on the sides of the display mask and exert a slight pressure, just enough to release the mask from the UPS, as demonstrated in the drawing on the side.



- 3 - **WARNING:** The display mask is connected to the UPS by a special cable. This means that you must extract the mask taking extreme care and avoiding violent jerks or other brusque movements, so as to avoid possibly damaging the display and/or the UPS. DO NOT TRY IN ANY WAY TO SEPARATE THE DISPLAY MASK FROM THE UPS.
- 4 - Rotate the mask by 90° in the anti-clockwise direction and fasten it to the UPS again, inserting it gently into the housing until a slight clicking noise is heard and the mask remains in position. NOTE: pressure must be exerted close to the coupling slots.
- 5 - Rotate the UPS by 90° clockwise taking the utmost care.

- 6 - At this point, with the UPS in the horizontal position, attach the handles to the side of the UPS with the appropriate screws as depicted in the figure to the side. (handles and screws are include in the *handles kit* option)



**NOTE:** The UPS is compatible with assembly in standard rack cabinets of 600mm x 800mm or greater (in depth). In rack type installation, given the weight of the UPS, use of the support brackets is compulsory (guide with L-shape support). For the same reason, it is recommended that you install the UPS in the bottom part of the rack cabinet.

## CONNECTIONS

**INSTALLATION MUST BE CARRIED OUT EXCLUSIVELY BY QUALIFIED PERSONNEL.**

**THE FIRST CONNECTION TO BE CARRIED OUT IS THE PROTECTION CONDUCTOR (EARTH CABLE), TO BE INSERTED IN THE TERMINAL MARKED  $\perp$ .**

**THE UPS MUST NOT BE OPERATED WITHOUT BEING CONNECTED TO THE EARTHING SYSTEM.**

**Warning:** if the neutral (N) and phase (F) instructions are observed for the plugs and sockets, the UPS will not change the existing neutral arrangements when inserted in a system. The resistance on the neutral connection is less than 0.1 ohm.

A differential switch placed upstream will also be triggered for a fault occurring downstream of the UPS. The sensitivity of this switch has to take into account the leakage current of the unit (approx. 2 mA) and of the load which are added together on the UPS earth conductor.

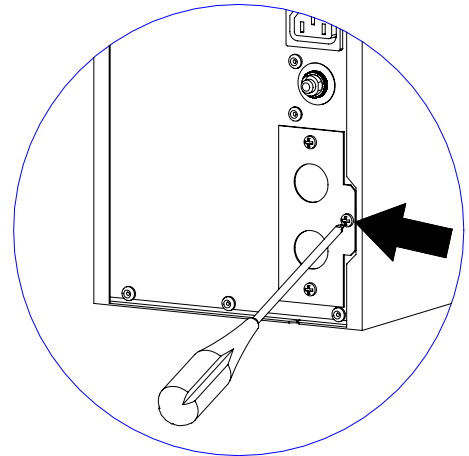
The neutral arrangements will only be changed if an isolation transformer is connected or when the UPS is operating with the neutral isolated upstream.

**Avoid connecting the output neutral to the input neutral or to earth as this could damage the UPS .**

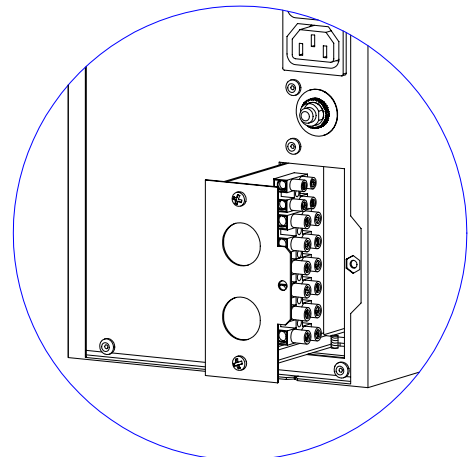
For the mains and load connections follow the instructions set out below:

1. Install a 32A magneto-thermal switch with B or C trip curve upstream of the equipment.

2. The terminals to be used for the connection of the input and output lines are located inside the IN/OUT connections drawer. Undo the screw securing the connections drawer located on the right-hand side of the drawer (see figure at side).

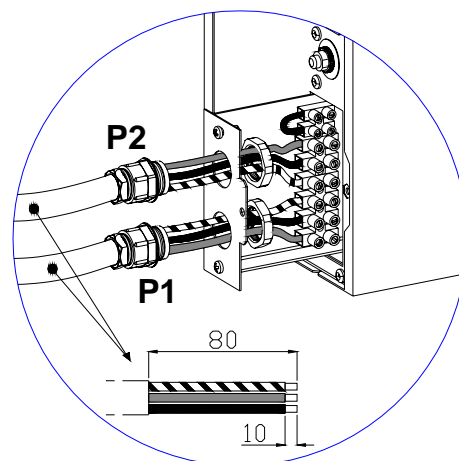


3. Pull the drawer out as much as is needed for the terminals to be easily accessible (see figure at side). **WARNING:** the drawer has a locking system to prevent it being pulled out completely. Do not try to remove the drawer completely.



4. **Use 3-pole cables with 4 mm<sup>2</sup> section.** With reference to the figure shown at the side:

- Insert the cable from the 32A magneto-thermal switch into cable guide P1 (input line).
- Insert the cable from the load into cable guide P2 (output line).
- Strip the cables observing the measurements provided.
- Insert the stripped end in the terminals provided.



5. Connect the wires to the relative terminals strictly following the instructions set out below:

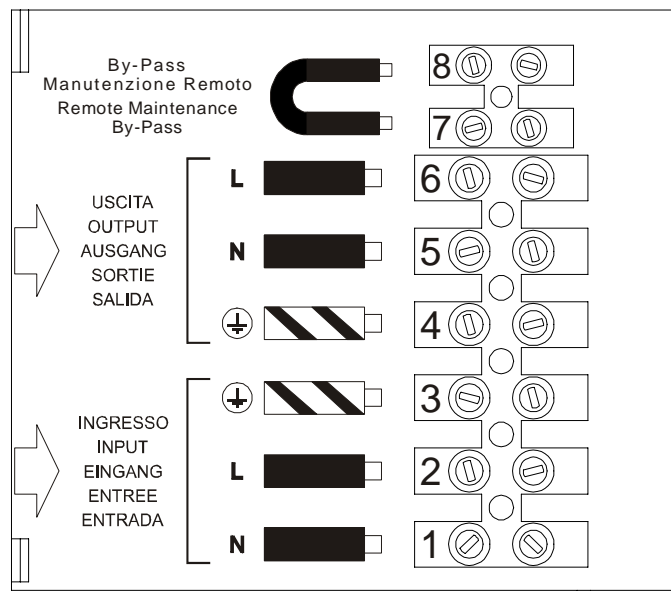
**Input line**

- a - Ensure that the magneto-thermal switch upstream is open.
- b - Connect the earth wire to terminal 3.
- c - Connect the neutral wire to terminal 1.
- d - Connect the phase wire to terminal 2.

**Output line**

- a - Connect the earth wire to terminal 4.
- b - Connect the neutral wire to terminal 5.
- c - Connect the phase wire to terminal 6.

6. Ensure that a jumper is connected at terminals 7 and 8; this is needed for the correct operation of the UPS.




7. Secure the cable guides to the flange, close the drawer and secure it with the screw removed previously.


A WARNING LABEL MUST BE AFFIXED TO ALL MAINS POWER ISOLATING SWITCHES INSTALLED FAR FROM THE UPS AREA, IN ORDER TO REMIND SUPPORT SERVICE PERSONNEL THAT THE CIRCUIT IS CONNECTED TO A UPS. THE LABEL MUST CARRY THE FOLLOWING MESSAGE:

**ISOLATE THE UNINTERRUPTIBLE POWER SYSTEM (UPS)  
BEFORE WORKING ON THIS CIRCUIT**

## FIRST START-UP

- 1) Ensure that all the operations described in the paragraph above, “*Connections*”, have been carried out correctly.
- 2) Close the magneto-thermal switch located upstream of the UPS.
- 3) Press the general switch located on the front panel.
- 4) The UPS will start up after a few seconds; the display comes on, a beep is emitted and the  icon will flash.  
The UPS is now in stand-by state: this means that the UPS is in a minimum consumption condition. The microcontroller is powered and carries out monitoring and autodiagnostic tasks; the batteries are charging; everything is ready to activate the UPS. There is also a stand-by state during operation from battery if the timer is activated.
- 5) Check the settings on the display (see paragraph: *Configuration area*)


## START-UP FROM MAINS

- 1) Press the “ON” button. When this is pressed all the icons on the display light up for 1 second and the UPS emits a beep.
- 2) Switch on the equipment connected to the UPS.  
**Only for the first start-up:** after approx. 30 sec., check that the UPS is operating correctly:
  1. Simulate a black-out by opening the switch connected upstream of the UPS.
  2. The load must continue to be powered, the  icon should appear on the display and a beep should be heard every 4 seconds.
  3. If the switch upstream is closed again the UPS must go back to operating from the mains.

## START-UP FROM BATTERY

- 1) Press the general switch located on the front panel.
- 2) Keep the “ON” button pressed for at least 5 seconds. All the icons on the display will light up for 1 second and the UPS will emit a beep.
- 3) Switch on the equipment connected to the UPS.

## UPS SHUTDOWN

To switch the UPS off, keep the “STBY” key pressed for at least 1.5 seconds. The UPS will return to the stand-by condition and the  icon will start to flash:








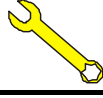

- a. If the mains is present, the general switch must be pressed so that it returns to its original position (raised position) to switch the UPS off completely.
- b. If the UPS is operating from battery and the timer has not been set, it will automatically switch off completely after 5 seconds. If however the timer has been set, the “STBY” key has to be pressed for at least 5 seconds to switch off the UPS. If it is required for the UPS to stay completely switched off when mains power returns, the general switch has to be pressed (see point a.).

## DISPLAY PANEL INDICATIONS

This chapter will describe in depth all the items of information that may be posted on the LCD. For easier understanding, we can divide the information displayed into three main groups:

- UPS status indicators
- Measurements display area
- Configuration area

### UPS status indicators

ICON	STATUS	DESCRIPTION
	Fixed	Indicates presence if a problem
	Blinking	The UPS is in stand-by mode
	Fixed	Indicates UPS operating normally
	Fixed	The UPS is working on mains power
	Blinking	The UPS working on mains power, but the output voltage is not synchronized with the mains voltage
	Fixed	The UPS is working on battery power. When in this condition, the UPS emits a beep at 4-second regular intervals.
	Blinking	End of discharge early warning. Indicates that the battery's back-up is running out. In this condition, the UPS emits a beep at 1-second regular intervals.
	Fixed	Indicates that the loads connected to the UPS are being powered by the bypass
	Dynamic	Indicates the estimated percentage back-up
	Dynamic	Indicates the % load applied to the UPS with respect to the nominal value
	Blinking	Maintenance action is needed
	Fixed	Indicates that the timer is activated (programmed switch-on or switch-off). The timer can be activated/de-activated through the software supplied
	Blinking	1 minute to go before the UPS is switched on again or 3 minutes until it is switched off



### Measurements display area







The most important measurements relating to the UPS may be displayed on the display screen.


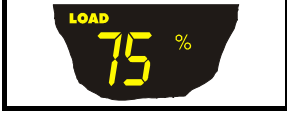




When the UPS is switched on, the display shows the mains voltage value.

To move on to display something else, press the “SEL / SET” button repeatedly until the desired measurement value appears.

If a failure/alarm occurs (FAULT) or the machine stops (LOCK), the display will automatically display the type of problem and the corresponding alarm code.

A number of examples are shown below:

SAMPLE GRAPHIC <sup>(1)</sup>	DESCRIPTION
	Mains voltage
	Mains frequency
	UPS output voltage
	Output voltage frequency
	Remaining battery backup
	Battery charge percentage

SAMPLE GRAPHIC <sup>(1)</sup>	DESCRIPTION
	Total battery voltage
	Percentage load applied
	Current absorbed by the load
	Temperature of the cooling system of the UPS internal electronics
	Fault / Alarm <sup>(2)</sup> : the corresponding code is displayed
	Lock <sup>(2)</sup> : the corresponding code is displayed

<sup>(1)</sup> The values given in the pictures of the table are purely indicative.

<sup>(2)</sup> The FAULT / LOCK codes will only be displayed if they are active at that time (in presence of a failure/alarm or machine stoppage).

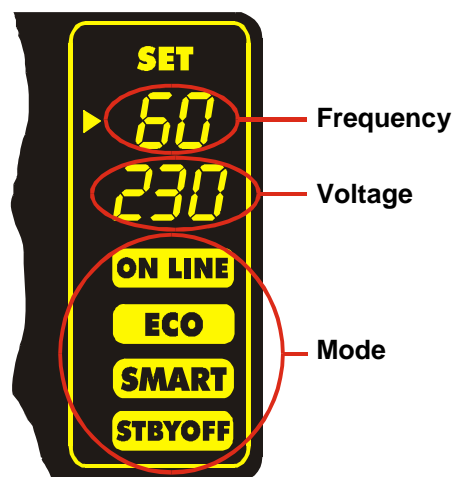
## Configuration area

The configuration area contains the main operating parameters of the UPS and displays its current status. The parameters found in this area can be modified by taking action directly from the display panel.

### SETTABLE PARAMETERS:

- Frequency:** output voltage frequency
- Voltage:** Output voltage
- Mode:** UPS operating mode

The picture to the side depicts the area of the display reserved for settings (configuration area), with the three settable parameters in view.



### How to proceed:

- To enter the configuration area hold down the “SEL / SET” button for at least 2 sec.
- The word “SET” lights and an arrow ( ► ) appears to the left of *Frequency*.
- The arrow indicates the setting selected. To change the selection of the parameter to be modified, press the “SEL / SET” button.
- To change the item selected, press the “ON” button.
- To exit from the configuration area, hold the “SEL / SET” button down for at least 2 sec.

### POSSIBLE SETTINGS

*Frequency:*     50 Hz         60 Hz         Off (frequency self-teach)

*Voltage:*         220 V         230 V         240 V

*Mode:*             ON LINE     ECO         SMART     STBYOFF

NOTE: For the change in configuration of output frequency to become effective, the UPS must be switched off completely and switched on again (by the main switch).



**THE PARAMETERS *VOLTAGE* AND *OUTPUT FREQUENCY* MUST BE COMPATIBLE WITH THOSE OF THE LOAD POWERED BY THE UPS**



## MODES OF OPERATION

The mode that gives the load maximum protection is ON LINE mode (default), where the energy intended for the load undergoes a double conversion and is reconstructed on the output in a perfectly sinusoidal way with frequency and voltage fixed by the precision digital control provided by a microprocessor fully independently of the input (V.F.I.). \*

Besides the traditional ON LINE double conversion operating mode, it is also possible to set the following modes:

- ECO (LINE INTERACTIVE)
- SMART (SMART ACTIVE)
- STBYOFF (STAND-BY OFF)

For optimized efficiency, in ECO mode, the load is powered normally from the bypass. If the mains exits from its specified tolerances, the UPS switches to the normal ON LINE double conversion operating mode. About five minutes after the mains has returned inside tolerance, the load is again switched to bypass.

Where a user is unable to decide between the most suitable operating mode (ON LINE or ECO), he can leave the choice to SMART ACTIVE mode in which, in relation to statistics regarding the quality of the mains power supply, the UPS autonomously decides which mode to configure itself in.

Finally in STAND-BY OFF mode, operation is as a back-up device:

with mains line present, the load is powered down, whereas when a black-out occurs the load is powered by the inverter through the batteries.

## R.E.P.O.

This isolated input is used to switch off the UPS remotely in an emergency. Any “Remote Emergency Power Off” (R.E.P.O.) switch that is normally closed must be connected to the connector located at the back of the UPS.

The UPS is supplied ex-works with the R.E.P.O. terminals short circuited: remove the short circuit if this contact is connected to the auxiliary of a remote emergency switch.

The R.E.P.O. circuit is self-powered with SELV type circuits. No external power supply voltage is therefore required. When it is closed (normal condition) there is a current of 10mA max.

## PROGRAMMABLE AUXILIARY SOCKET (POWER SHARE)

The UPS is provided with an output socket that allows the automatic disconnection of the load applied to it under certain operating conditions. The events that determine the automatic cut-out of the Power share socket can be user-selected by means of the UPSTools configuration software (see paragraphs **Configuration software** and **UPS Configuration**).

It is possible for example to select cut-out after a certain time of operation from battery, or on reaching the end of battery discharging prealarm threshold, or in the event of an overload.

\* The rms value of the output voltage is fixed by accurate microprocessor control independently of the input voltage while the frequency of the output voltage is synchronized (within a user-selectable tolerance) with that of the input to enable use of the bypass. The UPS will desynchronize outside of this tolerance, returning to nominal frequency, and the bypass can no longer be used (free running mode).

## UPS CONFIGURATION

The following table illustrates all the possible configurations that users have at their disposal to best adapt the UPS to their needs.

### LEGEND:



=

Indicates that the configuration can be modified, both via the configuration software supplied and also by means of action on the display panel.







=

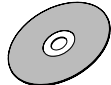





Indicates that the configuration can be modified only through the configuration software supplied.

FUNCTION	DESCRIPTION	PREDEFINED	POSSIBLE CONFIGURATIONS	MODE
<b>Output frequency</b>	Selects the nominal output frequency	Auto	<ul style="list-style-type: none"> <li>• 50 Hz</li> <li>• 60 Hz</li> <li>• Auto: automatic self-teaching of the input frequency</li> </ul>	
<b>Output voltage</b>	Selects the nominal output voltage	230V	<ul style="list-style-type: none"> <li>• 220V</li> <li>• 230V</li> <li>• 240V</li> <li>• 220 ÷ 240 in steps of 1V (only through the software)</li> </ul>	
<b>Operating mode</b>	Selects one of the 4 different modes of operation	ON LINE	<ul style="list-style-type: none"> <li>• ON LINE</li> <li>• ECO</li> <li>• SMART ACTIVE</li> <li>• STAND-BY OFF</li> </ul>	
<b>Switch-on delay</b>	Delay time for automatic switching on again after the mains returns	5 sec.	<ul style="list-style-type: none"> <li>• Disabled</li> <li>• 1 ÷ 255 in steps of 1 sec.</li> </ul>	
<b>Switch-off due to minimum load</b>	Automatic UPS switch-off when in battery-powered operation, if the load is less than 5%	Disabled	<ul style="list-style-type: none"> <li>• Enabled</li> <li>• Disabled</li> </ul>	
<b>Back-up limitation</b>	Maximum battery operation time	Disabled	<ul style="list-style-type: none"> <li>• Disabled (full battery discharge)</li> <li>• 1 ÷ 65000 in steps of 1 sec.</li> </ul>	
<b>End of discharge early warning</b>	Estimated remaining back-up time for the end of discharge early warning	3 min.	1 ÷ 255 in steps of 1 min.	
<b>Battery test</b>	Time interval for the automatic battery test	40 hours	<ul style="list-style-type: none"> <li>• Disabled</li> <li>• 1 ÷ 1000 in steps of 1 hour</li> </ul>	

# USE

FUNCTION	DESCRIPTION	PREDEFINED	POSSIBLE CONFIGURATIONS	MODE
<b>Alarm threshold for maximum load</b>	Selects the overload user limit	Disabled	<ul style="list-style-type: none"> <li>Disabled</li> <li>0 ÷ 103 in steps of 1%</li> </ul>	
<b>Display brightness</b>	Selects the level of brightness of the LCD	Maximum	Minimum ÷ Maximum in 20 steps	
<b>Sound alarm</b>	Selects the mode of operation of the sound alarm	Reduced	<ul style="list-style-type: none"> <li>Normal</li> <li>Reduced: does not sound for momentary intervention of the bypass</li> </ul>	
<b>Auxiliary socket (power share)</b>	Selects the operating mode of the auxiliary socket	Always connected	<ul style="list-style-type: none"> <li>Always connected</li> <li>Cut-out after <i>n</i> seconds of operation from battery</li> <li>Cut-out after <i>n</i> seconds from the end of discharge prealarm signal</li> <li>... (see UPSTools manual)</li> </ul>	

## ADVANCED FUNCTIONS

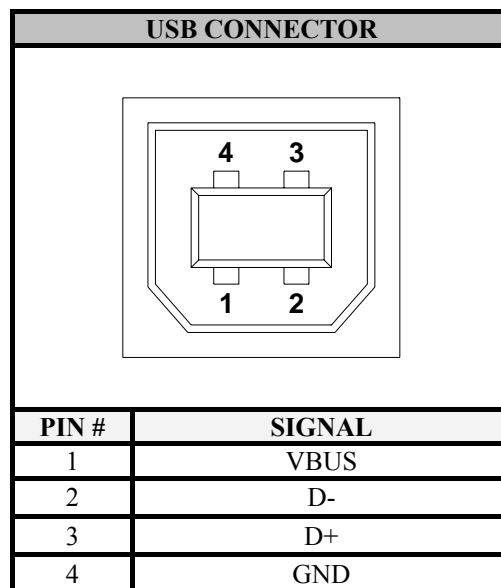
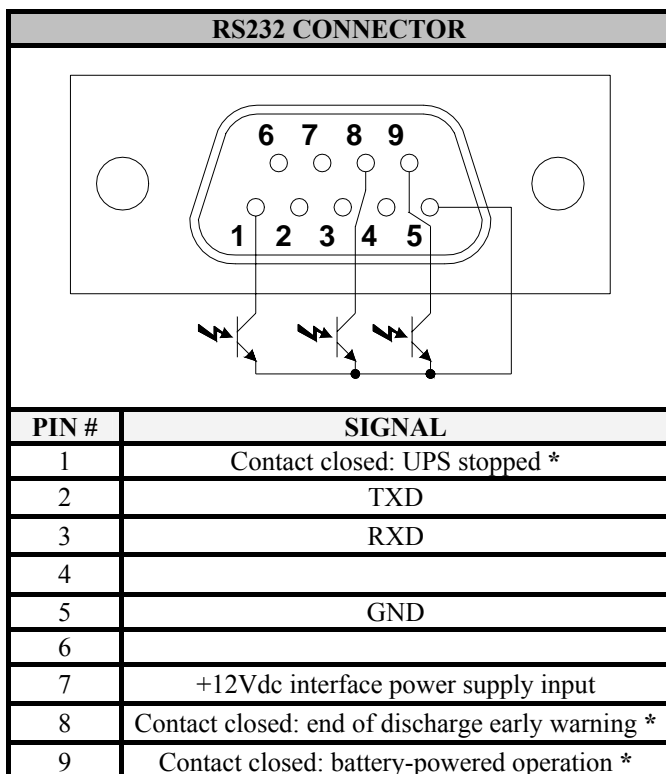
<b>Input frequency tolerance</b>	Selects the permitted range for the input frequency for switchover to bypass and for output synchronization	± 5%	<ul style="list-style-type: none"> <li>± 0.25%</li> <li>± 0.5%</li> <li>± 0.75%</li> <li>± 1 ÷ ±10 in steps of 1%</li> </ul>	
<b>Bypass voltage thresholds</b>	Selects the permitted voltage range for switchover to bypass	Low: 180V High: 264V	Low : 180 ÷ 200 in steps of 1V High: 250 ÷ 264 in steps of 1V	
<b>Bypass voltage thresholds for ECO</b>	Selects the permitted voltage range for ECO mode operation	Low: 200V High: 253V	Low: 180 ÷ 220 in steps of 1V High: 240 ÷ 264 in steps of 1V	
<b>Sensitivity of intervention for ECO mode</b>	Selects the sensitivity of intervention during operation in ECO mode	Normal	<ul style="list-style-type: none"> <li>Low</li> <li>Normal</li> <li>High</li> </ul>	
<b>Load power supply in stand-by</b>	Power supply of the load on bypass with UPS switched of (stand-by status)	Disabled (load NOT powered)	<ul style="list-style-type: none"> <li>Disabled (not powered)</li> <li>Enabled (<b>powered</b>)</li> </ul>	
<b>Bypass operation</b>	Selects the mode for use of the bypass line	Normal	<ul style="list-style-type: none"> <li>Normal</li> <li>Disabled with input/output synchronization</li> <li>Disabled without input/output synchronization</li> </ul>	

## COMMUNICATION PORTS

The following communication ports are found on the rear of the UPS (see *UPS Views*):

- Serial port, available with RS232 connector and USB connector.  
NOTE: use of one connector automatically excludes the other one.
- Expansion slots for additional COMMUNICATION SLOT interface cards.

### RS232 and USB connectors



\* Optoisolated contact max. +30Vdc / 10mA

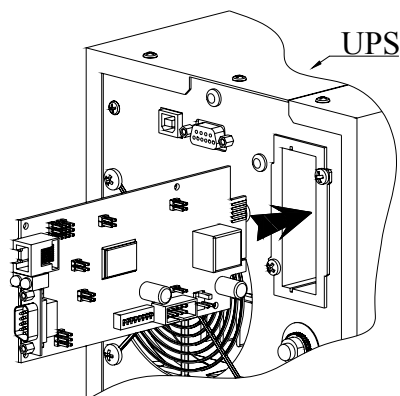
### Communication Slot

The UPS is provided with an expansion slot for optional communication cards (see the figure to the side) that enable the machine to carry out dialog using the main communication standards.

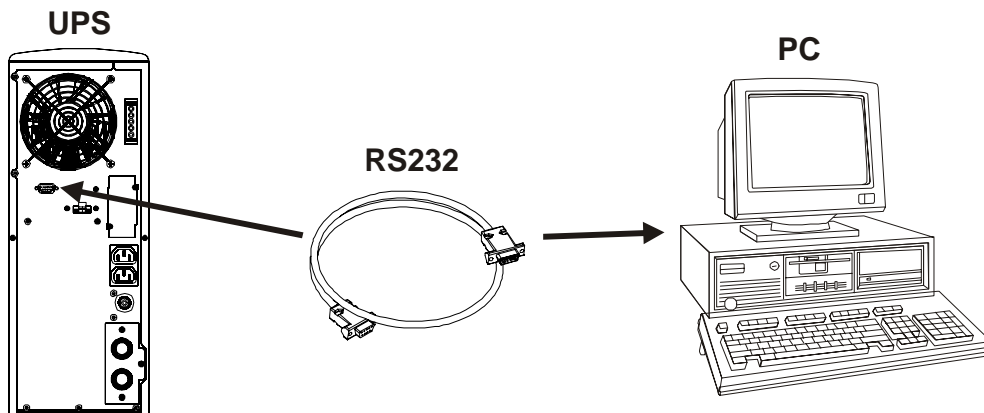
Some examples:

- Second RS232 port
- Serial port duplexer
- Ethernet network agent with TCP/IP, HTTP and SNMP protocol
- RS232 + RS485 port with JBUS / MODBUS protocol
- Signalling relay card

For more information on the accessories available, consult the manufacturer's web site.



## SOFTWARE



### Monitoring and control software

The **PowerShield<sup>2</sup>** software provides effective and intuitive management of the UPS, displaying all the most important information, such as input voltage, load applied, and battery capacity.

It is also able to automatically effect operations such as shutdown, transmission of e-mails, SMS and network messages when particular events that can be selected by the user occur.

#### Installation procedure:

- Connect the UPS's RS232 communication port to a COM communication port on the PC by means of the serial cable provided\* or connect the USB port on the UPS to a USB port on the PC using a USB standard cable\*.
- Insert the CD-ROM and select the desired operating system.
- Follow the instructions of the installation program.
- For more detailed information about installation and use, see the software user manual in the *Manuals* folder of the CD-ROM supplied.

To check if a more up to date version of the software is available, visit the manufacturer's web site.

### Configuration software

The **UPSTools** software may be used for configuration and full display of the parameters and status of the UPS through the RS232 serial port.

For a list of the possible configurations at the user's disposal, see the section ***UPS Configuration***.

#### Installation procedure:

- Connect the RS232 communication port of the UPS to a COM communication port on the PC by means of the serial cable provided\*.
- Follow the instructions on installation found in the software user manual in the *UPSTools* folder of the CD-ROM supplied.

To check if a more up to date version of the software is available, visit the manufacturer's web site.

\* You are advised to use a cable of max. length 3 metres.

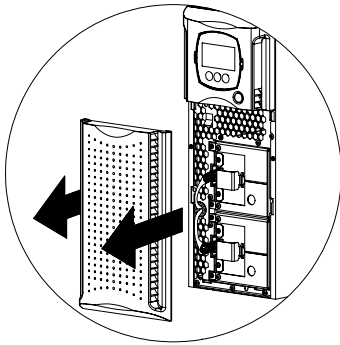
## REPLACING THE BATTERY PACKS

As mentioned in the introduction, the UPS comes with a dedicated battery pack to allow an easy *hot swap* replacement of the batteries with full safety ensured thanks to the protected connection system.

**WARNING:** *for your safety and that of your product, the information set out below should be carefully followed.*



**WHEN THE BATTERY PACK IS DISCONNECTED, THE LOADS CONNECTED TO THE UPS ARE NOT PROTECTED FROM MAINS FAILURE.  
THE BATTERY PACK IS VERY HEAVY. BE VERY CAREFUL WHEN REPLACING IT.**

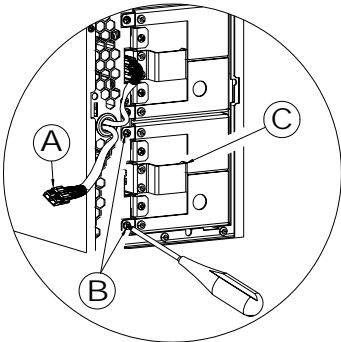
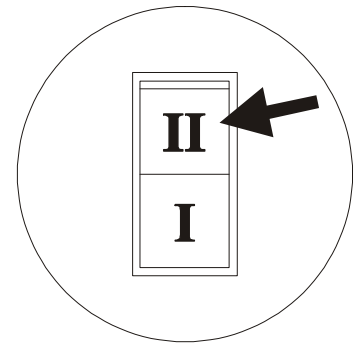


1. The battery packs are located behind the UPS front panel. Hold the panel centrally from the sides and gently pull it outwards as shown in the figure at the side. Do not force the panel fixing pins during this operation.

2. Set the manual bypass switch located under the front panel to position “II” (see figure at side).

NOTE: in this condition the load is powered from bypass and the display should show the message **FAULT: C02**.

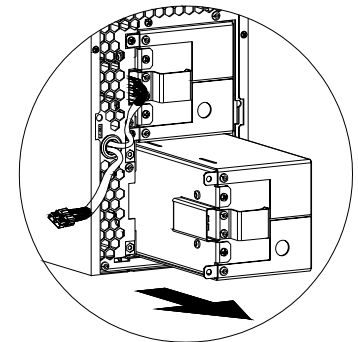
**WARNING:** *For correct operation of the UPS it is recommended to replace the battery pack only with the UPS switched on.*



3. The battery packs are connected to the UPS via cables with connector. Referring to the figure shown at the side: take hold of the connector ( **A** ) and remove it by gently pulling. Undo the two screws securing the battery pack to the UPS ( **B** ) and take hold of the handle ( **C** ) for removal.

4. Holding the handle, remove the battery pack by pulling it outwards, as shown in the figure at the side. Be very careful when extracting the battery pack as it is extremely heavy.

**WARNING:** the new battery pack must have the same number and type of batteries as the one it is replacing (see label on the battery pack near the connector).



5. Insert the new battery pack in the compartment, secure it to the UPS with the screws removed previously and reconnect the cable with connector. Replace the other battery pack by repeating the operations described from point 3 onwards. Once the new battery packs have been secured and connected, return the switch to position “I” and close the front panel. Check that the display has returned to normal.



## PROBLEM SOLVING

Irregular functioning of the UPS is very often not an indication of a fault but due simply to trivial problems, minor difficulties or carelessness.

We therefore recommend that you refer to the table below which gives a summary of useful information to solve the most common problems.

PROBLEM	POSSIBLE CAUSE	SOLUTION
THE DISPLAY DOES NOT SWITCH ON	GENERAL SWITCH NOT PRESSED	Press the general switch located on the front panel.
	THE BATTERY PACK CONNECTOR IS DISCONNECTED	Connect the battery pack connector by following the instructions set out in the paragraph "REPLACING THE BATTERY PACK".
	NO CONNECTION TO THE ELECTRICITY MAINS	Check the connection to the electricity mains.
	MAINS VOLTAGE FAILURE (BLACK-OUT)	Check the presence of the electricity mains voltage.
	UPSTREAM PROTECTION TRIGGERED	Reset the protection. <b>WARNING:</b> Check that there is no overload in output to the UPS.
THE DISPLAY IS ON BUT THE LOAD IS NOT POWERED	THE UPS IS IN STAND-BY MODE	Press the "ON" key located on the front panel to power the loads.
	STAND-BY OFF MODE HAS BEEN SELECTED	The mode has to be changed. The STAND-BY OFF mode (back-up) in fact only powers the loads in the event of a black-out.
	NO CONNECTION TO THE LOAD	Check the connection to the load.
THE UPS IS OPERATING FROM BATTERY EVEN THOUGH THE MAINS VOLTAGE IS PRESENT	UPSTREAM PROTECTION TRIGGERED	Reset the protection. <b>WARNING:</b> Check that there is no overload in output to the UPS.
	THE INPUT VOLTAGE IS OUTSIDE THE ALLOWED TOLERANCE FOR OPERATION FROM MAINS	Problem dependent on the mains. Wait for the input mains to return within tolerance. The UPS will automatically go back to operation from mains.
THE UPS DOES NOT SWITCH ON AND THE DISPLAY SHOWS ONE OF THESE CODES: <b>A06, A08</b>	THE TEMPERATURA OF THE UPS IS LOWER THAN 0°C	Check the temperature of the environment where the UPS is located; if it is too low, bring it to above the minimum threshold (0°C).
THE DISPLAY SHOWS THE CODE: <b>A11</b>	INPUT RELAY BLOCKED	The fault does not cause any particular malfunctions. If the problem should occur again on a subsequent start-up, contact the support service centre.

PROBLEM	POSSIBLE CAUSE	SOLUTION
THE BUZZER SOUNDS CONTINUOUSLY AND THE DISPLAY SHOWS ONE OF THESE CODES: <b>A54, F50, F51, F52, F55, L50, L51, L52</b>	THE LOAD APPLIED TO THE UPS IS TOO HIGH	Reduce the load to within the threshold of 100% (or user threshold in the case of code <b>A54</b> ).
THE DISPLAY SHOWS THE CODE: <b>A61</b>	BATTERIES SHOULD BE REPLACED	Replace the battery packs (as indicated in the chapter <i>BATTERY PACK</i> ).
THE DISPLAY SHOWS THE CODE: <b>A62</b>	BATTERY PACKS NOT PRESENT OR NOT CONNECTED	Check that the battery packs are inserted and connected correctly (see chapter <i>BATTERY PACK</i> ).
THE DISPLAY SHOWS THE CODE: <b>A63</b>	THE BATTERIES ARE DISCHARGED; THE UPS IS WAITING FOR THE VOLTAGE OF THE BATTERIES TO GO OVER THE SET THRESHOLD	Wait for the batteries to recharge or force start-up manually by keeping the "ON" key pressed for at least 2 sec.
THE BUZZER SOUNDS CONTINUOUSLY AND THE DISPLAY SHOWS ONE OF THESE CODES: <b>F03, F05, F07, F10, F13, F21, F40, F41, F42, F43</b>	A MALFUNCTION OF THE UPS HAS BEEN VERIFIED; PROBABLY ABOUT TO STOP	If power can be removed from the load, switch the UPS off and then on again; if the problem should occur again, contact the support service centre.
THE BUZZER SOUNDS CONTINUOUSLY AND THE DISPLAY SHOWS ONE OF THESE CODES: <b>F04, L04</b>	THE TEMPERATURES OF THE DISSIPATORS INSIDE THE UPS IS TOO HIGH	Check that the temperature of the environment where the UPS is located does not exceed 40°C.
THE BUZZER SOUNDS CONTINUOUSLY AND THE DISPLAY SHOWS ONE OF THESE CODES: <b>F53, L53</b>	A FAULT HAS BEEN DETECTED ON ONE OR MORE APPLICATIONS POWERED BY THE UPS	Disconnect all the applications and reconnect them one by one to identify the faulty one.
THE BUZZER SOUNDS CONTINUOUSLY AND THE DISPLAY SHOWS ONE OF THESE CODES: <b>F60, L03, L05, L07, L10, L13, L20, L21, L40, L41, L42, L43</b>	A MALFUNCTION OF THE UPS HAS BEEN VERIFIED	If power can be removed from the load, switch the UPS off and then on again; if the problem should occur again, contact the support service centre.
THE DISPLAY SHOWS ONE OF THESE CODES: <b>C01, C02, C03</b>	A REMOTE CONTROL HAS BEEN ACTIVATED	If this is not required, check the position of the manual bypass switch or the status of the control inputs of any optional contacts card. Check the closing of the R.E.P.O. contact at the back of the UPS.

## ALARM CODES

By using a sophisticated self-test system, the UPS can check and report on the display panel any problems and/or failures that could occur during normal operation of the equipment. In case of a problem, the UPS signals the event by posting on the display the code and type of alarm present (FAULT and/or LOCK).

### FAULT

The FAULT type reports may be divided into three categories.

- **Failures:** these are “minor” problems that do not result in the UPS stopping but they limit its performance or prevent certain features being used.

CODE	DESCRIPTION
A06	Temperature sensor1 less than 0°C
A08	Temperature sensor2 less than 0°C
A11	Input relay stuck (does not open)
A54	Load > threshold set by user
A61	Batteries need replacement
A62	Battery pack missing or not connected
A63	Waiting for batteries to recharge

- **Alarms:** these problems are more critical than the failures because – if they continue – they could cause the UPS to stop, even in a very short time frame.

CODE	DESCRIPTION
F03	Auxiliary power supply incorrect
F04	High temperature on heat sinks
F05	Temperature Sensor1 broken
F07	Temperature Sensor2 broken
F10	Input fuse broken or input relay stuck (does not close)
F13	Capacitor precharging failure
F21	Capacitor bank overvoltage
F40	Inverter overvoltage
F41	D-C voltage on output
F42	Inverter voltage not right
F43	Inverter undervoltage
F50	Overload: load > 103%
F51	Overload: load > 110%
F52	Overload: load > 150%
F53	Short-circuit
F55	Waiting for load reduction before return to inverter
F60	Battery overvoltage

➤ **Commands in progress:** indicates presence of a remote command in progress.

CODE	DESCRIPTION
C01	Remote shutdown command
C02	Remote load on bypass command
C03	Remote switch-on command
C04	Battery test in progress

## LOCK

The LOCK (block) type report signals are usually preceded by an alarm signal and, on account of their importance, result in the inverter being switched off and the load being powered through the bypass line (the procedure is excluded in case of lockouts due to strong and persistent overloads and lockouts following a short-circuit).

CODE	DESCRIPTION
L03	Auxiliary power supply incorrect
L04	High temperature on heat sinks
L05	Temperature Sensor1 broken
L07	Temperature Sensor2 broken
L10	Input fuse broken or input relay stuck (does not close)
L13	Capacitor precharging failure
L20	Capacitor bank undervoltage
L21	Capacitor bank overvoltage
L40	Inverter overvoltage
L41	D-C voltage on output
L42	Inverter voltage not right
L43	Inverter undervoltage
L50	Overload: load > 103%
L51	Overload: load > 110%
L52	Overload: load > 150%
L53	Short-circuit

# TECHNICAL DATA TABLE

MODELS	DLD 500	DLD 600
--------	---------	---------

## INPUT

Nominal voltage	[Vac]	220 - 230 - 240	
Nominal frequency	[Hz]	50 – 60	
Accepted range	[Vac]	0 ÷ 276	
Voltage and frequency range for non intervention of the battery	[Vac]	Maximum: 276	
	[Vac]	Minimum: 164 ÷ 84 (from 100% to 50% of load in linear mode)	
	[Vac]	Return to mains-powered operation: 180	
	[Hz]	Frequency: 40 ÷ 72	
Maximum current <sup>(1)</sup>	[A]	25	30
Nominal current <sup>(2)</sup>	[A]	18	22
Power factor		≥ 0.98	
Current distortion @ maximum load		≤ 6%	

## BYPASS

Accepted voltage range for switching	[Vac]	180 ÷ 264	
Accepted frequency range for switching		Frequency selected ±5 %	
Switching time	[msec]	0,1	

## BATTERY

No. batteries / V / Ah		16 / 12 / 7 high rate discharge	
Recharge time	[h]	4 ÷ 6	

## OUTPUT

Nominal voltage <sup>(8)</sup>	[Vac]	220 / 230 / 240 ±1.5%	
Maximum current	[A]	23 / 22 / 21	27 / 26 / 25
Static variation <sup>(4)</sup>		1.5%	
Dynamic variation <sup>(5)</sup>		≤ 5% in 20 msec	
Waveform		Sinusoidal	
Voltage distortion @ linear load		≤ 3%	
Voltage distortion @ distorting load <sup>(3)</sup>		≤ 5%	
Frequency <sup>(6)</sup>		50 or 60 Hz selectable	
Current crest factor		≥ 3 : 1	
Nominal power <sup>(3)</sup>	[VA]	5000	6000
Nominal power	[W]	3500	4200

## MISCELLANEOUS

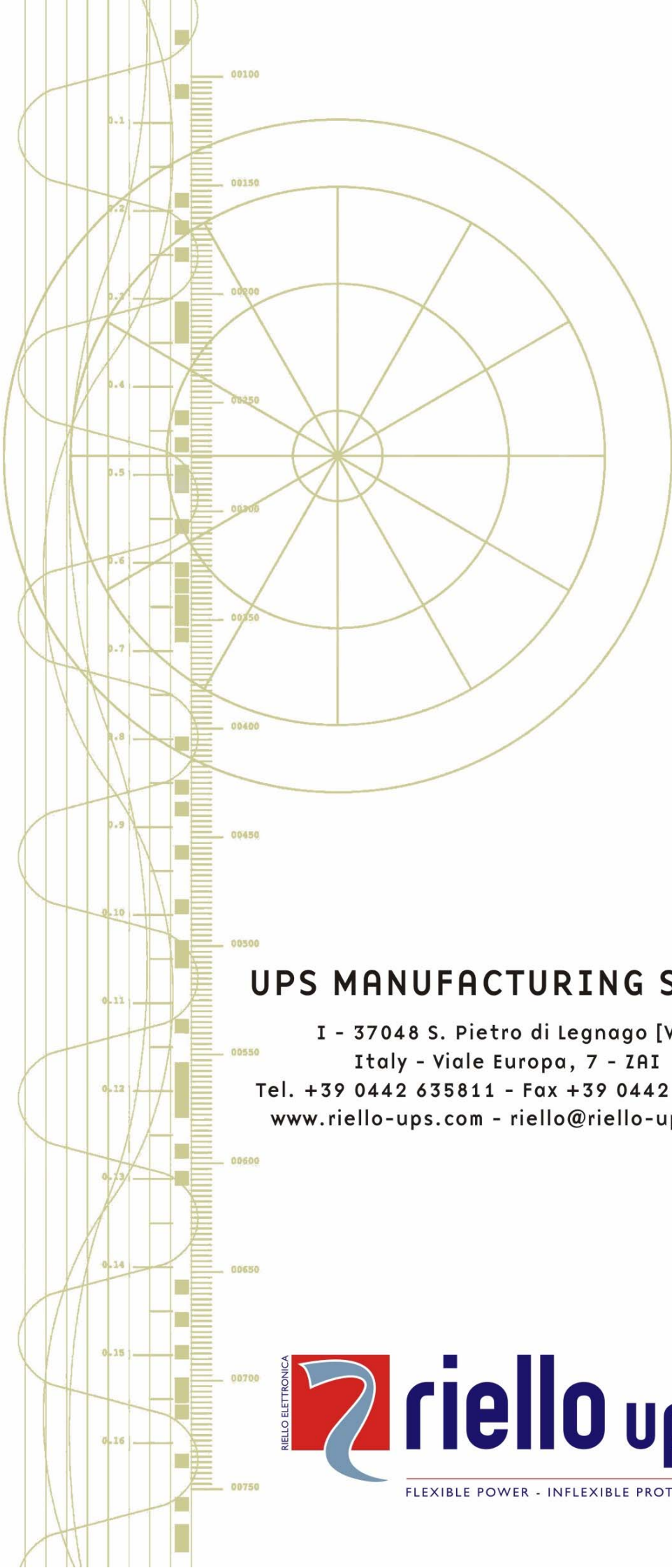
Leakage current to earth	[mA]	≤ 2	
AC/AC efficiency		> 91%	
Ambient temperature <sup>(7)</sup>	[°C]	0 – 40	
Humidity		< 90% non-condensing	
Protections		Excessive battery discharge – Overcurrent – short-circuit – Overvoltage – undervoltage - thermal	
Safety compliance		EN 50091-1-1 and directive 73 / 23 / EEC, 93/68 EEC	
EMC compliance		EN 50091 - 2 cl. A and directive 89/336 EEC, 92/31 EEC, 93/68 EEC	
Hold-up time	[msec]	≥ 35	
Noise level		< 45 dB(A) at 1 mt.	
Dimensions H x L x D	[mm]	455 x 175 x 660 <sup>(10)</sup>	
Weight	[Kg]	64	

# TECHNICAL DATA TABLE

OVERLOAD TIMES	OPERATION POWERED BY	
	BYPASS	INVERTER
100% < Load ≤ 110%	Activates bypass after 2 sec Stoppage after 120 sec	Stoppage after 60 sec
110% < Load ≤ 150%	Activates bypass after 2 sec Stoppage after 4 sec	Stoppage after 4 sec
Load > 150%	Activates bypass instantaneously Stoppage after 1 sec	Stoppage after 0.5 sec

- <sup>(1)</sup> @ nominal load, minimum voltage of 164 Vac, battery charging
- <sup>(2)</sup> @ nominal load, nominal voltage of 230 Vac, battery charging
- <sup>(3)</sup> According to appendix M5 of standard EN50091-1-1
- <sup>(4)</sup> Mains/Battery @ load 0% -100%
- <sup>(5)</sup> @ Mains/battery/mains @ resistive load 0% / 100% / 0%
- <sup>(6)</sup> If the mains frequency is within ± 5% of the value selected, the UPS is synchronized with the mains. If the frequency is outside the tolerances or operation is battery-powered, the frequency is the selected frequency ±0.1%
- <sup>(7)</sup> 20 - 25 °C for longer battery life
- <sup>(8)</sup> To maintain the output voltage inside the precision range indicated, a recalibration may be necessary after a long period in operation
- <sup>(9)</sup> Time required to reach 90% of the charge (after a full discharge)
- <sup>(10)</sup> Corresponding to: 19” x 4U x 26” (H x L x D)





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