



**Dale Power Solutions Ltd**

## **User Manual**

**6 and 10 kW E200 Series UPS**

**E206U, E206REU**

**E2010U, E2010REU**

**External Battery Packs**

**EE2000U, EER2000U**

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## Safety

There are dangerous voltages and high temperatures inside the UPS. During installation, operation and maintenance please abide by local safety instructions, regulations and laws. Failure to do so may result in injury to personnel or damage to equipment. Safety instructions in this manual are supplementary to local safety instructions. Dale Power Solutions Ltd does not accept any liability caused as a result of failure to follow safety instructions. Please note the following:

- The UPS contains its own power source in the form of batteries, and these can supply an output even when the UPS isn't connected to the mains supply.
- Do not disconnect the UPS from the mains while it is turned on.
- After turning off a UPS leave it for 10 seconds before attempting to disconnect it from the mains to allow the EMC capacitors to discharge.
- Do not use the UPS for any other purpose than the one for which it was designed.
- Do not exceed the rated load of the UPS.
- Under no circumstances open the UPS. There are high capacity batteries inside and other electronics that can cause electric shock. If the UPS requires internal maintenance or battery replacement, contact Dale Power Solutions Ltd.
- Keep the UPS in a dry, well ventilated location away from any area or situation in which there is a risk of fire, such as direct sunlight or other sources of heat.
- If the UPS emits smoke, operate the emergency power off (EPO) switch and isolate from the mains. Contact Dale Power Solutions Ltd.



**WARNING!** THIS IS A PRODUCT FOR COMMERCIAL AND INDUSTRIAL APPLICATION IN THE SECOND ENVIRONMENT INSTALLATION RESTRICTIONS OR ADDITIONAL MEASURES MAY BE NEEDED TO PREVENT DISTURBANCES (AS STATED IN EN62040-2:2006).

## Warning symbols

The safety symbols used in this manual are shown in table below. They alert you to important safety information that you need to be aware of when installing, operating and maintaining the UPS.

| Safety Symbol | Indication                 |
|---------------|----------------------------|
|               | Attention                  |
|               | Static discharge sensitive |
|               | Electric shock             |



**Caution:** A caution describes a situation in which there is a risk of damage to equipment.



**WARNING!** A WARNING DESCRIBES A SITUATION IN WHICH THERE IS A RISK OF INJURY OR DEATH TO PERSONNEL.

## Product description

### Applications

This UPS series provides reliable AC backup power to various types of equipment, for example computer centres, network management centres, auto control systems, and telecommunication systems.

### Product range

The following table lists the tower and rack mount models available in the E200 series. For increased backup power (see the battery backup times on page 40), external battery packs are also available in both mechanical formats.

| Capacity                | 6 kW     | 10 kW    |
|-------------------------|----------|----------|
| Tower units             | E206U    | E2010U   |
| Rack mount units        | E206REU  | E2010REU |
| Battery voltage         | ±120 V   | ±120 V   |
| No. of 12 V batteries   | 20       | 20       |
| External battery packs: |          |          |
| Tower units             | EE2000U  |          |
| Rack mount units        | EER2000U |          |

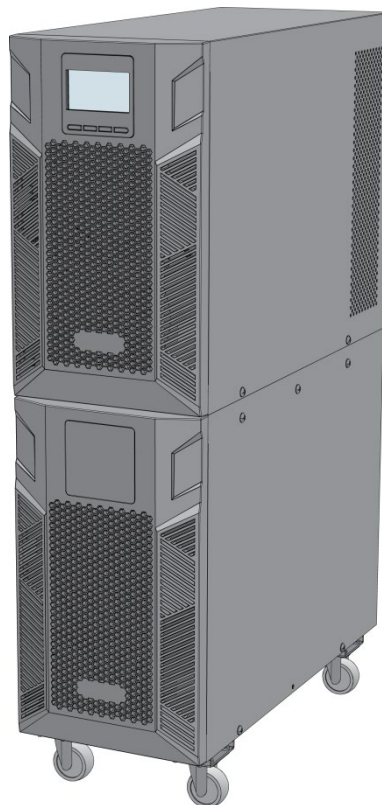


Figure 1 E206U and E2010U tower units

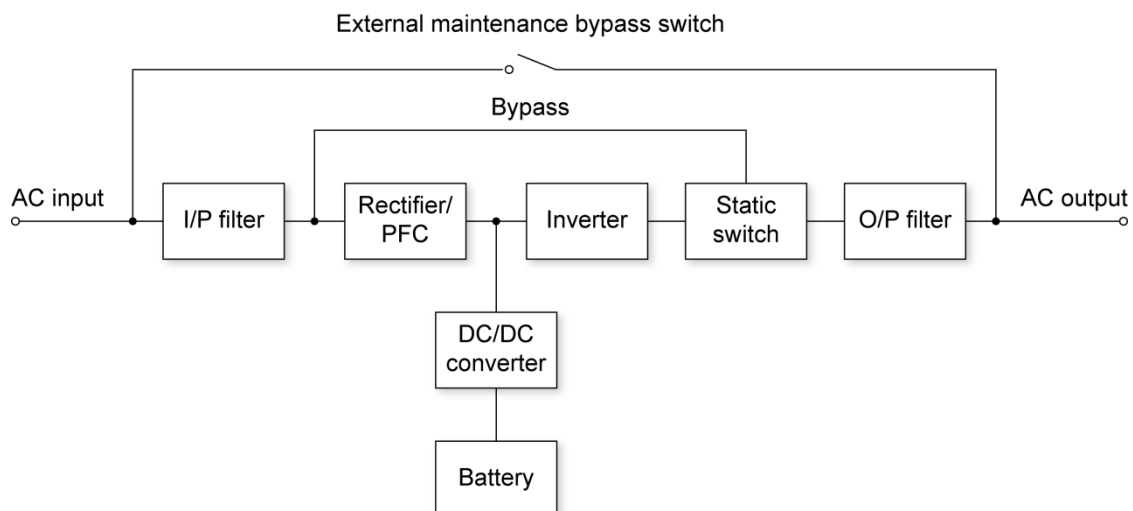
Models with an R suffix are designed to be mounted horizontally (Figure 2) or vertically (not shown). The LCD control panel can be manually rotated by 90 degrees to suit the orientation of the unit. Mounting brackets are available to allow horizontal units to be rack mounted, and support bases are provided to hold vertically positioned units in place. Rack mount units require an external battery.



**Figure 2 E206REU and E2010REU shown in the horizontal position**

## System block diagram

A functional block diagram representing the UPS is shown in Figure 3. The UPS can be installed and operated as a single unit or it can be operated with other units of the same type in parallel N+1 redundant mode for additional reliability, or in a parallel capacity mode for increased output rating. In cases where it is not possible to meet the hold-up time, up to four external battery packs may be connected.



**Figure 3 Single unit block diagram**

## Features

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- E200 series units have an intelligent online sine-wave output with power factor correction. High frequency double-conversion and a wide input voltage range ensure continuous output for areas with poor power supply regulation.
- DSP technology for digital control ensures high reliability, circuit protection and self-diagnostics in the unlikely event of a fault. Intelligent digital battery management extends battery life and ensures optimum performance.
- An LCD panel and LED indicators clearly display the system status and system parameters such as input/output voltage, frequency, load, and unit temperature.
- Network power management can be achieved using UPS monitoring software via an RS232 serial connection or a USB connection.
- Remote EPO (emergency power off) operation.
- Optional SNMP or dry contact relay cards are available.

## Installation

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### Siting considerations

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Before unpacking and installing the unit, consider the following:

- DO NOT expose the UPS to high temperatures, water ingress, environments in which water may condense, flammable or corrosive gas, dust, or direct sunlight.
- Locate the UPS indoors on a level surface as close as possible to the equipment it will be powering to minimise cable voltage drops. Allow enough spare cable to move the UPS and access the rear and side panels during servicing.
- Maintain a gap of at least 20 cm between the ventilation holes/slots at the front and rear of the unit, and walls or other equipment.
- For maximum battery life and improved product reliability ensure cool air is available at the front of the unit. As an approximation, battery life is halved for every 10°C rise in temperature (above 20°C).
- Ensure the ambient temperature is in the range 0 to 40°C. If you need to operate the UPS above 40°C, derate the output by 2.4% per °C increase in temperature. The maximum operating temperature is 50°C.

## Wiring considerations

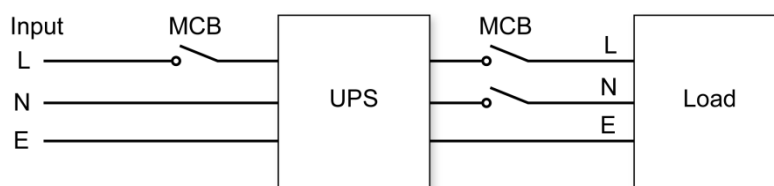
To ensure a safe installation please follow these instructions and the local electrical code of the area or country in which you are installing the equipment:

- If the UPS is to be supplied from a local transformer, ensure the transformer kVA rating is at least 50% greater than the UPS output kW rating.
- Use circuit breakers and cables with the correct rating (see the next section).
- Always fit an MCB between the mains supply live line only and the UPS input (see Figure 4).



**Caution:** Do not fit an MCB in the neutral line.

- Because of the high leakage current, permanently hard wire all the a.c. cables or use industrial connectors (not domestic connectors).
- Use ring terminal crimps on the end of all cable conductors to ensure the connections are secure.
- Although it may not be absolutely necessary, it is recommended that you fit an MCB between the UPS and the load to protect the output load and cables in the event of a fault (see Figure 4). You may also wish to connect the UPS output to your load via a distribution unit (PDU).



**Figure 4** Power cable wiring configuration for a single UPS

## Operation from a generator

As a guide, it is recommended that the load capacity should be less than 30% of the generator capacity, and the generator rating should be 1.5 to 2 times the rating of the UPS, depending on the type of generator used.



**Caution:** Ensure that the neutral line from the generator is permanently connected to the mains neutral line. Do not use an MCB or any other type of switch in this line.

## Circuit breaker and cable sizes

Use the following sizes of circuit breakers and cables to connect the UPS between mains power and the load.

| Model           | Input and output breakers (A) | Breaker type | Input and output cable sizes (mm <sup>2</sup> ) |
|-----------------|-------------------------------|--------------|-------------------------------------------------|
| E206U, E206RU   | C40                           | MCB          | 6 (10 AWG)                                      |
| E2010U, E2010RU | C63                           | MCB          | 10 (8 AWG)                                      |

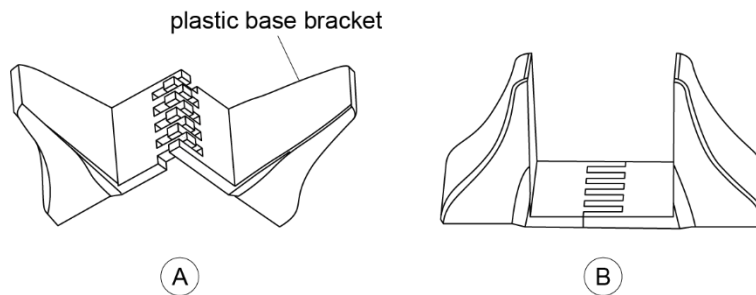
## Rack mount units only

### Vertical positioning

If you want to stand your rack mount UPS and EBP vertically, use the plastic support bases, which are supplied as two pairs of brackets and the appropriate number of spacers.

#### To assemble a stand for an E206RU+ or E2010RU+:

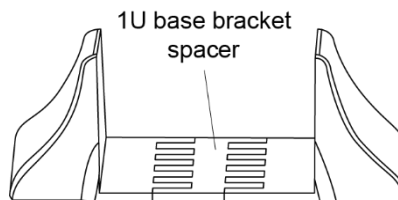
- Interlink the fingers of a pair of brackets at 90 degrees (A), and then press flat (B).



#### To assemble a stand for a combination of UPS and EBP(s):

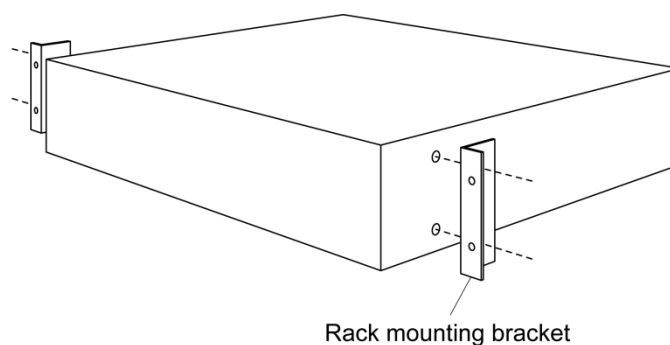
**Note:** To allow interconnection, UPSs and EBPs must be positioned directly adjacent to each other.

- Use the method above, adding one or more 1U spacers between the brackets. The finished stand should look like this:



### Rack mounting

If rack mounting your UPS, screw rack-mounting brackets to the sides of the unit in the positions shown in Figure 5 using the 4M screws supplied.



**Figure 5 Fitting rack mounting brackets**

## Rear panel layouts

### Tower unit

Figure 6 show the rear panel connections of the tower UPS.

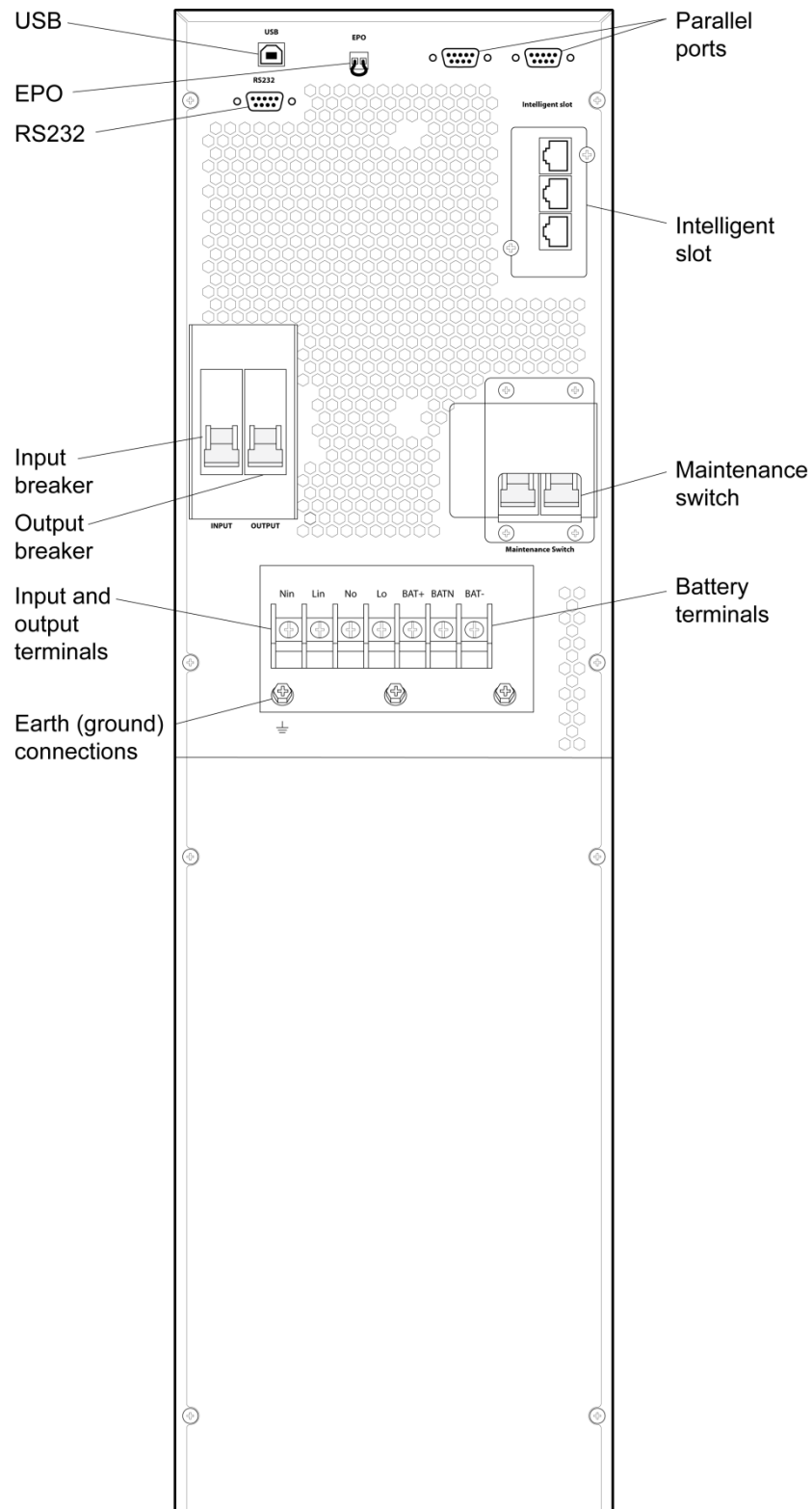
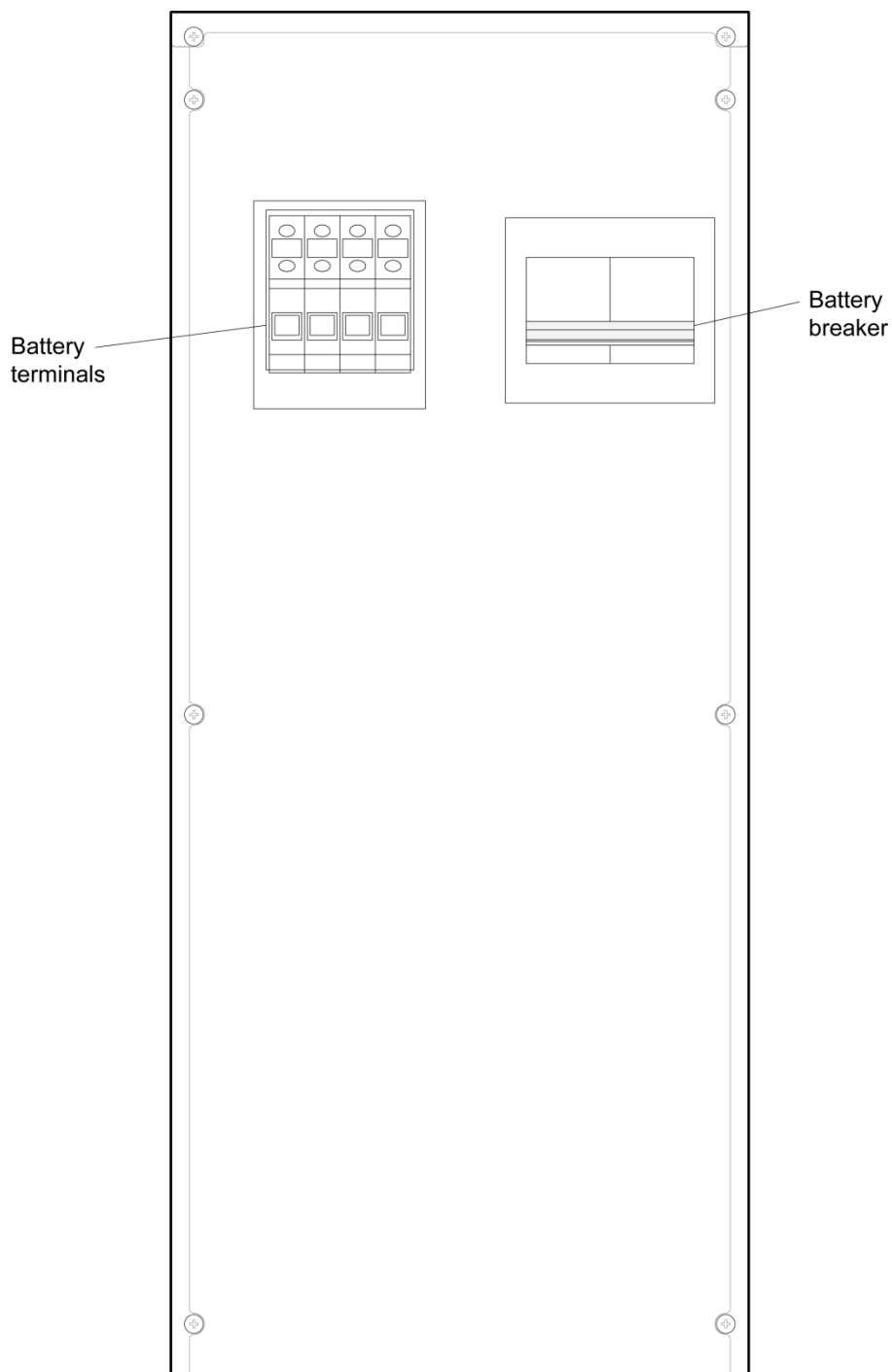


Figure 6 E206U and E2010U rear panel layout (6 kW and 10 kW units)

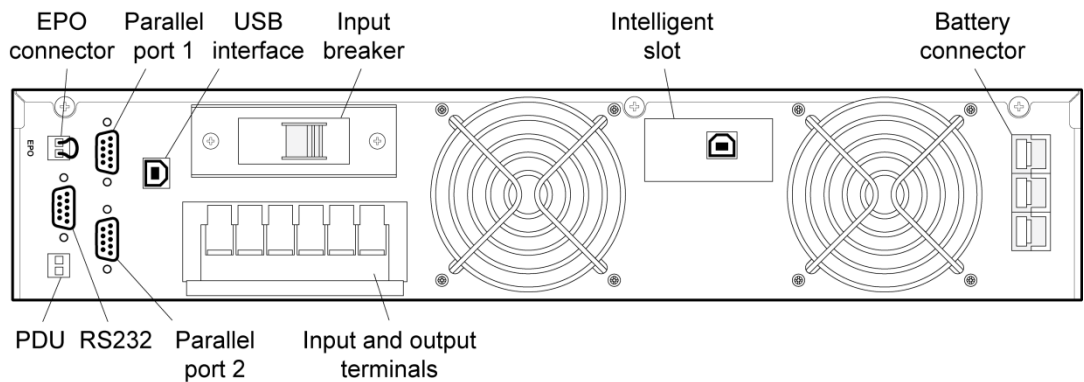
Figure 7 show the rear panel connections of the tower external battery pack.



**Figure 7 EE2000U rear panel layout (EBP for 6 kW and 10 kW tower units)**

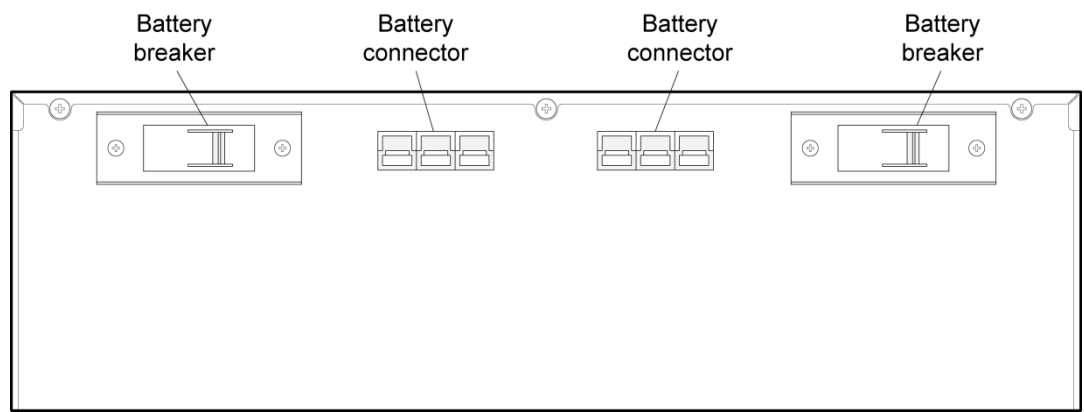
Rack mount units

Figure 8 show the rear panel connections of the rack mount UPS.



**Figure 8 E206REU and E2010REU rear panel layout (6 kW and 10 kW)**

Figure 9 shows the rear panel connections of the rack mount external battery pack.



**Figure 9 EER2000U rear panel layout (EBP for 6 kW and 10 kW UPSs)**

## Unpacking the UPS

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### To unpack the UPS:

1. Cut the two straps securing the packing box to the pallet and remove the packing box by lifting it up and over the UPS.
2. Remove and retain the documentation, CD and leads from the top of the UPS.
3. Dispose of packets of desiccant correctly.
4. Move the UPS off the pallet.



#### **WARNING!**

UNITS CAN WEIGH UP TO 72 kg. TO PREVENT THE UPS FROM FALLING DO NOT LEAN IT WHEN MOVING IT OFF THE PALLET.

5. Check the appearance of the UPS to see if it is damaged. If any damage is found, do not switch on the UPS and contact the dealer.
6. Check the packing list. Contact your distributor if any of the accessories are missing.

## Wiring the UPS

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Before connecting the UPS, read the siting considerations on page 8 and check you have selected breakers and cables with the correct ratings.



#### **WARNING!**

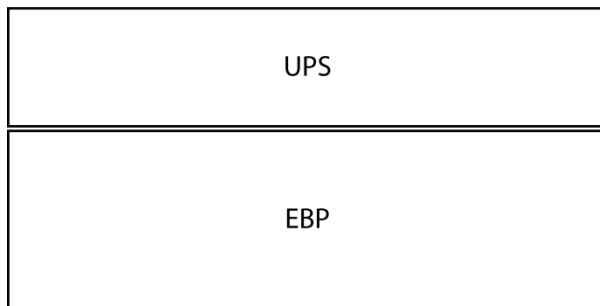
BEFORE ATTEMPTING TO WIRE THE UPS ENSURE ALL BREAKERS ARE IN THE OFF POSITION.

**Note:** If you intend to use the dry contact signals card (if fitted) you will need a PH1 Phillips screwdriver to remove and replace the card. Do not use a pozidrive (PZ) screwdriver.

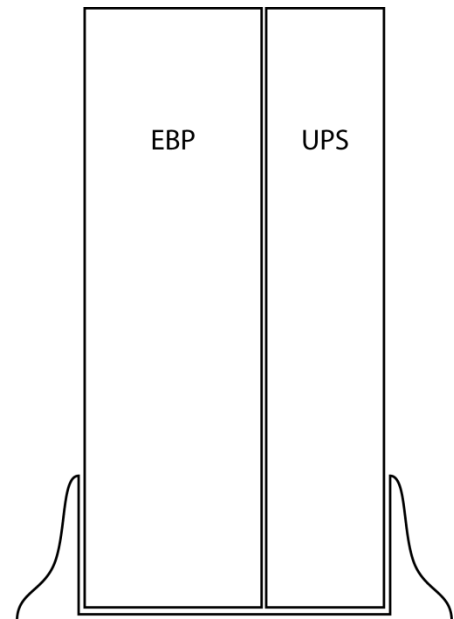
### To connect the UPS to your system:

1. If your system is connected to an external battery, measure the battery voltage. The voltage should be approximately 240 Vd.c.
2. If your system uses one or more external battery packs (EBPs), ensure that the UPS and EBP are matching types, for example E206U and EE2000U or E206REU and EER2000U where there is an R if the units are rack mountable. Connect units together as follows:

- a. **E206REU and E2010REU and their corresponding EBP only:** position the UPS and EBP(s) directly adjacent to each other as shown below.



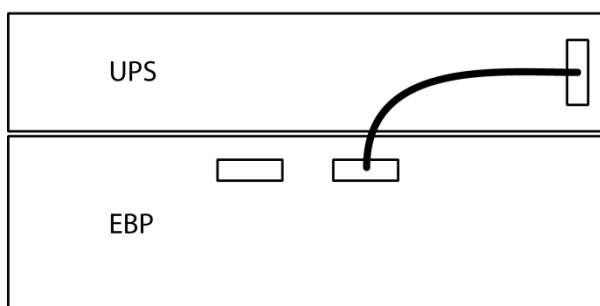
Horizontally mounted



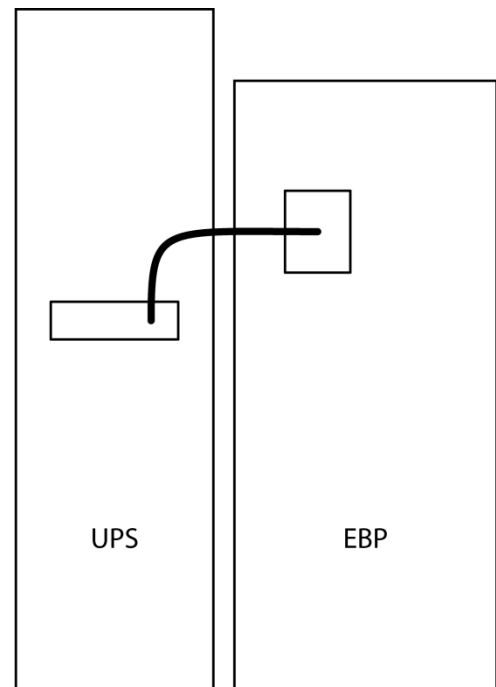
Vertically mounted

- b. On the rear panels, connect a battery cable between the EBP and the UPS as shown below.

**Note:** Rack units use cables with plugs and tower units have screws terminals.



Rack mount UPS and EBP



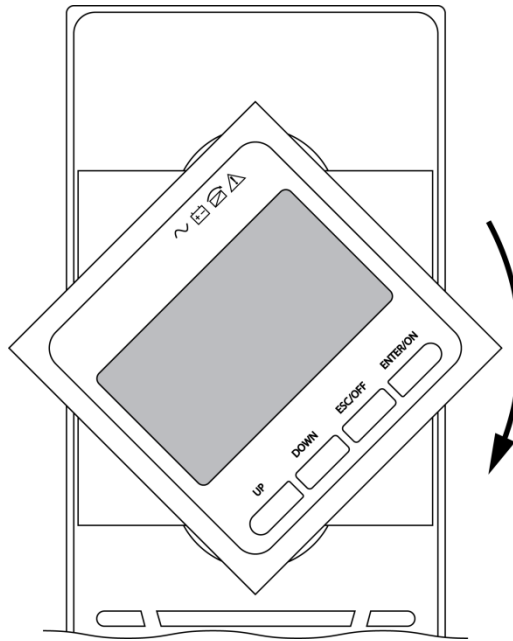
Tower UPS and EBP

3. **All tower units and their corresponding EBPs only:** on the unit rear panels, connect an earth cable between the UPS and each EBP.

**WARNING!**

YOU CANNOT RELY ON THE MAINS EARTH TO PROVIDE AN ADEQUATE EARTH INTERCONNECTION BETWEEN THE UPS AND EACH EBP.

4. **E206REU and E2010REU only:** if vertically mounting the UPS, ensure that the control panel is rotated so that buttons and screen are in the correct orientation. To rotate the panel, grip its sides, pull forwards and rotate through 90° as shown below.



5. On the UPS rear panel, connect the output terminals to your load(s).
6. Ensure the loads are turned off.
7. If your unit has an SNMP or relay contact card fitted or you plan to use the RS232 port or other standard signals including remote EPO (emergency power off) switch, see Appendix 1 Signals options on page 36.
8. On the UPS rear panel, connect the input terminals to the mains.

## Wiring units in parallel

You can operate 2, 3 or 4 units in parallel. Each unit must be ordered with a factory fitted parallel board option.



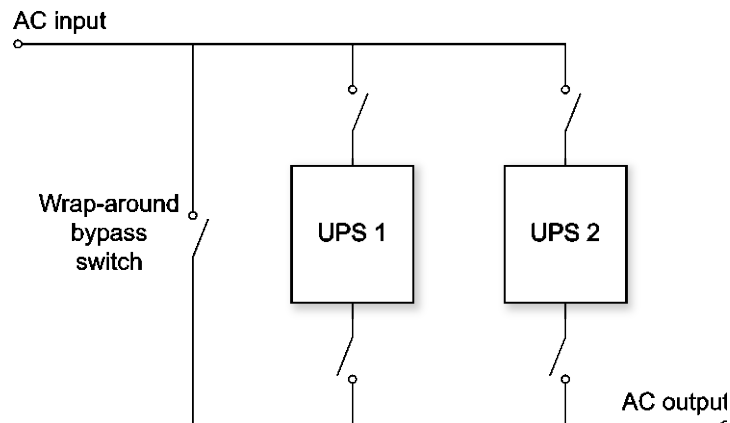
**Caution:** If you are using units with external batteries, each unit requires its own battery bank. You cannot use a common battery bank for more than one unit working in parallel mode.

**WARNING!**

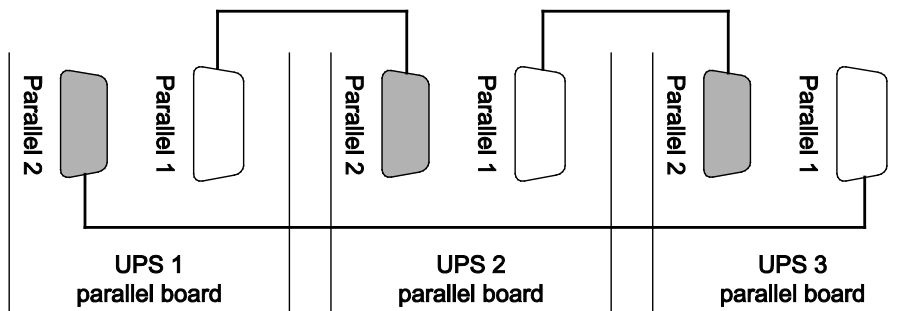
BEFORE ATTEMPTING TO WIRE THE UNITS, ENSURE ALL BREAKERS ARE IN THE OFF POSITION.

**To connect two or more units in parallel:**

1. Wire the power cables and optional signals as described above.
2. If a system bypass is required, wire in a separate MCB capable of carrying the total system load current as shown below. This is not required if you have only two units working in N+1 mode where the load never exceeds the rating of a single unit.



3. On the parallel board of each UPS, connect the CAN bus labelled **Parallel 1** and **Parallel 2**, in a ring arrangement using the supplied RS232 cables as shown below. Make sure you wire all CAN bus connectors and secure them in place using their captive screw locks.



## Operation

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### Working modes

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The UPS has four distinct modes of operation:

- On-line mode
- Bypass mode
- Battery mode
- ECO mode

Each operating mode is described below.

#### On-Line mode

---

This is the default mode of operation in which the load is supplied via the rectifier and inverter when the a.c. input and load are within their normal ranges. In this mode the green inverter icon is on (  ) and the battery is trickle charged.

During fault conditions the UPS automatically switches to either bypass mode or battery mode without interruption to the load.

#### Bypass mode

---

In bypass mode the load is supplied directly from the a.c. input and the battery is charged. The UPS switches to bypass mode (  ) when any of the following conditions occur:

- An output overload – the unit beeps twice every second, indicating that the load must be reduced to within its normal range as soon as possible. Once the overload is removed the inverter re-starts after a 5 minute delay. If the UPS is overloaded too many times in any one hour it will eventually remain in bypass mode.
- The UPS is too hot – the UPS reverts to on-line mode as soon as the unit temperature returns to normal.
- The UPS fails – a serious fault has occurred within the UPS that must be repaired.
- The UPS is manually turned off (when this option is enabled).

In bypass mode the inverter icon is off, the amber bypass icon (  ) is on, the red fault icon (  ) flashes and the UPS beeps every 4 seconds.

#### Battery mode

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In battery mode the load is supplied from the battery via the DC/DC converter and inverter, the UPS beeps every 4 seconds, and the rectifier and charger are turned off. The UPS switches to battery mode when there is no a.c. input or the a.c. input is outside its normal range. On the front panel the inverter (  ), battery (  ) and fault (  ) icons are on.

When the battery reaches a pre-set low limit, the battery (  ) and fault (  ) icons, and **LOW BATT** on the LCD flash once a second. Error 35 is displayed on the LCD. Eventually the UPS shuts down to prevent damage to the batteries. When this happens the fault (  ) icon flashes once a second and the unit beep once a second. Error 34 and **LOW BATT** are displayed on the LCD.

When the a.c. mains is restored the inverter starts automatically and the UPS reverts to the mode in which it was previously operating.

### ECO mode

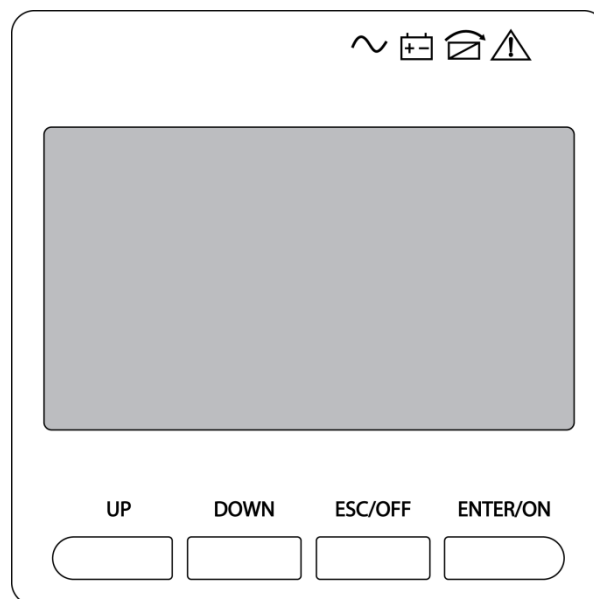
If specified, your UPS may be set to operate in ECO mode instead of on-line mode. In ECO mode the load is supplied via the bypass circuit and not the rectifier and inverter, allowing the UPS to work at higher efficiency and the inverter ( ~ ) and bypass ( ☑ ) icons are on. The battery is trickle charged in this mode. If the a.c. input is lost or goes beyond its normal range the UPS automatically switches to battery mode, however, the transfer speed is slower than on-line mode and may not be suitable for all applications.

**Note:** Do not use ECO mode when the mains supply is of poor quality or the load comprises sensitive equipment.

### Front panel controls and indicators

The front panel controls and indicators are shown in Figure 10. On rack mounted units you rotate the display panel to suit vertical or rack mount orientation. Using the buttons, indicator icons and the menu structure displayed on the LCD panel you can:

- Check the status of the UPS
- Check and make changes to the settings



**Figure 10 Front panel controls and display**

By default the LCD screen is blank and remains in that state until any button is pressed. About 1 minute after the last button press the screen goes blank again.

The following table describes the operation of the LEDs (for a full description of LED status under normal and fault conditions, see Appendix 4 on page 44):

| LED                                                                               | Description                                                                                                                                             |
|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | Indicates a fault. Maybe lit or flashing depending on the fault.                                                                                        |
|  | When on alone, indicates that the UPS is working in bypass mode.<br>When on with the green inverter LED, indicates that the UPS is working in ECO mode. |
|  | Indicates that the UPS is in battery mode. Flashes under fault conditions or low battery status.                                                        |
|  | Indicates that the UPS inverter is running.<br>If flashing it indicates that the output is overloaded.                                                  |

The following table describes the button functions:

| Function            | Buttons         | Definition                                                                                                                                                                               |
|---------------------|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Switch inverter on  | ENTER/ON        | Press and hold for more than 3 s to turn on the UPS.                                                                                                                                     |
| Switch inverter off | ESC/OFF         | Press and hold for more than 3 s to turn off the UPS inverter.<br>When bypass mode is enabled the UPS is switched to bypass, otherwise its output is shut down.                          |
| Menu access         | UP + DOWN       | Press and hold for more than 3 s to enter settings mode.                                                                                                                                 |
| Exit menu           | DOWN<br>ESC/OFF | Press a final time on the last menu selection to save and exit.<br>Press to exit settings mode without saving any changes.                                                               |
| Change settings     | ENTER/ON        | Press to confirm changes when in settings mode.                                                                                                                                          |
| TEST/MUTE           | ENTER/ON        | Operating in on-line or eco mode: press and hold for more than 3 s to run the self-test function.<br>Operating in battery mode: press and hold for more than 3 s to mute warning sounds. |
| Parameter check     | DOWN or UP      | Press repeatedly to see output voltage, load, temperature, input voltage, battery voltage, battery remaining time (battery mode only) and system software version.                       |

## LCD display

The LCD display comprises a numerical values section at the top and various graphics showing the operating mode and status as shown below.

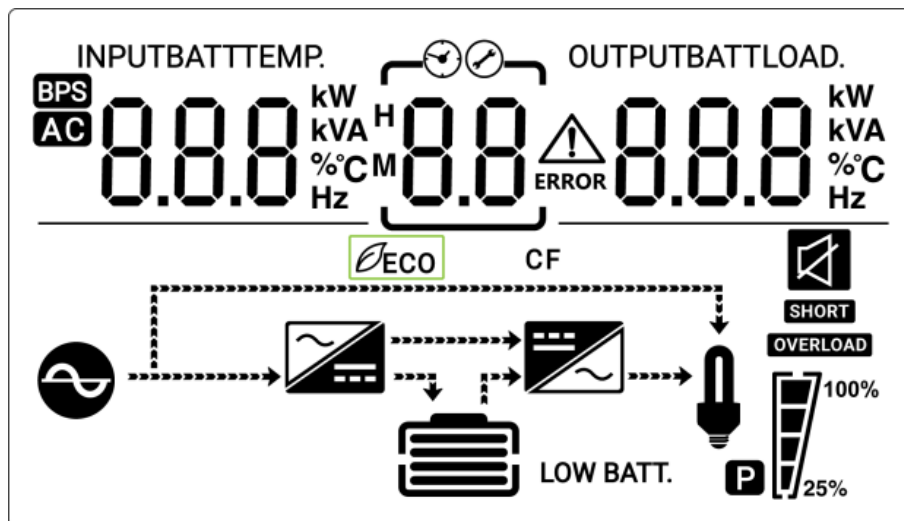


Figure 11 LCD display

The table below describes what each icon displays when lit.

| Icon                                                                                | Description                                                                                                                                                                           |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>AC</b>                                                                           | Indicates that mains is present                                                                                                                                                       |
| INPUTBATTTEMP.<br>8.8.8 kW<br>kVA<br>%C<br>Hz                                       | Displays input voltage, frequency, power, battery voltage and temperature                                                                                                             |
|  | Indicates the settings program that is being accessed                                                                                                                                 |
|  | The warning triangle flashes and a warning code number is displayed when there is a problem. See Troubleshooting on page 35 and Appendix 4 Alarm and fault reference codes on page 44 |
|  | Error flashes and an error code is displayed when there is a fault. See Troubleshooting on page 35 and Appendix 4 Alarm and fault reference codes on page 44                          |
| OUTPUTBATTLOAD.<br>8.8.8 kW<br>kVA<br>%C<br>Hz                                      | Displays output voltage, frequency, power, load percentage, and discharge current                                                                                                     |
|  | Indicates the battery level in 25% steps (one bar per step)                                                                                                                           |
|  | Indicates the load level in 25% steps (one bar per step)                                                                                                                              |
| <b>OVERLOAD</b>                                                                     | Indicates that the UPS is overloaded                                                                                                                                                  |
| <b>SHORT</b>                                                                        | Indicates that there is a short circuit on the output                                                                                                                                 |

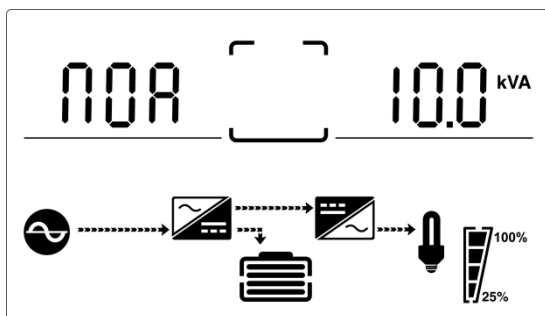
| Icon                                                                              | Description                                        |
|-----------------------------------------------------------------------------------|----------------------------------------------------|
|  | Indicates that the UPS is connected to the mains   |
|  | Indicates that the UPS is operating in bypass mode |
|  | Indicates that the charger is operating            |
|  | Indicates that the inverter is operating           |
|  | Indicates that the audible alarm is muted          |

## Checking parameters

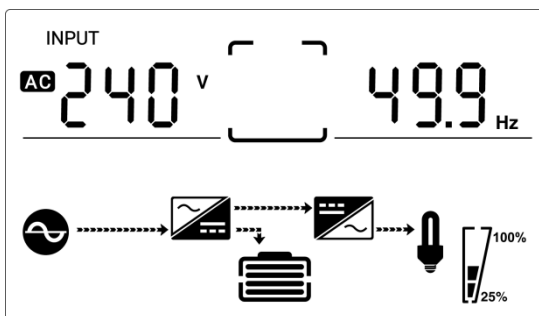
### To check the UPS parameters:

- Press **DOWN** or **UP** to display the parameter you wish to check. Examples are shown below.

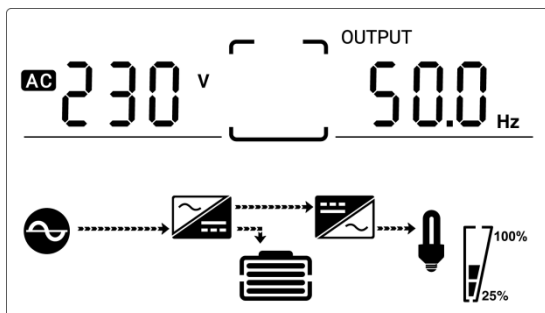
#### Operational mode



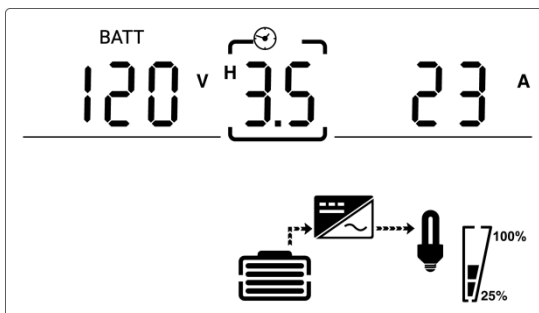
#### Input voltage



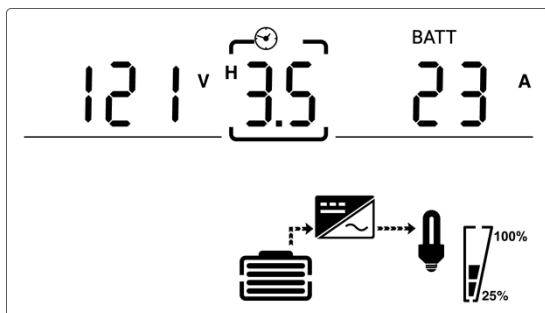
#### Output voltage



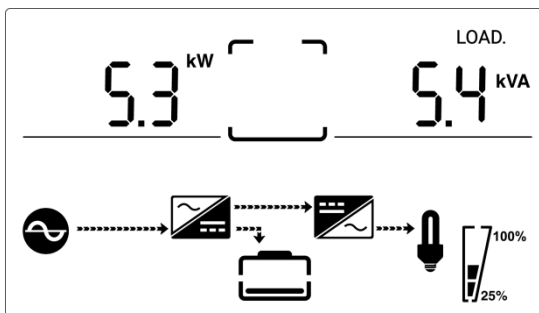
#### Bat. + (voltage, backup time, current)



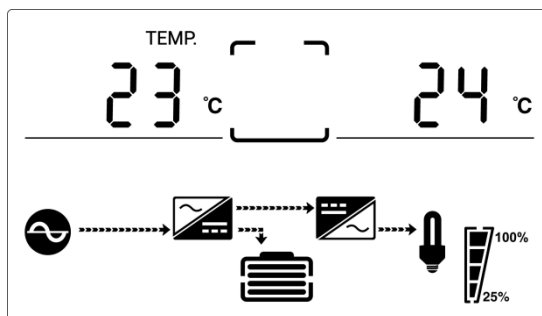
#### Bat. - (voltage, backup time, current)



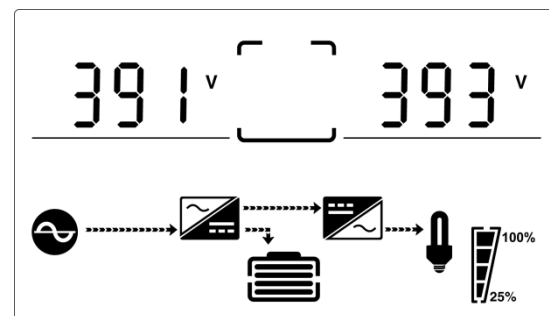
#### Load



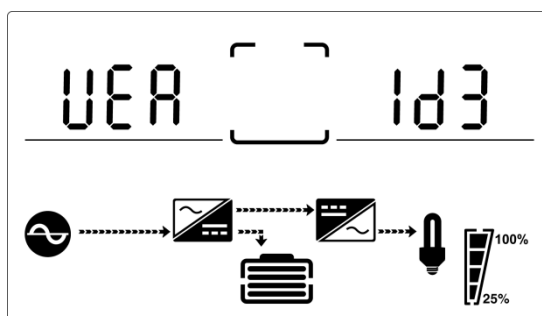
### Temperature



### DC bus voltage



### Software version



## Before switch on

**Before turning on the unit for the first time or after any wiring or battery changes:**

1. Read the section above on working modes.
2. Check all the wiring.
3. Check that the rated load does not exceed the rated output of the UPS.
4. If the UPS is supplied by a generator, check that the generator is correctly rated and wired (see Operation from a generator on page 9).

## Switching on the UPS

**Note:** It is important to switch on your UPS as described below as damage may occur when supplying certain load types.



**Caution:** When using the UPS for the first time, charge the batteries for at least 8 hours as they may have lost charge during the time between production and installation.

**To switch on the UPS:**

**Note:** If there is no mains and you want to start the UPS and run it from the battery, follow the procedure from step 3.

1. Ensure your system is installed and connected as described in the Installation section starting on page 8.
2. Turn on the mains supply to the UPS and EBP(s), if these are also installed.  
You should immediately hear the fan start up. The output screen will display 0 V a.c. if bypass is not set, or approximately 240 V a.c. if bypass is set; the bypass LED would also be lit.
3. On the front panel, press and hold **ENTER/ON** (see Figure 10 on page 19) until a beep is heard (after approximately 3 seconds).

The LED are lit according to the working mode of the UPS:

- **On-line:**    
- **ECO:**        and 

The output voltage and frequency are displayed. In one of these states your unit is working correctly and able to deliver power to the load, and provide backup in the case of a power cut. There is no need to alter any settings.

4. Switch on the loads, preferably one-by-one.



**Caution:** If the UPS input power is provided by a generator it is important to apply the load gradually.

---

**Switching off the UPS**

**Caution:** All power to the loads will be removed when you follow this procedure.

**To switch off the UPS:**

1. On the front panel, press and hold **ESC/OFF** until a beep is heard. Ignore step 2 if mains is not connected.
2. Switch off the mains to the UPS.



**Caution:** If disconnecting the UPS from the mains, allow 10 seconds for internal charge to dissipate before doing so.

---

**Self-test****To perform a self-test:**

1. Ensure the inverter is running (  ).
2. On the front panel, press and hold **ENTER/ON** until a beep is heard. A self-test is performed before normal operation is resumed. During the self-test the LEDs will flash in sequence.

## Mute sounds in battery mode

---

### To mute warning sounds when operating in battery mode:

- On the front panel, press and hold **ENTER/ON** until a beep is heard.

**Note:** It is not possible to mute sounds for any other warnings.

## Settings

---

You can change these settings in any mode:

- **nod** (operating mode): ECO, PAL, NOR or CF
- **OPU** (output voltage): set to 220, 230 or 240 VAC
- **OPF** (frequency converter mode): 50 or 60 Hz output
- **bAH** (battery capacity): 1 to 200 Ah
- **bn** (number of batteries): 16, 18 or 20
- **HLS** (bypass voltage upper limit): 10%, 15%, 20% or 25% (20% and 25%, 220V O/P only)
- **LLS** (bypass voltage lower limit): 20%, 30% or 45%
- **b2** (mute): ON/OFF
- **tSt** (battery self-test): every 30 days for: 10 s, 10 minutes, until EOD
- **PId** (parallel ID): 1, 2, 3 or 4
- **Pn** (number of units in parallel): 2, 3 or 4
- **Prn** (parallel redundancy mode): 0 (not redundant) or 1 (n+1 mode)

### To enter settings mode:

- Press **UP** + **DOWN** for more than 3 s.

### To exit settings mode without saving any changes:

- Press **ESC/OFF**.

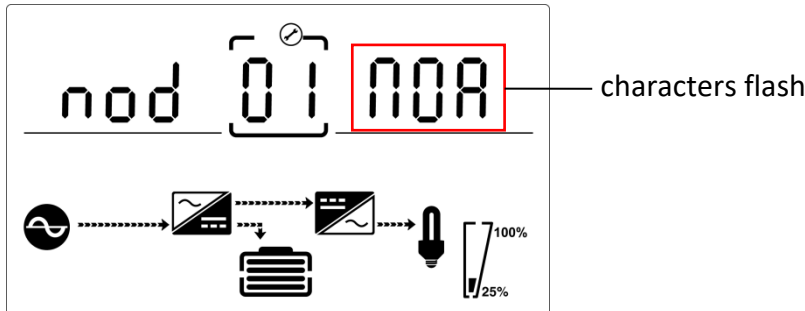
### To save changes and exit settings mode:

1. Press **DOWN** repeatedly until setting 10 is displayed.
2. Press **DOWN** one more time.

## Mode setting

### To set the operating mode:

1. On the front panel, press **UP + DOWN** for more than 3 s. The following is displayed.



2. Press **ENTER/ON** until the setting flashes.
3. Press **UP** or **DOWN** to display **ECO**, **PAL**, **NOR** or **CF**.

**Note:** If you want to use **CF** (convert frequency) mode, first go to Frequency converter mode on page 27 and change the output frequency. If you change to **CF** mode first you will get unwanted error codes.

4. Press **ENTER/ON** until the setting stops flashing.
5. Save and exit settings or press **DOWN** to enter the next setting.

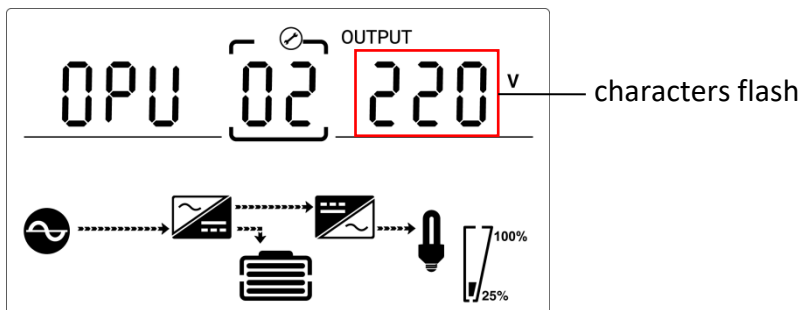
## Output voltage level

### To change the output voltage:



**Caution:** Before changing the output voltage, turn off all loads and ensure they are rated for the new output voltage.

1. On the front panel, press **UP + DOWN** for more than 3 s if not in settings mode.
2. Press **DOWN** until the following is displayed.

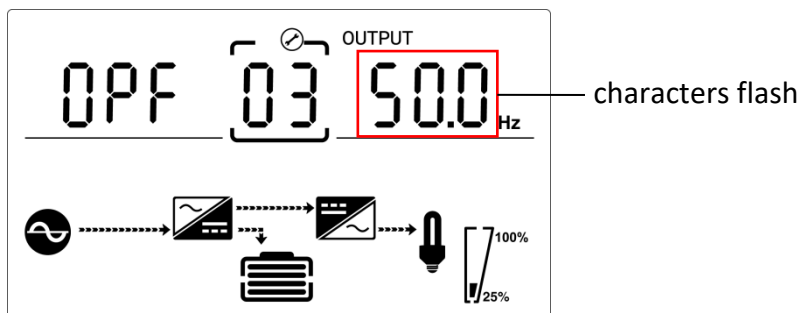


3. Press **ENTER/ON** until the setting flashes.
4. Press **UP** or **DOWN** to display the output voltage you require. The voltages provided are, 220 V, 230 V (the default value) and 240 V.
5. Press **ENTER/ON** until the setting stops flashing.
6. Save and exit settings or press **DOWN** to enter the next setting.

## Frequency converter mode

### To set the output frequency:

1. On the front panel, press **UP** + **DOWN** for more than 3 s if not in settings mode.
2. Press **DOWN** until the following is displayed.



3. Press **ENTER/ON** until the setting flashes.
4. Press **UP** or **DOWN** to select either 50.0 Hz or 60.0 Hz.

**Note:** If you want to stop frequency conversion, first go to Mode setting on page 26 and change the mode to **ECO** or **NOR** before changing the output frequency.

5. Press **ENTER/ON** until the setting stops flashing.
6. Save and exit settings or press **DOWN** to enter the next setting.

## Battery capacity

Use the following tables to determine the battery capacity in your system and enter that value as described below.

E206U, E2020U

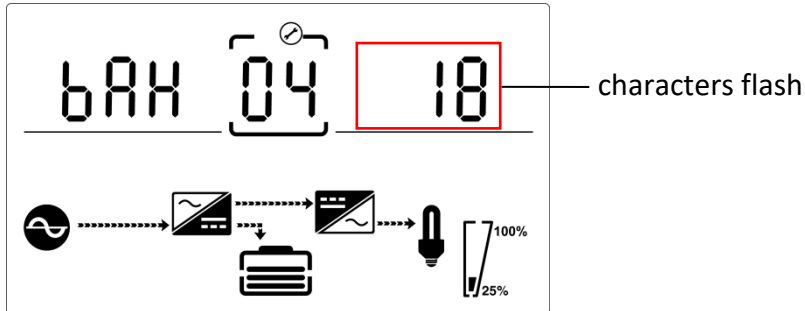
| Number of EBP units           | Number of battery strings | Capacity (Ah) |
|-------------------------------|---------------------------|---------------|
| UPS only (internal batteries) | 1 (default)               | 9             |
| UPS + 1 EBP                   | 3                         | 27            |
| UPS + 2 EBPs                  | 5                         | 45            |
| UPS + 3 EBPs                  | 7                         | 63            |
| UPS + 4 EBPs                  | 9                         | 81            |

R206RU, E2010RU

| Number of EBP units | Number of battery strings | Capacity (Ah) |
|---------------------|---------------------------|---------------|
| 1 EBP               | 1                         | 9             |
| 2 EBPs              | 2                         | 18            |
| 3 EBPs              | 3                         | 27            |
| 4 EBPs              | 4                         | 36            |

**To set the battery capacity:**

1. On the front panel, press **UP + DOWN** for more than 3 s if not in settings mode.
2. Press **DOWN** until the following is displayed.



3. Press **ENTER/ON** until the setting flashes.
4. Press **UP** or **DOWN** to change the value between 1 and 200 Ah.

**Note:** If you press and hold **UP** or **DOWN** the value jumps in steps of 10.

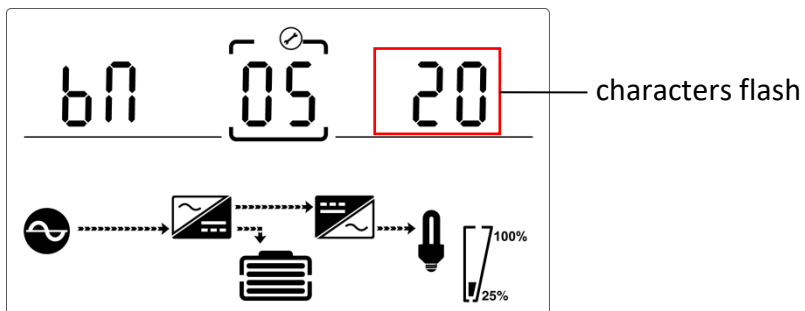
5. Press **ENTER/ON** until the setting stops flashing.
6. Save and exit settings or press **DOWN** to enter the next setting.

Number of batteries

---

**To change the number of batteries:**

1. On the front panel, press **UP + DOWN** for more than 3 s if not in settings mode.
2. Press **DOWN** until the following is displayed.



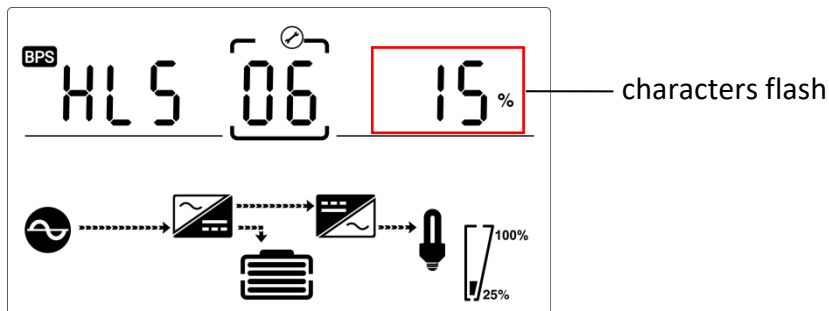
3. Press **ENTER/ON** until the setting flashes.
4. Press **UP** or **DOWN** to select 16, 18 or 20.
5. Press **ENTER/ON** until the setting stops flashing.
6. Save and exit settings or press **DOWN** to enter the next setting.

### Bypass voltage upper limit

---

#### To set the bypass voltage upper limit:

1. On the front panel, press **UP** + **DOWN** for more than 3 s if not in settings mode.
2. Press **DOWN** until the following is displayed.



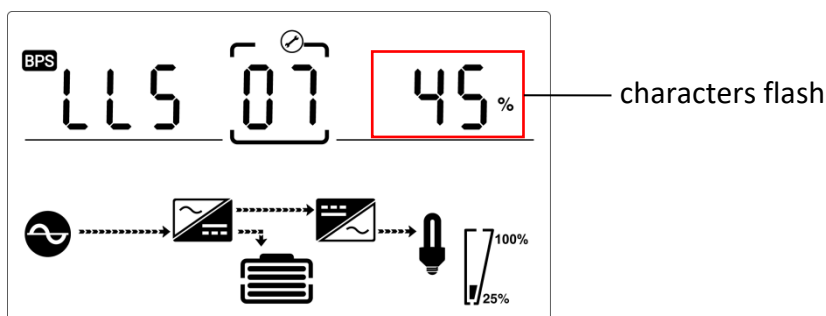
3. Press **ENTER/ON** until the setting flashes.
4. Press **UP** or **DOWN** to select 10%, 15%, 20% (220V O/P only) or 25% (220V O/P only).
5. Press **ENTER/ON** until the setting stops flashing.
6. Save and exit settings or press **DOWN** to enter the next setting.

### Bypass voltage lower limit

---

#### To set the bypass voltage lower limit:

1. On the front panel, press **UP** + **DOWN** for more than 3 s if not in settings mode.
2. Press **DOWN** until the following is displayed.

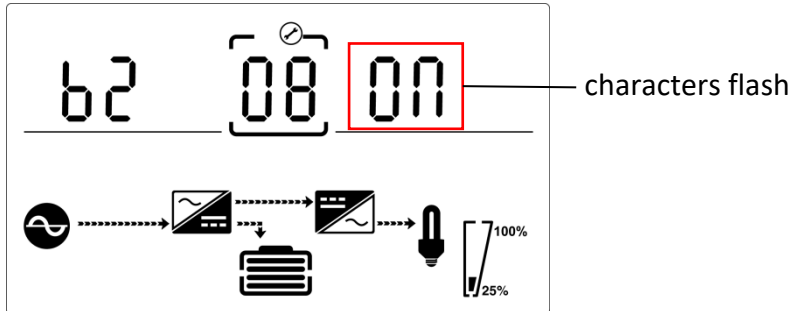


3. Press **ENTER/ON** until the setting flashes.
4. Press **UP** or **DOWN** to select 20%, 30% or 45%.
5. Press **ENTER/ON** until the setting stops flashing.
6. Save and exit settings or press **DOWN** to enter the next setting.

## Mute

### To mute audible warnings:

1. On the front panel, press **UP + DOWN** for more than 3 s if not in settings mode.
2. Press **DOWN** until the following is displayed.

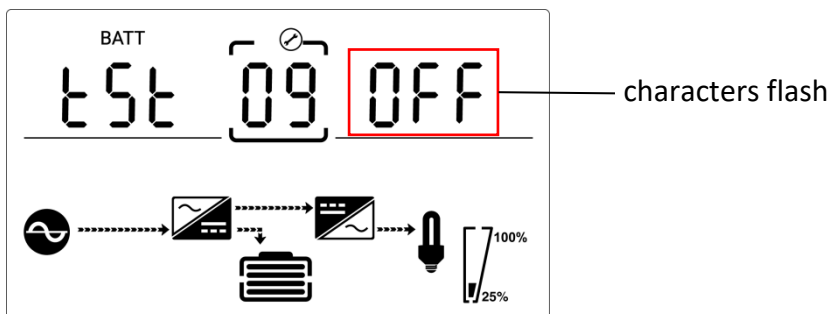


3. Press **ENTER/ON** until the setting flashes.
4. Press **UP** or **DOWN** to select ON or OFF.
5. Press **ENTER/ON** until the setting stops flashing.
6. Save and exit settings or press **DOWN** to enter the next setting.

## Battery self-test

### To enable of disable battery self-test:

1. On the front panel, press **UP + DOWN** for more than 3 s if not in settings mode.
2. Press **DOWN** until the following is displayed.



3. Press **ENTER/ON** until the setting flashes.
4. Press **UP** or **DOWN** to select ON1, ON2, ON3 or OFF (the default setting).  
ON1: Tests the battery for 10 s every 30 days (the recommended option)  
ON2: Tests the battery for 10 minutes every 30 days (use for higher capacity batteries only)  
ON3: Tests the battery to EOD every 30 days (not recommended in normal operation)
5. Press **ENTER/ON** until the setting stops flashing.
6. Save and exit settings or press **DOWN** to enter the next setting.

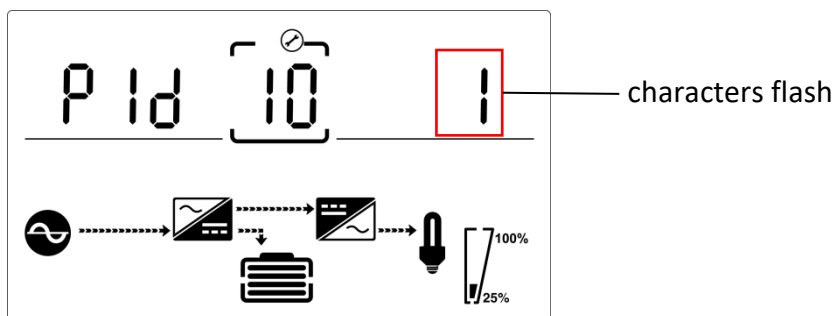
## Parallel ID

### Notes:

- (1) Before setting the Parallel ID, set the operating mode to **PAL** (see Mode setting page 26).
- (2) Set the parallel IDs of each UPS before connecting the parallel cables.

### To set a unique ID in parallel mode:

1. On the front panel, press **UP** + **DOWN** for more than 3 s if not in settings mode.
2. Press **DOWN** until the following is displayed.



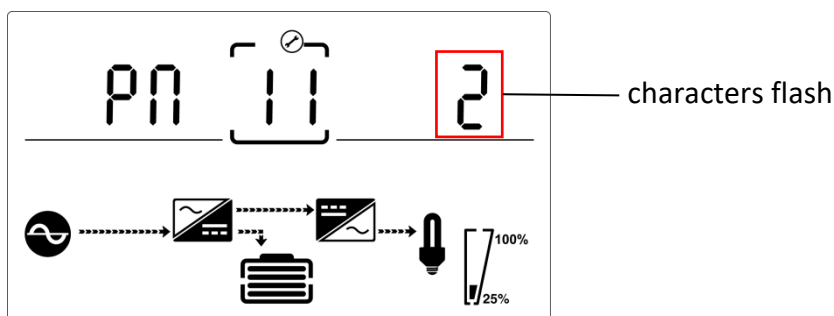
3. Press **ENTER/ON** until the setting flashes.
4. Press **UP** or **DOWN** to select a value between 1 and 4.
5. Press **ENTER/ON** until the setting stops flashing.
6. Save and exit settings or press **DOWN** to enter the next setting.

## Parallel number

**Note:** Before setting the Parallel number, set the operating mode to **PAL** (see Mode setting page 26).

### To set the number of units that are to work in parallel:

1. On the front panel, press **UP** + **DOWN** for more than 3 s if not in settings mode.
2. Press **DOWN** until the following is displayed.



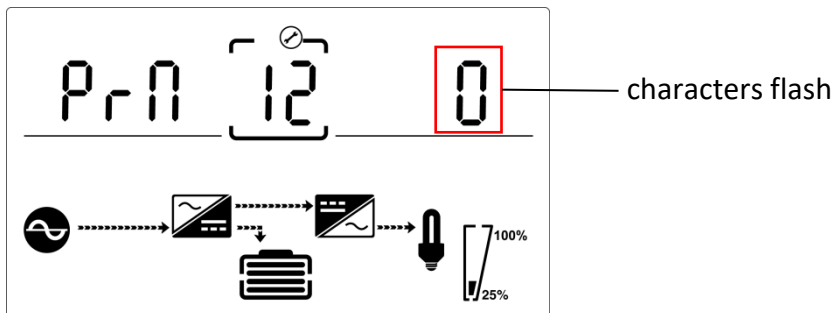
3. Press **ENTER/ON** until the setting flashes.
4. Press **UP** or **DOWN** to select a value between 2 and 4.
5. Press **ENTER/ON** until the setting stops flashing.
6. Save and exit settings or press **DOWN** to enter the next setting.

## Parallel redundancy mode

**Note:** Before setting the Parallel redundancy mode, set the operating mode to **PAL** (see Mode setting page 26).

### To set the parallel redundancy mode:

1. On the front panel, press **UP** + **DOWN** for more than 3 s if not in settings mode.
2. Press **DOWN** until the following is displayed.



3. Press **ENTER/ON** until the setting flashes.
4. Press **UP** or **DOWN** to select 0 or 1.
  - 0: The maximum output is the combined output of all units. There is no redundancy.
  - 1: Limits the maximum output to provide n+1 redundancy.
5. Press **ENTER/ON** until the setting stops flashing.
6. Save and exit settings or press **DOWN** to enter the next setting.

## Fault mode

In fault mode the UPS cuts off the output or switches to bypass mode, and sounds the buzzer. The warning LED is lit, and the display shows a fault code. A list of fault codes is shown on page 44.

## Maintenance

E200 series units use sealed lead acid batteries and require minimum maintenance in general. To keep the batteries fully charged and in good condition, ensure the UPS is plugged into the mains at all times. The UPS battery charger guards against over-charging and deep discharge.

## Fan

At normal room ambient temperature the fans will operate continuously for 20,000 to 40,000 hours. Increased ambient temperatures will shorten this lifetime.

Periodically, ensure that air is blowing out of the rear of the unit.

Ensure that the fans are clear of dust and other debris.

## Battery

Battery life depends on the ambient temperature and the number of discharge/charge cycles. Battery life is shortened with high ambient temperature and deep discharges.

To maximise the life of your batteries, maintain them as follows:

- Maintain the ambient temperature in the range 15 to 25°C
- Avoid discharge currents of less than 10% of full load current.
- Charge the battery for at least 12 hours every 3 months if it has not been used. If the ambient temperature is higher than 25°C, charge the battery every 2 months.

If the backup time has significantly reduced, or a battery fault is displayed on the LCD screen contact your distributor to find out if the batteries need replacing.

### **WARNING!**



DON'T SHORT CIRCUIT THE BATTERY AS IT COULD CAUSE A FIRE.

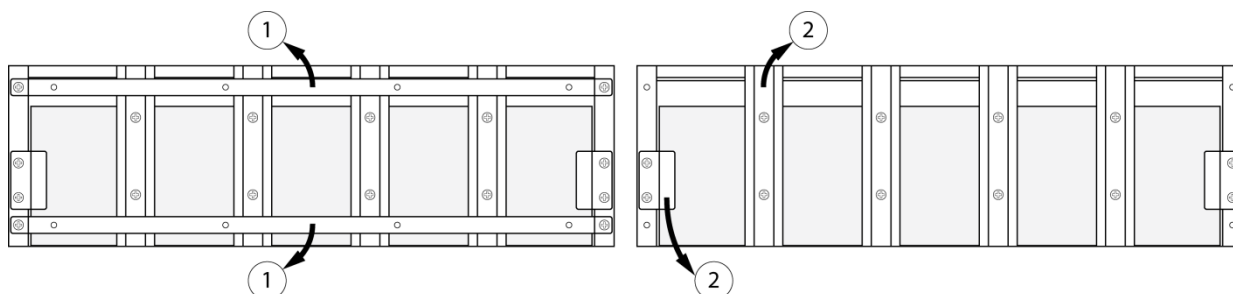
DON'T OPEN THE BATTERY AS THE ELECTROLYTE INSIDE IS HARMFUL TO SKIN AND EYES.

## Battery replacement – rack mount EBPs

Rack mount EBPs are fitted with replaceable battery cartridges. The following procedure explains how to replace the batteries cartridges. For clarity, the battery cables and wiring are not shown.

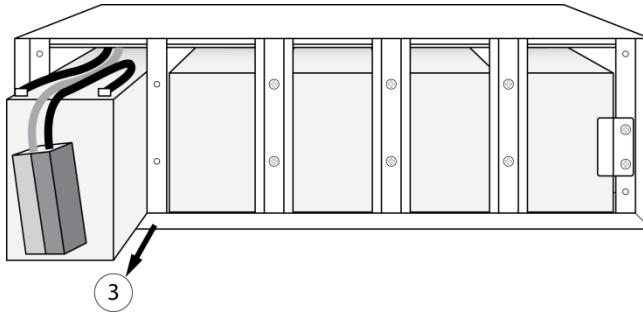
### **To replace a battery cartridge:**

1. Isolate all devices from the mains.
2. Unscrew and remove the front panel.
3. Unscrew and remove the two front panel mounting brackets (1).
4. Unscrew and remove the retaining plates (2) from either side of the cartridge you want to replace.



5. Disconnect the battery cable from the cartridge you want to replace.

6. Slide out the cartridge (3).



7. Insert a new cartridge. Ensure it is fully inserted into its bay.  
8. Reassemble the connectors, plates, brackets and front panel in the reverse order.

### External battery pack change



**Caution:** We strongly recommend you switch off and isolate the whole UPS when you need to change an external battery pack.

### Visual check

Ensure there is adequate ventilation to maintain the UPS at the correct temperature (see Siting considerations on page 8).

### UPS status check

Check the following:

- Ensure there are no faults or alarms indicated.
- If the UPS is working in bypass mode, investigate the cause.
- If the UPS is working in battery mode, make sure it is normal, if not, investigate.

### Function check

Perform a self-test every 6 months as described on page 24.

## Storage

Before storing the UPS, charge it for 5 hours. Cover the UPS and store upright in a cool and dry location. During storage, recharge the UPS according to the following table.

| Storage temperature | Recharge frequency | Charging duration |
|---------------------|--------------------|-------------------|
| -25°C to 40°C       | Every 3 months     | 1 to 2 hours      |
| 40°C to 45°C        | Every 2 months     | 1 to 2 hours      |

## Troubleshooting

Before contacting your distributor, try to solve your problem using the information in the following table. If you need to contact your distributor make sure you have the model number and serial number of your UPS.

| Problem description                                    | Probable causes                                                        | Solution                                                                                                                       |
|--------------------------------------------------------|------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| No indication or alarm even though the mains is normal | The AC input power is not correctly connected                          | Check that input power cord is firmly connected to the mains                                                                   |
|                                                        | The AC input is connected to the UPS output                            | Plug the AC input power cord to the AC input correctly                                                                         |
| Alarm code <b>33</b><br>Battery LED flashing           | The external or internal battery is incorrectly connected              | Check if all batteries are correctly connected                                                                                 |
| Alarm code <b>26</b><br>Battery LED flashing           | Battery voltage is too high or the charger is faulty                   | Contact distributor                                                                                                            |
| Alarm code <b>34</b><br>Battery LED flashing           | Battery voltage is too low or the charger is faulty                    | Contact distributor                                                                                                            |
| Alarm code <b>32</b><br>Inv or bypass LED flashing     | UPS is overloaded                                                      | Remove excess load from UPS                                                                                                    |
| Alarm code <b>29</b><br>Fault LED light                | Short circuit on the UPS output and the UPS has shutdown automatically | Check load and remove any short circuit                                                                                        |
| Alarm code <b>9</b><br>Fault LED light                 | Fan faulty                                                             | Contact distributor                                                                                                            |
| Alarm codes <b>01, 02, 15, 16, 17 or 18</b>            | An internal fault has occurred                                         | Contact distributor                                                                                                            |
| Battery backup time is shorter than nominal value      | Batteries are not fully charged                                        | Charge the batteries for at least 5 hours and then check the capacity. If the problem still persists, contact your distributor |
|                                                        | Batteries defective                                                    | Contact distributor                                                                                                            |

## Appendix 1 Signals options

### USB port

Units are fitted with a USB port, which can be used to:

- Monitor the UPS power status
- Monitor the UPS alarm information
- Monitor the UPS running parameters
- Timing on/off function

#### To enable USB monitoring:

1. Connect the UPS to your computer using the supplied USB cable.

**Note:** The USB port is internally wired to the RS232 port through a converter and overrides the RS232 connection.

2. Load the supplied software onto your computer.

### RS232 serial port

This provides the same monitoring capabilities as above.

#### To enable RS232 monitoring:

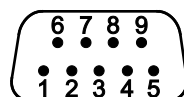
1. Connect the UPS to your computer using the supplied RS232 cable.
2. If present, disconnect the USB cable between UPS and your computer.

**Note:** A USB connection overrides the RS232 connection.

3. Load the supplied software onto your computer.

Connections between computer and UPS RS232 ports

| Computer |   | UPS   |
|----------|---|-------|
| RDX 2    | ← | TX 3  |
| TDX 3    | → | RX 2  |
| GND 5    |   | GND 5 |



**Figure 12 RS232 serial port pin-outs looking at the socket on the**

#### RS232 communication data format

| Parameter    | Value    |
|--------------|----------|
| Baud rate    | 2400 bps |
| Byte length  | 8bit     |
| End bit      | 1bit     |
| Parity check | Null     |

## SNMP card (advanced monitoring and control)

If your unit is fitted with the optional SNMP card (located in the Intelligent Slot on the rear panel), connect it to your computer with a network cable.

For instruction on how to operate the SNMP card, refer to the supplied documentation.

## Relay card (advanced monitoring and control)

If your unit has been specified and fitted with the optional relay card (located in the Intelligent Slot on the rear panel) you have access to more advanced monitoring and control functionality via a set of dry contacts and a single opto-coupled input.

Connections:

| Description         | Terminal block connection no. | Additional information                                   |
|---------------------|-------------------------------|----------------------------------------------------------|
| Relay common        | 1                             |                                                          |
| UPS on (N/O)        | 2                             |                                                          |
| AC failure (N/O)    | 3                             | Utility or mains failure                                 |
| AC failure (N/C)    | 4                             |                                                          |
| Battery low (N/O)   | 5                             |                                                          |
| Battery low (N/C)   | 6                             |                                                          |
| UPS alarm (N/O)     | 7                             | UPS in battery mode, Battery low<br>UPS internal failure |
| UPS alarm (N/C)     | 8                             |                                                          |
| Bypass active (N/O) | 9                             |                                                          |
| Bypass active (N/C) | 10                            |                                                          |
| UPS failure (N/O)   | 11                            | UPS in battery mode, Battery low<br>UPS internal failure |
| UPS failure (N/C)   | 12                            |                                                          |
| Remote shutdown     | CN4-1                         | Shutdown signal: 5 V to 12 V                             |
| Remote shutdown GND | CN4-2                         | 0 V for shutdown signal                                  |

Relay contact specifications:

| Parameter                | Value                                                                                            |
|--------------------------|--------------------------------------------------------------------------------------------------|
| Maximum switched voltage | 220 V a.c. or 30 V d.c.                                                                          |
| Minimum switching load   | 5 V d.c. 10 mA                                                                                   |
| Maximum current          | 3 A d.c.<br>3 A a.c. @ 120 V a.c.                                                                |
| Maximum switching power  | 360 VA or 90 W                                                                                   |
| Life (electrical)        | 100,000 operations (1 A 120 V a.c. /24 V d.c.)<br>50,000 operations (3 A 120 V a.c. / 24 V d.c.) |

Opto-coupler input specifications (used for remote shutdown):

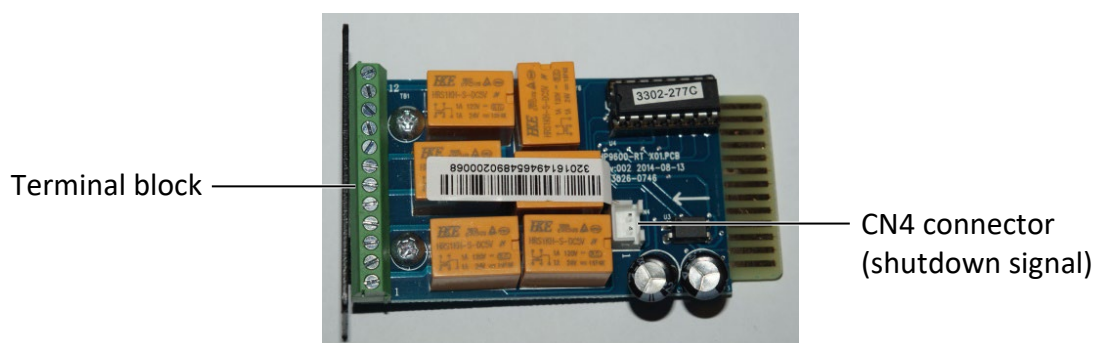
| Parameter                         | Value                              |
|-----------------------------------|------------------------------------|
| Reverse voltage ( $V_R$ )         | 6 V d.c.                           |
| Forward input voltage             | 1.4 V d.c. max., 1.2V d.c. typical |
| Forward current                   | 50 mA max.                         |
| Peak forward current ( $I_{Fm}$ ) | 1 A                                |

**To connect to the 12-way terminal block and CN4 connector:**

- Using a PH2 Phillips screwdriver, remove the two screws holding the relay card in place, and remove the card.



- Connect your signal wires to the appropriate terminals and/or CN4 connector via the slots in the cover plate (see the connection table on the previous page).



- Refit the card and secure it in place with the two screws.

## Remote emergency power off (EPO)

---

The EPO input can be used to shut down the UPS remotely using a switch. The switch type is normally closed. When the EPO is activated (switched opened), the UPS shuts down the output and all its power converters immediately. The UPS remains on to alarm the fault.

### **WARNING!**



THE EPO CIRCUIT IS AN IEC 60950 SAFETY EXTRA LOW VOLTAGE (SELV) CIRCUIT. SEPARATE THIS CIRCUIT FROM ANY HAZARDOUS VOLTAGE CIRCUITS WITH REINFORCED INSULATION.

### **Caution:**



- DO NOT connect the EPO to any utility connected circuits.
- When the emergency power-off function is activated, disconnect the input power from the UPS. This ensures the UPS stops supplying power to the load during any mode of operation.

**Note:** For Europe, the emergency switch requirements are detailed in Harmonized document HD-384-48 S1, *Electrical Installation of the Buildings, Part 4: Protection for Safety Chapter 46: Isolation and Switching*.

Use a switch and wire with the following ratings:

- 24 Vd.c. and 20 mA, latching-type (the EPO signal must remain active for at least 250 ms)
- 1.0 mm<sup>2</sup> (17 AWG)

### **To connect an EPO switch:**

1. On the rear of the unit, remove the shorting link plug (see Rear panel layouts on page 11).
2. Disconnect the shorting link from the plug and re-wire it to the remote switch wiring.

## Appendix 2 Specifications

### Electrical

|          |                  |                    |
|----------|------------------|--------------------|
| Models   | E206U, E206RU    | E2010U, E2010RU    |
| Capacity | 6000 W / 6000 VA | 10000 W / 10000 VA |

| Input                   |                                                                                                                                                                                          |            |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| Input type              | Single phase (L, N and E)                                                                                                                                                                |            |
| Power factor            | ≥0.99                                                                                                                                                                                    |            |
| Voltage range           | 120 V a.c. to 276 V a.c. at full load                                                                                                                                                    |            |
| Current (at 230 V a.c.) | 26.1 A max                                                                                                                                                                               | 43.5 A max |
| Rated frequency         | Auto sensing for 50/60 Hz systems                                                                                                                                                        |            |
| Frequency range         | 45 Hz to 65 Hz                                                                                                                                                                           |            |
| Bypass voltage range    | upper limit: 220 V a.c. max.: 25% (default), 20%, 15%, 10%<br>230 V a.c. max.: 20% (default), 15%, 10%<br>240 V a.c. max.: 15% (default), 10%<br>lower limit: -45% (default), -30%, -20% |            |
| Bypass frequency range  | ±1%, ±2%, ±4%, ±5%, ±10%,                                                                                                                                                                |            |
| Current harmonics       | ≤3% (100% linear load, input THDV ≤1%)<br>≤5% (100% non-linear load, input THDV ≤1%)                                                                                                     |            |

| Battery              |                                             |                         |
|----------------------|---------------------------------------------|-------------------------|
| Models               | E206U, E2010U                               | E206RU, E2010RU         |
| Voltage              | ±120 V                                      |                         |
| Batteries per string | 20                                          |                         |
| Number of strings    | 1                                           | 1 (external to the UPS) |
| Type                 | 12 V, 9 Ah VRLA maintenance free            |                         |
| Charging regime      | Boost charge or float charge, auto-switched |                         |
| Charge time          | 20 hours max. on boost charge               |                         |
| Charge current       | 10 A                                        |                         |

| Output        |                                  |  |
|---------------|----------------------------------|--|
| Output type   | Single phase (L, N and E)        |  |
| Rated voltage | 220 / 230 (default) / 240 V a.c. |  |
| Power factor  | 1.0                              |  |

## E200 6 and 10 kW Series

| Output                                                                    |                                                                                                                                                                                                |
|---------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Voltage regulation                                                        | ±1%                                                                                                                                                                                            |
| Voltage distortion (THD)                                                  | ≤2% with 100% linear load<br>≤5% with 100% non-linear load                                                                                                                                     |
| Waveform                                                                  | Pure sinewave                                                                                                                                                                                  |
| Frequency:<br>Battery mode<br>Parallel operation<br>Synchronized range    | 50 Hz / 60 Hz ± 0.1%<br>50 Hz / 60 Hz ± 0.25%<br>47 – 53 Hz or 57 – 63 Hz                                                                                                                      |
| Frequency track speed                                                     | 1 Hz/s, standalone<br>0.5 Hz/s, parallel operation                                                                                                                                             |
| Transfer time                                                             | On-line ↔ battery: 0 ms<br>On-line ↔ bypass: <15 ms (50 Hz), <13.3 ms (60 Hz),                                                                                                                 |
| Overload (on-line and battery mode mode)<br>(Ambient temp. < 35°C)        | 105 - 110%, after 1 hour switch to bypass mode<br>110 - 125%, after 10 min switch to bypass mode<br>125 - 150%, after 1 min switch to bypass mode<br>> 150%, switch to bypass mode immediately |
| Overload (on-line and battery mode mode)<br>(< 35°C Ambient temp. < 40°C) | 105 - 110%, after 10 min switch to bypass mode<br>110 - 130%, after 1 min switch to bypass mode<br>> 130%, switch to bypass mode immediately                                                   |
| Crest factor                                                              | 3:1                                                                                                                                                                                            |
| Efficiency in on-line mode                                                | 92% at full load                                                                                                                                                                               |
| Dynamic response                                                          | ±5% (100% balanced load)<br>≤5% in a cycle                                                                                                                                                     |
| DC component                                                              | ≤200 mV                                                                                                                                                                                        |

| Safety and EMC       |                                              |
|----------------------|----------------------------------------------|
| Safety               | EN62040-1, GB4943                            |
| Isolation resistance | >2 MΩ (500 V d.c.)                           |
| Isolation voltage    | 2,820 V d.c., <3.5 mA 1 min                  |
| EMI                  | EN62040-2 (conduction, radiation, harmonics) |
| EMS                  | EN62040-2                                    |
| Surge                | IEC60664-1 1.2/50 μs + 8/20 μs 6 kV/3 kA     |

## Environment

|                       |                                                                                                             |
|-----------------------|-------------------------------------------------------------------------------------------------------------|
| Operating temperature | 0 to 40°C                                                                                                   |
| Storage temperature   | -25°C to 55°C without batteries<br>-20°C to 40°C with batteries                                             |
| Relative humidity     | 0 to 95% non-condensing                                                                                     |
| Altitude              | < 1500 m (full power). Over 1500 m, reduce the rated power output by 1% for every 100 m increase in height. |

## Mechanical

| Models                       | E206U, E2010U<br>(Tower)               | E206RU, E2010RU<br>(Rack)                     |
|------------------------------|----------------------------------------|-----------------------------------------------|
| Dimensions (mm)<br>W x D x H | 191 x 509 x 720<br>(including castors) | 440 x 700 x 86.5<br>(excluding mounting ears) |
| Net weight (kg)              | 61                                     | 27                                            |
| Audible noise                | < 55dB (1m)                            |                                               |
| Colour                       | Black                                  |                                               |
| Display                      | LCD and LED                            |                                               |
| Ingress protection           | IP20                                   |                                               |

## External battery packs

| Battery packs |                   | EE2000U<br>Tower unit                                | EER2000U<br>Rack unit                        |
|---------------|-------------------|------------------------------------------------------|----------------------------------------------|
| Input         |                   | Batteries charged via the UPS                        |                                              |
| Output        | Voltage           | $\pm 120$ Vd.c.                                      |                                              |
|               | Current           | 42 A max                                             |                                              |
| Battery       | Battery type      | Sealed, maintenance free, valve regulated, lead acid |                                              |
|               | Number of strings | 2 strings of 20, 12 V 9 Ah                           | 1 string of 20, 12 V 9 Ah                    |
|               | Recharge time     | 4 to 8 hours to 90%                                  |                                              |
| Dimensions    | W x D x H (mm)    | 250 x 610 x 616.2<br>(including castors)             | 440 x 693 x 131<br>(excluding mounting ears) |

## Appendix 3 Optional equipment

The following items are available as options for the UPS:

- External battery packs
- Dry contact relay card
- SNMP card
- Bypass panel
- Server racks and rack mount accessories
- Alternative input leads
- Output leads and power distribution units
- Replacement batteries and battery cartridges

## Appendix 4 Alarm and fault reference codes

| Alarm code | Fault                                              | ~ | + | ⚡ | ⚠ | Beeps      |
|------------|----------------------------------------------------|---|---|---|---|------------|
| 1          | Rectifier fault                                    |   |   |   | ⚠ | Continuous |
| 2          | Inverter fault (including shorted inverter bridge) |   |   |   | ⚠ | Continuous |
| 3          | Inverter thyristor short-circuit                   |   |   |   | ⚠ | Continuous |
| 4          | Inverter thyristor open                            |   |   |   | ⚠ | Continuous |
| 5          | Bypass thyristor short-circuit                     |   |   |   | ⚠ | Continuous |
| 6          | Bypass thyristor broken                            |   |   |   | ⚠ | Continuous |
| 7          | Fuse broken                                        |   |   |   | ⚠ | Continuous |
| 8          | Parallel relay fault                               |   |   |   | ⚠ | Continuous |
| 9          | Fan fault                                          |   |   |   | ⚠ | Continuous |
| 11         | Auxiliary power fault                              |   |   |   | ⚠ | Continuous |
| 12         | Self-test fault                                    |   |   |   | ⚠ | Continuous |
| 13         | Positive battery charger fault                     |   |   |   | ⚠ | Continuous |
| 14         | Negative battery charger fault                     |   |   |   | ⚠ | Continuous |
| 15         | DC bus overvoltage                                 |   |   |   | ⚠ | Continuous |
| 16         | DC bus below voltage                               |   |   |   | ⚠ | Continuous |
| 17         | DC bus imbalance                                   |   |   |   | ⚠ | Continuous |
| 18         | Soft start failure                                 |   |   |   | ⚠ | Continuous |
| 19         | UPS over temperature                               |   |   |   | ⚠ | Every ½ s  |
| 20         | Heatsink over temperature                          |   |   |   | ⚠ | Every ½ s  |
| 22         | Battery reverse                                    |   |   |   | ⚠ | Every ½ s  |
| 23         | Cable connection error                             |   |   |   | ⚠ | Every ½ s  |

| Alarm code | Fault                          |  |  |  |  | Beeps      |
|------------|--------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------|
| 24         | CAN bus fault                  |                                                                                   |                                                                                     |                                                                                     |  | Every ½ s  |
| 25         | Parallel load sharing fault    |                                                                                   |                                                                                     |                                                                                     |  | Every ½ s  |
| 26         | Battery overvoltage            |                                                                                   |                                                                                     |                                                                                     |  | Every 1 s  |
| 27         | Mains wiring fault             |                                                                                   |                                                                                     |                                                                                     |  | Every 1 s  |
| 28         | Bypass wiring fault            |                                                                                   |                                                                                     |                                                                                     |  | Every 1 s  |
| 29         | Output short-circuit           |                                                                                   |                                                                                     |                                                                                     |  | Every 1 s  |
| 30         | Input current limit            |                                                                                   |                                                                                     |                                                                                     |  | Every 1 s  |
| 31         | Bypass overcurrent             |                                                                                   |                                                                                     |  |                                                                                     | Every 1 s  |
| 32         | Overload                       |  |                                                                                     |  |                                                                                     | Every 1 s  |
| 33         | No battery                     |                                                                                   |  |                                                                                     |                                                                                     | Every 1 s  |
| 34         | Battery under voltage          |                                                                                   |  |                                                                                     |                                                                                     | Every 1 s  |
| 35         | Battery low pre-warning        |                                                                                   |  |                                                                                     |                                                                                     | Every 1 s  |
| 36         | Internal communication error   |                                                                                   |                                                                                     |                                                                                     |  | Every 2 s  |
| 37         | DC component over limit        |  |                                                                                     |                                                                                     |                                                                                     | Every 2 s  |
| 38         | Parallel overload              |  |                                                                                     |                                                                                     |                                                                                     | Every 2 s  |
| 39         | Mains voltage abnormal         |                                                                                   |  |                                                                                     |                                                                                     | Every 2 s  |
| 40         | Mains frequency abnormal       |                                                                                   |  |                                                                                     |                                                                                     | Every 2 s  |
| 41         | Bypass not available           |                                                                                   |                                                                                     |  |                                                                                     |            |
| 42         | Bypass missing                 |                                                                                   |                                                                                     |  |                                                                                     |            |
| 43         | Inverter not started correctly |                                                                                   |                                                                                     |                                                                                     |                                                                                     |            |
| 45         | EPO                            |                                                                                   |                                                                                     |                                                                                     |  | Continuous |

    LEDs on

    LEDs flashing



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