

**EX RT 5 3:1  
EX RT 7 3:1  
EX RT 11 3:1**

**Installation and user  
manual**

**English**

**Français**

**Deutsch**

**Italiano**

**Español**

**Nederlands**



**EATON**

*Powering Business Worldwide*



EX RT 5 3:1  
EX RT 7 3:1  
EX RT 11 3:1

**Installation and user  
manual**



# Introduction

Thank you for selecting an EATON product to protect your equipment.

The **EX RT** range has been designed with the utmost care.

We recommend that you take the time to read this manual to take full advantage of the many features of your **UPS**.

Warning: this is a class A UPS product. In a domestic environment, this product may cause radio interference, in which case, the user may be required to take additional measures.

If the device must be installed in overvoltage category III or IV environments, additional upstream overvoltage protection must be provided for.

To discover the entire range of EATON products and the options available for the **EX RT** range, we invite you to visit our web site at [www.eaton.com](http://www.eaton.com) or contact your EATON representative.

## Environmental protection

EATON cares about the environmental impact of its products and has therefore implemented an eco-design process for the entire life cycle of the **EX RT** product: design, usage and recycling.

## Using this document

Information may be found primarily by checking:

- the contents,
- the index.

## Icons



Important instructions that must always be followed.



Information, tips, help.



Visual indication.



Action.



Audible alarm.

In the illustrations on the following pages, the symbols below are used:



LED off.



LED on.



LED flashing.

## 1. Presentation

<b>1.1</b>	<b>Standard configurations</b>	5
	Tower configuration	5
	Rack configuration	5
<b>1.2</b>	<b>Rear panels</b>	6
	Power module EX RT 5/7/11	6
	Battery module EX RT EXB 7/11	6
<b>1.3</b>	<b>Display and control panel</b>	7
<b>1.4</b>	<b>Options</b>	7
	Rack mounting kits	7
	Transformer for galvanic isolation or earthing arrangement change	8
	Battery extensions for UPS backup times up to 60 minutes	9
	CLA module (Long backup time charger) for backup times from 2 to 8 hours	9
	Modules integration system	10
	Battery module with Remote Emergency Power Off function (REPO)	10
	Battery extension cable (1,8 m / 6 ft)	10

## 2. Installation

<b>2.1</b>	<b>Unpacking and parts check</b>	11
	Power module	11
	Battery module	11
<b>2.2</b>	<b>Installation in tower configuration</b>	12
<b>2.3</b>	<b>Installation in rack configuration</b>	13
	Adjustment of the orientation of the logo and control panels	13
	Battery module rack mounting (optional rail required)	13
	Power or battery module rack mounting (optional rail required)	14
<b>2.4</b>	<b>Communication ports</b>	16
	Connection to the RS232 communication port	16
	Connection to the communications port by relays	16
	Remote Power Off	17
	Remote Power Off communication port	17
	Installation of communication cards (optional, standard with the Network Pack version)	17
<b>2.5</b>	<b>Installation depending on the system earthing arrangement (SEA)</b>	18
	UPS with common Normal and Bypass AC inputs	18
	UPS with separate Normal and Bypass AC inputs	18
	UPS with separate Normal and Bypass AC inputs, supplied by separate sources	19
	Frequency converter (without Bypass AC input)	19
	Hot standby	19
<b>2.6</b>	<b>Required protective devices and cable cross-sections</b>	20
	Recommended upstream protection	20
	Recommended downstream protection	20
	Required cable cross-section	20
<b>2.7</b>	<b>Connections of input/output power cables</b>	21
	UPS with common Normal and Bypass AC sources	21
	UPS with separate Normal and Bypass AC sources	22
	Frequency converter	23
	Connection of battery cables	24
	Connection of galvanic isolation transformer	24
	Connection of CLA module	25

# Contents

## 3. Operation

<b>3.1</b>	<b>Initial start up</b>	26
	UPS personalisation	26
	Accessing personalisation with front panel buttons	26
	Access to the personalisation through external software	27
<b>3.2</b>	<b>Final start up sequence</b>	27
<b>3.3</b>	<b>Operating modes</b>	28
	Normal (double conversion) mode	28
	Eco mode	28
<b>3.4</b>	<b>Operation on battery power</b>	29
	Transfer to battery power	29
	Threshold for the low-battery warning	29
	End of backup time	29
<b>3.5</b>	<b>Return of Normal AC source</b>	29
<b>3.6</b>	<b>Shut down</b>	30

## 4. Maintenance

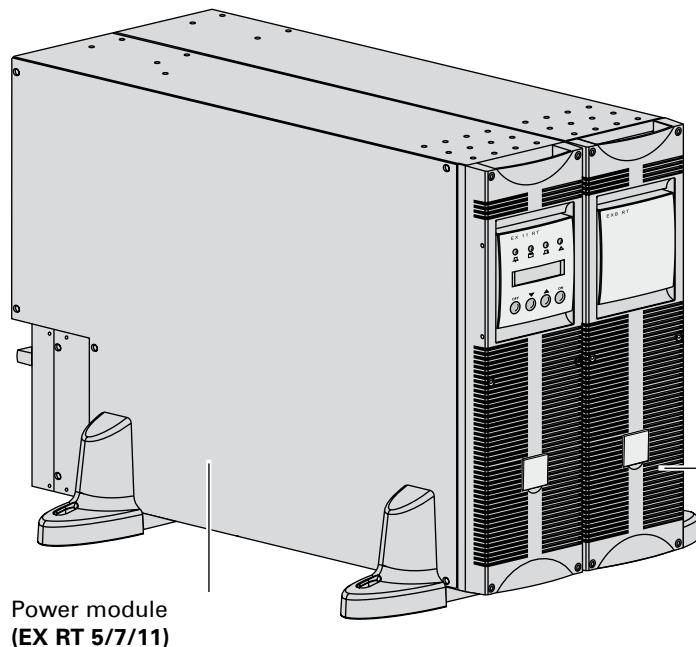
<b>4.1</b>	<b>Troubleshooting</b>	31
<b>4.2</b>	<b>Hot-swapping the power module</b>	32
	Disconnecting the power module	32
	Reconnecting the power module	33
<b>4.3</b>	<b>Hot-swapping the battery module</b>	33
	Disconnecting the battery module	33
	Reconnecting the battery module	33
<b>4.4</b>	<b>Training center</b>	34

## 5. Appendices

<b>5.1</b>	<b>Technical specifications</b>	35
	Electrical characteristics	35
	Thermal characteristics	38
<b>5.2</b>	<b>Glossary</b>	38

## 1.1 Standard configurations

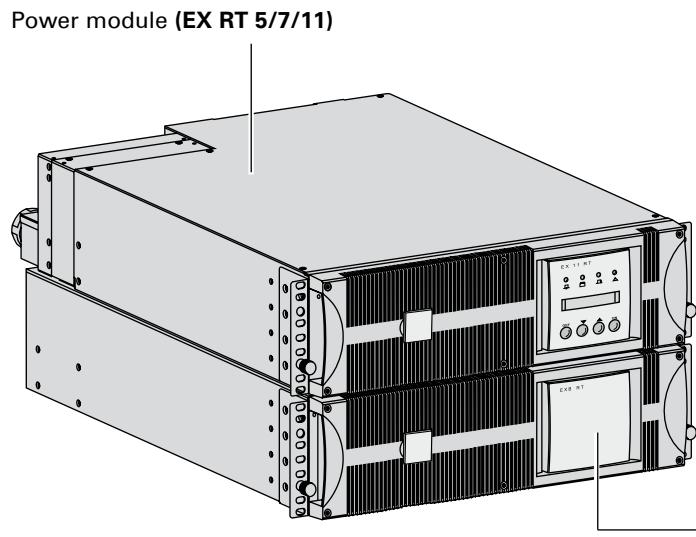
### Tower configuration



	Dimensions in mm/ inches (H x W x D)
<b>EX RT 5</b> <b>EX RT 7</b> <b>EX RT 11</b> <b>EX RT EXB 7</b> <b>EX RT EXB 11</b>	444 x 131 x 635
	Weight in kg/lbs
<b>EX RT 5</b> <b>EX RT 7</b>	22.5
<b>EX RT 11</b>	27.5
<b>EX RT EXB 7</b>	64.5
<b>EX RT EXB 11</b>	68.5

Battery module  
(EX RT EXB 7/11)

### Rack configuration



	Dimensions in mm/ inches (H x W x D)
<b>EX RT 5</b> <b>EX RT 7</b> <b>EX RT 11</b> <b>EX RT EXB 7</b> <b>EX RT EXB 11</b>	131 (3U) x 444 x 635

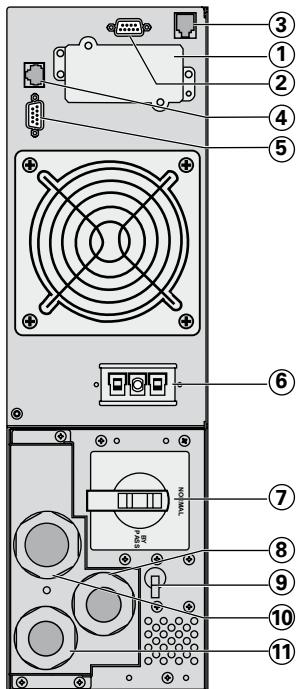
	Weight in kg/lbs
<b>EX RT 5</b> <b>EX RT 7</b>	22.5
<b>EX RT 11</b>	27.5
<b>EX RT EXB 7</b>	64.5
<b>EX RT EXB 11</b>	68.5

Battery module  
(EX RT EXB 7/11)

# 1. Presentation

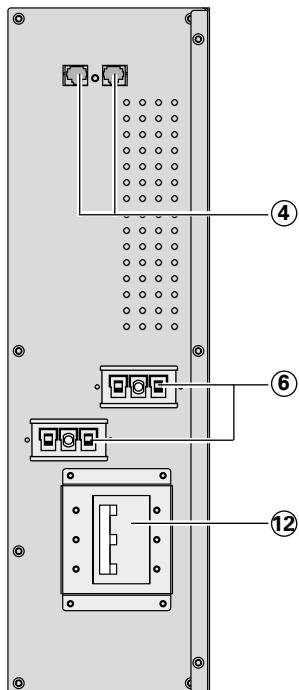
## 1.2 Rear panels

### Power module EX RT 5/7/11



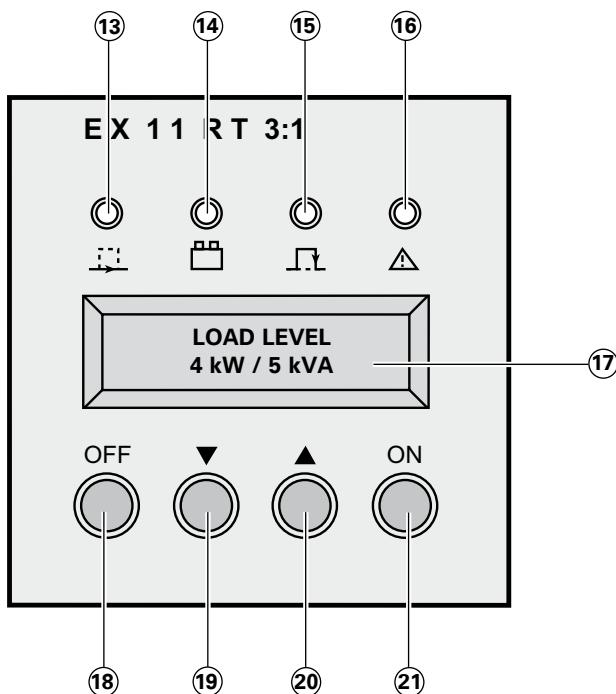
- ① Slot for communication cards.
- ② Communication port by relays.
- ③ Remote Emergency Power Off communication port (REPO).
- ④ Connectors for automatic detection of battery module(s).
- ⑤ RS232 communications port.
- ⑥ Battery module connectors (to the UPS or to other battery modules).
- ⑦ Manual Bypass switch.
- ⑧ Output terminal block.
- ⑨ Normal AC source circuit-breaker.
- ⑩ Normal AC source terminal block.
- ⑪ Bypass AC source terminal block.

### Battery module EX RT EXB 7/11



- ④ Connectors for automatic detection of battery module(s).
- ⑥ Battery module connectors (to the UPS or to other battery modules).
- ⑫ Battery circuit breaker.

## 1.3 Display and control panel

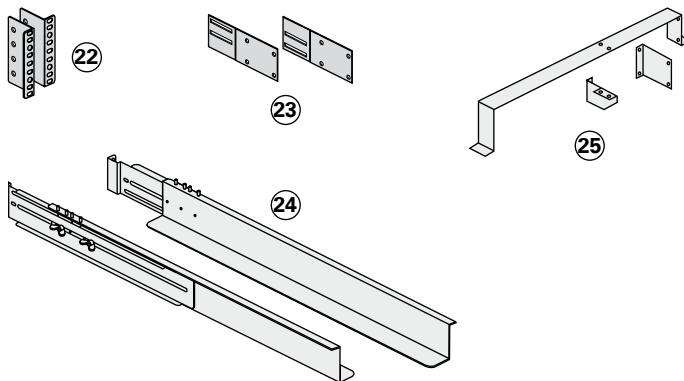


- ⑯ Load protected LED.
- ⑯ Operation on battery LED.
- ⑯ Operation on bypass LED.
- ⑯ Fault LED.
- ⑯ Alphanumeric display.
- ⑯ UPS OFF button.
- ⑯ ⑯ Function buttons (scroll up / scroll down).
- ⑯ UPS ON button (or function button in personalisation mode).

## 1.4 Options

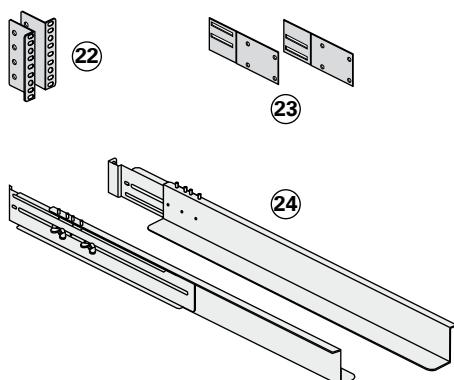
### Rack mounting kits

**Telescopic rails for Power module mounting in 19" enclosure with mounting hardware**  
(Part number 68001)



- ⑯ Ear hangup.
- ⑯ Rear bracket system for transportation.
- ⑯ Telescopic rails, 639 mm to 1005 mm length (27.36" to 39.96").
- ⑯ Input/Output box bracket system.

**Telescopic rails for Battery module mounting in 19" enclosure with mounting hardware**  
(Part number 68002)

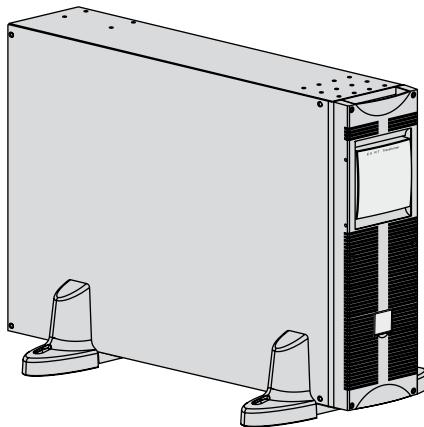


- ⑯ Ear hangup.
- ⑯ Rear bracket system for transportation.
- ⑯ Telescopic rails, 639 mm to 1005 mm length (27.36" to 39.96").

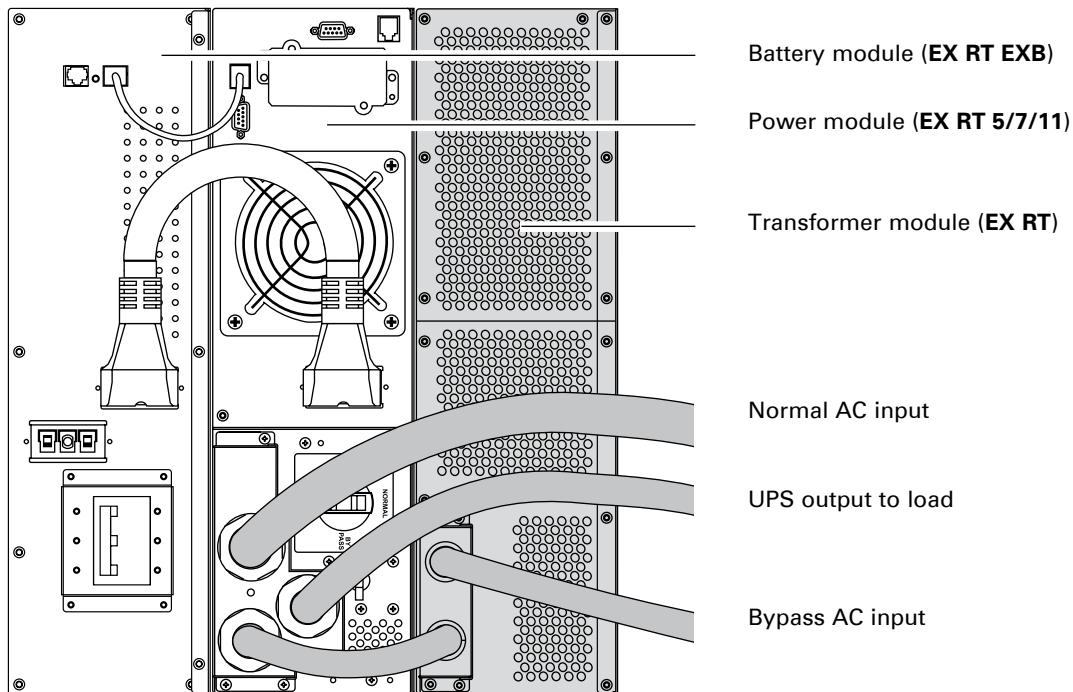
# 1. Presentation

## Transformer for galvanic isolation or earthing arrangement change (Part number 68003)

This module is necessary either when a downstream neutral system from the UPS upstream is required, or when a different power source connects the automatic bypass for higher availability.



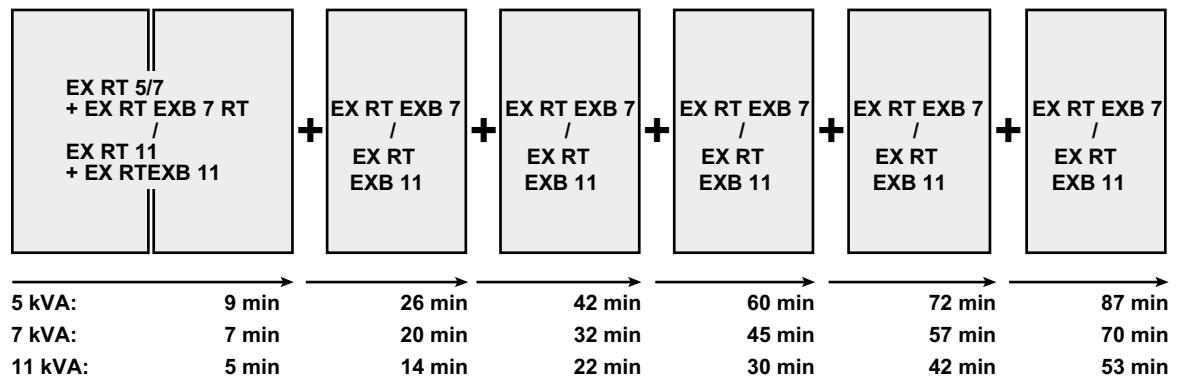
Example of EX RT transformer connected upstream for EX RT galvanic isolation



## Battery extensions for UPS backup times up to 60 minutes (at full load)

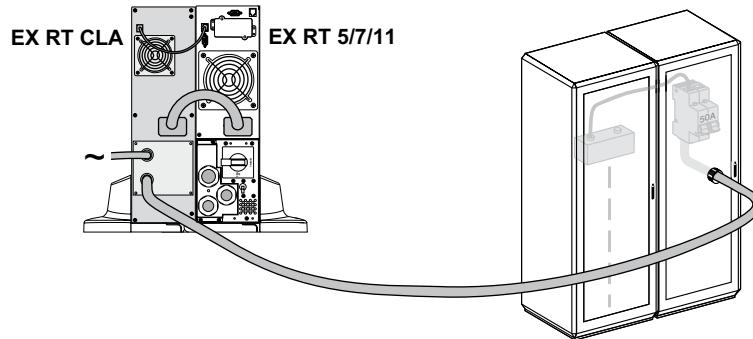
**EX RT** offers a standard backup time of 5/9 minutes at full load.  
To increase backup time, it is possible to connect **EX RT EXB 7/11** modules to the UPSs.

### Battery extensions for EX RT 5, EX RT 7 or EX RT 11



## CLA module (Long backup time charger) for backup times from 2 to 8 hours (Part number 68004)

Very long backup times, from 2 to 8 hours at full load, require a **EX RT CLA** module.



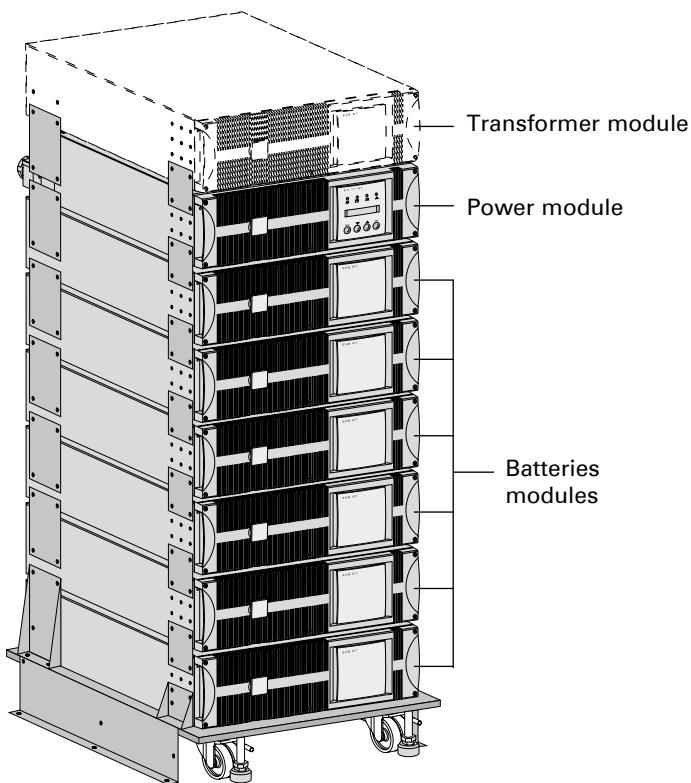
Battery backup time	Recommended batteries for:		
	EX RT 5	EX RT 7	EX RT 11
2 hours	50 Ah	65 Ah	100 Ah
4 hours	100 Ah	130 Ah	200 Ah
8 hours	200 Ah	260 Ah	400 Ah

Total battery voltage : 240 V DC (20 x 12V DC).

The battery capacity must be set within the **UPS** (5 Ah increment possible, see UPS Personalisation section).

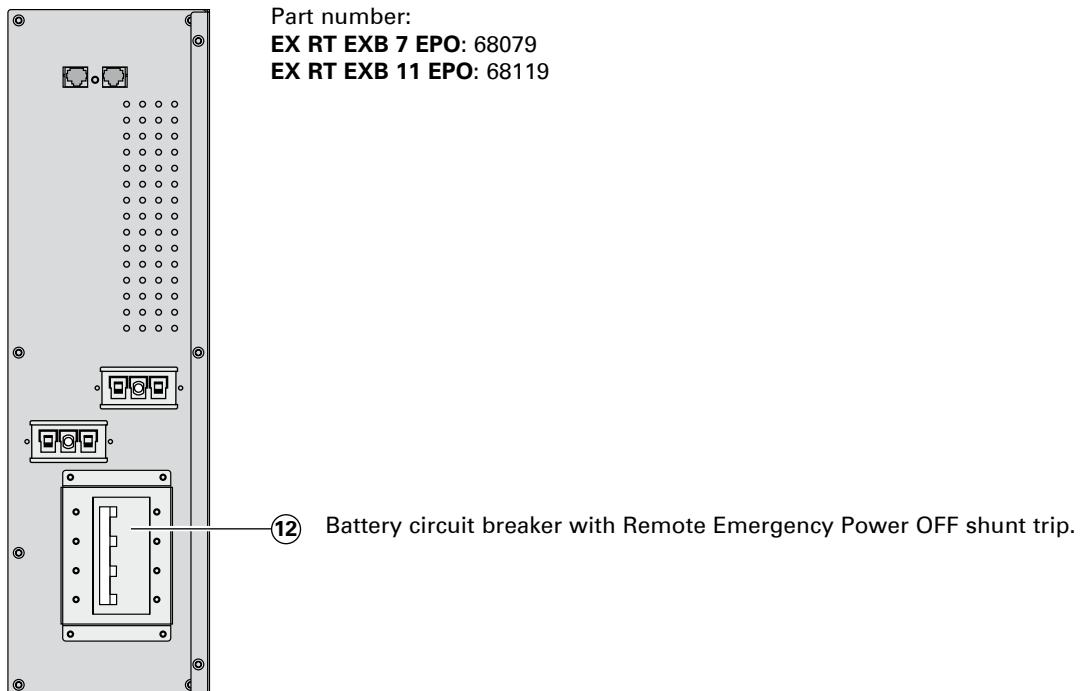
# 1. Presentation

## Modules integration system (Part number 68005)



Modules integration system for extended backup time configurations to conveniently stack and secure up to 8 modules on the same cart (swivel wheels with brakes, leveling feet, seismic side panels, plates to lock modules and screws included).

## Battery module with Remote Emergency Power Off function (REPO)

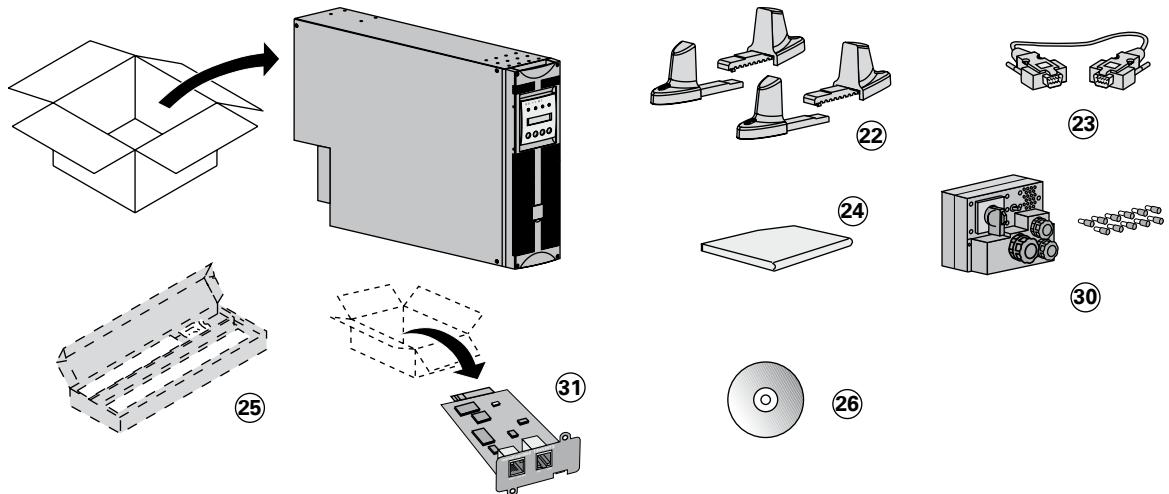


## Battery extension cable (1,8 m / 6 ft, Part number 68006)

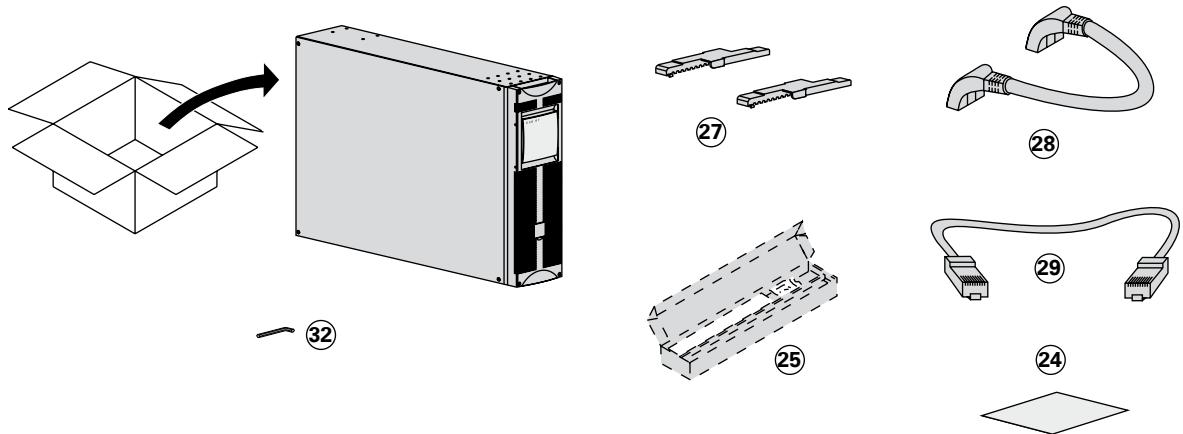
This extended battery cable will be used instead of the standard battery cable when battery modules are distant from each other (located in two different enclosures, for instance).

### 2.1 Unpacking and parts check

#### Power module



#### Battery module



- 22 Two sets of tower stands.
- 23 RS232 communications cable.
- 24 Product documentation.
- 25 Telescopic rails for rack enclosure with mounting hardware (optional, or standard with **Network Pack** version).
- 26 **Solution-Pac** power management suite CD-ROM.

- 27 Tower stand expanders.
- 28 Battery cable.
- 29 Battery communication cable.
- 30 Input/Output junction box (with 11 insulated ferrules).
- 31 Network Management card (optional, or standard in **Network Pack** version).
- 32 Bezel screw driver.



Packaging must be destroyed according to waste management standards. Recycling icons are displayed for easy selection.



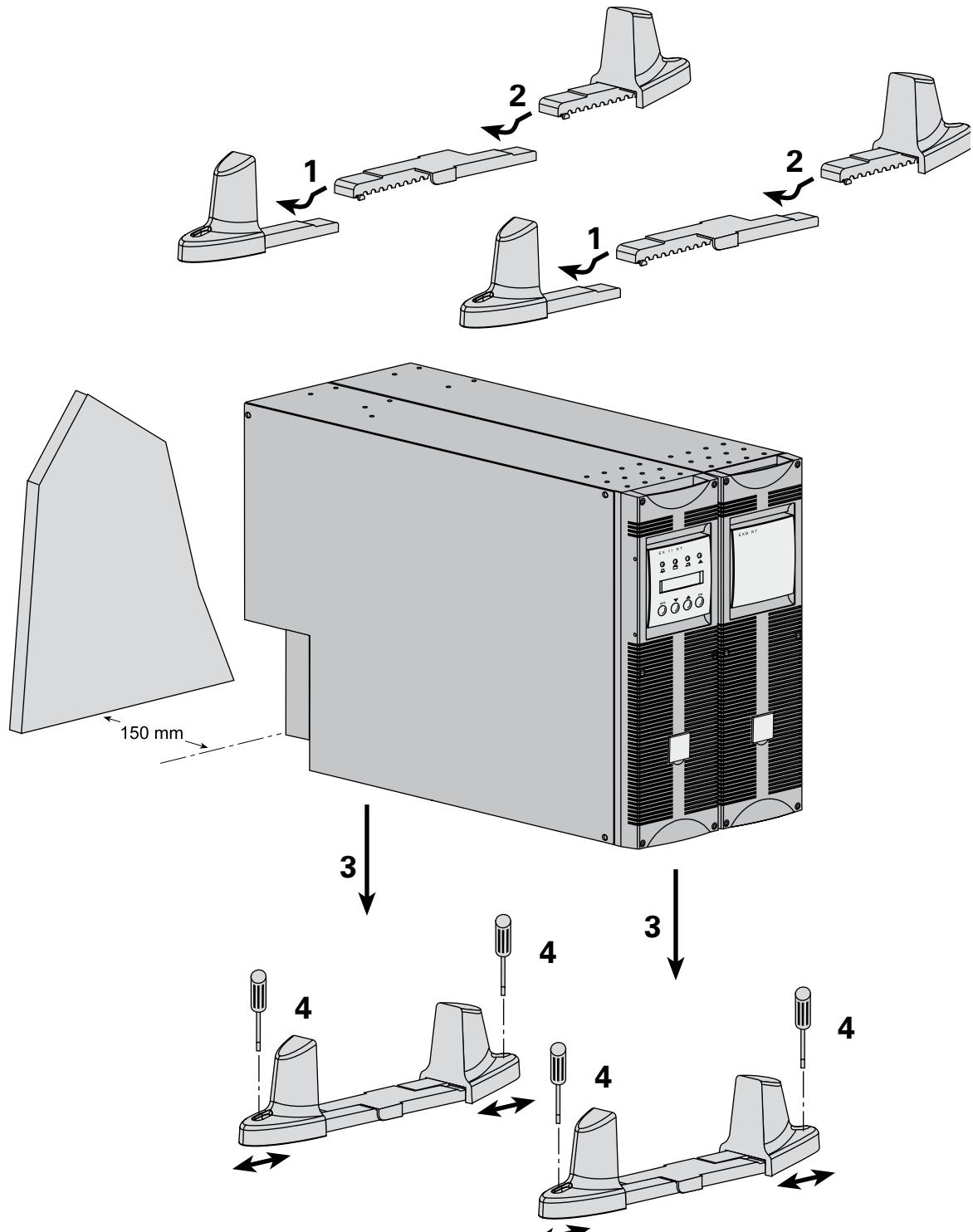
**A dangerous voltage is present inside the power module and the battery module. Any operations to be carried out on these modules must be done so by qualified staff.**

## 2. Installation

### 2.2 Installation in tower configuration



Use the tower stand template provided with the battery module.



Follow steps 1 to 4 to adjust the tower stands for the upright position.

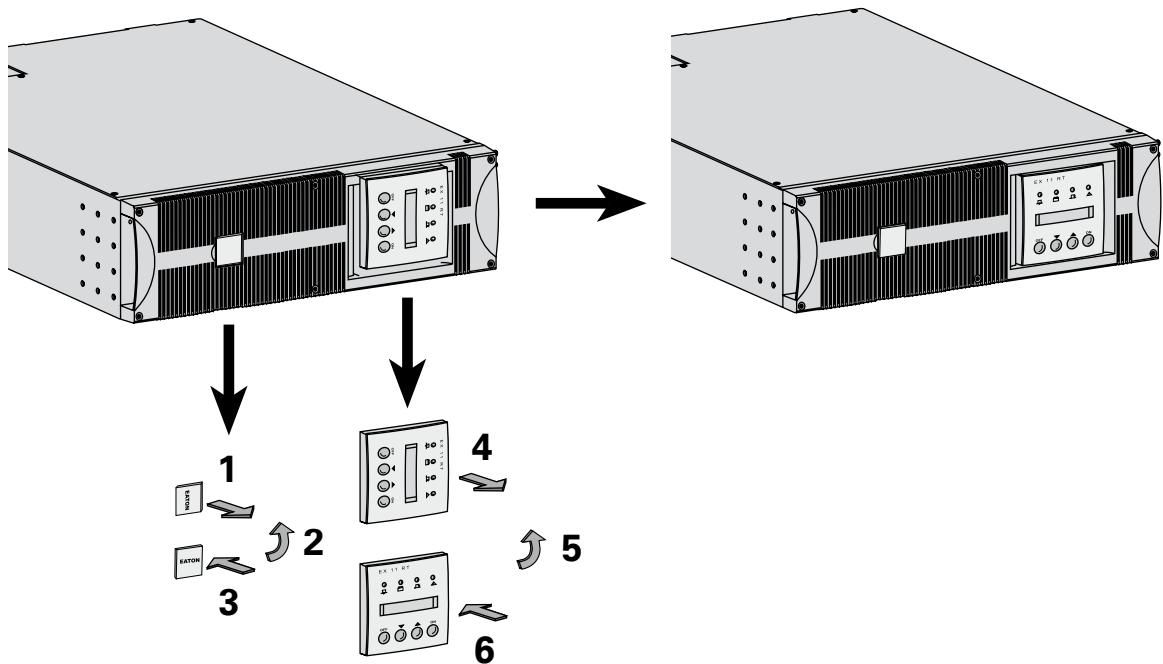
**Always keep 150 mm free space behind the UPS rear panel.  
The distance between the tower stands should be 450 mm.**



### 2.3 Installation in rack configuration

We recommend to mount the battery module first, then mount the power module above the battery

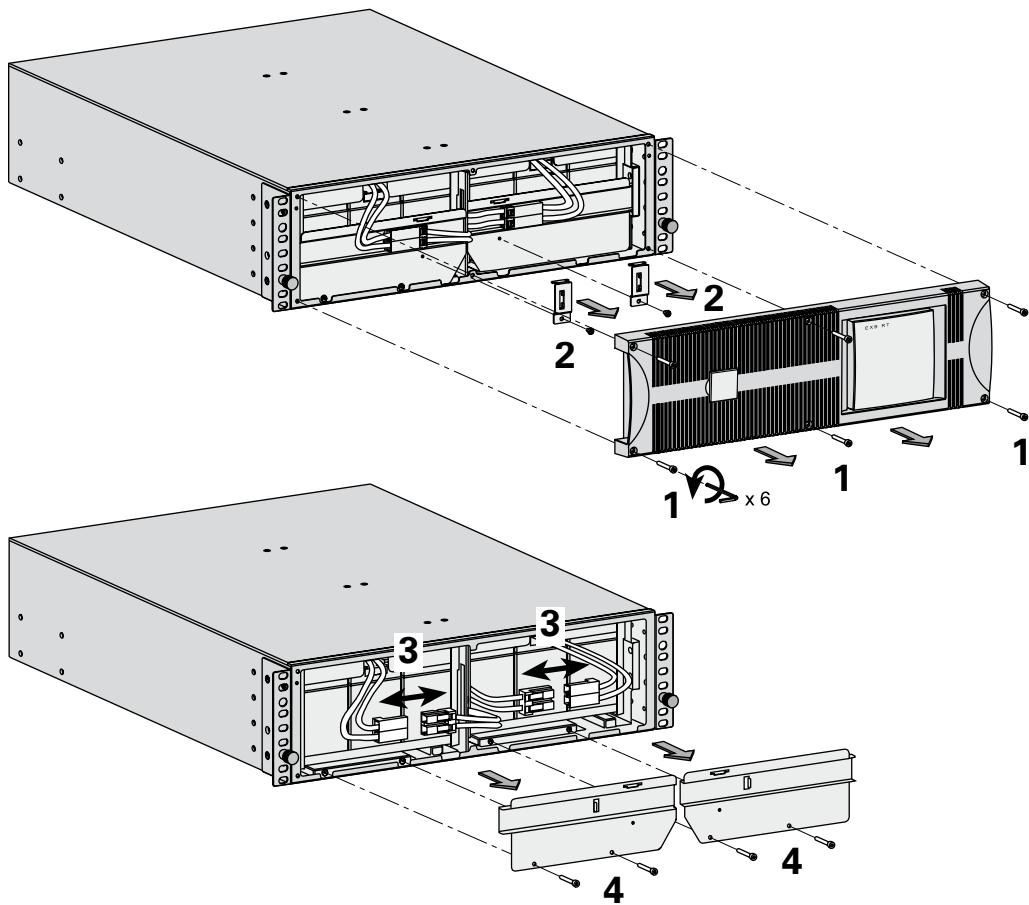
#### Adjustment of the orientation of the logo and control panels



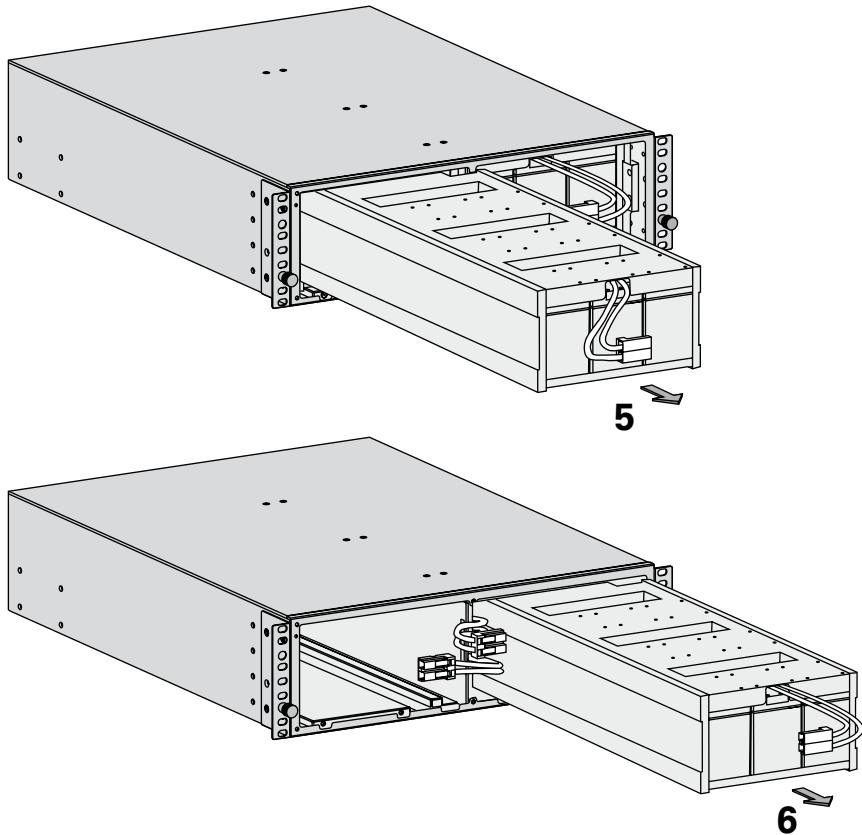
#### Battery module rack mounting (optional rails required, part number: 68002)



The battery module is very heavy. To ease its rack integration, we strongly recommend to remove the battery trays as explained below:

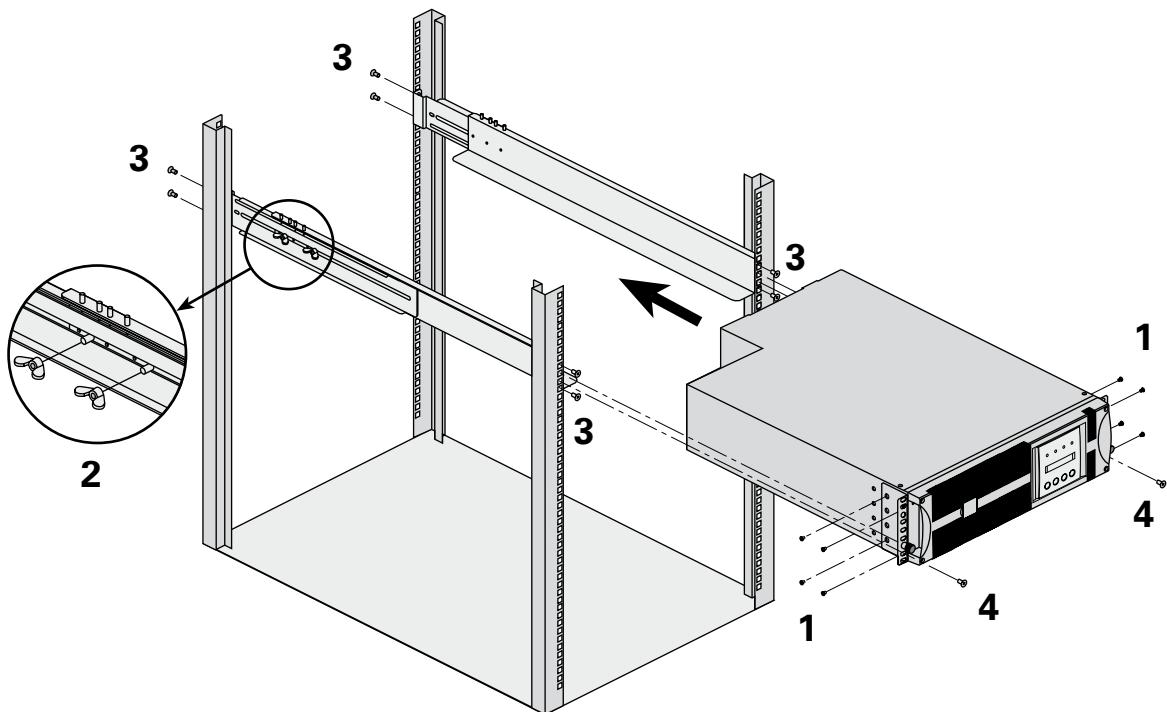


## 2. Installation



**Power or battery module rack mounting** (optional rails required, part number: 68001)

Follow steps 1 to 4 for rack mounting the UPS onto the rails.



The rails and the necessary mounting hardware are supplied by EATON.

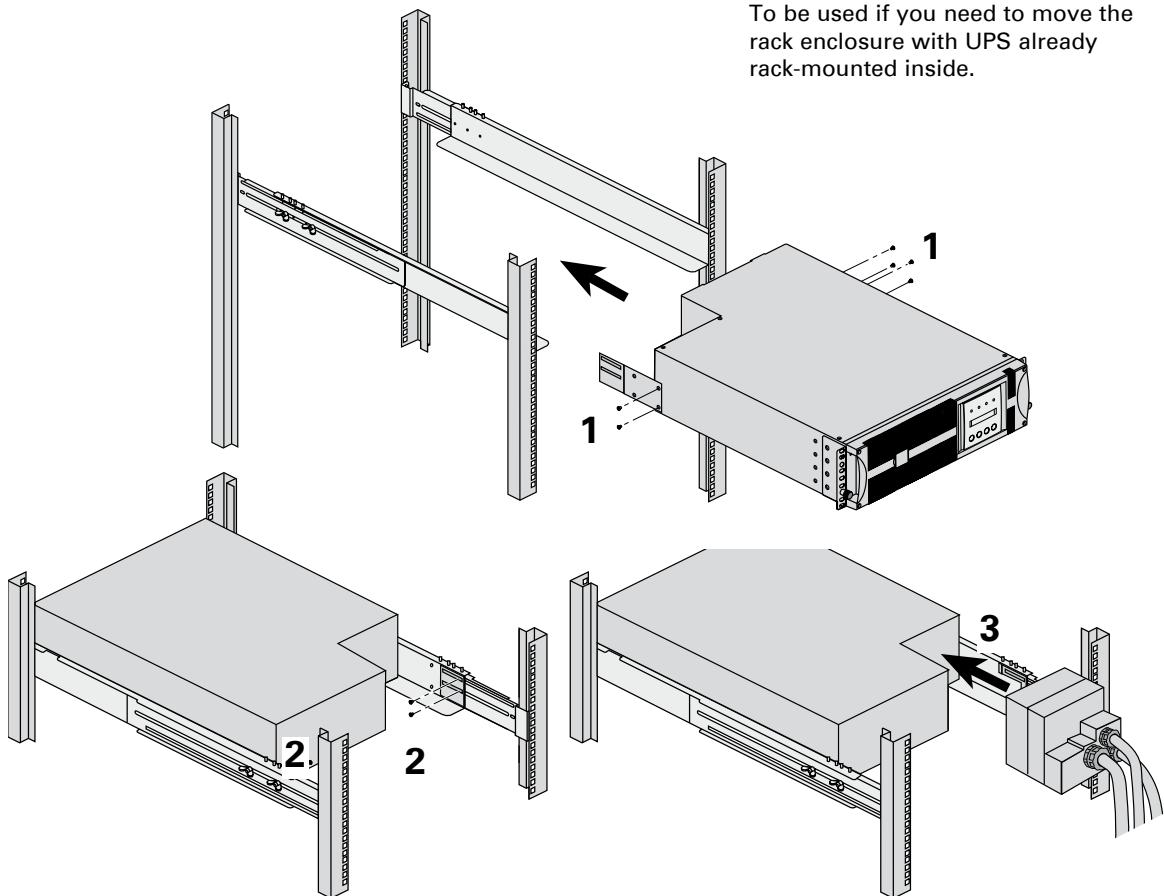
**Note for step 1:** it is possible to adjust the position of both front mounting ears.

## 2. Installation

### Rear bracket system (included with rail kits, part numbers 68001 and 68002)



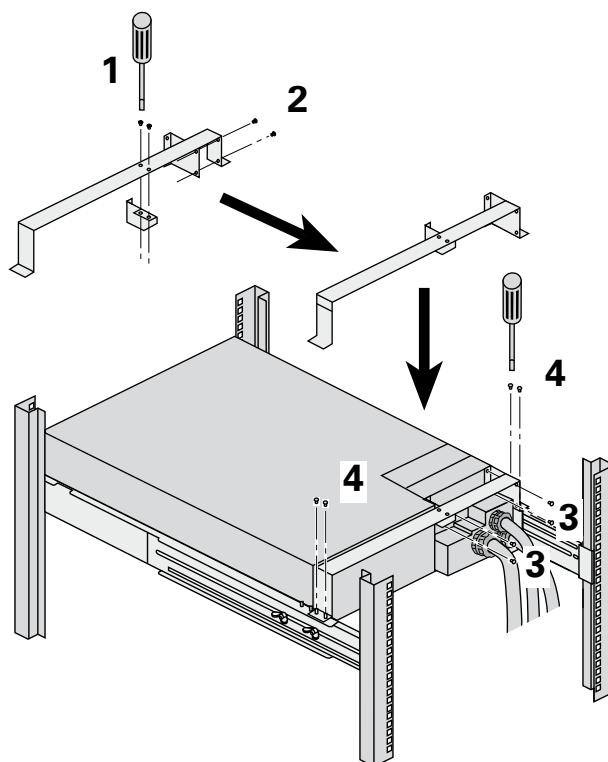
To be used if you need to move the rack enclosure with UPS already rack-mounted inside.



### Input/output junction box bracket system (included with power module rail kit, part number 68001)



This bracket will maintain the Input/Output box at the rear of the rack enclosure when hot-swapping the power module. It will then be easier to slide the replacement module into the connectors of the Input/Output box.



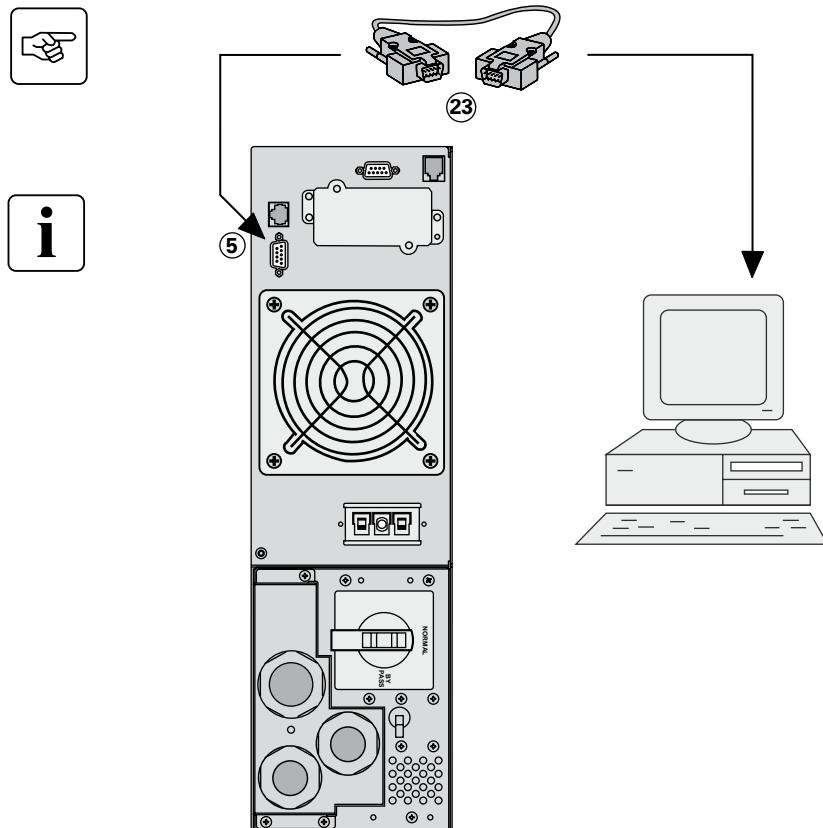
## 2. Installation

### 2.4 Communication ports

EX RT provides 3 communication methods that can be used simultaneously:

- The COM port provides RS232 communications using EATON SHUT protocol. Compatible with most power management software applications available into the enclosed **Solution Pac** CD-Rom.
- The output contact port is used for basic signaling or for protection of IT systems like IBM iSeries (formerly AS400) and more.
- The slot is compatible with any EATON communication card (check [www.eaton.com](http://www.eaton.com) web site for the complete list of compatible cards).

#### Connection to the RS232 communication port

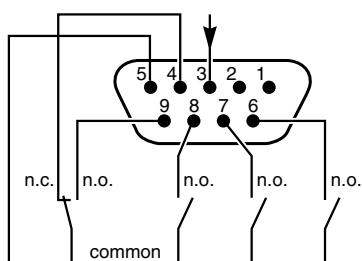


1 - Connect the RS 232 23 communications cable to the serial port on the computer.

2 - Connect the other end of the communications cable 23 to the RS 232 5 communications port on the UPS.

The UPS can now communicate with various EATON power management application software. Please note that the configuration software is included with **Personal Solution Pac** for Windows.

#### Connection to the communication port by relays ②



- Pin 1, 2: not used,
- Pin 3: Remote Power Off signal (5 to 27 V DC, 10 mA max),
- Pin 4: Operation on mains (not on battery),
- Pin 5: User common,
- Pin 6: Operation on automatic by-pass,
- Pin 7: Low battery,
- Pin 8: Load protected,
- Pin 9: Operation on battery.

n.o.: contact normally open.  
n.c.: contact normally closed.

When the status is active, the contact between the common (Pin 5) and the relevant information pin is closed.

#### Output relays specifications

- Voltage: 48 V DC max,
- Current: 2 A max,
- Power: 62,5 VA, 30 W.

Example: for 48 V DC,  $I_{max} = 625 \text{ mA}$

## 2. Installation

### Remote Power Off

Installation of a Remote power off function must be carried out in compliance with applicable regulations.

In order to fully de-energize devices and **EX RT** with an RPO port, it is necessary :

- To use a two-position switch (Normally Open or Closed contact should be held more than 1 second to be taken into account).
- To use battery cabinet(s) **EX RT EXB EPO**.
- To connect to this RPO switch a device that allows to trip all breaker(s) located **upstream<sup>(1)</sup>** AC NORMAL and AC BY PASS as well as **downstream<sup>(2)</sup>** the **EX RT**. This can be achieved through by means of a shunt trip.

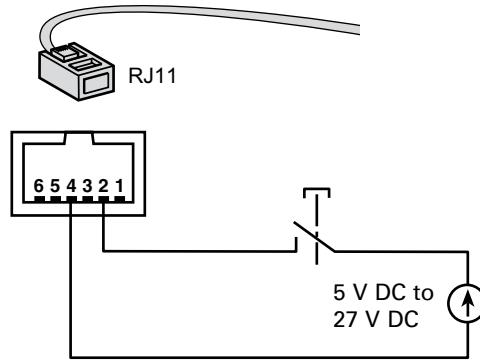
(1) If not, the output devices will remain powered through the **AC BY PASS** if RPO switch has been loosened.

(2) If not, the output devices will remain powered several seconds after the RPO activation.

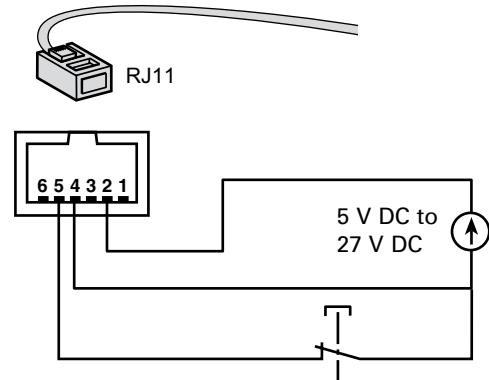
### Remote Power Off communication port (3)

Used in conjunction with the optional EPO battery module, this port enables total isolation of all power sources connected to the UPS in case of emergency (the cable is not provided).

Remote power off contact normally open



Remote power off contact normally closed



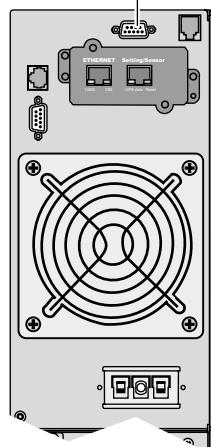
● Signal:

- activation voltage: 5 V DC to 27 V DC.
- current: 10 mA max.

### Installation of communication cards (optional, standard with the **Network Pack** version)



① Communication card.



It is not necessary to shut down the UPS to install the communication card:

1 - Remove the slot cover secured by two screws.

2 - Insert the card ① into the slot.

3 - Secure the card with both screws.

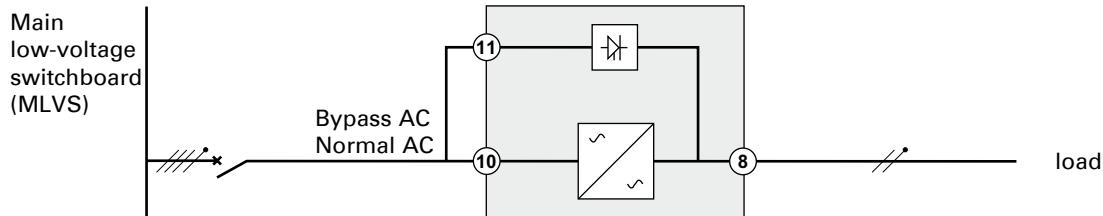
## 2. Installation

### 2.5 Installation depending on the system earthing arrangement (SEA)

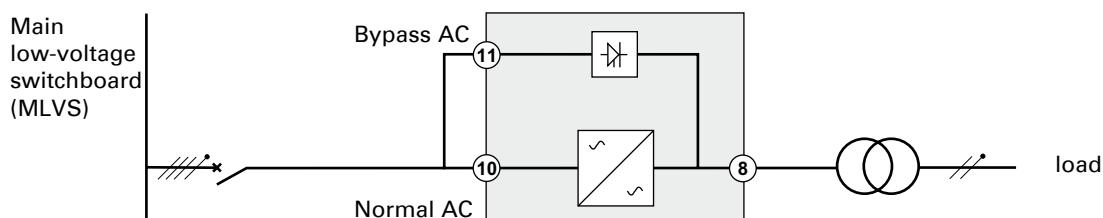


EX RT must be fed from a 3-phase source with neutral.

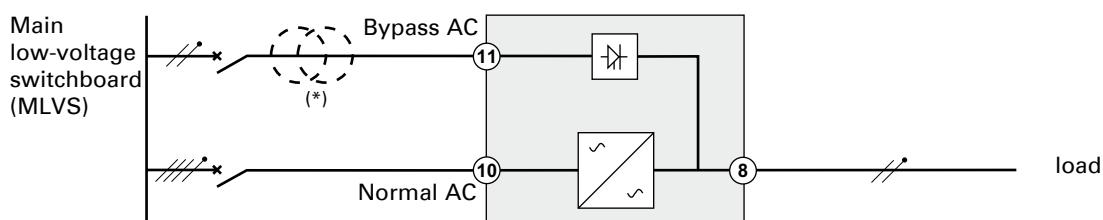
#### UPS with common Normal and Bypass AC inputs



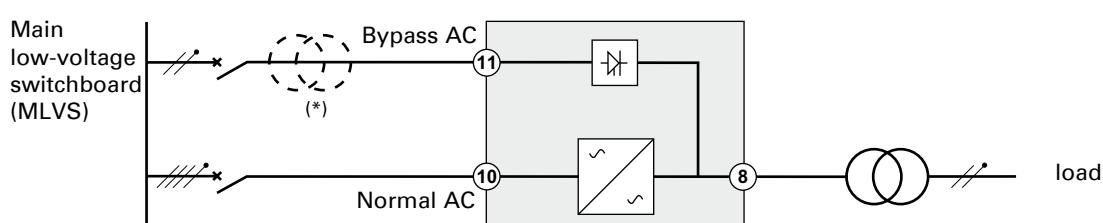
Changement de SLT entre amont et aval ou isolation galvanique requis



#### ASI with separate AC Normal and AC Bypass networks



Changement de SLT entre amont et aval ou isolation galvanique requis

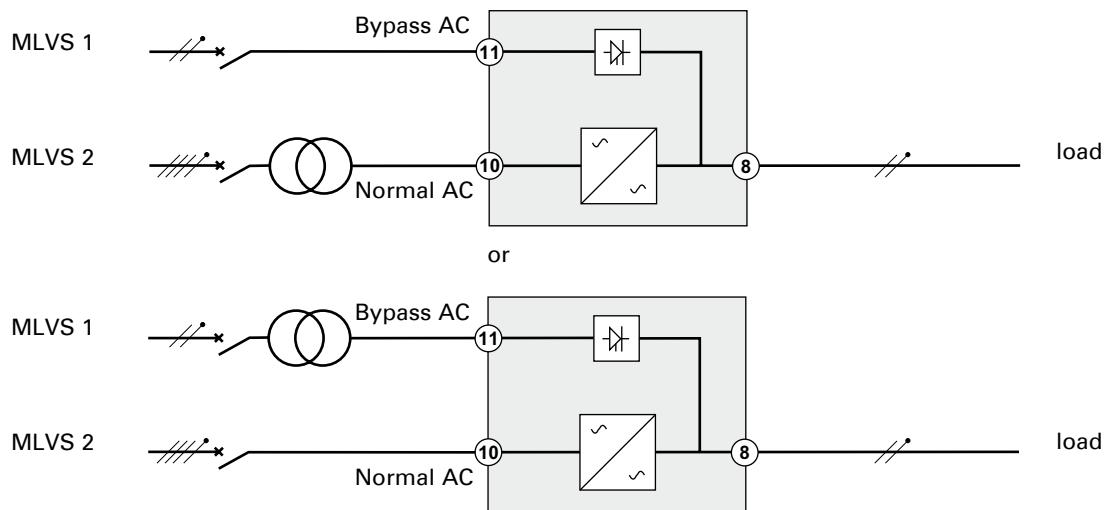


(\*): The transformer is not necessary if:

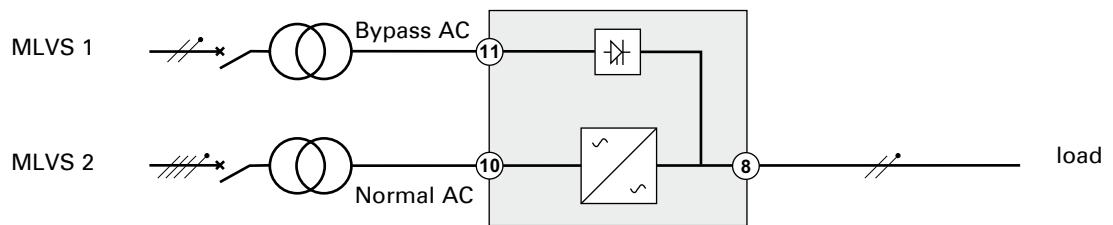
- Normal and Bypass AC inputs are connected to the same source,
- and wires cross sections and wires lengths on Normal and Bypass inputs are identical,
- and upstream protection is provided by only one switch with RCD (residual current device) for Normal and Bypass inputs.

## 2. Installation

### UPS with separate Normal and Bypass AC inputs, supplied by separate sources

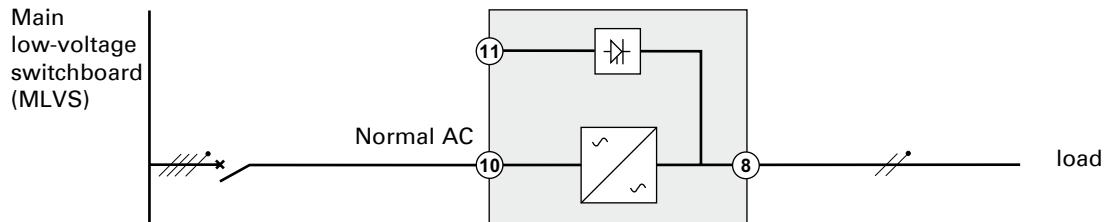


### Change in SEA between upstream and downstream or galvanic isolation required



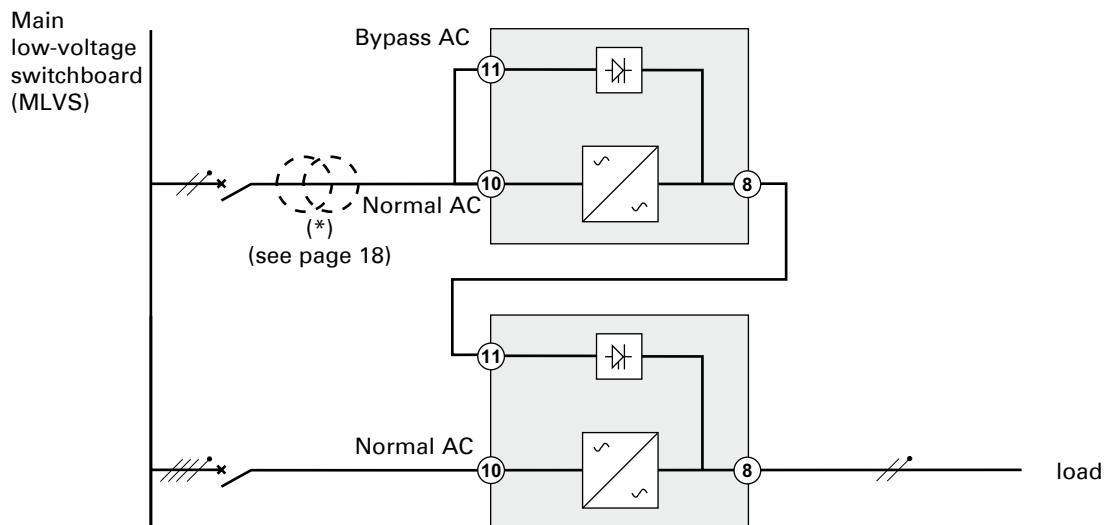
### Frequency converter (without Bypass AC input)

Configuration used when the frequency of the application differs from the Mains (Example: marine requirements).



### Hot stand by

Configuration used to provide full redundancy (N+1) to critical loads.



## 2. Installation

### 2.6 Required protective devices and cable cross-sections

#### Recommended upstream protection

UPS power rating	Common AC inputs Upstream circuit-breaker Normal / Bypass AC sources	Separate AC inputs	
		Upstream circuit-breaker Normal AC source	Upstream circuit-breaker Bypass AC source
5 kVA	D curve - 40 A	C curve - 32 A	D curve - 40 A
7 kVA	D curve - 40 A	C curve - 32 A	D curve - 40 A
11 kVA	D curve - 63 A	C curve - 40 A	D curve - 63 A

**Note:** see the simplified diagrams in the appendix for common or separate AC inputs, indicating the positions of the protection devices, the characteristics of the internal UPS fuses and UPS line currents under overload conditions.

#### Recommended downstream protection

UPS power rating	Downstream circuit breaker
5 kVA	Z curve - 10 A
	C curve - 4 A
7 kVA	Z curve - 10 A
	C curve - 4 A
11 kVA	Z curve - 10 A
	C curve - 6 A

The indicated protection ensures discrimination for each output circuit downstream of the UPS, whether supplied by the Normal or the Bypass AC source. If these recommendations are not followed, protection discrimination is not achieved and may result in a potential power interruption to the connected devices.

**Note:** see the simplified diagrams in the appendix for common or separate AC inputs, indicating the positions of the protection devices, the characteristics of the internal UPS fuses and UPS line currents under overload conditions.

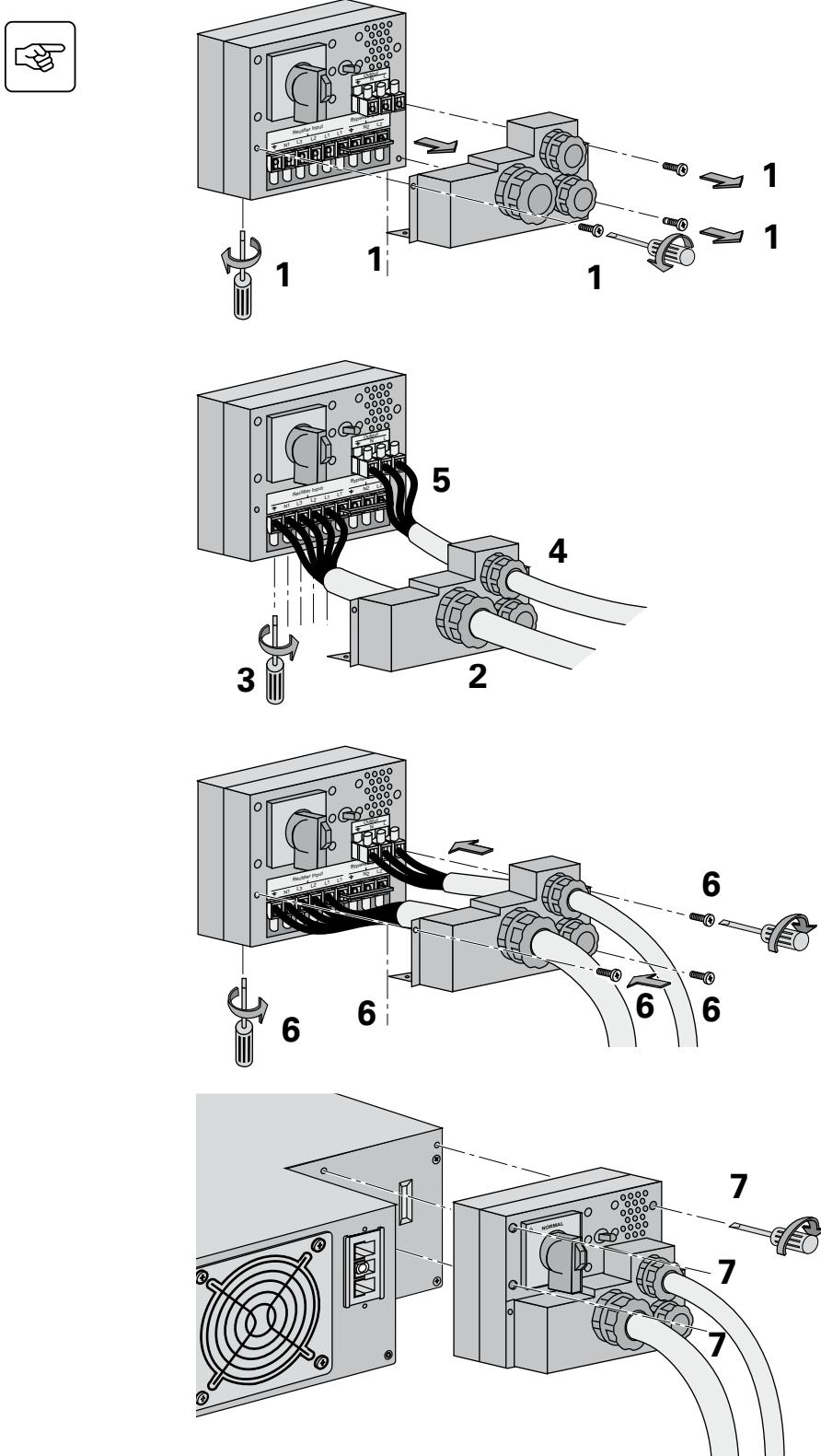
#### Required cable cross-sections

- Terminal-block cable capacity: 10 mm<sup>2</sup>, solid or stranded wire (maximum 13 mm<sup>2</sup> or AWG 6).
- Capacity for earthing conductor: 10 mm<sup>2</sup>, solid or stranded wire (maximum 13 mm<sup>2</sup> or AWG 6).

### 2.7 Connections of input/output power cables

- This type of connection must be carried out by qualified electrical personnel.
- Before carrying out any connection, check that the battery circuit breaker (12) and that the upstream protection devices (Normal and Bypass AC sources) are open ("0").
- **EX RT UPS** always comes from factory with Normal and Bypass AC inputs already connected together, using a bridge.
- Use included insulated ferrules with stranded wires.

#### UPS with common Normal and Bypass AC sources



To access the connection terminal blocks, see section 1.2 "Rear panel":  
1 - Remove the terminal block cover (5 screws),

2 - Insert the Normal AC cable through the cable gland,  
3 - Connect the 5 wires to the Normal AC terminal block,

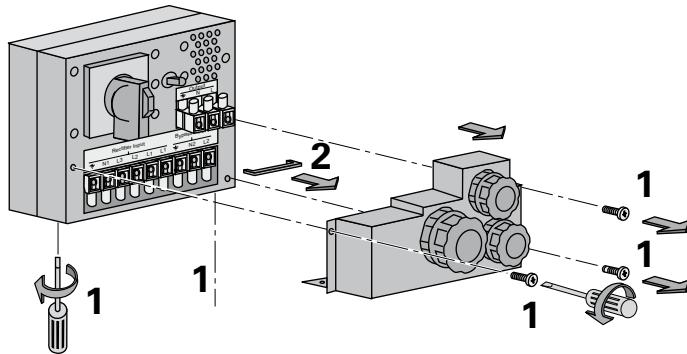
 **Always connect the earthing wire first.**

4 - Insert the output cable to the load through the output cable gland,  
5 - Connect the 3 wires to the output terminal block,

6 - Refit the terminal block cover and tighten the cable glands,  
7 - Secure the junction Input/Output box to the rear of the power module by means of the 3 screws.

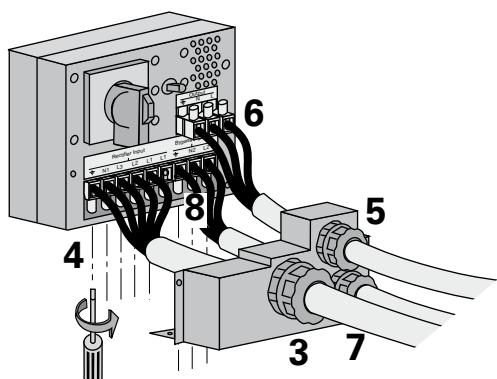
## 2. Installation

### UPS with separate Normal and Bypass AC sources

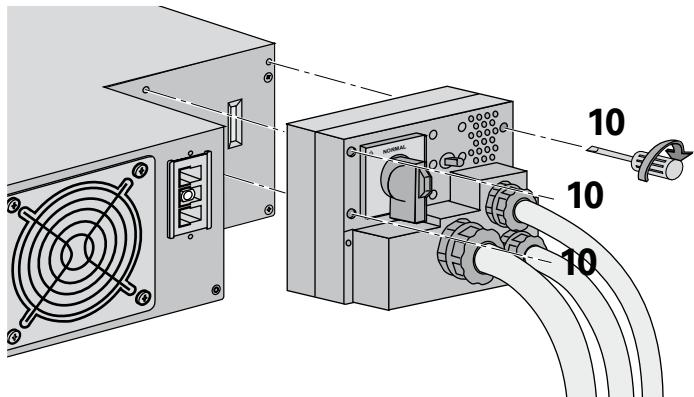
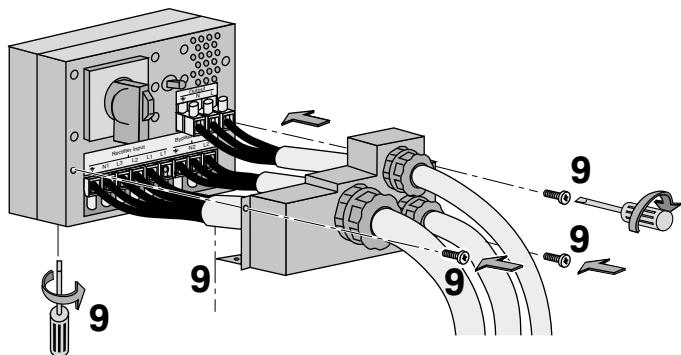


- 1 - Remove the terminal block cover (5 screws),
- 2 - Remove the bridge connected between L2 and L1,
- 3 - Insert the Normal AC cable through the cable gland,
- 4 - Connect the 5 wires to the Normal AC terminal block,

 **Always connect the earthing wire first.**

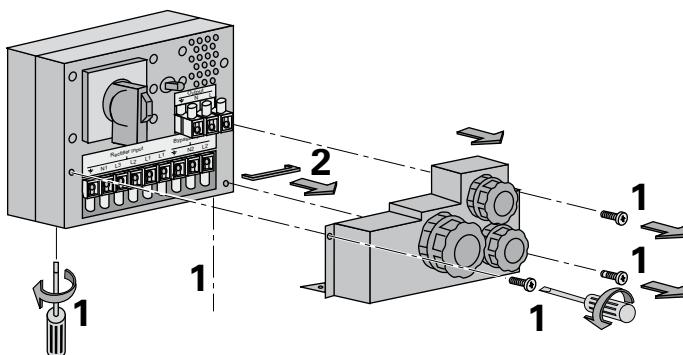


- 5 - Insert the Output cable to the load through the Output cable gland,
- 6 - Connect the 3 wires to the output terminal block,
- 7 - Insert the Bypass cable through the cable gland,
- 8 - Connect the 3 wires to the Bypass AC terminal block,
- 9 - Refit the terminal block cover and tighten the cable glands,
- 10 - Secure the junction Input/Output box to the rear of the power module by means of the 3 screws.



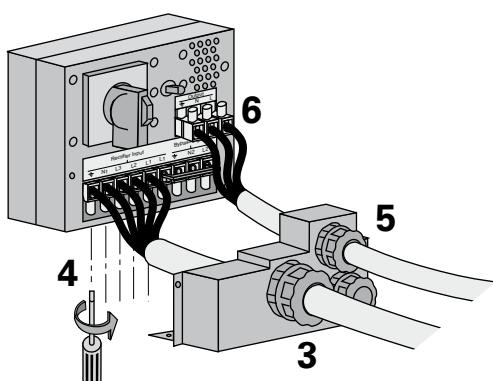
## 2. Installation

### Frequency converter



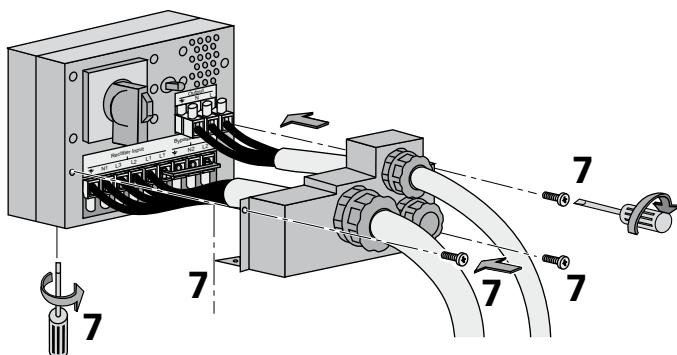
- 1 - Remove the terminal block cover (5 screws),
- 2 - Remove the bridge connected between L2 and L1,
- 3 - Insert the Normal AC cable through the cable gland,
- 4 - Connect the 5 wires to the Normal AC terminal block,

**Always connect the earthing wire first.**

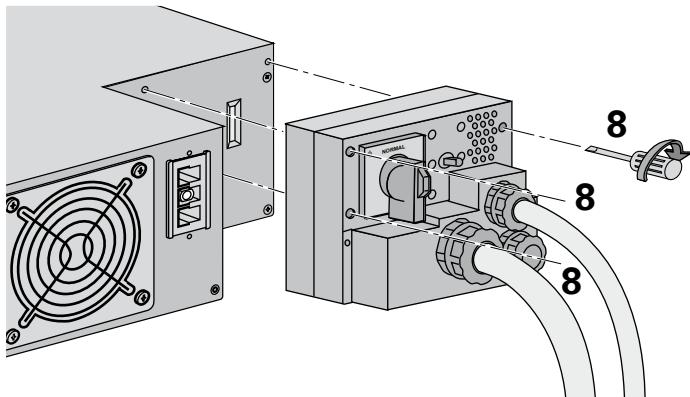


- 5 - Insert the Output cable supplying the load through the Output cable gland,
- 6 - Connect the 3 wires to output terminal block,

**Do not connect anything to the Bypass AC terminal block.**

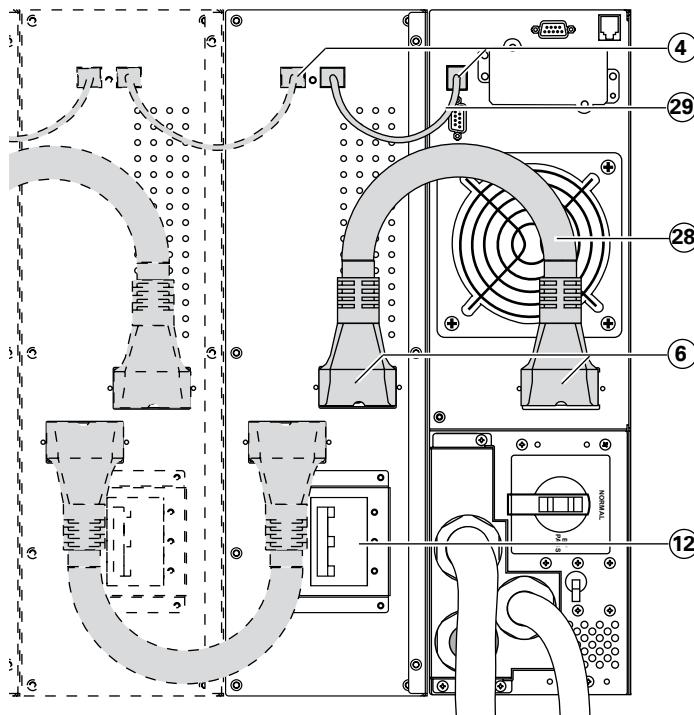


- 7 - Refit the terminal block cover and tighten the cable glands,
- 8 - Secure the junction Input/Output box to the rear of the power module by means of the 3 screws.



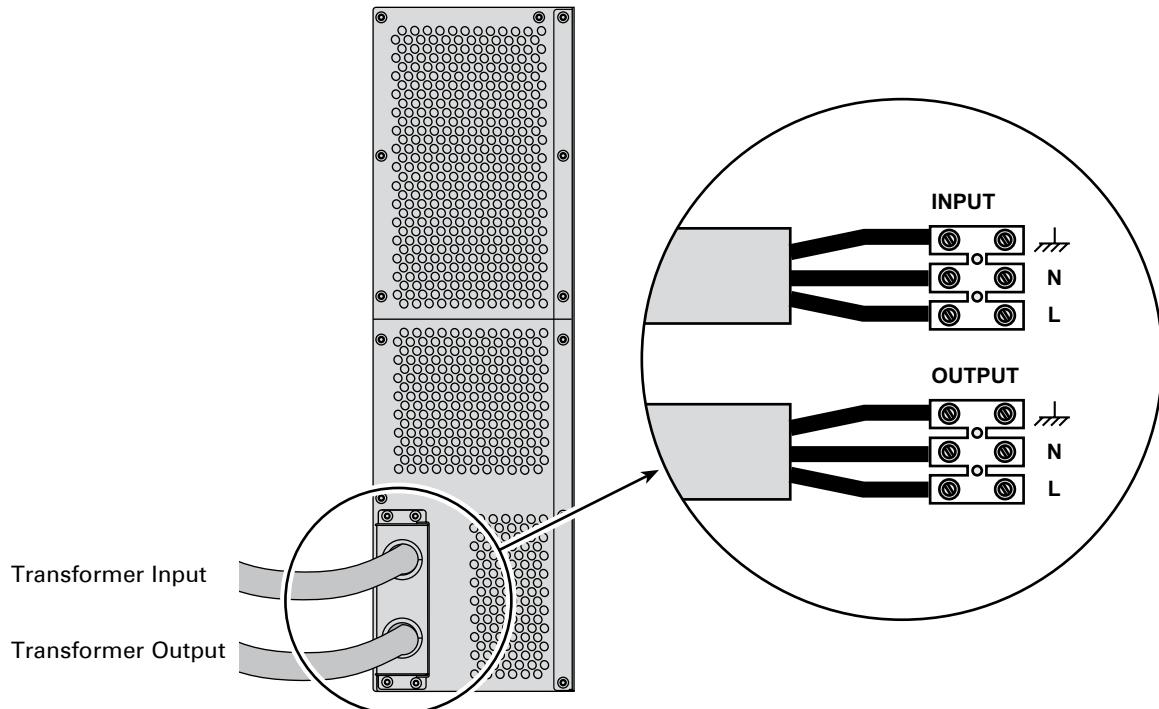
## 2. Installation

### Connection of battery cables



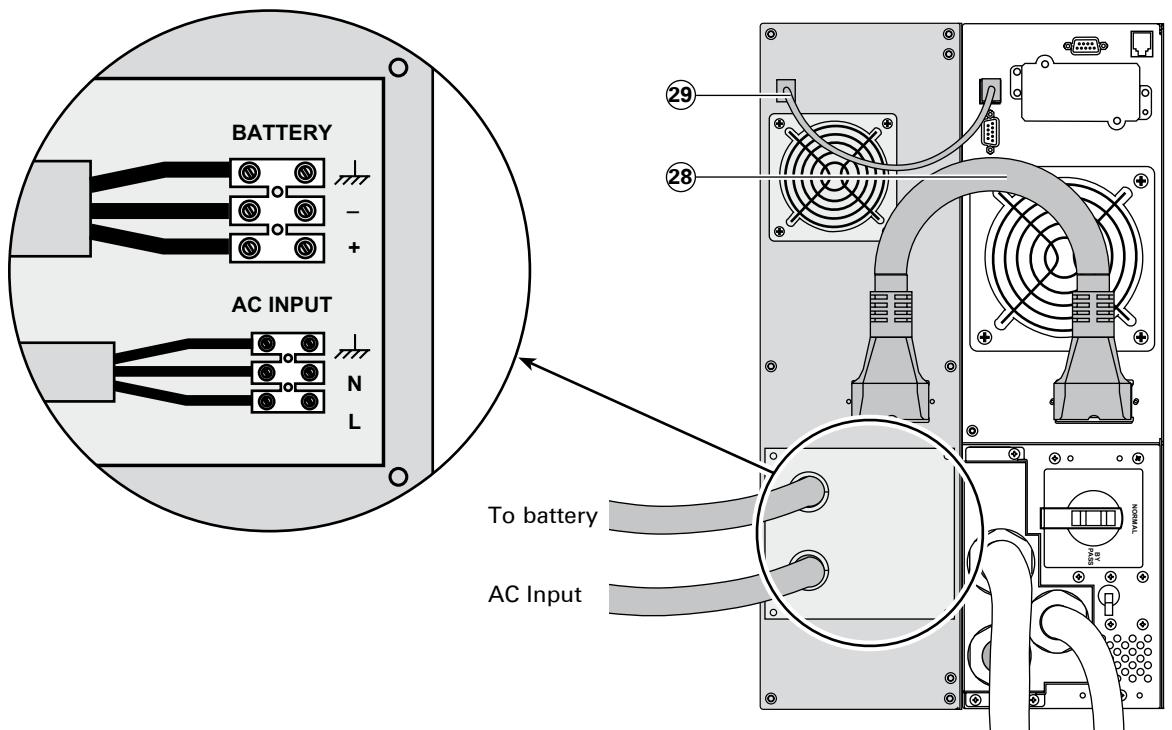
- 1 - Check that the battery circuit breaker **12** is OFF ("0" position),
- 2 - Connect the battery power cable **28** to the connectors **6** of the power and battery modules,
- 3 - Connect the battery detection cable **29** to the connectors **4** of the power and battery modules,

### Connection of galvanic isolation transformer



- Output cable cross-section (not provided): 10 mm<sup>2</sup>, solid or stranded wire (maximum 13 mm<sup>2</sup> or AWG 6).
- Input cable cross-section (not provided): 10 mm<sup>2</sup>, solid or stranded wire (maximum 13 mm<sup>2</sup> or AWG 6).

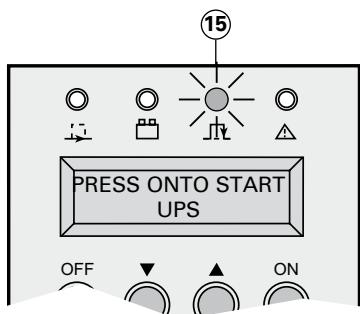
### Connection of CLA module



- Connect the battery cable **28** (provided with the **CLA** module) between the power module and the **CLA** module.
- Connect the cable **29** (provided with the **CLA** module) between the power module and the **CLA** module.
- Connect the battery:
  - cable cross-section (not provided): 10 mm<sup>2</sup>, solid or stranded wire (maximum 13 mm<sup>2</sup> or AWG 6).
- Use a circuit-breaker (curve B, 50 A) for cable protection.
- Connect the input cable of the **CLA** module to the AC input:
  - AC input cable cross-section (not provided) : 2,5 mm<sup>2</sup>.
- Use a circuit-breaker (curve C, 10 A) for cable protection.

### 3. Operation

#### 3.1 Initial start up



Check that the manual bypass switch (15) is on Normal position. Set the normal AC source circuit-breaker (9) to the "I" position. Set the battery circuit breaker (12) to the "I" position.

**The load is powered via the bypass AC source, but not protected by the UPS.**

**Batteries are recharging, an eight-hour recharge period is necessary to get full backup time.**

**LED (15) is ON.**



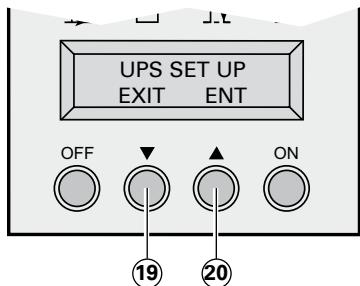
#### UPS personalisation



If specific settings are required, it is recommended to enter the UPS personalisation mode at this stage. It is possible to enter this mode through the front panel buttons or the **Personal Solution-Pac** software for Windows included in the EATON **Solution-Pac** power management suite CD-ROM.



#### Accessing personalisation with front panel buttons



- Press "scroll up" (19) and "scroll down" (20) function buttons together for more than 3 seconds.
- Press the function button (20) placed under the ENT word to enter the set up mode and follow the LCD messages using the buttons now defined as select keys.

#### Local settings

Function	Factory setting	Options
Language	English	French, Spanish, German, Italian.
Date / time format	International format (DD-MM-YYYY/HH:MM)	US format (MM-DD-YYYY/HH:MM AM/PM).
Date / time change	Time in France	MM-DD-YYYY/HH:MM adjustable.
Audible alarm	Quick beeps	Slow beeps.

#### Personnalisation de la sortie

Function	Factory setting	Options	Comments
Output voltage	230 Volts AC	200/208/220/240/250	
Frequency converter	Disabled	Enabled	Bypass AC source disabled.
Output frequency	Auto ranging	50/60 Hz	User selectable under frequency converter mode.
Eco mode	Disabled	Enabled	See glossary.
Hot standby	Disabled	Enabled	N+1 redundancy (See section 2.5 "Hot standby").
Operating mode	Industrial	I/T Network	(*)
Transfer on Bypass AC source	If the Bypass AC source is out of tolerances	If the Bypass AC source is inside tolerances	(*)
Break time	10 ms	10 to 200 ms (by steps of 10 ms)	Break time calibration during load transfer on Bypass AC source out of tolerances.
Overload level	102 %	50/70 %	

(\*) : - Select "I/T Network" and "AC Bypass within tolerance" for computer loads.

- Select "Industrial" and "AC Bypass out of tolerance" in case of absolute need for service continuity (with potential 10 ms break).

### 3. Operation

#### ON/OFF features

Function	Factory setting	Options	Comments
Cold start	Disabled	Enabled	Start on battery.
Forced reboot	Enabled	Disabled	Enables automatic restart of the system even if normal AC source is restored before the end of the shutdown sequence.
Automatic restart	Enabled	Disabled	UPS restarts automatically when normal AC source is restored.
Sleep mode	Disabled	Enabled	Automatic shutdown on battery if output load level < 10%.
UPS ON/OFF by software	Enabled	Disabled	Enables consideration of shutdown or restart orders from software to be authorized.

#### Personnalisation batterie

Function	Factory setting	Options	Comments
Battery test	Every week	No test / daily / monthly	
Low battery signal	20 %	0 to 100 %	1% increment.
Run time choice	UPS reads # of battery modules connected	From 50 to 400 Ah	Requires <b>EX RT CLA</b> if using options (see section 1.4 "Battery extensions").
Battery deep discharge protection	Enabled	Disabled	If disabled, lost of EATON warranty.

- Use EXIT key when set up is completed.
- These parameters are only adjustable if **UPS** is OFF.

#### Access to the personalisation through external software



- Insert the **Solution-Pac** CD ROM in your CD drive.
- At the first Navigator Screen, select "Installation" and follow the instructions to install **Personal Solution-Pac** for Windows.
- If nothing appears, launch startup.exe
- Then go to "Advanced settings" and "UPS settings".

Please note that the Linux/Unix/MacOS versions of **Personal Solution-Pac** do not include this feature.

#### 3.2 Final start up sequence



- Press the ON button more than 3 seconds.
- After UPS internal test sequence, the green LED **(13)** goes on.

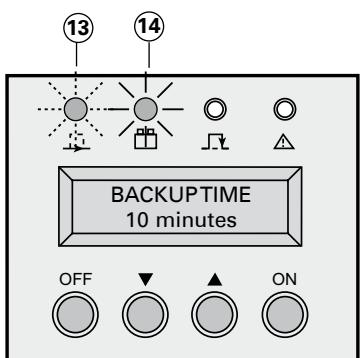
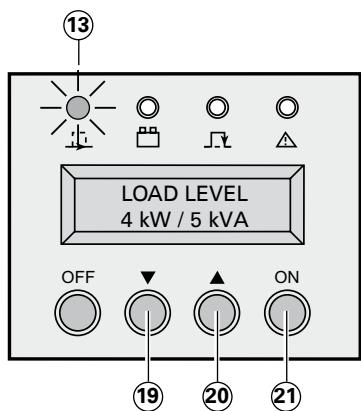


During the restart, if the Bypass AC source is out of tolerance, the UPS will generate an output 10 ms calibrated break.

### 3. Operation

#### 3.3 Operating modes

##### Normal (double conversion) mode



This is the standard operating mode, set by default in the factory.

Two possible choices.

##### 1 - Normal AC source available:

LED 13 is ON.

**The load is protected by the UPS.**

Scroll up 19 and scroll down 20 function buttons allow you to read the UPS measurements (Normal AC source voltage, Bypass AC source voltage, operating mode, battery capacity and UPS Serial Number).

##### 2 - Normal AC source not available:

LED 13 flashes.

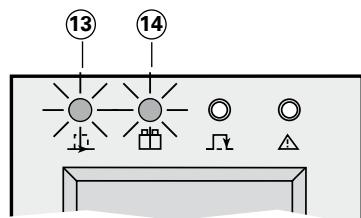
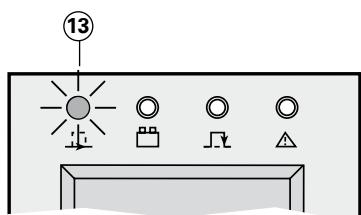
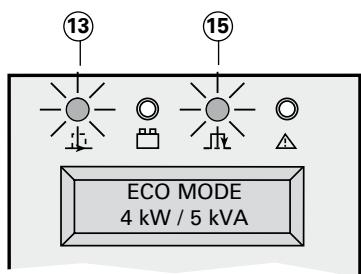
LED 14 is ON.

The audible alarm sounds intermittently.

**The load is supplied by the UPS from battery power.**

**Do not operate the manual Bypass switch 7 when the UPS is in the normal mode.**

##### Eco mode



The main advantage of the Eco mode (see glossary) is that it reduces the consumption of electrical power.

Three possible choices:

##### 1 - Bypass AC source available:

LEDs 13 and 15 are ON.

The load is supplied in ECO mode.

##### 2 - Bypass AC source not available:

LED 13 is ON.

The audio alarm sounds intermittently.

The load is automatically supplied in Normal mode via the Normal AC input.

##### 3 - Both Normal and Bypass AC sources not available or out of tolerance:

LED 13 is ON.

LED 14 is ON.

The audio alarm sounds intermittently.

**The load is supplied by the UPS from battery power.**

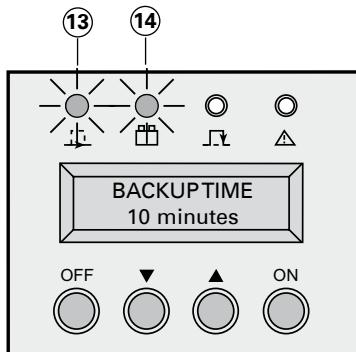
**The display indicates the battery remaining backup time.**

### 3. Operation

#### 3.4 Operation on battery power

The load continues to be protected by the UPS when the Normal AC source is not available. Power is supplied by the battery.

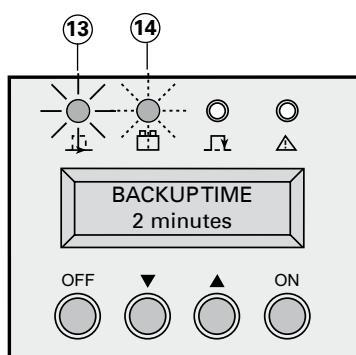
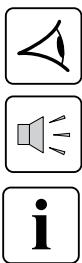
##### Transfer to battery power



LED **13** is ON.  
LED **14** is ON.  
The audio alarm beeps every 10 seconds.

**The load is supplied by the battery.**  
**The display indicates the battery remaining backup time.**

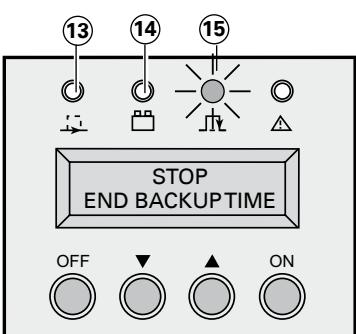
##### Threshold for the low-battery warning



LED **13** is ON.  
LED **14** flashes.  
The audio alarm beeps every 3 seconds.

Low battery warning on display. There is very little remaining battery backup time. Close all applications because UPS automatic shutdown is impending.

##### End of backup time



LED **13** and **14** are OFF.  
The audio alarm is stopped.

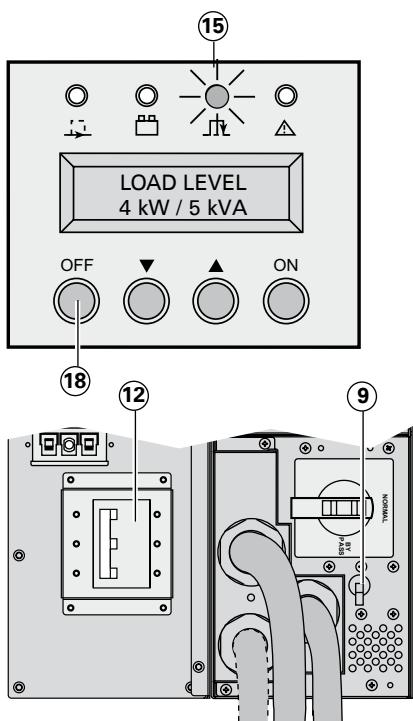
**The load is transferred to the Bypass AC source if available. In this case, the LED 15 is ON.**

#### 3.5 Return of Normal AC source

After an outage, the UPS restarts automatically when AC power is restored (unless this function has been disabled via UPS personalisation).

### 3. Operation

#### 3.6 Shut down



1 - Press the OFF button **18** more than 3 seconds.

**⚠** The load is no longer protected by the UPS. It is powered via the bypass AC source. If the UPS is set in frequency converter mode, the load will not be powered.

If the bypass AC source is out of tolerance, the UPS will generate a 10 ms output calibrated break.

2 - Set the battery circuit breaker(s) **12** to the "0" position.  
3 - Set the Normal AC source circuit-breaker **9** to the "0" position.

4 - For a full shutdown of UPS and connected load, the

### 4.1 Troubleshooting



If any of LEDs **15** or **16** is on, there is an operating anomaly or an alarm. Use "scroll up" or "scroll down" function button to reset the audible alarm.

#### Troubleshooting not requiring EATON after-sales support:

Indication	Signification	Correction
Led <b>15</b> is on, the alphanumeric display shows: <b>BAD CONNECTION</b> <b>REWIRE AC NORMAL</b>	AC source is not connected to the correct terminals.	Rewire correctly the normal AC source.
Led <b>15</b> is on, the alphanumeric display shows: <b>LOAD LEVEL</b> <b>Xx kW / XX KVA</b>	Load supplied by bypass AC source.	Push the ON button for more than 3 seconds.
Led <b>15</b> is on*, the alphanumeric display shows: <b>THERMAL OVERLOAD</b> <b>1XX%</b>	UPS overload.	Check the power drawn by the equipment and disconnect any non-priority devices.
Led <b>16</b> is on, the alphanumeric display shows: <b>CURRENT OVERLOAD</b>	Short circuit conditions on output devices.	Check if any device is shorted or failed.
Audible alarm is on, the alphanumeric display shows: <b>I/O BOX REMOVED</b>	Junction of Input/Output box not correctly screwed.	Check if the junction Input/Output

(\*): if bypass AC source available.

#### Troubleshooting requiring EATON after-sales support:

Indication	Signification	Correction
Leds <b>15</b> * and <b>16</b> are on and audible alarm is on. The alphanumeric display shows: <b>xxx FAULT</b> <b>www.eaton.com</b>	Internal fault and transfer of load on bypass AC source.	Follow the UPS replacement procedure (see section 4.3). Call the after sales support department.
Led <b>15</b> is on* and audible alarm is on. the alphanumeric display shows: <b>BATTERY FAULT</b>	Battery fault during the battery test.	Follow the battery replacement procedure (see section 4.3). Call the after sales support department.
Led <b>15</b> is on, the alphanumeric display shows: <b>SHUTDOWN</b> <b>STATIC SW FAILED</b>	Static switch failure.	Follow the UPS replacement procedure (see section 4.3). Call the after sales support department.
Audible alarm is on, and the alphanumeric display shows: <b>BATTERY CHECK</b> <b>www.eaton.com</b>	Batteries may have exceeded their rated life period. Battery capacity is severely reduced.	Call the local after sales support: <a href="http://www.eaton.com">www.eaton.com</a> , "Contact Us" section**.

(\*): if bypass AC source is available.

(\*\*): to reset this alarm permanently, press both function buttons **19** and **20** for more than 3 seconds and access the LCM Setup menu.

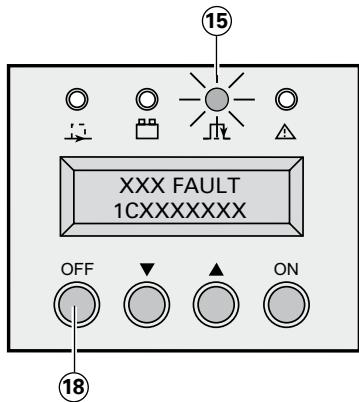
## 4. Maintenance

### 4.2 Hot-swapping the power module



This operation can be performed without interrupting the load.

#### Disconnecting the power module

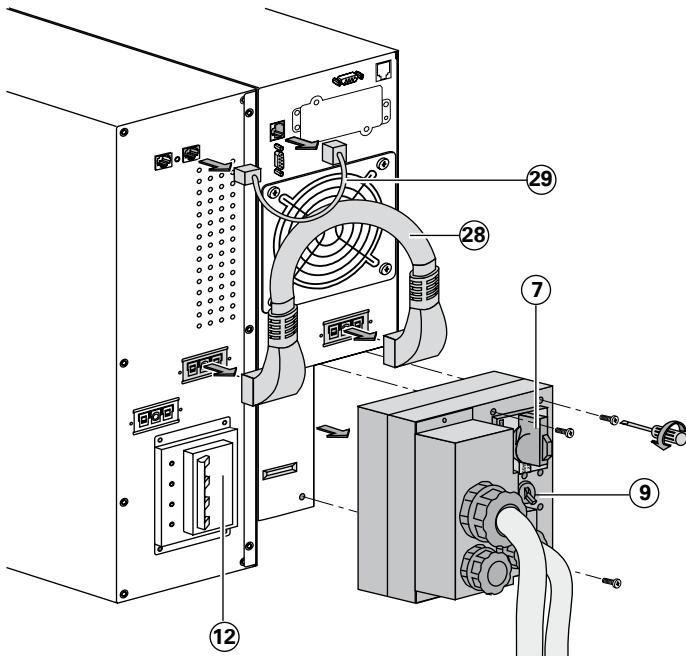


- Stop the UPS with the OFF button **18** (press more than 3 seconds).
- Check if UPS is on bypass AC source:  
led **15** is on (If led **15** is not on, do not turn the manual bypass and call the after sales support department).
- Turn the manual bypass switch **7** to the BYPASS position.
- Switch the battery circuit breaker(s) **12** to the "0" position.
- Switch the Normal AC source circuit-breaker **9** to the "0" position and wait 30 seconds.
- Remove the three fixing screws to free the junction Input/Output box.
- Disconnect the battery cables **28** and **29** from the power module.

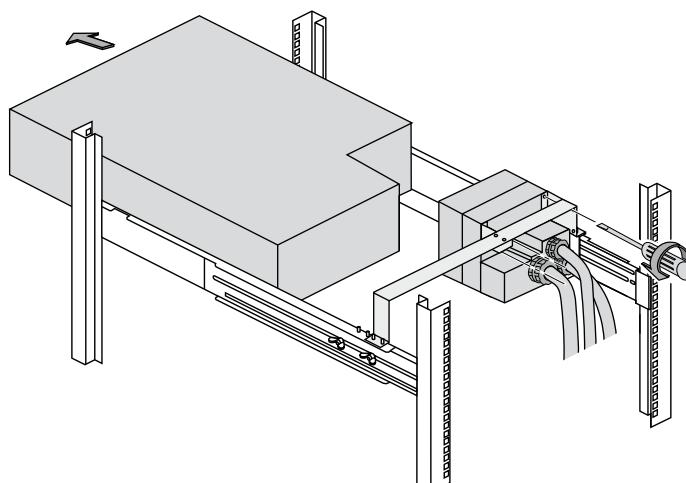
**The power module can be replaced.**

**The connected equipment is powered by the Bypass AC source.**

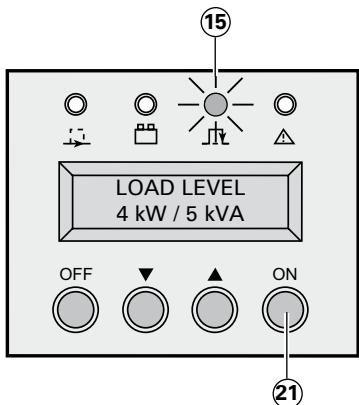
#### Tower configuration



#### Rack configuration



### Reconnecting the power module

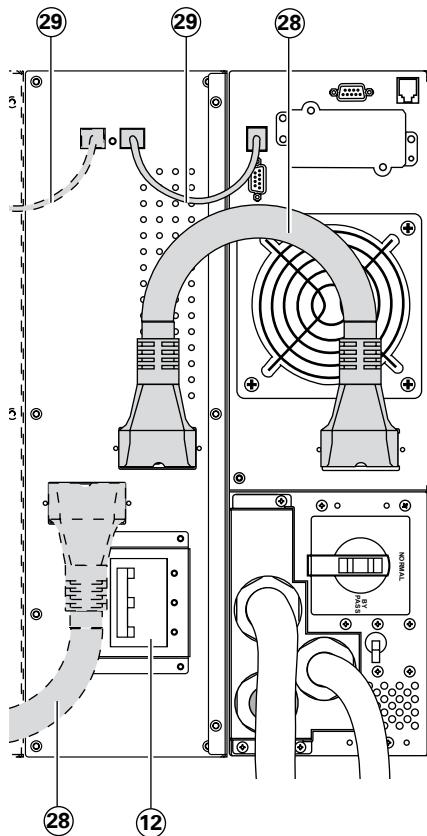


- Secure the Input/Output junction box using the three screws.
- Reconnect the battery cables 28 and 29 to the power module.
- Switch the battery circuit breaker(s) 12 to the "I" position.
- Switch the Normal AC source circuit-breaker 9 to the "I" position.
- Turn the manual bypass switch from the BYPASS to the NORMAL position.
- Check that the led 15 is on.
- Follow initial start up sequence (see section 3.1) in order to personalize the UPS.
- Push the ON button 21 for more than 3 seconds.

The green led 13 is on, and the connected equipment is now protected by the UPS.

### 4.3 Hot-swapping the battery module

#### Disconnecting the battery module



- Switch the battery circuit breaker(s) 12 to the "0" position.
- Disconnect the battery cables 28 and 29 from the power module.

The battery module can be replaced. The connected equipment is powered by the UPS.

It is also possible to replace battery trays instead of battery module.  
Contact your nearest after sales support service.

#### To remove battery trays:

- First, switch the battery circuit breaker(s) 12 to the "0" position.
- See section 2.3 and follow instructions to remove battery trays.

#### Reconnecting the battery module



- Reconnect the battery cables 28 and 29 to the power module.
- Switch the battery circuit breaker(s) 12 to the "I" position.

#### To reconnect battery trays:

See section 2.3 and follow the reverse instructions.

- When battery module front panel is closed, connect the battery cables 28 and 29 to the power module.
- Switch the battery circuit breaker(s) 12 to the "I" position.

## 4. Maintenance

### 4.4 Training Center



To allow you to use EATON products effectively and carry out basic maintenance, we offer a complete range of technical training courses in English and French.

For further information, please visit our website: [www.eaton.com](http://www.eaton.com)

## 5.1 Technical specifications

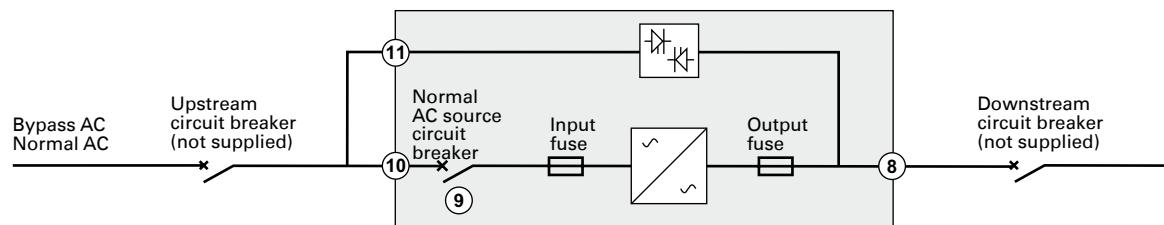
### Electrical characteristics

#### I/T network and industrial operating modes

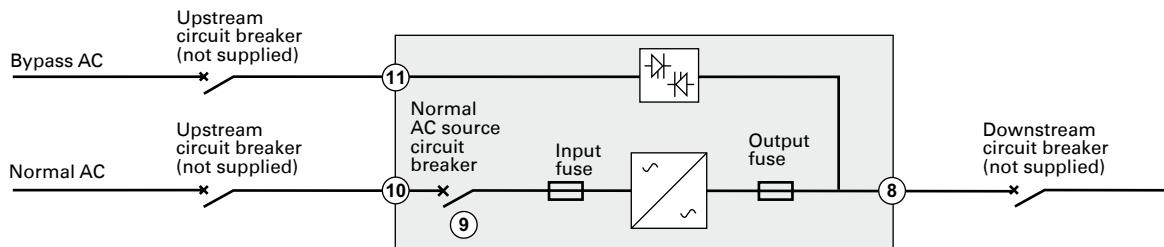
	Mode Industrial mode	I/T network mode
Overload, and Bypass AC source in tolerance.	Same as I/T network mode, but the UPS does not return to normal mode if overload released.	Load is transferred to Bypass AC source. UPS returns to normal mode if overload released.
Overload, and Bypass AC source not in tolerance.	Load is transferred to Bypass AC source with 10 milliseconds output break. The UPS does not return to normal mode if overload released.	The UPS shuts down and load is not transferred to Bypass AC source.
Output short circuit and Bypass AC source in tolerance.	Load is transferred to Bypass AC source, the UPS returns to normal mode if the short circuit is released by downstream circuit breaker action (see section 2.6).	The load remains powered by the UPS. The UPS shuts down after 3 minutes if the short circuit remains.
Output short circuit and Bypass AC source not in tolerance.	The load is transferred to Bypass AC source with 10 milliseconds output break. The UPS does not return to normal mode if the short circuit is released by downstream circuit breaker action (see section 2.6).	The load remains powered by the UPS. The UPS shuts down after 3 minutes if the short circuit remains.

#### Selection of protection devices

##### UPS unit with common Normal and Bypass AC inputs



##### UPS unit with separate Normal and Bypass AC inputs



When sizing the upstream circuit breakers, the parameters presented below must be taken into account:

#### Line current values

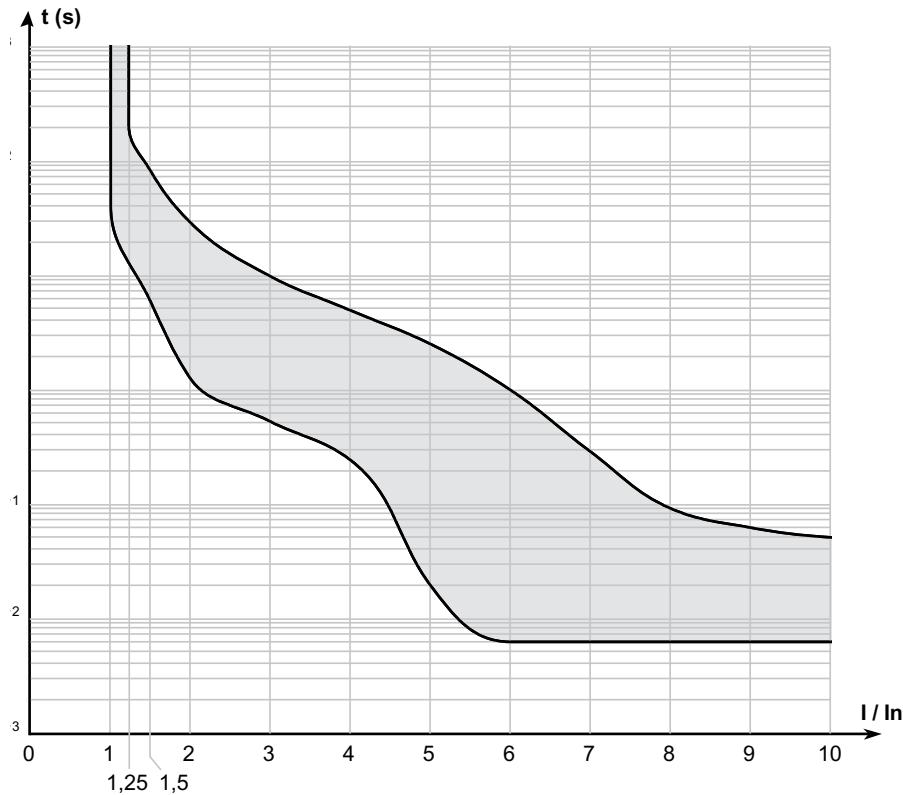
UPS power rating	Continuous current at 400/320 Volts and nominal load	Continuous current at 320 Volts and overload = 110 % limited to 2 minutes	Input fuse rating	Output fuse rating
5 kVA	9/10 A	11 A	25 A	80 A
7 kVA	10/11 A	12 A	25 A	80 A
11 kVA	15/19 A	21 A	30 A	100 A

Discrimination of upstream/downstream protections mentioned in paragraph 2.6 is achieved for a 30 m cable length and 10 mm<sup>2</sup> cross section.

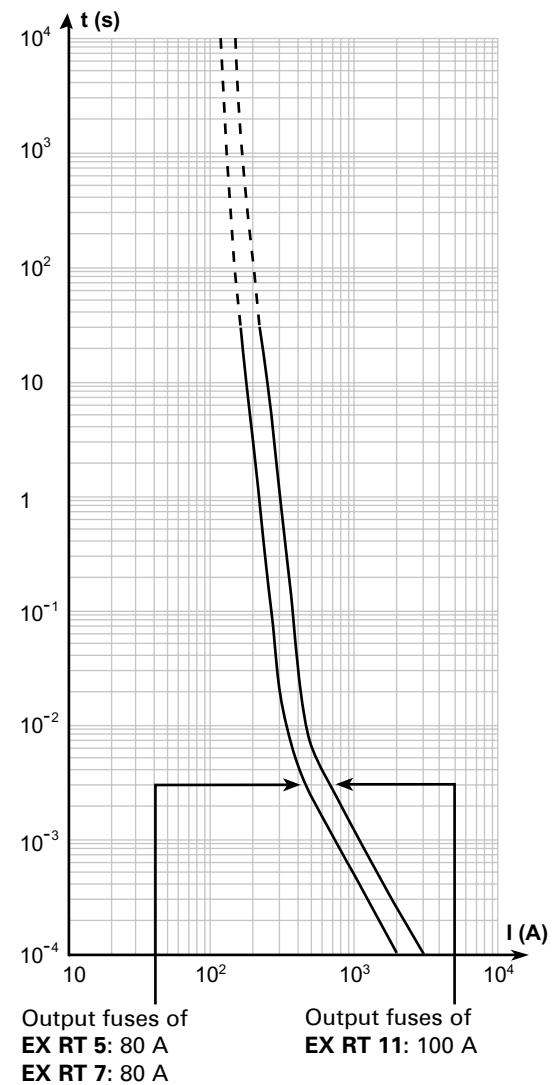
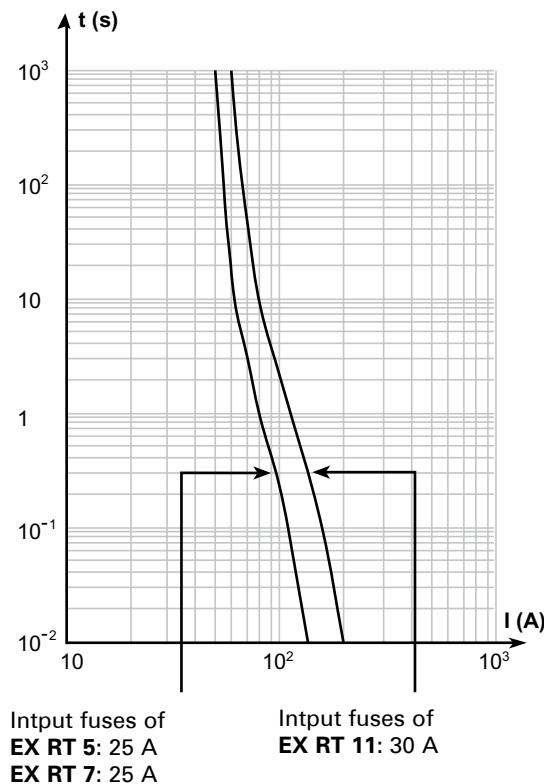
Circuit breaker capacity must be selected according to the installation, length and cross section of cables.

## 5. Appendices

Time/current curves for UPS Normal AC source circuit-breaker



Time/current curves for UPS input and output fuses



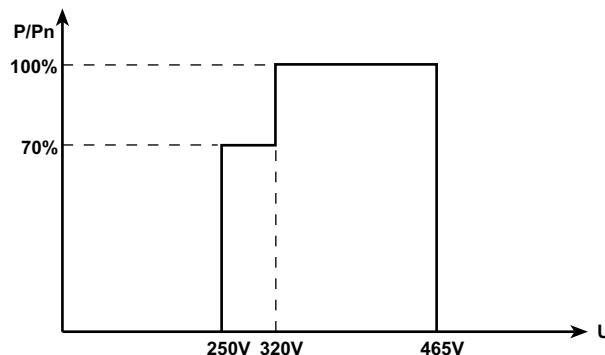
### UPS Input / output characteristics

Source	Voltage	Frequency
Normal AC source	320 to 465 Volts AC	40 to 70 Hz
Bypass AC source	187 to 264 Volts AC*	48 to 52 Hz**
Load output	230 Volts AC (200/208/220/240/250 V are possible values)	50/60 Hz autoranging (or frequency converter)

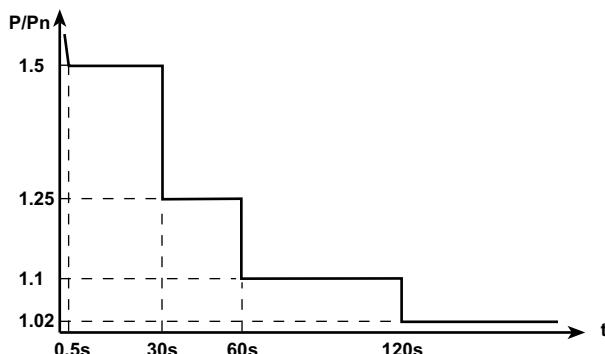
(\*): depends on output voltage setting, can be modified by software.

(\*\*): set to +/- 4% by default, (1,2,4,8 are possible values), can be modified by software.

### Power supplied as a function of input voltage



### Permissible UPS overloads as a function of time



### Short-circuit current provided by the UPS in Normal or Batterie mode

- EX RT 5: 110 A for 80 ms.
- EX RT 7: 110 A for 80 ms.
- EX RT 11: 150 A for 80 ms.

### EX RT Transformer

Nominal power	11 kVA
Nominal current	63 A
Input voltage	160-280 Volts AC
Voltage drop	7 Volts at nominal load
Frequency	50/60 Hz (+/- 10 %)
Isolation (EN 61558-1-2-4)	3.75 kV / 5 M ohms
Operating temperature	From 0° to +40°C
Max. operating rel. humidity	95 %
Derating / altitude	Pn -10 % > 1000 m
Dimensions HxWxD (tower)	444 x 131 x 635 mm
Dimensions HxWxD (rack 3U)	131 x 444 x 635 mm
Weight	86.5 kg

## 5. Appendices

### EX RT CLA module

- AC input voltage: 160-280 Volts AC,
- Input frequency: 40-70 Hz,
- Battery charge current: 6 A DC,
- Recharge time to recover 90% of the rated backup time after discharge at full load:

	Configuration for 2 hours backup time	Configuration for 4 hours backup time	Configuration for 8 hours backup time
<b>EX RT 5</b>	5 hours	12 hours	20 hours
<b>EX RT 7</b>	5 hours	12 hours	20 hours
<b>EX RT 11</b>	7 hours	15 hours	24 hours

### Thermal characteristics

- The operating temperature is 0 to 40°C (8 hours at 45°C), however optimum operation is within the +20 to +25°C range.
- Battery backup time is adversely affected by high and low temperatures. It is significantly reduced at temperatures under 10°C. Above 25°C, battery service life is cut in half every 10°C. Above 40°C, battery manufacturers no longer guarantee operation due to the risk of thermal runaway.
- Air enters through the front and exits through the back.

## 5.2 Glossary

<b>Backup time</b>	Time that the connected loads can operate on battery power.
<b>Bypass AC source</b>	Source supplying the bypass line. The load can be transferred to the bypass line if an overload occurs on the UPS output, for maintenance or in the event of a malfunction.
<b>ECO mode</b>	Operating mode by which the load is supplied directly by the AC source if it is within the tolerances defined by the user. This mode reduces the consumption of electrical power.
<b>Load</b>	Devices or systems connected to the UPS output.
<b>Manual bypass</b>	Rotary switch controlled by the user, used to connect the loads directly to the AC source. Transfer of the load to the manual bypass enables UPS maintenance without interrupting the supply of power to the connected loads.
<b>Normal (double conversion) mode</b>	The normal UPS operating mode in which the AC source supplies the UPS which in turn supplies the connected loads (after electronic double conversion).
<b>Normal AC source</b>	Normal source of power for the UPS.
<b>Relay contacts</b>	Contacts supplying information to the user in the form of signals.
<b>UPS</b>	Uninterruptible Power Supply.