Pulsar EX

EX 700RT / EX 1000RT
EX 1500RT

Installation and User Manual

THE UNINTERRUPTIBLE POWER PROVIDER

MGE
UPS SYSTEMS

Introduction

Important safety instructions
Read before installing product

SAVE THESE INSTRUCTIONS. This manual contains important instructions that should be followed during installation and maintenance of the UPS and batteries.

Thank you for selecting an MGE UPS SYSTEMS, INC. product to protect your electrical equipment.

The **Pulsar 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 your UPS's many features.

MGE UPS SYSTEMS, INC. pays great attention to the environmental impact of its products.
Measures that have made **Pulsar EX RT** a reference in environmental protection include:

- The eco-design approach used in product development,
- Recycling of **Pulsar EX RT** at the end of its service life.

To discover the entire range of MGE UPS SYSTEMS, INC. products and the options available for the **Pulsar EX RT** range, we invite you to visit our web site at www.mgeups.com or contact your MGE UPS SYSTEMS, INC. representative.

This manual contains important instructions for **Pulsar EX RT** Models that must be followed during installation, operation and maintenance of the UPS and batteries.

The **Pulsar EX RT** models that are covered in this manual are listed below:

UPS EX 700RT (700VA/490W), part number 85070.

UPS EX 1000RT (1000VA/700W), part number 85100.

UPS EX 1500RT (1500VA/1050W), part number 85150.

For extended back up time, the above UPS's can be used with the optional extended battery module, Pulsar EXB 1500RT (36Vdc, 14Ah), part number 85001.

The UPS Pulsar EX 700RT, EX 1000RT, and EX 1500RT are intended for installation in an environment within 0 to 40° C, free of conductive contaminant.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

CAUTION: Safety of persons

- The UPS has its own internal power source (the battery). Consequently, the power outlets may be energized even if the UPS is disconnected from the AC power source.
- Dangerous voltage levels are present within the UPS. It should be opened exclusively by qualified service personnel.
- The UPS must be properly grounded. Measurements are required to ensure that the total leakage current of the UPS and the protected equipment does not exceed 3.5 mA by checking their characteristics (maximum leakage current of the UPS = 2 mA).
- The battery supplied with the UPS contains small amounts of toxic materials. To avoid accidents, the directives listed below must be observed:
  - Never burn the battery (risk of explosion).
  - Do not attempt to open the battery (the electrolyte is dangerous for the eyes and skin).
  - Comply with all applicable regulations for the disposal of the battery.
  - Batteries constitute a danger (electrical shock, burns). The short-circuit current may be very high. Precautions must be taken for all handling: remove watches, rings, bracelets and any other metal objects, use tools with insulated handles.
  - Do not lay tools or metal parts on top of batteries.

CAUTION: Product Safety

- The UPS connection instructions and operation described in the manual must be followed in the indicated order.
- UPS must be connected to a nearby wall outlet that is easily accessible. The UPS can be disconnected from the AC power source by removing the power cord.
- Check that the indications on the rating plate correspond to your AC powered system and to the actual electrical consumption of all the equipment to be connected to the UPS.
- Never install the UPS near liquids or in an excessively damp environment.
- Never let a foreign body penetrate inside the UPS.
- Never block the ventilation grates of the UPS.
- Never expose the UPS to direct sunlight or source of heat.
- If the UPS must be stored prior to installation, storage must be in a dry place.
- The admissible storage temperature range is -25ºC to +55ºC.

Special Precautions

- All handling operations will require at least two people (unpacking, installation in rack system).
- Once installed and connected to the AC power source for the first time, the battery will start to charge. Full charging to obtain the rated battery backup time requires at least 8 hours.
- Before and after the installation, if the UPS remains de-energized for a long period, the UPS must be energized for a period of 24 hours, at least once every 6 months (for a normal storage temperature less than 25°C). This charges the battery, thus avoiding possible irreversible damage. During the replacement of the battery module, it is imperative to use the same type and number of element as the original battery module provided with the UPS to maintain an identical level of performance and safety. In case of doubt, don't hesitate to contact our after sales department (for more information, refer to the web site www.mgeups.com).

How to use this document

Using this document

Information may be found primarily by consulting:
- The contents,
- The index.

Icon Usage

WARNING: Eminent hazard to personnel or equipment, information must always be followed.

CAUTION: Hazard to personnel or equipment, information that must always be followed.

Notes, tips and information, help.

Important information, help.

Visual indication.

Action.

Audio indication.

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

LED off.

LED on.

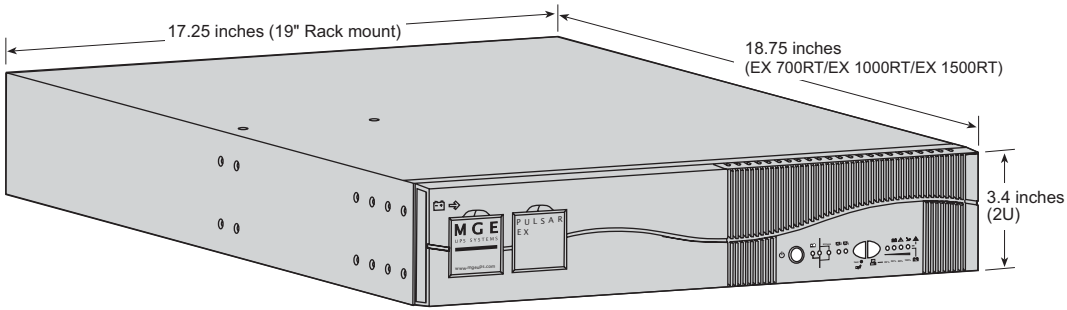
LED flashing.

Contents

Contents

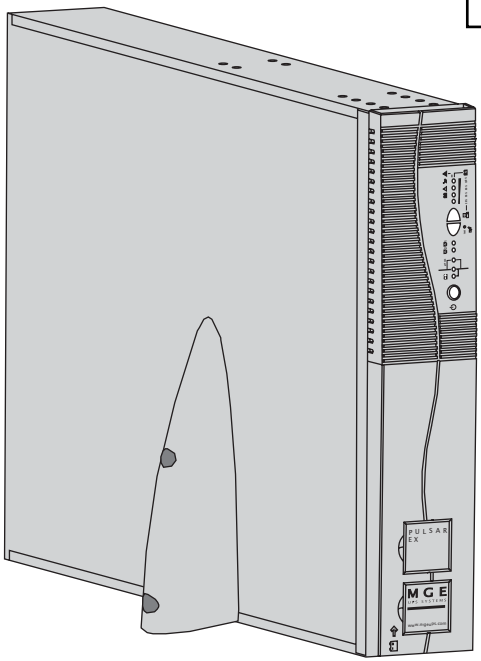
1.1 System configurations

Rack setup



Model	Part Number	Weight (lbs/kg)
Pulsar EX700RT	85070	42.0 lbs (19.0 kg)
Pulsar EX1000RT	85100	42.0 lbs (19.0 kg)
Pulsar EX1500RT	85150	46.0 lbs (20.5 kg)

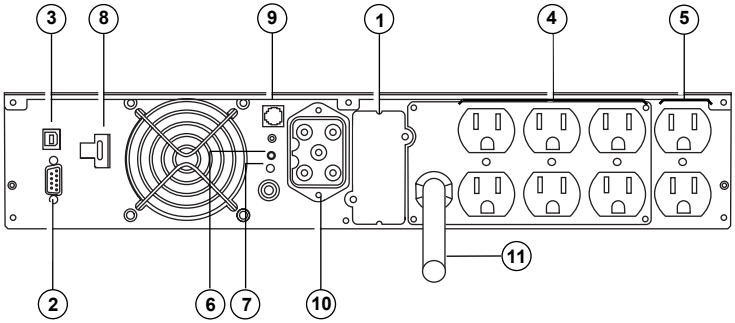
Tower setup



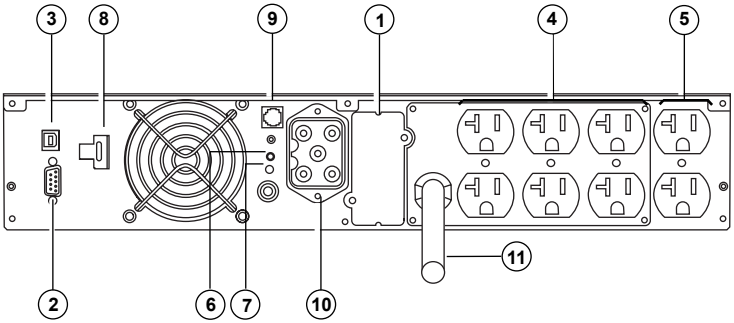
1. Presentation

1.2 Rear panel

Pulsar EX700RT/EX1000RT

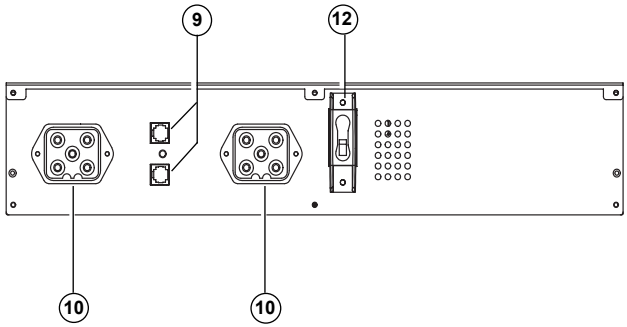


Pulsar EX1500RT



Pulsar EXB 1500RT (optional)

NOTE: The EXB 1500RT extended battery module is designed to work with all EX700RT, EX100RT, EX1500RT UPS units.



(1) Slot for communication-card option.

(2) RS232 communication port.

(3) USB communication port.

(4) Six NEMA 5-15/20R (EX 1500 RT), six NEMA-5-15R (EX 700 RT, EX 1000 RT) receptacles for connection to AC power load.

(5) Two programmable NEMA 5-15/20R (EX 1500 RT), two programmable NEMA-5-15R (EX 700 RT, EX 1000 RT) receptacles.

(6) Pushbutton to test phase/neutral inversion of AC power source.

(7) LED indicating Site Wiring Alarm Enable, with flashing and intermittent buzzer. Reset fault with rear panel button.

(8) Connector for remote power off (RPO).

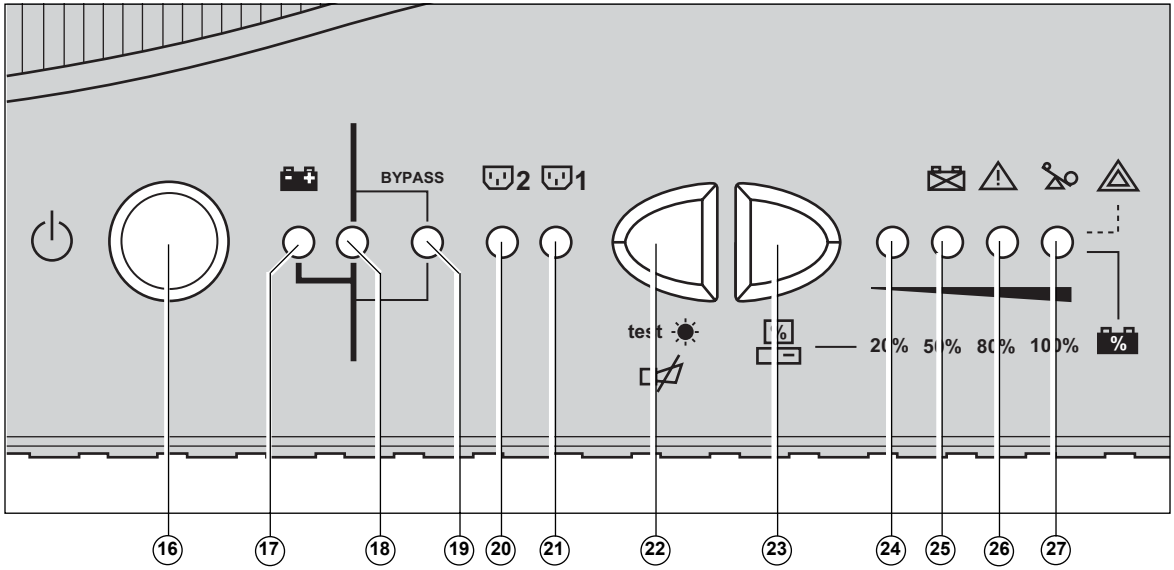
(9) Connector for automatic detection of an additional battery module.

(10) Connector for an additional battery module.

(11) NEMA 5-15P Input power plug for direct connection to AC power source.

(12) Circuit breaker for battery ON/OFF and protection.

1.3 Control panel



(16) ON / OFF.

(17) Operation on battery power.

(18) Operation in ON-LINE mode (backup power available).

(19) Operation on bypass (no backup power available).

(20) Status of programmable outlet 2:

(21) Status of programmable outlet 1:

- Supplied with power
- Status change in progress.

(22)
- Lamp test or buzzer OFF.
- Forced transfer to bypass and back by pressing button 3 times in less than 5 seconds.

Press simultaneously at least 3 seconds to reset the “End of battery life” alarm.

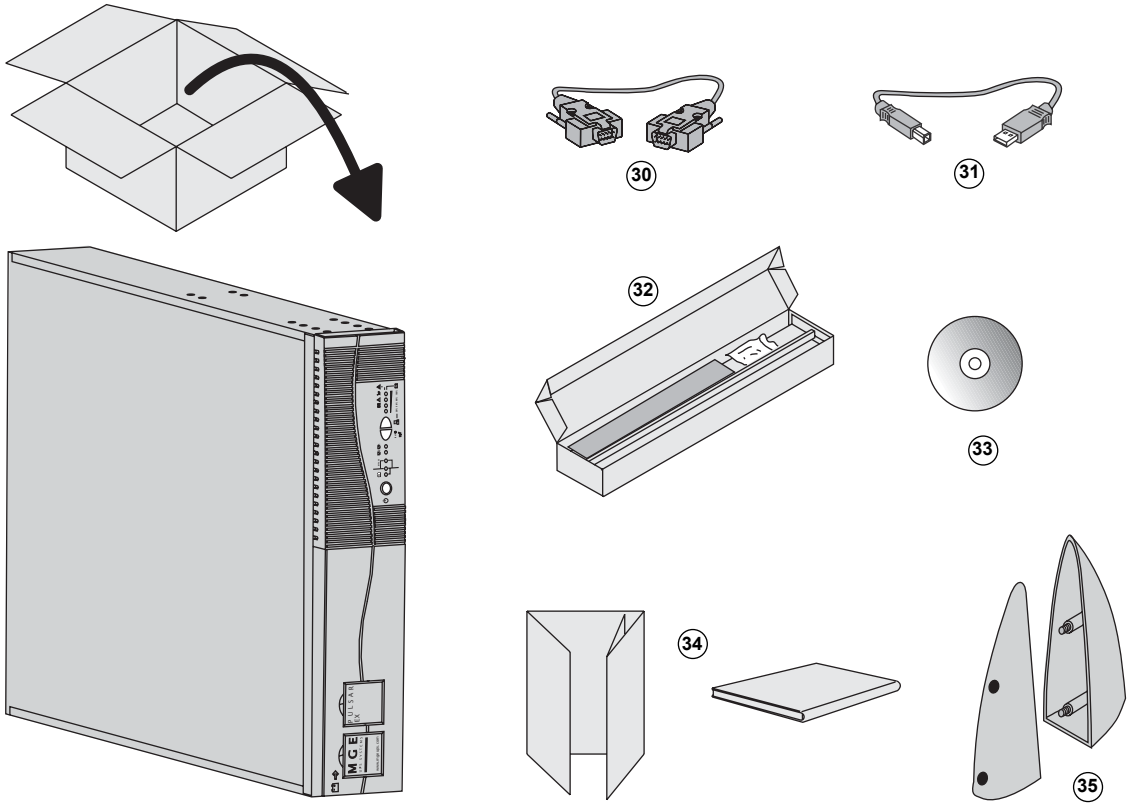
(23) Hold down to display percent load:

Alarms	% battery remaining	% load
(27) UPS overload	100%	100%
(26) Electronics fault	80%	80%
(25) Battery fault *	50%	50%
(24) Site Wiring Fault	20%	20%

(*) :
- flashing LED + buzzer: battery fault (battery must be replaced).
- flashing LED + long buzzer (once per hour): theoretical end of battery life (replacement recommended).

2. Installation

2.1 Unpacking



(30) RS232 communication cable.

(31) USB communication cable.

(32) Telescopic rails for mounting in 19" bay with mounting hardware.

(33) CD-ROM with the **Solution-Pac** and **UPS Driver** software.

(34) Product documentation.

(35) Two tower supports for the upright position.

2.2 Installation in rack position

Follow steps A to D for rack mounting of the UPS on the rails. The rails and the necessary mounting hardware are supplied in the box along with the UPS (see item (32) on page 10).

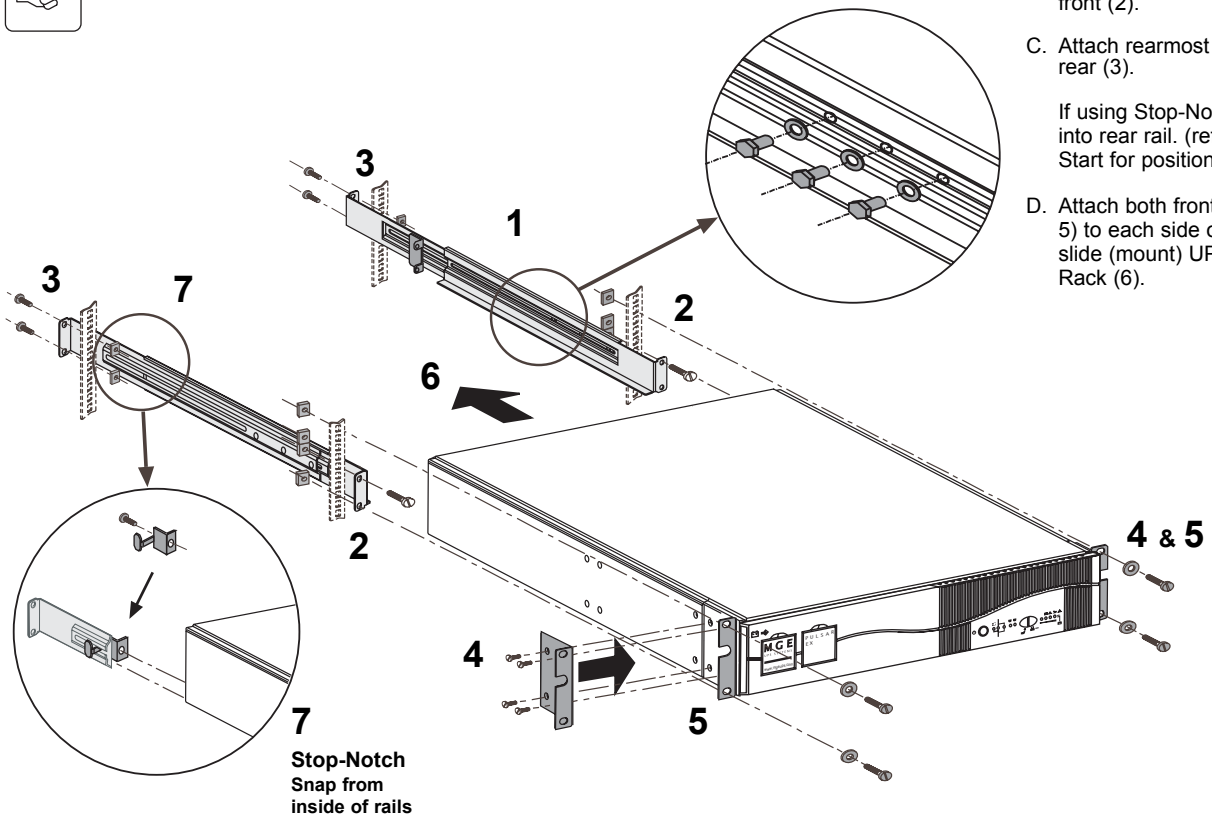
A. Secure Rails together with three screws (1).

B. Attach frontal Rails to Rack front (2).

C. Attach rearmost Rails to Rack rear (3).

If using Stop-Notch (7) snap into rear rail. (refer to Quick Start for positioning details.)

D. Attach both front brackets (4 & 5) to each side of UPS, and slide (mount) UPS into the Rack (6).



CAUTION: Do not lean or place objects on top of unit at any time. Hazard of dismounting and disconnection can occur with units.

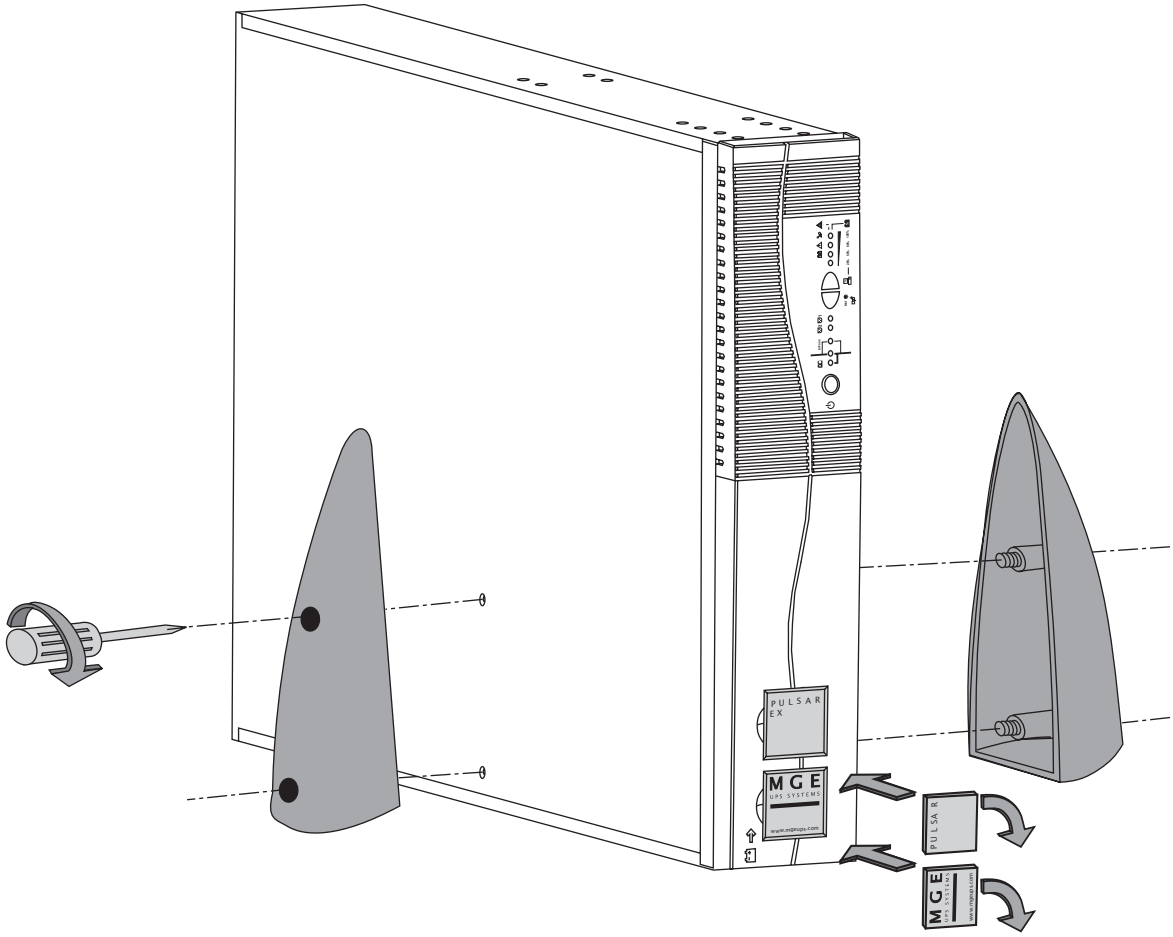
NOTE: (For step 5) it is possible to adjust the position of the front fixed bracket.

2. Installation

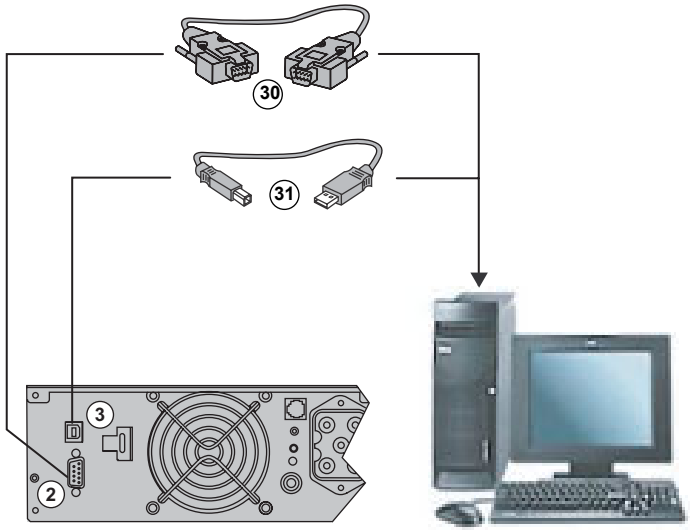
2.3 Installation in tower position

Install the two tower supports for the upright position using provided hardware in the package.
(see item 35 on page 10).

Pull out the MGE Logo and model plates, then rotate them as shown.



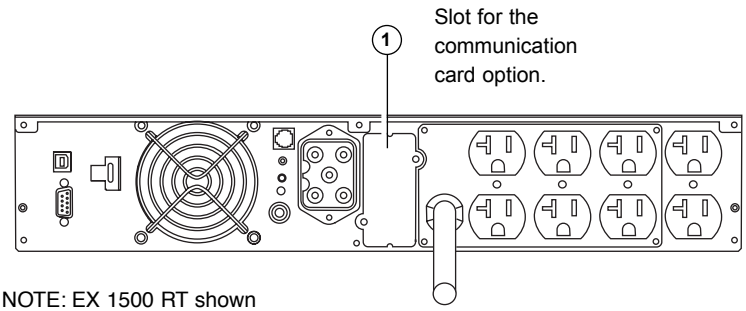
2.4 Connection to the RS232 or USB communication port (optional)



1. Connect the RS232 (30) or USB (31) communication cable to the serial port or the USB port on the computer.
2. Connect the other end of the communication cable (30) or (31) to the RS232 (2) or USB (3) communication port on the UPS.

NOTE: The RS232 and USB communication ports cannot be used at the same time.

2.5 Installation of the optional communication-card



NOTE: EX 1500 RT shown

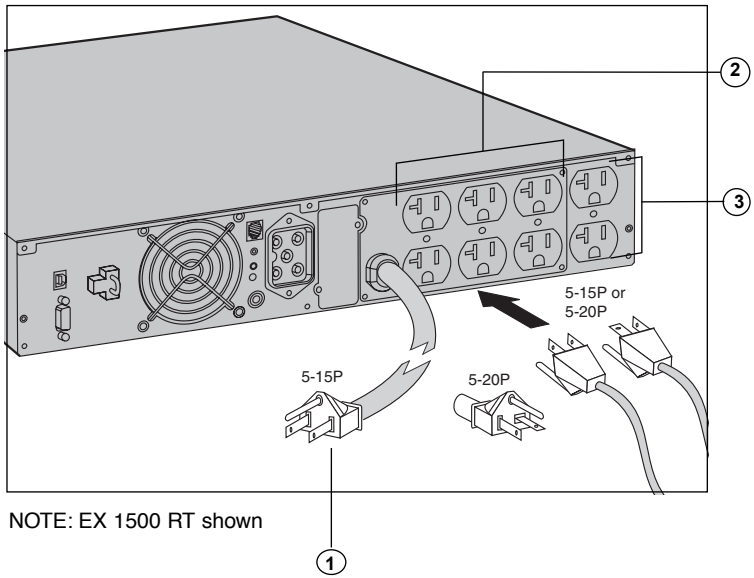
It is not necessary to shut down the UPS to install the communication card:

1. Remove the slot (1) cover secured by two screws.
2. Insert the card in the slot.
3. Secure the card with the two screws.

2. Installation

2.6 Connections

CAUTION: Check that the indications on the rating plate (on the back of the UPS), correspond to your AC power system, and to the actual electrical consumption of all the equipment to be connected to the UPS.



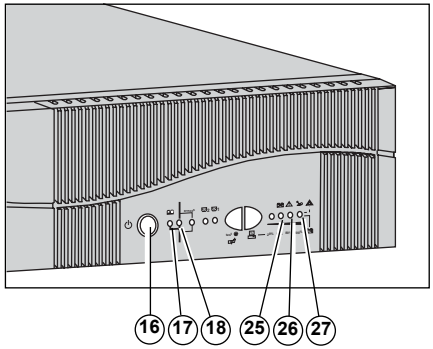
NOTE: EX 1500 RT shown

1. Connect the input power cord (1) to the AC outlet.
2. Connect the protected equipment to the UPS. It is advised to connect priority loads to the NEMA 5-15/20P outlets (2) and any non-priority loads to the two programmable outlets (3) (If the UPS is connected to a computer running MGE UPS SYSTEMS, INC. communication software, it is possible to program the interruption of power to the two programmable outlets (3) during operation on battery power, thus reserving backup power for the priority loads).

The battery begins charging the instant the UPS unit is connected to a power source. Eight hours are required to charge to the full rated backup time.

3.1 Start-up

The protected equipment connected to the UPS can be energized, whether AC input power is available or not.



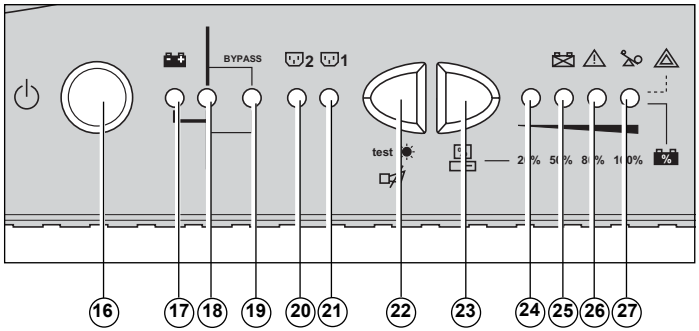
CAUTION:The AC input power source must be present when energizing for the first time.

1. Press the ON / OFF button (16).
   - The buzzer beeps and all the LED's go ON.
   - The buzzer beeps twice, then:
   - If AC input power is available, LED (18) goes ON, indicating operation in ON-LINE mode.
   - If AC input power is not available and the UPS is configured for automatic restart mode, the buzzer beeps three times and LED (17) goes ON, signaling operation on battery power.

All connected equipment is energized.

NOTE: If LED's (17) or (18) do not turn ON or if LED's (25) to (27) flash, there is a fault (see section 4.1 Troubleshooting, page 20).

3.2 LED indicators



LED's (24) to (27) provide three different indications:

1. Remaining backup time in percent (during normal operation).
2. Percent load drawn by the protected equipment, when button (23) is pressed.
3. Operating faults (flashing LED and beeps):
   - (27) Overload.
   - (26) UPS fault.
   - (25) Battery fault or end of life warning.
   - (24) Site Wiring Fault

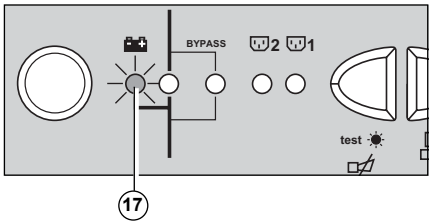
Description of LED indicator status (20) and (21) for programmable outlets 1 and 2:

- OFF: the outlets are not supplied with power.
- Flashing: status change in progress.
- ON: the outlets are supplied with power.
  Outlets 1 and 2 can be remotely programmed and controlled.
  They may be used for sequential start-up of the protected applications, shedding of non-priority applications during operation on battery power, and priority management at the end of battery backup time to reserve the longest possible backup time for the most sensitive applications. These outlets are programmed using **Solution-Pac** software.

3. Operation

3.3 Operation on battery power (following an AC input power failure)

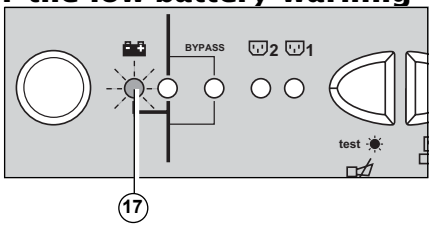
Transfer to battery power



The AC power source is outside tolerances, LED (17) is ON, the buzzer beeps three times.

The AC power to equipment connected to the UPS is supplied by the battery.

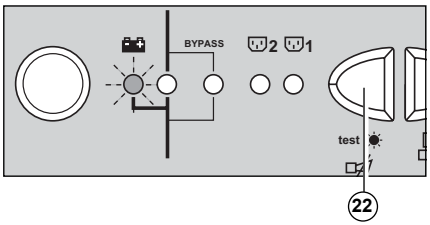
Threshold for the low-battery warning



The low-battery warning threshold can be set by the user, with the **UPS Driver** software (see section 3.4 Personalization, page 17).
LED (17) flashes.
The buzzer beeps every three seconds.

There is very little remaining battery backup time. Close all applications because UPS automatic shutdown is imminent.

End of backup time



The buzzer sounds continuously.
Press button (22) to turn the buzzer OFF.

The equipment is no longer supplied with power.

The UPS goes to sleep mode at the end of the battery backup time, until complete shutdown, due to tripping of the battery-protection function against deep discharge.

Return of AC input power:
IMPORTANT: If, in spite of the return of AC input power, the UPS does not restart, check that the automatic-restart function (activated by return of AC input power) has not been disabled (see section 3.4).

3.4 Personalization (optional)

Function

Personalization parameters can be set and modified using the **UPS Driver** software installed on a computer that is connected to the UPS (see section 2.4 Connection to the RS232 communication port, page 13).

NOTE: Check that the RS232 cable (30) is properly connected.

UPS Driver installation:

1. Insert the **Solution-Pac** CD-ROM containing the **UPS Driver** software into the computers CD ROM drive.
2. Open the file Manager and select the CD-ROM drive.
3. Launch "\Emb\Config\UPSDRVxx.exe" (xx = software version).

IMPORTANT: You can download the software **UPS Driver** from the www.mgeups.com as well, or contact an MGE representative in your area. Once **UPS Driver** has been installed, the UPS parameters listed below can be modified.

"ON / OFF conditions" tab

Personalization function	Default setting	Options
Automatic start	Enabled	Disabled
Cold start (battery power)	Enabled	Disabled
Forced shutdown	Enabled	Disabled
Sleep mode	Disabled	Enabled
UPS ON / OFF via software	Enabled	Disabled

"Battery" tab

Personalization function	Default setting	Options
Automatic "Battery test" intervals	Every weeks	Once a day Once a month No test
"Low-battery warning" threshold	20% remaining battery backup time	From 0% to 100% of the remaining battery backup time
Protection against deep discharges	Enabled	Disabled

3. Operation

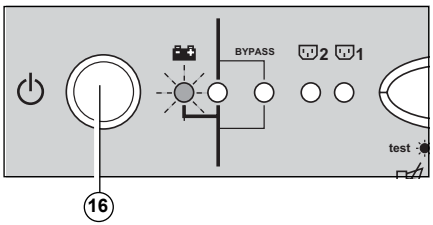
"Output" tab

Personalization function	Default setting	Options
Rated UPS voltage	120 V	100 V - 127 V
Frequency working mode	Autoselect	Converter
Rated UPS frequency	F = 60 Hz	50 Hz
UPS tolerance for AC power source frequency	F ± 5%	F ± 1% to ± 10%, in 1% steps
Overload alarm threshold	110%	0 to 110%, in 10% steps
UPS restart following short-circuit	Disabled	Enabled (click to add check)

"Bypass" tab

Personalization function	Default setting	Options
Transfer to bypass if overload	Enabled	Disabled (click to remove check)
Transfer to bypass following a fault, whatever the conditions on the AC power source	Disabled	Enabled (click to add check)

3.5 UPS shutdown

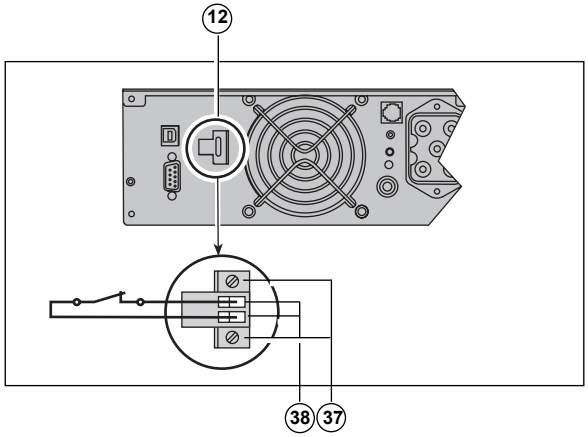


Press button (16) (return to the OFF position).

The connected equipment is no longer supplied with power.

3.6 UPS Remote Power Off (RPO)

Pulsar EX RT's are equipped with a Remote Power Off function (RPO) that can cut power to all the devices connected to the UPS using a remote user-operated contact.
The function is implemented by opening a contact connected to the two terminals of connector (12) on the back of the UPS.



Installation and test of the remote power off function

1. Check that the UPS is shut off and disconnected from the AC outlet power source.
2. Remove the RPO connector (12) by undoing the screws (37).
3. Connect an insulated dry contact (NC, 60 V DC, 30 V AC max., 20 mA max., cable size 0.75 mm) to the two terminals of the RPO connector (38).
4. Put the RPO connector (12) back in place on the back of the UPS.
5. Connect the UPS to the ACoutlet and restart it as indicated previously.
6. Activate the RPO external contact to test the function.
7. To return to normal operation, deactivate the RPO external contact and restart the UPS using button (16) (press OFF, then ON).

4. Maintenance

4.1 Troubleshooting

If any of LED's (25), (26) or (27) flash, there is a operating anomaly or an alarm.

NOTE: If a LED flashes, the bargraph data is no longer displayed.

LED (27) flashes and the buzzer beeps.	UPS overload. Overload is too long or too high. ◗ If AC power is present and within tolerances, the UPS goes to bypass mode (supply directly by the ACoutlet). LED (19) flashes. The buzzer beeps every second. ◗ If AC power is not present or not within tolerances, the connected applications are no longer supplied. The buzzer sounds continuously.	◗ Check the power drawn by the equipment and disconnect any short current or non-priority devices. ◗ Restart the UPS.
LED (25) flashes and the buzzer beeps.	A battery fault was detected during the automatic battery test. ◗ Replace battery module (see section 4.2, page 22).	◗ Check that the battery connector is fully pushed in.
LED (25) flashes and the buzzer emits a long beep once per hour.	The battery has reached the theoretical end of its service life. See the section on maintenance.	◗ Reset the alarm by pressing buttons (22) and (23) simultaneously for 3 seconds. ◗ It is advised to replace the entire battery module with the same rating as the the battery module being replaced.
The yellow LED (24) flashes, the red indicator light (7) behind the UPS comes on and the buzzer sounds continuously.	The function for monitoring the phase and neutral position of your electrical network has detected a reversal.	◗ Directly grounded neutral type networks: check the cabling of phase and neutral on your electrical network. For all other network types, de-activate the detection function (this function is only operational for directly grounded neutral electrical networks): Press for at least 5 seconds the pushbutton (6) behind the UPS (UPS stopped and connected to the network for less than 30 minutes).


Indication	Signification	Correction
LED (26) flashes and the buzzer sounds continuously.	UPS has detected a fault. Depending on the UPS personalization parameters (see section 3.4, page 17). There are two possibilities: ◗ The equipment connected to the UPS continues to receive AC power, but it is directly from the AC power source (via the automatic bypass (LED (19) ON). ◗ The connected equipment is no longer supplied with AC power. The equipment connected to the UPS is no longer protected.	◗ Call the after-sales support department.

4. Maintenance

4.2 Replacement of the battery module

CAUTION: Load will not be protected during this procedure!

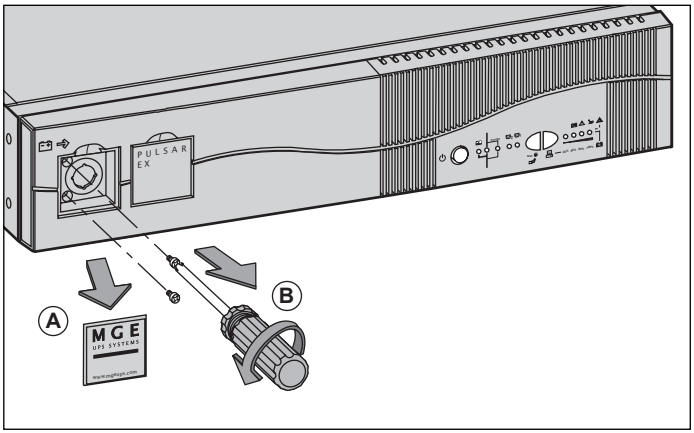
Batteries constitute a danger (electrical shock, burns). The short-circuit current may be very high.

Precautions must be taken for all handling.

Safety Rules:

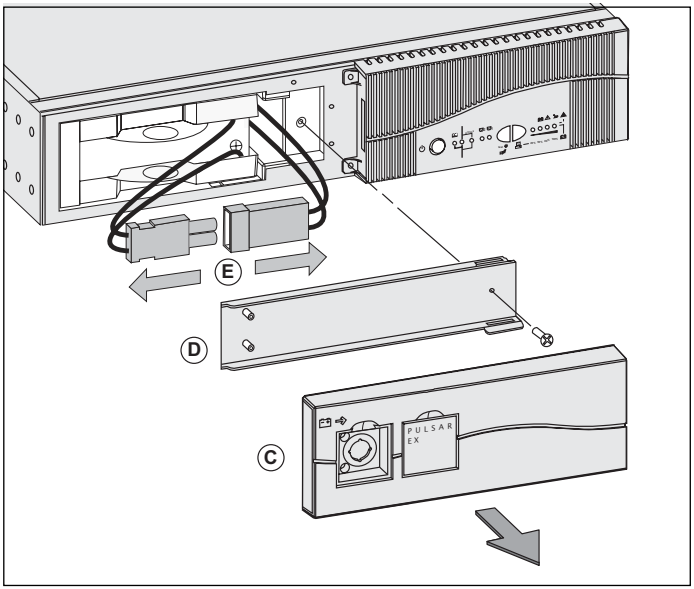
- Remove all watches, rings, bracelets and any other metal objects that may come into contact with the battery module.
- Use tools with insulated handles.

Removal of the battery module



(A) - Unclip the small plate with the MGE UPS SYSTEMS, INC. Logo on the UPS front panel.

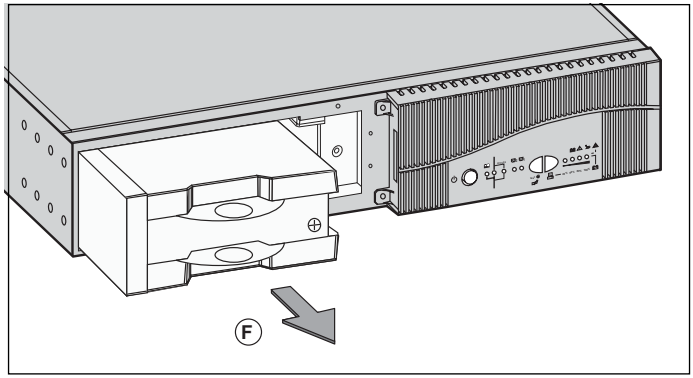
(B) - Remove the 2 screws.



(C) - Remove the left part of the front panel.

(D) - Remove the screw and cover plate.

(E) - Disconnect the connectors.



Ⓕ - Remove the battery module and proceed with replacement.

Reinstallation of the battery module

To reinstall the battery module perform this procedure in reverse order e.g., “F”, “E”, “D”,”C”, “B”, “A”.

- **To maintain an identical level of performance and safety, use a battery module with the same rating as the battery module being replaced.**
- **Press the two parts of the battery connector tightly together to ensure proper connection.**

5. Environment

This product has been designed to respect the environment:

It does not contain any Chlorofluorocarbon (CFC) or Hydrochlorofluorocarbon (HCFC).

UPS recycling at the end of service life:

MGE UPS SYSTEMS, INC. undertakes to recycle, by certified companies and in compliance with all applicable regulations, all UPS products recovered at the end of their service life (contact your MGE UPS SYSTEMS, INC. branch office).

Packing:

UPS packing materials must be recycled in compliance with all applicable regulations.

WARNING:

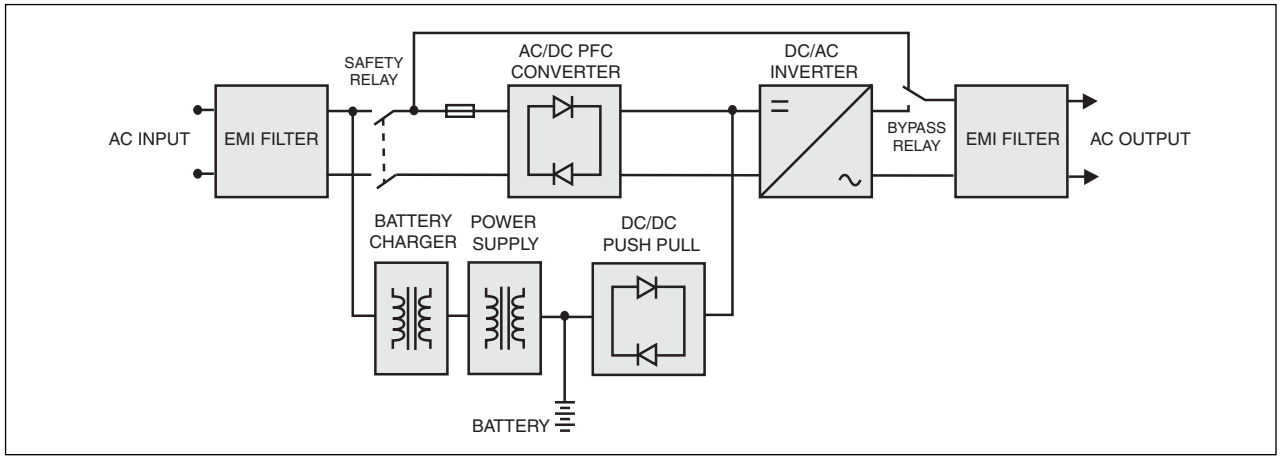
This product contains lead-acid batteries. Lead is a dangerous substance for the environment if it is not properly recycled by specialized companies.

MGE Customer Care Center

Technical questions? If you encounter a problem while following the instructions in this manual, we recommend that you contact our Technical Support Group at **1 800 523-0142**.

Or visit MGE UPS SYSTEMS, INC. website at www.mgeups.com for complete technical support information, FAQ and RMA forms for service.

6.1 Technical characteristics



	Pulsar EX 700RT	Pulsar EX 1000RT	Pulsar EX 1500RT	Pulsar EXB 1500RT
Output power rating	**700 VA / 490 W**	**1000 VA / 700 W**	**1500 VA / 1050 W**	**36VDC - 14 Ah**
AC-input ◗ Voltage ◗ Frequency ◗ Power factor	Single phase, 60 V / 70 V / 80 V to 142 V (1) 50/60 Hz (auto-select) ≥ 0.95			**Runtime @ full load** 20min -40min -60min -80min 1EXB -2EXB -3EXB -4EXB
Output specification ◗ Voltage ◗ Frequency ◗ Harmonic distortion ◗ Overload capability ◗ Output Receptacle ◗ Power Share (#12 #2)	Single phase, 120 V ± 3% (2) 50/60 Hz ± 0.5% (3) < 4% on linear load, < 6% on non linear load 110% continuous, 130% 12s, > 130% 1.5s 6-NEMA 15R 2-NEMA 15R		6-NEMA 15/20R 2-NEMA 15/20R	**QUALITY** ISO 9001 quality system.
Battery (sealed lead-acid, maintenance free)	3 x 12 V - 7 Ah		3 x 12 V -9 Ah	36VDC - 14 Ah
Environmental and safety ◗ Noise level ◗ Operating temperature ◗ Relative humidity ◗ Safety ◗ EMC ◗ Agency markings	< 45 dBA 0 to 40° C 20 to 90% (without condensation) UL 1778 / cUL CSA 22.2 N°107.1 FCC 47 CFR Part 15, class B UL , cUL			UL, CSA FCC Class B UL , cUL

(1) Input voltage correspond to 33% / 66% / 100% of the nominal power rating.
(2) Adjustable from 100 V to 127 V using **UPS Driver** software.
(3) Frequency converter mode may be set using the **UPS Driver** software.

6. Appendices

6.2 Glossary

Authorized input voltage range for transfer to bypass if fault or overload	Upper and lower input voltage thresholds within which the UPS can transfer to bypass in the event of a UPS fault or overload.
Automatic bypass	Automatic switch controlled by the UPS, used to connect the equipment directly to the AC-power source in the event of a UPS failure or an overload.
Auto-restart	This function automatically re-starts the UPS when AC input power returns following shutdown at the end of the battery backup time. It can be enabled or disabled.
Backup time	Time that the connected equipment can operate on battery power.
Bar graph	Device on the front panel indicating the percent remaining backup time or the percent load.
Battery test	Internal UPS test on battery status.
Dialog box	A window in a computer program displayed for selection by the user of various options and parameter settings.
Double conversion	The power supplied to the connected equipment is completely regenerated by continuous double conversion, i.e. the AC power from the AC power source is rectified (AC - DC), then converted back (DC - AC) to AC power.
Equipment	Devices or systems connected to the UPS output.
Forced shutdown	Ten-second interruption in the supply of power to the connected equipment following a system shutdown, even if AC input power returns during the interruption period.
Percent load	Ratio between the power drawn by the connected equipment and the total power that the UPS can supply.
Personalization	A number of UPS functions can be modified using the **UPS Driver** software to better meet the user's needs.
Programmable outlets	Outlets that can be automatically shed during operation on battery power (a shedding time delay may be programmed using **Solution-Pac** software.
Remote Power Off	External dry contact can be used to stop the unit, during an emergency situation for example. All power is removed from the load.
Start on battery power	This function makes it possible to energize the connected equipment even when AC input power is not available (operation exclusively on battery power).
UPS	Uninterruptible Power Supply.
UPS ON / OFF via software	It is possible to enable or disable use of UPS ON / OFF controls by the computer-system protection software.

6.3 Index

MGE UPS SYSTEMS, INC.

THE UNINTERRUPTIBLE POWER PROVIDER

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1 800 523-0142
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UPS SYSTEMS

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