Comet **EX***treme*
4.5/6/9/12 kVA

Installation and User Manual

MGE
UPS SYSTEMS

www.mgeups.com

Introduction

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

The **Comet EX*treme*** 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.

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

- production in an ISO 14001 certified factory;
- recycling of **Comet EX*treme*** at the end of its service life.

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

For service call
1-800-438-7373

Note

This equipment has been tested and found to comply with the limits for a Class A 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.

Important: Save these instructions.

This manual contains important instructions for Comet EXtreme UPS Models that must be followed during installation, operation and maintenance of the UPS and batteries.

The Comet EXtreme UPS Models that are covered in this manual are listed below.

5103304XXX
5103306XXX
5103309XXX
5103312XXX
5103354XXX
5103356XXX
5103359XXX
5103362XXX

Tightening torque for all input and output terminal blocks shall be 10.6 - 12.3 in - lbs. (1.2 - 1.4 Nm) for 4.5 and 6 kVA models and 21.8 - 26.1 in - lbs (2.5 - 3 Nm) for 9 and 12 kVA models.

The normal battery voltage for all models is 240 VDC.

The Comet EXtreme server UPS is intended for installation in a temperature controlled indoor area, free of conductive contaminants.

Safety of persons

A UPS has its own internal power source (the battery). Consequently, the output terminals 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 earthed.

The battery supplied with the UPS contains small amounts of toxic materials. To avoid accidents, the directives listed below must be observed.

- **Never operate the UPS if the ambient temperature and relative humidity are higher than the levels specified in the documentation.**
- **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.**

Product safety

The UPSs connection to the AC-power source must be protected by a circuit breaker that is easily accessible.

The UPS can be disconnected from the AC-power source by opening the circuit breaker.

- Never install the UPS near liquids or in an excessively damp environment.
- Never let a liquid or foreign body penetrate inside the UPS.
- Never block the ventilation grates on the front or back of the UPS.
- Never expose the UPS to direct sunlight or a source of heat.

Special precautions

The UPS connection instructions contained in this manual must be followed in the indicated order.
Check that the indications on the rating plate correspond to your AC-power system and to the actual electrical consumption of all the equipment to be connected to the UPS.
If the UPS is positioned flat, check that not more than five modules are stacked on top of each other.
If the UPS must be stored prior to installation, storage must be in a dry place.
The admissible storage temperature range is -40° C to +50° C.
If the UPS remains de-energized for a long period, we recommend that you energize the UPS for a period of 24 hours, at least once every month.
This charges the battery, thus avoiding possible irreversible damage.

Warning

Batteries can present a risk of electrical shock and/or burn from high short circuit current. Observe proper precautions. Do not open battery packs. There are NO user-servicable parts within. Do not allow anything to touch the battery terminals. Do not pierce battery pack wiring insulation. Do not allow conductive tools or jewelry to touch battery packs or battery terminals.

Foreword

Using this document

Information may be found primarily by consulting:
- the contents;
- the index.

Pictograms

Important instructions that must always be followed.

Information, advice, help.

Visual indication.

Action.

Audio indication.

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

LED off.

LED on.

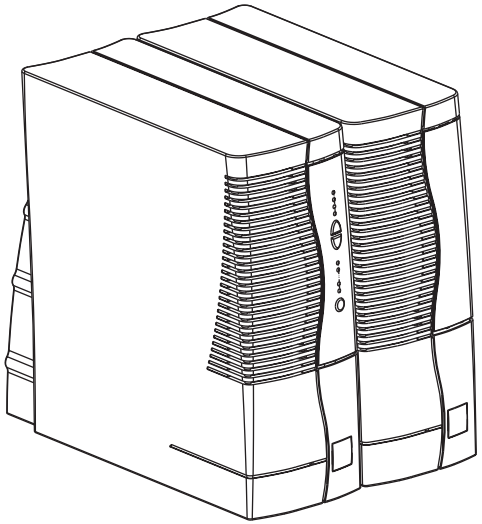
LED flashing.

Contents

Contents

1.1 Comet EX*treme* range

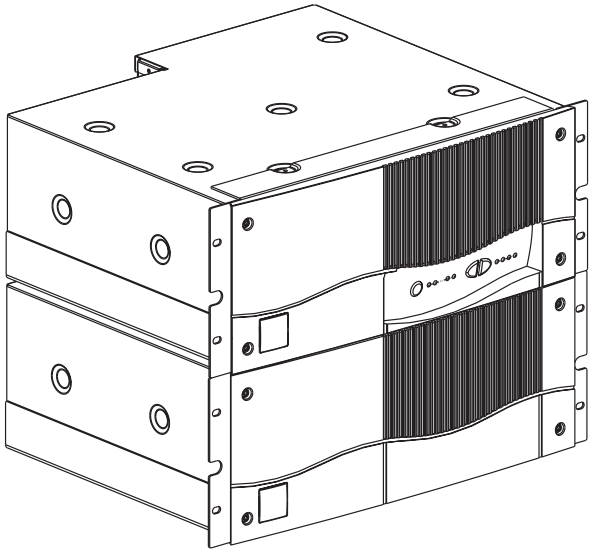
4,5 and 6 kVA tower models:



	Dimensions in inches (H x W x D)
Electronic module	17.45 x 6.81 x 18.3
Battery module	17.45 x 6.81 x 18.3

	Weight in lbs.
Electronic module	31
Battery module	106

4,5 and 6 kVA rack models:

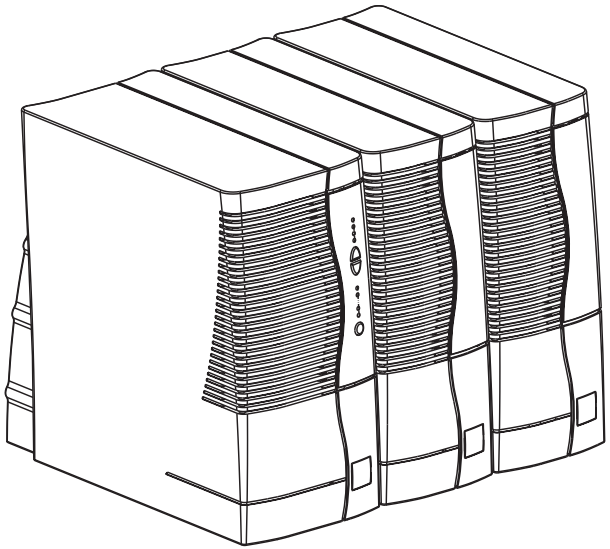


	Dimensions in inches (H x W x D)
Electronic module	6.97(4u) x 19.01 x 18.19
Battery module	6.97(4u) x 19.01 x 18.19

	Weight in lbs.
Electronic module	40
Battery module	112

1. Presentation

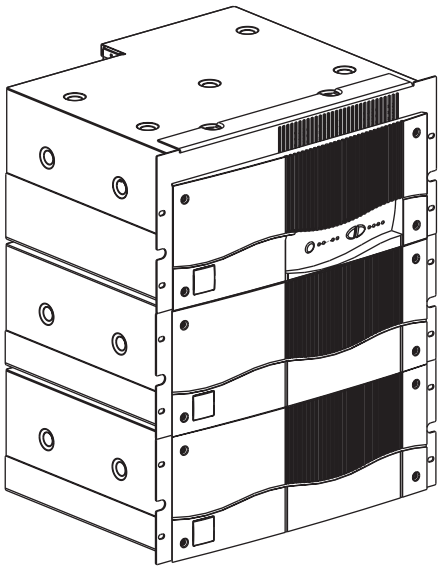
9 and 12 kVA tower models:



	Dimensions in inches (H x W x D)
Electronic module	17.45 x 8.50 x 18.3
Battery module	17.45 x 6.81 x 18.3

	Weight in lbs.
Electronic module	48
Battery module	106

9 and 12 kVA rack models:

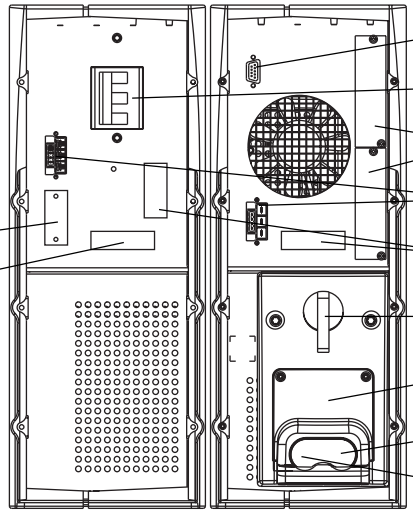


	Dimensions in inches (H x W x D)
Electronic module	8.7 (5u) x 19 x 18.18
Battery module	6.96 (4u) x 19 x 18.18

	Weight in lbs.
Electronic module	60
Battery module	112

1.2 Back

Comet EX*treme* 4,5 and 6 kVA:



5a connector for battery extension modules.

5b emergency power off.

1 RS232 communications port.

2 battery circuit breaker.

3 communications-card option.

4 EXB battery module connector.

6 rating plate.

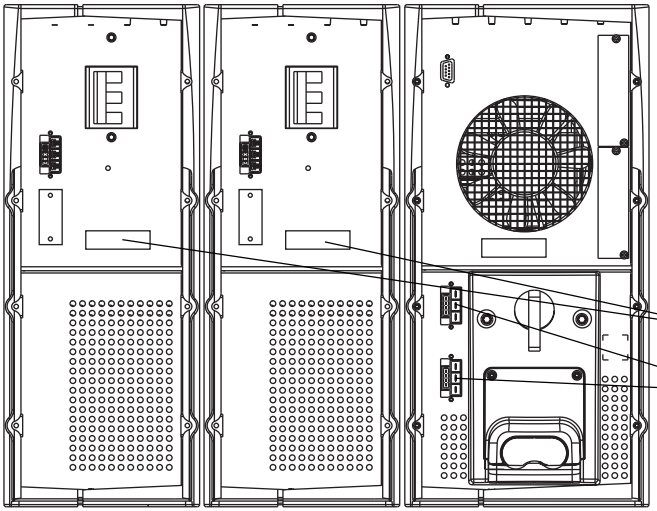
7 manual by-pass switch.

8 connection module.

9 output terminal block.

10 input terminal block.

Comet EX*treme* 9 and 12 kVA:

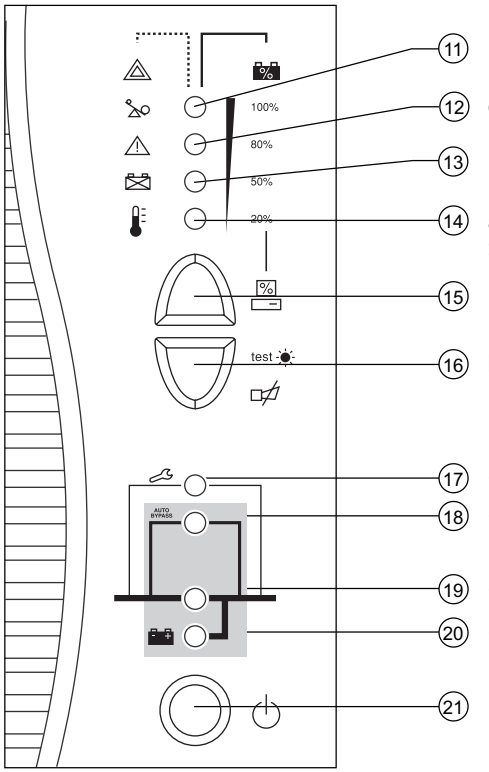


5b emergency power off.

4 EXB battery module connector.

1. Presentation

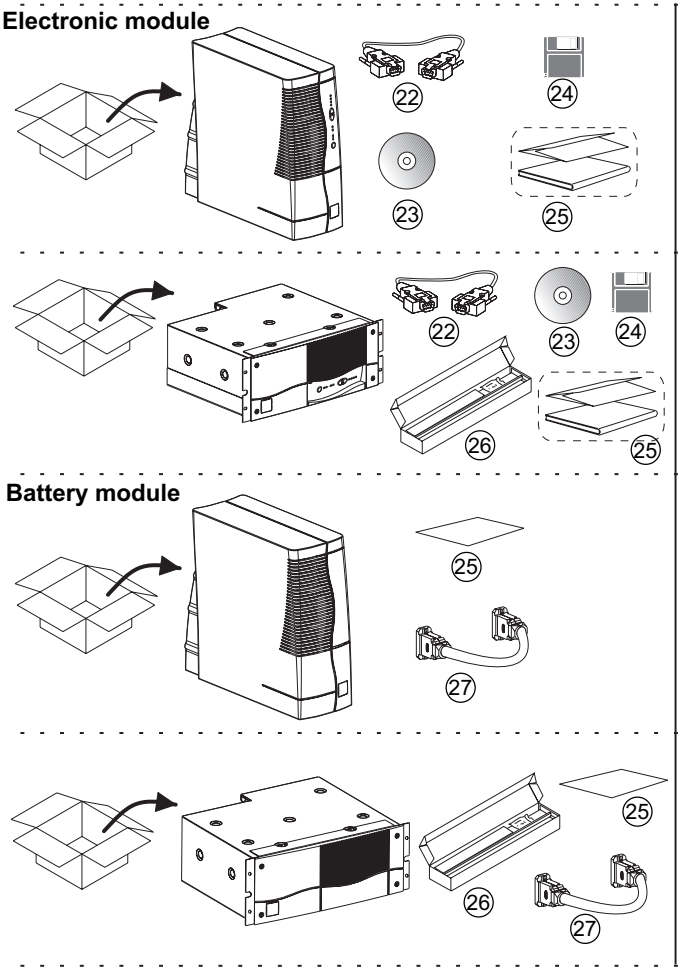
1.3 Control panel



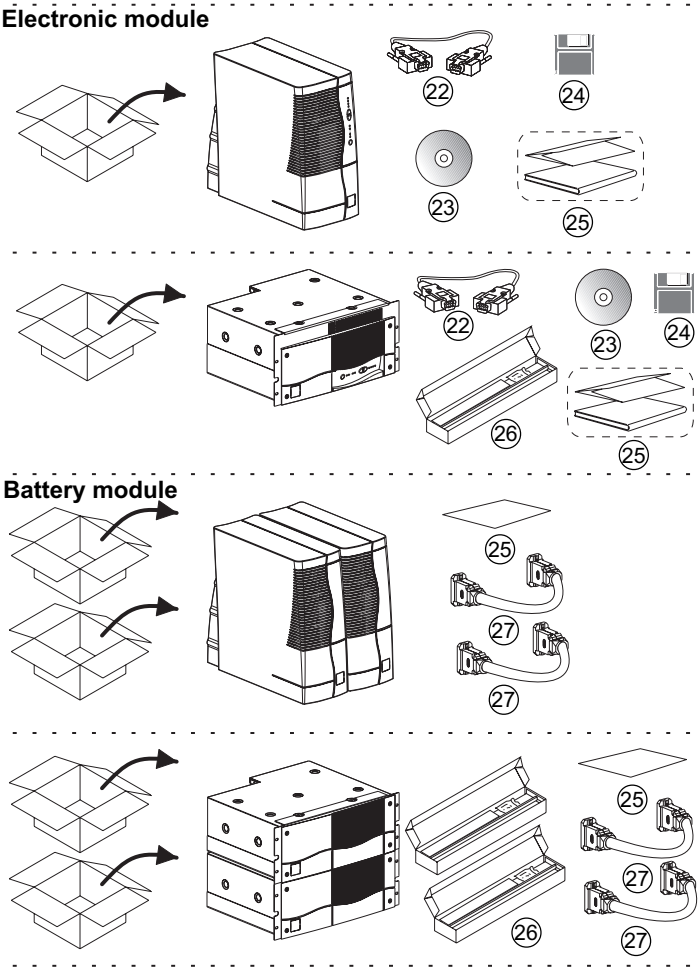
	Alarms	% battery remaining	% load
11	UPS overload	100%	100%
12	electronics fault	80%	80%
13	battery fault	50%	50%
14	ambient temp. > 40°C	20%	20%
15	hold down to display percent load.		
16	lamp test or buzzer OFF.		
17	operation on manual bypass.		
18	operation in Automatic Bypass mode.		
19	operation in ON-LINE mode.		
20	operation on battery power.		
21	ON/OFF.		

2.1 Unpacking and checks

Comet EX*treme* 4,5 and 6 kVA:



Comet EX*treme* 9 and 12 kVA:



(22) RS 232 communications cable.

(23) "Solution Pac" CD ROM.

(24) "UPS Driver" diskette.

(25) documentation.

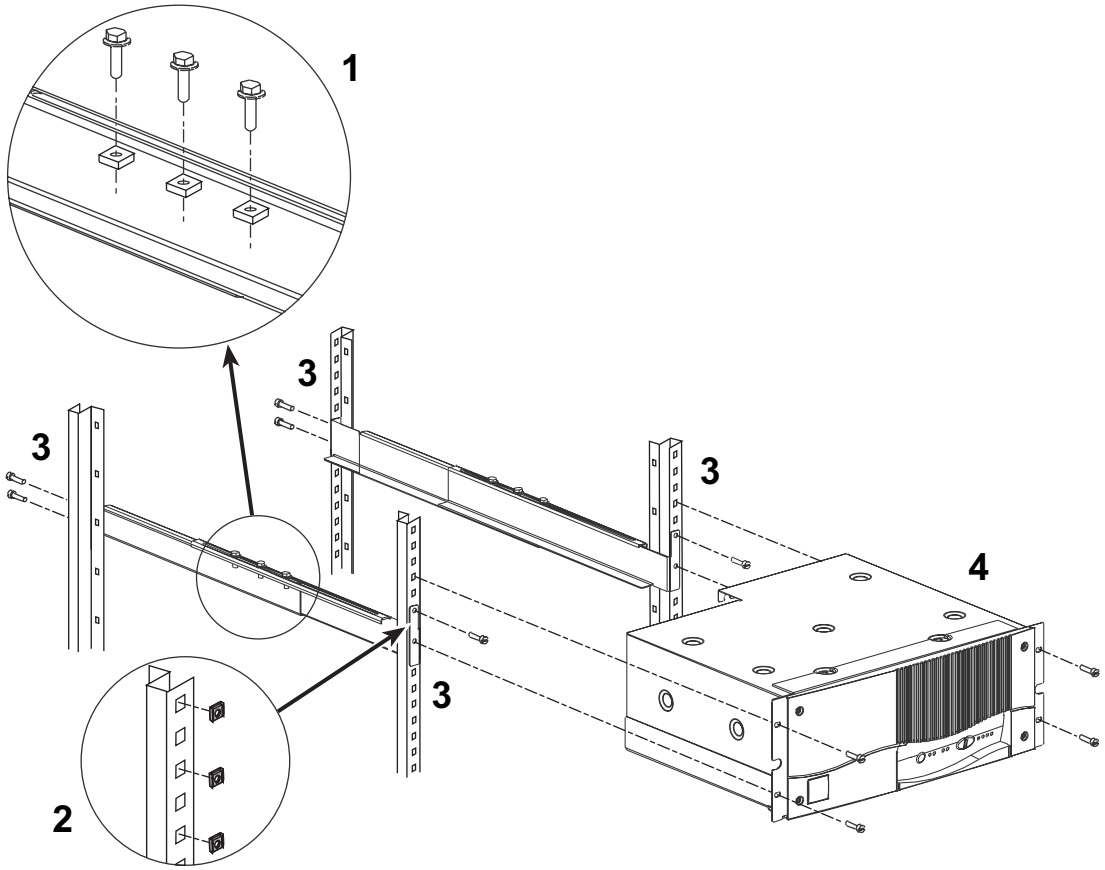
(26) telescopic rails for mounting in 19" bay with mounting hardware.

(27) cable for connection to battery module.

2. Installation

2.2 Installation (rack version)

Rack mounting diagram with rails.

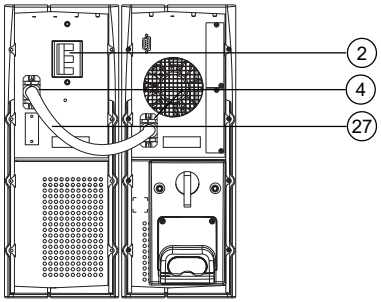


The rails and the necessary mounting hardware are supplied with the UPS in the package.

2.3 Battery-module connections

Comet EX*treme* 4,5 and 6 kVA:

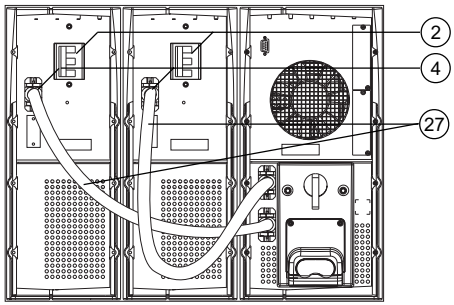
Check that the battery circuit breaker (2) is OFF.



Connect cable (27) to the connectors (4) of the electronic and battery modules.

Comet EX*treme* 9 and 12 kVA :

Check that the battery circuit breaker (2) is OFF.

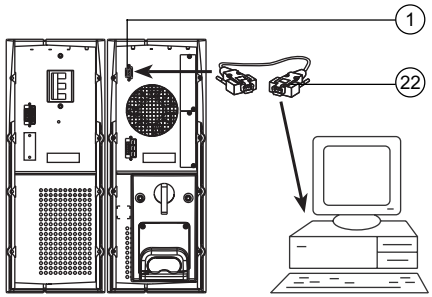


Connect cable (27) to the connectors (4) of the electronic and battery modules.

* Transformer connections (120 volt models)
Refer to Transformer Installation Guide.

2. Installation

2.4 Connection to the RS 232 communications port (optional)

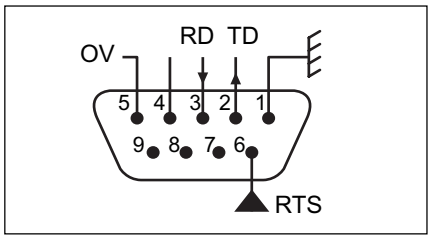


1. Connect the RS 232 communications cable (22) to the serial port on the computer.

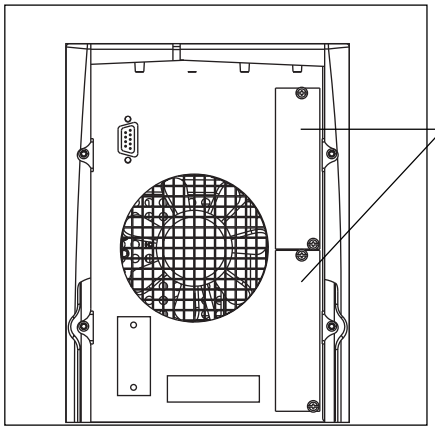
2. Connect the RS 232 communications cable (22) to the RS 232 communications port (1) on the UPS.

The UPS can now communicate with all MGE UPS SYSTEMS supervision, set-up or safety software.

Pin-out diagram for the RS 232 communications port (1) on the UPS.



2.5 Installation of the communications-card option



(3) Slots for communications card.

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

1. Remove the slot cover (3).

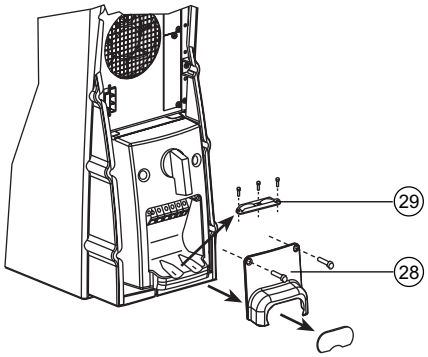
2. Insert the card in the slot.

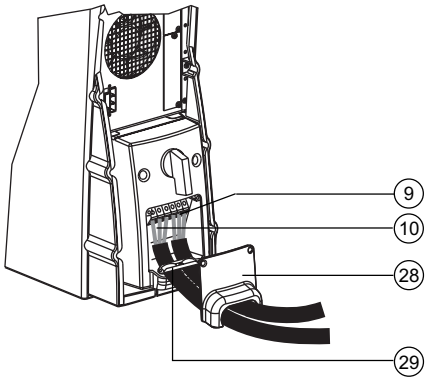
3. Secure the card with the two screws.

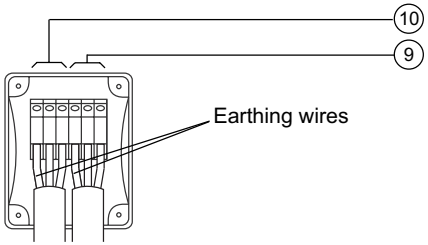
2.6 Connection to the connection modules

This type of connection must be carried out by qualified electrical personnel.

Before carrying out any connections, check that the battery circuit breaker (2) is OFF and that the upstream protection devices (AC-power source) are open (OFF).







The overall cable diameter and the cross-sectional area of the three wires depends on the UPS rating.

	cable size gauge
EX*treme* 4,5 to 6 kVA	20 to 6 AWG
EX*treme* 9 to 12 kVA	20 to 6 AWG

1. Remove the terminal-block cover (28).
2. Remove the cable entry knockouts from the cover.
3. Loosen the cable clamp (29) .
4. Insert the cable supplying the equipment and the power cable through the terminal-block cover (28).

Always connect the earthing wire first.

5. Connect the three wires of the equipment cable to the output terminal block (9).
6. Connect the three wires of the power cable to the input terminal block (10) .
7. Tighten the cable clamp (29) .
8. Refit and secure the terminal-block cover (28).

2. Installation

2.7 Emergency Power Off (EPO)

The end user is responsible for the installation of an emergeny power off function. Installation must be carried out in compliance with local code regulations.

To power down the entire installation via an emergency power off function, the action should perform the following via a single device:

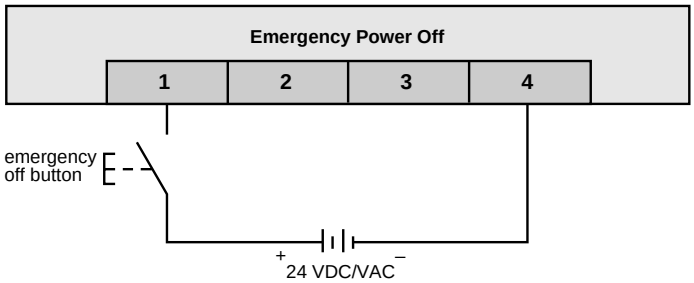
- sever the AC input power to the Comet EXtreme
- remotely trip off the battery circuit breaker on the Comet EXtreme
- remotely trip off the circuit breaker for the additional battery cabinet(s), if applicable

Battery circuuit breaker shunt trip connection

To accomodate the EPO function, the Comet EXtreme UPS and battery cabinets come equipped with battery circuit breakers with shunt trip mechanisms. By applying 24 Vdc or 24 VAC across the shunt trip coil, the circuit breaker will trip off, thereby disconnecting battery input to the inverter.

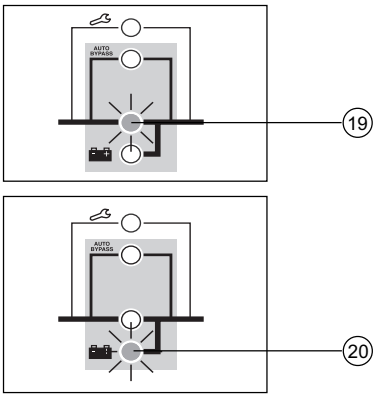
- Check that the upstream circuit breaker on the low voltage switchboard, the input circuit breaker, and the battery circuit breaker are all in "off" position
- Remove the connection cover panel (5b) from the battery module
- Connect the 24Vdc or 24 VAC output of the EPO circuit to the shunt trip coil across terminals 1 and 4
- Once the connections are made, reposition the connection cover panel and reset all circuit breakers

Connection diagram for battery circuit breaker shunt trip on terminal block



3.1 Operating mode

ON-LINE mode



This is the standard operating mode, set by default in the factory. It makes use of electronic double conversion of the input power.

Two possible cases:

LED (19) is ON: AC input power is available. Power is drawn from the AC-power source and supplied to the protected equipment via the UPS.

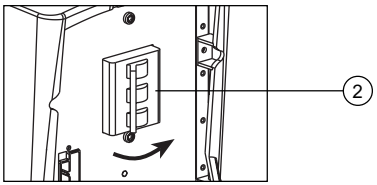
LED (20) is ON: AC input power is not available. Power is drawn from the battery and supplied to the protected equipment.

3. Operation

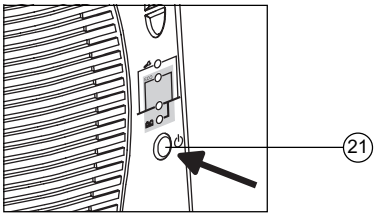
3.2 Start-up

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

Prior to initial start-up, check the UPS voltage settings. If the protected equipment voltage is other than 208 V / 60 Hz, the UPS settings must be modified using the "UPS Driver" software (24) (see section 3.5).



1. Set the battery circuit breaker(s) (2) to ON.



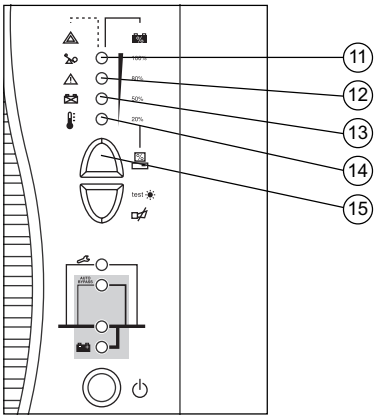
2. Press the ON / OFF button (21).

All connected equipment is energized. The buzzer sounds. LEDs (18), (19) and (20) go ON.

If LEDs (18), (19) and (20) do not go ON or if LEDs (11), (12), (13) or (14) flash, there is a fault (see section 4.1).

3.3 Bargraph indications

LEDs (11) to (14) provide three different indications.



1. Remaining backup time in percent (in ON-LINE mode).

2. Percent load drawn by the protected equipment, when button (15) is pressed.

3. Operating faults (flashing LED and beeps):

(11) Overload.

(12) UPS fault.

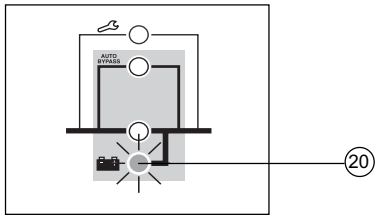
(13) Battery fault.

(14) Excessive ambient temperature.

3.4 Failure of AC input power and operation on battery power

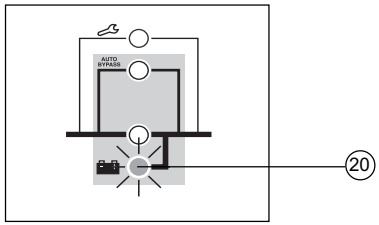
AC input power is not available, the battery steps in to supply the protected equipment.

Transfer to battery power



The AC-power source is outside tolerances, LED (20) is ON, the buzzer beeps three times.

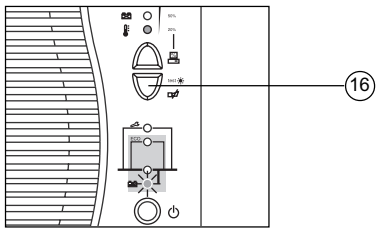
Threshold for the low-battery shutdown warning



The low-battery shutdown warning threshold can be set by the user, with the "UPS Driver" software (see section 3.5).
LED (20) 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 (16) to turn the buzzer OFF.

The equipment is no longer supplied with power.

Sleep mode

This operating mode may be personalized using the "UPS Driver" software (see section 3.5).
It saves battery power when no equipment is connected to the UPS.
The UPS automatically restarts when the AC-power source returns to within tolerances.

Return of AC input power

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 3.5).

3. Operation

3.5 Personalization

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 2.3 Connection to the RS 232 communications port).

Check that the RS 232 cable (22) is correctly connected and that the battery circuit breaker (2) is closed.

"UPS Driver" installation:

1. Insert the "UPS Driver" diskette in the drive of an IBM-compatible microcomputer.
2. Select the disk drive (A :\).
3. Double-click "upsdriv.exe".

Once "UPS Driver" has been installed, UPS parameters can be modified in a window containing a number of tabs, each presenting a set of parameters.

"ON / OFF conditions" tab

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

"Battery" tab

Personalizable function	Default setting	Options
"Battery test" intervals	Every day	Once a week Once a month No test
"Low-battery shutdown warning" threshold	20% remaining battery backup time	40% remaining battery backup time
Charger	Standard	CLA (2, 4 or 8 hours)

"Output" tab

Rated AC-power source voltage (see figure 1)	208 V	200 V-208 V-220 V-240 V
Rated AC-power source frequency	60 Hz	50 Hz
Tolerance for AC-power source frequency (fig. 2)	± 5%	± 1% to ± 10% , in 1% steps
Frequency-regulation rate	Standard	Redundancy (see section 6.1)
Alarm threshold for overload	100%	0 to 100%, in 10% steps
Restart inverter after short circuit	Disabled	Enabled (click to add check)

"By-pass" tab

Authorized voltage range for transfer to bypass (see figure 3) if fault or overload	187 V to 265 V (for 208 V rated voltage)	187 V to 265 V, in 1V steps
Authorized frequency range for transfer to bypass (see figure 2) if fault or overload	± 10%	± 1% to ± 10%, in 1% steps
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)

The value selected for the rated UPS voltage impacts on the power available at UPS output (see the diagram below).

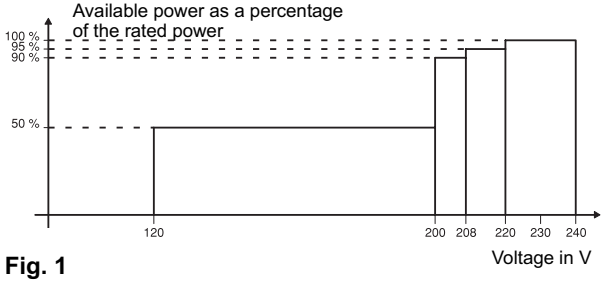


Fig. 1

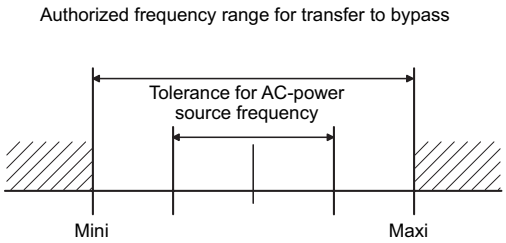
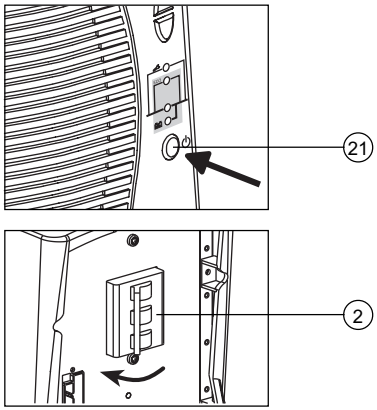


Fig. 2

3. Operation

3.6 Shutdown



1. Press button (21) (return to the OFF position).

The connected equipment is no longer supplied with power.

2. Set the battery circuit breaker(s) (2) to OFF.

The battery is no longer recharged.

4.1 Troubleshooting

If any of LEDs ⑪, ⑫, ⑬ or ⑭ flash, there is a operating anomaly or an alarm.

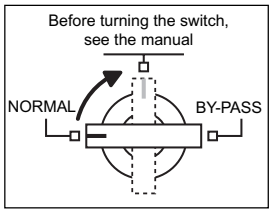
If a LED flashes, the bargraph data is no longer displayed.

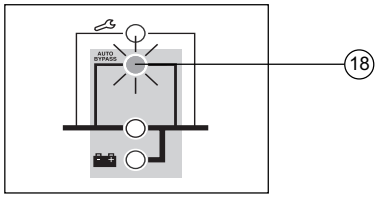
Troubleshooting not requiring MGE after-sales support

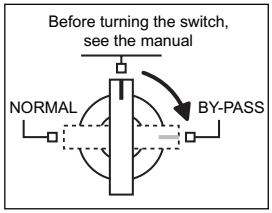
Indication	Signification	Correction
LED ⑪ flashes and the buzzer beeps.	UPS overload. Overload is too long or too high. The UPS cuts the supply of power to the connected equipment and the buzzer sounds continuously.	Check the power drawn by the equipment and disconnect any non-priority devices.
LED ⑭ flashes.	The ambient temperature is higher than 40° C. The UPS is not designed to operate more than eight hours under these conditions.	Install the UPS in a room where the ambient temperature is not greater than 40° C.
LED ⑰ is ON.	The UPS is in maintenance mode (bypass)	Turn the manual bypass switch to "NORMAL" position.
LED ⑫ flashes and the buzzer beeps.	UPS electronics have detected a UPS fault. Depending on the UPS personalization parameters (see section 3.5), there are two possibilities: ◗ the equipment connected to the UPS continues to be supplied, but directly from the AC-power source (via the automatic bypass (LED ⑱ ON); ◗ the connected equipment is no longer supplied. The equipment connected to the UPS is no longer protected.	Follow the UPS replacement procedure (see section 4.2). Call the after-sales support department. 1-800-523-0142
LED ⑬ flashes.	A battery fault was detected during the battery test.	Make sure that the battery circuit breaker(s) is closed.If that is the case, call the after-sales support department because the battery is not OK

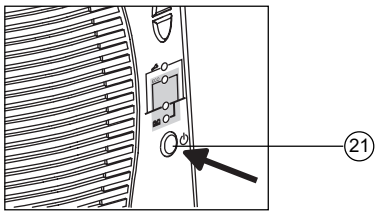
4. Maintenance

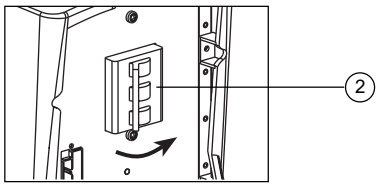
4.2 Replacement of the electronic module

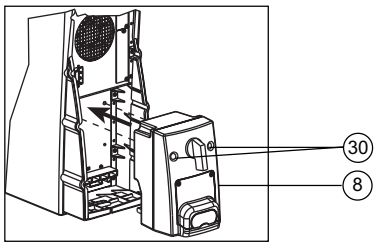












Disconnecting the connection module:

1. Turn the manual bypass switch (7) from the NORMAL to the intermediate position.
2. Check that LED (18) is ON before continuing to the BYPASS position.

If LED (18) is not ON, do not switch to the BYPASS position and call the after-sales support department at 1-800-523-0142.

3. Turn the manual bypass switch (7) from the intermediate position to the BYPASS position.

The connected equipment is supplied by the AC-power source, via the manual bypass.

4. Shut down the UPS by pressing button (21) (return to the OFF position).
5. Switch the battery circuit breaker(s) (2) to the OFF position.
6. Remove the two fixing screws (30) to free the connection module (8).
7. Remove the connection cable(s) from the battery module(s).

The UPS can be replaced. The connected equipment is supplied by the AC-power source.

Reconnecting the connection module:

1. Secure the connection module (8) using the two screws (30).
3. Reconnect the connection cable(s) to the battery module(s).
3. Switch the battery circuit breaker(s) (2) to the ON position.

Check that UPS personalization settings still correspond to the equipment to be supplied (see section 3.5).

4. Start the UPS by pressing button (21).
5. Check that LED (18) is ON before turning the manual bypass switch (7) to the intermediate position.

If LED (18) is not ON, do not switch to the intermediate position and call the after-sales support department.

6. Turn the manual bypass switch (7) from the BYPASS position to the intermediate position and check that LED (18) is ON.
7. Turn the manual bypass switch (7) from the intermediate position to the NORMAL position.

The connected equipment is again protected by the UPS.

5. Environment

This product has been designed to respect the environment:

It does not contain CFCs or HCFCs.
It was manufactured in a factory certified ISO 14001.

UPS recycling at the end of service life:

MGE UPS SYSTEMS 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 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 correctly recycled by specialized companies.

Web site : www.mgeups.com

6. Appendices

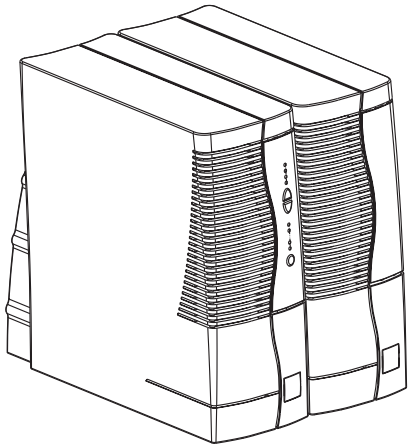
6.1 Glossary

Authorized voltage range for transfer to bypass if fault or overload	Upper and lower voltage thresholds within which the UPS can operate on the automatic 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.
Automatic start following return of AC input power	When AC input power returns following shutdown at the end of the battery backup time, UPS automatic start can be enabled or disabled.
Backup time	Time that the connected equipment can operate on battery power.
Bargraph	Device on the front panel indicating the percent remaining backup time or the percent load.
Battery test	Internal UPS test on battery status.
Cold start	See "Start on battery power".
Connection module	Unit grouping the receptacles for connection to the AC-power source and the equipment.
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.
Frequency-regulation rate	The rate at which the UPS frequency is synchronized with that of the AC-power source. Two possible cases: 1. The installation comprises a single UPS. The frequency-regulation rate is set to "Standard". 2. The installation comprises two UPSs connected in series. The AC-power source supplies power to the first UPS which in turn supplies the second UPS. The connected equipment is supplied by the second UPS. The frequency regulation rate of the first UPS must be set to "Standard", the frequency regulation rate of the second UPS must be set to "Redundancy".

Manual bypass	Rotary switch controlled by the user, used to connect the equipment directly to the AC-power source. Transfer of the load to the manual bypass enables UPS maintenance or replacement, without interrupting the supply of power to the connected equipment.
ON-LINE mode	The normal UPS operating mode, by which the AC-power source supplies the UPS, which in turn, following double conversion of the AC power, supplies the connected equipment.
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.
Redundancy	See "Frequency-regulation rate".
Sleep mode	This function shuts down the UPS when it operates on battery power and no load is detected on the UPS output.
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).
Tolerance for AC-power source frequency	The range of frequency supplied by the AC-power source within which the UPS can operate in ON-LINE mode (double conversion).
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. Appendices

6.2 Index



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