www.mgeups.com

MGE
UPS SYSTEMS

Comet **EX***treme*

4.5/6/9/12 kVA

Installation and User Manual

IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS – This manual contains important instructions for Comet Extreme 4.5/6/9/12 kVA that must be followed during installation, operation, and maintenance of the equipment.

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 grounded.

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 branch circuit overcurrent protection 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.

Do not use an external bypass switch. Contact customer service & support for assistance.

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-serviceable 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.

WARNING

High voltages are present inside the Comet EXtreme UPS modules. Any servicing requiring removal of the protective covers may be undertaken only by qualified personnel certified by MGE UPS Systems.

WARNING

OPENING ENCLOSURES EXPOSES HAZARDOUS VOLTAGES. ALWAYS REFER SERVICE TO QUALIFIED PERSONNEL ONLY.

NOTE

As standards, specifications and designs are subject to change, please ask for confirmation of the information given in this publication. This manual is a controlled document. Pages should not be removed individually from this binder.

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.

Comet EXtreme 4.5/6/9/12 kVA

Installation and User Manual

For service call
1-800-523-0142

86-153719-10 B00 02/03

MGE UPS SYSTEMS, Inc.
1660 Scenic Avenue
Costa Mesa, CA 92626

(714) 557-1636

MGE
UPS SYSTEMS

Comet EXtreme 4.5/6/9/12 kVA
Installation and User Manual

Warranty

The liability of MGE UPS SYSTEMS, Inc. hereunder is limited to replacing or repairing at MGE UPS SYSTEMS, Inc.'s factory or on the job site at MGE UPS SYSTEMS, Inc.'s option, any part or parts which are defective, including labor, for a period of 12 months from the date of purchase. The MGE UPS SYSTEMS, Inc. shall have the sole right to determine if the parts are to be repaired at the job site or whether they are to be returned to the factory for repair or replacement. All items returned to MGE UPS SYSTEMS, Inc. for repair or replacement must be sent freight prepaid to its factory. Purchaser must obtain MGE UPS SYSTEMS, Inc.'s Return Materials Authorization prior to returning items. The above conditions must be met if warranty is to be valid. MGE UPS SYSTEMS, Inc. will not be liable for any damage done by unauthorized repair work, unauthorized replacement parts, from any misapplication of the item, or for damage due to accident, abuse, or Act of God.

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Direct questions about the operation, repair, or servicing of this equipment to MGE UPS SYSTEMS, Inc. Technical Support Services. Include the part number and serial number of the unit in any correspondence. Should you require factory service for your equipment, contact MGE UPS SYSTEMS, Inc. Technical Support Services and obtain a Return Materials Authorization (RMA) prior to shipping your unit. Never ship equipment to MGE UPS SYSTEMS, Inc. without first obtaining an RMA.

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Revision History

Comet EXtreme 4.5/6/9/12 kVA Installation and User Manual
86-153719-10

Revision: A00 New Release 07/01
Revision: B00 ECN 002960 02/03

CAUTION

RECORD ALL SERIAL NUMBERS FOR THE UPS UNIT, I/O BOX, BATTERY PACK/PACKS AND TRANSFORMER.

THESE SERIAL NUMBERS WILL BE REQUIRED IF YOUR SYSTEM NEEDS SERVICE. KEEP THIS MANUAL IN A PLACE WHERE YOU CAN REFERENCE THE SERIAL NUMBERS IF SERVICE IS REQUIRED!

UPS UNIT SERIAL NUMBER: _____

I/O BOX SERIAL NUMBER: _____

TRANSFORMER SERIAL NUMBER: _____

BATTERY MODULE SERIAL NUMBER: _____

ADDITIONAL BATTERY SERIAL NUMBERS:

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

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How To Use This Manual

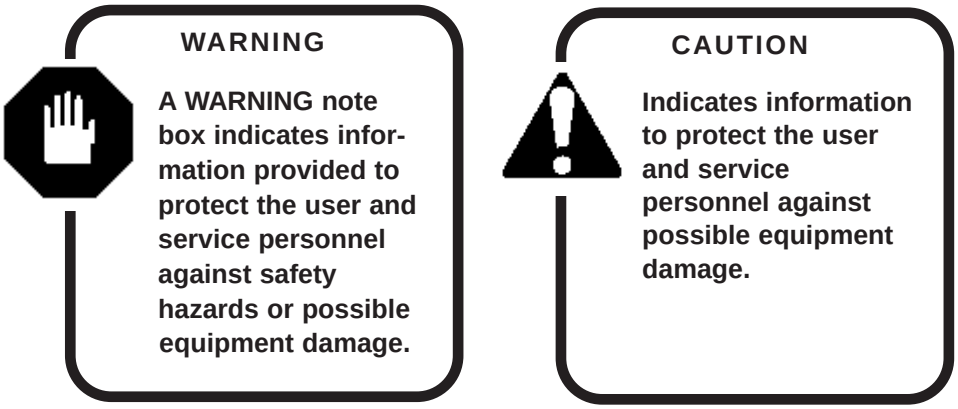
This manual is designed for ease of use and easy location of information

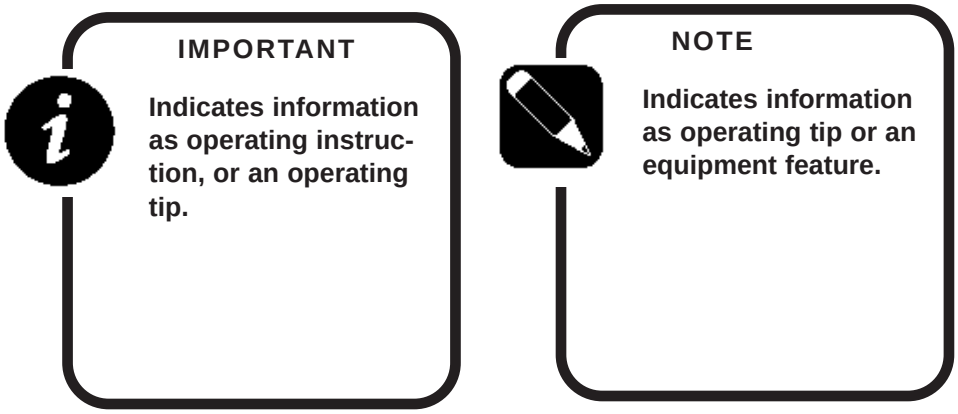
To quickly find the meaning of terms used within the text, look to the Glossary.

To quickly find a specific topic, look at the Contents.

This manual uses Note boxes to convey important information.

Note boxes come in four varieties.





Introduction

NOTE

Before installing Comet EXtreme system, record all serial numbers of UPS unit, battery packs, I/O Box and transformer.

1.0 Scope

This manual provides information required for installation, wire connections, for Tower & Rack, and Floor mounting the 4.5 kVA, 6 kVA, 9 kVA and 12 kVA members of the Comet EXtreme series uninterruptible power system (UPS). Please retain this manual for future reference.

The manual is divided into four sections:

Section I — Introduction

The Introduction is a general description of sections and the Comet Extreme 4.5/6/9/12 kVA. The Comet EXtreme family of Uninterruptible Power Supplies (UPS) are designed for safe reliable VAC back up power for the computer room, office or industrial environments.

Section II — Installation and Connections

This section describes the Installation and wiring connections for the Comet Extreme 4.5/6/9/12 kVA, (Tower & Rack and Floor Mounts.) Including descriptions of all indicators, controls, and operating modes.

Section III — Operation

This section describes operating information for Comet EXtreme 4.5 kVA, 6 kVA, 9 kVA and 12 kVA UPS single-module systems, including an overview of the system, its components, and functions, and operational sequences to be followed for all conditions of normal, emergency, and maintenance operation.

Section IV — Maintenance and Troubleshooting

This section provides a quick view for Maintenance and troubleshooting during installation and connection.

Including environmental considerations for Comet EXtreme 4.5/6/9/12 kVA UPS.

A glossary in the rear of this manual provides definitions of terms used within the text.

1.1 General Description

The Comet EXtreme series are a family of Uninterruptible Power Supplies (UPS) designed for safe reliable VAC backup power for the computer room, office or industrial environments.

This manual describes the function and installation of the 4.5 kVA, 6 kVA, 9 kVA and 12 kVA members of the Comet EXtreme UPS family. The following are the model numbers and part numbers respectively:

Table 1-1: Model and Part Numbers for Installation.

Description	Part Number With Transformer	Part Number Without Transformer
Tower 4.5 kVA	891045-10	891045-80
Tower 6 kVA	891060-10	891060-80
Tower 9 kVA	891090-10*	891090-80
Tower 12 kVA	891012-10*	891012-80
Tower 9 kVA	891090-20**	891090-80
Tower 12 kVA	891012-20**	891012-80
Rack 4.5 kVA	891045-11	891045-81
Rack 6 kVA	891060-11	891060-81
Rack 9 kVA	891090-11*	891090-81
Rack 12 kVA	891012-11*	891012-81
Rack 9 kVA	891090-21**	891090-81
Rack 12 kVA	891012-21**	891012-81

*UPS with Floor Mount Isolation Transformer.

** UPS with Rack and Tower Isolation Transformer.

Table 1-2: Optional System Descriptions.

Description	Part number	Dimensions
Power Dist. Module 16x5-15R	72-153700-01	3 U ; 19-inch wide
Power Dist. Module 8x5-15R & 4xL5-20	72-153700-02	3 U ; 19-inch wide
Power Dist. Module 8x5-15R & 4xL6-30	72-153700-03	3 U ; 19-inch wide
Power Dist. Module 5xL5-20 & 2xL6-30	72-153700-04	3 U ; 19-inch wide
Power Dist. Module 4x5-15R2 & 4x5-20R	72-153700-05	3 U ; 19-inch wide
Power Dist. Module 4x5-15R2 & 2x6-30R	72-153700-06	3 U ; 19-inch wide
Power Dist. Module 4x5-20R2 & 2x6-30R	72-153700-07	3 U ; 19-inch wide
Power Dist. Module 6xL5-20 & 2x6-30R	72-153700-08	3 U ; 19-inch wide
Power Dist. Module 7x5-15R2 & L6-15	72-153700-09	3 U ; 19-inch wide
Multi-slot basic	66071	
2 U-Talk/Basic port card	66060	
JBUS/MODBUS card	66061	
SNMP card	66074	
2 RS 232 COM (HID protocol) port card	66066	

USB card	66067
AS400 volt-free contact/remote power off card	66068
6 alarm relay (250V 2A) card	66069
Remote panel UPS control NEMA + COM card	66087
Tower Transformer Comet Extreme 4.5/6 Kva	891085
Floor Mount ISO Transformer Comet Extreme 9/12 Kva	891087
Tower ISO Transformer Comet Extreme 9/12 Kva	891088
Rack ISO Transformer Comet Extreme 9/12 Kva	891089
Rack Transformer Comet Extreme 4.5/6 Kva	891086
Rack Battery Module LA 4.5/6 kVA (1 module)	891062
Tower Battery Module LA 4.5/6 kVA (1 module)	891061
Rack Battery Module LA 9/12 kVA (2 modules)	891066
Tower Battery Module LA 9/12 kVA (2 modules)	891065
Rack Battery Module XLA 4.5/6 kVA (2 modules)	891064
Tower Battery Module XLA 4.5/6 kVA (2 modules)	891063
Rack Battery Module XLA 9/12 kVA (4 modules)	891068
Tower Battery Module XLA 9/12 kVA (4 modules)	891067
Tower Electronic Module 4.5 kVA without I/O Box	67688
Tower Electronic Module 6 kVA without I/O Box	67689
Tower Electronic Module 9 kVA without I/O Box	67690
Tower Electronic Module 12 kVA without I/O Box	67691
Rack Electronic Module 4.5 kVA without I/O Box	67693
Rack Electronic Module 6 kVA without I/O Box	67694
Rack Electronic Module 9 kVA without I/O Box	67695
Rack Electronic Module 12 kVA without I/O Box	67696
Input/Output box 4.5/6 kVA	72-153569-05
Input/Output box 9/12 kVA	72-153569-06

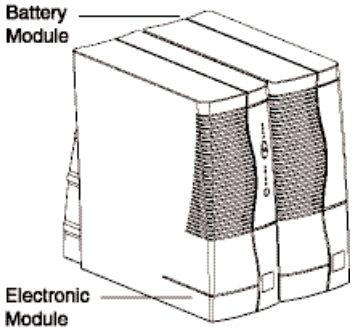
Table 1-3: Comet EXtreme Rating.

kVA/kW (230VAC)	**V Input**	**I Input (Maximum)**	**V Output**	**I Output**
4.5 kVA/2.9 kW	230/208	24A	230/208	21A
6 kVA/3.9 kW	230/208	32A	230/208	28A
9 kVA/5.8 kW	230/208	48A	230/208	41A
12 kVA/7.8 kW	230/208	64A	230/208	55A
Battery Module Rating: 240 VDC, 23 A				

Note: kVA/kW listed for 230 VAC input/output. UPS power rating should be derated for 208 VAC output. I output remains constant.

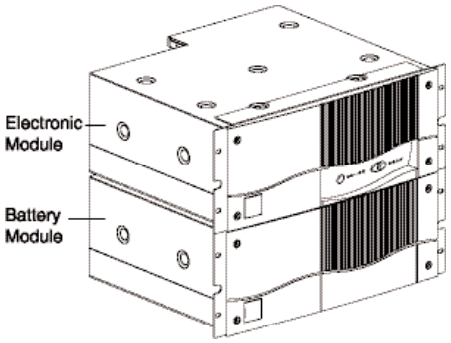
1.2 Configuration

Figure 1-1: 4.5 & 6 kVA Tower Models (without transformer).



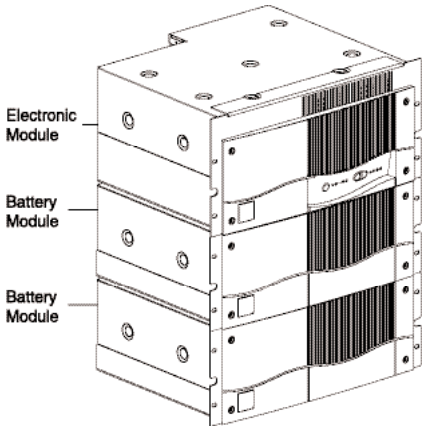
	Dimensions in inches (H x W x D)	Weight in Lbs.
Electronic module	17.45 x 6.81 x 18.3	31
Battery module	17.45 x 6.81 x 18.3	106

Figure 1-2: 4.5 & 6 kVA Rack Models (without transformer).



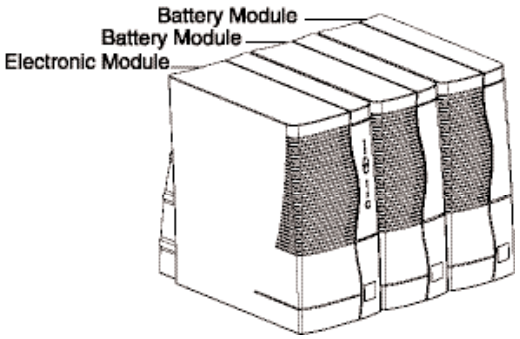
	Dimensions in inches. (H x W x D)	Weight in Lbs
Electronic module	6.97(4u) x 19 x 18.19	40
Battery module	6.97(4u) x 19 x 18.19	112

Figure 1-3: 9 & 12 kVA Rack Models (without transformer).



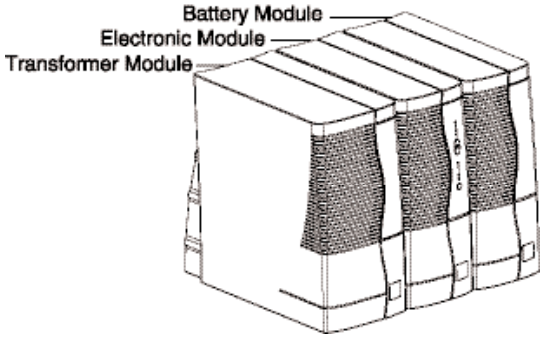
	Dimensions in inches (H x W x D)	Weight in Lbs.
Electronic module	8.7 (5u) x 19 x 18.19	60
Battery module	6.97 (4u) x 19 x 18.19	112

Figure 1-4: 9 & 12 kVA Tower Models (without transformer).



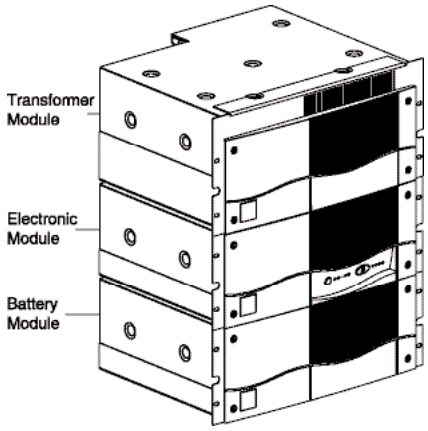
	Dimensions in inches (H x W x D)	Weight in Lbs.
Electronic module	17.45 x 8.5 x 18.3	48
Battery module	17.45 x 6.81 x 18.3	106

Figure 1-5: 4.5 & 6 kVA Tower Models (with transformer).



	Dimensions in inches (H x W x D)	Weight in Lbs.
Electronic module	17.45 x 6.81 x 18.3	31
Battery module	17.45 x 6.81 x 18.3	106
Isolation transformer	17.45 x 6.81 x 18.5	104

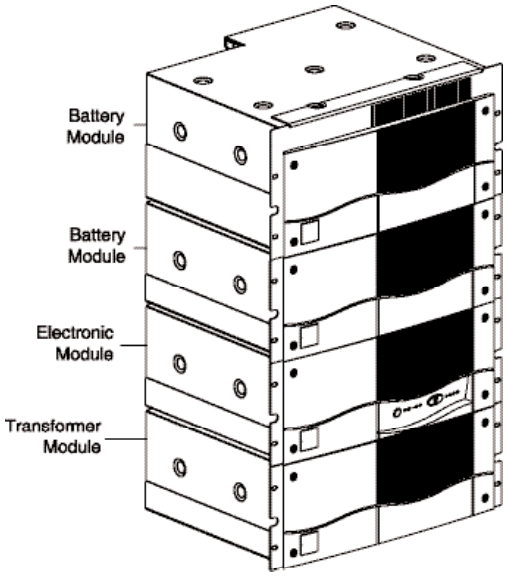
Figure 1-6: 4.5 & 6 kVA Rack Models (with transformer).



	Dimensions in inches (H x W x D)	Weight in Lbs.
Electronic module	6.97(4u) x 19 x 18.19	40
Battery module	6.97(4u) x 19 x 18.19	112
Isolation transformer	6.97 x 19 x 18.5	104

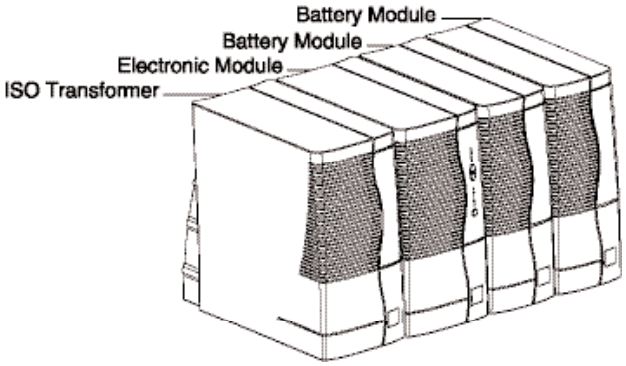
Note: Refer to Comet Extreme Transformer Cabinet installation manual for detailed installation information.

Figure 1-7: 9 & 12 kVA Rack Module with Transformers.



	Dimensions in inches (H x W x D)	Weight in Lbs.
Electronic module	8.7(5u) x 19 x 18.19	60
Battery module	6.97(4u) x 19 x 18.19	112
Isolation transformer	8.7(5u) x 19 x 21	189

Figure 1-8: 9 & 12 kVA Tower Module with Transformers.

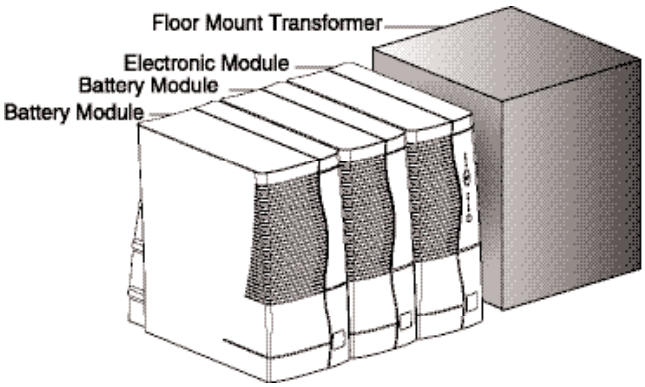


	Dimensions in inches (H x W x D)	Weight in Lbs.
Electronic module	17.45 x 8.5 x 18.3	48
Battery module	17.45 x 6.81 x 18.3	106
Isolation Transformer	17.5 x 8.5 x 21	180

Figure 1-9: Optional Transformer for 9 &12 kVA Floor Mount.

	Dimensions in inches (H x W x D)	Weight in Lbs.
Transformer (floor mount) 9 kVA, 12 kVA	17.5 x 13.5 x 19	215

Figure 1-10: 9 & 12 kVA Tower Module with Floor Mount Transformer.



	Dimensions in inches (H x W x D)	Weight in Lbs.
Electronic module	17.45 x 8.5 x 18.3	48
Battery module	17.45 x 6.81 x 18.3	106
Transformer (floor mount) 9 kVA, 12 kVA	17.5 x 13.5 x 19	215

Note: Floor Mount Transformer requires 3 inch space on all sides.

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Installation and Connections

2.0 Scope

This section describes installation, cable and wiring connections for the Comet Extreme 4.5/6/9/12 kVA ISO Transformer, Power Module, and Rack Mount with Rails. The rails and the necessary mounting hardware are supplied with the Isolation Transformer in the package.

2.1 Storage

The equipment must always be stored in its original packaging.

IMPORTANT

The battery is of the sealed type. Battery storage or prolonged shutdown of Comet EXtreme should never exceed 6 months at 68°F (20°C) without recharging, for a battery initially at 100% charge. The battery warranty is void if the 6 month recharge interval is not respected.

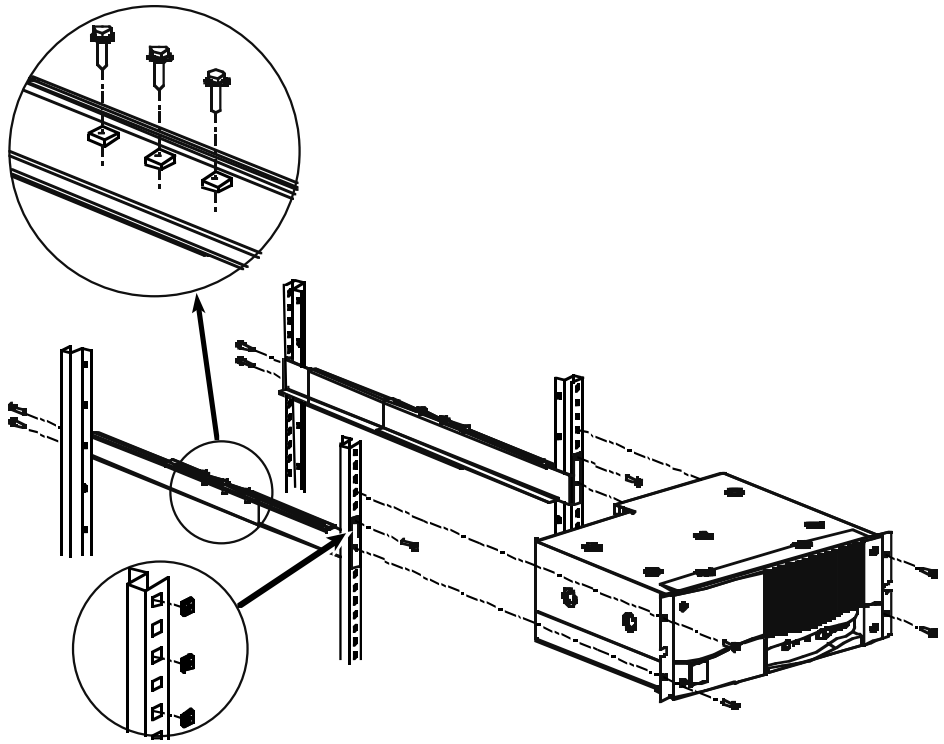
2.2 Unpacking

The equipment must be unpacked close to the installation location. Check all system components for damaged or missing parts. Check cable and termination points for damage. Call your MGE sales representative before installation if parts are missing or damaged.

WARNING

Wiring is to be done by qualified electrical personnel. Insure that all external AC input line circuit breakers are open (off).

Figure 2-1: Rack Mounting with Rails. (Rack model)



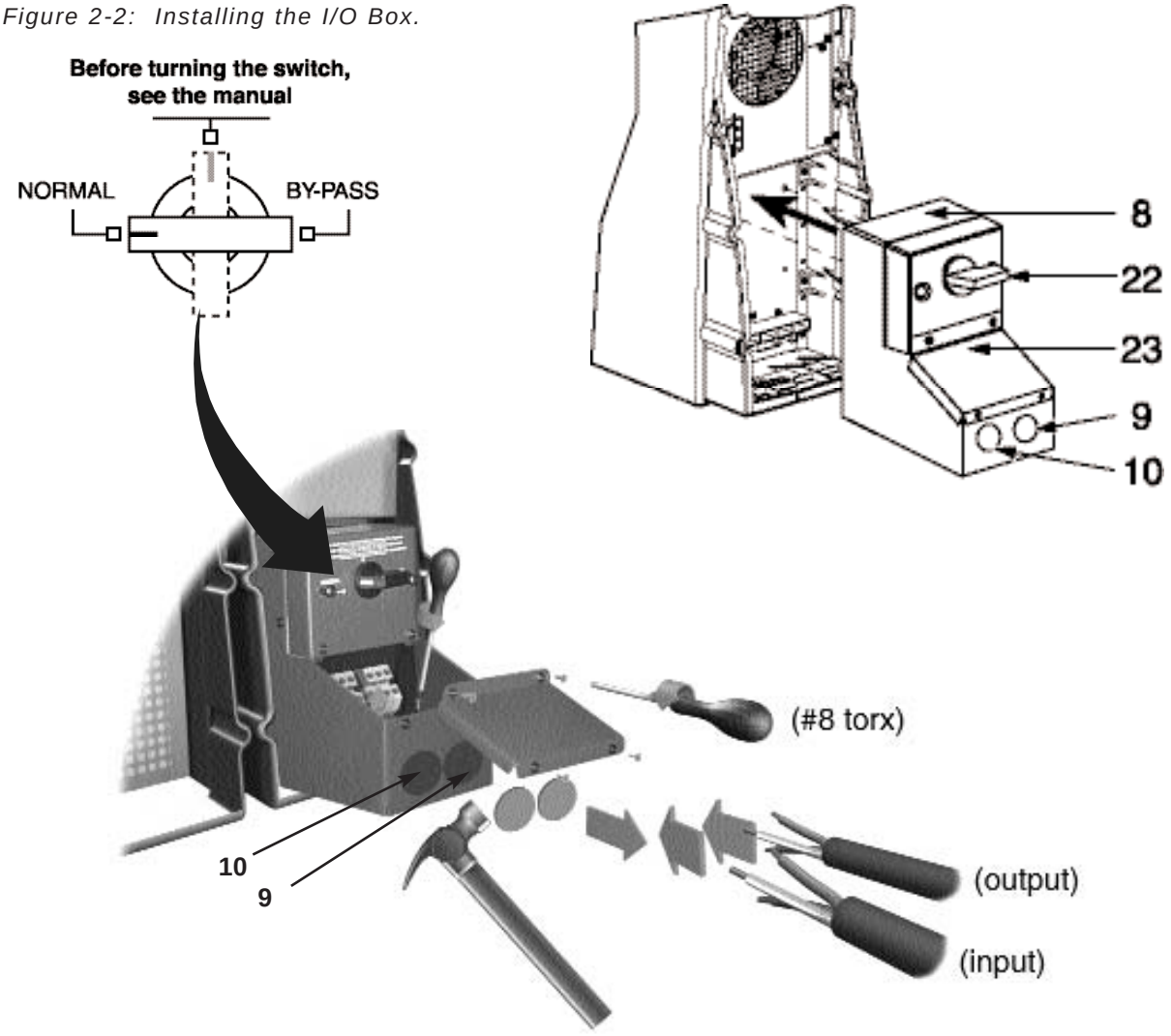
2.3 Installing the I/O Box

1. Install I/O Box. Verify the I/O Box "8 " is mounted properly to the UPS and the mounting screws are properly torqued to 20.7 in. LB. Use #8 torque tool to install I/O Box.
2. Verify the Bypass Rotary Switch "22", on the I/O Box, is in the "NORMAL" position, as shown in Figure 2-2.
3. Remove terminal block cover "23" on I/O Box.
4. Remove cable entry knockouts "9 , 10" at rear of I/O Box.
5. Insert cables for input power (left) and output power (right) through knockouts.
6. Be sure cables are secured to I/O Box with a strain relief.
7. Refit and secure the terminal block cover.

CAUTION

Do not operate switch. Refer to section 4-2 on pages 4-2 and 4-3.

Figure 2-2: Installing the I/O Box.

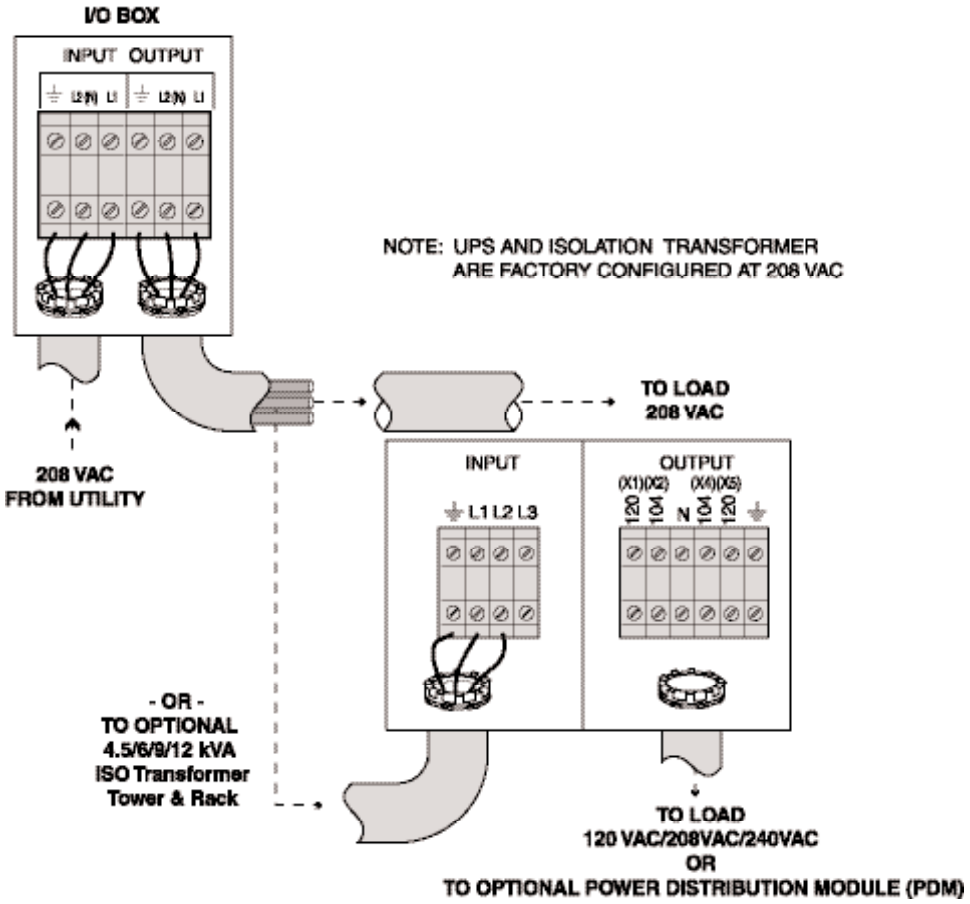


2.4 Input/Output Connections

1. Connect the three wires of the load or Comet EXtreme transformer to the “OUTPUT” terminal block as shown in Figures 2-3 and 2-4.

2. Connect the three wires of the power cable to the “INPUT” terminal block as shown in Figures 2-3, 2-4, and 2-5.

Figure 2-3: 4.5/6/9/12 kVA Configuration Terminal Block Layout. (Tower)



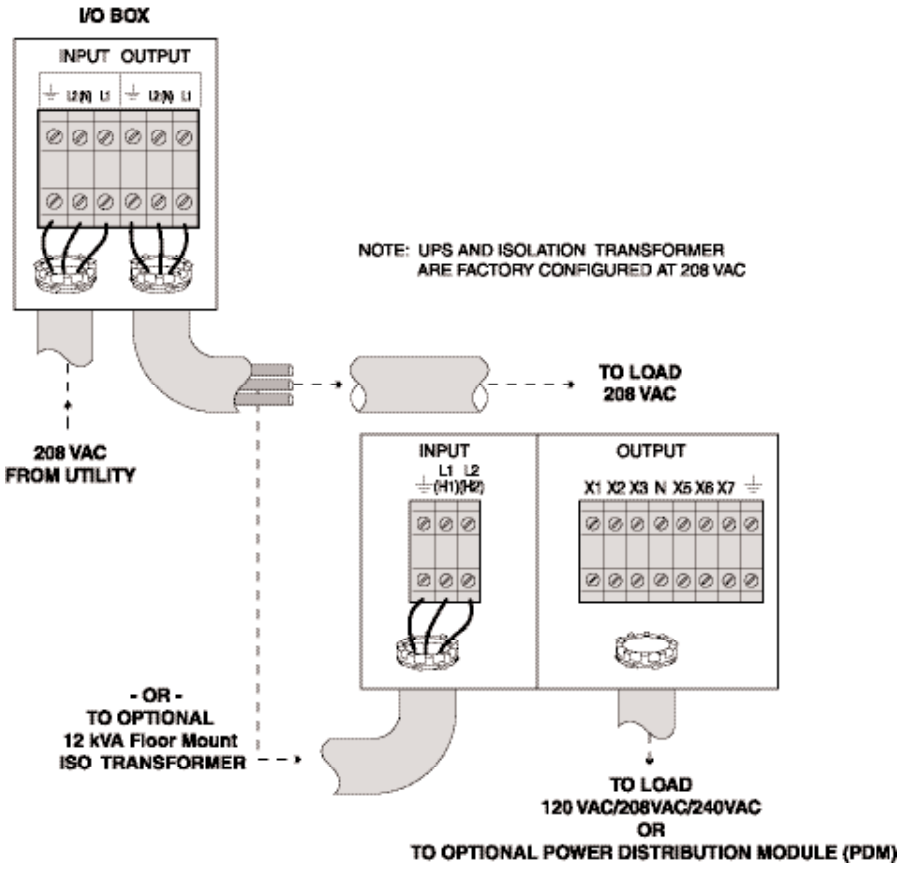
WARNING

Always connect the earth safety ground first.

WARNING

Before making connections to the UPS, check that the battery and AC power circuit breakers are in OFF position.

Figure 2-4: 4.5/6/9/12 kVA Configuration Terminal Block Layout. (Floor Mount)



WARNING

Always connect the earth ground wire first!

WARNING

Before making connections to the UPS, check that the battery and AC power circuit breakers are in OFF position.

Figure 2-5: 4.5/6/9/12 kVA Optional 208VAC Wiring Diagram.

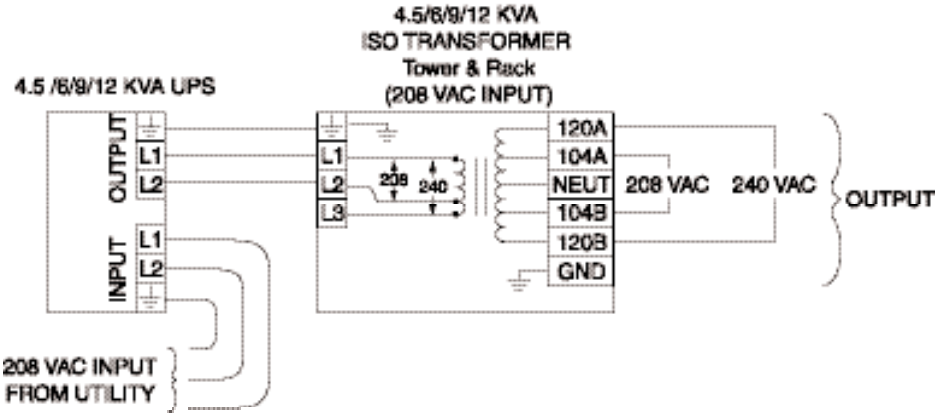
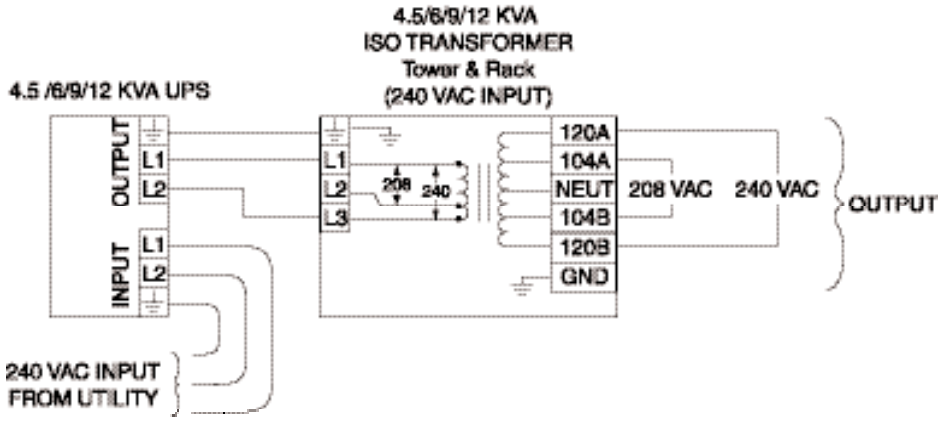


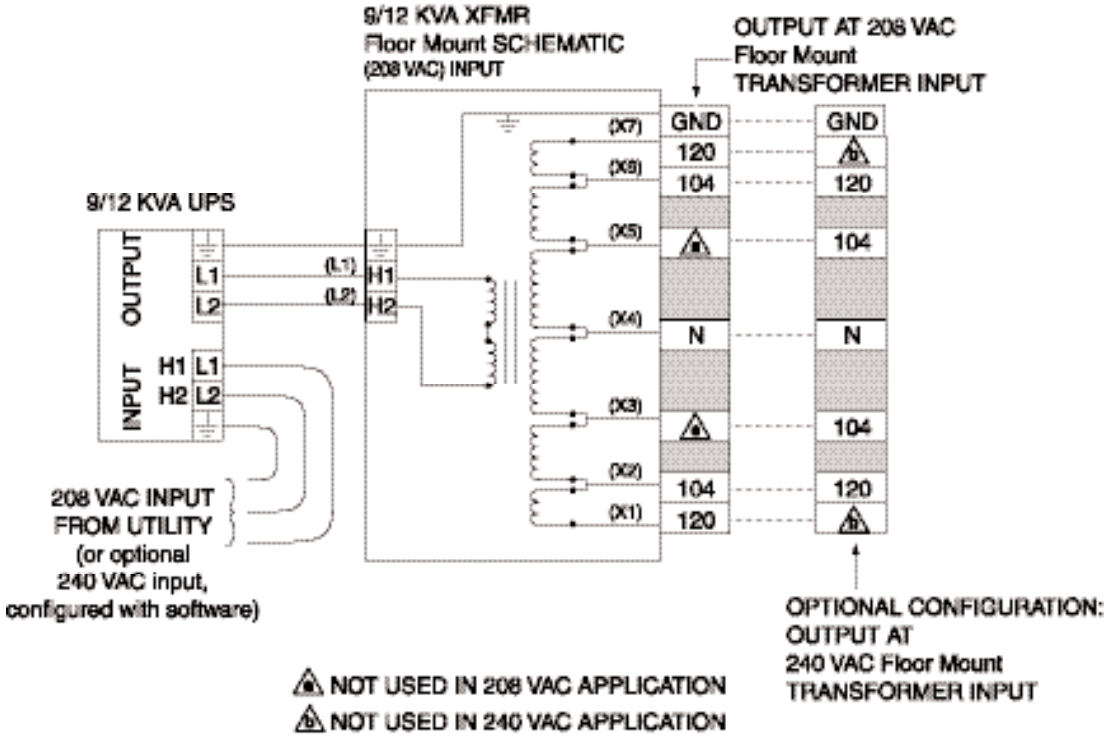
Figure 2-6: 4.5/6/9/12 kVA Optional 240VAC Wiring Diagram.



WARNING

To avoid overloading transformer windings, provide branch over current protection for all transformer output terminals.

Figure 2-7: 9/12 kVA Optional Transformer Floor Mount wiring diagram.



2.5 Battery-Module Connections

2.5.1 Comet EXtreme 4.5 and 6 kVA

1. Check that the battery circuit breaker(s) is OFF
2. Connect the Battery cable to the UPS and ISO Transformer, as shown in Figure 2-8 and 2-9.

Figure 2-8: Power Connections.

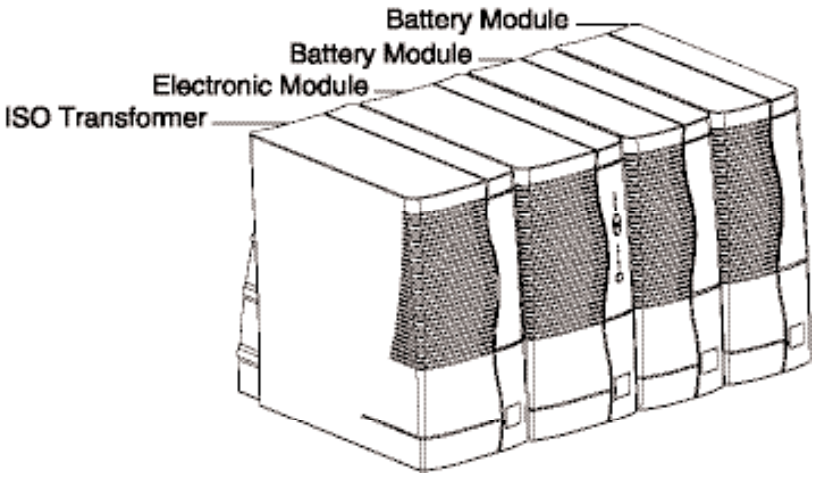
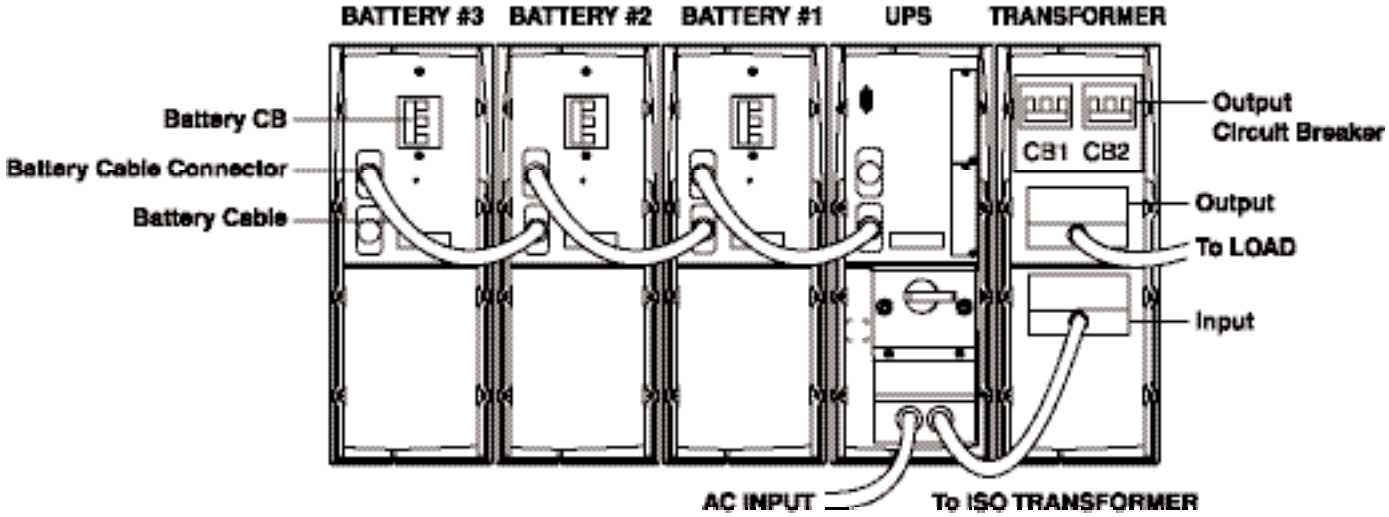


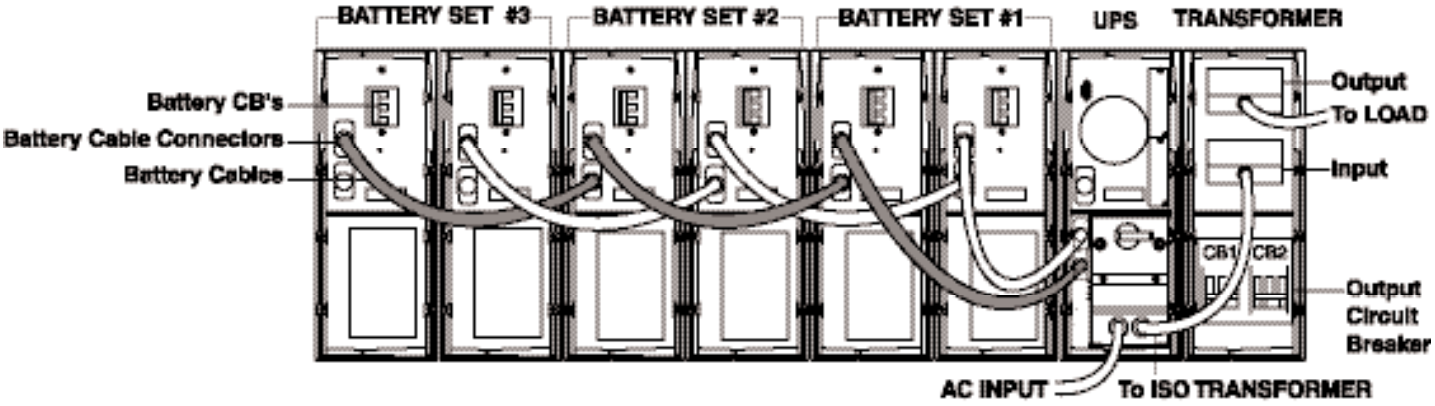
Figure 2-9: Battery-Module 4.5/6 kVA Connections.



2.5.2 Comet EXtreme 9 and 12 kVA

1. Check that the battery circuit breaker(s) is “OFF”.
2. Connect the Battery cable to the UPS and ISO Transformer, as shown in Figure 2-10.

Figure 2-10: Battery-Module 9/12 kVA Connections.



CAUTION

Input and output voltage of the UPS must always be the same.

CAUTION

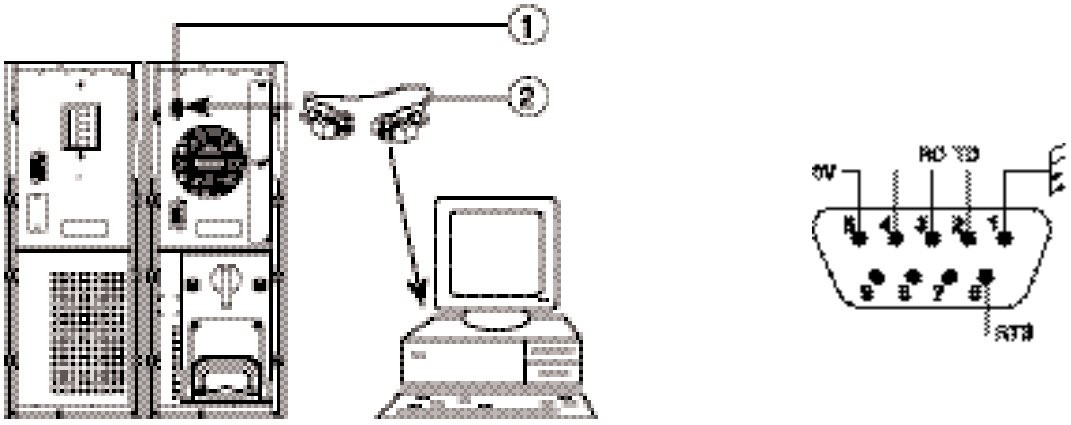
Comet EXtreme products are factory configured at 208 VAC, 60 Hz input and output.

2.6 Connection to the RS232

1. Connect the RS232 communications cable "2" to the serial port on the computer.
2. Connect the RS232 communications cable "2" 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.

Figure 2-11: RS232 Connection. Pin-out diagram for the RS232 communications port 1 on the UPS.

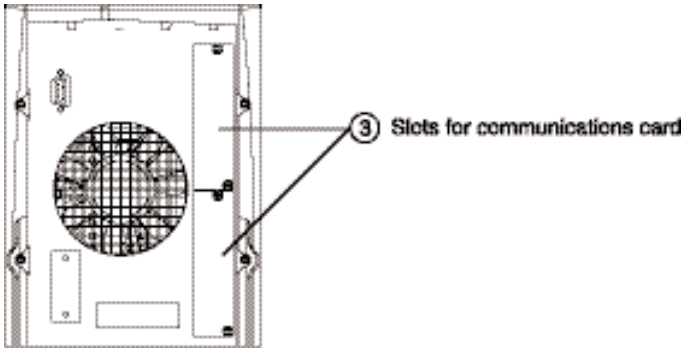


2.7 Installation of the Communications Card (Optional)

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.

Figure 2-12: Communications Card Slots.



2.8 Emergency Power-Off (EPO)

The end user is responsible for the installation of an emergency 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 be performed via a single device.

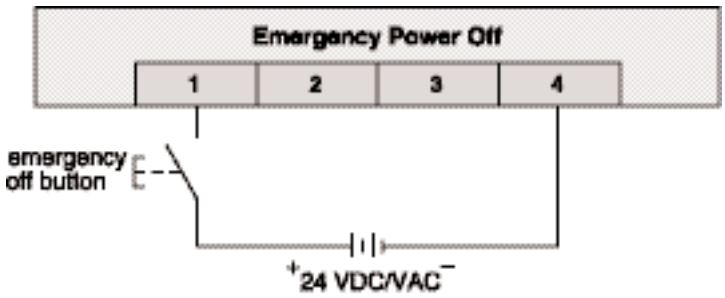
1. Disconnect the AC input power to the Comet EXtreme.
2. Remotely trip off the battery circuit breaker on the Comet EXtreme.
3. Remotely trip off the circuit breaker for the additional battery cabinet(s), if applicable.

2.8.1 Battery Circuit Breaker Shunt Trip Connection

To accommodate the EPO function, Comet Extreme 4.5/6/9/12 kVA 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 (shunt trip is rated 1 AMP, 125 VAC).

1. 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.
2. Remove the connection cover panel 5b from the battery module. See Figure 2-1 on page 2-1.
3. Connect the 24Vdc or 24 VAC output of the EPO circuit to the shunt trip coil across terminals 1 and 4.
4. Once the connections are made, reposition the connection cover panel and reset all circuit breakers.

Figure 2-13: Battery CB Shunt Trip Connection Diagram.



NOTE

Both AC and DC power are required to start Comet EXtreme UPS.

If Electronic module is configured for cold start, then AC and DC are required for initial start-up only.

2.9 Comet EXtreme Installation

1. Remove modules from packaging. Inspect for damage. Do not use damaged modules. If the system has a transformer, inspect terminal blocks for damage.

2. Remove cables and I/O Box from packaging. Inspect for damage, especially the connection points. Insure that connectors are not pinched or damaged in any way.

3. Place modules together for installation as shown in figures and wiring diagrams in this section.

4. Ensure that battery circuit breakers are off. Install battery cables to battery packs. Do not force or pinch cables. This can cause damage to the UPS.

5. Have an electrician install the AC line input cables to the input side of the I/O Box as described in this section. I/O Box should not be attached to the UPS while the AC connections are being made to the I/O terminals.

Ensure that input is connected to the input side of the I/O Box terminal block as shown in this section.

6. Turn on external AC line voltage. Measure voltage from L1 to L2. Should be 208 VAC or 240 VAC nominal. Measure voltage between L1 and Ground and L2 and Ground. Should be 120 VAC nominal. Turn off external AC line voltage.

7. Place the Manual Bypass Switch in the Normal position. Install I/O Box to the back of the UPS unit. Insure that the I/O Box connector lines up properly with the UPS. Push on the I/O Box to insure that it fits tightly. Secure I/O Box to the UPS unit using a #8 Torque tool. Do not attempt to install I/O Box using a tool other than Torque.

8. Connect battery cable (s) to UPS unit. Insure that the connectors line up properly. Do not pinch connectors or force them in.

9. Check the front of the UPS unit and insure that none of the buttons are pushed in. Check the " ON/OFF " button to insure that it is out, not pushed in.

10. Turn on battery circuit breaker(s). You will hear 3 short beeps indicating that the UPS unit has detected the battery voltage.

11. Wait 60 seconds to ensure that the top four amber LEDs illuminate on the UPS. When the four amber LEDs “11 through 14” are illuminated, turn on the input AC line voltage. With the AC input present, the four amber LEDs represent battery charge level. At this time the four amber LEDs will change as follows; normally two or three LEDs will illuminate and then the third and forth will illuminate. This will take approximately 30 to 60 seconds. Wait 60 seconds to ensure that 4 LEDs are illuminated.

12. UPS can now be turned on. Please read the “Operation” section for UPS start-up instructions.

CAUTION

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.

NOTE

Both AC and DC power are required to start Comet EXtreme UPS. If Electronic module is configured for cold start, then AC and DC are required for initial start-up only.

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Operation

3.0 Scope

This section describes operation of the Comet Extreme 4.5/6/9/12 kVA UPS.

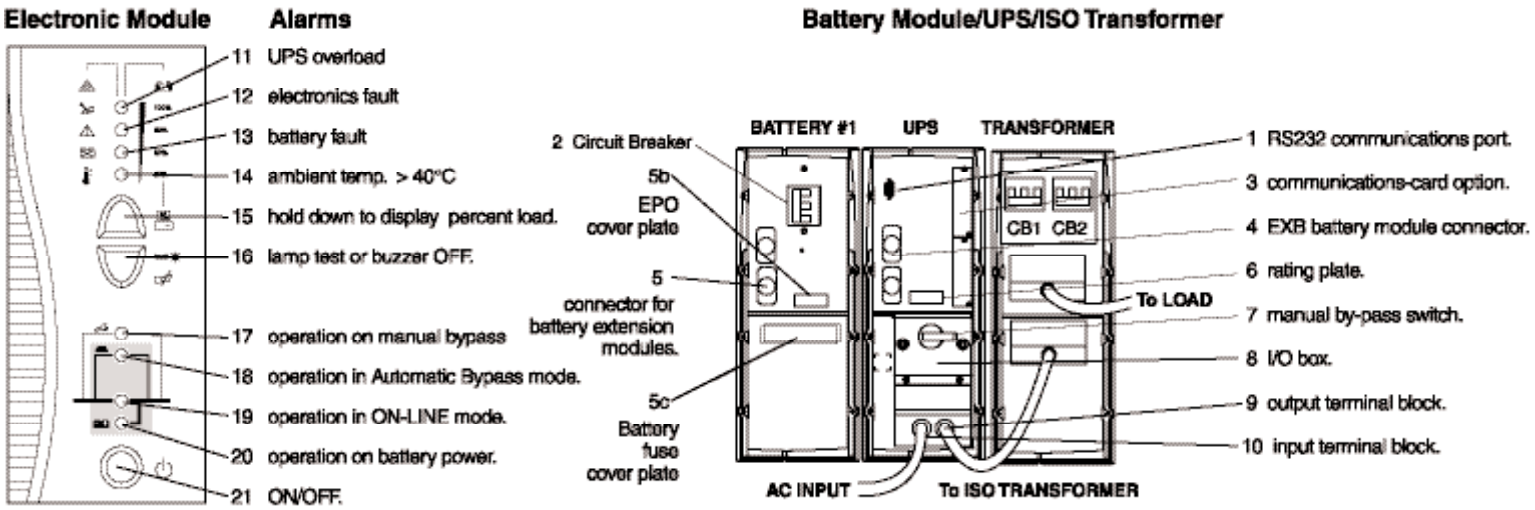
3.1 Controls and indicators

Comet EXtreme 4.5/6/9/12 kVA UPS operating controls include basic controls and indicators (Figure 3-1), concerning the overall operating status of the UPS and the special command and diagnostic display panel (Figure 3-2), which includes specific controls and a 2-digit display for the UPS fault numbers. These numbers provide UPS diagnostics.

CAUTION

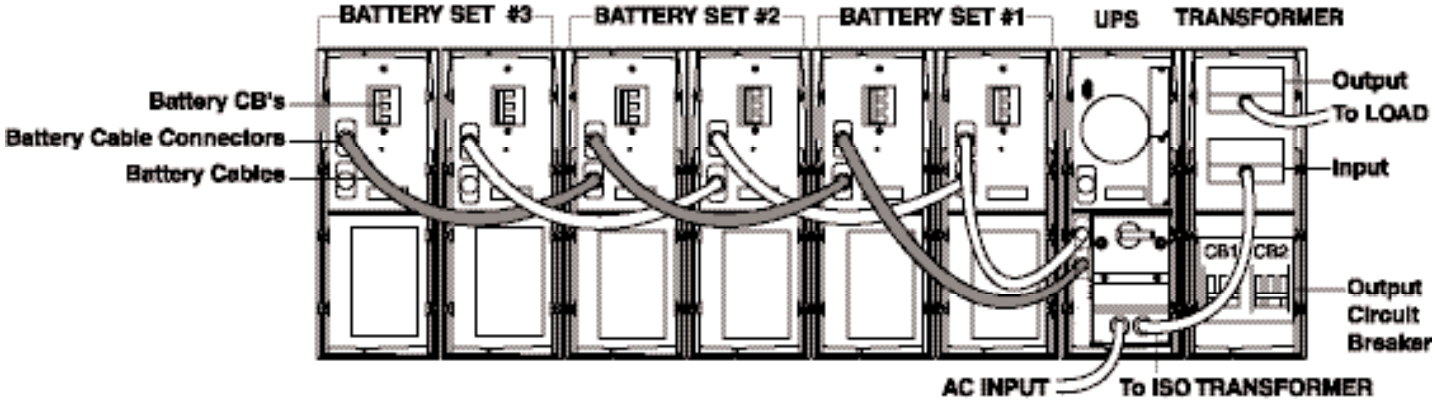
Comet EXtreme products are factory configured at 208 VAC, 60 Hz input and output. Input and output of the UPS must always be the same.

Figure 3-1: Comet EXtreme 4.5 kVA & 6 kVA front and rear panel (tower).



Note: Rack model controls and indicators are identical to tower.

Figure 3-2: Comet EXtreme 9 & 12 kVA (tower).



CAUTION

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.

NOTE

Both AC and DC power are required to start Comet EXtreme UPS. If Electronic module is configured for cold start, then AC and DC are required for initial start-up only.

3.2 Comet EXtreme Start-Up Procedure

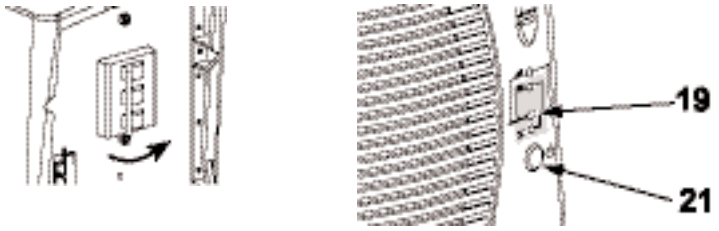
This document provides an overview of the initial procedures that should be followed before any devices are powered by your Comet EXtreme UPS.

1. Turn on AC input breaker.
2. Turn the battery circuit breaker(s) “2” to ON position. The buzzer will sound three times. Wait for LEDs (amber) “11, 12 , 13 , and 14” to illuminate.
3. Press the ON/OFF button “21” . All connected equipment is energized. The buzzer sounds. LED “19” illuminates.

NOTE

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

Figure 3-3: Battery Circuit Breakers “ON” (left), and ON/OFF Button on unit (right).



3.3 Battery Scan Test

Battery Scan Test procedure is a test for each battery to verify it is in basic working order. To verify it holds a charge, batteries should be charged for several hours before testing battery levels.

The protected equipment connected to the UPS can be energized, only if AC input power is available.

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.

1. Verify that all AC and DC connections, input and output, are secure.
2. Set the battery circuit breaker(s) to “ON”. The buzzer will sound three times.
3. Turn on external AC power.
4. Press the ON/OFF button 21 on UPS. After 30 seconds, LEDs “19” , and “11 - 14” illuminate. All connected equipment is energized.

NOTE: If LED “19” does not go ON, or if LEDs “11 , 12 , 13 or 14” flash, there is a fault (refer to section 4.5 of this manual).

5. LEDs “11 to 14” provide four different indications:
   - Remaining backup time in percent, with AC present (ON-LINE mode).
   - Battery time remaining in battery mode.
   - Percent load drawn by the protected equipment, when button “15” is pressed.
   - Operating faults (flashing LED and beeps):

     11 Overload

     12 UPS fault

     13 Battery fault

     14 Excessive ambient temperature
6. Allow the battery packs to charge for at least 10 minutes.
7. Remove power from the Comet EXtreme 4.5/6/9/12 kVA UPS by setting the AC main circuit breaker supplying power to the UPS to “OFF.”
8. Set all battery circuit breakers, except one, to the “OFF” position.
9. Verify that the Output Power ON/OFF switch on the UPS is in the “ON” position.
10. After approximately 30 seconds, at least one of the four yellow LEDs on the front panel of the UPS should be lit. Additionally, the Battery Input LED“20”, on the front panel of the UPS should be lit. This will indicate that the battery pack is operational.
11. Activate the next battery (if system has more than one battery set) by setting its circuit breaker to “ON”. Deactivate the battery that was tested previously by setting its circuit breaker to “OFF”. The battery test LEDs should still be illuminated.
12. Repeat step #11 until all batteries have been tested. Any battery that fails to light at least one of the “battery remaining” LEDs may need to be charged for a minimum of three hours. Repeat the scanning

procedure. If the battery pack again fails to light at least one LED, it should be replaced.

13. Restore power to the Comet EXtreme UPS by setting the AC mains circuit breaker supplying power to the UPS to “ON.” And set all battery circuit breakers to the “ON” position.

3.4 Load Power-Up Test

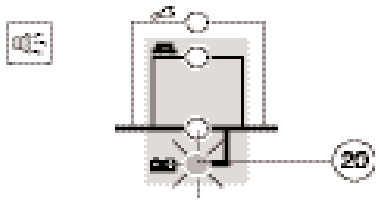
1. After performing the Battery Scan Procedure above, set all battery circuit breakers to the “ON” position.
2. Allow the UPS to charge the batteries for at least three hours per battery pack. You may use the UPS while the batteries charge, but the battery backup runtime will be reduced until the batteries are fully charged.
3. If the system configuration includes an ISO transformer switch the CB1/CB2 to the “ON” position.
4. Switch on the protected equipment, one load at a time. If the UPS beeps an alarm when you start your equipment, the UPS may be overloaded.
5. The four LEDs on the right side of the front of the UPS (“11 through 14”) show the percent of battery capacity remaining. To verify the percentage of maximum load, depress the “Push for % of load” button.

Successful completion of the procedures above will verify that the Comet EXtreme UPS is properly configured and ready for use.

3.5 Fault Modes

Failure of AC Input Power The AC-power source is outside tolerances, LED “20” is ON, the buzzer beeps three times, unit transfers to battery power.

Figure 3-4: LED 20 is “ON” and 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. 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.
Refer to Figure 3-1.
The equipment is no longer supplied with power.

Sleep mode	This operating mode may be personalized using the "UPS Driver" software. Sleep mode 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

3.6 Personalization

3.6.1 Function

Note: Manual Bypass Switch must be in normal mode during personalization.

Note: 240 VAC can be applied to the UPS prior to completion of personalization.

Personalization parameters can be set and modified using the "UPS Driver" software installed on a computer that is connected to the UPS (see section 2.7 Connection to the RS 232 communications port).

Check that the RS232 cable “24” is correctly connected and that the battery circuit breaker “2” is closed.

3.6.2 “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.

Note: Verify that AC input and output voltages are correct at I/O Box in/out terminal block, according to UPS personalization and your application.

Table 3-1: Personalization Functions tables.

“ON/OFF conditions” tab

Personalization 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

Personalization 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 back-up time	40% remaining battery back-up time

Charger	Standard	CLA (2, 4 or 8 hours)

“Output” tab

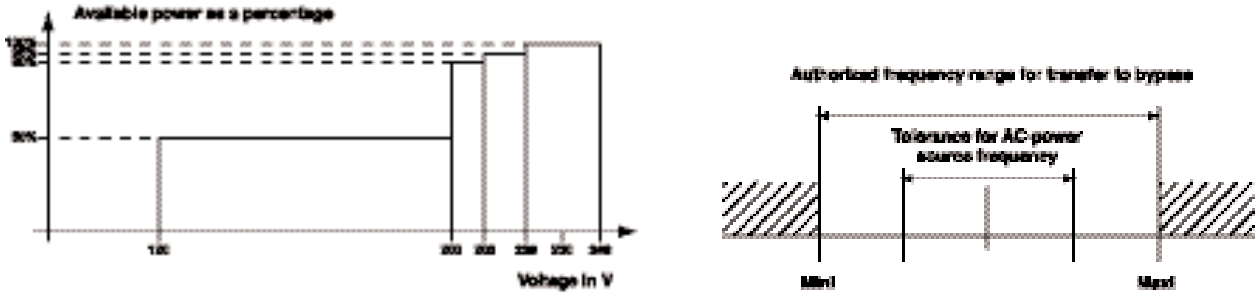
Rated AC-power source voltage	208 V	220 V-208 V-220 V-240 V
Rated AC-power source frequency	60 Hz	50 Hz
Tolerance for AC-power source frequency	±5%	±1% to ±10%, in 1% steps
Frequency-regulation rate for overload	Standard 100%	Redundancy Alarm threshold 0 to 100%, in 10% steps
Restart inverter after short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

“By-pass” tab

Authorized voltage range for transfer to bypass 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 steps if fault or overload	± 10%	± 1% to ± 10%, in 1%
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).

Figure 3-5: Values selected for the rated UPS voltage.



3.6.3 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.

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Maintenance and Troubleshooting

4.0 Scope

This section describes maintenance of the Comet Extreme 4.5/6/9/12 kVA UPS.

4.1 Troubleshooting

If any of LEDs “11 , 12 , 13 or 14” flash, there is an operating abnormality or an alarm.

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

Table 4-1: Troubleshooting not requiring MGE after-sales support.

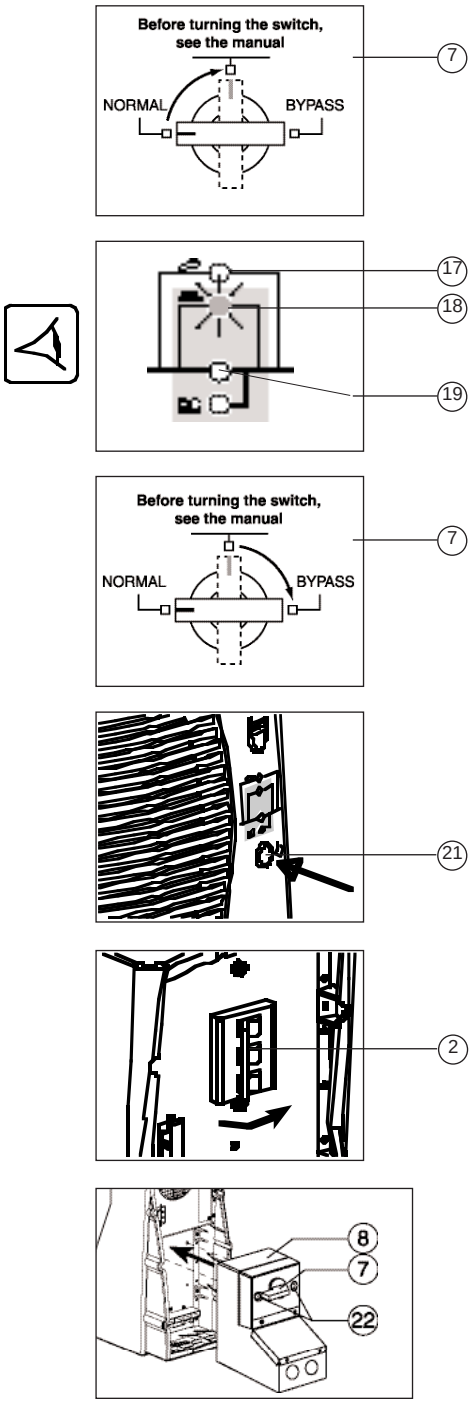
Indication	Description of Problem	Correction
AC & DC power are present. On/Off switch is pressed on. All UPS front panel LEDs are off. No output power.	UPS fault due to incorrect start up procedure, incorrect cable connections, or incorrect connection of the I/O Box.	Push the "Output Power On/Off" switch to turn the UPS OFF. Switch OFF all battery breakers. Remove the I/O Box for at least 2 minutes then reinstall the I/O Box to the UPS. Turn battery circuit breakers to ON position. Repeat start-up procedure (Section 4.3)
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.

Table 4-2: Troubleshooting requiring MGE after-sales support.

Indication	Description of Problem	Correction
LED “12” flashes and the buzzer beeps.	UPS electronics have detected a UPS fault. Depending on the UPS personalization parameters (see section 4.6), there are two possibilities: The equipment connected to the UPS continues to be supplied, directly from the AC-power source (via the automatic bypass, LED “18” ON); The connected equipment is not powered or protected.	Follow the UPS replacement procedure Call the after-sales support department at 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 faulty.

4.2 Replacement of the Electrical Module

AC main power must be operating before beginning the "Replacement of the Electronic Module" procedure. Make certain that the ON-LINE LED 19 on the front panel is illuminated.



Disconnecting the I/O Box:

1. Turn the manual bypass switch “7” from the NORMAL to the intermediate position, wait for 60 seconds. Check that the amber bypass LED (ECO) “18” is illuminated before continuing to the manual BYPASS position. This may take up to 30 seconds.

CAUTION: If LED 18 is not ON, do not switch to the manual BYPASS position, power can be lost or the UPS damaged. Call the after-sales support department at 1- 800-523-0142.

2. Turn the manual BYPASS switch “7” from the INTERMEDIATE position to the manual BYPASS position. Check the front of the UPS to ensure that the amber bypass LED “18” and red manual bypass LED “17” are illuminated. The connected equipment is supplied by the AC power source, via the manual bypass.

NOTE: If you are verifying the operation of the manual bypass switch, do not perform steps 3 through 10. Go to step 12 now.

3. Shut down the UPS by pressing button “21” (return to the OFF position). Red manual bypass LED “17” will stay illuminated.
4. Switch the battery circuit breaker(s) to the OFF position.
5. If you intend to replace the Electronic Module with a new UPS, loosen the two screws, item “22”, securing the I/O Box and remove the I/O Box.
6. Remove the connection cable(s) between the UPS and the battery module(s).
7. The UPS can now be replaced. The connected equipment is supplied directly by the AC-power source.

Reconnecting the I/O Box:

8. Secure the I/O Box “8” to the new UPS using the two screws “22”
9. Reconnect the battery cable(s) to the new UPS.
10. Switch the battery circuit breaker(s) “2” to the ON position.

Note: The four LEDs on top of the front panel “11 , 12 , 13 and 14” may take up to 60 seconds to turn ON.

11. Press the UPS On/Off switch to turn the UPS ECU ON. The amber Auto Bypass LED (ECO) 18 and red manual bypass LED “17” should turn ON.

Note: If the Auto Bypass LED and/or Manual Bypass LED on the front panel are OFF, perform the following recovery procedure:

- Push the "Output Power On/Off" switch to turn the UPS OFF.
- Switch OFF all battery breakers.
- Remove the I/O box for at least 2 minutes and return to step 8 of this procedure.

12. Turn the manual bypass switch from the BYPASS position to the INTERMEDIATE position.

13. Amber Auto Bypass LED “18” will remain ON and the red Manual Bypass LED “17” will turn OFF.

14. Turn the manual bypass switch from the INTERMEDIATE to NORMAL position. The connected equipment is now being supplied power from the UPS. Verify that the amber Auto Bypass LED is OFF and the green on-line LED “19” is ON.

If LED “19” is not ON, do not switch to the intermediate position. Call the after-sales support department.

Note: Check that UPS personalization settings are configured for your application. See Section 3.6.

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Environmental

5.0 Scope

This section describes environmental considerations for Comet EXtreme.

5.1 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.

5.1.1 UPS Recycling at 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).

5.1.2 Packing

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

5.1.3 Warning

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

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Glossary

Appendix A

Symbols	Definition/Meaning
@	At.
/	And/or.
+/-	Plus or Minus.
≤	Equal to or less than.
#	Number.
°C	Degree Celsius.
°F	Degree Fahrenheit.
Ø	Phase angle.
Ω	Ohm; unit of resistance.
®	Trade Mark.
2nd	Second.
AC or ac	Alternating current, also implies root-mean-square (rms).
Ambient Temp.	Temperature of surrounding air.
Ambient noise	Acoustical noise of surrounding environment.
ANSI	American National Standard Institute.
AWG	American Wire Gauge.
Automatic bypass AC-power source.	Automatic switch controlled by the UPS, used to connect the equipment directly to the
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.
Bar graph load.	Device on the front panel indicating the percent remaining backup time or the percent
Battery circuit breaker	DC-power circuit breaker that protects the battery circuit.
Battery test	Internal UPS test on battery status.

Breaker	Electrical circuit interrupter.
BTU or Btu	British thermal unit. Defined as the amount of heat required to raise the temperature of one pound of water by 1°F.
BYPASS	See “Static Transfer switch”.
BYPASS mode	See “off-line mode”.
Carrier	The company or individual responsible for delivering goods from one location to another.
C	Common.
CB	Circuit breaker.
cm	Centimeter.
dB	Decibels.
DC	Direct current.
Conduit	A flexible or rigid tube enclosing electrical conductors.
Cold start	See "Start on battery power".
Connection module equipment.	Unit grouping the receptacles for connection to the AC-power source and the
C.S.S.	Customer Support Service.
Current rating	The maximum current that a conductor or equipment can carry reliably without damage.
dBA	Decibel Adjusted.
dBrnC	Decibel above reference noise.
DC or dc	Direct current, or voltage.
Digital Meter	The LCD display on the front panel of inverter system.
Double conversion continuous	The power supplied to the connected equipment is completely regenerated by double conversion, i.e. the AC power from the AC-power source is rectified (AC - DC), then converted back (DC - AC) to AC power.
Earth ground	A ground circuit that has contact with the earth.
Electrician	Refers to an installation electrician qualified to install heavy-duty electrical components in accordance with local codes and regulations. Not necessarily qualified to maintain or repair electrical or electronic equipment.
FET	Field effect transistor.
Freq.	Frequency.
Frequency slew rate	The change in frequency per unit of time. Given in term of Hz per second (Hz/sec.).
GND	Ground (safety).

Hz	Hertz, frequency measurement unit, 1Hz is one cycle per second.
Inverter mode	See “on-line” mode.
I	Current.
IEC	International Electrotechnical Commission.
IEEE	Institute of Electrical and Electronic Engineers.
Input branch circuit	The input circuit from the building power panel to the equipment.
Inverter	An electrical circuit that generates an AC voltage source from a DC voltage source.
IGBT	Insulated gate bipolar transistors
kVA	KiloVolt-Ampere; is equal to 1000 Volt-Ampere.
L	Line.
LCD	Liquid-Crystal Display unit.
LED	Light Emitting Diode.
Mains or Mains 1	Main AC input source.
Mains 2	Bypass AC input source.
mA	Milliampere.
MAX.	Maximum.
MCM	Thousand circular mil; standard wire sizes for multiple stranded conductors over 4/0 AWG in diameter. M is from Roman numerical system indicating 1000.
Module	Refers to individual power inverter module.
N	Neutral.
NC	Normally close.
NO	Normally open.
NEC	National Electrical Code.
NFPA	National Fire Protection Association.
NO. or No.	Part number.
On-line mode	Inverter output power is the primary energy source to load.
Off-line mode	Inverter output is off, and the load connected at the inverter output receives power from utility line via a static transfer switch or maintenance bypass relay.
OSHA	Occupational Safety and Health Agency.
PCA	Printed circuit assembly.
PCB	Printed circuit board.

PWM	Pulse Width Modulation.
SCR	Silicon controlled rectifier.
Shipping damage	Any damage done to an article while it is in transit.
SPDT	Single Pole Double Throw.
Static Transfer	An solid state switching mechanism electronically controlled to pass AC power directly from the utility to an output load.
Technician	Refers to an electronic technician qualified to maintain and repair electronic equipment. Not necessarily qualified to install electrical wiring.
Test connector	DB-9 type connector on the LCD panel allowing MGE UPS SYSTEMS Customer Support Service technician to access programmable and diagnostic features of the system.
V	Volts
VA	Volt amperes
VA	Volt-amps, unit for apparent power measurement, equal V x I.
VAC or Vac	Voltage of AC type.
VDC or Vdc	Voltage of DC type.
ve	Battery voltage.
Via	By way of.

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