



EX 5RT / EX 7RT/ EX 11RT System

Installation and User Manual

86-86000-00 A01



IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS – This manual contains important instructions for MGE UPS SYSTEMS, INC. products that must be followed during operation and maintenance of the equipment.



WARNING

Opening enclosures expose hazardous voltages. Always refer service to qualified personnel only.

ATTENTION

L'ouverture des cabinets expose des tensions dangereuses. Assurez-vous toujours que le service ne soit fait que par des personnes qualifiées.

WARNUNG!

Das Öffnen der Gehäuse legen gefährliche Spannungen bloss. Service sollte immer nur von qualifizierten Personal durchgeführt werden.



WARNING

As standards, specifications, and designs are subject to change, please ask for confirmation of the information given in this publication.

ATTENTION

Comme les normes, spécifications et produits peuvent changer, veuillez demander confirmation des informations contenues dans cette publication.

WARNUNG!

Normen, Spezifizierungen und Pläne unterliegen Änderungen. Bitte verlangen Sie eine Bestätigung über alle Informationen, die in dieser Ausgabe gemacht wurden.



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 user's own expense.

Certification Standards

- ▶ IEEE 587-1980/ANSI C62.41 1980 Standards for Surge Withstand Ability
- ▶ FCC rules and regulations of Part 15, Subpart J, Class A
- ▶ UL listed under 1778, Standards for Uninterruptible Power Supply Equipment
- ▶ IEC 61000-4-2 (ESD) : level4.
- ▶ IEC 61000-4-3 (Radiated field) : level 3.
- ▶ IEC 61000-4-4 (EFT) : level4.
- ▶ IEC 61000-4-5 (Fast transients) : level4.
- ▶ IEEE-C6241 Category B (ring wave).
- ▶ IEC 61000-4-6 (electromagnetic field).
- ▶ IEC 61000-4-8 (conducted magnetic field).

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.
- ▶ 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 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.

Product Safety

- ▶ A protection circuit breaker must be installed upstream and be easily accessible..
- ▶ The UPS can be disconnected from the AC power source by opening the input circuit breaker.
- ▶ UPS must be connected to a nearby power source that is easily accessible.
- ▶ Never block the ventilation grates of the UPS.
- ▶ The UPS must be installed in a controlled environment.

Special Precautions

- ▶ The UPS connection instructions and operation described in the manual must be followed in the indicated order.
- ▶ 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.
- ▶ 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.

How to use this manual and Symbol Usage

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

Typographical conventions use “< >” angle brackets in procedures to denote a prompt for User action:

For example: 1. After the selections are complete, click on the <Save> button.

This manual uses four icon symbols with text to convey important information and tips.



WARNING

Indicates information provided to protect the user and service personnel against safety hazards and/or possible equipment damage.



CAUTION

Indicates information provided to protect the user and service personnel against possible equipment damage.



IMPORTANT

Indicates information provided as an operating instruction, or as an operating tip.



NOTE

Indicates information provided as an operating tip or an equipment feature.

CAUTION: Record All Serial Numbers!

**RECORD ALL SERIAL NUMBERS FOR EX 5/7/11 RT AND ACCESSORIES.
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!**

EX 5RT System

EX 7RT System

EX 11RT System

Power Module SERIAL NUMBER: _____

Battery Module SERIAL NUMBER: _____

Transformer SERIAL NUMBER: _____

ADDITIONAL MODULES SERIAL NUMBERS:

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

EX 5/7/11 RT System *Installation and User Manual*

Revision History

EX 5RT / EX 7RT / EX 11RT System *Installation and User Manual* 86-86000-00
Revision: A00 Initial Release 07/2004

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section	description	page
	IMPORTANT SAFETY INSTRUCTIONS	.ii
	Certification Standards	.ii
	Safety of Persons	.iii
	How to use this manual and Symbol Usage	.iii
	CAUTION: Record All Serial Numbers!	.iv
	Revision History	.v

Section 1 Introduction

section	description	page
1.0	Scope	.1 — 1
1.1	System Electrical Characteristics	.1 — 4
1.2	Standard Configurations	.1 — 4
1.2.1	Tower Configuration	.1 — 4
1.2.2	Rack Configuration	.1 — 5
1.3	Rear Panels	.1 — 6
1.3.1	Power Module EX 5/7/11 RT	.1 — 6
1.3.2	Battery Module EXB 5/7/11 RT With Emergency Power Off (EPO) Function	.1 — 6
1.3.3	EX RT Transformer Module	.1 — 7
1.4	Display and Control Panel	.1 — 7
1.5	Optional Accessories	.1 — 8
1.5.1	Power Module Rail Kit	.1 — 8
1.5.2	Battery/ Transformer/CLA Module Rail Kit	.1 — 8
1.5.3	Battery Module with Remote Emergency Power Off (REPO) Function	.1 — 9
1.5.4	Battery Extension Cable Kit	.1 — 9
1.5.5	Battery Integration Kit with Casters	.1 — 10
1.5.6	Input/Output Box	.1 — 10
1.5.7	Transformer Module	.1 — 11
1.5.8	CLA Module (Long backup time charger)	.1 — 12

Section 2 Setup and Installation

section	description	page
2.0	Scope	2 — 1
2.1	Unpacking and Parts Check	2 — 1
2.2	Contents of EX 5/7/11 RT System	2 — 2
2.3	Installation in Tower Configuration	2 — 4
2.4	Installation in Rack Mounting Configuration	2 — 5
2.4.1	Adjustment of Front Panel Logo and control panel for Rack Orientation.	2 — 5
2.5	Prepare Battery Module for Rack Mounting	2 — 6
2.6	Power or Battery Module Rack Mounting	2 — 7
2.6.1	Rear Support Brackets Installation	2 — 8
2.6.2	Input/Output Box Bracket System Installation	2 — 8
2.7	Communication Ports	2 — 9
2.7.1	Connecting the RS232 Communication Port	2 — 9
2.7.2	Connecting the Dry (Relay) Contact Communication Port	2 — 10
2.7.3	Installation of Optional Network Management Card	2 — 10
2.7.4	Remote Emergency Power Off (REPO) Communication Port	2 — 12
2.8	Connecting the Input and Output Power Cables to the Input/Output Box	2 — 13
2.8.1	Flexible Cordage and Conduit Installations	2 — 13
2.8.2	System Connections with Common Normal and Bypass AC Sources	2 — 15
2.8.3	Connecting EX RT Transformer	2 — 16
2.8.4	System Connections with Separate Normal and Bypass AC Sources	2 — 17
2.8.5	System Connections as Frequency Converter (without Bypass AC Source)	2 — 18
2.9	Connection of Battery Module, EXB	2 — 19
2.10	Connection of CLA Module	2 — 20

Section 3 Operation

section	description	page
3.0	Scope	3 — 1
3.1	Initial Startup	3 — 1
3.2	UPS Personalization	3 — 2
3.2.1	Accessing personalization with front panel buttons	3 — 2
3.2.2	Accessing personalization through external software	3 — 4
3.2.3	Final startup sequence	3 — 4
3.3	Operating Modes	3 — 5
3.3.1	Normal (double conversion) Mode	3 — 5
3.3.2	ECO Modes	3 — 6
3.4	Operation on battery power	3 — 7
3.4.1	Transfer to Battery Power	3 — 7
3.5	Return of Normal AC source	3 — 8
3.6	Shutdown	3 — 8

Section 4 Maintenance

section	description	page
4.0	Scope	4 — 1
4.1	Information Technology (IT) Network and Industrial Operating Modes	4 — 1
4.2	Troubleshooting	4 — 2
4.3	Hot Swapping the Power Module	4 — 4
4.4	Re-connecting the power module	4 — 5
4.5	Hot Swapping the Battery Module	4 — 6
4.5.1	Disconnecting the Battery Module	4 — 6
4.5.2	Re-connecting the Battery Module	4 — 6

Section 5 Appendix

section	description	page
5.0	Electrical Specifications	5 — 1
5.1	System Input/Output Power Ratings	5 — 1
5.2	System Overload Characteristics	5 — 1
5.3	System Backup Characteristics	5 — 1
5.4	System Short Circuit Protection	5 — 2
5.5	Accessories Electrical Characteristics	5 — 2
5.6	Heat Rejection	5 — 2
5.7	Environmental Characteristics	5 — 2

MGE Warranty & Propriety Rights

MGE Warranty
 Proprietary Rights Statement

Warranty and Product Registration

User Information
 Product information
 Warranty Extension (Warranty+) not available on products

Technical Support and Field Service

MGE Service and Repair
 Who to Contact
 Scheduling Field Service Engineer Support
 Return for Repair (RMA)

Glossary G — 1

Reorder Form RO — 1

Figures

figure	description	page
1-1:	Tower Configurations with Power Module, Battery Module, and optional Transformer Module.	1 — 4
1-2:	Rack Configurations with Power Module, Battery Module, and Transformer Module	1 — 5
1-3:	Rear panel of the Power Module.	1 — 6
1-4:	Rear Panel of the Battery Module.	1 — 6
1-5:	Rear Panel of the optional Transformer Module. (PN 86003)	1 — 7
1-6:	View of typical control panel interface.	1 — 7
1-7:	Power Module Rack Mounting Kit.	1 — 8
1-8:	Telescopic rails for the Battery/Transformer/CLA module Rack mounting.	1 — 8
1-9:	Typical back-up time with multiple EXB's at full load.	1 — 9
1-10:	Typical Battery Integration kit with casters setup.	1 — 10
1-11:	Typical Transformer Module contents and connections.	1 — 11
1-12:	Connection for CLA Module and EX 5/7/11 RT.	1 — 12
2-1:	Contents of Standard HV EX 5RT (PN 86050) / EX 7RT (PN 86070) / EX 11RT (PN 86110) System.	2 — 3
2-2:	Tower Configuration of Standard System and Optional Transformer Module.	2 — 4
2-3:	Typical orientation of the logo and control panel. (Power Module shown)	2 — 5
2-4:	Accessing Battery Pack.	2 — 6
2-6:	Rack mounting of the power module onto the rails.	2 — 7
2-7a:	Rear Support Brackets.	2 — 8
2-7b:	Input/Output Box Bracket System.	2 — 8
2-8:	RS232 Communication Cable Connection.	2 — 9
2-9:	Relay Pin Connections for Communication Port.	2 — 10
2-10:	Communication Card Slot with SNMP/Web Network Management Card installed.	2 — 10
2-10a:	Activation of remote power off function using a contact normally open switch.	2 — 12
2-10b:	Activation of remote power off function using a contact normally closed switch.	2 — 12
2-12a:	Step 1 & 2; Typical plastic and metal coupling installations.	2 — 13
2-12b:	Step 3; Typical Straight Metal Conduit installation.	2 — 14
2-12c:	I/O Box Terminal Block Diagram.	2 — 14
2-13:	Normal AC Input and Output Cables installation.	2 — 15
2-14:	View of EX RT transformer connected downstream for 120/208/240 Vac outputs (shown with one EXB).	2 — 16
2-15:	Normal AC Input, Bypass AC, and Output Cables Installation.	2 — 17
2-16:	Accessing Terminal Blocks for Input and Output power cables.	2 — 18
2-17:	Rear view of battery module cable connections.	2 — 19
2-18:	Rear view of CLA module cable battery and AC input connections.	2 — 20

Figures (continued)

figure	description	page
3-1:	Initial Startup Display.	3 — 1
3-2:	Control Panel with scroll up and down buttons.	3 — 2
3-3:	Configuration used to provide full redundancy (2N) to critical loads.	3 — 3
3-4:	Normal (double conversion) mode.	3 — 5
3-5:	ECO mode display.	3 — 6
3-6:	Transfer, Threshold and End of backup time.	3 — 7
3-7:	Shutdown display, circuit breaker, and AC source switch.	3 — 8
4-1:	Disconnecting the power module.	4 — 4
4-2:	Reconnect the power module.	4 — 5
4-3:	Rear view of the battery module.	4 — 6
5-1:	Power supplied as a function of input voltage (left), and Permissible UPS overloads as a function of time (right).	5 — 1

Tables

table	description	page
1:	EX RT Model Descriptions and Contents	1 — 2
2:	Optional Accessories (See section 1.5 for description)	1 — 3
3:	Power Module Ratings	1 — 4
4:	Battery Module Ratings	1 — 4
5:	Battery backup time chart.	1 — 12
3-1:	Local Settings.	3 — 3
3-2:	Output features.	3 — 3
3-3:	ON/OFF features.	3 — 4
3-4:	Battery features.	3 — 4
4-1:	Network and Industrial Modes of Operation.	4 — 1
4-2:	Troubleshooting not requiring MGE after-sales support.	4 — 2
4-3:	Troubleshooting requiring MGE after-sales support.	4 — 3
5-1:	EX 5/7/11 RT Input and Output Characteristics.	5 — 1
5-2:	Back-up Time (in minutes).	5 — 1
5-3:	Battery Recharge time to recover 90% of the rated backup time after discharge at full load.	5 — 2
5-4:	Full load heat rejection in BTU's/hr.	5 — 2

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1.0 Scope

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

The product you selected is a part of the EX RT series. The EX RT series is a family of Uninterruptible Power Supply (UPS) designed to provide safe, and reliable AC power backup for sensitive electrical equipment. To discover the entire range of MGE products, we invite you to visit our website at www.mgeups.com or contact your representative at (800) 523-0142.

This manual describes the installation and operation of standard HV EX 5/7/11RT systems within the EX RT product family. For a complete description of the EX RT product family and its available options, please refer to the tables below:

1 Introduction

Introduction is a general description of system configurations of the EX 5/7/11 RT, and its mechanical ,electrical characteristics. Additionally there is an optional accessories section with important information on MGE products that will enhance the performance of the EX 5/7/11RT. Please contact your MGE representative for detailed information on these options.

2 Setup and Installation

Setup and Installation guides the user through tools and equipment required for connecting the EX 5/7/11 RT and battery installation or replacement. Included are assembly instructions, power cable connections with wire diagrams for configuring the product to hardware specifications.

3 Operation

Operation describes the EX 5/7/11RT system characteristics of indicators and controls, modes and specifications. The user procedures include performing software programming that will maintain optimal performance.

4 Maintenance

Maintenance includes a troubleshooting guide of symptoms and possible solutions, hot swapping the power module, battery module, and testing scenarios.

5 Appendix

Electrical and Mechanical specifications for the EX 5/7/11 RT.

A Glossary provides definitions of abbreviations and terms used in this manual.

Table 1: EX RT Model Descriptions and Contents

System Description		Contents								
Model Number	Part	Power Module			Battery Module		Transformer Module (120/208/240Vac) 86003	Power Module Rail Kit 86001	Battery Module Rail Kit 86002	SNMP/Web Network Mgt. Card 66074
		86055	86075	86115	86079	86119				
5kVA HV EX 5RT	86050	X			X					
5kVA HV EX 5RT Network Pack	86052	X			X			X	X	X
5kVA LV EX 5RT	86050-01	X			X		X			
5kVA LV EX 5RT Network Pack	86052-01	X			X		X	X	X (x2)	X
7kVA HV EX 7RT	86070		X		X					
7kVA HV EX 7RT Network Pack	86072		X		X			X	X	X
7kVA LV EX 7RT	86070-01		X		X		X			
7kVA LV EX 7RT Network Pack	86072-01		X		X		X	X	X (x2)	X
11kVA HV EX 11RT	86110			X		X				
11kVA HV EX 11RT Network Pack	86112			X		X		X	X	X
11kVA LV EX 11RT	86110-01			X		X	X			
11kVA LV EX 11RT Network Pack	86112-01			X		X	X	X	X (x2)	X

Table 2: Optional Accessories (See section 1.5 for description)

Part Number	Description
86001	Rail Kit for Power Module EX 5/7/11 RT
86002	Rail Kit for Battery/Transformer/CLA Module
86005	Battery Integration Kit with Casters
86006	Battery Extension Cable Kit
86008	Battery Chassis Empty EXB RT W/EPO
86009	I/O Box 5/7kVA UL/US
86010	I/O Box 11kVA UL/US
86012	I/O Box Bracket System
86013	Rear Bracket Supports

1.1 System Electrical Characteristics

Table 3: Power Module Ratings

Part Number	86055	86075	86115
Apparent Power, kVA	5	7	10 @ 200/208/250 VAC Output 11 @ 220/230/240 VAC Output
Active Power, kW	4	4.9	8 @ 200/208/250 VAC Output 7.3 @ 220/230/240 VAC Output
Input Current, A	25/24/23/ 22/21/20	35/34/32 31/30/28	50/48/50/48/46/40
Input Voltage, VAC	200/208/220/ 230/240/250	200/208/220/ 230/240/250	200/208/220/230/240/250
Output Current, A	25/24/23/ 22/21/20	35/34/32 31/30/28	50/48/50/48/46/40
Output Voltage, VAC	200/208/220/ 230/240/250	200/208/220/ 230/240/250	200/208/220/230/240/250



CAUTION

Power Module is factory configured at 208Vac, 60 Hz input and output.
Input and Output of the UPS must always be the same.

Table 4: Battery Module Ratings

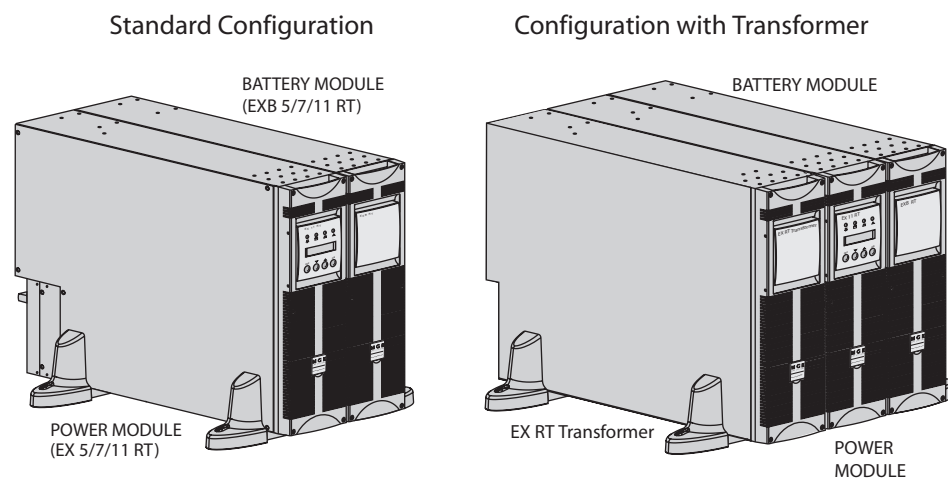
Part Number	86079	86119
Battery Type	12VDC/7Ah	12VDC/9Ah
Battery Output Voltage	240VDC	240VDC

1.2 Standard Configurations

The EX 5/7/11 RT systems can be set up in tower and rack configurations.

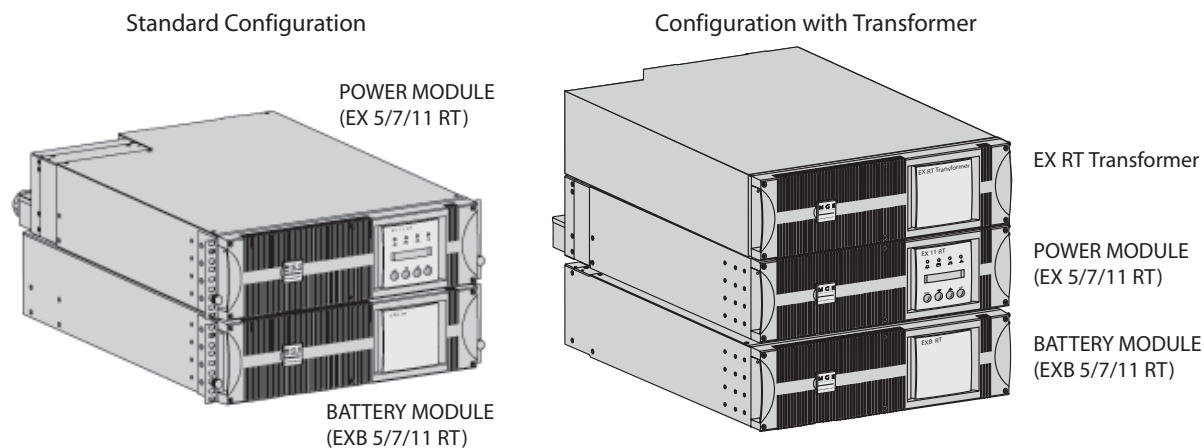
1.2.1 Tower Configuration

Figure 1-1: Tower Configurations with Power Module, Battery Module, and optional Transformer Module.



1.2.2 Rack Configuration

Figure 1-2: Rack Configurations with Power Module, Battery Module, and Transformer Module.



Model	Dimensions	Weights
EX 5RT/7RT	(3U) 5.16" x 17.49" x 25" (131 x 444 x 635mm)	49.6 lbs (22.5 kg)
EX 11RT	(3U) 5.16" x 17.49" x 25" (131 x 444 x 635mm)	60.6 lbs (27.6 kg)
EXB 5 RT/ 7 RT	(3U) 5.16" x 17.49" x 25" (131 x 444 x 635mm)	142 lbs (64.5 kg)
EXB 11RT	(3U) 5.16" x 17.49" x 25" (131 x 444 x 635mm)	151 lbs (68.5 kg)
EX RT Transformer	(3U) 5.16" x 17.49" x 25" (131 x 444 x 635mm)	173 lbs (78.5 kg)

1.3 Rear Panels

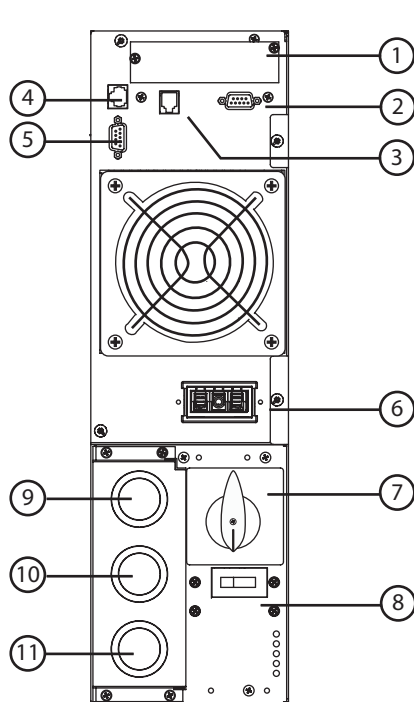
1.3.1 Power Module EX 5/7/11 RT

EX 5RT Power Module part number 86055

EX 7RT Power Module part number 86075

EX 11RT Power Module part number 86115

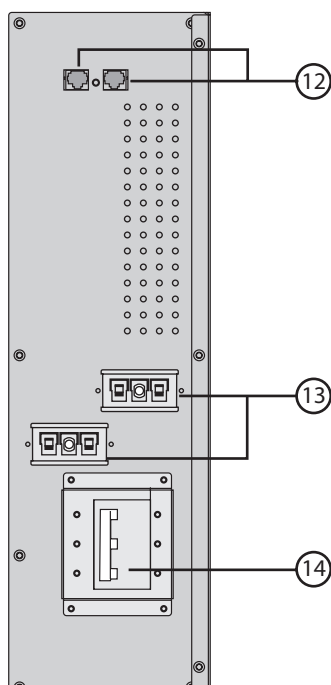
Figure 1-3: Rear panel of the Power Module.



- ① Slot for optional communication cards.
- ② Communication port by relays (Dry contacts).
- ③ Remote Emergency Power Off communication port (REPO).
- ④ Connectors for automatic detection of battery module(s).
- ⑤ RS232 communication port.
- ⑥ Battery/CLA module power connector.
- ⑦ Manual Bypass switch.
- ⑧ Normal AC source circuit breaker.
- ⑨ Knockout for entry of AC Output conduit.
- ⑩ Knockout for entry of Normal AC source conduit.
- ⑪ Knockout for entry of Bypass AC source conduit.

1.3.2 Battery Module EXB 5/7/11 RT With Emergency Power Off (EPO) Function

Figure 1-4: Rear Panel of the Battery Module.

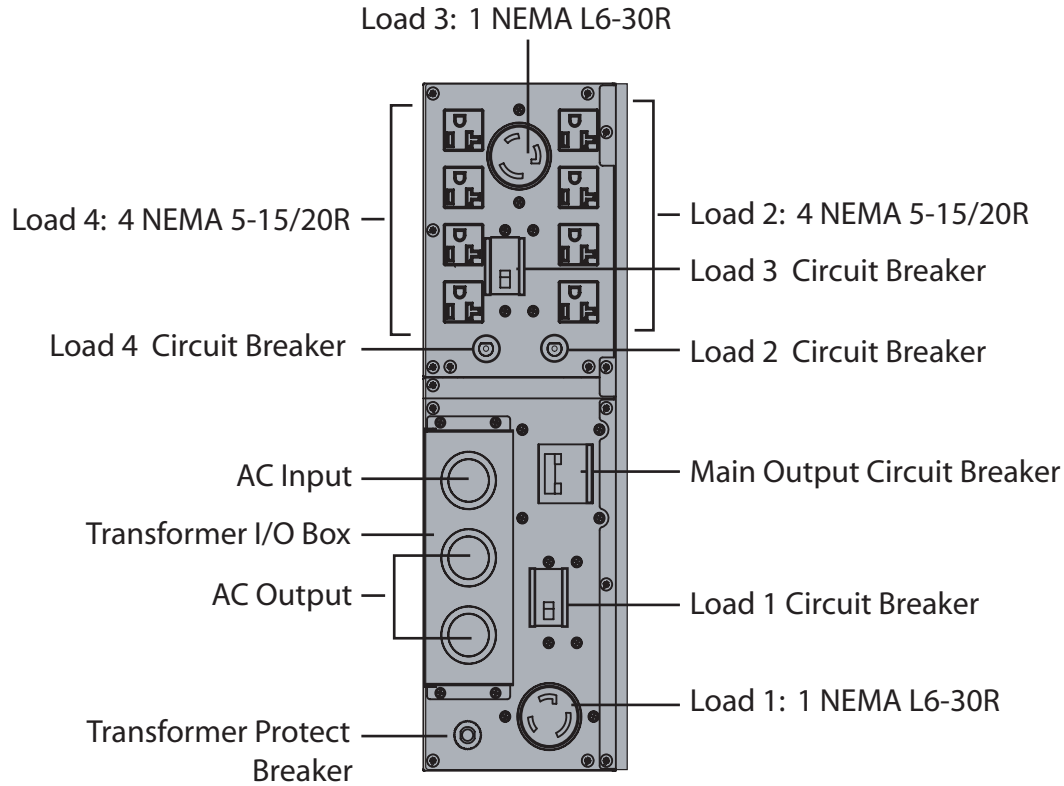


- ⑫ Connectors for automatic detection of additional battery module(s) (to the UPS or to other battery modules).
- ⑬ Battery power connectors (to the UPS or to other battery modules).
- ⑭ Battery Circuit Breaker with Remote Emergency Power Off (REPO) shunt trip.

EXB 5RT with EPO part number 86079
EXB 7RT with EPO part number 86079
EXB 11RT with EPO part number 86119

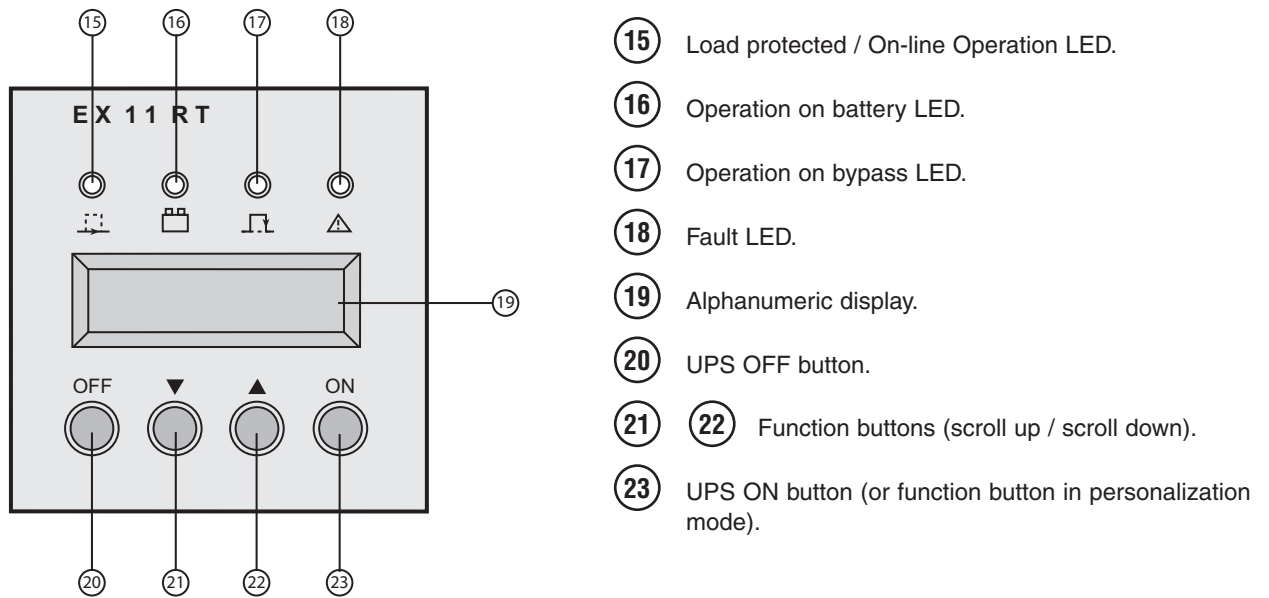
1.3.3 EX RT Transformer Module

Figure 1-5: Rear Panel of the optional Transformer Module. (PN 86003)



1.4 Display and Control Panel

Figure 1-6: View of typical control panel interface.



1.5 Optional Accessories

Optional Accessories describes the options available for upgrades and enhancement of the EX 5/7/11RT system. Detailed installation of the unit is described in following sections.

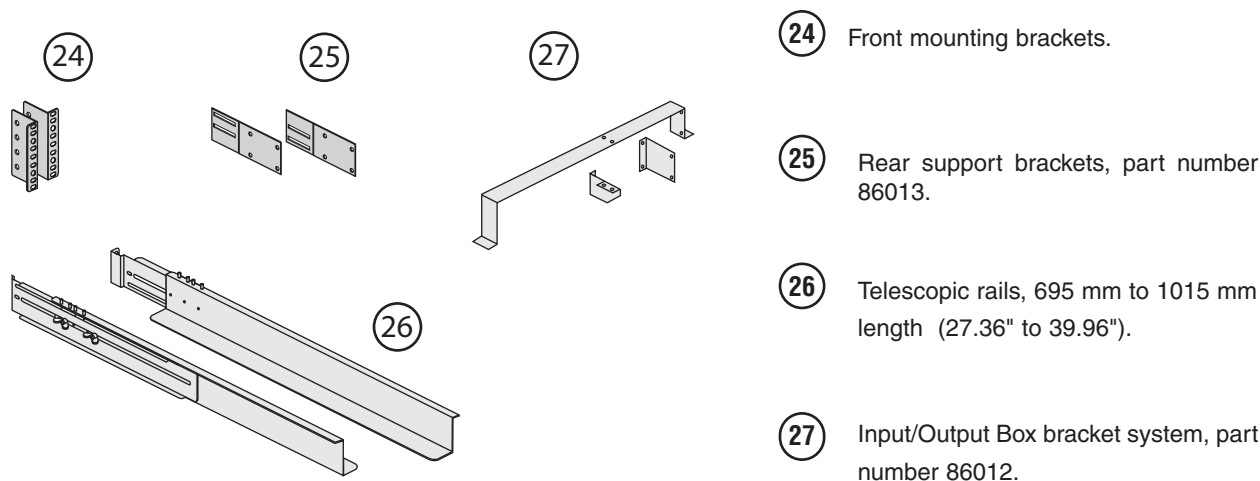
To ensure a successful installation, all procedures should be followed in their correct sequence. Note that any unauthorized installation may cause damage to the UPS(s) and void the MGE warranty.

1.5.1 Power Module Rail Kit

(Part Number 86001)

This kit is for rack mounting the power module in a 19" enclosure. See section 2.6 for rack installation of power module.

Figure 1-7: Power Module Rack Mounting Kit.

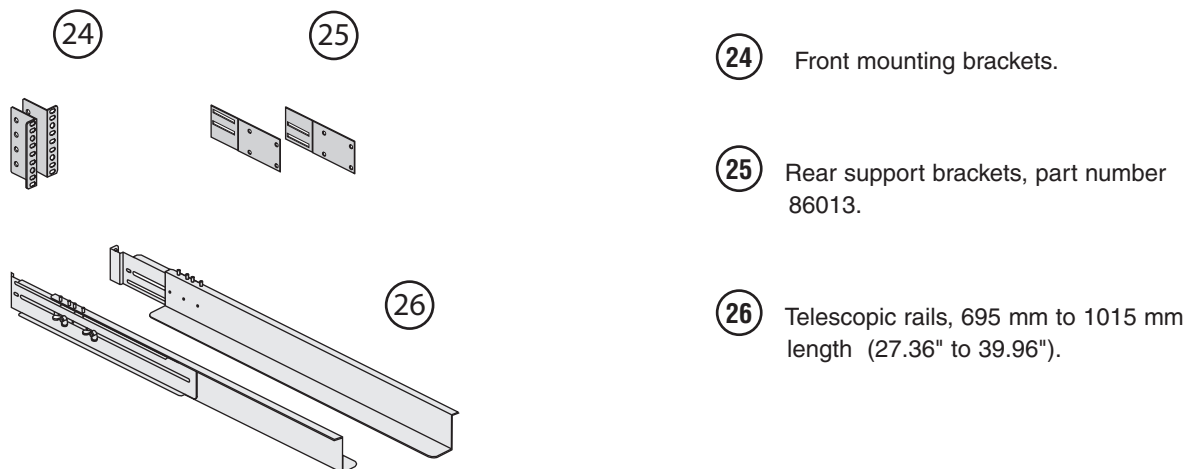


1.5.2 Battery/ Transformer/CLA Module Rail Kit

(Part number 86002)

This kit is for rack mounting of the battery/step-down transformer/CLA module in 19" enclosure. See section 2.6 for rack installation of power module.

Figure 1-8: Telescopic rails for the Battery/Transformer/CLA module Rack mounting.



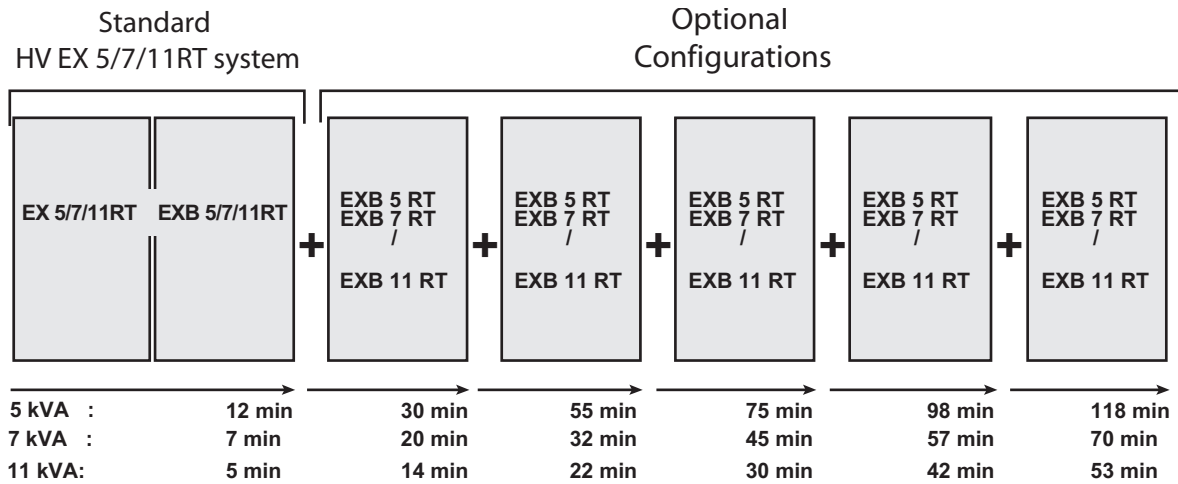
1.5.3 Battery Module with Remote Emergency Power Off (REPO) Function

(EXB 5/7 RT; PN 86079, EXB 11RT; PN 86119)

Standard HV EX 5/7/11RT system (one Power Module, EX 5/7/11 RT, and one Battery Module, EXB 5/7/11RT) offers a standard backup time of 5 to 12 minutes at full load.

To increase backup time, it is possible to connect up to 5 additional EXB 5/7/11 RT modules to the EX 5/7/11 RT module. See section 2.10 for connections between Power Module (EX 5/7/11 RT) and Battery Module (EXB 5/7/11 RT)

Figure 1-9: Typical back-up time with multiple EXB's at full load.



See Appendix for additional Back-up time information.

1.5.4 Battery Extension Cable Kit

(6 ft / 1.8 m, Part number 86006)

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

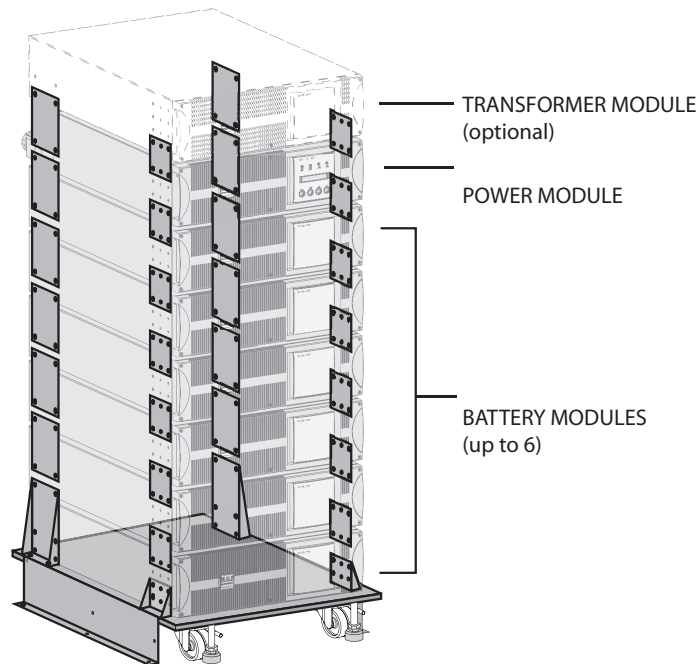
The battery extension cable kit includes a 6 ft long, straight connector battery power cable and a 6 ft. long battery detection cable.

1.5.5 Battery Integration Kit with Casters

(Part number 86005)

Battery Integration Kit is a cart, designed to hold up to 8 modules. It has swivel wheels with brakes, leveling feet, seismic floor mount panels, plates to lock modules and hardware included. Modules not included.

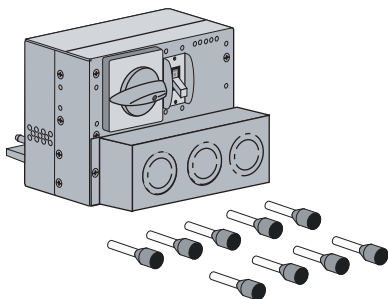
Figure 1-10: Typical Battery Integration kit with casters setup.



(Modules Not Included In Kit)

1.5.6 Input/Output Box

Shipped with ferrules for stranded wire application.



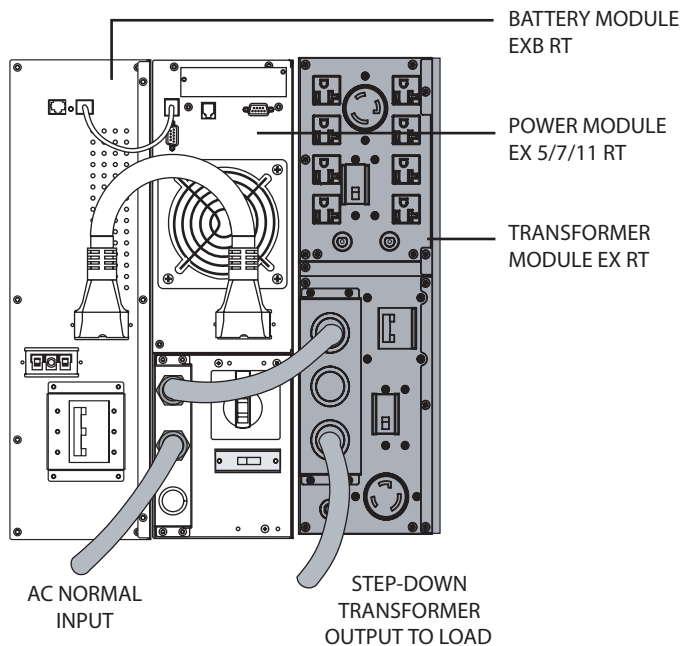
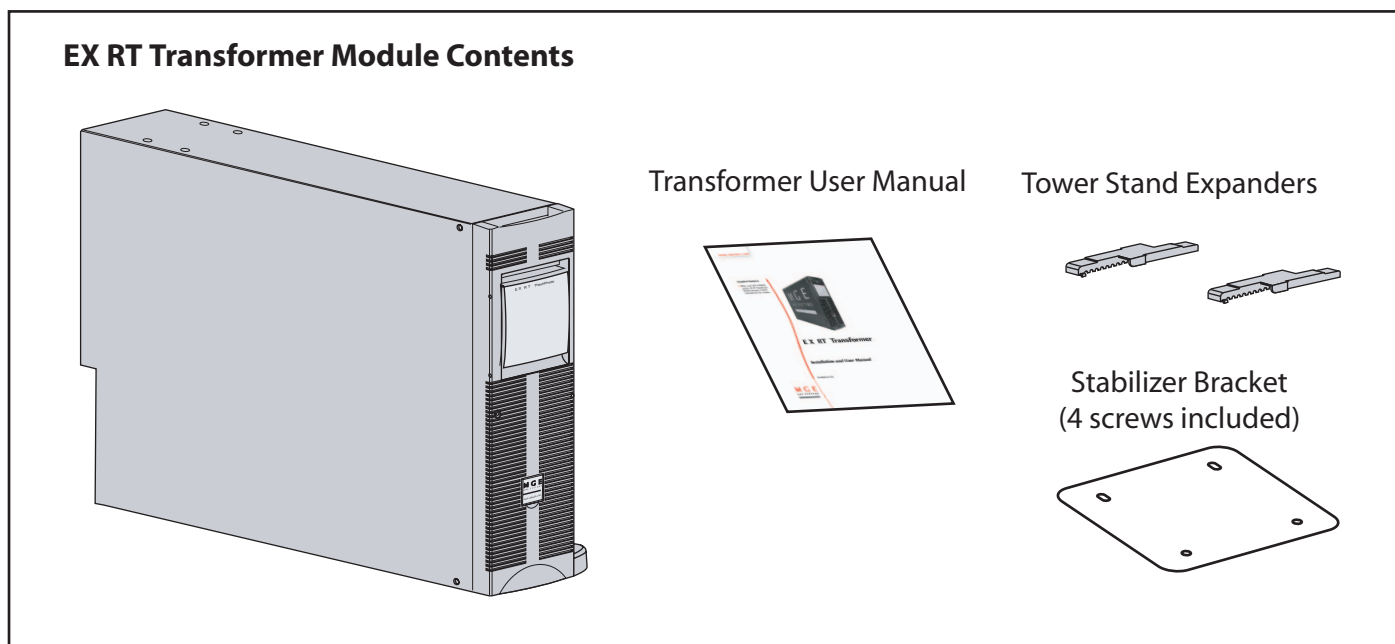
- I/O Box 5/7kVA Part number 86009

- I/O Box 11kVA Part number 86010

1.5.7 Transformer Module

This module provides isolated 120/208/240Vac output.

Figure 1-12: Typical Transformer Module contents and connections.



1.5.8 CLA Module (Long backup time charger)

(Part number 86004)

Extended back-up time (up to 8 hours at full load) requires a high power battery cabinet connected to the EX 5/7/11RT via the CLA module.



IMPORTANT The CLA can not be used to charge the battery module (EXB). It is designed to charge the customer provided high power battery cabinet.

Figure 1-12: Connection for CLA Module and EX 5/7/11 RT.

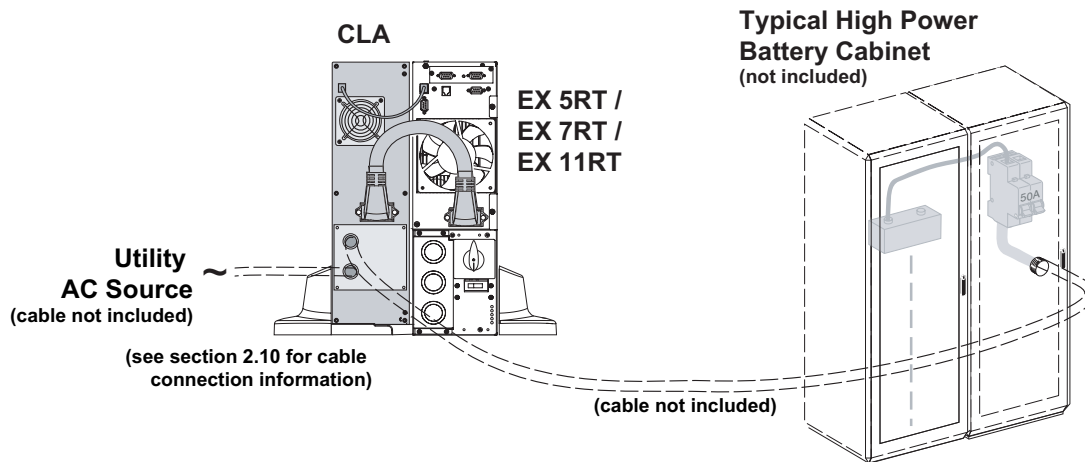
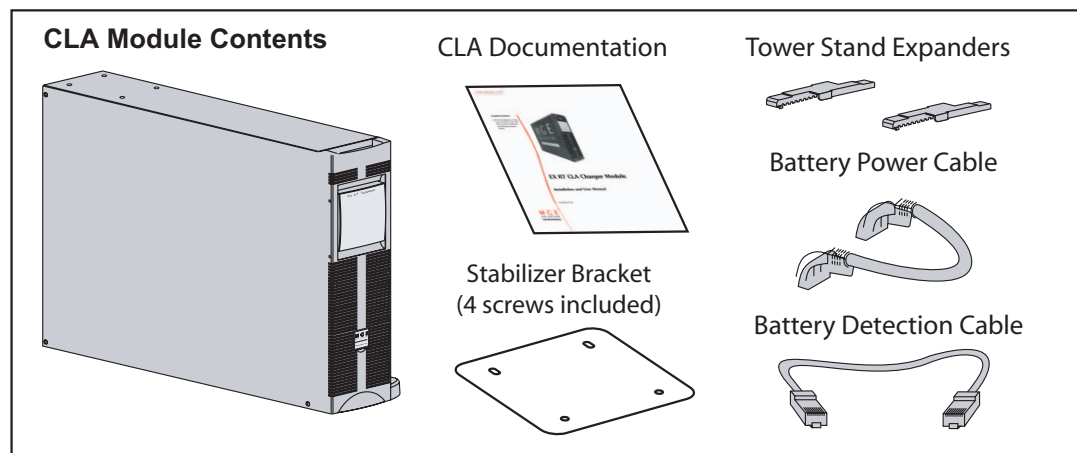


Table 5: Battery backup time chart.

Battery Backup Time	Recommended Batteries		
	EX 5RT	EX 7RT	EX 11RT
2 hours	50 Ah	65 Ah	100 Ah
4 hours	100 Ah	130 Ah	200 Ah
8 hours	200 Ah	200 Ah	400 Ah

Total battery voltage : 240 VDC (20 x 12VDC, one string).

The battery capacity must be set within the UPS (5 Ah increment possible, see UPS Personalization section 3.2).

2.0 Scope

Installation guides the user through tools and equipment required for making input/output power and communication cable connections, and battery installation and replacement. It provides assembly instructions, power cable connections with wire diagrams for configuring the product to hardware specifications.

2.1 Unpacking and Parts Check

Once the EX 5/7/11RT system has been inspected and received from the shipping courier, the unit should be moved to a position as close to the final installation location as possible. See Figures 2-1 on page 2-3.

All Modules are shipped in separate boxes.

Prior to any installation, the following items should be observed upon receipt of the EX 5/7/11 RT.

1. Inspect shipment for any damage prior to receipt. Damage claims should be filed directly with the courier. Replacements for damaged components should be ordered through MGE Customer Support Services at 1-800-438-7373.
2. Remove wrapping and foam corners to verify that the equipment nameplate (located on the rear of the units) details a system that corresponds with the equipment ordered.

2.2 Contents of EX 5/7/11 RT System

Contents of Power Module:

- ③① EX 5RT /EX 7RT/ EX 11RT.
- ③② Two sets of tower stands.
- ③③ RS232 communication cable.
- ③④ Product documentation.
- ③⑤ Input/Output Box. (With 9 insulated ferrules for stranded wires.)
(PN 86009 for EX 5/7RT; 86010 for EX 11RT)
- ③⑥ Solution-Pac CD.
- ③⑦ Power Module rack mounting kit, PN 86001
(optional, but standard with Network Pack version).
- ③⑧ SNMP/Web Network Management Card, PN 66074.
(optional, or standard with Network Pack version)

Contents of Battery Module:

- ②⑨ Stabilizer Bracket and hardware.
- ③⑧ EXB 5/7/11 RT.
- ③⑨ Tower stand expanders.
- ④① Battery Power cable.
- ④② Battery/EX RT transformer/CLA
module rack mounting kit, PN 86002.
- ④③ Battery detection cable.
- ④④ EXB Documentation.
- ④⑤ Bezel hex drive.

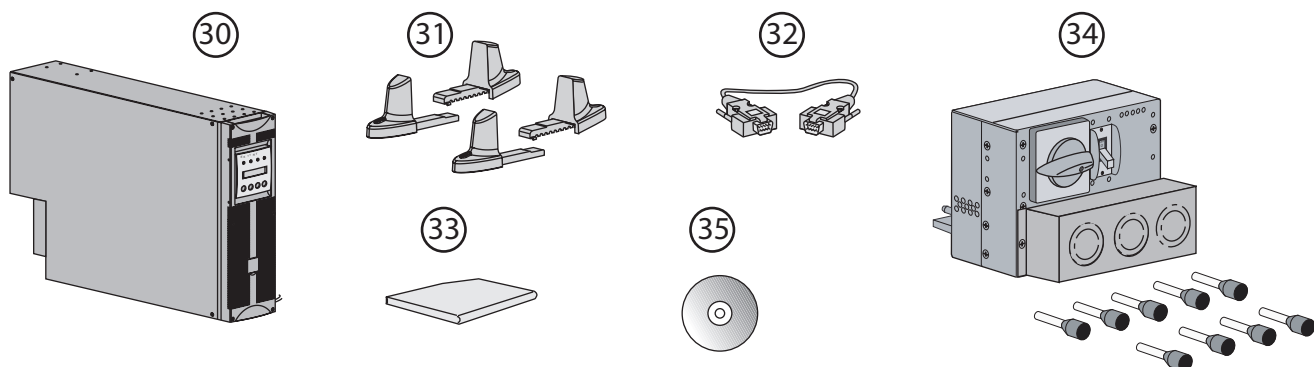


IMPORTANT

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

Figure 2-1: Contents of Standard HV EX 5RT (PN 86050) / EX 7RT (PN 86070) / EX 11RT (PN 86110) System.

- EX 5RT Power Module Part number 86055
- EX 7RT Power Module Part number 86075
- EX 11RT Power Module Part number 86115

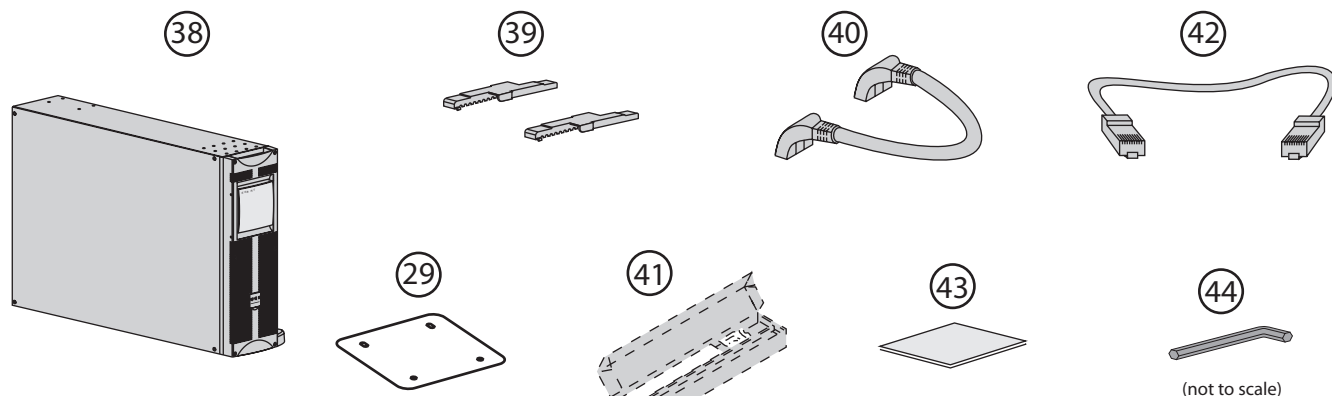


- I/O Box 5/7kVA Part number 86009
- I/O Box 11kVA Part number 86010

(36) (see 1.5.1)

Standard only with Network Pack option.

- EX 5RT network Pack Part number 86052-01
- EX 7RT network Pack Part number 86072-01
- EX 11RT network Pack Part number 86112-01



- EXB 5RT Battery Module Part number 86079
- EXB 7RT Battery Module Part number 86079
- EXB 11RT Battery Module Part number 86119

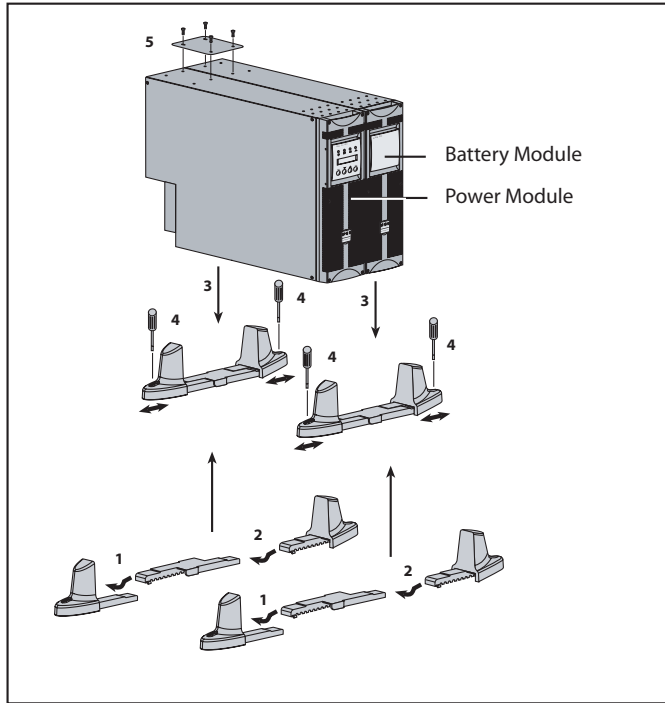
Standard only with Network Pack version. See 1.5.2.

2.3 Installation in Tower Configuration

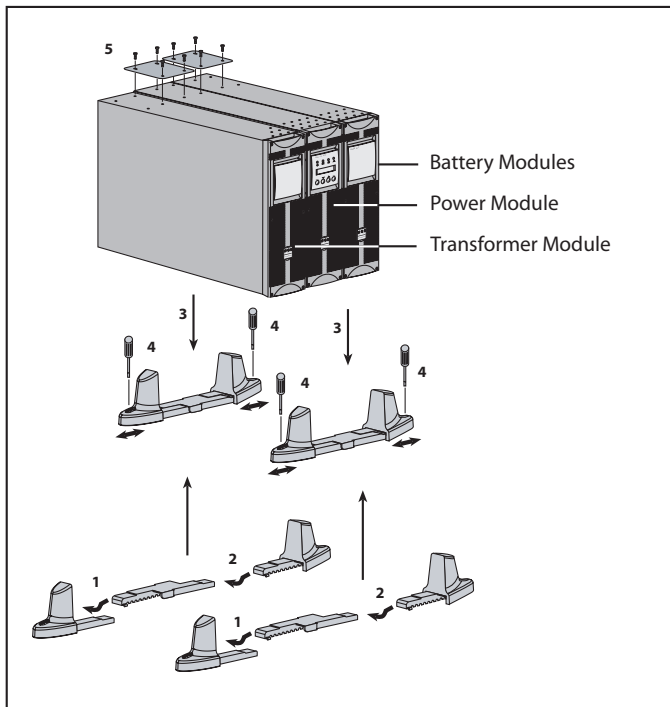
Follow the numerical sequence to assemble tower stands and tower stand expanders, shown in Figure 2-2.

Figure 2-2: Tower Configuration of Standard System and Optional Transformer Module.

Tower Configuration with Standard System



Tower Configuration with Optional Transformer Module



Use the same procedure for tower mounting multiple battery modules, if applicable.

2.4 Installation in Rack Mounting Configuration

2.4.1 Adjustment of Front Panel Logo and control panel for Rack Orientation.



NOTE

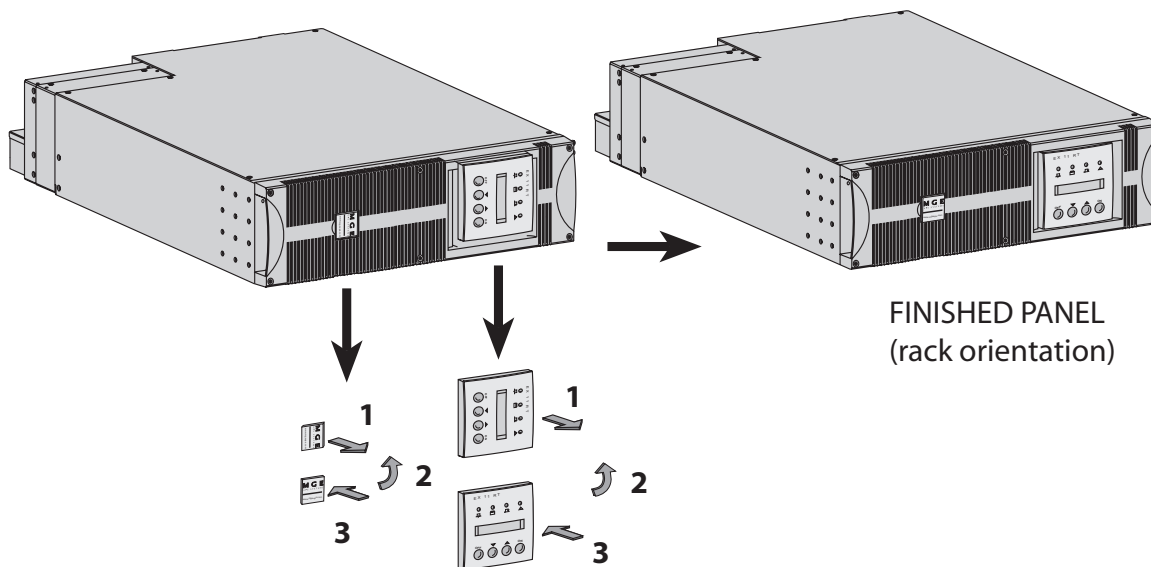
If system includes the transformer module, we recommend to mount the battery module on the bottom, then mount the power module above the battery module and mount the transformer on top for optimum stability.

To prepare the front panel logo and LCD display for rack orientation, of all modules. (including transformer or CLA module, if equipped).

Proceed as follows:

1. Unclip logo plate, and pull the LCD display from front panel.
2. Rotate them 90 degree counter clockwise as shown.
3. Place items back onto the panel.

Figure 2-3: Typical orientation of the logo and control panel. (Power Module shown)



2.5 Prepare Battery Module for Rack Mounting

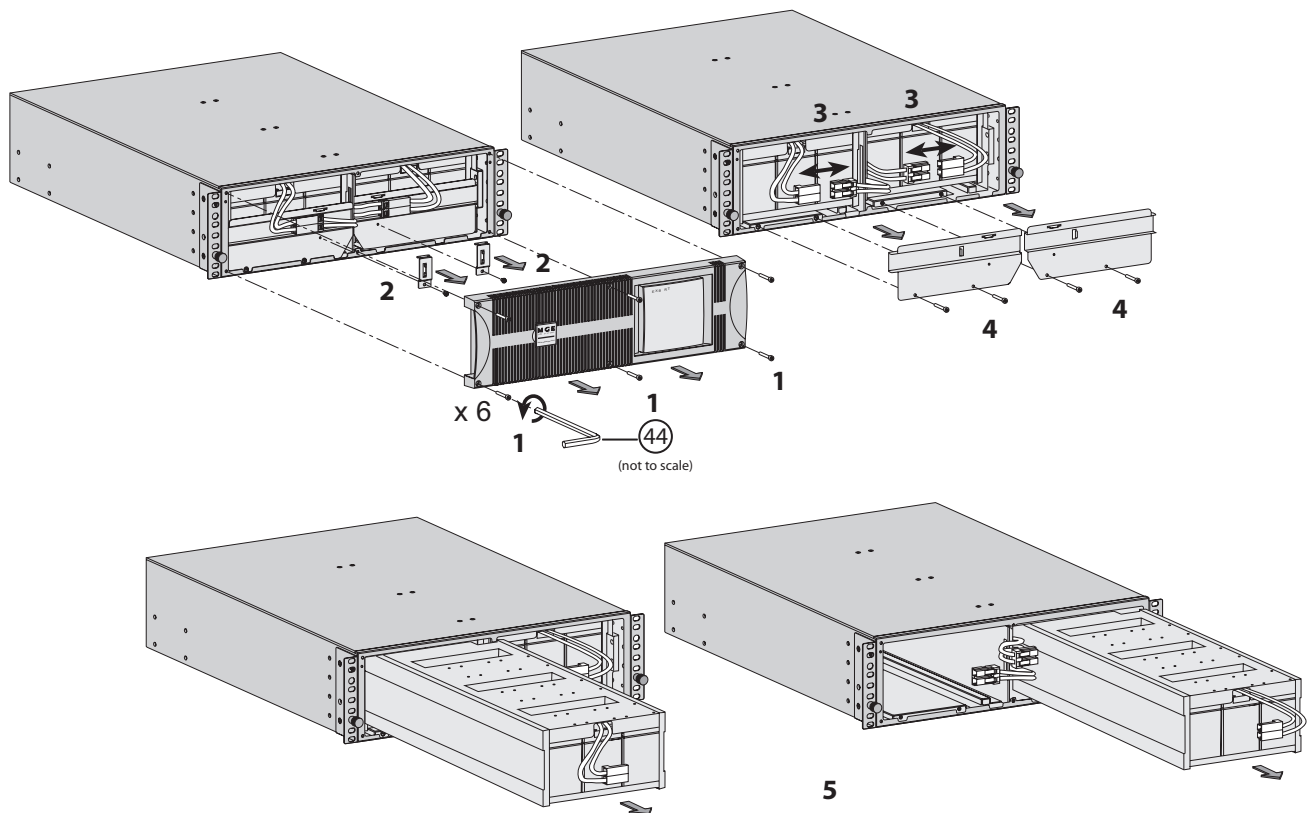
(optional rails required, part number: 86002)

The battery module is very heavy. To ease its rack mounting, we strongly recommend to remove the battery pack from the battery module, as explained below. See Section 1.2.2 for battery module weight.

Proceed as follows:

1. Unscrew the six screws securing front panel using Bezel Hex Driver (44).
2. Unscrew the brackets securing the battery connectors.
3. Disconnect Battery plugs.
4. Unscrew the brackets securing the battery pack. Remove battery bracket pack covers.
5. Pull the left and right battery packs out and set aside for reinstalling after the battery module cabinet has been rack mounted.
6. Mount battery module cabinet on rack.
7. Re-install the battery pack in reverse order.

Figure 2-4: Accessing Battery Pack.



2.6 Power or Battery Module Rack Mounting

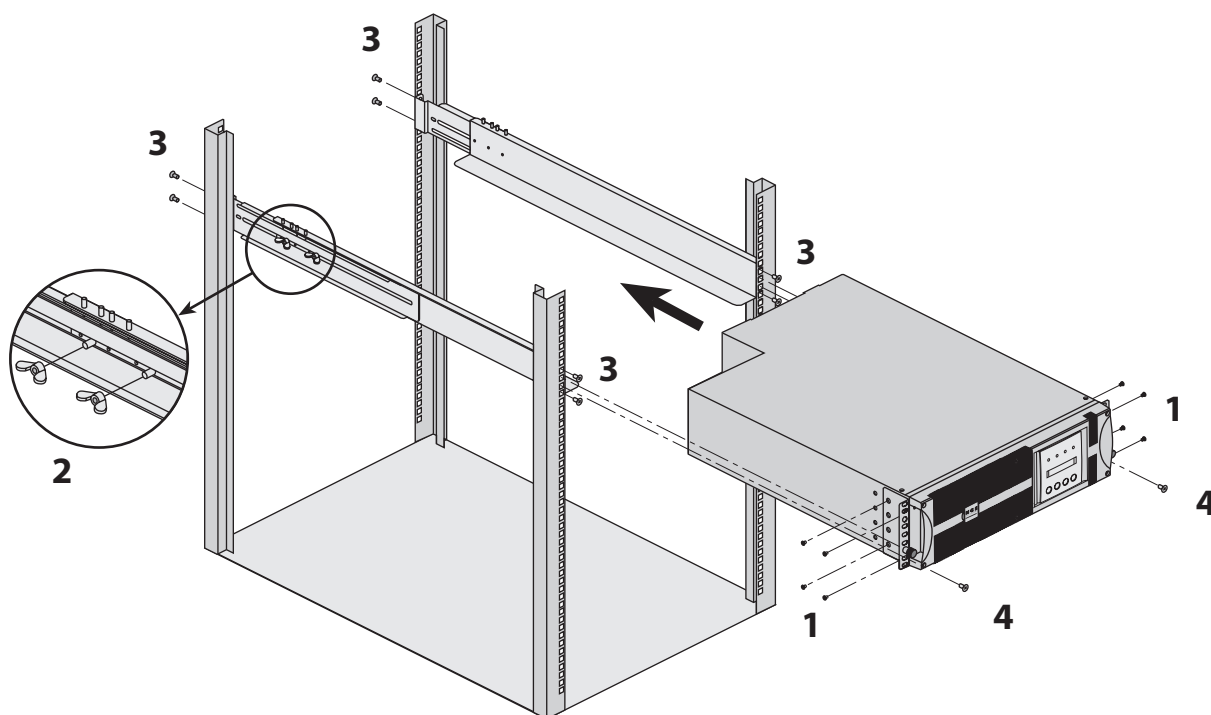
(optional rack mounting kits required, part number: 86001 and 86002)

The rails and necessary mounting hardware are supplied by MGE UPS SYSTEMS, INC.

Proceed as follows:

1. Attach both front mounting ear brackets (24) to power module or battery module with supplied screws. (For this step, it is possible to adjust the position of both front mounting ears.)
2. Attach rails (26) together and secure with wing nuts, and finger tighten.
3. Attach both rails to rear and front of rack chassis with supplied screws (as shown).
4. Use caution when sliding unit into rack mount, secure unit to rack with supplied screws. (For this step, it is possible to adjust the position of both front mounting brackets.)

Figure 2-6: Rack mounting of the power module onto the rails.



2.6.1 Rear Support Brackets Installation

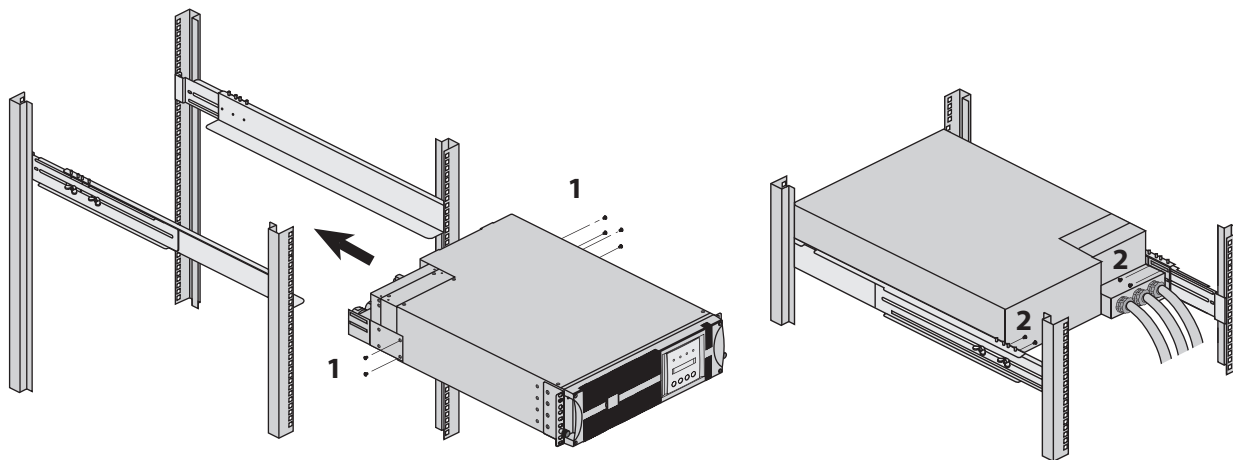
(Part number 86013, included with rack mounting kits, part numbers: 86001 and 86002)

These brackets prevent the power module from moving when the entire rack enclosure is moved.

Proceed as follows:

1. Attach the brackets (25) to the I/O Box and power module.
2. Secure brackets to rails.

Figure 2-7a: Rear Support Brackets.



2.6.2 Input/Output Box Bracket System Installation

(Part number 86012 included with power module rack mounting kit, part numbers: 86001)

This bracket system keeps the I/O Box stationary while hot swapping the power module. It will then be easier to slide the replacement module into the connectors of the I/O Box.

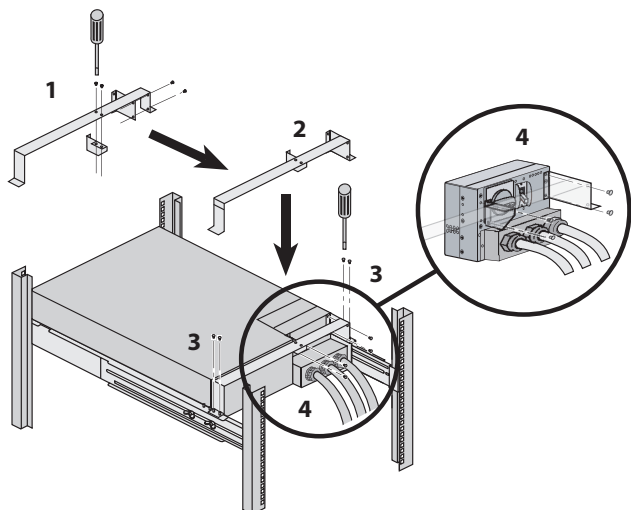


NOTE:

The rear support brackets must be removed prior to installing I/O Box bracket system.

1. Secure small bracket to larger bracket from the underside (27).
- 2 & 3. Secure large bracket (27) (with supplied screws) to rails at the rear of module.
4. Secure small attached bracket (with supplied screws) to the I/O Box.

Figure 2-7b: Input/Output Box Bracket System.



2.7 Communication Ports

EX 5/7/11RT provides 3 communication methods that can be used simultaneously:

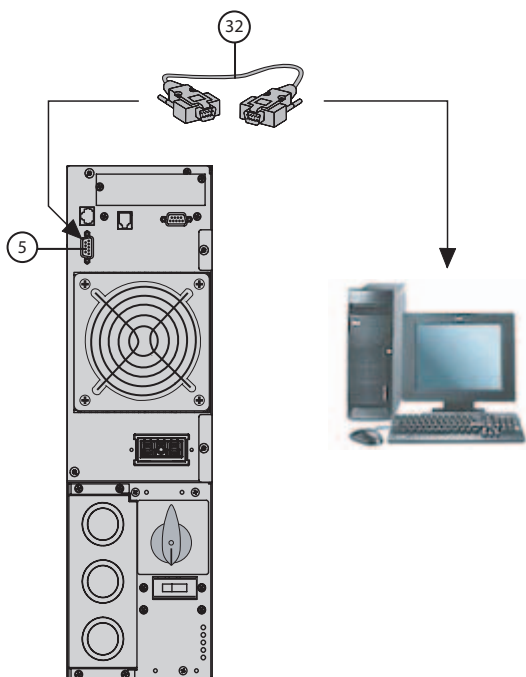
- ▶ The COM port (5) provides RS232 communications using MGE Serial HID UPS Transfer (SHUT) protocol. This COM Port is compatible with Personal Solution Pac (PSP) to shutdown one computer. Personal Solution Pac is included in the Solution Pac CD-Rom. For Network Management or multiple computer shutdowns an optional network card must be purchased.
- ▶ The Dry Contact Port (2) is used for basic signaling or for protection of IT systems like IBM iSeries (formerly AS400) and more.
- ▶ The slot (1) is compatible with any MGE UPS SYSTEMS, INC. communication card (check www.mgeups.com web site for the complete list of compatible cards)

2.7.1 Connecting the RS232 Communication Port

1. Connect the RS 232 (32) communications cable to the serial port on the computer.
2. Connect the other end of the communications cable (32) to the RS 232 (5) communications port on the EX 5/7/11 RT.

The EX 5/7/11 RT System can now communicate with Personal Solution Pac for power management. UPS configuration settings are done by Personal Solution Pac for Windows.

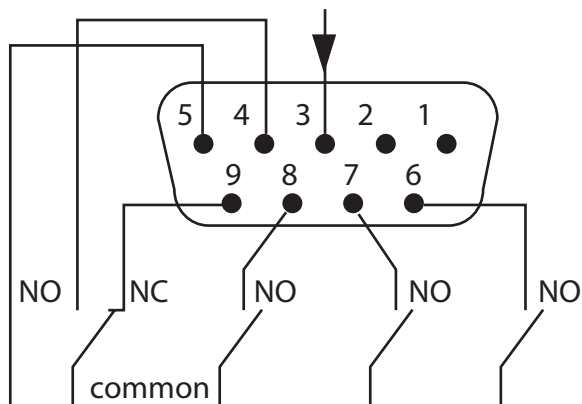
Figure 2-8: RS232 Communication Cable Connection.



2.7.2 Connecting the Dry (Relay) Contact Communication Port ②

The system status is indicated by the connection of common pin (Pin 5) to the appropriate pins. Refer to the pin explanations below for details.

Figure 2-9: Relay Pin Connections for Communication Port.



- Pin 1, 2:** not used.
 - Pin 3:** Remote Power Off signal (5 to 27 VDC, 10 mA max).
 - Pin 4:** Operation on mains (not on battery). (48VDC, 2A max.)
 - Pin 5:** User common.
 - Pin 6:** Operation on automatic bypass.
 - Pin 7:** Low battery.
 - Pin 8:** Load protected
 - Pin 9:** Operation on battery.
- Legend:**
- NO:** contact normally open.
 - NC:** contact normally closed.

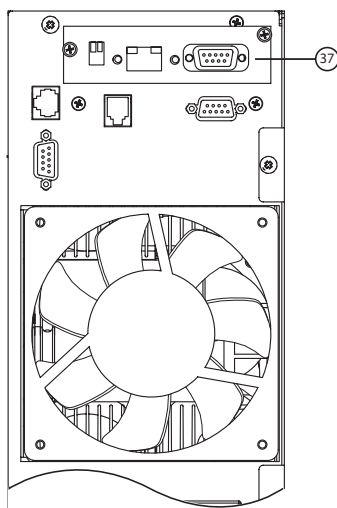
2.7.3 Installation of Optional Network Management Card

It is not necessary to shut down the UPS to install the optional communications card, except for USB card. Following is a typical installation of the Network Management Card, (PN 66074, standard with the network pack option.)

Proceed as follows:

1. Remove the slot cover secured by two screws.
2. Insert the card ③7 into the slot.
3. Secure the card with both screws.

Figure 2-10: Communication Card Slot with SNMP/Web Network Management Card installed.



A wide range of optional cards will allow your UPS to talk to nearly all equipment management systems, making integration faster and easier. All these cards can plug directly into the UPS, saving time and money on your next UPS project. (Meta UPS Card and U-Talk /Basic Acquisition Cards are used exclusively with Multi-slot.)

Dual U-Talk/Basic Card	(66060) Provides two communications ports that may be configured for serial link or AS/400 type dry contacts.
ModBus Card	(66061) Interface your UPS with a Building Management System.
Dual COM Ports Card	(66066) This card has two independent RS232 communication ports on which it can be connected. One for connecting monitoring software (included) and one for remote control panel UPS control.
USB Card	(66067) Take advantage of the latest and fastest communication protocol for Microsoft Windows 2000/XP or Mac OSX.
Dual Volt Free Contacts	(66068) The two ports are used to supply UPS status information
Card for AS/400	or one port can be used as a Remote Power Off (REPO) port.
Alarm Relay Card	(66069) Six output relays show UPS status and two status inputs are used with the Galaxy 3000 UPS.
XML-Web Card	(66073) XML-Web Card acts as a web page for your UPS information. Used along with XML-Client™ software, up to 50 servers or workstations will be protected and can monitor the UPS with a simple web browser. Security is handled with the SSL protocol, used by many websites to safeguard sensitive password information.
SNMP-Web Card	(66074) The SNMP/Web 10/100BT communications card is both an SNMP agent and an HTTP/Web server. Therefore, it enables UPS supervision from any Network Monitoring System using SNMP traps or simply from any web browser (Internet Explorer, Netscape Navigator, etc.) Orderly system shutdown of up to 32 protected servers can be established using MGE's Solution-Pac/WAN software suite.

2.7.4 Remote Emergency Power Off (REPO) Communication Port ③

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 shutdown the entire system completely in case of emergency:

Disconnect the AC input to the power module.

Turn off the circuit breaker of the battery module connecting to the power module.

Turn off the circuit breaker of the subsequent battery modules, if applicable.

All these steps above should be performed via a single device.

To simplify the last two steps above, the power module provides an RJ-45 connector on the back panel, called Remote Emergency Power Off (REPO) port. Upon applying a voltage source (5-27VDC, 10mA max.) to pins 2, 4 of this port, the power module will send a signal to trip off the shunt trip on each circuit breaker of all battery modules via the battery detection cable simultaneously. Refer to the diagram below for details.

Figure 2-10a: Activation of remote power off function using a contact normally open switch.

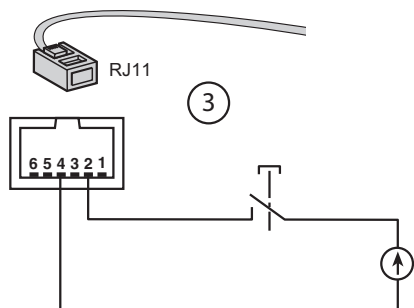
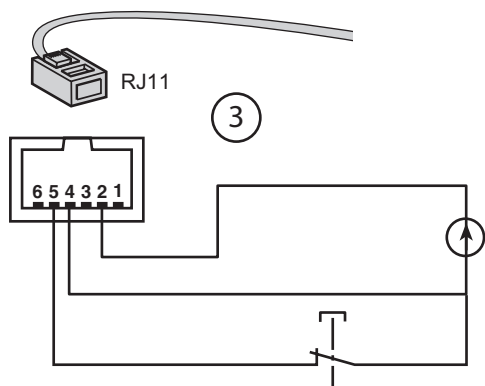


Figure 2-10b: Activation of remote power off function using a contact normally closed switch.



Signal:

Activation voltage: 5VDC to 27VDC

Current 10 mA (max)



NOTE

Both AC and DC sources must be present for normal start-up of EX 5/7/11RT system. If the system is configured for cold start, the AC and DC sources are required for initial start-up only.

2.8 Connecting the Input and Output Power Cables to the Input/Output Box



WARNING

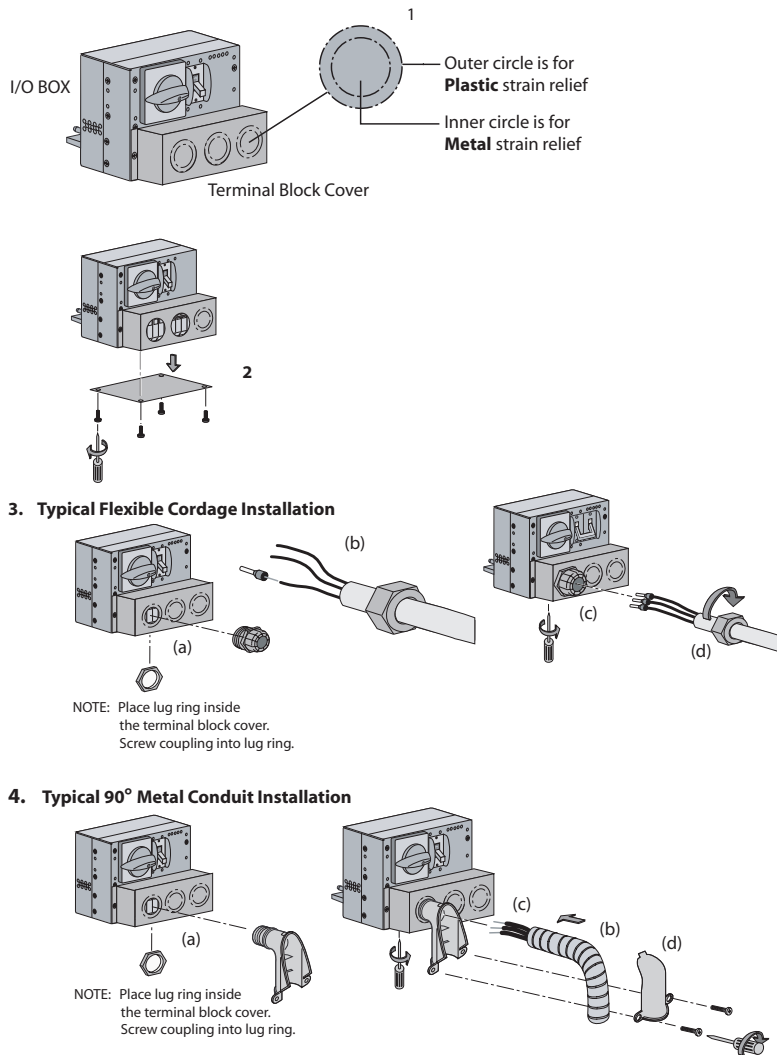
This type of connection must be carried out by qualified electrical personnel.

Before carrying out any connections, check that battery circuit breaker (14) is OFF and that the upstream protection devices (Normal and Bypass AC sources) are open (OFF).

EX 5/7/11 RT UPS always comes from factory with Normal and Bypass AC inputs already connected together, using a shunt.

2.8.1 Flexible Cordage and Conduit Installations

Figure 2-12a: Step 1 & 2; Typical plastic and metal coupling installations.



1. Knockout die stamp circles.



NOTE

Terminal cable capacity:
Max. 4 AWG (11kVA), 6 AWG (5/7kVA).

Knockout die stamp circles (on terminal block cover) have two sizes that fit either plastic or metal coupling. Plastic coupling is for flexible cordage and metal coupling is for solid wires. Knock out appropriate circle for your application.

2. Remove bottom cover plate as shown.

3. Typical plastic strain relief installation:

- a) Secure strain relief body onto the knockout plate.
- b) Strip the jacket back to expose the three wires. Strip the insulation of each wire back 1/2". Insert the ferrules as shown to each wire.



CAUTION:

Always connect the earth ground wire first.

- c) Slide the cordage into the strain relief and secure the wires into the terminal blocks using the guide printed on bottom of I/O box.

- d) Secure the cordage retainer nut.

4. Typical 90° metal conduit installation.

- a) Secure strain relief body to knockout plate as shown.
- b) Insert three wires through flexible conduit and bend 90°.
- c) Strip the insulation back 1/2" to expose solid wire and secure three wires into the terminal block using guide printed on bottom of I/O box.



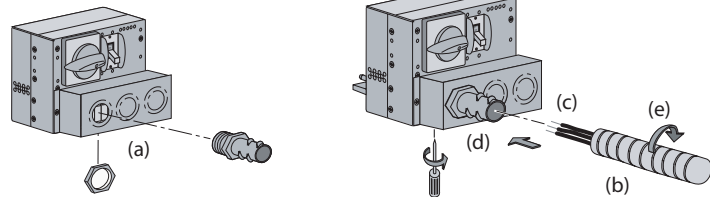
CAUTION:

Always connect the earth ground wire first.

- d) Install strain relief cover using two screws.

Figure 2-12b: Step 3; Typical Straight Metal Conduit installation.

5. Typical Straight Conduit Installation



NOTE: Place lug ring inside the terminal block cover. Screw coupling into lug ring.

5. Typical straight metal conduit Installation.

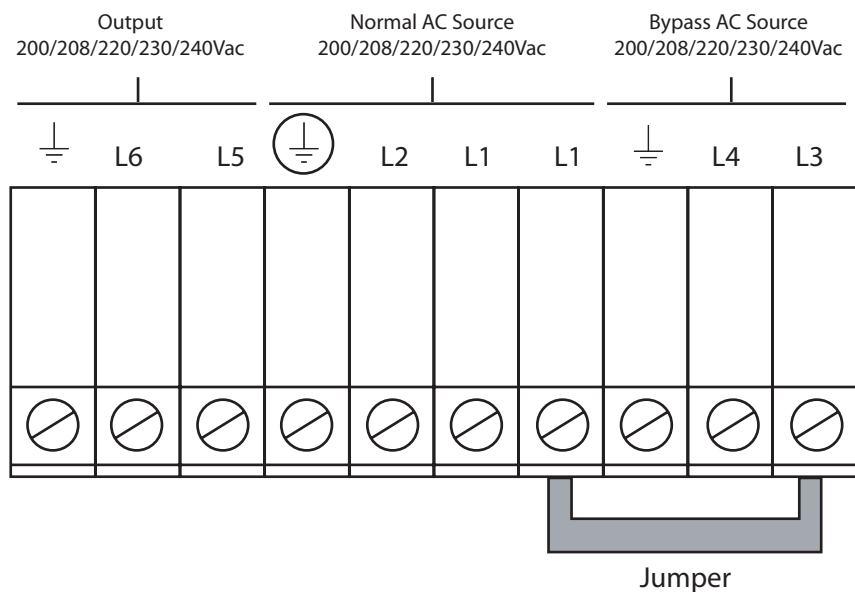
- a) Secure strain relief onto the terminal block cover as shown.
- b) Insert three wire through flexible conduit.
- c) Strip the insulation of each wire back 1/2" to expose solid wire.



CAUTION: Always connect the earth ground wire first.

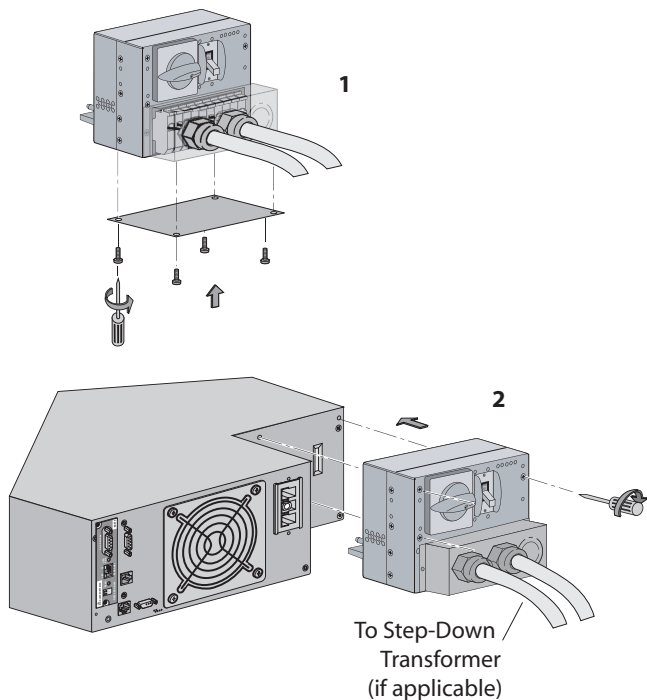
- d) Secure three wires into the terminal block using guide printed on bottom of I/O box.
- e) Twist the conduit onto the coupling body as shown.

Figure 2-12c: I/O Box Terminal Block Diagram.



2.8.2 System Connections with Common Normal and Bypass AC Sources

Figure 2-13: Normal AC Input and Output Cables installation.



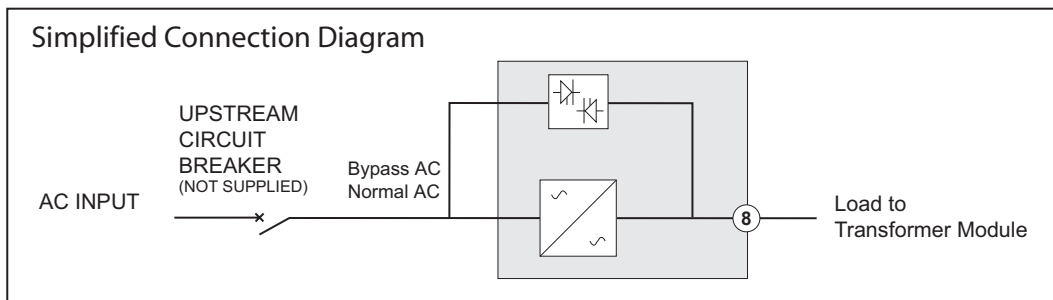
Proceed as follows:

1. Remove the I/O box from EX 5/7/11RT by loosening three screws. Knockout appropriate circle for your wire style.



CAUTION: Always connect the earth ground wire first.

1. See section 2.8.1 to install normal AC source and output wires per I/O Box Terminal diagram. Re-install the cover plate under the I/O Box.
2. Install the I/O Box with three screws.



NOTE:

The power module factory default is for the common normal and bypass AC source (single Main). AC input connections must be made to L1, L2, and



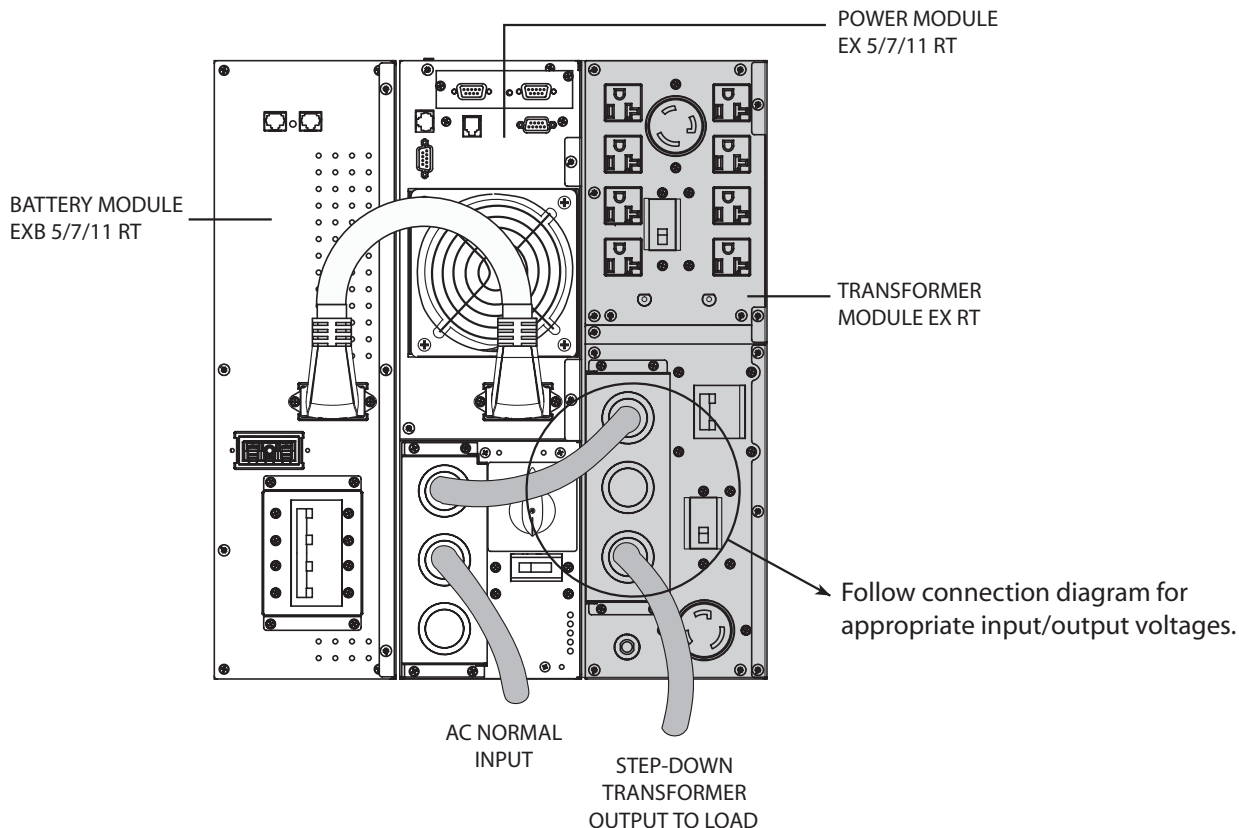
terminals.

2.8.3 Connecting EX RT Transformer

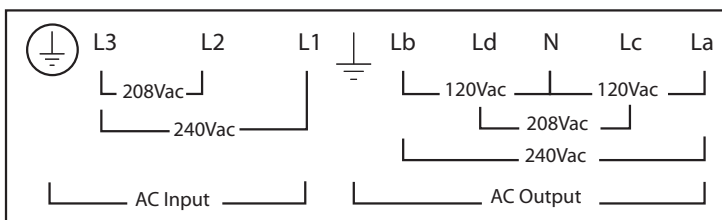
(Part number 86003)

This module is to provide isolated 120/208/240 VAC outputs to the protected loads.

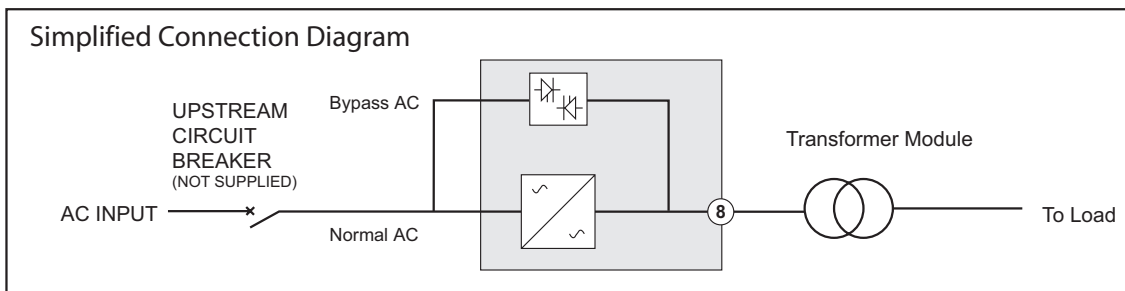
Figure 2-14: View of EX RT transformer connected downstream for 120/208/240 Vac outputs (shown with one EXB).



Terminal Block Transformer Module Connection diagram (located on bottom of Transformer I/O Box)



Terminal Block capability :
AWG 4 solid or stranded wire.



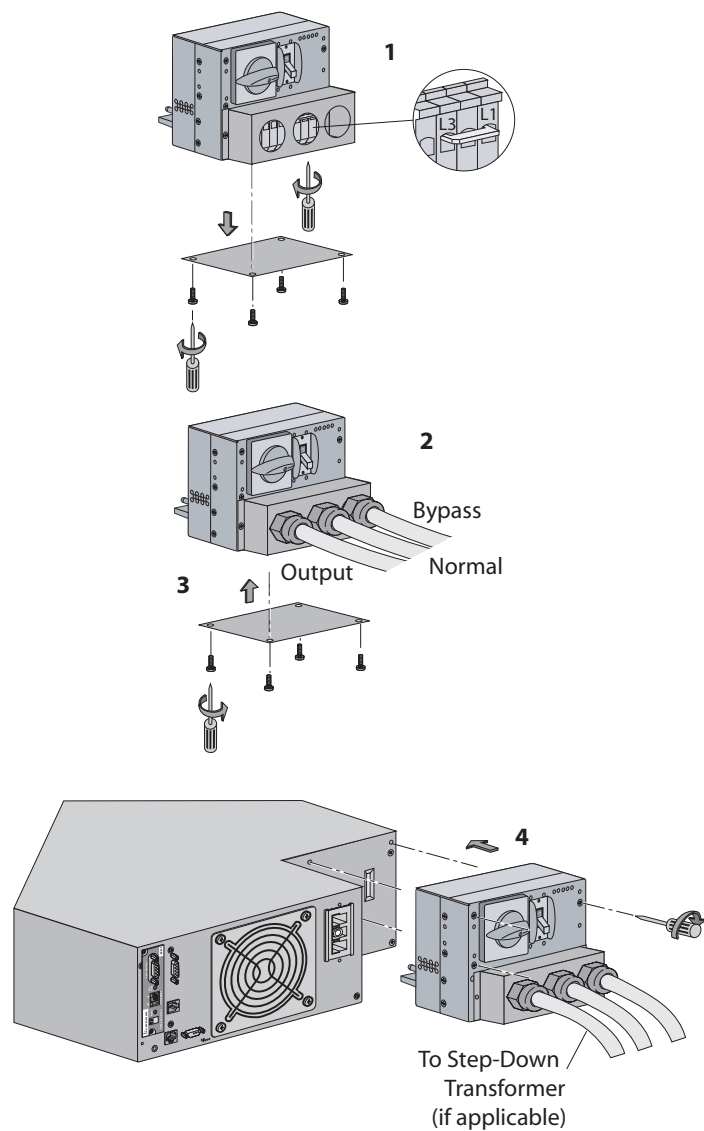
2.8.4 System Connections with Separate Normal and Bypass AC Sources



CAUTION:

This installation requires 2 AC input source with Line, Neutral plus Ground, (200-240VAC). Neutral points are connected together inside the UPS.

Figure 2-15: Normal AC Input, Bypass AC, and Output Cables Installation.



Proceed as follows:

1. Remove the cover plate under the I/O Box. Loosen the terminal blocks L1 and L3, and remove the jumper.



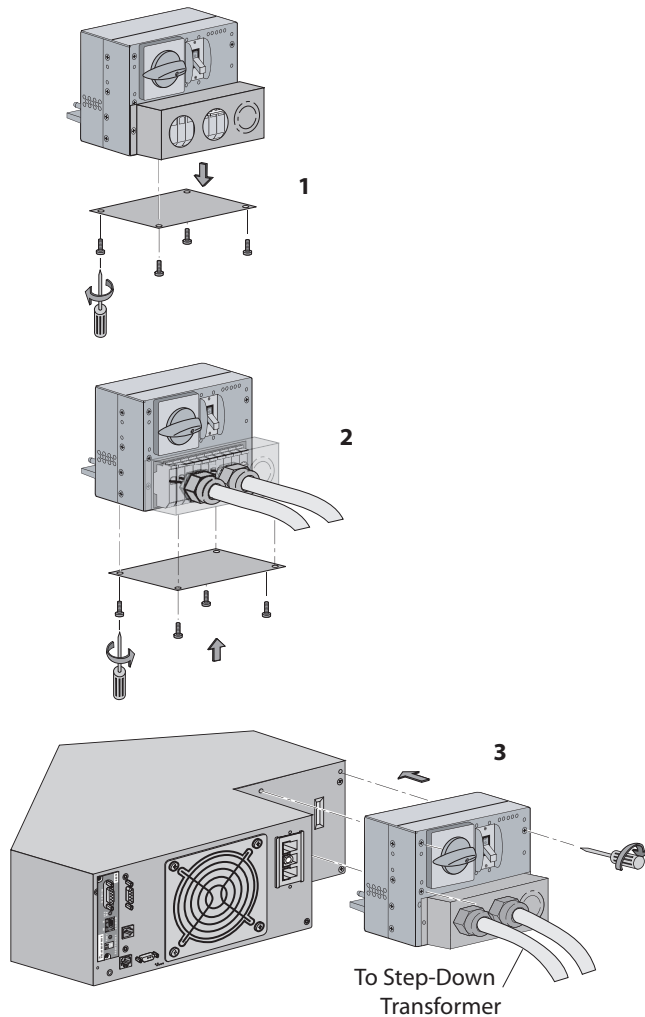
CAUTION: Always connect the earth ground wire first.

2. See section 2.8.1 and I/O Box terminal diagram for installation of Normal AC Input, Bypass AC source, and Output cable with different wire style.
3. Reinstall the cover plate under the I/O Box with four screws.
4. Secure the I/O Box to the power module using three screws.

See section 2.8.3 for connecting EX RT Transformer, if applicable.

2.8.5 System Connections as Frequency Converter (without Bypass AC Source)

Figure 2-16: Accessing Terminal Blocks for Input and Output power cables.



CAUTION: Always connect the earth ground wire first.

1. Remove the cover plate under the I/O Box.
Remove the jumper connecting L3 and L1.



CAUTION: Do not connect anything to the Bypass AC terminal block.

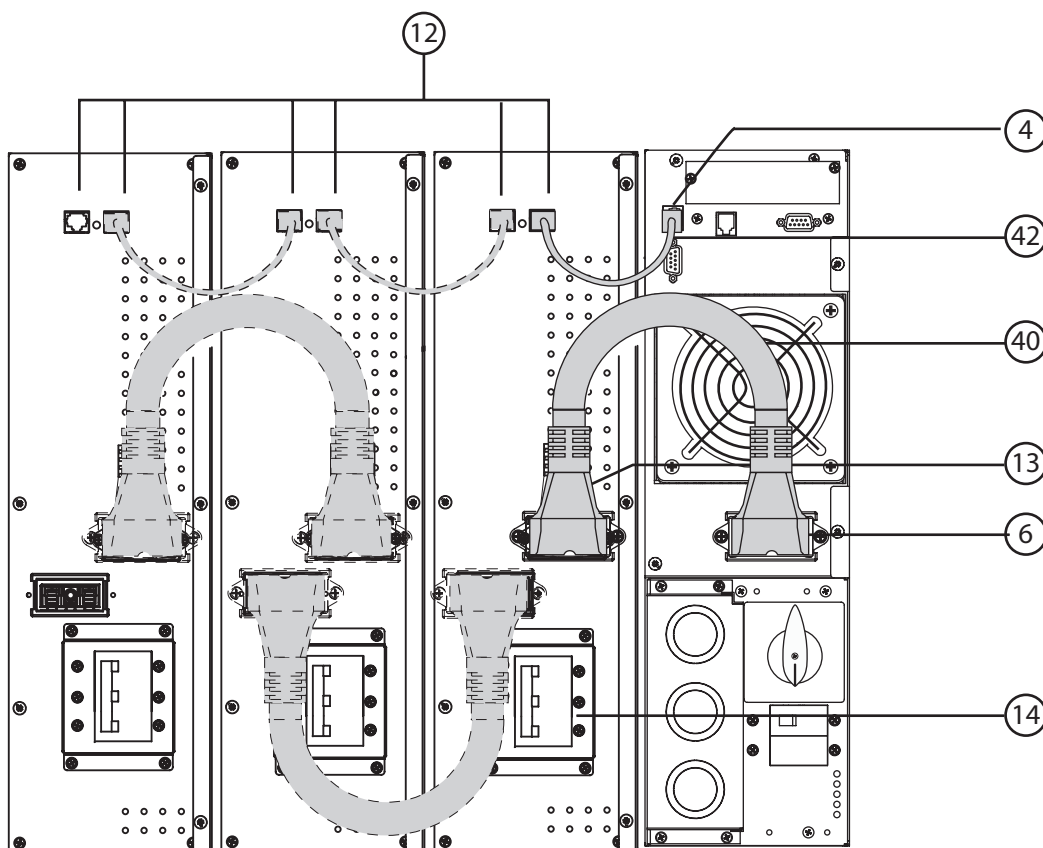
2. Refer to section 2.8.1 to install normal AC source and output wires per I/O Box Terminal diagram. Reinstall the cover plate under the I/O Box.
3. Secure the I/O Box to power module with three screws.

See section 2.8.3 for connecting EX RT Transformer, if necessary.

2.9 Connection of Battery Module, EXB

1. Check that the battery circuit breaker (14) is OFF ("0") position.
2. Connect the battery power cable (40) to the connectors (6) and (13) of the power and battery modules.
3. Connect the battery detection cable (42) between connectors (4) and (12) of the power and battery modules.

Figure 2-17: Rear view of battery module cable connections.

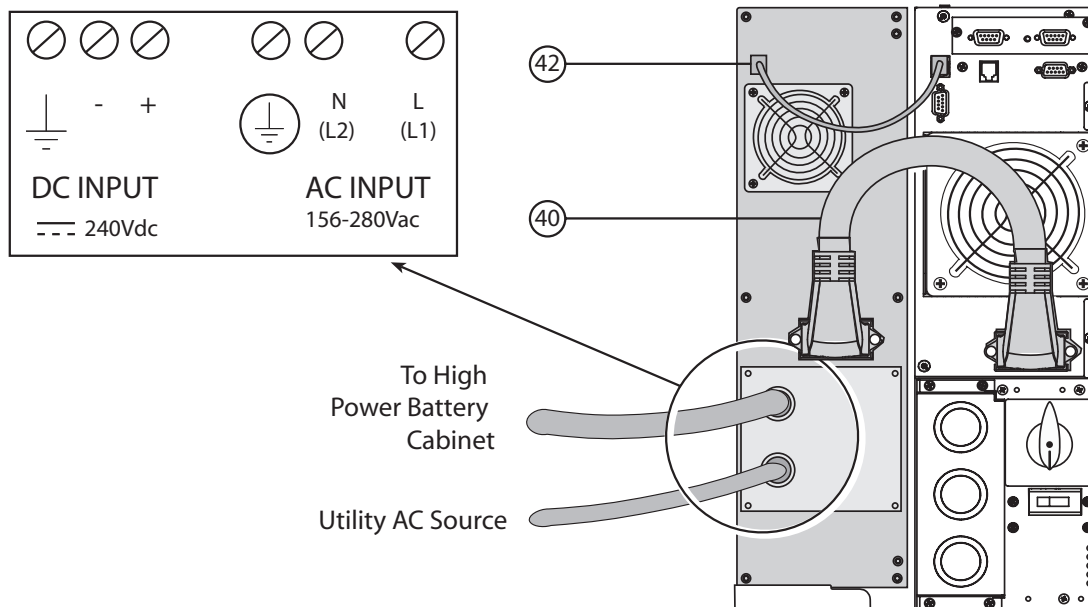


2.10 Connection of CLA Module

1. Connect the battery power cable (40) and battery detection cable (42) (provided with the CLA module) between the power module and the CLA module.
2. Connect the DC Input of the CLA to high power battery cabinet.
 - ▶ DC Input Cable cross-section (not provided): maximum 4 AWG solid or stranded wire.
3. Connect the AC input cable of the CLA module to the utility AC input:
 - ▶ AC input cable cross-section (not provided): maximum 16 AWG solid or stranded wires.

Figure 2-18: Rear view of CLA module cable battery and AC input connections.

Connection Diagram
(inside CLA Module)



3.0 Scope

Operation describes EX 5/7/11RT system characteristics of indicators and controls, modes and specifications and theory of operating the EX 5/7/11RT. The user procedures include performing software programming that will maintain smooth performance. Refer to Figure 1.6 for descriptions of circled numbers.

3.1 Initial Startup

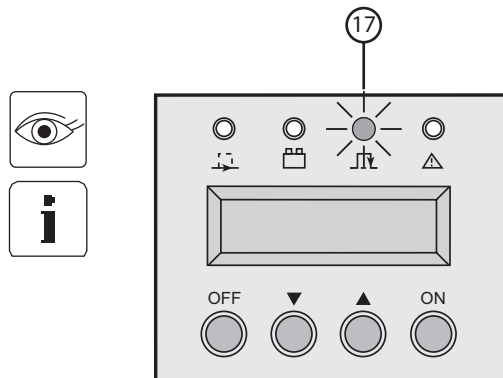
1. Check that the manual bypass switch (7) is on Normal position.
2. Set the normal AC source circuit breaker (8) to the ON position.
3. Set the battery circuit breaker (14) to the ON position.

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

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

LED (17) is ON.

Figure 3-1: Initial Startup Display.



3.2 UPS Personalization



IMPORTANT

If specific settings are required, it is recommended to enter the UPS personalization mode at this stage.

It is possible to enter this mode through the front panel buttons or the Personal Solution-Pac software for Windows included in the MGE UPS SYSTEMS, INC. Solution-Pac power management suite CD-ROM.

3.2.1 Accessing personalization with front panel buttons

- ▶ Press "scroll up" (20) and "scroll down" (21) function buttons together for more than 3 seconds.
- ▶ Press the function button (21) placed under the "ENT" word to enter the set up mode and follow the LCD messages using the buttons now defined as select keys. See Tables: 3-1, 3-2, 3-3, and 3-4 for settings.

Figure 3-2: Control Panel with scroll up and down buttons.

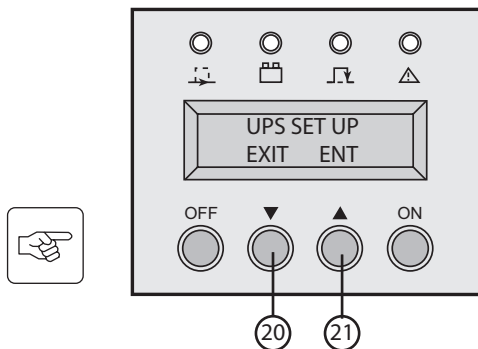


Table 3-1: Local Settings.

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

Table 3-2: Output features.

Display	Factory setting	Options	Comments
Output voltage	208 Volts AC	200/208/220/230/240/250	
Frequency converter	Disabled	Enabled	Bypass AC source disabled
Output frequency	Auto ranging	50/60 Hz	User selectable under frequency converter mode
Eco mode	Disabled	Enabled	See glossary
Hot standby	Disabled	Enabled	Full redundancy (see Figure 3-3)
Operating mode	IT Network	Industrial	(*) See Section 4.1
Bypass Transfer	When bypass OK (**)	When bypass NOK (**)	(*)
Interrupt time	10 ms	10 to 200 ms (by steps of 10 ms)	Interrupt time calibration during during load transfer on Bypass AC source out of tolerances
Overload level	102%	50/70%	

(*) : - Select "IT Network" for computer loads.

- Select "Industrial" when bypass NOK in case of absolute need for service continuity (with potential 10 ms interrupt).

(**) UPS will switch to Bypass AC Source if it is within the set tolerances.

Figure 3-3: Configuration used to provide full redundancy (2N) to critical loads.

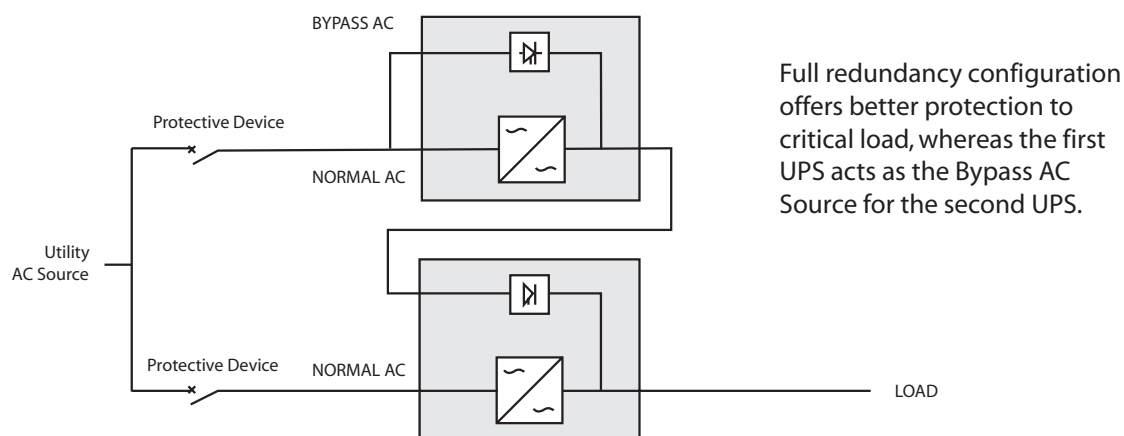


Table 3-3: ON/OFF features.

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

Table 3-4: Battery features.

Display	Factory setting	Options	Comments
Battery test	Every week	No test/daily/monthly	
Pre-Alarm	20%	0 to 100%	Low battery signal;1% increment
Runtime choice	UPS reads # and type of battery modules connected.	From 65 to 400 Ah	Requires EX 5/7/11RT CLA if using options (see section 1.5.4 "Battery extensions cable kit")
Battery deep discharge protection	Enabled	Disabled	If disabled, loss of MGE UPS SYSTEMS,INC. warranty.

3.2.2 Accessing personalization through external software

Insert the **Solution-Pac** CD ROM in your CD drive.

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

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

3.2.3 Final startup sequence

Press the <ON> button more than 3 seconds.

- ▶ After UPS internal test sequence, the green LED **(15)** goes on.



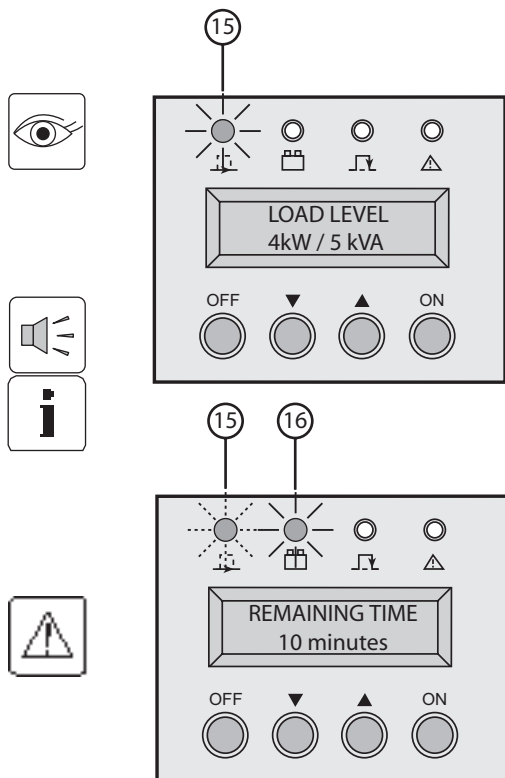
CAUTION

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

3.3 Operating Modes

3.3.1 Normal (double conversion) Mode

Figure 3-4: Normal (double conversion) mode.



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

Two possible cases.

1. If Normal AC source available:

15 LED is ON.

The load is protected by the UPS.

Scroll up 21 and scroll down 22 function buttons allow you to read the UPS measurements (Normal AC source voltage, Bypass AC source voltage, operating mode, battery capacity and UPS Serial Number).

2. If Normal AC source not available:



CAUTION: Do not operate the Manual Bypass switch when the UPS is in Normal mode.

15 LED flashes.

16 LED is ON.

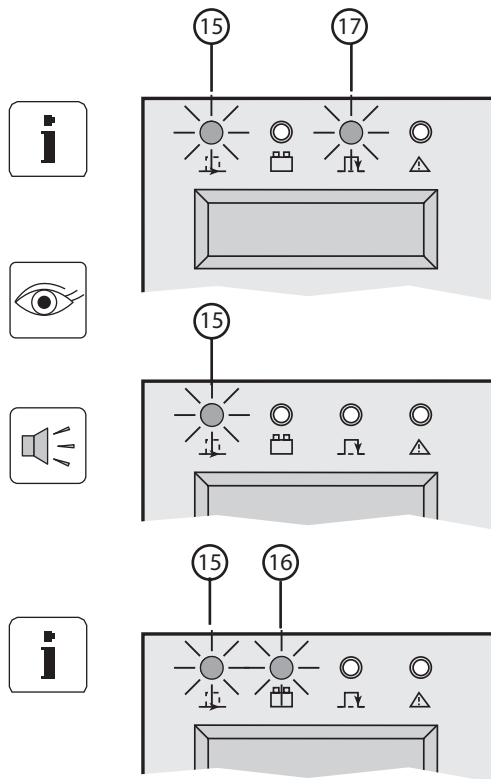
The audible alarm sounds intermittently.

The load is now powered by the UPS battery.

This display shows remaining back-up time.

3.3.2 ECO Modes

Figure 3-5: ECO mode display.



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

Three possible cases:

1. If Bypass AC source available:

LED 15 and LED 17 are ON.

The load is supplied with AC power but not protected in ECO mode.

2. If Bypass AC source not available:

LED 15 is ON.

The audio alarm sounds intermittently.

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

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

LED 15 is ON.

LED 16 is ON.

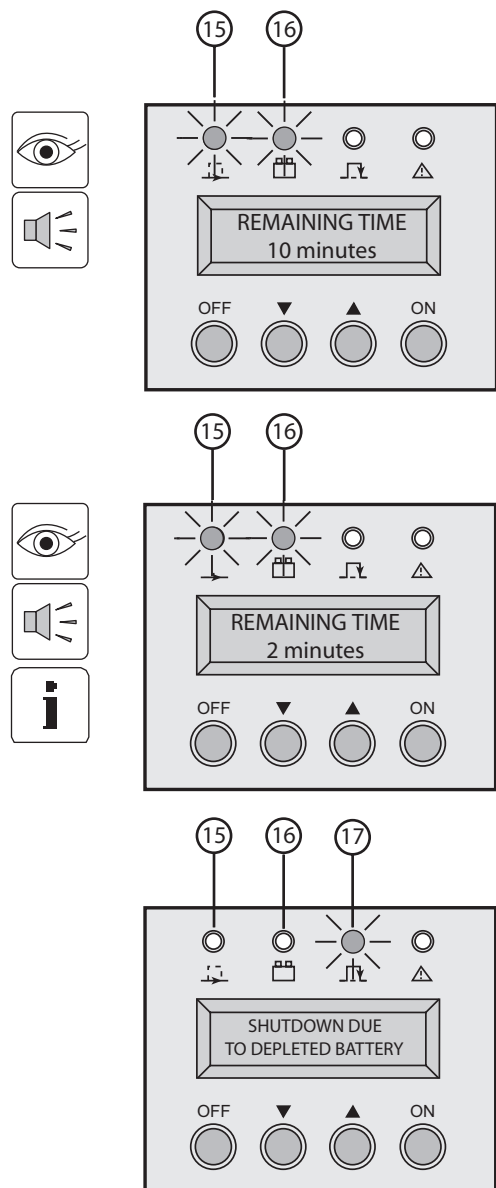
The audio alarm sounds intermittently.

The load is powered by the battery power from the UPS.

The display indicates the battery remaining backup time.

3.4 Operation on battery power

Figure 3-6: Transfer, Threshold and End of backup time.



3.4.1 Transfer to Battery Power

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

There are three possible cases:

First Case:

15 LED is ON.

16 LED is ON.

The audio alarm beeps every 10 seconds.

- ▶ This indicate the load is supplied by the battery.

- ▶ The display indicates the battery remaining backup time.

Second Case:

15 LED is ON.

16 LED is ON.

The audio alarm beeps every 3 seconds.

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

Third Case:

15 LED is OFF.

16 LED is OFF.

The audio alarm is stopped.

- ▶ The load is transferred to the Bypass AC source if available. In this case:

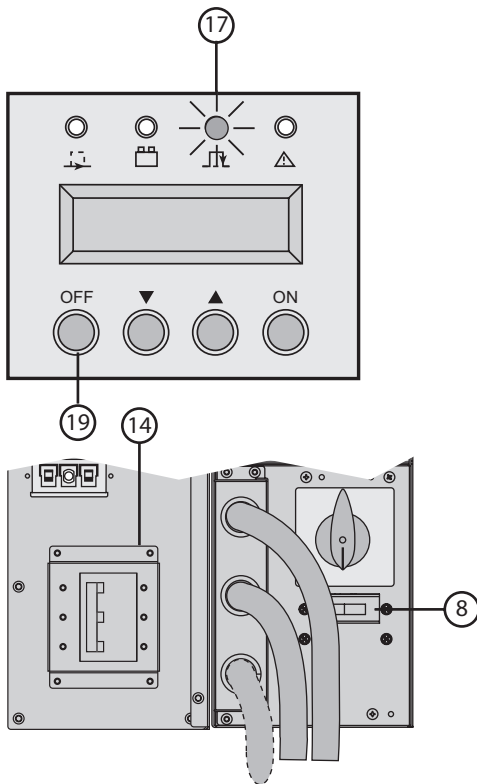
17 LED is ON.

3.5 Return of Normal AC source

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

3.6 Shutdown

Figure 3-7: Shutdown display, circuit breaker, and AC source switch.



1. Press the OFF button **19** more than 3 seconds.

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

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

2. Set the battery circuit breaker(s) **14** to the OFF position.
3. Set the Normal AC source circuit breaker **8** to the OFF position.
4. For a full shutdown of UPS and connected load, the upstream circuit breaker (not included) should be set to the OFF position.

4.0 Scope

Maintenance includes a troubleshooting guide of symptoms and possible solutions, Hot swapping the power module and Battery Module, and testing scenarios.

4.1 Information Technology (IT) Network and Industrial Operating Modes

Table 4-1: Network and Industrial Modes of Operation.

Symptoms	IT network mode	Industrial mode
Overload, and Bypass source in tolerance.	Load is transferred to Bypass AC source. UPS returns to normal mode if overload is removed.	Same as I/T network mode, but AC to the UPS does not return to normal mode if overload is removed.
Overload, and Bypass AC source not in tolerance.	The UPS shuts down and load is not transferred to Bypass AC source.	Load is transferred to Bypass AC source with 10 milli-seconds output break. The UPS does not return to normal mode if overload is removed.
Output short circuit and Bypass AC source in tolerance.	The load remains powered by the UPS. The UPS shuts down after 3 minutes if the short circuit remains	Load is transferred to Bypass AC source, the UPS returns to normal mode if the short circuit is removed.
Output short circuit and Bypass AC source not in tolerance.	The load remains powered by the UPS. The UPS shuts down after 3 minutes if the short circuit remains.	The load is transferred to Bypass AC source with 10 milliseconds output break. The UPS does not return to normal mode if the short circuit is removed.

4.2 Troubleshooting

- ▶ If any of LED's (17) or (18) is on, there is an operating anomaly or an alarm.
- ▶ Use "scroll up" or "scroll down" function button to reset the audible alarm.
- ▶ Troubleshooting not requiring MGE UPS SYSTEMS, INC. after-sales support:

Table 4-2: Troubleshooting not requiring MGE after-sales support.

Symptom	Indication	Correction
LED (17) is on, and Bypass AC source is present the alphanumeric display shows BAD CONNECTION REWIRE AC NORMAL	AC source is not connected to the correct terminals.	Rewire correctly the normal AC source.
LED (17) is on, the alphanumeric display shows: LOAD LEVEL XX kW / XX KVA	Load supplied by bypass AC source.	Push the ON button for more than 3 seconds.
LED (17) is on, and Bypass AC source is present the alphanumeric display shows: THERMAL OVERLOAD 1XX%	UPS overload	Check if any device is shorted or failed.
LED (18) is on, the alphanumeric display shows: CURRENT OVERLOAD	Short circuit conditions on output devices.	Check if any device is shorted or failed.
LED (15) is on, but the alphanumeric display shows: BYPASS REVERSE REWIRE BYPASS	180° degree phase shift between bypass and normal AC source.	Check if bypass source is correctly wired (in case of upstream transformer use).
Audible alarm is on, the alphanumeric display shows: I/O BOX REMOVED	Input/Output box not installed correctly.	Check if the Input/Output box is correctly installed. See section 2.8.

Table 4-3: Troubleshooting requiring MGE after-sales support.

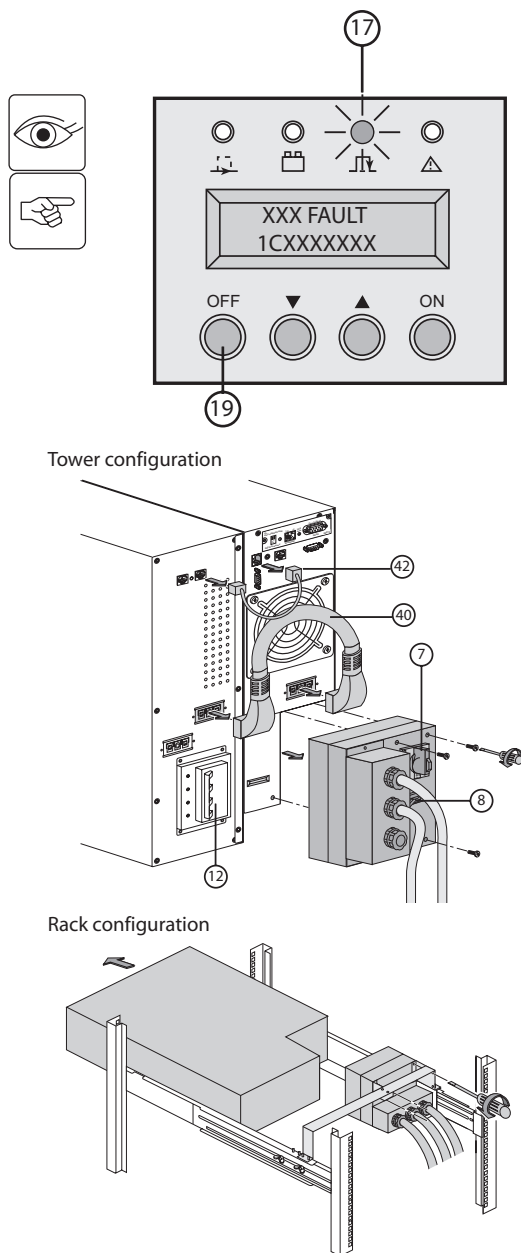
Symptom	Indication	Correction
LED 17 and 18 are on, Bypass AC Source is present and audible alarm is on. the alphanumeric display shows: xxx FAULT	Internal fault and transfer of load on bypass AC source	Call the after sales support department.
LED 17 is on, and audible alarm is on, the alphanumeric display shows BATTERY FAULT	Battery fault during the battery test.	Call the after sales support department.
LED 17 is on, the alphanumeric display shows: SHUTDOWN STATIC SW FAILED	Static switch failure	Call the after sales support department.
Audible alarm is on, the alphanumeric display shows: END OF WARRANTY	Batteries may have exceeded their rated life period. Battery capacity is severely reduced.	Follow the battery replacement procedure in section 4.5.

NOTE: To reset the alarm permanently, press both function buttons 21 and 22 for more than 3 seconds.

4.3 Hot Swapping the Power Module

This operation can be performed without interrupting the load.

Figure 4-1: Disconnecting the power module.



1. Stop the UPS with the OFF button (19) (press more than 3 seconds).

Check if UPS is on bypass AC source:

LED (17) is on (If LED (17) is not on, do not turn the manual bypass and call the after sales support department).

2. Turn the manual bypass switch (7) to the BYPASS position.
3. Switch the battery circuit breaker(s) (14) to the OFF position.



CAUTION: Do not switch the Normal AC source circuit-breaker (8) to the OFF position. Doing so will disconnect power to the load.

4. Loosen three screws to remove the Input/Output box.
5. Disconnect the battery cables (40) and (42) from the power module.

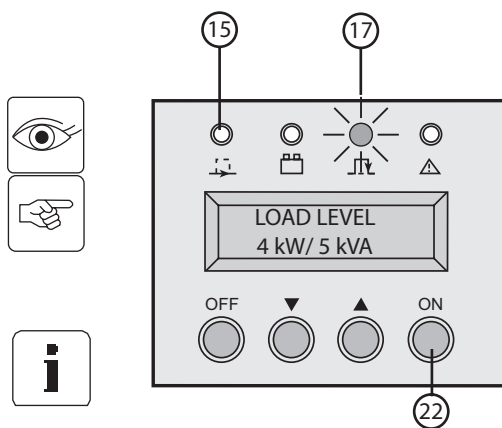
The power module can be replaced.

The connected equipment is powered by the Bypass AC source.

4.4 Re-connecting the power module

This operation can be performed without interrupting the load.

Figure 4-2: Reconnect the power module.

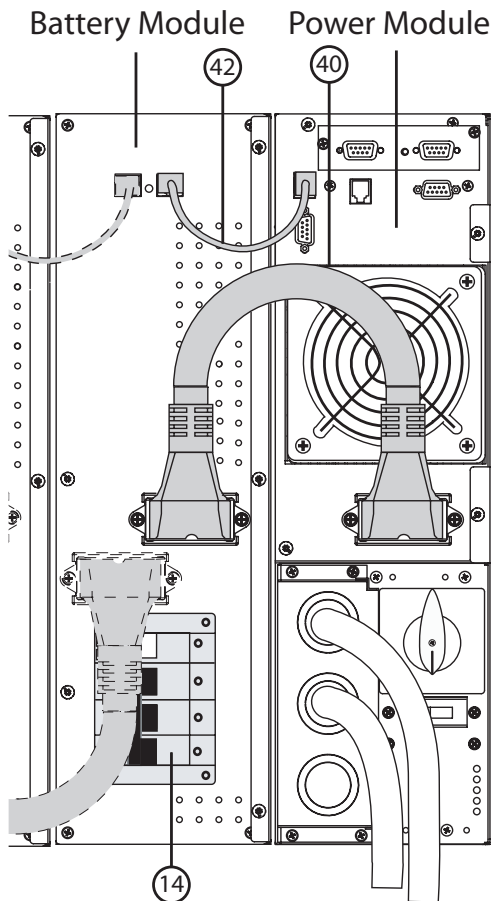


1. Secure the Input/Output junction box using the three screws.
2. Reconnect the cables 40 and 42 to the power module.
3. Switch the battery circuit breaker(s) 14 to the ON position.
4. Check if Normal AC source circuit breaker 8 is on the ON position.
5. Check that the LED 17 is on.
6. Turn the manual bypass switch from the BYPASS to the NORMAL position.
7. Follow initial start up sequence (see section 3.1) in order to personalize the UPS.
8. Push the ON button 22 for more than 3 seconds.

The green LED 15 is on, and the connected equipment is now protected by the UPS.

4.5 Hot Swapping the Battery Module

Figure 4-3: Rear view of the battery module.



4.5.1 Disconnecting the Battery Module

1. Switch the battery circuit breaker(s) (14) to the OFF position.
2. Disconnect the cables (40) and (42) from the power module.

The battery module can be replaced.

The connected equipment is powered by the UPS, but not protected.

It is also possible to replace battery pack instead of battery module.

Contact your nearest after sales support service.



CAUTION: Always replace both battery packs with new ones.

To remove battery pack:

1. First, switch the battery circuit breaker(s) to the OFF position.

See section 2.5 and follow instructions for battery pack replacement.

4.5.2 Re-connecting the Battery Module

1. Reconnect the battery cables (40) and (42) to the power module.
2. Switch the battery circuit breaker(s) (14) to the ON position.

5.0 Electrical Specifications

5.1 System Input/Output Power Ratings

Table 5-1: EX 5/7/11 RT Input and Output Characteristics.

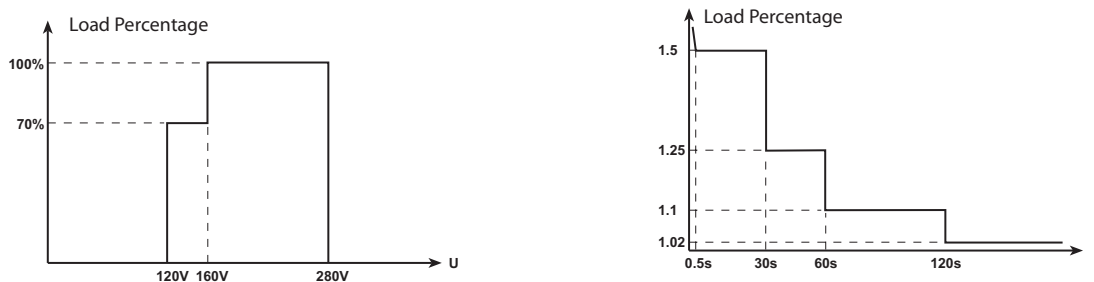
Source	Voltage	Frequency
Normal AC Source	208 to 240 Volts AC	40 to 70 Hz
Bypass AC Source	208 to 240 Volts AC*	48 to 52 Hz**
Load Output	120/240Vac Volts AC (120/208/240Vac are possible with transformer module)	50/60 Hz autoranging (or frequency converter)

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

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

5.2 System Overload Characteristics

Figure 5-1: Power supplied as a function of input voltage (left), and Permissible UPS overloads as a function of time (right).



5.3 System Backup Characteristics

Table 5-2: Back-up Time (in minutes).

System	Load Percentage			
	30%	50%	70%	100%
Standard 11kVA	25	14	9	5
Standard 11kVA + 1 EXB	61	30	20	14
Standard 11kVA + 2 EXB	96	53	34	22
Standard 11kVA + 3 EXB	135	84	51	30
Standard 11kVA + 4 EXB	172	102	67	42
Standard 11kVA + 5 EXB	201	113	87	53
Standard 7kVA	37	21	12	7
Standard 7kVA + 1 EXB	80	53	30	20
Standard 7kVA + 2 EXB	124	83	55	32
Standard 7kVA + 3 EXB	185	108	75	45
Standard 7kVA + 4 EXB	245	132	98	57
Standard 7kVA + 5 EXB	287	164	118	72
Standard 5kVA	37	31	21	12
Standard 5kVA + 1 EXB	90	70	53	30
Standard 5kVA + 2 EXB	140	112	83	55
Standard 5kVA + 3 EXB	185	156	108	75
Standard 5kVA + 4 EXB	255	207	132	98
Standard 5kVA + 5 EXB	306	260	164	118

Table 5-3: Battery Recharge time to recover 90% of the rated backup time after discharge at full load.

	Configuration for 2 hours backup time	Configuration for 4 hours backup time	Configuration for 8 hours backup time
EX 5	7 hours	15 hours	24 hours
EX 7	5 hours	12 hours	20 hours
EX 11	7 hours	15 hours	24 hours

5.4 System Short Circuit Protection

Short circuit current provided by EX 5/7/11RT in normal or battery mode:

EX5/7 RT	110A for 80ms
EX11 RT	190A for 80ms

5.5 Accessories Electrical Characteristics

EX RT Transformer

Nominal power	11 kVA
Nominal current	63 A
Input voltage	208-240Vac
Output Voltage	120/208/240Vac
Frequency	50/60 Hz (+/-10%)
Isolation (EN 61558-1-2-4)	3.75 kV / 5 M ohms
Operating temperature	From 0° to +40°C
Max. operating rel. humidity	95%
Derating / altitude	Pn-10% > 1000 m
Dimensions HxWxD (tower)	17.5 x 5.15 x 25 inches (444 x 131 x 635 mm)
Dimensions HxWxD (rack 3U)	5.15 x 17.5 x 25 inches (131 x 444 x 635 mm)
Weight	151 lbs. (68.5 kg)

EX RT CLA module

AC input voltage	156-280 Volts AC
Input frequency	40-70 Hz
Battery charge current	6 A DC

5.6 Heat Rejection

Table 5-4: Full load heat rejection in BTU's/hr.

System	Operation Mode	
	On-line	On Battery
5kVA	1327	1944
7kVA	1858	2722
11kVA	2919	4278

5.7 Environmental Characteristics

- ▶ The operating temperature is 0 to 40°C (8 hours at 45°C), however optimum operation is within the +20 to +25°C range and at 5-95% humidity, non-condensing at altitude up to 3280ft without de-rating.
- ▶ The storage temperature : -20 to 40°C. Humidity : 5-95%, non condensing.
- ▶ Battery backup time is adversely affected by high and low temperatures. It is significantly reduced at temperatures under 10°C. Above 25°C, battery service life is cut in half every 10°C. Above 40°C, battery manufacturers no longer guarantee operation due to the risk of thermal runaway.
- ▶ Air enters through the front air vent grills and exits through the back. Always keep air vent grills unobstructed.

MGE Warranty & Proprietary Rights for Single Phase Products

MGE 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 24 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.

In no event shall the MGE UPS SYSTEMS, INC. be liable for loss, damage, or expense directly or indirectly arising from the use of the units, or from any other cause, except as expressly stated in this warranty. MGE UPS SYSTEMS, INC. makes no warranties, express or implied, including any warranty as to merchantability or fitness for a particular purpose or use. MGE UPS SYSTEMS, INC. is not liable for and Purchaser waives any right of action it has or may have against MGE UPS SYSTEMS, INC. for any consequential or special damages arising out of any breach of warranty, and for any damages Purchaser may claim for damage to any property or injury or death to any person arising out of its purchase of the use, operation or maintenance of the product. MGE UPS SYSTEMS, INC. will not be liable for any labor subcontracted or performed by Purchaser for preparation of warranted item for return to MGE UPS SYSTEMS, INC.'s factory or for preparation work for field repair or replacement. Invoicing of MGE UPS SYSTEMS, INC. for labor either performed or subcontracted by Purchaser will not be considered as a liability by the MGE UPS SYSTEMS, INC.

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MGE UPS SYSTEMS, INC. makes no warranty with respect to whether the products sold hereunder infringe any patent, U.S. or foreign, and Purchaser represents that any specially ordered products do not infringe any patent. Purchaser agrees to indemnify and hold MGE UPS SYSTEMS, INC. harmless from any liability by virtue of any patent claims where Purchaser has ordered a product conforming to Purchaser's specifications, or conforming to Purchaser's specific design.

Purchaser has not relied and shall not rely on any oral representation regarding the Product sold hereunder and any oral representation shall not bind MGE UPS SYSTEMS, INC. and shall not be part of any warranty.

There are no warranties which extend beyond the description on the face hereof. In no event shall MGE UPS SYSTEMS, INC. be responsible for consequential damages or for any damages except as expressly stated herein.

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Warranty and Product Registration

Thank you for choosing MGE UPS SYSTEMS, INC. for your power protection, distribution, and quality requirements. We are pleased to have you join our increasing family of users.

In order to maximize the value you receive from this product, and to ensure that you are kept informed of product or software updates, we recommend that you take a few minutes to register your new purchase. You may register online at the URL noted below. Should you not have Internet access, you may mail or fax this form back (attn: Warranty Registration) as indicated at the bottom of the page.

Register your UPS at: <http://www.mgeups.com/email/warranty/menu.htm>

Please be prepared with the following information to register and validate your UPS warranty, keep informed on software and product updates, and register your extension "Warranty+" if purchased with the UPS.

User Information

Last name _____
First name _____
Company name _____
Address _____
Zip code _____
City _____
State/Province _____
Country _____
Tel _____
Fax * _____
Email* _____

Product information

Model _____
Serial Number _____
Date of purchase _____

Warranty Extension (Warranty+) not available on products

I have purchased a warranty extension (Warranty+)

Reference: _____ Contract Number: _____

Thank you from all of us at MGE.

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

Tel: 714-557-1636

Fax: 714-557-9788

41-000154-53 Rev B00 9/2003

MGE Customer Care Center

Technical Support and Product Services



Technical questions? If you encounter a problem while following the instructions in this manual, or have questions about the operation, repair, or servicing of your equipment, please direct calls to MGE UPS SYSTEMS, INC. Customer Care Center or visit our web site www.mgeups.com for complete service information.

To insure that your questions are correctly answered, please obtain the part number, assembly number, and serial number of the unit and include them in any discussions or correspondence.

Part Number: _____

Assembly Number: _____

Serial number: _____

Who To Contact

Customer Care Center: **1-800-523-0142, extension 1113** (USA and Canada Only)

Field Service Engineer: **1-800-438-7373** (USA and Canada Only)

**Customer FAQ
or International calls:** **1-714-557-1636** (Ask for Technical Support Group, TSG)

Commitment: MGE UPS SYSTEMS, INC. is committed to providing easy to access factory trained experts that will provide responses to any questions that you might have.

Scheduling Field Service Engineer Support

Scheduling of the MGE Field Service Engineers typically should be done 7 to 10 days before they are required on-site. If the startup of the UPS is critical to maintaining your schedule, please call the MGE toll free telephone number at **1-800-438-7373**, to insure a safe installation and startup that will maintain the MGE warranty and insure smooth performance

Return Policy for Repair (RMA)

Should you require factory service for your equipment, contact MGE's Customer Support Services and obtain a Return Materials Authorization (RMA) prior to shipping your unit. Never ship equipment to MGE without first obtaining an RMA.

Date: _____

RMA Number: _____

Contact Name: _____

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Term used	Definition / Meaning
@	At.
/	And/or.
+/-	Plus or Minus.
≤	Equal to or less than.
#	Number.
°C	Degree Celsius.
°F	Degree Fahrenheit.
∅	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.
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.
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.
Earth ground	A ground circuit that has contact with the earth.
ECO Mode	Operating mode by which the load is supplied directly by the AC source if it is within the tolerances defined by the user. This mode reduces the consumption of electrical power.
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.
I/O	Input/Output.
I/T or IT	Information Technology.
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 closed.
NO	Normally open.
NEC	National Electrical Code.
NFPA	National Fire Protection Association.
PN	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 $V \times I$.
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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