



# BATTERY CHARGER MODULE

## User's Guide





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# CHAPTER 1

## INTRODUCTION

The optional battery charger module is designed to provide additional current for faster recharging of UPS battery modules in systems with many batteries.



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**NOTE** To realize maximum module functionality, battery charger modules should be installed in the UPS cabinet.

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In addition, for systems with especially long runtime requirements, DIP switches found on the rear panel of the battery charger module make it possible to install the module in a specially designed external battery cabinet.

The battery charger module is capable of providing up to 20 amperes of current for optimum charging, based upon the condition and number of batteries in the system.

Examples of improved system recharge times are shown in Table 1. Note that larger systems require at least one (or more) battery charger modules to be able to recharge the larger number of battery modules.

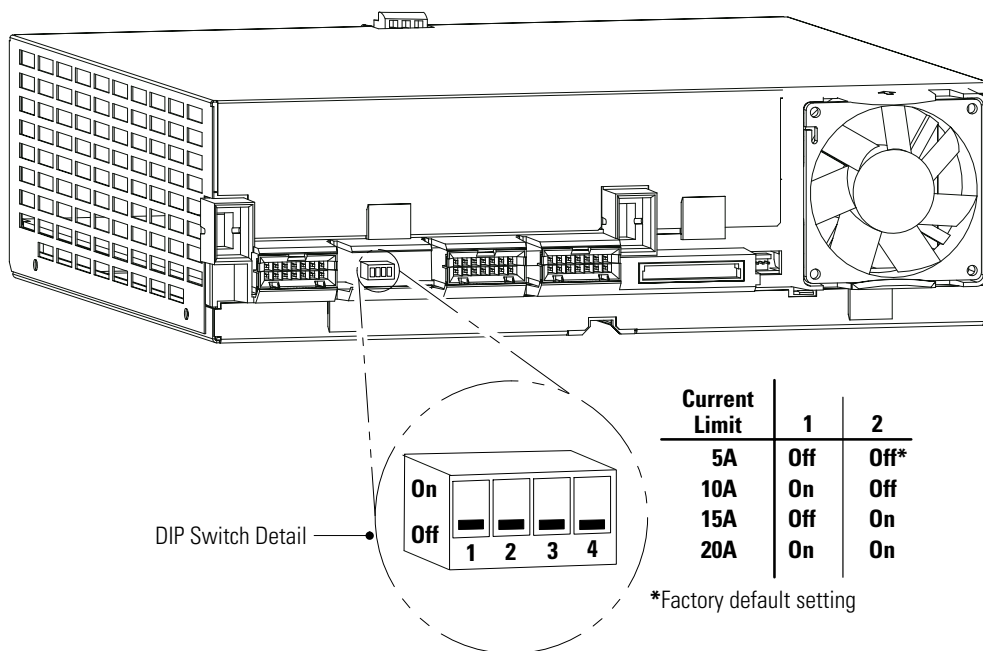
**Table 1. Recharge Times Using Battery Charger Modules**

Designed Run Time (minutes)	Number of Battery Charger Modules	6 kVA Capacity		12 kVA Capacity		18 kVA Capacity	
		Battery Modules	Recharge Time (hours)	Battery Modules	Recharge Time (hours)	Battery Modules	Recharge Time (hours)
58	0	16	20	32	20	48	20
	1		3		4		6
120	1	28	5	56	8	82	11
240	1	54	9	110	17	160	N/A
	2		6		9		13
360	1	78	14	160	N/A	234	N/A
	2		7		14		19
480	1	102	18	200	N/A	308	N/A
	2		10		18		26
	3		7		13		18

## Physical Features

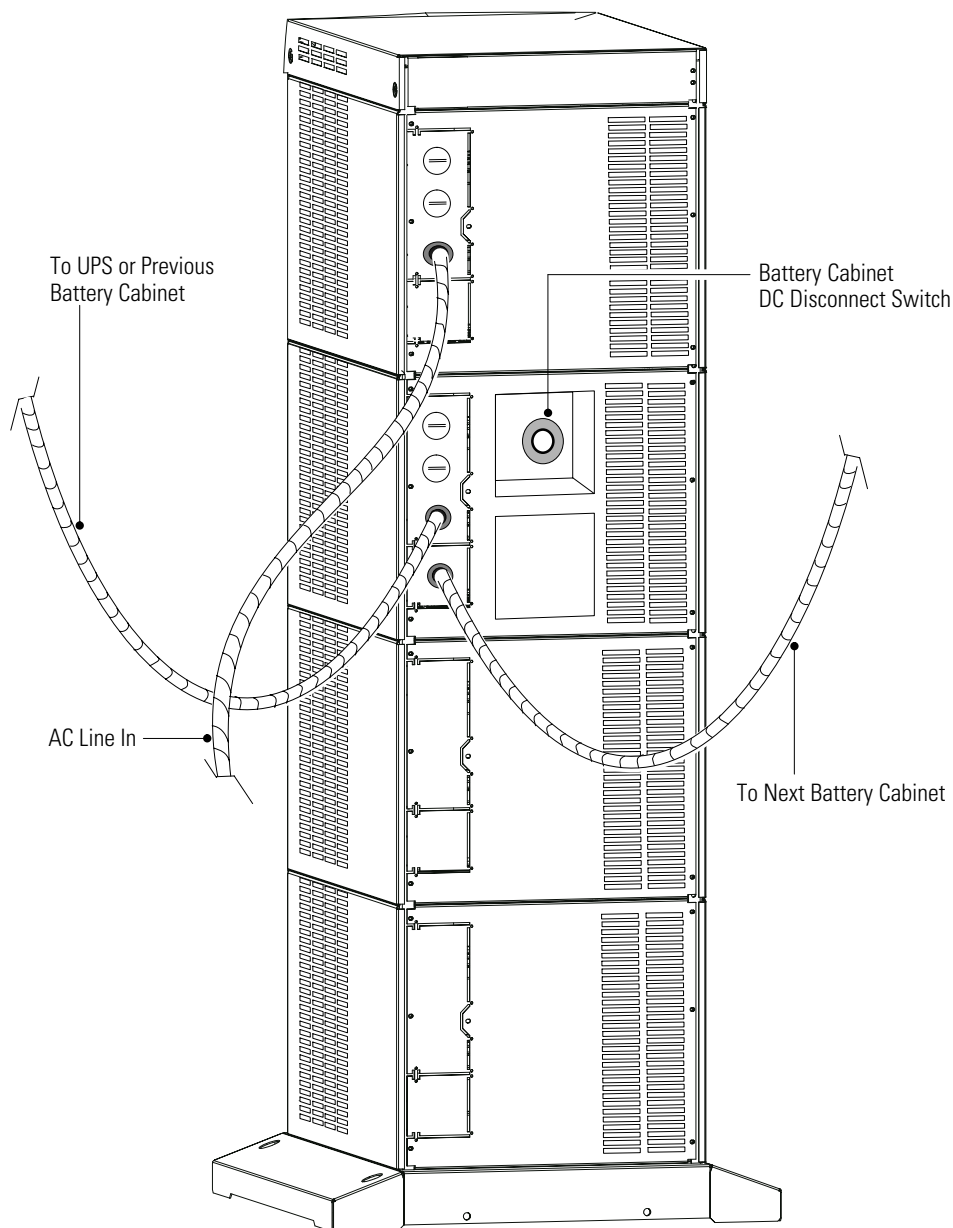
The battery charger module is similar in appearance to a power module. The two primary differences are the light-purple colored front label and the current-limit DIP switch on the rear panel of the module as shown in Figure 1. See “Setting DIP Switches” on page 6 for more information on DIP switch functions.

The module may be installed in either the UPS cabinet (6-, 9-, and 12-slot sizes) or a special 12-slot external battery cabinet.



**Figure 1. Battery Charger Module (Rear View)**

The external battery cabinet may have input power hardwired through rigid or flexible conduit, as shown in Figure 2, or input power may be supplied through a plug-terminated line cord (requires the purchase of a line cord kit). Besides input power, the external battery cabinet has a cable or conduit connection to the UPS cabinet. It may also have a cable or conduit to additional battery cabinets.



**Figure 2. External Battery Cabinet for Charger Modules**





## CHAPTER 2

# INSTALLATION

The battery charger module can be plugged into any UPS cabinet slot above the battery modules. Battery charger modules may be installed in any of the top three slots of the special 12-slot external battery cabinet.



**NOTE** Do not block the ventilation holes on each side and the back of the unit.

### Cabinet Preparation

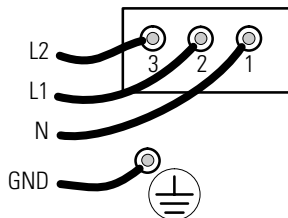
Follow the procedures in the UPS user's guide for:

- equipment clearances
- installing the UPS cabinet and optional external battery cabinets

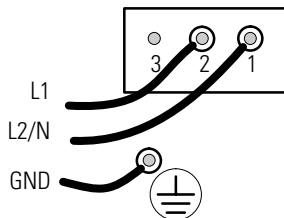
If additional external battery cabinets are to be used for battery charger modules, install input power wiring to each additional cabinet (see Figure 3). Table 2 shows required wire sizes based upon the number of battery charger modules.

For each 12-slot external battery cabinet, stabilizer brackets must be installed. If required, also install a floor anchor kit as described in the UPS user's guide.

**(a) Split-Phase Power Modules**  
(3-Wire Plus Ground Input) (2 PEN)  
100/200, 110/220, 120/208, 120/240, 127/220 Vac



**(b) Universal Power Modules**  
(2-Wire Plus Ground Input)  
208, 220, 230, and 240 Vac



**NOTE** The special 12-slot external battery cabinet must be wired for input power from the utility AC power supply.

**Figure 3. Input Power Wiring to Battery Cabinet**

**Table 2. Required Input Wiring for External Battery Cabinet**

	Number of Charger Modules	Input Circuit Breaker Rating	75°C Copper Wire Size	Conductor Screw Torque
200-240 Vac, 50/60 Hz	1	15A	14/12 AWG	20 in lb (2.3 Nm)
	2	30A	10 AWG	20 in lb (2.3 Nm)
	3	45A	8 AWG	25 in lb (2.8 Nm)
100-127/200-240	1	15A	14/12 AWG	20 in lb (2.3 Nm)
	2	30A	10 AWG	20 in lb (2.3 Nm)
	3	45A	8 AWG	25 in lb (2.8 Nm)

## DC Cabling Between Cabinets

Refer to “Battery Cabinet Installation” in the UPS user’s guide for the procedure to connect the cable assembly between the external battery cabinet and the UPS cabinet, or to additional external battery cabinets.



**NOTE** See Figure 2 on page 4 for the proper location of cabinet-to-cabinet wiring, which must be in the second cabinet section, NOT the top section as shown in the UPS user’s guide.

## Setting DIP Switches

The DIP switch on the rear panel of the battery charger module is functional only when the module is installed in an external battery cabinet. It controls two functions: the output current limit and a periodic float charging to equalize all battery capacities.



**NOTE** The DIP switches need to be set **ONLY** if the battery charger module is placed in the specially designed 12-slot battery cabinet. There is no need to set the DIP switches when the module is placed in the UPS cabinet.

### Output Current Limit

The battery charger module is capable of producing up to 5, 10, 15, or 20 amperes when installed in an external battery cabinet. Discharged batteries must be recharged at an optimum rate; neither too quickly nor too slowly. For optimum charging of batteries, you must set positions 1 and 2 of the DIP switch.

Follow the guidelines in the table below to determine the proper output current setting.



**NOTE** A battery string is made up of two battery modules.

**Table 3. DIP Switch Settings**

DIP Switch Setting	Minimum Requirement
5A	2 battery strings (7.2 AH)
10A	4 battery strings (14.4 AH)
15A	6 battery strings (21.6 AH)
20A	8 battery strings (28.8 AH)

Set DIP switch positions 1 and 2 for the required output current as shown in Figure 4.

	Current Limit		1	2
	On	Off		
5A			Off	Off*
10A			On	Off
15A			Off	On
20A			On	On

\*Factory default setting

**Figure 4. DIP Switch**

### Periodic Float Charge

To enable automatic float (or equalize) charging of the battery modules every 30 days, set DIP switch position 3 to ON.



**NOTE** Enable only one battery charger module in external battery cabinets.

### Reserved Switch

The function of DIP switch position 4 is reserved; it should remain in the OFF position.

## Battery Charger Module Installation

Use the following procedure to install the battery charger modules into the UPS or external battery cabinet:

1. Remove the front covers of the cabinet.

The covers have spring latches on the left and right sides that hold them in place.



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**NOTE** Place battery charger modules above the battery modules in the UPS cabinet, or in any of the top three slots of the special 12-slot external battery cabinet.

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2. Insert the battery charger modules into the cabinet.

To insert a battery charger module, lower the front down slightly and lift the rear edge over the safety stop on the center support rail. Keep the module handle extended until the module is fully inserted.

3. Raise the battery charger module handle to secure the module into the cabinet. Be sure the handle latch snaps into place. Tighten the thumbscrew on the handle.
4. Reinstall the front covers.
5. The UPS may now be turned on according to the UPS user's guide.



## CHAPTER 3

# OPERATION

The battery charger module operates in two automatic modes:

- as a charger module within the UPS cabinet under control of the UPS power modules, and
- as an independent charger module located in a battery cabinet containing battery modules for the UPS system.

### UPS Cabinet Operation

When the battery charger module is installed in the UPS cabinet, it communicates through a controller area network (CAN) bus with the power modules. The power modules monitor and control the battery charger. Alarm conditions detected by the battery charger module are logged and announced by the UPS system (refer to the UPS user's guide). Normal output voltage is 133 Vdc.

### Battery Cabinet Operation

When the battery charger module is installed in an external battery cabinet, it has no communication path with the UPS power modules. Therefore, it controls its own operation, independent of any system information within the power modules.

The module output current limit is set by a rear panel DIP switch. An audible alarm signals module status and alarm conditions (see "Troubleshooting" on page 15). Normal output voltage is 133 Vdc.

### Output Foldback

If the battery charger module senses a charged-battery condition, it folds back its output voltage to prevent overcharging system batteries. Output current is controlled by power modules on the UPS CAN bus or by the rear panel DIP switch.





## CHAPTER 4

# SPECIFICATIONS

**Table 4. Model Specifications for Universal Modules**

Cabinet Size	Optional Chargers	UPS kVA/Watts	Input Current for 208/220/230/240V	Output Current for 208/220/230/240V	Recommended Input Service	Heat Dissipation
3-slot	NA	3/2100	17/16/15/15A	14.4/13.6/13.0/12.5A	25A	285W (0.98 kBTU/hr)
6-slot	0	3/2100	17/16/15/15A	14.4/13.6/13.0/12.5A	25A	285W (0.98 kBTU/hr)
	1	3/2100	31/29/28/27A	14.4/13.6/13.0/12.5A	40A	570W (1.94 kBTU/hr)
	2	3/2100	46/44/42/41A	14.4/13.6/13.0/12.5A	60A	860W (2.93 kBTU/hr)
	0	6/4200	31/29/28/27A	28.8/27.2/26.0/25.0A	40A	570W (1.95 kBTU/hr)
	1	6/4200	46/44/42/41A	28.8/27.2/26.0/25.0A	60A	860W (2.93 kBTU/hr)
	0	9/6300	46/44/42/41A	43.2/40.8/39.0/37.5A	60A	860W (2.93 kBTU/hr)
9- and 12-slot	0	3/2100	17/16/15/15A	14.4/13.6/13.0/12.5A	25A	285W (0.98 kBTU/hr)
	1	3/2100	31/29/28/27A	14.4/13.6/13.0/12.5A	40A	570W (1.95 kBTU/hr)
	2	3/2100	46/44/42/41A	14.4/13.6/13.0/12.5A	60A	860W (2.93 kBTU/hr)
	3	3/2100	62/59/56/53A	14.4/13.6/13.0/12.5A	80A	1145W (3.90 kBTU/hr)
	4	3/2100	77/73/70/67A	14.4/13.6/13.0/12.5A	100A	1430W (4.88 kBTU/hr)
	5	3/2100	93/87/84/80A	14.4/13.6/13.0/12.5A	125A	1720W (5.85 kBTU/hr)
	0	6/4200	31/29/28/27A	28.8/27.2/26.0/25.0A	40A	570W (1.95 kBTU/hr)

Cabinet Size	Optional Chargers	UPS kVA/Watts	Input Current for 208/220/230/240V	Output Current for 208/220/230/240V	Recommended Input Service	Heat Dissipation
	1	6/4200	46/44/42/41A	28.8/27.2/26.0/25.0A	60A	860W (2.93 kBTU/hr)
	2	6/4200	62/59/56/53A	28.8/27.2/26.0/25.0A	80A	1145W (3.90 kBTU/hr)
	3	6/4200	77/73/70/67A	28.8/27.2/26.0/25.0A	100	1430W (4.88 kBTU/hr)
	4	6/4200	93/87/84/80A	28.8/27.2/26.0/25.0A	125A	1720W (5.85 kBTU/hr)
	5	6/4200	102A	28.8/27.2/26.0/25.0A	125A	1995W (6.75 kBTU/hr)
	0	9/6300	46/44/42/41A	43.2/40.8/39.0/37.5A	60A	860W (2.93 kBTU/hr)
	1	9/6300	62/59/56/53A	43.2/40.8/39.0/37.5A	80A	1145W (3.90 kBTU/hr)
	2	9/6300	77/73/70/67A	43.2/40.8/39.0/37.5A	100A	1430W (4.88 kBTU/hr)
	3	9/6300	93/87/84/80A	43.2/40.8/39.0/37.5A	125A	1720W (5.85 kBTU/hr)
	4	9/6300	102A	43.2/40.8/39.0/37.5A	125A	1995W (6.75 kBTU/hr)
	0	12/8400	62/59/56/53A	57.6/54.4/52.0/50.0A	80A	1145W (3.90 kBTU/hr)
	1	12/8400	77/73/70/67A	57.6/54.4/52.0/50.0A	100A	1430W (4.88 kBTU/hr)
	2	12/8400	93/87/84/80A	57.6/54.4/52.0/50.0A	125A	1720W (5.85 kBTU/hr)
	3	12/8400	102A	57.6/54.4/52.0/50.0A	125A	1995W (6.75 kBTU/hr)
	0	15/10500	77/73/70/67A	72.0/68.0/65.0/62.5A	100A	1430W (4.88 kBTU/hr)
	1	15/10500	93/87/84/80A	72.0/68.0/65.0/62.5A	125A	1720W (5.85 kBTU/hr)
	2	15/10500	102A	72.0/68.0/65.0/62.5A	125A	1995W (6.75 kBTU/hr)



Cabinet Size	Optional Chargers	UPS kVA/Watts	Input Current for 208/220/230/240V	Output Current for 208/220/230/240V	Recommended Input Service	Heat Dissipation
	0	18/12600	93/87/84/80A	86.4/81.6/78.0/75.0A	125A	1720W (5.85 kBTU/hr)
	1	18/12600	102A	86.4/81.6/78.0/75.0A	125A	1995W (6.75 kBTU/hr)
	2	18/12600	102A	86.4/81.6/78.0/75.0A	125A	2280W (7.77 kBTU/hr)

**Table 5. Model Specifications for Split-Phase Modules**

Cabinet Size	Optional Chargers	UPS kVA/Watts	Input Current (200V)	Output Current (100/200V, 110/220V, 120/240V)	Recommended Input Service	Heat Dissipation
3-slot	NA	3/2100	18A	30/15A, 27/14A, 25/12.5A	25A	285W (0.98 kBTU/hr)
6-slot	0	3/2100	18A	30/15A, 27/14A, 25/12.5A	25A	285W (0.98 kBTU/hr)
	1	3/2100	32A	30/15A, 27/14A, 25/12.5A	40A	570W (1.94 kBTU/hr)
	2	3/2100	48A	30/15A, 27/14A, 25/12.5A	60A	860W (2.93 kBTU/hr)
	0	6/4200	32A	60/30A, 52/28A, 50/25A	40A	570W (1.95 kBTU/hr)
	1	6/4200	48A	60/30A, 52/28A, 50/25A	60A	860W (2.93 kBTU/hr)
	0	9/6300	48A	90/45A, 81/42A, 75/37.5A	60A	860W (2.93 kBTU/hr)
9- and 12-slot	0	3/2100	18A	30/15A, 27/14A, 25/12.5A	25A	285W (0.98 kBTU/hr)
	1	3/2100	32A	30/15A, 27/14A, 25/12.5A	40A	570W (1.95 kBTU/hr)
	2	3/2100	48A	30/15A, 27/14A, 25/12.5A	60A	860W (2.93 kBTU/hr)
	3	3/2100	64A	30/15A, 27/14A, 25/12.5A	80A	1145W (3.90 kBTU/hr)
	4	3/2100	80A	30/15A, 27/14A, 25/12.5A	100A	1430W (4.88 kBTU/hr)
	5	3/2100	100A	30/15A, 27/14A, 25/12.5A	125A	1720W (5.85 kBTU/hr)
	0	6/4200	32A	60/30A, 52/28A, 50/25A	40A	570W (1.95 kBTU/hr)
	1	6/4200	48A	60/30A, 52/28A, 50/25A	60A	860W (2.93 kBTU/hr)
	2	6/4200	64A	60/30A, 52/28A, 50/25A	80A	1145W (3.90 kBTU/hr)
	3	6/4200	80A	60/30A, 52/28A, 50/25A	100	1430W (4.88 kBTU/hr)
	4	6/4200	100A	60/30A, 52/28A, 50/25A	125A	1720W (5.85 kBTU/hr)
	5	6/4200	102A	60/30A, 52/28A, 50/25A	125A	1995W (6.75 kBTU/hr)

Cabinet Size	Optional Chargers	UPS kVA/Watts	Input Current (200V)	Output Current (100/200V, 110/220V, 120/240V)	Recommended Input Service	Heat Dissipation
	0	9/6300	48A	90/45A, 81/42A, 75/37.5A	60A	860W (2.93 kBTU/hr)
	1	9/6300	64A	90/45A, 81/42A, 75/37.5A	80A	1145W (3.90 kBTU/hr)
	2	9/6300	80A	90/45A, 81/42A, 75/37.5A	100A	1430W (4.88 kBTU/hr)
	3	9/6300	100A	90/45A, 81/42A, 75/37.5A	125A	1720W (5.85 kBTU/hr)
	4	9/6300	102A	90/45A, 81/42A, 75/37.5A	125A	1995W (6.75 kBTU/hr)
	0	12/8400	64A	120/60A, 108/56A, 100/50A	80A	1145W (3.90 kBTU/hr)
	1	12/8400	80A	120/60A, 108/56A, 100/50A	100A	1430W (4.88 kBTU/hr)
	2	12/8400	100A	120/60A, 108/56A, 100/50A	125A	1720W (5.85 kBTU/hr)
	3	12/8400	102A	120/60A, 108/56A, 100/50A	125A	1995W (6.75 kBTU/hr)
	0	15/10500	80A	150/75A, 135/70A, 125/62A	100A	1430W (4.88 kBTU/hr)
	1	15/10500	100A	150/75A, 135/70A, 125/62A	125A	1720W (5.85 kBTU/hr)
	2	15/10500	102A	150/75A, 135/70A, 125/62A	125A	1995W (6.75 kBTU/hr)
	0	18/12600	100A	180/90A, 162/84A, 150/75A	125A	1720W (5.85 kBTU/hr)
	1	18/12600	102A	180/90A, 162/84A, 150/75A	125A	1995W (6.75 kBTU/hr)
	2	18/12600	102A	180/90A, 162/84A, 150/75A	125A	2280W (7.77 kBTU/hr)



## CHAPTER 5

# TROUBLESHOOTING

### Alarm Messages

When the battery charger module is located in a UPS cabinet, the UPS displays alarm messages which involve the battery charger module. Refer to “Troubleshooting” in your UPS user’s guide.

### Audible Alarms and UPS Conditions

When the battery charger module is located in an external battery cabinet, the battery charger module uses an audible alarm feature to alert you of potential power problems. When the alarm is activated, the battery charger module beeps in different intervals according to a particular condition. Use Table 6 to determine and resolve the alarms and conditions.

**Table 6. Battery Charger Module Audible Alarms**

Audible Alarm	Condition	Action
1 short (0.5 sec)	Startup	Nothing. Module is operating normally.
1 short, pause, 2 short	Shorted output error	Call your service representative.
1 short, pause, 3 short	Battery overvoltage error	Call your service representative.
1 short, pause, 4 short	Charger failure	Call your service representative.

### Battery Charger Module Replacement

The battery charger module may be hot-swapped in a manner similar to replacing power modules or battery modules. This feature enables you to replace the module without disconnecting the load or damaging the UPS.

Use care in removing and installing battery charger modules. To replace a battery charger module:

1. Loosen the thumbscrew on the module handle. Press down on the latch release at the center of the module handle and pull the handle down.  
As the module handle fully extends, the module disconnects. Slide the module slowly out of the cabinet.
2. Use two hands to support the module. When fully extended, lower the module front slightly and lift the rear edge over the safety stop on the center support rail.
3. Treat the original and replacement modules with care to avoid damaging connectors or internal circuitry. Label the original module with masking tape or some other identifier. Record the serial number of the replacement module for your warranty.
4. If replacing a battery charger module in an external battery cabinet, verify that the DIP switches on the replacement are set to the same positions as the original.
5. Insert the replacement module by sliding it carefully into the cabinet. Tip the module front down slightly and lift the rear edge over the safety stop on the center support rail. Keep the module handle extended until the module is fully inserted.
6. Push the module in firmly. Raise the battery charger module handle to secure the module into the cabinet. Be sure the handle snaps into place. Tighten the thumbscrew on the handle.

## Service and Support

If you have any questions or problems with the UPS, call your **Local Distributor** or the **Help Desk** at one of the following telephone numbers and ask for a UPS technical representative.

In the United States:	1-800-356-5737 or 1-608-565-2100
Europe, Middle East, Africa:	+44-17 53 608 700
Asia:	+852-2830-3030
Australia:	+61-3-9706-5022

Please have the following information ready when you call the Help Desk:

- Model number
- Serial number
- Version number (if available)
- Date of failure or problem
- Symptoms of failure or problem
- Customer return address and contact information

If repair is required, you will be given a Returned Material Authorization (RMA) Number. This number must appear on the outside of the package and on the Bill Of Lading (if applicable). Use the original packaging or request packaging from the Help Desk or distributor. Units damaged in shipment as a result of improper packaging are not covered under warranty. A replacement or repair unit will be shipped, freight prepaid for all warrantied units.



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**NOTE** For critical applications, immediate replacement may be available. Call the **Help Desk** for the dealer or distributor nearest you.

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