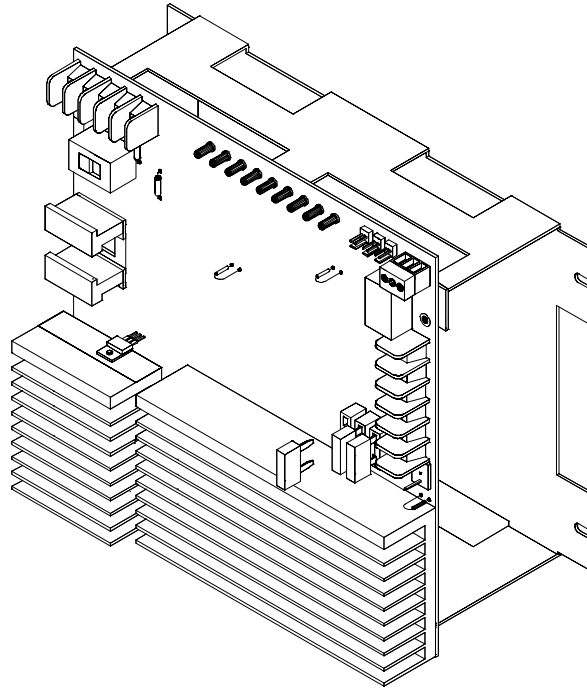




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ADT-CHG-120 Battery Charger

Instruction Manual

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Notes

1. Introduction to the Charger

Overview

The ADT-CHG-120 battery charger is designed to charge lead-acid batteries that provide emergency standby power for a Fire Alarm Control Panel (FACP). Two 12-volt batteries are always used in series to supply 24 VDC nominal. The following list gives answers to some common questions about the charger:

Note: Throughout this manual, the term “charger” refers to a ADT-CHG-120.

- **What types of FACP’s can be used with the charger?** Any 24 VDC FACP that uses lead-acid 25 AH to 120 AH batteries *and* that has the feature to disable the FACP battery charger.
- **Where does the charger mount?** You can mount the charger into a CAB-3 Series Cabinet or into a BB-55 Battery Box.
- **How many outputs does the charger provide?** The charger provides two output circuits for connection to multiple loads (such as a power supply, amplifier, auxiliary amplifier, and so forth).
- **What options are available with the charger?** You can configure the charger to disable the charger’s ground fault detection, to delay AC loss reporting (8 or 16 hours), and to operate with 120 VAC or 240 VAC.
- **How long does it take the charger to charge batteries?** Typically, it takes 9 hours to charge 25 AH batteries, 20 hours to charge 55 AH batteries, and 38 hours to charge 120 AH batteries. Refer to “Specifications” on page 2 for details.

Figure 1 identifies features of the charger:

Note: For detailed descriptions of charger connections, jumpers, and switches, see “Charger Connections, Jumpers, and Switches” on page 4.

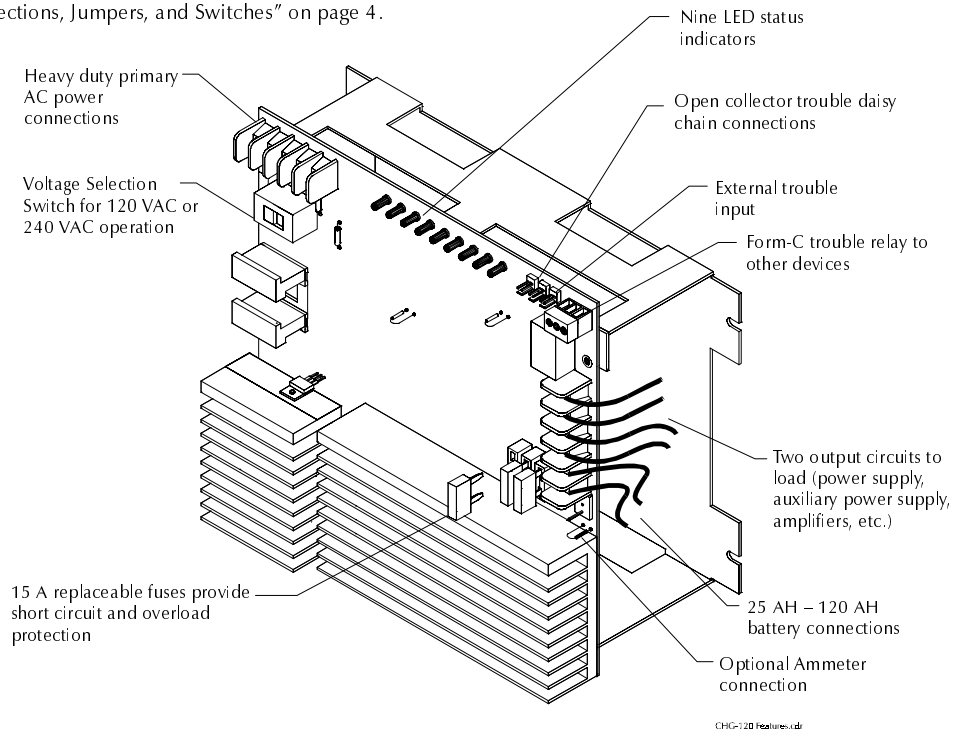


Figure 1 Charger Features

The charger also provides the following features:

- AM-1 ammeter (0-10A) ordered separately
- VM-1 voltmeter (0-50 V) ordered separately
- Disable local ground fault detection
- Selectable loss of AC delay (8 or 16 hours)

Specifications

Table 1 contains electrical specifications for the charger:

Primary AC power in (TB1)	120 VAC, 60 Hz, 2 A 240 VAC, 50 Hz, 1 A
Form-C relay (TB3)	5 A at 30 VDC
Float charge voltage	27.6 VDC
Maximum charging current	4.5 A
Fuses F1-F3 (PN 12057)	15 A
Battery sizes	25 AH to 120 AH
Charging Time (to charge two fully discharged batteries)	25 AH – 9 hours 55 AH/60 AH – 20 hours 120 AH – 38 hours

Table 1 Charger Specifications

Compliance with NFPA Codes and UL Standards

The charger complies with the following standards:

- NFPA 72-1993 National Fire Alarm Code
- UL 864 Standard for Control Units for Fire Alarm Systems and UL 1481 Power Supplies for Fire Alarm Systems
- CAN/ULC-S527-M87

Charger Maintenance

The charger does not require regular maintenance. While installing the charger, however, make sure to maintain proper polarity when connecting power leads and battery connections. To ensure optimal operation of the charger, observe the following:

Overload and reverse-polarity protection Fuses F1, F2 and F3 (15 A, PN 12057) provide overload and reverse-polarity protection. Replace a blown fuse with a fuse with the same rating and type.

Periodic Inspection Periodically inspect the batteries for corrosion and make sure that corrosive effects to the batteries do not affect the charger or cabinet.

Troubleshooting Most problems with a charger are due to faulty batteries or loose connections. If you encounter problems, inspect the charger, the battery, and all connections for loose wiring or short circuits.

Replacing Batteries Only replace batteries with the same charge rate and capacity as other batteries in the set. For example, if replacing one of four 55 AH batteries, make sure the replacement battery has the same charge rate and capacity as the other three batteries.

2. Installing the Charger

Overview

This section contains instructions and illustrations for installing the charger, divided into the following topics:

Section	Topic(s) Covered	Page
Installation Precautions and Standards	Precautions to take when installing the charger and recommended installation standards.	3
Charger Connections, Jumpers, and Switches	Location and references to connections, jumpers, and switches used to configure, maintain, and operate the charger.	4
Connecting AC Power to the Charger	How to connect AC power to the charger.	5
Connecting Batteries to the Charger	How to connect batteries to the charger in two configurations: using two batteries and using four batteries.	6
Mounting the Charger	How to mount the charger to a CAB-3. How to mount the charger to a BB-55.	8
Connecting the Charger to a Load	Instructions and illustrations for wiring a charger to a multiple load and for wiring a charger for a large system installation.	10
Configuring the Charger	Configuring the charger for the following options: Delaying loss of AC reporting (DACT); and Disabling ground fault detection	12
Trouble and Form-C Relay Connections (Optional)	Instructions and illustrations for connecting the following: Open Collector Trouble In (JP5) Trouble Out (JP4) Master Trouble In (JP6) Form-C Trouble Relay (TB3)	13
Installing Optional Meters	How to install an optional ammeter, voltmeter, or both.	14

Table 2 Installation Topics

Installation Precautions and Standards



Battery Precautions When installing the charger, observe the following precautions:

- Observe polarity when making connections.
- Do not connect the Battery Interconnect Cable until instructed.
- Batteries, although sealed, contain hazardous acid chemicals.
- Charging batteries can cause flammable hydrogen gas.
- Take care when handling batteries: batteries are heavy—take care in lifting and handling them.
- Mounting batteries requires proper mounting hardware. Follow the battery manufacture's installation instructions

Installation Standards An installer should be familiar with the following standards:

- NEC Article 300 Wiring Methods.
- NEC Article 760 Fire Protective Signaling Systems.
- Applicable Local and State Building Codes.
- Requirements of the Authority Having Jurisdiction.

Charger Connections, Jumpers, and Switches

Figure 2 shows all connections, jumpers, and switches needed to maintain, configure, and operate the charger:

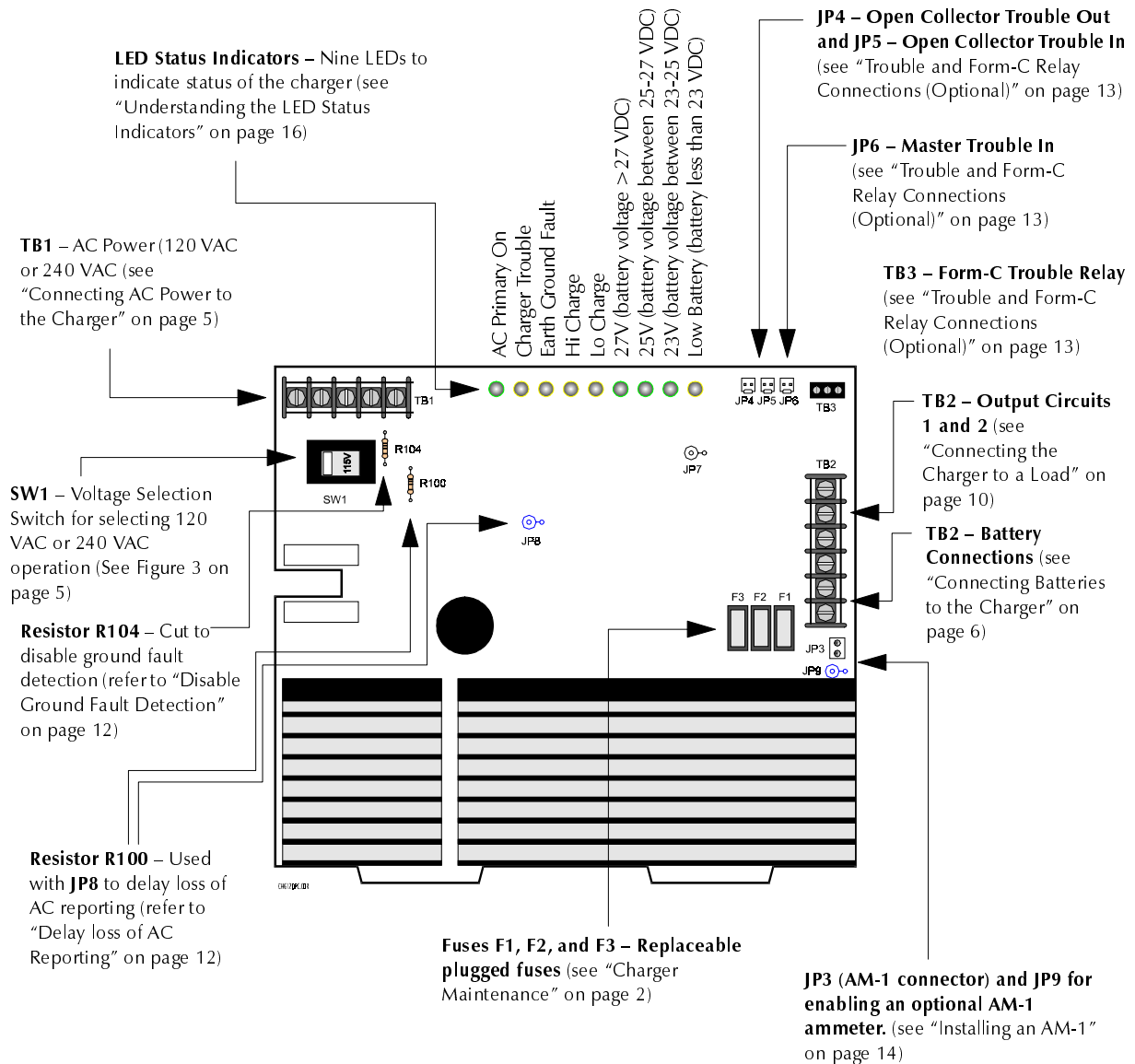
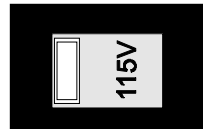


Figure 2 Charger Connections, Switches, and Jumpers

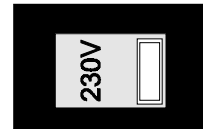
Connecting AC Power to the Charger

Caution: Before connecting AC power to the charger—make sure to set the Voltage Select Switch (SW1) on the charger (Figure 2) to match your AC power source (120 VAC or 240 VAC). Figure 3 shows the voltage selection positions for SW1:

Note: The charger is rated for 120 VAC or 240 VAC operation. Therefore, 115V on SW1 indicates 120 VAC operation; and 230V, indicates 240 VAC operation.



SW1
SW1 set to 120 VAC operation



SW1
SW1 set to 240 VAC operation

Figure 3 Using SW1 to Select AC Voltage

Figure 4 shows the steps for connecting the charger to the main AC power source.

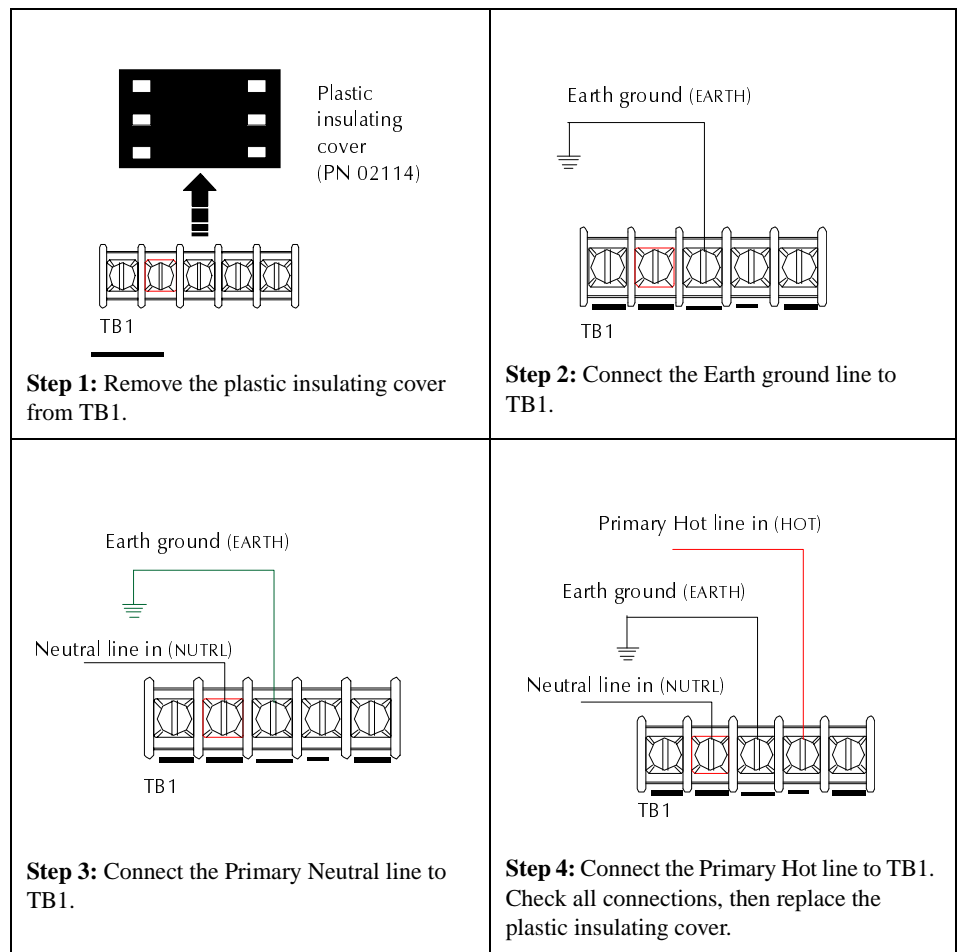


Figure 4 Connecting AC Power to the Charger

Connecting Batteries to the Charger

Overview you can connect 25 AH –120 AH batteries to the charger. This section provides illustrations and instructions for connecting two batteries or for connecting four batteries.

Connecting Two Batteries Figure 5 shows how to connect two 25 AH batteries to the charger:

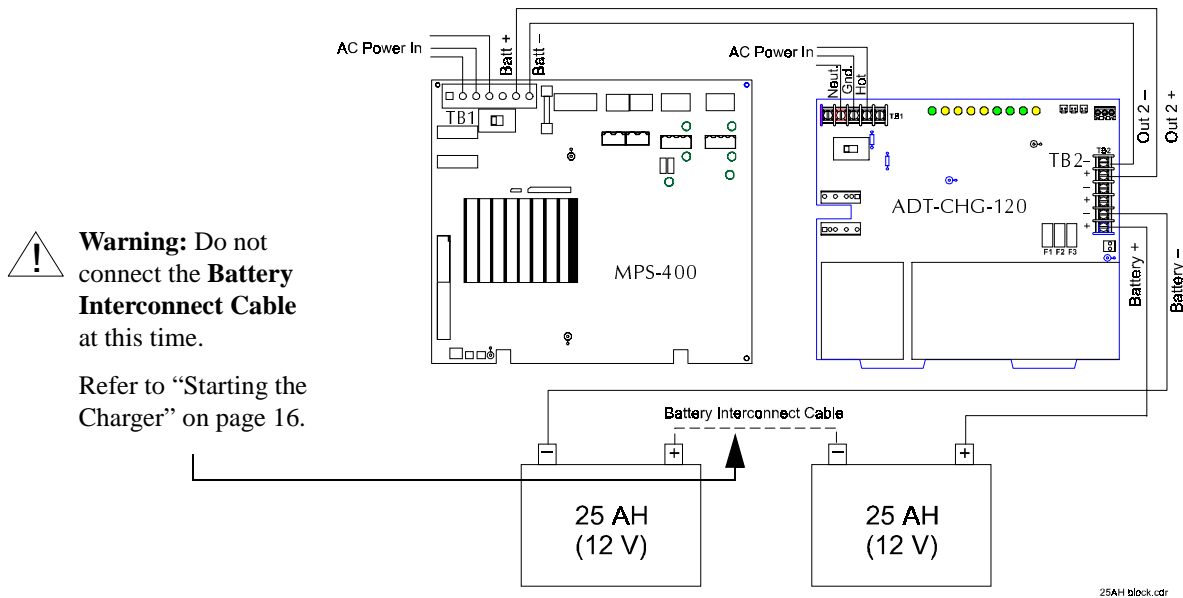


Figure 5 Connecting 25 AH Batteries

Table 3 contains instructions for connecting batteries to the charger:

Step	Action
1	Remove all power sources to the charger.
2	Connect the battery negative cable to the TB2 terminal (on the charger labeled “Battery -” as shown in Figure 5.
3	Connect the battery positive cable to the TB2 terminal (on the charger) labeled “Battery +” as shown in Figure 5.
4	Proceed to the section “Connecting the Charger.” <i>Do not connect the Battery Interconnect Cable at this time</i> —refer to “Starting the Charger” on page 16.

Table 3 Connecting 25 AH Batteries

Connecting Four Batteries Figure 6 shows how to connect four 55 AH batteries to the charger:



Warning: Do not connect the **Battery Interconnect Cable** at this time.

Refer to “Starting the Charger” on page 16.

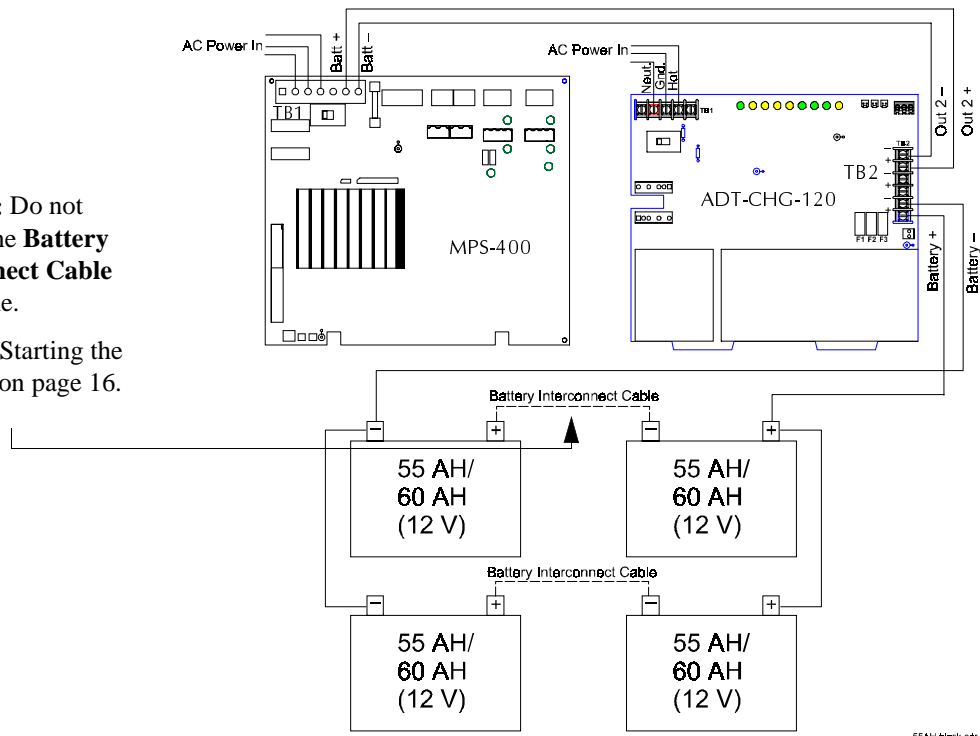


Figure 6 Connecting Four Batteries to a Charger

Table 4 contains instructions for connecting four batteries to the charger:

Step	Action
1	Remove all power sources to the charger.
2	Tie the batteries in pairs by connecting the battery negative terminals and the battery positive terminals as shown in Figure 6.
3	Connect the battery negative cable to the TB2 terminal (on the charger labeled “Battery -”) as shown in Figure 6.
4	Connect the battery positive cable to the TB2 terminal (on the charger) labeled “Battery +” as shown in Figure 6.
5	Proceed to the section “Connecting the Charger.” <i>Do not connect the Battery Interconnect Cable at this time</i> —refer to “Starting the Charger” on page 16.

Table 4 Connecting 55 AH Batteries

Mounting the Charger

Mounting the Charger into a CAB-3 Series Cabinet You can mount a charger into the bottom row of a CAB-3 Series Cabinet, as long as the charger is within 20 feet of the load. Typically, a charger mounts into the lower right corner of the CAB-3—beside the power supply (Figure 7, position 2). If using an additional CAB-3, you can mount the charger in the lower left corner (Figure 7, position 2). Figure 7 shows the two mounting positions of a charger into a CAB-3.

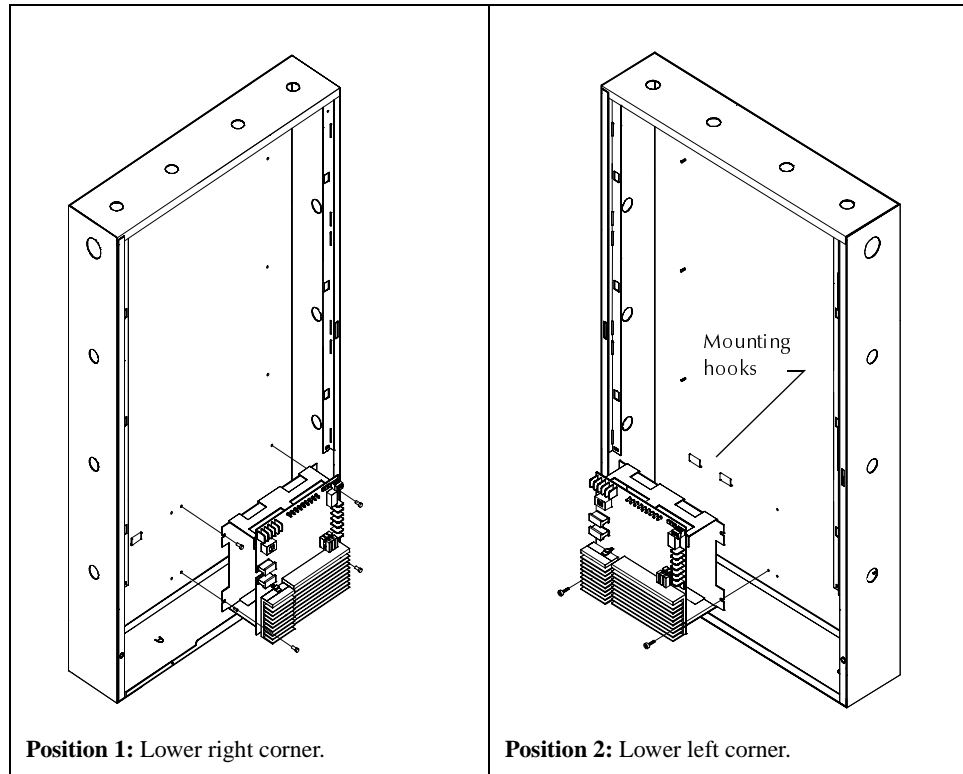


Figure 7 Mounting a Charger into a CAB-3 Series Cabinet (CAB-C3 shown)

To mount a charger into a CAB-3 Series Cabinet, follow these instructions:

Step	Action
1	Place the charger chassis mounting slots in line with the mounting holes in the cabinet. If mounting in position 2, place the charger chassis onto the mounting hooks in the cabinet.
2	Insert the self-tapping screws through the charger chassis mounting slots and into the mounting holes in the cabinet.
3	Tighten the self-tapping screws.

Mounting the Charger into a BB-55 Battery Box You can also mount a charger into a BB-55 battery box, as long as the BB-55 is within 20 feet of the load. Note that a charger takes up half the space of the BB-55. This means you only have room left for two 25 AH batteries in the BB-55. Figure 8 shows the mounting position of a charger in a BB-55.

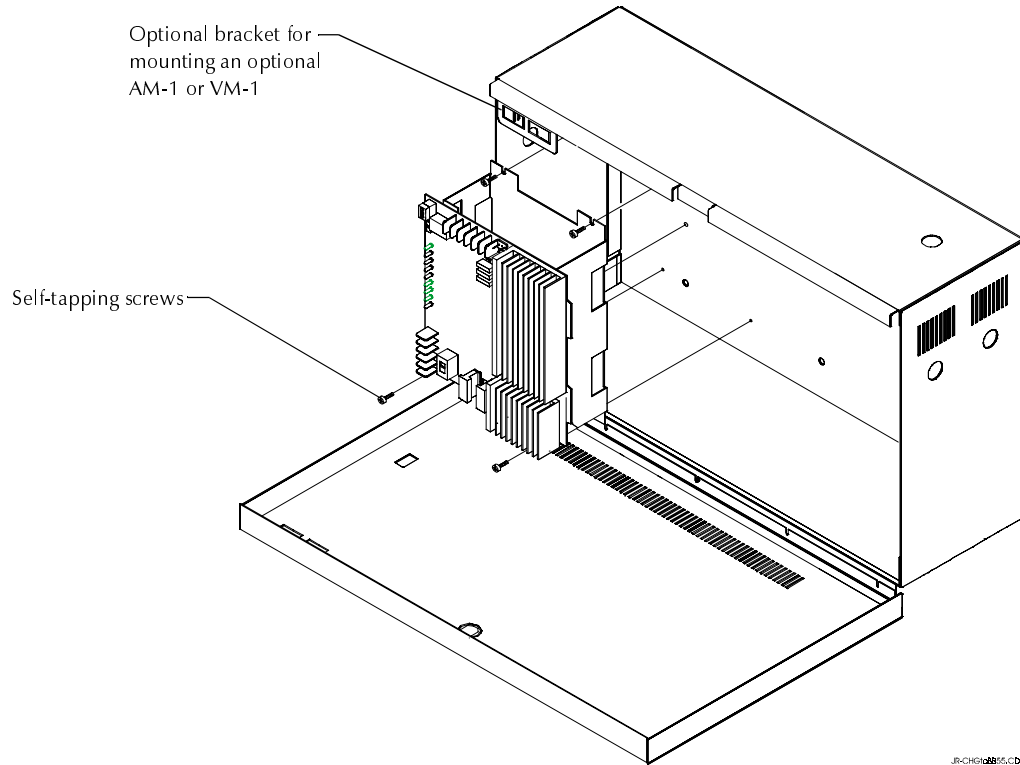


Figure 8 Mounting a Charger into a BB-55

To mount a charger into a BB-55 battery box, follow these instructions:

Step	Action
1	Place the charger chassis mounting slots in line with the mounting holes in the BB-55.
2	Insert the self-tapping screws through the charger chassis mounting slots and into the mounting holes in the BB-55.
3	Tighten the self-tapping screws.

Connecting the Charger to a Load

This section provides two applications for connecting a charger to a load. While connecting a charger to a load, observe the following precautions:

- Make sure all power sources are off to the charger and the load.
- Follow polarity when making connections.

Connecting the Charger to a Multiple Load You can connect a charger to multiple loads, such as a main power supply, auxiliary power supply, amplifiers, and so forth, as shown in Figure 9.

Note: Figure 10 shows a wiring diagram for tying the load to battery terminals to obtain additional current. For example, the first AA-120 draws 7 A, the daisy-chained AA-30s draw 7 A, and the second AA-120 draws 7 A of additional current from the batteries.

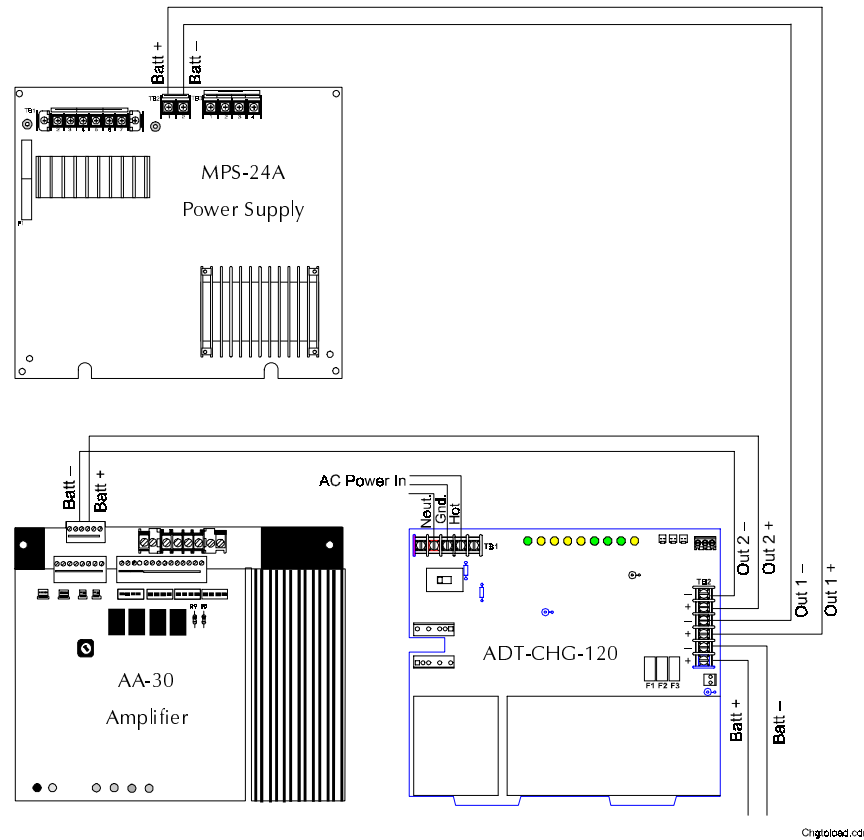
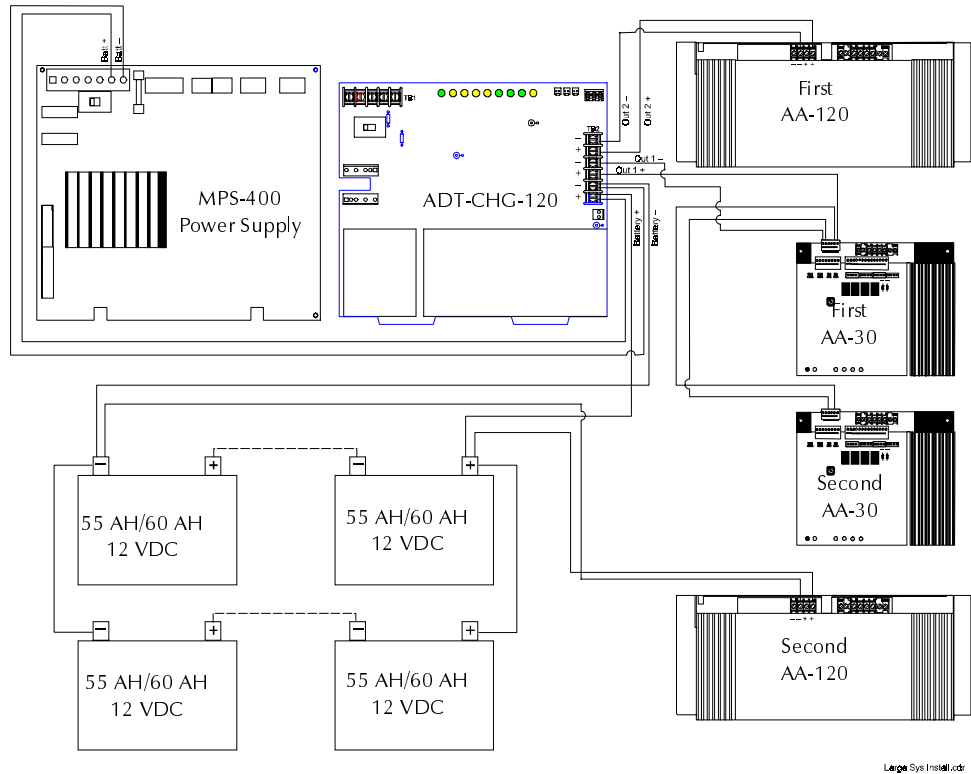


Figure 9 Typical Wiring for a Charger to a Multiple Load

To connect a charger as shown in Figure 9, follow these steps:

Step	Action
1	Connect the battery+ and battery- terminals of the power supply to the charger output circuit (TB2: Out 1+ and Out 1-) as shown in Figure 9.
2	Connect the battery+ and battery- terminals of the amplifier to the charger output circuit (TB2: Out 2+ and Out 2-) as shown in Figure 9.
3	Connect the batteries to the charger (for battery connections see Figure 5 or Figure 6).

Connecting the Charger for Additional Current You can draw 10 A maximum from each charger output—with a maximum current draw of 45 A of alarm current from the charger. To draw additional current from the charger, you can connect a load directly to the batteries as shown in Figure 10:



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Figure 10 Typical Connections for Drawing Additional Current

To connect a charger as shown in Figure 10, follow these steps:

Step	Action
1	Connect the Battery+ and Battery– terminals of the power supply to the charger Battery output (TB2: Batt 1+ and Batt 1–) as shown in Figure 10.
2	Connect the Battery+ and Battery– terminals of the first AA-120 to the charger output circuit (TB2: Out 2+ and Out 2–) as shown Figure 10.
3	Connect the Battery+ and Battery– terminals of the first AA-30 to the charger output circuit (TB2: Out 1+ and Out 1–) as shown in Figure 10.
4	Connect the Battery+ and Battery– terminals of the second AA-30 to the Battery+ and Battery– terminals of the first AA-30 as shown in Figure 10.
5	Connect the Battery+ and Battery– terminals of the second AA-120 to the batteries as shown in Figure 10.
6	Connect the batteries to the charger.

Configuring the Charger

You can configure the charger to do the following:

- Set the charger input power (see Figure 3 on page 5).
- Delay AC loss reporting (for Central Station applications); and
- Disable charger ground fault detection.

Figure 11 shows how to configure the charger for delaying the loss of AC reporting and for disabling ground fault detection:

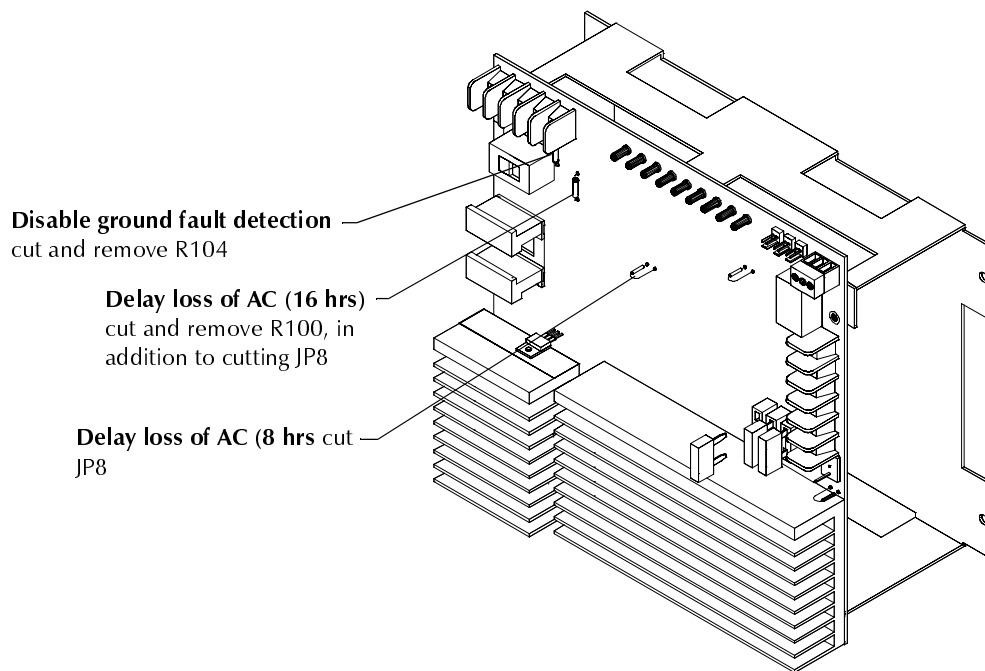


Figure 11 Configuring the Charger

Delay loss of AC Reporting If using a Digital Alarm Communicator (DACT), you must delay the reporting of an AC loss condition to a central station. This delays activation of the trouble bus and Form-C trouble contacts when AC fails. You can configure the charger for an 8-hour or a 16-hour delay as follows:

- 8-hour delay – Cut and remove jumper JP8 on the charger (Figure 11).
- 16-hour delay – Cut jumper JP8; then, cut and remove resistor R100 (Figure 11).

Disable Ground Fault Detection To disable local (charger) earth fault detection, cut and remove resistor R104 (Figure 11). Figure 12 contains a simplified block diagram that shows ground fault detection disabled on a charger connected to multiple power supplies:

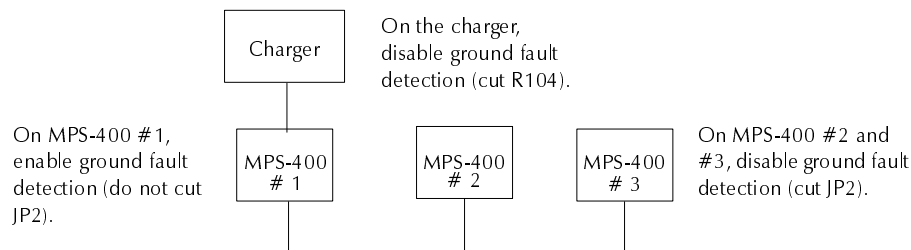


Figure 12 Disabling Ground Fault Detection

Trouble and Form-C Relay Connections (Optional)

Table 5 contains descriptions of optional connectors on the charger:

Function	Connector
Use open collector input and output to daisy chain a trouble signal through the charger without affecting charger operation.	JP5 Open Collector Trouble In JP4 Open Collector Trouble Out
Receive trouble signals from another device, such as a M500CH.	JP6 Master Trouble In
Transmit a charger trouble signal to another device.	TB3 Form-C Trouble Relay

Table 5 Charger Trouble and Form-C Relay Connections

Figure 13 shows charger trouble and Form-C relay connections:

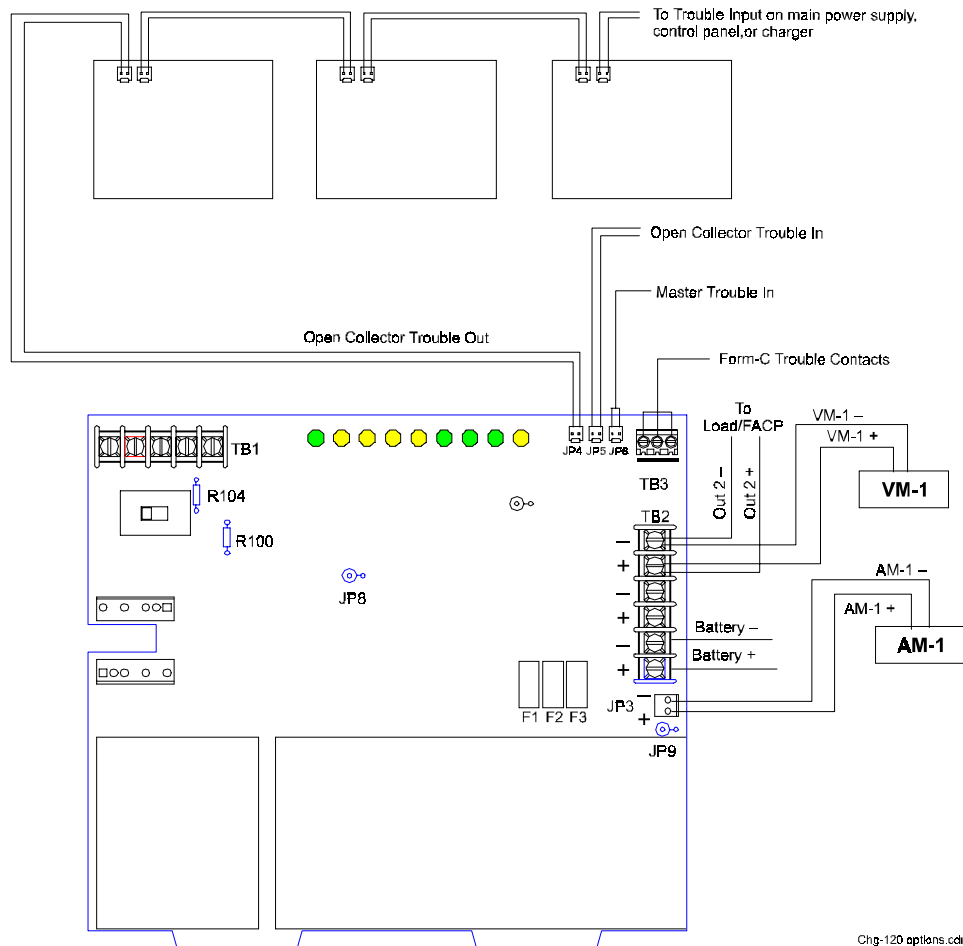


Figure 13 Connections for Optional Devices

Installing Optional Meters

You can also order and install a ammeter (AM-1), voltmeter (VM-1), or both (MPM-3) for use with the charger. If mounting an AM-1 or a VM-1, mount the meter to a BB-55 as shown in Figure 14. If mounting an MPM-3, mount to a power supply (Figure 15) installed in a CAB-3. Table 6 contains descriptions and part numbers for these optional meters:

Item	Part Number	Description
Ammeter	AM-1	0-10 A ammeter with a 3-ft. cable for connection to the charger (JP3). Mounts into a BB-55 battery box only.
Voltmeter	VM-1	0-50 V voltmeter with 3-ft. positive and negative leads for connection to the charger output circuit. Mounts into a BB-55 battery box only.
Ammeter and Voltmeter Assembly	MPM-3	An AM-1 and VM-1 attached to a mounting bracket. Mounts onto a power supply.

Table 6 Optional Meters

Installing an AM-1 To install an AM-1, follow these steps:

1. Cut jumper JP9 on the charger (Figure 13).
2. Connect the AM-1 harness to JP3 on the charger (Figure 11)—making sure to observe proper polarity.
3. Mount the AM-1 into a mounting slot on the front of the BB-55 (Figure 14):

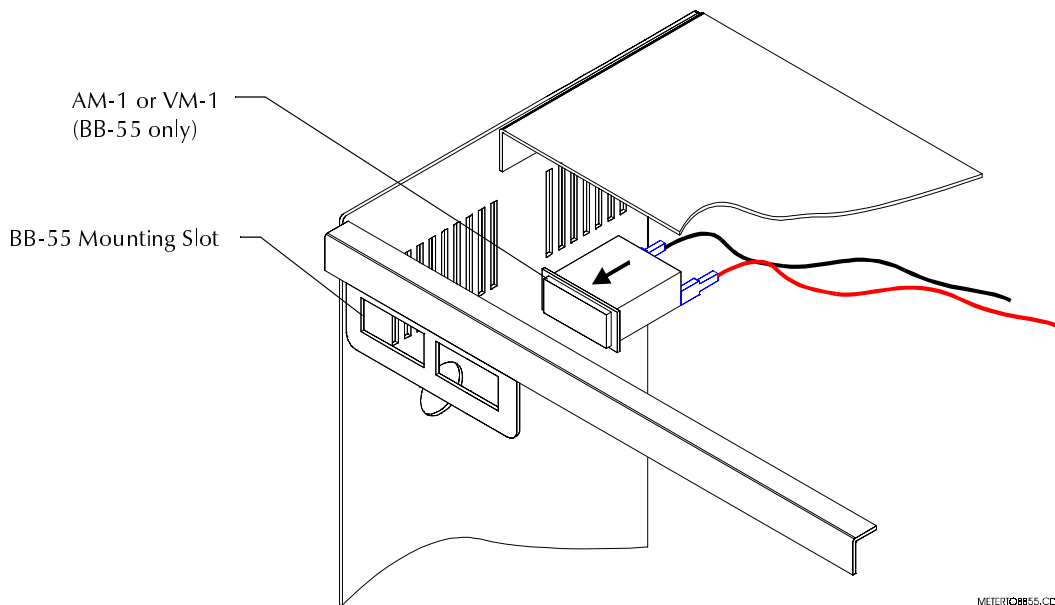


Figure 14 Mounting an AM-1 or VM-1 to a BB-55 Battery Box

Installing a VM-1 You can connect a VM-1 across a charger output circuit. For example, to install a VM-1 to measure voltage from charger output circuit 1, follow these steps:

1. Connect the positive lead to TB2 Out 1 (+). See Figure 13.
2. Connect the negative lead to TB2 Out 1 (-). See Figure 13.
3. Mount the VM-1 into a mounting slot on the front of the BB-55 battery box.

Installing an MPM-3 To install an MPM-3, follow these steps:

1. Connect the AM-1 (Figure 13).
2. Connect the VM-1 (Figure 13).
3. Mount the MPM-3 onto a power supply connected to your system, such as an MPS-400 or MPS-24A (Figure 15).

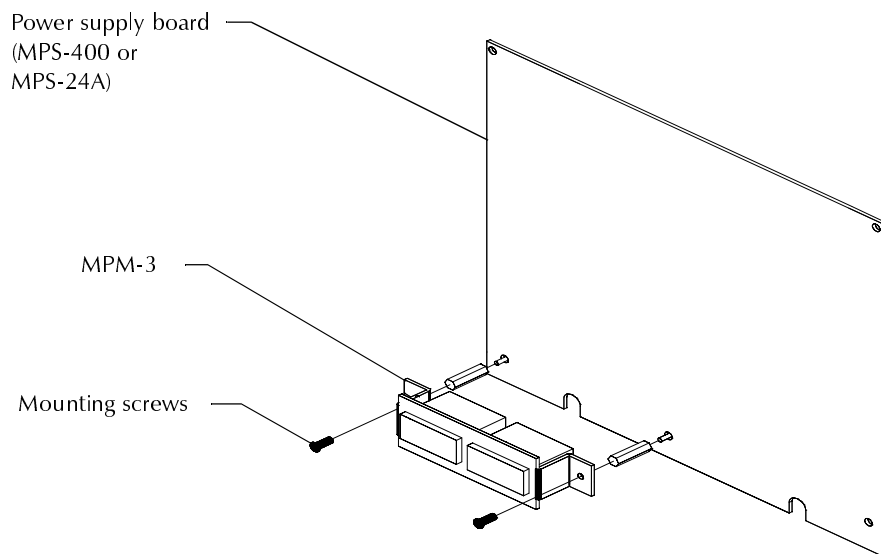


Figure 15 Mounting an MPM-3

3. Operating the Charger

Overview

This section contains information on starting the charger, interpreting the LED Status Indicators on the charger, and normal operation of the charger.

Starting the Charger



Warning: Before starting the charger, do the following:

- Follow the installation instructions in Section 2, “Installing the Charger.”
- Verify proper polarity on all connections between the charger and the batteries, load, and optional meters.
- Make sure there are no short circuits between leads and between battery terminals.
- Make sure the Battery Interconnect Cable(s) is not connected.

To start the charger, follow these steps:

1. Connect AC power to the charger. The AC On LED and Trouble LED go on.
2. Connect the batteries to the charger
3. Connect the Battery Interconnect Cable. The Trouble LED goes off.
4. Connect the charger to the load (such as a power supply, an amplifier, and so on).

Understanding the LED Status Indicators

The charger provides nine LED Status Indicators, which are identified in Figure 16. Also refer to Table 7 for conditions, such as troubles, that cause LEDs to light.

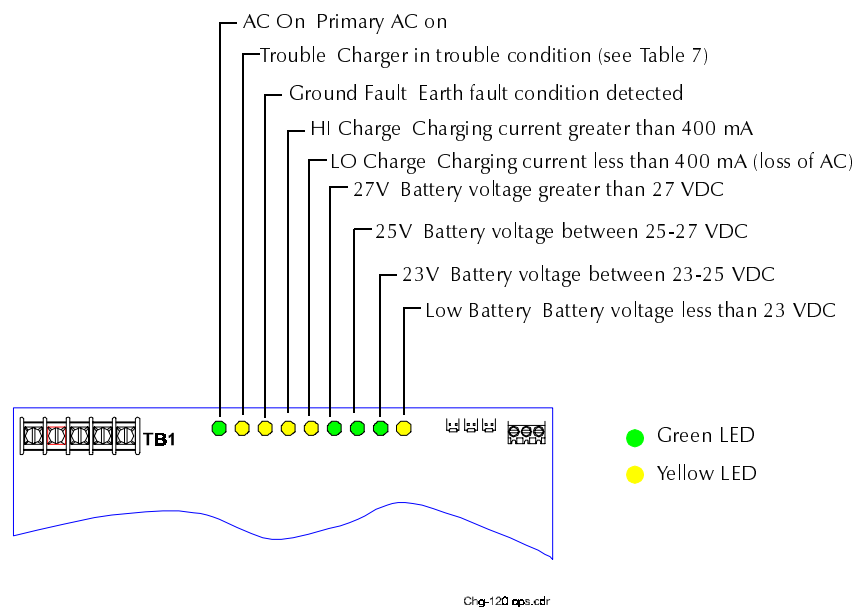


Figure 16 LED Status Indicators

Table 7 shows the conditions that cause the charger LEDs to come on:

LED	Normal Operation	AC Trouble	Disconnected Battery	Ground Fault	Short Circuit	Faulty Battery (or less the 21 V)	Trouble (with AC Trouble Delay used)	Trouble (Master Trouble In JP6 connected)
AC On	★		★	★	★	★		★
Trouble		★	★	★	★	★	★	★
Ground Fault				★				
HI Charge	☆	☆		☆		☆		☆
LO Charge (Loss of AC)	☆	★	★	☆		☆	★	☆
27 V	☆	☆	★	☆			☆	☆
25 V	☆	☆		☆			☆	☆
23 V	☆	☆		☆			☆	☆
Low Battery	☆	☆		☆	★	★	☆	☆
Legend: ★ LED on. ☆ LED on or off, depending on battery voltage. Refer to "Normal Operation."								

Table 7 LED Status Indicators

Normal Operation

The ADT-CHG-120 charges batteries at 4.5 A. When batteries are fully charged, the charger maintains a float charge of 27.6 VDC at a trickle charge rate of less than 400 mA. While charging the batteries, the HI and LO Charge LEDs switch on and off approximately every 20 seconds. Also, one of the 23 V, 25 V, 27 V, or Low Battery LEDs also comes on, depending on the battery voltage.

Notes