

LINE AMPS	DISCONNECT SWITCH *	BRANCH FUSE SIZE (AMPERES)	COPPER CABLE SIZE AWG **	
			POWER	GROUND
0-2.5	30A	5	No. 14	No. 14
2.6-4.5	30A	7	No. 14	No. 14
4.6-7.5	30A	10	No. 14	No. 14
7.6-12	30A	15	No. 14	No. 14
12.1-16	30A	20	No. 12	No. 12
16.1-18	30A	25	No. 10	No. 10
18.1-22	30A	30	No. 10	No. 10
22.1-24.5	60A	35	No. 8	No. 10
24.6-32.5	60A	40	No. 8	No. 10
32.6-40	60A	50	No. 8	No. 10
40.1-45	60A	60	No. 6	No. 10
45.1-57.5	100A	80	No. 4	No. 8
57.6-78	100A	100	No. 2	No. 8
78.1-102.5	200A	125	No. 2	No. 6
102.6-135	200A	150	No. 1/0	No. 6

Table 4-1 Recommended AC Input and Branch Fusing

The above table (Table 4-1) is based on 75°C (167°F) rated conductors and 40°C (104°F) ambient temperatures. Refer to National Electrical Code (1999) Tables 310-16 corrected to 40°C (104°F).

* For 115, 208, and 230-volt lines, use 250-volt disconnect switch.
For 440-480, 575-volt lines, use 600-volt disconnect switch.

** Two conductors and ground conductor required for single phase.
Three conductors and ground conductor required for three phase.

Recommended minimum size of grounding conductors (based on National Electrical Code 1999 – Table 250-95).

Line Voltage Changeover Instructions

1. Determine if the charger is connected for available line voltage. A label located near AC input terminals is marked with the AC voltage for which the charger is factory connected.
2. If charger is not connected correctly, check serial nameplate to determine that charger is equipped to be connected for available line voltage. If charger is suitably equipped, make voltage changeover connections by following instructions on AC INPUT label inside charger.
3. If charger is reconnected, check input fuse (s) ratings with ratings specified on label and replace if necessary.

CAUTION: INCORRECT CONNECTIONS AND INCORRECT FUSE SIZE can damage this equipment. Follow voltage changeover instructions carefully.

Line Connections to Battery Charger

Follow local code requirements if different than instructions in this manual.

1. Turn charger OFF.
2. Be sure charger is connected correctly for available line voltage as instructed above.
3. On charger nameplate, note the AC input amperes corresponding to the line voltage to which charger is to be connected. Use that ampere value to select the proper disconnect switch, fuse, and power cable sizes from Table 4-1. A “WARNING” label inside charger also lists fuse sizes for each line voltage (circled fuse rating is required for internal line voltage connections made at factory).

4. Route AC power input cable in through knock-out provided in side panel of charger cabinet. Securely fasten cable wires to a power input terminal inside charger. Refer to Grounding section of this manual for proper connection of grounding conductor. (Charger cabinet top or side panel, or both, may have to be removed to provide access to terminal block.)
5. With disconnect switch (on AC input power line) in "OPEN" or "OFF" position, connect power cable coming from charger, to the switch. Install fuses in switch.

Charging Cable Connectors

If connectors are already attached to charging cables, make sure that they're attached so that positive charger polarity will connect to positive battery terminal.

If connectors must be attached to charging cables, follow instructions supplied with connectors.

CAUTION: Make sure connectors are securely attached to cables (good solder joint or well tightened set screws, whichever is applicable). Be certain that positive charger cable will connect to positive battery terminal. If necessary, trace cables into charger and use supplied connection diagram to determine polarity. The use of a DC voltmeter may show polarity. Improper connections will "blow" output fuse and may cause other damage.

Note: If this charger is equipped with certain optional features, the connector attaching procedure may be modified. Refer to OPTIONS chapter of this manual for details.

Pre-operation Checks

1. Inspect charger thoroughly for damage; loose screws, nuts, or electrical connections.

WARNING: ELECTRICAL SHOCK HAZARD – Before inspecting or cleaning inside cabinet, turn OFF and remove fuses of disconnect switch (supplying AC power to charger), disconnect battery, and check for voltage on capacitors. Discharge through insulated screwdriver if there is any reading.

2. Remove all special tags that are tied to charger. Keep tags with this manual for future reference. Leave all precautionary and instruction labels in place on charger. Carefully read and follow instructions on all tags and labels. Make sure all labels remain visible to anyone operating charger.
3. Make sure all charger cabinet panels are fastened in place, to assure proper flow of ventilating air through cabinet.

OPERATION

Preliminary

1. Make sure that charger is installed and grounded as instructed in this manual.
2. Make sure the charge control is set to the proper cell size via the charge control DIP switch cell selector.
3. Turn on main fused disconnect switch that supplies AC power to charger.
4. Maintain electrolyte level in batteries to be charged, as instructed by battery manufacturer. The volume of electrolyte will expand during the charge. Therefore, to avoid overfilling, do not add water until the battery has received at least an 80% charge. This will usually be reached at the time gassing starts.

Normal or Daily Charge

WARNING: DO NOT connect a battery to this charger if any LED is lit. Do not disconnect a battery from this charger while a charge is in progress; otherwise, arcing and burning of connector parts or a battery explosion may result. Batteries produce explosive gases. Keep sparks, flame and cigarettes away. Ventilate when charging in an enclosed area. Always shield eyes when working near batteries.

1. Insure that battery size matches the charger. (Number of cells and ampere-hour capacity are within charger nameplate rating.)
2. Securely engage the battery and charger connectors.
3. After a 5 second delay (all LED's will be lit), the charger will turn on. The "Charge in Progress" LED will indicate charging current.
4. The "80% Charged" LED will light when the battery on charge reaches the 80% charged voltage.
5. The charger will automatically turn off and the "Charge Complete" LED will light when the charge has finished. The light will remain on until the battery is disconnected from the charger.

NOTE: To disconnect battery from charger before charge is complete, first press the STOP key, then disconnect the battery from the charger.

Equalize or Weekend Charge

The AC500 features Auto Equalize every 5th charge cycle. Closing S1-9 disables the auto equalize feature; and an equalize charge request can be performed by pressing the "Equalize" push-button on the control front panel. When Auto Equalize is enabled (S1-9 is open), then the "Equalize" push-button cannot be used to request an equalize charge. The AC500 is shipped with auto equalize feature enabled. With auto equalize disabled, an equalize charge can be selected or de-selected for any charge cycle using the sequence below.

1. Insure that battery size matches the charger. (Number of cells and ampere-hour capacity are within charger nameplate rating.)
2. Securely engage the battery and charger connectors.
3. After a 5 second delay (all LED's will be lit), the charger will turn on. The "Charge in Progress" LED will indicate charging current.
4. Press the "Equalize" key. The "Equalize" LED will light solid. Press the key again to cancel the equalize charge.

NOTE: The equalize charge cannot be cancelled once the battery reaches the equalize charging period. Press the STOP key to terminate the charge.

5. The "80% Charged" LED will light when the battery on charge reaches the 80% charged voltage.
6. The battery reaches the normal termination point (pT/dV/dT or VT). However, the battery is charged another 3 hours. The "Equalize" LED will flash during this equalize period.
7. The charger will automatically turn off, and the "Charge Complete" and the "Equalize" LED will light when the equalized charge has finished. The LED's will remain on until the battery is disconnected from the charger.

WARNING: DO NOT connect a battery to this charger if any LED is lit. Do not disconnect a battery from this charger while a charge is in progress; otherwise, arcing and burning of connector parts or a battery explosion may result. Batteries produce explosive gases. Keep sparks, flame and cigarettes away. Ventilate when charging in an enclosed area. Always shield eyes when working near batteries.

Manual Stop

1. To turn the charger off during any part of a charge cycle, press the STOP key. All four LEDs will flash.
2. To restart the charger, disconnect and reconnect the battery. A new charge cycle will begin.

Battery Discrimination

The AC500 Control has the ability to reject batteries with cell sizes that do not match the cell size that the control is set up for (via DIP switch S1-1 through S1-6). If the battery connected to the charger has an average terminal voltage of greater than 2.30 volts/cell, the charger will not start and all 4 LEDs will flash, then the "Charge in Progress" LED will flash (high battery fault indication). If the battery voltage eventually falls below 2.30 volts/cell, the control will begin a normal charge sequence.

If the battery connected to the charger has an average terminal voltage of less than 1.75 volts/cell, the charger will not start and all 4 LEDs will flash, then the "80% Charged" LED will flash (low battery fault indication). If the battery voltage eventually rises above 1.75 volts/cell, the control will start a normal charge sequence. If the battery connected to the charger has a terminal voltage of less than 1.75 volts/cell and the operator wishes to start the charge regardless of this low battery voltage, the charge cycle will start if both the EQUALIZE and the STOP keys are held pushed in until all LEDs go out (approximately 5 seconds). Release the key at this time.

Refresh Charge

In order to guarantee that a fully charged battery is always ready for use, a "Refresh" feature has been incorporated into the AC500 Control. If a battery is left connected to the charger for 72 hours after a "Charge Complete" has been reached, the AC500 will start a charge sequence. The running time of this "Refresh" charge will depend on the depth of self-discharge of the battery.

Backup Timer Shutdown

A backup timer will shut down the charger and all 4 LEDs will flash then the "Charge Complete" LED will flash if the battery on charge does not reach the 80% voltage during the first 10 hours of charging.

Likewise, if the AC500 Control is set to terminate via the pT/dV/dT methodology (DIP switch S1-8 off) and the charger does not reach the termination point within 5 hours after reaching the 80% charged voltage, all 4 LEDs will flash then the "Charge Complete" LED will flash.

WARNING: DO NOT connect a battery to this charger if any LED is lit. Do not disconnect a battery from this charger while a charge is in progress. Otherwise, arcing and burning of connector parts or a battery explosion may result. Batteries produce explosive gases. Keep sparks, flame, and cigarettes away. Ventilate when charging in an enclosed area. Always shield eyes when working near batteries.

Battery Disconnect Shutdown

If the battery is disconnected from the charger during a charge cycle, the charger will be shutdown. All LEDs will be off.

Low Current Shutdown

If the charger output current falls below a predetermined level, a low current shutdown will occur. All 4 LEDs will flash, then the "Equalize" LED will flash.

AC POWER FAIL

During an AC power failure, the AC500 Control stores key information about the charge cycle. The information is retained by powering some of the control's key components with a battery derived power supply. This causes the control to resume the charge where it left off when the AC power is returned, unaffected timers and equalize requests.