

Palomino

BATTERY CHARGERS



Installation and Operating Instructions

*One Technology Place
Caledonia, New York 14423*

The Power of Excellence

FM1320 REV - B

IMPORTANT SAFETY INSTRUCTIONS
INSTRUCTIONS IMPORTANTES CONCERNANT LA SECURITE

1. SAVE THESE INSTRUCTIONS. THIS MANUAL CONTAINS IMPORTANT SAFETY AND OPERATING INSTRUCTIONS;

CONSERVER CES INSTRUCTIONS. CE MANUEL CONTIENT DES INSTRUCTIONS IMPORTANTES CONCERNANT LA SECURITE ET LE FONCTIONNEMENT;

2. WORKING IN THE VICINITY OF A LEAD-ACID BATTERY IS DANGEROUS. BATTERIES GENERATE EXPLOSIVE GASSES DURING NORMAL BATTERY OPERATION. FOR THIS REASON IT IS OF THE UTMOST IMPORTANCE THAT EACH TIME BEFORE USING YOUR CHARGER, YOU READ AND FOLLOW THE INSTRUCTIONS PROVIDED EXACTLY;

IL EST DANGEREUX DE TRAVAILLER A PROXIMITE D'UNE BATTERIE AU PLOMB. LES BATTERIES PRODUISENT DES GAS EXPLOSIFS EN SERVICE NORMAL. AUSSI EST-IL IMPORTANT DE TOUJOURS RELIRE LES INSTRUCTIONS AVANT D'UTILISER LE CHARGEUR ET DE LES SUIVRE A LA LETTRE;

3. TO REDUCE RISK OF BATTERY EXPLOSION, FOLLOW THESE INSTRUCTIONS AND THOSE ON THE BATTERY;

POUR REDUIRE LE RISQUE D'EXPLOSION, LIRE CES INSTRUCTIONS ET CELLES QUI FIGURENT SUR LA BATTERIE;

4. NEVER SMOKE OR ALLOW AN OPEN SPARK OR FLAME IN THE VICINITY OF THE BATTERY OR ENGINE;

NE JAMAIS FUMER PRES DE LA BATTERIE OU DU MOTEUR ET EVITER TOUTE ETINCELLE OU FLAMME NUE A PROXIMITE DE CES DERNIERS.

5. USE CHARGER FOR CHARGING A LEAD-ACID BATTERY ONLY. IT IS NOT INTENDED TO SUPPLY POWER TO AN EXTRA LOW-VOLTAGE ELECTRICAL SYSTEM OR TO CHARGE DRY-CELL BATTERIES. CHARGING DRY-CELL BATTERIES MAY CAUSE THEM TO BURST AND CAUSE INJURY TO PERSONS AND DAMAGE TO PROPERTY;

UTILISER LE CHARGEUR POUR CHARGER UNE BATTERIE AU PLOMB UNIQUEMENT. CE CHARGEUR N'EST PAS CONCU POUR ALIMENTER UN RESEAU ELECTRIQUE TRES BASSE TENSION NI POUR CHARGER DES PILES SECHES. LE FAIT D'UTILISER LE CHARGEUR POUR CHARGER DES PILES SECHES POURRAIT ENTRAINER L'ECLATEMENT DES PILES ET CAUSER DES BLESSURES OU DES COMMAGES.

6. NEVER CHARGE A FROZEN BATTERY;

NE JAMAIS CHARGER UNE BATTERIE GELEE.

7. DO NOT OPERATE IN A CLOSED-IN AREA OR RESTRICT VENTILATION IN ANY WAY;

NE PAS FAIRE FONCTIONNER LE CHARGEUR DANS UN ESPACE CLOS ET/OU NE PAS GENER LA VENTILATION;

8. DANGER: RISK OF ELECTRICAL SHOCK. DO NOT TOUCH UNINSULATED PORTION OF OUTPUT CONNECTOR OR UNINSULATED BATTERY TERMINAL;

DANGER: RISQUE DE CHOC ELECTRIQUES. NE PAS TOUCHER LES PARTIES NON ISOLEES DU CONNECTEUR DE SORTIE OU LES BORNES NON ISOLEES DE L'ACCUMULATEUR.

9. CAUTION: DISCONNECT SUPPLY BEFORE CHANGING FUSE.

ATTENTION: COUPER L'ALIMENTATION AVANT DE REMPLACER LES FUSIBLES.

10. WARNING – TO REDUCE THE RISK OF FIRE, INSTALL BATTERY CHARGER ON A FLOOR OF NON-COMBUSTIBLE MATERIAL, SUCH AS STONE, BRICK, CONCRETE, OR METAL.

NE PAS INSTALLER SUR DES SURFACES COMBUSTIBLES OU AU-DESSUS DE TELLES SURFACES.

11. USE COPPER CONDUCTORS RATED 75 C.

Palomino BATTERY CHARGER

OWNERS MANUAL

INSTALLATION: READ AND FOLLOW ALL SAFETY INSTRUCTIONS ON THE FOLLOWING PAGE. All Palomino chargers are for indoor use only. Charging areas must be clean, dry and free from combustible materials, open flames. Charging areas must be properly ventilated and smoking should never be allowed in or near the charging area. The temperature of the charging room should be between 32° F and 104° F.

MOUNTING: All Palomino chargers are designed for floor or bench mounting. There are (4) holes in the charger base to be used to secure it in place.

INPUT POWER CONNECTION: CAUTION, To reduce the risk of fire, use only on circuits provided with branch circuit protection as indicated in Table 1 in accordance with the National Electric Code, ANSI/NFPA 70 or equivalent. The AC power input terminals are identified with a red on white “AC INPUT ” label. The wire size and torque value are listed on the contactor. The ground terminal is identified with a green on white “GROUND”. The terminal is rated for 14awg to 6awg wire with a recommended torque value of 12 in lbs.

CONTROL FEATURES: For the standard Palomino units.

1. Automatic five second delayed start upon connection of a properly sized battery. (9, 8, 7...0)
2. Battery voltage is continually monitored.
3. Automatic charge termination by dv/dt-di/dt slope
4. Negative battery slope termination to prevent battery thermal runaway.
5. 80% charge point selectable 2.37 or 2.45 volts per cell (Remove R70 for 2.45 VPC).
6. Backup timers- 9 hours to the 80%, and 6 hours from the 80 % point to charge complete.
7. Automatic fault shut down: displayed numerically on the led readout: (Note: The fault code blinks alternately with the 3 decimal points of the display.)
 - a. **Fault code “1”** - Low volts per cell - the battery voltage is less than 1.7 vpc
 - b. **Fault code “2”**-High volts per cell - greater than 2.8 or 2.88 vpc (set with 80% point)
 - c. **Fault code “3”** - Battery disconnected from charger during charge
 - d. **Fault code “4”** - Charge time exceeded - backup timer expired
 - e. **Fault code “5”**- Low charging current - charging current less than approximately 3 amps
8. Pushbutton Equalize switch provided to extend charge 3 additional hours after normal charge termination.
9. Automatic Equalize every 5th charging cycle (Remove R6 to enable). To count as a valid cycle, the charge must proceed 1 hour or more prior to reaching 80% charged voltage.
10. Refresh cycle every 24 hours. The charger restarts charging and terminates by dv/dt-di/dt assuming the charger was not disconnected from the battery after a normal charge complete was reached. Refresh function can be disabled. (Remove R48).
11. Automatic led test - All LED’s flash alternate red / green upon battery connection.
12. **Fault code “0”** - Manual stop button - used to end the charging process. (Note: the 0 is not displayed after the battery is removed.)

13. Displays:

- a. 3 digit LED readout - display's charging current and Fault codes.
- b. CHARGING LED- on solid when the charger is charging the battery.
- c. 80% LED - illuminates when the battery voltage exceeds 2.37 volts per cell.
- d. CHARGE COMPLETE LED - on solid when unit has completed a normal charge cycle and blinks when the unit is in refresh.
- e. EQUALIZE LED - on solid when unit is set to manual equalize, flashes when unit is in equalize charge mode.

PHYSICAL LOCATION: Charging areas should be clean and dry, free from combustible materials and well ventilated. The room should be kept between 32 ° F (0 ° C) and 104 ° F (40 C). Combustible materials, open flames and smoking should not be permitted near or in the charging area. Refer to Safety Instructions on page 2.

The chargers are designed to be bench or floor mounted. Install charger only onto a non-combustible surface such as concrete or plated steel; never install charger over a wood surface.

INPUT VOLTAGE CHANGEOVER: The Input Voltage **CAN NOT** be changed on the Palomino chargers. These units can only be operated at one input voltage, which was specified at time of order.

OPERATING PROCEDURE: Verify that the charger is wired for the correct AC input voltage. Connect the charger to AC source. A “ 0 “ will scroll across the led display. Connect a properly sized (same cell number and amp-hr. size) battery to the charger. The charger LED's will again flash several times. If the charger and battery are matched and all are in good working order, the charger will count down to 0 then start charging. The charging current will be displayed on the digital LED readout. If the charger and battery are mismatched or either is defective the charger will shutdown and display a fault code. Consult the charger front panel label or see above “Control Features” for fault codes. The charger will automatically terminate the charge cycle by dv/dt - di/dt unless the equalize button is pressed or a fault condition occurs. After a normal charge completion the charger will return to displaying the sequencing “0”. The battery can now be safely unplugged since all charging has stopped. If the charger was still in “charge” mode, pressing the STOP button will terminate the charging process and allow the battery to be safely unplugged. **CHARGER_DAMAGE_PREVENTION: To prevent damage to the charger, always shutdown the charger by using the STOP switch before disconnecting the battery.**

TROUBLESHOOTING GUIDE

The symptoms below pertain to the Palomino battery chargers. Identify the symptom your charger is experiencing and follow the step by step troubleshooting procedure to determine the cause of the problem.

SYMPTOM - POWER IS APPLIED BUT THE DISPLAY IS NOT ON!

1) AC POWER CONNECTION:

Make sure the AC input line, located at the AC CONTACTOR, is connected to the AC power outlet. Measure the voltage and verify that AC power is at the charger.

2) CONTROL TRANSFORMER:

Locate the Control Transformer. Measure the AC input voltage at the Control Transformer primary. If there is no voltage measured, repair open circuit. Measure the Control Transformer secondary voltage across terminals 5 and 7. The AC voltage should be approximately (18 to 20) volts rms. If no voltage is measured, then the Control Transformer is defective and should be replaced.

3) MAIN BOARD:

If there is the appropriate voltage level across the Control Transformer disconnect AC power then reapply AC power. This action will reset the Micro controller.

SYMPTOM - POWER IS APPLIED. DISPLAY IS IN IDLE MODE BUT CHARGER WILL NOT START OR CHARGE STARTS BUT IS TERMINATED IMMEDIATELY!

1) PROPER BATTERY:

Verify that the number of cells of the battery to be charged matches the charger. Also, check the diagnostic voltage indicators.

2) GOOD BATTERY:

Measure the total battery voltage. Divide the voltage value measured by the number of battery cells. This will yield an average volts per cell value. If the average volts per cell value is less than 1.7 volts or greater than 2.8 volts, then the battery is bad and should not be used.

3) DC FUSE:

Disconnect the battery and AC input power from the charger. Verify that the fuse is not open. Replace defective fuse and check the following:

- a) Make sure that the battery to charger connector cables connect the battery to the charger with the proper polarity.
- b) Verify that AC power and battery has been disconnected from the charger. Locate the rectifier diodes on the heat sink. Remove the connecting wires from the diodes. Test the diodes and replace if faulty.
- d) Make sure all connections are tight.

4) CONTROL TRANSFORMER:

Apply AC power to the charger and measure the AC voltage across the Control Transformer secondary terminals 8 and 9. The secondary voltage should be approximately 24 volts rms. If there is no voltage measured at the secondary, the Control Transformer is defective and should be replaced.

SYMPTOM - CHARGE TERMINATES EARLY!

1) LOW VOLTS/CELL:

Having a flashing red SHUTDOWN LED with "1" on indicates that the control measured the average volts/cell to be less than 1.7 volts. The LOW VOLTAGE condition does not "lock" the charger off since the charger will automatically start charging if the battery's voltage rises about 1.7 volts per cell.

2) HIGH VOLTS/CELL:

If this indicator is on, then the Palomino CONTROL measured the average volts/cell to be greater than 2.8 volts.

- a) Verify that the Battery connected to the Palomino charger has the correct number of cells.
- b) If the battery has the appropriate number of cells, measure the battery voltage. Divide the measured voltage value by the number of battery cells. This value is the average volts per cell of the battery. If the average volts per cell of the battery is between 1.7 and 2.8 volts/cell, then the battery is good.

3) CABLE DISCONNECTION:

The CABLE DISCONNECTION indicator will be on whenever the battery to charger charging cable is disconnected while the battery is charging. Always make sure to manually shut-down (press the stop button) the charge before disconnecting the cables.

4) CHARGE TIME EXCEEDED:

This indicates that the battery did not reach 80% of full charge within nine hours or that the battery did not charge from 80% charged to full charge within six hours. Disconnect the battery and AC input power from the charger. Verify that the DC Fuse is not open. Verify that the charger and battery AMP-HR size are matched.

5) LOW CURRENT:

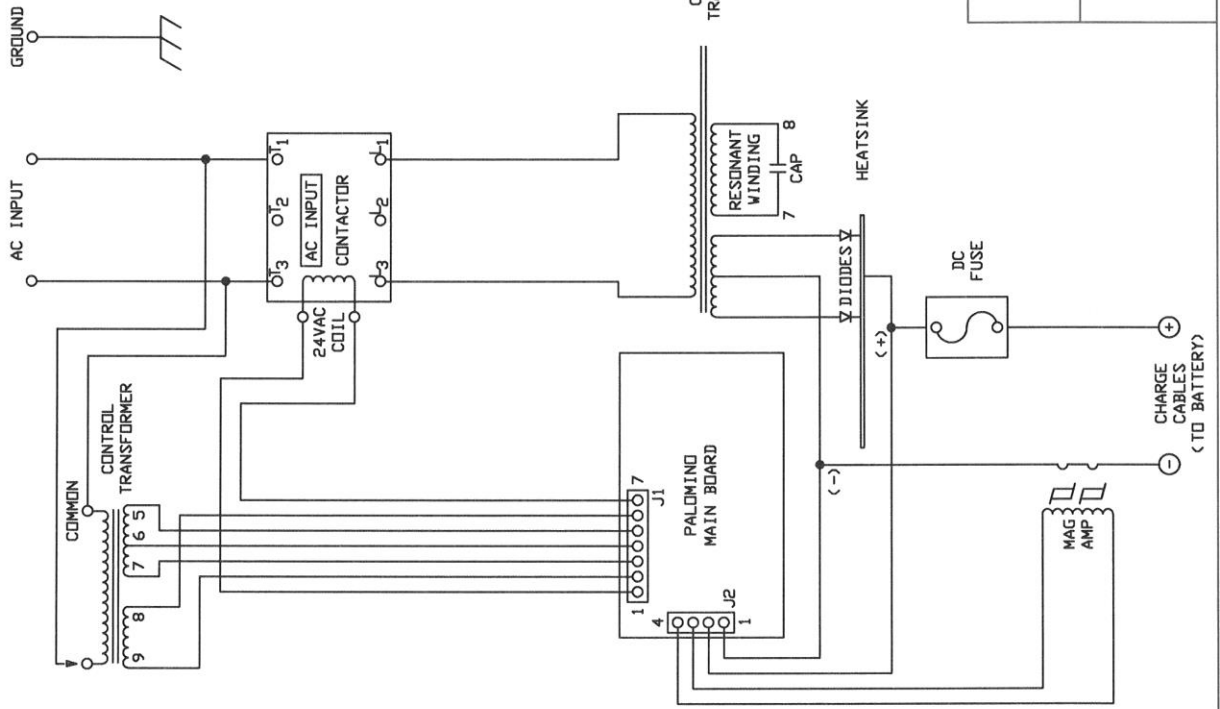
If this indicator is on, the battery on charge was not receiving current.

- a) Disconnect the battery and AC input power from the charger.
- b) Check the DC Fuse. Verify that the fuse is not open. Replace faulty fuse.
- c) Verify the Magnetic Amplifier is not an open. Check for continuity between the Magnetic Amplifier and Cell Select Board. Repair any bad connections. Replace the Magnetic Amplifier if faulty.
- d) Verify the AC Resonant Capacitor is not an open. Replace the capacitor if defective.

TABLE 1

Model Number	Input Voltage	Branch Circuit Protection Required
06B0510ALB	208	15
06B0600ALB	208	15
12B0510ALB	208	25
12B0600ALB	208	30
12B0750ALB	208	35
12B0875ALB	208	40
18B0600ALB	208	40
18B0750ALB	208	50
24B0475ALB	208	35
06B0510AMC	240	15
06B0600ALB	240	15
12B0510AMC	240	25
12B0600AMC	240	30
12B0750AMC	240	35
12B0875AMC	240	40
18B0600AMC	240	40
18B0750AMC	240	50
24B0475AMC	240	30
06B0510AND	480	6
06B0600AND	480	6
12B0510AND	480	10
12B0600AND	480	15
12B0750AND	480	15
12B0875AND	480	20
18B0600AND	480	20
18B0750AND	480	20
24B0475AND	480	15
12B0540BHB	208	15
12B0600BHB	208	15
12B0750BHB	208	20
12B0875BHB	208	25
12B1050BHB	208	30
18B0540BHB	208	20
18B0600BHB	208	20
18B0750BHB	208	30
18B0875BHB	208	30
18B0965BHB	208	30
18B1050BHB	208	40
18B1260BHB	208	50

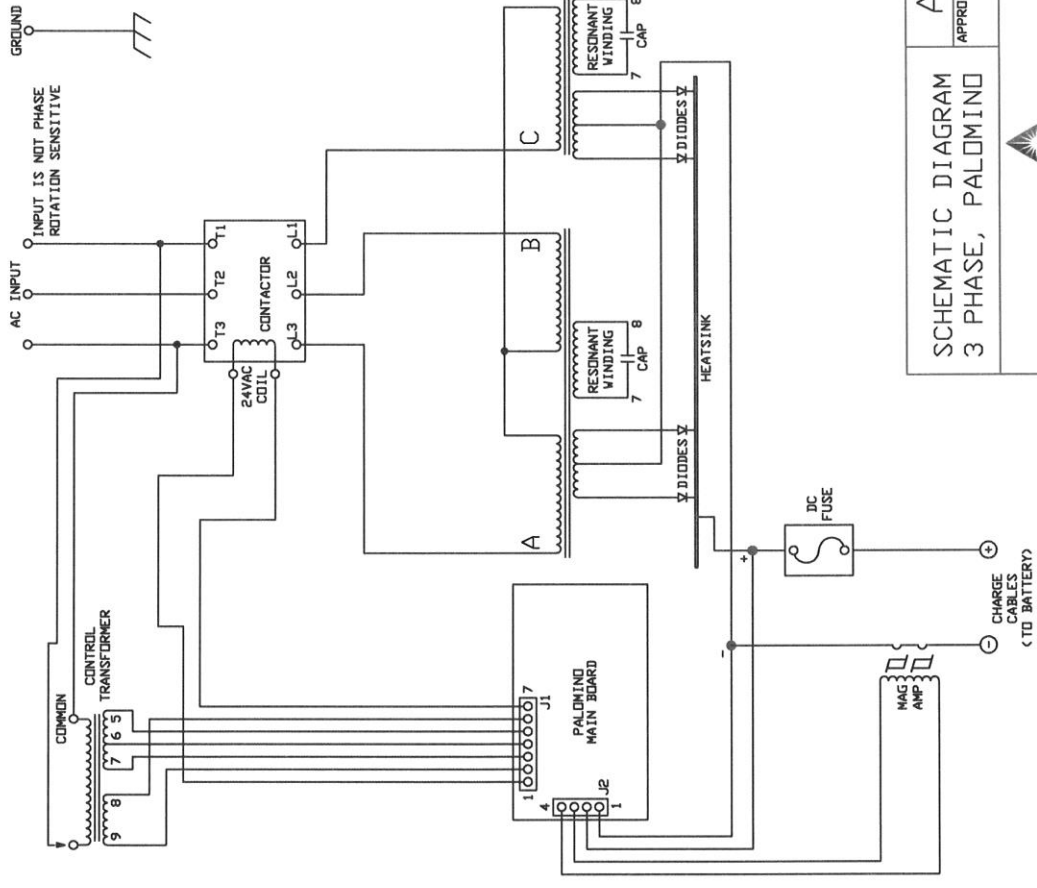
Model Number	Input Voltage	Branch Circuit Protection Required
24B0475BHB	208	20
24B0600BHB	208	25
24B0750BHB	208	35
24B0875BHB	208	40
24B1050BHB	208	50
12B0540BJC	240	15
12B0600BJC	240	15
12B0750BJC	240	20
12B0875BJC	240	25
12B1050BJC	240	30
18B0540BJC	240	20
18B0600BJC	240	20
18B0750BJC	240	30
18B0875BJC	240	30
18B0965BJC	240	30
18B1050BJC	240	40
18B1260BJC	240	50
24B0475BJC	240	20
24B0600BJC	240	25
24B0750BJC	240	35
24B0875BJC	240	40
24B1050BJC	240	50
12B0540BKD	480	6
12B0600BKD	480	10
12B0750BKD	480	10
12B0875BKD	480	10
12B1050BKD	480	15
18B0540BKD	480	10
18B0600BKD	480	10
18B0750BKD	480	15
18B0875BKD	480	15
18B0965BKD	480	15
18B1050BKD	480	20
18B1260BKD	480	20
24B0475BKD	480	10
24B0600BKD	480	12
24B0750BKD	480	15
24B0875BKD	480	20
24B1050BKD	480	20



SCHEMATIC DIAGRAM 1 PHASE, PALOMINO	APPROVED:	A80-141
		REV -



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SCHEMATIC DIAGRAM
3 PHASE, PALMIND

A80-140
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