SAVE THESE IMPORTANT SAFETY INSTRUCTIONS

This manual contains important safety, operating, and installation instructions – read before using charger.

CALIFORNIA ENERGY COMMISSION COMPLIANT BC

Battery Safety Information

Warning: Use charger only on battery systems with an algorithm selected that is appropriate to the specific battery type. Other usage may cause personal injury and damage. Lead acid batteries may generate explosive hydrogen gas during normal operation. Keep sparks, flames, and smoking materials away from batteries. Provide adequate ventilation during charging. Never charge a frozen battery. Study all battery manufacturers' specific precautions such as recommended rates of charge and removing or not removing cell caps while charging.

Electrical Safety Information

Danger: Risk of electric shock. Connect charger power cord to an outlet that has been properly installed and grounded in accordance with all local codes and ordinances. A grounded outlet is required to reduce risk of electric shock – do not use ground adapters or modify plug. Do not touch uninsulated portion of output connector or uninsulated battery terminal. Disconnect the AC supply before making or breaking the connections to the battery while charging. Do not open or disassemble charger. Do not operate charger if the AC supply cord is damaged or if the charger has received a sharp blow, been dropped, or otherwise damaged in any way – refer all repair work to qualified personnel.

This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.

Precautions

1. Always connect the charger to a **GROUNDED** outlet. When using an extension cord, avoid excessive voltage drops by using a grounded, 3-wire, 10-AWG cord no longer than 30m (100').
2. **AVOID** connecting a QuiQ charger and another device to a single 15A or 20A circuit or the circuit may become overloaded.
3. Other models of Delta-Q chargers may not be appropriate for Yamaha Golf Cars. Use the above Yamaha P/N.

Features and Benefits

- **Switch-Mode Design:** High efficiency operation with smooth, ripple-free DC output.
- **10-L.E.D. Display:** Displays state of charge and charge error conditions.
- **Charge Protection:** Protects from improper connection, overload and excessive temperatures. Programmed safety features include charge time monitoring and over temperature protection.
- **Charge Algorithm:** I-E-I - constant current/constant voltage/constant current charge profile.
- **Pre-Test:** Performs several diagnostic tests before charging begins.
- **Multi-Charge Steps:** Ensures a consistent and repeatable charge.
  - **Step 1: Pre-test**: Tests several conditions before charging begins. If a problem is detected, charging is terminated.
  - **Step 2: Constant Current Step**: Battery is charged with full rated output current, restoring up to 80% of charge.
  - **Step 3: Constant Voltage Step**: Regulated voltage "equalizes" individual battery cells resulting in full charge delivered to the battery.
  - **Step 4: Topping Off Step**: Battery pack is brought slowly to full charge without excess gassing.
  - **Step 5: Storage**: Every 14th day and if voltage becomes less than 48V, charger restarts cycle to refresh batteries in storage.
- **Automatic battery equalization (Boosting) :** Automatically boosts battery pack when individual cell-voltages are not balanced and restores pack capacity.

Maintenance Instructions

1. For flooded lead-acid batteries, regularly check water levels of each battery cell after charging and add distilled water as required to level specified by battery manufacturer. Follow the maintenance and safety instructions recommended by the battery manufacturer.
2. Make sure charger connections to battery terminals are tight and clean.
3. Do not expose charger to oil, dirt, mud or direct heavy water spray when cleaning vehicle.

Operating Instructions

1. The instructions printed on the charger (shown below) are for daily reference. The charger is factory preset for use with Trojan 48 Volt golf car batteries.

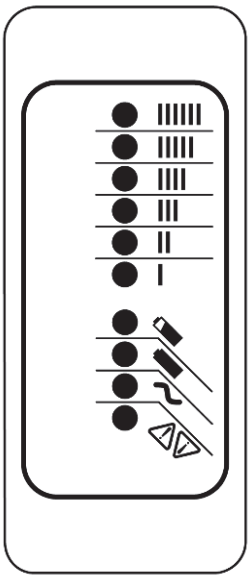
OPERATING INSTRUCTIONS:

1. **PLUG AC CORD INTO A GROUNDED RECEPTACLE**
2. **PLUG DC CORD INTO GOLF CAR RECEPTACLE**
3. **CHARGE CYCLE WILL BEGIN AFTER A FEW SECONDS AND AMMETER WILL TURN ON**
4. **CHARGER SHUTS OFF AUTOMATICALLY WHEN BATTERIES ARE CHARGED**

Connect charger's AC cord set to AC power. Then, connect the DC cord set plug to the vehicle charging-receptacle by grasping the plug handle and pushing the plug straight into the receptacle. The charger will start automatically.

Upon connection to AC power source, the lower four LEDs come on as a Power-On Self-Test, then the AC power LED turns on. Upon connection to Battery Pack, output indicators turn on to indicate charging is active.

Under normal charge circumstances, the LEDs operate as follows:



Ammeter (Amber)		**On:**	Displays approximate scale of current output during Step 2.
		Blinking:	High internal charger temperature. Current output reduced.
80% Charge (Amber)		**On:**	Step 2 complete, 80% charged. In Step 3.
		Blinking:	With no battery connected, the number of flashes indicates algorithm #93 for Trojan 48V batteries.
100% Charge (Green)		**On:**	Charging complete. Charger in Storage Mode.
		Blinking:	Step 3 complete. In Step 4.
AC On (Amber)		**On:**	AC Power good.
Fault (Red)		**Blinking:**	Charger error. Refer to Troubleshooting below.

Troubleshooting Instructions

If a fault occurs, count the number of red flashes between pauses and refer to the table below:

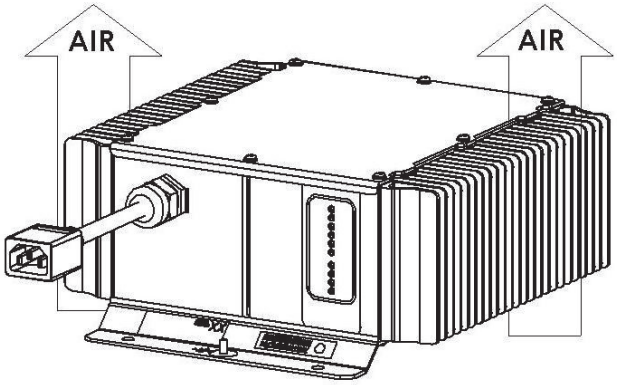
Red Flashes	Cause	Solution
☀	Battery High Voltage	Check battery size and condition and reset charger (interrupt DC connection for 15 seconds).
☀☀	Battery Low Voltage	Check battery size and condition and reset charger (interrupt DC connection for 15 seconds).
☀☀☀	Charge Timeout caused by battery pack not reaching required voltage. Charger output was reduced due to high temperatures.	Check connections. Operate charger at a lower ambient temperature.
☀☀☀☀	Check Battery: Battery could not be trickle charged up to minimum voltage.	Check for shorted or damaged cells.
☀☀☀☀☀	Over-Temperature: Charger shut down due to high internal temperature.	Ensure sufficient cooling air flow and reset charger (interrupt DC connection for 15 seconds).
☀☀☀☀☀☀	Charger Internal Fault	Reset charger (interrupt AC power or DC connection for 15 seconds). Return to qualified service depot if fault persists.

Instructions

WARNING: The output of chargers with 48V outputs pose an energy and/or shock hazard under normal use. These units must be installed in the host equipment in such a manner that the output cable and battery connections are only accessible with the use of a tool by qualified personnel.

1) Determine Mounting Location:

While its sealed nature allows the charger to be mounted virtually anywhere, the choice of mounting location and orientation is extremely important. For optimum performance and shortest charge times, mount the charger in an area with adequate ventilation. The charger should also be mounted in an area that will be relatively free of oil, dirt, mud, or dust since accumulations within the fins of the charger will reduce their heat-dissipating qualities. Optimal cooling also occurs when the charger is mounted on a horizontal surface with the fins vertical. More airflow from below the charger will help cool the fins, so mounting above open areas or areas with cut-outs for airflow is desirable. Contact your distributor for information on other mounting orientations.



As the charger may get hot in operation, the charger must be installed such that risk of contact by people is reduced. The charger's AC plug must be located at least 46cm (18") above the floor or ground surface and the status display must be visible to the user.

Specifications

DC Output – see Operating Instructions

All models	
Voltage-nom (V)	48
Voltage-max (V)	67.2
Current-max (A)	18
Battery Type	Specific to selected algorithm
Reverse Polarity	Electronic protection – auto-reset
Short Circuit	Electronic current limit

AC Input

All models	
Voltage-max (Vrms)	85 – 265
Frequency (Hz)	45 - 65
Current - max (Arms)	12A@100VAC / 11.5A@110VAC / 6.1A@200VAC / 5.6A@220VAC / 5.4A@230VAC / 5.1A@240VAC
Current – nom (Arms)	10A@120VAC / 6A@200VAC / 5.5A@220VAC
AC Power Factor	>0.98 at nominal input current

Mechanical

All models	
Dimensions	28.0 x 24.5 x 11.0 cm (11 x 9.7 x 4.3")
Weight	<5 kg (11 lbs) w/ standard cord
Environmental	Enclosure: IP20
Operating Temperature	-30°C to +50°C (-22°F to 122°F), derated above 30°C, below 0°C
Storage Temperature	-40°C to +70°C (-40°F to 158°F)
AC input connector	IEC320/C14 (≥1.8m (6ft) localized cord required)
DC output connector	OEM specific w/ 12AWG wire

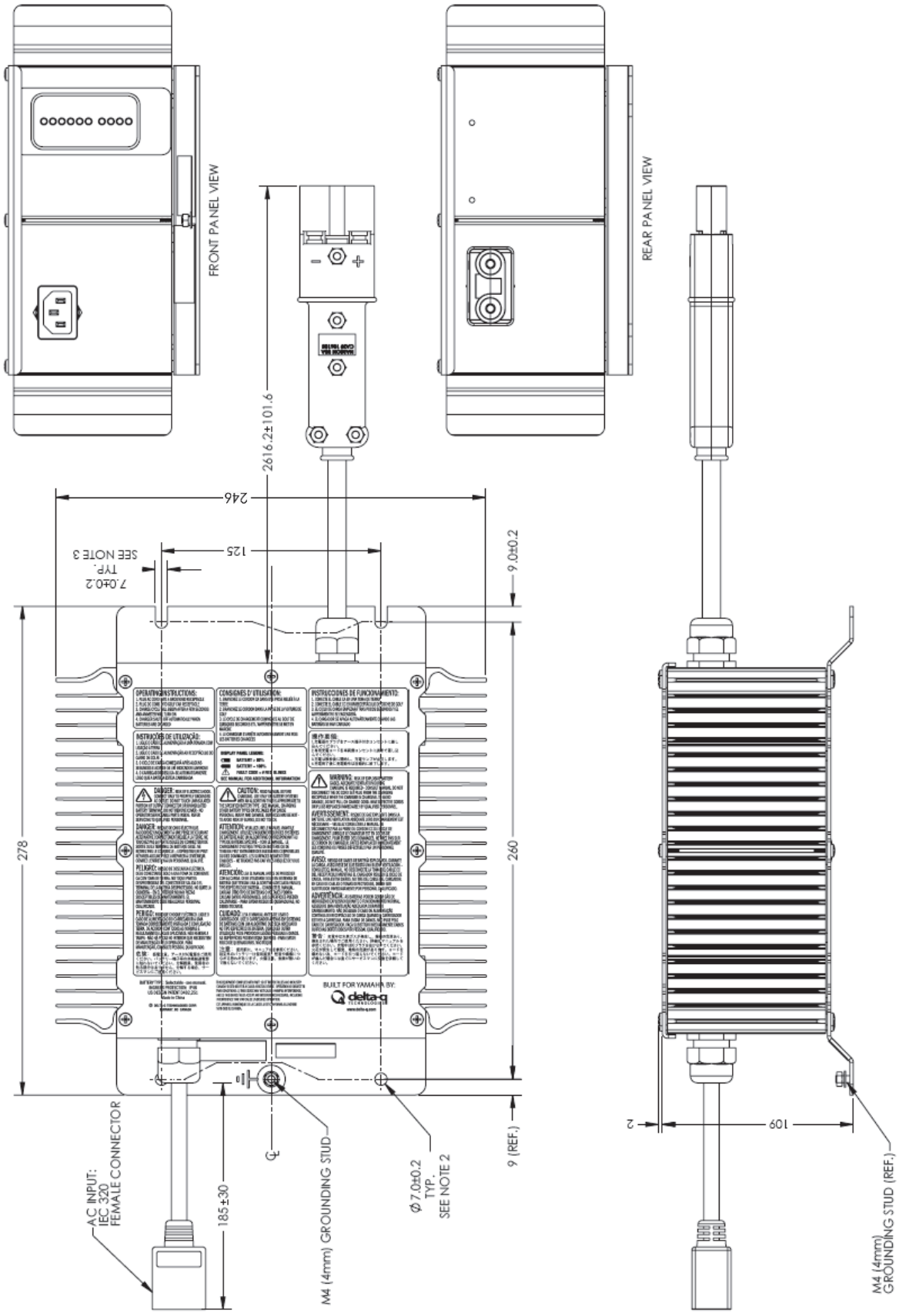
Operation

All models	
Battery Temperature Compensation	Automatic
Maintenance Mode	Auto-restart if V < 48V and 14 days elapse

Regulatory

Safety	
EN 60335-1/2-29	Safety of Appliances/ Battery Chargers
UL2202	EV Charging System Equipment
UL1564 2nd Ed.	Industrial Battery Charger
CSA-C22.2 No. 107.2	Battery Chargers- Industrial
Emissions	
FCC Part 15/ICES 003	Unintentional Radiators Class A
EN 55011	Radio disturbance characteristics (Class A)
EN 61000-3-2	Limits for harmonic current emissions
EN 61000-3-3	Limits of voltage fluctuations and flicker
Immunity	
EN 61000-4-2	Electrostatic discharge immunity
EN 61000-4-3	Radiated, radio-frequency, EMF immunity
EN 61000-4-4	Electrical fast transient/burst immunity
EN 61000-4-5	Surge immunity
EN 61000-4-6	Conducted Immunity
EN 61000-4-11	Voltage variations immunity

Drawings



Note: This is a Class A product. In a domestic environment this product may cause radio interference, in which case the user may be required to take adequate measures.