

QuiQ™

HF/PFC Battery Charger

QuiQ and QuiQ-dci Troubleshooting Guide



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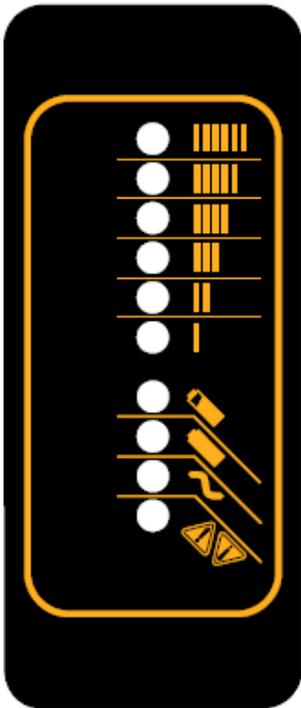
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1.0 Indications on the Charger 10-LED Display

LED indications following "Power-On Self Test":



Ammeter (Amber)



Solid: Displays approximate scale of current output during bulk phase. Also indicates algorithm #1-6 for 11 seconds if no battery is connected.

Flashing: High internal charger temperature. Current output reduced.

- Provide better airflow to the charger, perhaps with a fan.
- Try to move the charger to a cooler location or open a machine panel that may be restricting airflow
- Confirm that dirt or mud is not blocking the cooling fins of the charger. Clean the charger. Rinse charger with low pressure hose if required.

80% Charge (Amber)



Solid: Bulk charge phase complete, 80% charged. Charger now in absorption phase.

Flashing: With no battery connected, indicates the charge algorithm # selected by the number of flashes.

100% Charge (Green)



Solid: Charging complete. If supported by the charge algorithm, the charger will enter Maintenance Mode. See Delta-Q publication 710-0088 Algorithm Descriptions for details on individual algorithms.

Flashing: Absorption phase complete. Charger in Finish phase

AC On (Amber)



Solid: AC Voltage normal

Flashing: AC Voltage below 105VAC, check voltage and extension cord length (max 100', 12-AWG or 50' 14-AWG).

Fault (Red)



Flashing: Charger error. Check code and refer to troubleshooting guide below.

2.0 Fault Indications

Red Flashes	Explanation and Solution
	<p>High Battery Voltage Detected – starting voltage above 2.5V/cell or voltage during charge rose above 2.7V/cell (algorithm dependent).</p> <ul style="list-style-type: none"> + Check that the battery charger voltage is consistent with the battery pack voltage. + Check for wiring errors. + Occasionally a new, fully charged battery pack may cause this condition. Use this pack before charging it again. + Disconnect any other sources during charging. + If this problem does not clear after the battery voltage is measured to be less than 2.5V per cell, contact Delta-Q. + This fault will automatically clear and the charger will restart charging when the voltage drops to within operating range.
	<p>Low Battery Voltage Detected – starting voltage below 0.5V/cell</p> <ul style="list-style-type: none"> + Check the battery and connections to the battery. + Check the nominal battery voltage. Confirm that the nominal battery voltage is the same as the charger voltage. + If this problem does not clear after the battery voltage is measured to be higher than 1V per cell and all connections are good, contact Delta-Q. + This fault will clear automatically when the returns within range.
	<p>Charge Timeout - Indicates the battery failed to charge within the time allowed by the charge algorithm. This could occur if the battery is of larger capacity than the algorithm is intended for. In unusual cases it could mean charger output is reduced due to high ambient temperature. It can also occur if the battery is damaged, old, or in poor condition.</p> <ul style="list-style-type: none"> + Check the battery for damage such as shorted cells and insufficient water. Try the charger on a good battery. + If the same fault occurs on a good battery, check the connections on the battery and connection to AC power, and AC voltage. + Confirm that the nominal battery pack voltage is the same as the battery charger voltage. + If a charger displays this fault on a battery pack, and the pack is of questionable status, reset the charger by disconnecting AC power for 30 seconds, and then reconnect the AC to start a new charge cycle. After a few charge cycles this problem could stop occurring as the pack “recovers.” + This fault must be cleared manually by unplugging the AC, waiting 30 seconds and reconnecting the ac power.

Red Flashes	Explanation and Solution
	<p>Check Battery - This fault indicates the battery pack could not be trickle charged up to the minimum level required for the normal charge cycle to be started.</p> <ul style="list-style-type: none"> ✦ Check that none of the battery pack connections between modules are reversed or incorrectly connected. ✦ Check that one or more cells in the battery are not shorted. ✦ Confirm that the nominal battery pack voltage is the same as the battery charger voltage. ✦ Try the charger on a good battery. ✦ If this fault occurs the battery pack is likely in poor condition. Try to recover the pack with a charger that can charge the individual batteries – such as an automotive charger. Be sure to set this charger to the appropriate voltage – 6V per 6V battery, 12V per 12V string/battery.
	<p>Over-Temperature: This fault indicates the charger has become too hot during operation and has shut down. This extra fault indication (as opposed to the flashing ammeter described above), indicates an even higher temperature was reached inside the charger. Though not damaging to the charger, charge time will be extended significantly</p> <ul style="list-style-type: none"> ✦ This fault indication will not clear automatically, but the charger will restart charging automatically when the temperature drops. The fault indication must be cleared manually by unplugging the AC power, waiting 30 seconds and reconnecting the AC. ✦ If possible, install the charger in a cooler location or increase cooling airflow to the cooling fins. ✦ Confirm that dirt or mud is not blocking the cooling fins of the charger. If required, clean the charger by rinsing it with a low-pressure hose.
	<p>QuiQ Internal Fault: This fault indicates that the batteries will not accept charge current, or an internal fault has been detected in the charger. This fault will nearly always be set within the first 30 seconds of operation. If it occurs after the charger has started charging normally, be sure to make a note of it.</p> <ul style="list-style-type: none"> ✦ Try to clear the fault by unplugging AC power, waiting 30 seconds and reconnecting the AC. ✦ Check all battery connections. Look for a high resistance connection. The most likely reason for this fault is a fault in the battery such as a bad battery connection, an open cell, or insufficient water. ✦ Other electrical hardware such as contactors, switches, etc. which are badly wired may also cause this fault. ✦ This fault will occur if an internal fuse inside the charger blows. If the green wire is shorted to ground even momentarily this fuse will blow. To check the fuse, measure with an ohmmeter between the green and red wires with the AC disconnected. If a short circuit is not measured, the fuse has blown. Contact Delta-Q ✦ If this fault occurs after battery charging has started, confirm that AC power was not interrupted and that all battery connections are good. ✦ If all battery connections are good, an internal fault has been detected. Contact Delta-Q.

3.0 QuiQ-dci Charger/Converter Troubleshooting

The DC-DC converter in the QuiQ-dci is a highly reliable, high performance unit. It has no operating indicators. If abnormal operating conditions arise, consult the symptoms and possible solutions below.

Symptom	Possible Causes and Solutions
No or low output	<ul style="list-style-type: none">+ Input voltage out of range:<ul style="list-style-type: none">+ 35 – 87V for the 48V model+ 50 – 130V for the 72V model+ Unit overheating – increase cooling air flow+ Short circuit detected+ Poor connections – Inspect connections+ Converter damaged
No switched output	<ul style="list-style-type: none">+ Switched input voltage out of range:<ul style="list-style-type: none">+ 8 – 87V for the 48V model+ 8 – 130V for the 72V model+ Switching input circuit damaged from high voltage+ Poor connections – Inspect connections
Turn-on or turn-off delay greater than 3 seconds	<ul style="list-style-type: none">+ Switched input circuit variability – no action required
Wiring or connectors overheating	<ul style="list-style-type: none">+ Wire gauge too small (minimum 18AWG)+ More than 18A drawn from single connector

4.0 Other Conditions

Indication	Explanation and Solution
AC on LED lit, charger won't start charging.	<p>Charger has detected a condition that does not allow it to charge</p> <ul style="list-style-type: none"> + This condition is generally corrected by resetting the charger by removing AC power for 30 seconds and reconnecting it.
Excessive battery watering or strong sulphur (rotten egg) smell	<p>Overcharging or high battery temperature. These symptoms are unlikely to be caused by too high a charge current since the maximum charge current of the charger will be small compared to even a moderately sized battery pack. The most likely cause for this problem is incorrect charge algorithm setting and/or high ambient temperatures.</p> <ul style="list-style-type: none"> + Confirm that the battery pack is not too small – Delta-Q chargers are usually used with batteries larger than 50Ah. + Confirm that the nominal battery voltage matches the charger output voltage. + Confirm the correct battery charge algorithm. If the battery pack is new, the algorithm will need to be changed if the pack is not the same as the old one. Refer to the Product Manual for instructions on how to determine and change the battery charge algorithm. + If the pack is older, it is possible sulphation has taken root. Increased resistance of the battery pack due to this will cause excessive heat and water usage.
Charger operates at low current only	<p>Delta-Q charge algorithms only operate at a low current, usually 2-5A if the battery voltage is less than 2.0V/cell. This is to slowly recharge an over discharged battery to avoid damaging it.</p> <ul style="list-style-type: none"> + Check the battery pack voltage, if it is <2.0V/cell then this low current is normal.
Charger restarts automatically	<p>There are two features of algorithms that may cause this:</p> <ul style="list-style-type: none"> + Maintenance Mode – charger automatically restarts after 14d or 30d, or when the battery voltage falls below 2.08V/cell or 1.5V/cell. These settings are algorithm dependent. + Battery overvoltage – If the battery is very resistive, sometimes in new batteries, the voltage may rise so quickly the charger trips off due to overvoltage. It will then restart the charge cycle when the voltage falls back into range.
Difficulty changing the default battery charge algorithm	<ul style="list-style-type: none"> + The mode to change the battery charge algorithm can only be selected during the first 10 seconds of operation. Refer to the Product Manual for instructions. + If the 10 second window is missed, cycle AC power by unplugging the charger, waiting 30 seconds, and reconnecting AC power. + To extend Battery Charge Algorithm Change Mode by 30 seconds (120 seconds on newer models), connect the charger output to a good battery for approximately 1 second and then disconnect the battery again.

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