



RQ SERIES BATTERY CHARGERS USER MANUAL



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ORIGINAL SAFETY AND OPERATING INSTRUCTIONS

This manual is for the Delta-Q Technologies RQ Series Industrial Battery Chargers. Read and comprehend this document fully before handling or working with any RQ Series battery chargers. Important safety, operating, and installation instructions are included. As well, this manual includes a link to a list of fault codes and error codes that help engineers take steps quickly to resolve issues.

Read this information in its entirety before using your Delta-Q Technologies charger. Save these instructions.

For technical support, contact the manufacturer or distributor of your vehicle or machine, as their version of this charger may require unique operating instructions. For additional product documentation, see www.delta-q.com/resources.



Warning

Use the charger only with an algorithm that is appropriate to the specific battery type and capacity of your product. Other usage may cause personal injury and damage. Lead acid batteries may generate explosive hydrogen gas during normal charging. Keep sparks, flames, and smoking materials away from batteries. If this charger is used with lithium-ion type batteries, an integrated battery management system (BMS) must be used. The BMS must ensure that in all operating modes, the battery cells are protected from inappropriate levels of voltage, current, temperature, and state of charge. Do not operate the charger in a closed-in area or restrict ventilation. Never charge a frozen or non-rechargeable battery. Observe all battery manufacturers' precautions (e.g., maximum charge rates and if cell caps should be removed while charging).



Danger

Risk of electric shock. Connect charger power cord to an AC outlet that has been properly installed and grounded in accordance with all local codes and ordinances. A grounded AC outlet is required to reduce the risk of electric shock—do not use ground adapters or modify the plug. Do not touch uninsulated portions of the output connector or uninsulated battery terminals. Disconnect the AC supply before making or breaking the connections to the battery. Do not open or disassemble the charger. Do not operate this charger if the AC supply cord or DC output cord is damaged or if the charger has received a sharp blow, been dropped, or is damaged in any way. Refer all repair work to the manufacturer or qualified personnel. This charger is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge on electrical systems and battery charging, unless they have been given supervision or instruction concerning use of the charger by a person responsible for their safety. Children should be supervised to ensure they do not play with the charger.

Instructions importantes concernant la sécurité

Conserver ces instructions. Ce manuel contient des instructions importantes concernant la sécurité et le fonctionnement.



Attention

Utiliser le chargeur seulement avec un algorithme approprié au type et capacité spécifique de batterie. D'autres types de batteries pourraient éclater et causer des blessures ou dommages. Les batteries au plomb peuvent produire des gaz explosifs en service normal. Ne jamais fumer près de la batterie et éviter toute étincelle ou flamme nue à proximité des batteries. Si ce chargeur est utilisé avec des batteries au lithium-ion, un système de gestion des batteries intégrés doit être utilisé. Le système de gestion des batteries doit assurer que dans tous les modes de fonctionnement, les cellules de la batterie sont protégées contre les niveaux inappropriés de tension, de courant, de température et d'état de charge. Fournissez une ventilation adéquate du chargement. Ne jamais charger une batterie gelée ou non rechargeable. Prendre connaissance des mesures de précaution spécifiées par le fabricant de la batterie, p. ex., vérifier s'il faut enlever les bouchons des cellules lors du chargement, et les taux de chargement.



Danger

Risque de décharge électrique. Ne pas toucher les parties non isolées du connecteur de sortie ou les bornes non isolées de la batterie. Toujours connecter le chargeur à une prise de courant mise à la terre. Déconnectez la source CA avant de faire ou défaire les connections à la batterie en chargement. Ne pas utiliser le chargeur si le cordon d'alimentation CA est endommagé ou si le chargeur est abîmé suite à une chute ou autre incident. Ne pas ouvrir ni désassembler le chargeur – référer toute réparation aux personnes qualifiées. Cet appareil n'est pas destiné à un usage par des personnes (dont les enfants) avec des facultés motrices, sensorielles ou mentales réduites, ou ayant une expérience et des connaissances insuffisantes, à moins qu'elles sont sous la supervision ou reçoivent les instructions sur l'utilisation de l'appareil d'un répondant garant de leur sécurité. Les enfants devraient être surveillés afin qu'il ne jouent en aucun temps avec l'appareil.

SAFE OPERATING INSTRUCTIONS

- The charger contains up to 25 selectable charging algorithms stored in its internal memory to charge batteries. These algorithms are specific to each manufacturer and model of battery. Your equipment supplier or charger distributor is responsible for ensuring the active charge algorithm matches the battery pack charging requirements. Contact them with any questions about which algorithm to select for each battery pack.
- The charger may become hot during charging. Use hand protection to safely handle the charger when charging.
- To maintain safe operations, the unit automatically reduces its output power if the temperature rises above set thresholds, or if the AC input voltage is too low.
- If power is interrupted, and then returns, the charger restarts and continues to operate without hazard to the user, or damage to the batteries.
- Unplug the charger from both AC and DC sources when cleaning, moving, or conducting any maintenance or repair on the charger. No user serviceable parts are inside. Do not remove the cover due to the risk of electrical shock.
- Do not expose the charger to oil, dirt, mud, or direct heavy water spray when cleaning the vehicle or machine.
- All connectors between the battery charger and the battery should be regularly inspected for corrosion and contamination as these can cause overheating and can be a fire hazard.
- If the detachable AC input power cord set or DC output cord is damaged, do not use the charger until they are replaced with cord sets appropriate to your region and application.
- When mated with a Delta-Q Technologies sealed AC cord, the charger meets IP66 specifications, making it dust-tight and protected against powerful water jets. If a cord set with an unsealed connector is used, the plug and connector must be periodically inspected to ensure the contacts are clean and dry.
 - If this charger is provided with an AC cord set and the power plug does not match the power outlet, contact the equipment manufacturer, distributor, or Delta-Q Technologies for the correct AC cord set terminating with a 3-prong plug suitable for your region's grounded power outlet.
 - In North America (and other 120V AC regions), the AC cord must be a 3-conductor UL Listed/ CSA approved detachable cord set at least 1.8m in length (≥ 6 feet), minimum 16 AWG and rated SJT; rated 105°C min, and terminated with 125V, 13A, or greater connector.
 - In Japan, the AC cord must be a 3-conductor PSE approved detachable AC cord set, rated 105°C, and terminated with 100V, 15A, or greater connector.
 - In 220-240VAC regions, the AC cord must be a 3-conductor safety-approved cord set, with 1.0mm² conductors (min.), rated appropriately for industrial use. The cord must be terminated on one end with a grounding type input plug appropriate for use in the country of destination; both plug and connector should be rated 250V, 10A, or greater.
- Extension cords must be 3-wire cords no longer than 30m (100') at 10 AWG or 7.5m (25') at 16 AWG, per UL guidelines.



EMC DECLARATION

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules for the United States and the ICES Regulations for Canada. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures: Reorient or relocate the receiving antenna. Increase the separation between the equipment and receiver. Connect the equipment into an outlet on a circuit different from that to which the receiver is connected. Consult the dealer or an experienced radio/TV technician for help. Class A models of this equipment are available upon request.

Note: If a Delta-Q Technologies sealed cord with an over-molded ferrite bead is not used, a clamp-on bead (LAIRD 28A0807-0A2) can be added to the AC cord to ensure Class B compliance. It should be positioned approximately the same distance from the charger as the beads on the DC and signal cables.

MODELS

The RQ Series has several models:

Model	Maximum Voltage	Lead Acid	Lithium-ion
RQ0350-012	18V	6 Cell 150* - 250 Ah	3-5 Cells 150* - 250 Ah
RQ0350-024	36V	12 Cell 75* - 250 Ah	6-10 Cells 75* - 250 Ah
RQ0350-036	60V	18 Cell 50* - 250 Ah	9-16 Cells 50* - 250 Ah
RQ0350-048	72V	24 Cell 40* - 250 Ah	12-20 Cells 40* - 250 Ah

* Smaller pack sizes can be accommodated. Special testing or configuration may be required to ensure efficiency legislation compliance. Contact Support at Delta-Q Technologies if charging smaller pack sizes.

MOUNTING INSTRUCTIONS

Robust mounting points are cast into the charger's aluminum enclosure. At each corner are 4.5mm x 8mm diameter slots, arranged to allow ample tolerance when mating with standoffs or pre-drilled holes in a machine. Use M4 screws of an appropriate length to secure the charger to the intended support.

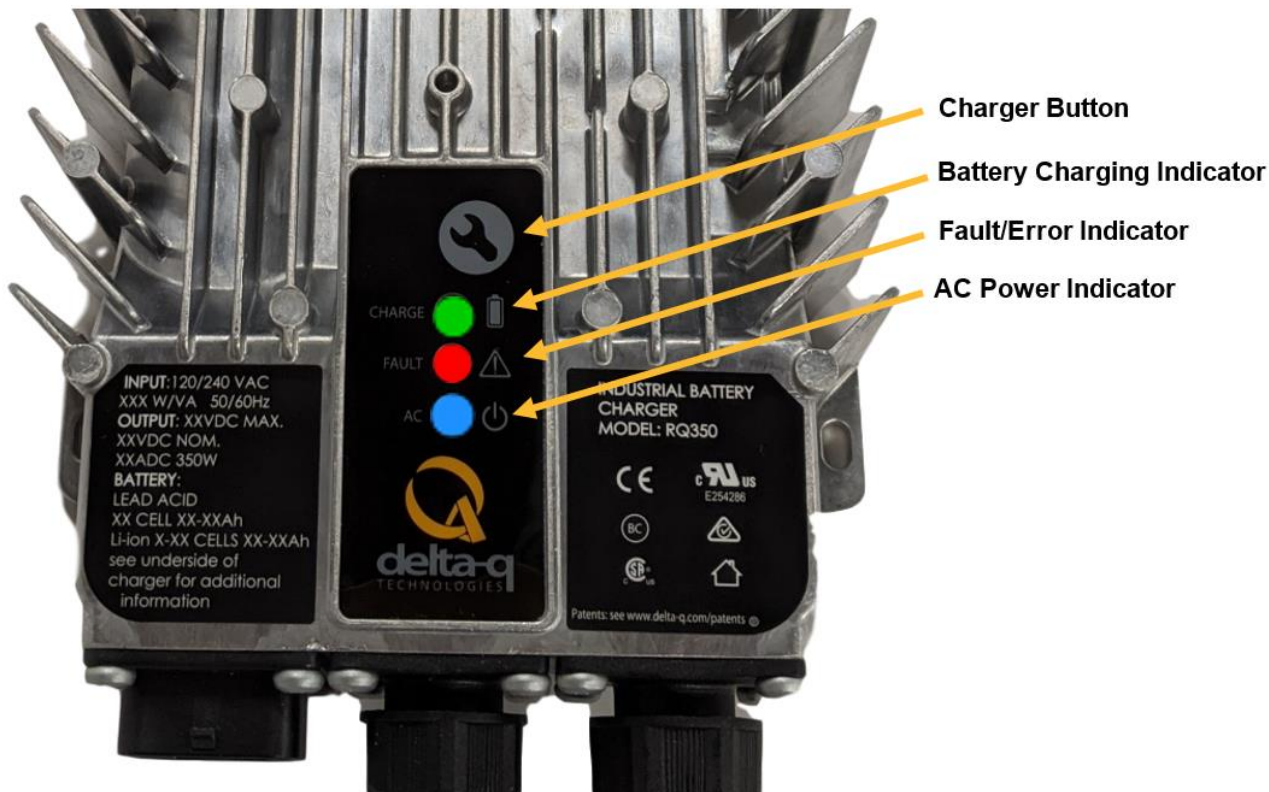
If mounting the charger on a vehicle or machine frame that may be prone to flexing, it is recommended to mount the charger using only three of the mounting points to prevent the charger case and internal components from being subjected to undue stress and torsional loads.

- Mount the charger securely using the mounting points.
- A bracket may need to be fabricated, particularly if there is insufficient cooling air flow.
- Do not drill holes in the charger.

OPERATING INSTRUCTIONS

- On a 120V AC input, you can connect a maximum of three (3) chargers to a single 15A circuit.
- On a 240V AC input, you can connect a maximum of four (4) chargers to a single 10A circuit.

CHARGER INTERFACE



1. When you plug into AC power, the **AC Power Indicator** illuminates solid blue to indicate AC power is present.



Solid Blue = AC power available

2. The **Battery Charging Indicator** has the following states:



Slow Breathing Green = Less than 80% charged



Fast Breathing Green = More than 80% charged
Solid Green = Charge is complete

3. The **Fault/Error Indicator** indicates faults and errors. Visit the Delta-Q Technologies support website at <https://support.delta-q.com> and search for **fault and error codes** to review recommended actions.
4. The **Charger** button has multiple functions:
 - Short Press (less than 4 seconds) shows the currently active algorithm.
 - It is also used to select a new algorithm from those loaded on the charger.

For more information, see *Selecting a Charge Algorithm*.

CHARGING ALGORITHMS

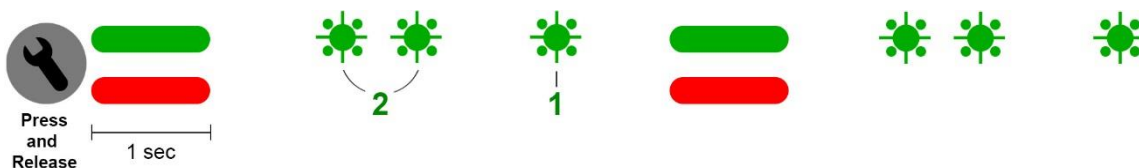
Almost every model of battery has different charging requirements and each application may add to those requirements. Delta-Q Technologies has established over 200 charge algorithms for the most common motive deep cycle batteries. These algorithms are designed to get the longest battery life and meet a variety of application environments.

The algorithms are specific to each manufacturer and model of battery. Your equipment supplier or charger distributor is responsible for ensuring the active charge algorithm matches the battery pack charging requirements. Contact them with questions regarding the default algorithm, the other algorithms on the charger, and which algorithm to select for each battery pack.

Displaying the Active Algorithm

There are up to 25 charge algorithms stored in the charger. Use the **Charger** button to display and/or change the active charge algorithm.

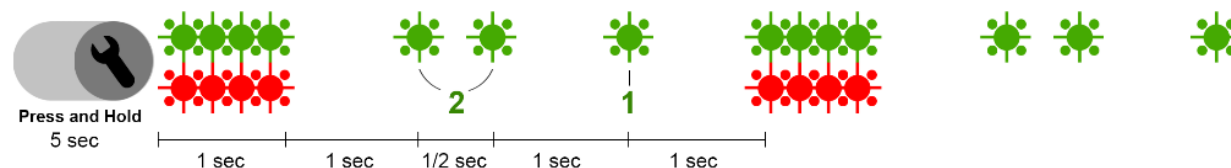
Press and release the **Charger** button to display the active algorithm. It will be displayed twice on the GREEN LED. (e.g., Show Active Charge Algorithm 21).



Selecting a Charge Algorithm

1. Activating Charge Algorithm Select Mode

Press and hold the **Charger** button until the GREEN and RED LEDs start flashing fast indicating **Select Mode** is now active. The BLUE LED (AC) remains ON during this process. Once the GREEN and RED LEDs stop flashing, the GREEN LED will flash slowly displaying the first algorithm available in the list to be selected. In this example, Charge Algorithm 21 is the first stored algorithm. Then, the GREEN and RED LEDs flash fast again indicating the algorithm will be displayed for the second time.



Note: If there is no user interaction, the charger will exit Select Mode five (5) seconds after displaying the algorithm for the second time.

2. Selecting a Charge Algorithm

With **Select Mode** active, press and release the **Charger** button to advance through the charge algorithms. Repeat this step until the charger displays the desired algorithm. The selected charging algorithm will be displayed twice. (e.g., Advancing from Algorithm 21 to Algorithm 13).



3. Confirming the Charge Algorithm Selection

Press and hold the **Charger** button for more than five (5) seconds to confirm the charge algorithm selection. The GREEN and RED LEDs will be ON for one (1) second and then OFF for one (1) second confirming the algorithm selection. (e.g., Confirming Charge Algorithm 13 selection).



Note: You can verify the selected algorithm by displaying the active algorithm.

FAULT AND ERROR CODES

Visit the Delta-Q Technologies support website at <https://support.delta-q.com> and search for **fault and error codes** to review recommended actions.

IDENTIFYING THE CHARGER PART & SERIAL NUMBERS

The part & serial number label is located on the first fin on the LEFT side of the charger. The 7-digit part number is followed by a 16-digit serial number. Use these numbers when requesting technical support.



NOTE: The bar code only contains the serial number; the part number is **not** included in the bar code.

ACRONYMS

The following table provides acronym definitions used within this guide.

Term	Definition
AC	Alternating Current
AWG	American Wire Gauge
BMS	Battery Management System
DC	Direct Current
EMC	Electromagnetic Compliance
FCC	Federal Communications Commission
HV	High Voltage
LED	Light Emitting Diode
LV	Low Voltage
SJTW	Hard Service Cord
UL	Underwriters Laboratories
V	Volt
VAC	Volts Alternating Current



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