QuiQ™

1 kW Industrial Battery Charger

QuiQ Charger - GEM Product Manual

This manual contains important safety and operating instructions for versions of the QuiQ or QuiQ-dci charger / DC-DC converter installed on GEM brand vehicles (Model nos. 912-240x / 360x / 480x / 720x. Please read this information before using your Delta-Q QuiQ Charger. For manufacturer contact information and technical support resources, please visit delta-q.com/support

Warning

Use charger only 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 (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 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 portions of output connector or uninsulated battery terminals. Disconnect the AC supply before making or breaking the connections to the battery. Do not open or disassemble charger. Do not operate this charger if the AC supply 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 that they do not play with the charger.

Attention

Utiliser le chargeur seulement avec un algorithme approprié au type spécifique de batterie. D´autres types de batteries pourraient éclater et causer des blessures ou dommages. Les batteries 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. Fournissez une ventilation adéquate du chargement. Ne jamais charger une batterie gelée. 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 AC avant de faire ou défaire les connections à la batterie en chargement. Ne pas utiliser le chargeur si le cordon d'alimentation AC est endommagé ou si le chargeur est abîmé suite à une chute ou autre indicent. 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.

Maintenance Instructions

1. Do not expose charger to high pressure water spray when cleaning vehicle.
2. The enclosure of the charger meets IP66, making it dust-tight and protected against powerful water jets. The AC connection is rated to IP20, which is not protected against water. Protect the AC connection if used in wet or dusty environments.
3. If the detachable input power supply cord set is damaged, replace with a cord that is appropriate for your region:
   - This charger is provided with a cord set for connection to outlets operating at nominal 120 Volts (or 240 Volts as appropriate). If the input plug does not fit the power outlet, contact Delta-Q Technologies for the proper cord set terminating in an attachment plug of the proper configuration for the power outlet.
   - 'North America: UL or CSA listed / approved detachable cord, 3 conductor, 16AWG minimum and rated SJT; terminated in a grounding type IEC 60320 C14 plug rated 250V, 13A minimum
   - For all other regions: Safety approved detachable cord, 3 conductor, 1.5mm^2 minimum, rated appropriately for industrial use. The cord set must be terminated on one end with a grounding type input connector appropriate for use in the country of destination and, on the other end, an output grounding type IEC 60320 C14 plug.

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Operating Instructions

1. Always use a grounded outlet. When using an extension cord, avoid excessive voltage drops by using a grounded 3-wire 12 AWG cord.

2. The charger will automatically turn on and go through a short LED indicator self-test (all LEDs will flash in an up-down sequence for two seconds). If the charger is used in an off-board application and the charger is waiting to be plugged into a battery pack, the charging algorithm number will be displayed for 11 seconds (see "Check / Change Charging Algorithm") before ultimately displaying an under-voltage fault until AC is cycled.

3. Once a minimum battery voltage is detected, the charger will enter the bulk charging, constant-current stage and current to the battery will be displayed on the ammeter. The length of charge time will vary by how large and how depleted the battery pack is, the input voltage (the higher, the better), and ambient temperatures (the lower, the better). If the input AC voltage is low (below 104VAC), the charging power will be reduced to avoid high input currents ('AC' LED will flash YELLOW). If the AC voltage remains low for more than 10 seconds, the charger will halt and remain halted with the 'AC' LED extinguished. If the ambient temperature is too high, then the charging power will also be reduced to maintain a maximum internal temperature (ammeter will flash YELLOW).

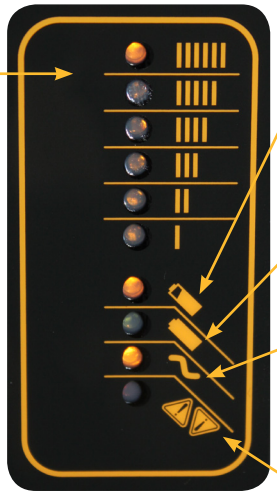
4. When the battery is at approximately 80% state of charge, the bulk stage has completed and an >80% charge indication is given by turning on the bulk charge indicator. In the next phase, known as the absorption or constant-voltage phase, the last 20% of charge is returned to the battery. The charging could be terminated at this point if the vehicle requires immediate usage. However, it is highly recommended to wait until 100% charge indication is given to ensure maximum battery capacity and life.

5. A low current "finish-charge" phase is next applied to return and maintain maximum battery capacity. The charge completion indicator will flash.

6. When the charge completion indicator is continuously GREEN, the batteries are completely charged. The charger may now be unplugged from AC power (always pull on plug and not cord to reduce risk of damage to the cord). If left plugged in, the charger will automatically restart a complete charge cycle to top the batteries up after an appropriate time interval has elapsed (the interval varies depending on the selected algorithm).

Ammeter

- If solid: Displays scale of output during bulk phase.
- If flashing: Output has been reduced due to high internal charger temperature. Displays charge profiles 1-6 for 11 seconds if no battery is connected.



Bulk Charge Indicator

- If solid: Bulk charge phase complete (80% charged); in absorption phase.
- If flashing: Displays charge profile number if no battery is connected. Displays charge profiles 7 and above.

Charge Completion Indicator (Green Light)

- If solid: Charging complete and maintenance mode is active.
- If flashing: Absorption phase complete, in finishing phase.

AC Indicator

- If solid: AC power is present.
- If flashing: Low AC voltage. Check electrical source and cord length.

Fault Indicator (Red Light)

- Charger error. Refer to troubleshooting information below.

Troubleshooting Instructions

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

Flashes	Cause	Solution
	Battery temperature out of range: the battery is too hot or cold to charge.	Ensure temperature sensor is connected and operating correctly. If batteries are too hot, increase air flow around them to cool.
	Battery voltage out of range: the battery voltage is too high or low to allow charging to proceed.	Ensure batteries meet minimum voltage criteria to begin charging. If voltage is spiking too high, discharge batteries slightly before recharging.
	Charge timeout: the charge did not complete in the allowed time. This may indicate a problem with the battery pack (voltage not attaining the required level), or that the charger output was reduced due to high ambient temperatures.	Check connections to ensure that battery type matches selected charge profile and operate the charger at a lower ambient temperature. Reset the charger by interrupting AC power for 15+ seconds.
	AC out of range: condition will occur when AC power is out of range for more than 10 seconds.	Reset the charger by interrupting AC power for 15+ seconds.
	Over-temperature: auto-recover. Charger has shut down due to high internal temperature which typically indicates there is not sufficient airflow for cooling.	See Installation Instructions (1). Charger will restart and charge to completion if temperature is within accepted limits.
	Internal charger fault	Reset charger by interrupting AC power for 15+ seconds. Return to qualified service depot if fault persists.

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.

Selecting A Charge Profile

The GEM specific version of the QuiQ comes with a customized charge profile (algorithm) and software package designed especially for GEM Cars and the algorithm change process is different to our standard QuiQ chargers. The charger comes pre-loaded with charge profiles as detailed in the table below. If your specific battery model is not listed, please contact GEM to find to closest suitable charge profile match. The charge profile package does not contain any settings for AGM batteries in the car as GEM chooses not to support their use in their vehicles. In contrast to the majority of our product range, the GEM specific QuiQ chargers cannot have additional charge profiles loaded into them.

QuiQ™ Charge Profiles (Algorithms)

Model:	922-7200-04B, 912-7200-02
No.	Battery Type
13	GEM Trojan dv/dt
14	GEM DEKA 8G31 Gel dv/dt
15	GEM DEKA 8G31 Gel Recovery*
24	GEM DEKA High Capacity Gel dv/dt
25	GEM DEKA High Capacity Gel Recovery*
32	DEKA EV31 dv/dt

** Only to be used when batteries are severely discharged*

To check the charge profile:

Each time AC power is applied with the battery pack NOT connected, the charger enters an algorithm display mode for about 11 seconds. During this time, the current charge profiles (algorithm) # is indicated by the number of blinks of the '80%' LED and Remote LED. A 2-digit Algorithm # is indicated by the # of blinks for the 1st digit followed by a pause, then the # of blinks for the 2nd digit followed by a longer pause.

To change the charge profile:

a) Disconnect the charger positive connector from battery pack. Apply AC power and after the LED test, the Algorithm # will display for an 11 second window (the window is closes when the 2 flash fault code begins to display and you must restart the process).

b) During this window enter algorithm selection mode by touching the positive connector to the battery pack's positive terminal for 1 second and then remove.

c) Once in "programming mode" there is a 2 minute window to change algorithm; do step to the next algorithm in sequence touch the positive connector to the battery pack's positive terminal for 4 seconds and then remove. The Algorithm # being displayed will advance after 3 seconds.

d) Repeat the step until desired Algorithm # is displayed. The 2 minute window is reset for every increment (Incrementing beyond the last algorithm moves back to the first algorithm in the table).

e) When the desired Algorithm # is displayed, touch the charger connector to the battery positive until the output relay is heard to click (~10 seconds) – the selection is now stored as the default charging algorithm.

f) Remove AC power from the charger and reconnect the charger positive connector to the battery pack. It is highly recommended to confirm a newly changed algorithm selection by repeating the check algorithm steps.

Notice:

A Pack recovery (PRC) algorithm selection is not stored in permanent memory when selected by a user. This algorithm is designed to be used one time to recover severely discharged batteries in poor condition. After following the change algorithm steps, connect the charger to the battery without interrupting AC power. After about 10 seconds, the charger will begin charging. Use of the PRC algorithm is indicated by the '80%' and '100%' LEDs flashing together. When the PRC charge completes, or AC power is removed and reconnected, the charger will automatically reset its self to the #14 DEKA NC algorithm. **THIS IS THIS ONLY TIME THE ALGORITHM WILL ALTER WITHOUT USER INTERACTION**.