SAFETY INSTRUCTIONS

GOALS OF THIS MANUAL

This manual is aimed at any authorized personnel wanting to use a 3-phase **LifeSpeed iQ**™ charger to recharge lead acid motive power batteries (vented, NexSys®, Gel or Water Less®/ Water Less® 20 ranges).
This manual contains information on:
- Charger functionality.
- Use and setting of charger parameters.
- Technical specifications of the LifeSpeed iQ chargers.

EnerSys® intends to provide clear and simple information in this manual, and assumes no responsibility for misunderstanding or improper interpretation of the information.
The owner of the equipment is required to preserve this manual during the life of the equipment and to transfer said manual to any subsequent purchaser.

WARRANTY

Warranty is offered by the manufacturer based on local regulations. Please contact your local distributor for further information.

RECOMMENDATIONS

Recommendations for safe operation

This manual should be carefully read, prior to using the equipment, by anyone intending to use the charger. LifeSpeed iQ:
- Must not have its air circulation impaired in any way, primarily around the air inlet areas.
- Dust accumulation must be removed every 12 months.
- Must be used within its protection norms, and never be directly in contact with water.
- Must be used only within the temperature range specified in the technical specifications.
- Internal connection torques must be checked once a year.
- Must not be installed on a surface subject to high vibration levels (proximity of motors, compressors, etc.).
- Must not be installed close to the batteries in order to avoid any gassing that could damage it prematurely.
- Must not be installed in arduous environments such as:
  - Harbour applications (saline environment)
  - Close to cold stores
  - External locations with exposure to wind and rain

This appliance is not intended for use by persons (including children) with reduced physical and mental capacities, who are not experienced in their use, unless instructed to do so by a person responsible for their safety.

Operator safety

Take all necessary precautions when the equipment will be used in areas where there is the possible risk of an accident occurring. Ensure appropriate ventilation according to standard EN 62485-3 to allow any gases released to escape. Never disconnect the battery while it is being charged.

General warnings

Requirements for use:
- The equipment must be properly grounded (earthed).
- The input voltage must match the charger requirements.
- The battery voltage must match the charger's capabilities.
- The battery capacity is within the charger's range.

ELECTRICAL SAFETY

Safety regulations and requirements must be observed.

Safety devices installed on the electrical supply to the chargers must be of the proper type and rating. It is important to ensure that only fuses of the proper capacity should be used if they need to be replaced.

The equipment must be totally disconnected from all power sources (mains supply and battery) before it can be opened for inspection or servicing. The battery can only be disconnected after the charge has been stopped by pushing the Stop/Start button. Access to the inside of the charger should be restricted to authorized maintenance personnel.

Please consult a qualified factory representative about any problems or questions related to the installation of this unit.

LIMITS OF USE

This charger is designed to be used in a sheltered area. It is designed exclusively to recharge lead batteries in an industrial environment.

PRODUCT RECYCLING - DESTRUCTION

When this charger becomes obsolete, it can be recycled or destroyed by authorized facilities. Local regulations will prevail and must be followed.

MODIFICATIONS AND IMPROVEMENTS

EnerSys reserves the right, at any time, to modify or improve its products, without any obligation to update this product or this manual accordingly.

The customer is not permitted to modify the product from its original design and configuration (e.g. fitting additional modules).
Any changes made by the customer could affect the product performance and invalidate the warranty.

RECEIVING - STORAGE

Upon receipt, please inspect visually the exterior of the charger for any physical damage. If necessary, proceed within 24 hours with the usual claims procedure with the transport company.

If the charger is to be stored before use, it should remain in the original packaging, carefully closed. Store in a clean, dry area at a moderate temperature (0 °C to +40 °C). If the equipment is stored at a temperature below 15°C, it must be gradually (24 hours) restored to operating temperature before use, to prevent the risk of condensation that could cause electrical faults and short-circuits.

INFORMATION PLATE

Located on either side of the charger.

EU DECLARATION

CE EnerSys hereby declares that the chargers in the Lifespeed iQ range covered by this declaration conform to the descriptions laid down in:

- **Directive 2014/35/EU:**
  Safety
  European Standard:
  - EN IEC 62368-1: 2020 + A11: 2020
- **Directive 2014/30/EU:**
  Electromagnetic Compatibility
  European Standards:
  - EN61000-6-2: 2006
  - EN61000-6-4: 2007+A1: 2011
- **Directive 2011/65/EU:**
  RoHS
- **Directive 2013/35/EU:**
  Electromagnetic fields
  European Standards:
  - EN62311: October 2008

Note: DC cables of the charger emit low power magnetic fields in their surroundings (<5cm). Even if emissions are below the standard limits, people bearing medical implants should avoid operating close to the charger during recharge.

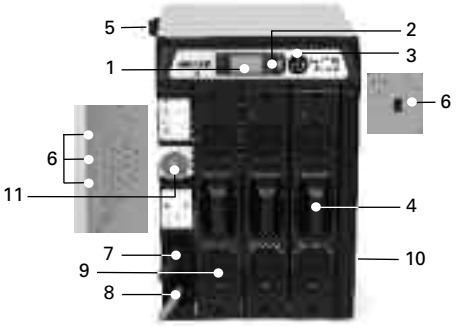
DESCRIPTION & USE

INTRODUCTION

The LifeSpeed iQ™ range of chargers is designed to recharge 24 V, 36 V, 48 V, 72V or 80 V batteries with 3-phase mains supply. The microprocessor-controlled unit automatically recognises the battery (voltage, capacity, charge level, etc.) and very effectively analyses its condition for optimum handling. Several charging profiles are available (vented lead/acid, NexSys®, gel or Water Less®/Water Less® 20 batteries) depending on the configuration selected by the user. The capability for desulphation, equalisation and refresh charging is also included.

EXTERNAL COMPONENTS

Presented below:



Ref.	Function
1.	Control panel with LCD display
2.	USB port
3.	Navigation button
4.	Modules
5.	Input cable
6.	Connectors for options: ethernet, electrovalve, Lifenetwork iQ
7.	Output cables
8.	Output cables
9.	Ventilation panels
10.	Dual harness-only 6 bay cabinet
11.	AC safety switch

Figure 1: *Principal components of the charger.*

CONTROL PANEL

Incorporates LCD Display, USB port and navigation button.

LCD Display

The display is fitted with 5 different colours indicating the status of the charger

COLOUR	FUNCTION
Dark blue	Waiting status until battery connected
Light blue	Battery on charge
Light blue / Orange	Alternating, on charge indicating a pump defect, overdischarge, thermal fault or module failure
Green	Battery charged
Red	Charger faults DF1, DF2, DF3, TH, WRG MOD
Green / Orange	Alternating, battery charged with pump defect, overdischarge or module failure

Navigation button

Functions of the keys

The keys offer the following general functions:

Key	Function
	Navigation in the menu. Start/End of list (press 2 seconds)
 GREEN/RED	The central button is equipped with a two-coloured LED Green/Red (Green: charger is waiting Red: charger is operating) Stop or Start of charge Selection of active menu or validation of value stored Cancel the value stored (press 2 seconds)
	Start an equalisation charge. Access to a sub-menu.
	Access to the menus (press 3 seconds) Close the window.

UNPACKING

The charger is delivered with the following:
- 2 m AC mains cable.
- 3 m DC battery cable.
- This technical manual.

MECHANICAL INSTALLATION

The charger is intended to be wall mounted (only 3 bay cabinet) or floor standing and must be installed in the vertical orientation. The distance between 2 adjacent chargers should be at least 0.3 m.

See paragraph ***Recommendations*** and avoid areas where the chargers may be splashed with water, or saline environments.

ELECTRICAL CONNECTIONS

3-phase input

Connection to the mains supply is 400V AC 3-phase and must be connected using a suitable plug and adequately sized circuit breaker (not included). Current requirements in Amps are indicated on the charger information plate.

Battery output

It is essential to ensure correct polarity. However, reversed polarity will result in blowing the output fuse, inability to charge and the fault code DF2 will be displayed. See Messages and fault codes.

Connection to the battery should be done using the cables supplied:
- RED cable: POSITIVE.
- BLACK cable: NEGATIVE.

FACTORY SETUP

The charger is delivered with a factory setup as follows:

Profile	As ordered
Output DC cable length	3 m
Configuration	As ordered
Automatic equalisation	No
Delayed start enabled	No

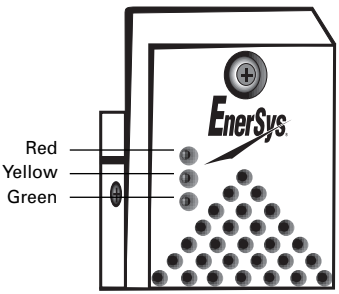
MODULES MANAGEMENT

- There are two types of the modules: 24/36/48V and 72/80V.
- It is not allowed to mix both models in a single system.
- The modules are ***plug and play***: if the user needs to replace a module, he just needs to plug the new module into the cabinet and the system will operate. It is obligatory to follow safety rules and disconnect the system from AC and DC sides.

The module management system ensures optimization of the electrical efficiency & performance of the product.

- If one module fails then the system keeps on charging in a reduced power mode. It allows the battery to be charged even in the case of module failure.
- There are 3 status LED's on the modules:

Red	OFF	normal status
	ON	internal module fault
Yellow	OFF	absence of AC supply
	ON	normal status when AC supply present
Green	OFF	module OFF
	ON	module ON (in function - charging)



Location of the wrong module in the system (here 3rd module from the right side on a 6-slot cabinet)

CHARGING THE BATTERY

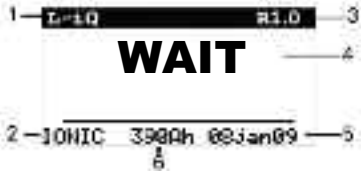
It is now assumed that the charger has been properly set up. Charging can only begin with a battery of the proper type, capacity and voltage connected to the charger.

Off-charge display

With the charger in waiting mode, the display shows information concerning the charger (top and bottom lines):

1. Charger type (Battery voltage + current).
2. Last selected charging profile.
3. Software version.
4. Waiting indication.
5. Date and time of the charge.
6. Set up battery operating temperature.

Alternating battery temperature/capacity if the 'manual' capacity mode is selected.



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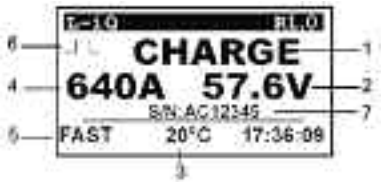
Starting the charge

1. **If Autostart is ON (default), the charge starts automatically when the battery is connected to the charger. To stop the charge, press the central button . If Autostart is OFF the charge will start only if the central button is pressed. To stop the charge, press the central button .**

   The display shows information relative to the connected battery and counts down the time remaining until the effective charge begins.

Ref.	Without Wi-iQ®	With Wi-iQ
1.	Charger status (CHARGE, AVAIL, DEFAULT, EQUAL..), possible pump fault or DF4.	
2.	Alternating display of battery voltage, voltage per cell, Ah restored, charging time, remaining charging time, percentage of battery charge.	
3.	Set up operating battery T°C, and battery capacity if manual mode set	Battery temperature and capacity given by the Wi-iQ (*).
4.	Charging current	
5.	Programmed charging profile.	Detected charging profile (*).
6.	Various information can be displayed: equalisation symbol required at the end of charge, USB connection symbol, Wi-iQ link symbol, possible battery default DF4. See more under ***Messages and fault codes*** chapter.	
7.	Empty line.	Alternating, detected serial number, as information is received and alarms if present. See more under ***Messages and fault codes*** chapter.

(*) as information is received.



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As soon as the countdown time has elapsed, the display shows the information relative to the charge.

To induce the start of the charge if the delayed charge has been programmed:

1. **Connect the battery**
2. **Press the central button to stop the charger.**
3. **Press and hold the central button for 3 seconds. Release.**

Defaults DF1, DF2, DF3 and TH inhibit the charge. Refer to section ***Messages and fault codes***.

End of charge without equalisation

1. **The backlight of the screen becomes green at the end of a correct charge and the indication AVAIL is displayed.** Possible alternating display between DF5 default and pump default and DF4 (ref.1). The displays shows alternately: (ref. 2):
   - charging time achieved
   - number of Ah restored

   If the battery remains connected, and in order to maintain it in a fully charged condition, refresh charges followed by equalisation charges will be automatically initiated according to the battery technology.

2. **If an equalisation charge has been programmed (vented battery), it will start automatically**. Alternatively, an equalisation charge can be triggered manually; go to section ***End of charge with equalisation***.

3. **Press the central button or disconnect the battery that is now ready for use**.

End of charge with equalisation

Equalisation only applies to vented batteries. Start can be manual or automatic.

Manual start

1. **At the end of charge (green display light on), press the key**  .

   The start of the equalisation charge is indicated by the message EQUAL. During the equalisation charge, the charger displays the current (ref 4) and alternating, the battery voltage, voltage per cell, remaining time (ref 2).

2. **The battery will be available as soon as the screen becomes green**.

Automatic start

If the equalisation charge has been programmed (*Configuration/Equalisation* menu), the equalisation charge is initiated automatically.

If the battery remains connected, and in order to maintain it in a fully charged condition, refresh charges followed by an equalisation charge will be automatically initiated according to the battery technology. Similar indications to those displayed in manual start (see above) are displayed.

MESSAGES AND FAULT CODES

Fault	Cause	Solution
DF1*	Charger or mains supply problem.	DF1 appears when the charger is not able to supply its output current. Follow the breakdown procedure for the charger, mains voltage.
DF2*	Output default.	Check the correct connection of the battery (reversed polarity cables) and the output fuse.
DF3*	Wrong battery.	Too high or too low battery voltage. Battery voltage must be within the acceptable range. Use proper charger for battery.
DF4	Battery discharged more than 80% of its capacity.	Charge continues.
DF5	Battery requires inspection.	DF5 appears when the charging profile has been achieved with a fault condition, that can be a current increase in regulation phase demonstrating a battery heating or a badly programmed regulation voltage, or the charging time is too long and has exceeded the safety limit. Check charging parameters: profile, temperature, capacity, cables. Check the battery (defective cells, high temperature, water level..).
DF PUMP	Fault in the air circuit of the electrolyte circulation system.	Check the proper operation of the pump via the menu *Option-Option test*. Check the air circuit (pump, tubes). If this fault occurs, the charger will adapt the battery charging profile for an optimised charge.
TH*	Thermal problem in charger resulting in charge interruption.	Verify the proper operation of the fans and/or too high ambient temperature, or wether there is poor natural ventilation to the charger. The charge process resumes when the ambient temperature decreases below the correct value.
STOP*	Critical battery electrolyte level	Top up battery electrolyte to the level specified in the battery Instruction for Use.
BAT TEMP*	Critical battery temperature.	Wait until the battery temperature cools down, check the battery state (water, profile) Verify the set up of temperature in the menu *Configuration-Battery-High temperature*. Check the temperature sensor of the Wi-iQ®.
DF MOD	One or more modules are not working correctly.	This fault will not prevent the charger from operating as long as at least one module is working correctly. If all modules are not working correctly, the fault code displayed will be DF1.
WRG MOD*	One or more modules are not the correct specification.	It could be due to a mix of 24/36/48V and 72/80V modules (not allowed) or due to an incorrect voltage setting in the charger menu (eg 72/80V modules with 48V battery setting in the menu)
iQ SCAN	Looking for presence of Wi-iQ	
iQ LINK	Set the link Wi-iQ-Charger	
	Low electrolyte level	Battery water topping up required after charging or check that the Wi-iQ is functioning - if in doubt, contact EnerSys.
	Default of balance voltage detected by the Wi-iQ	Check each battery cell during discharge. Check if the Wi-iQ is properly adjusted, if in doubt, contact EnerSys.
	Too high battery temperature.	Verify the battery electrolyte level or the correct set up of the charger. Check the temperature sensor of the Wi-iQ.
	Preventive maintenance indicator.	Consult a qualified factory representative to conduct preventive maintenance operation.
NO Wi-iQ	The Wi-iQ on the battery is not functioning correctly. The charger will charge the battery with the default setting.	Check if the Leds of the Wi-iQ are flashing, if yes, try to restart the charge process, if not or in doubt contact EnerSys.

(*) : blocking fault preventing charging from continuing.

WARNING:
The electrical characteristics of the product are given according to its factory configuration. The user is responsible for any modification to the product which may affect its characteristics.

Subject to technical modification without any prior notice. E.&O.E.

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