SAFETY INSTRUCTIONS

GOALS OF THIS MANUAL
This manual is aimed at any authorized personnel wanting to use a single phase POWERTECH IQ charger to recharge lead acid motive power batteries (vented, XFC FLEX, Gel or WF200 ranges).
This manual contains information on:
• Charger functionality.
• Use and setting of charger parameters.
• Technical specifications of the Powertech 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. The Powertech IQ:
• Must not have its air circulation impaired in any way, primarily around the air inlet areas. Dust accumulation must be removed every six 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.
• 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 air),
  • Close to cold stores
  • External locations with exposure to wind and rain.

Operator safety
All proper precautions must be observed when the equipment is used in areas where accidents are possible. Ensure proper ventilation when the charger is used with lead-acid batteries, due to gassing. Never disconnect the battery during the charging process.

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.

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.

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.

EEC DECLARATION OF CONFORMITY
Enersys hereby declares that the chargers in the Powertech IQ range covered by this declaration conform to:

Directive 2006/95/EC: Low voltage Directive
European Standard:
EN60335-1
EN60335-2-29
EN60950-1

EN61000-6-2 : 2001
EN61000-6-4 : 2001

Directive 2002/95/EC: ROHS
**DESCRIPTION & USE**

**INTRODUCTION**

The Powertech IQ range of chargers is designed to recharge 24V, 36V or 48V batteries, depending on the version supplied, from a single-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 batteries, VRLA batteries (XFC FLEX), gel batteries or WF200 batteries) depending on the configuration selected by the user. The capability for desulphation, equalisation and refresh charging is also included.

**EXTERNAL COMPONENTS**

Presented below:

![Diagram of charger components](image)

**CONTROL PANEL**

Incorporates the Display and the Control Panel. See Chapters “The Menus” and “Using the charger” to get more detailed information.

**LCD Display**

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

<table>
<thead>
<tr>
<th>COLOUR</th>
<th>FUNCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dark blue</td>
<td>Waiting status until battery connected</td>
</tr>
<tr>
<td>Light blue</td>
<td>Battery on charge</td>
</tr>
<tr>
<td>Light blue/Orange</td>
<td>Alternating, on charge and defect pump</td>
</tr>
<tr>
<td>Green</td>
<td>Battery charged</td>
</tr>
<tr>
<td>Red</td>
<td>Charger faults DF1, DF2, DF3, TH</td>
</tr>
</tbody>
</table>

**Functions of keys**

The keys offer the following general functions:

<table>
<thead>
<tr>
<th>Key</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Navigation icon]</td>
<td>Navigation in the menu. Start/End of list (Press 2 seconds)</td>
</tr>
<tr>
<td>![Green/Red icon]</td>
<td>The central button is equipped with a two-coloured LED Green/Red (Green: charger is waiting, Red charger operating)</td>
</tr>
<tr>
<td>![Stop/Start icon]</td>
<td>Stop or Start of charge. Selection of active menu or validation of value stored.</td>
</tr>
<tr>
<td>![Equalisation icon]</td>
<td>Cancel the value stored (Press 2 seconds)</td>
</tr>
<tr>
<td>![Restart icon]</td>
<td>Start an equalisation charge. Access to a sub-menu.</td>
</tr>
<tr>
<td>![Option icon]</td>
<td>Access to the menus (press 3 seconds) Close the window.</td>
</tr>
</tbody>
</table>

**UNPACKING**

The charger is delivered with the following:

- 3 m AC mains cable.
- 3 m DC battery cable.
- This technical manual.

**MECHANICAL INSTALLATION**

The charger must be mounted in a vertical position. For wall mounted chargers, the bottom of the charger must be at least 0.60 m from the floor and/or the charger below and the top of the unit at least 1.0 m from the ceiling. The minimum distance between two adjacent chargers must be 0.30 m.

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

The charger is held by 4 x M6 screws suitable for the type of support. The drilling pattern is depending on the charger model. Refer to technical data.

**ELECTRICAL CONNECTIONS**

**Single phase input**

Connection to the mains supply will be 230V AC single 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 to be displayed. See Fault Codes.

Connection to the battery should be done using the cables supplied:

- **RED** cable: battery POSITIVE.
- **BLACK** cable: battery NEGATIVE.

**FACTORY SETUP**

The charger is delivered with a factory setup as follows:

<table>
<thead>
<tr>
<th>Profile</th>
<th>As ordered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output DC cable length:</td>
<td>3 m</td>
</tr>
<tr>
<td>Configuration:</td>
<td>As ordered</td>
</tr>
<tr>
<td>Automatic equalisation:</td>
<td>No</td>
</tr>
<tr>
<td>Delayed start enabled:</td>
<td>No</td>
</tr>
</tbody>
</table>
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.
5. Date and time of the charge.
6. Set up battery operating temperature.

Alternating battery temperature/capacity if the ‘manu’ capacity mode is selected.

Starting the charge
1. The charge starts automatically when the battery is connected to the charger. To stop the charge, press the central button.

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

<table>
<thead>
<tr>
<th>Ref.</th>
<th>Without Wi-IQ</th>
<th>With Wi-IQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Charger status (CHARGE, AVAIL, DEFAULT, EQUAL..), possible pump fault.</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Alternating display of battery voltage, voltage per cell, Ah restored, charging time, remaining charging time, percentage of battery charge.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Set up operating battery T°C Battery temperature and capacity given by the Wi-IQ (*).</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Charging current</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Programmed charging profile. Detected charging profile (*).</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Various information can be displayed: equalisation symbol required at the end of charge, USB connection symbol, Wi-IQ link symbol, possibly battery default DF4.</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Empty line. Alternating, detected serial number, as information is received and alarms if present. See § Fault codes.</td>
<td></td>
</tr>
</tbody>
</table>

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 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 (ref.1). The display shows alternately (ref. 2):
- charging time achieved.
- number of Ah restored.

Refer to sections Memorisations or Status for detailed information relevant to the end of charge.

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 lighted display 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.

(*) as information is received.

As soon as the countdown time has elapsed, the display shows the information relative to the charge.
## MESSAGES AND FAULT CODES

<table>
<thead>
<tr>
<th>Fault</th>
<th>Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>DF1*</td>
<td>Charger problem.</td>
<td>DF1 appears when the charger is not able to supply its output current. Follow the breakdown procedure for the charger with control of the IGBT, diode, mains voltage ...</td>
</tr>
<tr>
<td>DF2*</td>
<td>Output default.</td>
<td>Check the correct connection of the battery (reversed polarity cables) and the output fuse.</td>
</tr>
<tr>
<td>DF3*</td>
<td>Wrong battery.</td>
<td>Too high or too low battery voltage. Battery voltage must be between 1.6V and 2.4V per cell. Use proper charger for battery.</td>
</tr>
<tr>
<td>DF4</td>
<td>Battery discharged more than 80% of its capacity.</td>
<td>Charge continues.</td>
</tr>
<tr>
<td>DF5</td>
<td>Battery requires inspection.</td>
<td>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...).</td>
</tr>
<tr>
<td>DF PUMP</td>
<td>Fault in the air circuit of the electrolyte circulation system.</td>
<td>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.</td>
</tr>
</tbody>
</table>

| TH* | Thermal problem in charger resulting in charge interruption. | Verify the proper operation of the fans and/or absence of too high ambient temperature, or whether there is poor natural ventilation to the charger. |
| STOP* | Critical battery electrolyte level | Top up battery electrolyte. Do not fill in until the bottom of the cell in order to avoid overflow by the next charge. |
| 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. |

| DEF CFG* | Error in Configuration/Memory/Charger menu. | Change of the main board |
| DEF EEP* | | |
| DEF MENU* | | |

| IQ SCAN | Look for present Wi-IQ | |
| IQ LINK | Set the link Wi-IQ-Charger | |

| Low electrolyte level | Battery water topping up or ensure that the Wi-IQ is properly adjusted and installed (see Wi-IQ instructions of mounting) |

| Default of balance voltage detected by the Wi-IQ | Check each battery cell during discharge. Control if the Wi-IQ is properly adjusted (see Wi-IQ instructions of mounting). |

| 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. |

(*) : blocking fault preventing charging from continuing.