CHARGING
SOLUTIONS

NexSys®+

Battery Charger

OWNER'S MANUAL

CE UK CA

EnerSys®
Power/Full Solutions

www.enersys.com

CONTENTS

INTRODUCTION

NexSys®+

Battery Charger

The information contained in this document is critical for safe handling and proper use of the NexSys®+ charger(s). It contains a global system specification as well as related safety measures, codes of behavior, a guideline for commissioning, and recommended maintenance. This document must be retained and available for users working with and responsible for the battery charger. All users are responsible for ensuring that all applications of the system are appropriate and safe, based on conditions anticipated or encountered during operation.

This owner's manual contains important safety instructions. Read and understand all instructions before installing, handling or operating the battery charger. Failure to follow these instructions may result in serious injury, death, destruction of property, damage to the battery charger, and/or void the warranty.

This owner's manual is not intended as a substitute for any training on handling and operating material handling equipment, batteries or NexSys®+ charger that may be required by local laws, entities and/or industry standards. Proper instruction and training of all users must be ensured prior to handling the battery charger system.

For service, contact your sales representative or call:

EnerSys EMEA
EH Europe GmbH
Baarerstrasse 18
6300 Zug, Switzerland
Tel: +41 44 215 74 10

EnerSys APAC
No. 85, Tuas Avenue 1
Singapore 639518
+65 6558 7333

www.enersys.com

Your Safety and the Safety of Others is Very Important

⚠ WARNING You can be killed or seriously injured if you don't follow instructions.

Features

- Microprocessor-controlled.
- Able to auto-identify battery's capacity.
- Able to adapt to State of Charge (SoC).
- Compatible with battery voltages of:

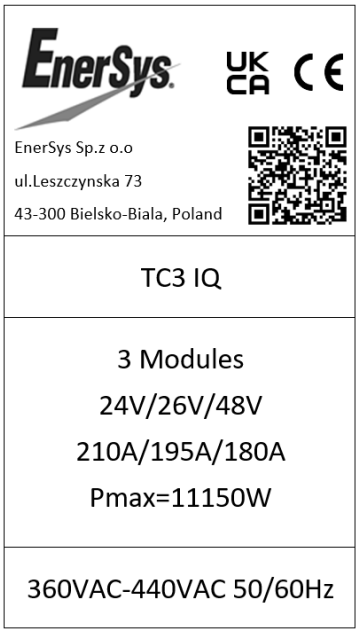
1ph	3ph
12V	
24V	24/36/48V
36/48V	72/80V
	96V
	120V

- Wireless integration with Wi-iQ® battery monitoring devices.
- Individual battery pack recognition and automatic pairing with the charger.
- Unique profile for charging Thin Plate Pure Lead (TPPL).
- Unique charging profiles for the following NexSys® batteries: NXBLOC; NXSTND; NXSFAST; NXP2V; NXPBLC; ATP2V.
- Remote access via E Connect™ mobile app to change settings, monitor charger and share data.
- Controller Area Network (CAN) communication capable.
- Fully programmable to unique fleet requirements.
- Battery chemistry agnostic: EnerSys® Lithium-ion (Li-ion), TPPL, Flooded and Gel Lead-Acid batteries.

Technical Information

Name Plate Label Definitions

Item	Description
Serial Number	Provides date code.
Hertz	Input voltage frequency. Under no conditions operate the charger at a different frequency or from a generator with unstable frequency.
Phase	TCX. When "1" indicates a Single Phase Charger and "3" indicates a Three Phase Charger.
AC Volts	Nominal voltage for which this charger is rated to operate.
DC Volts	Nominal DC output voltage of the charger.
Modules	Actual number of power modules installed in the charger cabinet.
DC Amps	DC current that this charger will deliver to a discharged battery with the number of power modules installed and based on the nominal voltage.



Technical Information (cont.)

Output Power Letter Codes

Output Power (kW)	Number Modules	Module Power (kW)
1.0	1	1.0
2.0	2	1.0
3.0	3	1.0
3.5	1	3.5
7.0	2	3.5
10.5	3	3.5
14.0	4	3.5
17.5	5	3.5
21.0	6	3.5
24.5	7	3.5
28.0	8	3.5

Cabinet Size (number of modules available) and DC Cable Size

Phases	Module Positions	Standard Cable Gauge	Comments
1ph	Max 1	6 mm^2	Stand-alone cabinet
1ph	Max 3	25 mm^2	Three-slot, 3 kW cabinet
3ph	Max 2	35 mm^2	Two-slot, 7 kW cabinet
3ph	Max 4	70 mm^2	Four-slot, 3.5 to 14 kW cabinet
3ph	Max 6	95 mm^2	Six-slot, max 21 kW cabinet
3ph	Max 8	70 mm^2 or 1 x 95 mm^2	Eight-slot, max 28 kW cabinet. Dual cable for 24/36/48Vdc, single cable for 72/80Vdc

Charge Profile Codes

Profile Code	Charger Profile	Description
P19	FAST	Fast profile for flooded battery equipped with airmix. Charger rate up to 0.4 C5. Must set battery capacity, temperature & equalize values and fit properly programmed Wi-iQ® battery monitoring device (FAST EU). If not installed or no Comm, charger will use STDWL profile. Weekly equalization of 8h is needed. Recommended parameters to set on the charger.
P22	HDUTY	Heavy duty wet cell pulse profile. The charge profile diagnoses the battery status throughout the recharge phase and adjusts its parameters to optimize the charge of flooded battery technology. Max 0.25 C5. Auto battery capacity matching with continuous current loops.
P21	STDWL	Standard (Water Less®) wet cell profile. IUI profile Max 0.13 to 0.20 C5. Auto battery capacity matching with Ph1 loops. Can manually set battery capacity if required. Weekly equalization is needed.
P02	GEL	IUI profile. Max 0.17 to 0.22 C5. Auto battery capacity with Ph1 loops. Can manually set battery capacity if required. Weekly equalization is needed.

Technical Information (cont.)

Profile Code	Charger Profile	Description
P06	AGM	IUI profile. Max 0.20 C5. Auto battery capacity with Ph1 loops. Finish time limitation. Can manually set battery capacity if required. Weekly equalization is needed.
P07	OPP (*)	Opportunity charge PzQ cells. IU (main) & IUI pulse (daily) profile @0.25 C5. Finish current 5%. Must set daily full charge. If programmed Wi-iQ® battery monitoring device fitted, gives capacity, temp and voltage; however, for safety if no communication, should manually set battery capacity, temp and voltage. Weekly equalization is needed.
P04	AIRMIX	Pneumatic/Airmix profile. Must have air kit fitted to use this profile. IUI profile Max 0.13 to 0.25 C5. Auto battery capacity with Ph1 loops. Can manually set battery capacity if required. Weekly equalization is needed.
P09	WL20	Water Less® 20 battery, IUI profile (old WF200). Requires airmix and Wi-iQ® battery monitoring device comm. Weekly equalization is needed.
P25	LOWCHG	Low rate charge profile. IUI profile 0.09 to 0.13 C5. Manually set battery capacity if required. Weekly equalization is needed.
P31	NXBLOC (*)	For NexSys® TPPL Bloc battery under normal charge. Charge rate 0.18 to 0.70 C5. Must set Battery Capacity, Temperature & Equalize values, or fit properly programmed Wi-iQ® battery monitoring device (NexSys® BLOC battery). If not installed or no comm, charger will use manual setup Ah and temp. Weekly equalization is needed.
P29	NXSTND (*)	For NexSys® TPPL 2V battery under normal charge. Charge rate 0.18 to 0.25 C5. Must set battery capacity, temperature & equalize values or fit properly programmed Wi-iQ® battery monitoring device (NexSys® 2V battery). If not installed or no comm, charger will use manual setup Ah and temp. Weekly equalization is needed.
P30	NXFAST (*)	For NexSys® TPPL 2V battery under fast, higher rate. Charge rate 0.251 - 0.40 C5. Properly FAST programmed Wi-iQ® battery monitoring device (NexSys® 2V battery). If not installed or no comm, charger will use manual setup Ah and temp. Weekly equalization is needed.
P32	NXP2V (*)	For NexSys® TPPL 2V battery under fast, higher rate. Charge rate 0.18 - 0.40 C5. Properly programmed Wi-iQ® battery monitoring device (NexSys® TPPL 2V battery). If not installed or no comm, charger will use manual setup Ah and temp. Weekly equalization is needed.
P33	NXPBLC (*)	For NexSys® TPPL Bloc battery under normal charge. Charge rate 0.18 to 0.70 C5. Properly programmed Wi-iQ® battery monitoring device (NexSys® TPPL Bloc battery). If not installed or no comm, charger will use manual setup Ah and temp. Weekly equalization is needed.
	ATP2V	For NexSys® ATP 2V battery under fast, higher rate. Charge rate 0.2 to 0.5 C5. Properly FAST programmed Wi-iQ® battery monitoring device (NexSys® ATP 2V). If not installed or no communication, charger will use setup Ah and temperature. Float ON have to be set. I_{Float} = Round (roundup [Battery Voltage x Battery Capacity]/1000 x 0,1).
	NXSION (*)	For Enersys® lithium battery only. The charger is communicating with the Enersys® lithium BMS through the CANBUS, the BMS is driving the charger and then the setting of the charger is not compulsory. Nevertheless, there are recommended parameters to set on the charger.

Technical Information (cont.)

(*) Opportunity Profile Options
Operation: In opportunity charging mode, the user can charge the battery during breaks, lunch, or any available time during the work schedule. The opportunity charge profile allows the battery to be safely charged while it is kept in a partial state of charge between 20% and 100% of C5 throughout the work week. Sufficient time should be scheduled after the weekly equalize charge to allow battery cooling and to perform periodical electrolyte level checks.

Daily Charge:
This option can be set to add additional daily charging time, if the work schedule allows. It should be considered only when the daily work demand requires additional capacity.

Equalization Charging
Equalization charging for lead-acid batteries, performed after normal charging, balances the electrolyte densities in the battery's cells.

NOTE: The factory default is Daily Charge DISABLE, 6-8 hours Equalize, Sunday at 00 hour for flooded, 2-hour week/maintenance charge for NexSys® charging profiles.

Block-Out Time
This function inhibits the charger from charging the battery during the block-out time window. If a charge cycle has started before the block-out window it is stopped during the block-out window and will automatically restart the charge cycle at the end of the block-out window.

Refresh Charging
Refresh or maintenance charging enables the charger to maintain the battery at maximum state of charge as long as it is attached to the charger.

Charger Option List

Suffix	Description
PLC	Programmable Logic Controller
LMEB	Late Make/Early Break
CAN	Controller Area Network
Ethernet	Network Connection
Airmix	Electrolyte Circulation System

Safety Precautions

1. **⚠ WARNING** The shipping pallet must be removed for proper and safe operations.
2. This manual contains important safety and operating instructions. Before using the battery charger, read all instructions, cautions and warnings on the battery charger, the battery and the product using the battery.
3. Read and understand all setup and operating instructions before using the battery charger, to prevent damage to the battery and to the charger.
4. **Do not** touch non-insulated parts of the output connector or the battery terminals to prevent electrical shock. Never open the equipment: High voltage could be still present, even after turning off the charger. Any adjustment, maintenance or repairs to the equipment while it is open must only be carried out by an appropriately skilled person who is aware of the risks involved.
5. During charge, lead-acid batteries produce hydrogen gas, which can be dangerous if ignited. Never smoke, use an open flame or create sparks in the vicinity of the battery. 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 or local regulations to allow any gases released to escape. Never disconnect the battery while it is being charged.
6. Unless charger is equipped with LMEB (Late Make/Early Break) feature, **do not** connect or disconnect the battery plug while the charger is on. Doing so will cause arcing and burning of the connector, resulting in charger damage or battery explosion.

Safety Precautions

7. Lead-acid batteries contain sulfuric acid which may cause burns. **Do not** get in eyes, on skin or on clothing. In cases of contact with eyes, flush immediately with clean water for at least 15 minutes. Seek medical attention immediately.
8. Only factory-qualified personnel should install, set up and service this equipment. De-energize all AC and DC power connections before servicing the charger.
9. Must be used in conformance with its indicated level of protection and never come into contact with water.
10. **Must not be installed on surfaces subject to vibration (near compressors, engines, motors).**
11. Must be installed so that the gases from the battery being charged do not get drawn into the charger by its fans.
12. The charger is **not** for outdoor use, only indoor use.
13. **Do not** expose the charger to moisture. Operating conditions should be 32°F (0°C) to 113°F (45°C); 0 to 70% relative humidity.
14. **Do not** operate the charger if it has been dropped, received a sharp impact, or otherwise damaged in any way.
15. For continued protection and to reduce the risk of fire, install chargers on a non-combustible surface.
16. For NexSys® iON batteries, use only EnerSys® battery packs that include the battery management system and all necessary protection for the battery pack integral to the pack.
17. The DC cables of the charger emit low-power magnetic fields in their surroundings (<5cm). People with medical implant devices should avoid being near charger while charging.
18. Contact one of the company's trained technicians if any problem is encountered when putting the charger into operation. It is only designed to recharge EnerSys® Industrial Motive Power lead-acid and NexSys® batteries on industrial premises. When the equipment becomes obsolete, the casings and the other internal components can be disposed of by specialist companies. Local legislation takes precedence over any instructions in this document and must be scrupulously observed (WEEE 2002/96 EC).

Installation

Location
For safe operation, choose a location which is free of excess moisture, dust, combustible material, and corrosive fumes. Also, **avoid high temperatures (above 113°F [45°C]**) or potential liquid spills on the charger.

Do not obstruct the openings in the charger for air ventilation.

Follow charger warning label when mounting on or over a combustible surface.

It is recommended to mount the charger **at least 72 cm radial distance** away from the closest top edge of the battery.

Cabinet Mounting
The charger must be mounted on a wall, stand, shelf or floor in a vertical position. The minimum distance between two chargers must be 31 cm. If wall mounted, make sure that the surface is free of vibrations and the charger is mounted in a vertical position; if floor mounted, make sure that the surfaces are free of vibration, water, humidity. You must avoid areas where the chargers may be splashed with water.

The charger must be held by 2 or 4 fixings suitable for the type of support. The drilling pattern varies according to the model of charger (please refer to the technical data sheet).

Installation (cont.)

Electrical Connections
To prevent failure of the charger, make sure it is connected to the correct line voltage. Follow your local country standards and laws in making these connections.

⚠ WARNING Make sure the power source is OFF and the battery is disconnected before connecting the input power to the terminals of the charger.

To the mains supply: You may only connect to the 1-phase 230Vac or 3-phase 400Vac mains supply (depending on the type of the charger) by means of a standard socket and an appropriate circuit breaker (not supplied). The current consumption is shown on the charger's information plate.

Connection to Battery: The charger must be connected to the battery by the cables supplied:
- The RED cable: to the battery's POSITIVE terminal.
- The BLACK cable: to the battery's NEGATIVE terminal.

AC Circuit Protection
The user must provide suitable branch circuit protection and a disconnect method from the AC power supply to the charger to allow for safe servicing.

⚠ CAUTION Risk of Fire/Electric Shock. Use only on circuits provided with branch circuit protection in accordance with laws and standards.

The prevailing safety regulations must be observed. The system protection installed on the power supply to the charger must conform to the charger's electrical characteristics. The installation of a suitable circuit breaker is recommended. It is imperative to ensure that when fuses are being replaced, only fuses of the specified type and of the correct size are used.

This equipment conforms to Class 1 safety standards, which means that the appliance must be earthed and must be powered from an earthed supply.

Grounding the Charger
Connect ground wire to the proper terminal, usually marked with either of the two symbols below.

⚠ DANGER FAILURE TO GROUND THE CHARGER COULD LEAD TO FATAL ELECTRIC SHOCK. Follow National Electric Code for ground wire sizing.

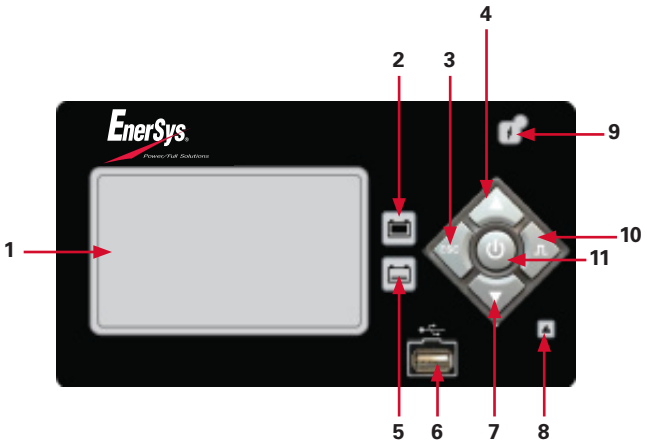
DC Connector Polarity
DC plug polarity
The charging cables are connected to the DC output of the charger: the red charging cable (POS) is connected to the positive busbar of the charger, and the black charging cable (NEG) is connected to the negative busbar of the charger. The output polarity of the charger must be observed when connecting to the battery. Improper connection will open the DC fuses in the power modules.

EU Declaration
EnerSys® hereby declares that the chargers in the NexSys®+ range are in conformity with the following UK and European regulations:
- **Electrical Equipment (Safety) Regulations 2016 (S.I. 2016/1101)**
- **European Directive 2014/35/EU**
  Safety
  BS EN IEC 62368-1 : 2020 + A11 :2020
- **EMC Regulations 2016 (S.I. 2016/1091)**
- **Directive 2014/30/EU:**
  Electromagnetic Compatibility
  BS EN IEC 61000-6-2: 2019
  BS EN IEC 61000-6-4: 2019
- **Directive 2011/65/EU**
  RoHS
- **Control of Electromagnetic Fields Regulations (S.I. 2016/588)**
- **Directive 2013/35/EU:**
  Electromagnetic fields
  BS EN IEC 62311: 2020
- Radio Equipment Regulations 2017 (S.I. 2017/1206)
- Directive 2014/53/EU
  ETSI EN 301 489-1 V2.1.1 (2017-02)
  ETSI EN 301 489-17 V3.1.1 (2017-02)
  ETSI EN 300 328 V2.2. 2 (2019-07)

NOTE: DC cables of the charger emit low-power magnetic fields in their surroundings (<5cm). Even if emissions are below the standard limits, people with medical implants should avoid being near the charger during recharge.

Operating Instructions

Ref	Function	Description
1	Graphical display	Display charger operation info/menus
2	GREEN charge complete indicator	OFF = charger off or battery not available FLASHING = cooling phase ON = battery ready and available
3	Navigate LEFT/ESC button	Enter main menu/Scroll left/ Exit menus
4	Navigate UP button	Navigate menus/Change values
5	YELLOW charging indicator	OFF = charger off or battery not available ON = charging in progress
6	USB port	Download memos/Upload software
7	Navigate DOWN button	Navigate menus/Change values
8	RED fault indicator	OFF = no fault FLASHING = ongoing fault detected ON = fault
9	BLUE AC supply indicator	OFF = AC missing ON = AC present
10	Navigate RIGHT/ EQUALIZE button	Scroll right/Start equalize or desulfation
11	ENTER/STOP and START button	Select menu items/Enter values/Stop and restart battery charge

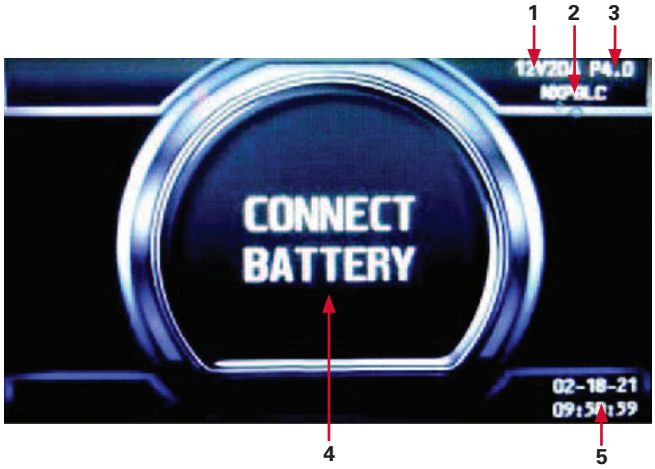


Control Panel Features

Charge Operation

Charger idle display: With the charger in wait mode (no battery connected) and without pressing the ENTER/ STOP and START button, the display will show the following information:

Reference	Description
1	Charger DC Voltage
2	Selected Charge Profile
3	Firmware Version
4	Connect Battery
5	System Time and Date



Charger Idle Display

Operating Instructions (cont.)

- Connect battery: Make sure the charger connector(s) matches the battery connector(s). Plug the charger connector(s) into the battery connector(s). For chargers with dual connectors, both connectors must be connected in order to start a charge.
- NexSys® iON lithium batteries come with specific type of connector. The NexSys®+ charger comes with one or two connectors (LI Connector) depending on the charger model. When the charger is equipped with two connectors, both connectors must be connected, otherwise charge cycle will not start. Always connect connector 1 first. All NexSys® iON charger connectors are equipped with arcless option called Late Make/Early Break to prevent arcing if battery is disconnected while charging.
- When CAN communication is established between the NexSys® iON battery and charger, "BMS CONNECTED" will appear on the display screen. If the text "BMS CONNECTED" is NOT shown, the charge cycle will not start. Check CAN wiring and battery.

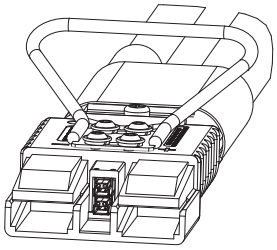


Figure 1

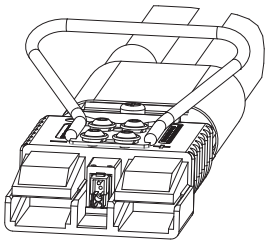


Figure 2

Figures 1 & 2: Connectors for NexSys® iON Batteries

Start Charging
When a battery is connected to the charger, the control board senses the voltage and after a short delay, the charger starts charging the battery automatically if auto start is set to ON. Push the ENTER/STOP and START button if the battery is already connected. When charging a NexSys® iON battery, the CAN communication between the battery and charger is established and the message "BMS CONNECTED" will be displayed on the screen. After a few seconds, the battery will close the charge contactor to initiate the charge. The charger will start the countdown process and will start displaying the charge information.

Delayed Start: If the charger was programmed for delayed start, charging will begin following that delay. When the battery is plugged in to the charger, the display shows the time remaining before the programmed charging starts. **Figure 3.**

Figure 3

Without a Wi-iQ® battery monitoring device: If the Wi-iQ® battery monitoring device adapter is not enabled or no Wi-iQ® battery monitoring devices are in range, effective charging starts after the programmed delay. **The charger uses profile, capacity and temperature settings programmed in the Configuration menu.**

Pairing with a Wi-iQ® battery monitoring device: If one or more Wi-iQ® battery monitoring device adapters are in range, the charger will turn on and apply current to the battery. The display will show "SCAN" followed by "IQLINK". This routine determines which Wi-iQ® battery monitoring device in range is connected to the battery charger. Once the charger makes the determination, it downloads data from Wi-iQ® battery monitoring device, displays the battery S/N, updates the profile capacity and temperature for charging, and starts the main charge.

Operating Instructions (cont.)

Reference	Description
1	Charge time
2	Charging current
3	Percent of charge
4	Wi-iQ® battery monitoring device warnings
5	USB connection
6	Charge voltage (total V and V/c), alternates with Ah returned
7	Battery temperature, alternates with battery capacity
8	Battery S/N from Wi-iQ® battery monitoring device Li-ion only: Max current and voltage requested by BMS
9	Wi-iQ® battery monitoring device link

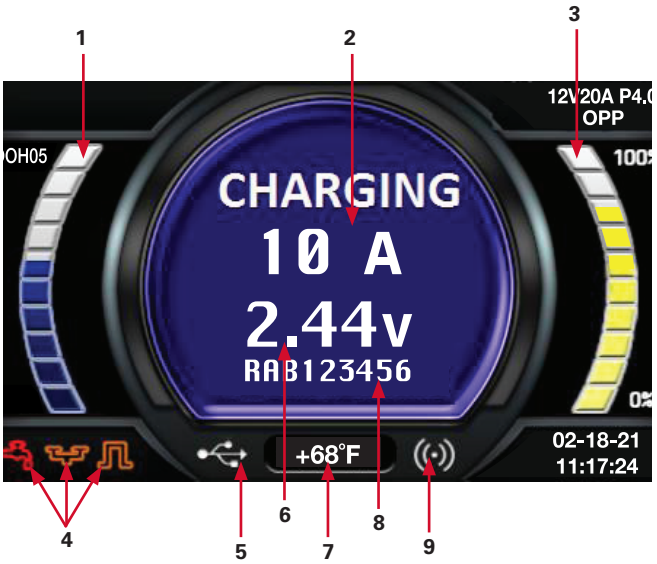


Figure 4

Charging current (2) is determined by the battery voltage and state of the charge condition. Charging current declines automatically as battery voltage rises during the charge. As the battery charges, the graphical display will output various charge parameters, including the percentage of battery capacity (3).

When charging a NexSys® iON battery, the battery BMS controls the charge current and voltage. During the charge cycle, the BMS through the CAN will send information to the charger to start, stop and output the desired current and voltage. If the CAN is lost during charge cycle, the charger will stop the charge and show the off-charge display without the message "BMS CONNECTED".

Stop Charging
The charging can be paused and restarted where it left off at any time. Just hit the ENTER/STOP and START button (marked as number 11 in Control Panel Features section) Remote is available for controlling at a distance.

Charge Complete
Figure 4: End of charge display

End of Charge Without Equalization
The GREEN charge complete indicator comes on after proper end of charge. The GREEN charge complete LED is on and the display shows CHARGE COMPLETE. The display alternates between:

- Total charging time
- Amp-hours restored to the battery

Any other lit LED indicates a problem during charging. Please refer to paragraph Control Panel Features for more information.

If the battery remains plugged in and refresh charge has been enabled, refreshes will occur to maintain an optimal charge.
The battery is now ready for use. Push the ENTER/STOP and START button before unplugging the battery.

End of Charge With Equalization
An Equalize charge can be started manually or automatically.

Manual Equalization Start
At the end of charge (green LED on or flashing), press on the Navigate RIGHT/EQUALIZE button. The equalize button can also be pressed any time during the charge and an equalize charge will be started after charging is complete.

The start of the equalization charge is indicated by the symbol. During the equalization charge, the charger displays the output current and alternates, the battery voltage and voltage per cell and remaining time.

NOTE: When an equalization charge is manually started, the output will be set automatically.

Operating Instructions (cont.)

Automatic Equalization Start
If an equalization day has been programmed in Charger Configuration, the equalization charge will start automatically on the programmed day of the week after charging is complete.

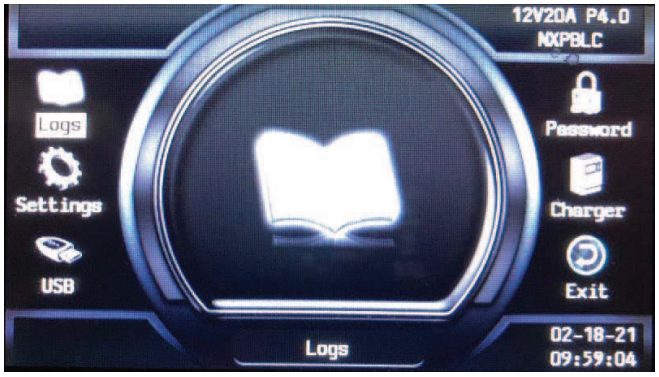
After the equalization, the battery will be available when the green LED comes back on and the display shows AVAIL. The battery is now ready for use. If the battery remains plugged in and refresh charge has been enabled, refreshes will occur to maintain an optimal charge. Push the ENTER/STOP and START button before unplugging the battery.

AC Power Fail
If the AC power fails with a battery connected to the charger during a charge cycle, the charger will reset and start a new charge cycle when power is restored. All charger settings as well as the time and date are preserved.

Series Charging
In series charging, the voltages of both batteries add up and must match charger's nameplate DC volts rating. The charger's amp-hour rating must be equal to each battery's amp-hour rating. Charge cycle will not start unless both batteries are connected.

Menu and Display Information

Main Menu Display
When the charger is idle, press and hold ESC, the Main Menu is then displayed. The main menu is automatically exited after 60 seconds of inactivity or can be exited voluntarily by pressing the ESC button.



All menus are accessed from the Main Menu; a detailed description of each menu is included in the next sections of this manual. The menus that require a password are not displayed until the correct password has been entered.

The menus provide access to the following functions:
- Logs (): View status and memorizations
- Charger (): View faults, alarms, etc.
- USB (): USB functions
- Settings (): Setting date, language and others
- Password (): Management of password (for service technicians only)
- Exit (): Exit main menu

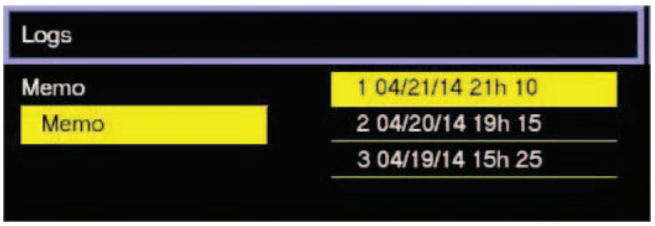
Menu and Display Information (cont.)

Logs

Memorization Display Screen
The charger can display the details of the last 300 charge cycles.
The display here shows that 3 charges have been stored in memory. Memo 1 is the latest charge memorized. After memorizing the three-hundredth charge, the oldest record is deleted and replaced by the next oldest.

Displaying a Charge Cycle
Proceed as follows:

1. Select a record (Memo x) using the ▲/▼ buttons.
2. Display the first History screen by pressing the Enter button.



3. Display the second History screen by pressing ▼.
4. Return to the Main Menu by pressing the ESC button.

The charge history is displayed; use ▲/▼ to scroll through the parameters.

Memorization Data

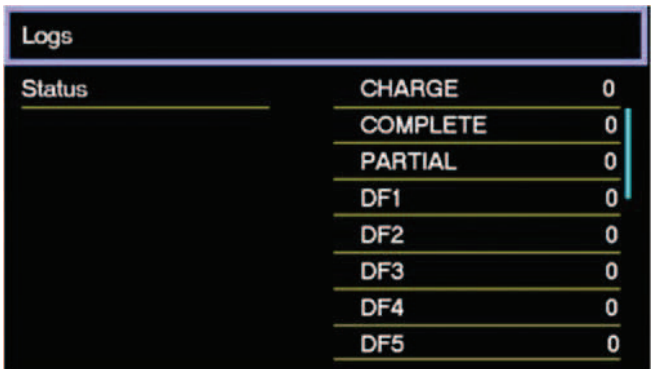
Memo	Description
S/N	Wi-iQ® battery monitoring device serial number
Capacity	Rated battery capacity (Ah)
U batt	Rated battery voltage (V)
Temp	Battery temperature at State of Charge (°F)
Techno	Battery technology
Profile	Selected profile
% init	State of charge at start of charge (%)
U start	Battery voltage at start of charge (Vpc)
U end	Battery voltage at end of charge (Vpc)
Warning	Wi-iQ® battery monitoring device warnings

Memo	Description
I end	Current at end of charge
Temp end	Battery temperature at end of charge (°F)
Chg Time	Time of the charge cycle (minutes)
Ah	Amp-hours returned during charge cycle
kWh	Kilowatt-hours returned during charge cycle
Status	Partial or complete
Default	Fault codes
SoC	Start of charge date and time
DBa	Battery disconnect date and time
CFC	Termination code (for service technician)

Menu and Display Information (cont.)

Status
This menu displays the status of the charger's internal counters (number of normal and partial charges, fault code, etc.).

Status	Description
Charge	Total number of charges - corresponds to the total of normally terminated charges and charges terminated with or by faults.
Complete	Number of charges normally terminated.
Partial	Number of charges terminated abnormally.
TH	Number of charger temperature faults.
DF1 etc.	Number of faults recorded by the charger (see Fault Codes).



Status Screen

Setting Parameters

Parameter	Description
Date/Time	Sets date and time of the charger. The clock has a battery backup which will preserve the time when power to the charger is off.
Language	Selects the language displayed in the menus.
Region	Selects the format for date, metric (EU) or imperial (US) units for temperature, length and cable gauge in both metric and AWG.
Display	Set screen saver function and display themes.
Screen Saver	Enables or disables the screen saver function.
Delay Savings	Set the time the screen stays illuminated. The delay time is adjustable in minutes up to one hour and 59 minutes.
Themes	Themes A and B are two different ways that information is displayed throughout the charge cycle as seen in table below. Theme A is selected by default and will be used in this manual.
Daylight Savings	Enables or disables automatic clock adjustment for daylight savings time. When enabled, time will move ahead one hour at 02:00 on the second Sunday in March and will move back one hour at 02:00 on the first Sunday of November. The charger must be powered up at the time of the change for it to take effect.

USB
This menu provides access to the USB function to update software.
Software updates are provided by EnerSys®.

Password
This is where the password is entered to gain access to service level menus by authorized EnerSys® service personnel.

Service and Troubleshooting

Fault Display
In case of a fault, one of the corresponding fault codes listed below will appear on the display. If it is a critical fault, charging will stop and the red Fault LED will be illuminated.

Fault Codes

Fault	Cause	Solution
DF-CUR	Current fault before DF1 (can be low mains, phase missing or faulty module).	Call for service.
DF1	Critical current fault, all modules are on DF1 fault (check the mains and phase missing).	Call for service.
DF2	Output fuse fault, battery reverse polarity.	Check the correct connection of the battery (reversed polarity cables) and the output fuse.
DF3	Incorrect battery voltage for charger setting.	Battery voltage too high or too low. Battery voltage must be between 1.6V and 2.4V per cell for lead-acid technology. Use proper charger for battery.
DF4	Overdischarge.	Charge continues.
DF5	Battery or charger setting inspection (Ah security, charge timeout, negative voltage Dv/Dt).	DF5 appears when the charging profile has been achieved with a fault condition. That can be an increase in current during the regulation phase indicating 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.
DF7	Air pressure pump fault. Current Di-Dt, thermal runaway.	Call for service.
TH	Charger thermal fault, all modules are on thermal fault (check air flow and ambient temperature).	Verify the proper operation of the fans and/or absence of too high ambient temperature, or there is poor natural ventilation to the charger.
TH-Amb	Ambient temperature too high.	Move the charger to a place with lower ambient temperature. Follow instructions on installation and safety.
DFMOD	Module faulty (refer to Module Menu to know the fault type).	Call for service.
MOD DEF	Module is unplugged or does not answer.	Clean the module or the backplane connection. If not working, call for service.
MOD DFC	Module converter faulty; the module can't output the maximum current (check the AC phases and AC fuse).	Check power supply.

Service and Troubleshooting (cont.)

Fault	Cause	Solution
MOD TH	Module thermal fault (check the air flow, ambient, refer to Module Status Description to check the internal temperature sensor).	Check that the fan(s) is (are) working correctly and/or that the ambient temperature is not too high or whether there is poor natural ventilation to the charger. **If all modules are in thermal fault, a TH fault will follow.**
MOD FUS	Module output fuse damaged.	Call for service.
MOD Err	Module internal error.	Call for service (check the Module Status Description).
MOD VBAT	Battery voltage is corrupted vs fuse voltage and VLMFB vs Modules.	Call for service (check the voltage reading on the Module Status Description).
BAT TEMP	Wi-iQ® battery monitoring device battery temperature too high.	Battery needs to cool down.
TH-LOCK	Module is locked because of repetitive thermal events.	Check the Exx, CDV file to reset the lock, or call for service.
POWER MODULE OFF	No CANbus communication between display and module.	Check ribbon cable, AC mains, module plugged, idle = off or call for service.
DF-TECHNO	Wi-iQ® battery monitoring device setting does not match the charger type.	Check charger and Wi-iQ® battery monitoring device settings (example Wi-iQ® battery monitoring device set for NexSys® battery charger with IMPAQ charger).
DF-VREG	Modules do not follow the regulation voltage setting.	Call for service (replace the faulty module).
DF-ID	Menu setting does not match the module type (ie: cell setting = 12V, module type 40 cells).	Use correct module.
	**Default of balance voltage detected by the Wi-iQ® battery monitoring device.**	**Check each battery cell during discharge. Control if the Wi-iQ® battery monitoring device is properly adjusted (see Wi-iQ® battery monitoring device instructions for mounting).**
CANBUSERROR	CANbus error.	Call for service.
DEFEEP	Memory access denied.	Call for service.
DEFRTC	Clock access denied.	Call for service.

⚠ WARNING THERE ARE DANGEROUS VOLTAGES WITHIN THE BATTERY CHARGER CABINET. ONLY A QUALIFIED PERSON SHOULD ATTEMPT TO ADJUST OR SERVICE THIS BATTERY CHARGER.

The charger requires minimal maintenance. Connections and terminals should be kept clean and tight. The unit (especially the heatsink) should be periodically cleaned with low-pressure air to prevent any excessive dirt buildup on components. Care should be taken not to bump or move any adjustments during cleaning. Make sure that both the AC lines and the battery are disconnected before cleaning. The frequency of this type of maintenance depends on the environment in which this unit is installed.

Any data, descriptions or specifications set forth herein are subject to change without notice. Before using the product(s), the user is advised and cautioned to make their own determination and assessment of the suitability of the product(s) for the specific use in question and is further advised against relying on the information contained herein, as it may relate to any general use or indistinct application. It is the ultimate responsibility of the user to ensure that the product is suited, and the information is applicable to the user's specific application. The product(s) featured herein will be used under conditions beyond the manufacturer's control and therefore all warranties, either express or implied, concerning the fitness or suitability of such product(s) for any particular use or in any specific application, are disclaimed. The user expressly assumes all risk and liability, whether based in contract, tort or otherwise, in connection with the use of the information contained herein or the product itself.

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