CHARGING
SOLUTIONS

NexSys® iOUTDOOR

Charger

OWNER'S MANUAL

EnerSys®
Power/Full Solutions

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INTRODUCTION

NexSys® + OUTDOOR

Charger

The information contained in this document is critical for safe handling and proper use of the NexSys®+ Outdoor 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, battery or NexSys®+ Outdoor 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 of the battery charger system.

For service, contact your sales representative or visit:
https://www.enersys.com/en/sales-services/

Your Safety and the Safety of Others is Very Important

⚠ WARNING You may be seriously injured if you don't follow these and other related instructions.

FEATURES & INFORMATION

Features

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

3ph
24/36/48V
72/80V
96V

- Wireless integration with Wi-iQ® battery monitoring devices.
- Individual battery pack recognition and automatic pairing with the charger.
- Rugged 6-bay IP54/NEMA3R rated enclosure (outdoor cabinet).
- Modular design (up to 21kW).
- Multi-voltage 24/48, 72/96V DC.
- HF modular technology with efficiency up to 94%.
- Internal heater, fans and filter.
- Unique profile for charging Thin Plate Pure Lead (TPPL).
- Unique profiles for NexSys® battery charge applications: NXBLOC; NXSTND; NXSFAST; NXP2V; NXPBLC.
- 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.
- External START/STOP and equalization buttons.
- Two chargers in parallel to double DC output is an available option.
- Operating conditions should be -4°F to 113°F (-20°C to +45°C).

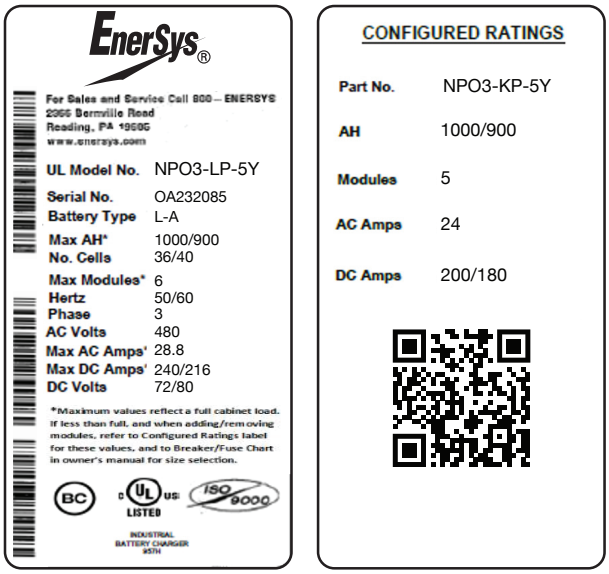
Technical Information

Main Nameplates (UL model number) vs. Configured Rating (part number) Labels

There are two nameplates located on the outside of the charger. The main nameplate includes the UL model number and the ratings of the cabinet at its full capacity, while the Configured Ratings nameplate includes the part number and the ratings of the cabinet as configured. **The Configured Ratings nameplate must be replaced when adding or removing modules permanently in the field.**

The Part Number is required in any discussion or correspondence regarding this unit.

Nameplate Labels



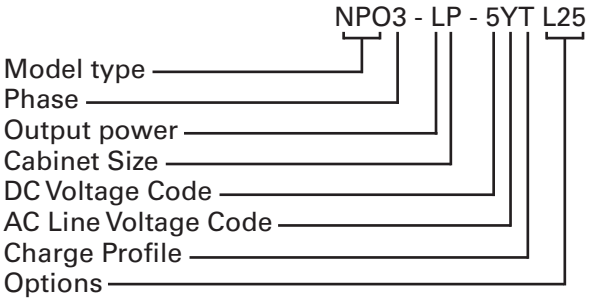
Technical Information (cont.)

Nameplate Label Definitions

Item	Description
UL Model No	UL-recognized number that indicates the ratings of the cabinet at its full capacity.
Serial Number	Provides date code.
Battery type	L-A: Lead-Acid; Li-ion: Lithium-ion.
Max Ah	Maximum amp-hour capacity of this cabinet.
No. Cells	Number of battery cells this unit will charge. **Any battery connected to the charger output should have the same number of cells.**
Max Modules	Maximum number of modules the cabinet can hold.
Hertz	AC input voltage frequency. **Under no conditions operate the charger at a different frequency or from a generator with unstable frequency.**
Phase	Number "3" indicates a three phase charger and number "1" indicates a single phase charger.
AC Volts	Nominal voltage for which this charger is rated to operate.
Max AC Amps	Maximum AC amps for which this cabinet is rated.
Max DC Amps	Maximum output DC amps for which this charger is rated.
DC Volts	Nominal DC output voltage of the charger.
Part Number	Indicates the complete information about the charger.
Ah	Largest ampere-hour (Ah) capacity of the battery this charger is designed to charge efficiently as configured.
Modules	Actual number of power modules installed in the charger cabinet.
AC Amps	AC current drawn by the charger with the number of power modules shown in Configured Ratings nameplate.
DC Amps	DC current that this charger will deliver to a discharged battery with the number of power modules installed.
CEC	Logo is applied to chargers that are certified with the California Energy Commission in compliance with appliance efficiency regulations.
cULus	Logo is applied to chargers that have been tested to applicable standards and requirements by Underwriters Laboratories (UL) and the Canadian Standards Association (CSA). c UL us LISTED

Part Number Decoder

Single Display Cabinet:



Technical Information (cont.)

Output Power Letter Codes

Letter Code	Output Power (kW)	Number Modules	Module Power (kW)
I	10.5/7.5*	3	3.5/2.5*
J	14.0/10.0*	4	3.5/2.5*
K	17.5	5	3.5
L	21.0	6	3.5
M	24.5	7	3.5
N	28.0	8	3.5

*Three Phase/Single Phase

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

Letter Code	Module Positions	Standard Cable Gauge	Comments
P	6	3/0	Six slot, 3.5 kW cabinet
R	8	3/0	Eight slot, 3.5 kW cabinet

DC Line Voltage Letter Codes

Number Code	Output Voltage(s)
1	12
2	24
3	36/48
4	24/36/48
5	72/80
8	96

AC Line Voltage Letter Codes

Letter Code	Voltage(s) (volts rms)	Line Frequency (Hertz)	Comments
C	600	50/60	600 VAC only
G	208/220/240	50/60	208/220/240 VAC
Y	480	50/60	480 VAC only

Charge Profile Letter Codes

Letter Code	Charger Profile	Description
C	Cold Storage	IEI (constant current, constant voltage, constant current) type with several user-configurable parameters specifically designed for cold storage applications.
G	Gel-Bloc	IEI (constant current, constant voltage, constant current) charging profile designed for gelled electrolyte type sealed lead-acid batteries.
I	IONIC™	The IONIC™ charge profile diagnoses the battery status throughout the recharge phase and adjusts its parameters to optimize the charge of flooded battery technology. Short current pulses injected during charge stimulate gas formation in the active material, allowing for a better density distribution of sulfuric acid (homogenization) across the surface of the plates. Being performed during the regular charge, this sophisticated form of equalization improves charge efficiency in terms of charge time reduction and heat generation.

Technical Information (cont.)

Letter Code	Charger Profile	Description
LI	LITH	When a NexSys® iON battery is connected, the CAN communication between the battery and charger is established and the message "BMS CONNECTED" will be displayed on the screen. The battery BMS will control the charge current and voltage through the CAN.
O	Opportunity(*)	Designed for opportunity charging operations. It includes a start rate of up to 25% C6 and an equalize charge performed once a week. The weekly equalize charge can be programmed to run automatically.
T	NXBLOC	Designed for NexSys® TPPL bloc batteries at 0.2 to 0.7 C6 charging rates.
T2	NXSTND	Designed for NexSys® 2V batteries at 0.2 to 0.25 C6 charging rates.
T3	NXFAST	Designed for NexSys® 2V batteries at 0.26 to 0.40 C6 charging rates.
T4	NXPBLC	This charging profile allows charging of NexSys® TPPL bloc batteries at rates of 0.2 to 0.7 C6.
T5	NXP2V	This charging profile allows charging of NexSys® TPPL 2V batteries at rates of 0.2 to 0.4 C6.
V	VRLA	IEIE (constant current, constant voltage, constant current, constant voltage) profile type for Valve Regulated Lead-Acid (VRLA) batteries.

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 80% of C6 throughout the work week. Sufficient time should be scheduled after the weekly equalization 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 traditional flooded lead-acid batteries, performed after normal charging, balances the electrolyte densities in the battery's cells.
NOTE: The factory default is Daily Charge DISABLED, 6-8 hours equalize, Sunday at 00 hour for flooded, 2-hour week/maintenance charge for NexSys® charge 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 inhibited 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

- DC cables for lithium at different lengths
- DC cables for lead-acid at different lengths
- Floor Stand
- Air Filter Metal Mesh
- Air Filter IP54
- LM1, LM2
- CAN
- Ethernet
- PAR (Parallelization)
- PAR + Ethernet
- CAN + Ethernet
- Series Charging Harness

Safety Precautions

- **⚠ WARNING** The shipping pallet must be removed for proper and safe operations.
- 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.
- Read and understand all setup and operating instructions before using the battery charger to prevent damage to the battery and to the charger.
- 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.
- During charge, lead-acid batteries produce hydrogen gas, which can explode 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 to allow any gases released to escape. Never disconnect the battery while it is being charged.
- Unless charger is equipment 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. To avoid arcing, please push START/STOP button before disconnecting the battery.
- Lead-acid batteries contain sulfuric acid, which causes 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.
- Only factory-qualified personnel should install, set up and service this equipment. De-energize all AC and DC power connections before servicing the charger.
- Must be used in conformance with its indicated level of protection and never come into contact with water.
- Must not be installed on surfaces subject to vibration (near compressors, engines, motors).
- Must be installed so that the gases from the battery being charged do not get sucked into the charger by its fans.
- Do not expose the charger to moisture. Operating conditions should be -4°F to 113°F (-20°C to +45°C); 0 to 70% relative humidity.
- Do not operate the charger if it has been dropped, received a sharp impact, or otherwise damaged in any way.
- For continued protection and to reduce the risk of fire, install chargers on a non-combustible surface.
- 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.
- The DC cables of the charger emit low power magnetic fields in their surroundings (<5cm). People with medical implant devices should avoid being near the charger while charging.
- 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 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 dust, combustible material, and corrosive fumes. Also, **avoid high temperatures (above 113°F [45°C])** or potential liquid spill on the charger.

Do not obstruct the openings in the charger for air ventilation. This includes air inlets on the front and underside of the charger as well as the air outlet grid on the back of the charger.

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

It is recommended to mount the charger **at least 28 inches (72 cm) radial distance** away from the closest top edge of the battery.

Cabinet Mounting
The charger can be mounted on a wall, stand, shelf, or floor in a vertical position. The minimum distance between two chargers must be 4 inches (10 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, or humidity.

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).

Electrical Connections
To prevent failure of the charger, make sure it is connected to the correct line voltage. Follow your local and National Electrical Code (NEC) 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.

Connecting Input Power
Connect the input power to the appropriate terminals and apply appropriate torque as follows:

Phase	Power (kW)	Cabinet (Bay)	Terminals			Torque (in-lbs)
3	2.5/3.5	6	L1	L2	L3	15
3	2.5/3.5	8	L1	L2	L3	25

Three phase chargers are not phase rotation sensitive and work with a grounded Delta or Wye electrical service configuration.

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 Breaker/Fuse Chart table in this manual, and the National Electrical Code, NFPA 70.

AC Amps (A)	Breaker Fuse Size (A)
1 - 12	15
12.1 - 16	20
16.1 - 20	25
20.1 - 24	30
24.1 - 28	35
28.1 - 32	40
32.1 - 36	45
36.1 - 40	50
40.1 - 48	60
48.1 - 56	70
56.1 - 64	80
64.1 - 72	90
72.1 - 80	100
80.1 - 88	110
88.1 - 100	125

Installation (cont.)

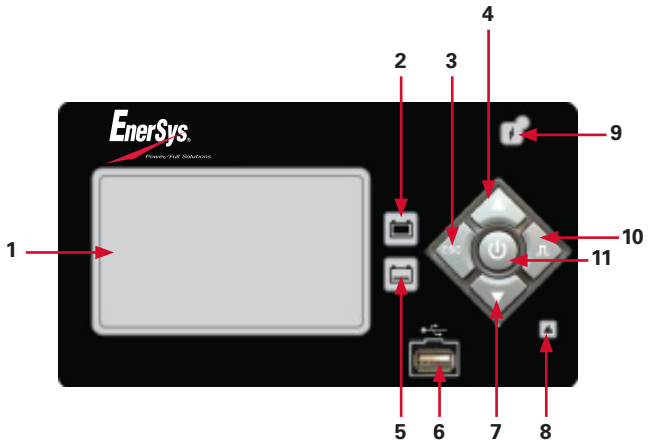
Grounding the Charger
Connect ground wire to the proper terminal usually marked with either of the two symbols (below). Apply same torque value per the table in the Connecting Input Power section.

DANGER FAILURE TO GROUND THE CHARGER COULD LEAD TO FATAL ELECTRIC SHOCK. Follow National Electrical 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.

Control Panel

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

Operating Instructions

Charge Operation

To provide the ingress protection specified by design, the charger needs to be operated with both cabinet doors locked. All routine battery charging operations can be accomplished without accessing the control panel. Simply connect the charger terminals to the battery terminals and use the external push buttons accessible on the front of the charger.

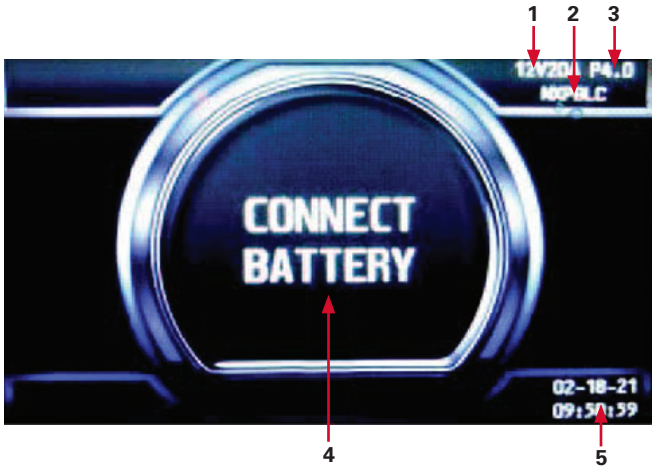
Charger idle display: With the charger in wait mode (no battery connected) and without pressing the Stop/Start button, the display will show the following information:

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

- Connect battery: Make sure the charger connector(s) matches the battery connector(s). Plug the charger connector(s) to the battery connector(s). For chargers with dual connectors, both connectors must be connected in order to start a charge.
- NexSys® iON batteries come with specific type of connector. The NexSys+ Outdoor 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.

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 Stop/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 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.



Charger idle display

Figure 1

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 1.**

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

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 (**Figure 2**).

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".

Pause Charging
To pause charging, press the START/STOP button once. To resume charging, press the START/STOP button once more (**Figure 3**).

Charge Complete
Figure 2: 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 indicator 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 for more information.

Figure 2

Figure 3

- 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 ON/OFF button before unplugging the battery.

Operating Instructions (cont.)

End of Charge with Equalization
An equalize charge can be started manually or automatically.

Manual Equalization Start
- The EQUALIZE button can also be pressed any time during the charge and an equalization charge will be scheduled 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.

Automatic Equalization Start
- If an equalization day has been programmed in charger configurations, 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.

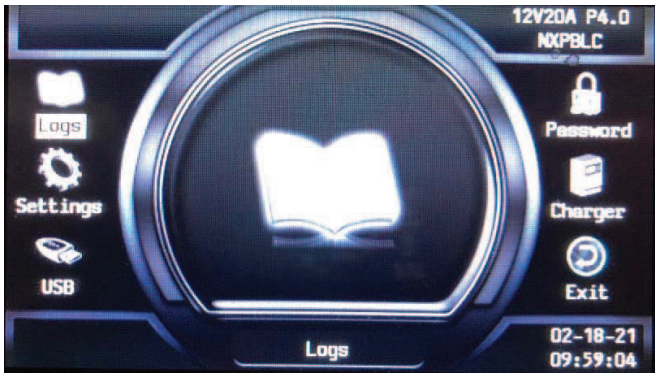
AC Power Failure
If the AC power fails with a battery connected to the charger during a charge cycle, the charger will reset and start a new charge cycle when power is restored. All charger settings, as well as the time and date, are preserved.

Series Charging
In series charging, the voltages of both batteries add up and must match charger's nameplate DC volts rating. The charger's ampere-hour rating must be equal to each battery's ampere-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 the Exit button, 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 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.



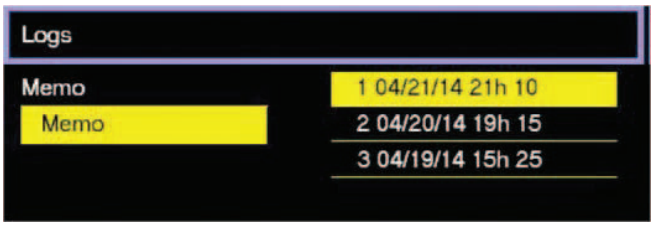
The menus provide access to the following functions:
- Logs (): View status and memorizations
- Charger (): View faults, alarms, etc.
- USB (): USB functions
- Settings (): Setting date, language and others
- Password (): Management of password (for service technicians only)
- Exit (): Exit main menu

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

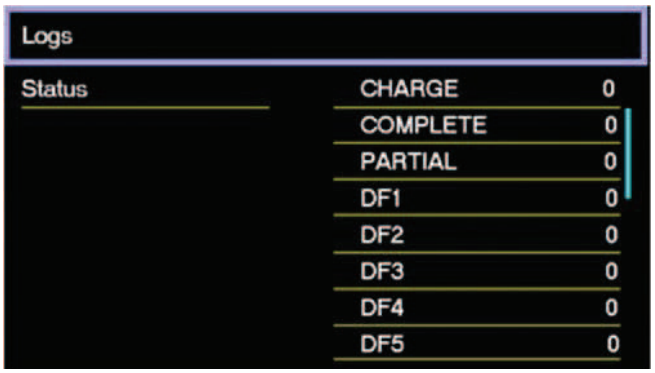
Memo	Description
S/N	Wi-iQ® battery monitoring device serial number
Capacity	Rated battery capacity (Ah)
U batt	Rated battery voltage (V)
Temp	Battery temperature at State of Charge (°F)
Techno	Battery technology
Profile	Selected profile
% init	State of charge at start of charge (%)
U start	Battery voltage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

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.

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 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.

Fault Codes (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 locking 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® Fast Battery 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 of mounting).**
CANBUSERROR	CANbus error.	Call for service.
DEFEEP	Memory access denied.	Call for service.
DEFRTC	Clock access denied.	Call for service.

Maintenance and 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 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 unit or make 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.

To ensure proper charger unit ventilation and protection against particulate matter intrusion, routine air filter inspection and maintenance is required. The filter is accessible from the front of the unit by unlocking and opening the two doors. Be sure to disconnect the charger from all power sources (AC grid, batteries) prior to opening any charger door.

Maintenance and Service (cont.)

Intervals for inspection are application-specific, depending on the environmental conditions in which the unit operates. The maximum interval for inspection is 90 days, with more frequent inspection required in areas with higher levels of airborne dust, dirt, or other particulate contaminants, or if the filter routinely becomes wet or moist. Upon inspection, if the exterior-facing surface of the filter appears to be darkened or clogged with contaminant, is carrying contaminant on its surface, or if the filter appears to be damaged or compromised in any manner, it should be replaced with a new filter.

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.

Figure 4: Control panel is accessible once outer cabinet door is opened.

Figure 5: Air filter, heater and power modules are accessible once the second inner door is opened.

Figure 6: Control panel not accessible when cabinet is closed. Use external buttons for Start/Stop, pause, and equalization functions.

Figure 4

Figure 5

Figure 6

Technical Specifications

SINGLE CABINET Technical Specifications

CELLS IN SERIES	CATALOG NUMBER	INPUT AC AMPS	VAC	# OF MODULES	DC OUTPUT (AMPS)	CABINET SIZE	CHARGER WEIGHT (LBS)
			480 VAC				
12, 18, 24	NPO3-IP-4Y	14.4	480	3	240/240/180	6	151
12, 18, 24	NPO3-JP-4Y	19.2	480	4	320/320/240	6	159
12, 18, 24	NPO3-KP-4Y	24	480	5	320/320/300	6	167
12, 18, 24	NPO3-LP-4Y	28.8	480	6	320/320/320	6	174
36, 40	NPO3-IP-5Y	14.4	480	3	108/108	6	151
36, 40	NPO3-JP-5Y	19.2	480	4	144/144	6	159
36, 40	NPO3-KP-5Y	24	480	5	180/180	6	167
36, 40	NPO3-LP-5Y	28.8	480	6	216/216	6	174

CELLS IN SERIES	CATALOG NUMBER	INPUT AC AMPS	VAC	# OF MODULES	DC OUTPUT (AMPS)	CABINET SIZE	CHARGER WEIGHT (LBS)
			208/240 VAC				
12, 18, 24	NPO3-IP-4G	22.2/21.0/19.2	208/240	3	120/120/120	6	151
12, 18, 24	NPO3-JP-4G	29.6/28.0/25.6	208/240	4	160/160/160	6	159
12, 18, 24	NPO3-KP-4G	37.0/35.0/32.0	208/240	5	200/200/200	6	167
12, 18, 24	NPO3-LP-4G	44.4/42.0/38.4	208/240	6	240/240/240	6	174
36, 40	NPO3-IP-5G	23.1/21.9/20.1	208/240	3	75/75	6	151
36, 40	NPO3-JP-5G	30.8/29.2/26.8	208/240	4	100/100	6	159
36, 40	NPO3-KP-5G	38.5/36.5/33.5	208/240	5	125/125	6	167
36, 40	NPO3-LP-5G	46.2/43.8/40.2	208/240	6	150/150	6	174

PARALLEL Technical Specifications

CELLS IN SERIES	CATALOG NUMBER	INPUT AC AMPS	VAC	# OF MODULES	DC OUTPUT (AMPS)	CABINET SIZE	CHARGER WEIGHT (LBS)
			480 VAC				
12, 18, 24	NPO3-JP-4YPAR	38.4	480	8	640/640/480	2x6	2x 159
12, 18, 24	NPO3-KP-4YPAR	48	480	10	640/640/600	2x6	2x167
36, 40	NPO3-JP-5YPAR	30.4	480	8	288/288	2x6	2x159
36, 40	NPO3-KP-5YPAR	48	480	10	360/360	2x6	2x167
36, 40	NPO3-LP-5YPAR	57.6	480	12	432/432	2x6	2x174

CELLS IN SERIES	CATALOG NUMBER	INPUT AC AMPS	VAC	# OF MODULES	DC OUTPUT (AMPS)	CABINET SIZE	CHARGER WEIGHT (LBS)
			208/240 VAC				
12, 18, 24	NPO3-JP-4GPAR	60/56/50	208/240	8	320/320/320	6	2x159
12, 18, 24	NPO3-KP-4GPAR	74.0/70.0/64.0	208/240	10	400/400/400	6	2x167
12, 18, 24	NPO3-LP-4GPAR	88/84.0/76	208/240	12	480/480/480	6	2x174
36, 40	NPO3-JP-5GPAR	62/60/54	208/240	8	200/200	6	2x159
36, 40	NPO3-KP-5GPAR	76/72/66	208/240	10	250/250	6	2x167
36, 40	NPO3-LP-5GPAR	92/88/80	208/240	12	300/300	6	2x174

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