



NexSys[®]+

MODEL: NIP1/NIP3/NPE1/NPE3



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1. Features

- 1.1. Microprocessor-controlled
- 1.2. Able to auto identify battery's capacity
- 1.3. Able to adapt to State of Charge (SoC) in IONIC™ charge profile
- 1.4. Compatible with battery voltages of 12, 24, 36, 48, 60, 64, 72 and 80
- 1.5. Wireless integration with EnerSys® Wi-iQ® battery monitoring devices
- 1.6. Individual battery pack recognition and automatic pairing with the charger
- 1.7. Unique profile for charging Thin Plate Pure Lead (TPPL)
- 1.8. Unique IONIC charge profile for flooded (patented)
- 1.9. Unique profiles for NexSys® battery charge applications. GEN 1 - NXBLOC; NXSTND; NXSFAST. GEN 2 - NXP2V; NXPBLC.
- 1.10. Remote access via E Connect™ mobile app to change settings, monitor charger and share data
- 1.11. Controller Area Network (CAN) communication capable
- 1.12. Fully programmable to unique fleet requirements
- 1.13. Battery chemistry agnostic - Lithium-ion (Li-ion), TPPL, Flooded Lead Acid

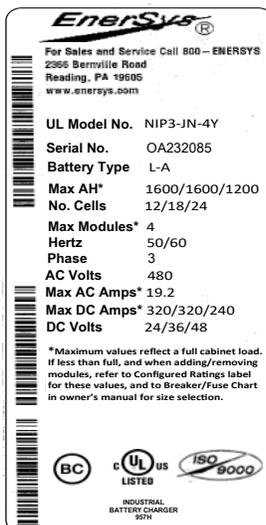
2. Technical Information

2.1. Main nameplates (UL model number) vs. Configured Rating (Part number) labels

2.1.1. 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 label must be replaced when adding or removing modules permanently in the field.**

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

2.1.3 Name plate labels



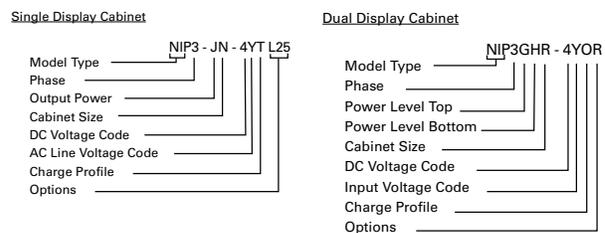
CONFIGURED RATINGS	
Part No.	NIP3-HN-4YT
AH	800/800/600
Modules	2
AC Amps	9.6
DC Amps	160/160/120

2.1.4. Name plate 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-hours 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 Amperes-Hours (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 Underwriter Laboratories (UL) and the Canadian Standards Association (CSA)



2.1.5. Part number decoder



2.1.6. Output power letter codes

Letter Code	Output Power (kW)	Number Modules	Module Power (kW)
A	1.0	1	1.0
B	2.0	2	1.0
C	3.0	3	1.0
D	4.0	4	1.0
E	5.0	5	1.0
F	6.0	6	1.0
G	2.5/2.5*	1	3.5/2.5*
H	7.0/5.0*	2	3.5/2.5*
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

2.1.7. Cabinet size (number of modules available) and DC cable size

Letter Code	Module Positions	Standard Cable Gauge	Comments
L	2	1/0	Two slot, 3.5 kW cabinet
M	3	4 AWG	Three slot, 1 kW cabinet
N	4	3/0	Four slot, 3.5 kW cabinet
P	6	2/0	Six slot, 1 kW cabinet
P	6	3/0	Six slot, 3.5 kW cabinet
R	8	3/0	Eight slot, 3.5 kW cabinet

2.1.8. DC line voltage letter codes

Number Code	Output Voltage(s)
1	12
2	24
3	36/48
4	24/36/48
5	72/80
6	64
7	60

2.1.9. AC line voltage letter codes

Letter Code	Voltage(s) (volts rms)	Line Frequency (Hertz)	Comments
A	120	50/60	120 VAC only
C	600	50/60	600 VAC only
G	208/220/240	50/60	208/220/240 VAC
Y	480	50/60	480 VAC only

2.1.10. 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.
LI	LITH	When a NexSys® iON Li-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 PURE bloc batteries at rates of 0.2 to 0.7 C6
T5	NXP2V	This charging profile allows charging of NexSys PURE 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.

2.2. (*) Opportunity profile options

2.2.1. 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 equalize charge to allow battery cooling and to perform periodical electrolyte level checks.

2.2.2. 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.

2.3. Equalization charging

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

2.3.2. 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® charge profiles.

2.4. Block out time

2.4.1. 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.

2.5. Refresh charging

2.5.1. 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.

2.6. Specialty charger option list

Suffix	Description
C6	6 Ft of AC Cord
C10	10 Ft of AC Cord
C12	12 Ft of AC Cord
C18	18 Ft of AC cord
L10*	10 Ft of DC cable
L13	13 Ft of DC cable
L15*	15 Ft of DC cable
L18	18 Ft of DC cable
L20*	20 Ft of DC cable
L25	25 Ft of DC cable
L30	30 Ft of DC cable
PLC	Programmable Logic Controller
R	Remote ready
IR	Remote Installed
LM2	Late Break/Early Make
CAN	Controller Area Network
Ethernet	Network Connection

*L10, L15 and L20 cable lengths are the only available options for Lithium Chargers as well as standard.

3. Safety Precautions

- 3.1. 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.
- 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. Ventilate well when the battery is in an enclosed space.
- Unless charger is equipment with LM2 (Late Break/Early Make) 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.
- 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 15 minutes. Seek medical attention immediately.

3. Safety Precautions (cont.)

- 3.8. Only factory-qualified personnel should install, set up and service this equipment. De-energize all AC and DC power connections before servicing the charger.
- 3.9. The charger is **not** for outdoor use.
- 3.10. **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.
- 3.11. **Do not** operate the charger if it has been dropped, received a sharp impact, or otherwise damaged in any way.
- 3.12. For continued protection and to reduce the risk of fire, install chargers on a non-combustible surface.
- 3.13. 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.
- 3.14. 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.

4. Installation

4.1. Location

- 4.1.1. For safe operation, choose a location which is free of excess moisture, dust, combustible material, and corrosive fumes. Also, **avoid high temperature (above 113°F (45°C))** or potential liquid spill on the charger.
- 4.1.2. **Do not** obstruct the openings in the charger for air ventilation.
- 4.1.3. Follow charger warning label when mounting on or over a combustible surface.
- 4.1.4. It is recommended to mount the charger **at least 28 inches radial distance** away from the closest top edge of the battery.

4.2. Cabinet mounting

- 4.2.1. The charger must be mounted on a wall, stand, shelf or floor in a vertical position. The minimum distance between two chargers must be 12 inches.
- 4.2.2. The charger must be installed with four 5/15-inch bolts or with the bracket supplied. Charger should be permanently fastened in place.
- 4.2.3. For shelf mounting, part number 159-6LA22723 is required – two per charger.

4.3. Electrical connections

- 4.3.1. To prevent failure of the charger, make sure it is connected to the correct line voltage. Follow your local and National Electric Code (NEC) in making these connections.
- 4.3.2. **WARNING: Make sure the power source is OFF and the battery is disconnected before connecting the input power to the terminals of the charger.**

4.4. Connecting input power

- 4.4.1. Connect the input power to the appropriate terminals and apply appropriate torque as follow:

Phase	Power (kW)	Cabinet (Bay)	Terminals		Torque (in-lbs)
1	1	1 and 3	L*	N*	6
1	2.5/3.5 2.5/3.5	4	L2	L3	15
3	2.5/3.5	4 and 6	L1	L2 L3	15
3	2.5/3.5	8	L1	L2 L3	25

*For 208/220/240V 1 kW single phase, connect L1 to Terminal L and L2 to terminal N.

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

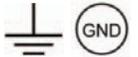
4.5. AC circuit protection

- 4.5.1. 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.
- 4.5.2. **CAUTION: Risk of Fire. Use only on circuits provided with branch circuit protection in accordance with the 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

4.6. Grounding the charger

- 4.6.1. Connect ground wire to terminal marked with either of the two symbols to the right and apply same torque value per the table in section 4.4.1.



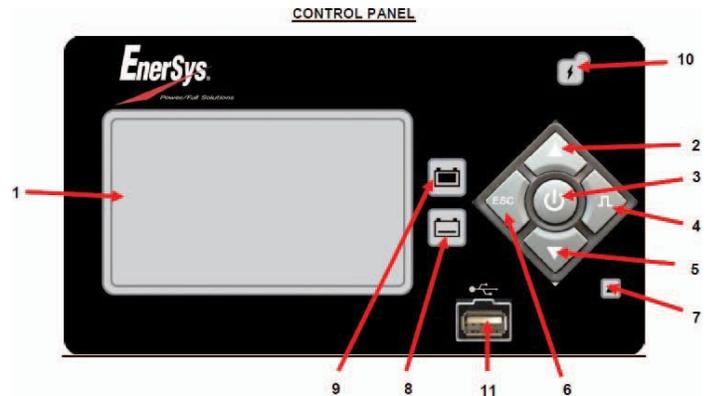
- 4.6.2. **DANGER: FAILURE TO GROUND THE CHARGER COULD LEAD TO FATAL ELECTRIC SHOCK. Follow National Electric Code for ground wire sizing.**

4.7. DC connector polarity

- 4.7.1. DC plug polarity
- 4.7.2. 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.

5. Operating Instructions

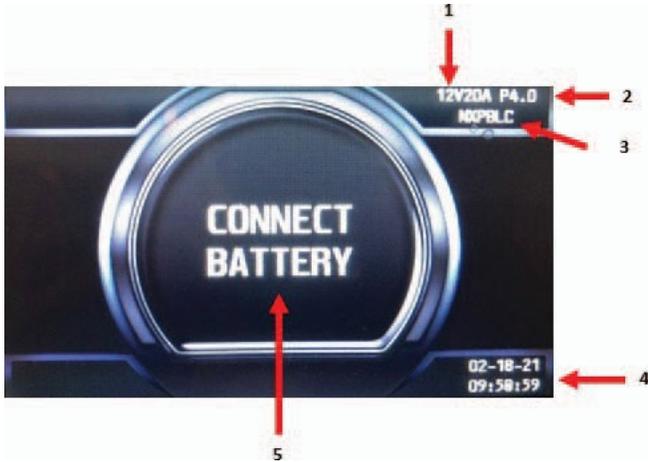
5.1. Control panel features



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

5.2. Charge operation

5.2.1. 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:



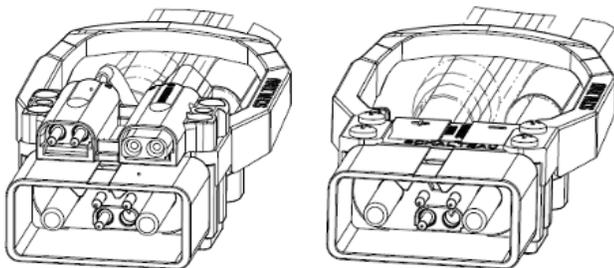
Reference	Description
1	Charger DC Voltage
2	Firmware Version
3	Selected Charge Profile
4	System Time and Date
5	Connect Battery

5.2.2. 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.

5.2.3. NexSys® iON Li-ion 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 arclless option called Late Make Early Break to prevent arcing if battery is disconnected while charging.

5.2.4. 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.

5.3. Connectors for NexSys iON Batteries



5.4. 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.

5.4.1. 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.



5.4.2. Without a Wi-iQ® Device: If the Wi-iQ device adapter is not enabled or no Wi-iQ devices are in range, effective charging starts after the programmed delay. **The charger uses Profile, Capacity and Temperature settings programmed in the Configuration menu.**

5.4.3. PAIRING with a Wi-iQ Device: If one or more Wi-iQ 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 device in range is connected to the battery charger. Once the charger makes the determination, it downloads data from Wi-iQ device, displays the battery S/N, updates the profile capacity, and temperature for charging, and starts the main charge.



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

5.4.4. 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 (6).

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".

5. Operating Instructions (cont.)

5.5. Stop charging

5.5.1. The charging can be paused and restarted where it left off at any time. Just hit the center power button (marked as number 3 in control panel section) Remote is available for controlling at a distance.

5.6. Charge complete

5.6.1. End of charge display



5.6.2. End of charge without equalization

5.6.2.1. The green complete LED comes on after proper end of charge. The green complete LED is on and the display shows CHARGE COMPLETE. The display alternates between:

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

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

5.6.2.3. If the battery remains plugged in and refresh charge has been enabled, refreshes will occur to maintain an optimal charge.

5.6.2.4. The battery is now ready for use. Push the ON/OFF button before unplugging the battery.

5.6.3. End of charge with equalization

5.6.3.1. An Equalize charge can be started manually or automatically.

5.6.4. Manual equalization start

5.6.4.1. At the end of charge (green LED on or flashing), press on the <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.

5.6.4.2. 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.

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

5.6.5. Automatic equalization start

5.6.5.1. 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.

5.6.5.2. 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 ON/OFF button before unplugging the battery.

5.7. AC power fail

5.7.1. 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.

5.8. Series charging

5.8.1. 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 ampere-hour rating. Charge cycle will not start unless both batteries are connected.

6. Menu and Display Information

6.1. Main menu display

6.1.1. 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.



6.1.2. 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.

6.1.3. The menus provide access to the following functions:

- View status and memorizations (LOGS icon)
- Viewing of faults, alarms, etc. (CHARGER icon)
- USB functions (USB icon)
- Setting of date, language and others (SETTINGS icon)
- Management of password (For service technicians only)
- Exit main menu (EXIT icon)

6.2. Logs

6.2.1. Memory display screen

6.2.1.1. The charger can display the details of the last 300 charge cycles.

6.2.1.2. The display here shows 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.



6.2.2. Display a charge cycle

6.2.2.1. Proceed as follows:

1. Select a record (MEMO x) using the ▲/▼ buttons.
2. Display the first History screen by pressing Enter.
3. Display the second History screen by pressing ▼.
4. Return to the Main Menu by pressing Esc.

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

6. Menu and Display Information (cont.)

6.2.3. Memorization Data

Memo	Description	Memo	Description
S/N	Wi-iQ® device serial number	I end	Current at end of charge
Capacity	Rated battery capacity (AH)	Temp end	Battery temperature at end of charge (F)
U batt	Rated battery voltage (V)	Chg Time	Time of the charge cycle (minutes)
Temp	Battery temperature at start of charge (F)	AH	Amp-hours returned during charge cycle
Techno	Battery technology	kWh	Kilowatt-hours returned during charge cycle
Profile	Selected profile	Status	Partial or Complete
% init	State of charge at start of charge (%)	Default	Fault codes
U start	Battery voltage at start of charge (Vpc)	SoC	Start of charge date and time
U end	Battery voltage at end of charge (Vpc)	DBa	Battery disconnect date and time
Warning	Wi-iQ device warnings	CFC	Termination code (for service tech)

6.2.4. Status

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

6.2.4.2. Status screen

Logs		
Status	CHARGE	0
	COMPLETE	0
	PARTIAL	0
	DF1	0
	DF2	0
	DF3	0
	DF4	0
	DF5	0

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)

6.3. 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.

6.4. USB

6.4.1. This menu provides access to the USB function to update software.

6.4.2. Software Updates are provided by EnerSys®.

6.5. Password

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

7. Service and Troubleshooting

7.1. 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.



7.2. Fault Codes

Fault	Critical	Cause	Solution
DF1	Yes	Low output current	Call for service
DF2	Yes	Output fault	Call for service
DF3	Yes	Incorrect battery	Call for service
DF4	No	The battery has been discharged more than 80% of its capacity.	Call for service
DF5	No	Battery requires inspection	Call for service
DF7	No	Inspect battery	Call for service
TH or TH-Amb	Yes	Charger overheating	Call for service
BAT TEMP	Yes	Battery temperature reached maximum level.	Allow battery to cool down
MOD TH	No	Alternating with charge parameters – one or more module in thermal fault – the charge process continues – the fault module(s) is (are) displayed + red led flashing.	Call for service
DFMOD	No	Alternating with charge parameters – one or more module in DF1 fault – the charge process continues – the fault module(s) is (are) displayed + red led flashing.	Call for service
DEF ID	Yes	Blocking fault – one or more modules are not compatible with the charger configuration (for example 24 V charger with one 48 V module). This can happen if the user replaces one module with another one with a different voltage setting.	Call for service
	No	Battery balance fault	Call for service

7.3. Maintenance and service

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

7.3.2. The charger requires minimal maintenance. Connections and terminals should be kept clean and tight. The unit (especially the heatsink) should be periodically cleaned with a low pressure air to prevent any excessive dirt build up 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.

**For service, contact your sales representative or call:
1-800-ENERSYS (USA) 1-800-363-7797**

7.3.3. 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 its 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.