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Installation, Operation  
and Maintenance  
Instructions

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**EnerSys**<sup>®</sup>

Power/Full Solutions

RESERVE  
POWER

## IMPORTANT

Please read this manual immediately on receipt of battery before unpacking and installing. Failure to comply with these instructions will render any warranties null and void.

The term battery within this literature pertains to (1) 16 volt battery consisting of (8) individuals cells.

## CARE FOR YOUR SAFETY



Dispose at registered waste handling facility



Battery must be recycled



Protect eyes from electrolyte



Read instructions



Do not charge in sealed container

### Handling

DataSafe® 16HX batteries are supplied in a fully charged state and must be unpacked carefully to avoid very high short-circuit currents between terminals of opposite polarity. Use care when handling and moving batteries. Appropriate lifting equipment must be used.

### Keep flames away

In case of accidental overcharge, a flammable gas can leak off the safety vent.

Discharge any possible static electricity from clothes by touching an earth connected part.

### Tools

Use tools with insulated handles.

Do not place or drop metal objects on the battery. Remove rings, wristwatch and articles of clothing with metal parts that may come into contact with the battery terminals.

### Other safety precautions that need to be taken



No smoking, no naked flames, no sparks



Danger



Electrolyte is corrosive



Clean all acid splash in eyes or on skin with plenty of clean water. Then seek medical help. Acid on clothing is to be washed with water.



Risk of explosion or fire. Avoid any short circuit. Metallic parts under voltage on the battery, do not place tools or items on top of the battery.

## RECEIVING THE SHIPMENT

Carefully examine the battery shipment upon arrival for any signs of transit damage and that it agrees with the materials list or packing slip. Be very careful not to inadvertently discard any accessories contained in the packing material.

Batteries contain sulfuric acid in glass fiber separators.

Use rubber gloves when handling broken or damaged containers in case of acid leakage.

## STORAGE

Store DataSafe 16HX batteries in a dry, clean and preferably cool location.

Since the batteries are supplied charged, storage time is limited. In order to easily charge the batteries after prolonged storage, it is advised not to store it more than:

- 6 months at ambient temperature no warmer than 77°F (25°C)
- 4 months at 86°F (30°C)
- 2 months at 104°F (40°C)

Give the battery a freshening charge before the end of the recommended storage interval.

A refreshing charge shall be performed at 18.08 Volts per battery (2.26 Volts per cell) at 77°F (25°C) for 96 hours or until the charge current does not vary for a 3 hour period.

The necessity of a charge can also be determined by measuring the open circuit voltage of a stored battery.

Charge is advised if the voltage drops below 16.56 Vpb (2.07 Vpc).

Maximum total storage prior to installation is 2 years from date of shipment from factory to the customer. Freshening charges are required before the end of the storage time period or more frequently, as noted above.

Failure to observe these conditions may result in greatly reduced capacity and service life.

**FAILURE TO CHARGE AS NOTED VOIDS THE BATTERY'S WARRANTY.**

## INSTALLATION

Install in clean, dry area. DataSafe 16HX product releases minimal amounts of gas during normal operation (gas recombination efficiency  $\geq 95\%$ ). It can be installed near the main equipment. Batteries must be installed in accordance with local, state and federal regulations and manufacturers instructions.

### ■ Temperature

Avoid placing the battery in areas of high temperature or in direct sunlight. The battery will give the best performance and service life when working at a temperature between 68°F (20°C) and 77°F (25°C). The normal continuous operating temperature range is between -22°F (-30°C) and 113°F (45°C). Reasonable precautions should be taken so that the continuous operating temperature is not sustained below -22°F (-30°C) or above 113°F (45°C).

### ■ Ventilation

Under normal conditions gas release is very low and natural ventilation is sufficient for cooling purposes and inadvertent overcharge, enabling DataSafe 16HX batteries to be used safely in offices and with main equipment.

However care must be taken to ensure adequate ventilation when placed in cabinets. Batteries must not be placed in sealed cabinets.

### ■ Security

All installation and ventilation must comply with the current local, state and federal regulations.

### ■ Mounting

EnerSys® battery racks or cabinets are recommended for proper installation.

Assemble the rack according to instructions. Place the battery blocs or cells on the rack and arrange the positive and the negative terminals for connection. Check that all contact surfaces are clean and apply the bloc or cell connectors and terminal hardware.

Tighten nuts securely. Follow the polarity to avoid short circuiting batteries. Finally connect the battery terminals. It is important that the battery is mounted firmly.

### ■ Torque

The maximum torque load of intercell connector nuts is 11.3 to 12.5 Nm (100 to 110 lb. in) for M8 nut. A loose connector can cause problems in charger adjustment, erratic battery performance, possible damage to the battery and/or personal injury. Finally, install the connector covers (optional).

*NOTE: Top terminal connections are secured with Nord-Lock® washers. This washer provides a secure terminal connection over the life of the battery. If loosened, this connection should have a maximum torque load of 9 to 10Nm (80 to 90 Lb.in) applied to the M6 screw.*

## CELLS IN PARALLEL STRINGS

When using constant voltage chargers, ensure that the connections between the charger and the end of each string within the battery have the same electrical resistance. Parallel strings must be limited to five strings.

## CHARGING

### ■ Float Voltage

The float/charge voltage is 18.08 Vpb (2.26 Vpc) at 77°F (25°C).

When the average ambient temperature deviates more than ± 9°F (5°C) from the reference, it is necessary to adjust the float voltage as follows :

18.96 to 19.04 Vpb (2.37 to 2.38 Vpc) at 32°F (0°C)  
 18.40 to 18.64 Vpb (2.30 to 2.33 Vpc) at 50°F (10°C)  
 18.16 to 18.40 Vpb (2.27 to 2.30 Vpc) at 68°F (20°C)  
 17.92 to 18.16 Vpb (2.24 to 2.27 Vpc) at 77°F (25°C) (reference T°C)  
 17.84 to 18.08 Vpb (2.23 to 2.26 Vpc) at 86°F (30°C)  
 17.68 to 17.92 Vpb (2.21 to 2.24 Vpc) at 95°F (35°C)

### ■ Charging Current

Utilizing a constant voltage charger results in a charging current that is self limiting.

### ■ Fast Recharge

Occasionally (4 or 5 times a year) the battery may be recharged at 19.20 Vpb (2.40 Vpc) with a current limited to the values listed in Table 2. Fast charging should be stopped after approximately 10 or 15 hours.

### ■ Ripple Current

Unacceptable levels of ripple current from the charger or the load can cause permanent damage and a reduction in service life. It is recommended to limit the continuous ripple current to the values of the Table 2 (in amperes).

### ■ State of Charge

The battery state of charge can be determined approximately by measuring the open circuit voltage after the battery has been at rest for a minimum of 24 hours at 77°F (25°C).

State of charge	Voltage
100%	17.04 to 17.12 Vpb (2.13 to 2.14 Vpc)
80%	16.72 to 16.88 Vpb (2.09 to 2.11 Vpc)
60%	16.48 to 16.64 Vpb (2.06 to 2.08 Vpc)
40%	16.16 to 16.32 Vpb (2.02 to 2.04 Vpc)
20%	15.76 to 16.00 Vpb (1.97 to 2.00 Vpc)

## DISCHARGING

### ■ End of Discharge Voltage

The end of discharge voltage must be limited to 12.8 Vpb (1.60 Vpc).

A protecting system must be installed to prevent deep discharges.

### ■ Discharged Cells

DataSafe® 16HX batteries must not be left in a discharged condition after supplying the load, and must be immediately returned to float recharge mode.

Failure to observe these conditions may result in greatly reduced service life and unreliability.

### ■ Accidental Deep Discharge

When the battery is completely discharged, the sulfuric acid is completely absorbed and the remaining electrolyte consists only of water.

At this point, the sulfation of the plates is at its maximum, considerably increasing the cell's internal resistance.

- **Important notice** : this type of deep discharge will provoke a premature deterioration of the battery and a noticeable effect on life expectancy.

### ■ The effect of temperature on capacity

Correction factor of the capacity, according to temperature.

Time of discharge	1 min to 60 mins
41°F (5°C)	0.84
50°F (10°C)	0.88
59°F (15°C)	0.93
68°F (20°C)	0.97
77°F (25°C)	1.00
86°F (30°C)	1.03
95°F (35°C)	1.05
104°F (40°C)	1.07

Table 1

## MAINTENANCE/CHECKS

DataSafe 16HX batteries are maintenance free, sealed, lead acid batteries and need no water addition.

The containers and lids shall be kept dry and free from dust. Cleaning must be done only with a damp cotton cloth. Check monthly that total voltage at battery terminals is 17.92 to 18.16 Vpb for a temperature of 77°F (25°C). (N being the number of cells in the battery).

Every 12 months, read and record the following:

- Individual cell or unit voltages (volts)
- Cell-to-cell connection resistance (ohms)
- Terminal connection resistance (ohms)
- Ambient temperature in the immediate battery environment

Keep a logbook to record values, power outages, discharge tests, etc.

An autonomy check can be carried out once or twice a year.

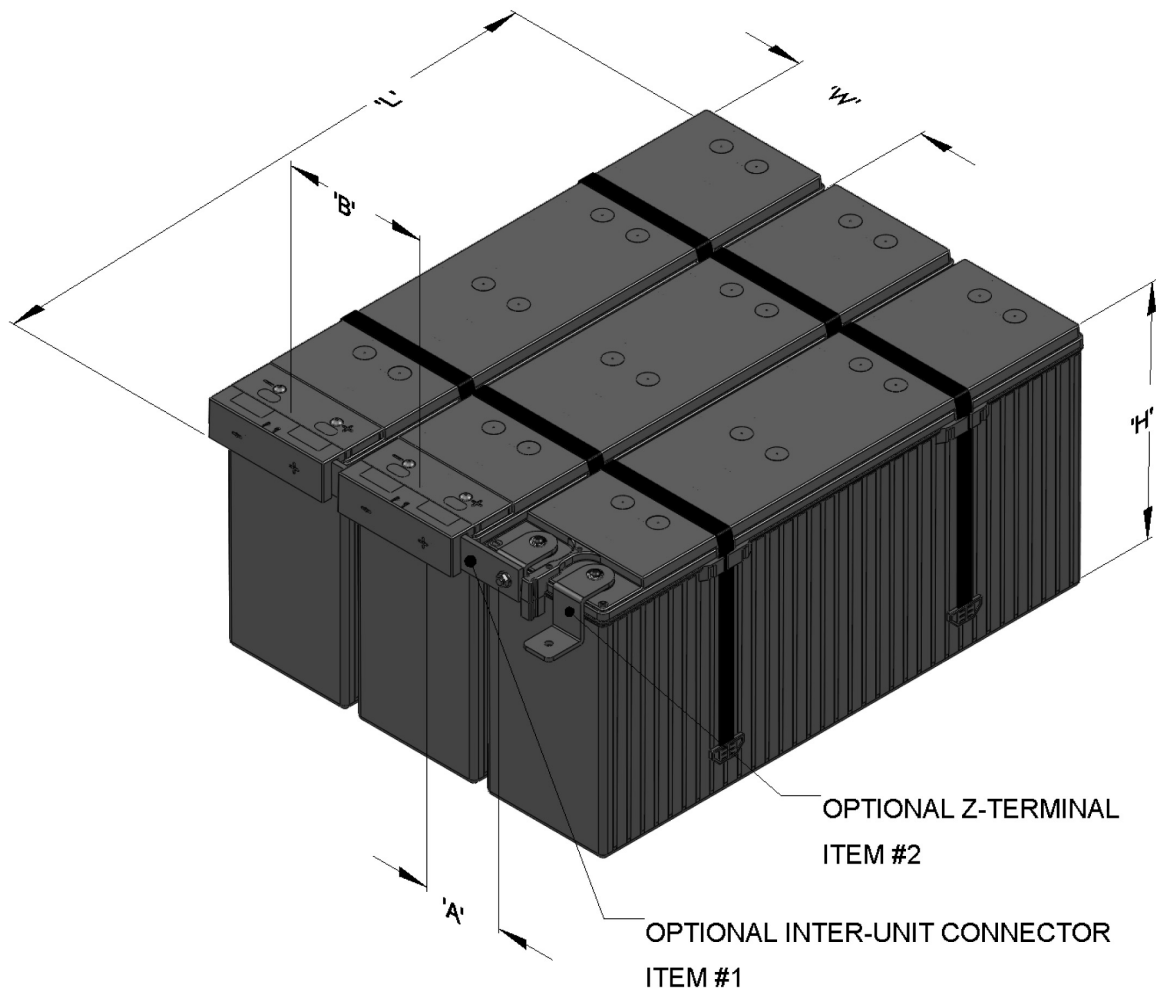
The above record taking is the absolute minimum to protect the warranty. This data will be required for any warranty claim made on the battery.

## RECOMMENDED CURRENT LIMIT VALUES WHEN RECHARGING WITH CONSTANT VOLTAGE RECHARGING METHOD

Type	Maximum charging current (A)	Max recommended rms value of the alternating component (A)
16HX550F	12.0	6.0
16HX800F	20.0	10.0
16HX925F	23.0	11.5

Table 2

## INTER-UNIT CONNECTOR LAYOUT



Type	A		B		L		W		H		Weight		Item 1* 10 Minutes + 1.67 End Volts @77°F (25°C)	Item2* 10 Minutes + 1.67 End Volts @77°F (25°C)
	Inches	mm	Inches	mm	Inches	mm	Inches	mm	Inches	mm	Lbs.	kg.		
16HX550F	2.7	69	4.6	117	27.2	692	4.6	117	12.3	313	151	68	827500TP	827580TP
16HX800F	3.9	99	7.0	178	27.2	692	7.0	178	12.3	313	232	105	827502TP	827578TP
16HX925F	3.9	99	7.0	178	27.2	692	7.0	178	12.3	313	248	112	827502TP	827578TP

\* For run times under 10 minutes or end voltages less than 1.67, consult Engineering for assistance.

Connectors and Z-Terminals are RoHS compliant.

Batteries come standard with a stainless steel hardware package; p/n NUTPKG16V-STD (one package per unit).  
An optional stainless steel hardware package with brass dual tab washers is available; p/n NUTPKG16V-DTW.



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