

The world's first 16V Front Terminal UPS battery



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Battery Installation, Operation  
and Maintenance Instructions

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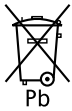


Available exclusively from EnerSys®, the world leader in stored power solutions.

## Important

Please read this manual immediately upon receipt of battery prior to 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) individual 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® HX-FT 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 escape from 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, wristwatches and any other articles of clothing with metal parts that may come into contact with the battery terminals.

### Other safety precautions that need to be taken



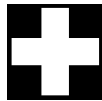
No smoking, no naked flames, no sparks



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® HX-FT 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 2.26 Volts per cell (VPC) or 18.08 Volts per battery (VPB) 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.

Charging is advised if the voltage drops below 2.07 VPC (16.56 VPB).

Maximum total storage prior to installation is 2 years from date of shipment from the 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 HX-FT batteries release minimal amounts of gas during normal operation (gas recombination efficiency  $\geq 95\%$ ). The batteries can be installed near the main equipment. Batteries must be installed in accordance with local, state and federal regulations and the manufacturer's instructions.

### ■ Temperature

Avoid placing batteries in areas of high temperature or in direct sunlight. The batteries will give their best performance and service life when operating at a temperature between 68°F (20°C) and 77°F (25°C), however they are capable of operating in a temperature range of -22°F (-30°C) to 122°F (50°C). Please reference the charging float voltage section for more information regarding float voltage adjustments for temperature variations. Reasonable precautions should be taken to prevent continuous operation below -22°F (-30°C) or above 122°F (50°C).

### ■ Ventilation

Under normal conditions gas release is very low and natural ventilation is sufficient for cooling purposes and inadvertent overcharge, enabling DataSafe HX-FT 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.

### ■ Stowing

For proper installation, EnerSys® battery racks and cabinets are recommended.

For rack installations, reference Assembly Instructions for DataSafe HX and HX Front Terminal UBC Battery Racks (US-HXRACK-IM).

For cabinet installations, reference Installation, Operation and Maintenance Manual for DataSafe Front Terminal Battery Cabinets (US-HXFT-CAB).

Intercell connector covers (provided) should be installed after completing the intercell connections.

**Attention:** Unless otherwise noted, battery racks and cabinets should not be transported with rigid intercell connectors in place.

### ■ Torque

The maximum torque load of intercell connector nuts (M8) is 11.3 to 12.5 N•m (100 to 110 in-lbs). A loose connector can cause problems in charger adjustment, erratic battery performance, possible damage to the battery and/or personal injury.

**NOTE:** Top terminal connections are secured with Nord-Lock® washers. These washers provide an effective terminal connection over the life of the battery. If loosened, this connection should be tightened to a maximum torque of 9 to 10 Nm (80 to 90 in-lbs).

## Cells in Parallel Strings

When utilizing a constant voltage charger, ensure that the connections from the charger and the end of each string have the same electrical resistance. To reduce the risk of current imbalance, the number of parallel strings in any system should be limited to five.

## Charging

### ■ Float Voltage

The float/charge voltage is 2.26 VPC (18.08 VPB) 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 :

- 2.37 to 2.38 VPC (18.96 to 19.04 VPB) at 32°F (0°C)
- 2.30 to 2.33 VPC (18.40 to 18.64 VPB) at 50°F (10°C)
- 2.27 to 2.30 VPC (18.16 to 18.40 VPB) at 68°F (20°C)
- 2.25 to 2.28 VPC (18.00 to 18.24 VPB) at 77°F (25°C) (reference)
- 2.23 to 2.26 VPC (17.84 to 18.08 VPB) at 86°F (30°C)
- 2.22 to 2.25 VPC (17.76 to 18.00 VPB) at 95°F (35°C)

### ■ Fast Recharge

Occasionally (4 or 5 times a year) the battery may be recharged at 2.40 VPC (19.20 VPB) with a current limited to the values listed in Table 1. This charging should not be allowed to continue for more than 16 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 1 (in amperes).

DataSafe® HX-FT Battery Model	Maximum charging current (A)	Max recommended rms value of the alternating component (A)
16HX550F	31.0	6.0
16HX800F	51.0	10.0
16HX925F	55.0	11.5

Table 1

### ■ Charging Current

The recommended charging method for DataSafe HX-FT batteries is current limited, constant voltage charging. Refer to Table 1 for the current limits for each battery model.

### ■ 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).

## Discharging

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

Table 2

### ■ End of Discharge Voltage

The end of discharge voltage must be limited to 1.60 VPC (12.8 VPB). A protecting system must be installed to prevent deep discharges.

### ■ Discharged Cells

DataSafe® HX-FT 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.

## Maintenance and Records

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 3

DataSafe HX-FT batteries are maintenance free, sealed, lead acid batteries and need no water addition. These batteries are equipped with self-resealing, flame-arresting safety vents.

The containers and lids shall be kept dry and free from dust. Cleaning must only be done with a damp cotton cloth. Check monthly that total voltage at battery terminals, while on float, is 17.92 to 18.16 VPB for a temperature of 77°F (25°C).

Every 12 months, read and record the following:

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

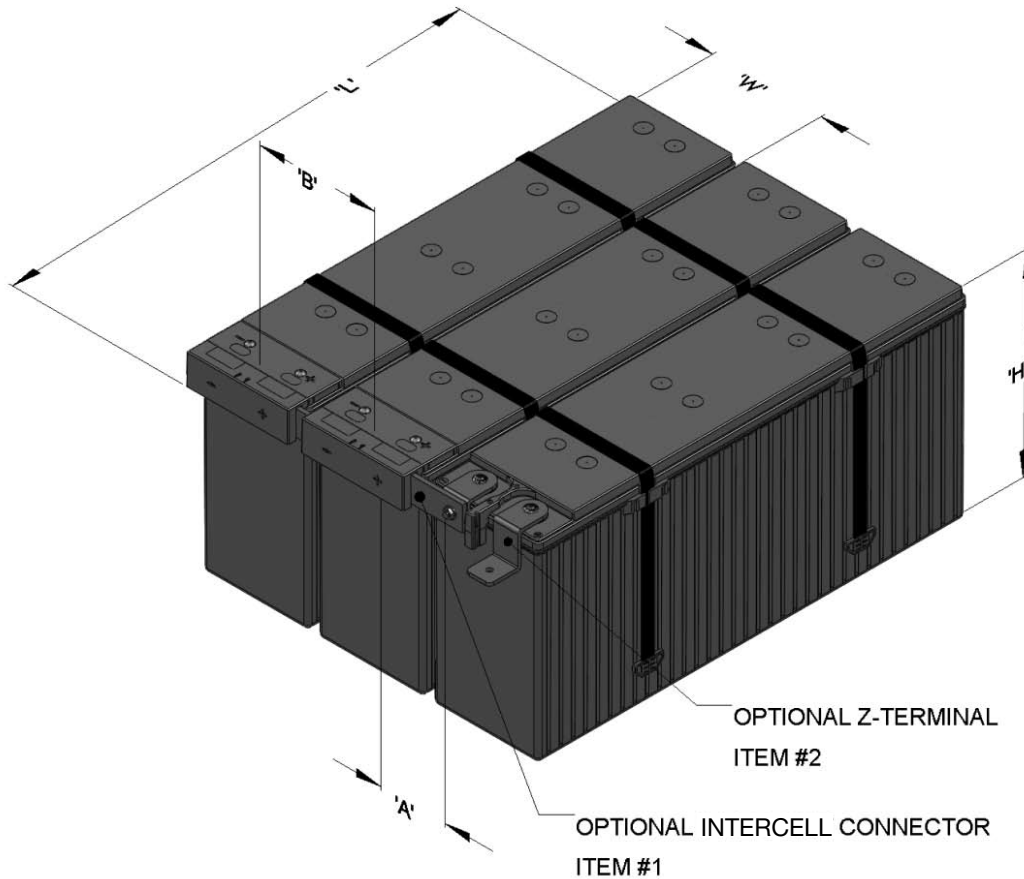
Keep a logbook to record values, power outages, discharge tests, etc.

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.

## Intercell Connector Layout



DataSafe <sup>®</sup> HX-FT Battery Model	Number of Cells	A		B		L		W		H		Weight		Item 1*	Item 2*
		In	mm	In	mm	In	mm	In	mm	In	mm	Lbs	kg		
16HX550F	8	2.7	69	4.6	117	27.2	692	4.6	117	12.3	313	151	68	827500TP	882040TP
16HX800F	8	3.9	99	7.0	178	27.2	692	7.0	178	12.3	313	232	105	827502TP	882041TP
16HX925F	8	3.9	99	7.0	178	27.2	692	7.0	178	12.3	313	248	112	827502TP	882041TP

Table 4

\* For run times under 10 minutes or end voltages less than 1.67, consult technical support 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 battery).

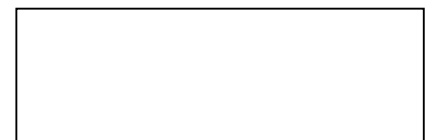
An optional stainless steel hardware package with brass, dual tab washers is available (p/n NUTPKG16V-DTW).



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