

Installation, Operation
and Maintenance
Instructions



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.

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 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 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, 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™ HX 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 V/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 2.07 V/cell.

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 HX batteries release minimal amounts of gas during normal operation (gas recombination efficiency $\geq 97\%$). It can be installed near the main equipment. Batteries must be installed in accordance with federal, state and local law 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 usual operating temperature is between -4°F (-20°C) and 113°F (+45°C). Limits are comprised between -22°F (-30°C) and 131°F (+55°C).

■ Ventilation

Under normal conditions gas release is very low and natural ventilation is sufficient for cooling purposes and inadvertent overcharge, enabling DataSafe HX 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 federal, state and local 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 the terminal screws.

Tighten the screws securely. Follow the polarity to avoid short circuiting of cell groups. Finally connect the battery terminals. It is important that the battery is mounted firmly.

■ Torque

The maximum torque load of intercell connector bolts is 6.8 to 10 Nm (60 to 88 in.lbf) for M6 screw. 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).

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 should be limited to five strings.

CHARGING

■ Float Voltage

The float/charge voltage is 2.26 V per cell at 77°F (25°C).

When the average ambient temperature deviates more than $\pm 9^\circ\text{F}$ (5°C) from the reference, it is necessary to adjust the float voltage as follows:

- 2.33 to 2.36 Vpc at 32°F, (0°C)
- 2.30 to 2.33 Vpc at 50°F, (10°C)
- 2.27 to 2.30 Vpc at 68°F, (20°C)
- 2.24 to 2.27 Vpc at 77°F, (25°C) (reference T°C)
- 2.23 to 2.26 Vpc at 86°F, (30°C)
- 2.21 to 2.24 Vpc at 95°F, (35°C)

Due to the phenomena of gas recombination, a difference of $\pm 2\%$ (earlier in float life $\pm 5\%$ is common) for an individual cell voltage can be observed. However, the total voltage of the battery shall be within the limits stated above.

■ Charging Current

The charging current is self limiting.

■ Fast Recharge

Occasionally (4 or 5 times a year) the battery may be recharged at 2.40 V per cell with a current limited to the values listed in the 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%	2.12 to 2.14 V/Cell
80%	2.09 to 2.11 V/Cell
60%	2.05 to 2.08 V/Cell
40%	2.01 to 2.04 V/Cell
20%	1.97 to 2.00 V/Cell

DISCHARGING

■ End of Discharge Voltage

The end of discharge voltage must be limited to 1.60 V per cell.

A protecting system shall have to be installed to prevent deep discharge.

■ Discharged Cells

DataSafe™ HX batteries must not be left in a discharged condition after supplying the load, but 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°, (40°C)	1.07

Table 1

MAINTENANCE/CHECKS

DataSafe HX 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 $(N \times 2.24 \text{ to } 2.27 \text{ V})$ 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.

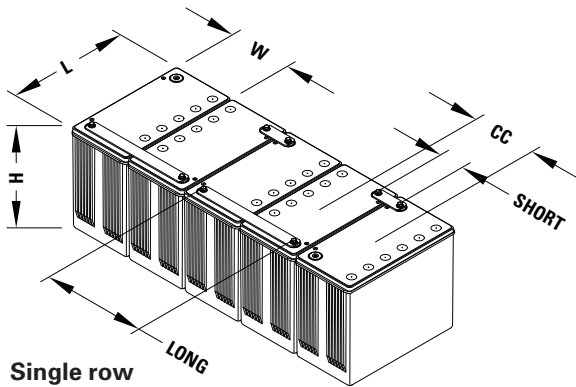
The above record taking is the absolute minimum to protect the warranty. This data will be required for any warranty claim made on the battery.

RECOMMENDED CURRENT LIMIT VALUES WHEN RECHARGING WITH CONSTANT VOLTAGE RECHARGING METHOD

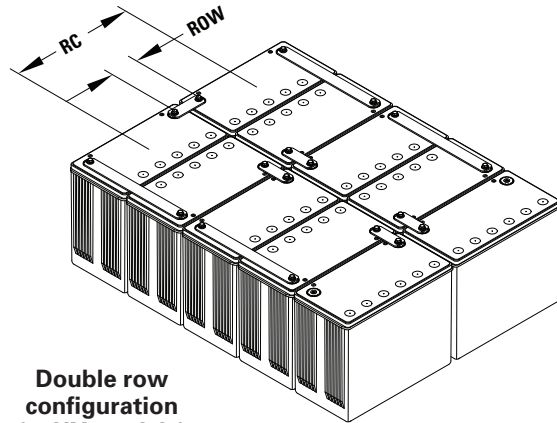
DataSafe™ HX Battery Model	Maximum charging current (A)	Max recommended rms value of the alternating component (A)
12HX205	4.0	2.0
12HX300	7.0	3.5
12HX330	7.0	3.5
12HX400	8.5	4.25
12HX505	10.0	5.0
12HX540	10.0	5.0

Table 2

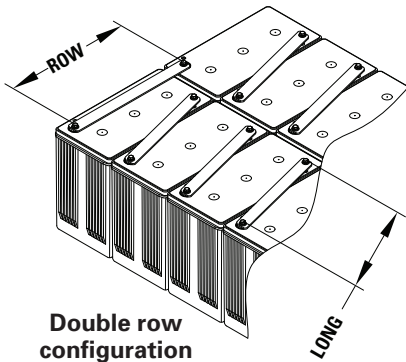
INTER-UNIT CONNECTOR LAYOUT



Single row configuration (12HX models)



Double row configuration (12HX models)



Double row configuration (6HX800 only)

Note: End terminal position will depend upon number of units in row, ie. whether "ODD" or "EVEN" number.

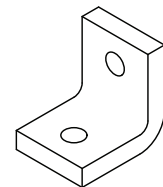
DataSafe™ HX Battery Model	L		W		H	CC		RC		Short		Long		Row		Lbs	kg	
	In	mm	In	mm		In	mm	In	mm	In	mm	In	mm	In	mm			
12HX205	8.9	226	5.5	140	8.1	206	5.6	142	9.1	231	2.2	56	9.0	229	1.9	48	43	20
12HX300	10.2	259	6.9	175	8.2	208	6.9	175	10.3	262	2.7	69	11.2	284	2.2	56	60	27
12HX330	11.8	300	6.8	173	8.4	213	6.9	175	12.1	307	2.7	69	11.2	284	2.5	64	71	32
12HX400	13.3	338	6.8	173	8.3	211	6.9	175	13.4	340	2.7	69	11.2	284	3.0	76	80	36
12HX505	13.3	338	6.8	173	10.7	272	6.9	175	13.4	340	2.7	69	11.2	284	3.0	76	103	47
12HX540	13.3	338	6.8	173	10.7	272	6.9	175	13.4	340	2.7	69	11.2	284	3.0	76	106	48
6HX800	13.4	340	6.8	173	8.3	211	6.9	175	13.2	335	-	-	9.0	229	13.4	340	80	36

Batteries come standard with a stainless steel hardware package; p/n 867500 (one package per unit). The hardware package includes (2) each M6x1 x 16mm long bolts, flat washers and lock washers.

Longer bolts are available and must be specified at the time of order placement

OPTIONAL EXTRAS

DataSafe™ HX Battery Model	SHORT			LONG			ROW			L-TERMINAL
	Connector* 15 Minutes + 1.67 End Volts 77 F (25 C)	Cover Black	Cover Clear	Connector* 15 Minutes + 1.67 End Volts 77 F (25 C)	Cover Black	Cover Clear	Connector* 15 Minutes + 1.67 End Volts 77 F (25 C)	Cover Black	Cover Clear	
12HX205	866881TP	HRD2328	827564	866885TP	HRD2329	827567	866880TP	HRD2328	827564	866889TP
12HX300	866883TP	HRD2327	827565	866886TP	HRD2330	827568	866881TP	HRD2328	827564	866889TP
12HX330	866883TP	HRD2327	827565	866886TP	HRD2330	827568	866882TP	HRD2327	827565	866888TP
12HX400	866883TP	HRD2327	827565	866886TP	HRD2330	827568	866884TP	HRD2327	827566	866888TP
12HX505	866883TP	HRD2327	827565	866886TP	HRD2330	827568	866884TP	HRD2327	827566	827576TP
12HX540	866883TP	HRD2327	827565	866886TP	HRD2330	827568	866884TP	HRD2327	827566	827576TP
6HX800	-	-	-	866887TP	HRD2329	827567	821940TP	-	827569	827576TP



L-Terminal for multiple cables

* For run times under 15 minutes or end voltages less than 1.67, consult Engineering for assistance.

Connectors and L-Terminals are RoHS compliant.



www.enersys.com

EnerSys
Global Headquarters
 P.O. Box 14145
 Reading, PA 19612-4145
 USA
 Tel: +1-610-208-1991
 +1-800-538-3627
 Fax: +1-610-372-8613

EnerSys Europe
 Zurich, Switzerland
 Tel: +41 (0)44 215 7410

EnerSys Asia
 Guangdong, China
 Tel: +86-755-2689 3639

Distributed by:

© 2009 EnerSys. All rights reserved.
 Trademarks and logos are the property of EnerSys and its affiliates unless otherwise noted.