data safe®

*12HX Front Terminal Battery Applications*

# Battery Installation, Operation and Maintenance Instructions

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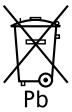
## Important

Read these instructions immediately upon receipt. DataSafe® HX batteries are safe when operated and handled properly. It is vitally important that you observe the precautions recommended in this instruction sheet. YOU SHOULD BE TRAINED IN HANDLING, INSTALLING, OPERATING AND MAINTAINING BATTERIES BEFORE YOU WORK ON ANY BATTERY SYSTEM.

## 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 Front Terminal 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.

## 1. 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.

## 2. Storage

Store DataSafe 12HX-FT batteries in a dry, clean and preferably cool location.

Although batteries are supplied charged, their storage time is limited. The maximum storage intervals prior to a required refreshening charge, based on the battery's date code label, are as follows:

- 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)

A refreshening charge shall be performed at 2.26 Volts Per Cell (VPC) or 13.56 Volts Per Battery (VPB) at 77°F (25°C) for 96 hours or until the charge current does not vary for a three 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 (12.42 VPB).

Maximum total storage prior to installation is two 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.**

## 3. Installation

Install in clean, dry area. DataSafe 12HX-FT batteries release minimal amounts of gas during normal operation (gas recombination efficiency ≥ 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).

- **Torque**
  The maximum torque load of intercell connector nuts (M8) is 100 to 110 in-lbs (11.3 to 12.5 N•m). 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 80 to 90 in-lbs (9 to 10 N•m).

## 4. 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.

## 5. Charging

- **Float Voltage**
  The float/charge voltage is 2.26 VPC (13.56 VBP) 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:
  2.33 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)
  2.25 to 2.28 VPC at 77°F (25°C) (reference)
  2.23 to 2.26 VPC at 86°F (30°C)
  2.22 to 2.25 VPC at 95°F (35°C)

  Due to the phenomena of gas recombination, a difference of ± 2% (earlier in float life ± 5% is common) for an individual cell voltage can be observed, however, the total voltage of the battery should be within the stated limits.
- **Fast Recharge**
  Occasionally (four or five times a year) the battery may be recharged at 2.40 VPC 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 Battery Model | Maximum Charging Current (A) | Max Recommended RMS Value of the Alternating Component (A) |
|---|---|---|
| 12HX680F-FR | 45 | 8.0 |

*Table 1*

- **Charging Current**
  The recommended charging method for DataSafe® HX-FT batteries is constant voltage charging. Utilizing a constant voltage charger results in a charging current that is self-limiting.
- **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). Refer to Table 2 for these approximations.

| State of Charge | Voltage |
|---|---|
| 100% | 2.12 to 2.14 VPC |
| 80% | 2.09 to 2.11 VPC |
| 60% | 2.05 to 2.08 VPC |
| 40% | 2.01 to 2.04 VPC |
| 20% | 1.97 to 2.00 VPC |

*Table 2*

## 6. Discharging

- **End of Discharge Voltage**
  The end of discharge voltage must be limited to 1.60 VPC. A protecting system must be installed to prevent deep discharge.
- **Discharged Cells**
  DataSafe 12HX-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**
  The optimum operating temperature for DataSafe 12HX-FT batteries is 77°F (25°C). The capacity of a battery operated above this optimal temperature generally increases at the expense of battery life while operating below this optimal temperature extends life but at the expense of capacity. Please refer to the recommended practices outlined in IEEE 1188 when determining the effect of temperature on battery capacity.

## 7. Maintenance and Records

DataSafe 12HX-FT batteries are maintenance free, sealed, lead acid batteries. 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 (N x 2.24 to 2.27 V) for a temperature of 77°F (25°C), (where N is the number of cells in the battery).

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.

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