

Instruction Sheet



Important

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

Care for your safety



No smoking, no naked flames, no sparks



Shield eyes



Read instructions



Electrical hazard



Electrolyte is corrosive



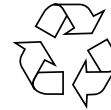
Danger



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



Warning: Risk of fire, explosion, or burns. Do not disassemble, heat above 60°C (140°F), or incinerate. Avoid any short circuit. Metallic parts under voltage on the battery, do not place tools or items on top of the battery



Recycle scrap batteries. Contains lead

Pb

BCI Warning



DANGER

Contains: Lead, Sulfuric Acid (Electrolyte), Lead Compounds.

Harmful if swallowed, inhaled, or in contact with skin. Acid causes severe skin burns and eye damage. May damage fertility or the unborn child if ingested or inhaled. May cause harm to breast-fed children. May cause cancer if ingested or inhaled. Causes skin irritation, serious eye damage. Contact with internal components may cause irritation or severe burns. Causes damage to central nervous system, blood and kidneys through prolonged or repeated exposure if ingested or inhaled. Irritating to eyes, respiratory system, and skin. May form explosive air/gas mixture during charging. Extremely flammable gas (hydrogen). Explosive, fire, blast or projection hazard.

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Wash thoroughly after handling. Do not eat drink

or smoke when using this product. Avoid contact during pregnancy/while nursing. Wear protective gloves/protective clothing, eye protection/face protection. Use only outdoors or in a well-ventilated area. Avoid contact with internal acid. Do not breathe dust/fume/gas/mist/vapors/spray. Keep away from heat/sparks/open flames/hot surfaces. No smoking. IF SWALLOWED OR CONSUMED: rinse mouth. Do NOT induce vomiting. Call a poison center/doctor if you feel unwell. IF ON CLOTHING OR SKIN (or hair): Remove/Take off immediately all contaminated clothing and wash it before reuse. Rinse skin with water/shower. IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER or doctor/physician. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If exposed/concerned, or if you feel unwell seek medical attention/advice. Store locked up, in a well-ventilated area, in accordance with local and national regulation. Dispose of contents/container in accordance with local and national regulation. Keep out of reach of children.

Handling

Genesis® Thin Plate Pure Lead (TPPL) batteries are supplied in a charged condition and are capable of extremely high short circuit currents. Take care to avoid short-circuiting terminals of opposite polarity.

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.

California Proposition 65 Warning - Battery posts, terminals, and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and reproductive harm. Wash hands after handling.

1. Receiving

Upon the receipt of the shipment, check the contents for damage and against the packing slip. Immediately inform EnerSys® of any damaged or missing items. EnerSys is not responsible for shipment damage or shortages that the receiver does not report to the carrier.

2. Storage

2.1. Storage Conditions and Time

If a battery cannot be immediately installed it should be stored in a clean, cool and dry area. During storage monoblocs lose capacity through self-discharge. High temperatures increase the rate of self-discharge and reduce the storage life.

Although these batteries are shipped fully charged and may be stored for up to two years at 77°F (25°C) periodic checks of their open circuit voltages are recommended. The warmer the storage environment, the more frequent the voltage check should be performed. The batteries must be given a freshening charge once every two years or when OCV drops to 12.00V, whichever occurs earlier. Failure to observe these conditions may result in greatly reduced capacity and service life. FAILURE TO CHARGE AS NOTED VOIDS THE BATTERY WARRANTY.

2.2 Freshening Charge

The freshening charge should be for 96 hours at 13.62V at 77°F (25°C) or until the charge current does not vary over a three hour period. Alternatively, the freshening charge can be set at 14.4V for 16 to 24 hours or until the charge current does not vary over a three hour period.

3. Installation

Install the batteries in accordance with the instructions and/or layout drawing, take care to ensure correct terminal location and polarity. On each bloc, the positive and negative terminals are identified with "+" and "-" symbols. Do not handle the batteries by the terminals as this can damage the terminal seals.

Ensure the battery terminals, interconnect straps and cable lugs are clean and free of corrosion. If the environment is corrosive, a light coating of NO-OX can be applied to the battery terminals prior to installing the connectors to the terminals.

Install connectors to the battery with the specified torque:

Battery Model	Terminal Torque
13EP and XE13	50 in-lbs (5.6 Nm)
16EP and XE16	50 in-lbs (5.6 Nm)
26EP and XE30	60 in-lbs (6.8 Nm)
42EP and XE40	60 in-lbs (6.8 Nm)
70EP, XE60 and XE70	60 in-lbs (6.8 Nm)
200EP	44 in-lbs (5.0 Nm)

4. Operation

4.1 Temperature

Avoid placing batteries in areas of high temperature or in direct sunlight. The optimal temperature range for best performance and service life of the Genesis battery is 68°F (20°C) to 77°F (25°C). These batteries can, however be used at temperatures ranging from -40°F (-40°C) to 176°F (80°C) when fitted with a metal jacket.

4.2 Ventilation

Under normal operating conditions the gas emission from the Genesis battery is very low. Natural ventilation is adequate for cooling and to prevent buildup of hydrogen gas. This is why the Genesis battery may be used safely in offices, hospitals and other human environments.

When installing batteries in cabinets or other enclosures, care must be taken to ensure they are not sealed enclosures. UNDER NO CIRCUMSTANCES SHOULD THESE BATTERIES BE CHARGED IN A SEALED ENCLOSURE/CONTAINER.

4.3 Discharge

It is strongly recommended that a low voltage cut-off be included in the battery load circuit to protect the battery from over-discharges. The setting for End of Discharge Voltage (EODV) is dependent on the rate of discharge, as shown in the table below. For optimum battery life, we recommend that the battery be disconnected from the load when the appropriate voltage is reached and put back on charge as soon as possible after discharge.

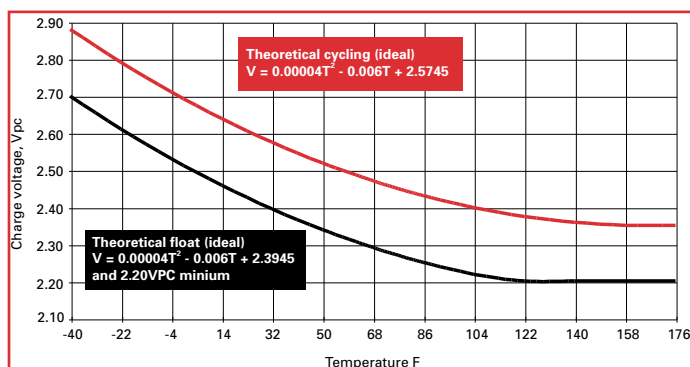
Discharge rate in amps	Suggested minimum EODV
0.05C10 (C10/20)	10.50V
0.10C10 (C10/10)	10.20V
0.20C10 (C10/5)	10.02V
0.40C10 (C10/2.5)	9.90V
1C10	9.60V
2C10	9.30V
>5C10	9.00V

4.4 Charging

In a float or standby application the Constant Voltage (CV) charger should be set at 13.5V to 13.8V at 77°F (25°C). For a cyclic application, the charge voltage should be set between 14.4V and 15V at 77°F (25°C). In both cases, the linearized temperature compensation factor is ±24mV per battery per °C variation from 77°F (25°C). The higher the temperature the lower the charge voltage should be and vice versa.

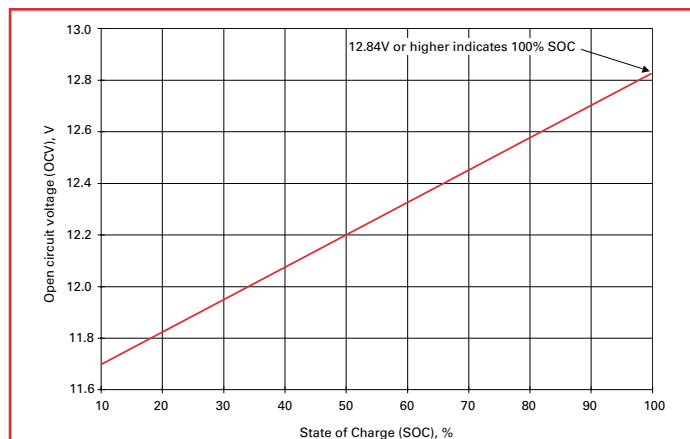
The graph below shows the temperature compensation factor for float and cyclic applications. Equations representing the compensation curves are also shown in this figure. Note that for both types of applications there is no limit on the inrush current. We recommend the highest practical and economical current.

For other possible techniques, refer to the Genesis® Battery Application Manual.



4.5 State of Charge

The graph below shows the Open Circuit Voltage (OCV) and corresponding State of Charge (SOC) for a Genesis battery. An OCV of 12.84V or more indicates a battery at 100% SOC. The figure is accurate to within 20% of the true SOC of the battery if the battery has not been charged OR discharged in the 24 hours preceding the voltage measurement. The accuracy improves to 5% if the period of inactivity before the voltage measurement is five days.



Although efforts should be made to ensure that batteries are stored in temperature-controlled environments, a freshening charge should be applied once every twenty-four (24) months or when the OCV reading drops to 12V, whichever comes first. As shown in the graph, 12V corresponds to a 35% SOC. The battery may be permanently damaged if the OCV is allowed to drop below 11.90V.

4.6 Recovering Over-Discharged Batteries

There may be instances when a Genesis battery is over-discharged to the point where a standard charger is unable to fully recharge the battery. In such cases, the following procedure may help recover the affected battery:

1. Bring the battery to room temperature (77°F (25°C)).
2. Measure the OCV. Continue to Step 3 if it is at least 12V; otherwise terminate the procedure and reject the battery.
3. Charge the battery using a 0.05C₁₀ constant current for 24 hours. The charger should be capable of providing a driving voltage as high as 36V. Monitor the battery temperature; discontinue charging if the battery temperature rises by more than 36°F (20°C).
4. Allow the charged battery to stand on open circuit for a minimum of one hour before proceeding to Step 5.
5. Perform a capacity test on the battery and record the amp-hours delivered. The longer the discharge the more reliable the result. This is Cycle 1.
6. Repeat Steps 3 to 5. The capacity returned in Step 5 is now Cycle 2. If Cycle 2 capacity is greater than Cycle 1 capacity proceed to step 7; otherwise reject the battery.
7. Repeat Steps 3 to 5 to get Cycle 3 capacity. Proceed to step 8 if Cycle 3 capacity is equal to or more than Cycle 2 capacity. Reject the battery if Cycle 3 capacity is less than Cycle 2 capacity.
8. If Cycle 3 capacity equals or exceeds Cycle 2 capacity, recharge the battery and put it back in service.

Deep discharge will produce a premature deterioration of the battery and a noticeable reduction in the life expectancy of the battery.

5. Maintenance

In practice the user usually specifies the maintenance schedule based on site criticality, location and manpower. The following is the recommended minimum maintenance schedule:

Every Six Months (Record All Readings)

Measure, at the battery terminals, the string voltage. If necessary adjust the charger float voltage to the correct value.

Measure individual bloc voltages. The blocs should be within 5% of the average. All readings should be recorded in a format where sudden deviations and trends are easily identifiable.

Inspect for loose or corroded connectors, acid leaks and dust. If necessary isolate the string/blocs and clean with a soft damp cloth. Do not use solvents or scouring powders to clean the blocs. Contact EnerSys® if you have any questions regarding maintenance.

6. Disposal

Genesis TPPL batteries are recyclable. Scrap batteries must be packaged and transported in accordance with prevailing transportation rules and regulations.

Scrap batteries must be disposed of in compliance with local and national laws by a licensed or certified lead acid battery recycler.

7. Shipping

Approved as non-hazardous cargo for ground, sea and air transportation in accordance with US DOT Regulation CFR and ICAO and IATA Packing Instruction 806. Please see our SDS for complete details at: www.enersys.com.



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