

SPL Ni-Cd batteries

Installation and operating instructions

Important recommendations

- Never allow an exposed flame or spark near the batteries, particularly while charging.
- Never smoke while performing any operation on the battery.
- For protection, wear rubber gloves, long sleeves, and appropriate splash goggles or face shield.
- The electrolyte is harmful to skin and eyes. In the event of contact with skin or eyes, wash immediately with plenty of water. If eyes are affected, flush with water, and obtain immediate medical attention.
- Remove all rings, watches and other items with metal parts before working on the battery.
- Use insulated tools.
- Avoid static electricity and take measures for protection against electric shocks.
- Discharge any possible static electricity from clothing and/or tools by touching an earth-connected part "ground" before working on the battery.

1. Receiving the shipment

Do not overturn the package. Check the packages and cells for transport damage. The cells are shipped filled and charged, and is ready for immediate use. Transport seals are located under the lid of each vent, they must be removed prior to mounting.

The cells must never be charged with the plastic transport seals in place as this is dangerous and can cause permanent damage.

2. Storage

Store the cells indoors in a dry, clean, cool location (0°C to +30°C / +32°F to +86°F) and well ventilated space on open shelves.

Storage of a filled cells at temperatures above +30°C (+86°F) can result in loss of capacity. This can be as much as 5 % per 10°C (18°F) above +30°C (+86°F) per year.

Do not store in direct sunlight or expose to excessive heat.

SPL batteries are supplied filled with electrolyte and charged, they can be stored in this condition for maximum 12 months from date of shipment.

Never drain the electrolyte from the cells.

3. Installation

3.1. Location

Install the battery in a dry and clean room. Avoid direct sunlight and heat. The battery will give the best performance and maximum service life when the ambient temperature is between +10°C to +30°C (+50°F to +86°F).

3.2. Ventilation

During the last part of charging, the battery is emitting gases (oxygen and hydrogen mixture). At normal float charge, the gas evolution is very small but some ventilation is necessary.

Note that special regulations for ventilation may be valid in your area depending on the application.

3.3. Mounting

Verify that cells are correctly interconnected with the appropriate polarity. The battery connection to load should be with nickel plated cable lugs.

Recommended torque for terminal bolts:

30 ± 3 N.m (22 ± 2 ft-lb)

The connectors and terminals should be corrosion-protected by coating with a thin layer of anti-corrosion oil or no-oxide grease.

Remove the transport seals and close the vent caps.

3.4 Electrolyte

When checking the electrolyte levels, a fluctuation in level between cells is not abnormal and is due to the different amounts of gas held in the separators of each cell. The level should be at least 15 mm (5/8") above the minimum level mark (lower) and there is normally no need to adjust it.

Do not top-up levels prior to initial charge.

4. Commissioning

Verify that the transport seals are removed and the ventilation is adequate during the operation. A good commissioning is important. Charge at constant current is preferable.

4.1. Cells stored up to 6 months:

A commissioning charge is normally not required and the cells are ready



for immediate use.

If full performances are necessary immediately, a commissioning charge as mentioned in section 5.2. is recommended.

4.2. Cells stored more than 6 months and up to 1 year:

A commissioning charge is necessary:

- **Constant current charge:**
16 h at 0.1 C₅ A maximum (see Table A)

Note: At the end of the charge, the charge voltage may reach the level of 1.75 V/cell, thus the charger shall be able to supply such voltage. When the charger maximum voltage setting is too low to supply constant current charging, divide the battery into two parts to be charged individually.

- **Constant potential charge:**
1.65 V/cell for a maximum of 30 h with current limited to 0.1 C₅ A (see Table A).

If these methods are not available, then charging may be carried out at lower voltages, 1.50 V/cell for 72 hours minimum.

Note that when full battery performance is required for capacity test purposes, the battery has to be charged in accordance with IEC 60623 section 4.

5. Charging in service

The recommended charging voltages for continuous parallel operation, with occasional battery discharges, are:

- **for two level charge:**
 - float level: 1.42 ± 0.01 V/cell
 - high rate (boost) level: 1.45 - 1.55 V/cell
- **for single level charge:**
1.43 ± 0.02 V/cell.

The maximum charge voltage can be increased up to 1.50 V/cell when the temperature compensation is not available for low temperatures or when the battery is deep discharged several times a month.

For use at temperatures outside the range of +15°C to +25°C (+59°F to +77°F), a temperature compensation

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is recommended to further optimize the topping-up intervals at high temperatures.

The recommended value is $-3 \text{ mV}/^{\circ}\text{C}/\text{cell}$ ($-1.7 \text{ mV}/^{\circ}\text{F}/\text{cell}$).

6. Periodic Maintenance

SPL is an ultra low maintenance battery and requires the minimum of maintenance. As a periodic maintenance, the following is recommended:

- Keep the battery clean using only water. Do not use a wire brush or solvents of any kind. Vent plugs can be rinsed in clean water if necessary.
- Check the charging voltage. It is important that the recommended charging voltage remains unchanged. The charging voltage should be checked at least once yearly. If a cell float voltage is found below 1.35 V, high-rate charge is recommended to apply to the cell concerned.
- Check visually the electrolyte level. Never let the level fall below the minimum level mark (lower). **Use only distilled or deionized water to top-up.** Experience will tell the time interval between topping-up.
Note: There is no need to check the electrolyte density periodically. Interpretation of density measurements is difficult and could be misleading.
- Check every two years that all connectors are tight.
- The connectors and terminal bolts should be corrosion-protected by coating with a thin layer of anti-corrosion oil or no-oxide grease.
- High water consumption is usually caused by high improper voltage setting of the charger.

7. Environment

To protect the environment all used batteries must be recycled. Contact your local Saft representative for further information.

Table A:

Cell type	Capacity (Ah)	Charging current 0.1 C ₅ A (A)	Cell connection bolt per pole
SPL 80	80	8	M 10
SPL 100	100	10	M 10
SPL 130	130	13	M 10
SPL 165	165	16.5	M 10
SPL 200	200	20	M 10
SPL 250	250	25	2 x M 10
SPL 290	290	29	2 x M 10
SPL 340	340	34	2 x M 10
SPL 380	380	38	3 x M 10
SPL 420	420	42	3 x M 10

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