

# Ultima Ni-Cd batteries

## Type SLM

### 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

Unpack the battery immediately upon arrival. Do not overturn the package.

Check the packages and cells for transport damage.

The battery is shipped filled and charged, and is ready for immediate use.

#### 2. Storage

Store the battery 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 battery 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.

Ultima batteries are supplied filled with electrolyte and charged, **they can be stored in this condition for maximum 12 months.**

Never drain the electrolyte from the cells.

- When deliveries are made in cardboard boxes, store without opening the boxes.
- When deliveries are made in plywood boxes, open the boxes before the storage. The lid and the packing material on top of the cells must be removed.

#### 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 torques for terminal bolts are:

- M 6 = 11 ± 1.1 N.m
- M 8 = 20 ± 2 N.m
- M 10 = 30 ± 3 N.m

The connectors and terminals should be corrosion-protected by coating with a thin layer of anti-corrosion oil.

##### 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 above the minimum level mark and there is normally no need to adjust it.



Do not open or remove the low pressure vents.

#### 4. Commissioning

Verify that the ventilation is adequate during this operation.

##### 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 (for example capacity test), a commissioning charge 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 C<sub>5</sub> A recommended (see Table A)
- Constant potential charge: 1.65 V/cell for a minimum of 30 h with current limited to 0.1 C<sub>5</sub> A (see the current in 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.

#### 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 level: 1.45 ± 0.01 V/cell

##### ■ for single level charge:

- 1.42 ± 0.01 V/cell

**For use at temperatures outside the range of +15°C to +25°C (+59°F to +77°F), the correcting factor for charge voltage is -3 mV/°C/cell (-1.7 mV/°F/cell).**

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## 6. Periodic Maintenance

Ultima 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.
- Check visually the electrolyte level. The topping-up is recommended when the electrolyte level reaches the minimum level mark but must be carried out before it reaches the warning level. 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.
- Check the charging voltage. In parallel operation, it is of great importance that the recommended charging voltage remains unchanged. The charging voltage should be checked at least once yearly. High water consumption of the battery is usually caused by 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 <sub>5</sub> A (A)	Cell connection bolt per pole
SLM 8	8	0.8	M 6
SLM 16	16	1.6	M 6
SLM 24	24	2.4	M 6
SLM 32	32	3.2	M 6
SLM 40	40	4.0	M 6
SLM 48	48	4.8	M 6
SLM 71	71	7.1	M 8
SLM 95	95	9.5	M 8
SLM 119	119	11.9	M 10
SLM 142	142	14.2	M 10
SLM 166	166	16.6	2 x M 8
SLM 190	190	19.0	2 x M 8
SLM 238	238	23.8	2 x M 10
SLM 285	285	28.5	2 x M 10
SLM 357	357	35.7	3 x M 10
SLM 426	426	42.6	3 x M 10
SLM 476	476	47.6	4 x M 10
SLM 570	570	57	4 x M 10
SLM 600	600	60	5 x M 10
SLM 710	710	71	5 x M 10
SLM 850	850	85	6 x M 10

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