

Ultima.plus Ni-Cd batteries

STL ⊕ type Installation and operating instructions

1. Safety

- 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.

2. Important recommendations

- Only trained and certified personnel should assemble and install Ultima.plus batteries.
- Local regulations related to battery compartment ventilation (e.g. Telcordia GR-487-CORE) should be carefully observed. Saft will not be responsible for the non-observance of these regulations.
- Refer to Saft's "Ultima.plus batteries for telecom networks - Installation and operation manual" for complete instructions.

3. Unpacking and inspection

The Ultima.plus batteries are shipped filled with electrolyte and charged.

- Make sure all items are received by using the packing list. Report any shortages to the shipping company as well as to Saft.
- Check for damage or electrolyte spillage. Report any irregularities to the shipping company as well as to Saft.

- Prior to installation, always check the Open Circuit Voltage of each cell (see section 6).
- Transport seals are located under the lid of each vent, they must be removed prior to mounting.

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

4. Storage

The batteries should be stored in the charged state in a dry, clean and cool location (0°C to +30°C/+32°F to +86°F).

- Make sure that the transport seals remain in place during storage.
- Do not store in direct sunlight or expose to excessive heat.
- In such conditions, Ultima.plus can be stored for maximum 12 months. Never drain the electrolyte from the cell.
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.

5. Preparation for transportation

- Make use of original packing cases if possible. The batteries may alternatively be placed in heavy cardboard boxes and strapped to pallets.
- Make sure that the plastic transport seals remain in place.
- Transport cells upright.
- For transportation over public roads, each box or pallet must carry a "hazardous material" label and any other indication required by local transport authorities.

6. Open circuit voltage check

Prior to installation, the Open Circuit Voltage (OCV) of each cell should be checked in each module. If any cell voltages are less than 1.20 V, do not deploy the battery or discontinue assembly process and notify Saft for recommended action.

7. Installation

Ultima.plus are delivered filled with electrolyte. Do not top up batteries during or immediately after installation.



7.1. Recommended tools

The following tools will facilitate Ultima.plus installation:

- 10, 13 and 16 mm socket
- Torque wrench, up to 30 N.m (265 in.lbs)
- Hand shears
- Multi meter (VDC)
- Cutter or knife.

7.2. String assembly

Battery configurations vary depending on the application. A battery layout is provided with each string. The step by step procedures will vary with application and layout, but the following should be observed:

- Where applicable, place liners or trays in position.
- When positioning trays, make sure they are placed so they can be easily slid into the compartment for subsequent assembly steps.
- Place the battery modules in position in accordance with the provided layout diagram. Pay special attention to the orientation of the positive and negative terminals.
- Whenever modules are to be installed in a tight space where access to the rear terminals will be difficult, all rear connections should be made first. The modules can then be slid into place (in their trays if provided) and all front connections can subsequently be completed.
- Make sure that each module is connected to the next in accordance with the layout diagram and observe that the electrical connection has been completed.
- Make sure that each interconnecting cable or inter-block connector is connected between a positive and a negative terminal.
- The cable lugs and connectors should be secured with a wave washer under each terminal bolt. Refer to Table A for torque values.

Ultima.plus Ni-Cd batteries

Table A (Terminal size and torque value):

	STL ⊕38	STL ⊕77	STL ⊕115 to STL ⊕460
Terminal size	M6	M8	M10
Socket	10 mm	13 mm	16 mm
Torque	11 N.m (97 in.lbs)	20 N.m (177 in.lbs)	30 N.m (265 in.lbs)

- If a central water filling system is used as an option, refer to the corresponding installation and operating instructions sheet.
- Apply anti-corrosion oil on both terminals of each module as well as on both extremities of the connecting wires.
- If necessary, trim and cut covers with a knife. Place covers over inter-cell links by snapping them into position.
- Do not at this stage connect the system's power cables.

7.3. Connecting power

- Before connecting the power cables to the string, measure the string as well as each module's Open Circuit Voltage (OCV). It must be higher than 1.20 V x the number cells (i.e 45.6 V for a 38 cell string).
- Temperature compensated voltage control is recommended (see section 9).
- Make sure the output of the rectifier is adjusted to: 1.43 V per cell i.e V = 54.4 for 38 cells at +20°C to +25°C (+68°F to +77°F).
- Note the polarity of the battery terminals and verify the polarity of the power cables before connecting these to the battery. Look for polarity markings. DO NOT rely on colour matching.
- Connect the power cables (-) and (+) to the string terminals and secure hardware: Refer to table 7.3. for torque values.
- Apply approved corrosion preventative compound on string terminals.
- Apply rectifier power to the power cables by closing string breakers or turning the rectifiers on.

8. Commissioning

If Ultima.plus batteries are stored more than 6 months and up to 1 year, a commissioning charge is necessary and use one of the methods below:

- Constant current charge:
16 h at 0.1 C₈ A maximum.
- Constant potential charge:
1.65 V/cell for a maximum of 30 h with current limited to 0.1 C₈ A.

If these methods are not available, then charging may be carried out at a lower voltage of 1.50 V/cell for 72 hours minimum. Current limited at 0.1 C₈ A.

9. Charging

- Constant voltage charging is recommended and should be done at 1.43 V per cell (54.4 ± 0.7 V per 38 cells string) at +20°C to +25°C (+68°F to +77°F).
- For use at temperatures outside the range of +15°C to +25°C (+59°F to +77°F), a temperature compensation on the charge voltage is recommended to further optimize the topping-up intervals at high temperatures. The recommended value is:
-2.5 mV/°C/cell (-1.4 mV/°F/cell).

10. Maintenance and inspection

10.1. Watering

Watering should be done in average once every 5 years when temperature compensation is used. Never let the electrolyte level fall below the plate top. Use only distilled or deionized water to top-up. Refer to the instruction sheet provided by Saft's watering kit.

The maximum quantity of distilled water to be added is tabulated below:

Table B (maximum quantity of distilled water to be added):

Type	Maximum quantity of water		
	per cell (cc)	for a 38 cells string (l)	(US gal)
STL ⊕38	190	7.5	1.98
STL ⊕77	280	11.0	2.90
STL ⊕115	380	14.5	3.83
STL ⊕155	500	19.0	5.02
STL ⊕190	590	22.5	5.94
STL ⊕230	700	27.0	7.13
STL ⊕270	860	33.0	8.72
STL ⊕305	1000	38.0	10.04
STL ⊕345	1100	42.0	11.10
STL ⊕385	1200	46.0	12.15
STL ⊕460	1400	53.5	14.13

10.2. Cleaning

It is good practice to visually inspect the string periodically. Vacuuming or dusting with a soft brush is adequate if the string is dirty. A wet rag may be used, but do not use any detergent, chemicals or cleaning aids. Do not use metal brushes or hard bristles.

10.3. Inspection and control

Check the float voltage and adjust as necessary within the acceptable range (see §9). Re-torquing terminal bolts is not recommended.

11. Removal and recycling

To protect the environment all used batteries must be recycled.

Contact your local Saft representative for further information.

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