

SMRX 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

Unpack the battery immediately upon arrival. Do not overturn the package. Transport seals are located under the cover of the vent plug. The battery is normally shipped filled and ready for installation.

- Make sure all items have been received by comparing with the packing list.
- Check for damage or electrolyte spillage. Report any irregularities to the carrier and to Saft.
- Remove the plastic transport seals. The battery must never be used electrically with the plastic transport seal in place as this can cause permanent damage.

The battery is ready for installation.

2. Storage

Store the battery indoors in a dry, clean, 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 exposed to excessive heat.
- A battery delivered charged (80%) must not be stored more than 3 months up to 30°C, or more than 6 months up to 20°C (including transport). If a charged battery has to be stored for more than the durations and associated temperatures mentioned above, discharge the cells at 0.2 C₅A down to 1V per cell or less.
- A battery delivered discharged and filled may be stored for many years before it is installed.
- If storage is required prior to commercial service, clean and coat the metallic parts with a thin layer of neutral vaseline or neutral petroleum jelly grease approved by Saft. Leave the battery in its transport case to protect from dust, moisture and short circuits.

3. Installation

Remove the transport seals and close the vent plugs.

3.1. Verify that cells are correctly interconnected and that battery connection to the load is also correct.

3.2. Check tightness of terminal connecting nuts. Torque applied must be:

- 10 ± 2 N.m for cells SMRX 75 to 140
- 15 ± 2 N.m for cells SMRX 160 to 260

The connectors and terminal nuts should be corrosion-protected by coating with a thin layer of neutral vaseline or anti-corrosion oil agreed by Saft.

3.3. Electrolyte

The electrolyte used is E41.

4. Commissioning

Caution: during constant charging operations, the battery box must be open.

4.1. The cells are delivered 80% charged.

Charging and discharging should be done at constant current.

- For a battery stored less than 3 months at T < +30°C, or less than 6 months at T < +20°C, no charge/discharge operation is required before use.
- For a battery stored for more than 3 months or at T > +30°C, or more than 6 months at T > +20°C:



- Discharge the battery at 0.2 C₅A down to an average 1V per cell.
- Maintain the battery in open circuit during 8 hours or until the battery temperature is between 10°C and 30°C.
- Charge the battery at 0.2 C₅A for 8 hours.

4.2. The cells are delivered discharged

Caution: even if the battery is discharged, there remains a residual charge that may cause an electric shock.

Charging and discharging should be done at constant current.

- For a battery placed into service immediately after delivery or after less than one year of storage:

- Constant current charge: charge the battery at 0.2 C₅A for 8 hours.

Caution: during constant current charging the battery box must be open.

- Constant voltage charge: 1.55V/cell for 20 hours with the current limited at 0.2 C₅A.

- For a battery stored more than 1 year:

- Charge the battery at 0.2 C₅A for 8 hours.
- Discharge the battery at 0.2 C₅A down to an average 1V per cell.
- Maintain the battery in open circuit during 8 hours or until the battery temperature is between 10°C and 30°C.
- Charge the battery at 0.2 C₅A for 8 hours.

The battery is ready for use.

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5. Charging in service

■ 1.47 V/cell at +20°C (+68°F) with voltage compensation:
-3 mV/°C/cell (-1.7 mV/°F/cell).

For higher charging voltages, consult your local Saft representative.

■ Boost charge according to IEC62973-2.

6. Topping-up

Frequency of topping-up must be determined for each battery. Topping-up shall be performed after one year in order to determine the ideal topping-up interval which depends on the charging voltage and actual use of the battery.

Never let the electrolyte level fall below the minimum level mark. Use only distilled or deionized water to top-up.

The topping-up operation must be carried on charged cells with a rest time of minimum 2 hours.

■ Batteries not equipped with a water filling system (typical frequency of topping-up is every 6 months):

- No electrolyte level measurement is necessary if you use a Saft cell-topper, which allows the correct level to be obtained by a simple nozzle setting (see nozzle lengths in Table A). If a cell-topper is not available, the electrolyte level must be measured.
- Insert a transparent glass or plastic tube (alkali resistant, 5 to 6 mm in diameter) vertically into the cell vent until it touches the top of the plates. Close the top end of the tube by putting a finger on it and remove it from the cell. The height of the liquid in the tube indicates the electrolyte level.

Cell type	Level (mm)	
	High	Low
SMRX 75 to 140	66	15
SMRX 160 to 260	59	15

- Batteries equipped with water filling system (typical frequency of topping-up is every 12 months):
- Remove transport seals and connect hydraulic tubing between cells up to a maximum of 50 cells.
- Make sure that the tubes are completely inserted for a good seal.
- The hydraulic connection of cells must be in parallel to the electrical connection, in order to avoid voltage differences of more than 1.2V between two hydraulically connected cells.
- The hydraulic connection must be horizontal in order to avoid siphoning.
- The water filling circuit output must not be too close to electrical equipment, electrical circuit and metallic structure.
- Water filling circuit input must be connected to the self-closing inlet.
- After a check after the first year of use, topping-up can be performed every 6 years (if the annual average cell temperature is below 30°C and the battery is used as a back-up battery) by gravity or using adapted pump with a flow rate of 0.7 l/min at a relative pressure of 0.3 bar maximum.

7. Preventive maintenance

■ Maintenance operations (not including the topping-up operation):

Table A:

Cell type	C ₅ Ah (Ah)	0.2 C ₅ A (A)	Electrolyte Reserve (cm ³)	Topper nozzle (mm)
SMRX 75	75	15	185	59
SMRX 90	90	18	285	59
SMRX 110	110	22	280	59
SMRX 125	125	25	335	59
SMRX 140	140	28	335	59
SMRX 160	160	32	415	39
SMRX 190	190	38	410	39
SMRX 220	220	44	465	39
SMRX 260	260	52	550	39

- Periodic maintenance should be carried out at least every 5 years. For detailed maintenance, please refer to the maintenance manual of the battery.
- 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.
- Check the torque of all terminal screws. Coat with DW33 anti-corrosion greasy film all the terminal nuts and cell connectors.
- Check charger settings. It is very important that the recommended charging voltage remains unchanged. High water consumption of the battery is usually caused by improper voltage setting of the charger.

8. Electrolyte

Do not change the electrolyte during the life time of the cells.

9. Environment

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