

# SRA/SRA LT/SRA HT 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 C<sub>5</sub>A 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  
SRA 75 to 140  
SRA LT 75 to 140  
SRA HT 70 to 130
- 30 ± 3 N.m for cells  
SRA 160 to 375  
SRA LT 160 to 375  
SRA HT 150 to 350

The connectors and terminal nuts should be corrosion-protected by coating with a thin layer of DW33 anti-corrosion greasy film.

**3.3.** Electrolyte

The electrolyte used is specific for each product line:

- SRA: E 41
- SRA LT: E 34
- SRA HT: Na 15 L

### 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 C<sub>5</sub>A 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 C<sub>5</sub>A 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:
  - Preferred solution: constant current charge; charge the battery at 0.2 C<sub>5</sub>A 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 C<sub>5</sub>A.
- For a battery stored for more than 1 year:
  - Charge the battery at 0.2 C<sub>5</sub>A for 8 hours.
  - Discharge the battery at 0.2 C<sub>5</sub>A 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 C<sub>5</sub>A for 8 hours.

The battery is ready for use.

### 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 the first 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.

If charge at constant current : operation must be carried on charged cells with a rest time of

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minimum of 2 hours.

If charge at constant voltage on the train, the topping-up can be carried out at any time.

■ 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
SRA 75 to 140	66	15
SRA 160 to 375	75	15
SRA LT 75 to 140	66	15
SRA LT 160 to 375	59	15
SRA HT 70 to 130	66	15
SRA HT 150 to 350	75	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.
- Topping-up can be performed (for SRA range, 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): periodic maintenance should be carried out at least every 5 years. And

Table A:

Cell type	C <sub>5</sub> Ah (Ah)	0.2 C <sub>5</sub> A (A)	Electrolyte reserve (cm <sup>3</sup> )	Topper nozzle (mm)
SRA 75	75	15	185	59
SRA 90	90	18	285	59
SRA 110	110	22	280	59
SRA 125	125	25	335	59
SRA 140	140	28	335	59
SRA 160	160	32	575	54
SRA 190	190	38	570	54
SRA 220	220	44	645	54
SRA 260	260	52	765	54
SRA 280	280	56	900	54
SRA 310	310	62	900	54
SRA 340	340	68	1085	54
SRA 375	375	75	1085	54
SRA LT 75	75	15	185	59
SRA LT 90	90	18	285	59
SRA LT 110	110	22	280	59
SRA LT 125	125	25	335	59
SRA LT 140	140	28	335	59
SRA LT 160	160	32	415	39
SRA LT 190	190	38	410	39
SRA LT 220	220	44	465	39
SRA LT 260	260	52	555	39
SRA LT 280	280	56	650	39
SRA LT 310	310	62	645	39
SRA LT 340	340	68	785	39
SRA LT 375	375	75	780	39
SRA HT 70	70	14	185	59
SRA HT 85	85	17	285	59
SRA HT 105	105	21	280	59
SRA HT 115	115	23	335	59
SRA HT 130	130	26	335	59
SRA HT 150	150	30	575	54
SRA HT 175	175	35	570	54
SRA HT 200	200	40	645	54
SRA HT 245	245	49	765	54
SRA HT 265	265	53	900	54
SRA HT 290	290	58	900	54
SRA HT 315	315	63	1085	54
SRA HT 350	350	70	1085	54

for SRA range, it shall be carried out up to every 10 years if the annual average cell temperature is below 30°C and the battery is used as a back-up battery.

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