

# MRX 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. Generally MRX batteries are shipped discharged and filled with electrolyte. An accessory kit should also be included.

- 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 Saft.
- Never operate the battery with coloured transport seals inserted on the outlet and inlet of each module as this will damage permanently the battery.

### 2. Storage

Store the battery indoors 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 expose to direct sunlight or excessive heat.
- **Battery delivered discharged may be stored for many years before installation. Battery delivered charged (80%) must not be stored at room temperature for more than 3 months (including transport).**

### 3. Installation

Remove the transport seals.

#### 3.1. Battery configuration varies depending on the requirement.

- Block battery directly fitted inside a battery box.
- Block battery to be installed by customer in battery box designed by Saft. In this case the block battery is delivered with two front plates and strings used for shipment and handling. Front plates and strings must be removed for battery installation.
- Block battery to be managed directly by the customer. In this case the block batteries are delivered in light self-keeping cradles. Never remove this assembly.

#### 3.2. Verify that cells are correctly interconnected and battery is correctly connected to the load.

#### 3.3. Check torque of terminal connecting screws.

Torque must be:  $10 \pm 2$  N.m

Connections and terminal screws must be protected against corrosion by coating with a thin layer of neutral vaseline or anti-corrosion oil agreed by Saft.

### 4. Water filling system installation

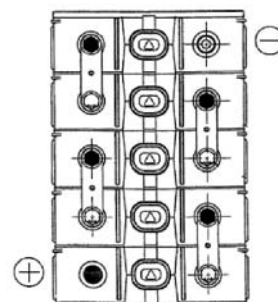
Remove transport seals and connect hydraulic tubing between block battery up to a maximum of 50 cells. Make sure that the pipes are completely inserted to ensure a good tightness.



Hydraulic connection of cells is in parallel to the electrical connection in order to avoid voltage differences of more than 1.2 V between two cells connected by this method. The hydraulic connection must be horizontal in order to avoid any siphon.

The water filling circuit outlet must not be located close to electrical equipment, and electrical circuit or metallic structure.

Water filling circuit input must be connected to the self-closing inlet. For each battery block, the water filling inlet and outlet must be respected according to the triangle visible on top of the cell.



### 5. Commissioning

#### 5.1. Discharged block battery put into operation immediately after delivery or after less than one year of storage:

- a) charge at constant current: at  $0.2 C_5$  A for 8 h  
**Caution:** during charging, the battery box must be open.
- b) charge at constant voltage: 1.55 V/cell for 20 h with the current limited at  $0.2 C_5$  A

Charge at constant current is recommended.

The battery is ready for use.

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## 5.2. Discharged block battery stored more than 1 year:

- charge at 0.2 C<sub>5</sub> A for 10 h
- discharge at 0.2 C<sub>5</sub> A down to 1.0 V/cell

Between discharge and the following charge, the battery must be kept in open circuit for 8 hours or battery temperature down to  $\leq +30^{\circ}\text{C}$  ( $\leq +86^{\circ}\text{F}$ ).

- charge at 0.2 C<sub>5</sub> A for 8 h

The battery is ready for use.

## 5.3 Charged cells (80%) shipped and/or stored at temperatures $>+30^{\circ}\text{C}$ ( $>+86^{\circ}\text{F}$ ), and/or $\geq 3$ months from date of charge:

- charge at 0.2 C<sub>5</sub> A for 10 h
- discharge at 0.2 C<sub>5</sub> A down to 1.0 V/cell

- charge at 0.2 C<sub>5</sub> A for 8 h

The battery is ready for use.

## 6. Charging in service

### ■ Cycling application

The battery is cycled up to 20% Depth Of Discharge (DOD) per day.

- Single level charge:
  - 1.45 to 1.55 V/cell at  $+20^{\circ}\text{C}$  ( $+68^{\circ}\text{F}$ )
  - 1.47 V/cell is recommended
- Dual level charge:
  - High level: 1.45 to 1.60 V/cell at  $+20^{\circ}\text{C}$  ( $+68^{\circ}\text{F}$ )
  - Float level: 1.38 to 1.40 V/cell at  $+20^{\circ}\text{C}$  ( $+68^{\circ}\text{F}$ )

### ■ Stand-by application

The battery is on float and discharged only in case of emergency.

- Single level charge:
  - 1.41 to 1.43 V/cell at  $+20^{\circ}\text{C}$  ( $+68^{\circ}\text{F}$ )
- Dual level charge:
  - High level: 1.43 to 1.50 V/cell at  $+20^{\circ}\text{C}$  ( $+68^{\circ}\text{F}$ )
  - Float level: 1.38 to 1.40 V/cell at  $+20^{\circ}\text{C}$  ( $+68^{\circ}\text{F}$ )

### ■ Voltage compensation

For use at temperature range outside  $+10^{\circ}\text{C}$  to  $+30^{\circ}\text{C}$  ( $+50^{\circ}\text{F}$  to  $+86^{\circ}\text{F}$ ), the charge voltage correcting factor is:

**-2 mV/°C/cell (-1.1 mV/°F/cell)**  
if the charging voltage is  $< 1.45\text{ V}$  at  $+20^{\circ}\text{C}$  ( $+68^{\circ}\text{F}$ )

**-3 mV/°C/cell (-1.7 mV/°F/cell)**  
if the charging voltage is  $\geq 1.45\text{ V}$  at  $+20^{\circ}\text{C}$  ( $+68^{\circ}\text{F}$ )

**For any other charging voltages, consult Saft.**

**To minimise the water consumption, Saft recommends the use of low charging voltage.**

## 7. Topping-up

Use only distilled and deionized water for topping-up.

Connect distilled water tank to the self-closing inlet.

Topping-up is completed when an excess of 1 litre of water is measured at the outlet of the water filling circuit.

Topping-up can be performed by gravity, or by using a Saft automatic filling pump with a flow rate of 0.7 l/min at a relative pressure of 0.3 bar maximum.

## 8. Periodic maintenance

Except when topping-up, periodic maintenance should be carried out every 5 years.

- Keep the battery clean using only water. Do not use a wire brush or solvents of any kind.
- Check torque of all terminal screws. Coat with grease approved by Saft or neutral vaseline all terminal screws and connections.
- Check charger settings. It is very important that the recommended charging voltage remains unchanged. High water consumption by the battery is usually caused by improper voltage setting of the charger.

Table A:

Cell type	Rated capacity Ah	Charge current Amp
MRX 70	70	14
MRX 80	80	16
MRX 90	90	18
MRX 100	100	20
MRX 115	115	23
MRX 130	130	26
MRX 145	145	29
MRX 160	160	32
MRX 180	180	36
MRX 200	200	40
MRX 230	230	46
MRX 260	260	52
MRX 280	280	56
MRX 300	300	60
MRX 350	350	70
MRX 400	400	80
MRX 460	460	92
MRX 520	520	104

- Frequency of topping-up must be determined for each battery. It depends on the charging voltage and actual use of the battery. Refer to section 7 concerning topping-up.

## 9. Change of electrolyte

Due to the sintered/plastic bonded electrode technology, it is not necessary to change the electrolyte during the life of the battery.

## 10. Recycling

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

## Saft Industrial Battery Group

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