

# NCX Ni-Cd batteries

## NCX 80 – NCX 125

### 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 NCX battery strings.
- 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 "NCX batteries for telecom networks - Installation and operation manual" for complete instructions.

#### 3. Unpacking and inspection

The NCX batteries are shipped discharged and filled with electrolyte. An accessories kit should also be included.

- Make sure all items are received by using the packing list or single string layout diagram.
- Check for damage or electrolyte spillage. Report any irregularities to the shipping company as well as to Saft.
- No electrical connections may be applied to the battery modules before the transportation caps (see fig.1) have been removed. Charging with the caps in place may cause battery damage and electrolyte spillage.

#### 4. Storage

The batteries should be stored discharged in a dry, clean and cool location.

- Make sure that the transportation caps remain in place during storage.
- Do not store in direct sunlight or expose to excessive heat.
- The batteries may be stored for up to two years before installation.



Fig.1 - Transportation cap

#### 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 transport caps remain in place (see fig.1).
- Transport cells upright.
- If transporting without boxes and packing, make sure the modules are secured to prevent spillage.
- 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 (see fig.2).

If any cells voltages are less than the values indicated in table A, do not deploy the string. Discontinue the assembly process and consult with Saft for recommended action.

	Storage at +25°C (+77°F) and for less than one year	Storage above +25°C (+77°F) or for more than one year
OCV	1.10 V	0.30 V

Table A - Minimum open cell voltage after storage



#### 7. Installation

##### 7.1. General

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

##### 7.2. Operating environment

Clean and dry area before installing the battery.

##### 7.3. Recommended tools

The following tools will facilitate NCX installation:

- 10 mm socket
- Torque wrench, up to 5.3 N.m (50 in.lbs)
- Multi meter (VDC).

##### 7.4. 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.



Fig.2 - OCV being verified with a voltmeter

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- Make sure that each module is connected to the next in accordance with the layout diagram and observe that both the electrical as well as the hydraulic 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 a bolt that should be torqued to  $5 \pm 1$  N.m ( $48 \pm 9$  in.lbs).
- The hydraulic tubes should be inserted as far as possible and secured in both ends with supplied tie collars (see fig.3).
- Apply corrosion protective compound (as supplied) to all metallic parts at the terminals of each module.
- Place cable boots over each inter-connecting wire lug.
- Do not at this stage connect the system's power cables.
- The inter-connecting strap covers are installed in the factory. Make sure that they are properly seated.
- Rope handles should be removed after installation.

## 7.5. Flame arrestor assembly and shut-off assembly

One flame arrestor assembly and one shut-off assembly are normally required for each string.

If all modules in one string are not installed on the same level, refer to the battery layout diagram.

- The flame arrestor must be positioned where ventilation is adequate.
- The flame arrestor assembly must be attached to the **positive** end of the string and secured with a tie collar (see fig.3).
- The flame arrestor should be mounted out and above top of the battery layout.



Fig.3 - Tube secured by tie collar

- Always route the tube on a path that is higher than the top of the battery.
- Make sure that kinks and traps are prevented.
- The shut-off assembly must be attached to the negative end of the string and secured with a tie collar.

## 7.6. Connecting power

- Use preferably un-tinned cable with section higher than  $10\text{mm}^2$
- Use lugs and heat shrinks provided in the installation kit for connecting power cables to the battery terminals.
- Make sure that the cables are properly secured and supported. It is recommended to seal the lugs at the end of cables when batteries are used in area with wide temperature variation.
- Before connecting the power cables to the string, measure the string's as well as each module's Open Circuit Voltage (OCV).
- Sum up all the module OCVs. Compare this sum to the string OCV. If values show a discrepancy of 0.1 V or more, verify the polarity, position and connection of each module. Re-assemble as required.
- Temperature compensated voltage control is not recommended. Disengage temperature compensation circuit if activated.
- Make sure the output of the rectifier is adjusted to: 1.43 V per cell i.e  $V = 54.4$  for 38 cells.
- 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: M6 Terminal Torque  $5 \pm 1$  N.m ( $48 \pm 9$  in.lbs).
- Apply approved corrosion preventative compound on string terminals.
- Apply rectifier power to the power cables by closing string breakers or turning the rectifiers on.
- If a battery must be connected to a live system, it may be necessary to charge the batteries prior to the installation to minimize the inrush current.

## 8. Charging

- Constant voltage charging is recommended and should be done at

1.43 V per cell ( $54.4 \pm 0.7$  V per 38 cell string).

- Temperature compensated voltage control is not recommended.
- If necessary, constant current charging may be done at a maximum rate of  $C_8/20$  A.

## 9. Maintenance and inspection

### 9.1. Watering

Watering should be done once every 7 years. Refer to the instruction sheet provided with Saft's watering kit.

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

Type	Maximum quantity of water		
	per cell (cc)	for a 38 cells string (l)	(US gal)
NCX 80	380	14.5	3.83
NCX 125	550	21.0	5.55

### 9.2. 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.

### 9.3. Inspection and control

Check the float voltage and adjust as necessary within the acceptable range (see §8). Re-torquing terminal bolts is not recommended.

### 9.4. Float current monitoring

When the battery is ageing, it is advisable to check the float charging current. The battery requires action if the float current is higher than **5 mA/Ah** when charging at 1.43 V per cell.

## 10. Removal and recycling

Make sure appropriate packing material are available. Block all water-filling openings by putting on transportation caps, which can be taken from the new battery or obtained from Saft. All local laws and regulations must be respected when removing, transporting and storing used batteries. Call Saft to make arrangement for recycling.

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Doc N° 21249-2-0806

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Société anonyme au capital de 31 944 000 €  
RCS Bobigny B 383 703 873

Pragma - Printed in France - 3k



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