

Uptimax Ni-Cd batteries

Type UP1 L and UP1 M

Installation and operating instructions



Important recommendations

- **WARNING:** Risk of fire, explosion, or burns. Do not disassemble, heat above 70°C, or incinerate.
- 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.
- Ventilation, in accordance with the IEC 62485-2 standard, is mandatory during commissioning and operation.

1. Receiving the shipment

Upon receipt of the goods, any transportation damage, electrolyte spillage or irregularities must be reported to the carrier and to Saft.

The battery is shipped filled and charged, and is ready for immediate use. Storage of cells must not exceed the maximum storage time indicated on the packing case (first in, first out).

2. Storage

The battery must be stored in a dry indoor location, on open, well ventilated shelves away from direct sunlight between 0°C and +30°C (+32°F and 86°F).

Uptimax batteries are supplied filled with electrolyte and charged. They can be stored in this condition for maximum 24 months from date of shipment in accordance with the recommendations set forth in this I&O.

Storage of a filled battery at temperatures above +30°C (+86°F) can result in permanent change and loss of product performance, depending on the duration of the storage above the maximum recommended temperature. Never drain the electrolyte from the cells. To ensure maximum protection of the cells always store the product in its original packaging.

3. Installation

3.1. Location

Install the battery in a dry and clean room. Avoid direct sunlight and heat.

The battery will give the best performance and maximum service life when the ambient temperature is between +10°C to +30°C (+50°F to +86°F)

3.2. Mounting

Verify that cells are correctly interconnected with the appropriate polarity and with the connectors are correctly torque. Connections between the battery and the load shall be made with nickel plated cable lugs. Tightening torque for the terminals must be:

- M 6 = 11 ± 1.1 N.m (97.4 ± 9.8 lbf.in)
- M 8 = 20 ± 2.0 N.m (177.0 ± 17.7 lbf.in)
- M 10 = 30 ± 3.0 N.m (265.0 ± 26.6 lbf.in)

The connectors and terminals should be corrosion-protected by coating with a thin layer of anti-corrosion oil, NO-OX-ID "A", or approved equal.

3.3. Ventilation

During operation the battery emits an amount of gas mixture (oxygen and hydrogen). Ventilation inside the battery room must be adequately managed, comply with IEC 62485-2 and local regulations.

3.4. Electrolyte

When checking electrolyte levels, a fluctuation in level between cells is normal. This is caused by a small difference in internal pressure in each cell. Normally there is no need to adjust the electrolyte level. If the level is 30 mm (1.2") below the minimum level mark, the affected product must be topped up using Saft's E22 electrolyte.

Do not top-up cells prior to an initial charge. After commissioning, when the level is stabilized, the electrolyte level should be between the maximum mark and 5 mm below.

4. Commissioning

Verify that ventilation, in accordance with the IEC 62485-2 standard, is provided during this operation.

A good commissioning is important. Charge at constant current is preferable.

If the current limit is lower than indicated in the table A, extend the charge time proportionally.

After commissioning, the battery shall be charged permanently according to section 5.

Prior and during commissioning charge, record all data requested in the commissioning report available on www.saftbatteries.com.

■ Cells stored up to 6 months:

A commissioning charge is normally not required and the cells are ready for immediate use. However, the product's full performance will only be achievable after six months of charging in service (see section 7.3 charge acceptance of Technical manual).

If the published performance is required immediately, please refer to Section 4 and the procedure dedicated to cells stored more than 6 months and up to 2 years.

■ Cells stored more than 6 months and up to 2 years:

A commissioning charge is necessary:

- **Commissioning at ambient temperature between + 10°C to + 30°C (+ 50°F to + 86°F)**

- Constant current charge:

10 h at 0.2 C₅ A recommended (see Table A).

Notice: At the end of charge, the cell voltage will reach about 1.80 V, thus the charger shall be able to supply such a voltage.

When the charger maximum voltage setting is too low to supply constant current charging, divide the battery into two parts to be charged individually at constant current.

- Constant potential charge:

1.55 V/cell for a minimum of 24 h with current limit of 0.2 C₅ A (see the current in Table A).

If this voltage level is not available, then charging may be carried out at 1.50 V/cell for 36 hours

- **Commissioning at ambient temperature above + 30°C (+ 86°F)**

- Only constant current charge:

10 h at 0.2 C₅ recommended,
20 h at 0,1 C₅ possible.

The battery container temperature is to be monitored during charge. If the temperature exceeds + 45°C (+113°F) during charging, then it must be stopped to reduce the temperature. The charging can be resumed when battery container temperature drops below + 40°C (+ 104°F).

Capacity Testing : When full battery performance is required for capacity test purposes, the cells shall be charged in accordance with IEC62259 section 7 (7.1 & 7.2).

Uptimax Ni-Cd batteries

5. Charging in service

The recommended charging voltages for continuous parallel operation, with occasional battery discharges, are:

■ Two level charge:

- float level:
1.39 ± 0.01 V/cell or 1.42 + 0.01 V/cell
- high rate (boost) level:
1.45 ± 0.01 V/cell

■ Single level charge:

1.39 ± 0.01 V/cell or 1.42 + 0.01 V/cell

To achieve maintenance-free operation (in term of water topping-up), it is necessary to control the charge input to the battery to minimize water consumption during the entire life of the battery. Temperature Compensated Voltage (TCV) is generally mandatory. The conditions to apply TCV depend on charge voltage and ambient operating temperature.

1.39V : TCV is mandatory

from -20°C to +20°C (-4°F to +68°F), but shall not be used from +20°C to +40°C (+68°F to +104°F).

1.42V : TCV is mandatory from -20°C to +40°C (-4°F to +104°F). For more information, see section 7.2 Temperature compensation of Technical Manual

6. Preventive Maintenance

Uptimax is maintenance-free battery under the recommended operating conditions, from -20°C (+4°F) to +40°C (+104°F) and requires only preventive maintenance.

Best practices include keeping the battery clean using only water. Do not use a wire brush or solvents of any kind.

Individual cell and total battery charge voltage must be checked and recorded once per year. Individual cells with voltages measured below 1.30 V during float charge must receive corrective action. Please refer to Section 11.1 of the Uptimax Technical Manual.

Under normal operating conditions there is no need for topping up. In case of increased water consumption, the electrolyte level is visible from the outside.

If visual check from the outside is not possible, a level testing tube can be used to check the electrolyte level.

Table A

Cell Type	Capacity C ₅ Ah (Ah)	Charging current 0,1 C ₅ A (A)	Charging current 0,2 C ₅ A (A)	Cell connection bolt per pole	Cell Type	Capacity C ₅ Ah (Ah)	Charging current 0,1 C ₅ A (A)	Charging current 0,2 C ₅ A (A)	Cell connection bolt per pole
UP1 L 15	15	1.5	3.0	M 6	UP1 M 8	8	0.8	1.6	M 6
UP1 L 30	30	3.0	6.0	M 6	UP1 M 16	16	1.6	3.2	M 6
UP1 L 47	47	4.7	9.4	M 6	UP1 M 24	24	2.4	4.8	M 6
UP1 L 62	62	6.2	12.4	M 6	UP1 M 32	32	3.2	6.4	M 6
UP1 L 75	75	7.5	15.0	2 x M 6	UP1 M 40	40	4.0	8.0	M 6
					UP1 M 48	48	4.8	9.6	M 6
					UP1 M 65	65	6.5	13.0	2 x M 6
UP1 L 95	95	9.5	19.0	M 8					
UP1 L 110	110	11.0	22.0	2 x M 6					
UP1 L 140	140	14.0	28.0	M 10	UP1 M 75	75	7.5	15.0	M 8
UP1 L 185	185	18.5	27.0	M 10	UP1 M 100	100	10.0	20.0	M 8
UP1 L 235	235	23.5	47.0	M 10	UP1 M 125	125	12.5	25.0	M 10
UP1 L 280	280	28.0	56.0	M 10	UP1 M 150	150	15.0	30.0	M 10
					UP1 M 170	170	17.0	34.0	M 10
					UP1 M 195	195	19.5	39.0	M 10
					UP1 M 220	220	22.0	44.0	M 10
UP1 L 325	325	32.5	65.0	2 x M 10					
UP1 L 375	375	37.5	75.0	2 x M 10	UP1 M 245	245	24.5	49.0	2 x M 10
UP1 L 420	420	42.0	84.0	2 x M 10	UP1 M 270	270	27.0	54.0	2 x M 10
UP1 L 470	470	47.0	94.0	2 x M 10	UP1 M 295	295	29.5	59.0	2 x M 10
UP1 L 515	515	51.5	103.0	2 x M 10	UP1 M 320	320	32.0	64.0	2 x M 10
UP1 L 560	560	56.0	112.0	2 x M 10	UP1 M 345	345	34.5	69.0	2 x M 10
					UP1 M 370	370	37.0	74.0	2 x M 10
UP1 L 610	610	61.0	122.0	3 x M 10	UP1 M 395	395	39.5	79.0	2 x M 10
UP1 L 650	650	65.0	130.0	3 x M 10	UP1 M 420	420	42.0	84.0	2 x M 10
UP1 L 700	700	70.0	140.0	3 x M 10	UP1 M 445	445	44.5	89.0	2 x M 10
UP1 L 750	750	75.0	150.0	3 x M 10					
UP1 L 800	800	80.0	160.0	3 x M 10	UP1 M 490	490	49.0	98.0	3 x M 10
UP1 L 840	840	84.0	168.0	3 x M 10	UP1 M 540	540	54.0	108.0	3 x M 10
UP1 L 890	890	89.0	178.0	4 x M 10	UP1 M 590	590	59.0	118.0	3 x M 10
UP1 L 940	940	94.0	188.0	4 x M 10	UP1 M 640	640	64.0	128.0	3 x M 10
UP1 L 980	980	98.0	196.0	4 x M 10	UP1 M 690	690	69.0	138.0	4 x M 10
UP1 L 1030	1030	103.0	206.0	4 x M 10	UP1 M 740	740	74.0	148.0	4 x M 10
UP1 L 1120	1120	112.0	224.0	4 x M 10	UP1 M 785	785	78.5	157.0	4 x M 10
					UP1 M 835	835	83.5	167.0	4 x M 10
UP1 L 1220	1220	122.0	244.0	5 x M 10	UP1 M 885	885	88.5	177.0	4 x M 10
UP1 L 1300	1300	130.0	260.0	5 x M 10					
UP1 L 1400	1400	140.0	280.0	5 x M 10	UP1 M 935	935	93.5	187.0	5 x M 10
					UP1 M 985	985	98.5	197.0	5 x M 10
UP1 L 1500	1500	150.0	300.0	6 x M 10	UP1 M 1030	1030	103.0	206.0	5 x M 10
UP1 L 1600	1600	160.0	320.0	6 x M 10					
UP1 L 1700	1700	170.0	340.0	6 x M 10	UP1 M 1130	1130	113.0	226.0	6 x M 10
					UP1 M 1230	1230	123.0	246.0	6 x M 10
					UP1 M 1330	1330	133.0	266.0	6 x M 10

Never let the level fall below the minimum level mark. Use only distilled or de-ionized water to top-up. Topping up of the Uptimax battery shall be carried out when battery is fully charged.

Changing or measuring the electrolyte specific gravity is not required.

The connectors and terminals should be corrosion-protected by coating with a thin layer of anti-corrosion oil, NO-OX-ID "A", or approved equal.

To maximise the topping-up interval check the charging voltage and adjust as required.

7. Environment

To protect the environment all used batteries must be recycled.

Contact your local Saft representative for further information.

Saft Industrial Standby Division

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Battery Information Sheet

Industrial Nickel-Cadmium cells, modules and battery systems

According to REACH regulation (EC 1907/2006, Art 31) and to OSHA regulation (29 CFR 1910.1200), batteries are **ARTICLES** with no intended release. As such, they are not covered by legal requirements to generate and supply an SDS or an MSDS.

This Battery Information Sheet is provided solely as an information document for the purpose of assisting our customers.

1. IDENTIFICATION

1.1 Product

Industrial Ni-Cd cells and modules or battery systems composed of these cells

1.2 Supplier

Headquarters Address Phone/Fax	Saft S.A.S 26 quai Charles Pasqua, 92300 LEVALLOIS-PERRET – France Phone / Fax : +33 1 58 63 16 00/+33 1 58 63 16 18
Factory Address Phone/Fax	Saft Bordeaux 111-113, boulevard Alfred Daney, 33074 BORDEAUX – France + 33(0)5 57 10 64 00- +33(0)5 57 10 68 77
Factory Address Phone/Fax	Saft AB Jungnergaten – Box 709 SE-572 28 OSKARSHAMN- Sweden +46 491 68 000/ +46 491 68 180
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Factory Address Phone/Fax	Saft Valdosta 711, Industrial Boulevard, VALDOSTA, GA 31601 –USA Tel/ Fax : +1 229 247 2331/ +1 229 247 8486
Factory Address Phone/Fax	Saft Batteries Co., Ltd. Zhuhai Free Trade Zone, Lianfeng Road, ZHUHAI 519030, Provinz Guangdong – China +86 756 881 9318/+86 756 881 9328
Factory Address Phone/Fax	Amco Saft India Ltd. Plot No. 10/1 A, 1B & 1C, Abbanakuppe, Bidadi Industria Area, Bangalore 562109 Karnataka – India +91 80 2728 7947/+91 80 2728 7716
Factory Address Phone/Fax	Saft Poitiers Rue Georges Leclanché - BP n°1089, 86060 POITIERS Cedex 9 – France +33(0)5 49 55 48 48/ + 33 (0)5 49 55 48 50

1.3 Emergency contact

Chemtrec US Service within the USA: + 1 800 424 93 00/outside: +1 703 527 3887



2. HAZARD IDENTIFICATION

2.1 At cell level

Not chemically dangerous with normal use, where the electrode materials and the electrolyte are enclosed within the cell. The battery should not be opened or burned. Exposure to /Ingestion of the ingredients contained within could be harmful.

EYE CONTACT: contents of an opened cell (electrolyte) within a battery can cause severe burns.

SKIN CONTACT: Electrolyte solution inside cells can cause severe burns

2.2 At module and battery system level

HIGH VOLTAGE: Systems with voltages ≥ 100 volts should always be kept in a restricted access area. Only authorized people aware of high voltage hazards and trained to work on such systems are allowed to enter in the battery area.

TEMPERATURE: Do not place the batteries on or near fires or other high-temperature locations ($> 70^{\circ}\text{C}$).

3. COMPOSITION, INFORMATION OR INGREDIENTS

3.1 At cells and modules level

Component	CAS Number	EINECS/ELINCS	Content (wt. %)*
Active nickel**	12054-48-7	235-008-5	4-15
Active cadmium***	21041-95-2	244-168-5	7-12
Cobalt	21041-93-0	244-166-4	0-2
Alkaline electrolyte (pH=14)	N/A	N/A	14-40
Plastics	N/A	N/A	5-20
Steel	N/A	N/A	10-40
Nickel	7440-02-0	231-111-4	5-20
Copper	7440-50-8	231-159-6	0-10

* Quantities may vary with cell model

** Active nickel present as $\text{Ni}(\text{OH})_2$ and NiOOH

***Active cadmium present as $\text{Cd}(\text{OH})_2$ and Cd : the cells and modules, depending on the state of charge, contain cadmium (CAS 7440-43-9, EINECS 231-152-8), listed on REACH candidate list since June 2013 and cadmium hydroxide (CAS 21041-95-2, EINECS 244-168-5), listed on REACH Candidate List since January 2018

During battery production, active substances detailed in the previous table are embedded in a mechanical substrate to form electrodes. These electrodes are then further assembled with the other battery components such as separator, electrolyte, connectors and casing to obtain a finished battery. This battery is defined in the REACH regulation as “an article with no intended release” meaning that, under normal and reasonably foreseeable conditions of use, no end-user of this battery will be exposed to any chemical substances.

3.2 At battery system level

Depending on the application and on customers’ requirements, modules are assembled either in a plastic, wood or steel container.

4. FIRST AID MEASURES (not anticipated under normal use)

For contact with electrolyte:

EYE CONTACT: Rinse immediately with plenty of water during at least 15-30 minutes, **seek** immediate medical attention/treatment



SKIN CONTACT: Rinse immediately with plenty of water and seek medical attention/treatment

INHALATION: Remove to fresh air, rinse mouth and nose with water and seek immediate medical attention/treatment.

INGESTION: If the injured is fully conscious, clear mouth with water and afterwards drink plenty of water. Do not induce vomiting. Send immediately to hospital for medical attention/treatment.

5. FIRE FIGHTING MEASURES (not anticipated under normal use)

EXTINGUISHING MEDIA:

Use Class A, B or C type fire extinguisher and/or sand
Do not use water

SPECIAL FIRE FIGHTING PROCEDURES:

Fire fighters should wear self-contained breathing apparatus and full fire-fighting protective clothing.
If overheated by an external source or by internal shorting, the cell may give off potassium hydroxide mist and/or hydrogen gas.
In fire situations, fumes containing cadmium and nickel compounds may develop; danger of serious acute damage to health by inhalation of fumes.

6. ACCIDENTAL RELEASE MEASURES (not anticipated under normal use)

INDIVIDUAL PRECAUTIONS:

In case of fire, evacuate the employees from the area until fumes dispersal.
In case of electrolyte leakage, flush electrolyte spillage with plenty of water and beware risk of slipping/ falling.
In case of skin or eye contact, inhalation or ingestion, follow the measures described in section 12.

ENVIRONMENTAL PRECAUTION: Avoid sewage, surface water and underground water contamination. Avoid ground and atmosphere contamination.

WAYS OF CLEANING: Using protective glasses and gloves, use absorbent material (sand, earth or vermiculite) to absorb any exuded material. Seal leaking battery (unless hot) and contaminated absorbent material in plastic bag or suitable leak proof container and send for recycling in accordance with local regulations.

7. HANDLING AND STORAGE

STORAGE: Store in a dry place. Since short circuit can cause burn hazard, keep batteries in original packaging until use and do not jumble them.

HANDLING:

- Do not short (+) or (-) terminal with conductors/conductive materials.
- Do not reverse the polarity
- Do not open the battery system or modules
- Do not submit to excessive mechanical stress.

CHARGING/DISCHARGING: Refer to Saft Instructions.

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION*



Handle an opened battery only in a well-ventilated place.

	Respiratory protection	Fire fighters should wear self-contained breathing apparatus.
	Hand protection	Use polypropylene, polyethylene, rubber or Viton gloves when handling leaking or ruptured cells.
	Eye protection	In case of incident or after an abusive use, in case of a leak or cell opening, wear safety glasses with protected side shields or a mask covering the whole face when handling leaking or ruptured cells
	Other	In the event of leakage or ruptured cells, wear a rubber apron and protective clothes.

*AFNOR pictograms

9. PHYSICAL AND CHEMICAL PROPERTIES

The Nickel-Cadmium cell or battery described by this Battery Information Sheet is a manufactured “article” and does not expose the user to hazardous chemicals when used in accordance with manufacturer specifications.

Boiling Point – Not applicable
Vapor Pressure – Not applicable
Specific Gravity – Not applicable

Melting Point – Not applicable
Vapor Density – Not applicable
Physical shape and colour as supplied

10. STABILITY AND REACTIVITY – the battery system is stable when handled and stored according to section 4

MATERIALS TO AVOID: Do not fill cells with acidic electrolyte for e.g. lead/acid battery

CONDITIONS TO AVOID: Avoid exposing battery to fire or temperature over 85°C. Do not disassemble, crush or short-circuit the electrode connections or install with incorrect polarity. Avoid deformation/crushing of cells

11. TOXICOLOGICAL INFORMATION

If the cell is mechanically, thermally or electrically abused to the point of compromising the enclosure toxic and hazardous internal components may be exposed.

- ACUTE TOXICITY

The electrolyte:

Potassium hydroxide	LD50/oral/rat: 365 mg/kg
Lithium hydroxide	No data available

Exposure monitoring performed with the assistance of battery charging area employees between 1993 and 2012 has consistently resulted in no detectable levels of cadmium or nickel.

- HEALTH HAZARD

Skin contact can cause severe injury.

Eye contact rapidly causes severe damage. Risk of permanent damage.

Ingestion usually results in severe injury. Risk of permanent injuries.

12. ECOLOGICAL INFORMATION



There is no ecological harm when batteries are used correctly and recycled after use has ended.

Spilled/Released electrolyte: The sharp pH rise may cause harmful impact on fish, plankton and stationary organisms. If released to water bodies, the electrolyte contained in the product can be toxic for aquatic organisms because of alkalinity.

13. DISPOSAL CONSIDERATIONS

As with all battery systems, Ni-Cd cells must be collected separately from other waste and recycled – contact your local Saft representative for information

Never incinerate Ni-Cd batteries

Never dispose of Ni-Cd batteries in landfills

Europe: End-of-life management must be performed according to directive 2006/66/EC on batteries and accumulators and waste batteries and accumulators as well as its transposition into each European Union's Member State national legislation. Check with Saft or with your national or local environment authority for details.

For this purpose, within the EU and in many other countries, Saft has implemented a network of bring back points which receive waste industrial Ni-Cd batteries free of charge from end-users.

See the section on "Recycling policy/Circular Economy" in About us " on <https://www.saftbatteries.com/about-us/environmental-responsibility>

14. TRANSPORT INFORMATION

14.1 UNITED NATIONS

- UN N°: 2795

14.2 INTERNATIONAL CONVENTIONS

- Air : IATA manual
- Sea : IMDG code
- Land Europe: ADR (road) or RID (rail)

14.3 APPLICABLE REQUIREMENTS

According to IATA special provision A164, cells, modules and batteries being transported by air have to be protected from short-circuiting (for instance by installation of insulating protection on the + and – connections). Batteries with a management system and batteries installed in a equipment/vehicle, have to be protected from short-circuiting and from any unintended activation when such an activation is possible (for instance by battery disconnection and installation of insulating protection on the connections).

Road transport in Europe of new or used cells and batteries with classification UN2795 (Class 8) is not restricted according to ADR special provision 598, providing that requirements of this special provision are met.

Defective or damaged cells or batteries that have the potential of leading to a hazardous event during transportation must not be shipped.

UN	NAME	LAND: RAIL & ROAD				SEA (IMDG)				AIR (IATA)		
		Hazardous Class	Code	Packing group	Label	Hazardous Class	EmS	Packing group	Label	Hazardous Class	Packing group	Label

UN	NAME	LAND: RAIL & ROAD				SEA (IMDG)				AIR (IATA)		
2795	BATTERIES WET, FILLED WITH ALKALI Electric storage	8	C 11	(ADR) – None (US)(DOT) - III (for packaging: see SP598; no packaging if new or used not damaged) Other case P801/P801a for packaging)	New battery or used not damaged, SP598: None Other case: Corrosive	8	F-A, S-B	None (packaging: no group; and see P801)	Corrosive	8	None (for packaging: group II; and see A802 and P1870)	Corrosive

More information concerning shipping, testing, marking, packaging, special provisions and handling of defective/damaged products can be obtained from your Saft sales representative.

15. REGULATORY INFORMATION

15.1 PRODUCT MARKING (EU)



Cd

15.2 PRODUCT MARKING (US)

Regulated marking includes the three-pointed chasing arrows symbol, the abbreviation Ni-Cd, and the phrase BATTERY MUST BE RECYCLED OR DISPOSED OF PROPERLY.

16. OTHER INFORMATION

This information has been compiled from sources considered to be dependable and is, to the best of our knowledge and belief, accurate and reliable as of the date compiled. However, neither exhaustively nor perfect reliability can be granted. Information does not imply implicit or specific warranty of it.

This information relates to the specific products designated and may not be valid for such products used in combination with any other materials or in any process. It is the user's responsibility to satisfy himself as to the suitability and completeness of this information for his particular use.



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Sample