

VTXVantex Ni-Cd batteries
Type VTX 1L and VTX 1M**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.**
- **Ventilation, in accordance with the IEC62485-2 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 Alcad.

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).

Vantex 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

Interconnect the cells with the appropriate polarity.

Connections between the battery and the load shall be made with nickel plated cable lugs. Tightening torque for the terminals must be.

- M6 = 11 ± 1.1 N.m (97.4 ± 9.8 lbf.in)
- M8 = 20 ± 2 N.m (177.0 ± 17.7 lbf.in)
- M10 = 30 ± 3 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-CX-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 Alcad'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. Commissioning the battery is important: Charging at constant current is preferable.

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

• 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 C₅A recommended,
20 h at 0.1 C₅A possible (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 C₅A recommended, 0.1 C₅A possible (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 permitted:

10 h at 0.2 C₅ recommended,
20 h at 0.1 C₅ possible.

The electrolyte 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 electrolyte 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).

Reliability inside**ALCAD**

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
VTX1 L 15	15	1.5	3.0	M 6	VTX1 M 8	8	0.8	1.6	M 6
VTX1 L 30	30	3.0	6.0	M 6	VTX1 M 16	16	1.6	3.2	M 6
VTX1 L 47	47	4.7	9.4	M 6	VTX1 M 24	24	2.4	4.8	M 6
VTX1 L 62	62	6.2	12.4	M 6	VTX1 M 32	32	3.2	6.4	M 6
VTX1 L 75	75	7.5	15.0	2 x M 6	VTX1 M 40	40	4.0	8.0	M 6
VTX1 L 95	95	9.5	19.0	M 8	VTX1 M 48	48	4.8	9.6	M 6
VTX1 L 110	110	11.0	22.0	2 x M 6	VTX1 M 65	65	6.5	13.0	2 x M 6
VTX1 L 140	140	14.0	28.0	M 10	VTX1 M 75	75	7.5	15.0	M 8
VTX1 L 185	185	18.5	37.0	M 10	VTX1 M 100	100	10.0	20.0	M 8
VTX1 L 235	235	23.5	47.0	M 10	VTX1 M 125	125	12.5	25.0	M 10
VTX1 L 280	280	28.0	56.0	M 10	VTX1 M 150	150	15.0	30.0	M 10
VTX1 L 325	325	32.5	65.0	2 x M 10	VTX1 M 170	170	17.0	34.0	M 10
VTX1 L 375	375	37.5	75.0	2 x M 10	VTX1 M 195	195	19.5	39.0	M 10
VTX1 L 420	420	42.0	84.0	2 x M 10	VTX1 M 220	220	22.0	44.0	M 10
VTX1 L 470	470	47.0	94.0	2 x M 10	VTX1 M 245	245	24.5	49.0	2 x M 10
VTX1 L 515	515	51.5	103.0	2 x M 10	VTX1 M 270	270	27.0	54.0	2 x M 10
VTX1 L 560	560	56.0	112.0	2 x M 10	VTX1 M 295	295	29.5	59.0	2 x M 10
VTX1 L 610	610	61.0	122.0	3 x M 10	VTX1 M 320	320	32.0	64.0	2 x M 10
VTX1 L 650	650	65.0	130.0	3 x M 10	VTX1 M 345	345	34.5	69.0	2 x M 10
VTX1 L 700	700	70.0	140.0	3 x M 10	VTX1 M 370	370	37.0	74.0	2 x M 10
VTX1 L 750	750	75.0	150.0	3 x M 10	VTX1 M 395	395	39.5	79.0	2 x M 10
VTX1 L 800	800	80.0	160.0	3 x M 10	VTX1 M 420	420	42.0	84.0	2 x M 10
VTX1 L 840	840	84.0	168.0	3 x M 10	VTX1 M 445	445	44.5	89.0	2 x M 10
VTX1 L 890	890	89.0	178.0	4 x M 10	VTX1 M 490	490	49.0	98.0	3 x M 10
VTX1 L 940	940	94.0	188.0	4 x M 10	VTX1 M 540	540	54.0	108.0	3 x M 10
VTX1 L 980	980	98.0	196.0	4 x M 10	VTX1 M 590	590	59.0	118.0	3 x M 10
VTX1 L 1030	1030	103.0	206.0	4 x M 10	VTX1 M 640	640	64.0	128.0	3 x M 10
VTX1 L 1120	1120	112.0	224.0	4 x M 10	VTX1 M 690	690	69.0	138.0	4 x M 10
VTX1 L 1220	1220	122.0	244.0	5 x M 10	VTX1 M 740	740	74.0	148.0	4 x M 10
VTX1 L 1300	1300	130.0	260.0	5 x M 10	VTX1 M 785	785	78.5	157.0	4 x M 10
VTX1 L 1400	1400	140.0	280.0	5 x M 10	VTX1 M 835	835	83.5	167.0	4 x M 10
VTX1 L 1500	1500	150.0	300.0	6 x M 10	VTX1 M 885	885	88.5	177.0	4 x M 10
VTX1 L 1600	1600	160.0	320.0	6 x M 10	VTX1 M 935	935	93.5	187.0	5 x M 10
VTX1 L 1700	1700	170.0	340.0	6 x M 10	VTX1 M 985	985	98.5	197.0	5 x M 10
					VTX1 M 1030	1030	103.0	206.0	5 x M 10
					VTX1 M 1130	1130	113.0	226.0	6 x M 10
					VTX1 M 1230	1230	123.0	246.0	6 x M 10
					VTX1 M 1330	1330	133.0	266.0	6 x M 10

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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 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

Vantex 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 Vantex 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. Never let the level fall below the minimum level mark.

Use only distilled or de-ionized water to top-up.
Topping up of the Vantex battery shall be carried out when battery is fully charged.
Changing or measuring the electrolyte specific gravity is not required.

Check all connections are tight every two years. Tightening torque for the terminals must be:

- M6 = 11 ± 1.1 N.m (97.4 ± 9.8 lbf.in)
- M8 = 20 ± 2 N.m (177.0 ± 17.7 lbf.in)
- M10 = 30 ± 3 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.

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 Alcad representative for further information.

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