VTX

Vantex Ni-Cd batteries
Type VTX 1L and VTX 1M

Ni-Cd Batteries

Installation and operating instructions

Important recommendations

- **WARNING: Risk of fire, explosions, or burns. Do not disassemble, heat above +70°C, or incinerate.**
- **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 IEC 62485-2 standard, is mandatory during commissioning and operation.**

1. Receiving the shipment

Do not overturn the package.

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.

2. Storage

The battery must be stored in a dry and clean indoor location, on open, well ventilated shelves away from direct sunlight or expose to excessive heat in ambient temperature 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 document.

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.

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 and 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). For cells with handles, both must be used when lifting and moving. To prevent electrolyte spillage, do not tilt the cells.

3.2 Mounting
For cells with handles, both must be used when lifting and moving. To prevent electrolyte spillage, do not tip cells.
Verify that cells and that the connectors are correctly torqued 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 Nm (97.4 ± 9.8 lbf.in)
- M8 = 20 ± 2 Nm (177.0 ± 17.7 lbf.in)
- M10 = 30 ± 3 Nm (265.0 ± 26.6 lbf.in)

The connectors and terminals should be corrosion-protected by coating with a thin layer of anti-corrosion oil, anti-corrosion grease (NO-OX) 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 / EN 50272-2 and local regulations.
To calculate the required ventilation, contact your local representative or use our sizing tool, BaSiCs.

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 and due to the varying amounts of gas held in the separators of each cell. The level is normally at least 15 mm (5/8") above the minimum (lower) level mark and there should be no need to adjust it.

If electrolyte is ever spilled from a cell and the level is 30 mm below the minimum (lower) level mark, refilling with E22 electrolyte is required. Contact your local Alcad representative for more details.

Do not top up with deionized or distilled water prior to initial charge to avoid overfilling a cell. After commissioning, when the level is stabilized, the electrolyte level should be approximately 5 mm below maximum (upper) level mark .

4. Commissioning

Verify that ventilation, in accordance with the IEC 62485-2 standard, is provided during the 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.
After commissioning, the battery shall be charged permanently according to section 5.

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

4.1 Filled & charged 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 achieveable after six months of charging in service.

If the published performance is required immediately, please refer to Section 4.2 and the procedure dedicated to cells stored up to 2 years.

4.2 Cells delivered filled & charged stored for more than 6 months and up to 2 years or filled & discharged cells stored up to 2 years:
Always conduct a commissioning charge before use to get the full perfomance.

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

Constant current charge:
Charge for 10 h at 0.2 C_5 A
20 h at 0.1 C_5A 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:
- **Filled and charged**

Charge at 1.55 V/cell for a minimum of 24 h with current limit of 0.2 C_5 A (see the current in Table A).
If this voltage level is not available, then charge at 1.50 V/cell for a minimum of 36 h with current limited to 0.2 C_5 A (see the current in Table A).

- **Filled and discharged**

Commissioning at ambient temperature between + 10°C to + 30°C (+ 50°F to + 86°F)
Constant voltage charge at a low voltage level:
Charge at 1.45 V/cell for a minimum of 72 h with current limit of 0.2 C_5 A (see the current in Table A).
If capacity is not needed directly it is also possible to charge 1.42 V/cell for a minimum of 1 month with current limited to 0.2 C_5 A (see the current in Table A).

Reliability inside

ALCAD

Table A:

Cell Type	Capacity	Charging Current	Charging Current	Cell connection bolt per pole
	C5 Ah	0.1 C5 (A)	0.2 C5 (A)	
VTX1 L 15	15	1,5	3,0	M6
VTX1 L 30	30	3,0	6,0	M6
VTX1 L 47	47	4,7	9,4	M6
VTX1 L 57	57	5,7	11,4	M6
VTX1 L 62	62	6,2	12,4	M6
VTX1 L 75	75	7,5	15,0	2xM6
VTX1 L 83	83	8,3	16,6	M8
VTX1 L 95	95	9,5	19,0	M8
VTX1 L 102	102	10,2	20,4	2xM6
VTX1 L 110	110	11,0	22,0	2xM6
VTX1 L 124	124	12,4	24,8	M10
VTX1 L 140	140	14,0	28,0	M10
VTX1 L 167	167	16,7	33,4	M10
VTX1 L 185	185	18,5	37,0	M10
VTX1 L 210	210	21,0	42,0	M10
VTX1 L 225	225	22,5	45,0	M10
VTX1 L 235	235	23,5	47,0	M10
VTX1 L 250	250	25,0	50,0	M10
VTX1 L 280	280	28,0	56,0	M10
VTX1 L 294	294	29,4	58,8	2xM10
VTX1 L 325	325	32,5	65,0	2xM10
VTX1 L 350	350	35,0	70,0	2xM10
VTX1 L 375	375	37,5	75,0	2xM10
VTX1 L 420	420	42,0	84,0	2xM10
VTX1 L 454	454	45,4	90,8	2xM10
VTX1 L 470	470	47,0	94,0	2xM10
VTX1 L 500	500	50,0	100,0	2xM10
VTX1 L 515	515	51,5	103,0	2xM10
VTX1 L 560	560	56,0	112,0	2xM10
VTX1 L 589	589	58,9	117,8	3xM10
VTX1 L 610	610	61,0	122,0	3xM10
VTX1 L 650	650	65,0	130,0	3xM10
VTX1 L 664	664	66,4	132,8	3xM10
VTX1 L 700	700	70,0	140,0	3xM10
VTX1 L 725	725	72,5	145,0	3xM10
VTX1 L 750	750	75,0	150,0	3xM10
VTX1 L 775	775	77,5	155,0	3xM10
VTX1 L 800	800	80,0	160,0	3xM10
VTX1 L 840	840	84,0	168,0	3xM10
VTX1 L 870	870	87,0	174,0	4xM10
VTX1 L 890	890	89,0	178,0	4xM10
VTX1 L 914	914	91,4	182,8	4xM10
VTX1 L 940	940	94,0	188,0	4xM10
VTX1 L 980	980	98,0	196,0	4xM10
VTX1 L 990	990	99,0	198,0	4xM10
VTX1 L 1010	1010	101,0	202,0	4xM10
VTX1 L 1030	1030	103,0	206,0	4xM10
VTX1 L 1080	1080	108,0	216,0	4xM10
VTX1 L 1120	1120	112,0	224,0	4xM10
VTX1 L 1180	1180	118,0	236,0	5xM10
VTX1 L 1220	1220	122,0	244,0	5xM10
VTX1 L 1260	1260	126,0	252,0	5xM10
VTX1 L 1300	1300	130,0	260,0	5xM10
VTX1 L 1324	1324	132,4	264,8	5xM10
VTX1 L 1350	1350	135,0	270,0	5xM10
VTX1 L 1400	1400	140,0	280,0	5xM10
VTX1 L 1460	1460	146,0	292,0	6xM10
VTX1 L 1500	1500	150,0	300,0	6xM10
VTX1 L 1540	1540	154,0	308,0	6xM10
VTX1 L 1570	1570	157,0	314,0	6xM10
VTX1 L 1600	1600	160,0	320,0	6xM10
VTX1 L 1700	1700	170,0	340,0	6xM10

Cell Type	Capacity	Charging Current	Charging Current	Cell connection bolt per pole
	C5 Ah	0.1 C5 (A)	0.2 C5 (A)	
VTX1 M 8	8	0,8	1,6	M6
VTX1 M 16	16	1,6	3,2	M6
VTX1 M 24	24	2,4	4,8	M6
VTX1 M 32	32	3,2	6,4	M6
VTX1 M 40	40	4,0	8,0	M6
VTX1 M 48	48	4,8	9,6	M6
VTX1 M 65	65	6,5	13,0	2xM6
VTX1 M 75	75	7,5	15,0	M8
VTX1 M 89	89	8,9	17,8	2xM6
VTX1 M 96	96	9,6	19,2	2xM6
VTX1 M 100	100	10,0	20,0	M8
VTX1 M 114	114	11,4	22,8	M10
VTX1 M 125	125	12,5	25,0	M10
VTX1 M 140	140	14,0	28,0	M10
VTX1 M 150	150	15,0	30,0	M10
VTX1 M 170	170	17,0	34,0	M10
VTX1 M 175	175	17,5	35,0	M10
VTX1 M 195	195	19,5	39,0	M10
VTX1 M 209	209	20,9	41,8	M10
VTX1 M 220	220	22,0	44,0	M10
VTX1 M 238	238	23,8	47,6	2xM10
VTX1 M 245	245	24,5	49,0	2xM10
VTX1 M 263	263	26,3	52,6	2xM10
VTX1 M 270	270	27,0	54,0	2xM10
VTX1 M 285	285	28,5	57,0	2xM10
VTX1 M 295	295	29,5	59,0	2xM10
VTX1 M 310	310	31,0	62,0	2xM10
VTX1 M 320	320	32,0	64,0	2xM10
VTX1 M 332	332	33,2	66,4	2xM10
VTX1 M 345	345	34,5	69,0	2xM10
VTX1 M 358	358	35,8	71,6	2xM10
VTX1 M 370	370	37,0	74,0	2xM10
VTX1 M 382	382	38,2	76,4	2xM10
VTX1 M 395	395	39,5	79,0	2xM10
VTX1 M 420	420	42,0	84,0	2xM10
VTX1 M 434	434	43,4	86,8	2xM10
VTX1 M 445	445	44,5	89,0	2xM10
VTX1 M 461	461	46,1	92,2	3xM10
VTX1 M 475	475	47,5	95,0	3xM10
VTX1 M 490	490	49,0	98,0	3xM10
VTX1 M 502	502	50,2	100,4	3xM10
VTX1 M 517	517	51,7	103,4	3xM10
VTX1 M 530	530	53,0	106,0	3xM10
VTX1 M 540	540	54,0	108,0	3xM10
VTX1 M 553	553	55,3	110,6	3xM10
VTX1 M 569	569	56,9	113,8	3xM10
VTX1 M 590	590	59,0	118,0	3xM10
VTX1 M 604	604	60,4	120,8	3xM10
VTX1 M 620	620	62,0	124,0	3xM10
VTX1 M 630	630	63,0	126,0	3xM10
VTX1 M 640	640	64,0	128,0	3xM10
VTX1 M 656	656	65,6	131,2	3xM10
VTX1 M 675	675	67,5	135,0	3xM10
VTX1 M 690	690	69,0	138,0	4xM10
VTX1 M 715	715	71,5	143,0	4xM10
VTX1 M 740	740	74,0	148,0	4xM10
VTX1 M 752	752	75,2	150,4	4xM10
VTX1 M 772	772	77,2	154,4	4xM10
VTX1 M 785	785	78,5	157,0	4xM10
VTX1 M 810	810	81,0	162,0	4xM10
VTX1 M 835	835	83,5	167,0	4xM10
VTX1 M 860	860	86,0	172,0	4xM10
VTX1 M 885	885	88,5	177,0	4xM10
VTX1 M 915	915	91,5	183,0	5xM10
VTX1 M 935	935	93,5	187,0	5xM10
VTX1 M 960	960	96,0	192,0	5xM10
VTX1 M 985	985	98,5	197,0	5xM10
VTX1 M 1000	1000	100,0	200,0	5xM10
VTX1 M 1030	1030	103,0	206,0	5xM10
VTX1 M 1080	1080	108,0	216,0	5xM10
VTX1 M 1130	1130	113,0	226,0	6xM10
VTX1 M 1180	1180	118,0	236,0	6xM10
VTX1 M 1230	1230	123,0	246,0	6xM10
VTX1 M 1250	1250	125,0	250,0	6xM10
VTX1 M 1280	1280	128,0	256,0	6xM10
VTX1 M 1330	1330	133,0	266,0	6xM10

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

Only constant current charge permitted:
10 h at 0.2 C_5 recommended,
20 h at 0.1 C_5 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).

Note: When full battery performance is required for capacity test purposes, the cells shall be charged in accordance with IEC 62259 section 7 (7.1 & 7.2).

5. Charging in service

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

- **Single level charge**
  1.39 ± 0.01 V/cell or 1.42 ± 0.01 V/cell
- **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

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
Between -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). The TCV control value is –3 mV/°C/cell (–1.7 mV/°F/cell) starting from + 20°C (+ 68°F).

1.42V: TCV is mandatory
Between -20°C to +40°C (-4°F to +104°F)
Note: TCV control value is –2.5 mV/°C/cell (–1.4 mV/°F/cell). (+68°F to +104°F) starting from + 20°C (+ 68°F).

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.

However, it is good practice with any system to carry out an inspection of the system once per year or at there commended topping-up interval period to ensure that the charging system, the battery and the ancillary electronics are all functioning correctly.
Additionally, follow your standard preventative maintenance procedures.

- Keep the battery clean using only de-ionized or distilled water. Do not use a wire brush or solvents of any kind. Vent plugs can be rinsed in clean water if necessary.
- Check the charging voltage. This should be checked and recorded at least once yearly. Individual cells with voltages measured below 1.30 V during float charge, high rate charge is recommended to apply to the cell concerned.
- Under normal operating conditions there is no need for topping up. High water consumption is usually caused by an improper voltage setting or voltage drift that is above the recommended in service charging voltages. To maximize the topping-up interval check the charging voltage and adjust as required.
- Visually check the electrolyte level. Never let the level fall below the minimum level mark. Use only distilled or deionized water to top-up. Topping up of the VANTEX battery **shall be carried out when battery is fully charged.**
- **Note**: There is no need to check the electrolyte density. Electrolyte density measurements do not indicate state of charge or state of health.
- Ensure all terminals and connectors are coated with a thin layer of anti-corrosion oil, anti-corrosion grease (NO-OX) or approved equal.

7. Environment

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

Alcad Limited

Sweden
Telephone : +46 491 68 100
Facsimile : +46 491 68 110

Alcad Sales Offices

United Kingdom
Telephone: +44 1279 772 555

Middle East
Telephone: +357 25 871 816
Facsimile: +357 25 343 542

Asia
Telephone: +65 6 7484 486
Facsimile: +65 6 7484 639

USA
Telephone: +1 203 985 2500
Facsimile: +1 203 985 2539

www.alcad.com | alcad.sweden@alcad.com