VTX

Vantex Ni-Cd batteries

Type VTX 1L and VTX 1M

Ni-Cd Batteries

Installation and operating instructions

VTX 5.7E
November 2023

Safety precautions

- **WARNING: Risk of fire, explosion, or burns. Do not disassemble, heat above +70°C (+158°F), 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

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, ready for immediate use or filled and discharged for easy commissining. Storage of cells must not exceed the maximum storage time indicated on the packing case.

2. Storage

Cells shall never be stored for a period exceeding 24 months from the date of manufacture. Storage time cannot be reset by doing a recharge mid storage time.

The battery must be stored in a dry, clean and well-ventilated indoor location, away from UV-sources (sunlight) at an ambient temperature between 0°C and +30°C (+32°F and +86°F).

Storage of battery at temperatures above +30°C (+86°F) and/or above 24 months can result in permanent change and loss of product performance.

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 heat, direct sunlight and other UV-source.

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

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 are correctly interconnected with the appropriate polarity and that the connectors are correctly torqued.

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, anti-corrosion grease (NO-OX), or approved equal.

3.3. Ventilation

During operation the battery emits a gas mixture of oxygen and hydrogen.

Ventilation inside the battery room must be adequately managed, comply with IEC 62485-2 and local regulations.

To calculate the required ventilation, contact your local Alcad representant or use our sizing tool, BaSiCs.

3.4. Electrolyte

Do not top up with deionized or distilled water prior to initial charge to avoid overfilling a cell.

When checking electrolyte levels, a fluctuation in level between cells is normal. This is caused by a small difference in internal pressure 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 level mark (lower) and there should be no need to adjust it.If electrolyte is ever spilled from a cell and the level is 30 mm (1.2") below the minimum level mark (lower), then refilling with E22 electrolyte is required. Contact your local Alcad representative for more details.

4. Commissioning

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

A good commissioning is important and mandatory. After commissioning, the battery must be charged permanently according to section 5.

Prior and during commissioning charge, record all data requested in the commissioning report available on Alcad Academy.

It is mandatory to send commissioning report to *commissioning@alcad.com* to activate the warranty.

4.1. Cells delivered filled and charged 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 be achievable after 1 to 3 months of float charge in service.

If the published performance is required immediately, please refer to Section 4.2.

Reliability inside

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4.2 Cells delivered filled and charged stored for more than 6 months and up to 2 years or filled and deep discharged stored up to 2 years

Always conduct a commissioning charge before use in service.

Commissioning at ambient temperature between + 10°C to + 30°C (+ 50°F to + 86°F).4.2.1. Constant current charge

Charge for 10 h at 0.2 C_5 A (see Table A).

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

Notice: At the end of charge, the cell voltage will reach about 1.80 V/cell, 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.

4.2.2. Constant potential charge

- **Filled and charged/deep discharged**

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 deep discharged (option)**

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).

4.2.3. Commissioning at ambient temperature above + 30°C (+ 86°F)

Only constant current charge.

10 h at 0.2 C_5 A recommended.

20 h at 0.1 C_5 A possible.

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. It must be stopped to reduce the temperature.

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).

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).

4.3. Electrolyte adjustment

Check the electrolyte level and adjust it to the maximum level mark (upper) by adding distilled or deionized water.

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

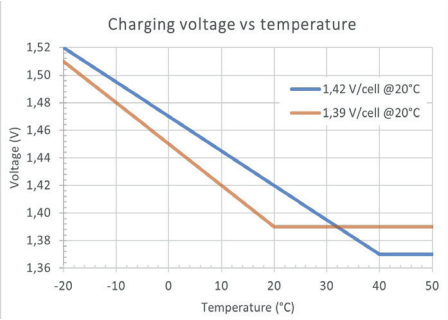
High rate (boost) level

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.

1.39 V/cell: TCV is mandatory, from -20°C to +20°C (-4°F to +68°F) increase the charge voltage by 3 mV/°C/cell (+1.7 mV/°F/cell). TCV shall not be used from +20°C to +40°C.

1.42 V/cell: TCV is mandatory, from -20°C to +20°C -4°F to +68°F) increase the charge voltage by 2.5 mV/°C/cell (+1.4 mV/°F/cell) and from +20°C to +40°C (+68°F to +104°F) decrease the charge voltage by 2.5 mV/°C/cell (–1.4 mV/°F/cell).



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 the recommended topping-up interval period to ensure that the charging system, the battery and the ancillary electronics are all functioning correctly. Keep the battery clean using only 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, should be checked and recorded at least once yearly. Individual cells with voltages measured below 1.30 V/cell 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 maximise 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.
- 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.

All these maintenance recommendations followed the IEEE 1106 standard 'Recommended Practice for Installation, Maintenance, Testing and Replacement of Vented Nickel-Cadmium Batteries for Stationary Applications'.

Additionally, follow your standard preventative maintenance procedures.

7. Environment

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

Table A - Vantex L

Cell type	Capacity Charging Current			Cell connection bolt per pole
	C_5 Ah	0,1 C_5 A	0,2 C_5 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

Cell type	Capacity Charging Current			Cell connection bolt per pole
	C_5 Ah	0,1 C_5 A	0,2 C_5 A	
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

Cell type	Capacity Charging Current			Cell connection bolt per pole
	C_5 Ah	0,1 C_5 A	0,2 C_5 A	
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

Table A - Vantex M

Cell type	Capacity Charging Current			Cell connection bolt per pole
	C_5 Ah	0,1 C_5 A	0,2 C_5 A	
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

Cell type	Capacity Charging Current			Cell connection bolt per pole
	C_5 Ah	0,1 C_5 A	0,2 C_5 A	
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

Cell type	Capacity Charging Current			Cell connection bolt per pole
	C_5 Ah	0,1 C_5 A	0,2 C_5 A	
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

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Data in this document are subject to change without notice and become contractual only after written confirmation by Alcad.

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