

Nickel Cadmium

VALVE REGULATED STATIONARY BATTERIES

INSTALLATION and OPERATING INSTRUCTIONS

Warning!

The gases emitted during charging are explosive. The electrolyte (potash lye) is strong etching. Exposed metal parts of the battery always conduct a voltage and are electrically active parts. Precautions in accordance with **DIN VDE 0510, Part 2** have to be observed.



Observe the instructions for use and position them visibly near the battery! Only work on batteries after indoctrinating by qualified labour!



Risk of explosion and fire – avoid short circuits!
Warning! Metal parts of the battery are always fraught with voltage, so never place objects or tools on the battery!



When working on batteries wear safety goggles and protective clothing. Remove all rings, watches and other items with metal parts before working on the battery! Only use isolated tools! Obtain strictly the accident prevention regulation as well as **DIN VDE 0510, VDE 0105, Part 1**.



Electrolyte is strong etching!



The electrolyte is harmful to skin and eyes, therefore, after contact wash immediately with plenty of clean water. If eyes are affected flush with water and consult a doctor immediately. Clothing contaminated by lye should be washed in water immediately!



Cells are heavy!
Make sure they are safely installed!
Only use suitable transport equipment!



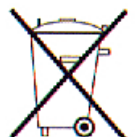
No smoking! Do not allow open fire, ember or sparks near the battery due to the risk of explosion or fire!

The Maintenance and Handling Instructions must be strictly observed. Non-compliance with the Maintenance and Handling Instructions, replacing with unoriginal spares, usage other than specified, use of additives to the electrolyte and unauthorised tampering will invalidate any entitlement to warranty.



Ni-Cd

Supplied World wide by:
SEC Industrial Battery Co.



Cd

1. Receiving the battery

The cells are not to be stored in packaging, therefore, unpack the battery immediately after arrival. Do not overturn the package. The battery cells are equipped with a blue plastic transport plug. The **SEC Valve Regulated** battery will be delivered

- **Filled and charged/** the battery is ready for installation. Replace the transport plug by the red vent cap included in our accessories only before use. **The battery must not be charged with the transport plug in the cells as this can damage the battery.**

2. Storage

The rooms provided for storing the batteries must be clean, dry, cool (+10°C to 30°C) and well ventilated. The cells are not to be stored in closed packaging and must not be exposed to direct sunlight or UV-radiation.

If the cells are delivered in plywood boxes open de boxes before storage and remove the packing material on the top of the cells. If the cells are delivered on pallets remove the packing material on the top of the cells.

Filled **lomain** cells can be stored 12 months at the most from the time of delivery.

Storage of filled cells at a temperature above +30°C results in loss of capacity. This can be approximately 5% per 10 degrees/year when the temperature exceeds +30°C. It is very important that the cells are sealed with the plastic transport plugs tightly in place. This is to check after receipt of goods. In case of loss of electrolyte during transport, refill the cell until the "MAX" mark with genuine electrolyte before storage.

3. Installation

EN 50272-2:2001 "Accumulators and battery installations, stationary battery installations" is binding for the setting up and operation of battery installations. For non stationary installations specific standards are valid.

3.1 Location

Install the battery in a dry and clean room. Avoid in any case direct sunlight and heat. The battery will give the optimal performance and maximum service life if the ambient temperature lies between + 10°C and + 30°C.

3.2 Ventilation

During the last part of charging the battery gases (oxygen and hydrogen mixture) are emitted. At normal float charge the gas evolution is very small but some ventilation is necessary. **Special regulations for ventilation might be required in your area for certain applications.**

If no regulations are fixed DIN EN 50272 – 2: 2001 should be met.

3.3 Setting up

Always pay attention to the assembly drawings, circuit diagrams and other separate instructions. The transport plugs have to be removed by the vent caps included in the accessories.

Cell connectors and/or flexible cables should be checked to ensure they are tightly seated. Terminal nuts, screws and connectors must be tightly seated. If necessary tighten with a torque spanner.

Torque loading for:

M10: 8 Nm

Female thread:

M 8: 20 – 25 Nm

M10: 25 – 30 Nm

The connectors and terminals should be corrosion-protected by coating with thin layer of anti corrosion grease.

3.4 Electrolyte

The electrolyte for NiCd batteries consists of diluted caustic potash solution (specific gravity 1.20 kg/litre ± 0,01 kg/litre) with a lithium hydroxide component, in accordance with IEC 60993. The specific gravity of the electrolyte does not allow any conclusion to be drawn on the charging state of the battery. It changes only insignificantly during charging and discharging and is only minimally related to the temperature. When checking the electrolyte levels, a fluctuation in level between cells is not abnormal and is due to the different amounts of gas held in the separators of each cell. The level should not be more than 10 mm below the "MAX" mark before the first putting into service. There is normally no need to adjust it. Do not open or remove the low pressure vents.

If the electrolyte level is lower than the upper edge of plate block during service the battery should not be disconnected from the charger for a longer time.

SEC Ni-Cad Valve Regulated cells fulfil the requirements according IEC 62259 , point 7.9 for gas recombination efficiency.

3.5 Commissioning

The following instructions are valid for commissioning while 20 °C till 30 °C. For different conditions please contact manufacturer. Charge at constant current is preferable. If a site test is requested it has to be carried out in accordance with to IEC 62259.

According to IEC 62259, 0.1C₅A is also expressed as 0.1 I_tA. The reference test current I_t is expressed as: I_tA= C₂₀Ah

1 h

Example:

0.1 I_tA means:

10 A for a 100 Ah battery or

50 A for a 500 Ah battery

3.5.1 Commissioning with constant current

SEC VR cells stored up to 6 month

A commissioning charge is normally not required and the cells are ready for service. If full performance is necessary immediately, a commissioning charge of 10 hours at 0.1 I_tA is recommended.

During the charge the temperature should be observed see point 5.

SEC VR cells stored more than 6 month and up to 1 year

A commissioning charge of 15 hours at 0.1 I_tA is necessary.

During the charge the temperature should be observed see point 5.

3.5.2 Commissioning with constant voltage

If the charger's maximum voltage setting is too low to supply constant current charging divide the battery into two parts to be charged individually.

SEC VR cells stored up to 6 month

A commissioning charge is normally not required and the cells are ready for service. If full performance is necessary immediately, a commissioning charge of 20 hours at 1,65 V/cell with current limited to 0.1 I_tA is recommended.

During the charge the temperature should be observed see point 5.

SEC VR cells stored more than 6 month and up to 1 year

A commissioning charge of 30 hours at 1,65 V/cell with current limited to 0.1 I_tA is necessary.

During the charge the temperature should be observed see point 5.

4. Charging in operation

Do not open or remove the low pressure vent caps during operation. The current limit should be 0.1 I_t A maximum in general.

Recommended charging voltages for ambient temperatures + 20°C to + 25°C are:

4.1. Two level charge

float level: 1.40 – 1.42 V/cell
high level: 1.45 V/cell

4.2. Single level charge

1.40 – 1,42 V/cell

For temperatures higher than +25 °C, the correcting factor for charge voltage is –3 mV/K.

5. Periodic Maintenance

SEC Valve Regulated batteries are extreme low maintenance batteries and require a minimum of maintenance. The following is recommended:

- The battery must be kept clean using only water. Do not use a wire brush or solvents of any kind.
- Check visually the electrolyte level. The topping up is recommended when the electrolyte level reaches the upper edge of plate block but never let the level fall below the lower level mark “MIN”. Use only distilled or deionized water to top-up the cells in accordance with IEC 60993. Experience will tell the time interval between topping-up.
- **NOTE: Once the battery has been filled with the correct electrolyte at the factory there is no need to check the electrolyte density periodically. Interpretation of density measurements is difficult and could lead to misunderstandings.**
- Check regularly (appr. every year) that all connectors, nuts and screws are tightly fastened. All metal parts of the battery should be corrosion-protected by coating with a thin layer of anti-corrosion grease. **Do not coat any plastic part of the battery, for example cell cases!**
- Check the charging voltage. If a battery is parallel connected it is important that the recommended charging voltage remains unchanged. The charging current in the strings should also be checked to ensure it is equal. These checks has to be carried out once a year. High water consumption of the battery is usually caused by improper voltage setting of the charger.
- Check the electrolyte temperature from time to time. The temperature of the electrolyte should never exceed 45 °C as higher temperatures have a detrimental effect on the function and duration of the cells. In the course of charging an electrolyte temperature of = 35 °C should be aimed for. On exceeding 45 °C the charging should be temporarily interrupted until the electrolyte temperature falls down to 35 °C. The temperature measurements are to be made on one of the cells in the middle of the battery. Low ambient or electrolyte temperatures down to -25 °C do not have any detrimental effect on the battery they just cause a temporary reduction in capacity.

6. Additional warning notes

Ni-Cad batteries must not be prosecuted or stored in the same room as lead acid batteries. In addition to this the charging gases from lead acid batteries must be kept away from Ni-Cad batteries by suitable precautions such as ventilation or hermetic isolation of the rooms. Tools for lead acid batteries must not be used for Ni-Cad batteries

Do not place electrically conductive objects such as tools etc. on the battery!

Risk of short circuit and fire!

No rings or metal bracelets should be worn during the assembly of the battery – **Risk of injury!**

Open the doors of the battery cabinet during charging so that the charging gases can escape. The charging gases from batteries are explosive. Do not allow open fire or ember in the vicinity of the battery!

Risk of explosion!

Caution – caustic potash solution is corrosive!

Caustic potash solution is used as electrolyte. Caustic potash solution is a highly corrosive liquid which can cause severe damage to health if it comes into contact with the eyes or the skin (risk of blinding). If even small quantities are swallowed there is a possibility of internal injuries.

When working with electrolyte and on cells / batteries rubber gloves, safety goggles with side guards and protective clothing must always be worn!

Contact with the eyes: Flush out immediately with copious amounts of water for 10 – 15 minutes. If necessary consult an eye clinic.

Contact with the skin: Remove splashed clothing immediately and wash the affected skin areas with copious amounts of water. For any discomforts consult a doctor.

Swallowing: Rinse out the mouth immediately with copious amounts of water and keep drinking large amounts of water. Do not provoke vomiting. Call an emergency doctor immediately.

In the event of injuries: Rinse thoroughly for a long period under running water. Consult a doctor immediately.

Cells Covered by Valve Regulated Ni-Cad batteries

Cell Type	Cell Type
KGL 12P	KGM 11P
KGL 20P	KGM 18P
KGL 25P	KGM 24P
KGL 35P	KGM 30P
KGL 45P	KGM 40P
KGL 50P	KGM 48P
KGL 60P	KGM 55P
KGL 70P	KGM 65P
KGL 80P	KGM 75P
KGL 100P	KGM 90P
KGL 120P	KGM 110P
KGL 135P	KGM 125P
KGL 155P	KGM 140P
KGL 175P	KGM 160P
KGL 205P	KGM 185P
KGL 225P	KGM 205P
KGL 245P	KGM 225P
KGL 275P	KGM 250P
KGL 300P	KGM 270P
KGL 330P	KGM 300P
KGL 350P	KGM 320P
KGL 375P	KGM 340P
KGL 390P	KGM 355P
KGL 420P	KGM 380P
KGL 440P	KGM 400P
KGL 500P	KGM 450P
KGL 555P	KGM 470P
KGL 585P	KGM 500P
KGL 610P	KGM 520P
KGL 645P	KGM 550P
KGL 665P	KGM 570P
KGL 705P	KGM 600P
KGL 750P	KGM 630P
KGL 795P	KGM 675P
KGL 835P	KGM 690P
KGL 890P	KGM 750P
KGL 990P	KGM 770P
KGL 1110P	KGM 800P
KGL 1260P	KGM 850P
KGL 1320P	KGM 950P
KGL 1390P	KGM 1000P
KGL 1460P	KGM 1030P
KGL 1570P	KGM 1130P
	KGM 1250P
	KGM 1350P

TECHNICAL SUPPORT

*SEC is always ready to assist you in your installation and operation of SEC **Nickel Cadmium Valve Regulated** batteries. If you have any questions on any portion of this manual, please do not hesitate to call or fax any of our offices listed below and request assistance.*

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SECTION 9 - BATTERY REPORT

SEC NICKEL CADMIUM BATTERY REPORT

Installed by: Representative:
 Operating Company: Date: Time:
 Address/Location:

Battery Information

Type of Battery: No. of Cells/String: String Float Voltage:
 Installation Date: No. of Strings/Battery: Float Voltage/Cell:
 Battery Charge Current: Battery Code: Float Current:
 Charging Equipment: Ambient Temperature: Cell Temperature:

Battery Charger Information

Make Type Current rating
 Model Year of manufacture Charging voltage

INDIVIDUAL CELL READINGS

Cell No.	Float Volts	Test Volts	Cell No.	Float Volts	Test Volts	Cell No.	Float Volts	Test Volts	Cell No.	Float Volts	Test Volts	Cell No.	Float Volts	Test Volts
1			26			51			76			101		
2			27			52			77			102		
3			28			53			78			103		
4			29			54			79			104		
5			30			55			80			105		
6			31			56			81			106		
7			32			57			82			107		
8			33			58			83			108		
9			34			59			84			109		
10			35			60			85			110		
11			36			61			86			111		
12			37			62			87			112		
13			38			63			88			113		
14			39			64			89			114		
15			40			65			90			115		
16			41			66			91			116		
17			42			67			92			117		
18			43			68			93			118		
19			44			69			94			119		
20			45			70			95			120		
21			46			71			96			121		
22			47			72			97			122		
23			48			73			98			123		
24			49			74			99			124		
25			50			75			100			125		

Remarks and Recommendations: _____



Signed: _____



