LET US LEAD YOU INTO THE WORLD OF EVERLASTING ENERGY AND INTRODUCE YOU WITH OPzS STATIONARY BLOCKS AND CELLS PRODUCED IN THE CONVENTIONAL LEAD-ACID TECHNOLOGY.

LOW MAINTENANCE TAB OPzS VENTED STATIONARY BATTERIES

The batteries are distinguished for:
- HIGH CAPACITY
- LONG LIFE TIME
- REDUCED MAINTENANCE
- LOW SELF-DISCHARGING
- QUICK AND SIMPLE ACID LEVEL CONTROL
- ECONOMICAL WATER CONSUMPTION
- APPROPRIATE DIMENSIONS AND WEIGHT
- THE LOWEST AND CONSTANT MAINTENANCE CURRENT.

The individual cells (2V) and blocks (6V and 12V) are in translucent plastic containers made of styrenacylnitril (SAN), a material which is extraordinary resistant to chemical influences and mechanical damage.

The stationary batteries of the type OPzS are manufactured according to the DIN 40736, EN 60896 and IEC 896-1 regulations.

APPLICATION

Stationary batteries of the OPzS type are intended for the supply of tele-communication facilities, computers, emergency lightning, alarm, control and monitoring systems in power plants and distribution stations, at railway stations, airports etc.

Due to their extremely low self-discharging they are suitable for plants supplied by solar cells.

OPERATION MAINTENANCE

IT IS RECOMMENDED THAT THE OPZS BATTERIES ARE INSTALLED IN THE SYSTEMS WHERE THEY ARE CONSTANTLY CONNECTED TO THE RECTIFIER.

The battery can be float-charged with voltage of 2.23 to 2.25 V/cell, or, in case of rapid charging after discharge, with voltage of 2.35 to 2.40 V/cell. Rapid charging usually lasts another 3-5 hours after the voltage has already reached 2.35 to 2.40 V/cell. After that, an automatic switchover to the constant maintaining voltage of 2.23 to 2.25 V/cell takes place. Battery maintenance is reduced to a minimum and required only from time to time.

AT NORMAL OPERATION, ONLY SOME DESTILLED WATER HAS TO BE ADDED ONCE IN A 2-3 YEAR PERIOD AND, IF NECESSARY, THE SURFACE OF CELLS HAS TO BE CLEANED. ALL STATED VOLTAGE VALUES ARE VALID FOR THE TEMPERATURE RANGE FROM 15 TO 25 DEGREES C. OUT OF THIS RANGE, THE CORRECTIONS GIVEN BY THE BATTERY PRODUCER ARE NECESSARY.

FOR DETAIL INFORMATION PLEASE CHECK OUR OPERATION MANUAL.
IN CASE OF PROBLEMS WITH ORDERING WE WILL BE GLAD TO ADVISE AND ASSIST YOU IN THE SELECTION OF THE SUITABLE TYPE OF BATTERY.

The positive armored plate is of a tubular type, which means that the active substance (PbO\(_2\)) is contained in special gauntlet made of polyester fibres and hardened by an impregnation compound. Such construction prevents escaping of an active substance during the operation and ensures a long life time. The grids of a positive and a negative plate are made of special low percentage (less than 2 %) antimony alloy with addition agents for improvement of crystalline structure of casting. Negative plates are pasted-type plates with special alloys maintaining porosity of an active substance during the operation. As an electrolyte, a diluted sulphuric acid (H\(_2\)SO\(_4\)) with a density of 1.24 ± 0.01 kg/l at 20 degrees C, and at a maximum permitted level is used. Separators separating the positive plates from the negative ones are made of microporous plastic material with a low electric resistance. The cell containers are made of transparent SAN, while lid of nontransparent SAN or ABS material (SAN for blocks, ABS for 2V cells). In a special process, the lids are tightly sealed to the container. The terminal plugs are sealed with rubber seals. This prevents any escape of electrolyte from the cells. Due to the transparent containers the electrolyte level is clearly visible, the maximum and minimum levels are marked on a self-adhesive acid-proof label on a container side. A cell plug seals well (ceramic filter), and prevents leakage of any sulphuric acid vapours, however, it lets through hydrogen and oxygen.

Two versions of batteries are being manufactured:

- **DRY-CHARGE VERSION:** a battery has to be filled up with an electrolyte and supplementary charged before use. The plates are already formed and in a special process protected against oxidation. They can be stored without problems.
- **ELECTROLYTE-CHARGE:** battery can be installed immediately, because it is already filled up with electrolyte and electrically charged as well. The capacity test has already been performed by the producer.

CONSTRUCTION

IN ORDER THAT THE BATTERIES WOULD MEET ALL YOUR DEMANDS, WE KINDLY ASK YOU TO ENCLOSE THE FOLLOWING DATA WITH YOUR ORDER:

- kind of consuming device (telephone plant, DC-AC converter, emergency lightning etc.)
- operating energy of the consumer (kW, kVA, cos Φ)
- minimum and maximum allowable rated voltage at consuming device (V)
- time diagram of a consumer load, and the required time autonomy (reserve)
- expected voltage drop in the supply lines
- surrounding temperature in the battery room (average, minimum, maximum)

IN CASE OF PROBLEMS WITH ORDERING WE WILL BE GLAD TO ADVISE AND ASSIST YOU IN THE SELECTION OF THE SUITABLE TYPE OF BATTERY.
TAB OPzS BLOCKS

TAB OPzS STATIONARY BLOCKS (CELLS) ARE PRODUCED IN THE CONVENTIONAL LEAD-ACID TECHNOLOGY.

Stationary batteries of the OPzS type are intended for the supply of telecommunication facilities, computers, emergency lightning, alarm, control and monitoring systems in power plants and distribution stations, at railway stations, airports etc.

### DESIGN

**OPzS cells (block)**

- **POSITIVE ELECTRODE**
  - Tubular plate with low antimony alloy (<2%)
- **NEGATIVE ELECTRODE**
  - Flat with long life expander active material
- **SEPARATION**
  - Microporous separator
- **ELECTROLYTE**
  - Sulphuric acid of 1.24 kg/l at 20 °C
- **CONTAINER**
  - High impact, transparent SAN LID
  - ABS (SAN)* in grey color
- **BLOCKS WITH BLIND CELLS**
  - 4V, 6V, 8V, 10V
- **PLUGS**
  - Ceramic plugs according to DIN 40740
- **POLE SEALING**
  - 100 % gas-and electrolyte-tight, sliding-pole
- **CONNECTOR**
  - Flexible insulated copper cable with cross-section of 35, 50, 70, 95 or 120 mm²
  - (35, 50 or 70 mm²)*

**KIND OF PROTECTION**

- IP 25 regarding DIN 40050, touch protected according to VBG 4

### Specifications

<table>
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<tr>
<th>Uf (V/cell)</th>
<th>1.80</th>
<th>1.77</th>
<th>1.75</th>
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**12V 2 OPzS 100**

- **Rated voltage**: 12V ± 0.1%
- **Number of positive plate**: 50
- **Number of negative plate**: 51
- **Capacity at 10 hour discharging**: 28.4 A
- **Electrolyte density**: 1.24 ± 0.01 kg/l at 20 °C

All measures and weights are within standard production tolerances. Electrical values are approximative. Technical modifications are reserved without prior notice.
**CHARGING**

OPzS cells (block)*

- **IU - CHARACTERISTIC**
  - Imax without limitation

- **FLOAT CHARGE**
  - $U = 2.23\ V/cell \pm 1\%$
  - between 10 °C and 30 °C
  - $\Delta U/\Delta T = -0.004\ V/K$
  - below 10 °C in the monthly average

- **BOOST CHARGE**
  - $U = 2.35\ to\ 2.40\ V/cell$, time limited
  - 6h with 1.5 * I10 initial current
  - 2.23 V/cell, 50 % C10 discharged

**DISCHARGE CHARACTERISTICS**

OPzS cells (block)*

- **REFERENCE TEMPERATURE**
  - 20 °C

- **INITIAL CAPACITY**
  - 100 %

- **DEPTH OF DISCHARGE**
  - Normally up to 80 %
  - More than 80 % DOD or discharges beyond final discharge voltages (dependent on discharge current) have to be avoided

**MAINTENANCE**

OPzS cells (block)*

- **EVERY 6 MONTH**
  - Check battery voltage, pilot block voltage, temperature

- **EVERY 12 MONTH**
  - Take down battery voltage, block voltage, temperature

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**OPERATIONAL DATA**

OPzS cells (block)*

- **DESIGN LIFE**
  - Up to 20 years (18 years) at 20 °C

- **WATER REFILLING INTERVAL**
  - More than 2 years at 20 °C

- **IEC 896-1 CYCLES**
  - 1500 (1200)*

- **SELF-DISCHARGE**
  - Approx. 2 % per month at 20 °C

- **OPERATIONAL TEMPERATURE**
  - -20 °C to 55 °C, recommended 10 °C to 30 °C

- **VENTILATION REQUIREMENT**
  - $f_1=0.5$ (low-antimony alloy) according EN 50272-2

- **MEASUREMENTS ACCORDING**
  - DIN 40 737 part 1

- **TESTS ACCORDING**
  - IEC 896-1

- **SAFETY STANDARDS**
  - VDE 0510 part 2 and EN 50272-2

- **TRANSPORT**
  - No dangerous goods during road transport

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<th>UF V/cell</th>
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**FURTHER INFORMATION**

- Electrolyte density: $1.24 \pm 0.01\ kg/l$ at 20 °C
- All measures and weights are within standard production tolerances
- Electrical values are approximative
- Technical modifications are reserved without prior notice
TAB OGi BLOCK BATTERIES ARE ROBUST VENTED LEAD-ACID BATTERIES DESIGNED FOR INDUSTRIAL APPLICATIONS IN POWER SUPPLY WITH HIGH SAFETY REQUIREMENTS.

TAB OGi block batteries can be used for both long duration discharge (10 hours) and short duration discharge (few minutes). The main areas of application are DC power supply systems in power stations, UPS systems, industrial systems and emergency power supply systems. They can also be used for engine starting and PV power systems.

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Design

Positive Electrode
- Robust-grid plate with circular bars in a corrosion-resistant PbSe alloy < 2% Sb

Negative Electrode
- Flat plate with long life expander and low antimony alloy

Separation
- Microporous separator

Electrolyte
- Sulphuric acid of 1.24 kg/l,

Container
- High impact, transparent SAN

Lid
- SAN in dark grey colour

Blocks with Blind Cells
- 4V, 6V, 8V, 10V

Plugs
- Ceramic plugs or optional ceramic funnel plugs according to DIN 40740

Pole Sealing
- 100% gas-and electrolyte-tight, sliding-pole

Pole
- M10, brass insert

Connector
- Flexible insulated copper cable, with cross-section of 35, 50, 70, 95 or 120 mm²

Kind of Protection
- IP 25 regarding DIN 40050, touch protected according VBG 4

Charging

IU - Characteristic
- Imax without limitation

_float charge
- U = 2.23 V/cell ± 1%, between 10°C and 55°C
- dU/dT = -0.004 mV/°K below 10°C in the monthly average

Boost Charge
- U = 2.35 to 2.40 V/cell, time limited

Charging Time Up to 92% (10% C10 discharged)
- 6h with 1.5*I10 initial current, 2.23 V/cell, 50% C10 discharged

Discharge Characteristics

Reference Temperature
- 20°C

Initial Capacity
- 100%

Depth of Discharge
- Normally up to 80% (depend on discharge current)
- More than 80% DOD or discharges beyond final discharge voltages to be avoided

Maintenance

Every 6 Month
- Check battery voltage, pilot block voltage, temperature

Every 12 Month
- Take down battery voltage, block voltage, temperature

Operational Data

Operational Life
- Up to 15 years at 20°C
- Up to 7.5 years at 30°C
- Up to 4 years at 40°C

Water Refilling Interval
- More than 3 years at 20°C

IEC 896-1 Cycles
- 1000

Self-Discharge
- Approx. 3% per month at 20°C

Operating Temperature
- -20°C to 55°C, recommended 10°C to 30°C

Ventilation Requirement
- f1=0.5 (low-antimony alloy) according VDE 0510 part 2

Measurements According
- DIN 40 737 part 3

Tests According
- IEC 896-1

Applicable Standards
- VDE 0510 part 2

Transport
- No dangerous goods during road transport

6V 7 OGi 175

Rated voltage

Number of positive plate

Robust OGi plates

Capacity at 10-hour discharging
TAB UPS BATTERIES ARE ROBUST AND FOR HIGH DISCHARGE - PERFORMANCES OPTIMISED LEAD-ACID BATTERIES.

The main application for TAB UPS are Uninterruptable Power Supplies (UPS) in the size of 50 to 250 kVA. The battery is perfectly suited to start diesel engines for the auxiliary power supply.

<table>
<thead>
<tr>
<th>Voltages</th>
<th>Cells</th>
<th>C10 (Ah)</th>
<th>Weight (kg)</th>
<th>IEC 896-1</th>
<th>Dimensions (mm)</th>
<th>Weight (kg)</th>
<th>Weight (kg)</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Discharging (min)</td>
<td>L</td>
<td>W</td>
<td>H</td>
<td>Dry</td>
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<tr>
<td>12V</td>
<td>1 UPS 100</td>
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<td>42</td>
<td>64</td>
<td>92</td>
<td>120</td>
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<td>2 UPS 200</td>
<td>59</td>
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<tr>
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<td>1098</td>
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</table>

100 W is the average power per plate at the 10 min rate $U_f=1.63$.

Electrolyte density: $1.28 \pm 0.01$ kg/l at 20°C.

All measures and weights are within standard production tolerances.

Electrical values are approximative.

Technical modifications are reserved without prior notice.
DESIGN

**POSITIVE ELECTRODE**
- Robust plate with circular bars in a corrosion-resistant PbSe alloy < 2 % Sb

**NEGATIVE ELECTRODE**
- Flat plate with long life expander and low antimony alloy

**SEPARATION**
- Microporous separator

**ELECTROLYTE**
- Sulphuric acid of 1,28 kg/l

**CONTAINER**
- High impact, transparent SAN

**LID**
- SAN in dark grey colour

**BLOCKS WITH BLIND CELLS**
- 4V, 6V, 8V, 10V

**PLUGS**
- Ceramic plugs or optional ceramic funnel plugs according to DIN 40740

**POLE SEALING**
- 100 % gas-and electrolyte-tight, sliding-pole

**POLE**
- M10, brass insert

**CONNECTOR**
- Flexible insulated copper cable, with cross-section of 35, 50, 70, 95 or 120 mm²

**KIND OF PROTECTION**
- IP 25 regarding DIN 40050, touch protected according VBG 4

**OPERATIONAL LIFE**
- Up to 12 years at 20 °C
- Up to 6 years at 30 °C
- Up to 3 years at 40 °C

**WATER REFILLING INTERVAL**
- More than 3 years at 20 °C

**IEC 896-1 CYCLES**
- 800

**SELF-DISCHARGE**
- Approx. 3 % per month at 20 °C

**OPERATIONAL TEMPERATURE**
- -20 °C to 55 °C, recommended 10 °C to 30 °C

**VENTILATION REQUIREMENT**
- f1=0,5 (low-antimony alloy) according VDE 0510 part 2

**MEASUREMENTS ACCORDING**
- DIN 40 737 part 3

**TESTS ACCORDING**
- IEC 896-1

**APPLICABLE STANDARDS**
- VDE 0510 part 2

**TRANSPORT**
- No dangerous goods during road transport

**6V 7 UPS 700**

<table>
<thead>
<tr>
<th>Rated voltage</th>
<th>Number of positive plate</th>
<th>Power Watt/cell 10 min</th>
<th>Uf=1,63 V/cell</th>
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<tbody>
<tr>
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<td>7UPS</td>
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</table>

**CHARGING**

**IU - CHARACTERISTIC**
- Imax without limitation

**FLOAT CHARGE**
- U = 2,25 to 2,27 V/cell ± 1 %, between 10 °C and 55 °C
- dU/dT = -0,004 mV/K below 10 °C in the monthly average

**BOOST CHARGE**
- U = 2,35 to 2,40 V/cell, time limited

**CHARGING TIME UP TO 92 %**
- 6h with 1,5×I10 initial current, 2,23 V/cell, 50 % C10 discharged

**DISCHARGE CHARACTERISTICS**

**REFERENCE TEMPERATURE**
- 20 °C

**INITIAL CAPACITY**
- 100 %

**DEPTH OF DISCHARGE**
- Normally up to 80 %
- More than 80 % DOD or discharges beyond final discharge voltages (dependent on discharge current) have to be avoided

**MAINTENANCE**

**EVERY 6 MONTH**
- Check battery voltage, pilot block voltage, temperature

**EVERY 12 MONTH**
- Take down battery voltage, block voltage, temperature
The batteries are distinguished for:

- **HIGH CAPACITY**
- **LONG LIFE TIME**
- **REDUCED MAINTENANCE**
- **LOW SELF-DISCHARGING**
- **QUICK AND SIMPLE ACID LEVEL CONTROL**
- **ECONOMICAL WATER CONSUMPTION**
- **APPROPRIATE DIMENSIONS AND WEIGHT**
- **THE LOWEST AND CONSTANT MAINTENANCE CURRENT.**

The stationary batteries of the type TOPzS are manufactured according to the DIN 40736, EN 60896 and IEC 896-1 regulations. Individual cells (2V) are made from translucent PP containers.

The positive armored plate is of a tubular type, which means that the active substance (PbO$_2$) is contained in special gauntlet made of polyester fibres and hardened by an impregnation compound. Such construction prevents escaping of an active substance during the operation and ensures a long life time.

The grids of a positive and a negative plate are made of special low percent-age (less than 2%) antimony alloy with addition agents for improvement of crystalline structure of casting. Negative plates are pasted-type plates with special alloys maintaining porosity of an active substance during the operation.

As an electrolyte, a diluted sulphuric acid (H$_2$SO$_4$) with a density of 1.24 ± 0.01 kg/l at 20 degrees C, and at a maximum permitted level is used.

Separators separating the positive plates from the negative ones are made of microporous plastic material with a low electric resistance.

Due to the transparent containers the electrolyte level is clearly visible, the maximum and minimum levels are marked on a self-adhesive acid-proof label on a container side.

Two versions of batteries are being manufactured:

- **DRY-CHARGE VERSION:** a battery has to be filled up with an electrolyte and supplementary charged before use. The plates are already formed and in a special process protected against oxidation. They can be stored without problems.

- **ELECTROLYTE-CHARGE:** battery can be installed immediately, because it is already filled up with electrolyte and electrically charged as well. The capacity test has already been performed by the producer.
**Design**

**Positive Electrode**
- Tubular positive plate with low antimony alloy (<2%)

**Negative Electrode**
- Flat plate with long life expander

**Separation**
- Microporous separator

**Electrolyte**
- Sulphuric acid of 1.24 kg/l

**Container**
- Transparent PP

**Pole Sealing**
- 100% gas-and-electrolyte-tight, rubber seal

**Pole**
- M10, brass insert

**Connector**
- Flexible insulated copper cable, with cross-section of 35, 50, or 70 mm²

**Pole Screw**
- M10, steel, insulated

**Charging**

**IU - Characteristic**
- Imax without limitation

**Float Voltage**
- U = 2.23 V/cell ± 1%

**Boost Charge**
- U = 2.35 to 2.40 V/cell

**Discharge Characteristics**

**Reference Temperature**
- 20°C at C10 (1.80 V/cell) and 25°C at C100 (1.85 V/cell)

**Initial Capacity**
- 100%

**Depth of Discharge**
- Normally up to 80%
- More than 80% DOD or discharges beyond final discharge voltages (dependent on discharge current) have to be avoided

**Maintenance**

**Every 6 Month**
- Check battery voltage
- Pilot block voltage

**Every 12 Month**
- Take down battery voltage
- Block voltage

**Operational Data**

**Operational Life**
- Up to 15 years

**IEC 896-1 Cycles**
- 1200

**Self-Discharge**
- Approx. 3% per month at 20°C

**Operational Temperature**
- -20°C to 55°C, recommended 10°C to 30°C

**Tests According**
- IEC 896-1, EN 60896-1, EN 61427

**Safety Standard, Ventilation**
- EN 50272-2

---

<table>
<thead>
<tr>
<th>CELL TYPE</th>
<th>Dimensions (mm)</th>
<th>Weight (kg)</th>
<th>C10</th>
<th>C100</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>L</td>
<td>W</td>
<td>H</td>
<td>Dry</td>
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<td>3 TOPzs 265</td>
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<td>83</td>
<td>472</td>
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<tr>
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<td>198</td>
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<td>198</td>
<td>191</td>
<td>720</td>
<td>50.2</td>
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</tbody>
</table>

Electrolyte density: 1.24 ± 0.01 kg/l at 20°C.

---

**Operation-Maintenance**

For more detail information please check our operation manual.

**Transport**

Batteries are not subject to ADR (road transport).
TAB OPzV range of valve regulated lead acid stationary batteries combine the benefits of recombination technology (i.e. virtually no maintenance due to very low gas emissions) plus the advantages of conventional vented batteries with positive tubular plates (i.e. long life and excellent cycling capability).

TAB OPzV VALVE REGULATED LEAD ACID BATTERIES ARE THE IDEAL ENERGY SOURCE FOR MANY DIFFERENT STANDBY APPLICATIONS.

**Design**

**Tubular Positive Plates**
- Special grid construction, pressure cast from antimony free alloy, with highly porous gauntlets that retain the active material

**Pasted Negative Plates**
- Service lives consistent with the positive plates

**Electrolyte**
- Gel structure

**Separators**
- Extremely high porosity and low internal resistance

**Containers and Lids**
- Made of plastic (ABS) material. Also available in ABS flame retardant material as an option (according to IEC 707 FV0)

**Terminals**
- Female treated terminal (M10) perfect contact and low resistance with flexible cable connectors

**Post Seals**
- Prevents electrolyte leakage and terminal corrosion

**Connectors**
- Flexible, fully insulated cable connectors screwed (with 20 ±1 Nm) to the terminal with an insulated screw having a probe hole on the top for electrical measurement

**One Way Relief Valve**
- Opens at low pressure and is fitted with a flame arrestor device

**Installation**

Cells are normally installed in an upright position on steel stands

**Charging**

**Float Voltage**
- Standby use 2.25 V/cell

**Boost Recharge**
- Maximum voltage of 2.35 - 2.40 V/cell with a maximum current of 0.25 C10 (A)

**Operational Data**

**Operational Life**
- More than 15 years

IEC 896-1 CYCLES
- 1200

**Self-Discharge**
- Approx. 2 % per month at 20 °C

**Tests According**
- IEC 896-1, EN 60896-1, EN 61427

<table>
<thead>
<tr>
<th>DIN 40742</th>
<th>Capacity (Ah at 20 °C)</th>
<th>Weight</th>
<th>Dimensions (mm)</th>
<th>Isc</th>
<th>Ri</th>
<th>Pict.</th>
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<tr>
<td></td>
<td>Nomin. Cap. 10 hrs to 5 hrs to 3 hrs to 1 hrs to</td>
<td></td>
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<tr>
<td></td>
<td>kg L W H1/H2 (A) (mOhm)</td>
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<tr>
<td>10 hrs / 1,8 VPC</td>
<td>1,8 VPC 1,77 VPC 1,75 VPC 1,67 VPC</td>
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According to DIN 40742, IEC 60896-2

**Features**

- Safe
- Versatile
- Reliable
- Minimal Gassing
- Deep Discharge Resistance

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