

## Operation and maintenance instructions Powerbloc Dry

# ENGLISH

**Motive power batteries for small traction**  
**Sealed gas recombination monoblocs**  
**MFP series: gel technology**











### Rating data

1. Nominal capacity C <sub>20</sub>	: see type
2. Nominal voltage	: see type
3. Discharge current	: C <sub>20</sub> /5h
4. Rated temperature	: 30°C

Powerbloc Dry batteries of MFP series are valve-regulated lead-acid batteries. Unlike conventional batteries with liquid electrolyte these batteries have immobilised electrolyte (gelled sulphuric acid). Instead of a vent plug, a valve is used to regulate the internal gas pressure, preventing the ingress of oxygen from the air and allowing the escape of excess charging gasses. When operating valve-regulated lead-acid batteries the same safety requirements as for vented batteries apply, to protect against hazards from electric current, from explosion of electrolytic gas and - with some limitations - from the corrosive electrolyte.

Battery valves should never be removed. These batteries do not require topping – up with distilled or demineralized water

### SAFETY PRECAUTIONS

	<ul style="list-style-type: none"> <li>Pay attention to the operating instructions and keep them close to the battery.</li> <li>Work on batteries must only be carried out by skilled personnel!</li> </ul>		<ul style="list-style-type: none"> <li>Risk of explosion and fire</li> <li>Avoid short circuits: do not use non-insulated tools, do not place or drop metal objects on top of the battery. Remove rings, wristwatches and articles of clothing with metal parts that might come into contact with the battery terminals.</li> </ul>
	<ul style="list-style-type: none"> <li>Use protective glasses and wear safety clothing when working on batteries.</li> <li>Adhere to the current accident prevention rules in the country where the battery is used or EN 62485-3, EN 50110-1.</li> </ul>		<ul style="list-style-type: none"> <li>Electrolyte is highly corrosive.</li> <li>In the normal operation of this battery a contact with acid isn't possible. If the cell containers are damaged, the immobilised electrolyte (gelled sulphuric acid) is corrosive like the liquid electrolyte.</li> </ul>
	<ul style="list-style-type: none"> <li>Keep children away from batteries!</li> </ul>		<ul style="list-style-type: none"> <li>Batteries and monoblocs are heavy. Ensure secure installation! Use only suitable handling equipment.</li> <li>Lifting hooks must not damage the blocs, connectors or cables.</li> <li>Do not place batteries in direct sunlight without protection.</li> <li>Discharged batteries can freeze. For that reason, Always store in a frostfree zone.</li> </ul>
	<ul style="list-style-type: none"> <li>No smoking!</li> <li>Do not expose batteries to naked flames, glowing embers or sparks, as it may cause the battery to explode</li> <li>Avoid sparks from cables or electrical apparatus as well as electrostatic discharges.</li> </ul>		<ul style="list-style-type: none"> <li>Dangerous electrical voltage!</li> <li>Avoid contact and short circuits.</li> <li>Caution - metal parts of the battery are always live: do not place tools or other objects on the battery!</li> </ul>
	<ul style="list-style-type: none"> <li>Acid splashes into the eyes or on the skin must be washed immediately with an abundance of clean water. After abundant flushing consult a doctor immediately!</li> <li>Clothing contaminated by acid should be washed in water.</li> </ul>		<ul style="list-style-type: none"> <li>Pay attention to the hazards that can be caused by batteries</li> </ul>

Ignoring the operating instructions, repair with non-original parts will render the warranty void.

All failures, malfunctions or defaults of the battery, the charger or any other accessories, must be notified to our After Sales Service.

### 1. Commissioning

The MFP series monoblocs are supplied in a charged condition. The battery should be inspected to ensure it is in perfect physical condition. Check

- the battery cleanliness. Before installing, the battery compartment has to be cleaned.
- the battery end cables have a good contact to terminals and the polarity is correct. Otherwise battery, vehicle or charger could be destroyed.

Use special coding systems for maintenance free batteries for the charging plug- and- socket devices to prevent accidental connection to the wrong type of charger. Never directly connect an electrical appliance ( for example : warning beacon) to a part of the battery. This could lead to an imbalance of the cells during the recharge, i.e. a loss of capacity, the risk of insufficient discharge time, damage to the cells and this may EFFECT THE WARRANTY OF THE BATTERY.

Charge the battery (see 2.2) before commissioning.

Only blocs with the same state of discharge (the same voltage, tolerance like the following table) should be connected together.

Bloc voltage (V)	Max. tolerance from average value - $\Delta U_{\text{bloc}}$
6	$\pm 0.035$
12	$\pm 0.049$

After connecting, the terminals must be covered with grease as protection against external corrosion.

The specified torque loading for the bolts/screws of the end cables and connectors are:

Flat pole M6	DIN conic post
$6 \pm 1$ Nm	$8 \pm 1$ Nm
Type of monobloc	Specific value

## 2. Operation

EN 62485-3 "Traction batteries for industrial trucks" is the standard which applies.

The nominal operating temperature is 30°C.

The optimum lifetime of the battery depends on the operating conditions (temperature and depth of discharge).

The temperature range of use for the battery is between +15°C and +35 °C. Any use outside of this range must be approved by a Service Technician.

Optimal battery life is obtained with the battery at a temperature of 25-30°C.

Higher temperatures shorten the life of the battery (according to IEC 1431 technical report), lower temperatures reduce the available capacity. 45°C is the upper temperature limit and batteries should not be operated above this temperature.

The capacity of the battery changes with temperature and falls considerably under 0 °C.

The optimum lifetime of the battery depends on the operating conditions (moderate temperature and discharges equal to or lower than 80% of the nominal capacity C<sub>5</sub>).

The battery obtains its full capacity after about 10 charging and discharging cycles.

### 2.1. Discharging

The valves on the top of the battery must not be sealed or covered.

Electrical connections (e.g. plugs) must only be made or broken in the open circuit condition.

Discharges over 80% of the rated capacity are deep discharges and are not acceptable. They reduce considerably the life expectancy of the battery. Discharged batteries must be recharged immediately and must not be left in a discharged condition.:

Discharge	Recharge
>40%	Every day
<40%	Every second day

This also applies to partially discharged batteries.

Discharged batteries can freeze.

Limit the discharge to 80% DOD. The presence of a discharge limiter is imperative with an energy cut-off set at 1.90Volts per cell.

### 2.2. Charging

Powerbloc Dry batteries can be recharged with 50 Hz or HF chargers. If you wish to use an existing charger with WUla or IUla profile, you should check that the profile is approved by our Technical Department. Only connect the battery to the correctly assigned charger, which is suitable for the battery type.

After any changing of cables on the charger, our Technician must visit the site to check the charger setting.

Nevertheless, when charging, correct provision must be made for venting of the charging gases. Battery container lids and the covers of battery compartments must be opened or removed.

With the charger switched off connect up the battery, ensuring that the polarity is correct. (positive to positive, negative to negative). Now switch on the charger.

When charging the temperature of the battery rises by about 10°C, so charging should only begin if the battery temperature is below 35°C. The electrolyte temperature of the battery should be at least +15 °C before charging, otherwise a full charge will not be achieved without specific settings of the charger.

Use the correction factor according to DIN VDE 0510-1 (draft) with -0.005 Vpc per °C.

### 2.3. Equalising Charge

Equalising charges are used to safeguard the life of the battery and to maintain its capacity. Equalising charges are carried out following normal charging. They are necessary after deep discharges and repeated incomplete recharges. For the equalising charges, only the chargers prescribed by the battery manufacturer can be used.

## 3. Maintenance

The electrolyte is immobilised. The density of the electrolyte cannot be measured.

Never remove the safety valves from the monobloc.

In case of accidental damage to the valve, contact our After Sales Service for replacement.

### 3.1. Daily

- recharge the battery after every discharge of more than 40% C<sub>5</sub>.
- check the condition of the plugs, cables and that all insulation covers are in place and in good condition.

### 3.2. Weekly

Visual inspection after recharging for signs of dirt and mechanical damage.

### 3.3. Quarterly

At the end of the charge, carry out end of charge voltage readings, measure and record:

- the voltage of the battery
- the voltages of each cell

If significant changes from earlier measurements or differences between the monoblocs are found, please contact our After Sales Service.

If the discharge time of the battery is not sufficient, check:

- that the required work is compatible with the battery capacity
- the settings of the charger
- the settings of the discharge limiter.

### 3.4. Annually

Internal dust removal from the charger.

Electrical connections: test all connections (sockets, cables, and contacts). Monoblocs having terminals with insert : check the torque loading of the bolts/screws.

According to EN 1175-1 when necessary, but at least once a year, the insulation resistance of the truck and of the battery must be checked by an electrical specialist.

The test on the insulation resistance of the battery must be conducted in accordance with EN 1987-1. The average insulation resistance of the battery must not be lower than 50 Ω per Volt nominal voltage (EN 62485-3).

For batteries up to 20 V nominal voltage the minimum value is 1000 Ω.

## 4. Storage and Transportation

Store the battery in a fully charged condition in a dry, clean and frost free area.

Always disconnect the battery from the electric vehicle before storage.

For easy recharge of the batteries, it is advised not to store without recharge for more than 3 months at 20°C and 2 months at 30°C.

To ensure the battery is always ready for use a choice of charging methods can be made :

- monthly equalising charge according to 2.3.
- float charge with 2.27 V x number of cells.

Always recharge before putting the battery into service.

The storage time should be taken into account when considering the life of the battery.

**Back to the manufacturer!**  
**Batteries with this sign must be recycled.**  
**Batteries which are not returned for the recycling process must be disposed of as hazardous waste!**

