

# Commissioning Instructions and Report

## Motive Power (Traction) Dry Charged Batteries with Positive Tubular Plates

### PzS and PzB Types

#### Safety Instructions



Read the instructions carefully and place them close to the battery.

Work on batteries to be carried out by skilled personnel only!



Use protective glasses, protective gloves and apron when working on batteries. Pay attention to the accident prevention rules as well as EN 50272-3 and EN 50110-1.



No smoking!



Do not expose batteries to naked flames, glowing embers or sparks, as it may cause an explosion.



Electrolyte splashes in the eyes or on the skin must be washed with water. In case of accident consult a doctor immediately!

Clothing contaminated by acid should be washed in water..



Risk of explosion and fire.  
Caution: Metal parts of the battery are always under voltage. Do not place tools or other metal objects on the battery!  
Avoid short circuits!



Electrolyte is highly corrosive.



Batteries and cells are heavy.  
Ensure secure installation!  
Use only suitable handling equipment e.g. lifting gear in accordance with VDI 3616.



Dangerous voltage!



Batteries with this symbol can be recycled.



Treat batteries as special waste.  
Do not mix them with other industrial or household waste. Recycling can be achieved through a recognized company for battery recycling or by returning them to the manufacturer, depending on the agreement you have made.

Disregarding the operation instructions, repair with non-original parts or using additives for the electrolyte will render the warranty void.

The completed commissioning reports (see §7) should be sent back to the battery manufacturer or its local agent

## 1. Description

Dry charged batteries are supplied charged but without electrolyte inside the cells. Containers with electrolyte ready to use are available upon request. Each cell is sealed by a plug during storage. Store the cells or batteries in a dry cool room, free of wind, moisture, rain and snow. Storage time should not exceed 1 year, whilst it is also very important not to remove the plugs.

## 2. Checking

The battery installation and the charging equipment should be inspected to ensure that they are in perfect mechanical condition.

All connectors must be tightened to secure a good contact, taking care that the polarity is correct. The tightening torque for all the connector bolts must be  $25 \pm 2$  N·m.

A check must be made to ensure that the charger equipment is ready for operation. Make sure that the polarity is correct (positive to positive and negative to negative). Before filling the cells, ensure that the safety requirements of EN 50272-3 or other standards currently applied in the country of use, with regard to the installation and ventilation, are applied.

## 3. Filling of Cells

If the cells are supplied in bulk, put them in the battery tray according to the connecting instructions. In case no battery tray is available, the cells must be wedged to avoid their bulging. Bulged cells may spill electrolyte, when placed into the tray.

If the filling electrolyte is not supplied by SUNLIGHT, the maximum allowed elemental impurities must comply with DIN 43530 part 2. The density of the filling electrolyte must be in accordance with the following table. If the values are different, required precautions for the preparation of the mixture of acid and water should be taken.

Density of the filling electrolyte			
Cell range	Density of filling electrolyte		Nominal density to be obtained after charging at 30 °C (g/ml)
	30 °C	15 °C	
PzS / PzB	1.28	1.29	1.29

The temperature of the electrolyte used for filling should be between 10 °C and 30 °C. The temperature must be measured and recorded before filling.

After removing the transport plugs, the cells should be filled to the upper level of the separator. Acid resistant filling equipment should be used for this purpose. Transport plugs

must not be used when operating the battery. They must be replaced by vent plugs. Higher temperature reduces the density of the electrolyte, whilst lower temperature increases it. The temperature correction factor for the electrolyte density is  $-0.0007$  g/ml per °C.

Example: An electrolyte density of 1.28 g/ml at 45 °C corresponds to an electrolyte density of 1.29 g/ml at 30 °C.

## 4. Rest Period

After filling the cells, the filled battery should stand for a period of 2 hours for the soaking of the plates and separators. During this period, for cells supplied in bulk, check with a voltmeter that the battery polarities are corresponding to those indicated on the terminals or on the lids. Place the inter-cell connectors and tight the bolts with respect to the specified torque. Refill each cell with electrolyte to the level of the anti-surge baffle or to the top of the separator. Connect the battery socket with the charger plug, paying attention to the polarities in order to avoid an inverse charge which leads to the destruction of the charger and the battery. Then depending on the number of cells, the temperature and the electrolyte density should be measured and recorded for at least 2 to 4 pilot cells (see paragraph 7).

## 5. Commissioning

It is important that the first charge is carried out fully and as long as possible without interruption. The temperature of the electrolyte however must not exceed 55 °C during commissioning and if it does, charging must be interrupted and be resumed after the necessary cooling time. After commissioning is completed, the voltage, the electrolyte density and the temperature of all cells should be measured and recorded with details of date and time (see paragraph 7). During commissioning, check if all cells are gassing at the end of charge. Complete charging has been achieved when the electrolyte density and the cell voltages have not increased for a period of two hours.

### 5.1 Commissioning by Normal Recharging

The recharging must be carried out with the appropriate charger.

At the end of the recharging the nominal electrolyte density should be achieved with a deviation of  $\pm 0.01$  g/ml. If a uniform electrolyte density is achieved and all cells release gas identically, without rising of the voltage in individual cells (for IU chargers there will be no further drop of charging current value), then the battery is ready for operation. During charging, the electrolyte level will rise.

### 5.2 Commissioning with an Equalizing Charge

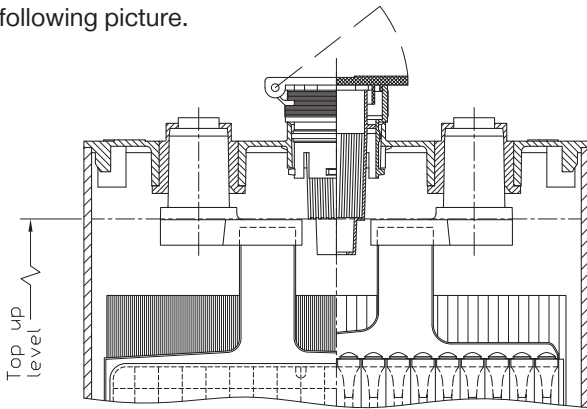
The equalizing charge must be carried out with the appropriate charger by selecting "Equalization" (see Technical Manuals of the chargers).

Maximum permissible charging currents per 100 Ah C5	
Charging characteristics	Charging current
I - charging characteristic	5A
Wa / WoWa - characteristic	at 2.40 V/cell 8A, decreasing at 2.65 V/cell 4A

End of charge conditions are the same as given in point 5.1

### 5.3 Electrolyte Level

During charging, the electrolyte level will rise. If the maximum level of the electrolyte is exceeded, the excess must be sucked. However if the electrolyte level is below the maximum level, top up with electrolyte according to the following picture.



### 5.4 Electrolyte Density

If the electrolyte density at the end of the commissioning is too high, replace a part of the electrolyte by purified water according to DIN 43530, part 4.

### 6. Notes

Electrolyte which escapes or spills must be carefully removed or neutralized. This can be done with a soda solution (1 kg of soda to 10 liters of water) or other neutralization agents. Neutralization agents must not get into the cells. Liquid in the battery tray should be sucked out and disposed in accordance with the regulations.

When using the battery the "Instructions for Use" of PzS / PzB Motive Power (Traction Batteries) should be applied. The battery will reach its rated capacity after the 10th cycle at the latest.

### 7. Reporting & Records

Battery type: .....

Battery no: ..... (see battery label)

Density of the filling electrolyte .....g/ml

at ..... °C

Commissioning carried out by Company

Name: .....

Signature .....

Commissioning charge was carried out in accordance to point: 5.1  5.2

Commissioning charge has started on ..... Date ..... time

Measurement	Pilot cells <sup>1</sup>	No.	No.	No.	No.
Electrolyte Density [g/ml]					
Electrolyte temperature [°C]					
Electrolyte Density, normalized at 30°C (see §3) [g/ml]					

<sup>1</sup> Cell numbering, beginning at the positive terminal.

Remarks/Notes:

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

**Cell / voltage, temperature and electrolyte density for all cells at the end of the commissioning charge.**

No. <sup>1</sup>	Voltage (V)	Density (g/ml)	Temperature (°C)	No. <sup>1</sup>	Voltage (V)	Density (g/ml)	Temperature (°C)	No. <sup>1</sup>	Voltage (V)	Density (g/ml)	Temperature (°C)
1				21				41			
2				22				42			
3				23				43			
4				24				44			
5				25				45			
6				26				46			
7				27				47			
8				28				48			
9				29				49			
10				30				50			
11				31				51			
12				32				52			
13				33				53			
14				39				54			
15				35				55			
16				36				56			
17				37				57			
18				38				58			
19				39				59			
20				40				60			

**SYSTEMS SUNLIGHT S.A.**

**Headquarters**

2 Ermou & Nikis Str., Syntagma Sq.  
105 63 Athens, Attica, Greece  
T +30 210 6245400  
F +30 210 6245409

**Service Department**

366 Tatoiou Str.  
136 73 Acharnes, Attica, Greece  
T +30 210 6245600  
F +30 210 6245619

**Manufacturing Plant**

Neo Olvio  
672 00 Xanthi, Greece  
T +30 25410 48100  
F +30 25410 95446