

### PASSIVE BATTERY MODULE

- 24V, 12Ah Battery Capacity (2x 12V Batteries in Series)
- IP00 Open Type Protection Level
- Small Mounting Footprint
- ATO Fuse for Power Wires Included
- 2m Power Leads Included
- PT1000 Sensor for Battery Module Temperature Included
- Center-tap Terminal with Auto-resettable Fuse Included to Support the PULS 1-Battery-Concept

## 1. GENERAL DESCRIPTION

The UZK24.121 passive battery module utilizes two non-spillable maintenance-free lead-acid batteries (connected in series), that are assembled in one package with all the required wiring included.

The battery module includes the monitoring and protection board UZS24.100. This board contains a temperature sensor and a center-tap connection with an auto-resettable fuse to protect the center-tap wire between the battery module and the DC-UPS control unit. Connecting the center-tap wire to the DC-UPS control unit enables all the benefits of the PULS 1-Battery-Concept. This makes the use of matched replacement batteries unnecessary and allows a precise battery charging and testing which results in the longest possible battery life.

The UZK24 battery module is available in two different options. It can be ordered with assembled batteries or as a battery bracket without batteries, allowing for different battery options. The mounting bracket option also allows the batteries to be assembled just in time, avoiding outdated batteries due to limited shelf life.

## 2. DATA

|                     |  |  |
|---------------------|--|--|
| Battery type        | VRLA   | Lead-acid                                      |
| Battery design life | 3 to 5 years                                       | acc. EUROBAT                                   |
| Battery voltage     | DC 24V   |  |
| Battery capacity    | 12Ah   |  |
| Battery current     | max. 30A<br>max. 3.5A                              | for discharging<br>for charging                |
| Battery fuse        | 30A  | ATO fuse                                       |
| Temperature sensor  | PT1000   |  |
| Charging voltage    | 27.8V<br>27.5V<br>27.15V<br>26.8V                  | at 10°C<br>at 20°C<br>at 30°C<br>at 40°C       |
| Self-discharge rate | 3%/month   | at 20°C  |
| Temperature range   | -10°C to +40°C<br>-15°C to +50°C<br>-20°C to +50°C | for charging<br>for discharging<br>for storage |
| Dimensions          | 203x186x143mm                                      | WxHxD  |
| Weight              | 9000g / 19.8lb<br>900g / 2lb                       | UZK24.121<br>UZO24.121                         |

## 3. ORDER NUMBERS

|                |                  |  |
|----------------|------------------|--|
| Battery Module | <b>UZK24.121</b> | Battery module with assembled batteries                          |
|                | <b>UZO24.121</b> | Battery module without assembled batteries                       |
| Replacement    | <b>UZB12.121</b> | Battery replacement 12V, 12Ah 2pcs needed for one battery module |

## 4. MARKINGS



EMC, LVD, RoHS, Battery directive

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### 5. INTENDED USE

This module is designed for installation in an enclosure and is intended for the general professional use such as in industrial control, office, communication, and instrumentation equipment.  
Do not use this module in equipment, where malfunction may cause severe personal injury or threaten human life.

### 6. INSTRUCTIONS FOR DISPOSAL OF THE BATTERY

Always dispose the batteries through a recycling organization.  
Batteries must be completely discharged before recycling.



### 7. WARRANTY

3 Year limited warranty except batteries which are considered a service part.

### 8. INSTALLATION INSTRUCTIONS

This device may only be installed and put into operation by qualified personnel.

Check the last charging date of the batteries (marked on the battery). If it is older than 9 month replace the batteries. PULS charges every battery before shipment.

For storage, installation and operation, the requirements of the EN 50272-2 as well as other national regulations must be observed.

Place the battery module in a cool area inside a cabinet and ensure sufficient ventilation for the battery. The battery module should be securely mounted on a flat surface.

If damage or malfunction should occur during installation or operation, immediately turn power off and send unit to the factory for inspection.

Shorten the (+) and (-) wires as needed for the DC-UPS between the battery module and the DC-UPS. If separate wires are used, do not use wires smaller than 4mm<sup>2</sup> (12 AWG).

When required, install the UZS24.100 sensor board. The sensor board can be snapped on the metal mounting bar as shown in chapter 12. Connect the blue center-tap wire to the battery.

Connect the sensor board to the DC-UPS by using control wires with a minimum wire size of 0.5mm<sup>2</sup> / 20AWG.

The last step is to insert the battery fuse and to store the spare fuse in the designated holes of the plastic cover.

Do not store batteries or the battery module longer than 9 month without supplementary charge or performance might change.

**⚠ WARNING** Risk of electrical shock, fire, personal injury or death.

- Do not short-circuit the battery poles or power wires
- Observe correct battery polarity
- Disconnect battery fuse before working on the battery or on the DC-UPS. Protect against inadvertent re-powering.
- Make sure that the wiring is correct by following all local and national codes.
- Do not modify or repair the unit.
- Do not use in wet locations or in areas where moisture or condensation can be expected.

Fig. 8-1 Wiring scheme

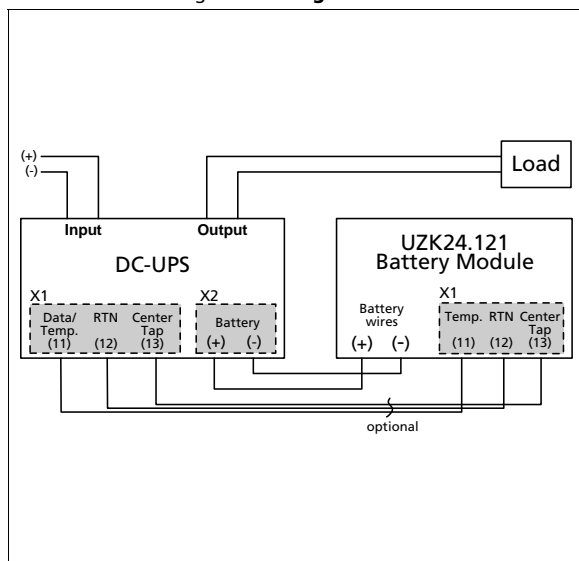
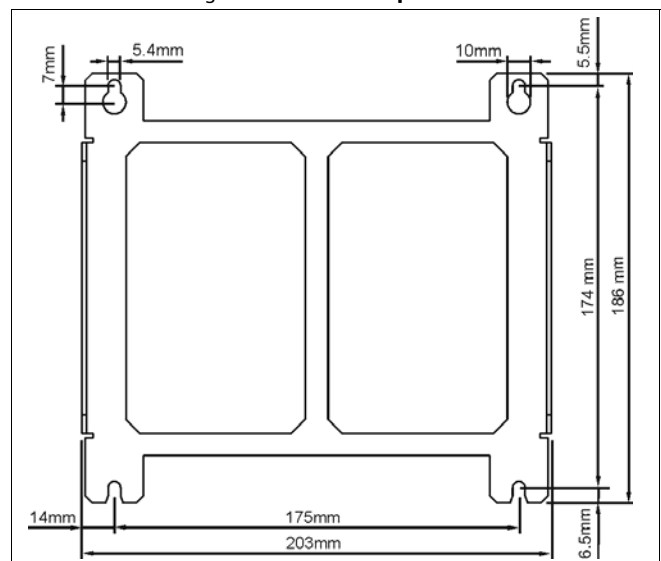


Fig. 8-2 Bracket hole pattern



### 9. REPLACING BATTERIES

Disconnect battery fuse before replacing the batteries.

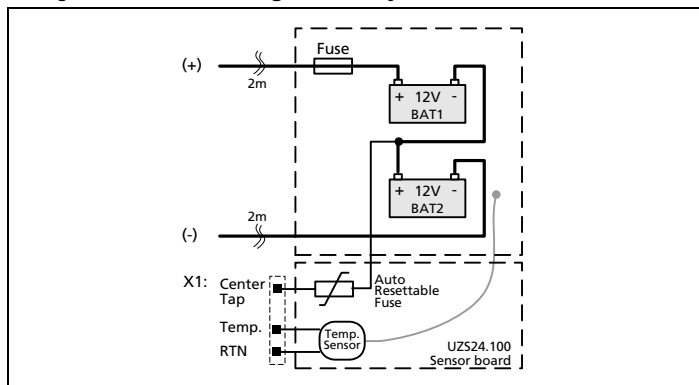
To replace battery, loosen screw with only one turn and slide the mounting bracket sideways. Replace only one battery at a time.

Always dispose the batteries through a recycling organization. Batteries must be completely discharged before recycling. Batteries can also be returned to PULS or the battery manufacturer.

Battery replacements can be acquired through PULS. PULS also offers a list with recommended batteries in case batteries need to be acquired elsewhere.

### 10. FUNCTIONAL DIAGRAM

Fig. 10-1 Functional diagram battery module with sensor board



### 11. ENVIRONMENT

|                                       |  |  |
|---------------------------------------|--|--|
| Operational temperature <sup>*)</sup> | -10°C <sup>**)</sup> to +40°C (14°F to 104°F)  | for charging   |
|                                       | -15°C to +50°C (5°F to 122°F)  | for discharging  |
| Storage temperature                   | -20°C to +50°C (-4°F to 122°F)   | for storage and transportation                                     |
| Humidity                              | 5 to 95% r.h.  | IEC 60068-2-30<br>Do not energize while condensation is present    |
| Vibration sinusoidal                  | 2-17.8Hz: ±1.6mm; 17.8-500Hz: 1g<br>2 hours / axis   | IEC 60068-2-6,<br>in standard mounting orientation acc. Fig. 18-1  |
| Shock                                 | 15g 6ms, 10g 11ms<br>3 bumps / direction, 18 bumps in total  | IEC 60068-2-27,<br>in standard mounting orientation acc. Fig. 18-1 |
| Altitude                              | 0 to 6000m (0 to 20 000ft)   | without any restrictions   |
| Degree of pollution                   | 2  | IEC 62103, EN 50178, not conductive                                |
| LABS compatibility                    | The unit does not release any silicone or other LABS-critical substances and is suitable for use in paint shops. |  |

\*) Operational temperature is the same as the ambient temperature and is defined as the air temperature 2cm below the unit.

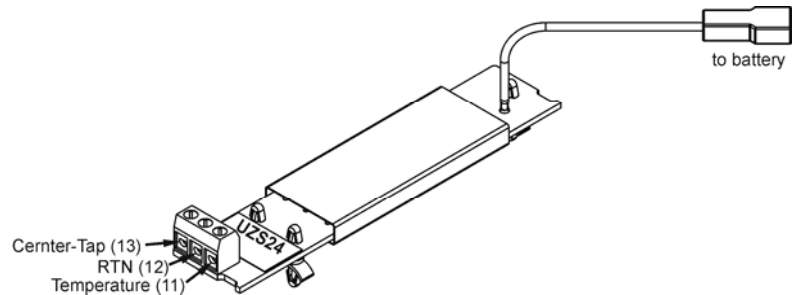
\*\*\*) Frequently charging below +5°C (41°F) reduced the lifetime of the battery

### 12. UZS24.100 SENSOR BOARD

The battery module includes the monitoring and protection board UZS24.100. This board contains a temperature sensor and a center-tap connection with an auto-resettable fuse to protect the center-tap wire between the battery module and the DC-UPS control unit.

The UZS24.100 is compatible with most of the PULS DC-UPS control units and enables all the benefits of the PULS 1-Battery-Concept. This makes the use of matched replacement batteries unnecessary and allows a precise battery charging and testing which results in the longest possible battery life.

The use of the sensor board is optional, the DC-UPS will also function without the sensor board installed.



#### Screw terminal specification:

|                               |                            |
|-------------------------------|----------------------------|
| Solid wire                    | 0.5-1.5mm <sup>2</sup>     |
| Stranded wire                 | 0.5-1.5mm <sup>2</sup>     |
| American Wire Gauge           | AWG20-12                   |
| Max. wire diameter            | 1.5mm (including ferrules) |
| Wire stripping length         | 6mm / 0.25inch             |
| Screwdriver                   | 3x 0.5mm slotted           |
| Recommended tightening torque | 0.5Nm/ 4lb-in              |

Follow national installation codes and installation regulations!

Ensure that all strands of a stranded wire enter the terminal connection!







Unused terminals should be securely tightened.

Ferrules are allowed.

### 13. PROTECTION FEATURES

|  |         |                          |
|--|---------|--------------------------|
| Degree of protection   | IP 00   | EN/IEC 60529             |
| Class of protection  | III     | EN/IEC 61140             |
| Internal input fuse  | 30A     | DC-Fuse (ATO blade type) |
| Isolation voltage between power and signal circuits to chassis | 1100Vac |                          |

### 14. APPROVALS

|   |   |   |
|---|---|---|
| EC Declaration of Conformity                    |    | The CE mark indicates conformance with the<br>- EMC directive 2004/108/EC,<br>- Low-voltage directive (LVD) 2006/95/EC,<br>- RoHS directive 2011/65/EU and<br>- Battery directive 2006/66/EC. |
| IEC 60950-1<br>2 <sup>nd</sup> Edition, pending |   | CB Scheme,<br>Information Technology Equipment  |
| UL 508, pending                                 |  | Listed for use as Industrial Control Equipment;<br>U.S.A. (UL 508) and Canada (C22.2 No. 107-1-01);<br>E-File: E198865  |
| UL 60950-1<br>2 <sup>nd</sup> Edition, pending  |  | Recognized for use as Information Technology Equipment,<br>Level 5; U.S.A. (UL 60950-1) and Canada (C22.2 No. 60950-1);<br>E-File: E137006  |
| Marine,<br>pending                              |  | GL (Germanischer Lloyd) classified<br>Environmental category: T.B.D.<br>Marine and offshore applications  |
| GOST P,<br>pending                              |  | Certificate of Conformity for Russia and other GUS countries  |

### 15. FULFILLED STANDARDS

|                     |   |
|---------------------|---|
| EN/IEC 60204-1      | Safety of Electrical Equipment of Machines  |
| EN/IEC 61131-2      | Programmable Controllers                    |
| EN 50178, IEC 62103 | Electronic Equipment in Power Installations |

### 16. PHYSICAL DIMENSIONS AND WEIGHT

|              |                |  |
|--------------|----------------|--|
| Size (WxHxD) | 203x186x143mm  | with installed sensor board UZS24.100    |
|              | 203x186x135mm  | without installed sensor board UZS24.100 |
| Weight       | 9000g / 19.8lb | UZK24.121                                |
|              | 900g / 2lb     | UZO24.121                                |

Fig. 16-1 **Front view**

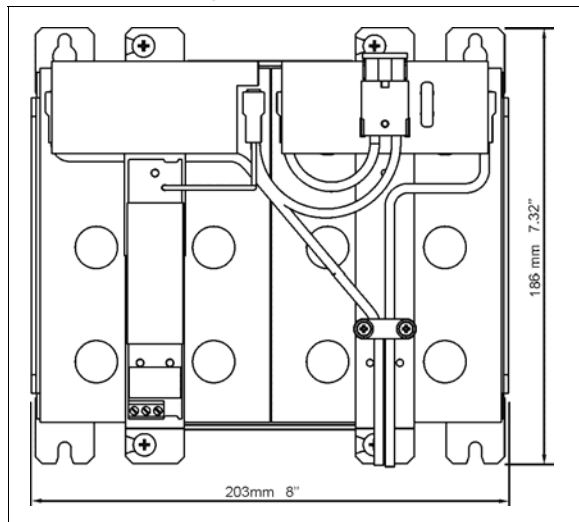


Fig. 16-2 **Side view**

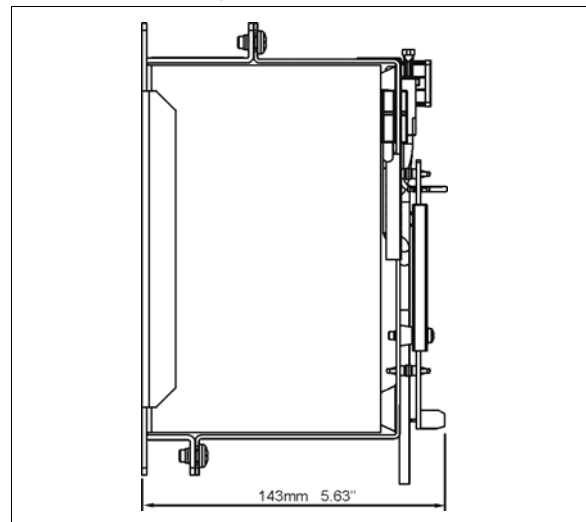
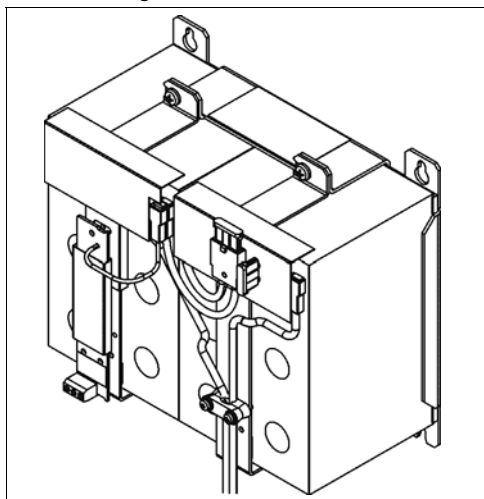


Fig. 16-3 **Isometric view**

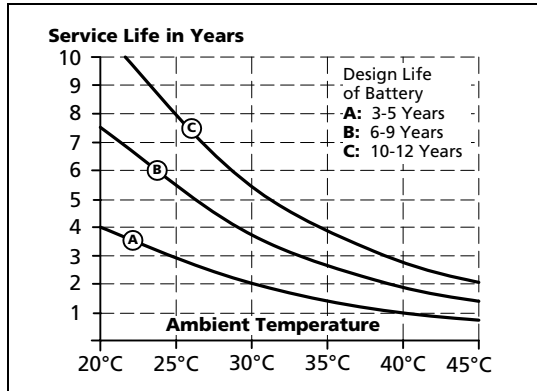


### 17. RECOMMENDATIONS FOR A LONG BATTERY LIFE

#### Temperature:

The temperature has the most impact on the service life. The hotter the temperature, the earlier the wear-out phase of the battery begins. The wear-out results in a degradation of battery capacity. Place the battery module in a cool location, E.g. near the bottom of the control cabinet. Do not place the battery module near heat generating devices. Do not overcharge batteries!

Fig. 17-1 Service life vs. ambient temperature, typ.

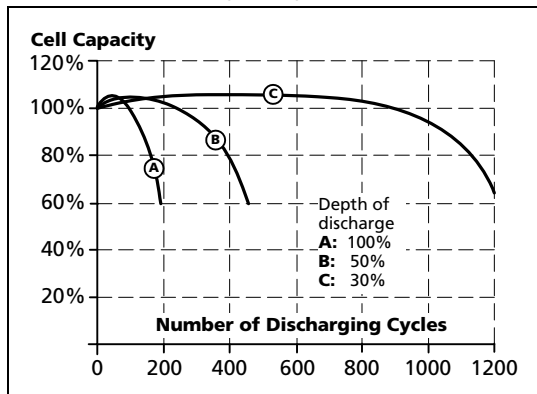


#### Number of discharge cycles and depth of discharge:

Do not discharge batteries more than necessary. Set buffer time limiter to the required buffer time. The number, as well as the depth of discharging cycles is limited. A replacement of the battery might be necessary earlier.

When choosing the battery capacity, always try to get the next higher capacity than required. The depth of discharge reduces the service life of the battery and limits the number of cycles.

Fig. 17-2 Battery degradation vs. discharging cycles, typ.



#### Store batteries fully charged

Do not store discharged batteries. Keep batteries fully charged!

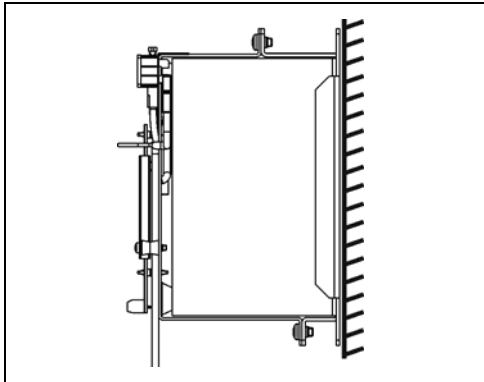
Charge retention is important to get the longest battery life. Stored batteries which are not fully charged age faster than charged batteries. Batteries which are not in use should be recharged at least once a year. The higher the ambient temperature, the shorter the charging interval. At storage temperatures higher than 30°C, recharging should be done at least every nine months.



### 18. MOUNTING ORIENTATIONS

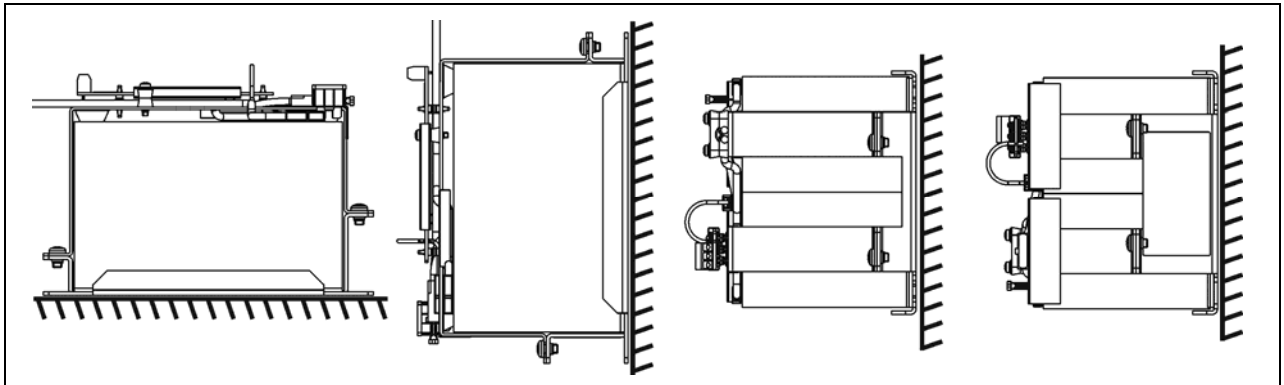
The standard mounting orientation is the vertical installation onto a flat surface.

Fig. 18-1 **Standard mounting orientation**



The following mounting orientations are also allowed:

Fig. 18-2 **Allowed mounting orientation**



Do not use the battery module in an upside down position:

Fig. 18-3 **Forbidden mounting orientation**

