25. INSTALLATION NOTES

Mounting:
The power terminal shall be located on top of the unit. An appropriate electrical and fire end-product enclosure should be considered in the end use application.

Cooling: Convection cooled, no forced air cooling required. Do not obstruct air flow!

Installation clearances: 40mm on top, 20mm on the bottom, 5mm on the left and right side are recommended when loaded permanently with full power. In case the adjacent device is a heat source, 15mm clearance are recommended.

Risk of electrical shock, fire, personal injury or death!

Turn power off and disconnect battery fuse before working on the DC-UPS. Protect against inadvertent re-powering.
Make sure the wiring is correct by following all local and national codes. Do not open, modify or repair the unit.
Use caution to prevent any foreign objects from entering into the housing.
Do not use in wet locations or in areas where moisture or condensation can be expected.

Service parts:
The unit does not contain any service parts. The tripping of an internal fuse is caused by an internal fault. If damage or malfunctioning should occur during operation, immediately turn power off and send unit to the factory for inspection!

Wiring and installation instructions:

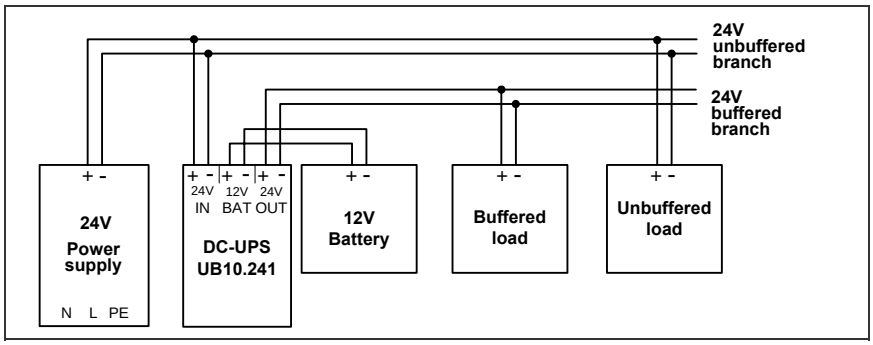
(1) Connect the power supply to the input terminals of the DC-UPS.

(2) Connect the battery to the battery terminals of the DC-UPS. It is recommended to install the battery outside the cabinet or in a place where the battery will not be heated up by adjacent equipment. Do not install the battery in airtight housings or cabinets. The battery should be installed according to EN50272-2, which includes sufficient ventilation. Batteries store energy and need to be protected against energy hazards. Use a 30A battery fuse typ ATO® 257 030 (Littelfuse) or similar in the battery path. The battery fuse protects the wires between the battery and the DC-UPS. It also allows the disconnection of the battery from the DC-UPS which is recommended when working on the battery or DC-UPS. Disconnect battery fuse before connecting the battery.
Please note: Too small or too long wires between the DC-UPS and the battery can shorten the buffer time or can result in a malfunction of the DC-UPS. Do not use wires smaller than 2.5mm^2 (or 12AWG) and not longer than 2x1.5m (cord length 1.5m). Avoid voltage drops on this connection.

(3) Connect the buffered load to the output terminals of the DC-UPS. The output is decoupled from the input allowing load circuits to be easily split into buffered and non buffered sections. Noncritical loads can be connected directly to the power supply and will not be buffered. The energy of the battery can then be used in the circuits which requires buffering.

(4) Install the fuse when the wiring is finished.

Fig. 25-1 **Typical wiring diagram**



26. ACCESSORIES

Battery Modules

Two pre-assembled battery modules with a single 12V battery are available for different buffer times. As an option, the mounting brackets are also available without batteries. This option offers more flexibility in selecting an appropriate battery or can save shipping and logistic costs. See individual datasheets for detailed information.

	UZK12.071	**UZK12.261**	
Battery type	Standard version 12V, 7Ah	High current version 12V, 26Ah	VRLA lead-acid maintenance free battery
Service life	3 to 5years	10 to 12years	According to EUROBAT guideline
Dimensions	155x124x112mm	214x179x158mm	Width x height x depth
Weight	3.2kg	9.9kg	
DIN-Rail mountable	yes	no	
Order number	UZK12.071	UZK12.261	Battery module
	UZO12.07	UZO12.26	Mounting bracket without battery
	UZB12.071	UZB12.261	Replacement battery only

Fig. 26-1 **UZK12.071**

Fig. 26-2 **UZK12.261**

ZM1.WALL Wall / Panel mounting bracket

This bracket is used to mount the DC-UPS units onto a flat surface without utilizing a DIN-Rail. The two aluminum brackets and the black plastic slider of the DC-UPS have to be removed so that the two surface brackets can be mounted.

Fig. 26-3 **ZM1.WALL Wall / Panel Mounting Bracket**

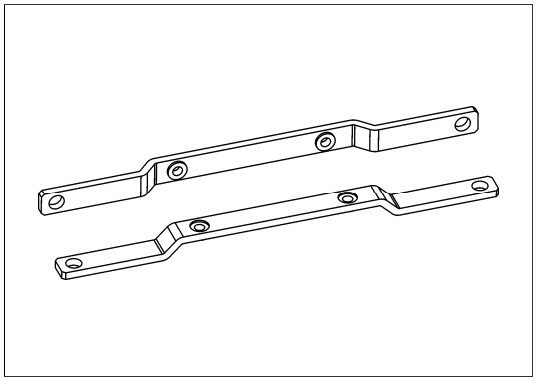
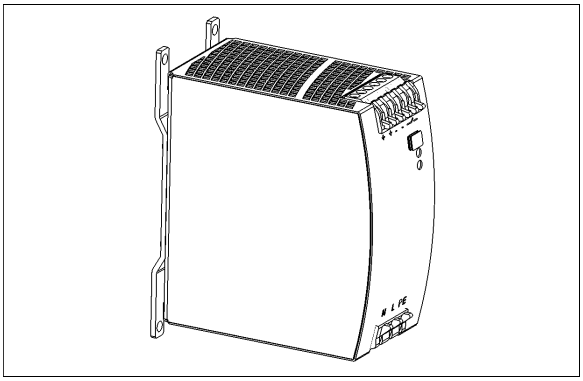


Fig. 26-4 **Assembled Wall / Panel Mounting Bracket**



27. Application Notes

27.1. Battery Replacement Intervals

Batteries have a limited life time. They degrade slowly beginning from the production and need to be replaced periodically. The design life figures can be found in the individual datasheets of the batteries and usually is specified according to the Eurobat guideline or according to the manufacturer's specifications.

The design life is the estimated life based on laboratory condition, and is quoted at 20°C using the manufacturer's recommended float voltage condition. According to the Eurobat guideline, design lives have been structured into the following different groups:

3 - 5 years: This group of batteries is very popular in standby applications and in small emergency equipment. This represents a 4 years design life with a production tolerance of ±1 year.

6 - 9 years: This group of batteries is usually used when an improved life is required. This represents a 7.5 years design life with a production tolerance of ±1.5 years.

10 - 12 years: This group of batteries is used when in applications where longest life and highest safety level are required. This represents a 11 years design life with a production tolerance of ±1 year.

A battery failure within the specified design life of the battery usually results in a complete loss of the battery function (broken cell, defect connection, …) and will be detected and reported by the periodical battery tests which are included in the UB10.241 DC-UPS control unit.

If the operational parameters differ from those which are specified for the design life, an earlier change of the battery might be necessary. The "real life" is called service life and is defined as the point at which the cell's actual capacity has reached 80% of its nominal capacity. At the end of the service life the capacity degrades much faster, so that a further use of the battery is not recommended.

Temperature effect:

The temperature has the most impact in 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. See Fig. 27-1 for details.

Effect of discharging cycles

The number as well as the depth of discharging cycles is limited. A replacement of the battery might be necessary earlier than the calculated service life if the battery exceeds the numbers and values of Fig. 27-2.

Other effects which shortens the service life

- Overcharging and deep discharging shortens the service life and should be avoided. Thanks to the single battery concept of the UB10.241, the end-of-charge-voltage can be set very precisely to the required value an thereby avoiding unnecessary aging effects.
- Charge retention is important to get the longest battery life. Stored batteries which are not fully charged age faster then charged batteries. Batteries which are not in use should be recharged at least once a year.
- Excessive float charge ripple across the battery has an effect of reducing life and performance. The UB10.241 does not produce such a ripple voltage. This effect can be ignored when the battery is charged with the UB10.241.

Guidelines for a long battery service life:

- Place the battery in a cool location: E.g. near the bottom of the control cabinet.
- Do not place the battery near heat generating devices.
- Do not store discharged batteries.
- Do not discharge the battery more than necessary. Set buffer time limiter to the required buffer time.
- 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. See Fig. 27-2.

Example for calculating the service life and the required replacement cycle:

Parameters for the example:

- A 7Ah battery with a design life of 3-5 years is used (e.g. Yuasa battery from the battery module UZK12.071)
- The average ambient temperature is 30°C
- One buffer event consumes approx. 25% of the achievable buffer time.
- One buffer event per day

Calculation:

Ambient temperature influence:
According to Fig. 27-1 curve A, a 2 years service life can be expected for an ambient temperature of 30°C.

Number of discharging cycles: 2 years * 365 cycles = 730cycles in 2 years.
According to Fig. 27-2, curve C has to be used (only 25% of battery capacity is required). 730 cycles have only a negligible influence in a battery degradation and can be ignored.

Result:
The battery shall be replaced after 2 years.
Please note that the battery degrading begins from the production date (check date code on the battery) which may shorten the replacement intervals.

Fig. 27-1 **Service life versus ambient temperatures, typ *)**

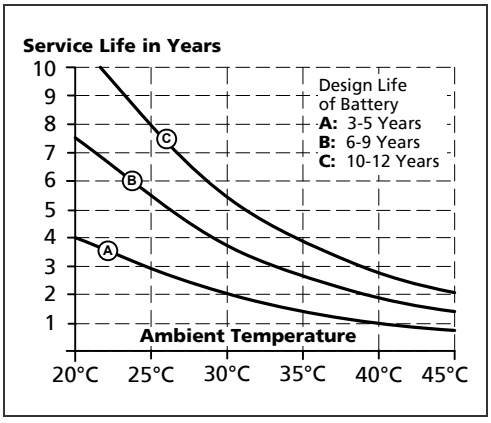
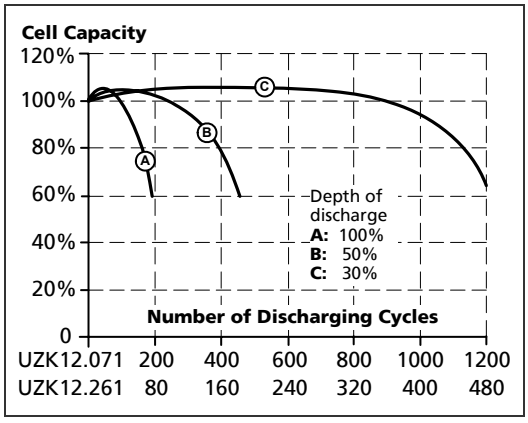


Fig. 27-2 **Cell capacity degradation vs. discharging cycles *)**



*) datasheet figures from battery manufacturer

27.2. Parallel and Serial Use

Do not use the DC-UPS in parallel to increase the output power. However, two units of the DC-UPS can be paralleled for 1+1 redundancy to gain a higher system reliability.

Do not use batteries in parallel, since the battery quality test might create an error message.

Do not connect two or more units in series for higher output voltages.

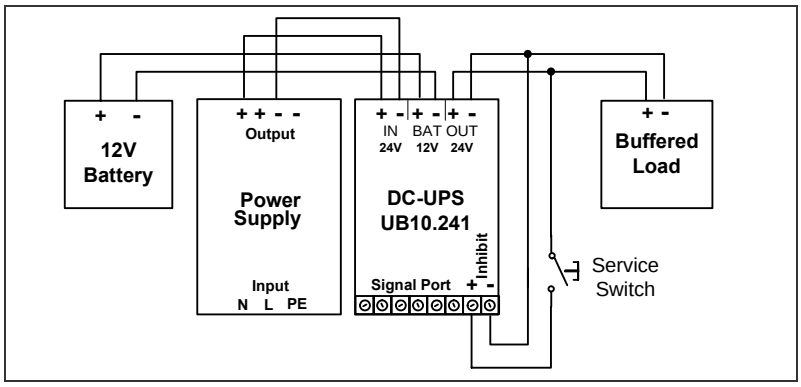
Do not connect two or more units in a row to get longer hold-up times.

27.3. Using the Inhibit Input

The inhibit input disables buffering. In normal mode, a static signal is required. In buffer mode, a pulse with a minimum length of 250ms is required to stop buffering. The inhibit is stored and can be reset by cycling the input voltage.

For service purposes, the inhibit input can also be used to connect a service switch. Therefore, the inhibit signal can be supplied from the output of the DC-UPS.

Fig. 27-3 **Wiring example for inhibit input**



27.4. Troubleshooting

The LEDs on the front of the unit and relay contacts indicate about the actual or elapsed status of the DC-UPS. Please see also chapter 14.

The following guidelines provide instructions for fixing the most common failures and problems. Always start with the most likely and easiest-to-check condition. Some of the suggestions may require special safety precautions. See notes in section 25 first.

"Check wiring" LED is on	Check correct wiring between the battery and the DC-UPS Check battery fuse. Is the battery fuse inserted or blown? Check battery voltage (must be typically between 7.4V and 15.1V) Check input voltage (must be typically between 22.8V and 30V) Check battery polarity
DC-UPS did not buffer	Inhibit input was set Battery did not have enough time to be charged and is still below the deep discharge protection limit.
DC-UPS stopped buffering	Buffer time limiter stopped buffering → set buffer time limiter to a higher value Deep discharge protection stopped buffering → use a larger battery, or allow sufficient time for charging the battery Output was overloaded or short circuit → reduce load
Output has shut down	Cycle the input power to reset the DC-UPS Let DC-UPS cool down, over temperature protection might have triggered.
DC-UPS constantly switches between normal mode and buffer mode	The supplying source on the input is too small and can not deliver sufficient current → Use a larger power supply or reduce the output load