

Battery Maintenance and Replacement

Battery Storage and Preventative Maintenance

Storing batteries correctly is key to maintaining their performance and extending their lifespan. A common issue that leads to battery failure is improper storage. All batteries naturally lose charge over time, even when not in use. This process, called self-discharge, happens more quickly when batteries are exposed to very hot or cold temperatures. If a battery is stored for a long period without being checked or recharged, it can lose capacity and may not work properly when needed. To avoid this, it's important to regularly check battery voltage and recharge as needed. Following a simple maintenance routine can help prevent early failure and keep batteries ready for use.

Guidelines for Optimal Battery Performance:

- 1. Battery Storage:
 - Store battery packs disconnected from the UPS unit.
 - \circ $\;$ Recharge battery packs before use to achieve 100% capacity.
 - Implement a maintenance program for stored battery packs, including periodic recharging (see General Guidelines below).
- 2. General Guidelines:
 - Store batteries in a cool location (10°C 25°C) to maximize lifespan.
 - Recharge the battery by connecting it to an Acumentrics UPS, powered by AC input, at the timeframes seen in the table below:

| Temperature | Lead Acid | LFP | | |
|------------------------------|------------|----------|--|--|
| Below 20°C (68°F) | 9 months | | | |
| 21°C(70°F) to 30°C (86°F) | 6 months | 6 months | | |
| 31°C (88°F) to 40°C (104°F) | 3 months | | | |
| 41°C (106°F) to 50°C (122°F) | 1.5 months | | | |

Table 1 - Storage Temperature and Recharge Interval

• Replace batteries when the runtime is less than 80% of the original runtime or at recommended timeframe (see When to Replace the Battery Due to Age).

Battery Lifespan and Replacement

<u>LFP Batteries</u>: Battery lifespan is influenced by various factors, including temperature extremes and the frequency of charge and discharge cycles. Consistent exposure to high or low temperatures, as well as repeated deep discharges, can reduce overall battery performance and longevity.

<u>VRLA Batteries</u>: The overall lifespan of these batteries depends on operating conditions. High or low ambient temperatures and frequent deep discharge cycles can negatively affect long-term performance and reduce battery life.

The most accurate method to assess battery health is by performing a runtime test. To perform a runtime test, follow these steps:





Runtime Test Using a Known Load:

- 1. Procedure
 - Using a new, fully charged battery pack and a known load, operate the UPS in "On Battery" mode without any power input.
 - Measure the time until the UPS powers off completely during the first test.
 - Repeat the test with a "used" (not new) fully charged battery pack using the same known load.
 - Measure the time until the UPS powers off completely during the second test.
- 2. Battery Health Assessment:
 - If the second runtime test is less than 80% of the new battery runtime test, it is recommended to replace the battery. For example, if the new battery ran for 20 minutes and the used battery runs for less than 16 minutes, it should be replaced.

When to Replace the Battery Due to Age:

<u>LFP Batteries</u>: To limit potential issues and downtime due to an older battery, consider replacing the battery any time after **4 years**.

<u>VRLA Batteries</u>: To limit potential issues and downtime due to an older battery, consider replacing the battery any time after **2 years**.

If the system is not in use and at a customer depot/in for repairs, consider testing the battery or proactively replacing it to ensure expected performance when in operation.

The manufactured date of the battery pack can be determined by the Serial Number that is found on the battery pack label found on top of the pack. The first two numbers after the "W" represent the week of the year the battery was manufactured. The second two numbers represent the year of manufacture. Refer to Figure 1.



Figure 1 - Identifying Battery Manufacture Date

Battery Disposal:

Acumentrics recommends safely recycling any old battery packs at a local facility per local regulations.



Battery Maintenance and Replacement Manual



Purchasing a Spare or Replacement Battery

All Acumentrics battery packs can be sold individually (separate from UPS) for spare units and replacements. Please contact an Acumentrics representative directly or visit the Acumentrics website link below, which will bring you to the Battery Replacement page. https://acumentrics.com/battery-replacement/

Expected Battery Run Time in Minutes for New Batteries:

| Battery Type | LFP | LFP | LLFP | VRLA | VRLA |
|---------------|----------|-----|------|-------|------|
| Size (Height) | 1U/2U/3U | 4U | 4U | 1U/2U | 4U |
| Load (W) | | | | | |
| 250 | 53 | - | - | 25 | - |
| 500 | 28 | 57 | 89 | 11 | 41 |
| 750 | 18 | - | - | 7 | - |
| 1000 | 13 | 28 | 46 | 4 | 17 |
| 1250 | 10 | - | - | 2 | - |
| 1500 | - | 18 | 29 | - | 11 |
| 2000 | - | 14 | 21 | - | 7 |
| 2400 | - | 11 | 17 | - | 6 |

Table 2 - Expected Run Time for New Batteries

