

## Maintenance Guidelines for Uninterruptable Power Supplies

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Every uninterruptible power supply (UPS) includes a battery system that engages when an unplanned electrical outage occurs. The battery is a key component of every UPS system and acts as a secondary power source to provisionally support connected equipment. Unfortunately, the battery can be the weakest link in every UPS system.

UPS systems and their batteries should be properly maintained and monitored to prolong their service life, mitigate safety concerns, and, most importantly, avoid breakdowns. Our Boiler & Machinery Division has developed the following maintenance guidelines based on industry-accepted standards and many years of experience working with our clients to investigate equipment breakdowns.

### Preventative Maintenance Guidelines

As a best practice, a UPS preventive maintenance program should be established that includes keeping the following documentation on site:

- Manufacturer manuals
- Wiring diagrams
- Operating procedures
- Maintenance schedules and records

Maintenance or repairs should be performed in accordance with the original equipment manufacturer's guidelines.

Note: Some UPS software programs automatically log this information, recording UPS issues or associated repairs, and a complete maintenance history. A physical copy should be kept with the preventive maintenance program.

The following periodic activities should be included in your UPS maintenance program:

### Quarterly

- Visually inspect the area around the equipment for signs of trouble (e.g., water on the floor, proper cooling and environmental controls).
- Ensure no operating abnormalities or warnings have registered on the interface modules or controls associated with the UPS system.
- Inspect batteries for signs of corrosion or other defects.

### Semiannually

- Visually check for liquid contamination from batteries and capacitors.
- Clean and visually inspect UPS equipment enclosures.
- Check HVAC equipment and performance related to temperature and humidity.

### Annually

- Conduct thermographic scans on electrical connections. This is a non-invasive diagnostic test to help ensure connections are tight and not generating heat, which may be the first, and sometimes the only, indication of a problem. If the thermal scan shows hot spots, indicating high resistance areas, they should be addressed by the technician and, if any loose connections are found, retorqued to the manufacturer's specifications.
- Provide a complete operational test of the system. This test should include a load test to make sure the battery bank will provide enough power in the event of an outage, to allow time for the emergency generator to come online or for a "graceful" equipment shutdown.
- A monitored battery-rundown test to determine if any battery strings or cells are near the end of their useful lives.

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- Test UPS transfer switches, circuit breakers and maintenance bypasses. If a generator is part of the building's emergency-power system and feeds the UPS, it should also to be tested monthly or quarterly.



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