



Eaton Type-10 UPS for healthcare facilities

Overview

The National Fire Protection Association (NFPA) is a recognized organization in the United States dedicated to prescribing standards and regulations for protection against fire, electrical, and related hazards. Fire hazards (both electric and chemical) is a leading cause of death, injury, damage to property, and adverse effects on the environment.

Power interruption, for even a short period, can have a severe impact on critical or life-dependent processes - for example, the loss of life of a patient on a dialysis machine. To this effect, the organization has put out several protection standards, which include the NFPA 70, NFPA 99, and the NFPA 110. All three standards support a 10-second emergency power (Type-10) requirement to bring emergency or backup power online to sustain the operation of devices and equipment.

- **NFPA 110** - governs backup and restoration time/capacity
- **NFPA 99** - governs healthcare facilities
- **NFPA 70** - additional standards for healthcare systems, and other emergency-type systems (in addition to healthcare) that require Type-10 backup restoration

Note: *NFPA standards are amended from time to time. Moreover, they are subject to prevailing federal, state, and local safety regulations. This technical note focuses on healthcare applications covered by the NFPA 99 standard.*

NFPA 99 - Healthcare systems

The NFPA 99 standard covers the emergency preparedness of electrical power systems for life-critical applications in the healthcare sector. NFPA 99 supports Type-10 power restoration (10-second emergency backup power from generators or power storage system) for electronic devices and machines that assist healthcare professionals in the diagnosis, monitoring, and treatment planning for patients at hospitals and clinics. Examples include medical resonance imaging (MRI) machines, computed tomography (CT) scanners, pacemakers with insulin pumps, and more.

Eaton Type-10 UPS for healthcare applications

Type-10 generators, which provide backup power to medical devices and systems a maximum of 10 seconds after a power outage, are insufficient for healthcare applications where only a few seconds of a power outage can be life-threatening. Consequently, many healthcare facilities rely on uninterruptible power supplies (UPS), rated from between 100 kW to 600 kW, to bridge the gap before secondary power comes online.

Eaton's Type-10 UPS solutions provide reliable backup power to minimize interruptions to critical loads and support dwelling at hospitals, clinics, and other healthcare facilities. End-users in the healthcare industry can integrate large UPS systems into Eaton XLM module cabinets (XLCM) to optimize space.



Powering Business Worldwide

Eaton Type-10 UPS selection process

For selecting the right backup power system, end-users should note the following considerations:

- Duration of backup time (in seconds, minutes, etc.) before switching to Type-10 generators
- The load requirements of the healthcare facility
- The size of the healthcare facility (are there space constraints for installing Eaton UPS systems?)

With the above information in mind, Eaton offers the following power storage solutions:

Batteries: Eaton's UPS batteries provide backup power to sustain healthcare equipment for up to 15 minutes after a power outage. They are ideal for facilities that require UPS for up to several minutes. Eaton 12 V 620 W batteries (PWHR12-620W), rack-mounted and paired in series, can provide sufficient emergency power for large buildings.

Supercapacitors: Eaton supercapacitors provide Type-10 backup power after a power outage to sustain healthcare equipment. They are ideal for facilities that require UPS for a very brief duration (approximately 10 seconds). Supercapacitors are compact and maintenance-free, with lifetimes of up to 20 years.*

Eaton's XLM62 supercapacitor modules are ideal for Type-10 healthcare UPS systems used to sustain life-critical medical equipment during brownouts or total power loss. Each XLM62 supercapacitor offers 130 F of capacitance with a maximum working voltage of 62.1 V and an initial equivalent series resistance (ESR) of 6.7 mΩ.



Figure 1. Eaton's XLM62 supercapacitor modules

**Eaton supercapacitor lifetimes are dependent on charge voltages and operating temperatures. For more information on lifetime estimates, please see Eaton application guidelines.*

200 kW - 300 kW Eaton Type-10 UPS for emergency room

A 3-phase 200 kW - 300 kW Eaton Type-10 UPS provides backup power to keep medical equipment in an ER running for up to 10 seconds after a power failure or outage. ER equipment supported includes ECG monitors and defibrillators, incubators, ventilators, and more. This solution uses ten units of series-connected XLM62 modules, which increases the distribution voltage. The supercapacitor modules utilize Eaton cell balancing technology to optimize the voltage level in individual cells.

The standard system dimensions are 30 inches wide and 31 inches deep in Eaton's XLM module cabinet (XLCM). Using Eaton's supercapacitors, this system will last up to 20 years under normal operating conditions. End-users can customize the number of supercapacitors to suit their specific power and time requirements.



Figure 2. Eaton's XLM module cabinet (XLCM)

500 kW - 600 kW Eaton Type-10 UPS for hospital complex

A 3-phase 500 kW - 600 kW Eaton Type-10 UPS provides backup power for a hospital or similar large building. The system supplies power to lighting, air-conditioning, diagnostics machines, and life-sustaining medical equipment after a power outage before backup generators come online.

Estimating total cost of ownership

Eaton provides a simple-to-use online tool [click here](#) for quickly estimating your total cost of ownership over the life of your emergency power system.

Success story

A healthcare facility selected XLM modules paired with a UPS to provide 20 kW of backup power for two minutes or 164 kW for 13 seconds. Additionally, the same XLMs provide 364 kW for two seconds to support CT scan pulses while the generator is providing power. This multipurpose system helped defer additional capital investment, generator stress, and retrofit in other, more expensive distribution equipment while also providing low maintenance operations for 20 years.

How to purchase

To purchase Eaton Type-10 UPS solutions, please contact Eaton Electronics or find your local sales rep. For further information on the Eaton supercapacitor product line, please visit www.eaton.com/supercapacitors.

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