Lithium-Ion Risk Prevention System

Description

Lithium-ion batteries present fire risks with unique hazards that are extremely difficult to secure before they become a major fire. The GEM Lithium-Ion Risk Prevention System, powered by LI-ION TAMER* technology, has been designed to proactively identify a lithium-ion battery failure before it reaches thermal runaway resulting in a major fire event.

Lithium-ion batteries can fail for a number of reasons including overcharging, over heating, excessive discharging and failure of battery management systems. The off-gassing of a lithium-ion battery occurs during the beginning stages of battery failure. Once a battery off-gasses, if no actions are taken to remove the failure mechanism, the battery will proceed to thermal runaway and burst into fire.

Fortunately, if the lithium-ion battery off-gas event is detected, many batteries can be prevented from going into thermal runaway conditions.

The GEM Lithium-Ion Risk Prevention System - when combined with AUTOPULSE, ZETTLER or FIRECLASS detection and INERGEN® or SAPPHIRE® Fire Suppression Systems - identifies lithium-ion batteries that have off-gassed and provides the ability to help suppress fires by proactively activating alarms and releasing the fire suppression system.

Application

The GEM Lithium-Ion Risk Prevention System with a connected releasing panel and suppression system is particulary useful for early detection and suppression of fires in hazards where lithium-ion batteries are in use. Typical applications include lithium-ion energy storage systems, lithium-ion battery test chambers and lithium-ion battery assembly rooms.

Key Features

- Early warning of lithium-ion battery failures
- Response time of less than 5 seconds to lithium-ion gases
- Single cell failure detection without electrical or mechanical contact of cells
- Compatible with all lithium-ion battery configurations and chemistries available today
- Independent and redundant perspective on battery health
- Several communication protocols including digital outputs and serial communication
- For use with AUTOPULSE, ZETTLER or FIRECLASS detection and INERGEN® or SAPPHIRE Fire Suppression Systems

* LI-ION TAMER is a trademark of Nexceris, LLC.

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Controller Specifications

- Dimensions: 8.26 in. (210 mm) x 4.44 in. (113 mm) x 2.48 in. (63 mm)
- Operating voltage: 12 VDC to 28 VDC
- Maximum power consumption: 6.6 W at 24 VDC
- Maximum sensor inputs: 15 per controller
- System communications output: Alarm and Fault messaging through digital I/Os and Modbus interface
- Networking so multiple controllers link together for expansion

Johnson Controls

Sensor Specifications

011161

Sensor Overview

There are two types of Lithium-Ion Risk Prevention Monitoring Sensors: a reference sensor and a monitoring sensor. The reference sensor provides the surrounding environment air quality data to the controller, while the monitoring sensor is placed within the battery racks or racking system to allow for close capturing of the air directly adjacent to the lithium-ion batteries. The controller is constantly monitoring both the environment and battery rack air for changes of less than 1 ppm of lithium-ion off-gas compounds.

Sensor Key Features

- Early warning of lithium-ion battery failures
- Response time less than 5 seconds for lithium-ion gases
- Capable of single cell failure detection
- Compatible with all lithium-ion battery configurations and chemistries available today
- Calibration free design
- Compact design

Ordering Information

Part No.	Description
451786	Controller, Shipping Assembly, GEM
241022	Sensor, Monitoring
241023	Sensor, Reference
451983	Power Cable, 10 ft (3.05 m)
451984	Digital Output Cable, 10 ft (3.05 m)
451985	Monitoring Sensor Cable, 25 ft (7.62 m), RJ45 Black
451986	Monitoring Sensor Cable, 50 ft (15.24 m), RJ45 Black
451987	Monitoring Sensor Cable, 100 ft (30.48 m), RJ45 Black
451988	Reference Sensor Cable, 25 ft (7.62 m), RJ45 Blue
451989	Reference Sensor Cable, 50 ft (15.24 m), RJ45 Blue
451990	Reference Sensor Cable, 100 ft (30.48 m), RJ45 Blue
451991	Controller Cable, Daisy Chain, 1 ft (0.30 m), RJ45 Gray
451992	Controller Cable, Daisy Chain, 3 ft (0.91 m), RJ45 Gray
451993	Controller Cable, Daisy Chain, 25 ft (7.62 m), RJ45 Gray
451994	Modbus, TCP/IP Adapter
451995	Modbus, Serial Cable
451996	Form C Relay
451997	Bump Test Bottle

Note: The converted values in this document are provided for dimensional reference only and do not reflect an actual measurement.

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