Li-ion Tamer® GEN 3
LITHIUM ION OFF-GAS DETECTION SYSTEM

Product Description

The Li-ion Tamer GEN 3 is a device that detects the venting of battery electrolyte solvent vapours (off-gassing phase) that occurs early in the failure mode of lithium-ion batteries (LIB). The early detection of this event allows proper mitigation steps to be taken to avoid a catastrophic thermal runaway failure.

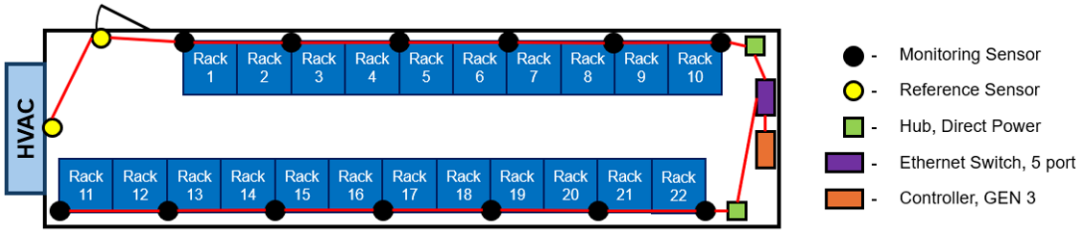
The Li-ion Tamer GEN 3 system is designed to be easy to install and configure, consisting of several components: (i) sensors, (ii) hub, (iii) standard or PoE ethernet switch, (iv) controller.

- Each sensing node comprises an off-gas sensor with advanced algorithms making it acutely sensitive to detecting battery electrolyte vapours (off-gassing compounds), does not require calibration, is compatible with all LIB form factors and chemistries, and has a lifetime comparable to a typical LIB system. The sensing node also includes temperature and humidity sensors for environmental monitoring.
- Sensing nodes are networked by the hubs and switches to the controller, which is the central point for managing and monitoring the entire system. The controller has relays and Modbus TCP/IP outputs that connect to the BMS or other control systems.

System Configuration

The Li-ion Tamer GEN 3 system is a versatile solution that accommodates the vast range of lithium-ion battery systems. In a typical setup, system configuration will consist of the following

- Monitoring sensors installed at the battery racks – downstream convective airstreams – to monitor off-gas events
- Reference sensors installed to monitor the ambient environment and air inlets to prevent false positive signals
- Hubs installed local to their respective zone of sensors
- Controller and Ethernet switch for aggregating sensor signals (optional PoE switches for distributing power to the system)



The Li-ion Tamer GEN 3 system requires minimal operation and maintenance procedures as the sensors are calibration-free and have comparable lifetime to that of the ESS battery system. The gas sensors response can be easily verified with a simple test. To confirm operation, sensors can be activated with a bottle of battery off-gassing compounds (Diethyl Carbonate, DEC) which is supplied by Li-ion Tamer.

Important Note: This device detects the venting of electrolyte vapours from lithium-ion batteries. It does not prevent fires or thermal runaway. This device is not a standalone safety device and should be incorporated into a proper safety system. If device responds, there is a risk of battery fault which could lead to thermal runaway. To avoid injury, leave area immediately.

Hardware Details

Controller

Sensor and Hub

Key Features

- Early warning of lithium-ion battery failures - enable thermal runaway prevention with proper mitigating actions
- Single cell failure detection without mechanical or electrical contact to the cells
- Scalable deployment for cost effective protection of a wide range of battery storage systems
- Temperature and humidity monitoring at each sensing node
- Extended product lifetime
- Calibration-free product with highly reliable output signal
- Compatible with all lithium-ion battery form factors and chemistries
- Easy installation
- Independent and redundant perspective on battery health
- Auto diagnostic capabilities
- Reduction/removal of false positive signals
- Communication protocols including relays and Modbus serial

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Specifications

Controller Specifications	
Dimensions (LxWxH)	115mm x 82mm x 34mm
Input Power Range	12 VDC
Max Sensors per Controller	100
Power Consumption Specifications	
Controller, GEN 3	3 A (36 W @ 12 VDC)
Hub (Fully Populated)	0.5 A (6.0 W @ 12 VDC)
Additional Hardware	See User Manual (Doc. 3001) for details
MODBUS Output Specifications	
Hardware	TCP/IP Ethernet
Relay Output Specifications	
Connector Type	Screw Terminals
Signal Type	16 SPDT Form C Relays See User Manual (Doc. 3001) for details
Product Life Specifications	
Target lifetime	> 10 years
Gas Detection Specifications	
Target gases	Lithium-ion battery electrolyte solvent vapours
Min. Detection Threshold	< 1 ppm/sec
Min. Response Time	5 seconds
Fault Detection	Single cell failure
Temperature Measurement Specifications	
Measurement Range	-40 to 125°C (−40 to 257°F)
Measurement Accuracy	± 0.4°C from 5 to 60°C (41 to 140°F)
Humidity Measurement Specifications	
Measurement Range	0 to 100% RH (non-condensing)
Measurement Accuracy	± 2.0% RH from 20 to 80% RH
Environmental Specifications	
Operating Temperature	Controllers: 0 to 40°C (32 to 104°F) Sensors and Hubs: -10 to 50°C (14 to 122°F)
Humidity	10 to 90% RH (non-condensing)

Product Certifications

- ETL listed to UL 61010 and CSA 22.2 NO. 61010 for product safety
- EN 61326-1:2013 for EU Directive (2014/30/EU)
- RoHS 3 EU 2015/863, WEEE, and REACH compliant
- UKCA

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Ordering Information

Ordering Code	Description
261001	Monitoring Sensor, Gen 3
261002	Reference Sensor, Gen 3
261003	Hub, Direct Power
261004	Hub, PoE
261007	Hub DIN-Rail Mount Kit
311367	Controller, Gen 3
311344	Controller DIN-Mount Kit
311348	Ethernet Switch, PoE, 4 Port
311365	Ethernet Switch, PoE, 24 Port
311404	PoE Switch 24 port, IEC Power Adapter
311349	Ethernet Switch, 5 Port
311350	Ethernet Switch, 8 Port
311351	Ethernet Switch, 16 Port
311366	Ethernet Relay Module, 16 Port
311380	Relay Output DIN-Rail Mount Kit
311356	Power Supply, 12VDC
311357	Power Supply, 48VDC
311359	3' (~1m) Network Cable (RJ45)
311360	5' (~1.5m) Network Cable (RJ45)
311361	10' (~3m) Network Cable (RJ45)
311362	25' (~7.6m) Network Cable (RJ45)
311363	50' (~15m) Network Cable (RJ45)
311364	100' (~30m) Network Cable (RJ45)
241028	DEC Bump Test Bottle
261006	Spare Kit - 4x Terminators 1x Screw Terminal Adapter

Demo Kit

Ordering Code	Description
261008	Li-ion Tamer Gen 3 Demo Kit

www.liiontamer.com

Doc. No. 3007_01
March 2025