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.

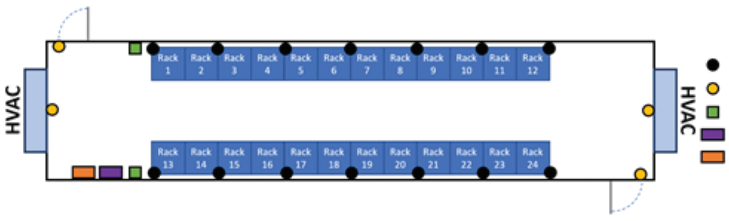
The Li-ion Tamer GEN 3 system is designed to be easy to install and configure, consisting of several components: (i) sensors,
(ii) hub, (iii) power switch, (iv) network switch, (v) controller.

- 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 Xtralis.

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

LI-ION TAMER® GEN 3 Technical Specifications

SPECIFICATIONS

Controller Specifications

Dimensions (LxWxH): 115mm x 82mm x 34mm

Input Power Range: 12 VDC

Max Sensors per Controller: 100

Power Consumption Specifications

Controller: 36 W (@ 12 VDC)

Hub (Fully Populated): 6.0 W (@ 12 VDC)

Additional Hardware: See User Manual (Doc. 37141) 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. 37141) 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

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)

ORDERING INFORMATION

ORDERING CODE	DESCRIPTION
LT-SEN-M3	Monitoring Sensor, Gen 3
LT-SEN-R3	Reference Sensor, Gen 3
LT-ACC-HUB-PWR-HON	Hub, Direct Power, Gen 3
LT-ACC-HUB-POE-HON	Hub, PoE, Gen 3
LT-ACC-HUB-MKT	Hub DIN-Rail Mount Kit
LT-CTR-SML	Controller, Gen 3
LT-CTR-SML-DMK	Controller DIN-Mount Kit, Gen 3
LT-ACC-POE-4	Ethernet Switch PoE, 4 Ports
LT-ACC-POE-24	Ethernet Switch PoE, 24 Ports
LT-ACC-POE-24-ADR	PoE Switch 24 Ports, IEC Power Adapter
LT-ACC-ETS-5	Ethernet Switch, 5 Ports
LT-ACC-ETS-8	Ethernet Switch, 8 Ports
LT-ACC-ETS-16	Ethernet Switch, 16 Ports
LT-ACC-ERO-16	Ethernet Relay Module, 16 Ports
LT-ACC-ERO-MKT	Relay Output DIN-Rail Mount Kit
LT-ACC-PWR-12	Power Supply, 12VDC
LT-ACC-PWR-48	Power Supply, 48VDC
LT-ACC-SAK	Spare Kit - 4x Terminators 1x Screw Terminal Adapter
LT-ACC-NCL-3	3' Network Cable (RJ45), Gen 3
LT-ACC-NCL-5	5' Network Cable (RJ45), Gen 3
LT-ACC-NCL-10	10' Network Cable (RJ45), Gen 3
LT-ACC-NCL-25	25' Network Cable (RJ45), Gen 3
LT-ACC-NCL-50	50' Network Cable (RJ45), Gen 3
LT-ACC-NCL-100	100' Network Cable (RJ45), Gen 3
LT-ACC-TST	DEC Bump Test Bottle

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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