LI-ION TAMER RACK MONITOR
LITHIUM ION BATTERY RACK MONITORING SYSTEM

LI-ION TAMER®
◆ xtralis

Product Description

The Li-ion Tamer Rack Monitoring system 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. The early detection of this event allows proper mitigation steps to be taken to avoid a catastrophic thermal runaway failure.
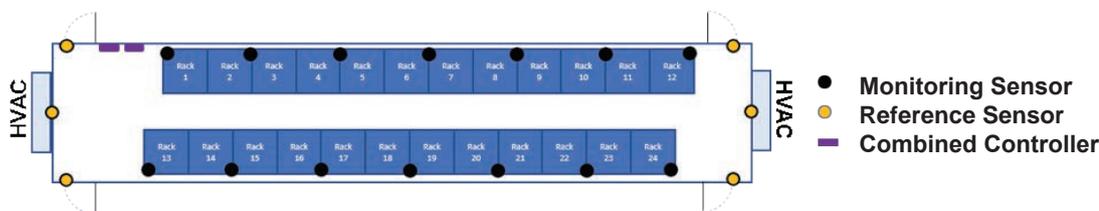
The Li-ion Tamer Rack Monitoring system is designed to be plug-and-play, easy to install and consists of two primary components, (1) off-gas sensors, (2) controller.

1. Off-gas sensors comprise on-board detection algorithms making them acutely sensitive to lithium-ion battery electrolyte solvent vapours, do not require calibration, are compatible with all forms of lithium-ion battery form factors and chemistries and have a lifetime comparable to a typical lithium-ion battery system.
2. Off-gas sensors are connected to the controller that contains proprietary logic to diagnose when and where battery electrolyte vapours venting has occurred. It has digital and Modbus serial outputs that can be used to electrically isolate the battery system and activate the ventilation system.

System Configuration

The Li-ion Tamer Rack Monitoring 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 the venting of battery electrolyte vapours
- Reference sensors installed to monitor the ambient environment and air inlets to cancel common mode signals
- Controllers for aggregating sensor signals

- ● **Monitoring Sensor**
- ● **Reference Sensor**
- ▬ **Combined Controller**

The Li-ion Tamer Rack Monitor system requires minimal operation and maintenance procedures as the sensors are designed to be calibration-free and have comparable lifetime to that of the ESS battery system. The gas sensors response can be easily verified with a bump test. To confirm operation, sensors can be activated with a bottle of battery off-gassing compounds (diethyl carbonate) 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 stand alone 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
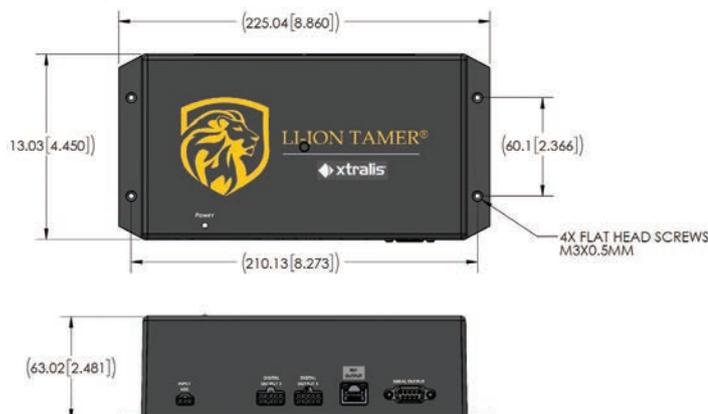
Off-gas Sensor
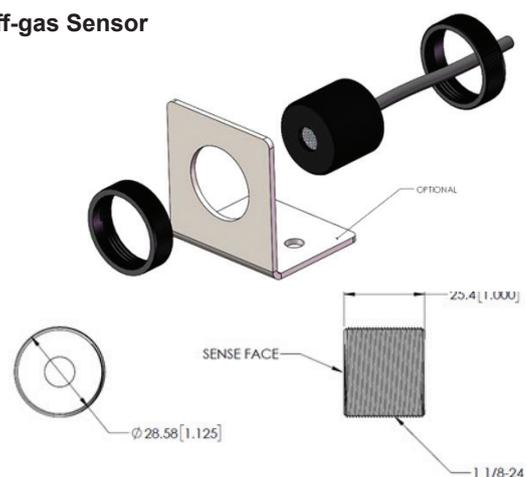
Key Features

- Early warning of lithium-ion battery failures
- Enable thermal runaway prevention with proper mitigation actions
- Single cell failure detection without electrical or mechanical contact of cells
- Extended product lifetime
- Calibration-free product
- Highly reliable output signal
- Low power consumption
- 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
- Configurable communication protocols including digital outputs and Modbus serial communication

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Specifications

Controller Specifications	
Dimensions [mm]	210 (W) x 113 (L) x 63 (H)
Input power range	12 - 28 VDC
Max sensors per controller	15
System outputs	Digital outputs/MODBUS

Power Consumption Specifications	
Controller (no sensors)	2.4 W (@ 24VDC) 1.4 W (@ 12 VDC)
Sensor	275 mW (@ 5 VDC)
Controller (fully populated, 15 sensors)	6.6 W (@ 24 VDC) 5.6 W (@ 12 VDC)
Fuse Rating	3.5 A

MODBUS Communication Specifications	
Baud rate	9600
Parity	None
Stop bit	One
Hardware	RS232 3-wire (TX, RX, ground)

Product Life Specifications	
Target lifetime	> 10 years
Warranty	1 year

Gas Detection Specifications	
Target gases	Lithium ion battery off- gassing compounds
Min. detection threshold	< 1 ppm/sec
Response time	5 seconds
Fault detection	Single cell failure

Environmental Specifications	
Temperature	-10 to +60°C
Humidity	5 to 95% RH
Max temperature change	8.6^{o}C/min

Digital Output Specifications	
Connector type	2x 10-pin Molex
Signal type	Digital
Signal level, normal	HIGH, 12 – 28 VDC (Input voltage) 100mA max per channel
Signal level, alarm	LOW, ~0 VDC

Ordering Information

Ordering Code	Description
LT-SEN-M-L	Li-ion Tamer GEN2+ Monitoring Sensor
LT-SEN-R	Reference Sensor
LT-CTR-C	Combined Controller
LT-ACC-PCL	10' Power Cable
LT-ACC-DCL	10' Digital Output Cable
LT-ACC-MCL-25	25' Monitoring Sensor Cable (RJ45 Black)
LT-ACC-MCL-50	50' Monitoring Sensor Cable (RJ45 Black)
LT-ACC-MCL-100	100' Monitoring Sensor Cable (RJ45 Black)
LT-ACC-RCL-25	25' Reference Sensor Cable (RJ45 Blue)
LT-ACC-RCL-50	50' Reference Sensor Cable (RJ45 Blue)
LT-ACC-RCL-100	100' Reference Sensor Cable (RJ45 Blue)
LT-ACC-CCL-1	1' Controller Daisy Chain Cable (RJ45 Grey)
LT-ACC-CCL-3	3' Controller Daisy Chain Cable (RJ45 Grey)
LT-ACC-CCL-25	25' Controller Daisy Chain Cable (RJ45 Grey)
LT-ACC-CCL-50	50' Controller Daisy Chain Cable (RJ45 Grey)
LT-ACC-CCL-100	100' Controller Daisy Chain Cable (RJ45 Grey)
LT-ACC-IPA	MODBUS TCP/IP Adapter
LT-ACC-RLY	Form C Relay
LT-ACC-TST	DEC Bump Test Bottle
LT-ACC-BKT-PK5	Sensor Mount Kit Spare – 5x brackets 10x nuts
LT-ACC-SCL-MF	6' MODBUS Serial Cable Male to Female
LT-ACC-OEM	OEM Board

Product Certifications

- ETL listed to UL 61010 and CSA 22.2 NO. 61010 for product safety
- EN 61326 for EU Directive (2014/30/EU)
- RoHS 3 EU 2015/863

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