

LI-ION TAMER RACK MONITOR

LITHIUM ION BATTERY RACK MONITORING SYSTEM



LI-ION TAMER®



Product Description

The Li-ion Tamer Rack Monitoring system is a device that monitors lithium-ion battery off-gas events. Off-gas events occur early in the failure mode of lithium-ion batteries and very early detection of these events allow proper mitigation steps to be taken to avoid a catastrophic thermal runaway failure.

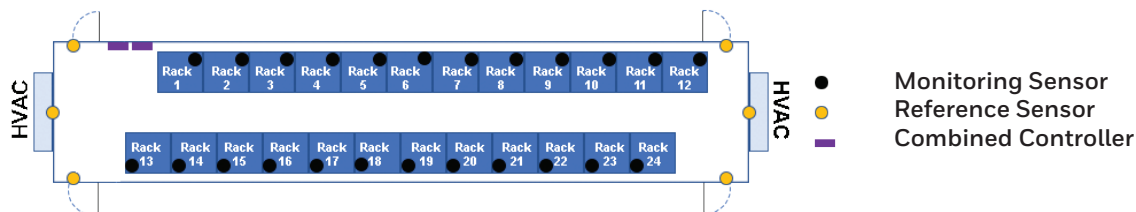
The Li-ion Tamer Rack Monitoring system is designed to be plug-and-play, easily to install and consists of two primary components, (i) off-gas sensors, (ii) controller.

- Off-gas sensors comprise on-board detection algorithms making them acutely sensitive to lithium-ion battery off-gassing compounds, 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.
- Off-gas sensors are connected to the controller that contains proprietary logic to diagnose when and where battery off-gas events have 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 off-gas events
- Reference sensors installed to monitor the ambient environment and air inlets to cancel common mode signals
- Controllers for aggregating sensor signals

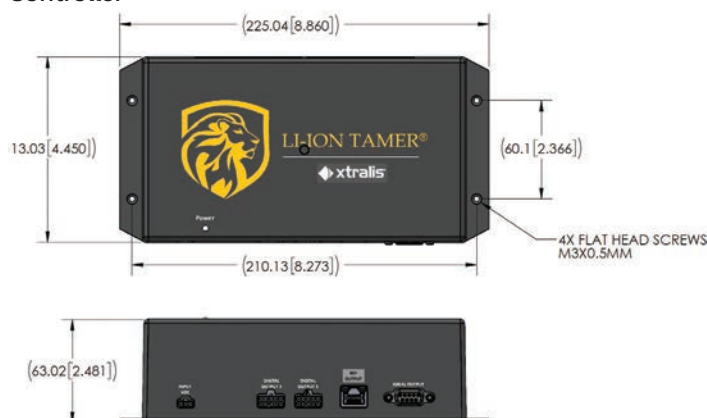


The Li-ion Tamer Rack Monitor system requires minimal operation and maintenance procedures as the sensors are designed to be calibration-free and have comparable lifetime to that of the ESS battery system. The gas sensors response can be easily verified with a bump test. To confirm operation, sensors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

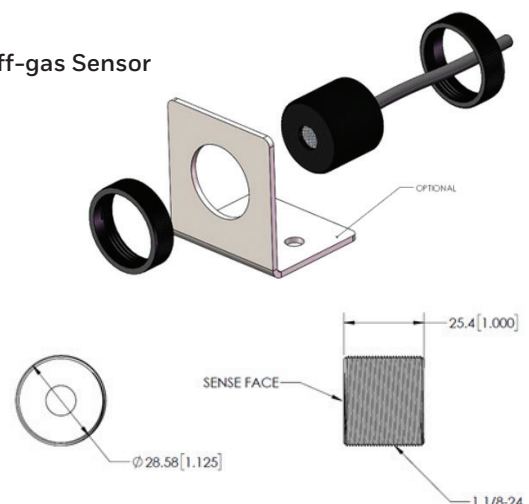
Important Note: This device detects off-gas from lithium-ion batteries. It does not prevent fires or thermal runaway. This device is not a stand alone safety device and should be incorporated into a proper safety system. If device responds, there is a risk of battery fault which could lead to thermal 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

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°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 | 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 |

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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