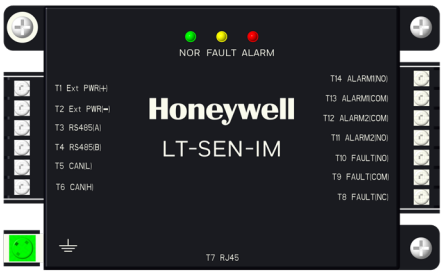
LI-ION TAMER®
SENSOR MULTI OUTPUT SOLUTION (MOS)

Following the launch of the multi-sensor Li-ion Tamer system, Honeywell is introducing the Li-ion Tamer Sensor Multiple Output Solution (MOS) for the protection of lithium-ion batteries.

Li-ion Tamer Sensor MOS comprises a single sensor with multiple communication outputs that detects hydrogen gas, which is generated during thermal runaway of lithium-ion batteries. The detection of hydrogen allows proper management of flammable gas accumulation to avoid explosive conditions.

It is also capable of detecting the initial venting of battery electrolyte solvent vapours (off-gassing phase) that occurs early in the failure mode of lithium-ion batteries. The early detection of such events allows proper mitigation steps to be taken to avoid a catastrophic thermal runaway failure.

The Li-ion Tamer Sensor MOS provides 3 relays, CANbus and Modbus output signals, and is intended to protect Battery Energy Storage Systems (BESS) with small footprint (i.e. cubes, single battery racks, etc.)



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The Li-ion Tamer Sensor MOS is designed to be plug-and-play, easy to install and consists of two primary components, (1) Off-gas Sensor (2) Interface Module.

- **Off-gas Sensor** comprises on-board detection algorithms making it acutely sensitive to hydrogen gas and lithium-ion battery electrolyte solvent vapours, is compatible with all lithium-ion battery form factors and chemistries and has a lifetime comparable to a typical lithium-ion battery system.
- **Interface Module** that connects to the Off-gas Sensor allowing real-time monitoring of the sensor status and timely detection of hydrogen and battery electrolyte vapour emissions. The module provides 3 relay outputs and Modbus 485/ CANbus serial outputs that can be used to electrically isolate the battery system and activate the ventilation system.

CUSTOMER BENEFITS

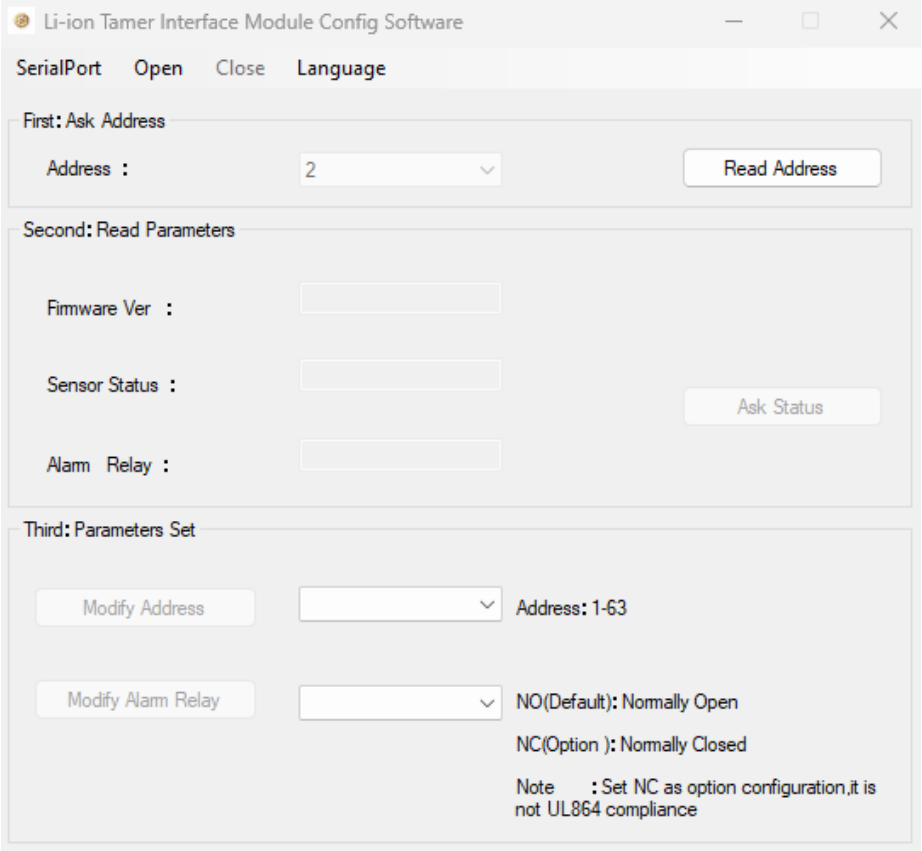
EARLIEST WARNING	Utilises an advanced algorithm to provide the earliest detection of lithium-ion battery off-gassing, creating a barrier for the prevention of catastrophic thermal runaway events.
EXPLOSION PREVENTION	Provides detection of hydrogen gas at or below 10% of LFL.
LOWER MAINTENANCE COST	Low maintenance requirements with calibration free sensor, simplified bump testing and extended sensor life.
ENHANCED CONNECTIVITY	Provides 3 Relays and Digital Communication Protocols (MODBUS, CAN) for integration with Fire Panels and Battery Management Systems.
COST EFFECTIVE	Cost Effective solution for small footprint BESS.

EASY SETUP AND MAINTENANCE

Setup and commissioning of the Li-ion Tamer Sensor MOS is done by the Interface Module configuration tool "Li-ion Tamer Interface Module Config Software".

With the configuration tool, the user can read the current status of the Li-ion Tamer Sensor MOS Firmware version, Modbus address and Alarm relay configuration. The user also has the option to change the address of the Interface Module in a network, and change the configuration of the Alarm relay from its default settings.

Note: For UL864 compliant installations the Interface module Alarm Relay must be set to its default Normaly Open (NO) configuration. For non UL864 compliant installations the user can set the Alarm Relay configuration to Normaly Close (NC).



KEY APPLICATIONS

INDUSTRY TYPE	KEY APPLICATIONS
Stationary Battery Energy Storage	Small footprint BESS installations (modular cubes, single battery racks, etc.)
Datacentres	Battery UPS
Manufacturing	Assembly lines Battery formation process Cell aging and EOL testing Module or pack assembly
Automotive	Vehicle test facilities
Laboratory Safety	Environmental chambers Battery abuse testing
Shipping and Storage	Post-manufacturing storage Battery-powered equipment

SPECIFICATIONS

INTERFACE MODULE SPECIFICATIONS	
Dimensions [mm]	140 (L) x 85 (W) x 34 (H)
Input Power Range	15 - 32VDC Typical 24VDC
Max. Sensors per Module	1
System Outputs	3 Relay outputs/ MODBUS/CANBUS
POWER CONSUMPTION SPECIFICATIONS	
Interface Module (with Sensors)	65mA, Max 1.56W (@ 24VDC)
Off-Gas Sensor	Max. 15 mA (200mW @ 13.2 VDC)
Relay Load	Max. 30 VDC 2A Max. 125 VAC 0.5 A
Output – RJ45	0.25W (5VDC/ 0.5mA) power supply for sensor
COMMUNICATION SPECIFICATIONS	
Baud Rate	MODBUS: 9600 CANBUS: 500K
Hardware	MODBUS: RS485, 2-wire (TX, RX) CANBUS: 2-wire (CANH, CANL)
PRODUCT LIFE SPECIFICATIONS	
Target lifetime	> 10 years

GAS DETECTION SPECIFICATIONS	
Target Gases	Hydrogen gas Lithium-ion battery off-gassing compounds (battery electrolyte solvent vapours)
Min. Detection Threshold	10 ppm/second (hydrogen gas) < 1 ppm/second (electrolyte solvents)
Response Time	5 seconds
Fault Detection	Single cell failure
OFF-GAS SENSOR ENVIRONMENTAL SPECIFICATIONS	
Temperature	-40 °C to 50 °C
Humidity	5 % to 90 %RH (non-condensing)
Max. Temperature Change	8.6oC/min
RELAY OUTPUT/ LED INDICATOR SPECIFICATIONS	
Relays Numbers	3 (alarm1, alarm2, fault)
Alarm Latch	Alarm output latch, reset or send command to release.
LED Indicator	Initialisation: Green LED Blink Normal: Green LED Steady Alarm: Red LED steady Fault: Yellow LED steady (sensor fault)

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