



Limotec

Perfection in Detection

FM-S-040-V1-EN

SMART 3-R MPS GAS DETECTOR LITHIUM-ION BATTERY OFF-GASSING DETECTION





WHY EARLY DETECTION OF OFF-GASSING IS CRITICAL

The energy transition we are currently experiencing brings new challenges. The large-scale use of **lithium-ion batteries** in electric vehicles and many other devices offers us comfort and independence from fossil fuels, but it also introduces **a real risk of fire**.

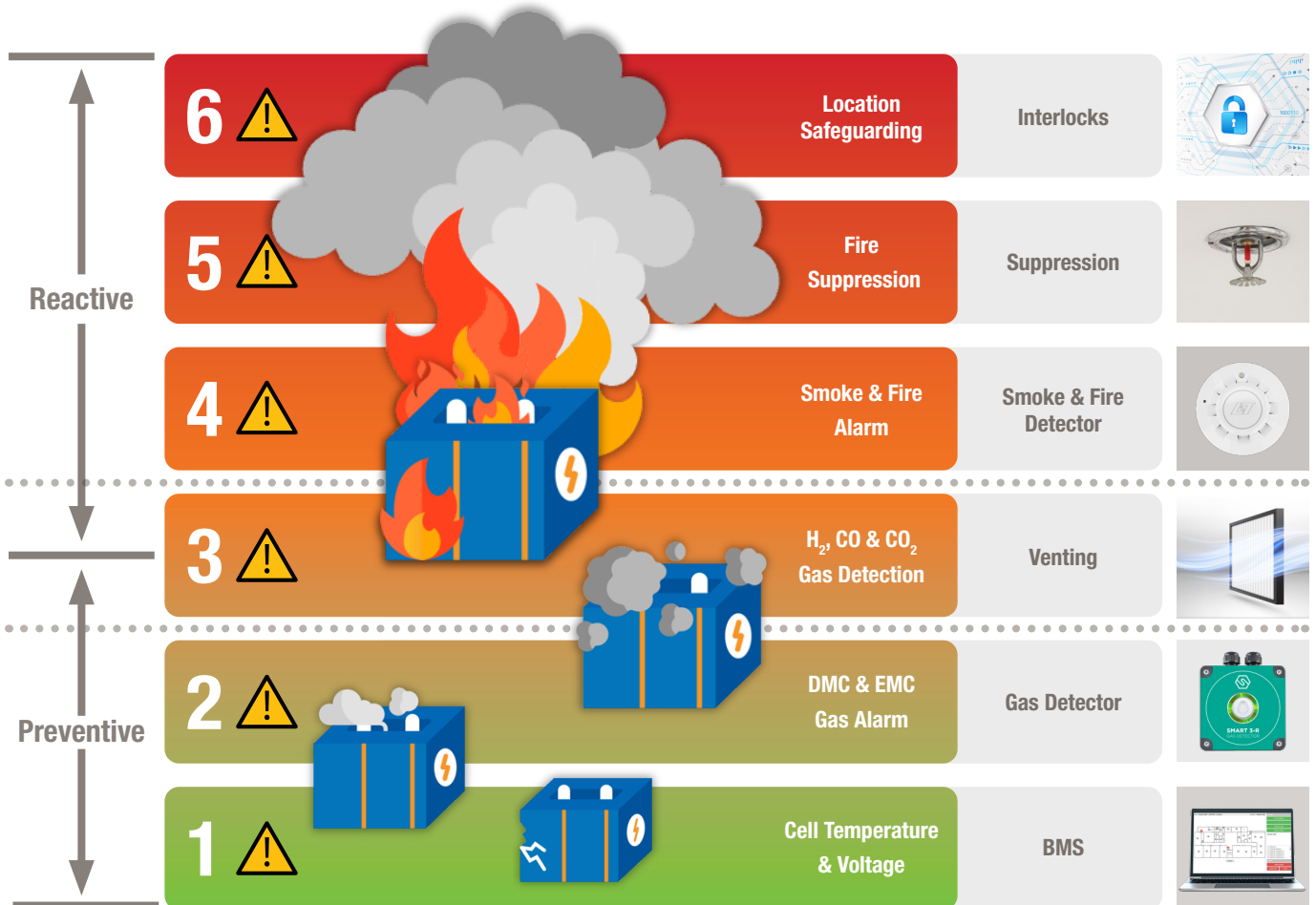
A lithium-ion battery contains a positive and a negative electrode, separated by a thin separator. **Damage to the battery or incorrect charging** can compromise this separator, gradually leading the battery into a state of internal short-circuiting. As this process develops, the internal temperature and pressure rise, eventually causing the gases formed inside the battery to be released through the pressure-relief valves — the so-called **off-gassing**. Depending on the circumstances, **thermal runaway** can occur between 2 and 30 minutes after this off-gassing event. Once thermal runaway starts, extinguishing the battery is only possible by complete immersion.



Early detection of off-gassing makes it possible to intervene in time and prevent escalation.

The SMART 3-R gas detector provides a solution for detecting the gases released during lithium-ion battery off-gassing. The SMART 3-R gas detector uses MPS (Molecular Property Spectrometer) technology. Its rapid detection of DMC and EMC vapors – the characteristic early off-gassing compounds – enables prompt intervention, such as interrupting the charging process of the lithium-ion battery. In many cases, this timely action can prevent thermal runaway and the onset of a difficult-to-control fire.

BATTERY FAILURE SAFETY LEVELS



VERSIONS

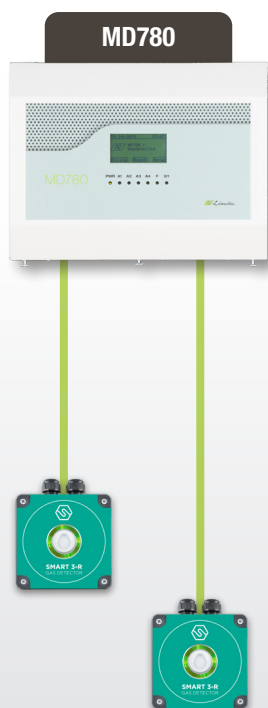


The SMART 3-R **gas detector** is equipped with the latest MPS technology and is available in both a **standard** and an **ATEX version**.

The SMART 3-R gas detector is powered by 24 VDC and offers three different outputs: volt-free alarm and fault contacts, 4–20 mA, and RS485. Through its 4–20 mA output, the SMART 3-R is **compatible with the Limotec MD780** conventional gas detection panel. Using the RS485 output, it can be connected to the detection loop of the **Sensitron addressable Multiscan++Park** gas detection panel. Finally, the SMART 3-R gas detector can also be connected to the loop-based detection circuit of a **Limotec analogue-addressable fire alarm control panel** via a single addressable input module.

The gases released during lithium-ion battery off-gassing are heavier than air. For off-gassing detection, the SMART 3-R gas detector should therefore be installed between 10 cm and 30 cm above floor level.

The SMART 3-R gas detector can be used to detect off-gassing from electric vehicles in underground car parks, bicycle storage rooms, battery storage areas, and any other indoor location where lithium-ion batteries are present.



Maximum 8 zones



Maximum 126x SA4700-100
on a single loop circuit



Maximum 32 addresses
on a single loop circuit



MOLECULAR PROPERTY SPECTROMETER (MPS) TECHNOLOGY



Discover the next generation of combustible gas detection. The SMART 3-R gas detector is equipped with a gas sensor based on the new MPS, or Molecular Property Spectrometer, technology. It has been proven that the MPS sensor outperforms other sensors such as pellistors, semiconductors, and infrared sensors in reliably detecting more than 15 different combustible gases.

The earliest possible warning of battery failure

The MPS sensor detects DMC and EMC gases released in the early stages of lithium-ion battery off-gassing and enables intervention through automatically triggered actions or by alerting the first-response supervisor, with the goal of preventing a dangerous thermal runaway.”

TrueLEL™ multi-gas accuracy

While other sensors may provide inaccurate readings when multiple gases are present, the MPS sensor automatically detects and identifies more than 15 different flammable gases in real time, without false alarms.

Sensor Poisoning is solved

The MPS sensor is designed for multi-gas environments and is resistant to contamination and poisoning from substances such as silicone, chlorine and sulfur vapors, which do affect other conventional sensors. The MPS technology provides peace of mind in any environment.

Cost-effective: No calibration required and long service life

The MPS sensor is completely maintenance-free, limiting the annual inspection to a simple functional test of the detector. In addition, the MPS sensor can easily be tested using the standard 50% LEL methane test gas. Its expected lifetime is 15 years, which is a significant improvement compared to the relatively short life cycles of standard gas sensors. Thanks to the combination of minimal annual inspection time and long service life, the MPS sensor is a cost-efficient solution for detecting lithium-ion battery off-gassing.

100% technical self-monitoring → lockdown mode

The MPS sensor is fully self-monitoring and reports any detected technical faults to the electronics of the SMART 3-R gas detector. In the event of a technical failure of the MPS sensor, the SMART 3-R gas detector automatically switches to lockdown mode and activates the fault relay. As a result, the SMART 3-R gas detector operates with 100% fail-safe functionality.

APPLICATIONS

