Early fire detection

in small-scale storage of lithium-ion batteries

Fire Gas and Smoke Detection System – FGSDS

Storage with risks

The safe storage of lithium-ion batteries is increasingly an issue for recycling companies - but also for manufacturers who are obliged to take back batteries.

Gases and aerosols can escape from pre-damaged batteries in the storage room - signs of an impending thermal runaway of the batteries.

How quickly these fire gases can be detected depends on many factors: Degree of damage, amount and residual capacity of the damaged batteries or composition of the electrolyte, to name but a few.

Quite smart: the FGSDS

Our solution for small warehouses is based on a special gas detector: This detects different fire gases long before the thermal runaway of the battery.

In combination with smoke detection, the system therefore offers comprehensive fire protection. In addition, freely adjustable threshold values enable adaptation to individual safety specifications.

Compact and smart: The system can be installed outside the warehouse with little effort. Thanks to the combination with the air intake, only one detector is needed to monitor the entire interior.

T&B electronic
Fire Protection
Made in Germany

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FGSDS Information:

- New development - so far unique combination of conventional smoke aspiration system + fire gas detector, see attachment.
  - RAS: Central smoke detector that draws air from the protected object via a plastic pipe and a fan and actively feeds it to the detector.
  - Fire gas detector: Detects nitrogen oxides, hydrocarbons, carbon monoxide and hydrogen, among others. All these gases are produced at an early stage of a combustion process (oxidation). The material does not emit much IR radiation at this early stage of the combustion process (because it is not yet hot), nor is smoke developed at this stage. The individual combustion gas values can be set individually in the range of 0-100ppm and must be adjusted according to the process and combustion material.
- In the FGSDS, the fire gas detector is connected downstream of the RAS system in the pipe system, which leads the sucked-in air back into the protected object/shelter.
- The combination enables a light, smart installation without having to set up the technology in the danger zone.
- Potential-free relay contacts are available to forward alarms, faults and operating status to, for example, a fire alarm panel.
- Two alarm thresholds can be set (pre-alarm and main alarm).
- T&B wants to use the installation to monitor small warehouses. What can be done after an early alarm has been triggered must be agreed individually with the customer and/or his property insurer. Possibilities include moving the affected pallet out, alerting the fire brigade, connecting a hydrant line to a dry extinguishing line in the container, or a water spray extinguishing system.

Information Field of application:

- In the case of pre-damaged accumulators or batteries (e.g. due to mechanical damage), the above-mentioned gases already escape before the battery fire ("thermal runaway"). Together with a battery recycler from Braunschweig, T&B carried out (fire) tests and analyzed the gases produced in various battery and accumulator fires. The result was extremely good. The system enables an alarm to be issued well before a thermal runaway.
- Batteries or accumulators consist of an anode and a cathode, which are isolated from each other by a separator. Together, these form a cell. Depending on the capacity, several cells can be lined up in a battery. If the separator is damaged, e.g. due to mechanical damage, overheating, overcharging or other effects, and thus a direct connection between anode and cathode is established, a violent thermal reaction occurs. If the breakdown occurs from one cell to further cells, this is called a thermal runaway, which is an uncontrollable, violent fire scenario.
- Thermal runaway means the uncontrolled thermal " leakage " of the battery and occurs when several cells of a battery oxidize. The fire of a battery is a chemical reaction in which the battery produces its own oxygen. Extinguishing or inerting is not possible! Only by adding sufficient water can the battery or accumulator be cooled so that the fire from an accumulator/battery cannot spread to other stored energy sources. It is therefore important to detect unwanted events in the battery well before the thermal runaway.

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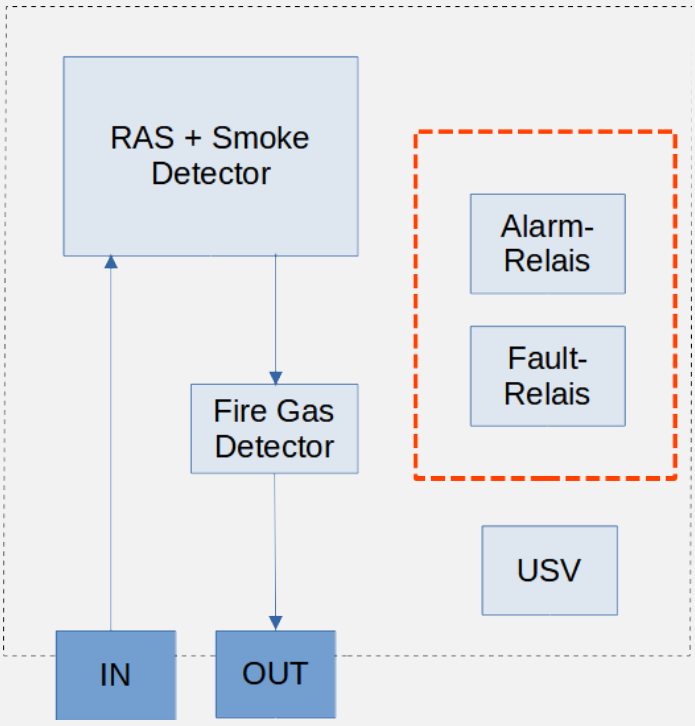
Product news

- VIKING AMX4004 + GSME ADICOS
- Smoke Aspiration System
- 1 Fire gas detector HC, NOx, CO, H2
- 1 Smoke Detector
- Output
- Group fault
- Group alarm
- USV
- Monitoring of containers and storage places

FGSDS-2



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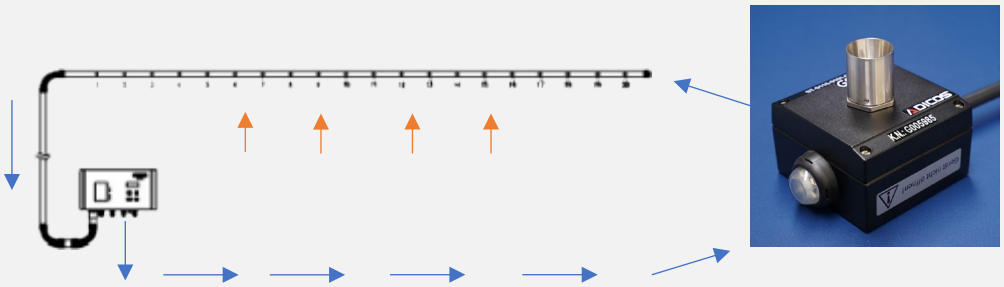
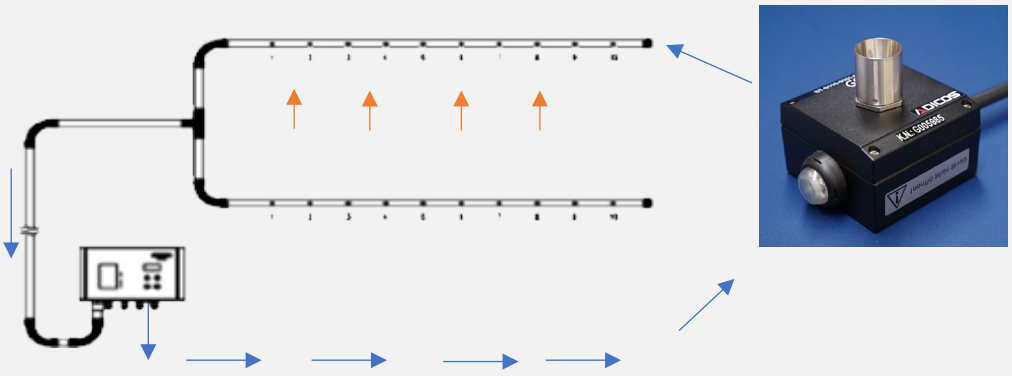
- **I-System:**
- **Max. 80m total length**
- **Max. 20 drill holes**



- **U-System**
- **Max. 130m total length**
- **Max. 2x10 drill holes**



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