

HMI Parking: monitoring and management of gas emissions in parking lots

Parkings

Keywords:

- Parking lots
- Gas detection
- Human-machine interface
- Data traceability



In covered parking lots, urban densification and the increase in the number of cars on the road are raising the stakes when it comes to air quality. CO, NO₂, LPG, and CNG emissions require systems capable of quickly detecting exceedances, providing clear alerts, and controlling ventilation as accurately as possible in order to balance safety and energy management. The electrification of the fleet adds another challenge. Early detection of certain gases can signal thermal runaway in electric vehicle batteries. This early warning helps prevent fire risks and guide the response of emergency teams.

This continuous monitoring provides operators with an immediate overview of areas, actionable traceability, and reliable data to support operational decisions.

From a regulatory standpoint, this requirement falls under EN 50545-1, the European standard for fixed toxic gas detection devices in parking garages and tunnels. The standard defines performance and usage requirements (accuracy and response time, alarm and fault management, self-monitoring, periodic testing and maintenance, installation recommendations).

Thus, in accordance with EN 50545-1, DALEMANS gas detectors constitute the first line of protection for parking lots.

Gas detection in parking lots:

The challenges faced by DALEMANS

In practical terms, gas monitoring in parking lots relies on **DALEMANS** detectors distributed across the various levels and spaces. They continuously monitor CO, NO₂, LPG, and CNG, apply thresholds in accordance with EN 50545-1, and self-check to report any faults. The position of the detectors is adapted to the density of the gases: CO/NO₂ at 150 cm above the ground, LPG at 15 cm above the ground, CNG at ceiling level.

The measurements are sent in real time to a central control room from roads, ramps, and areas prone to stagnation. This network ensures uniform coverage of floors and circulation areas.

The **DALEMANS** control unit aggregates and prioritises information. It manages thresholds, acknowledgements, and faults, then controls ventilation and alarms. It also transmits this data to other systems via Modbus TCP.



However, the operation reveals three points of friction that impact safety, compliance, and efficiency:

■ **Data centralisation**

Measurements remain scattered between sensors, control rooms, and floors, with no single reference point, which delays decisions and creates inconsistencies when gas levels are exceeded.

■ **Data visualisation**

Heterogeneous interfaces and incomplete zone views hinder readability and temporal context in alarm situations.

■ **Traceability management**

Incomplete histories of measurements, events, and faults complicate the consolidation of test and maintenance evidence.



The SMART solution

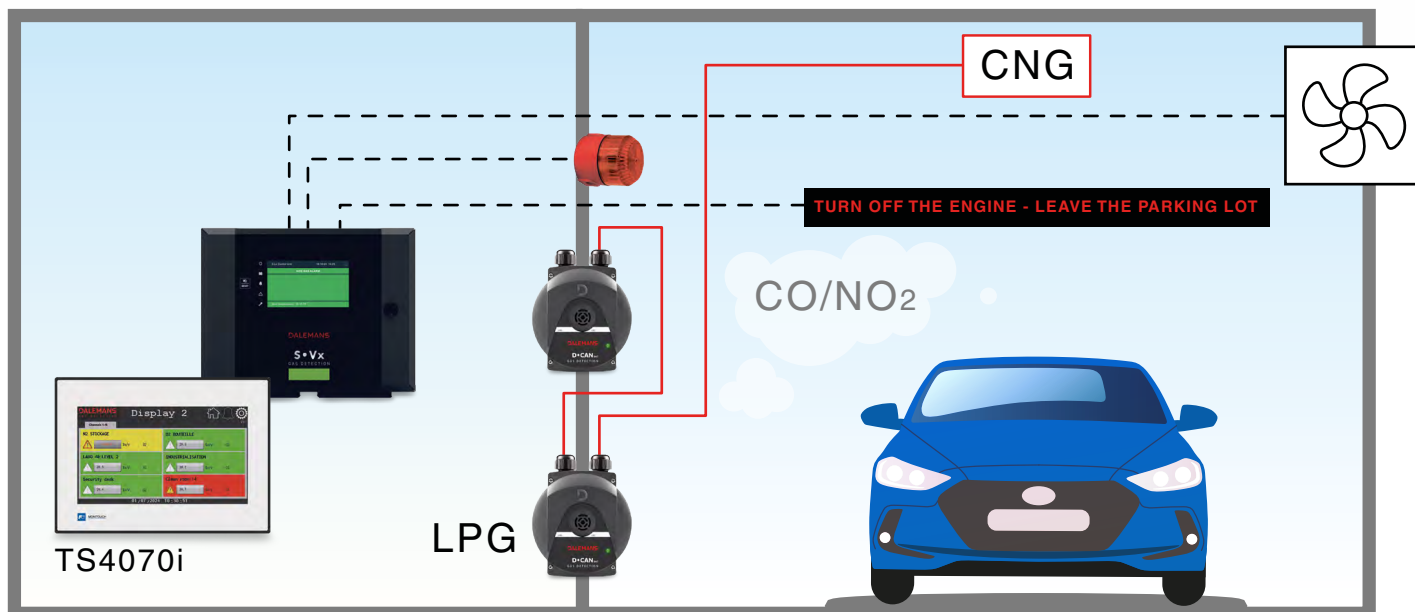
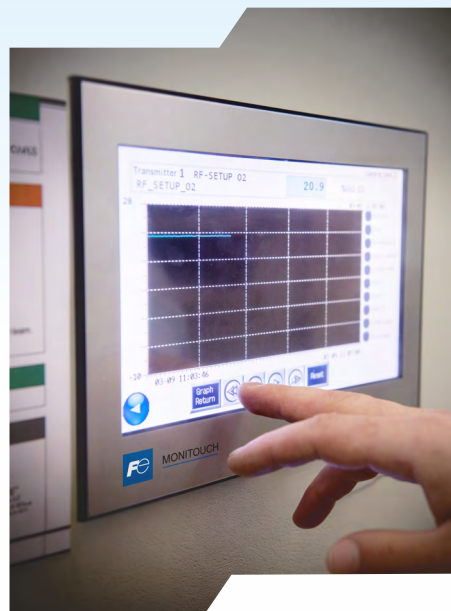
La Solution SMART associe l'IHM TS4000 Fuji Electric aux détecteurs et aux centrales DALEMANS

The SMART Solution combines the Fuji Electric TS4000 HMI with DALEMANS detectors and control units.

It connects all control units, automatically collects measurements from each detector and standardises formats. The data is centralised in a clear repository for easy understanding, quick decision-making and coordination of actions. Its benefits include reduced response times, fewer reading errors and an overview that can be used by field teams and supervisors.

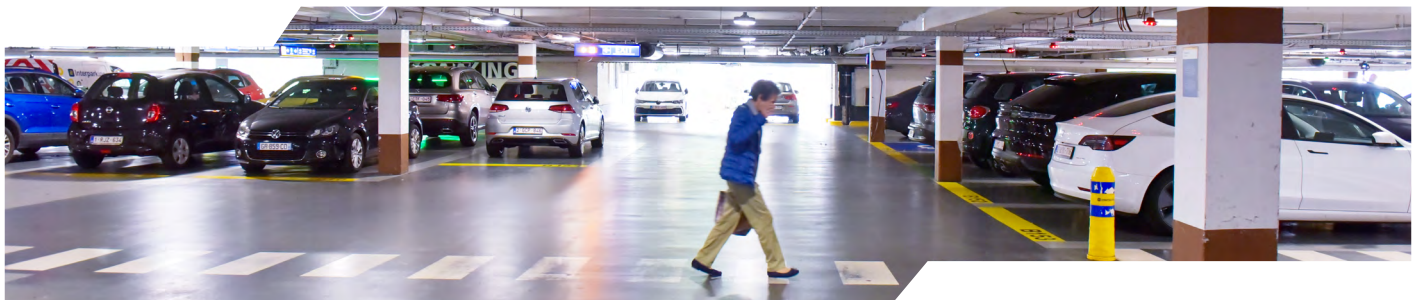
Then, the HMI continuously records values, alarms, faults, acknowledgements and events. Each piece of data is time-stamped and linked to its zone, floor and equipment. The logs facilitate searches, analyses, operational reviews and maintenance planning. Once the log has been consolidated, the information must be easily accessible to teams.

The touchscreen interface provides data locally and remotely via Modbus TCP, on the HMI or on a customer supervisor. The screen displays are customised and tailor-made to show the desired data: zones, trends, thresholds, alarms and faults, statistics and ventilation indicators. These views speed up understanding and decision-making in the field.



Your benefits

- + **Centralise and secure your data**
Supervision of all detectors, data recording and logging.
- + **Display the data you need**
Customised screen layout according to your requirements.
- + **Access and distribute your data locally or remotely**
View values and logs on the human-machine interface or your supervisor via Modbus TCP.



A monitoring solution for safer parking lots

Next-generation human-machine interfaces - TS4000

- **Formats adapted to available space**
Screens available from 7 to 15,6 inches depending on the model.
- **Remote supervision**
Data reading and integration via Modbus TCP on a third-party supervisor.
- **Customised readability**
Customisation of screens and views (zones, floors, thresholds, alarms, trends) according to requirements.
- **Project support**
Co-engineering with DALEMANS to define the architecture, adapt the screens and secure the integration of detectors/control units.



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