

TS4000 HMI for laboratory gas detection: supervision, safety and data visualisation

Laboratories

Keywords

- Laboratories
- Gas detection
- Monitoring
- Safety
- Human-machine interface



In a laboratory environment, atmospheres can change rapidly depending on handling, storage and processes. A wide variety of gases can be encountered, such as ammonia (NH_3), hydrogen (H_2), oxygen (O_2), hydrogen peroxide (H_2O_2), argon (Ar), butane (C_4H_{10}), volatile organic compounds (VOCs) and sulphur dioxide (SO_2).

■ This diversity means that risks must be considered in terms of families:

- **Toxic gases (SO_2 , NH_3 , H_2O_2):**
Risk of exposure for personnel, with thresholds to be monitored continuously.
- **Flammable gases (H_2 , C_4H_{10}):**
Risk of explosion, with levels close to the LEL monitored.
- **Asphyxiating gases (Ar , CO_2):**
Risk linked to oxygen depletion, sometimes without any noticeable signs.

In terms of requirements, fixed detection generally falls within a structured regulatory framework, notably EN 45544 (for toxic gases), EN 50104 (for oxygen detection) and EN 60079-29-1 (for flammable gases). Depending on zoning and scenarios (presence of flammable gases, ignition sources, ventilation), ATEX constraints may also apply, particularly with regard to the choice of equipment and installation rules.

Consequently, an effective detection solution must be demonstrable. Traceability therefore becomes a key element: time-stamped measurement history, alarm and fault log, acknowledgement tracking, and recording of test/calibration operations. These elements facilitate HSE audits, documentary compliance and continuous improvement of safety procedures.



When detection exists, but exploitation remains difficult

At many sites, detection systems are well established, but day-to-day operation remains a sensitive issue.

The first obstacle is often the dispersion of information: measurements are distributed between detectors, control rooms, local screens and remote screens. In the event of an alert, this fragmentation complicates interpretation and can delay decision-making at a time when rapid interpretation is crucial.

A second issue concerns overall understanding of the situation. Without a comprehensive and consistent overview (by zone, by gas, by alarm level and by status), it becomes more difficult to identify the source of an exceedance, monitor its progress and immediately check what actions have already been taken (ventilation, controls, acknowledgement).

As a result, operations become less fluid and teams may lack context when it comes to taking action.

Finally, gas safety in laboratories also relies on evidence and repeatability. Control, adjustment and calibration operations using standard gas are essential. When historical data is limited or access to events is not straightforward, these tasks become more time-consuming, costly and difficult to consolidate during inspections or internal audits.



The SMART solution

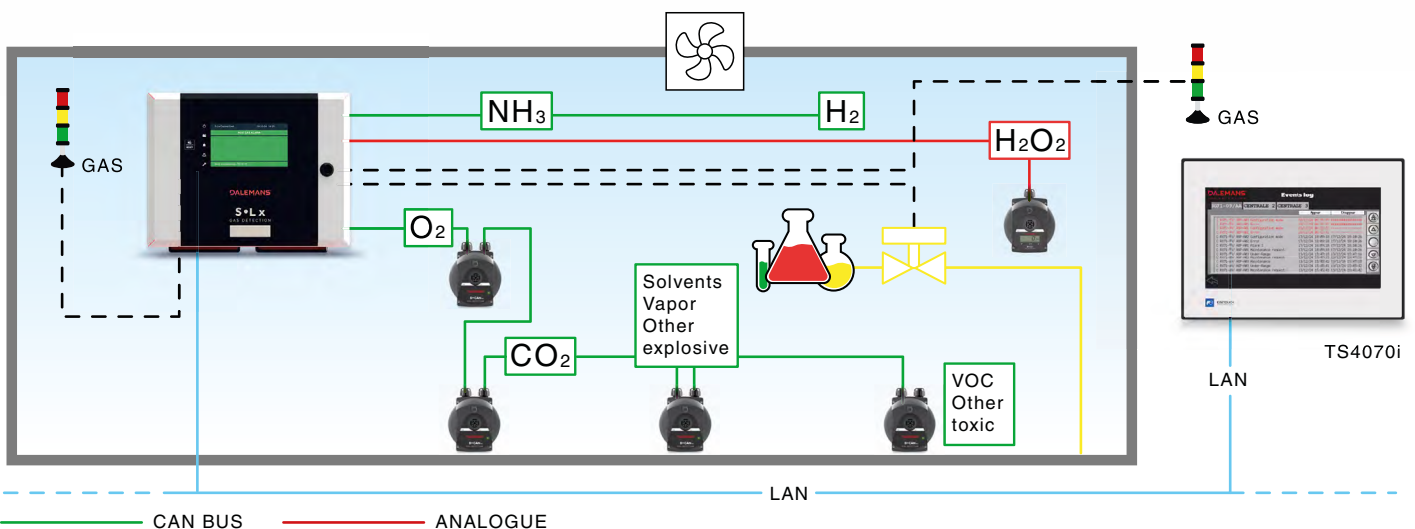
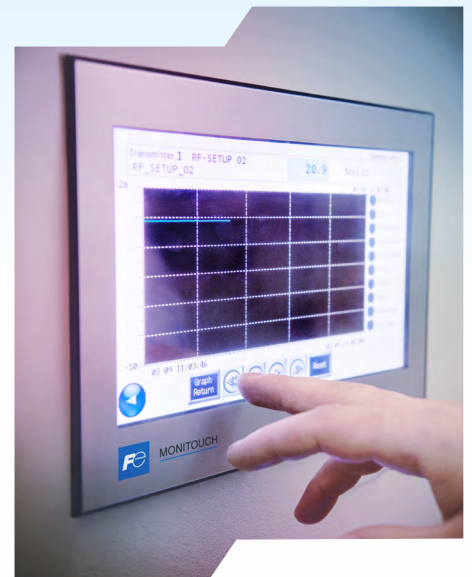
In laboratories, monitoring is based on gas detectors installed as close as possible to risk areas (storage areas, fume cupboards, ventilated cabinets, technical rooms).

Each detector continuously measures the concentration of the target gas and sends this information to a **DALEMANS control unit**. This unit centralises the measurements, manages the alarm thresholds, reports faults (sensor, power supply, communication) and provides immediately readable operating status reports to trigger and control safety actions.

Connected to the DALEMANS architecture, the **Fuji Electric TS4000 human-machine interface** becomes the system's main display point: it centralises measurements, alarms and faults in clear views (by zone, by gas and by alarm level) in order to speed up analysis and decision-making.

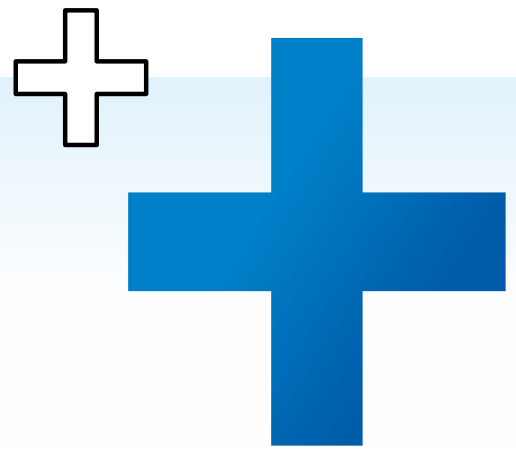
The industrial touchscreen also logs values and events (alarms, faults, acknowledgements) with timestamps to facilitate operational monitoring, maintenance and the production of evidence during audits.

The display of information on the interface is customised (synoptics, overviews, trends, help messages) to suit the needs of the teams. Data can be viewed and retrieved remotely via Modbus TCP for integration into a supervisor/BMS or third-party system, without the need for multiple interfaces.



Your benefits

- + **Effective readability**
Of measurements, alarms and faults via a single interface.
- + **Traceability**
Via accessible event logs and history.
- + **Local or remote consultation**
And use of information.



Human-machine interfaces TS4000:

Latest generation connected supervision

- **Formats adapted to laboratory spaces**
Screen sizes ranging from 7 to 15.6 inches.
- **Local or remote supervision**
Display on the touch screen or another supervisor via Modbus TCP.
- **Customised readability, designed for operation**
Customised formatting of data displayed on screens.
- **Project support**
Fuji Electric x DALEMANS co-engineering for system design



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