



Fire & Gas

Fire Protection Solutions



## Fire & Gas Systems

### FOREWORD

Fire & Gas systems are designed to monitor environmental conditions and detect those variations that can be associated with an incipient fire or gas leakage. Most of the time, the F&G system is formed by one or more control panels each of which is interconnected with field detectors, signalling units and actuators.

The functions that F&G systems are normally called to perform are those of monitoring, warning, tripping and actuating.

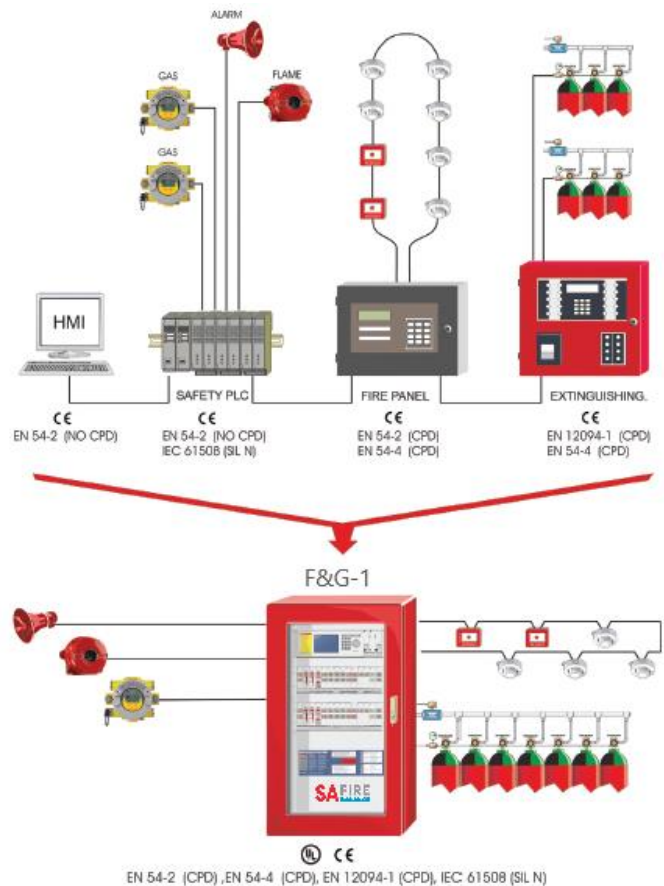
The monitoring function takes place between the panel and the detectors and it is aimed at detecting any environmental variation that can be associated with an anomalous condition. This is the case in detecting the presence of Smoke, Heat, Flame or Gas either combustible or toxic within the monitored area. Another monitoring function is also present between the panel and the instrumentation distributed in the area to monitor the status of the firefighting systems such as water or gas pressure, valve positions, system activations, etc.

The warning function is performed within the panel and the signalling unit located in the monitored area as well as within the panel and the master fire or control room. This function relates to the distribution of warning signals within the monitored area anticipating the formation of a threatening condition. The same is repeated to the control room where plant operators monitor the process.

The trip function is correlated with other superior systems such as the ESD or DCS and it is used to transfer the confirmation that certain hazardous conditions have been detected. The ESD or DCS normally acquire such trip and elaborate shut downs of the process equipment involved in the hazard, stops ventilation, de-energize rotating equipment or generators, etc.

The actuation function is performed within the F&G Panel and the actuators of those mitigation systems (such as

water or foam deluge skid) that are provided to fight fires or contain gas clouds to spread. SA Fire Protection offer a complete design of F&G systems for on-shore and off-shore as well as main applications based on PLC or EN 54 control panels. The system architecture can be designed with SIL certified panels, detectors and actuators in order to grant the desired integrity level of each safety function. Safety and loss prevention initiatives require reliable data from F&G systems in order for personnel to take the right actions for early detection and response.



### F&G CONTROL PANEL Model F&G-1 CP

Unlike the traditional approach of having multiple individual process safety subsystems (each performing a separate function), the SA Fire F&G-1 panel is capable of integrating multiple systems in to one comprehensive panel. The integration of Smoke, Heat, Flame and Gas detection; logic control and networking equipment; suppression and extinguishing capability; public address, sounders, beacons and other safety components offers operators a best-in-class approach to protecting people, processes and the environment. Not only is the F&G-1 panel compact it also ensures there is a rapid emergency response thus avoiding costly shutdowns.



The panels are fully customisable and can have up to 10 rows with each row holding up to 13 cards. This modular design gives the end user the flexibility to take what is needed now with the capability of expanding later. The rack has a multifunction operator interface and has its own power supply in addition to a standby battery so there is no need for external UPS. Cabinet options provide either wall mount or freestanding capabilities. The F&G-1 complies with fault tolerance requirements set by IEC61508 and it is capable of attaining a Safety Integrity Level 3 (SIL3 level) that is certified by a third-party agency. In addition to this high achievement with SIL, the F&G-1 has some excellent features:

- Hot backup redundant central processing units (CPUs) eliminate downtime
- Hot swappable redundant CPUs and power supplies
- Hot swappable cards with automatic reconfiguration
- Redundant and looped panel communication bus
- Automatic testing of card inputs and outputs
- Self-diagnostics and fault signalling of cards and CPU
- Automatic safe disabling of malfunctioning cards
- Fire and gas applications can have redundant cards
- Multiple protocol addressable detection systems

The F&G-1 offers a unified view of operations. Inside of these panels is a Process Knowledge System that extends across plant and business applications to control the processes which manage plant assets and ensure the process design continues to function as intended. In turn, the system can protect operations from pending incidents with an early indication of failing assets. Using the latest technology, plant personnel have access to a single dashboard across the entire site. Operator effectiveness afforded by a common interface, knowledge capture through automation of procedural

operations, and advanced alarming capability allow end users to better prevent and respond to abnormal situations.

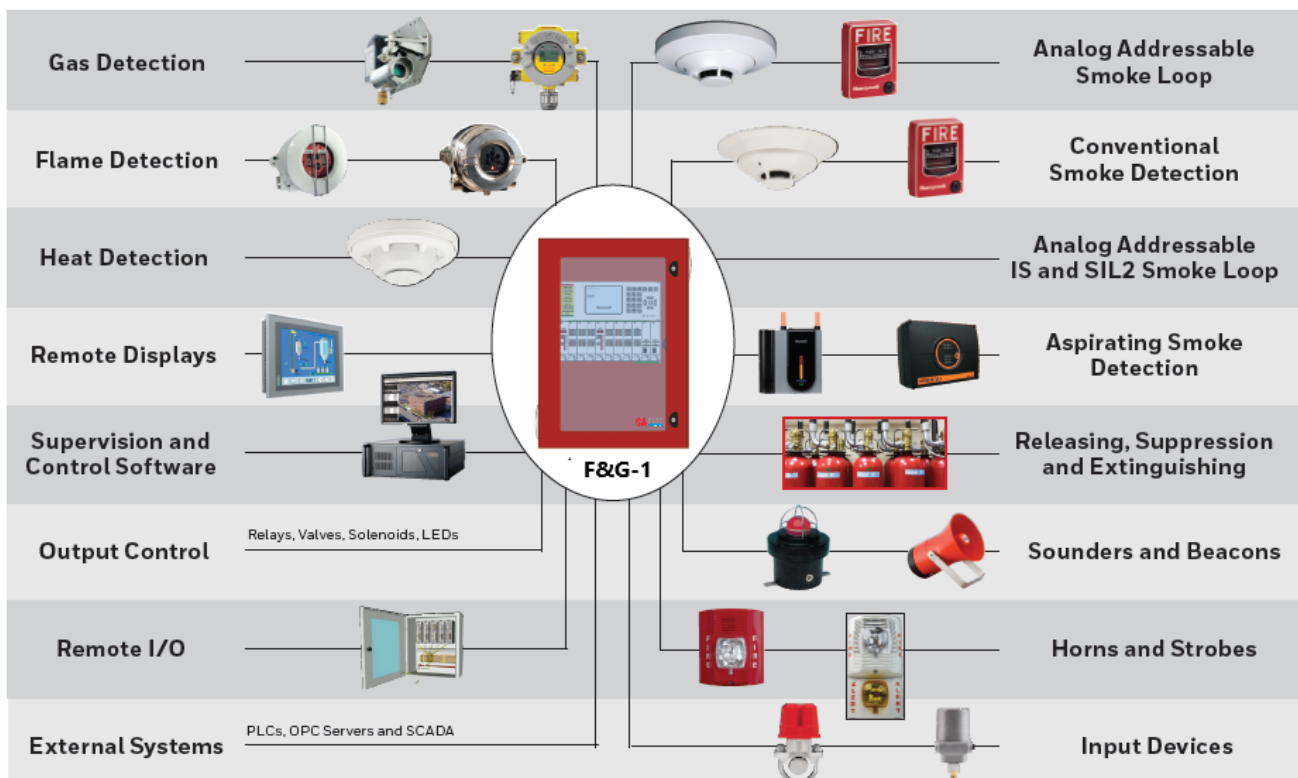
The SAFire safety system platform, is a reliable solution for integrating process control of assets while maintaining separate databases and redundant networks. It provides a unified platform for emergency shutdown and F&G detection, as well as burner management systems, compressor control and protection, and critical control.



Integration of F&G systems into the overall control system is a very important factor in running modern process plants. Integration of data, sequence of events, alarms, time synchronization and diagnostic messages is mandatory for safe operations. By implementing a unified fire & gas strategy employing the latest automation technology, plants can meet their critical infrastructure protection requirements while ensuring operational and business readiness at project start-up.

In addition to providing the only truly integrated safety and security solution for the process automation industry, SAFire's solution improves business performance by reducing the risk of incidents, faults and failures that cost money by disrupting normal operations.





## Approvals

The SAFire F&G-1 Control Panels have:

- SIL2/3
- EN54
- ATEX
- UL864
- ABS
- FM 3010
- GOST R

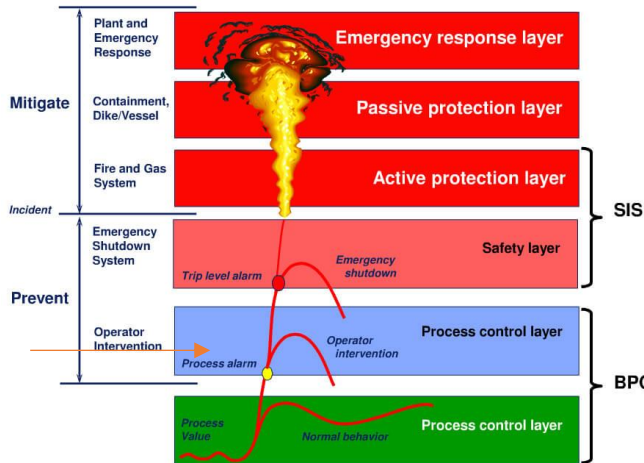
## FIELD DETECTORS

SAFire offer a sophisticated range of Smoke, Heat, Flame and Gas Detectors to meet any facilities safety requirements in harsh industrial environments as well as the heaviest functional reliability and availability requirements with excellent resistance to electromagnetic disturbances. These detection systems enable operators to monitor areas where hazardous levels of explosive or toxic gas may become present, and provide early warning of the build-up of gas or fire before it becomes a hazard. The detection technology provided by SAFire can minimise hazardous conditions and improve the operation of all parts of an industrial F&G solution. Detection and monitoring systems save time and money by automating the detection of events, and improving the speed and accuracy of operator responses to process upsets.



# THERMO-CAMERA SYSTEM MODEL T-VS

Traditional thermo-camera systems are able to detect a temperature profile and provide an alarm when the temperature threshold limit is surpassed. Similarly, traditional Smoke, Heat, Flame and Gas detector all operate in mitigation layer. These detection systems detect a fire incident once has already taken place.



The SAFire T-VS is innovative in its architecture because the software has been developed to combine temperature analysis with thermo graphic image analysis. Whether its piping, pumps, flanges, valves, turbines, compressors, electric cabinets, power supply cabinets or vehicles operating in the ATEX area, gas or hot liquid could escape/ leak from any of these areas which could later lead to a fire.

The T-VS is used to monitor the status of devices in the field and is capable of a high degree of accuracy so that even a drop of leakage can be detected. Pools of hot combustible liquids can lead to fire. To avoid the possibility of fire, the system will send an alarm when the temperature in the Region of Interest (ROI) goes beyond its temperature threshold and extends beyond the boundaries of the allowed number of pixels for that zone.



The T-VS operates in the prevention layers and as such is capable of spotting and reporting abnormal conditions long before the fire has a chance to ignite. This early warning system detects an abnormal condition that could

lead to a fire way before a fire could potentially break out (this could be an hour, a day or even a week). The T-VS is more cost-effective solution due to its simple architecture & standard components. The TV -S increases the overall reliability of the fire safety systems due to the extremely early detection capability. Therefore, operators can prevent a fire before it has the chance to cause damage to property, assets or claim human life. The data gathered by the T-VS system can be stored and the time stamped data can be used after an incident for root cause analysis.

## Application

Model T-VS is specifically designed for harsh industrial applications (such as tank monitoring, electric distribution, reactors, plant devices, switch gear panels, cabinet and electrical devices, warehouse, storage areas, coal power plants, sulphur storage areas, process areas, loading areas, waste treatment facilities, and more).

