

Application Note:

# Fleet Maintenance Facilities



**GENERAL MONITORS**  
*An MSA Company*



# Natural Gas Fleet Maintenance Facilities



## APPLICATION |

LNG (liquefied natural gas) and CNG (compressed natural gas) are common methane fuels used by long haul trucking firms as well as municipal fleet vehicles, also known as NGVs (natural gas vehicles). As private companies and municipalities convert their fleets from diesel to LNG -or CNG-fueled vehicles to reduce fuel costs and emissions, NGV maintenance and storage facilities must be constructed or overhauled as well. Such facilities are generally large buildings (four to 10 or more bay doors) with roll-up doors for each bay.

CNG vehicles can be subject to leaks due to premature natural gas cylinder release, typically caused by use of defective or incorrect pressure relief valves. LNG vehicle tanks that are stored within warming conditions can also be subject to pressure relief valve gas leaks, as well as liquid leaks.\* If NGVs are stored within enclosed maintenance facilities, potentially hazardous gas and vapor buildup may occur. Natural gas leaks with an ignition source present can result in explosions and fire.

NGV facilities management personnel must meet safety and building code monitoring requirements specific to natural gas fuels to help ensure safe environments within these sites. In addition, such facilities may be located in public areas, an obvious concern for those working and living nearby. Trade associations the National Fire Protection Association (NFPA) and the International Code Council (ICC) provide voluntary national code guidelines for gas detection instrumentation installation within NGV fleet storage and maintenance facilities. Specifically, NFPA 72: National Fire Alarm and Signaling Code 2013 Edition includes "the application, installation, location, performance, inspection, testing, and maintenance of fire alarm systems, supervising station alarm systems, public emergency alarm reporting systems, fire warning equipment and emergency communications systems (ECS), and their components." \*\*

However, local public safety requirements may stipulate the installation of both gas and flame detectors to address safety concerns via the Authority Having Jurisdiction (AHJ). According to the NFPA, "the AHJ may be a federal, state, local, or other regional department or individual such as a fire chief, fire marshal; chief of a fire prevention bureau, labor department, or health department; building official; electrical inspector; or others having statutory authority." \*\*

When a fleet maintenance/storage facility natural gas detection system activates, bay doors open, heaters are powered off, ventilation fans and louvers activate, and in most cases the fire department is notified. Heating systems may deactivate. Automated controllers are needed to activate doors, fans and heaters. Accuracy, timing, precision of tie-ins with ventilation systems, and avoidance of false alarms are key to the benefits of flame and gas detection systems for natural gas.

\* *Guideline for Determining the Modifications Required for Adding Compressed Natural Gas and Liquefied Natural Gas Vehicles To Existing Maintenance Facilities, Douglas B. Horne, P.E., [www.cleanvehicle.org](http://www.cleanvehicle.org)*

\*\* [www.nfpa.org](http://www.nfpa.org)

## SOLUTIONS |

*General Monitors Infrared Gas Detectors and FL4000H MSIR Flame Detectors for CNG and LNG markets offer superior performance, rugged environmental durability, lower cost of ownership, fast speed of IR sensor response through effective leak detection, and significant reduction in the number of costly false alarms.*

### Gas Detection

The **Model IR400 Gas Detector** uses infrared technology to sense for combustible gases and vapors to quickly and reliably detect LNG gas leaks. The detector comes factory pre-calibrated, takes only minutes to set-up, operates with less than 4.8 W of power, requires little maintenance, and is inexpensive to operate and maintain.

- Fail-to-safe operation for high reliability
- Three second response time
- Event logging for easy record-keeping
- Heated optics that eliminate condensation
- Dirty optics indicator for preventive maintenance
- 4-20 mA signal for remote alarm and fault indication
- Built-in RS485 interface for ease of communication
- Dual Modbus interface
- HART® communication
- IP66, Type 4X ratings for rugged processes
- Global approvals: ATEX, CE, CSA, FM, IECEx, SIL 3 certified

The **Model IR4000S Gas Monitor** is an easy-to-use solution for single-point combustible gas detection where a local display unit is required. It is a three-digit LED display and relay module used to calibrate, gas check and zero the IR400.



### Flame Detection

The **Model FL4000H MSIR Flame Detector** uses four multi-spectrum infrared sensors and Neural Network Technology (NNT) to distinguish between real fires and false alarm sources from distances of up to 230 feet. Continuous Optical Path Monitoring (COPM) checks optical path integrity and the detector's electronic circuitry. Dependability is enhanced by the ability to function at temperatures between -40° F and 185° F.

A longer range and wider of field view means that fewer detectors can cover more territory, reducing the cost of protection. Detectors are housed within rugged stainless steel explosion-proof enclosures. The FL4000H can be installed at strategic points above LNG storage tanks via optional mounting brackets, potentially covering entire areas around tanks.

- Sees through dense smoke produced by diesel, rubber, plastics, lube oil and crude oil fires.
- Event logging records time, date and type of event
- Serial communication port allows 128 units (247 using repeaters) to be linked to a host computer using Modbus RTU protocol.
- HART® digital communication signal superimposed on the 4-20 mA analog signal
- TL105 Test Lamp with high-energy broadband radiation source tests the detector operation
- IP66/67, Type 6P ratings for rugged processes
- Global approvals: ATEX, BV, CE, CSA, EN 54-10, FM, GOST, IECEx, ULC, VNIPO, SIL 3 certified



## System Solutions

**MC600 controllers**, when configured with our highly reliable catalytic-bead combustible gas sensors, provide a breakthrough in economical safety monitoring systems. The result is a high performance, low cost per point safety monitoring system that is easy to install with a long life, reducing safety system life cycle costs and offering an attractive return on investment. The highly scalable MC600 Multi-Channel Controller can be configured as either a local gas detection system, or it can be networked to provide a large plant-wide distributed safety system. Up to 127 MC600 Controllers can be linked to monitor 762 points. Designed with dual RS-485 serial communications, the MC600 is Modbus compatible. It features six user configurable relays and up to three zones with selectable zoning and independent voting.

The **HazardWatch Integrated Fire and Gas System** is modular, scalable and employs Allen-Bradley ControlLogix™ programmable technology for gas and flame detection. It is highly scalable, making it suitable for small systems to large plant-wide applications. Up to 13 local gas and fire alarm panels can be linked over a network up to 25 km long. Offering intelligence, flexibility and reliability, the HazardWatch System's controller hardware configuration and software has been tested by Factory Mutual to verify NFPA 72 compliance. This includes certification for central station monitoring, as both a fire alarm panel and gas controller, for fault tolerant digital communications and as a releasing control panel. Systems easily integrate with third-party auxiliary devices and are ideal for many applications.



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