



MODEL IR400

Infrared Point Detector for Combustible Gas Detection



Features

- No routine calibration required
- True fail-to-safe operation
- Multiple communication outputs
- Heated optics
- Dirty optics indication
- T90 < 3 seconds (w/splash guard)

Benefits

- Low maintenance
- True gas detection performance
- Provides complete status and control capability in the control room
- Eliminates condensation
- Discriminates between true fault and cleaning requirements
- Industry-leading speed of response

Description

The Model IR400 infrared (IR) point detector is a microprocessor-based combustible gas detector that continuously monitors combustible gases in the lower explosive limit (LEL) range and provides a 4 to 20 mA analog signal proportional to the 0 to 100% LEL concentration. The detector also monitors other conditions such as supply voltage and optical path integrity.

The IR400 detection principle is based on measuring the absorption of infrared radiation passing through a volume of gas using a dual beam, single detector method. The IR detector measures the intensity of two specific wavelengths, one at an absorption wavelength and another outside of the absorption wavelength. The gas concentration is determined by a comparison of these two values.

Most industrial point IR gas detection applications require a splash guard to protect the sensing element from rain and other environmental conditions. In many cases, the addition of a splash guard slows the speed of response considerably and should be taken into consideration. The IR400 gas detector responds within three seconds to gas leaks even with a splash guard installed.

Configurations with analog output, Modbus, and HART are available. The IR400 provides a two-wire RS-485 addressable communications link conforming to the

Modbus protocol that is used to monitor the IR400's status and settings in order to simplify installation and maintenance. Data available through HART or Modbus, such as configuration device settings and stored maintenance records, can be used to perform diagnostics and take corrective action before a problem occurs.

The IR400 is calibrated at the factory and needs no routine field calibration. It requires only a periodic cleaning of the windows and re-zeroing to ensure dependable performance.

Applications

- Chemical Plants
- Compressor Stations
- Drilling and Production Platforms
- Fuel Loading Facilities
- LNG/LPG Processing and Storage Facilities
- Oil Well Logging
- Refineries
- Wastewater Treatment Facilities



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System Specifications

Detector Type:	Infrared absorption type
Measuring Range:	0 to 100% LEL 0 to 100% by volume (methane only)
Gases:	Methane, propane, ethane, ethylene, butane, hexane, pentane, benzene <i>Consult factory for other gases</i>
Detector Life:	Greater than 5 years
Accuracy: (@ 25°C)	± 3% LEL at ≤ 50% LEL reading ± 5% LEL at > 50% LEL reading
Zero Drift:	< 2% per year
Response Time:	T50 ≤ 1.5 s, T60 ≤ 1.5 s, T90 ≤ 3 s (with splash guard) <i>Except ethylene where T60 ≤ 2 s and T90 ≤ 4 s</i>
Readout / Relay Display Modules:	DC110; TA102A; IR4000 display, and relay alarms
Accessories:	Junction box, duct mount junction box, calibration cup, flow block, splash guard, rain guard, portable purge calibrator
Classification:	Class I, Zone 1, IIB + H ₂ (Ta=-40°C to +75°C) Ex d, IIB + H ₂ T5 Gb Ex tb IIC, T100°C Db, IP66 (Ta=-60°C to +75°C)
Warranty:	Two years
Approvals:	ATEX, IECEx, BV, CE Marking, FM 6310, 6320 and CSA 22.2 No. 152, EN 60079-29-1 Performance Approved HART Registered, SIL 3 suitable FM Certified to IEC 61508

Environmental Specifications

Operating Temperature Range:	FM, CSA, GOST-R: -40°F to +167°F (-40°C to +75°C) ATEX, IECEx: -76°F to +167°F (-60°C to +75°C) Ethylene: -40°F to +140°F (-40°C to +60°C)
Storage Temperature Range:	-58°F to +185°F (-50°C to +85°C)
Humidity:	10% to 95% RH, non-condensing

Electrical Specifications

Input Power:	20-36 VDC @ 200 mA max. 24 VDC nominal
Analog Signal:	0-21.7 mA (600 ohms max.) Start up, Fault (non-HART) 0 mA Start up, Fault (HART)* 1.25 mA Cal, Zero, Gas Check* 1.5 mA Dirty Optics* 2.0 mA 0 to 100% LEL 4 to 20 mA (proportional) Over-range 20 to 21.7 mA

EMC:	Complies with EN 50270, EN 61000-6-4
Cable Requirements:	Max. distance between IR400 and power source @ 24 VDC nominal (20 ohm loop resistance): 14 AWG (2.0 mm ²) - 3600 ft (1100 m) Max. distance for analog output (500 ohms max): 14 AWG (2.0 mm ²) - 9000 ft. (2740 m)
Faults Monitored:	Re-calibration Error, EPROM Checksum Error, Optics Failure / Blockage; Low Supply Voltage, EEPROM Checksum Error, Reference or Active Lamp Failure, Heater Failure, Time to Re-zero unit, Short circuit on CAL_IO wire
RS-485 Output:	Modbus RTU, suitable for linking up to 128 units or up to 247 units with repeaters
Baud Rate:	2400, 4800, 9600, or 19200 BPS
HART: (optional)	HART 6, HART Device Descriptor available. AMSaware
Wireless Communication:	Available with ELPRO Technologies wireless devices

Mechanical Specifications

Diameter:	2.9 inches (74 mm)
Length:	8.87 inches (225 mm)
Weight:	3 lbs (1.35 kg) - aluminum 6 lbs (2.7 kg) - stainless steel
Mounting:	3/4" NPT
Ingress Protection:	Type 4X, IP66
Housing:	Aluminum 6061-T6 alloy or 316 stainless steel
Standard Configuration:	IR400-0-01-1-2-0-1-0 Methane, 4-20 mA, Modbus, aluminum, splashguard w/screen, no junction box

Specifications subject to change without notice.

Represented by:

General Monitors Worldwide



www.generalmonitors.com

Lake Forest, CA

26776 Simpatica Circle
Lake Forest, California 92630
Tel: +1-949-581-4464
Fax: +1-949-581-1151
Email: info@generalmonitors.com

Houston, TX

9776 Whithorn Drive
Houston, Texas 77095
Tel: +1-281-855-6000
Fax: +1-281-855-3290
Email: gmmhou@generalmonitors.com

Ireland

Ballybrit Business Park
Galway
Republic of Ireland
Tel: +353-91-751175
Fax: +353-91-751317
Email: info@gmil.ie

Singapore

Block 5, Amk Tech II, #05-20/22/23
Ang Mo Kio Industrial Park, 2A
Singapore 567760
Tel: +65-6748-3488
Fax: +65-6748-1911
Email: genmon@gmpacifica.com.sg

United Arab Emirates

P.O. Box 61209
Jebel Ali
Dubai
United Arab Emirates
Tel: +971-4-8143814
Fax: +971-4-8857587
Email: gmmme@emirates.net.ae

United Kingdom

Heather Close
Lyme Green Business Park
Macclesfield, Cheshire
United Kingdom, SK11 0LR
Tel: +44-1625-619583
Fax: +44-1625-619098
Email: info@generalmonitors.co.uk

* Under HART, the analog output minimum level can be configured as 3.5 mA or as stated above, depending on user selection.