

GasPlus[®]-IR

Model 4688-IR Combustible Gas Transmitter



COMBUSTIBLES



radiation into the instrument's "optical bench"; which contains a known volume of gas. This radiation is reflected onto two detectors, one tuned to measure a wavelength absorbed by organics and the other tuned to a reference band that is not absorbed. The outputs of the detectors are compared and used to compute gas concentration. Fault conditions are detected by the sensors when radiation intensity falls below a threshold level for a set period of time.

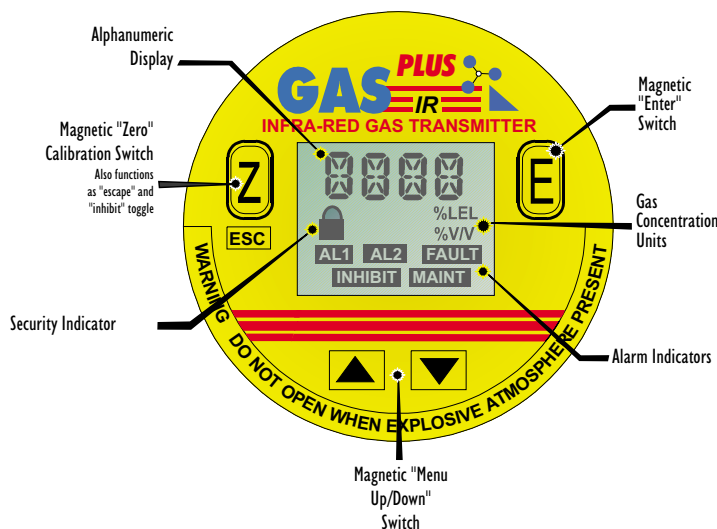
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The Model 4688 IR is a rugged, reliable solution for hydrocarbon gas detection. Designed with extensive user input, the instrument is extremely flexible, easy to use, and easy to maintain. The **GAS^{PLUS} IR** is suitable for most applications where catalytic bead detectors are currently used – as well as some applications where catalytic sensors won't work.

Principle of Operation

An infrared source emits pulses of

Easy, Intuitive Operation...



Features...

Low Maintenance

No span calibration required. Zero adjustment a quick, non-intrusive procedure.

Flexible

Many parameters are user-adjustable, including gas to be detected, decimal precision, damping, and engineering units.

Rugged Design

Conformally coated electronics, nickel plated optics protects components against corrosion, and harsh industrial environments.

Extensive Self Diagnostics

Instrument compensates for detector contamination and aging. Optics are heated to prevent moisture formation. Detailed fault codes aid in troubleshooting.

Multiple Output Choices

4-20mA and RS/485 (Modbus protocol) outputs are standard features. Relays with user adjustable set/reset points, and time delays are available as an option.

User-Friendly Display

Large LCD display shows gas concentration, engineering units (%LEL or %v/v), alarm relay status, alarm inhibit, and more.

Low Cost of Ownership

An excellent price/performance ratio and low long-term cost of ownership.

Use and Maintenance

Operation of the 4688IR is simple and intuitive. All settings and adjustments, such as alarm setpoints, gas measured, etc., are non-intrusive, performed at the instrument with a magnetic screwdriver – or remotely through the instrument's RS/485 interface. Password protection prevents unauthorized personnel from tampering with the settings.

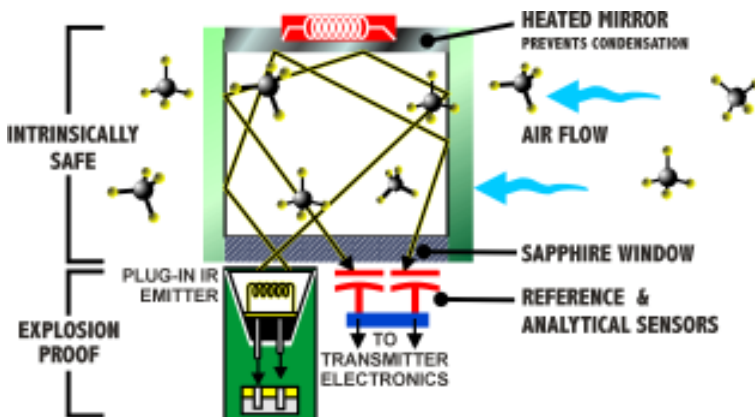
Minimal maintenance is necessary. All span information is preset at the factory, and never needs to be adjusted. Zero adjustment is a quick, non-intrusive procedure. On-board diagnostics continuously check transmitter electronics, optics, and software for faults and indicate corrective action should a fault be detected. The field serviceable infrared emitter is replaced with a simple plug-in connection.

4688-IR Infrared Technology

Why IR?

IR technology provides numerous advantages that may be beneficial for your application's conditions

- Reduced maintenance (no span calibration required).
- No saturation from high gas concentrations
- No oxygen required for operation
- Continuous sensor fault monitoring
- Sensor lifetime not reduced by exposure to gas
- Rapid speed of response
- Minimal temperature and humidity effects



Typical Specifications

- 1. General.** Transmitter shall be approved by a nationally recognized testing laboratory for Class 1, Division 1 Group B, C, and D hazardous locations. All parameter settings shall be password protectable. A large integral display shall provide visual indication of gas concentration, engineering units, alarm relay and inhibit status.
- 2. Temperature and Power.** Transmitter shall operate over an input range of 18-28VDC in ambient conditions of -40°C to 60°C and shall consume no more than 4.0 W maximum.
- 3. Output.** Transmitter shall provide an isolated, 4-20mA signal, and shall be digitally addressable using MODBUS protocol with RS/485 or RS/232 data transmission. Two SPST alarm relays shall be available as an option. User shall be able to separately adjust alarm set points, reset points, set delays, and reset delays. All alarm parameters shall be password protected and be non-intrusively adjustable through transmitter's front panel via a manufacturer supplied magnet.
- 4. Diagnostics.** Transmitter shall conduct self-diagnostics of electronics, software, and sensor at least twice per second. Fault conditions shall be indicated with a specific fault code on the instrument display and with a user-adjustable analog signal. One SPST fault relay shall be available as an option. User shall be capable of testing the alarm and fault relays from the instrument's front panel or remotely via RS-232 / RS-485 communications interface.
- 5. Calibration.** All span calibration data shall be preset, with no additional span calibration required by user. Non-intrusive zero calibration shall be performed via magnet. Transmitter shall provide the ability to inhibit its output. A time-out feature shall automatically return the unit to normal operation mode after a preset amount of time. The calibration curve for the gas being monitored shall be user selectable in the field through the transmitter's front panel via a manufacturer supplied magnet.
- 6. Sensor.** Sensor shall be non-dispersive infrared type using no moving mechanical parts. Linearity and repeatability shall be $\pm 2\%$ LEL below 40% of full scale, and $\pm 5\%$ LEL at or above 40% of full scale. Infrared emitter shall be field replaceable.

Ordering Information

Model 4688IR - A - B - C - D - E - F - G Includes Rainshield

A: Gas Type

1 - Standard Gases (built-in)

- **Butane** 0-100% LEL or 0-1.9% v/v ^{Note 1}
- **Ethane** 0-100% LEL or 0-3.0% v/v
- **Hexane** 0-100% LEL or 0-1.1% v/v
- **Methane** 0-100% LEL or 0-5.0% v/v
- **Pentane** 0-100% LEL or 0-1.5% v/v
- **Propane** 0-100% LEL or 0-2.1% v/v
- **Propylene** 0-100% LEL or 0-2.0% v/v

2 - Extended Gas Set 1 Specify gas(es) (includes standard gases but not extended gas set 2)

- **Acetone** 0-100% LEL or 0-2.5% v/v
- **MEK** 0-100% LEL or 0-1.5% v/v
- **Isopropyl Alcohol (IPA)** 0-100% or 0-2.0%v/v
- **Pure Methane** 0-100% v/v
- **Methanol** 0 - 100% or 0 - 6% v/v
- **Toluene** 0-100% LEL or 1.1%v/v

3 - Extended Gas Set 2 Specify gas(es)

(includes standard gases but not extended gas set 1)

- **Butadiene** 0-100%LEL or 0-2% v/v
- **Ethylene** 0-100% LEL or 2.7% v/v
- **Ethanol** 0-100% or 3.3% v/v
- **Isobutanol** 0-100% LEL or 1.7% v/v
- **Hexane** 0-20% v/v ^{NOTE 2}
- **Benzene** 0-100% LEL or 1.2 % v/v
- **Xylene** 0-100% LEL or 1.1v/v

4 - Other Gases (contact factory)

B: Remote Display/User Interface

- 1 - Display integral with transmitter
- 2 - Remote display/user interface with junction box - 50' (15.2 meters) max separation

C: Digital Protocol

- 1 - RS-485 ^{Note 3}
- 2 - RS-232

D: Relays (non-failsafe mode of operation)

- 1 - None
- 2 - All Normally Open (NO)
- 3 - All Normally Closed (NC)
- 4 - Alarm NO, Fault NC
- 5 - Alarm NC, Fault NO

E: Optics Material

- 1 - Nickel Plated aluminum
- 2 - Stainless Steel

F: Rating ^{NOTE 4}

- 1 - Non CENELEC approved transmitter
- 2 - CENELEC approved transmitter

G: Rainshields

- 1 - Standard
- 2 - Flowcell (Nitrile O-ring)
- 3 - Flowcell (Viton O-ring)
- 4 - Flowcell (ethylene propylene)

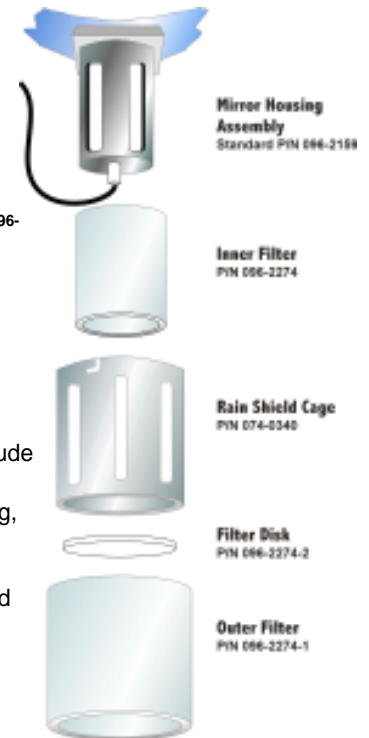
Ordering Notes

- **Not available for acetylene or H₂**
- 1. %v/v is in air
- 2. **Not for %LEL applications**
- 3. **RS/485 includes 120Ω termination resistor which is user removable.**
- 4. **"CENELEC approved" covers transmitter only. CENELEC approved enclosure includes metric conduit seal fitting; non-CENELEC approved enclosure includes NPT conduit seal fitting.**

Accessories

Part #	Description
077-0120	EIT magnetic screwdriver
096-2201	RS-485 Termination Board
096-2191	1/4 turn flowcell ^{Note 2} (Requires Gas Test Adaptor, #096-2192)
074-0321	Rainshield
096-2192	Gas Test Adaptor
096-2289	Bump Test Adaptor
096-2187	Zero Adjustment Kit (includes regulator, tubing, and carrying case - does NOT include methane "bump gas")
096-2190	Gas test kit (2 ft tubing, zero air and methane "bump" gas", cal adaptor, regulator, and carrying case)
096-2215	Porex dust filter (for rainshield) pack of 5
096-2214	Porex dust filter (for sensor) pack of 5
077-0161	Emitter replacement tool
096-2143	IR Emitter (plug-in, includes emitter)

Optical Bench Assembly



GasPlus Alarm System

Engineered to handle difficult industrial environments yet incredibly easy to operate and maintain, the Gas Plus Alarm System provides visual and audible local alarm annunciation in a rugged steel enclosure.

Designed for easy use and maintenance, the Gas Plus Alarm System can be equipped with either the Scott Instruments Model 4600 Gas Plus Universal Toxic Gas Transmitter, the Model 4688IR Infrared Combustible Gas Transmitter, or the Model 4679IR CO₂ transmitter.

Built-in strobe lights and an 80 db horn respond to two levels of alarm to quickly alert personnel of dangerous, build-ups of toxic or combustible gas. Three 10 amp relays provide additional response support for your facility, and a front panel light provides continuous visual indication of system status.

The built-in 110 Vac power supply provides simple plug-in electrical connection. Since all system adjustments are non-intrusive, the rugged painted or stainless steel enclosure never needs to be opened after installation.

See the Alarm System datasheet for more information.



Technical Specifications

GENERAL

Sensor Type	Non-dispersive infrared
Detection Range	See "Ordering Information"
Linearity	± 2% below 40% full scale ± 5% from 40% to 110% full scale
Repeatability	± 2% below 40% full scale ± 5% from 40% to 110% full scale
Response Time	T90 < 5 seconds (without rainshield)
Start Up Time	30 seconds
Self-Diagnostic Test	2x per second
Calibration	Span: none (factory set) Zero: every 3 to 6 months
User Interface	Non-intrusive via magnet
Display	4 digit LCD with user-adjustable contrast. Numeric display of gas concentration and faults; icons for alarms, lock, and inhibit
Weight	6.5 lbs (3.0 kg)
Warranty	2 years

OUTPUTS

Analog	Isolated, 4-20mA, max loop load 900W at 24 VDC (current source or sink)
Programmable Fault	2.4 to 4.0mA
Programmable Inhibit	1.5 to 20.0mA
Programmable Loop Test	1.0 to 20.0mA
Digital	RS/485 or RS/232 using Modbus RTU or Modbus ASCII protocol
Relay (optional)	3 SPST relays (2 concentration, 1 fault), 5A at 250 VAC. User-selectable latching/nonlatching, energized/de-energized, set/reset delay, and set/reset point

ELECTRICAL

Input Voltage	18-27VDC
Power Consumption	3.1W, nominal / 6.0W, max
Connections	3 wires or 4 wires (with RS/485 or RS/232 configuration); 18-22 AWG nominal
RFI/EMI	certified to EN50082-1

ENVIRONMENTAL

Operating Temp	-40°F to 140°F (-40°C to 60°C)
Operating Humidity	0 to 100% RH

ENCLOSURE

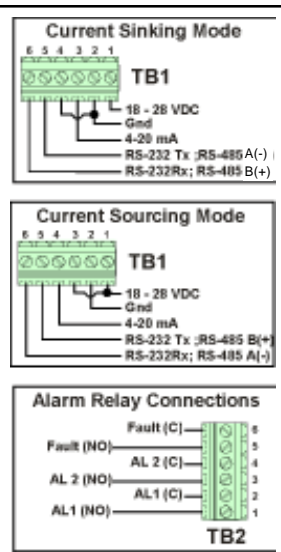
Enclosure Material	Copper-free cast aluminum, baked epoxy finish
Optical Bench Material	Stainless steel or electroplated aluminum

APPROVALS

Enclosure	Explosion proof; UL/FM/CSA, Class 1 Group B,C,D / Class 2, Group E, F / Class 3, NEMA-4X, NEMA-7B, C,D; NEMA-9 E,F,G; IP66
System	ETL listed to UL2279 and UL3111-1 (Class 1, Div 1, Group B,C,D), CE Marked CSA approved to Class 1, Zone 1, Groups IIB+H2; Class I, Groups E,F,&G; Class III CENELEC approved to EExd[ib] IIC T6

Installation Drawings

Electrical



Dimensions

