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IR1 Single Gas Series Datasheet

Infrared Single Gas Sensor for Hazardous Environments
(Portable and Fixed Systems)

The SGX infrared sensors use the proven Non-Dispersive Infrared (NDIR) principle to detect and monitor the presence of gases. With an infrared source and specific filtering on the pyroelectric detectors mounted inside the optical/gas cavity, individual gases or types of gas can be identified and their concentrations determined.

These sensors are suitable for reliable monitoring of gas levels in general safety applications where the sensor size is restricted and require a flameproof enclosure for hazardous environments.

APPLICATIONS

- Oil & Gas
- Petrochemical
- Biogas
- Wastewater
- Utilities
- Steelworks
- Confined Space Entry
- Indoor Air Quality

FEATURES

- For detection of the following gases:
  - Carbon Dioxide (IR11 Series),
  - Hydrocarbons (IR12 series, IR13 series)
  - Acetylene (IR14 series)
- Gas concentration ranges:
  - 0 - 5% Carbon Dioxide
    (also suitable for 0 to 0.5%v/v)
  - 0 - 100% Carbon Dioxide
    (also suitable for 0 to 10%)
  - 0 - 100%v/v Hydrocarbons
    (also suitable for 0 to 100%LEL)
  - 0 - 100%v/v Acetylene
    (also suitable for 0 to 100%LEL)
- 16.6mm or 19.0mm sensor heights available
- Embedded temperature sensor in some versions for improved temperature compensation
- Shock-resistant IR Source version available on certain types
- Diffused gas sampling via mesh
- Low power
- Reference channel for self-compensation
- Special gold plated optical gas cavity for stable signal levels
- Operational in varying temperature, pressure and humidity
- Fast response
- Rugged stainless steel construction
- No moving parts
- Immunity from 'poisoning'
- Reliable fail-safe operation
- Certified: ATEX, IECEx, CSA and UL

OPERATION

To operate, the sensors must be interfaced to a suitable circuit for power supply, output amplification and signal processing. Sensor outputs require linearisation and compensation for ambient temperature variation using algorithms in the system firmware. This is necessary for sensors to meet their full performance specification. An embedded temperature sensor facilitates this compensation on certain types. Further compensation for pressure changes can also be made in an algorithm, provided there is a suitable input from a pressure sensor.

A set of Application Notes is available from the SGX Sensortech Ltd website, to explain more about NDIR gas sensing and provide advice for the end-user on interfacing the sensors and processing signals.

TECHNICAL SPECIFICATION

Mechanical

Dimensions	See Outlines
Body material	Stainless Steel
Approximate Weight	30g

Environmental

Ambient temperature range **for operation:** **storage:**	 -20°C to +55°C -20°C to +55°C
Operational pressure range	30kPa to 130kPa
Humidity range for operation and storage	0 to 95% RH *(Non-condensing)*

Electrical

DC supply to detectors	3V to 5V
Typical power	180mW @ 5V
IR Source Supply **(Recommended)**	+5V, 60mA (Square Wave at 4Hz, 50% duty cycle)

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CONFIGURATIONS

Sensor Type **	Gas	Concentration Range *		IR Source		Sensor Height		Internal Temperature Sensor			Qty of Pins
		Highest	Lowest	Standard	Rugged	16.6mm	19mm	Thermistor	LM60	None	
IR11BD	Carbon Dioxide	0 to 5%	0 to 0.5%	✓			✓			✓	6
IR11EJ				✓			✓	✓			7
IR11EM				✓		✓		✓			7
IR11GJ				✓			✓		✓		7
IR11GM				✓		✓			✓		7
IR11GM_1					✓	✓			✓		7
IR11BR		0 to 100%	0 to 10%	✓			✓	✓			7
IR12BD	Methane / Hydrocarbons	0 to 100%	0 to 100%LEL	✓			✓			✓	6
IR12EJ				✓			✓	✓			7
IR12EM				✓		✓		✓			7
IR12GJ				✓			✓		✓		7
IR12GM				✓		✓			✓		7
IR12GM_1					✓	✓			✓		7
IR13BD				✓			✓			✓	6
IR14BD	Acetylene	0 to 100%	0 to 2.5%	✓			✓			✓	6

* ***The Highest Concentration Range is the highest range the sensor is suitable. The Lowest Concentration Range is the lowest range the sensor is suitable. The use of the sensor beyond these ranges will affect the sensor's performance.***

** ***All sensors use temperature compensated pyroelectric detectors except for IR1nBD variants which are uncompensated. This refers to a change in the DC voltage output only. Further temperature compensation is required for all sensor variants.***

HANDLING PRECAUTIONS

1. Do not allow sensors to fall on the floor. This could cause IR Source filament breakage, damage to the pins and the gas entrance aperture.
2. Do not apply mechanical force against the gas entrance aperture.
3. Do not immerse sensors in water or other fluids.
4. Protect the gas entrance aperture against dust ingress and sprayed materials.
5. Anti-static handling precautions must be taken.

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