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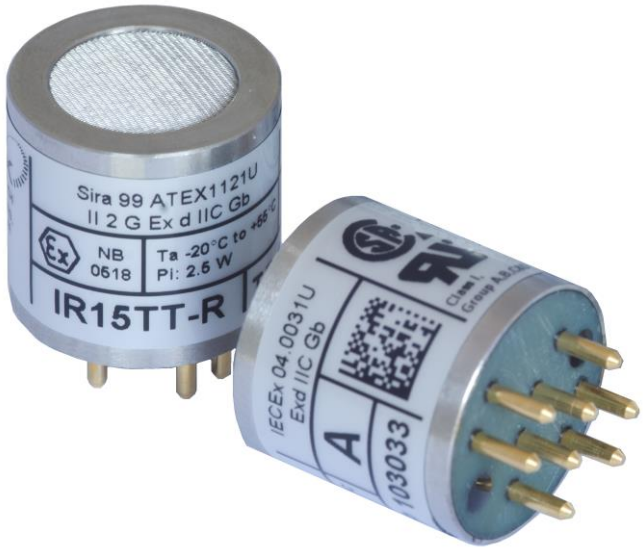
# IR15 Dual Gas Series Datasheet

**Infrared Dual 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.

The IR15 Series contain two active detector elements for simultaneous monitoring of Carbon Dioxide and Methane or Hydrocarbon mixtures in the same size housing as some of the single gas sensors from the IR1xxx series sensors, making the sensor more cost effective than two separate sensors.




## APPLICATIONS

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

## FEATURES

- For detection of the following gases:
  - Carbon Dioxide & Hydrocarbons,
  - Hydrocarbons Mixtures
- 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)
- 19mm sensor height
- Embedded thermistor for improved temperature compensation
- 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** | 35g |

### Environmental

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

### Electrical

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

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## CONFIGURATIONS

| Sensor Type | Target Gas 1 | | | Target Gas 2 | | | Application(s) |
|---|---|---|---|---|---|---|---|
| | Gas | Concentration Range * | | Gas | Concentration Range * | | |
| | | Highest | Lowest | | Highest | Lowest | |
| IR15TT | Carbon Dioxide | 0 to 5% | 0 to 0.5% | Hydrocarbons | 0 to 100% | 0 to 100%LEL | Oil & Gas<br>Petrochemical<br>Wastewater<br>Steelworks<br>Confined Space Entry<br>Indoor Air Quality |
| IR15TT-M | | | | | | | |
| IR15TT-R | | 0 to 100% | 0 to 10% | | | | Biogas |
| IR15TT-D | Hydrocarbons | 0 to 100% | 0 to 100%LEL | | | | Utilities |

* ***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.***

**IR15TT**
The IR15TT can be used in all applications for general monitoring of both relatively low concentrations of carbon dioxide and simultaneous %LEL and %v/v concentrations of Group II hydrocarbons, including benzene. The sensors contain a broadband hydrocarbon detector which are cross sensitive to most hydrocarbons and can therefore be calibrated to a specific target gas or a number of gases that can then be selected in the configuration of the customer's gas measurement instrument.

**IR15TT-M**
The IR15TT-M is very similar to the IR15TT except that a narrowband hydrocarbon detector is used. The sensor can still be used to monitor the same levels of carbon dioxide and hydrocarbons but are unsuitable for the detection of benzene. The narrowband detector also has a slightly lower response to humidity than the IR15TT, but is generally more cross-sensitive to other hydrocarbons.

**IR15TT-R**
The IR15TT-R was designed specifically for Biogas applications for the simultaneous detection of carbon dioxide up to 100%v/v and %LEL and %v/v concentrations of hydrocarbons, but can be potentially used for other applications. The IR15TT-R contains the narrowband detector which is unsuitable for the detection of benzene.

**IR15TT-D**
The IR15TT-D is fitted with both the narrowband and broadband hydrocarbon detectors with differing centre wavelength and bandwidth to potentially differentiate between hydrocarbons. The sensor was designed for the gas instruments being used by utilities companies to help differentiate between different compositions of natural gas.

## 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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