

TECHNICAL DATA SHEET



**HYDROCARBON
INFRARED SENSOR
CERTIFIED VERSION
TYPE MSH-P-HC**



**Patent Numbers : GB 2 401 432 & GB 2 403 291
US Patent Application No. 10/929, 350
Other World Patents Pending**

ATEX Certificate No. SIRA 04ATEX1357U, I M2 EExd I and II 2 G EEx d IIC
IECEX Certificate No. SIR 05.0053U, Ex d I and/or Ex d IIC
UL recognised Class 1, Groups A, B, C and D, T4 with 60°C ambient

FEATURES

- ★ Contains all the necessary optics, electronics and firmware to provide a linearized, temperature-compensated output.
- ★ Choice of output format – direct pellistor replacement, industry standard 0.4 to 2 volts dc or digital.
- ★ Instantly converts existing compatible pellistor-based instruments to infrared.
- ★ Sensors can be factory configured to customer specification.
- ★ All sensor types are user configurable using configuration equipment available from Dynament.
- ★ Fast track route for original equipment manufacturers to introduce the latest infrared technology – without any specialist knowledge.
- ★ Internal Flash memory allowing sensor firmware updates via configuration equipment.



Dynament Limited

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DESCRIPTION

Dynamant infrared sensors operate by using the NDIR principle to monitor the presence of target gas. The sensor contains a long life tungsten filament infrared light source, an optical cavity into which gas diffuses, a dual temperature compensated pyroelectric infrared detector, an integral semiconductor temperature sensor and electronics to process the signals from the pyroelectric detector .

Two versions are available:-

3 Pin Version - Pellistor Replacement Infrared

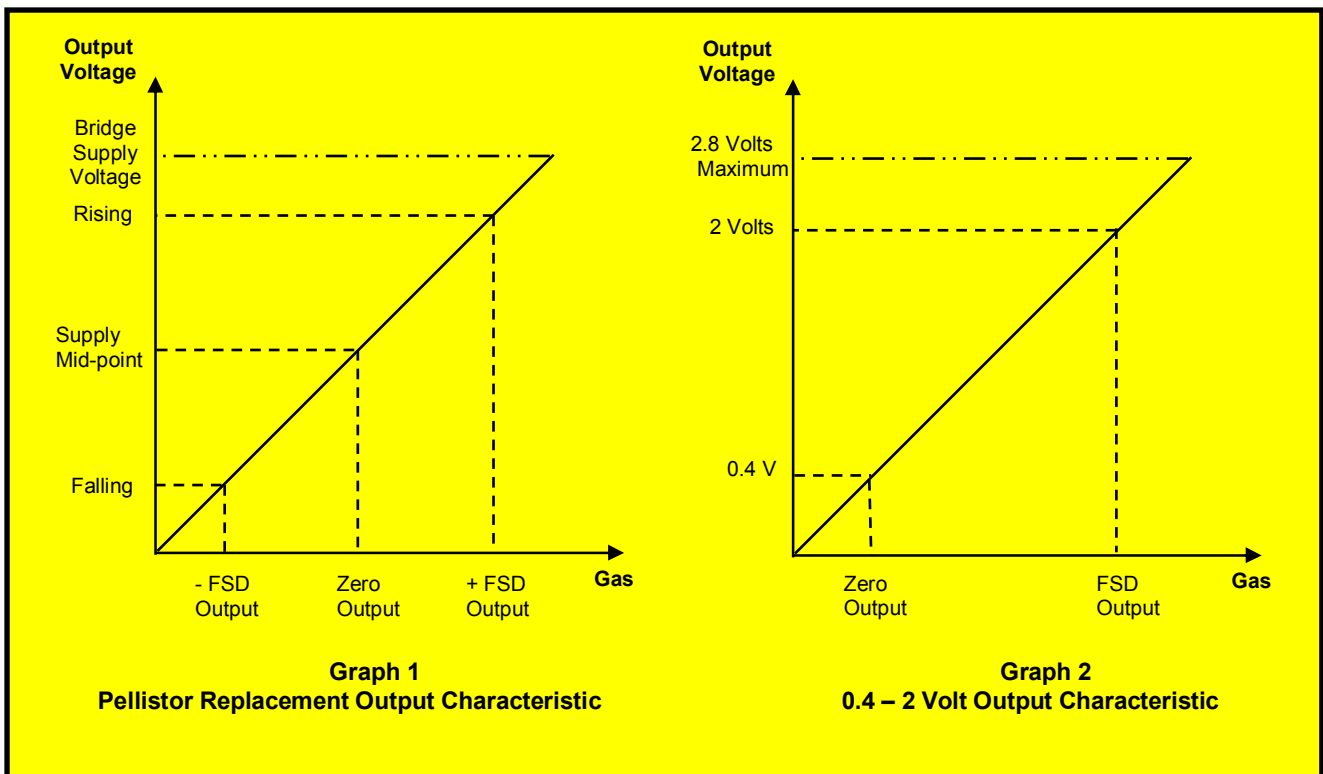
These sensors provide a pellistor style linearized, temperature-compensated output as shown in Graph 1. They can either be supplied pre-set to customer specification or may be configured by the user by means of a configuration unit available from Dynamant Ltd. The output signal can be set to rise or fall with increase in the gas level.

5 Pin Version - Multi-Purpose Range

This version of the sensor provides maximum user flexibility by providing the following output options:-

- ★ Industry Standard 0.4 to 2 volt linearized, temperature-compensated output as shown in Graph 2, or alternative voltages for zero and FSD outputs.
- ★ Digital output for direct communications with instrument electronics.
- ★ Rising or falling output with increasing gas level.

The digital output is a UART format comprising 8 data bits, 1 stop bit and no parity. Refer to specification for available baud rates.



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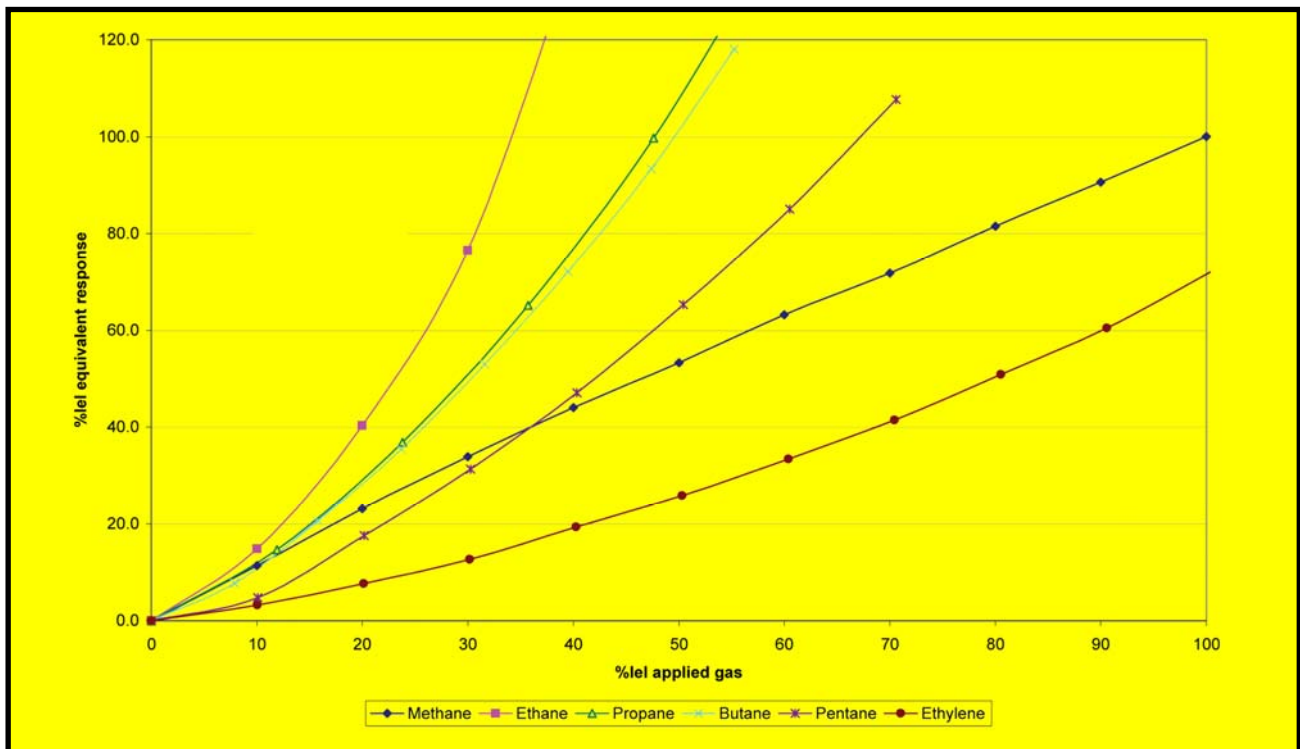
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Hydrocarbon Response Characteristics

Unless otherwise specified, the Premier Range of Hydrocarbon infrared sensors are calibrated to provide an output signal linearized for methane (CH₄) during manufacture.

However, the sensor will also respond to a range of hydrocarbon gases. The characteristics shown in Graph 3 demonstrate the relative response to some of the common hydrocarbons.

If the expected target gas is other than methane, or a general response is required, then the characteristics can be used as a guide to setting up the associated instrument alarm levels.



Note – Cross reference data is also available for other gas such as Ethanol, Hexane, Acetone.



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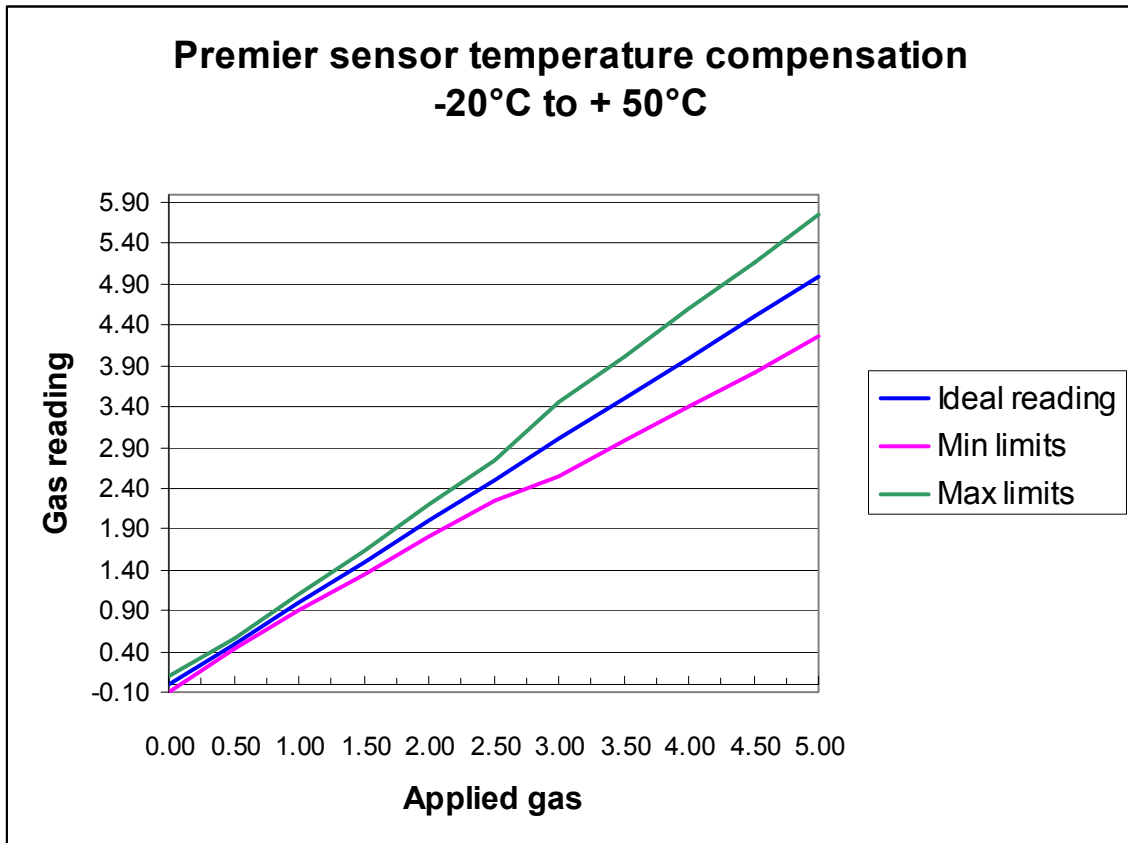
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Hydrocarbon Temperature Compensation

The Premier sensor is temperature compensated over the range of -20°C to +50°C. The output variation is $\pm 2\%$ FSD or 10% of the reading up to 50% FSD and $\pm 15\%$ of the reading from 50% to 100% FSD, which ever is greater.

The following graph is based on the hydrocarbon sensor being characterised for methane.



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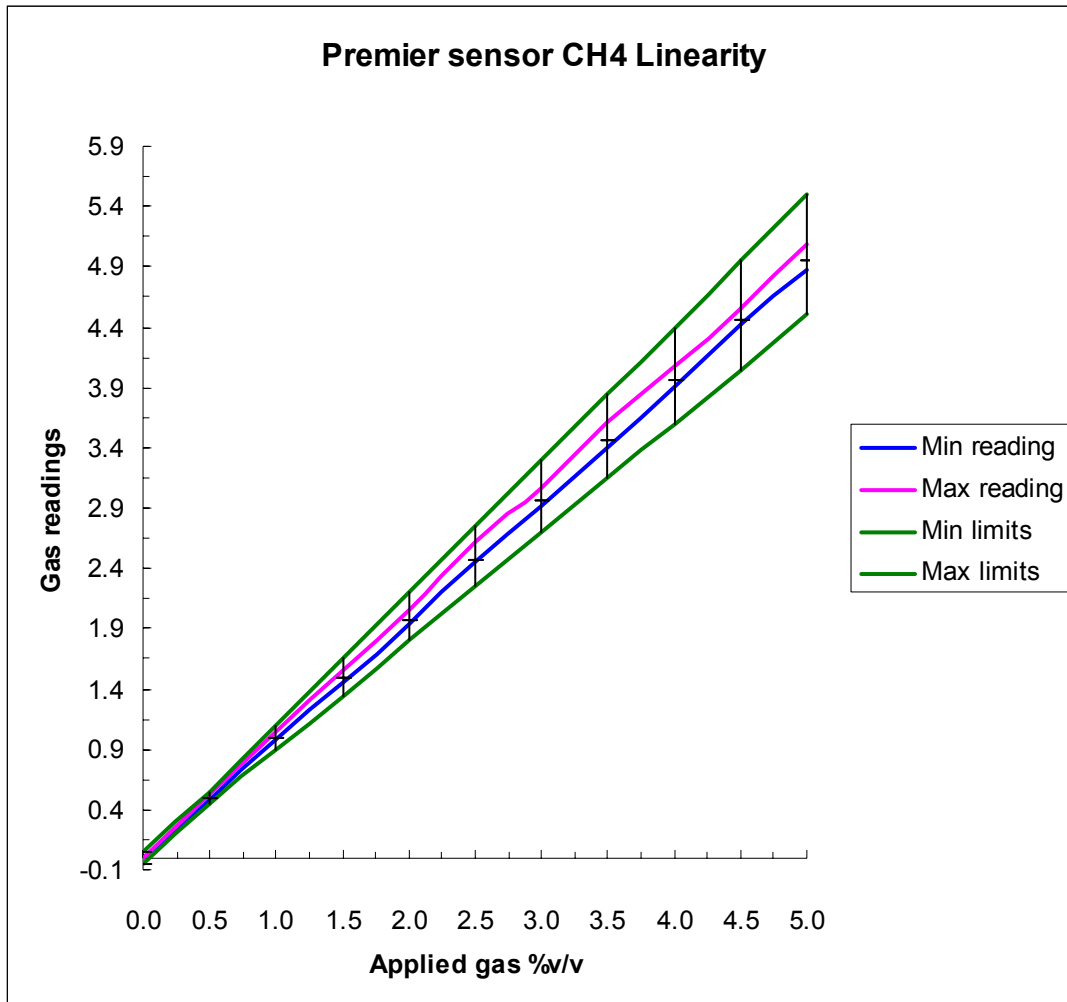
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Hydrocarbon Linearity

The Premier sensor linearity at ambient temperature is $\pm 2\%$ FSD or 10% of the reading which ever is greater.

The following graph is based on the hydrocarbon sensor being characterised for methane, data based on 24 sensors.



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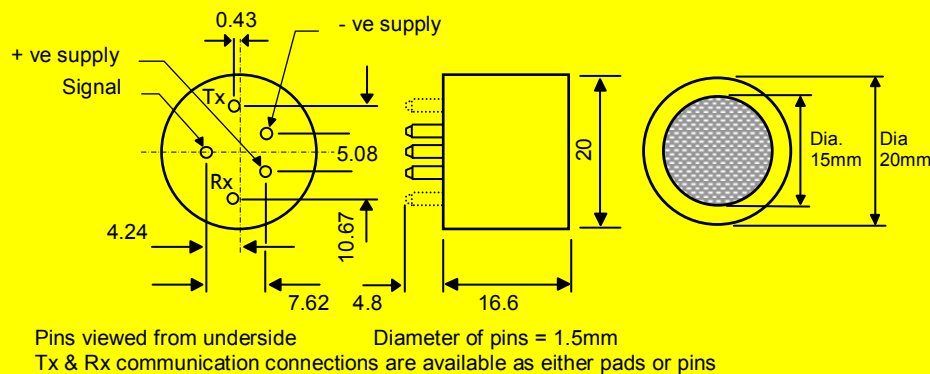
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SPECIFICATION

Operating Voltage Range:	3.0 – 5.0 V d.c.
Operating Current:	Constant current operation, current range 75 – 85mA
Programmable Output Voltage Ranges:	Voltage Output Types – 0v to 2.8 volts d.c. Bridge Output Types – 0v to Bridge Supply Voltage
Methane measuring range:	0 – 5% volume up to 0 – 100% volume
Hydrocarbon measuring range	0 – 100% LEL equivalent
Resolution:	1% of measuring range
Warm up time:	To final zero \pm 2% FSD : 1 minute @20°C (68°F) ambient
Response Time T₉₀:	<30s @20°C (68°F) ambient
Zero Repeatability:	\pm 1% FSD @20°C (68°F) ambient
Span Repeatability:	\pm 2% FSD @20°C (68°F) ambient
Long term zero drift:	\pm 1% FSD per month @20°C (68°F) ambient, (max \pm 3% FSD per year)
Operating temperature range:	-20°C to +50°C (-4°F to 122°F)
Temperature performance: <small>* May not be applicable when using gas cross-reference factors</small>	\pm 10% of reading up to 50% FSD, \pm 15% of reading from 50% to 100% FSD, or 2% FSD whichever is greater over the range -20°C to +50°C (-4°F to 122°F)
Storage temperature range:	-20°C to +50°C (-4°F to 122°F)
Humidity range:	0 to 95% RH non-condensing.
Digital signal format:	8 data bits, 1 stop bit, no parity
Standard baud rates:	38,400, 19,200, 9600
User configurable parameters:	Zero output voltage FSD output voltage Positive or negative going output Sensor 'zero' function Sensor 'span' function
MTBF:	> 5 years
Weight :	15 grams

MECHANICAL DETAIL

NOTES



1. DIMENSIONS WITHOUT TOLERANCES ARE NOMINAL.
2. RECOMMENDED PCB SOCKET WEARNES CAMBION LTD CODE: 450-3326-01-06-00.
3. WEIGHT: 15g
4. USE ANTI-STATIC PRECAUTIONS WHEN HANDLING
5. DO NOT CUT PINS
6. DO NOT SOLDER DIRECTLY TO PINS

NOTE – The above pin configuration is shown for the POSITIVE version of the sensor. The NEGATIVE version has the +ve and -ve supply pin positions exchanged. See ordering details.



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Ordering Details

In order to completely specify the type of sensor that is required, the customer needs to provide the following information:-

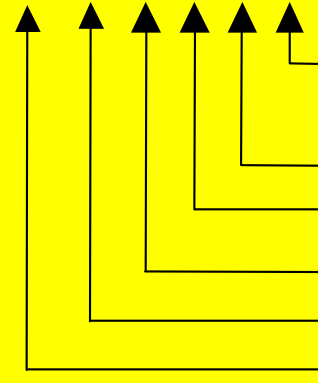
- An Order Code (see below) that specifies the sensors' basic physical and electrical characteristics.
- The sensor configuration requirements.

Available sensor options:

F = Replaceable, self adhesive microporous PTFE filter

EXAMPLE OF ORDER CODES

MSH – P / HC / 3 / B / P / F



Option

FILTER : BLANK = OMITTED
 F = FITTED

SUPPLY POLARITY : P = Positive
 N = Negative

OUTPUT TYPE : B = Bridge
 V = Voltage

NUMBER OF PINS : 3 or 5

GAS TYPE : HC = Hydrocarbon

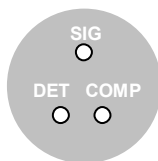
PREMIER SENSOR

CONFIGURATION OPTIONS

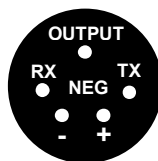
(To be stated on customer order in addition to the Order Code)

1. Output voltage for zero.
2. Output voltage for span.
3. Rising or falling output voltage with increasing gas level.
4. Sensitivity e.g. 20 mV / % volume CH₄.
5. Communication speed – 38,400 baud (default), specify alternative rate if required.

Pellistor Replacement - Explanation of Positive & Negative Polarity

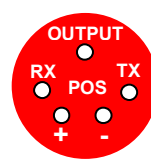


Typical Pellistor Pinout



Premier Negative Polarity Option

Use where the DET pin of the existing pellistor is connected to the Negative of the pellistor bridge supply.



Premier Positive Polarity Option

Use where DET pin of the existing pellistor is connected to the Positive of the pellistor bridge supply.

Note – the RX and TX connections are pads on the 3 pin versions of the sensor.



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