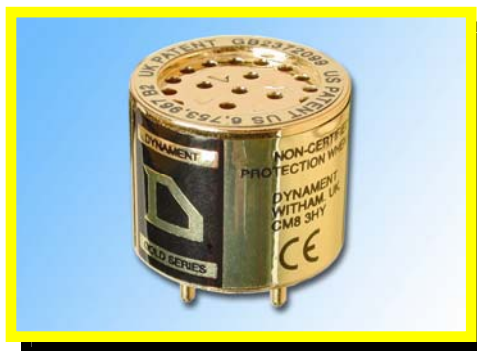




TAKING INVENTIVE STEPS IN INFRARED....

HYDROCARBON INFRARED SENSOR  
TEMPERATURE COMPENSATED  
NON-CERTIFIED VERSION  
GOLD SERIES TYPE  
MSH-HC/NC/TC



PATENT NUMBER: GB 2372099B; US 6,753,967 B2

FEATURES

- %l CH4 , %l hydrocarbon & %vol CH4
Standard sensor size
Fast Response
Internal temperature signal
Gas diffusion sampling
Temperature compensated detector elements
Wide operating temperature range
Low power

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 and an integral thermistor to monitor the internal temperature.

- An active signal which decreases in the presence of target gas
A reference signal which is used to monitor the intensity of the source

Both signals are composed of a DC offset voltage (typically 0.7V - 1.0V) with a small superimposed response signal alternating in sympathy with the source drive voltage. The alternating signal must be extracted and amplified in order to obtain a measure of the peak to peak value for both the active and reference.

[concentration] = (-ln (1 - (1 - Ratio/zero)/span)) / a ^ (1/b)

Where zero is the ratio in the absence of target gas, span is determined during calibration & the constants a and b are:

- a = 0.022989, b = 0.78836 and typical span = 0.2 for a range of 0-100%l methane.
a = 0.020748, b = 0.500 and typical span = 2.5 for a range of 0-100% volume methane.
a = 0.0118, b = 0.911 and typical span = 0.7 for a range of 0-100%l non-methane aliphatic hydrocarbons (eg propane)

The internal temperature signal is used to measure the temperature inside the sensor. This temperature measurement is used to correct for the ideal gas law and also to correct for any optical filter effects on zero and span as a function of temperature.

Further details on the sensor, interfacing circuitry, signal extraction and relative responses to other hydrocarbons can be found in the Dynamant application notes on the Dynamant web site or by contacting Dynamant directly.



Dynamant Limited

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## SPECIFICATION

<b>Maximum Power Requirements:</b>	5V d.c. 60mA max. (50% duty cycle source drive)
<b>Minimum operating voltage:</b>	3.0V d.c. (50% duty cycle source drive)
<b>Source drive frequency :</b>	2.0Hz minimum, 3.0 Hz typical, 4.0 Hz maximum
<b>Active mV pk-pk output in N<sub>2</sub>:</b>	12.0mV typical @ 3Hz, 50% duty cycle
<b>Reference mV pk-pk output in N<sub>2</sub>:</b>	4.0mV typical @ 3Hz, 50% duty cycle
<b>Sensitivity (reduction in active signal) at 20°C, 3Hz, 50% duty cycle:</b>	11% typical @ 100%l CH <sub>4</sub> 36% typical at 100% volume CH <sub>4</sub> 18% typical @ 100%l propane
<b>Methane measuring range:</b>	0 – 5% volume up to 0 – 100% volume
<b>Hydrocarbon measuring range</b>	0 – 100%l
<b>Resolution:</b>	1% of measuring range
<b>Warm up time:</b>	To final zero ± 2%l : <20s @20°C (68°F) ambient To specification: < 30 minutes @20°C (68°F) ambient
<b>Response Time T<sub>90</sub>:</b>	<30s @20°C (68°F) ambient
<b>Zero Repeatability:</b>	± 1%l @20°C (68°F) ambient
<b>Span Repeatability:</b>	± 2%l @20°C (68°F) ambient
<b>Long term zero drift:</b>	± 1%l per month @20°C (68°F) ambient
<b>Operating temperature range:</b>	-20°C to +50°C (-4°F to 122°F)
<b>Storage temperature range</b>	-20°C to +50°C (-4°F to 122°F)
<b>Humidity range:</b>	0 to 95% RH non-condensing.
<b>MTBF</b>	> 5 years
<b>Temperature signal</b>	Integral thermistor for temperature monitoring
<b>Weight :</b>	7 grams

Refer to Technical Data Sheet TDS0022 – General Description for further information

	<b><u>MECHANICAL DETAIL</u></b>	<b><u>NOTES</u></b>	<b><u>PIN OUT</u></b>
		<ol style="list-style-type: none"> <li>1 DIMENSIONS WITHOUT TOLERANCES ARE NOMINAL</li> <li>2 RECOMMENDED PCB SOCKET: WEARNES CAMBION LTD CODE: 450-3326-01-06-00</li> <li>3 WEIGHT: 15g</li> <li>4 USE ANTI-STATIC PRECAUTIONS WHEN HANDLING</li> <li>5 DO NOT CUT PINS</li> <li>6 DO NOT SOLDER DIRECTLY TO PINS</li> </ol>	<ol style="list-style-type: none"> <li>1 LAMP RETURN</li> <li>2 LAMP +5V</li> <li>3 +5V PYRO SUPPLY</li> <li>4 DETECTOR OUTPUT</li> <li>5 REFERENCE OUTPUT</li> <li>6 THERMISTOR OUTPUT</li> <li>7 0V PYRO SUPPLY AND CASE CONNECTION</li> </ol>

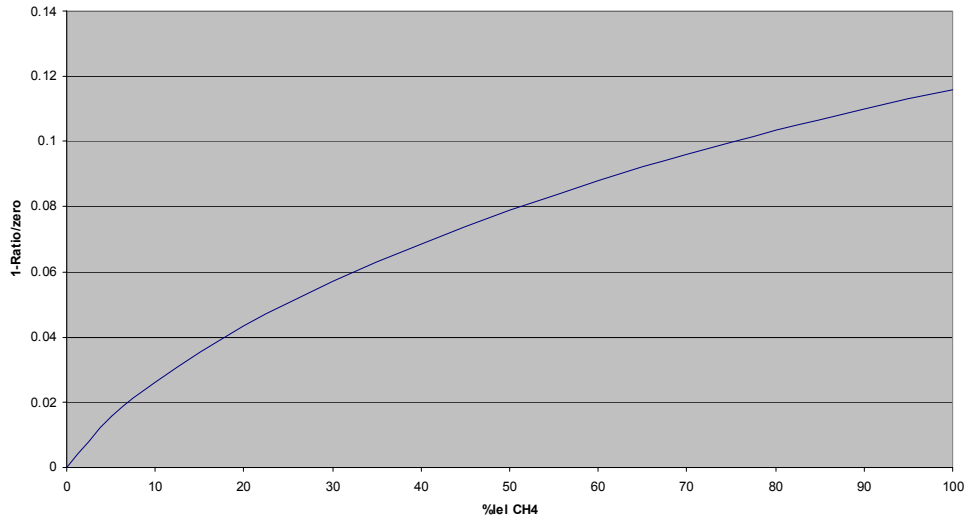
<p><b><u>Available sensor options:</u></b></p> <p><b>P</b> = Removable 45 micron plastic insert dust filter</p> <p><b>F</b> = Replaceable, self adhesive, microporous PTFE filter</p> <p><b>I</b> = Case isolated from 0V pin</p>	<p style="text-align: center;"><b><u>EXAMPLE OF ORDER CODES</u></b></p> <p style="text-align: center;"><b>MSH – HC / NC / TC / P / F / I</b></p> <div style="display: flex; align-items: center;"> <div style="margin-right: 20px;"> </div> <div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center;"><b><u>OPTIONS:</u></b></p> <p><b>ISOLATION:</b> BLANK = STANDARD I = ISOLATED CASE</p> <p><b>FILTER:</b> BLANK = OMITTED F = FITTED</p> <p><b>PLASTIC INSERT:</b> BLANK = OMITTED P = FITTED</p> <p>TC = TEMPERATURE COMPENSATED DETECTOR ELEMENTS</p> <p>NC = NON-CERTIFIED</p> <p>GAS TYPE : HC = Hydrocarbon</p> </div> </div>
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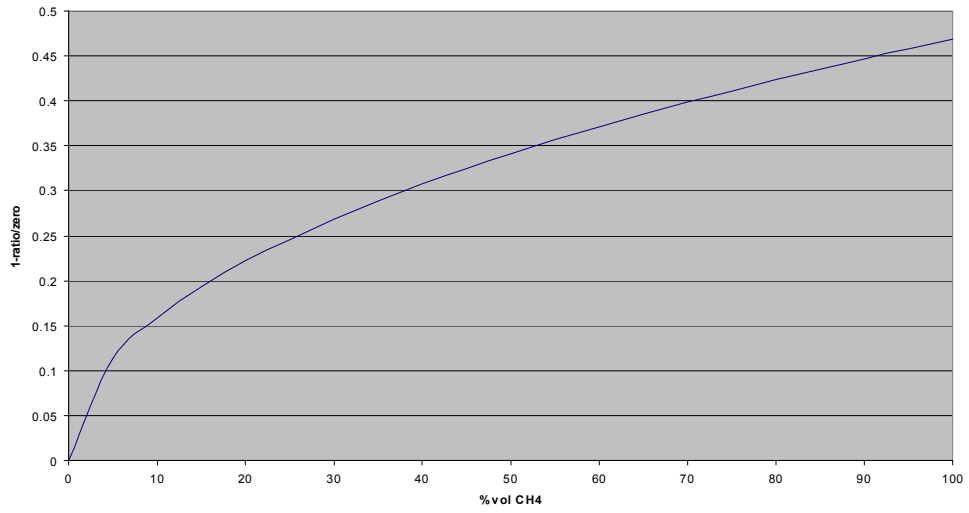
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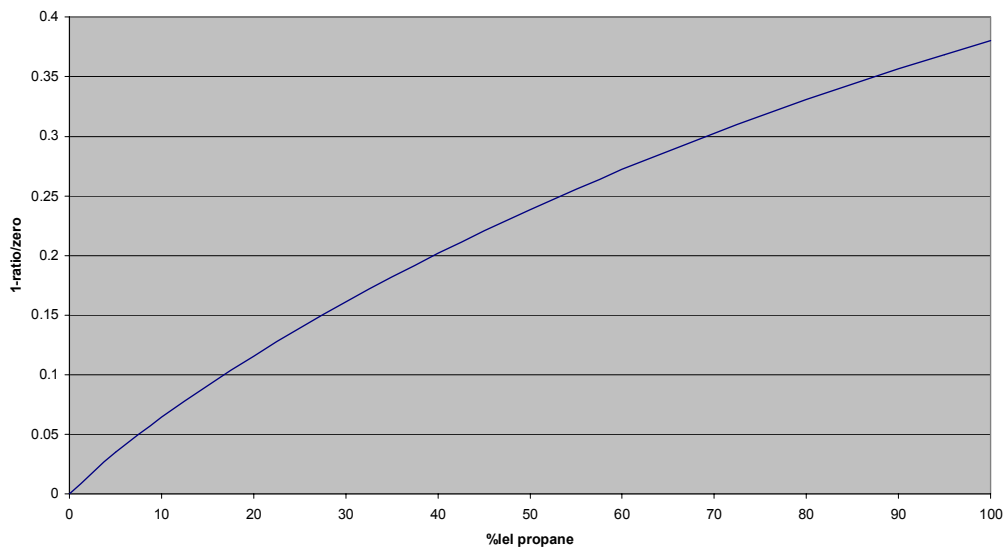
Typical response to 0-100% l<sub>el</sub> CH<sub>4</sub>



Typical response to 0-100% volume CH<sub>4</sub>



Typical response to 0-100%l<sub>el</sub> propane



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