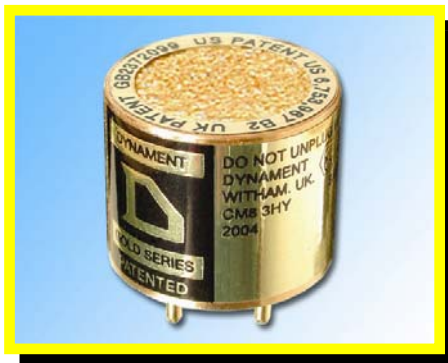




TAKING INVENTIVE STEPS IN INFRARED....

HIGH RANGE  
CARBON DIOXIDE  
INFRARED SENSOR  
TEMPERATURE  
COMPENSATED  
CERTIFIED VERSION  
GOLD SERIES TYPE  
MSH-HCO2/TC



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

FEATURES

- High % volume CO2
Standard sensor size
Fast Response
Internal temperature signal
Gas diffusion sampling
Temperature compensated detector elements
Wide operating temperature range
Low power

ATEX Certificate No. SIRA 04ATEX1357U, Ex I M2 EExd I and Ex 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

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 = 0.14578, b = 0.66972 and typical span = 0.22 for a range of 0-100% volume carbon dioxide.

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>	9.0mV typical @ 3Hz, 50% duty cycle
<b>Reference mV pk-pk output in N<sub>2</sub>:</b>	6.0mV typical @ 3Hz, 50% duty cycle
<b>Sensitivity (reduction in active signal) at 20°C, 3Hz, 50% duty cycle:</b>	19% typical @ 50% volume carbon dioxide
<b>Carbon dioxide measuring range:</b>	0 - 5% volume up to 0 - 100% volume maximum
<b>Resolution:</b>	1% of measuring range
<b>Warm up time:</b>	To final zero ± 2% full scale : <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% full scale @20°C (68°F) ambient
<b>Span Repeatability:</b>	± 2% full scale @20°C (68°F) ambient
<b>Long term zero drift:</b>	± 1% full scale 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>	17 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>DIMENSIONS WITHOUT TOLERANCES ARE NOMINAL</li> <li>RECOMMENDED PCB SOCKET: WEARNES CAMBION LTD CODE: 450-3326-01-06-00</li> <li>WEIGHT: 15g</li> <li>USE ANTI-STATIC PRECAUTIONS WHEN HANDLING</li> <li>DO NOT CUT PINS</li> <li>DO NOT SOLDER DIRECTLY TO PINS</li> </ol>	<ol style="list-style-type: none"> <li>LAMP RETURN</li> <li>LAMP +5V</li> <li>+5V PYRO SUPPLY</li> <li>DETECTOR OUTPUT</li> <li>REFERENCE OUTPUT</li> <li>THERMISTOR OUTPUT</li> <li>0V PYRO SUPPLY AND CASE CONNECTION</li> </ol>

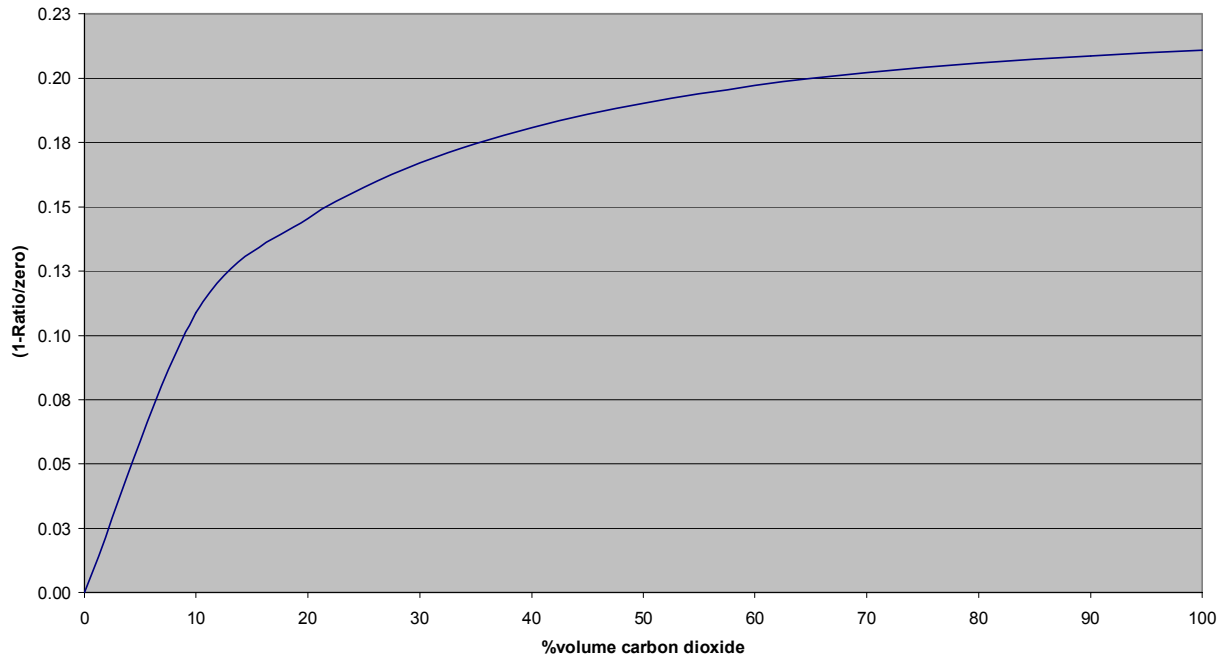
<p><b><u>Available sensor options:</u></b></p> <p>F = Replaceable, self adhesive, microporous PTFE filter</p> <p>I = Case isolated from 0V pin</p>	<p><b><u>EXAMPLE OF ORDER CODES</u></b></p> <p><b>MSH – HCO<sub>2</sub> / TC / F / I</b></p>
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### Typical response to carbon dioxide



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