

CO2 OR HYDROCARBONS INFRARED SENSOR WITH INTEGRATED TRANSMITTER

1. FEATURES

- Analogue (voltage or dynamic pellistor) standard output
- Incorporated signal linearisation and temperature compensation suited for manufacturers without any specialist knowledge in IR technology
- Standard sensor size 20 mm or 32 mm
- Fast response
- Robust construction
- Wide operating temperature and humidity range
- Low power consumption
- ATEX approved version available in 4 series size

2. DESIGN

The C/M/P4 series of infrared gas detection sensors utilise NDIR (Non Dispersive Infrared) to monitor the presence of Carbon Dioxide or hydrocarbons. This technique is based on the fact that the gas has a unique and well defined light absorption curve in the infrared spectrum that can be used to identify the specific gas.

The gas concentration can be determined by using a suitable infrared source and analysing the optical absorption of the light that passes through the gas.

The sensor contains optics and incorporated electronics with software in order to provide an output that is linearised and temperature compensated. The type of output can be of analogue voltage type 0.4 – 2Vdc (other voltages are available on request) or bridge type $V_{cc}/2 \pm \Delta$ dc (Δ value is to be specified by the customer) depending on the sensor model.

The sensor provides a linearised and temperature compensated analogue voltage output (voltage or dynamic pellistor) that is proportional to the gas concentration (see fig. 1).



Infrared CO₂, CH₄ or C₃H₈ sensor in 4 or 7 series sizes with integrated analogue (standard 0.4-2.0V) or bridge dc transmitter. Output on request.

Part nos.: 2112BC/M/P4-V (4 and 7 series sizes) or 2112BC/M/P4A-V for ATEX approved version (4 series size)

Measuring ranges:

Carbon Dioxide CO₂: 0-5000ppm, 0-1% vol, 0-2% vol, 0-5% vol, 0-30% vol

Methane CH₄ & Propane C₃H₈: 0-100% LEL or 0-100% vol



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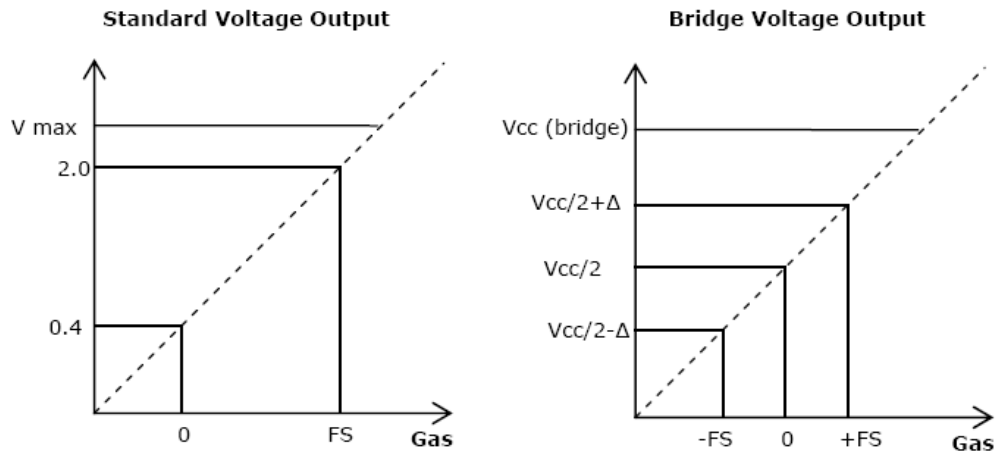
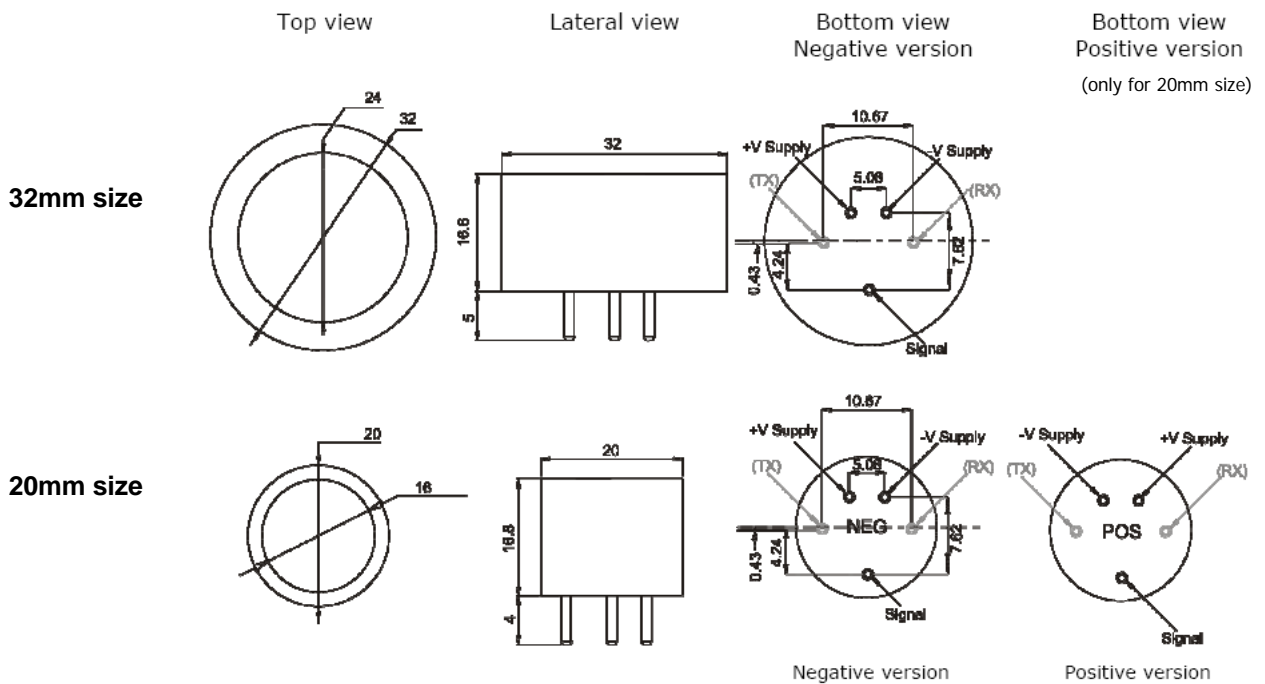


Fig. 1: Characteristics of output voltage

3. DIMENSIONS



All the dimensions in the figures are indicated in millimetres.

The two pins RX and TX for MODBUS protocol communication, are available on request.

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4. TECHNICAL DATA

General	Operating temperature range	-40 to +60 °C
	Storage temperature range	-40 to +85 °C
	Operating humidity range	0-95% non condensing
	Gas types	CH4, C3H8 or CO2
	Weight	44 g (32mm – 7 series) 22 g (20mm – 4 series)
	MTBF	≥ 5 years
	Patent information	Patent pending (request no. MI2013A000478)
	Software and digital technology	Designed for use in a detector that complies to EN 50271
	Electromagnetic Compatibility (EMC)	Designed for use in a detector that complies to EN 50270
	Optics	Metal optics treated to increase brightness and prevent oxidation
	Enclosure	Stainless steel
Calibration	Individually calibrated with temperature compensation. Test report supplied.	
Measurement	Sensing method	NDIR (active and reference signal)
	Measurement ranges	0 - 100% LEL (available for hydrocarbons (4,4% vol for Methane, 1,7% for Propane) 0 - 2% vol (available for Propane (0-100 % LEL outside of EU)) 0 - 5% vol (available for Methane (0-100 % LEL outside of EU)) 0 - 100% vol (available for Methane and Propane) 0 - 5000 ppm (available for CO2) 0 - 1% vol (available for CO2) 0 - 2% vol (available for CO2) 0 - 5% vol (available for CO2) 0 - 30% vol (available for CO2)
	Repeatability	±2% of FS range
	Accuracy	±2% of FS range for readings below 50% of range ±5% of FS range above 50% of range
	Resolution	0.5% of FS range
	Long Term Drift	±3% of FS range/year
	Temperature Performance	± 2% of FS range for readings below 50% of range ± 5% of FS range above 50% of range
	Response time T90	<30 s (only for Hydrocarbons sensors) <60 s for all other gases (EN 60079-29-1 compliance requires <60 s)

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4. TECHNICAL DATA

Electrical	Power voltage	3.0-5.5 Vdc (20mm – 4 series) 3.5-5.5 Vdc (32mm – 7 series)
	Operating current	75-85 mA Idc (20mm – 4 series) 110-120 mA Idc (32mm – 7 series)
	Warm up time	60 s for full operation @ 25 °C At least 30 min for full specification @ 25 °C
	Max output current	± 7.5 mA
	DC output impedance	0,05 Ω (typical) 0,15 Ω (max)
	Max capacitance load	1000 pF
	Analogue output (standard for voltage mode)	Standard voltage [0.4 V–2 V] dc (other voltages available on request)
	Analogue output (standard for bridge mode)	[Vcc/2 – Δ] dc (Δ value is to be specified by the customer)
	Digital communication	MODBUS protocol communication (available on request)
Certification	SIL certification number	C-IS-192972-01
	Reference standards	EN 50402 and IEC EN 61508
	Systematic and random integrity	SIL3 capable, SIL2 or SIL3 depending on configuration
	Performance approval	Designed for use in a detector that complies to IEC EN 60079-29-1

The data contained in this document is believed to be accurate and reliable. The data given is for guidance only. Euro-Gas Management Services Ltd accepts no liability for any consequential losses, injury or damage resulting from the use of this datasheet or the information contained in it. Customers should test the sensors under their own conditions to ensure that the sensors are suitable for their own requirements and in accordance with the plans and circumstances of the specific project and any standards/regulations pertaining to the country in which the sensors will be utilised. This datasheet is not intended to form the basis of a contract and in the interest of product improvement, Euro-Gas reserves the right to alter design features and specifications without notice. 04/14



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5. ORDERING DETAILS

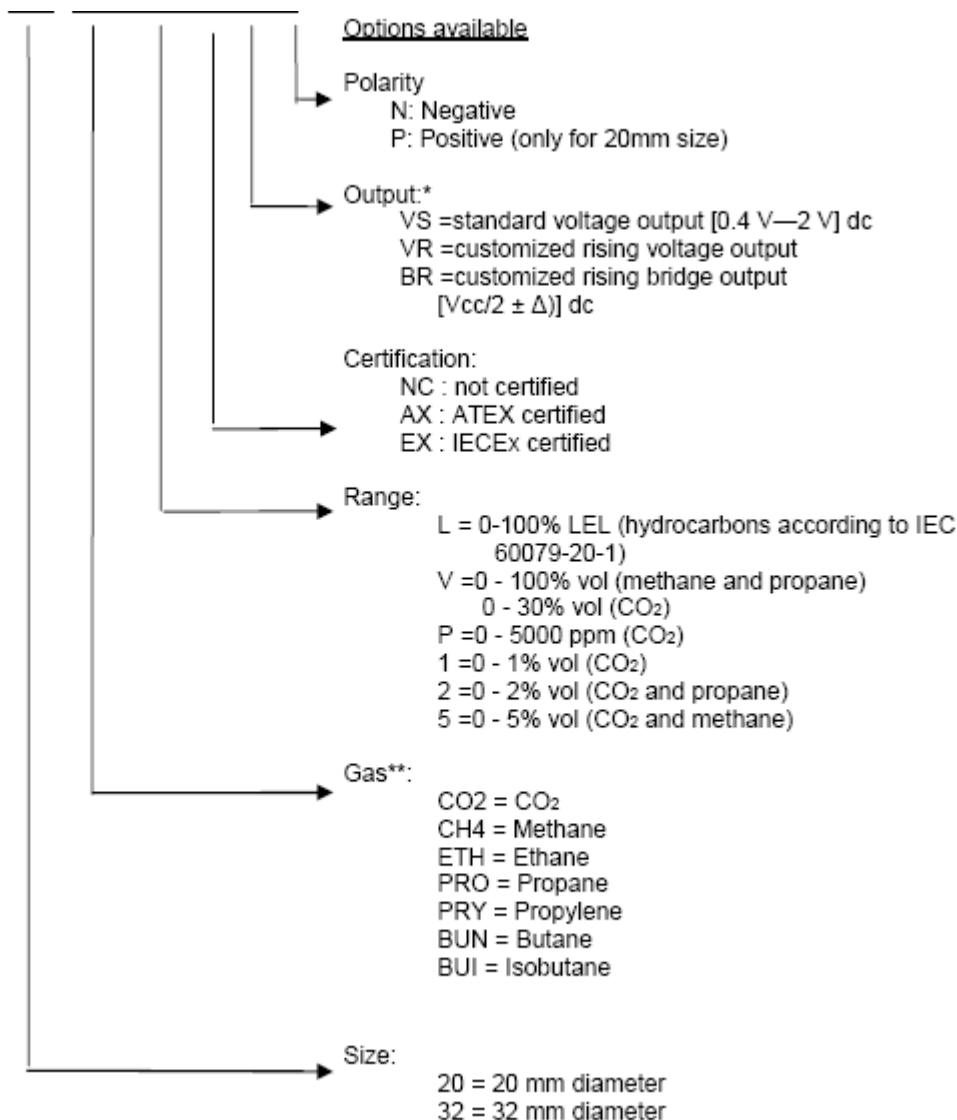
When ordering, please confirm the basic physical and electrical properties that are needed for the specific application. This is made through the part number selection below. The squared fields of the part number below can be modified according to the options on the right.

Main gas sensor product codes:

CO₂ = 2112BC4-V or 2112BC4A-V (ATEX version)
CH₄ = 2112BM4-V or 2112BM4A-V (ATEX version)
C₃H₈ = 2112BP4-V or 2112BP4A-V (ATEX version)

With following options available:

20 – CO21-NCVSN



* In case of customised VR output, the requested zero and full range voltage must be indicated in the order. In case of customized BR output, the requested sensitivity voltage must be indicated in the order (e.g. 100mV = 100% sensor full scale).

** Sensors are fully characterised for these gases and calibration is performed with the specific gas.

For other hydrocarbons on request, Euro-Gas can verify feasibility and provide a correction factor based on response of a Propane sensor for each target gas.