

INFRARED SENSOR FOR CO2 OR HYDROCARBONS WITH ANALOGUE OUTPUT

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 V—2 V] dc (other voltages, falling or rising, are available on request) or bridge type [$V_{cc}/2 \pm \Delta$] dc (falling or rising and 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).

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.

02/13



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: 0-100% vol, 0-30% vol, 0-5000ppm, 0-2% vol, 0-5% vol

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



INFRARED SENSOR FOR CO2 OR HYDROCARBONS WITH ANALOGUE OUTPUT

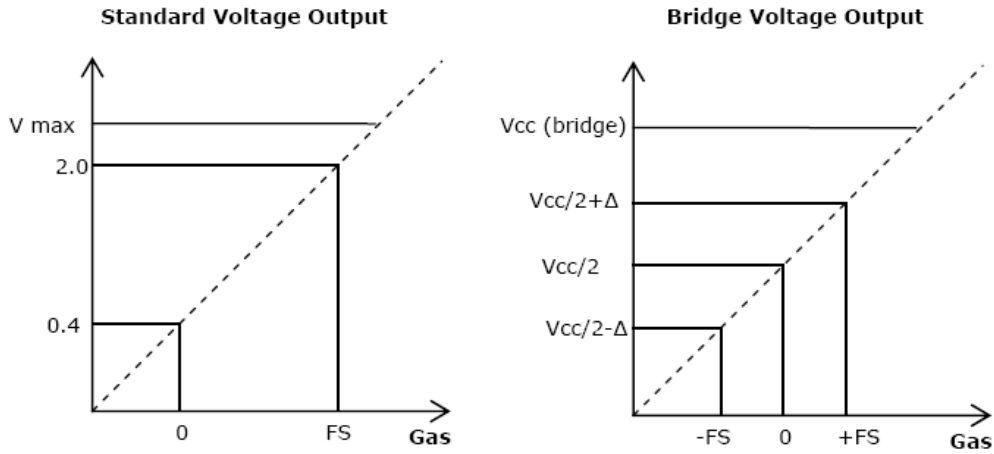
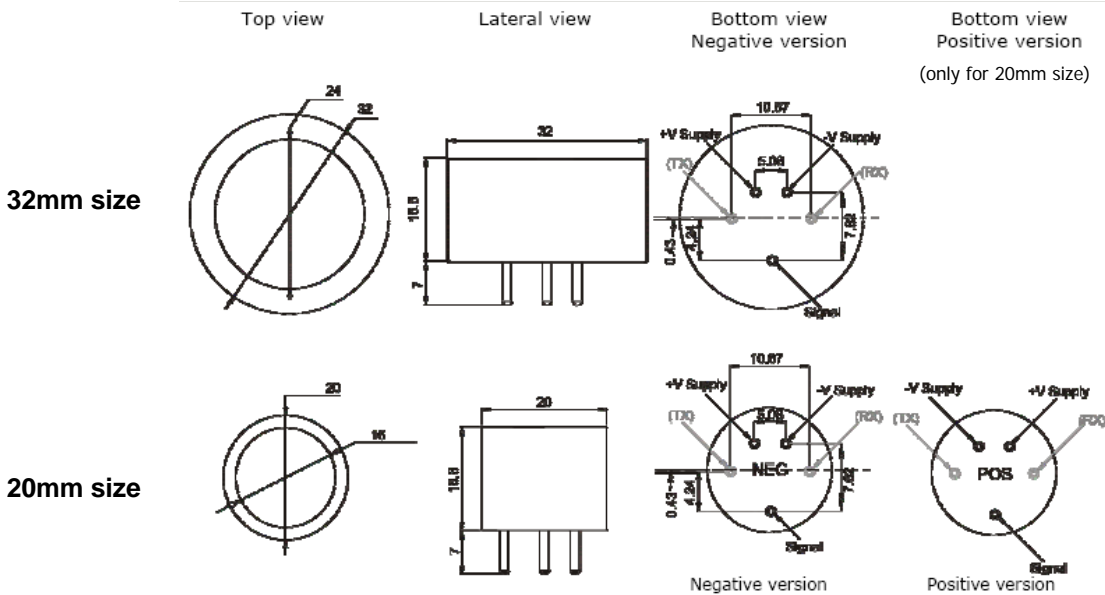


Fig. 1: Characteristics of output voltage

3. DIMENSIONS



All the dimensions in the figures are indicated in millimetres. The two pins RX and TX for Serial communication, with included protocol, are available on request.

INFRARED SENSOR FOR CO₂ OR HYDROCARBONS WITH ANALOGUE OUTPUT

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	CH ₄ , C ₃ H ₈ or CO ₂
	Weight	44 grams (32mm size) 22 grams (20mm size)
	MTBF	≥ 5 years
	Patent information	Patent GB2449433, EP 08156680.4, US 12/124,626
	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
	Optic	Metal optical path opportunely cleaned to increase brightness and prevent oxidation
	Enclosure	Metal enclosure
	Calibration	Made one by one for sensors to accurately calculate temperature compensation
Measurement	Sensing method	NDIR
	Measurement range	0-100% LEL; 0-100% vol (CH ₄) 0-5000 ppm; 0 - 2% vol; 0-5% vol; 0 – 30% vol (CO ₂)
	Repeatability	±2% of FS range
	Accuracy	±1% of FS range for readings below 50% of range ±4% of FS range above 50% of range
	Resolution	0.5% of FS range
	Long Term Drift	±5% 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 T ₉₀	<30 s (only for Hydrocarbons sensors) <60 s for all other configurations EN 60079-29-1 compliance requires <60 s
Electrical	Power voltage	3.0-5.5 Vdc (20mm size) 5 Vdc ±10% (32mm size)
	Operating current	90-100 mA Idc (20mm size) 100-110 mA Idc (32mm size)
	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 output capacitance	1000 pF
Signal Output	Analog output (standard for voltage mode)	3 pin (5 pin version with Serial communication protocol available on request), standard voltage [0.4 V—2 V] dc (other voltages, falling or rising, available on request)
	Analog output (standard for bridge mode)	[V _{cc} /2 ± Δ] dc (falling or rising and Δ value is to be specified by the customer)

INFRARED SENSOR FOR CO2 OR HYDROCARBONS WITH ANALOGUE OUTPUT

5. ORDERING DETAILS

When ordering, please specify 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.

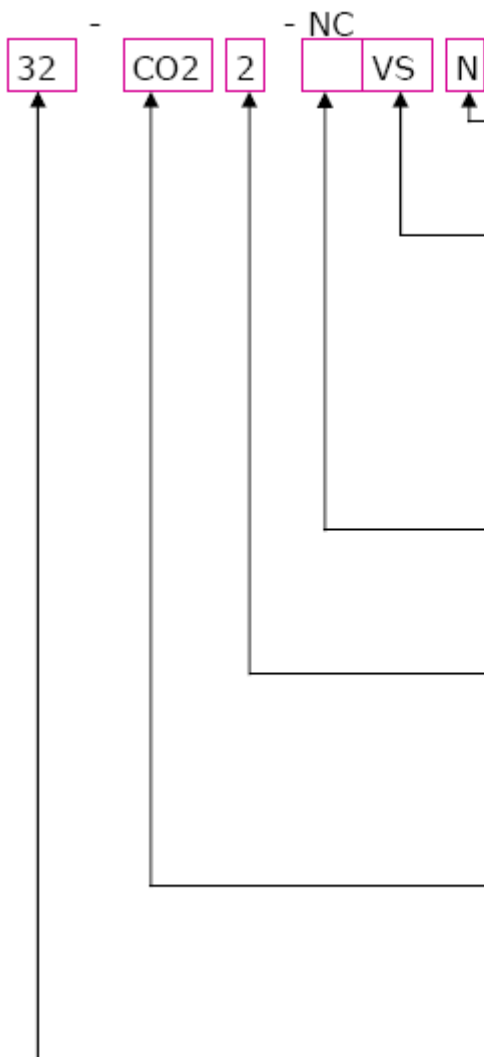
Main gas sensor product codes:

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:



Options available

Polarity:
P=positive, N=negative (only for 20mm size, see mechanical characteristics)

Output¹:
VS=standard voltage output [0.4 V—2 V] dc
VR=customized rising voltage output
VF=customized falling voltage output
BR=customized rising bridge output [Vcc/2 ± Δ] dc
BF=customized falling bridge output [Vcc/2 ± Δ] dc

Note 1: If the output mode VR, VF, BR or BF is selected, the rising or falling voltage value must be specified separately in the order. The bridge output is indicated for use when substituting a low power pellistor.

Construction:
NC (Not Certified—Stainless Steel)
NP (Not Certified—PVC)

Range:
L=0 - 100% LEL (methane and propane)
V=0 - 100% vol (CO₂, methane and propane)
P=0 - 5000 ppm (CO₂)
2=0 - 2% vol (CO₂)
5=0 - 5% vol (CO₂)

Gas:
CO2=CO₂
CH4=Methane
PRO=Propane

Size:
20=20 mm diameter
32=32 mm diameter

