

# smartMODUL<sup>FLOW</sup> CO low range // Technical Data

Infrared gas sensor for flow operation with digital interfaces



Infrared gas sensor using dual beam technology with measurement and reference channel for use in analytical devices and process control applications. Integrated evaluation electronics for drift and temperature compensation. Robust aluminium cuvette with gas line connectors.

- Infrared measuring principle (NDIR)
- Dual beam technology
- Modbus ASCII via UART
- Robust aluminium cuvette
- 3/5mm gas line connectors
- Pre calibrated
- High selectivity
- Customer-specific modules possible

Gas		Measurement range	Model type
CO	Carbon monoxide	0-2000 ppm	F1-222205-00000
CO	Carbon monoxide	0-2000 ppm (with optical filter)	F1-222205-00006

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General features	
Measurement principle:	Non Dispersive Infra-Red (NDIR), dual wavelength
Measurement range:	2000 ppm
Gas supply:	by flow
Gas line connectors:	3 mm internal, 5 mm outer diameter
Flow rate:	0.2 to 0.8 l/min (constant)
Dimensions:	Length 255 mm x 28 mm x 42 mm (L x W x H) <sup>(1)</sup>
Warm-up time:	< 2 minutes (start up time)   < 30 minutes (full specification)
Measuring response <sup>(2)</sup>	
Response time (t <sub>90</sub> ):	Appr. 15 s (@ 0.5 l/min)
Digital resolution (@ zero):	1 ppm
Detection Limit (3 $\sigma$ ):	$\leq 1.5 \% FS^{(3)}$ (typically)
Repeatability:	$\leq \pm 1 \% FS^{(3)}$
Linearity error <sup>(4)</sup> :	$\leq \pm 2 \% FS^{(3)}$
Long term stability (zero) <sup>(5)</sup> :	$\leq \pm 2 \% FS^{(3)}$ over 12 month period
Long term stability (span) <sup>(5)</sup> :	$\leq \pm 2 \% FS^{(3)}$ over 12 month period
Influencing variable <sup>(6)</sup>	
Temp. dependence (zero):	$\leq \pm 0.1 \% FS^{(3)}$ per °C
Temp. dependence (span):	$\leq \pm 0.2 \% FS^{(3)}$ per °C
Pressure dependence (zero):	-
Pressure dependence (span):	0.15 % value per hPa
Cross sensitivity H <sub>2</sub> O:	< 200 ppm (@ dew point 25°C)
Cross sensitivity CO <sub>2</sub> :	< 600 ppm with optical filter / < 1100 ppm without optical filter (@ 20Vol.-% CO <sub>2</sub> )
Electrical inputs and outputs	
Supply voltage:	6 V DC $\pm 5 \%$
Supply current:	70 mA average, max. 140 mA
Power consumption:	< 1 Watt
Digital output signal:	Modbus ASCII via UART
Calibration:	zero and span by SW
Climatic conditions	
Operating temperature:	-10 °C to 40 °C
Storage temperature:	-20 °C to 60 °C
Air pressure:	800 to 1200 hPa
Humidity:	0 % to 95 % rel. humidity (not condensing)

Also available with additional pcb as PREMIUM (P1-...) with a wider supply voltage range of 12 - 28V DC, analog signal output 0 (4) - 20 mA and digital output RS 485.

<sup>1)</sup> Dependent on the gas and the measurement range

<sup>2)</sup> Relating to sample gas pressure 1013 hPa absolute, 0.5 l/min gas flow and 25°C ambient and gas temperature

<sup>3)</sup> FS = Full scale

<sup>4)</sup> Stated linearity error excludes calibration gas tolerance of  $\pm 2 \%$

<sup>5)</sup> For dry and clean test gas at 25°C and 1013hPa absolute - depending on the operating and ambient conditions values may differ

<sup>6)</sup> Relating to calibration conditions (see final check)

Please consult smartGAS Marketing for parts specified with other temperature and measurement ranges.

At first initiation and depending on application and ambient conditions recalibration is recommended. Recurring cycles of recalibration are recommended.

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