

# GasSense NDIR INFRARED TRANSMITTER

GasSense is an innovative high specification dual channel infrared gas sensor with integrated transmitter for the measurement of CO<sub>2</sub>, CO, CH<sub>4</sub>, N<sub>2</sub>O or hydrocarbons. Featuring automatic temperature compensation, it can be easily integrated into new or existing measurement systems and monitoring instruments. The ultra low power transmitter features a fault diagnostics system, wireless module and can be used for both pumped and diffusion applications.



## TECHNICAL DATA

<b>Detection Method</b>	Dual Channel Non-Dispersive Infrared (NDIR)
<b>Dimensions</b>	Depending on the sensor model (type of gas and range)
<b>Source drive frequency</b>	1 to 2Hz
<b>Data refresh rate</b>	5 to 10 seconds
<b>Response time (t90)</b>	15 to 40s @ 20°C ambient and @ 1 l/min
<b>Warm up time</b>	<30s @ 20°C operational <30 minutes @ 20°C (full spec)
<b>Operating conditions</b>	Temperature 0°C to 50°C linear compensated
	Humidity 0-95% RH (non-condensing) not compensated
	Pressure 800-1150 hPa not compensated
<b>Pressure dependency</b>	+1.5% reading per kPa deviation from normal pressure of 100kPa
<b>Storage temperature</b>	-40°C to 85°C
<b>Recommended Flow Rate</b>	0.5 l/min
<b>Analogue Output</b>	4-20mA, 0-5V
<b>Analogue Input</b>	2 available for third-party devices
<b>Digital I/O</b>	4OUT: Open collector, ground referred, protected 4 IN: 0-5 V protected up to 24Vdc
<b>Pipe connection</b>	For tube with diameter $\varnothing 4 / \varnothing 2.5$ mm
<b>Interface connection</b>	UART (TTL level), baud rate: 9600 (default) - 19200 - 38400



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## TECHNICAL DATA (CONTINUED)

Connector type	On module connector	Mating connector
Power Supply:	Weidmüller SL3.5/2/180G3.2	Weidmüller BL3.5/2
Analog I/O:	Weidmüller SL3.5/2/180G3.2	Weidmüller BL3.5/6
Pump:	Weidmüller SL3.5/2/180G3.2	Weidmüller BL3.5/2
Digital I/O:	TE Connectivity 215307-5	TE Connectivity 826656-5
Analogue Out (0-5V):	TE Connectivity 8-215464-6	TE Connectivity 8-215079-6
Power Supply & UART TTL level (0-5V):	TE Connectivity 7-215464-6	TE Connectivity 7-215079-6
<b>MTBF</b>	> 5 years	
<b>Warranty Term</b>	12 months from manufacture date	
<b>Long Term Drift</b>	< 2% of FS range / year	
<b>Power supply</b>	9-24V DC, reverse protected	
<b>Power consumption</b>	max 90mA @ 9VDC, excluding pump power absorption	

## SENSOR DIMENSIONS

GasSense Model	Dimensions (Length x Width x Height) / Standard Net Weight
A-1, A-2, A-4, A-4l, A-6, A-7, A-8, A-9, C-2, C-3l, C-4, D-2, F-5	56mm x 48mm x 38mm / 45g
B-1, B-3, B-4, B-5, C-1, C-6, D-1, F-1, F-3, F-6	306mm x 48mm x 43mm / 110g
A-3	56mm x 48mm x 43mm / 45g



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## SPECIFICATIONS

Gas	Measurement Range*	Accuracy**	Zero Res. (ppm)	Full Scale Res.	Zero Repeatability (ppm)	Full Scale Repeatability (ppm)	GasSense Model
CO <sub>2</sub>	0-1000ppm	±1% FS	1	1% FS	±5	±10	A-7
	0-2000ppm	±1% FS	1	1% FS	±10	±25	A-8
	0-5000ppm	±1% FS	1	2% FS	±10	±50	A-1
	0-1%	±2% FS	1	2% FS	±25	±200	A-9
	0-5%	±2% FS	1	2% FS	±25	±250	A-6
	0-10%	±2% FS	1	2% FS	±25	±250	A-2
	0-25%	±2% FS	1	1% FS	±50	±500	A-3
	0-100%	±1% FS	1	1% FS	±1000	±5000	A-4
	0-100% biogas ***	±1% FS	1	1% FS	±1000	±5000	A-4l
	CO	0-2000ppm	±1% FS	5	1% FS	±10	±70
0-2%		±1% FS	5	1% FS	±10	±70	B-2
CH <sub>4</sub>	0-2000ppm	±4% FS	5	4% FS	±15	±100	C-1
	0-100% LEL	±2% FS	15	4% FS	±50	±500	C-2
	0-100% vol. biogas ***	±2% FS	500	2% FS	±1000	±5000	C-3l
	0-100% vol.	±2% FS	300	2% FS	±500	±3000	C-4
HC ****	0-2000ppm	±4% FS	5	4% FS	±15	±100	D-1
	0-100% LEL	±2% FS	15	4% FS	±50	±500	D-2
N <sub>2</sub> O	0-100ppm	±2% FS	1	2% FS	±3	±3	F-3
	0-1000ppm	±1% FS	1	1% FS	±10	±20	F-2
	0-2000ppm	±1% FS	1	1% FS	±10	±20	F-1
	0-2000ppm Diffusion	±1% FS	1	1% FS	±10	±20	F-6
	0-100% vol	±2% FS	1	2% FS	±1000	±5000	F-5

\* Other measurement ranges available on special request.

\*\* Stated accuracy excludes calibration gas tolerance of ± 1%.

\*\*\* Anti-Corrosion sensor cell and housing model.

\*\*\*\* Currently available with Propane or Hexane calibration – other hydrocarbons on special request.



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## OPTIONS

### Anti-Corrosion gas sensor cell and housing

This option offers a dedicated rugged gas cell and housing to reduce the effects of corrosion in harsh industrial environments. The detector element and the optical source are protected by using calcium fluoride (CaF<sub>2</sub>) optical glass lids and the optical cavity uses AISI 316 stainless steel for added protection.

### Wireless TX connectivity

The GasSense transmitter can integrate surface mount modules incorporating a RF transceiver chip, and is suitable for low power wireless applications. The transmitter can be purchased with an RF connector, so that an approved antenna (from near omni-directional to shaped front/back patterns) can be used. By means of the GasSense analogue input, it is also possible to use the sensor board to broadcast data output of other sensors.

RF transceiver frequency	Antenna	Model
433MHz	monopole whip/ dipolar/directive	WTX1
868MHz		WTX2
915MHz		WTX3
2.4GHz		WTX4

### Wireless RX connectivity (gateway)

The receiving unit, or gateway, allows the user to build up a wireless network of GasSense sensors. The gateway is an electronic board specially programmed as a master. The gateway can receive wireless data from one up to eight GasSense sensors and could be connected to other devices using its UART interface port.

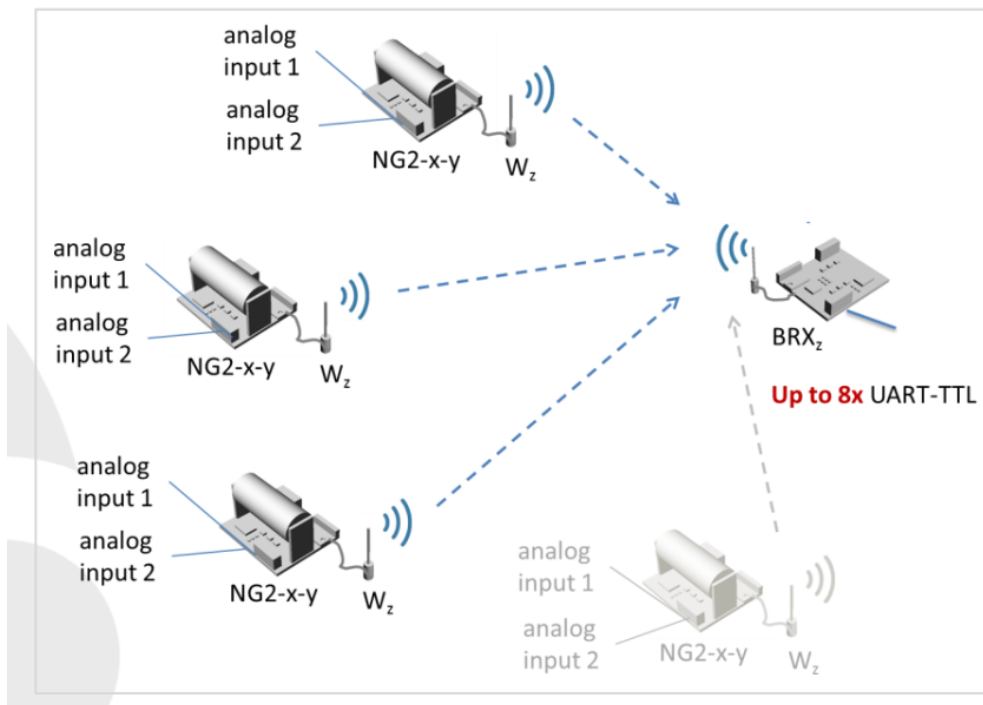


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## Wireless RX connectivity (gateway) (CONTINUED)

RF transceiver frequency	Antenna	Model
433MHz	monopole whip/ dipolar/directive	BRX1
868MHz		BRX2
915MHz		BRX3
2.4GHz		BRX4

The following image shows an example of network topology based on GasSense sensors:



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## Energy harvesting power-management

With this option, the GasSense sensor integrates a switch-mode battery charge controller for photovoltaic, wind and piezoelectric energy harvesting. The controller provides input voltage regulation and energy storage. Typical configuration deploys a 12V solar panel and a rechargeable lithium-ion battery (output 8.4V max – 0.5A).

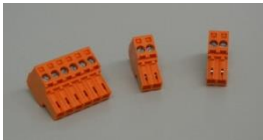

Solar panel	Battery	Model
5W around 200x200mm	PCM 7.4V 2600mAh	S

## Gas supply

Depending on the requirement and application, the GasSense sensor module can be operated by natural gas diffusion or by using a sampling pump. We recommend a pump of 5.0L per minute. We would not recommend any flow higher than 1.0L per minute, as this could affect measurement stability and mechanical seals. We offer a pump accessory on request.

Pump	Filter	Model
Diaphragm 0,5 l/min	Hydrophobic 1um (pore size) 5um (pore size) drain with automatic discharge	DPH

## Optional accessories

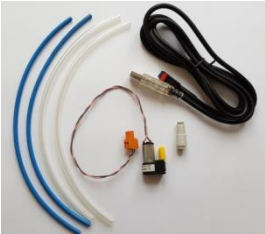
Accessory	Description	Product Part Number
	GasSense NDIR wired connector kit. In order to speed up sensor integration and easy connection, this is a useful accessory and recommended!	2112B5022-CON
	GasSense NDIR USB Interface cable. This is a UART TTL to USB interface cable which connects the sensor to a PC using the USB port. (Note: not required if purchasing Calibration Kit)	2112B5022-USB





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## Optional Accessories (CONTINUED)

Accessory	Description	Product Part Number
	GasSense NDIR Calibration Kit including: USB to TTL serial UART converter cable (0-5V), Diaphragm pump (0.5 l/min), Straight union fitting 6mm - 4mm; Soft polyurethane tubing (OD 6mm, ID 4mm); Soft polyurethane tubing (OD 4mm, ID 2.5mm)	2112B5022-KIT
	GasSense NDIR Diaphragm pump (0.5 l/min) (Note: not required if purchasing Calibration Kit)	2112B5022-PUMP
	Anti-condensation filter with manual moisture drain	2112B5022-FILT

Any sensor can potentially fail to meet specification without warning. Euro-Gas makes every effort to ensure reliability of all sensors but where life safety is a performance requirement of the product and, where practical, Euro-Gas recommends that all gas sensors and instruments using sensors are checked for response to gas before use.

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