GasSense NDIR
INFRARED TRANSMITTER

GasSense is an innovative high specification dual channel infrared gas sensor with integrated transmitter for the measurement of CO2, CO, CH4, N2O 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

Detection Method	Dual Channel Non-Dispersive Infrared (NDIR)	
Dimensions	Depending on the sensor model (type of gas and range)	
Source drive frequency	1 to 2Hz	
Data refresh rate	5 to 10 seconds	
Response time (t90)	15 to 40s @ 20°C ambient and @ 1 l/min	
Warm up time	<30s @ 20°C operational <30 minutes @ 20°C (full spec)	
Operating conditions	Temperature	0°C to 50°C linear compensated
	Humidity	0-95% RH (non-condensing) not compensated
	Pressure	800-1150 hPa not compensated
Pressure dependency	+1.5% reading per kPa deviation from normal pressure of 100kPa	
Storage temperature	-40°C to 85°C	
Analogue Output	4-20mA, 0-5V	
Analogue Input	2 available for third-party devices	
Digital I/O	4OUT: Open collector, ground referred, protected 4 IN: 0-5 V protected up to 24Vdc	
Pipe connection	For tube with diameter ø4/ø2.5mm	
Interface connection	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
MTBF	> 5 years		
Power supply	9-24V DC, reverse protected		
Power consumption	max 90mA @ 9VDC, excluding pump power absorption		

SENSOR DIMENSIONS

GasSense Model	**Dimensions (Length x Width x Height)**
A-1, A-2, A-4, A-6, A-7, A-8, A-9, C-2, C-3I, C-4, D-2	56mm x 48mm x 38mm
B-1, C-1, D-1, F-1	306mm x 48mm x 43mm
A-3	56mm x 48mm x 43mm

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SPECIFICATIONS

Gas	Measurement Range*	Accuracy**	Zero Res. (ppm)	Full Scale Res.	Zero Repeatability (ppm)	Full Scale Repeatability (ppm)	GasSense Model
CO2	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
CO	0-2000ppm	±1% FS	5	1% FS	±10	±70	B-1
CH4	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-3I
	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
N2O	0-2000ppm	±1% FS	1	1% FS	±10	±20	F-1

***** **Other measurement ranges available on request**

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

******* **Corrosion-proof sensor cell and housing**

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OPTIONS

Corrosion-proof 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 (CaF2) 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. A low noise amplifier (LNA) can be integrated for special applications – please ask for details.

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

Wireless RX connectivity (gateway)

The following option allows the user to build up a wireless network of GasSense sensors by means of two types of receiving units:

1. The USB unit consists of a RF transceiver chip integrated in a USB key that can be directly connected to a PC. By selecting this option, customers can monitor GasSense sensors in real time and, using a dedicated SW, several network topologies – star, tree, mesh - can be configured.

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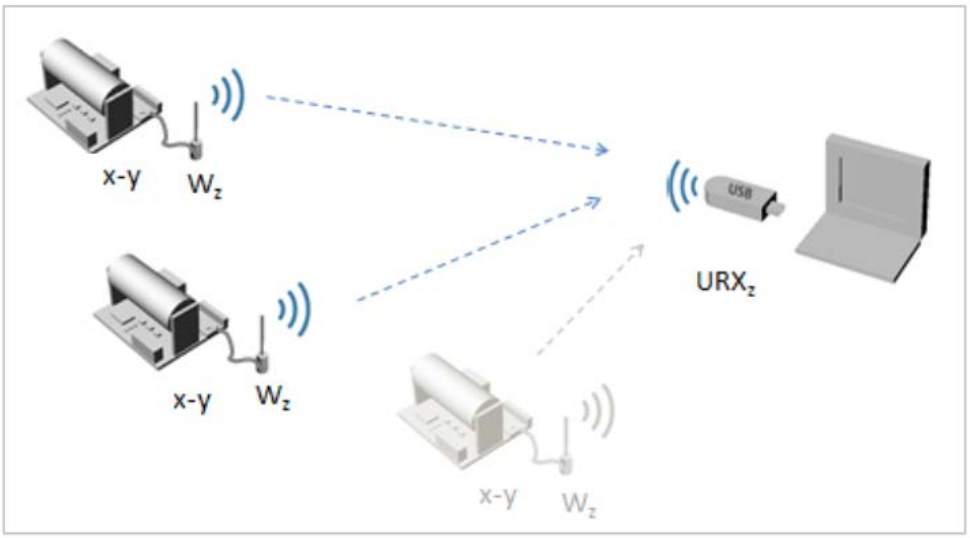
2. The DIN-board option allows the customer to build a multi-channel controller. The option comprises a receiving board unit to detect from 2 to 64 GasSense sensors and to gather their 4-20mA output data. The DIN-mounted board is provided with a RF transceiver connector to properly plug the selected antenna type. DIN-board dimensions are approximately: (L)120mm x (W)150mm x (H) 50mm. According to customer requirements, the DIN-board can be integrated into plastic or stainless steel housing fitted with LEDs for status monitoring and alarms, panel buttons for gas calibration and zero procedures, and LCD display, as well as all the selectable GasSense options.

RF transceiver frequency	Antenna	Type	Model
433MHz	monopole whip/ dipolar/directive	USB	URX1
		DIN-board	BRX1
868MHz		USB	URX2
		DIN-board	BRX2
915MHz		USB	URX3
		DIN-board	BRX3
2.4GHz		USB	URX4
		DIN-board	BRX4

The following images show two examples of network topologies based on GasSense sensors and the selectable receiving unit options:



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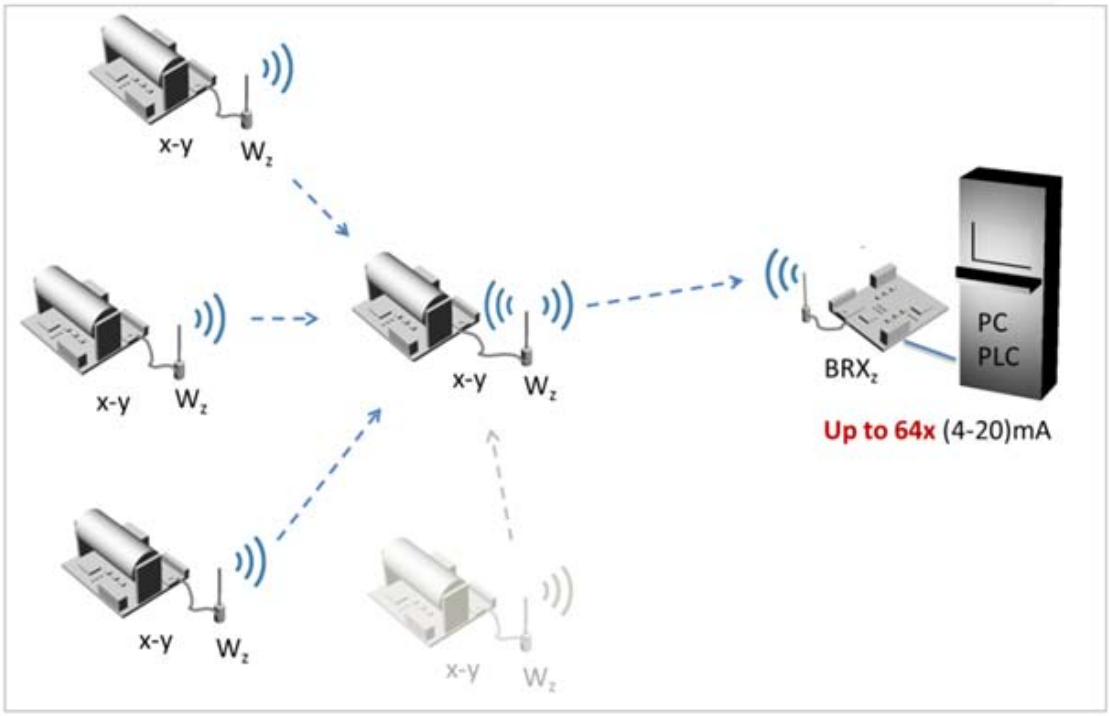

Energy harvesting power-management

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

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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:

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

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