DATA SHEET

PORTABLE GAS SENSOR MIPEX-14-X-RX-X.X

Features

- ☑ Target application: fixed and portable no-maintenance gas detectors for industrial safety.
- ☑ Allows designing battery operated gas detector lasting no less than 12 months without charge.
- ☑ Average operating current is less than 300 microAmps.
- ☑ Smart sensor with embedded microcontroller returns linearized, temperature-compensated output data.
- ☑ LED based dual beam / dual wavelength technology.
- ☑ Measurement range:
  a) detectivity from:
  - 50 ppm for methane (CH_4)
  - 20 ppm for propane (C_3H_8)
  b) detectivity to:
  - 100% vol. for methane (CH_4)
  - 2.5% vol. for propane (C_3H_8).
- ☑ Provides intrinsically safe explosion protection level “ia” which does not need metal-ceramic filters (sinters).

Description

MIPEX-14 is intended for automatic continuous measurement of the concentration of hydrocarbons and carbon dioxide in atmosphere of hazardous areas.

Sensor operating principle is based on NDIR technology, i.e. on selective absorption of LED produced infrared radiation by gas molecules.

Differential dual beam / dual wavelength method allows compensation of aging of parts, optical elements impurity and other non-selective hindrances influence, providing extremely high stability of operation.

Life time: more than 20 years of continuous operation (24 h a day).

Communication interface – UART.

Technical specification

General specification		
Gas sampling method:		Diffusion
Operating principle:		Non-Dispersive Infra-Red (NDIR)
Calibration gas		CH_4
		C_3H_8
		CO_2
Operating, storage and transportation conditions:	**Relative humidity, %**	up to 98
	Atmospheric pressure, kPa	80…120
	Temperature*, °C	-40...+60
Warm-up time, sec		≤ 120
Overall dimensions, mm		52×24×18.5
Housing material		Polycarbonate Lexan™
Weight, g		14

Measurement specification	
Measurement range	0…5000 ppm (C_3H_8)
	0…15000 ppm (CH_4)
	0…2.5 % vol. (C_3H_8)
	0…5 % vol. (CH_4 and CO_2)
	0…100 % vol. (CH_4)
Variability (+20…+25 ºC)**	± 50 ppm or ± 5% of readings (whichever is greater) for CH_4
	± 20 ppm or ± 5% of readings (whichever is greater) for C_3H_8
	± 10 ppm or ± 5% of readings (whichever is greater) for CO_2
Response time t(90), sec	≤ 30 (CH_4 and C_3H_8 sensors for measurement range in pre-explosive concentration)
	≤ 60 (CH_4 and C_3H_8 sensors for measurement range in maximum allowable concentration)
	≤ 60 (CO_2 sensors)

Electrical specification	
Operating supply voltage, VDC	+3.2…+5.0
Maximum supply voltage, VDC	+5.5
Communication interface	UART
Average current, µA	300 max
Peak current, mA	4 max

* Term **operating temperature** refers to ambient temperature at which sensor operates and its intrinsic safety is ensured, but sensor readings variability is provided only in specified **temperature range**.

** Variability in whole operating temperature range for any sensor modification is presented below.

Readings variability

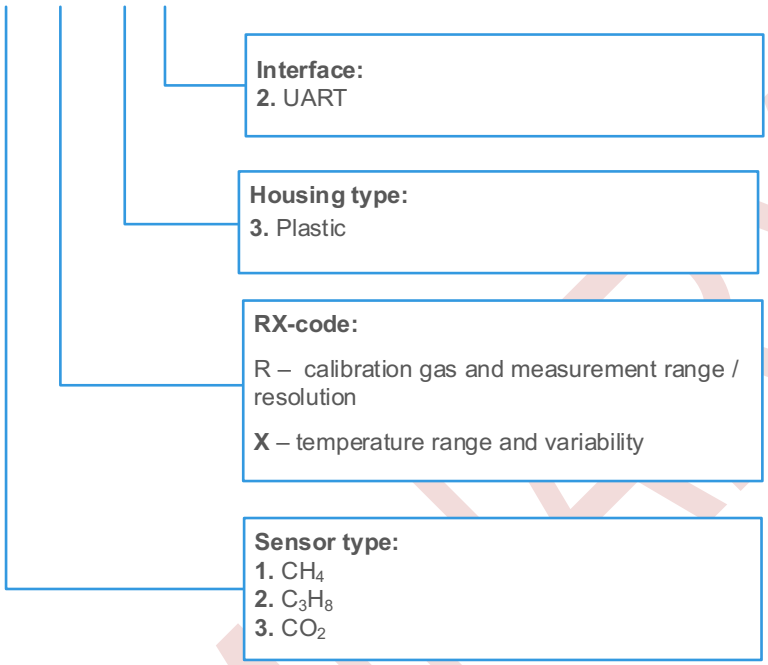
Calibration gas*	Readings variability within a temperature range	Additional variability due to pressure	Additional variability due to humidity
CH_4 (up to 100% vol.)	± 0.1% vol. or ± 5% of readings (whichever is greater) within the range of +20…+25 °C;	± 0.2% vol. or ± 15% of readings (whichever is greater) at 100 kPa (test: 80 kPa, 100 kPa, 120 kPa)	± 0.2% vol. or ± 15% of readings (whichever is greater) at 40 °C (test: 20% RH, 50% RH, 90% RH)
	± 0.15% vol. or ± 7.5% of readings (whichever is greater) within the range of -10…+20 °C and +25…+40 °C;		
	± 0.2% vol. or ± 10% of readings (whichever is greater) within the range of -20…-10 °C and +40…+50 °C.		
	± 0.3% vol. or ± 15% of readings (whichever is greater) within the range of -40…-20 °C and +50…+60 °C.		
CH_4 (up to 15000 ppm)	± 50 ppm or ± 5% of readings (whichever is greater) within the range of +20…+25 °C;	± 75 ppm or ± 30% of readings (whichever is greater) at 100 kPa (test: 80 kPa, 100 kPa, 120 kPa)	± 75 ppm or ± 15% of readings (whichever is greater) at 40 °C (test: 20% RH, 50% RH, 90% RH)
	± 75 ppm or ± 7.5% of readings (whichever is greater) within the range of -10…+20 °C and +25…+40 °C;		
	± 100 ppm or ± 10% of readings (whichever is greater) within the range of -20…-10 °C and +40…+50 °C.		
	± 125 ppm or ± 15% of readings (whichever is greater) within the range of -40…-20 °C and +50…+60 °C.		
C_3H_8 (up to 2.5% vol.)	± 0.05% vol. or ± 5% of readings (whichever is greater) within the range of +20…+25 °C;	± 0.1% vol. or ± 15% of readings (whichever is greater) at 100 kPa (test: 80 kPa, 100 kPa, 120 kPa)	± 0.1% vol. or ± 15% of readings (whichever is greater) at 40 °C (test: 20% RH, 50% RH, 90% RH)
	± 0.1% vol. or ± 10% of readings (whichever is greater) within the range of -20…+20 °C and +25…+50 °C;		
	± 0.15% vol. or ± 15% of readings (whichever is greater) within the range of -40…-20°C and +50…+60 °C.		
C_3H_8 (up to 5000 ppm)	± 20 ppm or ± 5% of readings (whichever is greater) within the range of +20…+25 °C;	± 40 ppm or ± 30% of readings (whichever is greater) at 100 kPa (test: 80 kPa, 100 kPa, 120 kPa)	± 40 ppm or ± 15% of readings (whichever is greater) at 40 °C (test: 20% RH, 50% RH, 90% RH)
	± 40 ppm or ± 10% of readings (whichever is greater) within the range of -20…+20 °C and +25…+50 °C;		
	± 50 ppm or ± 15% of readings (whichever is greater) within the range of -40…-20°C and +50…+60 °C.		
CO_2	± 0.05% vol. or ± 5% of readings (whichever is greater) within the range of +20…+25 °C;	± 0.1% vol. or ± 20% of readings (whichever is greater) at 100 kPa (test: 80 kPa, 100 kPa, 120 kPa)	± 0.1% vol. or ± 15% of readings (whichever is greater) at 40 °C (test: 20% RH, 50% RH, 90% RH)
	± 0.075% vol. or ± 7.5% of readings (whichever is greater) within the range of -10…+20 °C and +25…+40 °C;		
	± 0.1% vol. or ± 10% of readings (whichever is greater) within the range of -20…-10°C and +40…+50 °C.		

***For sensors with dual measuring ranges, compliance with the variability requirements for each of the ranges**

Ordering info

Part number structure:

MIPEX-14-X-XX-X.X



Available part numbers

Part number	Calibration gas	Measurement range	Resolution, ppm	Temperature range, °C	RX-code
MIPEX-14-1-A0-3.2	CH_4	0…15000 ppm / 1.5…5 % vol.	10	-10…+40	A0
MIPEX-14-1-10-3.2		0…5 % vol.	100		10
MIPEX-14-1-20-3.2		0…100 % vol.	100		20
MIPEX-14-1-A1-3.2		0…15000 ppm / 1.5…5 % vol.	10	-40…+60	A1
MIPEX-14-1-11-3.2		0…5 % vol.	100		11
MIPEX-14-1-21-3.2		0…100 % vol.	100		21
MIPEX-14-1-A2-3.2		0…15000 ppm / 1.5…5 % vol.	10	-20…+50	A2
MIPEX-14-1-12-3.2		0…5 % vol.	100		12
MIPEX-14-1-22-3.2		0…100 % vol.	100		22
MIPEX-14-2-B1-3.2	C_3H_8	0…5000 ppm / 0.5…2.5 % vol.	10	-40…+60	B1
MIPEX-14-2-71-3.2		0…2.5 % vol.	100		71
MIPEX-14-2-B2-3.2		0…5000 ppm / 0.5…2.5 % vol.	10	-20…+50	B2
MIPEX-14-2-72-3.2		0…2.5 % vol.	100		72
MIPEX-14-3-40-3.2	CO_2	0…5 % vol.	100	-10…+40	40
MIPEX-14-3-42-3.2		0…5 % vol.	100	-20…+50	42

Intrinsic safety

Sensor is not certified.

Sensor is designed in accordance with standards:

IEC/ BS EN 60079-0 and **IEC/BS EN 60079-11:**

- Explosion protection level – “ia”;
- Hazardous area class (Electrical equipment group) – “I” and “IIC”;
- Temperature class – “T6”.
- Intrinsic safety parameters: P_i = 0.13 W, U_i = 5.4 V, I_i = 200 mA, C_i = 58.1 µF, L_i = 0 mH.

UL913, CAN/CSA-C22.2 No. 60079-11:

- Class I, Division 1, Group A, B, C, D.
- Intrinsic safety parameters: P_{max} = 0.13 W, U_{max} = 5.4 V, I_{max} = 200 mA, C_i = 58.1 µF, L_i = 0 mH.

IEC/EN 60079-28:

- MIPEX-14 optical radiation power is less than 15 mW.

Sensor is suitable for use within end equipment with temperature classes T1-T6 at maximum ambient temperature of +60 °C.

Certificates / Declarations of conformity

- RoHS 2 Compliant – Directive 2011/65/EU;
- RoHS 3 Compliant – EU Directive 2015/863.

Handling precautions

Maximum pressure load to sensor top surface must not exceed 0.27 N/mm^2.

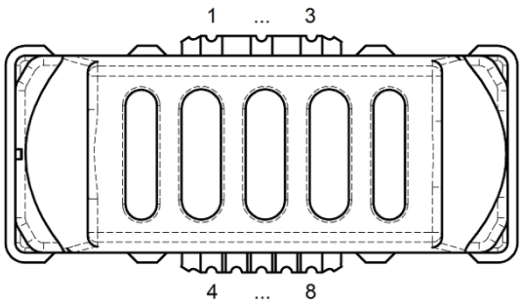
It is not allowed to apply pressure to side surface.

Sensor is not intended to measure hydrocarbons contained in water or other fluids.

Gas holes of sensor should be protected against ingress of dust and sprayed materials.

There is no risk of pollution and negative impact on human health. Sensor does not contain any harmful substances that may be released during its normal operation.

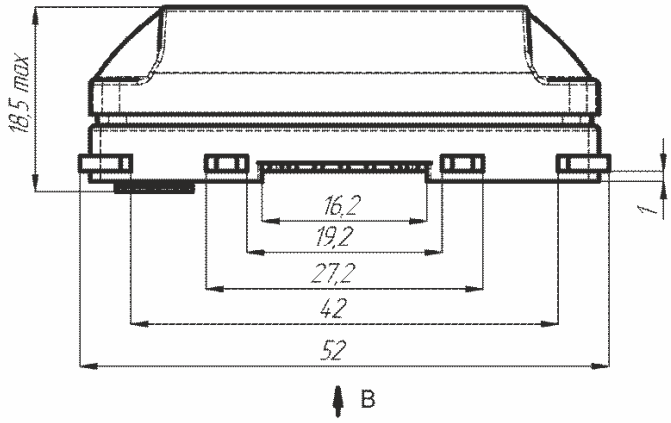
Sensor pinout

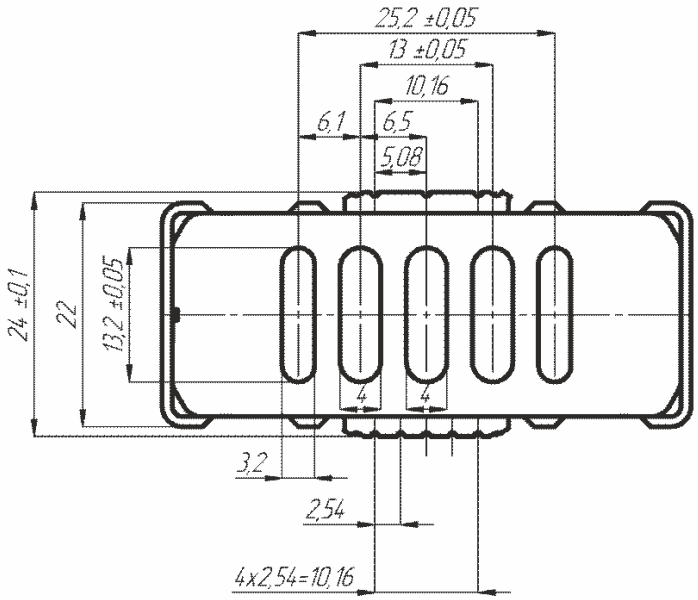


Pin	Purpose
1-3, 7	GND
4	UART Tx out
5	UART Rx in
6	Empty
8	+3.2…+5.0 VDC

Outline

All dimensions are in millimeters.





Contacts

MIPEX TECHNOLOGY

SIA MIPEX

2B, Valkas iela, Daugavpils, Latvia, 5417

Tel/fax: +371 26179021

www.mipex-tech.com

info@mipex-tech.com

support: support@mipex-tech.com