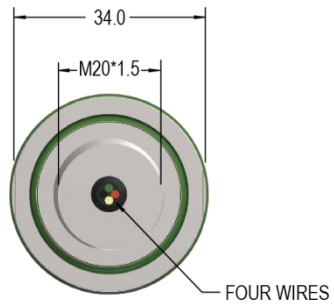
User Guide for TDLAS Methane (CH4) Sensor

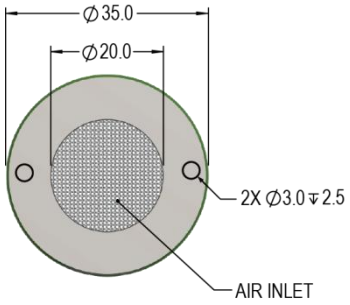
The TDLAS Methane (CH4) sensor includes a laser, photodetector (PD), and gas cell, all integrated into a compact design to ensure high precision, stability, and reliability. The optical system within the product is exceptional, effectively minimizing noise and delivering advantages such as accurate detection, rapid response, and low power consumption. The optical path structure incorporates an independently patented design, guaranteeing product stability with excellent resistance to vibration, impact, and temperature fluctuations, enabling reliable operation in diverse and complex environments.

Product Dimensions



Top View

Side View



Bottom View

All dimensions in mm

Performance

Principle	TDLAS
Target Gas	Methane (CH4)
Measurement range	0 ~ 5%VOL (0 ~ 100%LEL)
Accuracy	±3%LEL FS@25ºC
	±7%LEL FS@-40ºC ~ +60ºC
Resolution	0.01%VOL (0.2%LEL)
Response time	< 25s
Warm-up time	< 30s

Mechanical

Enclosure	Stainless steel
Weight	200 grams

Electrical

Supply voltage	3.3 ~ 5.0V DC
Power consumption	< 0.2W
Output	3.3V TTL
Communication	UART
Operating Current (RT)	35mA (Typ.)
	320mA (Max.)

Environmental

Temperature range	-40ºC ~ +60ºC
Pressure range	1atm ± 10%
Humidity range	0% ~ 98%RH non-condensing

Lifetime

Storage temp	-40 ºC ~ 85 ºC
Operating lifetime	5 years
Storage life	5 years in original packaging
Warranty	24 months

Approvals

Pending

Explosion-proof, EMC, Waterproof and dustproof design

Warning!

Exposure to high concentrations of solvent vapors should be avoided under any circumstances.

info@senovol.com www.senovol.com

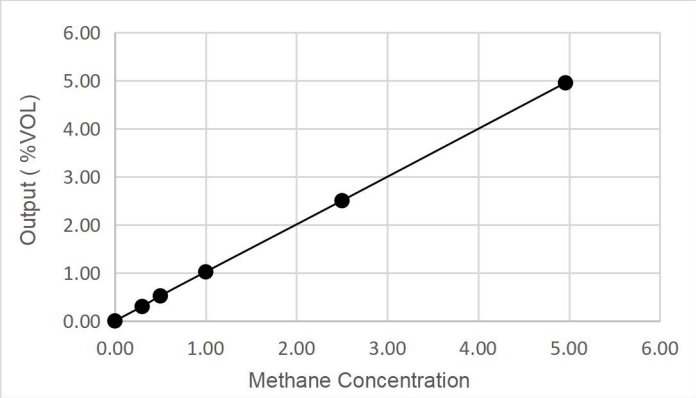
Pinout Details

Red	Black	Yellow	Green
+5V	GND	Rx	Tx

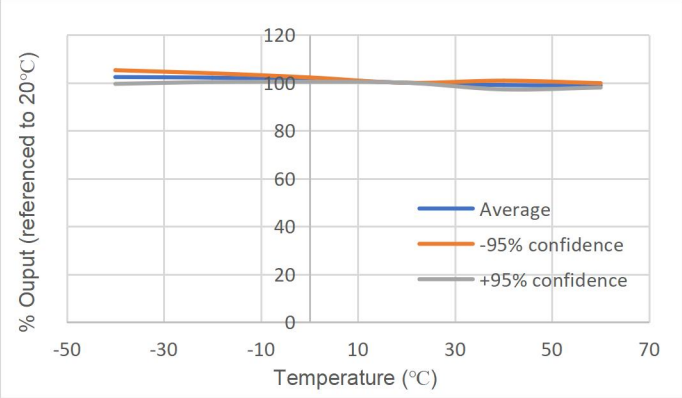
Variability due to humidity

±0.01%VOL or 5% of readings (whichever is greater) @ 25℃

Linearity



Temperature Compensation



Safety Note

If the sensor is used in certain instruments for life critical applications, it is required to read the instrument user's guide carefully and comply with the calibration procedures by using the certified target calibration gas before each use. Failure to do so may cause serious injury and/or death. It is highly recommended for customers to validate the sensor's performance using this document as a reference for their product designs or applications.

Communication Protocol

The output 29 bytes of ACSII string with fixed length. The format:

+xxx.xx blank symbol nn.n blank pppp.pp blank SS blank HH<CR><LF>

String	Means	Unit	Range
+xxx.xx	Gas concentration	% VOL	+000.00 ~ +999.99
Symbol nn.n	Temperature	ºC	(-99.9 ~ +99.9)
pppp.pp	Pressure	mbar	(0000.00~9999.99)
SS	Product status code		
HH	Check sum of 25 bytes XOR and will be output in 2 bytes		
<CR><LF>	CR and LF		

- **Communication port configuration**

Description	Arguments
Baud rate	115200
Stop bit	1
Data bits	8
Check bit	N/A
Flow control	N/A

- **Format**
  - The output is an active fixed-length string with output 29 bytes.

Function code	Concentration	Blank	Temp.	Blank	Pressure	Blank	Status code	Blank	XOR Check Sum	Return line	New line
Byte No.	1-7	8	9-13	14	15-21	22	23-24	25	26-27	28	29
Byte Count	7	1	5	1	7	1	2	1	2	1	1
Unit	%VOL	-	ºC	-	mbar	-	-	-	-	-	-
E.g. ACSII	+000.00	<SP>	+21.4	<SP>	1001.01	<SP>	00	<SP>	28	<CR>	<LF>
E.g. HEX	2B 30 30 30 2E 30 30	20	2B 32 31 2E 34	20	31 30 30 31 2E 30 31	20	30 30	20	32 38	0D	0A

  - About XOR description of the verification method
    XOR from the first byte to backwards until the last 25 byte.
    For example:
    1, 0.00%VOL,21.4°C,1001.01 mbar
    Output: +000.00 +21.4 1001.01 00 28<CR><LF>
    2, 2.01%VOL, -9.4°C,989.12 mbar
    +002.01 -09.4 0989.12 00 2D<CR><LF>

  - Status code
    Status code is 23 byte and 24 byte, ASCII bytes are converted to corresponding BCD codes. The 23 – byte ASCII code is converted to BCD code to form the high 4 bits. The 24 - byte ASCII code is converted to BCD code to form the lower 4 bits. Each bit represents a different fault.

    Here is the comparison table:

The 23 - byte				The 24 - byte			
D8	D7	D6	D5	D4	D3	D2	D1
Reserve	TEC Control Error	Senor of T&P Com	Calibrated	Optical power low	Optical power high	Absorption Wave shift	Reserve
0	1:Ab 0:Nor	1:Ab 0:Nor	1:Ab 0:Nor	1:Ab 0:Nor	1:Ab 0:Nor	1:Ab 0:Nor	0