

MST LS4 Series

Laser Methane Sensor

Description:

The LS4 series laser methane sensor is a high-precision, miniaturized gas sensor designed based on Tunable Diode Laser Absorption Spectroscopy (TDLAS) technology. It features small size, low power consumption, stable performance, long service life of sensor components and high sensitivity.

Features:

- Excellent stability, no calibration required.
- Only respond to methane. Has no response to other gases, water vapor or dust.
- Fast response, high performance at measurement accuracy and repeatability.
- TTL serial port & 0.4-2V analog signal, dual output.
- Long lifespan of more than 5years.

Specification:

Item	Description	
Detection Gas	CH ₄	
Sampling Method	Diffusion	
Principle	TDLAS	
Response Time	≤ 20S	
Measuring Range	0-1%VOL (10000ppm) / 0-5%VOL / 0-100%VOL	
Accuracy	Range 0-1%VOL	±0.03%VOL
	Range 1%-100%VOL	±5% Truth value
Resolution	0.01%VOL	
Typical Life	> 5 years	
Working Temperature	-5°C to +55°C (customizable -40°C to +70°C)	

Item	Description
Working Humidity	< 98%RH (no condensation)
Working Pressure	86Kpa~106Kpa
Working voltage	3V-5.5V
Average operating current	< 100mA
Output	TTL serial port & 0.4V-2V analog signal
Shell Material	304 stainless steel
Mechanical Dimensions	Φ20mm*16.6mm (diameter* height)
Levels of Protection	IP65
Weight	17g

Table 1: Room Temperature Linear Test Data

	Standard gas									
	0.00	0.25	0.50	2.50	3.50	5.00	10.00	20.00	50.00	100.00
Number	indicating value									
1	0.00	0.25	0.47	2.45	3.40	4.92	9.89	19.69	49.55	99.61
2	0.00	0.25	0.50	2.50	3.47	5.01	9.99	19.97	49.54	99.39
3	0.00	0.24	0.48	2.47	3.46	5.01	10.02	19.98	49.72	99.91
4	0.00	0.23	0.48	2.50	3.48	5.03	10.06	20.13	50.16	100.03
5	0.00	0.25	0.50	2.49	3.46	5.00	10.04	19.91	49.81	99.87
6	0.00	0.26	0.50	2.48	3.42	4.93	9.92	19.61	48.93	97.81

Table 2 High and low temperature accuracy test data

		Concentration of standard gas 0.5%VOL				Concentration of standard gas 1%VOL				Concentration of standard gas 20%VOL			
		0℃	20℃	40℃	55℃	0℃	20℃	40℃	55℃	0℃	20℃	40℃	55℃
Sensor number	1	0.51	0.50	0.52	0.52	1.01	1.00	1.03	1.02	20.19	19.65	19.45	19.60
	2	0.47	0.49	0.52	0.52	0.97	1.00	1.03	1.02	20.05	19.83	19.99	20.31
	3	0.50	0.50	0.52	0.53	0.98	1.00	1.02	1.03	19.83	19.95	20.02	20.20
	4	0.50	0.49	0.49	0.51	1.00	0.99	0.99	1.02	20.30	20.07	20.11	20.21
	5	0.50	0.50	0.50	0.51	1.01	1.01	0.99	1.00	20.61	20.05	19.83	19.89
	6	0.50	0.50	0.50	0.54	1.01	1.01	1.02	1.05	20.04	19.91	19.64	20.14

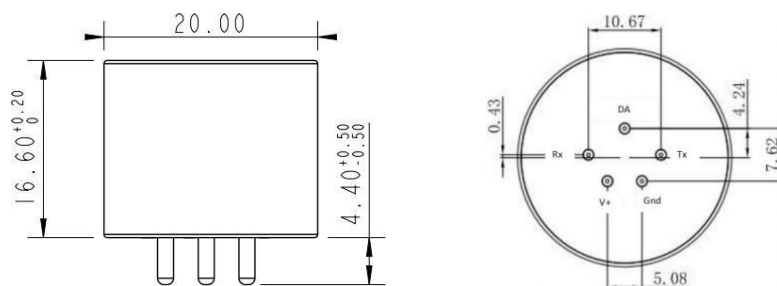
Table 3: Indication Stability and Repeatability

Product number	First time (inflating to 1% VOL, monitor for one minute after stabilization)		Second time (inflating to 1% VOL, monitor for one minute after stabilization)		Third time (inflating to 1% VOL, monitor for one minute after stabilization)	
	Minimum value	Maximum value	Minimum value	Maximum value	Minimum value	Maximum value
1	0.99	1.00	1.00	1.02	0.97	0.98
2	0.98	0.99	0.99	1.00	0.99	1.00
3	0.99	1.00	0.97	0.99	0.98	1.00
4	1.03	1.04	1.00	1.01	1.02	1.04
5	0.99	1.00	1.00	1.01	0.98	0.99

Product number	First time (inflating to 20% VOL, monitor for one minute after stabilization)		Second time (inflating to 20% VOL, monitor for one minute after stabilization)		Third time (inflating to 20% VOL, monitor for one minute after stabilization)	
	Minimum value	Maximum value	Minimum value	Maximum value	Minimum value	Maximum value
1	20.07	20.08	20.05	20.07	20.12	20.14
2	20.04	20.06	20.05	20.08	19.97	19.99
3	19.94	20.01	19.94	20.00	19.94	20.01
4	19.85	19.91	19.96	20.02	19.89	19.91
5	20.07	20.12	20.14	20.15	19.95	20.00

Size and Pin Definition

Unit: mm



Pin mark	Description
V+	Power input Voltage range: 3.0V-5.5V DC
Gnd	Power input (ground)
Tx	Serial port, TTL TXD
Rx	Serial port, TTL RXD
DA	Analog Voltage Output Port 0V Sensor Fault 0.2V sensor preheat status 0.4-2V corresponds to 0-100% FS 2.2V indicates over-range.

TTL Serial Port Data Usage Guide

Porter rate: 38400; Data Bit: 8; Stop Bit: 1; Parity Bit: None

1. Data Packet Format and Check-byte.



- A data packet is a string composed of ASCII codes.
- Checksum = 100(Hex) - Data Area(Byte1 + ... + ByteN). For example: 46 31 09 38 39 0D 0A, Checksum is 100-46-31=89(Hex).
- The calculated checksum is 0x89, the corresponding high byte is 0x38 (ASCII character "8") and the low byte is 0x39 (ASCII character "9").
 An other example, If the calculated checksum is 0xAC, the corresponding high byte is 0x41 (ASCII character "A") and the low byte is 0x43 (ASCII character "C").

2. **F1** Command (Enter Active Transmission Mode)

Instruction: When it is necessary to enter F1 automatic data transmission mode, send the following command. On F1 model, the sensor will reply concentration data automatically (ASCII format, 1 second interval).

Transmit (hexadecimal): 46 31 09 38 39 0D 0A

Response (hexadecimal): 46 31 09 38 39 0D 0A

3. **F0** Command (Enter Passive Response Mode)

Instruction: When it is necessary to disable F1 automatic transmission mode, send the F0 command to enter passive response mode. The sensor will respond only upon receiving a command.

Transmit (hexadecimal): 46 30 09 38 41 0D 0A

Response (hexadecimal): 46 30 09 38 41 0D 0A

4. **R6** Command (Read Concentration Data)

Instruction: In F0 mode, when send R6 command to sensor, the sensor will return real-time concentration data.

Transmit (hexadecimal): 52 36 09 37 38 0D 0A

Response (hexadecimal): 32 2E 35 30 09 33 42 0D 0A

32 2E 35 30 represents the value, corresponding to the ASCII code "**2.50%vol**".

Notes

- Severe impact and vibration should be avoided during transportation and installation.
- Unused sensors should be stored in a warehouse at room temperature, away from corrosive gases.
- Before use, ensure the power cord is connected correctly and the voltage is normal.
- Do not disassemble or repair the sensor in an explosive gas environment.
- Do not place the sensor near high temperatures or fire sources.
- Do not weld onto the sensor pins. Please weld onto the included metal socket and then install the sensor onto the socket.
- Do not attempt to disassemble or repair the sensor by yourself.