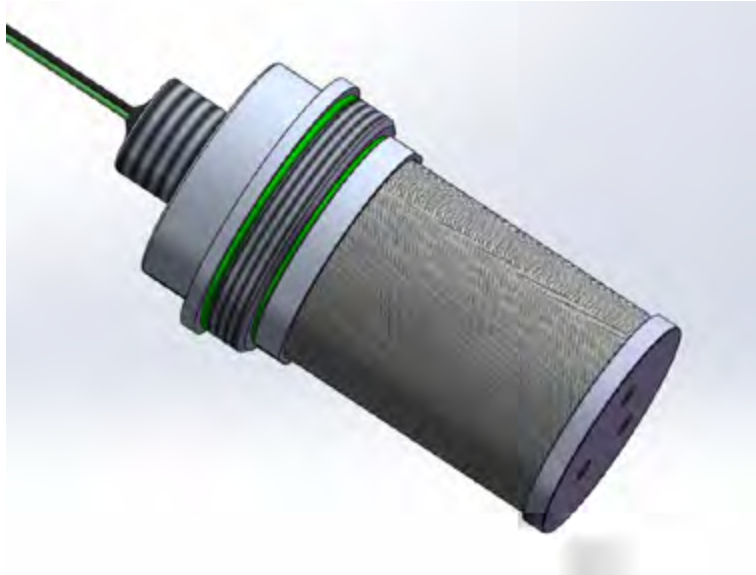




TDLAS Methane & Ethane Detector PD358



The laser methylethane sensor uses tunable laser spectral absorption (TDLAS) technology for precise measurement of the target gas and uses advanced algorithms to detect both gases simultaneously. The product integrates advanced laser, detector, gas chamber and other components to achieve high precision, high density, high reliability of miniaturized integrated package; The product adopts excellent optical system, which greatly reduces the noise caused by the optical system, and ensures the advantages of high detection accuracy, fast response and low power consumption; At the same time, the optical path structure of the product uses an independent patent design to ensure the stability of the product, with excellent anti-vibration, anti-impact and temperature stability, can work stably in a variety of complex environments.

2. Feature Specifications

- High precision, miniaturization, low power consumption;
- High reliability, intrinsic anti-interference (non-methylethane gas has no reaction);
- 3.3V ~ 5.0V wide voltage range power supply, TTL serial port, easy to secondary integration;
- Intrinsic safety design, EMC protection design;
- Waterproof and dustproof design.
- Lightweight and compact
- The structure is stable, resistant to vibration and impact

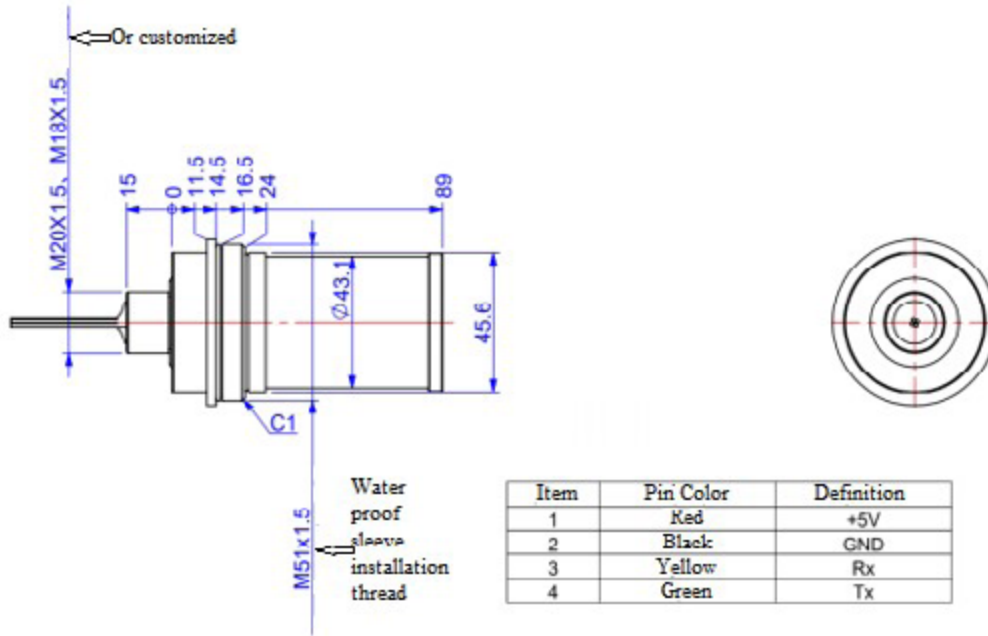
3. Application field

- Petroleum, chemical industry, mining
- Natural gas pipelines, transmission stations, filling stations
- Coal mine Safety Monitoring
- Pipeline leak monitoring and household natural gas leak monitoring
- Underground integrated pipe gallery, gas leakage monitoring, biogas monitoring
- Other related safety monitoring and testing areas

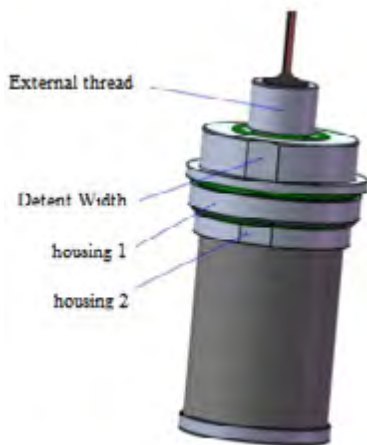
4. Technical Specifications

Parameters		Minimum	Typical value	Maximum	Units
General parameters					
Storage temperature		- 40	-	85	°C
Operating temperature		- 20	-	60	°C
Operating humidity (non-condensing)		-	-	98	%RH
Working pressure		80	-	116	kPa
Measuring range	Methane	0	-	20	%VOL
	ethane	0	-	5000	ppm
Basic error (room temperature, atmospheric)	Methane	0 ~ 5.00% VOL		+ 1500	ppm
		(5.001 to 20) %VOL		True value ±3%	
	Ethane	0~2000ppm		Plus or minus 50	ppm
		(2000~5000) ppm		True value ±3%	
Basic error (full condition)	Methane	0 ~ 5.00% VOL		+ 3000	ppm
		(5.001 to 20) %VOL		True value ±7%	
	ethane	0~2000ppm		+ 100	ppm
		(2000~5000) ppm		True value ±7%	
Response time		-	20	30	s
Minimum resolution (display)		Methane: 10 / ethane: 0.1			ppm
Communication interface					
TTL	Baud rate	-	115200	-	Baud
	Stop bit	-	1	-	Bit
	Data bits	-	8	-	Bit
	Check bit	-	-	-	Bit
Electrical performance (room temperature)					
Operating voltage		3.3	3.6	5	V
Working current		-	50	200	mA
Overall dimensions					
Overall dimensions		See Figure 1			
Weight		About 220g			

5. Mechanical dimensions (unit: mm) and pin definition



6. Operating instructions



6.1 As shown in the figure above, when the product is installed with external thread, the wrench with 46mm opening on the opposite side should be used first to clamp the clamp, and then start the operation, while avoiding the force on other parts of the product;

6.2 During the use of the product, shell 1 and shell 2 should not move or rotate each other.

7. Communication Format

When the product is in the detection state, the output form is ACSII string fixed length output, a total of 37 bytes, the format is as follows:

Symbol xx.xxx Space symbol xxxx.x space symbol nn.n Space pppp.pp space SS space HH<CR><LF>

The symbol xx.xxx stands for methane concentration, unit %VOL, range +00.000~+20.000;

x represents ethane concentration, unit ppm, range +0000.0~+5000.0;

Symbol nn.n represents temperature, unit ° C, range -99.9~+99.9;

pppp.pp represents gas pressure, unit mbar, range 0000.00~9999.99;

SS is the equipment status code.

HH is the XOR check value of the first 33 bytes, which is output in the form of 2 characters;

<CR><LF> represents the return newline character.

Annex 1: Serial communication protocol for laser methylethane sensor

1. Communication port configuration

The product communicates with external devices through serial ports. The configuration of communication ports is as follows:

Configuration Items	Parameters
Baud Rate	115200
Stop bit	1
Data Bits	8
Check bit	There is no
Flow control	There is no

2. Data output format

2.1 When the product is in the detection state, the output form is active fixed-length string output, a total of 37 bytes, the format is as follows:

Function code	Methane concentration	Spaces	Ethane concentration	Spaces	Temperature	Spaces	Pressure	Spaces	Trouble codes	Spaces	Xor check code	Carriage return	Line breaks	
Byte sequence number	1-7	8	9 to 15	16	17-21	22	23-29	30	31-32	33	34-35	36	37	
Number of bytes	7	1	7	1	5	1	7	1	2	1	2	1	1	
Units	%VOL	-	ppm	-	°C	-	mbar	-	-	-	-	-	-	
E.g.	ACSII	+ 00.000	<SP>	+ 0000.0	<SP>	+ 21.4	<SP>	1001.01	<SP>	00	<SP>	3D	<CR>	<LF>
	HEX	2B 30 30 2E 30 30 30	20	2B 30 30 30 30 2E 30	20	2B 32 31 2E 34	20	31 30 30 31 2E 30 31	20	30 30 20	20	51 68 0D	0A	

2.2 Method Description of XOR check:

The calculation method is to calculate the XOR one by one from the first byte. That is, the first byte is different

or the second byte, the result is different or the third byte, and so on, until the first 33 bytes end, get a byte check result, the result is converted into two characters output. For example, the calculated result is 0X3D, then the characters '3' and 'D' are the output result, if the contained characters are letters, the output is in uppercase form.

An Example

Example 1. The current methane concentration is 0%VOL, ethane concentration is 0ppm, temperature is +21.4°C, pressure is 1001.01 mbar, no fault, and the output is as follows:

+00.000 +0000.0 +21.4 1001.01 00 3D<CR><LF>

Example 2. The current methane concentration is +0.201%VOL, ethane concentration is +100.0ppm, temperature is -9.4°C, pressure is 829.00 mbar, no fault, the output is as follows:

+00.201 + 0100.0-09.4 0829.00 00 31<CR><LF>

2.3 Status Code table

In the case of default mode output, the 31st and 32bytes are the status codes represented by ASCII codes, which represent the working status of the product. Convert two ASCII code bytes to the corresponding BCD code, that is, each byte is converted into a 4-bit hexadecimal data, the 31st byte ASCII code is converted into BCD code to form a high 4 bits, the 32th byte ASCII code is converted into a low 4 bits, a total of 8 data bits into a byte, each bit represents different faults, specifically:

The 31st byte				The 32nd byte			
D8	D7	D6	D5	D4	D3	D2	D1
Retain	Temperature control exception mark	Abnormal communication of temperature and pressure sensor	Whether to mark	Low light intensity mark	If the light intensity is too high	Whether the absorption peak deviates from the mark	Retain
Default to 0	1: The temperature control is abnormal 0: Normal	1: The communication is abnormal 0: Normal	1: Uncalibrated 0: calibrated	1: too small 0: Normal	1: Too large 0: Normal	1: off 0: not deflected	Default is 0

Example:

1. The product works properly: At this time the output status code is 00, the ASCII code corresponding to the 31st byte is 0X30 and its corresponding BCD code is B0000, the ASCII code corresponding to the 32th byte is 0X30 and its corresponding BCD code is B0000, and the corresponding flag bit is :B0000 0000.

2. If the absorption peak is offset: at this time the output status code is 02, the ASCII code corresponding to the 31st byte is 0X30 and its corresponding BCD code is B0000, the ASCII code corresponding to the 32th byte is 0X32 and its corresponding BCD code is B0010, and the corresponding flag bit is :B0000 0010.

3. If the temperature control is abnormal and the optical intensity is too large, the output status code is 44, the ASCII code of the 31st byte is 0X34 and the BCD code is B0100, the ASCII code of the 32nd byte is 0X34 and the BCD code is B0100, and the flag bit is B0100.

4. If the temperature control is abnormal, the communication of the temperature and pressure sensor is abnormal, the product is not calibrated, the light intensity is too small, and the absorption peak is out of line: At this time the output status code is 7A, the ASCII code corresponding to the 31st byte is 0X37 and its corresponding BCD code is B0111, the ASCII code corresponding to the 32th byte is 0X41 and its corresponding BCD code is B1010, and the corresponding flag bit is :B0111 1010.