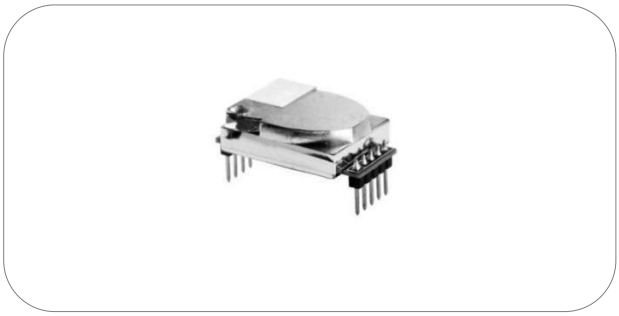
Infrared Carbon Dioxide Sensor Module
CM1106-Single Beam



Introduction

Single Beam(Single light source, single wavelength) NDIR CM1106 (Miniature size) can be used to detect CO2 concentration of indoor air by adopting advanced non-dispersive infrared technology(NDIR). It is widely used in IAQ monitor, air conditioner with purifying function, air purifier, ventilation system, automotive, agricultural IOT and other consumer electronic products etc.

Features

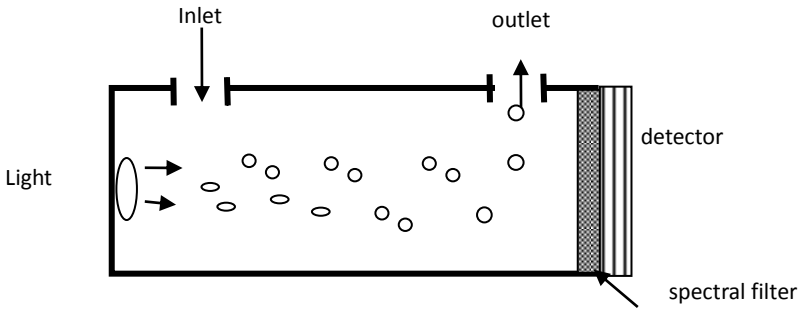
- Advanced non-dispersive infrared technology (NDIR) with independent intellectual property
- High accuracy: temperature calibration within whole measurement range
- High stability: advanced auto-calibration at background
- Small size and compact structure, easy to install

Applications

- ✓ IAQ monitor
- ✓ Air conditioner with purifying function
- ✓ Air purifier
- ✓ Ventilation system
- ✓ Automotive

Principle of particle measurement

Molecule like CO2 and CO is composed of different types of atoms, it has absorption spectrum in infrared range. Absorption intensity abides by Lamber-Beer's Law. When light wave corresponded to certain gas with absorption spectrum passes through measured gas, the intensity of light wave will be significantly weakened. The intensity attenuation is related to concentration of measured gas. This relation follows Lamber-Beer's Law. Basic working principle of NDIR sensor is as below,



Basic mathematical model：A majority of both organic and inorganic polyatomic gas have specific absorptive wavelength in infrared region. When infrared light passed by, the light transmissivity of this gas molecule to certain wavelength can be expressed by Lambert-Beer Law:

I stands for light transmissivity, $I = I_0 e^{-kpl}$

i stands for light absorption intensity, $i = I_0 - I = I_0 (1 - e^{-kpl})$

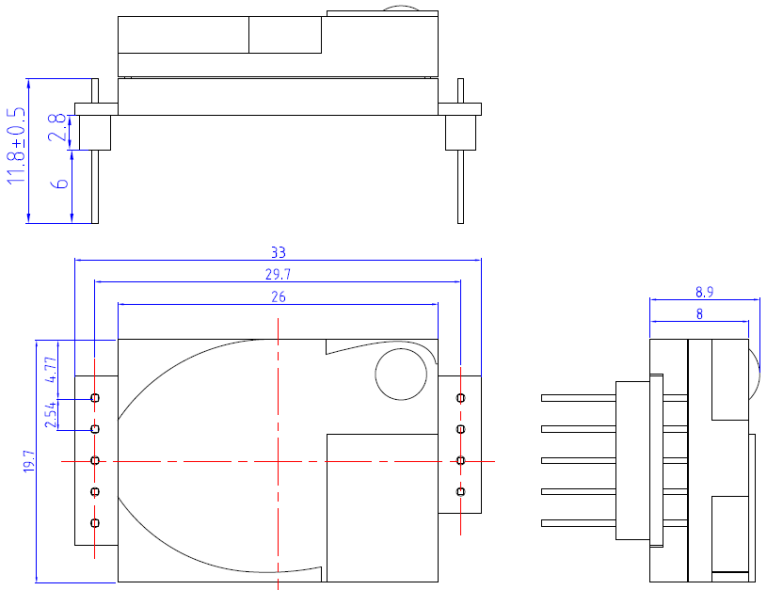
I_0**:** incident light intensity.
l: thickness of gaseous medium
p: gas concentration
k: absorption coefficient

Specifications

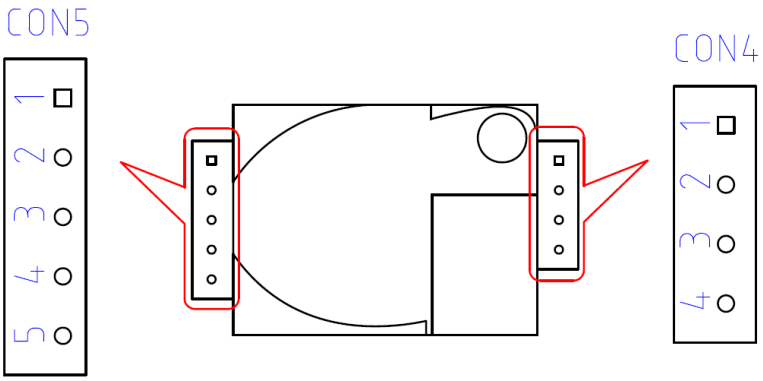
Technology	NDIR
Sampling method	diffusion
Measurement range	0-2000ppm (0-5000ppm, 0-10000ppm should be customized)
Accuracy	± (50ppm+5% of reading), auto-calibration within temperature and concentration range
Max drift	±3%FS
Resolution	1 ppm
Repeatability	<3%
Response time(T90)	< 120S
Temperature influence coefficient	＜0.5% FS per℃
Working temperature	-10 ℃ ~ +50°C
Storage temperature	-30°C ~ +60°C
Humidity	0-95% RH non-condensing
Power supply	DC 5V±5%
Working current	average 70mA, peak 120mA
Signal output	PWM: linear output
	UART: TTL electrical level (3.3v electrical level)
Size	33*19.7*8.9mm
Data bits	Data bits: 8; Stop bit: 1; Check bit: no check bit. Standard baud rate: 9600bps
Lifespan	8-10years

Outline and Dimension

1. Schematic diagram



2. I/O definitions



No.	Name	Description	No.	Name	Description
1	+3.3V	Power supply output (+3.3V/100mA)	1	+5V	Power supply input (+5V)
2	RX	UART-RX (Receiving)	2	GND	Power supply input（GND）
3	TX	UART-TX (Sending)	3	A	Alarming (Reserved)
4	R/T	RS485 (Reserved)	4	PWM	PWM output
5	CA	Manual calibration			

Manual calibration

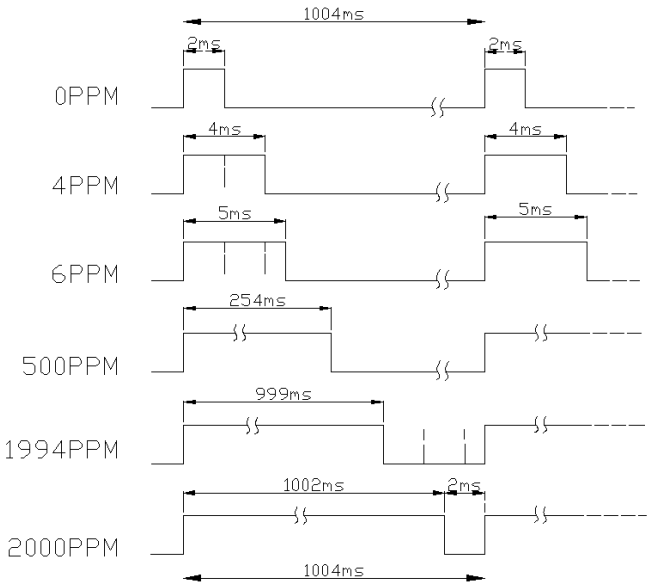
Short circuit CA in CON5 and GND in CON4 for 2s and the sensor will activate the calibration after 6s. The calibration procedure is set to calibrate the zero point of sensor to be 400ppm. Before calibration, please make sure the current environment is stable. The sensor could also be calibrated through protocol command, please refer to more details in communication protocol.

PWM output

PWM cycle：1004ms

Positive pulse width：（PPM/2）+2ms

PWM output schema：



After-sales services and consultancy

TEL：86- 27-81628827 **FAX**：86-27-87401159

ADD：Fenghuang No.3 Road,Fenghuang Industrial Park, Eastlake Hi-tech Development Zone, Wuhan 430205, China

Http://www.gassensor.com.cn

E-mail: info@gassensor.com.cn