# MH-Z14 CO2 Module

MH-Z14 NDIR Infrared gas module is a common type, small size sensor, using non-dispersive infrared (NDIR) principle to detect the existence of CO_2 in the air, with good selectivity, non-oxygen dependant and long life. Built-in temperature sensor can do temperature compensation; and it has digital output and analog voltage output. This commons type infrared gas sensor is developed by the tight integration of mature infrared absorbing gas detection technology, and superior circuit design.

MH-Z14 NDIR Infrared gas module is applied in the HVAC, indoor air quality monitoring, industrial process, safety and protection monitoring, agriculture and animal husbandry production process monitoring.
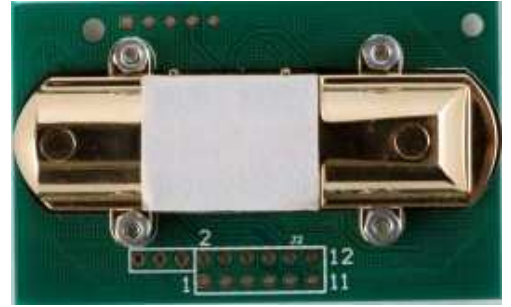
Its design, production and inspection adhere to below:

GB/T13384-92

1. Technical specification:

Detection range	0-5%VOL（optional）
Working voltage	4.5V-6V DC
Average current	＜85mA
interface levels	3.3V
Output signal	0.4V-2V DC
	UART
	PWM
Warm-up time	3 min
Response time	T90 < 90s
Working temperature	0-50℃
Storage temperature	-40-70℃
Working humidity	0%-95%RH（No condensation）
Weight	23g
Using age	> 5 year

Detection range and corresponding resolution

Detected gas	molecular formula	Range	Resolution	Accuracy	Remarks
CO2	CO2	0-2000ppm	1ppm	±200ppm	Temperature compensation
		0-6000ppm	1ppm	±300ppm	Temperature compensation
		0-1%VOL	1ppm	±3%F.S	Temperature compensation
		0-3%VOL	1ppm	±3%F.S	Temperature compensation
		0-5%VOL	10ppm	±3%F.S	Temperature compensation

High Sensitivity and resolution

Lower power consumption

UART, analog voltage output or PWM output (optional)

Fast response

Temperature compensation and excellent linear output

Excellent stability

Long life

Anti-poisons, anti-vapor interference

2. Structure Dimension Chart

Sensor module Dimension   Pin definition
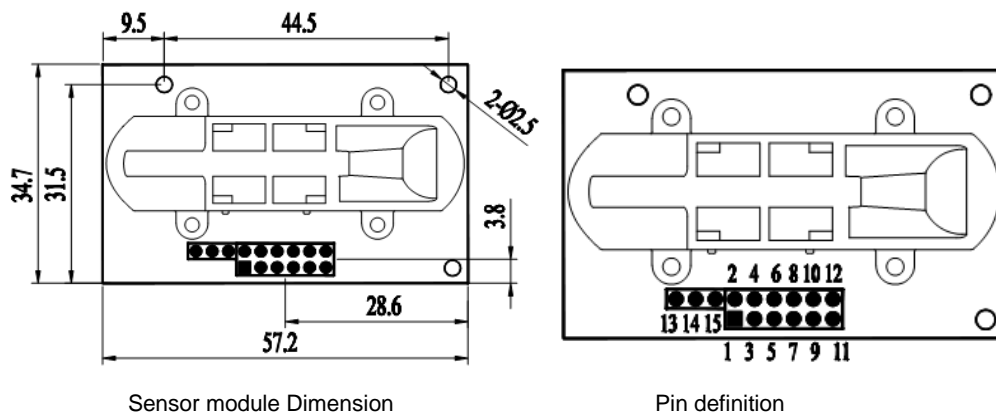
3. Pin instruction and signal output

3.1 Pin definition:

Pad1, Pad 5: Vin   (Voltage input 4.5V-6V)

Pad 2, Pad 3, Pad 12: GND

Pad 4: DAC2

Pad 5: DAC1

Pad 6: PWM output

Pad 7, Pad 8, Pad 9: NC；

Pad 10, Pad 13: UART(TXD)   0-3.3V data output

Pad 11, Pad 14: UART (RXD)   0-3.3V data input

3.2 Signal output:

Analog voltage output:

DAC1 output voltage range（0-2.5V），corresponding gas concentration（0-full detection range）

DAC2 output voltage range（0.4-2V），corresponding gas concentration（0-full detection range）

PWM output (taking PWM output from 2000ppm as example):

CO2 output range: 0ppm-2000ppm

Cycle: 1004ms±5%

High level output for beginning: 2ms (in name)

Middle of cycle: 1000ms±5%

Low level output for ending: 2ms（in name）

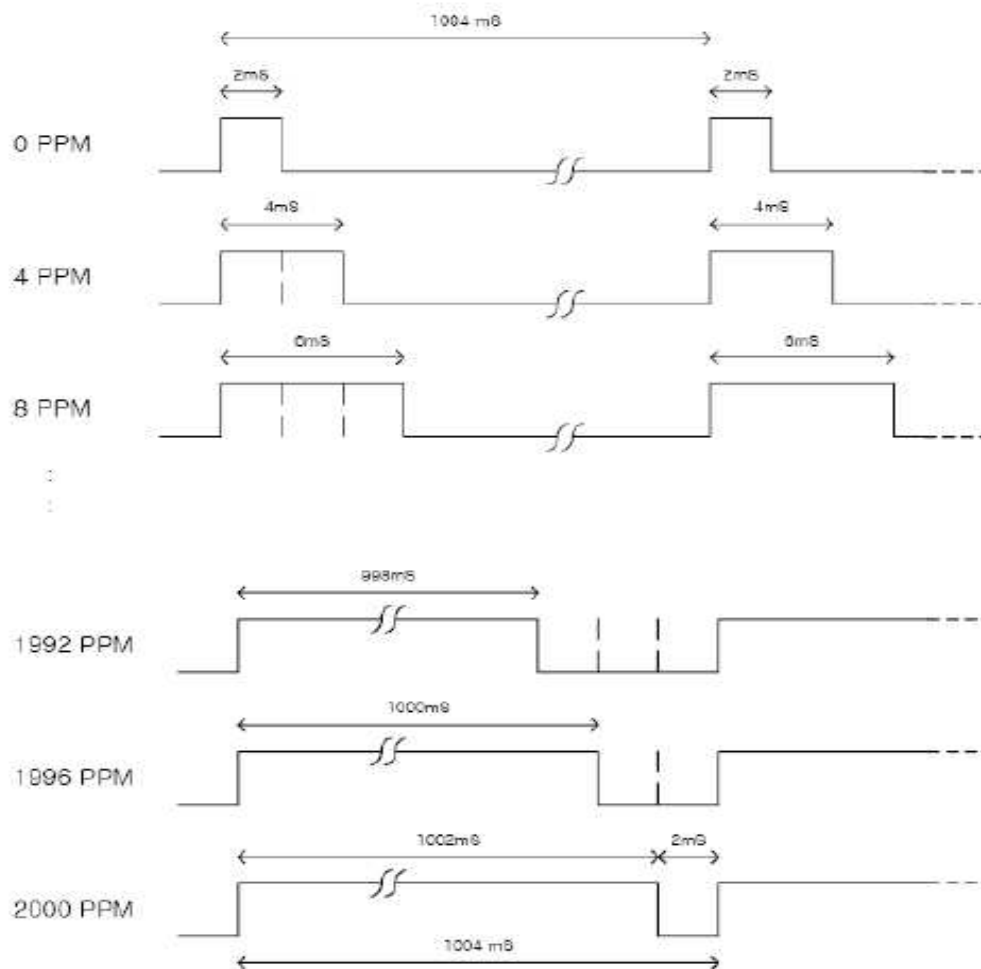Account formula for CO2 concentration which gets through PWM:

$$C_{ppm} = 2000 \times (T_H - 2ms)/(T_H + T_L - 4ms)$$

Among:

Cppm is calculated CO2 concentration, unit is ppm;

TH is time for high level during an output cycle;

TL is time for low level during an output cycle.

4. Working Environment

Working Power：4.5-6V DC

Working Temperature：0℃-50℃

Humidity: 0-95%RH

5. Power Supply Influence

In order to ensure that the sensors work properly, the recovery time of supply power must be less than 50MS and working voltage in the range of 4.5V-6V DC. Sensor will not work normally when the power is beyond the range.
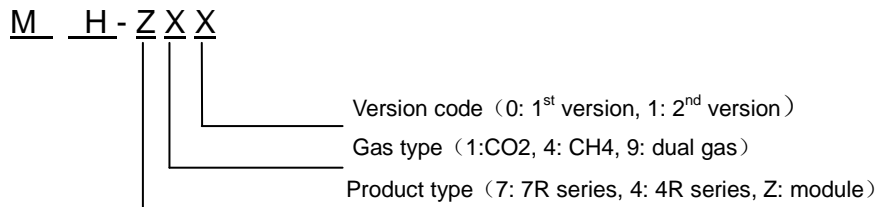
6. Communication protocol

MH-Z14 is communicated through UART. Module works following slave mode and can be connected with MCU outside. More information, please refer MH-Z series communication protocol instruction.

7. Order Notes

Please provide the following information in order to purchase the specified product.

1) Detected range of sensor

2) Resolution of sensor

3) Sensor name: MH-ZXX

M H - Z X X

Version code（0: 1st version, 1: 2nd version）

Gas type（1:CO2, 4: CH4, 9: dual gas）

Product type（7: 7R series, 4: 4R series, Z: module）

8. Notes for maintenance

8.1 The sensor should be calibrated regularly. The cycle time is better to be no more than 6 months.

8.2 Do not use the sensor in the high dusty environment for long time.

8.3 Please use the sensor with correct power supply.

8.4 Forbidden to cut the sensor pin.