

### General Description

The YY-MSGGA-CO2 Commercial Carbon Dioxide (CO2) sensor is a single channel, non-dispersive infrared (NDIR) sensor. Within the YY-MSGGA-CO2 is a sensing chamber with an infrared source at one end and a detector fitted with an optical filter at the other end. The inner wall of the sensing chamber treated with a special process can effectively improve the efficiency of light emission, use the principle of mirror reflection to effectively increase the optical path, and improve the sensitivity and accuracy of the sensor.

The source emits radiation at wavelengths which include the absorption band of CO2. The filter blocks wavelengths which are not sensitive to the presence of CO2, thereby increasing selectivity and sensitivity. As the light passes through the sensing chamber, a fraction is absorbed if CO2 is present.

The thermopile detector integrates a 1000 times amplifier (AFE). AFE has a good noise suppression function, which can effectively suppress external electrical noise interference. The signal received by the detector has a large output after 1000 times amplification, which can effectively improve the sensitivity and accuracy of the product.

The Automatic Baseline Correction (ABC) function can automatically calibrate the sensor's lowest reading over a pre-configured interval to 400 ppm CO2. This enhances long term stability and may eliminate the need for calibration.

### Features and Benefits

- Single channel Non-dispersive infrared technology (NDIR)
- Automatic Baseline Correction (ABC) function
- Detector integrated amplifier and noise suppression module
- Mirror sensing chamber prepared by special process
- Temperature and humidity compensation, Strong environmental adaptability
- Operating Temperature Range: 0°C To +50°C
- High sensitivity, high precision, low power consumption, consistency, repeatability and stability
- Small size, long service life, provide UART output mode

### Applications

- HVAC
- Smart home and IoT system
- Air purification systems
- Building control

### Specifications

CHARACTERISTIC	PARAMETER	Remark
Target gas	carbon dioxide (CO2)	
Standard range	400 ppm to 2000 ppm, upto 5000 ppm extended range	
Measurement interval	≤ 2s	
Accuracy <sup>3</sup>	± 30 ppm ± 3% of reading Typical response	
Typical response time (T90)	≤ 120s	
Sensor warm-up time	≤ 180s	
Repeatability	> 97%	
Operating voltage	4.5 V to 5.0V unprotected against surges and reverse connection	
Power consumption	300 mA peak@5V, 45mA average@5V	
Alarm output, open collector	1000 ppm/800 ppm normal state is conducting max 100 mA. Transistor open at CO2 high or at sensor failure	
Serial communication	UART, Modbus protocol	
Operating temperature range	0 °C to 50°C	
Storage temperature range	-30°C to 70°C	
Operating humidity	0%RH to 85%RH non-condensed	
Maintenance	maintenance-free for normal indoor applications Weight < 7 g	
Dimensions	33 mm x 22 mm X 11.5mm (tolerance ± 0.5mm)	

## Mechanical Drawings

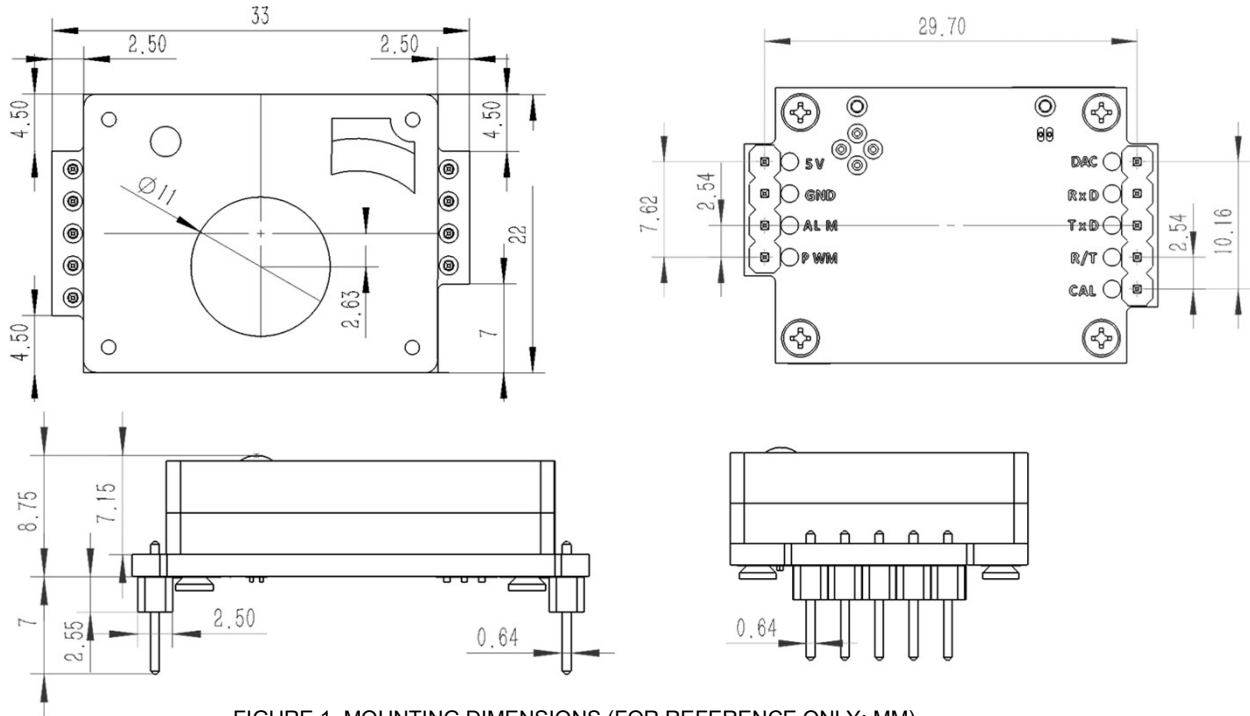


FIGURE 1. MOUNTING DIMENSIONS (FOR REFERENCE ONLY: MM)

## Pin Definitions and Descriptions

PIN NUMBER	FUNCTION	Descriptions
PIN1	DAC	Analog voltage output level@3.3V
PIN2	UART_RXD	TTL Level@3.3V, RxD@3.3V
PIN3	UART_TXD	TTL Level @3.3V, TxD@3.3V
PIN4	UART_R/T	TTL Level @3.3V, R/T@3.3V
PIN5	CAL	TTL Level @3.3V
PIN6	PWM output	PWM output /TTL, Cycle@2s,
PIN7	Alarm output	Alarm output
PIN8	GND	GND
PIN9	Vin_(4.5 V to 5.5 V)	+5V

## Revision History

Revision Number	Release Date	Description
Rev1	2021/8/27	Initial Release