

## OGM220 Series Dual Channels NDIR CO<sub>2</sub> Gas Sensor Module

### Introduction

OGM220 series is a dual channels NDIR module having a digital output directly proportional to CO<sub>2</sub> concentration. OGM220 is designed for multi-dropped connection that several OGM220 can be connected in the same bus for CO<sub>2</sub> monitoring.

By using dual channels CO<sub>2</sub> sensor, OGM220 offers superior performance that can overcome the drift of light source and CO<sub>2</sub> sensor over time.

OGM220 series is ideal for customers who require their products that can meet time to market with a moderate start up cost. All units are factory calibrated and can be configured to measure CO<sub>2</sub> concentration up to 2,000ppm. (Other maximum concentration is available upon request).

OST also offers OEM version of CO<sub>2</sub> module that can be configured to different concentration reading, threshold setting and output format.

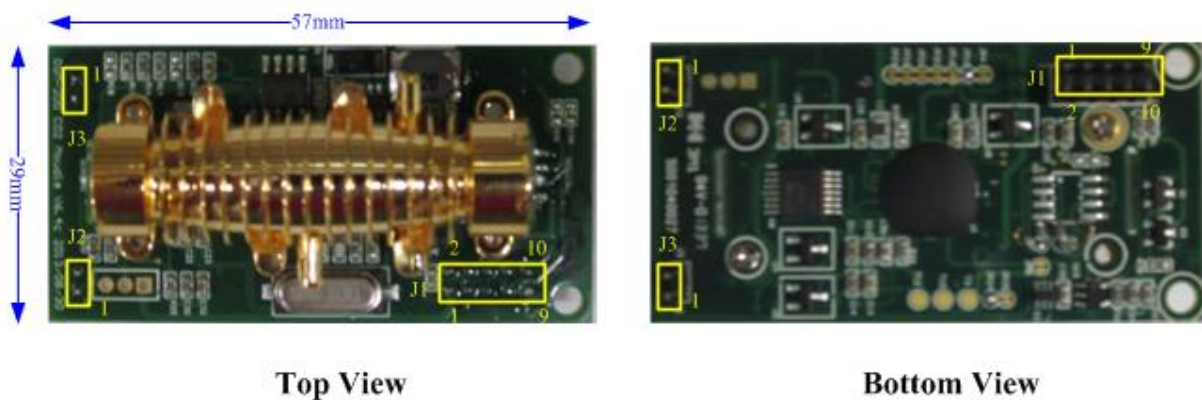


Figure 1a Overview of OGM220 series with size 29x57mm.

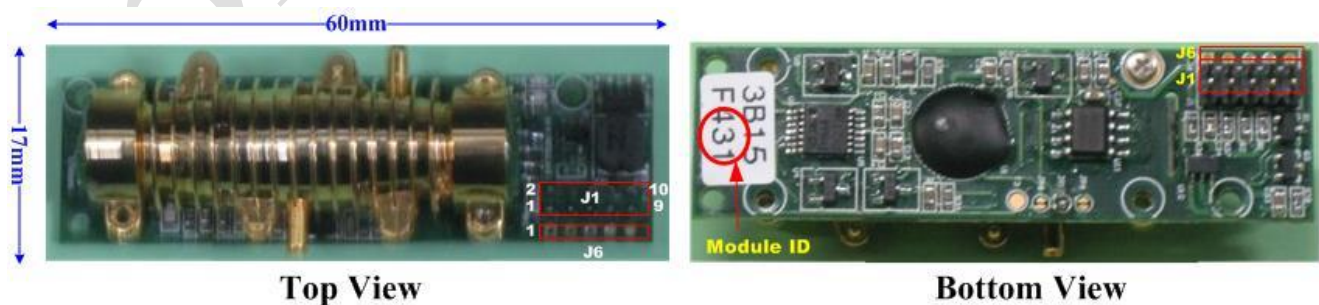


Figure 1b Overview of OGM220 series with size 17x60mm.

## **Features**

- NDIR sensor for CO<sub>2</sub> measurement
- Pre-calibrated and ready-to-use
- Excellent stability and accuracy
- Analog PWM output
- Open drain threshold output for relay driving
- Digital interface to master controller using RS485 interface
- Self calibration function.
- LED drivers for CO<sub>2</sub> level warning. (Green < 800ppm, Amber for 800-1200ppm, RED for >1200ppm)

## **Applications**

- Demand controlled ventilation (DCV) for air conditioning
- Environment management system
- Indoor air quality monitoring
- Securing devices of combustors

## **Dimension:**

Regular model: 57mm (W) x 29mm (L) x 18mm (H)

Or

Slim model: 60mm(W)x 17mm (L) x 18mm (H)

## Specifications

|                                | Item   | Specification  |
|--------------------------------|--|--|
| General                        | Operating Temperature  | 5°C ~ 50°C * <sup>2</sup> (non condensing)   |
|                                | Operating Humidity   | 0 ~ 95% RH(Non-condensing)   |
|                                | Operating Environment  | Residential, Commercial spaces   |
|                                | Storage Temperature  | -20°C ~ 70°C (non condensing)  |
| CO <sub>2</sub><br>Measurement | Sensing Method   | NDIR(Non-dispersive Infrared) dual channels  |
|                                | Measurement Range  | 0 to 2,000 ppm (standard), or<br>0 to 5,000 ppm, other range please contact OST  |
|                                | Precision  | ±(50ppm +3% of measured value)* <sup>1</sup>   |
|                                | Warm-up Time   | < 3 minutes  |
|                                | Response Time (63%)  | < 30 seconds (diffusion)   |
|                                | Sampling Interval  | ~ 3 seconds  |
| Electrical data                | Power Input  | 5~6 VDC @500mA peak, 39mA average,<br>minimum input 4.5V, Max 6.5V DC  |
|                                | Output connector   | 10 pins  |
| Output interface               | Digital or analog Output   | RS485 or UART, PWM analog output, Open drain<br>threshold output (20V, 1A)   |
| LED Interface                  | Two color LED drivers  | Open drain LED drivers, need external current limit<br>resistor, I <sub>LED</sub> <20ma. (Common anode bi-color<br>LEDs) |
| Altitude<br>Compensation       | Compensate the pressure<br>difference due to altitude of<br>CO <sub>2</sub> module | Height in meter or feet, set from PC interface by<br>using OST installer software.                                       |

Note: 1. Test at 25+/-2°C, 60% RH environment.

2. The measurement error might be greater than specified. Specifications are subject to change without notice.

### Interface connector (J1):

Pin 1: +5~6V DC

Pin 2: GND

Pin 3: /RST(low active, 3.3V normal)

Pin 4: Reserved (Factory use)

Pin 5: Reserved (Factory use)

Pin 6: PWM analog output

Pin 7: THSOUT (open drain)

Pin 8: Reserved (Factory use)

Pin 9: RS485+ / TXD (3.3V logic)

Pin 10: RS485- / RXD (3.3V logic)

The threshold level can be programmed by PC through USB/RS485 interface.

Normally, J1-pin 6 is digital PWM output that provides analog data output. The PWM output has 12 bits resolution with max output of 2.5V. For default setting, the analog output is set to 0.5V for 500ppm, and 2.0V for 2000ppm. For 5000ppm model, the analog output is 0.5V for 1000ppm, and 2.5V for 5000ppm. For high concentration model, such as 7S (7000ppm) or 9S (9000ppm) and 5% models, the analog output is set to 2.5V for full scale value. User might program the offset and full scale value of the analog output by using OST provided installer program. The offset feature is used for 4-20ma current loop interface.

The OGM220 is designed for ease of system integration and connection by using multidrop serial communication (RS485). Each module can program up to 127 node ID with ID “FF” default as global command address. The async communication is set to 9600 bps, 8 data bit and 1 stop bit. For the PC interface, OST also provides USB/RS485 converter to link to OGM220 module. The communication protocol is half duplex with PC as host controller. OGM220 support Modbus RTU mode. Contact OST sales for details.

Figure 2 shows the typical interface connection of OGM2xx family. To get standard 0-10V analog output, an external amplifier is required that has DC gain of 5 for 2000ppm model (Figure 3), other range models, the DC gain is 4 for full scale value. For solid state relay driving, THSOUT must be connected with a current limit resistor R1 as shown in Fig 3. The ON resistance of THSOUT is less than 0.10ohms, and it is open drain output that can sustain up to 20V DC for 1A maximum.

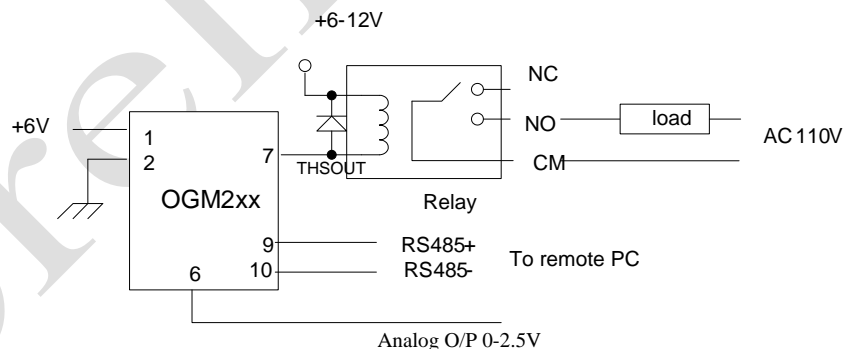


Figure 2 Typical Interface Connection (J1)

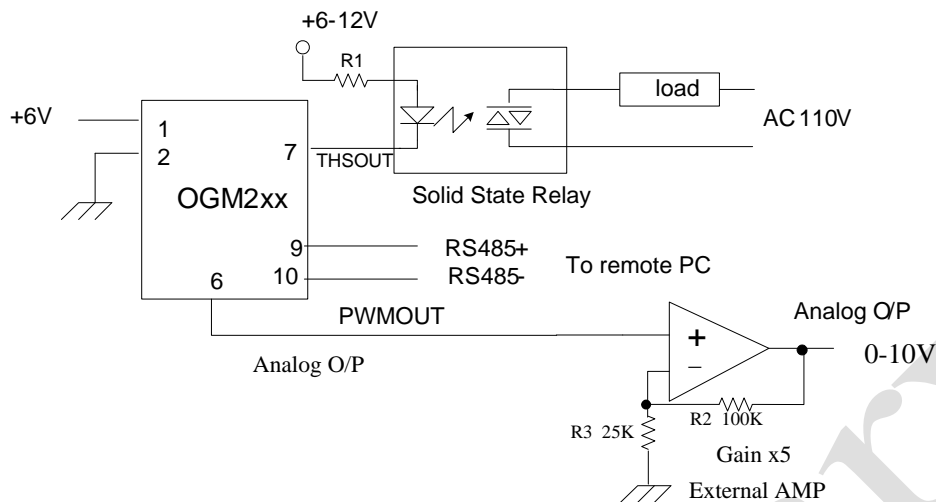


Figure 3 Threshold output for solid state relay driving.

Figure 4 shows the PC interface and multiple sensor connection. A termination resistor of 120 Ohms is required in the remote end, and the cable is twisted pair with characteristic impedance of 120 ohms.

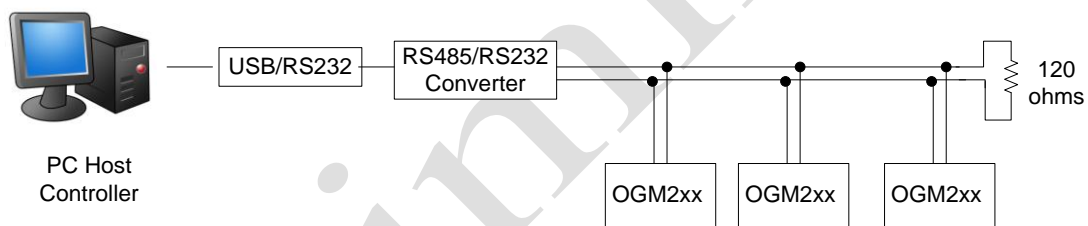


Figure 4 Interface diagram of multi-drop RS485 communication.

Each OGM2xx module must be programmed with different ID address (8 bits). The host controller can issue command to read OGM2xx output at any time. The ID address is factory preset and is shown in the last two digits of module's serial number label in Hex format. A legal ID is between 00-7FH or 0-127 in decimal. The address ID of OGM220 can be modified by installer software only. For one to one communication, user might use FFH as global address to communicate with OGM220.

A self calibration function is provided that can be activated by remote command. This command will align its reading with reference data (e.g. background level at 400ppm). Please contact with OST sales for protocol details.

Interface connector (J3): for mode selection

Pin 1: Factory reserved

Pin 2: GND

Two LED drivers are provided that can drive common anode LEDs as shown in Figure 4. The LED colors are set to green for CO<sub>2</sub> level <800ppm, amber for CO<sub>2</sub> level between 800-1200ppm, and RED for CO<sub>2</sub> level >1200ppm. The LED status level can be programmed by PC through USB/RS485 interface.

Interface connector (J2) for LED display, open drain sourcing drivers

Pin 1: Green LED

Pin 2: RED LED

A typical application circuit of LED driver is shown in Figure 5. Normally two external series resistors with LEDs are required to limit LED current to be less than 20mA. The LED drivers are open drain type that can sustain up to 20V@1A.

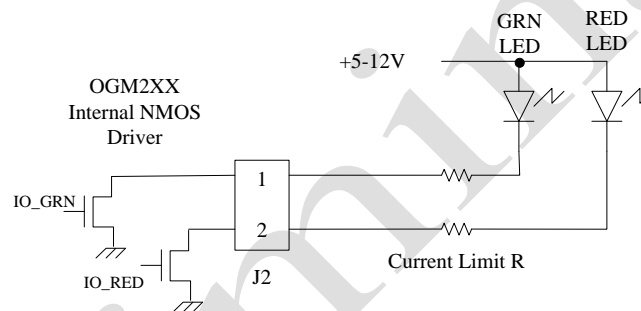


Figure 5 Build-in open drain LED driver (20V max).

For 17x60mm size, J6 connector offers simple connection and its pin definition is listed below;

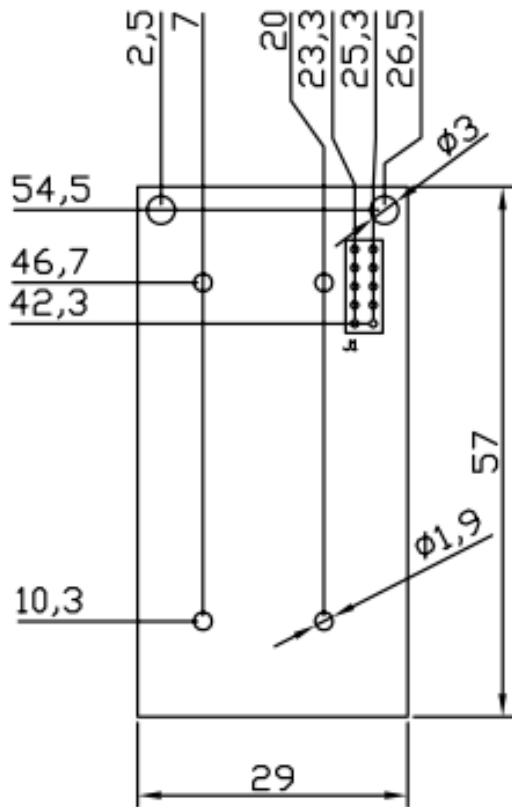
|                           |            |
|---------------------------|------------|
| Pin 1: +5-6V              | Pin 2: GND |
| Pin 3: TXD                | Pin 4: RXD |
| Pin 5: (factory reserved) |            |

### **Package Information**

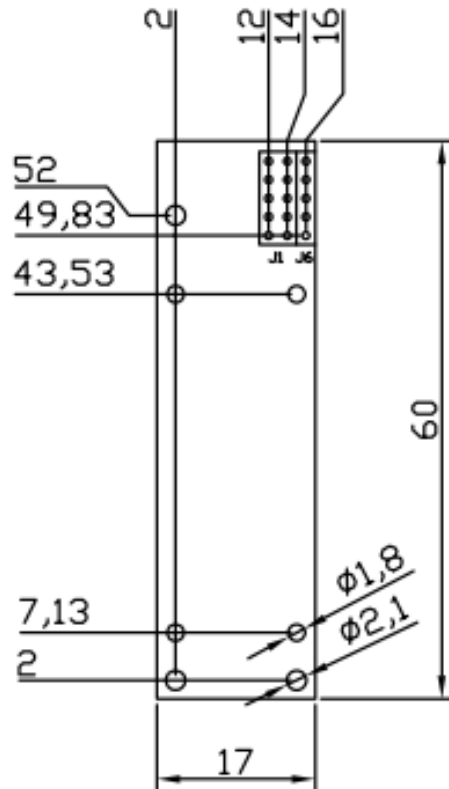
1. Tray: width x depth x height 28x20x4 cm, weight 320g
2. One Box holds 5 trays with 20 pcs in each tray. Total 100 pcs per box maximum.
3. Box size: 30(W)x21(D)x25(H) cm
4. Weight:2.05Kg per Box

**Mechanical Dimension and Connector Coordinate**

(a) Size 29x57mm



(b) Size 17x60mm

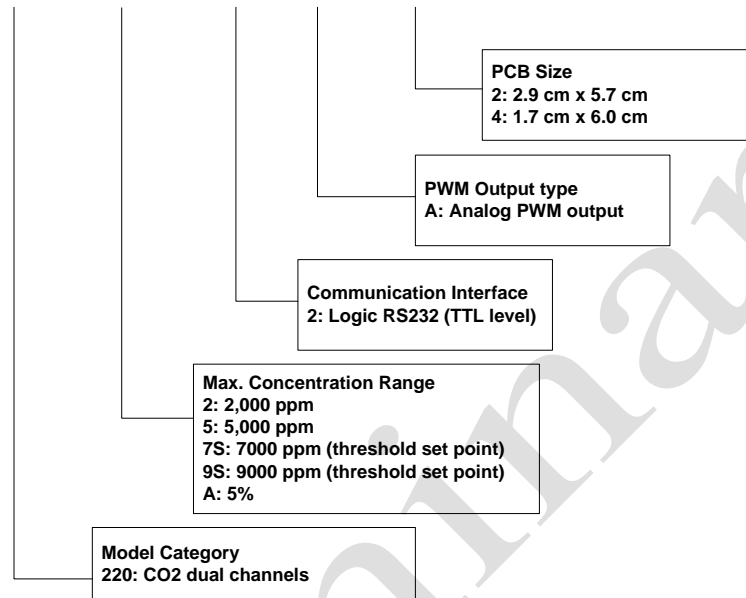


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## Ordering Information

### OGM model number example

**OGM 220 - 5 - 2 A 2**



Note: RS485 option is available for 29x57mm model only.

Typical module part numbers are shown below

- ◆ OGM220-2-2A2: 2000ppm, Logic RS232 (3.3V level), analog output, size 29x57mm
- ◆ OGM220-2-4A2: 2000ppm, RS485, analog output, size 29x57mm.
- ◆ OGM220-2-2A4: 2000ppm, Logic RS232 (3.3V level), analog output, size 17x60mm