CRIR E1

Commercial Carbon Dioxide (CO_2) Sensor, 400 ppm to 2000 ppm, up to 5000 ppm Extended Range

DESCRIPTION

The CRIR E1 Commercial Carbon Dioxide (CO_2) sensor is a single channel, non-dispersive infrared (NDIR) sensor. Within the CRIR E1 is a sensing chamber with an infrared source at one end and a detector fitted with an optical filter at the other end. The source emits radiation at wavelengths which include the absorption band of CO_2. The filter blocks wavelengths which are not sensitive to the presence of CO_2, thereby increasing selectivity and sensitivity. As the light passes through the sensing chamber, a fraction is absorbed if CO_2 is present. The difference between the light emitted by the source and received by the detector can then be converted to a CO_2 concentration reading.

The Automatic Baseline Correction (ABC) function can automatically calibrate the sensor's lowest reading over a pre-configured interval to 400 ppm CO_2. This enhances long term stability and may eliminate the need for calibration.

VALUE TO CUSTOMERS

- Small size
- Maintenance free for normal indoor applications
- Enhanced long term stability
- Higher accuracy: ±50 ppm ±5% of reading
- Consistency and repeatability
- Easy integration

POTENTIAL APPLICATIONS

- HVAC, demand controlled ventilation
- Indoor air quality (IAQ) measurement
- Air purification systems
- Smart /IoT (Internet of Things) systems



FEATURES

- Single channel, non-dispersive infrared technology
- Automatic Baseline Correction
- Temperature compensation
- UART digital interface

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COMMERCIAL CARBON DIOXIDE SENSOR, 400 PPM TO 2000 PPM
CRIR E1

TABLE 1. SPECIFICATIONS

CHARACTERISTIC	PARAMETER
Target gas	carbon dioxide (CO_2)
Operating principle	non-dispersive infrared (NDIR)
Standard range[1, 2]	400 ppm to 2000 ppm, up to 5000 ppm extended range
Measurement interval	4 s
Accuracy[3]	±50 ppm ±5% of reading
Typical response time (T_{90})	≤120 s
Sensor warm-up time	3 min typical
Repeatability	>97%
Operating voltage	4.5 V to 5.5 V unprotected against surges and reverse connection
Power consumption	300 mA peak, 30 mA average
Alarm output, open collector	1000 ppm/800 ppm normal state is conducting max 100 mA. Transistor open at CO_2 high or at sensor failure (see Figure 1).
Serial communication[5]	UART, Modbus protocol
Operating temperature range	0°C to 50°C
Storage temperature range	-40°C to 70°C
Operating humidity	0 %RH to 90 %RH non-condensed
Expected operating life	10 years
Maintenance[6]	maintenance-free for normal indoor applications
Weight	<8 g
Dimensions	33 mm x 22 mm X 11,2 mm (tolerance ±0,5 mm)

[1] The CRIR E1 is designed to measure CO_2 in the range of 400 ppm to 2000 ppm with the accuracy specified in Table 1; however, exposure to concentrations below 400 ppm may result in incorrect operation of the ABC algorithm and should be avoided when the ABC is ON.

[2] The CRIR E1 provides readings via UART in the extended range; however, the accuracy is reduced.

[3] In normal IAQ applications, the sensor accuracy is defined after a minimum of three ABC periods of continuous operation.

[4] The sensor accuracy is specified over the operating temperature range and referenced to certified calibration mixtures. Uncertainty of calibration gas mixtures (±1% currently) is to be added to the specified accuracy for absolute measurements.

[5] See the CRIR E1 User Guide for Modbus address and parameter definitions.

[6] The CRIR E1 normally does not require maintenance in IAQ applications; however, for some industrial applications, maintenance may be required.

FIGURE 1. ALARM STATE DIAGRAM

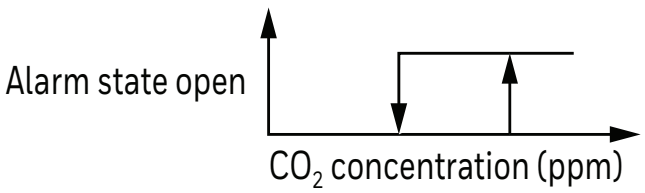


FIGURE 2. MOUNTING DIMENSIONS (FOR REFERENCE ONLY: MM)

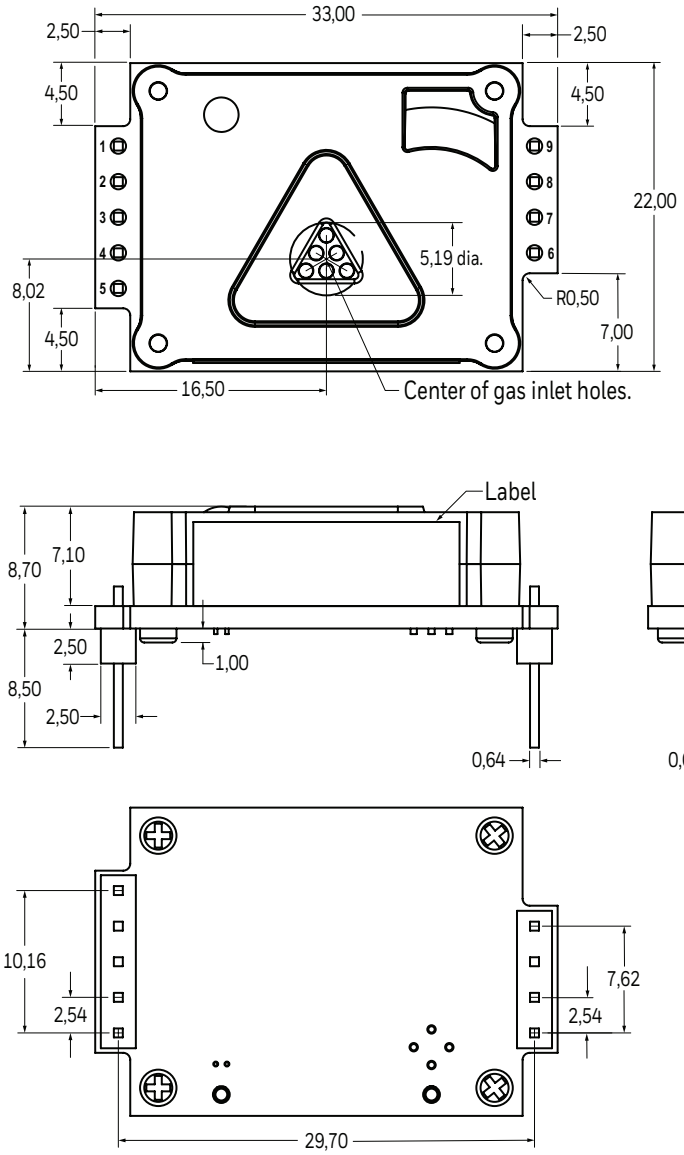


TABLE 2. PINOUT

PIN NUMBER	FUNCTION
1	DAC (See CRIR E1 User Manual)
2	UART_RXD
3	UART_TXD
4	UART_R/T
5	bCAL_in/CAL_in
6	PWM output (See CRIR E1 User Manual)
7	Alarm output
8	GND
9	Vin_(4.5 V to 5.5 V)

TABLE 3. ORDER GUIDE

CATALOG LISTING	DESCRIPTION
C06-0800-000	CRIR E1 Commercial Carbon Dioxide Sensor, 400 ppm to 2000 ppm, up to 5000 ppm extended range

ADDITIONAL MATERIALS

The following associated literature is available at sensing.honeywell.com:

- CRIR E1 User Guide

FOR MORE INFORMATION

Honeywell Sensing and Internet of Things services its customers through a worldwide network of sales offices and distributors. For application assistance, current specifications, pricing or the nearest Authorized Distributor, visit sensing.honeywell.com or call:

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⚠ WARNING
MISUSE OF DOCUMENTATION

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- Complete installation, operation, and maintenance information is provided in the instructions supplied with each product.

Failure to comply with these instructions could result in death or serious injury.

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