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

Alarm state open

CO_2 concentration (ppm)
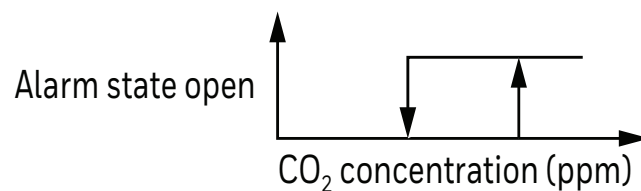
COMMERCIAL CARBON DIOXIDE SENSOR, 400 PPM TO 2000 PPM
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FIGURE 2. MOUNTING DIMENSIONS (FOR REFERENCE ONLY: MM)

Center of gas inlet holes.
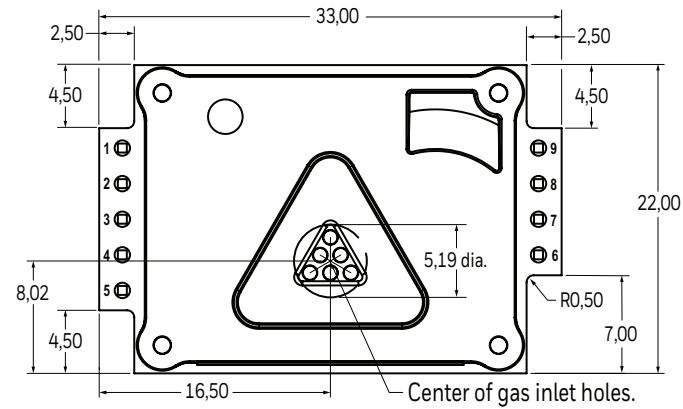
Label

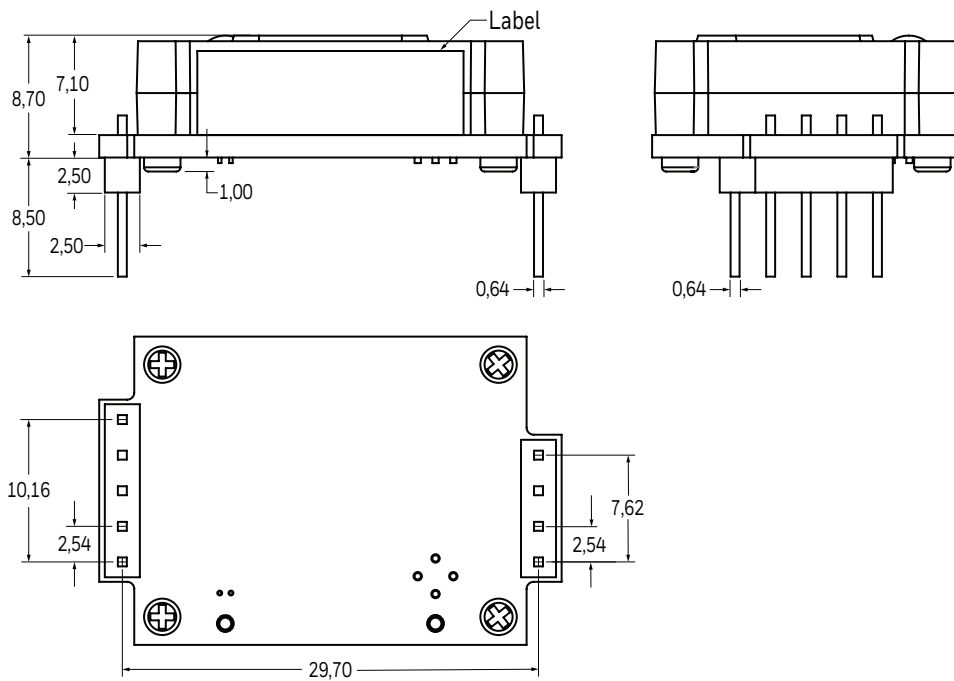| TABLE 2. PINOUT	
PIN NUMBER	**FUNCTION**
1	DAC (See CRIR E1 User Manual)
2	UART_RXD
3	UART_TXD
4	UART_R/T
5	bCAL_in/CAL_in
6	PWM output (See CRIR E1 User Manual)
7	Alarm output
8	GND
9	Vin_(4.5 V to 5.5 V)

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

WARRANTY/REMEDY

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship during the applicable warranty period. Honeywell's standard product warranty applies unless agreed to otherwise by Honeywell in writing; please refer to your order acknowledgment or consult your local sales office for specific warranty details. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace, at its option, without charge those items that Honeywell, in its sole discretion, finds defective. **The foregoing is buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall Honeywell be liable for consequential, special, or indirect damages.**

While Honeywell may provide application assistance personally, through our literature and the Honeywell web site, it is buyer's sole responsibility to determine the suitability of the product in the application.

Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this writing. However, Honeywell assumes no responsibility for its use.

⚠ **WARNING**
PERSONAL INJURY

DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.

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

⚠ **WARNING**
MISUSE OF DOCUMENTATION

- The information presented in this product sheet is for reference only. Do not use this document as a product installation guide.
- 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.

FOR MORE INFORMATION

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