CD2 SERIES

Duct Mount All-in-One CO_2, RH, Temp, VOC and PM Sensing

CD2

CD2 Series Air Quality Sensors are duct mount all-in-one sensors for monitoring air quality. The device combines CO_2, temperature, humidity, VOC and particulate matter (PM) sensing into a single unit to ensure a building's optimum air quality and energy efficiency.

Each device is an active sensor that converts a measurement into one of the following output options:

- Analog output: 4-20 mA, 0 to 5 Vdc or 0 to 10 Vdc
- Protocol output: BACnet MS/TP, Modbus RTU

Different models are available based on application requirements for lower-cost installations.

CD2 is available with an LCD display option on selected models. See Ordering Information for details.

BACnet & Modbus

Embedded BACnet and Modbus communication protocols for easy systems integration

Easy to install

Latch-on sensor cover and screwless terminal block wiring with spring actuator

Self-calibrating

Innovative self-calibration algorithm…easy to maintain

Field selectable

Field-selectable outputs for operation flexibility

Dual-beam NDIR CO_2 sensor

Dual-beam, non-dispersive infrared technology (NDIR) repeatable to ±20 ppm ±1% of measured value… high accuracy measurement

Field replaceable

Replace RH element and temp transmitter in the field… maintain accuracy and minimize downtime and cost

APPLICATIONS

- HVAC systems
- Indoor air quality monitoring
- Life sciences applications
- Key component for the LEED green building program and WELL Building Standard*

*Leadership in Energy and Environmental Design (LEED) is a registered trademark of the US Green Building Council. The WELL Building Standard is a trademark of the International WELL Building Institute in the United States and other countries..

SPECIFICATIONS

OPERATING & STORAGE ENVIRONMENT	
Operating Temp. Range	0 to 50 °C (32 to 122 °F)
Operating Humidity Range	0 to 95% RH (non-condensing)
Storage Temp. Range	-25 to 70 °C (-13 to 158 °F)
Storage Humidity Range	0 to 95% RH (non-condensing)
Power Supply	3-wire volt mode: 20 to 30 Vdc, 24 Vac, 50 to 60 Hz
Output	Analog: selectable 4 to 20 mA, 0 to 5 Vdc, 0 to 10 Vdc Protocol: BACnet MS/TP, Modbus RTU
Power Consumption	See Maximum Power Consumption table, next page
Tube Length	200 mm
Medium	Neutral gas, air
Housing Material	Polycarbonate; flammability rating UL 94 V0
Mounting Location	For indoor use only. Not suitable for wet locations.
IP Rating	IP 65
Protection Class	Class III
CO_2 SENSOR	
Sensor Type	Non-dispersive infrared (NDIR), diffusion sampling
Output Range	Analog models: 0 to 2000/5000 ppm (selectable) Protocol models: 0 to 10,000 ppm
Accuracy	±30 ppm ±3% of measured value
Repeatability	±20 ppm ±1% of measured value
Response Time	<60 seconds for 90% step change
Calibration	Field calibration support

VOC SENSOR OPTION		
Sensor Type	Solid state	
Output Range	0 to 100% AQI for VOC	
Accuracy	±15% sensor-to-sensor variation	
	LEVEL	**VENTILATION RECOMMENDATION**
AQI Table	>61%	Greatly increased
	20 to 61%	Significantly increased
	10 to 20%	Slightly increased
	5 to 10%	Average
	0 to 5%	Target value

RH SENSOR OPTION	
Sensor Type	Solid state capacitive, replaceable
Accuracy*	±2% from 10 to 80% RH @ 25 °C (77 °F) ±1%, ±2% replaceable models
Hysteresis	1.5% typical
Linearity	Included in accuracy specification
Stability	±1% @ 20°C (68 °F) annually for 2 years
Output Range	0 to 100% RH
Temperature Coefficient	±0.1% RH/°C above or below 25 °C (77 °F) typical

TEMPERATURE SENSOR OPTION	
Sensor Type	Solid state, integrated circuit
Temp. Sensing Element**	See Ordering Information on page 2 for available temp. sensing elements
Time Constant	Air velocity 1.5 m/s. approx. 72 s; Air velocity 3.0 m/s. approx. 52 s
Accuracy***	±0.2 °C (±0.4 °F) typical at 25 °C
Resolution	0.1 °C (0.1 °F)
Range	0 to 50 °C (32 to 131 °F)

SPECIFICATIONS (CONT.)

PM SENSOR OPTION

Sensor Type	Laser-scatter
Particulate Size	PM1.0, PM2.5, PM4.0, PM10
Resolution	±1 µg/m³
Mass Concentration Range	±1 µg/m³
Accuracy	PM1 and PM2.5: 0 to 100 µg/m³ +/-[5µg/m³+5% m.v.], 100 to 1000 ug/m³ +/-[10% m.v.] PM4 and PM10:**** 0 to 100 µg/m³ +/-[25µg/m³], 100 to 1,000 µg/m³ +/-[25% m.v.] (sensor-to-sensor deviation)

DISPLAY MODELS

LCD Type	Positive display with backlight
Measurement Values Displayed	CO_2: ppm, Temp: °C or °F, Humidity: % RH, VOC: % AQI, PM: µg/m³
Display Resolution	CO_2: 1 ppm, Temp: 0.1 °C or °F, Humidity: 0.1% RH VOC: 1% AQI, PM: 1 µg/m³

WIRING TERMINALS

Terminal Blocks	Screwless terminal block with spring actuator, 16-24 AWG

WARRANTY

Limited Warranty	5 years

COMPLIANCE INFORMATION

Agency Approvals	UL 916 European Conformance CE: EN 60730-1, EN 61000-6-2, EN 61000-6-3, EN 61000 Series - Industrial Immunity, EN 61326-1 FCC Part 15 Class A, REACH, RoHS, RoHS 2 (China), RCM (Australia), ICES-003 (Canada), UKCA (UK)

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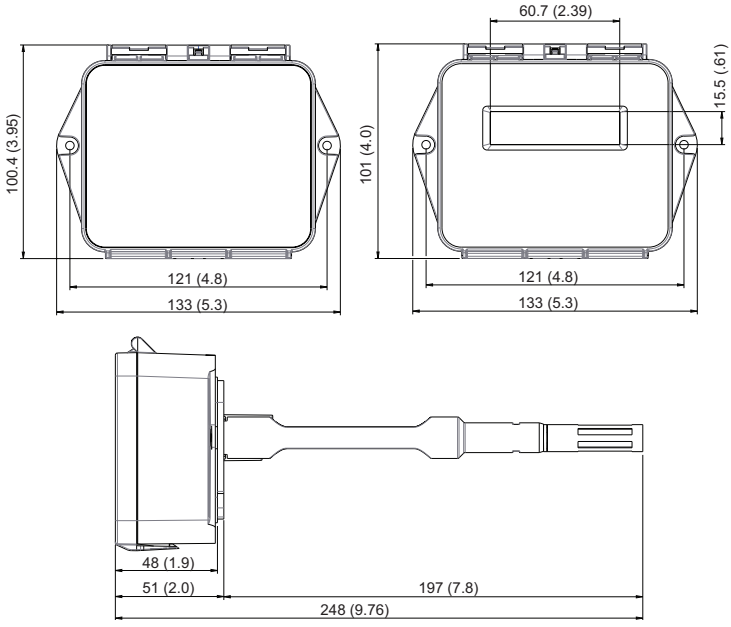
* Humidity sensor measurement uncertainty should include: accuracy, hysteresis, temperature coefficient and stability.
**See thermistor table Z202030 for accuracy.
***±0.5 °C over full operating range.
****PM4 and PM10 output values are calculated based on the distribution profile of all measured particles.

DIMENSIONAL DRAWING

mm (in.)



WIRING DIAGRAM

See installation guide for wiring information.

MAXIMUM POWER CONSUMPTION

SERIES	LCD	CO_2/VOC	PM	TEMP/RH	MAX. POWER
CD2 Analog	Yes	Yes	Yes	Yes	9VA @ 24VAC
	Yes	Yes	No	Yes	8VA @ 24VAC
	Yes	No	Yes	Yes	7VA @ 24VAC
	No	Yes	No	Yes	6VA @ 24VAC
	No	Yes	No	No	4VA @ 24VAC
CD2 Protocol	Yes	Yes	Yes	Yes	4VA @ 24VAC
	Yes	Yes	No	Yes	3VA @ 24VAC
	No	Yes	Yes	Yes	2VA @ 24VAC
	Yes	Yes	No	Yes	1.5VA @ 24VAC

ORDERING INFORMATION

MODEL	LCD	2% RH SENSOR	TEMP.	NDIR CO_2	VOC	PM
Analog Models						
CD2LAXAVP	X		Temp Transmitter	X	X	X
CD2LAXAVX	X		Temp Transmitter	X	X	
CD2LAXAXP	X		Temp Transmitter			X
CD2XA2AVX		X	Temp Transmitter	X	X	
CD2XA2BCX		X	100 PT RTD	X		
CD2XA2CCX		X	1000 PT RTD	X		
CD2XA2DCX		X	10K T2	X		
CD2XA2HCX		X	10K T3	X		
CD2XA2KCX		X	10K Curve G/11K	X		
CD2XA2MCX		X	20K NTC	X		
CD2XA2NCX		X	1.8K	X		
CD2XAXAVX			Temp Transmitter	X	X	
CD2XAXBCX			100 PT RTD	X		
CD2XAXCCX			1000 PT RTD	X		
CD2XAXDCX			10K T2	X		
CD2XAXHCX			10K T3	X		
CD2XAXKCX			10K Curve G/11K	X		
CD2XAXMCX			20K NTC	X		
CD2XAXNCX			1.8K	X		
Protocol Models						
CD2LP2AVP	X	X	Temp Transmitter	X	X	X
CD2LP2AVX	X	X	Temp Transmitter	X	X	
CD2LPXAVP	X		Temp Transmitter	X	X	X
CD2LPXAVX	X		Temp Transmitter	X	X	
CD2XP2AVP		X	Temp Transmitter	X	X	X
CD2XP2AVX		X	Temp Transmitter	X	X	
CD2XPXAVP			Temp Transmitter	X	X	X
CD2XPXAVX			Temp Transmitter	X	X	

Note: Replaceable RH and temperature modules available to be ordered separately per table below.

REPLACEABLE RH ELEMENTS & TEMPERATURE AND HUMIDITY CALIBRATION MODULES

MODEL	DESCRIPTION	TEMP. CALIBRATION	RH CALIBRATION
HS1N	Replaceable RH sensor, 1% with NIST certificate	N/A	2-point calibration
HS2N*	Replaceable RH sensor, 2% with NIST certificate	N/A	2-point calibration
HS2X	Replaceable RH sensor, 2%	N/A	2-point calibration
TS2**	Replaceable temperature module with 2-point calibration certificate	2-point calibration	N/A
THS2**	Replaceable temperature and humidity module with 2-point calibration certificate	2-point calibration	2-point calibration

*Not for use with HO2 Series outdoor humidity sensors. **For use on temp transmitter models only