



CDL



CDE



**NOTICE**

- This product is not intended for life or safety applications.
- Do not install this product in hazardous or classified locations.
- Read and understand the instructions before installing this product.
- Turn off all power supplying equipment before working on it.
- The installer is responsible for conformance to all applicable codes.

No responsibility is assumed by Veris Industries for any consequences arising out of the use of this material.

# CD Series

## Duct Mounted CO<sub>2</sub> Sensors

### Product Overview

CD series duct mount CO<sub>2</sub> sensors measure the levels of CO<sub>2</sub>, RH (if equipped), and temperature (if equipped) of air inside a duct. The CO<sub>2</sub> sensor operates within accuracy specifications for an interval of 5 years and can be field calibrated. The temperature element is warranted to meet accuracy specifications for a period of 5 years. RH equipped models feature a replaceable HS Series humidity element that is warranted to meet accuracy specifications for a period of 1 year. To maintain accuracy, all vents must remain clear and free of dust, debris, etc.

### Product Identification

#### Standard Models:

CDE

#### Deluxe Models:

CDLS	RH Option	Temp Option	Temp Sensor Type	Optional Temp Cal Cert
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	H = RH2% X = No RH	T = Temp X = No Temp (Stop here)	A = Transmitter B = 100R Platinum, RTD C = 1k Platinum, RTD D = 10k T2, Thermistor E = 2.2k, Thermistor F = 3k, Thermistor G = 10k CPC, Thermistor H = 10k T3, Thermistor J = 10k Dale, Thermistor K = 10k w/11k shunt, Thermistor M = 20k NTC, Thermistor N = 1800 ohm, Thermistor R = 10k US, Thermistor S = 10k 3A221, Thermistor T = 100k, Thermistor U = 20k "D", Thermistor W = 10k T2 high accuracy, Thermistor Y = 10k T3 high accuracy, Thermistor Z = 10k E1, Thermistor	Blank = None 1 = 1 pt Temp Cert 2 = 2 pt Temp Cert

## Specifications

<b>Input Power</b>	20 to 30VDC/24VAC; 100mA max.
<b>Analog Output</b>	
CDL	4-20mA (clipped & capped)/0-5VDC/0-10VDC (selectable)
CDE	4-20mA (clipped & capped)/0-10VDC (selectable)
<b>Operating Temp Range</b>	0° to 50°C (32° to 122°F)
<b>Operating Humidity Range</b>	0 to 95% RH noncondensing
<b>Housing Material</b>	High impact ABS plastic
<b>CO<sub>2</sub> TRANSMITTER</b>	
<b>Sensor Type</b>	Non-dispersive infrared (NDIR), diffusion sampling
<b>Output Range</b>	
CDL	0-2000/5000 ppm (programmable)
CDE	0-2000 ppm
<b>Accuracy</b>	±30 ppm ±2% of measured value*
<b>Repeatability</b>	±20 ppm ±1% of measured value
<b>Response Time</b>	<60 seconds for 90% step change
<b>RH TRANSMITTER (AVAILABLE ON CDL MODELS ONLY)</b>	
<b>HS Sensor</b>	Fully replaceable, digitally profiled thin-film capacitive (32-bit mathematics) U.S. Patent 5,844,138
<b>Accuracy</b>	±2% from 10 to 80% RH @ 25°C; NIST traceable multi-point calibration
<b>Hysteresis</b>	1.5% typical
<b>Stability</b>	±1% @ 20°C (68°F) annually for two years
<b>Output Range</b>	0-100% RH
<b>Temperature Coefficient</b>	±0.1% RH/°C above or below 25°C (typical)
<b>TEMPERATURE TRANSMITTER (AVAILABLE ON CDL MODELS ONLY)</b>	
<b>Sensor Type</b>	Solid-state, integrated circuit
<b>Accuracy</b>	±0.5°C (±1°F) typical
<b>Resolution</b>	0.1°C (0.2°F)
<b>Output Range</b>	10° to 35°C (50° to 95°F)
<b>RELAY CONTACTS (AVAILABLE ON CDL MODELS ONLY)</b>	
<b>1 Form C (SPDT)</b>	1A@30VDC, resistive; 30W max.

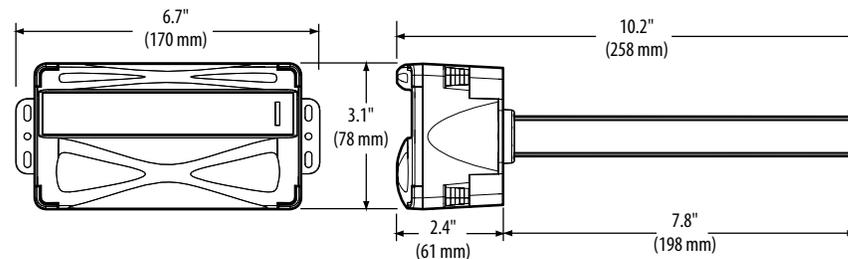
EMC Conformance: Low voltage directive 2006/95/EC & EMC directive 2004/108/EC.

EMC Special Note: Connect this product to a DC distribution network or an AC DC power adaptor with proper surge protection (EN 61000-6-1:2007 specification requirements).

\* Measured at NTP

Note: Rough handling and transportation may cause a temporary reduction of CO<sub>2</sub> sensor accuracy. With time, the ABC function will tune the readings back to the correct accuracy range. The default tuning speed is limited to 30 ppm per week.

## Dimensions

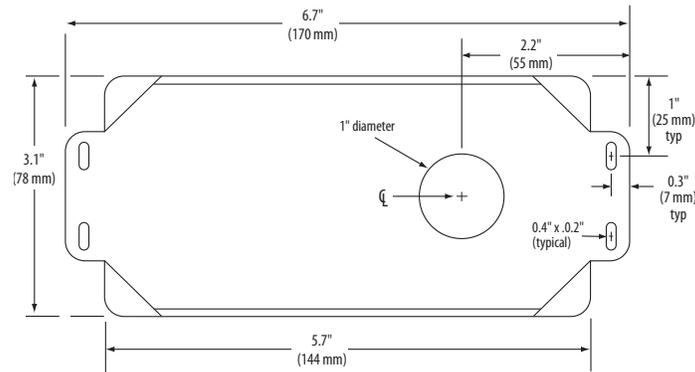


## Installation

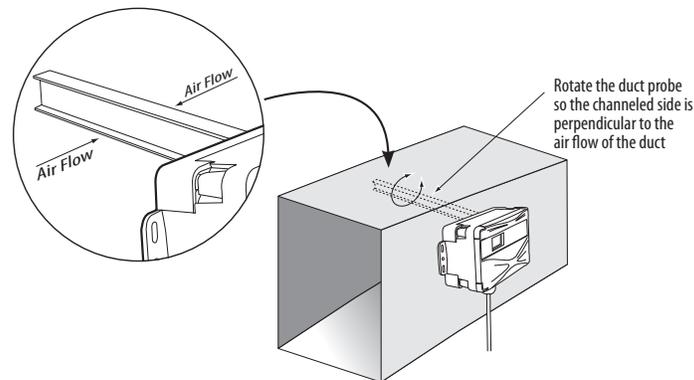


Observe precautions for handling static sensitive devices to avoid damage to the circuitry that is not covered under the factory warranty.

1. Choose a location to mount the sensor. The centerline of the housing must be parallel to the direction of air flow in the duct.
2. Use the mounting diagram to drill the four holes in the duct for securing the sensor.



3. Insert the probe into the hole. Rotate the housing so that the widest surface is perpendicular to the air flow.

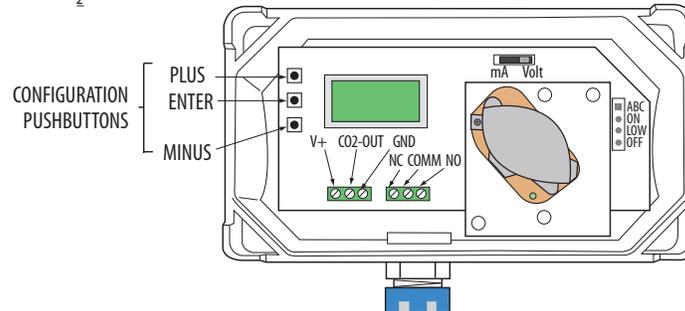


4. Attach the sensor to the duct using the sheet metal screws provided. Make sure that the gasket on the back of the housing is compressed between the housing and the duct for a secure fit.
5. Wire the device. See Wiring section.
6. Configure the system using the menu (CDL only; see Configuration section).
7. Calibrate using 0 ppm CO<sub>2</sub> gas (see Calibration section).

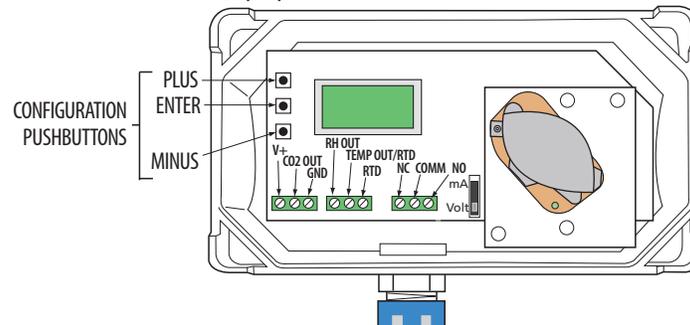
Wiring

1. Feed the control wire through the conduit adapter and the grommeted compression fitting on the bottom of the housing.
2. Remove the terminal blocks by pulling outward on the assemblies.
3. Connect wires as shown and push the terminal blocks back into the receptacles.
4. Tighten the compression fitting around the control wire until it is sealed.
5. Snap the conduit adapter onto the compression fitting.
6. Select mA or Volt output using the selector switch.

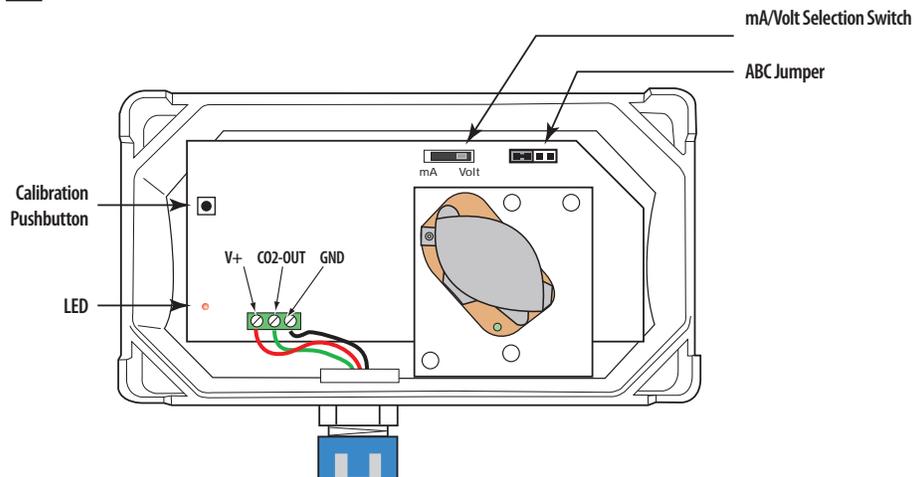
CDL: CO<sub>2</sub> Only



CDL: With RH and/or Temp Options



CDE



## Configuration (CDL Models Only)

### Run Mode

1	0	0	0		P	P	M
		*			C	0	2

CO<sub>2</sub> only model  
\*Indicates relay status

1	0	0	0		P	P	M
5	0	.	0		%	R	H

CO<sub>2</sub>/RH model

1	0	0	0		P	P	M
7	0	.	0			°	F

CO<sub>2</sub>/Temp model

1	0	0	0		P	P	M
X	X	.	X		X	X	X

CO<sub>2</sub>/RH/Temp model  
Toggle between %RH and degrees

### Configuration Mode

Press ENTER to enter Configuration mode.  
Press plus or minus to change a setting.

S	E	T	P	O	I	N	T
C	0	2			8	0	0

Range is 500 to 1500 in 50 ppm increments

D	E	A	D	B	A	N	D
C	0	2			1	0	0

Range is 10 to 500 in 5 ppm increments

R	A	N	G	E			
C	0	2		X	X	X	X

Options are 2000 or 5000

A	B	C		M	O	D	E
-		X	X	X			+

Options are ON, LOW, or OFF  
See the ABC Calibration Algorithm section for explanations

U	N	I	T	S			
-			°	X			+

Temp model only; options are °F or °C

	O	U	T	P	U	T	
-	0	-	1	0	V		+

Voltage mode only; options are 0-5V or 0-10V  
Default is 0-10V

	O	U	T	P	U	T	
	4	-	2	0	m	A	

mA mode only

### Calibration Mode

Push and hold plus and minus for 5 seconds to enter Calibration mode. Press arrows to change options. Press ENTER for the next selection.

	S	E	R	I	A	L	
X	X	X	X	X	X	X	X

Displays serial number

		X	X	X			
	X	X	X	X	X		

Displays model number

O	F	F	S	E	T		
°	C				X	.	X

Range is -5 to 5°C in 0.1°C increments  
(available only in models equipped with temp sensing)

O	F	F	S	E	T		
%	R	H		X	X	.	X

Range is -10 to 10% RH in 0.1% increments  
(available only in models equipped with RH sensing)

C	0	2		C	A	L	?
-			X	X	X		+

Options are YES or NO

C	A	L		G	A	S	?
-			X	X	X	X	+

Options are NONE, 0, or 400

W	O	R	K	I	N	G	
*			5	:	0	0	

The unit automatically returns to Run mode when calibration is complete.

Note: This product is factory calibrated. The typical CO<sub>2</sub> sensor calibration interval is 5 years, depending on specific site installation factors. As of the date of this document, compliance with ANSI/ASHRAE 62-2001 requires minimum on-site accuracy verification intervals of 6 months or per the building operation and maintenance manual. Verify accuracy using a comparison to a known reference or the CO<sub>2</sub> gas calibration kit available from Veris Industries as AA01.

Note: CO<sub>2</sub> sensor calibration requires gas calibration kit. Performing calibration without gas kit or at an incorrect gas flow rate will cause erroneous readings.

## ABC Calibration Algorithm

ABC (Automatic Baseline Calibration) is a patented self-calibration feature that automatically adjusts the CO<sub>2</sub> sensor to compensate for drift. When ABC is enabled, the sensor records the lowest reading within every 24-hour interval and compares these values over a running 7-day or 28-day period. If a statistically significant amount of drift is detected, the ABC applies an automatic correction factor. This enables the sensor to operate within specifications for the 5-year calibration interval.

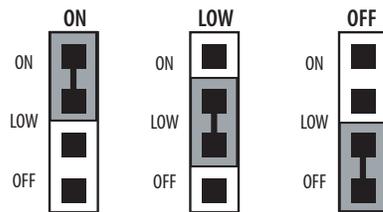
**ON POSITION.** Recommended Setting. Use the ON setting for applications where the building is unoccupied within a 24-hour timeframe.

**LOW POSITION.** Use the LOW setting for buildings occupied 24 hours a day.

**OFF POSITION.** Not Recommended.

To set the ABC mode for CDL models, refer to the Configuration section.

To set the ABC mode for CDE models, position the ABC jumper as shown below.



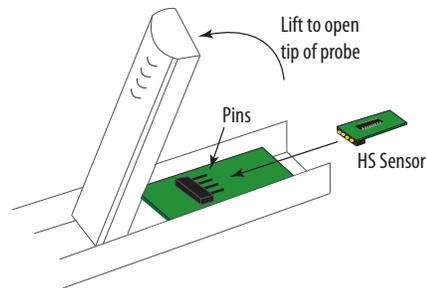
**NOTE:** After changing the ABC settings, power cycle the unit for the changes to take effect.

## Replacing the RH Element (If Equipped, CDL Models Only)



Observe precautions for handling static sensitive devices to avoid damage to the circuitry that is not covered under the factory warranty.

1. Disconnect power to the unit.
2. Remove the CDL from the duct to access probe tip.
3. Open the probe tip.
4. Slide the old RH sensor off the pins.
5. Slide the new RH sensor onto the pins.
6. Re-install the CDL in the duct.
7. Restore power.



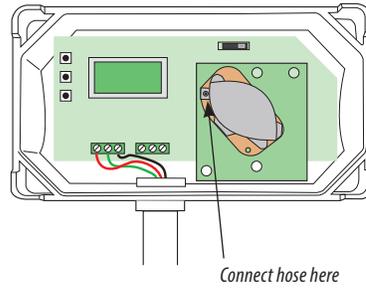
## Output Scaling

### 0-2000 ppm

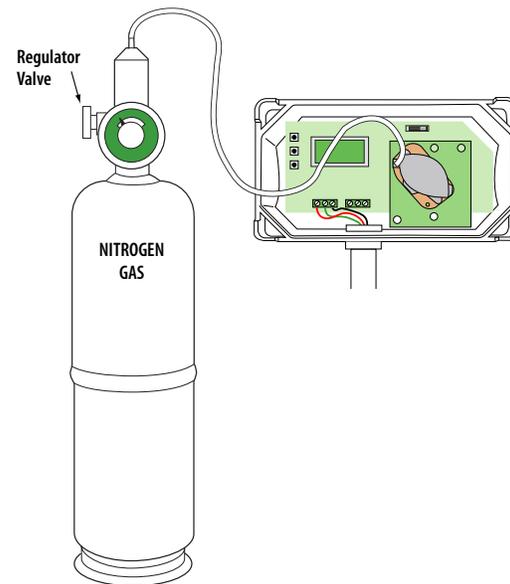
	CO <sub>2</sub> ppm	0-5 Volt Output	0-10 Volt Output	mA Output
Outside	300-500	0.75 to 1.25	1.5 to 2.5	6.4 to 8
Over Ventilated	Under 600	under 1.5	Under 3	Under 8.8
Ideal Ventilation	600-900	1.5 to 2.25	3 to 4.5	8.8 to 11.2
Under Ventilated	Over 900	over 2.25	Over 4.5	Over 11.2

## Calibration - CDL Models

1. Remove the cover and connect the gas cylinder hose to the plastic port located on the sensing module. Note: only connect one sensor to the calibration gas cylinder at a time.



2. Start flowing nitrogen gas (0 ppm CO<sub>2</sub>). Use a flow rate of 0.3 to 0.5 liter/minute.

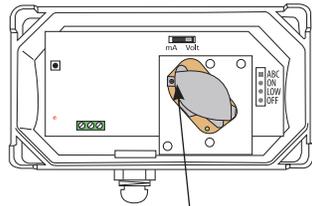


3. Calibrate for 5 min. The unit returns to working display when finished.
4. When unit returns to working display, remove the hose from the calibration port and enter the Calibration mode as described in the Configuration section.

*Note: For more information about this calibration procedure, see the installation guide for the AA01 calibration kit.*

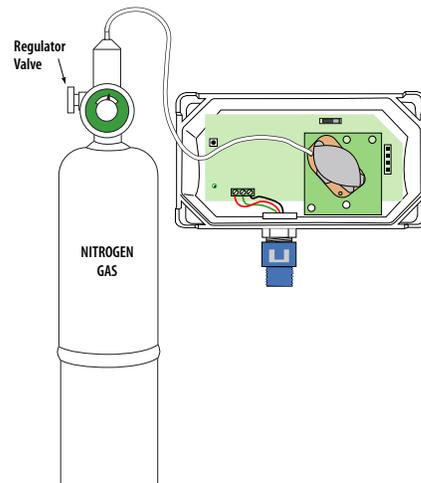
## Calibration - CDE Models

1. Remove the cover and connect a gas cylinder hose to the plastic port located on the sensing module. Note: only connect one sensor to the calibration gas cylinder at a time.

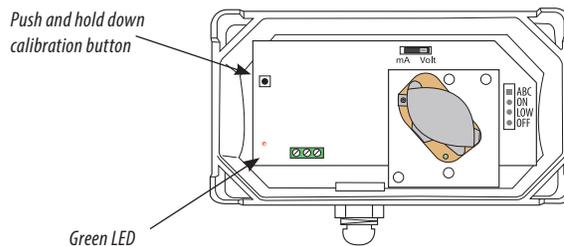


Connect hose here

2. Start flowing nitrogen gas (0 ppm CO<sub>2</sub>). Use a flow rate of 0.3 to 0.5 liter/minute.



3. Push and hold down the calibration button until the LED illuminates.



4. Continue flowing gas through the sensor until the LED deluminates. Estimated calibration time is 5 minutes. Remove the hose from the calibration port when complete.

*Note: For more information about this calibration procedure, see the installation guide for the AA01 calibration kit.*