CW SERIES

CWL

CWE

CE

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.

PRODUCT IDENTIFICATION

WALL DELUXE MODELS:

CWL [S] [RH Option] [Temp] [Sensor Type]

RH Option	Temp	Sensor Type	
H = RH 2%	T = Temp	A = Transmitter	J = 10k Dale, Therm.
X = No RH	X = No (stop here)	B = 100R Platinum, RTD	K = 10k w/11k shunt, Therm.
		C = 1k Platinum, RTD	M = 20k NTC, Therm.
		D = 10k T2, Therm.	N = 1800 ohm, Therm.
		E = 2.2k, Therm.	R = 10k US, Therm.
		F = 3k, Therm.	S = 10k 3A221, Therm.
		G = 10k CPC, Therm.	T = 100k, Therm.
		H = 10k T3, Therm.	U = 20k "D", Therm.

Options Available

Temp Cal Cert	Option	Setpoint Slider Value
X = No	1 = Push Button Override *	–
1 = 1pt Temp Cal	2 = Set Point Slider	A = 1k
2 = 2pt Temp Cal	3 = Push Button Override*+Set Point Slider	F = 10k
		G = 20k
		K = 50k
		M =100k

** Note: the Pushbutton Override feature is not available with temperature transmitter models. Only resistive temperature models qualify for this feature.*

WALL ECONOMY MODELS:

CWE [S] [Sensor Type]

Sensor Type	
B = 100R Platinum, RTD	K = 10k w/11k shunt, Therm.
C = 1k Platinum, RTD	M = 20k NTC, Therm.
D = 10k T2, Therm.	N = 1800 ohm, Therm.
E = 2.2k, Therm.	R = 10k US, Therm.
F = 3k, Therm.	S = 10k 3A221, Therm.
G = 10k CPC, Therm.	T = 100k, Therm.
H = 10k T3, Therm.	U = 20k "D", Therm.
J = 10k Dale, Therm.	

CW SERIES

Wall Mounted Environmental CO_2 Sensors

Installer's Specifications

Input Voltage	20 to 30VDC, 24VAC
Analog Output	CWL: 4-20mA (clipped and capped)/0-5VDC/0-10VDC (selectable) CWE: 4-20mA (clipped and capped)/0-10VDC (selectable);
Sensor Current Draw	100mA max.
Operating Temperature Range	No humidity option: 0° to 50°C (32° to 122°F) With humidity option**: 10° to 35°C (50° to 95°F)
Operating Humidity Range	0-95% (noncondensing)
Housing Material	High impact ABS plastic
CO_2 Transmitter:	
Sensor Type	Non-dispersive infrared (NDIR), diffusion sampling
Output Range	CWL: 0-2000 ppm or 0-5000 ppm, user selectable; CWE: 0-2000 ppm
Accuracy	±30 ppm ±2% of measured value*
Repeatability	±20 ppm ±1% of measured value
Response Time	<60 seconds for 90% step change
*RH Transmitter**:*	
HS Sensor	Digitally profiled thin-film capacitive (32-bit mathematics); U.S. Patent 5,844,138
Accuracy	±2% from 10 to 80% RH @ 25°C; Multi-point calibration NIST
Hysteresis	1.5% typical
Linearity	Included in Accuracy spec.
Stability	±1% @ 20°C (68°F) annually for two years
Output Range	0-100% RH
Temperature Coefficient	±0.1% RH/°C above or below 25°C (typical)
*Temperature (Transmitter)**:*	
Sensor Type	Thermistor
Accuracy	±0.5°C (±1°F) typical
Resolution	0.1°C (0.2°F)
Output Range	10° to 35°C (50° to 95°F)
*Relay Contacts**:*	
1 Form C (on models without setpoint slider option)	1A@30VDC, resistive; 30W max.

Specified accuracy with 24VDC supplied power with rising humidity. RTD/Thermistors in wall packages are not compensated for internal heating of product.
EMC Conformance: EN 61000-6-3:2001 Class B, EN 61000-6-1:2001, EN 61000-3-2:2000, EN 61000-3-3:2001
EMC Test Methods: CISPR 22:1997(Amended A9:2000, A2:2002), IEC 61000-4-2:2001, IEC 61000-4-3:2002, IEC 61000-4-4:2004, IEC 61000-4-5:2001, IEC 61000-4-6:2004, IEC 61000-4-8:2001, IEC 61000-4-11:2004.
EMC Special Note: Connect this product to a DC distribution network or an AC/DC power adaptor with proper SURGE PROTECTION (EN 61000-6-1:2001 specification requirements)
** Measured at NTP*
*** Not available on CWE*
Note: Rough handling and transportation may cause a temporary reduction of CO_2 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.

QUICK INSTALL

1. Select a mounting location away from ventilation sources. The sensor should be mounted on a vertical wall, about 4 1/2 feet above the floor.
2. Affix the backplate to the wall.
3. Wire the device. Refer to wiring diagrams on page 2.
4. Install Cover.

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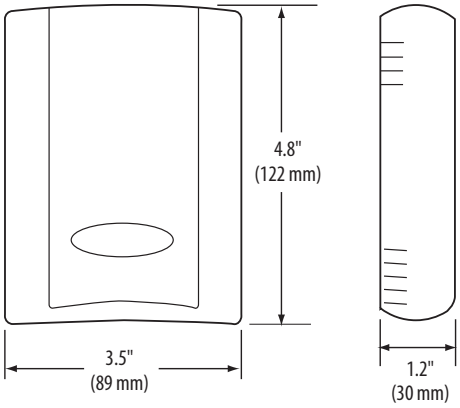
OPERATION

CW series wall mount CO_2 sensors measure the levels of CO_2, RH (if equipped), and temperature (if equipped) of air inside a duct. The CO_2 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.

DIMENSIONS



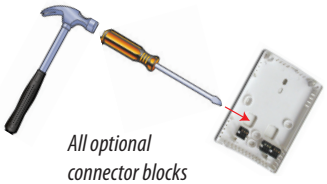
INSTALLATION

1. Remove the cover by pressing the tab at the top of the sensor while pulling outward from the top of the cover.

Observe handling precautions for static sensitive devices to avoid damage to the circuitry which would not be covered under the factory warranty.

2. Remove the backplate by unfastening the sensor from the bottom of the backplate and pivoting the sensor outward.

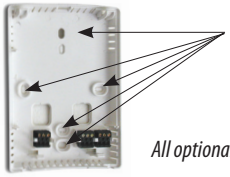
3. Punch out desired wire openings in the backplate.



All optional connector blocks are shown here for clarity.

4. Position the sensor vertically on the wall, 4 1/2 feet above the floor. Locate away from windows, vents, and other sources of draft. If possible, do not mount on an external wall, as this might cause inaccurate temperature readings.

5. Mount the backplate onto the wall using the screws provided.



Five screwholes available; use a minimum of two for secure mounting.

All optional connector blocks are shown here for clarity.

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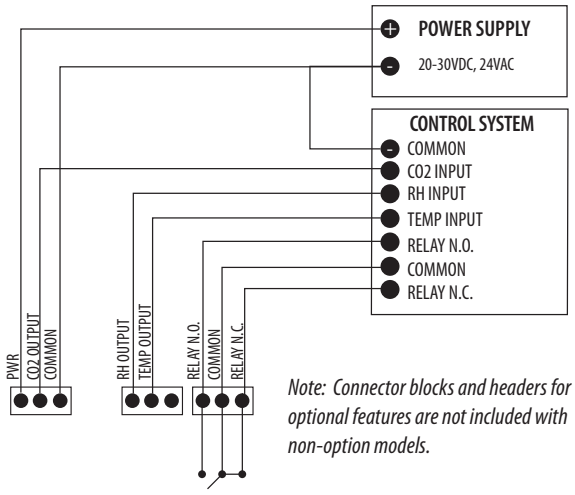
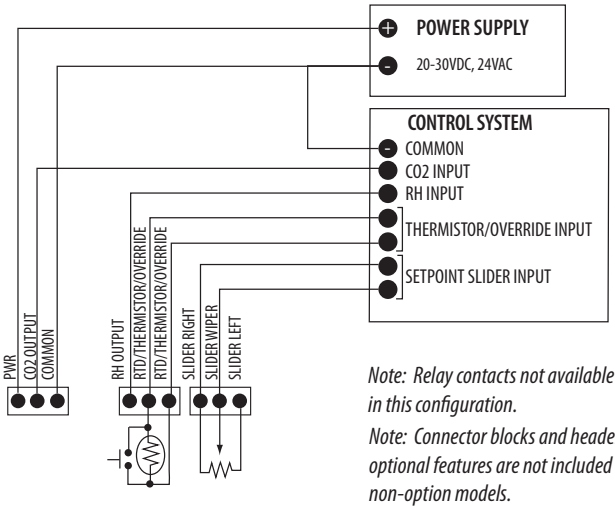
6. Wire the backplate.

CWL with RH and Temperature Transmitter Options



Note: Connector blocks and headers for optional features are not included with non-option models.

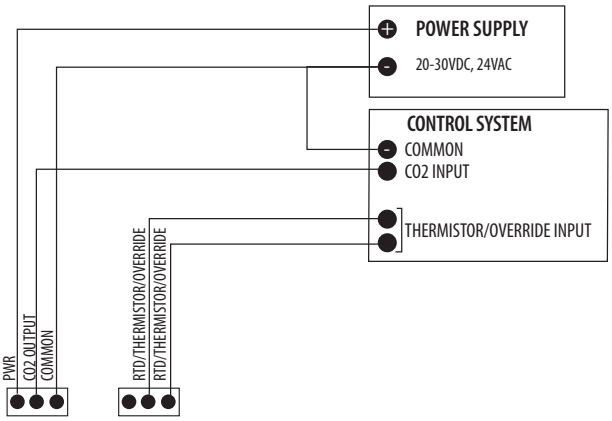
CWL with RH, Thermistor/RTD, Pushbutton Override, and Setpoint Slider Options



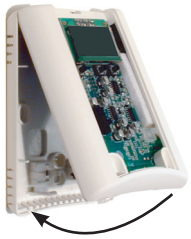
Note: Relay contacts not available in this configuration.

Note: Connector blocks and headers for optional features are not included with non-option models.

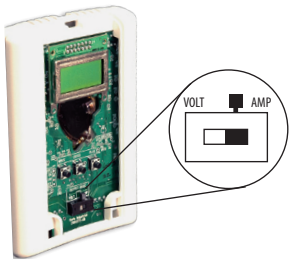
CWE



7. Install the sensor onto the backplate.



8. Use the switch to select voltage or current output. For CWL model, see Configuration section on page 4.



9. When installation is complete, install the cover and snap into place.

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ABC CALIBRATION ALGORITHM

ABC (Automatic Baseline Calibration) is a patented self-calibration feature that automatically adjusts the CO_2 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.

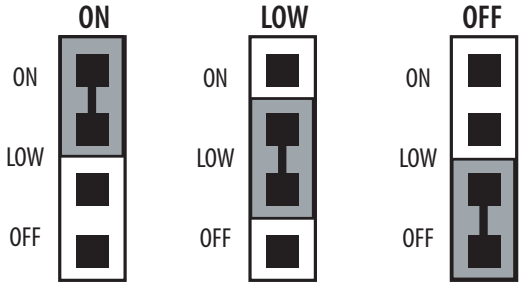
LOW POSITION. Use the LOW setting for buildings occupied 24 hours a day.

OFF POSITION. Not Recommended.

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

To set the ABC mode for CWL models, refer to the Configuration section on page 4.

To set the ABC mode for CWE models, position the ABC jumper as shown:



OUTPUT SCALING

CO_2 - Carbon Dioxide Sensor

Output scaling: 0-2000ppm

	CO_2 PPM	0-5 V Output	0-10 V 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

RH - Relative Humidity Sensor

Output scaling: 0-100%

T - Temperature Transmitter

Output scaling: 10° to 35°C (50° to 95°F)

To determine temperature from output reading:

1. Compute Total Span from Temperature Range:
   Maximum range - Minimum range = Total span
   ex. 10° to 35°C range: 35 - 10 = 25 Total span

2. Compute Output % of Span from Reading:
   (Reading - Minimum Output) / (Maximum output - Minimum output)
   ex. 11.10 mA reading on 4-20 mA output: (11.10-4) / (20-4) = 7.10 / 16 = 0.444 = 44.4%
   ex. 4.44v reading on 0-10 V output: (4.44-0) / (10-0) = 4.44 / 10 = 0.444 = 44.4%

3. Compute Temperature:
   (Total span x Output % of Span) + Minimum range
   ex. 44.4% Output, Total Span = 45, range = 50/95: (0.444 x 45) + 50 = 20 + 50 = 70°

Example outputs for selected temperatures:

Temp	4-20 mA	0-10 V	0-5 V
65	9.33 mA	3.33 V	1.67 V
70	11.10 mA	4.44 V	2.22 V
75	12.89 mA	5.56 V	2.78 V

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CONFIGURATION - CWL ONLY

RUN MODE:

1	0	0	0		P	P	M
		*			C	0	2

CO_2 ONLY MODEL
*INDICATES RELAY STATUS

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

CO_2/RH COMBO MODEL

1	0	0	0		P	P	M
7	0	.	0			°	F

CO_2/T COMBO MODEL

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

CO_2/RH/T COMBO MODEL
TOGGLE %RH AND DEGREES

CONFIGURATION MODE:

PRESS [ENTER] FOR CONFIGURATION MODE.
PRESS PLUS OR MINUS TO CHANGE SETTING.

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

RANGE 500 TO 1500
50PPM INCREMENT

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

RANGE 10 TO 500
5 PPM INCREMENT

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, OFF
SEE PREVIOUS PAGE FOR EXPLANATION

U	N	I	T	S			
–			°	X			+

(TEMP MODELS ONLY)
OPTIONS ARE °F or °C

	O	U	T	P	U	T	
–	0	–	1	0	V		+

(VOLTAGE MODE ONLY)
OPTIONS: 0-10V OR 0-5V
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 MODE. PRESS ARROW TO CHANGE OPTION. PUSH ENTER FOR 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, 0.1°C INCREMENT
(CO_2/temp combo models)

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

RANGE -10 TO 10%, 0.1% INCREMENT
(CO_2/temp combo models)

C	O	2		C	A	L	?
–			X	X	X		+

OPTIONS ARE YES, NO

C	A	L		G	A	S	?
–			X	X	X	X	+

OPTIONS ARE NONE, 0, 400

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

Unit will automatically return to run mode when calibration is complete.

NOTE: This product is factory calibrated. The typical CO_2 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_2 gas calibration kit available from Veris Industries as AA01.

WARNING: CO_2 sensor calibration requires gas calibration kit. Performing calibration without gas kit or at an incorrect gas flow rate will cause erroneous readings.

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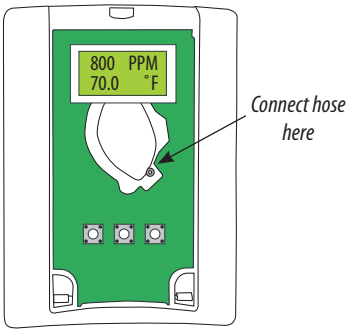
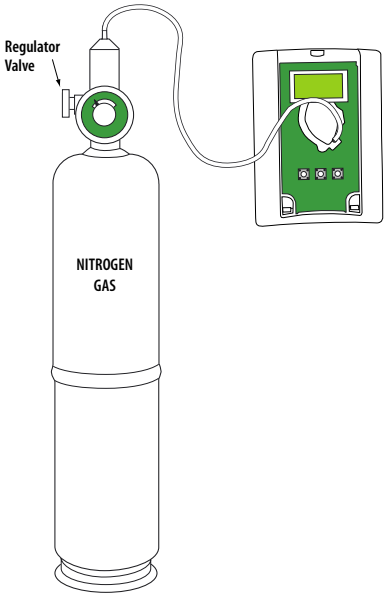
CALIBRATION PROCESS: CWL MODELS

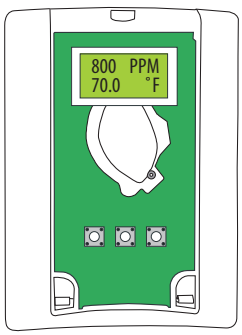
1. Remove cover and connect gas cylinder hose to the plastic port located on sensing module. Note: only connect one sensor to the calibration gas cylinder at a time.



2. Start flowing nitrogen gas (0 ppm CO_2). Use a flow rate of 0.3 to 0.5 liter/minute.



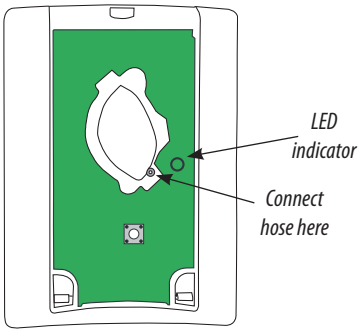
3. Calibrate for 5 min. Unit will return to working display when finished.



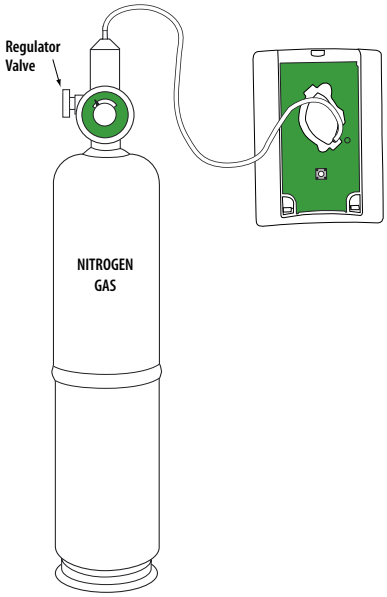
4. When unit returns to working display, remove hose from calibration port and enter Calibration mode as described on page 3.

CALIBRATION PROCESS: CWE MODELS

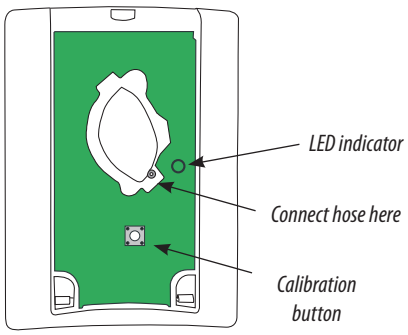
1. Remove cover and connect gas cylinder hose to the plastic port located on sensing module. Note: only connect one sensor to the calibration gas cylinder at a time.



2. Start flowing nitrogen gas (0 ppm CO_2). Use a flow rate of 0.3 to 0.5 liter/minute.



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



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

For more complete calibration instructions using the AA01 Calibration Kit, see the AA01 Installation Guide.

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