



WARNING--REFER SERVICING TO QUALIFIED PERSONNEL ONLY!

- Read instructions thoroughly prior to install
- This product is not intended for life or safety applications

Applications shown are suggested means of installing sensors, but it is the responsibility of the installer to ensure that the installation is in compliance with all national and local codes and OSHA requirements. Installation should be attempted only by individuals familiar with proper installation techniques and with codes, standards, and proper safety procedures for control installations.

INTRODUCTION

The CW Series is a non-dispersive infrared analyzer designed for measuring environmental CO2 concentration in ventilation systems and indoor living spaces. Its measurement range of 0-2000 or 0-5000 ppm covers the range required to monitor compliance with ANSI/ASHRAE 62 or other ventilation efficiency standards.

The CW Series provides a user-selectable 4-20mA or 0-5/0-10VDC output. An LCD display is available to provide local indication of CO2 concentration and facilitate the setup and calibration process. An adjustable setpoint relay is available for direct control and alarm applications. Microprocessor-based digital electronics and a unique self-calibration algorithm improves long-term stability and accuracy.

SPECIFICATIONS

General

Input Voltage..... 20 to 30 VDC, 24AC
 Analog Output 0-5 VDC, 0-10 VDC or 4-20mA; (selectable)
 Operating Temperature Range. 0°C to 50°C (32°F to 122°F)
 Sensor Current Draw..... 100mA maximum
 Material ABS high impact plastic, UL 94 VO

CO2 - Carbon Dioxide Sensor

Sensor Type Non-dispersive infrared (NDIR) diffusion sampling
 Measurement Range 0-2000ppm or 0-5000ppm; user selectable
 Accuracy ±30ppm, ±5% of measured reading
 Repeatability ±20ppm, ±1% of measured value
 Response Time <60 seconds for 90% step change

RH - Relative Humidity Sensor

HS Element Digitally profiled thin-film capacitive (32-bit mathematics)
 U.S. Patent 5,844,138
 Accuracy** ±2%, 10 to 80% RH; Multi-point calibration NIST traceable
 Reset Rate* 24 hours
 Stability ±1% @ 20°C (68°F) annually, for two years
 Hysteresis 1.5% (typical)
 Humidity Range 0 to 100% RH
 Operating Temperature Range. 10°C-35°C (50°F-95°F)
 Temperature Coefficient..... ±0.1% RH/°C above or below 25°C (typical)

T - Temperature Transmitter

Sensor Type Solid State, integrated circuit
 Accuracy ±0.5°C typical
 Resolution 10 to 35°C=0.1°C
 Ranges..... 10° to 35°C (50 to 95°F)

*Reset Rate is the time required to recover to 50% RH after exposure to 90% RH for 24 hours.

**Specified accuracy with 24VDC supplied power with rising humidity.

Installation Instructions

CW SERIES

Environmental CO2 Sensors
Combination CO2/RH/T Sensors

VERIS INDUSTRIES

PORTLAND, OREGON USA
 (503) 598-4564 FAX (503) 598-4664
 1-800-354-8556
<http://www.veris.com> email:sales@veris.com



NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, many cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

SPECIFICATIONS

Sensor Location and Backplate Mounting

Select a mounting location with good air circulation away from ventilation inlets, doors, windows, or other fresh air entry points. For room installation, the sensor should be mounted at least 4-1/2 feet above the floor.

The CW Series backplate may be flush mounted on a wall, or mounted on a standard US or European single gang junction box. Punch out openings in the backplate for wiring as required, and use the backplate as a template for locating holes for screws and wiring. Mount the backplate using screws provided. Wall anchors are recommended for drywall installations.



Note: Sensor must be mounted to vertical surface to ensure proper ventilation.

Backplate Wiring

Install wiring into terminal blocks as indicated, and push slack wire back into wall or junction box.



WARNING: Applying power to output terminal may cause permanent damage!

Sensor Installation

Carefully align top of sensor assembly to mounting plate and close as shown. Press firmly to ensure terminal pins and housing latches are fully engaged. Select switch position for mA or voltage output.



WARNING!
Static Sensitive Device

Note: In voltage output mode, 0-5V or 0-10V operation may be selected in the configuration menu.

Cover Installation

Select cover plate to permit or prevent viewing of LCD display. Install as shown. Cover plate may be removed using a slot screwdriver as needed to access pushbuttons for setup and calibration.



CONFIGURATION

RUN MODE:

P	P	M		1	0	0	0
C	0	2					

CO2 ONLY MODEL
*INDICATES RELAY STATUS

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

CO2/RH COMBO MODEL

P	P	M		1	0	0	0
°	F			7	0	.	0

CO2/T COMBO MODEL

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

CO2/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 NEXT 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

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
.1°C INCREMENT

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

RANGE -10 TO 10%
.1% INCREMENT

C	0	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 CO₂ sensor calibration interval is 5 years, dependent 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. Accuracy verification should be performed using a comparison to a known reference, or the CO₂ gas calibration kit available from Veris Industries as model AA01.

WARNING: CO₂ sensor calibration requires gas calibration kit. Performing calibration without gas kit will cause erroneous readings. Consult factory for calibration kit.

ABC CALIBRATION ALGORITHM

ABC (Automatic Baseline Calibration) is a patented self-calibration feature, which automatically adjusts the CO2 sensor to compensate for drift. When ABC is enabled, the lowest reading within every 24-hour period is recorded and analyzed over a running 7 day or 28-day period. If a statistically significant amount of drift is detected, an automatic correction factor is applied. 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 hr. timeframe.

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

OFF POSITION. Not Recommended!

Refer to Calibration Mode procedures on previous page to set desired ABC mode.

OUTPUT SCALING

CO2 - Carbon Dioxide Sensor

Output scaling: 0-2000ppm

	CO2 PPM	0-10 VOLT OUTPUT	mA OUTPUT
Outside	300-500	1.5 to 2.5	6.4 to 8
Over Ventilated	Under 600	Under 3	Under 8.8
Ideal Ventilation	600-900	3 to 4.5	8.8 to 11.2
Under Ventilated	Over 900	Over 4.5	Over 11.2

RH - Relative Humidity Sensor

Output scaling: 0-100%

T - Temperature Transmitter

Output scaling: 50/95°F (10-35°C)

To determine temperature from output reading:

1) Compute Total Span from Temperature Range:

Maximum range - Minimum range = Total span

ex. 50/95° range: 95 - 50 = 45 Total span

2) Compute Output % of Span from Reading:

(Reading - Minimum Output) / (Maximum output - Minimum output)

ex. 11.10mA reading on 4-20mA output: $(11.10-4)/(20-4)=7.10/16=0.444=44.4\%$

ex. 4.44v reading on 0-10v 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: $(0.444 \times 45) + 50 = 20 + 50 = 70$ degrees

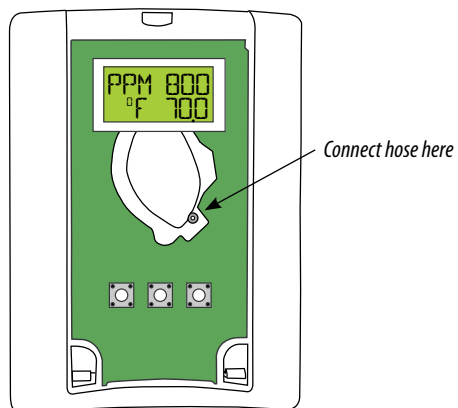
Example outputs for selected temperatures:

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

CALIBRATION PROCESS

1. Remove cover to the device.
2. Hook up hose to plastic port located on sensing module
3. Enter Calibration mode by following instructions on previous page.
4. Select 0 ppm Cal Gas option
5. Flow gas (Nitrogen) 0 ppm CO2 gas through the sensor until the unit returns to its run mode. Estimated calibration time is 30 seconds to five minutes.

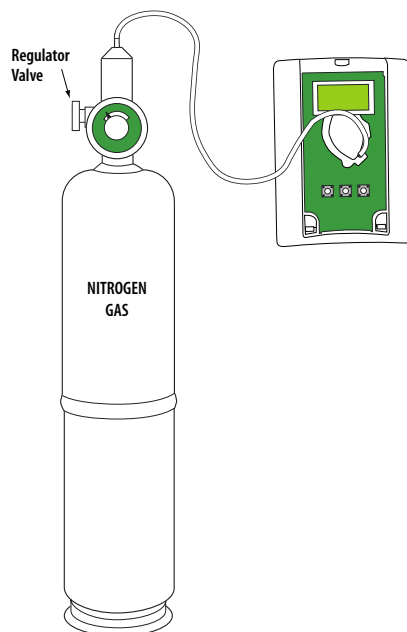
STEP 1 **Calibration Port**



STEP 2

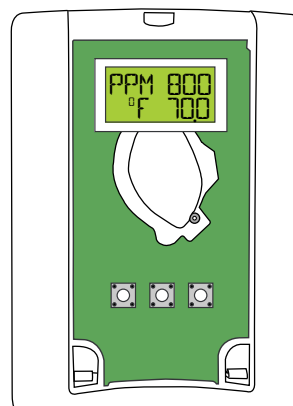
Enter Calibration Mode menu per directions on page 2. Choose 0 ppm calibration gas option.

STEP 3 **Flow Nitrogen**

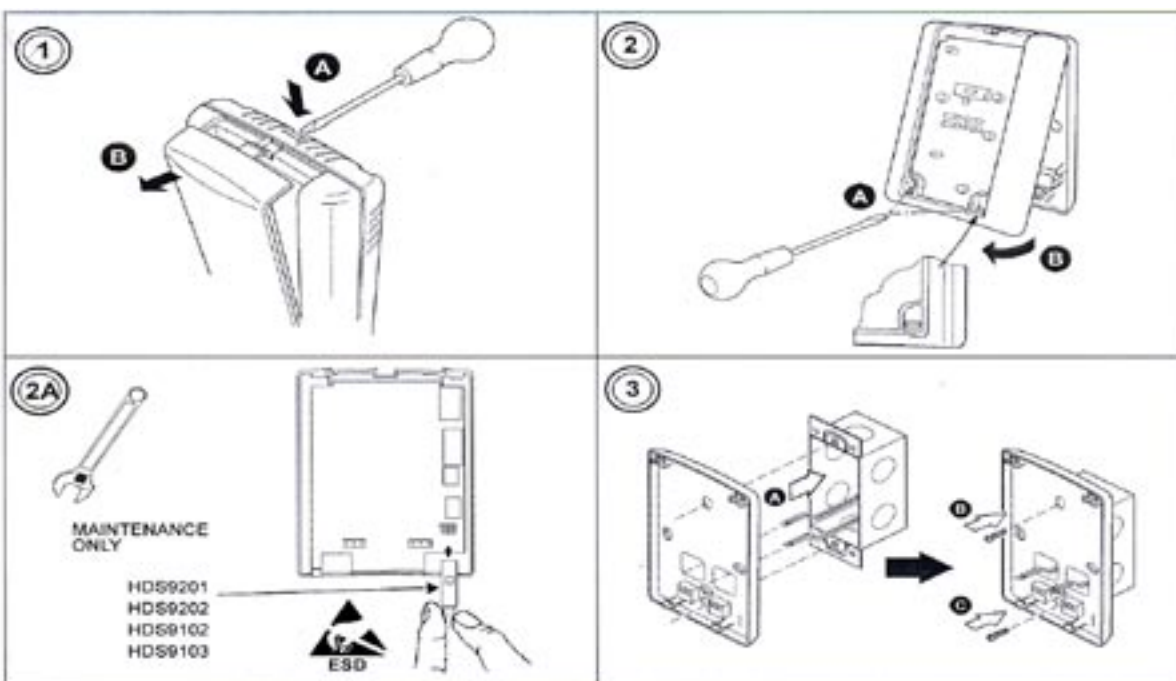


STEP 4

Calibrate 5 minutes. Unit will return to run mode when calibration is complete.



INSTALLATION: ACCESSING TERMINAL BLOCK OR HUMIDITY ELEMENT



THERMISTOR/RTD TABLE

STANDARD RTD AND THERMISTOR VALUES

TEMP.		RTD		Thermistor (units in k ohm)*					
°C	°F	1000 ohm ±0.3°C .0385 curve	100 ohm ±0.3°C .0385 curve	100 k Consult Factory	20 k Consult Factory	Type 3 10 k ±0.2°C 0/50°C	Type 2 10 k ±1.0°C -50/150°C	Dale 10 k ±0.2°C -20/70°C	3 k ±0.2°C 0/70°C
-50°	-58°	803.06	80.306		1267.600	454.910	692.700	672.30	205.800
-40°	-40°	842.71	84.271	3366.00	643.800	245.089	344.700	337.20	102.690
-30°	-22°	882.22	88.222	1770.00	342.000	137.307	180.100	177.20	53.730
-20°	-04°	921.60	92.160	971.200	189.080	79.729	98.320	97.130	29.346
-10°	14°	960.86	96.086	553.40	108.380	47.843	55.790	55.340	16.674
0	32°	1000.00	100.000	326.600	64.160	29.588	32.770	32.660	9.822
10°	50°	1039.03	103.903	199.00	39.440	18.813	19.930	19.900	5.976
20°	68°	1077.94	107.794	124.900	24.920	12.272	12.500	12.490	3.750
25°	77°	1097.35	109.735	100.000	20.000	10.000	10.000	10.000	3.000
30°	86°	1116.73	111.673	80.580	16.144	8.195	8.055	8.056	2.417
40°	104°	1155.41	115.541	53.260	10.696	5.593	5.323	5.326	1.598
50°	122°	1193.97	119.397	36.020	7.234	3.894	3.599	3.602	1.081
60°	140°	1232.42	123.242	24.880	4.992	2.763	2.486	2.489	0.747
70°	158°	1270.75	127.075	17.510	3.512	1.994	1.753	1.753	0.527
80°	176°	1308.97	130.897	12.560	2.516	1.462	1.258	1.258	0.378
90°	194°	1347.07	134.707	9.164	1.833	1.088	0.919	0.917	-
100°	212°	1385.06	138.506	6.792	1.356	0.821	0.682	0.679	-
110°	230°	1422.93	142.293	5.108	1.016	0.628	0.513	0.511	-
120°	248°	1460.68	146.068	3.894	0.770	0.486	0.392	0.389	-
130°	266°	1498.32	149.832	3.006	0.591	0.380	0.303	0.301	-

*RTD/Thermistors in wall packages are not compensated for internal heating of product.