VERIS CW2 Series Air Quality Sensor Installation Guide

Contents

VERIS CW2 Series Air Quality Sensor

Specifications

- **Operating Environment:** IP Rating IP 30, suitable for indoor use only, not suitable for wet locations
- **Mounting Location:** Surface mount on Single Gang J-Box, British Standard, and CE60 wall boxes
- **CO2 Transmitter:**
  - **Sensor Type:** Non-dispersive infrared (NDIR), diffusion sampling
  - **Output Range:** 0 to 2000/5000 ppm (selectable)
  - **Response Time:**
    - **0 to 5%:** Target value (0 to 50)
    - **5 to 10%:** Average (50 to 100)
    - **10 to 20%:** Slightly increased (100 to 200)
    - **20 to 61%:** Significantly increased (200 to 610)
    - **Greater than 61%:** Greatly increased (greater than 610)
- **RH Transmitter Option:**
  - **HS Sensor:** Solid-state capacitive, replaceable
  - **Hysteresis:** 1.5% typical
- **Temperature Transmitter Option:**
  - **Sensor Type:** Solid state, integrated circuit
- **Display Models:**
  - **Touchscreen:** 61 mm (2.4 in), color, backlit, capacitive, 240×300 px
  - **LCD:** 52mm (2.05 in), segmented with 3 buttons
- **Setpoints:**

- **Humidity Setpoint:** 0 to 10V output, scale: 0 to 100% RH
- **Fan Speed Setpoint:** 0 to 10V output (Off 0V, Auto 1.5V, Low 3.3V, Med. 6.7V, High 10.0V)

FAQs

- **Q: Can I use the CW2 Series sensors in wet locations?**
  - **A:** No, the CW2 Series sensors are suitable for indoor use only and not recommended for wet locations due to their IP Rating of IP30.

MODELS

Veris Industries Stratford Park 5 Telford TF3 3BL United Kingdom

WARNING: HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

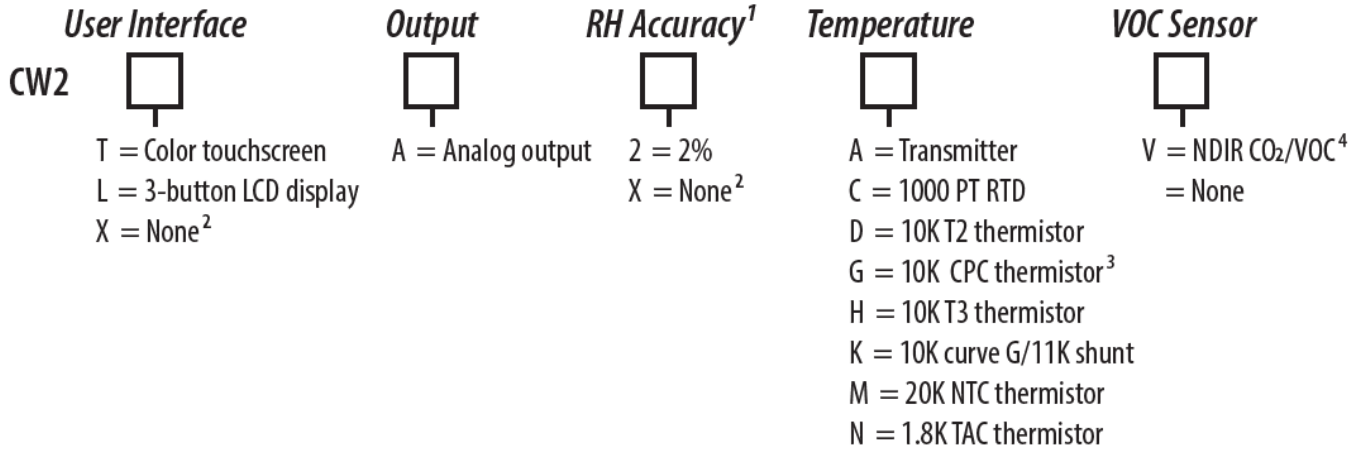
- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E or CSA Z462.
- This equipment must only be installed and serviced by qualified electrical personnel.
- Turn off all power supplying this equipment before working on or inside equipment.
- Always use a properly rated voltage sensing device to confirm power is off.
- Replace all devices, doors, and covers before turning on the power to this equipment.
- Failure to follow these instructions can result in death, serious injury, or equipment damage.
- This product is intended for use in HVAC and building environmental control applications.
- It is not intended for direct medical monitoring of patients.
- Read and understand these instructions before installing this product.
- The installer is responsible for all applicable codes.
- If this product is used in a manner not specified by the manufacturer, the protection provided by the product may be impaired.
- No responsibility is assumed by the manufacturer for any consequences arising out of the use of this material.

Product Overview

The CW2 Series of air quality sensors for living space is a flexible multi-sensor platform for use with BAS controllers designed to accept 4 to 20mA, 0 to 5Vdc, or 0 to 10Vdc outputs. CW2 Series sensors are available with three user interface options: touchscreen, LCD with three buttons, and blank. C02 and temperature sensors

are included with all CW2 Series air quality sensors. Models with VOC sensors and relative humidity sensors are also available.

Product Identification



1. Replaceable RH module is available to be ordered separately per the table below.
2. For analog non-display, non-RH, models with RTD/thermistor order from CWE2 line.
3. Available in CW2LAXG only.
4. VOC is only available with the temperature transmitter option.

Replaceable RH Elements

Model	RH Accuracy	Calibration Certificate	Description
HS1N	±1%	X	Replaceable RH sensor, 1% with NIST certification
HS2N	±2%	X	Replaceable RH sensor, 2% with NIST certification
HS2X	±2%		Replaceable RH sensor, 2%

Specifications

OPERATING ENVIRONMENT	
Input Power	Class 2; 20 to 30 Vdc, 24 Vac, 50 to 60 Hz
Analog Output	Selectable 4 to 20 mA, 0 to 5 V, 0 to 10 V
Operating Temp. Range	0 to 50 °C (32 to 122 °F)
Operating Humidity Range	0 to 95% RH non-condensing
Housing Material	High-impact ABS plastic
Terminal Block Torque	0.5 to 0.6 N-m (0.37 to 0.44 in-lbf)
IP Rating	IP 30
Mounting Location	For indoor use only. Not suitable for wet locations.
Surface Mount	The device can be surface mounted on Single Gang J-Box, British Stand ard, and CE60 wall boxes

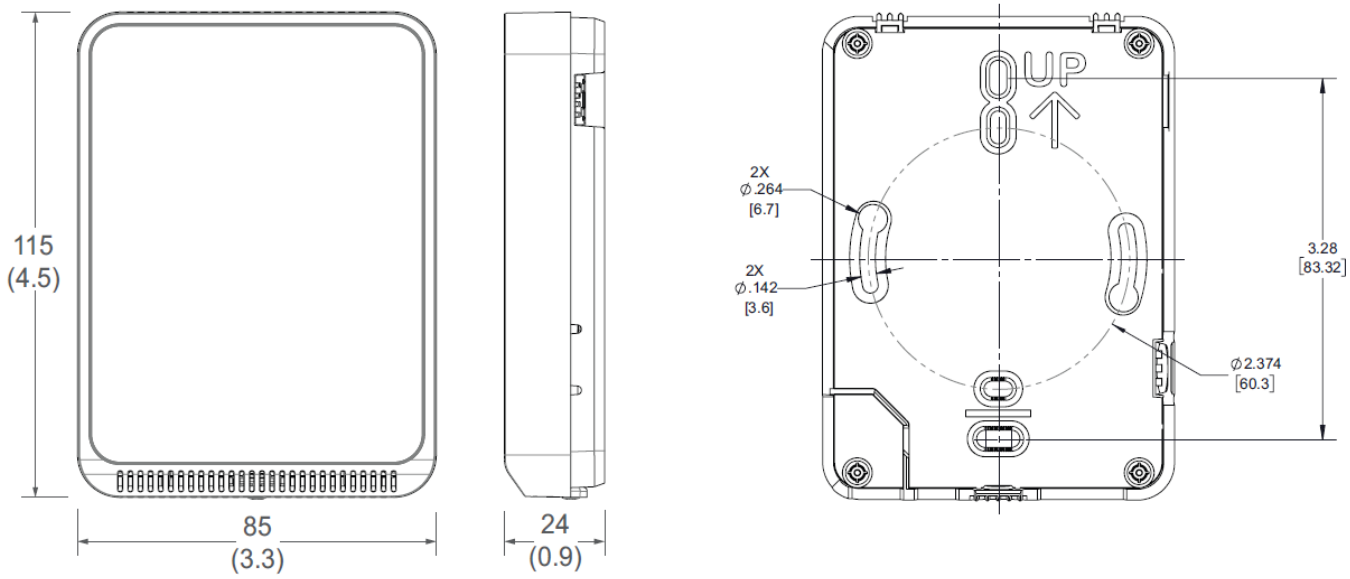
CO2 TRANSMITTER			
Sensor Type	Non-dispersive infrared (NDIR), diffusion sampling		
Output Range	0 to 2000/5000 ppm (selectable)		
Accuracy	±30 ppm ±3% of measured value		
Repeatability	±20 ppm ±1% of measured value		
Response Time	<60 seconds for 90% step change		
VOC TRANSMITTER OPTION			
Sensor Type	Solid state		
Output Range	0 to 100% AQI for VOC		
Accuracy	±15% of measured value		
Output Scale	0 to 1,000 ppb of total VOC (TVOC)		
	Level	**Ventilation Recommendation**	**TVOC (ppb)**
AQI Table*	>61%	Greatly increased	>610
	20 to 61 %	Significantly increased	200 to 610
	10 to 20 %	Slightly increased	100 to 200
	5 to 10%	Average	50 to 100
	0 to 5%	Target value	0 to 50
RH TRANSMITTER OPTION			
HS Sensor	Solid-state capacitive, replaceable		
Accuracy (Includes Hysteresis)**	±3.8% RH from 10 to 60% RH @ 25°C (77 °F) ±4.8% RH from 60 to 80% RH @ 25°C (77 °F) ±5.8% RH from 80 to 100% RH @ 25°C (77 °F)		

Hysteresis	1.5% typical
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 TRANSMITTER OPTION	
Sensor Type	Solid state, integrated circuit
Accuracy	±0.2 °C (±0.4 °F) typical
Resolution	0.1 °C (0.1 °F)
Range	0 to 50 °C (32 to 122 °F)
DISPLAY MODELS	
Touchscreen	61 mm (2.4 in), color, backlit, capacitive, 240×300 px Setpoint: 0-10Vdc. Temperature, humidity, or fan speed selectable Time out override: Display timeout*** Lockout override: Touchscreen/button lockout***
LCD	52mm (2.05 in), segmented with 3 buttons Setpoint: 0-10Vdc. Temperature, humidity, or fan speed selectable Time out override: Display timeout Lockout override: Touchscreen/button lockout***
SETPOINTS*	
Temperature Setpoint	0 to 10V output Scale: 10 to 35 °C (50 to 95 °F) / 0 to 50 °C (32 to 122 °F)
Humidity Setpoint	0 to 10V output Scale: 0 to 100% RH
Fan Speed Setpoint	0 to 10V output Off 0V, Auto 1.5V, Low 3.3V, Med. 6.7V, High 10.0V

OVERRIDE	
Override Button	Display models feature a momentary-to-ground override button
WIRING TERMINALS	
Terminal Blocks	Screw terminals, 18-24 AWG
Screw Terminal Torque	0.2 N-m (2.0 in-lbF) max.
WARRANTY	
Limited Warranty	5 years
COMPLIANCE INFORMATION	
Agency Approvals	UL 916, European conformance CE: EN61000-6-2, EN61000-6-3, EN61 000 Series – industrial immunity, EN 61326-1 FCC Part 15 Class B, REA CH, RoHS, RCM (Australia), ICES-003 (Canada), UKCA (UK)

- The Air Quality Index for VOC aligns with TVOC levels for IAQ as specified by the WHO (World Health Organization).
- Humidity sensor overall accuracy should include accuracy, temperature coefficient, and stability.
- Humidity accuracy is shown as an absolute value, so if testing accuracy with a hand-held device, you must check for deviation in its readings instead of calculating the percentual deviation.
- Additionally, you must consider the overall accuracy of the hand-held device in the comparison.
- DIP switch selectable.
- One setpoint type is selectable via a DIP switch on display models only

Dimensions



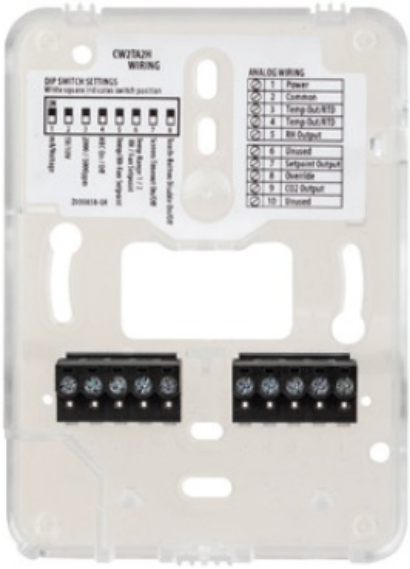
Functions

- The CW2 Series sensor measures CO2, VOC (if equipped), RH (if equipped) and temperature in a room and provides analog outputs to a controller.

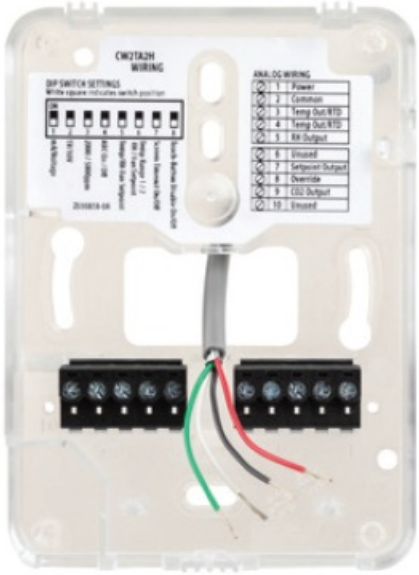
Installation

1. Remove the cover from the base at the bottom of the device.

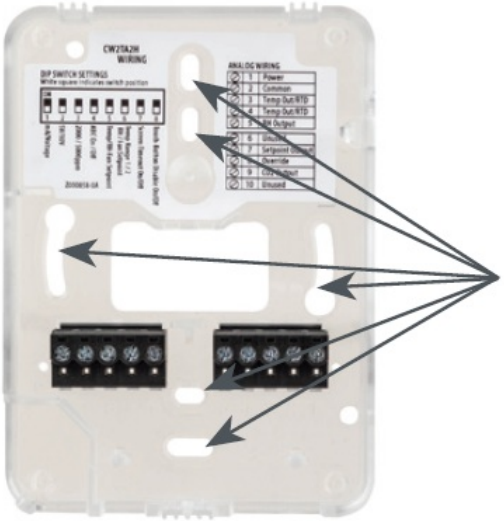
2. Position the sensor base vertically on the wall 1.35 m (4.5 ft.) above the floor with the “UP” arrow facing upward. Locate away from windows, vents, and other sources of draft. If possible, do not mount on an external wall, as this may cause inaccurate temperature readings.



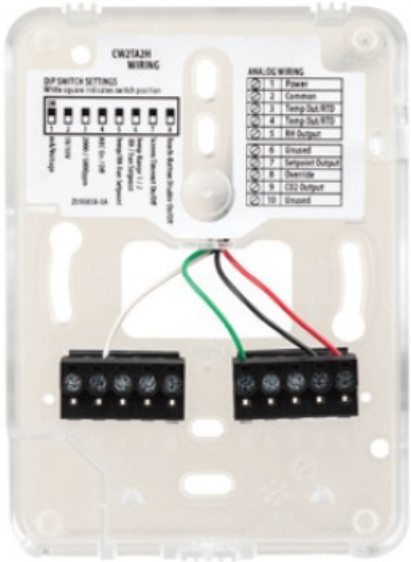
3. Pull 18 or 22 AWG cable(s) through the hole in the backplate.



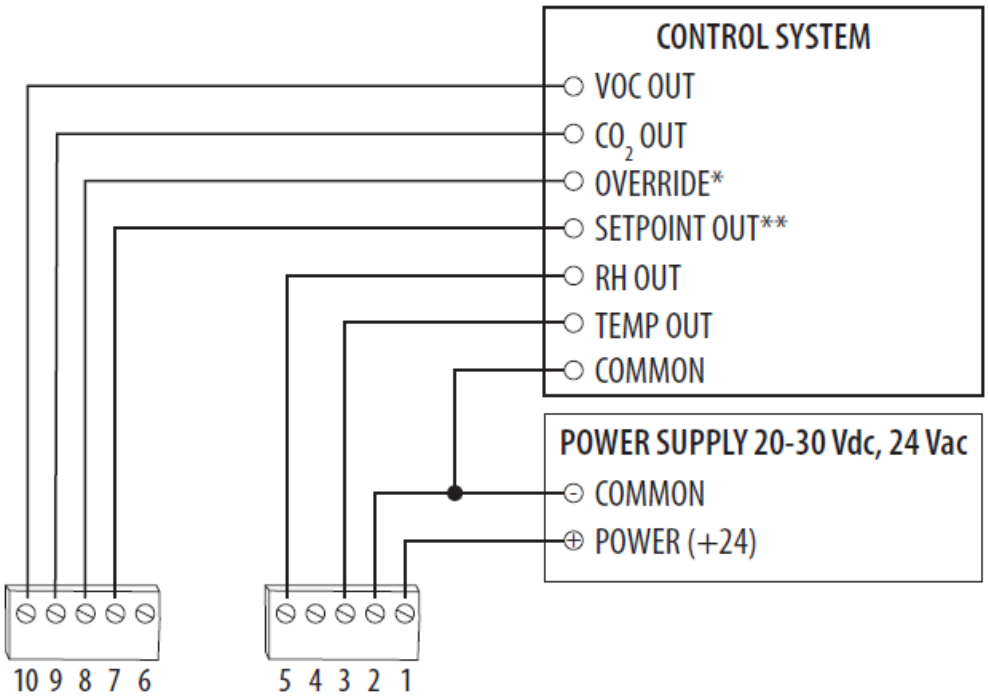
4. Mount the backplate onto the wall using the screws provided.



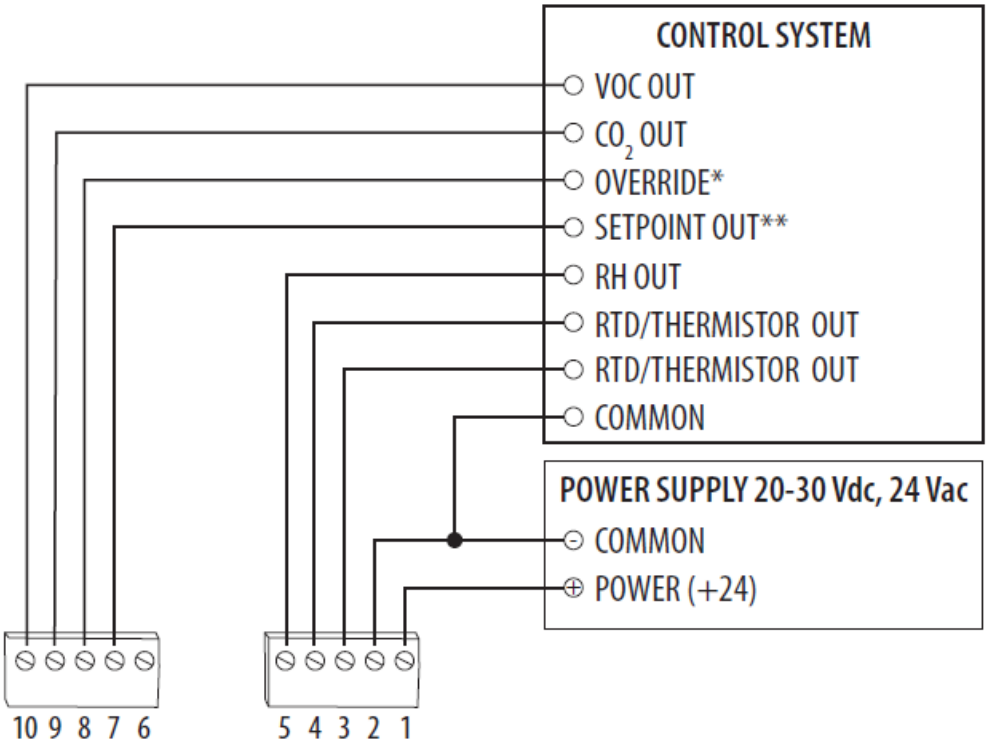
5. Connect the wires to the screw terminals. Do not over-tighten the screws.



- **Wiring for models with temperature transmitter:.**

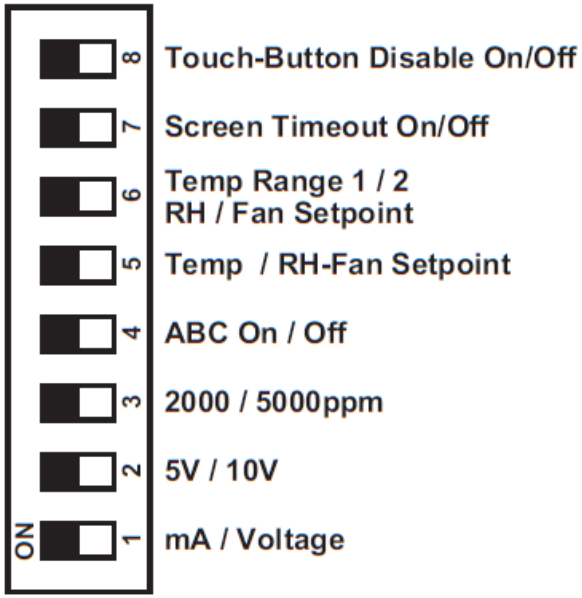


- **Wiring for models with RTD/thermistor:**



- Momentary to ground.
- 0-10V DIP switch selectable for temperature, RH (if equipped), or fan speed (off, 0V, Auto 1.5V, Low 3.3V, Medium 6.7V or high 10V).

6. Set the DIP switches.


ON
1
2
3
4
5
6
7
8
mA / Voltage
5V / 10V
2000 / 5000ppm
ABC On / Off
Temp / RH-Fan Setpoint
Temp Range 1 / 2
RH / Fan Setpoint
Screen Timeout On/Off
Touch-Button Disable On/Off

Switch	Function	Description
1	Output mode	ON – 4-20mA output mode enabled OFF – Voltage output mode enabled
2	Voltage output range*	ON – 0-5V output range enabled OFF 0-10V output range enabled
3	CO2 output range	ON – 0-2000 ppm CO2 output range enabled OFF – 0-5000 ppm CO2 output range enabled
4	Automatic Baseline Calibration (ABC) for CO2	ON – ABC enabled OFF – ABC disabled
5	Setpoint output type	ON – Temperature setpoint enabled (temp range selected on DIP switch 6) OFF – RH or Fan Speed setpoint enabled (specific setpoint output type to be selected on DIP switch 6) Models without RH option select only temp or fan setpoint
6	Setpoint output temperature range or RH/Fan Speed output type	Temperature setpoint (must be enabled on DIP switch 5) ON – Temp range 1, 50 to 95 °F (10 to 35 °C) enabled OFF – Temp range 2, 32 to 122 °F (0 to 50 °C) enabled
		RH or Fan Speed setpoint (must be enabled on DIP switch 5) ON – RH setpoint enabled OFF – Fan Speed setpoint enabled Models without RH option, set to OFF
7	Display times out and turns off after 6-10 seconds of touchscreen/button press	ON – Display Timeout enabled OFF – Display Timeout disabled
8	Touchscreen touch functions and buttons are disabled	ON – Touchscreen touch/button functions disabled OFF – Touchscreen touch/button functions enabled

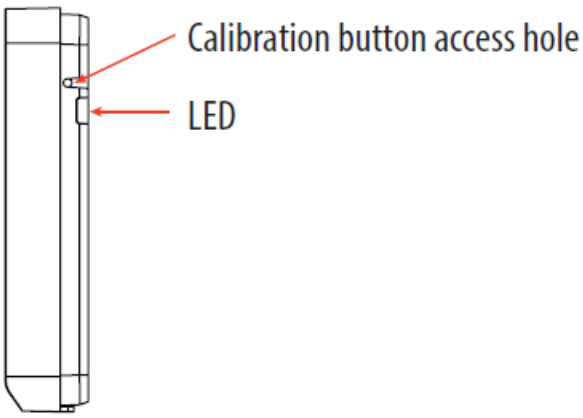
- Only used with voltage output mode enabled. Not applicable to setpoint output. Setpoint is 0-10V fixed.

7. With the sensor base fully installed, align the top of the cover to the mounting tabs on top of the sensor base. Swing the cover downward until it latches at the bottom.

8. Install a locking screw to secure the cover in the closed position.

CO2 Sensor Calibration

- There are two methods for CO2 calibration available: 400 ppm baseline calibration and automatic baseline calibration (ABC).
    - 400 ppm Baseline Calibration
    - 400 ppm baseline calibration allows the sensor to be set at 400 ppm. Push and hold the calibration button for 3 to 5 seconds.
- The LED will flash green. Once the button is released, calibration is complete and the LED switches off.

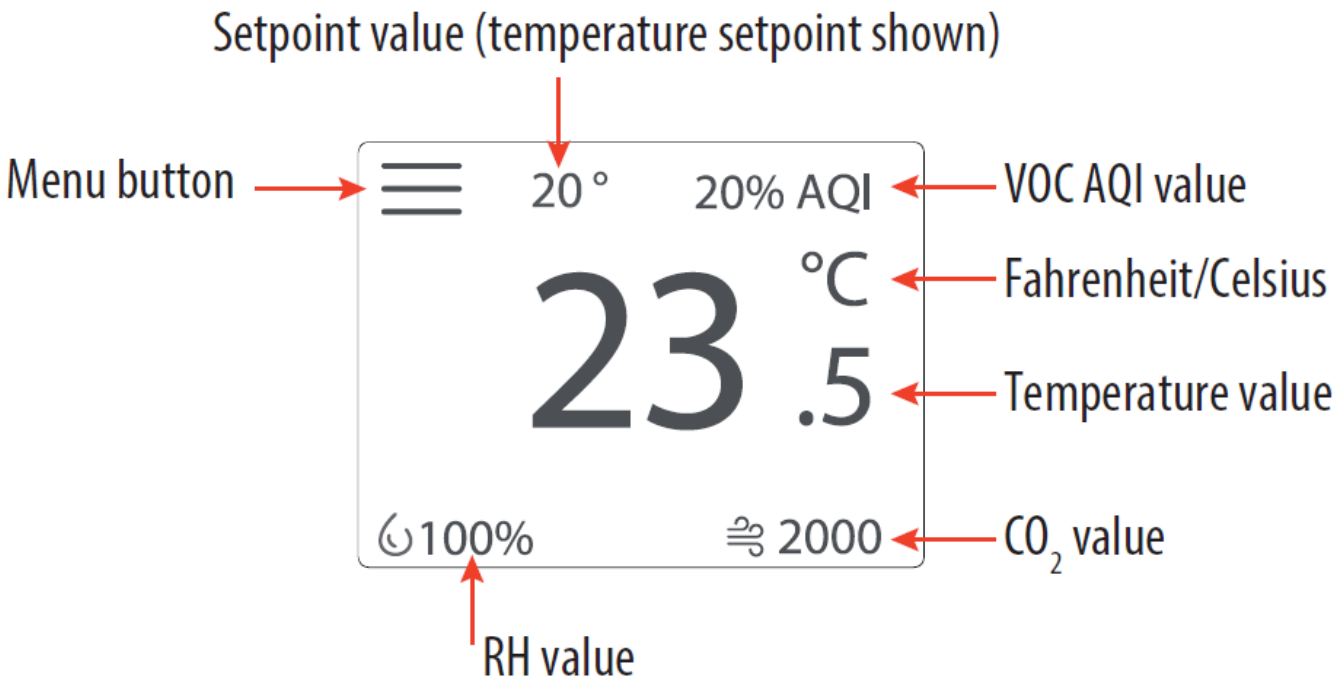


Automatic Baseline Calibration (ABC)

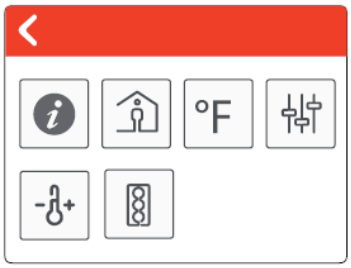
The ABC mode addresses the 400 ppm calibration. It allows turning on or off a background correction/recovery mode that will minimize any calibration error that has been caused by shock during handling and transportation or is caused by a long-term shift in measurement. The ABC algorithm constantly keeps track of the sensor's lowest reading over a preconfigured time interval and slowly corrects for any long-term drift detected as compared to the expected fresh air value of 400 ppm. After initial startup, it is expected that the sensor reaches specified accuracy after 7 to 21 days.

Touchscreen Operation

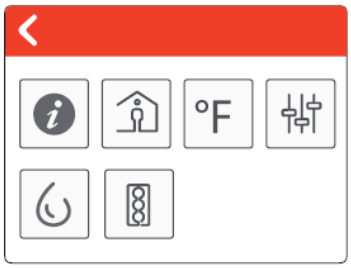
Main Screen: The touchscreen user interface displays applicable sensor output values (temperature, RH, CO2, and VOC), setpoint value, menu button, and CO2 stoplight status (if enabled).



Menu Screen
The menu screen opens when pressing the Menu button on the main screen. Integrator's submenu, occupancy/override, Fahrenheit/Celsius, settings, setpoint submenu (temp, RH or fan, determined by DIP switch settings) and CO2 stoplight buttons are displayed on the menu screen.



Temperature setpoint DIP switch selected

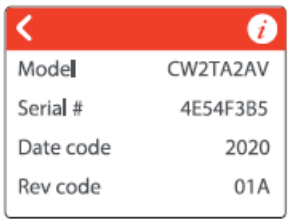


RH setpoint DIP switch selected

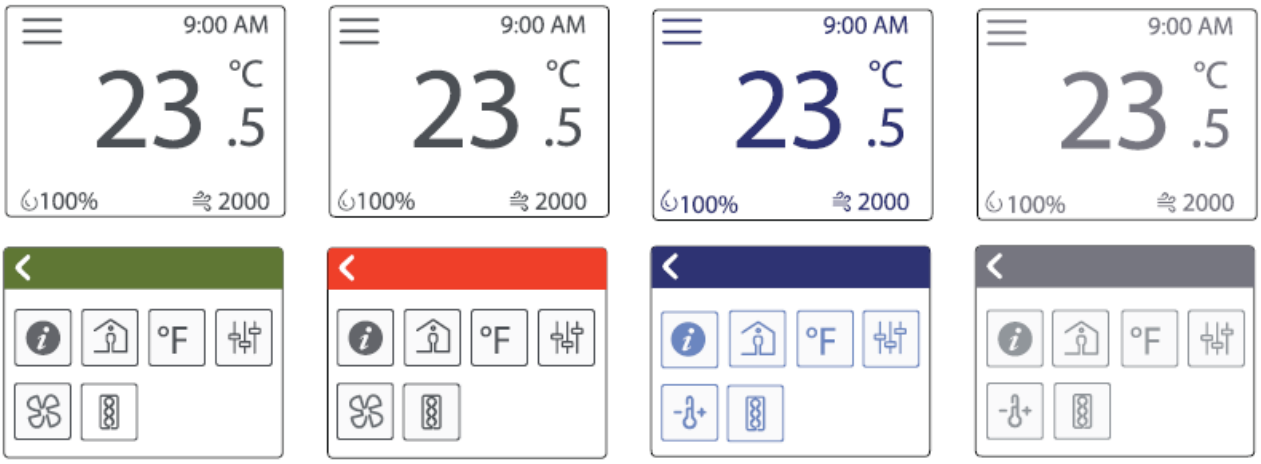
Fan Speed setpoint DIP switch selected

Menu Button Functions

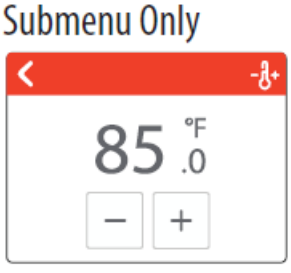
- **Integrator's Submenu**
  - Press this icon to access the Integrator's menu.
- **Submenu Only**



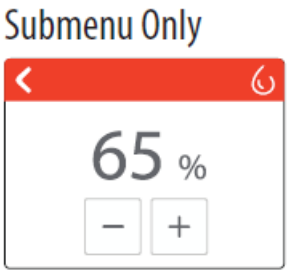
-  **Occupied Override Button**
  - Press this icon to provide momentary ground output to the controller
-  **Single Press Only**
  - Signals occupied/override call to controller.
-  **Fahrenheit/Celsius Switch**
  - Press this icon to display either °C or °F.
- **Single Press Only**
  -  Changes units to Fahrenheit when pressed.
  -  Changes units to Celsius when pressed.
-  **Settings**
  - This icon provides the ability to change the color scheme of the display.
- **Submenu Only**



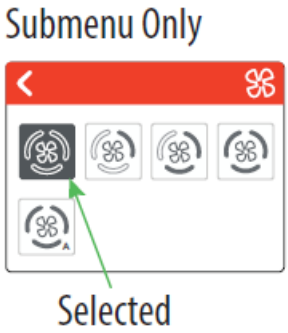
-  **Temp Setpoint Adjustment**
  - Click this icon to access the setpoint change menu. Mutually exclusive with fan speed, set by DIP switch.
- **Submenu Only**



- **Humidity Setpoint Adjustment**
  - Click this icon to access the setpoint change menu. Mutually exclusive with humidity and fan speed. Set by DIP switch.
- **Submenu Only**



- **Fan Speed**
  - Click this icon to access the fan speed menu. Mutually exclusive with humidity and fan speed. Set by DIP switch.
- **Submenu Only**

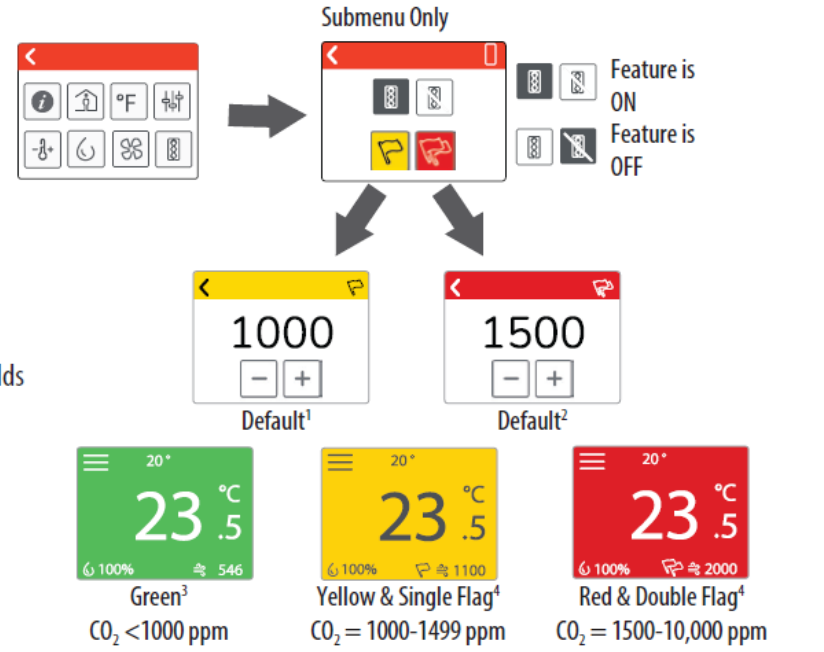


- **CO2 Stoplight Menu**
  - Click this icon to toggle the CO2 Stoplight feature on and off. With the CO2 Stoplight turned on, the background color of the main screen changes with CO2 level. This provides a visual indicator of CO2 levels to the room occupants.
  - Using the +/- buttons, the thresholds at which the colors change on the main screen are user-configurable, as described in the diagram.

CO_2 Stoplight Menu

Click this icon to toggle the CO_2 Stoplight feature on and off. With CO_2 Stoplight turned on, the background color of the main screen changes with CO_2 level. This provides a visual indicator of CO_2 levels to the room occupants.

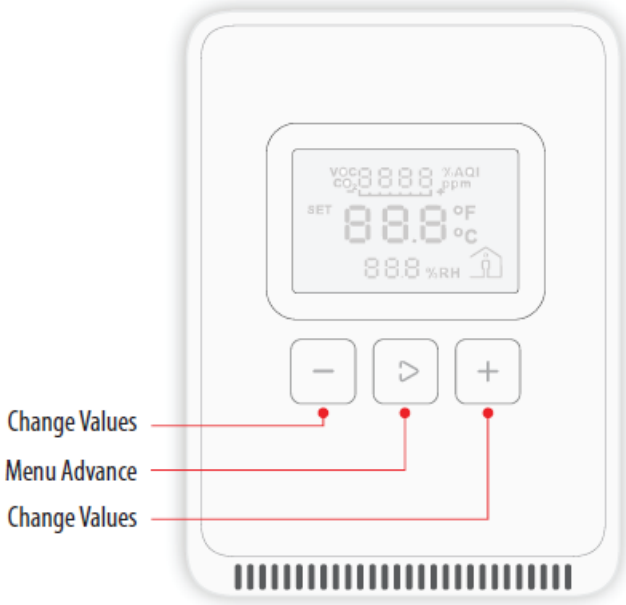
Using the +/- buttons, the thresholds at which the colors change on the main screen are user configurable, as described in the diagram.



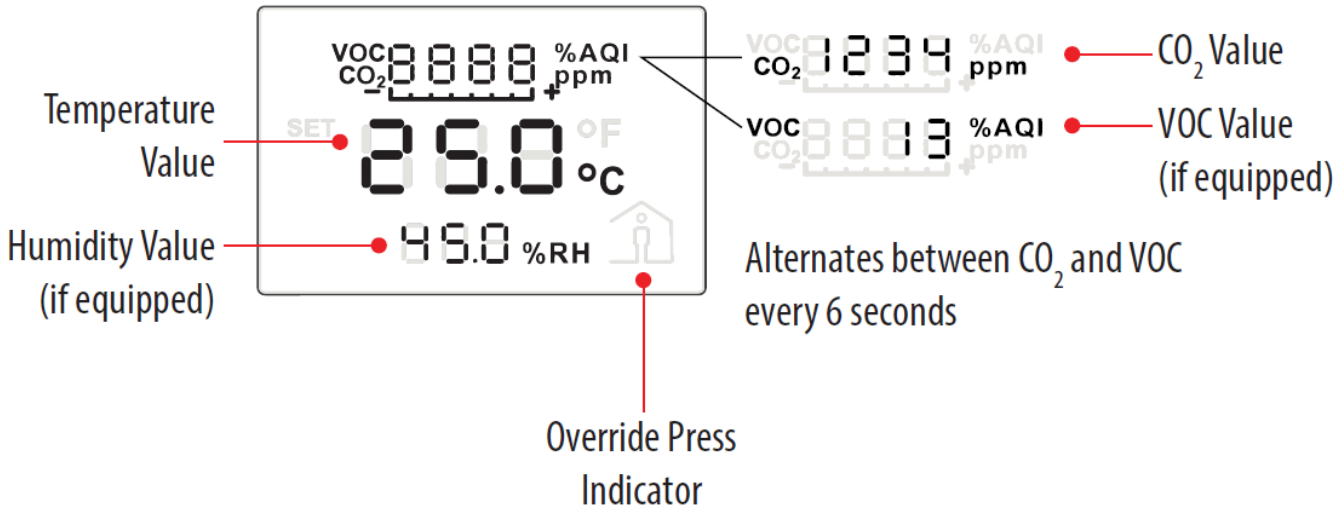
1. Values <400 ppm will be rounded up to the minimum limit of 400 ppm.
2. Values >10,000 ppm will be rounded down to the maximum limit of 10,000 ppm.
3. Possible to adjust CO_2 thresholds by changing the yellow and red limits.
4. User configurable in increments of 10 ppm using the +/- buttons. With a long press of these buttons, the number will change more quickly.

LCD Display Operation

Button Functions



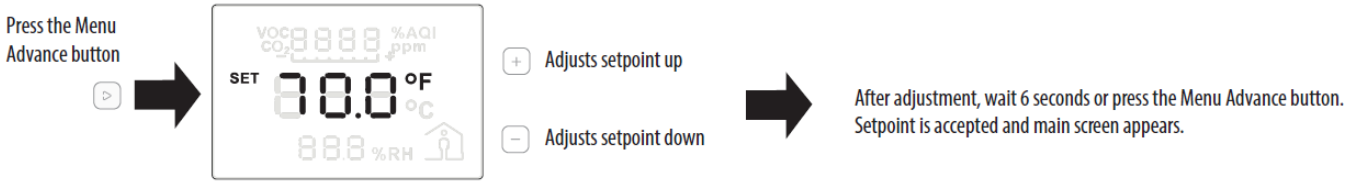
Display Icons: The main screen displays sensor values for CO2, VOC (if equipped), RH (if equipped), temperature, and Celsius/Fahrenheit.



Setpoint Function

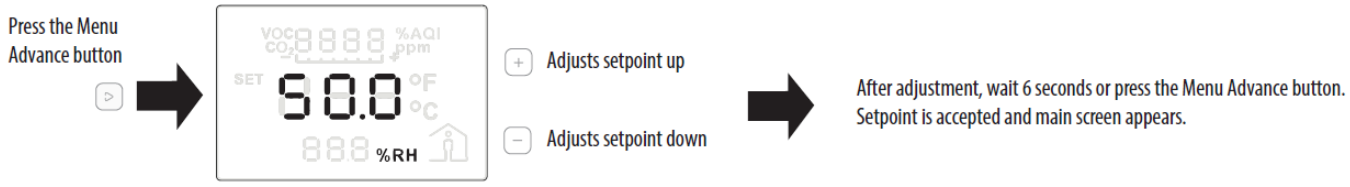
- A single 0-10V setpoint (temperature, RH (if equipped) or fan speed) can be selected via DIP switch.

Temperature Setpoint Adjustment



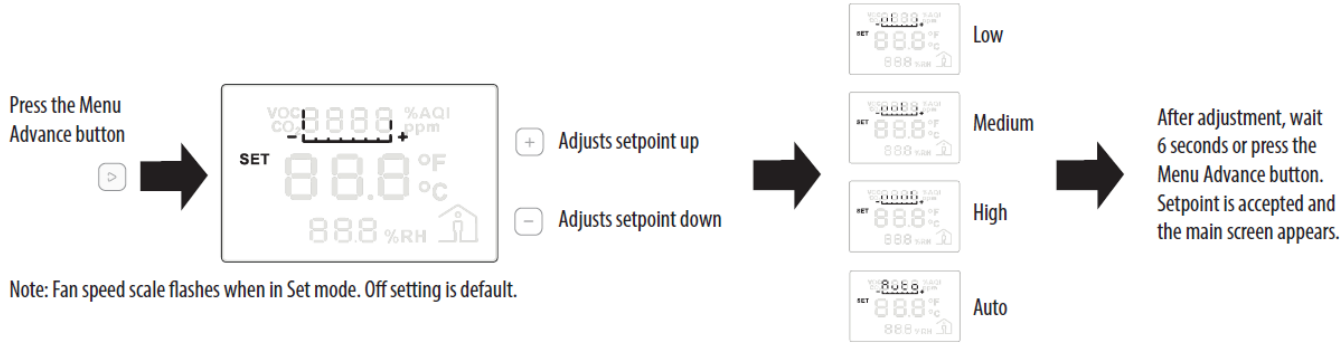
Note: Numeric information will flash while in Set mode.

RH Setpoint Adjustment



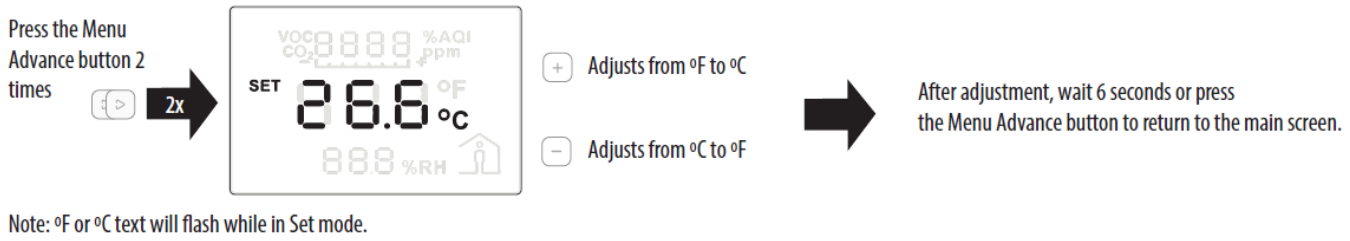
Note: Numeric information will flash while in Set mode.

Fan Speed Setpoint Adjustment



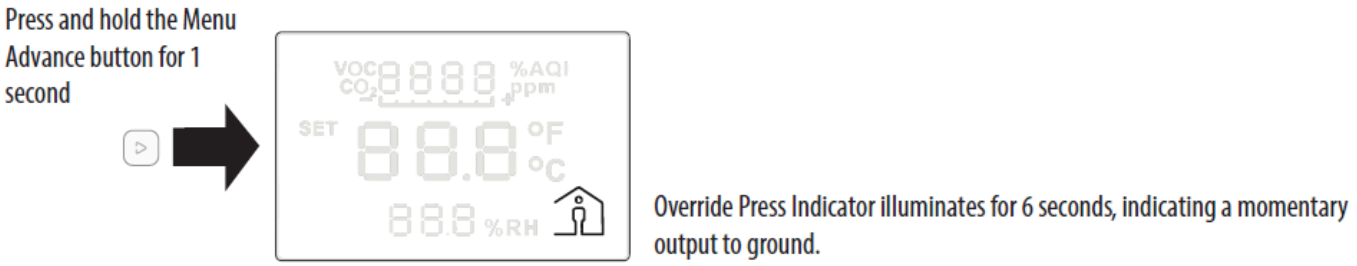
Note: Fan speed scale flashes when in Set mode. Off setting is default.

Changing Celsius and Fahrenheit Scales



Note: °F or °C text will flash while in Set mode.

Occupied/Override Button



China RoHS Compliance Information

Environment-Friendly Use Period (EFUP) Table

Hazardous Substances						
Part Name	(Pb)	(Hg)	(Cd)	(Cr (VI))	(PBB)	(PBDE)
Electronic	X	O	O	O	O	O

This table is made according to SJ/T 11364.

- **O:** indicates that the concentration of hazardous substances in all of the homogeneous materials for this part is below the limit as stipulated in GB/T 26572.
- **X:** indicates that the concentration of a hazardous substance in at least one of the homogeneous materials used for this part is above the limit as stipulated in GB/T 26572

CONTACT INFORMATION

- ©2024 Veris Industries
- **USA** 800.354.8556 or
- +1.503.598.4564
- support@veris.com

Documents / Resources

	**VERIS CW2 Series Air Quality Sensor** [pdf] Installation Guide CW2Txxxx, CW2Lxxxx, CW2Xxxxx, CW2 Series Air Quality Sensor, CW2 Series, Air Quality Sensor, Quality Sensor, Sensor

References

- **User Manual**