V VERIS

CW2 Series

Wall Mounted Air Quality Sensors

CW2Txxxx   CW2Lxxxx   CW2Xxxxx

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. CO2 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

| User Interface | Output | RH Accuracy[1] | Temperature | VOC Sensor |

CW2 ☐ ☐ ☐ ☐ ☐

User Interface
T = Color touchscreen
L = 3-button LCD display
X = None[2]

Output
A = Analog output

RH Accuracy[1]
2 = 2%
X = None[2]

Temperature
A = Transmitter
C = 1000 PT RTD
D = 10K T2 thermistor
G = 10K CPC thermistor[3]
H = 10K T3 thermistor
K = 10K curve G/11K shunt
M = 20K NTC thermistor
N = 1.8K TAC thermistor

VOC Sensor
V = NDIR CO₂/VOC[4]
= None

1. Replaceable RH module available to be ordered separately per table below.
2. For analog non-display, non-RH, models with RTD/thermistor order from CWE2 line.
3. Available in CW2LAXG only.
4. VOC only availble with 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
HSX	±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 Standard and CE60 wall boxes

Specifications (cont.)

CO₂ TRANSMITTER	
Sensor Type	Non-dispersive infrared (NDIR), diffusion sampling
Output Range	0 to 2000/5000 ppm (selectable)
Accuracy	±30 ppm $\pm3\%$ of measured value
Repeatability	±20 ppm $\pm1\%$ 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	$\pm15\%$ 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	Thin-film capacitive, replaceable
Accuracy	$\pm2\%$ from 10 to 80% RH @ 25°C (77 °F)
Hysteresis	1.5% typical
Stability	$\pm1\%$ @ 20°C (68 °F) annually for 2 years
Output Range	0 to 100% RH
Temperature Coefficient	$\pm0.1\%$ 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, 240x300 px Setpoint: 0-10Vdc. Temperature, humidity or fan speed selectable Timeout 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 Timeout 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

Specifications (cont.)

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, EN61000 Series - industrial immunity, EN 61326-1 FCC Part 15 Class B, REACH, RoHS, RCM (Australia), ICES-003 (Canada)

* Air Quality Index for VOC aligns with TVOC levels for IAQ as specified by the WHO (World Health Organization).
**DIP switch selectable.
*** One setpoint type is selectable via DIP switch on display models only.

Dimensions

115 (4.5)
85 (3.3)
24 (0.9)

2X ⌀.264 [6.7]
2X ⌀.142 [3.6]
3.28 [83.32]
⌀2.374 [60.3]
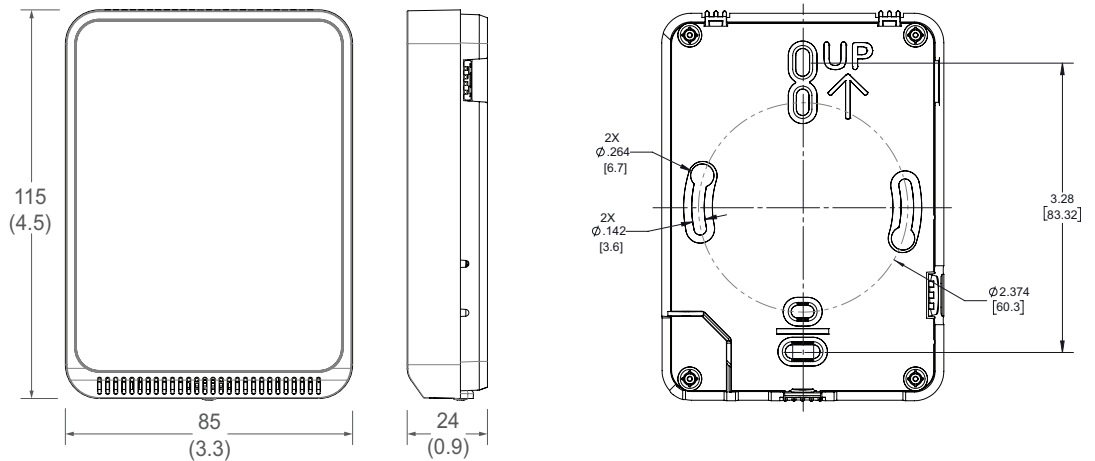
Functions

The CW2 Series sensor measures CO_2, VOC (if equipped), RH (if equipped) and temperature in a room and provides analog outputs to a controller.
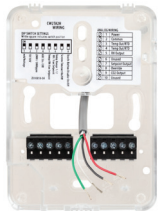
Installation

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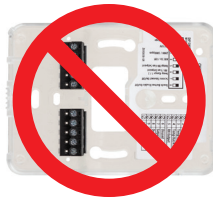
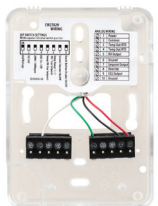3. Pull 18 or 22 AWG cable(s) through the hole in the backplate.

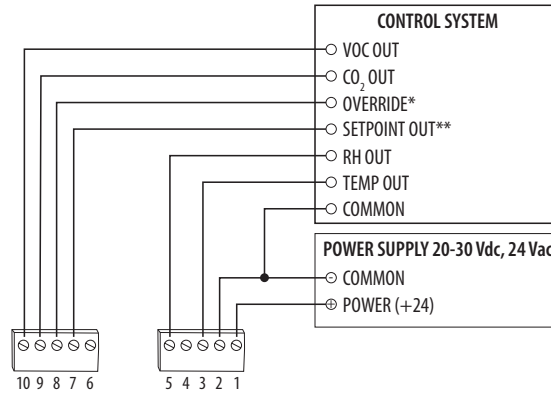4. Mount the backplate onto the wall using the screws provided.
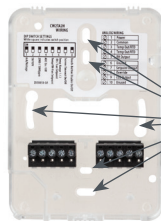
Six screw holes available. Use a minimum of two for secure mounting.

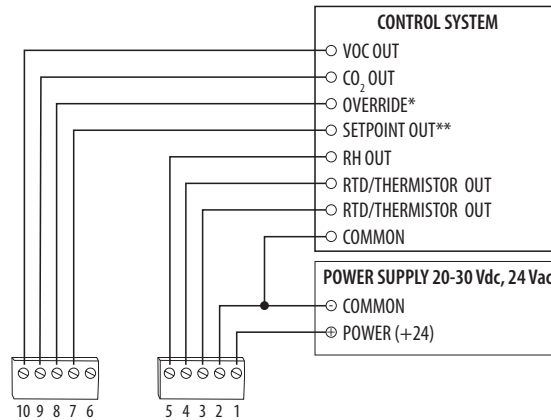5. Connect the wires to the screw terminals. Do not over-tighten the screws.

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Installation (cont.)

Wiring for models with temperature transmitter:.

```
CONTROL SYSTEM
  VOC OUT
  CO2 OUT
  OVERRIDE*
  SETPOINT OUT**
  RH OUT
  TEMP OUT
  COMMON

POWER SUPPLY 20-30 Vdc, 24 Vac
  COMMON
  POWER (+24)

10 9 8 7 6     5 4 3 2 1
```

Wiring for models with RTD/thermistor:

```
CONTROL SYSTEM
  VOC OUT
  CO2 OUT
  OVERRIDE*
  SETPOINT OUT**
  RH OUT
  RTD/THERMISTOR  OUT
  RTD/THERMISTOR  OUT
  COMMON

POWER SUPPLY 20-30 Vdc, 24 Vac
  COMMON
  POWER (+24)

10 9 8 7 6     5 4 3 2 1
```
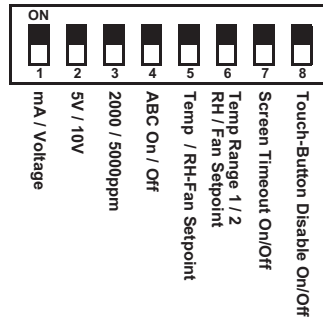
Momentary to ground.
** 0-10V DIP switch selectable for temperature, RH (if equipped) or fan speed (off, 0V, Auto 1.5V, Low 3.3V, Medium 6.7V or high 10V).

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Installation (cont.)

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	CO_2 output range	ON - 0-2000 ppm CO_2 output range enabled OFF - 0-5000 ppm CO_2 output range enabled
4	Automatic Baseline Calibration (ABC) for CO_2	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 sensor base fully installed, align top of cover to mounting tabs on top of sensor base. Swing cover downward until it latches at the bottom.

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Installation (cont.)

8. Install locking screw to secure cover in 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.

Calibration button access hole

LED
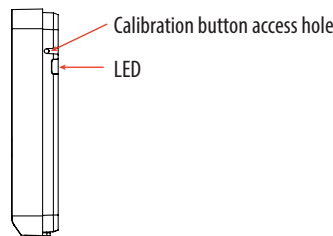
Automatic Baseline Calibration (ABC)
The ABC mode addresses the 400 ppm calibration. It allows turning on or off a background correction/recovery mode that will minimize any calibration error that has been caused by shock during handling and transportation or is caused by a long term shift in measurement. 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.
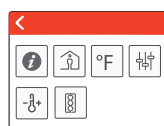
Touchscreen Operation

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).

Setpoint value (temperature setpoint shown)

Menu button

VOC AQI value

Fahrenheit/Celsius

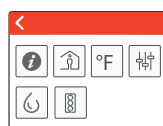Temperature value

CO_2 value

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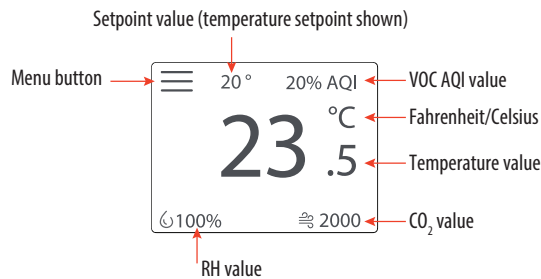
Menu Screen
The menu screen opens when pressing the Menu button on the main screen. Integrator's submenu, occupancy/override, Fahrenheit/Celsius, settings, setpoint submenu (temp, RH or fan, determined by DIP switch settings) and CO2 stoplight buttons are displayed on the menu screen.

Temperature setpoint
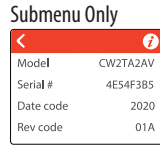DIP switch selected

RH setpoint
DIP switch selected
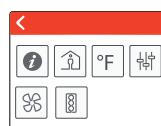
Fan Speed setpoint
DIP switch selected

Touchscreen Operation (cont.)

Menu Button Functions

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

Submenu Only

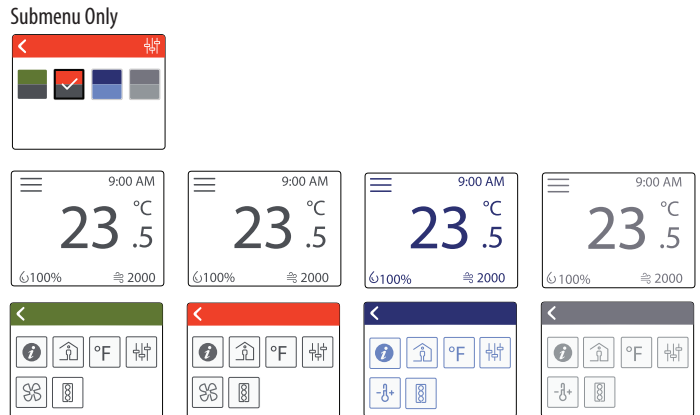| <		*i*
Model		CW2TA2AV
Serial #		4E54F3B5
Date code		2020
Rev code		01A

Menu Button Functions (cont.)

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

°F Changes units to Fahrenheit when pressed.

°C Changes units to Celsius when pressed.

Settings
This icon provides the ability to change the color scheme of the display.

Submenu Only

9:00 AM
23 °C .5
100% 2000

9:00 AM
23 °C .5
100% 2000

9:00 AM
23 °C .5
100% 2000

9:00 AM
23 °C .5
100% 2000

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

Submenu Only

85 °F .0
− +
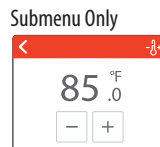
Humidity Setpoint Adjustment
Click this icon to access the setpoint change menu. Mutually exclusive with humidity and fan speed. Set by DIP switch.

Submenu Only

65 %
− +
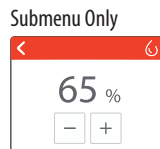
Fan Speed
Click this icon to access the fan speed menu. Mutually exclusive with humidity and fan speed. Set by DIP switch.
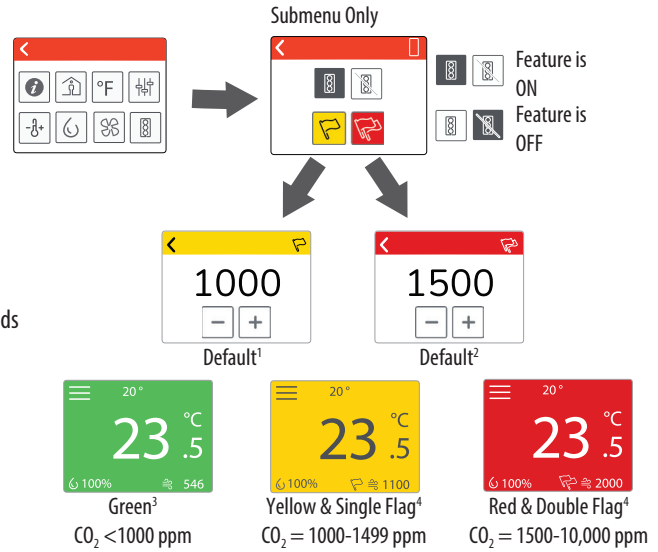
Submenu Only

Selected
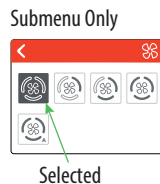
Touchscreen Operation (cont.)

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.

Submenu Only

Feature is ON
Feature is OFF

1000
Default[1]

1500
Default[2]

Green[3]
CO_2 <1000 ppm

Yellow & Single Flag[4]
CO_2 = 1000-1499 ppm

Red & Double Flag[4]
CO_2 = 1500-10,000 ppm

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 CO₂ 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.
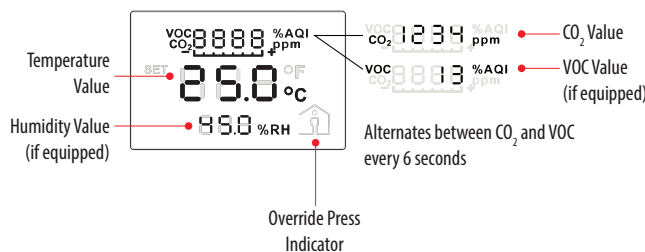
LCD Display Operation

Button Functions

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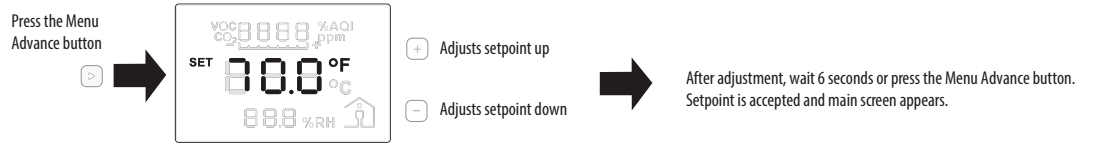Menu Advance
Change Values
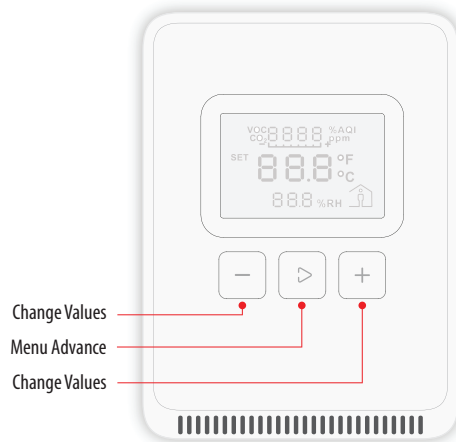
Display Icons
The main screen displays sensor values for CO₂, VOC (if equipped), RH (if equipped), temperature and Celsius/Fahrenheit.

Temperature Value
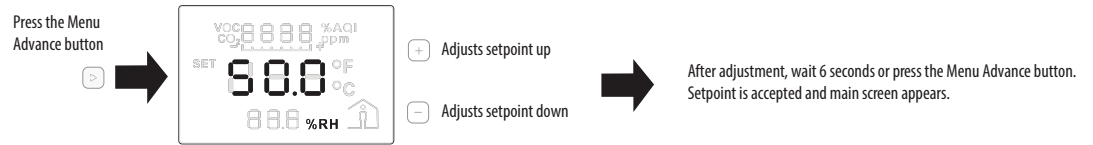Humidity Value (if equipped)
Override Press Indicator

CO_2 Value
VOC Value (if equipped)
Alternates between CO_2 and VOC every 6 seconds

rContent unreadable at required fidelity.

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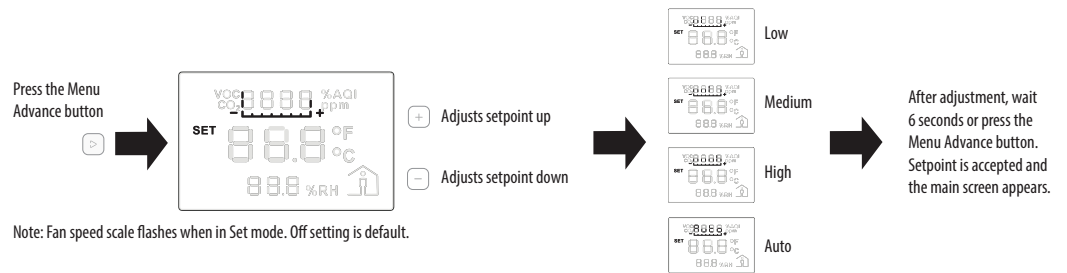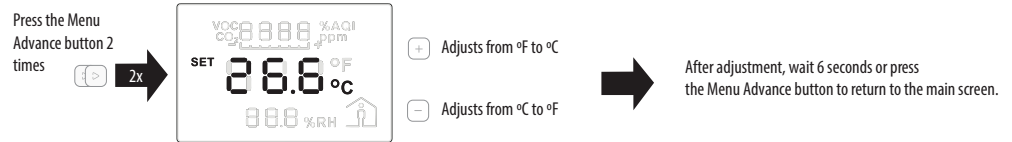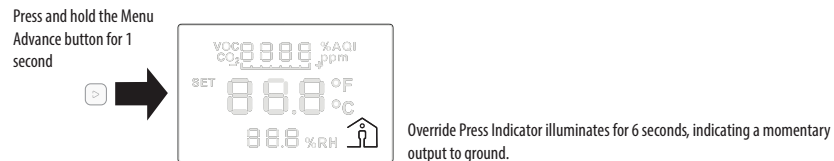
China RoHS Compliance Information

Environment-Friendly Use Period (EFUP) Table

部件名称	有害物质 - Hazardous Substances					
Part Name	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr (VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
电子件 Electronic	X	O	O	O	O	O

本表格依据SJ/T11364的规定编制。

O: 表示该有害物质在该部件所有均质材料中的含量均在GB/T 26572规定的限量要求以下。

X: 表示该有害物质至少在该部件的某一均质材料中的含量超出GB/T 26572规定的限量要求。

（企业可在此处，根据实际情况对上表中打 ×的技术原因进行进一步说明。）

This table is made according to SJ/T 11364.

O: indicates that the concentration of hazardous substance in all of the homogeneous materials for this part is below the limit as stipulated in GB/T 26572.

X: indicates that concentration of hazardous substance in at least one of the homogeneous materials used for this part is above the limit as stipulated in GB/T 26572

Z000057-0B