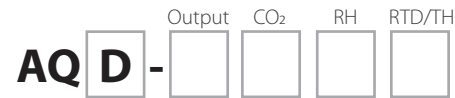


# INSTALLATION INSTRUCTIONS

## AQD Duct Series AQO Outdoor Series Analog and BACnet versions CO<sub>2</sub>/RH/T Combination Sensor



### PRODUCT IDENTIFICATION



#### Package

D = Duct  
O = Outdoor

#### Output Type

A = Analog (0-5/10V)  
B = BACnet

#### CO<sub>2</sub> Sensor

A = None  
B = CO<sub>2</sub> Sensor  
D = Dual Channel CO<sub>2</sub>

#### RH Sensor

A = None  
B = 2% RH Sensor

#### RTD/Thermistor\*

A = None	G = 10k w/11k
C = 100Pt (385) RTD	H = 3k
D = 1000Pt (385) RTD	I = 2k2
E = 10k type 2	J = 1k8
F = 10k type 3	K = 20k

\*Add-on RTD/Thermistor is not readable via BACnet;  
Temperature output is standard on AQ devices.

### IMPORTANT WARNINGS

- Only qualified trade installers should install this product
- This product is not intended for life-safety applications
- Do not install in hazardous or classified locations
- The installer is responsible for all applicable codes
- De-energize power supply prior to installation or service

#### PRODUCT APPLICATION LIMITATION:

Senva products are not designed for life or safety applications. Senva products are not intended for use in critical applications such as nuclear facilities, human implantable device or life sup-

### OPERATION

The AQ series design allows customization for a sensor that meets project requirements for monitoring temperature, CO<sub>2</sub> and relative humidity. The product can be ordered for outdoor or duct mount and with a 0-5/10V analog or BACnet RS485 output.

To verify the features see the 'Product Identification' section of the installation manual.

### INSTALLATION

#### AQD (Duct) Installation

1. Drill a 3/4" hole in duct. Install sensor using gasket and screws provided. The pickup tube will ensure adequate air flow regardless of air flow direction.
2. Mount unit to duct with supplied screws. Continue to step 3 under general installation.

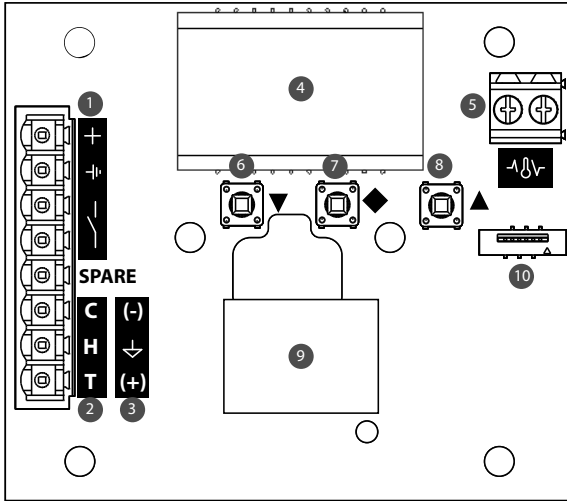
#### AQO (Outdoor) Installation

1. Select an outdoor location under an eave on north side of building away from direct sunlight and rain exposure.
2. Mount product to building with supplied screws. Continue to step 3 under general installation.

#### General (both) Installation

3. If installing with a conduit adapter, remove and replace the factory-installed cable gland.
4. Wire analog (or RS485 for BACnet version) outputs as needed.
5. Apply power to sensor.
6. Tighten cable gland firmly around wires. If installing with a conduit adapter, seal wire entry to prevent conduit air from affecting sensor readings or operation.
7. Close lid and tighten screw. Cover must be securely installed to prevent moisture from entering enclosure.

## WIRING



ALL MODELS: ①  
 + POWER VIN  
 - GND/COMMON  
 N.O. RELAY  
 N.O. RELAY

ANALOG ONLY:

C OUT CO<sub>2</sub>  
 H OUT RH ②  
 T OUT TEMP

BACNET ONLY:

(-) RS485 -  
 AGND ③  
 (+) RS485 +

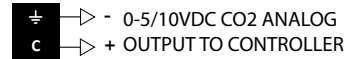
OPTIONAL:

⊖ THERMISTOR  
 RESISTANCE  
 OUTPUT

PARTS LIST:

- ① TERMINALS - ALL MODELS
- ② TERMINALS - ANALOG ONLY
- ③ TERMINALS - BACNET ONLY
- ④ DISPLAY
- ⑤ THERMISTOR OUTPUT (OPTION)
- ⑥ DOWN BUTTON
- ⑦ MENU BUTTON
- ⑧ UP BUTTON
- ⑨ REPLACEABLE CO<sub>2</sub> SENSOR
- ⑩ TEMP/RH SENSOR

EXAMPLE ANALOG OUTPUT:



## QUICK START MENU

1. Press and hold ▼ and ◆ (left and middle) buttons for 1 second to enter the Quick Start Menu that is adjustable using the LCD. Screen will display *SPt* when the menu has been activated.

2. Navigation and parameters:

- Pressing ◆ advances to the next menu item.
- If a menu item is visible, pressing either ▼ or ▲ displays the current value.
- If a value is visible, pressing either ▼ or ▲ changes the value. Holding ▼ or ▲ for a time accelerates the value change.
- If a value is visible, pressing ▼ and ▲ together sets the value to the default.
- If a value is visible, pressing ◆ returns to the menu item list.

<i>SPt</i>	Sets the relay turn-on threshold (Closed above this level); Default: <i>800</i>
<i>SPh</i>	Sets the relay turn-off hysteresis (Open below this level); Default: <i>100</i>
<i>SCl</i>	Sets the CO <sub>2</sub> concentration scaling ( <i>2</i> = 2000ppm (default); <i>5</i> = 5000ppm, <i>10</i> = 10000ppm)
<i>RdJ</i>	Sets the CO <sub>2</sub> concentration calibration offset up to +/- 250ppm; Default: <i>0</i> ppm
<i>CRl</i>	Sets the CO <sub>2</sub> auto calibration period <i>0FF</i> Auto calibration disabled*, <i>7d</i> 7 days, <i>14d</i> 14 days (default), <i>30d</i> 30 days, <i>60d</i> 60 days
<i>qFC</i>	Selects the unit system for displayed temperature measurements <i>USr</i> User defined (default), <i>qF</i> Degrees Fahrenheit, <i>qC</i> Degrees Celsius
<i>LUl</i>	Output Scaling (analog version only): <i>5U</i> 5.0V full scale, <i>10U</i> 10.0V full scale (default)
<i>rUN</i>	Close this menu with changes saved and display parameters.

3. When setup is complete, select RUN or wait for setup mode to time out.

\*If auto calibration is disabled, sensor may experience drift. Use in areas that are continuously occupied or with concentrated levels of CO<sub>2</sub> such as greenhouses should consider **dual-channel sensor** options. Consult factory for more information.

## QUICK START MENU - BACNET

**IMPORTANT:** The device will not activate the BACnet interface until the baud rate and the MS/TP MAC address are configured. If an active RS485 network is not available, configure the device using the *Setup Menu* (documented in the 'AQ Series User's Guide').

Access the auto configuration wizard by removing the front cover and pressing the ▼, ◆, and ▲ (all three) buttons for one second. After the wizard activates, the display will show *CF9*.

The wizard automatically advances between each step after a few seconds. Pressing the ◆ button also advances the wizard.

- br* The baud rate value can usually be detected from existing network activity. If no baud rate could be detected, the display will show *rP*. If necessary, use ▼ and ▲ to change the baud rate before advancing.
- Rdr* The device detects the smallest free MAC address on the local MS/TP subnet from existing network activity. If the installation requires a specific MAC address, use ▼ and ▲ to override the detected address. If the wizard detects that the selected MAC address conflicts with another device, it automatically advances to the next smallest free MAC address.

After the wizard completes, the device saves the baud rate and MS/TP MAC address. Additionally, the device adds 665000 to the selected MAC address and saves the resulting sum as the device object ID. If the object ID conflicts with another device, use *id\_1*, *id\_2*, and *id\_3* in the *Setup Menu* to set a unique object ID.

The BACnet interface becomes active immediately after the wizard completes. To reconfigure the baud rate and MAC address, use the *Setup Menu* or run the wizard again.

## MENU OPTIONS

To access the full menu options use the 'AQ Series User's Guide' manual online at [www.senvainc.com/download\\_center.asp](http://www.senvainc.com/download_center.asp)

The 'AQ Series User's Guide' includes:

- User's Menu
- Setup Menu
- Quick Start Menu
- Diagnostics

## OBJECT LIST MANUAL

For further reading access the object list and conformance statement 'AQ Series BACnet Protocol Guide' found online at [www.senvainc.com/download\\_center.asp](http://www.senvainc.com/download_center.asp)

The 'AQ Series BACnet Protocol Guide' includes:

- Protocol Implementation Conformance Statement
- Supported Objects
- Supported Properties

## HOME SCREEN

By default, the device displays one measurement at a time, rotating between measurements every 10 seconds if multiple sensor options are installed.

If the installer wants to change which values are displayed on the LCD, access the *User's Menu* (See 'AQ Series User's Guide').

## VISUAL INDICATORS

Each measurement should display in turn.

If a measurement does not appear, the respective sensor damaged, has been removed from the device, or has been selected not to appear through the *User's Menu* (See 'AQ Series User's Guide').

### BACnet Only:

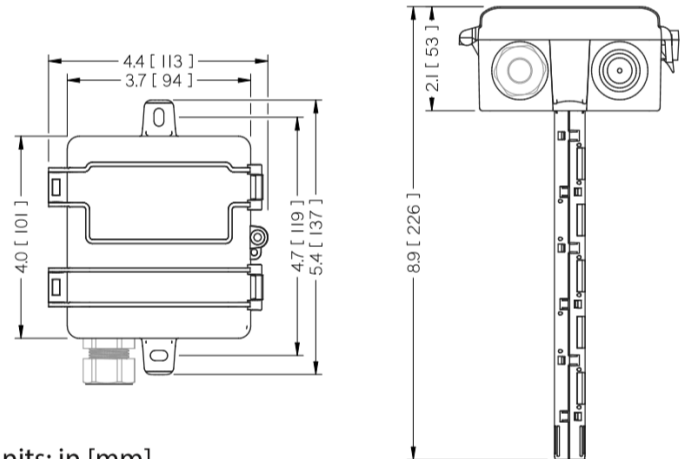
The baud rate and MAC address must be configured before the device begins transmitting.

The RX light (receiving indicator) will flash while data is being received. If the RX light is not blinking, verify the wiring configuration and wiring connections.

The TX light (transmitting indicator) will flash while data is being transmitted.

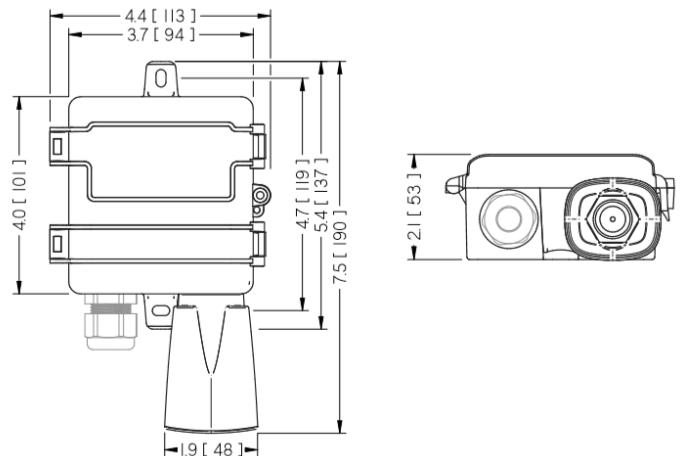
## DIMENSIONS

### AQD Dimensions



Units: in [mm]

### AQO Dimensions



## TROUBLESHOOTING

Symptom	Solution
No output	Check wiring. Ensure power supply meets requirements.
Reading error	Verify unit is located away from hot/cold sources.
	Verify control panel software is configured correctly.
	Verify accuracy of test instrument.
	Install insulation behind sensor to prevent air flow from inside wall.

## SENA TECHNICAL SUPPORT

Need further assistance? Call our toll-free number for live technical support: (866) 660-8864 or feel free to email us at [support@senvainc.com](mailto:support@senvainc.com)

## SPECIFICATIONS

Power Supply	12-30VDC/24VAC <sup>(1)</sup> , 100mA max.
Analog Outputs (Analog Version Only)	<b>Temperature</b> 0-5/10V standard; Scaling 50°F to 95°F (10°C to 35°C); Thermistor/RTD values optional
	<b>CO2 and RH</b> 0-5/10V
	<b>Update Rate</b> Continuous
Protocol Output (BACnet Version Only)	<b>Programmable Relay</b> Solid-state output, 1A @ 30VAC/DC, N.O.
	<b>Protocol</b> BACnet
	<b>Connection</b> 3-wire RS-485, with isolated ground
	<b>Data Rate</b> Locally set baud rate up to 115200 (9600, 19200, 28800, 38400, 57600, 76800, 115200)
	<b>Address Range</b> 0-127
	<b>Bus Load</b> 1/8 <sup>th</sup> unit (256 nodes maximum on bus)
CO <sub>2</sub>	<b>Programmable Relay</b> Solid-state output, 1A @30VAC/DC, N.O. Source Selectable: CO <sub>2</sub> , RH, Temperature
	<b>Type</b> Non-dispersive Infrared (NDIR)
	<b>Accuracy (Standard)</b> ±(30ppm +3% of reading) (400-2000ppm), @-10-50°C ±(50ppm +5% of reading) (2000-5000ppm), @-10-50°C ±(100ppm+10% of reading) (5000-10000ppm), @ 0-50C
	<b>Accuracy (Dual-Channel option)</b> ±(30ppm+3% of reading) (0-2000ppm), @ 0-50C ±(50ppm+3% of reading) (2000-5000ppm), @ -10-50C ±(100ppm+10% of reading) (5000-10000ppm), @ 0-50C
	<b>Drift with ABC disabled (Standard)</b> < 35ppm/month
	<b>Drift with ABC disabled (Dual Channel)</b> < 5ppm/month
	<b>Pressure Dependence</b> +1% reading per 1kPa (0.146PSI) deviation from nominal pressure (101kPa, 14.7PSI)
	<b>Range</b> 0-2000/5000/10000ppm (2000ppm default); Programmable up to 10,000ppm
	<b>Response time</b> 30s
	<b>Sample rate</b> 1s
	Relative Humidity
<b>Accuracy</b> 2% models, +/-2% over 10 to 90%RH range	
<b>Resolution</b> 0.05%RH	
<b>Hysteresis</b> +/-1%RH	
<b>Temperature coefficient</b> Compensated on-board	
<b>Response time <sup>(2)</sup></b> 30s	
<b>Sample rate</b> 3s	
<b>Operating range/Output Scale</b> 0 to 100%RH (non-condensing)	
<b>Long term drift</b> <0.5%RH per year	
<b>Operating conditions <sup>(4)</sup></b> -20° C to 60° C @ RH>90% -20° C to 80° C @ RH=50%	
Temperature (with RH element)	<b>Type</b> Silicon Bandgap
	<b>Nominal Accuracy</b> +/-0.3° C (operating range)
	<b>Maximal Accuracy</b> +/-0.5° C (at 25° C), +/-1.0° C (operating range)
	<b>Resolution</b> 0.01° C
	<b>Repeatability</b> +/-0.1° C
	<b>Response time <sup>(3)</sup></b> 30s
Temperature (without RH element)	<b>Sample rate</b> 3s
	<b>Type</b> NTC Thermistor
	<b>Nominal Accuracy</b> +/-0.5° C (operating range)
	<b>Maximal Accuracy</b> +/-1.0° C (at 25° C), +/-2.0° C (operating range)
	<b>Resolution</b> 0.05° C
	<b>Repeatability</b> +/-0.2° C
Operating Environment <sup>(4)</sup>	<b>Sample Rate</b> 100 milliseconds
	<b>Temperature</b> -4 to 122F (-20 to 50° C)
Enclosure	<b>Humidity</b> 0-95% non-condensing
	<b>Material</b> ABS/Polycarbonate
	<b>Dimensions</b> 4.0" h x 4.4" w x 2.1" d (AQD: +6.8" probe) (AQO: +2.8" solar shield)