

# TotalSense Series IAQ/Occupancy Sensor

Industry's first IAQ sensor with PIR motion detection  
 Nine environmental sensors: PIR, PMx, VOC, CO2, CO, RH, T, ambient light, barometric pressure  
 BACnet/Modbus or analog outputs with set-point relay



## DESCRIPTION

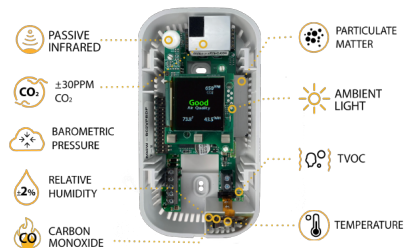
The TotalSense Series provides more data for more advanced ventilation control while drastically reducing installation cost and time on a project. It includes a comprehensive selection of IAQ sensing with carbon dioxide (CO2), relative humidity (RH), and temperature plus options for occupancy detection (PIR), total volatile organic compounds (TVOC), particulate matter (PM), Carbon Monoxide (CO), and ambient light. More than an IAQ sensor, it's the first fully configurable Indoor Environmental Quality (IEQ) sensor matrix. Motion detection (PIR) can initiate ventilation upon occupancy, providing air exchanges the instant people are present, allowing for cleaner and safer indoor spaces while still saving energy.

## APPLICATIONS

- Verify effectiveness of IAQ strategies in post covid environment
- Energy management/building control
- Facilitates compliance with ASHRAE 62.1 standard for air quality
- Contributes toward satisfying Feature A08 and T06 under the WELL Building Standard®



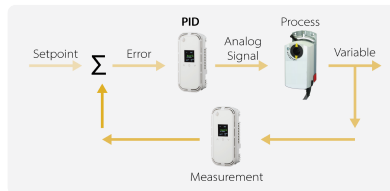
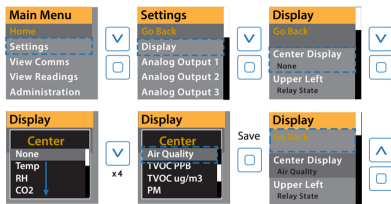
GOOD  
FAIR  
POOR



Display, AQ ring, and standard designs

PIR Motion Detection (optional) - Detect occupancy for quicker and safer ventilation

Configure up to nine sensors



Change any setting, press ENTER to see the setup menu and navigate to parameter

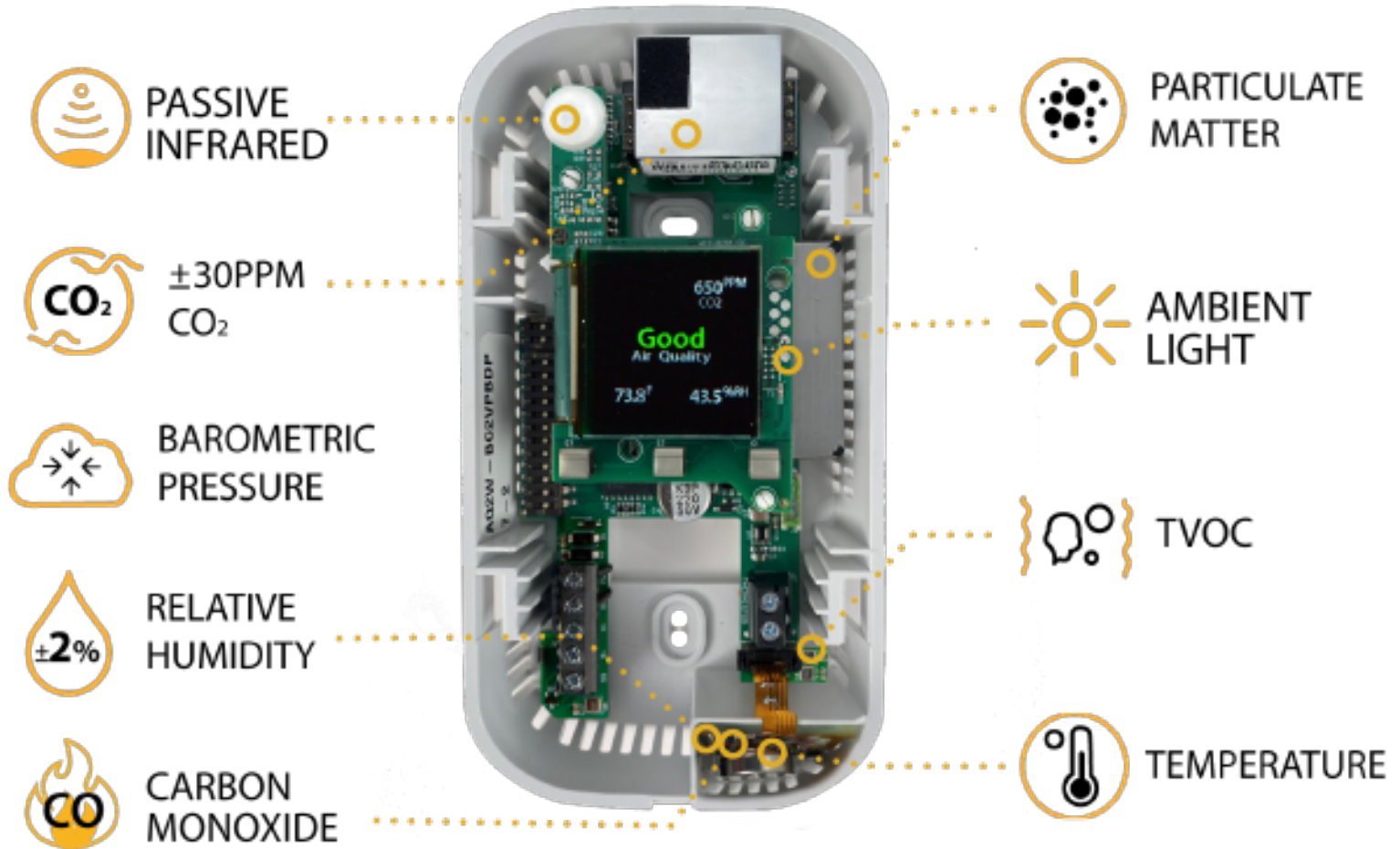
NEW! PID control - program any analog output for local control of dampers or valves

RESE monitors are tested and certified for your RESE Air Projects.

FEATURES

- NEW! Save even more using an analog output for local PID control
- NEW! Dual BACnet/Modbus PLUS analog output version for BAS connection plus local analog control
- NEW! Configuration App with Senva Sync
- Specify the exact product for your application with made in USA quality
- NEW! Use PIR occupancy sensor to enable auto-wakeup of display
- Initiate ventilation immediately upon occupancy detection for healthier buildings and energy savings
- Sense unhealthy or offensive air with TVOC
- Detect a variety of PM sizes to indicate airborne respiratory droplets, allergens, and other dangers
- Industry-leading temperature and barometric pressure compensated CO2 sensing with non-dispersive infrared sensing element (NDIR), 15+ year life expectancy on CO2 sensing element;  $\pm 30\text{ppm}$ ,  $\pm 3\%$  of reading
- Capacitive touch buttons make setup and use simple
- Slim and sleek surface-mount enclosure is tamper-proof and easy to install
- Field-replaceable PM, RH, Temp, and CO2 sensors ease maintenance
- Set-point sliders and pushbuttons are also available to meet the requirements for any job
- 7-year limited warranty / 3 years on CO2 sensor - 2 years on all others

NINE SENSING TECHNOLOGIES



**ORDERING**

|                                       |   |   |  |   |  |  |   |  |   |  |  |  |  |  |  |  |  |  |  |  |
|---------------------------------------|---|---|--|---|--|--|---|--|---|--|--|--|--|--|--|--|--|--|--|--|
| <b>AQ2</b>                            | <b>W</b>  | - |  |   |  |  |   |  |   |  |  |  |  |  |  |  |  |  |  |  |
| <b>Mounting Type</b><br>W= Wall Mount | <b>Output Type (1)(3)(4)</b><br>A = Analog<br>B = BACnet/Modbus<br>D= Dual Analog + BACnet/Modbus |   | <b>CO2 (2)</b><br>A = None<br>C = CO <sub>2</sub><br>D= Dual Channel CO <sub>2</sub> | <b>Humidity Sensor (RH)</b><br>A= None<br>2= 2% RH Sensor | <b>Volatile Organic Compounds (VOC)</b><br>A= None<br>V= VOC | <b>Advanced Sensors (3) (5) (6)</b><br>A= None<br>C= CO<br>P= (PM) Particulate Matter 1.0, 2.5, 4.0,10.0<br>R= CO+PM | <b>Temperature (4)</b><br>A= None<br>B= Transmitter<br>C= 100PtRTD<br>D= 1000PtRTD<br>E= 10K Type 2<br>F= 10K Type 3<br>G= 10K W/ 11K<br>H= 3K<br>I = 2K2<br>J = 1K8<br>K = 20K | <b>Display (5)</b><br>X= None<br>D= OLED Display<br>S= OLED w Solid Cover<br>R= Air Quality Ring | <b>Optional Accessories</b><br>Blank= None<br>(See below for options) |  |  |  |  |  |  |  |  |  |  |  |

|  |  |  |  |
|--|--|--|--|
| <b>Setpoint Slider (6)</b><br>Blank = None<br>C = 1K Ω<br>F = 10K Ω<br>G = 20K Ω<br>T= 200-900 Ω | <b>Slider Offset Resistor</b><br>Blank= None<br>E = 910 Ω<br>K= 6K Ω | <b>Pushbutton (6)</b><br>Blank= None<br>S= Slider Override Pushbutton (7)<br>O= Thermistor Override Pushbutton (8)<br>U= Stand Alone PB Terminals<br>B= Comms Only PB (No Terminals) | <b>PIR Sensor</b><br>Blank= None<br>P= PIR Sensing |
|--|--|--|--|

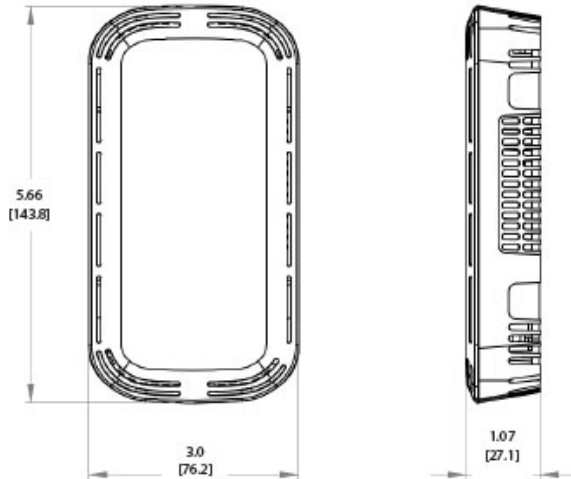
- (1) Ambient light detection standard on all models with BACnet/Modbus and D display option
- (2) Barometric pressure sensing included standard on all models with CO2!
- (3) All PM options only available with BACnet/Modbus models.
- (4) Only Transmitter option is shown on display and readable via BACnet/Modbus. Thermistor versions not available to display on OLED or to read over BACnet/Modbus.
- (5) CO sensor only available with display for calibration purposes.
- (6) Slider and pushbutton options not available with PM sensor. Call for additional slider and override options.
- (7) Slider required, shorts slider terminals to read pushbutton.
- (8) Thermistor Required, shorts thermistor terminals to read pushbutton.

**Example:**      Mount    Output    CO<sub>2</sub>    RH    VOC    PM    Temp    Display    Slider    Push-Button    PIR

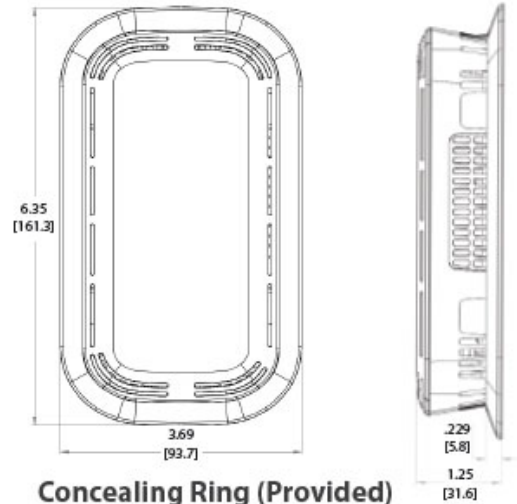
**AQ2**   **W** - **B**   **C**   **2**   **V**   **P**   **F**   **D**   **F**   **S**   **P**

(TotalSense Wall mount with BACnet/Modbus RS-485, Temp, CO2, 2% RH, VOC, PM, 10KT3 Temp, OLED, 10K Slider, Slider Override PB, No Offset Ω, PIR Sensor)

**DIMENSIONS**



**Standard Surface Mount**



**Concealing Ring (Provided)**

- Conceal oversized drywall cutouts or European junction boxes

**Warning:** The datasheet is designed for reference only. Refer to installation instructions that accompany the product and heed all safety instructions. Product improvement is a continuing process at Senva. Changes may occur to products without prior notice

**SPECIFICATIONS**

|   |                                |   |
|---|--------------------------------|---|
| Power Supply                                    | Non-Display                    | 16-30VDC/24VAC(1), 3.5W nominal, 4W max.  |
|   | Display or LED Ring            | 24-30VDC/24VAC(1), 4.3W nominal, 5W max.  |
| Interface                                       | OLED (optional)                | 1.5" Organic LED Display, 128x128, color  |
|   | Air Quality Ring               | Color changing (red/yellow/green) LED Air Quality Ring  |
| Analog Outputs<br>(Analog or Dual version only) | Quantity                       | Up to 3 outputs   |
|   | Source                         | CO <sub>2</sub> , RH%, Temp, Temp slider, TVOC (selectable)   |
|   | Scale                          | 0-5V, 0-10V, 4-20mA (switch selectable, programmable per output)  |
| Protocol Output<br>(Comms or Dual version only) | Protocol                       | BACnet MS/TP or Modbus RTU  |
|   | Connection                     | 3-wire RS-485, with isolated ground   |
|   | Data Rate                      | 9600, 19200, 38400, 57600, 76800, 115200 (switch selectable)  |
|   | Address Range                  | 0-127   |
| Relay<br>(Standard except for PM models)        | Type                           | Solid-state output, 1A @ 30VAC/DC, N.O.   |
|   | Polarity                       | NO/NC (selectable)  |
|   | Source                         | CO <sub>2</sub> setpoint, RH setpoint, Temp setpoint, TVOC setpoint, PIR motion detection, Air Quality, off (selectable)                                |
| CO <sub>2</sub> (Optional)                      | Type                           | Non-dispersive Infrared (NDIR)  |
|   | Accuracy                       | ±(30ppm + 3% of reading) (400-2,000ppm), -10-50°C, 0-85%RH<br>±(50ppm + 5% of reading) (2,000-5,000ppm), -10-50°C, 0-85%RH<br>>5,000ppm consult factory |
|   | Resolution                     | 1 ppm   |
|   | Range                          | 0-2,000 PPM (Default) (Programmable up to 10,000ppm)  |
|   | Response time                  | 90 seconds to 90% reading   |
|   | Sample rate                    | 1s  |
|   | Temp and Pressure Compensation | Yes, barometric pressure readable over comms  |
| Relative Humidity<br>(Optional)                 | Type                           | Digital CMOS  |
|   | Accuracy(2)                    | 2% models, +/-2% over 0 to 80%RH range  |
|   | Resolution                     | 0.05%RH   |

|                         |                               |   |
|-------------------------|-------------------------------|---|
|                         | Response time (3)             | 30s   |
|                         | Sample rate                   | 3s  |
|                         | Operating range               | 0 to 100%RH (non-condensing)  |
|                         | Operating conditions (4)      | -4 to 140oF (-20 to 60° C) @ RH>90%; -4 to 176oF @ RH=50%                       |
| Temperature Transmitter |                               | With RH option  |
| (Optional)              |                               | Without RH option   |
|                         | Type                          | Silicon Band-gap  |
|                         | Nominal Accuracy              | ±0.3° C (operating range)   |
|                         | Maximum Accuracy (2)          | ±0.5° C (at 25° C), ±1.0° C   |
|                         | Resolution                    | 0.1° C  |
|                         | Response time                 | 30s   |
|                         | Sample rate                   | 3s  |
|                         |                               | 100 milliseconds  |
| TVOC (Optional)         | Type                          | MOS   |
|                         | Gas                           | Total VOC   |
|                         | Formaldehyde CH2O Sensitivity | Responsive to Formaldehyde concentrations 50-1000 ppb                           |
|                         | Range                         | 0-32,000 µg/m3 (Display may be programmed to show PPB)                          |
|                         | Response Time                 | <10s  |
|                         | Output                        | 0-2,000 µg/m3 (default) programmable up to 32,000 µg/m3                         |
| PMx (Optional)          | Type                          | Optical   |
| CLASS 1 LASER PRODUCT   | Size Range                    | PM1.0, PM2.5, PM4.0, PM10.0   |
|                         | Scale                         | 0-1,000 µg/m3   |
|                         | Lower detection limit         | 0.3 µm  |
|                         | Precision                     | ±10 µg/m3 (0-100µg/m3); ±10% (100-1,000 µg/m3)                                  |
|                         | Long-Term Drift               | ±1.25 µg/m3 / year  |
| Carbon Monoxide         | Type                          | Electrochemical   |
|                         | Detection Range               | 0-200 ppm   |
|                         | Accuracy                      | 5% of reading   |
|                         | Resolution                    | 1 ppm   |
|                         | Response Time                 | 60 seconds  |
| PIR (Optional)          | Type                          | Passive Infrared  |
|                         | Axis X field of view          | 140o, 15 ft (4.5m)  |
|                         | Axis Y field of view          | 76o, 15 ft (4.5m)   |
| Ambient Light           | Type                          | Phototransistor   |
|                         | Scale                         | 0-100 fc (lm/ft2), readable over comms  |
| Operating Environment   | Temperature                   | 32 to 122oF (0 to 50oC)   |
|                         | Humidity                      | 0-95% non-condensing  |
| Enclosure               | Material                      | ABS Plastic   |
|                         | Dimensions                    | 5.67" h x 3.00" w x 1.07" d (With concealing ring: 6.35" h x 3.69" w x 1.25" d) |
| Compliance              | Agency                        | CE, RoHS  |

1. One side of transformer, secondary is connected to signal common. Dedicated transformer is recommended.
2. Models with PM sensor included achieve ±5% accuracy over 0 to 80%RH range and an additional temperature shift of up to +0.5°C
3. Time for reaching 63% of reading at 25° C and 1 m/s airflow
4. Long term exposures to conditions outside normal range at high humidity may temporarily offset the RH reading (+3%RH after 60 hours.)

\* Product improvement is a continual process as Senva and product features and specification may change without prior notice. Refer to instructions that accompany the product for installation and wiring.