Engineering Specifications

TotalSense Series - Indoor Environmental and Air Quality Sensor

1. The sensor shall be an indoor air quality sensor that has the option to sense all the following: CO2, Humidity, Temperature, Particulate Matter, TVOCs, Ambient light, Occupancy, Ozone, CO, and Barometric Pressure.
2. The sensor shall have a phone application to read or apply settings to the device without it being powered.
3. The sensor shall have an optional color OLED display to show measured values and change device parameters. The display shall allow for customization of up to 5 parameters to be displayed, selectable by the user, including a three-color air quality indication for good, fair, and poor air quality. The OLED shall also have an optional screen-saver mode that cycles through all measured values.
4. The sensor shall have a phone application to connect to the device for quick setup, including the ability to save and share templates and program one or multiple devices.
5. The sensor shall allow for complete customization of the air quality index calculation, including adjustment to good and poor thresholds for each measurement as well as the ability to disable sensors from the calculation.
6. The sensor shall have a lockable lid.
7. The sensor shall have an optional LED air quality ring with RED/YELLOW/GREEN LEDs to represent the air quality in the space.
8. The sensor shall have an optional relay with selectable NO/NC operation that can be used for CO2 setpoint, RH setpoint, Temp setpoint, TVOC setpoint, PIR motion detection, CO setpoint, and Ozone setpoint.
9. The sensor shall meet the following sensing requirements:
   1. CO2
      1. Type: Non-dispersive Infrared (NDIR)
      2. Accuracy: ±(30ppm + 3% of reading) (400-2000ppm), -10-50ºC, 0-85%RH

±(50ppm+ 5% of reading) (2000-5000ppm), -10-50ºC, 0-85%RH

>5000ppm consult factory>5000ppm consult factory

* + 1. Resolution: 1 ppm
    2. Range: 0-10000ppm
    3. Response time: 90 seconds to 90% reading
    4. Sample rate: 1s
    5. Temp and Pressure Compensation: Yes, barometric pressure readable over comms
  1. Humidity
     1. Type: Digital CMOS
     2. Accuracy: 2% models, +/-6% over 10 to 80%RH range
     3. Resolution: 0.05%RH
     4. Response time: 30s ) Time for reaching 63% of reading at 25° C and 1 m/s airflow)
     5. Sample rate: 3s
     6. Operating range: 0 to 100%RH (non-condensing)
     7. Operating conditions: -4 to 140°F (-20 to 60° C) @ RH>90%; -4 to 176oF @ RH=50%
  2. TVOC
     1. Type: MOS
     2. Gas: Total VOC
     3. Range: 0-10000 μg/m3
     4. Response Time: <10s
     5. Temp and Pressure Compensation: Yes
     6. Output: 0-2000 μg/m3 (default) programmable up to 10000 μg/m3
  3. PMx
     1. Type: Optical
     2. Size Range: PM1.0, PM2.5, PM4.0, PM10.0
     3. Scale: 0-1000 μg/m3
     4. Lower detection limit: 0.3 μm
     5. Precision: ±10 μg/m3 (0-100μg/m3); ±10% (100-1000 μg/m3)
     6. Long-Term Drift: ±1.25 μg/m3 / year
  4. PIR (occupancy)
     1. Type Passive: Infrared
     2. Axis X field of view: 140°, 15 ft (4.5m)
     3. Axis Y field of view: 76°, 15 ft (4.5m)
  5. Ambient Light
     1. Type: Phototransistor
     2. Scale: 0-100 fc (lm/ft2), readable over comms
  6. Temperature Transmitter:
     1. Type: Silicon Band-gap
     2. Nominal Accuracy: ±0.3° C (operating range)
     3. Maximum Accuracy: ±0.5° C (at 25° C), ±1.0° C
     4. Resolution: 0.1° C
     5. Response time: 30s
     6. Sample rate: 3s
  7. Carbon Monoxide
     1. Type: Electrochemical
     2. Detection range: 0-200 ppm
     3. Accuracy: ±5% full scale @ 20°C
     4. Resolution: 1 ppm
     5. Response Time: 60s
     6. Sensor Lifetime: 5 years
     7. Certifications: UL2034 recognized component
  8. Ozone
     1. Type: MOS
     2. Detection Range: 20-500 ppb
     3. Accuracy: ±15% FS @20°C

1. The sensor shall offer a secondary RTD/Thermistor temperature option.
2. The sensor shall operate from 0 to 50°C.
3. The sensor shall operate in a humidity range from 0-95% non-condensing.
4. The sensor shall be RESET accredited.
5. The sensor shall meet CE and RoHS requirements.
6. The sensor shall be able to communicate either digitally with Modbus RTU and BACnet MS/TP or with analog outputs. The sensor shall be able to optionally operate Modbus and BACnet as well as an analog output concurrently.
7. The device shall communicate using BACnet MS/TP or Modbus RTU at speeds of 9600 to 115200 using a 3 wire RS-485 with isolated ground connection.
8. The sensor shall be powered by 24 VAC and 24-30 VDC with a nominal power consumption of 3.5W.
9. The sensor shall be able to output both 0-5V/0-10 V and 3 wire 4-20 mA that are ±1% accurate to what is displayed on the device.
10. The sensor shall have an optional setpoint resistive slider.
11. The sensor shall have an optional override push button.
12. The sensor shall have wiring terminals to accommodate 14-26 AWG wire.
13. The sensor electronics shall have a 7-year warranty.
14. The sensor shall have a 2-year warranty on all replaceable elements.
15. The sensor shall be manufactured in the USA.
16. The sensor shall be manufactured by Senva.