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, and Barometric Pressure.
2. The sensor shall meet CE and RoHS requirements.
3. The sensor shall be able to communicate both digitally with Modbus and BACnet and with analog outputs.
4. 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.
5. The sensor shall be powered by 24VAC and 24-30VDC with a nominal power consumption of 3.5W.
6. The sensor shall be able to output both 0-5V/0-10V and 3 wire 4-20mA that are +/-1% accurate to what is displayed on the device.
7. The sensor shall have an optional OLED display to show measured values and change device parameters.
8. The sensor shall have an optional LED air quality ring with RED/YELLOW/GREEN LEDs to represent the air quality in the space.
9. The sensor shall have optional touch buttons for the user to navigate the device menu and configure device settings.
10. The sensor shall meet the following sensing requirements:
    a. CO2
        i. Type: Non-dispersive Infrared (NDIR)
        ii. 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
        iii. Resolution: 1 ppm
        iv. Range: 0-10000ppm
        v. Response time: 90 seconds to 90% reading
        vi. Sample rate: 1s
        vii. Temp and Pressure Compensation: Yes, barometric pressure readable over comms
    b. Humidity
        i. Type: Digital CMOS
        ii. Accuracy: 2% models, +/-6% over 10 to 80%RH range
        iii. Resolution: 0.05%RH
        iv. Response time: 30s) Time for reaching 63% of reading at 25° C and 1 m/s airflow)
        v. Sample rate: 3s

vi. Operating range: 0 to 100%RH (non-condensing)
vii. Operating conditions: -4 to 140°F (-20 to 60° C) @ RH>90%; -4 to 176oF @ RH=50%

c. TVOC
i. Type: MOS
ii. Gas: Total VOC
iii. Range: 0-10000 µg/m3
iv. Response Time: <10s
v. Temp and Pressure Compensation: Yes
vi. Output: 0-2000 µg/m3 (default) programmable up to 10000 µg/m3

d. PMx
i. Type: Optical
ii. Size Range: PM1.0, PM2.5, PM4.0, PM10.0
iii. Scale: 0-1000 µg/m3
iv. Lower detection limit: 0.3 µm
v. Precision: ±10 µg/m3 (0-100µg/m3); ±10% (100-1000 µg/m3)
vi. Long-Term Drift: ±1.25 µg/m3 / year

e. PIR (occupancy)
i. Type Passive: Infrared
ii. Axis X field of view: 140°, 15 ft (4.5m)
iii. Axis Y field of view: 76°, 15 ft (4.5m)

f. Ambient Light
i. Type: Phototransistor
ii. Scale: 0-100 fc (lm/ft2), readable over comms

g. Temperature Transmitter:
i. Type: Silicon Band-gap
ii. Nominal Accuracy: ±0.3° C (operating range)
iii. Maximum Accuracy: ±0.5° C (at 25° C), ±1.0° C
iv. Resolution: 0.1° C
v. Response time: 30s
vi. Sample rate: 3s

11. The sensor shall offer a secondary RTD/Thermistor temperature option.
12. The sensor shall operate from 0 to 50C
13. The sensor shall operate in a humidity range from 0-95% non-condensing
14. The sensor shall have an option relay with selectable NO/NC operation that can be used for, CO2 setpoint, RH setpoint, Temp setpoint, TVOC setpoint, PIR motion detection, Air Quality.
15. The sensor shall have an optional setpoint resistive slider.
16. The sensor shall have an optional override push button.
17. The sensor shall have wiring terminals to accommodate 14-26AWG wire.
18. The sensor electronics shall have a 7-year warranty.
19. The sensor shall have a 2-year warranty on all replaceable elements.
20. The sensor shall be manufactured in the USA.

21. The sensor shall be manufactured by Senva.