SENVA

AQO Series
Outside Air CO2/RH/T

ASHRAE BACnet®

- Available with analog outputs or protocol for BACnet RS-485
- Integrated set-point relay
- Optional field replaceable NDIR CO2 and RH elements
- Now available with dual-channel CO2 element

DESCRIPTION

The AQO series exceeds project requirements for monitoring outside air conditions for temperature, CO_2 and relative humidity. The AQO series is enclosed in an outdoor rated enclosure to protect electronics from rain, overhead watering systems and harmful UV rays. The sensor can be ordered as stand alone temperature, CO_2/Temp, RH/Temp or all-in-one CO_2/RH/Temp with a 0-5/10V analog or BACnet RS485 output. Now available with a dual-channel CO2 element for more accurate sensing in continuously occupied spaces and greenhouses.

APPLICATIONS

- Controlling ventilation in response to occupancy
- Facilitates compliance with ASHRAE 62.1 standard for air quality
- Offices, conference rooms, and public assembly areas
- Hospitals (dual channel version)
- Greenhouses (dual channel version)

FEATURES

Customize to meet project requirements

- Standard LCD and temperature on each device
- Options to add CO_2 and/or RH sensing elements
- Field replaceable elements for RH
- Available with 0-5/10V Analog or BACnet protocol communication

Protocol Version

- BACnet RS-485 ready
- Auto-configuration wizard detects baud rate and MAC address
- Adjustable set-point using button menu or optional 10k slider

Analog Version

- LCD for easy setup of all parameters (concealment cover included)
- Programmable set-points for complete control
- Provision to offset CO_2 reading
- Optional thermistors, sliders and override button

High performance NDIR CO_2 element

- Selectable auto-calibration mode returns sensor to baseline values
- NEW! Dual-Channel CO2 element available. Dual channel technology employs a calibrated reference chamber to minimize drift

2% RH field replaceable sensor

- On-board temperature compensation for RH eliminates temp coefficient errors achieving excellent measurement accuracy, high repeatability and offset stability.
- State of the art testing facilities. 8-point NIST traceable certification available—consult factory
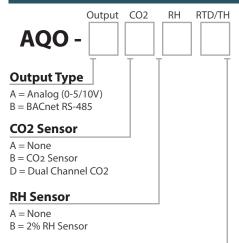
Quality

- Gasketed hinged housing with tamper screw

ORDERING INFORMATION

	Output	CO2	RH	RTD/TH
AQO -				

Output Type
A = Analog (0-5/10V)
B = BACnet RS-485

CO2 Sensor
A = None
B = CO_2 Sensor
D = Dual Channel CO2

RH Sensor
A = None
B = 2% RH Sensor

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

*Add-on RTD/Thermistor not readable via BACnet; Temperature output is standard on AQO devices, Add-on RTD/Thermistor is option for Analog.

PROUDLY MADE IN USA   7 year limited warranty

BACnet® is a registered trademark of ASHRAE.

SPECIFICATIONS

Power Supply		12-30VDC/24VAC[1], 100mA max.
Analog Outputs	Temperature (Analog)	0-5/10V standard, Analog scaling 50°F to 95°F (10°C to 35°C)
	Termparature (Thermistor)	Thermistor/RTD values optional, temp range varies -40 to 185°F (-40 to 85°C) or better
	CO2 and RH	0-5/10V
	Update Rate	Continuous
	Programmable Relay	Solid-state output, 1A @ 30VAC/DC, N.O. Source Selectable: CO2, RH, Temperature
Analog LCD Menu Parameters [2]	$5P\text{E}$, Set point, Hi (On)	Sets relay turn-on threshold (800ppm default)
	$5Ph$, Set point, hysteresis (Off)	Sets the relay turn-off hysteresis (100ppm default)
	5EL, Scaling	0-2000ppm or 0-5000ppm (2000ppm default)
	AdJ, Adjustment	CO2 Offset adjustment +/-250ppm (0 default)
	EAL, Auto Calibration Period	Off, 7 days, 14 days, 30 days, 60 days (14 days default)
	FE, Displayed Temp Unit	F degrees fahrenheit (default), E degrees celsius
	LuL Analog Output Scale	5u 5.0V full scale, IOu 10.0V full scale (default)
	rUn, Run Mode	Displays temp and optional CO2 and RH
Protocol Output	Protocol	BACnet (Isoloated)
	Connection	3-wire RS-485, with isolated ground
	Data Rate	Locally set baud rate up to 115200 (9600, 19200, 28800, 38400, 57600, 76800, 115200)
	Address Range	0-127
		Solid-state output, 1A @ 30VAC/DC, N.O. Source Selectable: CO2, RH, Temperature Source selectable: CO2, RH, Temperature
CO2 Sensor Performance	Type	Non-dispersive Infrared (NDIR)
	Accuracy (Standard)	±(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
	Accuracy (Dual Channel)	±(30ppm+3% of reading) (0-2000ppm), @ 0-50C ±(50ppm+3% of reading) (2000-5000ppm), @ -10-50C ±(100ppm+10% of reading) (5000-10000ppm), @ 0-50C
	Drift with ABC disabled (Standard)	35ppm/month [6]
	Drift with ABC disabled (Dual Channel)	5ppm/month [6]
	Range	0-2000/5000ppm; Programmable up to 10,000ppm
	Response time	30s
	Sample rate	1s
Relative Humidity	Type	Digital CMOS
	Accuracy	2% models, +/-2% over 10 to 90%RH range
	Resolution	0.05%RH
	Hysteresis	+/-1%RH
	Temperature coefficient	Compensated on-board
	Response time [3]	30s
	Sample rate	3s
	Operating range/Output Scale	0 to 100%RH (non-condensing)
	Long term drift	<0.5%RH per year
	Operating conditions [4]	-4 to 140°F (-20 to 60° C) @ RH>90%; -4 to 176°F (-20 to 80° C) @ RH=50%
Temperature (analog) (with RH option)	Type	Silicon Bandgap
	Nominal Accuracy	+/-0.3° C (operating range)
	Maximal Accuracy	+/-0.5° C (at 25° C), +/-1.0° C (operating range)
	Resolution	0.01° C
	Repeatability	+/-0.1° C
	Response time [3]	30s
	Sample rate	3s
Temperature (analog)	Type	NTC Thermistor
	Nominal Accuracy	+/-0.5° C (operating range)
	Maximal Accuracy	+/-1.0° C (at 25° C), +/-2.0° C (operating range)
	Resolution	0.05° C
	Repeatability	+/-0.2° C
	Sample Rate	100 milliseconds
Operating Environment[5]	Temperature	-4 to 122°F (-20 to 50°C)
	Humidity	0-95% non-condensing
Enclosure	Material	ABS Plastic
	Enclosure Rating	Nema 1; Add drain holes to enclosure bottom to achieve Nema 3R rating
	Dimensions	4.0"h x 4.4"w x 2.1"d (+2.8" solar shield)

(1) One side of transformer, secondary is connected to signal common. Dedicated transformer is recommended.
(2) Quick Start Menu parameters shown, for additional capabilities see installation manual.
(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.)
(5) Accuracy of CO2 reading may be reduced at temperatures below 14ºF (-10ºC).
(6) It is not recommended to de-activate ABC (auto-calibration) except for continuosly occupied spaces or greenhouses. Drift ratings may vary based on environment.