SENVA

HUMIDITY/TEMPERATURE

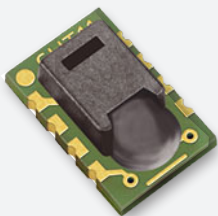## HUMIDITY/TEMP

The "Triple Threat Combo": CO2, RH, and temp in a compact unit with optional BACnet in the **AQW Series.** *This customizable sensor allows you to specify RH, CO2 or both to meet project requirements!*
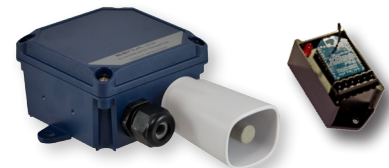
Wireless units for rooftop applications reduces installation time and permits proper location. Solar Powered—save hundreds on your install.

Our microsensors are optimized for precision relative humidity and temperature measurement

When it comes to humidity, we're not perfect. Just better.

Conventional capacitive sensors have large elements that absorb or release water proportional to the relative environmental humidity. But they also absorb contaminants. And their bulky materials age haphazardly. Long term stability is the casualty. We set out to change that paradigm—and did.

How about the world's first solar power wireless outside air station?

Outside air is one of the most challenging installations going. First, you have to get to the roof top. Then you have conduit. Then someone figures out it's not really in the shade. Like moving that conduit again? We just had a notion that a solar-powered wireless humidity temp transmitter would be a better idea.

BACnet® is a registered trademark of ASHRAE.

Wall Humidity Sensors
CO2/Humidity/Temp

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

ASHRAE **BACnet**®

Designed and Assembled

In the U.S.A

DESCRIPTION

The AQW series design allows customization for a sensor that meets project requirements for monitoring temperature, CO2 and relative humidity. The sensor can be ordered as stand alone temperature, CO2/Temp, RH/Temp or all-in-one CO2/RH/Temp with a 0-5/10V analog or BACnet RS485 output. Lower material costs and installation time by combining multiple sensors into a single sensor housing with standard LCD and optional add-on features.

APPLICATIONS

- Controlling ventilation in response to occupancy
- Facilitating compliance with ASHRAE 62.1-2004 standard for air quality
- Offices, conference rooms, and public assembly areas

FEATURES

Customize to meet project requirements

- Standard LCD and temperature on each device
- Options to add CO2 and/or RH sensing elements
- Field replaceable elements for CO2 and 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 CO2 reading
- Optional thermistors, sliders and override button

High performance field replaceable NDIR CO2 element

- Selectable auto-calibration mode returns sensor to baseline values

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

- Industry leading 7-year limited warranty/ 2-year RH element, 3-year CO2 element limited warranties

ORDERING INFORMATION

	Output	CO2	RH	SLD	BTN	RTD/TH	Color
AQW -			B				

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

CO2 Sensor
A = None
B = CO2 Sensor

RH Sensor
A = None
B = 2% RH Sensor

Set-Point Slider
A = None
B = 1k (Not valid w/ BACnet)
C = 10k

Push Button
A = None
B = Override Button (Requires thermistor)
C = User Push Button

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

Color
1 = White
2 = Ivory
4 = Light Almond

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

Example

	Output	CO2	RH	SLD	BTN	RTD/TH	Color
AQW -	B	B	B	A	A	A	1

(AQW sensor with BACnet RS-485, Temp, CO2, 2% RH, no set-point slide, no user push button, no RTD/thermistor, white color)

SPECIFICATIONS

Power Supply		12-30VDC/24VAC[(1)], 100mA max.
Analog Outputs	Temperature	0--5/10V standard, Scaling 50°F to 95°F (10°C to 35°C); thermistor/RTD values optional
	CO2 and RH	0-5/10V
	Update Rate	Continuous
	Programmable Relay	Solid-state output, 1A @ 30VAC/DC, N.O.
Analog LCD Menu Parameters [(2)]	5Pt, Set point, Hi (On)	Sets relay turn-on threshold (800ppm default)
	5Ph, Set point, hysteresis (Off)	Sets the relay turn-off hysteresis (100ppm default)
	5CL, Scaling	0-2000ppm or 0-5000ppm (2000ppm default)
	AdJ, Adjustment	CO2 Offset adjustment +/-250ppm (0 default)
	CAL, Auto Calibration Period	Off, 7 days, 14 days, 30 days, 60 days (14 days default)
	°FC, Displayed Temp Unit	°F degrees fahrenheit (default), °C degrees celsius
	LuL Analog Output Scale	5u 5.0V full scale, I0u 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
Protocol Relay Set-point	Programmable	Solid-state output, 1A @ 30VAC/DC, N.O.
		Source selectable: CO2, RH, Temperature
CO2	Type	Non-dispersive Infrared (NDIR)
	Accuracy	±40ppm, ±3% of reading (400-2000ppm)
	Range	0-2000/5000ppm; Programmable up to 10,000ppm
	Response time	60 seconds to 90% reading
	Sample rate	3 seconds
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)]	-20° C to 60° C @ RH>90%; -20° C to 80° C @ RH=50%
Temperature (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 (without RH option)	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	Temperature	32 to 122F (0 to 50C)
	Humidity	0-95% non-condensing
Enclosure	Material	ABS Plastic
	Dimensions	4.85"h x 3.25"w x 1.19"d

(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.)

BACnet® is a registered trademark of ASHRAE.

Recessed Wall
Humidity/Temperature

2% or 3% accuracy
0-5/10V RH/Temp (thermistors optional)
Field-calibration potentiometer
Durable and attractive low-profile design

| Ivory | White | Light Almond | Almond | Black | Brown | Gray |
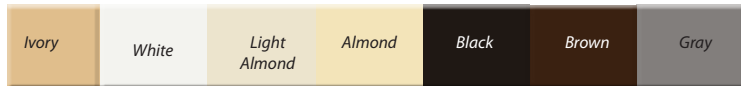
DESCRIPTION

The HR series is designed for use in energy management systems in buildings. They combine excellent stability with reliable operation and the provision to offset the RH reading +/-5% for in-field calibration. Thermistor options accommodate any installation. Housing is offered in multiple color choices to match any decor.

APPLICATIONS

- HVAC room humidity and temperature measurement and control
- Energy management/building control

FEATURES

Attractive recessed design is attractive and durable

- Match colors and existing interior decor
- Fits in most standard wall plates
- No exposed screws; unobtrusive tamper resistant design
- Ideal for schools

Field calibration poteniometer

- Field calibration scaled adjustment allows easy adjustment of calibrated RH value as needed to maintain certification.
- 0-5V/0-10V output—jumper selectable

Choose from a range of accuracy and options

- 2% and 3% RH accuracy options
- Thermistor outputs for temperature optional

Superior RH sensing

- On-board temperature compensation for RH. Eliminates temperature coefficient errors and achieves an excellent measurement accuracy as well as high repeatability and offset stability.
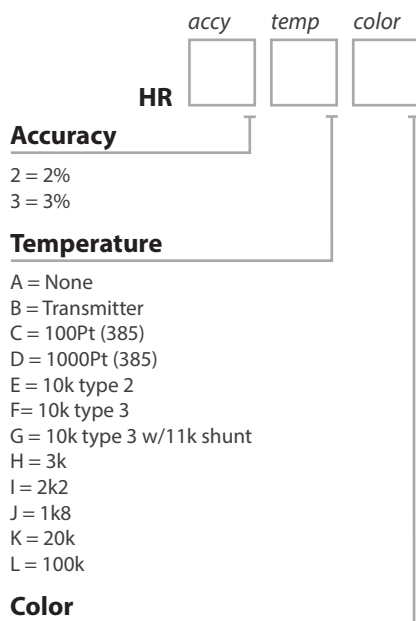
Slimline enclosure

- Tamper resistant design allows the sensor to mount flush with the wall for a clean, low-profile appearance

Optional Trim Ring for surface mount applications or mis-sized j-boxes
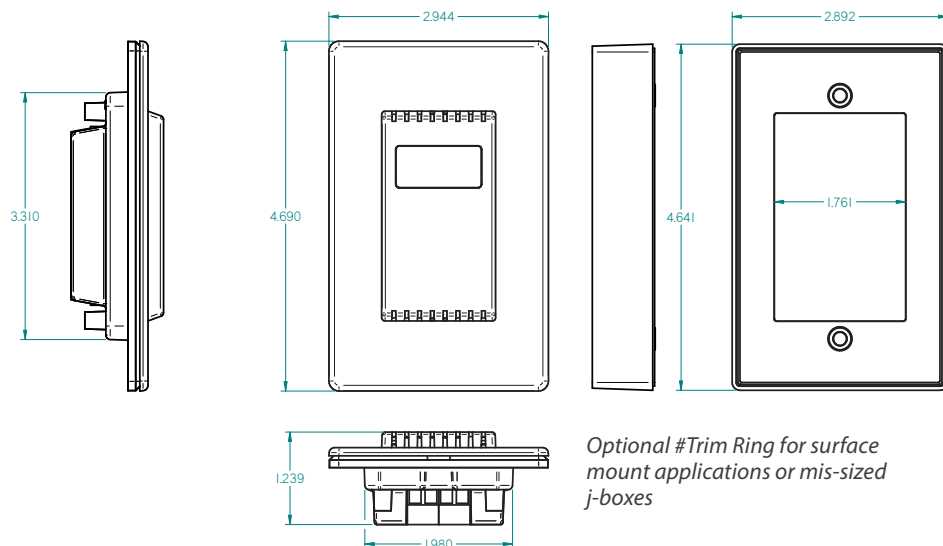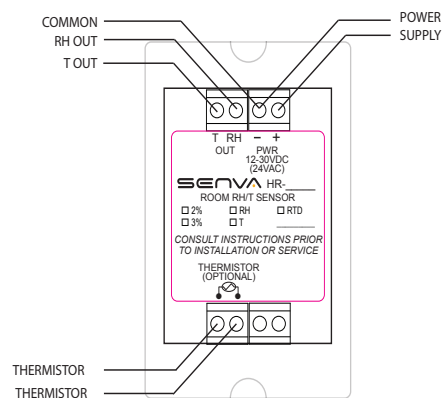
Designed and Assembled
In the U.S.A

7 year limited warranty

ORDERING

	accy	temp	color
HR	☐	☐	☐

Accuracy

2 = 2%
3 = 3%

Temperature

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

Color

Blank = White

2 = Ivory

3 = Brown

4 = Light Almond

5 = Almond

6 = Black

7 = Gray

SPECIFICATIONS

Power Supply		12-30VDC/24VAC [1], 15mA max.
Outputs	RH% and Temperature	3-wire 0-5/10V [4] (jumper selectable)
Output scaling	RH%	0-100% RH
	Temperature	50-95° F (10-35° C)
Thermistor Options		Yes, see ordering table below
Media filter		PTFE membrane, IP54 protection
Relative Humidity	Accuracy	2% models, +/-2% over 10 to 90%RH range
		3% models, +/-3% over 20 to 80%RH range
	Resolution	0.05%RH
	Hysteresis	+/-1%RH
	Non-Linearity	factory linearized <1%RH
	Temperature coefficient	fully compensated by on-board temp sensor
	Response time [2]	30s
	Output update rate	2s
	Operating range	0 to 100%RH (non-condensing)
	Long term drift	<0.5%RH per year
	Operating conditions [3]	-20° C to 60° C @ RH>90%
		-20° C to 80° C @ RH=50%
Temperature	Accuracy (-20° C to 70° C range)	2% models, <+/-1° C; 0.5° C typ @ 25° C
		3% models, <+/-2° C; 0.5° C typ @ 25° C
	Resolution	0.01° C
	Repeatability	+/-0.1° C
	Response time [2]	30s
	Temperature Scaling	50-95° F (10-35° C)
	Output update rate	2s
	Operating range	-40° C to 120° C

(1) One side of transformer, secondary is connected to signal common. Dedicated transformer is recommended.
(2) Time for reaching 63% of reading at 25° C and 1 m/s airflow.
(3) Long term exposures to conditions outside normal range at high humidity may temporarily offset the RH reading (+3%RH after 60 hours).
(4) 15-30VDC/24VAC power supply voltage required for 10 volt output.

DIMENSIONS

2.944
2.892
3.310
4.690
4.641
1.761
1.239
1.980

Optional #Trim Ring for surface mount applications or mis-sized j-boxes

TYPICAL WIRING

COMMON
RH OUT
T OUT
POWER SUPPLY

T RH — +
OUT PWR
12-30VDC
(24VAC)

SENVA HR-_____
ROOM RH/T SENSOR
☐ 2%   ☐ RH   ☐ RTD
☐ 3%   ☐ T   _____
CONSULT INSTRUCTIONS PRIOR TO INSTALLATION OR SERVICE
THERMISTOR (OPTIONAL)

THERMISTOR
THERMISTOR

Duct
Humidity/Temperature

2% or 3% accuracy (NIST certification options)
0-5V/10V and 4-20mA RH/Temp (thermistors optional)
LCD display with field calibration menu
Field replaceable element

DESCRIPTION

The HD Series is designed with both the engineer and field technician in mind. The HD Series combines excellent stability with reliable operation in 2% or 3% RH accuracy options. Optional temperature transmitters, RTDs and thermistors add further flexibilty when ordering. The standard LCD and field replaceable elements make the intitial installation and future service a breeze.

APPLICATIONS

- HVAC room humidity and temperature measurement and control
- Replaceable element is ideal for difficult environments such as swimming pools

FEATURES

Versatile

- 2% or 3% RH versions with field replaceable sensor
- Switch selectable 5V/10V and 4-20mA RH/T transmitter outputs
- Thermistor outputs for temperature optional

Easy to maintain

- Field calibration. LCD and push-button menu allows easy adjustment of calibrated RH value as needed to maintain certification.
- Field replaceable sensor—without disturbing conduit

Superior RH sensing

- On-board temperature compensation for RH. Eliminates temperature coefficient errors and achieves an excellent measurement accuracy as well as high repeatability and offset stability.
- State of the art testing facilities. 8-point calibration certificate available (NIST traceability—consult factory)
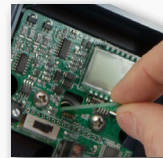
Quality

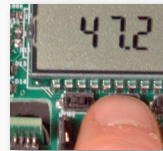- Industry leading 7-year warranty/ 2-year replaceable element warranty

Field replaceable element

- Ideal for harsh environments
- Accurate dual RH/Temp IC sensing

LCD with menu

- Easier commissioning
- Re-scale to field metrics if required
- LCD cover provided

NIST traceable

- 8-point calibration certification options. Consult factory.

Designed and Assembled
In the U.S.A

7 year limited warranty

ORDERING

accy   temp

HD - ☐ ☐

Accuracy

2 = 2%
3 = 3%

Temperature

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

Replacement Sensor Elements

HSD-2 = 2% accuracy
HSD-3 = 3% accuracy

Consult factory for certification and point calibration options

(Write your selected Accuracy, Temperature, and Replacement Sensor Elements numbers/letters in the boxes above)

SPECIFICATIONS

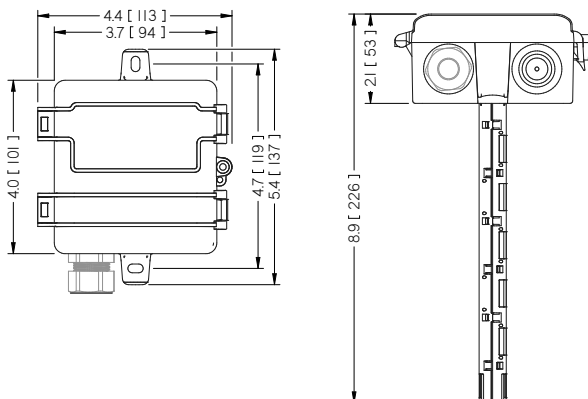|		
Power Supply	3-wire voltage mode (0-5/10V)	12-30VDC/24VAC [1], 15mA max.
	2-wire current mode (4-20mA)	12-30VDC, 30mA max.
Outputs	RH and Temperature (option)	3-wire 0-5/10V [4] or 2-wire 4-20mA
Output scaling	RH	0-100% RH
	Temperature (jumper)	32-122° F (0-50ºC) or -40-140° F (-40-60ºC)
Thermistor/RTD	Optional	See ordering table
Media filter		PBT with water-vapor permeable membrane
Relative Humidity	Accuracy	2% models, +/-2% over 10 to 90%RH range 3% models, +/-3% over 20 to 80%RH range
	Resolution	0.05%RH
	Hysteresis	+/-1%RH
	Non-Linearity	factory linearized <1%RH
	Temperature coefficient	fully compensated by on-board sensor
	Response time [2]	30s
	Output update rate	2s
	Operating range	0 to 100%RH (non-condensing)
	Long term drift	<0.5%RH per year
	Operating conditions [3]	-20° C to 60° C @ RH>90% -20° C to 80° C @ RH=50%
Temperature	Accuracy (-20° C to 70° C range)	2% models, <+/-1° C; 0.5° C typ @ 25° C 3% models, <+/-2° C; 0.5° C typ @ 25° C
	Resolution	0.01° C
	Repeatability	+/-0.1° C
	Response time (2)	30s
	Output update rate	2s
	Operating range	-40° C to 120° C
Enclosure	Materials	ABS/Polycarbonate
	Dimensions	4.0"h x 4.4"w x 2.1"d (+6.8" probe)

(1) One side of transformer, secondary is connected to signal common. Dedicated transformer is recommended.
(2) Time for reaching 63% of reading at 25° C and 1 m/s airflow.
(3) Long term exposures to conditions outside normal range at high humidity may temporarily offset the RH reading (+3%RH after 60 hours.)
(4) 15-30VDC/24VAC power supply voltage required for 10 volt output.

DIMENSIONS

TYPICAL WIRING
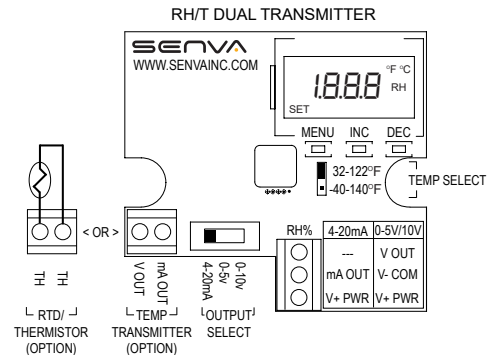
RH/T DUAL TRANSMITTER

4-20mA wiring:
   mA OUT = 4-20mA output return
   V+ PWR = Loop supply voltage

0-5V/0-10V wiring:
   V OUT = Voltage output, 0-5 or 10VDC
   V- COM = Ground/Common
   V+ PWR = Power supply voltage

SENVA

Outside Air
Humidity/Temperature

2% or 3% accuracy (NIST certification options)
0-5V/10V and 4-20mA RH/Temp (thermistors optional)
LCD display with field calibration menu
Field replaceable element

DESCRIPTION

The HO Series is designed to be mounted on the building exterior to provide outside air RH measurement. The HO Series combines excellent stability with reliable operation in 2% or 3% RH accuracy options. Optional temperature transmitters, RTDs and thermistors add further flexibilty when ordering. The standard LCD, gasketed lid and field replaceable elements make the intitial installation and future service a breeze.

APPLICATIONS

- Outdoor humidity and temperature measurement for building control

FEATURES

Versatile

- 2% or 3% Rh versions with field replaceable sensor
- Switch selectable 5V/10V and 4-20mA RH/T transmitter outputs
- Thermistor/RTD output for temperature optional

Easy to maintain

- Field calibration. LCD and push-button menu allows easy adjustment of calibrated RH value as needed to maintain certification
- Replace a sensor without disturbing conduit

Superior RH sensing

- On-board temperature compensation for RH. Eliminates temperature coefficient errors and achieves an excellent measurement accuracy as well as high repeatability and offset stability
- State of the art testing facilities. 8-point calibration certificate available (NIST traceability—consult factory)

Quality

- Industry leading 7-year warranty/ 2-year replaceable element warranty
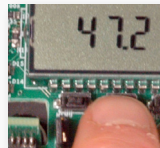
Field replaceable element

- Ideal for harsh environments
- Accurate dual RH/Temp IC sensing

LCD with menu

- Easier commissioning
- Re-scale to field metrics if required

NIST traceable

- 8-point calibration certification options. Consult factory.

Designed and Assembled
In the U.S.A

7 year limited warranty

SENVA

ORDERING

accy   *temp*

HO -

Accuracy

2 = 2%
3 = 3%

Temperature

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

Replacement Sensor Elements

HSO-2 = 2% accuracy
HSO-3 = 3% accuracy

warranty

SPECIFICATIONS

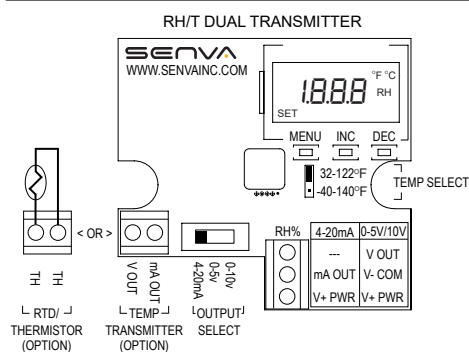|		
Power Supply	3-wire voltage mode (0-5/10V)	12-30VDC/24VAC[1], 15mA max
	2-wire current mode (4-20mA)	12-30VDC, 30mA max.
Outputs	RH and Temperature (option)	3-wire 0-5/10V[4] or 2-wire 4-20mA
Output scaling	RH	0-100% RH
	Temperature (jumper)	32-122°F (0-50°C) or -40-140°F (-50-60°C)
Thermistor/RTD	Optional	See ordering table
Media filter		Sintered stainless steel
Relative Humidity	Accuracy	2% models, +/-2% over 10 to 90%RH range 3% models, +/-3% over 20 to 80%RH range
	Resolution	0.05%RH
	Hysteresis	+/-1%RH
	Non-Linearity	Factory linearized <1%RH
	Temperature coefficient	Fully compensated by on-board sensor
	Response time[2]	30s
	Output update rate	2s
	Operating range	0 to 100%RH (non-condensing)
	Long term drift	<0.5%RH per year
	Operating conditions[3]	-20° C to 60° C @ RH>90% -20° C to 80° C @ RH=50%
Temperature	Accuracy (-20° to 70°C range)	2% models, <+/-1° C; 0.5° C typ @ 25° C 3% models, <+/-2° C; 0.5° C typ @ 25° C
	Resolution	0.01° C
	Repeatability	+/-0.1° C
	Response time[2]	30s
	Output update rate	2s
	Operating range	-40° to 70° C
Enclosure	Materials	ABS/Polycarbonate
	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) Time for reaching 63% of reading at 25° C and 1 m/s airflow.
(3) Long term exposures to conditions outside normal range at high humidity may temporarily offset the RH reading (+3%RH after 60 hours.)
(4) 15-30VDC/24VAC power supply voltage required for 10 volt ouput.

TYPICAL WIRING

RH/T DUAL TRANSMITTER

SENVA
WWW.SENVAINC.COM

1.8.8.8   °F °C
            RH
SET

MENU   INC   DEC

32-122°F
-40-140°F   TEMP SELECT

< OR >

RTD/
THERMISTOR
(OPTION)

TEMP
TRANSMITTER
(OPTION)

0-10v
0-5v
4-20mA

OUTPUT
SELECT

RH%   4-20mA   0-5V/10V
---   V OUT
mA OUT   V- COM
V+ PWR   V+ PWR

4-20mA wiring:
  mA OUT = 4-20mA output return
  V+ PWR = Loop supply voltage

0-5V/0-10V wiring:
  V OUT = Voltage output, 0-5 or 10VDC
  V- COM = Ground/Common
  V+ PWR = Power supply voltage

DIMENSIONS

4.4 [113]
3.7 [94]
4.0 [101]
4.7 [119]
5.4 [137]
7.5 [190]
1.9 [48]
2.1 [53]

SENVA

Wireless Outside Air
Humidity/Temperature

2.4 GHz ZigBee™ wireless for easy installation
2% or 3% accuracy
LCD display with field calibration
Field replaceable element

DESCRIPTION

The WO outside air series consists of a labor saving solar powered wireless temp/humidity transmitter with a remote receiver. This eliminates costly conduit, roof penetrations, and allows for easy repositioning should conditions warrant. Excellent stability with reliable operation.

APPLICATIONS

- Outdoor humidity and temperature measurement for building control
- Eliminate costly conduit runs and relocation

FEATURES

Breakthrough wireless labor savings

- 2.4 GHz ZigBee™ wireless for super fast installation—save hours on conduit and allows for flexible repositioning.
- Solar-powered for long, reliable transmission; works even in cloudy areas

Versatile

- 2% or 3% RH versions with field replaceable sensor
- 3-wire 0-10V output

Easy to maintain

- Field replaceable sensor—without disturbing installation

Superior RH sensing

- On-board temperature compensation for RH. Eliminates temperature coefficient errors and achieves an excellent measurement accuracy as well as high repeatability and offset stability.

Quality

- Industry leading 7-year warranty/ 2-year replaceable element warranty

Solar powered with integral battery

- Trouble-free operation without changing batteries or pulling conduit

Field replaceable element

- Ideal for harsh environments
- Accurate dual RH/Temp IC sensing

Designed and Assembled
In the U.S.A

warranty 7

7 year limited warranty

ORDERING

accy

WO -

Accuracy

2 = 2%
3 = 3%

Replacement Sensor Elements

HSO-2 = 2% accuracy
HSO-3 = 3% accuracy

(Write your selected Accuracy and Replacement Sensor Element numbers/ letters in the boxes above)

SPECIFICATIONS

Power Supply	Transmitter	Long life battery with integral solar charger
	Receiver	12-30VDC/12VAC[(1)], 45mA max
Radio	Frequency/Power	2.4GHz unlicensed ISM band, ZigBee™, 60mW
	Range	300' line-of-sight
	FCC id	OUR24XBEE
	Broadcast interval	Daylight, 5-min; Dark, 30-min
Outputs	RH% and Temperature	3-wire 0-10VDC
Output scaling	RH%	0-100% RH
	Temperature	-40 to 140° F
Media filter		Sintered Stainless Steel
Relative Humidity	Accuracy	2% models, +/-2% over 10 to 90%RH range
		3% models, +/-3% over 20 to 80%RH range
	Resolution	0.05%RH
	Hysteresis	+/-1%RH
	Non-Linearity	factory linearized <1%RH
	Temperature coefficient	fully compensated by on-board temp sensor
	Response time [(2)]	30s
	Output update rate	2s
	Operating range	0 to 100%RH (non-condensing)
	Long term drift	<0.5%RH per year
	Operating conditions [(3)]	-20° C to 60° C @ RH>90%
		-20° C to 80° C @ RH=50%
Temperature	Accuracy (-20° C to 70° C range)	2% models, <+/-1° C; 0.5° C typ @ 25° C
		3% models, <+/-2° C; 0.5° C typ @ 25° C
	Resolution	0.01° C
	Repeatability	+/-0.1° C
	Response time (2)	30s
	Output update rate	2s
	Operating range	-40° C to 120° C

(1) One side of transformer, secondary is connected to signal common. Dedicated transformer is recommended.
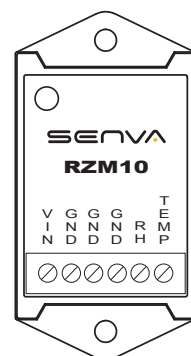
(2) Time for reaching 63% of reading at 25° C and 1 m/s airflow

(3) Long term exposures to conditions outside normal range at high humidity may temporarily offset the RH reading (+3%RH after 60 hours.)

DIMENSIONS
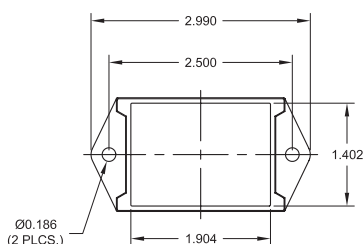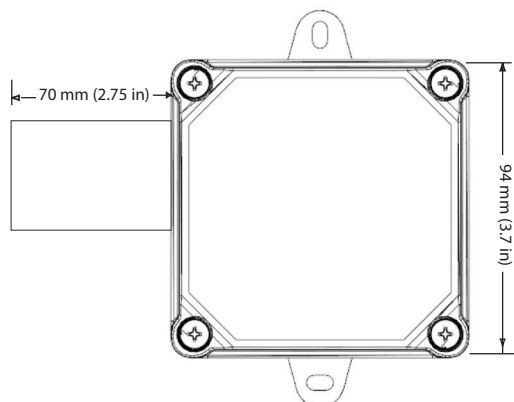
TYPICAL WIRING

VIN = Power supply excitation voltage
GND = Ground/Common
RH = RH Voltage output, 0-10vdc
TEMP = Temperature output, 0-10vdc

Wall Temperature Sensors
CO2/Humidity/Temp

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

Designed and Assembled

In the U.S.A

DESCRIPTION

The AQW series design allows customization for a sensor that meets project requirements for monitoring temperature, CO2 and relative humidity. The sensor can be ordered as stand alone temperature, CO2/Temp, RH/Temp or all-in-one CO2/RH/Temp with a 0-5/10V analog or BACnet RS485 output. Lower material costs and installation time by combining multiple sensors into a single sensor housing with standard LCD and optional add-on features.

APPLICATIONS

- Controlling ventilation in response to occupancy
- Facilitating compliance with ASHRAE 62.1-2004 standard for air quality
- Offices, conference rooms, and public assembly areas

FEATURES

Customize to meet project requirements

- Standard LCD and temperature on each device
- Options to add CO2 and/or RH sensing elements
- Field replaceable elements for CO2 and 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 CO2 reading
- Optional thermistors, sliders and override button

High performance field replaceable NDIR CO2 element

- Selectable auto-calibration mode returns sensor to baseline values

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

- Industry leading 7-year limited warranty/ 2-year RH element, 3-year CO2 element limited warranties

ORDERING INFORMATION

	Output	CO2	RH	SLD	BTN	RTD/TH	Color
AQW -							

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

CO2 Sensor
A = None
B = CO2 Sensor

RH Sensor
A = None
B = 2% RH Sensor

Set-Point Slider
A = None
B = 1k (Not valid w/ BACnet)
C = 10k

Push Button
A = None
B = Override Button (Requires thermistor)
C = User Push Button

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

Color
1 = White
2 = Ivory
4 = Light Almond

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

Example	Output	CO2	RH	SLD	BTN	RTD/TH	Color
AQW -	B	B	B	A	A	A	1

(AQW sensor with BACnet RS-485, Temp, CO2, 2% RH, no set-point slide, no user push button, no RTD/thermistor, white color)

SPECIFICATIONS

Power Supply		12-30VDC/24VAC[1], 100mA max.
Analog Outputs	Temperature	0--5/10V standard, Scaling 50°F to 95°F (10°C to 35°C); thermistor/RTD values optional
	CO2 and RH	0-5/10V
	Update Rate	Continuous
	Programmable Relay	Solid-state output, 1A @ 30VAC/DC, N.O.
Analog LCD Menu Parameters [2]	5Pℓ, Set point, Hi (On)	Sets relay turn-on threshold (800ppm default)
	5Ph, Set point, hysteresis (Off)	Sets the relay turn-off hysteresis (100ppm default)
	5CL, Scaling	0-2000ppm or 0-5000ppm (2000ppm default)
	AdJ, Adjustment	CO2 Offset adjustment +/-250ppm (0 default)
	CAL, Auto Calibration Period	Off, 7 days, 14 days, 30 days, 60 days (14 days default)
	°FC, Displayed Temp Unit	°F degrees fahrenheit (default), °C degrees celsius
	LuL Analog Output Scale	5u 5.0V full scale, I0u 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
Protocol Relay Set-point	Programmable	Solid-state output, 1A @ 30VAC/DC, N.O.
		Source selectable: CO2, RH, Temperature
CO2	Type	Non-dispersive Infrared (NDIR)
	Accuracy	±40ppm, ±3% of reading (400-2000ppm)
	Range	0-2000/5000ppm; Programmable up to 10,000ppm
	Response time	60 seconds to 90% reading
	Sample rate	3 seconds
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]	-20° C to 60° C @ RH>90%; -20° C to 80° C @ RH=50%
Temperature (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 (without RH option)	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	Temperature	32 to 122F (0 to 50C)
	Humidity	0-95% non-condensing
Enclosure	Material	ABS Plastic
	Dimensions	4.85"h x 3.25"w x 1.19"d

(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.)

BACnet® is a registered trademark of ASHRAE.

Recessed Wall
Temperature Sensor

Wide range of thermistor options
Set-point & override options
Low-profile design
Decor color options

Ivory	White	Light Almond	Almond	Black	Brown	Gray
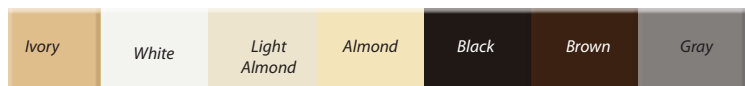
DESCRIPTION

The TR series is designed for use in energy management systems in buildings. The flush mount sensor housing accomodates a wide range of thermistor options for sensing room temperature. Optional setpoint slider and override button can be added for additional control.

APPLICATIONS

- Room temperature measurement for building automation control

FEATURES

The industry's best looking temp sensor

- Fits in any standard j-box or low voltage bracket.
- No exposed screws; unobtrusive tamper resistant design
- Popular colors to match any decor
- Complements CO2 sensor installations

User Friendly

- Wide range of thermistor options
- Set-point options
- Override options

Alerton TR-ES002 shown

Optional Trim Ring for surface mount applications or mis-sized j-boxes

ORDERING

	therm	color	ovrd	s-p
TR -				

Temperature

C = 100Pt (385)
D = 1000Pt (385)
E = 10k type 2
F = 10k type 3
G = 10k type 3 w/11k shunt
H = 3k
I = 2k2
J = 1k8
K = 20k
L = 100k

Color

1 = White
2 = Ivory
3 = Brown
4 = Light Almond
5 = Almond
6 = Black
7 = Gray

Override

A = None
B = N.O.

Set-point

A = None
B = 1000 ohm setpoint slider
C = 10k ohm setpoint slider

(Write your selected Temperature, Color, Override and Set-Point letters/numbers in the boxes above)

SPECIFICATIONS

Enclosure	Material	ABS Plastic
	Dimensions	4.7"h x 2.9"w x 1.24"d (0.48" wall profile) (fits low-voltage bracket)

Designed and Assembled

In the U.S.A

7 year limited warranty

SENVA THERMISTOR RESISTANCE-TEMPERATURE TABLES

	C	D	E	F	G	H	I	J	K	L
	100Pt	1000Pt	10K T2	10K T3	10K T3	3K	2K2	1K8 (100 C)	20K	100K
	385	385	B=3892	B=3694	11K Shunt	B=3892	B=3976	B0/100=4300	B=4262	B=4461
Temp F	Resistance [Ω]									
0	93.0	930	85.41K	70.40K	9513	25.62K	19.21K	327.5K	193.0K	1015K
5	94.1	941	72.96K	61.02K	9320	21.89K	16.41K	276.6K	163.5K	858.0K
10	95.2	952	62.50K	53.28K	9118	18.75K	14.06K	234.3K	139.7K	732.0K
15	96.3	963	53.69K	46.39K	8892	16.11K	12.08K	199.1K	118.8K	620.7K
20	97.4	974	46.24K	40.49K	8650	13.87K	10.41K	169.6K	101.3K	527.6K
25	98.5	985	39.93K	35.41K	8393	11.98K	8989	145.0K	86.73K	450.6K
30	99.6	996	34.57K	31.19K	8132	10.37K	7783	124.2K	74.87K	388.1K
32	**100.0**	**1000**	32.66K	29.49K	8012	9799	7352	116.8K	70.14K	362.9K
35	100.7	1007	30.01K	27.39K	7848	9004	6756	106.7K	64.43K	332.8K
40	101.7	1017	26.11K	24.11K	7554	7834	5878	91.87K	55.55K	285.1K
45	102.8	1028	22.77K	21.26K	7249	6832	5127	79.32K	48.07K	245.7K
50	103.9	1039	19.91K	18.79K	6938	5972	4482	68.66K	41.56K	212.3K
55	105.0	1050	17.44K	16.70K	6632	5233	3927	59.57K	36.31K	184.7K
60	106.1	1061	15.31K	14.81K	6312	4595	3448	51.80K	31.56K	160.0K
65	107.1	1071	13.48K	13.16K	5992	4043	3035	45.15K	27.50K	138.8K
70	108.2	1082	11.88K	11.72K	5675	3565	2676	39.44K	24.04K	120.9K
75	109.3	1093	10.50K	10.50K	5371	3150	2365	34.53K	21.17K	106.1K
77	109.7	1097	**10.00K**	**10.00K**	**5238**	**3000**	**2252**	**32.76K**	**20.00K**	**100.0K**
80	110.4	1104	9298	9375	5061	2789	2094	30.30K	18.58K	92.72K
85	111.5	1115	8249	8389	4760	2475	1858	26.64K	16.31K	80.95K
90	112.5	1125	7333	7520	4467	2200	1651	23.47K	14.38K	71.05K
95	113.6	1136	6530	6752	4184	1959	1471	20.71K	12.70K	62.47K
100	114.7	1147	5826	6094	3922	1748	1312	18.32K	11.29K	55.29K
105	115.8	1158	5207	5489	3662	1562	1173	16.24K	9993	48.71K
110	116.8	1168	4663	4951	3414	1399	1050	14.41K	8865	42.98K
115	117.9	1179	4182	4473	3180	1254	942	12.82K	7888	38.05K
120	119.0	1190	3757	4062	2966	1127	846	11.42K	7058	33.90K
125	120.0	1200	3381	3680	2758	1014	761	10.20K	6301	30.11K
130	121.1	1211	3047	3338	2561	914	686	9116	5623	26.71K
135	122.2	1222	2751	3033	2378	825	620	8164	5036	23.80K
140	123.2	1232	2487	2760	2206	746	560	7324	4518	21.24K
145	124.3	1243	2252	2522	2052	676	507	6581	4076	19.06K
150	125.4	1254	2043	2301	1903	613	460	5922	3664	17.04K