

Outside Air Humidity/Temperature

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



DESCRIPTION

The HO outside air series is designed for is designed to be mounted on the building exterior to provide outside air RH measurement. They combine excellent stability with reliable operation, and LCD display for in-field calibration. Set-point, override, and thermistor options accommodate any installation.

APPLICATIONS

- Outdoor humidity and temperature measurement for building control

FEATURES

Versatile

- 2 or 3% Rh versions with field replaceable sensor
- Switch selectable 5V/10V 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.
- 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. Certification options from 1-point, 2 -point, and 8 -point (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

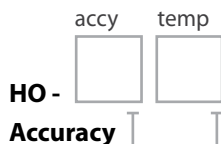
- Easier commissioning
- Re-scale to field metrics if required
- LCD cover provided



NIST traceable

- Multi-point calibration certification options. Consult factory.

ORDERING



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

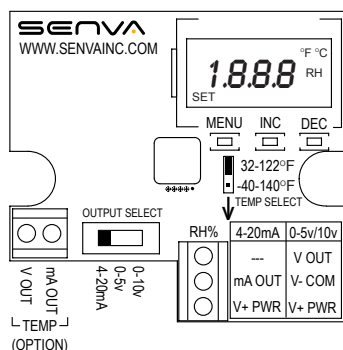
SPECIFICATIONS

Power Supply	0-5V or 0-10V operation (1) 4-20 mA operation	12-30VDC/12VAC, 45mA max 12-30VDC, 30mA max.
Outputs	RH% and Temperature	3-wire 0-5/10V (jumper) or 2-wire 4-20mA, selectable
Output scaling	RH%	0-100% RH
	Temperature	32-122°F or -40-140°F (jumper)
Thermistor Options	Yes, see ordering table below	
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
	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 exposure to conditions outside normal range at high humidity may temporarily offset the RH reading (+3%RH after 60 hours.)

TYPICAL WIRING

RH/T DUAL TRANSMITTER



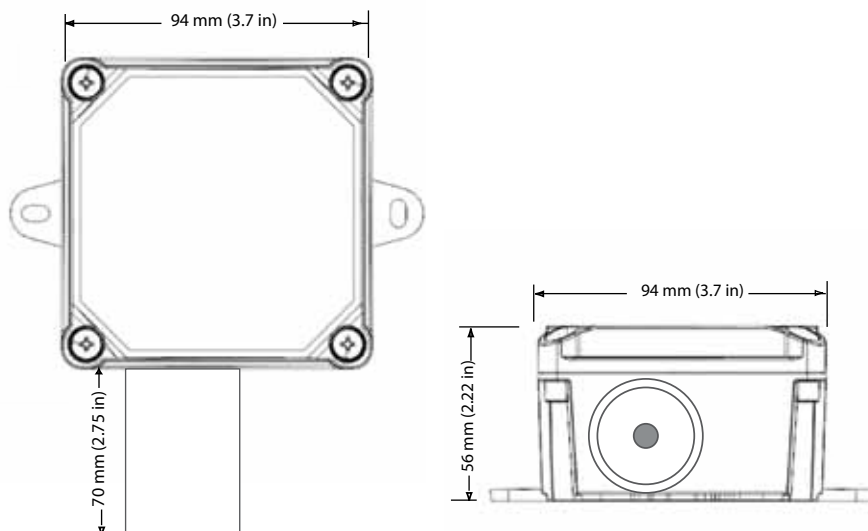
4-20mA wiring:

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

0-5v/0-10v wiring:

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

DIMENSIONS



SENVA THERMISTOR CURVES

TEMP		C	D	E	F	G	H	I	J	K	L
		100Pt	1000Pt	10K T2	10K T3	10K T3 WITH	3K	2K2	1K8	20K	100K
		385	385	B=3890	B=3675	11K SHUNT	B=3890	B=3892	B=3477	B=4247	B=4140
C	F										
-50	-58	80.3	803.1	670,166	441,200	10,732	201,050	150,395	70,263	1,655,340	8,231,000
-49	-56.2	80.7	807.0	624,159	414,400	10,716	187,248	140,087	66,062	1,537,600	7,648,000
-48	-54.4	81.1	811.0	581,605	389,300	10,698	174,482	130,553	62,140	1,428,940	7,110,000
-47	-52.6	81.5	815.0	542,225	365,900	10,679	162,668	121,727	58,475	1,328,620	6,613,000
-46	-50.8	81.9	818.9	505,763	344,000	10,659	151,729	113,553	55,049	1,235,940	6,154,000
-45	-49	82.3	822.9	471,985	323,600	10,638	141,596	105,981	51,845	1,150,280	5,729,000
-44	-47.2	82.7	826.9	440,674	304,500	10,616	132,202	98,963	48,848	1,071,080	5,336,000
-43	-45.4	83.1	830.8	411,640	286,700	10,594	123,492	92,452	46,044	997,800	4,972,000
-42	-43.6	83.5	834.8	384,703	270,000	10,569	115,411	86,412	43,416	929,960	4,635,000
-41	-41.8	83.9	838.8	359,700	254,300	10,544	107,910	80,803	40,957	867,140	4,323,000
-40	-40	84.3	842.7	336,479	239,700	10,517	100,944	75,593	38,651	808,940	4,034,000
-39	-38.2	84.7	846.7	314,904	226,000	10,489	94,471	70,753	36,490	755,000	3,766,000
-38	-36.4	85.1	850.6	294,848	213,100	10,460	88,454	66,252	34,461	704,960	3,517,000
-37	-34.6	85.5	854.6	276,194	201,100	10,430	82,858	62,066	32,560	658,540	3,286,000
-36	-32.8	85.9	858.5	258,838	189,800	10,397	77,651	58,171	30,775	615,440	3,071,000
-35	-31	86.2	862.5	242,681	179,200	10,364	72,804	54,542	29,097	575,420	2,872,000
-34	-29.2	86.6	866.4	227,632	169,300	10,329	68,290	51,164	27,522	538,240	2,687,000
-33	-27.4	87.0	870.4	213,610	159,900	10,292	64,083	48,017	26,042	503,680	2,515,000
-32	-25.6	87.4	874.3	200,539	151,200	10,254	60,162	45,081	24,651	471,540	2,354,000
-31	-23.8	87.8	878.3	188,349	142,900	10,214	56,505	42,343	23,342	441,640	2,205,000
-30	-22	88.2	882.2	176,974	135,200	10,172	53,092	39,789	22,111	413,800	2,067,000
-29	-20.2	88.6	886.2	166,356	127,900	10,129	49,907	37,404	20,952	387,880	1,937,000
-28	-18.4	89.0	890.1	156,441	121,100	10,084	46,932	35,176	19,861	363,740	1,817,000
-27	-16.6	89.4	894.0	147,177	114,600	10,037	44,153	33,095	18,833	341,240	1,705,000
-26	-14.8	89.8	898.0	138,518	108,600	9,988	41,555	31,150	17,865	320,260	1,600,000
-25	-13	90.2	901.9	130,421	102,900	9,938	39,126	29,331	16,952	300,700	1,502,000
-24	-11.2	90.6	905.9	122,847	97,490	9,885	36,854	27,629	16,092	282,420	1,411,000
-23	-9.4	91.0	909.8	115,759	92,420	9,830	34,728	26,036	15,280	265,380	1,326,000
-22	-7.6	91.4	913.7	109,122	87,650	9,773	32,737	24,545	14,515	249,460	1,247,000
-21	-5.8	91.8	917.7	102,906	83,150	9,715	30,872	23,148	13,792	234,580	1,173,000
-20	-4	92.2	921.6	97,081	78,910	9,654	29,124	21,839	13,109	220,680	1,103,000
-19	-2.2	92.6	925.5	91,621	74,910	9,592	27,486	20,611	12,465	207,680	1,038,000
-18	-0.4	92.9	929.5	86,501	71,130	9,527	25,950	19,461	11,857	195,520	977,400
-17	1.4	93.3	933.4	81,698	67,570	9,460	24,509	18,381	11,281	184,140	920,600
-16	3.2	93.7	937.3	77,190	64,200	9,391	23,157	17,368	10,728	173,600	867,300
-15	5	94.1	941.2	72,957	61,020	9,320	21,887	16,416	10,220	163,500	817,500
-14	6.8	94.5	945.2	68,982	58,010	9,247	20,695	15,522	9,734	154,160	770,800
-13	8.6	94.9	949.1	65,246	55,170	9,171	19,574	14,683	9,272	145,400	727,000
-12	10.4	95.3	953.0	61,736	52,490	9,094	18,521	13,893	8,836	137,180	686,000
-11	12.2	95.7	956.9	58,434	49,950	9,015	17,530	13,151	8,422	129,480	647,500
-10	14	96.1	960.9	55,329	47,540	8,933	16,599	12,453	8,032	122,660	611,400
-9	15.8	96.5	964.8	52,407	45,270	8,850	15,722	11,796	7,659	115,460	577,400
-8	17.6	96.9	968.7	49,656	43,110	8,764	14,897	11,177	7,308	109,100	545,600
-7	19.4	97.3	972.6	47,066	41,080	8,677	14,120	10,595	6,975	103,120	515,700
-6	21.2	97.7	976.5	44,626	39,140	8,587	13,388	10,046	6,658	97,500	487,600
-5	23	98.0	980.4	42,327	37,310	8,495	12,698	9,529	6,358	92,200	461,200
-4	24.8	98.4	984.4	40,159	35,580	8,402	12,048	9,042	6,073	87,240	436,300
-3	26.6	98.8	988.3	38,115	33,930	8,307	11,435	8,582	5,801	82,560	413,000
-2	28.4	99.2	992.2	36,187	32,370	8,210	10,856	8,148	5,546	78,160	391,000
-1	30.2	99.6	996.1	34,368	30,890	8,111	10,310	7,739	5,301	74,020	370,300
0	32	100	1,000	32,650	29,490	8,012	9,795	7,353	5,069	70,140	350,800
1	33.8	100.4	1,003.9	31,029	28,160	7,910	9,309	6,988	4,846	66,600	332,400
2	35.6	100.8	1,007.8	29,498	26,890	7,807	8,849	6,643	4,637	63,000	315,100
3	37.4	101.2	1,011.7	28,052	25,690	7,702	8,416	6,318	4,437	59,800	298,800
4	39.2	101.6	1,015.6	26,685	24,540	7,595	8,006	6,010	4,248	56,800	283,400
5	41	102.0	1,019.5	25,392	23,460	7,489	7,618	5,719	4,068	53,800	268,900
6	42.8	102.3	1,023.4	24,170	22,430	7,380	7,251	5,444	3,895	51,000	255,300
7	44.6	102.7	1,027.3	23,013	21,440	7,270	6,904	5,183	3,733	48,600	242,300
8	46.4	103.1	1,031.2	21,918	20,510	7,160	6,575	4,937	3,577	46,000	230,200
9	48.2	103.5	1,035.1	20,882	19,620	7,048	6,265	4,703	3,429	43,800	218,600
10	50	103.9	1,039.0	19,901	18,780	6,937	5,970	4,482	3,289	41,560	207,800
11	51.8	104.3	1,042.9	18,971	17,980	6,825	5,691	4,273	3,152	39,520	197,500
12	53.6	104.7	1,046.8	18,090	17,210	6,711	5,427	4,075	3,024	37,560	187,800
13	55.4	105.1	1,050.7	17,255	16,480	6,597	5,177	3,886	2,902	35,740	178,600
14	57.2	105.5	1,054.6	16,463	15,790	6,483	4,939	3,708	2,785	34,000	169,900
15	59	105.8	1,058.5	15,712	15,130	6,369	4,714	3,539	2,673	32,340	161,700
16	60.8	106.2	1,062.4	14,999	14,500	6,255	4,500	3,378	2,567	30,800	153,900
17	62.6	106.6	1,066.3	14,323	13,900	6,141	4,297	3,226	2,466	29,320	146,600
18	64.4	107.0	1,070.2	13,681	13,330	6,027	4,104	3,081	2,369	27,920	139,600
19	66.2	107.4	1,074.1	13,072	12,780	5,912	3,922	2,940	2,275	26,600	133,000
20	68	107.8	1,077.9	12,493	12,260	5,798	3,748	2,814	2,189	25,340	126,800
21	69.8	108.2	1,081.8	11,942	11,770	5,686	3,583	2,690	2,102	24,160	120,800
22	71.6	108.6	1,085.7	11,419	11,290	5,572	3,426	2,572	2,021	23,040	115,200
23	73.4	109.0	1,089.6	10,922	10,840	5,460	3,277	2,460	1,944	21,980	109,900
24	75.2	109.3	1,093.5	10,450	10,410	5,348	3,135	2,353	1,870	20,960	104,800
25	77	109.7	1,097.4	10,000	10,000	5,238	3,000	2,252	1,800	20,000	100,000
26	78.8	110.1	1,101.2	9,572	9,602	5,127	2,871.6	2,155.6	1,732.3	19,090	95,480
27	80.6	110.5	1,105.1	9,165	9,226	5,018	2,749.5	2,063.9	1,667.7	18,226	91,160

Terms & Conditions of Purchase

By purchasing Senva products, buyer agrees that all of the following terms and conditions apply to every purchase and supersede any conflicting terms in any purchase order or acknowledgement:

LIMITED WARRANTY:

SENA IS PROVIDING THIS WARRANTY IN LIEU OF ALL OTHER EXPRESSED OR IMPLIED WARRANTIES, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. THIS WARRANTY IS BUYER'S EXCLUSIVE REMEDY FOR ALL CLAIMS AGAINST SENVA. SENVA SHALL NOT BE LIABLE FOR ANY CONSEQUENTIAL OR INCIDENTAL DAMAGES. SENVA TOTAL LIABILITY FOR ALL CLAIMS SHALL BE LIMITED TO THE PRICE PAID FOR ITS PRODUCT.

Senva promises buyer that any standard product manufactured by Senva shall be free from material defects in design, material, or manufacturing for a period of seven (7) years from the manufacture date; provided, however, that the warranty shall not extend to ordinary wear and tear, or to normally replaceable components (e.g., batteries and humidity sensor elements). During the warranty period, Senva may repair or replace (in its sole discretion) any product suffering from a warranty defect and returned freight prepaid by buyer, with no charge to buyer for any warranty repair or replacement. The warranty shall remain in full force and effect for said 7 year period, provided that the product: (1) was installed, operated, and maintained properly; (2) has not been abused or misused; (3) has not been repaired, altered, or modified outside of Senva authorized facilities; This warranty provides specific legal rights that may be varied by local laws.

SPECIAL ORDERS:

Senva is committed to providing responsive customer service. For products designed and built to customer specifications, please consult with Senva.

RETURNS:

No product may be returned without a returned material authorization number assigned by Senva. All warranty claims must be delivered to Senva, attention customer service. Standard products in unopened condition

(except evaluation orders) can be returned to stock subject to a charge of 15% for up to 90 days from original shipment. Items opened, or held for 90 to 180 days, may be accepted for return subject to a 30% restocking charge. Products returned for credit must be in saleable condition. If the product has been modified, damaged, or installed, we cannot accept return for credit. Non-standard products (including those having electrical modifications or private labeling) may not be returned, except for warranty service.

PAYMENT:

Payment terms are stated on each invoice. Buyer agrees to pay finance charges of 18% per annum on any past due amount. Buyer further agrees to pay any court costs, collections fees or attorney fees if legal action must be taken on any unpaid balance. For disputes, the prevailing party shall receive its costs and attorney fees (including costs and fee incurred at trial or an appeal). All legal rights shall be governed by Oregon law, excluding principles of conflict of law. Buyer consents to the jurisdiction of Oregon courts and agrees that such courts shall have personal jurisdiction over buyer. Venue shall be in Multnomah County, Oregon. Product specifications and pricing subject to change without any notice.

PRODUCT APPLICATION LIMITATION:

Senva products are not designed for life or safety applications. Senva products are not intended for use in critical applications such as nuclear facilities, human implantable device or life support. Senva is not liable, in whole or in part, for any claims or damages arising from such uses. Senva strongly believes in continuous improvement, therefore we must reserve the right to change specifications and product offerings without notice. Where possible, we will substitute products with equivalent functionality when necessary.

©2013. All Rights Reserved

