SOC-H1T
Outdoor humidity transmitter & temperature sensor

Features

- Replaceable sensor element
- Outdoor humidity and temperature measurement
- Minimum and maximum value memory
- 0…10 V, 0…20 mA or 2…10 V, 4…20 mA measuring signals selectable with jumpers
- Optional alternative signal ranges programmable
- Selectable averaging signal
- Optional LCD display (OPC-S) or external display (OPA-S)
- Status LED

Applications

- Outdoor humidity & temperature measurement for heating, ventilation and air conditioning applications.
- Recording of minimum and maximum values for critical environments
- Supervision of critical humidity and temperatures

Humidity transmitter

A unique capacitive sensor element is used for measuring relative humidity. The applied measuring technology guarantees excellent reliability and long term stability. The microprocessor samples the humidity once per second. It calculates an averaging signal over a preset number of seconds and generates the output signal. Standard output signal range and types may be selected by jumpers. Standard signal ranges are: 0…10 VDC, 0…10 VDC, 4…20 mA and 0…20 mA. Other ranges can be defined by using a programming tool (OPA-S or OPC-S). A version with display is possible by ordering the integrated display accessory OPC-S.

Minimum and maximum values

Using the programming tool, the user has the option to read out and reset minimum and maximum values. The minimum and maximum values may as well be used as output signals. The minimum and maximum values are saved into the EEPROM and are available after a power interruption.

Temperature sensor

The sensor measures the temperature by use of a NTC, PT, or NI-sensing element. The sensing element is either a glass packed thermistor with a negative temperature coefficient, a platinum film or a nickel thin layer based probe. Its resistance changes according to the temperature. The change follows a specified curve. Contact our sales department for curves not yet listed below.

Ordering

Per default a sensor element with 3% RH accuracy, a NTC 10kΩ temperature sensor and a PG9 cable gland for cables ∅ 4 – 8 mm (AWG 6 – 1) is included. Contact your local sales contact to order sensing elements with different accuracies and temperature curves or if you prefer a sensor with conduit connectors or a built in display module.

Humidity transmitter and temperature sensor

Item name	Item code	Description/option
SOC-H1Tn10-A3-1	40-30 0155	Signal converter for humidity sensor with temperature probe, incl. cable gland AMC-1 and a temperature sensor element AES3-HTn10-A3

Sensor element (for replacement only)

Item name	Item code	Humidity sensor	Temperature Sensor
AES3-HTn3	40-50 0117-x	-x: 2% rH 40-50 00XX-2 3% rH 40 50 00XX-3 5% rH 40 50 00XX-5	NTC 3kΩ at 25°C (77°F) $B_{25/50}$ 3935
AES3-HTn10	40-50 0118-x		NTC 10kΩ at 25°C (77°F) $B_{25/50}$ 3935
AES3-HTn11	40-50 0119-x		NTC 10kΩ at 25°C (77°F) $B_{25/50}$ 3630
AES3-HTn12	40-50 0127-x		NTC 10kΩ at 25°C (77°F) $B_{25/50}$ 3380
AES3-HTn20	40-50 0120-x		NTC 20kΩ at 25°C (77°F) $B_{25/50}$ 4200
AES3-HTn100	40-50 0121-x		NTC 100kΩ at 25°C (77°F) $B_{25/50}$ 4200
AES3-HTp1	40-50 0123-x		PT100 EN60751
AES3-HTp2	40-50 0124-x		PT1000 EN60751
AES3-HTk5	40-50 0125-x		NI1000, 5000 ppm/K

Accessories

Item name	Item code	Description/option
OPC-S	40-50 0029	Built in display and programming module
OPA-S	40-50 0006	External display module
AMS-1	20-10 0116	Weather shield to protect the sensor element
AMC-2	40-50 0074	Conduit connector NPT 1/2

Technical specification

Warning! Safety advice! This device is intended to be used for comfort applications. Where a device failure endangers human life and/or property, it is the responsibility of the owner, designer and installer to add additional safety devices to prevent or detect a system failure caused by such a device failure. The manufacturer of this device cannot be held liable for any damage caused by such a failure. Failure to follow specifications and local regulations may endanger life, cause equipment damage and void warranty.

Power supply	Operating voltage Transformer	24 V AC 50/60 Hz ± 10%, 24 VDC ± 10% SELV to HD 384, Class II, 48 VA max.
	Power consumption	Max. 2 VA
	Terminal connectors	For wire 0.34…2.5 mm^2 (AWG 24…12)
Sensing probe	Humidity sensor: Range Measuring accuracy Hysteresis Repeatability Stability	Capacity sensor element 0…100 % rH See figure 1 ± 1% ± 0.1% < 0.5% / year
	Thermistor: Accuracy: -40…0°C (-40…32°F): 0…50°C (32…122°F): 50…70°C (122…158°F):	 0.5 K 0.2 K 0.5 K
	Platinum-film: Range: (Probe only) Accuracy	PT according EN 60751 -40…70 °C (-94…158 °F) EN 60751, Class B
	Nickel thin layer: Range: (Probe only) Accuracy	1000 Ω at 0 °C, 5000 ppm/K -40…70 °C (-76…158 °F) DIN 43760
Signal outputs	Analog outputs Output signal Resolution Maximum load	 DC 0-10 V or 0…20 mA 10 Bit, 9.7 mV, 0.019.5 mA Voltage: ⩾1kΩ Current: ⩽250Ω
Environment	Operation Climatic conditions Temperature Humidity	To IEC 721-3-3 class 3 K5 -40…70 °C (-40…158 °F) <95% R.H. non-condensing
	Transport & storage Climatic conditions Temperature Humidity Mechanical conditions	To IEC 721-3-2 and IEC 721-3-1 class 3 K3 and class 1 K3 -40…80 °C (-40…176 °F) <95% R.H. non-condensing class 2M2
Standards	CE conformity EMC directive Low voltage directive	 2014/30/EU 2014/35/EU
	Product standards automatic electrical controls for household and similar use	EN 60 730 –1
	Electromagnetic compatibility for domestic and industrial sector	Emissions: EN 60 730-1 Immunity: EN 60 730-1
	Degree of protection to EN 60529	IP63 if correctly mounted with AMS-1
	Safety class	III (IEC 60536)
General	Housing materials Cover, back part Filter material	PC+ABS (UL94 class V-0) PTFE coated 1µm pores
	RoHS compliant according to	2011/65/EU
	Dimensions (H x W x D):	150 x 91 x 47 mm (5.9” x 3.7” x 1.9”)
	Weight (including package)	220 g (7.8 oz.)

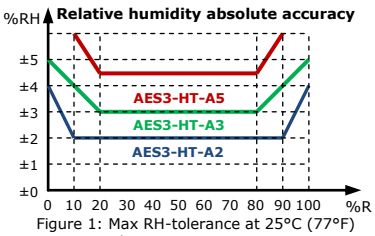
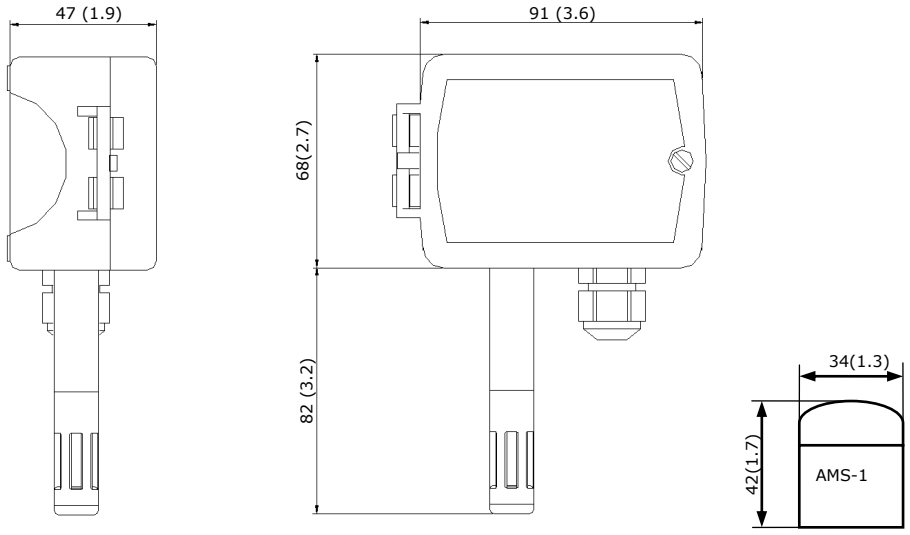


Figure 1: Max RH-tolerance at 25°C (77°F) per sensor type

Dimensions mm (inch)



Mechanical design and installation

The unit consists of two parts: (a) The back part with the probe and (b) the cover.

Warning about storage, packaging and usage environment

The sensing part is a polymer, which measures the humidity in the ambient air. For proper sensor operation some mandatory precautions need to be taken during storage, packaging and usage.
The transmitter and its sensing element should not be packaged, stored or used in out-gassing plastic materials, which could cause sensor contamination. In particular, it is recommended not to use any glue or adhesive tapes (Sellotape, Scotch-Tape, Tesa-Film, etc.)within the package or close proximity of the sensor.Foamed materials often cause contamination problems and should not be used to package the transmitter. Best packaging material is a simple cardboard box or a deep-drawn plastic case in a cardboard box.

Mounting instruction / replacing the sensor element

See installation sheet no. 70-000530 (www.vectorcontrols.com)

Configuration parameters

The transmitter can be adapted to fit perfectly into any application by adjusting the software parameters. The parameters are set with the operation terminals OPA-S or OPC-S. The OPA-S may also be used as remote indicator.

Input configuration

Parameter	Description	Range	Default
IP 00	H1: Show percent	ON, OFF	ON
IP 01	H1: Samples taken for averaging control signal	1…255	10
IP 02	H1: Calibration	-10…10%	0

Output configuration

Parameter	Description	Range	Default
OP 00	AO1: Humidity: Configuration of output signal: 0 = Feedback humidity input, 1 = Feedback humidity minimum value 2 = Feedback humidity maximum value	0 – 2	0
OP 01	AO1: Humidity: Minimum limitation of output signal	0 – Max %	0%
OP 02	AO1: Humidity: Maximum limitation of output signal	Min – 100%	100%

Output signal configuration

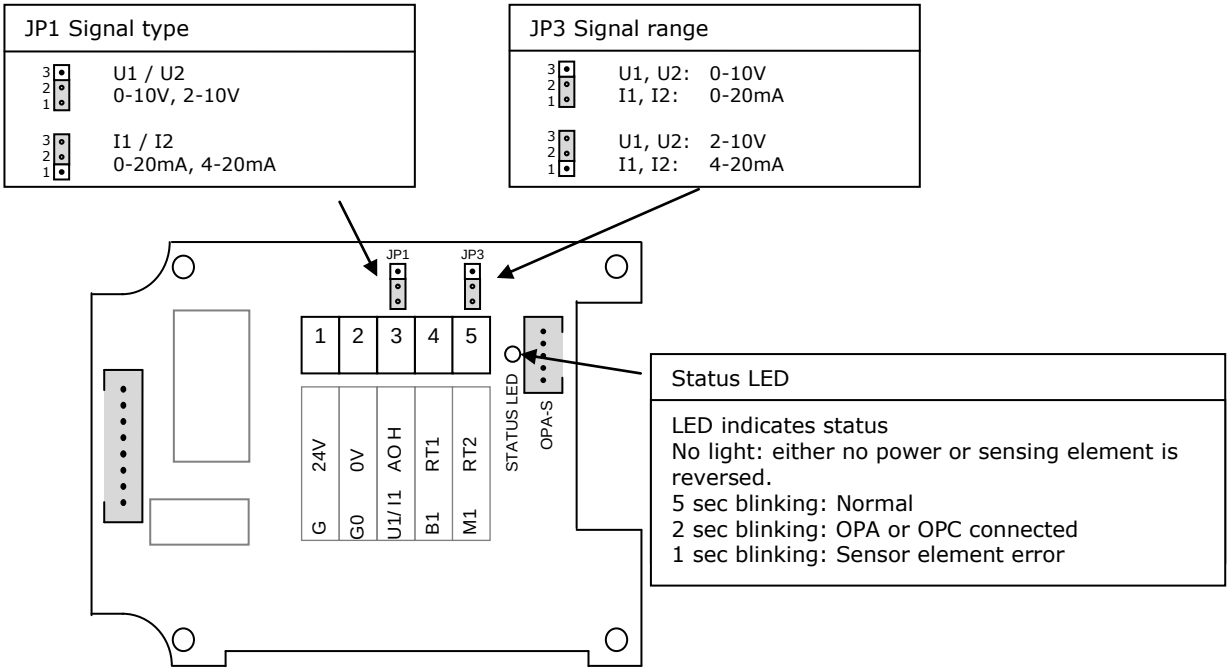
The analog output signal type may be configured with a jumper for 0-10 VDC or 0-20 mA control signals. The jumpers are located next to the terminal connector of each analog output. See table below for jumper placement. The factory setting is to 0-10 VDC.

Signal Type	JP1
0 – 10 V	(1-2)
0 – 20 mA	(2-3)

The signal range may be set with JP3 for both analog outputs. JP3 will only operate if the output range specified with OP01 and OP02 is left at the default position of 0…100%. With any other setting the position of JP3 has no influence and the range defined with the output parameters applies.

Signal Range	JP3
0 – 10 V, 0 – 20 mA	(1-2)
2 – 10 V, 4 – 20 mA	(2-3)

Jumper Settings



Resistance Table for Thermistors (NTC)

°C	°F	Tn3 [kΩ]	Tn5 [kΩ]	Tn10 [kΩ]	Tn11 [kΩ]	Tn12 [kΩ]	Tn20 [kΩ]	Tn100 [kΩ]
$B_{25/50}$		3935	3470	3935	3630	3380	4200	4200
$B_{25/85}$		3974	3535	3974	3687	3435	4260	4260
$B_{25/100}$		3988	3526	3988	3715	3455	4285	4285
Signal type →		NTC 3k	NTC 5k	NTC 10k-2	NTC-10k-3		NTC 20k	NTC 100k
-50	-58	201,1	161,9	670,2	441,3	329,2	1711	8558
-40	-40	100,9	89,49	336,4	239,7	188,4	814,0	4095
-30	-22	53,09	54,07	177,0	135,3	111,3	415,6	2077
-20	-4	29,12	33,21	97,08	78,91	67.74	220,6	1105
-10	14	16,60	21,07	55,33	47,54	42.45	122,4	612,4
0	32	9,795	13,73	32,65	29,49	27.28	70,20	351,0
10	50	5,969	9,041	19,90	18,79	17.96	41,56	207,8
20	68	3,747	6,064	12,49	12,26	12.09	25,34	126,7
25	77	3,000	5,000	10,00	10,00	10,00	20,00	100,00
30	86	2,417	4,139	8,057	8,194	8,313	15,88	79,43
40	104	1,598	2,875	5,327	5,592	5,828	10,21	51,06
50	122	1,081	2,032	3,603	3,893	4,161	6,718	33,60
60	140	0,746	1,463	2,488	2,760	3,021	4,518	22,59
70	158	0,525	1,069	1,751	1,990	2,229	3,100	15,50
80	176	0,376	0,792	1,255	1,458	1,669	2,168	10,84
90	194	0,275	0,601	0,915	1,084	1,266	1,542	7,707
100	212	0,203	0,464	0,678	0,817	0,973	1,114	5,571
110	230	0,536	0,354	0,512	0,624	0,752	0,818	4,092
120	248	0,123	0,272	0,410	0,481	0,605	0,609	3,046
130	266	0,097	0,212	0,322	0,380	0,487	0,460	2,298
140	284	0,077	0,169	0,257	0,300	0,395	0,351	1,755
150	302	0,063	0,137	0,210	0,240	0,325	0,271	1,356

Resistance Table for Platinum Film and NI1000 Elements

°C	°F	Tp1 [Ω]	Tp2 [Ω]	Tk5 [Ω]	Tk6 [Ω]
		PT100 DIN 60751	PT1000 DIN 60751	NI1000, K=5000	NI1000 K=6180
-50	-58	80,28	803,0	790,88	742,55
-40	-40	84,27	843,0	830,84	791,31
-30	-22	88,22	882,0	871,69	841,46
-20	-4	92,16	922,0	913,48	892,96
-10	14	96,09	961,0	956,24	945,82
0	32	100,00	1000,0	1000	1000
10	50	103,90	1039,0	1044,79	1055,52
20	68	107,79	1078,0	1090,65	1111,36
30	86	111,67	1117,0	1137,62	1170,56
40	104	115,54	1155,0	1185,71	1230,11
50	122	119,40	1194,0	1234,98	1291,05
60	140	123,24	1232,0	1285,45	1353,40
70	158	127,07	1270,5	1337,15	1417,21
80	176	130,89	1309,0	1390,12	1482,50
90	194	134,70	1347,0	1444,39	1549,34
100	212	138,50	1385,0	1500,00	1617,79
110	230	142,29	1423,0	1556,98	1687,89
120	248	146,06	1460,5	1615,37	1759,72
130	266	149,80	1498,0	1675,19	1833,35
140	284	153,60	1536,0	1736,48	1908,87
150	302	157,30	1573,0	1799,27	1986,35
160	320	161,05	1610,5	1863,60	2065,89
170	338	164,75	1647,5	1929,50	2147,58
180	356	168,45	1684,5	1997,00	2231,53
190	374	172,15	1721,5	2066,15	2317,83
200	392	175,85	1758,5	2136,96	2406,60