

SDC-H1T Duct Humidity Transmitter and Temperature Sensor

Features

- Replaceable sensor element
- Humidity and temperature measurement for air ducts
- Minimum and maximum value memory
- 0...10 V, 0...20 mA or 2...10 V, 4...20 mA output selectable with jumpers
- Optional alternative signal ranges programmable
- Selectable averaging signal
- Optional LCD display (OPC-S) or external display (OPU-S)
- Status LED

Applications

- Humidity and temperature measurement for supply and return air ducts
- 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 (OPU-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 us for curves not listed below.

Ordering

Per default a sensor element with 3% RH accuracy, a NTC 10kΩ temperature sensor and a PG9 cable gland (item name AMC-1) 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 (default)

Item name	Item code	Description/Option
SDC-H1Tn10-08-A3-1	40-30 0148	Probe length 8 cm (3"), cable gland AMC-1, sensor element AES3-HTn10-A3
SDC-H1Tn10-16-A3-1	40-30 0149	Probe length 16 cm (6.2"), cable gland AMC-1, 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:	NTC 3kΩ at 25°C (77°F) B _{25/50} 3935
AES3-HTn10	40-50 0118-x	2% rH 40-50 00XX-2	NTC 10kΩ at 25°C (77°F) B _{25/50} 3935
AES3-HTn11	40-50 0119-x	3% rH 40 50 00XX-3	NTC 10kΩ at 25°C (77°F) B _{25/50} 3630
AES3-HTn12	40-50 0127-x	5% rH 40 50 00XX-5	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
AES3-HTk6	40-50 0126-x		NI1000, 6180 ppm/K

Accessories

Item name	Item code	Description/Option
OPC-S	40-50 0029	Built in display and programming module
OPU-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	24 V AC 50/60 Hz \pm 10%, 24 VDC \pm 10%	
	Transformer	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	Capacity sensor element	
	Range	0...100% RH	
	Measuring accuracy	See Figure 1	
	Hysteresis	\pm 1%	
	Repeatability	\pm 0.1%	
	Stability	< 0.5% / year	
Thermistor:	NTC		
Accuracy	-40...0 °C (-40...32 °F)	0.5 K	
	0...50 °C (32...122 °F)	0.2 K	
	50...70 °C (122...158 °F)	0.5 K	
Platinum-film	PT according EN 60751		
Range (probe only)	EN 60751, Class B		
Accuracy	+/- 0.3 at 0 °C (32 °F), 0.005 x t[K] for values away from 0 °C (32 °F)		
Nickel thin layer	1000 Ω at 0 °C (32 °F), 5000 ppm/K		
Range (probe only)	DIN 43760		
Accuracy	+/- 0.4 at 0 °C (32 °F), <0°C(32 °F) 0.028 x t[K], >0 °C(32 °F) 0.007 x t[K]		
Signal outputs	Analog outputs	DC 0-10V or 0...20mA	
	Output signal	10 Bit, 9.7 mV, 0.019.5 mA	
	Resolution	Voltage: \geq 1k Ω Current: \leq 250 Ω	
	Maximum load		
Environment	Operation	To IEC 721-3-3	
	Climatic conditions	class 3 K5	
	Temperature	-40...70°C (-40...158°F)	
	Humidity	<95% R.H. non-condensing	
	Transport & storage	To IEC 721-3-2 and IEC 721-3-1	
	Climatic conditions	class 3 K3 and class 1 K3	
Temperature	-40...80°C (-40...176°F)		
Humidity	<95% R.H. non-condensing		
Mechanical conditions	class 2M2		
Standards		conformity	
		EMC directive	2014/30/EU
	Low voltage directive	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	IP60	
	Mounted probe down with AMS-1	IP63	
Safety class	III (IEC 60536)		
General	Material	Cover, back part	PC+ABS (UL94 class V-0)
		Filter material	PTFE coated 1 μ m pores
	RoHS compliant according to		2011/65/EU
	Dimensions (H x W x D)	Transmitter case	68 x 91 x 47 mm (2.7" x 3.7" x 1.9")
		Probe	\varnothing 14 x 77/157 mm (\varnothing 0.55 x 3/6.2")
Weight (including package)	SDC-H1Tn10-08-A3-1	227 g (7.9 oz.)	
	SDC-H1Tn10-16-A3-1	262 g (9.2 oz.)	

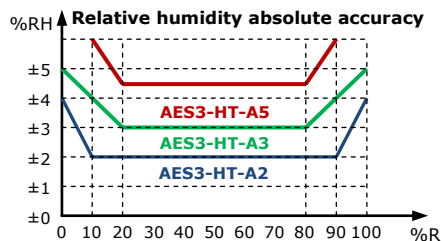
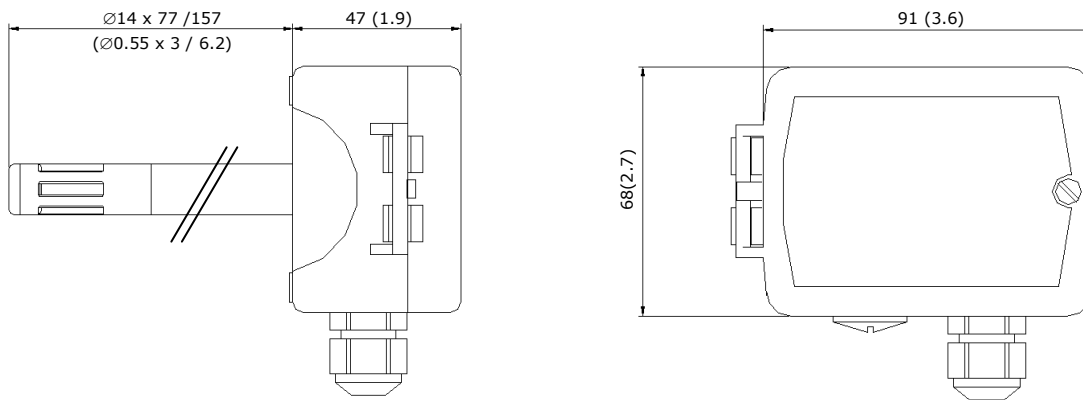


Figure 1: Max RH-tolerance at 25°C (77°F) per sensor type

Dimensions mm (inch)

Installation and Storage
Mounting location

The transmitter should be installed on the duct in an area where the air stream is well mixed:

- Locate a supply air sensor two or three meters downstream from the nearest fan and coil.
- Mount the return air sensor close to the air inlet but downstream from a return fan if one is present.

Mounting instruction / replacing the sensor element

See installation sheet no. 70-000525 (www.vectorcontrols.com).

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 (duct tape, Scotch® tape, 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.

Configuration

The transmitter can be adapted to fit perfectly into any application by adjusting the software parameters. The parameters are set with the operation terminals OPU-S or OPC-S. The OPU-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)

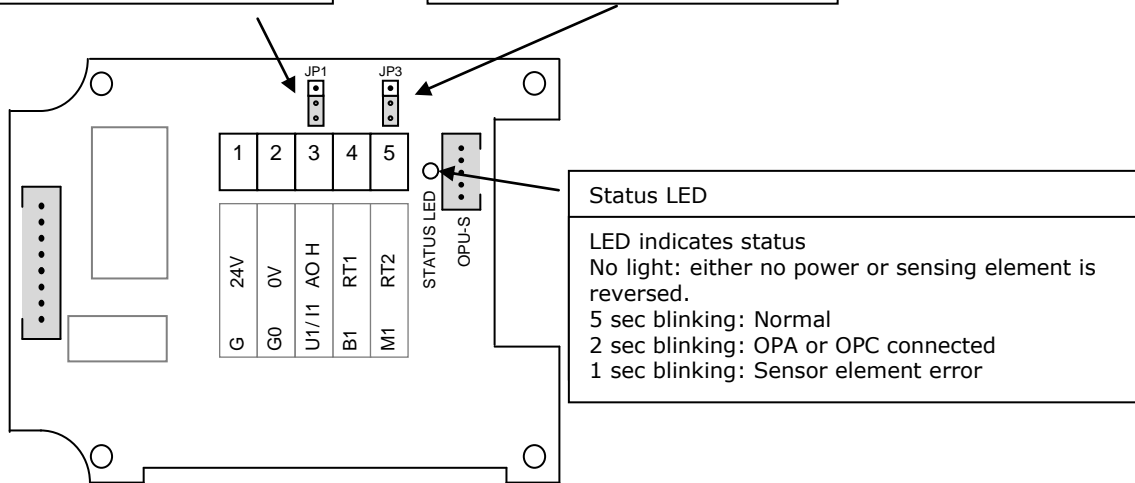
The signal range may be set with JP3 for both analog outputs. JP3 will only operate if the output range specified with OP01 and OP02 is left at the default position of 0...100%. With any other setting the position of JP3 has no influence and the range defined with the output parameters applies.

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

Jumper Settings

JP1 Signal type	
3 2 1	U1 / U2 0-10V, 2-10V
3 2 1	I1 / I2 0-20mA, 4-20mA

JP3 Signal range	
3 2 1	U1, U2: 0-10V I1, I2: 0-20mA
3 2 1	U1, U2: 2-10V I1, I2: 4-20mA



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