SRC-H1T Indoor humidity transmitter & temperature sensor

Features

- Indoor humidity and temperature measurement
- Replaceable sensor element
- Sensor reconditioning function against contamination
- Anti-Creep function for high humidity environments
- 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 external display (OPA-S)
- Status LED

Applications

- Indoor, Indoor humidity & temperature measurement for heating, ventilation and air conditioning applications
- Recording of minimum and maximum values for critical environments
- Supervision of critical humidity
- Measurements in high humidity environments

Humidity transmitter

A 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, 2…10 VDC, 0…20 mA and 4…20 mA. Other ranges can be defined by using a programming tool (OPA-S).

Minimum and maximum values

Using a display & programming accessory, 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.

Accuracy advice for the passive sensor input

The transmitter is an electronic device that generates heat during operation. The humidity output is compensated in software against this drift. The passive temperature probe is not. Large differences of up to +3°C (6°F) can occur.

It is thus recommended to compensate the passive input after installation and operation for > 1 hour or use SRA-T or SRC-H1T1 instead to measure indoor temperature.

Safety

⚠️ **DANGER! Safety advice**
This device is for use as a humidity transmitter and temperature sensor. It is not a safety device. Where a device failure could endanger human life and property, it is the responsibility of the client, installer and system designer to add additional safety devices to prevent such a device failure. Ignoring specifications and local regulations may cause equipment damage and endangers life and property. Tampering with the device and misapplication will void warranty.

Types and Ordering

Per default a sensor element with 3% RH accuracy is included. Contact your local sales contact to order sensing elements with different accuracies.

Transmitter

Product Name	Product No.	Description/Option		
SRC-H1Tn10-A3	40-300141	Humidity transmitter with temperature sensor		

Sensor element

Product Name	Product No.	Description/Option		
AES4-HTn18-Ax	40-500164-x	NTC 1.8kΩ at 25°C (77°F)	$B_{25/50}$ 3470	
AES4-HTn3-Ax	40-500160-x	NTC 3kΩ at 25°C (77°F)	$B_{25/50}$ 3935	
AES4-HTn10-Ax *	40-500145-x	NTC 10kΩ at 25°C (77°F)	$B_{25/50}$ 3935	
AES4-HTn11-Ax	40-500161-x	NTC 10kΩ at 25°C (77°F)	$B_{25/50}$ 3630	
AES4-HTn12-Ax	40-500169-x	NTC 10kΩ at 25°C (77°F)	$B_{25/50}$ 3380	Accuracy option of humidity sensor element:
AES4-HTn20-Ax	40-500162-x	NTC 20kΩ at 25°C (77°F)	$B_{25/50}$ 4200	x = 2: 2% rH
AES4-HTn100-Ax	40-500163-x	NTC 100kΩ at 25°C (77°F)	$B_{25/50}$ 4200	x = 3: 3% rH
AES4-HTp1-Ax	40-500165-x	PT100, 100Ω at 0°C (32°F)	EN60751	x = 5: 5% rH
AES4-HTp2-Ax	40-500166-x	PT1000, 1kΩ at 0°C (32°F)	EN60751	
AES4-HTk5-Ax	40-500167-x	NI1000, 1kΩ at 0°C (32°F) 5000 ppm/K	DIN 43760	
AES4-HTk6-Ax	40-500168-x	NI1000, 1kΩ at 0°C (32°F) 6180 ppm/K	DIN 43760	

* Vector Controls standard sensor

Accessories

Product Name	Product No.	Description/Option
OPA-S	40-500006	External display module

Technical Specifications

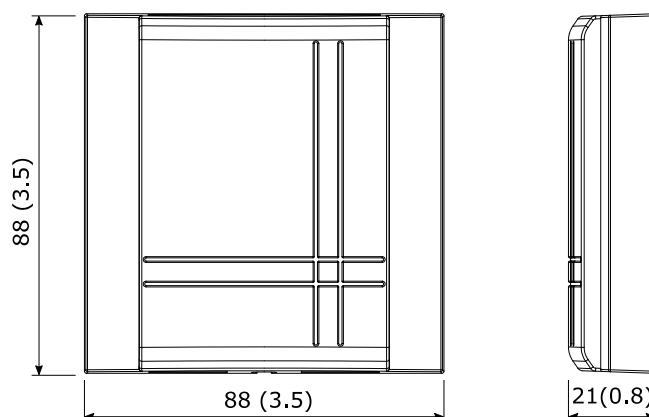|		
Power supply	Operating Voltage Transformer	24 VAC 50/60 Hz ± 10%, 24VDC ± 10% SELV to HD 384, Class II, 48VA max
	Power Consumption	Max 2 VA
	Terminal Connectors	For wire 0.34…2.5 mm^2 (AWG 24…12)
Sensing probe	Humidity Sensor: Range Measuring Accuracy Hysteresis Repeatability Stability	Capacity sensor element 0…100 % rH See Figure 1 ± 1% ± 0.1% < 0.5% / year
Passive sensor	Accuracy Warning: The transmitter is an electronic device that generates heat during operation. The transmitter is compensated in software against this drift. The passive probe is not. Large differences of up to 3°C (6°F) can occur. It is thus recommended to compensate the passive input after installation or use SRA-T or SRC-H1T1 instead.	
	Thermistor: Accuracy:	NTC 0.2 K
	Platinum-Film: Accuracy	PT according EN 60751 EN 60751, Class B
	Nickel Thin Layer: Accuracy	1000 Ω at 0°C, 5000 ppm/K DIN 43760
Signal outputs	Analog Outputs Output Signal Resolution Maximum Load	 DC 0-10V or 0…20mA 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 0…70°C (32…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 0…70°C (32…158°F) <95% R.H. non-condensing class 2M2
Standards	Degree of Protection	IP30 to EN 60 529
	Safety Class	III (EN 60730-1)
General	Housing Materials Cover Mounting Plate	Flame retardant PC+ABS plastic (UL94 class V-0) Galvanized steel
	Dimensions (H x W x D)	21 x 88 x 88 mm (0.8 x 3.5 x 3.5 in)
	Weight (including package)	160 g (5.6 oz)

Product testing and certification

CE Declaration of Conformity   Information on the conformity of our products can be found on our website www.vectorcontrols.com on the corresponding product page under "Downloads".

Dimension mm(inch)

88 (3.5)

88 (3.5)

21(0.8)

Mounting and Installation

Mounting location

- On a flat, easily accessible inner wall
- The following installation locations should be avoided:
  - Protect from direct exposure to sunlight
  - Do not install near heat sources, e.g. radiators or other heat-generating devices
  - Air storage spaces and niches, e.g. behind doors or shelves
  - Outside walls insufficiently insulated
  - In the direct sphere of influence of ventilation openings and fans

> **!** **Important**
> Observe local regulations!

Sealing of cable entries
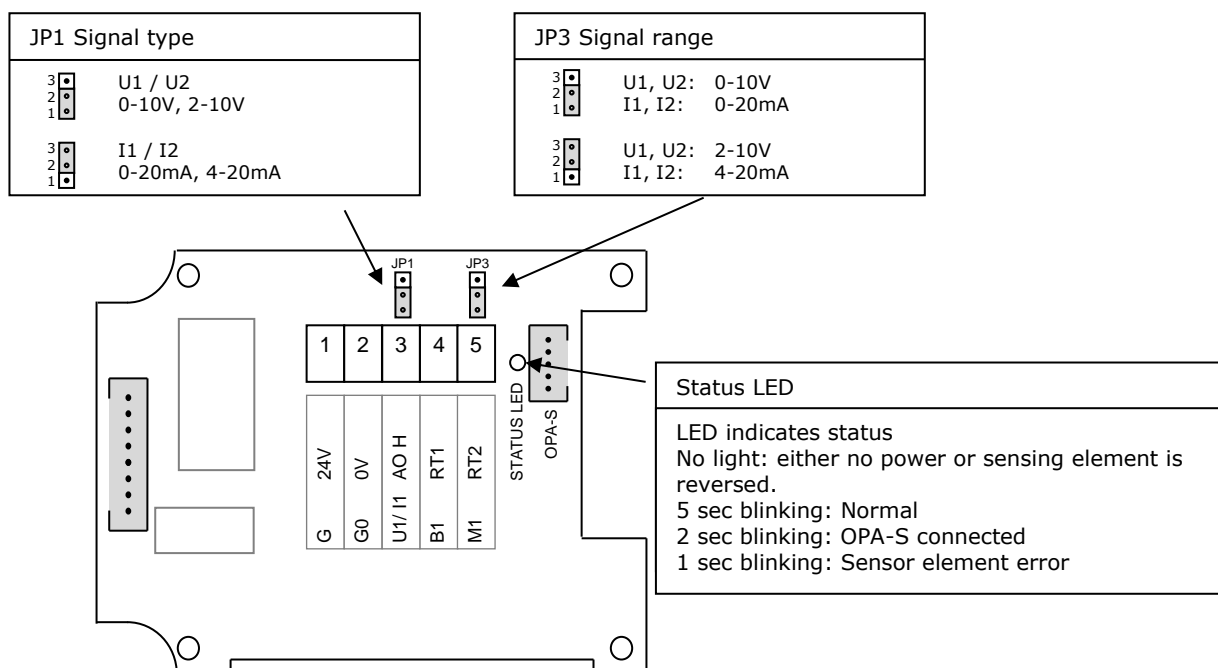
> **!** **Important**
> All cable entries into the connection box must be sealed to prevent air drafts, which could otherwise affect the sensors in the device and prevent correct measurements!

Mounting instruction / replacing the sensor element

See installation sheet no. 70-000568 (www.vectorcontrols.com).

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

Status LED

LED indicates status
No light: either no power or sensing element is reversed.
5 sec blinking: Normal
2 sec blinking: OPA-S connected
1 sec blinking: Sensor element error

Terminals: 1 2 3 4 5
G 24V | G0 0V | U1/I1 AO H | B1 RT1 | M1 RT2
STATUS LED | OPA-S

Recondition the sensing element

> **!** **Important**
> If the sensor has been exposed to chemical contamination or prolonged exposure to very humid climates (> 80%), we recommend running the "Sensor Reconditioning Function" once prior to continuous use to remove contamination and creep effect. This will ensure that the sensor operates at its specified accuracy.

For details on how to activate the sensor reconditioning function see chapter "Sensor reconditioning function" on page 5.

Information about storage, packaging and usage environment

ⓘ NOTE:
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.

Sensor

Accuracy of Temperature & Humidity sensor in -H, -T and -HT type
AES4-HT-A3 standard sensor

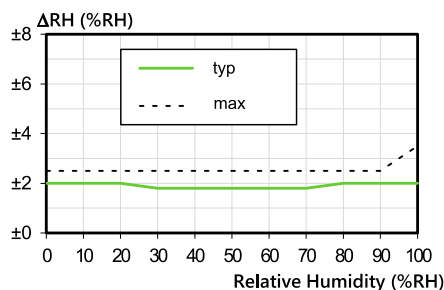

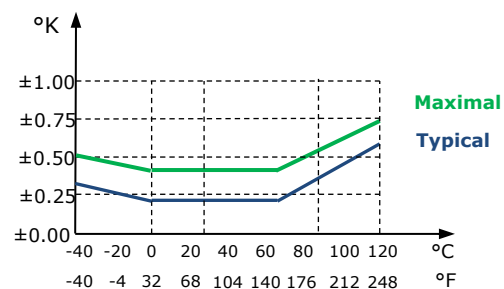Figure 1: Typical and maximal RH accuracy at 25°C (77°F)

Figure 2: Typical and maximal temperature accuracy

Anti-creep function for devices with AES4 sensors
Ensuring high accuracy of humidity measurement
When the AES4 sensor is exposed to very humid environments for extended periods of time, an anti-creep function is activated in the background to ensure that the sensing element remains accurate. While the anti-creep function is active, the RH value will appear to be frozen for short periods of time.

Sensor reconditioning function

Reconditioning the humidity sensing element eliminates chemical contamination and creep effects on the sensor and ensures that it operates at its specified accuracy.
Reconditioning can be configured to run once, periodically, or only at power-up.

Parameter **IP03** allows for sensor reconditioning of AES4 sensors.
Per default the value of this parameter is 0. If a number is entered the reconditioning procedure is started:
- The sensor is reconditioned for the number of minutes entered in **IP03**. During this time the status LED blinks in 1 second rhythm.
- If no interval is defined with **IP04**, the number in **IP03** is set to 0, once the recondition has started.
- If an interval is set with **IP04**, the value remains unchanged. When the internal counter reaches 0, reconditioning stops. The interval in hours defined in **IP04** determines the waiting time for the next reconditioning. The interval is stopped during a power failure and resumed when power is restored.

Parameter **IP05** allows reconditioning at each power-up. This reconditioning interval is independent of **IP03** or **IP04** settings. At each power up, the sensor will perform the reconditioning function according to the time in minutes defined with **IP05**.

ⓘ **Recommendation**
We recommend to set the **IP03** value to **80** minutes recondition time if the sensor is out of its accuracy range.

ⓘ **Note**
The display will freeze during reconditioning.

⚠ **Important**
Reconditioning will not continue if interrupted by a power cycle!

Resistance table for thermistors (NTC)

°C	°F	Tn18 [kΩ]	Tn3 [kΩ]	Tn5 [kΩ]	Tn10 [kΩ]	Tn11 [kΩ]	Tn12 [kΩ]	Tn20 [kΩ]	Tn100 [kΩ]
$B_{25/50}$		3470	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 1.8k	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	40,58	100,9	89,49	336,4	239,7	188,4	814,0	4095
-30	-22	22,938	53,09	54,07	177,0	135,3	111,3	415,6	2077
-20	-4	13,462	29,12	33,21	97,08	78,91	67.74	220,6	1105
-10	14	8,177	16,60	21,07	55,33	47,54	42,45	122,4	612,4
0	32	5,115	9,795	13,73	32,65	29,49	27,28	70,20	351,0
10	50	3,301	5,969	9,041	19,90	18,79	17,96	41,56	207,8
20	68	2,189	3,747	6,064	12,49	12,26	12,09	25,34	126,7
25	77	1,8	3,000	5,000	10,00	10,00	10,00	20,00	100,00
30	86	1,488	2,417	4,139	8,057	8,194	8,313	15,88	79,43
40	104	1,033	1,598	2,875	5,327	5,592	5,828	10,21	51,06
50	122	0,731	1,081	2,032	3,603	3,893	4,161	6,718	33,60
60	140	0,528	0,746	1,463	2,488	2,760	3,021	4,518	22,59
70	158	0,386	0,525	1,069	1,751	1,990	2,229	3,100	15,50
80	176	0,286	0,376	0,792	1,255	1,458	1,669	2,168	10,84
90	194	0,215	0,275	0,601	0,915	1,084	1,266	1,542	7,707
100	212	0,163	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

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 OPA-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
IP 03	Duration of the AES4-HT sensor reconditioning. This value will be cleared if periodic reconditioning is not active. It will remain if periodic reconditioning is enabled. 0: Not active	0-240 min	0 (not active)
IP 04	Interval period for AES4-HT sensor reconditioning 0: Periodic reconditioning disabled 1-240: Period reconditioning enabled (repeats every xxx hours)	0-240 hours	0 (not active)
IP 05	Power up reconditioning for AES4-HT sensor. The sensor is reconditioned each time it is power up. Periodic reconditioning settings have no effect. 0: Not active.	0-240 min	0 (not active)

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

For jumper settings see chapter "Jumper settings" on page 4.

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