SDC-H1T1 Duct humidity and temperature transmitter

Features

- Humidity and temperature measurement for air ducts
- Sensor reconditioning function against contamination
- Anti-Creep function for high humidity environments
- Minimum and maximum value memory
- Replaceable sensor element
- 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

- Humidity and temperature measurement for supply and return air ducts in heating, ventilation and air conditioning applications
- Recording of minimum and maximum values for critical environments
- Supervision of critical humidity and temperatures
- Measurements in high humidity environments

Humidity and temperature transmitter

A capacitive sensor element is used for measuring relative humidity while temperature is measured by a band-gap sensor. The applied measuring technology guarantees excellent reliability and long-term stability. The microprocessor samples the humidity and temperature once per second. It calculates an averaging signal over a preset number of seconds and generates the output signal based on lower and upper signal range values. Standard range is 0…100% RH, -40…60 °C (-40…140 °F) and 10 seconds average. The signal range of the temperature measurement and the averaging samples may be customized.

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 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.

Safety

⚠️ **DANGER! Safety advice**
This device is for use as a humidity and temperature transmitter. 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 and a PG9 cable gland for cables ∅ 4 – 8 mm (AWG 6 – 1) (item name AMC-1) is included. Contact your local sales contact to order different probe length, sensing elements with different accuracies or if you prefer a sensor with conduit connectors or a built-in display module.

Transmitter

Product Name	Product No.	Description/Option
SDC-H1T1-08-A3-1	40-300150	Transmitter for duct mounting: probe length 8 cm (3.1"), incl. cable gland AMC-1 and humidity sensor element AES4-HT-A3
SDC-H1T1-16-A3-1	40-300151	Transmitter for duct mounting: probe length 16 cm (6.2"), incl. cable gland AMC-1 and humidity sensor element AES4-HT-A3
SDC-H1T1-24-A3-1	40-300110	Transmitter for duct mounting: probe length 24 cm (9.4"), incl. cable gland AMC-1 and humidity sensor element AES4-HT-A3
Pre-Configured Versions		
SDC-H1T1-x-A3-1-W0	40-300xxx-0	**Signal range: -40…60°C (-40…140°F) (Default)**
SCC-H1T1-x-A3-1-W1	40-300xxx-1	Signal range: -35…35°C (-31…95°F)
SDC-H1T1-x-A3-1-W2	40-300xxx-2	Signal range: 0…50°C (32…122°F)
SDC-H1T1-x-A3-1-W3	40-300xxx-3	Signal range: Special – Specify in order

xxx = On request

Sensor element (for replacement only)

Product Name	Product No.	Humidity Accuracy [%rH]	Temperature Accuracy [K] @25°C (77°F)	Description/Option
AES4-HT-A2	40-500153	2%	± 0.5°	
AES4-HT-A3 *	40-500152	3%	± 0.4°	Humidity temperature sensor element
AES4-HT-A5	40-500144	5%	± 0.3°	

* Standard sensor

Accessories

Product Name	Product No.	Description/Option
OPC-S	40-500029	Built in display and programming module
OPA-S	40-500006	External display module
AMS-1	20-100116	Weather shield to protect the sensor element
AMC-2	40-500074	Conduit connector NPT 1/2

Technical Specifications

| Power supply	Operating Voltage		24 VAC 50/60 Hz ± 10%, 24VDC ± 10%
	Transformer		SELV to HD 384, Class II, 48VA max
	Power Consumption		Max 2 VA
	Terminal Connectors		For wire 0.34…2.5 mm² (AWG 24…12)
Sensing probe	Humidity Sensor:		Capacity sensor element
	Range		0…100 % RH
	Measuring Accuracy		See Figure 1
	Hysteresis		± 1%
	Repeatability		± 0.1%
	Stability		< 0.5% / year
	Temperature Sensor:		Bandgap sensor
	Measuring Accuracy		See Figure 2
	Repeatability		± 0.1°C, ± 0.2°F
Signal outputs	Analog Outputs		
	Output Signal		0…10 VDC or 0…20 mA
	Resolution		10 Bit, 9.7 mV, 0.019.5 mA
	Maximum Load		Voltage: ≥1kΩ Current: ≤250Ω
Environment	Operation		To IEC 721-3-3
	Climatic Conditions		class 3 K5
	Temperature	no display	-40…70°C (-40…158°F)
		with display (OPC-S)	0…50 °C (32…122 °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	no display	-40…70°C (-40…158°F)
		with display (OPC-S)	0…50 °C (32…122 °F)
	Humidity		<95% R.H. non-condensing
	Mechanical Conditions		class 2M2
Standards	Degree of Protection to EN 60 529		IP60
	Mounted probe down with AMS-1		IP63
	Safety Class		III (EN 60730-1)
General	Housing Materials	Cover	Flame retardant PC+ABS plastic (UL94 class V-0)
		Filter material	PTFE coated 1µm pores
	Dimensions (H x W x D)	Transmitter case	68 x 91 x 47 mm (2.7" x 3.7" x 1.9")
		Probe	∅ 14 x 77/157 mm (∅ 0.55 x 3/6.2")
	Weight (including package)	SDC-H1T1-08-A3-1	227g (7.9 oz)
		SDC-H1T1-16-A3-1	262g (9.2 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)
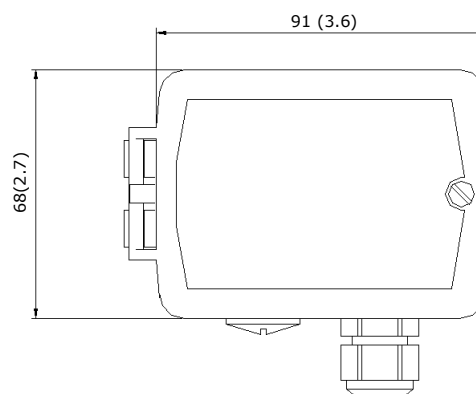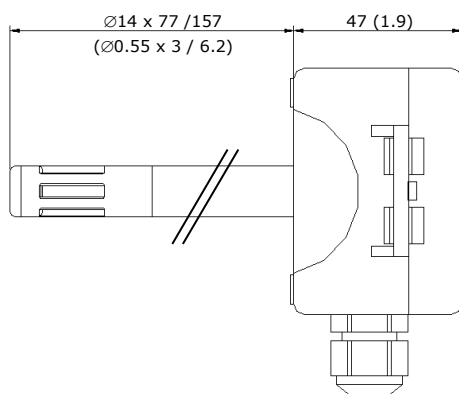
Mounting and Installation

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.

!	**Important**
	Observe local regulations!

Mounting instruction / replacing the sensor element

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

Jumper settings

JP1, JP2 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
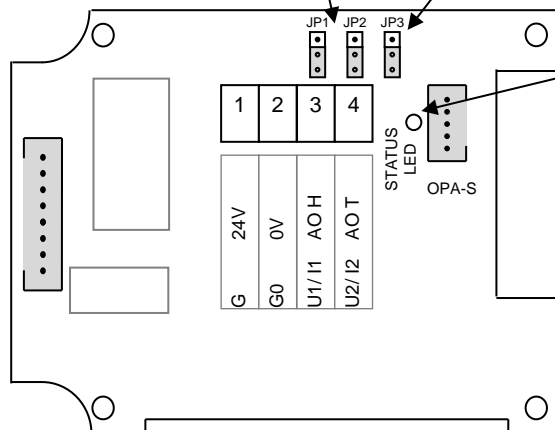
Status LED

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

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 6.

Information about storage, packaging and usage environment

(i)	**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.

Operation of the –OP type transmitter

Standard display

Single input transmitters: The current, minimum or maximum value is shown in the large digits. The small digits indicate the active input (IN 1). The vertical bar on the right side indicates the actual output voltage or current in 10% steps.

Indication and reset of minimum and maximum values

Activate the desired transmitter for dual transmitter by pressing the RIGHT key. Press UP to display maximum values, press DOWN key to display minimum values.
Resetting minimum or maximum values: Pressing either UP or DOWN keys for longer than 3 seconds while the minimum or maximum values are displayed.

Display
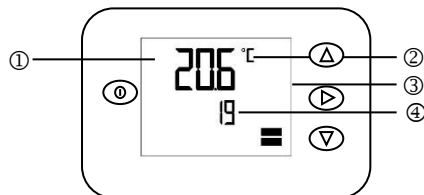
Legend:
1: 4-digit display of current value, minimum, maximum or control parameter
2: Unit of displayed value, °C, °F, % or none
3: Vertical display of output or input signal with a resolution of 10%
4: 4-digit display of current value or control parameter

Operation keys

Key	Function	Description
⓪	LEFT key:	Exit from parameter menu
△	UP key:	Display maximum values, Press for more than 2 seconds resets maximum value
▽	DOWN key:	Display minimum values, Press for more than 2 seconds resets minimum value
▷	RIGHT key:	Select transmitter, for transmitters with more than one input.

Sensor

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

AES4-HT-A3 standard sensor
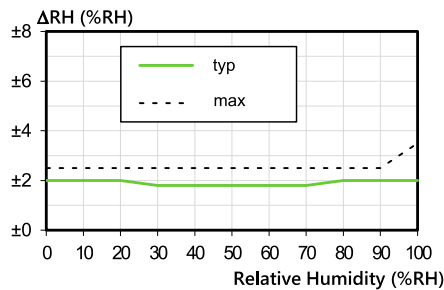
Relative humidity absolute accuracy

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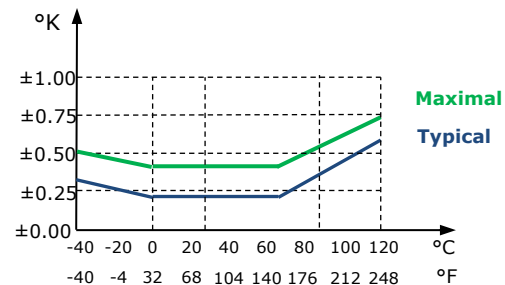
Temperature accuracy

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 **IP08** 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 **IP08**. During this time the status LED blinks in 1 second rhythm.
- If no interval is defined with **IP09**, the number in **IP08** is set to 0, once the recondition has started.
- If an interval is set with **IP09**, the value remains unchanged. When the internal counter reaches 0, reconditioning stops. The interval in hours defined in **IP09** determines the waiting time for the next reconditioning. The interval is stopped during a power failure and resumed when power is restored.

Parameter **IP10** allows reconditioning at each power-up. This reconditioning interval is independent of **IP08** or **IP09** settings. At each power up, the sensor will perform the reconditioning function according to the time in minutes defined with **IP10**.

ⓘ **Recommendation**
We recommend to set the **IP08** 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!

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 or OPC-S. The OPA-S may also be used as remote indicator.

Configuration parameters

The parameters are password protected. The parameters can be changed as follows:
1. Press UP and DOWN key simultaneously for three seconds. The display will indicate CODE.
2. Select a password using UP or DOWN keys. Dial **09** in order to get access to the configuration parameters. Press the RIGHT key after selecting the correct password.
3. Once logged in, choose IP for input configuration or OP for output configuration using UP or DOWN. Press the RIGHT key after selection.
4. The parameters are now displayed. The small digits show the parameter number, the large one its value.
5. Select the parameters with the UP/DOWN keys. Change a parameter by pressing the RIGHT key. The MIN and MAX symbols show up and indicate that the parameter may be modified now. Use UP and DOWN key to adjust the value.
6. After you are done, press RIGHT or LEFT key in order to return to the parameter selection level.
7. Press the LEFT key again so as to leave the menu. The unit will return to normal operation if no key is pressed for more than 5 minutes.
8. The parameters and its values depend on the transmitter. Please use the respective datasheet for the list of parameters.

Input configuration

Parameter	Description	Range	Default
IP 00	T1: Celsius or Fahrenheit, C = OFF, F = ON	ON, OFF	OFF
IP 01	T1: Samples taken for averaging control signal	1…255	10
IP 02	T1: Calibration	-10…10	0
IP 03	T1: Minimum temperature	-40…215 °C/F	0 °C
IP 04	T1: Maximum temperature	-40…215 °C/F	50°C
IP 05	H1: Show Percent	ON, OFF	ON
IP 06	H1: Samples taken for averaging control signal	1…255	10
IP 07	H1: Calibration	-10…10%	0
IP 08	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 09	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 10	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%
OP 03	AO2: Temperature: Configuration of output signal: 0 = Feedback temperature input, 1 = Feedback temperature minimum value 2 = Feedback temperature maximum value	0 – 2	0
OP 04	AO2: Temperature: Minimum limitation of output signal	0 – Max %	0%
OP 05	AO2: Temperature: 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, JP2
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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