

# SOC-H1T1 Outdoor Humidity & Temperature Transmitter

## Features

- Replaceable sensor element
- Outdoor humidity and temperature measurement
- Minimum and maximum value memory
- 0...10V, 0...20mA or 2...10V, 4...20mA 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 & Temperature Transmitter

A unique 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 an 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.

The output signal range and type may be customized by jumpers and if required by a programming tool. Standard signal ranges are 0-10VDC, 2-10VDC, 4-20mA and 0-20mA. These ranges can be set by jumpers. Other ranges can be set 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.

## Ordering

In order to receive an operational unit, the signal converter, the sensor element and the conduit connector or cable gland need to be ordered. Optionally a display module and a weather shield may be added.

### Signal converter

Item Name	Item Code	Description/Option
SOC-H1T1	40-30 0067	Signal converter for humidity & temperature sensor
SOC-H1T1-W0	40-30 00xx-0	0   Temperature Range: -40...60°C (-40...140°F) (Default)
SOC-H1T1-W1	40-30 00xx-1	1   Temperature Range: -35...35°C (-31...95°F)
SOC-H1T1-W2	40-30 00xx-2	2   Temperature Range: 0...50°C (32...122°F)
SOC-H1T1-W3	40-30 00xx-3	3   Temperature Range: Special – Specify in order

### Sensor element

Item Name	Item Code	Humidity Accuracy [%rH]	Temperature Accuracy [K] @25°C (77°F)	Description/Option
AES-HT-A2	40-50 0031-2	2%	± 0.5°	Humidity - temperature sensor element
AES-HT-A3	40-50 0031-3	3%	± 0.4°	
AES-HT-A5	40-50 0031-5	4.5%	± 0.3°	

### Accessories

Item Name	Item Code	Description/Option
OPC-S	40-50 0029	Built in display & programming module
OPA-S	40-50 0006	External display module
AMS-1	20-10 0116	Weather shield to protect the sensor element
AMC-1	20-10 0035	Cable gland PG9 for cables Ø 4 – 8 mm (AWG 6 – 1)
AMC-2	20-10 0067	Conduit connector NPT 1/2

## Technical Specification

Power Supply	Operating Voltage	24 V AC 50/60 Hz $\pm$ 10%, 24VDC $\pm$ 10%
	Power Consumption	Max 2 VA
Connection	Terminal Connectors	For wire 0.34...2.5 mm <sup>2</sup> (AWG 24...12)
Sensing Probe	Humidity Sensor:	Capacity sensor element
	Range Measuring Accuracy Hysteresis Repeatability Stability	0...100 % rH See Figure 1 $\pm$ 1% $\pm$ 0.1% < 0.5% / year
Signal Outputs	Temperature Sensor:	Bandgap sensor
	Range Measuring Accuracy Repeatability	-40...70°C (-40...158°F) See Figure 2 $\pm$ 0.1°C, $\pm$ 0.2°F
Environment	Analog Outputs	DC 0-10V or 0...20mA
	Output Signal Resolution Maximum Load	10 Bit, 9.7 mV, 0.019.5 mA 20 mA, 500 $\Omega$
Standards	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
Housing Materials	Product standards Automatic electrical controls for household and similar use Special requirement on temperature dependent controls	EN 61 000-6-1/ EN 61 000-6-3  EN 60 730 -1 EN 60 730 - 2 - 9
	Degree of Protection to EN 60529 Safety Class Cover, back part Filter material	IP63 if correctly mounted with AMS-1 III (IEC 60536) PC+ABS (UL94 class V-0) PTFE coated 1 $\mu$ m pores
General	Dimensions (H x W x D):	150 x 91 x 47mm (5.9" x 3.7" x 1.9")
	Weight (including package)	220g (7.8 oz)

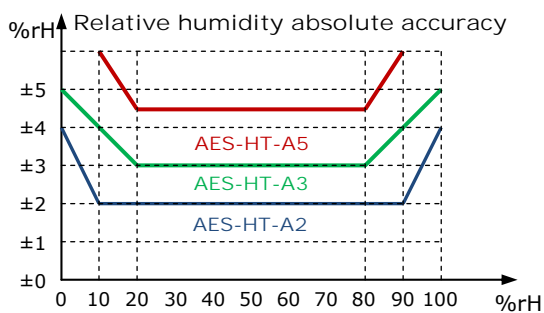


Figure 1: Max RH-tolerance at 25°C (77°F) per sensor type

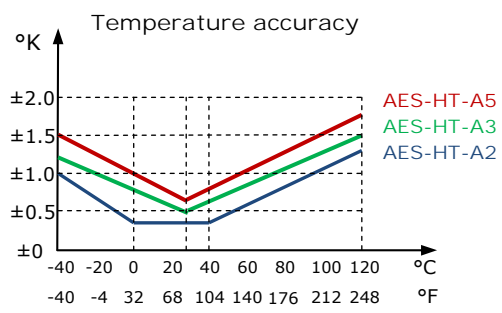
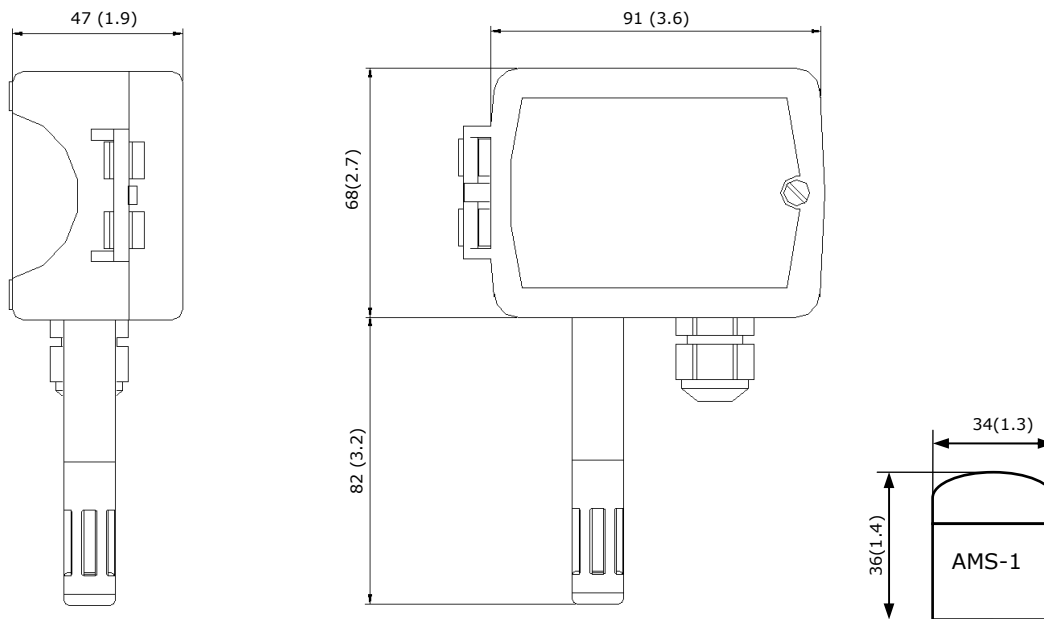


Figure 2: Max T-tolerance by sensor type

Dimensions mm (inch)



### Mechanical design and installation

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

#### Mounting location

The transmitter should be installed, probe facing down, directly on the wall, in a weather protected area. The weather shield accessory is recommended, in case the transmitter is exposed to weather and direct sunlight.

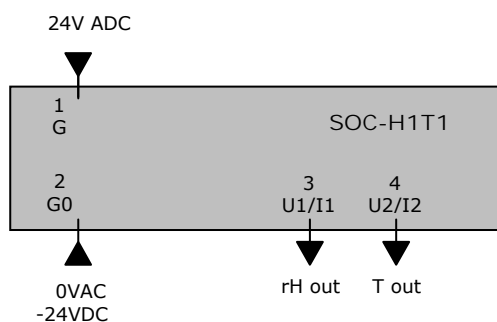
#### Installation

1. Turn the single screw on the cover counterclockwise and remove cover.
2. Mark the location for the mounting holes on the wall.
3. Depending on the wall material, drill two holes for plugs or use self tapping screws.
4. Mount the transmitter flat on a wall in a weather protected area. The probe must face downwards. A weather shield should be added to protect the sensor element from direct water and sun light.
5. Connect the conductors to the terminals according to wiring diagram.
6. While in the open position, slide the two hooks of the cover into the latch at the left side of the back part.
7. Close the front part.
8. Tighten the single screw on the cover clockwise to secure the cover to the back part. There is no need to tighten the screw too much.

#### Installation of the weather shield AMS-1:

1. Unscrew filter cap by turning it counter clockwise
2. Make sure O-ring fits nicely inside small opening of AMS-1 and thread of sensor probe is clean
3. Place AMS-1 over sensor probe with small opening facing upwards
4. Replace filter cap and carefully fix AMS-1 by screwing filter cap on clockwise

#### Connection terminals



- |       |   |
|-------|---|
| 1: G  | Power supply 24VAC, +24VDC  |
| 2: G0 | Power supply 0VAC, -24VDC   |
| 3: U1 | JP1 = 1-2, voltage output of humidity transmitter 0...10V or 2...10V (JP3)      |
| 3: I1 | JP1 = 2-3, current output of humidity transmitter 0...20mA or 4...20mA (JP3)    |
| 4: U2 | JP2 = 1-2, voltage output of temperature transmitter 0...10V or 2...10V (JP3)   |
| 4: I2 | JP2 = 2-3, current output of temperature transmitter 0...20mA or 4...20mA (JP3) |

### Output signal configuration

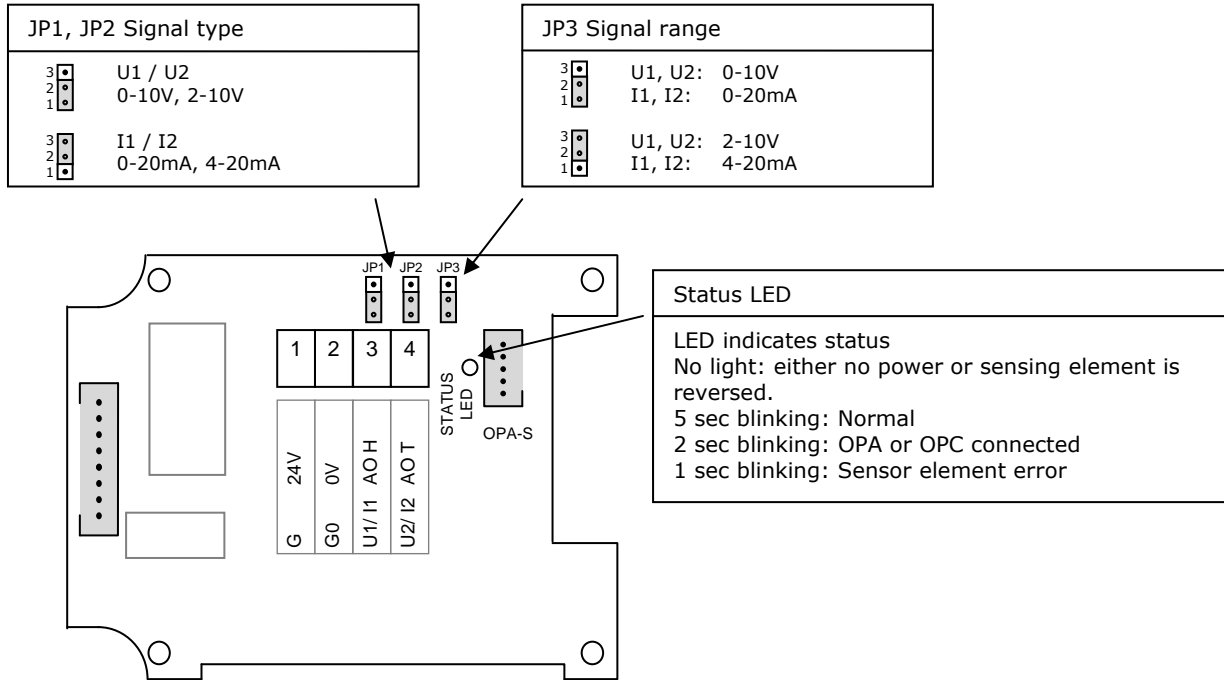
The analog output signal type may be configured with a jumper for 0-10 VDC or 0-20 mA control signals. The jumpers are located next to the terminal connector of each analog output. See table below for jumper placement. The factory setting is to 0-10 VDC.

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 or OP04 and OP05 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



## 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

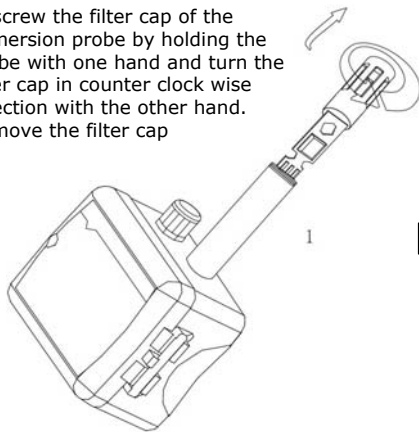
Parameter	Description	Range	Default
IP 00	TI1: Celsius or Fahrenheit, C = OFF, F = ON	ON, OFF	OFF
IP 01	TI1: Samples taken for averaging control signal	1...255	10
IP 02	TI1: Calibration	-10...10	0
IP 03	TI1: Minimum temperature	-40...215 °C/F	0 °C
IP 04	TI1: Maximum temperature	-40...215 °C/F	50°C
IP 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

### Output configuration

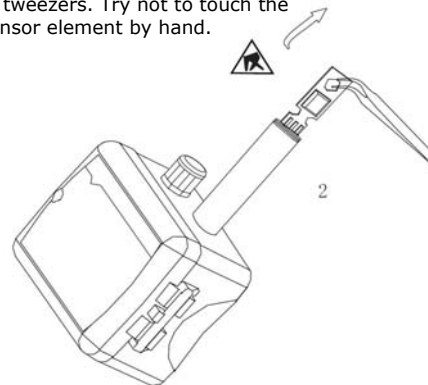
Parameter	Description	Range	Default
OP 00	AO1: Humidity: Configuration of output signal: 0 = Feedback humidity input, 1 = Feedback humidity minimum value 2 = Feedback humidity maximum value	0 - 2	0
OP 01	AO1: Humidity: Minimum limitation of output signal	0 - Max %	0%
OP 02	AO1: Humidity: Maximum limitation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

### Replacing the sensing element

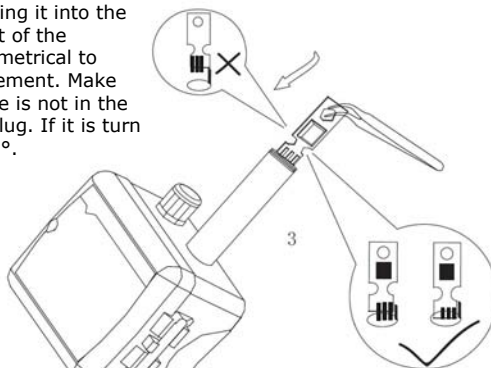
Unscrew the filter cap of the immersion probe by holding the probe with one hand and turn the filter cap in counter clock wise direction with the other hand.  
Remove the filter cap



Remove the sensor by pulling it out of the plug with the help of a pair of tweezers. Try not to touch the sensor element by hand.



Observe orientation of the new sensor before plugging it into the connector. The front of the connector is unsymmetrical to prevent wrong placement. Make sure the black nipple is not in the way of the sensor plug. If it is turn the sensor plug 180°.



Push the new sensor into the plug until a click is felt and there is no air between connector and sensor

Replace the filter cap by placing it over the sensor and turning it in clockwise direction.  
Use reasonable torque to screw on the filter cap.

