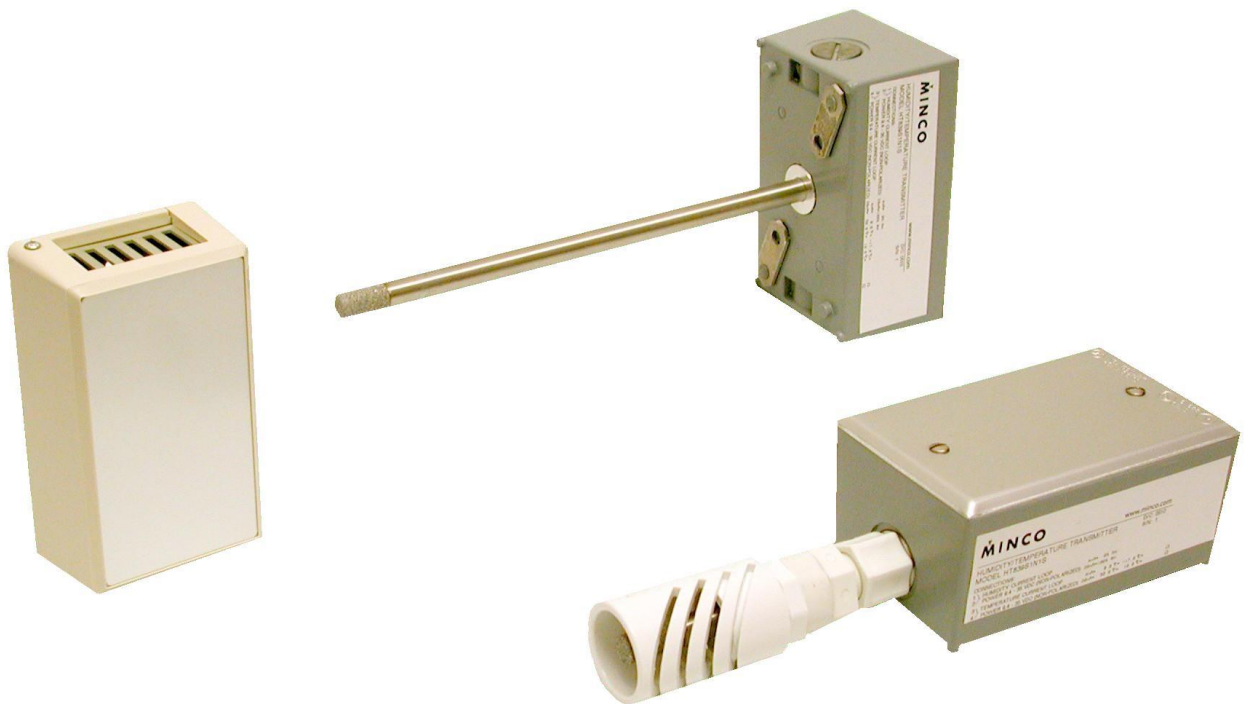




**AH429 Humidity Transmitter
AH439 Humidity and Temperature Transmitter
Installation and Operating Instructions**



Description

Model AH429 is a 2-wire temperature compensated humidity transmitter. The AH439 is the same as the AH429 but also incorporates a temperature transmitter output. The transmitter utilizes a Honeywell HIH series monolithic IC humidity sensor which provides excellent stability and chemical resistivity. The transmitter converts the humidity sensor's signal into a 4 to 20 mA DC current, which changes proportionally from 4 mA at 0% RH to 20 mA at 100% RH. The AH439 has a second 4 to 20 mA DC output where the current changes from 4 mA at the lowest temperature of the range, to 20 mA at the top of the temperature range. The AH439 has 7 field selectable temperature ranges via dip-switches. The leads that supply power also carry the current signal. These transmitters have non-interacting, field adjustable zero and span pots and are available in duct mount, wall mount, outside air (OSA), and space mount configurations.

Specifications

Output(s):	Humidity: 4 to 20 mA DC = 0% to 100% RH. Temperature: 4 to 20 mA DC over specified range (AH439 only).
Sensing Element:	Humidity: Capacitive monolithic IC. Temperature: 1000 ohm platinum; 2 lead RTD.
Ambient Temperature:	
Operating:	Room: -10 to 150°F (-23 to 65°C), non-condensing. Duct/Wall/OSA: -10 to 185°F (-23 to 85°C), non-condensing.
Storage:	Room: -58 to 150°F (-50 to 65°C), non-condensing. Duct/Wall/OSA: -58 to 185°F (-50 to 85°C), non-condensing.
Supply voltage:	9.5 to 35 VDC, non-polarized.
Voltage effect:	.001% of span/volt from 9.5 to 35 VDC.
Loop resistance:	The maximum allowable resistance of the signal-carrying loop, including extension wires and load resistors, is given by this formula: $R_{loopmax} = (V_{supply} - 9.5) / 0.02 \text{ AMPS}$. For example, if supply voltage is 24 VDC, the loop resistance must be less than 725Ω.
Accuracy:	Includes temperature, linearity, hysteresis, repeatability, and voltage effects.
Humidity:	±1% from 10% to 80% RH @ 25 to 35°C or ±2% from 0% to 90% RH @ 25°C. (±3% from 0% to 90% RH @ 15 to 50°C). (±5% from 0% to 90% RH @ 0 to 82°C).
Temperature:	±0.75 of span (AH439 only).
Adjustments:	Zero and Span field adjustments, non-interacting.
Time Constant:	50 seconds in slow moving air.
Connections:	Screw terminals (22-14 AWG wire).
Weight:	Room: 0.19 lb (.084 kg). Duct/Wall/OSA: 1.20 lb (0.55 kg).
Minimum output current:	3.5 mA.
Maximum output current:	23 mA.

Installation Do's and Don'ts

Do:

- Check the label and verify the model number of the unit.
- Confirm the required power and signal wires are available at installation site.
- Avoid electrical interference with other signals by using twisted pair wiring. Do not run signal leads near or parallel to line voltage or other power leads.
- Mount the unit on an interior wall located away from air drafts coming from forced air heating/cooling vents, within the wall and/or the wiring conduit.

Don't:

- Do not touch or manipulate the sensors.
- Do not expose the sensor to direct light during installation. This causes a false reading. Should this occur, shade the sensor. It will self-adjust and yield an accurate reading in less than two minutes.
- Do not expose the sensor or transmitter to static electricity. This device incorporates CMOS components which are vulnerable to damage via static charges.

Mounting

Installation of the AH429 and AH439 consists of mounting the transmitter and connecting it to power.

Space Mounting: Model AH429S... and AH439S...

1. Separate the plastic base plate from the cover.
2. Mount the base plate using two countersink screws to the wall. The long edge to the vertical, observing the directional arrow marked on the base plate.
3. Connect power wires to the transmitter by 2 screw terminals located near the edge of the circuit board (Figure 1). Power supply must not exceed 35 VDC.
4. Re-install cover to base plate.

Duct/Wall/OSA Mounting: Models AH429D... AH429O... AH429W... AH439D... AH439O... and AH439D...

1. For the duct mount model AH429D only, drill ½" hole into sheet metal of duct. (Probe is 3/8" in diameter.)
2. Remove the rubber cap from the end of the probe.
3. Using the fold-out tabs on bottom of housing, mount housing to sheet metal.
4. Remove transmitter cover and connect power wires to the transmitter by 2 screw terminals located near the edge of the circuit board (Figure 2). Power supply must not exceed 35 VDC.
5. Re-install cover.

AH429 Wiring Diagrams

Space Mount

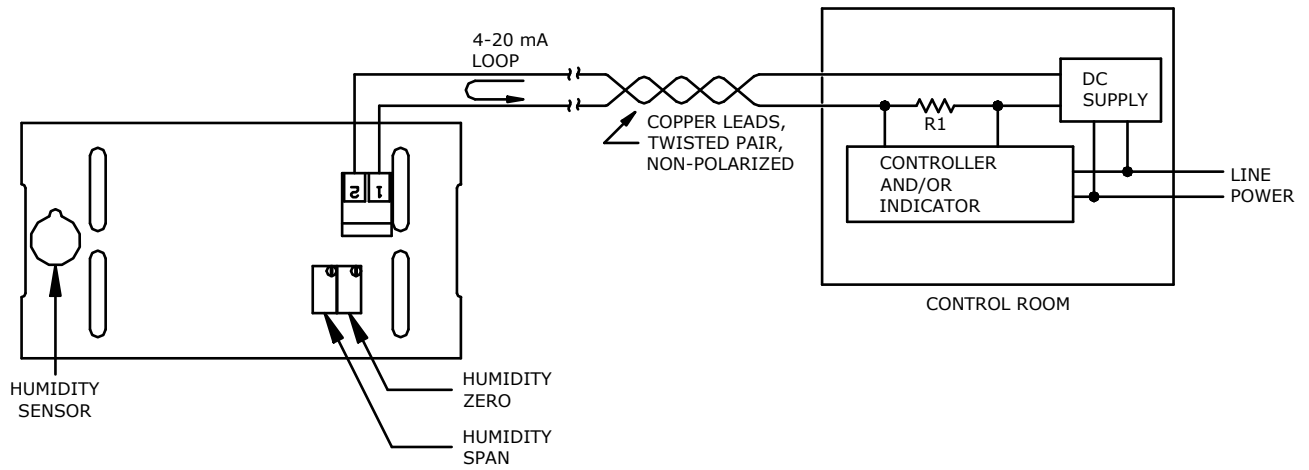


Figure 1

Duct/Wall/OSA Mount

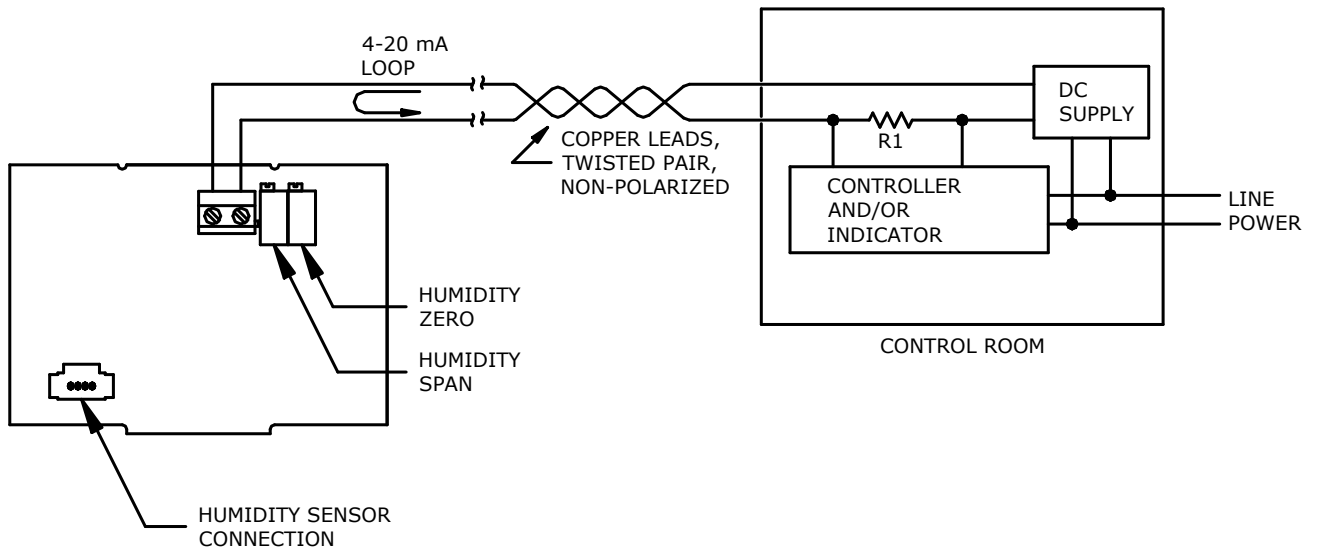


Figure 2

AH439 Wiring Diagrams

Space Mount

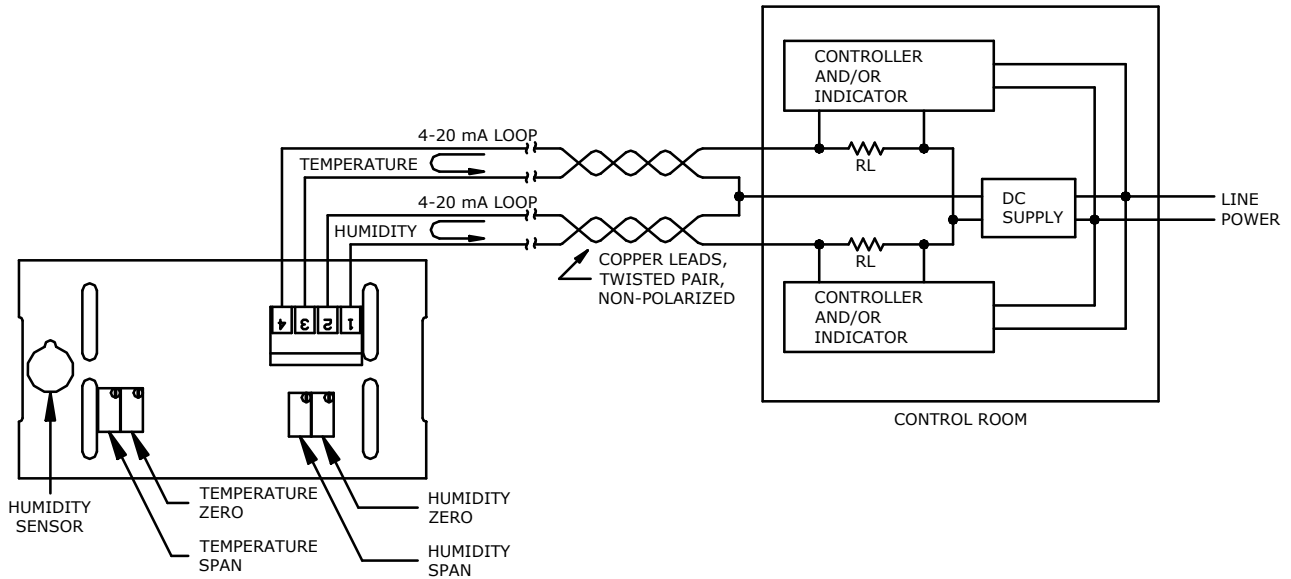


Figure 3

Duct/Wall/OSA Mount

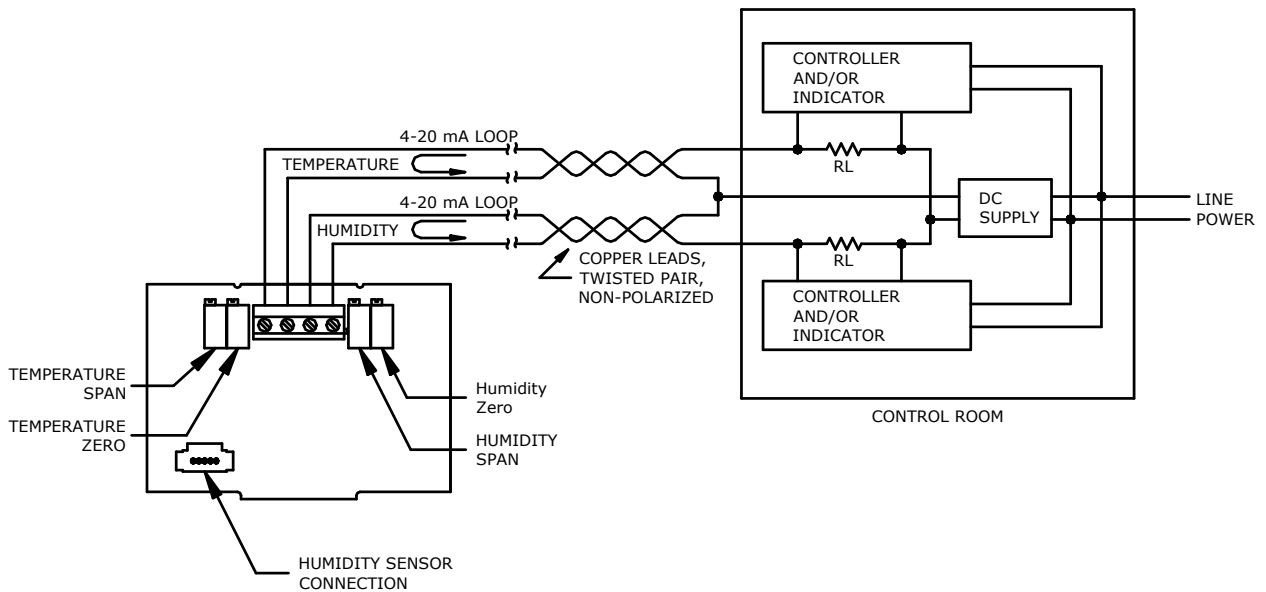


Figure 4

Note: When using a transmitter with both humidity and temperature, both loops must be powered to receive a signal from the transmitter.

Power Supply

DC power supply requirements are determined by the AH429 and AH439's minimum voltage requirement and voltage drop across the load resistor and installation lead wires.

Example: The transmitter requires 9.5 Volts minimum. A typical 250 ohm load resistor drops 5.0 Volts @ 20 mA. Allowing a margin of 0.5 Volts for the supply permits 25 ohms of lead wire resistance for remote installation. Totaling these, we get a minimum power supply requirement of 15.0 VDC.

Using a 24 VDC power supply will take care of nearly all installations, but the AH429 and AH439 will operate at voltages up to 35 VDC.

Humidity Transmitter Calibration

Calibration of the humidity transmitter can be done in a number of ways; comparison to another calibrated RH instrument, using saturated salts, or in a controlled environment using a humidity chamber. The AH429 and AH439 have non-interacting zero and span pots for field calibration.

Comparison method

To compare the calibration of the AH429 or AH439 to another calibrated RH instrument, both sensors should be within 2" to 3" of each other with a fan blowing on both sensors for at least 10 minutes. This will equalize the temperature of both sensors and emulsify the moisture content of the air. If adjustment is needed, adjust the humidity zero (HZ) pot only. Refer to wiring diagrams 1-4 for location of the adjustment pots. Do not adjust the span control.

Saturated Salts

Calibration is accomplished using saturated salt calibration cells as humidity standards. The cells are designed for field use in constant temperature conditions. Various types of cells and their respective relative humidity values are available. The cells must accept a 3/8" diameter probe. If adjustment is needed, and you're performing a single point calibration, adjust the humidity zero (HZ) pot only. For 2 point calibrations, use the humidity zero (HZ) pot to adjust the low humidity calibration point and the humidity span (HS) pot to adjust the high humidity calibration point.

Humidity Chamber

Follow the instructions of the humidity chamber for simulating humidity and temperature under controlled conditions. If adjustment is needed, and you're performing a single point calibration, adjust the humidity zero (HZ) pot only. For 2 point calibrations, use the humidity zero (HZ) pot to adjust the low humidity calibration point and the humidity span (HS) pot to adjust the high humidity calibration point. If the humidity span (HS) pot is adjusted, go back and verify that unit is still within calibration at the low humidity calibration point.

Temperature Transmitter Calibration (AH439 only)

Temperature Chamber/bath

Follow the instructions of the temperature chamber or bath simulating temperature under controlled conditions. If adjustment is needed, and you're performing a single point calibration, adjust the temperature zero (TZ) pot only. For 2 point calibrations, use the temperature zero (TZ) pot to adjust the low temperature calibration point and the temperature span (TS) pot to adjust the high Temperature

calibration point. If the temperature span (TS) pot is adjusted, go back and verify that unit is still within calibration at the low temperature calibration point.

Temperature Transmitter Ranging (AH439 only)

The transmitter is initially calibrated to a specific temperature range as shown on the label attached to the housing. Alternatively, this specific temperature range can be determined by comparing the dip switches on the circuit board with table 1 below. If a different range is desired, configure the dip switches per the table for the desired range. If an adjustment is made, follow the instructions for Temperature Transmitter Calibration found above.

Temperature Range Table			
Dip Switch			
1	2	3	Temperature range
OFF	OFF	OFF	S = 0°F to 100°F
OFF	OFF	ON	EN = -20°F to 140°F
OFF	ON	OFF	A = 20°F to 120°F
OFF	ON	ON	BI = 30°F to 130°F
ON	OFF	OFF	KK = 30°F to 180°F
ON	OFF	ON	N = 32°F to 122°F
ON	ON	OFF	H = 40°F to 90°F

Table 1

Temperature Range Selection

Space Mount Dip-Switch Positions

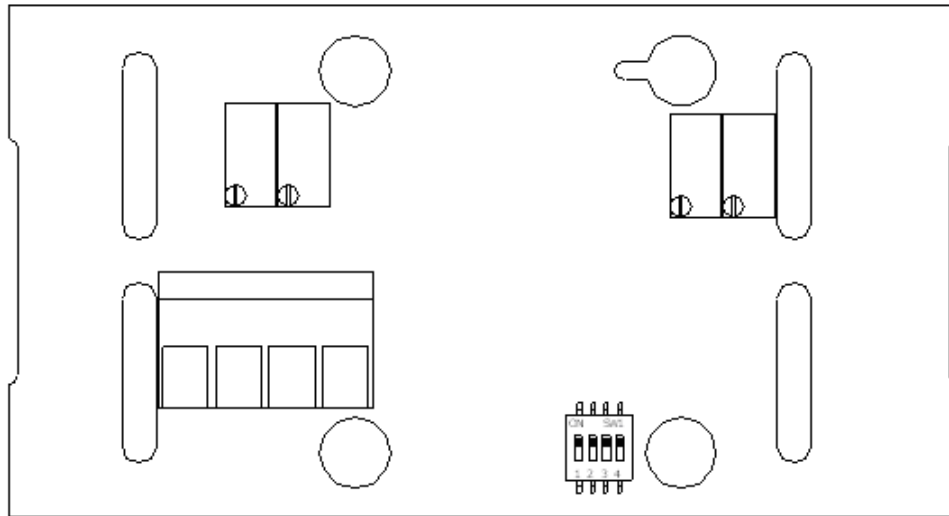


Figure 6

Duct/Wall/OSA Mount Dip-Switch Positions

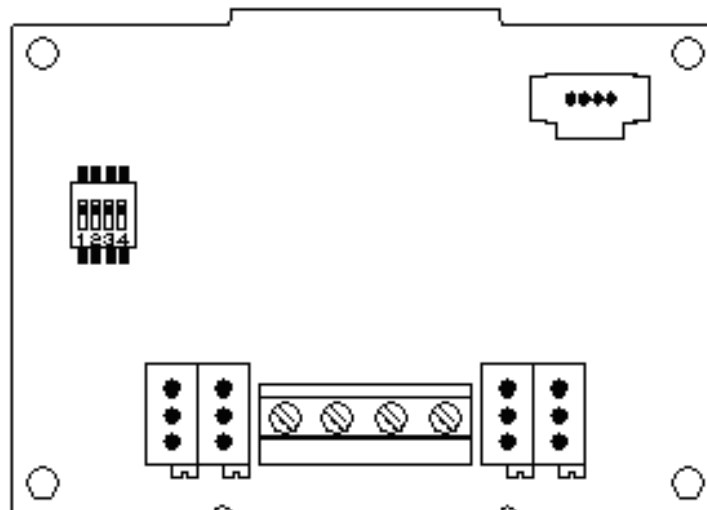


Figure 7

Resistance vs. Temperature for 1000 Ohm Platinum Sensors
PF = 0.00385 ohm/ohm/°C, PW = 0.00375 ohm/ohm/°C

Note: A "PW" sensor is used for temperature compensation on the AH429S... and AH439S models and a "PF" sensor is used for all other models.

Temp. (°F)	Sensor	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
0	PW	932.07	921.42	910.76	900.09	-----	-----	-----	-----	-----	-----
	PF	930.33	919.41	908.49	897.55	-----	-----	-----	-----	-----	-----
Temp. (°F)	Sensor	0	5	10	15	20	25	30	35	40	45
0	PW	932.07	942.71	953.34	963.96	974.57	985.17	995.77	1006.35	1016.92	1027.49
	PF	930.33	941.24	952.14	963.04	973.92	984.79	995.66	1006.51	1017.36	1028.20
50	PW	1038.04	1048.59	1059.12	1069.65	1080.17	1090.68	1101.18	1111.67	1122.15	1132.62
	PF	1039.03	1049.85	1060.66	1071.46	1082.25	1093.04	1103.81	1114.58	1125.34	1136.08
100	PW	1143.08	1153.54	1163.98	1174.41	1184.84	1195.25	1205.66	1216.06	1226.45	1236.82
	PF	1146.82	1157.55	1168.28	1178.99	1189.69	1200.39	1211.07	1221.75	1232.42	1243.08
150	PW	1247.19	1257.55	1267.90	1278.25	1288.58	1298.90	1309.21	1319.52	1329.81	1340.10
	PF	1253.73	1264.37	1275.00	1285.63	1296.24	1306.85	1317.45	1328.03	1338.61	1349.18
200	PW	1350.38	1360.64	1370.90	-----	-----	-----	-----	-----	-----	-----
	PF	1359.74	1370.30	1380.84	-----	-----	-----	-----	-----	-----	-----

Table 2

Warranty

Items returned within one year from the date of sale, transportation prepaid, which Minco Products, Inc. (the "seller") reasonably determines to be faulty by reason of defective materials or faulty workmanship will be replaced or repaired at the seller's discretion, free of charge.

This remedy is to be the sole and exclusive remedy available to the buyer in the event of a breach by the seller. Items that show evidence of mishandling or misapplication may be returned by the seller at the customer's expense.

Furthermore, the seller is not to be held responsible for consequential damages caused by this product except as required under Minnesota Statutes, Section 336.1-719 (3).

This warranty is in lieu of any other expressed warranty or implied warranty of merchantability or fitness for a particular purpose, and of any other obligations or liability of the seller or its employees or agent.

How to Order AH429

AH429	Model Number: AH429 – Humidity Transmitter
D	Enclosure: D = Duct mount, 8" probe length O = Outside Air/Wall mount, 4" probe length with shield, weather resistant enclosure S = Space mount W = Wall mount, 4" probe length, weather resistant enclosure
1	Output: 4 to 20 mA DC
N10	Calibration Accuracy: (Humidity Transmitter) N10 = ±1% from 10% to 80% (25 to 35°C) with NIST certificate N20 = ±2% from 0% to 90% (25°C) with NIST certificate S20 = ±2% from 0% to 90% (25°C)
T1	Sensing Element Cover (omitted on "S" space mount models) T0 = Sintered stainless steel; pressed on cover T1 = Sintered stainless steel; screw on cover T2 = Slotted stainless steel; screw on cover (not available on "O" outside air models)
AH429D1N10T1 ← Sample part number	

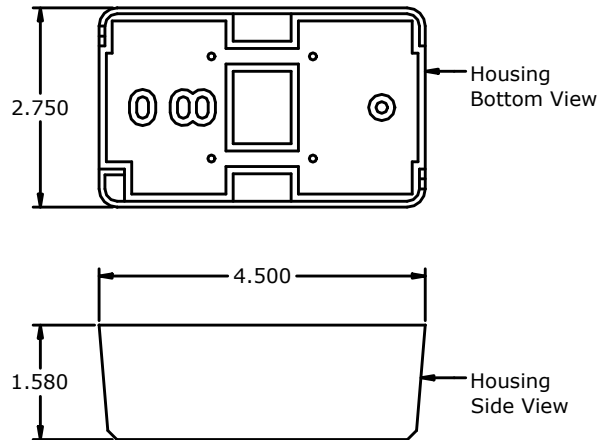
How to Order AH439

AH439	Model Number: AH439 – Dual Humidity and Temperature Transmitter
D	Enclosure: D = Duct mount, 8" probe length O = Outside Air/Wall mount, 4" probe length with shield, weather resistant enclosure S = Space mount W = Wall mount, 4" probe length, weather resistant enclosure
1	Output: 4 to 20 mA DC
N10	Calibration Accuracy: (Humidity Transmitter) N10 = ±1% from 10% to 80% (25 to 35°C) with NIST certificate N20 = ±2% from 0% to 90% (25°C) with NIST certificate S20 = ±2% from 0% to 90% (25°C)
S	Temperature Transmitter range: EN = -20°F to 140°F S = 0°F to 100°F A = 20°F to 120°F BI = 30°F to 130°F KK = 30°F to 180°F N = 32°F to 122°F

T1	H = 40°F to 90°F Consult factory for other possible ranges.
	Sensing Element Cover (omitted on "S" space mount models) T0 = Sintered stainless steel; pressed on cover T1 = Sintered stainless steel; screw on cover T2 = Slotted stainless steel; screw on cover (not available on "O" outside air models)
AH439D1N10ST1 ← Sample part number	

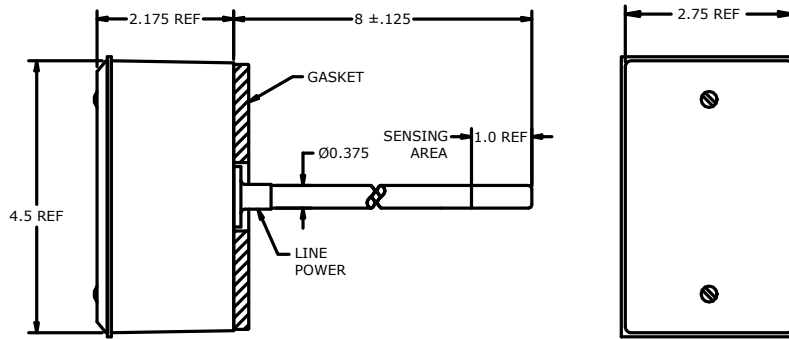
Dimensions

Space Mount

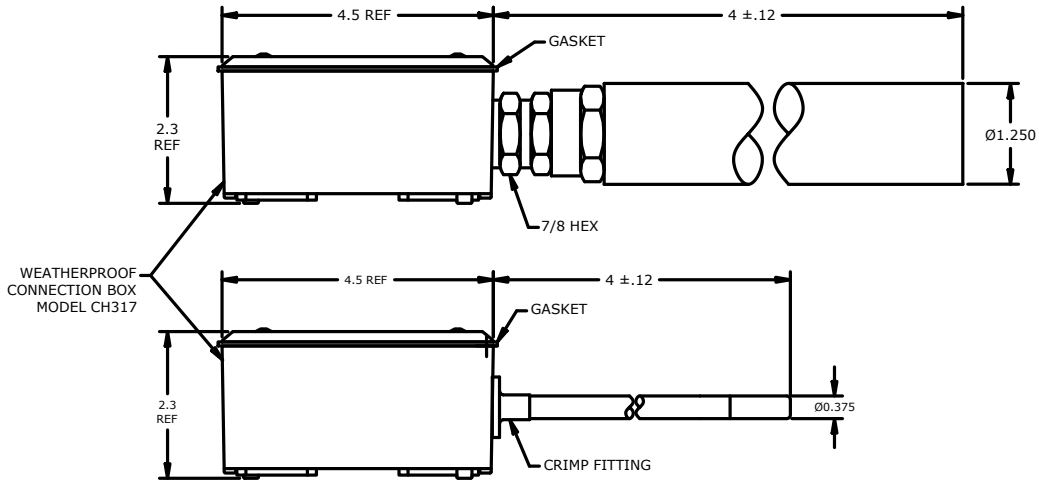


Duct, Wall, and Outside Air Mount

Duct



OSA



Wall

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Fax: 1.763.571.0927

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