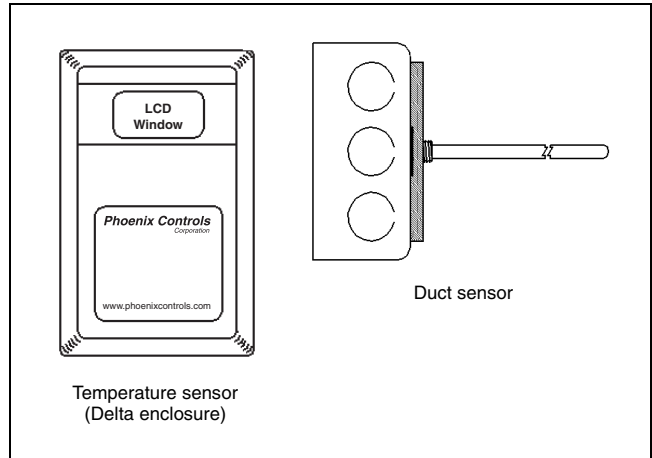
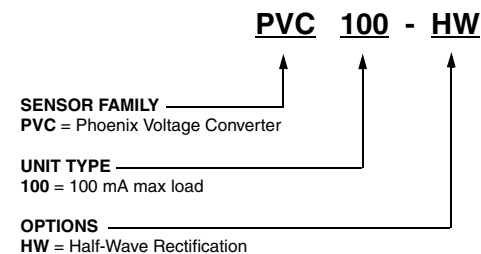
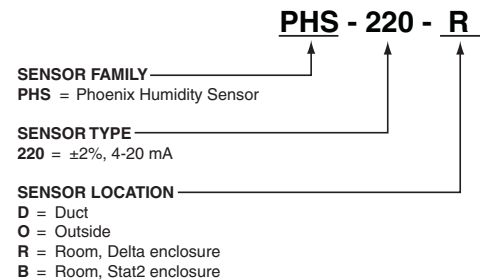
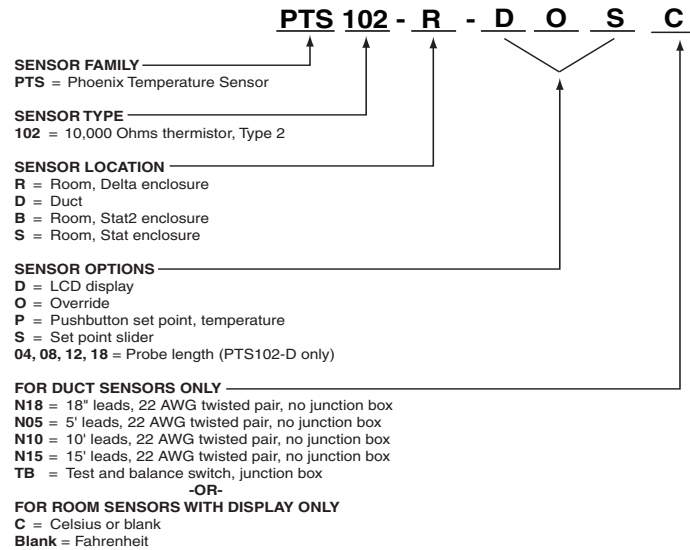


Phoenix Controls temperature and humidity sensors provide a stable, secure environment for those facilities that need it the most, such as hospitals, cleanrooms, and laboratory animal facilities. These sensors also simplify room balancing by eliminating the need for a certified person to accompany the balancer during the commissioning process.

- Teflon-insulated wires ensure resistance to moisture, corrosive elements and abrasion.
- A three-position test and balance (T&B) switch in all room sensors allows for overrides into full heating or cooling modes, as well as for normal operation (optional for duct temperature models).
- A 3.5-mm communications jack is standard for all room models.



ORDERING GUIDES



NOTE: The Voltage Converter is required for display or humidity sensors.

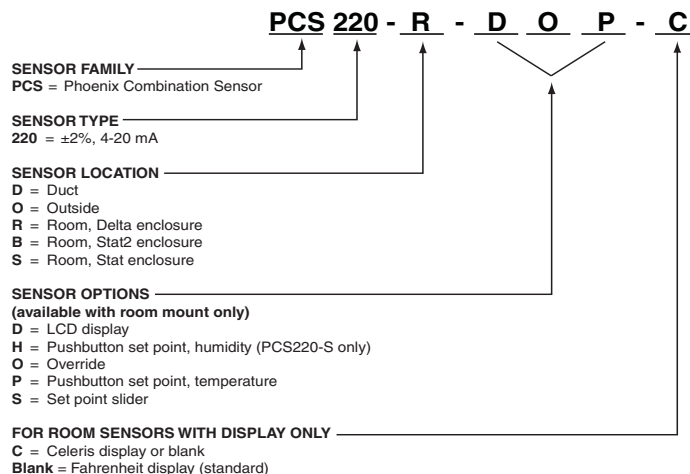


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SPECIFICATIONS

	Temperature		Humidity and Combination		
	Room	Duct	Room	Duct	Outside
Signal	10 K, Type 2 thermistor	10 K, Type 2 thermistor	4 to 20 mA (output)	4 to 20 mA (output)	4 to 20 mA (output)
Supply Voltage	5 to 25 Vdc (LCD only)		15 to 24 Vdc (current or voltage output)		
Power Consumption	≤ 0.2 VA		≤ 1.1 VA		
Operating Temperature Range	-67 to 302 °F (-55 to 150 °C)	-67 to 302 °F (-55 to 150 °C)	32 to 158 °F (0 to 70 °C)	-10 to 160 °F (-23 to 71 °C)	-10 to 160 °F (-23 to 71 °C)
Environmental Temperature Range	32 to 122 °F (0 to 50 °C)	-40 to 212 °F (-40 to 100 °C)	32 to 122 °F (0 to 50 °C)	-22 to 150 °F (-30 to 70 °C)	-22 to 158 °F (-30 to 70 °C)
Environmental Humidity Range	0 to 95% RH (non-condensing)	0 to 100% RH (non-condensing)	0 to 95% RH (non-condensing)	0 to 100% RH	0 to 100% RH
Housing Material	ABS plastic	Steel	ABS plastic	Weatherproof–Cast Aluminum	Weatherproof–Cast Aluminum
Accuracy	±0.2 °C (0 to 70 °C)	±0.2 °C (0 to 70 °C)	±2% from 15 to 95% RH @ 25 °C	±2% from 15 to 95% RH @ 25 °C	±2% from 15 to 95% RH @ 25 °C
Dissipation Constant	3 mW/C	3 mW/C			
Stability	< 0.02 °C/year	< 0.02 °C/year			
Reference Resistance	10 kΩ @ 25 °C	10 kΩ @ 25 °C			
Sensing Element	Thermistor	Thermistor	Impedance Type Humidity Sensor		
Response Time			20 seconds for a 63% step	20 seconds for a 63% step	

FEATURES AND APPLICATIONS

Temperature Sensors

Room Sensors

Phoenix Controls offers three types of room-mounted temperature sensors. Each sensor incorporates a 10 k Ω thermistor that has an accuracy of ± 0.2 °C.

These options are available on room-mounted sensors:

- Delta, Stat2 or Stat enclosures. The Stat enclosure can be used in wipedown applications.
- An LCD display is optional and offers readings to the tenth degree.
- An override switch can be incorporated that allows the user to temporarily override the temperature set point. The override signal is in parallel with the sensor output, except for the Stat enclosures, where the override is a separate output.
- Temperature set point adjustment is available in either a pushbutton or slider configuration.
 - Pushbutton operation allows the user to see a change in the set point on the display.
 - A set point slider offers a warm/cool scale and its setting is not indicated on the display.

Duct Sensors

Duct-mounted temperature sensors are available with varying probe lengths from 4-12". These probes are stainless steel and come standard with medical-grade foam padding to seal the probe insertion hole and absorb vibrations.

Humidity and Combination Sensors

All humidity sensors employ an impedance type, $\pm 2\%$ accuracy sensing element. All combination sensors also incorporate a 10 k Ω thermistor.

Room Sensors

All room humidity units incorporate a integral filter, which is unaffected by volatile organic compounds or surface contamination.

These options are available on room-mounted sensors:

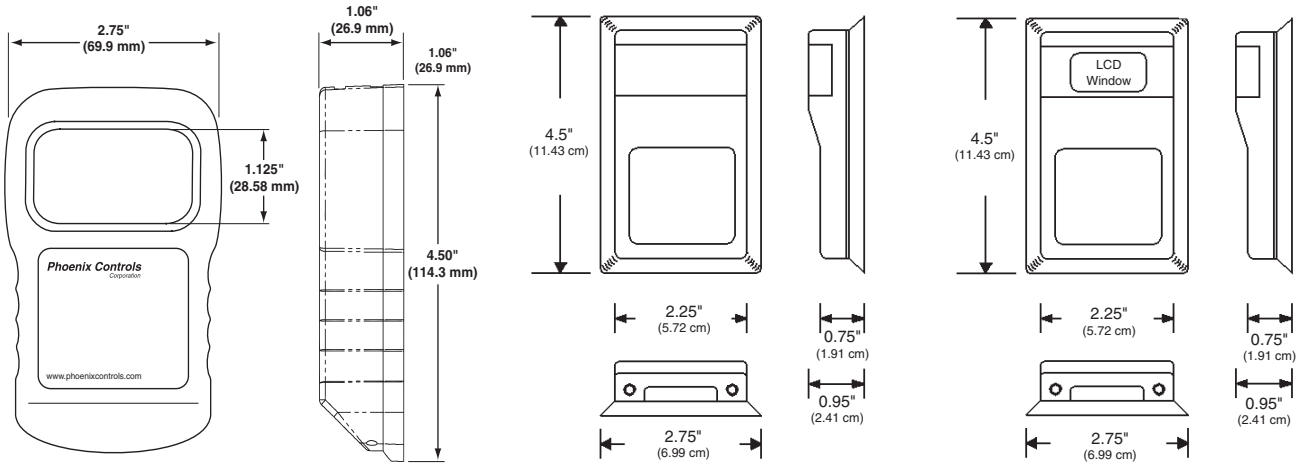
- Delta, Stat2 or Stat enclosures. The Stat enclosure can be used in wipedown applications.
- An LCD display is optional and offers readings to the tenth degree.
- An override switch can be incorporated that allows the user to temporarily override the set point. The override signal is in parallel with the sensor output, except for the Stat enclosures, where the override is a separate output.
- Humidity set point adjustment is available as pushbutton configuration for the Stat enclosure only.
 - Pushbutton operation allows the user to see a change in the set point on the display.
 - A set point slider offers a warm/cool scale and its setting is not indicated on the display.

Duct and Outside Sensors

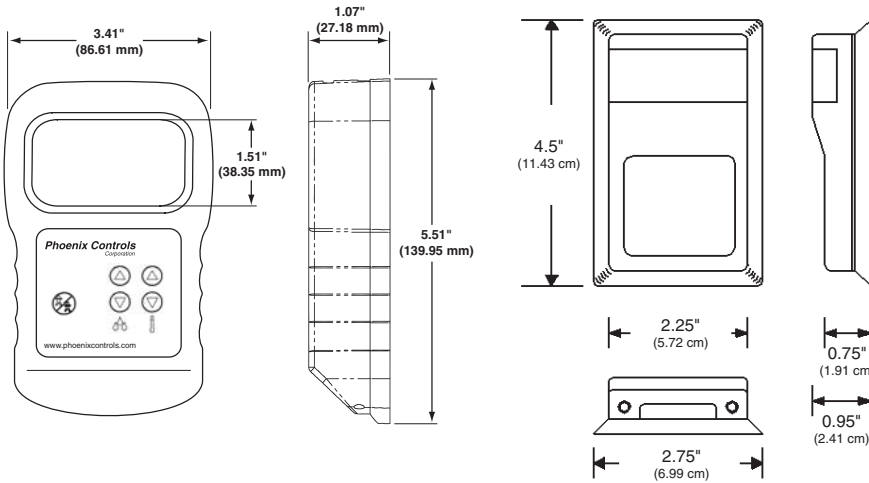
Duct and outside-mounted sensors are enclosed in a weatherproof, cast aluminum enclosure. Furthermore, the transmitter has been ruggedized and is suitable for locations where moisture or condensation may be a problem. A sintered bronze filter is built in, and can be cleaned and replaced if heavy dirt build-up occurs.

DIMENSIONS

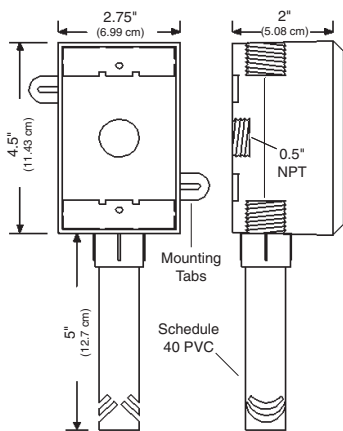
Temperature Sensors *(Stat2 enclosure shown on left; Delta enclosure in center and on right)*



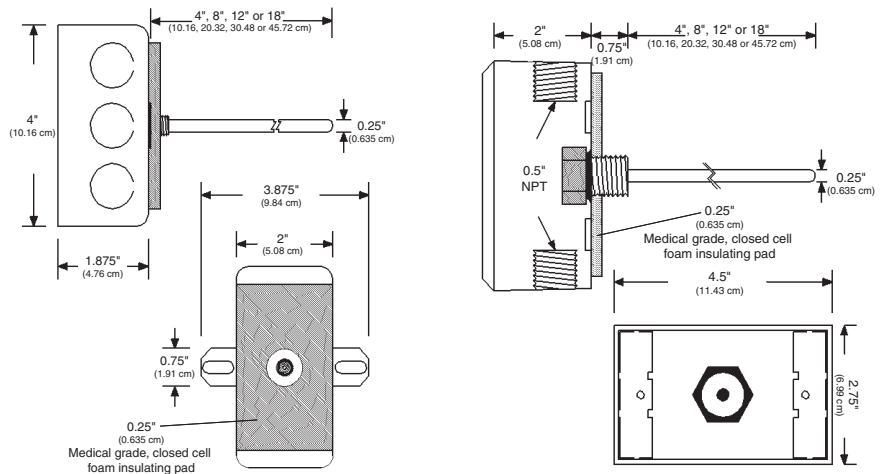
Humidity Sensors *(Stat enclosure shown on left; Delta enclosure on right)*



Outside Sensors



Duct Sensors *(duct unit shown on left; duct waterproof on right)*



INSTALLATION

NOTE: Detailed installation instructions can be found in the literature that accompanies shipment of the selected unit.

Temperature, Humidity and Combination Sensors

Room Sensors (Delta, Stat2 and Stat enclosures)

Please note that the temperature differences of the air within the wall and the room can cause erroneous readings. Also, the temperature difference can cause condensation on the sensor. To prevent these conditions, seal the conduit leading to the junction box and seal the hole in the drywall by using an adhesive-backed, foam-insulating pad.

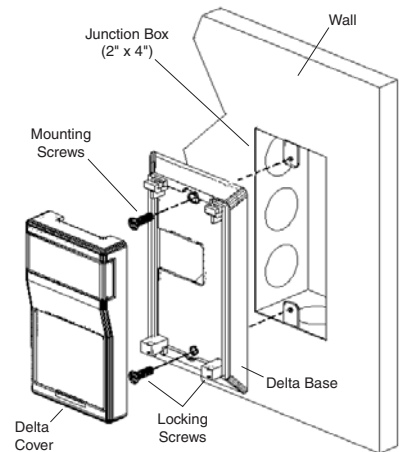
Physical Installation

Required materials:

Mounting hardware is provided for junction box and drywall installations.

Installation steps:

1. Pull the wires through the wireway hole in the baseplate.
2. For junction box installation, secure the base to the box using the #6-32 x 1/2" mounting screws provided.
3. For drywall installation, drill two 3/16" holes 3.275" apart on the center. Insert the drywall anchors and secure the base using the #6 x 1" sheet metal screws provided.
4. Terminate the unit following the instructions provided.
5. Attach the cover by latching it to the top of the base, rotating the cover down, and snapping it into place.
6. Secure the cover by backing out the lock down screws using a 1/16" allen wrench until they are flush with the bottom of the cover.



Duct Sensors

Please note that it is strongly suggested to seal the conduit leading to the weatherproof junction box to eliminate erroneous readings and condensation.

Physical Installation

Required materials:

- Sheet metal screws for mounting to the duct (provided by others)

Installation steps:

1. Drill a 1" hole in the duct for the probe.
2. Attach the unit to the duct using the screws provided.
3. Before sealing the cover, the unit must be wired properly. (Please see electrical instructions.)

INSTALLATION (CONTINUED)

Outside Sensors

Please note that it is strongly suggested to seal the conduit leading to the weatherproof junction box to eliminate erroneous readings and condensation.

Physical Installation

Required materials:

- Mounting hardware is provided with the weatherproof box.

Installation steps:

1. Drill a hole large enough for the sensor cable to pass through the mounting surface. Please note that outside-mounted sensors cannot be mounted in direct sunlight and must be mounted with the probe facing down.
2. Mount the unit to the surface with the wiring knock-out centered over the mounting hole.
3. Before sealing the cover, the unit must be wired properly.

Electrical Installation (all models)

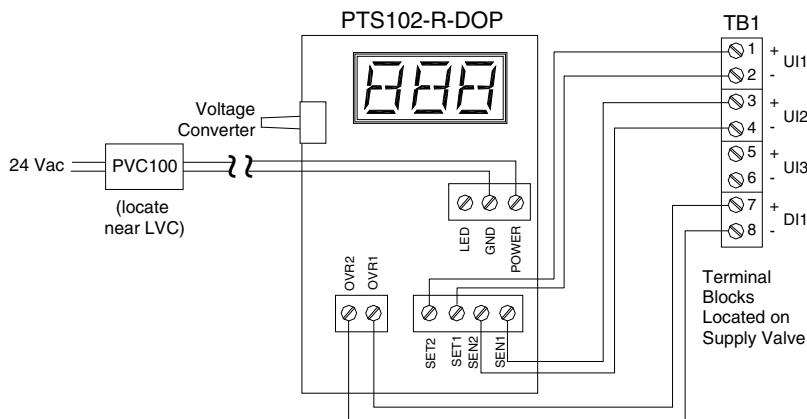
Phoenix Controls recommends using twisted-pair cable of at least 22 AWG and sealant-filled connectors for all wire connections. Larger gauge wire may be required for long runs. All wiring must comply with the National Electric Code (NEC) and local codes. Do not run this device's wiring in the same conduit as AC power wiring of NEC classes 1, 2 and 3, and with wiring used to supply highly inductive loads, such as motors, contactors and relays. Test show that fluctuating and inaccurate signal levels are possible when AC power wiring is present in the same conduit as the signal lines. If you are experiencing any of these difficulties, please contact your Phoenix Controls representative.

NOTE: Please see termination instructions provided with shipment of the product.

POINTS AND WIRING (see submittal wiring diagram for project-specific details)

Temperature Sensor with Communication Jack, Pushbutton Set Point, LCD Display and Override

(typical; see note 2)

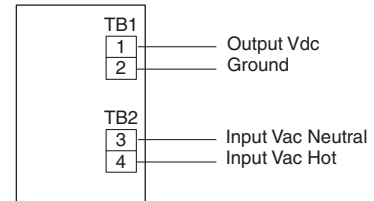


NOTES:

1. The PTS102-R-DOP configuration shown above represents the most complete version of the temperature sensors. All others are lesser derivatives.
2. The wiring diagram above is an example only. The model-specific wiring diagram is included in the packaging from the factory.

Voltage Converter

PVC100



Test and Balance (T&B) Switch

Optional: Test and Balance Switch (S2)

- High:** Will set the sensor value at 5.11 K = (-106 °F)
- Normal:** Thermistor will operate normally
- Low:** Will set the sensor value at 26.7 K = (-40 °F)

MAINTENANCE

Phoenix Controls sensors require no ongoing preventative maintenance. Once the field engineer has completed the field setup, these units will provide years of continuous operation.

TROUBLESHOOTING

Temperature Sensors

Room Sensors

Problem	Possible Cause/Solution
1. The controller reports a higher than actual temperature.	<ul style="list-style-type: none">A. Confirm that the input is set up correctly in the front-end software.B. Verify that the wires are not physically shorted.C. Check wiring for proper termination.D. Verify that the sensor output is correct.E. Verify that the sensor output is correct from (J2) pin 1 to pin 2.F. Determine whether the sensor that is exposed to an external source is different from the room environment (conduit draft).
2. The controller reports a lower than actual temperature.	<ul style="list-style-type: none">A. Confirm that the input is set up correctly in the front-end software.B. Verify that the thermistor is not physically open.C. Check wiring for proper termination.D. Verify that the sensor output is correct.E. Verify that the sensor output is correct from (J2) pin 1 to pin 2.F. Determine whether the sensor that is exposed to an external source is different from the room environment (conduit draft).
3. The set point is not working correctly.	<ul style="list-style-type: none">A. Verify that the set point output is correct from (J2) pin 5 to pin 6.B. Verify that J4 and J5 are set up correctly.C. Check wiring for proper termination.
4. The override is not working correctly.	<ul style="list-style-type: none">A. Verify that the output from (J2) pin 3 to pin 4 is less than 50 ohms when S1 is used.B. Check wiring for proper termination.

Duct and Outside Sensors

Problem	Possible Cause/Solution
1. The controller reports a higher than actual temperature.	<ul style="list-style-type: none">A. Confirm that the input is set up correctly in the front-end software.B. Verify that the wires are not physically shorted or open.C. Check wiring for proper termination.D. Disconnect wires and measure sensor resistance with an Ohm meter.E. Verify that the sensor output is correct (see note below).
2. The controller reports a lower than actual temperature.	<ul style="list-style-type: none">A. Confirm that the input is set up correctly in the front-end software.B. Verify that the thermistor is not physically open or shorted.C. Check wiring for proper termination.D. Disconnect wires and measure sensor resistance with an Ohm meter.E. Verify that the sensor output is correct (see note below).

NOTE: Measure the temperature at the temperature sensor's location using an accurate temperature standard. Disconnect the temperature sensor wires and measure the temperature sensor's resistance with an Ohm meter. Compare the temperature sensor's resistance to the Thermistor Output Table on page 10. If the measured resistance is different from the temperature table by more than 5%, call the Phoenix Controls Product Support Center.

TROUBLESHOOTING (CONTINUED)

Humidity Sensors

Problem	Possible Cause/Solution
1. The unit will not operate; the display is not working.	A. Check power supply/controller voltage supply. B. Disconnect sensor and check power wires for +15 to +24 Vdc power to the sensor.
2. The humidity reading is maximum 20 mA or 100%.	Make sure the sensor is installed properly and is not shorted. Quick Check: Remove sensor. The readings should change toward 0%.
3. The humidity reading is minimum 4 mA or 0%.	Verify that the humidity sensor is installed. Quick Check: Short the sensor terminal block with a wire. The readings should change toward 100%.
4. The humidity reading in the software appears to be off more than specified accuracy.	A. Check all software parameters. B. If available, check the sensor against a calibrated control such as a hygrometer. C. Check the 4 to 20 mA loop against the 0 to +5 Vdc output to verify the output signal is the same (requires 2 digital multimeters). D. Determine if the sensor is exposed to an external source different from the room environment (conduit draft).
5. The display will not toggle between temperature and humidity.	Check "Toggle Rate Adjustment" pot on the back of the sensor, and make sure the adjustment is correct according to the diagram below. <div style="border: 1px solid black; padding: 10px; width: fit-content; margin: 10px auto;"> <p style="text-align: center;">Toggle Rate Adjustment (for display units only)</p> <p style="text-align: center;">The pointer indicates the approximate toggle rate or the value that is displayed constantly.</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Markings:</p> <p>3 10 20 T H</p> <p>Display cycle in seconds</p> </div> <div style="text-align: center;"> <p>Settings:</p> <p>10-second cycle </p> <p>Temperature only </p> <p>Humidity only </p> </div> </div> </div>

Output	Humidity Formula
0-5 Vdc	% RH = V/0.05

Output Tables

Thermistor Output Table (all temperature and combination models)

°F	°C	Ohms	°F	°C	Ohms	°F	°C	Ohms
-39	-39.44	323,839	37	2.78	28,365	113	45.00	4,367
-37	-38.33	300,974	39	3.89	26,834	115	46.11	4,182
-35	-37.22	279,880	41	5.00	25,395	117	47.22	4,006
-33	-36.11	260,410	43	6.11	24,042	119	48.33	3,838
-31	-35.00	242,427	45	7.22	22,770	121	49.44	3,679
-29	-33.89	225,809	47	8.33	21,573	123	50.56	3,525
-27	-32.78	210,443	49	9.44	20,446	125	51.67	3,380
-25	-31.67	196,227	51	10.56	19,376	127	52.78	3,242
-23	-30.56	183,068	53	11.67	18,378	129	53.89	3,111
-21	-29.44	170,775	55	12.78	17,437	131	55.00	2,985
-19	-28.33	159,488	57	13.89	16,550	133	56.11	2,865
-17	-27.22	149,024	59	15.00	15,714	135	57.22	2,751
-15	-26.11	139,316	61	16.11	14,925	137	58.33	2,642
-13	-25.00	130,306	63	17.22	14,180	139	59.44	2,538
-11	-23.89	121,939	65	18.33	13,478	141	60.56	2,438
-9	-22.78	114,165	67	19.44	12,814	143	61.67	2,343
-7	-21.67	106,939	69	20.56	12,182	145	62.78	2,252
-5	-20.56	100,218	71	21.67	11,590	147	63.89	2,165
-3	-19.44	93,909	73	22.78	11,030	149	65.00	2,082
-1	-18.33	88,090	75	23.89	10,501	151	66.11	2,003
1	-17.22	82,670	77	25.00	10,000	153	67.22	1,927
3	-16.11	77,620	79	26.11	9,526	155	68.33	1,855
5	-15.00	72,911	81	27.22	9,078	157	69.44	1,785
7	-13.89	68,518	83	28.33	8,653	159	70.56	1,718
9	-12.78	64,419	85	29.44	8,251	161	71.67	1,655
11	-11.67	60,592	87	30.56	7,866	163	72.78	1,594
13	-10.56	57,017	89	31.67	7,505	165	73.89	1,536
15	-9.44	53,647	91	32.78	7,163	167	75.00	1,480
17	-8.33	50,526	93	33.89	6,838	169	76.11	1,427
19	-7.22	47,606	95	35.00	6,530	171	77.22	1,375
21	-6.11	44,874	97	36.11	6,238	173	78.33	1,326
23	-5.00	42,317	99	37.22	5,960	175	79.44	1,279
25	-3.89	39,921	101	38.33	5,697	177	80.56	1,234
27	-2.78	37,676	103	39.44	5,447	179	81.67	1,190
29	-1.67	35,573	105	40.56	5,207	181	82.78	1,149
31	-0.56	33,599	107	41.67	4,981	183	83.89	1,109
33	0.56	31,732	109	42.78	4,766	185	85.00	1,070
35	1.67	29,996	111	43.89	4,561	187	86.11	1,034

**Humidity Transmitter Output Table
(all humidity and combination models)**

%RH	mA	5V	%RH	mA	5V
0	4.00	0.00	50	12.00	2.50
1	4.16	0.05	51	12.16	2.55
2	4.32	0.10	52	12.32	2.60
3	4.48	0.15	53	12.48	2.65
4	4.64	0.20	54	12.64	2.70
5	4.80	0.25	55	12.80	2.75
6	4.96	0.30	56	12.96	2.80
7	5.12	0.35	57	13.12	2.85
8	5.28	0.40	58	13.28	2.90
9	5.44	0.45	59	13.44	2.95
10	5.60	0.50	60	13.60	3.00
11	5.76	0.55	61	13.76	3.05
12	5.92	0.60	62	13.92	3.10
13	6.08	0.65	63	14.08	3.15
14	6.24	0.70	64	14.24	3.20
15	6.40	0.75	65	14.40	3.25
16	6.56	0.80	66	14.56	3.30
17	6.72	0.85	67	14.72	3.35
18	6.88	0.90	68	14.88	3.40
19	7.04	0.95	69	15.04	3.45
20	7.20	1.00	70	15.20	3.50
21	7.36	1.05	71	15.36	3.55
22	7.52	1.10	72	15.52	3.60
23	7.68	1.15	73	15.68	3.65
24	7.84	1.20	74	15.84	3.70
25	8.00	1.25	75	16.00	3.75
26	8.16	1.30	76	16.16	3.80
27	8.32	1.35	77	16.32	3.85
28	8.48	1.40	78	16.48	3.90
29	8.64	1.45	79	16.64	3.95
30	8.80	1.50	80	16.80	4.00
31	8.96	1.55	81	16.96	4.05
32	9.12	1.60	82	17.12	4.10
33	9.28	1.65	83	17.28	4.15
34	9.44	1.70	84	17.44	4.20
35	9.60	1.75	85	17.60	4.25
36	9.76	1.80	86	17.76	4.30
37	9.92	1.85	87	17.92	4.35
38	10.08	1.90	88	18.08	4.40
39	10.24	1.95	89	18.24	4.45
40	10.40	2.00	90	18.40	4.50
41	10.56	2.05	91	18.56	4.55
42	10.72	2.10	92	18.72	4.60
43	10.88	2.15	93	18.88	4.65
44	11.04	2.20	94	19.04	4.70
45	11.20	2.25	95	19.20	4.75
46	11.36	2.30	96	19.36	4.80
47	11.52	2.35	97	19.52	4.85
48	11.68	2.40	98	19.68	4.90
49	11.84	2.45	99	19.84	4.95
			100	20.00	5.00