

Phoenix Controls wall plate combination temperature and humidity sensor provides a stable, secure environment for facilities that need it the most, such as hospitals, cleanrooms, biocontainment laboratories and vivariums. This sensor is suitable for locations requiring wipedown, washdown or gaseous decontamination, or where flush mount installation is desired.

- Stainless steel, watertight wall plate unit
- Flush mount design
- ±2% relative humidity (RH) accuracy
- Full-range temperature compensation of RH signal
- Choice of humidity outputs (0-10 Vdc or 4-20 mA)

**FEATURES AND APPLICATIONS**

**Wall Plate Combination Sensor**

The Phoenix Controls Wall Plate Combination Sensor measures the room temperature and humidity and transmits the data to an analog output module through wired RS-485 communications. The sensors and transmitter are mounted on a single gang 304 stainless steel wall plate.

The data transmit rate between the wall plate and the output modules is approximately once every 10 seconds. Each wall plate has a unique address with built-in error detection. Each variable sent by the wall plate is picked up and converted by a Phoenix Controls output module to a voltage, current or resistance signal, which is sent to the controller.

**Power Supply**

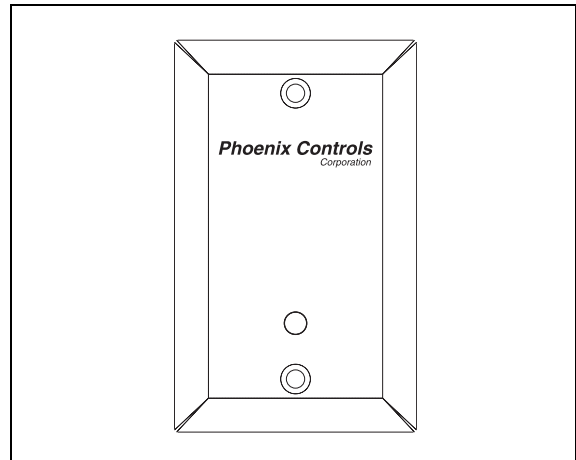
The Wall Plate Power Supply (PSA100-VPS) provides the power to the wall plate units as well as to the analog output modules. The power supply receives the temperature and humidity data from the wall plate through an RS485 bus. One power supply can support up to 15 different wall plate units wired in parallel and up to 30 different output modules, connector to connector or with RS-485 cable. The power supply is surface or snaptrack mountable.

**Output Modules**

The Analog Output Modules convert the temperature or humidity data from the wall plate into a resistance, voltage, or current signal for the Celeris valve controller (LVC).

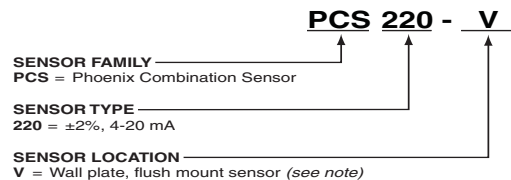
The output modules are connected to a wall plate power supply and receive the temperature or humidity data through an RS485 bus. Up to 30 different output modules can be connected to a single power supply; therefore, one power supply can power up to 15 different wall plates. Each output module is easily trained to a specific wall plate signal with a pushbutton and LED; the modules and wall plates remain trained to one another through power cycling. The modules are surface or snaptrack mountable.

One temperature (resistive) output module and one humidity (either current or voltage) output module are required for each wall plate.

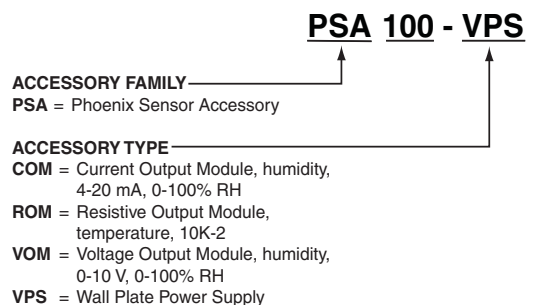


Wall plate combination temperature and humidity sensor.

**ORDERING GUIDES**



**NOTE:**  
Wall plate sensor requires a PSA100-VPS, PSA100-VOM, and either a PSA100-COM or -ROM.

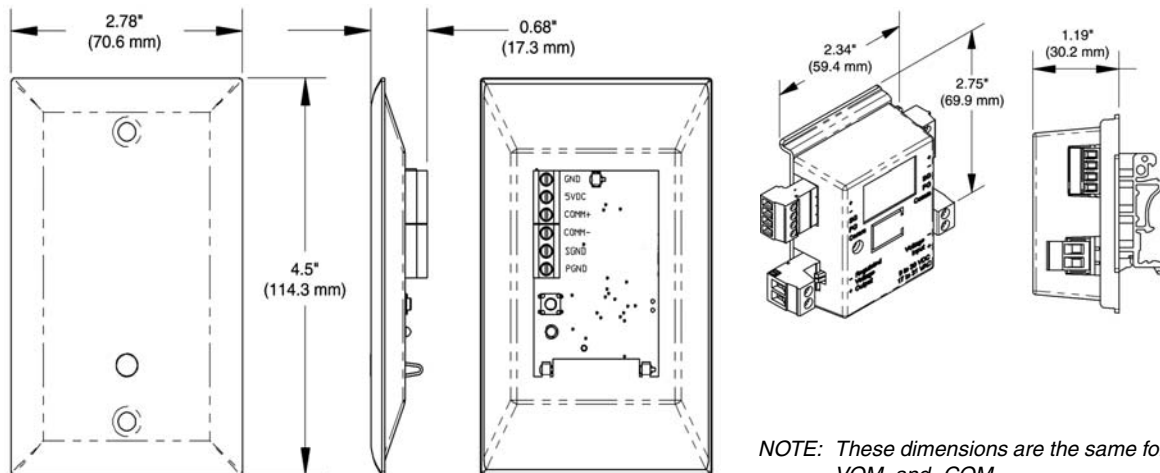


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## SPECIFICATIONS

	Wall Plate		Accessories			
	Temperature	Humidity	Current Output Module	Resistive Output Module	Voltage Output Module	Power Supply
Signal	–	4 to 20 mA (output)	–	–	–	–
Supply Voltage	5 Vdc (provided by VPS)	5 Vdc (provided by VPS)	9 to 36 Vdc, loop powered	14 to 30 Vdc or 17 to 31 Vac	14 to 30 Vdc or 17 to 31 Vac	8 to 24 Vdc or 6 to 24 Vac
Power Consumption	<1 mA DC max	<1 mA DC max	20 mA max, loop powered	3 mA DC max 0.1 VA AC max	3 mA DC max 0.1 VA AC max	20 mA DC max 0.6 VA AC max
Operating Temperature Range	-22 to 150 °F (-30 to 70 °C)	–	–	32 to 140 °F (0 to 60 °C)	–	–
Operating Humidity Range	–	0 to 100% RH (non-condensing)	0 to 95% RH (non-condensing)	–	0 to 95% RH (non-condensing)	–
Environmental Temperature Range	-40 to 176 °F (-40 to 80 °C)	-40 to 176 °F (-40 to 80 °C)	35 to 120 °F (1 to 50 °C)	35 to 120 °F (1 to 50 °C)	35 to 120 °F (1 to 50 °C)	–
Environmental Humidity Range	0 to 100% RH (non-condensing)	0 to 100% RH (non-condensing)	0 to 100% RH	0 to 100% RH	0 to 100% RH	–
Housing Material	304 SS	304 SS	ABS plastic	ABS plastic	ABS plastic	ABS plastic
Material Rating	–	–	UL 94, V-0	UL 94, V-0	UL 94, V-0	UL 94, V-0
RS-485 Cable Distance	4000 feet (305 meters) to VPS	4000 feet (305 meters) to VPS	100 feet (30.5 meters)	100 feet (30.5 meters)	100 feet (30.5 meters)	–
Accuracy	±0.5 °C, 0 to 49 °C (0.9 °F, 23 to 120 °F)	±2% RH	–	–	–	–
Stability	–	<0.5% RH/year	–	–	–	–
Sensing Element	Semiconductor band gap, proportional to absolute temperature	Capacitive Polymer	–	–	–	–
Response Time	–	60 seconds for a 63% step	–	–	–	–

## DIMENSIONS



## INSTALLATION

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

### Wall Plate Combination Sensor

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.

### Junction Box Installation

Required materials:

Mounting hardware is provided for junction box installations.

Junction box installation steps:

1. Pull the wires out of the junction box to create an adequate service loop (~6").
2. Terminate the unit following the instructions provided.
3. Train the wall plate to the appropriate output modules as described in the instructions provided.
4. Secure the wall plate to the junction box using the #6-32 x 1/2" mounting screws provided.

## INSTALLATION (CONTINUED)

### Wall Plate Power Supply and Output Modules

*NOTE: The input power negative (-) must be connected to the LVC analog ground.*

#### Physical Installation

Required materials:

Snaptrack or #8 pan head screws

Snaptrack installation steps:

1. Insert the power supply into a piece of snaptrack.
2. To the right of the power supply, insert an output module and slide it to the left until its connectors are fully mated into the power supply connectors.
3. Repeat for up to 30 output modules.
4. If another piece of snaptrack is required, place it nearby and connect wires from the right end of the train to the output module at the left end of the second snaptrack.
5. Continue to mount additional output modules in the second snaptrack.

Surface mount installation steps:

1. Mount a power supply to a surface with 2 #8 pan head screws.
2. Slide an output module onto the power supply until its connectors are fully mated into the power supply connectors.
3. Attach the output module to the surface with 2 #8 pan head screws.
4. Slide additional output modules on the right end, first mating the connectors and then securing each output module with 2 screws.
5. If additional output modules need to be mounted on a separate surface, place the modules nearby and connect wires from the right end of the train to the additional output modules.

#### Electrical Installation

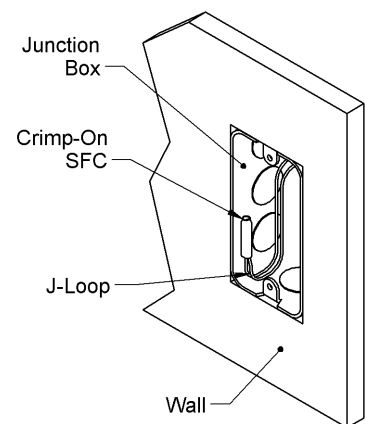
Phoenix Controls recommends using shielded, twisted-pair cable of at least 22 AWG (Belden 9841, Belden 8132 or equivalent) and sealant-filled connectors for all wire connections. Total aggregate length of RS-485 cable from all wall plates to power supply and between output modules is 4000 ft (305 m). If the RS-485 cable segment between output modules is longer than 100 ft (30.5 m), then each group of output modules should have its own power supply.

Incorporating a "J-loop" (also known as a drip loop) into all terminations adds an additional layer of protection against moisture and oxidation by directing moisture away from the connection. The idea is to place the wire junction as high as possible and form a "J" with the lead wires. The bottom of the "J" should be below the junction point. Any moisture that collects on the leads is pulled downward by gravity to the bottom of this loop and away from the junction.

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. Tests 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 these difficulties, please contact your Phoenix Controls representative.

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

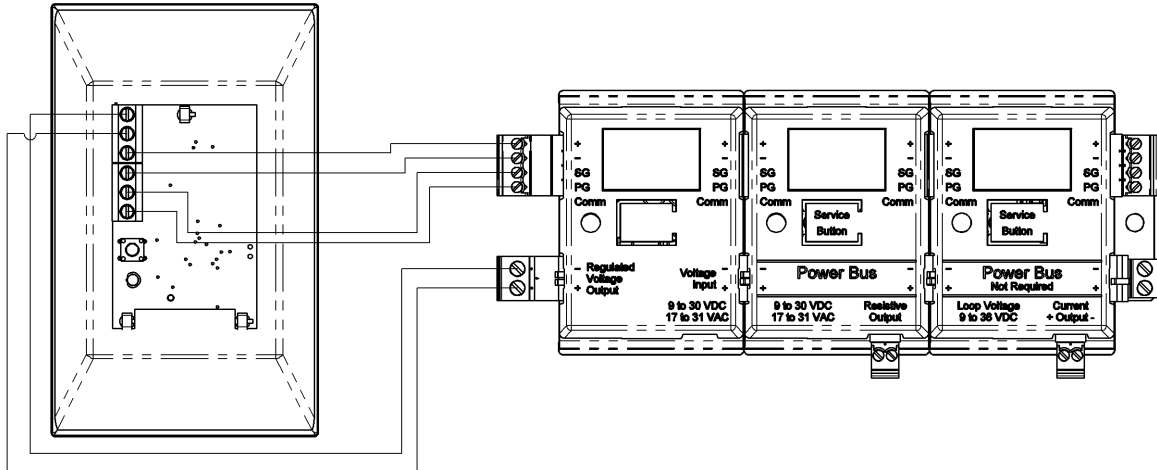


## Analog Output Module Training

*NOTE: It may be easier to perform this procedure in the shop before mounting the units at the job site. If this is done, be sure to mark the wall plates and associated output modules.*

1. Connect the power supply to the wall plate(s) and plug in the output modules. If more than one wall plate is wired to a VPS, make sure that the wall plates are in parallel.
2. Apply power to the VPS and output modules.
3. The power LED on the VPS should light and remain lit. The powered output modules LEDs should flash and go out. (The flash is very quick.)
4. The LED on the wall plate should flash once approximately every 10 seconds. (The flash is very quick.)
5. Pick a wall plate and an output module you want to train to recognize one another. Press and hold the plastic service button on the face of the output module, and at the same time, press for one second and release the training button on the wall plate. When the LED on the output module lights, release its button (the LED will go out when you release the button). The output module will now report the environmental conditions from the wall plate trained to it. The output module LED will flash quickly when it receives an update from the wall plate. The temperature (resistive) and humidity (current or voltage) output modules are trained to the wall plate separately.
6. Mount the wall plate at the desired location. The units will remain trained to one another through power failures.

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



**TROUBLESHOOTING**

Problem	Possible Cause/Solution
1. The temperature or humidity is reading its low limit.	A. Check wire from output modules to valve controller for proper connections and polarities. B. Verify that the controller is configured properly. C. Check the wall plate to confirm the LED flashes every 10 seconds. D. Check power to the output modules. E. Check output modules LED. F. Retrain output modules to wall plate.
2. The temperature or humidity reading is coming from the incorrect output module.	Retrain output modules to wall plate.
3. The temperature or humidity is reading incorrectly	A. Check wire from output modules to controller for proper connections and polarities. B. Verify that the controller is configured properly. C. Verify that the correct output module is connected to the correct controller.
4. The LED blinks rapidly.	The data is not transmitting from the wall plate to the output module. Retrain output modules to wall plate.

## Output Tables

### Temperature Output Module Table

°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 Output Module Table

%RH	mA	5V		%RH	mA	10V
0	4.00	0.00		50	12.00	5.00
1	4.16	0.05		51	12.16	5.10
2	4.32	0.10		52	12.32	5.20
3	4.48	0.15		53	12.48	5.30
4	4.64	0.20		54	12.64	5.40
5	4.80	0.25		55	12.80	5.50
6	4.96	0.30		56	12.96	5.60
7	5.12	0.35		57	13.12	5.70
8	5.28	0.40		58	13.28	5.80
9	5.44	0.45		59	13.44	5.90
10	5.60	0.50		60	13.60	6.00
11	5.76	0.55		61	13.76	6.10
12	5.92	0.60		62	13.92	6.20
13	6.08	0.65		63	14.08	6.30
14	6.24	0.70		64	14.24	6.40
15	6.40	0.75		65	14.40	6.50
16	6.56	0.80		66	14.56	6.60
17	6.72	0.85		67	14.72	6.70
18	6.88	0.90		68	14.88	6.80
19	7.04	0.95		69	15.04	6.90
20	7.20	1.00		70	15.20	7.00
21	7.36	1.05		71	15.36	7.10
22	7.52	1.10		72	15.52	7.20
23	7.68	1.15		73	15.68	7.30
24	7.84	1.20		74	15.84	7.40
25	8.00	1.25		75	16.00	7.50
26	8.16	1.30		76	16.16	7.60
27	8.32	1.35		77	16.32	7.70
28	8.48	1.40		78	16.48	7.80
29	8.64	1.45		79	16.64	7.90
30	8.80	1.50		80	16.80	8.00
31	8.96	1.55		81	16.96	8.10
32	9.12	1.60		82	17.12	8.20
33	9.28	1.65		83	17.28	8.30
34	9.44	1.70		84	17.44	8.40
35	9.60	1.75		85	17.60	8.50
36	9.76	1.80		86	17.76	8.60
37	9.92	1.85		87	17.92	8.70
38	10.08	1.90		88	18.08	8.80
39	10.24	1.95		89	18.24	8.90
40	10.40	2.00		90	18.40	9.00
41	10.56	2.05		91	18.56	9.10
42	10.72	2.10		92	18.72	9.20
43	10.88	2.15		93	18.88	9.30
44	11.04	2.20		94	19.04	9.40
45	11.20	2.25		95	19.20	9.50
46	11.36	2.30		96	19.36	9.60
47	11.52	2.35		97	19.52	9.70
48	11.68	2.40		98	19.68	9.80
49	11.84	2.45		99	19.84	9.90
				100	20.00	10.00