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Pressure Sensor Description

The focal point of any sensor is the sensing element itself, and BAPI has gone to great lengths to produce one of the best sensors on the market today. The heart of every BAPI unit is a micro-machined, single-crystal silicon, piezoresistive pressure sensor that changes resistance as a function of applied pressure. Each sensor is fabricated using the same integrated circuit technology used to make millions of cell phones, game machines and personal computers. To control and maintain the quality of these sensors, BAPI is involved in all phases of production from design to use.

The diaphragm at the core of BAPI's pressure sensor is made of silicon with strain gauges diffused into the substrate to form a one-piece crystalline structure. Since silicon strain gauges have high output levels in relation to the pressure applied, the pressure levels in the BAPI diaphragm can be lower than in other non-silicon strain gauges. This means a more accurate measurement of lower pressure levels.

Silicon does bring with it one undesired trait—thermal sensitivity. The traditional method of compensating for this thermal sensitivity is an external circuit with discreet resistors, some of which have their own temperature dependencies, introducing more error. BAPI uses a different, unique approach. We employ a custom compensation ASIC (Application Specific Integrated Circuit) that uses digital compensation while maintaining an analog signal path, producing a sensor that is precise and interchangeable. The result is a pressure sensor that offers the ultimate in high accuracy, while preserving the fast response and smooth output inherent to silicon sensors.

Because of the innovative sensor and digital temperature compensation circuit, we are able to produce a highly accurate and stable product. This accuracy is verified during final calibration at our factory using a pressure-controlled source accurate to 0.001 inch of water and traceable to NIST standards.

Specifications

Output Ranges:

4 to 20 mA, 0 to 5 V or 0 to 10V

Power:

7 to 45 VDC (4-20 mA output)
7 to 45 VDC or 7 to 32 VAC (0-5 VDC output)
13 to 45 VDC or 13 to 32 VAC (0-10 VDC output)

Power Consumption:

4.9 mA max DC at 0-5 VDC or 0-10 VDC Output
0.12 VA max AC at 0-5 VDC or 0-10 VDC Output
20 mA max, DC only at 4-20 mA Output

Ranges Inches W.C.

Unidirectional

0-0.1", 0-0.25", 0-1.0", 0-2.5", 0-5.0"

Bi-directional

±0.1", ±0.25", ±1.0", ±2.5", ±5.0"

Bi-directional Pressure:

Zero pressure at mid-span

Accuracy: ±1% on 0-0.1 and ±0.1 ranges
±0.5% all other ranges

Temperature Limits:

Storage: -25° to 80°C (-13° to 176°F)
Operational: -25° to 80°C (-13° to 176°F)
Compensated: 0° to 60°C (32° to 140°F)

Operating RH Range:

0 to 95% non-condensing

Media:

Non-Ionic, Non-Corrosive, Clean, Dry Gasses



Pressure Transmitter Output Table

Pressure Range 0-1.0" W.C.				
W.C.	Pasc.	4-20mA	0-5V	0-10V
0.00	0.00	4.00	0.00	0.00
0.02	4.98	4.32	0.10	0.20
0.04	9.96	4.64	0.20	0.40
0.06	14.95	4.96	0.30	0.60
0.08	19.93	5.28	0.40	0.80
0.10	24.91	5.60	0.50	1.00
0.12	29.89	5.92	0.60	1.20
0.14	34.87	6.24	0.70	1.40
0.16	39.85	6.56	0.80	1.60
0.18	44.84	6.88	0.90	1.80
0.20	49.82	7.20	1.00	2.00
0.22	54.80	7.52	1.10	2.20
0.24	59.78	7.84	1.20	2.40
0.26	64.76	8.16	1.30	2.60
0.28	69.74	8.48	1.40	2.80
0.30	74.73	8.80	1.50	3.00
0.32	79.71	9.12	1.60	3.20
0.34	84.69	9.44	1.70	3.40
0.36	89.67	9.76	1.80	3.60
0.38	94.65	10.08	1.90	3.80
0.40	99.64	10.40	2.00	4.00
0.42	104.62	10.72	2.10	4.20
0.44	109.60	11.04	2.20	4.40
0.46	114.58	11.36	2.30	4.60
0.48	119.56	11.68	2.40	4.80
0.50	124.54	12.00	2.50	5.00
0.52	129.53	12.32	2.60	5.20
0.54	134.51	12.64	2.70	5.40
0.56	139.49	12.96	2.80	5.60
0.58	144.47	13.28	2.90	5.80
0.60	149.45	13.60	3.00	6.00
0.62	154.44	13.92	3.10	6.20
0.64	159.42	14.24	3.20	6.40
0.66	164.40	14.56	3.30	6.60
0.68	169.38	14.88	3.40	6.80
0.70	174.36	15.20	3.50	7.00
0.72	179.34	15.52	3.60	7.20
0.74	184.33	15.84	3.70	7.40
0.76	189.31	16.16	3.80	7.60
0.78	194.29	16.48	3.90	7.80
0.80	199.27	16.80	4.00	8.00
0.82	204.25	17.12	4.10	8.20
0.84	209.23	17.44	4.20	8.40
0.86	214.22	17.76	4.30	8.60
0.88	219.20	18.08	4.40	8.80
0.90	224.18	18.40	4.50	9.00
0.92	229.16	18.72	4.60	9.20
0.94	234.14	19.04	4.70	9.40
0.96	239.13	19.36	4.80	9.60
0.98	244.11	19.68	4.90	9.80
1.00	249.09	20.00	5.00	10.00

Pressure Range 0-2.5" W.C.				
W.C.	Pasc.	4-20mA	0-5V	0-10V
0.000	0.00	4.00	0.00	0.00
0.050	12.45	4.32	0.10	0.20
0.100	24.91	4.64	0.20	0.40
0.150	37.36	4.96	0.30	0.60
0.200	49.82	5.28	0.40	0.80
0.250	62.27	5.60	0.50	1.00
0.300	74.73	5.92	0.60	1.20
0.350	87.18	6.24	0.70	1.40
0.400	99.64	6.56	0.80	1.60
0.450	112.09	6.88	0.90	1.80
0.500	124.54	7.20	1.00	2.00
0.550	137.00	7.52	1.10	2.20
0.600	149.45	7.84	1.20	2.40
0.650	161.91	8.16	1.30	2.60
0.700	174.36	8.48	1.40	2.80
0.750	186.82	8.80	1.50	3.00
0.800	199.27	9.12	1.60	3.20
0.850	211.73	9.44	1.70	3.40
0.900	224.18	9.76	1.80	3.60
0.950	236.63	10.08	1.90	3.80
1.000	249.09	10.40	2.00	4.00
1.050	261.54	10.72	2.10	4.20
1.100	274.00	11.04	2.20	4.40
1.150	286.45	11.36	2.30	4.60
1.200	298.91	11.68	2.40	4.80
1.250	311.36	12.00	2.50	5.00
1.300	323.82	12.32	2.60	5.20
1.350	336.27	12.64	2.70	5.40
1.400	348.72	12.96	2.80	5.60
1.450	361.18	13.28	2.90	5.80
1.500	373.63	13.60	3.00	6.00
1.550	386.09	13.92	3.10	6.20
1.600	398.54	14.24	3.20	6.40
1.650	411.00	14.56	3.30	6.60
1.700	423.45	14.88	3.40	6.80
1.750	435.91	15.20	3.50	7.00
1.800	448.36	15.52	3.60	7.20
1.850	460.81	15.84	3.70	7.40
1.900	473.27	16.16	3.80	7.60
1.950	485.72	16.48	3.90	7.80
2.000	498.18	16.80	4.00	8.00
2.050	510.63	17.12	4.10	8.20
2.100	523.09	17.44	4.20	8.40
2.150	535.54	17.76	4.30	8.60
2.200	548.00	18.08	4.40	8.80
2.250	560.45	18.40	4.50	9.00
2.300	572.90	18.72	4.60	9.20
2.350	585.36	19.04	4.70	9.40
2.400	597.81	19.36	4.80	9.60
2.450	610.27	19.68	4.90	9.80
2.500	622.72	20.00	5.00	10.00