

110-WS-16BP

User Manual

110-WS-16BP Barometric Pressure Sensor



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Receiving and Unpacking

Carefully unpack all components and compare to the packing list. Notify NovaLynx Corporation immediately concerning any discrepancy. Inspect equipment to detect any damage that may have occurred during shipment. In the event of damage, any claim for loss must be filed immediately with the carrier by the consignee. Damages to equipment sent via Parcel Post or UPS require the consignee to contact NovaLynx Corporation for instructions.

Returns

If equipment is to be returned to the factory for any reason, call NovaLynx between 8:00 a.m. and 4:00 p.m. Pacific Time to request a Return Authorization Number (RA#). Include with the returned equipment a description of the problem and the name, address, and daytime phone number of the sender. Carefully pack the equipment to prevent damage or additional damage during the return shipment. Call NovaLynx for packing instructions in the case of delicate or sensitive items. If packing facilities are not available take the equipment to the nearest Post Office, UPS, or other freight service and obtain assistance with the packaging. Please write the RA# on the outside of the box.

Warranty

NovaLynx Corporation warrants that its products are free from defects in material and workmanship under normal use and service for a period of one year from the date of shipment from the factory. NovaLynx Corporation's obligations under this warranty are limited to, at NovaLynx's option: (i) replacing; or (ii) repairing; any product determined to be defective. In no case shall NovaLynx Corporation's liability exceed product's original purchase price. This warranty does not apply to any equipment that has been repaired or altered, except by NovaLynx Corporation, or that has been subjected to misuse, negligence, or accident. It is expressly agreed that this warranty will be in lieu of all warranties of fitness and in lieu of the warranty of merchantability.

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1 FORWARD

Thank you for purchasing NovaLynx products. NovaLynx has been designing and manufacturing weather instruments since 1988. NovaLynx represents several well-known brands of quality manufacturers, including Gill Instruments, RM Young, Kipp & Zonen, and Vaisala. It is our hope that our products will meet all your monitoring requirements.

2 INTRODUCTION

The NovaLynx **110-WS-16BP Barometric Pressure Sensor** uses piezoresistive technology to sense changes in atmospheric pressure. The 0 to 5 volt output signal represents a span of 2.5 inHg (85 mb). An elevation offset adjustment allows this sensor to be installed at altitudes up to 10,000 feet (3048 meters).

The sensor must be installed in a vented, rain-tight enclosure, or mounted indoors.

3 SPECIFICATIONS

110-WS-16BP	
Type	Piezoresistive
Range	28.25 to 30.75 inHg (956.6 to 1041.3 mb)
Measurement span	2.50 inHg (85 mb)
Resolution	± 0.01 inHg or ± 0.3 mb
Altitude offset	0 to +10,000 feet, screwdriver adjustable
Absolute Accuracy	0.05 inHg (2 mb)
Supply voltage	10 to 18 Vdc
Output voltage	0 to 5 Vdc = 2.5 inHg (85 mb) span
Cable	Tinned leads, 24 AWG, 18" (0.6 m)
Dimensions	2.1" x 2.1" x 1.5" (53 x 53 x 38 mm)
Operating conditions	Not temperature compensated. Avoid temperature extremes for best accuracy.
Enclosure	ABS plastic
Weight / Shipping	1 lbs (0.45 kg) / 2 lbs (0.91 kg)

4 INSTALLATION

The sensor must be mounted indoors or, if outdoors, in a rain-tight vented enclosure. In either case, the arrangement must allow air pressure around the sensor to equalize with outdoor barometric pressure. Avoid mounting near AC power sources or power supplies where electrical noise might affect the sensor. Protect the sensor from temperature extremes.

Connect the sensor to your logger or other monitoring equipment according to the wire installation table below:

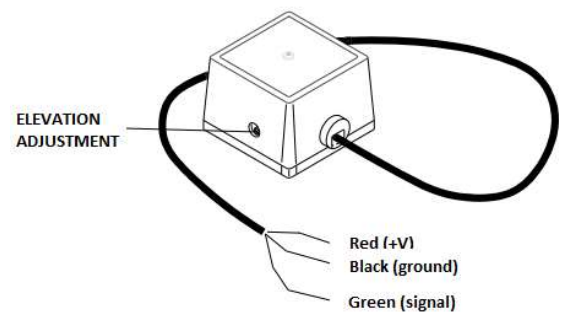
Wire Color	Function
Red	Power Supply (+10 to +18 Vdc)
Black	Ground
Green	0 to 5 Volt Signal Output

5 ELEVATION ADJUSTMENT

NOTE: In order to calibrate the barometric pressure, you must first obtain a reliable **reference pressure** for comparison. The **230-M202** or **230-M2000 Handheld Digital Barometer**, or other calibration grade reference is best. A local weather reporting service or airport may be able to supply the current barometric pressure either on their website or by phone.

Barometric pressure decreases with elevation in a non-linear fashion from 29.92 inHg at sea level to 20.58 inHg at 10,000 feet (1013 to 697 mb). Since the range of the 110-WS-16BP is a small fraction of this overall variation, it must be adjusted for average conditions (Standard Pressure) at the elevation where it will operate.

Barometric pressure at any location is constantly changing, but seldom changes by more than 1 inHg (34 mb) from average. When the elevation adjustment is properly set, the sensor should stay within the operating range of 0 to 5 volts. If the sensor output "pegs" at either 0 or 5 volts it is not adjusted properly for that altitude.



The **110-WS-16BP Barometric Pressure Sensor** is factory adjusted to mean sea level (MSL). If the sensor is installed at a higher elevation the pressure will be less and the sensor output will average below 2.5 volts or may even read zero volts. To bring the output into range, connect a volt meter and power supply to the sensor, then adjust the output to 2.5 volts. You will need a small flat-blade screwdriver to turn the elevation adjustment (CW = decrease, CCW = increase). The final adjustment is made by comparison with a reference once the logger is set up.

6 LOGGER SETUP

The voltage output of the barometric pressure sensor is often read by a logger that can be calibrated to display the pressure in engineering units such as inches of mercury (inHg), millibars (mb), or other units which are interchangeable. The calibration is usually done by entering the slope(m) and offset(b) that represents the scale desired. Some loggers require two points representing the minimum and maximum readings, and then calculate slope and offset parameters internally.

Barometric pressure can be expressed as the station pressure or can be referenced to sea level (MSL). To simplify comparison, find out whether your **reference pressure** is station pressure or MSL and set the logger to match. After setting the elevation adjustment, the procedure explains how adjust your logger to calculate either station pressure or MSL, whichever you prefer.

6.1 Calibration by Two Point Method

The illustration below is copied from the reference tables at the end of this manual. Mean sea level (MSL) is listed in the first data row at zero feet elevation. If your **reference pressure** is referenced to sea level, enter 28.67 inHg or 970.8 mb to correspond to zero volts on the logger, and 31.17 inHg or 1055.8 mb to correspond to 5 volts on the logger.

If your **reference pressure** is station pressure, select the closest elevation on the chart and obtain the Range Low and Range High numbers that correspond. Enter the numbers in your logger.

After entering the two points into the logger, obtain some real-time measurements from the logger. Compare these to the **reference pressure** obtained from your calibration reference or local weather service. Use a small flat-blade screwdriver to turn the elevation adjustment until the readings match.

Elevation		Inches of Mercury (InHg)				Millibars (mb)			
Feet	Meters	Standard Pressure	Deviation from Sea Level	Range Low	Range High	Standard Pressure	Deviation from Sea Level	Range Low	Range High
0	0.0	29.92	0.00	28.67	31.17	1013.3	0.00	970.8	1055.8
50	15.2	29.87	0.05	28.62	31.12	1011.4	1.83	968.9	1053.9

Once the elevation adjustment is correctly set, the Range Low and Range High numbers can be exchanged to reference MSL or station pressure readings. Suppose your **reference pressure** represents station pressure, and you had entered the parameters for an elevation of 1,000 feet. To reference sea level, replace the Range Low and Range High numbers with the sea level (zero feet elevation) numbers. Do not change the elevation adjustment. The logger readings are now referenced to sea level. You can do the converse to change from MSL to station pressure.

6.2 Calibration by the Slope – Offset Method

The general formula for calculating slope is:
$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

The slope(m) parameter does not vary with altitude. We can use any two points from the reference table to make the calculation. The "y" values are the Range High and Range Low numbers, while the "x" values are the logger's input readings at those points. Usually the low value is 0 volts and high value 5 volts, but some loggers use 0 mV and 5000 mV, so we will calculate both ways.

Example: $m = (31.17 \text{ inHg} - 28.67 \text{ inHg}) / (5 \text{ V} - 0 \text{ V}) = 0.5 \text{ inHg / V}$

Units	Range Low	Range High	In Low	In High	Slope(m)
inHg / V	28.67	31.17	0	5	0.5
inHg / mV	28.67	31.17	0	5000	0.0005
mb / V	970.8	1055.8	0	5	17
mb / mV	970.8	1055.8	0	5000	0.017

1. Enter the calculated slope in your logger.
2. The offset(b) is the Range Low parameter for the reference altitude. If the **reference pressure** is sea level referenced, enter 28.67 inHg or 970.8 mb. Otherwise, find the closest elevation in the reference table at the end of this manual, and select the corresponding Range Low value to obtain station pressure readings. Enter the offset value in your logger.
3. Obtain some real-time measurements from the logger. Compare these to the **reference pressure** obtained from your calibration reference or local weather station. Adjust the altitude offset until the readings match.
4. Once the altitude offset is adjusted, the logger's offset parameter can be changed to reference sea level or station pressure readings, whichever you prefer. Suppose the **reference pressure** represents station pressure, and you had entered the parameters for an elevation of 1,000 feet. To reference sea level, replace the offset number in the logger with the sea level (zero feet elevation) Range Low value. Do not adjust the altitude offset. The logger readings are now referenced to sea level. You can do the converse to change from sea level reference to station pressure.

7 MAINTENANCE

Compare the output of the barometric pressure sensor to a reference annually. Be sure the reference is displaying the same relative range, either Mean Sea Level or station pressure. If the values do not agree, use a small flat-blade screwdriver to turn the elevation adjustment until the readings match.

Note: if the output of the sensor "pegs" at 0 or 5 volts then the elevation adjustment is not correctly set. Review Section 6.

8 TROUBLESHOOTING GUIDE

TROUBLESHOOTING MATRIX	
Output is 0 volts	The sensor is not getting power. The sensor requires 10 to 18 Vdc to operate.
The Output is 0 volts or 5 volts.	The elevation adjustment is out of range. When the atmospheric pressure is "normal" the output of the sensor will be near 2.5 volts. Use a small flat-blade screwdriver to turn the elevation adjustment (CW = decrease, CCW = increase). If setting the output to 2.5 volts results in disagreement with the reference sensor, the offset parameter in the logger can be adjusted to bring the readings into agreement.
The readings do not always match readings from a weather service.	Barometric pressure will vary from location to location. The closer the reference station, all other things being equal, the closer the readings should agree. Ideally, the reference used to calibrate the 110-WS-16 BP will be a NIST traceable calibration reference.

APPENDIX A CALIBRATION CHART

Elevation		Inches of Mercury (inHg)				Millibars (mb)			
Feet	Meters	Standard Pressure	Deviation from Sea Level	Range Low	Range High	Standard Pressure	Deviation from Sea Level	Range Low	Range High
0	0.0	29.92	0.00	28.67	31.17	1013.3	0.00	970.8	1055.8
50	15.2	29.87	0.05	28.62	31.12	1011.4	1.83	968.9	1053.9
100	30.5	29.81	0.11	28.56	31.06	1009.6	3.66	967.1	1052.1
150	45.7	29.76	0.16	28.51	31.01	1007.8	5.48	965.3	1050.3
200	61.0	29.71	0.22	28.46	30.96	1006.0	7.30	963.5	1048.5
250	76.2	29.65	0.27	28.40	30.90	1004.1	9.12	961.6	1046.6
300	91.4	29.60	0.32	28.35	30.85	1002.3	10.94	959.8	1044.8
350	106.7	29.54	0.38	28.29	30.79	1000.5	12.75	958.0	1043.0
400	121.9	29.49	0.43	28.24	30.74	998.7	14.56	956.2	1041.2
450	137.2	29.44	0.48	28.19	30.69	996.9	16.37	954.4	1039.4
500	152.4	29.38	0.54	28.13	30.63	995.1	18.18	952.6	1037.6
550	167.6	29.33	0.59	28.08	30.58	993.3	19.98	950.8	1035.8
600	182.9	29.28	0.64	28.03	30.53	991.5	21.78	949.0	1034.0
650	198.1	29.23	0.70	27.98	30.48	989.7	23.58	947.2	1032.2
700	213.4	29.17	0.75	27.92	30.42	987.9	25.37	945.4	1030.4
750	228.6	29.12	0.80	27.87	30.37	986.1	27.16	943.6	1028.6
800	243.8	29.07	0.86	27.82	30.32	984.3	28.95	941.8	1026.8
850	259.1	29.01	0.91	27.76	30.26	982.5	30.74	940.0	1025.0
900	274.3	28.96	0.96	27.71	30.21	980.7	32.52	938.2	1023.2
950	289.6	28.91	1.01	27.66	30.16	978.9	34.30	936.4	1021.4
1000	304.8	28.86	1.07	27.61	30.11	977.2	36.08	934.7	1019.7
1050	320.0	28.80	1.12	27.55	30.05	975.4	37.86	932.9	1017.9
1100	335.3	28.75	1.17	27.50	30.00	973.6	39.64	931.1	1016.1
1150	350.5	28.70	1.22	27.45	29.95	971.8	41.41	929.3	1014.3
1200	365.8	28.65	1.28	27.40	29.90	970.1	43.18	927.6	1012.6
1250	381.0	28.59	1.33	27.34	29.84	968.3	44.94	925.8	1010.8
1300	396.2	28.54	1.38	27.29	29.79	966.5	46.70	924.0	1009.0
1350	411.5	28.49	1.43	27.24	29.74	964.8	48.47	922.3	1007.3
1400	426.7	28.44	1.48	27.19	29.69	963.0	50.22	920.5	1005.5
1450	442.0	28.39	1.54	27.14	29.64	961.3	51.98	918.8	1003.8
1500	457.2	28.33	1.59	27.08	29.58	959.5	53.73	917.0	1002.0
1550	472.4	28.28	1.64	27.03	29.53	957.8	55.48	915.3	1000.3
1600	487.7	28.23	1.69	26.98	29.48	956.0	57.23	913.5	998.5
1650	502.9	28.18	1.74	26.93	29.43	954.3	58.98	911.8	996.8
1700	518.2	28.13	1.79	26.88	29.38	952.5	60.72	910.0	995.0
1750	533.4	28.08	1.84	26.83	29.33	950.8	62.46	908.3	993.3

Elevation		Inches of Mercury (inHg)				Millibars (mb)			
Feet	Meters	Standard Pressure	Deviation from Sea Level	Range Low	Range High	Standard Pressure	Deviation from Sea Level	Range Low	Range High
1800	548.6	28.03	1.90	26.78	29.28	949.1	64.20	906.6	991.6
1850	563.9	27.97	1.95	26.72	29.22	947.3	65.93	904.8	989.8
1900	579.1	27.92	2.00	26.67	29.17	945.6	67.66	903.1	988.1
1950	594.4	27.87	2.05	26.62	29.12	943.9	69.39	901.4	986.4
2000	609.6	27.82	2.10	26.57	29.07	942.1	71.12	899.6	984.6
2050	624.8	27.77	2.15	26.52	29.02	940.4	72.85	897.9	982.9
2100	640.1	27.72	2.20	26.47	28.97	938.7	74.57	896.2	981.2
2150	655.3	27.67	2.25	26.42	28.92	937.0	76.29	894.5	979.5
2200	670.6	27.62	2.30	26.37	28.87	935.2	78.01	892.7	977.7
2250	685.8	27.57	2.35	26.32	28.82	933.5	79.72	891.0	976.0
2300	701.0	27.52	2.40	26.27	28.77	931.8	81.43	889.3	974.3
2350	716.3	27.47	2.46	26.22	28.72	930.1	83.14	887.6	972.6
2400	731.5	27.42	2.51	26.17	28.67	928.4	84.85	885.9	970.9
2450	746.8	27.37	2.56	26.12	28.62	926.7	86.55	884.2	969.2
2500	762.0	27.32	2.61	26.07	28.57	925.0	88.25	882.5	967.5
2550	777.2	27.26	2.66	26.01	28.51	923.3	89.95	880.8	965.8
2600	792.5	27.21	2.71	25.96	28.46	921.6	91.65	879.1	964.1
2650	807.7	27.16	2.76	25.91	28.41	919.9	93.34	877.4	962.4
2700	823.0	27.11	2.81	25.86	28.36	918.2	95.04	875.7	960.7
2750	838.2	27.07	2.86	25.82	28.32	916.5	96.73	874.0	959.0
2800	853.4	27.02	2.91	25.77	28.27	914.8	98.41	872.3	957.3
2850	868.7	26.97	2.96	25.72	28.22	913.2	100.10	870.7	955.7
2900	883.9	26.92	3.01	25.67	28.17	911.5	101.78	869.0	954.0
2950	899.2	26.87	3.06	25.62	28.12	909.8	103.46	867.3	952.3
3000	914.4	26.82	3.10	25.57	28.07	908.1	105.13	865.6	950.6
3050	929.6	26.77	3.15	25.52	28.02	906.4	106.81	863.9	948.9
3100	944.9	26.72	3.20	25.47	27.97	904.8	108.48	862.3	947.3
3150	960.1	26.67	3.25	25.42	27.92	903.1	110.15	860.6	945.6
3200	975.4	26.62	3.30	25.37	27.87	901.4	111.82	858.9	943.9
3250	990.6	26.57	3.35	25.32	27.82	899.8	113.48	857.3	942.3
3300	1005.8	26.52	3.40	25.27	27.77	898.1	115.14	855.6	940.6
3350	1021.1	26.47	3.45	25.22	27.72	896.5	116.80	854.0	939.0
3400	1036.3	26.42	3.50	25.17	27.67	894.8	118.46	852.3	937.3
3450	1051.6	26.37	3.55	25.12	27.62	893.1	120.11	850.6	935.6
3500	1066.8	26.33	3.60	25.08	27.58	891.5	121.76	849.0	934.0
3550	1082.0	26.28	3.64	25.03	27.53	889.8	123.41	847.3	932.3

Elevation		Inches of Mercury (inHg)				Millibars (mb)			
Feet	Meters	Standard Pressure	Deviation from Sea Level	Range Low	Range High	Standard Pressure	Deviation from Sea Level	Range Low	Range High
3600	1097.3	26.23	3.69	24.98	27.48	888.2	125.06	845.7	930.7
3650	1112.5	26.18	3.74	24.93	27.43	886.5	126.70	844.0	929.0
3700	1127.8	26.13	3.79	24.88	27.38	884.9	128.35	842.4	927.4
3750	1143.0	26.08	3.84	24.83	27.33	883.3	129.98	840.8	925.8
3800	1158.2	26.03	3.89	24.78	27.28	881.6	131.62	839.1	924.1
3850	1173.5	25.99	3.94	24.74	27.24	880.0	133.26	837.5	922.5
3900	1188.7	25.94	3.98	24.69	27.19	878.4	134.89	835.9	920.9
3950	1204.0	25.89	4.03	24.64	27.14	876.7	136.52	834.2	919.2
4000	1219.2	25.84	4.08	24.59	27.09	875.1	138.15	832.6	917.6
4050	1234.4	25.79	4.13	24.54	27.04	873.5	139.77	831.0	916.0
4100	1249.7	25.75	4.18	24.50	27.00	871.9	141.39	829.4	914.4
4150	1264.9	25.70	4.22	24.45	26.95	870.2	143.01	827.7	912.7
4200	1280.2	25.65	4.27	24.40	26.90	868.6	144.63	826.1	911.1
4250	1295.4	25.60	4.32	24.35	26.85	867.0	146.24	824.5	909.5
4300	1310.6	25.56	4.37	24.31	26.81	865.4	147.86	822.9	907.9
4350	1325.9	25.51	4.41	24.26	26.76	863.8	149.47	821.3	906.3
4400	1341.1	25.46	4.46	24.21	26.71	862.2	151.07	819.7	904.7
4450	1356.4	25.41	4.51	24.16	26.66	860.6	152.68	818.1	903.1
4500	1371.6	25.37	4.56	24.12	26.62	859.0	154.28	816.5	901.5
4550	1386.8	25.32	4.60	24.07	26.57	857.4	155.88	814.9	899.9
4600	1402.1	25.27	4.65	24.02	26.52	855.8	157.48	813.3	898.3
4650	1417.3	25.22	4.70	23.97	26.47	854.2	159.08	811.7	896.7
4700	1432.6	25.18	4.74	23.93	26.43	852.6	160.67	810.1	895.1
4750	1447.8	25.13	4.79	23.88	26.38	851.0	162.26	808.5	893.5
4800	1463.0	25.08	4.84	23.83	26.33	849.4	163.85	806.9	891.9
4850	1478.3	25.04	4.89	23.79	26.29	847.8	165.43	805.3	890.3
4900	1493.5	24.99	4.93	23.74	26.24	846.2	167.02	803.7	888.7
4950	1508.8	24.94	4.98	23.69	26.19	844.7	168.60	802.2	887.2
5000	1524.0	24.90	5.03	23.65	26.15	843.1	170.18	800.6	885.6
5050	1539.2	24.85	5.07	23.60	26.10	841.5	171.75	799.0	884.0
5100	1554.5	24.80	5.12	23.55	26.05	839.9	173.33	797.4	882.4
5150	1569.7	24.76	5.16	23.51	26.01	838.4	174.90	795.9	880.9
5200	1585.0	24.71	5.21	23.46	25.96	836.8	176.47	794.3	879.3
5250	1600.2	24.66	5.26	23.41	25.91	835.2	178.04	792.7	877.7
5300	1615.4	24.62	5.30	23.37	25.87	833.7	179.60	791.2	876.2
5350	1630.7	24.57	5.35	23.32	25.82	832.1	181.16	789.6	874.6

Elevation		Inches of Mercury (inHg)				Millibars (mb)			
Feet	Meters	Standard Pressure	Deviation from Sea Level	Range Low	Range High	Standard Pressure	Deviation from Sea Level	Range Low	Range High
5400	1645.9	24.53	5.40	23.28	25.78	830.5	182.72	788.0	873.0
5450	1661.2	24.48	5.44	23.23	25.73	829.0	184.28	786.5	871.5
5500	1676.4	24.43	5.49	23.18	25.68	827.4	185.83	784.9	869.9
5550	1691.6	24.39	5.53	23.14	25.64	825.9	187.39	783.4	868.4
5600	1706.9	24.34	5.58	23.09	25.59	824.3	188.94	781.8	866.8
5650	1722.1	24.30	5.63	23.05	25.55	822.8	190.48	780.3	865.3
5700	1737.4	24.25	5.67	23.00	25.50	821.2	192.03	778.7	863.7
5750	1752.6	24.21	5.72	22.96	25.46	819.7	193.57	777.2	862.2
5800	1767.8	24.16	5.76	22.91	25.41	818.1	195.11	775.6	860.6
5850	1783.1	24.11	5.81	22.86	25.36	816.6	196.65	774.1	859.1
5900	1798.3	24.07	5.85	22.82	25.32	815.1	198.19	772.6	857.6
5950	1813.6	24.02	5.90	22.77	25.27	813.5	199.72	771.0	856.0
6000	1828.8	23.98	5.94	22.73	25.23	812.0	201.25	769.5	854.5
6050	1844.0	23.93	5.99	22.68	25.18	810.5	202.78	768.0	853.0
6100	1859.3	23.89	6.03	22.64	25.14	808.9	204.31	766.4	851.4
6150	1874.5	23.84	6.08	22.59	25.09	807.4	205.83	764.9	849.9
6200	1889.8	23.80	6.12	22.55	25.05	805.9	207.36	763.4	848.4
6250	1905.0	23.75	6.17	22.50	25.00	804.4	208.88	761.9	846.9
6300	1920.2	23.71	6.21	22.46	24.96	802.9	210.39	760.4	845.4
6350	1935.5	23.66	6.26	22.41	24.91	801.3	211.91	758.8	843.8
6400	1950.7	23.62	6.30	22.37	24.87	799.8	213.42	757.3	842.3
6450	1966.0	23.57	6.35	22.32	24.82	798.3	214.93	755.8	840.8
6500	1981.2	23.53	6.39	22.28	24.78	796.8	216.44	754.3	839.3
6550	1996.4	23.49	6.44	22.24	24.74	795.3	217.95	752.8	837.8
6600	2011.7	23.44	6.48	22.19	24.69	793.8	219.45	751.3	836.3
6650	2026.9	23.40	6.52	22.15	24.65	792.3	220.95	749.8	834.8
6700	2042.2	23.35	6.57	22.10	24.60	790.8	222.45	748.3	833.3
6750	2057.4	23.31	6.61	22.06	24.56	789.3	223.95	746.8	831.8
6800	2072.6	23.26	6.66	22.01	24.51	787.8	225.44	745.3	830.3
6850	2087.9	23.22	6.70	21.97	24.47	786.3	226.93	743.8	828.8
6900	2103.1	23.18	6.75	21.93	24.43	784.8	228.42	742.3	827.3
6950	2118.4	23.13	6.79	21.88	24.38	783.3	229.91	740.8	825.8
7000	2133.6	23.09	6.83	21.84	24.34	781.9	231.40	739.4	824.4
7050	2148.8	23.04	6.88	21.79	24.29	780.4	232.88	737.9	822.9
7100	2164.1	23.00	6.92	21.75	24.25	778.9	234.36	736.4	821.4
7150	2179.3	22.96	6.96	21.71	24.21	777.4	235.84	734.9	819.9

Elevation		Inches of Mercury (inHg)				Millibars (mb)			
Feet	Meters	Standard Pressure	Deviation from Sea Level	Range Low	Range High	Standard Pressure	Deviation from Sea Level	Range Low	Range High
7200	2194.6	22.91	7.01	21.66	24.16	775.9	237.32	733.4	818.4
7250	2209.8	22.87	7.05	21.62	24.12	774.5	238.79	732.0	817.0
7300	2225.0	22.83	7.09	21.58	24.08	773.0	240.26	730.5	815.5
7350	2240.3	22.78	7.14	21.53	24.03	771.5	241.73	729.0	814.0
7400	2255.5	22.74	7.18	21.49	23.99	770.1	243.20	727.6	812.6
7450	2270.8	22.70	7.22	21.45	23.95	768.6	244.66	726.1	811.1
7500	2286.0	22.65	7.27	21.40	23.90	767.1	246.12	724.6	809.6
7550	2301.2	22.61	7.31	21.36	23.86	765.7	247.58	723.2	808.2
7600	2316.5	22.57	7.35	21.32	23.82	764.2	249.04	721.7	806.7
7650	2331.7	22.52	7.40	21.27	23.77	762.8	250.50	720.3	805.3
7700	2347.0	22.48	7.44	21.23	23.73	761.3	251.95	718.8	803.8
7750	2362.2	22.44	7.48	21.19	23.69	759.8	253.40	717.3	802.3
7800	2377.4	22.40	7.53	21.15	23.65	758.4	254.85	715.9	800.9
7850	2392.7	22.35	7.57	21.10	23.60	757.0	256.30	714.5	799.5
7900	2407.9	22.31	7.61	21.06	23.56	755.5	257.74	713.0	798.0
7950	2423.2	22.27	7.65	21.02	23.52	754.1	259.19	711.6	796.6
8000	2438.4	22.23	7.70	20.98	23.48	752.6	260.63	710.1	795.1
8050	2453.6	22.18	7.74	20.93	23.43	751.2	262.06	708.7	793.7
8100	2468.9	22.14	7.78	20.89	23.39	749.8	263.50	707.3	792.3
8150	2484.1	22.10	7.82	20.85	23.35	748.3	264.93	705.8	790.8
8200	2499.4	22.06	7.87	20.81	23.31	746.9	266.37	704.4	789.4
8250	2514.6	22.01	7.91	20.76	23.26	745.5	267.79	703.0	788.0
8300	2529.8	21.97	7.95	20.72	23.22	744.0	269.22	701.5	786.5
8350	2545.1	21.93	7.99	20.68	23.18	742.6	270.65	700.1	785.1
8400	2560.3	21.89	8.03	20.64	23.14	741.2	272.07	698.7	783.7
8450	2575.6	21.85	8.08	20.60	23.10	739.8	273.49	697.3	782.3
8500	2590.8	21.80	8.12	20.55	23.05	738.3	274.91	695.8	780.8
8550	2606.0	21.76	8.16	20.51	23.01	736.9	276.32	694.4	779.4
8600	2621.3	21.72	8.20	20.47	22.97	735.5	277.74	693.0	778.0
8650	2636.5	21.68	8.24	20.43	22.93	734.1	279.15	691.6	776.6
8700	2651.8	21.64	8.28	20.39	22.89	732.7	280.56	690.2	775.2
8750	2667.0	21.59	8.33	20.34	22.84	731.3	281.96	688.8	773.8
8800	2682.2	21.55	8.37	20.30	22.80	729.9	283.37	687.4	772.4
8850	2697.5	21.51	8.41	20.26	22.76	728.5	284.77	686.0	771.0
8900	2712.7	21.47	8.45	20.22	22.72	727.1	286.17	684.6	769.6
8950	2728.0	21.43	8.49	20.18	22.68	725.7	287.57	683.2	768.2

Elevation		Inches of Mercury (inHg)				Millibars (mb)			
Feet	Meters	Standard Pressure	Deviation from Sea Level	Range Low	Range High	Standard Pressure	Deviation from Sea Level	Range Low	Range High
9000	2743.2	21.39	8.53	20.14	22.64	724.3	288.97	681.8	766.8
9050	2758.4	21.35	8.57	20.10	22.60	722.9	290.36	680.4	765.4
9100	2773.7	21.31	8.62	20.06	22.56	721.5	291.75	679.0	764.0
9150	2788.9	21.26	8.66	20.01	22.51	720.1	293.14	677.6	762.6
9200	2804.2	21.22	8.70	19.97	22.47	718.7	294.53	676.2	761.2
9250	2819.4	21.18	8.74	19.93	22.43	717.3	295.91	674.8	759.8
9300	2834.6	21.14	8.78	19.89	22.39	716.0	297.30	673.5	758.5
9350	2849.9	21.10	8.82	19.85	22.35	714.6	298.68	672.1	757.1
9400	2865.1	21.06	8.86	19.81	22.31	713.2	300.06	670.7	755.7
9450	2880.4	21.02	8.90	19.77	22.27	711.8	301.43	669.3	754.3
9500	2895.6	20.98	8.94	19.73	22.23	710.4	302.81	667.9	752.9
9550	2910.8	20.94	8.98	19.69	22.19	709.1	304.18	666.6	751.6
9600	2926.1	20.90	9.02	19.65	22.15	707.7	305.55	665.2	750.2
9650	2941.3	20.86	9.06	19.61	22.11	706.3	306.92	663.8	748.8
9700	2956.6	20.82	9.10	19.57	22.07	705.0	308.28	662.5	747.5
9750	2971.8	20.78	9.14	19.53	22.03	703.6	309.65	661.1	746.1
9800	2987.0	20.74	9.18	19.49	21.99	702.2	311.01	659.7	744.7
9850	3002.3	20.70	9.22	19.45	21.95	700.9	312.37	658.4	743.4
9900	3017.5	20.66	9.26	19.41	21.91	699.5	313.73	657.0	742.0
9950	3032.8	20.62	9.30	19.37	21.87	698.2	315.08	655.7	740.7
10000	3048.0	20.58	9.34	19.33	21.83	696.8	316.43	654.3	739.3