

Pressure Calibration Check

07 July 1999

pressure sensor model: DigiQuartz 415K-187
 sensor serial number: 42410
 installed in: CTD 09P9833-0358

This pressure calibration is a check of the 'test' sensor against a stable reference pressure sensor. The reference pressure sensor is itself checked several times per year against a NIST-traceable pressure standard maintained at Paroscientific, Inc.. The circumstances of this pressure check introduce no more than 1.5 psia total error in 10,000 psi (0.015 %) in addition to the error resident in the Paroscientific site standard. The check offers a very high level certification of the health and proper operation of the 'test' sensor.

Input Pressure* [psia]	Sensor Output [hz]	Sensor Temperature [deg C]	Pressure Factory Coef [psia]	Pressure Corrected [psia]	Error [psia]
14.700	35321.12	21.9	14.391	14.494	-0.206
3014.700	36073.71	22.0	3015.057	3015.280	0.580
6014.700	36808.79	22.1	6014.761	6015.103	0.403
9014.700	37527.67	22.1	9014.603	9015.064	0.364
12014.700	38231.22	22.2	12014.245	12014.826	0.126
15014.700	38920.14	22.2	15013.098	15013.798	-0.902
12014.700	38231.25	22.2	12014.202	12014.783	0.083
9014.700	37527.70	22.3	9014.357	9014.818	0.118
6014.700	36808.89	22.3	6014.646	6014.988	0.288
3014.700	36073.81	22.3	3014.744	3014.967	0.267
14.700	35321.14	22.4	13.476	13.580	-1.120

Sensor Temperature: pressure sensor internal temperature.

Pressure Corrected: pressure computed with original factory coefficients and then corrected with a slope and offset to give the best linear agreement with the 'reference' Input pressure.

Error: Corrected pressure - Input pressure

A linear fit of this calibration data, between sensor pressure computed with factory coefficients and the Input pressure, yields correction coefficients:

$$\text{Corrected pressure} = \text{psi_slope} * \text{Factory pressure} + \text{psi_offset [psia]}$$

$$\text{psi_slope} = 1.00004 \quad \text{and} \quad \text{psi_offset} = +0.10 \text{ [psia]}$$

These are converted to Slope and Offset in decibars for use in the SEASOFT programs by: Slope = psi_slope = 1.00004
 Offset = C * (psi_offset - 14.7 * (1 - psi_slope)) = +0.0714 [dbars]
 C = 0.689476 [dbar/psi]

Slope and Offset coefficients are entered into the pressure sensor calibration coefficient section of the <>.CON file using the program SEACON.

DigiQuartz Coefficients:

C1 = -6.955272e+04
 C2 = -1.315465e+00
 C3 = 1.769770e-02
 D1 = 2.997500e-02
 D2 = 0.000000e+00
 T1 = 2.832503e+01
 T2 = -5.558577e-04
 T3 = 3.608460e-06
 T4 = 0.000000e+00

AD590 Pressure Temperature Coefficients:

AD590M = 0.01129
 AD590B = -8.33425

Calibration Correction:

Slope = 1.00004
 Offset = +0.0714