

Sea-Bird Electronics, Inc.

13431 NE 20th Street, Bellevue, WA 98005-2010 USA

Phone: (+1) 425-643-9866 Fax (+1) 425-643-9954 Email: seabird@seabird.com

SENSOR SERIAL NUMBER: 9158
CALIBRATION DATE: 04-Mar-14

SLOCUM PAYLOAD CTD
TEMPERATURE CALIBRATION DATA
ITS-90 TEMPERATURE SCALE

ITS-90 COEFFICIENTS

a0 = -2.057941e-004
a1 = 3.300494e-004
a2 = -6.254796e-006
a3 = 2.489968e-007

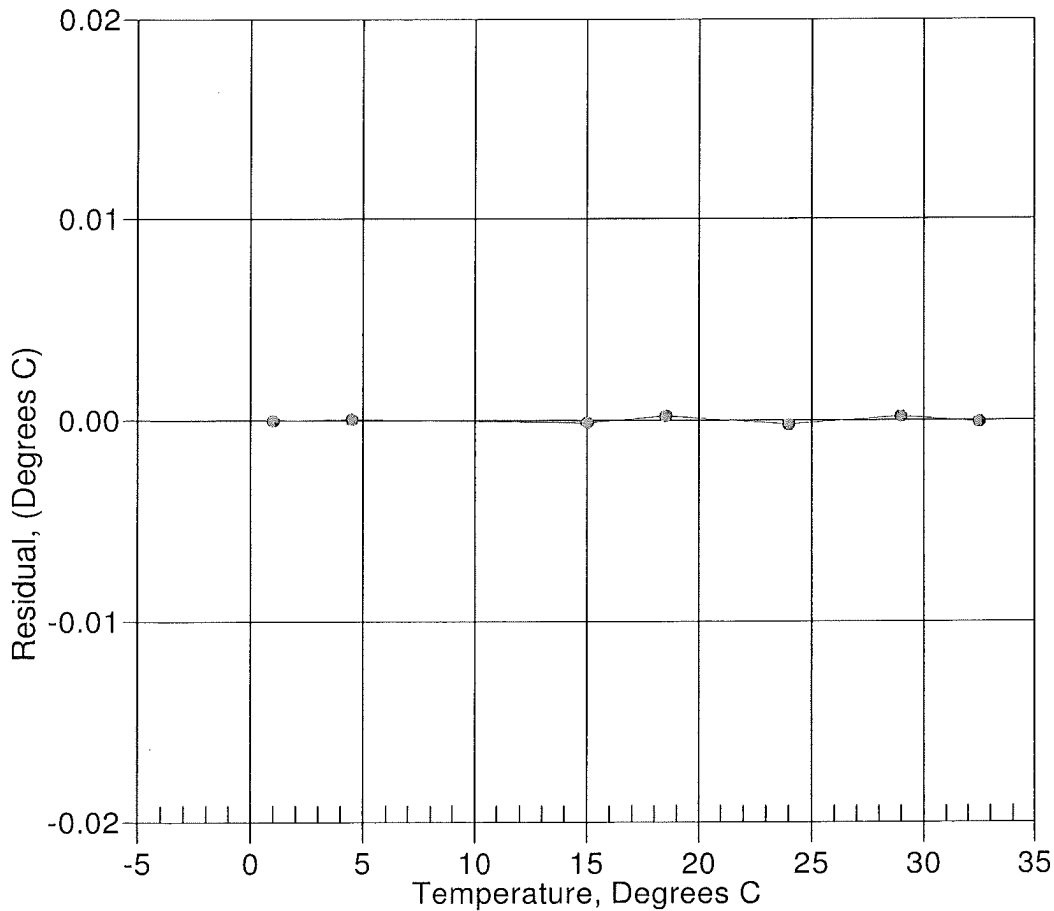
BATH TEMP (ITS-90)	INSTRUMENT OUTPUT	INST TEMP (ITS-90)	RESIDUAL (ITS-90)
1.0000	566474.0	1.0000	-0.0000
4.5000	484677.8	4.5000	0.0000
15.0000	309581.0	14.9999	-0.0001
18.5000	268274.3	18.5002	0.0002
24.0000	215505.0	23.9998	-0.0002
29.0000	177675.0	29.0002	0.0002
32.5000	155742.0	32.4999	-0.0001

Temperature ITS-90 = $1 / \{a_0 + a_1[\ln(n)] + a_2[\ln^2(n)] + a_3[\ln^3(n)]\} - 273.15$ (°C)

Residual = instrument temperature - bath temperature

Date, Delta T (mdeg C)

04-Mar-14 -0.00



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CALIBRATION DATE: 26-Feb-14

SLOCUM PAYLOAD CTD
PRESSURE CALIBRATION DATA
1450 psia S/N 4101192

COEFFICIENTS:

PA0 = 6.628500e-002
PA1 = 4.502722e-003
PA2 = -1.364526e-011
PTEMPA0 = -6.985740e+001
PTEMPA1 = 5.154561e-002
PTEMPA2 = -6.470958e-007

PTCA0 = 5.245701e+005
PTCA1 = 4.687887e-001
PTCA2 = 1.208378e-003
PTCB0 = 2.495337e+001
PTCB1 = -9.250000e-004
PTCB2 = 0.000000e+000

PRESSURE SPAN CALIBRATION

PRESSURE PSIA	INST OUTPUT	THERMISTOR OUTPUT	COMPUTED PRESSURE	ERROR %FSR
14.53	527791.0	1802.0	14.53	0.00
314.68	594418.0	1806.0	314.70	0.00
914.86	727673.0	1808.0	914.69	-0.01
1214.62	794324.0	1810.0	1214.61	-0.00
1464.72	849921.0	1810.0	1464.70	-0.00
1214.62	794348.0	1810.0	1214.72	0.01
914.64	727673.0	1810.0	914.69	0.00
614.68	661033.0	1809.0	614.70	0.00
314.75	594429.0	1810.0	314.76	0.00
14.53	527786.0	1811.0	14.51	-0.00

THERMAL CORRECTION

TEMP ITS90	THERMISTOR OUTPUT	INST OUTPUT
32.50	2038	527847.25
29.00	1967	527847.75
24.00	1864	527847.50
18.50	1753	527841.00
15.00	1682	527837.00
4.50	1469	527836.50
1.00	1400	527830.50

TEMP (ITS90)	SPAN (mV)
-5.00	24.96
35.00	24.92

$$y = \text{thermistor output}; t = PTEMPA0 + PTEMPA1 * y + PTEMPA2 * y^2$$

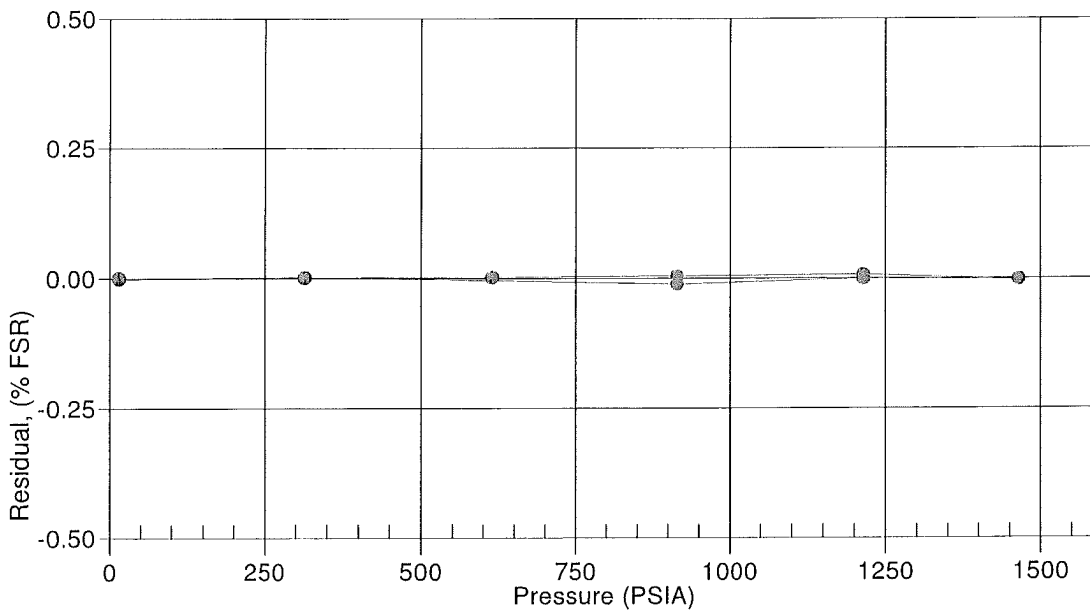
$$x = \text{pressure output} - PTCA0 - PTCA1 * t - PTCA2 * t^2$$

$$n = x * PTCB0 / (PTCB0 + PTCB1 * t + PTCB2 * t^2)$$

$$\text{pressure (psia)} = PA0 + PA1 * n + PA2 * n^2$$

Date, Avg Delta P %FS

● 26-Feb-14 -0.00



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SLOCUM PAYLOAD CTD
CONDUCTIVITY CALIBRATION DATA
PSS 1978: C(35,15,0) = 4.2914 Siemens/meter

COEFFICIENTS:

g = -9.946153e-001	CPcor = -9.5700e-008
h = 1.295782e-001	CTcor = 3.2500e-006
i = -3.480677e-004	WBOTC = 3.0001e-008
j = 4.227463e-005	

BATH TEMP (ITS-90)	BATH SAL (PSU)	BATH COND (Siemens/m)	INST FREQ (Hz)	INST COND (Siemens/m)	RESIDUAL (Siemens/m)
22.0000	0.0000	0.00000	2777.40	0.00000	0.00000
1.0000	34.8090	2.97540	5548.67	2.97541	0.00001
4.5000	34.7892	3.28242	5758.64	3.28242	-0.00000
15.0000	34.7468	4.26399	6382.86	4.26396	-0.00003
18.5000	34.7375	4.60904	6587.95	4.60906	0.00002
24.0000	34.7272	5.16684	6906.22	5.16685	0.00001
29.0000	34.7210	5.68846	7190.70	5.68845	-0.00001

$$f = \text{INST FREQ} * \text{sqrt}(1.0 + \text{WBOTC} * t) / 1000.0$$

$$\text{Conductivity} = (g + hf^2 + if^3 + jf^4) / (1 + \delta t + \epsilon p) \text{ Siemens/meter}$$

t = temperature[°C]; p = pressure[decibars]; δ = CTcor; ϵ = CPcor;

Residual = instrument conductivity - bath conductivity

