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: 9269
CALIBRATION DATE: 12-Jan-15

Slocum Payload CTD PRESSURE CALIBRATION DATA
FSR: 1450 psia S/N 4314735

COEFFICIENTS:

PA0 =	2.561136e-001	PTCA0 =	5.241982e+005
PA1 =	4.687350e-003	PTCA1 =	-1.762746e+000
PA2 =	-3.118241e-011	PTCA2 =	1.874702e-001
PTEMPA0 =	1.287501e+002	PTCB0 =	2.525125e+001
PTEMPA1 =	-6.012557e-002	PTCB1 =	5.000000e-005
PTEMPA2 =	-2.185924e-006	PTCB2 =	0.000000e+000

PRESSURE SPAN CALIBRATION

PRESSURE PSIA	INST OUTPUT	THERMISTOR OUTPUT	COMPUTED PRESSURE	ERROR %FS
14.78	527358.0	1667.0	14.81	0.00
315.11	591454.0	1663.0	315.09	-0.00
615.07	655537.0	1662.0	615.05	-0.00
915.04	719679.0	1660.0	915.04	0.00
1215.01	783874.0	1658.0	1215.01	0.00
1464.99	837404.0	1656.0	1464.96	-0.00
1215.01	783879.0	1657.0	1215.04	0.00
915.06	719691.0	1659.0	915.09	0.00
615.10	655546.0	1658.0	615.09	-0.00
315.13	591458.0	1661.0	315.10	-0.00
14.78	527355.0	1660.0	14.78	-0.00

THERMAL CORRECTION

TEMP ITS90	THERMISTOR OUTPUT	INST OUTPUT
32.50	1518	527491.40
29.00	1569	527451.20
23.99	1644	527415.20
18.50	1726	527379.00
15.00	1777	527365.80
4.50	1931	527343.80
1.00	1982	527346.80

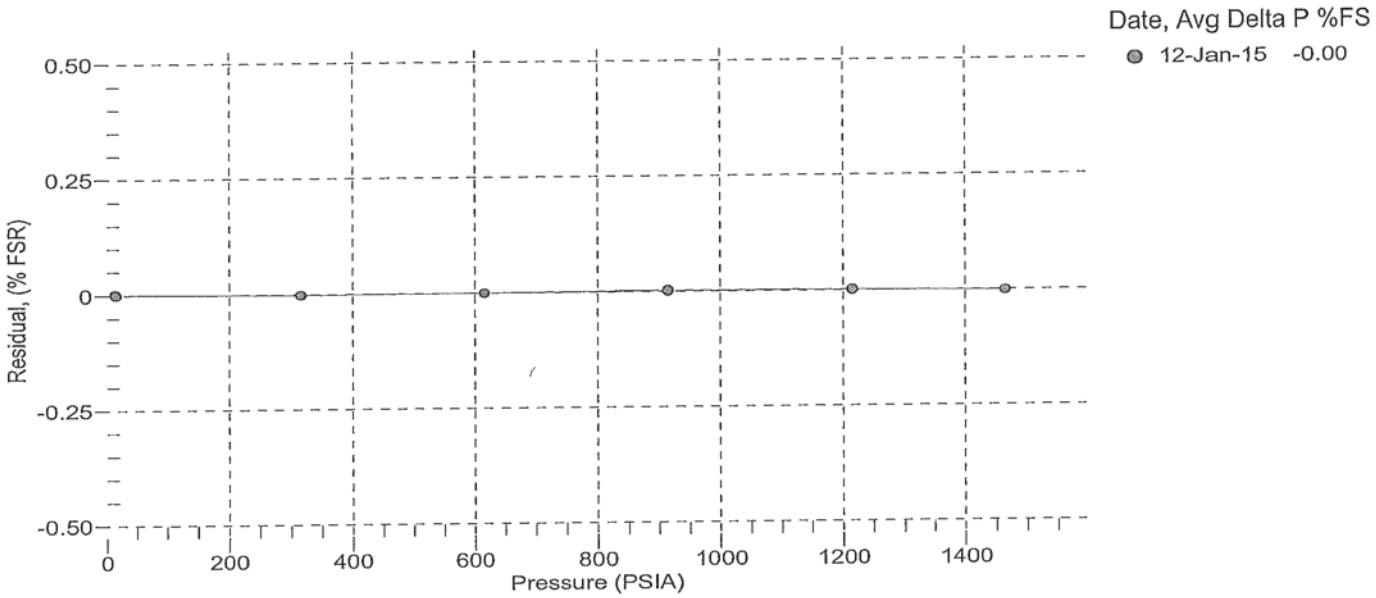
TEMP (ITS90)	SPAN (mV)
-5.00	25.25
35.00	25.25

y = thermistor output; $t = PTEMPA0 + PTEMPA1 * y + PTEMPA2 * y^2$

x = pressure output - $PTCA0 - PTCA1 * t - PTCA2 * t^2$

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

pressure (psia) = $PA0 + PA1 * n + PA2 * n^2$



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SENSOR SERIAL NUMBER: 9269
CALIBRATION DATE: 17-Jan-15

Slocum Payload CTD TEMPERATURE CALIBRATION DATA
ITS-90 TEMPERATURE SCALE

COEFFICIENTS:

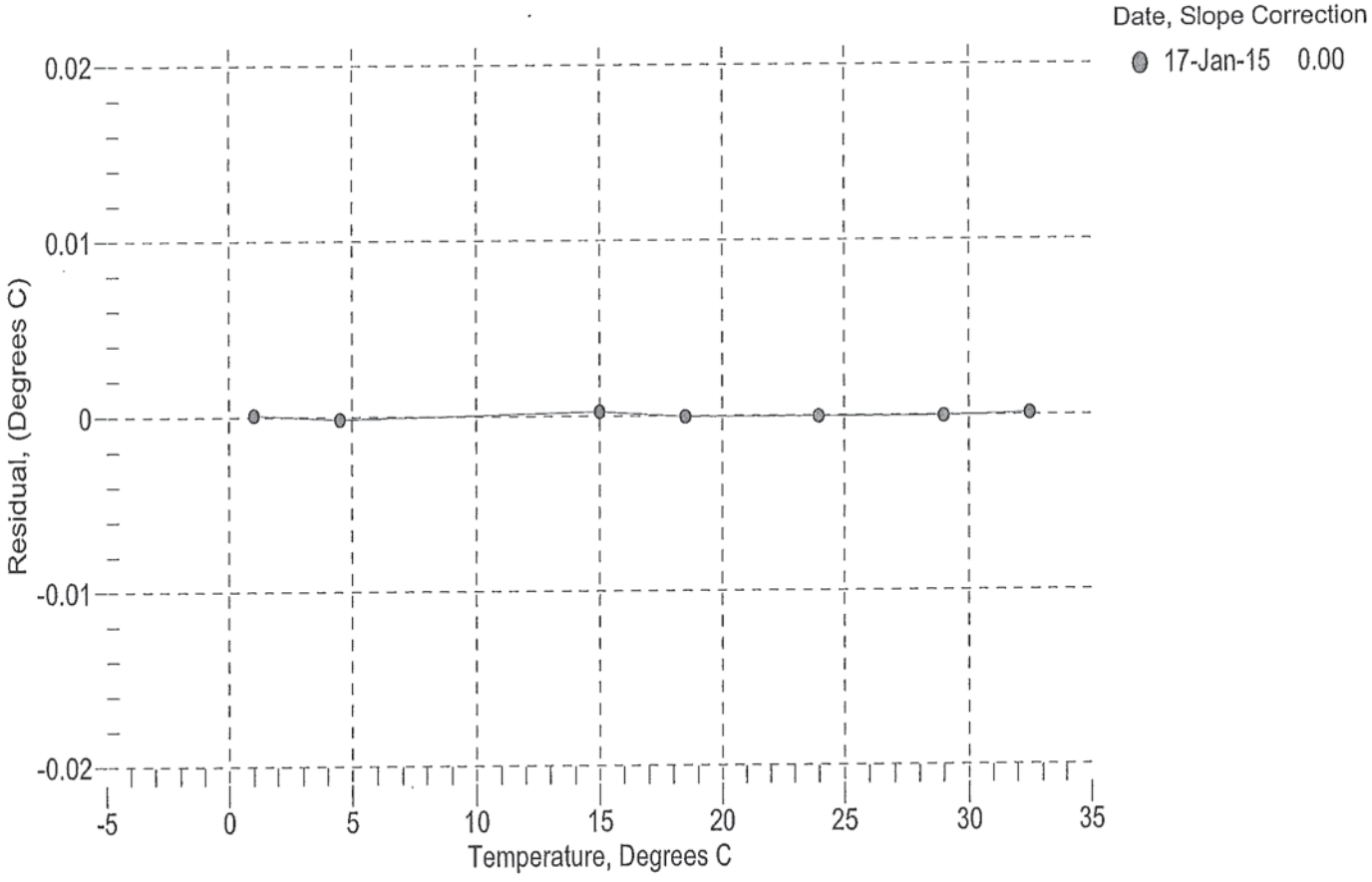
a0 = -1.132004e-004
a1 = 3.054029e-004
a2 = -4.255376e-006
a3 = 1.961393e-007

BATH TEMP (ITS-90)	INSTRUMENT OUTPUT	INST TEMP (ITS-90)	RESIDUAL (ITS-90)
1.0000	577890.0	1.0001	0.0001
4.5000	494623.6	4.4998	-0.0002
15.0000	316258.8	15.0002	0.0002
18.5000	274162.4	18.4999	-0.0001
23.9940	220397.2	23.9939	-0.0001
29.0000	181749.4	28.9999	-0.0001
32.5000	159357.6	32.5001	0.0001

Temperature ITS-90 = $1/\{a0 + a1[ln(n)] + a2[ln^2(n)] + a3[ln^3(n)]\} - 273.15$ (°C)

Residual = instrument temperature - bath temperature

n = instrument output



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CALIBRATION DATE: 17-Jan-15

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

COEFFICIENTS:

```
g = -9.854851e-001
h =  1.400135e-001
i = -2.417621e-004
j =  3.726159e-005

CPcor = -9.5700e-008
CTcor =  3.2500e-006
WBOTC =  6.9004e-007
```

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	2656.60	0.00000	0.00000
1.0000	34.8900	2.98166	5327.36	2.98167	0.00000
4.5000	34.8701	3.28930	5529.43	3.28929	-0.00001
15.0000	34.8272	4.27281	6130.15	4.27282	0.00001
18.5000	34.8181	4.61858	6327.52	4.61858	-0.00000
23.9940	34.8080	5.17691	6633.53	5.17691	0.00000
29.0000	34.8020	5.70024	6907.72	5.70023	-0.00001
32.5000	34.7978	6.07313	7096.44	6.07313	0.00001

f = INST FREQ * sqrt(1.0 + WBOTC * t) / 1000.0

Conductiv ity = $(g + h * f^2 + i * f^3 + j * f^4) / (1 + \delta * t + \varepsilon * p)$ Siemens / meter

t = temperatur e[°C)]; p = pressure[decibars]; δ = CTcor; ε = CPcor;

Residual = instrument conductivity - bath conductivity