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: 9023
CALIBRATION DATE: 19-Aug-12

SLOCUM PAYLOAD CTD
TEMPERATURE CALIBRATION DATA
ITS-90 TEMPERATURE SCALE

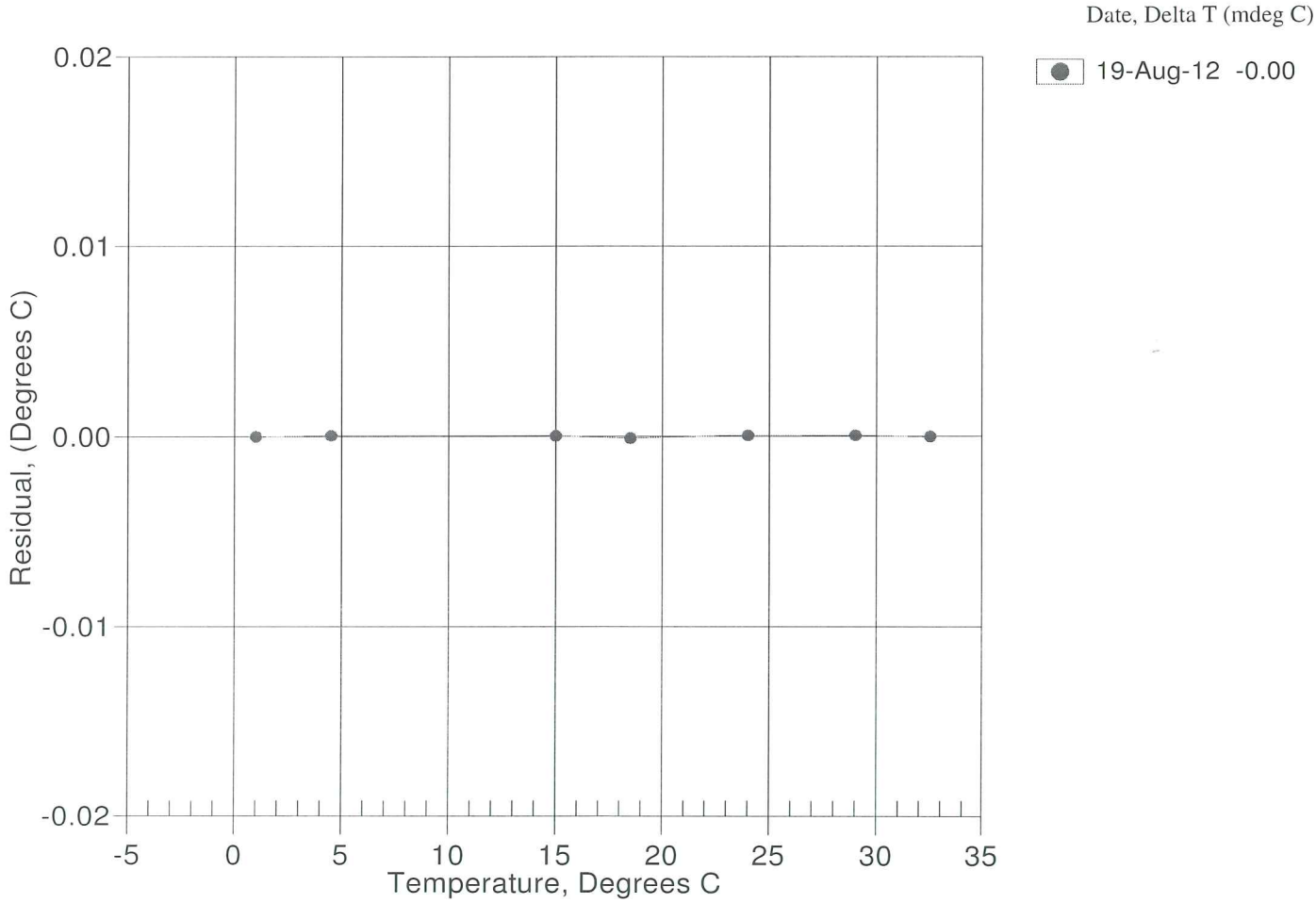
ITS-90 COEFFICIENTS

a0 = -1.065761e-004
a1 = 3.075909e-004
a2 = -4.530560e-006
a3 = 2.026894e-007

BATH TEMP (ITS-90)	INSTRUMENT OUTPUT	INST TEMP (ITS-90)	RESIDUAL (ITS-90)
1.0000	572982.9	1.0000	-0.0000
4.5000	489971.3	4.5000	0.0000
15.0000	312468.5	15.0000	0.0000
18.5000	270647.1	18.4999	-0.0001
24.0000	217240.0	24.0001	0.0001
29.0000	178985.6	29.0000	0.0000
32.5000	156814.6	32.5000	-0.0000

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

Residual = instrument temperature - bath temperature



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CALIBRATION DATE: 19-Aug-12

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

COEFFICIENTS:

```
g = -9.929285e-001
h =  1.400408e-001
i = -2.055461e-004
j =  3.428454e-005

CPcor = -9.5700e-008
CTcor =  3.2500e-006
WBOTC = -3.4385e-007
```

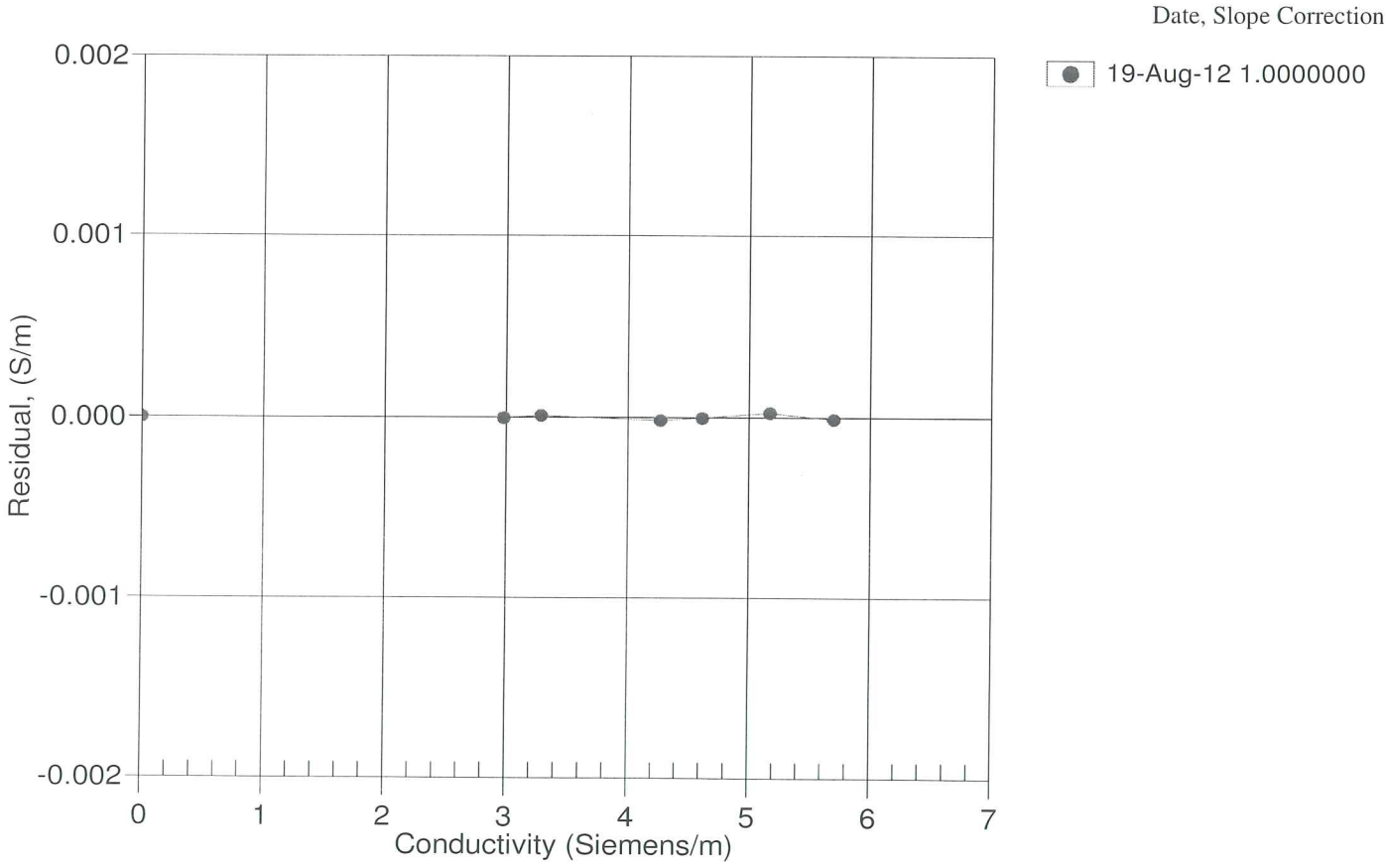
BATH TEMP (ITS-90)	BATH SAL (PSU)	BATH COND (Siemens/m)	INST FREQ (Hz)	INST COND (Siemens/m)	RESIDUAL (Siemens/m)
22.0000	0.0000	0.00000	2665.67	0.00000	0.00000
1.0000	34.8504	2.97860	5327.72	2.97860	-0.00000
4.5000	34.8303	3.28591	5529.38	3.28592	0.00001
15.0000	34.7880	4.26851	6129.01	4.26849	-0.00002
18.5000	34.7792	4.61398	6326.09	4.61398	-0.00000
24.0000	34.7702	5.17253	6632.05	5.17255	0.00002
29.0000	34.7661	5.69502	6905.65	5.69501	-0.00001

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

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

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

Residual = instrument conductivity - bath conductivity



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SENSOR SERIAL NUMBER: 9023
CALIBRATION DATE: 14-Aug-12

SLOCUM PAYLOAD CTD
PRESSURE CALIBRATION DATA
1450 psia S/N 3647167

COEFFICIENTS:

PA0 =	-5.107743e-002	PTCA0 =	5.236758e+005
PA1 =	4.572149e-003	PTCA1 =	-3.781976e-001
PA2 =	-2.497048e-011	PTCA2 =	-5.521415e-003
PTEMPA0 =	-6.888531e+001	PTCB0 =	2.539625e+001
PTEMPA1 =	5.208900e-002	PTCB1 =	-3.500000e-004
PTEMPA2 =	-5.257954e-007	PTCB2 =	0.000000e+000

PRESSURE SPAN CALIBRATION

PRESSURE PSIA	INST OUTPUT	THERMISTOR OUTPUT	COMPUTED PRESSURE	ERROR %FSR
14.57	526870.0	1804.0	14.61	0.00
314.96	592555.0	1805.0	314.91	-0.00
614.97	658224.0	1807.0	614.93	-0.00
914.93	723937.0	1807.0	914.92	-0.00
1214.89	789693.0	1807.0	1214.90	0.00
1464.91	844520.0	1808.0	1464.86	-0.00
1214.85	789696.0	1808.0	1214.91	0.00
914.90	723943.0	1807.0	914.95	0.00
614.94	658229.0	1807.0	614.95	0.00
314.98	592563.0	1807.0	314.95	-0.00
14.56	526860.0	1808.0	14.57	0.00

THERMAL CORRECTION

TEMP ITS90	THERMISTOR OUTPUT	INST OUTPUT
32.50	1986	526914.90
29.00	1916	526922.40
24.00	1817	526925.70
18.50	1707	526926.00
15.00	1638	526926.40
4.50	1430	526933.90
1.00	1360	526935.70

TEMP(ITS90)	SPAN(mV)
-5.00	25.40
35.00	25.38

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) = $PA0 + PA1 * n + PA2 * n^2$