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: 9029
CALIBRATION DATE: 30-Aug-12

SLOCUM PAYLOAD CTD
TEMPERATURE CALIBRATION DATA
ITS-90 TEMPERATURE SCALE

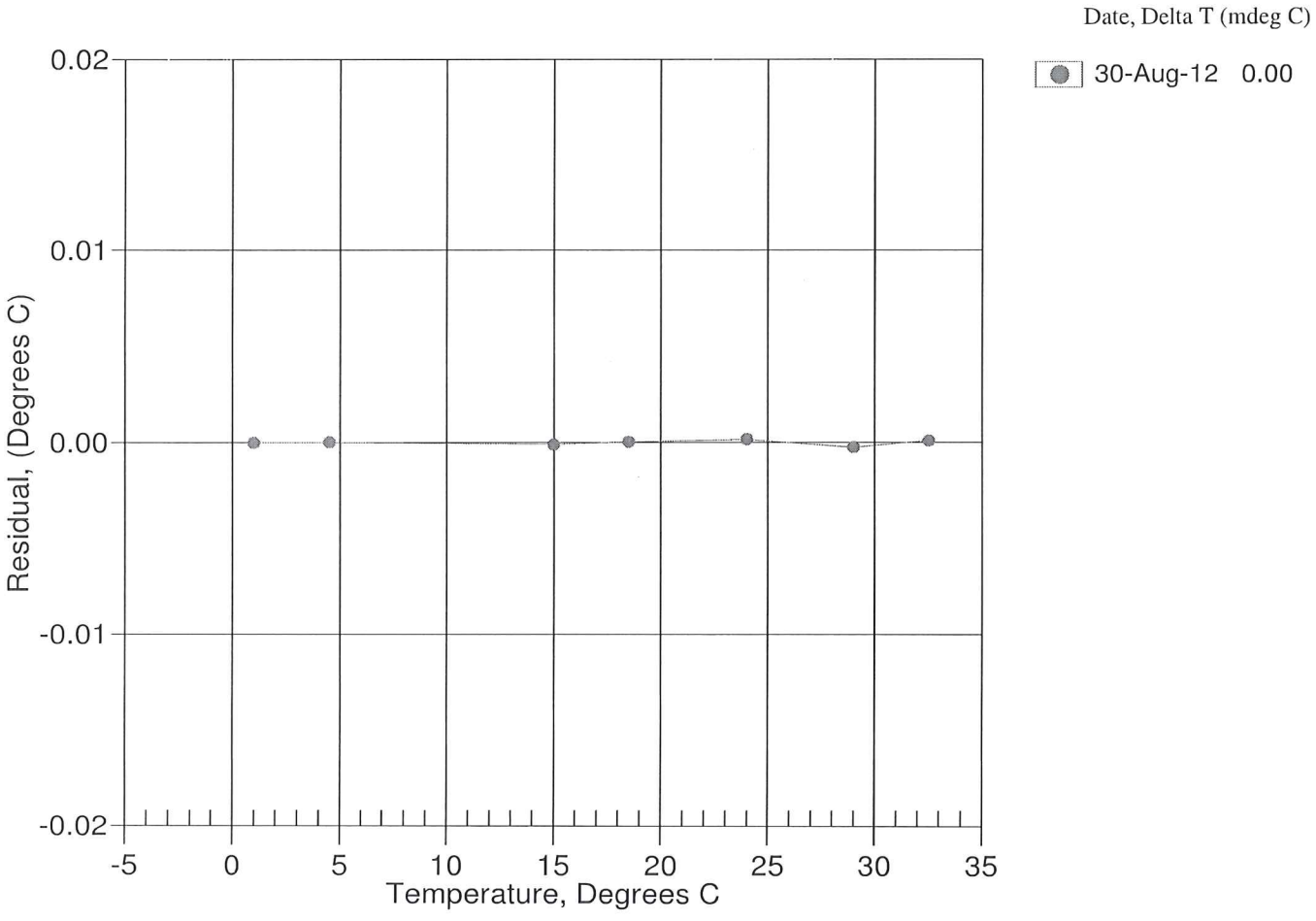
ITS-90 COEFFICIENTS

a0 = -5.638979e-005
a1 = 2.959402e-004
a2 = -3.644306e-006
a3 = 1.792879e-007

BATH TEMP (ITS-90)	INSTRUMENT OUTPUT	INST TEMP (ITS-90)	RESIDUAL (ITS-90)
1.0000	578926.8	1.0000	-0.0000
4.5000	494945.4	4.5000	0.0000
15.0000	315445.0	14.9999	-0.0001
18.5000	273167.6	18.5000	0.0000
24.0000	219194.6	24.0002	0.0002
29.0000	180547.0	28.9998	-0.0002
32.5000	158148.0	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



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CALIBRATION DATE: 30-Aug-12

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

COEFFICIENTS:

```
g = -9.873373e-001
h =  1.436806e-001
i = -2.069419e-004
j =  3.580785e-005

CPcor = -9.5700e-008
CTcor =  3.2500e-006
WBOTC = -9.5261e-008
```

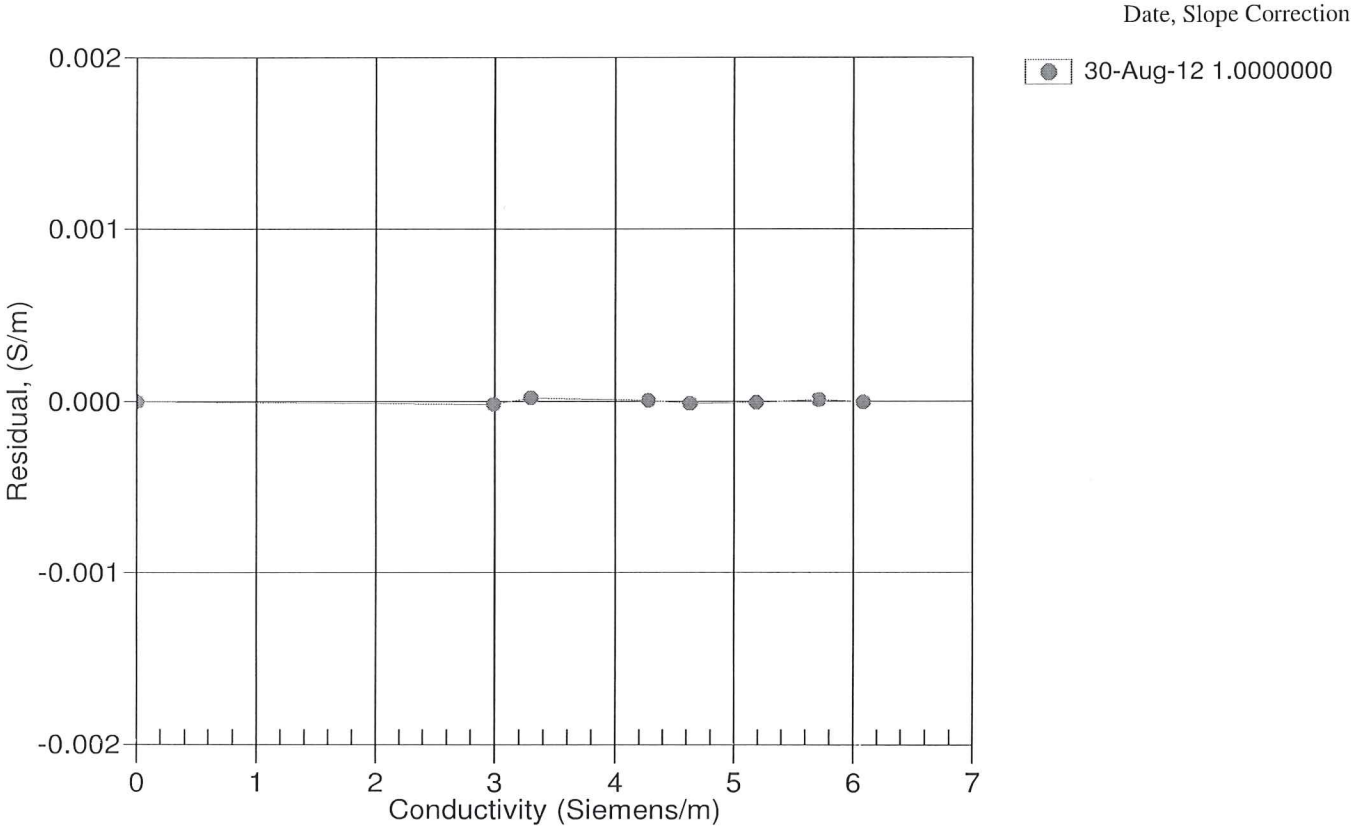
BATH TEMP (ITS-90)	BATH SAL (PSU)	BATH COND (Siemens/m)	INST FREQ (Hz)	INST COND (Siemens/m)	RESIDUAL (Siemens/m)
22.0000	0.0000	0.00000	2624.11	0.00000	0.00000
1.0000	34.9490	2.98622	5260.64	2.98621	-0.00002
4.5000	34.9289	3.29430	5460.14	3.29432	0.00002
15.0000	34.8860	4.27926	6053.20	4.27926	0.00001
18.5000	34.8771	4.62556	6248.08	4.62555	-0.00001
24.0000	34.8674	5.18539	6550.59	5.18538	-0.00001
29.0000	34.8626	5.70905	6821.11	5.70906	0.00001
32.5000	34.8605	6.08282	7007.62	6.08282	-0.00000

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: 9029
CALIBRATION DATE: 27-Aug-12

SLOCUM PAYLOAD CTD
PRESSURE CALIBRATION DATA
1450 psia S/N 3701173

COEFFICIENTS:

PA0 =	2.481023e-001	PTCA0 =	5.246154e+005
PA1 =	4.625401e-003	PTCA1 =	-8.434930e-001
PA2 =	-1.975458e-011	PTCA2 =	1.266496e-001
PTEMPA0 =	-7.081564e+001	PTCB0 =	2.545125e+001
PTEMPA1 =	5.211363e-002	PTCB1 =	-3.550000e-003
PTEMPA2 =	-6.058207e-007	PTCB2 =	0.000000e+000

PRESSURE SPAN CALIBRATION

PRESSURE PSIA	INST OUTPUT	THERMISTOR OUTPUT	COMPUTED PRESSURE	ERROR %FSR
14.62	527756.0	1819.0	14.62	-0.00
314.98	592499.0	1821.0	314.92	-0.00
614.92	657207.0	1821.0	614.88	-0.00
914.81	721947.0	1821.0	914.83	0.00
1214.81	786725.0	1822.0	1214.80	-0.00
1464.81	840736.0	1823.0	1464.78	-0.00
1214.85	786738.0	1823.0	1214.86	0.00
914.85	721964.0	1824.0	914.93	0.01
614.93	657218.0	1824.0	614.94	0.00
315.00	592510.0	1823.0	314.97	-0.00
14.62	527770.0	1825.0	14.68	0.00

THERMAL CORRECTION

TEMP ITS90	THERMISTOR OUTPUT	INST OUTPUT
32.50	2030	527890.20
29.00	1960	527868.40
24.00	1859	527838.40
18.50	1749	527813.00
15.00	1680	527798.60
4.50	1470	527785.80
1.00	1401	527783.20

TEMP(ITS90)	SPAN(mV)
-5.00	25.47
35.00	25.33

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