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: 9030
CALIBRATION DATE: 30-Aug-12

SLOCUM PAYLOAD CTD
TEMPERATURE CALIBRATION DATA
ITS-90 TEMPERATURE SCALE

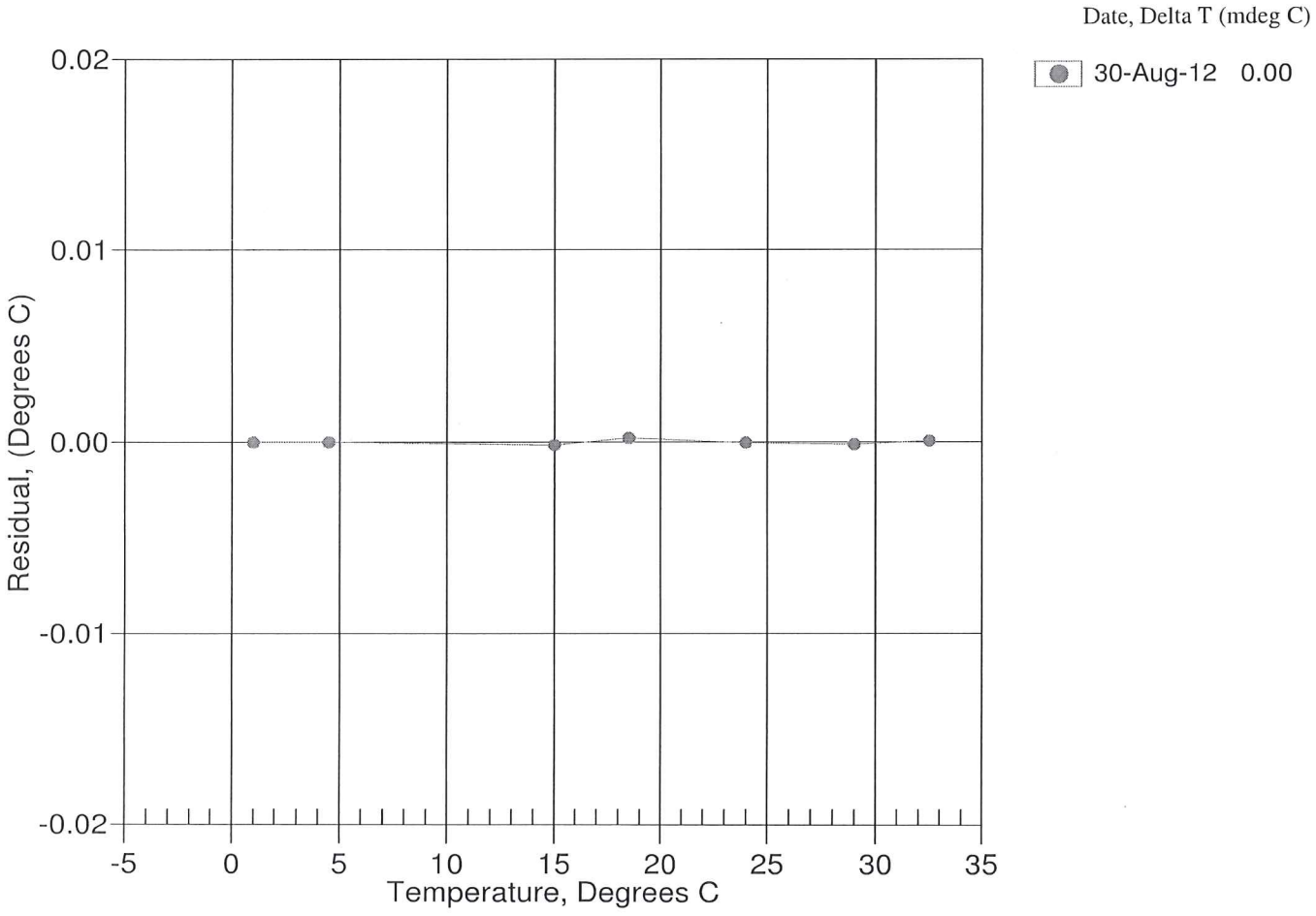
ITS-90 COEFFICIENTS

a0 = -4.680886e-005
a1 = 2.954395e-004
a2 = -3.720512e-006
a3 = 1.819870e-007

BATH TEMP (ITS-90)	INSTRUMENT OUTPUT	INST TEMP (ITS-90)	RESIDUAL (ITS-90)
1.0000	587238.6	1.0000	0.0000
4.5000	501781.6	4.5000	0.0000
15.0000	319289.8	14.9999	-0.0001
18.5000	276348.0	18.5002	0.0002
24.0000	221567.0	24.0000	-0.0000
29.0000	182363.4	28.9999	-0.0001
32.5000	159658.0	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 = -9.885307e-001
h =  1.366668e-001
i = -1.988434e-004
j =  3.268173e-005

CPcor = -9.5700e-008
CTcor =  3.2500e-006
WBOTC = -2.1664e-007
```

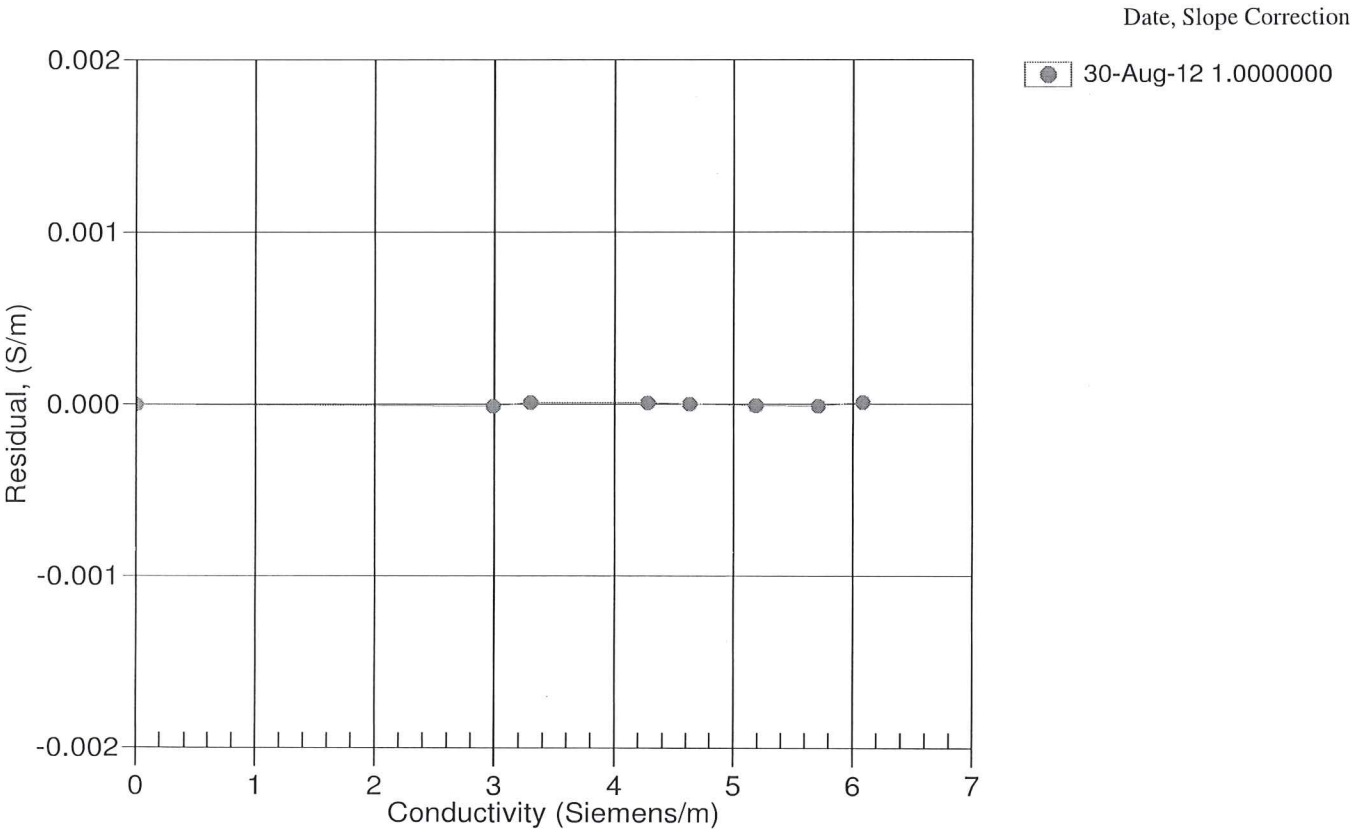
BATH TEMP (ITS-90)	BATH SAL (PSU)	BATH COND (Siemens/m)	INST FREQ (Hz)	INST COND (Siemens/m)	RESIDUAL (Siemens/m)
22.0000	0.0000	0.00000	2692.40	0.00000	0.00000
1.0000	34.9490	2.98622	5395.31	2.98621	-0.00001
4.5000	34.9289	3.29430	5599.87	3.29431	0.00001
15.0000	34.8860	4.27926	6208.01	4.27927	0.00001
18.5000	34.8771	4.62556	6407.85	4.62556	0.00000
24.0000	34.8674	5.18539	6718.05	5.18538	-0.00001
29.0000	34.8626	5.70905	6995.44	5.70904	-0.00001
32.5000	34.8605	6.08282	7186.71	6.08283	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: 9030
CALIBRATION DATE: 27-Aug-12

SLOCUM PAYLOAD CTD
PRESSURE CALIBRATION DATA
1450 psia S/N 3697024

COEFFICIENTS:

PA0 =	-2.724669e-002	PTCA0 =	5.244624e+005
PA1 =	4.663002e-003	PTCA1 =	-1.842554e+000
PA2 =	-1.445390e-011	PTCA2 =	7.112477e-002
PTEMPA0 =	-6.991548e+001	PTCB0 =	2.530262e+001
PTEMPA1 =	5.170511e-002	PTCB1 =	9.250000e-004
PTEMPA2 =	-4.899333e-007	PTCB2 =	0.000000e+000

PRESSURE SPAN CALIBRATION

PRESSURE PSIA	INST OUTPUT	THERMISTOR OUTPUT	COMPUTED PRESSURE	ERROR %FSR
14.63	527612.0	1827.0	14.67	0.00
315.00	592076.0	1828.0	314.95	-0.00
614.99	656501.0	1829.0	614.92	-0.00
914.88	720956.0	1829.0	914.92	0.00
1214.86	785425.0	1830.0	1214.86	-0.00
1464.85	839169.0	1830.0	1464.81	-0.00
1214.85	785433.0	1830.0	1214.89	0.00
914.87	720960.0	1829.0	914.94	0.00
614.93	656505.0	1829.0	614.94	0.00
314.98	592077.0	1829.0	314.95	-0.00
14.63	527609.0	1829.0	14.65	0.00

THERMAL CORRECTION

TEMP ITS90	THERMISTOR OUTPUT	INST OUTPUT
32.50	2019	527678.80
29.00	1949	527672.00
24.00	1849	527664.60
18.50	1739	527656.40
15.00	1669	527650.00
4.50	1459	527658.20
1.00	1390	527664.00

TEMP(ITS90)	SPAN(mV)
-5.00	25.30
35.00	25.34

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