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: 0075
CALIBRATION DATE: 14-Dec-11

GliderAPL CONDUCTIVITY CALIBRATION DATA
PSS 1978: C(35,15,0) = 4.2914 Seimens/meter

GHIJ COEFFICIENTS

```
g = -1.01079070e+001
h =  1.14750286e+000
i = -2.10769655e-003
j =  2.45147428e-004
CPcor = -9.5700e-008 (nominal)
CTcor =  3.2500e-006 (nominal)
```

ABCDM COEFFICIENTS

```
a =  6.02676088e-006
b =  1.14129945e+000
c = -1.00889893e+001
d = -8.70532053e-005
m =  5.2
CPcor = -9.5700e-008 (nominal)
```

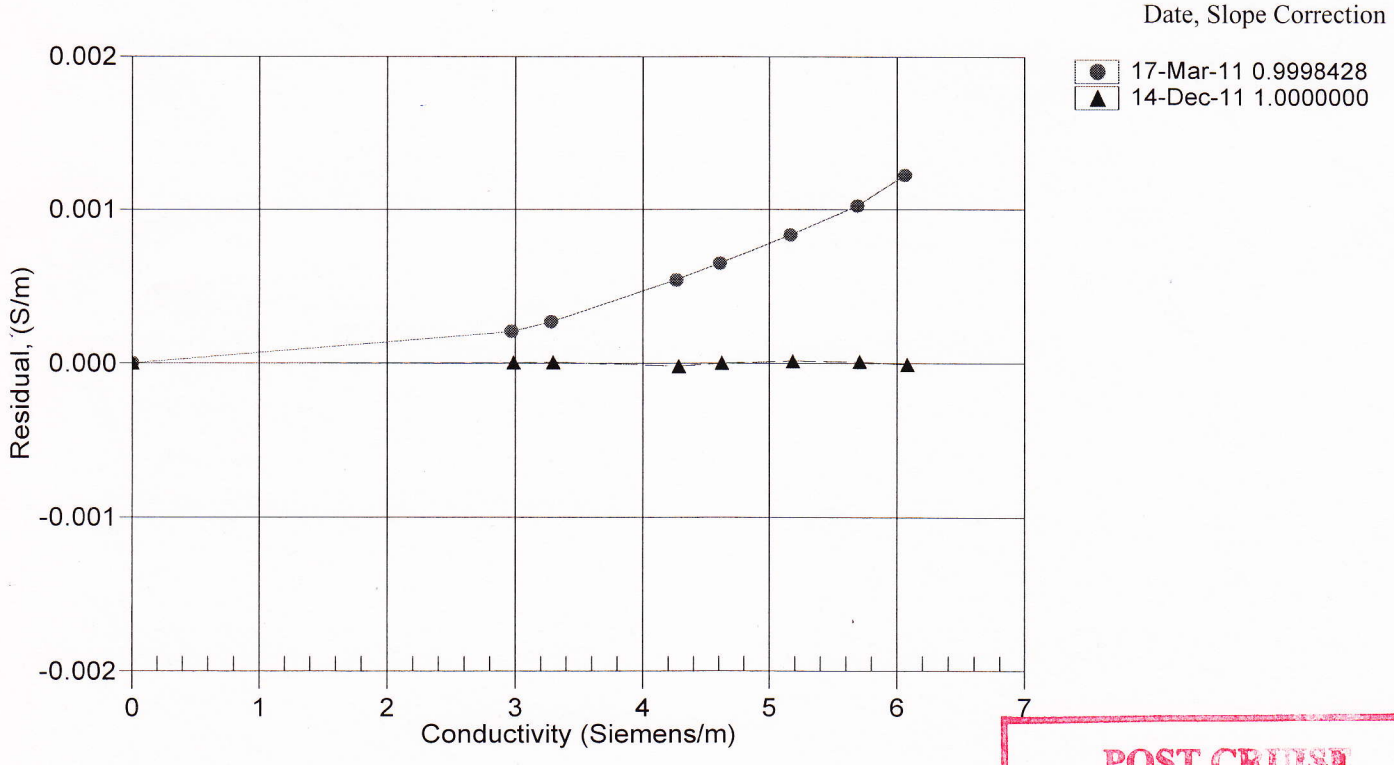
BATH TEMP (ITS-90)	BATH SAL (PSU)	BATH COND (Siemens/m)	INST FREQ (kHz)	INST COND (Siemens/m)	RESIDUAL (Siemens/m)
22.0000	0.0000	0.00000	2.97325	0.00000	0.00000
1.0000	34.9392	2.98547	5.91137	2.98547	0.00000
4.5000	34.9188	3.29344	6.13445	3.29344	0.00000
14.9999	34.8744	4.27798	6.79793	4.27796	-0.00002
18.4999	34.8645	4.62406	7.01602	4.62406	0.00000
23.9999	34.8529	5.18346	7.35456	5.18347	0.00001
29.0000	34.8441	5.70636	7.65716	5.70637	0.00001
32.5001	34.8370	6.07920	7.86561	6.07919	-0.00001

Conductivity = $(g + hf^2 + if^3 + jf^4) / 10(1 + \delta t + \varepsilon p)$ Siemens/meter

Conductivity = $(af^m + bf^2 + c + dt) / [10 (1 + \varepsilon p)$ Siemens/meter

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

Residual = (instrument conductivity - bath conductivity) using g, h, i, j coefficients



POST CRUISE CALIBRATION

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SENSOR SERIAL NUMBER: 0075
CALIBRATION DATE: 14-Dec-11

GliderAPL TEMPERATURE CALIBRATION DATA
ITS-90 TEMPERATURE SCALE

ITS-90 COEFFICIENTS

g = 4.39800857e-003
h = 6.39648787e-004
i = 2.52347891e-005
j = 2.66228490e-006
f0 = 1000.0

IPTS-68 COEFFICIENTS

a = 3.64763748e-003
b = 5.89961276e-004
c = 1.54803464e-005
d = 2.66382195e-006
f0 = 3402.851

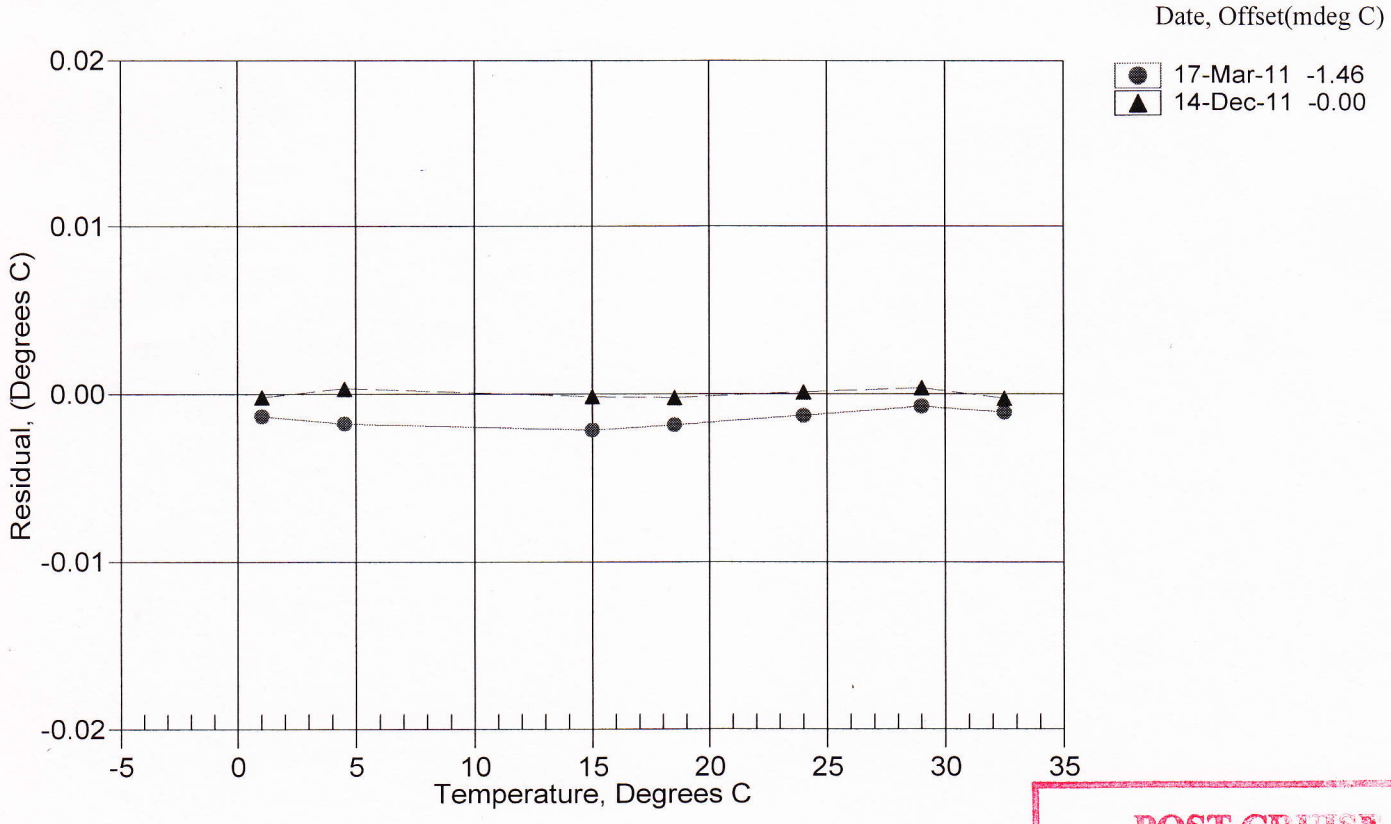
BATH TEMP (ITS-90)	INSTRUMENT FREQ (Hz)	INST TEMP (ITS-90)	RESIDUAL (ITS-90)
1.0000	3402.851	0.9998	-0.00019
4.5000	3679.369	4.5003	0.00034
14.9999	4605.996	14.9997	-0.00015
18.4999	4948.723	18.4997	-0.00022
23.9999	5523.047	24.0000	0.00012
29.0000	6084.115	29.0004	0.00036
32.5001	6499.421	32.4998	-0.00026

Temperature ITS-90 = $1/\{g + h[ln(f_0/f)] + i[ln^2(f_0/f)] + j[ln^3(f_0/f)]\} - 273.15$ (°C)

Temperature IPTS-68 = $1/\{a + b[ln(f_0/f)] + c[ln^2(f_0/f)] + d[ln^3(f_0/f)]\} - 273.15$ (°C)

Following the recommendation of JPOTS: T_{68} is assumed to be 1.00024 * T_{90} (-2 to 35 °C)

Residual = instrument temperature - bath temperature



POST CRUISE CALIBRATION

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Temperature Calibration Report

Customer:	SEAGLIDER FABRICATION CENTER		
Job Number:	66944	**Date of Report:**	12/14/2011
Model Number:	Glider	**Serial Number:**	0075 Glider T/C Assembly

Temperature sensors are normally calibrated 'as received', without adjustments, allowing a determination sensor drift. If the calibration identifies a problem, then a second calibration is performed after work is completed. The 'as received' calibration is not performed if the sensor is damaged or non-functional, or by customer request.

An 'as received' calibration certificate is provided, listing coefficients to convert sensor frequency to temperature. Users must choose whether the 'as received' calibration or the previous calibration better represents the sensor condition during deployment. In SEASOFT enter the chosen coefficients. The coefficient 'offset' allows a small correction for drift between calibrations (consult the SEASOFT manual). Calibration coefficients obtained after a repair apply only to subsequent data.

'AS RECEIVED CALIBRATION' ☑ Performed ☐ Not Performed

Date: 12/14/2011 Drift since last cal: +0.00196 Degrees Celsius/year

Comments:

'CALIBRATION AFTER REPAIR' ☐ Performed ☑ Not Performed

Date: Drift since Last cal: Degrees Celsius/year

Comments:

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Conductivity Calibration Report

Customer:	SEAGLIDER FABRICATION CENTER		
Job Number:	66944	**Date of Report:**	12/14/2011
Model Number:	Glider	**Serial Number:**	0075 Glider T/C Assembly

Conductivity sensors are normally calibrated 'as received', without cleaning or adjustments, allowing a determination of sensor drift. If the calibration identifies a problem or indicates cell cleaning is necessary, then a second calibration is performed after work is completed. The 'as received' calibration is not performed if the sensor is damaged or non-functional, or by customer request.

An 'as received' calibration certificate is provided, listing the coefficients used to convert sensor frequency to conductivity. Users must choose whether the 'as received' calibration or the previous calibration better represents the sensor condition during deployment. In SEASOFT enter the chosen coefficients. The coefficient 'slope' allows small corrections for drift between calibrations (consult the SEASOFT manual). Calibration coefficients obtained after a repair or cleaning apply only to subsequent data.

'AS RECEIVED CALIBRATION' ☑ Performed ☐ Not Performed

Date: 12/14/2011 Drift since last cal: -0.00050 PSU/month*

Comments:

'CALIBRATION AFTER CLEANING & REPLATINIZING' ☐ Performed ☑ Not Performed

Date: Drift since Last cal: PSU/month*

Comments:

**Measured at 3.0 S/m*

Cell cleaning and electrode replatinizing tend to 'reset' the conductivity sensor to its original condition. Lack of drift in post-cleaning-calibration indicates geometric stability of the cell and electrical stability of the sensor circuit.

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Service Report

RMA Number 66944A

Customer Information:

Company	SEAGLIDER FABRICATION CENTER	**Date**	1/11/2012
Contact	Karl Kunkle		
PO Number	100902		

Serial Number	0075 Glider T/C Assembly
Model Number	Glider

Services Requested:

1. Evaluate/Repair Instrumentation.
2. Perform Routine Calibration Service.

Problems Found:

Services Performed:

1. Performed initial diagnostic evaluation.
2. Performed "Post Cruise" calibration of the temperature & conductivity sensors.
3. Performed complete system check and full diagnostic evaluation.

Special Notes: