

SG146

SEA-BIRD ELECTRONICS, INC.

1808 136th Place N.E., Bellevue, Washington, 98005 USA

Phone: (425) 643 - 9866 Fax (425) 643 - 9954 Email: seabird@seabird.com

SENSOR SERIAL NUMBER: 0073
 CALIBRATION DATE: 29-Nov-08

GliderAPL TEMPERATURE CALIBRATION DATA
 ITS-90 TEMPERATURE SCALE

ITS-90 COEFFICIENTS

g = 4.29417617e-003
 h = 6.28392541e-004
 i = 2.32697640e-005
 j = 2.44072446e-006
 f0 = 1000.0

IPTS-68 COEFFICIENTS

a = 3.64763525e-003
 b = 5.87233566e-004
 c = 1.54885396e-005
 d = 2.44223332e-006
 f0 = 2904.520

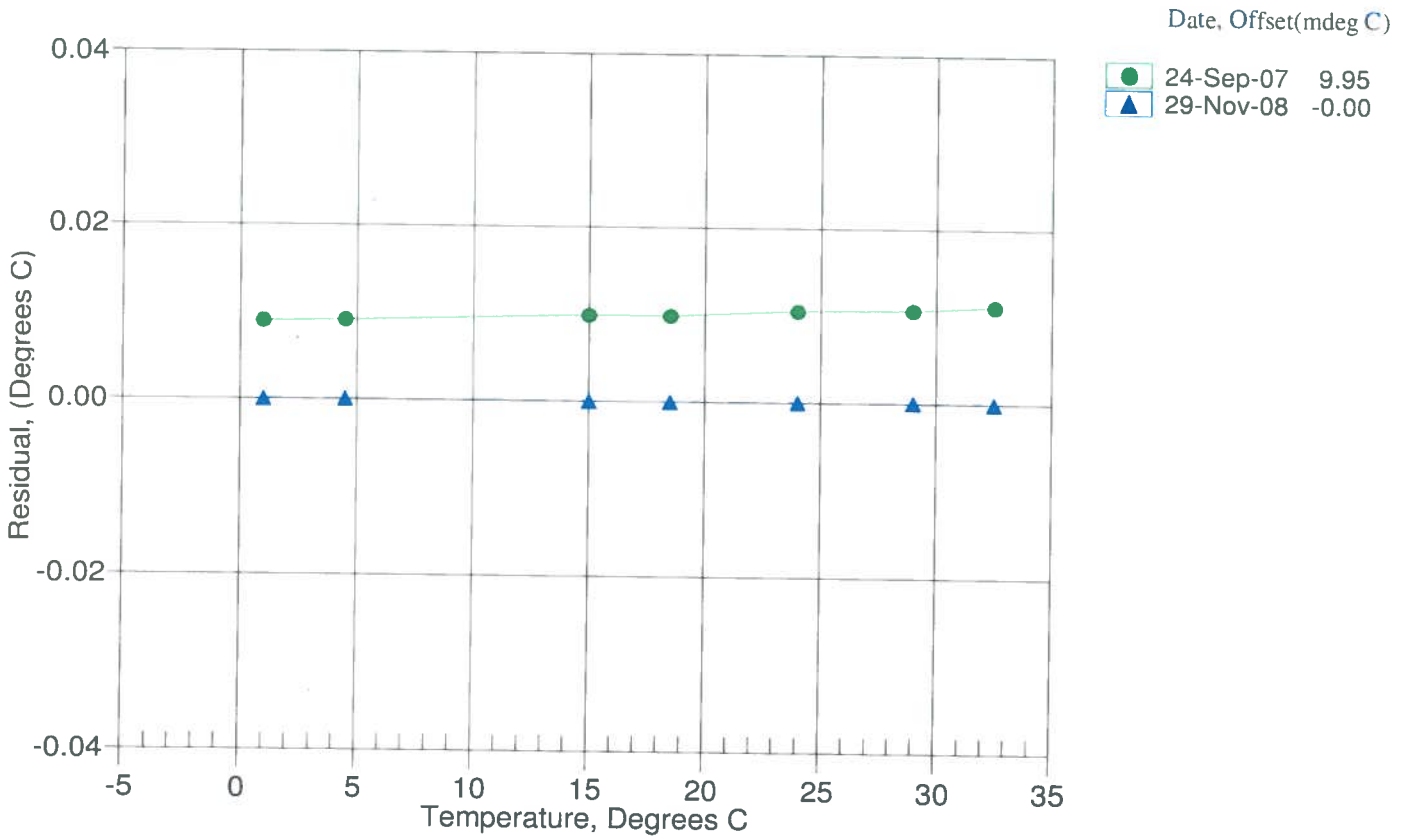
BATH TEMP (ITS-90)	INSTRUMENT FREQ (Hz)	INST TEMP (ITS-90)	RESIDUAL (ITS-90)
1.0000	2904.520	1.0000	-0.00002
4.5000	3141.656	4.5000	0.00004
15.0000	3937.139	15.0000	0.00000
18.5000	4231.597	18.4999	-0.00005
24.0000	4725.292	24.0000	0.00002
29.0000	5207.914	29.0001	0.00005
32.5000	5565.422	32.5000	-0.00004

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



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CALIBRATION DATE: 29-Nov-08

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

GHIJ COEFFICIENTS

g = -1.00839027e+001
h = 1.12836892e+000
i = -1.24331547e-003
j = 1.89101441e-004
CPcor = -9.5700e-008 (nominal)
CTcor = 3.2500e-006 (nominal)

ABCDM COEFFICIENTS

a = 2.46249342e-005
b = 1.12478566e+000
c = -1.00718703e+001
d = -8.34875415e-005
m = 4.6
CPcor = -9.5700e-008 (nominal)

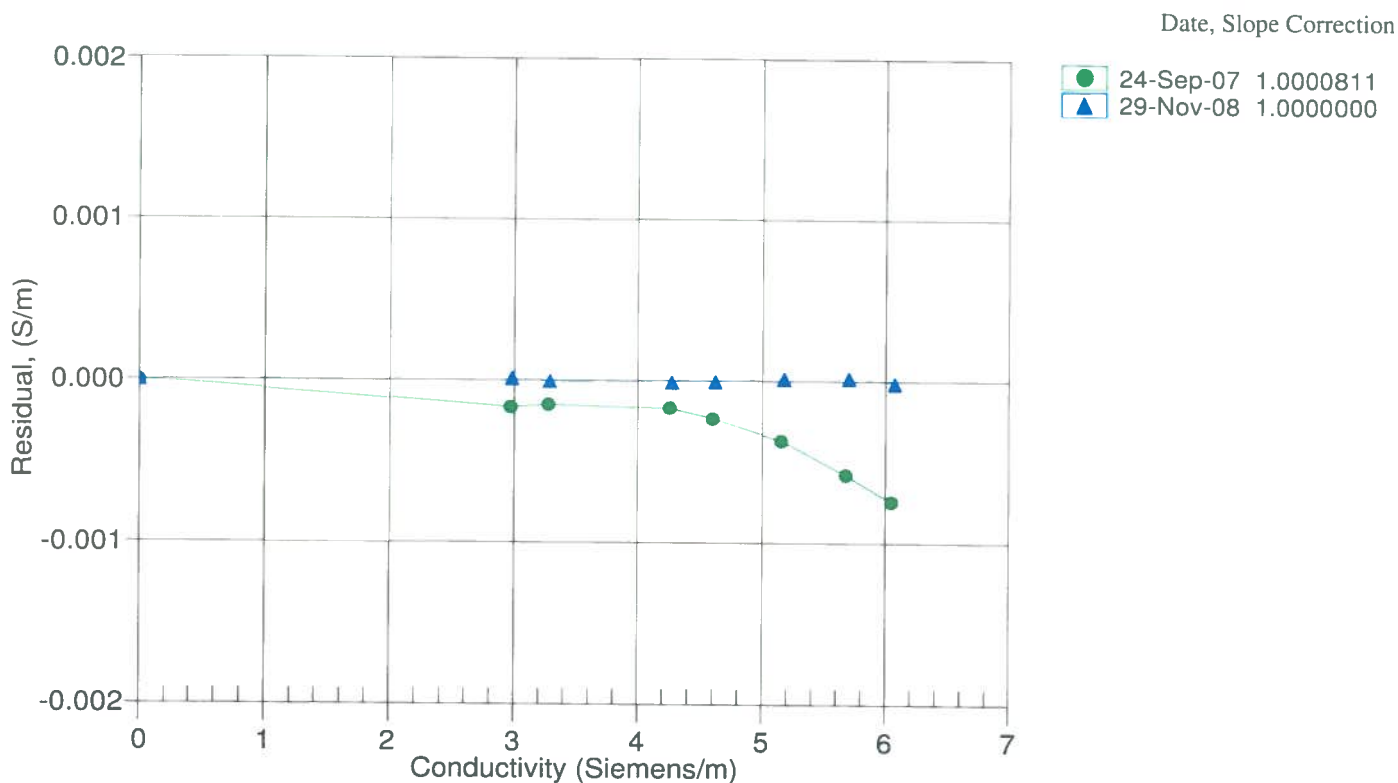
BATH TEMP (ITS-90)	BATH SAL (PSU)	BATH COND (Siemens/m)	INST FREQ (kHz)	INST COND (Siemens/m)	RESIDUAL (Siemens/m)
22.0000	0.0000	0.00000	2.99212	0.00000	0.00000
1.0000	34.8855	2.98132	5.94815	2.98133	0.00001
4.5000	34.8661	3.28896	6.17259	3.28895	-0.00001
15.0000	34.8239	4.27245	6.84019	4.27243	-0.00001
18.5000	34.8151	4.61823	7.05966	4.61822	-0.00001
24.0000	34.8052	5.17716	7.40041	5.17717	0.00001
29.0000	34.7997	5.69991	7.70516	5.69992	0.00002
32.5000	34.7966	6.07294	7.91526	6.07293	-0.00002

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

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

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

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



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SENSOR SERIAL NUMBER: 0133
CALIBRATION DATE: 27-Nov-08p

SBE 43F OXYGEN CALIBRATION DATA

COEFFICIENTS

Soc = 2.2648e-004 (DI)
Foffset = -793.77
Tau20 = 1.05

A = -1.3287e-003
B = 1.3593e-004
C = -1.4390e-006
E nominal = 0.036

NOMINAL DYNAMIC COEFFICIENTS

D1 = 1.92634e-4 H1 = -3.30000e-2
D2 = -4.64803e-2 H2 = 5.00000e+3
H3 = 1.45000e+3

BATH OX (ml/l)	BATH TEMP ITS-90	BATH SAL PSU	INSTRUMENT OUTPUT(Hz)	INSTRUMENT OXYGEN(ml/l)	RESIDUAL (ml/l)
1.27	2.00	0.00	1371.85	1.26	-0.00
1.27	6.00	0.01	1439.04	1.27	-0.00
1.27	12.00	0.01	1538.58	1.27	0.00
1.28	20.00	0.01	1664.24	1.27	-0.00
1.29	26.00	0.01	1762.21	1.29	-0.00
1.30	30.00	0.02	1834.49	1.30	0.00
4.21	20.00	0.01	3666.89	4.21	0.00
4.22	26.00	0.01	3974.38	4.22	0.00
4.23	12.00	0.01	3266.25	4.23	0.00
4.24	30.00	0.02	4184.40	4.24	0.00
4.24	6.00	0.01	2951.47	4.24	0.00
4.25	2.00	0.00	2735.14	4.25	-0.00
6.75	30.00	0.02	6194.76	6.75	-0.00
6.81	20.00	0.01	5451.17	6.82	0.01
6.82	26.00	0.01	5928.53	6.81	-0.01
6.84	12.00	0.01	4789.58	6.83	-0.01
6.86	6.00	0.01	4286.52	6.87	0.01
6.88	2.00	0.00	3940.29	6.88	-0.00

$$\text{Oxygen (ml/l)} = \text{Soc} * (\text{F} + \text{Foffset}) * (1.0 + \text{A} * \text{T} + \text{B} * \text{T}^2 + \text{C} * \text{T}^3) * \text{OxSol}(\text{T}, \text{S}) * \exp(\text{E} * \text{P} / \text{K})$$

F = frequency output from SBE43F, T = temperature [deg C], S = salinity [PSU] K = temperature [deg K]

OxSol(T,S) = oxygen saturation [ml/l], P = pressure [dbar]

Residual = instrument oxygen - bath oxygen

