

# 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: 0047  
CALIBRATION DATE: 28-Jan-07

90340 CONDUCTIVITY CALIBRATION DATA  
PSS 1978: C(35,15,0) = 4.2914 Siemens/meter

COEFFICIENTS:

g = -1.010490e+000  
h = 1.473580e-001  
i = -1.486247e-004  
j = 3.252169e-005

CPcor = -9.5700e-008  
CTcor = 3.2500e-006  
WBOTC = 2.0353e-006

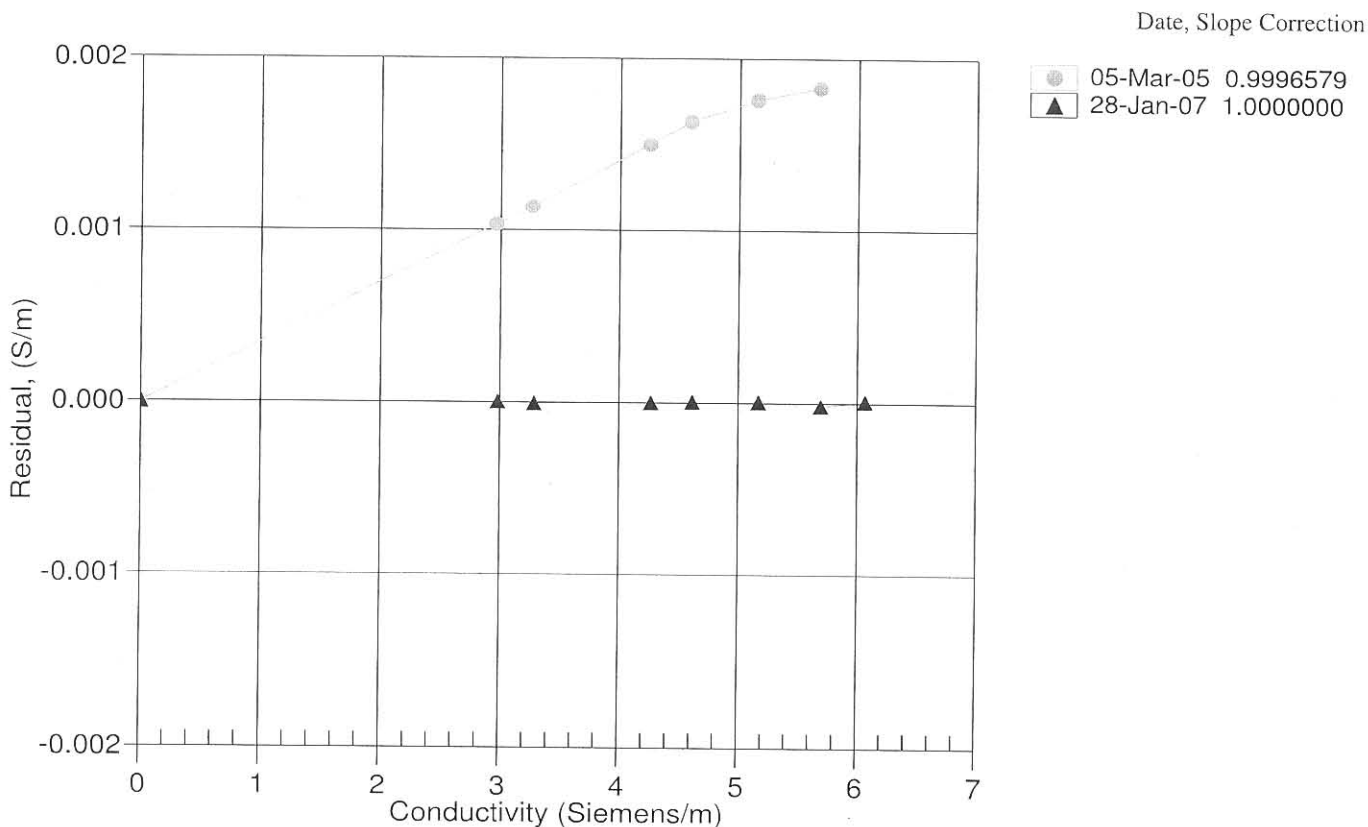
BATH TEMP (ITS-90)	BATH SAL (PSU)	BATH COND (Siemens/m)	INST FREQ (Hz)	INST COND (Siemens/m)	RESIDUAL (Siemens/m)
22.0000	0.0000	0.00000	2620.08	0.00000	0.00000
1.0000	34.8267	2.97677	5199.88	2.97677	0.00000
4.5000	34.8066	3.28390	5395.73	3.28389	-0.00001
15.0000	34.7635	4.26582	5978.29	4.26582	0.00000
18.5000	34.7541	4.61101	6169.78	4.61101	0.00001
24.0000	34.7436	5.16901	6467.05	5.16901	0.00000
29.0000	34.7373	5.69084	6732.88	5.69082	-0.00002
32.5000	34.7328	6.06308	6916.11	6.06309	0.00001

$$f = \text{INST FREQ} * \text{sqrt}(1.0 + \text{WBOTC} * t) / 1000.0$$

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

t = temperature[°C]; p = pressure[decibars];  $\delta$  = CTcor;  $\epsilon$  = CPcor;

Residual = instrument conductivity - bath conductivity



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SENSOR SERIAL NUMBER: 0047  
 CALIBRATION DATE: 25-Jan-07

90340 PRESSURE CALIBRATION DATA  
 2900 psia S/N 7689

**COEFFICIENTS:**

PA0 = -5.753644e-001	PTCA0 = -3.943184e+002
PA1 = 1.400781e-001	PTCA1 = -1.681827e-001
PA2 = -3.575001e-008	PTCA2 = -1.029137e-003
PTHA0 = -7.982337e+001	PTCB0 = 2.417600e+001
PTHA1 = 4.693919e-002	PTCB1 = -2.000000e-004
PTHA2 = -2.119431e-007	PTCB2 = 0.000000e+000

**PRESSURE SPAN CALIBRATION**

PRESSURE PSIA	INST OUTPUT	THERMISTOR OUTPUT	COMPUTED PRESSURE	ERROR %FSR
14.72	-289.5	2181.6	14.68	-0.00
592.08	3835.8	2183.5	592.01	-0.00
1169.11	7967.1	2185.8	1168.97	-0.01
1746.30	12109.5	2187.1	1746.24	-0.00
2323.57	16261.1	2187.2	2323.56	-0.00
2900.37	20417.5	2188.2	2900.32	-0.00
2323.22	16259.3	2187.7	2323.31	0.00
1746.10	12109.1	2185.5	1746.18	0.00
1169.23	7969.3	2184.9	1169.27	0.00
591.84	3835.2	2184.3	591.93	0.00
14.72	-288.9	2183.1	14.77	0.00

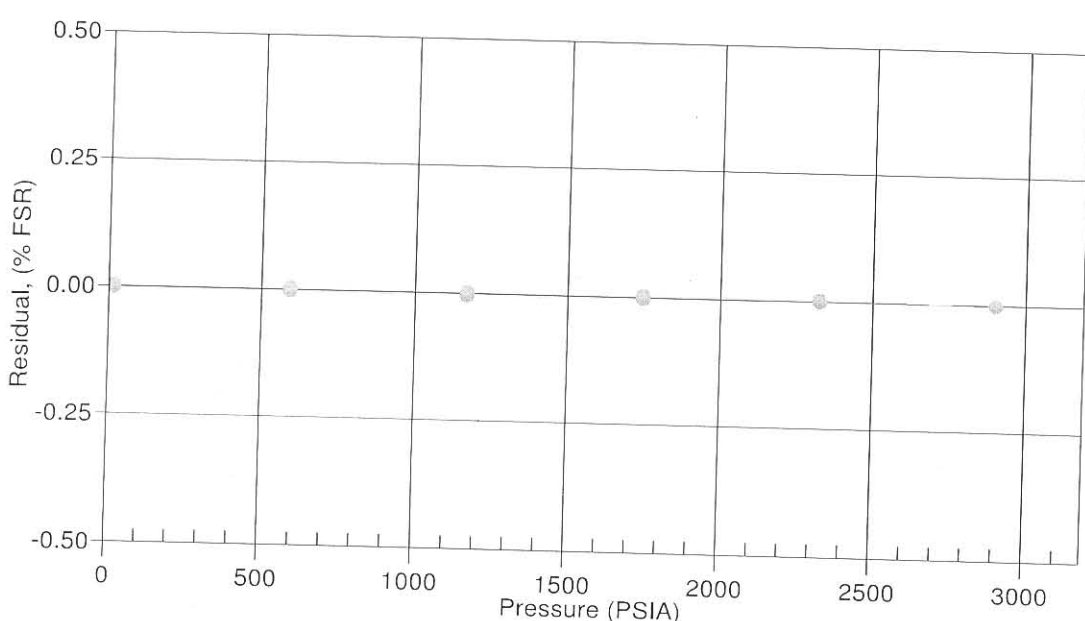
**THERMAL CORRECTION**

TEMP ITS90	PRESS TEMP	INST OUTPUT
32.50	2419.20	-288.64
29.00	2343.20	-287.55
24.00	2234.80	-286.35
18.50	2115.10	-285.40
15.00	2038.40	-284.92
4.50	1811.20	-282.63
1.00	1735.60	-282.10

TEMP (ITS90)	SPAN (mV)
-5.00	24.18
35.00	24.17

$y = \text{thermistor output}; t = P\text{TEMPA}0 + P\text{TEMPA}1 * y + P\text{TEMPA}2 * y^2$   
 $x = \text{pressure output} - P\text{TCA}0 - P\text{TCA}1 * t - P\text{TCA}2 * t^2$   
 $n = x * P\text{TCB}0 / (P\text{TCB}0 + P\text{TCB}1 * t + P\text{TCB}2 * t^2)$   
 $\text{pressure (psia)} = P\text{A}0 + P\text{A}1 * n + P\text{A}2 * n^2$



Date, Avg Delta P %FS  
 25-Jan-07 -0.00

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90340 TEMPERATURE CALIBRATION DATA  
 ITS-90 TEMPERATURE SCALE

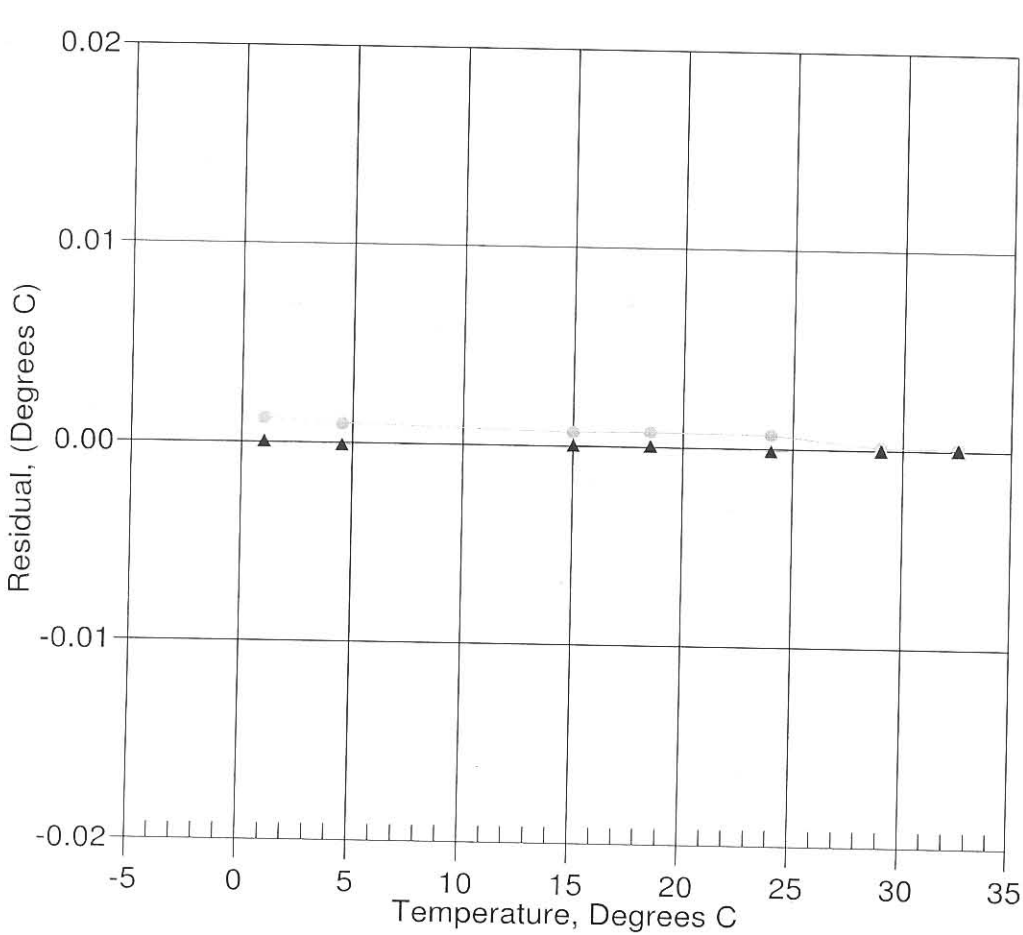
ITS-90 COEFFICIENTS

a0 = -4.465960e-006  
 a1 = 2.751270e-004  
 a2 = -2.298342e-006  
 a3 = 1.538753e-007

BATH TEMP (ITS-90)	INSTRUMENT OUTPUT	INST TEMP (ITS-90)	RESIDUAL (ITS-90)
1.0000	677713.0	1.0000	0.0001
4.5000	580215.9	4.4999	-0.0001
15.0000	371151.2	15.0000	0.0001
18.5000	321750.2	18.5001	0.0001
24.0000	258571.4	23.9999	-0.0001
29.0000	213234.1	29.0000	-0.0000
32.5000	186923.5	32.5001	0.0000

Temperature ITS-90 =  $1 / \{ a_0 + a_1[\ln(n)] + a_2[\ln^2(n)] + a_3[\ln^3(n)] \} - 273.15$  (°C)

Residual = instrument temperature - bath temperature



Date, Delta T (mdeg C)

●	05-Mar-05	0.66
▲	28-Jan-07	0.00