

# 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: 9081  
CALIBRATION DATE: 02-Jun-13

SLOCUM PAYLOAD CTD  
TEMPERATURE CALIBRATION DATA  
ITS-90 TEMPERATURE SCALE

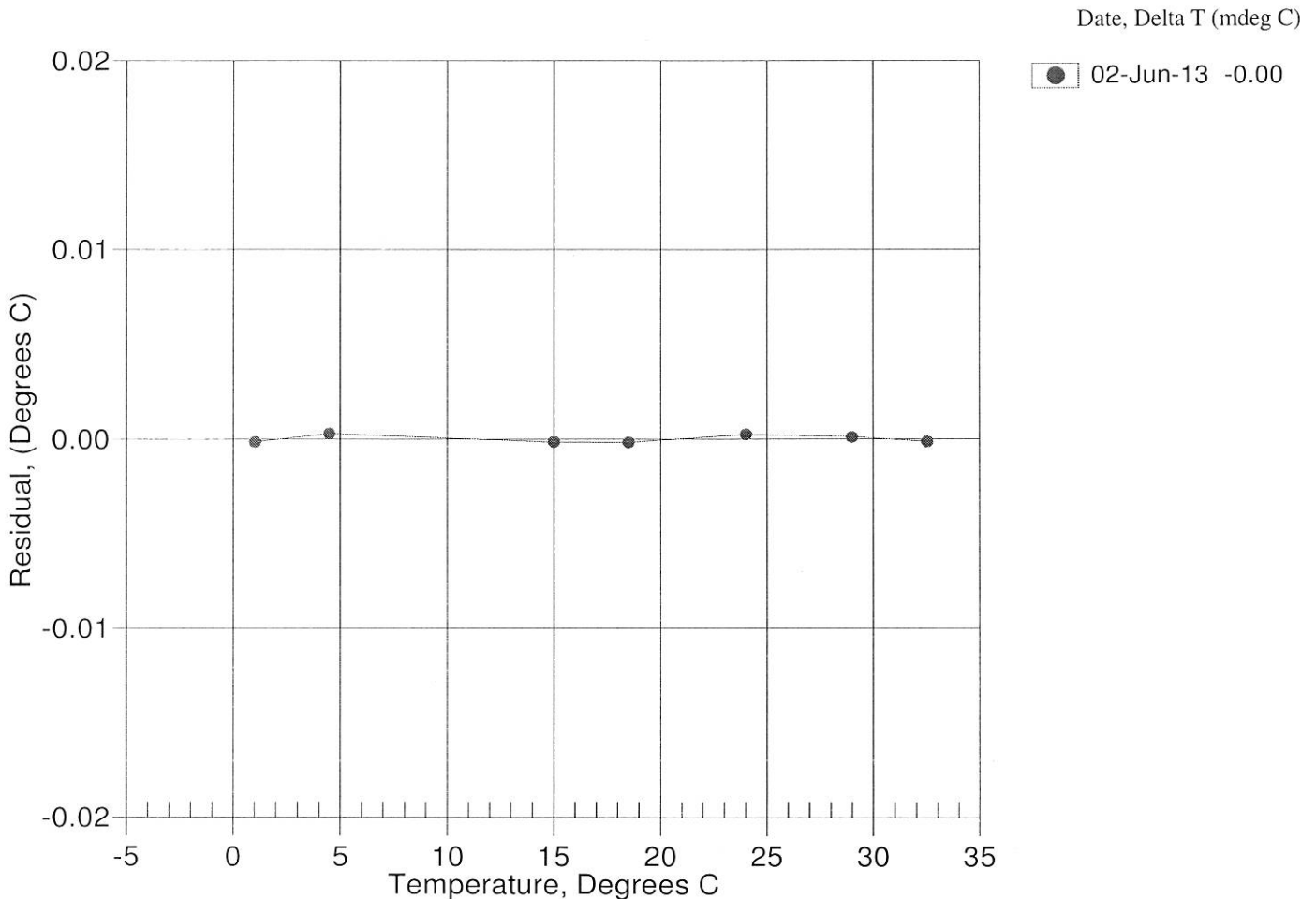
### ITS-90 COEFFICIENTS

a0 = -9.125914e-005  
a1 = 3.065987e-004  
a2 = -4.539199e-006  
a3 = 2.017893e-007

BATH TEMP (ITS-90)	INSTRUMENT OUTPUT	INST TEMP (ITS-90)	RESIDUAL (ITS-90)
1.0000	575841.2	0.9998	-0.0002
4.5000	491970.0	4.5003	0.0003
15.0000	312950.2	14.9998	-0.0002
18.5000	270842.9	18.4998	-0.0002
24.0000	217125.3	24.0002	0.0002
29.0000	178696.7	29.0001	0.0001
32.5000	156446.3	32.4999	-0.0001

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

$$\text{Residual} = \text{instrument temperature} - \text{bath temperature}$$



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

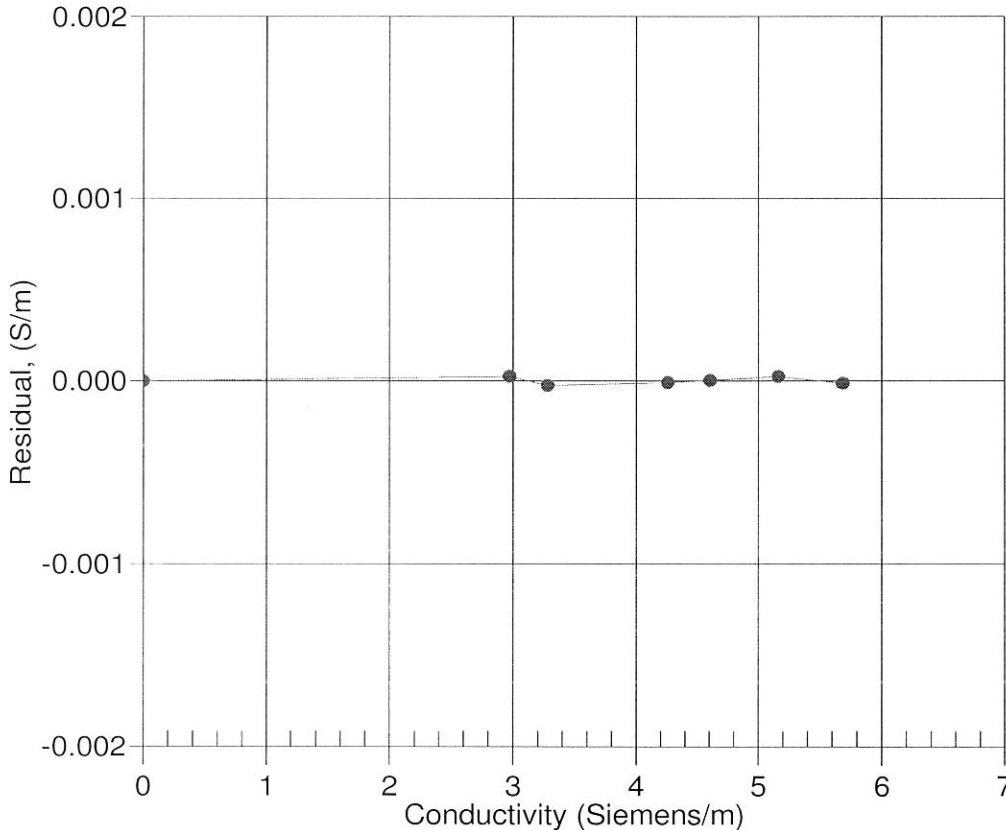
COEFFICIENTS:

g = -9.900330e-001	CPcor = -9.5700e-008
h = 1.407880e-001	CTcor = 3.2500e-006
i = -2.346381e-004	WBOTC = 7.5318e-007
j = 3.745116e-005	

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	2655.17	0.00000	0.00000
1.0000	34.7656	2.97204	5308.52	2.97207	0.00002
4.5000	34.7466	3.27880	5509.50	3.27877	-0.00003
15.0000	34.7036	4.25925	6107.01	4.25924	-0.00001
18.5000	34.6944	4.60394	6303.35	4.60394	0.00000
24.0000	34.6842	5.16114	6608.10	5.16117	0.00002
29.0000	34.6789	5.68234	6880.58	5.68233	-0.00001

$f = \text{INST FREQ} * \text{sqrt}(1.0 + \text{WBOTC} * t) / 1000.0$   
 Conductivity =  $(g + hf^2 + if^3 + jf^4) / (1 + \delta t + \epsilon p)$  Siemens/meter  
 t = temperature[°C]; p = pressure[decibars];  $\delta = \text{CTcor}$ ;  $\epsilon = \text{CPcor}$ ;  
 Residual = instrument conductivity - bath conductivity

Date, Slope Correction



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SENSOR SERIAL NUMBER: 9081  
 CALIBRATION DATE: 28-May-13

SLOCUM PAYLOAD CTD  
 PRESSURE CALIBRATION DATA  
 1450 psia S/N 3859874

**COEFFICIENTS:**

PA0 = -3.032646e-001  
 PA1 = 4.586258e-003  
 PA2 = -1.940237e-011  
 PTEMPA0 = -6.949422e+001  
 PTEMPA1 = 5.094623e-002  
 PTEMPA2 = -4.282513e-007

PTCA0 = 5.244438e+005  
 PTCA1 = -2.254658e+000  
 PTCA2 = -3.270059e-002  
 PTCB0 = 2.535150e+001  
 PTCB1 = 3.000000e-004  
 PTCB2 = 0.000000e+000

**PRESSURE SPAN CALIBRATION**

PRESSURE PSIA	INST OUTPUT	THERMISTOR OUTPUT	COMPUTED PRESSURE	ERROR %FSR
14.54	527623.0	1822.0	14.57	0.00
314.90	593136.0	1825.0	314.86	-0.00
615.01	658633.0	1826.0	614.91	-0.01
915.01	724158.0	1827.0	914.93	-0.01
1214.96	789725.0	1827.0	1214.96	-0.00
1464.97	844372.0	1828.0	1464.90	-0.00
1214.97	789750.0	1827.0	1215.08	0.01
914.94	724183.0	1828.0	915.04	0.01
614.94	658649.0	1827.0	614.99	0.00
314.90	593144.0	1827.0	314.90	0.00
14.55	527617.0	1829.0	14.55	0.00

**THERMAL CORRECTION**

TEMP ITS90	THERMISTOR OUTPUT	INST OUTPUT
32.50	2037	527647.50
29.00	1966	527664.80
24.00	1864	527685.00
18.50	1753	527703.70
15.00	1683	527714.00
4.50	1471	527745.60
1.00	1400	527754.80
TEMP (ITS90)		SPAN (mV)
-5.00		25.35
35.00		25.36

$$y = \text{thermistor output}; t = PTEMPA0 + PTEMPA1 * y + PTEMPA2 * y^2$$

$$x = \text{pressure output} - PTCA0 - PTCA1 * t - PTCA2 * t^2$$

$$n = x * PTCB0 / (PTCB0 + PTCB1 * t + PTCB2 * t^2)$$

$$\text{pressure (psia)} = PA0 + PA1 * n + PA2 * n^2$$

Date, Avg Delta P %FS

● 28-May-13 -0.00

