

# 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: 9306

CALIBRATION DATE: 11-Oct-15

Slocum Payload CTD TEMPERATURE CALIBRATION DATA

ITS-90 TEMPERATURE SCALE

## COEFFICIENTS:

a0 = -7.414462e-005

a1 = 2.950672e-004

a2 = -3.381322e-006

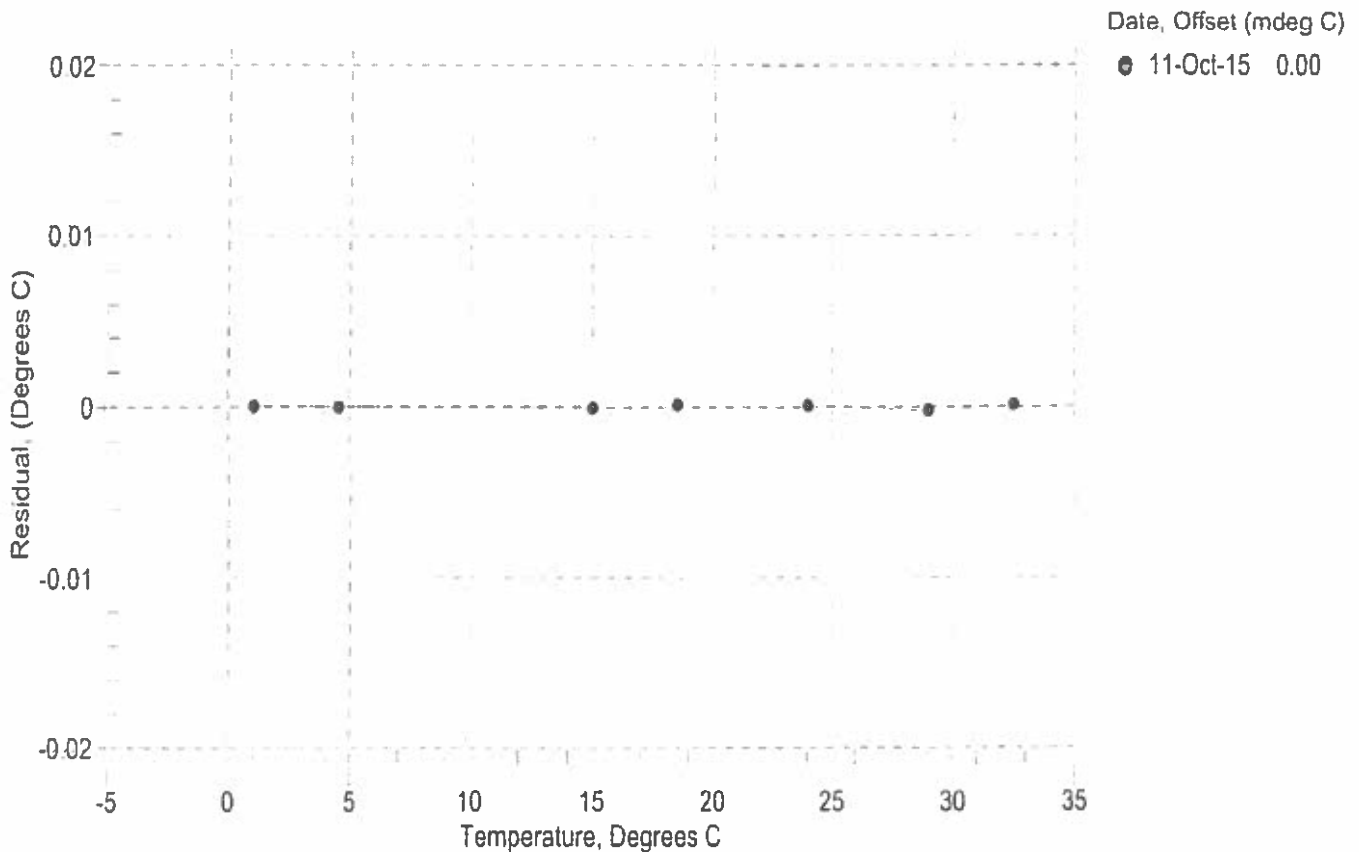
a3 = 1.750061e-007

BATH TEMP (ITS-90)	INSTRUMENT OUTPUT	INST TEMP (ITS-90)	RESIDUAL (ITS-90)
0.9999	565551.3	0.9999	0.0000
4.4999	484449.2	4.4999	-0.0000
15.0000	310476.8	14.9999	-0.0001
18.5000	269342.2	18.5001	0.0001
24.0000	216713.4	24.0001	0.0001
29.0001	178927.6	28.9999	-0.0002
32.5001	156984.1	32.5002	0.0001

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

n = instrument output



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

**COEFFICIENTS:**

g = -9.973074e-001	CPCor = -9.5700e-008
h = 1.512160e-001	CTcor = 3.2500e-006
i = -1.634637e-004	WBOTC = 3.2426e-007
j = 3.554077e-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	2569.69	0.00000	0.00000
0.9999	34.6063	2.95971	5113.89	2.95972	0.00001
4.4999	34.5868	3.26519	5306.93	3.26518	-0.00000
15.0000	34.5447	4.24181	5881.02	4.24180	-0.00001
18.5000	34.5359	4.58517	6069.72	4.58517	-0.00000
24.0000	34.5265	5.14026	6362.68	5.14026	0.00000
29.0001	34.5217	5.65948	6624.69	5.65949	0.00001
32.5001	34.5197	6.03010	6805.36	6.03009	-0.00001

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

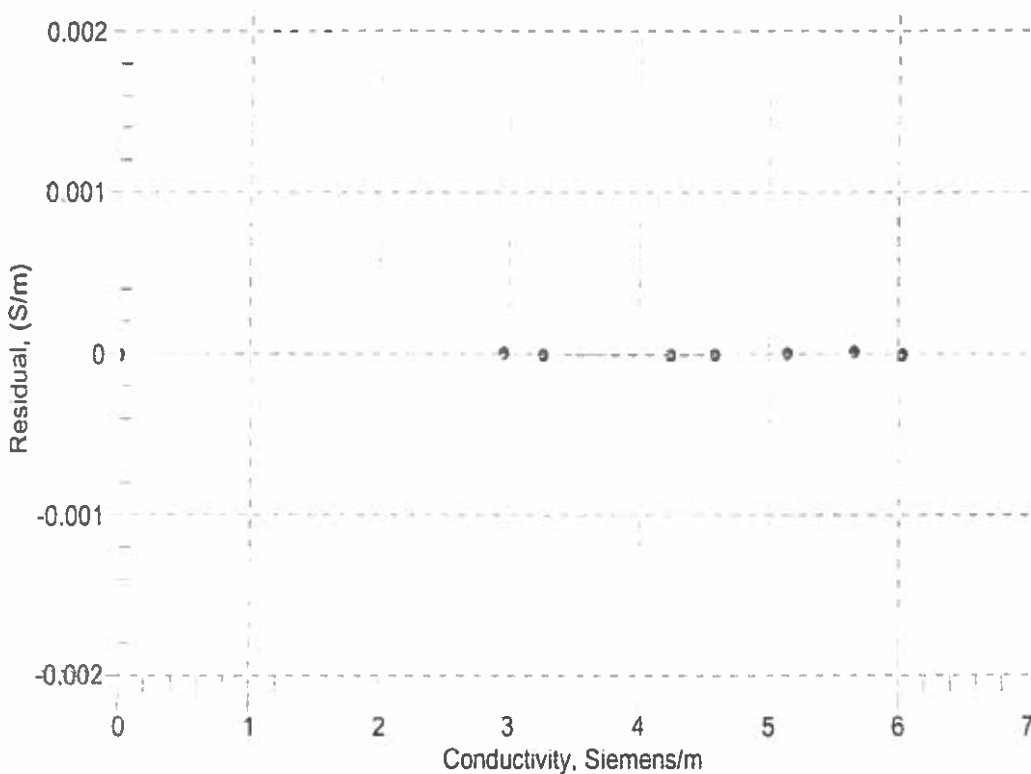
$$\text{Conductivity} = (g + h * f^2 + i * f^3 + j * f^4) / (1 + \delta * t + \epsilon * p) \text{ Siemens / meter}$$

$$t = \text{temperature} [^{\circ}\text{C}]; p = \text{pressure} [\text{decibars}]; \delta = \text{CTcor}; \epsilon = \text{CPCor};$$

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

Date, Slope Correction

● 11-Oct-15 1.0000000



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SENSOR SERIAL NUMBER: 9306  
CALIBRATION DATE: 30-Apr-15

Slocum Payload CTD PRESSURE CALIBRATION DATA  
FSR: 1450 psia S/N 4386334

**COEFFICIENTS:**

PA0 = 1.232473e-001  
PA1 = 4.528167e-003  
PA2 = -3.344330e-011  
PTEMPA0 = 1.660728e+002  
PTEMPA1 = -6.516326e-002  
PTEMPA2 = -3.625606e-007

PTCA0 = 5.246273e+005  
PTCA1 = -2.364599e+000  
PTCA2 = 1.521185e-001  
PTCB0 = 2.503188e+001  
PTCB1 = -2.493766e-005  
PTCB2 = 0.000000e+000

**PRESSURE SPAN CALIBRATION**

PRESSURE PSIA	INST OUTPUT	THERMISTOR OUTPUT	COMPUTED PRESSURE	ERROR %FS
14.76	527893.0	2166.0	14.79	0.00
315.08	594236.0	2166.0	315.05	-0.00
614.99	660581.0	2164.0	615.02	0.00
915.00	726993.0	2166.0	915.00	0.00
1214.91	793437.0	2160.0	1214.82	-0.01
1464.80	848898.0	2157.0	1464.86	0.00
1214.91	793450.0	2159.0	1214.88	-0.00
914.99	727000.0	2163.0	915.03	0.00
614.99	660585.0	2164.0	615.03	0.00
315.06	594240.0	2163.0	315.06	0.00
14.76	527882.0	2163.0	14.73	-0.00

**THERMAL CORRECTION**

TEMP ITS90	THERMISTOR OUTPUT	INST OUTPUT
32.50	2027	528006.40
29.00	2080	527978.50
24.00	2155	527944.30
18.50	2237	527923.30
15.00	2289	527926.00
4.50	2446	527915.50
1.00	2498	527913.20

TEMP (ITS90)	SPAN (mV)
-5.00	25.03
35.10	25.03

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

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

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

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

Date, Avg Delta P %FS

● 30-Apr-15 -0.00

