

# 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: 9015  
CALIBRATION DATE: 09-Aug-12

SLOCUM PAYLOAD CTD  
TEMPERATURE CALIBRATION DATA  
ITS-90 TEMPERATURE SCALE

### ITS-90 COEFFICIENTS

a0 = -1.199747e-004  
a1 = 3.098438e-004  
a2 = -4.675295e-006  
a3 = 2.082829e-007

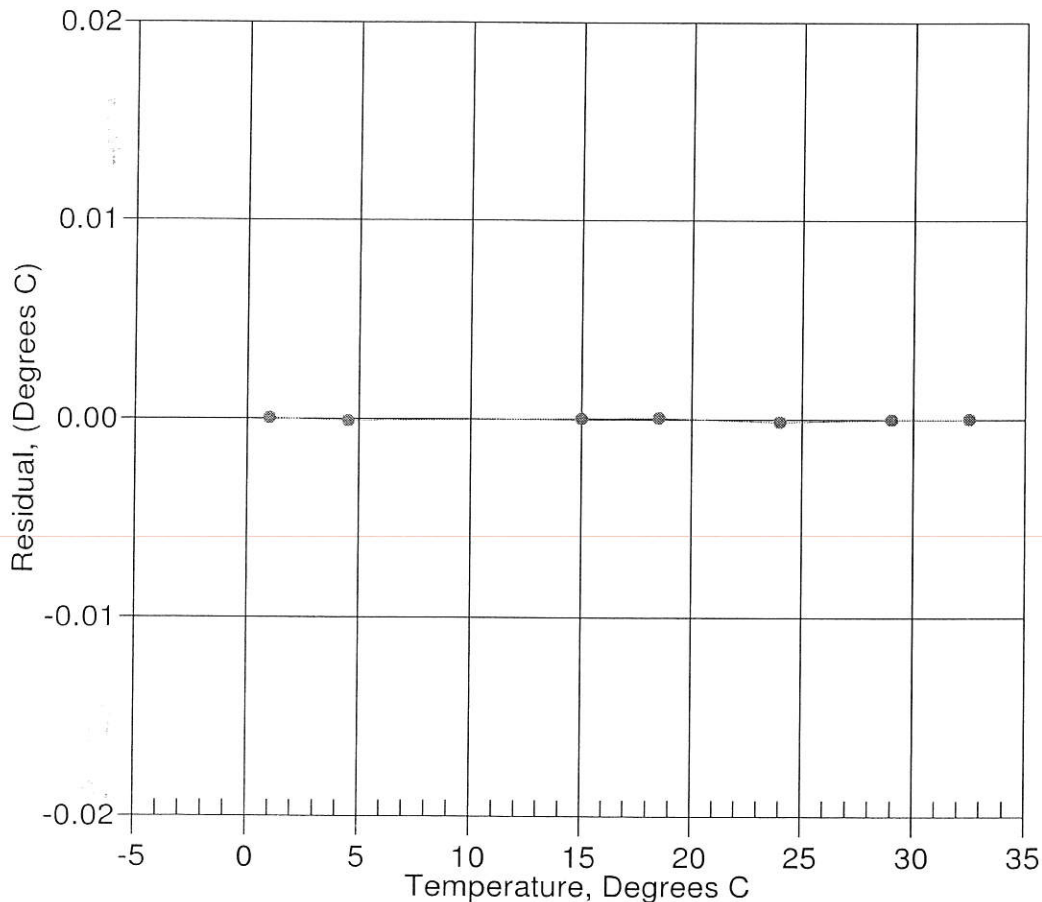
BATH TEMP (ITS-90)	INSTRUMENT OUTPUT	INST TEMP (ITS-90)	RESIDUAL (ITS-90)
1.0000	565157.5	1.0000	0.0000
4.4999	483608.0	4.4998	-0.0001
14.9999	308989.9	14.9999	0.0000
18.4999	267790.6	18.5000	0.0001
24.0000	215141.8	23.9999	-0.0001
29.0000	177394.3	29.0000	0.0000
32.5000	155502.1	32.5000	0.0000

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

Residual = instrument temperature - bath temperature

Date, Delta T (mdeg C)

09-Aug-12 0.00



# 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: 9015  
 CALIBRATION DATE: 09-Aug-12

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

COEFFICIENTS:

g = -9.871871e-001  
 h = 1.353286e-001  
 i = -1.463751e-004  
 j = 2.806188e-005

CPcor = -9.5700e-008  
 CTcor = 3.2500e-006  
 WBOTC = -1.5415e-007

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	2702.79	0.00000	0.00000
1.0000	34.7493	2.97078	5407.50	2.97080	0.00001
4.4999	34.7282	3.27722	5612.24	3.27720	-0.00002
14.9999	34.6817	4.25684	6221.07	4.25683	-0.00000
18.4999	34.6702	4.60106	6421.06	4.60107	0.00000
24.0000	34.6575	5.15761	6731.55	5.15761	0.00000
29.0000	34.6484	5.67791	7009.09	5.67791	0.00001
32.5000	34.6409	6.04885	7200.25	6.04885	-0.00001

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

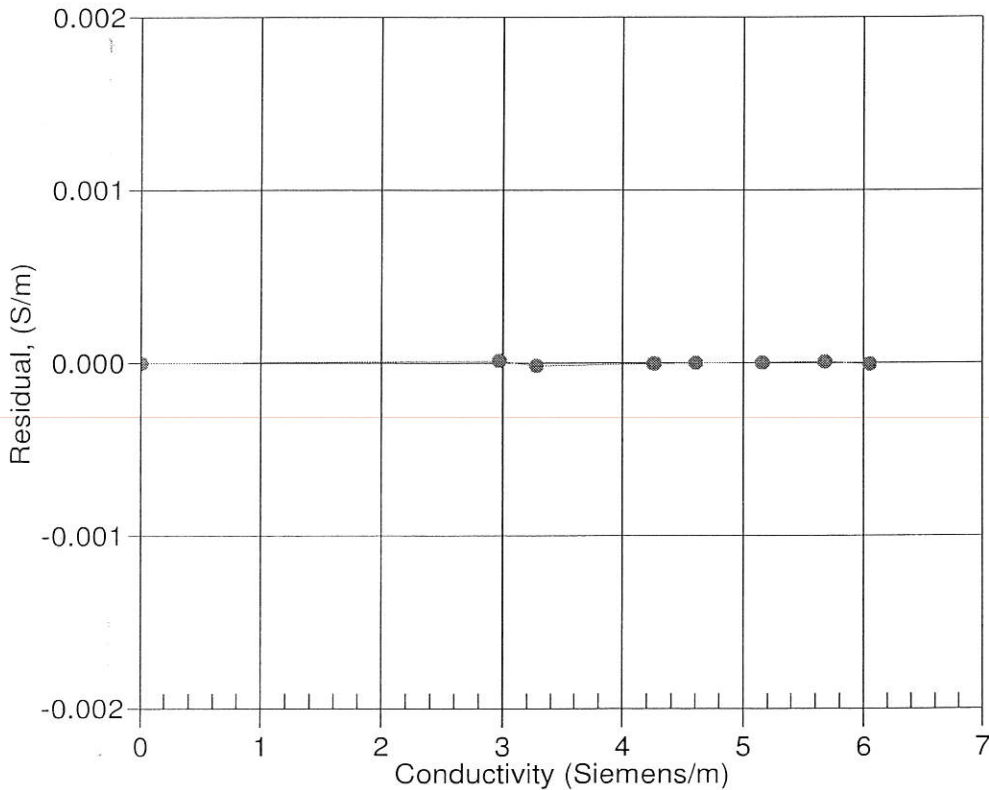
$$\text{Conductivity} = (g + hf^2 + if^3 + jf^4) / (1 + \delta t + \epsilon p) \text{ Siemens/meter}$$

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

Residual = instrument conductivity - bath conductivity

Date, Slope Correction

● 09-Aug-12 1.0000000



# 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: 9015  
CALIBRATION DATE: 06-Aug-12

SLOCUM PAYLOAD CTD  
PRESSURE CALIBRATION DATA  
1450 psia S/N 3626944

COEFFICIENTS:

PA0 = 4.901101e-001  
PA1 = 4.855384e-003  
PA2 = -1.620867e-011  
PTEMPA0 = -7.013160e+001  
PTEMPA1 = 5.223771e-002  
PTEMPA2 = -6.656469e-007

PTCA0 = 5.247318e+005  
PTCA1 = 9.382201e+000  
PTCA2 = -2.146945e-001  
PTCB0 = 2.519613e+001  
PTCB1 = 2.250000e-004  
PTCB2 = 0.000000e+000

PRESSURE SPAN CALIBRATION

PRESSURE PSIA	INST OUTPUT	THERMISTOR OUTPUT	COMPUTED PRESSURE	ERROR %FSR
14.65	527758.0	1829.0	14.68	0.00
314.96	589620.0	1833.0	314.92	-0.00
615.00	651469.0	1833.0	614.96	-0.00
915.00	713345.0	1836.0	915.02	0.00
1215.01	775239.0	1837.0	1215.03	0.00
1465.05	826829.0	1837.0	1465.01	-0.00
1215.01	775239.0	1837.0	1215.03	0.00
915.00	713350.0	1837.0	915.04	0.00
615.02	651477.0	1837.0	615.00	-0.00
314.99	589633.0	1837.0	314.98	-0.00
14.65	527752.0	1839.0	14.66	0.00

THERMAL CORRECTION

TEMP ITS90	THERMISTOR OUTPUT	INST OUTPUT
32.50	2017	527783.70
29.00	1946	527806.80
24.00	1845	527816.60
18.50	1735	527809.90
15.00	1665	527798.80
4.50	1456	527747.20
1.00	1386	527721.80

TEMP (ITS90)	SPAN (mV)
-5.00	25.20
35.00	25.20

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

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

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

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

Date, Avg Delta P %FS

06-Aug-12 -0.00

