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: 0104
CALIBRATION DATE: 11-Dec-11

SLOCUM PAYLOAD CTD
TEMPERATURE CALIBRATION DATA
ITS-90 TEMPERATURE SCALE

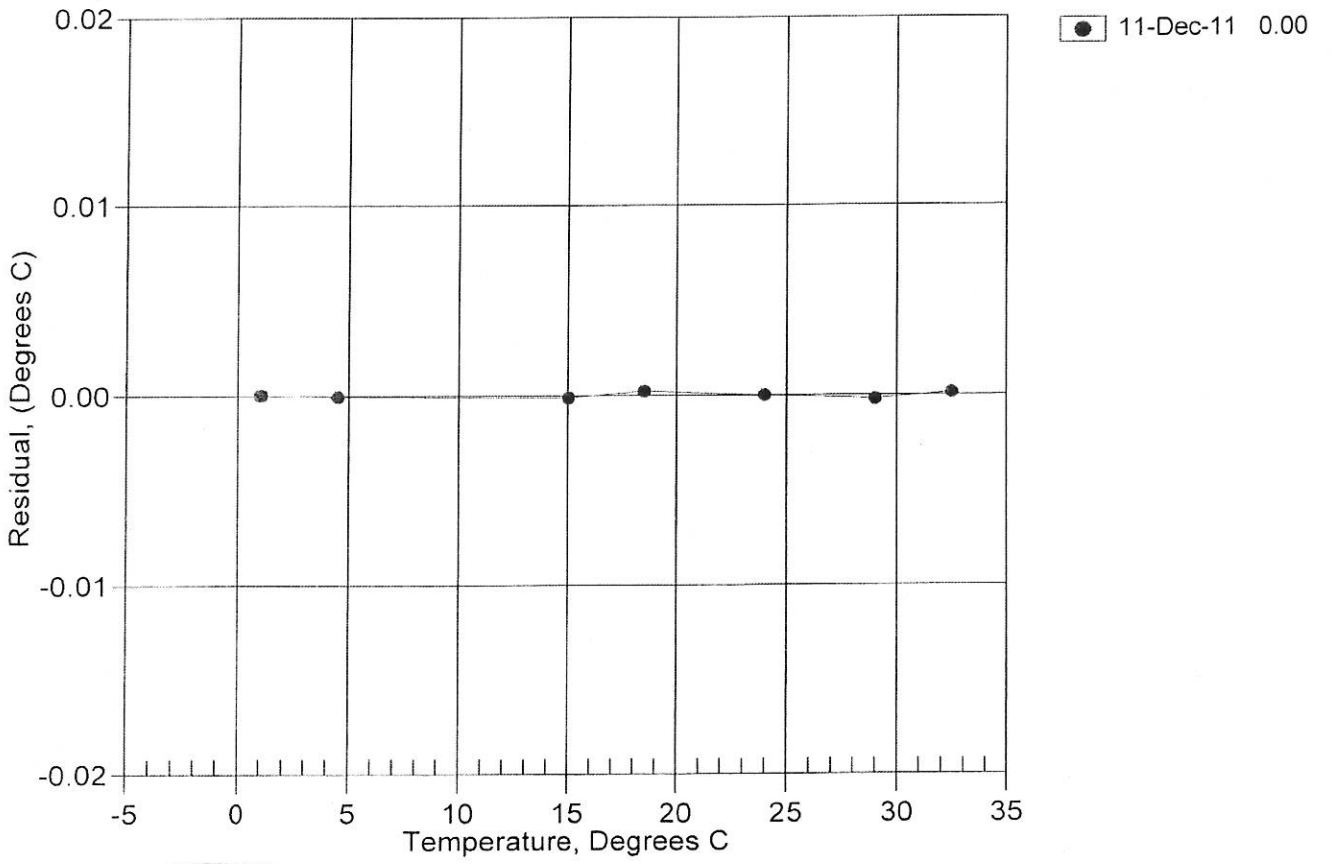
ITS-90 COEFFICIENTS

a0 = -7.954768e-005
a1 = 3.055388e-004
a2 = -4.488936e-006
a3 = 2.001958e-007

BATH TEMP (ITS-90)	INSTRUMENT OUTPUT	INST TEMP (ITS-90)	RESIDUAL (ITS-90)
1.0000	570388.0	1.0000	0.0000
4.5000	487156.0	4.5000	-0.0000
15.0001	309578.8	15.0000	-0.0001
18.5002	267837.0	18.5004	0.0002
24.0000	214620.8	24.0000	-0.0000
29.0000	176562.2	28.9998	-0.0002
32.5000	154530.2	32.5001	0.0001

Temperature ITS-90 = $1/\{a0 + a1[ln(n)] + a2[ln^2(n)] + a3[ln^3(n)]\} - 273.15$ (°C)

Residual = instrument temperature - bath temperature



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: 0104
CALIBRATION DATE: 11-Dec-11

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

COEFFICIENTS:

g = -9.843122e-001
h = 1.465982e-001
i = -4.133758e-004
j = 5.174089e-005

CPcor = -9.5700e-008
CTcor = 3.2500e-006
WBOTC = 3.8494e-007

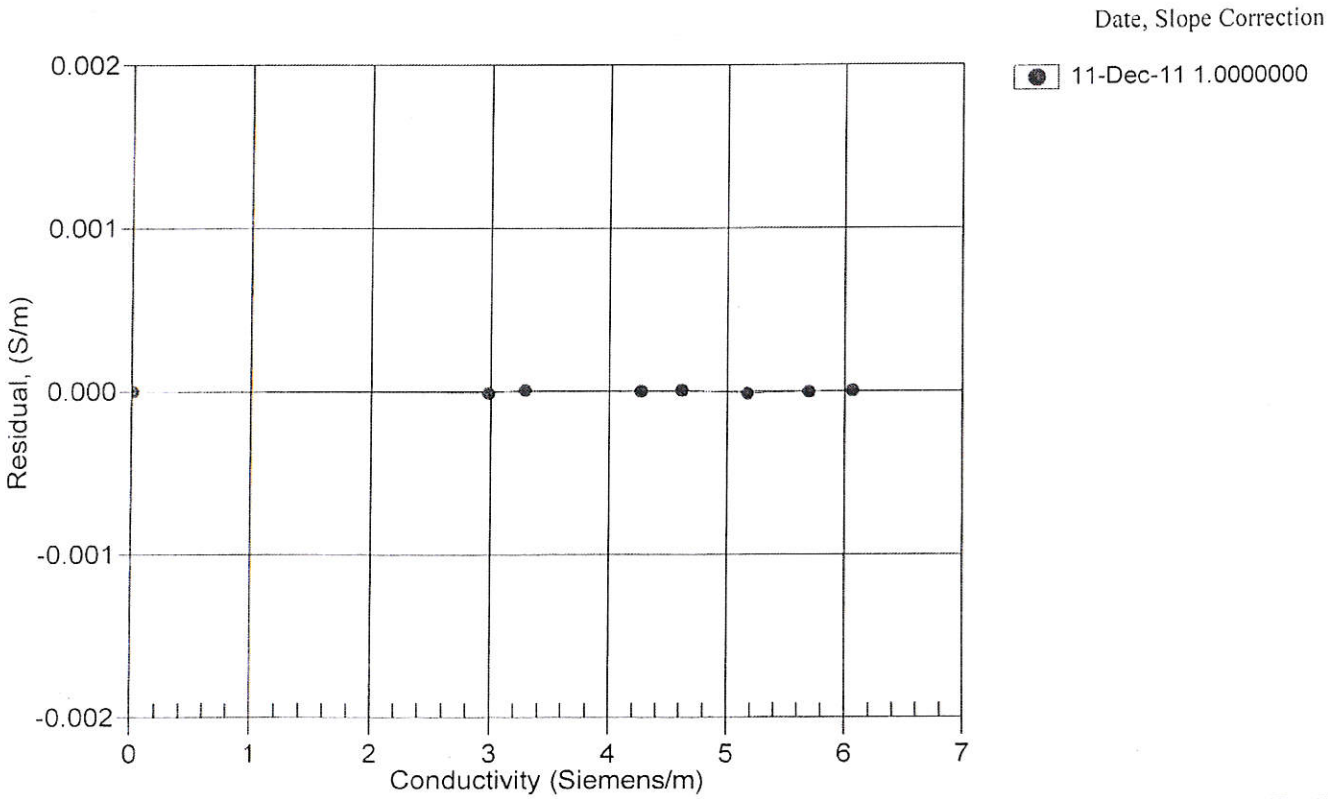
BATH TEMP (ITS-90)	BATH SAL (PSU)	BATH COND (Siemens/m)	INST FREQ (Hz)	INST COND (Siemens/m)	RESIDUAL (Siemens/m)
22.0000	0.0000	0.00000	2597.63	0.00000	0.00000
1.0000	34.8264	2.97675	5211.39	2.97674	-0.00001
4.5000	34.8059	3.28384	5409.17	3.28385	0.00001
15.0001	34.7625	4.26572	5997.11	4.26572	0.00000
18.5002	34.7533	4.61093	6190.28	4.61094	0.00001
24.0000	34.7433	5.16897	6490.05	5.16895	-0.00001
29.0000	34.7373	5.69083	6758.02	5.69083	-0.00000
32.5000	34.7337	6.06321	6942.71	6.06322	0.00000

f = INST FREQ * sqrt(1.0 + WBOTC * t) / 1000.0

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

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

Residual = instrument conductivity - bath conductivity



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: 0104
CALIBRATION DATE: 09-Dec-11

SLOCUM PAYLOAD CTD
PRESSURE CALIBRATION DATA
1450 psia S/N 3459008

COEFFICIENTS:

PA0 =	1.165921e-001	PTCA0 =	5.248777e+005
PA1 =	4.929230e-003	PTCA1 =	2.803011e+000
PA2 =	-2.534691e-011	PTCA2 =	-7.331970e-002
PTEMPA0 =	-7.510170e+001	PTCB0 =	2.531113e+001
PTEMPA1 =	4.835001e-002	PTCB1 =	4.250000e-004
PTEMPA2 =	-3.428701e-007	PTCB2 =	0.000000e+000

PRESSURE SPAN CALIBRATION

PRESSURE PSIA	INST OUTPUT	THERMISTOR OUTPUT	COMPUTED PRESSURE	ERROR %FSR
14.75	527882.0	2001.0	14.79	0.00
315.06	588831.0	2007.0	315.01	-0.00
615.08	649773.0	2007.0	615.02	-0.00
915.08	710757.0	2008.0	915.04	-0.00
1215.11	771790.0	2010.0	1215.11	-0.00
1465.09	822657.0	2012.0	1465.05	-0.00
1215.07	771796.0	2011.0	1215.13	0.00
915.03	710769.0	2012.0	915.09	0.00
615.03	649781.0	2011.0	615.05	0.00
315.03	588838.0	2012.0	315.05	0.00
14.75	527872.0	2015.0	14.74	-0.00

THERMAL CORRECTION

TEMP ITS90	THERMISTOR OUTPUT	INST OUTPUT
32.50	2262	527898.20
29.00	2187	527909.60
24.00	2080	527916.00
18.50	1963	527914.00
15.00	1889	527909.60
4.50	1666	527898.80
1.00	1592	527891.00

TEMP(ITS90)	SPAN(mV)
-5.00	25.31
35.00	25.33

y = thermistor output; $t = PTEMPA0 + PTEMPA1 * y + PTEMPA2 * y^2$

x = pressure output - $PTCA0 - PTCA1 * t - PTCA2 * t^2$

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

pressure (psia) = $PA0 + PA1 * n + PA2 * n^2$