

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: 9150
CALIBRATION DATE: 23-Dec-16

Slocum Payload CTD TEMPERATURE CALIBRATION DATA
ITS-90 TEMPERATURE SCALE

COEFFICIENTS:

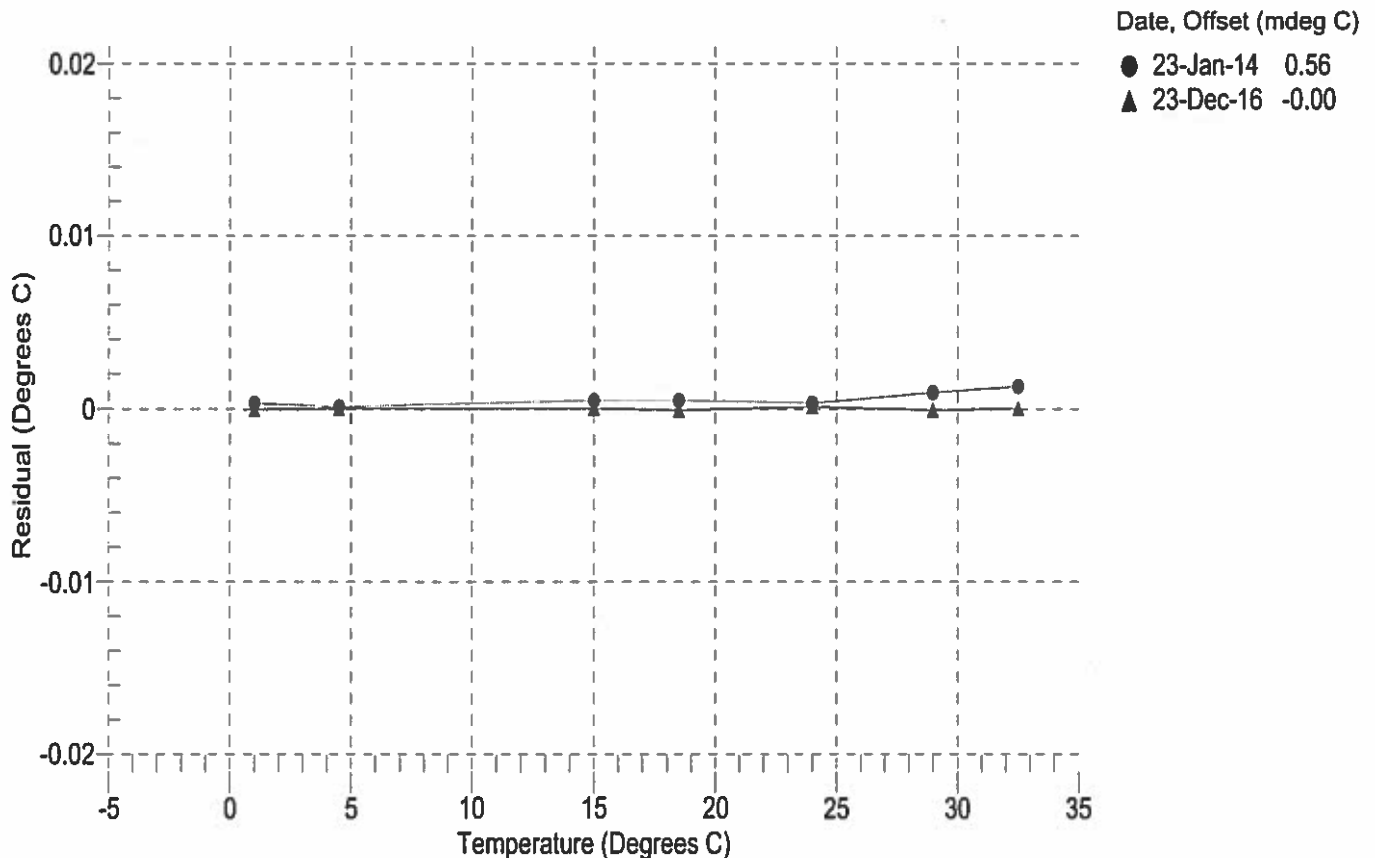
a0 = -1.224030e-004
a1 = 3.095487e-004
a2 = -4.625563e-006
a3 = 2.073844e-007

BATH TEMP (° C)	INSTRUMENT OUTPUT (counts)	INST TEMP (° C)	RESIDUAL (° C)
1.0000	564587.4	1.0000	-0.0000
4.5000	483252.4	4.5000	0.0000
15.0000	309017.4	15.0000	0.0000
18.5000	267885.4	18.4999	-0.0001
24.0000	215301.2	24.0001	0.0001
29.0000	177589.6	28.9999	-0.0001
32.5000	155709.7	32.5000	0.0000

n = Instrument Output (counts)

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

Residual (°C) = instrument temperature - bath temperature



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

COEFFICIENTS:

g = -9.754925e-001
h = 1.364181e-001
i = -2.557383e-004
j = 3.788339e-005

CPcor = -9.5700e-008
CTcor = 3.2500e-006
WBOTC = 4.3558e-007

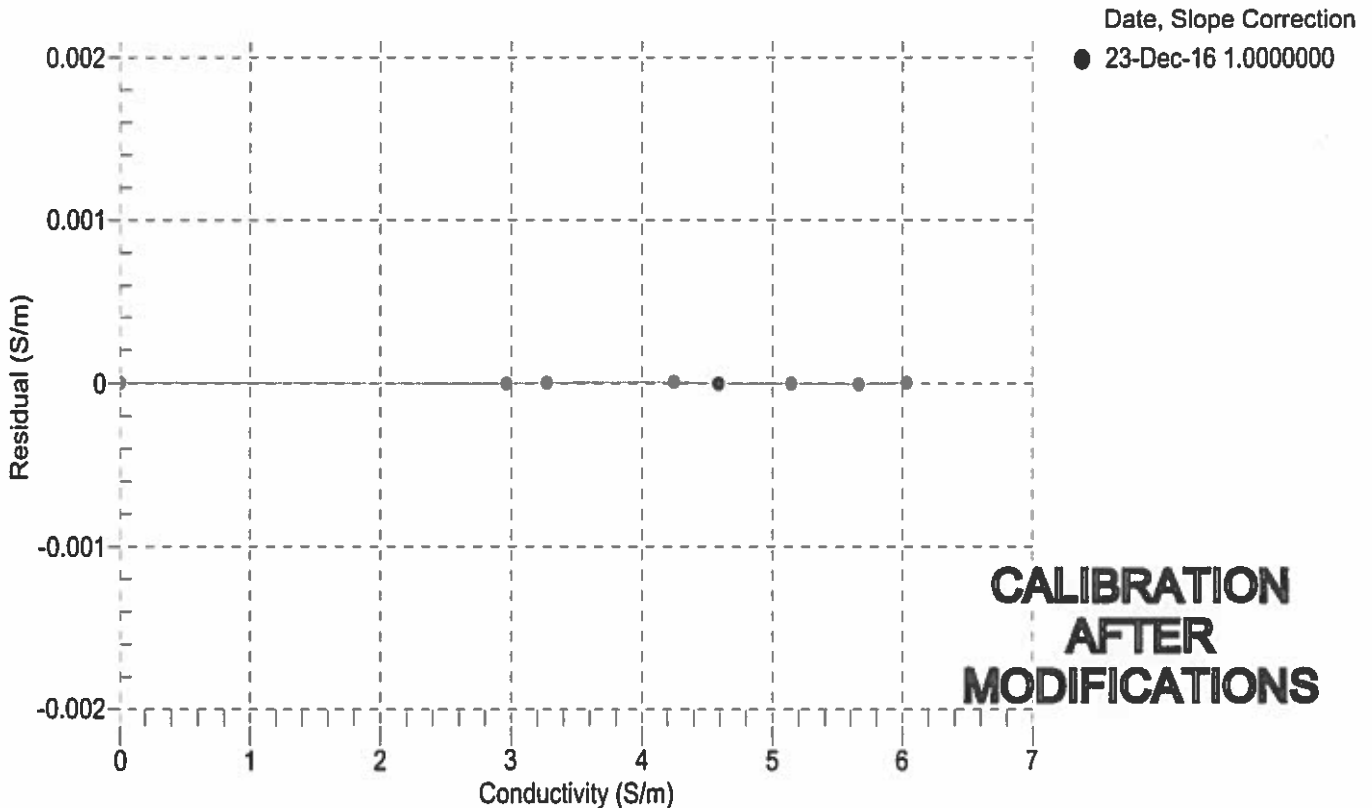
BATH TEMP (° C)	BATH SAL (PSU)	BATH COND (S/m)	INSTRUMENT OUTPUT (Hz)	INSTRUMENT COND (S/m)	RESIDUAL (S/m)
22.0000	0.0000	0.00000	2678.14	0.00000	0.00000
1.0000	34.6178	2.96061	5377.04	2.96061	-0.00000
4.5000	34.5981	3.26616	5581.20	3.26616	0.00000
15.0000	34.5558	4.24302	6188.07	4.24303	0.00001
18.5000	34.5465	4.58642	6387.42	4.58642	-0.00000
24.0000	34.5363	5.14156	6696.82	5.14155	-0.00000
29.0000	34.5303	5.66072	6973.41	5.66072	-0.00000
32.5000	34.5265	6.03114	7164.02	6.03115	0.00000

$f = \text{Instrument Output(Hz)} * \text{sqrt}(1.0 + \text{WBOTC} * t) / 1000.0$

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

$\text{Conductivity (S/m)} = (g + h * f^2 + i * f^3 + j * f^4) / 10 (1 + \delta * t + \epsilon * p)$

$\text{Residual (Siemens/meter)} = \text{instrument conductivity} - \text{bath conductivity}$



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SENSOR SERIAL NUMBER: 9150
CALIBRATION DATE: 12-Dec-16

Slocum Payload CTD PRESSURE CALIBRATION DATA
1450 psia S/N 4014437

COEFFICIENTS:

PA0 = 1.548241e-001	PTCA0 = 5.241092e+005
PA1 = 4.509564e-003	PTCA1 = 1.306287e+000
PA2 = -1.624984e-011	PTCA2 = 1.116395e-002
PTEMPA0 = -7.591714e+001	PTCB0 = 2.539762e+001
PTEMPA1 = 5.055453e-002	PTCB1 = -2.275000e-003
PTEMPA2 = -5.390748e-007	PTCB2 = 0.000000e+000

PRESSURE SPAN CALIBRATION

PRESSURE (PSIA)	INSTRUMENT OUTPUT (counts)	THERMISTOR OUTPUT (volts)	COMPUTED PRESSURE (PSIA)	RESIDUAL (%FSR)	TEMP (°C)	THERMISTOR OUTPUT (volts)	INSTRUMENT OUTPUT (counts)
14.67	527360.0	1967.0	14.69	0.00	32.50	2196	527391.90
314.99	593821.0	1968.0	314.90	-0.01	29.00	2123	527389.40
614.99	660278.0	1969.0	614.95	-0.00	24.00	2020	527379.70
914.97	726748.0	1969.0	914.91	-0.00	18.50	1906	527367.50
1214.97	793260.0	1969.0	1214.92	-0.00	15.00	1834	527358.60
1464.95	848710.0	1969.0	1464.92	-0.00	4.50	1619	527348.70
1214.95	793285.0	1969.0	1215.03	0.01	1.00	1547	527339.90
914.95	726772.0	1968.0	915.02	0.00			
614.95	660291.0	1968.0	615.01	0.00			
315.01	593849.0	1968.0	315.03	0.00			
14.67	527357.0	1968.0	14.68	0.00			

	TEMPERATURE (°C)	SPAN (mV)
	-5.00	25.41
	35.00	25.32

y = thermistor output (counts)

$$t = PTEMPA0 + PTEMPA1 * y + PTEMPA2 * y^2$$

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

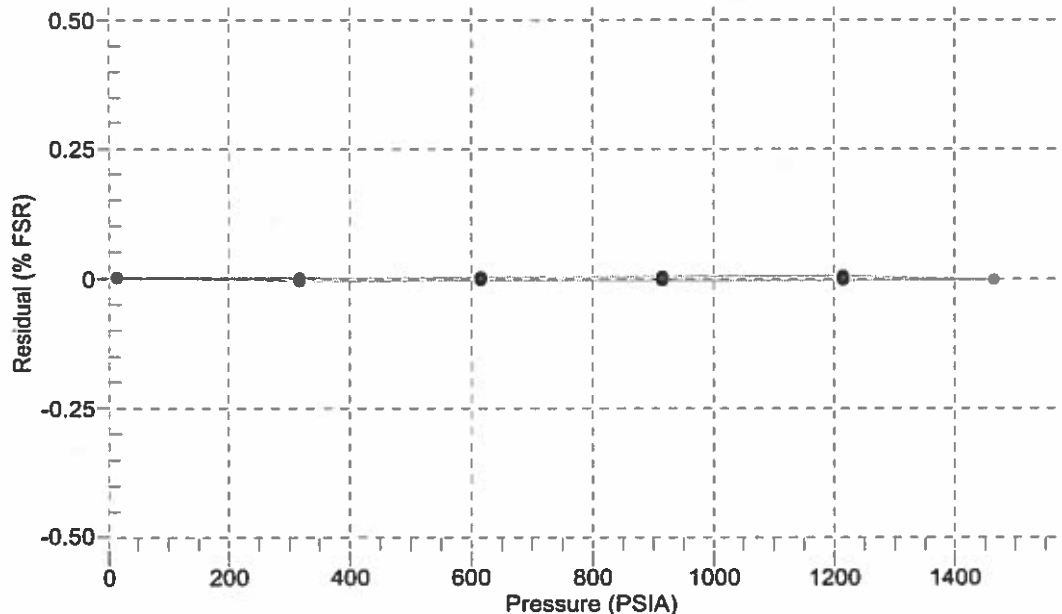
$$n = x * PTCB0 / (PTCB0 + PTCB1 * t + PTCB2 * t^2)$$

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

$$\text{Residual (\%FSR)} = (\text{computed pressure} - \text{true pressure}) * 100 / \text{Full Scale Range}$$

Date, Offset (%FSR)

● 12-Dec-16 0.00



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COEFFICIENTS:

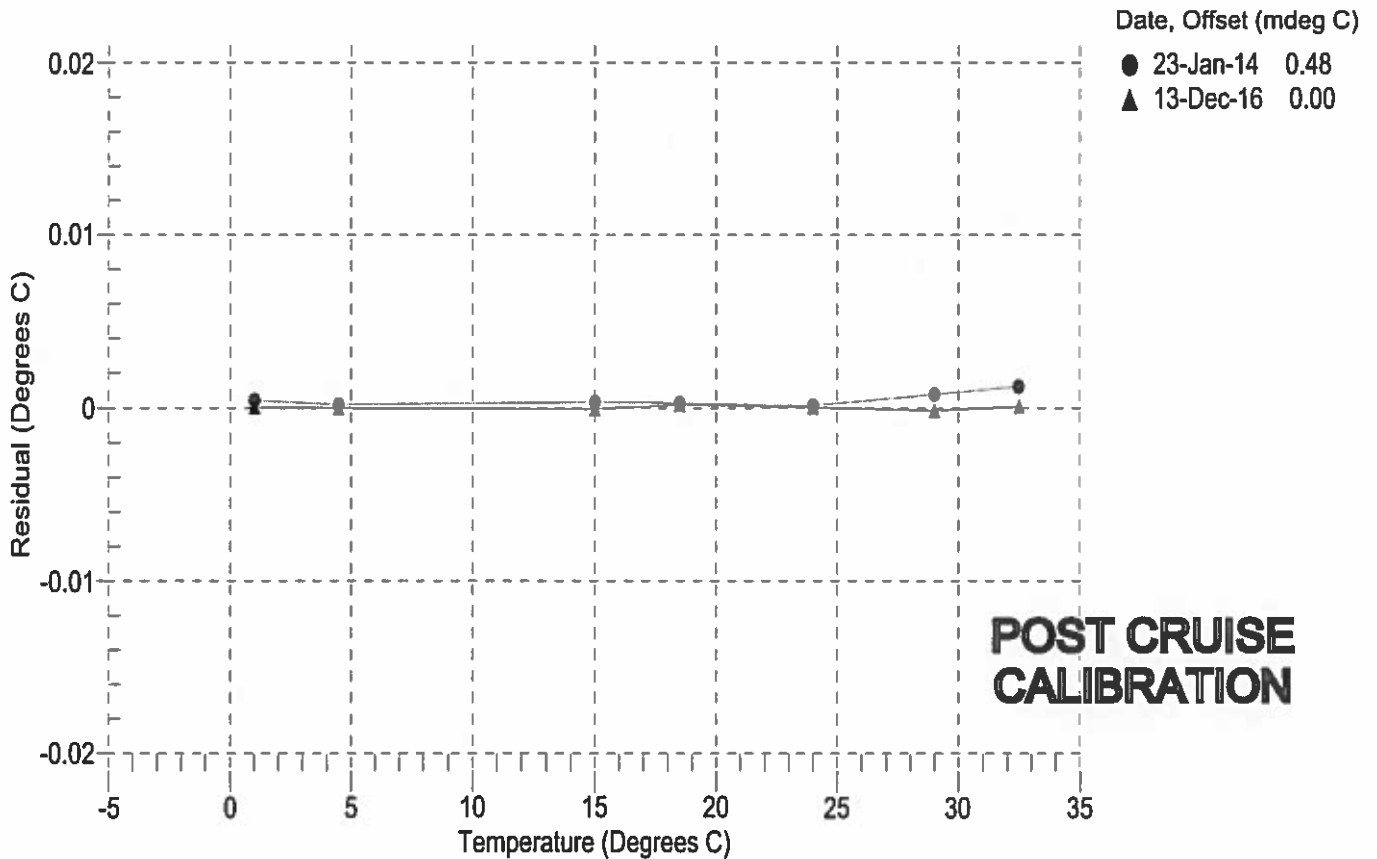
a0 = -1.371824e-004
 a1 = 3.130117e-004
 a2 = -4.895597e-006
 a3 = 2.143915e-007

BATH TEMP (° C)	INSTRUMENT OUTPUT (counts)	INST TEMP (° C)	RESIDUAL (° C)
1.0000	564589.2	1.0000	0.0000
4.5000	483255.1	4.5000	-0.0000
15.0000	309016.9	14.9999	-0.0001
18.5000	267881.1	18.5002	0.0002
24.0000	215300.3	24.0000	0.0000
29.0000	177589.2	28.9998	-0.0002
32.5000	155709.0	32.5001	0.0001

n = Instrument Output (counts)

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

$$\text{Residual (°C)} = \text{instrument temperature} - \text{bath temperature}$$



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COEFFICIENTS:

g = -9.884389e-001
h = 1.419064e-001
i = -1.992230e-003
j = 1.712115e-004

CPcor = -9.5700e-008
CTcor = 3.2500e-006
WBOTC = 4.3558e-007

BATH TEMP (° C)	BATH SAL (PSU)	BATH COND (S/m)	INSTRUMENT OUTPUT (Hz)	INSTRUMENT COND (S/m)	RESIDUAL (S/m)
22.0000	0.0000	0.00000	2678.24	0.00000	0.00000
1.0000	34.6416	2.96245	5387.03	2.96243	-0.00002
4.5000	34.6218	3.26818	5592.05	3.26812	-0.00006
15.0000	34.5800	4.24568	6201.15	4.24640	0.00071
18.5000	34.5714	4.58937	6399.78	4.58843	-0.00094
24.0000	34.5619	5.14495	6709.77	5.14522	0.00027
29.0000	34.5571	5.66462	6985.71	5.66473	0.00011
32.5000	34.5546	6.03549	7175.55	6.03541	-0.00008

$f = \text{Instrument Output(Hz)} * \text{sqrt}(1.0 + \text{WBOTC} * t) / 1000.0$

t = temperature (°C); p = pressure (decibars); $\delta = \text{CTcor}$; $\epsilon = \text{CPcor}$;

$\text{Conductivity (S/m)} = (g + h * f^2 + i * f^3 + j * f^4) / 10 (1 + \delta * t + \epsilon * p)$

$\text{Residual (Siemens/meter)} = \text{instrument conductivity} - \text{bath conductivity}$

