



**Sea-Bird Electronics, Inc.**  
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**SERVICE REPORT**

**Service Request**  
**Date**  
**Sales Order**

**1005502610**  
 31-AUG-2017  
 314757956

**PRODUCT INFORMATION**

**Item:** SLOCUM.50  
**Item Description:** SLOCUM GLIDER CTD, 1000 dBar, DIRECT GROUND  
**Serial:** 712-9341

**Special Notes**

Services Requested:  
 Evaluate/Repair Instrumentation.  
 Perform Routine Calibration Service.

Problems Found:  
 No problems found

Services Performed:  
 Performed initial diagnostic evaluation.  
 Performed "POST" cruise calibration.  
 Performed pressure calibration.  
 Performed complete system check and full diagnostic evaluation.  
 Installed NEW AF24173 Anti-foulant cylinder(s).

Item	Item Description	Qty
CAL_SLOCUM	CALIBRATE SLOCUM CONDUCTIVITY AND TEMPERATURE SENSORS (FRRF)	1
CNCRTSLOCUM	CONFIRM & RE-CERTIFY WEBB SLOCUM GLIDER CTD (FRRF)	1
REPLACEAF	EXTRA CHARGE TO INSTALL ONE ANTIFOULANT DEVICE, INCLUDES ONE 801542.1. (FRRF)	1
PCAL_SLOCUM	CALIBRATE SLOCUM PRESSURE SENSOR (FRRF)	1

**Unbilled Items**

Item	Item Description	Qty
801542.1	AF24173 ANTI-FOULANT, SINGLE CYLINDER, V2	1



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SENSOR SERIAL NUMBER: 9341  
 CALIBRATION DATE: 30-Aug-17

Slocum Payload CTD TEMPERATURE CALIBRATION DATA  
 ITS-90 TEMPERATURE SCALE

COEFFICIENTS:

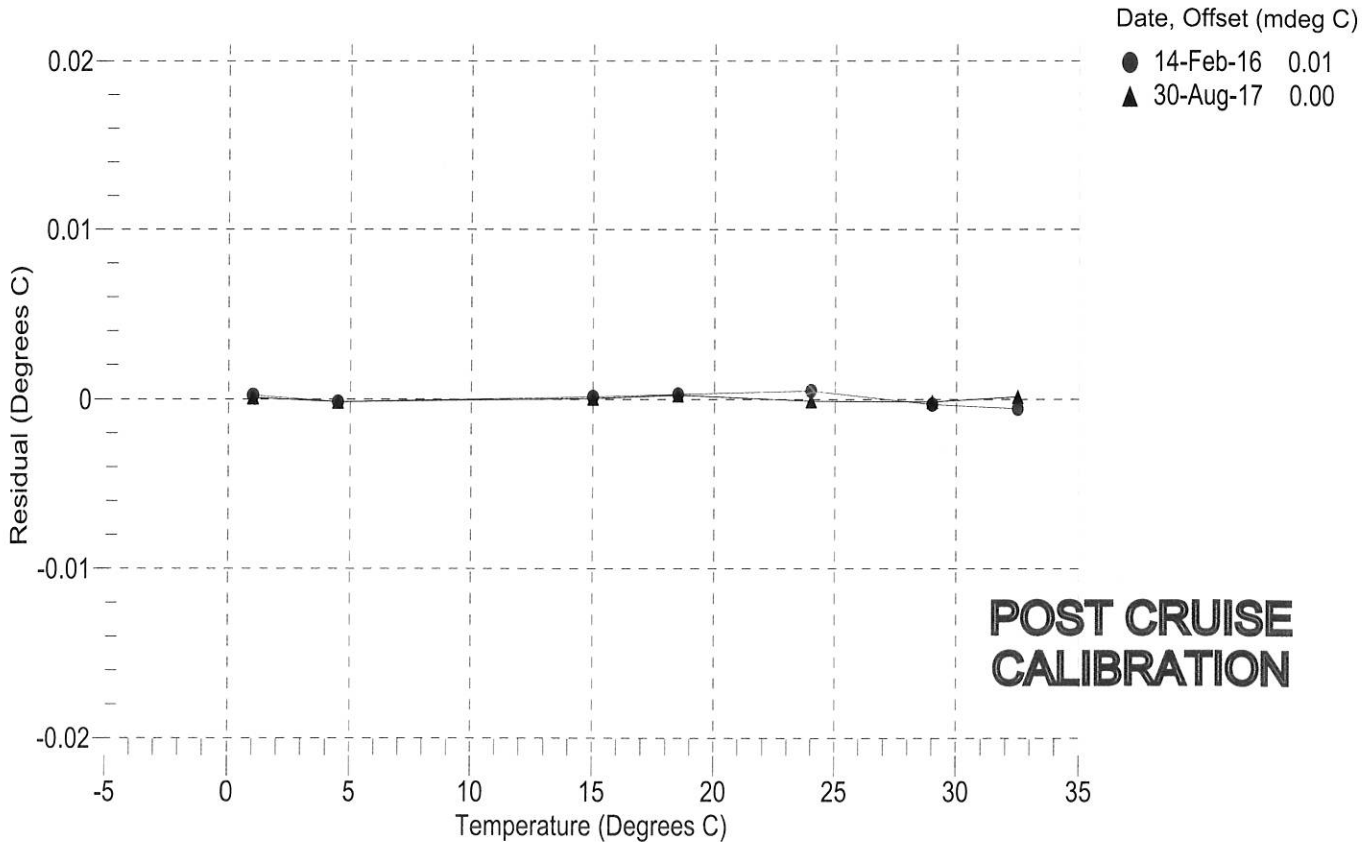
a0 = 2.282648e-005  
 a1 = 2.810334e-004  
 a2 = -2.603416e-006  
 a3 = 1.502729e-007

BATH TEMP (° C)	INSTRUMENT OUTPUT (counts)	INST TEMP (° C)	RESIDUAL (° C)
1.0000	585121.0	1.0001	0.0001
4.4999	499569.2	4.4997	-0.0002
15.0000	317153.2	15.0000	0.0000
18.5000	274306.6	18.5002	0.0002
24.0000	219696.4	23.9999	-0.0001
29.0000	180655.0	28.9998	-0.0002
32.5000	158061.2	32.5001	0.0001

n = Instrument Output (counts)

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

Residual (°C) = instrument temperature - bath temperature





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SENSOR SERIAL NUMBER: 9341  
 CALIBRATION DATE: 30-Aug-17

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

COEFFICIENTS:

g = -9.862095e-001                      CPcor = -9.5700e-008  
 h = 1.362309e-001                      CTcor = 3.2500e-006  
 i = -1.462406e-004                      WBOTC = 2.7853e-007  
 j = 2.838696e-005

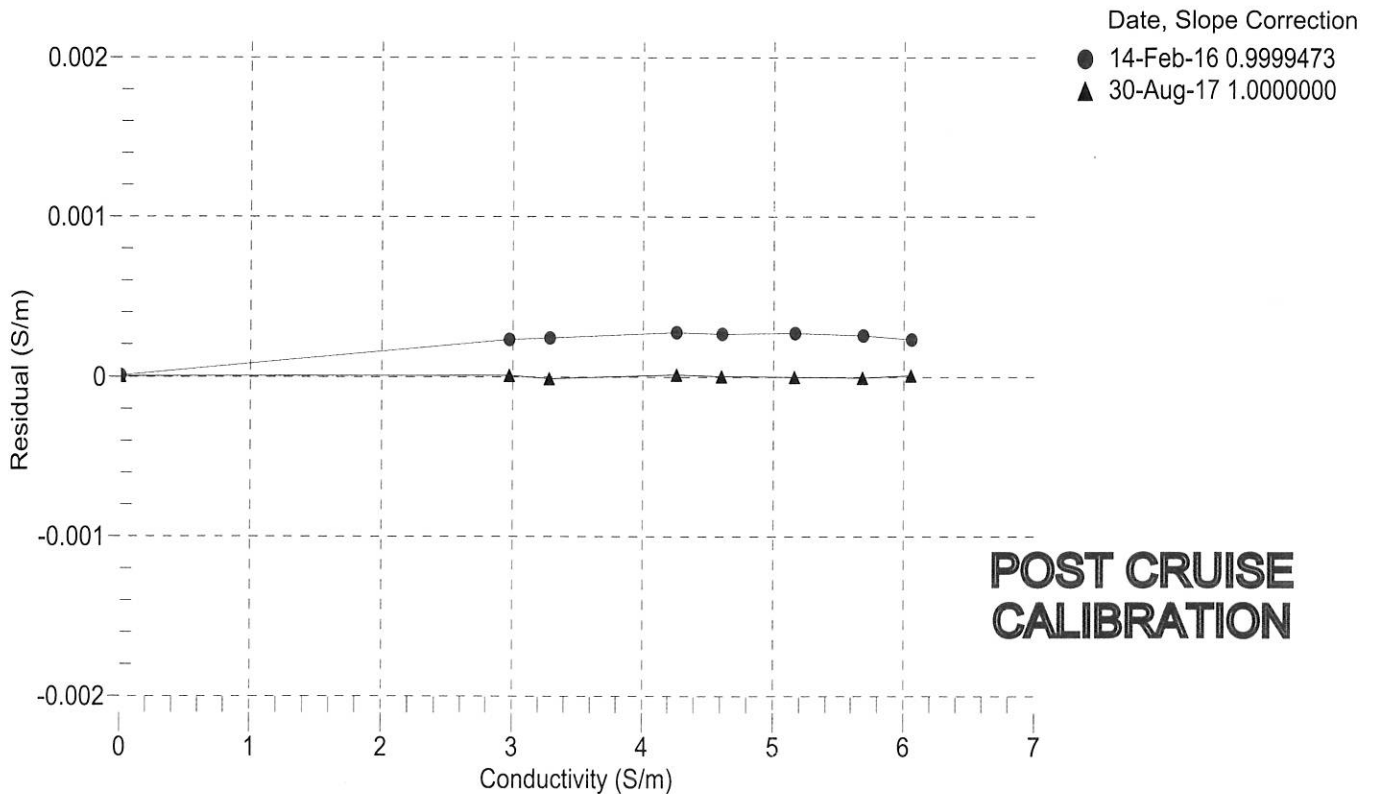
BATH TEMP (° C)	BATH SAL (PSU)	BATH COND (S/m)	INSTRUMENT OUTPUT (Hz)	INSTRUMENT COND (S/m)	RESIDUAL (S/m)
22.0000	0.0000	0.00000	2692.43	0.00000	0.00000
1.0000	34.7586	2.97150	5389.24	2.97151	0.00001
4.4999	34.7382	3.27807	5593.39	3.27806	-0.00001
15.0000	34.6949	4.25829	6200.52	4.25831	0.00001
18.5000	34.6858	4.60292	6400.04	4.60292	0.00000
24.0000	34.6758	5.16003	6709.76	5.16003	-0.00000
29.0000	34.6705	5.68112	6986.73	5.68111	-0.00001
32.5000	34.6675	6.05297	7177.68	6.05298	0.00001

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

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

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

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





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SENSOR SERIAL NUMBER: 9341  
 CALIBRATION DATE: 23-Aug-17

Slocum Payload CTD PRESSURE CALIBRATION DATA  
 1450 psia S/N 4451245

COEFFICIENTS:

PA0 =	-6.231666e-002	PTCA0 =	5.238798e+005
PA1 =	4.620917e-003	PTCA1 =	1.651658e+000
PA2 =	-3.236676e-011	PTCA2 =	-9.849949e-002
PTEMPA0 =	1.569432e+002	PTCB0 =	2.498898e+001
PTEMPA1 =	-6.369021e-002	PTCB1 =	-1.995012e-004
PTEMPA2 =	-4.817644e-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)
14.62	527048.4	2071.1	14.65	0.00	32.50	1926	527024.80
301.71	589183.3	2068.3	301.68	-0.00	29.00	1980	527039.80
588.88	651390.5	2067.1	588.80	-0.01	24.00	2055	527045.40
876.08	713677.7	2065.1	876.05	-0.00	18.50	2139	527071.80
1163.20	775992.2	2064.2	1163.16	-0.00	15.00	2192	527084.60
1450.26	838349.5	2063.0	1450.22	-0.00	4.50	2352	527071.00
1163.25	776030.2	2063.4	1163.33	0.01	1.00	2405	527078.20
876.04	713692.4	2064.8	876.11	0.01			
588.91	651426.0	2066.3	588.97	0.00			
301.73	589183.7	2066.5	301.69	-0.00			
14.62	527046.5	2067.1	14.64	0.00			

	TEMPERATURE (°C)	SPAN (mV)
	-5.10	24.99
	35.00	24.98

THERMAL CORRECTION

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)

● 23-Aug-17 0.00

