



SEA-BIRD

SEA-BIRD ELECTRONICS, INC.

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SERVICE REPORT

**Service Request
Date**

**1005501814
06-MAY-2017**

PRODUCT INFORMATION

Item: SLOCUM.LEGACY
Item Description: (LEGACY) Slocum Glider
Serial: 9082

Special Notes

Services Requested:
Evaluate/Repair Instrumentation.
Perform Routine Calibration Service.
Replace Antifoulant Device(s).

Problems Found:

The temperature probe was damaged during service.
Replaced at no charge.

Services Performed:

Perform initial diagnostic evaluation.
Performed pressure calibration.
Replaced temperature probe.
Replaced the O-rings.
Performed a hydrostatic pressure test.
Performed a "Final" Calibration.
Replaced lithium back up battery.
Installed NEW AF24173 Anti-foulant cylinder(s).

Item	Item Description	Qty
22096	LITHIUM COIN BATTERY, WITH TABS, BR1632A/HA	1
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

Unbilled Items

Item	Item Description	Qty
801801	GLIDER TEMPERATURE PROBE ASSY, FENWAL	1
801542.1	AF24173 ANTI-FOULANT, SINGLE CYLINDER, V2	1

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SENSOR SERIAL NUMBER: 9082
CALIBRATION DATE: 05-May-17

Slocum Payload CTD TEMPERATURE CALIBRATION DATA
ITS-90 TEMPERATURE SCALE

COEFFICIENTS:

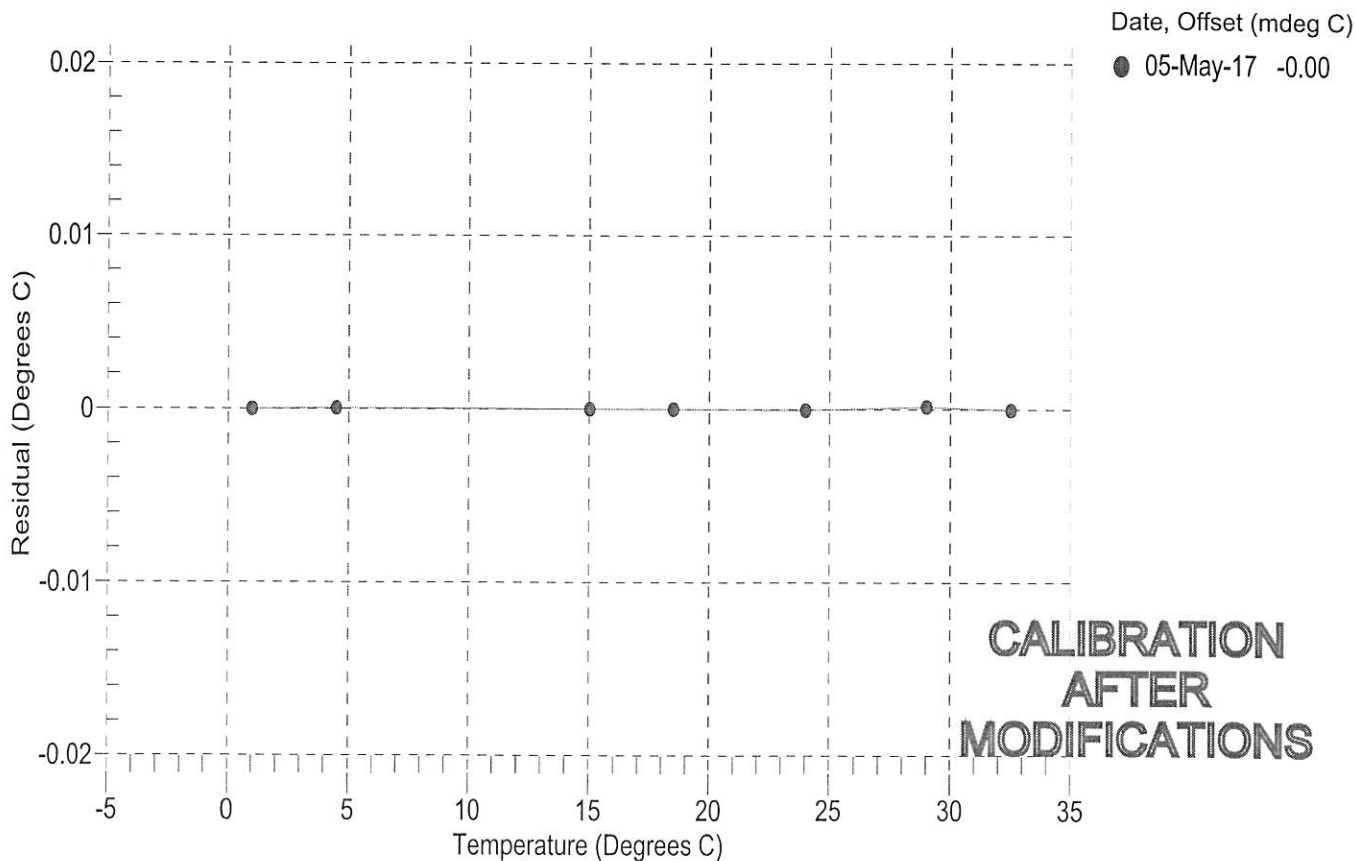
a0 = -3.950251e-005
a1 = 2.976499e-004
a2 = -3.929624e-006
a3 = 1.841967e-007

BATH TEMP (° C)	INSTRUMENT OUTPUT (counts)	INST TEMP (° C)	RESIDUAL (° C)
1.0000	577323.2	1.0000	-0.0000
4.5000	492700.0	4.5000	0.0000
15.0000	312424.9	15.0000	-0.0000
18.5000	270118.3	18.5000	-0.0000
24.0000	216218.4	23.9999	-0.0001
29.0000	177709.6	29.0001	0.0001
32.5000	155438.9	32.4999	-0.0001

n = Instrument Output (counts)

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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CALIBRATION DATE: 05-May-17

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

COEFFICIENTS:

g = -9.704380e-001
h = 1.301574e-001
i = -3.287740e-004
j = 4.097497e-005

CPcor = -9.5700e-008
CTcor = 3.2500e-006
WBOTC = 1.2788e-006

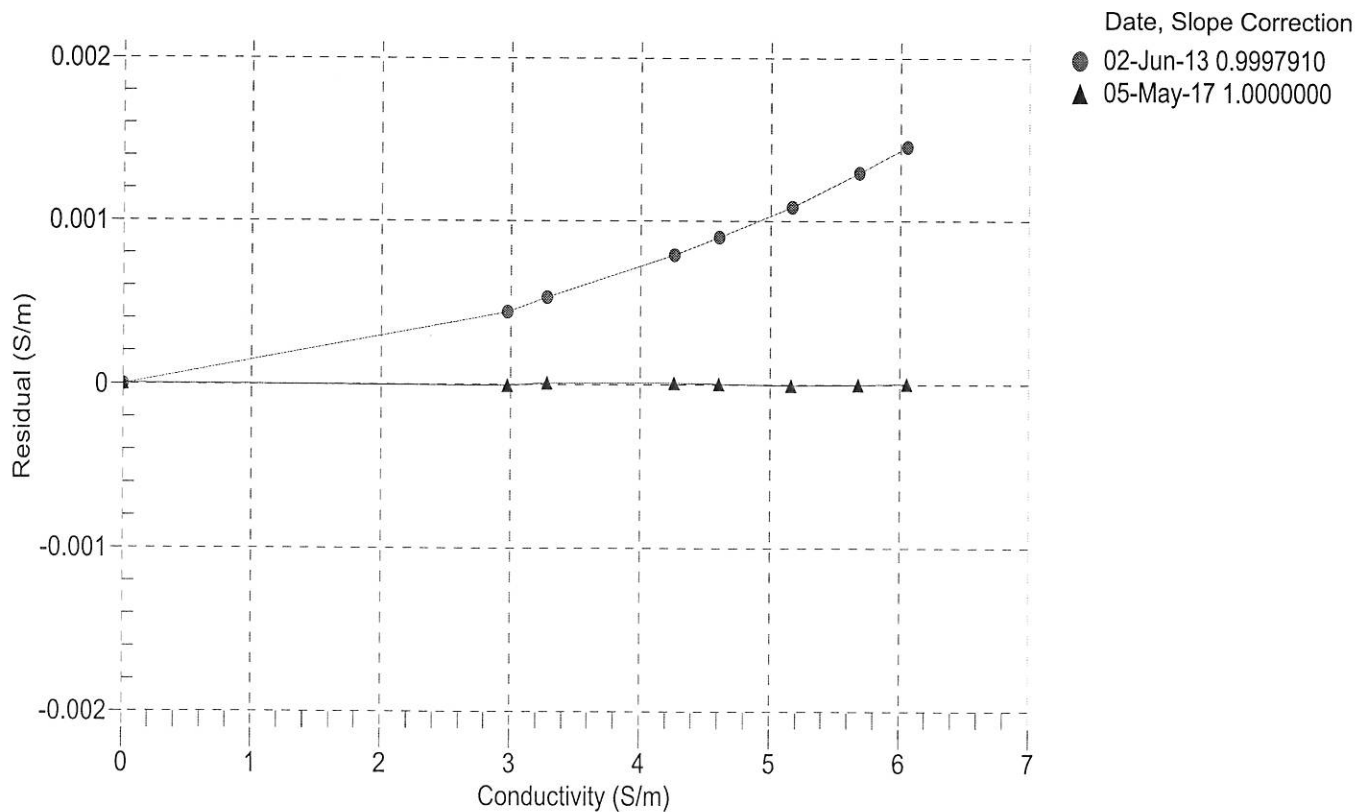
BATH TEMP (° C)	BATH SAL (PSU)	BATH COND (S/m)	INSTRUMENT OUTPUT (Hz)	INSTRUMENT COND (S/m)	RESIDUAL (S/m)
22.0000	0.0000	0.00000	2736.75	0.00000	0.00000
1.0000	34.7536	2.97112	5515.02	2.97111	-0.00001
4.5000	34.7341	3.27773	5724.92	3.27774	0.00001
15.0000	34.6924	4.25802	6348.71	4.25803	0.00001
18.5000	34.6838	4.60269	6553.60	4.60269	0.00000
24.0000	34.6744	5.15985	6871.56	5.15984	-0.00001
29.0000	34.6694	5.68096	7155.77	5.68096	-0.00000
32.5000	34.6663	6.05278	7351.61	6.05279	0.00000

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

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

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

Residual (Siemens/meter) = instrument conductivity - bath conductivity



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SENSOR SERIAL NUMBER: 9082
CALIBRATION DATE: 28-Apr-17

Slocum Payload CTD PRESSURE CALIBRATION DATA
1450 psia S/N 3859875

COEFFICIENTS:

PA0 = 1.142070e-001
PA1 = 4.566989e-003
PA2 = -2.052371e-011
PTEMPA0 = -7.187960e+001
PTEMPA1 = 5.144496e-002
PTEMPA2 = -5.787055e-007

PTCA0 = 5.244993e+005
PTCA1 = -5.580717e-001
PTCA2 = 7.004326e-002
PTCB0 = 2.525588e+001
PTCB1 = 3.750000e-004
PTCB2 = 0.000000e+000

PRESSURE SPAN CALIBRATION

THERMAL CORRECTION

PRESSURE (PSIA)	INSTRUMENT OUTPUT (counts)	THERMISTOR OUTPUT (volts)	COMPUTED PRESSURE (PSIA)	RESIDUAL (%FSR)	TEMP (°C)	THERMISTOR OUTPUT (volts)	INSTRUMENT OUTPUT (counts)
14.75	527736.9	1892.6	14.78	0.00	32.50	2078	527801.80
301.51	590555.7	1894.3	301.48	-0.00	29.00	2006	527785.90
588.79	653534.2	1894.8	588.75	-0.00	24.00	1905	527775.50
876.00	716548.4	1895.0	876.02	0.00	18.50	1793	527758.70
1163.21	779588.3	1895.2	1163.24	0.00	15.00	1722	527751.10
1450.28	842612.4	1895.2	1450.23	-0.00	4.50	1510	527745.50
1163.21	779588.2	1895.0	1163.24	0.00	1.00	1440	527744.40
875.98	716546.8	1894.7	876.01	0.00			
588.76	653534.8	1894.2	588.75	-0.00			
301.52	590553.4	1894.3	301.47	-0.00			
14.75	527736.5	1894.1	14.78	0.00			

TEMPERATURE (°C)	SPAN (mV)
-5.00	25.25
35.00	25.27

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)

● 28-Apr-17 0.00

