SEA-BIRD

Sea-Bird Electronics, Inc.
13431 NE 20th Street
Bellevue, WA 98005 United States

Phone +1-425-643-9866
Fax +1-425-643-9954
www.seabird.com

SERVICE REPORT

Service Request **1005502914**
Date 30-OCT-2017
Sales Order 314820413

PRODUCT INFORMATION

Item: SLOCUM.50
Item Description: SLOCUM GLIDER CTD, 1000 dBar, DIRECT GROUND
Serial: 712-9345

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

Services Performed:
Perform initial diagnostic evaluation.
Replaced lithium battery.
Performed pressure calibration.
Performed "POST" cruise calibration.
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
22096	LITHIUM COIN BATTERY, WITH TABS, BR1632A/HA	1

SEA-BIRD SCIENTIFIC
Sea-Bird Scientific
13431 NE 20th Street
Bellevue, WA 98005
USA

+1 425-643-9866
seabird@seabird.com
www.seabird.com

SENSOR SERIAL NUMBER: 9345
CALIBRATION DATE: 15-Oct-17

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

COEFFICIENTS:

```
g = -9.904140e-001
h =  1.275023e-001
i = -1.070008e-004
j =  2.437491e-005

CPcor = -9.5700e-008
CTcor =  3.2500e-006
WBOTC = -2.6895e-007
```

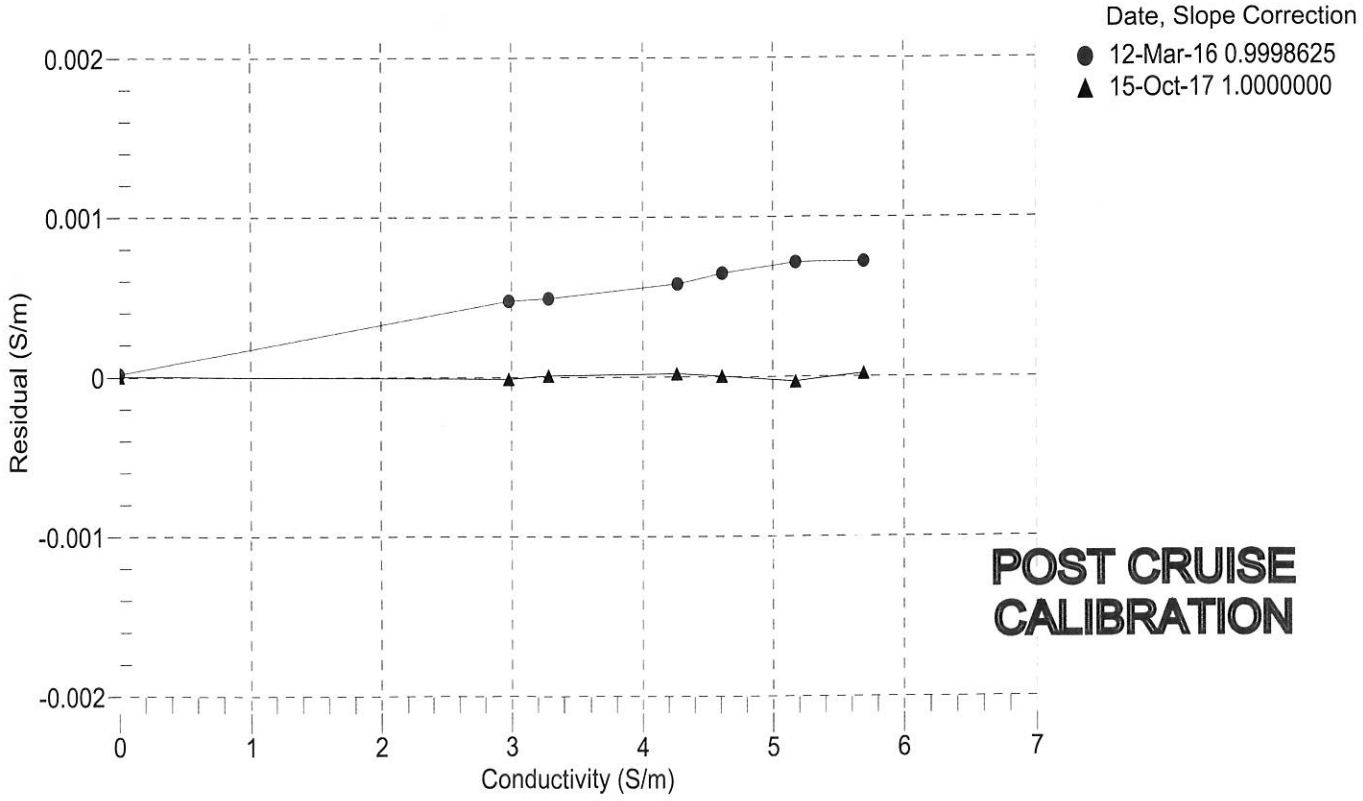
BATH TEMP (° C)	BATH SAL (PSU)	BATH COND (S/m)	INSTRUMENT OUTPUT (Hz)	INSTRUMENT COND (S/m)	RESIDUAL (S/m)
22.0000	0.0000	0.00000	2788.28	0.00000	0.00000
1.0000	34.8321	2.97719	5574.82	2.97717	-0.00001
4.5000	34.8114	3.28431	5785.80	3.28432	0.00001
15.0000	34.7691	4.26644	6413.22	4.26645	0.00002
18.5000	34.7604	4.61175	6619.41	4.61176	0.00000
24.0000	34.7506	5.16993	6939.45	5.16990	-0.00003
29.0000	34.7448	5.69192	7225.63	5.69194	0.00002
32.5000	34.7395	6.06411	7422.82	6.06427	0.00016

f = Instrument Output(Hz) * sqrt(1.0 + WBOTC * t) / 1000.0

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

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

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



SEA-BIRD SCIENTIFIC
Sea-Bird Scientific
13431 NE 20th Street
Bellevue, WA 98005
USA

+1 425-643-9866
seabird@seabird.com
www.seabird.com

SENSOR SERIAL NUMBER: 9345
CALIBRATION DATE: 15-Oct-17

Slocum Payload CTD TEMPERATURE CALIBRATION DATA
ITS-90 TEMPERATURE SCALE

COEFFICIENTS:

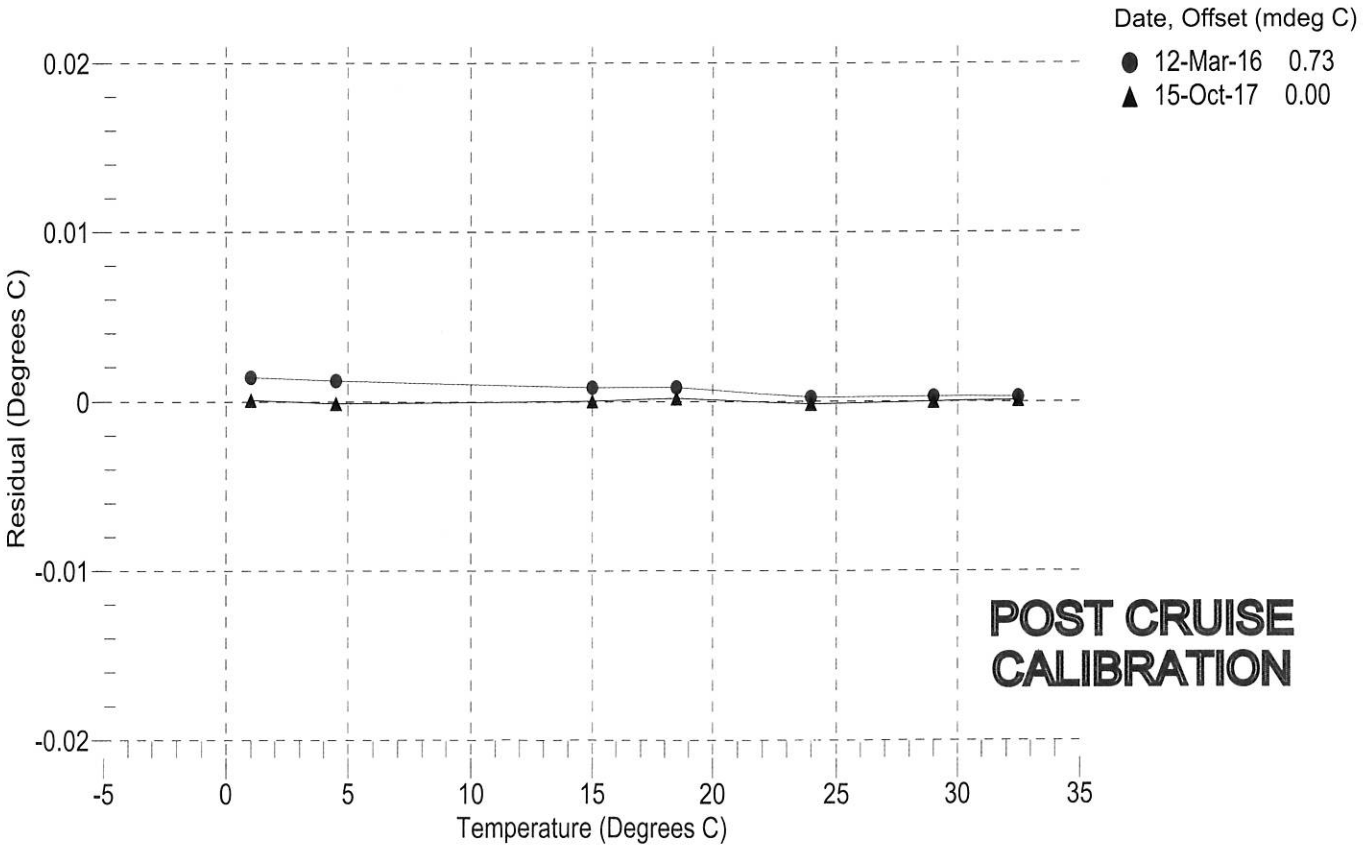
a0 = -1.467949e-004
a1 = 3.129000e-004
a2 = -4.754951e-006
a3 = 2.077488e-007

BATH TEMP (° C)	INSTRUMENT OUTPUT (counts)	INST TEMP (° C)	RESIDUAL (° C)
1.0000	568132.7	1.0001	0.0001
4.5000	486337.1	4.4999	-0.0001
15.0000	311104.0	15.0000	0.0000
18.5000	269733.6	18.5002	0.0002
24.0000	216848.5	23.9998	-0.0002
29.0000	178911.6	29.0000	-0.0000
32.5000	156900.3	32.5001	0.0001

n = Instrument Output (counts)

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

Residual (°C) = instrument temperature - bath temperature



SEA-BIRD SCIENTIFIC
Sea-Bird Scientific
13431 NE 20th Street
Bellevue, WA 98005
USA

+1 425-643-9866
seabird@seabird.com
www.seabird.com

SENSOR SERIAL NUMBER: 9345
CALIBRATION DATE: 13-Oct-17

Slocum Payload CTD PRESSURE CALIBRATION DATA
1450 psia S/N 4417954

COEFFICIENTS:

PA0 =	2.958294e-001	PTCA0 =	5.243812e+005
PA1 =	4.585989e-003	PTCA1 =	6.190692e+000
PA2 =	-3.577713e-011	PTCA2 =	-1.493942e-001
PTEMPA0 =	1.412720e+002	PTCB0 =	2.526700e+001
PTEMPA1 =	-6.389288e-002	PTCB1 =	-4.000000e-004
PTEMPA2 =	4.429043e-007	PTCB2 =	0.000000e+000

PRESSURE SPAN CALIBRATION

PRESSURE (PSIA)	INSTRUMENT OUTPUT (counts)	THERMISTOR OUTPUT (volts)	COMPUTED PRESSURE (PSIA)	RESIDUAL (%FSR)
14.71	527594.9	1879.2	14.75	0.00
301.69	590150.8	1877.6	301.58	-0.01
588.90	652872.9	1875.7	588.89	-0.00
876.19	715641.9	1873.3	876.14	-0.00
1163.49	778508.1	1872.7	1163.55	0.00
1450.46	841309.7	1871.1	1450.38	-0.01
1163.39	778486.6	1871.6	1163.45	0.00
876.45	715732.3	1873.7	876.55	0.01
588.92	652881.5	1874.6	588.93	0.00
301.68	590155.6	1874.6	301.60	-0.01
14.71	527601.0	1875.2	14.78	0.00

THERMAL CORRECTION

TEMP (°C)	THERMISTOR OUTPUT (volts)	INSTRUMENT OUTPUT (counts)
32.50	1723	527649.00
29.00	1779	527665.90
24.00	1860	527662.70
18.50	1947	527670.40
15.00	2004	527669.90
4.50	2174	527630.10
1.00	2230	527613.40

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

y = thermistor output (counts)

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

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

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

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

Residual (%FSR) = (computed pressure - true pressure) * 100 / Full Scale Range