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 1005508389
Date 17-AUG-2019
Sales Order 315682035

PRODUCT INFORMATION

Item: SLOCUM.LEGACY
Item Description: (LEGACY) Slocum Glider
Serial: 9102

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

Services Performed:
Perform initial diagnostic evaluation.
Performed pressure calibration.
Performed "POST" cruise calibration.
Replaced the lithium back-up battery(s).
Installed NEW AF24173 Anti-foulant cylinder(s).

Item	Item Description	Qty
CAL_SLOCUM	Calibrate SLOCUM conductivity and temperature sensors	1
CNCRTSLOCUM	Confirm & Re-certify Webb SLOCUM Glider CTD	1
REPLACEAF	Extra charge to install one antifoulant device, includes one 801542.1.	1
PCAL_SLOCUM	Calibrate SLOCUM pressure sensor	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: 9102
CALIBRATION DATE: 12-Jul-19

Slocum Payload CTD TEMPERATURE CALIBRATION DATA
ITS-90 TEMPERATURE SCALE

COEFFICIENTS:

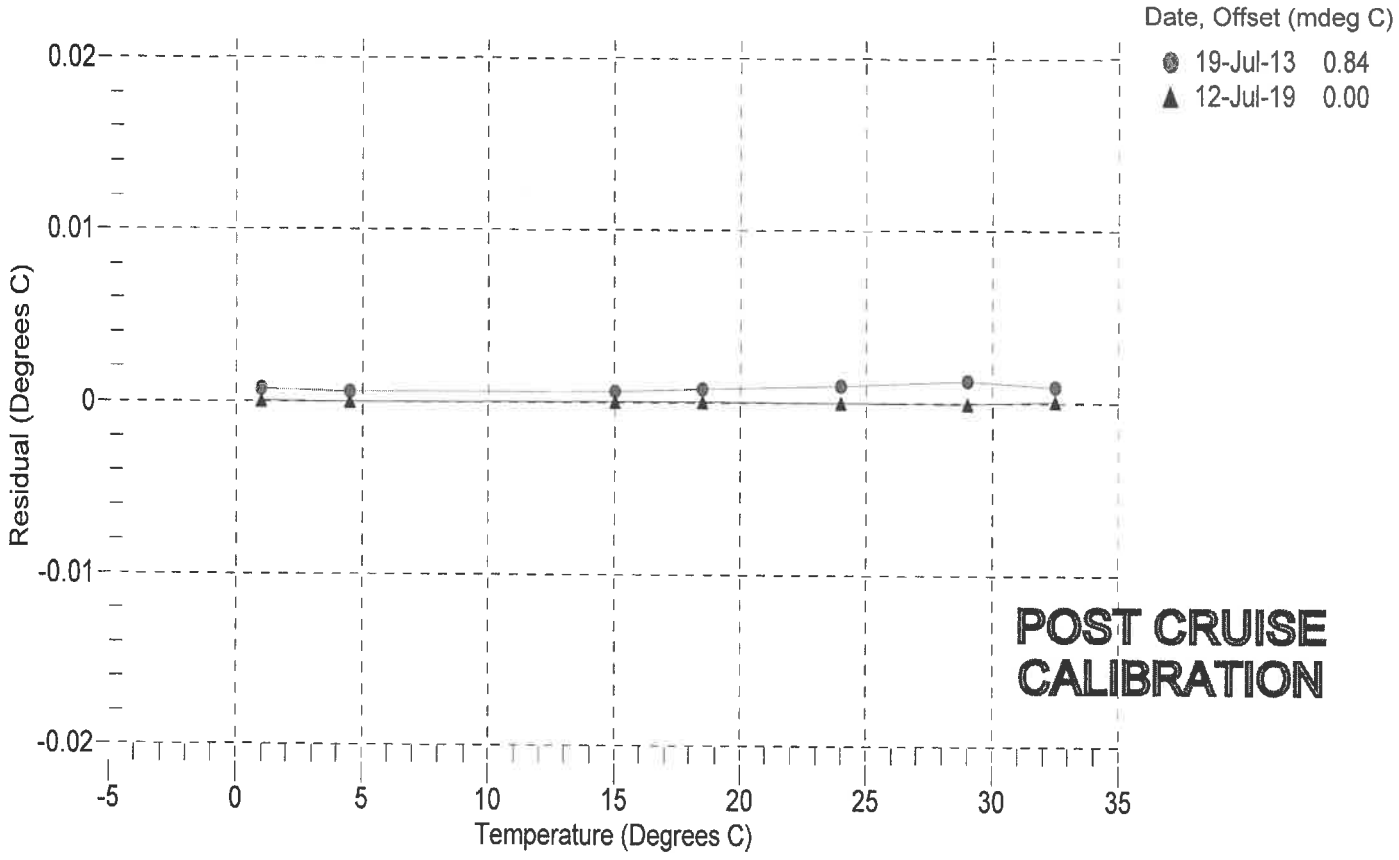
a0 = -3.598741e-005
a1 = 2.905977e-004
a2 = -3.222216e-006
a3 = 1.711379e-007

BATH TEMP (° C)	INSTRUMENT OUTPUT (counts)	INST TEMP (° C)	RESIDUAL (° C)
1.0000	569620.0	1.0000	0.0000
4.5000	487360.0	4.5000	-0.0000
15.0000	311267.9	15.0000	0.0000
18.5000	269728.2	18.5000	0.0000
24.0000	216648.7	24.0000	-0.0000
29.0000	178597.7	28.9999	-0.0001
32.5000	156529.4	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: 9102
CALIBRATION DATE: 12-Jul-19

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

COEFFICIENTS:

g = -9.842208e-001
h = 1.363516e-001
i = -2.630428e-004
j = 3.741392e-005

CPcor = -9.5700e-008
CTcor = 3.2500e-006
WBOTC = -1.2386e-007

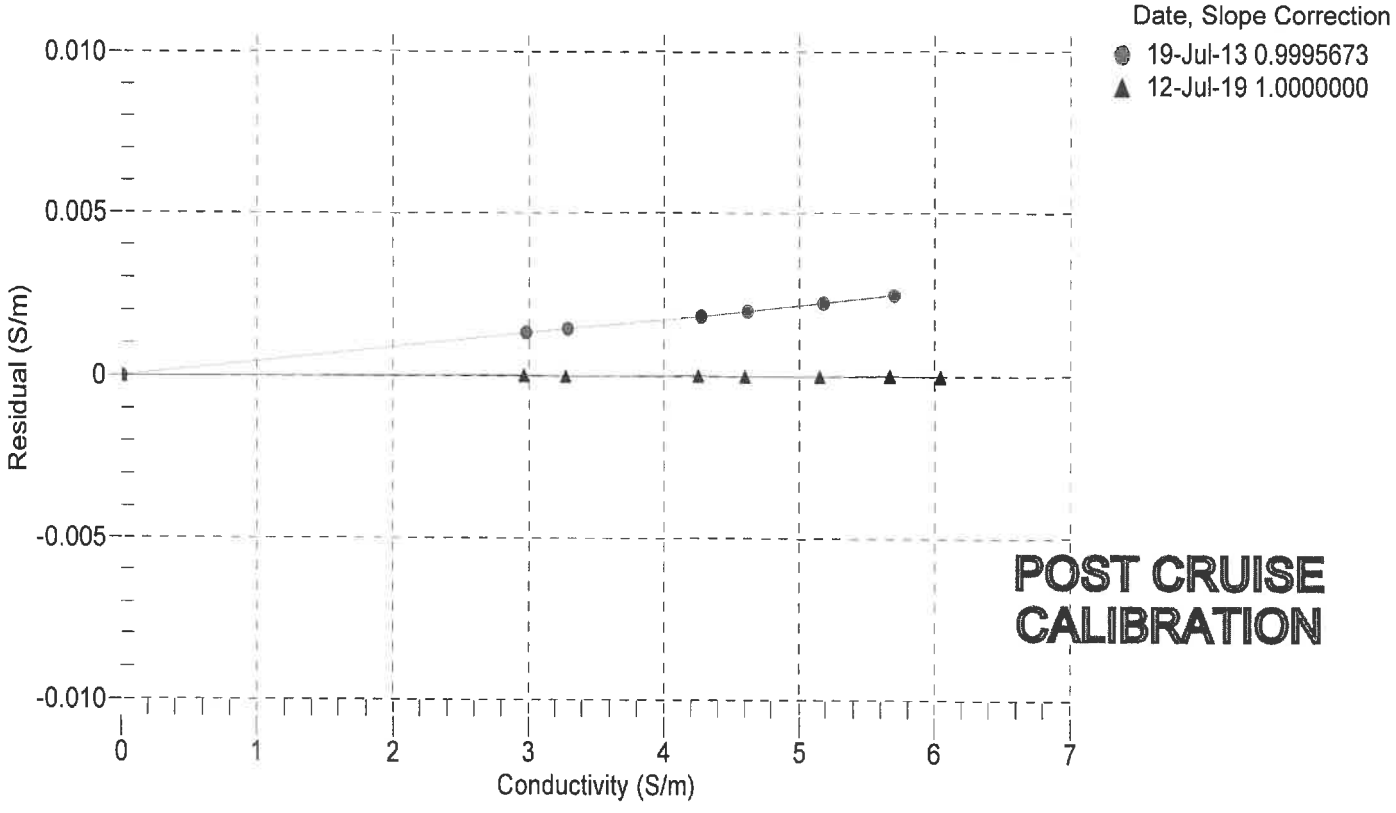
BATH TEMP (° C)	BATH SAL (PSU)	BATH COND (S/m)	INSTRUMENT OUTPUT (Hz)	INSTRUMENT COND (S/m)	RESIDUAL (S/m)
22.0000	0.0000	0.00000	2691.00	0.00000	0.00000
1.0000	34.7040	2.96728	5389.88	2.96728	0.00001
4.5000	34.6845	3.27351	5594.23	3.27350	-0.00001
15.0000	34.6414	4.25242	6201.72	4.25242	0.00000
18.5000	34.6321	4.59656	6401.31	4.59656	-0.00000
24.0000	34.6220	5.15291	6711.12	5.15291	-0.00000
29.0000	34.6160	5.67319	6988.09	5.67319	0.00000
32.5000	34.6118	6.04435	7178.94	6.04435	-0.00000

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: 9102
CALIBRATION DATE: 11-Jul-19

Slocum Payload CTD PRESSURE CALIBRATION DATA
1450 psia S/N 3912712

COEFFICIENTS:

PA0 =	2.195155e-001	PTCA0 =	5.248726e+005
PA1 =	4.530344e-003	PTCA1 =	1.470111e+000
PA2 =	-1.960528e-011	PTCA2 =	1.759149e-002
PTEMPA0 =	-7.046686e+001	PTCB0 =	2.534875e+001
PTEMPA1 =	5.229587e-002	PTCB1 =	-1.650000e-003
PTEMPA2 =	-6.773806e-007	PTCB2 =	0.000000e+000

PRESSURE SPAN CALIBRATION

PRESSURE (PSIA)	INSTRUMENT OUTPUT (counts)	THERMISTOR OUTPUT (volts)	COMPUTED PRESSURE (PSIA)	RESIDUAL (%FSR)
14.68	528107.0	1829.0	14.70	0.00
314.94	594280.0	1830.0	314.84	-0.01
614.89	660459.0	1831.0	614.84	-0.00
914.94	726682.0	1835.0	914.87	-0.00
1214.90	792940.0	1836.0	1214.89	-0.00
1464.88	848170.0	1836.0	1464.84	-0.00
1214.84	792947.0	1836.0	1214.92	0.01
914.89	726699.0	1835.0	914.95	0.00
614.86	660476.0	1835.0	614.92	0.00
314.84	594288.0	1835.0	314.88	0.00
14.68	528105.0	1836.0	14.69	0.00

THERMAL CORRECTION

TEMP (°C)	THERMISTOR OUTPUT (volts)	INSTRUMENT OUTPUT (counts)
32.50	2022	528158.50
29.00	1952	528150.10
24.00	1851	528141.60
18.50	1740	528125.90
15.00	1671	528116.30
4.50	1461	528101.40
1.00	1392	528094.00

TEMPERATURE (°C)	SPAN
-5.00	25.36
35.00	25.29

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