



SEA-BIRD

Sea-Bird Electronics, Inc.
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1005509092
06-NOV-2019
315779768

SERVICE REPORT

Service Request
Date
Sales Order

CUSTOMER INFORMATION

Name: TELEDYNE BENTHOS
Account : 40309863
CHARLES STILL
CHARLES.STILL@TELEDYNE.COM
1-508-563-1000

PO Number:
227281

Bill To Address

1026 N. Williamson Blvd.;ATTN: ACCOUNTS PAYABLE;
DAYTONA BEACH,FL,32114,US

Ship To Address

49 EDGERTON DRIVE;
NORTH FALMOUTH,MA,02556,US

PRODUCT INFORMATION

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

Special Notes

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

Services Performed:
Perform initial diagnostic evaluation.
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	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



Sea-Bird Scientific
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SENSOR SERIAL NUMBER: 9082
 CALIBRATION DATE: 02-Nov-19

Slocum Payload CTD TEMPERATURE CALIBRATION DATA
 ITS-90 TEMPERATURE SCALE

COEFFICIENTS:

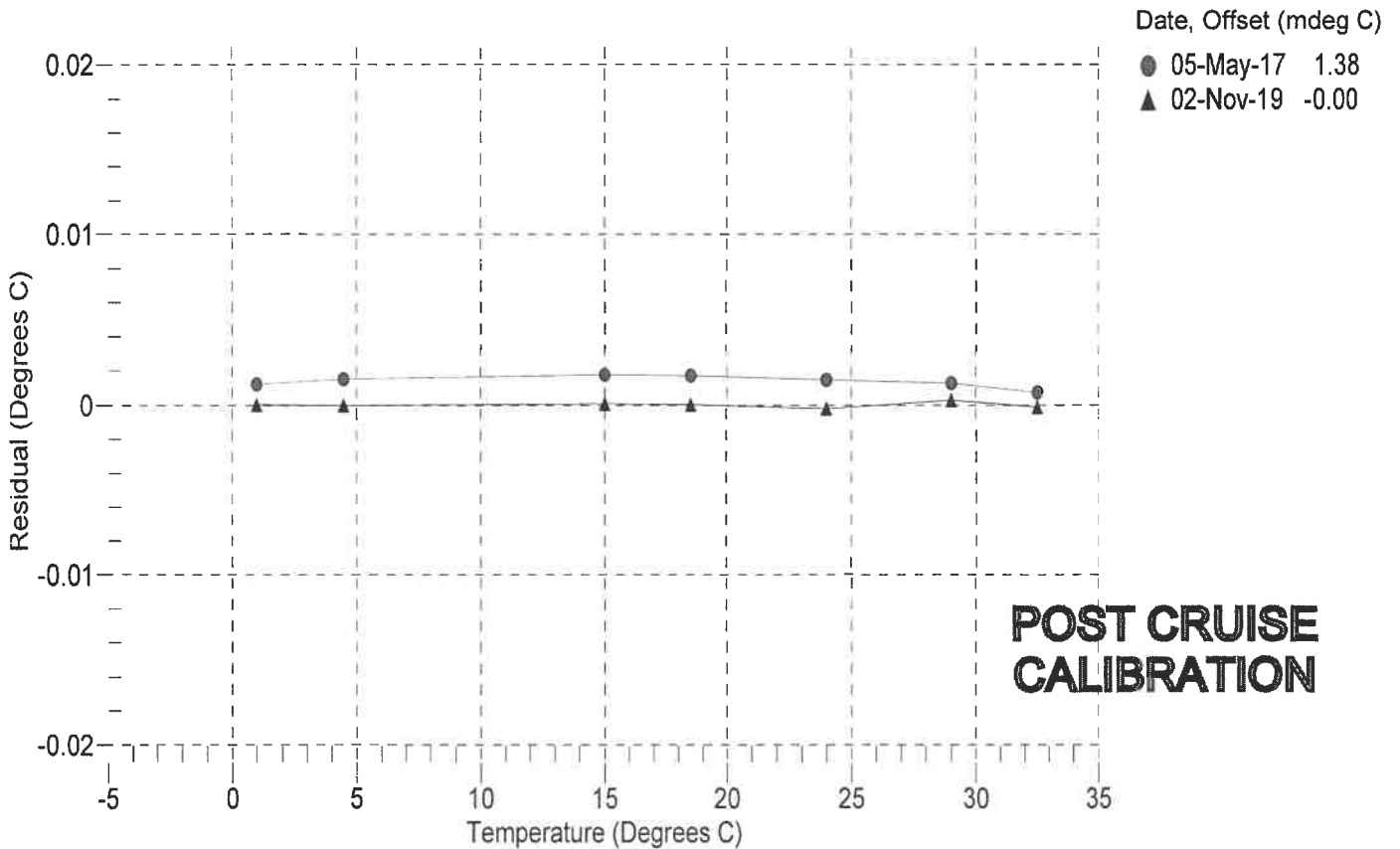
a0 = -2.972520e-005
 a1 = 2.955857e-004
 a2 = -3.786709e-006
 a3 = 1.809577e-007

BATH TEMP (° C)	INSTRUMENT OUTPUT (counts)	INST TEMP (° C)	RESIDUAL (° C)
1.0000	577355.6	1.0000	0.0000
4.5000	492733.4	4.5000	-0.0000
15.0000	312447.4	15.0001	0.0001
18.5000	270137.4	18.5000	0.0000
24.0000	216233.0	23.9998	-0.0002
29.0000	177716.4	29.0003	0.0003
32.5000	155443.8	32.4999	-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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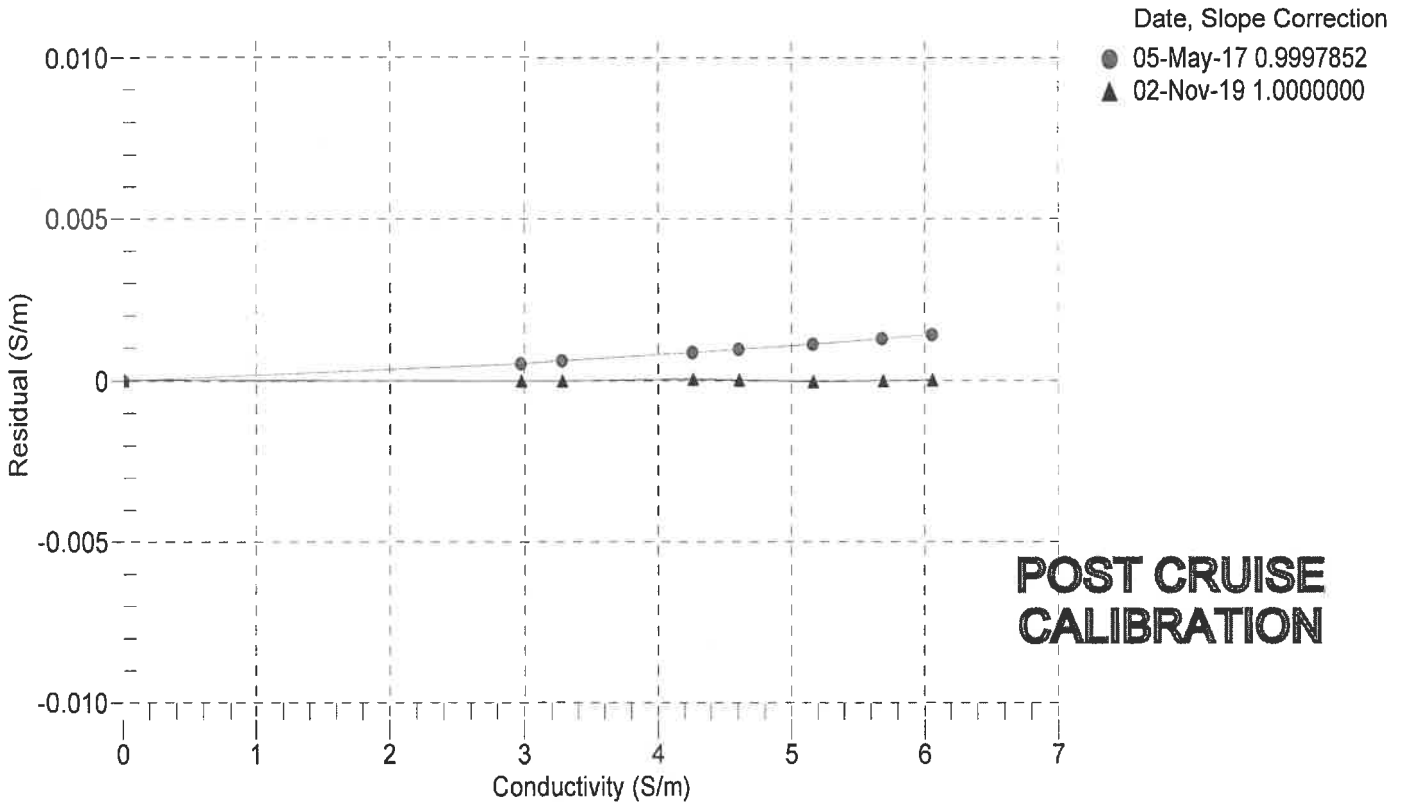
Slocum Payload CTD CONDUCTIVITY CALIBRATION DATA
 PSS 1978: C(35,15,0) = 4.2914 Siemens/meter

COEFFICIENTS:

g = -9.705789e-001 CPcor = -9.5700e-008
 h = 1.301708e-001 CTcor = 3.2500e-006
 i = -3.288088e-004 WBOTC = 1.2788e-006
 j = 4.126293e-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	2736.78	0.00000	0.00000
1.0000	34.8172	2.97603	5518.09	2.97603	-0.00000
4.5000	34.7957	3.28297	5728.03	3.28296	-0.00001
15.0000	34.7526	4.26463	6352.19	4.26465	0.00003
18.5000	34.7442	4.60984	6557.23	4.60984	0.00001
24.0000	34.7352	5.16789	6875.40	5.16786	-0.00003
29.0000	34.7297	5.68973	7159.76	5.68972	-0.00001
32.5000	34.7243	6.06176	7355.55	6.06177	0.00001

$f = \text{Instrument Output(Hz)} * \text{sqrt}(1.0 + \text{WBOTC} * t) / 1000.0$
 $t = \text{temperature (°C)}$; $p = \text{pressure (decibars)}$; $\delta = \text{CTcor}$; $\epsilon = \text{CPcor}$;
 $\text{Conductivity (S/m)} = (g + h * f^2 + i * f^3 + j * f^4) / (1 + \delta * t + \epsilon * p)$
 $\text{Residual (Siemens/meter)} = \text{instrument conductivity} - \text{bath conductivity}$





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SENSOR SERIAL NUMBER: 9082
 CALIBRATION DATE: 31-Oct-19

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

COEFFICIENTS:

PA0 =	1.522711e-001	PTCA0 =	5.245264e+005
PA1 =	4.566858e-003	PTCA1 =	3.100712e-001
PA2 =	-2.097038e-011	PTCA2 =	5.366202e-002
PTEMPA0 =	-7.184993e+001	PTCB0 =	2.525588e+001
PTEMPA1 =	5.141351e-002	PTCB1 =	3.750000e-004
PTEMPA2 =	-5.659287e-007	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)
14.69	527748.0	1870.0	14.71	0.00	32.50	2077	527794.40
314.98	593536.0	1870.0	314.95	-0.00	29.00	2005	527783.20
615.00	659320.0	1870.0	615.00	-0.00	24.00	1904	527767.00
915.04	725145.0	1870.0	915.05	0.00	18.50	1793	527751.60
1214.97	790990.0	1870.0	1215.01	0.00	15.00	1722	527744.20
1464.98	845881.0	1870.0	1464.93	-0.00	4.50	1510	527732.60
1214.97	790988.0	1869.0	1215.00	0.00	1.00	1440	527727.40
915.02	725143.0	1870.0	915.04	0.00			
614.99	659319.0	1871.0	614.99	0.00	TEMPERATURE (°C)	SPAN	
315.03	593535.0	1872.0	314.95	-0.01	-5.00	25.25	
14.68	527753.0	1871.0	14.73	0.00	35.00	25.27	

y = thermistor output (counts)
 $t = PTEMPA0 + PTEMPA1 * y + PTEMPA2 * y^2$
 $x = \text{instrument output} - PTCA0 - PTCA1 * t - PTCA2 * t^2$
 $n = x * PTCB0 / (PTCB0 + PTCB1 * t + PTCB2 * t^2)$
 pressure (PSIA) = PA0 + PA1 * n + PA2 * n²
 Residual (%FSR) = (computed pressure - true pressure) * 100 / Full Scale Range

Date, Offset (%FSR)
 ● 31-Oct-19 -0.00

