



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

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

SENSOR SERIAL NUMBER: 9453
 CALIBRATION DATE: 17-Feb-20

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

COEFFICIENTS:

g = -9.886816e-001 CPcor = -9.5700e-008
 h = 1.281896e-001 CTcor = 3.2500e-006
 i = 7.204160e-007 WBOTC = 6.0041e-007
 j = 1.700622e-005

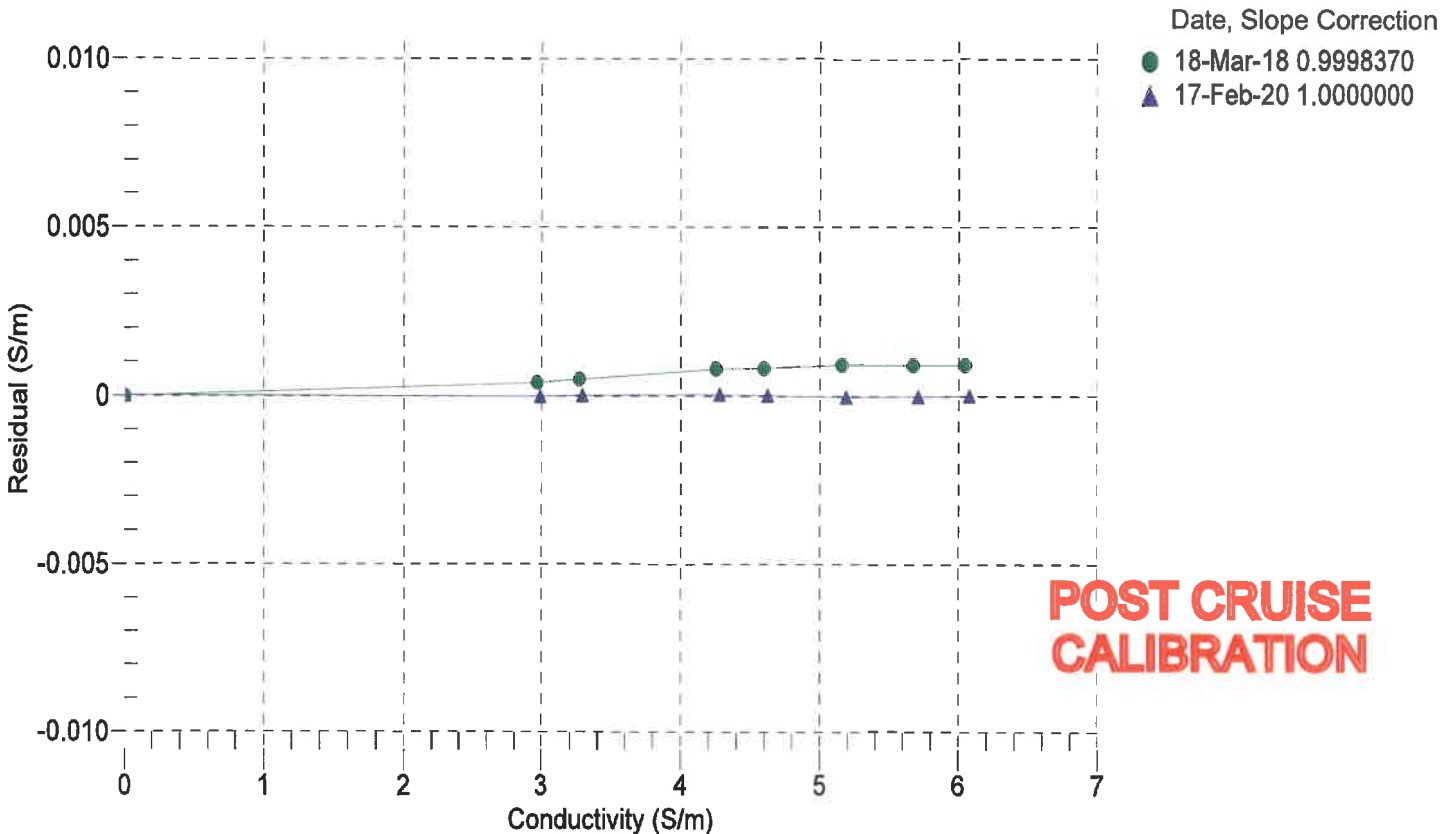
| BATH TEMP (° C) | BATH SAL (PSU) | BATH COND (S/m) | INSTRUMENT OUTPUT (Hz) | INSTRUMENT COND (S/m) | RESIDUAL (S/m) |
|--------------------|-------------------|--------------------|---------------------------|--------------------------|-------------------|
| 22.0000 | 0.0000 | 0.00000 | 2775.71 | 0.00000 | 0.00000 |
| 1.0000 | 34.9488 | 2.98621 | 5557.01 | 2.98620 | -0.00001 |
| 4.4999 | 34.9297 | 3.29436 | 5767.51 | 3.29436 | 0.00000 |
| 15.0000 | 34.8881 | 4.27949 | 6393.36 | 4.27951 | 0.00003 |
| 18.5000 | 34.8792 | 4.62581 | 6599.00 | 4.62581 | 0.00000 |
| 24.0000 | 34.8692 | 5.18562 | 6918.23 | 5.18560 | -0.00003 |
| 29.0000 | 34.8615 | 5.70889 | 7203.56 | 5.70889 | -0.00000 |
| 32.5000 | 34.8532 | 6.08170 | 7399.97 | 6.08171 | 0.00001 |

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

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

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

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



5847



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

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

SENSOR SERIAL NUMBER: 9453
 CALIBRATION DATE: 17-Feb-20

Slocum Payload CTD TEMPERATURE CALIBRATION DATA
 ITS-90 TEMPERATURE SCALE

COEFFICIENTS:

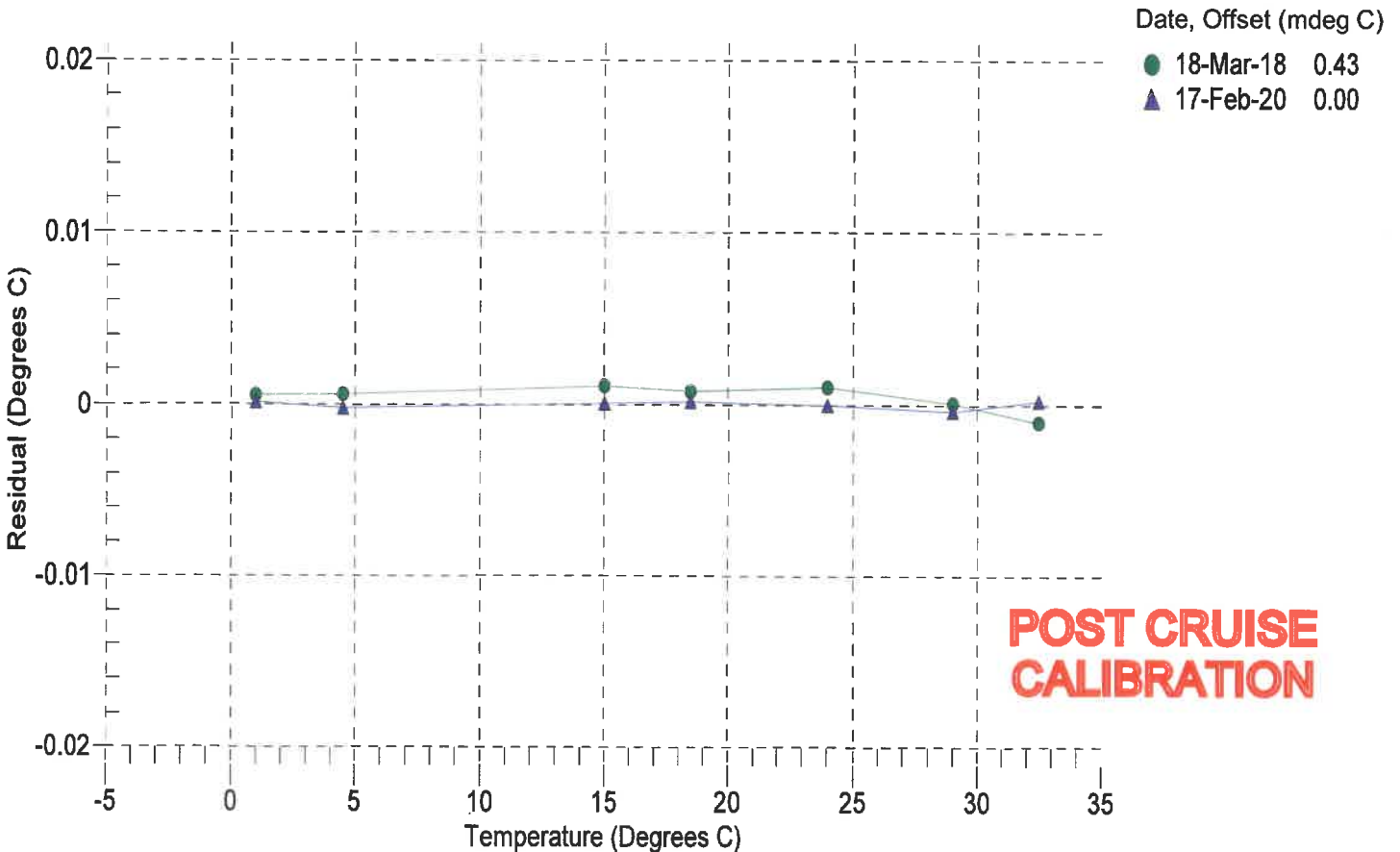
a0 = -5.816890e-005
 a1 = 2.882201e-004
 a2 = -2.696340e-006
 a3 = 1.557289e-007

| BATH TEMP (° C) | INSTRUMENT OUTPUT (counts) | INST TEMP (° C) | RESIDUAL (° C) |
|--------------------|-------------------------------|--------------------|-------------------|
| 1.0000 | 564294.6 | 1.0001 | 0.0001 |
| 4.4999 | 483670.6 | 4.4997 | -0.0002 |
| 15.0000 | 310532.0 | 15.0001 | 0.0001 |
| 18.5000 | 269552.8 | 18.5002 | 0.0002 |
| 24.0000 | 217086.0 | 24.0000 | -0.0000 |
| 29.0000 | 179385.8 | 28.9996 | -0.0004 |
| 32.5000 | 157475.4 | 32.5002 | 0.0002 |

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





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

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

SENSOR SERIAL NUMBER: 9453
 CALIBRATION DATE: 14-Feb-20

Slocum Payload CTD PRESSURE CALIBRATION DATA
 1450 psia S/N 10724298

COEFFICIENTS:

| | | | |
|-----------|----------------|---------|----------------|
| PA0 = | 7.398063e-001 | PTCA0 = | 5.242987e+005 |
| PA1 = | 4.506029e-003 | PTCA1 = | 1.443325e+001 |
| PA2 = | -2.709205e-011 | PTCA2 = | -3.000357e-001 |
| PTEMPA0 = | -6.310315e+001 | PTCB0 = | 2.500889e+001 |
| PTEMPA1 = | 5.387307e-002 | PTCB1 = | 2.631579e-003 |
| PTEMPA2 = | -6.937099e-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) |
|-----------------|----------------------------|---------------------------|--------------------------|-----------------|------------------|---------------------------|----------------------------|
| 14.54 | 527542.5 | 1616.9 | 14.55 | 0.00 | 32.50 | 1817 | 527615.60 |
| 301.64 | 591395.7 | 1618.4 | 301.48 | -0.01 | 29.00 | 1749 | 527555.60 |
| 588.93 | 655409.5 | 1619.1 | 588.91 | -0.00 | 24.00 | 1652 | 527661.60 |
| 876.15 | 719425.8 | 1619.8 | 876.12 | -0.00 | 18.50 | 1545 | 527628.40 |
| 1163.40 | 783511.7 | 1620.1 | 1163.43 | 0.00 | 15.00 | 1478 | 527580.20 |
| 1450.71 | 847625.0 | 1621.3 | 1450.64 | -0.01 | 4.50 | 1276 | 527460.60 |
| 1163.44 | 783526.5 | 1621.3 | 1163.49 | 0.00 | 1.00 | 1209 | 527491.40 |
| 876.18 | 719463.6 | 1621.5 | 876.29 | 0.01 | | | |
| 588.89 | 655416.5 | 1621.3 | 588.93 | 0.00 | TEMPERATURE (°C) | SPAN | |
| 301.56 | 591398.8 | 1621.6 | 301.49 | -0.01 | -4.90 | 25.00 | |
| 14.55 | 527571.1 | 1622.5 | 14.67 | 0.01 | 35.00 | 25.10 | |

y = thermistor output (counts)

t = PTEMPA0 + PTEMPA1 * y + PTEMPA2 * y²

x = instrument output - PTCA0 - PTCA1 * t - PTCA2 * t²

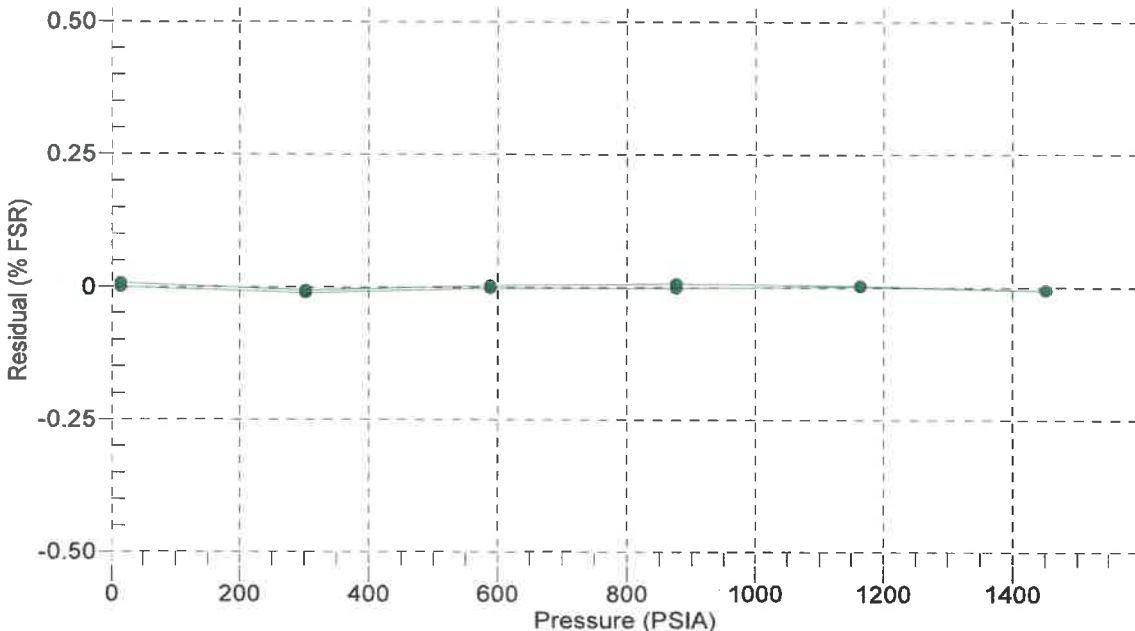
n = x * PTCB0 / (PTCB0 + PTCB1 * t + PTCB2 * t²)

pressure (PSIA) = PA0 + PA1 * n + PA2 * n²

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

Date, Offset (%FSR)

● 14-Feb-20 0.00





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

Phone
 Fax

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

SERVICE REPORT

Service Request
Date
Sales Order

1005510128
 27-FEB-2020
 315908185

CUSTOMER INFORMATION

Name: TELEDYNE WEBB RESEARCH
 Account : 40280819
 CHUCK STILL
 CHARLES.STILL@TELEDYNE.COM
 508-563-1000

PO Number:

Bill To Address

ATTN: ACCOUNTS PAYABLE
 1026 N. Williamson Blvd.
 Daytona Beach,FL,32114,US

Ship To Address

BUSINESS UNIT OF TELEDYNE INSTRUMENT INC
 49 EDGERTON DRIVE
 NORTH FALMOUTH,MA,02556,US

REQUESTED SERVICE DETAILS:

INSTALL ANTIFOUL: Yes
 SEND 3RD PARTY: Yes
 UPDATE FIRMWARE: Yes

REQUESTED TRANSACTION DETAILS:

PAPER COPIES: No
 SPLIT SHIP: split

PRODUCT INFORMATION

Item: SLOCUM.50
Item Description: SLOCUM GLIDER CTD, 1000 dBar, DIRECT GROUND
Serial: 712-9453

Special Notes

Service request:
 Standard 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



SEA-BIRD
SCIENTIFIC

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

Phone
Fax

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

SERVICE REPORT

Service Request
Date
Sales Order

1005510128
27-FEB-2020
315908185

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