



SEA-BIRD
SCIENTIFIC

SBE Sea-Bird
Electronics

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SBE41-CP ALACE

Instrument Configuration

Instrument Serial Number: 41-7301
 Instrument Firmware Version: ALACE-CP V 3.0C
 Zero Conductivity Frequency: 2686.06
 Communications Format: RS232
 Communications Settings: 9600 baud, 8 Data Bits, No Parity

Installed Devices/Sensors

| <i>Data Format</i> | <i>Measurement</i> | <i>Sensor Type</i> | <i>Serial Number</i> | <i>Rating</i> |
|--------------------|--------------------|--------------------|----------------------|------------------|
| Count | Temperature | Internal | N/A | N/A |
| Frequency | Conductivity | Internal | N/A | N/A |
| Count | Pressure | Kistler | 4645065 | 2000m(2000 dBar) |

CAUTION - This instrument is not intended for underwater use

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SENSOR SERIAL NUMBER: 7301
CALIBRATION DATE: 09-Jun-15

SBE 41 TEMPERATURE CALIBRATION DATA
ITS-90 TEMPERATURE SCALE

COEFFICIENTS:

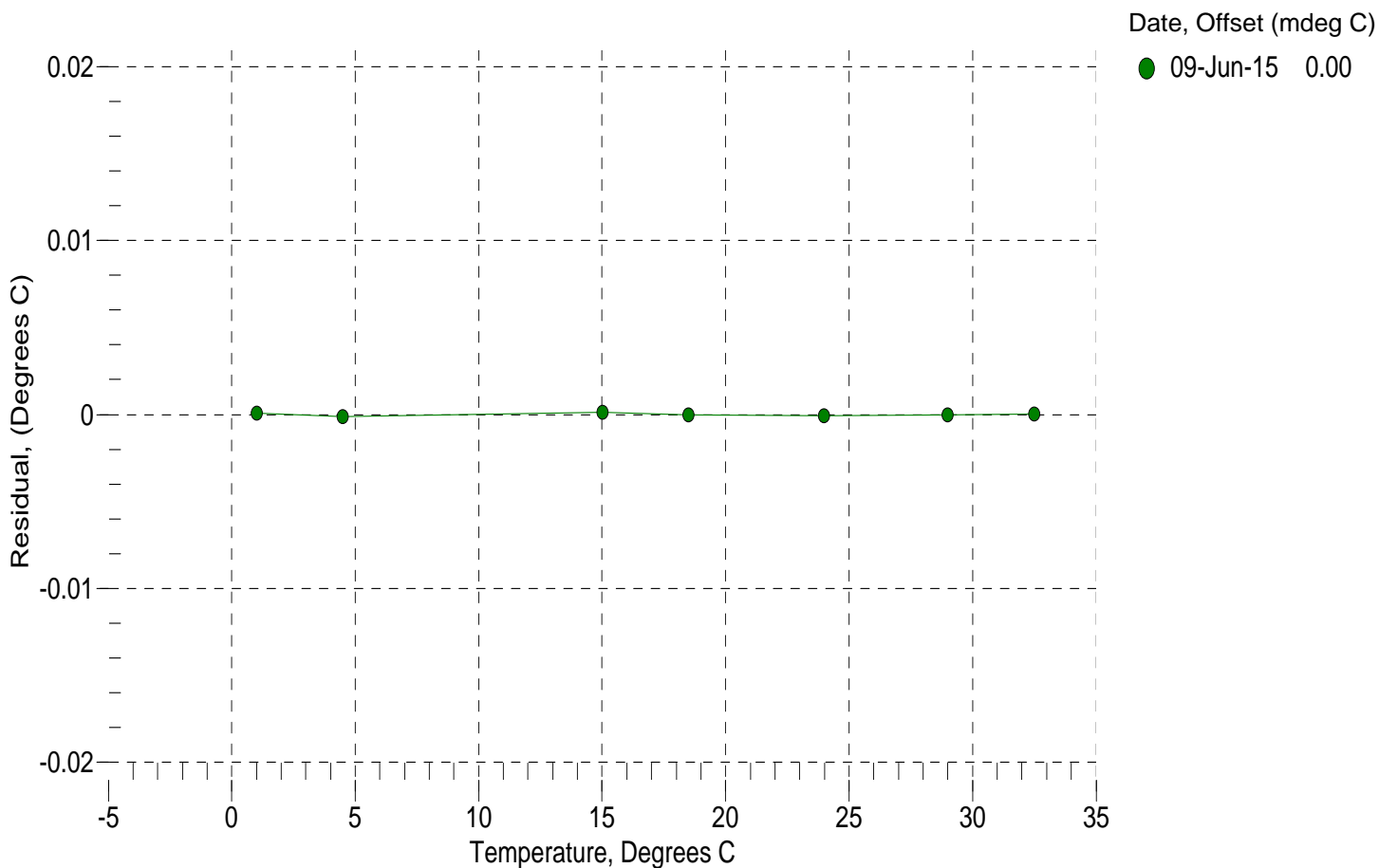
a0 = 3.352956e-005
a1 = 2.719968e-004
a2 = -2.329279e-006
a3 = 1.470784e-007

| BATH TEMP (ITS-90) | INSTRUMENT OUTPUT | INST TEMP (ITS-90) | RESIDUAL (ITS-90) |
|-----------------------|----------------------|-----------------------|----------------------|
| 1.0000 | 741594.2 | 1.0001 | 0.0001 |
| 4.5000 | 632538.4 | 4.4999 | -0.0001 |
| 15.0000 | 400325.5 | 15.0001 | 0.0001 |
| 18.5000 | 345872.0 | 18.5000 | -0.0000 |
| 23.9940 | 276594.1 | 23.9939 | -0.0001 |
| 29.0000 | 227016.1 | 29.0000 | -0.0000 |
| 32.5000 | 198395.7 | 32.5000 | 0.0000 |

Temperature ITS-90 = $1 / \{ a_0 + a_1[\ln(n)] + a_2[\ln^2(n)] + a_3[\ln^3(n)] \} - 273.15$ (°C)

Residual = instrument temperature - bath temperature

n = instrument output



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SENSOR SERIAL NUMBER: 7301
CALIBRATION DATE: 09-Jun-15

SBE 41 CONDUCTIVITY CALIBRATION DATA
PSS 1978: C(35,15,0) = 4.2914 Siemens/meter

COEFFICIENTS:

g = -9.748247e-001
h = 1.357054e-001
i = -3.355778e-004
j = 4.277377e-005

CPcor = -9.5700e-008
CTcor = 3.2500e-006
WBOTC = -9.3063e-008

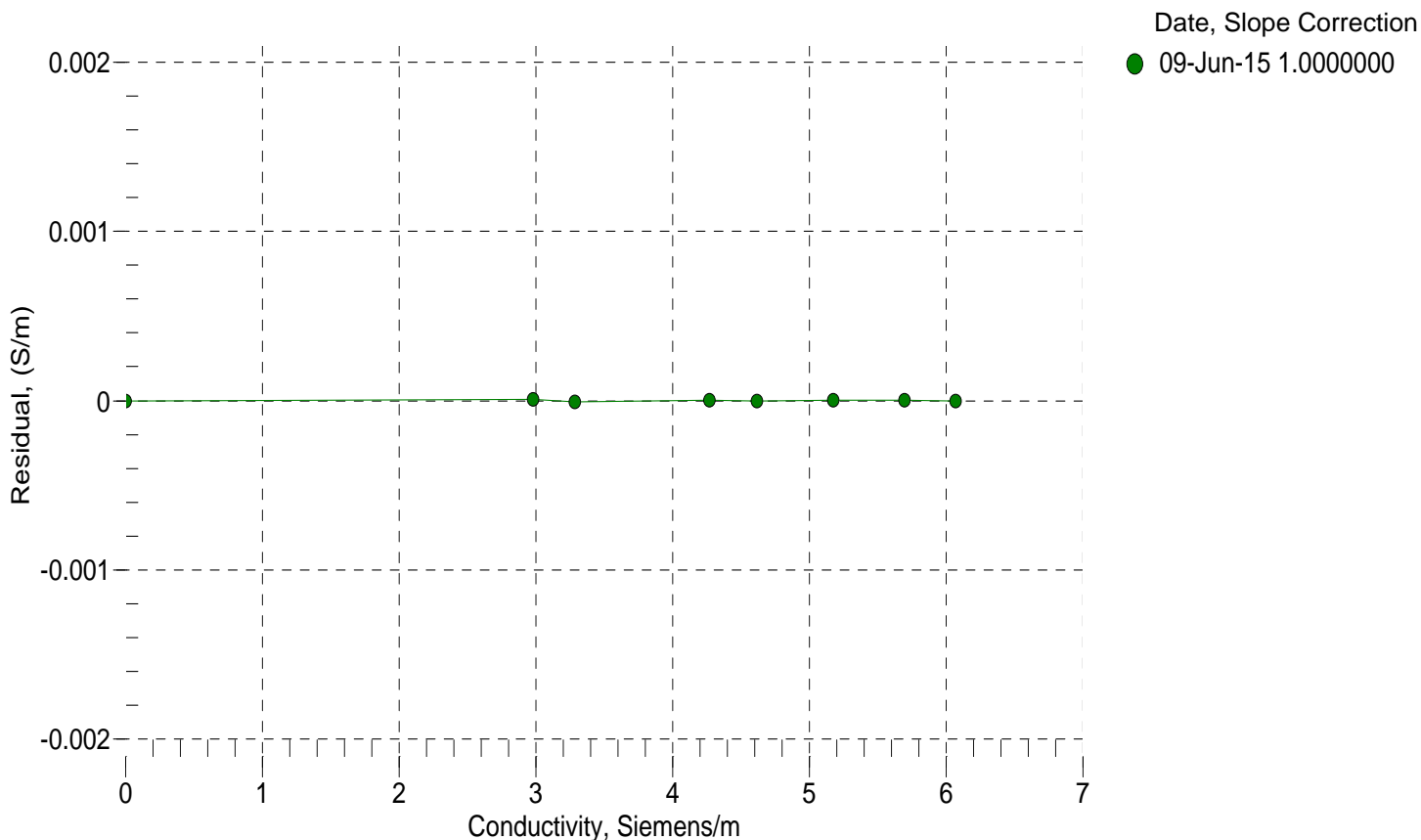
| BATH TEMP (ITS-90) | BATH SAL (PSU) | BATH COND (Siemens/m) | INST FREQ (Hz) | INST COND (Siemens/m) | RESIDUAL (Siemens/m) |
|-----------------------|-------------------|--------------------------|-------------------|--------------------------|-------------------------|
| 22.0000 | 0.0000 | 0.00000 | 2686.06 | 0.00000 | 0.00000 |
| 1.0000 | 34.8842 | 2.98121 | 5410.48 | 2.98122 | 0.00001 |
| 4.5000 | 34.8647 | 3.28884 | 5616.34 | 3.28883 | -0.00001 |
| 15.0000 | 34.8228 | 4.27233 | 6228.20 | 4.27233 | 0.00000 |
| 18.5000 | 34.8139 | 4.61808 | 6429.18 | 4.61808 | -0.00000 |
| 23.9940 | 34.8043 | 5.17642 | 6740.74 | 5.17642 | 0.00000 |
| 29.0000 | 34.7992 | 5.69983 | 7019.90 | 5.69984 | 0.00000 |
| 32.5000 | 34.7966 | 6.07294 | 7212.08 | 6.07294 | -0.00000 |

$$f = \text{INST FREQ} * \text{sqrt}(1.0 + \text{WBOTC} * t) / 1000.0$$

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

t = temperatur e[°C]; p = pressure[decibars]; δ = CTcor; ϵ = CPcor;

Residual = instrument conductivity - bath conductivity



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SENSOR SERIAL NUMBER: 7301
CALIBRATION DATE: 02-Jun-15

SBE 41 PRESSURE CALIBRATION DATA
2900 psia S/N 4645065

COEFFICIENTS:

| | |
|------------------------|------------------------|
| PA0 = -5.130564e-001 | PTCA0 = -1.513075e+002 |
| PA1 = 1.408540e-001 | PTCA1 = -6.581721e-001 |
| PA2 = 1.038369e-008 | PTCA2 = 2.162262e-002 |
| PTHA0 = -9.739481e+001 | PTCB0 = 1.024306e+002 |
| PTHA1 = 4.022531e-002 | PTCB1 = -4.317380e-003 |
| PTHA2 = 1.196515e-006 | PTCB2 = 0.000000e+000 |

PRESSURE SPAN CALIBRATION

| PRESSURE PSIA | INST OUTPUT | THERMISTOR OUTPUT | COMPUTED PRESSURE | ERROR %FS |
|---------------|-------------|-------------------|-------------------|-----------|
| 14.61 | -46.9 | 2769.5 | 14.72 | 0.00 |
| 592.34 | 4048.5 | 2781.3 | 592.31 | -0.00 |
| 1169.84 | 8141.1 | 2782.8 | 1169.88 | 0.00 |
| 1747.18 | 12230.4 | 2784.3 | 1747.33 | 0.01 |
| 2324.55 | 16316.4 | 2784.8 | 2324.67 | 0.00 |
| 2901.95 | 20398.7 | 2786.4 | 2901.83 | -0.00 |
| 2324.51 | 16315.4 | 2786.1 | 2324.53 | 0.00 |
| 1747.03 | 12228.2 | 2786.4 | 1747.02 | -0.00 |
| 1169.82 | 8139.9 | 2786.1 | 1169.71 | -0.00 |
| 592.26 | 4046.8 | 2786.4 | 592.06 | -0.01 |
| 14.61 | -47.1 | 2787.1 | 14.65 | 0.00 |

THERMAL CORRECTION

| TEMP ITS90 | PRESS TEMP | INST OUTPUT |
|------------|------------|-------------|
| 32.50 | 2967.30 | -36.36 |
| 29.00 | 2893.10 | -38.64 |
| 23.99 | 2786.90 | -41.11 |
| 18.50 | 2669.00 | -42.60 |
| 15.00 | 2594.10 | -42.78 |
| 4.50 | 2366.50 | -40.28 |
| 1.00 | 2290.10 | -38.43 |

| TEMP(ITS90) | SPAN(mV) |
|-------------|----------|
| -3.92 | 102.45 |
| 35.78 | 102.28 |

$$y = \text{thermistor output}; t = \text{PTHA0} + \text{PTHA1} * y + \text{PTHA2} * y^2$$

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

$$n = x * \text{PTCB0} / (\text{PTCB0} + \text{PTCB1} * t + \text{PTCB2} * t^2)$$

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

