SEA-BIRD SCIENTIFIC

SBE Sea-Bird Electronics

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SBE 41-CP ALACE

Instrument Configuration

Instrument Serial Number: 41-7275
Instrument Firmware Version: ALACE-CP V 3.0C
Zero Conductivity Frequency: 2702.83

Installed Devices/Sensors

Data Format	*Measurement*	*Sensor Type*	*Serial Number*	*Rating*
Count	Temperature	Internal	N/A	N/A
Frequency	Conductivity	Internal	N/A	N/A
Count	Pressure	Kistler	4669454	2000m(2000 dBar)

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SENSOR SERIAL NUMBER: 7275
CALIBRATION DATE: 23-Jun-15

SBE 41 TEMPERATURE CALIBRATION DATA
ITS-90 TEMPERATURE SCALE

COEFFICIENTS:

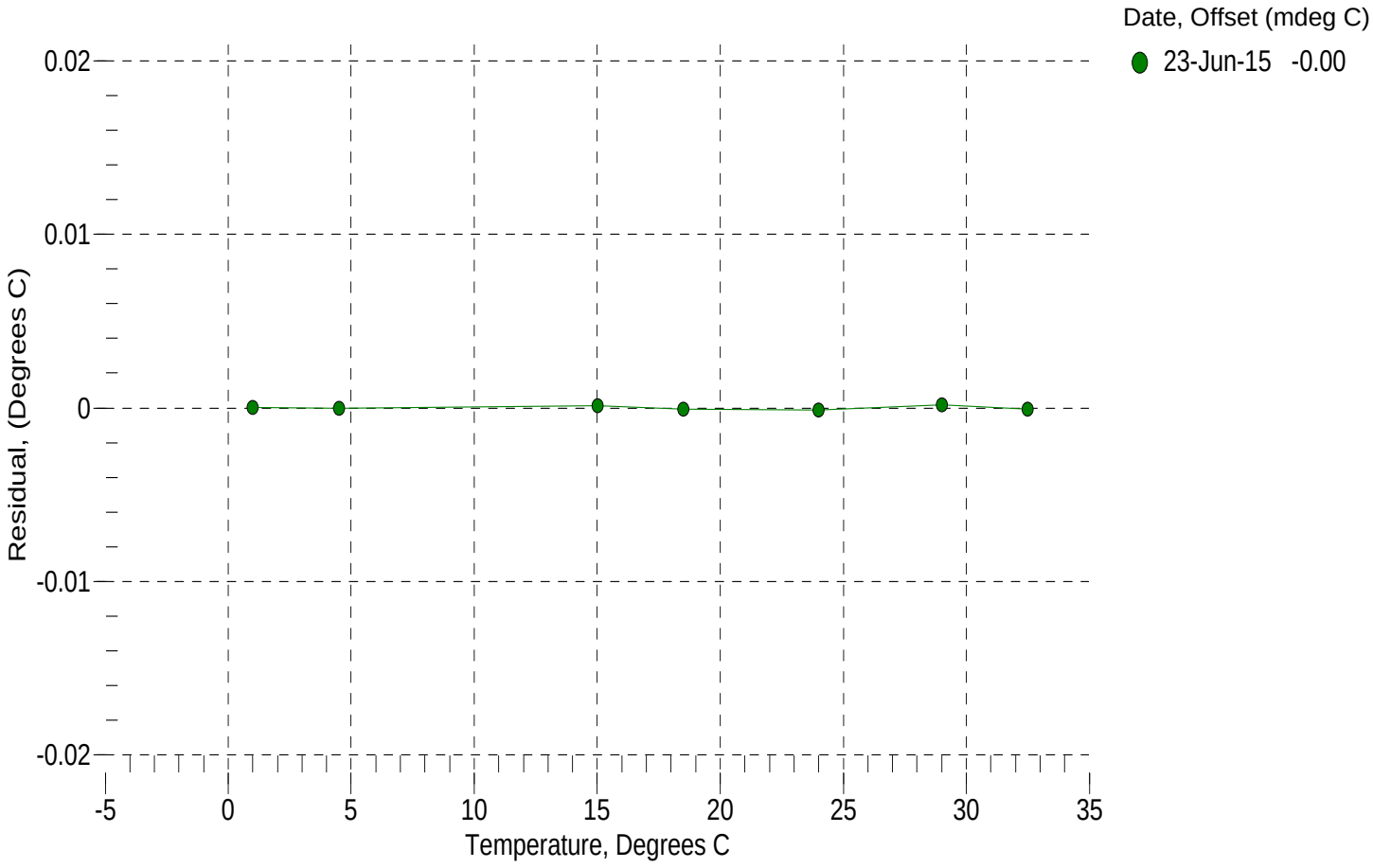
```
a0 =  7.338958e-005
a1 =  2.713585e-004
a2 = -2.214963e-006
a3 =  1.469158e-007
```

BATH TEMP (ITS-90)	INSTRUMENT OUTPUT	INST TEMP (ITS-90)	RESIDUAL (ITS-90)
1.0000	620975.9	1.0000	0.0000
4.5000	529959.3	4.5000	-0.0000
15.0000	335956.9	15.0001	0.0001
18.5000	290412.5	18.4999	-0.0001
23.9940	232428.1	23.9939	-0.0001
29.0000	190899.2	29.0002	0.0002
32.5000	166913.7	32.4999	-0.0001

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

Residual = instrument temperature - bath temperature

n = instrument output



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SENSOR SERIAL NUMBER: 7275
CALIBRATION DATE: 23-Jun-15

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

COEFFICIENTS:

```
g = -9.878538e-001
h =  1.358743e-001
i = -3.580837e-004
j =  4.363115e-005

CPcor = -9.5700e-008
CTcor =  3.2500e-006
WBOTC = -6.1657e-008
```

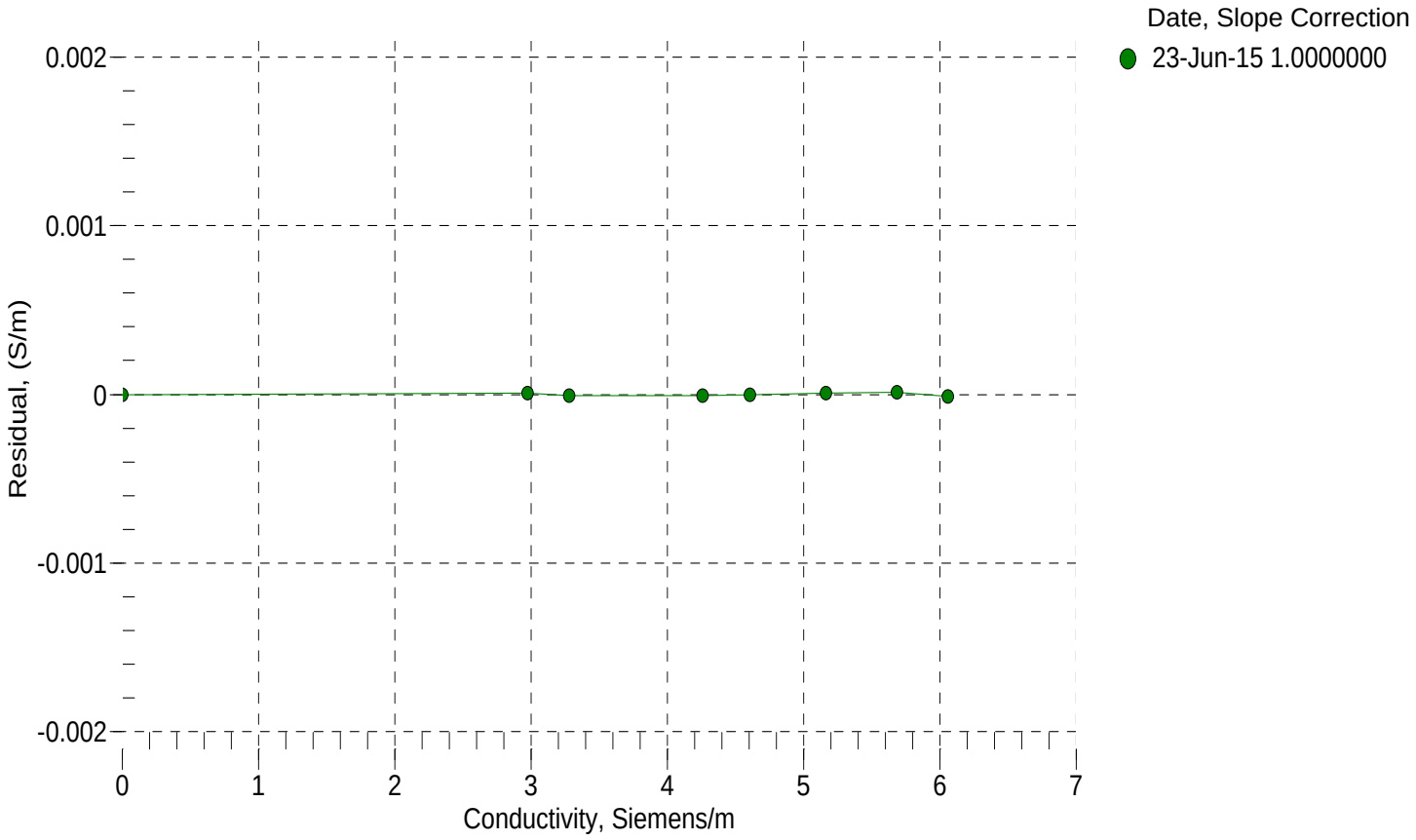
BATH TEMP (ITS-90)	BATH SAL (PSU)	BATH COND (Siemens/m)	INST FREQ (Hz)	INST COND (Siemens/m)	RESIDUAL (Siemens/m)
22.0000	0.0000	0.00000	2702.82	0.00000	0.00000
1.0000	34.7969	2.97446	5413.33	2.97447	0.00001
4.5000	34.7773	3.28141	5618.58	3.28140	-0.00001
15.0000	34.7350	4.26269	6228.78	4.26268	-0.00001
18.5000	34.7260	4.60768	6429.27	4.60768	-0.00000
23.9940	34.7163	5.16477	6740.11	5.16478	0.00001
29.0000	34.7109	5.68700	7018.64	5.68701	0.00001
32.5000	34.7082	6.05927	7210.39	6.05926	-0.00001

f = INST FREQ * sqrt(1.0 + WBOTC * t) / 1000.0

Conductiv ity = $(g + h * f^2 + i * f^3 + j * f^4) / (1 + \delta * t + \varepsilon * p)$ 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: 7275
CALIBRATION DATE: 19-Jun-15

SBE 41 PRESSURE CALIBRATION DATA
2900 psia S/N 4669454

COEFFICIENTS:

PA0 =	-1.091727e+000	PTCA0 =	-1.908627e+002
PA1 =	1.399533e-001	PTCA1 =	-8.185042e-001
PA2 =	1.124805e-008	PTCA2 =	2.134607e-002
PTHA0 =	-9.627321e+001	PTCB0 =	1.030847e+002
PTHA1 =	4.047546e-002	PTCB1 =	-8.465507e-003
PTHA2 =	1.027046e-006	PTCB2 =	0.000000e+000

PRESSURE SPAN CALIBRATION

PRESSURE PSIA	INST OUTPUT	THERMISTOR OUTPUT	COMPUTED PRESSURE	ERROR %FS
14.67	-85.7	2710.0	14.74	0.00
592.83	4036.3	2720.7	592.84	0.00
1170.50	8152.9	2722.8	1170.59	0.00
1748.26	12267.5	2724.4	1748.43	0.01
2326.01	16378.4	2726.1	2326.15	0.00
2903.64	20484.0	2728.2	2903.52	-0.00
2325.91	16376.5	2728.9	2325.91	-0.00
1748.23	12265.5	2729.7	1748.18	-0.00
1170.55	8151.4	2730.3	1170.40	-0.00
592.59	4032.5	2731.4	592.33	-0.01
14.67	-85.5	2733.8	14.76	0.00

THERMAL CORRECTION

TEMP ITS90	PRESS TEMP	INST OUTPUT
32.50	2959.10	-75.80
29.00	2884.20	-77.91
23.99	2775.90	-79.29
18.50	2656.70	-79.75
15.00	2580.00	-79.39
4.50	2349.50	-74.93
1.00	2272.40	-72.90

TEMP(ITS90)	SPAN(mV)
-4.38	103.12
37.48	102.77

y = thermistor output; $t = PTHA0 + PTHA1 * y + PTHA2 * y^2$

x = pressure output - $PTCA0 - PTCA1 * t - PTCA2 * t^2$

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

pressure (psia) = $PA0 + PA1 * n + PA2 * n^2$