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: 9773
CALIBRATION DATE: 20-Dec-21

Slocum Payload CTD TEMPERATURE CALIBRATION DATA
ITS-90 TEMPERATURE SCALE

COEFFICIENTS:

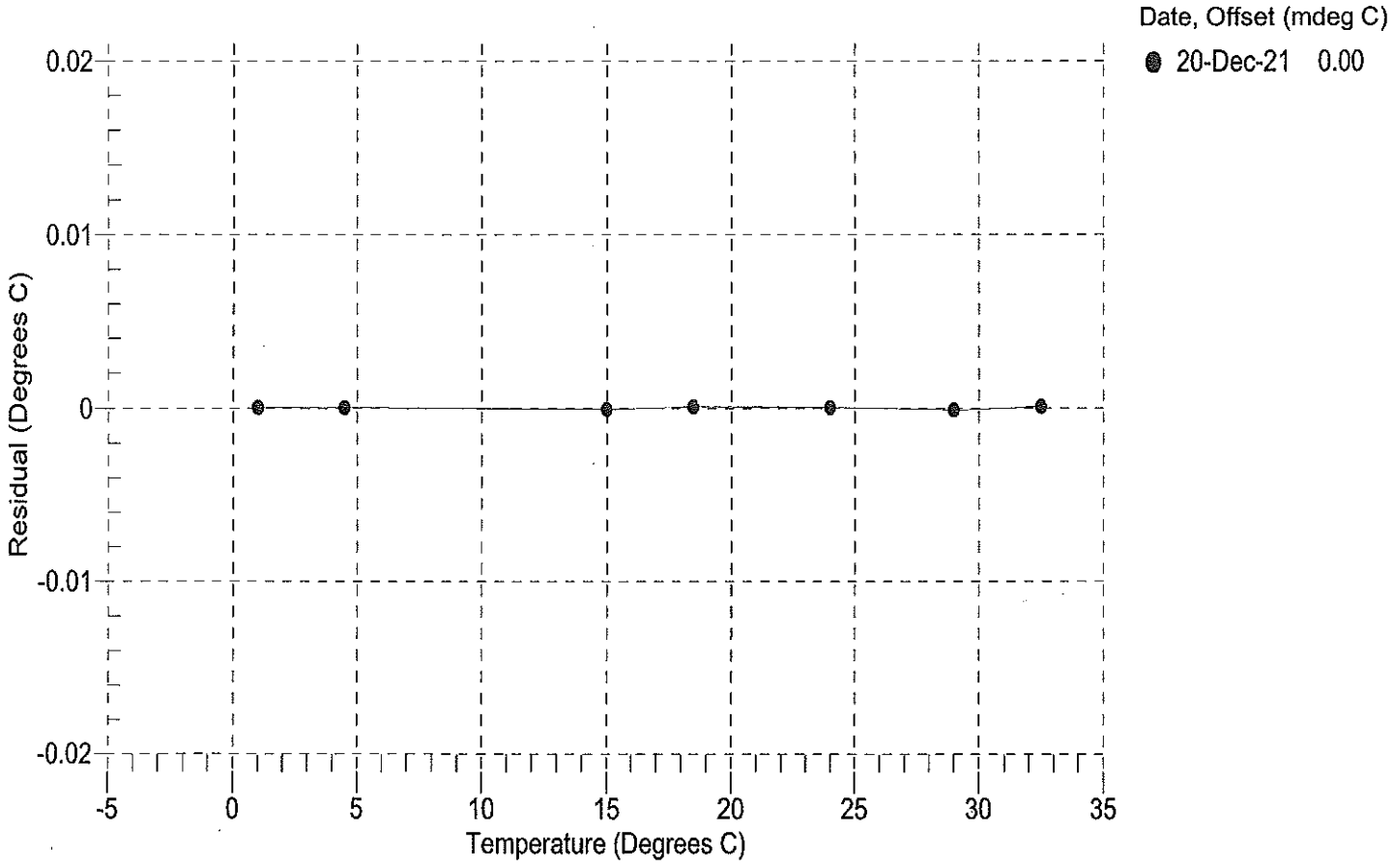
a0 = -3.402704e-005
a1 = 2.952727e-004
a2 = -3.718139e-006
a3 = 1.804845e-007

BATH TEMP (° C)	INSTRUMENT OUTPUT (counts)	INST TEMP (° C)	RESIDUAL (° C)
1.0000	572414.8	1.0000	0.0000
4.5000	488833.2	4.5000	0.0000
15.0000	310548.6	14.9999	-0.0001
18.5000	268650.5	18.5001	0.0001
24.0000	215231.4	24.0000	0.0000
29.0000	177034.4	28.9999	-0.0001
32.5001	154924.5	32.5002	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



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SENSOR SERIAL NUMBER: 9773
CALIBRATION DATE: 20-Dec-21

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

COEFFICIENTS:

```
g = -1.001335e+000
h =  1.425376e-001
i = -4.867042e-004
j =  5.627552e-005

CPcor = -9.5700e-008
CTcor =  3.2500e-006
WBOTC =  6.5813e-007
```

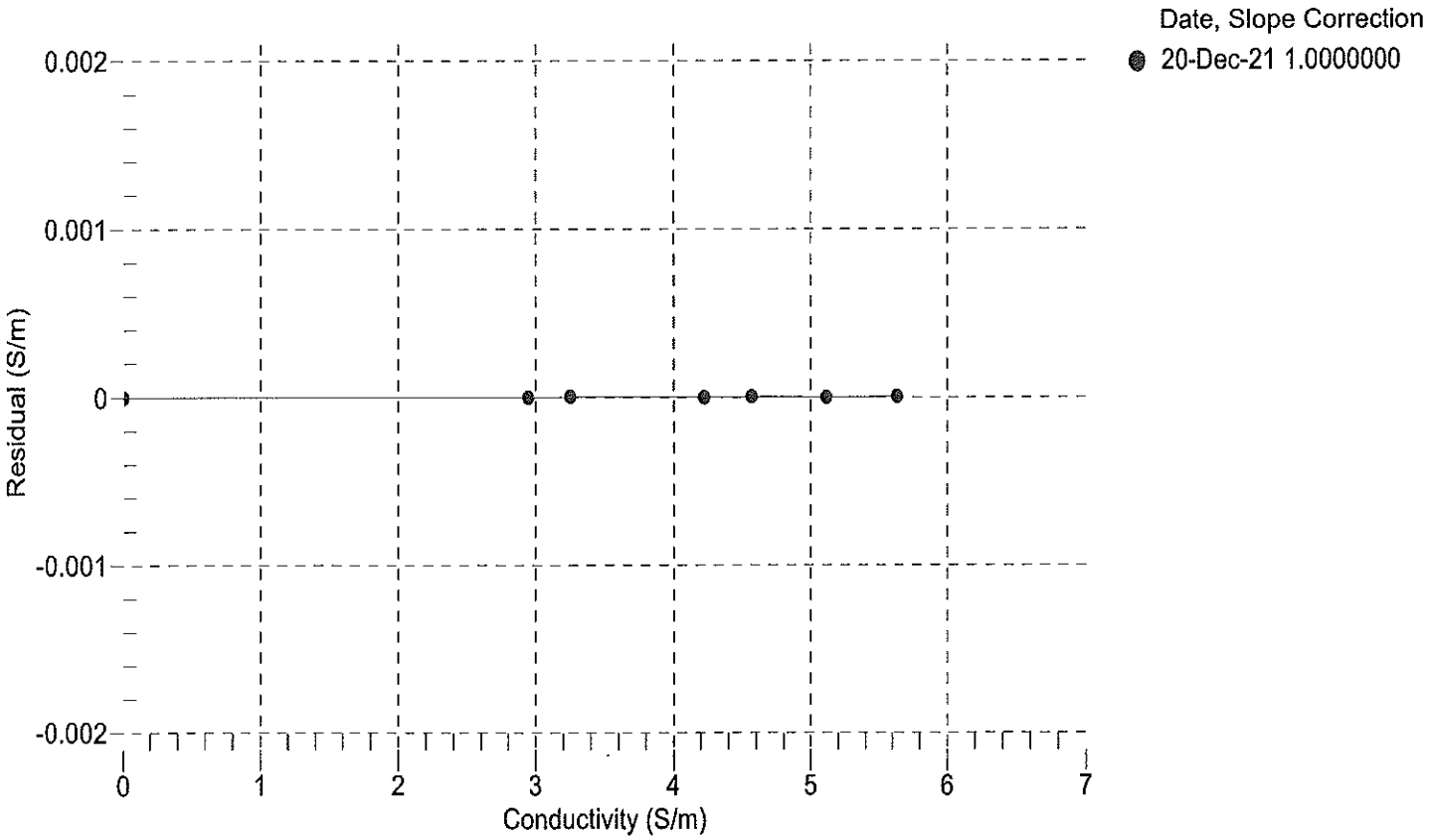
BATH TEMP (° C)	BATH SAL (PSU)	BATH COND (S/m)	INSTRUMENT OUTPUT (Hz)	INSTRUMENT COND (S/m)	RESIDUAL (S/m)
22.0000	0.0000	0.00000	2658.84	0.00000	0.00000
1.0000	34.4420	2.94700	5281.69	2.94700	-0.00000
4.5000	34.4224	3.25120	5480.93	3.25120	0.00000
15.0000	34.3804	4.22376	6073.42	4.22375	-0.00000
18.5000	34.3709	4.56561	6268.09	4.56561	0.00000
24.0000	34.3604	5.11825	6570.23	5.11825	-0.00000
29.0000	34.3539	5.63504	6840.33	5.63504	0.00000
32.5001	34.3542	6.00446	7026.42	6.00369	-0.00078

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



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SENSOR SERIAL NUMBER: 9773
CALIBRATION DATE: 17-Dec-21

Slocum Payload CTD PRESSURE CALIBRATION DATA
1450 psia S/N 11963590

COEFFICIENTS:

PA0 =	2.987177e-001	PTCA0 =	5.245175e+005
PA1 =	4.471872e-003	PTCA1 =	6.756016e+000
PA2 =	1.216911e-011	PTCA2 =	-1.589313e-001
PTEMPA0 =	-5.827139e+001	PTCB0 =	2.514379e+001
PTEMPA1 =	5.481396e-002	PTCB1 =	3.508772e-004
PTEMPA2 =	-8.090968e-007	PTCB2 =	0.000000e+000

PRESSURE SPAN CALIBRATION

PRESSURE (PSIA)	INSTRUMENT OUTPUT (counts)	THERMISTOR OUTPUT (volts)	COMPUTED PRESSURE (PSIA)	RESIDUAL (%FSR)
14.64	527834.7	1453.9	14.81	0.01
301.69	591963.2	1463.8	301.56	-0.01
588.80	656138.2	1465.2	588.61	-0.01
875.83	720334.7	1466.8	875.86	0.00
1163.00	784574.4	1469.3	1163.41	0.03
1450.61	848604.3	1472.7	1450.11	-0.03
1162.89	784560.6	1473.8	1163.34	0.03
875.85	720338.3	1473.9	875.88	0.00
588.85	656134.7	1474.9	588.59	-0.02
301.75	591970.6	1475.8	301.59	-0.01
14.64	527827.7	1476.5	14.78	0.01

THERMAL CORRECTION

TEMP (°C)	THERMISTOR OUTPUT (volts)	INSTRUMENT OUTPUT (counts)
32.50	1699	527819.50
29.00	1631	527830.90
24.00	1536	527838.60
18.50	1431	527839.80
15.00	1364	527834.20
4.50	1166	527792.40
1.00	1099	527777.00

TEMPERATURE (°C)	SPAN
-5.10	25.14
34.80	25.16

y = thermistor output (counts)

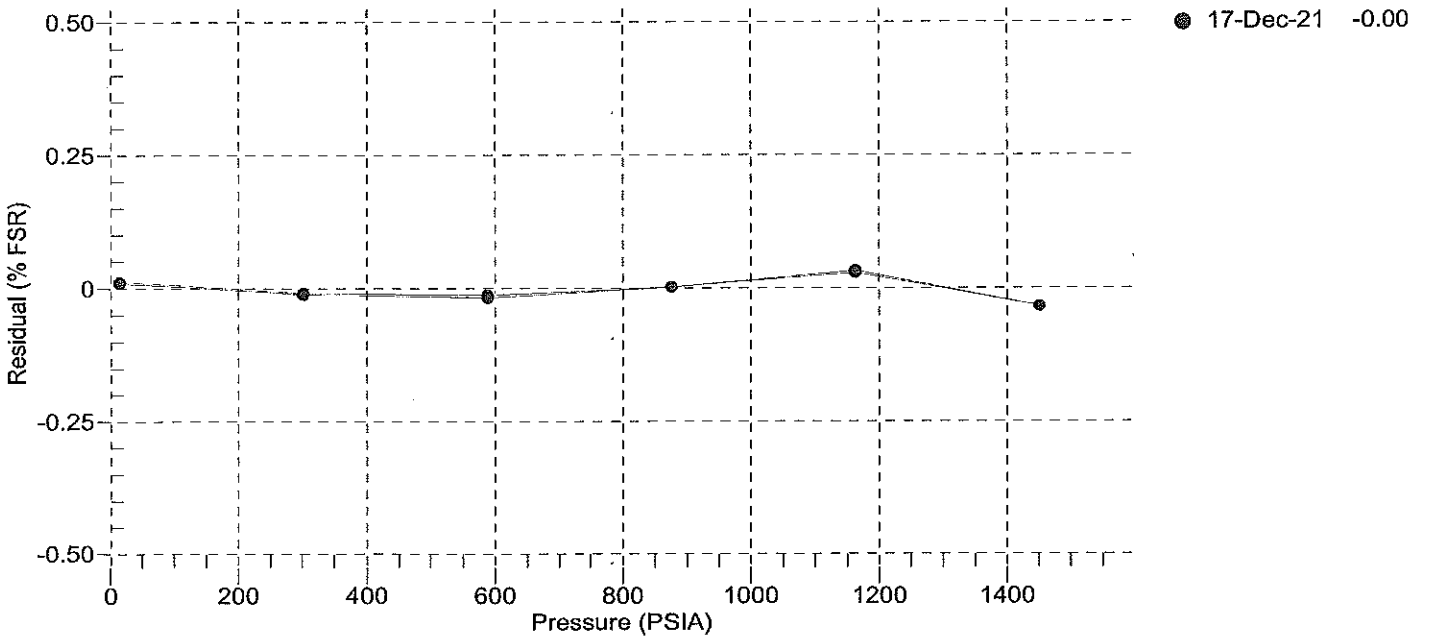
$t = PTEMPA0 + PTEMPA1 * y + PTEMPA2 * y^2$

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

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

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

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



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Pressure Test Certificate

Test Date: **2021-12-22**

Description: **Slocum CTD**

Sensor Information:

Model Number: **Slocum**

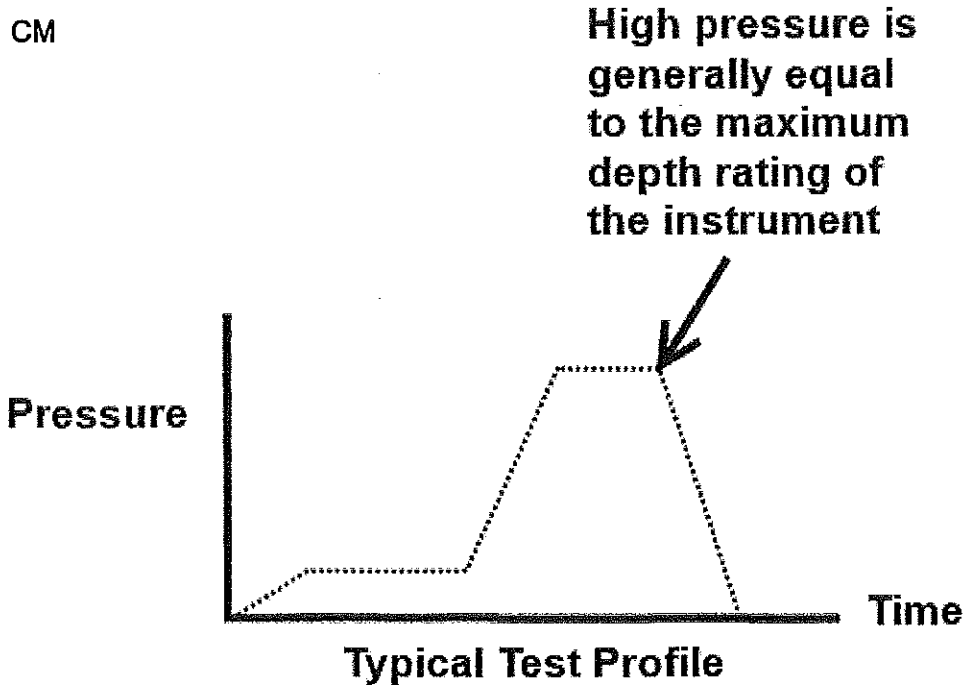
Serial Number: **9773**

Pressure Test Protocol:

Low Pressure Test:	**40**	PSI	Held For:	**15**	Minutes
High Pressure Test:	**40**	PSI	Held For:	**15**	Minutes

Passed Test: **True**

Tested By: **CM**



Typical Test Profile