ASL Environmental Sciences

AZFP Certificate of Calibration Version : 12.0

3/20/2019	Operator:	Jay Milligan	Unit Serial Number:	59014

Sonar Channel #1:

Frequency:	38.0 KHz	Transducer Part#:	92A01N40	Transducer Serial#:	105
OCV: Voltage on reference:	8.9V	Reference TVR:	145.9dB	Transducer Voltage:	0.13V
TVR: Voltage on transducer:	350V	Reference OCV:	-213.2dB	Reference Voltage:	0.53V

System Gain and Linearity:

Voltage on Reference	A/D Counts (N)
*	65000
-10dB	58750
-20dB	52480
-30dB	46490
-40dB	40160

Calibration Values		Units
TVR	156.8	dB
VTX	123.7	V_{RMS}
BP	0.1127	Sr
Echo Level	155.6	dB
Slope	0.236	V/dB

Sphere Check		Units
Water Temp	3.5	°C
Range	230	cm
Measured	-51.3	dB
Expected	-51.0	dB
Error	-0.3	dB

*This voltage is adjusted to bring N between 64950 and 65050 counts
All measurements with 1.0 meter separation in 20°C fresh water unless otherwise noted.

Sonar Channel #2:

Frequency:	67.5KHz	Transducer Part#:	92A01N21	Transducer Serial#:	104
OCV: Voltage on reference:	9.7V	Reference TVR:	143.2dB	Transducer Voltage:	0.17V
TVR: Voltage on transducer:	395V	Reference OCV:	-213.1dB	Reference Voltage:	0.8

System Gain and Linearity:

Voltage on Reference	A/D Counts (N)
*	65000
-10dB	58990
-20dB	53030
-30dB	47130
-40dB	41300

Calibration Values		Units
TVR	159.2	dB
VTX	139.7	V_{RMS}
BP	0.0483	Sr
Echo Level	152.2	dB
Slope	0.0226	V/dB

Sphere Check		Units
Water Temp	3.5	°C
Range	200	cm
Measured	-52.8	dB
Expected	-53.4	dB
Error	0.6	dB

*This voltage is adjusted to bring N between 64950 and 65050 counts
All measurements with 1.0 meter separation in 20°C fresh water unless otherwise noted.

ASL Environmental Sciences Inc.
#1-6703 Rajpur Place, Victoria, BC, Canada V8M 1Z5
Phone:+1-250-656-0177
Fax: +1-250-656-2162
Email: asl@aslenv.com
Web: www.aslenv.com

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Sonar Channel #3:					
Frequency:	125KHz	Transducer Part#:	92A01N21	Transducer Serial#:	104
OCV: Voltage on reference:	9.4V	Reference TVR:	139.7dB	Transducer Voltage:	0.08V
TVR: Voltage on transducer:	290V	Reference OCV:	-214dB	Reference Voltage:	1.75V

System Gain and Linearity:

Voltage on Reference	A/D Counts (N)
*	65000
-10dB	58900
-20dB	52820
-30dB	46940
-40dB	41150

Calibration Values		Units
TVR	169.6	dB
VTX	102.5	V_{RMS}
BP	0.0082	Sr
Echo Level	140.2	dB
Slope	0.0228	V/dB

Sphere Check		Units
Water Temp	3.5	°C
Range	330	cm
Measured	-49.6	dB
Expected	-49.3	dB
Error	-0.3	dB

*This voltage is adjusted to bring N between 64950 and 65050 counts
All measurements with 1.0 meter separation in 20°C fresh water unless otherwise noted.

Calibration Details

Sonar Calibration:
The sonar system is calibrated using a reference hydrophone and a reference source transducer in our fresh-water laboratory test tank. All measurements are at 20°C and 1.0 meters distance. The AZFP does not use a TVG system, so all system gain measurements are valid from 0 meters to full range.

Sonar Sphere Check:
The sonar sphere check is done in ASL's outdoor fresh water calibration tank. A precision tungsten-carbide sphere with known target strengths (at each frequency) is placed at 3.8m from the transducer. The values measured by the unit under test are compared to the known values of the sphere.

Tilt Sensor Check:
The unit under test is placed in ASL's tilt calibration jig and compared to the Reference Tilt Unit at three locations on each axis.