ASL Environmental Sciences

AZFP Certificate of Calibration Version : 12.0

11/30/2018	Operator:	Jay Milligan	Unit Serial Number:	59012

Sonar Channel #1:

Frequency:	38.0 KHz	Transducer Part#:	92A01N40	Transducer Serial#:	104
OCV: Voltage on reference:	8.87V	Reference TVR:	145.9dB	Transducer Voltage:	0.145V
TVR: Voltage on transducer:	360V	Reference OCV:	-213.2dB	Reference Voltage:	0.5V

System Gain and Linearity:

Voltage on Reference	A/D Counts (N)
*	65000
-10dB	58970
-20dB	53060
-30dB	47120
-40dB	41100

Calibration Values		Units
TVR	156.1	dB
VTX	127.3	V_{RMS}
BP	0.13	Sr
Echo Level	157.4	dB
Slope	0.0228	V/dB

Sphere Check		Units
Water Temp	8.1	°C
Range	210	cm
Measured	-51.8	dB
Expected	-51.0	dB
Error	-0.8	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#:	92A01N20	Transducer Serial#:	103
OCV: Voltage on reference:	9.8V	Reference TVR:	143.2dB	Transducer Voltage:	0.14V
TVR: Voltage on transducer:	313V	Reference OCV:	-213.1dB	Reference Voltage:	0.77V

System Gain and Linearity:

Voltage on Reference	A/D Counts (N)
*	65000
-10dB	58930
-20dB	52900
-30dB	47220
-40dB	41300

Calibration Values		Units
TVR	160.9	dB
VTX	110.7	V_{RMS}
BP	0.042	Sr
Echo Level	152.5	dB
Slope	0.0225	V/dB

Sphere Check		Units
Water Temp	8.1	°C
Range	200	cm
Measured	-53.8	dB
Expected	-53.7	dB
Error	-0.1	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.

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Sonar Channel #3:

Frequency:	125KHz	Transducer Part#:	92A01N20	Transducer Serial#:	103
OCV: Voltage on reference:	9.42V	Reference TVR:	139.7dB	Transducer Voltage:	0.06V
TVR: Voltage on transducer:	350V	Reference OCV:	-214dB	Reference Voltage:	1.56V

System Gain and Linearity:

Voltage on Reference	A/D Counts (N)
*	65000
-10dB	58850
-20dB	52650
-30dB	46850
-40dB	40680

Calibration Values		Units
TVR	167.0	dB
VTX	123.7	V_{RMS}
BP	0.01	Sr
Echo Level	137.5	dB
Slope	0.023	V/dB

Sphere Check		Units
Water Temp	8.1	°C
Range	420	cm
Measured	-49.1	dB
Expected	-49.5	dB
Error	0.4	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.