ASL Environmental Sciences

AZFP Certificate of Calibration

Version: 12.0

04/28/2021	Operator: **Jay Milligan**	Unit Serial Number: **59012**

Sonar Channel #1:

Frequency:	67kHz	Transducer Part#:	ASL 70/125	Transducer Serial#:	M-50725-03
OCV: Voltage on reference:	8.9V	Reference TVR:	145.9dB	Transducer Voltage:	0.14V
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
-50dB	- -

Calibration Values		Units
TVR	158.8	dB
VTX	183.1	V_{RMS}
BP	0.040	Sr
Echo Level	150.3	dB
Slope	0.023	V/dB

Sphere Check		Units
Water Temp	11.0	°C
Range	217	cm
Measured	-53.0	dB
Expected	-54.0	dB
Error	1.0	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:	125kHz	Transducer Part#:	ASL 70/125	Transducer Serial#:	M-50725-03
OCV: Voltage on reference:	9.8V	Reference TVR:	143.2dB	Transducer Voltage:	0.13V
TVR: Voltage on transducer:	518V	Reference OCV:	-213.1dB	Reference Voltage:	1.0V

System Gain and Linearity:

Voltage on Reference	A/D Counts (N)
*	65000
-10dB	58900
-20dB	52890
-30dB	46930
-40dB	40720
-50dB	- -

Calibration Values		Units
TVR	169.8	dB
VTX	70.7	V_{RMS}
BP	0.011	Sr
Echo Level	138.0	dB
Slope	0.023	V/dB

Sphere Check		Units
Water Temp	11.0	°C
Range	314	cm
Measured	-50.0	dB
Expected	-49.6	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.

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Calibration Details

Sonar Calibration

The sonar system is calibrated using a reference hydrophone and a reference source transducer in our freshwater 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 4.3m from the transducer (unless otherwise specified). 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.

Battery Check

The Main Voltage and Transmit Voltage are measured with a digital multimeter across a 1kΩ load.

Temperature Sensor Check

The unit under test is compared to the Reference Temperature Unit at room temperature (in air) and then again in the outdoor fresh water calibration tank.

Pressure Sensor Check

If a pressure sensor is installed in the unit under test, the pressure sensor is connected to the Reference Pressure Unit and a pressure reading is taken near 1BAR pressure and then another near the maximum pressure of the pressure sensor. The values from the Reference Pressure Unit are compared to the values reported on the unit under test.