ASL Environmental Sciences

AZFP Certificate of Calibration

Version: 12.0

04/29/2021 | Operator: **Jay Milligan** | Unit Serial Number: **59010**

Sonar Channel #1:

Frequency: 67kHz | Transducer Part#: ASL 70/125 | Transducer Serial#: M-50725-02

OCV: Voltage on reference: 8.8V | Reference TVR: 145.9dB | Transducer Voltage: 0.20V

TVR: Voltage on transducer: 230V | Reference OCV: -213.2dB | Reference Voltage: 0.3V

System Gain and Linearity:

Voltage on Reference	A/D Counts (N)
*	65000
-10dB	59110
-20dB	53090
-30dB	46960
-40dB	40900
-50dB	- -

Calibration Values		Units
TVR	158.7	dB
VTX	180.3	V_{RMS}
BP	0.040	Sr
Echo Level	148.1	dB
Slope	0.023	V/dB

Sphere Check		Units
Water Temp	11.0	°C
Range	218	cm
Measured	-53.1	dB
Expected	-54.0	dB
Error	0.9	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-50725-02

OCV: Voltage on reference: 9.8V | Reference TVR: 143.2dB | Transducer Voltage: 0.12V

TVR: Voltage on transducer: 510V | Reference OCV: -213.1dB | Reference Voltage: 1.0V

System Gain and Linearity:

Voltage on Reference	A/D Counts (N)
*	65000
-10dB	58850
-20dB	52860
-30dB	47020
-40dB	41000
-50dB	- -

Calibration Values		Units
TVR	170.4	dB
VTX	64.3	V_{RMS}
BP	0.011	Sr
Echo Level	138.8	dB
Slope	0.023	V/dB

Sphere Check		Units
Water Temp	11.0	°C
Range	323	cm
Measured	-50.6	dB
Expected	-49.6	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.

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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 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.