# Nortek DVL Built In Test

## Description of Built In Test (BIT)

The Built in Test is a DVL internal test to verify functionality of the instrument. The output provides an overview of system status, sensor health, and general functionality. It is by no means exhaustive nor is it conclusive but provides an indication of possible issues.

The most challenging element of the evaluation is determining the transducer functionality. The reason for this is that the DVL may be exposed to strong environmental noise (often found in a workshop/lab), and this may confound the conclusion.

The tests are intended to indicate if there is a low enough noise level to achieve reasonable bottom track, and for this reason **the tests must be run with the DVL submerged in water**. Saltwater is preferred (improves grounding and representative of the operating environment), and the tank should be as large as possible. A large bucket will work but may make the test interpretation difficult.

## Instructions for testing the DVL

1) Connect the DVL to power and comms, this may be done directly to a PC or through a paired instrument, such as an INS.
2) If connected through Ethernet comms, then one may simply navigate to the Maintenance page in the DVL's web browser interface and click on the "Retrieve Support File" button. Clicking this button starts the Built In Test which lasts for no more than 5 seconds.

## Interpretation of BIT Output

The Following is an example of the Built In Test (BIT) for the Nortek DVL. This example was conducted using a DVL 500.

Built In Test Report

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Test time: 2025-05-19 14:13:05

1 Version information:
  Firmware version: 4054_5/187 (Jan 27 2025 21:34:06)
  Bootloader version: 24

May 6th, 2025

2 Hardware configuration:

Instrument: NortekDVL_500m
Serial no.: 103136
Frequency: 500 kHz
Number of beams: 4
Digital board version: I-3
Interface board version: J-1
Analog board version: B-1(Low-Power mini) /Channel5ExtDynamics/LowGain
Sensor board version: I-0 /TemperatureRail /PressureRail

*Interpretation: None, this is the system description.*

3 Sensor configuration:

Temperature

Pressure N113645

*Interpretation: This lists the auxiliary sensors configured for operation.*

4 Licensed features:

Production
Bottom Track
16GB Recorder

*Interpretation: This details the licensed features. A Standard DVL will have Bottom Track enabled and a 16GB recorder. Optional features that will also appear in this section if purchased are Averaging Mode (Current Profile) and a 64GB Recorder (larger recorder).*

5 Noise profile test slanted beams:

| Cell | VelB1 | VelB2 | VelB3 | VelB4 | CorrB1 | CorrB2 | CorrB3 | CorrB4 | AmpB1 | AmpB2 | AmpB3 | AmpB4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 4.274 | -3.276 | 0.724 | -5.427 | 8 | 7 | 8 | 8 | 27.5 | 27.5 | 27.5 | 27.5 |
| 2 | -2.666 | 3.223 | -0.319 | 2.136 | 3 | 4 | 9 | 11 | 27.5 | 28.0 | 27.0 | 27.5 |
| 3 | -1.921 | 0.430 | 5.592 | -0.021 | 3 | 9 | 3 | 10 | 27.5 | 27.5 | 27.5 | 27.0 |
| 4 | 4.162 | -3.964 | 2.559 | -2.134 | 11 | 4 | 6 | 8 | 27.0 | 27.5 | 27.0 | 27.5 |
| 5 | -3.090 | 0.818 | 3.901 | 1.760 | 15 | 13 | 6 | 2 | 27.0 | 28.0 | 27.0 | 27.5 |
| 6 | 0.283 | 3.557 | -0.134 | 0.630 | 5 | 15 | 13 | 10 | 27.5 | 27.5 | 27.5 | 27.5 |
| 7 | -4.546 | 4.768 | -1.298 | 2.153 | 6 | 3 | 15 | 4 | 27.0 | 28.0 | 27.5 | 27.5 |
| 8 | -1.410 | 2.974 | -5.365 | 0.412 | 4 | 13 | 4 | 12 | 27.5 | 27.5 | 27.0 | 27.5 |
| 9 | 0.484 | -2.543 | -5.249 | 0.338 | 5 | 9 | 6 | 12 | 28.0 | 27.5 | 26.0 | 27.5 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | -3.427 | 4.577 | 1.131 | 1.696 | 3 | 11 | 7 | 8 | 27.5 | 27.5 | 27.0 | 27.5 |
| 11 | -2.894 | -0.688 | -2.373 | -2.180 | 3 | 13 | 5 | 10 | 28.0 | 28.0 | 27.0 | 27.5 |
| 12 | -1.487 | -0.825 | 0.441 | -0.504 | 8 | 15 | 9 | 6 | 27.5 | 28.0 | 27.5 | 27.5 |
| 13 | 5.016 | 0.852 | -1.023 | -0.299 | 12 | 4 | 1 | 2 | 28.0 | 28.0 | 27.5 | 27.5 |
| 14 | 0.781 | -5.303 | 3.511 | 1.155 | 2 | 15 | 5 | 11 | 28.0 | 27.5 | 27.5 | 28.0 |
| 15 | 0.112 | -2.029 | 0.392 | -2.570 | 3 | 6 | 6 | 7 | 27.0 | 27.5 | 28.0 | 27.5 |
| 16 | 2.557 | 1.086 | 1.024 | 0.574 | 5 | 3 | 9 | 7 | 27.0 | 27.5 | 27.5 | 26.5 |
| 17 | 1.483 | -2.280 | 4.178 | 0.406 | 0 | 3 | 5 | 10 | 27.5 | 28.0 | 27.5 | 27.0 |
| 18 | -2.520 | 1.656 | -2.806 | -3.641 | 4 | 12 | 7 | 8 | 27.5 | 27.5 | 26.5 | 28.0 |
| 19 | -2.365 | -0.527 | -1.024 | 3.914 | 2 | 3 | 10 | 7 | 27.5 | 27.5 | 27.5 | 28.0 |
| 20 | -0.264 | -1.379 | 3.724 | -2.703 | 6 | 6 | 5 | 2 | 28.0 | 28.0 | 27.5 | 27.0 |
| 21 | 3.309 | 2.150 | -2.014 | 1.774 | 2 | 7 | 2 | 9 | 27.5 | 28.0 | 28.0 | 27.0 |
| 22 | 2.847 | 1.663 | -4.996 | 2.444 | 7 | 13 | 6 | 11 | 28.0 | 28.5 | 28.0 | 27.5 |
| 23 | 2.348 | -4.032 | -2.137 | -3.777 | 10 | 13 | 2 | 10 | 28.0 | 27.5 | 28.5 | 27.5 |
| 24 | 1.952 | -2.473 | 0.788 | -1.264 | 2 | 1 | 6 | 4 | 28.0 | 27.5 | 28.0 | 27.5 |
| 25 | 0.016 | 1.389 | -1.301 | -1.593 | 0 | 4 | 3 | 2 | 27.5 | 28.0 | 27.5 | 27.5 |
| 26 | -1.777 | 3.753 | -2.320 | 3.506 | 7 | 0 | 10 | 3 | 28.0 | 27.5 | 28.0 | 27.5 |
| 27 | 2.967 | -5.324 | 2.234 | 1.564 | 2 | 7 | 10 | 10 | 27.0 | 27.5 | 27.5 | 27.0 |
| 28 | -2.553 | 2.957 | -0.657 | 1.793 | 7 | 6 | 5 | 5 | 27.5 | 27.5 | 27.0 | 28.0 |
| 29 | -5.260 | -2.303 | 4.435 | -2.428 | 10 | 6 | 9 | 7 | 27.5 | 28.0 | 27.0 | 27.0 |
| 30 | 2.633 | 2.833 | -1.707 | 3.302 | 17 | 6 | 7 | 10 | 27.0 | 27.5 | 27.0 | 27.5 |
| 31 | -1.471 | 1.716 | 1.360 | 4.695 | 2 | 7 | 9 | 7 | 28.0 | 27.5 | 27.5 | 27.5 |
| 32 | -0.867 | -1.520 | -4.935 | -0.172 | 6 | 12 | 6 | 5 | 27.5 | 28.0 | 28.0 | 27.5 |
| 33 | -3.201 | -3.924 | -2.282 | -1.731 | 7 | 6 | 4 | 17 | 28.0 | 27.5 | 27.5 | 27.0 |
| 34 | -0.424 | 5.257 | 3.049 | -2.163 | 6 | 6 | 4 | 1 | 28.0 | 27.5 | 27.5 | 27.0 |
| 35 | 2.531 | 1.287 | 2.629 | 1.325 | 2 | 2 | 5 | 10 | 27.0 | 27.5 | 27.5 | 27.5 |
| 36 | 5.098 | 2.590 | -5.261 | -1.913 | 4 | 5 | 13 | 3 | 27.5 | 28.0 | 27.5 | 27.5 |
| 37 | 2.876 | -0.080 | -3.861 | -3.884 | 11 | 8 | 7 | 11 | 27.5 | 27.0 | 27.0 | 28.0 |
| 38 | -3.159 | 1.344 | 2.596 | -4.258 | 14 | 5 | 2 | 15 | 28.0 | 28.0 | 27.5 | 27.5 |
| 39 | 3.300 | 3.530 | 4.171 | 4.436 | 1 | 8 | 10 | 10 | 28.0 | 28.0 | 28.0 | 27.5 |
| 40 | 4.934 | -1.856 | 3.045 | -0.662 | 5 | 16 | 7 | 8 | 27.5 | 28.0 | 28.5 | 27.5 |
| 41 | 0.155 | -3.452 | 0.600 | 3.833 | 8 | 7 | 8 | 13 | 26.5 | 27.5 | 27.5 | 27.5 |
| 42 | 1.650 | -3.991 | 4.452 | 0.702 | 8 | 1 | 10 | 1 | 28.0 | 27.5 | 27.0 | 27.5 |
| 43 | 0.065 | -3.297 | 2.607 | 4.548 | 4 | 3 | 3 | 7 | 28.5 | 27.0 | 27.0 | 28.0 |
| 44 | 3.274 | 4.997 | 3.625 | -4.413 | 1 | 5 | 4 | 7 | 28.0 | 28.0 | 27.0 | 27.5 |
| 45 | 1.992 | 2.921 | -3.968 | -1.533 | 7 | 11 | 3 | 10 | 27.5 | 27.5 | 27.5 | 28.0 |
| 46 | -3.006 | 3.002 | -1.665 | 3.886 | 4 | 6 | 3 | 12 | 27.5 | 28.0 | 27.5 | 28.0 |
| 47 | -2.087 | -2.842 | 5.044 | -4.007 | 6 | 0 | 10 | 1 | 27.5 | 27.0 | 28.0 | 27.5 |
| 48 | -5.312 | 0.752 | 1.866 | -1.051 | 1 | 1 | 6 | 1 | 27.5 | 28.0 | 27.0 | 28.0 |
| 49 | -3.816 | 3.710 | 4.310 | 2.938 | 10 | 9 | 9 | 6 | 27.5 | 27.5 | 27.5 | 27.5 |
| 50 | -1.726 | -3.700 | 3.820 | -1.814 | 9 | 1 | 3 | 3 | 27.0 | 27.0 | 27.0 | 28.0 |
| 51 | 4.768 | -3.555 | -4.253 | -0.685 | 8 | 2 | 6 | 5 | 27.5 | 27.5 | 27.5 | 27.5 |
| 52 | -3.358 | 4.447 | 3.403 | 1.551 | 4 | 11 | 10 | 5 | 28.0 | 27.0 | 28.0 | 27.0 |
| 53 | -1.711 | 1.131 | -0.676 | -4.310 | 2 | 11 | 12 | 5 | 28.0 | 27.5 | 27.5 | 27.5 |
| 54 | -2.032 | -4.601 | 4.057 | 3.697 | 8 | 9 | 10 | 5 | 27.5 | 27.0 | 28.0 | 27.0 |
| 55 | -2.384 | -1.814 | 2.022 | 2.794 | 7 | 1 | 14 | 8 | 27.5 | 27.5 | 27.5 | 28.0 |
| 56 | -4.243 | 2.895 | 2.316 | 0.197 | 1 | 8 | 0 | 7 | 28.0 | 27.0 | 27.5 | 28.0 |
| 57 | -0.655 | -0.981 | 4.130 | 5.238 | 1 | 5 | 8 | 6 | 27.5 | 28.0 | 27.5 | 27.5 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 58 | 0.954 | 1.647 | -4.214 | -0.463 | 1 | 4 | 0 | 6 | 27.5 | 28.0 | 28.0 | 27.5 |
| 59 | 3.009 | 2.712 | -5.674 | 0.437 | 1 | 13 | 1 | 7 | 27.5 | 27.0 | 27.5 | 27.5 |
| 60 | 3.485 | 3.401 | 0.662 | 1.234 | 4 | 6 | 10 | 4 | 28.0 | 27.0 | 27.5 | 27.0 |
| 61 | 0.962 | 1.201 | 0.845 | -3.857 | 5 | 4 | 17 | 6 | 28.0 | 28.0 | 27.5 | 27.5 |
| 62 | -1.995 | 0.257 | -1.359 | -0.797 | 3 | 5 | 3 | 13 | 27.5 | 28.5 | 27.5 | 27.5 |
| 63 | -4.953 | 1.260 | 1.554 | -2.258 | 2 | 4 | 8 | 19 | 28.0 | 27.5 | 27.5 | 28.0 |
| 64 | 1.019 | 0.394 | -1.552 | 3.966 | 1 | 1 | 10 | 6 | 27.5 | 28.0 | 28.0 | 27.5 |
| 65 | -5.301 | 2.974 | -2.054 | -2.472 | 6 | 4 | 1 | 6 | 28.0 | 27.0 | 28.0 | 27.0 |
| 66 | -5.057 | -4.358 | 4.450 | 1.002 | 6 | 15 | 6 | 9 | 27.0 | 28.0 | 28.0 | 28.0 |
| 67 | 3.249 | 0.629 | 4.240 | 1.262 | 7 | 6 | 5 | 4 | 28.0 | 27.5 | 27.0 | 28.0 |
| 68 | -2.396 | -3.800 | -1.973 | 0.073 | 9 | 15 | 4 | 7 | 28.0 | 27.5 | 28.0 | 27.5 |
| 69 | -0.186 | -2.681 | -4.256 | -3.978 | 2 | 5 | 0 | 0 | 27.0 | 28.0 | 28.0 | 27.5 |
| 70 | 4.050 | 5.015 | -0.807 | -3.237 | 18 | 4 | 6 | 8 | 28.0 | 28.5 | 27.0 | 27.5 |

*Interpretation: This test is intended to provide an indication of the noise levels, which is a combination of the noise from the DVL itself, effects from connected systems, and the environmental noise – both electric and acoustic.*

*This test is run with the transmitter turned off, i.e. listening only, and provides a profile for each of the beams and reports values of velocity, correlation, and amplitude. It is intended to provide an indication of noise exposure. High noise levels can reduce the range and noise that is colored may bias the velocity estimates. Since the DVL is not transmitting the velocity values shown in the test are not valid and should be ignored.*

*An ideal system (depending on model) will have amplitude levels of 23-32 dB.*

*Note that this noise is the noise perceived by the DVL and indicates not only the systems self-generated noise, but also noise resulting from noisy power supplies, neighboring acoustic devices, and environmental noise which may be present in the test facility/laboratory.*

5.1 Results beam 1:

Mean velocity = -0.185 m/s
Std velocity = 2.966 m/s
Mean correlation = 5.5 % PASSED
Mean amplitude = 27.6 dB PASSED
Bottom track noise = 0.40 PASSED

5.2 Results beam 2:

Mean velocity = 0.205 m/s
Std velocity = 2.966 m/s
Mean correlation = 6.9 % PASSED
Mean amplitude = 27.7 dB PASSED
Bottom track noise = 0.40 PASSED

5.3 Results beam 3:

Mean velocity = 0.314 m/s
Std velocity = 3.130 m/s
Mean correlation = 6.5 % PASSED
Mean amplitude = 27.5 dB PASSED
Bottom track noise = 0.40 PASSED

5.4 Results beam 4:

Mean velocity = -0.012 m/s
Std velocity = 2.680 m/s
Mean correlation = 7.3 % PASSED
Mean amplitude = 27.5 dB PASSED
Bottom track noise = 0.41 PASSED

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*Interpretation: These summary values are a quick indication of the functionality of the acoustics.*

*A properly operating system should have a mean correlation below 20%. A correlation between 20-25% will result in a warning and over 25% will result in a fail.*

*Mean amplitude should have a value between 18-35dB. The test will output a warning if the value is within 15-18dB or 35-40dB. Values below 15dB or above 40dB will output as fail.*

*What should happen if a warning or fail is shown? The first step should always be to check the test setup. It is very likely that external noise is causing the issue, especially in an office or workshop environment. Move to an area with less interference and retry the test.*

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6 Boost operation measurements:

Cap bank pretest voltage = 50.43 V

Average boost energy = 1.64 J PASSED

Source resistance = 1.82 Ohm

Minimum input voltage = 23.19 V PASSED

Cap bank voltage = 68.75 V PASSED

Cap bank charge duration = 189.1 ms PASSED

Low input voltage status = OK PASSED

## 7 Internal transmit/receive loopback test:

### 7.1 Results beam 1:

Velocity = 0.000 m/s PASSED

Correlation = 100 % PASSED

Amplitude = 103.0 dB PASSED

### 7.2 Results beam 2:

Velocity = 0.001 m/s PASSED

Correlation = 100 % PASSED

Amplitude = 99.9 dB PASSED

### 7.3 Results beam 3:

Velocity = 0.000 m/s PASSED

Correlation = 100 % PASSED

Amplitude = 98.0 dB PASSED

### 7.4 Results beam 4:

Velocity = 0.000 m/s PASSED

Correlation = 100 % PASSED

Amplitude = 95.7 dB PASSED

*Interpretation: The loop back test for the transmit receive should produce a near zero velocity on the four beams. Amplitude should be over 70dB.*

## 8 Water current profile test:

| Cell | VelB1 | VelB2 | VelB3 | VelB4 | CorrB1 | CorrB2 | CorrB3 | CorrB4 | AmpB1 | AmpB2 | AmpB3 | AmpB4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | -0.117 | 0.020 | -0.007 | 0.016 | 99 | 100 | 100 | 98 | 115.0 | 115.0 | 113.0 | 114.0 |
| 2 | -0.053 | -0.038 | -0.116 | -0.079 | 95 | 93 | 85 | 89 | 110.0 | 109.0 | 103.0 | 106.0 |
| 3 | -0.064 | -0.001 | -0.172 | 0.061 | 81 | 83 | 79 | 91 | 100.0 | 96.5 | 86.0 | 88.5 |
| 4 | -0.022 | 0.108 | -0.011 | -0.067 | 78 | 72 | 80 | 85 | 82.5 | 78.0 | 71.5 | 73.0 |
| 5 | 0.009 | 0.103 | -0.052 | -0.011 | 91 | 90 | 85 | 90 | 68.5 | 68.0 | 61.0 | 61.0 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | 0.004 | 0.105 | -0.064 | -0.056 | 86 | 88 | 89 | 86 | 54.5 | 53.0 | 50.0 | 47.5 |
| 7 | 0.062 | 0.027 | 0.051 | -0.032 | 85 | 86 | 80 | 77 | 42.5 | 40.5 | 39.5 | 36.0 |
| 8 | 0.025 | 0.007 | -0.026 | -0.102 | 50 | 55 | 49 | 32 | 31.5 | 32.0 | 32.5 | 29.5 |
| 9 | -0.367 | -0.042 | -0.189 | 0.814 | 17 | 12 | 24 | 12 | 28.0 | 28.5 | 28.5 | 26.5 |
| 10 | 0.166 | 1.598 | 4.269 | -1.544 | 9 | 4 | 7 | 9 | 27.5 | 28.5 | 27.5 | 27.5 |
| 11 | -4.450 | 1.774 | -3.041 | 4.336 | 3 | 6 | 1 | 11 | 27.5 | 27.0 | 27.5 | 27.0 |
| 12 | 3.209 | -2.619 | 2.313 | -3.522 | 3 | 6 | 8 | 5 | 27.0 | 27.5 | 27.0 | 28.0 |
| 13 | -2.040 | 2.047 | 0.911 | -4.621 | 10 | 6 | 6 | 6 | 28.0 | 27.5 | 27.5 | 27.5 |
| 14 | 0.744 | -1.751 | -4.472 | 4.848 | 2 | 3 | 6 | 8 | 27.5 | 28.0 | 28.5 | 27.0 |
| 15 | -1.746 | -0.363 | -2.303 | -3.746 | 7 | 4 | 3 | 10 | 27.0 | 28.0 | 27.5 | 27.5 |
| 16 | 0.565 | -4.908 | -3.588 | -3.894 | 2 | 1 | 9 | 11 | 28.0 | 27.5 | 27.5 | 27.5 |
| 17 | 3.167 | 4.865 | 3.310 | -1.486 | 5 | 3 | 12 | 10 | 27.5 | 28.0 | 27.5 | 28.0 |
| 18 | -3.144 | -1.564 | 2.481 | 3.582 | 4 | 3 | 2 | 1 | 27.5 | 27.5 | 28.0 | 28.0 |
| 19 | -0.660 | 1.121 | -3.167 | 0.308 | 9 | 3 | 10 | 5 | 27.5 | 27.5 | 28.0 | 28.0 |
| 20 | -4.874 | 4.166 | 1.678 | 4.036 | 9 | 9 | 5 | 3 | 27.5 | 27.5 | 27.0 | 28.0 |
| 21 | -3.514 | -3.437 | -4.098 | 1.120 | 10 | 6 | 8 | 0 | 28.0 | 27.5 | 27.0 | 27.0 |
| 22 | 3.238 | -1.523 | -1.101 | -2.152 | 8 | 4 | 10 | 4 | 27.0 | 27.5 | 27.5 | 28.0 |
| 23 | 3.830 | 1.166 | 2.437 | 2.197 | 1 | 10 | 4 | 4 | 27.5 | 28.0 | 27.5 | 27.5 |
| 24 | 4.815 | 4.517 | -1.416 | 3.836 | 17 | 10 | 10 | 0 | 28.0 | 27.5 | 27.0 | 27.0 |
| 25 | 0.209 | 1.228 | -0.016 | 3.598 | 8 | 8 | 11 | 3 | 28.0 | 27.0 | 27.5 | 27.5 |
| 26 | -1.916 | -0.181 | 1.650 | -1.242 | 5 | 11 | 2 | 0 | 27.5 | 27.5 | 28.0 | 27.0 |
| 27 | 5.234 | 1.994 | 4.376 | -3.230 | 1 | 5 | 21 | 6 | 27.5 | 28.0 | 28.0 | 27.5 |
| 28 | 3.185 | -0.312 | 4.442 | 2.302 | 0 | 5 | 1 | 3 | 28.0 | 27.5 | 27.5 | 27.0 |
| 29 | -5.413 | 3.771 | 3.687 | -2.470 | 6 | 6 | 2 | 9 | 27.5 | 27.5 | 27.5 | 28.0 |
| 30 | -0.916 | -0.828 | -0.339 | -4.244 | 10 | 1 | 3 | 4 | 27.0 | 28.0 | 27.5 | 27.0 |
| 31 | 3.564 | -4.994 | 2.573 | -5.383 | 4 | 14 | 9 | 7 | 27.5 | 27.5 | 26.5 | 27.5 |
| 32 | 3.334 | 2.358 | -1.321 | -1.967 | 6 | 20 | 2 | 2 | 27.5 | 27.5 | 28.0 | 28.0 |
| 33 | -4.092 | 3.970 | 2.256 | -0.244 | 4 | 5 | 11 | 1 | 27.5 | 27.5 | 28.0 | 28.0 |
| 34 | 2.502 | 4.243 | 1.939 | 0.276 | 6 | 11 | 11 | 3 | 27.5 | 27.5 | 26.5 | 28.0 |
| 35 | -3.712 | 1.984 | 3.515 | -2.621 | 9 | 19 | 11 | 12 | 28.0 | 27.5 | 28.0 | 27.5 |
| 36 | 5.459 | 4.292 | 2.381 | -2.642 | 7 | 3 | 1 | 2 | 28.0 | 28.0 | 26.5 | 28.0 |
| 37 | -5.124 | -3.753 | -0.263 | 3.414 | 2 | 0 | 2 | 5 | 27.5 | 28.0 | 27.5 | 27.5 |
| 38 | -1.568 | -2.958 | 0.344 | -0.705 | 1 | 1 | 8 | 7 | 28.0 | 27.5 | 27.5 | 27.5 |
| 39 | 0.320 | 4.795 | 2.046 | -2.925 | 13 | 17 | 10 | 3 | 27.5 | 28.0 | 27.5 | 27.5 |
| 40 | 3.693 | 4.202 | -2.835 | 2.915 | 13 | 10 | 12 | 3 | 27.0 | 27.5 | 27.5 | 27.5 |
| 41 | -2.070 | -5.252 | -4.485 | 2.682 | 10 | 6 | 3 | 11 | 28.0 | 28.0 | 28.5 | 27.5 |
| 42 | 1.080 | -3.712 | 1.668 | -4.200 | 8 | 9 | 2 | 15 | 28.0 | 28.0 | 27.5 | 27.5 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 43 | 2.474 | 4.483 | -1.165 | 0.366 | 3 | 4 | 2 | 4 | 28.0 | 28.0 | 27.5 | 27.5 |
| 44 | -2.938 | -0.278 | -1.396 | -2.693 | 10 | 3 | 8 | 12 | 27.5 | 28.0 | 27.5 | 28.5 |
| 45 | 0.584 | -0.318 | 3.040 | 1.604 | 6 | 6 | 4 | 15 | 28.0 | 28.0 | 27.5 | 27.5 |
| 46 | 0.963 | 1.843 | -0.711 | -2.199 | 5 | 6 | 3 | 10 | 27.5 | 28.5 | 27.0 | 27.5 |
| 47 | -2.964 | 1.407 | -1.005 | 3.321 | 7 | 9 | 9 | 3 | 27.5 | 27.5 | 27.0 | 27.5 |
| 48 | 2.283 | -0.059 | -0.534 | 4.528 | 3 | 13 | 10 | 4 | 27.5 | 28.5 | 28.0 | 27.0 |
| 49 | -1.965 | -1.205 | -1.136 | -3.440 | 20 | 9 | 8 | 7 | 27.5 | 27.5 | 27.0 | 27.5 |
| 50 | -2.415 | -4.105 | 4.233 | 1.912 | 3 | 6 | 10 | 8 | 28.0 | 27.5 | 27.0 | 28.5 |
| 51 | 3.204 | 3.714 | 0.316 | 2.880 | 3 | 12 | 9 | 12 | 28.0 | 27.5 | 27.5 | 27.0 |
| 52 | 3.013 | 4.004 | -5.323 | 2.602 | 10 | 16 | 15 | 1 | 27.5 | 28.0 | 27.0 | 27.5 |
| 53 | -0.905 | 3.854 | 2.269 | 2.754 | 10 | 6 | 7 | 8 | 28.0 | 27.5 | 27.5 | 27.0 |
| 54 | -4.910 | 2.424 | 0.644 | -5.125 | 6 | 1 | 6 | 6 | 27.5 | 28.0 | 28.0 | 27.5 |
| 55 | -1.104 | -1.404 | -0.414 | 2.577 | 4 | 6 | 14 | 7 | 27.0 | 27.5 | 27.0 | 27.0 |
| 56 | -3.687 | 3.826 | 1.762 | -1.649 | 12 | 1 | 6 | 1 | 27.5 | 27.5 | 27.5 | 27.5 |
| 57 | -6.417 | 0.983 | -2.547 | -2.705 | 0 | 11 | 5 | 5 | 27.5 | 27.5 | 27.0 | 27.5 |
| 58 | -3.592 | -1.102 | 3.168 | 1.125 | 5 | 6 | 0 | 4 | 27.0 | 27.0 | 27.5 | 27.5 |
| 59 | -3.139 | -1.113 | 2.852 | -4.479 | 1 | 8 | 6 | 13 | 28.0 | 27.5 | 27.5 | 28.0 |
| 60 | 4.220 | 2.290 | 3.948 | 1.959 | 2 | 9 | 0 | 4 | 28.0 | 27.5 | 27.5 | 27.0 |
| 61 | -0.849 | 4.569 | 5.428 | -3.102 | 16 | 5 | 9 | 9 | 28.0 | 28.0 | 28.0 | 27.5 |
| 62 | -3.603 | -2.634 | -2.905 | 1.654 | 4 | 10 | 6 | 1 | 28.0 | 27.5 | 28.0 | 28.0 |
| 63 | -3.870 | -3.074 | 3.842 | 4.580 | 7 | 1 | 3 | 1 | 28.0 | 28.0 | 28.0 | 27.5 |
| 64 | 3.358 | -4.040 | 4.332 | 4.147 | 4 | 8 | 5 | 4 | 27.0 | 27.5 | 28.0 | 27.0 |
| 65 | 3.970 | -0.670 | -2.825 | -0.522 | 2 | 8 | 6 | 6 | 28.0 | 28.0 | 27.0 | 27.0 |
| 66 | 0.540 | 0.288 | -2.523 | 2.182 | 9 | 10 | 12 | 8 | 27.5 | 27.5 | 27.5 | 28.0 |
| 67 | -0.609 | 0.800 | -1.922 | 4.648 | 6 | 3 | 10 | 10 | 28.0 | 27.5 | 28.0 | 28.0 |
| 68 | -1.135 | 2.616 | -1.590 | -4.993 | 10 | 13 | 3 | 10 | 27.5 | 27.5 | 27.0 | 27.5 |
| 69 | -1.991 | 3.166 | -4.588 | -0.979 | 2 | 4 | 9 | 3 | 27.5 | 27.0 | 27.5 | 28.0 |
| 70 | -5.143 | -0.045 | -1.645 | -0.343 | 3 | 9 | 4 | 18 | 27.5 | 28.0 | 28.0 | 28.0 |

*Interpretation: This test is similar to the noise test, but now the transmitter is turned on. Amplitude values may be high, particularly in a test tank where the pulse may be reflected and received multiple times before dying out. The amplitude should attenuate with range with the exception of boundaries or objects providing reflection and multipath returns.*

*The portion of the profile which is of most interest is at the greatest extent of the range. Here is where the amplitude (and correlation) should reach a constant value and define the noise level. Higher levels correspond to elevated noise floors and consequently reduced range.*

8.1 Results beam 1:
Correlation cell 3 = 81 %
Amplitude cell 3 = 100.0 dB

8.2 Results beam 2:
Correlation cell 3 = 83 %
Amplitude cell 3 = 96.5 dB

8.3 Results beam 3:
Correlation cell 3 = 79 %
Amplitude cell 3 = 86.0 dB

8.4 Results beam 4:
Correlation cell 3 = 91 %
Amplitude cell 3 = 88.5 dB

*Interpretation: This test will be executed regardless of whether a current profiling license is installed. The third measurement cell from the instrument is used for the test. If testing in a tank, there may be interference with the boundaries causing reflections. If the goal of running the BIT test is to check current profiling, the test must be conducted in deep water so a proper current profile can be taken.*

9 Measure transmit energy pr beam:

Transmit energy beam 1 = 76

Transmit energy beam 2 = 70

Transmit energy beam 3 = 70

Transmit energy beam 4 = 76

*Interpretation: This tests the transmitter energy output. All beams should be within +/- 50% of the mean value.*

10 Sensor measurements:

Internal temperature = 22.75 C

Water temperature = 21.74 C

Pressure sensor temperature = 21.00 C

Pressure sensor = 0.735 dBar

Pressure sensor (absolute) = 10.234 dBar

*Interpretation: Internal temperature should be in the range of -4 – 60 C. The water temperature sensor is located in the DVL head. It should read within -4 – 30 C and display a reasonable value for the expected water temperature.*

*Pressure sensor temperature should be within 3 degrees of the Temperature.*

*Pressure sensor should be in the range of 5 – 50 dBar.*
*Fail <5 and >100*
*Warning <8 and >50*

*Note that heading, pitch and roll sensors are disabled in DVL products.*

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11 Measure internal currents and voltages:

11.1 Power input:

Voltage = 23.99 V PASSED

Current = 10.87 mA (StdDev = 1.16 mA)

Power = 260.7 mW PASSED

11.2 Internal voltages:

5.3 V = 5.338 V PASSED

3.3 V = 3.264 V PASSED

*Interpretation: Voltage should be between 12 – 48 volts. Near 12v can cause uncertainty in the estimates and risks powering down. Above 51V will damage the instrument.*