

# OSOP

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# TitanBH

The Titan Borehole force balance triaxial accelerometer is ideally suited for national networks and research applications requiring reliable and durable instrumentation for strong motion and free field studies. The accelerometer is housed in a waterproof stainless steel enclosure and can be deployed in a direct burial posthole or cased borehole, which enables co-location with broadband posthole seismometers.

The Titan Borehole features industry leading dynamic range that, when combined with ultra-low self-noise performance, mitigates cultural noise resulting in precise measurements and high quality data.

It is the first accelerometer to incorporate software selectable full scale range and offset zeroing capabilities. Operators will also appreciate the instrument's low power consumption, making the Titan Borehole the instrument of choice for difficult to access or remote deployments, where site visits should be minimized.



**Titan Borehole**

### Industry Leading Performance Attributes

- Industry leading 166 dB dynamic range
- Ultra-low self-noise comparable to some broadband seismometers
- Wide operational frequency range: DC to 430 Hz
- Best in class thermal stability and high accuracy provide increased data quality
- Full scale range of  $\pm 0.25$  g to  $\pm 4$  g with independent horizontal and vertical range selection

### Ease of Use

- Electronically selectable full scale range facilitates remote sensor control when deployments are distant or difficult to access
- Integrated web server provides efficient instrument management and control

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## Accelerometer Technology and Performance

<b>Topology</b>	Triaxial, horizontal-vertical
<b>Feedback</b>	Force balance with capacitive displacement transducer
<b>Centering</b>	Electronic offset zeroing via user interface
<b>Full Scale Range</b>	Electronically selectable range: $\pm 4 g$ , $\pm 2 g$ , $\pm 1 g$ , $\pm 0.5 g$ , $\pm 0.25 g$ , and $\pm 0.125 g$ (nominal)
<b>Bandwidth</b>	DC to 430 Hz (-3 dB point)
<b>Dynamic Range (Integrated RMS)</b>	166 dB @ 1 Hz over 1 Hz bandwidth 155 dB, 3 to 30 Hz
<b>Offset</b>	Electronically zeroed to within $\pm 0.005 g$
<b>Non-Linearity</b>	<0.015% total non-linearity
<b>Hysteresis</b>	< 0.005% of full scale
<b>Cross-axis Sensitivity</b>	< 0.5% total
<b>Offset Temperature Coefficient</b>	Horizontal sensor: $60 \mu g/^{\circ}C$ , typical Vertical sensor: $320 \mu g/^{\circ}C$ , typical

## Digital Command and Control Interface

<b>Digital Interface</b>	Onboard web server standard HTTP RS-232 compatible Serial Line Internet Protocol (SLIP) R-232 command-line interface
<b>Commands</b>	Gain range selection Auto-zero or set to specific offset Self-test Calibration enable State of health request Firmware updates
<b>Data Outputs</b>	Sampled XYZ outputs (in volts and $g$ ) Instrument temperature Trimmer settings Instrument serial number Hardware assemblies and firmware revisions

## Hardware Interface

<b>Connector</b>	MIL-C-26482G Series 1, 14-pin, shell size 12 Captive cable shroud waterproof to 50m
<b>Acceleration Output</b>	40 Vpp differential
<b>Output Impedance</b>	2 x 100 $\Omega$
<b>Calibration Input</b>	Single voltage input, all channels enabled together
<b>Control Input</b>	Single control signal can be configured to initiate auto-zero, initiate self-test, or enable calibration
<b>Status Output</b>	Asserted: Init OK, output signal valid Deasserted: Self-test in progress or failed, auto-zeroing in progress, calibration enabled, or starting up
<b>Serial Port</b>	9600 Baud RS-232 compatible

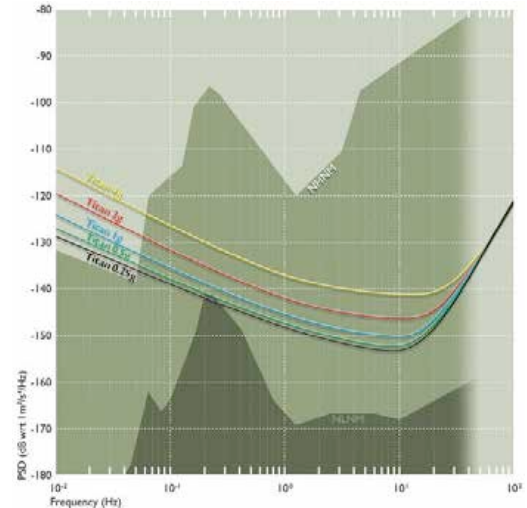
## Power

<b>Supply Voltage</b>	9 to 36 V DC isolated input
<b>Power Consumption</b>	1.1 W typical quiescent
<b>Protection</b>	Reverse-voltage and over-/under-voltage protected Self-resetting over-current protection
<b>Isolation</b>	Supply power is isolated from signal ground

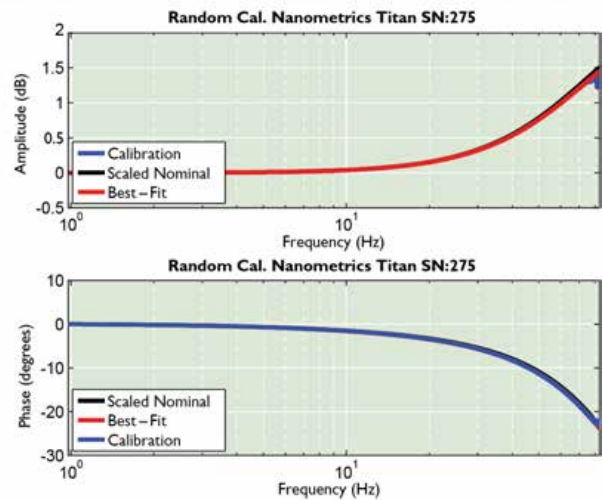
## Titan Borehole

<b>Diameter</b>	96.39 mm
<b>Height</b>	181.7 mm - with shroud connector
<b>Weight</b>	3 kg
<b>Immersion Rating</b>	50 m continuous submersion
<b>Weather Resistance</b>	Rated to IP 68 (with shroud)

## Titan Accelerometer Self-Noise



## Sensor Performance: Flat Response



Test results courtesy of USGS

\*Specifications subject to change without notice.