

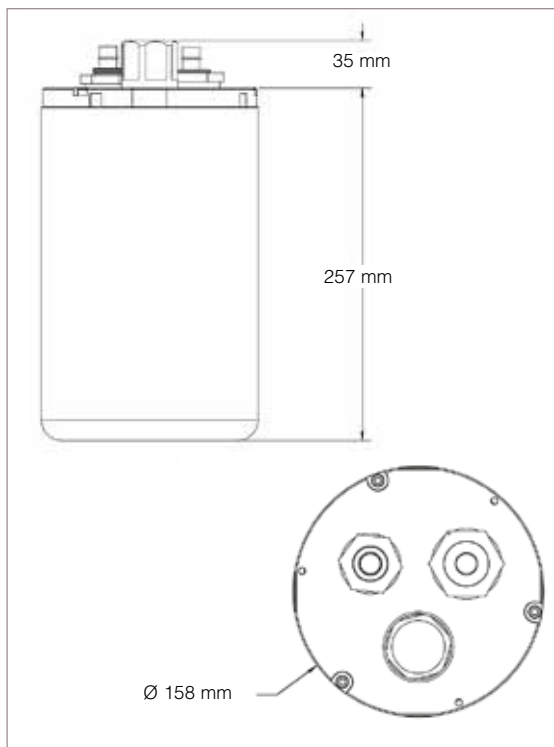


CODEVINTEC

Tecnologie per le Scienze della Terra e del Mare

45° 27' 39.384" N
9° 07' 30.145" E

Trillium Compact OBS Ocean bottom seismometer



The Trillium Compact Ocean Bottom Seismometer (OBS) is an ultra-low power broadband seismometer for ocean bottom deployments to 6000m depth.

Benefits

- > The precise, kinematic 360° gimbal auto-levels from any orientation ensuring successful deployment and implementation.
- > Comprehensive State-of-Health logging includes case orientation, providing a powerful data set for optimizing deployment techniques.
- > Ultra-low 180mW typical power consumption reduces battery costs
- > 120-second true broadband seismometer provides the same exceptional dynamic range and low noise performance as the proven Trillium Compact land seismometers
- > Compatible with Scripps Oceanographic Institute ABALONES ocean bottom system and other OBS systems



Trillium Compact OBS

The OBS vessel and gimbal design preserves the full performance of the land-based Trillium Compact seismometer, including its exceptional dynamic range and low noise floor.

Performance, Dependability and Availability

Incorporating a robust and reliable leveling gimbal that operates over a full 360° range, the Compact OBS will auto-level from all orientations.

A full titanium cylindrical pressure vessel for 6000m deployments, or aluminum-anodized enamel painted

vessel for 1800m deployments, and proven glass epoxy connectors ensure exceptional ruggedness and resistance to corrosion in marine and fresh water environments.

The system employs two separate connections: the primary analogue connection as well as a digital connection. The digital connector is provided for final configuration and sensor verification prior to deploying the OBS overboard.

Technical Specifications Trillium Compact OBS

Specifications subject to change without notice

Seismometer

Technology

Topology	Symmetric triaxial
Feedback	Force balance with capacitive transducer
Mass Centering	Not required

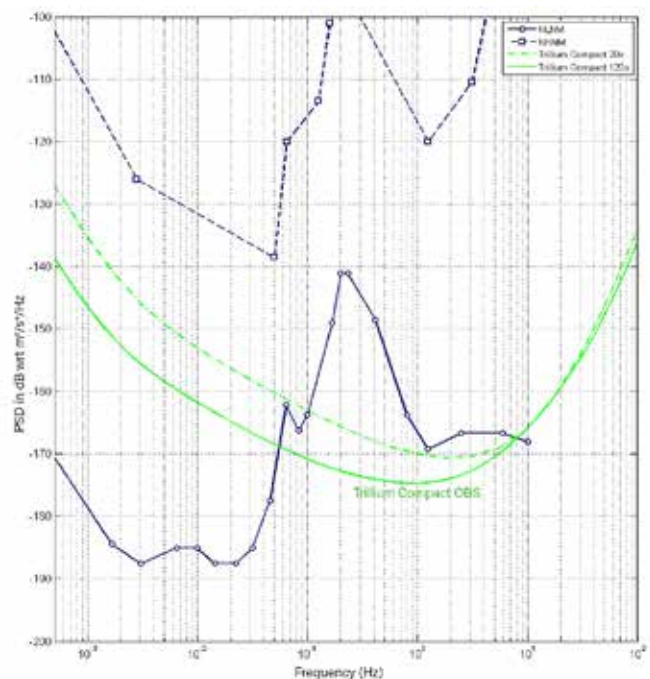
Seismometer Performance

Self-noise	See graph
Nominal Sensitivity	750 V-s/m (Reference User Guide for precise value)
Precision	±0.5% relative to User Guide specification
Bandwidth	-3 dB points at 120 s and 100 Hz
Off-axis Sensitivity	±0.5%
Clip Level	26 mm/s up to 10 Hz and 0.17 g above 10 Hz
Operational Tilt Range	±2.5° without re-leveling
Parasitic Resonances	None below 100 Hz
Dynamic Range	> 152 dB @ 1 Hz

Leveling and orientation

Technology	Dual degree-of-freedom motorized gimbals > Jam-free mechanism > Kinematic design preserves full seismometer performance
Range	Levels in any orientation, full ±180° range
Accuracy	Levels to within ± 0.5° of true vertical
Leveling initiation	Leveling checks done at some or all of: > configurable delay after power on > configurable periodic (three stage schedule) > on external command > Delay intervals configurable from seconds to months > Levels only when needed based on configurable mass position threshold
Magnetometer	3-component, mounted on and level with seismometer

Self-noise performance plot





Communications

Interfaces	RS-232 serial, on main and auxiliary connectors
Protocols	Serial Line IP (SLIP) > HTTP (POST and GET) > Command line protocol

Connectors/Plugs

Main	12-pin female, VSK-12-BCL rubber-molded glass epoxy > 40 V peak-to-peak differential seismic signal plus ground (3 channels) > Serial RS-232 port (Rx,Tx) > Calibration voltage input > Power input and return
Auxiliary/diagnostic	4-pin female, VSG-4-BCL rubber-molded glass epoxy > Serial RS-232 port (Rx,Tx, Grd) > Auxiliary control input
Vacuum/pressure port	1/4-inch male quick disconnect with shutoff > Vent for evacuation and servicing

Power

Supply voltage	9 to 29 VDC isolated
Power consumption	180 mW typical (leveled, quiescent)
Protection	Reverse-voltage and over- voltage protected > Self-resetting over-current protection > Unit can be powered on for descent and ascent

Physical

Enclosure	Titanium (6000 m), or enamelled aluminum (1800 m) > All connectors on end cap > End cap removable for O-ring servicing > Dual O-ring seals on end cap
Diameter	158 mm

Physical (Cont'd)

Height	257 mm, not including connector
Weight	> 11.96 kg, 6.66 kg in sea water (titanium) > 8.19kg, 2.89 kg in sea water (aluminum)

Environmental

Marine	> Depth to 6000 m (titanium) > Depth to 1800 m (aluminum)
Operating temp.	-20°C to +60°C
Storage temp.	-40°C to +70°C
Shock	100 g half sine, 5 ms without damage, 6 axes

- > No seismometer mass lock required prior to deployment and through full experiment cycle

Digital Command and Control Interface

User Interface

Web browser	Onboard web server, using industry standard web browsers
Command line	Basic interface for non-SLIP connections

Configuration and Control

Sensor	XYZ/UVW mode > Calibration channel selection (off, all, U, V or W) > Short/long period mode
Leveling	Initiate immediate leveling check > Automatic cycle mode selection: (post power-on, three stage periodic) > Automatic cycle parameter selection: (delay and interval times, max attempts)
Unit	Firmware updates > State-of-health request > Upload custom information

Data outputs

On-request	Seismometer mass position values > Temperature > Internal relative humidity > Magnetometer readings > Seismometer response (poles, zeroes, sensitivity) > Instrument serial number, subassembly revisions > Firmware revision > Case orientation (with respect to vertical) > Seismometer orientation (with respect to vertical) > Download logged state-of-health > Erase state-of-health log > Upload/Download custom information
Leveling Log	Every leveling event logged in non-volatile memory > Full before-and-after State of Health logged
State of Health Log	Scheduled interval recordings of SoH, includes: > time from power on > seismometer mass positions > vessel and seismometer orientations > magnetometer readings > temperature > Capacity for >2 years daily recordings