

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 6000 m depth. 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 6000 m deployments, or aluminum-anodized enamel painted vessel for 1800 m 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 analog connection as well as a digital connection. The primary analog connector is connected to the digital recorder during normal operation to capture the seismometer output, to actuate control lines, or to apply a calibration signal the digital connector is provided for final configuration and sensor verification prior to deploying the OBS overboard.



(Models TC120-OBST1 & TC120-OBSA1 shown)





CompactOBS

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 195 mW 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 Nanometrics' Abalones ocean bottom system and other OBS systems



nanometrics.ca

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

Sensitivity: (Nominal) 750 V-s/m; (Actual) 754.3 V-s/m +0.5%

Accuracy: ±0.5% relative to User Guide specification

Bandwidth: -3 dB points at 120 s and 100 Hz 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: 159 dB @ 1 Hz

AVAILABLE MODELS

TC120-OBST3: 6000 m, Titanium Model with Subconn Connector

TC120-OBST1: 6000 m, Titanium Model TC120-OBSA1: 1800 m, Aluminum Model TC120-OBSM1: Module, 360 degree Model TC120-OBSM2: Module, 105 degree Model

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

0.01

Listening to the Earth

AN nanometrics

Frequency (Hz)

Seismometer self-noise plotted against NLNM (after Peterson, 1993) and MLNM (after McNamara and Buland, 2004)

- · Levels only when needed based on configurable mass position threshold
- **SELF-NOISE GRAPH**

-120

-130

-150

-160

-170

-180

-190

-200 0.001

Acceleration Self-Noise PSD (m^2/s^3)

CONNECTORS/PLUGS

• 16-pin submersible connector male, MCBH16MTI

12-pin female, VSK-12-BCL rubber-molded glass ероху

- 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

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Vacuum/pressure port: 1/4-inch male quick disconnect with shutoff

· Vent for evacuation and servicing

Enclosure: Titanium (6000 m), or enamelled aluminum (1800 m)

- End cap removable for O-ring servicing
- Dual O-ring seals on end cap

Height: 257 mm, not including connectors

TC20

T120

-⇔-NLNM

T360GSN

10

-Trillium Compact OBS 120s

Γ=

 RS-232 compatible serial IP (SLIP) with onboard web server standard HTTP to select sensor operating modes, and to access state-of-health, virtual level bubble, firmware updates and metadata

· Plug-and-Play automated workflow interface

Main (Model TC120-OBST3):

(Titanium)

- Mounted on top of case

Main (Models TC120-OBST1 & TCOBSA1):

rubber-molded glass epoxy

Serial RS-232 port (Rx,Tx, Grd)

Auxiliary control input

PHYSICAL

All connectors on end cap

Diameter: 158 mm

Weight:

• 11.96 kg, 6.66 kg in sea water (titanium)

• 8.19kg, 2.89 kg in sea water (aluminum)

Serial Port:

to select sensor operating modes, and to access state-of-health, virtual level bubble and metadata

POWER

Supply voltage: 9 to 29 VDC isolated Power consumption: 195 mW typical (leveled, aujescent)

Protection: Reverse-voltage and overvoltage protected

- · Self-resetting over-current protection
- Unit can be powered on for descent and ascent

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 Humidity: 0% to 100% (submersible)

DIGITAL COMMAND AND CONTROL INTERFACE

USER INTERFACE

Web browser: Onboard web server, accessed with industry standard web browsers using Serial Line IP (SLIP) HTTP

Plug-and-Play: Nanometrics for communication via Pegasus OBS Digital Recorder

CONFIGURATION AND CONTROL

Unit: Firmware updates

DATA OUTPUTS

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Temperature Internal relative humidity Magnetometer readings

Firmware revision

non-volatile memory

of SoH, includes: time from power on

temperature

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· State-of-health request

· Upload custom information

- 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)

On-request: Seismometer mass position values

Seismometer response (poles, zeroes, sensitivity)

Instrument serial number, subassembly revisions

Seismometer orientation (with respect to vertical)

Case orientation (with respect to vertical)

Download logged state-of-health

seismometer mass positions vessel and seismometer orientations

Capacity for >2 years daily recordings

magnetometer readings

Upload/Download custom information Leveling Log: Every leveling event logged in

· Full before-and-after State of Health logged

State of Health Log: Scheduled interval recordings

Contact a product expert Toll Free: 18557926776

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Erase state-of-health log