

PERFORMANCE DEPENDABILITY AVAILABILITY

 COMPACT
Trillium
ALL-TERRAIN SEISMOMETER

The **Trillium Compact All-terrain Seismometer** is an ultra-low power broadband seismometer specifically developed for deployments where long-term site stability is variable, or where the ability to prepare a sensor footing is limited, such as volcanoes, ice fields, and glaciers.

Incorporating a robust and reliable leveling gimbal that operates over a full 360° range, the Compact All-terrain will auto-level from all orientations ensuring continuous operation even in a constantly changing environment.

The All-terrain seismometer features the performance of the Trillium Compact seismometer, including its exceptional dynamic range and low noise floor.

Benefits

- *The precise, kinematic 360° gimbal auto-levels from any orientation to provide successful deployment and continuous operation on hostile or unstable surface terrain without intervention through site visits*
- *SOH outputs logged in flash memory include case orientation, providing a powerful data set for reviewing deployment history*
- *A robust, stainless steel enclosure ensures the sensor is protected from the most hostile environments*
- *Ultra-low power consumption of 180mw reduces battery costs and minimizes power source requirements at the site*
- *Exceptionally high clip level of 26 mm/s permits on scale recording of larger events closer to the source*
- *Suitable for surface and posthole installations with up to 50 m cable length*



Nanometrics
INC.
SEISMOLOGICAL INSTRUMENTS

Trillium Compact All-terrain Seismometer

TECHNICAL SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

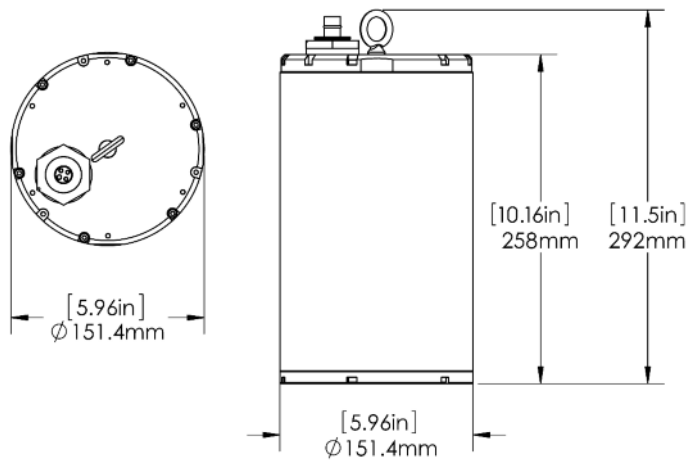
SEISMOMETER	
TECHNOLOGY	
Topology	Symmetric triaxial
Feedback	Force balance with capacitive transducer
Mass Centering	Not required
PERFORMANCE	
Self-noise	Below NLNM 30 s to 15 HZ
Sensitivity	750V·s/m nominal ±0.5% precision
Off-axis Sensitivity	±0.5 %
Bandwidth	-3dB points at 120 s and 100 Hz
Transfer Function	Lower corner poles within ±0.5% of nominal provided High-frequency response within 1dB of nominal No peak in response at high frequency
Clip Level	26 mm/s from 0.1 Hz to 10 Hz
Parasitic Resonances	None below 80 Hz
Operational Tilt Range	±2.5° without re-leveling
DIGITAL COMMAND AND CONTROL INTERFACE	
USER INTERFACE	
Web browser	Onboard web server, using industry standard web browsers
Command line	Basic command line interface
CONFIGURATION AND CONTROL	
Sensor	XYZ/UVW mode Calibration channel selection, enable Short/long period mode
Leveling	Initiate immediate leveling via user interface Automatic leveling mode selection: ➤ (post power-on, three stage periodic) Automatic leveling parameter selection: ➤ (delay and interval times, tilt threshold)
Unit	Firmware updates Self-test State-of-health request Upload custom information
DATA OUTPUTS	
On-request	Seismometer mass position values Temperature 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 Download custom information Internal relative humidity
Leveling Log	Every leveling event logged in flash 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 ➤ internal relative humidity Capacity for >2 years daily recordings

LEVELING AND ORIENTATION	
Technology	Dual degree-of-freedom motorized gimbals Jam-free mechanism Kinematic design preserves full seismometer performance
Range	>±180° relative to upright case
Accuracy	Levels to within ±0.5° of true vertical
Leveling initiation	Some or all of: ➤ configurable delay after power on ➤ configurable periodic ➤ automatic as-required, based on mass positions ➤ on external command Delay intervals configurable from seconds to months
Magnetometer	3-component, mounted on and leveled with seismometer
CONNECTORS	
Single	12-pin female, VSK-12-BCL rubber-molded glass epoxy 40V peak-to-peak differential seismic signal plus ground (3 channels) Serial RS-232 port (Rx, Tx, GND) Calibration voltage input Power input and return

POWER	
Supply voltage	9 to 29VDC 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 during installation and retrieval

ENVIRONMENTAL	
Operating temp.	-20°C to +60°C
Storage temp.	-40°C to +70°C
Shock	100g half sine, 5 ms without damage, 6 axes No seismometer mass lock required prior to deployment and through full experiment cycle

PHYSICAL	
Enclosure	Stainless steel case
Diameter	151.4 mm
Height	258 mm, not including connector
Weight	13.3 kg on land, 9.0 kg in water
Handling	Eye bolt on lid for lifting and strain relief cable



250 Herzberg Road, Kanata, Ontario, Canada K2K 2A1
613-592-6776 Fax: 613-592-5929
www.nanometrics.ca Email: sales_mkt@nanometrics.ca