

TRILLIUM 120

POSTHOLE SEISMOMETER

Ideal for local, regional, and teleseismic studies, the **Trillium 120 Posthole Seismometer** minimizes onsite power system requirements while providing exceptionally low-noise performance. This easy to deploy instrument makes it possible to efficiently reach quiet down-hole installations that can take advantage of the observatory class performance.

Designed for Down-Hole Deployments

The Trillium 120 Posthole's corrosion resistant, stainless steel enclosure features a high-pressure, marine-grade connector making it suitable for a range of uncased buried and posthole installations. The advanced levelling system allows the instrument to self-correct to ensure a successful down-hole deployment at any site.

Exceptional Performance and Reliability

The Trillium 120 Posthole provides a flat response to velocity from 120 seconds to 150 Hz with an exceptionally low self-noise, maximizing the dynamic range over the passband and providing a more reliable data output.

Complete Station Solutions

The Trillium 120 seismometer series is optimized for use with our popular Centaur digital recorder. Pairing the Trillium 120 with a Centaur provides a range of added functionality including quick and easy configuration of the station and digital leveling tools via the intuitive web-based user interface.



Key Features

- Low-power consumption of 230 mW minimizes power system requirements at the site.
- A waterproof, submersible stainless steel enclosure ensures the sensor is protected from harsh environments.
- Automatic leveling can be remotely initiated for corrections of up to $\pm 5^\circ$ or $\pm 10^\circ \pm 1^\circ$ (depending on the model), simplifying down-hole installation
- The axis stack is mechanically leveled to ensure that the vertical axis does not couple horizontal noise.
- Robust design doesn't require a mass lock providing reliable, trouble-free operation
- Also available: Trillium 120 Borehole, Trillium 120 Slim Posthole, and Trillium Horizon for vault or shallow direct bury
- Polar Certified model available for operating temperatures down to -50°C



TECHNICAL SPECIFICATIONS TRILLIUM 120 POSTHOLE

Specifications subject to change without notice

TECHNOLOGY

Topology: Symmetric triaxial

Feedback: Force balance with capacitive transducer

Self-Leveling: Internal automated leveling

Leveling Initiation: Control line or serial port command

Mass Centering: Motorized recentering automatically initiated during leveling sequence

LEVELING & ALIGNMENT

Digital Bubble Level: Graphical bullseye level is available via Centaur digital recorder Web interface

Alignment: N-S line on cover for down-hole sighting

- Keying features for down-hole alignment rod
- N-S marks on base for pier installation

Digital Tiltmeter: Reports case tilt from vertical for easy installation and remote troubleshooting

PERFORMANCE

Self-Noise: See plot below

Sensitivity: (Nominal) 1200 V·s/m;

(Actual) 1202.5 V·s/m $\pm 0.5\%$

Accuracy: $\pm 0.5\%$ relative to User Guide specification

Bandwidth: -3 dB points at 120 s and 150 Hz

Clip Level: 16.6 mm/s up to 10 Hz and 0.12 g above 10 Hz

Dynamic Range: 168 dB @ 1 Hz

Operating Tilt Range: $\pm 5^\circ$ or $\pm 10^\circ \pm 1^\circ$ (model-dependent)

Temperature: $\pm 45^\circ\text{C}$ without recentering

Magnetic Sensitivity: $< 0.03 \text{ (m/s}^2\text{)}/\text{T}$

(model T120-PH3-XC)

INTERFACE

Connector: 20-pin marine

Velocity Output: 40 V peak-to-peak differential

- Selectable XYZ or UVW mode

Mass Position Output: Three independent $\pm 4 \text{ V}$ outputs

Calibration Input: Single voltage input with one active-high control signal for all channels

- Calibration in XYZ or UVW
- Individual channels selectable via web interface

Control Lines: Auto-Level & Mass Center, Calibration Enable, XYZ/UVW mode

Serial Port:

- RS-232 compatible serial IP (SLIP) with onboard HTTP web server to select sensor operating modes, to mass center, and to access state-of-health, virtual level bubble, firmware updates and metadata
- Plug-and-Play automated workflow interface to select sensor operating modes, and to access state-of-health, virtual level bubble and metadata

POWER

Supply Voltage: 9 to 36 V DC isolated input

Power Consumption: 230 mW typical quiescent

Protection:

- Reverse-voltage and over-voltage protected
- Self-resetting over-current protection

PHYSICAL

Case Design: Stainless steel pressure vessel, submersible

Diameter:

- 143 mm ($\pm 5^\circ$ Model)
- 172 mm ($\pm 10^\circ \pm 1^\circ$ Model)

Height: 432 mm not including connector or feet

Weight: 15.5 kg

Handling: Eye bolt on lid for lifting cable

- 1300 lbf (5800 N) rated

ENVIRONMENTAL

Operating Temperature:

-20°C to 60°C (Standard Model)

-50°C to 60°C (Polar Certified Model)

Storage Temperature:

-40°C to +70°C (Standard Model)

-60°C to +70°C (Polar Certified Model)

Depth of Deployment: 500 m for a dry, cased, or partially water-filled hole

Ingress Protection: Seismometer is rated to IP68 and NEMA6P to 300 m for prolonged immersion

Humidity: 0% to 100% (submersible)

Shock: 20 g half sine, 5 ms without damage, 6 axis

- No mass lock required for transport

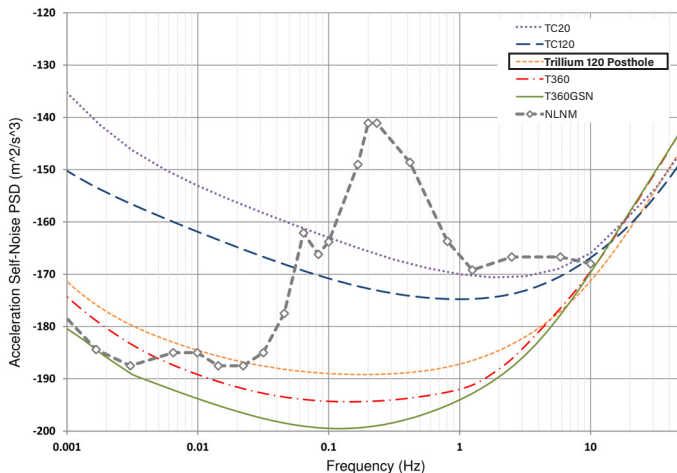
AVAILABLE MODELS

T120-PH3: Standard Model 143 mm

T120-PH3-XC: Polar Certified Model 143 mm

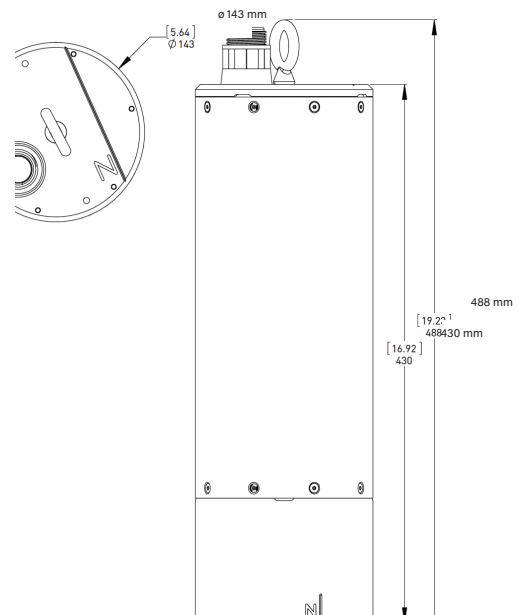
T120-PH4: Standard Model 172 mm

SELF-NOISE GRAPH



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

Buland, 2004)



Note: Figure depicts the T120-PH3 model

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Listening to the Earth

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