

# 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  $-50^\circ\text{C}$



# 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)

**Ingress Protection:** Rated to IP68 and NEMA6P to 300 m for prolonged immersion. A dry hole is recommended for best seismic performance

**Humidity:** 0% to 100% (submersible)

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

- No mass lock required for transport

## AVAILABLE MODELS

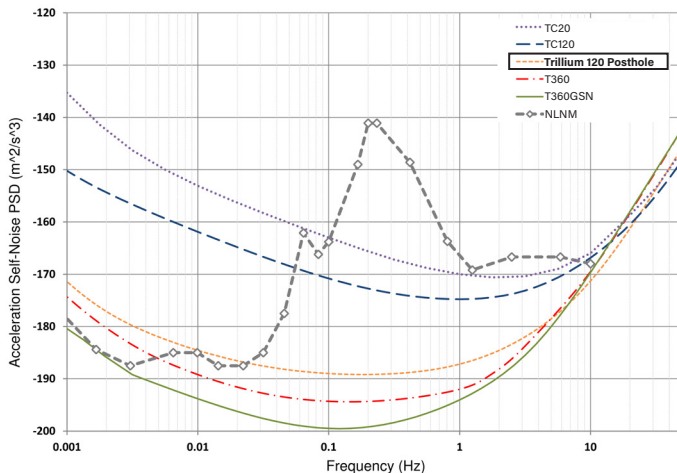
**T120-PH3:** Standard Model 143 mm

**T120-PH3-XC:** Polar Certified Model 143 mm

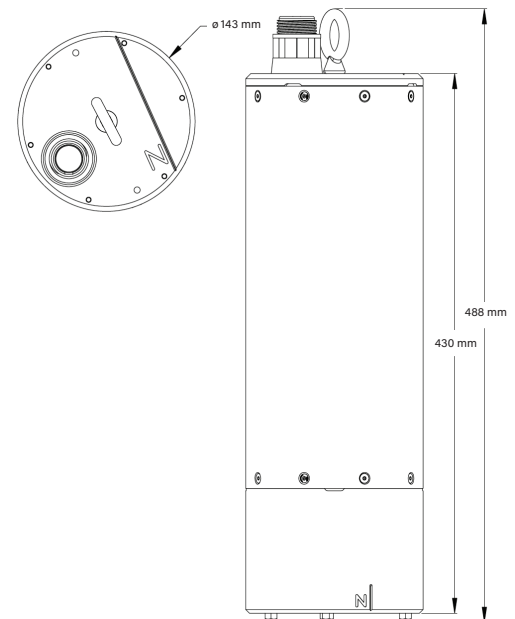
**T120-PH4:** Standard Model 172 mm

**T120-PH4-XC:** Polar Certified 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 TH120-PH3 model

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Listening to the Earth

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