## **BROADBAND SEISMOMETER**

# **Trillium I20P**

The Trillium 120P is an exceptional seismometer having an instrument self noise 4dB above the NLNM at 100 seconds and below the NLNM up to 10 Hz.

This instrument incorporates the same symmetric triaxial design and suspension system as the highly successful Trillium 40. The design employs fewer parts than traditional sensors and offers improved temperature stability. The robustness and reliability of the mechanical suspension is well proven: with over 500 Trillium units operating in the field, there have been no mechanical failures.

The very low self-noise of the Trillium 120P makes it ideal for local, regional and teleseismic studies in both observatory and portable applications. Portable network users will appreciate the low power consumption and reliable operation over a temperature range of ±45°C without re-centering.

The 120P is the smallest of the Trillium seismometers.

INC.



## Trillium I20P Self Noise Performance

wrt Im^2/s^4/Hz)

(dB

PSD

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

Trillium 120P SN 0113

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## The Earthquake Spectrum



Local events	<~10km	Several seconds to 30Hz
Regional	>~10km	30 seconds to 10Hz
Teleseismic	>~3000 km	3600 seconds to 2 seconds

Note: Sensor noise floors and earth noise models have been converted to equivalent peak amplitudes using a full octave bandwidth assuming Gaussian distribution and 95% probability.



## Self Noise Performance Plots

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

#### References

New Low-Noise Model (NLNM) from Peterson (1993) Observation and Modeling of Seismic Background Noise PDF Mode Low-Noise Model (MLNM) from McNamara and Buland (2004) Ambient Noise Levels in the Continental United States

Event Magnitudes from Clinton and Heaton (2002)

Potential Advantages of a Strong Motion Velocity Meter Over a Strong Motion Accelerometer

## Technical Specifications Trillium I20P

Specifications subject to change without notice.

$\Sigma = 1 - 1$	
Iechnology	
Topology	Symmetric triaxial
Feedback	Force balance with capacitive transducer
Mass centering	Operates over full temperature range
	without manual re-centering;
	Manual centering control included
Leveling	Integrated bubble level; Adjustable
	locking leveling feet
Alignment	Vertical scribe marks for N/S; Precision
-	N/S guide in top of cover for straight-
	edge, line or laser level; Precision holes
	for 5/16" alignment rod for E/W
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#### ► Performance

Self noise	See graph
Sensitivity	1201 V·s/m ±0.5%
Bandwidth	3 dB points at 120s and 175 Hz
Transfer function	Lower corner poles within ±0.5% of
	nominal provided; High frequency poles
	and zeros within ±5% of nominal
	provided
Clip level	>I5mm/s up to I.5Hz
Temperature	±45°C without re-centering

### Interface

Connector	19-pin MIL-C-28642, mounted in base
Velocity output	40 V peak-to-peak differential; Selectable
	XYZ or UVW mode
Mass position	Three independent voltage outputs
Calibration input.	Single voltage input with one active high
	control signal per channel; Calibration in
	XYZ or UVW, selectable via control
	lines
Serial port	For retrieval of sensor response infor-
	mation and instrument control

## > Power

Supply voltage	9 to 36 volts DC isolated input	
Power consumption	Power consumption650 mW typical at 15V input	
ProtectionReverse-voltage protection;		
	Auto-resettable over-current protection (no fuse to replace)	

#### > Physical

Diameter	21.0 cm
Height	20.9 cm to 21.8 cm depending on
-	leveling feet extension
Weight	7.2Kg
Handling	Detachable lifting handle included

#### ► Environmental

Operating temp	20°C to +50°C
Humidity	0 to 100%
Shock	20g half sine, 5 ms without damage,
	6 axes; No mass lock required for
	transport
Packaging	Rated to IP68 and NEMA6P for
	outdoor use



250 HERZBERG RD, KANATA, ONTARIO, CANADA K2K 2A1 613-592-6776 FAX 613-592-5929 EMAIL info@nanometrics.ca www.nanometrics.ca