

A high performance seismograph for down-hole installations

# Meridian PH

NEW

## All-in-one Digital Seismometer



### Exceptional Performance

Marrying the sensor to the digitizer, this all-in-one seismograph provides exceptional performance for a variety of downhole installations; direct burial, shallow or deep cased holes. The Meridian PH (M120-PH1) features a digitizer and a Trillium class seismometer mounted on a levelling system inside a stainless steel pressure vessel. Inherent in all Trillium seismometers, the Meridian PH provides low power consumption, remote mass centering, and a robust no-mass lock design.

### Efficient array management – Simplified site visits and logistics

- Reduced “touch time” makes it easier to manage your resources

### Meta data you can trust

- Instrumentation configuration is made easy with an intuitive user interface. Once configured, the Meridian PH builds its own meta data.
- With the digitizer and sensor housed in a single unit, data-less seed volume is internally built and guaranteed to be correct every time.

The ‘Surface Interface Unit’ provides intuitive diagnostic LEDs, which enables quick installations without the need for a smart device.



### Less to forget, less to integrate

- Combining proven technologies in a single package keeps it simple

### Cost Benefits

- Less equipment to maintain
- Installation costs reduced
- Logistics costs lowered

### Operational Benefits

- Higher data quality than vault style installations
- Uniform installation technique
- Less equipment to transport to the field
- Simplified meta data management
- Better performance in urban areas
- Improved security of assets



# Meridian PH

For more detailed specifications, please go to [www.nanometrics.ca](http://www.nanometrics.ca). Specifications subject to change without notice.

## SENSOR: Trillium Posthole Seismometer

See the Trillium Posthole Seismometer specifications for more details.

### TECHNOLOGY

Topology	Symmetric triaxial
Mass centering	Motorized re-centering automatically initiated during levelling sequence
Auto mass centering	Configurable thresholds, intervals, retries
Operational tilt range	Self-levelling: $\pm 5^\circ$

### PERFORMANCE

Bandwidth	-3dB corners at 120 s and 150 Hz
Self-noise	Below the NLNM 100s up to 10 Hz
Sensitivity	1200 V-s/m nominal $\pm 0.5\%$ precision
Clip Level	>15 mm/s up to 1.5 Hz

### DIGITIZER

#### PERFORMANCE

Type	24-bit ADC per channel
Dynamic range	142 dB @ 100 sps, measuring full-scale sine wave amplitude to RMS shorted-input noise
Sample rates	1, 2, 5, 10, 20, 40, 50, 80, 100, 200, 250, 500, 1000, 2000, 5000 sps, plus dual sample rates
Selectable Gain	1x, 2x, 4x, 10x, 20x, 40x

#### CALIBRATION

Signal Source	16-bit DAC with 30 ksp/s output
Attenuator	Selectable 1x, 10x, 100x, 1000x attenuation
Waveforms	Playback standard .wav files (step & sine wave provided) Custom waveforms may be used

#### RECORDING (CONTINUOUS)

Formats	MiniSEED, Nanometrics NP
Internal Media	8 GB flash memory (other capacities available upon request)
Removable Media	SD Card up to 64 GB

#### RECORDING (EVENTS)

Triggers	Bandpassed STA/LTA, Threshold
Captured Data	MiniSEED, ASCII (COSMOS, SMC, generic)

#### DATA RETRIEVAL

File Transfer	Via Ethernet, WiFi or Ethernet-connected DSL, VSAT, cellular, radio
Media Exchange	SD card field-swappable during continuous recording with no loss of data

#### REAL-TIME DATA COMMUNICATIONS

Continuous	Seismic data and State-of-Health data streaming
Formats	SEEDLink (optional), Nanometrics NP (standard)
Events	Triggered event data: email, secure file transfer, other options available

#### TIMING

Timing System	Internal DCXO clock disciplined to GPS (standard) or external PTP timing source (optional)
Timing Accuracy	<100 $\mu$ sec (GPS duty cycled) <5 $\mu$ sec (GPS Always On)
GPS Receiver	Internal 14-channel receiver
GPS Power	Selectable: Always On, or Duty Cycled
PTP (optional)	High precision network timing via Nanometrics PTP Master on same LAN (IEEE 1588-2002)

### COMMUNICATIONS

Web-based UI	Supports standard PC, tablet and mobile platforms
Interfaces	10/100 Base-T Ethernet, WiFi (optional)
IP Addressing	Static, dynamic (DHCP) or link-local IP address
Protocols	UDP/IP unicast/multicast, HTTP data streaming (inbound or outbound)

### POWER, ENVIRONMENTAL, PHYSICAL

#### POWER

Supply voltage	9-36 V DC isolated input
Consumption	1.6 W (1.9 W with Ethernet)
Protection	Lightning surge protected Reverse-voltage and over-voltage protected Self-resetting over-current protection
Battery Manager	User configurable low voltage shutdown and restart thresholds

#### ENVIRONMENTAL

Operating temperature	-40 to +65°C
Storage temperature	-55 to +75°C
Shock	20 g half sine, 5 ms without damage, 6 axes
Pressure	Insensitive to pressure
Weather/water resistance	Rated to IP-68 continuous immersion up to 40 m
Humidity	0 to 100%

#### PHYSICAL

Max. cable length	40 m
Housing	Stainless steel
Weight	17.9 kg (39.5 lb.)
Height	554 mm (21.81 in.), including sensor module, digitizer module, and feet
Diameter	143 mm (5.63 in.)
Removable digitizer	Digitizer can be removed for self-servicing

### SURFACE INTERFACE UNIT (SIU) BREAKOUT BOX

#### EXTERNAL FEATURES

Status LEDs	System status, Link, Time, Media, Sensor
Connectors	Power: 3-pin MIL-Circular Ethernet: Watertight RJ-45 connector GPS antenna: TNC connector with 3.3V supply for active antenna Meridian: 14-pin MIL-Circular

#### INTERNAL FEATURES BEHIND WATERTIGHT DOOR

LED	Media Eject
Media slot	Removable SD card
Buttons	Media Eject, Shutdown

#### PHYSICAL/ENVIRONMENTAL

Housing	Hard anodized aluminum
Weather/water resistance	Rated to IP-67
Dimensions	Length: 187 mm (7.36 in.) Width: 70 mm (2.76 in.) Height: 49 mm (1.93 in.)