



# MERIDIAN PH

## ALL-IN-ONE DIGITAL SEISMOGRAPH

A high performance seismograph for down-hole installations

Marrying the sensor to the digitizer and recorder, this all-in-one seismograph provides exceptional performance for a variety of downhole installations: direct burial, shallow or deepcased holes. The Meridian PH features the latest generation Trillium 120PH class seismometer technology mounted on a leveling 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. The Meridian PH is also available for Polar environments.

### Meta data you can trust

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

### Efficient array management, simplified site visits and logistics

- Reduced "touch time" makes it easier to manage your resources

### Less to forget, less to integrate

- Combining proven technologies in a single package keeps it simple

### Operational Benefits

- Higher data quality than vault style installations
- Auto-levels to true vertical for highest fidelity recording
- Uniform installation technique
- Less equipment to transport
- Simplified meta data management
- Better performance in urban areas
- Improved security of assets

### Cost Benefits

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



The combination of two proven technologies, the Trillium 120 seismometer and 24-bit Centaur digitizer provides ease of deployment with no compromise on quality.



Ask us about our ultra-low temperature options

# TECHNICAL SPECIFICATIONS MERIDIAN PH

Specifications subject to change without notice

## SENSOR: Trillium Compact Seismometer

See the Trillium Compact Seismometer specifications for more details.

### TECHNOLOGY

**Topology:** Symmetric triaxial

**Operational tilt range:**  $\pm 5^\circ$  automated leveling to true vertical

**Mass Centering:** Motorized recentring

automatically initiated during leveling sequence

**Auto mass centering:** Configurable thresholds, intervals, retries

### PERFORMANCE

**Bandwidth:** -3 dB corners at 120 s and 150 Hz

**Self-noise:** Below the NLNM from 100 s to 10 Hz

**Clip Level:**  $>17$  mm/s up to 10 Hz and 0.17 g above 10 Hz

## DIGITAL RECORDER

### DIGITIZER PERFORMANCE & CAPABILITIES

**Type:** 24-bit ADC per channel, simultaneous sampling

**Dynamic range:** 142 dB @ 100 sps

(full-scale peak to RMS shorted-input noise)

**Selectable Gain:** 1, 2, 4, 10, 20, 40

**Sensitivity:** 480, 960, 1920, 4800, 9600, 19200 counts/( $\mu\text{m/s}$ ), 1% accuracy

**Sample rates:** 1, 2, 5, 10, 20, 40, 50, 80, 100, 125, 200, 250, 500, 1000, 2000, 5000 sps

**Dual Sample Rates:** A second sample rate can be selected from the sample rates above

**Decimation Filter:** Selectable linear phase (non-causal) or minimum phase (causal)

**Anti-alias Filters:** -140 dB (linear phase) or -120 dB (minimum phase) at Nyquist frequency, 0 dB at 80% Nyquist

#### Digital Filters:

- User-configurable low-pass and high-pass
- 1st to 5th order, 0.1 mHz to Nyquist
- Different filters may be configured for primary and secondary sample rates

**Orientation Correction:** User configurable onboard 3-D data rotation for correcting azimuth and tilt

### CALIBRATION

**Signal Source:** 16-bit DAC with 30 ksp/s output

**Attenuator:** Selectable 1, 10, 100 attenuation

**Waveforms:** Synthesized sine, PRB signals, Playback user defined calibration files

### RECORDING (CONTINUOUS)

**Formats:** MiniSEED

**Internal Media:** 8 GB flash memory (32 or 64 GB options available)

**Removable Media:** SD Card up to 64 GB

### RECORDING (EVENTS)

**Triggers:** Bandpassed STA/LTA, Threshold

**Captured Data:** MiniSEED, ASCII

### DATA RETRIEVAL

**File Transfer:** Via Ethernet, Ethernet-connected DSL, VSAT, cellular, radio

**Media Exchange:** Weather-sealed data cartridge that is field-swappable during continuous recording with no loss of data

### TIMING - GNSS & PRECISION NETWORK TIMING

**Timing System:** Internal DCXO clock disciplined to selectable timing source

**Timing Source:** Select from GNSS, PTP (Precision Timing Protocol), NTP or free-running

**Timing Server:** Serve PTP or NTP time to other Meridian, Titan SMA/EA or Centaur

**Timing Accuracy:**  $<5$   $\mu\text{sec}$  (GNSS Always On)  $<100$   $\mu\text{sec}$  (GNSS duty cycled, PTP or local NTP)

**GNSS Support:** Internal GNSS receiver

**GNSS Power:** Selectable: Always on, Duty cycled, or off

### DATA STREAMING

**Continuous:** Seismic data and State-of-Health data

**Formats:** SeedLink (optional), Nanometrics NP (standard)

**Events:** Triggered event data: email, secure file transfer, other options available

### COMMUNICATIONS

**Web-based UI:** Supports standard PC, tablet and mobile devices

**Network interface:** 10/100 Base-T Ethernet

**IP Addressing:** Static, dynamic (DHCP) or link-local IP address

**Protocols:** UDP/IP unicast/multicast, HTTP data streaming

## SEISMOGRAPH SPECIFICATIONS

### POWER

**Power Input:** 9-36 VDC isolated input

**Consumption:** 1.5 W (1.8 W with Ethernet) typical

**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:**  $-20^\circ\text{C}$  to  $+60^\circ\text{C}$

(Ultra-low temperature option available, including SIU. Please contact Nanometrics.)

**Storage temperature:**  $-40^\circ\text{C}$  to  $+70^\circ\text{C}$

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

**Pressure:** Insensitive to pressure

**Ingress Protection:** Rated to IP68 to 40 m for continuous immersion

**Humidity:** 0 to 100%

### PHYSICAL

**Max. cable length:** 40 m

**Housing:** Stainless steel

**Weight:** 18.2 kg

**Height:** 600 mm, including connector and feet

**Diameter:** 143 mm

**Removable digitizer:** Digital recorder can be removed for servicing

**Connector:** 16-pin, Subconn Micro series, top mounted

## SURFACE INTERFACE UNIT (SIU)

### FEATURES

**Status LEDs:** Removable media, Archive, Time, Link, Sensor, System

**Connectors:** Power: 3-pin MIL-Circular

- Ethernet: 4-pin MIL-Circular
- Data cartridge: 8-pin MIL-Circular
- GNSS antenna: TNC connector with 3.3 V supply
- for active antenna
- 14-pin MIL-Circular

**Data cartridge:** Field-swappable, weather-sealed data cartridge holding replaceable SD card (41 mm dia. x 67 mm)

**Buttons:** Media Eject, Shutdown

### PHYSICAL/ENVIRONMENTAL

**Housing:** Powder coat aluminum with nickel-plated steel base

**Ingress Protection:** Rated to IP67

**Dimensions:**

- Length: 180 mm
- Width: 83 mm
- Height: 43 mm including connectors

Contact a product expert Toll Free: 1 855 792 6776 | [sales\\_mkt@nanometrics.ca](mailto:sales_mkt@nanometrics.ca)



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250 Herzberg Road, Kanata, Ontario, Canada K2K 2A1 | Tel: +1 613 592 6776