

Meridian Posthole - Release Notes

Firmware Versions	Release Date
4.3.20	2018-09-19
4.3.19	2018-06-29
4.3.18	2018-04-30
3.4.15	2017-03-14
3.3.1	2016-07-25
3.2.8	2016-06-20
1.6.2	2015-12-11
1.5.28	2015-07-14
1.5.22	2015-06-16
1.5.2	2014-12-01

Summary for Version 4.3.20

Firmware version 4.3.20 is a general availability release that introduces improvements and resolves some outstanding issues. This firmware release includes a workaround to address the GPS Week Number Roll Over limitation, a major GPS limitation that causes the week number to go back in time by approximately 20 years every 20 years. Firmware version 4.3.20 also resolves an archiving issue that occurred in earlier firmware versions.

Summary for Version 4.3.19

Firmware version 4.3.19 is a general availability release to support a minor hardware update that is required for newly-manufactured Meridian PH instruments. Otherwise, this firmware version provides the same features and performance capabilities as Firmware version 4.3.18. If your instrument is currently running Firmware version 4.3.18, there is no reason to update to version 4.3.19.

Summary for Version 4.3.18

Firmware version 4.3.18 release offers a broad range of new capabilities and improvements for the Meridian PH such as network timing synchronization, free-run timing, and reduced digitizing latency options. Also included is a new highly versatile sensor orientation correction feature unique to Nanometrics which performs full 3D

real-time data rotation to correct for sensor Azimuth misalignment and sensor tilt. To complement the existing calibration file playback capability, an onboard waveform synthesizer is now included to generate user-configurable sine and PRB (Pseudo Random Binary) calibration waveforms. Both the playback and synthesized signals are now fully adjustable, including user control of gain, duration, lead-in and lead-out silence intervals. Additional improvements and fixes are also included that improve the usability and reliability of the instrument. See details below.

New features and improvements in release 4.3.20 include:

- [Workaround for GPS Week Number Rollover](#)

New features and improvements in release 4.3.18 include:

- [Precision network timing and free-run timing](#)
- [Minimum-Phase \(causal\) anti-aliasing filters](#)
- [Sensor 3D real-time orientation correction using orthogonal data rotation](#)
- [Synthetic Sine and PRB waveform generation for calibration](#)
- [Calibration playback files with adjustable gain, duration, lead-in and lead-out](#)
- [Calibration command API](#)
- [Configuration limits to SeedLink backfill requests](#)
- [Improved Resolution of GPS/GNSS Geo-location](#)
- [Configurable Earth Location](#)
- [DNS server configuration available when using a static IP address](#)
- [Added firewall capability](#)
- [Configurable filename extensions added to archive filenames](#)
- [Earth location included in downloaded instrument response](#)
- [Alerts download-in-progress indicator](#)

Fixes and changes addressed in release 4.3.20 include:

- [Fixed the Web interface to display correct default duration for Calibration Playback files](#)
- [Resolved continuous archiving issue on start up that prevented archiving of channels](#)

Fixes and changes addressed in release 4.3.18 include:

- [Fixed problem with time-based SeedLink data retrievals](#)
- [Sample rate added to Dataless SEED instrument response](#)
- [Fixed issue where the Meridian PH responded improperly to time-based SeedLink data retrieval requests](#)
- [Fixed issue where SeedLink Server cannot backfill requested packets recorded at higher sample rates faster than real-time](#)

- [Mobile-specific UI Removed](#)
- [Fixed issue where data retrieval could not be performed with duration specified](#)

New Features and Improvements released in 4.3.20 firmware

Workaround for GPS Week Number Rollover

The Global Positioning System (GPS) has a design limitation where the timing information from the satellites uses a 10 bit (0-1023) week number that cycles every 20 years. This is called Week Number Roll Over. Firmware version 4.3.20 introduces a workaround for this issue where the Meridian PH compares the week number received from the GPS satellite with a fixed minimum week number and adjusts the received week number if necessary. If the satellite week number is less than 2016 then firmware adds 1024 to the GPS receiver week number permitting operation until week 3040 (2038-04-10) when it will roll back to week 2016 (2018-08-25).

New Features and Improvements released in 4.3.18 firmware

Precision network timing and free-run timing

In addition to GPS/GNSS timing, Precision Time Protocol (PTPv1) and Network Time Protocol (NTP) are added as selectable time references for Nanometrics digital seismometers. You can also set the time manually and let the instrument free-run. It is also possible to synchronize timing by configuring a Meridian PH to act as a PTPv1 or NTP time server for other instruments when its time server reference is NTP, GNSS, or free-running. For example, a Meridian PH could get its timing from its internal GPS/GNSS receiver and simultaneously serve PTPv1 over a local network to another Meridian PH or other Nanometrics instrument.

There are a wide range of use cases and applications for this very flexible timing system. See the user guide for more application examples and details on usage, setup, network configuration, and performance.

Minimum-Phase (causal) anti-aliasing filters

Low-latency minimum-phase (“causal”) anti-aliasing decimation filters are now available as an alternative to linear phase filters. A minimum-phase filter offers a much lower filter latency while trading off some stop-band performance, and is often used where minimizing overall real-time delay through the digitizer is important. The minimum-phase option is available for all sample rates except for 80 Hz and 2000 Hz. See the user guide for details on latency and filter performance.

Sensor 3D real-time orientation correction using orthogonal data rotation

A new feature has been added to firmware version 4.3.18 to perform real-time 3D seismic data rotation to correct sensor orientation for use cases in which the physical orientation of

a Meridian PH is different than what is desired, and where the output X, Y and Z signals do not represent the desired directions of sensitivity (often intended to be East, North and Vertical). Examples of where the sensor orientation correction feature may be used include borehole sensor azimuth correction and sensor tilt correction. Please refer to the *Meridian PH User Guide* for detailed use case information.

Synthetic Sine and PRB waveform generation for calibration

A new synthetic waveform signal generator for calibration introduces the ability to generate on-demand sine wave and PRB signals. This feature allows the user to configure the frequency or pulse-width, duration, amplitude, as well as lead-in and lead-out silence intervals for the selected waveform.

This feature complements the existing waveform file playback feature; it does not replace it. The file playback feature allows you to generate any specific signals you wish to define and upload to the Meridian PH.

Calibration playback files with adjustable gain, duration, lead-in and lead-out

Calibration waveform files uploaded to the Meridian PH can now be played back with adjustable gain, duration, lead-in and lead-out silence. Gain is adjustable from 1.0 to 0.001. File playback can be limited to a specific duration instead of playing back the entire file. Lead-in and/or lead-out silence can be set from 0 to 3600 seconds.

Calibration command API

The new HTTP-based Calibration API provides the ability to create external custom scripts or applications to initiate a calibration for a specified sensor. The Calibration API request allows the user to specify the desired parameters for the required calibration output signal type: file playback or synthesized sine or PRB, voltage waveform, and other waveform parameters.

Configuration limits to SeedLink backfill requests

To ensure that real time streaming resumes quickly, firmware version 4.3.18 introduces a new configuration parameter (Maximum backfill packet) that allows the user to limit the maximum number of 512-byte SeedLink packets that the SeedLink interface will attempt to re-transmit in response to 'DATA' requests. ('TIME' requests will not be limited.)

Improved Resolution of GPS/GNSS Geo-location

Firmware version 4.3.18 improves the resolution of the GPS/GNSS geo-location that is displayed on the Web Interface **Health** page to 6 digits of precision.

Configurable Earth Location

Firmware version 4.3.18 introduces the ability to explicitly configure the earth location for the instrument using latitude, longitude, and elevation to 6 digits of precision. If configured, this location is displayed on the **Health** page and is used instead of the GPS/GNSS derived

geo-location in the instrument's downloaded dataless SEED response files. State-of-health data that is generated by the instrument continues to use the GPS/GNSS derived location. The Web Interface **Health** page now shows both the configured and calculated GNSS earth location.

DNS server configuration available when using a static IP address

Firmware version 4.3.18 introduces the ability to configure up to two DNS server IP addresses when configuring a static IP address configuration on the **Ethernet** page of the Configuration menu. These IP addresses are ignored when a DHCP or Link-Local IP address configuration is specified.

Added firewall capability

Firmware version 4.3.18 introduces the ability to configure a firewall on the instrument using the iptables firewall utility for Linux. Among other capabilities, this utility allows the user to specify sets of IP addresses, IP networks and subnetworks that can communicate with the instrument.

Note that it is possible for users to become locked out of the instrument if the firewall is configured incorrectly. Only users with advanced Linux and networking knowledge should attempt to configure the firewall on Nanometrics instruments.

Configurable filename extensions added to archive filenames

Previously, archive filenames were created with a fixed filename extension (.miniseed or .csv, depending on the archive format). Firmware version 4.3.18 now allows you to configure the filename extension using the filename pattern fields. If the end of the filename pattern contains a dot (.) followed by text, the resulting archive files will use that added text as a filename extension. Conversely, if the end of the filename does not contain a dot (.) followed by text, then the archive files will be created without a filename extension.

Earth location included in downloaded instrument response

In previous firmware releases, download response files did not contain a correct earth location. Firmware version 4.3.18 now includes the geo-location in downloaded dataless SEED files. If the geo-location is manually configured then this value is used; otherwise, if the instrument has a built-in GNSS receiver and is configured to use GNSS as its time source then the actual earth location is used in the downloaded dataless SEED file. Note that the RESP response format does not include any geo-location information. Please consult the user guide for more details.

Alerts download-in-progress indicator

Firmware version 4.3.18 introduces a progress indicator in the Alerts panel on the **Health** page to indicate when alerts are still in the process of being loaded. This is to distinguish it from the condition where there are no alerts.

Fixes and Changes released in 4.3.20 firmware

Fixed the Web interface to display correct default duration for Calibration Playback files

In the **Waveform** tab on Web interface, configuring a Playback type of calibration allows the user to select different sample calibration files from the **Filename** dropdown menu. Each sample calibration file has a default value for Duration that should change when you select a different Filename. For example, "Titan prb 20g 10ms 5min" has a default Duration value of 300 and "Titan sine 2g 30s" has a default Duration value of 30. In previous firmware versions this Duration default value did not refresh when a different Filename was selected. Firmware 4.3.20 fixes this issue.

Resolved continuous archiving issue on start up that prevented archiving of channels

In previous firmware versions, upon start up, some channels would not be included in continuous archiving. This was dependent on the condition of the Store when continuous archiving started and was most likely to occur if a Store had been recreated shortly before continuous archiving started. Firmware 4.3.20 fixes this issue. Channels that may have been missed on start up are now discovered and added to the continuous archive process.

Fixes and Changes released in 4.3.18 firmware

Fixed problem with time-based SeedLink data retrievals

In previous releases, in rare occurrences, time-based SeedLink data retrieval requests returned no data. Firmware version 4.3.18 fixes this issue.

Sample rate added to Dataless SEED instrument response

The currently configured sample rate is now correctly reflected in dataless SEED files generated by the instrument. The sample rate can be found in SEED blockette #52, field #18.

Fixed issue where the Meridian PH responded improperly to time-based SeedLink data retrieval requests

In previous releases, the Meridian PH responded improperly to time-based SeedLink data retrieval requests, resulting in SeedLink clients such as slinktool and slarchive re-requesting the data indefinitely. Firmware version 4.3.18 fixes this issue.

Fixed issue where SeedLink Server cannot backfill requested packets recorded at higher sample rates faster than real-time

In previous releases, the SeedLink Server was slow to backfill requested data and could gradually get further behind, never catching up to real-time. Firmware version 4.3.18 fixes this issue.

Note that the data that was recorded to the instrument internal storage prior to the upgrade is still subject to the slow SeedLink backfill problem. You can optionally choose to recreate the store after upgrading to 4.3.18 to delete all prior data to ensure that the instrument does not attempt to backfill data recorded prior to the upgrade.

Mobile-specific UI Removed

Support for a mobile specific Web Interface for Meridian PH has been removed in favor of the default interface.

Fixed issue where data retrieval could not be performed with duration specified

When attempting to download data from the **Maintenance** page using start time and duration fields to specify the time range, the duration value will no longer be rejected.

Upgrade Considerations and Dependencies

Ensure all default instrument passwords are changed to reduce the risk of unauthorized access

Nanometrics highly recommends that all instrument passwords are changed from the default values to improve network security and reduce the risk of unauthorized access. This includes the root password, calibration password, and admin password. Nanometrics technical note *How to Increase the Security of your Internet-connected Instruments (18109)* provides recommendations on how to ensure your instruments are secure, including how to change these passwords to improve instrument security. This technical note can be obtained through our online knowledge base, or by contacting Nanometrics customer support.

User-uploaded calibration playback files are deleted when upgrading firmware

User-uploaded calibration playback files must be reloaded onto the instrument after a firmware upgrade, as these are deleted as part of the firmware upgrade process.

Firmware upgrade from 3.1.3 or earlier will cause the Linux root password to revert to the factory default password

If upgrading the firmware from version 3.1.3 or earlier to version 3.2.8 or later, the passwords for logging in to the Linux root or the calibration file upload accounts will revert to factory default passwords. The passwords to log on to the Web Interface are preserved.

Workaround: If you have previously changed the Linux passwords, you must use the factory default password to login and manually update them to the desired

passwords. Search for “Calibration Password” in the online help or in the PDF User Guide.

Apollo Server and Apollo Project Version Dependency

If you are using Apollo Server and Apollo Project with the Meridian PH, be sure to use Apollo Server version 2.5.9 or higher and Apollo Project version 2.4.1 or higher. This is to support the default NP streaming format used in Meridian PH firmware version 3.1.x or later. Alternatively, the ‘Libra Compatibility Streaming’ option available in the Configuration menu can allow the Meridian PH to work with older versions of Apollo Server and Apollo Project.

Configurable Archive Filenames

For the Meridian PH, upgrading to firmware version 4.3.18 from a version prior to 4.0 will apply changes to configurable archive filename settings:

- File format extensions will be appended to all existing archive filename patterns. ‘.miniseed’ will be added to seismic data archive filenames, and either ‘.miniseed’ or ‘.csv’ will be added to existing SOH archive filenames, depending on the configured SOH archive format.
- Seismic event archives will be reconfigured to use MiniSEED format, regardless of the current configuration. This format setting will have to be changed after firmware upgrade if another format is desired.
- Support for SOH archive files in NP format was removed in firmware version 1.5.28. If the Meridian PH is initially using an older firmware version and SOH archive files are configured to use NP format, this setting will be reconfigured to use MiniSEED format.

Other Considerations or Limitations

Some pages of alternate languages unavailable in Firefox

Newer versions of Firefox cannot display all of the Web Interface pages for all languages, and navigating to these unavailable pages returns the user to the **Summary** page.

Workaround: This issue is exclusive to newer versions of Firefox. Using an alternate browser (Chrome, Safari) will avoid this issue.

Context menu “paste” does not work properly in configuration menu

When configuring the instrument using the configuration menu in the Web Interface, the use of context menu paste (i.e. right-clicking the item and selecting “paste” from the

subsequent menu) will insert text that visibly looks correct but will not be recognized by the configuration system.

Workaround: Use the keyboard shortcut 'CTRL-V' to paste the configuration instead of using the context menu paste.

HTTP based web service

The Web Interface and the APIs use the HTTP protocol for instrument access. Some browsers may show a security warning when attempting to access the instrument.

Column names for Sensor State of Health in Exported CSV Files are no longer configurable

When defining a custom sensor in the instrument configuration it is possible to specify custom names for each of the Sensor SOH channels. Starting with firmware version 4.3, these custom channel names will appear on the **Sensors** page only, and will no longer be downloaded with the CSV-based state of health files.

Ext4 format no longer supported on external SD media, as of version 3.4

As of firmware version 3.4.x, Meridian PH no longer supports Ext4 formatting for the removable SD card. SD cards for archiving must be formatted as FAT32 SDHC. You can format an SD card when it is installed on the Meridian PH, or use a Windows, Linux or Macintosh PC to format an SD card as FAT32 SDHC. Note that Windows cannot format a 64GB SD card as FAT32 SDHC. SD cards preformatted as FAT32 SDXC will need to be reformatted as FAT32 SDHC on the Meridian PH instrument.

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