Power Xpert Gateway® 900 - Firmware Enhancement History

The following firmware version history applies to Eaton’s current generation firmware for the PXG 900 gateway design.

Version 4.4.0 – April 2018

- Integrated Linux Kernel 4.10.17 and RX-Red/RI8 toolkit
- Added UI settings to enable/disable hidden http and https ports
- Extended password policies (additional settings, minimum length from 4 to 6)
- HTTP is disabled by default
- Fixed edit of DNS Server and Domain Name settings
- Restored Bridged/Private Network2 setting missing in v4.3.2
- Improved Modbus TCP passthrough support with single socket connections
- Added device support of TSM900, IQ130/140
- Added Energy & Demand channels to Top16 list for DP4000

Version 4.3.2 – November 2017

- Added Modbus RTU support for SEL 751A relay.
- Added support for IQ 150S to PXG900.
- InsulGard EDS improvements.
- http://ip/waveforms shows bad links has been fixed.
- PXG900 v4.3.0 PXI cannot retrieve INCOM waveforms from the PXG900 V4.3.0 has been fixed.
- PXR 20/25 EDS improvements, alarm channels and device health support channels added.
- PXG900 W/NRX 1150 MCAM , breaker status not updating has been resolved with MCAM V1.0, MCAM V0.32 is workable.

Version 4.3.0 – February 2017

- SNMP support for Eaton’s Power Device MIB and Power Meter MIB has been added.
- Email notification configuration now allows selection from an expanded list of log files to be attached to each outgoing email. Selections now include: Alarm, Trend, User, Device, Config, Session, Command and Update logs.
- Option Card support for the IQ250/260 meters is now available. Specifically, the Pulse Output/Digital Input Card and the Relay Contacts/Digital Output Card are supported.
- Eaton’s PXR 20/25 Trip Units are now supported devices via native Modbus RTU or MCAM connection.
- Eaton’s EM20M, EM21M, EM22M and EM24M Energy Meters are now supported devices via Modbus RTU.
• Eaton’s PowerXpert® Solar Inverter models are now supported devices (monitoring only) via Modbus TCP on the PXG900’s 2nd Ethernet port.

• Concurrent logins to the PXG through its web UI may now be restricted. This cyber security-related feature allows the administrator to set the maximum concurrent logins to limit on the number of login sessions that can share the same account. The setting applies to all user accounts for the PXG.

• The output status for the Addressable Relay II is now supported. Field use requires that output relay signals be wired back into appropriate inputs, as the AR II does not internally monitor and report its own output status.

• The PXG now reports the correct status for FAN1 Relay, FAN2 Relay, Alarm Relay and Trip Relay associated with the TC50 and TC100.

• Waveform collection functionality is now available for Eaton’s PXM2280 and PXM2290 power quality meters when they are connected to the PXG900 via Modbus RTU. This functionality is not available if they are connected via Modbus TCP on the PXG900’s 2nd Ethernet port.

• Allocation and management of log space associated with saved waveform files has been improved. The PXG now allocates 100MB of internal space for saving waveform files – enough storage for approximately 300 waveform files. Roll-off of older waveform files occurs automatically as the available waveform log space is filled.

Version 4.2.2 – October 2016

• SNMP v3 User based Security Model support has been added to the existing SNMP v1 support, previously released in v4.1.8.

• The PXM1000 is now a supported device via Modbus RTU.

• The PXG now initially displays the Network Tab view instead of the One-Lines view whenever you login. Previously, with one or more devices configured, the PXG would automatically direct you to the One-Lines view.

• Time synchronization support has been updated to allow the entry of NTP pool addresses with the format: 0.us.pool.ntp.org. NTP support was also updated to provide better status updates when no valid time server has been configured. In addition, underlying NTP support was updated to 4.2.8p8, inheriting cybersecurity-related fixes for known vulnerabilities.

• BACnet/IP functionality has been improved to communicate state-texts in EPICS files under conditions where BACnet client software is unable to read the state-text property one array entry at a time. For example, in prior releases, the PXG’s EPICS generator did not capture state-text values for the DT1150’s ‘Cause of Status’ object due to the length of the data exceeding 1476 bytes. In addition, Routed Network Numbers have been added in the generated EPICS files for improved identification.

• For cybersecurity-related reasons, the PXG now requires entering the current password when users initiate a password change for their login account.

• An issue that prevented changing the username associated with a lone admin account in v4.2.0 has been corrected.

• The PXG’s manual waveform capture functionality will no longer timestamp an event associated with any user-initiated captures.

• User Documentation, available directly from the PXG’s web UI or downloadable from Eaton’s website, has been updated with details on the new SNMP v3 support. Clarifying details were also added to other chapters.
• The PXG900 Offline Configuration Tool has been updated. Version 2.4 now supports the ability to delete devices. Other features have been updated for more consistent behavior.

Version 4.2.0 – August 2016

• BACnet/IP functionality was updated to comply with updated BACnet/IP standards regarding how it responds to a Who-Is-Router-to-Network request. The PXG responds locally with the I-Am-Router-to-Network broadcast and I-Am messages are also now sent as Unicast.

• Upgrading gateways to v4.1.8 was found to reset the Modbus TCP Cached Data Server configuration. The existing Modbus TCP ID and Modbus Map configuration was lost following the upgrade. This issue has been corrected.

• An issue preventing communication between PowerNet and the PXG in EMINT mode, following gateway power-up, has been corrected. INCOM/UDP data now correctly re-directs to Port 55150 each time the PXG is powered up.

• This release corrects an issue introduced in v4.1.8 that prevented reliable communication with sub-devices on the PXMP and PXBCM multipoint meters.

Version 4.1.8 – July 2016

• The C445 Overload Relay is now a supported device via Modbus TCP on the PXG900’s 2nd Ethernet port.

• The C445 Overload Relay is now a supported device via Modbus RTU.

• The Eaton AutoVAR 300 PFC Controller is now a supported device via Modbus RTU.

• The DG1 Variable Frequency Drive is now a supported device via Modbus RTU.

• The Schweitzer Engineering Labs (SEL) model 751 feeder relay is now a supported device via Modbus TCP on the PXG900’s 2nd Ethernet port.

• The Utility Relay Company AC-Pro II trip unit is now a supported device via Modbus RTU.

• SNMP v1 support is now available in the PXG, providing access to data via the Eaton OIDs reference MIB, Eaton Alarms+Traps MIB, RFC 4133 Entity MIB and RFC 4268 Entity State MIB.

• The PXG’s Modbus TCP server support now includes an additional Efficient map selection with a 32 bit Maximum data value size. This optimized map broadens BMS client compatibility with a maximum data value size of 32 bits (2 registers). I.e., There are no Doubles defined in this register map.

• As a convenience, the PXG’s Modbus TCP server support now includes easily identifiable map type information in all downloadable Modbus register map files.

• A comprehensive set of password management features are now available to support enhanced security on a per-user basis.

• The PXG now has a previous login notification feature that will warn you about any failed login attempts.

• All remaining reset transfer commands have been added to the ATC-300, as well as the ATC-600/800. The ATC-300 EDS now has a total of 14 manual commands and the ATC-600/800 has a total of 15.

• An older issue preventing the ability to "Reset Transfer Status" on the ATC600/800 has been corrected.
• User Documentation, available directly from the PXG's web UI or downloadable from Eaton’s website, has been updated with details on the new SNMP v1 support, Modbus TCP support, cybersecurity hardening, new password management features, and other updated features.

Version 4.1.6 – April 2016

• An issue introduced in v4.1.4 affecting Modbus TCP communications with the Schweitzer Engineering Labs (SEL) 351S and 351A has been fixed.

• An issue introduced in v4.1.2 affecting the ability to generate BACnet/IP EPICS files for the DT1150 and DG1 has been corrected.

Version 4.1.4 – April 2016

• The Eaton Power Xpert Branch Circuit Monitor (BCM) is now a supported device via Modbus TCP on the PXG900’s 2nd Ethernet port.

• The Eaton ELC IO Module is now a supported device via Modbus TCP on the PXG900’s 2nd Ethernet port.

• The EGR-5000 is now a supported device via Modbus TCP on the PXG900’s 2nd Ethernet port.

• The SPX Higher Performance Drive is now supported via Modbus RTU. Support matches that previously available for the SVX.

• The Addressable Relay II is now a supported device via INCOM.

• Breaker status changes are now reflected graphically on the One-line tab. Dark Gray = Normal, Red = Closed, Green = Open, Yellow = Tripped or Alarmed, Light Gray = Unknown and/or no state information available.

• One-Line graphic support has been improved, allowing selection of available symbol states and colors when adding free symbols from the sidebar. The edit sidebar for free symbols now displays a gallery of the available symbol states and allows the user to select which one to use for display.

• For convenience, a new sidebar has been added to allow users to be able to access certain gateway-related functions, without having to enter Edit Mode on the Network tab.

• Cloning of channel/trend settings from one device to another device of the same model type is now supported. Configurations may also be saved from one gateway and loaded into another, as long as the connected device is the same model.

• A Session Timeout feature has been added to improve gateway security. When enabled, the PXG will log out existing browser sessions after a specified number of minutes of inactivity (1 to 60 minutes).

• The Waveform Available channel is now individually selectable to invoke an email notification.

• Robustness of Modbus TCP pass-through communications to connected devices has been improved after reports of failed firmware flashing of IQ Meters using the Eaton Meter Communications software. While flashing connected device firmware or making configuration changes using external software utilities (e.g., Eaton Meter Communications Software or PowerPort-E) customers are still reminded to Disable a device which temporarily suspends the gateway’s data polling.

• BACnet/IP handling of Multistates has been improved to ensure that devices states (i.e., input states) are correctly ordered.
• The UI performance associated with the Device Details pop-out has been improved. Internal testing found situations where devices with a great number of rapidly changing channels could slow or stall the browser.

• An issue involving the NRX520MI and NRX1150I and maintenance mode alarms being raised unexpectedly has been resolved. Only models supporting ARMS Maintenance Mode Function will raise the maintenance mode alarm when appropriate.

• An issue involving sub-devices from the Power Xpert Multipoint Meter (PXMP) and Veris E30 meters not showing up correctly in the PXG-generated Efficient Modbus TCP map has been resolved. Support for these devices was introduced in v4.1.2.

• An issue preventing web UI channel writes associated with the DIM KYZ has been resolved.

• The PXG now returns a Device Failed to Respond (0x0B) Modbus exception if a connected device has been disabled, or has lost communications.

• The OpenSSL Library used in the gateway was updated to version 1.0.1s. This version contains fixes for recently-reported cybersecurity vulnerabilities.

• Rating plug and frame channels are now available from the Digitrip 1150.

• ATC-800, 600 and 300 support now includes the availability of commands for Start ATS Test, Cancel ATS Test, Go To Emergency and Cancel Go To Emergency. All commands are restricted by user permissions.

• Coinciding with this firmware release, a new version of the PXG900 Offline Configuration Tool is now available. It includes support for new devices added in v4.1.2 and v4.1.4.

Version 4.1.2 – February 2016

• The EMR-5000 is now a supported device via Modbus TCP on the PXG900’s 2nd Ethernet port. Only EMR-5000 firmware versions 2.5 and newer are supported.

• The DG1 Variable Frequency Drive is now a supported device via Modbus TCP on the PXG900’s 2nd Ethernet port.

• The PXM 4000/6000/8000-series meters are now supported devices via Modbus TCP on the PXG900’s 2nd Ethernet port. Channel support is purposely limited for these devices.

• The Assemblies Electronic Monitor II (AEM II) with firmware version 6 or greater is now a supported device via INCOM. For more information, see the new Special Considerations for the AEM II section in the user documentation for v4.1.2.

• With the new AEM II support, the Digitrip T800 is now a supported device via INCOM (1200 baud).

• The Power Xpert Multi-Point Meter (PXMP) is now a supported device via Modbus RTU.

• The Schweitzer Engineering Labs (SEL) model 587 Current Differential Relay is now a supported device via Modbus RTU.

• The Veris E30/E31 Branch Circuit Monitors, in dual and three phase configurations, are now supported devices via Modbus RTU.

• Email notifications related to captured waveform availability now provide a convenient link back to a special webpage where one or more waveforms can be easily downloaded. For security reasons, proper login credentials are required to gain access to the page.

• Drag and drop functionality has been added for free symbols, lines and text from the One Line sidebar. The ability to rotate and remove them, has also been added.
• NTP time synchronization support has been updated to allow correct operation and the display of Stratum updates whenever a hostname is used instead of an IP address.

• An issue introduced in PXG v4.0.4 firmware that caused gateway communication issues with the MP-3000/4000 has been fixed.

• Configured users and their assigned roles are now part of the data included in a configuration backup made from a PXG.

• Supporting gateway hardware replacements in the field, configuration files saved from PXG-E models running the newest generation firmware (v4.1.0 or newer) may be uploaded to a PXG900 that is running v4.1.2 firmware or newer.

• Eaton’s testing found that the BACnet object identifier instances for some objects from various connected devices differed between the previous generation PXG firmware and the new generation firmware tracked here (starting with v3.0.7). The object identifiers were systematically reviewed and harmonized to prevent field issues with legacy building management system integrations.

• The issue reported against PXG v4.1.0 that requires the configured user to also have the Change Settings permission in order to perform a reboot of the gateway, has not been fixed.

• User documentation has been updated to provide a better explanation of how Alarm Levels work for Multi-States in the UI. In addition, an incorrect reference to the BACnet/IP Routed Network Number range has also been corrected.

Version 4.1.0 – January 2016

• The Schweitzer Engineering Labs (SEL) models: 351A¹, 351S¹, 710, 735² and 787 are now supported devices via Modbus TCP on the PXG900’s 2nd Ethernet port. Note 1: The 351A and 351S have user-configurable Modbus register maps. In order to remain compatible with the PXG, the registers used for analog data must be left at their factory defaults. Note 2: The 735 does not provide Voltage, Power and Energy scaling factors via its Modbus data. Therefore, the PXG expects that the meter’s default Voltage, Power and Energy scaling is set to KILO.

• The Schweitzer Engineering Labs (SEL) model 551 Overcurrent/Reclosing Relay is now a supported device via Modbus RTU.

• An issue introduced in v4.0.4 that caused communication failures when more than one NRX520i or NXR520mi are added to a gateway, has been corrected.

• A UI issue introduced in v4.0.4 that caused text labels and related informational text for previously enabled servers (i.e., BACnet/IP and Modbus TCP – Cached Data Server) to be missing on the Access Control page, has been corrected.

• Audit logging support has been enhanced, separating out individual User, Device, Configuration, Session, Command and Update logs. From the gateway’s Choose an Action menu, selecting Audit Logs produces the list of the available log files. Each selection generates an individual .csv file. See the gateway’s User Documentation for more information regarding the content of each new log file. Note: Customers updating their gateway to v4.1.0 will also see a Legacy audit log selection, which provides temporary (this release only) access to the content of the old audit log.

• In v4.0.4, the waveform delete functionality in the web UI did not work, although the UI did indicate success in deleting the selected waveform files. This has been corrected.

• Setting an IP address with leading zeroes in the octets is now prevented during configuration. Doing so in older firmware versions caused network configuration issues and the PXG became unresponsive.
Many responsive improvements were made to the web UI to support non-standard browser resolutions. The Eaton-recommended resolution remains 1280x1024.

Enhancements were made to the web UI to automatically update whenever configuration changes are made by another user.

One-Line enhancements to support zooming, dragging and panning on the canvas were made. In addition, basic Tie Breaker support was also added.

Support has been added to allow customer-selection of whether the Modbus TCP server replies with a 0 or NAN (Not a Number) whenever the connected device response for a channel is actually NAN. This enhancement was made to assist with Foreseer software compatibility.

Gateway-generated Modbus TCP register maps include a new column showing the Function Code(s) necessary to access each listed register.

Secure access using HTTPS from your web browser has been improved by replacing the gateway’s use of the SHA-1 cryptographic hash function with the more secure SHA-256.

User Documentation available directly from the gateway has a revised look and feel, and improved navigation.

Known Issue: In order to perform a gateway reboot through the web UI, a user is only supposed to need the Troubleshoot permission. With v4.1.0, in order to perform a reboot, the user also requires the Change Settings permission as well. This will be corrected in a future release.

Version 4.0.4 – October 2015

Version 4.0.4 also includes the new features and fixes listed under version 4.0.0 below.

A System Inventory feature has been added to the Choose an Action menu for the gateway itself. This feature provides an exportable list of all the devices connected to the gateway, along with information regarding their manufacturer, serial number, firmware version and current communicating status.

Convenient navigational access to Modbus TCP and BACnet/IP device mapping pages is now available from the Choose an Action menu for each device.

The Eaton C440, EDR-3000, ETR-4000, ETR-5000 and PXM2000 are now added to the list of devices supported via Modbus TCP on the PXG900’s 2nd Ethernet port. Third party device support for the Schweitzer Engineering Labs 751A and Ametek Ci20 is also provided.

Functionality added to manage database compaction-related log file sizes that minimize flash memory usage.

Eaton’s end user license agreement is available for review and acceptance via the gateway’s web UI.

THD Channel support has been added for the DigiTrip OPTIM 1050.

Energy values above 99,999,999 will now be properly represented for the Schneider Electric PowerLogic CM4000 and PM8000 Series.

Eaton E-Series Relays support was corrected to change Demand Total channels to System Average. Demand measurements are not provided on these relays.

Version 4.0.0 – September 2015

Note: This release will not be made publically available. It’s use by select customers will be managed by the Product Manager.
• Gateway user authentication is now controlled by selectable roles, each having configurable permissions. This expands well beyond the gateway’s original User and Admin logins, allowing a broader range of customization to support individual needs.

• The PXG900’s 2nd Ethernet port may now be configured to allow the connection of Modbus TCP-speaking devices. This is done by enabling Private Network vs. Bridge mode (the default) for the 2nd Ethernet port. This addition expands the gateway’s flexibility to now monitor Modbus TCP devices, offering functionality similar to what’s historically been provided for INCOM and Modbus RTU devices on their respective ports. Data from connected Modbus-TCP devices is available via the web UI, BACnet/IP and gateway-served Modbus TCP. Support is currently limited to the C441 overload relay and EDR-5000 protective relay.

• The web UI’s Network tab is now responsive to different size layouts to accommodate the displaying of Network 2 devices, if placed in Private Network mode. The user also has the ability to select which ports (and their respective devices) are visible on the Network tab.

• Eaton’s PX-BCM product is now supported by the PXG, including virtual meter naming.

• User documentation provided via the gateway’s web UI is now HTML-based instead of a .pdf file. PDF files will continue to be downloadable from the company’s website.

• The gateway’s Modbus TCP Efficient Register Map for the ION 7500/7600 Series incorrectly showed waveform enable and waveform supported registers. These have been removed.

Version 3.1.2 – August 2015

Note: Due to the importance of the content included in this release, Eaton highly recommends updating PXG 900 model gateways now in operation with a previous version such as 3.0.7, 3.0.8 or 3.1.0.

• The OpenSSL Library used in the gateway was updated to version 1.0.1p which contains a fix for a recent high severity cybersecurity vulnerability.

• A serious database compaction issue was fixed to prevent the gateway from inadvertently running out of trended data storage space.

• Configuration Upload support in the PXG900 now includes support for importing the Digitrip 810 AEMII CV6 models.

• BACnet IP Support - Downloading the EPICS file for the IQ35MA1/MA2 no longer causes the gateway’s BACnet server to crash.

• If you are using the Controls-enabled version of PXG firmware (v3.1.3), when attempting to set a Device Command using a coil or register with a value of 0 (false), the PXG’s Modbus server will now respond with a "0x03 - Illegal Data Value".

Version 3.1.0 – May 2015

• Trend graphs from the gateway’s Trend Viewer feature can now be exported and printed.

• Support was added for designating auto acknowledgement of an active alarm.

• Entity Operating State (Online/Offline) register support from the legacy PXG-E model firmware was added back into the new firmware.

• The Zero Fill feature is now enabled by default in the gateway’s Modbus TCP support.
- Subdevice support has been added to Modbus TCP. The additional registers are available in the Efficient Register Maps.
- Improvements were made to increase response times through during Modbus TCP pass-through activities.
- IQ MES II meter point TOU channels will now be set to trend by default.
- All browsers pointed at a gateway during a firmware update will be automatically refreshed upon completion of the update.
- User Documentation in .pdf format is now accessible directly from the gateway’s Help menu.
- Device Communications Events and Statistics log files (.csv format) are now downloadable from the Network Tab, to aid in diagnosing Modbus RTU and INCOM communication issues.
- The Waveform availability list was reformatted to make the waveform filenames more easily readable.
- Email notification configuration now allows the entry of a username that’s a complete email address.
- A customer-configurable System Use Notification feature has been added.
- BACnet/IP EPICS file export functionality was fixed. Modbus TCP register map export mapping was also improved.
- Fault Reset roles were made consistent between the S811 and M-Max device support.
- OpenSSL support was updated to the latest version 1.0.1M.
- NTP support was updated to 4.2.8p1 and the Time Zone database was updated to version 2015a.

Version 3.0.8 – January 2015

- Direct control features (breaker open/close, etc.) were removed in this release to prevent unintended access to the operations through admin-level login rights. These control features are no longer visible to the admin-level user for the following:

| H-Max, M-Max | FP5000, 6000 |
| IQ-Data Plus II | IQ500 |
| C440, C441 | MP-4000 |
| DigiTrip 520, 810, 910, 1150, 3000, 3200 | MPCV Relay |
| EDR-3000, 5000 | OPTIM 550, 750, 1050 |
| EGR-4000, 5000 | Series NRX520I, 520M |
| EMR-3000, 4000, 5000 | Series NRX1150I, 1150M |
| ETR-4000, 5000 | S611, S811+ |

Note: If control features are required for a specific customer application, Version 3.0.9 is available on request. It contains the same improvements as 3.0.8 listed here.

- Formal support for the Eaton ATC-900 was added.
- NTP support was updated to v4.2.8 to mitigate cybersecurity vulnerabilities previous versions are susceptible to.
- The ability to import saved configuration files from PXG-A and -E model gateways was added. This allows a new gateway to be configured easily based on settings imported from the old gateway it
replaces. The admin-level user will find this feature by accessing the Power Xpert Gateway Network Settings. They will find Configuration File Save/Restore under the Choose an Action pull-down menu.

- Alarm export functionality from the UI’s sidebar menu has been fixed.

Version 3.0.7 – December 2014

- This was the first official release of firmware for the new gateway product.