



Model 42iQ Firmware Upgrade Version 01.06.17.35763

OVERVIEW

This document contains instructions for how to perform a firmware upgrade for the operation firmware (software) for Thermo Scientific iQ Series. This firmware is for the Models 42iQ instruments. It is loaded into the instrument's microSD FLASH memory card at the factory, but it may be necessary to load updated firmware into the instrument as new features become available. This document also contains the release notes for released versions of the instrument firmware.

There are two different ways to perform a firmware update, via an Ethernet connection (with or without a router) using the Thermo Scientific *ePort* software or via a USB FLASH drive. Both methods will be described.

In some cases when updating instrument firmware, the upgrade may contain an additional firmware update for one or more of the DMC modules in the instrument. This is because the main firmware manages the firmware running on these modules. The module firmware update takes place in the background during the instrument boot sequence and is invisible to the user.

Also note that the instrument firmware upgrade process will temporally halt any data collection that is currently taking place on the instrument. The firmware update will retain any of the user-changed instrument settings across the firmware update. So for example, the calibrations and data logging selections and other settings will remain unchanged after the update.

Important: Since any data logged on the instrument at the start of the firmware update will be lost, please offload any data from the instrument before proceeding.

It is recommended that all of these instructions be read BEFORE starting the firmware update process. This is because there is a lot of text that may scroll by on the on the screen quickly and it may not always be clear what is happening. By reading through the instructions first, you will know the important messages to look for, and how to interpret some of the error messages.

If the Ethernet update method is used, the *ePort* application software is required. *ePort* software version 02.00.02 or higher is required. If the *ePort* software version is not at the required version level, check the Thermo Scientific web site at <http://www.thermofisher.com> or Contact Thermo Scientific Technical Service for an

updated version at 1-866-282-0430 (USA) or 1-508-520-0430 (Worldwide) or epm.techsupport@thermofisher.com.

If the *ePort*-based update method is to be used, see the *ePort*-based instrument Firmware Update Instructions section below and see the networking configuration section for details on these topics. In this case, when using Windows 7 or Windows 10, the credentials for the host PC's Administrator account will be needed.

If the USB based upgrade method is to be used, a USB FLASH drive device is required (see note below). See the USB-based instrument firmware update instructions section below for those details.

For configurations where neither a router or USB FLASH drive device is available but Ethernet can be used, upgrades can also be performed using a router-less "direct connect" configuration between a PC or laptop and the instrument, using an Ethernet cable.

Before attempting to upgrade the firmware, it is advisable to check that the instrument is a model supported by this update and that it is currently running an upgradeable version of firmware. This information may be viewed by going to the Settings> Health Check screen and looking at the Firmware Version button. Make sure that this matches one of the following release versions:

42iQ_V1.1.1.27507	42iQ_V1.6.2.32232	42iQ_V1.6.11.33737*
42iQ_V1.1.2.28579	42iQ_V1.6.5.32548	42iQ_V1.6.12.34061
42iQ_V1.1.3.28734	42iQ_V1.6.5.32556	42iQ_V1.6.13.34157
42iQ_V1.1.4.29096	42iQ_V1.6.6.32879	42iQ_V1.6.14.34444
42iQ_V1.1.5.29436	42iQ_V1.6.7.33056	42iQ_V1.6.15.34700
42iQ_V1.4.0.30359	42iQ_V1.6.7.33061	42iQ_V1.6.16.35166
42iQ_V1.5.0.31307	42iQ_V1.6.7.33081	
42iQ_V1.6.0.31471	42iQ_V1.6.8.33393	
42iQ_V1.6.1.32120	42iQ_V1.6.9.33600	
42iQ_V1.6.9.33603	42iQ_V1.6.10.33674	

***NOTE: The USB firmware update will not work on iQ version 1.6.11.33737. To perform an update from 1.6.11.33737, it is required to use ePort 4.0.0 or higher.**

If the instrument is not running a version listed above, it is not field upgradeable using this procedure. Contact our Technical Support for special upgrade instructions or specific information regarding changes to any firmware versions.

The entire firmware update process should take about 15 minutes

Note: It may be convenient to print this file out before continuing with the firmware upgrade.

INSTRUMENT FIRMWARE (ETHERNET-BASED) UPGRADE INSTRUCTIONS

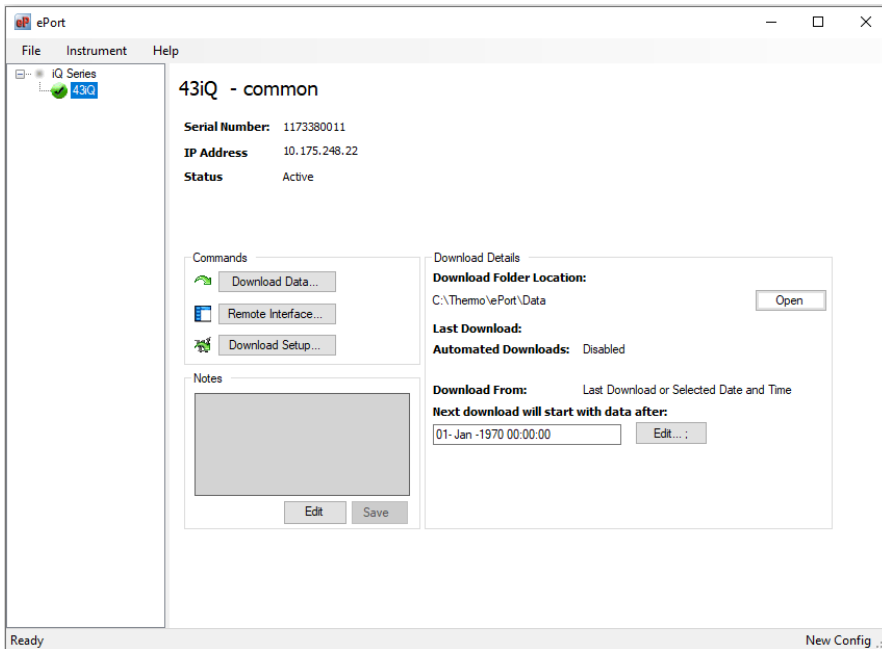
Follow these instructions to update an instrument's firmware using an Ethernet connection and the *ePort* application software. The firmware update process should preserve the instrument user settings across the update, so when the new firmware is running, the settings should be restored.

Important: As a reminder, please offload any required data log files that the instrument is currently holding now before proceeding because all the data will be deleted when the new firmware is installed.

Jump ahead to the Instrument Network Configuration section (towards the end of this document) first if the network is not already setup on the instrument. For additional information, please refer to the iQ Series Communications Manual for details about configuring the TCP/IP interface.

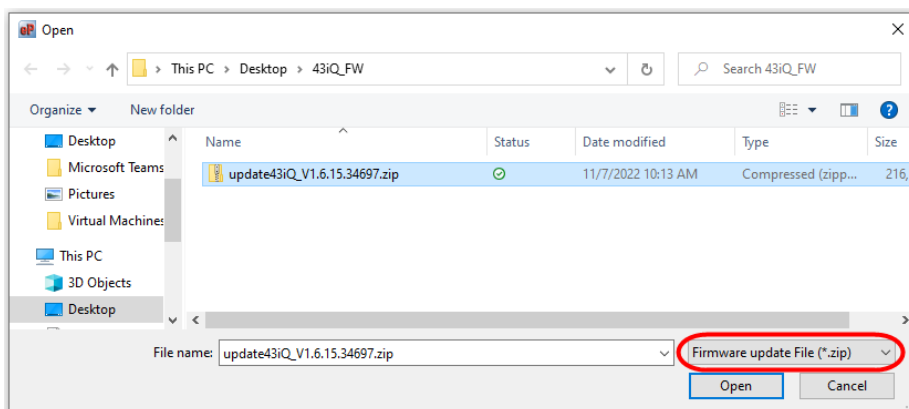
1. The file required for the Ethernet update method is a single zip file containing this document and all of the files required for the update process. The name of this file is update<Model>_V<Version>.zip, for example update42iQ_V1.1.0.27342.zip.
2. Before performing a firmware update, reboot the instrument.
3. a) On the instrument touch screen, navigate to the following screen: **Settings> Communications> Wired TCP/DHCP**. Note the value on the screen display for the **IP Address** setting, this will be used below.

b) On the instrument touch screen, navigate to the following screen: **Settings> Health Check> Status and Alarms> Serial Numbers**. Note the value on the screen display for the **Instrument**, this will also be used below.
4. Open *ePort* and select the appropriate configuration, then click the **OK** button.
5. On the list of recognized instruments on the left side, find the entry that matches the Serial Number noted for the instrument to upgrade, and click it once to select it (it should become high-lighted). As a double-check, see that the IP Address shown matches the one noted in the step above.

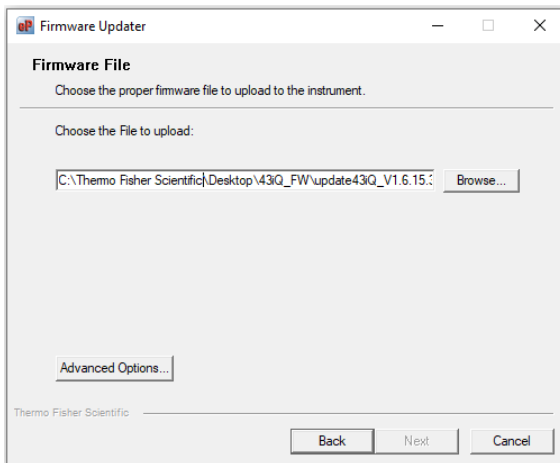


If the instrument doesn't appear in the instrument list, double-check that the cable is connected to the instrument and PC correctly, and check the PC software.

6. With the instrument selected, on ePort, click the menu item **Instrument > Upgrade Instrument Firmware**. The Firmware Updater screen should appear.
7. Click the **Next** button to continue. The Software file selection dialog box should appear.
8. Next to the Choose File to Upload text box, click the **Browse** button.
9. On the bottom right corner select “*.zip” extension in the filter.



10. Navigate to where the firmware file was downloaded and select the **update*.zip** file, then click the **Open** button. The dialog box should appear similar to the image below.



11. Back on the installer dialog box, click the **Next** button to continue and the firmware update should begin.

Important: Once the software update process starts, do not interrupt it.

12. When the Installer screen displays the message “Restarting instrument – This may take a few minutes”, watch the instrument if possible and if it does not automatically reboot after 2 to 5 minutes (the PC screen will also continue to display a **Restarting Instrument** message), manually power cycle the instrument. After the instrument reboots, the **Restarting Instrument** message on ePort should change when detected.
13. The Upload Progress screen should be displayed next as the update process continues and it should take approximately 15 minutes. After it reaches 100%, a **Software Update Completed** message should be displayed. At this completed message box, click the **Finish** button to exit the Firmware Installer.
14. The instrument should reboot automatically and should have the new firmware installed. To check that the firmware was installed, go to the **Settings> Health Check** screen and view the **Firmware Version** button.

INSTRUMENT FIRMWARE (USB-BASED) UPGRADE INSTRUCTIONS

Follow these instructions to update an instrument’s firmware using a USB FLASH drive device (also called a USB memory stick, or just “USB stick” here). An Ethernet connection is not necessary for this procedure.

Important: As a reminder, Please offload any required data log files that the instrument is currently holding now before proceeding because all the data will be deleted when the new firmware is installed.

Requirement: A USB stick formatted using the FAT file system, non-write-protected, with approximately 250MB free is required.

Note 1: While there are many different types of USB devices that could be used for the USB-based firmware update, the recommended device is a standard USB FLASH stick. USB hard drives and other USB devices might work but in some cases the instrument may not be able to supply enough current to power them, or it may not correctly recognize them, so a small standard FLASH drive device is recommended.

Note 2: The USB firmware update will not work on iQ version 1.6.11.33737.
To perform an update from 1.6.11.33737, it is required to use ePort 4.0.0 or higher.

1. Copy the update*.zip file onto the USB FLASH drive using Windows Explorer or another means. The file must be copied into the root directory of the USB stick's file system otherwise it won't be recognized. Also, make sure the USB stick is formatted using the FAT or FAT32 file system.
2. Insert the USB stick into the USB connector on the front or rear of the instrument.
3. The instrument should automatically sense that the USB device has been connected and show a popup window. If a USB password has been set, the user should enter this password. The instrument will show the **Settings> USB Drive** screen automatically. Press the **Firmware Update Via USB Drive** button to start the firmware update process.
4. The on-screen instructions will prompt the user to select the firmware update file and display what it is doing at each step and some steps may take several minutes to complete.

Important: Do not power off the instrument while the firmware update is in progress.

5. The instrument should reboot automatically and should have the new firmware installed. To check that the firmware was installed, go to the **Settings > Health Check** screen and view the **Firmware Version** button.

RELEASE NOTES

Version 01.06.17.35763 changes from version 01.06.16.35166

1. Upgrade compiler for Module firmware.
2. Fix creation/update of ColumnNameMappings table in dichot database so it works when the instrument password is set.
3. Add Description field into ColumnNameMappings table in dichot database.
4. Add "(Deg. C)" text to "Ambient Temp" label on logging screens and files.
5. Allow minus sign from physical keyboard in numeric key screen.
6. Show firmware update errors that occur in the GUI in firmwareUpgrade.log.
7. Fix Digital I/O module uptime calculation.

8. Don't show predictive diagnostics error pop-up when downloading health check files if it is disabled.
9. Fix field firmware upgrade so it doesn't fail and report "Free space unavailable on SD card" if there's no free space on the alternate partition.
10. Fix firmware upgrade when database is corrupted.
11. Restrict access to Firmware upgrade, Change USB password, Reset USB password and Restore functionality in Security View Only Access Mode.
12. Fix Data> View Data Log (User Defined Time) to display the log data within the user defined timestamps.
13. Add reboot pop-up warning for configuration restore.
14. Fix output of PreventiveMaintenanceCSV.csv file so Excel interprets subscript characters properly.
15. Monitor application logs for additional segmentation fault messages and kill applications if hung.
16. Limit size of network-conf-monitor.log included inside the SystemData .zip file inside the Health Check file so it doesn't fill up the microSD partition.
17. Fix error messages in network-conf-monitor.log upon powerup.
18. Remove cron.info messages in messages file included inside the SystemData .zip file inside the Health Check file to eliminate excess FLASH writes and make it easier to review this file.
19. Fix Calibration> Advanced Calibration> Calibration History screen so it shows Cal Result and Cal Target values properly when % units selected (don't show in exponential notation) and show more than 2 digits to the right of the decimal for span coefficient values.
20. Fix gas calibration values in Calibration> Advanced Calibration> Calibration History.
21. Fix Settings> USB Drive> Download Data to USB Drive> Download Calibration History Log so it works properly when instrument password is set.
22. Remove iq-network error messages when DHCP is enabled and the network cable is unplugged in messages file included inside the SystemData .zip file inside the Health Check file to eliminate excess FLASH writes and make it easier to review this file.
23. Fix minimum and maximum concentration limits on "Data entry is out of limits" pop-up messages so they are displayed in the current user-selected units.
24. Fix possible failed upgrade during firmware update.
25. Fix memory allocation error in Gui.
26. Fix possible communication faults with DMC modules when writing to FLASH memory.
27. Fix number of significant digits for concentration readings in the title bar and home screen.
28. Fix Min/Max popups display exponential value when % units are enabled.
29. Adjust lower limit for the time from 01-01-1970 00:00 to 01-01-2001 00:00 UTC to fix possible database error which caused software updates to fail. Show Gui pop-up message in case of real-time-clock battery failure or read failure.

30. Fix Settings> Measurement Settings> Range Settings so the ranges aren't changed on power cycle (this functionality was broken in v1.6.16, check Range Settings after upgrading to this version).
31. Fix evaluation of optional digital inputs so the measurement mode is not changed from NO Only or NOx Only to NO/NOx switching mode when the Digital I/O module is not installed/enabled (this functionality was broken in v1.6.16).
32. Allow instrument to come out of Warmup even if permeation oven isn't up to temperature, as this is not required for proper sample measurement.
33. Highlight PMT Supply Manual Entry cell yellow while calibrating in Settings> Measurement Settings> Advanced Measurement Settings> Reaction Chamber Settings> Continue to PMT Calibration Screen.
34. Limit Target Concentration cell to the current range setting in Settings> Measurement Settings> Advanced Measurement Settings> Reaction Chamber Settings> Continue to PMT Calibration Screen.

Version 01.06.16.35166 changes from version 01.06.15.34700

1. Fix loss of some favorites buttons after firmware upgrade.
2. Improve processor utilization and handling of instrument hang ups.
3. Validate temperature control tuning parameters on power-up to fix an uncommon issue where heater may not turn on.
4. Improve navigation on table screens.
5. Update Data> Advanced Data Setup> Data Logging Setup> Period to allow setting to 0 which will disable user datalogging.
6. Add Select All and Clear All buttons to select/deselect all the variables in Data> Advanced Data Setup> Data Logging Setup> Select Data Logging Variables and Data> Advanced Data Setup> Streaming Data Setup> Select Streaming Variables screens.
7. Order selections in alphabetical order in Data> Advanced Data Setup> Data Logging Setup> Select Data Logging Variables and Data> Advanced Data Setup> Streaming Data Setup> Select Streaming Variables screens and logged data output via USB and streaming data output via Ethernet and serial.
8. Modify output of .csv files to USB to be UTF-8 format and output column headers for GUI, USB, and streaming in Chinese if Chinese language is selected (keep ASCII format for English language).
9. Sort all csv files generated for USB or ePort output with oldest data first (at the top) to most recent data last (at the bottom) to facilitate graphing in Excel.
10. Remove previously logged items from Settings> USB Drive> Download Data To USB Drive outputs if they are not currently selected in Data> Advanced Data Setup> Data Logging Setup> Select Data Logging Variables.
11. Add Settings> USB Drive> Unmount USB Drive button to cleanly unmount any USB memory device.
12. Verify instrument serial number matches files before restoring data in Settings> USB Drive> Restore buttons and add Restore Calibration History Data button.
13. Restrict keyboard input in GUI numeric keypad screen when the number of digits after the decimal reaches the maximum number of digits.

14. Add English text to GUI buttons that need to be pressed to change language from Chinese to English.
15. Enable title and status bar buttons when update firmware is displayed on GUI.
16. Add support for reading/writing the Instrument ID via External Modbus (register address 5683).
17. Modify all table selection screens to update data if changed remotely while on the screen.
18. Increase height of cells in Settings> User Contact Information screen to show all data.
19. Fix Calibration History so it continues to log properly if the datalogging application crashes and respawns.
20. Fix Data> View Data... screens to always show "Retrieving user log data, ..." screen while retrieving logged data from the database.
21. Disable VNC protocol over Ethernet by default and allow user to enable/disable in Settings> Communications> Ethernet Protocol Selection screen. Also remove VNC server from instrument alarm evaluation since it now may be shut off by user. VNC will need to be re-enabled after upgrading to this version or later.
22. Note: VNC only evaluates the first 8 characters of the instrument password, so it is recommended that the instrument be protected by a firewall and not put directly on the Internet if VNC is enabled.
23. Add microSD card active partition utilization in percent to iq_memory.log.
24. Add new software version to firmwareUpgrade.log after upgrade.
25. Fix erroneous "USB is not unlocked" pop-up message when no USB password is set.
26. Fix numeric entry keyboard so it does not lock up on invalid data entry.
27. Fix data logging and streaming variable selection so default items are not re-selected after a firmware upgrade.
28. Improve GUI for file selection when restoring configuration files.
29. Clear TCP/IP DHCP configuration data when switching from DHCP Enabled to DHCP Disabled so it is clear that new DHCP data has not been obtained before pressing the commit button on Settings> Communications> Wired TCP/DHCP menu.
30. Fix possible failed upgrade during firmware update.
31. Use subscript numbers in gas names in GUI.
32. Fix Settings> Instrument Settings> Language menu so it does not look like two languages are selected at the same time.
33. Fix erroneous reporting of general faults bit in service log for NDIR Bench, 43 Bench, Flow/Pressure, NO2 Converter, Oxygen Sensor, Ozonator, Permeation Oven, and PSB modules.
34. Remove "alphaKeypadScreen.show();" messages from guiDataMgr.log.
35. Fix validation of Static Gateway when Commit button is pressed on Settings> Communications> Wired TCP/DHCP screen to properly handle a Static Netmask with numbers other than 255 and 0 in its octets.
36. Add module serial numbers to calibration history.
37. Remove "channel update fail min == max" error message in pcp.log.

38. Update temperature units to be °C in the GUI regardless of language selection and °C for Chinese and Deg. C for all other languages for USB downloads.
39. Remove empty columns from Settings > Health Check > Maintenance > Maintenance History screen.
40. Add Chinese language translations for Preventive Maintenance txt and .csv files in Health Check Report.
41. Do not allow reboot if GUI Security Access is in View Only Mode.
42. Improve automatic PMT calibration so it is more robust and executes faster to get within 1% of specified value or 5x detection limit, whichever is greater.
43. Fix calibration history to include small changes during manual PMT calibration.
44. Switch to NO/NOx automatic switching mode if neither NO-only nor NOx-only digital inputs are asserted, just like the iSeries.
45. Remove Cooler Voltage & Current Alarms.
46. Remove Ozonator Voltage & Current Alarms.
47. Fix evaluation of Frequency Hi Alarm so it is not set during gain transitions.
48. Add Sample Input (Ambient) Pressure to External Modbus addresses 47&48.
49. Update user data log and streaming selection screens so they contain the same items.
50. Improve pressure compensation in 42iQHL.
51. Remove Settings> Health Check> Maintenance> Service Tips> Pump Rebuild Video button from 42iQ Service Tips menu since pump design has changed.

Note: When selecting Data> View Data Log (User Defined Time) the start and end time are not corrected for the user-selected time zone, so the data in the table will be displayed with an offset equivalent to the offset displayed in Settings> Instrument Settings> Clock> Time Zone selection screen. For example, if the time zone is set to Eastern Daylight Savings(UTC-4), the user must put a start time of 6:00 and end time of 7:00 to view data from 10:00 to 11:00. This will be addressed in the next release.

Version 01.06.15.34700 changes from version 01.06.14.34444

Important note while upgrading firmware: Please note that while performing an upgrade from any version lower than 01.06.14.34444 to any version higher than 1.6.15.34700, the GUI screen will stay dark for about 3 minutes. While the screen is dark, the module firmware update is in progress. Do not turn off the instrument during this process. Please wait for the update to be completed.

1. Fix gas mode reporting in Bayern Hessen protocol when warmup mode is disabled and after restart (previously would report 0 which is invalid).
2. Don't allow more than one USB memory device to be connected to the instrument at a time.
3. Fix USB configuration restore so it doesn't include service and calibration log selections and data treatment table which are tied to the software version and not user selectable.
4. Allow TCP/IP Gateway address 0.0.0.0 as valid TCP/IP configuration to handle cases where no communications off the local subnet are allowed.

5. Limit application log file sizes to 10MB so microSD card isn't filled with logs causing instrument failure.
6. Remove "Register Read Error" from being reported in pcp.log when unitless values or concentrations are selected on analog output channels.
7. Initialize STEP/POL firmware versions to 0 in PSB Module firmware to prevent ERROR messages on bootup in pcp.log.
8. Fix software update failure due to USB memory device unmount errors.
9. Fix streaming server so it doesn't change any user parameters when it has errors reading snmp variables.
10. Fix serial server so it doesn't change any user parameters when it has errors reading snmp variables.
11. Return to previously active screen after front-panel GUI crash and respawn.
12. Add iq_memory.log to log application memory utilization in KB once per day. Reload applications if they crash instead of rebooting the whole instrument, reducing downtime by a couple of minutes.
13. Improve speed switching from DHCP to static IP address in Settings> Communications> Wired TCP/DHCP menu screen.
14. Limit the user logging database to 525600 entries (1 year of 1-minute data) in addition to the 1-year limit that already exists based on the timestamp to prevent excessive database memory usage.
15. Initialize pressure measurement values with current value on startup in Flow/Pressure Module so it doesn't take 30 seconds for the pressures to read properly.
16. Fix Settings> USB Drive> Download Data To USB Drive> Restore> Restore Configuration Data so the instrument is automatically rebooted after pressing OK on the message box so the restored settings are loaded.
17. Fix Restore file name displayed in Settings > More > USB Drive > Download Data To USB Drive > Restore > Restore Configuration Data > Select File To Restore.
18. Fix PID temperature control algorithm so it recovers quicker after losing control due to external over/under temperature condition.
19. Increase GUI timeout time during power-up from 120 to 180 seconds to allow sufficient time to load new firmware into all modules.
20. Fix 42iQ range concentration settings not saved after reboot when extended ranges are selected.
21. Widen acceptable frequency limits for input board calibration from 5% to 10% in 42iQ.
22. Fix Settings> Health Check> Status and Alarms> Serial Numbers menu to properly show Perm Oven button in 42iQ.
23. Fix digital input triggered calibrations.

Version 01.06.14.34444 changes from version 01.06.13.34157

1. Update field firmware update process to make sure deleted SNMP registers are not carried over.
2. Create new iq_crash.log to log all application crashes in a single file and include this in the health check report for diagnostic purposes.

3. Add new log file "iq_serialnum.log" to capture instrument serial number updates and include this file in health check report.
4. Reboot instrument if 10 consecutive snmp timeouts occur (indicates server is hung).
5. Fix possible lockout of all register access by reducing/removing locks in Analog and Digital I/O Modules.
6. Skip internal Modbus write to DMC module if errors are found when assembling the packet.
7. Fix STEP/POL board occasional power supply failures.
8. Update wired TCP/DHCP configuration parameters when DHCP lease expires.
9. Fix possible Datalog server application crashes due to snmp errors.
10. Fix to download Column Name Mappings using SQL query.
11. Reboot instrument if X hangs and the front-panel GUI freezes.
12. Improve error handling in boot scripts.
13. Reconfigure MySQL so it won't consume all available instrument RAM.
14. Fix handling of Modbus client disconnect which displayed "Modbus has failed" on front panel.
15. Fix memory leak in streaming protocol server application.
16. Fix memory leak in datalog server application.
17. Add Secondary Static DNS Server button to Settings> Communications> Wired TCP/DHCP menu.
18. Add Commit button to Settings> Communications> Wired TCP/DHCP menu that allows the user to update the network configuration without rebooting the instrument.
19. Add network configuration alarms if the updated network configuration is not valid and network communications are not working properly.
20. Update Modbus addresses to allow the user to view Wired TCP/DHCP static interface configuration Alarms.
21. Implemented pop-up to instruct user to reboot instrument when time zone has changed.
22. Add new "Instrument Serial Number" button under Menu> Settings> Instrument Settings (more) to allow user to update instrument serial number if it gets changed by swapping components.
23. Fix scheduled calibration Zero : Span Ratio execution.
24. Fix possible loss of logged data, calibrations, and time settings if critical applications crash or hang.
25. Improve validation of remote calibration manager external Modbus address 8300 and digital inputs in 42iQ.
26. Reduce the ozone being emitted during boot up.
27. Fix Event text on Calibration> Advanced Calibration> Calibration History screen so "Input Bd Zero Cal", "NO2 Man Low Span", "H2S Bkg Check", and "NOx Man Low Span" are displayed properly and add Chinese translations for all Events.

Version 01.06.13.34157 changes from version 01.06.12.34061

1. Fix Date and Time Modbus registers, 501 and 506, to update correctly.
2. Add status of Warm Up Modbus register 550: Regular operation=0, Warm-up=1.

3. Add processor watchdog which resets the instrument on lockup.
4. Add Gas Mode to Streaming.
5. Add Gas Mode Modbus register 6006: 0=Sample; 1=Zero; 2=Span; 3=Purge; 4=Auto Zero; 5=Auto Span; 6= Auto Purge; 7=EXTSpan; 8=i0 Reference; 9=Warm Up.
6. Add option to trigger oxygen calibration using Modbus register 7614.
7. Validate data logging and streaming data variable selections after a firmware update.

Version 01.06.12.34061 changes from version 01.06.11.33737

NOTE: The USB firmware update will not work on iQ version 1.6.11.33737.

In order to perform an update from 1.6.11.33737, it is required to use ePort 4.0.0 or higher.

1. Fix USB firmware update feature that was broken in v1.6.11.33737
2. Fix Modbus serial communication issues after the instruments reboots and when switching baud rates. Menu> Settings> Communications> Serial RS 232/485.
3. Fix issue while trying to set date and time using Modbus.
4. Add new Modbus register addresses to indicate the status of Schedule Zero, Span, and Ozone levels (only on 49iQ and 146iQ).
5. Add new function to adjust the clock (RTC) drift when time server is disabled. Setting > Instrument Settings > Clock
6. Add fix to hold Analog Out min and max values after a power cycle.

NOTE: After performing an upgrade to this version, all analog output concentration values will need to be re-entered. This only applies if an Analog I/O board is installed.

7. Fix Analog Output Concentration range to scale based on the base units only.
8. Fix the Analog Out Voltage and Current values variation on switching units.
9. Change Analog Out min and max values to display in user selected units.
10. Update decimal precision for the Analog Out min and max values.
11. Add Bypass Pump to Predictive Diagnostic in the 42iQHL. Menu> Settings> Health Check> Predictive Diagnostic.
12. Automatically update serial number storage to facilitate changing components.
13. Cleanup of Predictive Diagnostics text screens.

Version 01.06.11.33737 changes from version 01.06.10.33674

1. Fix erase all data log records so it works properly, and the instrument continues to log after an instrument password has been set.
2. Update max value for analog outputs assigned to concentration when user changes range setting.
3. Fix to show USB firmware update files in GUI for Chinese language.
4. Fix pressure compensation on 42iQ and variants to use the chamber pressure at the time of PMT calibration instead of a pressure compensation table.
5. Fix issue introduced in 42iQTL v01.06.09 (Trace Level model only) where the mode valve wasn't being set properly during the pre-reactor cycle.

Version 01.06.10.33674 changes from version 01.06.09.33603

1. Added Configuration file (zip file) to Health Check download package.

2. In new instruments, default digital inputs to NONE to prevent random/erroneous calibrations ending in failure when nothing is connected to the inputs. For existing instruments users need to set inputs to NONE manually if they see this problem.
3. Change Concentration alarms on the Health and Alarms screen to go active and inactive real-time instead of waiting 60 seconds continuously.
4. Modify service log purge to keep 10080 records instead of 7 calendar days.
5. Fix Zero Valve switching for the Internal Span Mode, when using Perm Oven.

Version 01.06.09.33603 changes from version 01.06.09.33600

1. Fix concentration calculation during auto (NO/NOx) mode for lag volume option.

Version 01.06.09.33600 changes from version 01.06.08.33393

1. Fix issue to allow iQ Series instruments to send email via gmail (to set up gmail, users must allow less secure apps in gmail settings and use SMTP server port 587 in instrument for TLS).
2. Correct problem where the Wired TCP/DHCP Static DNS Server field was not saved across power cycles.
3. Fix the Bayern Hessen Response packet to include ETX in checksum calculation.
4. Fix automatic adjustment of analog output maximum values to match concentration ranges for 42iQ and 450iQ in auto range mode.
5. Fix Calibration screens which displayed incorrect calibration information.
6. Fix condition in Range Setting screen that caused all buttons to be displayed blank red.
7. Remove un-necessary entries from Modbus and Bayern-Hessen server logs.
8. Improve STEP/POL board valve switching.
9. Allow the user to select the meter number manually for all the registers that are selected to be sent over Bayern-Hessen Protocol.
10. Fix Settings> Instrument Settings> Clock > Time edit window to prevent displaying redundant numeric keypad window.
11. Fix Ozonator Power Supply Alarm so it doesn't evaluate ozonator current and add new distinct Ozonator Current Alarm on Settings> Health Check> Status and Alarms screen.

Version 01.06.08.33393 changes from version 01.06.07.33081

1. Add password protection to SNMP, MySQL, and VNC protocol. For all other protocol the users can enable and disable them.
Requires ePort version 04.00.00 or later if password is set. This new version also supports field firmware updates across different subnets.
2. Disable the ability to add buttons on the Settings > Instrument Settings > Clock screen to the Favorites menu since they require also pressing the Commit button.
3. Fix intermittent issue when viewing Data Log from the Data menu where Data Log Error Can't retrieve log data from database message is displayed.
4. Gray out Update Firmware button on Settings> USB Drive> Firmware update Via USB Drive screen if USB memory device doesn't include any update files.
5. Add parameters to Service Log.
6. Fix ozonator power supply alarm so it is not active when user turns off ozonator.

7. Reset Low/High Flow Alarms and Low/High Chamber Pressure Alarms to default and adjust flow and pressure measurements after detecting a change of NO₂ converter type (Molybdenum or Stainless Steel).
8. Fix O₂ sensor 2-point calibration.
9. Fix O₂ sensor running average after calibrations performed.

Version 01.06.07.33081 changes from version 01.06.07.33061

1. Modify 42iQ Bench DMC Module firmware to limit power to the PMT cooler on power-up so overall power consumption doesn't exceed the power supply rating. This restriction is removed after the first 45 minutes of operation once the converter, reaction chamber, and cooler have reached their set points.
2. Fix special conditions in PID control loop so they work properly on cooler.

Version 01.06.07.33061 changes from version 01.06.07.33056

1. Fix issue that causes loss of configuration information on PMT DMC during firmware upgrades.
2. Add procedure to perform calibration in Modbus register table.

Version 01.06.07.33056 changes from version 01.06.06.32879

1. Implement new Service Tips feature on all iQ instruments. Settings>Health Check>Maintenance>Service Tips
2. Restore favorites after a firmware upgrade.
3. Fix Preventive Maintenance alerts to evaluate depending on the selected configuration setup. Setting > Health Check > Maintenance > Preventive Maintenance.
4. Improve warmup time on temperature-controlled assemblies
5. Increase the upper range on the 42iQTL instrument from 200 ppb to 1000 ppb. Settings>Health Check>Status and Alarms>Concentration

Version 01.06.06.32879 changes from version 01.06.05.32556

1. Implement new security features on Ethernet port.
NOTE: ePort version 2.0.2 (or older) is not compatible with the new security features associated with iQ firmware version 01.06.06. You will need to upgrade to ePort Software version 3.0.0 (or greater) to interface with any iQ instrument running iQ firmware version 01.06.06 (or higher). The following functionality is available with ePort 3.0.0; Download Data, Service Diagnostics Data and Download Diagnostics.
WARNING: ePort 3.0.0 does not support "Upgrade Instrument Firmware" functionality at this time. A future release will address this issue. Firmware update capability via USB is unaffected.
2. Add Chinese language support to the GUI.
3. Implement iQ Alert Assistant as a free offering to customers.
4. Eliminate intermittent alarms by waiting until the alarm exists for 60 seconds.
5. Fix graphing in Data> View... to display gaps when the data is discontinuous due to instrument being turned off.

6. Fix pop-up message when empty password is entered in Settings>Health Check>File Sharing>3rd Party Status and Renewal Screen.
7. Restrict the date selection in calendar from Jan 1970 to Dec 2038.
8. Fix Bayern Hessen issue where the ETX and BCC was not getting appended properly in response to the Data Query command. Also, resolve spacing issue after the command header.
9. Add "Busy" pop-up message when the user is trying to send health check report or test email.
10. Return to Home screen when clicking on the button "Cancel and Return to the Home Screen" in Settings>Health Check>Status and Alarms > 3rd Party screen.
11. The button "status and renewal request" on what screen is grayed out until enabled.
12. Add Warm up Enable/Disable option in Settings>Configuration screen for 42iQ, 43iQ, 48iQ, 49iQ, 450iQ instrument variants.
13. Shut down the Reaction Chamber heater when the thermistor is opened or shorted and turn back on when reading properly.
14. Shut down the converter heater when a short in thermocouple is detected.
15. Fix clipping of text on Settings>Measurement settings>Average Measurement Settings>Compensation>O2 correction screen.
16. Fix range settings in Settings>Measurement Settings> Range Settings to retain non-default setting changes across power cycles.
17. Fix 42iQ-LS to retain non-default setting changes for the NO, NO2, and NOx concentration hi alarm across power cycles.

Version 01.06.05.32556 changes from version 01.06.05.32548

1. Restart X and VNC server if they crash instead of rebooting the whole instrument.

Version 01.06.05.32548 changes from version 01.06.02.32232

1. Fix the analog voltage and current output false alarm for rapid changing measurement.
2. Fix "Hours" button on Date and Time screen. Hours value is now editable.
3. Time and Date may now be set via Modbus, using registers 5208 and 5236.
4. Add new date calendar and time entry screen.
5. Fix Display Power Save functionality when connected to ePort.
6. Fix messages for Settings> Health Check> Predictive Diagnostics items.
7. Fixed Modbus descriptions in Maintenance History and Digital I/O
8. Add Auto Range for Analog Outputs.
9. Enable filtering of nuisance alarms.
10. Add password protection for 3rd Party Service menu.
11. Add background and span calibration via Modbus commands.
12. Change Oxygen Sensor Concentration Min Alarm default from 3 to -0.5.
13. Change O2 span target and Adjust O2 span values from volatile to non-volatile.

Version 01.06.02.32232 changes from version 01.06.01.32120

1. Add new Settings> Configuration screen for 42iQ with stainless converter.
2. Add Ammonia Scrubber enable/disable option to Service Log.

3. Add the Ammonia Scrubber as an option on configuration screen in LS variant.
4. Add default ranges for flow and pressure on 42iQ with a stainless converter; sub type 6.
5. For the HL variant only, rename Pump to Bypass Pump on Peripheral Support and Valve and Pump Resets screens.
6. Add external modbus register for Valve Control, NO2 Converter, Oxygen Sensor modules' enable registers. Change Schedule module's external modbus register from Read/Write to Read Only.
7. Change digital relay out channel 1 register from NDIR to PMT42CalcSW.
8. Fix 42iQ Ozonator DMC module so that the ozonator is not turned on during power-up and possibly cause the loss of the module's serial number.

Version 01.06.01.32120 changes from version 01.06.00.31471

1. Add fields in the Service Log for the range settings for all iQ's. Multiple fields added for when the instrument is setup for dual range. Value in base units.
2. Add fields in the Service Log for Analog I/O and Digital I/O. 0 = not enabled in configuration menu, 1 = enabled in configuration menu.
3. Detect change in digital output assignments and reset the old one when None is selected.
4. Fixed intermittent alarm on I/O channels while calibrating SPAN on all iQ instruments.
5. HL variant bypass pump state now tracks the bypass flow option, clear bypass pump alarms when bypass option turned off.
6. Concentration is displayed correctly at startup plus implement the warmup state operation on all 42iQ variants.
7. Change font size of data on homescreen from size = 34 to size = 32.
8. Fix range limits to convert correctly.
9. Fixed NO, NO2 and NOx Range Setting buttons to now display ppb units when in Single mode.
10. Datalog Tables are blank for past data points that were not enabled to log.

Version 01.06.00.31471 changes from version 01.05.00.31307

1. Improve the pressure compensation for the 42 variants. Normalize the pressure compensation based on the pressure at PMT voltage calibration.
2. Allow user to set negative min alarm concentrations.
3. Add support for 42iQHL and 42iQTL.
4. Enhance predictive diagnostic and preventive maintenance support.
5. Fix Comm Alarm doesn't assert for missing Oxygen Sensor module not installed.
6. Detect change in digital output assignments and reset the old one when None is selected.

Version 01.05.00.31307 changes from version 01.04.00.30359

1. Update help screens for some of the screens in the Settings> Communications screen and the Settings> User Contact screen.
2. Fix description of the logged item clipped in Log Screen

3. Fix Modbus server handling of register addresses greater than or equal to 4999, the register value shall be editable through the protocol.
4. Add a flag in the service log to indicate the instrument warm-up in progress.
5. Add/Remove parameters in the service log to insure that the service log holds all important information.
6. Fix table row background color not alternating on Settings > Health Check > Maintenance > Preventive Maintenance Screen
7. Fix Open/Closed display in Active State column of Digital Output Relay screen.
8. Remove unused and disabled Reset to User Defaults button.
9. Remove references to the undefined registers in the Screens.
10. Remove unnecessary registers and screens.
11. Add missing sheet for Preventative Maintenance.
12. Provide 3 different up and down step sizes for calibrating the Analog output Current and Voltage.
13. Fix condition in digital inputs where using more than one input at a time will give inconsistent results.
14. Add Power Fail digital output.
15. Show the gears icon on the status bar when a maintenance item reaches 2 months left and turn the corresponding table row in Settings > Health Check > Maintenance > Preventive Maintenance to red when item reaches 1 month left.
16. Add "Reboot Instrument" button to all applications, in the Settings>Instrument Settings or Settings>Instrument Settings> More screens.
17. Fix bootup sequence to check for DMC application running before reading module information block.
18. Fix Service Log timing so that it logs every minute instead of synchronized to the user log time.
19. Restart applications automatically if they stop regardless of the error code.
20. Fix display of concentration values when units are percent.
21. Update Settings > Health Check > Maintenance > Preventive Maintenance screen.
22. Change to the O2 Concentration low limit from 0 to -5%.
23. Add Bayern Hessen Protocol Support.
24. Disable dynamic filtering during Auto PMT calibration and restore to original state after complete Auto PMT calibration.
25. Auto range level indicator output assigned to modbus address 31 added to Analog Output selections.
26. Add Modbus register 2025 to "Flow and Pressure" (pressure/flow/ambient temperature) module alarm count.
27. Modify the 42iQ HL pressure compensation table.
28. Stop evaluation of NO concentration alarm when NO is not being measured and NOx concentration alarm when NOx is not being measured.
29. Fix PMT voltage calibration so it doesn't attempt to set averaging time to 0.
30. Fix Bypass Flow alarm on 42iQ-HL when Bypass Flow option is enabled.
31. Add Modbus register 2024 overall AlarmCount register.

Version 01.04.00.30359 changes from version 01.01.05.29436

1. Remove "User Defined" units from any keypads where the user enters a gas concentration, it is expected that the user enter the concentration in the user-selected gas units.
2. Modify Data> View Data Log table screens to not show items which are not currently selected (also for data files exported to USB or ePort).
3. Add screen names in upper right corner of each screen under title bar.
4. Resize the table on the Calibration> Advanced Calibration> Calibration History so it all fits on the screen.
5. Modify Data> View Data Log table screens to not show numbers in headers for empty columns.
6. Implement analog output calibration in Settings> Communications> Analog I/O> Analog Out Calibration.
7. Fix table screens to correctly show alternating dark/light blue rows when rows are hidden in table.
8. Digital Input and Output Solenoid and Relay numbers now match the silkscreen on the rear panel.
9. Fix ePort firmware upgrade issue. Upgrading from 42iQ v1.1.5.29436, 43iQ v1.1.5.29436, 48iQ v1.1.4.29436, 49iQ v1.1.4.29436, or 146iQ v1.1.4.29436 over ePort will not work, users must upgrade over USB from these versions.
10. Move Standard Temperature setting button from Settings> Measurement Settings> Gas Units screen to Settings> Measurement Settings> Advanced Measurement Settings> Compensation screen.
11. Implement iQ360 service.
12. Only show installed options in Analog and Digital I/O lists in Settings> Communications> Analog I/O and Digital I/O variable selection table screens.
13. Remove units on Gas Units button in Settings> Measurement Settings because it's displayed on the title bar.
14. Inverted active state for relays 1-10 in Settings> Communications> Digital I/O> Digital Out (Relays) table screen.
15. Fixed empty service log download on USB download and health check report email.
16. Fix O2 Sensor 2-Point Calibration so values are updated properly in all scenarios.
17. Add external Modbus registers to support mobile app.
18. Fix oxygen sensor pressure compensation.
19. Fix spurious "Frequency too High" Alarms when the concentration changes considerably.
20. Fix Flow low and high alarm evaluation.

Version 01.01.05.29436 changes from version 01.01.04.29096

1. Add calibration for Analog I/O Module
2. Fix Oxygen Sensor concentration readings and factory calibrations
3. Fix display of alternating light/dark blue rows on Gui table screens when rows are hidden
4. Remove items for disabled options in Data> Advanced Data Setup> Data Logging Setup> Select Data Logging Variables and Data> Advanced Data Setup> Streaming Data Setup> Select Streaming Variables screens

5. Add Sample valve to predictive diagnostics, and evaluate the proper channels on the STEP modules for Sample/Zero/Span valves
6. Don't show Settings> Health Check> Status and Alarms> Serial Numbers> Permeation Oven button if permeation oven not enabled
7. Add Lag Volume and Permeation Oven valves to Settings> Health Check> Status and Alarms> Peripheral Support screen when options are enabled
8. Update Settings> Instrument Settings> Alarm Setpoints screen to not show O2 or permeation oven if not enabled and add permeation gas temperature to screen
9. Add support for Model 42iQD (NOx only)
10. Use user-selected date format in predictive diagnostic and calibration history files
11. Update error log reporting for Analog I/O module
12. Fix spelling error of supply to supply in Settings> Health Check> Status and Alarms> Flow and Pressure screen
13. Add external Modbus addresses for gas concentration units string
14. Fix bugs in Settings> Health Check> Status and Alarms> Peripherals Support screen when multiple STEP boards are installed
15. Re-format the new partition on microSD card if the mount fails during a field firmware update

Version 01.01.04.29096 changes from version 01.01.03.28734

1. Modify Modbus protocol server to match iSeries word order and starting address. IMPORTANT: This requires the December 2017 release of the Thermo Scientific "iQ Monitoring" App and will not work with earlier versions of this app due to these changes. If using the mobile app, DO NOT upgrade to this version of software without also updating the mobile app to this release.
2. Add support for permeation span source and external span
3. Make scheduled calibration check alarm survive a power cycle
4. Maintain selected logging and streaming variables across firmware update
5. Fix handling of multiple USB memory devices connected to the instrument
6. Fix handling of hidden buttons in Gui
7. Reboot if X server shuts down
8. Fix view of logged data for user-specified range, show up to 10000 data points
9. Make Bench and NO2 Converter sub-types non-volatile to support hardware simulators
10. Fixes for field firmware updates
11. Change max string length on button to 19 characters before showing "..."
12. Add user-specified standard temperature for ug/m3, mg/m3 and g/m3 units (standard pressure is always 760 mmHg)
13. Fix NO2 Converter temperature setpoint to survive power cycle
14. Remove unnecessary non-volatile SNMP register writes which were slowing down processing
15. Fix default preventive maintenance intervals for ozone permeation dryer and O2 sensor and properly show ozone and sample permeation dryers on screen
16. Add external Modbus registers for PMT42HW, Ozonator and NO2 Converter module alarms and units string
17. Fix ranges when changing gas units

18. Fix status alarms when multiple PSB STEP boards are enabled

Version 01.01.03.28734 changes from version 01.01.02.28579

1. Improve Dynamic Filtering.
2. Update concentration alarm limits for extended ranges.
3. Round off concentration alarm values when changing units.
4. Fix range concentration when units or range mode changed.
5. Update default Preventive Maintenance durations for System Components.
6. Show current settings on buttons in Settings> Communications> Serial RS-232/485 screen.
7. Show current setting on DHCP button in Settings> Communications> Wired TCP/DHCP screen.
8. Show current settings on Datalogging treatment, Streaming Labels and Timestamp and Power Save buttons.
9. Fix possible Gui crash when viewing logged data if only 1 or 2 items logged.
10. Fix possible Gui crash when selecting firmware update file.
11. Show firmware update files from last USB memory device connected to instrument.
12. Fix Gui attempting to re-mount USB memory devices that have already been mounted on respawn.
13. During firmware update, format new partition instead of erasing files and use UTC in partition timestamp.
14. Update hex display on SCB during startup after testing front-panel LEDs (02), rotating logs (15), bringing up localhost network (18), bringing up X11VNC (86), running partition check (87), and starting system alarm (88).
15. Keep PSB serial number after DMC firmware update.

Version 01.01.02.28579 changes from version 01.01.01.27507

1. Add Alarms
2. Add Calibration History
3. Add Scheduled Calibrations
4. Add Dynamic Filtering
5. Add front-panel security access password protection
6. Change manual calibration so it doesn't update the span concentration
7. Clamp analog output overrange to +/- 5%
8. Fix Digital I/O DMC Module so the serial number is not reset to default on power-up
9. Update dual range to work like auto range on homescreen and title bar (only show active range instead of both ranges)
10. Changed a few predictive diagnostics registers from non-volatile to volatile so they aren't written to FLASH all of the time
11. Improved logged data treatment initialization error handling
12. Limit service log to 1 week of data to speed up Health Check reporting
13. Show multiple lines of text in logged data view column headers
14. Add support for field firmware updates over Ethernet
15. Improve support for field firmware updates over USB
16. Update homescreen font size so everything fits on screen
17. Improve detection of button holds for assigning favorite buttons

18. Increase maximum number of SNMP registers to 5000 and speed up register access in common platform framework
19. Add support for manual entry of DNS when DHCP selected
20. Add support for email servers that require TLS encryption
21. Remove defaults for Analog Current Outputs since they show fault if current loop not connected
22. Decrease time black screen is present during power-up
23. Restart instrument if register agent shuts down
24. Many Gui enhancements
25. Add O2 Sensor support in 42iQLS
26. Extend user span concentration limits to support up to 100% in ug/m3 units
27. Extend NO2 Converter setpoint limits to 0 – 1000 Degrees C
28. Properly display NO2 converter in Configuration screen
29. Modify the PMT cooler current min alarm from -15% to -40%
30. Fix Ozonator output level selection for 42iQ vs. 42iQLS
31. Add Units conversion
32. Update pressure compensation
33. Reset averaging time back to original setting after automatic PMT calibration
34. Re-ordered tables for selecting items to log and stream
35. Fix concentration analog output when auto range mode selected
36. Update defaults for Analog and Digital I/O

Version 01.01.01.27507

1. Initial Release.