PROFIRE
PF3100 Software Release Notes

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Purpose of Document

This document is meant to provide customers with a list of changes for each firmware release. The notes are categorized by their firmware release version (e.g. XX-YY.Z). Where:

- XX: Region Code (e.g. NA for North America)
- YY: Major Software Release (typically with new features)
- Z: Minor Software Release (typically with fixes / changes)

Modification to software is generally split up into three main categories:

- FIXES: software modifications which correct identified issues (e.g. bugs)
- CHANGES: software modifications which modify existing behavior
- NEW: software modifications that add additional functionality (e.g. features)

Known Safety Issues

Description	Work Around	Affected Version(s)	Fixed Version
Failure of electrical component on Ion Pilot may result in permanent detection of flame.	Firmware Update has diagnostic to detect electrical component failure.	NA-37.3 and Older	NA-38 or newer
In multiple I/O Expansion installations, parallel connection of either PWR OUT or SIG IN terminals may result in unsafe operation. Failure Mode: if power is lost to one I/O Expansion module, the other I/O Expansion module's digital contacts will be forced to the energized state.	DO NOT parallel connect PWR OUT or SIG IN terminals of multiple I/O Expansions	All	None
With **FARC enabled**, purge position is NOT checked after it is initially proven. This could lead to excess gas in the chamber prior to ignition if the damper breaks after the purge position is proven but before the purge cycle completes.	None.	NA-36 to NA-40.1	NA-41

Description	Work Around	Affected Version(s)	Fixed Version
With **FARC enabled**, the system would interpolate the FARC table outside of the commissioned points. This could possibly allow the system to operate with Fuel / Air table values that are unintended. For example, if the minimum firing rate is lowered after commissioning is done, then the FARC table could be using values that were never verified.	Ensure that the FARC table is valid over the entire operating range after any FARC related settings are changed.	NA-36 to NA-40.1	NA-41
With **FARC enabled**, the system has the potential to run with excess fuel during firing rate transitions due to the absence of cross-limiting. Cross limiting uses positioning feedback to ensure the fuel/air mixture is always safe.	This can be mitigated by detuning the burner so that it always runs with excess air.	NA-36 to NA-40.1	NA-41
It is theoretically possible for poor ethernet link quality (excessive length, damaged cables) to cause a delay in alarm response times of up to 2.5s.	None	NA-36 to NA-41	NA-42
Removing any IO Expansion input after configuring a dry contact output in Input Setpoint Trip mode could result in the dry contact output referencing an incorrect IO expansion input.	Reconfigure any dry contacts configured in Input Setpoint Trip mode after removing any of the IO expansion inputs.	NA-36 to NA-41	NA-42
Removing any temperature input after configuring a dry contact output in Temp Setpoint Trip mode could result in the dry contact output referencing an incorrect temperature input.	Reconfigure any dry contacts configured in Temp Setpoint Trip mode after removing any of the temperature inputs.	NA-36 to NA-41	NA-42

List of Software Releases

NA-42

NA-42 was initially released on March 12, 2021. This is a major release that includes new features, updates to existing features and many bug fixes.

NA-42

Released March 12, 2021.

NEW:

- Added VFD support for FARC systems. Users can now configure the new *Airflow Control Type* setting to switch between damper and VFD operation.
- Added a *Secondary PID Input* mode. This allows an I/O expansion module input to be used as the Secondary PID input. This input can be configured as a pressure, level, flow or a custom input. If cascaded PID is enabled, this input can be used to control the outer PID loop.
- Low fuel pressure can now be configured as a main permissive (in addition to an Alarm and a Wait). To enable as a main permissive, Enable the Low Fuel Pressure Restart option and set the new *Restart Mode* setting to *Main Permissive*. Main permissive events are also captured in the event log.

CHANGES:

- Added a *No Auxiliary Temperature* alarm info dialog. This dialog details the reason for the alarm (Contact open, contact grounded, comm loss, ambient temp fault, high/low voltage on the temp card).
- Added an *Ion Aux Input Tripped* alarm info dialog. This dialog contains the alert description, mac address of the failing module, and the value being read by the input (if configured as 4-20), or the state of the digital contact (if configured as digital).
- Added the BMS MAC address to the controller status screen (located at the top of the screen).
- Added the Ion Aux Inputs to the Controller Status Screen (under diagnostics). The user can now see the live input reading of each Ion Aux Input in the controller. Note that this works when the Ion Aux Input is configured as a high trip alarm or for thermocouple flame detection.
- The *Ion Aux In Type* setting has been removed from the Pilot Configuration Dialog (Ignition Wizard) for UV pilot modules. Note that UV pilot modules do not have a configurable aux input.
- Updated UI state text to display “PID Control” when the PID is enabled (previously it showed “High/Low Fire”).

- The event log was updated with the following changes:
  - FW bundle version added to the top of each event log export.
  - FW update event added (log the version of FW the system was updated to).
  - UI swap event added (logs the mac address of the new UI).
  - Settings restore event added (logs the name of the json files used for the update).
  - Swap events added for all modules (BMS, Ignition, Temperature, I/O Expansion). Log shows old and new mac addresses for swapped modules.
  - +/- keys now scroll the event log one page at a time.
- Controller status screen has been revamped to include controller diagnostics data. This data was previously only accessible via the System Diagnostics screen which was inconvenient.
- I/O expansion inputs can now be configured as *Display Only*.
- Voltage alerts have been updated to include the mac address of the offending device (BMS, Temperature and Ignition Modules).
- Firing rate input on the I/O expansion module is now shown on the Appliance Screen (when configured).
- I/O expansion input settings can now be set to negative fractions.
- Logical I/O expansion inputs can now be read over Modbus. This is a workaround for a bug where the IO expansion modules could be reordered (when reconfiguring via the IO wizard or using settings backup/restore) causing the I/O expansion module input reads to be incorrect.
- Proof of Closure (POC) can now be configured for either the Waste Gas or the Assist gas. This allows independent proof of closure for both the Waste Gas and Assist Gas valves.
- Externally acknowledged shutdowns (Modbus, External Switch) now close the shutdown screen on the UI.
- When they system is configured as an Incinerator and using PID control, the system now properly displays the correct state name on the appliance and controller status screens when the PID is active (previously the status screens simply showed “PID Control” instead of “Lowfire”, “Incinerate”, and “Incinerate No Assist”).
- Removed the “Check After Main” IO expansion input mode.
- Added a “IO Expansion Dry Contact Config Error” alarm that ensures that dry contacts configured in temperature or IO expansion setpoint trip mode have an assigned input.

FIXES:

- Improved the reliability of PF3100 module communications.
- Fixed a bug where a fast-moving IO Expansion input signal would occasionally cause the system to shut down on a “IO Expansion Module Input Invalid” alarm.
- Fixed a bug where the appliance status screen would show I/O expansion module trip setpoints in PSI regardless of the configured unit.
- Fixed a bug where setting the cold start ramping temperature step to a fractional Celsius value would cause the TCV to open 100%.
- Fixed a bug with the cold start ramp temperature step was offset by 32 degrees if the units were set to Fahrenheit.
- Fixed a bug where I/O expansion inputs on the System Diagnostics screen were reading incorrect (offset by 4mA).

- Fixed a bug with UI only settings restore. Previously a UI only settings restore would not accurately restore the UI settings.
- Fixed a bug where the Modbus run status bit would clear when the Incinerate state was reached (Incinerator Enabled).
- Fixed a bug where the Pilot Off After Main mode did not work properly with Incinerators.
- Misc. IO and Temperature wizard reliability improvements.
- Misc. alert message typo fixes.

NA-41

NA-41 was initially released on June 30, 2020. This is a major release focused on making FARC fully compliant with CSA B149.3-20 Annex D.

NA-41.1

Released October 1, 2020.

CHANGES:

- Increased the maximum cross limit error to 15% (was previously 5%).

FIXES:

- Fixed a bug where the Cross Limit Error alarm would trip at half of the user specified value (e.g. system trip at 2.5% error instead of the user specified 5%).

NA-41

Released June 30, 2020.

CHANGES:

- FARC has been redesigned to be fully compliant with CSA B149.3-20 Annex D. The following is a list of the key changes:
  - Added cross limiting control for FARC system positioners. Cross limiting ensures the fuel /air mixture is always safe by ensuring moving the positioners in such a way that a rich mixture (too much fuel) is never allowed.
  - FARC configuration table has been redesigned.
    - The table does not allow a negative slope (must be rising or flat).
    - Table will only be utilized between commissioned points. Any firing rate outside of two commissioned points will be flattened to the closest commissioned point.
  - FARC settings are now protected by a new L3 password.
  - Added the *Position Error Alarm Timeout* setting.
  - Added the *Startup Checks* state when FARC is enabled. This state verifies that no airflow is present before transitioning to the *Request Purge Position* state.
  - Purge, pilot and lightoff positions are now proven in all relevant states (instead of solely the Request states).
  - The manual FARC firing rate is now limited by the minimum firing rate.
  - *Manual Firing Rate* setting can now be changed while in auto mode (previously this could only be changed in manual mode). Note that the manual firing rate does not take effect until the *FARC Mode* setting is changed to *Manual*.
  - Prove No Airflow, Request Purge Position, Prove Airflow, Request Pilot Position and Request Light Off Position timeouts have been increased from 60s to 90s.

- Renamed the *Aux Out Manual Override* setting to *Manual Override*.
- Renamed the *TCV PID Min Opening* setting to *Minimum Firing Rate*.
- Default *Position Error* has been decreased from 5% to 2%.
- The Low Fire state now holds the Light Off Position regardless of the manual mode override setting. If enabled, manual mode will apply once the system moves into High Fire.
- FARC configuration dialog now closes automatically if communication is lost with the BMS and a user attempts to change a setting.

FIXES:

- Fixed a bug where the fan output would stay energized after purging was completed in the Wait state (when fan control is enabled).
- Fixed a bug where some states could transition to Waiting without triggering a post purge (when fan control enabled).

NA-40

NA-40 was initially released on August 17, 2018 and is a major release focused on implementing functional safety with a SIL2 capability. It also includes many improvements based on user feedback.

NA-40.1

Released May 10, 2019.

FIXES:

- Modbus now supports writing setpoints above 1350F while in Fahrenheit mode.
- Fixed an issue where the Modbus TX LED would get stuck on in some cases.

NA-40

Released August 17, 2018.

NEW:

- Modbus now supports the reading of IO expansion inputs.
- Added PFRN communication status register to Modbus.
- Added Modbus communication error registers.
- Added advanced controller debug screen for improved troubleshooting.
- Added Network Discovery Utility to allow viewing of connected modules with different versions of firmware.
- The module swap wizard now works on a running appliance.
- Ignition wizard can now be run while the controller is running.
- Added warnings for Proof of Closure 2 and Proof of Pilot failed to open.
- Various additional tests and diagnostics implemented to meet functional safety requirements.

CHANGES:

- The event log can now be open when no controllers are communicating.
- The event log now shows which controller(s) have lost communication.
- Added a progress bar for exporting event logs.
- Modbus flame detection register now latches on a 4 second window, reducing issues with reading flame flicker.
- Improve multi-BMS settings implementation (e.g., pressing OK on an unlinked setting will now open the multiple BMS settings window).
- Improve the data log implementation (multiple improvements/bug fixes).
- Various over/under voltage faults and warnings added.
- Settings now only write to memory if they have changed to improve hardware longevity.
- Cleanup and addition of various Alarms and Warnings.

FIXES:

- Shutdown codes and appliance startup now properly record in the event log.
- IO expansion input events now record in the event log
- Smoothed out the transition between manual and automatic PID control.
- UV flame diagnostics fix.
- Fixed screen flickering issue.
- IO wizard can now be run while another appliance is running on the same UI.
- General cleanup of user interface operation and behavior.
- UI Swap wizard is now functional.
- Various minor bug fixes.

NA-39

NA-39 was initially released on September 7, 2017 and is a major release focused on improvements based on user feedback.

NA-39.10

Released February 15, 2018.

FIXES:

- Fixed a bug which didn't handle timer wrapping properly. This resolves a potential startup issue seen in multi-burner appliances.

NA-39.9

Released January 4, 2018.

FIXES:

- Fixed a bug with the run status contact not properly energizing in the transition delay state on the IO Expansion Module.

NA-39.8

Released December 12, 2017.

FIXES:

- Fixed PID issue that resulted in the output jumping around the setpoint.

NA-39.7

Released November 30, 2017.

NEW:

- Added "Purge Status" mode to I/O Expansion dry contact outputs.

NA-39.6

Released November 15, 2017.

FIXES:

- Event log fix for null characters.
- Fixed LCD screen bug where the screen would not go to sleep after power on.

CHANGES:

- Event log export now exports the RAW log files along with a human readable CSV file.
- Event log clean up.

NA-39.2 to NA-39.5

Released September 27, 2017.

FIXES:

- Various Modbus stability fixes.

NA-39.1

Released September 6, 2017.

FIXES:

- UI stability and lockup issues resolved.

NA-39

Released September 6, 2017.

NEW:

- Added ignition module flame diagnostics.
- FARC manual mode now persists with warning on UI.
- Added I/O Expansion and BMS wait timeouts (separate settings).
- Added the ability to manually control the TCV on the BMS while running.
- Added new keyboard shortcuts.
- Restore UI settings now restores the network map in addition to UI settings.
- Added the ability to read 4-20mA temperatures on I/O Expansion.
- Event log exports are now human readable.
- Added ability to use I/O expansion input as a bleed valve POC.
- Added ability to take screenshots and save them to USB storage.
- Added ability to swap BMS controllers while the appliance is running.
- Added ability to start individual ignition modules while the system is running

FIXES:

- Fixed a bug where firmware update breaks when bundles contain special characters.
- Fixed a bug w/4-20 units showing kg/m2 instead of ft3.
- Fixed a bug where a disabled pilot module would detect flame while off.
- Ion Aux Input deadband fix.

- Fixed a fault with I/O expansion outputs that are allocated at indexes other than 0.
- Fixed a bug where incinerator + main flame detect caused a state mismatch when transitioning to low fire.
- Fixed a bug where a 4-20mA transmitter disconnected and reconnected immediately triggered an alarm. There is now a timeout for reconnection before the alarm can be tripped.
- Fixed a bug where temperature echo was using the wrong scale.
- Fixed proof of low fire incinerator bug
- Various cleanup and spelling fixes.

CHANGES:

- Added character limits to the names of certain fields.
- Made several settings editable while the controller is stopped but the appliance is running.
- Revamped the event log.
- Event logs are now backed up to USB and then cleared on firmware update.
- Keyboard changes: ? key jumps to symbols menu, + key is now space.
- Ignition switch can no longer start the appliance.
- Increased fuel pressure and tank level deadband limits.

NA-38

NA-38 was initially released on May 25, 2017 and was intended as a clean-up release. This was triggered by the need for the additional Ion Pilot capacitor test.

NA-38.4

FIXES:

- Resolve issue with multiple IO Expansion cards with 4-20mA output enabled.

NA-38.3

CHANGES:

- Adjusted timing on Ion Pilot filter cap test to 10 minutes to reduce the likelihood of false notification.

NA-38.2

Released June 29, 2017.

NEW:

- Checksum added to firmware update process to ensure bundle is not corrupted.

CHANGES:

- Change to feature key alarm timing to improve robustness.

FIXES:

- UI stability improvement
- Modbus BMS run status behavior
- Modbus EEPROM write behavior changed to improve longevity.

NA-38.1

Released June 7, 2017.

FIXES:

- Fixed the display values of the IO Expansion Wizard Add Inputs tab.

NA-38

Released May 25, 2017

FIXES:

- Multiple changes made to improve stability of systems with multiple IO card or UV Pilot cards
- Fixed issue with integral latching for cascaded PID
- UI stability improvements
- Added test to Ion Pilot to check for open filter cap
- Improved stability of Modbus card.

NA-37

NA-37 was initially released on April 7, 2017. It was a major feature release and added significant capability to the PF3100 platform.

NA-37.3

Released May 2, 2017.

CHANGES:

- Modified Proof-of-Airflow behavior for Purge Fan configuration.

NA-37.2

Released April 27, 2017.

CHANGES:

- Allow minimum re-lights to be set to 0.

FIXES:

- Resolved restore settings issue for IO Expansion inputs
- Start/stop now works in data log screens
- Improved event log stability.

NA-37.1

Released April 17, 2017

FIXES:

- Fix for thermocouple flame detection.

NA-37

Released April 7, 2017.

NEW:

- Swap wizard can be used to swap out IO modules even if the appliance is running
- Names in status dialogs can be edited while running
- Temperature logging added
- Incinerator support added
- Thermocouple flame detection added
- Advanced PID added

- IO Expansion digital output controlled by temperature.

CHANGES:

- Allow more settings to be edited while running.

FIXES:

- Settings restore controller swap fixed.

NA-36

NA-36 was initially released on February 8, 2017. It was released as a field trial intended for use in testing the FARC (Fuel/Air Ratio Controller) capability on forced air systems.

NA-36

Released February 8, 2017.

NEW:

- FARC (Fuel/Air Ratio Controller) added.

NA-35

NA-35 was initially released on January 24, 2017. It added several significant user interface features targeted at improving the user experience.

NA-35

Released January 24, 2017.

NEW:

- Added alert helpers for the most common alarms. Clicking on an alert in the Alerts tab will now bring up more information about the alert.
- Added ability to name the IO Expansion 4-20mA PID output.

CHANGES:

- Re-vamped the status LED behavior on the BMS
- Level alarms clean-up
- Temperature alarms/warnings clean-up
- Default purge time changed to 60 seconds.

FIXES:

- Main flame faults no longer shown if main flame is disabled
- Fixed high process temperature wait functionality with pilot off
- Fixed behavior of pilot off at setpoint; now re-lights following main when LF is enabled
- Fixed the Modbus 4-20mA conversion formula
- Fix for passwords not working correctly on info box items
- IO Expansion outputs now display properly.

NA-34

NA-34 was initially released on November 17, 2016. It added several new features and cleaned up many others.

NEW:

- Added support for Proof of Air Flow on the IO Expansion module via the IO Wizard
- Added navigation and context-based setting dialogs to various info box items on the status page; users can now configure things like IO Expansion, PID parameters, inputs, and logical temps directly without navigating too deeply into the settings menus
- Added support for L1 passwords. L1 password enabled is accessible from the UI Settings page
- Added purge fan support
- Appliance Status screen now shows the IO expansion 4-20 output and 4-20 output name (configurable)
- Added an alarm that trips if fan control is enabled without chamber pressure.

CHANGES:

- Combined process and aux temps into single Temperatures heading on the Appliance Status page
- Removed the L1 enable setting from the Appliance Settings screen; this has been moved to the UI Settings page
- Pressing Down from the Appliance Status tab now leads to the info box instead of the controller list

FIXES:

- Added cannot edit while running dialog for IO expansion and temperature inputs on the appliance status page
- Fixed combo box key handling
- Right key presses on the appliance/controller status bars are now being handled correctly; this includes the right key press at the end of the Ignition Wizard (no longer exits the wizard without saving the configuration)
- Fixes for both the Controller and Appliance Status modes on the IO expansion module dry contacts
- Change “POC Contact Open” warning to “POC Contact Failed to Open”
- “Pilot off after main proven” has been replaced with “Pilot off after main on”; pilot is turned off 6 seconds after main kicks on
- Main flame detection re-vamp
- Fixed issue where the system could start via the switch without pre-purging (this happens when the fan is enabled)
- Fixed “POC Contact Open” warning enumeration name.