PF3100

SOFTWARE RELEASE NOTES

Version 21.0

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
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
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

DESCRIPTION	WORK AROUND	AFFECTED VERSION(S)	FIXED VERSION
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
In multi-BMS appliances, updating an IO Expansion input name, setpoint or deadband from the status screen only pushes the updates to the first communicating controller instead of all controllers in the appliance.	Use the IO Wizard to make changes to IO Expansion input names, setpoints and deadbands.	NA-36 to NA-42	NA-42.1
With multi-BMS appliances, the Settings Restore tool may not restore all BMS communication configuration settings properly, resulting in an “Appliance Comm Error” warning. This may cause some BMS’s to ignore IO expansion inputs.	Re-run the Appliance Wizard. No changes are necessary; simply open the wizard and save the existing configuration.	NA-37 to NA-42	NA-42.1
If the pilot flame is lost after being successfully established but before the main flame is proven and *Main Flame Detect* is enabled, the system does not count this event toward the configured relight attempt limit. As a result, repeated attempts to establish the main flame may occur without being limited by the configured ignition or relight attempt settings.	None	NA-34 to NA-45	NA-45.1
In certain configurations, IO Status Contacts configured in Appliance Alarm or Appliance No Alert modes may remain energized during shutdown-only conditions (such as Flame Fail). This could result in external systems not being notified of a controller shutdown through the IO Status Contact.	None	NA-34 to NA-45	NA-45.1

SOFTWARE UPDATES

NA-45

NA-45 was initially released on Sept 26, 2025. This is a major release that includes changes to existing features and bug fixes.

NA-45.2

Released Feb 19, 2026

This minor release corrects a Low Fire state transition issue when Delayed Lead Light Off is enabled. The update ensures proper position proving behavior during transitions from High Fire to Low Fire without affecting intended delayed light off functionality from Pilot.

FIXES:

- Corrected an issue where, with Delayed Lead Light Off enabled, the system incorrectly required Light Off Position proving on every transition into Low Fire. The system now only requires Light Off Position proving when transitioning from Pilot to Low Fire, as intended.

NA-45.1

Released January 16, 2026

This minor release improves ignition and FARC behavior in specific operating conditions, enhancing reliability during light-off and relight scenarios. It also corrects IO Status Contact behavior to ensure shutdown-only conditions are properly reflected, improving consistency and safety signaling.

NEW:

- Added a Delayed Lead Light Off feature for FARC systems, allowing airflow to remain at the pilot position during main flame light-off to reduce the risk of pilot flame loss before the main flame is established. This includes new Delayed Lead Light Off and Delayed Lead Light Off Transition Time settings, updated FARC state handling, and supporting updates in the FARC wizard UI.

FIXES:

- Fixed an issue where relight attempts were not decremented if the pilot flame was lost after pilot establishment but before main flame establishment when main flame detection was enabled. The system now correctly consumes a relight attempt in this scenario, ensuring ignition attempt limits are enforced.
- Fixed an issue where the Process Temperature Too High wait bit could repeatedly set and clear when Pilot Off Mode was set to Follow Main and FARC is enabled, potentially leaving the system stuck in a waiting state and cycling the fan output.
- Fixed an issue where IO Status Contacts configured in Appliance Alarm or Appliance No Alert modes did not de-energize during shutdown-only conditions (such as Flame Fail). IO Status Contacts now correctly de-energize whenever a controller shutdown occurs, ensuring shutdown-only conditions are handled consistently.

NA-45

Released Sept 26, 2025

CHANGES:

- Increased the maximum number of pilot modules that can be used by the system to 14 (previously 4). The following are associated changes:
    - Reduced the maximum number of IO modules that a BMS can connect to 14 (previously 32).
    - Added a Too Many IO Modules Configured alarm that trips if more than 14 pilot modules have been configured for use on the BMS.
    - Added the following Modbus Registers:
        - 304 -> 313 (module 5 -> 14 pilot state)
        - 320 -> 329 (module 5 -> 14 pilot quality)
        - 336 -> 345 (module 5 -> 14 main quality)
        - 352 -> 361 (module 5 -> 14 aux in reading)
        - 364 -> 447 (module 5 -> 14 flame diagnostics)
        - 460 -> 473 (module 1 -> 14 last 2 bytes of mac address)
    - Updated the controller status dialog to display a maximum of 5 pilot modules. After this point, the pilot section of the dialog will start to scroll.
    - Ignition wizard changes:
        - On startup, the wizard will remove all disconnected modules from the system, regardless of their configuration (disabled modules were previously preserved).
        - On startup, the wizard auto assigns and enables all connected pilot modules that are not already configured.
        - Updated the allocation tab to no longer display the pilot module slots. Instead, only configured modules are shown.
- Updated the system to be able to select if the UV module is detecting pilot flame, main flame, or both pilot and main flame. The following are the associated changes:
- Added a new flame source setting to the ignition module config.
- Added the "Main UV Module Enabled without Main Detect" alarm which triggers if a UV module has been set to main or pilot and main detect, but main flame detection is disabled.
- Added the "Main Flame Detect Enabled with No Main Flame Modules" alarm which triggers if main flame detect has been enabled, but only pilot UV modules have been configured.
- Ignition Wizard and Controller Status Dialog have been updated to allow selection between pilot and main flame source on the UV Pilot Module.
- Modbus changes:
- Added registers 476 -> 489 to report the flame source of the ignition modules.
- Updated registers 300 -> 313 (pilot state) to report 0 if the ignition modules' flame source is set to main.
- Remote lockout acknowledgements are now limited to 5 every fifteen minutes as per 60730-2-5 certification requirement changes.

FIXES

- Fixed a bug on the UI where it would read dry contact information using the wrong BMS (in multi BMS appliances). This could also result in the UI crashing.

- Fixed a bug where the UI would sometimes crash when configuring a dry contact in temperature setpoint trip mode depending on the specific logical input configuration.
- Fixed an issue on the UI where the IO wizard would unintentionally hide settings related to the 4-20 output if the wizard was left open too long.

NA-44

NA-44 was initially released on April 15, 2025. This is a major release that includes new features, updates to existing features and bug fixes.

NA-44

Released April 15, 2025

NEW:

- Added the ability to read and write firing rate to a single BMS over Modbus (register 161). A new *Modbus Firing Rate* Aux Output mode was added to facilitate writing firing rate over Modbus.
- Added the following Ignition Module related Modbus registers:
    - 300 to 303: ignition module pilot state (read).
    - 316 to 319: ignition module pilot flame quality (read).
        - ION+ Flame Quality [0% = No Flame, 100% = Flame]
    - 332 to 335: ignition module pilot/main flame quality (read).
        - Main ION+ Flame Quality [0% = No Flame, 100% = Flame]
    - 348 to 351: ignition module Aux Input (read).
        - 4-20mA mode: [0-25mA x 10]
        - Digital mode: [0 = De-energized, 10 = Energized]
    - 364 to 387: ignition module flame diagnostics (read).
        - Pilot DC High mV (Ion) or Fault Contact State (UV)
        - Pilot DC Low mV (Ion) or Flame Off Contact State (UV)
        - Pilot DC AC mV (Ion) or Flame On Contact State (UV)
        - Main DC High mV (Ion) or Flame Quality (UV)
        - Main DC Low mV (Ion) or Reserved (UV)
        - Main DC AC mV (Ion) or Reserved (UV)
- Added the following PID related Modbus registers:
    - 219: integral jacketing (read/write).
    - 220: cascade PID (read/write).
    - 221: primary setpoint max (read/write).
        - Units of Modbus temperature x10.
    - 222: primary setpoint min (read/write).
        - Units of Modbus temperature x10.
    - 223: secondary setpoint max (read/write).
        - Units of Modbus temperature x10.
    - 224: secondary setpoint min (read/write).
        - Units of Modbus temperature x10.
    - 225: proportional band sec (read/write).
        - Units of Modbus temperature x10.
    - 226: integral gain sec (read/write).

        - Units of minutes x10.
    - 227: derivative gain sec (read/write).
        - Units of minutes x10.
    - 228: integral reset range sec (read/write).
        - Units of Modbus temperature x10.
    - 229: PID staging mode (read/write).
    - 230: PID ramp time (read/write).
    - 231: PID rate limit primary (read/write).
    - 232: PID rate limit sec (read/write).
    - 233: PID deadband pri (read/write).
        - Units of Modbus temperature x10.
    - 234: PID deadband sec (read/write).
        - Units of Modbus temperature x10.
    - 235: proportional band (read/write).
        - Units of Modbus temperature x10.
    - 236: integral gain (read/write).
        - Units of minutes x10.
    - 237: derivative gain (read/write).
        - Units of minutes x10.
    - 238: integral reset range (read/write).
        - Units of Modbus temperature x10.
    - 239: sample time (read/write).
        - Units of seconds x10.
- Added the ability to select the FARC curve via Modbus (register 218 – read/write). A new *Remote FARC Curve Selection* setting has also been added to enable this feature.
- Added the ability to read the BMS state via Modbus (register 181 – read).
- Added a Modbus specific main permissive. This main permissive can be set / cleared by writing register 166 (write only).
- Added the ability for natural draft BMS' to always perform a purge on startup via the new *Natural Draft Pre-Purge* (disabled / enabled) setting.
- Added the ability for users to set custom L1, L2 and L3 passwords.
- Added the ability for users to read alert bit registers via Modbus:
    - 800 to 815: alarm bitset (read)
    - 830: wait bitset (read)
    - 840: main permissive bitset (read)
    - 850 to 851: warning bitset (read)
- Added the following NO / NC dry contact modes to the IO Expansion Module:
    - *Local Running Status*: the output energizes when the BMS connected to the IO Module is running.
    - *Appliance Alarm Present*: the output de-energizes if any BMS in the appliance has an alarm.

    - *Appliance Wait Present*: the output de-energizes if any BMS in the appliance has a wait.
    - *Appliance Warning Present*: the output de-energizes if any BMS in the appliance has a warning.
    - *Appliance Main Permissive Present*: the output de-energizes if any BMS in the appliance has a main permissive.
- Added a new *Trial for Ignition* setting that allows users to configure the ignition time between 4 and 10 seconds.
- Added the *Non-Fuel State Alarm*, *Pilot State Alarm* and *Main State Alarm* modes to the IO expansion inputs and the respective *Non-Fuel State Alarm Time*, *Pilot State Alarm Time* and *Main State Alarm Time* settings. These new modes allow the user to configure alarms based on and a specified set time for both digital and 4-20 IO expansion inputs.

CHANGES:

- Startup ignition attempts are now configurable from 1 to 3 (was previously hard set at 3) via the new *Ignition Attempts* setting.

FIXES:

- Fixed a bug where the NO / NC dry contacts on the IO Expansion module would remain energized erroneously when configured in *Appliance No Alert* mode. This would happen if there was a main permissive on the BMS that the IO Expansion module was connected to. The fix ensures that if there is a main permissive on ANY BMS in the appliance, the associated IO Expansion NO/NC contact will properly de-energize.

NA-43

NA-43 was initially released on January 31, 2022. This is a major release that includes new features, updates to existing features and many bug fixes.

NA-43.6

Released Jan 16, 2024

CHANGES:

- Added the *Proof of Light Off* aux in mode. When enabled, this mode sets a new *POLO Contact Open* main permissive when the system is in the pilot state and the aux in contact is open. This mode is exclusively for use with a TCV and a configuration alarm has been added to ensure this.
- Renamed the *Proof of Low Fire* aux in mode to *Proof of Closure High Fire* to make it clear that it is now exclusively for use with proof of closure on a high fire valve.
- The pressure and level span calibration settings are now editable on the UI.
- Changed the low temp setpoint lower limit to -200 °C (was previously 0 °C).

NA-43.5

Released August 25, 2023

CHANGES:

- Added support for new UI Card v1.4. This firmware is **REQUIRED** for UI Card v1.4 (using older firmware will result in damage to the card). This firmware is backwards compatible with older UI Card v1.3.

NA-43.4

Released January 16, 2023

FIXES:

- Fixed an issue where the BMS and Modbus cards may fail to communicate over PFRN when started in cold weather (below -30C).

NA-43.3

Released November 14, 2022

CHANGES:

- Updated flame detection algorithm to reduce the chances of nuisance shutdowns due to multiple ignition modules sharing the same flame envelope.

NA-43.2

Released October 26, 2022

FIXES:

- Fixed a bug with the Low Heat Standby mode in multi BMS applications where some BMS' in the appliance would incorrectly stay in the low heat state longer than necessary.

NA-43.1

Released October 17, 2022

CHANGES:

- Added an additional clear condition to the Low Temp Standby wait and main permissive when cascaded PID is enabled. This new condition allows for the alert to clear when the secondary PID input has its value go below the secondary process setpoint - dead band.
- O2 Trim Offsets have been changed to +/- 100% (previously +/- 10%).
- The System Data and Controller status screens now show 4-20mA readings in user configured units as well as the raw 4-20mA value.
- Added the O2 sensor reading to the FARC Status screen (in addition to the curve config page).
- FARC Output Inversion options have been renamed to “Enabled/Disabled” (previously “Direct/Reverse”) in the FARC Wizard.
- Renamed the IO Expansion Proof of Airflow input to Local Proof of Airflow to clarify that this input is local only (and not shared globally).

FIXES:

- Fixed a bug where the system would transition to waiting as soon as a single pilot lost communication (in a multi-pilot system). The system now correctly transitions to waiting only when enough pilot modules lose communication to violate the minimum pilots running setting.
- Fixed a bug in the O2 Trim controller where the integral would unintentionally accumulate when the actuator was at its physical limits. This caused a slower than desired response to process variable changes.
- Fixed a bug where BMS’ in an appliance were forced to use either the all Aux Inputs or all IO expansion inputs for Proof of Airflow. Each individual BMS can now use with the Aux Input or an IO Expansion input for Proof of Airflow.

NA-43

Released January 31, 2022

NEW:

- Added multi-channel FARC (see manual for details).
- Added O2 Trim (see manual for details).
- Added an Output Calibration Wizard. This wizard allows for easy calibration of all BMS TCV and IO Expansion outputs.
- Added Main Permissives to the UI Alerts tab, allowing users to see which main permissives are currently affecting the BMS. An event is now generated each time any of the main permissives are set / cleared.
- Added Network Diagnostics Utility to track communication link integrity between modules. This utility will show the number of lost packets and the packet error rate on both the BMS and IO networks.
- Added the ability to name IO modules (Temperature, Ignition and IO Expansion).
- The Network Discovery Utility now shows Modbus cards.
- Added the Low Heat Standby mode that allows the system to step down to a lower heat state (via a wait or main permissive) early when using PID or Cascaded PID control. See the manual for details.

CHANGES:

- System Overview page has been redesigned. The title has changed from “System Overview” to “System”. The “Settings” tab has been changed to “Config”. The new Config tab has been redesigned

with categories and a flat design (instead of the uncategorized, large buttons). This makes finding various system configuration wizards and utilities much easier.

- Appliance Wizard has been redesigned to be consistent with the IO Wizard. As such, it now has selectable tabs to navigate the various wizard pages, has a new review page that has the look of the io wizard review page, and has updated popup dialogs to match those of the IO Wizard.
- Temperature Wizard has been redesigned to be consistent with the IO Wizard. This involves: o Having the appliance selector open before the wizard opens.
    - A loading bar that initializes the wizard after the appliance has been selected.
    - Error checking during wizard creation that will exit under various conditions (not all controllers are communicating, too many temperature modules are connected, the system is running, etc.)
    - A revamped 'add inputs' page that opens dialogs to create temp inputs and another to configure their setpoints.
    - A redesigned allocate page.
    - A new review page that verifies the configuration is correct (this review page contains the checks that we previously done when changing tabs on the old temp wizard. ex. the primary temp doesn't exist, not all temps are allocated, etc.).
- Ignition wizard has been redesigned to be consistent with the IO Wizard. New ignition wizard no longer writes settings changes as they are made and instead caches changes until they are confirmed via the review page. New review page ensures that all pilot modules have been assigned, pilot modules have only been assigned once, and that there are not more min pilots needed to run than there are pilots assigned. The wizard now differentiates the configuration of Ion Pilot Module from a UV Module.
- Flame diagnostics screen is now scrollable with both the +/- keys and the up/down keys (previously was only scrollable with the +/- keys which was unintuitive).
- Data/Event Logging has been relocated from the data tab on an appliance status screen to the logging entry on the new config page. Various changes have been made to improve the data/event logging user experience.
- Reset Settings Dialog, Settings Backup /Restore Wizard, Quick Start Dialog, Firmware Update Dialog, Network Discovery, System Data, Info Dialog, Swap Wizard and UI Settings Dialog have all been updated to match the styling of the rest of the UI.
- Updated the "Failed To Prove No Airflow" alarm text to instead read "Airflow Input Stuck".
- UI Swap Wizard will now restore UI settings if they are present in the restore file.
- High pressure warning now trips for pressure inputs in dry contact high pressure mode.
- Added a "TC flame detect requires a 4-20 input" alarm to ensure that TC flame detect is properly configured (only supported on ion pilots with 4-20 ion aux inputs).
- The UI will now specify which IO module is causing the "IO 4-20 Output PID Configuration Error" alarm on the alerts screen.
- The UI will now specify which dry contact output is causing the IO Expansion Dry Contact Config Error alarm.
- Various visual updates to the controller status screen to make it more consistent with the rest of the UI.
- Removed the "Appliance Config" and "IO Modules" pages from the appliance settings menu.

- Removed some of the redundant information shown in the IO Alert dialogs.
- The BMS will now alarm if it detects and improperly configured Bleed Valve, O2 Sensor, FARC Output, Appliance Firing Rate and Proof of Airflow inputs.
- Start contact now requires a double action to start the system and clear lockouts. These actions also have a timeout if the double action takes too long to execute.
- "Pilot Flame Detect Voltage Error", "Main Flame Detect Voltage Error", "Pilot Load Monitor Error", and "Main Load Monitor Error" are now tracked separately for each ignition module. This improves pilot reliability in multi-pilot systems.
- Added event log entries for Flame Loss, Sparking and Flame Establishment events.
- The UI now shows a firing rate of 0 when in the Incinerate No Assist state and 100 in the Incinerate state (previously showed 0 always).
- The IO wizard now warns that using a bleed valve for a dry contact is an invalid configuration (on the review page).
- Added event log events for BMS controller comm loss / established between controllers in an appliance.
- Added a separate Pre Purge Time setting for use with FARC (independent of the normal Purge Time setting) allowing users to use different pre/post purge times when using FARC.
- Added the IO Expansion Span Config Error alarm that trips if the span min and max match.
- Added Modbus registers 500 -> 544 for reading out a uint16 version of the current io logical input readings, registers 600 -> 644 for reading out a uint16 * 10 version of the current logical input readings (copy of 115 -> 159), and registers 700 -> 789 that report the real float reading of the current logical inputs. The initial Modbus registers (115 -> 159) would wrap if the input reading exceeded 6553.5.
- Data logging now supports temperature inputs, IO module inputs, applied O2 offset, firing rate and individual BMS / IO module outputs.
- Added the ability to modify the setpoint of the Temperature or IO input being used for Secondary PID over Modbus.
- Added High Temp ESD set and clear events in the event log that trigger whenever a logical input goes above / below the high temp ESD setpoint.

FIXES:

- Fixed a bug where the UI would occasionally display the wrong transition (next) state.
- Updated the IO wizard to disable inputs that have invalid input types and fixed a bug where an out-of-range input mode would cause the input select mode dialog to lose focus.
- Fixed a bug where firing rate would be incorrectly displayed in Incinerate Mode.
- Fixed a bug where the POC failed to open warning bit followed the wrong valve while in incinerate mode.
- Fixed an issue where if the Pilot Off Mode was set to Off After Main On, opening the PoP contact in the main state would not cause an alarm. The PoP contact open alarm will now trip if the contact opens any time in which the Pilot valve is supposed to be closed.
- Fixed a bug in the FARC wizard in which a FARC output would be seen as invalid/disabled if its name was "Not Set".

- Fixed a bug where the Modbus module would ignore write commands (start, stop, clear lockout) if ~ 25 days had elapsed since the last time the commands were issued.
- Reduced pilot valve chattering (opening and closing) when communication to the pilot card is intermittent (but not bad enough to cause a comm loss).
- Fixed a bug where the UI would not mount USB drives during power on (user would have to disconnect and reconnect in order to use).
- Fixed a bug in the event log where shutdown entries would sometimes show as invalid.
- IO Expansion Input Invalid alert text is now aware of when an input is out of range and displays this information to the user.
- Fixed a bug where the status contact would be incorrectly closed in blue states regardless of the state of the start contact when Status Mode = Run and Start Status.
- Fixed a bug where the UI would incorrectly report the BMS' status contact as always open.
- Fixed a bug where the IO expansion module alert helpers would be blank for modules with stale data or cross compare failing inputs. The alert helper now correctly shows cross compare errors, stale data and internal voltage faults that are occurring on a module.

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-42.1

Released November 2, 2021.

FIXES:

- Fixed a bug where updating an IO Expansion input name, setpoint or deadband from the status screen would only push the updates to the first communicating controller. This only affects multi BMS appliances.
- Fixed a bug where settings backup/restore would not restore BMS communication configuration settings correctly in some multi BMS appliances (leading to an "Appliance Comm Error" warning).

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:
  a. FW bundle version added to the top of each event log export.
  b. FW update event added (log the version of FW the system was updated to).

    c. UI swap event added (logs the mac address of the new UI).
    d. Settings restore event added (logs the name of the json files used for the update).
    e. Swap events added for all modules (BMS, Ignition, Temperature, I/O Expansion). Log shows old and new mac addresses for swapped modules.
    f. +/- 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.

FIXES:

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

CHANGES:

- 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. Key changes:
  g. 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.
  h. FARC configuration table has been redesigned.
  i. The table does not allow a negative slope (must be rising or flat).
  j. Table will only be utilized between commissioned points. Any firing rate outside of two commissioned points will be flattened to the closest commissioned point.
  k. FARC settings are now protected by a new L3 password.
  l. Added the Position Error Alarm Timeout setting.
  m. 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.
  n. Purge, pilot and lightoff positions are proven in all relevant states (instead of solely the Request states).
  o. The manual FARC firing rate is now limited by the minimum firing rate.
  p. 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.
  q. Prove No Airflow, Request Purge Position, Prove Airflow, Request Pilot Position and Request Light Off Position timeouts have been increased from 60s to 90s.
  r. Renamed the Aux Out Manual Override setting to Manual Override.
  s. Renamed the TCV PID Min Opening setting to Minimum Firing Rate.
  t. Default Position Error has been decreased from 5% to 2%.
  u. 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.

v. 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.

NA-34

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.

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