UHPC-Control release notes

> **Info**
>
> All software versions built and tested on MS Windows 11 64-bit (Build 26100)

2.16.0:

- **Datafile Change**:
  - Step Position column (0,1,2,3) now includes 4(stopped), 5 (suspended), and 6 (resumed)
    - Previously “Step Type 14” was used when suspending, but now step type will remain unchanged. Step Position 5 will also be used when resuming from snapshot.
  - Custom Variables now saved (when being used) to a new column in data file
    - Previous datafile column positions remain the same
- Settings->Features->**Additional Data Output** feature change:
  - Optional feature to keep a third backup file locally or on a network drive
  - Writes once per hour (configurable) to a location of operator’s choice
    - Less frequent writing with task threading to prevent file write latency to system
    - Runs at startup for system crashes, and on shutdown/channel stop
  - Writes to C/Novonix/DataDump/ by default, previously C/Novonix/DataDump/{SystemName}
- **Email Notification Server discontinued**:
  - NOVONIX no longer supplies SMTP mail server for UHPC Notifications for security reasons
  - Please follow the prompt on screen after update to set up your own email server credentials
- Email on Step Suspended now available
- Update Variable: Cell Temperature support available
- **Batch Control**:
  - Batch Control can now set mass/capacity with different units
  - Batch Control can now batch assign a description
  - Assign button has been removed from Datafile and Protocol File
- **Unique Batch Control Pasting (from Excel)**
  - Can copy paste data out of an excel data column
  - Capacity, Mass, Area, Description, Data File Name, Cell ID all supported
  - Ctrl+V on the main page will now open the new copy paste window in Batch Control when more than 1 channel is selected

    - See user manual for more details
- Snapshots will now remain active for 24 hours in a session before being marked idle and hidden from view by default while other channels are running (previously immediate)
- Temperature Linking is now a Channel Configuration and will resume on load
    - For existing snapshots with linked temperature, set the channel temperature link before resuming snapshots
- Release notes will open on update
    - Disabled in Settings → System Settings → Notifications → Show Release Notes on Update
- No longer showing temperature as disabled if temperature limits have been disabled
- Moved charger information from channel grid to top header to save space
- Customer Knowledge Base linked in “Help” dropdown
- Licensing info updated
- Rare bug fix when using append data without cycles on a file that uses custom variables and start from step number
- Multi-System:
    - Changing the system name will now also migrate backup data
    - Fixed bug when changing system names that don’t contain valid characters for file folders

2.15.1:

- Fix for Gamry single channel EIS system integration

2.15.0:

- Right Click → **Edit Protocol** now edits all selected channels
    - All selected protocols must be the same
- Right Click → **Jump to Step** now jumps all selected channels
    - All selected protocols must be the same
- Right Click → **Start at Step Number** now starts all selected channels at step
    - All selected protocols must be the same
- **Email Notifications** for individual channels
    - Perfect for shared labs where tests belong to different users
    - Can select a default email address to receive email notifications (Or none) in Settings → System Configuration → Email Notifications → Default Email Address
    - Settings → Column Configuration → Enable Email Notifications to be able to select an email address per channel, or use Batch Control
- Better hardware current control to ensure accuracy and precision at step change
- Better user experience for hardware buffer size check on startup
- Show system name when restarting from snapshot
- Updated Thermal Chamber IP address change to remind user to power cycle chamber after change.

2.14.1:

- Fix for issues using IP-enabled thermal chambers in multi-system mode
- Fix for IP-enabled thermal chambers hanging in “Waiting to Set Temperature” if not connected to thermal chamber
- Fix for possible crash during snapshot load

2.14.0:

- **Analyze Data directly in UHPC Control**
    - Selecting and right clicking channels with datafiles assigned will allow user to “Analyze Selected Datafiles”
    - Select any datafile from top toolbar Tools → Analyze Datafiles
    - Similar processing options as available in plot
- **Improved CV Functionality**
    - Starting a CC-CV (dis)charge within 0.005V of the target can now gracefully start regardless of current direction.

    - Example, trying to do a pure CV hold after an OCV step using a custom variable to fetch the voltage, CC-CV will now use charge or discharge, whichever it needs to maintain the voltage, and the test will not fail to begin if the voltage is a little past the target (3.5004 instead of 3.5)
    - Can now disable resistors Settings → System Configuration → Features → Enable Dynamic Current (Configure CV Ranges)
        - This feature replaces the previous “Reduce noise/oscillation” checkbox by allowing more customization to prevent oscillation on larger/noisier cells.
- **Improved Network Troubleshooting tools**
    - **First-time user setup**, IPv4 configuration can be done in “Tools->Network IPv4 Configuration”
        - This will request admin permission to execute, and will update the chosen network in the same way manually done in the “First Time PC IP Address Setup” in the software manual
    - **Troubleshoot Network** in “Tools->Diagnostics” now much more helpful when setting up IP addresses
        - Will detect if user has properly set up a static IPv4 as described above
        - Will try common UHPC IP addresses on connected static IPs
        - Will suggest next steps in troubleshooting to user based on the detected static IP
    - **Hardware Buffersize Optimizations**
        - When turning on UHPC Control software, or changing the number of configured channels, UHPC Control will communicate with the hardware, and adjust hardware configurations if necessary to help prevent communication errors
        - Previously this had to be done manually by a NOVONIX technician
    - **Hardware IP Address Changing**
        - To better support multi-system mode, when editing the IP address in Settings → System Configuration → Edit IP Address, a checkbox has been added to allow a user to change the internal IP Address of the system
        - The master controller must already be properly connected to UHPC Control on the old IP Address
- **Edit Protocol Step Conditions**
    - Can now edit end/save data conditions such as step time, etc.
    - Right click a loaded protocol step → Edit This Step
- Batch Control fixes
    - When batch selecting channels, disabled channels will no longer be included
        - Can still select individual disabled channels with right click
    - Fixed bug where Disabled channels could be “started”
        - Can no longer assign datafiles, protocol files, mass, or capacity to disabled channels
    - Fixed bug when batch assigning a protocol for mismatched charger type (2A vs 20A), if the user selects “cancel” the first channel is cancelled, and the rest load in.
- Disable Channel Temperature Limits can now be done per channel
    - Right click selected channels, “Disable Channel Temperature Limits”
    - Channels with Disabled Temperature Limits will now show ‘Disabled’ in the temperature column of the channel grid. No changes to datafile temperature reporting.
- Cell ID can now be set in the API
- API GetStatus Channel Status will now properly return InError instead of Idle
- When a channel fails to start due to invalid data file with Append Data selected, the error message is more clear.
- Set Temperature Snapshot Synchronization Bug Fix
    - No longer sets temperature too soon when resuming multiple channels from snapshot if some are waiting to Set Temperature and some are not ready yet
- Fixed bug that could prevent user from opening up datafiles in Plot when Windows has no default program to handle .csv files set
- Fixed bug when using Suspend After This Step immediately before an increment cycle counter

2.13.1:

- Allow disabling individual resistors for CV hold to prevent oscillation for large cells at small currents

    - Settings -> System Configuration -> Features -> Configure CV Ranges
    - This feature replaces 'Reduce Noise/Oscillation'
- Allow CC-CV to start in the wrong current direction as long as target is within 0.005V
    - Intended to be used with CC-CV voltage target using 'last step voltage' custom variables after an OCV step
- Fix for bad packets potentially causing time jumps and errors

2.13.0:

- Added ‘API Clear Channel Info’ functionality → See user manual for details
- Gamry EIS Integration Improvements
    - 5 second delay added when ending EIS steps for improved hardware stability
    - Prevented unassigning IMX8 if another channel is actively using it
    - Resolved potential mismatch in Multi-System EIS configuration.
    - Enhanced error handling for less testing interruptions
- Edit Protocol Updates:
    - Can now edit custom variable equations that include underscore ('_')
    - Bug Fix: Can now edit a protocol step even if the protocol was stopped in CV mode.
- IP-Enabled Thermal Chambers
    - Resolved issue where ‘Waiting to Set Temperature’ was incorrectly displayed when starting with a Set Temperature step
    - 'Reset to Default' settings enhanced
    - Set Temperature steps now validated against step limits on load and edit
- Multi-System
    - Removed ‘Beta’ flag from multi-system features
    - When restarting from snapshot, the displayed system will auto-switch to the system being restarted.
- Snapshots:
    - Reduced popups when a batch or snapshot protocol fails to load
    - Improved error messages when snapshots fail to load
    - No prompt for loading snapshots shown if user resumed snapshots manually on restart before prompt appears
- Column Configuration Updates
    - New column added: “Cycle Time”
        - When previous version snapshots are loaded it will show “---” until the next cycle begins
    - ‘Reset Column Configuration’ now resizes column width without requiring restart
- Support for new default variables and end step conditions defined in Protocol
    - StartCap, LStepCCap, LStepDCap, LCycleCCap, LCycleDCap
- 20A hardware accuracy and longevity improvements
    - Added 2-second OCV delay between Charge → Discharge for 20A systems
    - Added 10-second OCV delay between Discharge → Charge for 20A systems
    - This change stabilizes the current applied to the hardware components and cell when switching between charge and discharge intended to increase hardware lifespan and test accuracy.
- Option to disable interpolation for second-to-last step datapoint
    - System Configuration → Features → Disable Interpolation
    - By default interpolation is done for Voltage, Hold Time, Step Time, Step Capacity and Cumulative Capacity
- Added Fahrenheit display option for channel temperature
    - Settings → System Configuration → Features → Display Temperature in Fahrenheit
- Diagnostic Report Changes:
    - Will no longer run unless hardware is connected
    - Renamed 'Open Diagnostic Report' to 'Open Report Folder'—now opens folder instead of the file
- When assigning a datafile with a name already in use, if the existing channel is idle, the user will be prompted to transfer the datafile to the new channel
- Support for “Zero (0)” protocol end condition for custom variable expressions

- Fixed issue where datafile names ending in “-#####” were incorrectly trimmed
- Resolved minor timing bug when ‘Suspend’ was clicked after the step had already begun to end
- Resolved issue that could stop channels when Daylight Savings time moves forward
- Fixed bug where the last channel number could not be selected on the Advanced Calibration page

2.12.1

- New Icon

2.12.0:

- IP-Enabled thermal chamber channel synchronization
  - When channels are connected to an IP-Enabled thermal chamber, they will wait for other channels in the same chamber at the "Set Temperature" step before executing.
  - Feature enabled by default
  - Settings → System Configuration → Sync Thermal Chamber Channels

2.11.0:

- EIS Enhancements
  - Gamry IMX8 Multiplexer pairing with supported EIS Devices added (1 channel → 8 channel)
  - Improvements to connection loss and re-establishment with EIS units
  - Simplified configuration page
- Fixed issue with ‘Jump to this step after current step finished’ Not changing step color to blue in expanded view.
- Enhanced the color changes to blue on ‘Jump to this step after current step finished' and yellow on 'Suspend after this step’ to condensed view.
- IP-Enabled Thermal Chamber configuration support for technician

2.10.3:

- dVdt and dIdt calculated more smoothly.
  - dVdt and dIdt will also appear as both positive and negative in the datafile depending on change in current or voltage. Not always positive.
  - Configuration option added for number of consecutive datapoint used System Configuration → Features → dVdt and dIdt # of points to average
  - Default 30 points (~5 seconds)

2.10.2:

- Fixing issue with some legacy .pro1 files not loading

2.10.1:

- Logs added for when snapshot fails to start
- Multiple selected channels suspend and resume bug fixed

2.10.0:

- We’re pleased to announce the new Application Programming Interface (API) functionality, which allows for remote communication with your UHPC systems.
  - **Monitor Status:** Check your channel status from any location.
  - **Control Functions:** Start, stop, and resume your channel remotely.
  - **Flexible Development:** Convert languages like C, Python, and Java into scripts for your applications.
  - See the Software Manual – Appendix C API Remote UHPC Control Interface for more information
- Snapshot Enhancements
  - Detailed Information for snapshots

        - Right click any snapshot and select “View detailed information”
        - Cycle Number, Mass, Cell Capacity, Step Capacity, Cumulative Capacity, Cell ID, Description
        - All custom variables names and values
    - Snapshot Change Channel Number Fixes
        - No longer results in duplicate channel numbers after using change channel functionality.
        - Older duplicates will be cleared over time by running tests on other channels
- Support for some cell chemistries that start “very slightly” negative.
    - Voltage readings below 0V are **not** accurate
    - Please contact NOVONIX for access
- Append Data Enhancements
    - Now can fetch Mass, Cell Capacity, and protocol file from datafile if using append data
        - Protocol file will only load from data files started in 2.10.0 or later
        - Protocol description in Data File looks different now (Line 18) to match PRO2 format, but overall datafile formatting remains unchanged.
    - If append data checkbox is selected, channel number and system name will not be updated in datafile name even when configured to do so
        - This will help support appending to an existing file when the channel number on the existing file is different.
        - Does not apply to batch control
    - Start From Step Number with Append Data does not work with Custom Variables, must use snapshots
- Minor Data File changes
    - Data file headers contains full path of protocol file instead of just file name
    - Protocol description always on line 18 now, no more variable number of header lines
        - Matches PRO2 format
        - Can be parsed by UHPC Control to reload protocol file using Append Data
- Diagnostic report expanded to include logs from new style master controller
- (Multi-System) Selected master controller cannot be changed when batch control is open.
- Clear Cell / Clear Mass / Clear Capacity right click option replaced with “Clear XXX” where XXX is the value of the clicked square in the grid, if it’s a value that can be cleared.
    - This is expanded to also include Area, Protocol, Datafile, Chamber, Channel Notes, Description, Barcode, Cell ID
    - Some other right click options will be hidden if not applicable to the selected channels for better organization
- System Configuration changes
    - Renamed Startup Configuration to System Configuration
    - System Configuration → Limits → SampleUpOrDownStepLimits has been converted to checkbox.
    - Admin only debug panel no longer shown
    - Multi system mode will no longer reset the shown system on save unless an IP change occurs
- Fix for visible system name not displaying properly after using troubleshoot network.
- EIS and Thermal Chamber updates
    - “Set Temperature” step can be edited in Control after protocol is loaded or while channel is running.
    - “Right click → Unassign Thermal Chamber” has been added to remove linked chambers to channels.
    - “Right click → Unassign EIS Device” has been added to remove linked EIS device to channels.
    - When assigning an EIS device or Thermal chamber for the first time to a channel, a prompt will appear to automatically show the relevant columns
        - Chamber Temperature, Chamber Name, and Assigned EIS Device
    - Watlow connection issues will only be logged if Set temperature step is executed.
    - Troubleshooting tip has been added when refresh button clicked more than twice in “Assign EIS device“ window.
- Error no longer thrown when using Remove Step on the first step in a protocol before starting it.
- Fixed customer details folder not found bug.
- Fixed bugs related to the cycle picker in batch control.
- No longer shows error in logs when opening UHPC Plot

- “No to All” button added when protocol files are missing when restarting multiple snapshots.
- Fixed issue with empty lines being appended in the error logs.
- Updated User Manual, Hardware Manual and Getting Started: First Tests in toolbar Help dropdown

2.9.4:

- Updated Append Data to have configuration options in Startup Configuration → Features → Append Data Settings
  - Cumulative Capacity and Cycle Number now fetched from datafile by default
  - Optionally Step Number can be imported from datafile for starting a protocol on the last recorded step number.
- EIS configuration settings to allow changing the EIS data folder structure
- Automatic migration of thermal chamber configurations to new file structure

2.9.3:

- Renamed General tab to Hardware tab
- Minor tweaks to 2.9.1 Dynamic Current changes
- Bug fix for first time system install
- Fixing of some typos
- Email on error log will no longer appear if user hasn’t entered an email address

2.9.2:

- Fixed crash occurring when loading snapshots without any selected
- Bug fix for first time system install

2.9.1:

- Improved recorded and displayed accuracy for low current values
  - 2A System:
    - 11 digits of accuracy recorded below 100mA for CV (200mA for CC)
    - 14 digits of accuracy recorded below 100uA for CV (200uA for CC)
  - 10A System:
    - 11 digits of accuracy recorded below 50mA for CV (100mA for CC)
    - 14 digits of accuracy recorded below 50µA for CV (100µA for CC)
  - Previously 8 digits of accuracy recorded for all current levels
- Reduce µA noise button added to startup configuration
  - If too much environmental noise is occurring below 200µA that is causing bad data for low currents, this button will help reduce amplification of noise at very low currents (CV ONLY)
- Dynamic Current improvements
  - If voltage drop is occurring during CV due to locking into a lower resistor, the current should respond more quickly and increase
- Removed minimum dVdt and dIdt minutes configuration. dVdt and dIdt are calculated every time data is saved based on the interval since the last data save.
  - Reorganized Configuration Tabs a bit

2.9.0:

- Gamry EIS Integration added
  - Run Galvanostatic, Potentiostatic, or Hybrid EIS during protocol execution without manual intervention using modified Gamry UHPC cables.
  - Supports most Gamry EIS devices. Tested on EIS Box 5000, Interface 5000, and Interface 1010
    - If using other devices they should be supported, contact us if issues occur.
    - Protocol uses default EIS values for EIS Box 5000, if using other EIS devices ensure the defaults/values set are correct for your system. (example voltage)

- Software update available pop up has been added on application start.
- Request for contact info when downloading updates from software.
- Users can now see the release notes before downloading the update (Enable software updates pop up on startup for this feature).
- Support for more than one master controller → Allows for mixed systems 2A, 10A, and 20A to work concurrently on one PC (Not one master controller)
  - Number of Channels/Charger type are now found in “Edit IP/Hardware Configuration”
  - Number of Channels and the Charger Type can now be changed without requiring restart.
- Remember Append Data checkbox option added
- Right Click “Disable” channels in grid (and enable)
  - Saved across sessions
  - Intended to simplify user interaction if a channel has no cells attached, or shouldn’t be used at the time
- Existing Datafile/Protocol file name (if set) loaded by default when editing
  - If unset, the last used datafile / protocol folder will open instead
- Editing a protocol (or removing steps) can now be saved to a temporary file, and loaded automatically when restarting from snapshot
  - User will be asked ahead of time if they would like the new protocol file to be replaced
  - Saved to C:\Novonix\DataSnapShot\EditedProtocolBackups as the original protocol file name with yyyy-MM-dd_HHmmss appended to the end.
- Fixed email notification/update notification/restart from snapshot notification popups opening on top of one another at startup
- dVdt and dIdt step conditions and data overhauled
  - Calculated instantaneously, no longer a running average
  - Values always included in datafile instead of only when dVdt / dIdt step conditions exist in a step
- ‘Esc’ key now closes the company details window when downloading software updates.
- Channel Module Timeout and ping frequency configurations now work as expected
  - UHPC Control hardware can now tolerate up to a 60 second network interruption
  - Stale voltage and current values will now end tests if no updates occur for the length of a module timeout.
  - Power cycling master controller or channel modules will still interrupt tests.
- IP enabled Watlow fixes for if thermal chamber is powered off while running to allow reconnecting to device when power is re-enabled
- IP enabled Watlow communication improvements around different temperature display units (C and F)
- Fixed a bug for cleaning up backup data.
- Mass/Capacity warning can now be Snoozed for 1 hour.
- New column “Channel Notes” has been added.
  - Settings → Column Configuration → select the checkbox beside Channel Notes.
  - Click on the cell to edit and save the values.
  - The Channel notes is are NOT added to Data files or snapshots.
- Repetitive error logs should log less frequently ~10 minute intervals

2.8.8:

- Fixed the bug right click control crash when no snapshots are selected.

2.8.7:

- Watlow Temperature Control now uses chamber temperature for measuring stability
- Optional Watlow Chamber Temperature column added
- Some minor fixes to Watlow chamber configuration
- Advanced Calibration window 20A fix - 20A vB being identified as 20A vA

2.8.6:

- Updated User Manual
  - On the top toolbar “Help → Help Manual”
- Custom variable fix for steptime minutes and seconds calculations
- Custom variable fix for “during CC” and “during CV” being calculated even when in CV and CC respectively
- Snapshot write errors now show in error log on screen (instead of popup) and update when fixed

2.8.5:

- IP enabled Watlow fixes for if thermal chamber is powered off while running to allow reconnecting to device when power is re-enabled
- IP enabled Watlow communication improvements around different temperature display units (C and F)

2.8.4:

- Minor Dynamic Current behavioral change during edge cases
  - Delay between successive Dynamic Current hardware resistor changes from 7 datapoints to 35 (5 seconds)
- Suspended tests resumed by snapshot now resume in a suspended state.

2.8.3:

- Fix for any “AND” step condition “During CV” always being true during the “CC” stage of a CCCV test.
- Advanced Calibration tab added in Diagnostics page to support field calibrations
  - Requires NOVONIX supplied password
- Fixed Control crash Opening Plot via control.

2.8.2:

- Email Notification improvements:
  - Switched to port 587 (from 25) using smtp.office365.com to follow best practices in secure/reliable email transmission.

2.8.1:

- Improvements to Email Notification user experience

2.8.0:

- Time and Capacity Step/Global/System safety limits removed
  - Old Protocols will function in UHPC Control as expected
  - Capacity and Time conditions are still valid (This is for global/step safety limits only)
  - Step Limits for Time and Capacity were redundant, and mostly causing tests to fail unexpectedly
  - Any special use-cases can be handled with step conditions
  - Please contact NOVONIX with any questions or concerns regarding this change
- Email Notifications on channel error added → Will be prompted on first time launch to set up if desired
  - Email Notification on channel complete option added
  - Will receive emails from UHPC-NoReply@novonixgroup.com
  - For privacy reasons only channel number and system name are shared in email, no error details
  - Configuration available to replace our email server with own SMTP implementation if desired for additional privacy
- Supports Set Temperature step types for new thermal chambers
  - Temperature Hold(time) and Temperature Variance(degrees) condition support added
  - Added NModbus licensing information to About page
- Supports custom equation voltages and changes to active variable during run time
- Better Validation when executing current/voltage changes
- Column Configuration
  - Column Configuration Width and Reordering now saves on restart
  - Can now enable/disable most columns in column configuration

    - Added new columns Step Capacity and Cumulative Capacity to the live display grid
        - Step Capacity is now a default column
        - Cumulative Capacity can be enabled in Settings → Column Configuration
- When using “Right click (live channel)→ open files in plot“ we can now open files in first running instance of plot (Plot 2.10.0 should be used for this feature).
- Dynamic Current support for legacy 1A charger
- Duplicate error logs have been reduced.
- Snapshots:
    - Fixed the archived snapshot bugs. Users can now see last two months of archived snapshots.
    - Fixed issue with monthly archived snapshots clean up.
        - Archived snapshots(saved once per hour) are now deleted every 2 months. Preventing a gradual directory size build up of 2GB per year on larger systems.
    - When starting archived snapshots users can now (optionally) fetch latest time from data files to prevent graphic inconsistencies
- When global limits are updated we now warn user if any loaded protocols are impacted.
- If the network drive connection is slow/disconnected we show a loading popup to check the drive connection on select Protocol files/Save Data files/Snapshot files.
- Switched to 64-bit Architecture.
- When validation errors are detected in protocol file you now get “More Information“ button to see detailed info in a dialog box.
- Fixed bug with energy being carried forward between steps, now resets to 0 between steps
- Fixed inconsistencies between significant figures
    - 8 digits of accuracy in .csv and display for Amps, Volts, Ah down from 10 to match hardware calibration
        - This will be 5, and 2 respectively for mA,mV,mAH and uA,uV,uAh
    - 3 digits of accuracy for temperature readout

2.7.7:

- Fix crash occurring when double clicking resistor cell
- Fix 20A default capacity limit to 400Ah from 50Ah
- Fixed validation error occurring when loading snapshot by not loading capacity/mass values first

2.7.6:

- Fixed crash occurring when empty textbox entered into select loop number for “suspend after this step”
- Fixed crash occurring when using jump to step after starting a suspended step from snapshot

2.7.5:

- Fixed issue with potential snapshot corruption during power failure

2.7.4:

- Fix for bug where multiple consecutive loops (not nested) would all exit if one loop contained step condition “End loop when…. “

2.7.3:

- Fix for % step capacity, % cumulative capacity, delta capacity -- not working properly with “AND” conditions.

2.7.2:

- Fix for .pro1 “capacity” end conditions not parsing correctly as “step capacity” when it’s in a multiple “or” step condition
- Can now edit snapshot protocol file name to include .pro2

2.7.1:

- Snapshot backup optimizations
- Bug fix - Update Custom Variable - Step capacity should always be positive
- Fixed bug where poorly created end step conditions could result in negative step time in data row at end step “step position 3”.

2.7.0:

- New Protocol Format .PRO2:
  - Faster load times
  - AND functionality added for step conditions
  - Custom Variables for tracking things like Step Capacity
    - Step 3 Update Variable: StepCapacity = ChargeStep3Capacity Ah
    - Step 4 Update Variable: StepCapacity = CCCVStep4Capacity Ah
  - Custom Equations for creating dynamic conditions
    - ex: Step 4 Constant Current Charge at (Step2Capacity+Step3Capacity)/20 A
    - ex: End Step 6 when Step Time > (Step3EndTime * 2) hours
  - Support for Cumulative Capacity and % Cumulative Capacity conditions
- Global Limits and Step Limit Changes:
  - Removed Emergency limits from Global and Step Limits.
    - Limits will still function as before
  - Added some information related to Step Limits, Global Limits, and System Limits in control for more information (settings → Safety Limits → More Information)
  - 4.6V and 4.8V upper global limit will now trigger pop-up to reset to default values on startup
- Snapshot Optimizations:
  - Checkbox to hide running channels while loading snapshots
  - Increased save frequency of snapshots to 1 second from 5 seconds to help prevent duplicate timestamps in data and save the latest possible data state
  - Improved handling of snapshot saving to prevent corruption
- Fixed the edit step instruction bug where users were unable to edit voltage cutoff when the channel is stopped in CV state.
- We can now edit the Data File/Protocol File/Channel before starting snapshots. To make these changes “right click“ on snapshot in the snapshots dialog.
  - Change Data File: User can change the data file before the you load the snapshot.
    - Additional option: When changing the data file you can either append to existing data files or create a new data file with copy of the data of the previous data file or use new data file entirely for the snapshot.
  - Change Protocol File: User can change the protocol file before the you load the snapshot.
  - Change Channel: user can decide in which channel the protocol has to run.
  - View Detailed Information: User can see when exactly the the data file is last saved.
- New feature to edit the current in the protocol step edit instruction. (right click on protocol step → edit protocol step or double click on protocol step)
- Fixed the issue of datafile name (already ending with CHXX) still adding CHXX_CHXX to end of filename.
- Mass and capacity can be set back to default values (right click → Clear Mass/Clear Capacity)
- Users can now open the backup data file location using File → Open Backup Datafile Location
- The release notes are now packaged along with software (Help → Release Notes).
- Fixed some edge cases of step limits not being checked in case of invalid incoming requests.
- Fixed sending multiple idle commands when channel is stopped due to bad current points.
- Added new functionality to filter by channel in Advanced Diagnostics (Tools → Diagnostics → Advanced Diagnostics → Filter by Channel checkbox).
- Added new functionality to Suspend/Resume the Advanced Diagnostics stream (Tools → Diagnostics → Advanced Diagnostics → Suspend/Resume)
- Removed Composite step functionality (Going ahead it will be loop with number of loops = 1)
- The CellID/Description are now available in snapshot detailed view (SnapShots → Right Click → Detailed information).
- Added new validation to Show location not accessible when starting from snap and data file location does not exist.

- Last Datafile / Protocol file folder used will be remembered across sessions
- Voltage Linking will now save data as described in user manual
- Removed deprecated 200mA charger column from safety limits
- Popup when loading protocol with mismatched charger
- Fixed crash occurring when viewing step details of cleared cell
- If current cannot be maintained and channel is halted, log files will now show the last reported current value before stopping

2.6.15:

- Option to disable bad ASCII log
- Re-implemented patch 2.6.8

2.6.14:

- Fixed “Jump to Step”/”Start at Step” not choosing the correct step if the following are all true:
  - Using condensed view
  - Step chosen is not inside of a loop
  - Step chosen occurs after a loop
- Fixed 20A and 10A upper capacity limits
  - Typo had set them to 50Ah/60Ah global limits
  - 20A capacity upper limit now set to 300Ah/400Ah
  - 10A capacity upper limit now set to 150Ah/200Ah

2.6.13:

- Giving some buffer time for data packets to arrive before triggering an end step/pause step due to missing data packet
- Rolling back patch 2.6.8
  - No longer processing current readings without paired voltage reading

2.6.12:

- Data Packets containing bad ASCII no longer re-processed by receivedbytes log, causing exceptions to occur
- Ignore End Conditions on Range Change (approx. 1 second / 7 data points) now includes limits
- If all messages are dropped between triggering an end step/pause step, and the last data packet arriving, next step/pause step will still occur

2.6.11:

- Fixed issues with Restore to defaults button in Setting → Safety Limits → Restore to defaults. The button now resets both system and global limits for all the chargers.
  - 20A lower current limit default value changed from 0.01A to 0A
  - 20A upper current limit default value changed to 20.05A from 20A
  - 10A upper current limit default value changed to 10.05A from 10A
- Additional logging for “Bad Packet Received” messages
  - Removed special exceptions where bad packets could still be processed
  - 20A modules occasionally dropping packets due to a timing issue when two packets for a channel arrive with the same timestamp will now only drop the duplicate channel data, and record a note in the logs that it occurred, and the rest of the packet will still be processed.
- Limits will not be triggered by stale Voltage/Current/Temperature values if the new packet doesn’t contain that type of data

2.6.10:

- Additional details included in Diagnostic Report

2.6.9

- Editing CellID no longer locks up UHPC Display

2.6.8

- Processing data with valid current reading when voltage message comes in separately

2.6.7:

- Dynamic Current Range up no longer saves sensitivity changes across steps

2.6.6:

- Minor increase for Constant Current Charge/Discharge voltage target overshoot from 0.001V past target, to 0.01V.
  - Helps ensure Constant Current voltage target is reached before hardware auto CV functionality kicks in and begins lowering current
  - Test will still halt when expected at target
  - Does not impact CCCV

2.6.5:

- Protocol ending in “Increment Cycle Counter” step no longer restart test when final step is complete

2.6.4:

- Snapshots now load Capacity and Mass before channel validation

2.6.3:

- Fixed configuration not updating 2mA resistor if user had saved dynamic current resistor values

2.6.2:

- Fixed 2mA resistor dropping into 200uA immediately when below 1.8mA with Dynamic Current in CCCV mode
- Fixed error loop that could occur when saving files to a network drive that isn’t available mid test
- Fixed system crash that could occur when exception was thrown on a backup snapshot thread

2.6.1:

- Dynamic Current Range Resistor Down tolerance improvement
  - Changed range down tolerance to 30 consecutive measurements (~5 seconds) below next resistor threshhold

2.6.0:

- Restarting CCCV from snapshot during CV stage should now resume step with less current fluctuation and without skipping to next step
- Step Transition rework:
  - End condition: 'StepTime - During CV' now counts step time from start of step (start of CCCV), and only triggers during CV stage, previously the steptime timer counted from the beginning of CV.
    - Use End condition: 'Hold Time' to measure step time during CV
    - End Condition: Hold time will interpolate exact end time based as “step position 3” in the datafile
  - Physical step transition logic reworked to send “Idle Current 100uA (5mA for 20A)” (sign adjusted for current) and then “Current off” at step end. As well as “Current On” and then applying “Step Current” at step start.
    - This will result in smoother step transitions and longer hardware life.
    - If the current being applied by the step is below this idle current, the idle current will be ignored
  - End step conditions won’t trigger when starting/resuming a protocol for ~1 second
    - Steps will still complete immediately if voltage condition is met before starting test
    - This prevents low current end step conditions from being triggered too soon
    - Contact NOVONIX for assistance if this is an issue for special testing purposes.

- Save data logic rework:
  - More precision of final current/cell state at end of step (Step Position 2)
  - Run-time now increments while suspended
    - Option to disable under System Settings → Startup Configuration->Features
  - Multiple save point conditions being triggered at the same time will not save the same datapoint multiple times
  - Ensure data points are saved at Suspend and Resume
  - Last datapoint of CC, and first datapoint of CV saved during CC-CV transition
  - “Jump to step” now saves final datapoints
- DCOffset Module Changes (Legacy Hardware)
  - No longer incorrectly adding 0.05V to voltage target of CCCV Charge when DCoffset is enabled
- New “Notifications” tab in Startup Configuration
  - New configuration to show prompt when Mass/Capacity are not changed from defaults
    - This configuration can be adjusted inside of Settings → StartupConfiguration → Notifications→ Mass/Capacity unset Popup
  - New configuration added to ignore step limits outside global limits warning pop up.
    - This configuration can be adjusted inside of Settings → StartupConfiguration → Notifications→ Show Step Limits Warning Popup
- Refactored suspended logic to prevent behavior that shouldn’t occur during Running, to also not be enabled during suspend (changing datafile names, protocols, etc.)
- System, Global Emergency, and Global operational, and step limit changes:
  - Default limits for 10A and 20A are updated for Capacity operation and emergency.
    - 1A system capacity limit to 100Ah from 9999Ah
    - 2A system capacity limit to 100Ah from 9999Ah
    - 10A capacity operation upper value - to 150Ah from 50Ah
    - 10A capacity emergency upper value- to 200Ah from 60Ah
    - 10A system capacity limit- to 300Ah from 60Ah
    - 20A capacity operation upper value- to 300Ah from 50Ah
    - 20A capacity emergency upper value- to 400Ah from 60Ah
    - 20A system capacity limit- to 500Ah from 9999Ah
  - Shutdown on emergency now overrides suspend channel on emergency
  - Emergency limit errors now count as operational errors as well, cumulative operational limit errors will not be cleared until emergency errors are cleared
  - Popup shown when step limits are outside of global limits
  - Step limits can be disabled in Settings → StartupConfiguration → Features→ Ignore Step Limits
- Snapshots
  - Loading snapshot from suspended state steptime is more accurate
  - If the last running channel completes, latest running snapshot for that channel is now removed, preventing snapshots for channels that immediately complete upon restarting
  - Warning popup if protocol / data file is missing during loading
    - If Protocol file is missing, the user has a chance to select a new protocol file
    - If files are missing, the user can cancel all snapshots loading - or just those in error
  - No longer delete the snapshot for a channel stopped due to emergency when Shutdown on Emergency configuration is selected
  - Added latest running snapshot backup file
    - Is read automatically if latest running snapshot file is corrupted
    - Saves 2.5 seconds after every successful snapshot save
- Dynamic Current:
  - Enabled by default
  - Now will range change upward if voltage begins to drop
  - More stable range changing downward

    - Debug Option: Include current resistor in datafile
- Protocol List View:
    - Steps can be now removed from the loaded protocols in the expanded view
    - “Increment Cycle” display occasionally not starting at 1 has been fixed.
    - Current Protocol step now bolds correctly when restarting from snapshot if channel is selected
    - Clearing a row or deselecting all rows no longer displays stale protocol
- AppendData checkbox now unchecks after restarting a channel
- Help Dropdown Improvements
    - Factory Reset button added, detailed below
    - Contact us button added containing customer support email
    - Check for Updates button added
- Restore to Defaults / Factory Reset functionality
    - Factory reset button has been added to toolbar → Help → Factory Reset. This will delete all system configurations, global limits, and system limits.
    - The limits configuration can be reset to defaults of software. This can be found in Settings → Safety limits → Restore defaults.
    - The startup configuration can be reset to defaults of software. This can be found in Settings → Startup Configuration → Restore defaults
    - After resetting system configuration or factory reset - IP Network Configuration wizard may need to run
        - User will be prompted once
        - Troubleshoot Network Can be found in Tools → Diagnostics → Troubleshoot Network button
- Voltage and Current display changes
    - 1Volts / 1Amps and above will be displayed in V / A (previous 0.1V / 0.1A and above)
    - 0.001Volts / 0.001Amps and above will be displayed in mV / mA (previously 0.1mV / 0.1mA and above)
    - Lower values will be displayed in uV / uA (previously only 99uV to 10uV)
    - 0 Values will be displayed as 0A
- Diagnostics:
    - Network Troubleshooting popup will no longer appear if the user has already begun network diagnostic
    - Can now select which enabled channel to ping
- Logging
    - View Comm Logs / View Error Logs buttons added to Main screen
    - No Ping Response filling up logs, and other clutter removed from logs
    - Additional logging when Bad Voltage count/ Same Voltage count / Bad Current count / Limits exceeded
    - Logs now detail what a channels current was set to when commands are sent
        - Previous just stated “sending current” with no details
- Start/Stop/Resume/Suspend Batch Control buttons now update more consistently when selected channel status changes
- Column Configuration:
    - Changes now take place only if “OK” is pressed (Cancel is an option)
    - Added “Resistor” column so that active resistor can be seen (dynamic current)
    - Area now hidden by default
- Admin Option added to disable unstable current and voltage safety stops for special circumstances
    - Does not prevent System, Global, and Step limits stops from occurring

2.5.5/2.5.6/2.5.7:

- Modified calibration mechanics to support more versions of hardware/firmware

2.5.4:

- The 20A default lower current is set to 0.00A from 0.01A

- For these changes to take effect, previous 20A system/global limits would need to be removed using factory reset or by contacting NOVONIX for assistance

2.5.3:

- Added 3rd party plugin licensing information

2.5.2:

- Fixed HoldTime End Step - Anytime end condition causing CCCV steps to falsely halt the running protocol

2.5.1:

- Fixed error where historical snapshot folder wasn't being created when month rolled over

2.5.0:

- Snapshot UI / functionality rework to be much less read/write intensive, more user friendly
  - Opens up to latest running snapshots by default to improve use-ability
  - Optional checkbox to show stopped channels when viewing snapshots
  - New Snapshot File Format – Latest running snapshots are all saved together in LatestRunningSnapshots.txt file, updated every 5 seconds, instead of two files per channel (regular and backup) every 5 seconds, much less file I/O
  - Support for importing legacy snapshots / Upgrading from older versions
  - Changing System Name no longer requires restart to create default folders and will offer to migrate snapshot files to the new folder location if the IP stays the same
  - Warning popup displayed to users once per session if Latestrunningsnapshots.txt is opened while tests are running, if this prevents snapshots from being saved
- Opening datafiles during run time will prompt an error to the user after several data points fail to save
  - Implemented improved logic so that data isn't lost after test completes if the user doesn't close the file right away. Additionally, UHPC Control will save the data to a {datafilename}-LostData.csv file if user starts a new test or performs an intentional system shutdown before closing the file for a proper save to occur.
  - This popup warning can be permanently disabled, and re-enabled in Startup Configuration → Features
- Double Click a loaded protocol step, or Right Click → "Edit Protocol" feature added to change voltage of currently loaded / running protocol
  - Does not update protocol file, only adjusts loaded protocol, changes lost on software reboot
- start/stop/suspend/assign protocol functionality of batch and main window has been synchronized into using same code.
  - Protocols started through batch now bold when using the condensed window
- The global and system limit validation bugs are fixed.
- Exception on first launch due to missing file directories fixed
- Renamed "Snapshot Frequency" to "Snapshot Archive Rate" in startup configuration. Updated tooltip.
- Prevent editing IP address / System Name while channels are running
- CC will now switch to CV properly instead of crashing if no "During CC" or "Anytime" step conditions exist
- Tooltips for the advanced configurations page
- Temporarily disabled "Remove Step Instruction" from protocol dropdown
- Switched to yyyy-MM-dd HH:mm:ss date & time formatting
  - example: 2022-12-13 15:29:33

2.4.3:

- Radio button for restarting snapshots to continue with existing data file, or start a new one.
- No Longer creates a new datafile by default when restarting from archived snapshots

2.4.2:

- Communication fix for new 2A boards to support faster messaging speed

- Made default IP address use the same one everywhere (172.29.9.1)
- The validation of only numbers in safety limits, start up config and batch control input has been improved
- Typos like ‘Adress’ have been fixed.
- Bug preventing 2A limits being saved without first clicking another charger, introduced in 2.4.1, has been resolved.

2.4.1:

- Added Diagnostic Tool (under Tools → Diagnostics) to help generate information for customer support issue resolution
- “About” section description updated
- Startup Configuration Charger selection strings updated to not cut off 10A
- Protocol Validator has been created to generalize the validation of protocols
- Batch Control now validates all the selected channels.
- BatchControl error details for the protocol files will be shown in the Error logs on the application if there are too many errors.
- When the application starts the Global and system Limits will be populated in the MainWindow.
- Support for UHPC Plot and datafile updated to be supported by 2.4.0 plot
- Snapshot now uses /datasnapshot/systemname/ folder correctly for hourly snapshots, saves to correct folder, snapshots will properly show up when loading system for first time or “restart from previous chanenl snapshot” is clicked

2.4.0:

- Super-User password change
- Fixed interpolation for Capacity end points (Step type 3) when discharging to correctly sum negatives

2.3.3

- Removing deprecated Thermal / Dual Camera / Safety Module
- Fixed bug introduced to pause conditions in 2.3.2.0
- Fixed bug preventing capacity end steps from firing properly
- Fixed bug for capacity conditions using units other than Ah to default back to Ah

2.3.2.0

- Renamed HPC Control to UHPC Control
- Updated Icons to use latest Novonix Graphics
- Fixed issues when launching software with German regional settings
- Password prompt for advanced and debug tabs in startup configuration window
- Incorrect password prompt no longer shows an "Incorrect Password" popup when clicking x on password prompt
- Added error text when entering blank password
- Fixed bug where EndStep Step Time “During CV” was including CC step time during calculations once CV was hit
- New passwords for each activity, as well as super password
- Data that saves in C:\Novonix now saves under the System Name instead of IP Name, System name must be unique now

2.3.1.0

- Fixed crash at startup if startupConfig missing
- Packets no longer saved to “bytesOutput” folder causing gigabytes of disc drives filling up without being in “save all data” debug mode
- Split up AppendSystemNameAndChannel into two buttons in startup config

2.3.0.1:

- Defaulting “Seven Day Backup” to be false
- Defaulting Batch Control to append CH number
- Adding dropdown for IP Configuration

2.3.0

- 10A support added

> **Info**
> The latest version of each software package is available for download in the NOVONIX Customer Area