Lumic Calibration 2 Software Manual

Ludlum Measurements

April 2026

2.9.0.0 and above

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CHAPTER 1

GETTING STARTED

General Description

Lumic 2 allows the user to connect to certain devices, (currently the Ludlum Models: 3000, 3001, 3002, 3003(i), 3004(i), 3005, 3006, 3007(B/i), 3014, 3019, 3276, and 3078(i) - more to be added later) customize, and calibrate said devices.

The software itself can be customized to a degree by the removal of parameters in either the main view or the printed parameters (conditionally as well). The software can also be customized by modifying or adding display ranges for Count, Dose, and Rate modes per detector.

There is also a Plateau Wizard to help with the calibration of the high voltage, a Detector Calibration Wizard to help determine the Calibration Constant, Dead Time, and Dead Time Second Order parameters, as well as a Wizard to calculate a Chi Squared consistency value for counts.

This software is fully compatible with these Ludlum Models:

- 3000
- 3001
- 3002
- 3003(i)
- 3004(i)
- 3005
- 3006
- 3007(B/i)
- 3009
- 3010

- 3020(LE)(X)
- 3014
- 3019
- 3276
- 3078(i)
- 30(-4)(-7(B))
- 35
- 38
- 79

Minimum Requirements

- **Supported Operating Systems**: Windows 7 and higher (32-bit and 64-bit versions).
- Computer with Intel or compatible 1 GHz or faster processor (2 GHz or faster is recommended).
- Minimum of 256 MB of RAM (1 GB or more is recommended).
- 310 MB of free hard disk space
- .Net Frameworks 4.8 or greater

How to Run the Program

1. Turn on the Device.
2. Run Lumic 2 Software
3. Log in. The default user name is "Admin", and the default password is "password".
4. Plug the device into the computer via USB cable.
5. Click Connect to Instrument and wait for the parameters to load.

CHAPTER 2

LOGIN

2.1 How To's

How to Log in

1. Fill in an appropriate user name and password. The default user name is "Admin", and the default password is "password".
2. Click the **Ok** button.

How to add a new Log in with default settings

1. Click the **Change Login** button.
2. Fill in an appropriate user name and password in the Current User Name and Current Password fields.
3. Fill in the new user name and password in the Updated User Name and Updated Password fields.
4. Ensure that the **Copy over Rules/Settings** checkbox is **not** checked.
5. Click the **Add** button.

How to add a new Log in with the settings from another Log in

1. Click the **Change Login** button.
2. Fill in the user name and password in the Current User Name and Current Password fields that you want to copy the settings from.
3. Fill in the new user name and password in the Updated User Name and Updated Password fields.
4. Ensure that the **Copy over Rules/Settings** checkbox is checked.
5. Click the **Add** button.

How to change the password for a Log in

1. Click the **Change Login** button.
2. Fill in the user name and password in the Current User Name and Current Password fields that you want to change the password for.
3. Fill in the same user name in the Updated User Name field.
4. Fill in the new password in the Updated Password field.
5. Click the **Update** button.

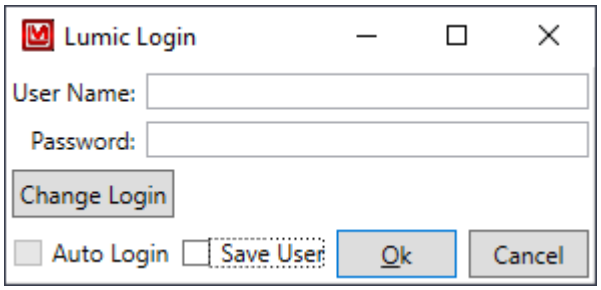
How to replace a Log in

1. Click the **Change Login** button.
2. Fill in the user name and password in the Current User Name and Current Password fields that you want to replace.
3. Fill in the new user name and password in the Updated User Name and Updated Password fields.
4. Click the **Update** button.

2.2 Screen Descriptions

2.2.1 Login Window

This is the password screen that allows the user into the Lumic 2 Software.



User Name

This is the user name to log in with. The default User Name is “Admin”.

Password

This is the password to log in with. The default Password is “password”.

Change Login

This allows the user to change the login user name and/or password.If "Auto Login" was previously selected it must be disabled in order to "Change Login". See section 3.1 .

Auto Login

Checking this will allow the user to skip logging in in the future. This will only be enabled after checking, “Save User.” Checking this will prevent the login screen from being displayed after the first successful login. See section 3.1 .

Save User

Checking this will save the last used user name and fill it in the next time the user starts the Lumic software.

OK

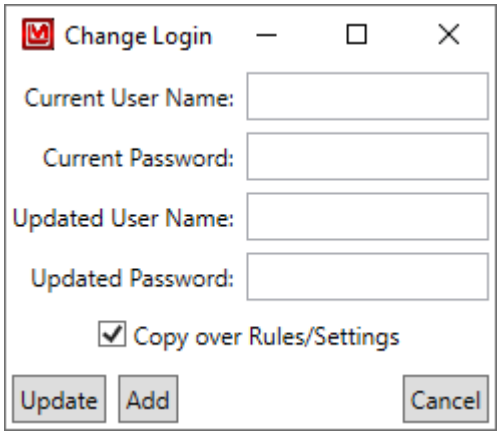
Clicking this will check the user name and password and either (if the user name and password is correct) close this window and open the Lumic 2 Software, or show a pop-up window indicating the error.

Cancel

This command closes this window and the software.

2.2.2 Change Login Window

This allows the user to change the user name and password to log in with.



Current User Name

This is a current user name. If you will be updating the Login, this is the user name that will be replaced.

Current Password

This is the password of the current user name.

Updated User Name

This is the new user name. If you will be updating the Login, this can be the same value as the "Current User Name" if only the password should be changed.

Updated Password

This is the new password. If you will be updating the Login, this can be the same value as the "Current Password" if only the user name should be changed.

Copy Over Rules/Settings

Checking this will copy over any modified Rules/Settings from the current user name to the new User Name. Please note that,in the event of updating an existing user name, is always done regardless of the state of this check box.

Update

Clicking this will either update the user name and password (if everything was correct) or show a pop-up window that indicates what was incorrect.

Add

Clicking this will either add a new user name and password (if everything was correct) or show a pop-up window that indicates what was incorrect.

Cancel

Clicking this closes the window without updating the user name and password.

2.3 How to transfer custom Rules/Settings to different computers

In the event that you want to transfer the custom Rules/Settings to a different computer (such as ensuring everyone has the same custom rules), you will have to copy the files over manually.

The Folder to look for is in `C:\ProgramData\Ludlum Measurements, Inc\Lumic_2_0`. Please note that `ProgramData` is typically hidden by default by Windows, thus you will need to ensure that "Show hidden files, folders, and drives" is selected to be able to see it.

In this folder should be a Folder with the name of the Lumic User you wish to copy. If there is no folder by that name, then there has never been custom Rules/Settings for that Lumic User, though an empty folder may exist if custom Rules/Settings had once been made, and then removed.

Simply copy this folder over to the new computer in the same location `C:\ProgramData\Ludlum Measurements, Inc\Lumic_2_0`.

Please note that just making this folder on a new computer will not create a new Lumic User for that computer. You will still need to create that User (see "How to add a new Log in with default settings" in Section 2.1).

How to show hidden Folders in Windows

1. Open the Windows File Explorer.
2. In the View Menu, select the Options button/icon.
3. In the Folder Options window, go to the View tab.
4. In the Advanced settings group, select the option **Show hidden files, folders, and drives**.
5. Click **Ok**.

How to transfer custom Rules/Settings to a different computer

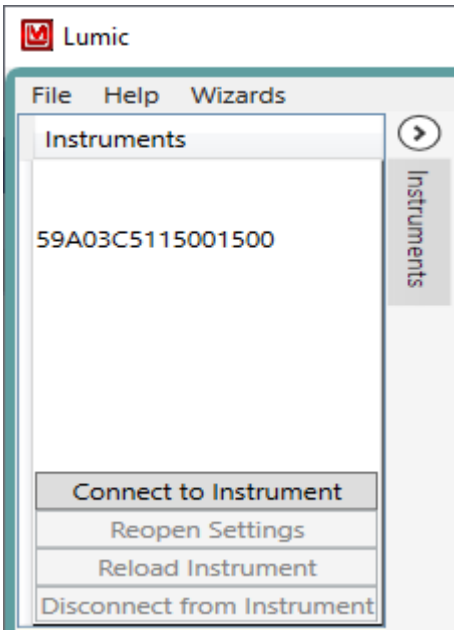
1. Open the Windows File Explorer.
2. Go to `C:` drive.
3. Open the `ProgramData` folder.

4. Open the `Ludlum Measurements, Inc` folder.
5. Open the `Lumic_2_0` folder.
6. Copy the folder with the Lumic User name you wish to copy to a flash drive (or how ever you will transfer the settings).
7. Go the other computer.
8. Repeat steps 1 - 5.
9. Paste the folder into the `Lumic_2_0` folder.
10. If needed, create the new Lumic User via "How to add a new Log in with default settings" in Section 2.1.

CHAPTER 3

MAIN INSTRUMENT SCREEN

3.1 Top Menu



File Menu

Disable Auto Login

This will disable the automatic login, if you need to change any login information but can't due to the LogIn screen being skipped via the Auto Login setting.

Exit

This will close the program.

Help Menu

Change Log

This will display the current Change Log of the software, which is a history of any changes done to the software. Any bolded List items indicate that said list was updated for that version, and thus if you have made any changes to said list, please use the appropriate List Wizard to check or merge the updates into your custom list.

Manual

Opens a copy of the manual installed with the software.

About

Shows the current version of the software.

Wizards Menu

List Wizards

This will open up the List Wizards for customizing the software. A device does not need to be plugged in to use this feature. (See Section 4 for more information).

3.2 Device Menu

Connect to the Instrument

Clicking this will connect to the device, load all parameters, and open the device's Settings tab.

Reopen Settings

Clicking this will open the Settings Tab if closed accidentally.

Note: This does not re-poll the instrument for current saved values. Any changes made but not saved will be pulled backed in with the unsaved visual indications.

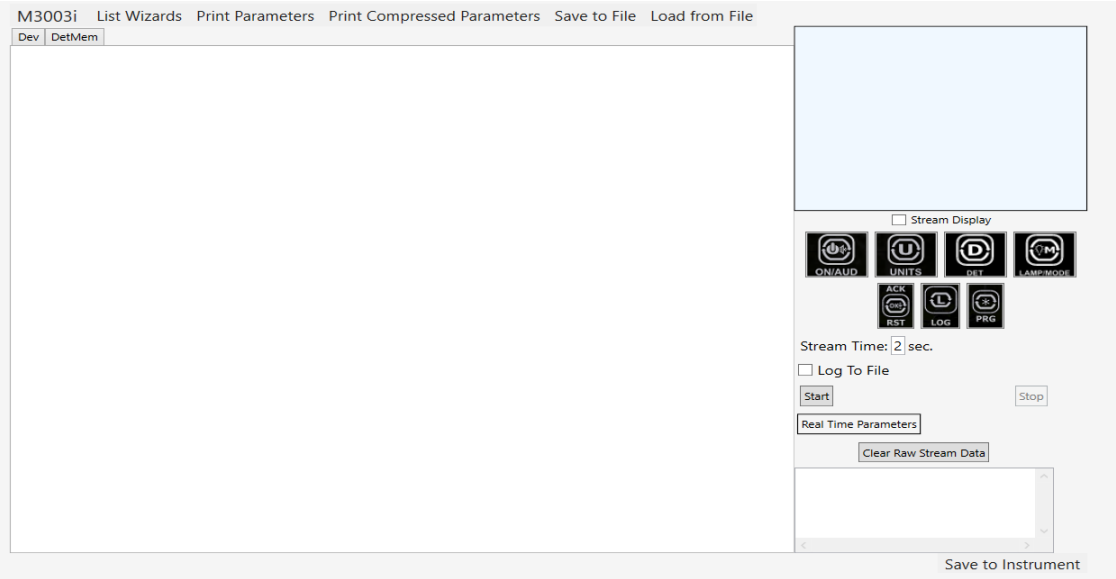
Reload Instrument

Clicking this will reload all parameters, closing the old Settings tab and opening a new Settings tab.

Disconnect from Instrument

Clicking this will close the Settings tab and disconnect the device from the software. This is not required to be done unless connecting to different Lumic Software without closing Lumic 2.

3.3 Device Setting Window



Device Parameters Tab

This is the screen that shows the programmatically generated display built from the device's parameters in combination with the Blacklist (Section 4.1), Conditional Blacklist (Section 4.4), Read Only List (Section 4.7), and potentially sorted with the Regular Priority List (Section 4.10).

Top Menu

List Wizards

Selecting this will open a special version of the List Wizard that displays the wire names of the current Instrument (See Section 4 for more information).

Print Parameters

Selecting this will print the parameters each major group (i.e. "Dev" or "Det Mem") will print on a separate page. This is also programmatically generated with the use of the Print Blacklist (Section 4.1), Print Conditional Blacklist (Section 4.4), and Print Priority List (Section 4.10).

Print Compressed Parameters

Selecting this will print the parameters in a compressed form (multiple major groups per page). This is also programmatically generated with the use of the Print Blacklist (Section 4.1), Print Conditional Blacklist (Section 4.4), and Print Priority List (Section 4.10).

Save to File

This saves the parameters to a file (either as an XML or Comma Separated Value file).

Load from File

This loads the parameters from a file (either as an XML or Comma Separated Value file).

Remote Display

This is either a general replication of the main display screen of the device along with its buttons, or a generic fallback that should work well enough for what is needed. In order for the remote display to update, the “Stream Display Checkbox” must be selected and the “Real-Time Stream Start” button clicked.

Display

This is either a general replication of the main display screen of the device or a generic fallback version.

Stream Display

Checking this box will allow the streaming of the display data. This counts as a single parameter.

Buttons

This is a generic recreation of the buttons on the device (split into different options of press length, typically ordered from the shortest to the longest.) Right-clicking each button will open a menu that allows the user to send a certain length of button press, if such press is desired. Left-clicking will generate a short press on the device.

Real-Time Stream

This starts and stops the real-time streaming of parameters. For now, only up to seven parameters can be streamed at one time.

Stream Time

This is the amount of seconds between each record sent from the device while streaming.

Log to File

Checking this box will allow the user to also save the real-time stream as a Comma Separated Value file.

Start Button

Clicking this button will start the real-time streaming if any parameters are selected to be streamed. Selecting the start button will automatically clear the “Raw Stream Data” if present.

Stop Button

Clicking this will end the real-time streaming.

Real-Time Parameters

This is a list of any real-time parameters being streamed.

Clear Raw Stream Data Button

Clicking this will clear the raw stream data.

Raw Stream Data

This is the raw stream of data. The value of each parameter selected will be streamed at the selected stream time. Each value will be separated by a comma and will be in the order in which they were selected. A time stamp is added at the beginning of each streamed record.

Bottom Menu

Save to Instrument

This saves any changed, valid values to the device.

3.4 Parameters Display

This is a description of how the display of the parameters is generated. It is an organized display of the wire names. It is recommended to use the Wizards when possible, as this display does not understand any semantic or logical connections, such as “Min” and “Max” values, but only the accepted ranges provided by the device.

Conversion from Wire Names

The display is built automatically from the device’s parameters (typically referred to as “Wire Names” when in their raw format). These are broken apart and then grouped together based on each part.

To further explain, following is an example list of Wire Names:

```
Base_Tab[0]_Group1_Field1
Base_Tab[0]_Group1_Field2
Base_Tab[0]_Group2_Field3
Base_Tab[0]_Group2_Field4
Base_Tab[1]_Group1_Field1
Base_Tab[1]_Group1_Field2
Base_Tab[1]_Group2_Field3
Base_Tab[1]_Group2_Field4
OtherBase_Group3_Field5
```

```
OtherBase_Group3_Field6
OtherBase_BrokenUpName
```

Will be converted to:

- Base (tab)
  - Tab 1 (tab)
    - Group 1 (group)
      - Field 1(field)
      - Field 2 (field)
    - Group 2 (group)
      - Field 3(field)
      - Field 4 (field)
  - Tab 2 (tab)
    - Group 1 (group)
      - Field 1(field)
      - Field 2 (field)
    - Group 2 (group)
      - Field 3(field)
      - Field 4 (field)
- Other Base (tab)
  - Broken Up Name (field)
  - Group 3 (tab)
    - Field 5(field)
    - Field 6 (field)

Each Wire Name is broken down based on underscores and added to a nested list of each chunk. Each leaf is the bottom list of each chunk. Then each chunk is checked for ending with a number surrounded by square brackets and is thus set as a tab – all chunks that are in the base list are set to tabs by default. Finally, all chunks' names are cleaned up to appear more readable, such as breaking up what seems to be Camel Case names (CamelCaseField $\rightarrow$ Camel Case Field), turning any numeric tab names into readable numbers (`[0]` $\rightarrow$ 1), etc.

When actually displayed, each collection of chunks is displayed in this order: Fields, Tabs, and Groups.

Tabs

Tabs tend to be either numeric portions of a parameter (such as Unit 1, Unit 2, etc.) or the base portion of parameters (typically Dev or DetMem for most devices). Note that this does not include any parameter that just happens to contain a number (such as DTC2).

Groups

Groups are portions of parameters that are shared by two or more parameters that aren't otherwise grouped into tabs.

Fields

Fields are the final part, representing the parameter itself. Each field can be one of several types, based on its Meta Data information. All fields have a check box that will add it to the list of real-time streaming values. As well as a red "X" that only appears when saving a value to the device, the device reports some error not otherwise caught by the software.

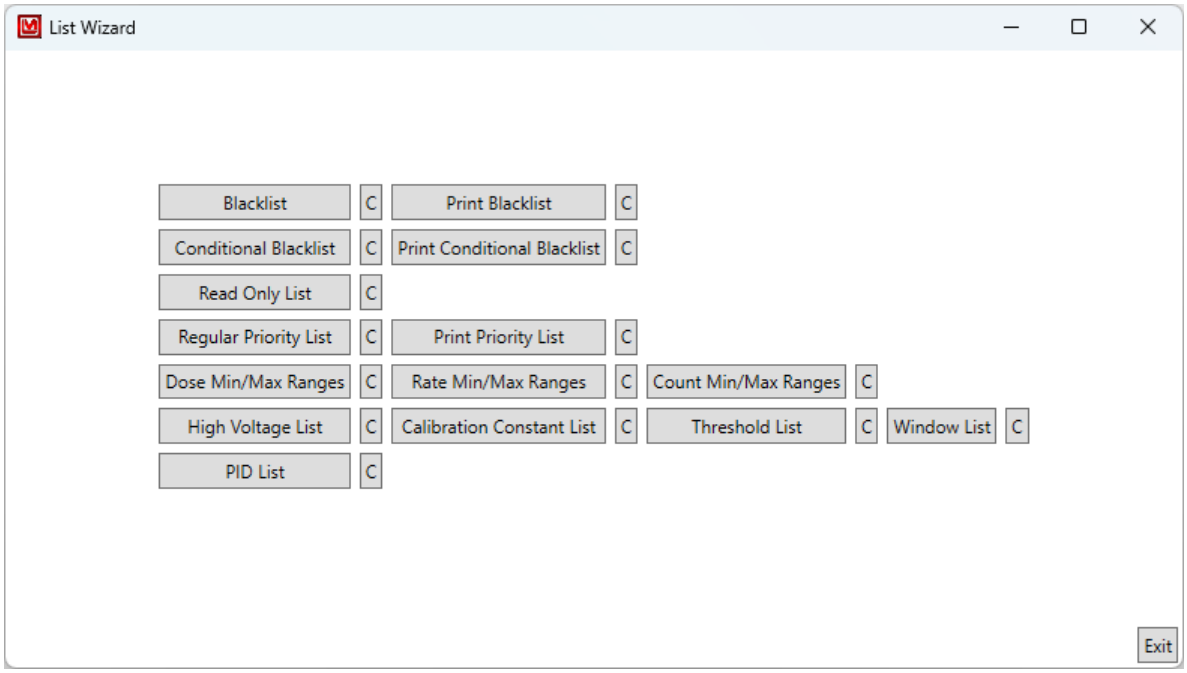
Types of Fields

- **Text Field** - A general text field, which has a minimum and maximum number of characters that can be input.
- **Selection Field** - A drop-down box with all allowed values for the field.
- **Whole Number Field** - A field that only accepts whole numbers (0, 1, 2, etc.).
- **Real Number Field** - A field that only accepts real numbers (0, 0.3, 1, 1.5, 2.7, 2.1e-5, etc.).
- **Checkbox Field** - A simple check box field, which typically is enabling or disabling the setting the parameter represents.
- **Multiple Choice Field** - A collection of check boxes that represent a value that can be made up of one or more parts.
- **SI Prefix Field** - A field that consists of a real number and an SI Prefix (m, k, etc.).
- **SI Prefix Field (3 digits only)** - A field that consists of a real number (with the restriction of only allowing up to 3 significant digits) and an SI Prefix (m, k, etc.). If less than three digits are entered, the missing digits will be post appended as decimal points.
- **Invalid Field** - This would indicate that the Meta data could not be parsed correctly or was not recognized. The best case scenario is that you might be using an older version of the software that does not know about a new field type. This field can still be used, but you should be careful in how you change the value. This will be displayed with an orange background.
- **Unknown Field** - This would indicate that the Meta Data was never read in the first place. This should only show up in older devices. Otherwise, a communication error occurred and the instrument should be reloaded. This will be displayed with an orange background.

CHAPTER 4

LIST WIZARD

The List Wizard provides a way to edit lists that allow the user to customize the main window. See the following figure and definitions of all the buttons shown. Please note that once a list is edited, it may be necessary to “Reload the instrument” in order to see the changes.



C Button

All buttons marked “C” will open a Comparison Window that allows you to compare your current version of the list with the factory default list, if there are any changes to compare.

Blacklist Button

Clicking this will open the Blacklist editing screen. Parameters on the Blackilist will NOT be seen on the software screen.

Print Blacklist Button

Clicking this will open the Print Blacklist editing screen. Parameters on the Print Blackilist will not print on the Print Parameters printout.

Conditional Blacklist Button

Clicking this will open the Conditional Blacklist editing screen. Even though an entire Base Tab or Group is Blacklisted a single parameter from the Tab or Group can be displayed by using the Conditional blacklist.

Print Conditional Blacklist Button

Clicking this will open the Print Conditional Blacklist editing screen. Even though an entire Base Tab or Group is Print Blacklisted a single parameter from the Tab or Group can be printed by using the Print Conditional blacklist.

Read Only List Button

Clicking this will open the Read Only List editing screen. The parameters values box for parameters on the Read Only List will appear blue in the software and the user can not edit them.

Regular Priority List Button

Clicking this will open the Regular Priority List editing screen. This allows the user to reorganized displayed parameters, base tabs, groups, etc.

Print Priority List Button

Clicking this will open the Print Priority List editing screen.This allows the user to reorganized printed parameters, base tabs, groups, etc.

Dose Min/Max Ranges Button

Clicking this will open the Dose Min/Max Ranges editing screen. The values entered here will be used when clicking the Dose Min/Max Wizard (For Most instruments this is in the Unit fields, in the Unit (1-3) tab(s), located in the DetMem(1-5) tab(s), within the basegroup tab DetMem.

Rate Min/Max Ranges Button

Clicking this will open the Rate Min/Max Ranges editing screen. The values entered here will be used when clicking the Rate Min/Max Wizard or Set Min and Max from Min/Max Range (For Most instruments this is in the Unit fields, in the Unit (1-3) tab(s), located in the DetMem(1-5) tab(s), within the basegroup tab DetMem.

Count Min/Max Ranges Button

Clicking this will open the Count Min/Max Ranges editing screen. The values entered here will be used when clicking the Count Min/Max Wizard (For Most instruments this is in the Unit fields, in the Unit (1-3) tab(s), located in the DetMem(1-5) tab(s), within the basegroup tab DetMem.

High Voltage List Button

Clicking this will open the High Voltage List editing screen. The values entered here will be used when clicking the Set High Voltage button.

Calibration Constant List Button

Clicking this will open the Calibration Constant List editing screen. The values entered here will be used when clicking the Set Calibration Constant button.

Threshold List Button

Clicking this will open the Threshold List editing screen. The values entered here will be used when clicking the Set Threshold button.

Window List Button

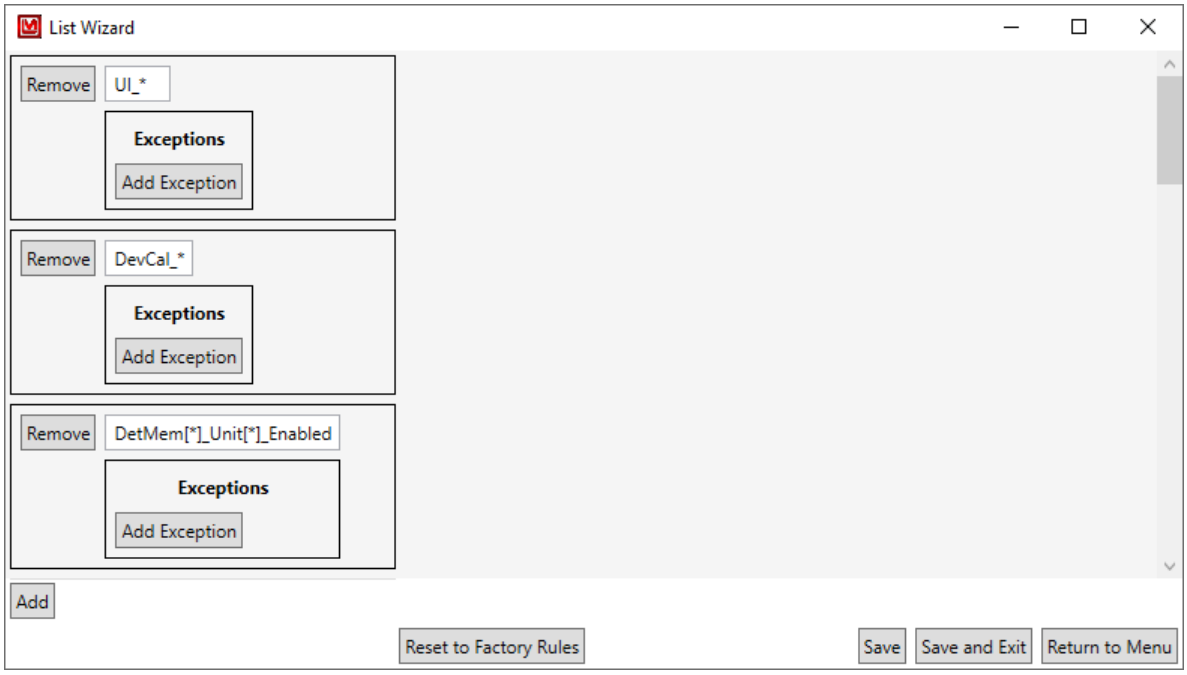
Clicking this will open the Window List editing screen. The values entered here will be used when clicking the Set Window button.

PID List Button

Clicking this will open the PID List editing screen. If a new instrument is created to work with Lumic 2 Software, but is not seen by the software it may be necessary to edit this list. Please contact Ludlum Measurements before editing this list.

4.1 Regular and Print Blacklists

This is a list of wire names that should not be shown on the main screen. These tend to be parameters that are used by wizards that are not intended for general use. Since the wire names can be specified with wildcard values, exceptions can also be specified.



Remove Button

Clicking this will remove the blacklist item making it visible in the main screen of the software after the instrument has been reloaded.

Wire Name

This is the specific name given to a certain parameter in firmware. The exact case sensitive wire name is what is used to blacklist (remove from main screen of software) parameters. This can have one or more wildcard values, denoted by an asterisk (*). This wildcard can represent any number of characters (including no characters). For example, in the previous screenshot the last parameter blacklisted is `DetMem[*]_Unit[*]_Enabled`. This is used to block the user from disabling any units for any detectors. The wildcard is used twice, first to signify that this condition applies to all `detectors[0-4]` and also applies to all `Units[0-2]` for those detectors.

Remove Button (within exception)

Clicking this will remove the exception to the blacklist making it visible in the main screen of the software after the instrument has been reloaded.

Exception Wire Name

This is the wire name to exclude from the blacklist. This can also include wildcard values.

Add Exception Button

Clicking this will add a new exception to the blacklist item.

Add Button

Clicking this will add a new blacklist item.

Reset to Factory Rules Button

Clicking this will reset to the current settings to the Factory Rules.

Save Button

Clicking this will save any changes.

Save and Exit Button

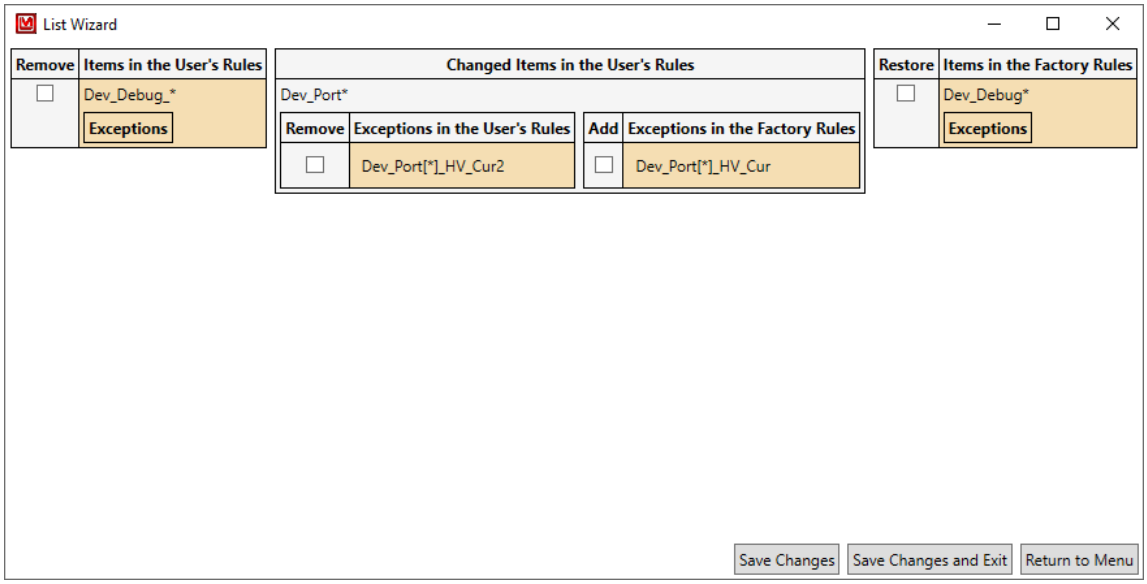
Clicking this will save any changes and returns to the main menu.

Return to Menu Button

Clicking this will return the user to the main menu.

4.2 Regular and Print Blacklists Comparer

This is a list of any differences between the current User's Rules and the factory defaults. It will display "No differences found" if there are no differences. The orange tint is there to help highlight the changes.



Remove Checkbox

Checking this will remove the item from the user's list.

Add Checkbox

Checking this will add the item to the user's list.

Save Changes Button

Clicking this will save any changes.

Save Changes and Exit Button

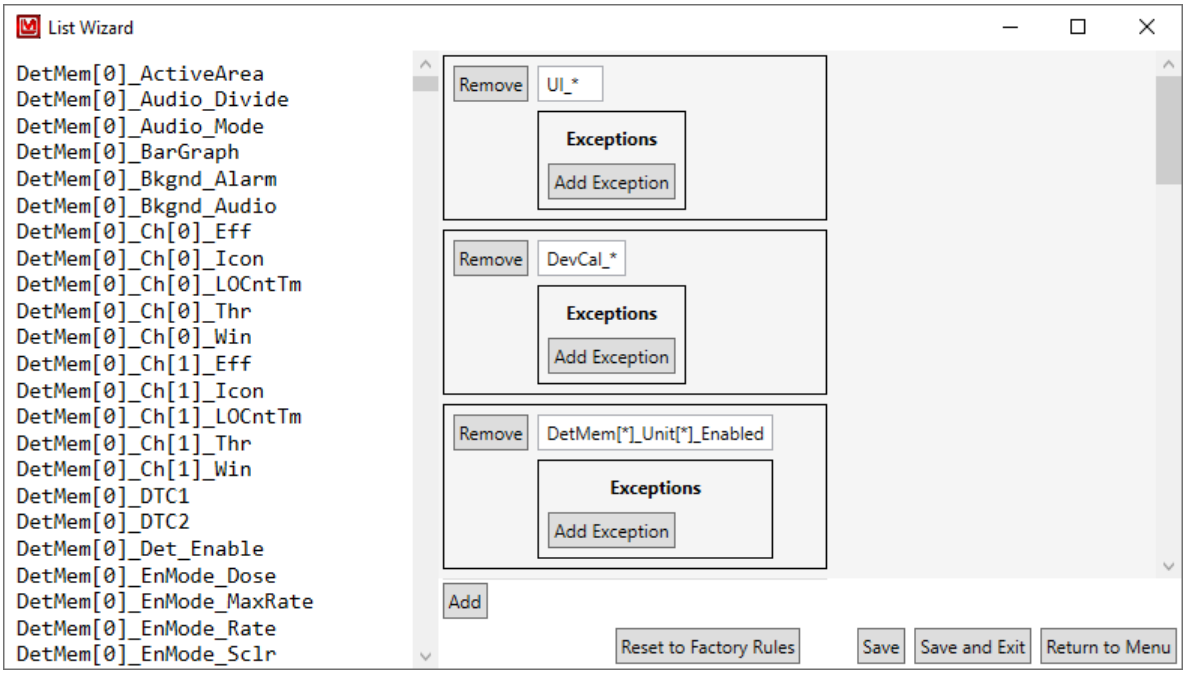
Clicking this will save any changes and returns to the main menu.

Return to Menu

Clicking this will return user to main menu.

4.3 Regular and Print Blacklists With Parameters

This is the normal Blacklist and Print Blacklist along with a display of the parameters of the current instrument. It is similar in every way to the standard Blacklist and Print Blacklist Wizard.

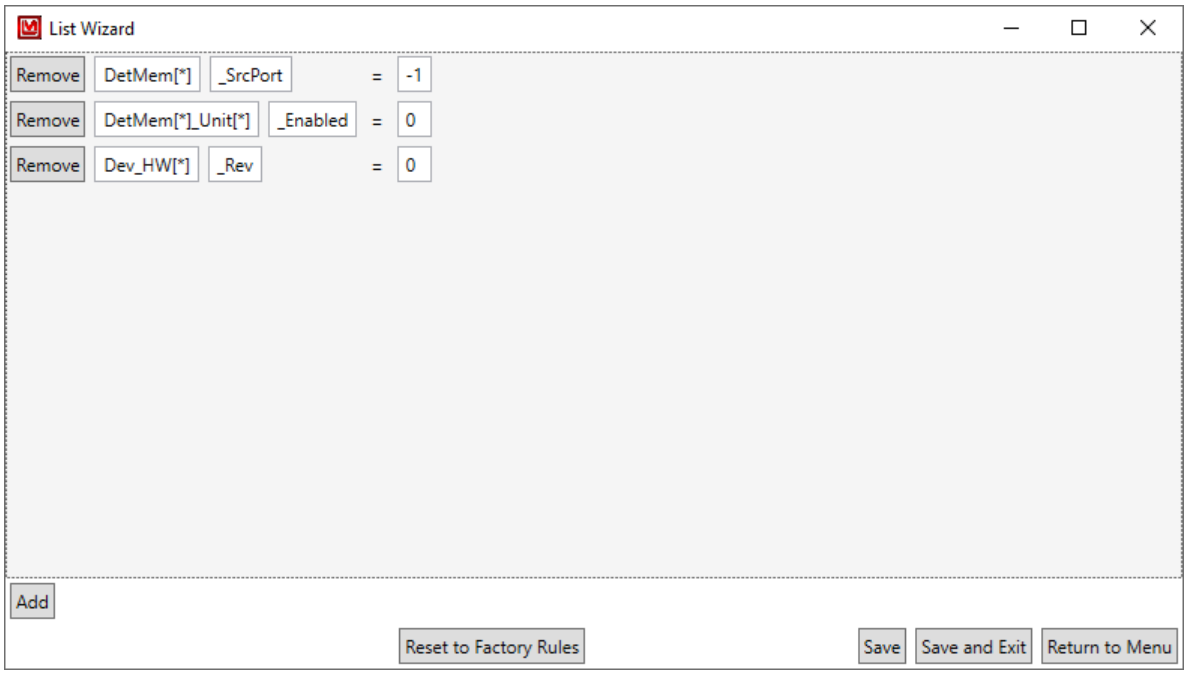


Parameter List

This is the list of parameters of the current instrument.

4.4 Regular and Print Conditional Blacklists

This is a list of wire names that will not be shown on the main screen if it equals the given value. These tend to be parameters that are inapplicable for the current settings of the device, such as disabled Units or Hardware.



Remove Button

Clicking this will remove the conditional blacklist item.

Wire Name (or prefix)

This is either the wire name to conditionally remove, or the initial part of a group of wire names that will all be removed if the specified tail is equal to the value. This can have one or more wildcard values, denoted by an asterisk (*). This wildcard can represent any number of characters (including no characters).

Wire Name (tail)

If this is filled in, then the combined value becomes the triggering value for all wire names that match the prefix value. This can also include wildcard values.

Value

This is a conditional value that determines whether or not the wire name is to be displayed.

Add Button

This adds a new conditional wire name.

Reset to Factory Rules Button

Clicking this will reset to the current settings to the Factory Rules.

Save Button

Clicking this will save any changes.

Save and Exit Button

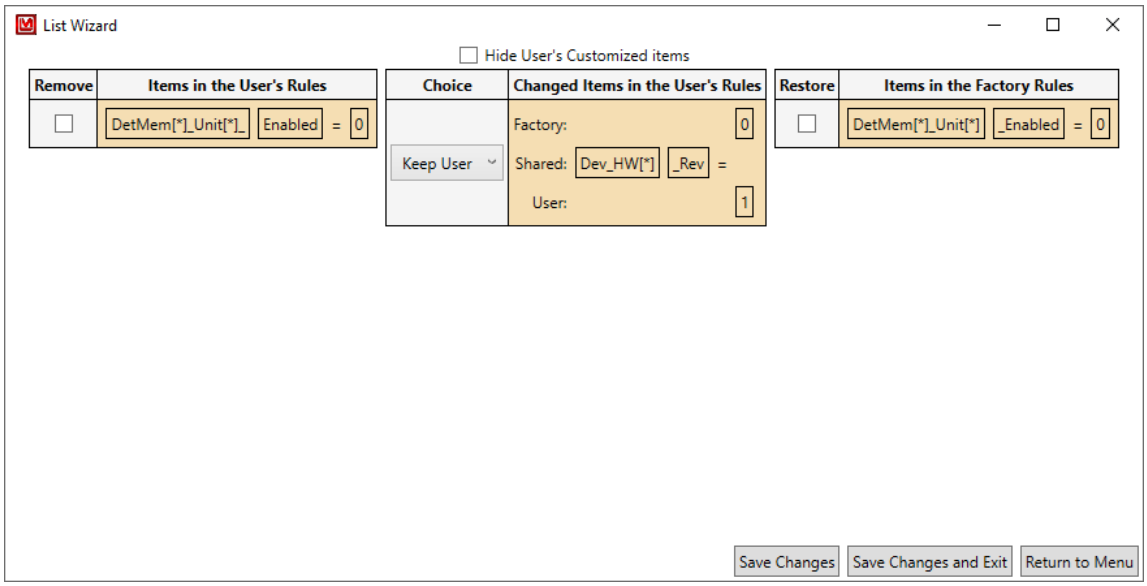
Clicking this will save any changes and returns to the main menu.

Return to Menu Button

Clicking this will return the user to the main menu.

4.5 Regular and Print Conditional Blacklists Comparer

This is a list of any differences between the current User's Rules and the Factory defaults. It will display "No differences found." if there are no differences. The orange tint is there to help highlight the changes.



Hide User's Customized Items Checkbox

Checking this will hide the Changed Items in the User's Rules column.

Remove Checkbox

Checking this will remove the item from the user's list.

Keep Selection

This allows the user to select which version of the item to keep.

Add Checkbox

Checking this will add the item to the user's list.

Save Changes Button

Clicking this will save any changes.

Save Changes and Exit Button

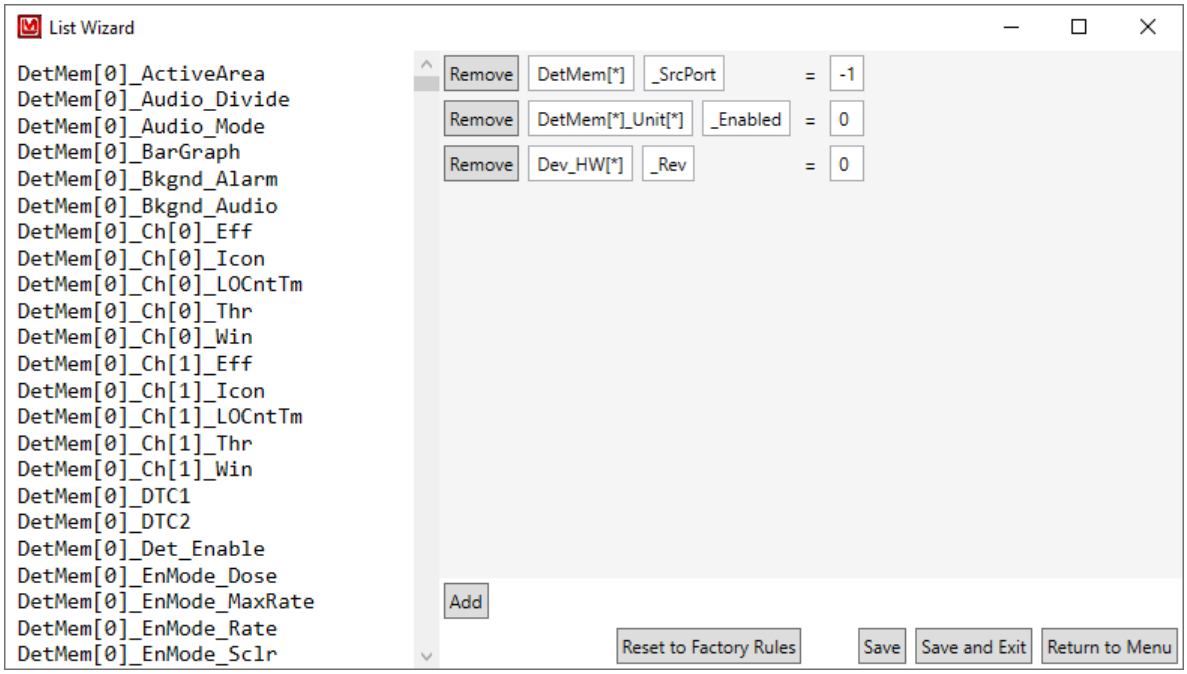
Clicking this will save any changes and returns to the main menu.

Return to Menu

Clicking this will return user to main menu.

4.6 Regular and Print Conditional Blacklists With Parameters

This is the normal Conditional Blacklist and Conditional Print Blacklist along with a display of the parameters of the current instrument. It is similar in every way to the standard Conditional Blacklist and Conditional Print Blacklist Wizard.

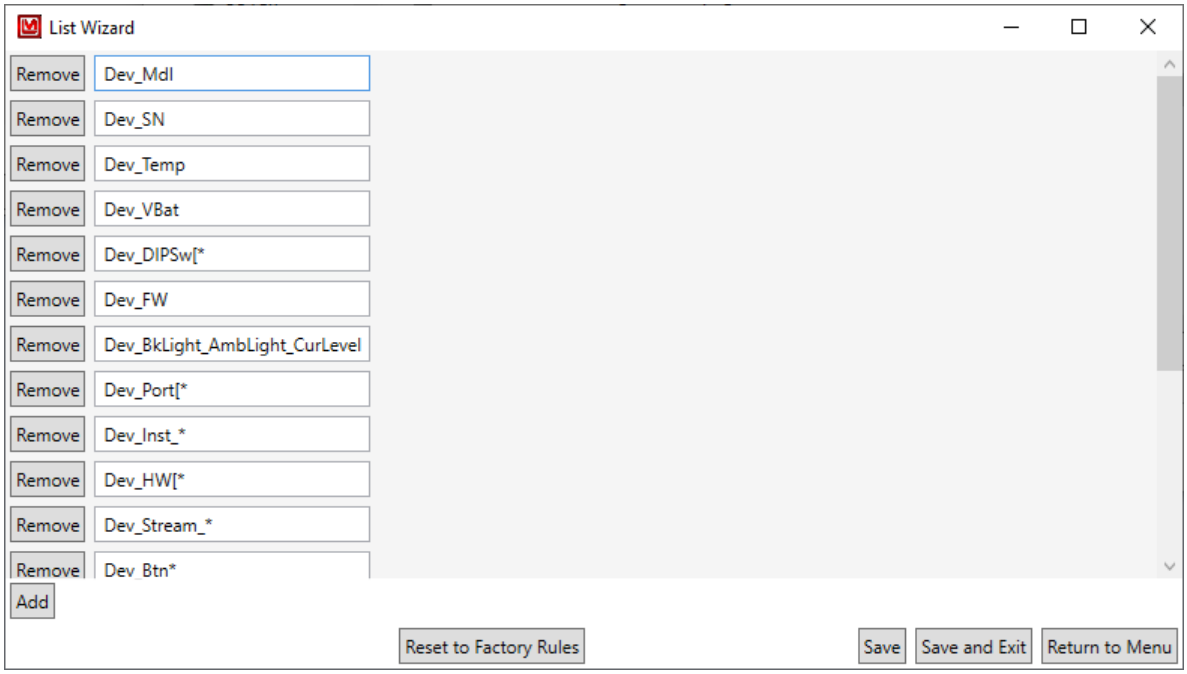


Parameter List

This is the list of parameters of the current instrument.

4.7 Read Only List

This is a list of wire names that should not be able to be set by the user, but only displayed to the user, such as the current battery voltage. It is recommended, but not required, to contain all of the wire names in the Black List. This recommendation is for when something was not intended to be seen, thus it should likely not be able to be changed.



Remove Button

Clicking this will remove the read-only item.

Wire Name

This is the wire name to make read only. It can have one or more wildcard values, denoted by an asterisk (*). This wildcard can represent any number of characters (including no characters).

Add Button

Clicking this will add a new read-only item.

Reset to Factory Rules Button

Clicking this will reset to the current settings to the Factory Rules.

Save Button

Clicking this will save any changes.

Save and Exit Button

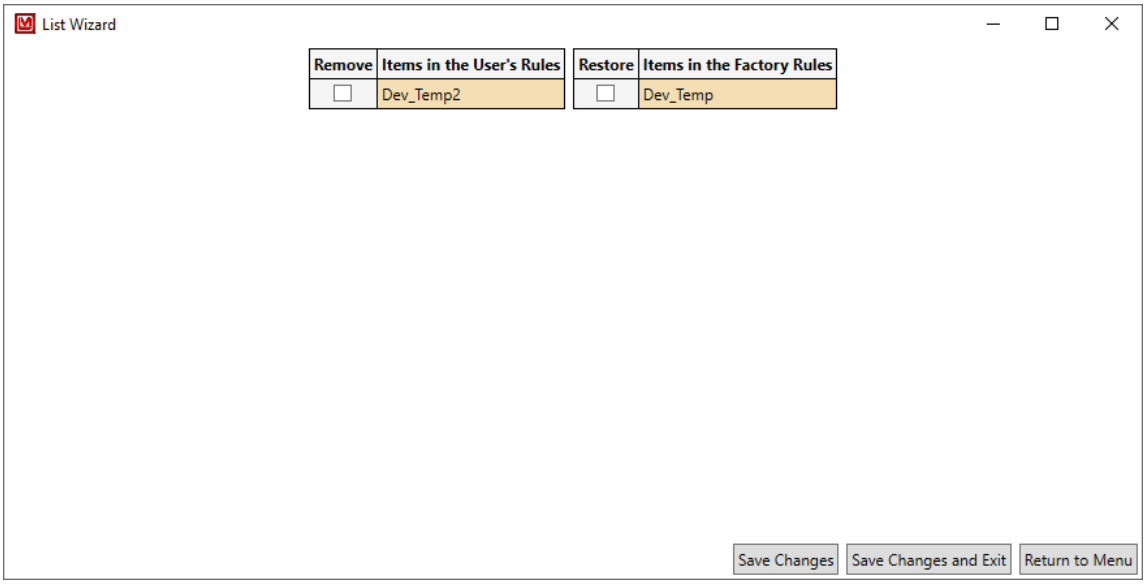
Clicking this will save any changes and returns to the main menu.

Return to Menu Button

Clicking this will return the user to the main menu.

4.8 Read Only List Comparer

This is a list of any differences between the current User's Rules and the Factory defaults. It will display "No differences found." if there are no differences. The orange tint is there to help highlight the changes.



Remove Checkbox

Checking this will remove the item from the user's list.

Add Checkbox

Checking this will add the item to the user's list.

Save Changes Button

Clicking this will save any changes.

Save Changes and Exit Button

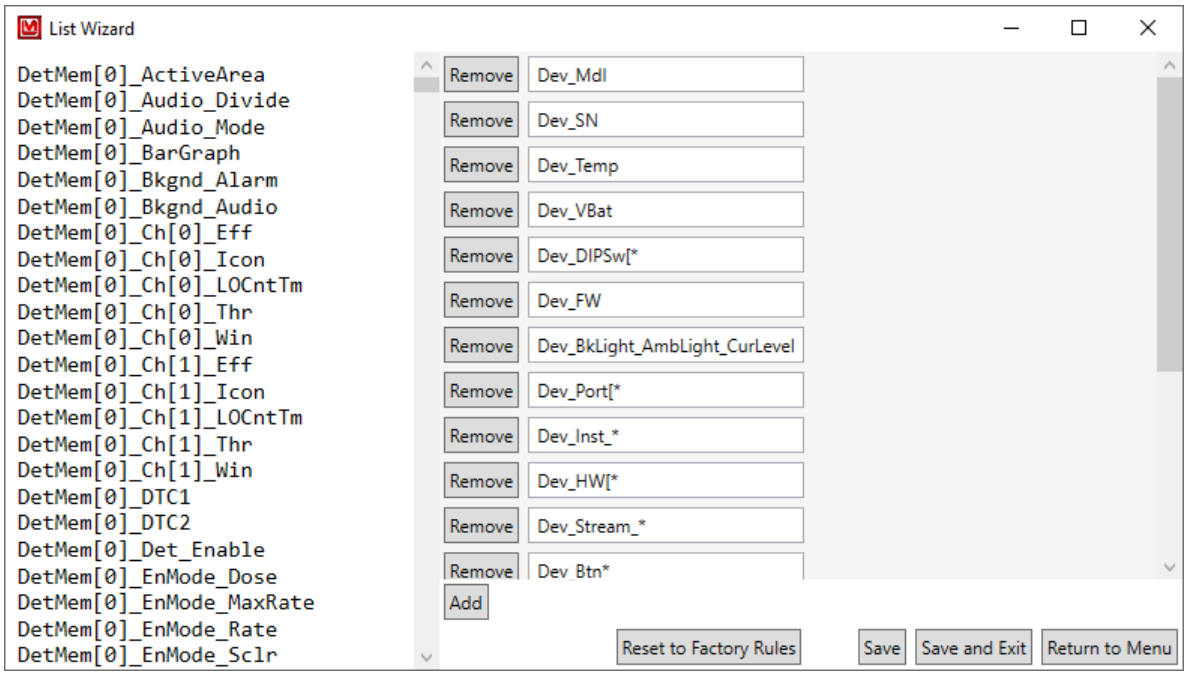
Clicking this will save any changes and returns to the main menu.

Return to Menu

Clicking this will return user to main menu.

4.9 Read Only List With Parameters

This is the normal Read Only List along with a display of the parameters of the current Instrument. It is similar in every way to the standard Read Only List Wizard.



Parameter List

This is the list of parameters of the current instrument.

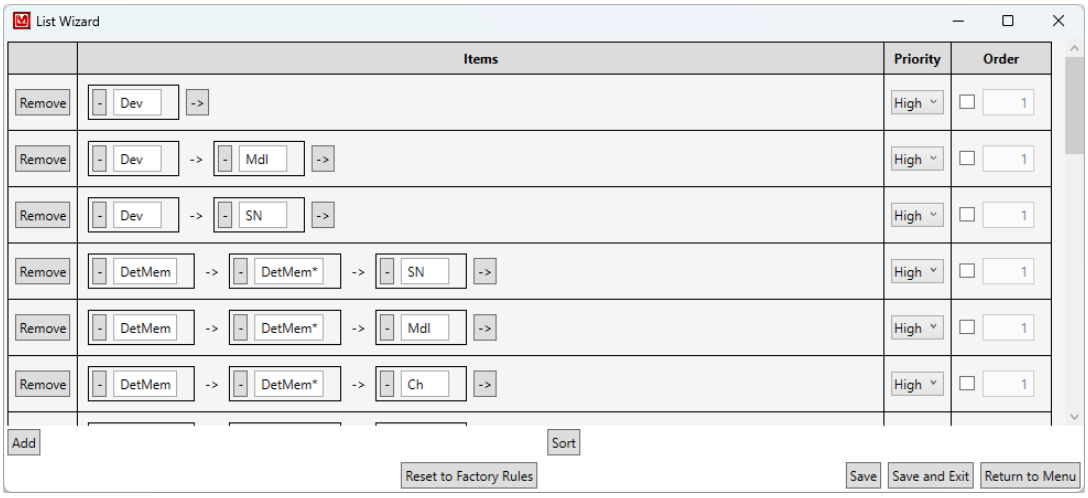
4.10 Regular and Print Priority Lists

This is a list of displayed items to be sorted to the top or bottom of the others in its collection of displayed items. Since this works on display names rather than just wire names, this allows the user to sort entire tabs and groups rather than just fields.

How these display names are generated from the Wire Names is explained in Section 3.4. Some examples from the following image:

- `Dev High` makes it so that the base group "Dev" will always be sorted before any other base group.
- `Dev → Mdl High` makes it so that the "Mdl" field inside of "Dev" will always be sorted before any other field. (Please note that this Wizard does not know nor care that this resolves into a field, it will attempt to sort anything named "Mdl" directly inside "Dev").
- `Dev → SN High` makes it so that the "SN" field inside of "Dev" will always be sorted before anything else. (Please note that Display Items will keep their relative positioning. So, "SN" will come after "Mdl", but this Wizard can not guarantee that).
- `DetMem → DetMem* → Unit Low` makes it so that the "Unit" group inside of any group that starts with "DetMem" that itself is inside "DetMem" will always be sorted AFTER anything else.

Also, please note that the Print version does not generate a parent group for numbered groups, thus rather than `DetMem → DetMem* → Unit Low`, it will need `DetMem* → Unit Low`.



Remove Button

Clicking this will remove the collection of display items.

'-' (Minus) Button

Clicking this will remove the current display item from the collection.

Display Item

This is the name of the display item. This can have one or more wildcard values, denoted by an asterisk (*). This wildcard can represent any number of characters (including no characters). Each subsequent item is one that is directly nested within the previous one.

'→' (arrow) button

Clicking this will add a new display item in the collection.

Priority Selection

This is the priority of the display item. "High" will group all items marked as such within the same display parent to the right or and/or above other items, as appropriate. "Low" will group all items marked as such within the same display parent to the left of and/or below other items, as appropriate. "Medium" requires an explicit order (see the next section) and will be sorted in between "High" and "Low".

Order Setting

This allows the user to give an explicit order to the items. Items without an explicit order will always be sorted after ones with an explicit order. The checkbox indicates whether to use the number as the explicit order. The number indicates the order the items will be sorted in, with 1 at the top and larger numbers below it.

Add Button

Clicking this will add a new collection of display items.

Reset to Factory Rules Button

Clicking this will reset to the current settings to the Factory Rules.

Save Button

Clicking this will save any changes.

Save and Exit Button

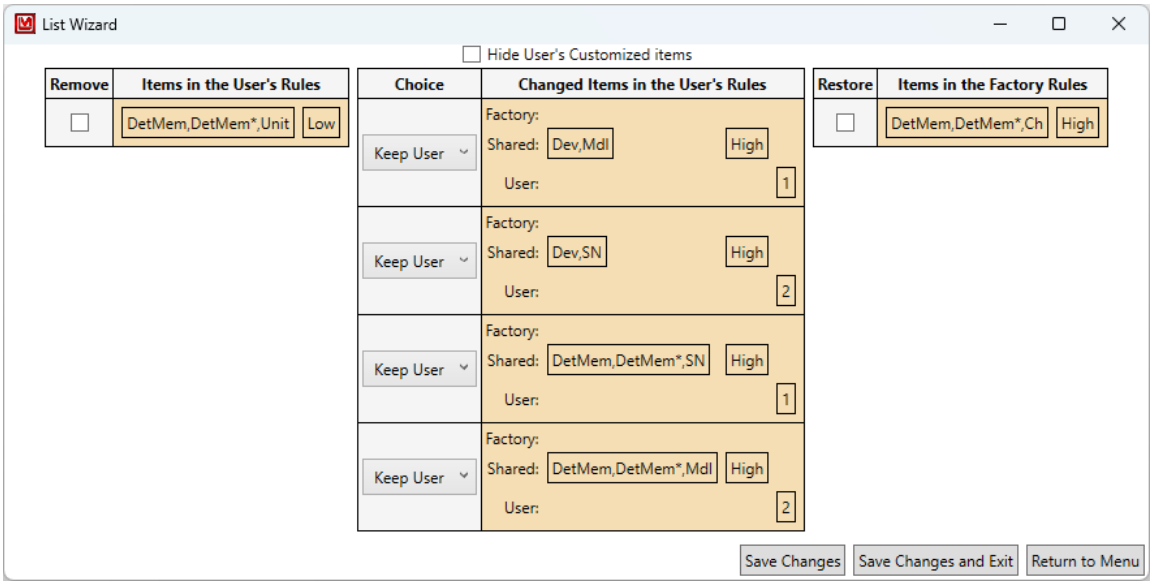
Clicking this will save any changes and returns to the main menu.

Return to Menu Button

Clicking this will return the user to the main menu.

4.11 Regular and Print Priority Lists Comparer

This is a list of any differences between the current User's Rules and the Factory defaults. It will display "No differences found." if there are no differences. The orange tint is there to help highlight the changes.



Hide User's Customized Items Checkbox

Checking this will hide the Changed Items in the User's Rules column.

Remove Checkbox

Checking this will remove the item from the user's list.

Keep Selection

This allows the user to select which version of the item to keep.

Add Checkbox

Checking this will add the item to the user's list.

Save Changes Button

Clicking this will save any changes.

Save Changes and Exit Button

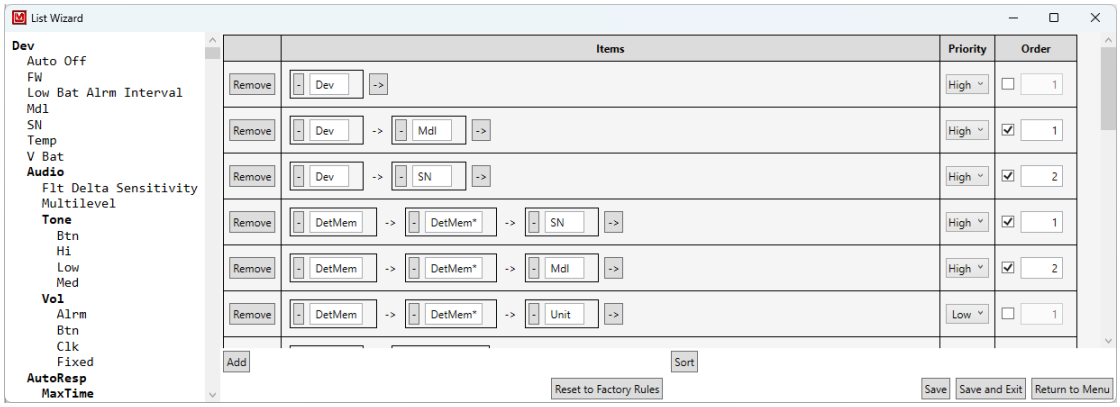
Clicking this will save any changes and returns to the main menu.

Return to Menu

Clicking this will return user to main menu.

4.12 Regular and Print Priority Lists With Parameters

This is the normal Regular Priority List and Print Priority List along with a display of the parameters of the current Instrument. It is similar in every way to the standard Regular Priority List and Print Priority List Wizard.

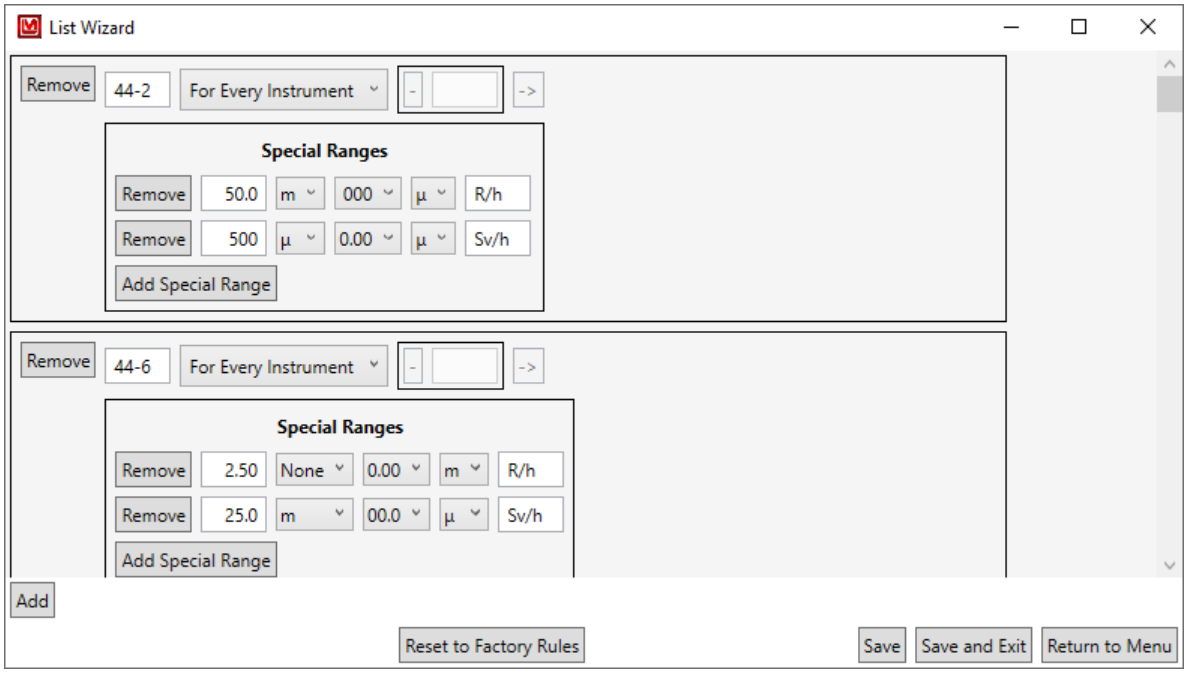


Parameter List

This is the list of parameters of the current instrument. Bolded items are representations of items that are parents of the indented items.

4.13 Dose, Rate, and Count Min/Max Ranges

This is a list of known instrument model specific minimum and maximum values that said instrument can read.



Remove Button

Clicking this will remove the instrument model and its ranges.

Model Name

This is the name of the model for the special ranges.

Range Application Selection

This allows the user to select whether the Range is applied to every instrument ("For Every Instrument") or only the given instruments ("For Only"). If "For Every Instrument" is selected, any instruments in the Instruments list is ignored.

'-' (Minus) Button

Clicking this will remove the current instrument from the collection.

Instrument Model

This is the name of one of the instruments to only apply the Range to. At least one is required if "For Only" is selected. Can not be blank if "For Only" is selected.

'→' (arrow) button

Clicking this will add a new instrument to the collection.

Remove Button (within Special Ranges)

Clicking this will remove the special range from the list of ranges.

Maximum Value

This is the maximum value for the range, from 0.00 to 999.

Maximum Value SI Prefix Selection

This is the maximum value's SI prefix, such as "µ" or "k". "None" is used for no prefix.

Minimum Value

This is the minimum value, restricted to "0.00," "00.0," "000," and "0". The single zero is there to let the Wizard know to not allow decimal places for the minimum value. This is generally useful for count and count-like units where it would be impossible to have a half of a value.

Minimum Value SI Prefix Selection

This is the minimum value's SI prefix, such as "µ" or "k". "None" is used for no prefix.

Unit

This is the unit for the range.

Add Special Range Button

This adds a new special range for the model.

Add Button

This adds a new model with special ranges to respect.

Reset to Factory Rules Button

Clicking this will reset to the current settings to the Factory Rules.

Save Button

Clicking this will save any changes.

Save and Exit Button

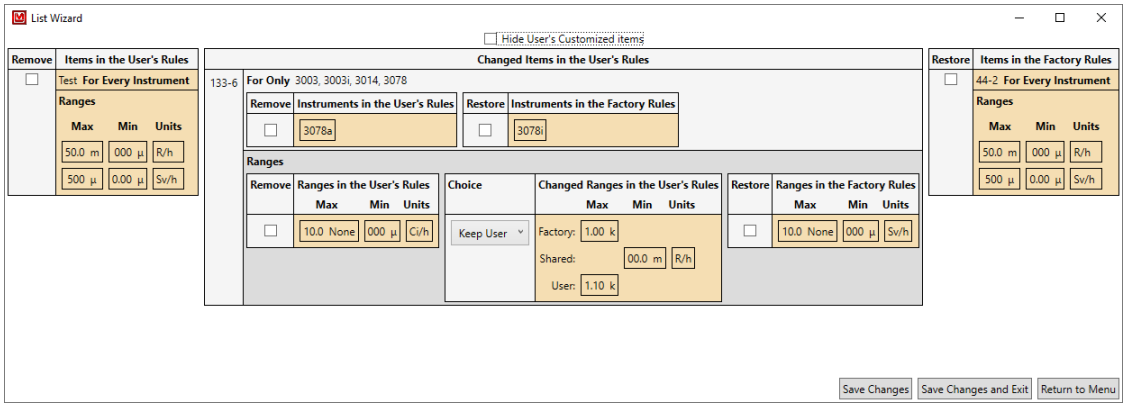
Clicking this will save any changes and returns to the main menu.

Return to Menu Button

Clicking this will return the user to the main menu.

4.14 Dose, Rate, and Count Min/Max Ranges Comparer

This is a list of any differences between the current User's Rules and the Factory defaults. It will display "No differences found." if there are no differences. The orange tint is there to help highlight the changes.



Hide User's Customized Items Checkbox

Checking this will hide the Changed Ranges in the User's Rules column within the Changed Items in the User's Rules column.

Remove Checkbox

Checking this will remove the item from the user's list.

Keep Selection

This allows the user to select which version of the item to keep.

Add Checkbox

Checking this will add the item to the user's list.

Save Changes Button

Clicking this will save any changes.

Save Changes and Exit Button

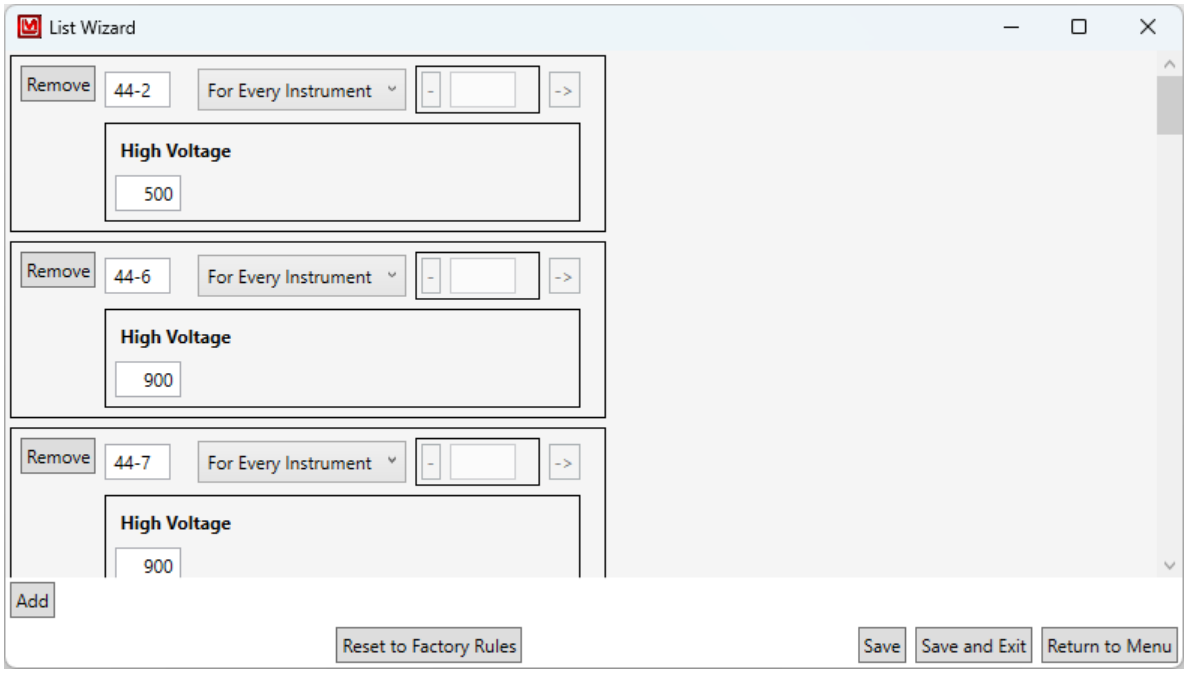
Clicking this will save any changes and returns to the main menu.

Return to Menu

Clicking this will return user to main menu.

4.15 High Voltage List

This is a list of known instrument model specific default High Voltage values.



Remove Button

Clicking this will remove the instrument model and its High Voltage.

Model Name

This is the name of the model for the High Voltage.

High Voltage Application Selection

This allows the user to select whether the High Voltage is applied to every instrument ("For Every Instrument") or only the given instruments ("For Only"). If "For Every Instrument" is selected, any instrument in the Instruments list is ignored.

'-' (Minus) Button

Clicking this will remove the current instrument from the collection.

Instrument Model

This is the name of one of the instruments to which to only apply the High Voltage. At least one is required if "For Only" is selected. This cannot be blank if "For Only" is selected.

'→' (Arrow) Button

Clicking this will add a new instrument to the collection.

High Voltage

This is the value for the High Voltage, from 1 to 65535.

Add Button

This adds a new model with High Voltage.

Reset to Factory Rules Button

Clicking this will reset current settings to the Factory Rules.

Save Button

Clicking this will save any changes.

Save and Exit Button

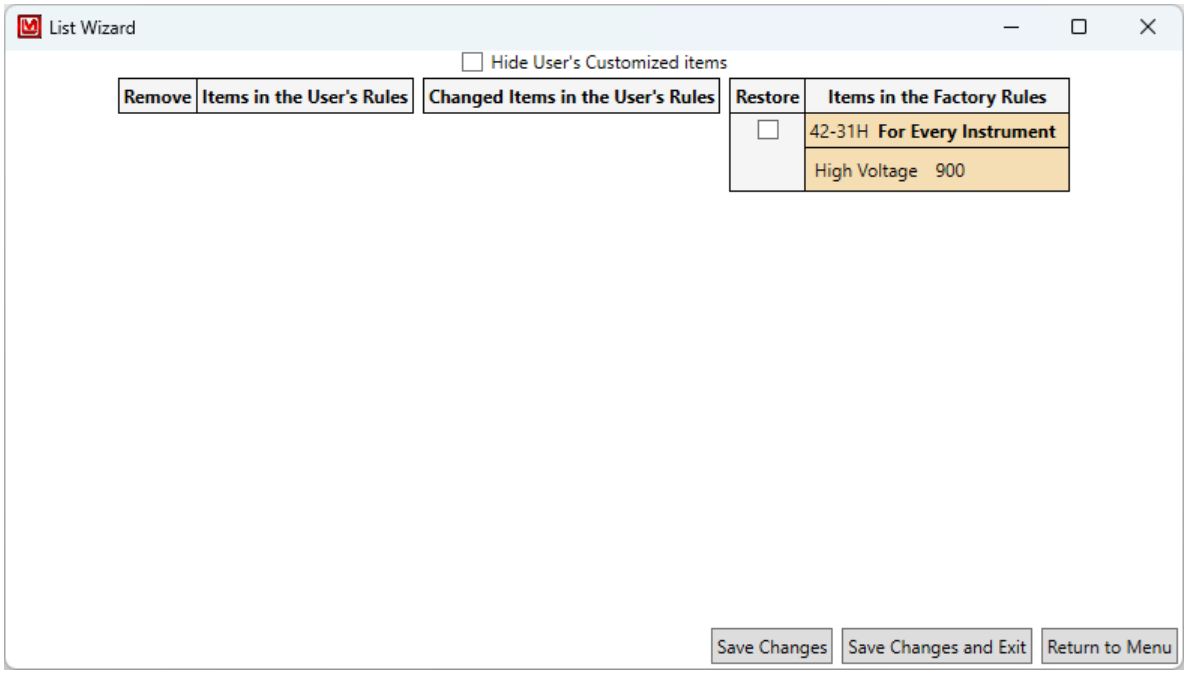
Clicking this will save any changes and returns to the main menu.

Return to Menu Button

Clicking this will return the user to the main menu.

4.16 High Voltage List Comparer

This is a list of any differences between the current User's Rules and the Factory defaults. If there are no differences, it will display "No differences found." The orange tint is there to help highlight the changes.



Hide User's Customized Items Checkbox

Checking this will hide the Changed Ranges in the User's Rules column within the Changed Items in the User's Rules column.

Remove Checkbox

Checking this will remove the item from the user's list.

Keep Selection

This allows the user to select which version of the item to keep.

Add Checkbox

Checking this will add the item to the user's list.

Save Changes Button

Clicking this will save any changes.

Save Changes and Exit Button

Clicking this will save any changes and returns to the main menu.

Return to Menu

Clicking this will return user to main menu.

4.17 Calibration Constant List

This is a list of known instrument model specific default Calibration Constant values.

Remove Button

Clicking this will remove the instrument model and its Calibration Constant.

Model Name

This is the name of the model for the Calibration Constant.

Calibration Constant Application Selection

This allows the user to select whether the Calibration Constant is applied to every instrument ("For Every Instrument") or only the given instruments ("For Only"). If "For Every Instrument" is selected, any instrument in the Instruments list is ignored.

'-' (Minus) Button

Clicking this will remove the current instrument from the collection.

Instrument Model

This is the name of one of the instruments to which to only apply the Calibration Constant. At least one is required if "For Only" is selected. This cannot be blank if "For Only" is selected.

'→' (Arrow) Button

Clicking this will add a new instrument to the collection.

Calibration Constant

This is the value for the Calibration Constant.

Add Button

This adds a new model with Calibration Constant.

Reset to Factory Rules Button

Clicking this will reset the current settings to the Factory Rules.

Save Button

Clicking this will save any changes.

Save and Exit Button

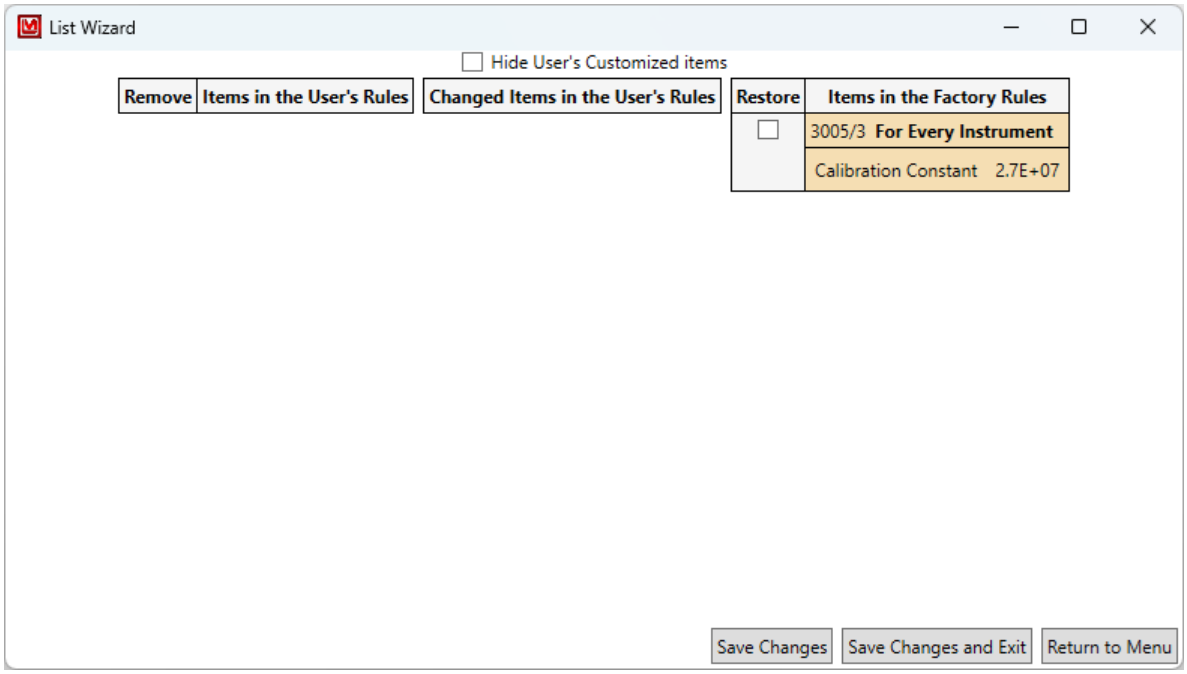
Clicking this will save any changes and returns to the main menu.

Return to Menu Button

Clicking this will return the user to the main menu.

4.18 Calibration Constant List Comparer

This is a list of any differences between the current User's Rules and the Factory defaults. If there are no differences, it will display "No differences found." The orange tint is there to help highlight the changes.



Hide User's Customized Items Checkbox

Checking this will hide the Changed Ranges in the User's Rules column within the Changed Items in the User's Rules column.

Remove Checkbox

Checking this will remove the item from the user's list.

Keep Selection

This allows the user to select which version of the item to keep.

Add Checkbox

Checking this will add the item to the user's list.

Save Changes Button

Clicking this will save any changes.

Save Changes and Exit Button

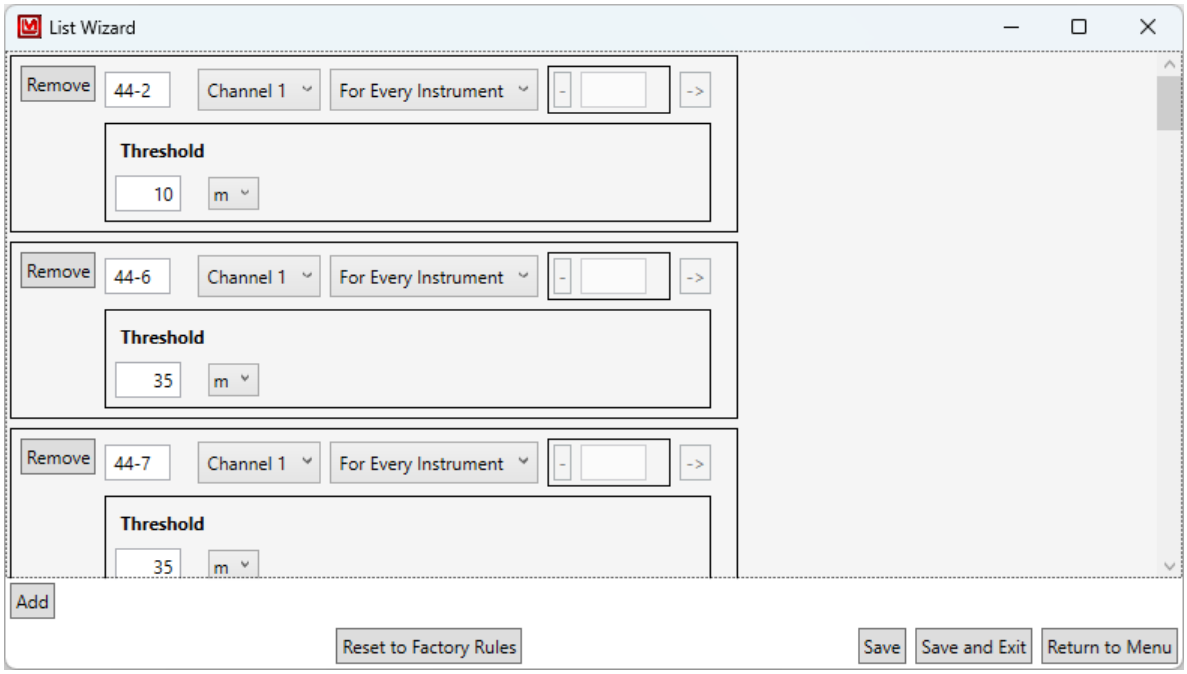
Clicking this will save any changes and returns to the main menu.

Return to Menu

Clicking this will return user to main menu.

4.19 Threshold List

This is a list of known instrument model specific default Threshold values.



Remove Button

Clicking this will remove the instrument model and its Threshold.

Model Name

This is the name of the model for the Threshold.

Threshold Application Selection

This allows the user to select whether the Threshold is applied to every instrument ("For Every Instrument") or only the given instruments ("For Only"). If "For Every Instrument" is selected, any instrument in the Instruments list is ignored.

'-' (Minus) Button

Clicking this will remove the current instrument from the collection.

Instrument Model

This is the name of one of the instruments to which to only apply the Threshold. At least one is required if "For Only" is selected. This cannot be blank if "For Only" is selected.

'→' (Arrow) Button

Clicking this will add a new instrument to the collection.

Threshold

This is the value for the Threshold.

Threshold SI Prefix Selection

This is the Threshold's SI prefix, such as "µ" or "k". "None" is used for no prefix.

Add Button

This adds a new model with Threshold.

Reset to Factory Rules Button

Clicking this will reset to the current settings to the Factory Rules.

Save Button

Clicking this will save any changes.

Save and Exit Button

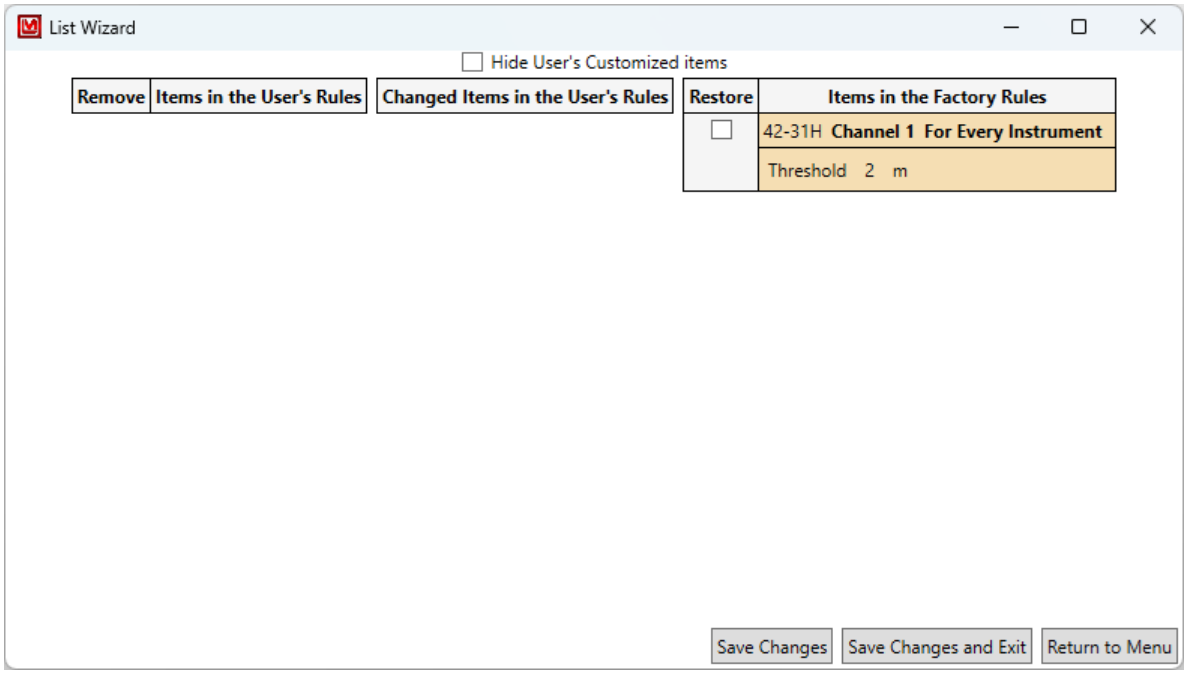
Clicking this will save any changes and returns to the main menu.

Return to Menu Button

Clicking this will return the user to the main menu.

4.20 Threshold List Comparer

This is a list of any differences between the current User's Rules and the Factory defaults. If there are no differences, it will display "No differences found." The orange tint is there to help highlight the changes.



Hide User's Customized Items Checkbox

Checking this will hide the Changed Ranges in the User's Rules column within the Changed Items in the User's Rules column.

Remove Checkbox

Checking this will remove the item from the user's list.

Keep Selection

This allows the user to select which version of the item to keep.

Add Checkbox

Checking this will add the item to the user's list.

Save Changes Button

Clicking this will save any changes.

Save Changes and Exit Button

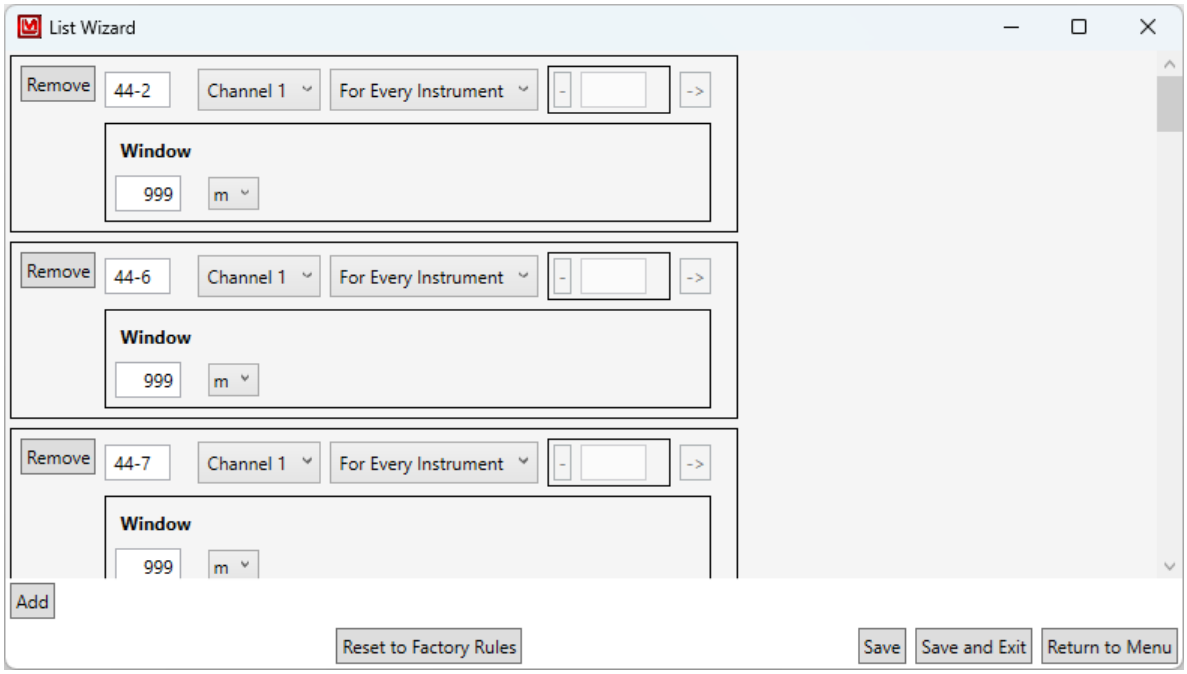
Clicking this will save any changes and returns to the main menu.

Return to Menu

Clicking this will return user to main menu.

4.21 Window List

This is a list of known instrument model specific default Window values.



Remove Button

Clicking this will remove the instrument model and its Window.

Model Name

This is the name of the model for the Window.

Window Application Selection

This allows the user to select whether the Window is applied to every instrument ("For Every Instrument") or only the given instruments ("For Only"). If "For Every Instrument" is selected, any instrument in the Instruments list is ignored.

'-' (Minus) Button

Clicking this will remove the current instrument from the collection.

Instrument Model

This is the name of one of the instruments to which to only apply the Window. At least one is required if "For Only" is selected. This cannot be blank if "For Only" is selected.

'→' (Arrow) Button

Clicking this will add a new instrument to the collection.

Window

This is the value for the Window.

Window SI Prefix Selection

This is the Window's SI prefix, such as "µ" or "k". "None" is used for no prefix.

Add Button

This adds a new model with Window.

Reset to Factory Rules Button

Clicking this will reset the current settings to the Factory Rules.

Save Button

Clicking this will save any changes.

Save and Exit Button

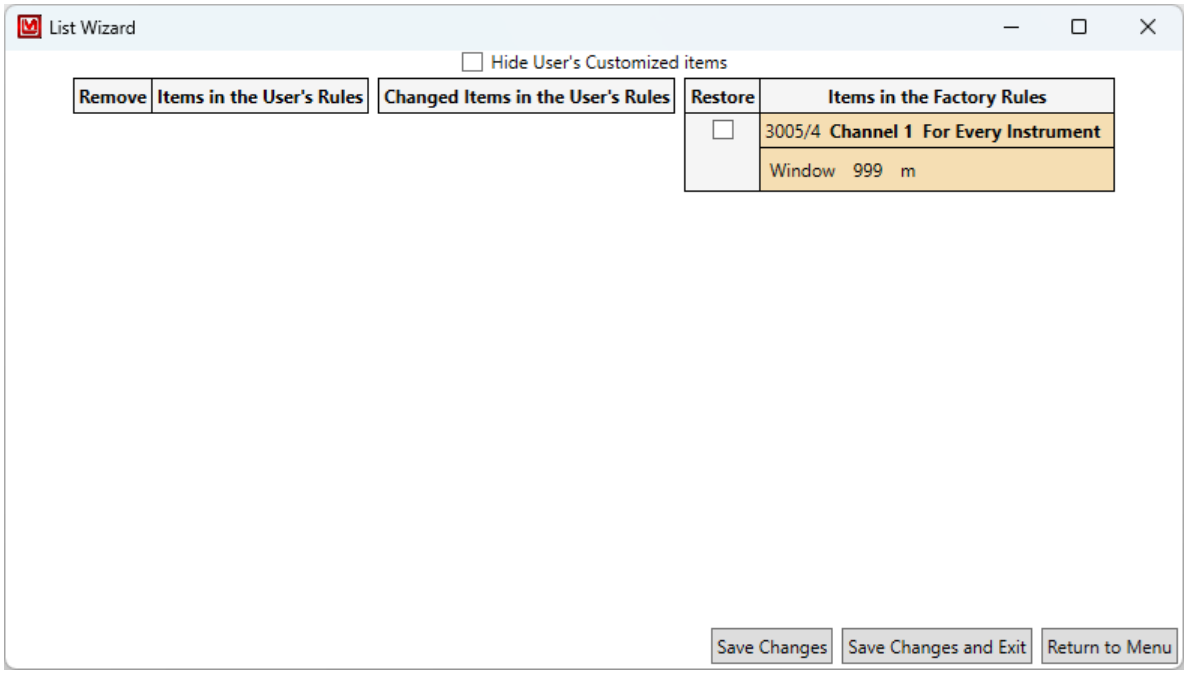
Clicking this will save any changes and returns to the main menu.

Return to Menu Button

Clicking this will return the user to the main menu.

4.22 Window List Comparer

This is a list of any differences between the current User's Rules and the Factory defaults. If there are no differences, it will display "No differences found." The orange tint is there to help highlight the changes.



Hide User's Customized Items Checkbox

Checking this will hide the Changed Ranges in the User's Rules column within the Changed Items in the User's Rules column.

Remove Checkbox

Checking this will remove the item from the user's list.

Keep Selection

This allows the user to select which version of the item to keep.

Add Checkbox

Checking this will add the item to the user's list.

Save Changes Button

Clicking this will save any changes.

Save Changes and Exit Button

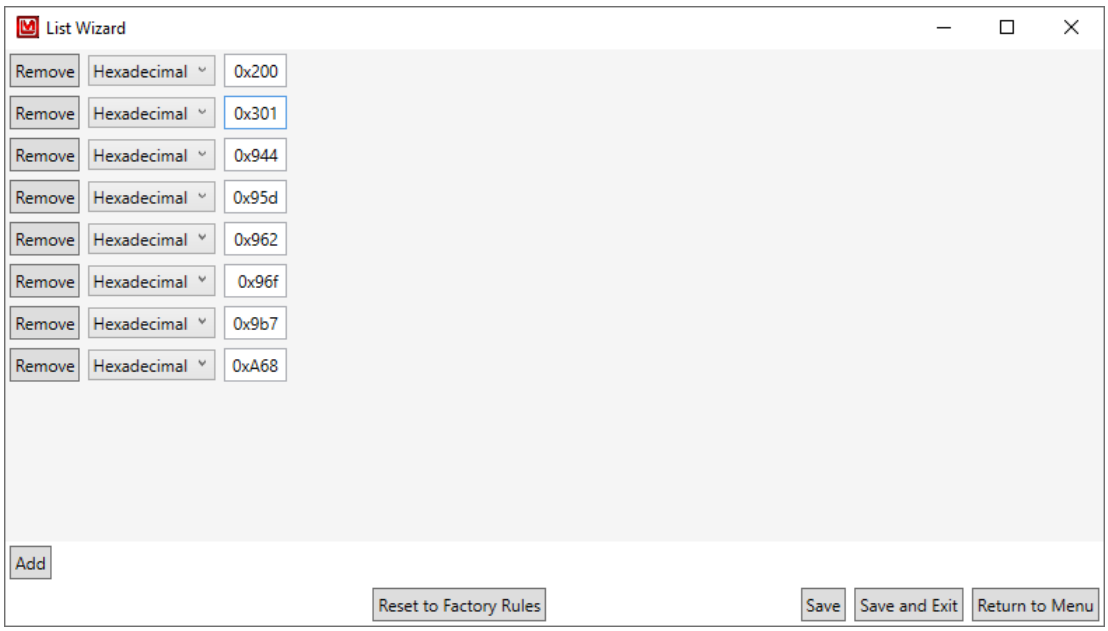
Clicking this will save any changes and returns to the main menu.

Return to Menu

Clicking this will return user to main menu.

4.23 PID List

This is the list of Product ID values to identify Lumic compatible Ludlum instruments.



Remove Button

This removes the Product ID from the list.

Number Type Selection

This is the type of number the Product ID is entered in. “Binary” for 1s and 0s, “Octal” for 0-7, “Decimal” for 0-9 (typical numbers), and finally “Hexadecimal” for 0-f or 0-F.

Product ID Value

This is the Product ID to use. This must be numeric digits only, with an optional prefix of “0x” or “0X” for hexadecimal numbers.

Add Button

This adds a new Product ID to the list.

Reset to Factory Rules Button

Clicking this will reset to the current settings to the Factory Rules.

Save Button

Clicking this will save any changes.

Save and Exit Button

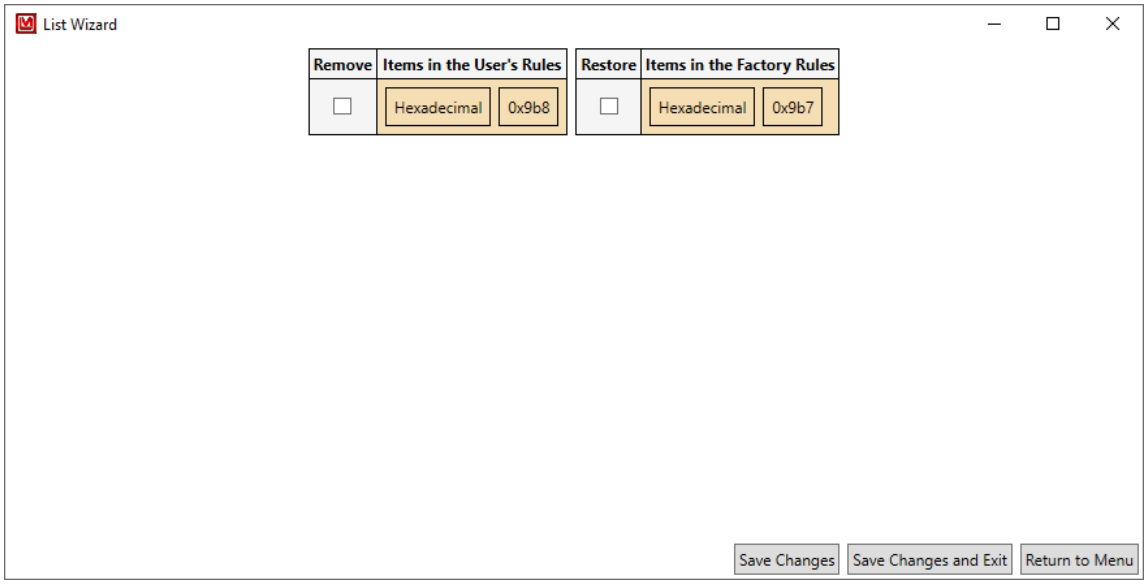
Clicking this will save any changes and returns to the main menu.

Return to Menu Button

Clicking this will return the user to the main menu.

4.24 PID List Comparer

This is a list of any differences between the current User's Rules and the Factory defaults. It will display "No differences found." if there are no differences. The orange tint is there to help highlight the changes.



Remove Checkbox

Checking this will remove the item from the user's list.

Add Checkbox

Checking this will add the item to the user's list.

Save Changes Button

Clicking this will save any changes.

Save Changes and Exit Button

Clicking this will save any changes and returns to the main menu.

Return to Menu

Clicking this will return user to main menu.

CHAPTER 5

POSSIBLE WIZARDS

5.1 Possible Buttons and Wizards

These “Wizards” are simply buttons that will set certain parameters to appropriate values.

Simple Button Wizards

Set to Clock (if Applicable for Real Time Clock Group)

This sets the real-time clock parameters to the current system time.

Set to Clock (if Applicable for Calibration Time Group)

This sets the calibration time parameters to the current system time.

Set both to Clock (Applicable if Real Time Clock and Calibration Time are in the Same Group)

This sets the real-time clock and calibration time parameters to the current system time.

Set Min and Max from Mix/Max Range (if Applicable for Rate)

This sets the rate’s minimum and maximum value to the values that the Rate Min Max Wizard uses, if the specified detector model can be found. Note that the user should select the desired unit type (R/h or Sv/h) before selecting this Simple Button Wizard.

Set to Disabled (if Applicable for Calibration Time Group)

This sets the calibration time parameters to zero to indicate it is disabled.

Set High Voltage

This sets the High Voltage value to a default value, if the specified detector model can be found in the High Voltage List (See Section 4.15 for more information).

Set Calibration Constant

This sets the Calibration Constant value to a default value, if the specified detector model can be found in the Calibration Constant List (See Section 4.17 for more information).

Set Threshold

This sets the Threshold value to a default value, if the specified detector model can be found in the Threshold List (See Section 4.19 for more information).

Set Window

This sets the Window value to a default value, if the specified detector model can be found in the Window List (See Section 4.21 for more information).

Full Wizards

These “wizards” open their own windows.

Run Plateau (if Applicable for the Detector Memory)

See Plateau.

Run Detector Cal (if Applicable for the Detector Memory)

See Detector Cal. A different version of this button will show up based on what can be set for the device. The user may choose whichever is appropriate for their needs.

Full is for calibrating all three parameters (Calibration Constant, Dead Time, and Dead Time Second Order) if the user expects to have both low readings and very high readings (e.g. approximately 100 μR/h to 1000 R/h).

Cal Const and Dead Time is for calibrating just those two parameters (Dead Time Second Order, if present, will be set to zero when saved) if the user expects to have low readings and high readings (e.g. approximately 100 μR/h to 10 R/h).

Cal Const Only is for calibrating just the Calibration Constant (Dead Time and Dead Time Second Order, if present, will be set to zero when saved) if the user expects just low readings (e.g. approximately 100 μR/h to 100 mR/h).

Cal Const and Fixed Dead Time is for calibrating just the Calibration Constant with a known Dead Time value, typically for neutron detectors and some scintillator detectors, (Dead Time Second Order, if present, will be set to zero when saved) if the user expects to have low readings and high readings (e.g. approximately 100 μR/h to 10 R/h).

Dose Min Wizard (if Applicable for Dose)

See Dose Min Wizard.

Rate Min Max Wizard (if Applicable for Rate)

See Rate Min Max Wizard or Rate Min Max Zero Only Wizard (as appropriate).

Count Min Wizard (if Applicable for Count)

See Count Min Wizard or Count Min Max Zero Only Wizard (as appropriate).

Unit Min Max Wizard (if Applicable for Unit)

See Unit Min Max Wizard.

5.2 Plateau Wizard

Plateau Procedure

Selecting this option will open a window that will lead you through a plateau procedure, which is commonly done to find the desired operating voltage for a particular detector. This procedure involves taking measurements with the detector at different voltages. The measurements at each voltage may include no radiation source (just background radiation), and/or one or more radiation sources. For example, a typical plateau for a scintillator detector might involve taking data from 600 to 1000 Vdc and measuring background radiation and a radiation source ^{241}Am.

The criteria for determining the desired operating voltage is up to the user, so this Plateau Wizard merely automates the measurement process.

How to Take a Plateau with Background Readings

1. Set the Fields as needed. See Section 5.2 for more details.
2. Ensure the **Does not take Background** checkbox is unchecked.
3. Add, remove, or edit the sources as needed.
4. Click the **Start** Button.
5. Move all sources out of the range of the detector.
6. Click the **OK** Button.
    a) Position the indicated source appropriately.
    b) Click the **OK** Button.
    c) Repeat.
7. Review the readings to find the optimal high voltage.
8. Either click on the button with the optimal high voltage, or type in the desired high voltage.
9. Click the **Send** Button.

How to Take a Plateau without Background Readings

1. Set the Fields as needed.
2. Ensure the **Does not take Background** checkbox is checked.
3. Add, remove, or edit the sources as needed.
4. Click the **Start** Button.
    a) Position the indicated source appropriately.
    b) Click the **OK** Button.
    c) Repeat.
5. Review the readings to find the optimal high voltage.
6. Either click on the button with the optimal high voltage, or type in the desired high voltage.
7. Click the **Send** Button.

How to Retake One or More Plateau Readings

1. Take a plateau.
2. Click the **Retake** Button.
3. Check the check boxes on the right of any readings you wish to retake.
4. Click the **Retake Selected** Button.
5. The program will now take the plateau again, but only take the readings that you indicated.

How to Change the HV Range of a Plateau

1. Take a plateau.
2. Click the **Adjust HV Range** Button.
3. Click the **+** and **-** buttons next to the **Starting** and **Ending** voltages to change them as desired.
4. Click the **Accept Changes** Button.
5. If needed, the program will take the plateau again, but only take the readings for the new voltages.

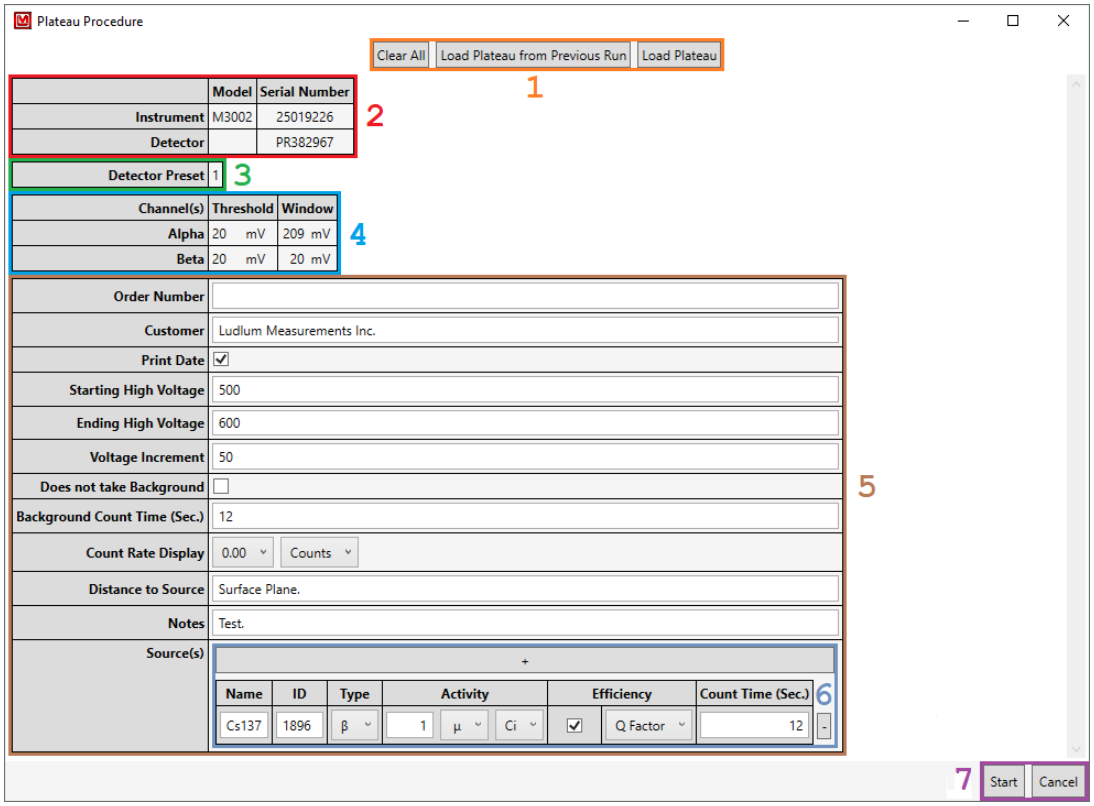
How to Take a Uniformity Check after a Plateau

1. Take a plateau.
2. If this is an alpha/beta device, select the type of the source to take a Uniformity Check.
3. Click the **Run Uniformity Check** Button (a new Window will pop up).
4. Adjust the Uniformity Settings as needed.
5. Click the **Run** Button.
6. Follow the instructions.
7. Click the **Accept** Button.

Screen Descriptions

Plateau Procedure Setup

It is recommended to already have the appropriate detector connected, and the appropriate detector selection on the instrument active before beginning the Wizard.



Section 1

Clear All Clicking this button will clear out all of the fields except source information.

Load Plateau from Previous Run Clicking this will load up the data from the last plateau ran and switches to the Plateau screen. If the software closed unexpectedly during the plateau this will reopen the plateau in process.

Load Plateau Clicking this will load the data of a previously saved plateau and switches to the Plateau screen. Allowing the user to retake data points, extend the plateau range, reprint, etc.

Section 2

Model This is the model information as reported by the instrument. The detector's model may be blank. This does not affect the procedure.

Serial Number This is the serial number as reported by the instrument. The detector's serial number may be blank. This does not affect the procedure.

Section 3

Detector Preset This is the currently selected detector settings or detector, if it has one.

Section 4

Channel This is the name of the channel if applicable.

Threshold This is the minimum voltage value for a pulse to be counted.

Window This is the maximum voltage value for a pulse to be counted, if present.

Section 5

Order Number This is the order number to help identify a specific plateau. This can be left blank.

Customer This is the customer identifier to, again, help identify a specific plateau. This can be left blank.

Print Date This is the option to show the date on the print or to be filled in later.

Starting High Voltage This is the lowest (and initial) high voltage which to test.

Ending High Voltage This is the highest (and final) high voltage which to test. This value must be higher than the starting high voltage.

Voltage Increment This is the amount the high voltage will change per step. This must be divisible by the difference of the starting and ending high voltages. For example, 20 would be a valid value for 500 and 600 (which would make the steps 500, 520, 540, 560, 580, and 600), but 30 would not be a valid value (which would make the steps 500, 530, 560, 590, and either 600 or 620).

Does Not Take Background This is the option to **not** take background readings. When the checkbox is checked, no background readings will be taken, and if unchecked, background readings will be taken based on the background count time that was entered.

Background Count Time (Sec) This is the amount of time to take the background readings for each step.

Count Rate Display This sets the number of decimal places to be displayed for the count rates. Note: If Counts is selected, no decimal positions will be displayed.

Distance to Source This is a note to indicate the distance between source and detector while taking a reading.

Notes This field allows the user to record extra information. Common notes tend to be the length of the cable between the instrument and the detector or the specific location the plateau was taken.

Sources(s) This is the list of sources the procedure will use to display the plateau. See Section 6 for more details.

Section 6

"+" Button Clicking this button will add a new source to the list.

Name This is the name of the source.

ID This is the ID of the source.

Type This is the radiation type of the source. It is used by multi-channel to choose which channel is the base channel for cross talk, and if selected, efficiency.

Activity This is the reading of the source. It must be entered to calculate standard efficiency, as cps/µCi.

Efficiency If selected, this will also calculate the chosen type of efficiency. The choices are (net is treated as merely the source if no background is taken):

- **Standard Efficiency:** Activity Disintegrations per Second/Net Counts per Second.
- **Q Factor:** $\frac{\text{Net Counts in 6 seconds}}{\sqrt{\text{Background Counts in 6 seconds}}}$ Note that this selection is ignored if no background is taken.
- **Cps/µCi:** Net Counts per Second/Activity in µCi.

Count Time (Sec.) This is the amount of time, in seconds, to take a reading from the source.

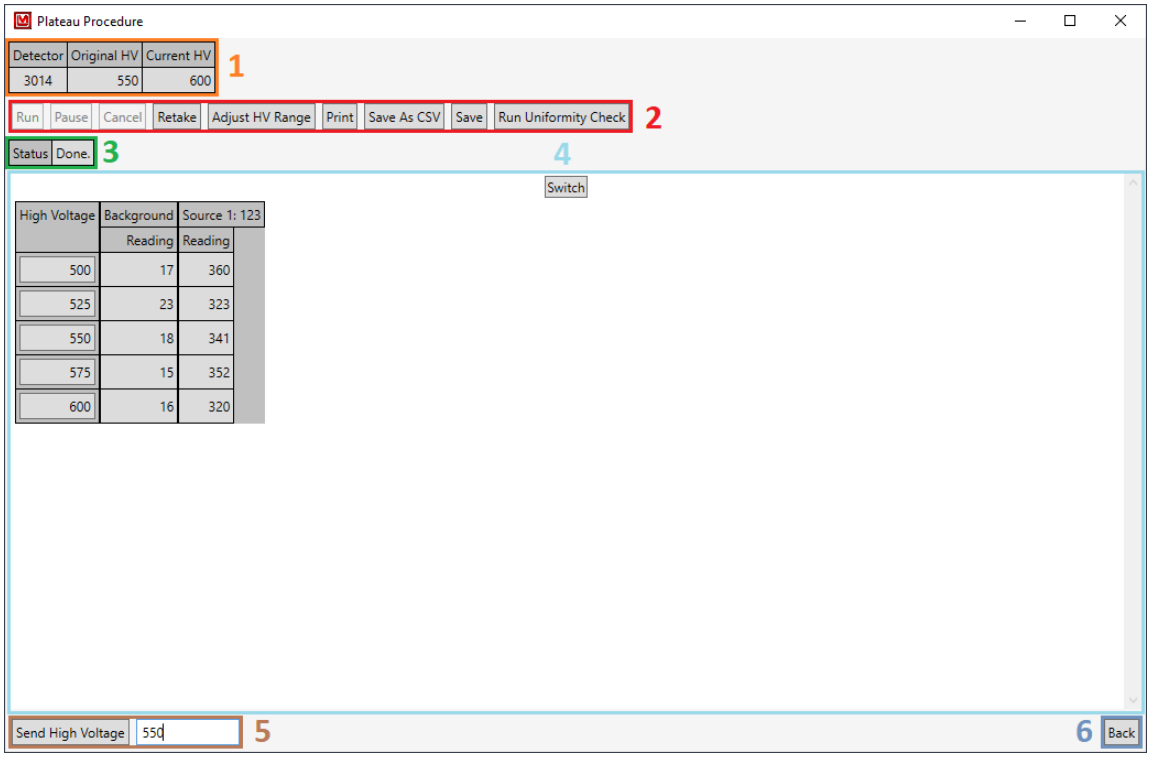
"-" Button Clicking this button will remove this source from the list.

Section 7

Start Clicking this button will start the Plateau Procedure. If any of the necessary information is invalid, error text will appear next to it and describe what is potentially wrong.

Cancel Clicking this button will close the Wizard.

Plateau Procedure Readings



Section 1

Detector This is the currently connected detector.

Original HV This is the high-voltage value the device had before the beginning of the plateau procedure.

Current HV This is the current high voltage.

Section 2

Run Clicking this button will run the plateau when it is paused.

Pause Clicking this button will pause a running plateau.

Cancel Clicking this button will cancel a running plateau.

Retake Clicking this button will let you retake one or more readings as needed.

Adjust HV Range Clicking this button will let you change the high-voltage range (the starting and ending voltage) as needed.

Print Clicking this button will print the plateau.

Save as CSV Clicking this button will save the plateau as a CSV file.

Save Clicking this will let the user save the plateau data to be loaded later.

Uniformity Check Source Selection This is the selection for the type of uniformity check, if applicable.

Run Uniformity Check Clicking this will open a sub window and allow the user to go through a uniformity check to ensure that readings on the heel and toe of the detector are within some tolerance.

Section 3

Status This is the current status of the plateau procedure.

Section 4

Switch Clicking this button will switch the view of the plateau data between a chart and a graph.

Plateau Chart This is the data gathered during the plateau procedure. It is displayed as either a table (the plateau chart) or a line graph (the plateau graph). You can click on a button in the plateau chart to easily select a desired high voltage.

Section 5

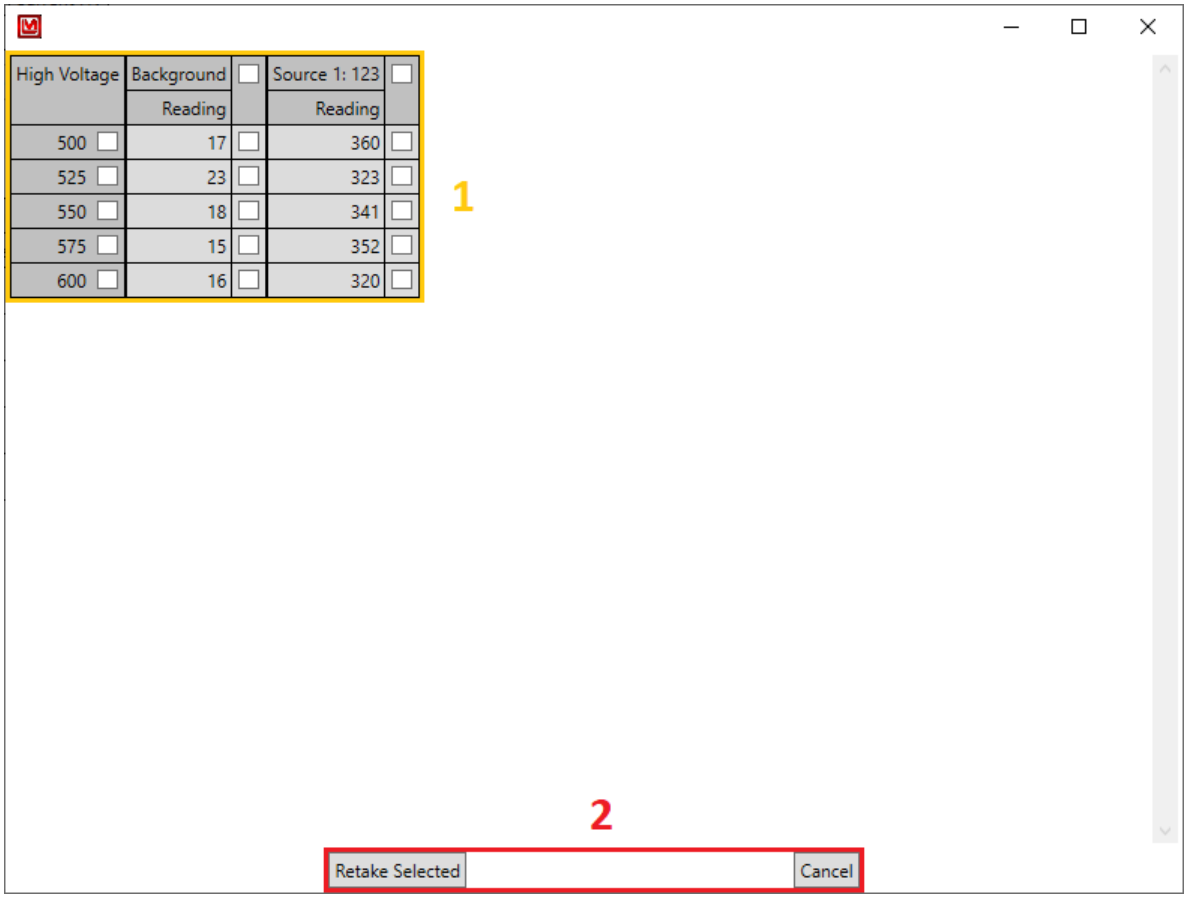
Send High Voltage Clicking this button will send the selected high voltage to the device.

Selected High Voltage This is the value of the high voltage to send to the device.

Section 6

Back Clicking this button will take you back to the Plateau Procedure Setup. This will cause the program to forget all plateau data. You will be asked to confirm this choice due to the loss of data.

Retake Plateau Procedure



Section 1

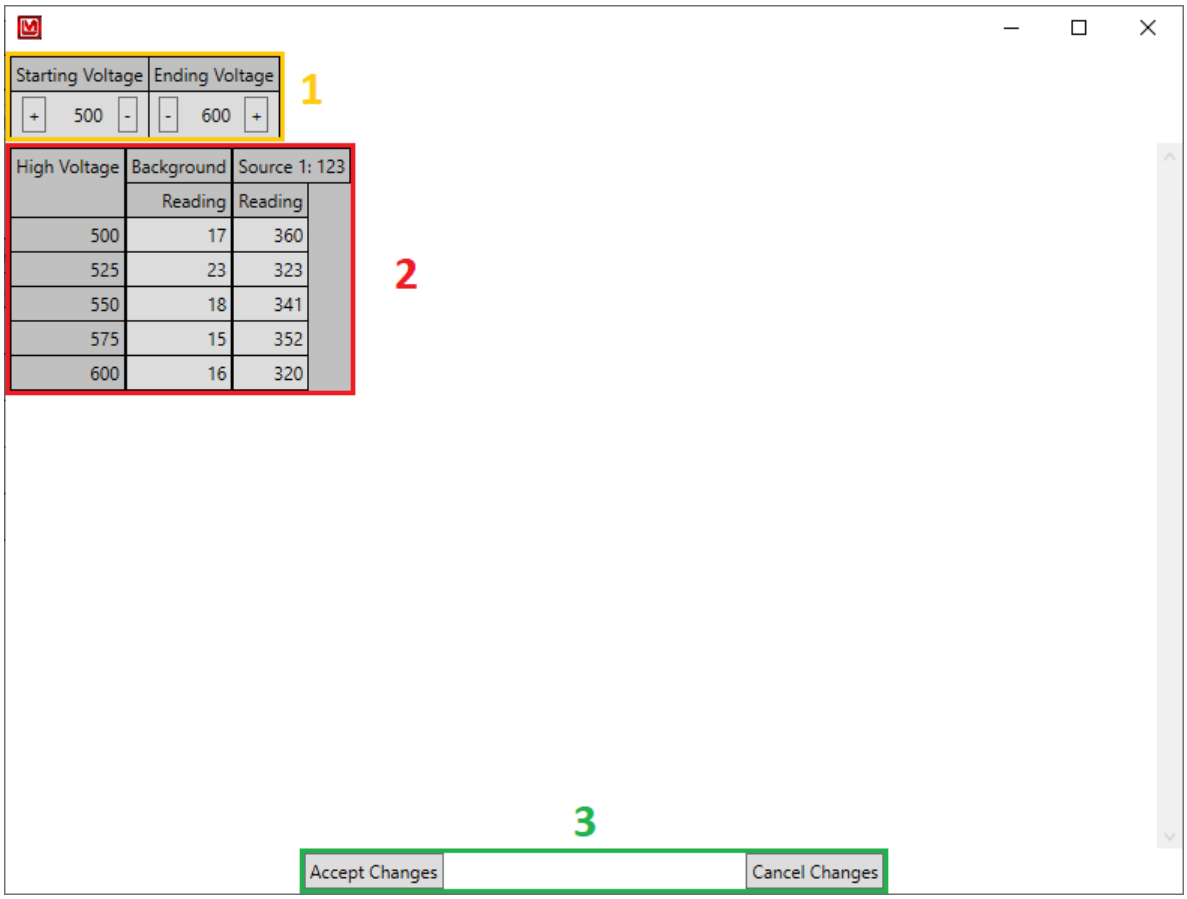
Retake Plateau This is the retake plateau selection menu. Check the checkboxes on the right of any reading you wish to retake. Clicking the checkbox to the right of the background (if there) or a source, will select all readings for that source. Clicking the checkbox to the right of a high voltage will select all readings for that voltage.

Section 2

Retake Selected Clicking this button will close the window and retake the selected readings.

Cancel Clicking this button will close the window, but not retake any readings.

Adjusting HV Range of a Plateau



Section 1

Starting Voltage This is the starting voltage. Clicking the + and – buttons will increase and decrease the starting voltage respectively.

Ending Voltage This is the ending voltage. Clicking the + and – buttons will increase and decrease the ending voltage respectively.

Section 2

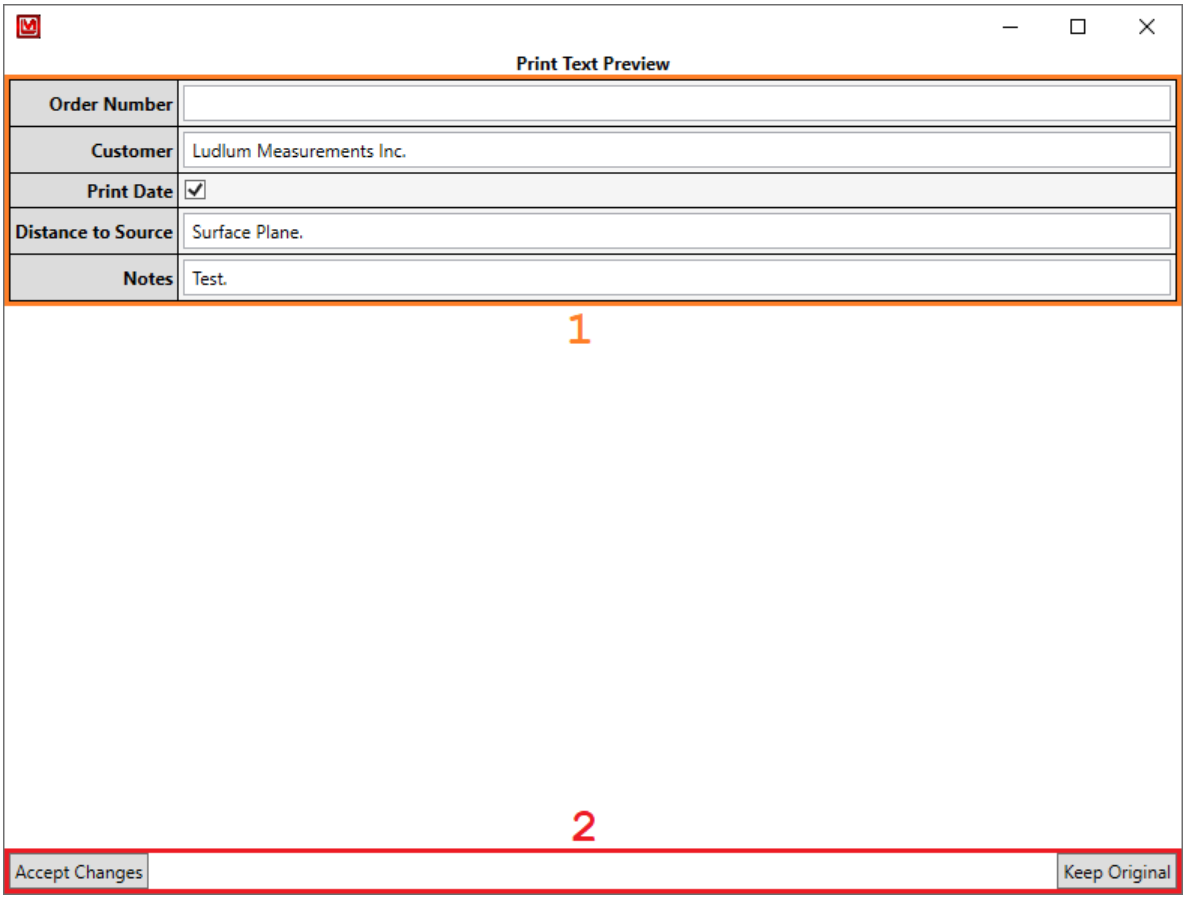
Adjust Ranged Plateau This is a display of the plateau with the new voltage range.

Section 3

Accept Changes Clicking this button will close the window, taking any new readings as needed.

Cancel Clicking this button will close the window, but not modify the plateau.

Plateau Print Text Confirmation



Section 1

Order Number This is the order number to help identify a specific plateau. This can be left blank.

Customer This is the customer identifier, again, to help identify a specific plateau. This can be left blank.

Print Date This is the option to show the date on the print or to be filled in later.

Distance to Source This is a note to indicate the distance between source and detector while taking a reading

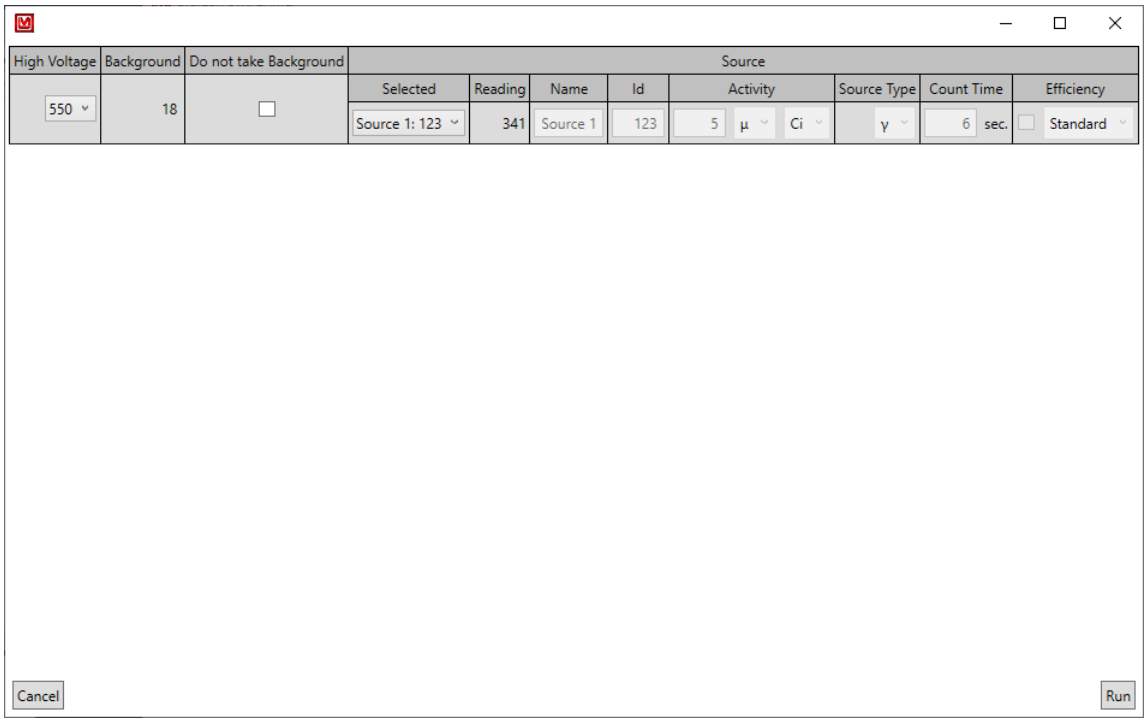
Note This field allows the user to record extra information. Common notes tend to be the length of the cable between the instrument and the detector or the specific location the plateau was taken.

Section 2

Accept Changes Clicking this button will close the window, and the printed plateau will have the modified text.

Keep Original Clicking this button will close the window, but not modify the text in the print.

Uniformity Check Setup



Section 1

High Voltage This is the current high voltage to use.

Background This is the background reading or readings, if applicable.

Do not take Background This is the option to **not** take background readings. When the checkbox is checked, no background readings will be taken, and if unchecked, background readings will be taken on the background count time that was entered.

Section 2

Selected This is the selected source to use. This is either one of the sources used in the plateau or "Uniformity Source," which allows the user to enter in a new source to use.

Reading This is the reading of said source, if applicable.

Name This is the name of the source.

ID This is the ID of the source.

Activity This is the activity of the source.

Source Type This is the type of the source.

Count Time This is the amount of time to count to take the readings.

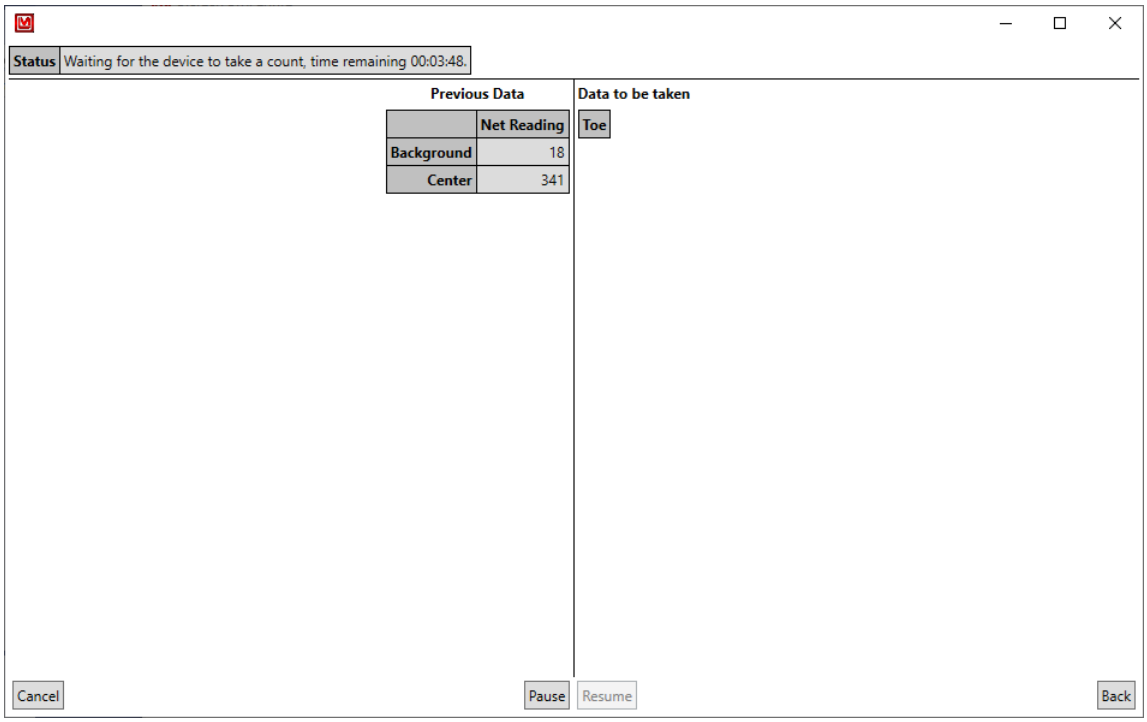
Efficiency This is the efficiency of the source, if applicable.

Section 3

Cancel This cancels taking the uniformity check and closes the window.

Run This runs the uniformity check.

Uniformity Check Running



Section 1

Status This is the current status of the uniformity check.

Section 2

Previous Data This is the previously taken data, if any.

Data to be Taken This is the data to be taken, if any.

Section 3

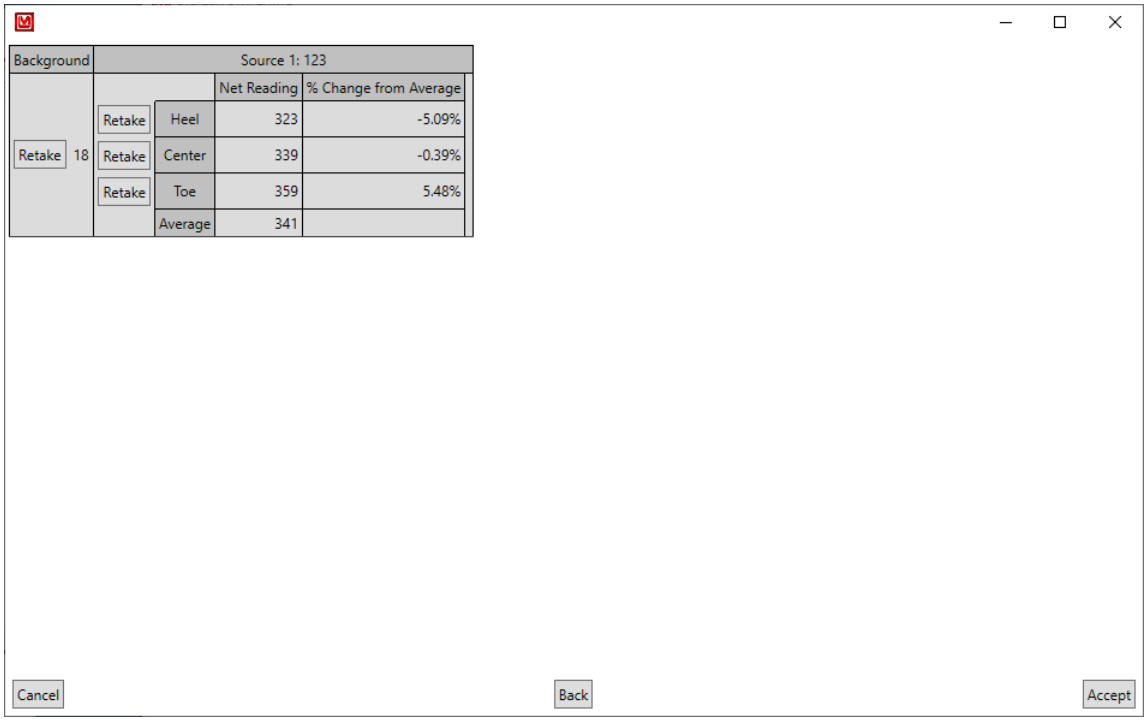
Cancel Clicking this cancels the uniformity check and closes the window.

Pause Clicking this pauses the uniformity check.

Resume Clicking this resumes the uniformity check (from a pause).

Back Clicking this goes back to the previous screen (setup for results as appropriate).

Uniformity Check Results



Section 1

Background This is the background reading, if applicable.

Retake Clicking this retakes the background, if applicable.

Section 2

Net Reading This is the net reading of the part of the uniformity check, as well as the average of all readings.

Efficiency This is the efficiency of the step, if applicable.

% Change from Average This is the percent change from the average.

Retake Clicking this retakes part of the uniformity check.

Section 3

Cancel Clicking this will cancel the uniformity check and closes the window.

Back Clicking this goes back to the setup screen.

Accept This accepts the values calculated and closes the window.

5.3 Detector Calibration Wizard

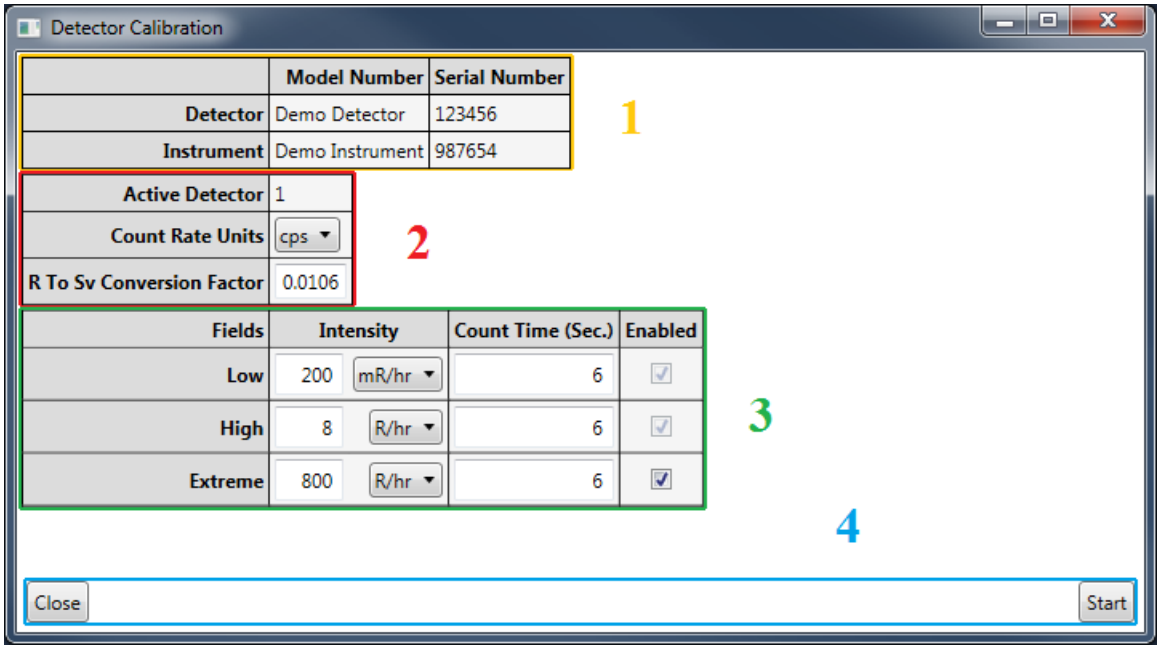
Gamma Exposure/Dose Calibration Wizard

It is recommended to already have the appropriate detector connected, and the appropriate detector selection on the instrument active before beginning.

How to Calibrate an Instrument

1. Set the Fields as needed.
2. Click the **Start** Button.
    a) Place the detector at the indicated field.
    b) Click the **Take Reading** Button.
    c) When prompted, click the **Continue** button.
    d) Repeat as needed.
3. Review the Calculated Coefficient Settings.
4. Click the **Send** Button.

Detector Calibration Setup



Section 1

Model Number This is the model information as reported by the instrument. The detector's model may be blank. This does not affect the procedure.

Serial Number This is the serial number as reported by the instrument. The detector's serial number may be blank. This does not affect the procedure.

Section 2

Active Detector This is the currently selected detector settings or detector. This is not shown if the instrument does not support storing multiple detector settings or detectors.

Count Rate Units This is how the count rate is displayed.

R to SV Conversion Factor Different radiation sources may have a different conversion from Roentgens (Exposure Rate) to Sieverts (Dosage Equivalent). This conversion is only used if you choose a Sievert field intensity. The default is 0.0106 (appropriate for ^{137}Cs calibrations).

Section 3

Fields This is the name of each field to test.

Intensity This is the intensity (in either Roentgens or Sieverts) of the field.

Count Time (Sec) This is the amount of time to take a reading in this field, in seconds.

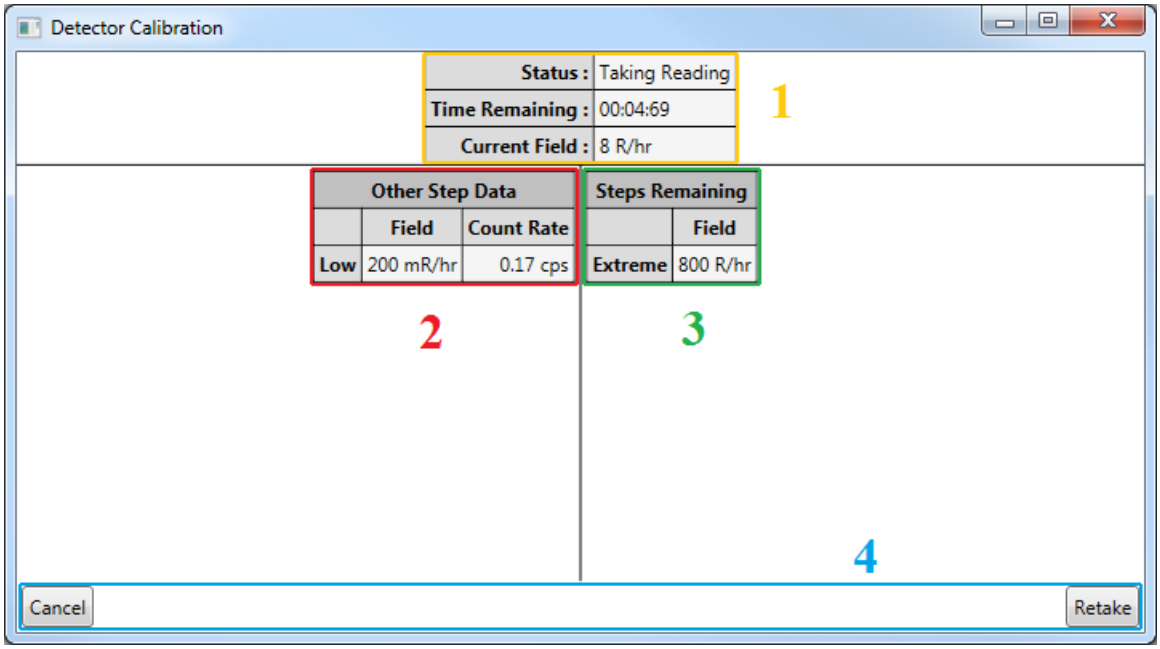
Enabled If available, this allows you to skip taking a reading at the given field, at the cost of the related coefficient always being calculated as zero.

Section 4

Close Clicking this button will close the Wizard.

Start Clicking this button will start the Detector Calibration Wizard. If any of the necessary information is invalid, an error text will appear next to it and describe what is potentially wrong.

Detector Calibration Reading



Section 1

Status This is the current status of the reading.

Time Remaining This is the time remaining to finish the current reading.

Current Field This is the current field strength.

Section 2 This section displays any readings that were previously taken for this calibration. If there hasn't been any readings taken previously, then this section does not appear.

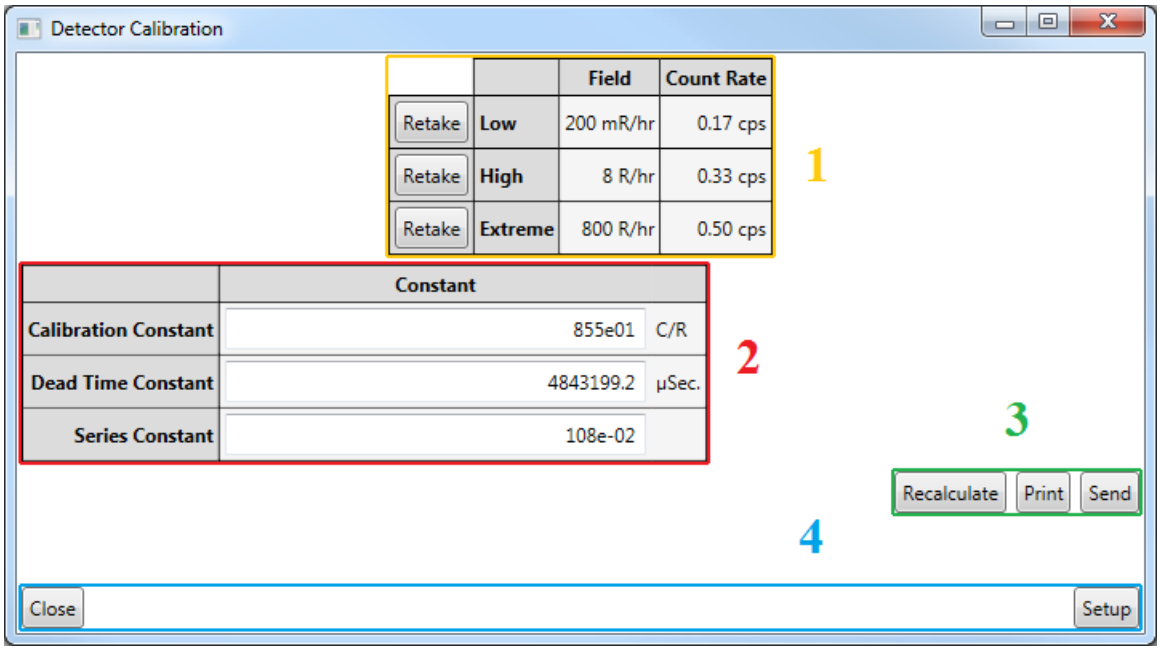
Section 3 This section displays any readings that have yet to be taken. If there are no more steps to be taken, then this section does not appear.

Section 4

Cancel Clicking this button will cancel the current field reading and return you to either the setup screen or results screen as appropriate.

Retake Clicking this button will restart the current reading.

Detector Calibration Results



Section 1 This section displays a summary of the taken readings. You may click the Retake button to retake that field, and only that field.

Section 2 This section displays the calculated coefficients and allows you to modify them if needed.

Section 3

Recalculate Clicking this button will reset the coefficients to the originally calculated values.

Print Clicking this button will print the information.

Send Clicking this will send the coefficients to the device. If the coefficients are invalid, an error text will display and explain what seems to be wrong.

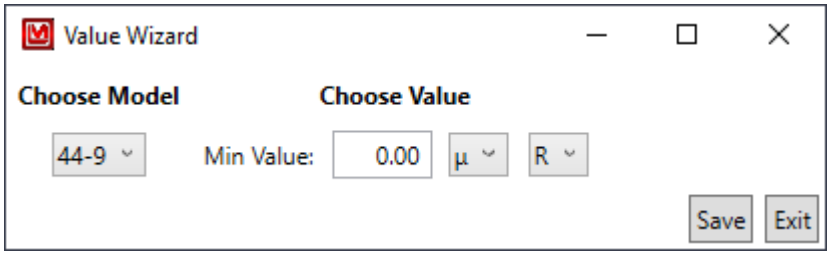
Section 4

Close Clicking this will close the Wizard.

Setup Clicking this will return the Wizard to the setup screen, allowing you to retake the detector calibration for this instrument.

5.4 Dose Min Wizard

This Wizard provides a way to set the Dose Minimum value that can utilize a known list of minimum and maximum allowed values for the given detector models to better constrain the minimum value. This list can be found (and modified) via the List Wizard (Section 4) and specifically the Dose Min Wizard (Section 4.13).



Choose Model

This allows the user to choose from any known preset limits. If the originally selected detector model is not found in the preset list (or the units are not found in the preset list), it is added automatically with the limits of the device.

Min Value

This is the minimum value, which is constrained by both the preset list and the device's constraints.

Save

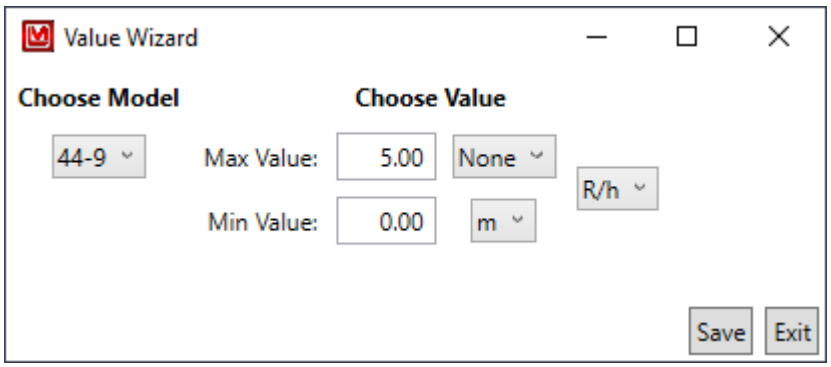
When clicking this, the program attempts to save the value to the device. If successful, the window will close.

Exit

Selecting this closes the window.

5.5 Rate Min Max Wizard

This Wizard provides a way to set the Rate Minimum and Maximum values that can utilize a known list of minimum and maximum allowed values for the given detector models to better constrain the values. This list can be found (and modified) via the List Wizard (Section 4) and specifically the Rate Min/Max Wizard (Section 4.13).



Choose Model

This allows the user to choose from any known preset limits. If the originally selected detector model is not found in the preset list (or the units are not found in the preset list), it is added automatically with the limits of the device.

Max Value

This is the maximum value, which is constrained by both the preset list and the device's constraints.

Min Value

This is the minimum value, which is constrained by both the preset list and the device's constraints.

Save

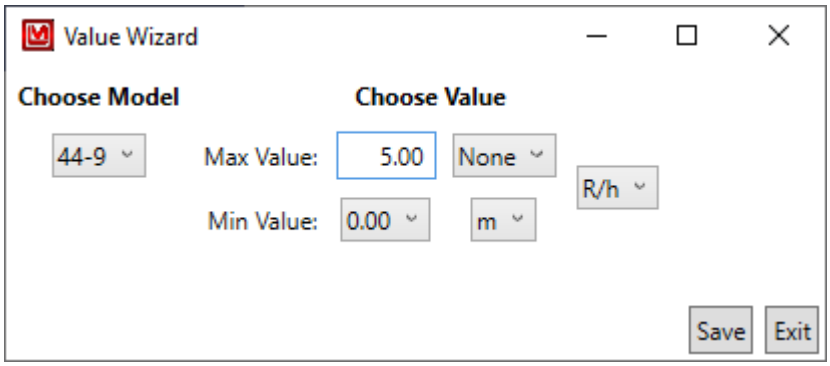
When clicking this, the program attempts to save the value to the device. If successful, the window will close.

Exit

Selecting this closes the window.

5.6 Rate Min Max Wizard (Zero Min Value Only)

This version of the Rate Min Max Wizard is for devices that only allow the Min Value to be zero, represented by a drop-down list of currently valid values.



Choose Model

This allows the user to choose from any known preset limits. If the originally selected detector model is not found in the preset list (or the units are not found in the preset list), it is added automatically with the limits of the device.

Max Value

This is the maximum value, which is constrained by both the preset list and the device's constraints.

Min Value

This is the minimum value, which is constrained by both the preset list and the device's constraints.

Save

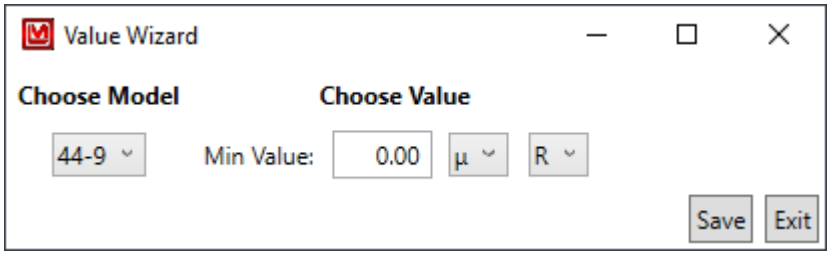
When clicking this, the program attempts to save the value to the device. If successful, the window will close.

Exit

Selecting this closes the window.

5.7 Count Min Wizard

This Wizard provides a way to set the Count Minimum value that can utilize a known list of minimum and maximum allowed values for the given detector models to better constrain the minimum value. This list can be found (and modified) via the List Wizard (Section 4) and specifically the Count Min Wizard (Section 4.13).



Choose Model

This allows the user to choose from any known preset limits. If the originally selected detector model is not found in the preset list (or the units are not found in the preset list), it is added automatically with the limits of the device.

Min Value

This is the minimum value, which is constrained by both the preset list and the device's constraints.

Save

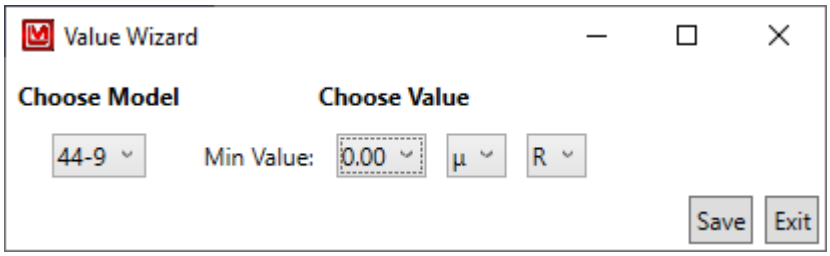
When clicking this, the program attempts to save the value to the device. If successful, the window will close.

Exit

Selecting this closes the window.

5.8 Count Min Wizard (Zero Min Value Only)

This version of the Count Min Wizard is for devices that only allow the Min Value to be zero, represented by a drop-down list of currently valid values.



Choose Model

This allows the user to choose from any known preset limits. If the originally selected detector model is not found in the preset list (or the units are not found in the preset list), it is added automatically with the limits of the device.

Min Value

This is the minimum value, which is constrained by both the preset list and the device's constraints.

Save

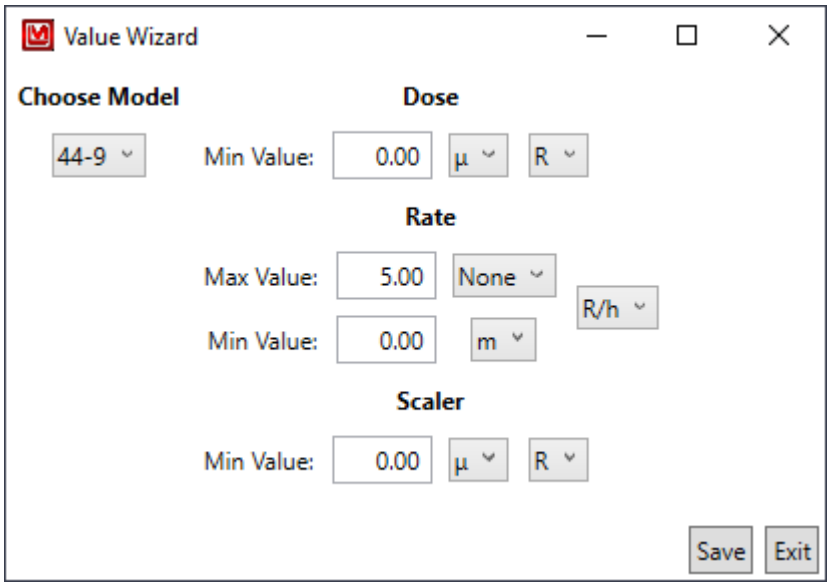
When clicking this, the program attempts to save the value to the device. If successful, the window will close.

Exit

Selecting this closes the window.

5.9 Unit Min Max Wizard

This Wizard provides a way to set the Dose Minimum Value, Rate Minimum and Maximum Values, and Count Minimum value that can utilize a known list of minimum and maximum allowed values for the given detector models to better constrain the values. These lists can be found (and modified) via the List Wizard (Section 4).



Choose Model

This allows the user to choose from any known preset limits. If the originally selected model is not found in the preset list (or the units are not found in the preset list), it is added automatically with the limits of the device

Dose Min Value

This is the minimum value, which is constrained by both the preset list and the device's constraints.

Rate Max Value

This is the maximum value, which is constrained by both the preset list and the device's constraints.

Rate Min Value

This is the minimum value, which is constrained by both the preset list and the device's constraints.

Count Min Value

This is the minimum value, which is constrained by both the preset list and the device's constraints.

Save

When clicking this, the program attempts to save the value to the device. If successful, the window will close.

Exit

Selecting this closes the window.

5.10 Chi Squared Wizard

Chi Squared Procedure

The χ^2 test (referred to as Chi Squared test for the rest of this manual) is used to check the consistency of a device's readings. This Wizard handles the taking and repeating of counts and calculates the results, the user must, however, determine the pass/fail of the test.

How to Take a Chi Squared test

1. Set the Fields as needed.
2. Click the **Start** Button.
3. Position the indicated source appropriately.
4. Click the **OK** Button.
5. Wait for all Counts to be finished.
6. Review the calculated Chi Squared value.

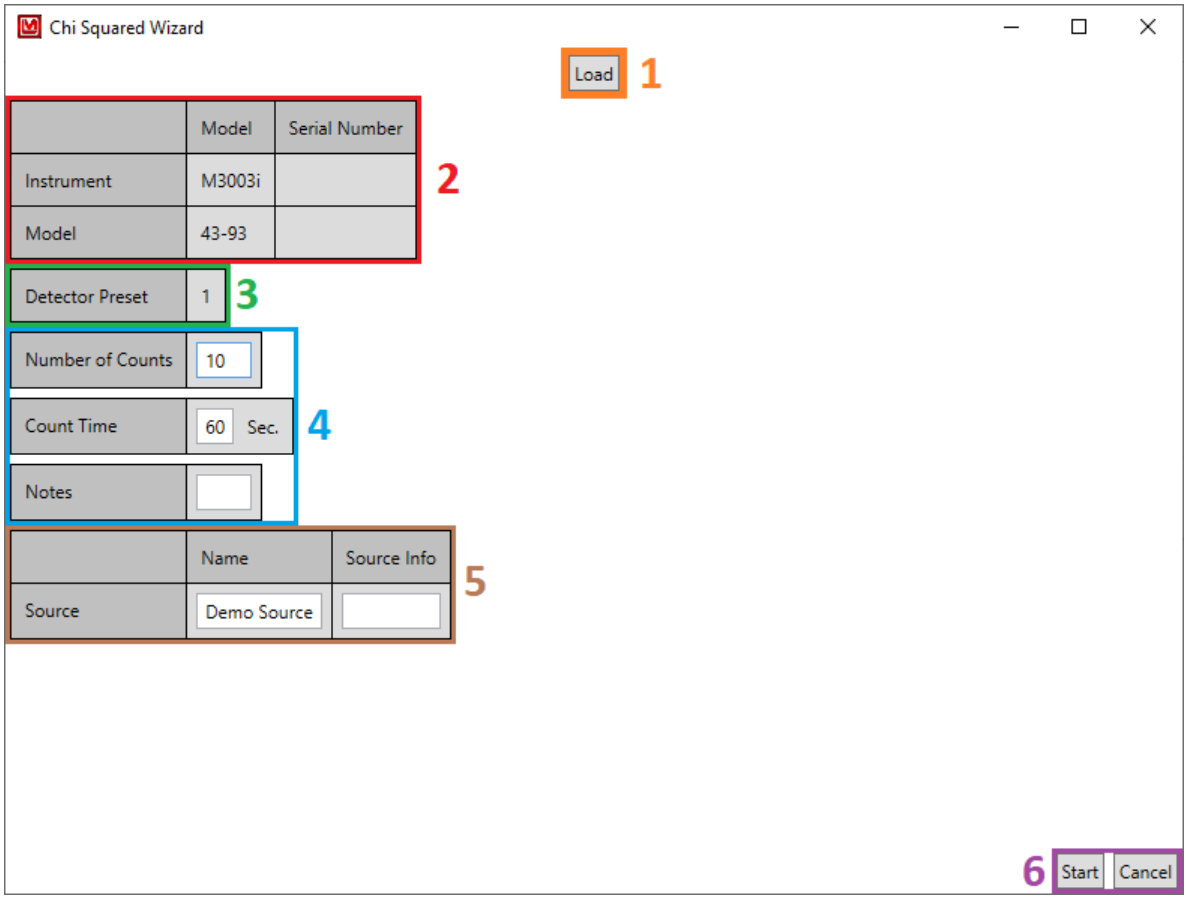
How to Retake One or More Chi Squared Counts

1. Take a Chi Squared test.
2. Select all Counts that you wish to retake, via the checkbox in the Retake column.
3. Click the **Retake** Button.
4. The program will now take the Chi Squared test again, but only take the counts that you indicated.

Screen Descriptions

Chi Squared Setup

It is recommended to already have the appropriate detector connected, and the appropriate detector selection on the instrument active before beginning the Wizard.



Section 1

Load Clicking this button will load a previously saved Chi Squared test and switches to the Chi Squared screen.

Section 2

Model This field is the model information as reported by the instrument. The detector's model may be blank. This does not affect the procedure.

Serial Number This field is the serial number as reported by the instrument. The detector's serial number may be blank. This does not affect the procedure.

Section 3

Detector Preset This field is the currently selected detector settings or detector, if it has one.

Section 4

Number of Counts This field is the number of counts to take. A minimum of 10 is recommended, though not required. Up to 40 Counts can be taken.

Count Time This field is the is the number of seconds to take each count. A minimum of 60 seconds is recommended, though not required. Up to 600 seconds (10 minutes) can be taken.

Notes This field holds any notes the user might want to indicate, such as a target Chi Squared value or range of values.

Section 5

Name This field is the name of the Source. This must not be blank.

Source Info This field holds any other information about the Source the user might want to note.

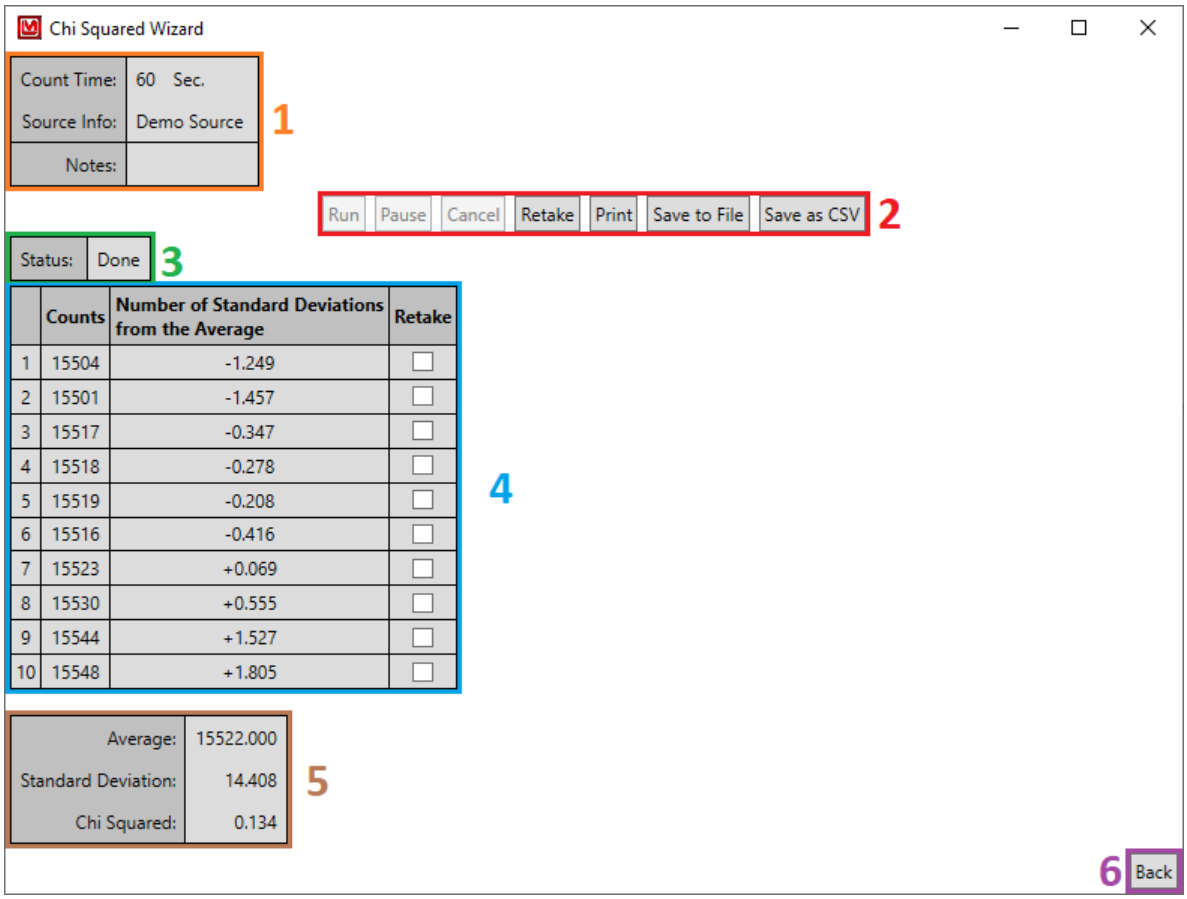
Section 6

Start Clicking this button will start the Chi Squared test.

Cancel Clicking this button will close the Chi Squared window.

Chi Squared Test

It is recommended to already have the appropriate detector connected, and the appropriate detector selection on the instrument active before beginning the Wizard.



Section 1

Count Time The count time for the Counts.

Source Info The Source's name and info.

Notes The notes provided by the user.

Section 2

Run If the Chi Squared Wizard is paused, clicking this button will start taking counts again.

Pause If the Chi Squared Wizard is running, clicking this button will pause taking counts.

Cancel If the Chi Squared Wizard is running or paused, clicking this button will cancel taking any more Chi Squared counts.

Retake If the Chi Squared Wizard is done, clicking this button will retake all counts selected to be retaken.

Print If the Chi Squared Wizard is done, clicking this button will print out the data.

Save to File If the Chi Squared Wizard is done, clicking this button will save the Chi Squared data to a file to be loaded later.

Save as CSV If the Chi Squared Wizard is done, clicking this button will save the data as a CSV file. This will just be the Counts, Number of Standard Deviations from the Average, and the Chi Squared value (repeated for each row). This file can not be loaded from.

Section 3

Status The current status of the Chi Wizard.

Section 4

Counts The counts read from the device.

Number of Standard Deviations from the Average The number of Standard Deviations from the average. This is to help identify any possible outliers could likely be flukes, and thus need to be retaken. What constitutes an outlier is up to the user's discretion, but greater than 2 Standard Deviations is a possible recommended threshold.

Retake Checking this checkbox will allow this Count to be retaken when the Retake Button is clicked.

Section 5

Average The average value of all of the counts, once all of them are taken or retaken.

Standard Deviation This field is the Population Standard Deviation of the counts, once all of them are taken or retaken. The formula is as follows: $\sigma = \sqrt{\frac{\sum_{i=1}^{N}(x_i - m)^2}{N}}$

Where

N Number of Counts

x_i the count.

m the average of all counts.

Chi Squared This field is the Chi Squared value of the counts, once all of them are taken or retaken. The formula is as follows: $\chi^2 = \sum_{i=1}^{N} \frac{(x_i - m)^2}{m}$

Where

N Number of Counts

x_i the count.

m the average of all counts.

Section 6

Back Clicking this button will take the user back to the Setup screen.

CHAPTER 6

TROUBLE SHOOTING

6.1 Missing .Net Framework

DotNet Framework comes with most standard Windows desktops. However, if for some reason while installing or after installation, you are still missing .NetFramework, please go to MSDN and download 4.5 Framework for your machine.

6.2 No devices showing up

1. Check to make sure everything is properly connected.
2. If that is correct, check to see if Microsoft Windows is still installing the drivers for the instrument. This may take a few moments. (If you have multiple new instruments on a daily basis, “Calibration on different devices” may speed this up.
3. Make sure the instrument is on, and if it is, try turning it off and then on again.
4. Change USB cable.
5. Check USB driver. Sometimes while installing the driver, you may run into an issue, i.e. power shuts off, instrument unplugged, Windows update, etc. This may cause your driver to become corrupt, and the instrument will no longer show in Lumic. To check for this issue, follow these steps.
    a) Unplug all other instruments. Plug in and turn on the instrument.
    b) Open “Device Manager.”
    c) Expand the Human Interface Devices drop-down menu. If you can see your instrument’s family name, i.e. Model 3000, Model 30, under the Human Interface Device Section, then Issue 5 is the cause. If you cannot, please call Ludlum Measurements.
    d) Right-click on appropriate family name instrument and select uninstall.
    e) Let Windows uninstall the driver and it should auto-reinstall the Instrument.
    f) When Windows shows the driver has been installed successfully, re-open Lumic and see if menu is still empty.

If none of the above solves your issue, please feel free to call Ludlum Measurements.

6.3 Calibration on different devices – first plug in

If your computer is running Windows 7 or higher, when a new device is connected to your computer, Windows may spend up to 15 minutes searching for the drivers through Windows update. This is unnecessary and time consuming if you are plugging in different new instruments. In order to avoid this, we need to change some system settings on handling drivers.

Windows 7

1. Click Start, right-click "Computer," and choose Properties.
2. In the Tasks list, click Advanced System Settings.
3. On the System Properties dialog box, click the Hardware tab, and then click Windows Update Driver Settings.
4. Then select “only if not found on local machine.”

Windows 8 and 10

Unfortunately for Windows 8 (and higher), you only get the choice of using Windows Update always or never, which is even less helpful.

1. Search for "Change device install" in the Windows 8 Start menu and select “change device installation settings.”
2. In answer to the question "do you want Windows to download driver software" choose "no, let me choose what to do," then select "never" and save changes.

6.4 Error Logging In

If the error "attempt to write to read-only database" appears when logging in, Windows is stopping the current Windows User from updating the database. This can be fixed by changing the permissions on the `User_Database.db` file.

The file is found in `C:\ProgramData\Ludlum Measurements, Inc\Lumic_2_0`. The folder `C:\ProgramData\` is hidden by default, thus you will need to make it visible. This is done by clicking the "View" menu item in the Windows File Explorer, going to "Show", then clicking the option "Hidden items" (if it is not already checked).

Right click the `User_Database.db` file and select Properties. Go to the Security tab. Click the "Edit" button. Either select the User or User Group in the "Group or user names" box that needs access to Lumic 2 or (if it is not in the list) add it via the Add button. Check the "Allow" checkbox for Write. Click "Ok".

CHAPTER 7

REVISION HISTORY

Please note that, like the Software's Change Log, Bolded Items are updated List Wizard items. Thus if you have made any changes to said list, please use the appropriate List Wizard to check or merge the updates into your custom list.

- 2.9.0.0
  - Lumic
    * Added the Model 38 and 38i.
    * Fixed bug where the Remote Displays for the Model 3003, 3003i, 3014, 3078, and 3078i did not display the alarm indicator.
    * Changed the software to skip the Log In screen on initial installation.
    * Changed the Real Time Stream to only keep the last 100 messages when logging to a file.
  - List Wizards
    * Fixed a bug where the Blacklist and Print Blacklist Comparer screens would not exit when the User clicked "Save Changes and Exit" button.
    * Changed all Comparer screens to refresh when the User clicked the "Save" button.
  - **Blacklist**
    * Updated. If you have customized this list, see Section 4.2 for how to incorporate changes.
  - **Print Blacklist**
    * Updated. If you have customized this list, see Section 4.2 for how to incorporate changes.
  - **Read Only List**
    * Updated. If you have customized this list, see Section 4.8 for how to incorporate changes.
- 2.8.0.0
  - Lumic

        * Fixed bug when loading a UnitVal item from a file, the control's value, dropdown box, and Tooltip blank out if it isn't in the format "XXXEX".
        * Fixed bug where clicking the Plateau button would cause an error if the device was set up incorrectly. It now explains what is wrong.
        * Added new buttons for quickly setting the High Voltage, Calibration Constant, Threshold, and Window, if setting is found (see new List Wizards).
        * Fixed misspelling in Load Parameters text "Load Complete".
    - List Wizards
        * Added Wizards to set High Voltage, Calibration Constant, Threshold, or Window for a given Detector.
        * Added dedicated "Save" and "Save and Exit" buttons to each Wizard.
    - Plateau
        * Changed it so that the Model 3002 (and related devices) displays the Detector as "Detector 1" rather than a blank line.
        * Fixed bug where canceling a Plateau would cause a crash.
        * Fixed bug where trying to run the Uniformity Check on a Single Channel detector would throw an error.
    - High Voltage List
        * Created.
    - Calibration Constant List
        * Created.
    - Threshold List
        * Created.
    - Window List
        * Created.

- 2.7.0.1
    - Detector Calibration
        * Fixed display issue that still showed the native number format rather than the "Invariant" format.

- 2.7.0.0
    - Lumic
        * The software now forces all numbers to be in an "Invariant" form in order to be consistent with the devices no matter the region.
        * Added support for certain sub-versions of the Model 30.
    - Priority Wizard
        * Added an explicit ordering option on top of just having a "High" and "Low".

- 2.6.1.0

  - Plateau
    - Fixed a bug where the Plateau will lock up on getting the counts for a Model 3002 set to be a Single Channel (just Alpha or Beta only).

- 2.6.0.0
  - Lumic
    - Added a warning to not allow more than one copy of Lumic 2 from running at a time.
    - Added in a "Compressed" Print for the Parameters.
    - Added a way to open the manual from the software.
    - Fixed a bug where certain devices would have their Rate Min Max values set to 999k and 0 when a valid Rate Min Max isn't found (rather than not setting it at all).
    - Fixed a bug where the Model 30's Rate Max value was not sent to the Rate Min Max Wizard correctly.
  - Plateau
    - For Alpha/Beta Plateaus, added a display of all background readings in the Uniformity Check and removed the Source Type selection for opening the Uniformity Check as the Uniformity Check can make the choice on its own.
  - **Priority List**
    - Updated. If you have customized this list, see Section 4.11 for how to incorporate changes.
  - **Print Priority List**
    - Updated. If you have customized this list, see Section 4.11 for how to incorporate changes.
  - **Rate Range List**
    - Updated. If you have customized this list, see Section 4.14 for how to incorporate changes.

- 2.5.0.0
  - Lumic
    - Fixed bug where a maximum range of zero would allow non-zero values (the device would still reject it).
    - Added Images and Remote Displays for the 3007(B/i), 30, 35, and 79 Models.
    - Added `Expanded_uint8 MetaData` type for the Model 30 family.
  - Min Max Wizard
    - Fixed bug where a maximum range of zero would allow non-zero values (the device would still reject it).
  - Chi Squared Wizard
    - Created.

  - **Blacklist**
    * Updated. If you have customized this list, see Section 4.2 for how to incorporate changes.
  - **Print Blacklist**
    * Updated. If you have customized this list, see Section 4.2 for how to incorporate changes.
  - **Read Only List**
    * Updated. If you have customized this list, see Section 4.8 for how to incorporate changes.

- 2.4.0.0
  - Lumic
    * Added support for the 3004(i).
    * Fixed a bug where the 3003(i), 3014, and 3078(i) would not show the Alarm indicator when streaming the Remote Display and the device had an error (such as Loss of Counts).

- 2.3.1.0
  - Lumic
    * Fixed a bug where, if an error occurred trying to log in, the error would not be displayed.
  - Plateau
    * On a fresh install, the Count Rate Display's numerical value for the Plateau is empty, causing a crash on Start.
    * Added in a checkbox in the Setup screen that will hide the Date in the Print Sheet.

- 2.3.0.0
  - Lumic
    * Fixed the parsing so that less than Micro will shift the decimal so that it would be Micro - and similarly for values greater than Mega.
    * Fixed bug where Plateau would try to call the wrong parameter for 3005s and 3006s.
    * Updated Remote Display to show for new value of 3002's Model Number (was "M3002", will now be "Model 3002").
  - Plateau
    * Fixed bug where loading a Single Channel, No Background, Cps/uCi Efficiency would crash the program.
    * Fixed bug where the Backgroundless version of Efficiency is always used for the Uniformity Check.

        * Fixed bug where No Background Uniformity printed the wrong title for the Efficiency.
    - List Wizard
        * Fixed bug where Print Blacklist and Print Priority List would saved as the regular versions instead.
        * Added the ability to make ranges that are specific to certain Instruments for the Min/Max Range list.
        * Added the ability to hide any customized Values (or at least values that appear to be customized) in the Comparison screens (if applicable).
    - Min/Max Wizard
        * Fixed bug that didn't show an error for drop downs in certain situations.
    - **Rate Range List**
        * Updated. If you have customized this list, see Section 4.14 for how to incorporate changes.

- 2.2.1.0
    - Lumic
        * Quick bug fix.
    - **Rate Range List**
        * Updated. If you have customized this list, see Section 4.14 for how to incorporate changes.

- 2.2.0.0
    - Lumic
        * Added a dedicated Remote Display for the 3000, 3001, 3002, 3005, 3006, 3019, and 3276 with extra long presses for the buttons.
        * Add in a special version of the Set Min and Max Rate button for the 3002 that sets the max cps to 20.0k.
    - Plateau
        * When the user took a background and then takes a Uniformity Check, the option to not use the background now says "Does not use background" for clarity.
    - Rate Min/Max Wizard
        * Fixed bug where cpm, cps, dpm, and dps fallback values (i.e. if not found in the range list) would not let the user set the min value to 0.00.
    - Count Min Wizard
        * Fixed bug where cpm, cps, dpm, and dps fallback values (i.e. if not found in the range list) would not let the user set the min value to 0.00.
    - **Rate Range List**

        * Updated. If you have customized this list, see Section 4.14 for how to incorporate changes.

- 2.1.0.0
    - Lumic
        * Added the ability to translate the error from the device, rather just showing the error code.
        * Changed the error "X" into a button that, when clicked, will re-read the value from the device.
        * Added a dedicated Remote Display for the 3000, 3001, 3002, 3005, 3006, 3019, 3276, and 3277.
        * Added in Wizard Support for the 3000, 3001, 3002, 3005, 3006, 3019, 3276, and 3277 for the following Wizards: Detector Calibration, Plateau, Count Min, Rate Min/Max, and Set Rate Min/Max.
        * Added buttons for the Calibration Constant Only and Calibration and Dead Time Constants versions of the Detector Calibration Wizard.
    - List Wizards
        * Renamed Scaler to Count in Wizards.
    - **Blacklist**
        * Updated. If you have customized this list, see Section 4.2 for how to incorporate changes.
    - **Print Blacklist**
        * Updated. If you have customized this list, see Section 4.2 for how to incorporate changes.
    - **Read Only List**
        * Updated (and removed `Dev_Btn*`). If you have customized this list, see Section 4.8 for how to incorporate changes.
    - **Priority List**
        * Updated. If you have customized this list, see Section 4.11 for how to incorporate changes.
    - **Print Priority List**
        * Updated. If you have customized this list, see Section 4.11 for how to incorporate changes.

- 2.0.0.20
    - Lumic
        * Added in the ability to stop Auto Login from the main screen.
        * Added ability for the software to ignore a FIPS policy check, which would stop the software from reading and writing to the software's User data.
    - List Wizards

        * Made the Dose/Rate/Scaler Min/Max List Wizard default to None rather than Yotta and Yocto for the Metric Prefixes/SI Units.

- 2.0.0.19 (Alpha)
    - List Wizards
        * Minor bug fixes.
- 2.0.0.18 (Alpha)
    - Lumic
        * Added a new button Wizard that sets the Calibration Time values to Zero.
        * Added the ability to create new User Profiles, rather than just changing the current one.
        * Changed the icons of the "Configuration" version of the software to be blue to help differentiate it.
    - List Wizards
        * Added a special version that shows the parameters of the currently connected Instrument (and a parsed version for the Priority List).
        * Added a Comparer Wizard for each List that shows the difference between the current User's Rules/Settings and the Factory defaults.
        * Added a way to reset the User's Rules/Settings to the Factory version.
        * Made the Save buttons also return to the Menu.
- 2.0.0.17 (Alpha)
    - Lumic
        * Made Float Multiplier fields take "xxxx." and ".xxxxx" values, as well as more than three digits correctly.
        * Added "signed long" meta data type.
        * Allowed up to 7 parameters to be streamed.
        * Made the Load Parameters skip any parameters in the Read Only List.
- 2.0.0.16 (Alpha)
    - Lumic
        * Added images for 3003, 3014, and 3078
        * Added icons to the software.
        * Re-added "Reopen Settings" button.
    - List Wizards
        * Added User specific files for when the User makes changes.
    - Plateau
        * Fixed crash where loading a plateau when it's background was not fully taken.

- 2.0.0.15 (Alpha)
  - Lumic
    - Added Connect and Disconnect buttons, removed automatic connection.
    - Removed Refresh and "Open Settings" buttons.
    - Renamed "Reload Parameters" to "Reload Instrument" button and it now closes any open tabs.
    - Added warning message that the device might be only Lumic 1.0 compatible.
    - Fixed bug in Float Multiplier where floating point rounding errors would make invalid values.
    - Added Conditional Blacklist and Inserted Controls to the check for skipping parameters.
- 2.0.0.14 (Alpha)
  - Lumic
    - Stopped the HID Reader from throwing an exception if it failed to read the PID or VID (it now just skips it).
    - Added ability to skip over parameters if it is in the Blacklist AND Print Blacklist.
    - Added ability to stop asking for Meta Data if the first one was invalid.
  - **Rate Range List**
    - Updated. If you have customized this list, see Section 4.14 for how to incorporate changes.
- 2.0.0.13 (Alpha)
  - Lumic
    - Made all Text Boxes on the main screen have a max width.
  - List Wizards
    - Added initial Priority Lists.
  - **Read Only List**
    - Updated. If you have customized this list, see Section 4.8 for how to incorporate changes.
- 2.0.0.12 (Alpha)
  - Lumic
    - Reordered Fields to be sorted before Tabs and Groups.
- 2.0.0.11 (Alpha)
  - Lumic
    - Added the ability to save parameters with "Ctrl + S"

        * Added ability to use the mouse wheel to scroll anywhere.
        * Added new Float Multiplier data type.
    - Plateau
        * Added ability to print both Uniformity checks if taken.
    - **Blacklist**
        * Updated. If you have customized this list, see Section 4.2 for how to incorporate changes.
    - **Print Blacklist**
        * Updated. If you have customized this list, see Section 4.2 for how to incorporate changes.

- 2.0.0.10 (Alpha)
    - Lumic
        * Made CSV the default file type for saving Parameters.
    - Plateau
        * Added ability to preform Alpha/Beta Uniformity Checks.
        * Added warning if the Model Number, Threshold(s), or Window(s) are different.

- 2.0.0.9 (Alpha)
    - Lumic
        * Allowed the Min/Max controls to accept "0XY" and "00X" as mantissa values.
        * Forced the real time stream to stop running on start up.
    - Plateau
        * Added ability to show Window for the last or only channel.
    - Min/Max Wizards
        * Added in initial Dose, Rate, and Scaler Min/Max Wizards.
    - **Blacklist**
        * Updated. If you have customized this list, see Section 4.2 for how to incorporate changes.

- 2.0.0.8 (Alpha)
    - Lumic
        * Initial Alpha Release