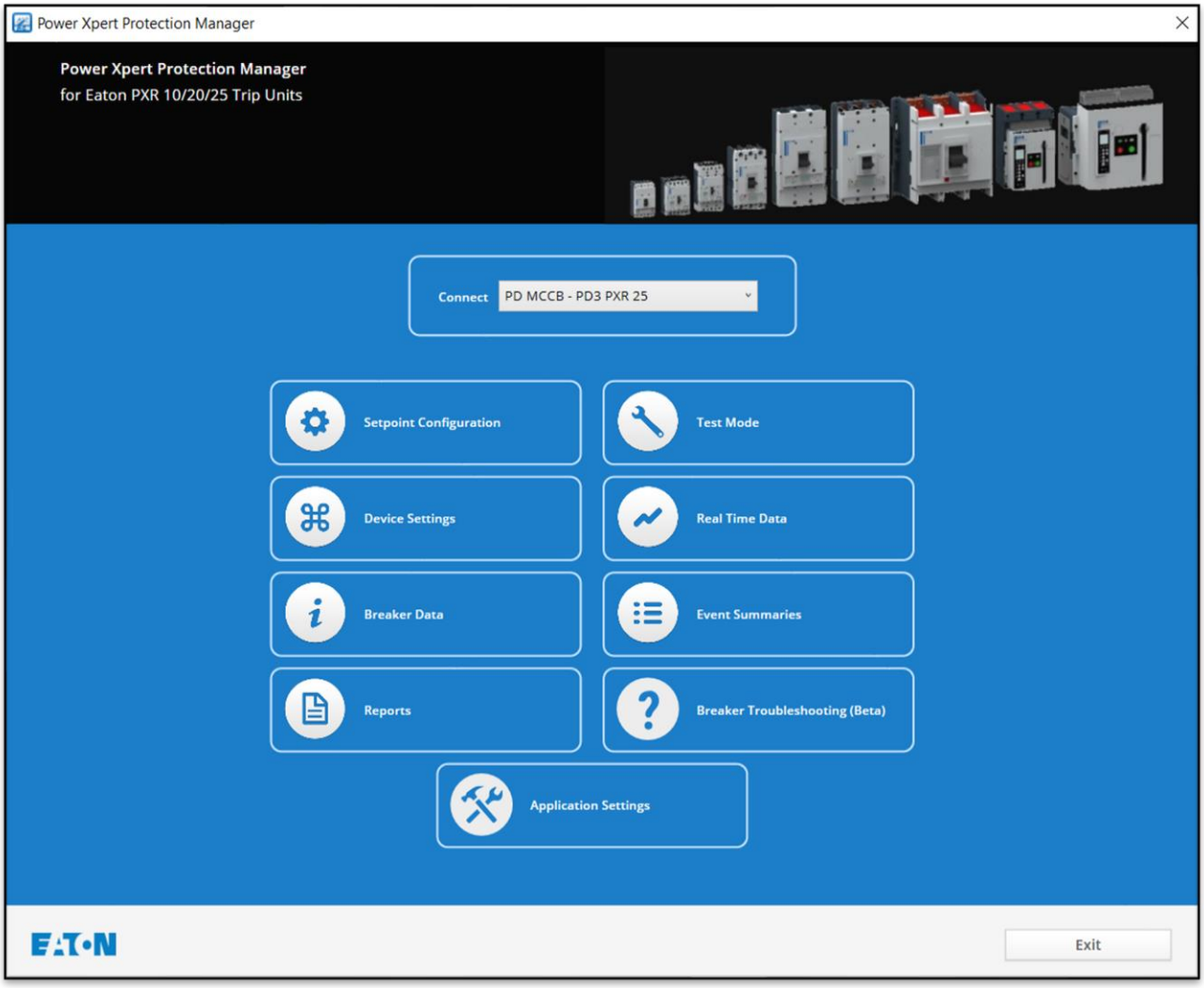
Power Xpert Protection Manager quick start guide



Introduction

Eaton's Power Xpert Protection Manager (PXPM) is a Microsoft® Windows-based software that configures, controls and tests Eaton PXR trip units in Series NRX, Power Defense, Magnum Breakers or NZM Breakers. This document guides users through the PXPM's installation and usage.

Cybersecurity is at the core of Eaton's "secure by design" philosophy. Our secure development approach helps us manage cybersecurity risks in our products through the entire product life cycle: from threat modeling, requirements analysis implementation and verification to ongoing maintenance. This product has been tested by an authorized UL cybersecurity test lab, following industry established frameworks and standards. Eaton Cybersecurity Center of Excellence (CCoE) would like to take this opportunity to reiterate to our customers the importance of continuing to review, implement and maintain recommended cybersecurity best practices.

1 System Requirements

Hardware requirements:

- Eaton PXR trip unit
- USB to Micro-USB cable
- Digitrip auxiliary power module (For PXR ACB Trip Units)
    - Catalog Number: PRTBAPMDV for U.S. power sockets
    - Catalog Number: DTAUXPMEU for European power sockets
    - Catalog Number: DTAUXPMUK for U.K. power sockets

Software requirements:

- Microsoft® Windows 7 or 10 (32-bit or 64-bit)
- Adobe® Acrobat Reader (version 5 or higher).

Screen resolution:

- 1280x1024 pixels or higher resolutions

1 Power Xpert Protection Manager Main Screen

The Power Xpert Protection Manager provides several features to communicate to the PXR trip units. (Figure 1). User may choose any of the features shown by clicking on the button. If the button is disabled, then the trip unit is not connected or does not support that function.

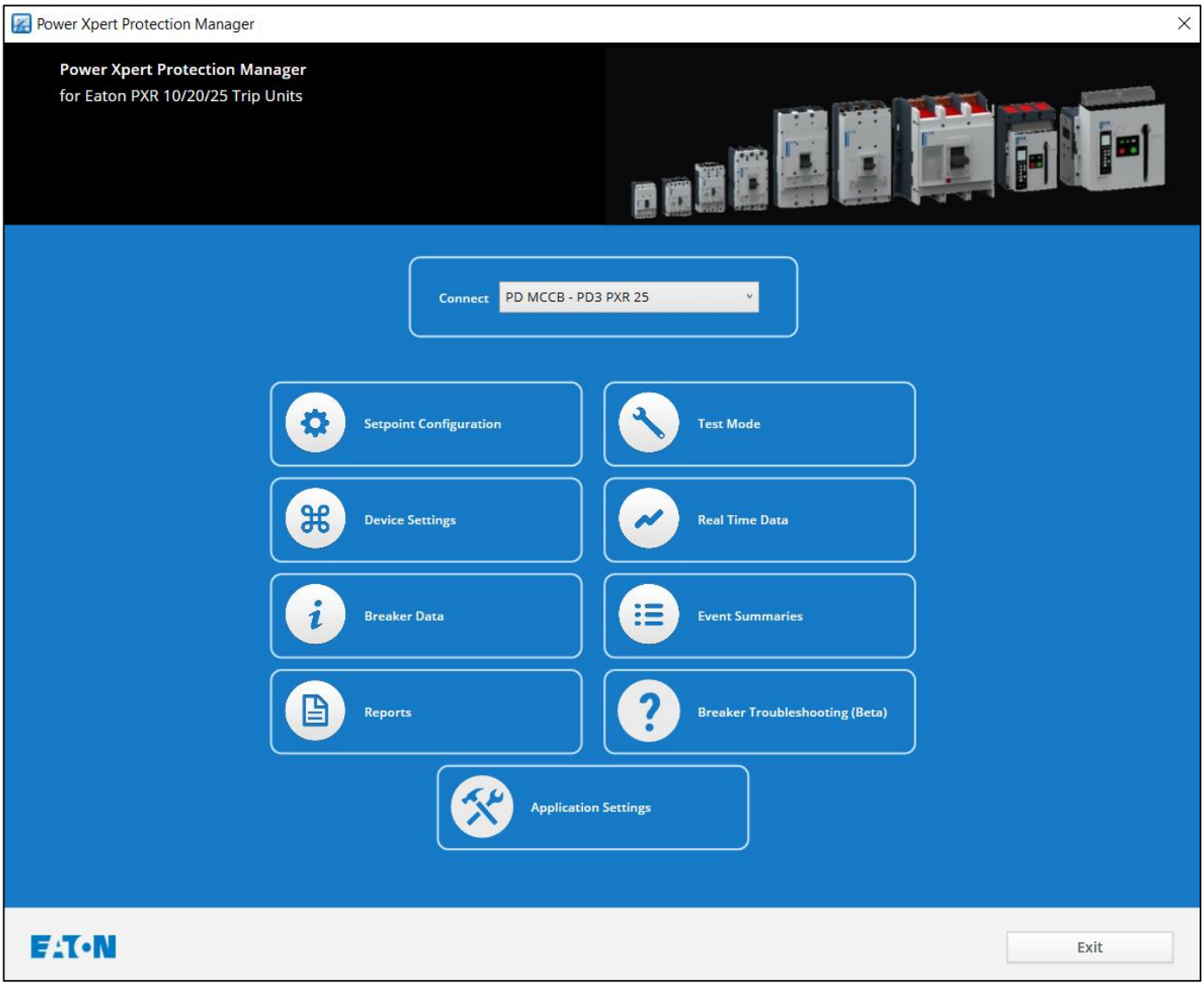


Figure 1: Power Xpert Protection Manager main screen

1.1 Connect

The user can connect a PXR Trip Unit using a USB Cable. PXPM software automatically detects if any trip unit is connected to the computer. Any PXR Trip Units connected to the computer will be located in the **Connect** box.

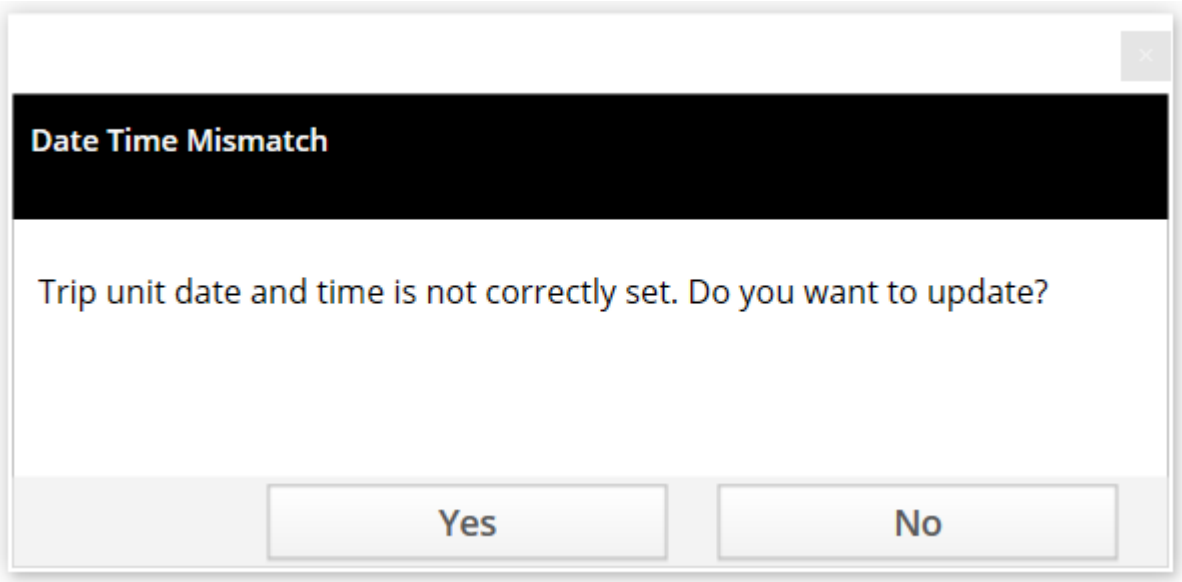


Figure 1.1 Date Time Mismatch Popup Screen

1.2 Date Time Mismatch Popup

Once the trip unit is connected or the trip unit is changed (if there are multiple trip units), it compares the trip unit's date & time with Computer's date & time. In case, it is not matching, then it will show the date & time mismatch popup (Figure 1.1 Date Time Mismatch Popup Screen). If the user decides to update the trip unit's date & time, then application will show the date & time screen as shown in Figure 13.

2 Setpoint Configuration

The **Setpoint Configuration** section provides four main features (Figure 2).

1. **New Offline Settings**: Create, modify, and save setpoint configurations without connecting to a PXR trip unit.
2. **Open Settings**: Open, modify and save existing setpoint configuration files (.pxset) from the computer.
3. **Connect to Unit**: Import and modify PXR trip unit's existing setpoints. The trip unit must be powered up and connected to the computer through a USB to Micro-USB cable.
4. **Export to Unit**: Export setpoints from an existing setpoint configuration file (.pxset) to a PXR trip unit. The trip unit must be powered up and connected to the computer through a USB to Micro-USB cable.

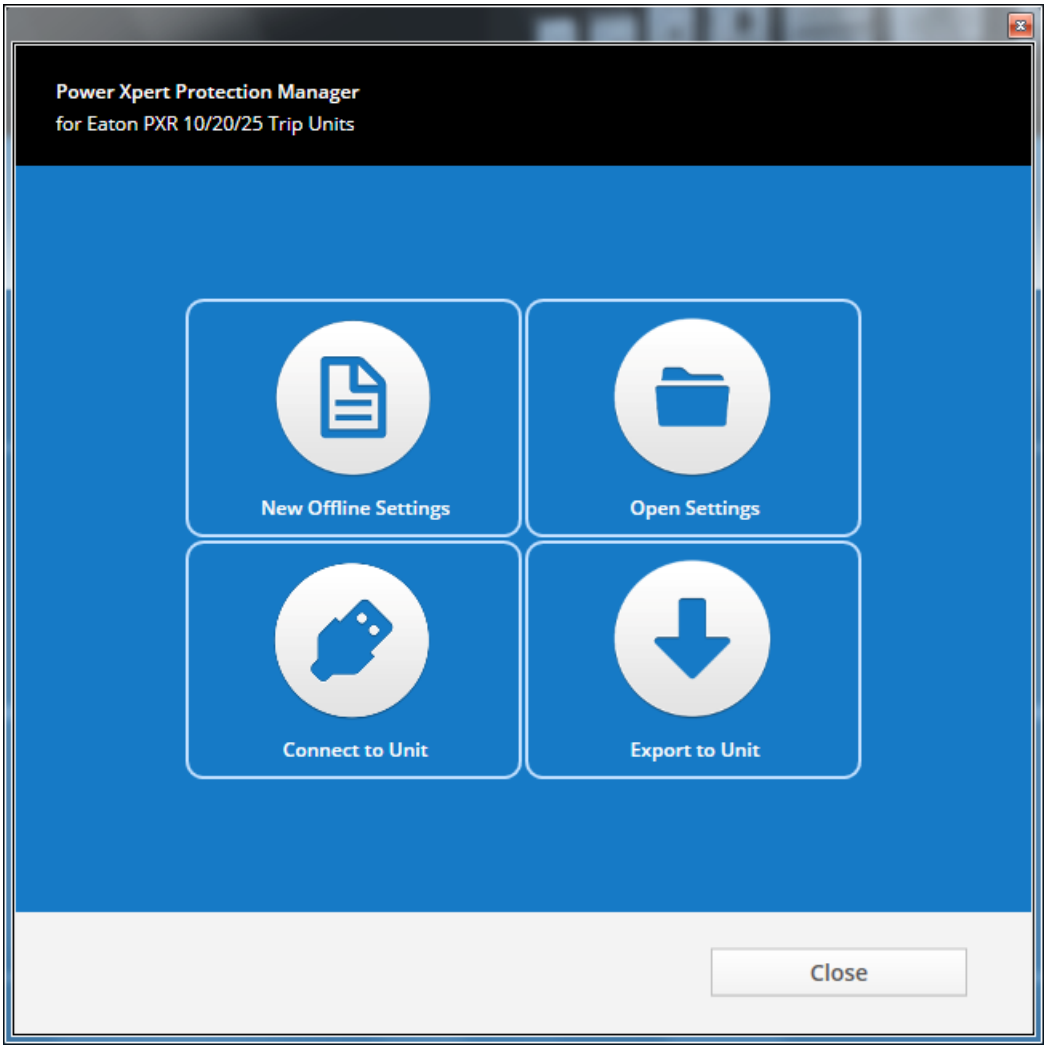


Figure 2: Setpoint options screen

2.1 New Offline Settings

To create a new offline setting, click **New Offline Settings** button on the startup screen (Figure 2). User can create new offline setting for either an PXR ACB, Power Defense or NZM trip unit.

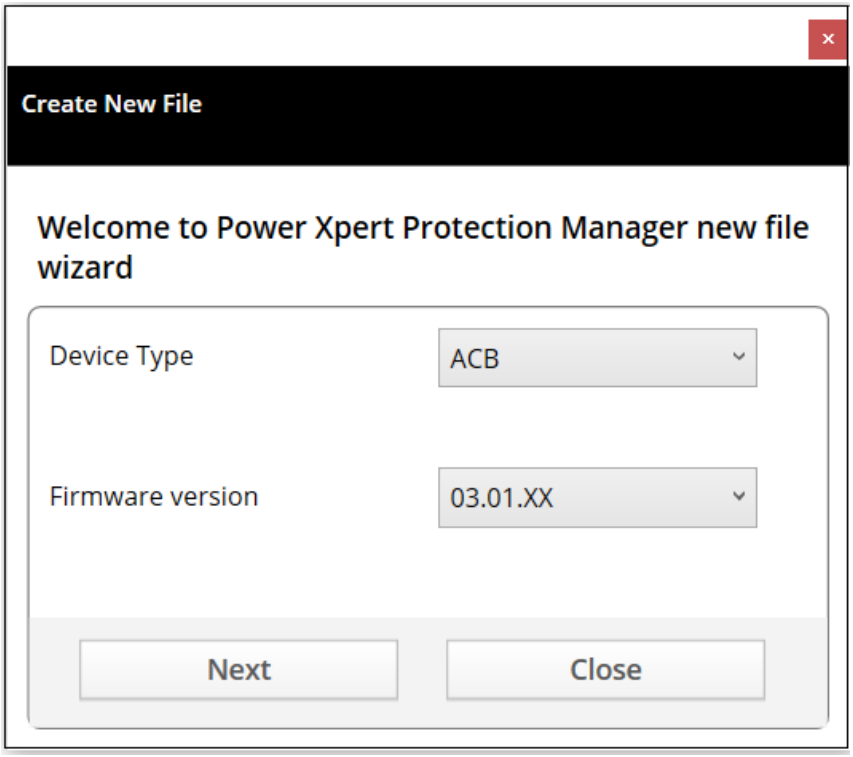


Figure 3: New offline settings screen

Note that connection to a PXR trip unit is not needed when using **New Offline Settings** feature. Select your Device Type and Firmware Version (if applicable) and click **Next** on the screen shown in Figure 3. This will take you to the Setpoint configuration screen described in Section 4.5.

2.2 Open Settings

To open a previously saved configuration file, click **Open Settings** button in Figure 2, and follow the prompted message to choose a configuration file to open. If a valid configuration file is selected, a configuration screen similar to the one shown in Figure 6 displays saved setpoints. This is described in Section 4.5.

2.3 Connect to Unit

To connect to a PXR trip unit, a USB to Micro-USB cable must be used. Note that the USB to Micro-USB cable cannot be a charge-only cable.

The trip unit must be powered up and running prior to using the **Connect to Unit** feature. A PXR trip unit auxiliary power module (Catalog Number: PRTBAPMDV for U.S. power sockets, DTAUXPMEU for European power sockets, or DTAUXPMUK for U.K. power sockets.) may be used to power up an ACB trip unit, as shown in Figure 4. This is required to trip the breaker.

In Figure 4, the standard USB end is connected to a computer's USB port. The Micro-USB end of the cable is connected to the Micro-USB port of the trip unit. Then click **Connect to Unit** button in Figure 2.

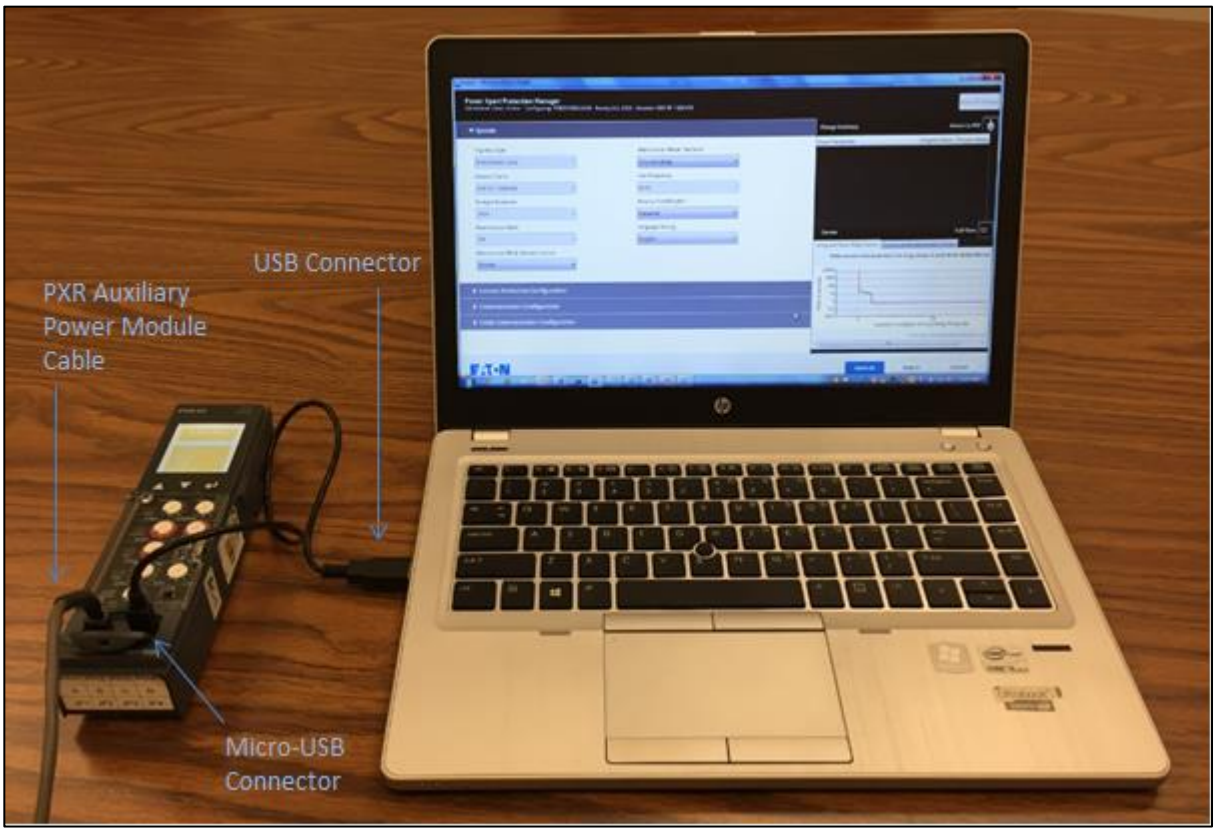


Figure 4: USB to Micro-USB Cable and PXR Trip Unit.

2.4 Export to Unit

Export to Unit exports setpoints from an existing setpoint configuration file (.pxset) to a PXR trip unit. It involves overwriting the trip unit's existing setpoints with new values. To prevent users from unintended overwrites, a dialog box similar to the one shown in Figure 5 is displayed to prompt the user to create a backup file of the trip unit's existing setpoints before overwriting.

Selecting **Yes** in Figure 5 allows the user to save the trip unit's existing setpoints in a backup file. Selecting **No** will skip the backup file and proceed to the next step.

The application then verifies that the trip unit style, rating, and other selections in the setpoint configuration file match those in the connected trip unit. Upon a successful match, the setpoints will be exported to the trip unit.

A user may restore the trip unit to the settings from a previously created setpoint file. Click **Export to Unit** from the **Setpoint Options Screen** (Figure 2) and choose the desired file. This will export the setpoints from the selected file into the trip unit.

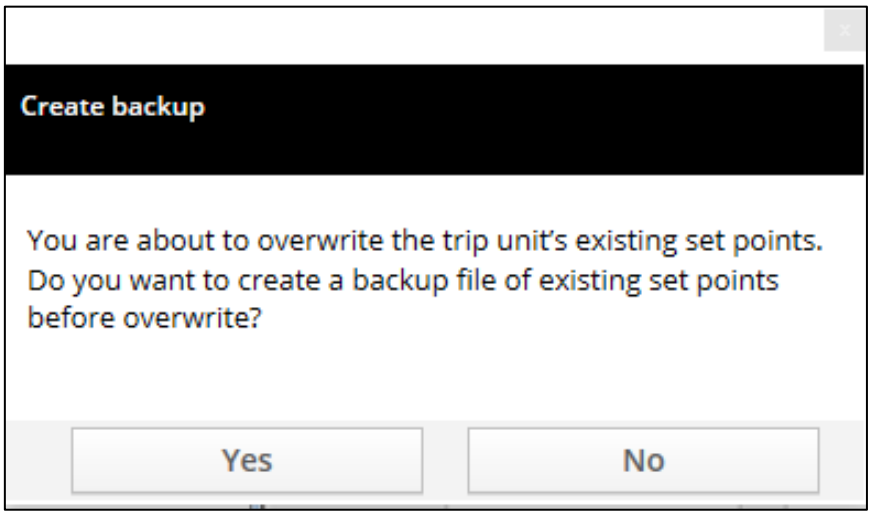


Figure 5: Create Backup Configuration File Screen

2.5 Setpoint configuration screen

The Setpoint configuration screen, in Figure 6.1 shows the resulting setpoints screen with trip unit type, style and other settings.

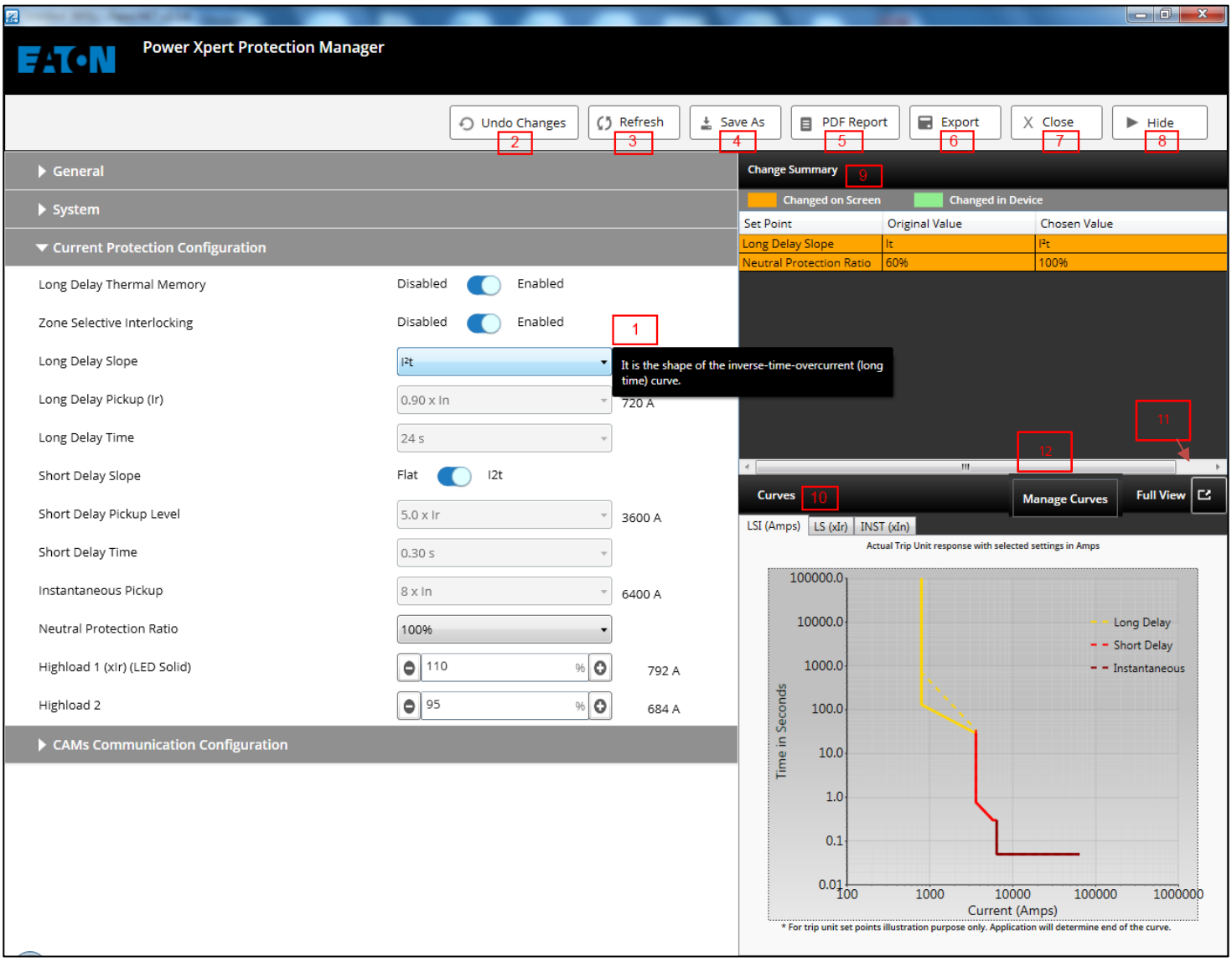


Figure 6.1: Setpoint configuration screen

The configuration screen allows users to view and edit setpoints. Figure 6.1 shows the configuration screen in online mode when **Connect to Unit** is selected. A configuration screen similar to Figure 6.1 is also shown when **New Offline Setting,** or **Open Settings** is selected.

1. **View and Edit Setpoints**: For each setpoint, its range, step size and description are shown in the tooltip when a user hovers the mouse cursor over that setpoint. For setpoints controlled by a physical switch on the front of a trip unit, PXPM does not display data and the user cannot edit this read-only setpoint.
2. **Undo Changes**: All setpoints changed on the screen, but not yet exported to the device will be returned to their original values.
3. **Refresh** (only visible when connected to a trip unit): Read setpoints from trip unit and display on the setpoint screen. All changes that have not been exported will be lost.
4. **Save As**: Saves setpoints to a new configuration file. Users will be prompted to select a location and name the file.
5. **PDF Report**: Exports all setpoints to a portable document format (PDF) file. Modified setpoint parameters are highlighted in the exported PDF file (Figure 7).
6. **Export**: Exports setpoints to a connected trip unit.
7. **Close**: Close the configuration screen.
8. **Hide/Show:** To close/open the sidebar containing change summary and curves.

9. **Change Summary pane**: Displays a summary of setpoints that have been changed in the present session. Both original and changed values are displayed. Setpoints exported to the device are displayed in green. Setpoints changed on screen, but not yet exported are displayed in orange.
10. **Curves pane**: Shows graphical representation of setpoints. Long and short delay protection curves, as well as ground (earth) and instantaneous protection are displayed. Trip curves are always visible when connected to a device and may be available when working offline. In the offline case, trip curves are only visible for device types where the setpoints are not controlled by physical switches. A dotted curve is shown when a setpoint value has been changed on the screen.
11. **Full View:** To open the enlarged view of **Curves.**
12. **Manage Curves:** Enables user to perform the comparative study of the behaviors of different PXR devices by analyzing the respective curves.

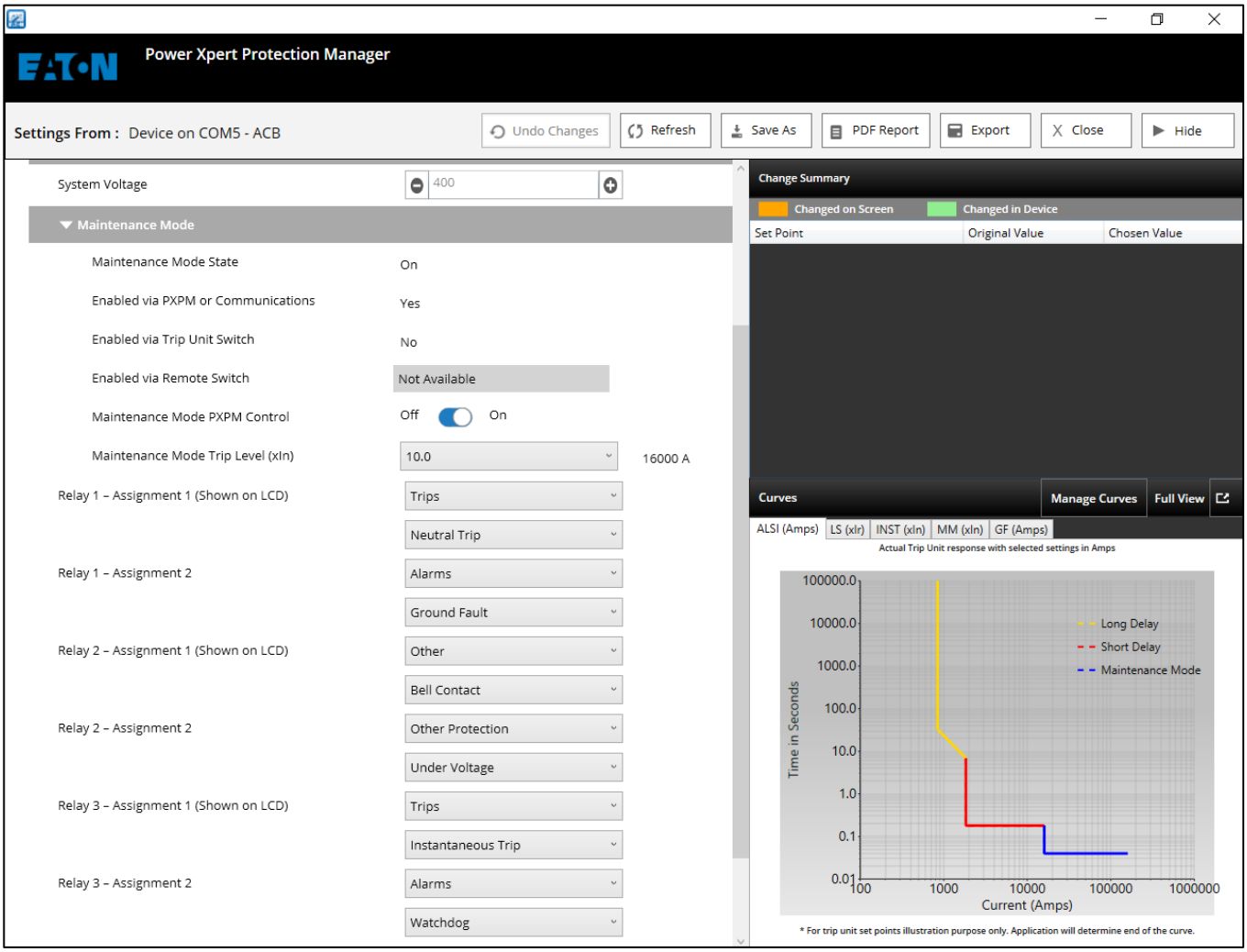


Figure 6.2: Maintenance mode and Multiple Relay setpoints

'Enabled via PXPM or Communications', 'Enabled via Trip Unit Switch', 'Enabled via Remote Switch' and 'Enabled via LCD Display' settings are added to Maintenance mode section as shown in Figure 6.2.

Enabled via PXPM or Communications: Communications can be by any of the possible external methods, PXPM, Modbus RTU or CAM module.

Enabled via Trip Unit Switch: The local switch on the face of the Electronic Trip Unit. Applicable only for ACB and Power Defense devices.

Enabled via LCD Display: Can be enabled in the Setpoint Menu on the display. Applicable only for NZM devices.

Enabled via Remote Switch: Can be an external toggle switch or contact that is wired to the circuit breaker.

These fields will let user know the source of maintenance mode change.

For ACB devices with Firmware version 03.00.XX, there is a provision to assign 2 Relay assignments for each Relay settings as shown in Figure 6.2.

Eaton Power Xpert Protection Manager Wizard - Change Summary Report

Created: 6/30/2023 8:56:22 AM

Customer Information	
Customer Name	-
Plant Location	-
Job#	-
Tested by	-
Device Summary	
Manufacturer	Eaton
Circuit Breaker Type/Model	Magnum Standard
Circuit Breaker Catalog Number	ACB2.2PXR25N-Frame
Circuit Breaker Serial Number	
Circuit Breaker Manufacturing Date	
Circuit Breaker Frame Rating (A)	2000
Trip Unit Model	PXR25V000LGAM
Trip Unit Serial Number	123456
Trip Unit Manufacturing Date	
Trip Unit In	1250 A
Voltage class	-
Frequency	-
Circuit Breaker Location	
Room/vault/switchgear #	-
Cell #	-
Environment Data	
Temperature	-
Humidity	-
Equipment Condition	
Circuit Breaker	-
ETU	-
Enclosure	-
Memo Details	
Memo	-
PXPM Software Version	
PXPM Software Version	23.06.1
Trip Unit Firmware Versions	

1 of 8

Eaton Power Xpert Protection Manager Wizard - Change Summary Report

Firmware version 1	02.02.XX
Firmware version 2	02.02.0016
Firmware version 3	NA

Trip Unit Features Included	
Parameter	As Found
Trip Unit	PXR 25
Firmware Version 1	02.02.XX
Firmware Version 2	02.02.0016
Firmware Version 3	NA
Trip Unit Features Included	
Parameter	As Found
Maintenance Mode Status	Yes
Ground Protection	Yes
Embedded Modbus	Yes

Trip Unit Features Included		
Parameter	As Found	As Left
Unit Type	IEC	IEC
Maintenance Mode State	On	Off
Enabled via PXPM or Communications	Yes	No
Enabled via Trip Unit Switch	No	No
Enabled via Remote Switch	Not Available	No
Maintenance Mode PXPM Control	On	Off
Maintenance Mode Trip Level (xIn)	2.5	2.5
Line Frequency	60 Hz	60 Hz
Reverse Feed Breaker	Forward	Forward
Power Factor Sign Convention	IEEE	IEEE
Language Setting	English	English
Relay 1 Function Configuration	Maintenance Mode Active	Maintenance Mode Active
Relay 2 Function Configuration	Ground Fault Trip	Ground Fault Trip
Relay 3 Function Configuration	All Trips	All Trips

2 of 8

Figure 7: Example of a change summary report

2.5.1 Manage Curves

PXPM allows the user to conduct a comparative behavioral study of the coordination of multiple PXR trip units through analysis of the respective time-current curves. Clicking on the **'Manage Curves'** button on Setpoint configuration screen brings up the following dialog box (Figure 8):

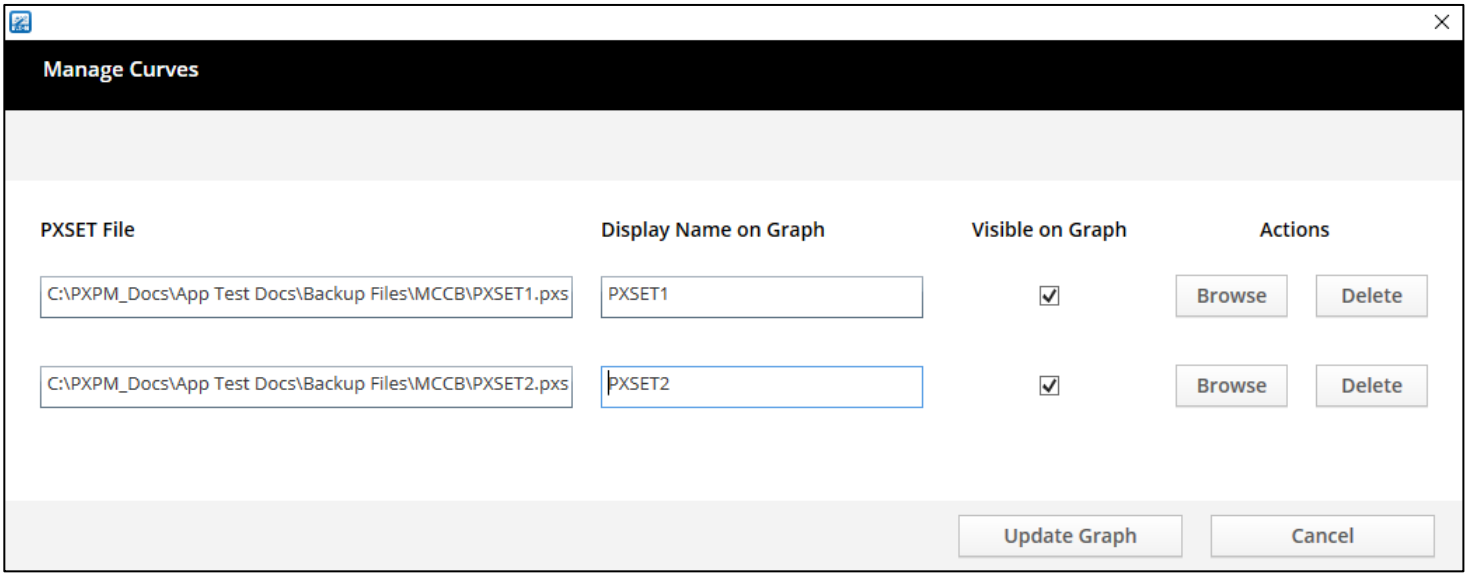


Figure 8: Manage Curves

User can select two PXSET files (exported from the device or created offline with PXPM) to compare the respective settings with the current settings. (Figure 8). The Curves display on Setpoint Configuration Screen for comparative study looks like the one below (Figure 9):

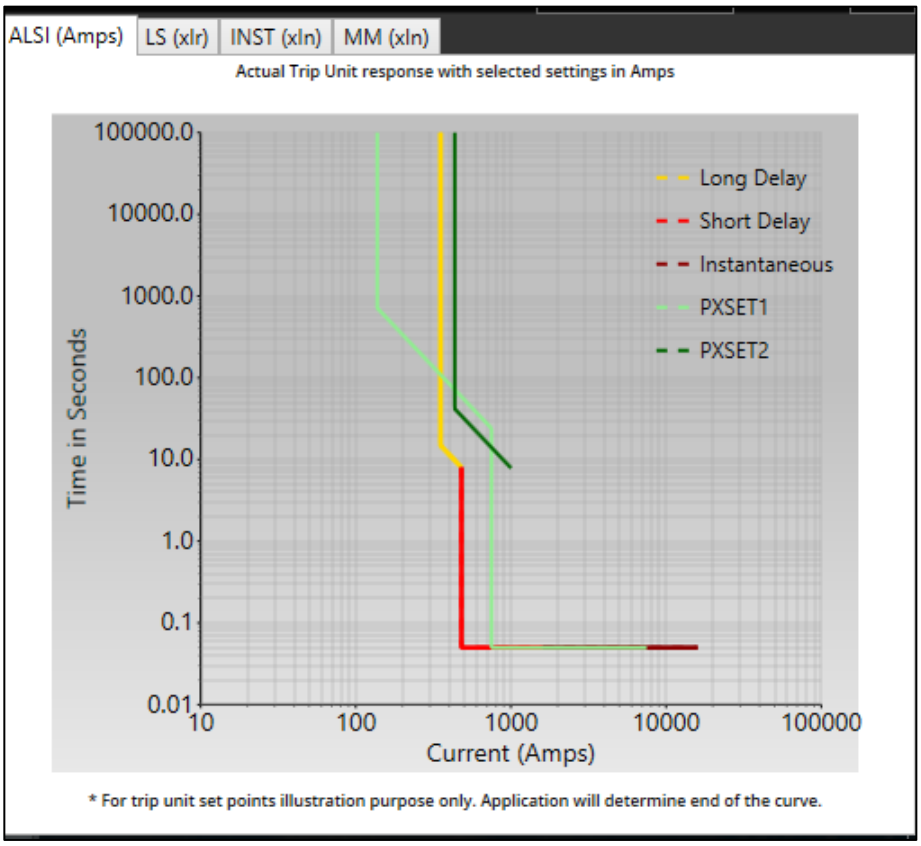


Figure 9: Comparative study of trip curves

Legend on the curve denotes the color of the curves displayed for the respective PXSET files.

3 Device Settings

The **Device Settings** section allows user to reset their trip unit, change trip unit date and time, set the password, download language, or change current rating if the trip unit supports these features.

The Device Settings screen (Figure 10) displays the Device Settings screen with download language option. This option is available only for Power Defense PXR trip units.

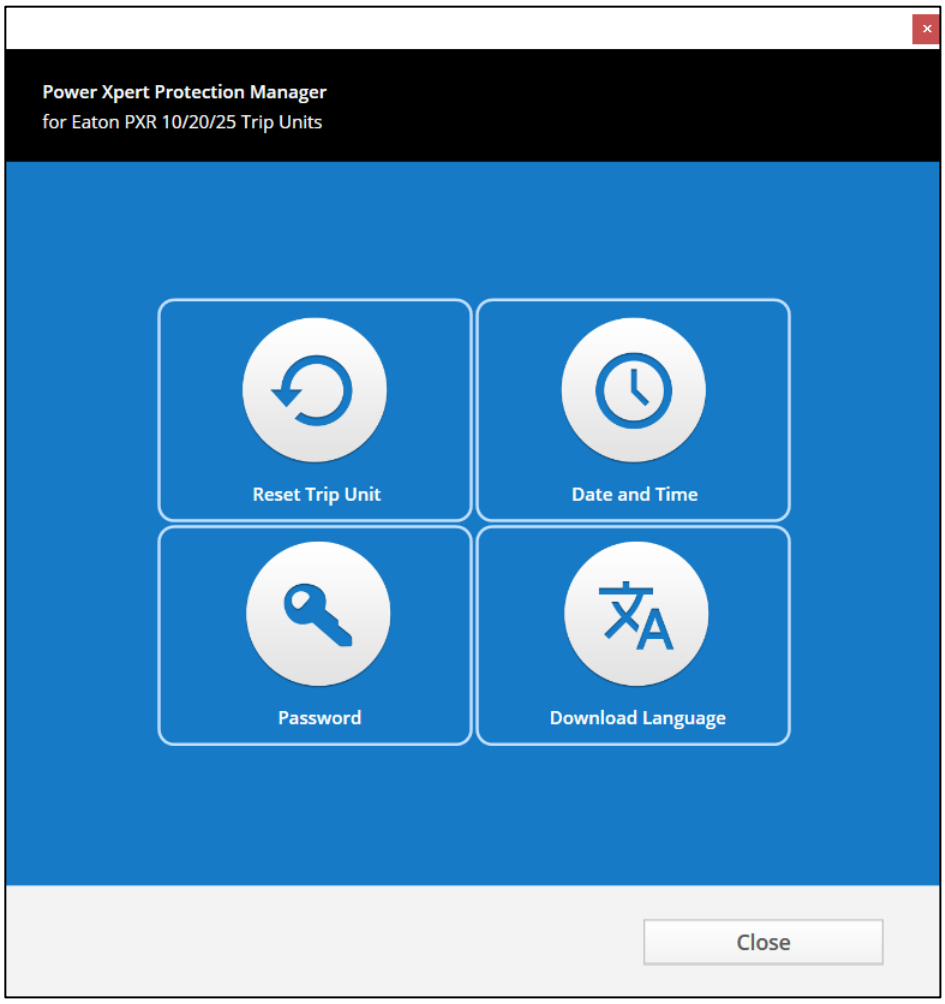


Figure 10: Device settings options screen with 'Download Language'

The Device Settings screen (Figure 11) displays the Device Settings screen with change Rated Current (In) option. This option is available only for ACB PXR trip units with firmware version 2.02.00 and above.

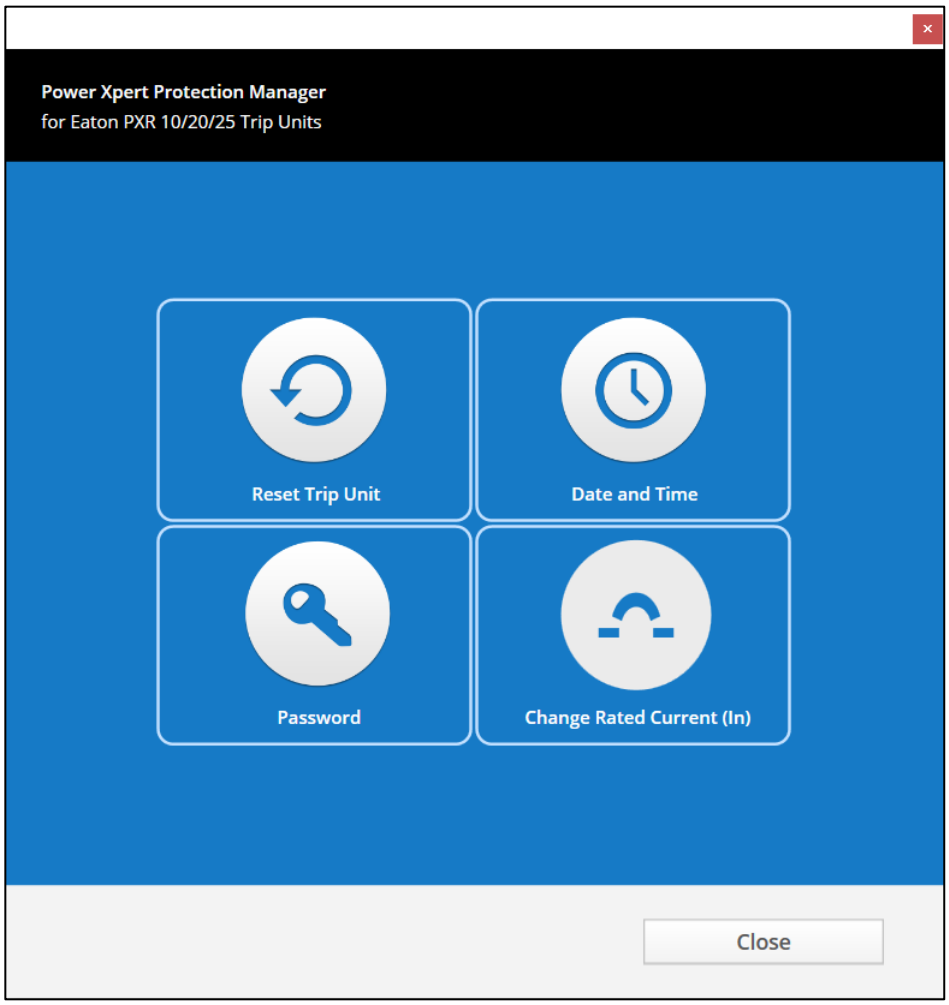


Figure 11: Device settings options screen with 'Change Rated Current (In)'

3.1 Reset Trip Unit

The PXR trip unit keeps an internal record of causes of trip, diagnostics, and metering data. In **Device Settings**, user can select and clear individual parameters by clicking **Reset Trip Unit** button Figure 10: Device settings options screen. The user can only reset one parameter at a time in Figure 12: Reset trip unit.

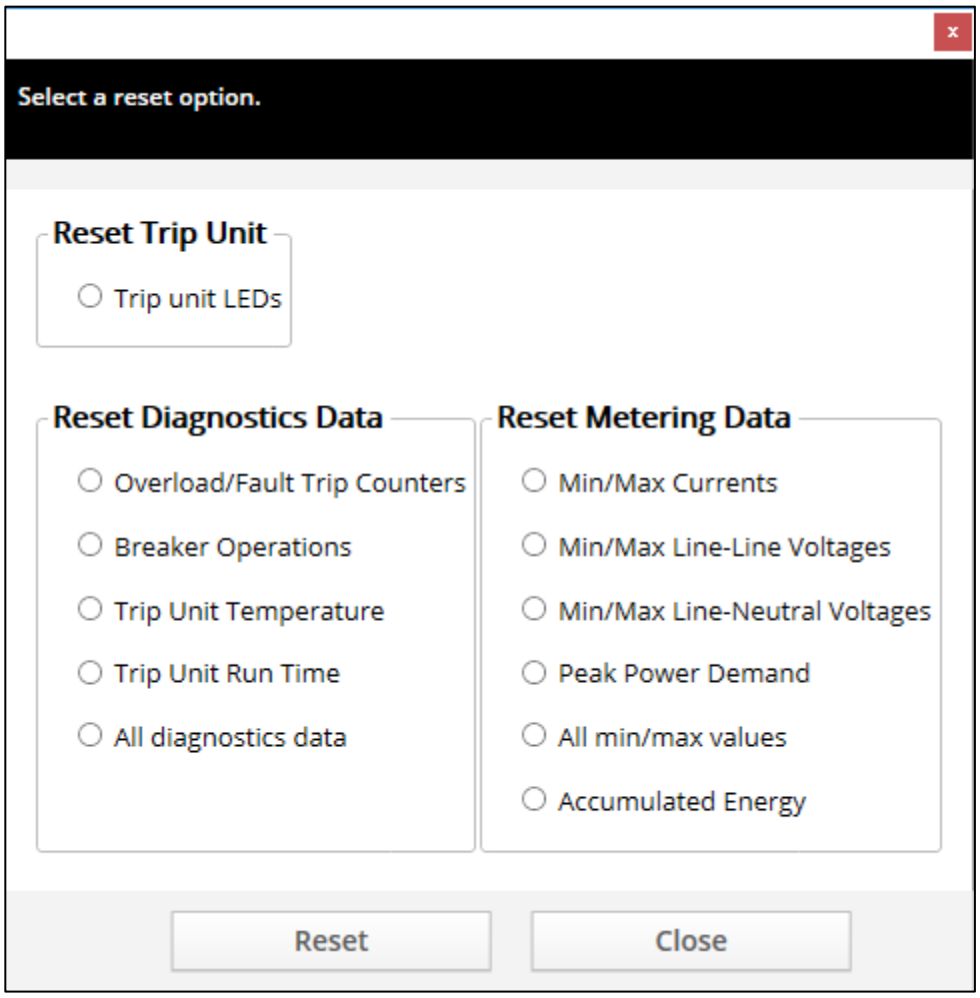


Figure 12: Reset trip unit

3.2 Change Trip Unit Date and Time

Some PXR trip units have an internal clock that keeps track of time. In **Device Settings**, user can modify this clock by clicking the **Date and Time** button. Use mouse cursor to select date and time, and then click the **Update** button to apply the date and time to the trip unit (Figure 13: Change PXR trip unit's date and time). Click the checkbox **Select System Date Time** to set the trip unit date time same as that of computer.

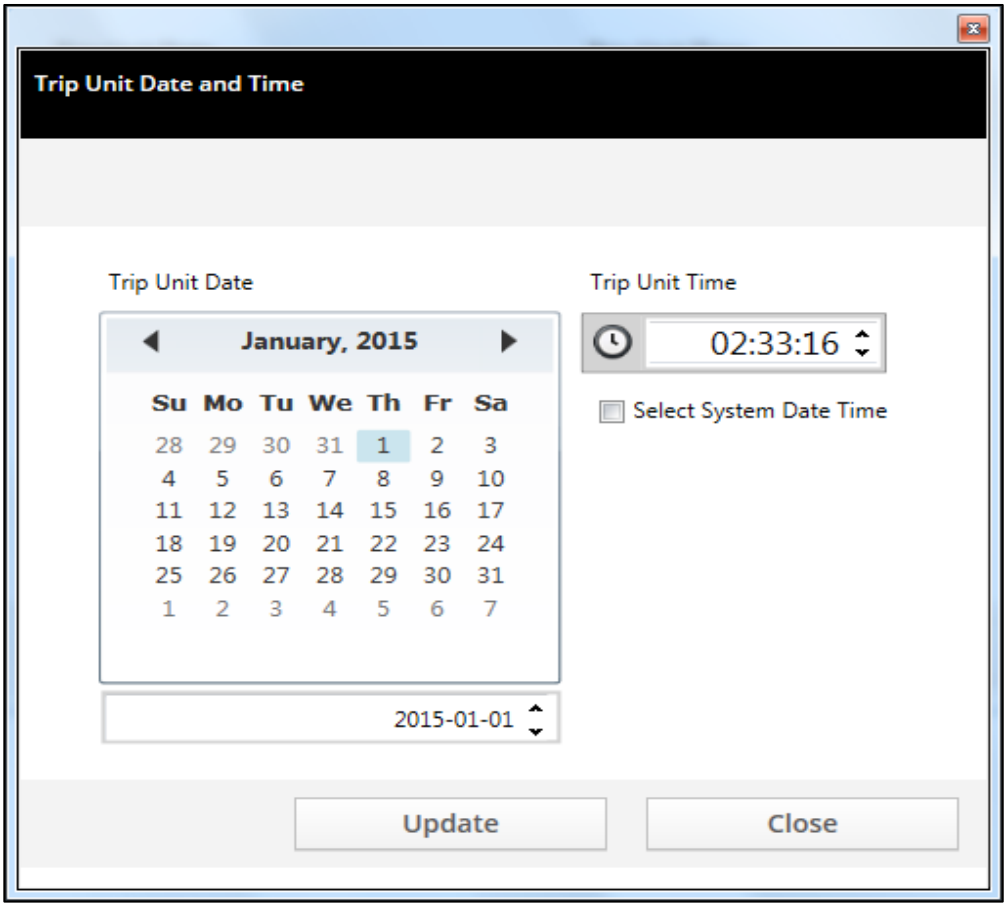


Figure 13: Change PXR trip unit's date and time

3.3 Breaker Password

PXR Trip Units contain a password that is required to change setpoints, perform testing, and other activities. Trip units that are compatible with PXPM breaker password management functionality will allow the user to enter or reset the breaker password directly in PXPM.

3.3.1 Verify Breaker Password

For trip units that support it, PXPM allows the user to enter and confirm their trip unit password directly from within the software (instead of from the PXR trip unit LCD display).

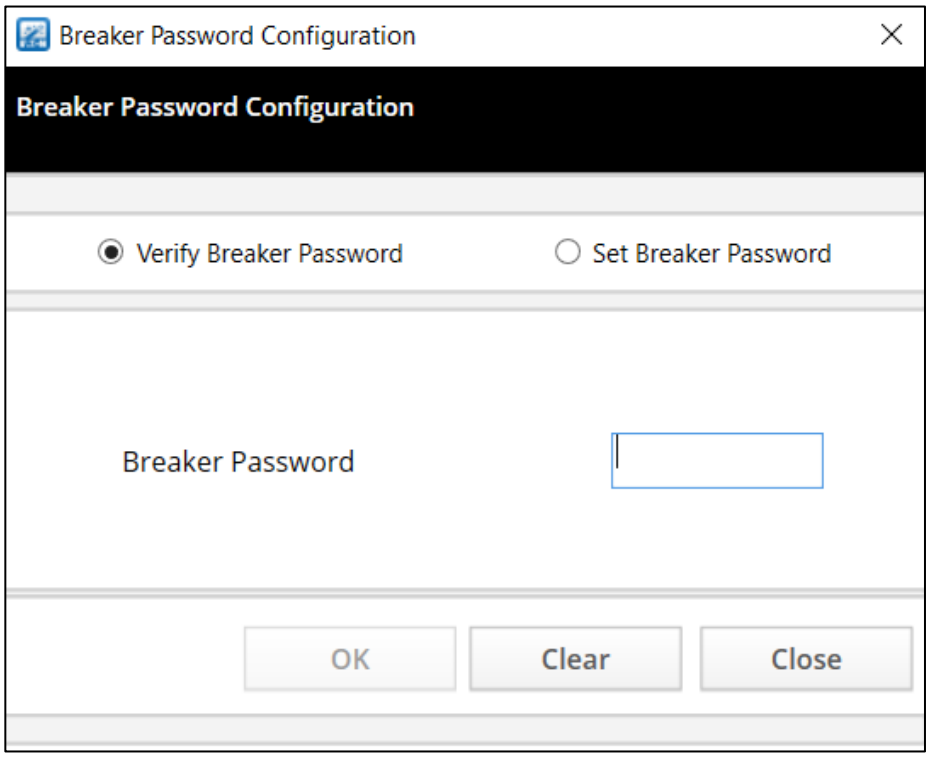


Figure 14: Verify Breaker password screen

3.3.2 Set Breaker Password

The user also has the ability to change the password for the PXR trip unit by using the **Set Password** feature.

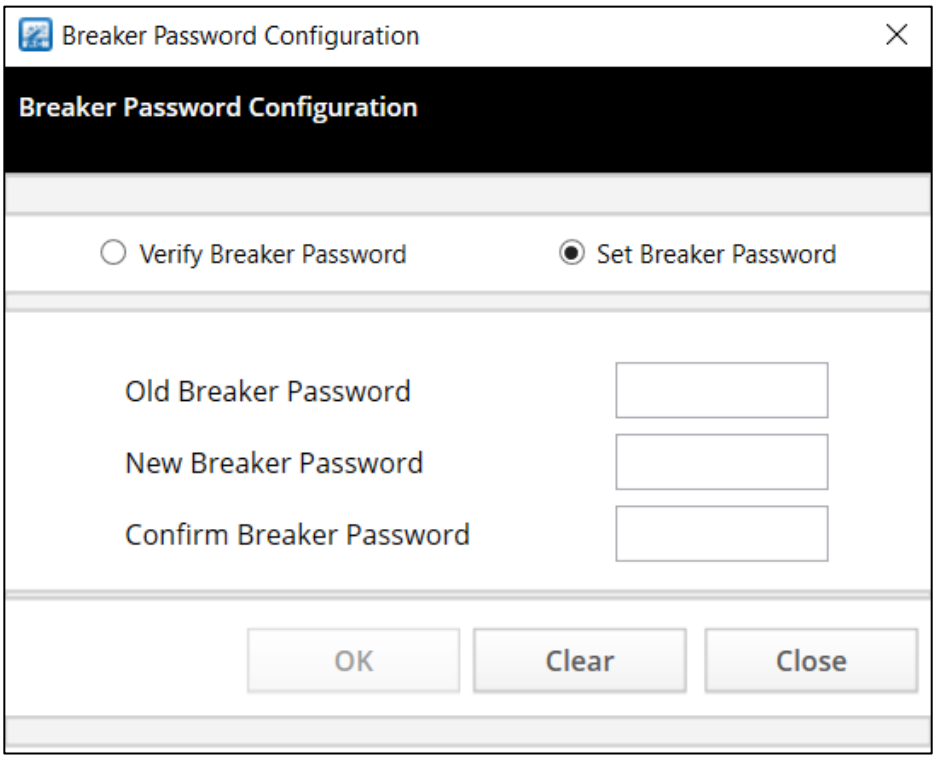


Figure 15: Set Breaker password screen

3.3.3 Password User Management for ACB devices with Firmware version 03.00.XX:

Password User Management functionality allows user to write setpoint configuration to Trip Unit based on privileges. Feature homepage is shown in Figure 15.1.

Trip Unit can have one Admin and one User. Admin has permission to write all the editable setpoints. By default, User has permission to write all the editable setpoints except protection settings. Admin can provide extended permission to User to allow writing protection settings to trip unit.

If the password entered matches with the Admin password configured in Trip Unit then customer will be treated as Admin. Admin has rights to Extend and Restrict User permissions, Create and Delete User and to reset Admin and User password as shown in Figure 15.2, 15.3 and 15.4.

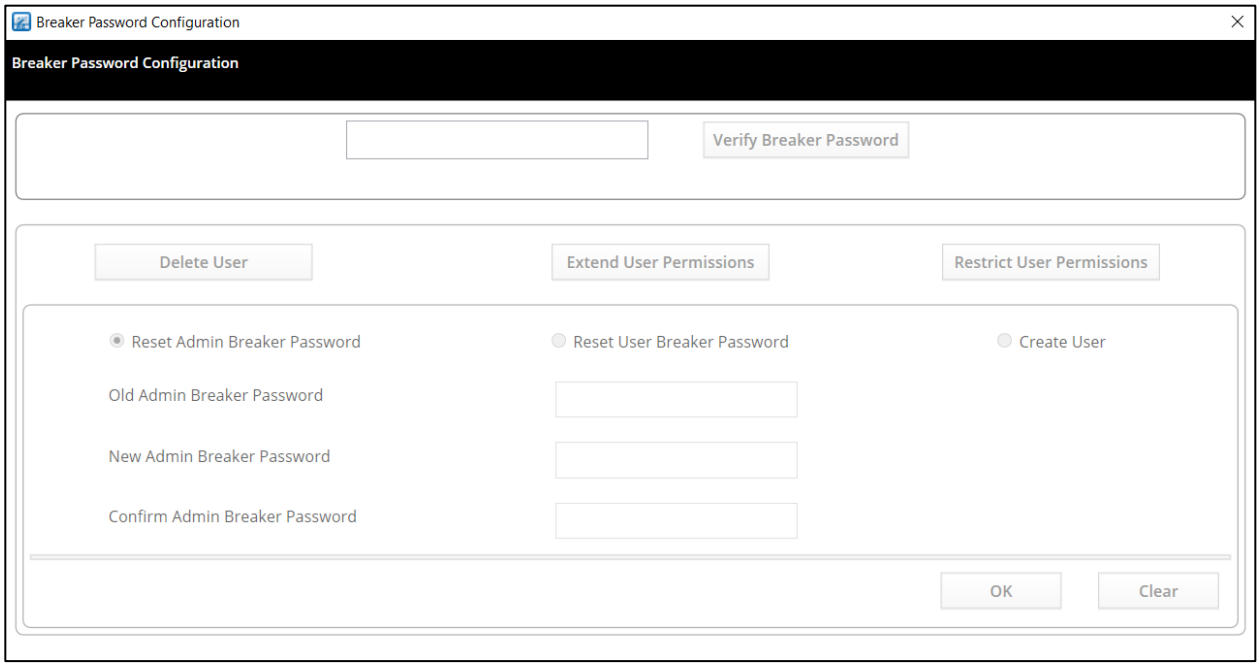


Figure 15.1: Password User Management homepage

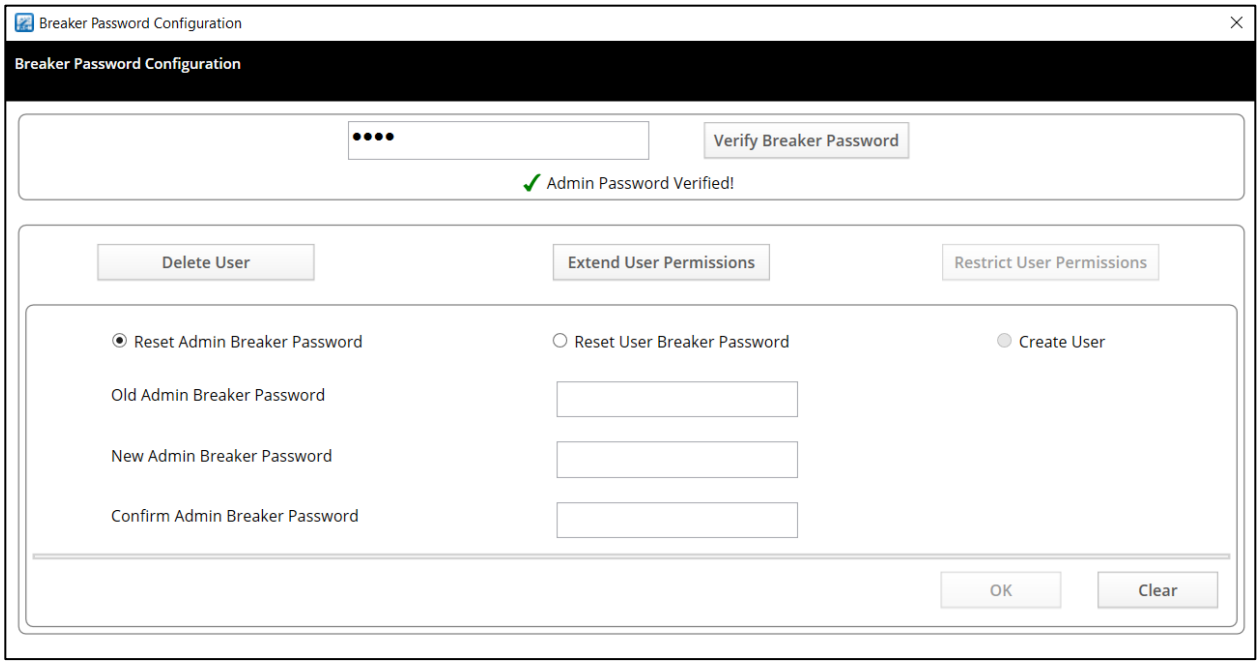


Figure 15.2: Reset Admin Breaker password

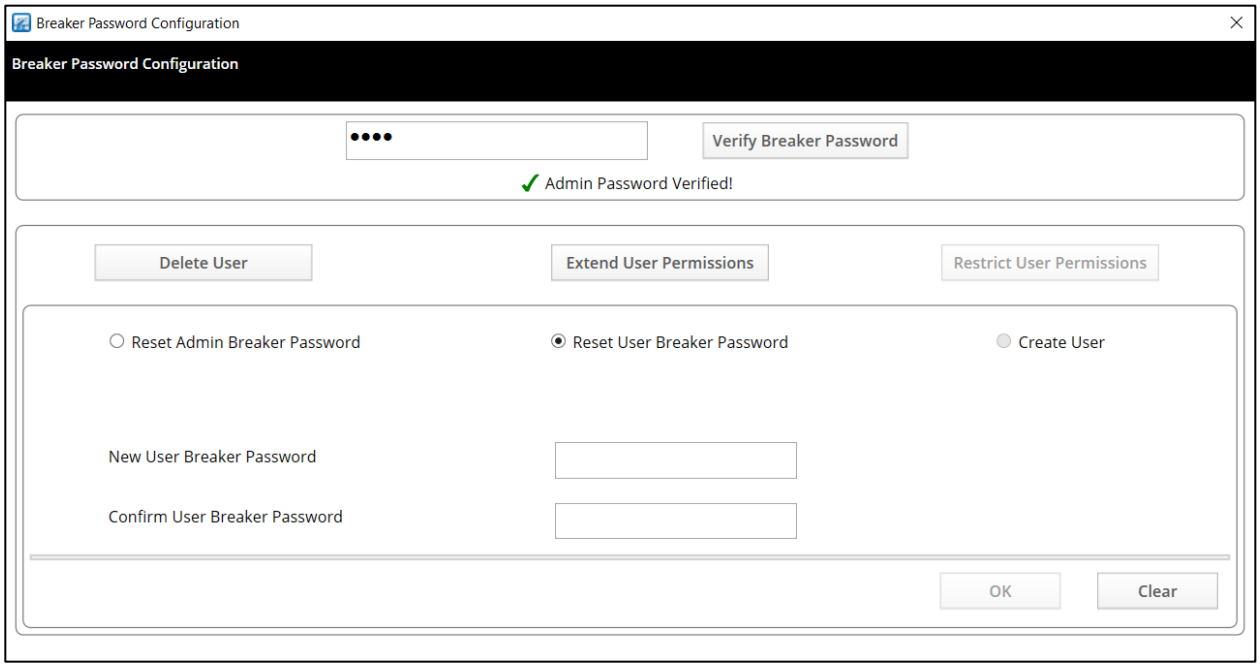


Figure 15.3: Reset User Breaker password

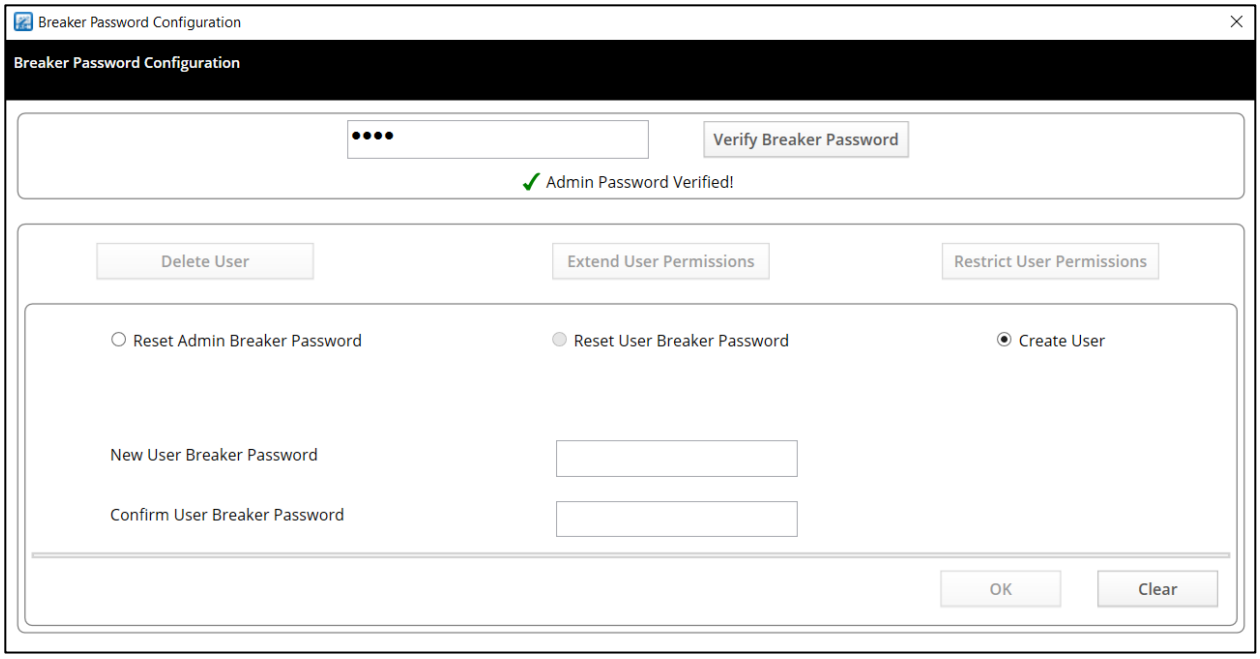


Figure 15.4: Create User

3.4 Download Language

The Power Defense PXR Trip Units have the ability to display different languages. Therefore, the PXPM provides the ability to see what languages are installed in the PXR Trip units as well as the ability to download additional languages. The additional languages are available on Eaton's website.

3.4.1 Language Status

The Language Status screen (Figure 16: Language status screen-Part1) will display all installed languages in the Trip Unit.

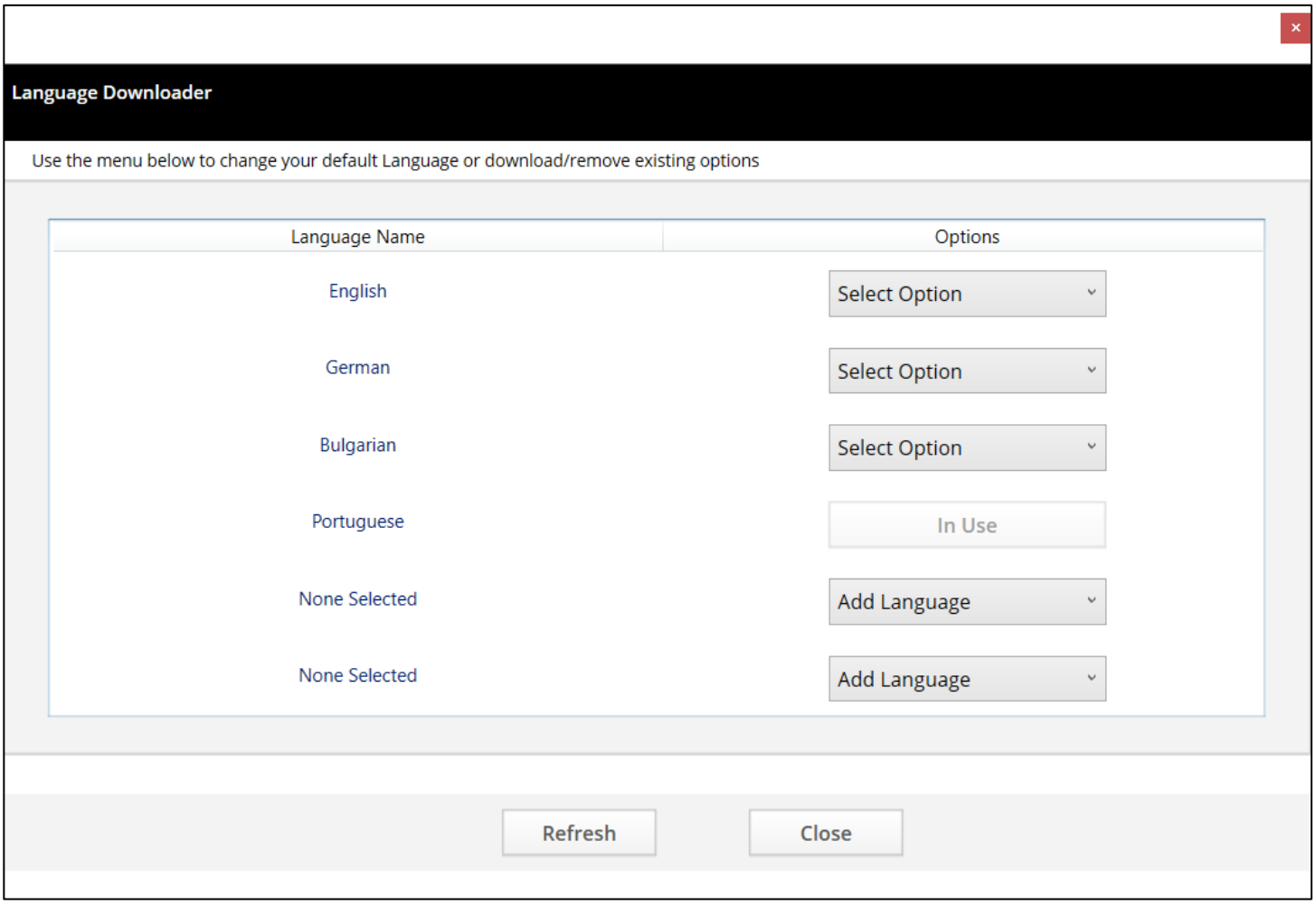


Figure 16: Language status screen-Part1

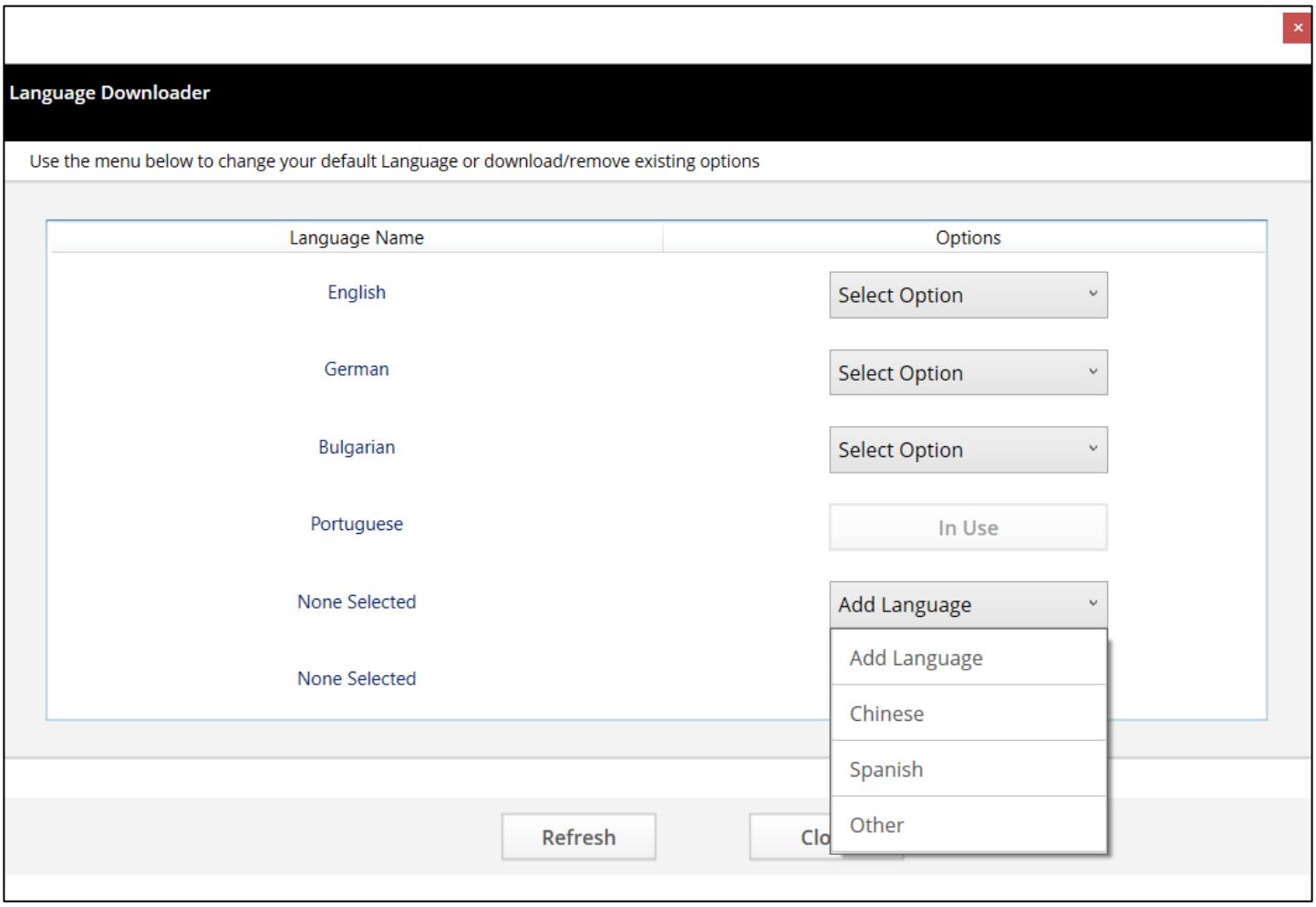


Figure 17: Language status screen-Part2

The language, which is selected on the trip unit, is marked as **In Use** on this screen.

For trip units that support language downloads, select language from **Add Language** combo box (Figure 17: Language status screen-Part2) to open the Language Selector screen (Figure 18: Language download screen). **Add Language** combo box contains the language packs provided by PXPM application and also 'Other' option to allow user to select language pack from the desired local path.

So, the user can either download available language packs from Eaton's website and use this screen to download a new language into the trip unit or select language packs provided by PXPM application.

User can also set the default language in trip unit by either using checkbox before downloading as shown in Figure 18 and Figure 19 or by selecting 'In Use' option from **Select Option** combo box as shown in Figure 20.

The user can delete the selected language by selecting **Delete** option from **Select Option** combo box as shown in Figure 20, if needed. Note that different trip units have default languages that cannot be erased. The language in use is also not erasable.

Clicking **Refresh** updates the screen to show the languages available in the trip unit.

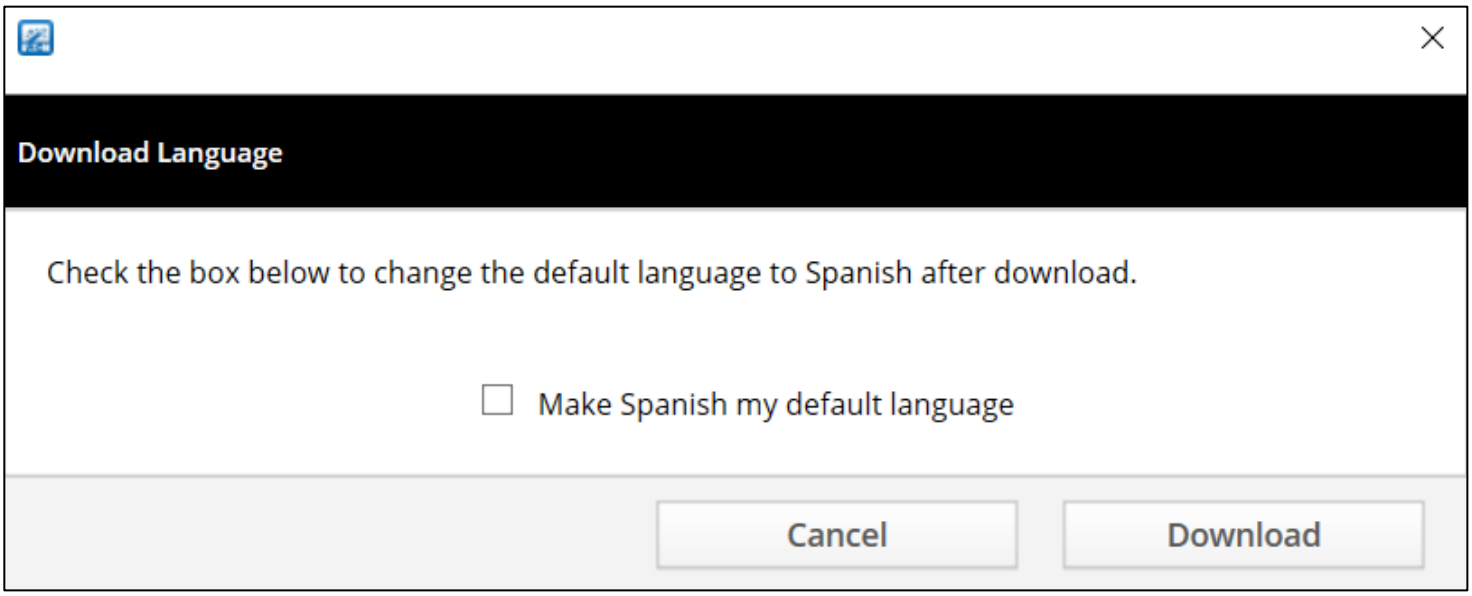


Figure 18: Language download screen-Part1

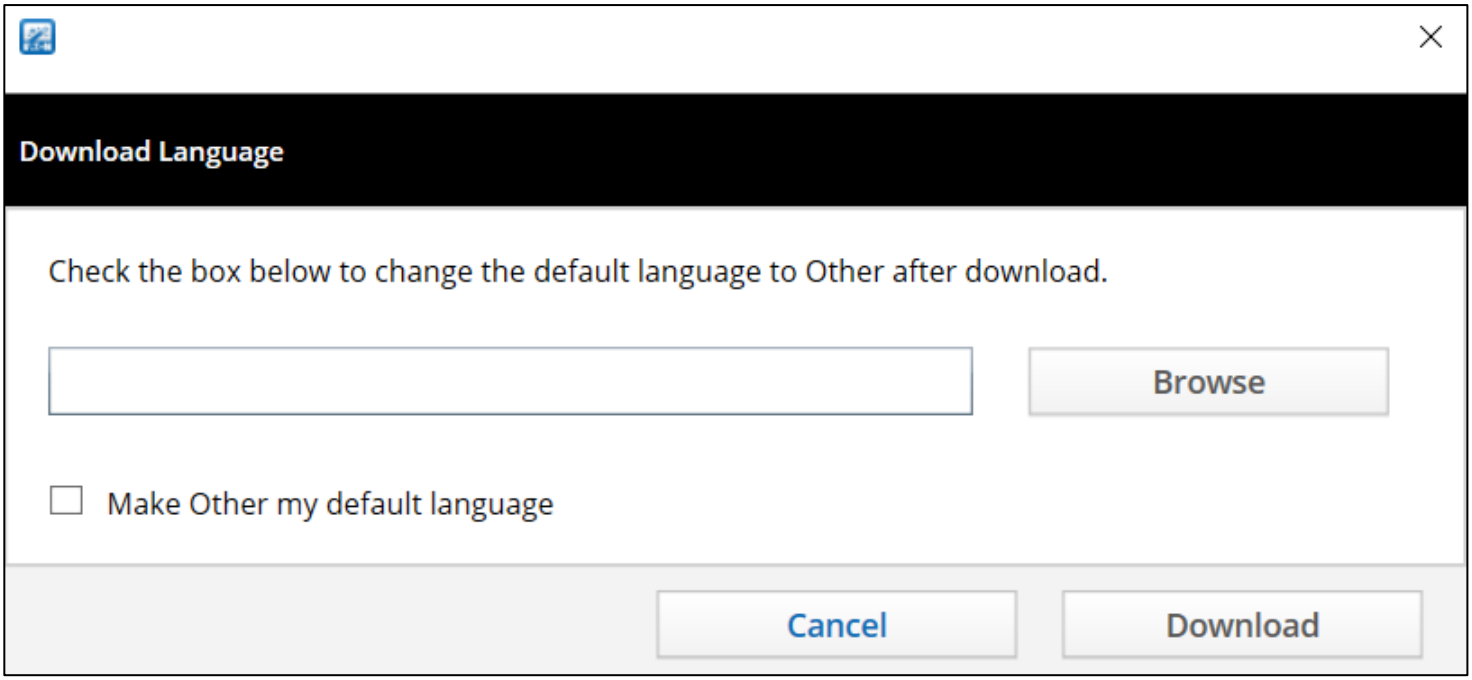


Figure 19: Language download screen-Part2

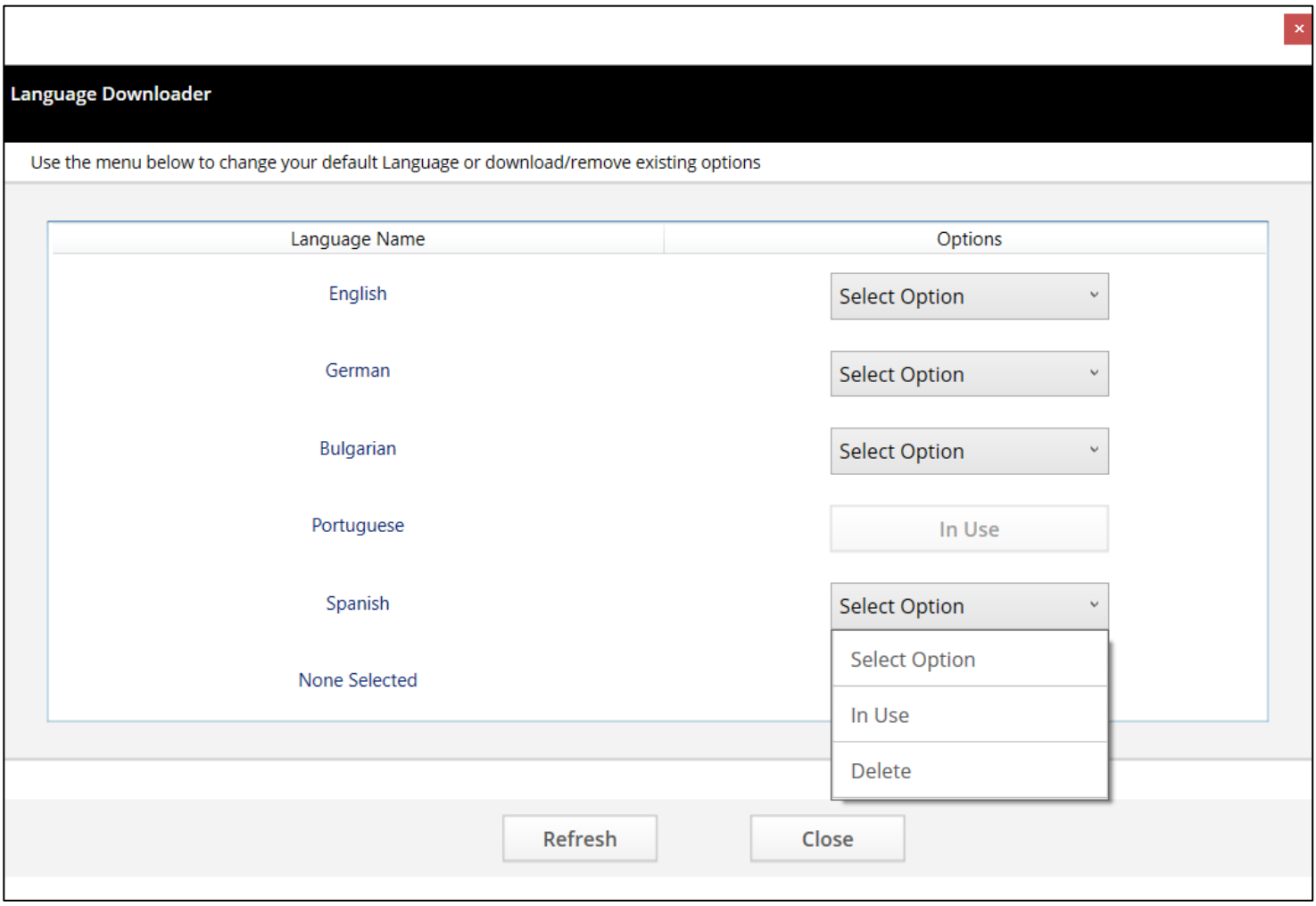


Figure 20: Language status screen-Part3

3.5 Change PXR ACB Rated Current (In)

This feature allows the user to modify the Rated Current (In) configured for the ACB PXR devices. This is a licensed feature. More information regarding a session is described in the 'License' section of this Quick Start Guide.

NOTE: There are no free trials allowed for using this feature.

If no license is installed for this feature, then a message is displayed to the user as shown in Figure 21. If the user clicks on Acknowledge button, Application is returned to the Device Settings screen.

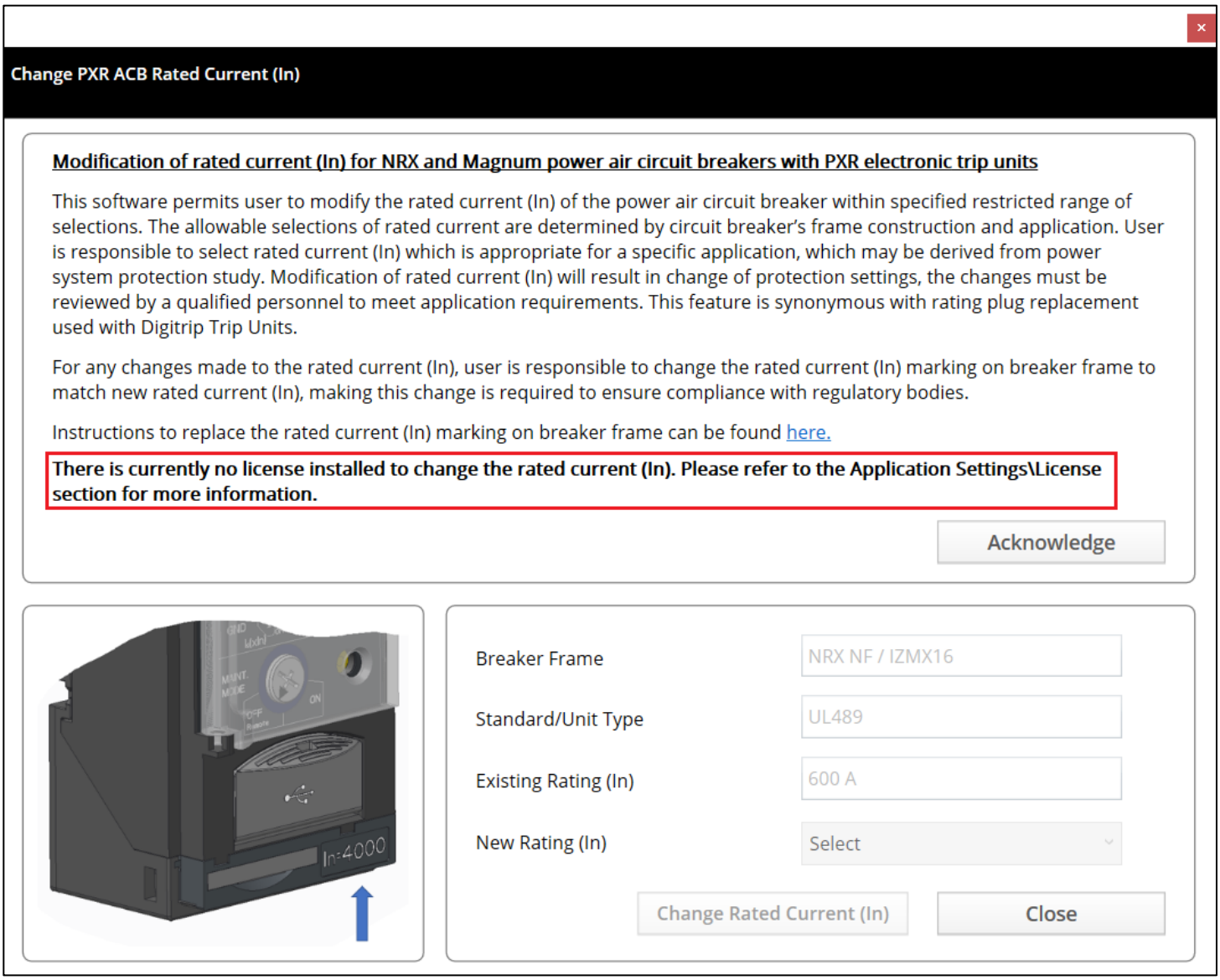


Figure 21: Change PXR ACB Rated Current (In) screen 1

If the license is already installed and user clicks on Acknowledge button as shown in Figure 22, then In Tool controls gets enabled and the user can select the New rating to change Rated Current (In) as shown in Figure 23.

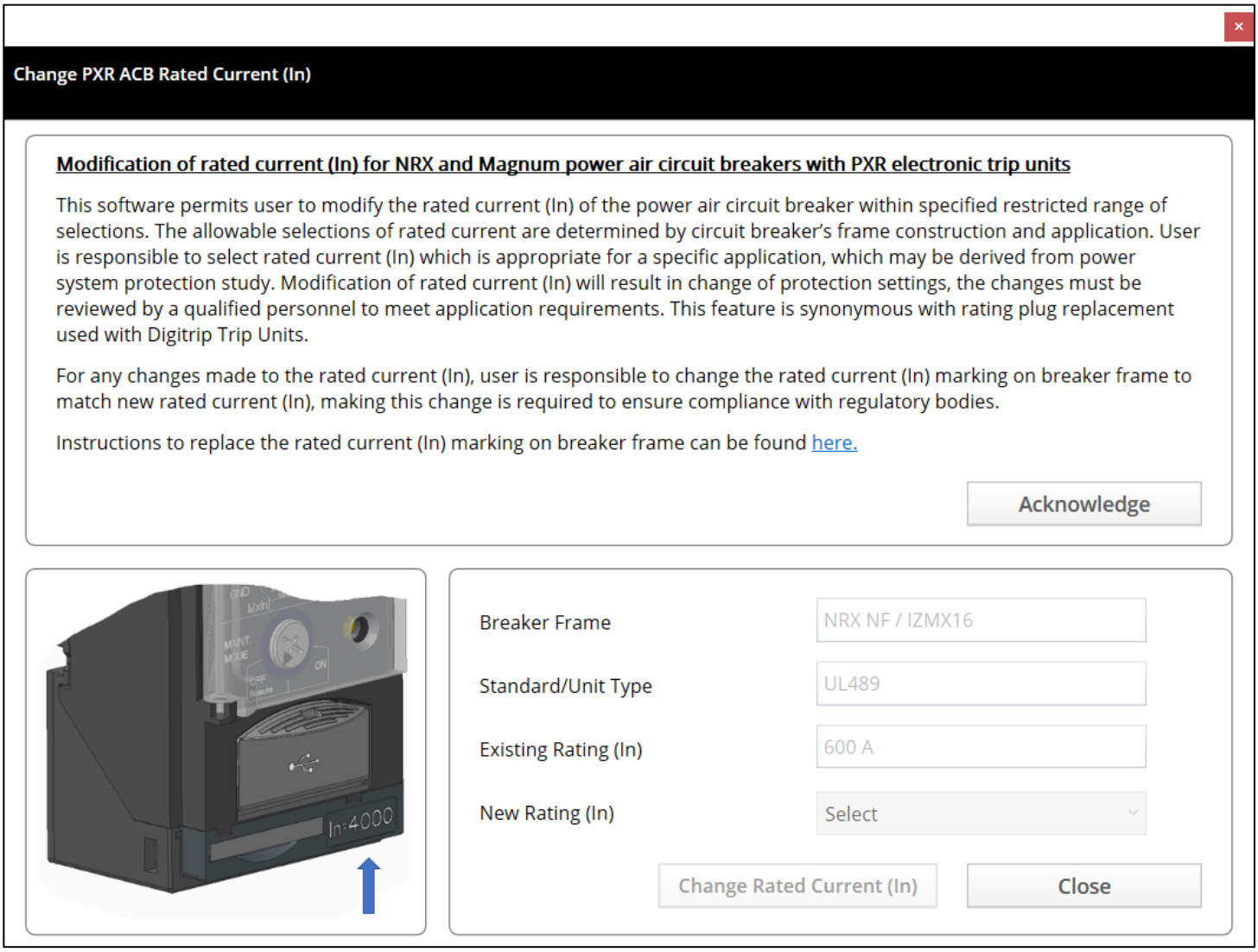


Figure 22: Change PXR ACB Rated Current (In) screen 2

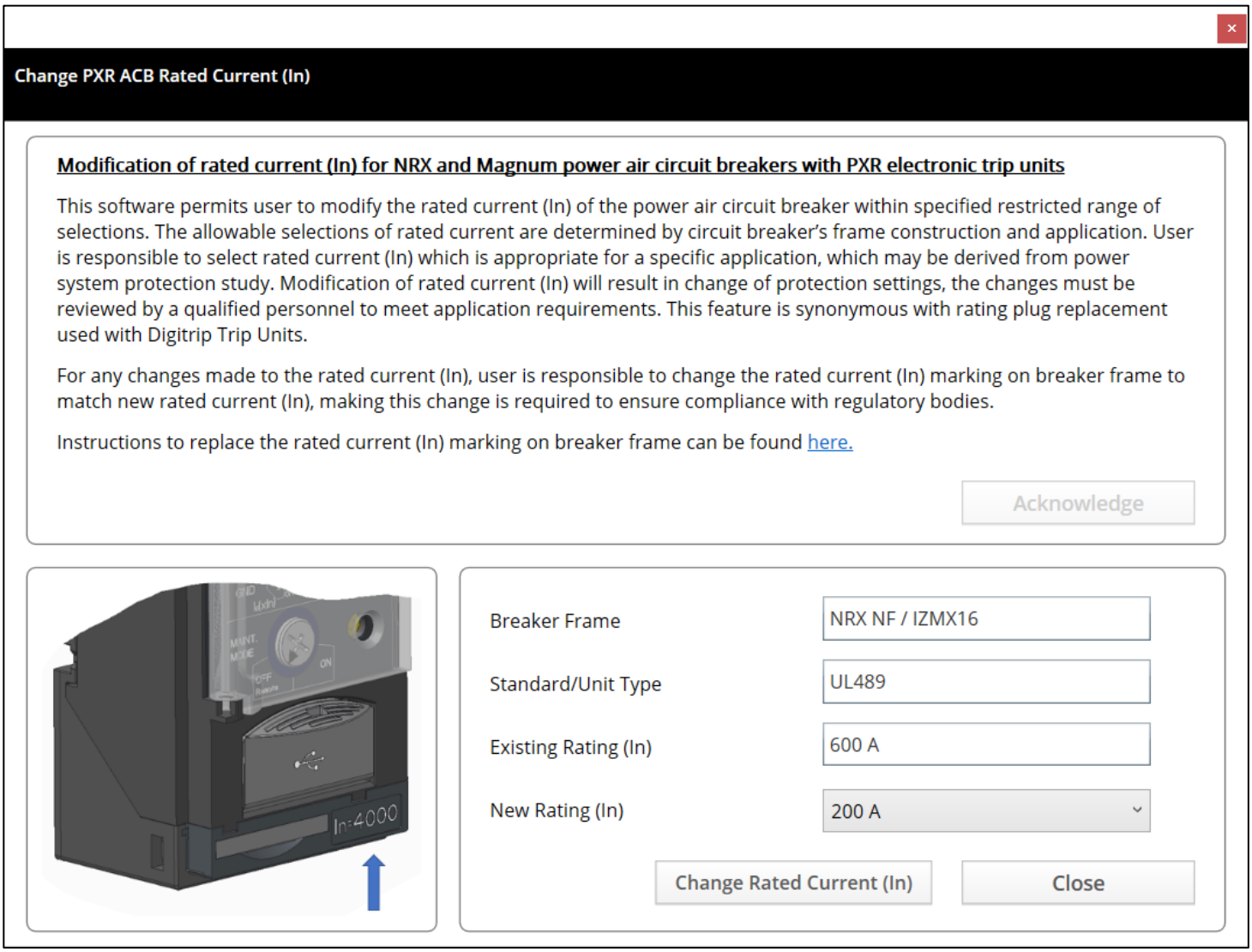


Figure 23: Change PXR ACB Rated Current (In) screen 3

After selecting New Rating (In), if the user clicks on 'Change Rated Current (In)' button, then prompt in Figure 24 is displayed asking if the user wants to continue with the modification along with the remaining license information.

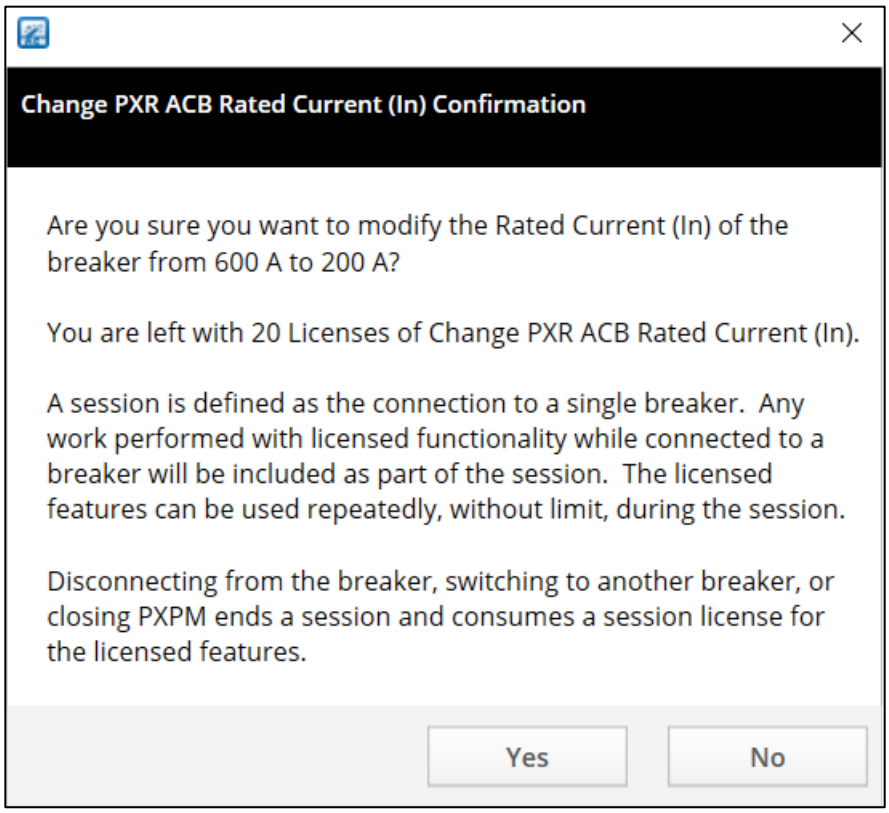


Figure 24: Prompt to confirm the Rated Current (In) change

If the user clicks on Yes button from Figure 24, then Pop-up in Figure 25 is displayed for successful change in rated current.

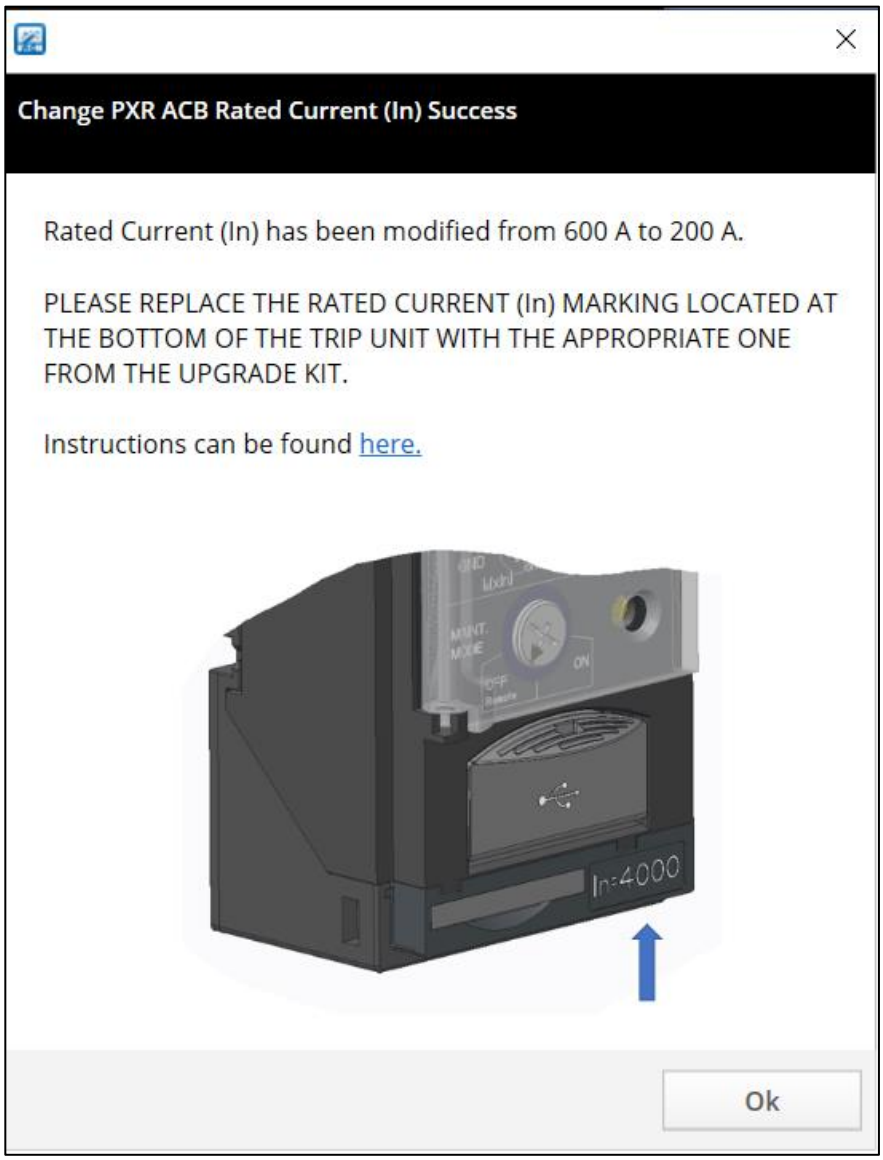


Figure 25: Pop-up for 'Rated Current (In) change' success

In case of error scenario when Rated Current (In) change has not happened successfully then Pop-up in Figure 26 is displayed to the user.

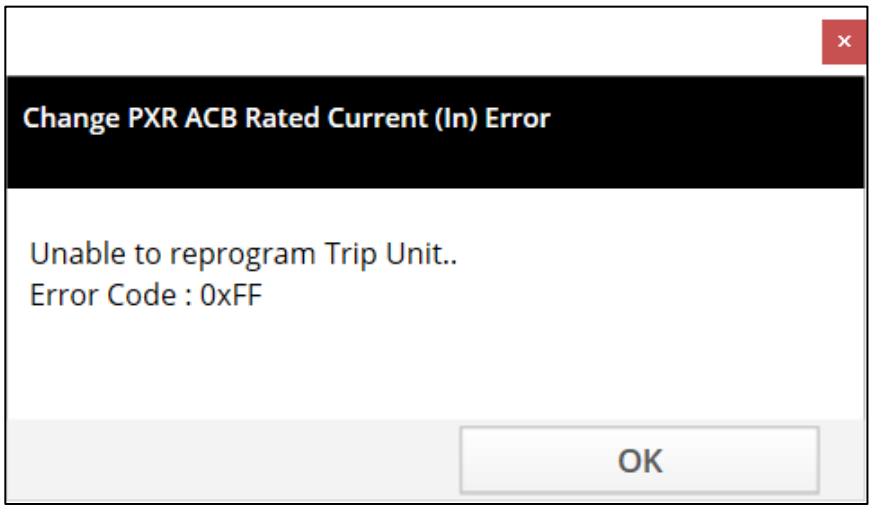


Figure 26: Pop-up for 'Rated Current (In) change' error

4 Test Mode

The user can perform Long, Short, Instantaneous, Ground, Maintenance Mode, Current Sensor and Open Breaker tests on the device, depending on the trip unit features. LSIG testing, Maintenance mode testing and current sensor continuity testing require an Advanced Testing License. Click **Test Mode** button to perform test operations.

The user will be prompted to confirm that the breaker is in a de-energized system or in a Test/Disconnected position.

Testing may only be performed when the device is carrying less than 5% or rated current.

Before any testing occurs, the existing trip unit settings are captured for future use.

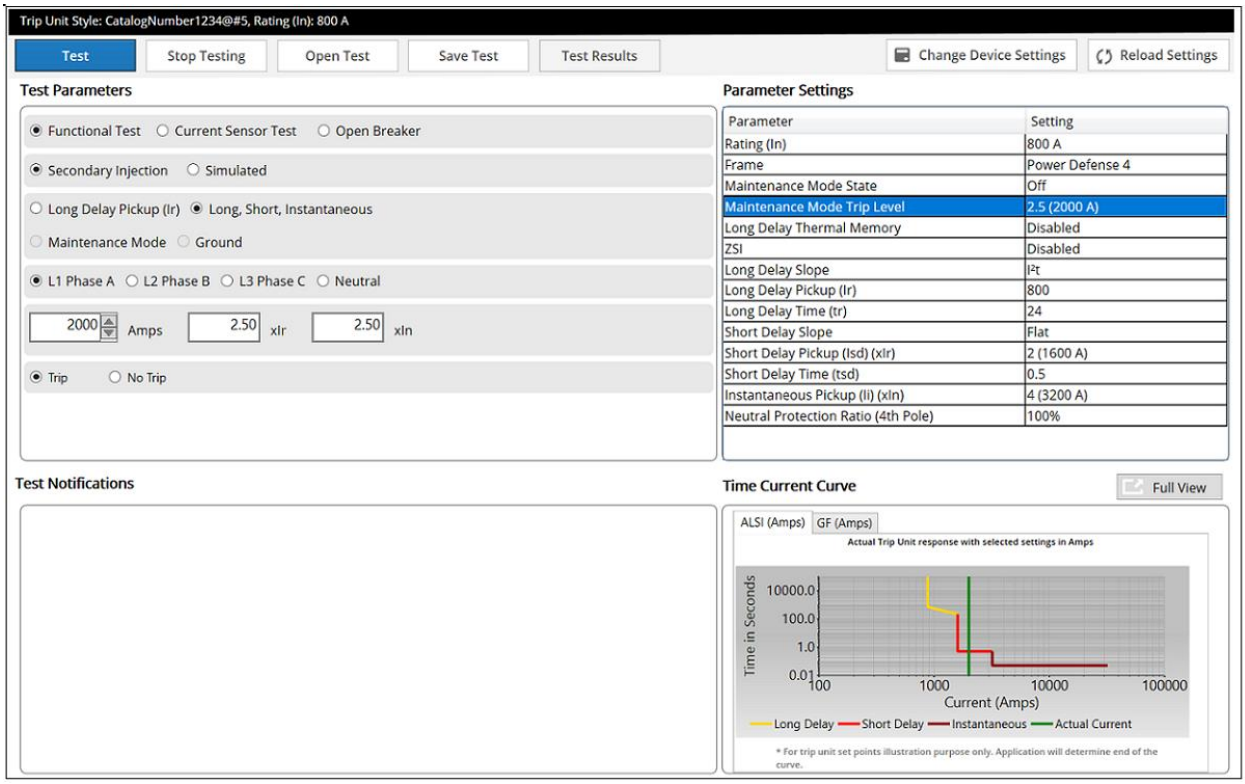


Figure 27: Test parameters selection on test screen for Power Defense Line

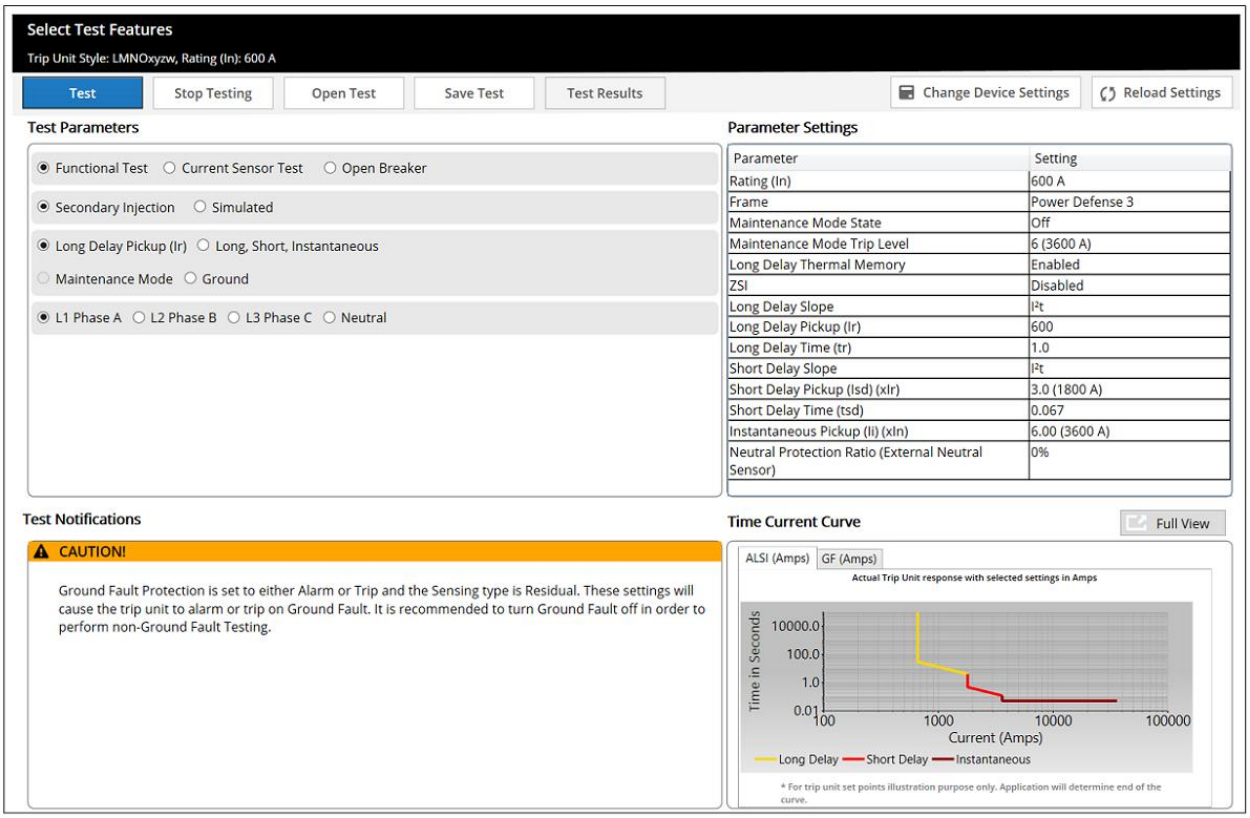


Figure 28: Test parameters selection on test screen for Long Delay Pickup Test

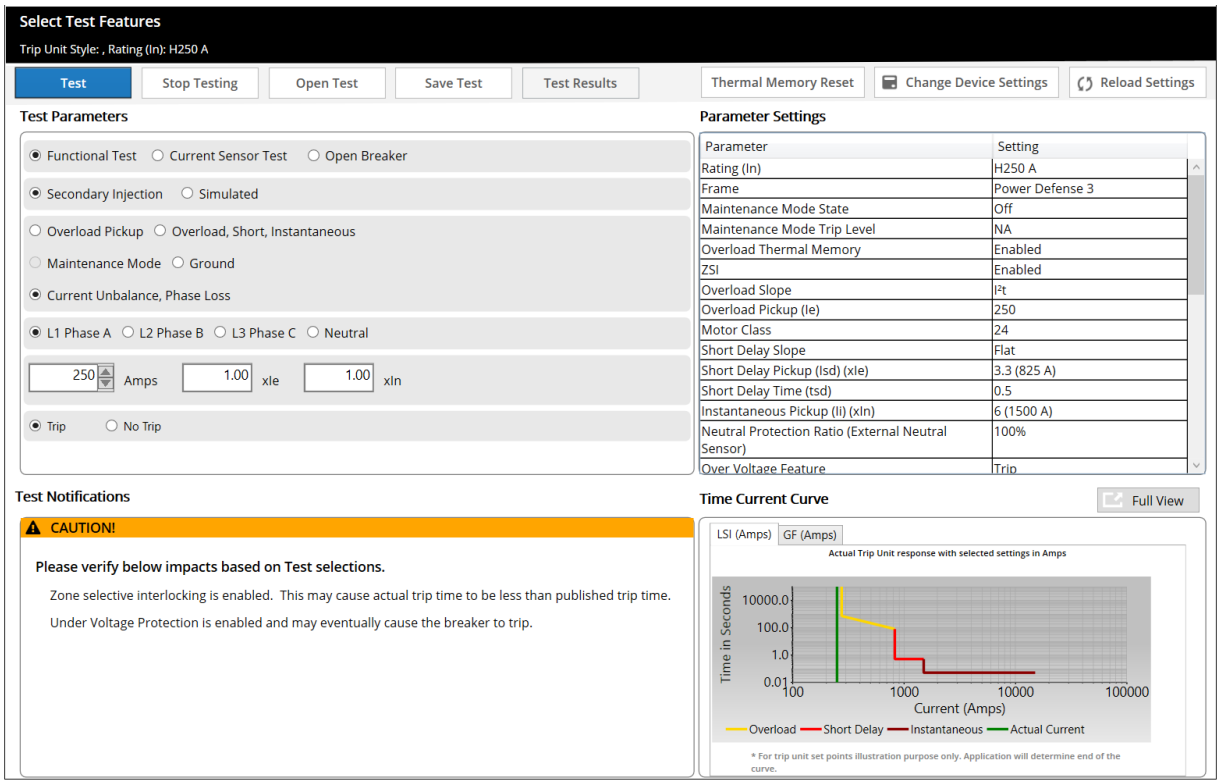


Figure 29: Test parameters selection on test screen for Motor Protection enabled device

The PXPM software controls the testing of long delay trip, short delay trip, instantaneous trip, maintenance mode, and ground (earth) fault trip via the USB communication. The software allows for testing on any phase, included limited input ranges on neutral. On applicable models, the trip unit's display can be used to observe the current being injected and the elapsed time until trip.

Time current curve shows the graphical representation of setpoints. The line shows the required current to trip the breaker. The vertical green line on the graph represents the current specified by the user. The intersection of the green line and the time current curve shows the expected time to trip at this current.

The PXR trip unit has two built-in functional test modes available for use. One is an internal **simulated** current test and the other is an internal **secondary injected** current test. Either mode can be configured for opening or not opening the breaker. Note that secondary injection and simulated testing are available for all breaker poles.

The **Simulated** test is an easy test to verify points on the Time-Current curve. The specified test current value is applied to the software algorithms programmatically to precisely verify the accuracy of the trip unit.

For the **Secondary Injection** testing, the trip unit uses an independent, built-in circuit to generate a test signal which is injected into the trip unit's sensor input circuit. This test feature replaces the need for an external secondary injection test kit.

For most ACB and MCCB devices, the PXPM software provides a **Current Sensor Test**. This is an additional mode that can test for continuity of each current sensor. This can serve as a non-damaging alternative to verifying sensor continuity with primary injection testing. ACB devices support continuity testing of all three phases (A, B, C) and neutral. Power Defense MCCB or NZM support continuity testing on phases (A, B, C) only.

The **Open Breaker** test allows user to verify the mechanical functionality of their breaker. It also allows the ability to check the Breaker Trip Status for MCCB and NZM devices. For ACB devices with firmware prior to version 3.0, this functionality is supported from the front of the breaker.

Thermal Memory Reset: This button is available only for Power Defense devices. This option resets the Ground Fault and Long Delay Thermal memory from the device. If the user clicks on this button, then on successful thermal memory reset, Pop-up in Figure 30 is displayed.

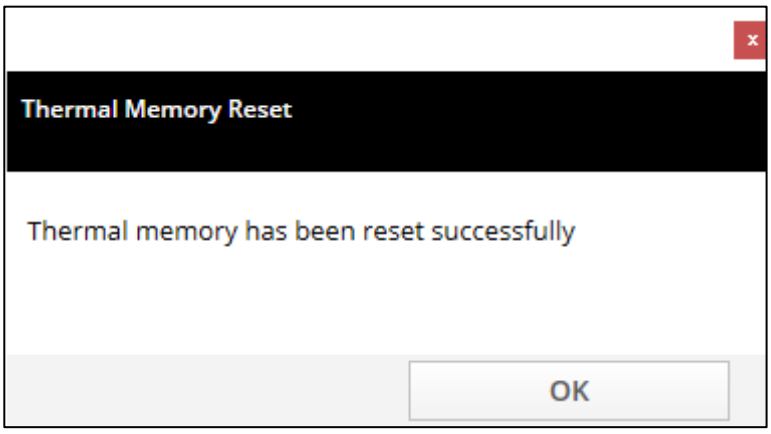


Figure 30: Pop-up for 'Thermal memory reset' success

If device holds thermal memory, trip unit will trip in less time than expected. After resetting thermal memory, trip time will come to normal (expected).

For other devices, thermal memory can be temporarily disabled to prevent issues with errors during testing. By pressing **Change Device Settings,** changes in trip unit setpoint values can be made if any of the values need to be changed before performing the test. After exporting same to the trip unit and navigating back to the test mode screen, the **Reload Settings** button will display changes made in the trip unit setpoint values.

If this is the first test performed on a device in **Test Mode,** a prompt requiring confirmation to utilize the license for the test feature is displayed. This License utilized is valid for one **session**. A session is defined as any testing performed while PXPM is running and connected to the same trip unit. It also displays the remaining number of test feature-licenses left with the user (Figure 31: Prompt to confirm the utilization of the License).

Power Xpert Protection Manager then prompts the user to enter the breaker password (Figure 32: Prompt to enter password). The password entered is valid throughout the session.

More information regarding a **session** is described in 'License' section of this Quick Start Guide.

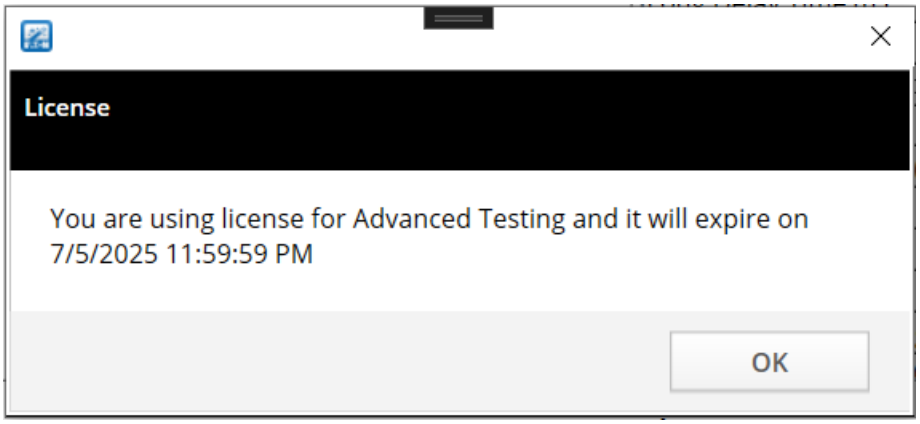


Figure 31: Notification of license usage and its expiry date

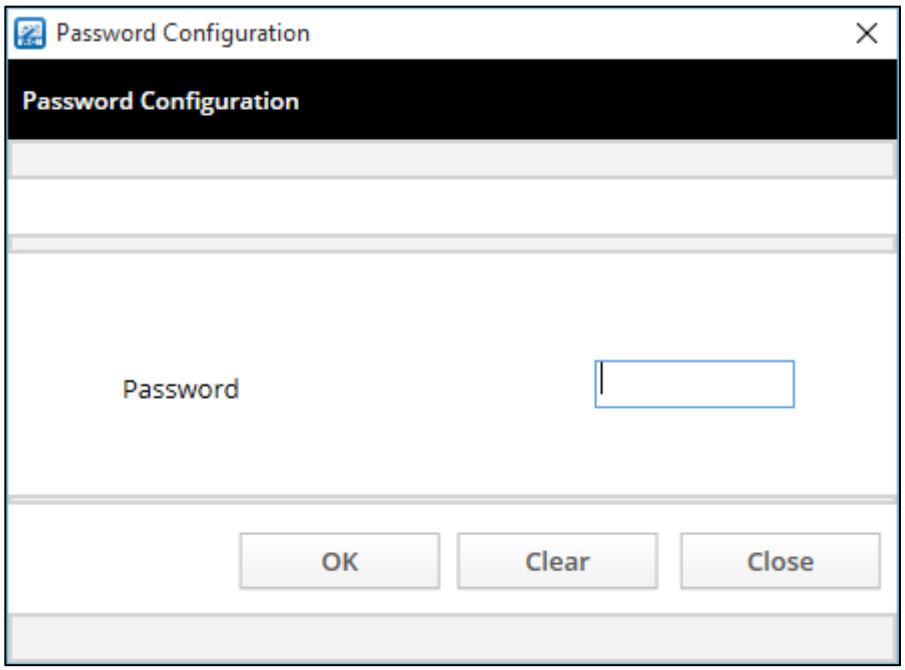


Figure 32: Prompt to enter breaker password

Note that the correct password only needs to be entered once in a test session. If the user fails to enter the correct password, Power Xpert Protection Manager application closes after 4 failed attempts. In this case, user needs to restart the application.

Note that for some trip unit models, such as the PXR for ACB Version 2.0, the password needs to be entered from the device.

After entering the correct password and after the completion of the test on the trip unit, the test result screen like one displayed in Figure 35: Functional test results screen will be displayed. Information on the test result screen will vary based on type of test.

For the Current Sensor test, the test result screen will display the continuity status of each phase. (Figure 33: Current Sensor test result screen)

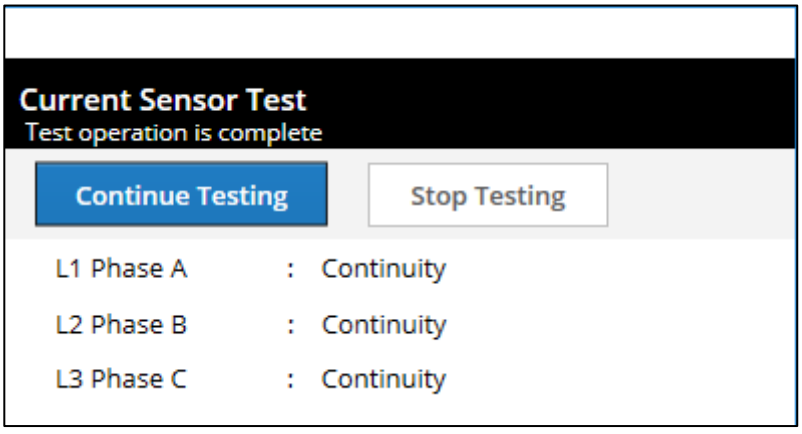


Figure 33: Current Sensor test result screen

For the Open Breaker Test, the test result screen will display whether the breaker has been tripped or not. (Figure 34: Open Breaker test result screen)

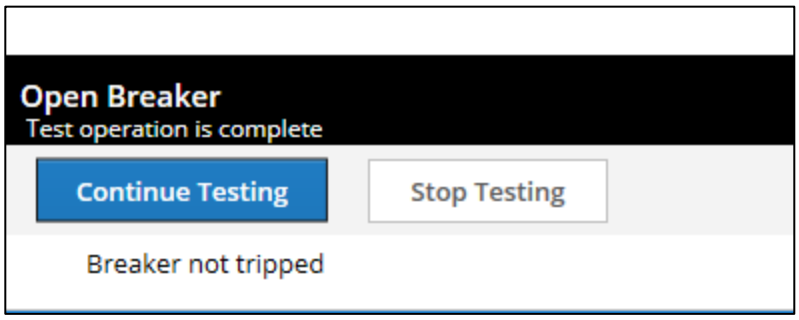


Figure 34: Open Breaker test result screen

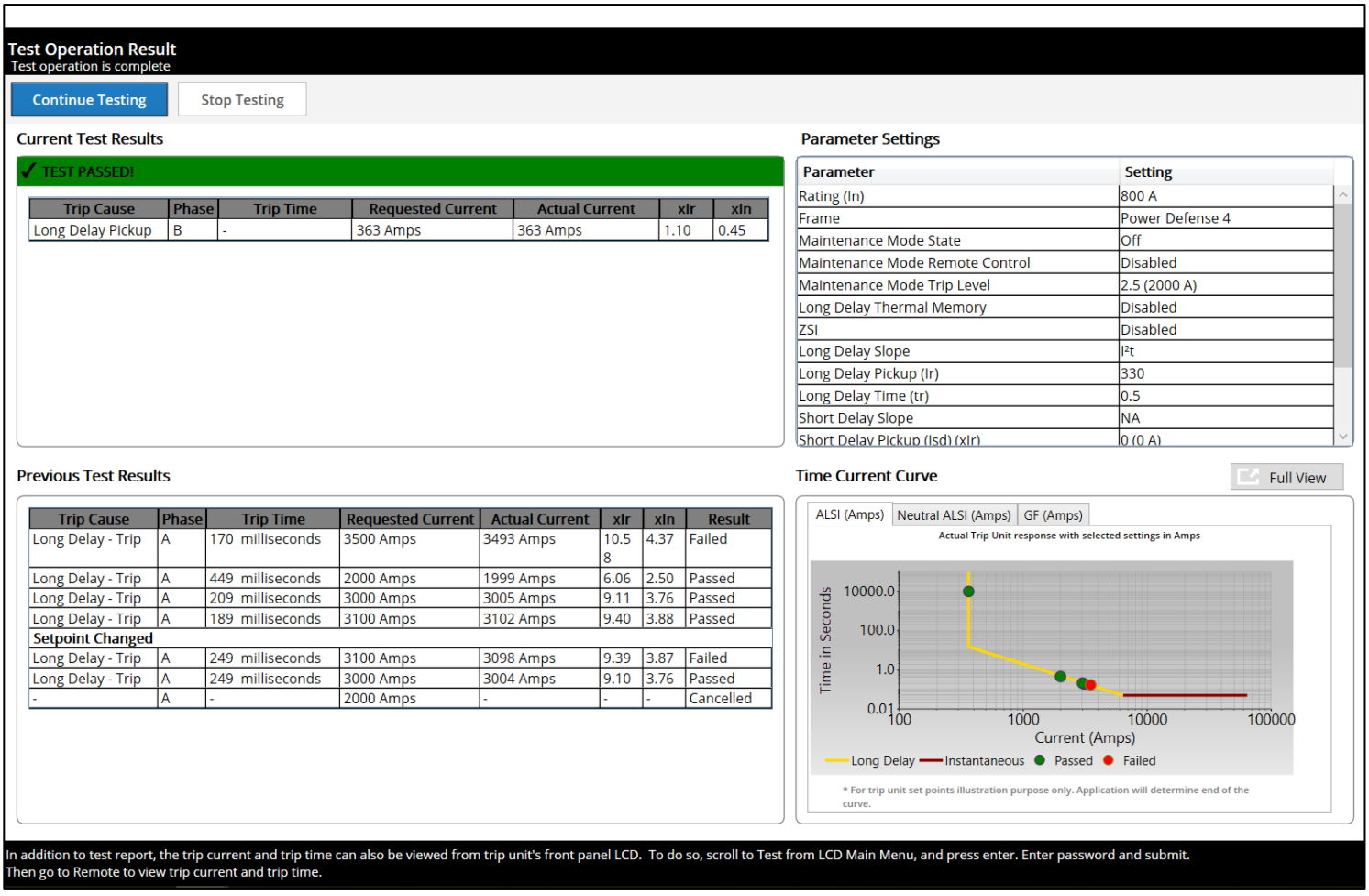


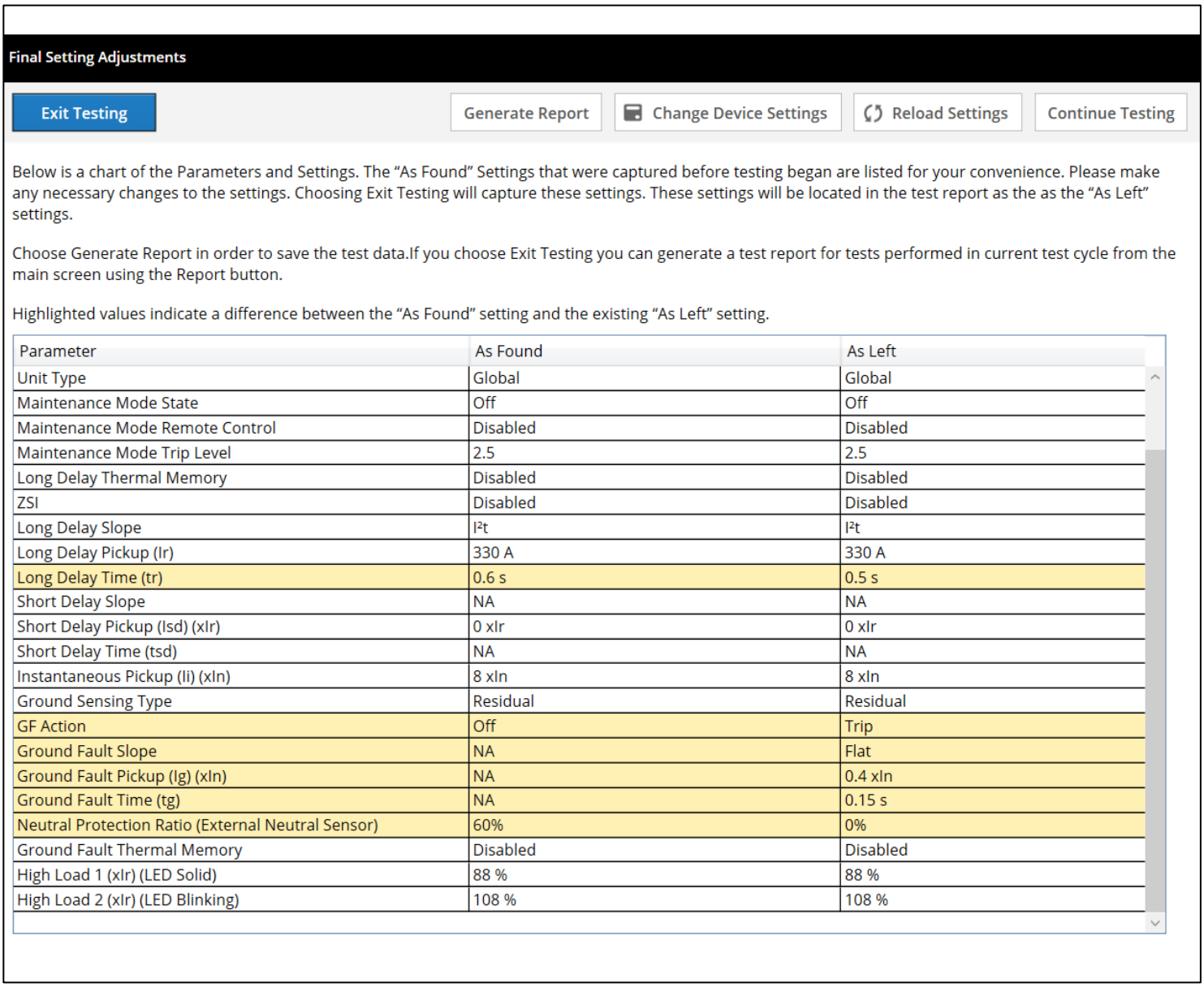
Figure 35: Functional test results screen

On the functional Test Result Screen (Figure 35: Functional test results screen), the **Previous Test Results** section displays the details of other tests performed in the current session. **Setpoint Changed** entries are displayed on this screen to indicate that setpoints were updated between tests.

The actual test results are shown on the time current curve with a green dot.

Clicking on the **Continue Testing** button returns the user to the **Test Parameter Selection** screen (Figure 27: Test parameters selection on test screen) will be displayed. Use the **Stop Testing** button to exit the test session. The user can then view and adjust final settings as desired. (Figure 36: Final settings adjustments).

Parameter values for "As Found" are captured at the beginning of test operation, just before user selects test features for the first time in a test session. Parameter values for "As Left" are captured when the testing has been completed. Any difference between "As Found" and "As Left" parameter values will be highlighted. After updated setpoints are exported to the device, any adjustments will be reflected under "As Left" column when "Reload Settings" button is clicked.



Parameter	As Found	As Left
Unit Type	Global	Global
Maintenance Mode State	Off	Off
Maintenance Mode Remote Control	Disabled	Disabled
Maintenance Mode Trip Level	2.5	2.5
Long Delay Thermal Memory	Disabled	Disabled
ZSI	Disabled	Disabled
Long Delay Slope	I^2t	I^2t
Long Delay Pickup (Ir)	330 A	330 A
Long Delay Time (tr)	0.6 s	0.5 s
Short Delay Slope	NA	NA
Short Delay Pickup (Isd) (xIr)	0 xIr	0 xIr
Short Delay Time (tsd)	NA	NA
Instantaneous Pickup (Ii) (xIn)	8 xIn	8 xIn
Ground Sensing Type	Residual	Residual
GF Action	Off	Trip
Ground Fault Slope	NA	Flat
Ground Fault Pickup (Ig) (xIn)	NA	0.4 xIn
Ground Fault Time (tg)	NA	0.15 s
Neutral Protection Ratio (External Neutral Sensor)	60%	0%
Ground Fault Thermal Memory	Disabled	Disabled
High Load 1 (xIr) (LED Solid)	88 %	88 %
High Load 2 (xIr) (LED Blinking)	108 %	108 %

Figure 36: Final settings adjustments

The **Reload Settings** button will display changes in the trip unit setpoint values after they are exported to the device.

Pressing the **Generate Report** button will prompt the screen which will ask user to include or exclude Trip Curves, Failed Tests, Cancelled Tests, Insulation and Contact Resistance Tests. If user selects the checkboxes for Trip Curves, Failed Tests, Cancelled Tests then it will get included in test pdf report otherwise it will include only the Passed tests (Figure 36.1: Test Report Details).

If user selects the checkbox for Insulation and Contact Resistance Tests, then the table will get enabled and user will be able to enter the details. On upload image button user can upload any image related to breaker, trip unit, or any other relevant information. all the Information entered for the Insulation and Contact resistance tests will be displayed on the test report in the Insulation and Contact Resistance Test Result table (Figure 40.1).

After test report screen, user input screen will prompt the user for optional report customizations (Figure 37: User input for test report customization) once in each the session. If the report is generated from Test screen and it is again generated later from the 'Reports' section from the main screen, User inputs screen will not be displayed.

By pressing **Change Device Settings,** changes in trip unit setpoint values can be made if any of the values need to be changed. After exporting same to the trip unit and navigating back to the test mode screen, the **Reload Settings** button will display changes made in the trip unit setpoint values.

On clicking the **Continue Testing** button**,** the Test parameter selection screen will be displayed. The **Exit Testing** button lets the user exit the test session.

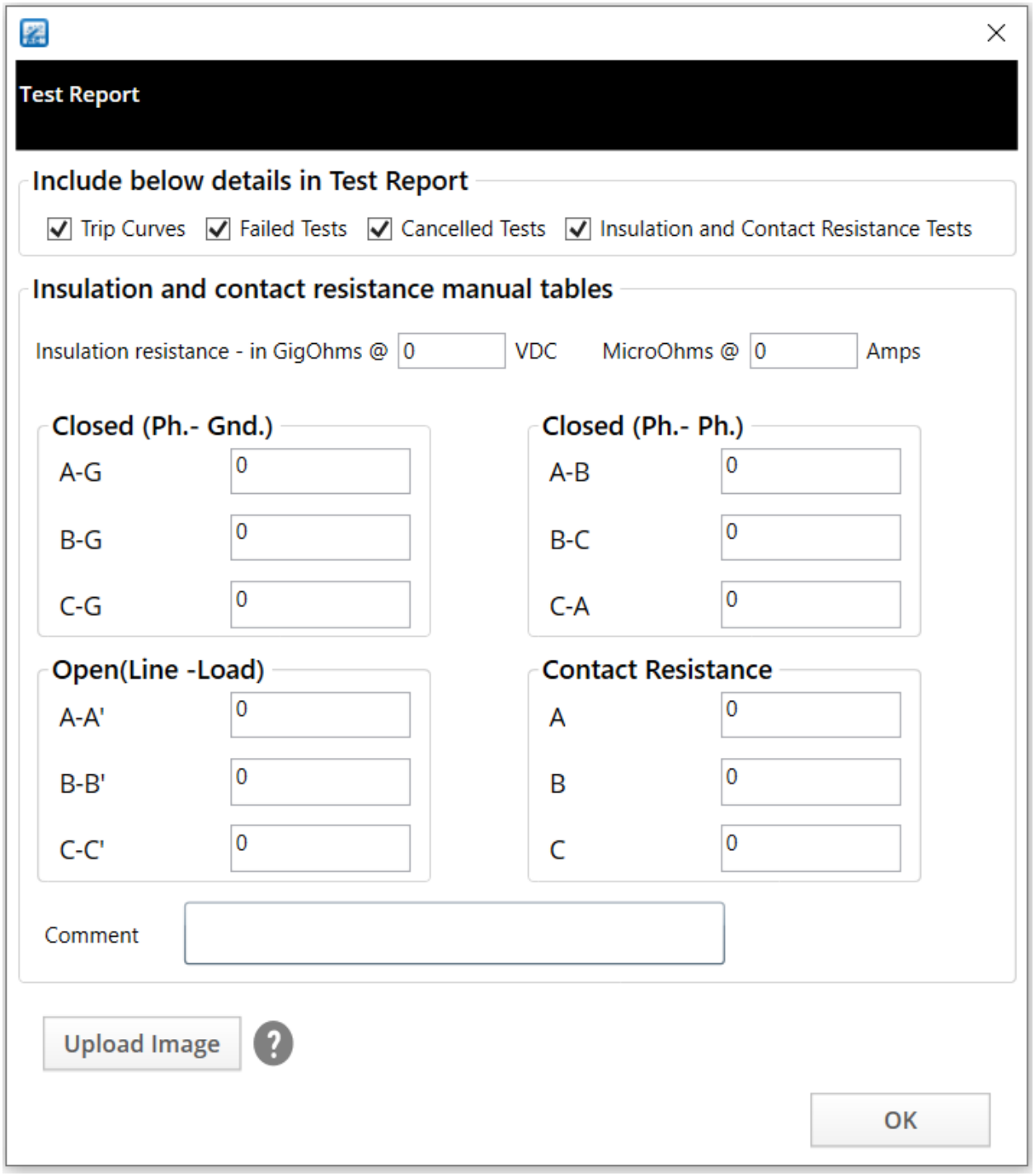


Figure 36.1: Test Report Details

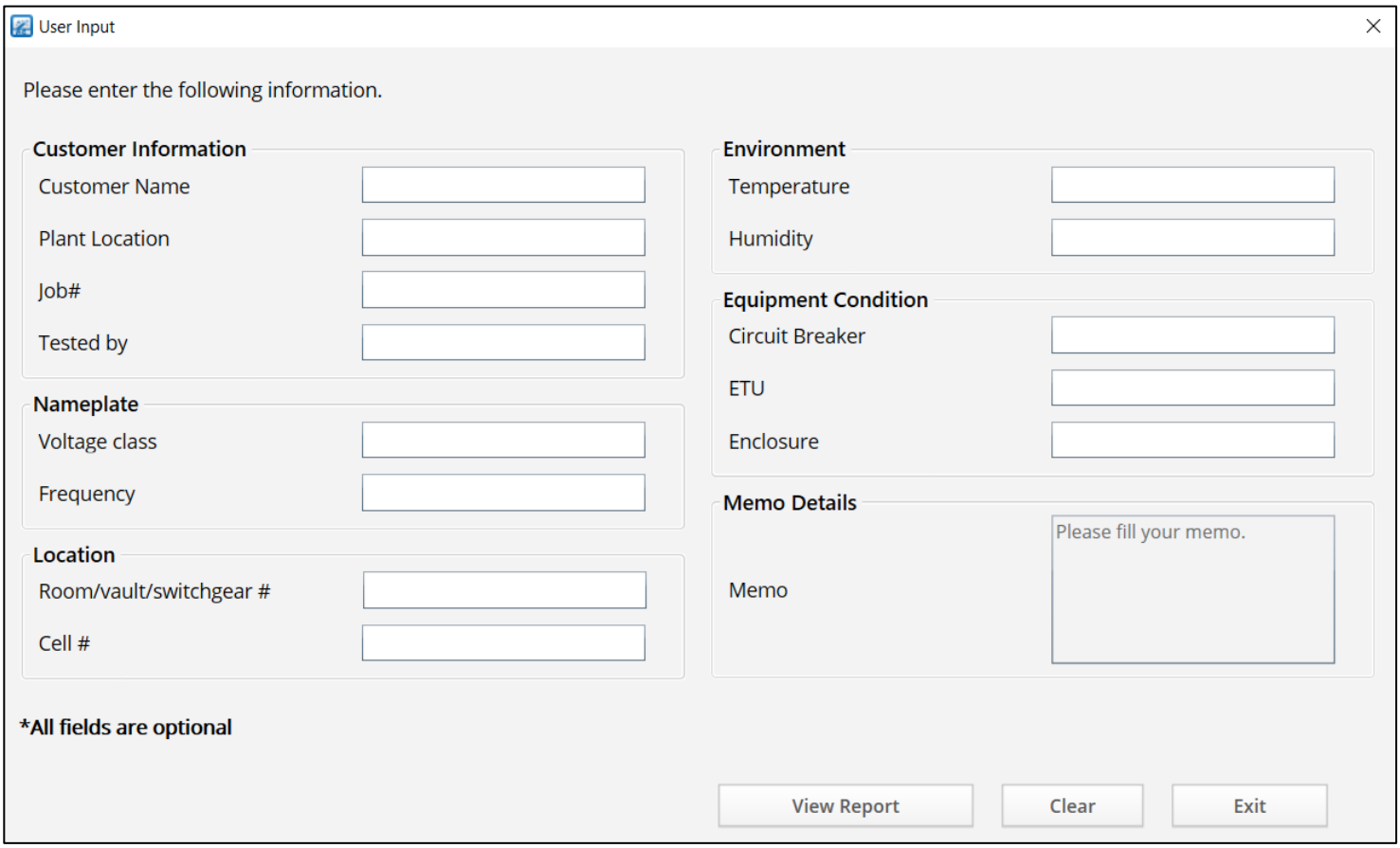


Figure 37: User input for test report customization

Information entered on the User Input screen will be displayed on the report in the respective sections.

The test report will display the User Input data, the settings and results for all conducted testing, and a table of As Found / As Left settings (Figure 38, Figure 39, and Figure 40).

Every **Parameter/Configuration Settings** table is followed by a **Test Results** table. Any change in settings will be displayed in a new table followed by any results for the tests performed at those settings.

Parameter values for **System** and **Current Protection Configuration** are captured at the beginning of the test session (As Found) and after the click of Next button on the As Found / As Left Screen (As Left). These parameter values are displayed at the end of report.

Power Xpert Protection Manager for PXR 10/20/25
Trip Units - Test Report

Created: 6/18/2021 5:03:59 PM

Customer Information	
Customer Name	-
Plant Location	-
Job#	-
Tested by	-
Device Summary	
Manufacturer	Eaton
Circuit Breaker Type/Model	Power Defense 4
Circuit Breaker Catalog Number	3255655
Circuit Breaker Serial Number	jhsfhsdgfh-DHGFDGFJHG-ESFXCHG-5466766771
Circuit Breaker Manufacturing Date	
Circuit Breaker Frame Rating (A)	800
Trip Unit Model	
Trip Unit Serial Number	GDDVCDVDH-RTY-46567787-gggggggggggggg12
Trip Unit Manufacturing Date	
Trip Unit In	800 A
Voltage class	-
Frequency	-
Circuit Breaker Location	
Room/vault/switchgear #	-
Cell #	-
Environment Data	
Temperature	-
Humidity	-
Equipment Condition	
Circuit Breaker	-
ETU	-
Enclosure	-
Memo Details	
Memo	-

Protection / Configuration Settings #1					
Parameter	Setting	Parameter	Setting	Parameter	Setting
Maint. Mode	Off	HL1	85 %	GST	Residual
MM Trip Level	2.5	HL2	105 %	GF Setting	Off
LDTM	Disabled	SDS	NA	GFS	NA
LDS	I^2t	SDPU	0	GFPU	NA
LDPU	330	SDT	NA	GFT	NA
LDT	0.6	INST	8	GFTM	Disabled
NPR	0%	ZSI	Disabled		

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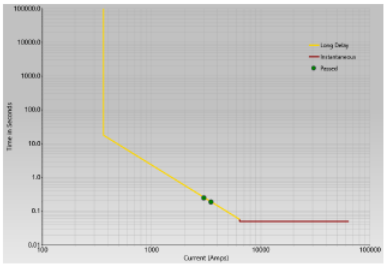
Power Xpert Protection Manager for PXR 10/20/25
Trip Units - Test Report

Created: 6/18/2021 5:03:59 PM

LSIG Test Results #1								
Test Settings						Test Results		
Phase	Current (Amps)	Multiple (xIr/xIn)	Current Type	Test Type	Open Bkr	Cause	Time	Result
A	3007	9.11xIr/ 3.76xIn	Sec. Inj.	LSI	Yes	Long Delay	249ms	Passed
A	3494	10.59xIr /4.37xIn	Sec. Inj.	LSI	Yes	Long Delay	189ms	Passed

Actual Trip Unit response with selected settings in Amps



** For trip unit set points illustration purpose only. Application will determine end of the curve.*

Protection / Configuration Settings #2					
Parameter	Setting	Parameter	Setting	Parameter	Setting
Maint. Mode	Off	HL1	85 %	GST	Residual
MM Trip Level	2.5	HL2	105 %	GF Setting	Off
LDTM	Disabled	SDS	NA	GFS	NA
LDS	I^2t	SDPU	0	GFPU	NA
LDPU	330	SDT	NA	GFT	NA
LDT	0.5	INST	8	GFTM	Disabled
NPR	0%	ZSI	Disabled		

LSIG Test Results #2								
Test Settings						Test Results		
Phase	Current (Amps)	Multiple (xIr/xIn)	Current Type	Test Type	Open Bkr	Cause	Time	Result
A	3213	9.74xIr/ 4.02xIn	Sec. Inj.	LSI	Yes	Long Delay	189ms	Passed

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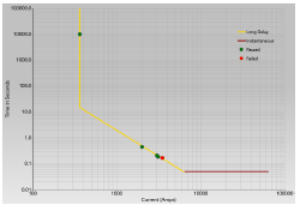
Figure 38: PDF test report-1

Power Xpert Protection Manager for PXR 10/20/25
Trip Units - Test Report

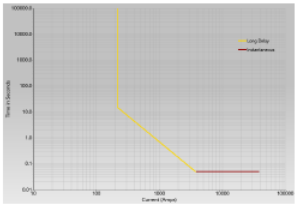
Created: 3/18/2021 2:24:37 AM

LSIG Test Results #2								
Test Settings						Test Results		
Phase	Current (Amps)	Multiple (xIr/xIn)	Current Type	Test Type	Open Bkr	Cause	Time	Result
A	3102	9.40xIr/ 3.88xIn	Sec. Inj.	LSI	Yes	Long Delay	189ms	Passed
A	3005	9.11xIr/ 3.76xIn	Sec. Inj.	LSI	Yes	Long Delay	209ms	Passed
A	1999	6.06xIr/ 2.50xIn	Sec. Inj.	LSI	Yes	Long Delay	449ms	Passed
A	3493	10.58xIr /4.37xIn	Sec. Inj.	LSI	Yes	Long Delay	170ms	Failed
B	363	1.10xIr/ 0.45xIn	Sec. Inj.	LDPU	Yes	Long Delay Pickup	-	Passed

Actual Trip Unit response with selected settings in Amps



Actual Trip Unit response with selected settings in Amps for Neutral Phase



** For trip unit set points illustration purpose only. Application will determine end of the curve.*

Protection / Configuration Settings #3					
Parameter	Setting	Parameter	Setting	Parameter	Setting
Maint. Mode	Off	HL1	88 %	GST	Residual
MM Trip Level	2.5	HL2	108 %	GF Setting	Trip
LDTM	Disabled	SDS	NA	GFS	Flat
LDS	I²t	SDPU	0	GFPU	0.4
LDPU	330	SDT	NA	GFT	0.15
LDT	0.5	INST	8	GFTM	Disabled
NPR	0%	ZSI	Disabled		

LSIG Test Results #3								
Test Settings						Test Results		
Phase	Current (Amps)	Multiple (xIr/xIn)	Current Type	Test Type	Open Bkr	Cause	Time	Result
G	599	0.75xIn	Sec. Inj.	Ground	Yes	Ground Fault	120ms	Passed

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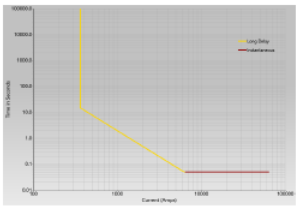
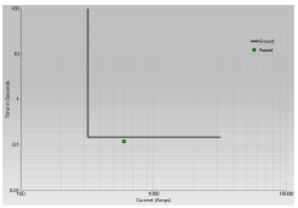
Power Xpert Protection Manager for PXR 10/20/25
Trip Units - Test Report

Created: 3/18/2021 2:24:41 AM

Actual Trip Unit response with selected settings in Amps



Ground Fault Response only when enabled.

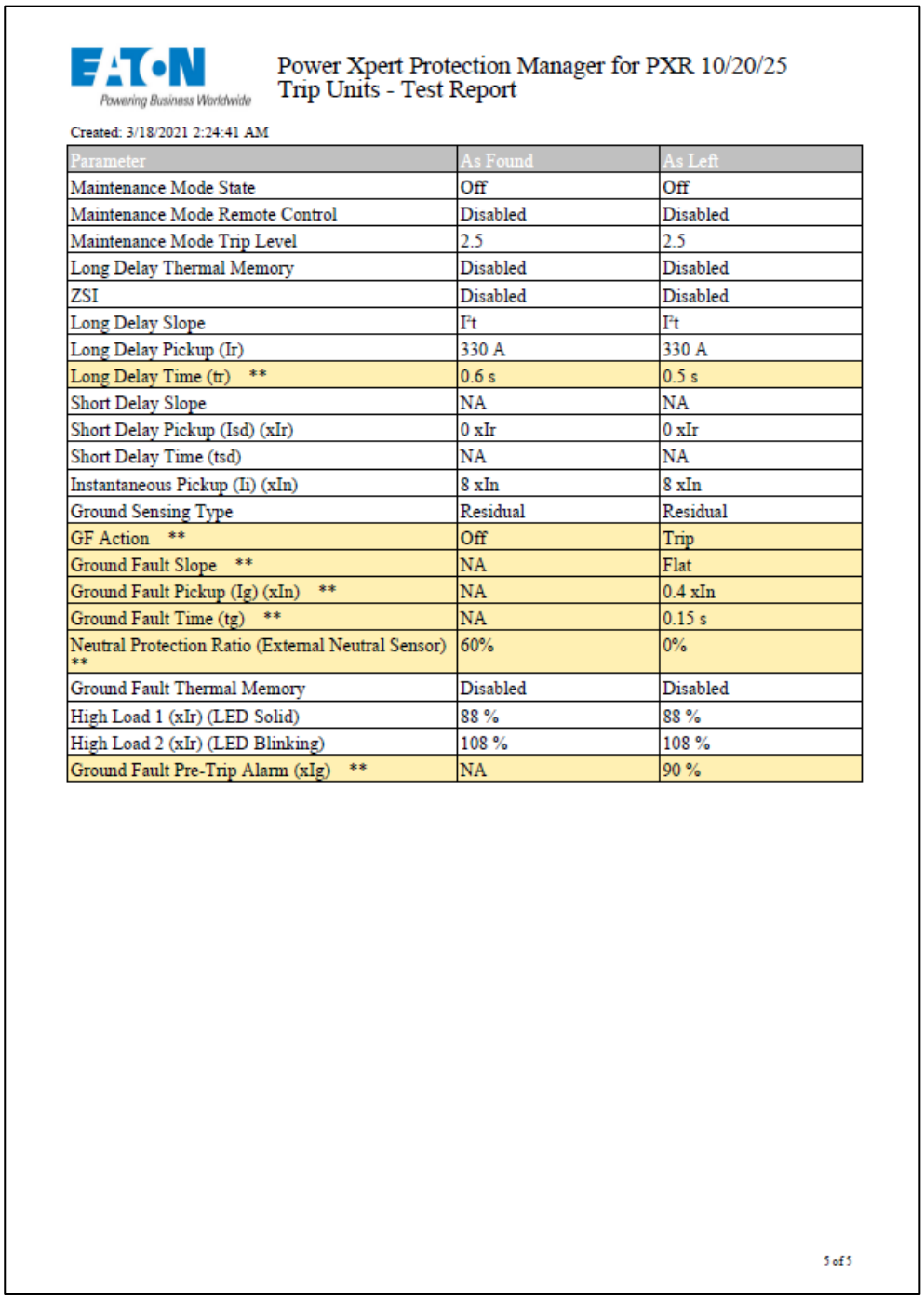


** For trip unit set points illustration purpose only. Application will determine end of the curve.*

System		
Parameter	As Found	As Left
Timestamp	02:04:49 AM	02:24:29 AM
Rating (In)	800 A	800 A
Frame	Power Defense 4	Power Defense 4
Line Frequency	50 Hz	50 Hz
Unit Type	Global	Global

4 of 5

Figure 39: PDF test report-2



Power Xpert Protection Manager for PXR 10/20/25
Trip Units - Test Report

Created: 3/18/2021 2:24:41 AM

Parameter	As Found	As Left
Maintenance Mode State	Off	Off
Maintenance Mode Remote Control	Disabled	Disabled
Maintenance Mode Trip Level	2.5	2.5
Long Delay Thermal Memory	Disabled	Disabled
ZSI	Disabled	Disabled
Long Delay Slope	I²t	I²t
Long Delay Pickup (Ir)	330 A	330 A
Long Delay Time (tr) **	0.6 s	0.5 s
Short Delay Slope	NA	NA
Short Delay Pickup (Isd) (xIr)	0 xIr	0 xIr
Short Delay Time (tsd)	NA	NA
Instantaneous Pickup (Ii) (xIn)	8 xIn	8 xIn
Ground Sensing Type	Residual	Residual
GF Action **	Off	Trip
Ground Fault Slope **	NA	Flat
Ground Fault Pickup (Ig) (xIn) **	NA	0.4 xIn
Ground Fault Time (tg) **	NA	0.15 s
Neutral Protection Ratio (External Neutral Sensor) **	60%	0%
Ground Fault Thermal Memory	Disabled	Disabled
High Load 1 (xIr) (LED Solid)	88 %	88 %
High Load 2 (xIr) (LED Blinking)	108 %	108 %
Ground Fault Pre-Trip Alarm (xIg) **	NA	90 %

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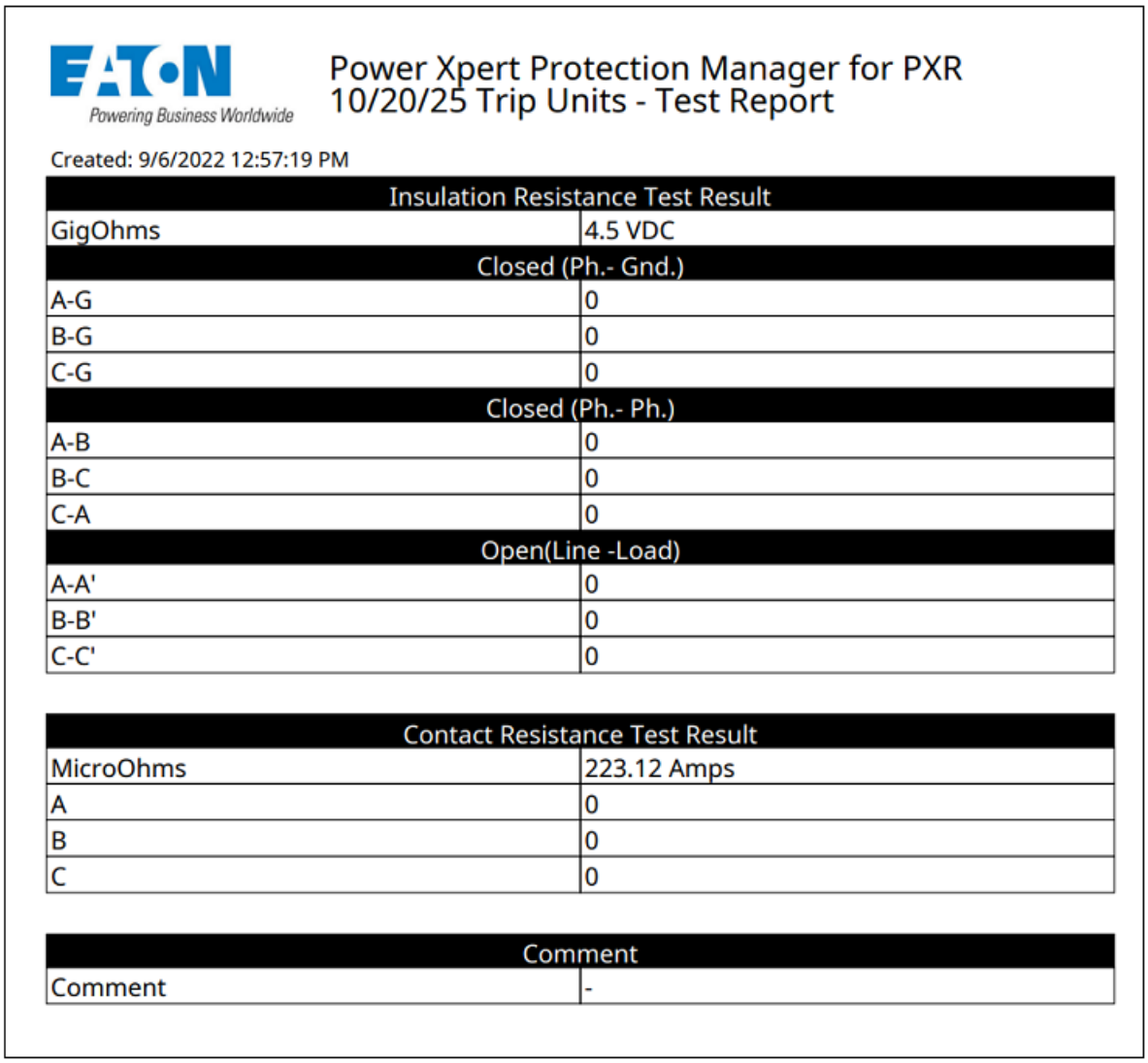
Figure 40: PDF test report-3



Power Xpert Protection Manager for PXR 10/20/25 Trip Units - Test Report

Created: 9/6/2022 12:57:19 PM

Insulation Resistance Test Result	
GigOhms	4.5 VDC
Closed (Ph.- Gnd.)	
A-G	0
B-G	0
C-G	0
Closed (Ph.- Ph.)	
A-B	0
B-C	0
C-A	0
Open(Line -Load)	
A-A'	0
B-B'	0
C-C'	0

Contact Resistance Test Result	
MicroOhms	223.12 Amps
A	0
B	0
C	0

Comment	
Comment	-

Figure 40.1: PDF test report-4

4.1 Test Library Feature

Test Library allows the user to

- To save the Test parameters for a that is to be performed frequently in the future
- To open a previously saved test to perform (Figure 41: Open and save test buttons are highlighted in red on Test Mode screen)

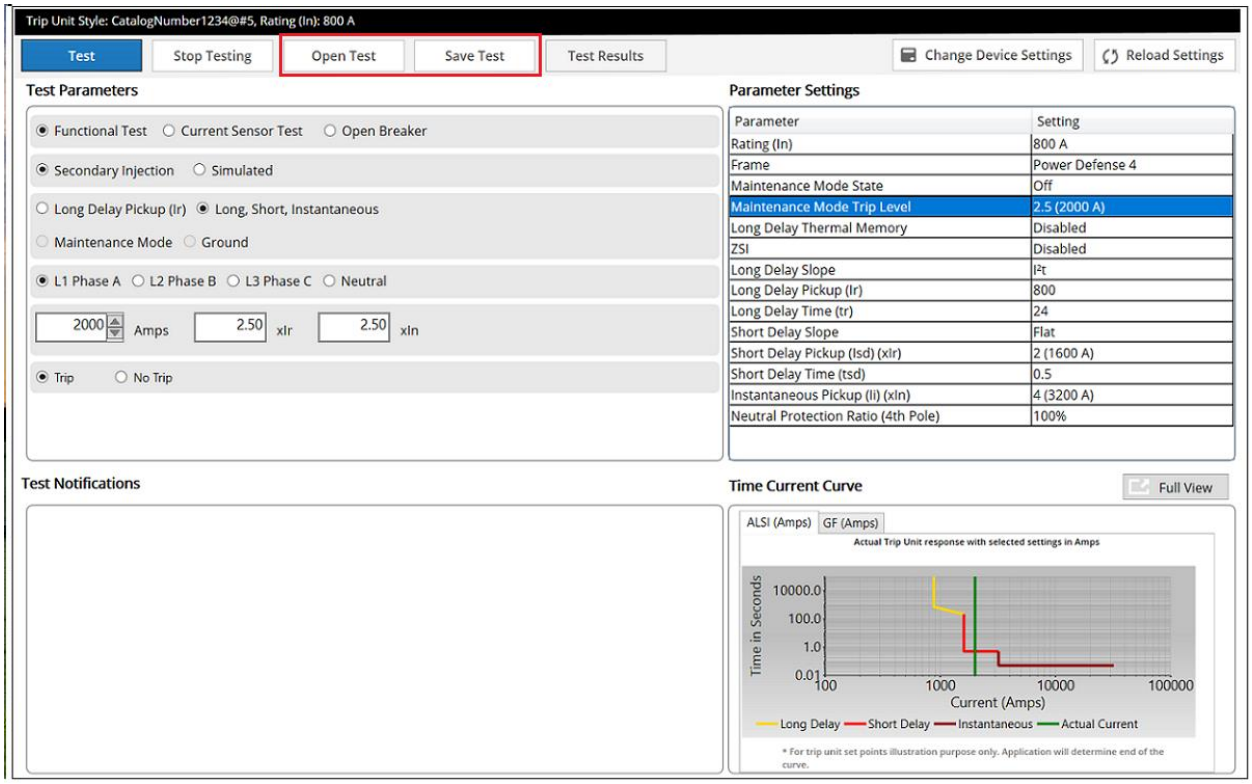


Figure 41: Open and save test buttons on Test Mode screen

Clicking **Save Test,** brings up the Test Library. All previously saved tests are displayed here. The user can enter a Test Description and Save to add the current test to the list for future use (Figure 42: Save test).

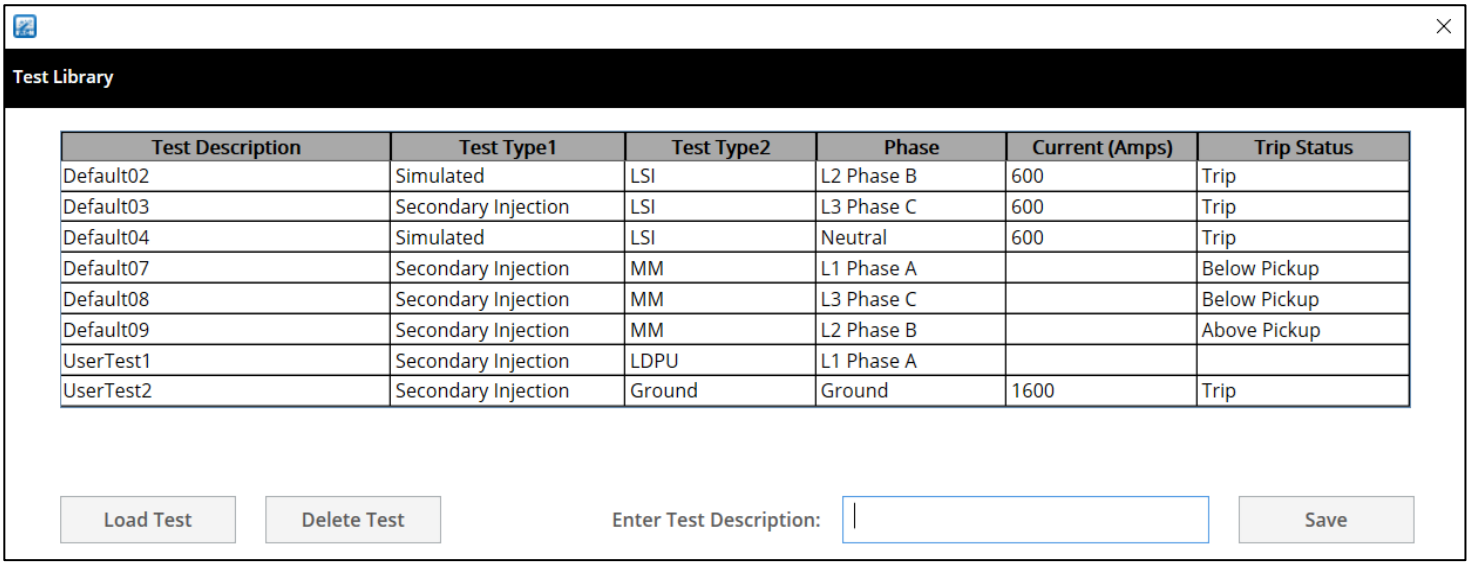


Figure 42: Save test

Clicking on **Open Test** brings up the Test Library. This is a list of all previously saved tests (Figure 43: Open test).

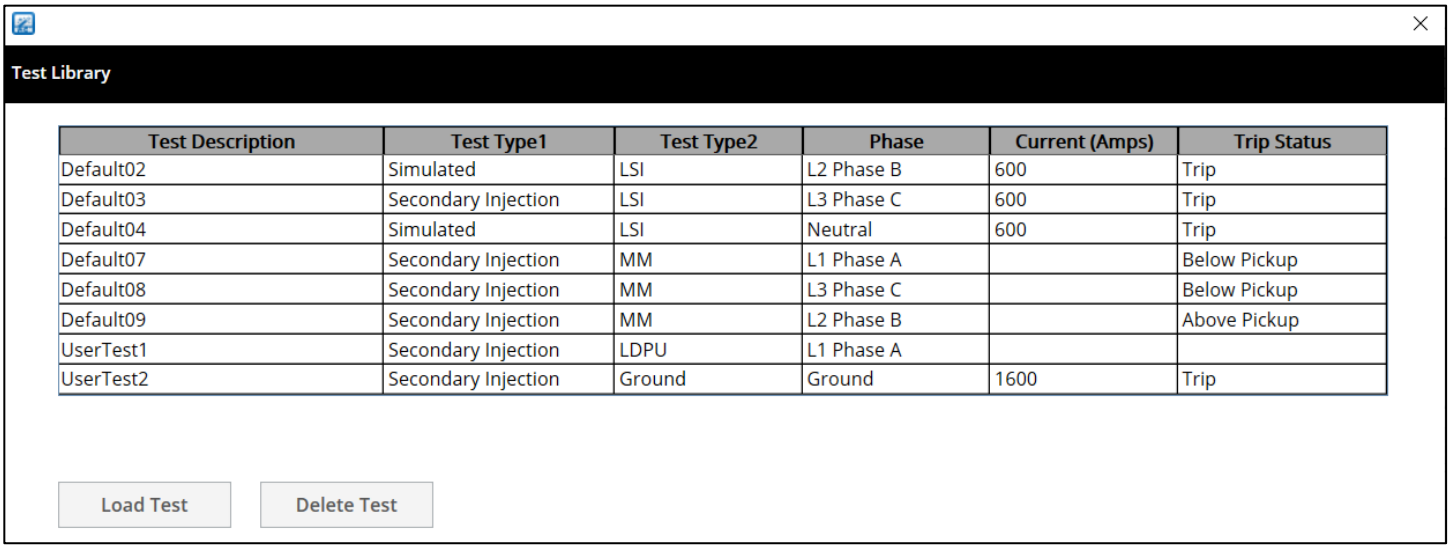


Figure 43: Open test

On pressing **Load Test,** test parameters corresponding to the selected test will get loaded in the test parameter screen of the Test mode.

On pressing **Delete Test,** the selected test will get deleted from the Test Library.

5 Breaker Information

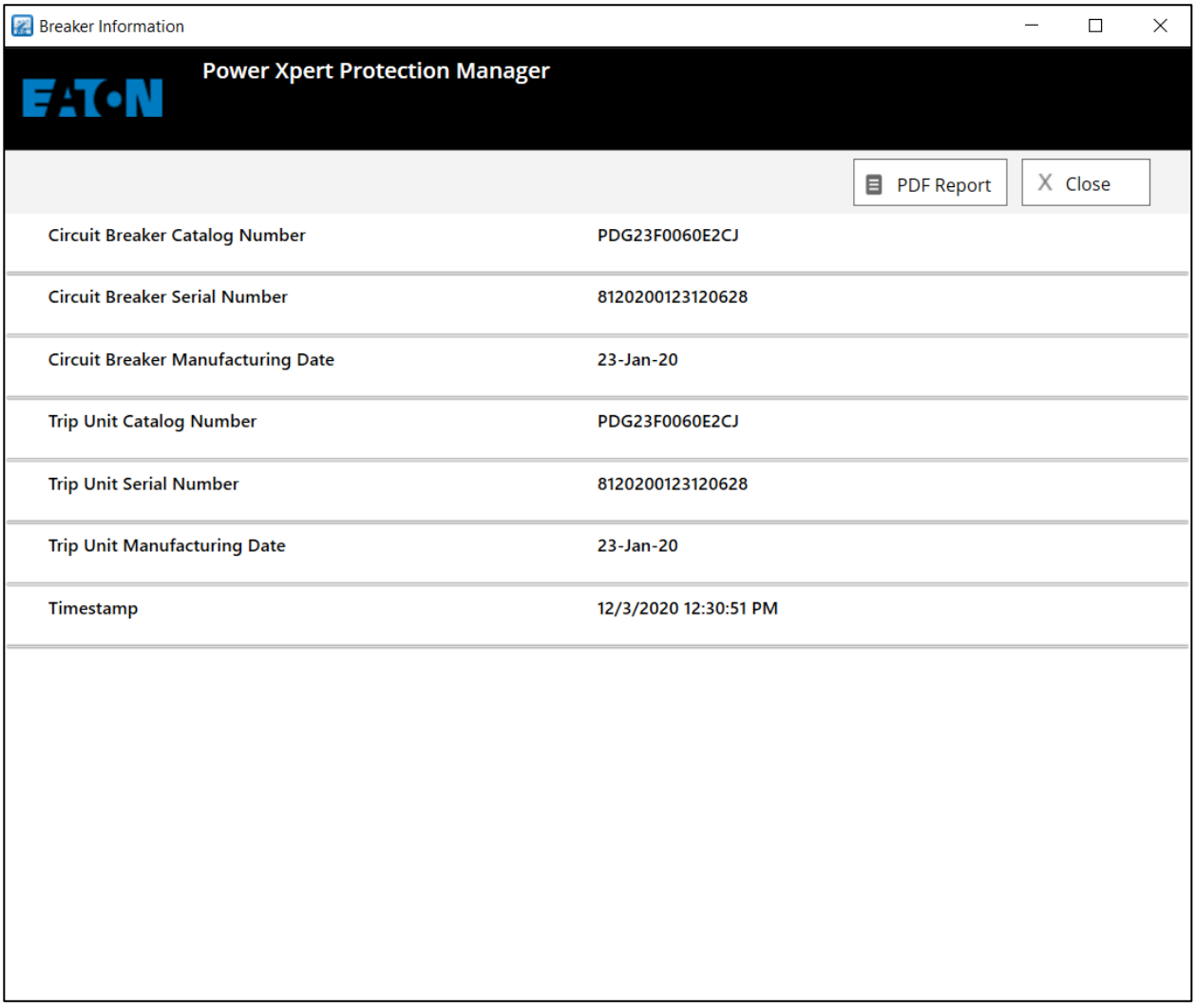


Figure 44: Breaker information screen

The **Breaker Information** screen (Figure 44: Breaker information screen) displays information pertaining to the PXR Trip unit such as Serial Number and Manufacturing Dates.

6 Real Time Data

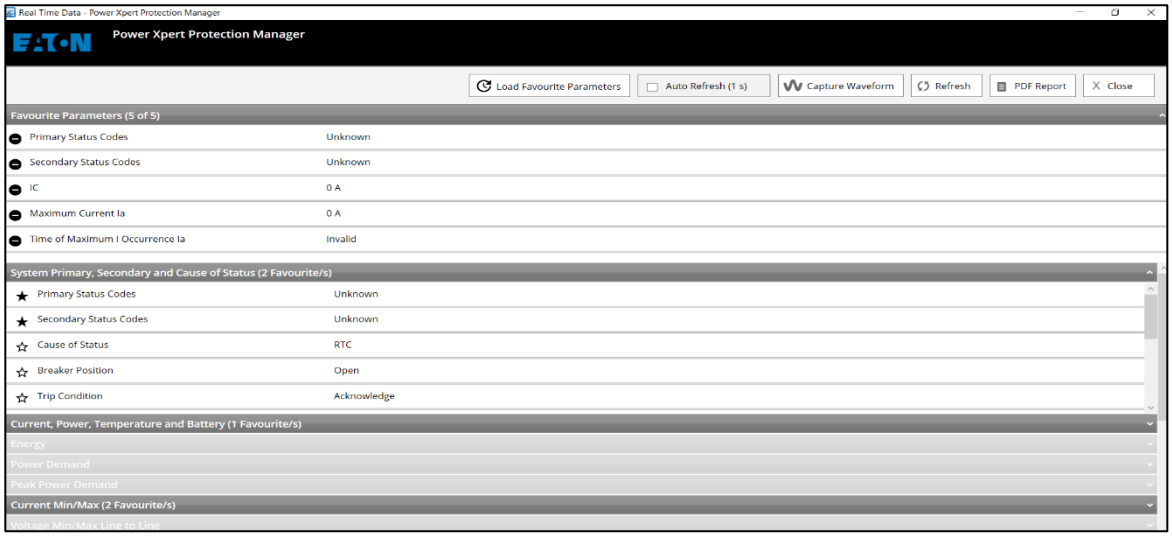


Figure 45: Real time data screen

The **Real Time Data** Screens (Figure 45: Real time data screen) provides information pertaining to all status and metered data from the PXR Trip unit. The user can expand each heading to view the nested data. The available data will be based on the specific connected trip unit. Not all parameters are supported in all PXR Trip Unit styles.

Real Time Data is now having a new **enhancement** where you can select **5 Favorite Parameters** from any of the buffers available by selecting the stars which are provided in front of parameter name, under each buffer. After selecting the favorite parameters, it will come under a new buffer named **Favorite Parameters. (**Shown in Figure 45: Real time data screen).

The following categories are available:

1. System Primary, Secondary and Cause of Status
2. Current, Voltage, Power, Temperature and Battery
3. Energy
4. Power Demand
5. Peak Power Demand
6. Current Min/Max
7. Voltage Min/Max Line to Line
8. Voltage Min/Max Line to Neutral
9. One Cycle Current
10. Diagnostics External
11. Total Harmonic Distortion
12. Current Harmonics
13. Voltage Harmonics Line to Neutral
14. Voltage Harmonics Line to Line
15. Motor Diagnostics
16. Unbalance, Current Demand and Current Demand Max/Min
17. Crest Factor
18. Power Factor and Frequency Max/Min

Above categories on Real time data screen are available based on which family of device is connected and whether that particular category is applicable or valid for the connected device.

6.1 Capture Waveform

PXR trip units allow user to manually capture current and/or voltage waveforms. To do so, click **Capture Waveform** button shown in Figure 45: Real time data screen. PXR trip unit then captures a full cycle of waveforms and transfers them for display on the Power Xpert Protection Manager software.

In Figure 46: Capture waveform screen, user can choose which waveform(s) to display by selecting or deselecting desired waveform(s) from the right side of the screen. Clicking on the **Capture Waveform** button will capture and display a new full cycle of waveforms.

User can zoom in the waveform using left mouse button. On clicking **Reset Zoom,** the waveform can be zoomed out.

User can export waveform data in either CSV or COMTRADE format as shown in Figure 46.

Using COMTRADE format option, user can save COMTRADE files (Header, Configuration and Data file).

Clicking on the **Close** button to return to **Real Time Data** Screen.

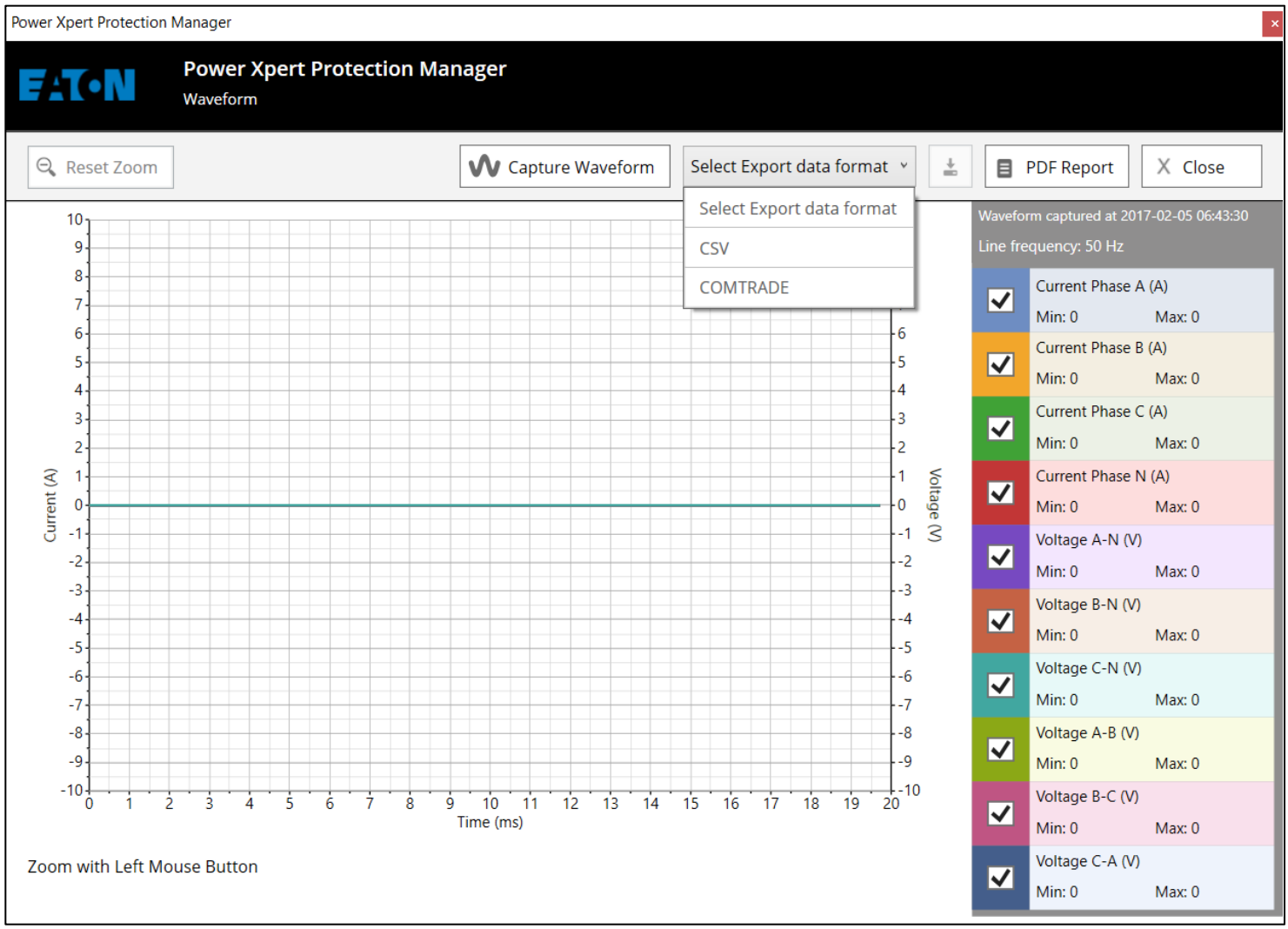


Figure 46: Capture waveform screen

7 Event Summaries

The PXR Trip Units record several different events. The Event Summary (Figure 47: Event Summary screen) lists up to 200 events that have occurred in the PXR Trip Unit.

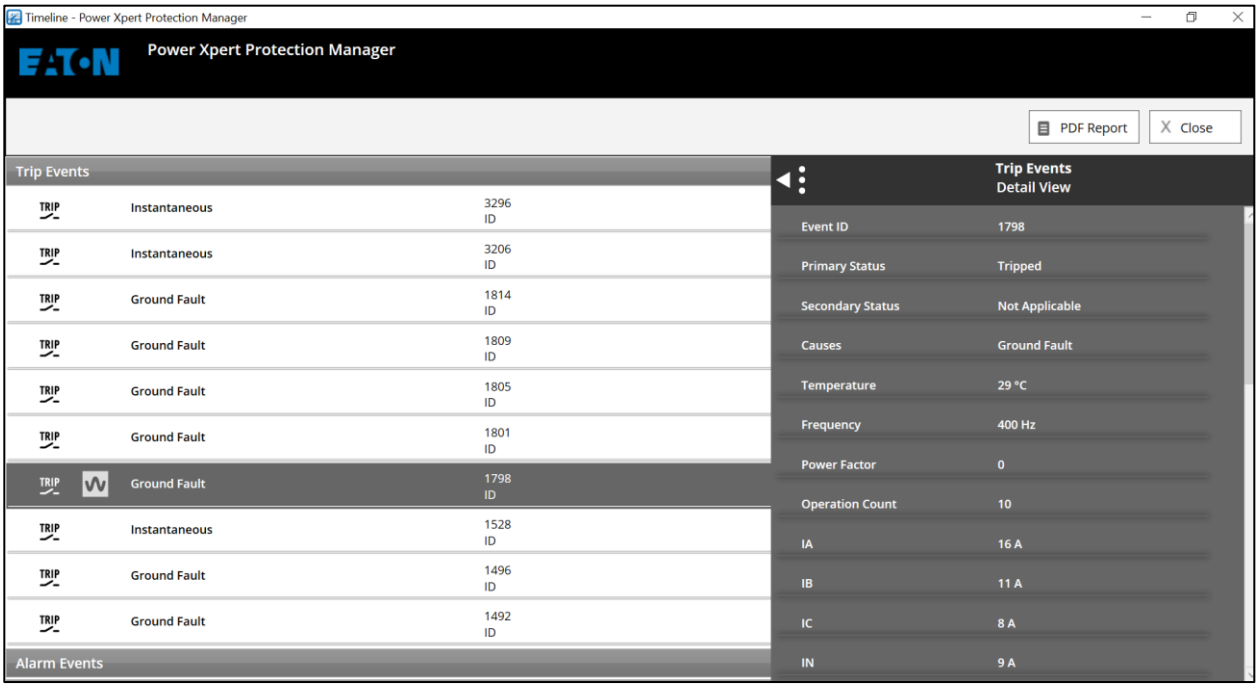


Figure 47: Event Summary screen

7.1 Last Waveform Recorded

User can access the latest waveform recorded for Trip and Alarm Events from the Events Summary Screen. This is a licensed feature. For more information on Licenses is given in the Licenses section.

Last Waveform Recorded icon is present for the respective Trip/ alarm event for which the waveform is present. On pressing the icon, a prompt asking for the confirmation to utilize the License for the waveform feature pops up (Figure 48: Prompt to confirm the utilization of the License). This License is valid for a particular **session**. After providing the confirmation, the waveform screen is displayed (Figure 49: Last waveform recorded).

User can zoom in the waveform using left mouse button. On clicking **Reset Zoom,** the waveform can be zoomed out.

User can export waveform data in either CSV or COMTRADE format as shown in Figure 49 and Figure 50.

Using COMTRADE format option, user can save COMTRADE files (Header, Configuration and Data file).

More information regarding a **session** is described in the 'License' section of this Quick Start Guide.

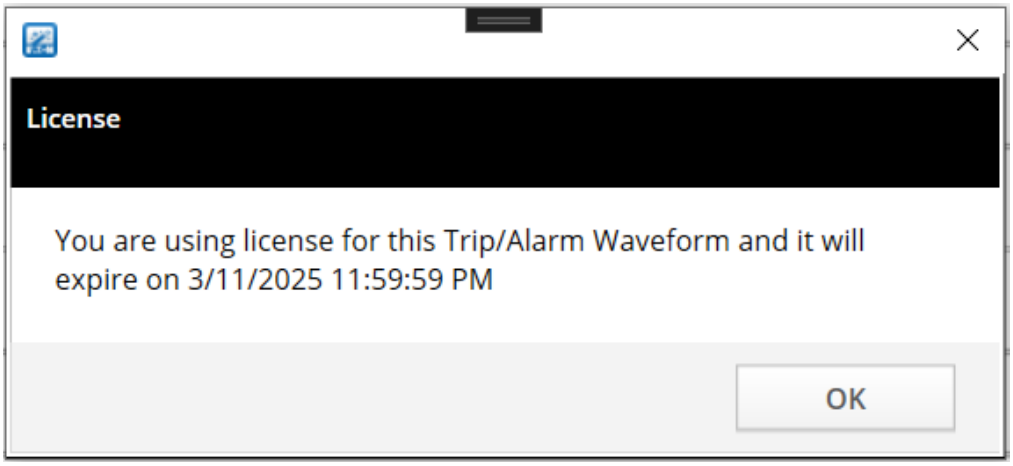


Figure 48: Notification of license usage and its expiry date

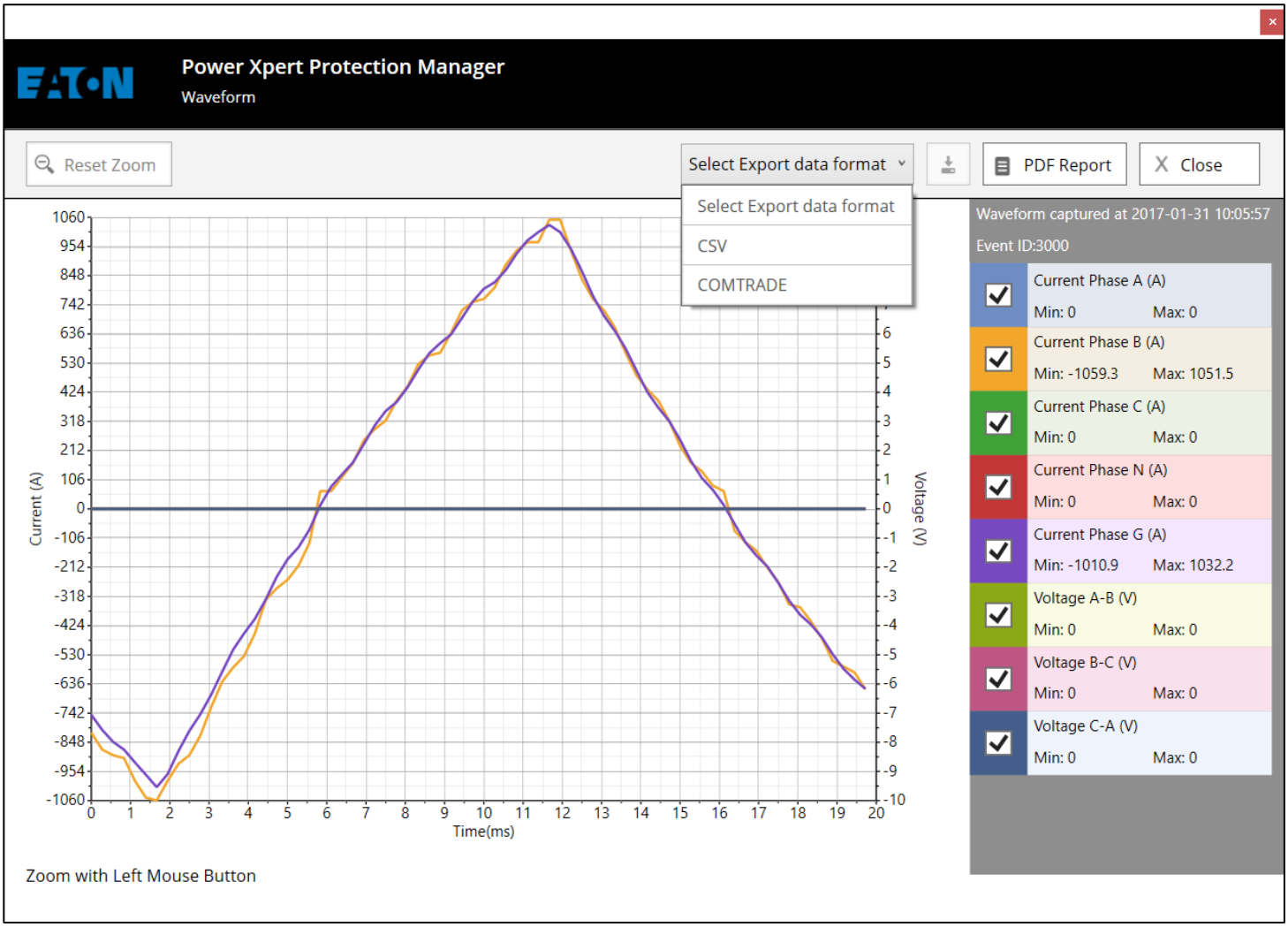


Figure 49: Last waveform recorded

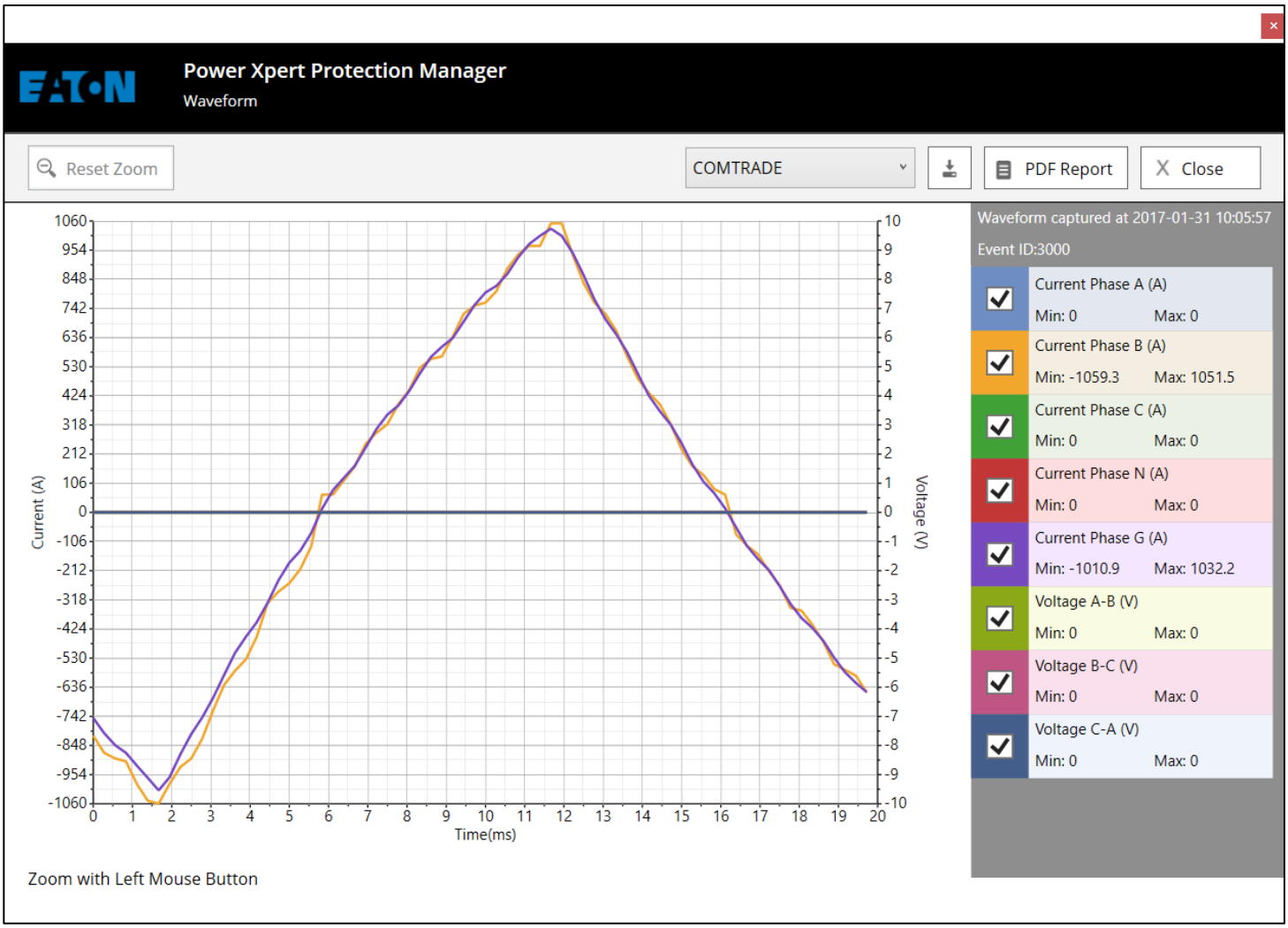


Figure 50: Last waveform recorded with COMTRADE format selected

7.2 Trip Events and Alarm Events

The PXR Trip unit will record more detailed information for the 10 most recent Trip Events and Alarm Events. The Primary, Secondary and Cause of Status will be listed on the Main Screen (Figure 51)

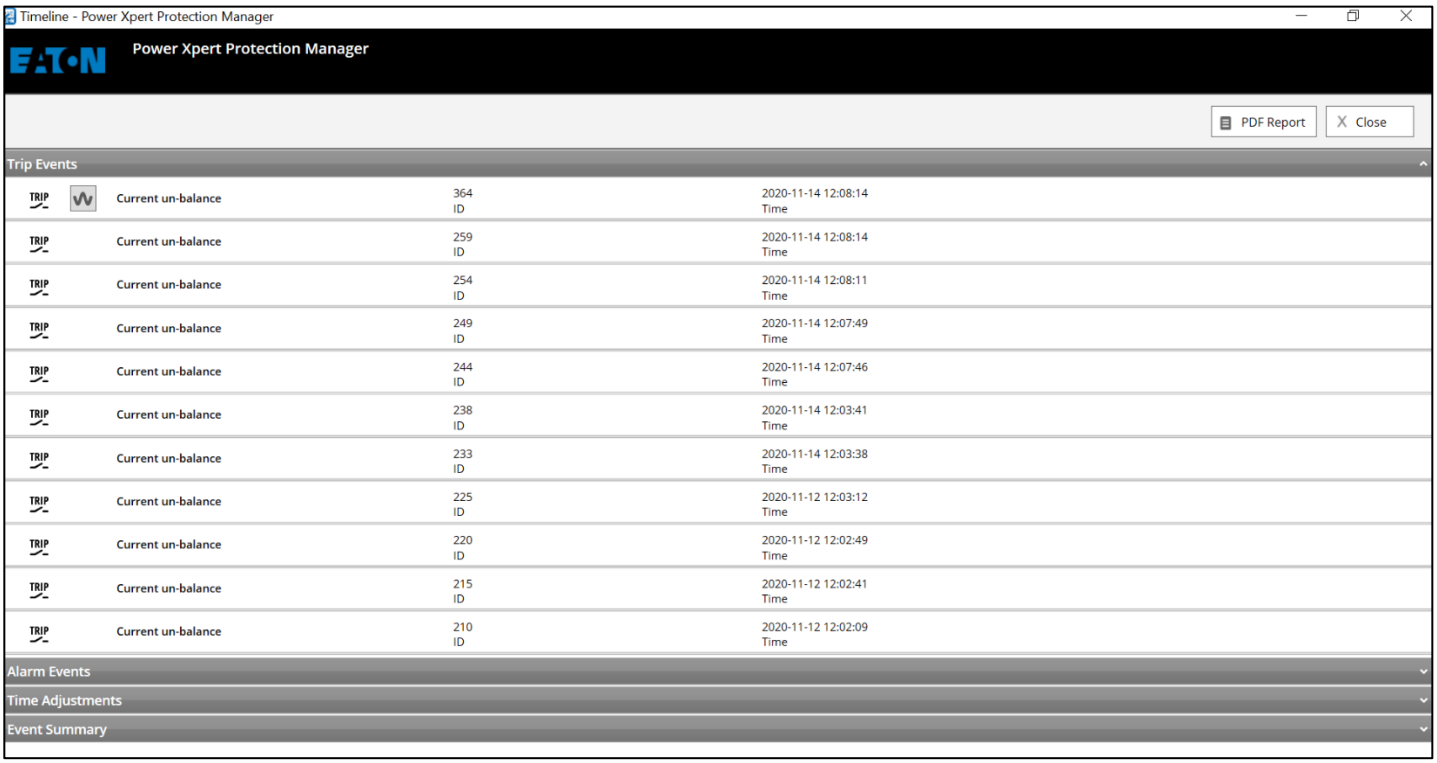


Figure 51: Trip or alarm event on the event summary screen

7.3 Time Adjustments

Some PXR Trip Units have a real time clock that is used to timestamp events. The PXPM software provides the ability to adjust the time on the real time clock. Any time the real time clock is set, the PXR trip unit records this as an event. The Time Adjustments Screen (Figure 52) will display any events where the real time clock has been changed.

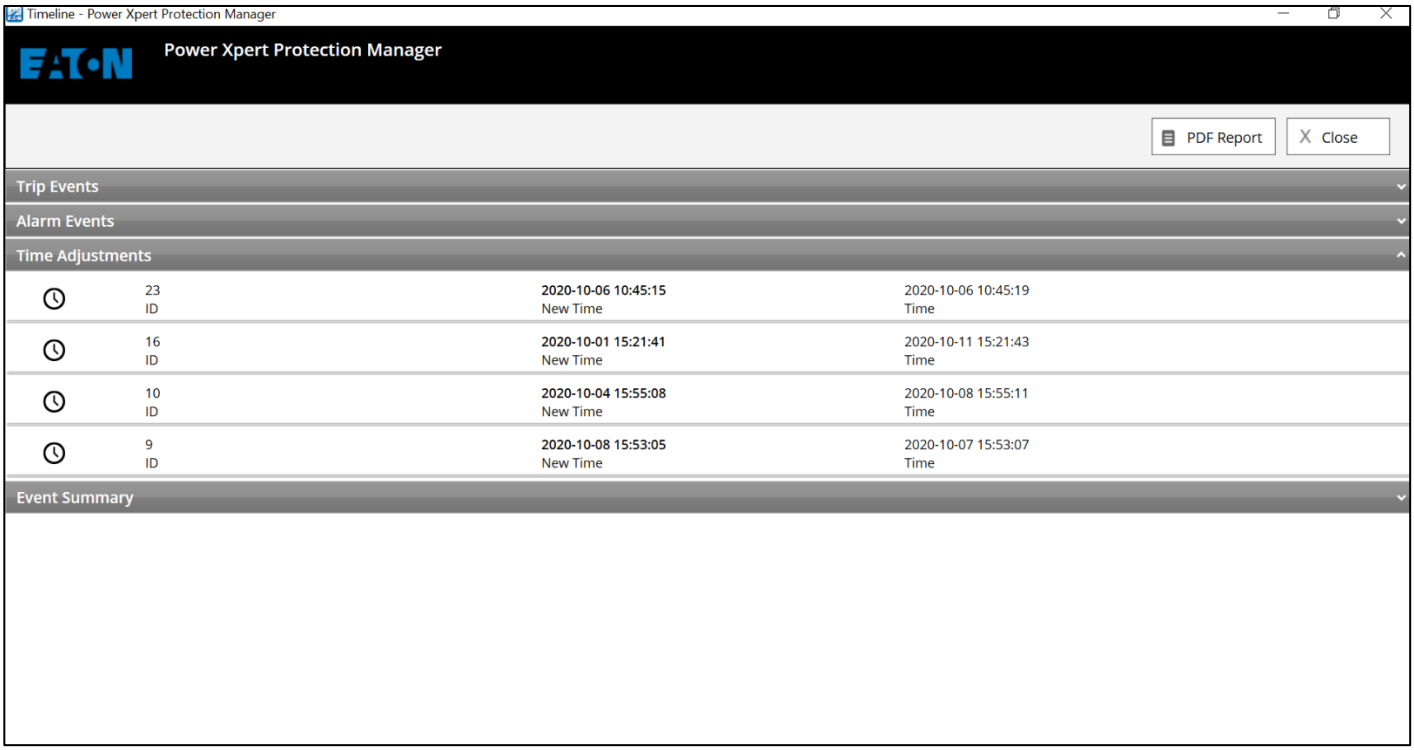


Figure 52: Time adjustments on the event summary screen

7.4 Event Summary

This section displays the record of several different Event Summary events (Figure 53).

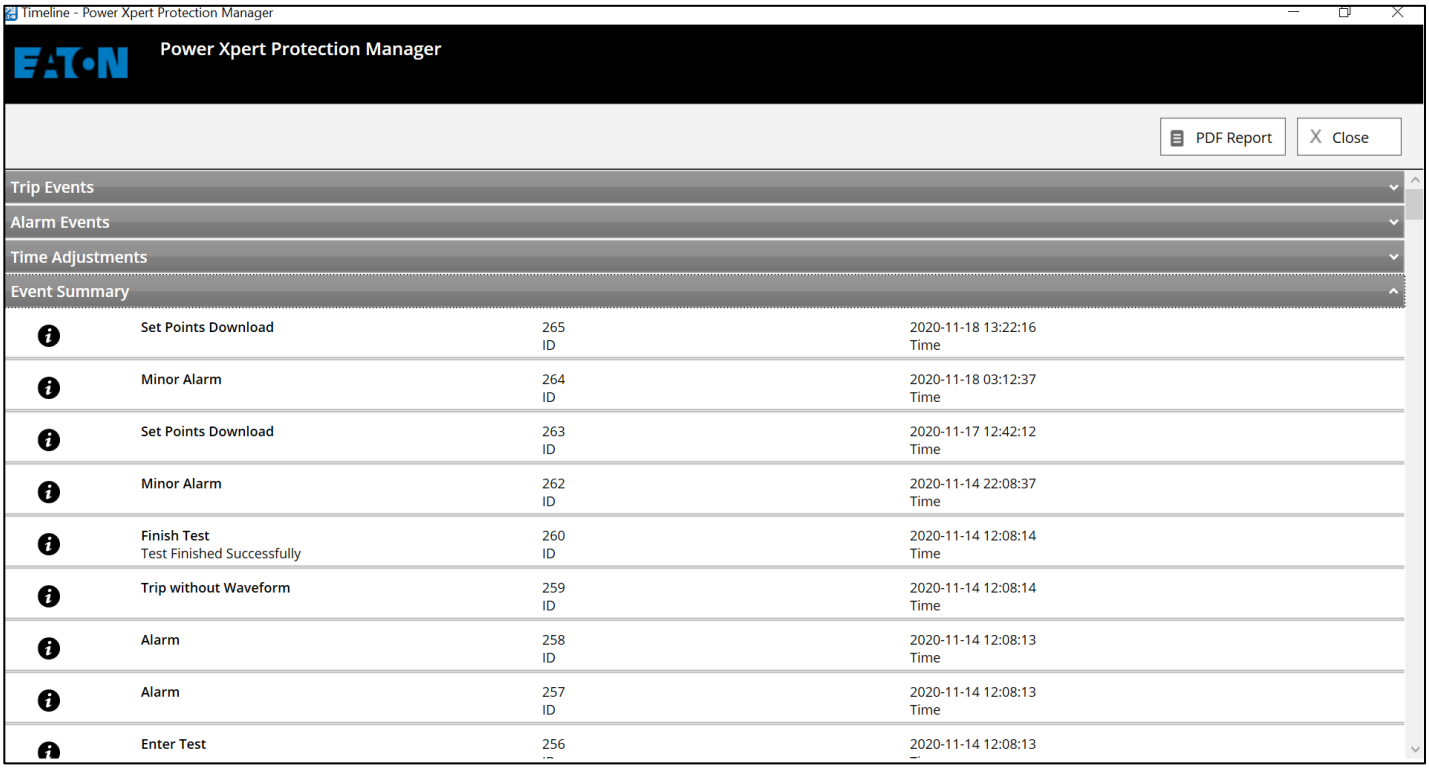


Figure 53: Event Summary screen

8 Reports

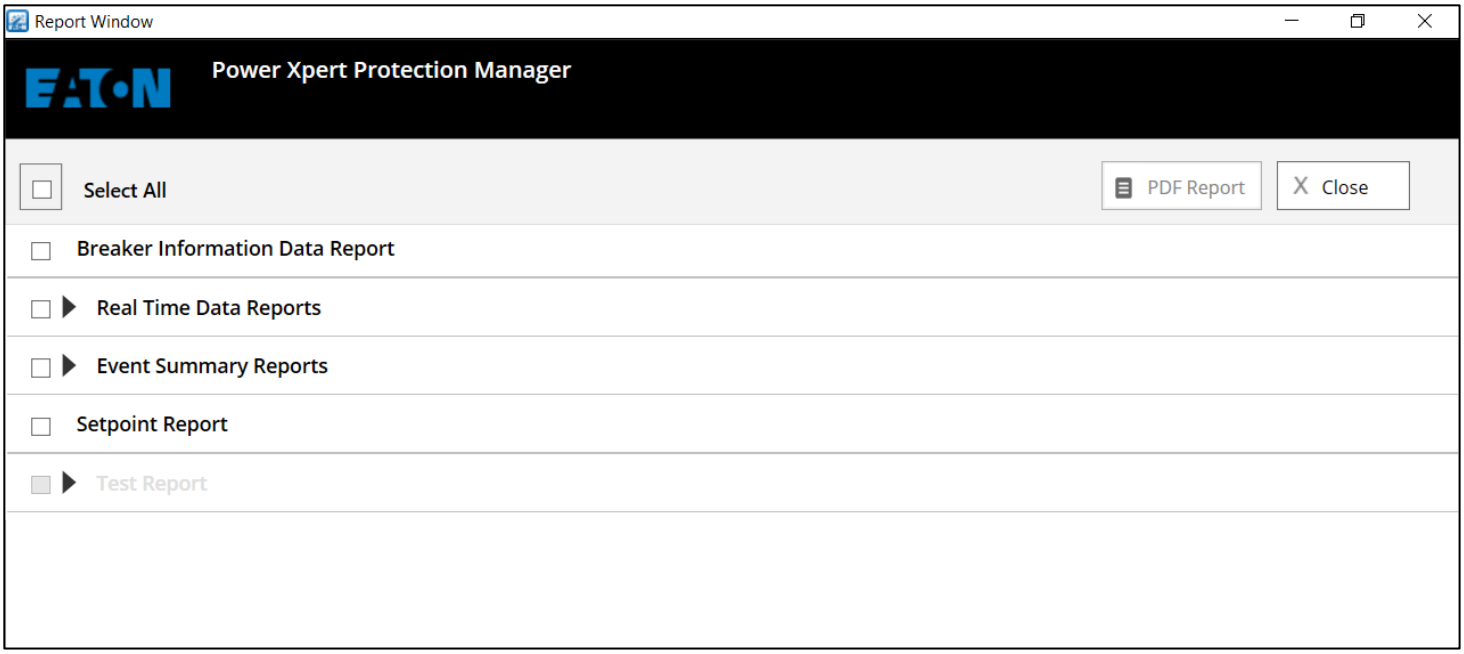


Figure 54: Report screen

The Report Screen (Figure 54) allows the user to print any or all reports. It will use any data previously received from the connected device. If there is data needed that has not been read from the device the PXPM will read the data when the report is generated. This can take a substantial amount of time depending on the amount of data that needs to be read.

Test Report option is enabled on this screen only if the feature has been licensed by the user and if testing has been performed during this session.

All data will be retained in the program for the duration of the connected session. If the user connects a different device or exits and reopened the PXPM then all previous data will be lost.

If the user selects any of the feature report and then clicks on PDF report button, User Input screen is displayed to user as shown in Figure 55.

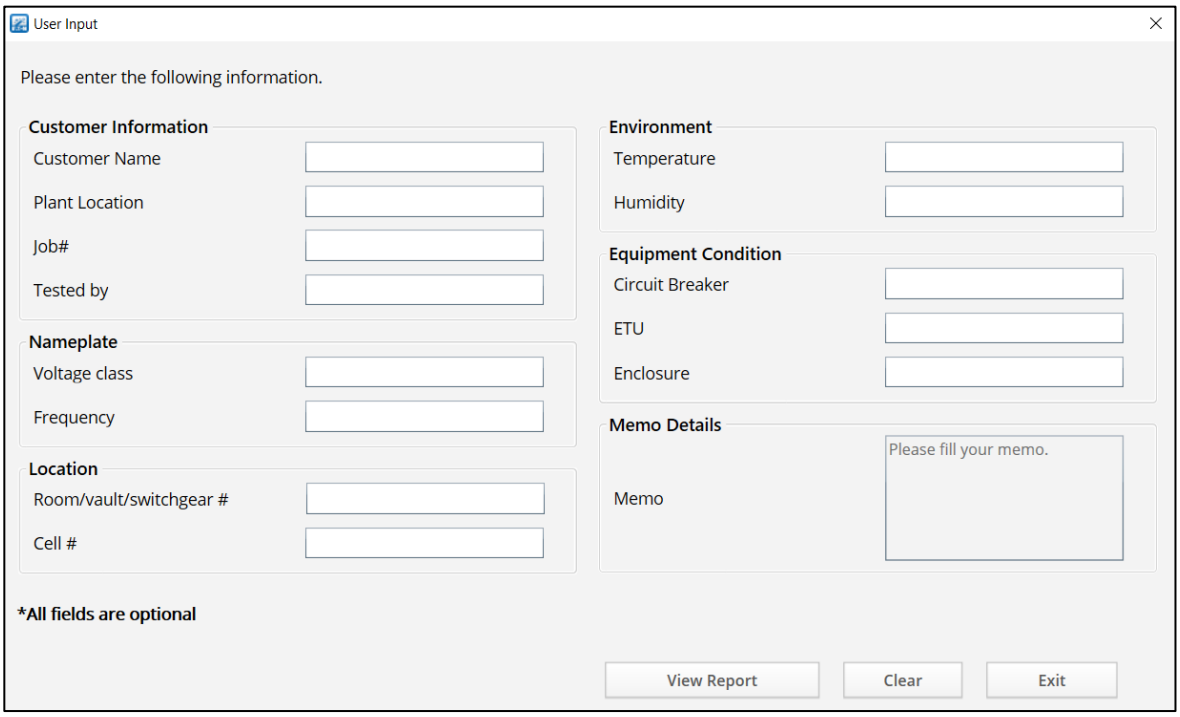


Figure 55: User input screen

9 Breaker Troubleshooting

This feature helps the user to determine the probable causes of circuit breaker problems and possible corrective actions. If the problem cannot be resolved with the aid of the Troubleshooting application, User can contact the Eaton service center for more in-depth assistance.

On pressing the Troubleshooting icon on main screen, a prompt asking for the confirmation to utilize the License for the feature pops up (Figure 56: Prompt to confirm the utilization of the License). A **Session** is defined differently for this feature (See section 10.1.1.1). After providing the confirmation, the following screen is displayed (Figure 57: Troubleshooting Options).

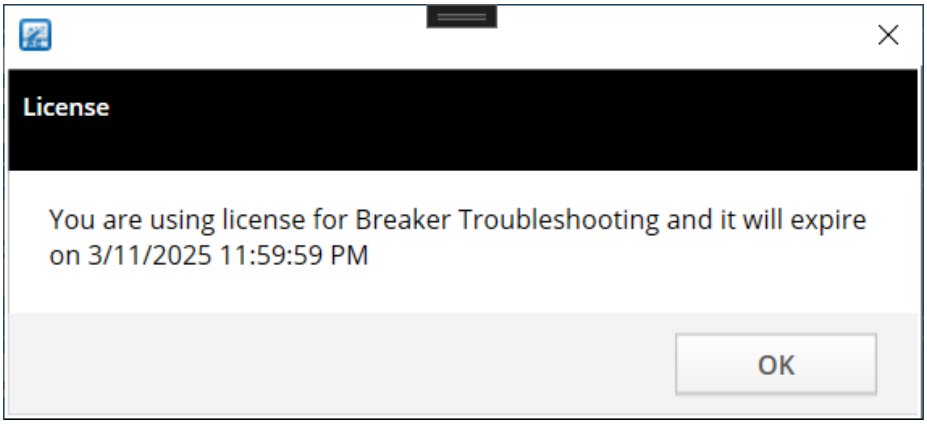


Figure 56: Notification of license usage and its expiry date

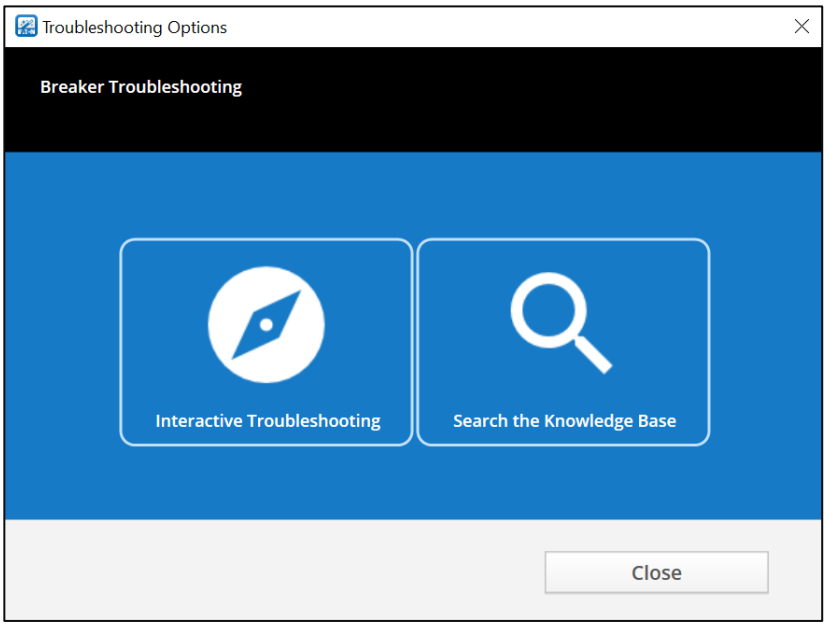


Figure 57: Troubleshooting Options

9.1 Interactive Troubleshooting

Interactive Troubleshooting is helpful to reach the solution of a problem based on the input provided by the user. User can navigate to the solution by selecting an answer to the question which best describes the problem faced, current visual indications etc.

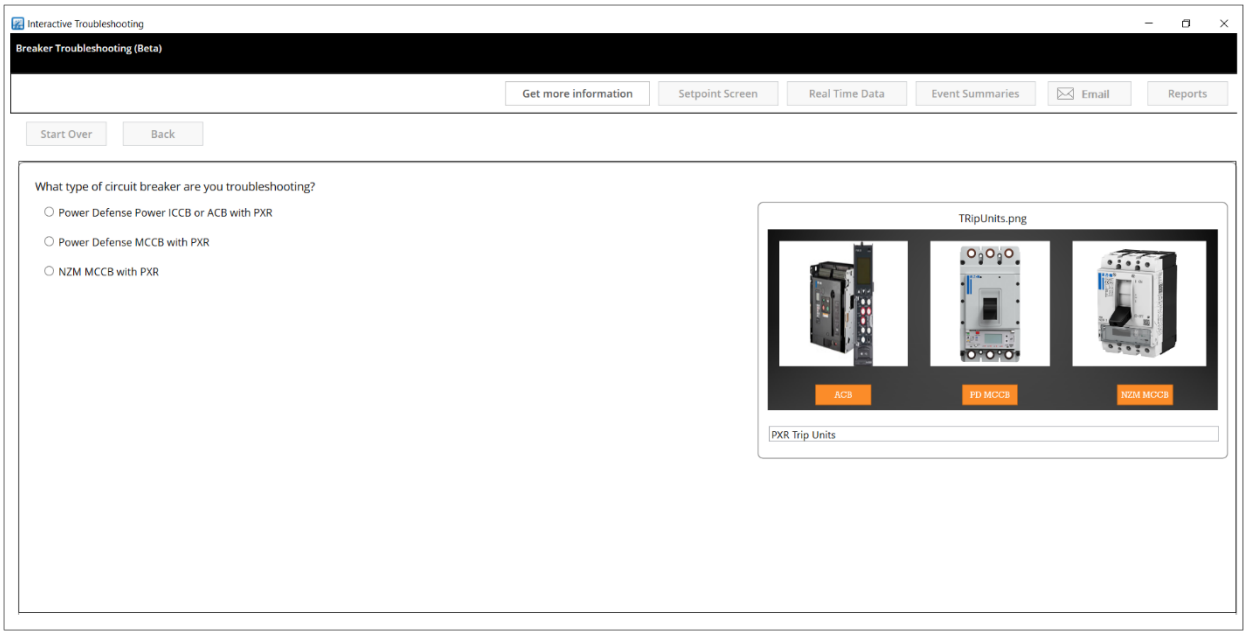


Figure 58: Interactive Troubleshooting

When **Get more information** button appears, additional information about the displayed prompt is available. Click on the button to show the information on the screen.

Upon clicking **Setpoint Screen, Real Time Data, Event Summaries** buttons, User is navigated to the respective screens of the PXPM features. This enables verification of specific parameters or changes in setpoints.

Using **Email** button, the PDF report of the troubleshooting steps that User has gone through, can be e- mailed to the desired recipient.

Reports button enables User to generate the PDF report of the troubleshooting steps opted by User till the current stage.

9.2 Search the knowledge base

Using this mode of Troubleshooting feature, User can access the knowledgebase of known problems related to breakers, its probable cause, and a proposed solution. User needs to enter the phrase/ words of desired choice which best related to the problem faced, in the search text box. Upon clicking **Search,** relevant searches will appear on screen as shown in **Fig. 59.**

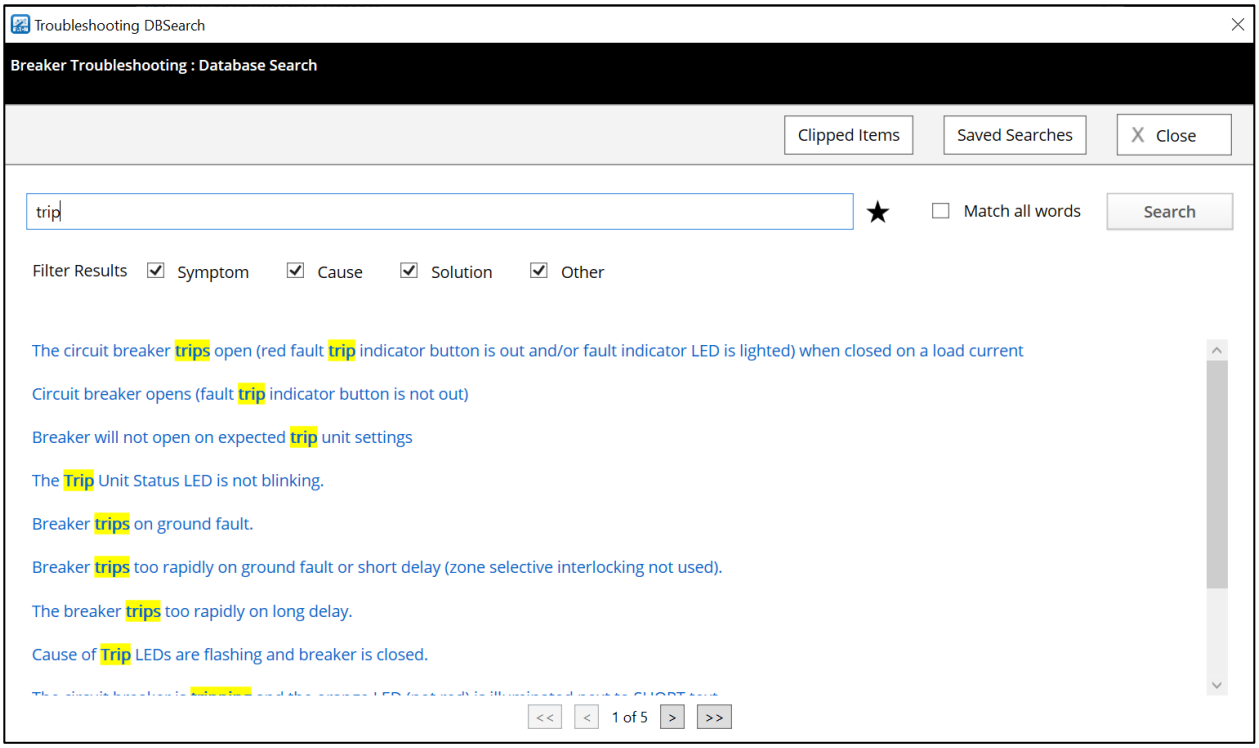


Figure 59: Search the Knowledge base

User can filter the results by **Symptom, Cause, Solution** or **Other** (if the current phrase doesn't belong to any of the other three filters)

On clicking the desired result, a window similar to **Fig 60** pops up. User can clip the item for the future reference.

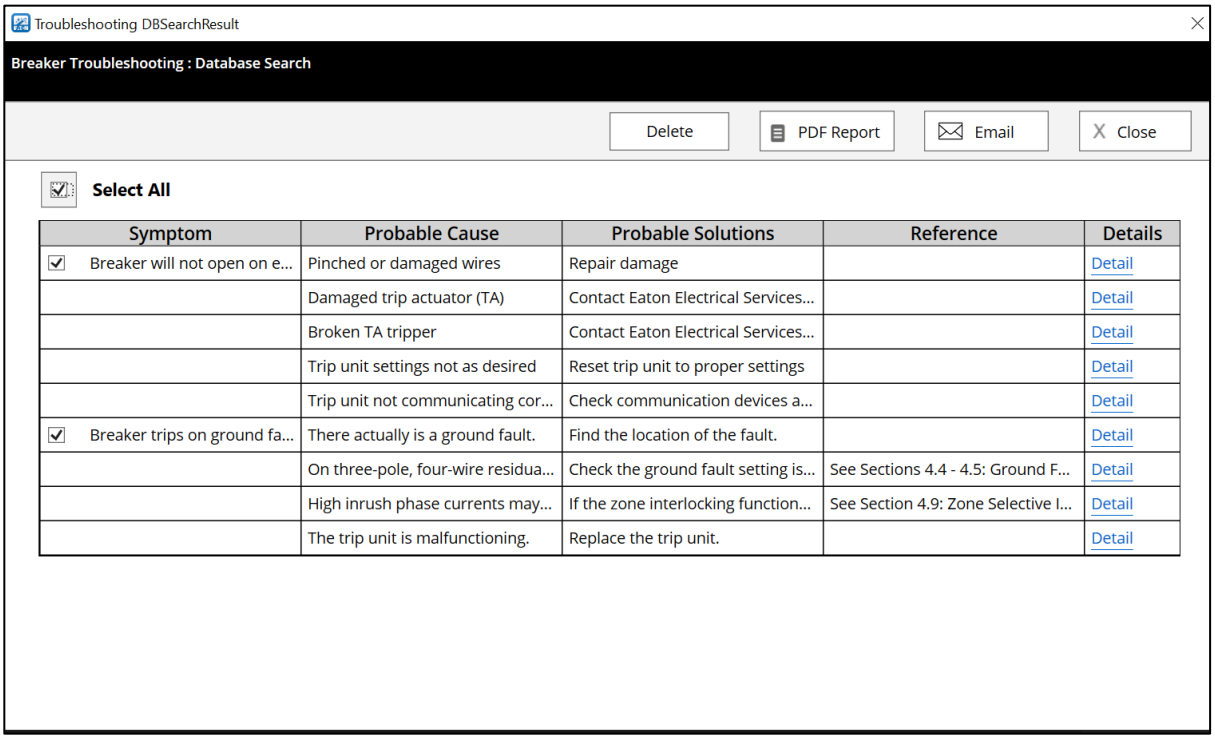


Figure 60: Search Result

9.2.1 Saved Searches

The desired search- term can be saved by clicking the **Favorite icon** displayed beside the text box in **Fig 58**. List of saved searches appear upon clicking **Saved Searches** button (Refer **Fig 61).** The selected item can be re-used for the search purpose by clicking **Load** button.

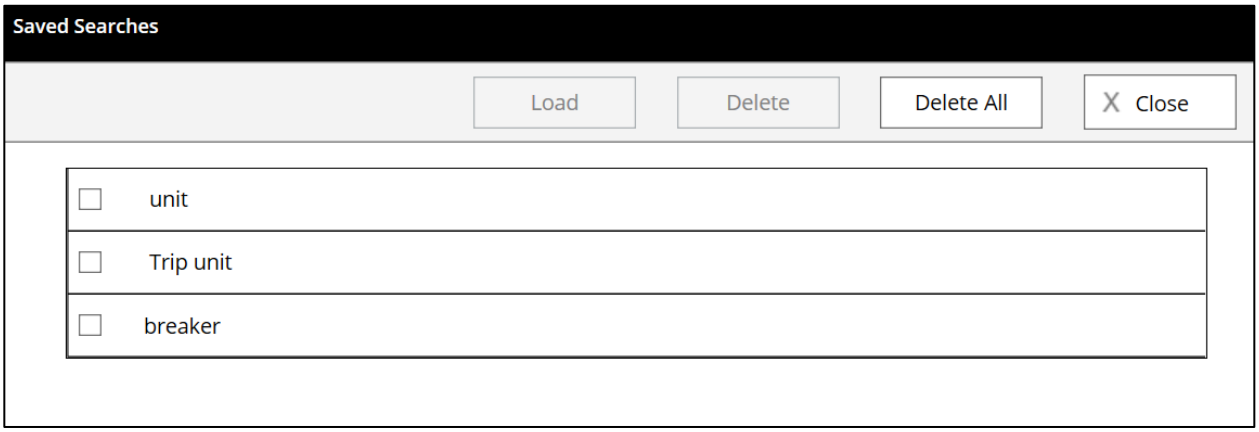


Figure 61: Saved Searches

9.2.2 Clipped items

Upon clicking **Clipped items** button displayed in **Fig 60,** following screen pops up. **(Fig 62)**

User can generate PDF report of the selected clipped items by clicking **PDF Report** button.

Selected items can be exported to PDF report and e-mailed to the desired recipient using **Email** button.

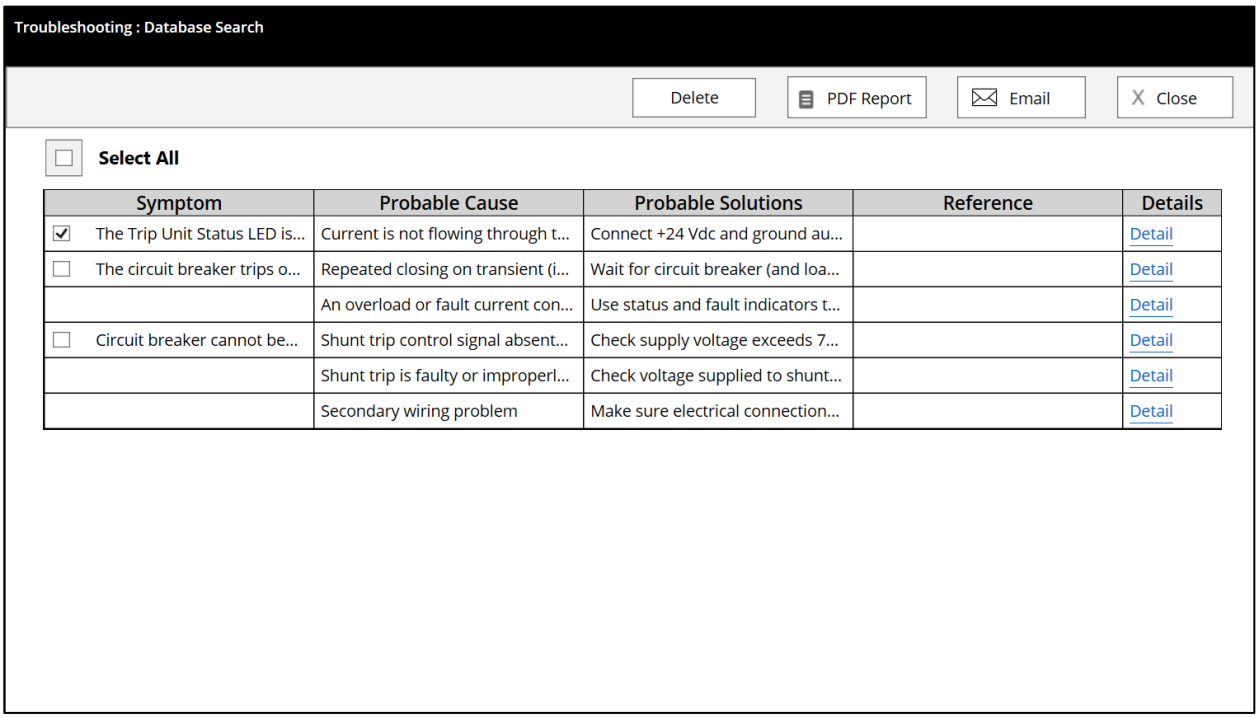


Figure 62: Clipped items

10 Application Settings

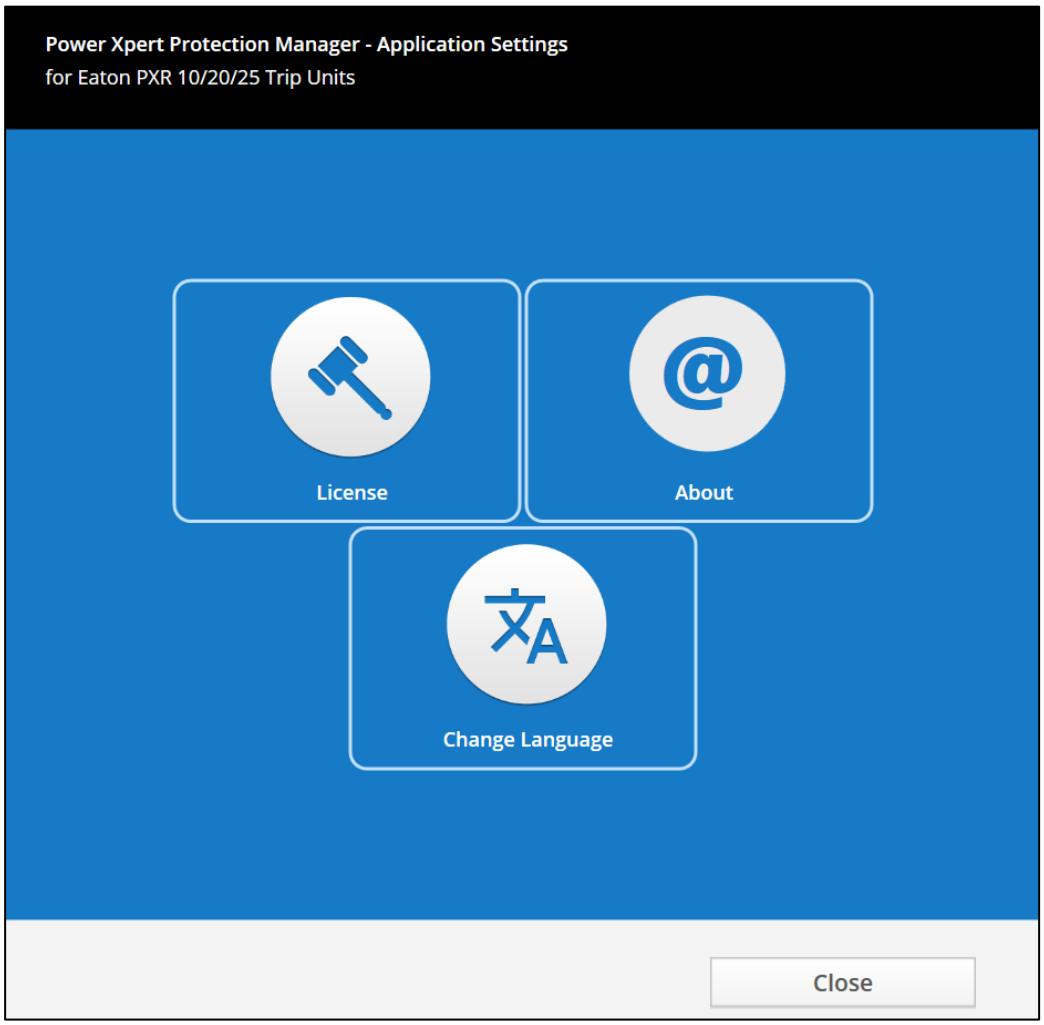


Figure 63: Power Xpert Protection Manager application settings

10.1 License

In order to enable the Advanced Testing features, Trip/Alarm Waveform (Last Waveform Recorded in Event Summaries), Breaker Troubleshooting feature, and to Change PXR ACB Rated Current (In) the user needs to purchase a License.

The window in Figure 64 displays the procedure that needs to be followed in order to purchase a license.

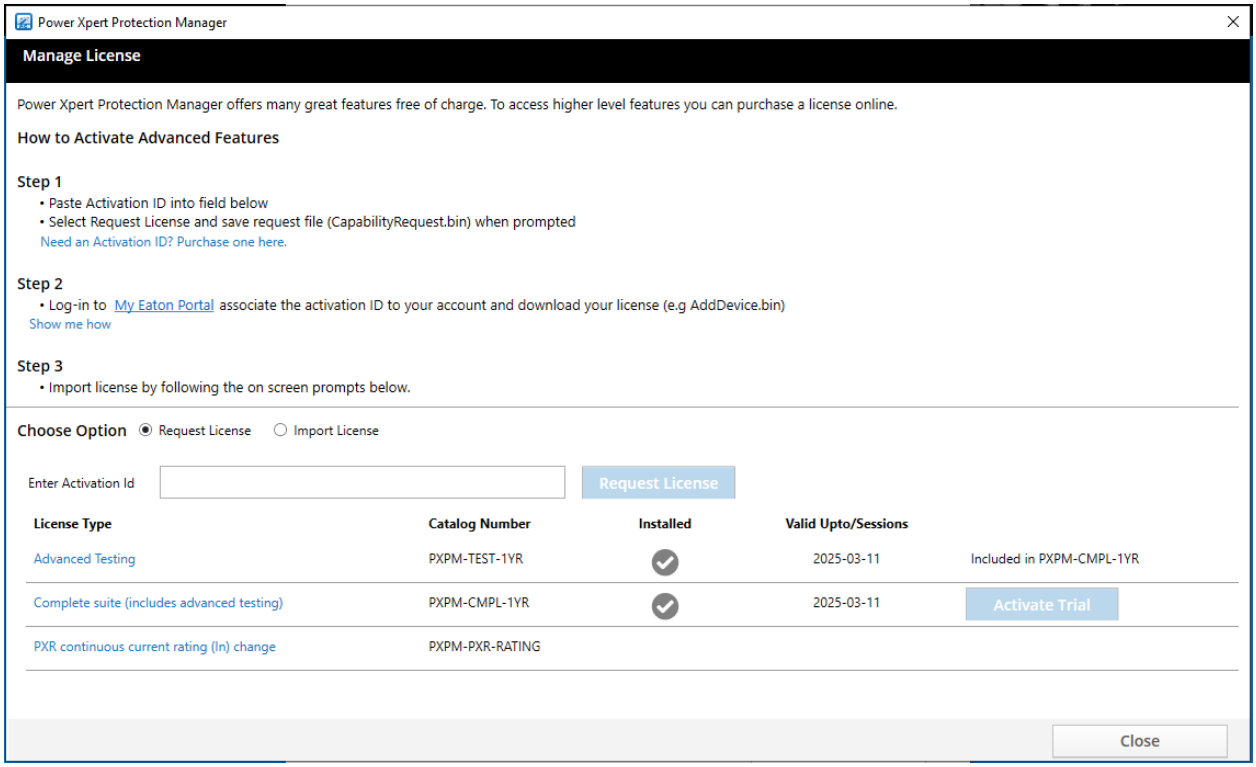


Figure 64: Power Xpert Protection Manager license management screen

When the License is purchased, it is valid only on the computer from which it has been requested for.

License Type and **Catalog Number** columns indicate the details of the license requested by the user.

'Installed' column indicates the successful installation of the licenses on the computer.

'Session' column indicates the remaining number of licenses (**including free trials),** one license corresponds to one session

NOTE: There are no free trials for 'Change PXR ACB Rated Current (In)'.

When PXPM is installed for the first time on user's computer, **'Activate Trial'** button will be enabled.
Free trials are valid for 15 days from activation or until user installs the license.

10.1.1 Session

PXPM apps are licensed by subscription based and session model.

A **session** defined as the connection to a single breaker. A **session** is said to be terminated by one of the following conditions:

1. If the Power Xpert Protection Manager application is closed.
2. If a device is de-selected and another device is selected with in the PXPM software.
3. If a device is physically disconnected from the computer (unplugging the USB Micro connector from the breaker or unplugging the USB cable from the computer)

When a user accesses feature - Change PXR ACB Rated Current (In), PXPM will prompt to confirm utilization of a session. Once confirmed, one license will be utilized, and it will be valid for the current session.

10.1.2 Types of Licenses

User can purchase two types of licenses:

- Session-based: The user purchases a set number of sessions to use on their computer. They have access to use an advanced feature during that specific session.

- Subscription-based: This type of license enables the feature on the computer for specified duration i.e., 1 year. The user may access the licensed feature during this 1-year unlimited times.. The user will be prompted with popup window with the expiry date of license 2 weeks before expiry date.

10.2 About

Here, the user can get the information of regional technical support contacts.

The user will also find the Power Xpert Protection Manager **Version** in this location (Figure 66). It is recommended that the user keep up to date with the latest version of PXPM.

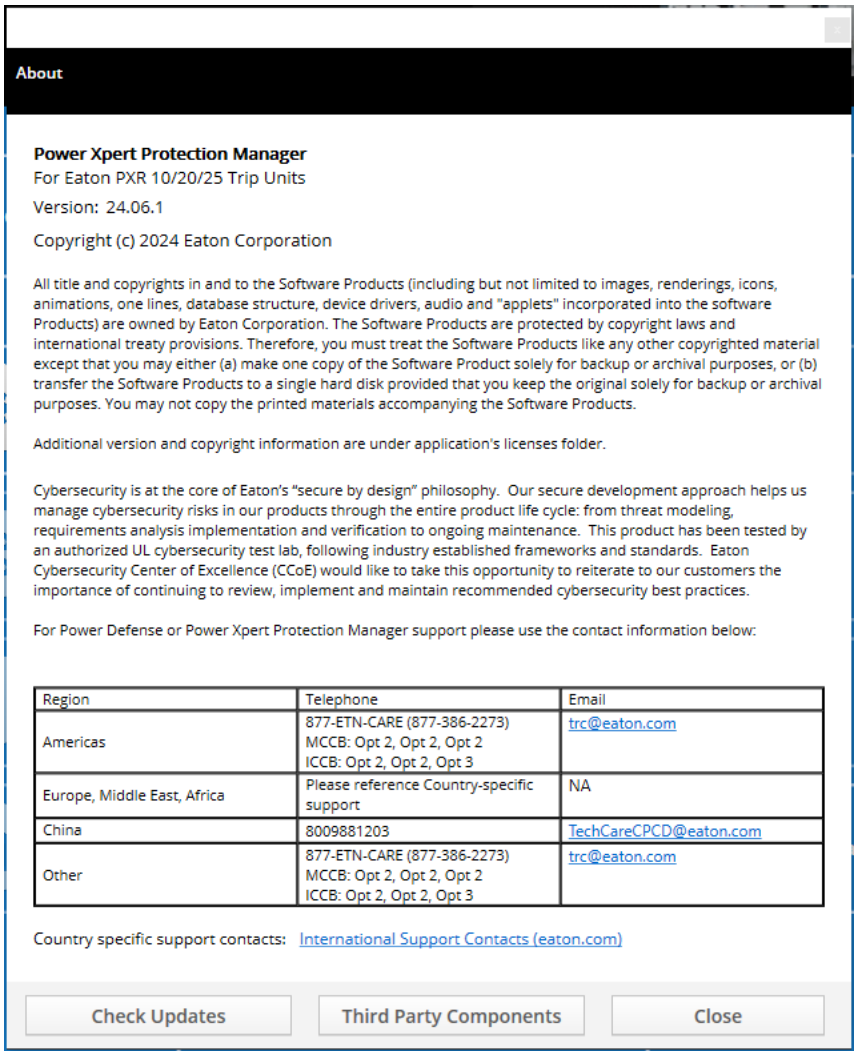


Figure 65: 'About' screen

10.2.1 Automatically Check for Updates

PXPM has the ability to automatically check for updates. This feature can be enabled via a pop-up (Figure 68) when PXPM is launched for the very first time. The setting can be edited under **Application Settings>About > Check Updates**.

When **Check Updates** button is clicked, then a pop-up is displayed on the screen (Figure 67), which provides the user the information of the latest available version and the features covered in the same. If the checkbox **Automatically check for updates** is checked, this pop-up is displayed on the screen every time the user launches PXPM.

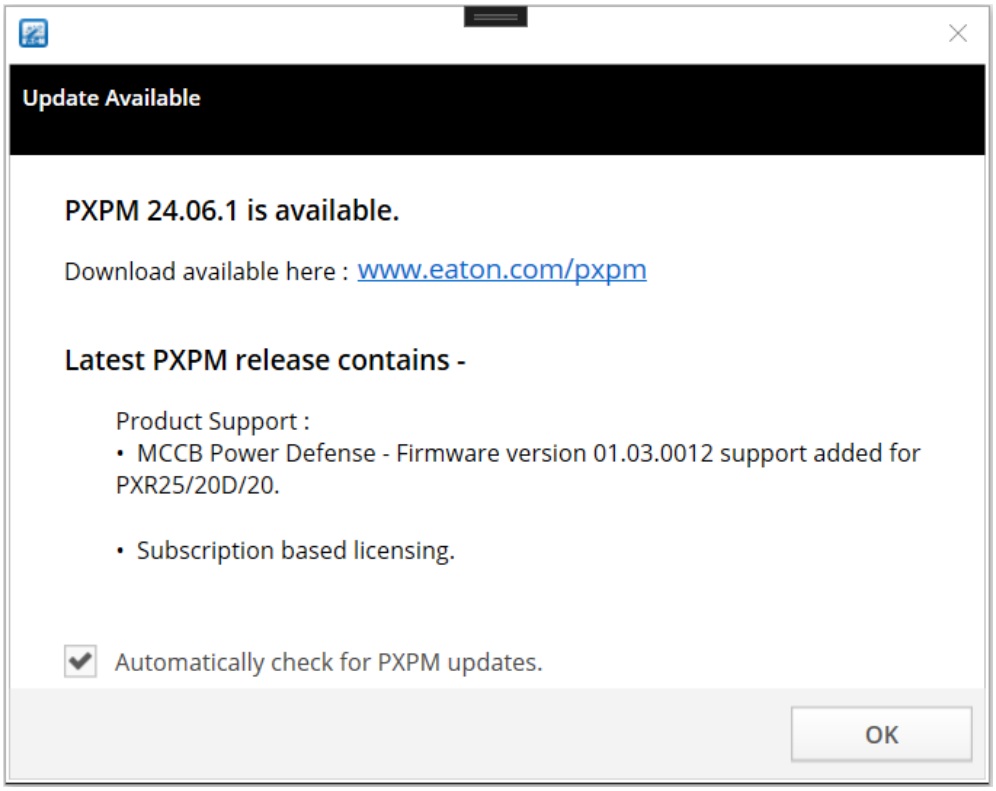


Figure 66: Pop-up for PXPM updates

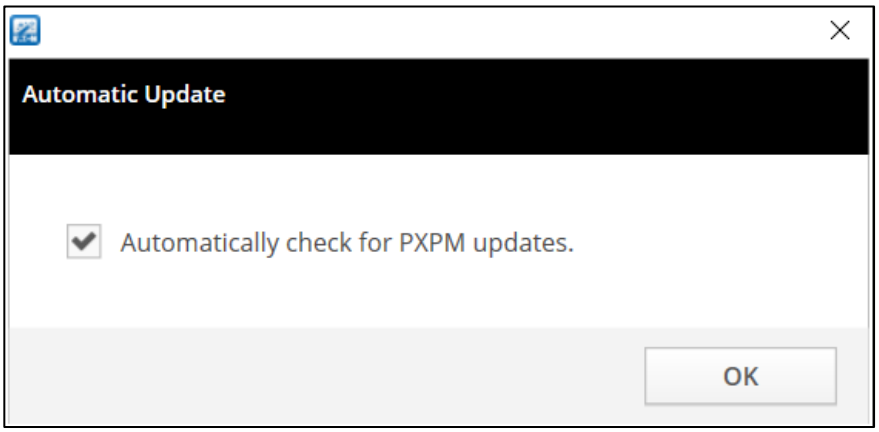


Figure 67: Pop-up on the first launch of PXPM

10.2.2 Third Party Components

When the Third Party Components button is clicked, then a new screen is opened (Figure 69) which displays the list of third party components and open source libraries used in the PXPM application.

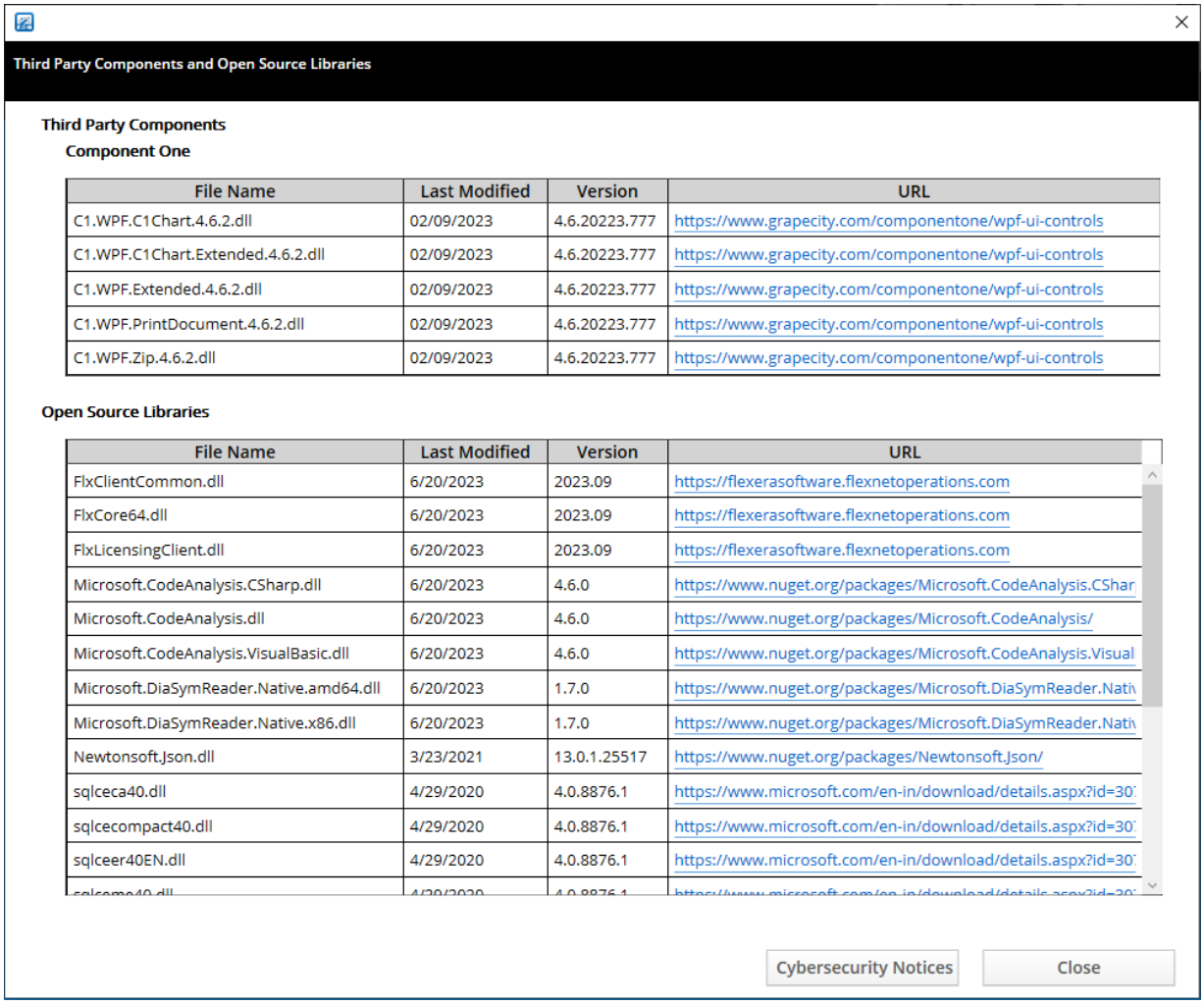


Figure 68: Third Party Components and Open-Source Libraries' screen

10.3 Change Language

Power Xpert Protection Manager allows the user to change the interface language. To do so, click the **Change Language** button, and select the language of your choice (Figure 70). Figure 71 shows Power Xpert Protection Manager startup screen in simplified Chinese. New languages are periodically included with software updates.

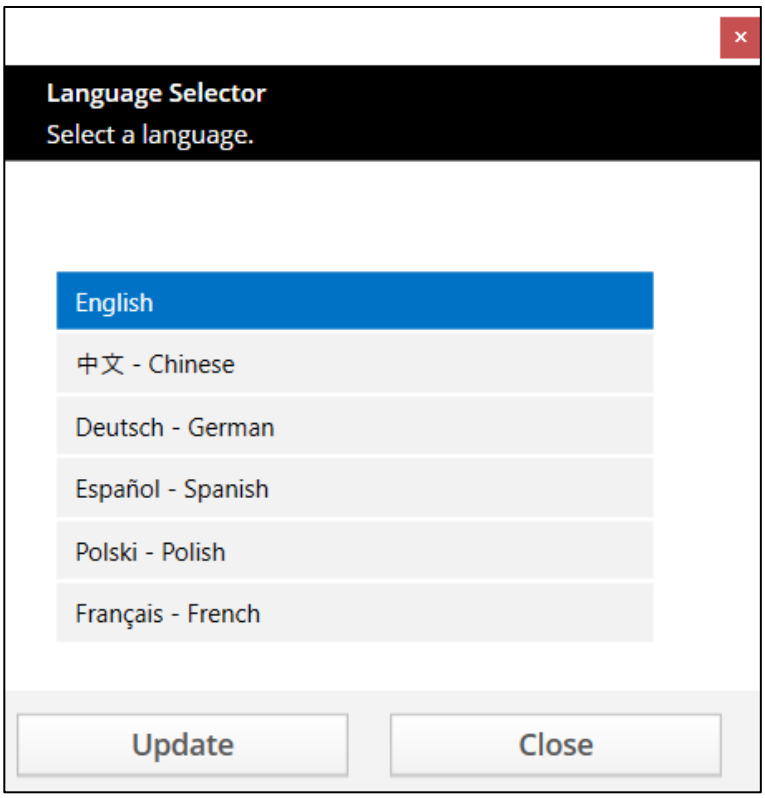


Figure 69: 'Change Language' screen

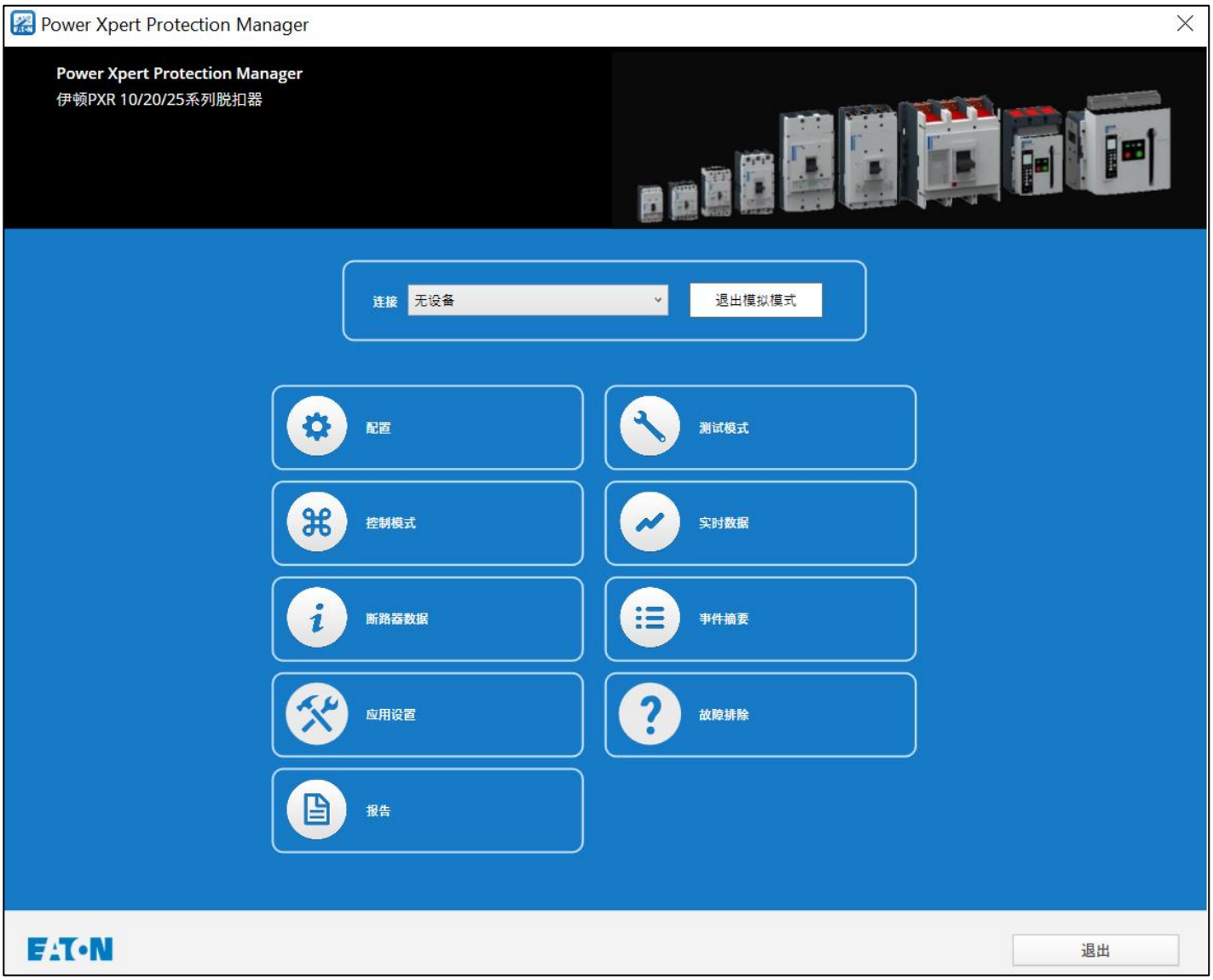


Figure 70: Power Xpert Protection Manager main screen in simplified Chinese

11 Simulation Mode

Simulation mode allows user to preview PXPM features which require connection to a breaker.

When no device is connected, 'Enter Simulation Mode' button is displayed on PXPM main screen as shown in Figure 72.

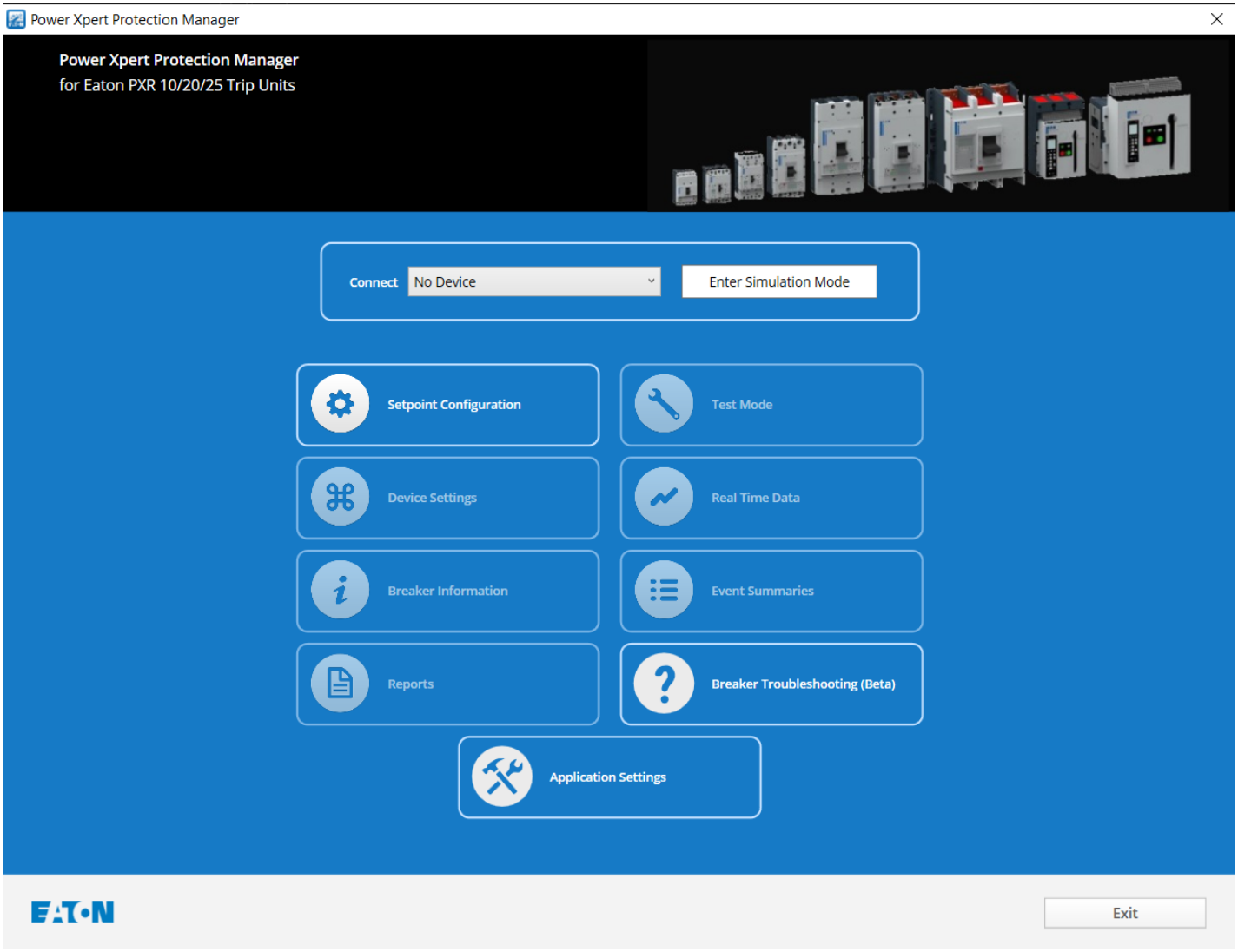
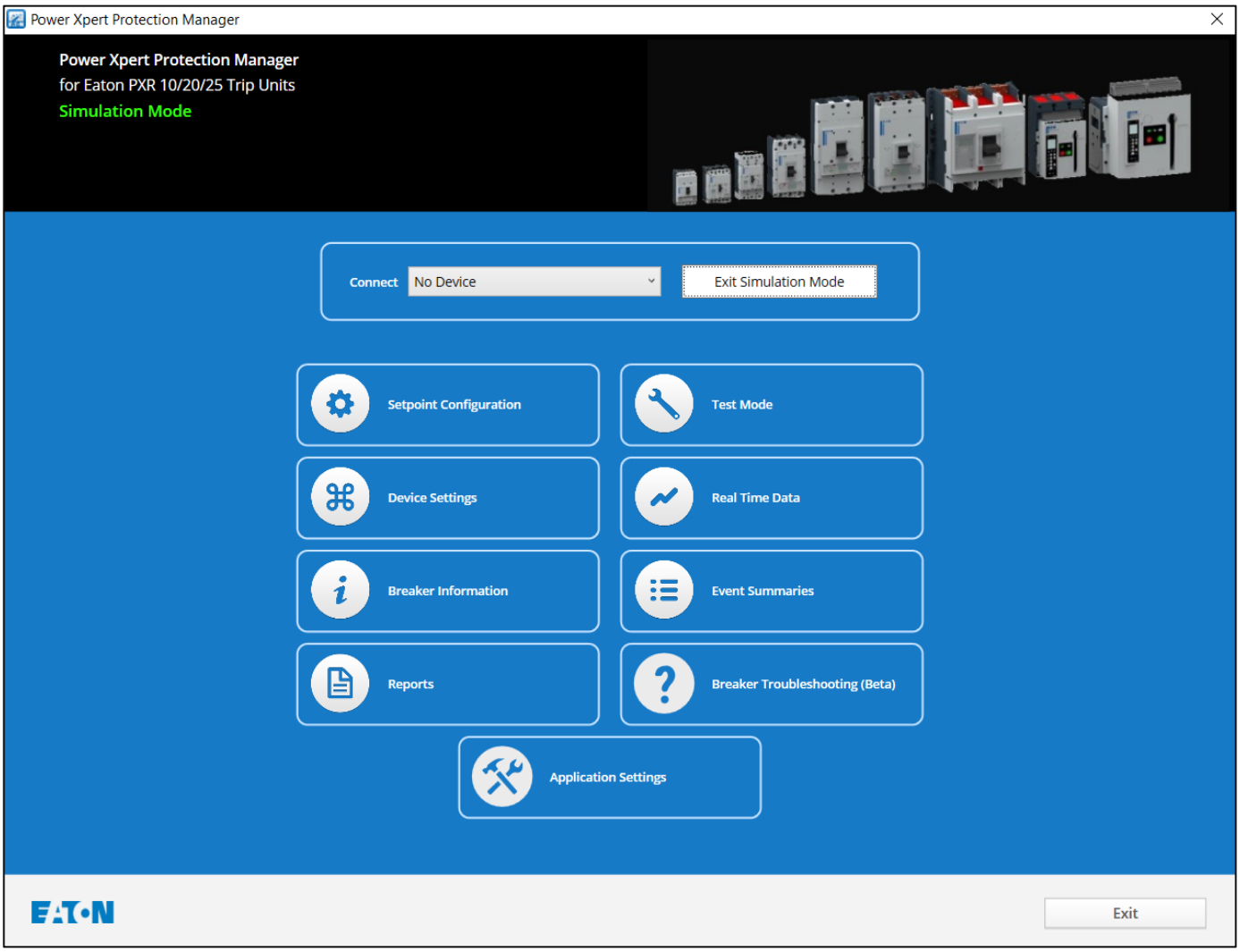


Figure 71: Power Xpert Protection Manager main screen in offline mode

If user clicks on 'Enter Simulation Mode' button, then all PXPM features will be enabled as shown in Figure 73. Sample data and pre-generated reports are displayed as an example.



'Simulation Mode' text is highlighted on top of every PXPM screen when user is in Simulation mode. Setpoint screen and Test Parameter screen in simulation mode are shown in **Figure 74** and **Figure 75** respectively.

Fig. 72: Power Xpert Protection Manager main screen in Simulation mode

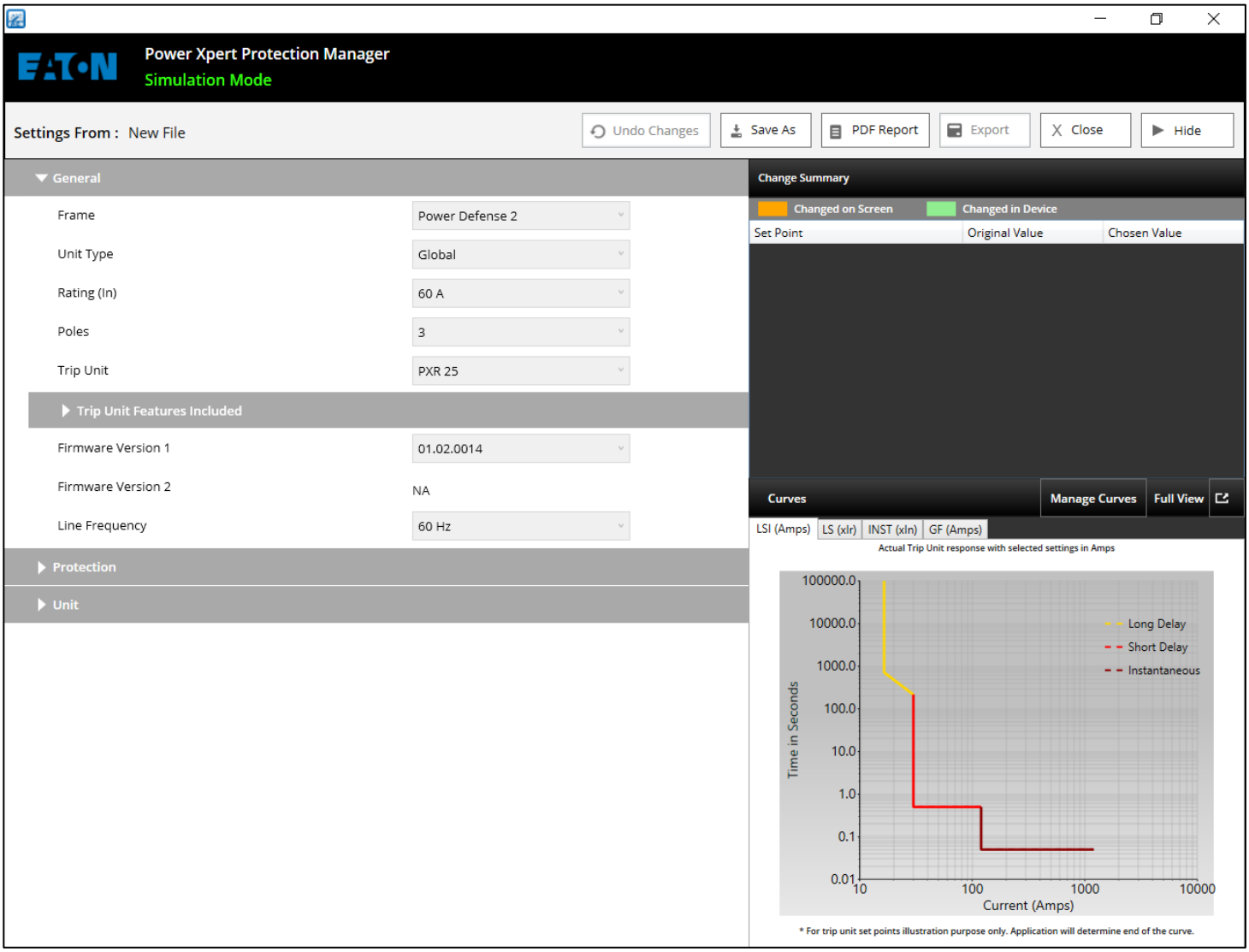
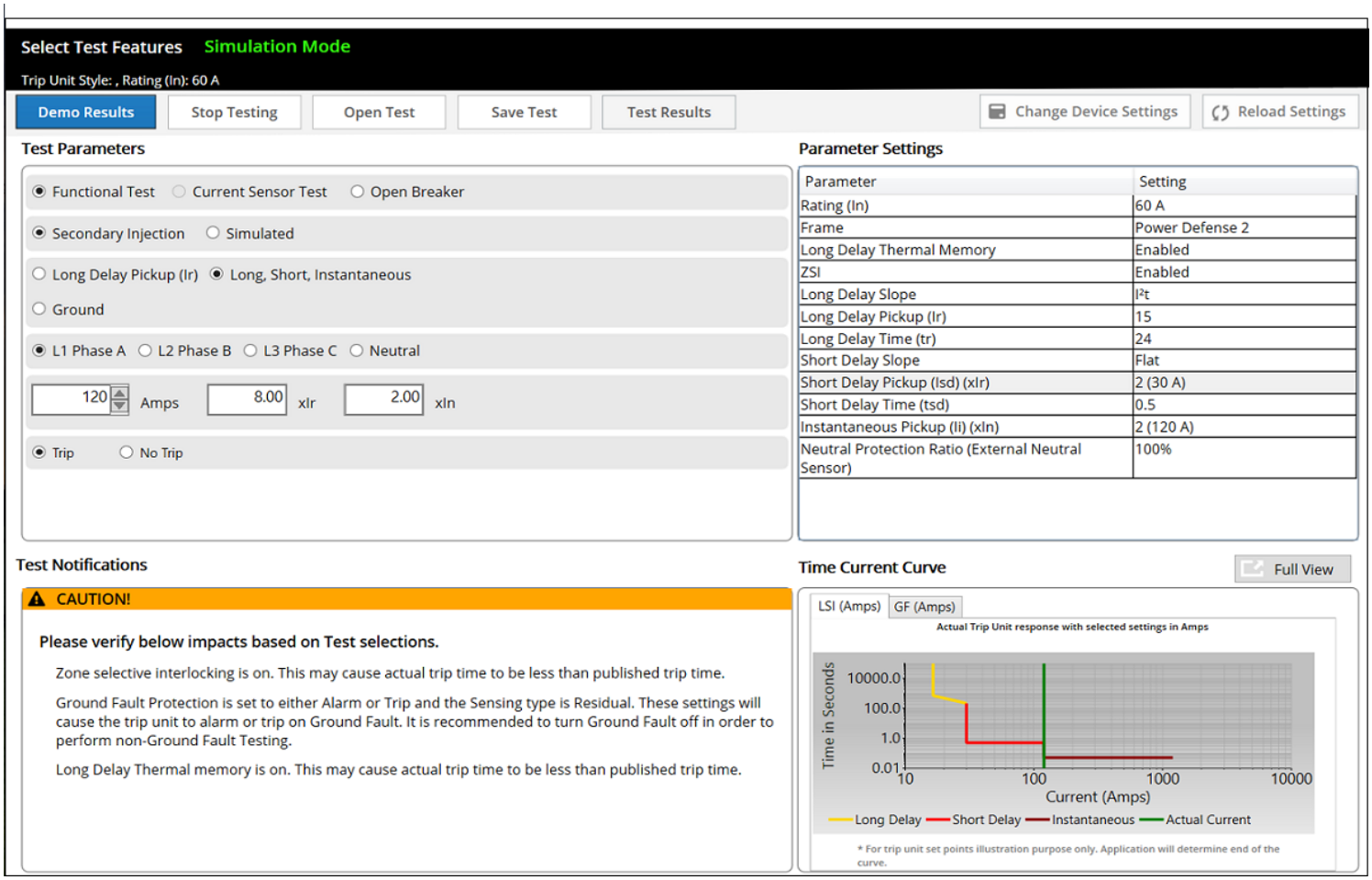


Figure 73: Setpoint configuration screen in Simulation mode


Select Test Features
Simulation Mode
Trip Unit Style: , Rating (In): 60 A
Demo Results
Stop Testing
Open Test
Save Test
Test Results
Change Device Settings
Reload Settings
Test Parameters
Functional Test
Current Sensor Test
Open Breaker
Secondary Injection
Simulated
Long Delay Pickup (Ir)
Long, Short, Instantaneous
Ground
L1 Phase A
L2 Phase B
L3 Phase C
Neutral
120
Amps
8.00
xIr
2.00
xIn
Trip
No Trip
Parameter Settings
Parameter
Setting
Rating (In)
60 A
Frame
Power Defense 2
Long Delay Thermal Memory
Enabled
ZSI
Enabled
Long Delay Slope
I²t
Long Delay Pickup (Ir)
15
Long Delay Time (tr)
24
Short Delay Slope
Flat
Short Delay Pickup (Isd) (xIr)
2 (30 A)
Short Delay Time (tsd)
0.5
Instantaneous Pickup (Ii) (xIn)
2 (120 A)
Neutral Protection Ratio (External Neutral Sensor)
100%
Test Notifications
CAUTION!
Please verify below impacts based on Test selections.
Zone selective interlocking is on. This may cause actual trip time to be less than published trip time.
Ground Fault Protection is set to either Alarm or Trip and the Sensing type is Residual. These settings will cause the trip unit to alarm or trip on Ground Fault. It is recommended to turn Ground Fault off in order to perform non-Ground Fault Testing.
Long Delay Thermal memory is on. This may cause actual trip time to be less than published trip time.
Time Current Curve
Full View
LSI (Amps)
GF (Amps)
Actual Trip Unit response with selected settings in Amps
Time in Seconds
10000.0
100.0
1.0
0.01
10
100
1000
10000
Current (Amps)
Long Delay
Short Delay
Instantaneous
Actual Current
* For trip unit set points illustration purpose only. Application will determine end of the curve.