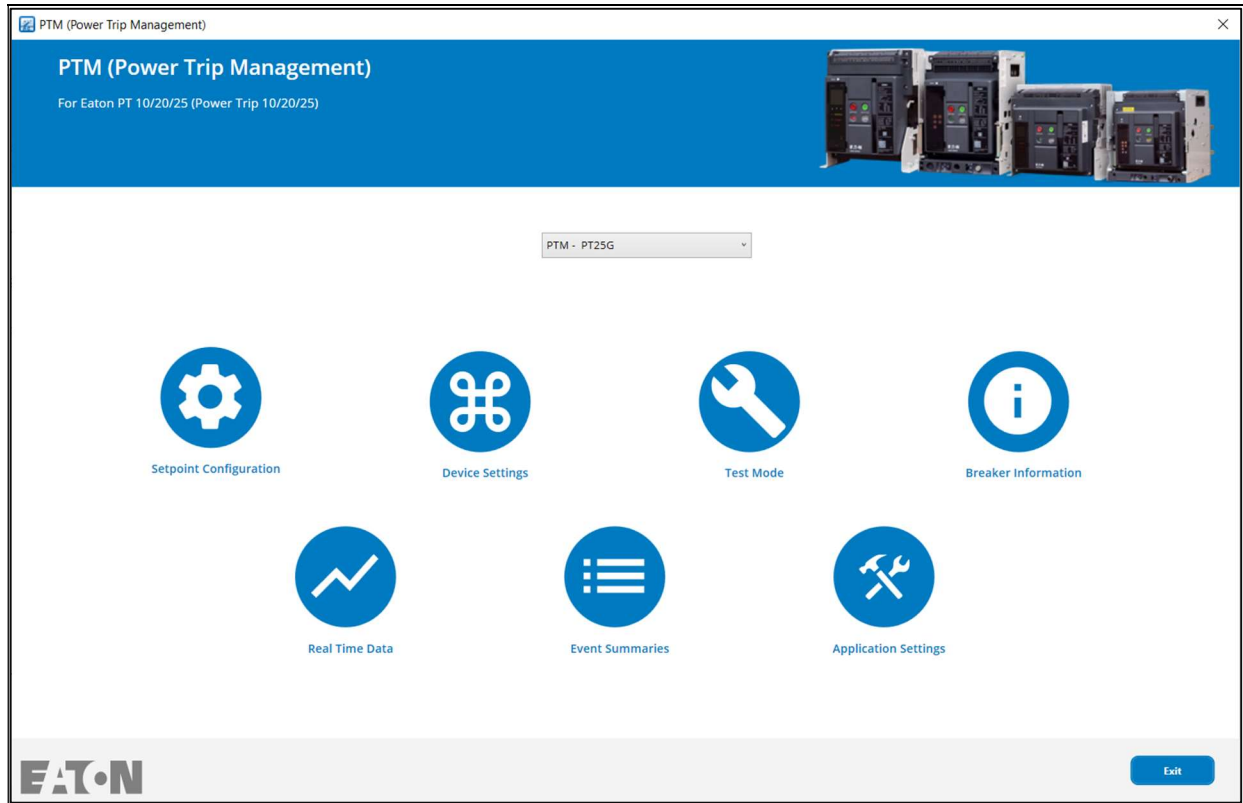


Power Trip Management quick start guide



Effective July 2023

1 Introduction

Eaton's Power Trip Management (PTM) is a Microsoft® Windows-based software that configures, controls and tests Eaton PT trip units in Series IZM Breakers. This document guides users through the PTM'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.

2 System Requirements

Hardware requirements:

- Eaton PT trip unit
- USB to Micro-USB cable

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 Trip Management Main Screen

The Power Trip Management provides several features to communicate to the PT trip units. (Figure 1.1). 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.

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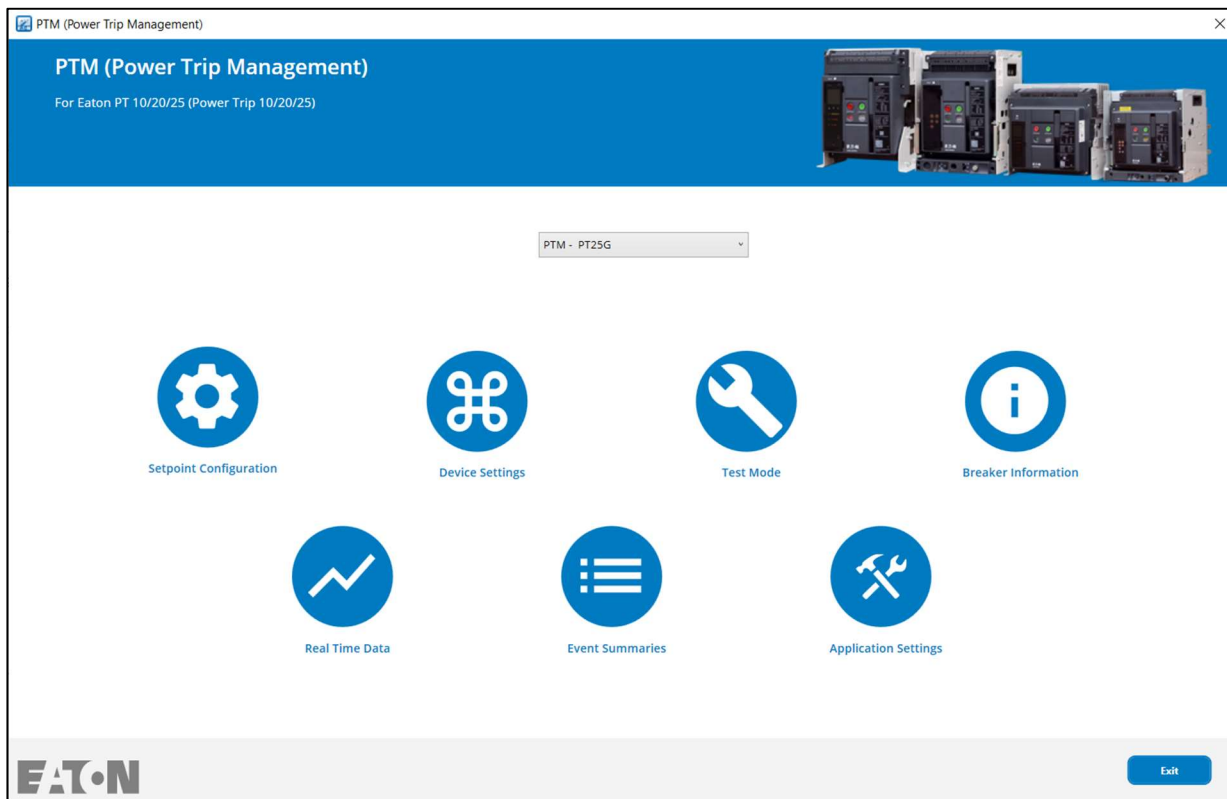


Figure 1.1: Power Trip Management main screen

1.1 Connect

The user can connect a PT Trip Unit using a USB Cable. PTM software automatically detects if any trip unit is connected to the computer. Any PT Trip Units connected to the computer will be located in dropdown.

2 Setpoint Configuration

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The **Setpoint Configuration** section provides two main features (Figure 2.1).

1. **Connect to Unit:** Import and modify PT trip unit's existing setpoints. The trip unit must be powered up and connected to the computer through a USB to Micro-USB cable.
2. **Export to Unit:** Export setpoints from an existing setpoint configuration file (.pxset) to a PT trip unit. The trip unit must be powered up and connected to the computer through a USB to Micro-USB cable.

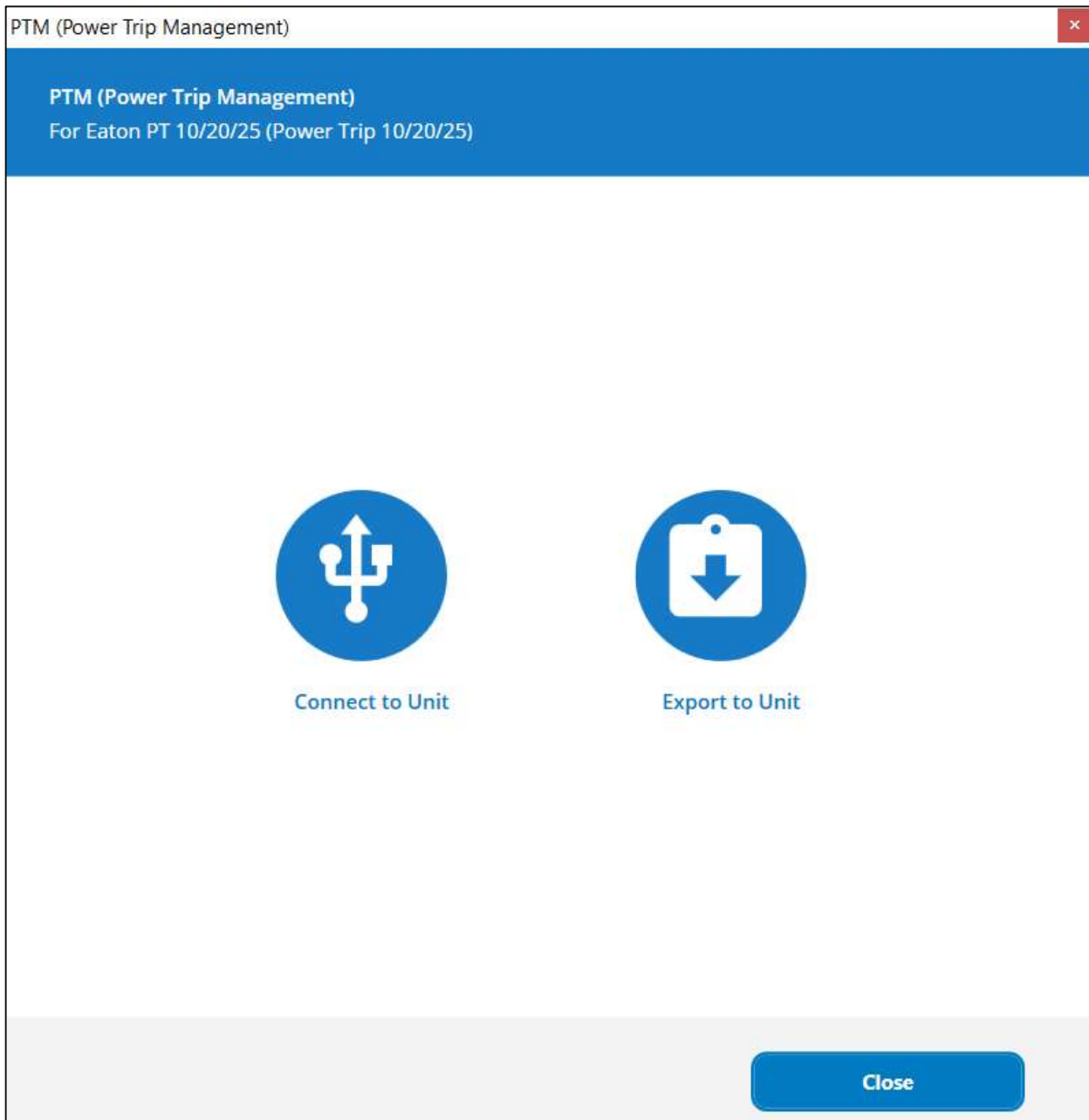


Figure 2.1: Setpoint options screen

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2.1 Connect to Unit

To connect to a PT 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.



Figure 2.2: USB to Micro-USB Cable and PT Trip Unit.

2.2 Export to Unit

Export to Unit exports setpoints from an existing setpoint configuration file (.pxset) to a PT 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 2.3 is displayed to prompt the user to create a backup file of the trip unit's existing setpoints before overwriting.

Selecting **Yes** in Figure 2.3 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 2.1) and choose the desired file. This will export the setpoints from the selected file into the trip unit.

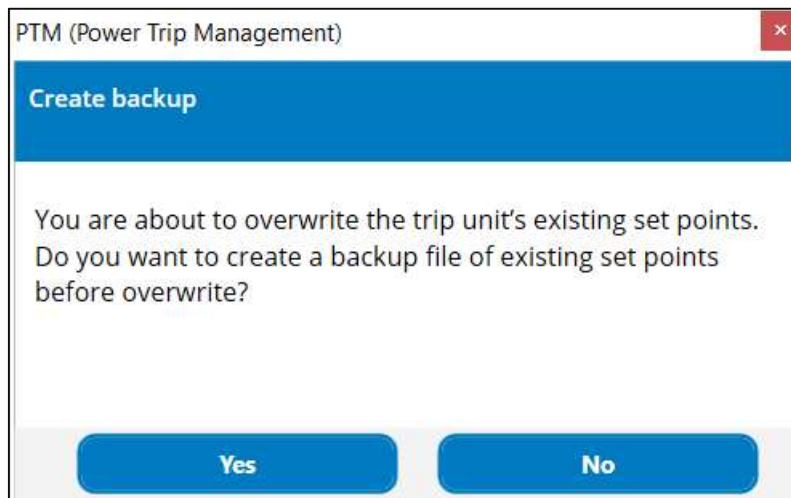


Figure 2.3: Create Backup Configuration File Screen

2.3 Setpoint configuration screen

The Setpoint configuration screen, in Figure 2.4 shows the resulting setpoints screen with trip unit type, style and other settings.

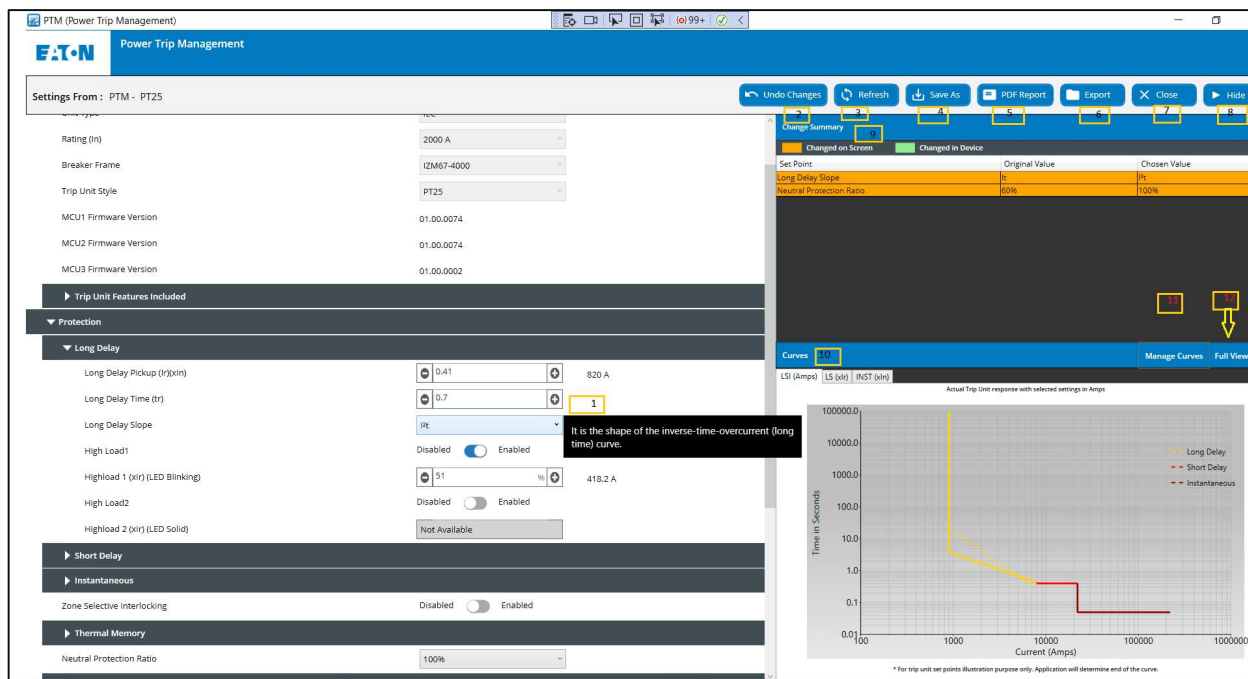


Figure 2.4: Setpoint configuration screen

The configuration screen allows users to view and edit setpoints. Figure 2.4 shows the configuration screen when **Connect to Unit** 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, PTM 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:** Read setpoints from trip unit and display on the setpoint screen. All changes that have not been exported will be lost.

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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 2.6).
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. A dotted curve is shown when a setpoint value has been changed on the screen.
11. **Manage Curves:** Enables user to perform the comparative study of the behaviors of different PT devices by analyzing the respective curves.
12. **Full View:** To open the enlarged view of Curves.

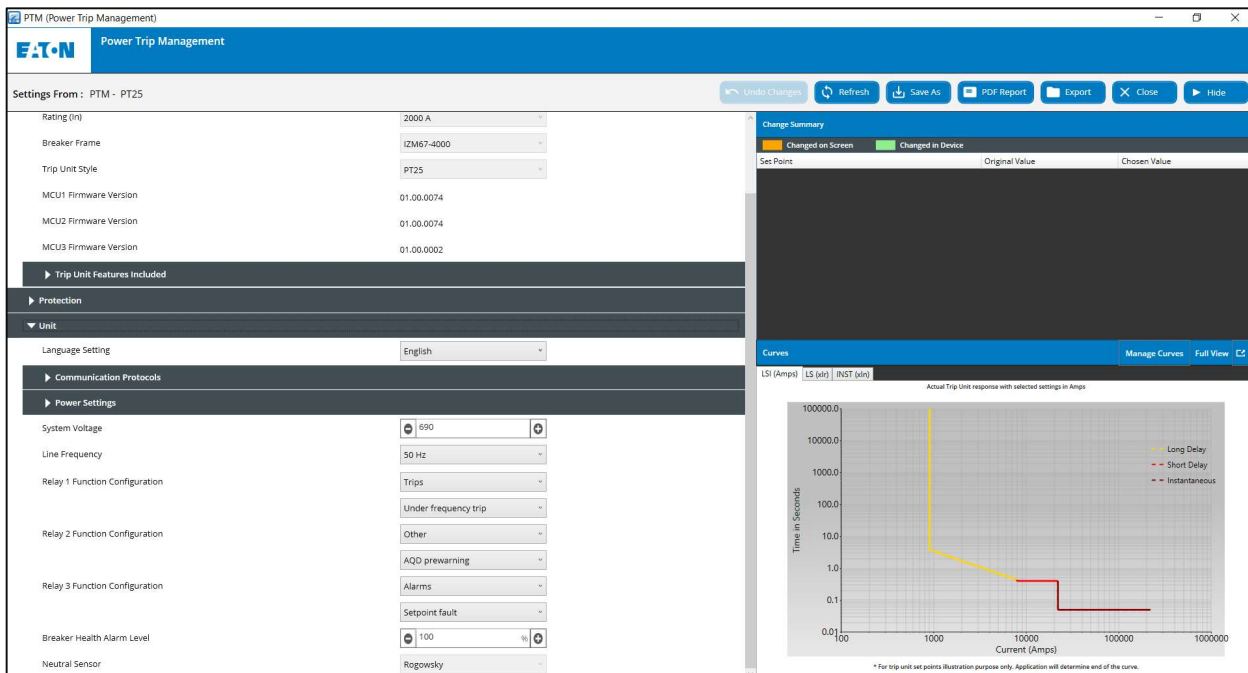


Figure 2.5: Multiple Relay setpoints

For PT25, there is a provision to assign 2 Relay assignments for each Relay settings as shown in Figure 2.5.

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Eaton Power Trip Management Wizard - Change Summary Report	
Created: 7/18/2023 4:43:35 PM	
Customer Information	
Customer Name	-
Plant Location	-
Job#	-
Tested by	-
Device Summary	
Manufacturer	Eaton
Circuit Breaker Type/Model	IZM61-1600
Circuit Breaker Catalog Number	
Circuit Breaker Serial Number	
Circuit Breaker Manufacturing Date	
Circuit Breaker Frame Rating (A)	630
Trip Unit Model	PT25G
Trip Unit Serial Number	12307
Trip Unit Manufacturing Date	
Trip Unit In	200 A
Voltage class	-
Frequency	-
Circuit Breaker Location	
Room/vault/switchgear #	-
Cell #	-
Environment Data	
Temperature	-
Humidity	-
Equipment Condition	
Circuit Breaker	-
ETU	-
Enclosure	-
Memo Details	
Memo	
PTM Software Version	23.07.1
PTM Software Version	23.07.1
Trip Unit Firmware Versions	

1 of 10

Eaton Power Trip Management Wizard - Change Summary Report	
MCU1 Firmware version 1	01.00.0092
MCU2 Firmware version 2	01.00.0092
MCU3 Firmware version 3	00.00.0000
Trip Unit Features Included	
Parameter	As Found
Trip Unit	PT 25
Unit Type	IEC
Trip Unit Style	PT25G
MCU1 Firmware Version	01.00.0092
MCU2 Firmware Version	01.00.0092
MCU3 Firmware Version	00.00.0000
Trip Unit Features Included	
Parameter	As Found
Ground Protection	Yes
Embedded Modbus	Yes

2 of 10

Figure 2.6: Example of a change summary report

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2.3.1 Manage Curves

PTM allows the user to conduct a comparative behavioral study of the coordination of multiple PT 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 2.7):

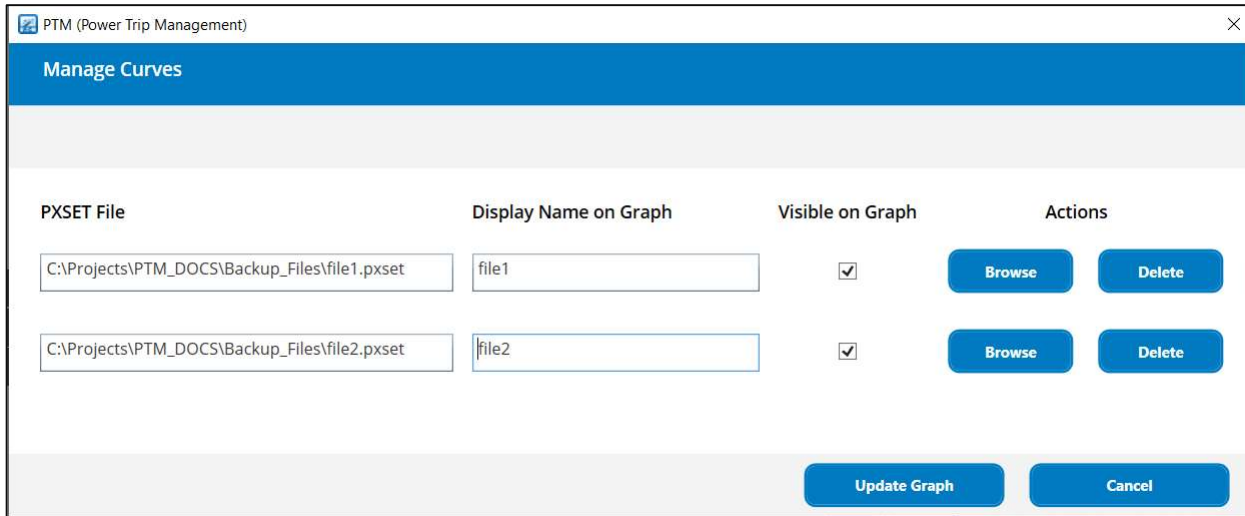


Figure 2.7: Manage Curves

User can select two PXSET files (exported from the device) to compare the respective settings with the current settings. (Figure 2.8). The Curves display on Setpoint Configuration Screen for comparative study looks like the one below (Figure 2.8):

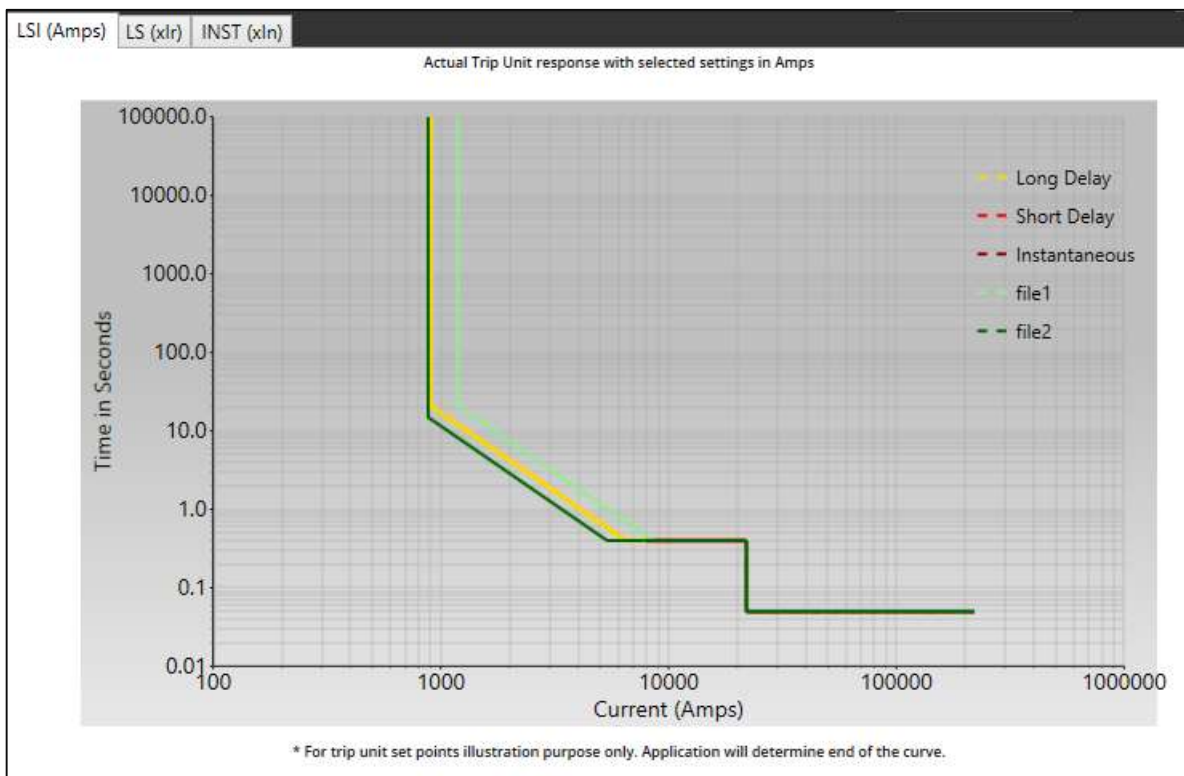


Figure 2.8: Comparative study of trip curves

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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 and set the password.

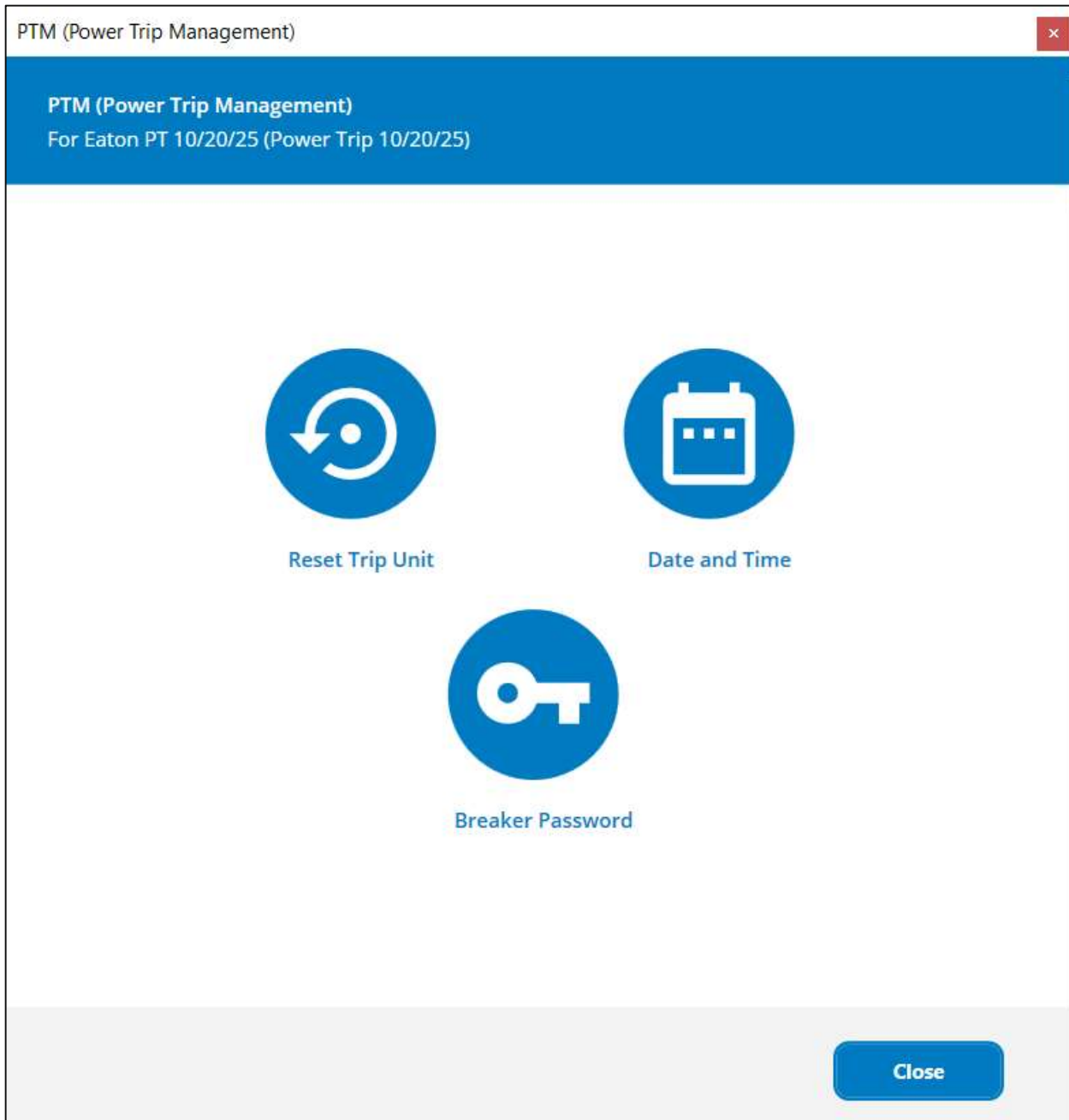


Figure 3.1: Device settings options screen

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3.1 Reset Trip Unit

The PT 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 3.1: Device settings options screen. The user can only reset one parameter at a time in Figure 3.2: Reset trip unit.

PTM (Power Trip Management)

Select a reset option.

Reset Trip Unit

- Trip unit LEDs

Reset Diagnostics Data

- Overload/Fault Trip Counters
- Breaker Operations
- Trip Unit Temperature
- Trip Unit Run Time
- All diagnostics data

Reset Metering Data

- Min/Max Currents
- Min/Max Line-Line Voltages
- Min/Max Line-Neutral Voltages
- Peak Power Demand
- All min/max values
- Accumulated Energy

Reset **Close**

Figure 3.2: Reset trip unit

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3.2 Change Trip Unit Date and Time

Some PT 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 3.3: Change PT 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.

The screenshot shows a window titled "PTM (Power Trip Management)" with a sub-header "Trip Unit Date and Time". The window is divided into two main sections: "Trip Unit Date" and "Trip Unit Time".

Trip Unit Date: A calendar for April 2021 is displayed. The days of the week are labeled as Su, Mo, Tu, We, Th, Fr, Sa. The date 27 is highlighted in blue. Below the calendar is a text box containing "2021-04-27".

Trip Unit Time: A digital clock icon is followed by a text box containing "00:52:02". Below this is a checkbox labeled "Select System Date Time", which is currently unchecked.

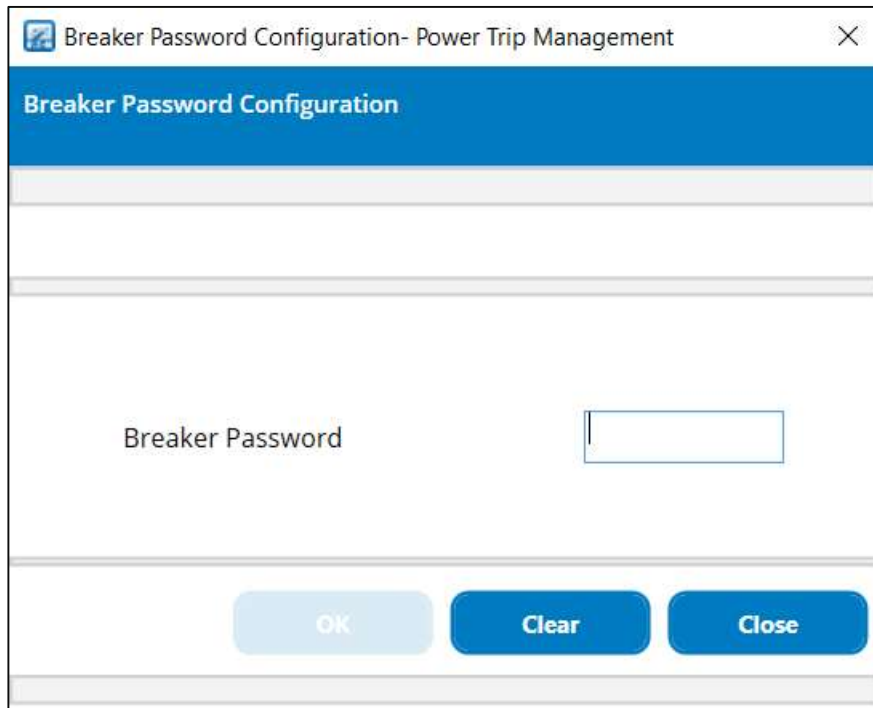
At the bottom of the dialog, there are two blue buttons: "Update" and "Close".

Figure 3.3: Change PT trip unit's date and time

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3.3 Breaker Password

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



The screenshot shows a dialog box titled "Breaker Password Configuration- Power Trip Management". The dialog has a blue header bar with the text "Breaker Password Configuration". Below the header, there is a large empty rectangular area. In the center of this area, the text "Breaker Password" is displayed to the left of a small, empty rectangular input field. At the bottom of the dialog, there are three buttons: "OK" (light blue), "Clear" (dark blue), and "Close" (dark blue).

Figure 3.4: Verify Breaker password screen

3.3.1 Password User Management:

Password User Management functionality allows user to write setpoint configuration to Trip Unit based on privileges. Feature homepage is shown in Figure 3.5.

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 3.6, 3.7 and 3.8.

Breaker Password Configuration

Breaker Password Configuration

Verify Breaker Password

Delete User Extend User Permissions Restrict User Permissions

Reset Admin Breaker Password Reset User Breaker Password Create User

Old Admin Breaker Password

New Admin Breaker Password

Confirm Admin Breaker Password

OK Clear

Figure 3.5: Password User Management homepage

Breaker Password Configuration

Breaker Password Configuration

Verify Breaker Password

✓ Admin Password Verified!

Delete User Extend User Permissions Restrict User Permissions

Reset Admin Breaker Password Reset User Breaker Password Create User

Old Admin Breaker Password

New Admin Breaker Password

Confirm Admin Breaker Password

OK Clear

Figure 3.6: Reset Admin Breaker password

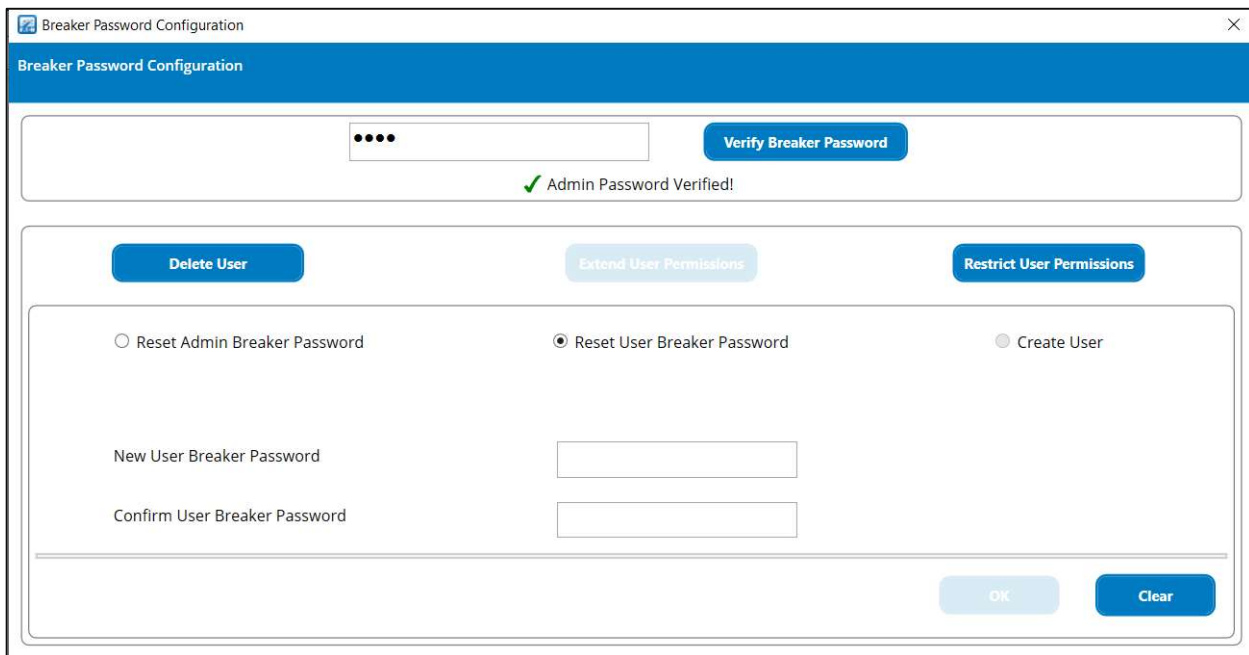


Figure 3.7: Reset User Breaker password

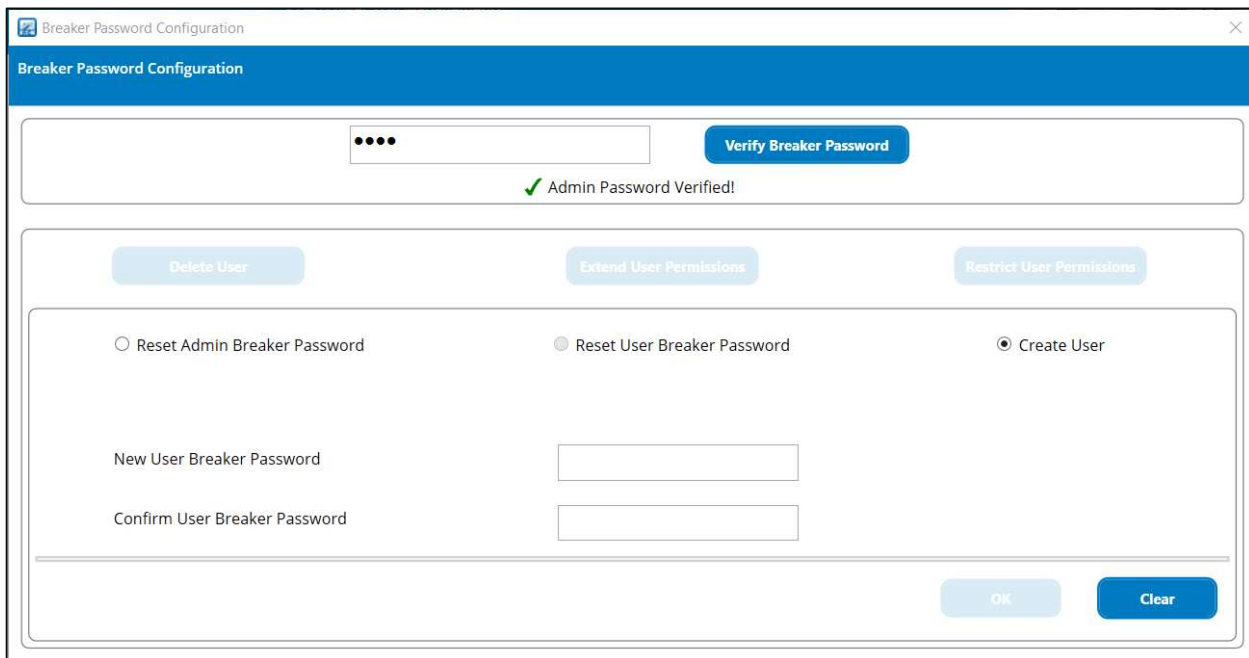


Figure 3.8: Create User

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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.

Test Parameters

- Simulated Open Breaker
- Long Delay Pickup (Ir) Long, Short, Instantaneous
- Ground
- Current Unbalance, Phase Loss
- L1 Phase A L2 Phase B L3 Phase C Neutral
- 820 Amps xIr xIn
- Trip No Trip

Parameter Settings

Parameter	Setting
Rating (In)	2000 A
Breaker Frame	I2M67-4000
Long Delay Thermal Memory	Disabled
Zone Selective Interlocking	Enabled
Long Delay Slope	I ² t
Long Delay Pickup (Ir)(xIn)	0.41 (820 A)
Long Delay Time (tr)	0.7
Short Delay Slope	Flat
Short Delay Pickup (Isd) (xIr)	9.7 (7954 A)
Short Delay Time (tsd)	0.4
Instantaneous Pickup (Ii) (xIn)	11 (22000 A)
Neutral Protection Ratio	60%
Over Voltage Feature	Alarm
Over Voltage Pickup	654 V
Over Voltage Time	5 S
Under Voltage Feature	Trip

Test Notifications

CAUTION!

Please verify below impacts based on Test selections.

Zone selective interlocking is enabled. This may cause actual trip time to be less than published trip time.

Time Current Curve

LSI (Amps) Neutral LSI (Amps)

Actual Trip Unit response with selected settings in Amps

Time in Seconds

Current (Amps)

Legend: Long Delay (yellow), Short Delay (red), Instantaneous (dark red), Actual Current (green)

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

Figure 4.1: Test parameters selection on test screen

PIM (Power Trip Management)

Select Test Features

Trip Unit Style: PT25, Rating (In): 2000 A

Test Parameters

Simulated Open Breaker

Long Delay Pickup (Ir) Long, Short, Instantaneous

Ground

Current Unbalance, Phase Loss

L1 Phase A L2 Phase B L3 Phase C Neutral

Parameter Settings

Parameter	Setting
Rating (In)	2000 A
Breaker Frame	IZM67-4000
Long Delay Thermal Memory	Disabled
Zone Selective Interlocking	Enabled
Long Delay Slope	I ² t
Long Delay Pickup (Ir)(xIn)	0.41 (820 A)
Long Delay Time (tr)	0.7
Short Delay Slope	Flat
Short Delay Pickup (I _{sd})(xIr)	9.7 (7954 A)
Short Delay Time (tsd)	0.4
Instantaneous Pickup (Ii)(xIn)	11 (22000 A)
Neutral Protection Ratio	60%

Test Notifications

Time Current Curve

Actual Trip Unit response with selected settings in Amps

Time in Seconds: 0.01, 1.0, 100.0, 10000.0

Current (Amps): 100, 1000, 10000, 100000, 1000000

Legend: Long Delay (yellow), Short Delay (red), Instantaneous (dark red)

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

Figure 4.2: Test parameters selection on test screen for Long Delay Pickup Test

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The screenshot displays the PTM (Power Trip Management) software interface. At the top, it says "PTM (Power Trip Management)" and "Select Test Features". Below this, it indicates "Trip Unit Style: PT25, Rating (In): 2000 A". There are four main tabs: "Test", "Stop Testing", "Test Results", and "Thermal Memory Reset". The "Thermal Memory Reset" tab is currently selected. To the right of the tabs are two buttons: "Change Device Settings" and "Reload Settings".

The interface is divided into several sections:

- Test Parameters:** This section contains several radio button options: "Simulated" (selected), "Open Breaker", "Long Delay Pickup (Ir)", "Long, Short, Instantaneous", "Ground", "Current Unbalance, Phase Loss", "L1 Phase A" (selected), "L2 Phase B", "L3 Phase C", and "Neutral". Below these are input fields for "Amps" (820), "xlr" (1.00), and "xln" (0.41). There are also radio buttons for "Trip" and "No Trip" (selected).
- Parameter Settings:** A table listing various parameters and their settings:

Parameter	Setting
Rating (In)	2000 A
Breaker Frame	IZM67-4000
Long Delay Thermal Memory	Disabled
Zone Selective Interlocking	Enabled
Long Delay Slope	It
Long Delay Pickup (Ir)(xln)	0.41 (820 A)
Long Delay Time (tr)	0.7
Short Delay Slope	Flat
Short Delay Pickup (Isd) (xlr)	9.7 (7954 A)
Short Delay Time (tsd)	0.4
Instantaneous Pickup (Ii) (xln)	11 (22000 A)
Neutral Protection Ratio	60%
Over Voltage Feature	Alarm
Over Voltage Pickup	654 V
Over Voltage Time	5 S
Under Voltage Feature	Trip
- Test Notifications:** A yellow banner with a warning icon and the text "CAUTION! Please verify below impacts based on Test selections. Zone selective interlocking is enabled. This may cause actual trip time to be less than published trip time."
- Time Current Curve:** A graph showing "Time in seconds" on the y-axis (log scale from 0.01 to 10000.0) and "Current (Amps)" on the x-axis (log scale from 100 to 1000000). The graph includes a vertical green line for "Actual Current" at 820 A, and curves for "Long Delay" (yellow), "Short Delay" (red), and "Instantaneous" (dark red). A legend at the bottom identifies these lines. A "Full View" button is located to the right of the graph.

Figure 4.3: Test parameters selection on test screen for Motor Protection enabled device

The PTM 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 PT trip unit has a built-in functional test mode available for use which is an internal **simulated** current test.

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.

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 the devices.

Thermal Memory Reset: 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 4.4 is displayed.

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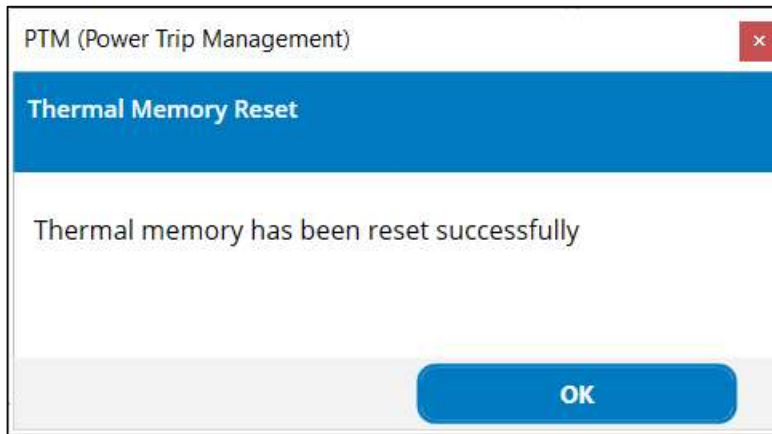


Figure 4.4: Pop-up for 'Thermal memory reset' success

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 PTM is running and connected to the same trip unit. It also displays the remaining number of test feature-licenses left with the user (Figure 4.5: Prompt to confirm the utilization of the License).

Power Trip Management then prompts the user to enter the breaker password (Figure 4.6: 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.

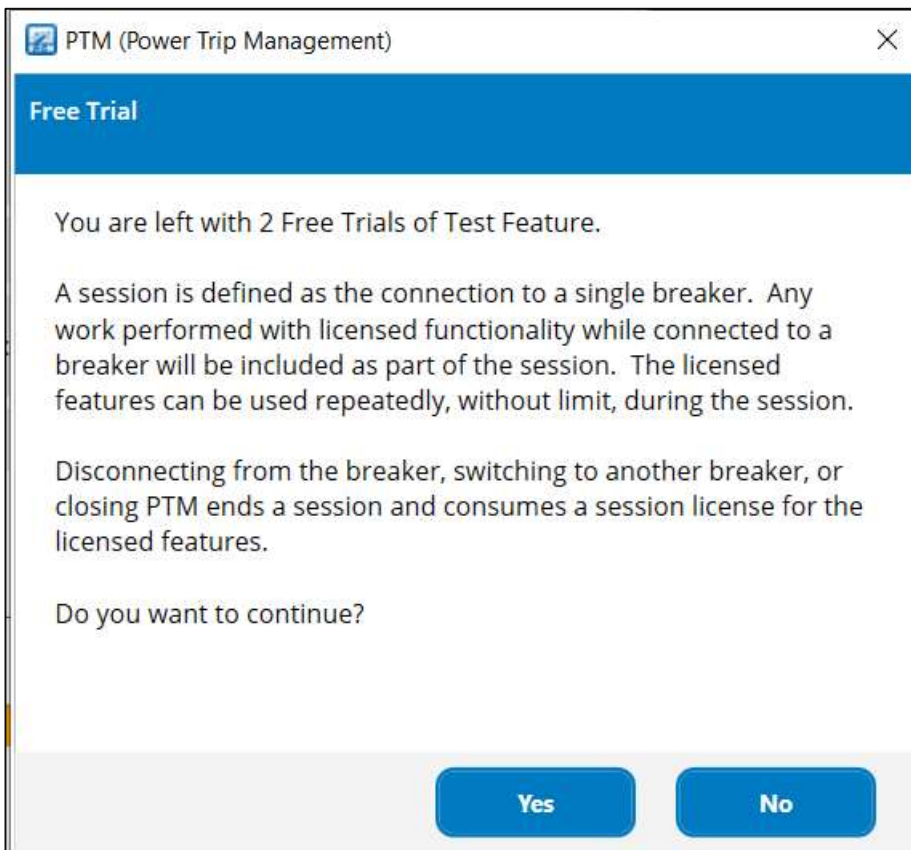


Figure 4.5: Prompt to confirm the utilization of the License

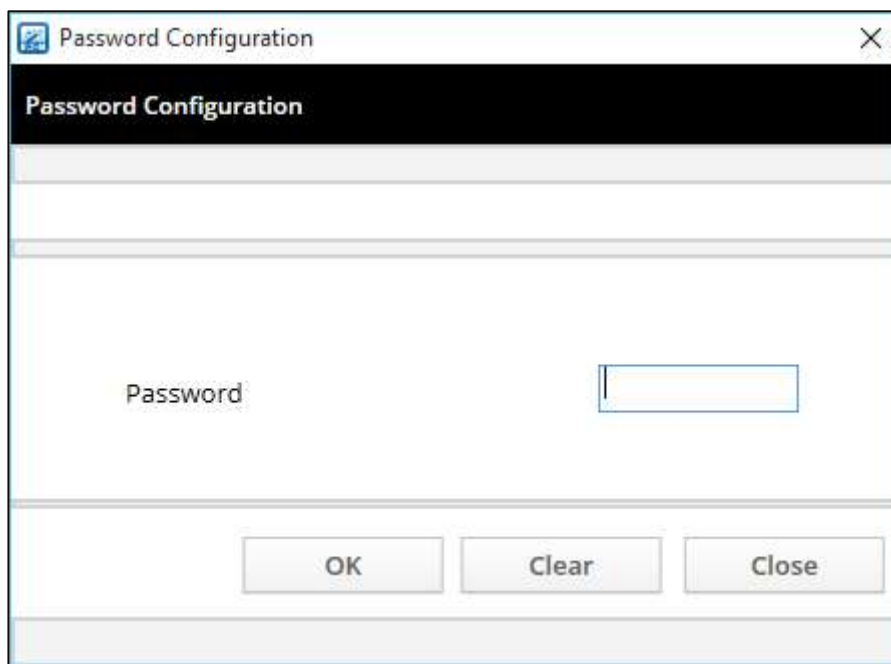


Figure 4.6: Prompt to enter breaker password

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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 Trip Management application closes after 4 failed attempts. In this case, user needs to restart the application.

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 4.8: Functional test results screen will be displayed. Information on the test result screen will vary based on type of test.

For the Open Breaker Test, the test result screen will display whether the breaker has been tripped or not. (Figure 4.7: Open Breaker test result screen)

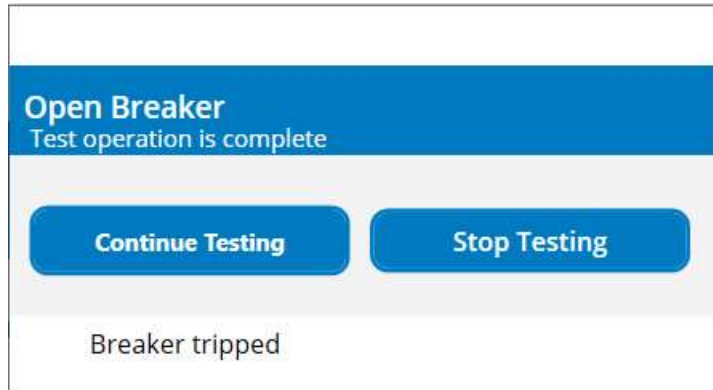


Figure 4.7: Open Breaker test result screen

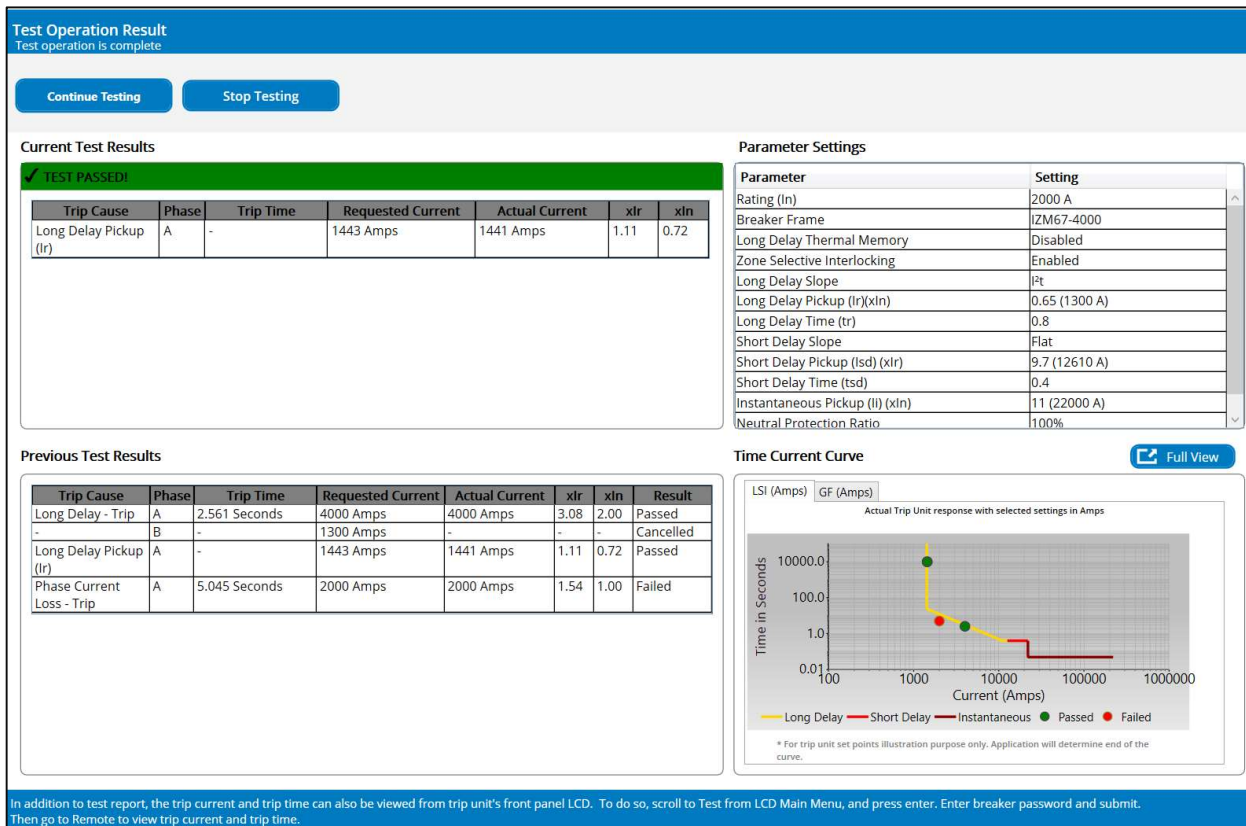


Figure 4.8: Functional test results screen

On the functional Test Result Screen (Figure 4.8: 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.

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Clicking on the **Continue Testing** button returns the user to the **Test Parameter Selection** screen (Figure 4.1: 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 4.9: 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.

PTM (Power Trip Management)

Final Setting Adjustments

Exit Testing
Generate Report
Change Device Settings
Reload Settings
Continue Testing

Below is a chart of the Parameters and Settings. The “As Found” Settings that were captured before testing began are listed for your convenience. Please make any necessary changes to the settings. Choosing Exit Testing will capture these settings. These settings will be located in the test report as the as the “As Left” settings.

Choose Generate Report in order to save the test data.If you choose Exit Testing you can generate a test report for tests performed in current test cycle from the main screen using the Report button.

Highlighted values indicate a difference between the “As Found” setting and the existing “As Left” setting.

Parameter	As Found	As Left
Rating (In)	2000 A	2000 A
Line Frequency	50 Hz	50 Hz
Reverse Feed Breaker	Reverse	Reverse
Language Setting	English	English
Long Delay Thermal Memory	Disabled	Disabled
Zone Selective Interlocking	Enabled	Enabled
Long Delay Slope	I ² t	I ² t
Long Delay Pickup (I _r)(xI _n)	0.41	0.65
Long Delay Time (tr)	0.7	0.8
Highload 1 (xI _r) (LED Blinking)	51 %	51 %
Highload 2 (xI _r) (LED Solid)	NA	NA
Short Delay Slope	Flat	Flat
Short Delay Pickup (I _{sd}) (xI _r)	9.7	9.7
Short Delay Time (tsd)	0.4	0.4
Instantaneous Pickup (I _i) (xI _n)	11	11
Ground Sensing Type	Residual	Residual
Ground Fault Protection Setting	Trip	Trip
Ground Fault Slope	Flat	Flat
Ground Fault Pickup (I _g) (xI _n)	0.27	0.27
Ground Fault Trip Time	0.1	0.1
Neutral Protection Ratio	60%	100%
Ground Fault Thermal Memory	Disabled	Disabled
Over Voltage Feature	Alarm	Alarm

Figure 4.9: Final settings adjustments

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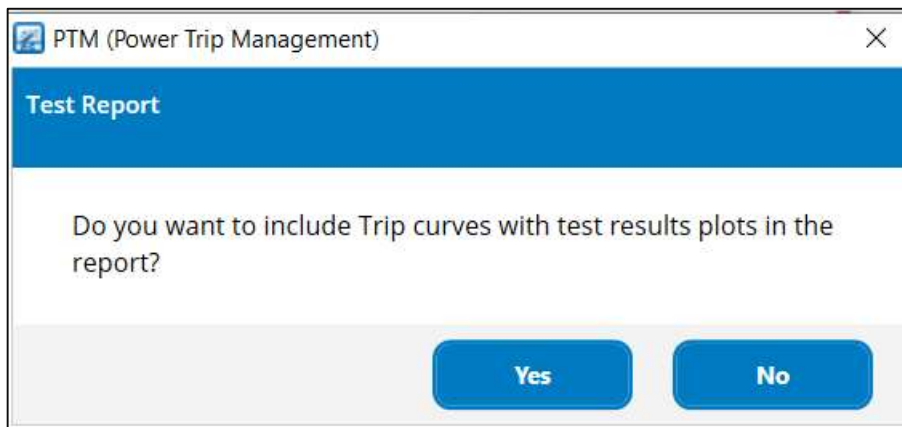


Figure 4.10 Trip curves popup

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. If user selects yes then it will get included in test pdf report (Figure 4.10: Trip curves popup).

After Trip curves popup screen, user input screen will prompt the user for optional report customizations (Figure 4.11: 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.

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User Input - Power Trip Management

Please enter the following information.

Customer Information

Customer Name

Plant Location

Job#

Tested by

Environment

Temperature

Humidity

Equipment Condition

Circuit Breaker

ETU

Enclosure

Nameplate

Voltage class

Frequency

Location

Room/vault/switchgear #

Cell #

Memo Details

Memo

*All fields are optional

Figure 4.11: 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 4.12, Figure 4.13).

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.

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EATON Power Trip Management for PT 10/20/25 Trip Units - Test Report
Powering Business Worldwide

Created: 11/23/2022 9:55:34 AM

Customer Information					
Customer Name	-				
Plant Location	-				
Job#	-				
Tested by	-				
Device Summary					
Manufacturer	Eaton				
Circuit Breaker Type/Model	I2M67-4000				
Circuit Breaker Catalog Number					
Circuit Breaker Serial Number					
Circuit Breaker Manufacturing Date					
Circuit Breaker Frame Rating (A)	630				
Trip Unit Model	PT25G				
Trip Unit Serial Number	123				
Trip Unit Manufacturing Date					
Trip Unit In	2000 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	NA	HL1	51 %	GST	Residual
MM Trip Level	NA	HL2	0 %	GF Setting	Trip
LDTM	Disabled	SDS	Flat	GFS	Flat
LDS	I't	SDPU	9.7	GFPU	0.27
LDPU	0.65	SDT	0.4	GFT	0.1
LDT	0.8	INST	11	GFTM	Disabled
NPR	100%	ZSI	Enabled		

EATON Power Trip Management for PT 10/20/25 Trip Units - Test Report
Powering Business Worldwide

Created: 11/23/2022 9:55:34 AM

Motor Settings #1			
Parameter	Setting	Parameter	Setting
Over Voltage	Alarm / 654 V / 5 S	Under Voltage	Trip / 65 V / 6 S
Voltage Unbalance	Trip / 11 % / 7 S	Current Unbalance	Trip / 16 % / 240 S
Reverse Power	Trip / 5 KW / 5 S	Phase Loss	Trip / 5 S

LSIG Test Results #1								
Test Settings					Test Results			
Phase	Current (Amps)	Multiple (xIr/xIn)	Current Type	Test Type	Open Bkr	Cause	Time	Result
A	2000	1.54xIr / 1.00xIn	Simulated	LSI	No	Phase Current Loss	5.045s	Failed
A	1441	1.11xIr / 0.72xIn	Simulated	LDPU	No	Long Delay Pickup (Ir)	-	Passed
B	1300	0.65xIn	Simulated	Motor	Yes			Cancelled
A	4000	3.08xIr / 2.00xIn	Simulated	LSI	No	Long Delay	2.561s	Passed
A	1441	1.11xIr / 0.72xIn	Simulated	LDPU	No	Long Delay Pickup (Ir)	-	Passed

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.*

Figure 4.12: PDF test report-1

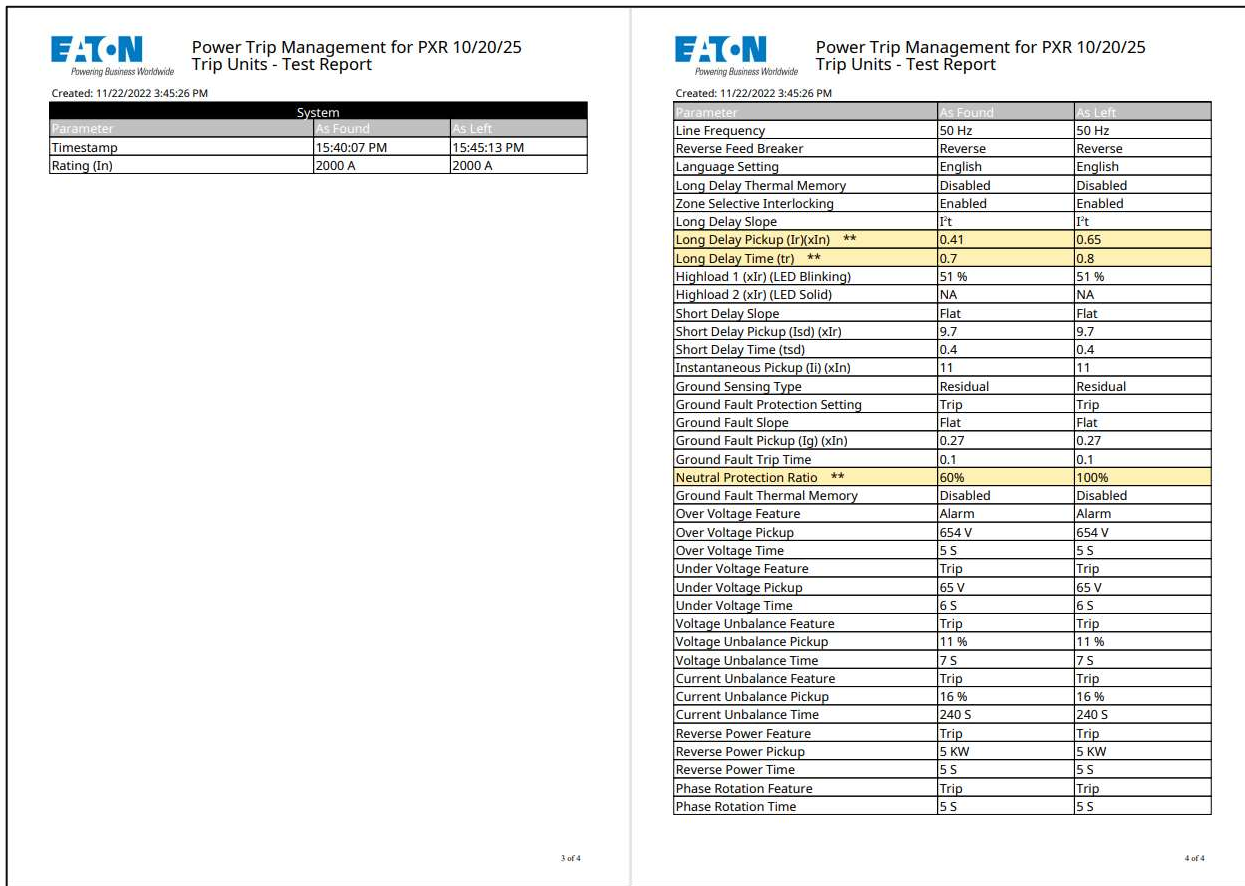
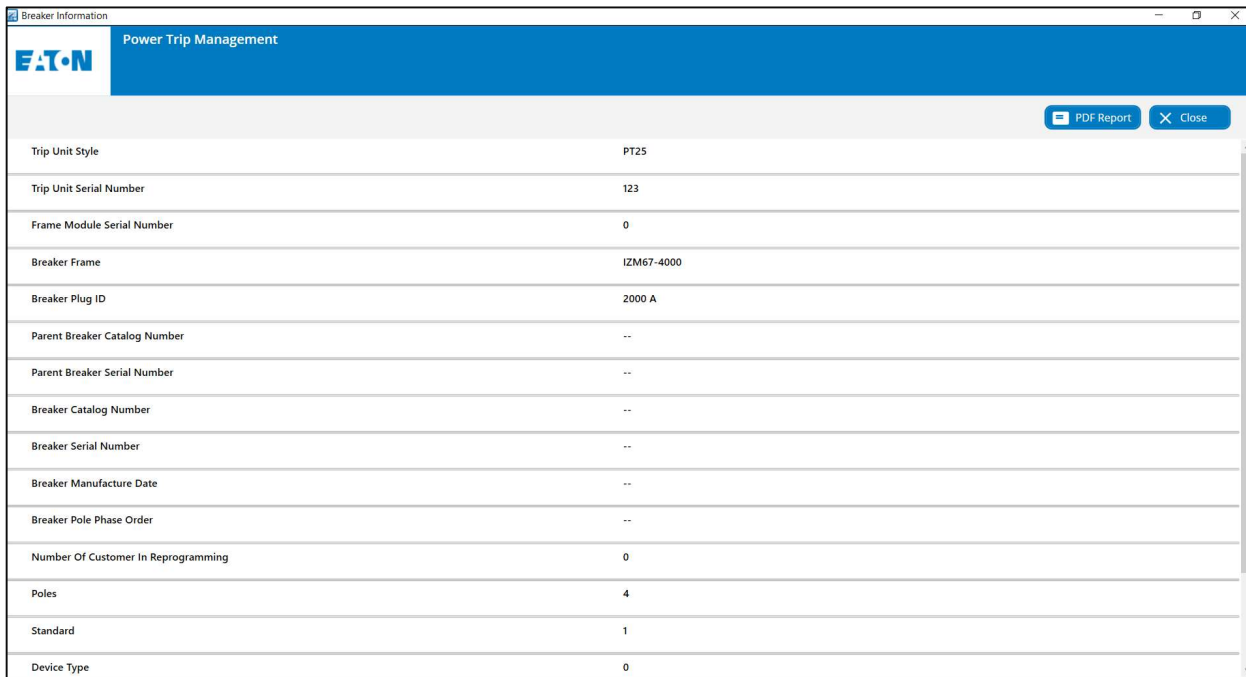


Figure 4.13: PDF test report-2

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5 Breaker Information



Power Trip Management	
Trip Unit Style	PT25
Trip Unit Serial Number	123
Frame Module Serial Number	0
Breaker Frame	IZM67-4000
Breaker Plug ID	2000 A
Parent Breaker Catalog Number	--
Parent Breaker Serial Number	--
Breaker Catalog Number	--
Breaker Serial Number	--
Breaker Manufacture Date	--
Breaker Pole Phase Order	--
Number Of Customer In Reprogramming	0
Poles	4
Standard	1
Device Type	0

Figure 5.1: Breaker information screen

The **Breaker Information** screen (Figure 5.1: Breaker information screen) displays information pertaining to the PT Trip unit such as Serial Number and Manufacturing Dates.

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6 Real Time Data

System Primary, Secondary and Cause of Status	
Current, Voltage, Power, Temperature and Battery	
Energy	
Forward Energy	0 kWh
Reverse Energy	0 kWh
Total Energy	0 kWh
Net Energy	0 kWh
Leading Reactive Energy	0 kVarh
Lagging Reactive Energy	1 kVarh
Total Reactive Energy	1 kVarh
Net Reactive Energy	1 kVarh
Apparent Energy	0 kVAh
Last Energy Reset Time	2021/05/10 05:33:02
Power Demand	
Peak Power Demand	
Current Min/Max	
Voltage Min/Max Line to Line	
Voltage Min/Max Line to Neutral	
One Cycle Current	

Figure 6.1: Real time data screen

The **Real Time Data** Screens (Figure 6.1: Real time data screen) provides information pertaining to all status and metered data from the PT 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 PT Trip Unit styles.

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. Unbalance, Current Demand and Current Demand Max/Min
13. Crest Factor
14. Power Factor and Frequency Max/Min
15. Real Time Relay and Digital Inputs

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

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6.1 Capture Waveform

PT trip units allow user to manually capture current and/or voltage waveforms. To do so, click **Capture Waveform** button shown in Figure 6.1: Real time data screen. PT trip unit then captures a full cycle of waveforms and transfers them for display on the Power Trip Management software.

In Figure 6.2: 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 6.2.

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.

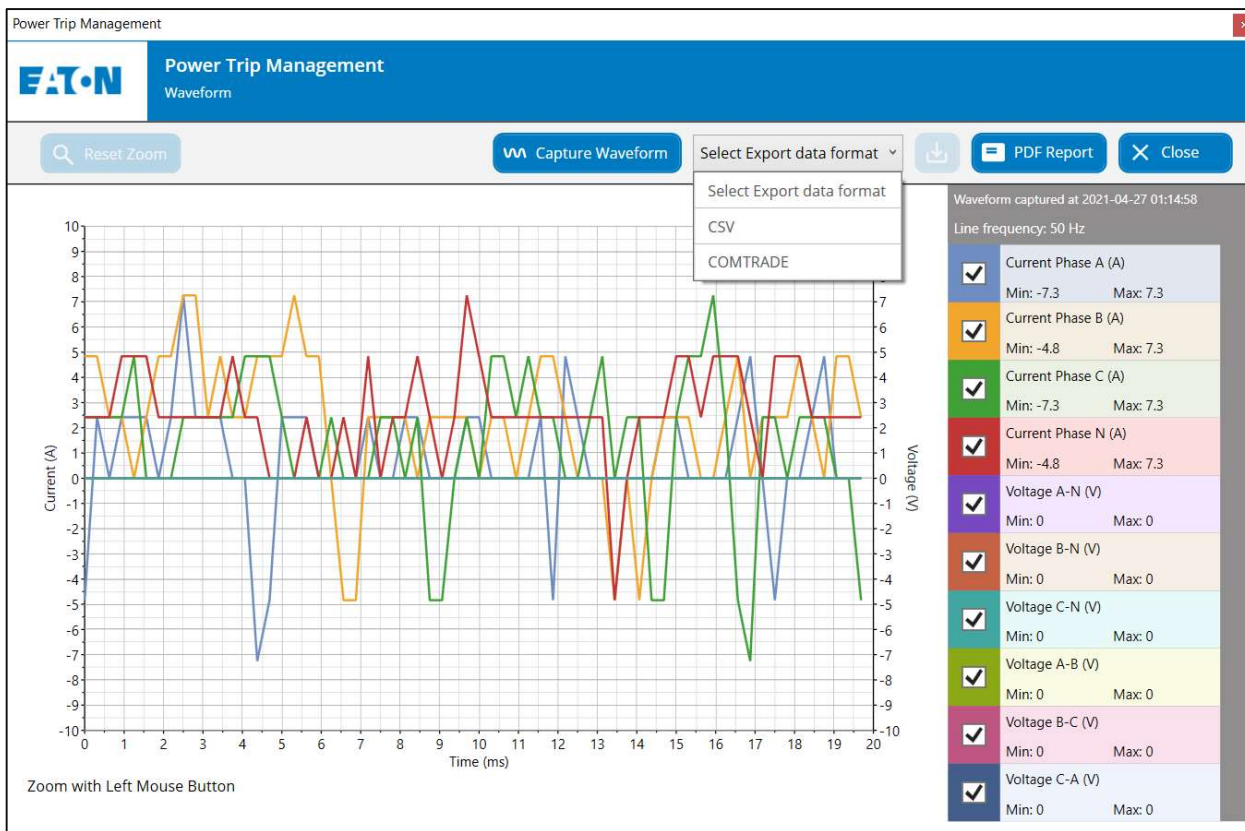


Figure 6.2: Capture waveform screen

7 Event Summaries

The PT Trip Units record several different events. The Event Summary (Figure 7.1: Event Summary screen) lists up to 200 events that have occurred in the PT Trip Unit.

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Alarm Events			
	Phase currents near Pickup, High Load Alarm	4109 ID	2021-04-27 00:40:59 Time
	Aux-power under power	4105 ID	2021-04-27 00:00:04 Time
	Aux-power under power	4103 ID	2021-04-27 00:00:04 Time
	Aux-power under power	4094 ID	2021-04-27 20:25:15 Time
	Aux-power under power	4092 ID	2021-04-27 02:30:22 Time
	Phase currents near Pickup, High Load Alarm	4086 ID	2021-04-27 01:09:33 Time
	Aux-power under power	4074 ID	2021-04-27 00:00:04 Time
	Aux-power under power	4072 ID	2022-11-21 01:51:52 Time
	Aux-power under power	4070 ID	2022-11-18 05:42:59 Time
	Aux-power under power	4068 ID	2022-11-18 05:41:36 Time

Figure 7.1: 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. This License is valid for a particular **session**. After providing the confirmation, the waveform screen is displayed (Figure 7.2: 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 7.2 and Figure 7.3.

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.

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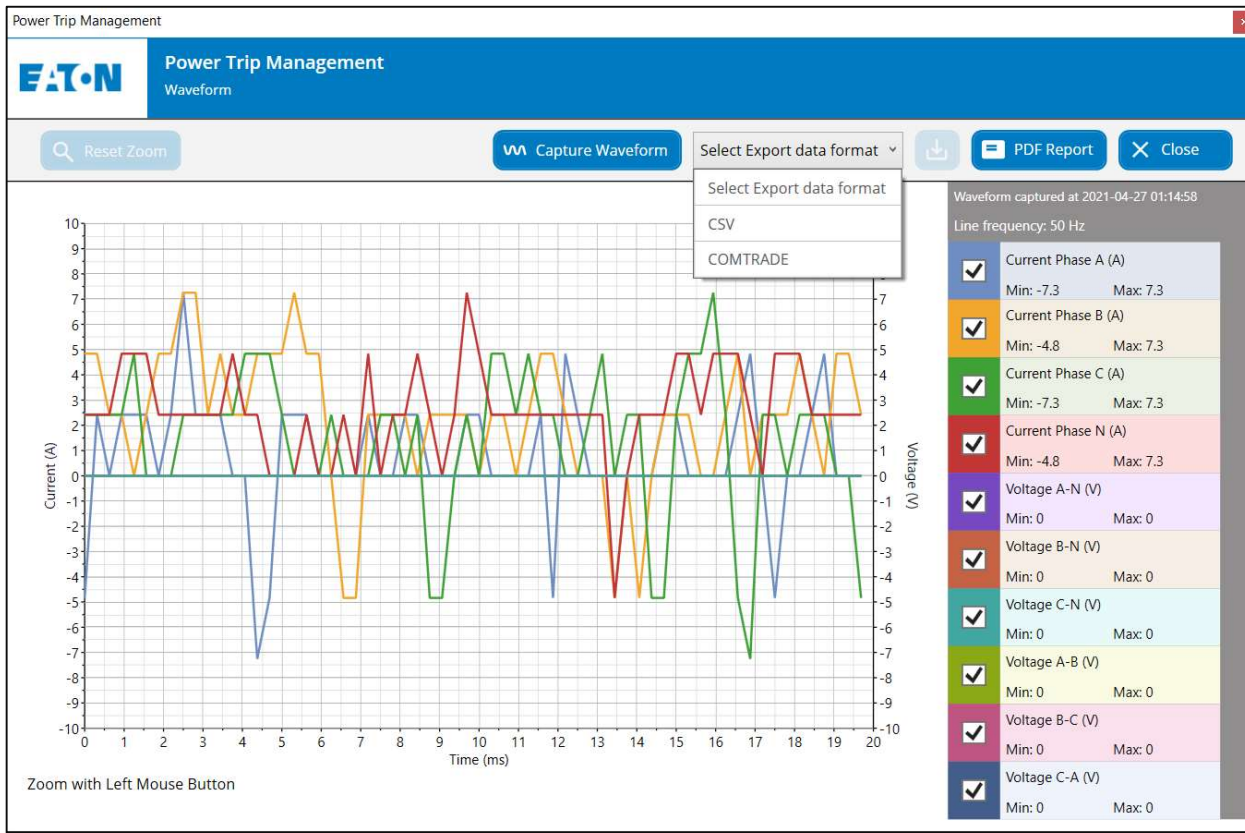


Figure 7.2: Last waveform recorded

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Figure 7.3: Last waveform recorded with COMTRADE format selected

7.2 Trip Events and Alarm Events

The PT 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 7.4)

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Alarm Icon	Event Description	ID	Time
🔔	Phase currents near Pickup, High Load Alarm	4109	2021-04-27 00:40:59
🔔	Aux-power under power	4105	2021-04-27 00:00:04
🔔	Aux-power under power	4103	2021-04-27 00:00:04
🔔	Aux-power under power	4094	2021-04-27 20:25:15
🔔	Aux-power under power	4092	2021-04-27 02:30:22
🔔	Phase currents near Pickup, High Load Alarm	4086	2021-04-27 01:09:33
🔔	Aux-power under power	4074	2021-04-27 00:00:04
🔔	Aux-power under power	4072	2022-11-21 01:51:52
🔔	Aux-power under power	4070	2022-11-18 05:42:59
🔔	Aux-power under power	4068	2022-11-18 05:41:36

Figure 7.4: Trip or alarm event on the event summary screen

7.3 Time Adjustments

Some PT Trip Units have a real time clock that is used to timestamp events. The PTM software provides the ability to adjust the time on the real time clock. Any time the real time clock is set, the PT trip unit records this as an event. The Time Adjustments Screen (Figure 7.5) will display any events where the real time clock has been changed.

Clock Icon	ID	New Time	Time
🕒	3989	2022-11-04 03:12:26	2022-11-04 03:12:28
🕒	3982	2022-11-04 02:40:05	2022-11-05 02:40:08
🕒	3687	2022-11-04 22:41:35	2021-04-27 22:41:38
🕒	3686	2021-04-27 22:41:18	2021-04-27 22:41:21
🕒	3682	2021-04-27 22:34:32	2021-04-27 22:34:35
🕒	2919	2022-10-27 17:14:20	2021-11-03 05:35:31
🕒	2918	2021-11-03 05:35:16	2021-05-10 05:35:20
🕒	335	2021-04-27 00:52:42	2021-04-27 00:52:45

Figure 7.5: Time adjustments on the event summary screen

7.4 Event Summary

This section displays the record of several different Event Summary events (Figure 7.6).

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Event Summary	ID	Time
Finish Test Test has been canceled	4090	2021-04-27 01:10:19
Enter Test	4089	2021-04-27 01:10:18
Password Entered	4088	2021-04-27 01:10:17
Finish Test Test has been canceled	4087	2021-04-27 01:09:41
Minor Alarm	4086	2021-04-27 01:09:33
Enter Test	4085	2021-04-27 01:09:31
Password Entered	4084	2021-04-27 01:09:29
Password Entered	4083	2021-04-27 00:57:58
Password Entered Password Entered - Wrong	4082	2021-04-27 00:57:46
Password Entered	4081	2021-04-27 00:56:16
Password Entered	4080	2021-04-27 00:55:19
Set Points Download	4079	2021-04-27 00:34:45

Figure 7.6: Event Summary screen

8 Application Settings

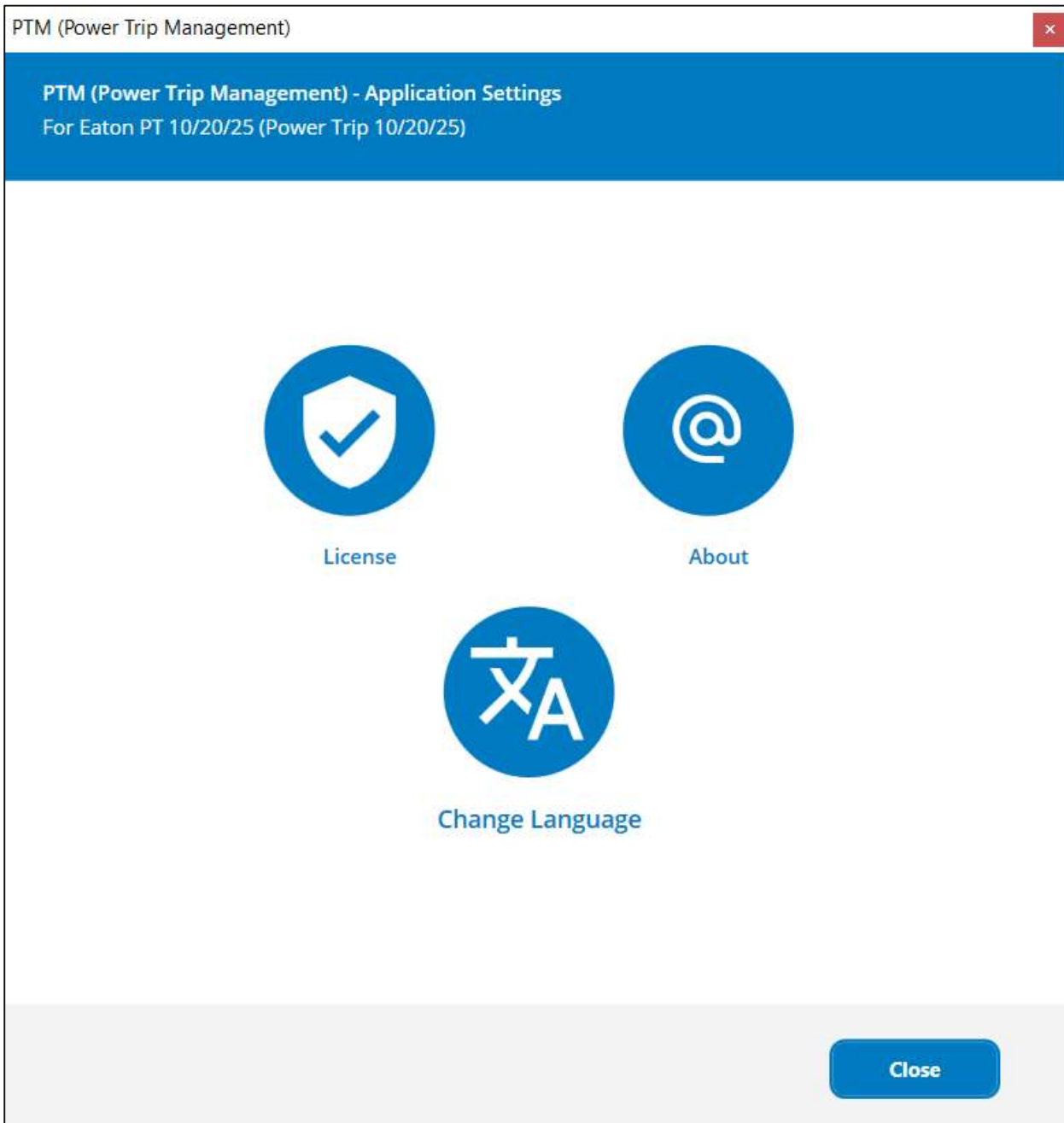


Figure 8.1: Power Trip Management application settings

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8.1 License

In order to enable the advanced Testing features, Trip/Alarm Waveform (Last Waveform Recorded in Event Summaries) the user needs to purchase a License.

The window in Figure 8.2 displays the procedure that needs to be followed in order to purchase a license.

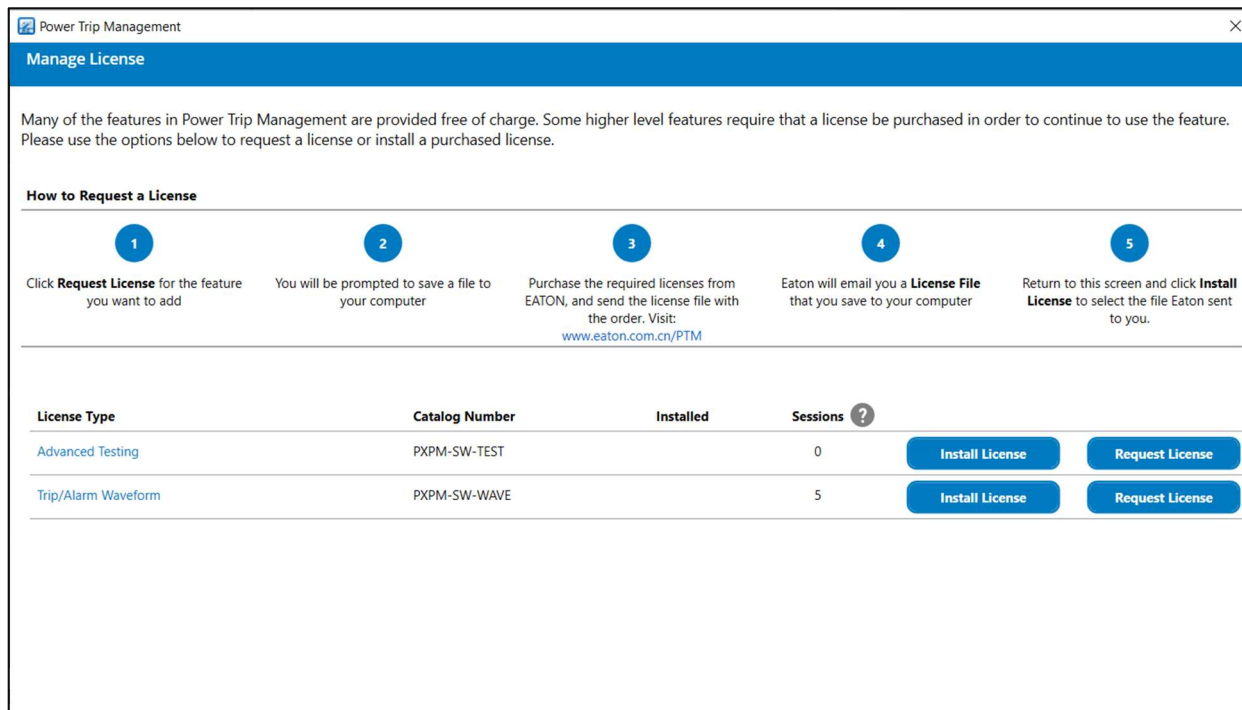


Figure 8.2: Power Trip Management license management screen

When the License is purchased, it is valid only on the Machine/ System 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 system.

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

If the user clicks on '?' button next to 'Sessions' column, Pop-up in Figure 8.3 is displayed showing the session description.

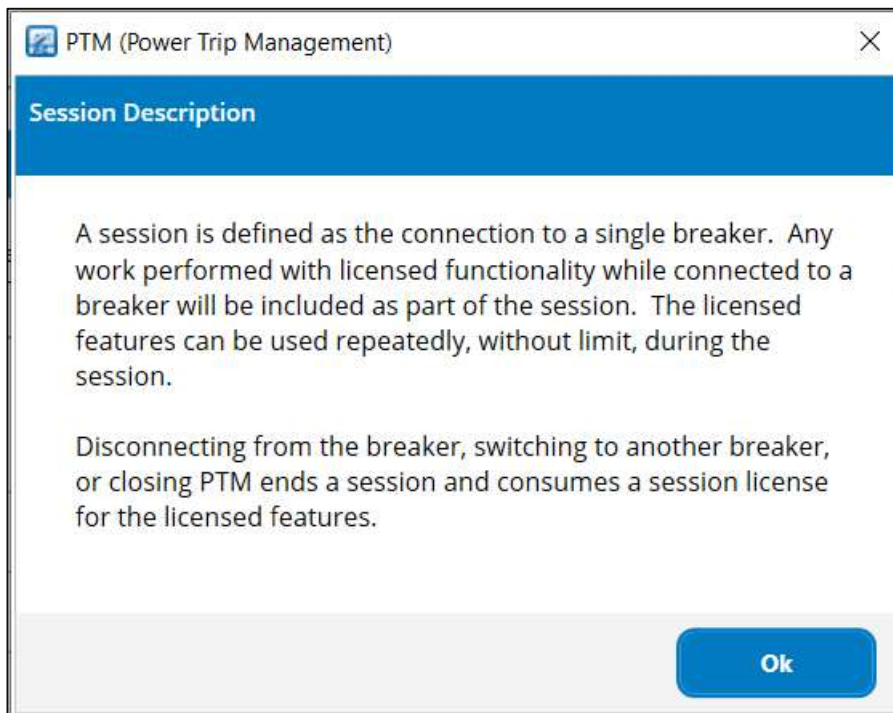


Figure 8.3: Pop-up for Session Description

When PTM is installed for the first time on user's machine, free trials are added to this 'Session' column by default (5 free trials for each Test mode and Trip/Alarm Waveform). Although Free trials are valid until user installs perpetual license, it is still valid even if the user installs session-based license.

8.1.1 Session

PTM apps are licensed by session.

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 Trip Management application is closed.
2. If a device is de-selected and another device is selected with in the PTM software.
3. If a device is physically disconnected from the PC (unplugging the USB Micro connector from the breaker or unplugging the USB cable from the PC)

When a user accesses the functions- Test Mode, Trip/ Alarm Waveform they will be prompted to confirm utilization of a session. When given the confirmation, one license is utilized and is valid for the **session**. The user needs to purchase the separate licenses for these two features.

8.1.2 Types of Licenses

User can purchase two types of licenses:

- Session-based: The user purchases a set number of sessions to use on their PC. They have access to use an advanced feature during that specific session.
- Perpetual: This type of license enables the feature on the PC. The user may access an unlimited number of sessions on the licensed machine. The user is no longer prompted before using a session.

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8.2 About

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

The user will also find the Power Trip Management **Version** in this location (Figure 8.4). It is recommended that the user keep up to date with the latest version of PTM.

PTM (Power Trip Management)

About

Power Trip Management
For Eaton PT 10/20/25 Trip Units
Version: 23.07.1
Copyright (c) 2023 Eaton Corporation

All title and copyrights in and to the Software Products (including but not limited to images, renderings, icons, animations, one lines, database structure, device drivers, audio and "applets" incorporated into the software Products) are owned by Eaton Corporation. The Software Products are protected by copyright laws and international treaty provisions. Therefore, you must treat the Software Products like any other copyrighted material except that you may either (a) make one copy of the Software Product solely for backup or archival purposes, or (b) transfer the Software Products to a single hard disk provided that you keep the original solely for backup or archival purposes. You may not copy the printed materials accompanying the Software Products.

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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.

For Power Defense or Power Trip Management support please use the contact information below:

Region	Telephone	Email
Americas	877-ETN-CARE (877-386-2273)	trc@eaton.com
Europe, Middle East, Africa	Please reference Country-specific support	NA
China	8009881203	TechCareCPCD@eaton.com
Other	877-ETN-CARE (877-386-2273)	trc@eaton.com

Country specific support contacts: [International Support Contacts \(eaton.com\)](https://www.eaton.com/International-Support-Contacts)

Third Party Components **Close**

Figure 8.4: 'About' screen

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8.2.1 Third Party Components

When the Third-Party Components button is clicked, then a new screen is opened (Figure 8.5) which displays the list of third party components and open source libraries used in the PTM application.

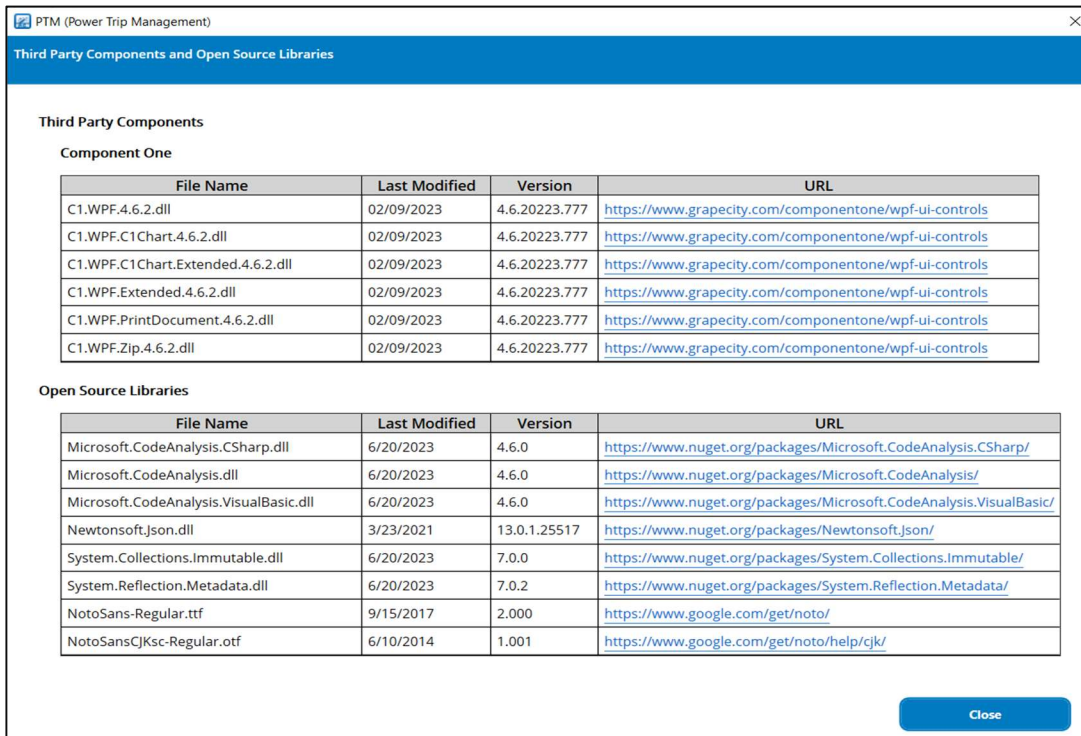


Figure 8.5: Third Party Components and Open Source Libraries' screen

Effective July 2023

8.3 Change Language

Power Trip Management allows the user to change the interface language. To do so, click the **Change Language** button, and select the language of your choice (Figure 8.6). Figure 8.7 shows Power Trip Management startup screen in simplified Chinese.

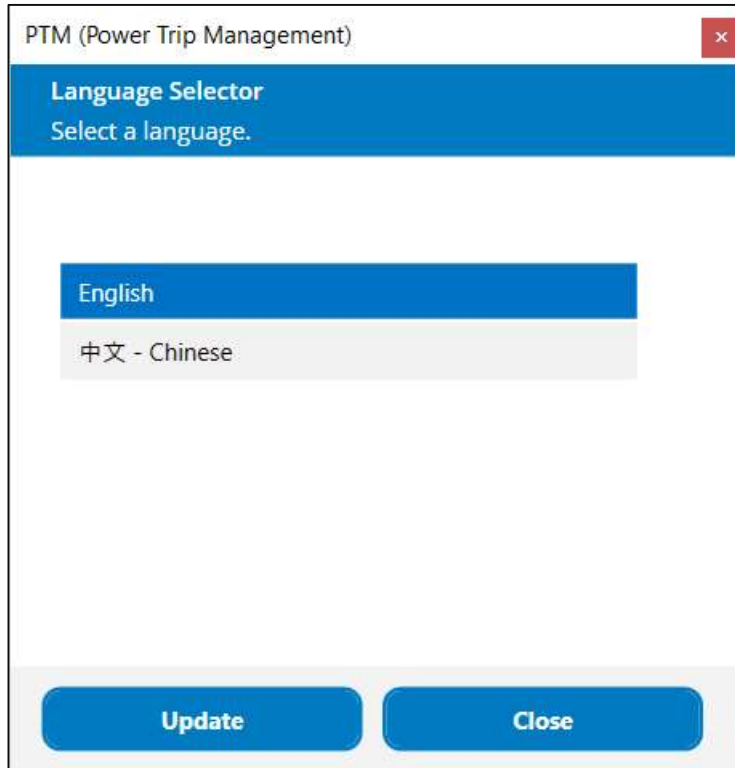


Figure 8.6: 'Change Language' screen

Effective July 2023

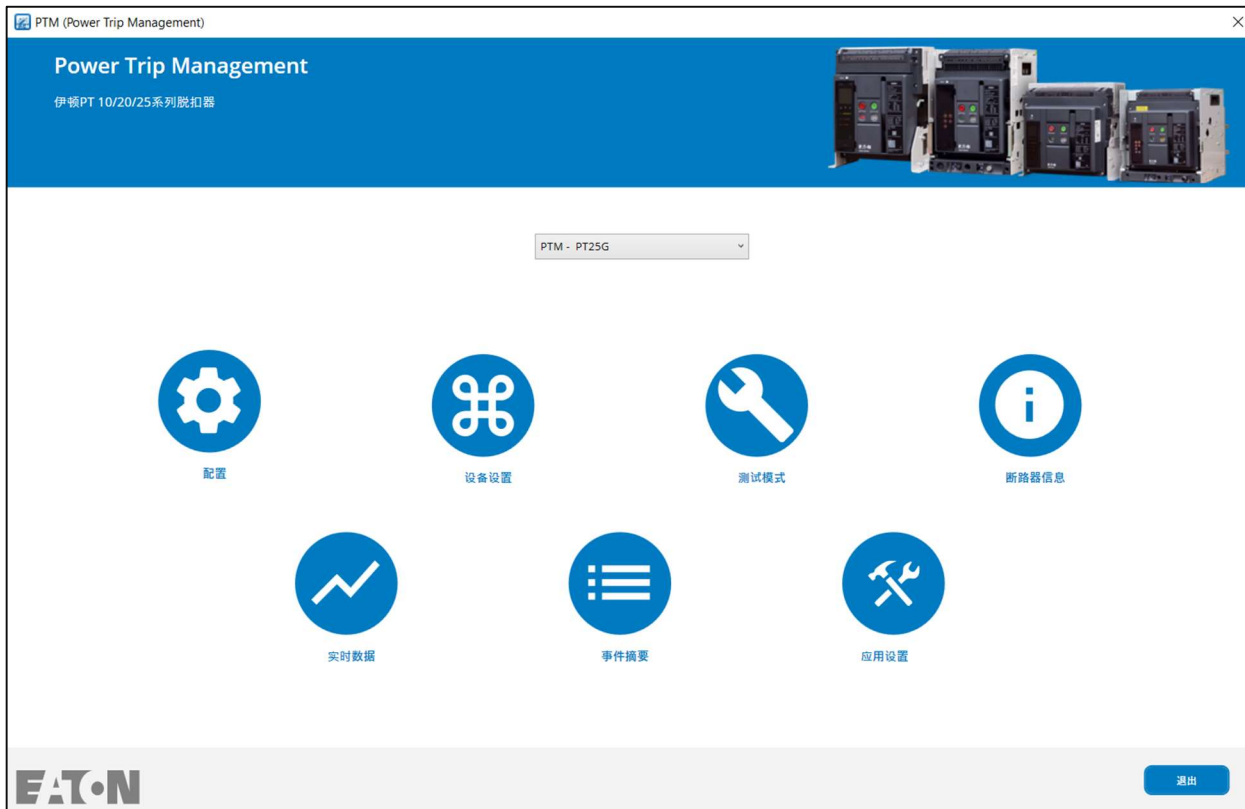


Figure 8.7: Power Trip Management main screen in simplified Chinese