



PowerTRAC™

AC Power Source Control Software

User Guide V 1.01

September 29, 2020

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Introduction

The PowerTRAC™ software provides an easy to use interface that allows you to take full control of functions and settings for Associated Power Technologies' automated power sources. PowerTRAC software is compatible with 6000, 7000, 8500, 300XAC and 400XAC Series models. Current available communication interfaces include RS-232 and USB, with future consideration for GPIB and Ethernet.

This document contains a complete guide to functions and features of the PowerTRAC software, which are specifically designed to help in collecting test data for many different types of test environments. The PowerTRAC software can be used to program and perform simple short duration testing to long-term burn-in testing.

Some of the advanced features of PowerTRAC software can be used to automate production line testing and data collection. The software interface simplifies setup by allowing you to set system settings, test parameters and extract test data from the power source in real time.

Installation

This section describes the minimum requirements for using PowerTRAC software and provides a guide to installation.

The PowerTRAC software is created using LabVIEW code and libraries which may require installing National Instrument's Run Time Engines along with other dependencies. The installer contains all the necessary National Instrument tools required to install the software.

System Requirements

- CPU requirements: PC with a minimum Pentium processor recommended
- Operating system requirements: Microsoft Windows 7, Windows 8 or Windows 10
- Microsoft Office Excel (Optional when using the export report functionality)
- Minimum 256 MB of RAM (512 MB recommended)
- Minimum 620 MB of free HDD space
- PC compatible keyboard and mouse
- PC Interface: RS-232, USB type 2.0 type A
- AC power source interface: USB/RS-232 interface (standard)
- Connection cable: USB type B connection cable (standard)

Installation Steps

1. Insert the USB Flash Drive that contains the installation file into the PC USB port or download the installation file from www.aptsources.com/products/powertrac/
2. Select and run PowerTRAC 2.0.0.exe.
3. Follow the instructions of the installer to finish the installation.
4. After the installation is complete, a "PowerTRAC" program icon is created in the C:\Programs Files (x86) and shortcut placed on the Desktop.

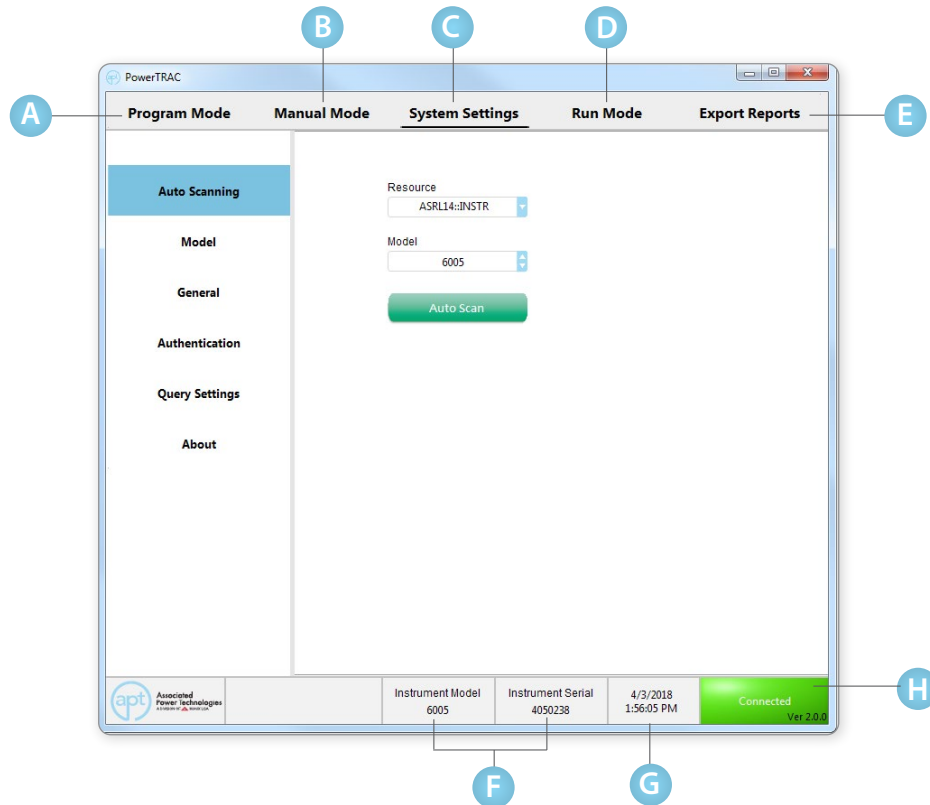
Please note: The National Instruments Visa driver, Runtime engine, will automatically be installed on your system during the installation of PowerTRAC. Additionally, Microsoft .NET Framework and Microsoft Office software checks are performed to ensure full compatibility.

6. Restart the PC when instructed or after installation has finished.
7. Upon first initialization of the software, the System Settings tab will be displayed which allows the user to set up proper connection parameters to the AC source.

Main Screen

PowerTRAC is an instrument control software that allows you to configure, control, and run your power source. The software consists of five different tabs: Program Mode, Manual Mode, System Settings, Run Mode, and Report Exporter.

PowerTRAC initiates on the System Settings tab upon start up. Output settings of the power source can be configured in Program, Manual, and Run Mode tabs. PowerTRAC software parameters are configured using the System Settings tab. The Report Exporter has the capabilities to search and export testing data collected during Program and Run Modes.



- A Program Mode**
The Program Mode allows you to program test routines with multiple steps. In this mode of operations the power source can be set to execute pre-programmed test routines. Refer to the section Program Mode for more details.

Program Mode

- B Manual Mode**
In Manual Mode the power source can be controlled to output continuously. The output parameters (Output Type, Function, Voltage, Frequency, Transients, High and Low limits, etc.) must be set before starting the test. The software will collect data at set intervals during the continuous output. This mode allows the user to adjust the voltage and frequency while the source is outputting, along with manually triggering transients. Refer to the Manual Mode Section for more details.

Manual Mode

C System Settings
This System Settings tab allows the user to set all the system parameters for the PowerTRAC software. Connection Settings, Model, Language, Authentication, Query Settings, and Print Settings can be adjusted using this tab. Refer to the System Settings section for more details

System Settings

D Run Mode
The Run Mode allows for production line testing where an operator only needs to run a sequence of tests on each unit manufactured. Test parameters cannot be modified or adjusted when using the PowerTRAC software in this mode.

Run Mode

E Export Results
The Export Reports tab allows you to search, filter, and export test data collected during Program, Manual, and Run Modes. Reports can be filtered by using Lot, Serial, Model, User, Station, Date, Results, or Filename parameters and exported to an Excel or Text file.

Export Reports

F Instrument Model and Serial Number
This section of the main window displays the Model and Serial Number of the connected power source.

Instrument Serial
4050238

G System Date and Time
This section of the main window displays the system date and time.

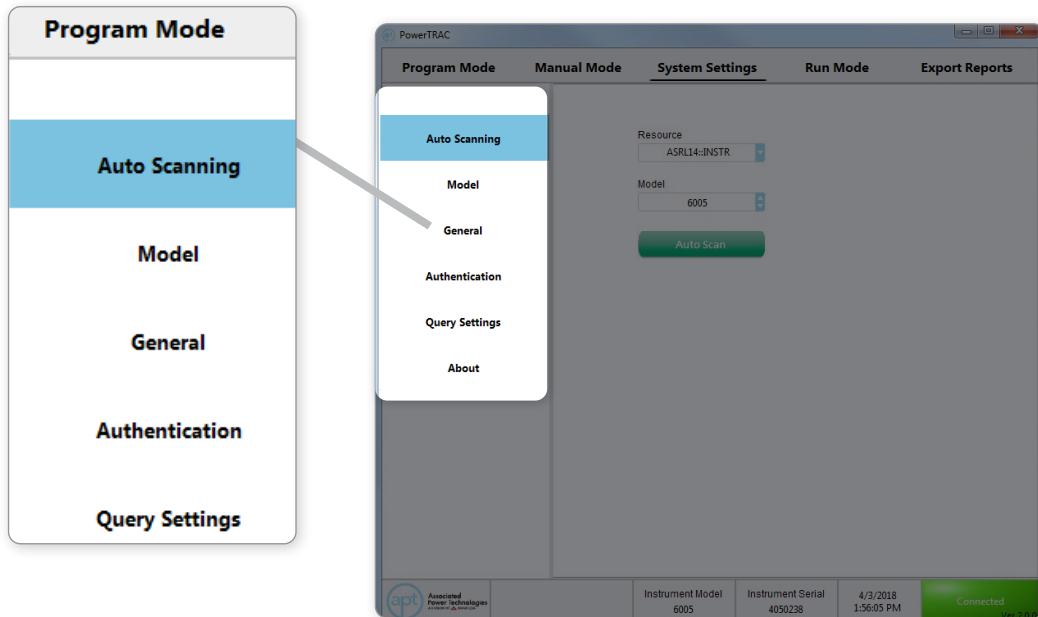
4/3/2018
1:56:05 PM

H Connection Status and Software Version
This section of the main window shows connection status to the power source along with firmware version information.

Connected
Ver 2.0.0

System Settings

The System Settings tab is used to set general parameters. General parameters include Auto Scanning, Model Information, Language Settings, Authentication, Query Settings, Print Mode, and About sections.



System Settings - Auto Scanning

Auto Scanning allows you to search for your connected APT power source. Once identified, you can use the drop down to populate the Resource and Model field. If no instruments are detected during the scan you can choose simulation mode. This provides a demo functionality of the software without a connection to a power source.



- A Resource**
Drop-down selection for communications interface to the power source. Select Simulation for running the software in Demo Mode.

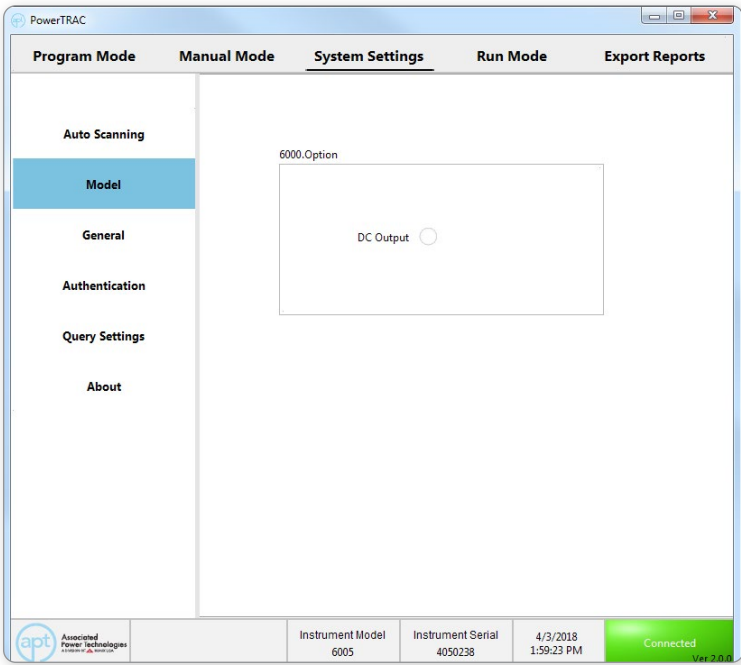
Resource
ASRL10::INSTR

- B Model**
Select the correct Model Number of the power source connected to the software.

Model
310XAC

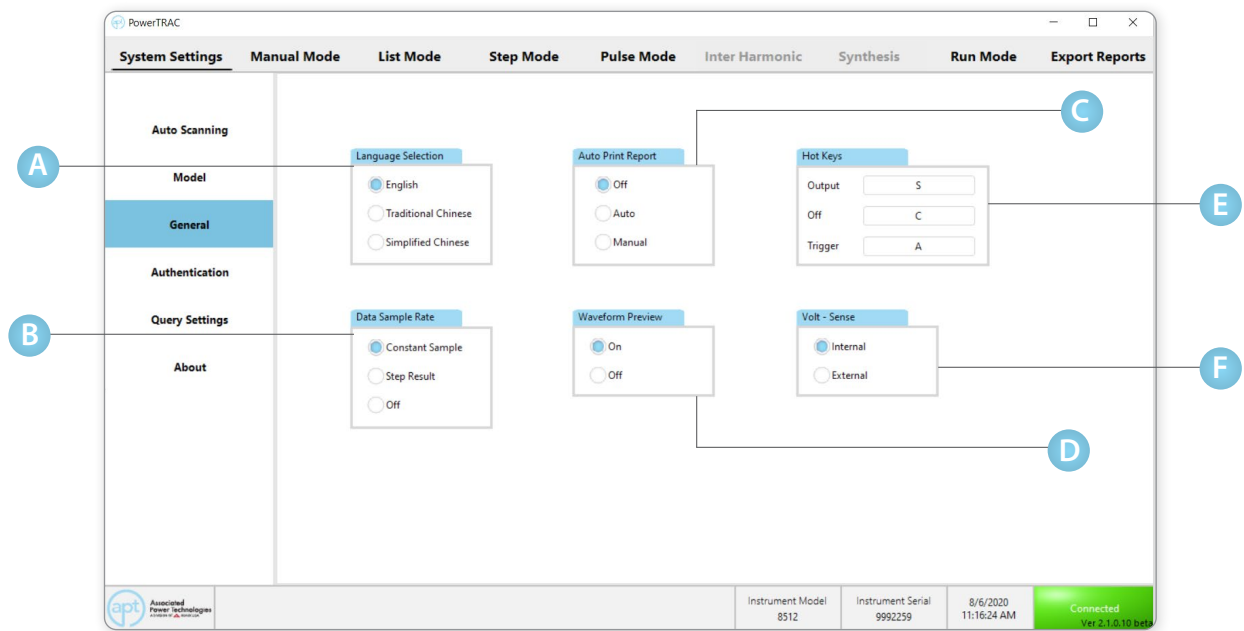
System Settings - Model

The Model section of System Settings displays additional information about the connected power source. The fields displayed in this section are dependent on the capabilities of the connected power source. Please refer to the product manual for more information.



Systems Settings - General

The General section of the System Settings tab displays adjustable settings for Language, Auto Report, Data, and Waveform.



A Language Selection

Select the system language from English, Traditional Chinese, or Simplified Chinese.

B Data Sample Rate

Data can be sampled at a constant sample rate or at the end of the test step. Constant sample will allow for result data to contain data from each sampled interval. With Step Result selected, results data contains only the last sampled result.

C Auto Print Report

Print reports can be set to auto print at the end of a test by selecting Auto. Setting parameter to Manual will allow for a prompt message to appear at the end of a test. The user can select Print to print report or Cancel to exit the prompt. This parameter can be set to OFF if no printing of the test report is required. The PowerTRAC software will print to the default printer set in Windows operation system. See page 9 for a sample print report generated by PowerTRAC.

D Waveform Preview

Waveform preview in Program Mode can be set to ON or OFF. ON will display the waveform corresponding to the step in the test file. OFF will disable the Waveform display for the selected test file. For test files containing a large amount of test steps and long testing times, the Waveform preview can be turned OFF to improve system performance.

E Hot Keys

Select a key that will function as a hot key. The corresponding key, when pressed, will activate the associated function, Output, Off and Trigger.

F Volt - Sense

Set the voltage sense functionality to Internal or External.

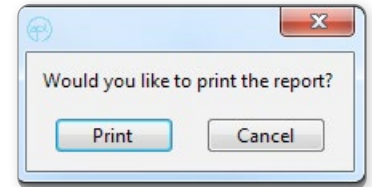


Auto Report continued

By selecting Auto within the Auto Report module, the report will be automatically sent to a default printer. You will not be able to select your printer before the document is printed.

Setting Auto Report to Manual will prompt the user to print the result data at the end of the test.

The manual print screen is shown at the end of the test sequence in Program, Manual, and Run Modes.



Example Print Reports

Program Mode

PowerTRAC Test Result													

Conditions													
Order Name		User Name											
Serial Number		Model Name											
Result		File Name											
Date/Time	*****	Station Name											

Date/Time	M-S	Phase	Status	Frequency	Voltage	Current	Power	Apeak	PF	Q	CF	VA	
2017/11/13 13:01:06	M1-1	None	Pass	55.5	93.7	0.2	21.87	0.1	0.01	3.53	1.77	21.87	
2017/11/13 13:01:07	M1-4	None	Pass	46.7	150.8	2.1	318.44	3.3	0.84	3.92	2.06	318.44	

Manual Mode

PowerTRAC Test Result													

Conditions													
Order Name		User Name											
Serial Number		Model Name											
Result	2	File Name											
Date/Time	*****	Station Name											

Date/Time	M-S	Phase	Status	Frequency	Voltage	Current	Power	Apeak	PF	Q	CF	VA	
2017/11/13 13:02:52	M1	None	Dwell	42.9	142.9	4.8	680.9	4.8	1	681.8	0.95	680.9	
2017/11/13 13:02:53	M1	None	Dwell	15.1	50.5	1.7	84.9	1.7	0.3	85.3	0.34	84.9	
2017/11/13 13:02:54	M1	None	Dwell	37.4	124.8	4.2	519	4.2	0.8	519.9	0.83	519	
2017/11/13 13:02:55	M1	None	Dwell	34.2	114	3.8	432.8	3.8	0.8	433.6	0.76	432.8	
2017/11/13 13:02:56	M1	None	Dwell	4.3	14.4	0.5	6.9	0.5	0.1	7	0.1	6.9	
2017/11/13 13:02:57	M1	None	Dwell	6.4	21.3	0.7	15.1	0.7	0.1	15.2	0.14	15.1	
2017/11/13 13:02:58	M1	None	Dwell	14.2	47.3	1.6	74.7	1.6	0.3	75	0.32	74.7	
2017/11/13 13:02:59	M1	None	Dwell	36.3	120.9	4	487.3	4	0.8	488.1	0.81	487.3	

Run Mode

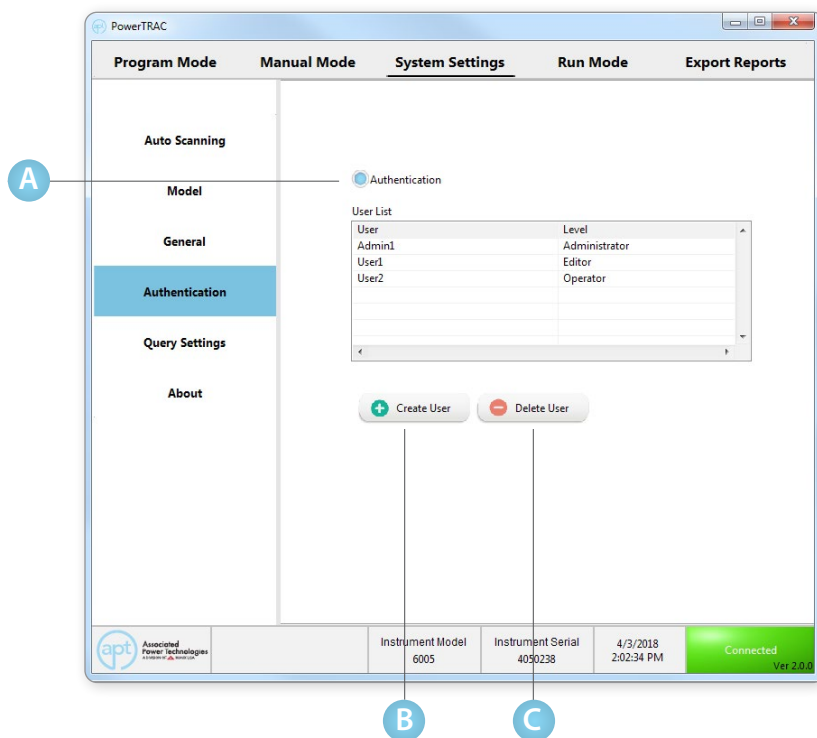
PowerTRAC Test Result													

Conditions													
Order Name		User Name	admin										
Serial Number		Model Name											
Result		File Name											
Date/Time	*****	Station Name											

Date/Time	M-S	Phase	Status	Frequency	Voltage	Current	Power	Apeak	PF	Q	CF	VA	
2017/11/13 12:55:43	M1-3	None	Pass	57.8	13.7	3.7	50.81	4.8	0.27	3.45	3.39	50.81	

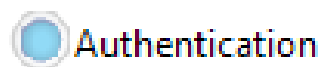
Systems Settings - Authentication

The User Authentication section of the System Settings tab allows for creating and editing user access levels. Use this section to turn the authentication feature of the software ON or Off and to add or remove new users.

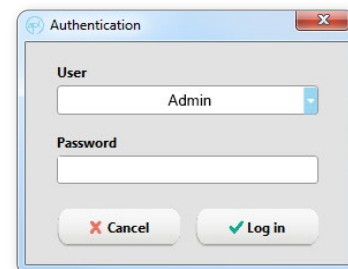


A Authentication On/Off

With authentication selected to ON, the software will require a user to log in when launching the software.



This screen shows the authentication window when opening the software.



B Create New User

1. To create a new user, click on the Create User button. A pop up screen will appear to set User ID, Password, and Access Level.

Choose the appropriate access level for each user:

Administrator

The administrator has full access to all functions of the software. Since this option allows for unrestricted access, it is suitable for a high-level user or manager. In the case of a lost password, use the default password listed below.

User ID: admin | Password: admin

Editor

The editor level has access to all the tabs of the software except for the System Settings tab. This level prevents any changes to the System Settings that are set by the administrator.

Operator

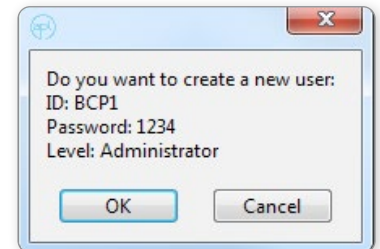
The operator level only allows access to the Run Mode tab. Operator level is the most restricted level out of the three access levels. It is most suitable for operators that need to run a particular test and don't need access to edit any parameters.

A dialog box titled "Add User" with fields for User ID, Password, Password check, and Level. The Level dropdown is set to Administrator. There are Cancel and OK buttons at the bottom.

Field	Value
User ID	
Password	
Password check	
Level	Administrator

2. Enter the User ID, Password, Password Check, and Level. Click OK to proceed to the confirmation screen.

3. Click OK to finish setting up the New User.

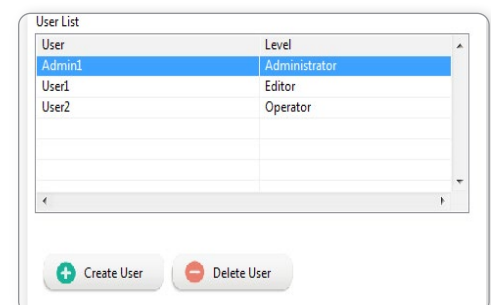


C Delete Existing User

Use the Delete User button to remove users.

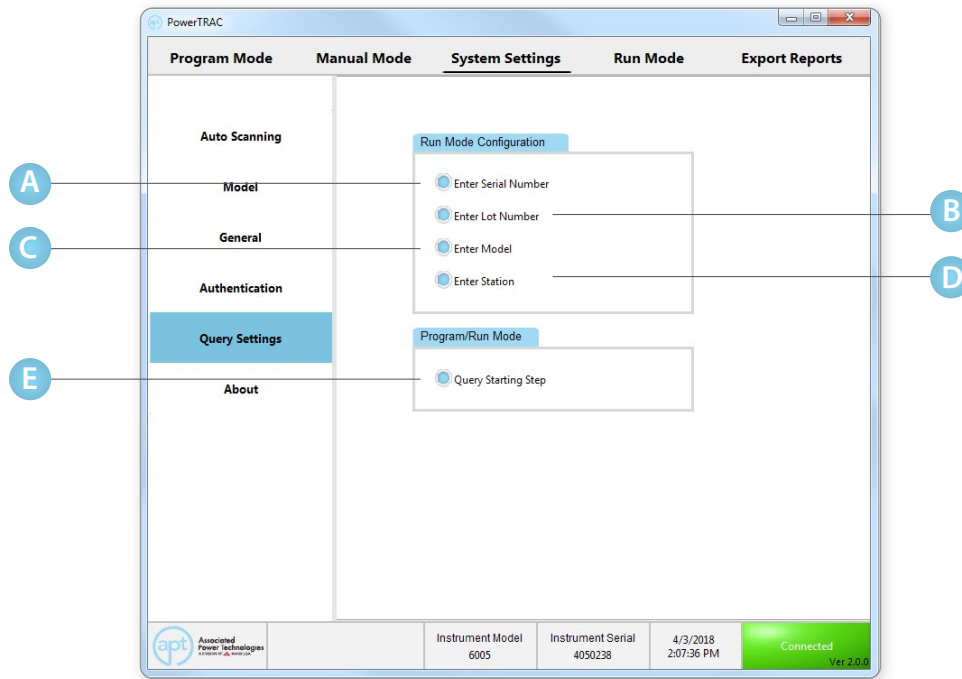


Highlight the user to be deleted and click the Delete User Button.



Systems Settings - Query Settings

The Query Settings section of the System Settings tab allows the administrator to select which information will be required when running a test in Run Mode.



A Serial Number

B Lot Number

C Model Field

D Station Field

E Query Starting Step Field

☐ Enter Serial Number

☐ Enter Lot Number

☐ Enter Model

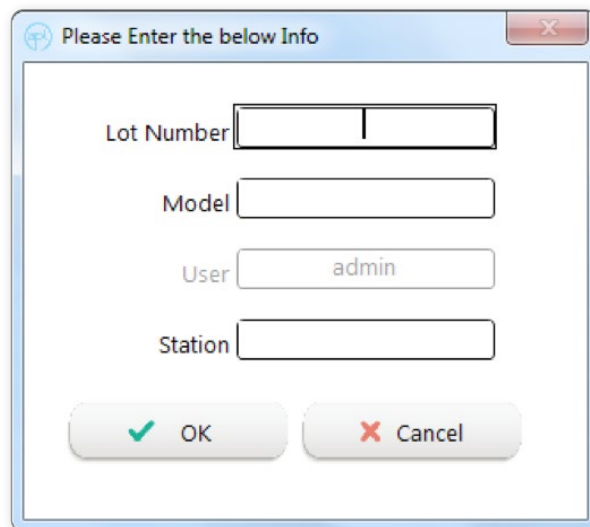
☐ Enter Station

☐ Query Starting Step

Example Screens for Run Mode Test Output Sequence

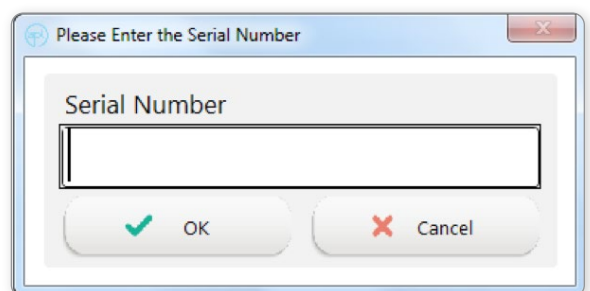
With the options selected in Query Settings, the following screens appear during Output. For more information on Run Mode Test Output Sequences see Run Mode section page 58.

1. For Run Mode, the options include a field to enter Serial, Lot, Model, and Station information.



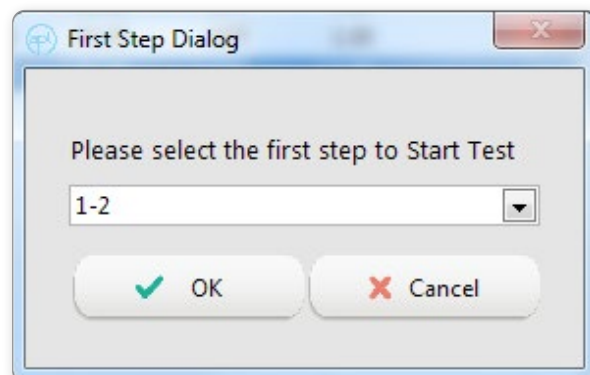
A dialog box titled "Please Enter the below Info" with a close button (X) in the top right corner. It contains four input fields: "Lot Number" (empty), "Model" (empty), "User" (containing "admin"), and "Station" (empty). At the bottom are two buttons: "OK" with a green checkmark icon and "Cancel" with a red X icon.

2. The Serial Number dialog box will appear after each test is completed.



A dialog box titled "Please Enter the Serial Number" with a close button (X) in the top right corner. It contains a single input field labeled "Serial Number" which is empty. At the bottom are two buttons: "OK" with a green checkmark icon and "Cancel" with a red X icon.

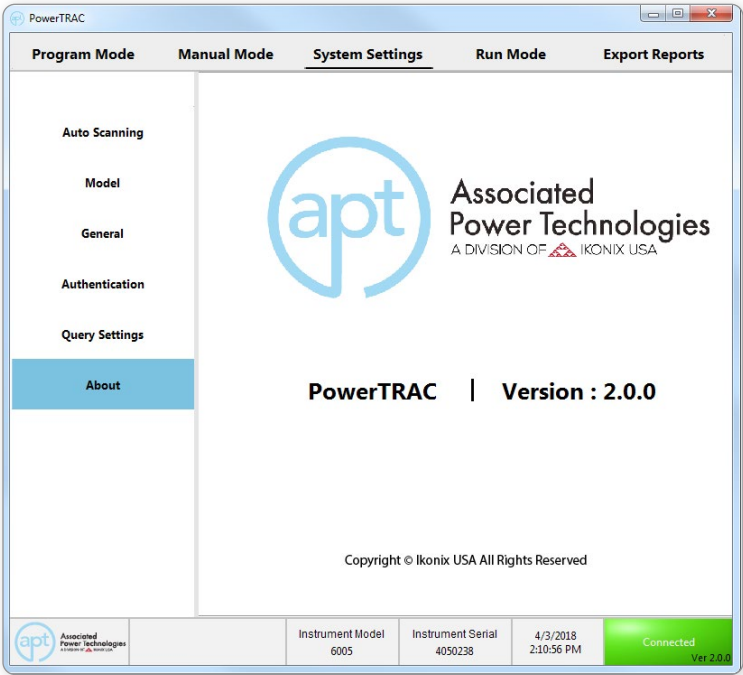
3. Program Mode allows the user the flexibility of starting the output at any step of the test memory.
Use the drop-down selector to select the starting step of the test sequence.



A dialog box titled "First Step Dialog" with a close button (X) in the top right corner. It contains a label "Please select the first step to Start Test" above a drop-down menu. The drop-down menu currently shows "1-2". At the bottom are two buttons: "OK" with a green checkmark icon and "Cancel" with a red X icon.

Systems Settings - About

The About section of the System Settings tab displays the PowerTRAC version information.



Manual Mode

Manual Mode allows for PowerTRAC to control the power source in a continuous output mode of operation. This mode will run a testing routine according to the parameters currently programmed into the memory, which can be set on this screen. There is no test time associated with Manual Mode, the output is continuous until the Start/Reset Test button is pressed.

The voltage and frequency can be adjusted while the source is outputting to achieve manual control of the power source. Transient functionality is also available to inject voltage transients while the power source output is on.

Test and transient parameters can be pre-setup to each memory in order to quickly select and run a test.

The software also monitors the available live meters and displays them under the Meter section of the screen. This live meter data is collected directly from the power source and saved at the selected sampling rate.

The screenshot shows the PowerTRAC software interface with the 'Manual Mode' tab selected. The interface is divided into several sections:

- Program Mode:** Includes a 'Memory Address' dropdown set to 0.
- Manual Mode:** Contains input fields for 'Line Voltage' (115.0), 'Phase Voltage' (115.0), 'Frequency' (50.0), and 'Range' (High). It also has 'Current High Limit A', 'B', and 'C' set to 0.00. Below these are 'OC Fold' and 'Transient' radio buttons, both currently unselected. Further down are 'Transient Phase' (N/A), 'Transient Voltage' (0.0), 'Transient Start Time' (0), 'Transient Duration' (0.0), and 'Transient Cycle' (0).
- Output Type:** Radio buttons for 'AC' (selected) and 'DC'. Below are 'Function' radio buttons for '1P2W' (selected), '3P4W', and '1P3W'. A green 'Output' button and a grey 'Transient' button are present.
- Sliders:** 'Voltage (0.0 - 300.0V)' is set to 115.0, and 'Frequency (40.0 - 1000Hz)' is set to 50.0.
- System Settings:** Includes 'Model Number' (x5), 'DUT SN' (empty), 'Sample Interval' (00:00:01), and 'Watt-Hour Meter' (0.0442125).
- Run Mode:** A 'Meters' section on the right displays live data: Meter-Voltage (114.6), Meter-Frequency (34.4), Meter-Current (3.8), Meter-Power (437.9), Reactive Power (438.7), Crest Factor (0.76), Peak Current (3.8), Apparent Power (437.9), and Power Factor (0.8).
- Export Reports:** A tab at the top right.
- Footer:** Displays the 'apt' logo, 'Associated Power Technologies', 'Instrument Model 6005', 'Instrument Serial 4050238', '4/3/2018 2:13:00 PM', and a green 'Connected' status with 'Ver 2.0.0'.

Manual Mode - Output Type and Function Selection

Select the Output Type to AC, DC, AC+DC depending on the type of the power source used.

Set Function to one of the following options: 1P2W (L, N), 1P3W (L1, L2, N), or 3P4W (Phase A, Phase B, Phase C, N).

The screenshot shows a control panel with two sections. The top section, labeled 'Couple', has three radio buttons: 'AC', 'DC', and 'AC+DC'. The 'AC+DC' button is selected. The bottom section, labeled 'Function', has three radio buttons: '1P2W', '3P4W', and '1P3W'. The '1P2W' button is selected.

Model	1P2W	1P3W	3P4W/3P3W	DC
6000 Series	●	-	-	Optional
7000 Series	●	-	-	-
8500 Series	●	-	-	Standard
300XAC Series	●	2 Units Linked	3 Units Linked	Standard
400XAC Series	●	●	●	Standard

Screen Overviews

AC 1P2W

The screenshot shows the PowerTRAC software interface in Manual Mode. The interface is divided into several sections. On the left, there are input fields for Memory Address, Line Voltage, Phase Voltage, Frequency, Range, Current High Limit A, B, and C, OC Fold, Transient, Transient Phase, Transient Voltage, Transient Start Time, Transient Duration, and Transient Cycle. In the center, there are controls for Output Type (AC, DC, AC+DC), Function (1P2W, 3P4W, 1P3W), and buttons for Output and Transient. Below these are sliders for Voltage (0.0 - 300.0V) and Frequency (40.0 - 1000Hz). On the right, there is a Meters section displaying various measurements: Meter-Voltage (114.6), Meter-Frequency (34.4), Meter-Current (3.8), Meter-Power (437.9), Reactive Power (438.7), Crest Factor (0.76), Peak Current (3.8), Apparent Power (437.9), and Power Factor (0.8). At the bottom, there is a status bar showing the Instrument Model (6005), Instrument Serial (4050238), Date and Time (4/3/2018 2:13:00 PM), and a Connected status indicator.

AC 1P3W

PowerTRAC

Program Mode Manual Mode System Settings Run Mode Export Reports

Memory Address 0

Line Voltage 230.0

Phase Voltage 115.0

Frequency 50.0

Range High

Current High Limit A 0.00

Current High Limit B 0.00

Current High Limit C 0.00

OC Fold

Transient

Transient Phase L1-N

Transient Voltage 0.0

Transient Start Time 0

Transient Duration 0.0

Transient Cycle 0

Output Type AC

Function 1P2W 3P4W 1P3W

Output

Transient

Voltage (0.0 - 300.0V) 115.0

Frequency (40.0 - 100.0Hz) 50.0

Model Number x5

DUT SN

Sample Interval 00:00:01

Watt-Hour Meter 0.0442125

Phase L1-L2

Meter-Voltage 114.6

Meter-Frequency 34.4

Meter-Current 3.8

Meter-Power 437.9

Reactive Power 438.7

Crest Factor 0.76

Peak Current 3.8

Apparent Power 437.9

Power Factor 0.8

Phase L1

Meter-Voltage 7.2

Meter-Frequency 2.2

Meter-Current 0.2

Meter-Power 1.7

Reactive Power 1.8

Crest Factor 0.05

Peak Current 0.2

Apparent Power 1.7

Power Factor 0.0

Phase L2

Meter-Voltage 79.3

Meter-Frequency 23.8

Meter-Current 2.6

Meter-Power 209.4

Reactive Power 210.0

Crest Factor 0.53

Peak Current 2.6

Apparent Power 209.4

Power Factor 0.5

Instrument Model 6005

Instrument Serial 4050238

4/3/2018 2:17:26 PM

Connected

Ver 2.0.0

AC 3P4W

PowerTRAC

Program Mode Manual Mode System Settings Run Mode Export Reports

Memory Address 0

Line Voltage 199.2

Phase Voltage 115.0

Frequency 50.0

Range High

Current High Limit A 0.00

Current High Limit B 0.00

Current High Limit C 0.00

OC Fold

Transient

Transient Phase A

Transient Voltage 0.0

Transient Start Time 0

Transient Duration 0.0

Transient Cycle 0

Output Type AC

Function 1P2W 3P4W 1P3W

Output

Transient

Voltage (0.0 - 300.0V) 115.0

Frequency (40.0 - 100.0Hz) 50.0

Model Number x5

DUT SN

Sample Interval 00:00:01

Watt-Hour Meter 0.0442125

Total

Meter-Voltage 114.6

Meter-Frequency 34.4

Meter-Current 3.8

Meter-Power 437.9

Reactive Power 438.7

Crest Factor 0.76

Peak Current 3.8

Apparent Power 437.9

Power Factor 0.8

Phase A

Meter-Voltage 7.2

Meter-Frequency 2.2

Meter-Current 0.2

Meter-Power 1.7

Reactive Power 1.8

Crest Factor 0.05

Peak Current 0.2

Apparent Power 1.7

Power Factor 0.0

Phase B

Meter-Voltage 79.3

Meter-Frequency 23.8

Meter-Current 2.6

Meter-Power 209.4

Reactive Power 210.0

Crest Factor 0.53

Peak Current 2.6

Apparent Power 209.4

Power Factor 0.5

Phase C

Meter-Voltage 161.7

Meter-Frequency 16.1

Meter-Current 1.8

Meter-Power 96.1

Reactive Power 96.5

Crest Factor 0.36

Peak Current 1.8

Apparent Power 96.1

Power Factor 0.4

Instrument Model 6005

Instrument Serial 4050238

4/3/2018 2:16:24 PM

Connected

Ver 2.0.0

DC Output

PowerTRAC

Program Mode Manual Mode System Settings Run Mode Export Reports

Memory Address 0

Line Voltage 115.0

Phase Voltage 115.0

Frequency 50.0

Range High

Current High Limit A 0.00

Current High Limit B 0.00

Current High Limit C 0.00

OC Fold

Transient

Transient Phase N/A

Transient Voltage 0.0

Transient Start Time 0

Transient Duration 0.0

Transient Cycle 0

Output Type DC

Function 1P2W 3P4W 1P3W

Output

Transient

Voltage (0.0 - 300.0V) 115.0

Frequency (40.0 - 100.0Hz) 50.0

Model Number x5

DUT SN

Sample Interval 00:00:01

Watt-Hour Meter 0.0442125

Meters

Meter-Voltage 114.6

Meter-Frequency 34.4

Meter-Current 3.8

Meter-Power 437.9

Reactive Power 438.7

Crest Factor 0.76

Peak Current 3.8

Apparent Power 437.9

Power Factor 0.8

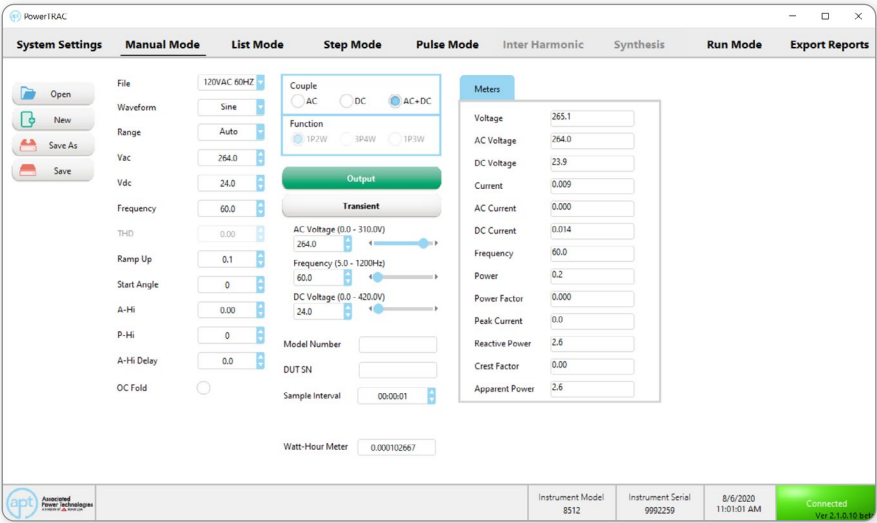
Instrument Model 6005

Instrument Serial 4050238

4/3/2018 2:18:35 PM

Connected

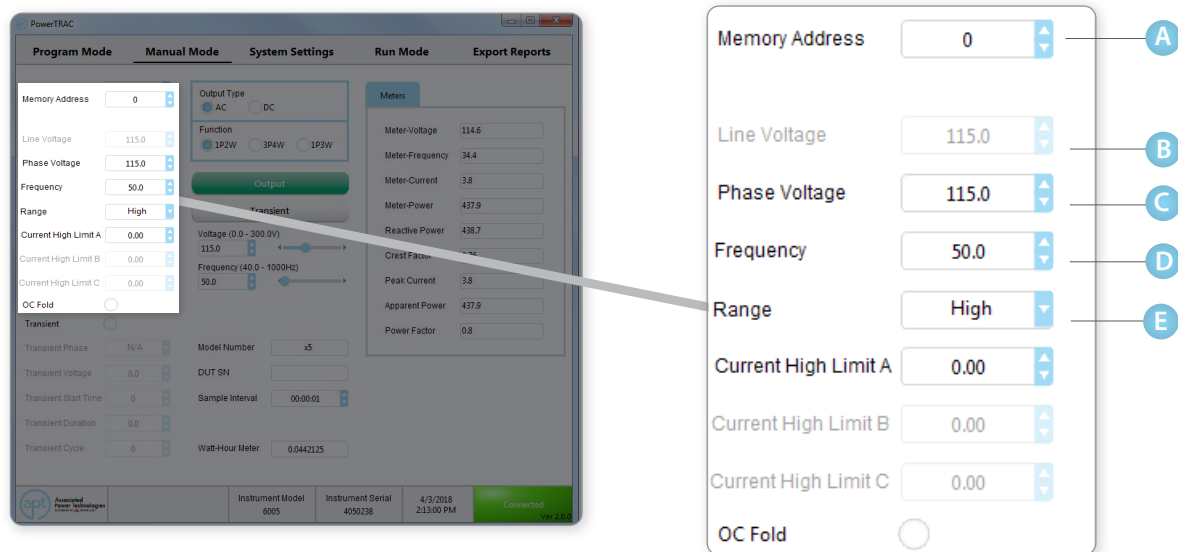
Ver 2.0.0



Manual Mode - Edit Parameters

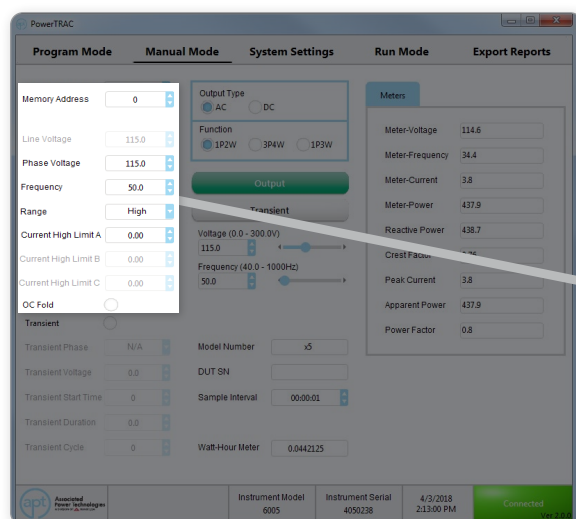
6000, 7000, 300XAC, and 400XAC Series

Test output parameters can be programmed within the Edit Parameters section of Manual Mode. For additional information on the applicable values for each parameter, please refer to the power source product manual.



- A Memory Address**
Select the memory location of the power source to load test parameters. Choose any memory location between 1 & 50.
- B Line Voltage (3P4W only)**
Enter the desired amount of line voltage for a 3-Phase output. Line voltage is the measurement between two phases of a 3 phase system. Line voltage values can be selected between 0 and 520 Volts.
- C Phase Voltage**
Enter the desired amount of phase voltage for 1P2W, 1P3W, or 3P4W output function. Phase voltage is the voltage measurement between the phase and neutral of a power system. Phase voltage values can be selected between 0 and 300 Volts.
- D Frequency**
Select the desired frequency for the AC output. Frequency can be set between 40 – 1000 Hz depending on the capabilities of the source.
- E Range**
The Range mode sets voltage range for the power source and can be set to Auto or High. Low voltage is defined by voltage set under 150 Volts. High voltage is defined by voltage set above 150 Volts. By setting Range to Auto, the system will automatically interpret the voltage range (above or below 150 Volts) and switch to the high or low voltage output range. Setting Range to High will put the output voltage into the high voltage output range. In high range output, the current capacity of instrument is now lowered to half of the low range current capacity.

6000, 7000, 300XAC, and 400XAC Series Cont.



Memory Address	0
Line Voltage	115.0
Phase Voltage	115.0
Frequency	50.0
Range	High
Current High Limit A	0.00
Current High Limit B	0.00
Current High Limit C	0.00
OC Fold	<input type="radio"/>

F Current High Limit

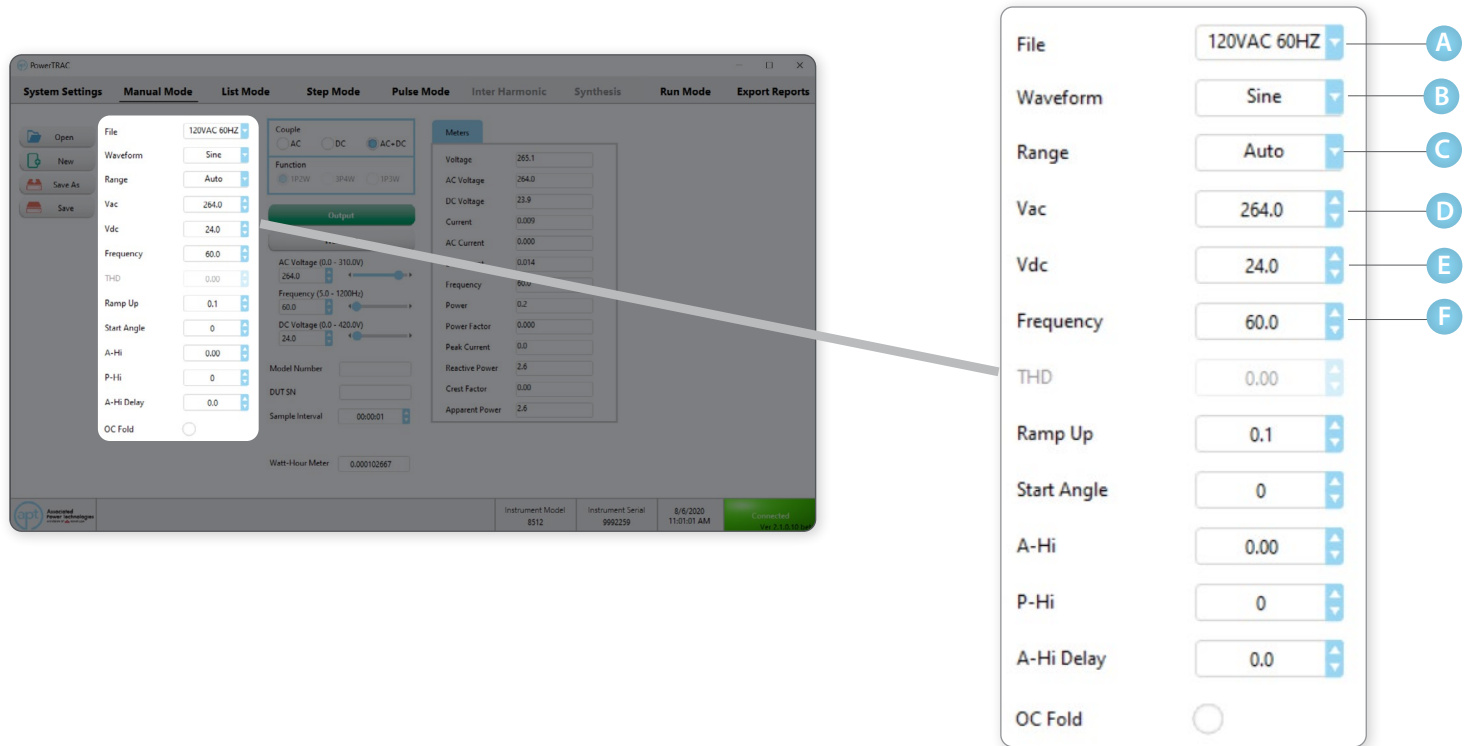
Current High Limit is used for setting the amperage high limit and can be used as a failure detector. If the amperage draw for a test exceeds this value the test will result in a fail. The value range is dependent on the maximum output capacity of the source. Additional current high limit parameters are available once the output function is set to 1P3W or 3P4W.

G OC Fold

Select to have OC Fold On or OFF. Over current foldback is a technology used in power sources that keeps output current constant by reducing the voltage in order to power loads that may have a high inrush current.

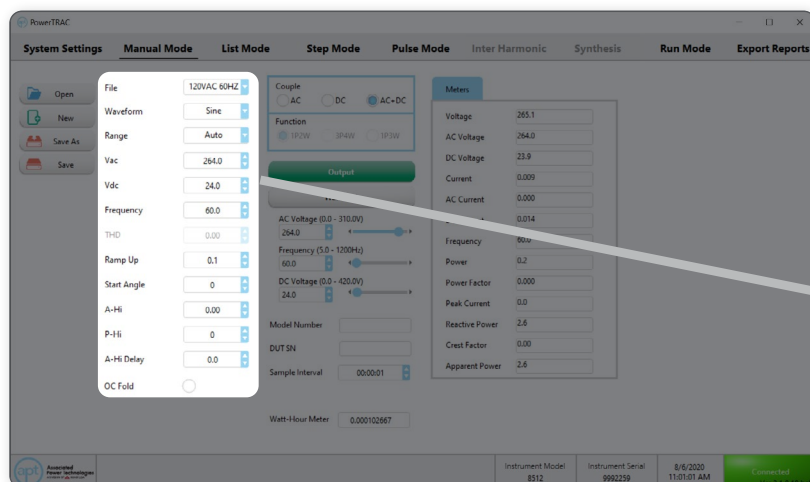
8500 Series

Test output parameters can be programmed within the Edit Parameters section of Manual Mode. For additional information on the applicable values for each parameter, please refer to the power source product manual.



- A File**
Select the test filename saved on the power source to load the test parameters. Choose any filename from the dropdown menu.
- B Waveform**
Select the desired output waveform between Sine, Square, Triangle, and Clipped.
- C Range**
The Range can be set to Auto, High, or Low. Setting the Voltage mode to Auto, the system will automatically interpret the voltage range and switch to the high or low voltage output range. Setting the Voltage mode to High will put the output voltage into the high voltage output range, and the current is limited to half as compared to the current limit in the low voltage output range. Setting the Voltage mode to Low will put the output move in low voltage range.
- D Voltage AC**
Enter the desired amount of AC voltage for 1P2W output function. AC voltage values can be selected between 0 and 310 Volts.
- E Voltage DC**
Enter the desired Step amount of DC voltage for 1P2W output function. DC voltage values can be selected between 0 and 420 Volts.
- F Frequency**
Select the desired frequency for the AC output. Frequency can be set to between 5 – 1200 Hz.

8500 Series Cont



File	120VAC 60HZ	
Waveform	Sine	
Range	Auto	
Vac	264.0	
Vdc	24.0	
Frequency	60.0	
THD	0.00	G
Ramp Up	0.1	H
Start Angle	0	I
A-Hi	0.00	J
P-Hi	0	K
A-Hi Delay	0.0	L
OC Fold	<input type="radio"/>	M

G THD (Clipped Waveform Only)

Select the amount of THD to introduce for the clipped waveform output. THD can be set 0 – 100.

H Ramp Up

Select the desired Ramp Up time in seconds. The output voltage will gradually ramp up from 0 to your set AC and DC values within the ramp up time. Ramp Up can be set to 0, 0.1 – 999.9 seconds, where 0 = OFF.

I Start Angle

Select the degree of the Start Angle of the output waveform. Start Angle can be set to between 0 – 359 °.

J A High Limit

Current High Limit is used for setting the amperage high limit. The value range is dependent on the maximum output capacity of the source.

K P High Limit

Power High Limit is used for setting the power high limit. The value range is dependent on the maximum output capacity of the source.

L A-Hi Delay

Current High Limit is used for setting the amperage high limit. Delay can be set to 0, 0.1 – 999.9 seconds, where 0 = OFF.

M OC Foldback

Select to have OC Fold On or OFF. Over current foldback is a technology used in power sources that keeps output current constant by reducing the voltage in order to power loads that may have a high in-rush current. Once past in-rush current phase the voltage is returned to set output voltage.

Manual Mode - Edit Transient

Transient function can be used to introduce momentary changes to the voltage in the waveform by programming surges or drops while the output is active. Transients during the Manual Mode can be triggered by using the Transient button while the output is active. The transient that is triggered will have the characteristics of the parameters set in this section. For detailed explanations of each parameter refer to the power source product manual.

A	Transient	<input checked="" type="radio"/>
B	Transient Phase	A
C	Transient Voltage	10.0
D	Transient Start Time	5
E	Transient Duration	50.0
F	Transient Cycle	5

- A Transient**
Select the radial to turn transient function on or off.
- B Transient Phase (1P3W and 3P4W)**
Select the phase on which the transient will appear. Only one phase can be selected at a time. Select L1-N or L2-N for 1P3W function or A, B, C for 3P4W function.
- C Transient Voltage**
Select surge or drop in voltage output for the transient between 0 - 300 V. For example, if the output voltage is programmed at 120 volts and the operator programs in a Trans-Volt of 150 volts this would be a surge of 30 volts. The opposite holds true if the Trans-Volt is programmed at 90 volts, this would be a drop of 30 volts. Trans-Volt is only selectable when the source is configured for AC output.

D Transient Start Time (Transient Site)

Select the specific degree of your angle within the sine wave to initialize the surge or drop the voltage. Select between 0 – 25 milliseconds.

E Transient Duration

Select overall duration of surge or drop between 0.5 – 999.9 milliseconds. For example, if the Trans-Site is 8 milliseconds, the output voltage is 120 volts, the surge voltage is 150 volts, and the Transient Duration Time is 20 milliseconds. When the sine wave reaches the 8-millisecond point (180°) the voltage will surge to 150 volts. This surge will hold for 20 milliseconds before the voltage output returns to 120 volts. Transient Duration is only selectable when the source is configured for AC output.

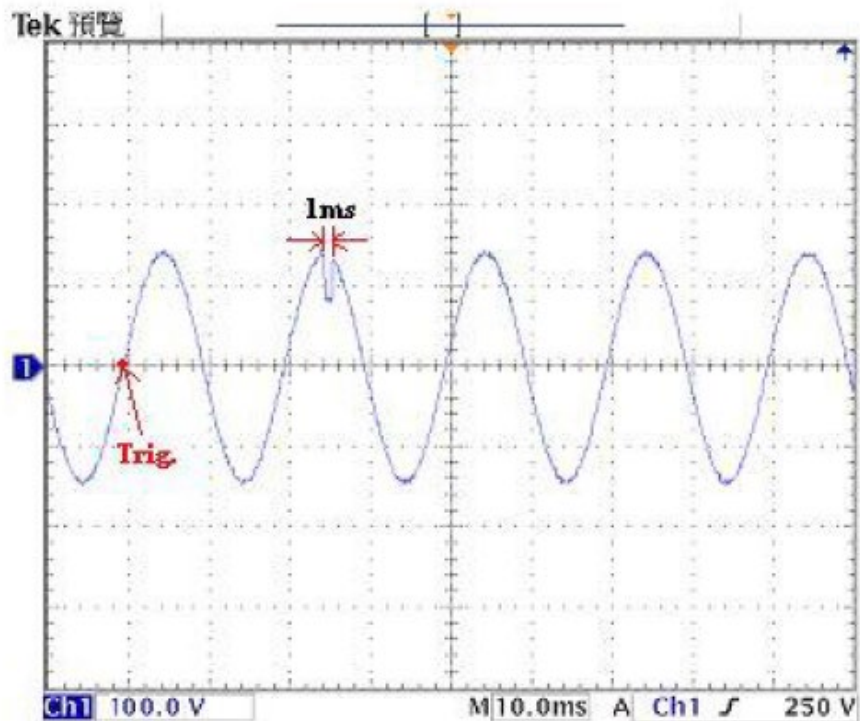
F Transient Cycle

To select Transient Voltage Cycle, choose a number between 0 (Constant) or 1-9999 cycles. By choosing constant cycle (0), the transient will occur continuously. By selecting a number between 1-9999, the transient is set to repeat to the number selected. Trans-Cycle is only selectable when the source is configured for AC output.

Transient Example

Given the following parameters:

Parameter Value
Output Voltage 100Vrms
Output Frequency 50 Hz
Transient Voltage 60Vrms
Transient Site 25ms
Transient Time 1ms



Manual Mode - Measurement

Measurement Meters display the live data being captured from the power source. Depending on the output function selected, each phase will have an associated meter.

The Meters display the data collected for Voltage, Current, Power, Reactive Power, Crest Factor, Peak Current, Apparent Power, and Power Factor.

1P2W

Meters	
Meter-Voltage	114.6
Meter-Frequency	34.4
Meter-Current	3.8
Meter-Power	437.9
Reactive Power	438.7
Crest Factor	0.76
Peak Current	3.8
Apparent Power	437.9
Power Factor	0.8

3P4W

Total	Phase A	Phase B	Phase C
Meter-Voltage	114.6		
Meter-Frequency	34.4		
Meter-Current	3.8		
Meter-Power	437.9		
Reactive Power	438.7		
Crest Factor	0.76		
Peak Current	3.8		
Apparent Power	437.9		
Power Factor	0.8		

1P3W

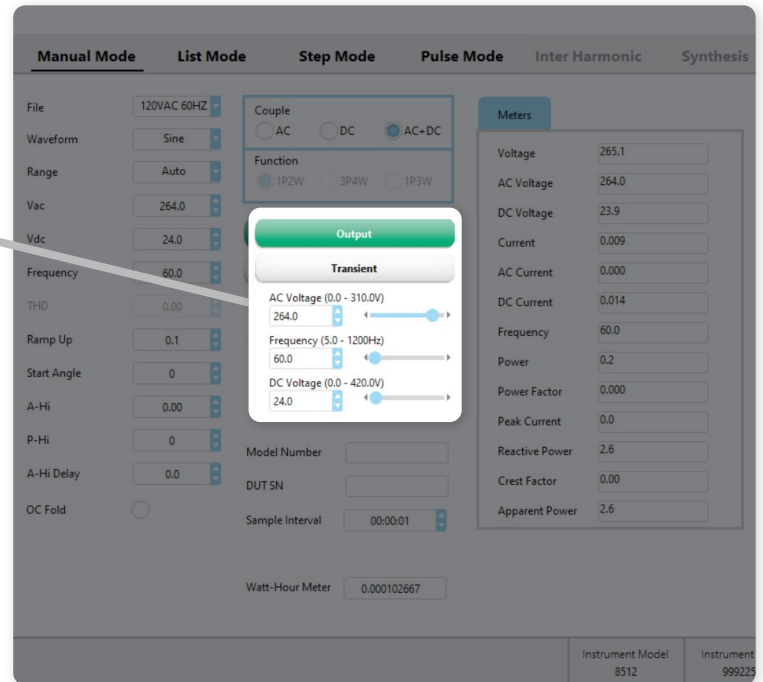
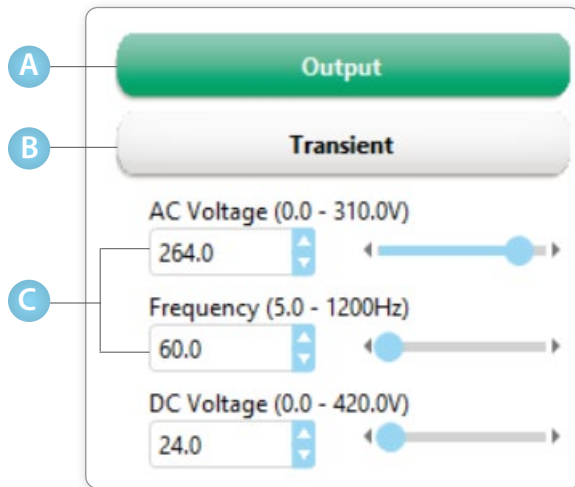
Phase L1-L2	Phase L1	Phase L2
Meter-Voltage	114.6	
Meter-Frequency	34.4	
Meter-Current	3.8	
Meter-Power	437.9	
Reactive Power	438.7	
Crest Factor	0.76	
Peak Current	3.8	
Apparent Power	437.9	
Power Factor	0.8	

8500 Series

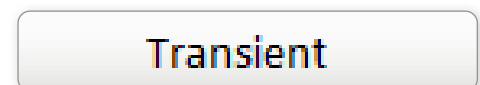
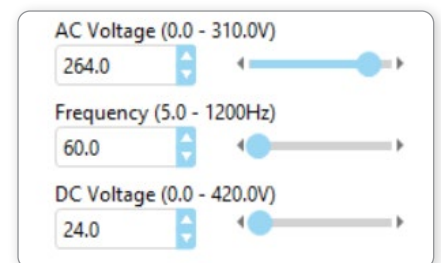
Meters	
Voltage	258.2
AC Voltage	238.0
DC Voltage	99.9
Current	0.008
AC Current	0.000
DC Current	0.014
Frequency	60.0
Power	1.9
Power Factor	0.000
Peak Current	0.0
Reactive Power	0.9
Crest Factor	0.00
Apparent Power	2.1

Manual Mode - Test Output and Reset

The Test Output and Reset section of the Manual Mode tab is used for starting or resetting the output on the power source. The voltage and frequency of the power source may also be adjusted here on the fly. Transients can be triggered by clicking on the Transient button. Additional Watts per Hour meters are available in this section.



- A Output**
Click on Output to activate voltage output.
- B Reset**
Click on Reset to stop output on the source.
(Note, the Output button changes to Reset once clicked on.)
- C Voltage and Frequency**
Enter voltage and frequency values or use the slider to edit the output voltage and frequency.
- D Transient**
Click on the Transient button to trigger a transient voltage on the output.



Manual Mode - Device Under Test (DUT) Information

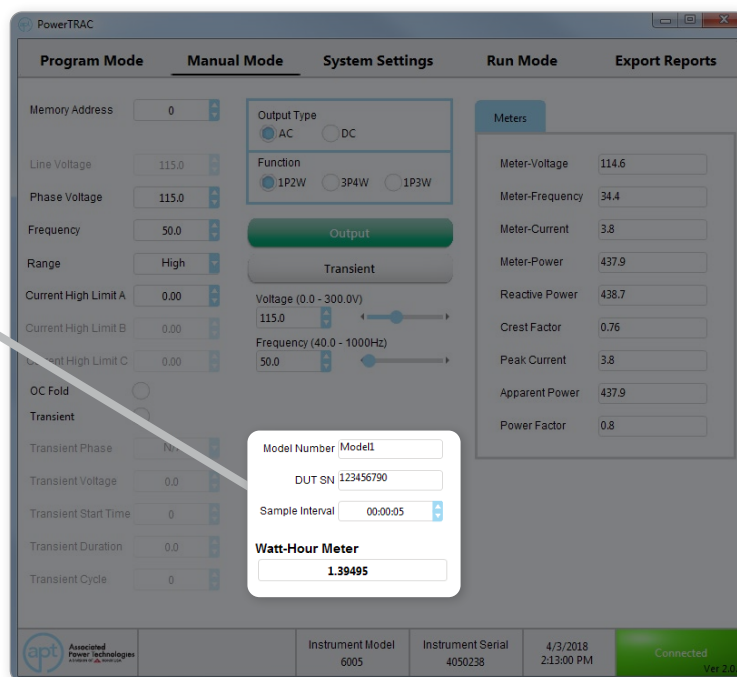
Use this section to enter the model and serial number of the DUT to be recorded in the test reports. The data collected will be sampled at the interval specified in the Sample Interval field.

A Model Number Model1

B DUT SN 123456790

C Sample Interval 00:00:05

D **Watt-Hour Meter**
1.39495



- A Model Number**
Field to enter DUT model number.
- B Serial Number**
Field to enter DUT serial number.
- C Sample Interval**
Field to set the time interval for sampling and saving of the test data.
- D Watt-Hour Meter**
Calculated value using Watts x Number of hours the output has been activated.

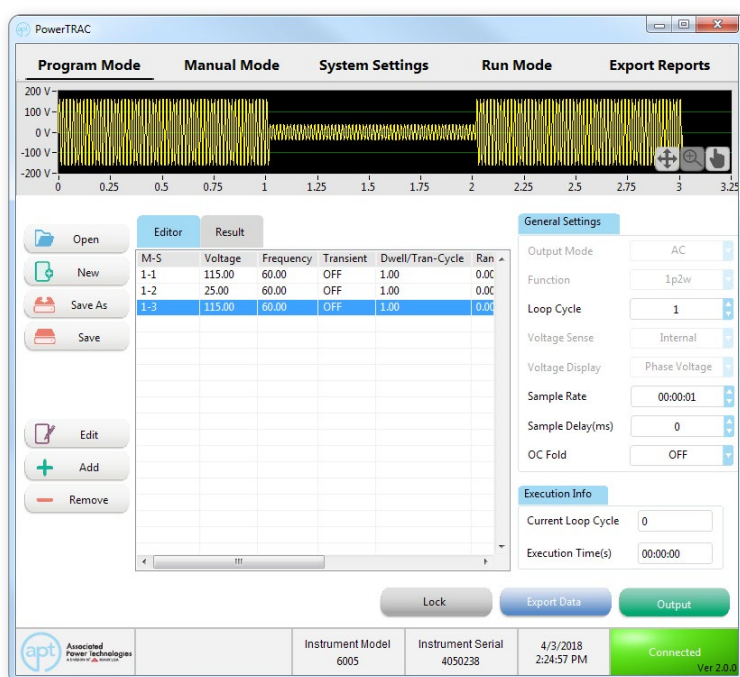
Program Mode

6000, 7000, 300XAC, and 400XAC Series

Program Mode allows for the software to program individual memories and steps with custom test parameters. This mode will run test routines according to the parameters currently programmed into the memory. The test times are programmed individually for each step. The voltage output will follow the preprogrammed steps created on this screen.

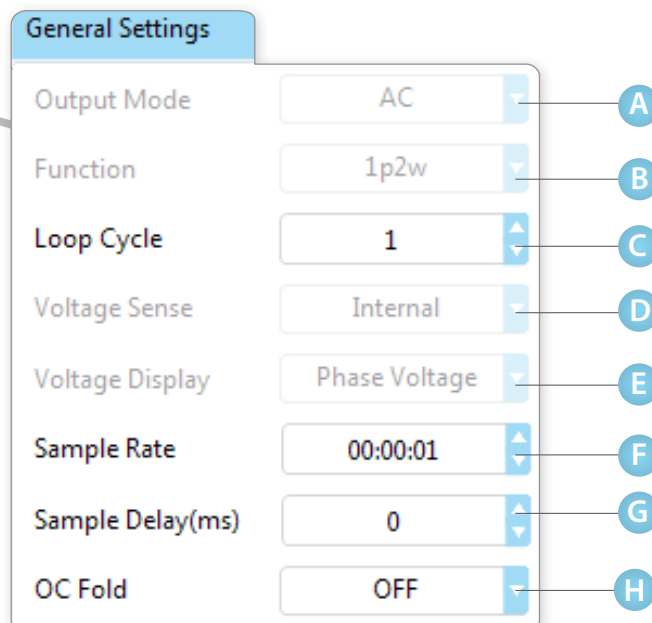
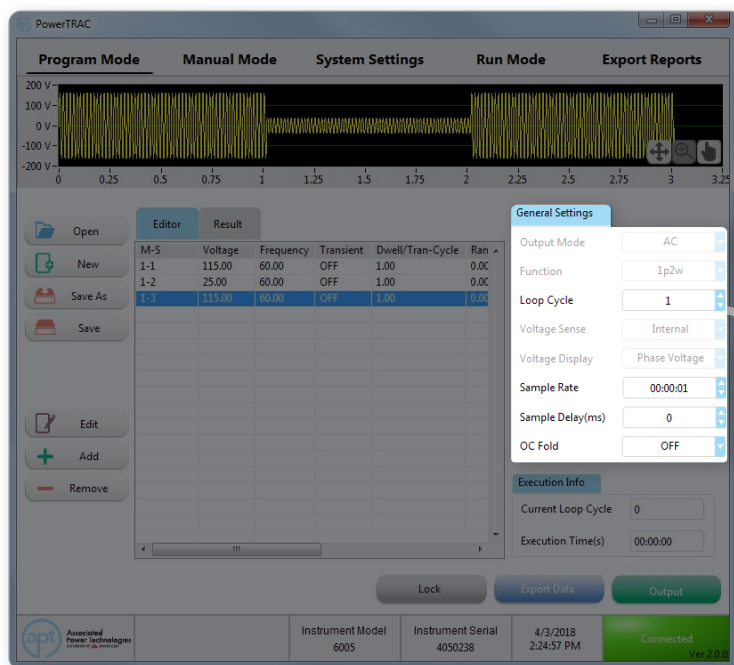
Test programs can be easily created by using the Add Step button and saved to PC in .pmsf format. This test file can later be used to recall the same setup. During Run Mode operation of the software, files created in this section of the software are recalled to perform the associated tasks.

The live meter data is collected directly from the power source and saved at the selected sampling time.



Program Mode - General Settings

The Program Mode General Settings tab is used to enter the Model and Serial Number of the DUT. Model and Serial data will be recorded within test reports. The data collected will be sampled at the interval specified in the Sample Interval field.

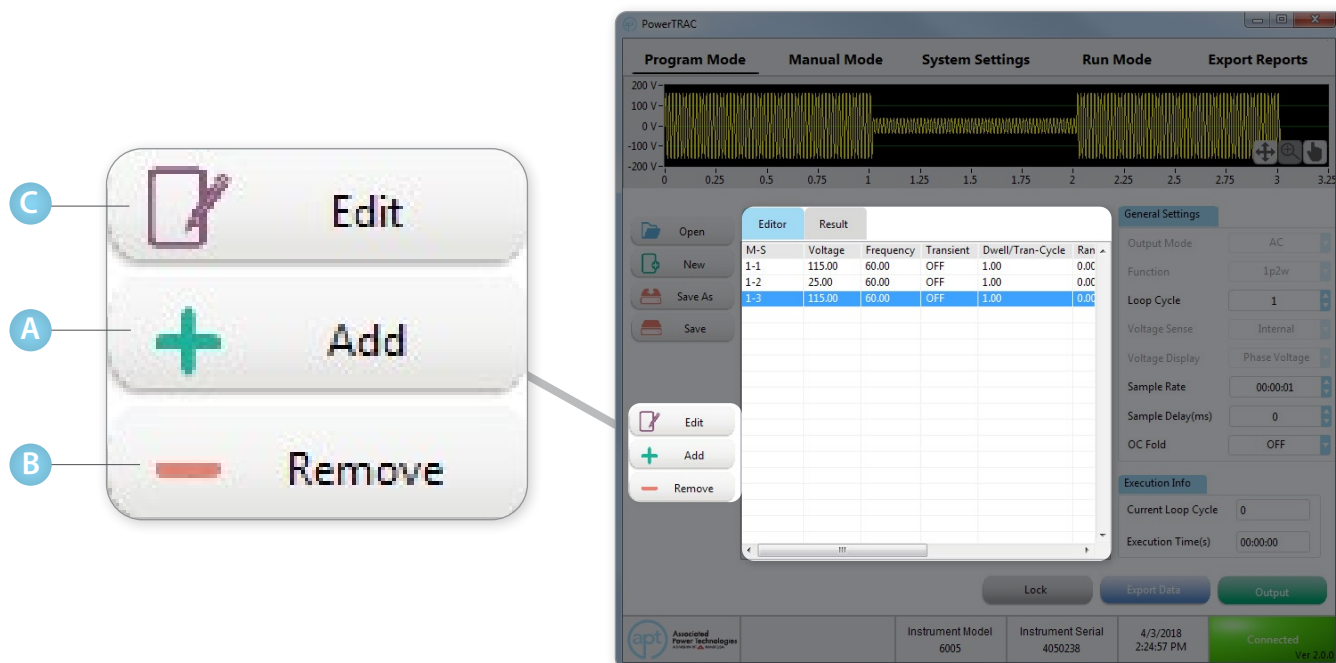


- A Output Mode**
Selectable to AC or DC
- B Function**
Selectable to 1P2W, 1P3W or 3P4W
- C Loop Cycle**
Allows the software to automatically loop test sequence, 0 = Continuous, 1 – 9999 number of loops
- D Voltage Sense**
Voltage sensing can be selected to be Internal or External
- E Voltage Display**
Selectable Phase or Line voltage
- F Sample Rate**
The sampling rate for collecting test data can be selected in 1-second increments.
- G Sample Delay**
Delay before the first sample of data is collected, 0 – 9999 ms
- H OC Fold**
Over current foldback is a technology used in power sources that keeps output current constant by reducing the voltage in order to power loads that may have a high inrush current.

Program Mode - Edit, Add, and Remove

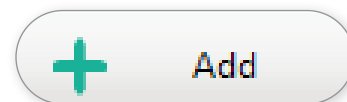
The Edit, Add, and Remove buttons of the program mode screen, located in the left toolbar, allow for creating and editing test routines.

Test step Editor and Results tabs may be accessed in the main table area of the screen. Choose Editor to edit test steps from the list. To edit your test step order, highlight an individual test step. You may drag and drop steps to quickly change test order.



A Adding Steps

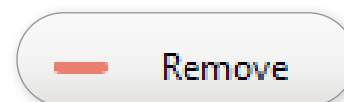
Click on the Add button to add a test step to the memory. The Edit Parameters screen opens up to allow for programming new test parameters. Verify the output parameters and click on OK to add a step.



The user can click on the Add key repeatedly to add memories and steps until no more memory and steps can be added. (Memory, Step, and Program limits vary depending on models).

B Removing Steps

To remove any step from the list, click on that step and click Remove button.





Editing Steps

If you need to modify the output parameters of a step, select the step and click Edit. Alternatively, double-click on the test step to open the editing window for that step. Once the editing is completed, click on OK to finish.



Edit

Add or Edit Parameter Screen Examples

The following screens appear after clicking Add or Edit. Update your test parameters here.

Function 1p2W

Edit parameters

Parameters

Transient ☐

Time Unit

Memory - Step Range

Voltage (0.0-300.0V) Frequency (40.0-1000Hz)

Ramp Up (0.0-999.9s) Ramp Down (0.0-999.9s)

Dwell (0.5-999.9, 0=const.) Delay (0.5-999.9s)

Step Cycle (0-9999,0=Cont, 1=OFF)

Start Angle (0-359deg) End Angle (0-359deg)

Memory Cycle (0-9999,0=Cont, 1=OFF)

OK Cancel

Edit parameters

Parameters Limit

A High-limit A Low-limit

P High-limit P Low-limit

Ap High-limit Ap Low-limit

CF High-limit CF Low-limit

PF High-limit PF Low-limit

VA High-limit VA Low-limit

Q High-limit Q Low-limit

OK Cancel

Function 1p3W

Edit parameters

Parameters

Transient ☐

Time Unit

Memory - Step Range

Voltage (0.0-300.0V) Frequency (40.0-1000Hz)

Ramp Up (0.0-999.9s) Ramp Down (0.0-999.9s)

Dwell (1.0-999.9, 0=const) Delay (1.0-999.9)

Step Cycle (0-9999,0=Cont, 1=OFF)

Start Angle (0-359deg) End Angle (0-359deg)

Memory Cycle (0-9999,0=Cont, 1=OFF)

OK Cancel

Edit parameters

Parameters L1-Limit L2-Limit

A High-limit A Low-limit

P High-limit P Low-limit

Ap High-limit Ap Low-limit

CF High-limit CF Low-limit

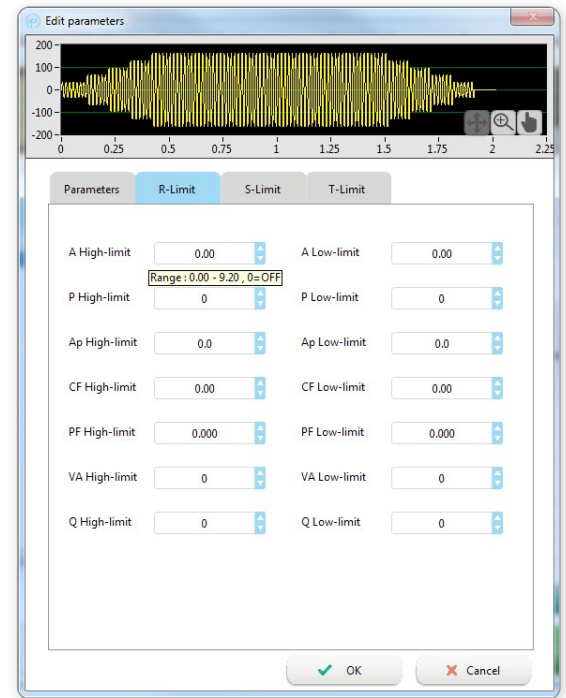
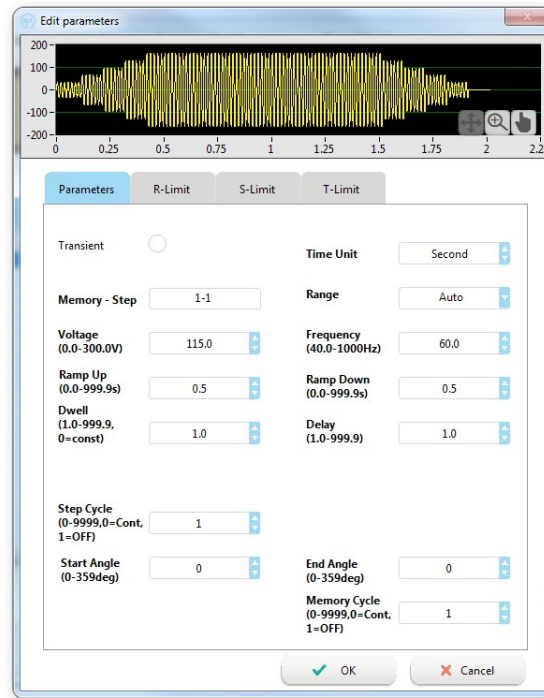
PF High-limit PF Low-limit

VA High-limit VA Low-limit

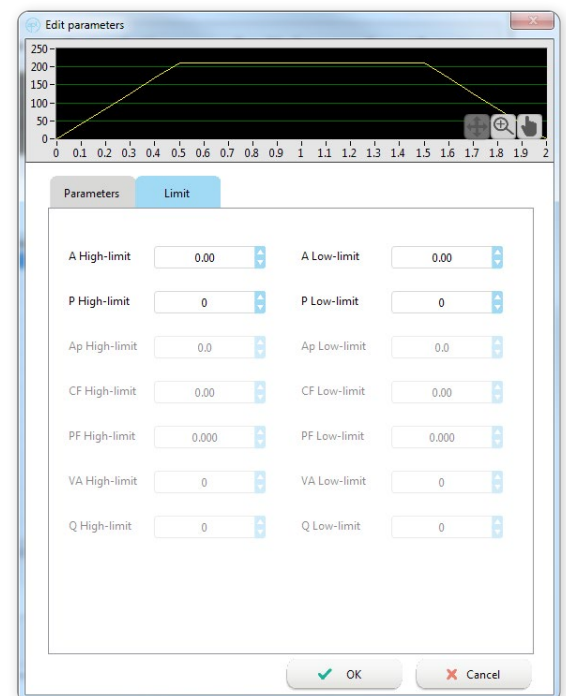
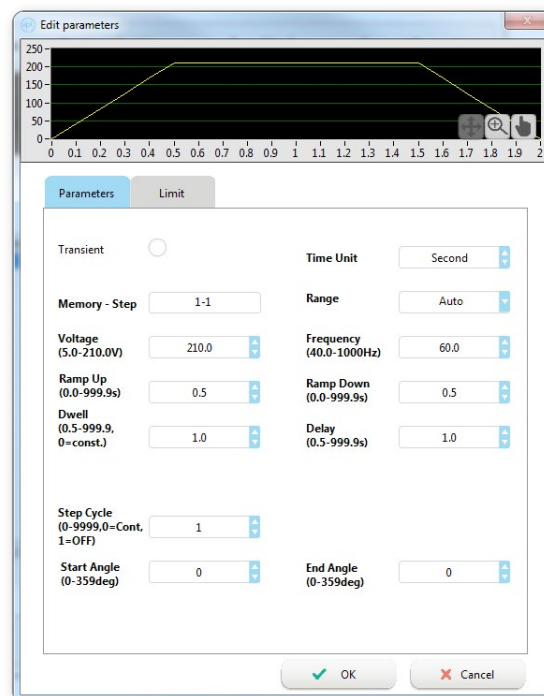
Q High-limit Q Low-limit

OK Cancel

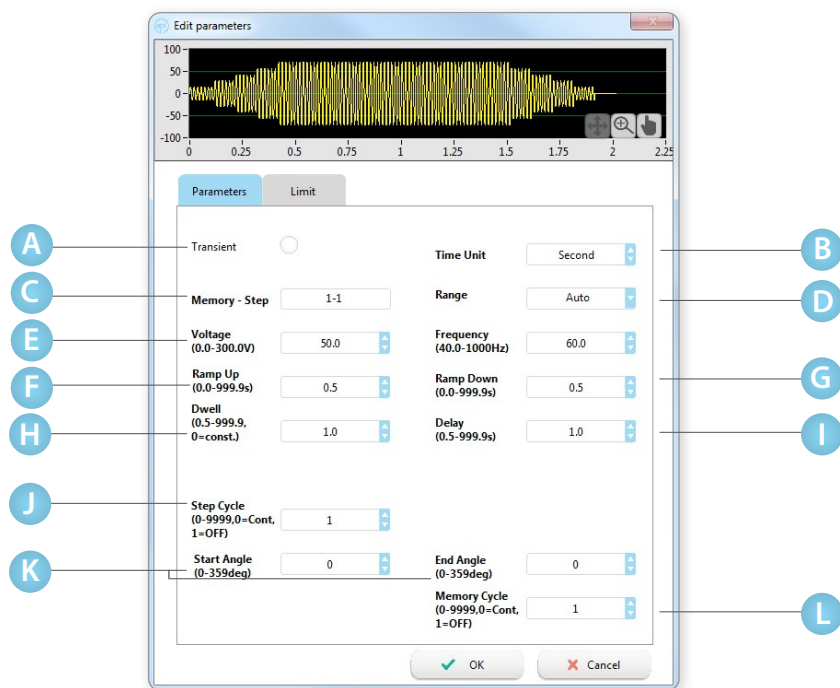
Function 3P4W



Output Mode DC

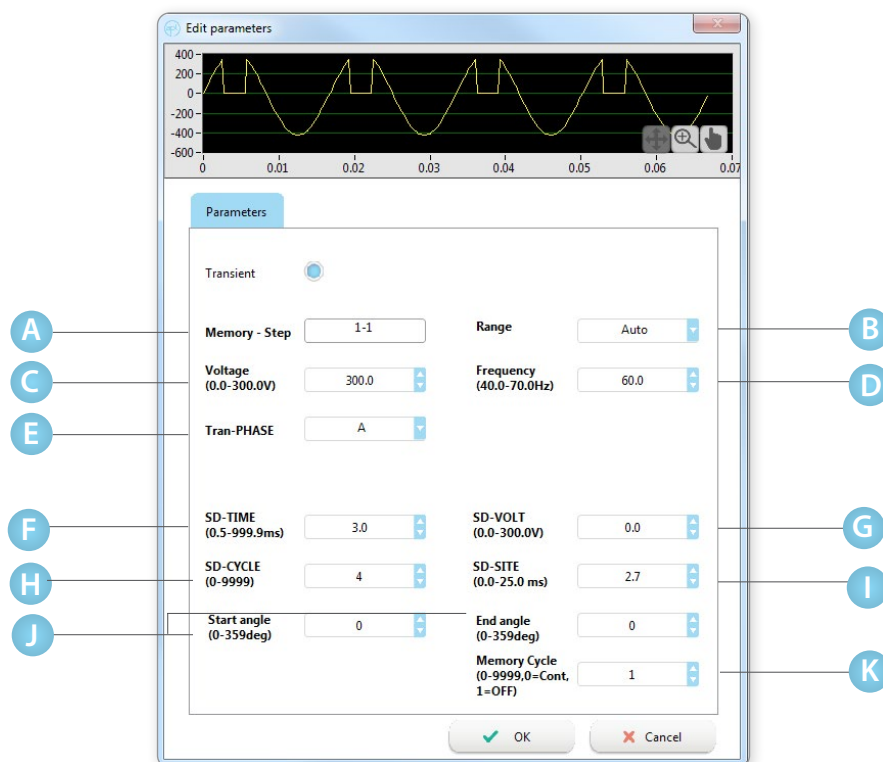


The Parameter Editing Screen



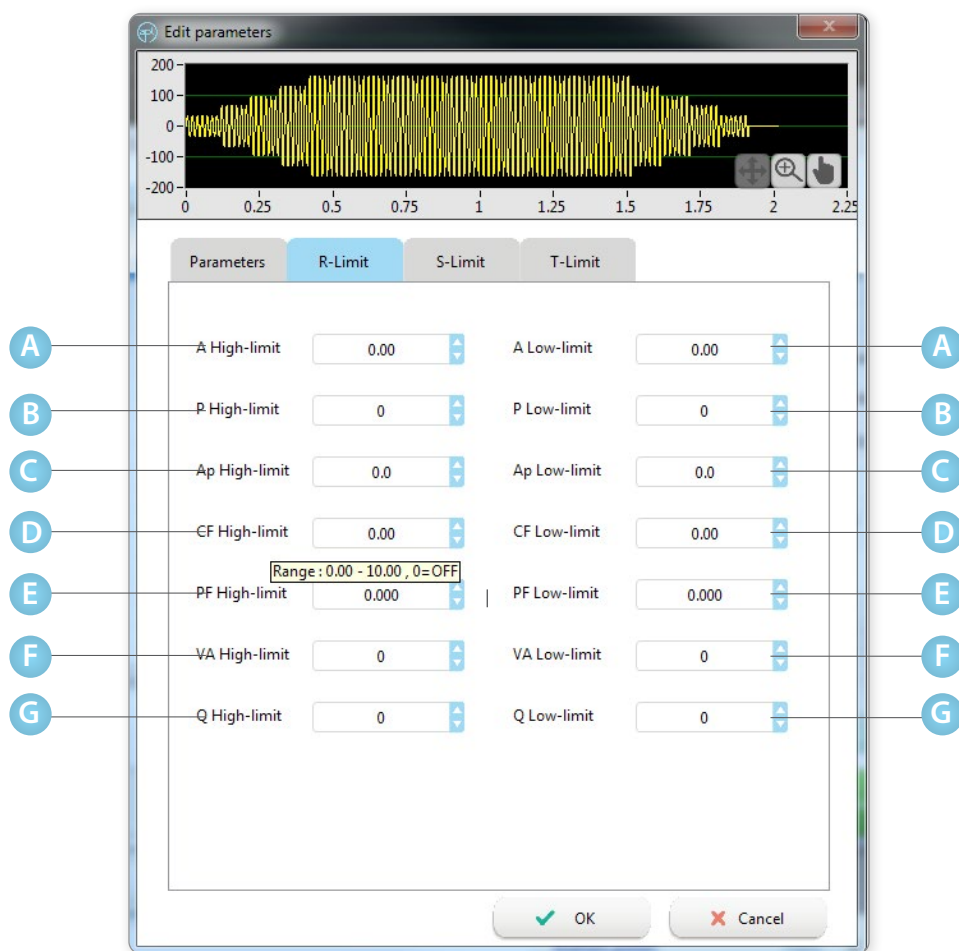
A	Transient	ON or OFF	Add a Transient Step
B	Time Unit	Hour, Minute, Second	Execution time unit selection in hour, minute or seconds
C	Memory – Step	1-50	Memory and Step selection
D	Range	Auto / High	Auto – Allows the source to select a best suitable range. High – When voltage is between 0 – 300 V, current is limited to high range current maximum
E	Voltage	0 300	Output Voltage selection in Volts
F	Ramp UP	0.0-999.9	Test parameter to increase the voltage output over a duration of time prior to achieving the programmed output voltage.
G	Ramp DOWN		Test parameter to program a time duration in which the output voltage is reduced to zero after the dwell time has completed.
H	Dwell Time	0.5-999.99	Test parameter of actual test or execution time. This time begins after the ramp-up time has been completed. The high and low limit thresholds are active during Dwell Time.
I	Delay Time	0.5-999.9	Test parameter of delay or warm up time. There is a voltage output present from the source, but the high and low limit thresholds are essentially ignored during this period.
J	Step Cycle	0-9999	Test parameter of loop cycles for a particular step. The step will be repeated based on this selection.
K	Start/End Angle	0-359	The starting and ending angle for the sine wave, only applicable to the first step of the memory.
L	Memory Cycle	0-9999, 0=cont, 1=OFF	Test parameter for how many times the memory test sequence will repeat when in the PROGRAM Mode. This eliminates the need for the operator to press the Test/Reset key or send multiple test commands to the source to repeat a memory test sequence.

Transient Parameters Example



A	Memory – Step	1 – 50	Memory and Step selection
B	Range	Auto / High	Auto – Allows the source to select a best suitable range. High – When voltage is between 0 – 300 V, current is limited to high range current maximum
C	Voltage	0 -300	Output Voltage selection in Volts
D	Frequency	47.0 -70.0 40.0 – 70.0	Output frequency selection in Hz. 6000 and 7000 series 300XAC and 400XAC series
E	Trans-Phase	A, B, C	For Three-Phase output only. Only one phase can be selected at a time to receive the transient voltage on the output.
F	SD-Time / Trans-Time	0.5-999.9	Surge or drop time in milliseconds. Flexibility to program the overall time duration of the surge or drop voltage.
G	SD-Volt / Trans-Volt	0.0-150.0	Surge or drop voltage in Volts. Flexibility to program a surge or drop in the voltage output.
H	SD-Cycle / Trans-Cycle	0-9999	Surge or drop loop. Flexibility to program whether the transient voltage will occur continuously for each sine wave of the test routine. The operator has the choice of selecting 0 or 1-9999.
I	SD-Site / Trans-Site	0.0-25.0	Surge or drop site on the sine wave in milliseconds. Flexibility to program the specific degree angle in the sine wave to initialize the surge or the drop voltage
J	Start/End Angle	0-359	The starting and ending angle for the sine wave, only applicable to the first step of the memory.
K	Memory Cycle	0-9999, 0=cont, 1=OFF	Memory Cycle - Test parameter for how many times the memory test sequence will repeat when in the Program Mode. Only applicable to the first step in the memory.

High and Low Limits Settings Screen

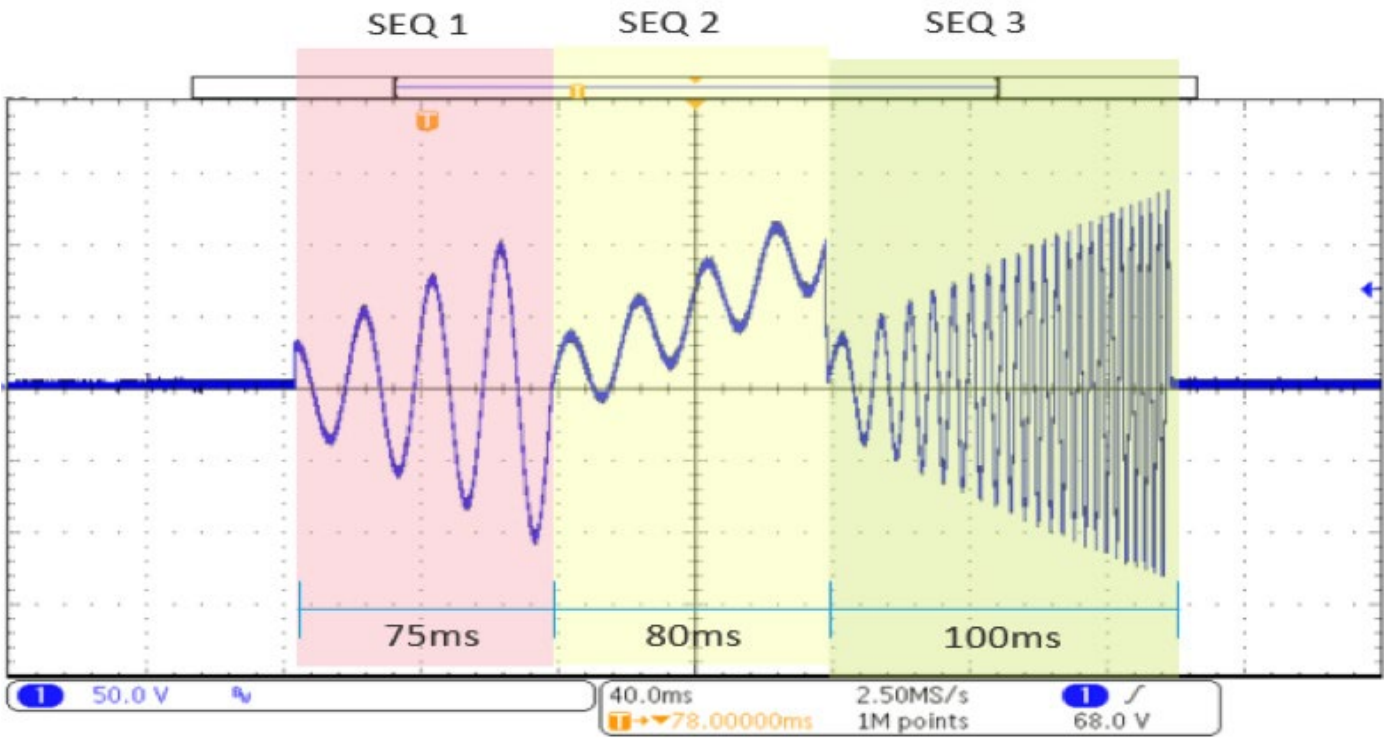


Moving the cursor over the parameter will display the available range for that test parameter.

A	A Limit	High / Low	The maximum and minimum values for Current output
B	P Limit	High / Low	The maximum and minimum values for Power in Watts
C	Ap Limit	High / Low	The maximum and minimum values for peak Current at the output
D	CF Limit	High / Low	The maximum and minimum values for Crest Factor at the output
E	PF Limit	High / Low	The maximum and minimum values for Power Factor at the output
F	VA Limit	High / Low	The maximum and minimum values for Apparent Power in VA at the output
G	Q Limit	High / Low	The maximum and minimum values for Reactive Power in VAR at the output

8500 Series - List Mode

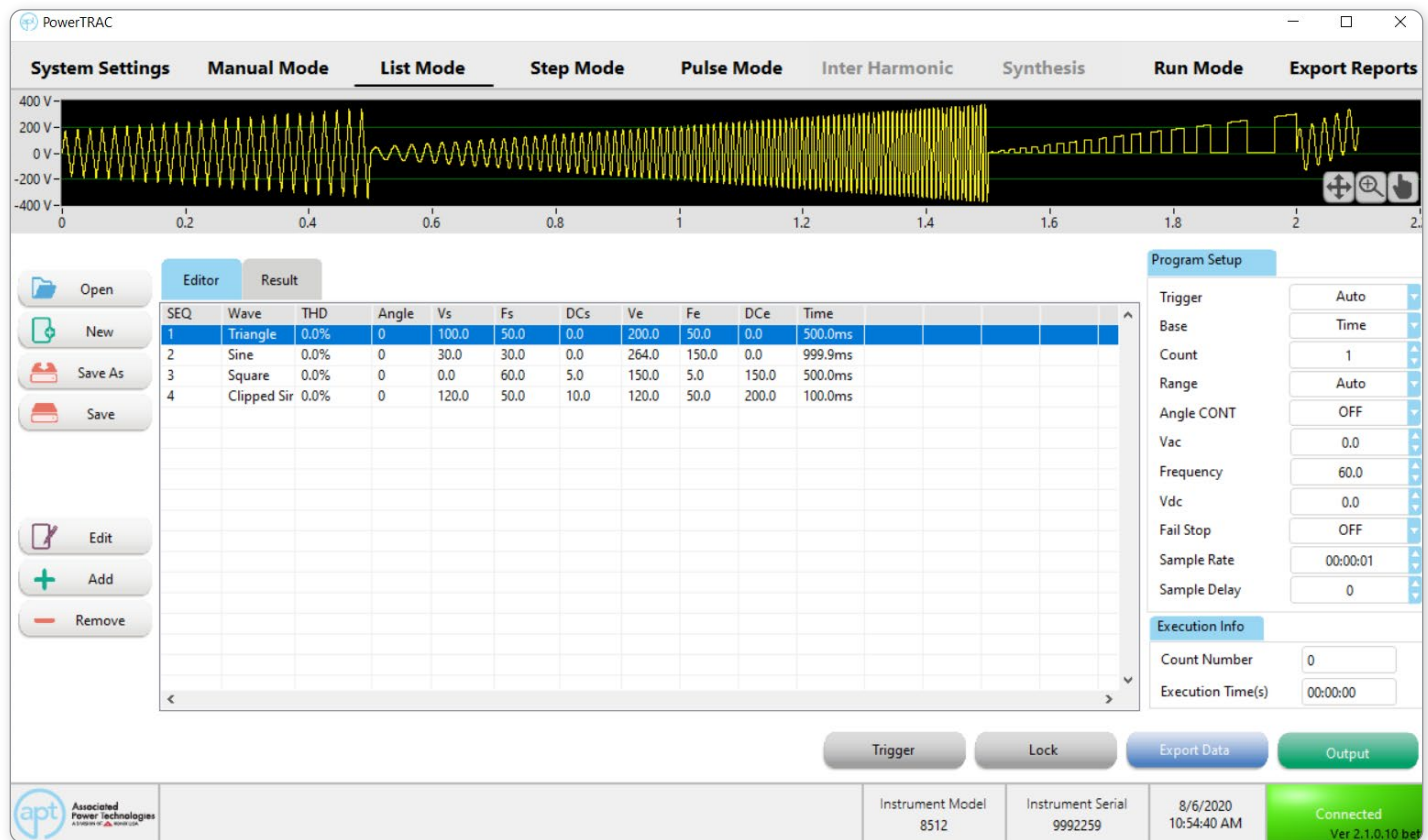
The List Mode allows you to create and generate complex output sequences with varying time, amplitude, frequency, and voltage. The List mode can be used to create a wide range of waveforms to simulate power grid faults and disturbances. Refer to section 4.4.4 List Mode – Test Parameters in 8500 Series operational manual for additional details.



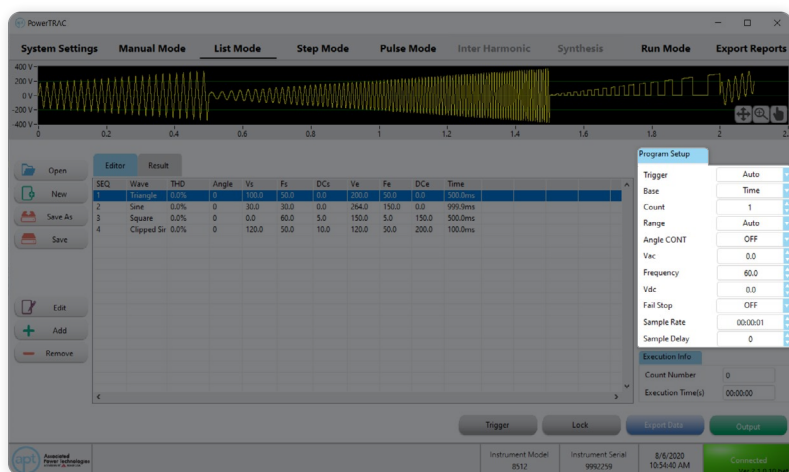
8500 Series - List Mode Cont.

List Mode allows for the software to program files with multiple sequences where each sequence can be programmed with custom test parameters. This mode will run test routines according to the parameters currently programmed into each file. The test times are programmed individually for each sequence. The voltage output will follow the preprogrammed sequences created on this screen.

Test programs can be easily created by using the Add button and saved to PC in .csv format. This test file can later be used to recall the same setup. During Run Mode operation of the software, files created in this section of the software are recalled to perform the associated tasks. The live meter data is collected directly from the power source and saved at the selected Sample Rate parameter.



8500 Series - List Mode - Program Setup



Program Setup

Trigger

Auto

▼

Base

Time

▼

Count

1

▲▼

Range

Auto

▼

Angle CONT

OFF

▼

Vac

0.0

▲▼

Frequency

60.0

▲▼

Vdc

0.0

▲▼

Fail Stop

OFF

▼

Sample Rate

00:00:01

▲▼

Sample Delay

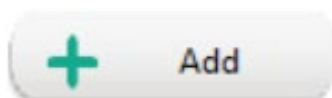
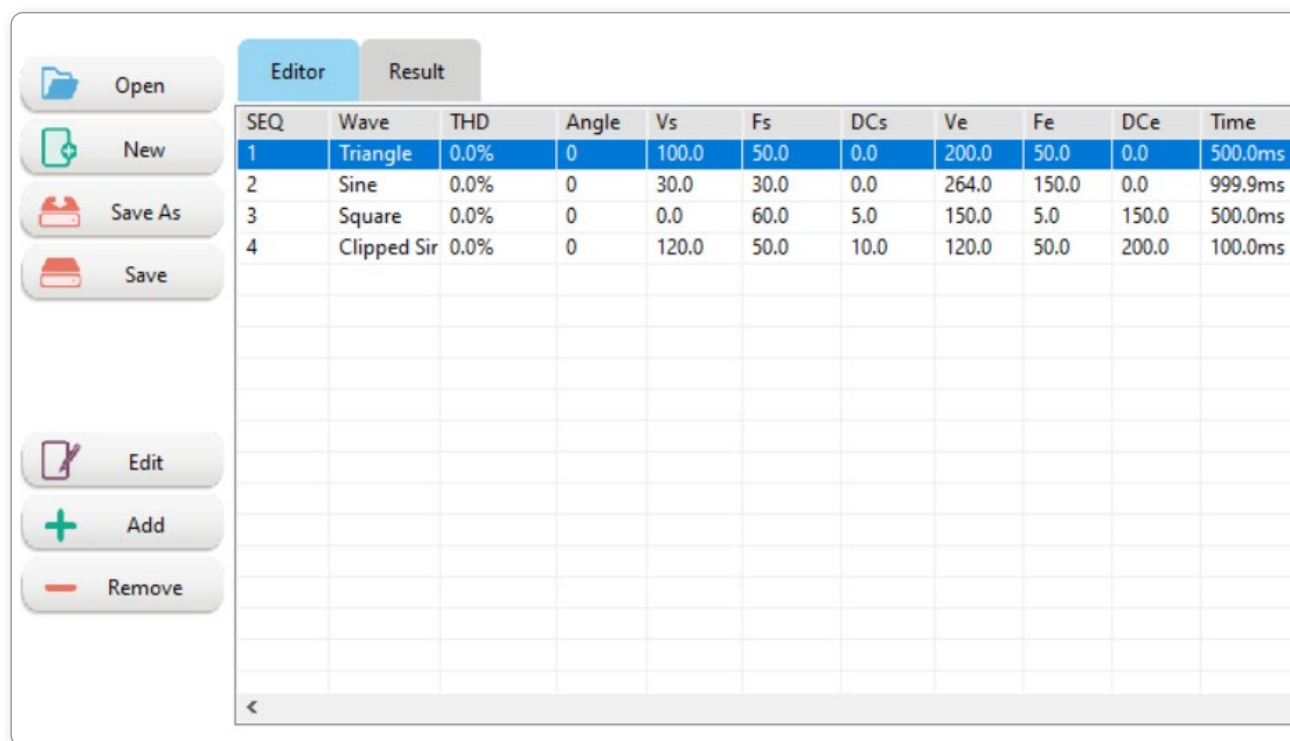
0

▲▼

- A Trigger**
Selectable Auto or Manual
- B Base**
Selectable Time or Cycle
- C Count**
Allows the software to automatically loop test sequence. 0 = Continuous, 1 – 9999 number of loops.
- D Range**
Selectable to Auto, High and Low
- E Angle CONT**
Selectable to ON or OFF
- F Vac**
AC Voltage parameter for the program (Valid for Manual trigger only)
- G Frequency**
Frequency parameter for the program (Valid for Manual trigger only)
- H Vdc**
DC Voltage parameter for the program (Valid for Manual trigger only)
- I Fail Stop**
Selectable to ON or OFF
- J Sample Rate**
The sampling rate for collecting test data can be selected in 1-second increments.
- K Sample Delay**
Delay before the first sample of data is collected, 0 – 9999 ms

8500 Series - List Mode - Add, Edit, and Remove Sequence

The Edit, Add, and Remove buttons of the list mode screen, located in the left toolbar, allow for creating and editing test routines. Test step Editor and Results tabs may be accessed in the main table area of the screen. Choose Editor to edit test steps from the list. To edit your test step order, highlight an individual test step. You may drag and drop steps to quickly change test order.



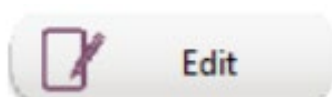
Adding Sequence:

Click on the Add button to add a test sequence to the file. The parameter editing screen opens up to allow for programming new test parameters. Verify the output parameters and click on Ok to add a sequence.



Removing Sequence:

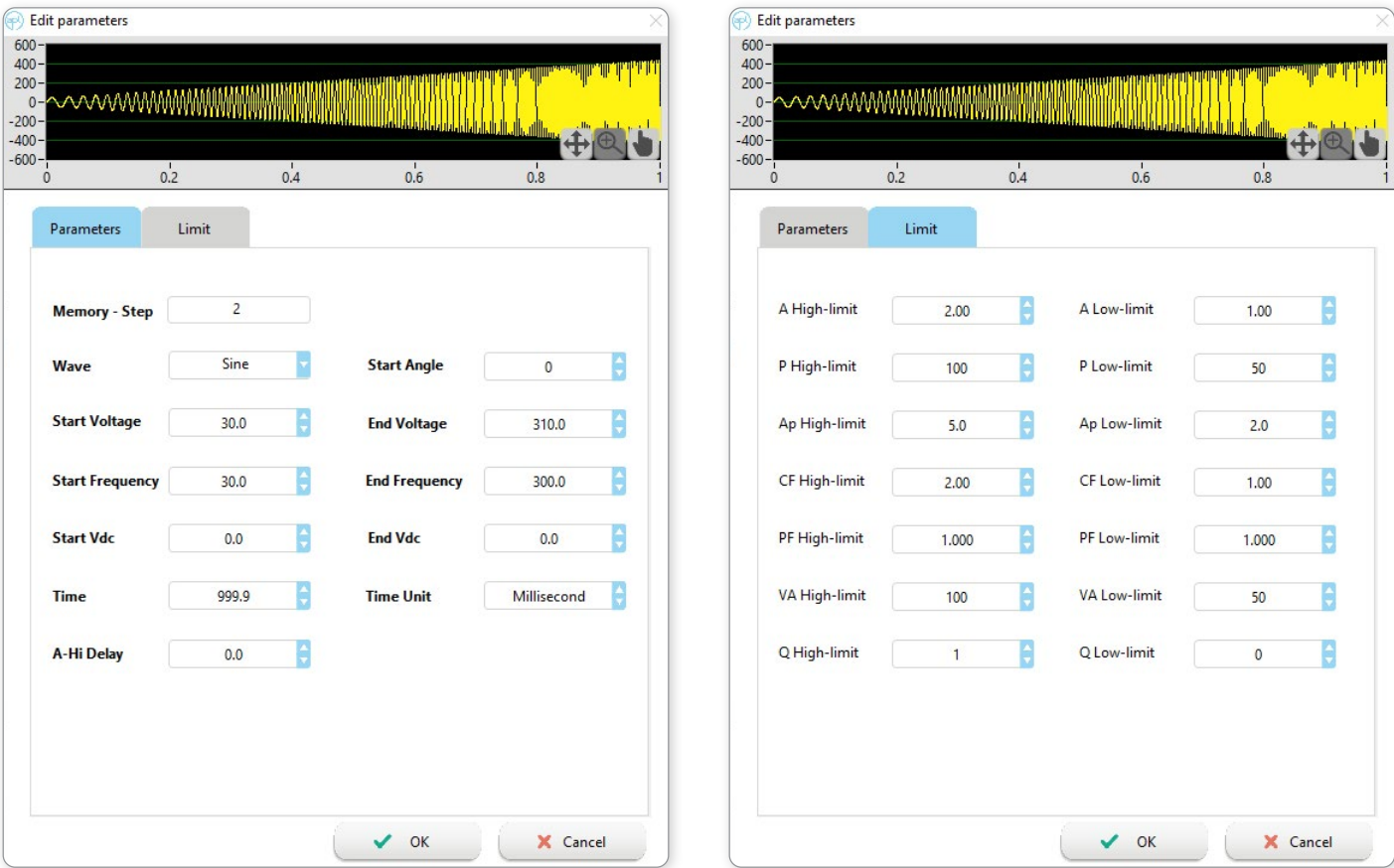
To remove any sequence from the list, click on that sequence and click Remove button.



Editing Sequences:

If the user needs to modify the output parameters of a sequence, click on the sequence and click on the Edit button. Alternatively, double-click to open the editing window for that sequence. Once the editing is completed, click on OK to finish.

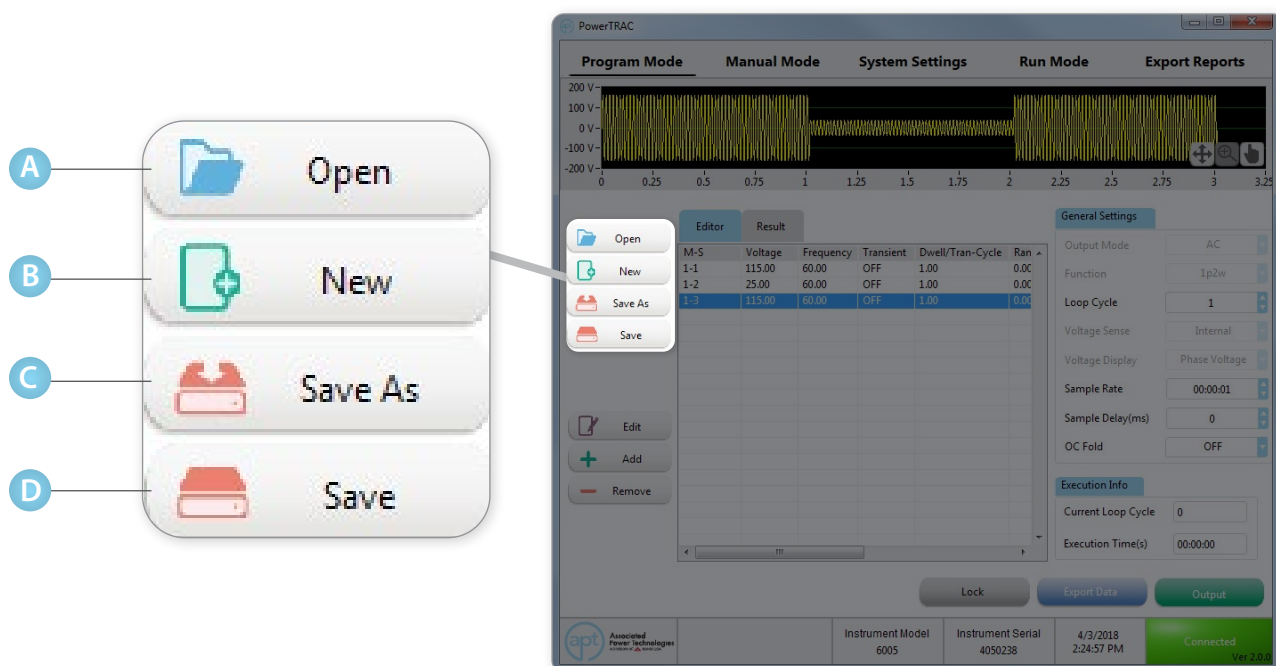
Add or Edit Parameter Screen Example



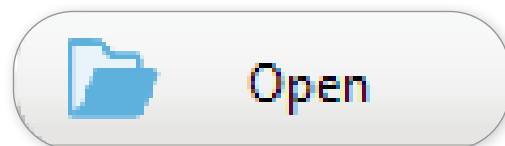
The available range and description of each test parameter can be found in the 8500 Operations Manual under List Mode section.

8500 Series - List Mode - File

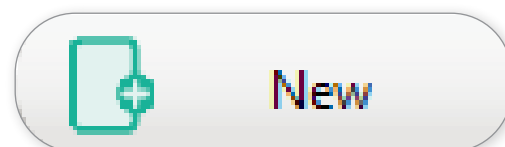
The File buttons of the program and list mode screen, located in the left toolbar, allow you to Create, Open, and Save test files. These buttons will open your PC's Microsoft Windows File Manager window.



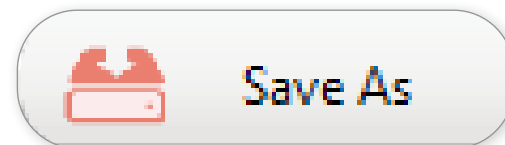
- A Open File**
Open a file and call up stored steps in a test file.



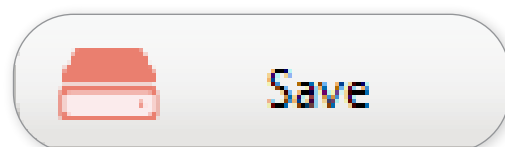
- B New File**
Create a new test file.



- C Save File As**
Save all programmed steps in the list to a new test file.

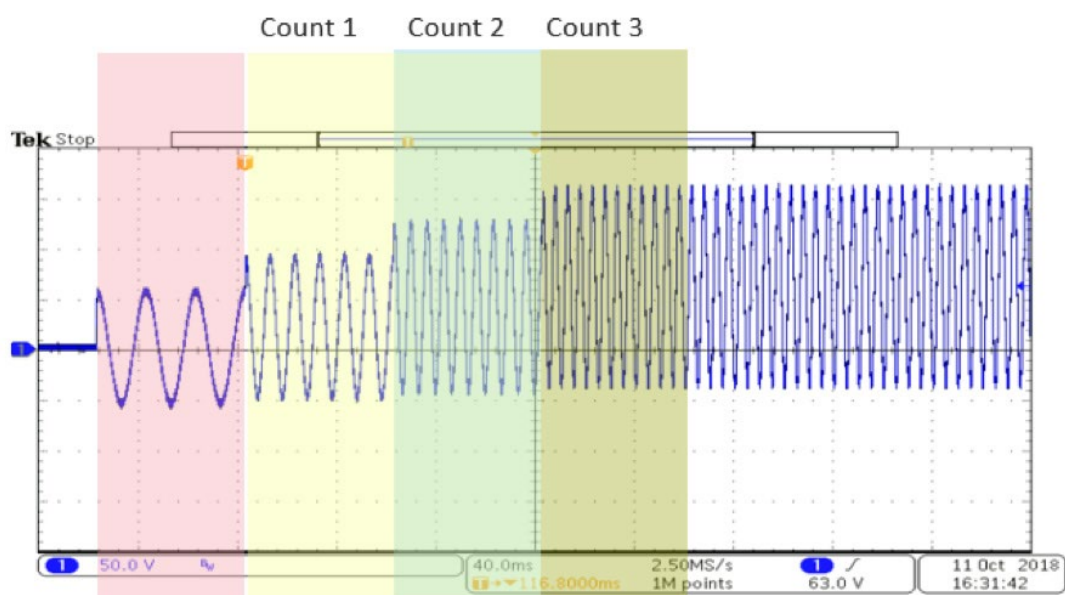


- D Save File**
Save the programmed steps in the current file to a test file.

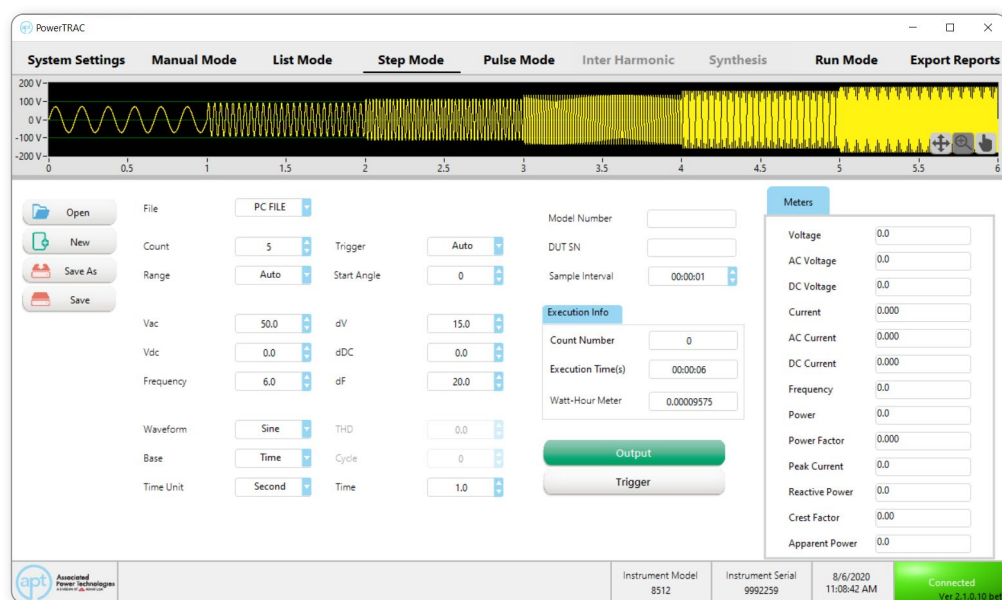


8500 Series - Step Mode

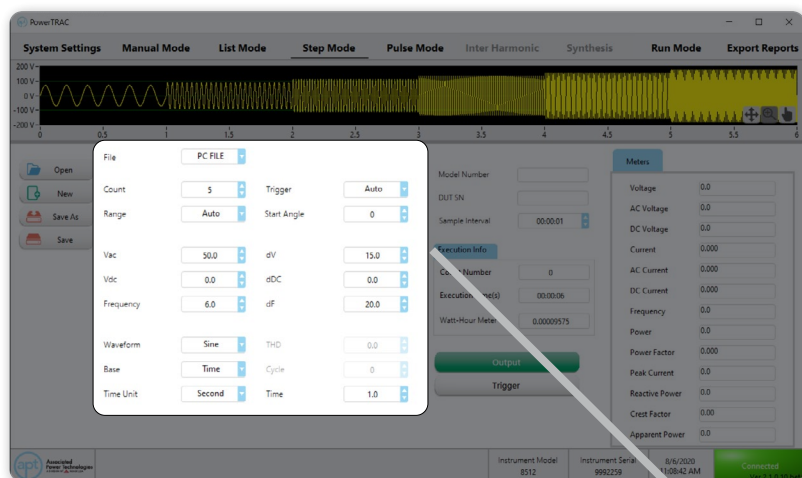
The Step Mode allows you to create and generate step-up output based on your defined voltage, frequency, and interval settings. Refer to section 4.4.6 Step Mode – Test Parameters in 8500 Series operational manual for additional details.



Step Mode allows for the software to program output with multiple counts with each count programmed to setup or step down AC, DC voltage and Frequency. This mode will run test routines according to the parameters currently programmed for each count. The test times are programmed for each count and total test time will be Time X Number of Counts. The voltage and frequency output will follow the rate of change listed under dV, dF and dDC parameters.



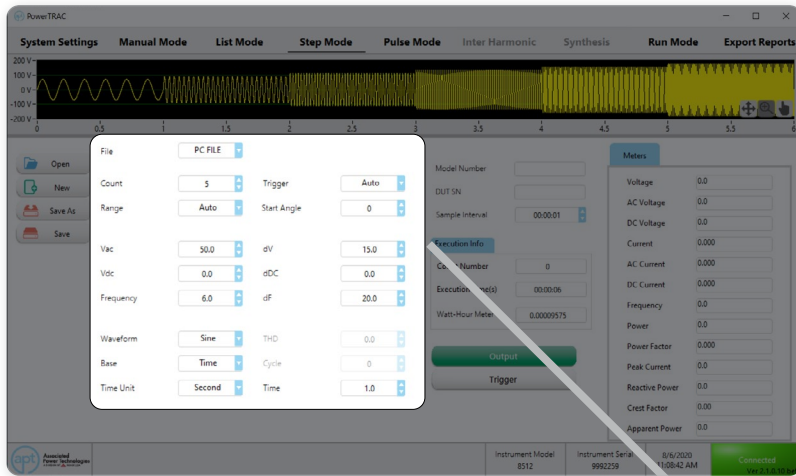
8500 Series - Step Mode - Setup



A	File	PC FILE		
B	Count	5	Trigger	C Auto
D	Range	Auto	Start Angle	E 0
F	Vac	50.0	dV	15.0
	Vdc	0.0	dDC	0.0
	Frequency	6.0	dF	20.0
	Waveform	Sine	THD	0.0
	Base	Time	Cycle	0
	Time Unit	Second	Time	1.0

- A File**
Select a pre-configured file from the dropdown list
- B Count**
Enter the number of counts
- C Trigger**
Selectable to Auto or Manual
- D Range**
Selectable to Auto, High, and Low
- E Start Angle**
Selectable between 0 and 259
- F Vac**
Starting AC Voltage

8500 Series - Step Mode - Setup Cont.



File	PC FILE	
Count	5	Trigger: Auto
Range	Auto	Start Angle: 0
Vac	50.0	dV: 15.0
Vdc	0.0	dDC: 0.0
Frequency	6.0	dF: 20.0
Waveform	Sine	THD: 0.0
Base	Time	Cycle: 0
Time Unit	Second	Time: 1.0

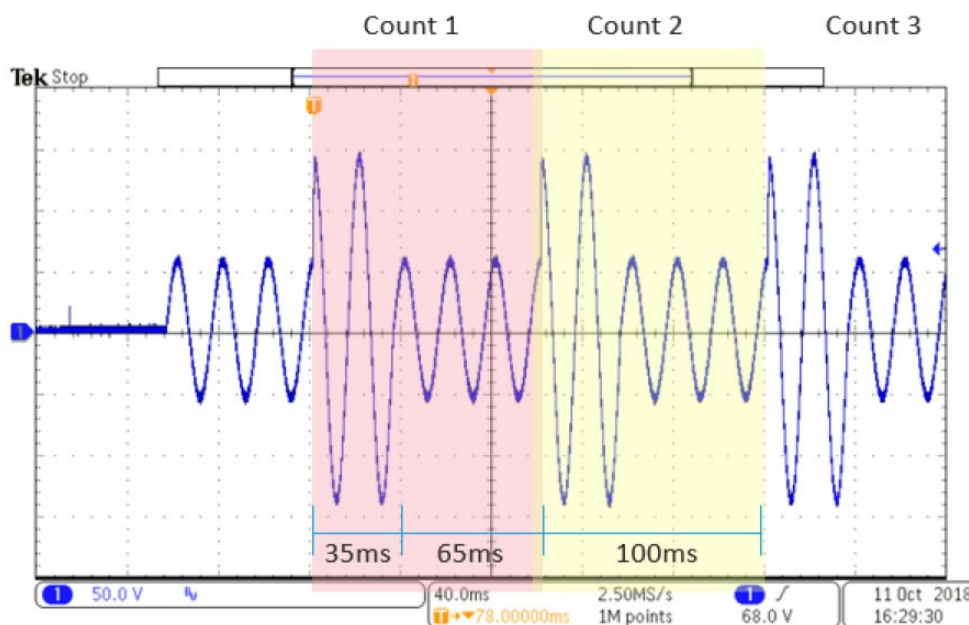
- G dV**
Rate of change in AC volts for each count
- H Vdc**
Starting DC Voltage
- I dDC**
Rate of change in DC volts for each count
- J Frequency**
Starting Frequency
- K dF**
Rate of change in Frequency for each count
- L Waveform**
Select the output waveform between Sine, Triangle, Square, and Clipped
- M THD**
Available for clipped sine wave output only
- N Base**
Selectable between Time and Cycle
- O Cycle**
Number of cycles to each step
- P Time Unit**
Selectable between Millisecond, Seconds, Minutes, and Hour
- Q Time**
Dwell time for each count.

H
J
L
N
P

G
I
K
M
O
Q

8500 Series - Pulse Mode

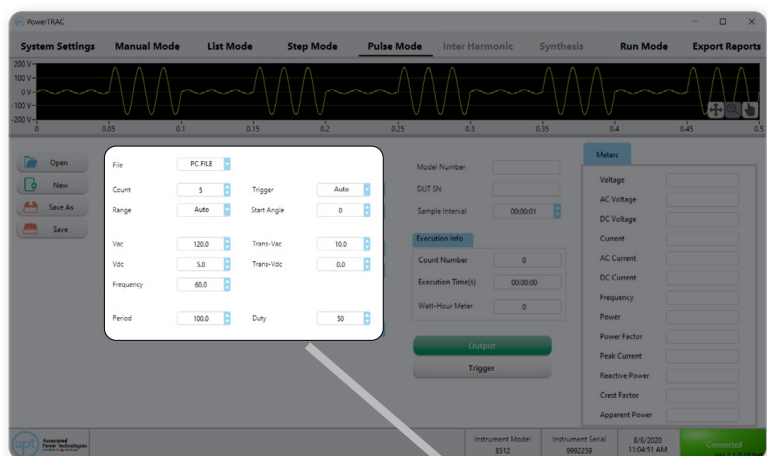
The Pulse Mode allows the user to create and generate single or multiple pulses with defined voltages. The Pulse mode can be used to create a wide range of waveforms to simulate power grid faults and disturbances, step-up or step-down output based on your defined voltage, frequency, and interval settings. Refer to section 4.4.8 Pulse Mode – Test Parameters in 8500 Series operational manual for additional details.



Pulse Mode allows for the software to program output with multiple counts with each count programmed to generate a pulse of change in AC or DC volts. The pulse can be controlled by the Duty Cycle parameter set to a value between 0 and 100 %. This mode will run test routines according to the parameters currently programmed for each count and repeated by the amount of counts the test Period is programmed for. Each count and total test time will be Period X Number of Counts.



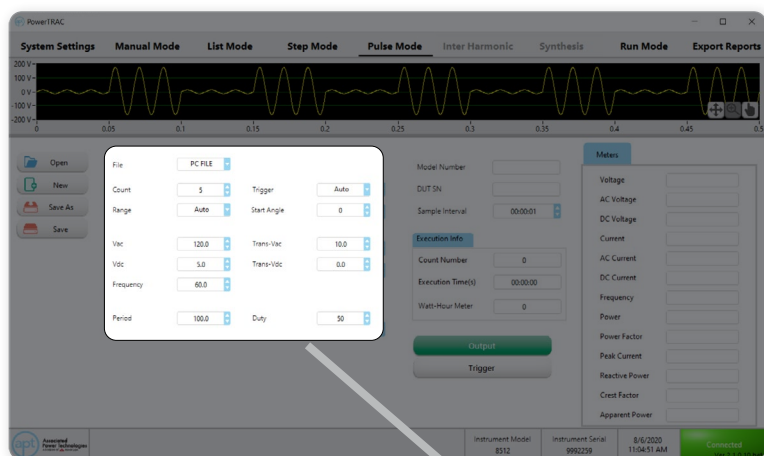
8500 Series - Pulse Mode - Setup



A	File	PC FILE			
B	Count	5	Trigger	Auto	C
D	Range	Auto	Start Angle	0	E
F	Vac	120.0	Trans-Vac	10.0	
	Vdc	5.0	Trans-Vdc	0.0	
	Frequency	60.0			
	Period	100.0	Duty	50	

- A File**
Select a pre-configured file from the dropdown list
- B Count**
Enter the number of counts
- C Trigger**
Selectable to Auto or Manual
- D Range**
Selectable to Auto, High and Low
- E Start Angle**
Starting angle select between 0 – 359 °
- F Vac**
Starting AC Voltage

8500 Series - Pulse Mode - Setup Cont.



File	PC FILE		
Count	5	Trigger	Auto
Range	Auto	Start Angle	0
Vac	120.0	Trans-Vac	10.0
Vdc	5.0	Trans-Vdc	0.0
Frequency	60.0		
Period	100.0	Duty	50

- G** **Trans-Vac**
Transient Voltage AC
- H** **Vdc**
Starting DC Voltage
- I** **Trans-Vdc**
Transient Voltage DC
- J** **Frequency**
Starting Frequency
- K** **Period**
Dwell time for each count
- L** **Duty**
Enter a percentage of count the pulse is activated.

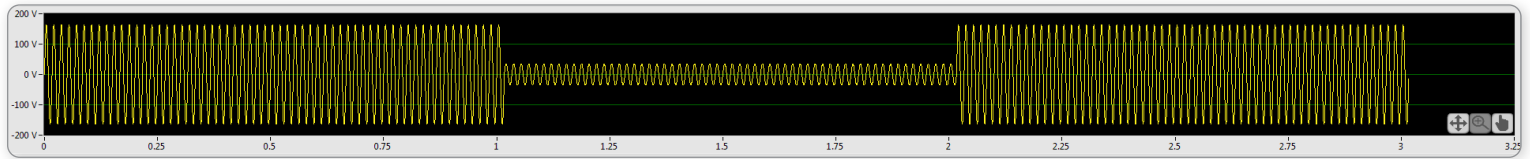
The available range and description of each test parameter can be found in the 8500 Operations Manual under Pulse Mode section.

8500 Series - Pulse Mode - Measurement

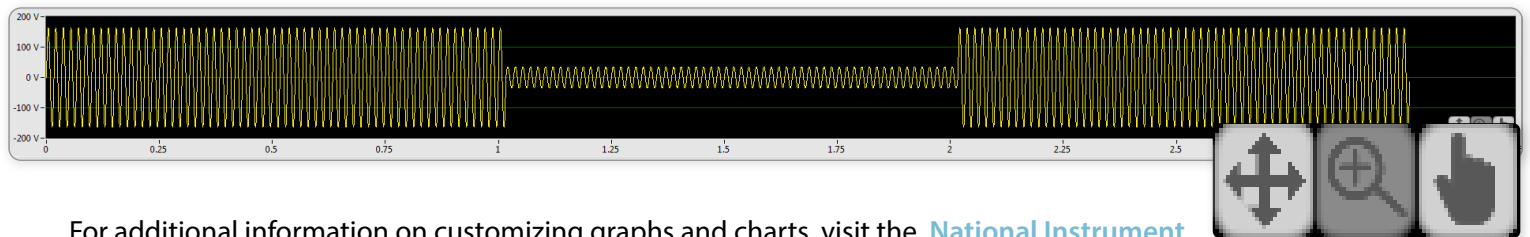
Measurement Meters display the live data being captured from the power source. Depending on the output function selected, each phase will have an associated meter. The Meters display the data collected for Voltage (AC+DC), AC Voltage, DC Voltage, Current, AC Current, DC Current, Frequency, Power, Power Factor, Peak Current, Reactive Power, Crest Factor, and Apparent Power.

Meters	
Voltage	310.0
AC Voltage	310.0
DC Voltage	0.0
Current	0.011
AC Current	0.000
DC Current	0.016
Frequency	60.0
Power	0.0
Power Factor	0.000
Peak Current	0.0
Reactive Power	3.6
Crest Factor	0.00
Apparent Power	3.6

Total Waveform Display

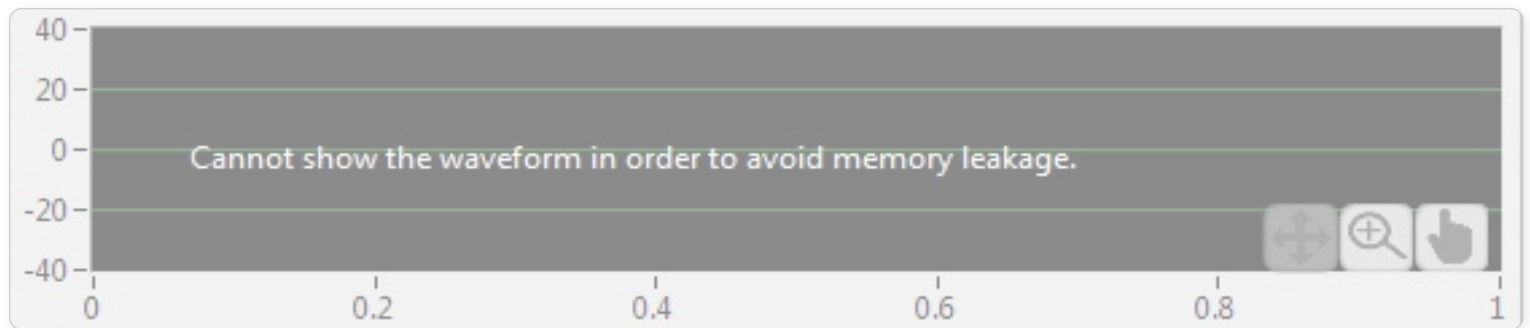


This graphical display simulates the actual waveform of all programmed test steps. The horizontal axis represents time in seconds and the vertical axis represents voltage. Users can double-click both sides of the vertical or horizontal axes to highlight and zoom in or out. Numbers can also be entered to zoom in and out of the waveform.



For additional information on customizing graphs and charts, visit the [National Instrument Website](#).

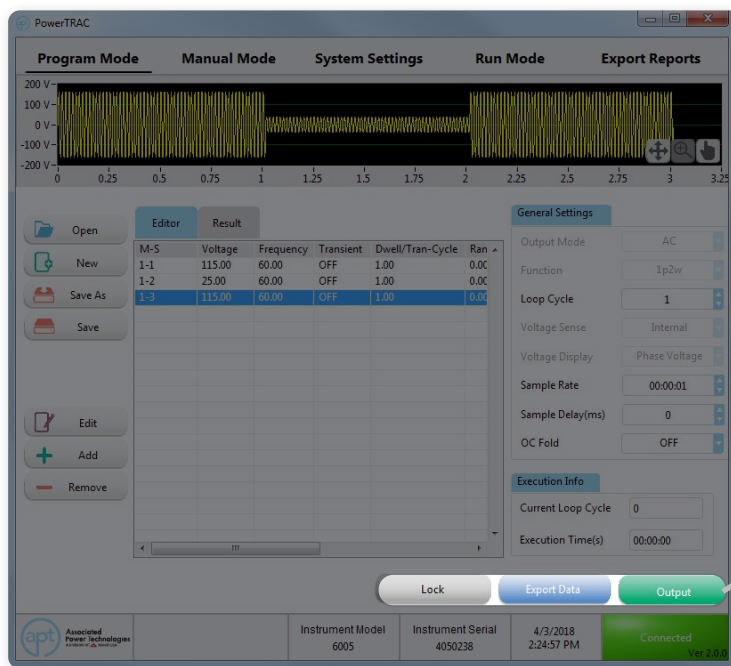
For the accuracy of waveforms and proper resolution, waveforms will not be displayed on the screen when the total step time is over one hour.



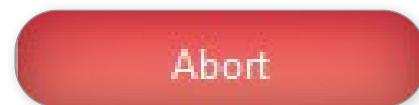
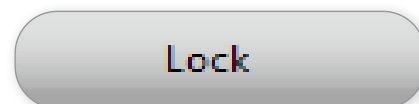
When test duration is set to over an hour the following message is displayed: "Cannot show the waveform in order to avoid memory leakage."

Output - Program Mode

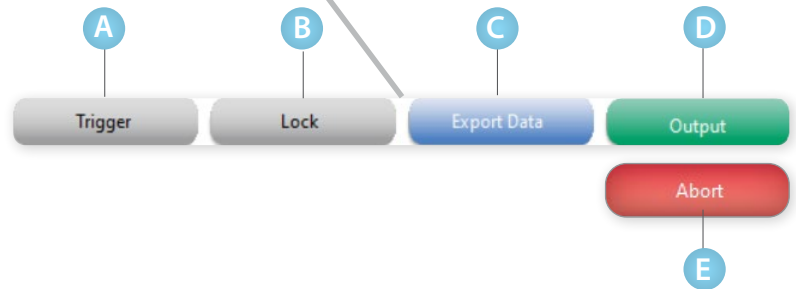
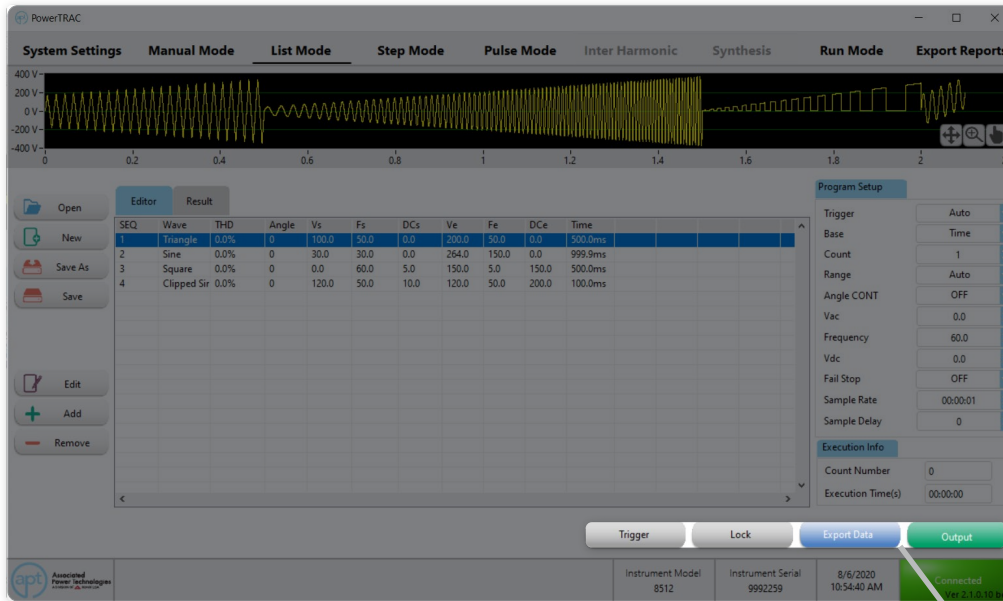
Once all the test steps have been programmed, the software is ready to send the test parameters to the power source. This section covers the steps required to start a test, abort a test, and export test data to a file.



- A** Use the Lock button to lock out any changes to the general settings or file editing.
- B** Upon completion of the test, use the Export Data button to export test data to a file.
- C** Click on the Output button to activate power source output.
- D** Once activated the Output button will turn into the abort button to allow the test to be aborted mid-sequence.



Output - List Mode



- A** Use the Trigger button to activate on-demand triggering of sequences.
- B** Use the Lock button to lock out any changes to the general settings or file editing.
- C** Upon completion of the test, use the Export Data button to export test data to a file.
- D** Click on the Output button to activate power source output.
- E** Once activated the Output button will turn into the abort button to allow the test to be aborted mid-sequence.

Trigger

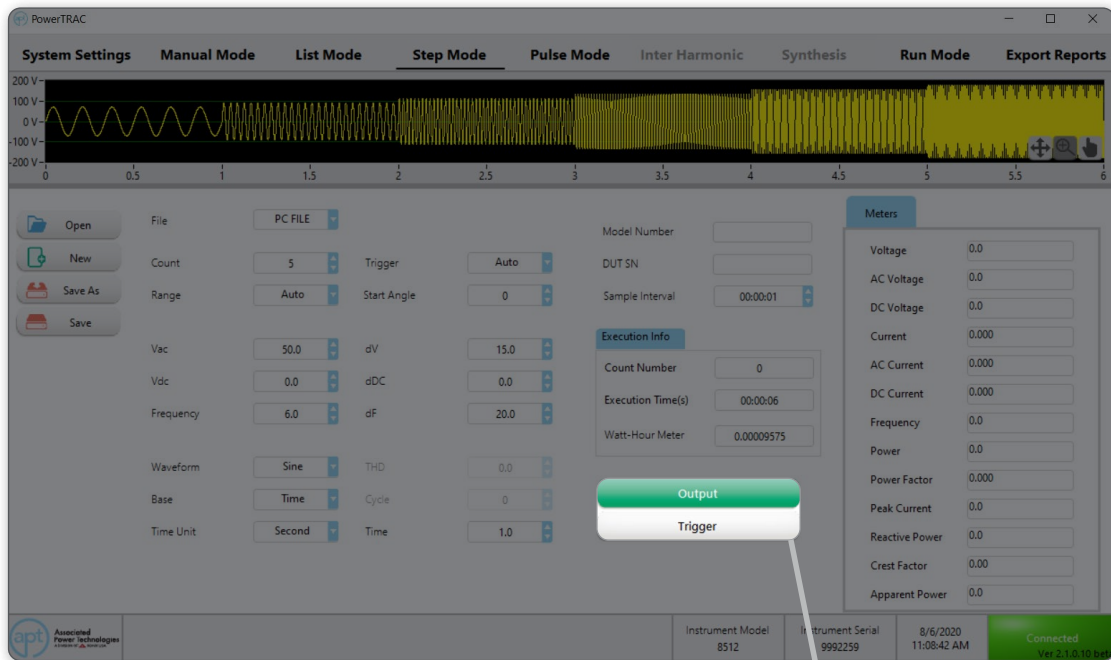
Lock

Export Data

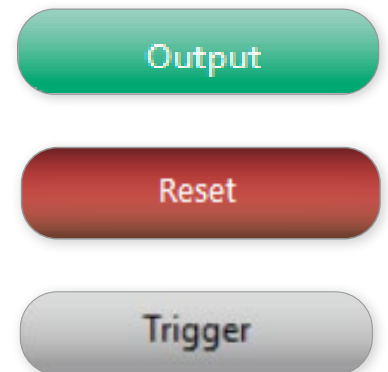
Output

Abort

Output - Step and Pulse Mode



- A** Click on the Output Button to activate the power source output.
- B** Once activated the Output button will turn into the Reset button to allow the test to be aborted mid-sequence.
- C** Trigger button is available depending on the setting for Trigger Parameter. If the Parameter is set to Manual, Trigger button can activate the trigger manually once the Output button has been activated.



Test Sequence Output

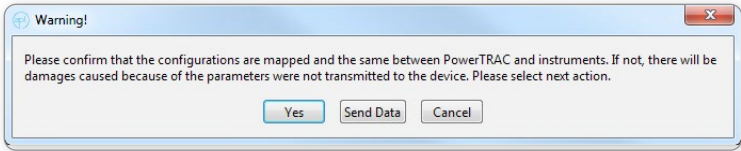
1. Click on the Output button.



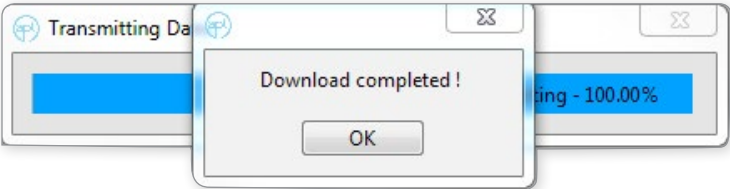
2. The following warning message will appear:

Select **Yes**, if the power source has already been pre-configured with the current test sequence. The software will now control and activate the voltage output from the power source.

Select **Send Data**, if the power source doesn't have the current test sequence loaded and needs to update the test configurations.



Once you click **OK**, the software will activate the voltage output from the power source.



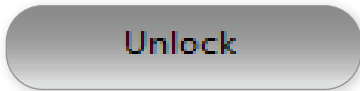
3. The power source will now output and execute all the steps in the test file or sequence. At the end of the test sequence, the screen will update the Results tab showing testing data.

Editor		Result														
M-S	Phase	Status	Frequency	Voltage	Current	Power	Apeak	PF	Q	CF	VA					
1-1	None	Pass	68.6	39.7	1.3	50.38	3.1	0.90	3.31	1.21	50.38					
1-2	None	Pass	42.3	278.3	4.6	1282.86	1.2	0.97	3.96	0.36	1282.86					
1-3	None	Pass	60.7	218.5	3.8	838.68	0.5	0.80	3.64	0.33	838.68					
1-4	None	Pass	54.2	168.6	2.5	429.63	1.0	0.82	2.22	1.15	429.63					

4. The output is enabled until the test ends. The entire PowerTRAC screen will be locked to avoid user interference. Only the Abort button will be available to select while a test is outputting.



Once the test sequence has completed you will need to click the Unlock button to unlock the screen. After output is enabled, PowerTRAC software screen will be locked until the test ends. The Abort button will be the only available button for selection.



5. After a test has run, export results using the Export Data button. The exported file will be an Excel file.

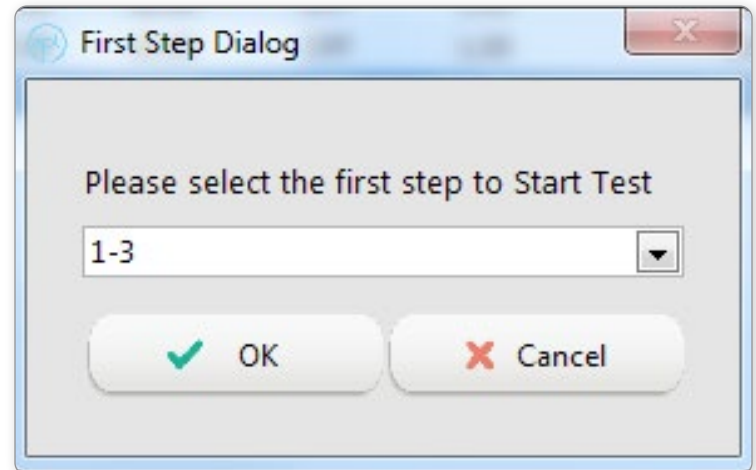


Test Sequence Output with Query Starting Step

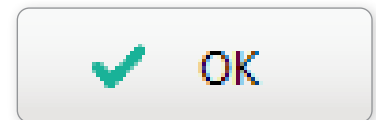
1. If Query starting step is selected in System Settings, the software requires an additional selection before executing the test output.



Select the starting test step of the test sequence via the pop-up dialog box.

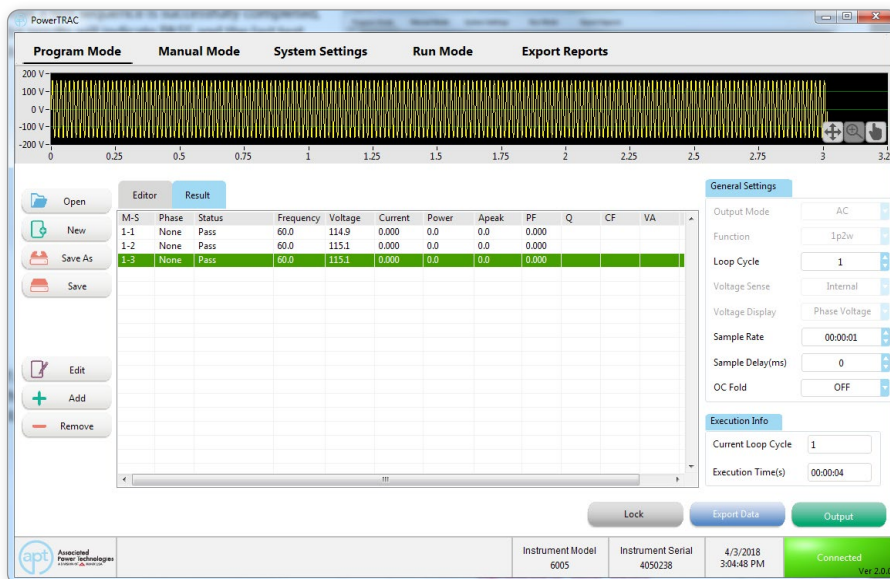


2. Select OK to start the output of the voltage (depending on the selected step in the dialog box).

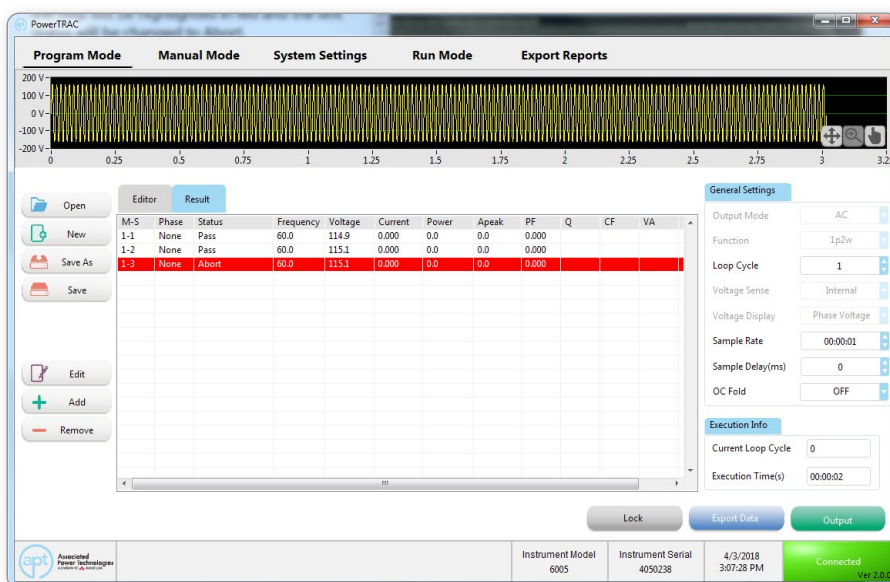


Output Status

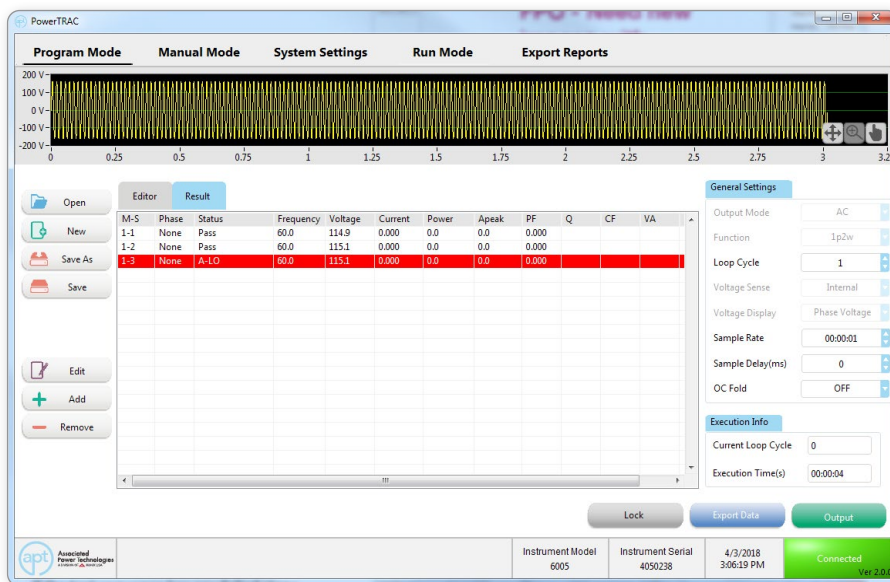
After a test sequence is successfully completed, the results will indicate PASS and the last test step will be highlighted in green.



If a test sequence is aborted during the test, the step will be highlighted in red and the test status will be changed to Abort.



If the test sequence has any failed steps, the step will be highlighted Red. The test's status will change to the failure message reported by the power source.

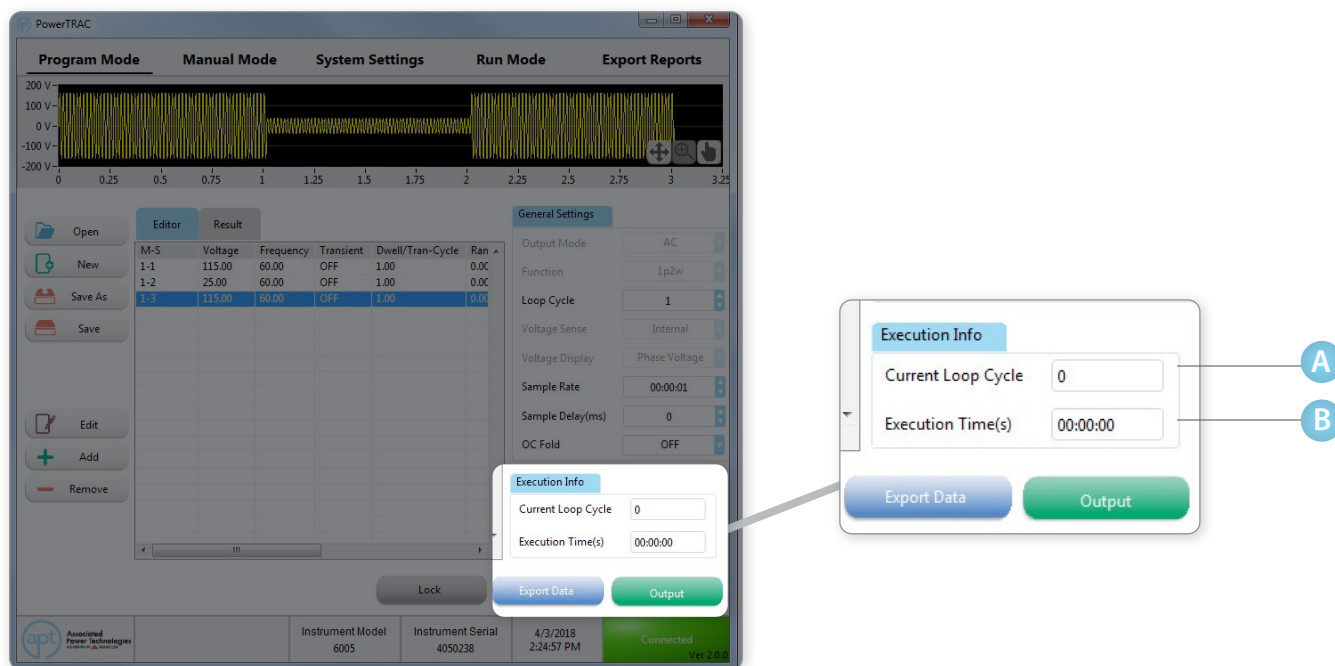


Source Failure Messages

LVP	Low voltage protection
OVP	Over-voltage protection
OCP	Over-current protection: activated when current exceeds power source capacity
OPP	Over-power protection: activated when real power exceeds power source capacity
OTP	Over temperature protection: activated when internal temperature is too high for continued operations
A-Hi/Lo	Output current over or under user-defined limits
P-Hi/Lo	Output power over or under user-defined limits
AP-Hi/Lo	Output peak current over or under user-defined limits
CF-Hi/Lo	Output crest factor over or under user-defined limits
PF-Hi/Lo	Output power factor over or under user-defined limits
VA-Hi/Lo	Output apparent power over or under user-defined limits
Q-Hi/Lo	Output reactive power over or under user-defined limits
AC IN Fail	Input voltage error: check input voltage to the power source
PFC Fail	PFC circuit error: contact APT Customer Service
D/D Fail	D/D circuit error: contact APT Customer Service
A/B/C Fail	Output circuit error: contact APT Customer Service
Shut Down	Output circuit error: Power cycle the power source and if the problem persists, contact APT Customer Service.

Execution Info

The Execution Info section of the Program Mode tab includes two displays to indicate Current Loop Cycle and Total Execution Time.



A

Current Loop Cycle

The Current Loop Cycle counts and updates the current loop cycle of the test memory.

Current Loop Cycle 0

B

Execution Time

The Execution Time counts and updates the total execution time of the test.

Execution Time(s) 00:00:00

Run Mode

The Run Mode tab is designed specifically for testing in production line test environments. Run Mode can be setup to prevent operators from editing test parameters or system changes. This mode can only open files with extension .pmst saved in Program Mode.

The screenshot shows the PowerTRAC software interface with the 'Run Mode' tab selected. The interface includes a table for test steps, a 'Test Info' section on the right, and an 'Execution' section below it. The status bar at the bottom indicates the instrument is connected.

Steps	Settings	Result
M-S	Voltage	Frequency
1-1	115.00	60.00
1-2	115.00	60.00
1-3	115.00	60.00

Test Info

Serial Number:
Power Source: 6005
User:
Station:
Time: 4/3/2018 3:09:37
Lot Number:
File Name: fasd.pmsf
Model:

Execution

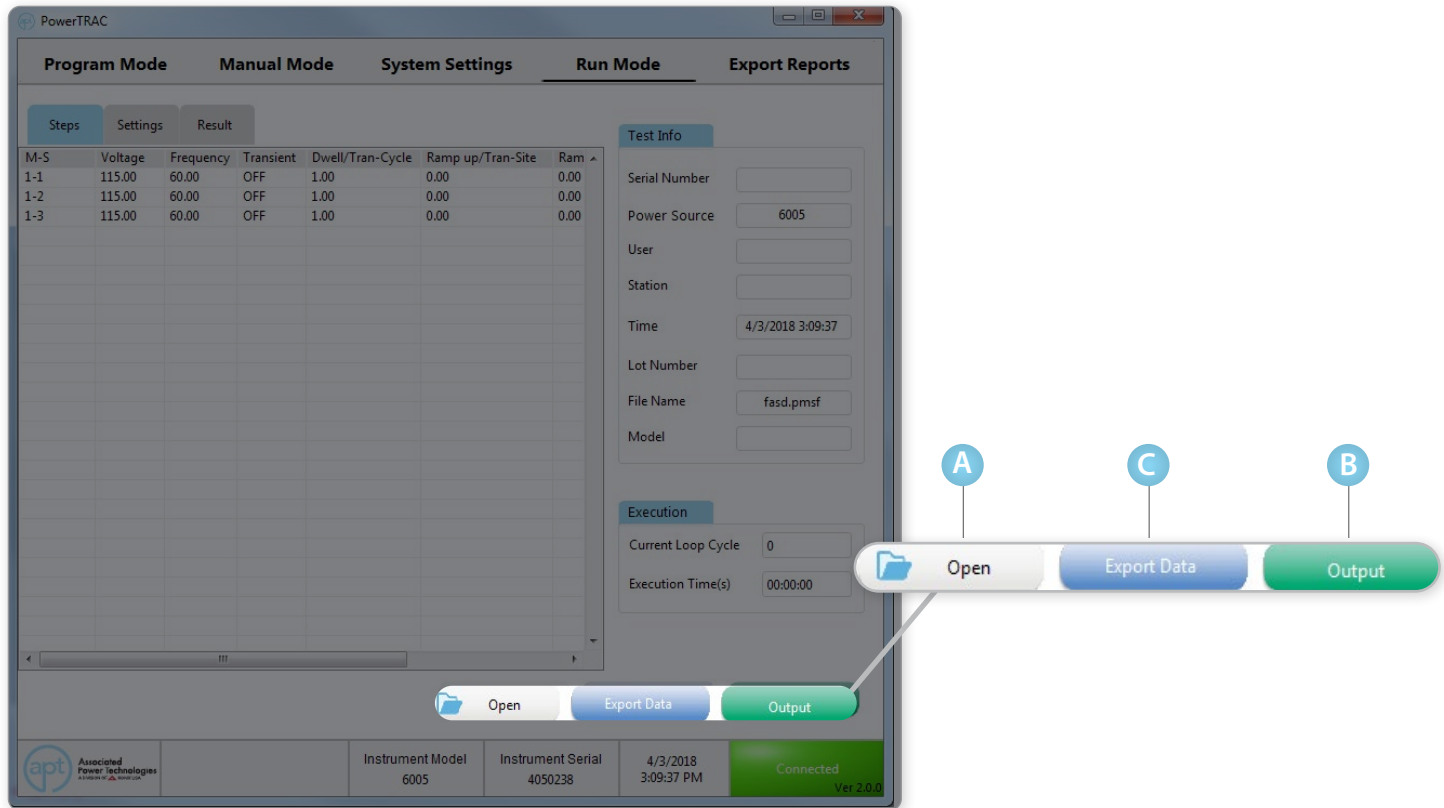
Current Loop Cycle: 0
Execution Time(s): 00:00:00

Status Bar:

apt Associated Power Technologies
Instrument Model: 6005
Instrument Serial: 4050238
4/3/2018 3:09:37 PM
Connected Ver 2.0.0

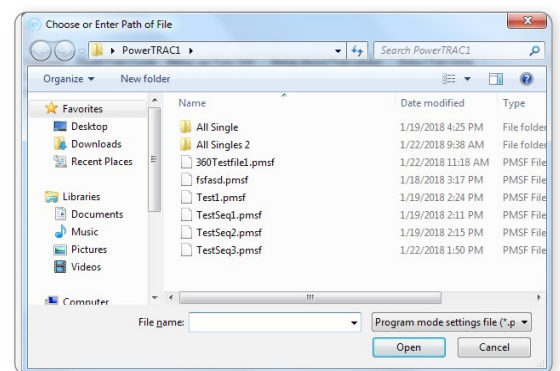
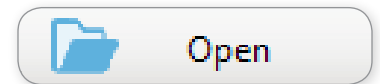
Run Mode - Open, Export Data, and Output

The Open, Export Data, and Output buttons of the Run Mode tab allows for loading test sequences, starting the output and exporting the results data.



A Opening and Loading Test File

1. Click on the Open button to select a test sequence.
2. Choose the file path via Windows dialog box. The file extension for test sequences are .pmsf (Program Mode Settings File). These file types are created in the Program Mode tab of PowerTRAC software.
3. Select the file to be loaded and click Open.



4. Test Parameters Loaded

The screen will update to display the selected test file. The Steps tab will now display test parameters for each step relating to the file selected.

Steps	Settings	Result					
M-S	Voltage	Frequency	Transient	Dwell/Tran-Cycle	Ramp up/Tran-Site	Ramp down/Tran-phase	Delay/Tran-time
1-1	115.00	60.00	OFF	1.00	0.00	0.00	1.00
1-2	115.00	60.00	OFF	1.00	0.00	0.00	1.00
1-3	115.00	60.00	OFF	1.00	0.00	0.00	1.00

5. Test Parameters Loaded

Use the Settings tabs to verify the power source output setting mode.

Steps	Settings	Result
Output Mode	AC	
Function	1p2w	
Loop Cycle	1	
PLC Remote	OFF	
Voltage Sense	Internal	
Single Step	OFF	
Voltage Disply	Phase Voltage	
Sample Rate	00:00:01	
Sample Delay(ms)	0	
OC Fold	OFF	

B Export Data

To export data from PowerTRAC into an Excel file, click on Export Data button. A dialog box will appear to select the destination path for the file.

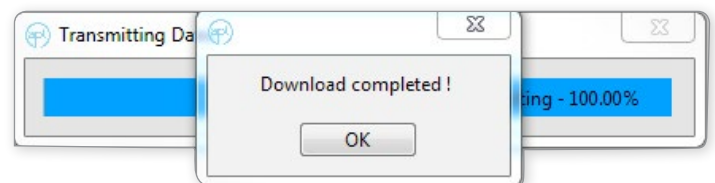


C Output

Run Mode output can be initiated by clicking the Output button. The Output button can only be selected if a test sequence has been loaded. See steps 1-2 described above.

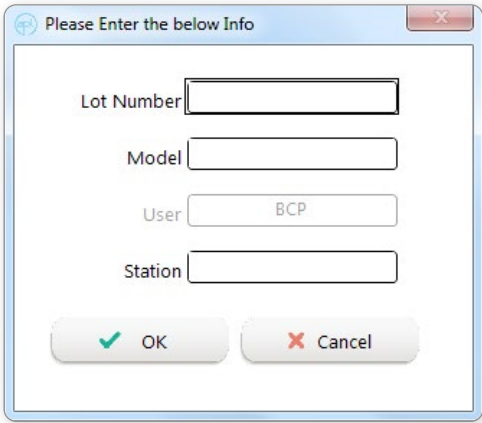


1. PowerTRAC will program the power source using the setting in the .prmg file. The following message will appear upon successful transmission. Click OK to continue.



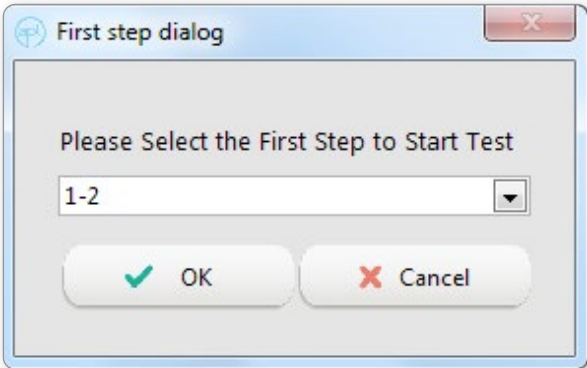
2. Enter DUT information within the next dialog window. Depending on the selection made in the Systems Settings tab for Query Settings the following fields are available; Lot Number, Model, and Station. This information will be recorded and displayed on the test results data. Click OK to continue or Cancel to return to previous screen.

Note: the User field is not editable and will display the name of the current user logged in.

A dialog box titled "Please Enter the below Info" with a close button in the top right corner. It contains four input fields: "Lot Number", "Model", "User" (which is pre-filled with "BCP" and is not editable), and "Station". At the bottom, there are two buttons: "OK" with a green checkmark icon and "Cancel" with a red X icon.

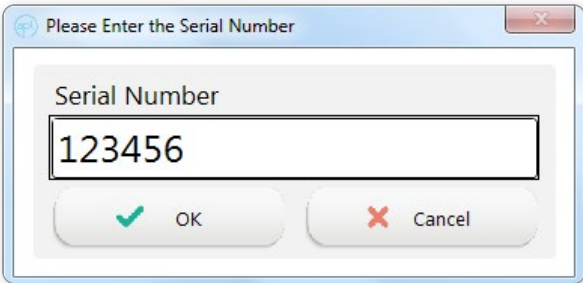
3. The next dialog box allows you to select the first step of the test sequence. Use the drop-down menu to make a selection and click OK to continue.*

*This dialog box will only appear if the option for Query Starting Step is selected in the System Settings tab under Query Settings.

A dialog box titled "First step dialog" with a close button in the top right corner. It contains a label "Please Select the First Step to Start Test" and a drop-down menu currently showing "1-2". At the bottom, there are two buttons: "OK" with a green checkmark icon and "Cancel" with a red X icon.

4. Enter the Serial Number of the product under test in the next dialog box. Click OK to start the test sequence or Cancel to return to Run Mode screen.

Once the test sequence is completed the serial number dialog box will appear again for next product to be tested.

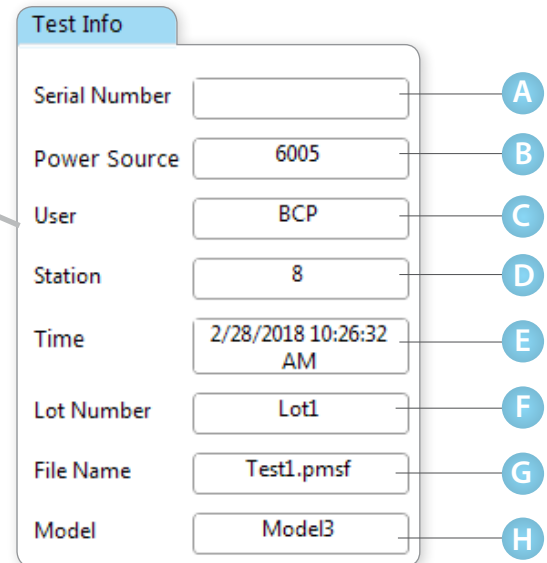
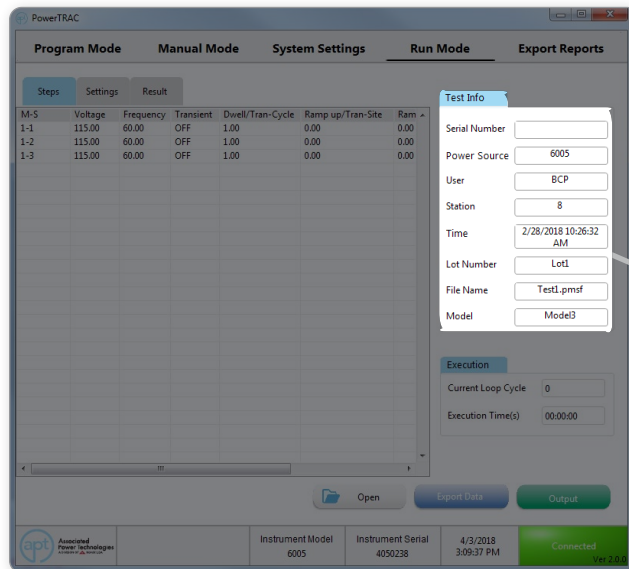
A dialog box titled "Please Enter the Serial Number" with a close button in the top right corner. It contains a label "Serial Number" and a text input field with the value "123456". At the bottom, there are two buttons: "OK" with a green checkmark icon and "Cancel" with a red X icon.

5. The Results tab will display the results of the last test performed.

Steps		Settings	Result									
M-S	Phase	Status	Frequency	Voltage	Current	Power	Apeak	PF	Q	CF	VA	
1-1	None	Pass	60.0	114.9	0.000	0.0	0.0	0.000				
1-2	None	Pass	60.0	115.1	0.000	0.0	0.0	0.000				
1-3	None	A-LO	60.0	115.1	0.000	0.0	0.0	0.000				

Run Mode - Test Info

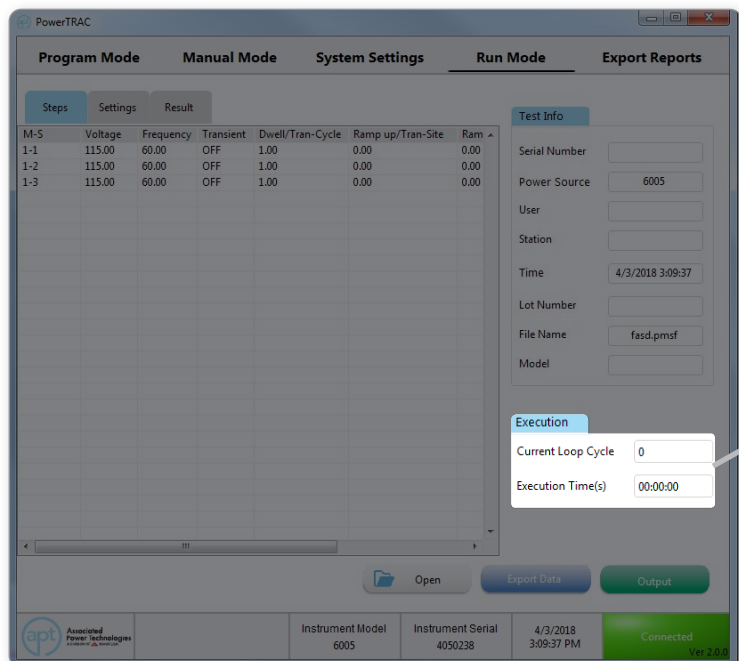
The Test Information section within the Run Mode tab displays the data collected during the last test performed. Serial Number, Station, Lot Number, and Model are collected when the test is first initiated. Power Source, User, Time, and File Name are collected from the system.



- A Serial Number**
Displays the serial number.
- B Power Source**
Displays the connected power source's model number.
- C User**
Displays the currently logged in user.
- D Station**
Displays the station number.
- E Time**
Displays system date and time.
- F Lot Number**
Displays the lot number.
- G File Name**
Displays the name of the test file used to perform the test sequence.
- H Model**
Displays the model number.

Run Mode - Execution Info

The Execution Info section of the Run Mode tab displays the Current Loop Cycle and Execution Times of the current test sequence.



A

Current Loop Cycle

Displays the value of the Current Loop Cycle signal. When the loop cycle has been activated the query will return a value of 0 for continuous cycling, 1 for Off or a range from 0~9999 cycles.

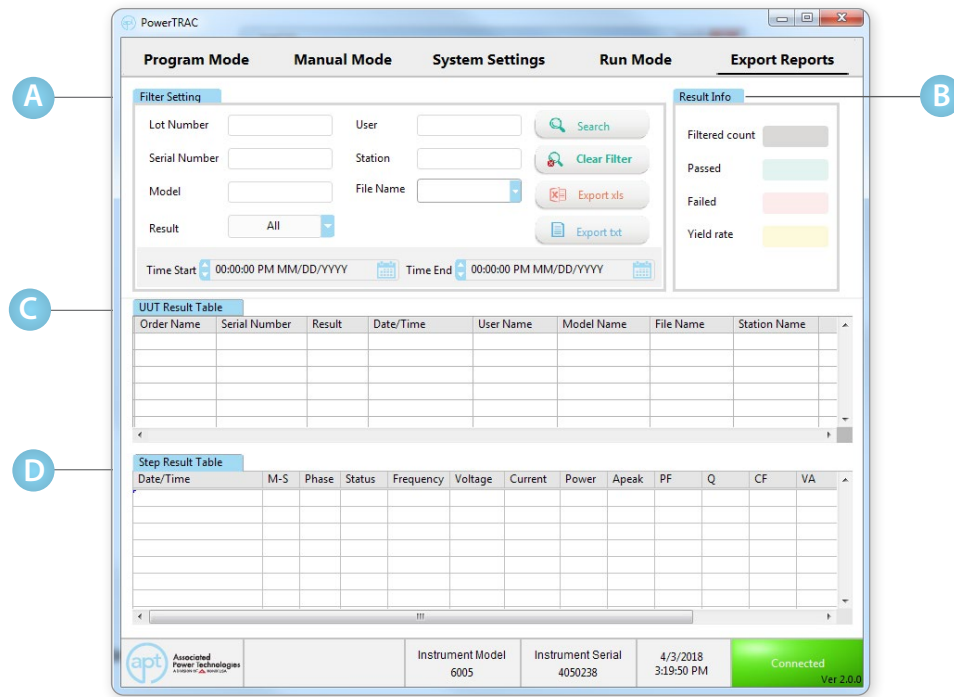
B

Execution Time

Displays the total test time in HH:MM:SS format.

Export Reports

The Export Reports tab allows for easy searching and exporting of test result data collected in Program, Manual, and Run modes. The reports can be exported in Excel or .txt formats.



- A Filter Setting**
Allows for filtering of data collected during Program, Manual and Run mode operations.
- B Result Info**
Displays basic analytics for the selected group of results.
- C DUT/UUT Result Table**
Displays the Serial Number, Result, Date/Time, User Name, Model Name, File Name, and Station Name.
- D Step Result Table**
Displays detailed step results selected from the UUT Result Table.

Export Reports - Filter Setting

The Filter Settings section within the Export Reports tab allows for searching of result data collected during Program and Run modes. Lot Number, Serial Number, Station, and Model numbers are user entered fields. User File Name, Time Start, and Time End are selected from the System Settings.

A diagram of the 'Filter Setting' window. Callout A points to the 'Lot Number' text box. Callout B points to the 'Serial Number' text box. Callout C points to the 'Model' text box. Callout D points to the 'User' text box. Callout E points to the 'Station' text box. Callout F points to the 'File Name' dropdown menu. Callout G points to the 'Result' dropdown menu, which is currently set to 'All'. Callout H points to the 'Time Start' and 'Time End' date/time pickers, both set to '00:00:00 PM MM/DD/YYYY'.

A screenshot of the PowerTRAC software interface. The 'Export Reports' tab is selected. The 'Filter Setting' section is active, showing the same fields as the diagram. To the right, the 'Result Info' section displays 'Filtered count', 'Passed', 'Failed', and 'Yield rate'. Below the filter settings are two tables: 'UUT Result Table' and 'Step Result Table'. The 'UUT Result Table' has columns for Order Name, Serial Number, Result, Date/Time, User Name, Model Name, File Name, and Station Name. The 'Step Result Table' has columns for Date/Time, M-S, Phase, Status, Frequency, Voltage, Current, Power, Apeak, PF, Q, CF, and VA. At the bottom, a status bar shows 'Instrument Model 6005', 'Instrument Serial 4050238', '4/3/2018 3:19:30 PM', and 'Connected'.

- A Lot Number**
Filter by lot number
- B Serial Number**
Filter by serial number
- C Model**
Filter by model name or number
- D User**
Filter by username
- E Station**
Filter by station number
- F File Name**
Filter by file name (use drop-down selector)
- G Results**
Filter by result type (use drop-down selector)
- H Time Start and Time End**
Filter by start and end time

Using the Filter Setting Section:

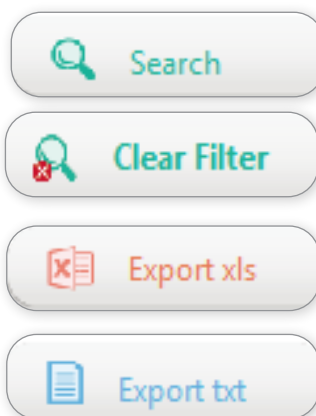
Start filtering of the data based on selections made for filter fields.

Click to clear out all the selections made for filter fields.

Click to export Excel .xls file format.

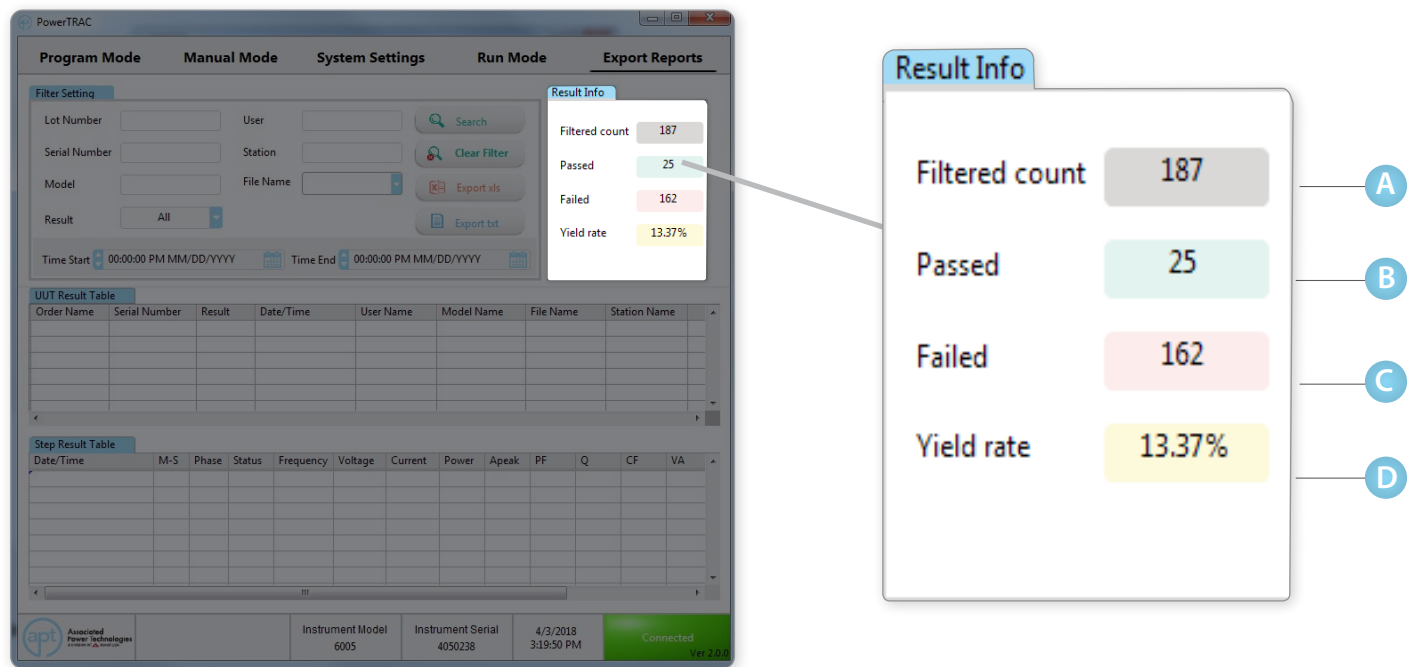
Click to export in .txt file format.

To see result export format examples, please continue to page 54.



Export Reports - Result Information

The Result Information section displays data analytics performed on the selected set of data.



- A Filtered Count**
Number of data points filtered using the search criteria.
- B Passed**
Number of Passes reported in the filtered data.
- C Failed**
Number of Fails reported in the filtered data.
- D Yield Rate**
Ratio of pass entries to the total searched entries in the filtered data.

Export Reports - DUT/UUT Result Table

DUT/UUT Result Table displays the data after all filters have been applied. The fields include Order Name, Serial Number, Results, Date/Time, User Name, Model Name, File Name, and Station Name. Each column of data can be sorted by clicking on the header of each column.

The screenshot shows the PowerTRAC software interface with the 'Export Reports' tab selected. The 'Filter Setting' section includes fields for Lot Number, Serial Number, Model, Result (set to 'All'), User, Station, and File Name, along with 'Search', 'Clear Filter', 'Export xls', and 'Export txt' buttons. The 'Result Info' section shows 'Filtered count', 'Passed', 'Failed', and 'Yield rate'. The 'UUT Result Table' is displayed with the following data:

Order Name	Serial Number	Result	Date/Time	User Name	Model Name	File Name	Station Name
12		Fail	2018/04/03 15:17:39	Admin1		fasd.pmsf	
	1223	Pass	2018/04/03 15:16:46	Admin1		fasd.pmsf	
		Abort	2018/04/03 15:07:17			fasd.pmsf	
		Fail	2018/04/03 15:06:00			fasd.pmsf	
		Pass	2018/04/03 15:04:03			fasd.pmsf	
		Abort	2018/04/03 14:44:05				

The 'Step Result Table' is also visible, showing columns for Date/Time, M-S, Phase, Status, Frequency, Voltage, Current, Power, Apeak, PF, Q, CF, and VA. The bottom status bar indicates 'Instrument Model 6005', 'Instrument Serial 4050238', '4/3/2018 3:19:50 PM', and 'Connected'.

A zoomed-in view of the 'UUT Result Table' from the screenshot, showing the same data as the main table:

Order Name	Serial Number	Result	Date/Time	User Name	Model Name	File Name	Station Name
12		Fail	2018/04/03 15:17:39	Admin1		fasd.pmsf	
	1223	Pass	2018/04/03 15:16:46	Admin1		fasd.pmsf	
		Abort	2018/04/03 15:07:17			fasd.pmsf	
		Fail	2018/04/03 15:06:00			fasd.pmsf	
		Pass	2018/04/03 15:04:03			fasd.pmsf	
		Abort	2018/04/03 14:44:05				

Export Reports - Step Result Table

The Step Result Table displays test data from a single data point selected in the DUT/UUT Result Table. Click on one of the DUT/UUT Results to view the detailed Date/Time, Memory-Step, Phase, Status, Frequency, Voltage, Current, Power, Apeak, Power Factor, Reactive Power (Q), Crest Factor, and Total Power (VA). Each column of data can be sorted by clicking on the header of each column.

The screenshot shows the PowerTRAC software interface. The 'Export Reports' tab is active. The 'Filter Setting' section includes fields for Lot Number, Serial Number, Model, Result (set to 'All'), User, Station, File Name, and Time Start/End. The 'Result Info' section shows 'Filtered count', 'Passed', 'Failed', and 'Yield rate'. The 'UUT Result Table' is visible, and the 'Step Result Table' is expanded, showing detailed test data for two steps.

Date/Time	M-S	Phase	Status	Frequency	Voltage	Current	Power	Apeak	PF	Q	CF	VA
2018/04/03 15:07:17	1-1	None	Delay	60.0	98.9	0.000	0.0	0.0	0.000			
2018/04/03 15:07:18	1-2	None	Delay	60.0	115.1	0.000	0.0	0.0	0.000			

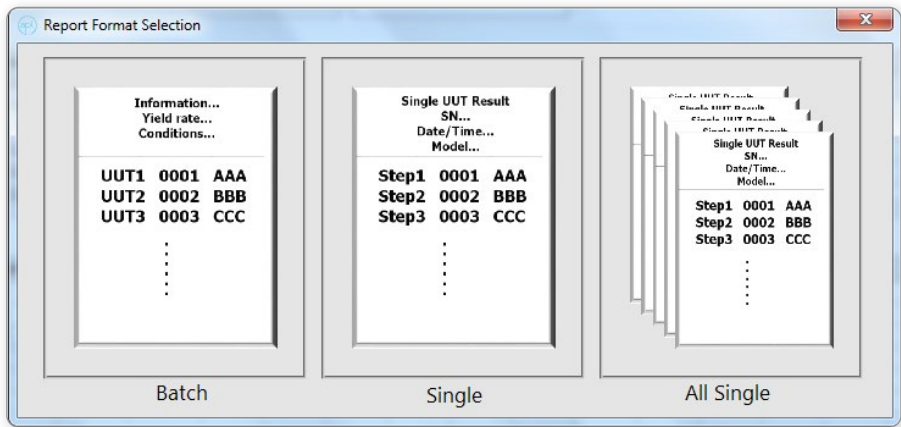
At the bottom, the status bar shows 'Associated Power Technologies', 'Instrument Model 6005', 'Instrument Serial 4050238', '4/3/2018 3:19:50 PM', and 'Connected Ver 2.0.0'.

A zoomed-in view of the Step Result Table, showing the same data as the main screenshot.

Date/Time	M-S	Phase	Status	Frequency	Voltage	Current	Power	Apeak	PF	Q	CF	VA
2018/04/03 15:07:17	1-1	None	Delay	60.0	98.9	0.000	0.0	0.0	0.000			
2018/04/03 15:07:18	1-2	None	Delay	60.0	115.1	0.000	0.0	0.0	0.000			

Sample Report Exports

The following pages detail file export formats of the Export Reports tab and provides example reports. Export formats include Batch, Single, and All Single.



Batch - The Batch report contains all the test data displayed in the Unit Under Test (DUT/UUT) Result Table.

UUT Result Table							
Order Name	Serial Number	Result	Date/Time	User Name	Model Name	File Name	Station Name
1	555	Fail	2018/01/19 15:17:49	BCP	2		4
1	444	Fail	2018/01/19 15:17:47	BCP	2		4
1	333	Fail	2018/01/19 15:17:45	BCP	2		4
1	222	Fail	2018/01/19 15:17:43	BCP	2		4
1	111	Fail	2018/01/19 15:17:41	BCP	2		4

Exported Excel view of file OR Sample Batch Report as opened in Excel.

	A	B	C	D	E	F	G	H
1	*****							
2	PowerTRAC Test Result							
3	*****							
4	Conditions							
5	Lot Number	None	File Name	None				
6	Serial Number	None	Result	All				
7	Model	None	Time Start	None				
8	User	None	Time End	None				
9	Station	4						
10	*****							
11	Statistics							
12	Filtered count	5	Passed	0				
13	Yield rate	0.00%	Failed	5				
14	*****							
15	Order Name	Serial Number	Result	Date/Time	User Name	Model Name	File Name	Station Name
16	1	555	Fail	2018/1/19 15:17:49	BCP	2		4
17	1	444	Fail	2018/1/19 15:17:47	BCP	2		4
18	1	333	Fail	2018/1/19 15:17:45	BCP	2		4
19	1	222	Fail	2018/1/19 15:17:43	BCP	2		4
20	1	111	Fail	2018/1/19 15:17:41	BCP	2		4

Single - The Single report contains all the test data displayed in the Step Results Table. Select a single result from the UUT results table to export.

UUT Result Table							
Order Name	Serial Number	Result	Date/Time	User Name	Model Name	File Name	Station Name
1	555	Fail	2018/01/19 15:17:49	BCP	2		4
1	444	Fail	2018/01/19 15:17:47	BCP	2		4
1	333	Fail	2018/01/19 15:17:45	BCP	2		4
1	222	Fail	2018/01/19 15:17:43	BCP	2		4
1	111	Fail	2018/01/19 15:17:41	BCP	2		4

Step Result Table													
Date/Time	M-S	Phase	Status	Frequency	Voltage	Current	Power	Apeak	PF	Q	CF	VA	
2018/01/19 15:17:45	1-1	None	Pass	46.8	158.6	3.0	475.45	4.0	0.76	4.58	3.42	475.45	

Sample Single Report
Exported Excel view of
file OR Sample Batch
Report as opened in
Excel.

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	*****												
2	PowerTRAC Test Result												
3	*****												
4	Conditions												
5	Order Name	1	User Name	BCP									
6	Serial Number	333	Model Name	2									
7	Result	Fail	File Name										
8	Date/Time	*****	Station Name	4									
9	*****												
10	Date/Time	M-S	Phase	Status	Frequency	Voltage	Current	Power	Apeak	PF	Q	CF	VA
11	2018/1/19 15:17:45	M1-1	None	Pass	46.8	158.6	3	475.45	4	0.76	4.58	3.42	475.45

All Single – Export all UUT Result Table data to a single file. This process will generate individual files for each item in the Results Table.

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	*****												
2	PowerTRAC Test Result												
3	*****												
4	Conditions												
5	Order Name	1	User Name	BCP									
6	Serial Number	222	Model Name	2									
7	Result	Fail	File Name										
8	Date/Time	*****	Station Name	4									
9	*****												
10	Date/Time	M-S	Phase	Status	Frequency	Voltage	Current	Power	Apeak	PF	Q	CF	VA
11	2018/1/19 15:17:43	M1-1	None	Pass	50.2	68.8	0.8	54.14	4.9	0.47	1.83	1.91	54.14

About Associated Power Technologies (APT)

APT provides quality AC Power Sources, Frequency Converters, and Variable Transformers to a variety of industries including the military, aviation, manufacturing, and test and measurement customers. APT is a division of Ikonix USA. To Learn more about APT, visit us at aptsources.com.

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