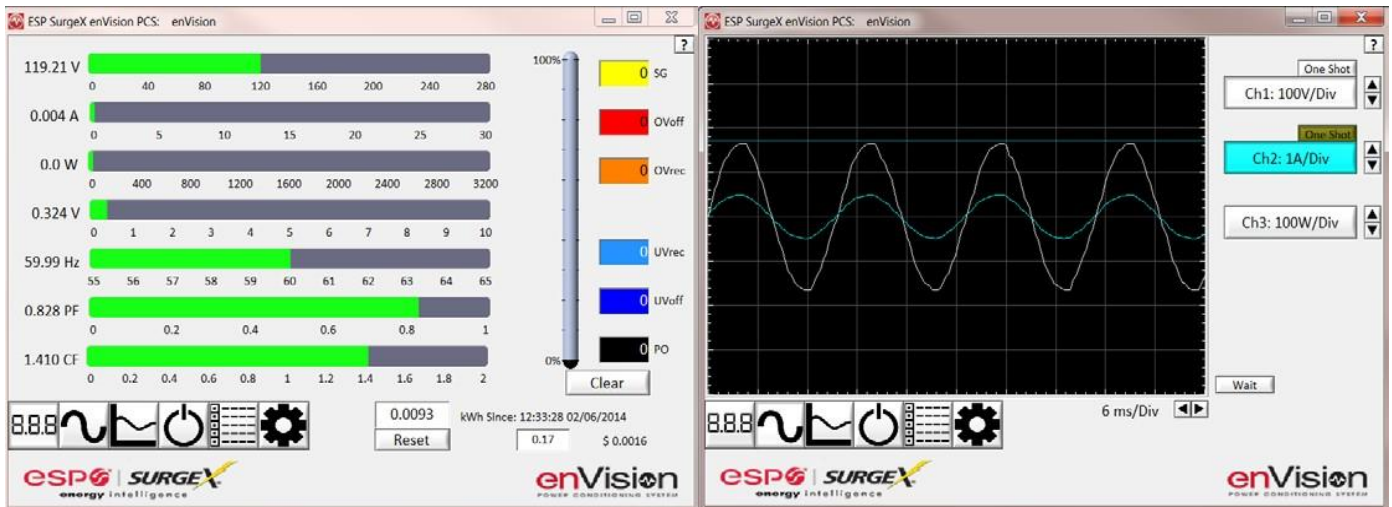




AMETEK
ELECTRONIC SYSTEMS PROTECTION

enVision



Software User Manual Software Version 3.4

Touchboards

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DIGITAL QC®	ESP®	MULTI-STAGE™	SURGE + DIAGNOSTIC™	

This product may be covered by one or more claims of the following patents or published patent application:

U.S. Patent Nos.: RE39,466; 4,870,528; 4,870,534; 5,136,455; 6,040,969; 6,728,089; 6,744,613; 6,947,266; 7,068,487; 7,184,252; 7,511,934; 7,541,696; and 7,551,412; 8,482,885; 8,520,349; 8,547,672; and 8,614,866

U.S. Patent Application Publication Nos.: 2012/0221161; 2013/0073232; 2012/0265361; 2013/0073060; 2013/0258538; and 2014/0005963

Canadian Patent Nos.: 1,332,439; 1,333,191; 2,461,332 and 2,511,695

I. Installation

1. Computer Requirements

- a. Minimum 133MHz Pentium processor (or equivalent), minimum 64MB of RAM, minimum 10MB free hard drive space, VGA or higher resolution monitor, keyboard, mouse, CD or DVD drive, minimum screen resolution of 1024x768, Microsoft Windows XP/Vista/7/8.

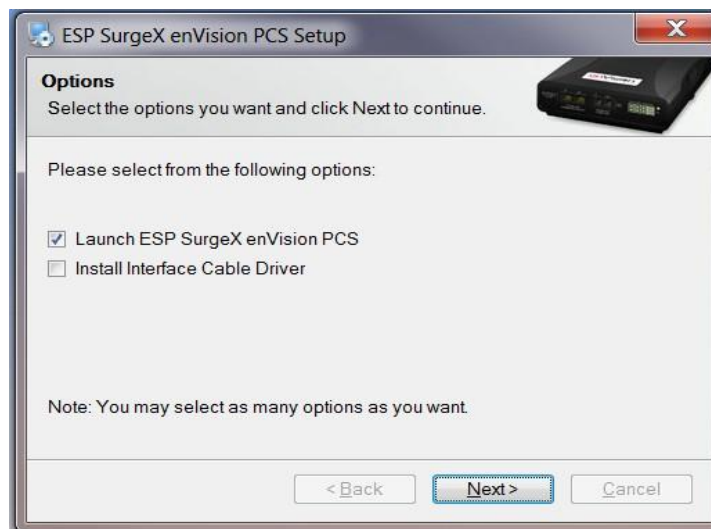
2. Hardware Requirements

- a. For use with enVision enabled products and Data Interface Cable (XG-PCS-1C-1)



3. Download and Install Software

- a. Download the Software Installer from www.espsurgex.com
- b. Unzip and run the installation utility.
- c. Follow the on-screen instructions to complete installation of the software.



4. Install Data Interface Cable

- a. Automatic Installation (Requires Internet connection)
 - i. Plug the USB side of the Data Interface Cable into an available USB port.
 - ii. Windows will automatically detect and install appropriate device driver files for the Data Interface Cable.
 - If a “Found New Hardware” pop-up box appears, follow the on-screen instructions and allow Windows to search online for driver files.
 - The installation could take several minutes to search for and download appropriate driver files. Once the files are found, follow the on-screen instructions to install.
 - Note: The driver installation process will first install USB Serial Converter driver files, and then will install USB Serial Port drivers separately.

- b. Manual Installation

In the event that the automatic driver installation process was not successful, or if no internet connection is available, the Data Interface Cable driver files may be installed manually.

- Select “Install Drivers” during the Software Installation process.
- Or run “enVision PCS Interface Setup” from:
Start/All Programs/ESP SurgeX/enVision PCS

- c. Once the Data Interface Cable has been successfully installed, it will appear in Device Manager as “USB Serial Port (COMx)” under “Ports (COM & LPT)”.

II. Using the Software

1. Physical Connections

- a. Plug the USB side of the Data Interface Cable into an available USB port.
- b. Plug the RJ-11 side of the Data Interface Cable into the RJ-11 “OUT” jack labeled “Data Port” on the enVision enabled unit, which is the jack closest to the LCD.
- c. Note: The enVision PCS must be powered by AC Mains for communications with the software to operate.

2. Start the Software

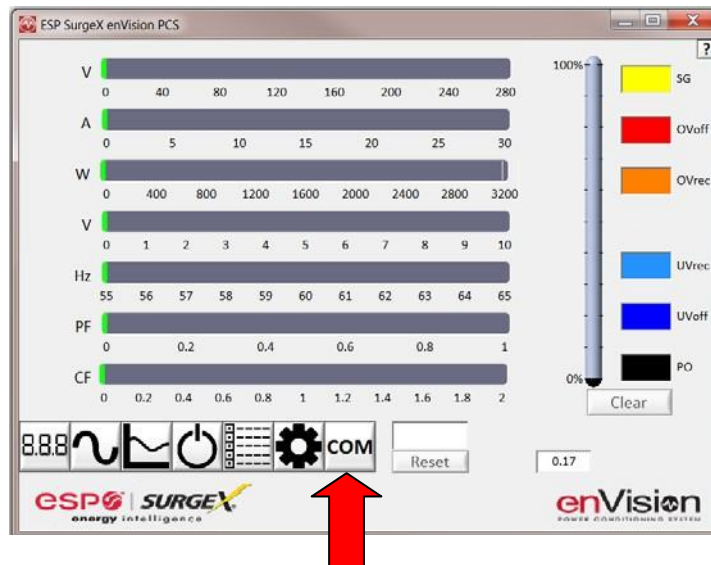
- a. Double-click the desktop shortcut labeled “enVision”, or use the “ESP SurgeX enVision PCS” Start Menu shortcut located at:

Start/All Programs/ESP SurgeX/enVision PCS



3. Configure the Data Interface Cable and COM Port

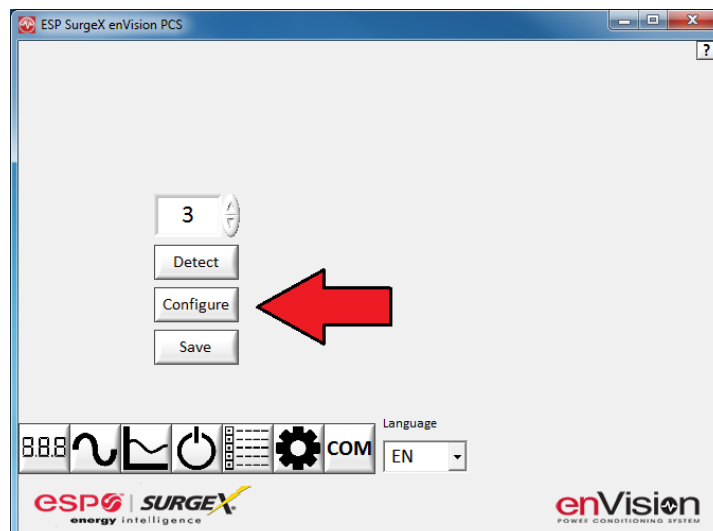
- a. Click the **COM Port Setup** button labeled **COM**.



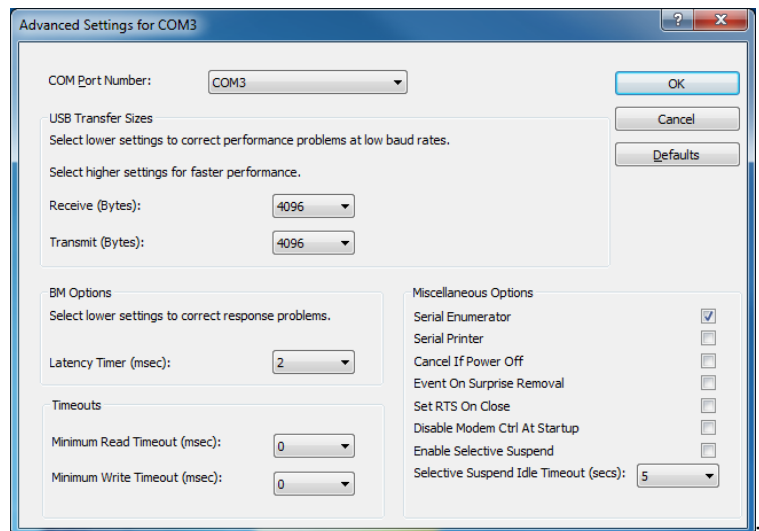
- b. Click Configure.

- i. The auto configuration process will automatically set the correct device parameters of the Data Interface Cable to operate properly with the software and enVision.

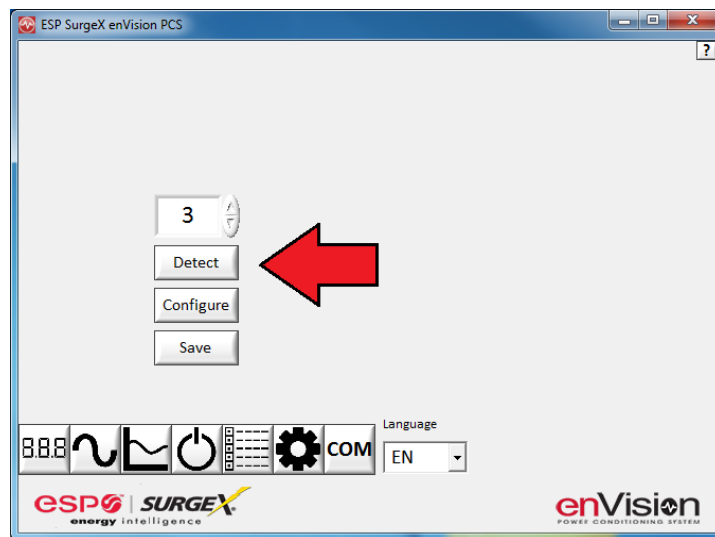
- Note: This process only needs to be done once for each new Data Interface Cable installed on the PC.
- Note: This process edits Windows registry values, and so may be blocked by MS Windows User Account Control (UAC) in Windows Vista/7/8/10. It may be necessary to exit the software and restart it with administrative rights by right-clicking the software shortcut and choosing "Run As Administrator". It may also be necessary to run the compatibility wizard by right-clicking the shortcut, selecting "Troubleshoot Compatibility", and following the prompts.



- ii. The COM port may also be manually configured using the Device Manager:
 1. Open Device Manager
 - a. Click on Start button
 - b. Type the following command in the Search box: devmgmt.msc
 - c. Press Enter
 2. In the Device Manager, expand “Ports (COM & LPT)”
 3. Right-click on the entry labeled “USB Serial Port (COMx)” and click “Properties”
 4. In the USB Serial Port Properties pop-up box, click the “Port Settings” tab, and then click the “Advanced” button.
 5. In “USB Transfer Sizes”, change both the “Receive” and “Transmit” values to 4096.
 6. In “BM Options”, change the “Latency Timer” value to 2.
 7. Leave all other settings at default.



- c. Click Detect.
 - i. The auto detect process will automatically detect the COM Port number assigned to the Data Interface Cable.
 - ii. If the auto detection process is successful, click Save. The software is now properly configured and ready for use.
 - iii. If the auto detection process is not successful, verify that the Data Interface Cable device drivers are properly installed, and that the physical connections between the enVision and the PC have been made correctly.



- d. The language may also be selected in this mode.

4. Software Modes

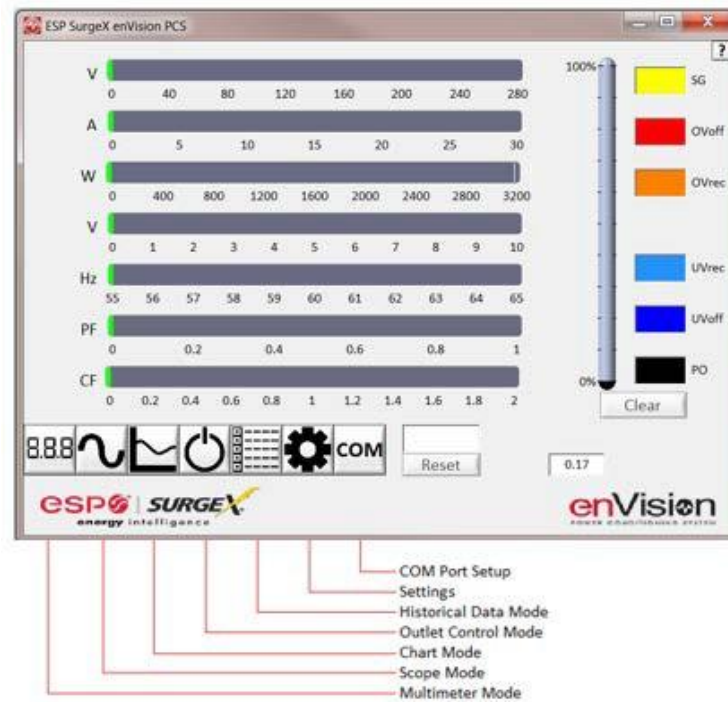
The enVision Software is organized into several operational modes. The modes are activated by clicking the corresponding button at the bottom of the software interface.

Press the Help Button (“?”) in the upper right for additional information on the features available in the current mode. Hovering the mouse cursor over items will also display additional information.

Scope Mode, Chart Mode, Historical Data Mode, and Settings Mode include a Save function. Press the Save button to save data to a CSV file. Time Stamped data may also be saved as a report in PDF format.

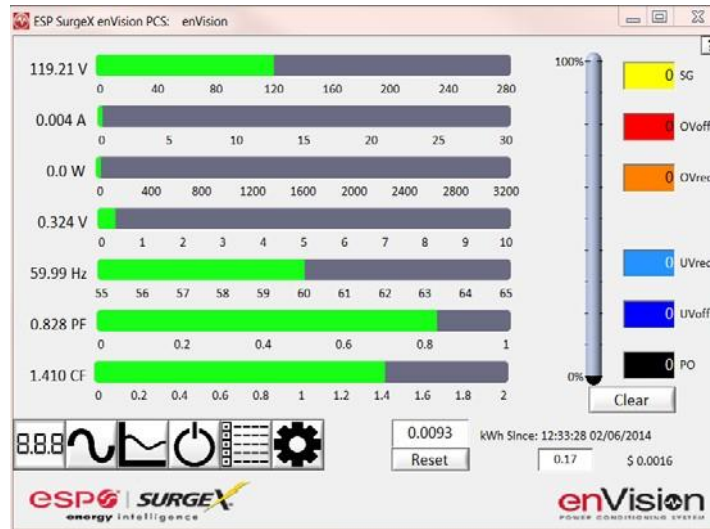
Chart Mode and Historical data may be analyzed by an automatic Expert Analysis tool. Press the Expert button to perform an expert analysis of recorded time-stamped event data, historical data, or chart measurements and generate a PDF report of potential conclusions and recommendations.





a. Multimeter Mode

- i. The Multimeter Mode provides information traditionally acquired from one or more handheld digital multimeters, as well as an overview of the recorded power quality events and energy consumption of connected equipment. $\pm 2\%$ Measurement Accuracy.



ii. Real-time display of 8 electrical parameters

- Line Voltage: AC RMS Volts Line-Neutral (Line1-Line2)
- Load Current Draw: AC RMS Amps
- Load Power Draw: Watts
- Neutral-Ground Voltage: AC RMS Volts Neutral-Ground (Line2-Ground)
- Line Frequency: Hertz
- Load Power Factor
- Line Voltage Crest Factor
- Energy Usage (kWh) of connected equipment since date and time of last manual usage reset

iii. Number of recorded power quality events

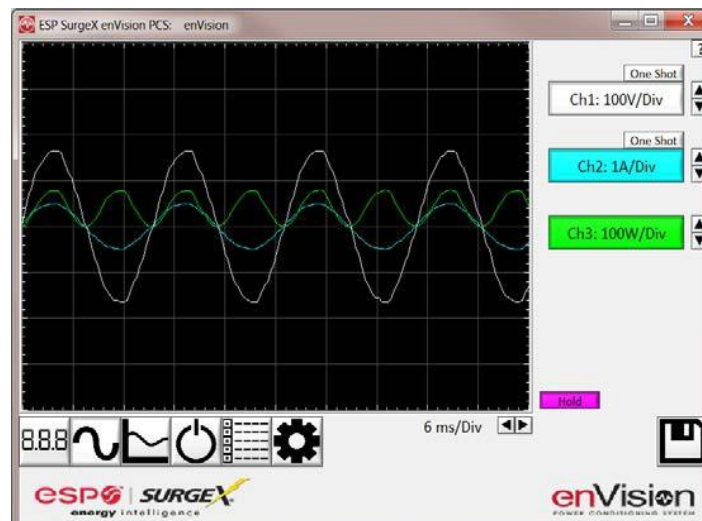
- Surge Events: SG
- Overvoltage Events with turn off of connected equipment: OVoff
- Overvoltage Events with no turn off of connected equipment: OVrec
- Undervoltage Events with no turn off of connected equipment: UVrec
- Undervoltage Events with turn off of connected equipment: UVoff
- Power Outage Events: PO

b. Scope Mode

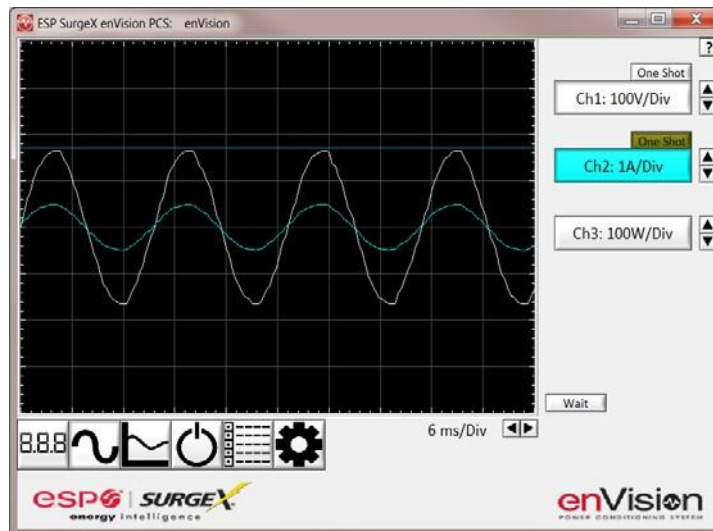
i. The Scope Mode enables a real-time voltage, current, and power oscilloscope which incorporates many functions available in standalone oscilloscopes. 4kHz Oscilloscope Bandwidth.

ii. **Ch1-Ch3** buttons toggle waveform displays.

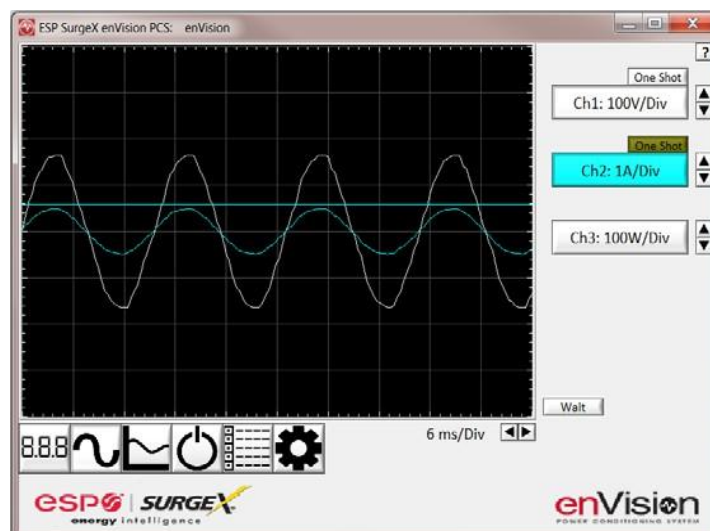
- **Ch1** button toggles line voltage trace.
- **Ch2** button toggles load current trace.
- **Ch3** button toggles load power trace.



- iii. **Up ▲** and **Down ▼** Arrow buttons adjust the vertical axis scaling of each channel.
- iv. **Left ◀** and **Right ▶** Arrow buttons adjust the horizontal (time) axis scaling.
- v. While in normal operation, pressing the **Wait** button will freeze the currently displayed waveform.
- vi. One Shot Trigger Function
 - The scope may be set to acquire and hold a waveform display, triggered by either Voltage or Current level.
 - Press the **One Shot** button above the desired channel. A trigger level cursor will appear on the display.
 - Next, Drag the trigger level cursor to the desired amplitude and press the Wait button

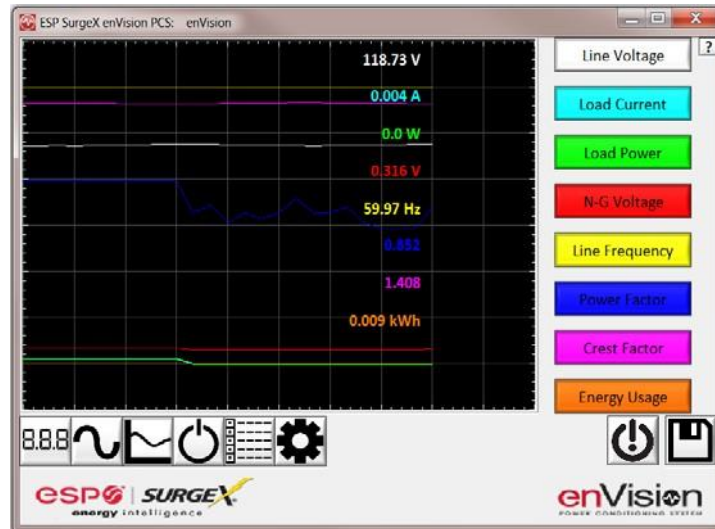


- If the Voltage of Current exceeds the trigger level, the scope will hold the display



c. Chart Mode

- i. The Chart Mode enables a chart style data logging function of 8 electrical parameters. Data point measurements are acquired once per second. The measured parameters may be enabled or disabled by pressing the corresponding button.

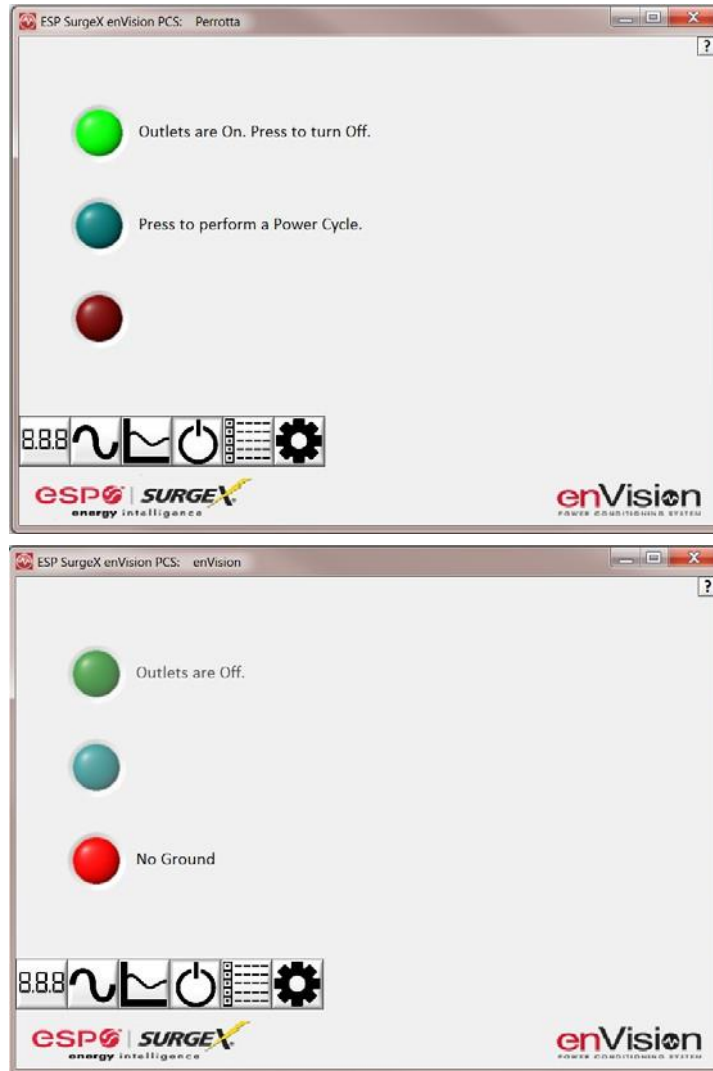


ii. Chart display of 8 electrical parameters:

- Line Voltage: AC RMS Volts Line-Neutral (Line1-Line2)
- Load Current Draw: AC RMS Amps
- Load Power Draw: Watts
- Neutral-Ground Voltage: AC RMS Volts Neutral-Ground (Line2-Ground)
- Line Frequency: Hertz
- Load Power Factor
- Line Voltage Crest Factor
- Energy Usage (kWh) of connected equipment since date and time of last manual usage reset

d. Outlet Control Mode

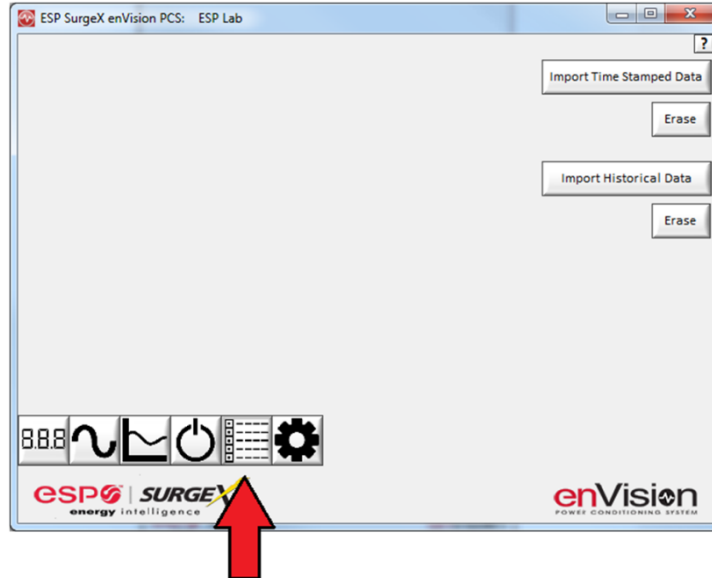
- i. The Outlet Control Mode enables control of the AC outlets and provides information about wiring faults and abnormal line voltage.



- ii. Use the green **On/Off** button to manually turn the AC outlets on and off.
 - Pressing the blue **Power Cycle** button will result in the execution of a power cycle. When commanded, the outlets will turn off, and then back on, after a 90 second delay. The **Power Cycle** indicator will be illuminated while a power cycle is active.

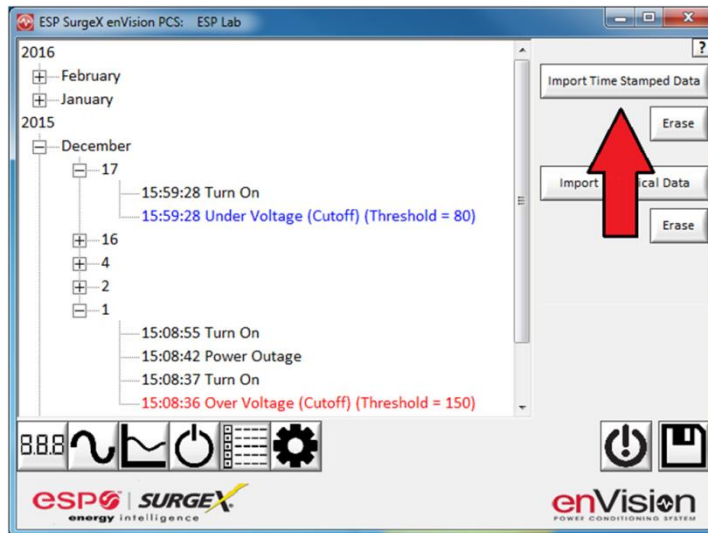
e. Historical Data Mode

The Historical Data Mode allows for the retrieval and display of the power quality event and electrical parameter data stored in the enVision internal memory.



i. Time Stamped Power Quality Event Data

- enVision is able to store and timestamp the 512 most recent power quality events in its internal memory. Press the **Import Time Stamped Data** button to download the event data.

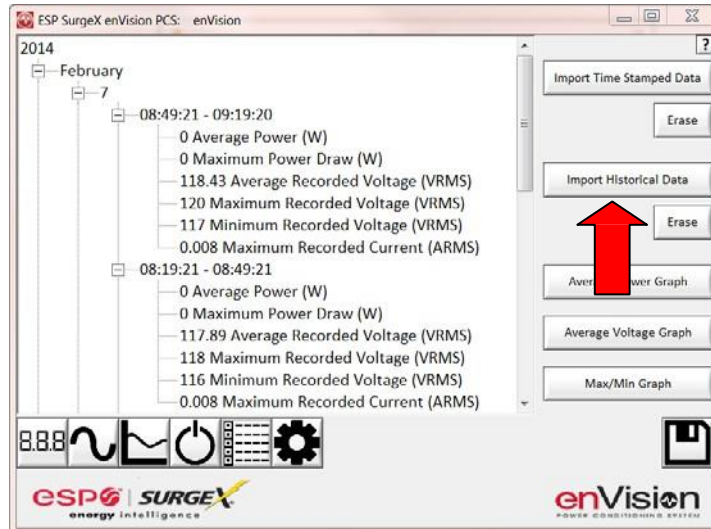


Twelve types of events are logged:

- Overload: Load current draw has exceeded 25A
- Surge: enVision has been exposed to a transient voltage in one of the 3 possible modes (between Live and Neutral, between Live and Ground, between Neutral and Ground) with a peak amplitude of 500V* or higher and a frequency of 20 kHz or higher. **500V surge voltage amplitude applies to IEEE C62.41 Category B Impulse; surge voltage amplitudes necessary for detection of other surge types may vary.*
- Over Voltage (Cutoff): Line voltage exceeded the over voltage shutdown threshold, and connected equipment was turned off.
- Over Voltage (Record): Line voltage exceeded the over voltage record threshold, and connected equipment was not turned off.
- Under Voltage (Record): Line voltage dropped below the under voltage record threshold, and connected equipment was not turned off.
- Under Voltage (Cutoff): Line voltage dropped below the under voltage shutdown threshold, and connected equipment was turned off.
- Power Outage: Loss of AC power.
- Turn On: The enVision outlets were turned on.
- Turn Off (Cycle): A power cycle was initiated by a received command.
- Turn Off (Software): Outlets were turned off by a received command.
- Turn Off (Button): Outlets were turned off by the pushbuttons.
- Turn Off (Loss of Ground): Outlets were turned off due to the loss of the safety ground conductor at the wall receptacle.

ii. Historical Electrical Parameter Data

Every 30 minutes, enVision stores a snapshot of 6 electrical parameters measured over the prior 30 minute interval. The internal memory can store 138 days of data. Press the **Import Historical Data** button to download the data.



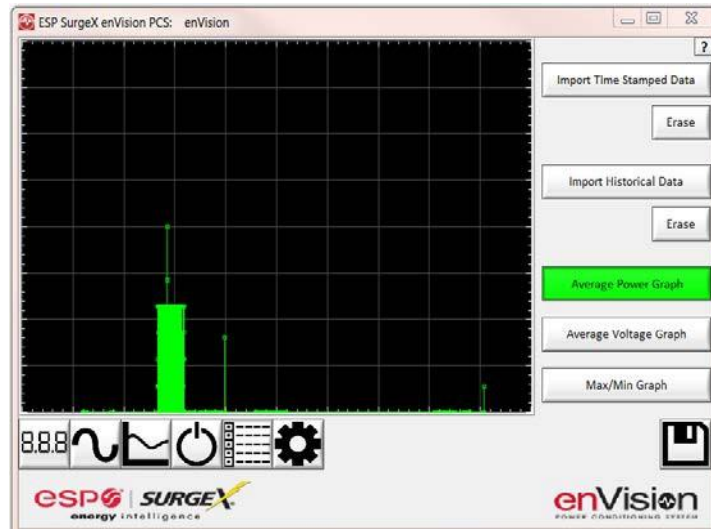
Six electrical parameters are logged:

- Average Power (Watts): The average real power draw of connected equipment during the 30 minute recording interval.
- Maximum Power Draw (Watts): The highest real power draw measured during the 30 minute recording interval.
- Average Recorded Voltage (V_{RMS}): The average line voltage during the 30 minute recording interval.
- Maximum Recorded Voltage (V_{RMS}): The highest line voltage measured during the 30 minute recording interval.
- Minimum Recorded Voltage (V_{RMS}): The lowest line voltage measured during the 30 minute recording interval.
- Maximum Recorded Current (A_{RMS}): The highest current draw measured during the 30 minute recording interval.

After the historical electrical parameter data has been downloaded, it may be saved to a file or graphically displayed by pressing one of the **3 Graph** buttons.

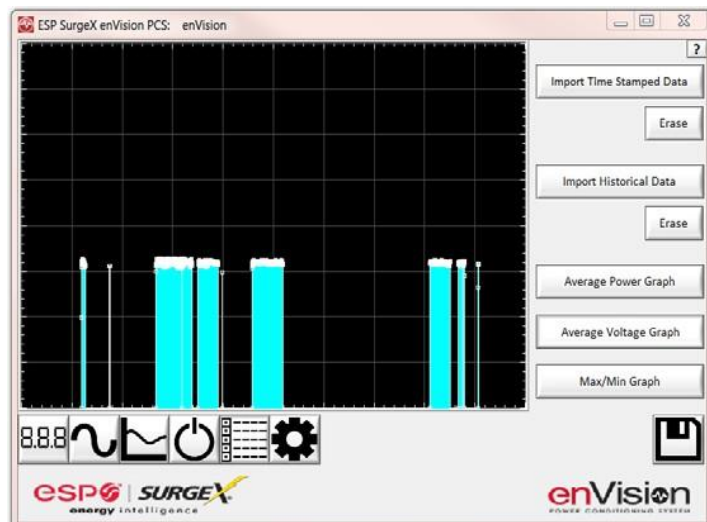
1. Average Power Graph

Pressing the **Average Power Graph** button will display a bar graph of the average real power draw of connected equipment during each 30 minute recording interval.



2. Average Voltage Graph

Pressing the **Average Voltage Graph** button will display a bar graph of the average line voltage during each 30 minute recording interval.



3. Max/Min Graph

Pressing the **Max/Min Graph** button will display line graphs of maximum voltage, minimum voltage, maximum current draw, and maximum power draw during each 30 minute recording interval.

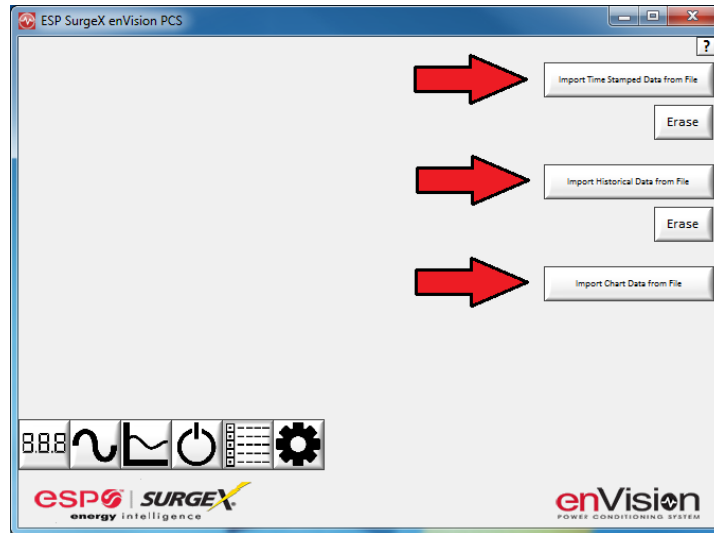
Pressing the **V Max**, **V Min**, **I Max**, or **P Max** buttons will enable or disable the display of the corresponding parameter.



iii. Import Data

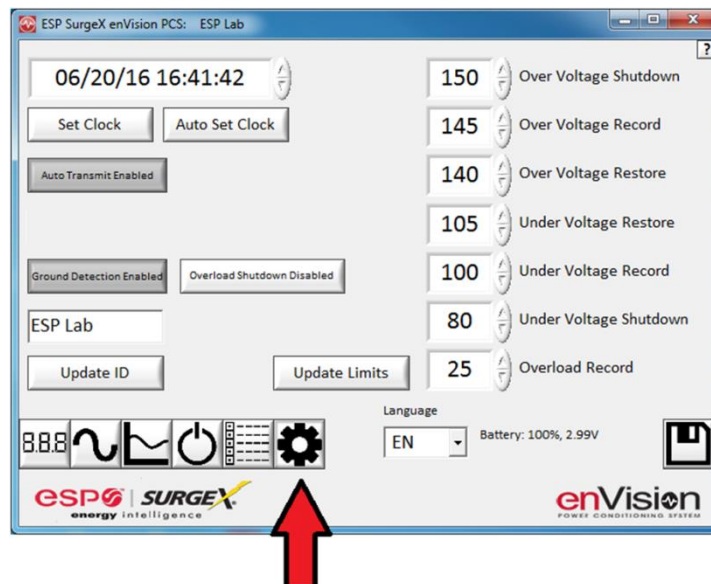
Previously saved data files may be imported by entering the Historical Data Mode while no enVision product is connected. This may be achieved by removing the data interface cable or by selecting and saving an invalid COM Port number.

Press the button that corresponds to the type of data file to import and browse to the location of the file.



f. Settings Mode

The Settings mode enables the specification of the user-configurable parameters of enVision. When this mode is entered, it displays the parameters currently in use. Firmware versions prior to 1.JD1 may not support all settings.

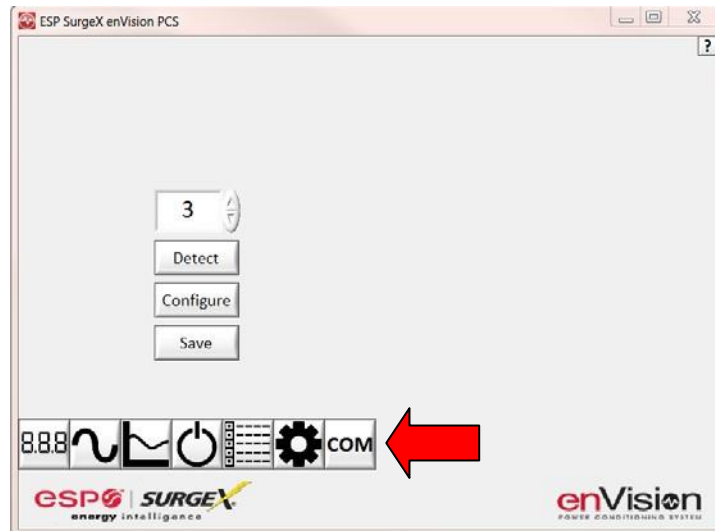


- i. Auto Set Clock: Automatically sets the internal clock to the current date and time.
- ii. Set Clock: Sets the internal clock to a date and time manually specified in the date/time field.
- iii. Auto Transmit: Enables/Disables the automatic transmission of status information every 30 minutes.
- iv. Ground Detection: Enables/Disables the ability of enVision to detect and respond to an open Ground connection. Disabling may be necessary in order to power enVision from a UPS output, but in general it is highly recommended to leave this feature enabled.
- v. Overload Shutdown: Enables/Disables the ability of enVision to turn off connected equipment when a current overload condition is detected. After this occurs, the outlets will not be automatically turned back on.
- vi. Update ID: Sets the product identifier specified in the text box. 10 character limit.
- vii. Update Limits: Sets the 6 voltage thresholds specified by the voltage threshold selection fields.
- viii. Language: Select the software's display language.
- ix. Save: Save the current settings for reference.

Limit	When Activated	Action	Factory Default	
			120V	208/240V
Over Voltage Shutdown	$V > OV_{Shutdown}$	Outlets turned Off and event recorded	150	280
Over Voltage Record	$OV_{Shutdown} > V > OV_{Record}$	Outlets stay On and event recorded	145	270
Over Voltage Restore	$V < OV_{Restore}$ After $OV_{Shutdown}$	Outlets turned On and event recorded	140	260
Under Voltage Restore	$V > UV_{Restore}$ After $UV_{Shutdown}$	Outlets turned On and event recorded	105	190
Under Voltage Record	$UV_{Shutdown} < V < UV_{Record}$	Outlets stay On and event recorded	100	180
Under Voltage Shutdown	$V < UV_{Shutdown}$	Outlets turned Off and event recorded	80	160

g. COM Port Setup Mode

- i. The COM Port Setup mode is used to configure new Data Interface Cables for use.



- ii. Detect: Automatically detect the COM Port when the enVision, Data Interface Cable, and PC are properly connected and powered up.
- iii. Configure: Automatically configure the advanced settings of the Data Interface Cable. May require running the software with elevated permissions (right-click program shortcut and choose “Run As Administrator”) on Windows Vista/7/8 with UAC (User Account Control) enabled.
- iv. Save: Saves the COM Port selection.

5. Command Line Operation

Usage: ESP_SurgeX_enVision_PCS (/o output_file) [-a] [-t] [-c] [-m]

Example : ESP_SurgeX_enVision_PCS /o C:\Users\Robert\Desktop\log.txt -a -m

Option	Meaning
-a	Append output file. If output file already exists, column headers will not be written.
-t	Write Timestamped data.
-c	Write Event Counts.
-m	Write Measurements.
If neither -t, -c, nor -m is specified, all will be written.	
If -a is not specified, output file will be overwritten.	

III. Troubleshooting

Symptom/Error Message	Possible Cause	What To Do
Unable to automatically determine COM Port	Data interface cable not properly connected, or EV is not connected to AC mains.	Check interface cable connections at PC and EV. Ensure that EV is powered by AC mains.
COM Port not successfully configured.	Windows User Account Control has prevented the software from automatically modifying the COM Port settings in the system registry.	Exit the software, right-click the desktop shortcut, and select "Run As Administrator" or select "Troubleshoot Compatibility" and follow the wizard.
Unable to locate or read dictionary file.	One or more language dictionary files cannot be found in the installation directory.	Uninstall the software, and then reinstall the latest version.
Problem communicating with EV.	Data interface cable not properly connected, or EV is not connected to AC mains.	Check interface cable connections at PC and EV. Ensure that EV is powered by AC mains.
COM Port Settings are not correct, which may result in non-optimal operation.	The COM Port has not been properly configured.	Configure the COM Port following the steps listed in the Configure the Data Interface Cable and COM Port section of this manual.
Wrong or corrupt file.	A file import operation has been attempted with an invalid or corrupt data file.	Select a valid data file for import.