



MULTIPAK[®]

Surge Protector / Power Conditioner

SX-DS-154 / SX-DS-156



User Manual

**120V Firmware Revision 1.67 and higher
Software Revision 4.0 and higher**

AMETEK

ELECTRONIC SYSTEMS PROTECTION

ADVANCED SERIES MODE®	ECOMMANDCENTER®	FLATPAK™	NEXT GEN®	SURGE + PDU™
AXESS®	ELIMINATOR SERIES™	ICE®	PCS™	SURGE ELIMINATION®
CERVELLA™	EMPOWER®	IMPEDANCE TOLERANT™	POWERFRAME®	SURGEX®
COUVS®	ENERGY INTELLIGENCE®	INRUSH CURRENT ELIMINATION®	REMOTE PORTAL®	SURGEXICE®
DEFENDER SERIES®	ENVISION®	MULTIPAK®	SERIES MODE®	
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

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I. INTRODUCTION

The MULTIPAK is a state-of-the-art power protector/power conditioner engineered with real-time data acquisition and storage.

1. **Models:** This manual applies to the following MULTIPAK models:

Model Number	Voltage (AC RMS)	Current (AC Amps)	Receptacles	Input	Output
SX-DS-154	120	15	4	NEMA 5-15P	NEMA 5-15R
SX-DS-156	120	15	6	NEMA 5-15P	NEMA 5-15R

2. Key Features:

- Multi-Stage power protection technology
- Normal and Common Mode EMI Noise Filter
- Zero-Voltage Turn-On
- Zero-Current Turn-Off
- Inrush Current Elimination (ICE®)
- Wiring Fault Detection
- Catastrophic over/under Voltage Shutdown (COUVS®) with selectable thresholds
- Under Voltage Event Recorder (up to 999 events)
- Over Voltage Event Recorder (up to 999 events)
- Power Outage Event Recorder (up to 999 events)
- Surge Event Recorder (up to 999 events)
 - Records surges in all three modes: Line-Neutral, Line-Ground, Neutral-Ground
- Event Timestamp Recorder (up to 60 events)
 - Records time between events
- Additional features available when connected to a PC (detailed in Section V: Using the Software)

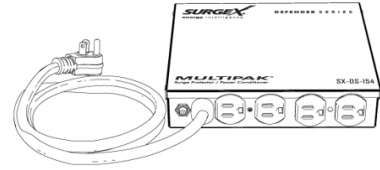
3. Technical Support:

- To download software and access further product information, visit <http://espsurgex.com/product/multipak/>
- For technical support, please contact SurgeX at 1-800-645-9721

II. INSTALLATION INSTRUCTIONS

1. Installation:

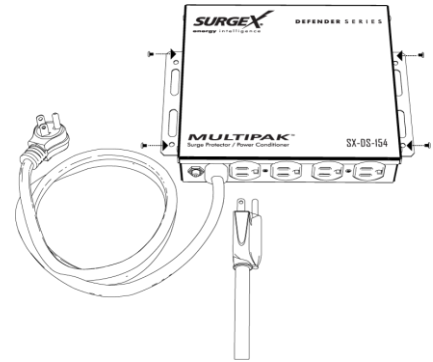
- a. Turn off the equipment you are connecting to the MULTIPAK, and unplug the equipment's power cord from the wall outlet.



- b. Connect Equipment

Connect the AC power cord of the equipment to be protected into one of the MULTIPAK convenience receptacles. Make sure that the total amperage of all equipment plugged into the MULTIPAK does not exceed the maximum branch circuit rating.

Please Note: Exceeding the branch circuit rating will cause the branch circuit breaker to trip.



- c. Connect the MULTIPAK to the Outlet: Plug the MULTIPAK input power cord into a properly grounded and compatible branch circuit outlet.

Please Note: Do not plug the MULTIPAK into a relocatable power tap.

- i. If the branch circuit outlet is correctly wired and the magnitude of the line voltage is acceptable, between 105 and 130 V_{RMS}, power will be connected to the outlets of the MULTIPAK and the **Green** "System On" LED will illuminate. Your equipment is now protected and installed correctly. You may now turn all connected equipment back on.
- ii. If the branch circuit outlet is incorrectly wired, the **Red** Wiring Fault" LED will illuminate. If this occurs, contact a licensed electrician to correct the outlet wiring. Refer to Section III.1: Hardware/MULTIPAK
- iii. If neither "System On", nor the "Wiring Fault" LED illuminates, there is either no voltage at the receptacle or the magnitude of the line voltage is not acceptable (less than 105 VRMS or above 130 VRMS). If this occurs, *verify that the MULTIPAK is operating properly. To test, plug the MULTIPAK into a known properly functioning outlet. If the "System On" LED still does not illuminate in the functioning outlet call SurgeX at 1-800-645-9721. If the "System On" LED illuminates, contact a licensed electrician to troubleshoot the abnormal voltage condition.*

III. HARDWARE

1. MULTIPAK:

- a. Normal Operation
Plug the MULTIPAK input power cord into a properly grounded and compatible branch circuit outlet; the green “System On” LED will illuminate.
- b. Wiring Fault
When connected to an incorrectly wired branch circuit outlet, the Red LED will be illuminated.
- c. Abnormal Voltage
When the magnitude of the branch circuit outlet voltage is not acceptable*, the MULTIPAK will disconnect power to its outlets; refer to Section IV: Diagnostic Software for more information).
- d. Clearing Memory
The MULTIPAK is able to timestamp the 60 most recent power quality events (information stored in microcontroller non-volatile memory). The microcontroller memory contents can be cleared at any time by following this method:
 - i. Diagnostic Software:
The device microcontroller memory may be cleared from within the Diagnostic Software in the following location: “Tools/Clear Device Memory”. See Section V for details.

IV. SOFTWARE 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/7/8/10.

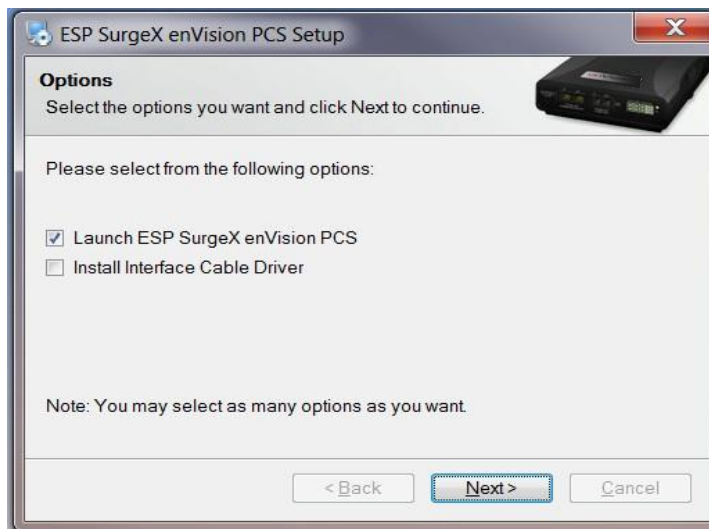
2. Hardware Requirements

- 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 “Interface Setup” from: Start/All Programs/ESP SurgeX/Diagnostic Tool

- 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)”.

V. 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 unit, which is the jack closest to the LCD.

2. Start the Software

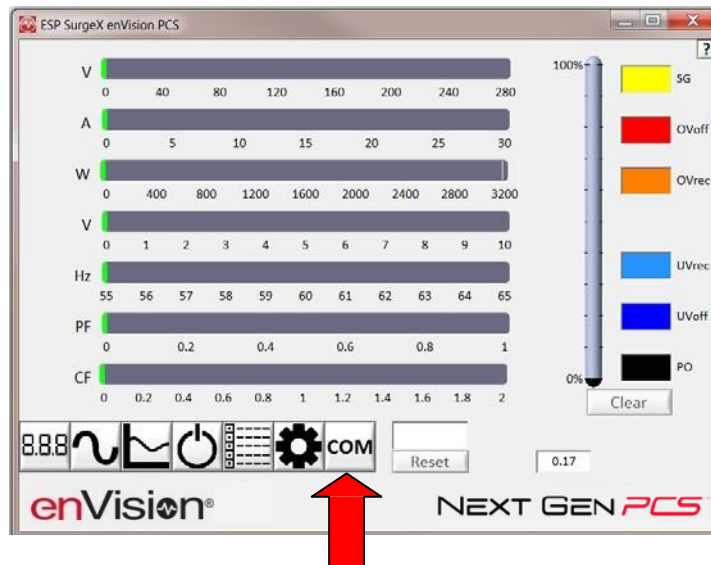
- a. Double-click the desktop shortcut labeled “ESP SurgeX Diagnostic Tool”, or use the “ESP SurgeX Diagnostic Tool” Start Menu shortcut located at:

Start/All Programs/ESP SurgeX/Diagnostic Tool



3. Configure the Data Interface Cable and COM Port

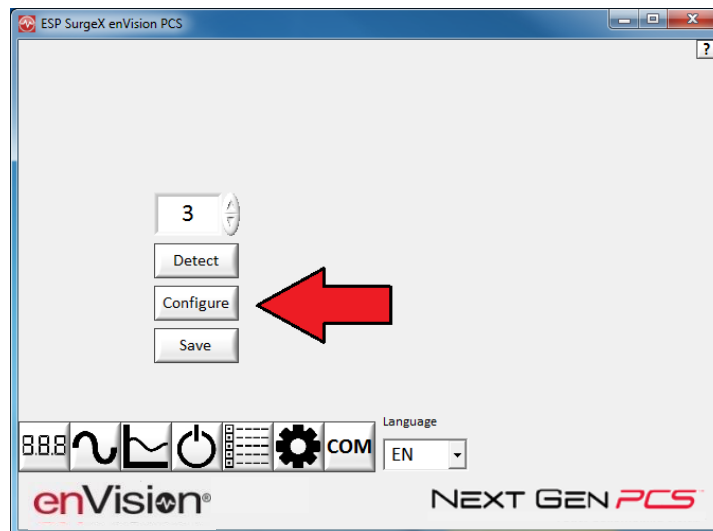
- a. Click the **COM Port Setup** button labeled **COM**.



- 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 Next Gen.

- 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)”

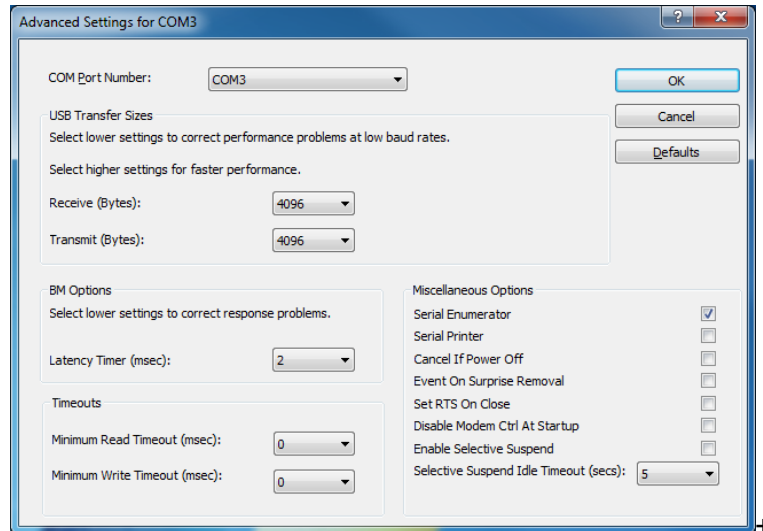
3. Right-click on the entry labeled “USB Serial Port (COMx)” and click “Properties”

4. In the USB Serial Port Properties pop-up box, click the “Port Settings” tab, and then click the “Advanced” button.

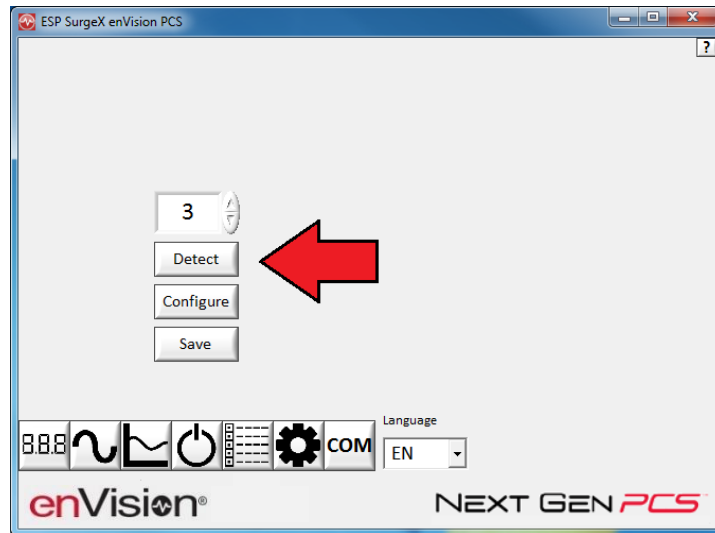
5. In “USB Transfer Sizes”, change both the “Receive” and “Transmit” values to 4096.

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

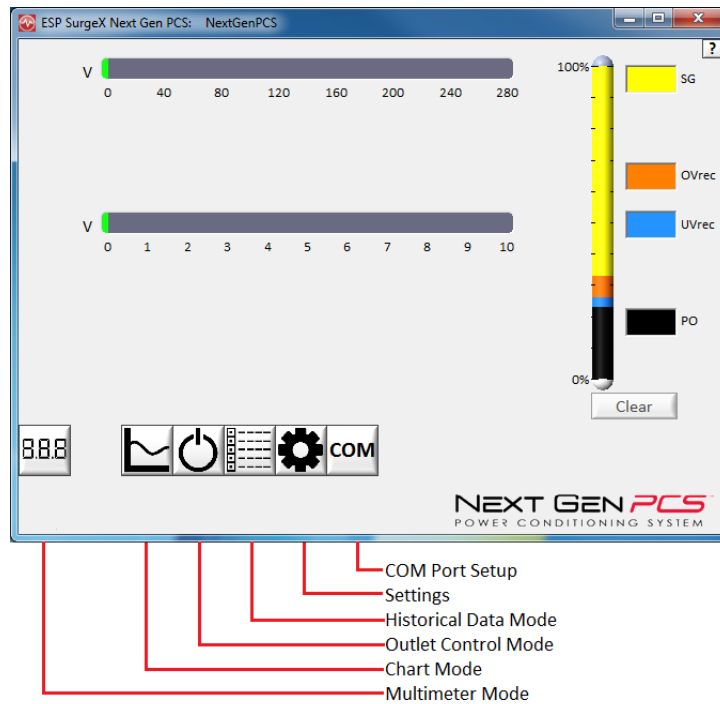
Note: Some features are only available when used with an enVision PCS product.

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.

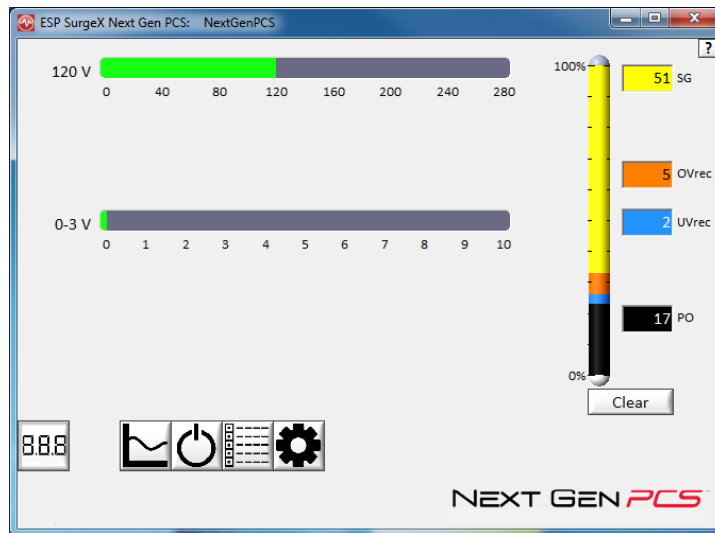
Chart Mode and Historical data may be analyzed by an automatic Expert Analysis tool. Press the Expert button to perform an expert analysis of recorded time-stamped event data or chart measurements and generate a PDF report of potential conclusions and recommendations.





a. Multimeter Mode

- i. The Multimeter Mode provides information traditionally acquired from a handheld digital multimeter, as well as an overview of the recorded power quality events. $\pm 2\%$ Typical Measurement Accuracy.



ii. Real-time display of electrical parameters

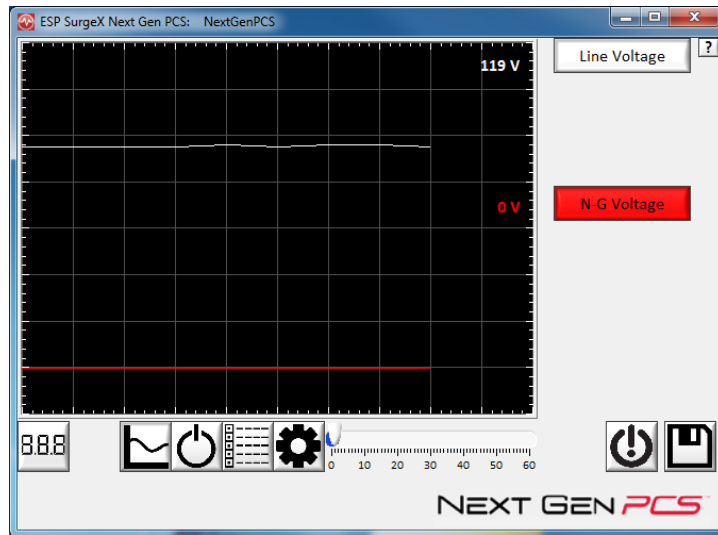
- Line Voltage: AC RMS Volts. Peak Measurement Type
- Neutral-Ground Voltage: AC RMS Volts Neutral-Ground. Peak Measurement Type. Available with 120V models with firmware version 2.00 and later. $\pm 1V$ accuracy from 3V-10V.

iii. Number of recorded power quality events

- Surge Events: SG
- Overvoltage Events: OVrec
- Undervoltage Events: UVrec
- Power Outage Events: PO

b. Chart Mode

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

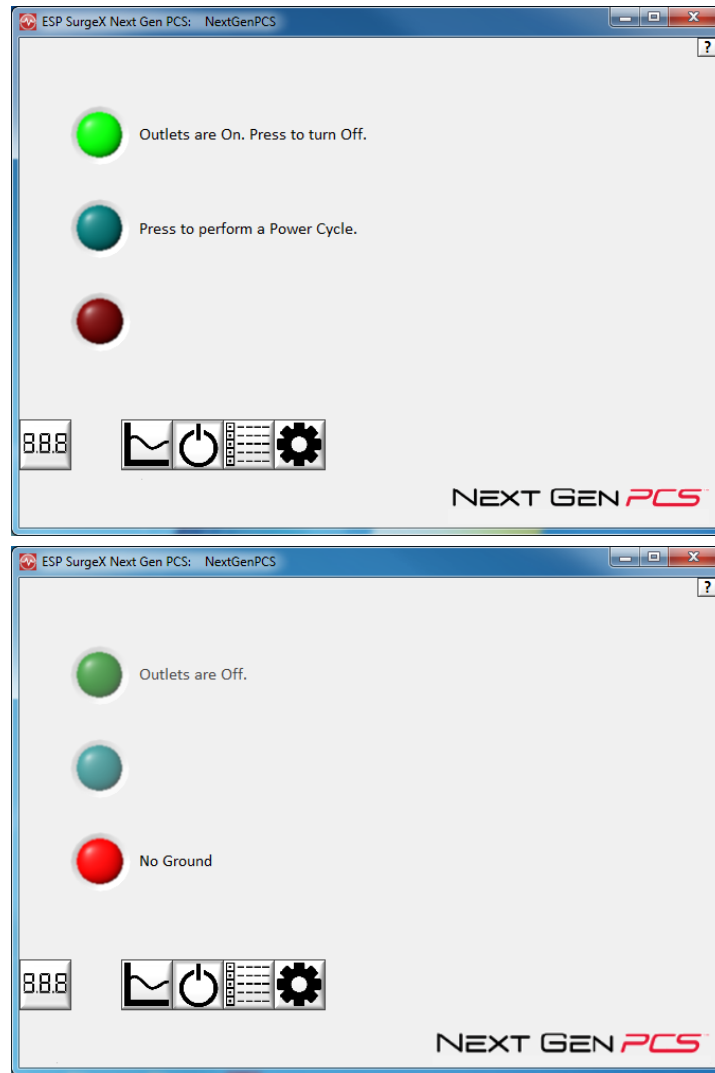


ii. Chart display of electrical parameters:

- Line Voltage: AC RMS Volts. Peak Measurement Type
- Neutral-Ground Voltage: AC RMS Volts Neutral-Ground. Peak Measurement Type. Available with 120V models with firmware version 2.00 and later. $\pm 1V$ accuracy from 3V-10V.

c. Outlet Control Mode

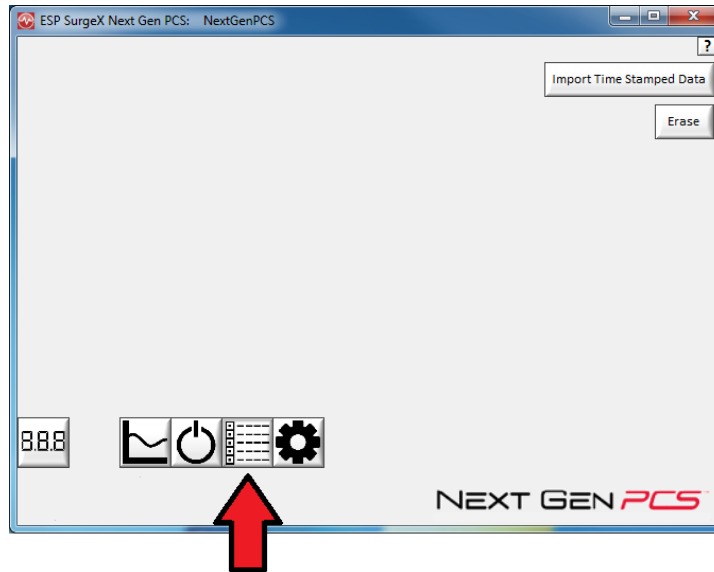
- i. The Outlet Control Mode enables control of the AC outlets and provides information about wiring faults and abnormal line voltage.



- 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.

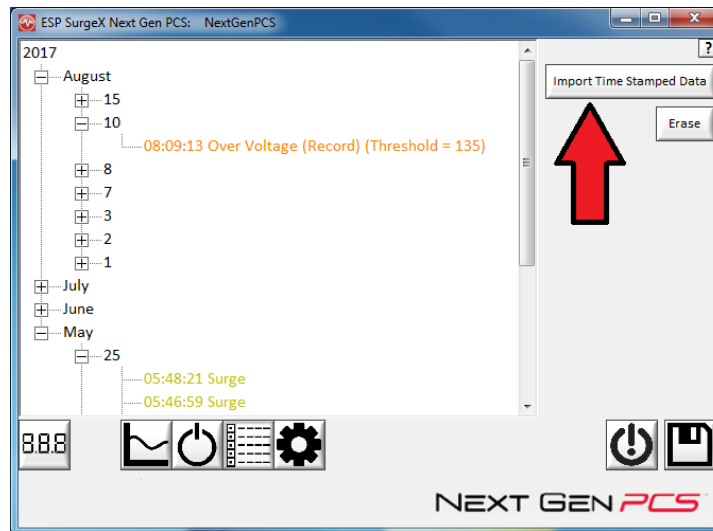
d. Historical Data Mode

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



i. Time Stamped Power Quality Event Data

- Next Gen is able to store and timestamp the 60 most recent power quality events in its internal memory. Press the **Import Time Stamped Data** button to download the event data.yuikl



Four types of events are logged:

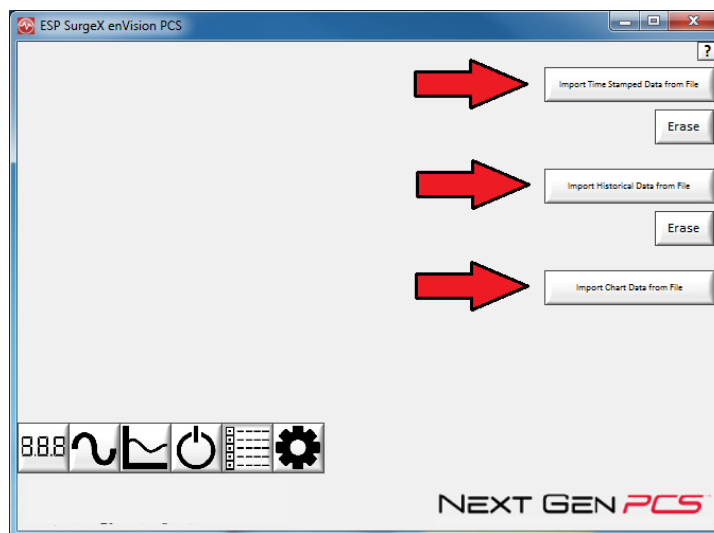
- Surge: Next Gen has been exposed to a transient voltage in one of the 3 possible modes (between Live and Neutral, between Live and Ground, between Neutral and Ground) with a peak amplitude of 500V* or higher and a frequency of 20 kHz or higher. **500V surge voltage amplitude applies to IEEE C62.41 Category B Impulse; surge voltage amplitudes necessary for detection of other surge types may vary.*
- Over Voltage: Line voltage exceeded the over voltage record threshold.
- Under Voltage: Line voltage dropped below the under voltage record threshold.
- Power Outage: Loss of AC power.

ii. Import Data

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

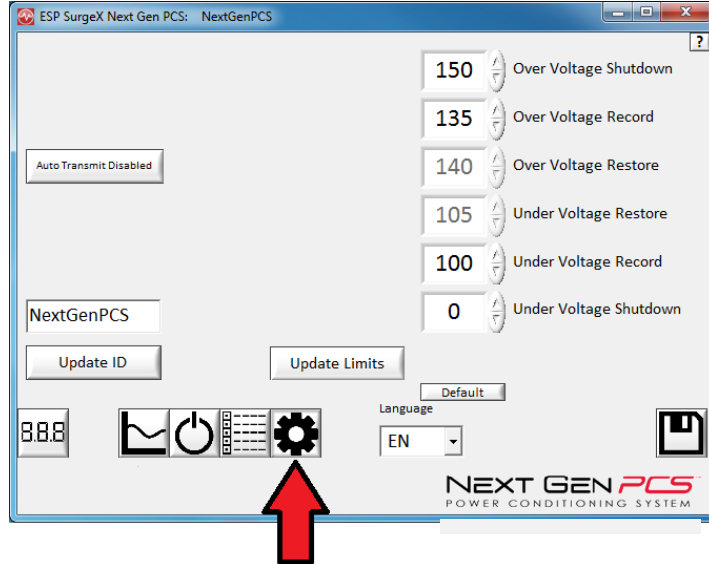
Press the button that corresponds to the type of data file to import and browse to the location of the file.

Note: “Import Historical Data from file” applies to enVision PCS, not Next Gen PCS.



e. Settings Mode

The Settings mode enables the specification of the user-configurable parameters of Next Gen. When this mode is entered, it displays the parameters currently in use. Firmware versions prior to 1.53 (120V models) and 1.02 (208-240V models) do not support the Auto Transmit feature.

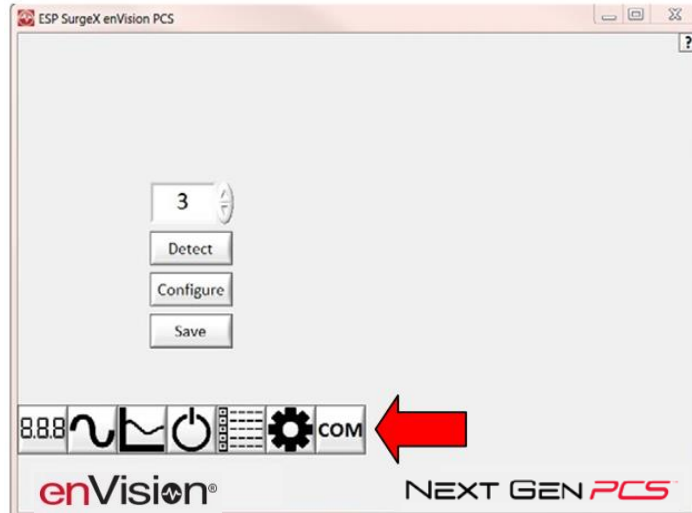


- i. Auto Transmit: Enables/Disables the automatic transmission of status information every 30 minutes. Primarily intended for use with Remote Portal RP-IP.
- ii. Update ID: Sets the product identifier specified in the text box. 10 character limit. This is a temporary setting intended to set an ID for saved reports.
- iii. Update Limits: Sets the voltage thresholds specified by the voltage threshold selection fields. Press **Default** to select factory default limits.
Note: Restore points may not be specified for Next Gen PCS.
- x. Language: Select the software’s display language.
- xi. 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	260
Over Voltage Record	$OV_{Shutdown} > V > OV_{Record}$	Outlets stay On and event recorded	135	260
Over Voltage Restore	$V < OV_{Restore}$ After $OV_{Shutdown}$	Outlets turned On	140	250
Under Voltage Restore	$V > UV_{Restore}$ After $UV_{Shutdown}$	Outlets turned On	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	0 (Disabled)	140

f. 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 Next Gen, 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/7/8/10 with UAC (User Account Control) enabled.
- iv. Save: Saves the COM Port selection.

5. Command Line Operation

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

Example : ESP_SurgeX_Diagnostic_Tool /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.	

VI. TROUBLESHOOTING

The MULTIPAK and Data Interface Cable contain no user-serviceable parts. Do not attempt product disassembly, as this will void the product warranty.

1. MULTIPAK:

Symptom	Possible Cause	What to Do
Red LED On, Green LED Off, No power at output	Incorrectly wired branch circuit outlet	Contact a licensed electrician to correct the branch circuit outlet wiring
Red LED Off, Green LED Off, No power at output	No voltage or unacceptable voltage at branch circuit outlet, or MULTIPAK output manually turned Off	Use the Communications Software to measure the voltage at the wall receptacle. Use the Communications Software to manually turn the outlets On. Plug the MULTIPAK into a known properly functioning outlet. If the "System On" LED still illuminates, contact a licensed electrician to troubleshoot the wall receptacle. If the "System On" LED still does not illuminate call SurgeX at 1.800.645.9721
Red LED Off, Green LED On, No power at output	Defective product	Contact SurgeX for product replacement at 1.800.645.9721

2. Software:

Symptom/Error Message	Possible Cause	What To Do
Unable to automatically determine COM Port	Data interface cable not properly connected.	Check interface cable connections at PC and XG.
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 XG.	Data interface cable not properly connected.	Check interface cable connections at PC and XG.
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.

VII. Specifications



Technical Specifications

SX-DS-154 (4x)

SX-DS-156 (6x)

Load Rating	15 Amps @ 120 Volts	15 Amps @ 120 Volts
Voltage Protection Rating (VPR)	330V All Modes	330V All Modes
EMI/RFI Filter, Normal Mode (50-ohm load)	> 30 dB 80kHz – 50MHz	> 30 dB 80kHz – 50MHz
EMI/RFI Filter, Common Mode (50-ohm load)	> 30 dB 70kHz – 50MHz	> 30 dB 70kHz – 50MHz
Overvoltage Shutdown	Adjustable from 135V to 160V. Restores at 130V	Adjustable from 135V to 160V. Restores at 130V
Undervoltage Shutdown	Adjustable from 80V to 95 V, or Disabled. Restores at 105V	Adjustable from 80V to 95 V, or Disabled. Restores at 105V
Dimensions	8.152" W x 7.272" D x 1.79" H	11.212" W x 7.272" D x 1.79" H
Weight	4.1 lbs.	5.0 lbs.
Temperature Range	5° to 35° C	5° to 35° C
Humidity Range	5% to 95% R.H., non-condensing	5% to 95% R.H., non-condensing
Agency Listings	Conforms to UL Stds 1283 & 1449 Certified to CSA Std C22.2 No. 8	Conforms to UL Stds 1283 & 1449 Certified to CSA Std C22.2 No. 8
FCC	Part 15 Class B	Part 15 Class B

* Specifications subject to change without notice.

This product, including its components and/or processes carried out thereby, are covered by one or more of the following:
U.S. Pat. No. 4,870,534. 4,870,528. 6,728,089. 6,744,613. 7,068,487. Can. Pat. No. 1,333,191. 1,332,439. Other Patents Pending.