

User Manual

120 and 208/230 Volt Models

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. PRODUCT OVERVIEW

The enVision PCS is a state-of-the-art, microprocessor-controlled, power filter engineered with real-time data acquisition and storage.

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

Model Number	Voltage (AC RMS)	Current (AC Amps)	Outlet
EV-12010 BR	120	10	
EV-12015	120	15	
EV-12016 BR	120	16	
EV-12020	120	20	
EV-20815	120/230 Split Phase	15	
EV-20816 BR	120/230 Split Phase	16	
EV-20820	120/230 Split Phase	20	
EV-23010	230 Single Phase	10	
EV-23016	230 Single Phase	16	
EV-23016-F	230 Single Phase	16	

2. Key Features:

- Normal and Common Mode EMI Noise Filter
- 3-Stage Normal and Common Mode AC Surge Suppressor
- CAT6 Network Line Surge Suppressor
- Modem/Fax Line Surge Suppressor (Note: Not available for EV-230xx)
- Inrush Current Elimination with Zero-Voltage Turn-On and Zero- Current Turn-Off (ICE Zero)
- Wiring Fault Detection
- Catastrophic Over/Under Voltage Shutdown (COUVS®) with selectable thresholds
- Under-Voltage Event Recorder (up to 65535 events)
- Over-Voltage Event Recorder (up to 65535 events)
- Power Outage Event Recorder (up to 65535 events)
- Surge Event Recorder (up to 65535 events)
 - Records surges in all three modes: Line-Neutral, Line-Ground, Neutral-Ground (120V)
 - Records surges in all three modes: Line1-Line 2, Line1-Ground, Line2-Ground (208/230V)
- Event Timestamp Recorder (up to 512 events)
 - Records actual date and time of events
- Internal logging of measured parameters
 - Average power, maximum power, average voltage, maximum voltage, minimum voltage, maximum current of 30 minute intervals for up to 138 days
 - Line voltage, current, power, NG voltage, frequency, power factor, crest factor, energy sampled every 10 seconds for up to 2.25 days
- Additional features available when connected to a PC (detailed in Diagnostic Software User Manual)

3. Technical Support:

- To download software and access further product information, visit www.espsurgex.com
- For enVision PCS technical support, please contact ESP at 1-800-645-9721

II. INSTALLATION INSTRUCTIONS

1. Filter Installation:

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

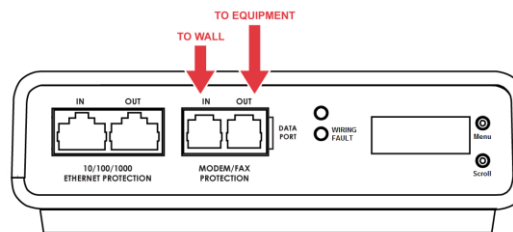
Éteignez la machine que vous connectez au filtre et débranchez de la prise murale le cordon d'alimentation de la machine.

Apague la máquina que intenta conectar al filtro y desconecte el cable de alimentación de la máquina del tomacorriente.



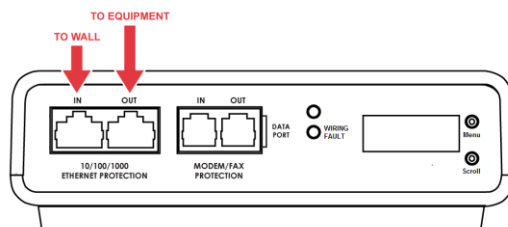
- b. Connect Modem/Fax line: Connect a phone cord from the wall jack to the "Modem/Fax" modular jack labeled "IN", and then connect a second phone cord from the "Modem/Fax" modular jack labeled "OUT" to the machine/equipment to be protected. The EV-23010 and EV-23016 models do not support a Modem Fax telco port.

Please Note: *The Filter only provides connectivity and protection for a single phone line.*

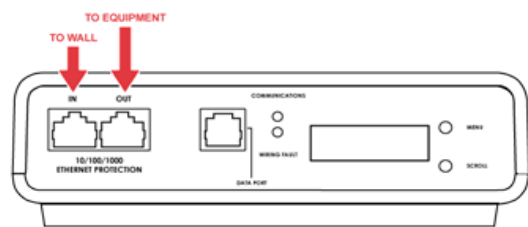


- c. Connect "10/100/1000 ETHERNET" network line: Connect a CAT6 network cable from the wall jack to the "10/100/1000 ETHERNET" modular jack labeled "IN", and connect a second CAT6 network cable from the "10/100/1000 ETHERNET" modular jack labeled "OUT" to the equipment to be protected.

One CAT6 network cable is included with the Filter.



EV-12015/20
EV-20815/20



EV-23010
EV-23016

d. Connect Equipment

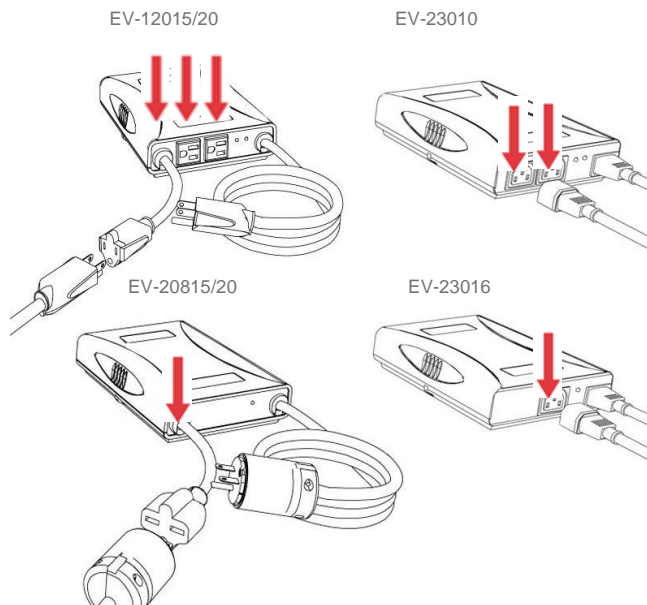
- i. Make sure that the total amperage of all equipment plugged into the Filter does not exceed the maximum branch circuit rating.

Assurez-vous que l'intensité totale de tous les appareils reliés au filtre ne dépasse pas la tension maximale du circuit de dérivation.

Asegúrese de que el amperaje total del equipo conectado al filtro no supere la clasificación máxima del circuito de derivación.

- ii. Connect the AC power cords of the equipment to be protected into the short output power cord of the Filter or two convenience receptacles next to the short output power cord.

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



EV-20815/20

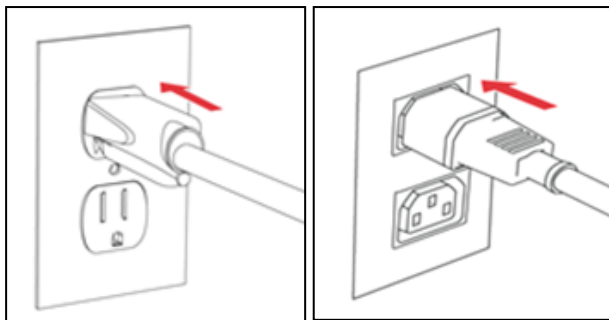
EV-23010

- e. **Connect Filter to Outlet:** Plug the Filter input power cord into a properly grounded and compatible branch circuit outlet. The plug is used as the disconnect device.

Please Note: Do not plug the Filter into a re-locatable power tap.

- i. If the branch circuit outlet is correctly wired and the magnitude of the line voltage is acceptable (between 105 and 140 V_{RMS} for 120V products, or between 190 and 260 V_{RMS} for 208/230V products), power will be connected to the outlets of the Filter 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 and the LCD will display specific wiring fault information. If this occurs, contact a licensed electrician to correct the outlet wiring. Refer to Section III: Hardware/EnVision PCS Filter, for LCD EVENT MONITOR display details.
- 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 V_{RMS} or above 140 V_{RMS} for 120V products, or less than 190 V_{RMS} or above 260 V_{RMS} for 208/230V products). If the magnitude of the line voltage is not acceptable, specific information will be displayed on the LCD. If this occurs, contact a licensed electrician to trouble-shoot the abnormal voltage condition. Refer to Section III: Hardware/EnVision PCS Filter, for LCD EVENT MONITOR display details.

1. *You may also need to verify that the Filter is operating properly. To test, plug the Filter into a known properly functioning outlet. If the “System On” LED still does not illuminate in the functioning outlet, contact ESP at 1-800-645-9721.*



EV-23010

CAUTION – Do not install this device if there is not at least 10 meters (30 feet) or more of wire between the electrical outlet and the electrical service panel.

La PRUDENCE - n'installe pas cet artifice s'il n'y a pas au moins 10 mètres (30pieds) ou plus de fil entre l'issue électrique et le comité de service électrique.

PRECAUCIÓN: No instale este dispositivo si no hay por lo menos 10 metros (30 pies) de cable entre el tomacorriente y el panel de servicio eléctrico.

III. HARDWARE

1. Filter

a. LCD Event Monitor

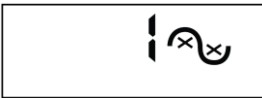
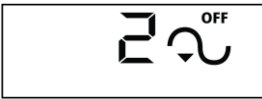

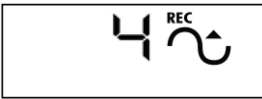
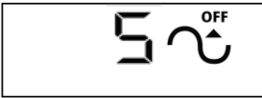

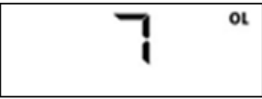
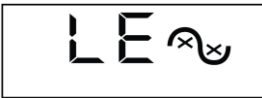










The LCD EVENT MONITOR displays useful information related to data collection, device status, and troubleshooting.

i. Normal Operation

1. When the EnVision PCS Filter is plugged into a branch circuit outlet with correct wiring and acceptable line voltage, the LCD Event Monitor will display the following information:

Menu	Item	Example Display
Electrical Parameters (EP)	Line Voltage	120 ~ V
	Neutral-Ground Voltage	388 ~ mV
	Load Current Draw	40 m A
	Load Power Draw	120 W
	Load Energy Usage	19 kWh
	Crest Factor	141 CF
	Power Factor	.996 PF
	Line Frequency	60.0 ~ Hz

Power Disturbances (Pd)	Power Outages	
	Under Voltages (Off)	
	Under Voltages (Record)	
	Over Voltages (Record)	
	Over Voltages (Off)	
	Surges	
	Overload	
	Last Recorded Event	
Outlet State (OS)	On / Off	
User Control (UC) Press and hold Menu and Scroll buttons to perform control action.	Turn Outlets On / Off	
	Memory All Clear (ALC)	
	Disturbance History Clear (dhC)	
	Power Usage Clear (PUC)	
	Disturbance Count Clear (dcC)	
	Energy Display Clear (EdC)	
	Chart Data Start (cdS)	

ii. Wiring Fault

When connected to an incorrectly wired branch circuit outlet, in addition to the illumination of the Red LED, the LCD Event Monitor will display the following information:

Wiring Fault Condition	Display	Example Display
Line (Hot) / Neutral Reversed (120V products only)	rP (Reverse Polarity)	
Missing Ground	gnd (no Ground)	

iii. Abnormal Voltage

When the magnitude of the branch circuit outlet voltage is not acceptable*, the Filter will disconnect power to its outlets and display the following information on the LCD Event Monitor (*above the over-voltage shutdown threshold or below the under-voltage shutdown threshold; refer to Section IV: Diagnostic Software for more information):

Voltage Condition	Display	Example Display
Over-Voltage	OFF + ▲ + Voltage	
Under-Voltage	OFF + ▼ + Voltage	

b. Clearing Memory:

The memory contents of the Filter can be cleared at any time by following one of these two methods:

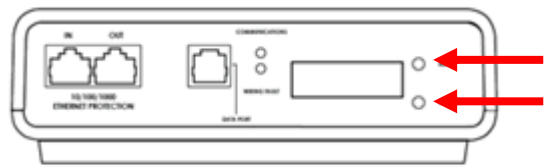
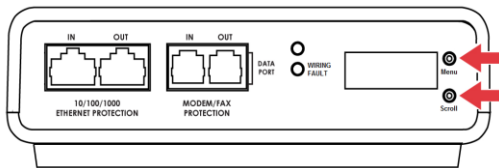
i. Buttons:

Follow these steps to clear the device memory:

1. Press the Menu button until "UC" (User Control) is displayed.
2. Next, press the Scroll Button to select which memory record to erase:

Memory All Clear (ALC)	ALC
Disturbance History Clear (dhC)	dhC
Power Usage Clear (PUC)	PUC
Disturbance Count Clear (dcC)	dcC
Energy Display Clear (EdC)	EdC

3. Finally, press and hold both Menu and Scroll buttons at the same time until "Clr" is displayed, and then release.



EV-23010

ii. Diagnostic Software:

The device memory may alternately be cleared from within the Diagnostic Software. See Diagnostic Software User Manual for details

2. Data Interface Cable

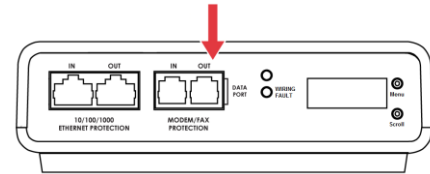
a. Overview

- i. The Data Interface Cable consists of a USB connection on one end, and a RJ-11 connection on the opposite end.
- ii. The USB connection plugs into an available USB port on your PC. The RJ-11 connection plugs into the RJ-11 "OUT" Jack (labeled "Data Port") on the enVision Filter, which is the jack closest to the LCD and buttons.



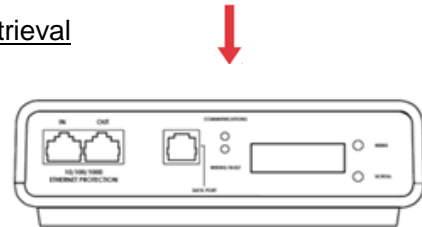
b. Instructions for Data Retrieval

- i. Disconnect any protected Modem/Fax lines connected to the "IN" and "Out" RJ-11 modular jacks on the Filter. Ethernet connections (RJ-45) may remain in place.
- ii. Connect the Data Interface Cable into the USB port on your PC.
- iii. Connect the Data Interface Cable into the RJ-11 "OUT" Jack (labeled "Data Port") on the Filter. It is the jack closest to the LCD and buttons.
- iv. Open the Diagnostic Software.
- v. When you are finished, be sure to re-connect the Modem/Fax lines to the "IN" and "Out" RJ-11 modular jacks on the Filter.



c. Instructions for EV-23010/EV-23016 Data Retrieval

- i. Ethernet connections (RJ-45) may remain in place.
- ii. Connect the Data Interface Cable into the USB port on your PC.
- iii. Connect the Data Interface Cable into the RJ-11 Jack (labeled "Data Port"). It is the jack closest to the LCD and buttons.
- iv. Open the Diagnostic Software.
- v. When you are finished, remove the Data Interface Cable from the RJ-11 Jack



IV. Troubleshooting

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

Le filtre et le câble d'interface de données ne contiennent aucune pièce réparable par l'utilisateur. N'essayez pas de démonter le produit, car cela annulerait la garantie du produit.

El filtro y el cable de la interfaz de datos no son piezas que un usuario pueda reparar. No intente desarmar el producto, ya que esto anulará su garantía.

1. enVision PCS Filter:

Symptom	Possible Cause	What To Do
Red LED On, Green LED Off, No power at output.	Incorrectly wired branch circuit outlet. The LCD EVENT MONITOR will display the nature of the wiring fault.	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 enVision PCS Filter output manually turned Off.	If the LCD EVENT MONITOR is not on, there is no power at the wall receptacle. If the voltage is unacceptable, the LCD EVENT MONITOR will display the type of voltage condition. Use the Diagnostic Software to measure the voltage at the wall receptacle. Contact a licensed electrician to troubleshoot the wall receptacle. Use the Diagnostic Software to manually turn the outlets On.
Red LED Off, Green LED On, No power at output.	Defective product.	Contact ESP for product replacement at 800.645.9721.

V. Specifications

Parameter		Specification
Load Rating	EV-12010 BR	10 Amps at 120 Volts
	EV-12015	15 Amps at 120 Volts
	EV-12016 BR	16 Amps at 120 Volts
	EV-12020	20 Amps at 120 Volts
	EV-20815	15 Amps at 120/230 Volts Split Phase
	EV-20816 BR	16 Amps at 120/230 Volts Split Phase
	EV-20820	20 Amps at 120/230 Volts Split Phase
	EV-23010	10 Amps at 230V Single Phase
	EV-23016	16 Amps at 230V Single Phase
	EV-23016-F	16 Amps at 230V Single Phase
Voltage Protection Rating (VPR)	EV-12010 BR EV-12015 EV-12016 BR EV-12020	330V All Modes
	EV-20815 EV-20816 BR EV-20820	700V All Modes
	EV-23010 EV-23016 EV-23016-F	NA
Attenuation	Normal Mode	EV-12010 BR EV-12015 EV-12016 BR EV-12020 EV-20815 EV-20816 BR EV-20820 EV-23010 EV-23016 EV-23016-F > 30 dB 80kHz – 50MHz
	Common Mode	EV-12010 BR EV-12015 EV-12016 BR EV-12020 EV-20815 EV-20816 BR EV-20820 EV-23010 EV-23016 EV-23016-F > 30 dB 70kHz – 50MHz > 30 dB 200 kHz – 50MHz
Power Requirement (no load)	All	4 Watts

** Specifications subject to change without notice

** All listed specifications obtained at an ambient temperature of 25°C

Parameter		Specification
Under-Voltage Shutdown	120V Models	Adjustable from 0 V to 110 V. Default 80 V.
	208/230V Models	Adjustable from 0 V to 220 V. Default 160 V.
Under-Voltage Record	120V Models	Adjustable from 0 V to 110 V. Default 100 V.
	208/230V Models	Adjustable from 0 V to 220 V. Default 180 V.
Under-Voltage Restore	120V Models	Adjustable from 80 V to 110 V. Default 105V.
	208/230V Models	Adjustable from 160 V to 220 V. Default 190 V.
Over-Voltage Shutdown	120V Models	Adjustable from 130 V to 160 V. Default 150 V.
	208/230V Models	Adjustable from 220 V to 300 V *. Default 280 V.
Over-Voltage Record	120V Models	Adjustable from 130 V to 160 V. Default 145 V.
	208/230V Models	Adjustable from 220 V to 300 V *. Default 270 V.
Over-Voltage Restore	120V Models	Adjustable from 130 V to 160 V. Default 140 V.
	208/230V Models	Adjustable from 220 V to 300 V *. Default 260 V.
Internal Memory Capacity		512 Power Quality Events with Timestamp 138 Day Electrical Parameter History at 30 minute intervals
Timestamp Accuracy		± 1% Typical Product Accuracy
Measurement Accuracy	120V Models	± 2% Typical product accuracy
	208/230V Models	± 2% Typical product accuracy
Response Time	Over-Voltage	90 ms
	Under-Voltage	200 ms
Power Outage Event Definition		AC Voltage has dropped below 20V
Surge Event Definition		Filter 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.
Modem/Fax Protection		Single telephone line surge suppression
Ethernet Protection		CAT6 network surge protection
Dimensions	All	6.125" W x 8.375" D x 2" H
Weight	All	2.25 lbs.
Temperature Range		5C to 40C
Humidity Range		5% to 95% R.H. Non-condensing
Agency Listings	EV-12015 EV-12020 EV-20815 EV-20820	ETL Certified to UL 1449 3rd Edition ETL Certified to UL 1283 5th Edition ETL Certified to CSA 22.2 No. 8-M1986 (R2008)
	EV-12010 BR EV-12016 BR EV-20816 BR	Tested per UL1449,4th Ed.,Dated August 20,2014
	EV-23010 EV-23016 EV-23016-F	TUV Certified to IEC 60950-1:2005 (Second Edition) + Am 1:2009 + Am 2:2013

* The allowed range was changed from 260-300V to 220-300V in firmware version 1.JB3, released in December 2016.

** Specifications subject to change without notice

** All listed specifications obtained at an ambient temperature of 25°C