

VaultGard™



VaultGard™

**EATON**

*Powering Business Worldwide*

The VaultGard™ from Eaton is the next generation communications product for Network Protectors, providing monitoring and remote control for vault systems. Certain to be your number one preventive maintenance tool, the VaultGard™ discovers network issues before they cause costly system-wide problems.



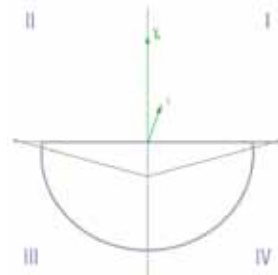
Incorporating the latest in Eaton's innovative technology, the VaultGard™ can connect up to 32 network protector relays through existing shielded twisted pair (STP) cable and is rated for the harsh environmental stresses typically found in underground vaults.

The integrated graphics display provides expanded capabilities and enhanced functionality that tracks such vital network protector performance metrics as:

- Device address including status and MPCV relay reason codes
- Breaker position and alarms
- Phase Currents
- Network, Transformer, and Phasing voltages
- Operations counter
- Power metrics: Real (Kilowatts), Reactive (VAR), Power factor
- Positive sequence angle and positive sequence voltage
- Sensor input: captures wireless current sensor and temperature data
- Real time MPCV vector graphic display

With easy to navigate on-board web pages accessible through Wi-Fi, cellular or Ethernet connectivity, the VaultGard™ can efficiently interact with a variety of network relays. Additionally, data can link to existing Supervisory Control and Data Acquisition (SCADA) systems via DNP 3.0 protocol.

The VaultGard™ also offers alarms, logging of captured relay data, and set point control. The user can view this MPCV data through a series of phasor plots that illustrate real-time load data along with set point trip and close boundary characteristics.



These plots automatically adjust to reflect the current relay state and curves and can be used to detect errors, send alerts, and show where problems exist within the network. This functionality is pre-installed and no additional software is required.

### Hardware

The VaultGard™ is housed in a secure enclosure with numerous input and output ports to support many applications. Some of these features include:

- Configurable threshold-based alarming with e-mail notification
- Real-time clock for historical logging of captured and timestamped data
- Monitoring of the remote digital inputs and outputs as well as third party devices on accepted

### Wireless Modem Options

- The VaultGard™ RJ-45 output port provides a user-friendly interface for both local and long range remote access and control of network protector relays. Options for the wireless functionality include:
- Wi-Fi: This wireless technology uses the IEEE standard of 802.11b/g for the wireless local area network. For security, the wireless signal uses WPA encryption as well as a unique username and password. One can access the relays locally with a laptop with a standard wireless card.

The ability to wirelessly connect to the network relays through the VaultGard™ at a distance of nearly 100m from the vault provides safety and cost advantages over labor-intensive vault entry.

- Cellular: A cellular modem can be used to broadcast a signal to a local cellular tower. This signal can be transmitted over long distances to a main office or used to send e-mail and phone alerts.

### Power Xpert Software Compatibility

Power Xpert® is an optional application that provides a centralized program linking all VaultGard™ units in a network. The Layout Manager software within Power Xpert® shows:

- Two-dimensional layouts of facilities
- Alarm and status indicators for specified channels
- Gauges/dials displaying values from specified channels and system behavior
- One-line diagrams showing the status of specified channels
- Import of GIS image(s) or existing topography for street/vault maps

### Additional Functionality

The VaultGard™ can also capture data from other external sensors that transmit their signals wirelessly. The VaultGard™ acts as a central hub for collecting vault data, controlling relays remotely, and communicating vital network data to the user.

The VaultGard™ from Eaton is the next generation communications product for Network Protectors, providing monitoring and remote control for vault systems. Certain to be your number one preventive maintenance tool, the VaultGard™ discovers network issues before they cause costly system-wide problems.

### Features

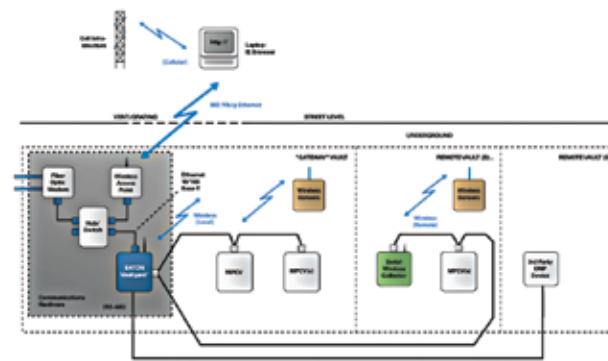
- Next generation communications product for Network Protectors
- Connect up to 32 MPCV relays on 1 unit
- Easy to navigate on-board web pages (no software needed)
- Comprehensive data monitoring (voltage, current, power metrics, etc.)
- Compatible with optional Power Xpert® software application to integrate entire network of VaultGard™ Units
- Compatible with wireless current sensors for vital cable loading data

### Functions

- Monitoring and remote control for a vault system Protectors
- Wi-Fi, Cellular, or Ethernet connectivity to on-board web pages through a web browser (ex. Internet Explorer)
- DNP3.0 protocol compatibility
- Configuration for master/slave topologies for integration with a local SCADA system
- Alarms, logging (live and historical)/trending/graphing of captured data, set point control
- E-mail alert notification
- Captures wireless current sensor data
- Monitoring and control of accepted digital I/O devices

### Benefits

- No software is required
- Central hub for collecting vault data, controlling relays remotely, and communicating vital network data to the user
- Acts as a preventive maintenance tool to discover issues before they cause system-wide and costly problems



Below: The VaultGard™ and remote vaults are connected through the daisy chaining of relays.

FPO

Phase	Voltage (V)	Current (A)	Power (kW)	Reactive Power (kVAR)	Power Factor (PF)
A	279	10	0	0	0
B	265	23	0	0	0
C	254	34	0	0	0

Protector	NP	Device	Breaker	LA	IB	IC	VT(A)	VT(B)	VT(C)	Power	Reactive	PF	Operation
Protector	ARMIS	Status	Position	(A)	(A)	(A)	(V)	(V)	(V)	(kW)	(kVAR)		Counter

Parameter	Value
Name	MPCV Relay 20
Address	020
Status	Closed
Reason	Normal
Operations	0
Firmware Version	1.016
Breaker Position	Closed
Remote Trip (ROBO)	Inactive
Attempting Remote Protective Close	false



**Network Protector Arc Reduction Maintenance System-Indicating Diagnostic Module (NP ARM-IDM)**

A new version of the Indicating Diagnostic Module that can sense fault current in either forward or reverse direction.

**VaultSense™ Wireless Current Sensor**

The analog Wireless Current Sensor from Eaton that measures vital system data for network underground vaults and manholes.



**Technology at work for you**

**CONNECTING UTILITIES TO THE TECHNOLOGY RESOURCES THEY NEED**

With an aging workforce and a slowly declining knowledge base, it has become increasingly important for utility crews to look for safer, more user-friendly systems. Reliability and Safety are of the utmost importance in today's utility environment. Through the incorporation of Eaton's communications solutions, you will see an increase in your Maintenance Interval times. This allows for a shift away from time-based maintenance toward predictive, usage-based diagnostics for maintenance. VaultGard brings a wealth of information from the Utility Vault to the fingertips of utility personnel in a user-friendly web interface or into existing SCADA. Information contained in VaultGard can be trended and analyzed different ways to determine predictive maintenance schedules. Through VaultGard, protectors can be opened and safety features activated remotely, mitigating potential danger to the operator before they enter the vault.



**Flexible Solutions For Your Communications**

**THE MPCV RELAY ALONG WITH OUR FAMILY OF COMMUNICATIONS PRODUCTS PROVIDES A TOTAL END TO END SOLUTION**

**INCREASE THE CAPABILITIES OF YOUR NETWORK PROTECTORS**

The MPCV Network Relay brings the proven performance of a sequence based microprocessor design in order to give your NWPS in service the most intelligent relay available in the market.

**The advantages of the MPCV are:**

- Gull Wing Trip Curve- Built in 5 degree shift in trip curve for high X/R transformers
- Anti-Pump Protection Algorithm- Reduces pumping on Network Protectors per your setpoints
- Sensitive and Non-Sensitive trip setpoints
- Built-in time delay function
- Circular Close option permits close at lower loads while assuring the watt flow is into the network

**REMOTE OPERATION AND CONTROL**

- Remote Open Block Open Command- Trips and blocks Network Protector Open under wired or wireless communications
- Protective Remote Closing Command- Advanced Safety Algorithm insures a positive close without sacrificing safety
- Advanced safety algorithms insure that the MPCV always call for a trip under adverse

**COMMUNICATIONS CAPABILITY**

The MPCV Relay has the capability of communicating via DNP 3.0, Ethernet TCP/IP, and 802.11 b/g protocols using VaultGard™ communication platform. The MPCV data can be transferred directly into the customer SCADA system.

The Benefits of a Microprocessor Design Our enhanced sequence filtering algorithm provides exceptional performance and stability over a wide range of temperatures and voltages in comparison with a power-based algorithm.

**Access and display information from the MPCV such as:**

- Voltages
- Currents
- Power Factor
- Status
- Temperature
- Phasing voltage
- Pos. sequence phase voltage (complex form)

Designed for safety, communications, and ease of use. Each MPCV relay is enclosed in a solid brass casted .25" submersible enclosure. LEDs on the front of the relay alert the user if the relay senses adverse or problematic conditions.

**The Benefits of a Microprocessor Design**

Our enhanced sequence filtering algorithm provides exceptional performance and stability over a wide range of temperatures and voltages in comparison with a power-based algorithm.



# VaultGard Data Concentration Underground Network Monitoring

The VaultGard™ Gateway from Eaton is certain to be the next generation communications product for Network Protectors, providing monitoring and remote control for vault systems. Certain to be your number one preventive maintenance tool, the VaultGard™ Gateway will discover network issues before they cause costly system-wide problems.

## FEATURES

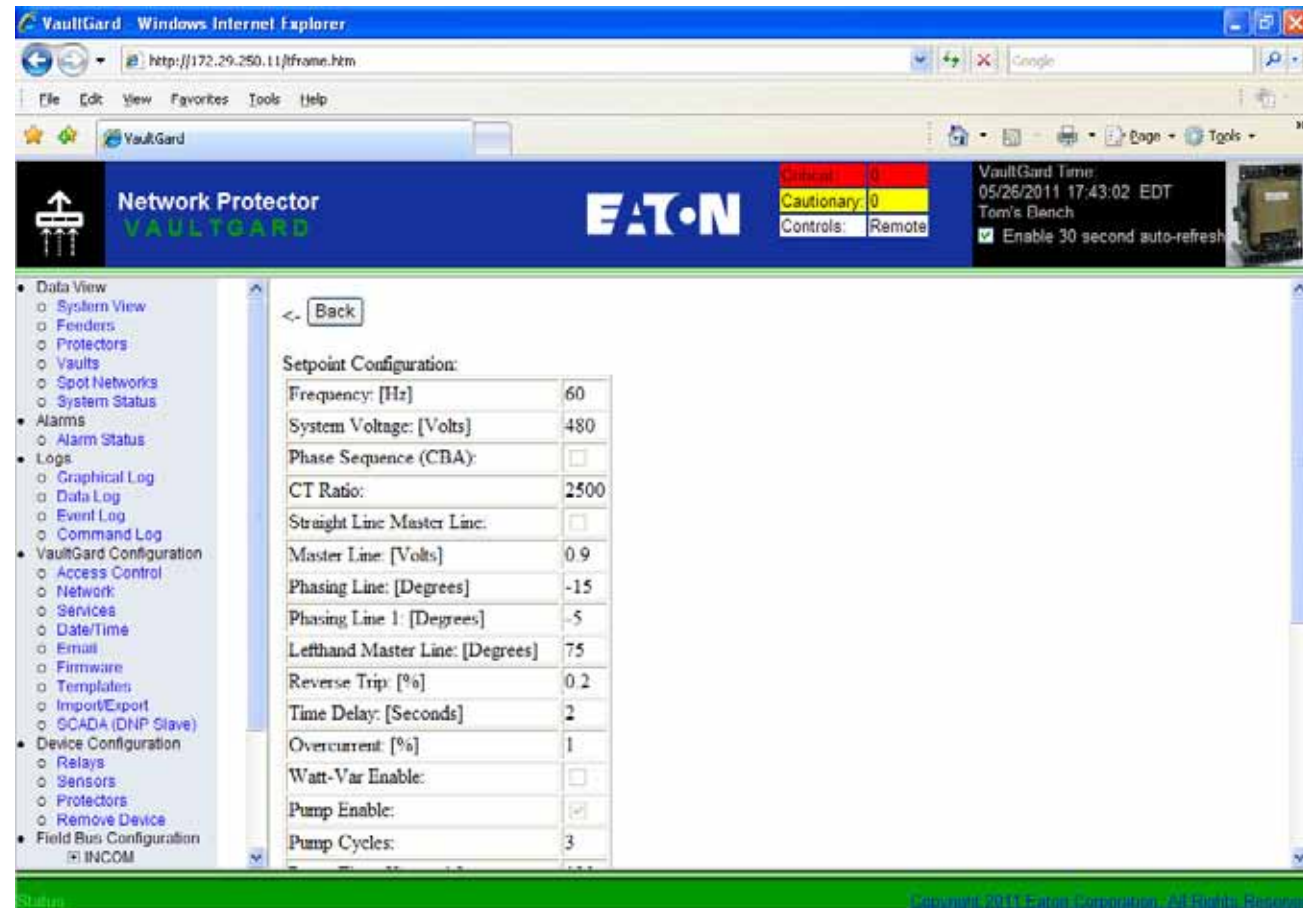
- Next generation communications product for Network protectors
- Connect up to 32 MPCV relays on 1 unit
- Easy to navigate on-board web pages (no software needed)
- Comprehensive data monitoring (voltage, current, power metrics, etc.)
- Compatible with optional Power Xpert® software application to integrate entire network of VaultGard™ Gateway Units

## FUNCTIONS

- Monitoring and remote control for a vault system
- Wi-Fi, Cellular, or Ethernet connectivity to onboard web pages through a web browser (ex. Internet Explorer)
- DNP3.0 protocol compatibility
- Configuration for master/slave topologies for integration with a local SCADA system
- Alarms, logging (live and historical)/trending/graphing of captured data, set point control
- Email alert notification
- Captures wireless current sensor data
- Monitoring and control of accepted digital I/O devices

## CHANGE SETPOINTS REMOTELY

The VaultGard web-interface provides a user-friendly means of adjusting the set-points to you MPCV relay remotely.

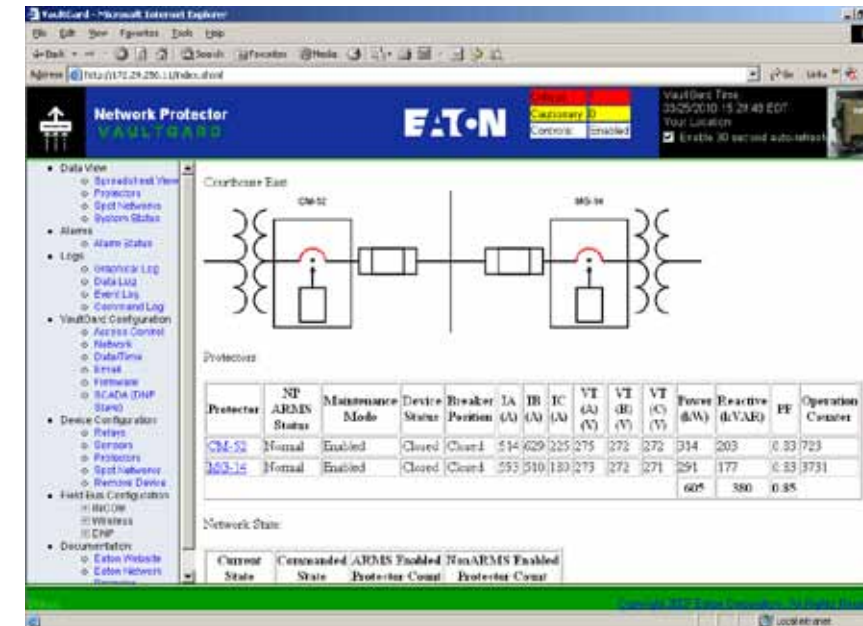
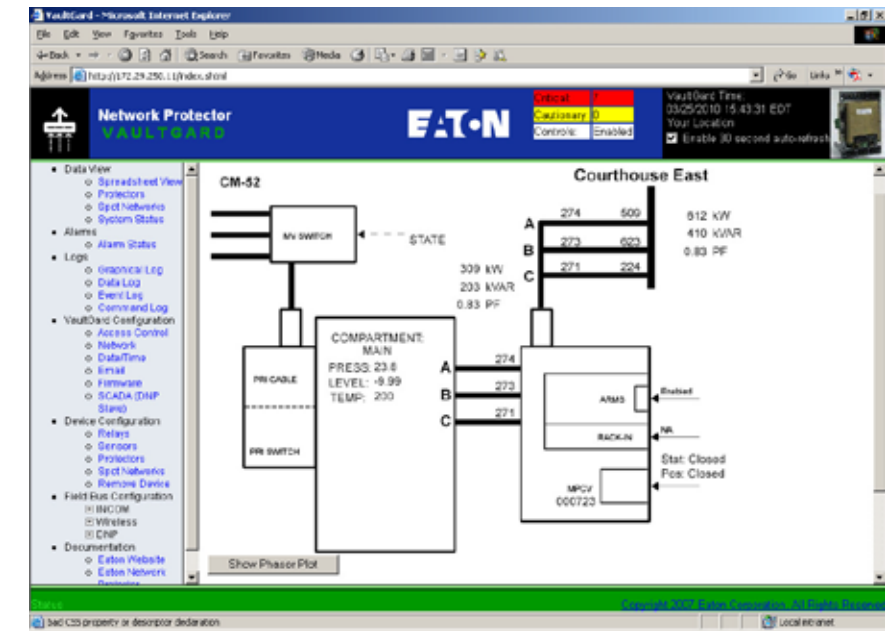


## NETWORK PROTECTOR VIEW

View your system-critical information on a protector-by-protector basis.

See data including the Network and Transformer Voltage, Current, Power and power factor.

Also control protector features like ROBO and protective close, as well as the ARMS IDM maintenance mode.



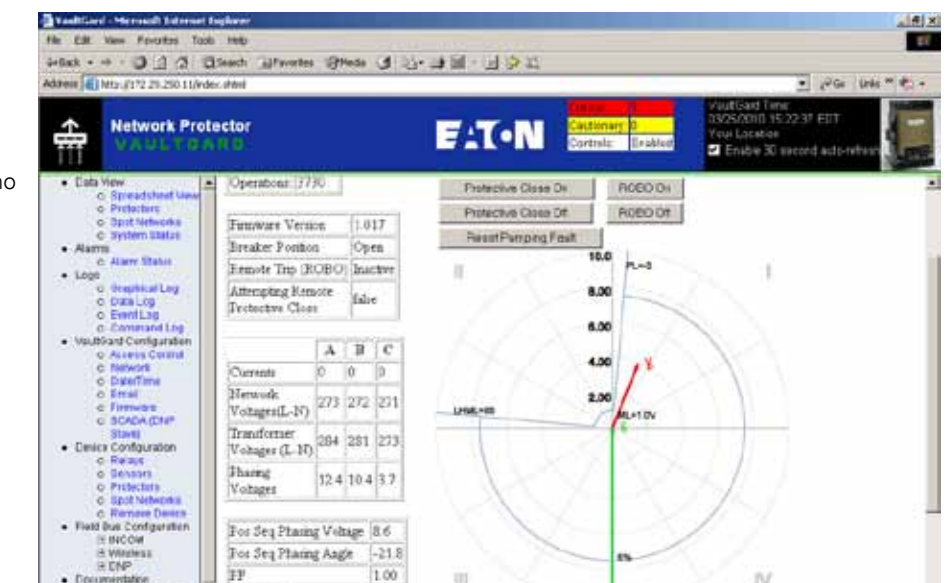
## SPOT NETWORK VIEW

View the one-line diagram of each of your Spot Networks, which displays the network protector names along with their Open/Close status, attached to a common network bus.

The spot network view shows a summary of the real and reactive power for a spot network, and also allows for control of multiple ARMS devices from a single click.

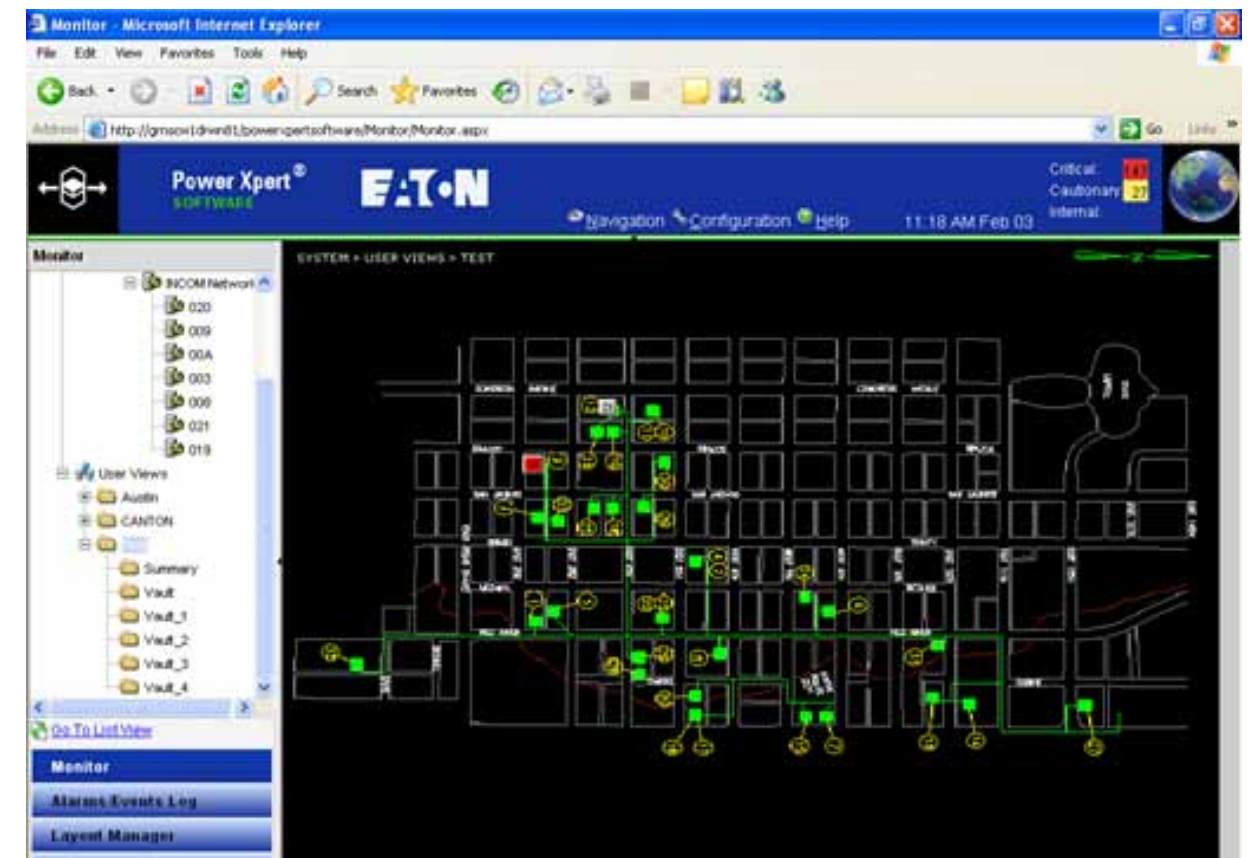
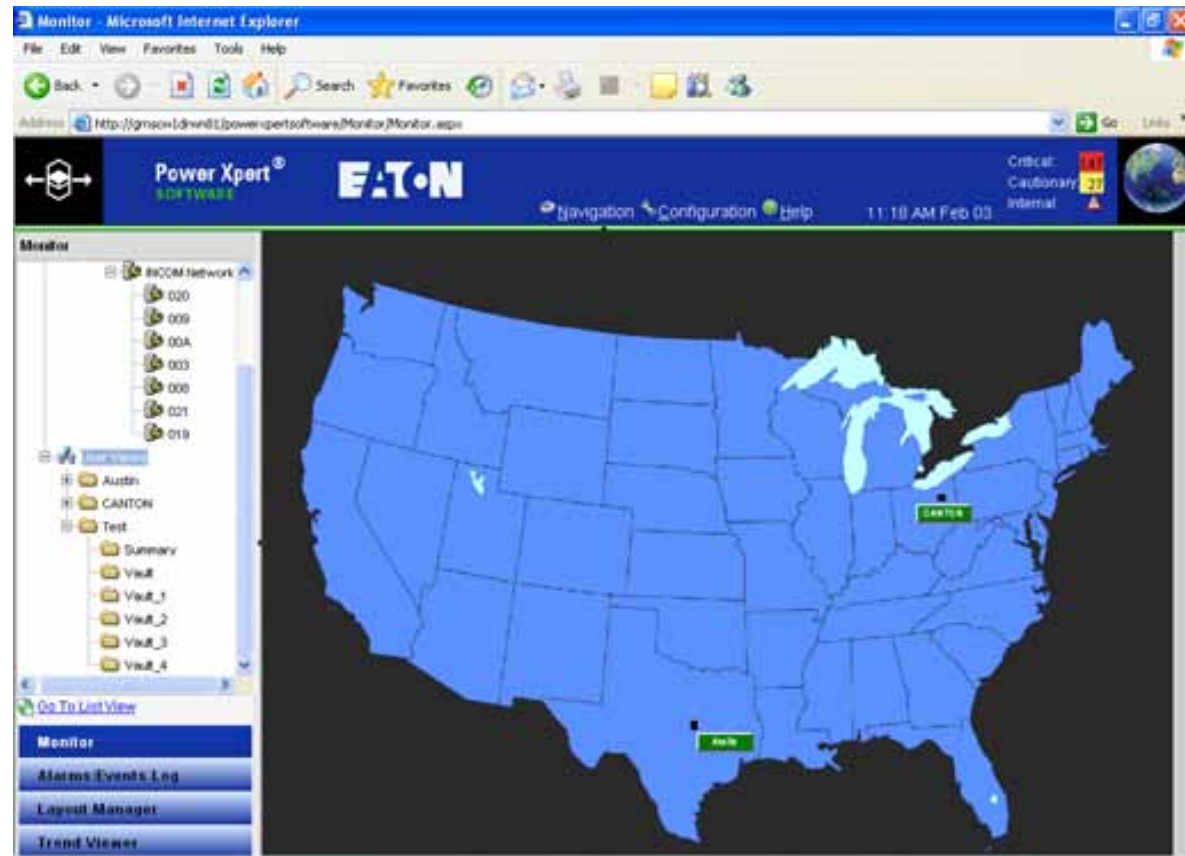
## PHASOR DIAGRAM

These plots automatically adjust to reflect the current relay state and curves, and can be used to detect errors, send alerts, and show where problems exist within the network. This functionality is preinstalled and no additional software is required.



# Power Xpert Solutions

## SCADA System Integration



# Accessories For SmartGrid Applications

## RemRack

Eaton's CM-52 remote racking device provides a means of remotely connecting and disconnecting a network protector from the energized bus-work while the door of the network protector remains bolted shut to help mitigate any chance of arc flash exposure.



## ARMs-IDM

The Network Protector Arc Reduction Maintenance System - Indicating Diagnostic Module is a new version of the Indicating Diagnostic Module that can sense fault current in either forward or reverse direction in addition to providing the utmost in arc flash protection.

When enabled, the innovative Arc Reduction Maintenance System establishes a preset instantaneous trip level that overrides the time delay function of traditional over current relays and schemes of the associated breaker. The trip initiation time is 4 ms and the device will respond both the forward or reverse direction. When the ARM-IDM is enabled, the protective sensing looks into both the line and load side of the network protector.



## RemRack/ARMs Junction Box Control Cabinet

Allows for control of up to 6 Remote Racking devices and 6 NP ARMs devices.

The user can enable Maintenance Mode on all protectors from a single illuminated switch. They can also Rack-In/Rack-Out the breakers, as well as see the breaker position via indicating lights.



FPO

## TripSafe

TripSafe™ is designed to work with any MPCV Relay controlled network protector regardless of model or vintage. TripSafe™ provides enhanced transformer and network bus surge protection in addition to its ability to detect an unpowered MPCV relay.

TripSafe™ has an output TRIP contact that can be paralleled with the Network breaker trip contact to provide a backup trip mechanism for when bus voltages are sensed to be present and the MPCV is unpowered. It is Engineered with appropriate algorithms to insure that noise or other disturbances will not cause nuisance tripping.



## DRAM

Digital Relay Accessory Module.

The DRAM addressable relay allows for up to 4 Form-C relay outputs, which provide a 'Pulse Relay' command for operating field devices.

The most common application for the DRAM would be for operating the Remote Racking system through communications, or interfacing with 3rd party equipment.



## DIM

Digital Input Module

The DIM device allows for up to 8 drycontact digital inputs, which can be used to monitor various alarms within each vault.

Some common alarms used with the DIM are the Smoke Alarm, Vault Float Sensor, Moisture Sensor, NP Pressure Sensor, and intrusion alarms



## Vault Flood Alarm

Rugged float switch inside of a debris-resistant housing. This float switch alarm can be used in conjunction with the DIM to sense the presence of liquid up to a certain level in a Vault environment.



FPO

## Bulkhead Penetrating

The Bulkhead Penetrating Junction Box provides a means of feeding cable/wiring in/out of the Submersible Network Protector tank while maintaining submergibility.

The box features up to 16 wire connections to the Network protector. This allows the user to easily connect the MPCV relay to communications, as well as incorporate external alarms with the Network Protector.



# Accessories For SmartGrid Applications (cont'd)

## NP Moisture Sensor

The NP Moisture Sensor is mounted at the bottom of the Network Protector tank, and monitors for the presence of any moisture within the tank.

It features a NO alarm contact which can be seen through communications via the DIM or through one of the MPCV's 3 spare Aux Inputs.



## NP Pressure Sensor

The NP Pressure Sensor monitors the pressure inside of the Network Protector tank, and features a normally closed circuit to alarm the system if there is a drop in pressure within an enclosed tank.

## Smoke Alarm

The smoke alarm is powered from 120VAC and provides a Normally Open alarm circuit which can be brought back through communications via the Digital Input Module.



## TAIM

In addition to traditional mechanical monitoring and protection, electronic transformer monitoring further improves reliability, safety, and the availability of key decision making information by automating control and making information available remotely.

The Transformer Analog Input Module (TAIM) allows utilities to see information that was never before available remotely.

The TAIM can collect critical data from the Transformer including accurate readings for Oil Temperature, Compartment Pressure, and Oil Level.

## Stacklight

The Submersible Stacklight features 5 indicating lights, and connects to each protector via the Bulkhead Connection Box.

Features Indication for ARMs Maintenance Mode, Breaker Open, Breaker Closed, RemRack Test Position, and RemRack Connect Position.



## Transformer Level Gauge

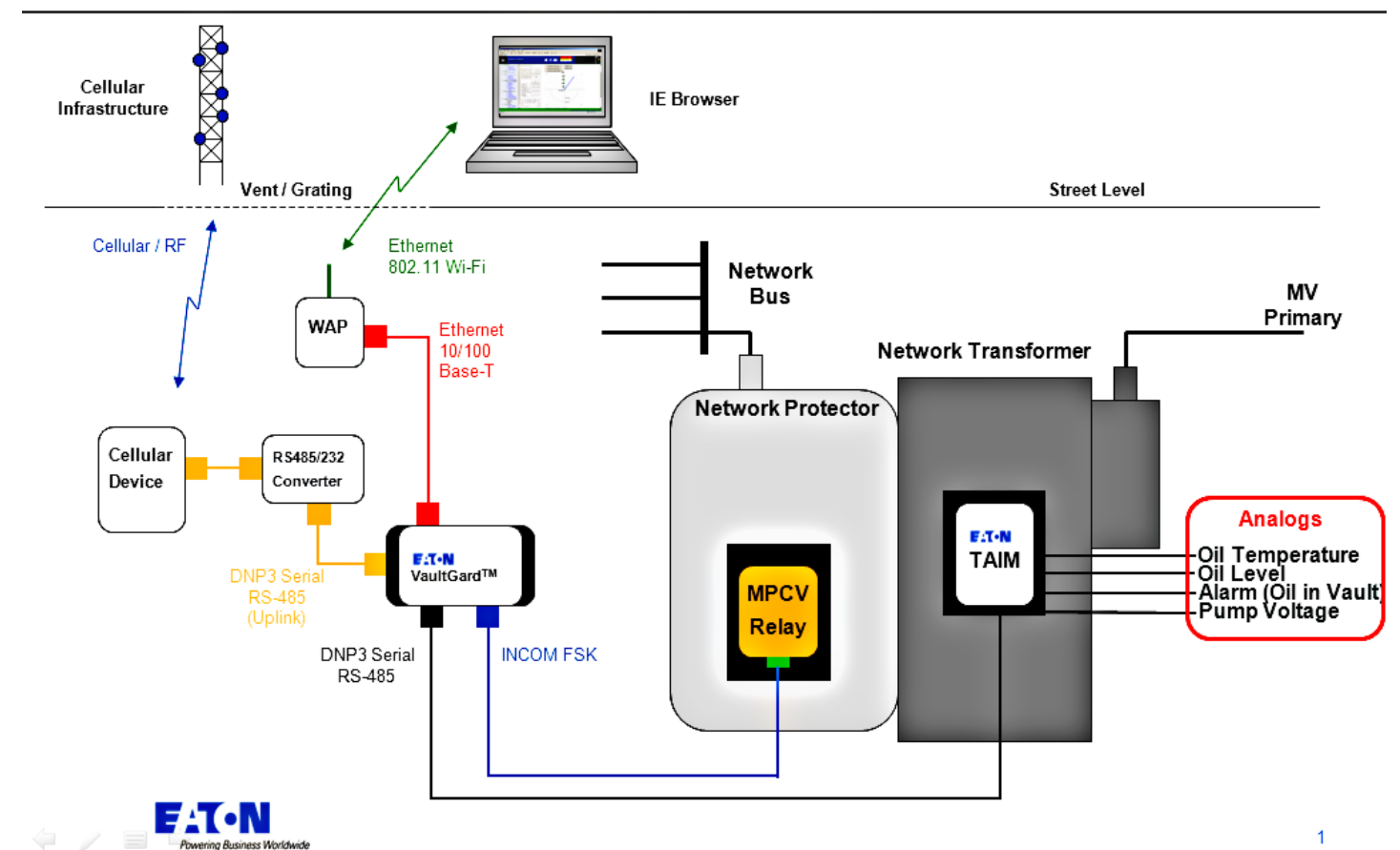


## Transformer Temperature Sensor (RTD)

## Ambient Temperature Sensor (RTD)

## Pressure Transducer

# Network Vault





Eaton's electrical business is a global leader in electrical control, power distribution, uninterruptible power supply and industrial automation products and services.

Eaton's global electrical brands, including Cutler-Hammer®, Powerware®, Holec® and MEM®, provide customer-driven PowerChain™ Management solutions to serve the power system needs of the industrial, institutional, government, utility, commercial, residential, IT, mission-critical and OEM markets worldwide.

Eaton Corporation is a diversified industrial manufacturer with 2006 sales of \$12.4 billion. Eaton is a global leader in electrical systems and components for power quality, distribution and control; fluid power systems and services for industrial, mobile and aircraft equipment; intelligent truck drivetrain systems for safety and fuel economy; and automotive engine air management systems, powertrain solutions and specialty controls for performance, fuel economy and safety. Eaton has 61,000 employees and sells products to customers in more than 125 countries.

For more information, visit:  
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