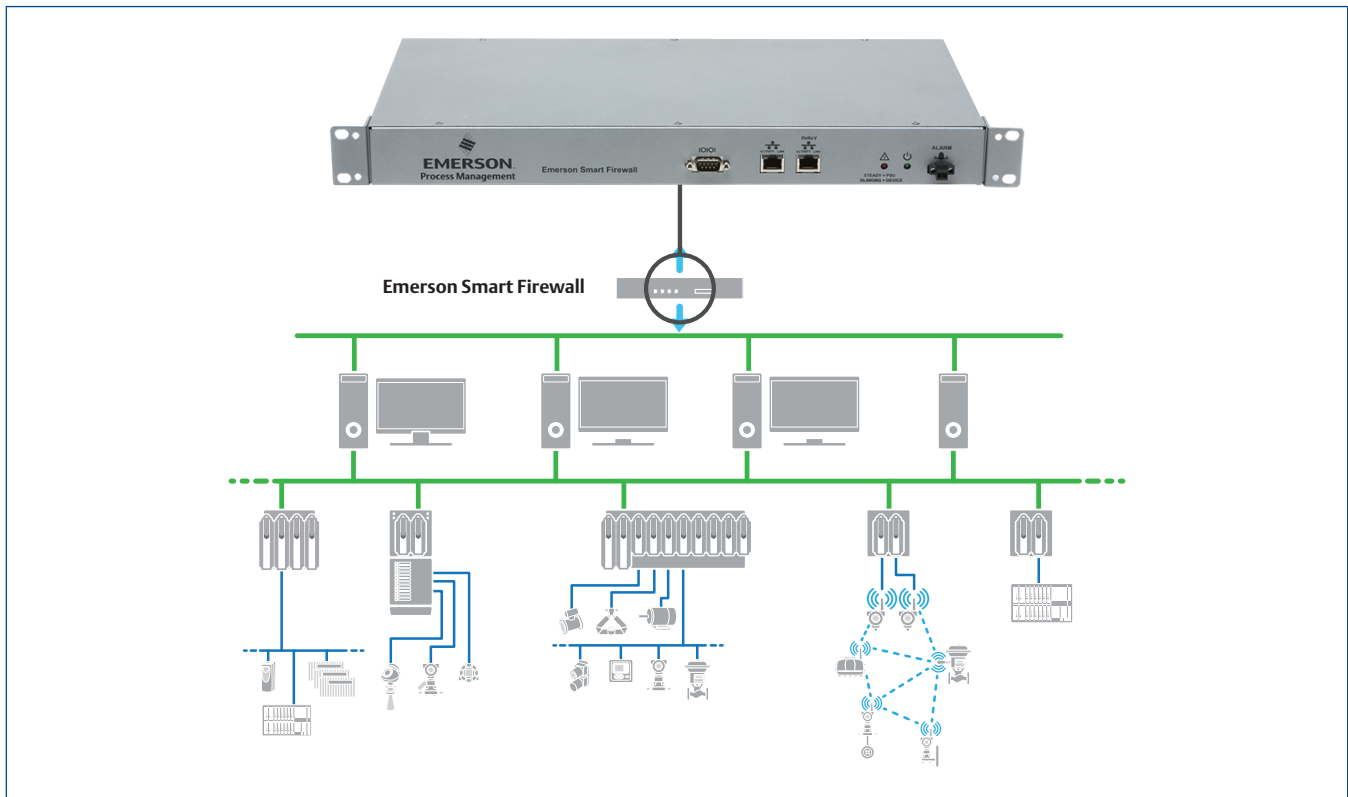# Emerson Smart Firewall

The Emerson Smart Firewall protects the DeltaV system with an easy-to-use perimeter defense solution.

- Purpose-built for easy deployment in the DeltaV system

- Easy-to-use web-based user interface

- "Firewall friendly" distributed component object model (DCOM) communications

- Monitor firewall hardware alerts on DeltaV operator workstations

Introduction

The Emerson Smart Firewall is a built-for-purpose perimeter firewall and Intrusion Detection System (IDS) specifically designed to provide an easy to install and easy to maintain perimeter security solution for a DeltaV distributed control system.

The Emerson Smart Firewall is a hardware-based perimeter protection solution designed to enforce highly controlled external network access to a DeltaV DCS. Even systems without access to security experts can easily meet the requirement for strong enforced network segmentation by using the Emerson Smart Firewall as it does not require security or IT expertise to manage.

![DeltaV logo]

![Emerson Process Management logo]

The Emerson Smart Firewall is specifically designed for use with DeltaV systems. The user friendly interface provides easy to understand setup menus. The pre-configured list of DeltaV application rules makes it easy for the DeltaV administrator or controls engineer to create the secure communications connections to those DeltaV applications used to communicate with computers external to the DeltaV network.

Benefits

Purpose Built – The Emerson Smart Firewall is specifically designed for use in the less complex and more defined DeltaV network architecture. The user friendly interface provides simplified and easy to understand setup menus.
– *Simple to install and maintain.*

Easy for the DeltaV Administrator – No Security or IT expertise is required to setup and maintain the firewall. Easy to understand menu choices allow DeltaV support personnel to manage the perimeter security of a DeltaV system.
– *No security expertise needed.*

Extensive, out of the box DeltaV Application List – Over 50 predefined communication applications are provided with the Emerson Smart Firewall, covering the typical types of connections used with DeltaV systems. The ability to add additional custom applications is supported.
– *Easy communications setup.*

Easy-to-use Management Interface – The built in password protected, web-based user interface provides intuitive, menu-based navigation and easy to understand configuration selections.
– *Simpler to install and maintain.*

Simplify DCOM Connectivity – Advanced capability makes the firewall DCOM "friendly." Dynamic port mapping provides a more secure perimeter solution when using classic OPC-based communications.
– *Easier and more secure DCOM communications.*

Monitor the Firewall Hardware Status on DeltaV Operator Workstations. – The DeltaV Network Management Center allows you to connect the firewall to DeltaV and integrate the hardware status into the DeltaV alarm system.
– *Monitor the health of the firewall using standard DeltaV alarms.*

Conform to new Security Standards – the Emerson Smart Firewall allows you to meet emerging security standards that require strong network perimeter protection with an economical and easy to implement solution.
– *Meet security standards.*

Hardware Description

The Emerson Smart Firewall is a 19-inch 110/220VAC rack-mounted device. It is designed to be installed in cabinets adjacent to the computers to which it is connected. It is a fanless device.
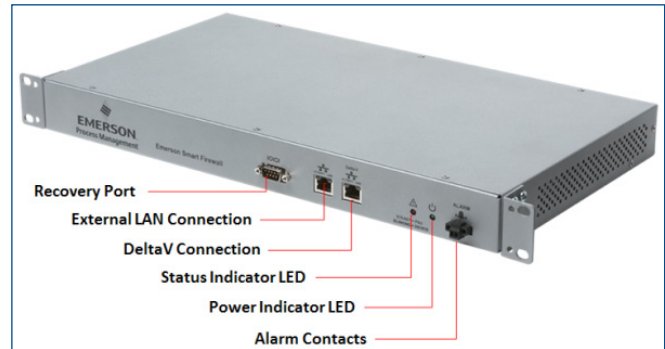
Emerson Smart Firewall front panel layout.

Recovery Port – serial port to reset lost administrator password and IP address.

External Local Area Network (LAN) Connection – network connection for external LAN.

DeltaV Connection – network connection to the third NIC on the DeltaV workstations.

Status Indicator LED – provides visual indication of the redundant power supply status of the firewall.

Power Indicator LED – Provides visual indication that the firewall is powered up.

Alarm Contacts provides remote indication of firewall hardware status.
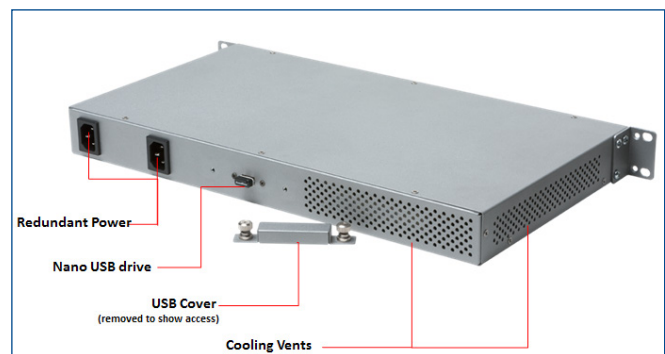
Emerson Smart Firewall rear panel layout.

Redundant Power: Bringing power from two different sources increases overall availability.

**Nano USB Drive:** Stores configuration for quick firewall replacement.

USB Cover: Protects the USB drive.

Cooling Vents: Fanless cooling provides greater reliability.

The 2.5 LAN and the DeltaV Security Zone

The Emerson Smart Firewall is specifically designed to be installed at the perimeter of the DeltaV system and help manage the external communication connections between the plant LAN or DMZ (demilitarized zone) and the DeltaV workstations. Locating the firewall between the DeltaV workstations and the external plant networks creates a network that needs to be treated as part of the DeltaV security zone.

This network is architecturally located between the level 2 control network and the level 3 external network and is referred to as the "2.5 LAN."
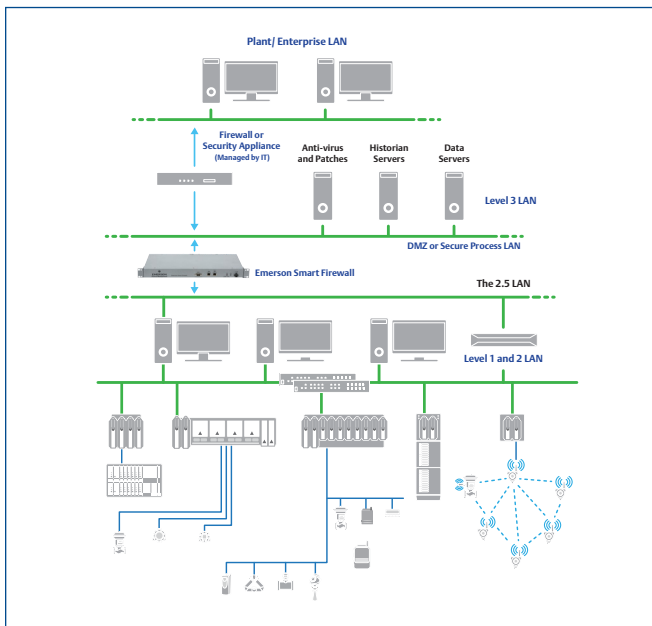
Installing the Emerson Smart Firewall effectively locates the boundary of the DeltaV system at the external output of the firewall. The firewall and the networks below the firewall should be treated as high security zones. All communications allowed through the firewall should be tightly managed to permit only the data flows and remote user access absolutely necessary to manage the system and export or import process information.

Ideally each DeltaV system should have a dedicated Emerson Smart Firewall for ease of management and maintenance. This 2.5 LAN should contain only those computers and devices that are dedicated to support the single DeltaV system connected to the DeltaV side of the firewall port. Computers that will be accessed by other DeltaV systems or other control systems should be located in the DMZ zone.

Secure Configuration

The user interface of the Emerson Smart Firewall encourages a more secure environment where adding new connections or new external computers to the system require deliberate action by the DeltaV system administrator. This prevents unauthorized users from easily gaining access to the DeltaV control system without the knowledge of the administrator.

The Firewall Configuration Interface

The Emerson Smart Firewall is configured from a built-in web-based interface (WebUI) that can be accessed from any workstation on the DeltaV network with network access to the firewall. The WebUI is password-protected and allows for three different levels of user access. The Emerson Smart Firewall provides-password protected, view-only access to the firewall configuration from an external LAN connection. This external access can be disabled.
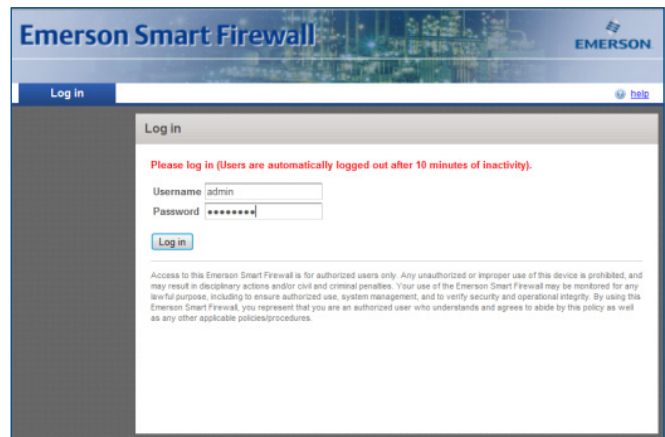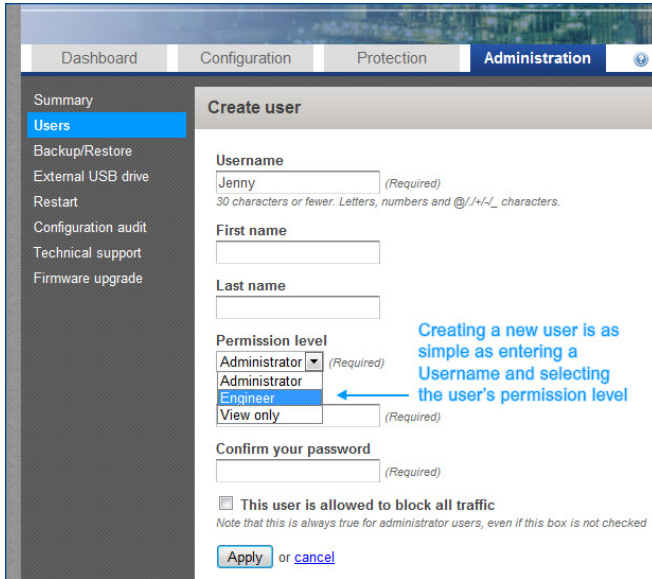

Firewall User Roles

The firewall has three different levels of user access: Administrator, Engineer, and View-only:

- Administrator user has access to all functions for viewing and changing the firewall configuration.

- The Engineer user has view-only access with the added ability to enable/disable protection rules.

- View-only access has access to only the summary information on each tab and cannot make any changes to the firewall configuration.

Creating new firewall users is easy since all of the user privileges are preset.

New Firewall users are easy to create.

Emerson Smart Firewall Setup and Management

The Emerson Smart Firewall management interface is divided into four sections. Each of these sections has a specific function.

- The **Dashboard** tab shows an overview of the status of the firewall and current communications.

- The **Configuration** tab (shown) has the menu items required to setup the firewall in the network.

- The **Protection** tab (shown) has the menu tasks required to create the authorized communications access through the firewall.

- The **Administration** (shown) tab has the menu tasks to manage users, backup and restore configurations, and perform other admin related activities.

The WebUI screen capture shows an example of how the information is arranged in the WebUI.

Access to the information in the tabs is user access controlled, so changes to the firewall settings can be assigned to different user roles.
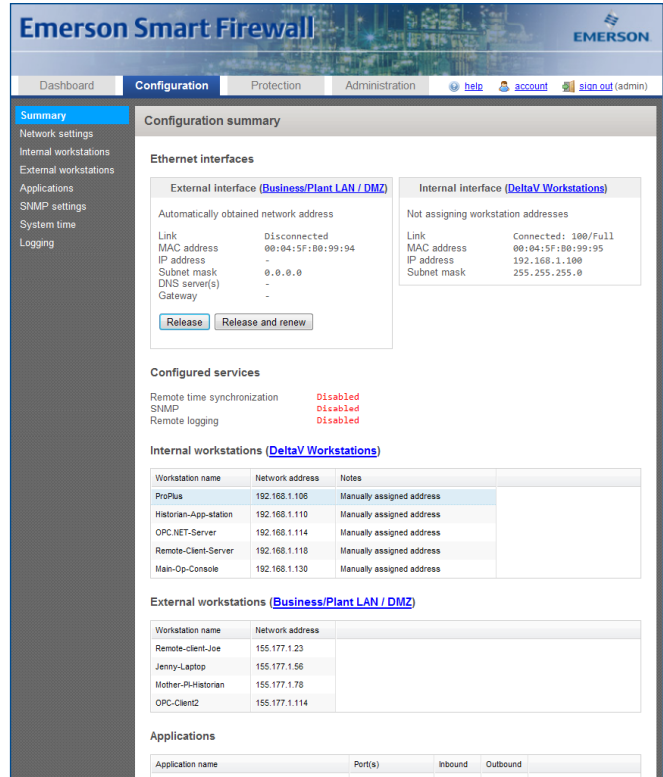
The Smart Firewall uses a familiar tab and menu configuration layout.
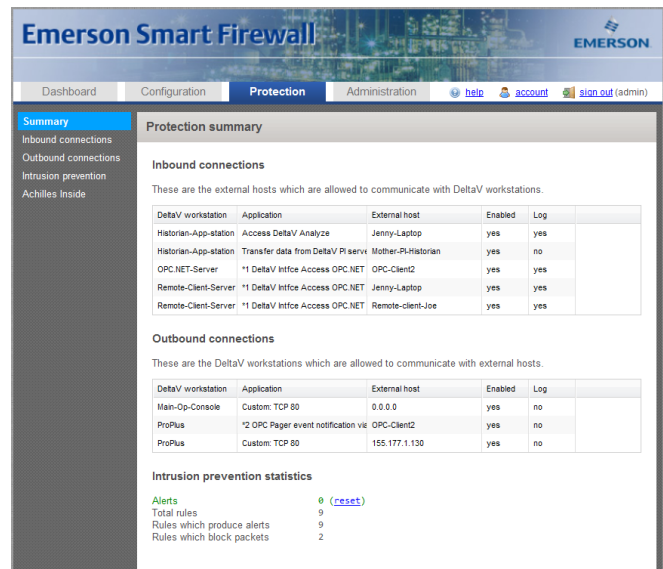
The protection tab shows a summary of the communications access allowed.

Easy-to-Configure Communications Access

The "smart" part of the Emerson firewall is the pre-configured list of DeltaV applications in the firewall.

The list includes ports and protocol information for all of the standard DeltaV applications that are designed to communicate with applications located on computers located on the level three LAN or above.

Creating authorized communications is as easy as selecting the type of communications from the application drop down list, selecting the computer end points and clicking "apply." The firewall will automatically create the desired access path through the firewall. As soon as the rule is applied, data will begin flowing between the applications using the ports enabled.

The dashboard tab will show all communication paths through the firewall currently being used.

As the applications list is part of the configuration it can be managed by the user to delete rules that would never be used in a specific system to reduce the size of the list.

Applications can also be disabled so they do not appear in the drop down list when creating authorized communications. This allows the administrator to delegate to the engineer user the ability to create a very limited set of communications.

Rules can be renamed so they are more relevant to a specific site nomenclature.

Customer-specific rules also can be easily added to the list to support non-DeltaV applications that will communicate through the firewall.

It is also easy to add new DeltaV applications to the list when upgrading your system.
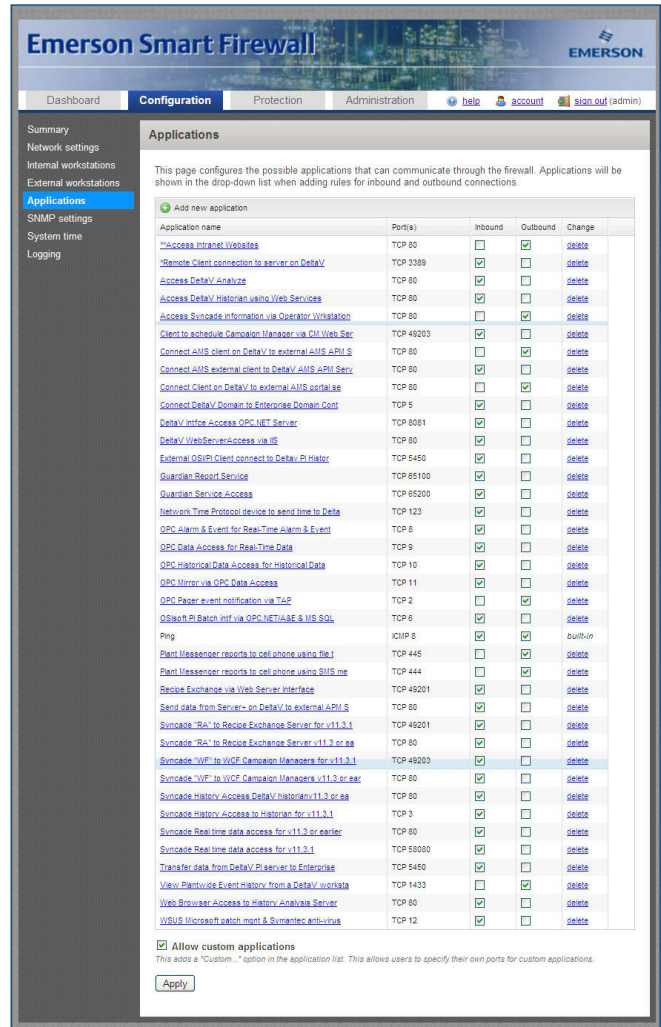
Emerson Smart Firewall Features and Capabilities

Hardware Specifications	
Dimensions and Weight	1.7in. high x 18.81in. wide x 9.84in. deep - Weight 7 lbs.
Power	Redundant power inputs. Input voltage – 85-264/50-60 Hz power cords supplied with unit BTU/hr – 77.
Mounting	19" rack mount x 1U high. Mounting brackets supplied. Leave one rack unit above unit for cooling. Requires air flow space on sides and back of unit. Designed to be mounted in rack with DeltaV computers. Does not require rear access for normal operations.
Environmental	Temperature: Operating 0°C to 40°C fanless design.
Certifications	FCC Class A, UL60950, CE, RoHS, RCM, EAC. Marine DNV certificate is pending. Achilles - the Emerson Smart Firewall has passed the Device Certification Firewall Level 1 testing and certificate is pending.

Specifications – Emerson Smart Firewall
Compatibility with DeltaV versions

The Emerson Smart Firewall is compatible with all versions of DeltaV[1].

Custom communications rules can be created to allow the firewall to be used with virtually any system or application[2].

1. The ports and protocol parameters used in the DeltaV/PSS applications in the Application List have been tested with DeltaV v11.3.1, v12, and v13.3. These parameters should also be valid for older versions of the applications. However it is possible that there are differences in the older application versions that are not reflected in the current Application List. If differences are discovered the Application List is user configurable to allow the correct parameters to be input into the list. Custom applications can also be created and added to the Application List.

2. Use of the firewall is not limited to protection of just DeltaV systems but can be used to protect many different systems. The Application List specific to Emerson communications can be removed and lists specific to other applications easily created.

Capacities	
Firewall Throughput*	500 concurrent DeltaV communications rules.
Sessions*	4,000
VPN Throughput	VPNs are not supported.

* These specifications are estimated based on DeltaV testing. The firewall has been performance tested with a set of DeltaV applications and has demonstrated to have more than sufficient performance to handle the typical external communications configured on a DeltaV system. Performance can be impacted by the number of DCOM connections and the number of SNORT intrusion protection rules enabled.

Specifications – Emerson Smart Firewall	
Firewall Users	100 different user names can be created for users who need to access the configuration interface.
	Supports the following user types:
	■ Administrator – full access.
	■ Engineering – view-only with privileges to enable/disable protection rules.
	■ View-only – can view summary pages only.
	Individual privileges for each user type are permanently assigned to that user type. The external user interface is view-only regardless of privileges of the user logged into the firewall externally.
Interface	
Configuration	Firewall configuration is supported using the built-in browser-based interface. Configuration access allowed only from the secure side of the firewall.
Ethernet Ports	2x copper – 1 DeltaV workstation (internal) port, 1 external LAN port. 10/100 MB auto-negotiating network speed supported. IPv4 only.
USB2.0	1 rear facing for configuration storage only – used to facilitate replacement of firewall. Configuration is pulled from the USB drive on power up of the firewall.
Serial/Console	1 RS232 (recover admin password and IP address only – no configuration access through the serial port). No command line configuration support. Serial cable not include with product.
Alarm Contacts	Front panel - TTL output normally HIGH (+5VDC), goes to LOW state if one or both power cords are unplugged or if there is an internal predefined fault.
Front Panel LEDs	1 – Green Power LED. 1 – Red power supply fault LED. 2 – Front panel LAN ports with Link Status and Activity LEDs.
Rear Access/ Power	Redundant power connections for 120/220vAC- 50/60 Hz. US power cables included with firewall. Rear access not required during operation. USB port (populated from factory) contains nano USB drive to hold configuration for ease of replacement of firewall.
Emerson Smart Firewall Network Security Features	
Stateful Firewall	
Supported Firewall Modes	Routing firewall only – requires different network subnets on external and internal networks. (NAT, Transparent, and bridging modes not available)
Intrusion Protection System	Standard SNORT rule Intrusion Protection System capability. (rules and rule updates must be supplied by others as DeltaV does not currently provide IDS/IPS rules.)
Special Features	
Drop Down List	Easily select the DeltaV application to communicate list is user configurable – custom rules can be created.
User Can Build Custom Rules	User configurable firewall rules can easily be created and added to the rule drop down list.

Specifications – Emerson Smart Firewall	
Pre-Built Rules Can Be Locked From Change	After the desired rule types have been created in the drop down list they can be locked so that only administrators can change or add new rules. This permits the engineer to create new connections but only within a specific set of rules.
DCOM Handling	The firewall is capable of handling DCOM using standard rules without opening a wide range of ports. The firewall manages the DCOM communications so only a single dynamic port is opened and closed by the firewall. No special configuration of the firewall or workstations is required for the DCOM handling to function.
Rules Can Be Set To Expire	Rules can optionally be set to expire and prevent new sessions from being established. Time is user configurable. Effective for managing remote user connections. Engineer level user privileges allow users to enable a preconfigured rule that will expire.
"Panic Button"	Firewall communications can be easily blocked with a single "deny all" button. Any user can be assigned permission to enable the "deny all" mode.

Specifications - Emerson Smart Firewall	
Infrastructure	
Dynamic Host Configuration Protocol (DHCP) Server	Provides network (IP) addresses to devices in the DeltaV side of the firewall. DHCP can be disabled to allow static addressing of DeltaV workstations. (DHCP on by default)
DHCP Client	External firewall port can obtain network (IP) address from external DHCP server or use a static address. (DHCP on by default but static addressing is preferred to avoid DHCP readdressing the firewall external port).
SNMP	SNMP v3 access can be enabled to monitor firewall parameters. Network Device Command Center can be used to monitor Emerson Smart Firewall hardware alarms on DeltaV v13.3 and higher.
Syslog Support	The firewall can send all logs to a Syslog server if enabled and the server address configured.
Net Timeserver Protocol Support	The firewall can have time set locally, get time from connected computer, or through an NTP Server .
Configuration Save/ Restore Options	Local USB drive and Configuration file Upload to Computer connected to WebUI (saved file cannot be modified by user. Configuration changes cannot be made using this file and restored to firewall).
Dashboard	Mode- Normal, Allow All, Deny All – user selectable Traffic graphs, Memory and CPU usage.
Logging Support	Internal – user selectable log reporting level – depending on log level, log will hold from 8 to 96 hours of data Syslog - Syslog support can be enabled and Syslog Server IP address configured. User selectable log reporting level.
External WebUI Interface	View-only access for all users including Administrators. User selectable function in the firewall configuration.

Ordering Information

Description	Model Number
Emerson Smart Firewall - North American Power Cord	VE6204P1
Emerson Smart Firewall - UK Power Cord	VE6204P2
Emerson Smart Firewall - European Power Cord	VE6204P3
Emerson Smart Firewall - Australian Power Cord	VE6204P4

The VE6204 Emerson Smart Firewall product is expected to provide an additional layer of protection to your DeltaV DCS to help avoid certain types of undesired actions. The VE6204 Emerson Smart Firewall product represents only one portion of an overall DeltaV security solution. Use of the VE6204 Emerson Smart Firewall product does not guarantee that your DeltaV system is secure from cyber-attacks, intrusion attempts, or other undesired actions. Users are solely and completely responsible for their control system security, practices and processes, and for the proper configuration and use of the VE6204 Emerson Smart Firewall product.

Related Products

- DeltaV Smart Switches – the DeltaV Smart Switch and the DeltaV Network Management Center are also part of DeltaV family of built-for-purpose security related products.

Prerequisites

- To implement the Emerson Smart Firewall it is helpful to have basic knowledge of Ethernet networking including network addressing and routing.

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