comnet
Communication Networks

Substation-Rated, Enhanced Security SCADA-Aware Ethernet Layer 2 Managed Switch/Layer 3 Router With Optional 2G/3G & 4G LTE Cellular Radio Link, Enhanced Network Security, Terminal Server, PoE+, and 100FX SFP Ports

RLGE2FE16R

LIFETIME ∞ WARRANTY	IEC 61850-3 IEEE 1613		SFP	HARDENED			1G GIGABIT	10/100 ETHERNET	GIGABIT ETHERNET
EXCLUSIVE	SUBSTATION	DIN RAIL	FLEXIBILITY	-40° TO +85°C	LAYER 3	FIREWALL	UPLINKS	16	2

ComNet product series RLGE2FE16R are substation-rated and industrially hardened layer 2 managed switches/layer 3 routers, with a unique and highly robust packet processing SCADA-aware security firewall for the most mission-critical and demanding cyber-security applications. The RLGE2FE16R is intended for deployment in environments where high levels of electromagnetic noise and interference (EMI) and severe voltage transients and surges are routinely encountered, such as electrical utility substations and switchyards, heavy manufacturing facilities, track-side electronic equipment, and other difficult out-of-plant installations. Layer 3 routing functionality allows for the participation and foundation of a core network infrastructure.

The RLGE2FE16R is an ideal platform for deploying a secure communications and networking gateway for remote electrical utility sites, and other critical infrastructure applications.

FEATURES

› Fully compliant with the requirements of IEC 61850-3 and IEEE 1613 Class 2, for use in electrical utility substations; and NEMA TS-1/TS-2 for Traffic Signal Control Equipment

› For NERC-CIP-5 and NERC-CIP-014 compliance, or any network application demanding effective cyber-security protection

› Up to (16) 10/100 Mbps Ethernet RJ-45 communications ports, with (2) 100/1000 Mbps SFP uplink ports. Available with optional (8) 100 Mbps SFP ports for network aggregation applications, or where it is desirable to provide optical connectivity directly to the switch/router or in electrically noisy environments.

› Optional internal 2G/3G/4G LTE GPRS/UMTS cellular radio modem with 2 SIM card slots, for maximum network reliability and availability

› Optional serial interface supports 4 ports of RS-232 serial data, with serial gateway and serial tunneling

› Optional PoE+: 30 watts per port, 8 ports max.

› Highly advanced and sophisticated security suite: Per Port Deep Packet Inspection (DPI) SCADA-aware firewall supports DNP-3, ModBus, IEC 104/101, and IEC 61850 protocols for NERC-CIP-5 compliance

› Network Learning allows the user to easily create secure and highly effective SCADA firewall rules

› Supports IEEE 1588v2 Precision Timing Protocol, Transparent Clock (TC), 10/100 Mbps communications ports only. (Gigabit uplink ports to be supported in future firmware release.)

› IEEE 802.1X Port-based network access control

› L-2/3/4 ACL for incoming traffic, and layer 2/layer 3 VPN with IPsec

› The user APA (Authentication Proxy Access) controls remote access and communications to end-point/edge of network devices by all users, with extreme granularity across the users, time, physical Ethernet or serial data ports, TCP ports, and SCADA protocols. It also provides PCAP for the entire allowed maintenance or access session.

› IPsec VPN with X.509 certificates, for use over any cellular or fiber-optic network

› Ethernet layer 2 switching & layer 3 IP routing with integrated VPN and link protection per ITU-T G.8032

› Fault/event notification provided through Syslog and SNMP traps

› Environmentally hardened for deployment in difficult unconditioned out-of-plant installations: Extended ambient operating temperature range of -40˚ C to +85˚ C, for use in virtually any environment. Conformal coating is optionally available for humidity with condensation or airborne particulate matter environments.

› Rugged metal housing. DIN-rail mountable & rated for IP-30 ingress protection

› Internal/self-contained universal power supply: Available in operating voltage ranges from 9 to 270 VDC, or 90 to 250 VAC.

› Redundant power supply input capability significantly reduces the possibility of a single-point-of-failure, for the highest possible system and network reliability (DC-powered units only)

› No fans or forced-air cooling; cooling via natural convection eliminates unreliable and troublesome fans/moving parts, with no periodic maintenance requirements

* Small Form-Factor Pluggable Module. Sold separately.

RLGE2FE16R

PRODUCT DESCRIPTION

Seamless & Reliable Connection to Any Network

The RLGE2FE16R provides connectivity to any copper, fiber optic, or cellular radio-based Ethernet network. Fiber optic networks are supported by the use of two 100/1000FX SFP uplink ports. The optional highly resilient 2G/3G/4G LTE cellular radio uplink with 2 SIM card slots for network redundancy, is ideal where fiber optic infrastructure is not available, and may be used as a back-up link for those applications where interruption of service is not tolerable. The 8 optional 100 Mbps SFP communications ports provide a simple to implement aggregation capability to the user's network.

Extremely Effective Network Security

The RLGE2FE16R is available with two different levels of network security software: Standard Security; or Enhanced Security, for the most mission-critical applications.

Standard Security Software Package Version:

Service Gateway

The RLGE2FE16R service gateway includes a highly robust application layer, and provides legacy support, an enterprise-class firewall, serial tunnelling, protocol gateway, and extremely effective encryption technologies. The service gateway offers a uniquely capable feature set which may serve as the hardware foundation to a secure industrial controls network, and includes Protocol Gateway, VPN, and IPsec features.

Protocol Gateway

Gateway functionality between a DNP3 TCP client (master) and a DNP3 Serial RTU, IED, PLC, or other compatible device is supported. This same functionality is supported across MODBUS TCP to MODBUS RTU, and IEC 61850 101/104 TCP to IEC 61850 101/104 RTU. This level of protocol conversion allows legacy protocols to be secured by enterprise and industry best practice level encryption across a TCP IP-based network.

VPN

VPN tunnels are included for secure inter-site connectivity with IPsec, DM-VPN, and VPN GRE tunnels with key management certificates. The supported VPN modes allow both layer-2 and layer-3 services, to best suit the user's application-specific cyber-protection needs.

IPSec

Internet Protocol Security (IPsec) is a protocol suite for securing Internet Protocol (IP) communications by authenticating and/or encrypting each IP packet of a communication session. IPsec-VPN as well as IPsec encryption are supported over other VPN technologies. By implementing this level of industry-accepted encryption, data may traverse the network in a guaranteed delivery method, as well as providing a cohesive and secure methodology for network communication across legacy and modern networks.

Enhanced Security Software Version:

Includes all of the security features of the Standard Security version, plus:

Identity Management and Authentication Proxy Access (APA)

NERC-CIP-5 defines the important requirement for network security protection of remote and unattended facilities. The capability of identifying the user and creating specific network privileges per identified and authenticated user prior to granting the user access to the network therefore becomes critical

The Authentication Proxy Access (APA) is a highly sophisticated security feature, which allows the network operator to manage the substation or any other facility maintenance process. This feature gives full control of the maintenance process to the operator by granting the capability to create dynamic policies to specific tasks within an explicitly defined time window. Following this time window, operators receive reporting on activities performed during the task. This audit trail comes in the form of an overview log, and a full packet capture (PCAP) of the session.

Before a user is allowed access to the network, they must log in to ComNet's internal authentication process with their unique user name and password. Upon validation of the user profile, specific access is granted to predefined devices and functions, and each operation is logged. Multi-factor authentication is available when combined with the Cyber-Physical Integration feature.

RLGE2FE16R

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PRODUCT DESCRIPTION (Cont'd)

Event logger

The event logger feature allows the operator to receive events and logs from any number of remote OT devices. It supports multiple formats (Syslog, SNMP, & HTTP), and is also capable of polling event tables from IP, access control, and serial data devices. The events are received and sent outbound in Syslog format, with additional fields appended, completing a unified Event Log Aggregator (e.g. location, source sub-system, and severity). Following this aggregation, the Event Logger stores normalized events locally, and forwards formatted events upstream to a central SIEM tool, providing encrypted, reliable, and guaranteed logging in accordance with NERC-CIP-5 standards.

X.509 Certificate Exchange for VPN Connections

VPN tunnels for secure inter-site connectivity with IPsec VPN, GRE Tunnels, and DMVPN technologies are fully supported. In addition to IPsec encryption, X.509 key management certificates are provided. This certificate support allows for a secure signed key exchange between a Certificate Authority, and two secure nodes. Having a third-party authority as a signing participant offers end-to-end security that may be managed and reissued from a trusted central source within the user's network.

Cyber-Physical Integration

Integrated within the enhanced-security RLGE2FE16R, is a physical identity server system, allowing the use of external authentication hardware, such as magnetic card readers, biometric identification sensors, facial recognition cameras, etc., to create a two-factor authentication to the APA feature. This provides an additional level of validation of the user and his/her credentials, prior to granting the user network access. Once the authentication is validated and approved, a set of defined policies allow the authenticated technician to perform their task.

The cyber-physical integration also allows the Event Logger feature to poll and deliver events from physical access control assets and devices. These assets include but are not limited to access control panels and access control head-end systems and databases.

Enhanced SCADA-Aware Firewall

A whitelist-based firewall is provided for every Ethernet and serial data port, so full firewall protection is available at all remote sites within the network. Every SCADA protocol packet (IEC 61850, DNP3 RTU/TCP, ModBus RTU/TCP, and IEC 101/104) is scanned and validated by the firewall engine for its source and destination, as well as its protocol and packet content.

The structure of the distributed firewall allows the creation of a unique firewall at each access point to the network. This is critical for securing against insider cyber-attacks, compromised field devices, man-in-the-middle attacks, and a myriad of alternate attack vectors, by providing a secure baseline.

Two firewall states are included: Monitoring, and enforcing. The monitoring state provides an alarm at the control center for any network violation, without blocking the network traffic. The enforcing state is extremely effective for blocking suspicious traffic, while also triggering a violation alarm at the control center.

DPI (Deep Packet Inspection) SCADA Protocols Firewall

ComNet's distributed DPI firewall ensures that the operator will have full control over the network, even when faced with a sophisticated attempt at breaching the network. Monitoring SCADA commands, this highly robust whitelist-based firewall analyses SCADA network traffic, and is provided for every Ethernet and serial data port, so full firewall protection is available at all remote sites within the network, as well as all IEDs, RTUs, PLCs, or any other device connected to the network. Every SCADA protocol packet (IEC 61850, DNP3 RTU/TCP, ModBus RTU/TCP, and IEC 101/104) is scanned and validated by the firewall engine for its source and destination, as well as its protocol and its specific packet

Any detected abnormal traffic behavioral patterns are blocked, any affected subnets are isolated, and alerts are automatically generated.

Ease of Installation and Network Integration

High levels of cyber-security experience are not required to successfully deploy the RLGE2FE16R. It is fully supported by ComNet's Reliance Product Configuration Utility and CLI, allowing the secure switch/router to be easily configured, and to diagnose network and security functions.

Configuration of the secure firewall is also simple. Once connected to the user's network, the RLGE2FE16R immediately begins to collect and analyse information across the network, including from other connected devices, traffic behavior, etc.

RLGE2FE16R

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DETAILED PRODUCT DESCRIPTION (Cont'd)

Recommended firewall rules are then suggested to the user; the implementation of these rules is optional, and they can be easily edited using the Configuration Utility.

OAM (IEEE 802.3-2005 & IEEE 802.1ag) and QoS are also supported. Strict priority, Weighted Round Robin (WRR), ingress policing, and egress traffic shaping are included for traffic management.

PRODUCT OPTIONS

Enhanced Security Software Option:

Includes all of the security features of the Standard Security version, plus: Identity management and authentication proxy access (APA), event logger, IPsec authentication with certificates, cyber-physical Integration, enhanced SCADA-aware firewall, and DPI (Deep Packet Inspection) SCADA protocols firewall.

Cellular Radio Option

An internal 2G/3G/4G LTE GPRS/UMTS cellular radio modem, with 2 SIM card slots for maximum network reliability and availability. All world-wide cellular radio frequency bands are supported.

Serial Data Interface Option

The 4-port serial interface is available for applications including terminal server with protocol gateway and serial tunnelling functionality, and provides direct connectivity to legacy RS-232 serial data IEDs, RTUs, and other devices.

PoE (Power over Ethernet) Option

30 watts per port is available for 8 of the RJ-45 Ethernet communications ports, and is compliant with the IEEE 802.3at specification.

The maximum PoE load per switch is dependant on the voltage type ordered and is shared across ports 1-8 only. Please refer to the PoE Power Management section for further details.

100 Mbps SFP Option

Includes (8) 100 Mbps SFP ports for network aggregation applications. Provides (8) 10/100 Mbps copper/RJ-45 communications ports; (8) 100 Mbps SFP ports; and (2) 100/1000 Mbps SFP uplink ports. Note: This option deletes the cellular radio option, as well as the serial interfaces option.
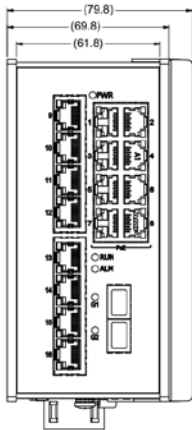
OUTLINE DRAWINGS

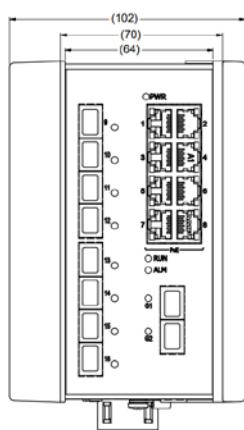*Complete Dimensional Drawings for this product series are available at www.comnet.net*
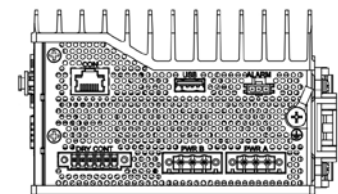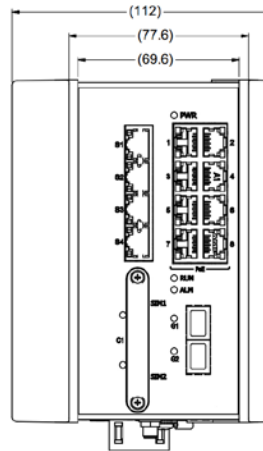
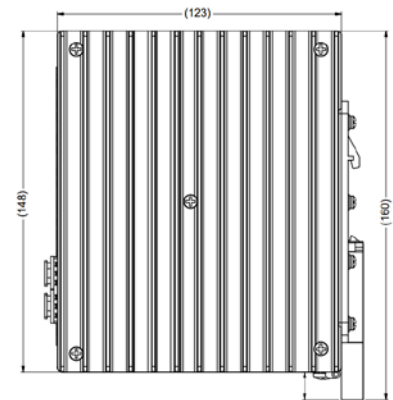

Bottom View
(DC 8TX Model Shown)
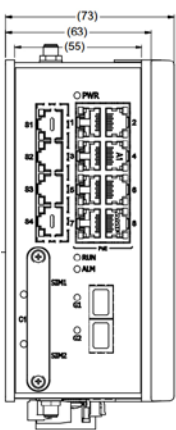
| DC Models 8TX Ports | DC Models 16TX Ports | DC Models 8TX + 8SFP Ports | AC Models | Side View, All Models |

RLGE2FE16R

APPLICATIONS

› NERC-CIP-5 compliance for electrical substation automation & SCADA networks; protective relaying systems; power transmission & distribution systems; remote/unattended wind farm, hydroelectric, and solar/photovoltaic power generation facilities; and other electrical utility-specific applications

› NERC-CIP-014 compliance for perimeter security, surveillance monitoring, and controlled access to electrical substations and power generating facilities, and other critical infrastructure/high value, mission-critical sites and assets

› Distribution Automation: Status indication, monitoring, and control of reclosers and other remotely-located electrical utility-specific equipment, via the internal cellular radio link.

› Industrial/Factory Automation & Process Control SCADA Networks

› Chemical and petrochemical refining and processing facilities, oil and gas pipelines/transmission systems, and mining installations

› Food processing/pharmaceutical manufacturing facilities› Wastewater treatment plants, and suppliers of potable drinking water

› ITS/transportation closed-loop signalization and VMS/VDS/surveillance/incident detection systems

› Railway/trackside control and monitoring systems

› City center security and surveillance monitoring

› Military, government, and defense communications networks

› Integrated IP-Video, VOIP, and Data Transmission Networks

› Cellular telephony and wireless backhaul networks

SPECIFICATIONS

Security

Distributed DPI Firewall	Profile based firewall	
	Security rules planning per service group	
	Firewall monitoring mode	
	Firewall enforcement mode	
	Firewall Learning Mode	
	IEC 101 DPI Firewall	
	IEC 104 DPI Firewall	
	IEC 61850 mms DPI Firewall	
	Modbus RTU DPI Firewall	
	Modbus TCP DPI Firewall	
	DNP3 RTU Firewall	
	DNP3 TCP Firewall	
VPN	IPsec Certificates X.509	
	IPsec CRL server	
	IPsec CA server	
	IPsec Dynamic Key Exchange	
	IPsec encryption AES	
	IPsec encryption 3DES	
	L3 IPsec VPN policy based	
	L3 IPsec VPN route based	
	L3 mGRE DM-VPN	
	L2 VPN GRE	
Access control	SNMPv1/v2/v3	Enable/Disable port
	Port access filter per MAC / IP addresses	
	IEEE 802.1x port-based authentication	
	local APA (Authentication Proxy Access)	
	User activity report (under local APA)	
	Access Lists L2/L3/L4	Radius
	TACACS	NAT - traversal
	VRF	RMON
Interface	2 × 100/1000 SFP¹ ports	
	8 × 10/100Base-T(X) ports (Optional 30 W PoE)	
	8 × 10/100Base-T(X) ports (Optional, No PoE)	
	8 × 100FX SFP ports (Optional)	
	4 × RS-232 ports (Optional)	
	(600 - 115.2 Kbps Support)	
	2G/3G/4G cellular modem (Optional)	

Management	Console serial port	
	Port management speed, auto-negotiation and Duplex	
	Backup/Restore running config	
	Conditioned/scheduled system reboot	
	Remote management-(SSHv2,CLI/HTTPS/Telnet)	
	Software upgrade via TFTP/ SFTP	
	TFTP/ SFTP Client Syslog Port mirroring	
Local Operation	Local USB port for emergency boot	
	Discrete outputs reporting system-alarms	
	Failsafe output relay reporting critical alarm	

Networking

Advanced Layer 2 feature-set	ITU-T G.8032v2 Ethernet ring	
	IEEE 802.1s MSTP	
	IEEE 802.1w RSTP, enhanced RSTP	
	IEEE 802.3ad LAG with LACP	
	IEEE 802.1q VLAN segregation	
	IEEE 802.1p per port queues	
	IEEE 802.3p	
	IEEE 802.3x.	
	DHCP Client, Server and Relay	
	QOS Prioritization, shaping, Scheduling	
	QOS functions: 8 queues tag, switch ports	
	OAM EFM IEEE 802.3ah	
	OAM CFM ITU-T Y.1731/IEEE 802.1ag	
	1588v2 PTP Transparent Clock	
	SNTP	
Layer 3 feature-set	Static routing; OSPF, RIPv2 Routing; VRRP redundancy scheme	
SCADA protocol handling	Transparent tunneling of serial streams	
	SCADA gateway for IEC101/104, ModBus RTU/TCP and DNP3	
	Terminal Server Byte/Frame mode	
	Terminal Server TCP/UDP	
Cellular Modem (Optional)	GPRS/UMTS or HSPA/EVDO/LTE cellular modem (cellular interface requires sold separately antennas)	
	2 × SIM cards	

SPECIFICATIONS, CONT'D

System Performance	Line rate L2/L3 switching throughput
	Switching latency <10 μSec
	16K MAC addresses
	4K VLANs with port affiliation & tagging
Multicast	L2 Multicast
	IGMP snooping for traffic optimization

Mechanical

Indicating LEDs	PWR Port Activity/Speed RUN ALM
Enclosure	Rugged - IP 30 rated, No fans
Weight	1.4 Kg (DC) – 1.8 Kg (AC)
Size, DC 8 Port Models	73 × 148 × 123 mm (2.9 × 5.8 × 4.8 in)
Size, DC 16TX Port Models	80 × 148 × 123 mm (3.1 × 5.8 × 4.8 in)
Size, DC 8TX + 8SFP Models	102 × 148 × 123 mm (4.0 × 5.8 × 4.8 in)
Size, AC Models	112 × 148 × 123 mm (4.4 × 5.8 × 4.8 in)
Mounting	DIN rail enclosure

Environmental

MTBF	>250,000 Hours
Storage Temperature	-40° to +85ºC
Operating Temperature	-40° to +85ºC
Operating Humidity	5% to 95% Non-condensing[2]

Power

Power input	See Options in Ordering Information
	DC models have 2 redundant inputs
	AC models have 1 input
Power Consumption	20 W Max (plus PoE Load if PoE version)

Power Management of 8 PoE Ports

Power Output	12 VDC: 60 W Max (30 W for two groups of 4 ports)
	24 VDC: 80 W Max (40 W for two groups of 4 ports)
	48 VDC: 120 W Max (60 W for two groups of 4 ports)
	110 VDC: 100 W Max (50 W for two groups of 4 ports)
	220 VDC: 100 W Max (50 W for two groups of 4 ports)
	VAC: 120 W Max (60 W for two groups of 4 ports)
PoE Group Division	Group 1: P1, P2, P3, P6; Group 2: P4, P5, P7, P8

Compliance

IEC 61850-3 Electric Utility Substations	IEEE 1613 Class 2 Electric Utility Substations
EN50121-4 Vibration & Shock resistance	IEC 61000 -4
EN 60950	NEMA TS-1/TS-2

AGENCY COMPLIANCE

FC PART 15 COMPLIANT   CE   cULus   RoHS   Low Power Consumption

[1] SFP Fiber modules require a fiber installation with a minimum 30 dB connector return loss. Multimode fiber needs to meet or exceed fiber standard ITU-T G.651. Single mode fiber needs to meet or exceed fiber standard ITU-T G.652 The use of Super Polish Connectors is recommended. Complies with FDA Performance Standard for Laser Products, Title 21, Code of Federal Regulations, Subchapter J.

Note: In a continuing effort to improve and advance technology, product specifications are subject to change without notice.

ORDERING INFORMATION

RLGE2FE16R Standard Security Models

Part Number	Description
RLGE2FE16R/S/XX/28[3]	RLGE2FE16R with 2 × 100/1000 FX SFP, 8 × 10/100 TX
RLGE2FE16R/S/XX/28/S22[3]	RLGE2FE16R with 2 × 100/1000 FX SFP, 8 × 10/100 TX, 4 × RS-232
RLGE2FE16R/S/XX/28/CGU[3]	RLGE2FE16R with 2 × 100/1000 FX SFP, 8 × 10/100 TX, 2G/3G GPRS/UMTS Cellular Modem
RLGE2FE16R/S/XX/28/CH+[3]	RLGE2FE16R with 2 × 100/1000 FX SFP, 8 × 10/100 TX, 2G/3G HSPA+ Cellular Modem
RLGE2FE16R/S/XX/28/CNA[3]	RLGE2FE16R with 2 × 100/1000 FX SFP, 8 × 10/100 TX, 4G LTE Cellular Modem (NA Bands)
RLGE2FE16R/S/XX/28/CNA[3]	RLGE2FE16R with 2 × 100/1000 FX SFP, 8 × 10/100 TX, 4G LTE Cellular Modem (NA Bands)
RLGE2FE16R/S/XX/28/CEU[3]	RLGE2FE16R with 2 × 100/1000 FX SFP, 8 × 10/100 TX, 4G LTE Cellular Modem (EU Bands)
RLGE2FE16R/S/XX/28/S22/CGU[3]	RLGE2FE16R with 2 × 100/1000 FX SFP, 8 × 10/100 TX, 4 × RS-232, 2G/3G GPRS/UMTS Cellular Modem
RLGE2FE16R/S/XX/28/S22/CH+[3]	RLGE2FE16R with 2 × 100/1000 FX SFP, 8 × 10/100 TX, 4 × RS-232, 2G/3G HSPA+ Cellular Modem
RLGE2FE16R/S/XX/28/S22/CNA[3]	RLGE2FE16R with 2 × 100/1000 FX SFP, 8 × 10/100 TX, 4 × RS-232, 4G LTE Cellular Modem (NA Bands)
RLGE2FE16R/S/XX/28/S22/CEU[3]	RLGE2FE16R with 2 × 100/1000 FX SFP, 8 × 10/100 TX, 4 × RS-232, 4G LTE Cellular Modem (EU Bands)
RLGE2FE16R/S/XX/28P[3]	RLGE2FE16R with 2 × 100/1000 FX SFP, 8 × 10/100 TX PoE+
RLGE2FE16R/S/XX/28P/S22[3]	RLGE2FE16R with 2 × 100/1000 FX SFP, 8 × 10/100 TX PoE+, 4 × RS-232
RLGE2FE16R/S/XX/28P/CGU[3]	RLGE2FE16R with 2 × 100/1000 FX SFP, 8 × 10/100 TX PoE+, 2G/3G GPRS/UMTS Cellular Modem
RLGE2FE16R/S/XX/28P/CH+[3]	RLGE2FE16R with 2 × 100/1000 FX SFP, 8 × 10/100 TX PoE+, 2G/3G HSPA+ Cellular Modem
RLGE2FE16R/S/XX/28P/CNA[3]	RLGE2FE16R with 2 × 100/1000 FX SFP, 8 × 10/100 TX PoE+, 4G LTE Cellular Modem (NA Bands)
RLGE2FE16R/S/XX/28P/CEU[3]	RLGE2FE16R with 2 × 100/1000 FX SFP, 8 × 10/100 TX PoE+, 4G LTE Cellular Modem (EU Bands)
RLGE2FE16R/S/XX/28P/S22/CGU[3]	RLGE2FE16R with 2 × 100/1000 FX SFP, 8 × 10/100 TX PoE+, 4 × RS-232, 2G/3G GPRS/UMTS Cellular Modem
RLGE2FE16R/S/XX/28P/S22/CH+[3]	RLGE2FE16R with 2 × 100/1000 FX SFP, 8 × 10/100 TX PoE+, 4 × RS-232, 2G/3G HSPA+ Cellular Modem
RLGE2FE16R/S/XX/28P/S22/CNA[3]	RLGE2FE16R with 2 × 100/1000 FX SFP, 8 × 10/100 TX PoE+, 4 × RS-232, 4G LTE Cellular Modem (NA Bands)

ORDERING INFORMATION, CONT'D

Part Number	Description
RLGE2FE16R/S/XX/28P/S22/CEU[3]	RLGE2FE16R with 2 × 100/1000 FX SFP, 8 × 10/100 TX PoE+, 4 × RS-232, 4G LTE Cellular Modem (EU Bands)
RLGE2FE16R/S/XX/216[3]	RLGE2FE16R with 2 × 100/1000 FX SFP, 16 × 10/100 TX
RLGE2FE16R/S/XX/216P[3]	RLGE2FE16R with 2 × 100/1000 FX SFP, 8 × 10/100 TX PoE+, 8 × 10/100 TX
RLGE2FE16R/S/XX/288[3]	RLGE2FE16R with 2 × 100/1000 FX SFP, 8 × 10/100 TX, 8 × 100 FX SFP
RLGE2FE16R/S/XX/288P[3]	RLGE2FE16R with 2 × 100/1000 FX SFP, 8 × 10/100 TX PoE+, 8 × 100 FX SFP

[3] Replace XX in above part codes with one of the options from the following power input table

Power Input Option Code	Description
12	Dual Redundant 9 to 18 VDC Inputs
24	Dual Redundant 18 to 32 VDC Inputs
48	Dual Redundant 36 to 60 VDC Inputs
11	Dual Redundant 85 to 165 VDC Inputs
AC	Single 90 to 250 VAC Input

RLGE2FE16R Standard Security Models 220 VDC

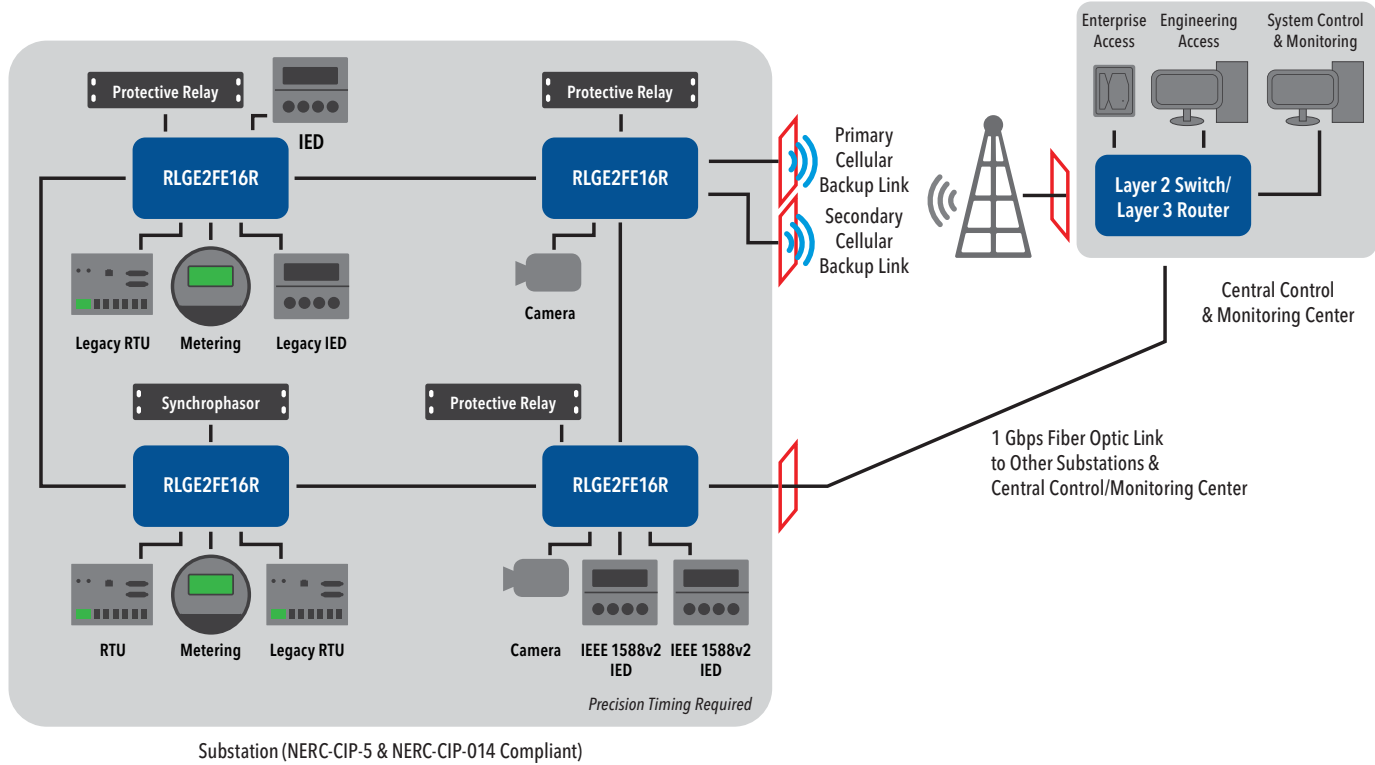| Part Number	Description
RLGE2FE16R/S/22/28	RLGE2FE16R with 2 × 100/1000 FX SFP, 8 × 10/100 TX, 220 VDC
RLGE2FE16R/S/22/28P	RLGE2FE16R with 2 × 100/1000 FX SFP, 8 × 10/100 TX PoE+, 220 VDC
RLGE2FE16R/S/22/216	RLGE2FE16R with 2 × 100/1000 FX SFP, 16 × 10/100 TX, 220 VDC
RLGE2FE16R/S/22/216P	RLGE2FE16R with 2 × 100/1000 FX SFP, 8 × 10/100 TX PoE+, 8 × 10/100 TX, 220 VDC
RLGE2FE16R/S/22/288	RLGE2FE16R with 2 × 100/1000 FX SFP, 8 × 10/100 TX, 8 × 100 FX SFP, 220 VDC
RLGE2FE16R/S/22/288P	RLGE2FE16R with 2 × 100/1000 FX SFP, 8 × 10/100 TX PoE+, 8 × 100 FX SFP, 220 VDC

RLGE2FE16R Enhanced Security Models

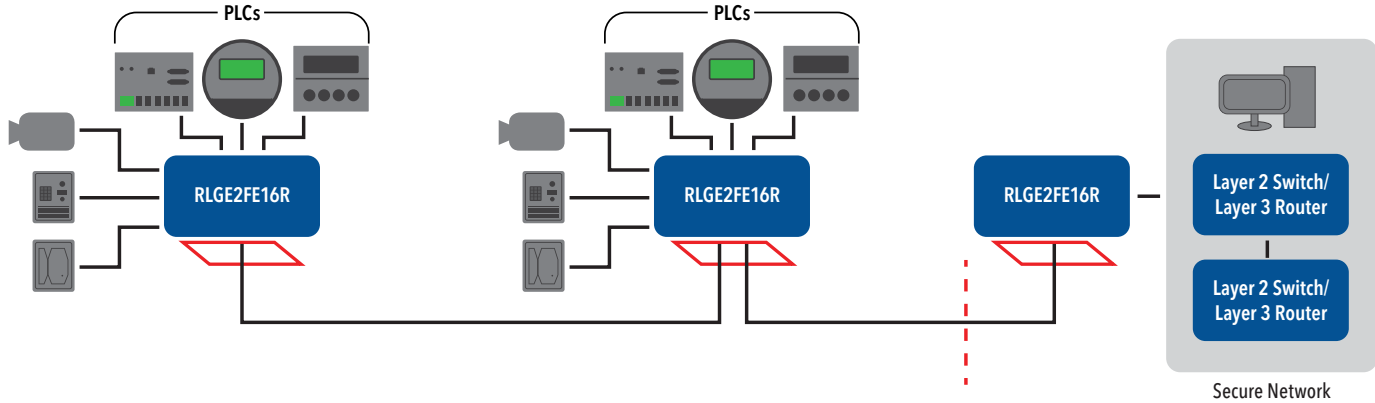| Part Number	Description
RLGE2FE16R/E	Replace /S with /E in part code for Enhanced Security software package (extra charge)

Options

Optional Part No	Description	Included
ANT3G-2M	2G/3G External Grade Cellular Antenna with 2M cable (1 required per switch)	Extra Charge, Consult Factory
ANT3G-5M	2G/3G External Grade Cellular Antenna with 5M cable (1 required per switch)	Extra Charge, Consult Factory
ANT4G-2M	4G LTE External Grade Cellular Antenna with 2M cable (1 required per switch)	Extra Charge, Consult Factory
ANT4G-5M	4G LTE External Grade Cellular Antenna with 5M cable (1 required per switch)	Extra Charge, Consult Factory
Power Supply	12 V, 24 V or 48 VDC DIN Rail power supply	Extra Charge, Consult Factory
Conformal Coat	Add suffix '/C' for Conformally Coated Circuit Boards to extend to condensation conditions	Extra Charge, Consult Factory
SFP Modules[1]	User selection of ComNet SFP (See SFP Modules data sheet for product numbers and compatibility)	Extra Charge, Consult Factory
DINBKT3	19-inch rack mount panel adapter	Extra Charge, Consult Factory

TYPICAL APPLICATIONS

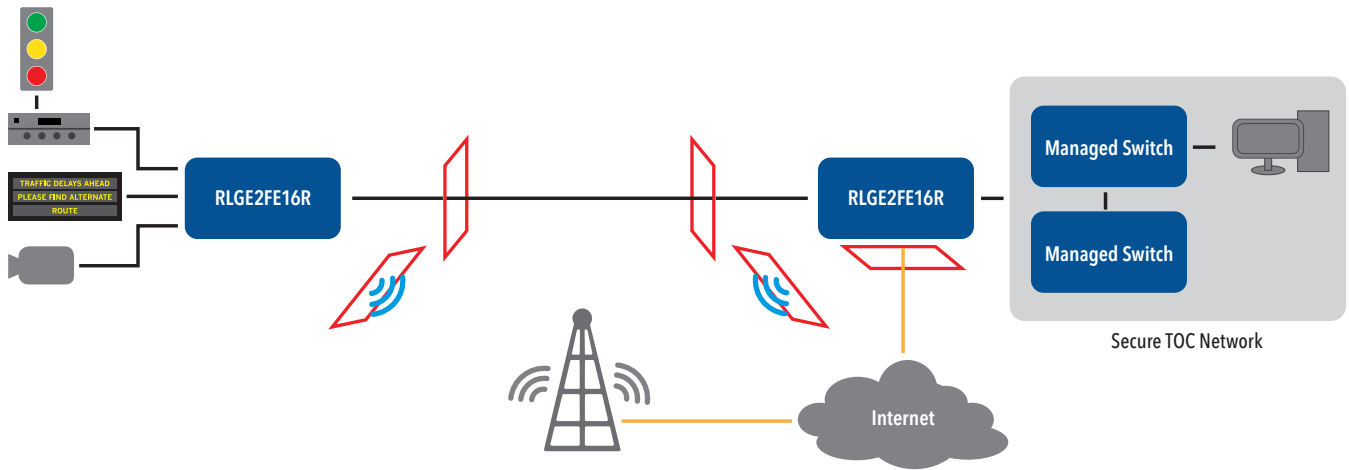Automated/Smart Grid Substation with Redundant Cellular Radio Links

Substation (NERC-CIP-5 & NERC-CIP-014 Compliant)

Securing Distributed Networks: Process Control

Secure Network

RLGE2FE16R

Substation-Rated, Enhanced Security SCADA-Aware Ethernet Layer 2 Managed
Switch/Layer 3 Router With Optional 2G/3G & 4G LTE Cellular Radio Link,
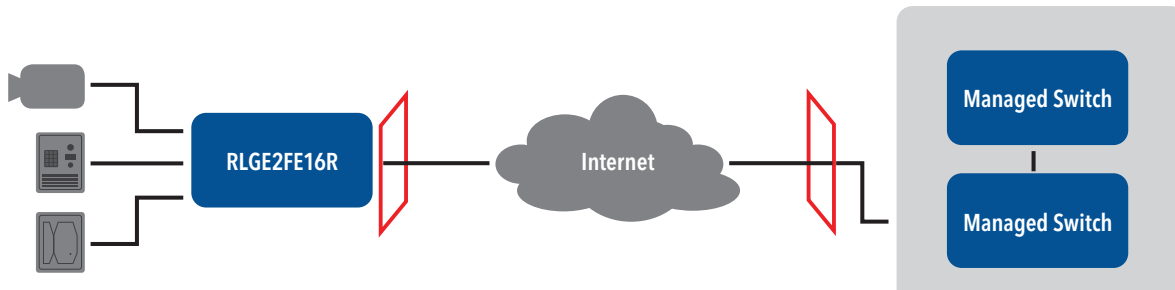Enhanced Network Security, Terminal Server, PoE+, and 100FX SFP Ports

TYPICAL APPLICATIONS (CONT'D)

ITS/Traffic Signalization System Over Cellular Radio

Securing Remote Access

Securing A Wireless Radio Link

RLGE2FE16R

Substation-Rated, Enhanced Security SCADA-Aware Ethernet Layer 2 Managed Switch/Layer 3 Router With Optional 2G/3G & 4G LTE Cellular Radio Link, Enhanced Network Security, Terminal Server, PoE+, and 100FX SFP Ports
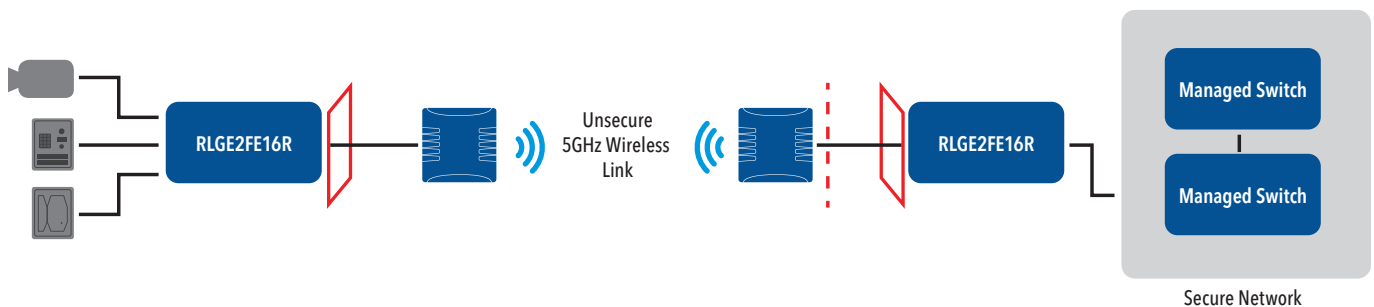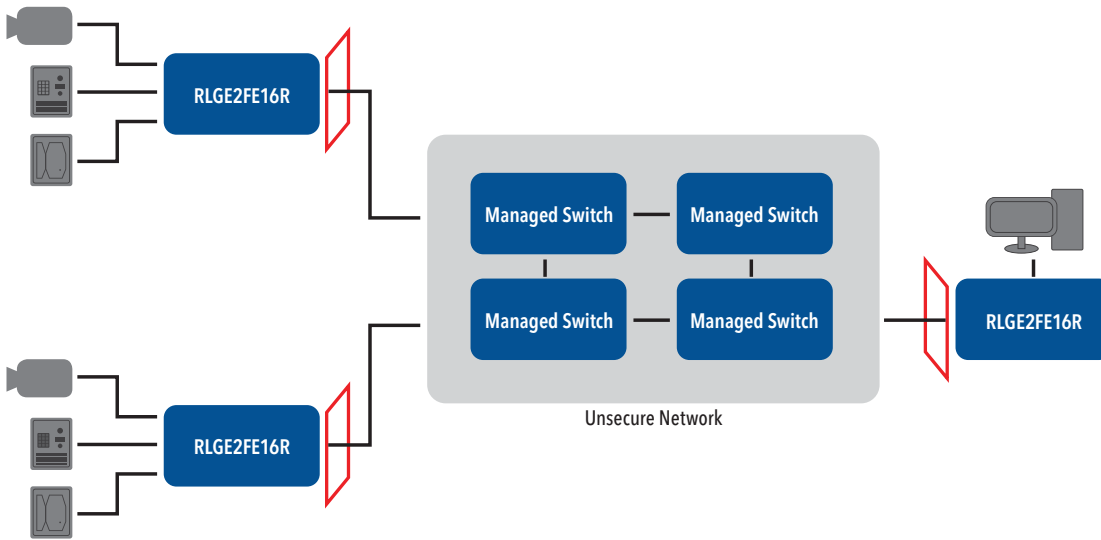
TYPICAL APPLICATIONS (CONT'D)

Securing Devices on an Unsecure Network

Securing Exterior Sites