



EXCLUSIVE



SUBSTATION



EN50155



FLEXIBILITY



-40° TO +85°



XE = 10 GB



4



24



ComNet product series RLXE4GE24MODMS is a substation-rated and industrially-hardened modular-configuration all-gigabit managed layer 2 switch/layer 3 router. The RLXE4GE24MODMS 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. The layer 3 static routing functionality allows for the participation and foundation of a core network infrastructure.

The user-configurable modularity provides a truly future-proof platform that may be upgraded or changed in the field at any time, to support changes in the user's communications and networking requirements as they arise. Four slots are provided in the chassis for accommodating individual modules featuring different combinations of SFP* and electrical 10/100/1000BASE-TX communications ports. The uplink module slot can accept either a 1 gigabit or a 10 gigabit module, with two or four 1 or 10 Gbps SFP+ ports. Dual user-replaceable redundant power supply modules provide an extremely high level of switch/router reliability, for those applications where the possibility of a power supply single-point-of-failure cannot be tolerated.

When configured with the 8-port 100/1000BASE-X SFP or 4 100 or 1000BASE-FX fixed ST or SC optics communications modules, the RLXE4GE24MODMS may be used for network aggregation applications, or where it is desirable to provide optical connectivity directly to the switch/router in electrically-noisy environments.

The RLXE4GE24MODMS supports multiple Ethernet redundancy protocols, including ComNet C-Ring (recovery time < 30ms, with >250 switches integrated within the ring), and MSTP with RSTP/STP compatibility. With its extremely fast recovery time, the most mission-critical applications are fully protected from network interruptions or temporary malfunctions due to possible short or long-term faults or outages within the network.

FEATURES

- › Fully compliant with the requirements of IEC 61850-3 and IEEE 1613 Class 2, for use in electrical utility substations; NEMA TS-1/TS-2 for Traffic Signal Control Equipment; and EN50155 for railway applications
- › Future-proof fully modular configuration supports changes to the users communications and networking requirements, and simplifies network planning and design
- › Choice of 100Mb, 1000Mb, or 10Gb port speeds, with either SFPs or fixed ST or SC optics
- › 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.
- › Dual-redundant power supplies significantly reduce the possibility of a single-point-of-failure, for the highest system and network reliability. Multiple AC and DC operating voltages with front or rear chassis power connection interfaces available.
- › Supports IEEE 1588v2 Precision Timing Protocol, Transparent Clock Synchronization (TC), for protective relaying and control applications
- › User-programmable alarm relay for local or remote indication of a fault condition
- › Layer 3 static routing, RIP, and VRRP functions
- › C-Ring compatible: Network recovery time <30ms, with >250 switches within the ring, for Ethernet redundancy.
- › Com-Ring open architecture supports other switch manufacturers' ring technologies, for seamless network integration
- › MSTP, with RSTP/STP compatibility
- › IEC 62439-2 MRP (Media Redundancy Protocol)
- › IPV6 internet protocol (latest version)
- › Support for Modbus TCP protocol
- › VLAN unaware: Supports priority-tagged frames to be received by specific IEDs (Intelligent Electronic Devices)
- › Provides HTTPS/SSH protocol for enhanced network security
- › IEEE 802.3AZ Energy Efficient Ethernet-Compliant
- › SMTP client, & IP-based bandwidth management
- › Application-based QoS management
- › Device Binding security function
- › DOS/DDOS auto-prevention
- › IGMP v2/v3 (IGMP snooping support) for filtering multicast traffic
- › SNMP v1/v2c/v3 & RMON & 802.1Q VLAN Network Management
- › ACL, TACACS+ and 802.1x User Authentication for network security
- › 9.6K Bytes Jumbo Frame
- › Web-based, Telnet, Console (CLI), and Windows utility (eConsole) configuration
- › Rugged 19-inch rack-mount steel housing, 1 RU high (1.75") (Can be mounted in front or rear facing orientation)
- › No fans or forced-air cooling; cooling via natural convection eliminates unreliable and troublesome fans/moving parts, with no periodic maintenance requirements
- › Lifetime Warranty

* Small Form-Factor Pluggable Module. Sold separately.

APPLICATIONS

- › Electrical substation SCADA and distribution automation 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
- › 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 system
- › Military, government, and defense communications networks
- › Integrated IP-video, VOIP, and data transmission networks
- › Cellular telephony and wireless backhaul networks

SPECIFICATIONS

Power

Redundant power input	LV PSU: 24/48 VDC, 20 to 72 VDC power inputs HV PSU: 88~264VAC / 100~370VDC power inputs Power connections are on rear of chassis as standard. For front panel power connections please order /FP chassis option
Power Consumption	46 W Max
Overload Current Protection	Present

Mechanical

Fault Contact Relay	Relay output to carry capacity of 1A at 24 VDC
Indicating LEDs	System Ready Indicator (PWR) Power Indicator (PWR1 / PWR2) Ring Master Indicator (R.M.) Fault Indicator (Fault) Reset To Default Running Indicator (DEF) Supervisor Login Indicator (RMT) Link/Act(LINK) Speed(SPD) Duplex(FDX) Remote (RMT) Port 1 ~ 28 Link/Act(LK/ACT)
Enclosure	19" rack mountable chassis
Size	17.32 x 12.8 x 1.73 in (44 x 32.5 x 4.4 cm)
Weight	1.42 lb / 6.45 kg

Environmental

MTBF	> 250,000 hours
Storage Temperature	-40° to +85°C
Operating Temperature	-40° to + 85°C -40° to +75°C when "XE" modules are in use
Operating Humidity	5 to 95% Non-condensing ³

Compliance

Traffic Control	NEMA TS-1, NEMA TS-2
Power Automation	IEC 61850-3; IEEE 1613, Class 2
EMI	FCC Part 15, CISPR (EN55022) class A, EN50155 (EN50121-3-2, EN55011, EN50121-4)
EMS	EN61000-4-2 (ESD), EN61000-4-3 (RS), EN61000-4-4 (EFT), EN61000-4-5 (Surge), EN61000-4-6 (CS), EN61000-4-8, EN61000-4-11

Connectors

RS232 Console	RS-232 in RJ-45 Connector with Console cable 115200 bps, 8, N, 1
Power	Screw Terminal
Fault Relay	Screw Terminal
RLXE4GE24MODMS/XE2SFP ¹	2 x SFP+
RLXE4GE24MODMS/XE4SFP ¹	4 x SFP+
RLXE4FE24MODMS/GE2SFP	2 x SFP
RLXE4GE24MODMS/GE4SFP	4 x SFP
RLXE4GE24MODMS/8TX	8 x RJ-45
RLXE4GE24MODMS/8SFP ¹	8 x SFP
RLXE4GE24MODMS/GE4SCM2	4 x Duplex SC ²
RLXE4GE24MODMS/FE4SCM2	4 x Duplex SC ²
RLXE4GE24MODMS/GE4SCS2	4 x Duplex SC ²
RLXE4GE24MODMS/FE4SCS2	4 x Duplex SC ²
RLXE4GE24MODMS/GE4STM2	4 x Duplex ST ²
RLXE4GE24MODMS/FE4STM2	4 x Duplex ST ²
RLXE4GE24MODMS/GE4STS2	4 x Duplex ST ²
RLXE4GE24MODMS/FE4STS2	4 x Duplex ST ²

Ethernet Standards

IEEE 802.3 for 10Base-T
IEEE 802.3u for 100Base-TX and 100Base-FX
IEEE 802.3ab for 1000Base-T
IEEE 802.z for 1000Base-X
IEEE 802.3ae for 10Gigabit Ethernet
IEEE 802.3x for Flow control
IEEE 802.3ad for LACP (Link Aggregation Control Protocol)
IEEE 802.1p for COS (Class of Service)
IEEE 802.1Q for VLAN Tagging
IEEE 802.1D for STP (Spanning Tree Protocol)
IEEE 802.1w for RSTP (Rapid Spanning Tree Protocol)
IEEE 802.1s for MSTP (Multiple Spanning Tree Protocol)
IEEE 802.1x for Authentication
IEEE 802.1AB for LLDP (Link Layer Discovery Protocol)



SPECIFICATIONS

Switch Properties

Switching Latency	7μs
Switching Bandwidth	128 Gbps
Max Available VLANs	256
IGMP multicast groups	128 for each VLAN
Port rate limiting	User Define
MAC Table	8K
Priority Queues	8
Processing	Store-and-Forward
Jumbo Frame	Up to 9.6K bytes
Packet Buffer	32 Mbits
Flash Memory	128 Mbits
DRAM Size	1 Gbits

Security Features

Device Binding security feature
 Enable/disable ports, MAC based port security
 Port based network access control (802.1x)
 Single 802.1x and Multiple 802.1x
 MAC-based authentication
 QoS assignment
 Guest VLAN
 MAC address limit
 TACACS+
 VLAN (802.1Q) to segregate and secure network traffic
 Radius centralized password management
 SNMPv3 encrypted authentication and access security
 Https / SSH enhance network security
 Web and CLI authentication and authorization
 Authorization (15 levels)
 IP source guard

Software Features

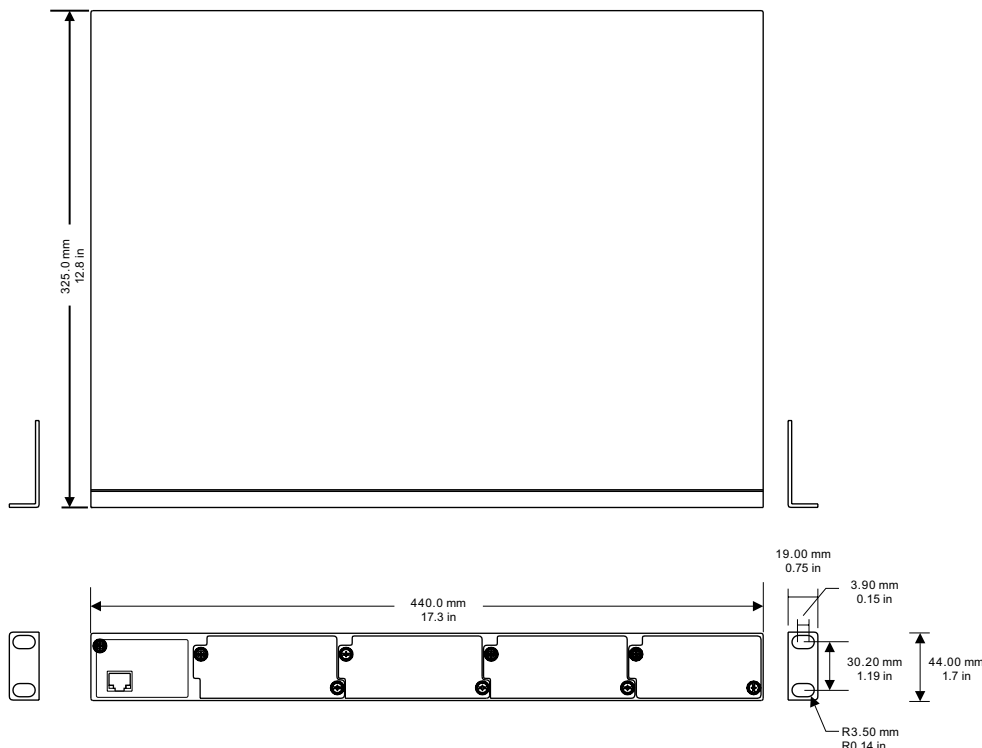
Hardware routing, RIP and static routing
 IEEE 1588v2 clock synchronization
 IEEE 802.1D Bridge, auto MAC address learning/aging and MAC address (static)
 Multiple VLAN Registration Protocol (MVRP)
 MSTP (RSTP/STP compatible)
 Redundant Ring (C-Ring) with recovery time less than 30ms over 250 units
 Virtual Router Redundancy Protocol (VRRP)
 TOS/Diffserv supported
 Quality of Service (802.1p) for real-time traffic
 VLAN (802.1Q) with VLAN tagging
 IGMP v2/v3 Snooping
 IP-based bandwidth management
 Application-based QoS management
 DOS/DDOS auto prevention
 Port configuration, status, statistics, monitoring, security
 DHCP Server/Client
 DHCP Relay
 Modbus TCP
 SMTP Client
 Voice VLAN supported
 NTP Server
 DNS client proxy

Network Redundancy

C-Ring
 Com-Ring
 Legacy Ring
 C-Chain
 MRP
 MSTP (RSTP/STP compatible)

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

OUTLINE DRAWING



ORDERING INFORMATION

Part Number	Description	Compatible Slots
RLXE4GE24MODMS/CHASSIS	4 Slot 10 Gigabit Managed Layer 2/3 Switch (Rear Panel Power Connections) - No PSUs or Modules included	n/a
RLXE4GE24MODMS/CHASSIS/FP	4 Slot 10 Gigabit Managed Layer 2/3 Switch (Front Panel Power Connections) - No PSUs or Modules included	n/a
RLXE4GE24MODMS/LVPSU	Low Voltage Power Supply Module, 24/48 VDC (20~72 VDC) - PSU Only (1 or 2 Per Chassis)	PSU 1 or 2
RLXE4GE24MODMS/HVPSU	High Voltage Power Supply Module, 88~264 VAC / 100~370 VDC - PSU Only (1 or 2 Per Chassis)	PSU 1 or 2
RLXE4GE24MODMS/XE2SFP	Industrial 2 × 10GBase-X SFP+ ports - Module Only (requires purchase of SFP+ modules) ¹	Slot 4
RLXE4GE24MODMS/XE4SFP	Industrial 4 × 10GBase-X SFP+ ports - Module Only (requires purchase of SFP+ modules) ¹	Slot 4
RLXE4GE24MODMS/GE2SFP	Industrial 2 × 1000Base-X SFP ports - Module Only (requires purchase of SFP modules) ¹	Slot 4
RLXE4GE24MODMS/GE4SFP	Industrial 4 × 1000Base-X SFP ports - Module Only (requires purchase of SFP modules) ¹	Slot 4
RLXE4GE24MODMS/8TX	Industrial 8 × 10/100/1000Base-T(X) ports - Module Only	Slots 1-3
RLXE4GE24MODMS/8SFP	Industrial 8 × 100/1000Base-X SFP ports - Module Only (requires purchase of SFP+ modules) ¹	Slots 1-3
RLXE4GE24MODMS/GE4SCM2	Industrial 4 × 1000Base-FX Multimode SC Fiber ports - Module Only ²	Slots 1-3
RLXE4GE24MODMS/FE4SCM2	Industrial 4 × 100Base-FX Multimode SC Fiber ports - Module Only ²	Slots 1-3
RLXE4GE24MODMS/GE4SCS2	Industrial 4 × 1000Base-FX Singlemode SC Fiber ports - Module Only ²	Slots 1-3
RLXE4GE24MODMS/FE4SCS2	Industrial 4 × 100Base-FX Singlemode SC Fiber ports - Module Only ²	Slots 1-3
RLXE4GE24MODMS/GE4STM2	Industrial 4 × 1000Base-FX Multimode ST Fiber ports - Module Only ²	Slots 1-3
RLXE4GE24MODMS/FE4STM2	Industrial 4 × 100Base-FX Multimode ST Fiber ports - Module Only ²	Slots 1-3
RLXE4GE24MODMS/GE4STS2	Industrial 4 × 1000Base-FX Singlemode ST Fiber ports - Module Only ²	Slots 1-3
RLXE4GE24MODMS/FE4STS2	Industrial 4 × 100Base-FX Singlemode ST Fiber ports - Module Only ²	Slots 1-3
Options	Low Voltage Industrial Power Supply (24 or 48 VDC) (Optional) User-selectable SFP Modules ¹ (Extra charge, consult factory) [3] Add suffix '/C' for Conformally Coated Circuit Boards to extend to condensation conditions (Extra charge, consult factory)	

[1] 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

[2] This product requires a fiber installation with a minimum 30 dB connector return loss. The use of Super Polish Connectors is recommended. Complies with FDA Performance Standard for Laser Products, Title 21, Code of Federal Regulations, Subchapter J.

APPLICATION DRAWING

Electrical Substation SCADA Network using RLXE4GE24MODMS

