



The RLXE4GE24MODMS Series is a substation-rated and industrially-hardened modular-configuration all-gigabit managed layer 2 switch. 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 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.

Key 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
- ✓ 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 SFPs 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
- ✓ C-Ring compatible: Network recovery time <30ms, with >250 switches within the ring, for Ethernet redundancy



SUBSTATION



FLEXIBILITY



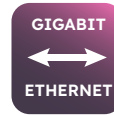
-40° TO +75°C



XE = 10 GB



4



24

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

AGENCY COMPLIANCE



- ✓ Supports Loop Protection function
- ✓ MSTP, with RSTP/STP compatibility
- ✓ Ethernet Ring Protection Switching (ERPS) (G.8032)
- ✓ IPV6 internet protocol
- ✓ 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
- ✓ 10K Bytes Jumbo Frame
- ✓ Web-based, Telnet, and Console (CLI) 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
- ✓ Limited Lifetime Warranty

* Small Form-Factor Pluggable Module. Sold separately.

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 | >100,000 HOURS |
| OPERATING TEMP | -40° C TO +85° C -40° C TO +75°C WHEN "XE" MODULES ARE IN USE |
| STORAGE TEMP | -40° C TO +85° C |
| OPERATING HUMIDITY | 5% TO 95% (NON-CONDENSING) ⁵ |

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 × SFP+ |
| RLXE4GE24MODMS/XE4SFP ¹ | 4 × SFP+ |
| RLXE4FE24MODMS/GE2SFP | 2 × SFP |
| RLXE4GE24MODMS/GE4SFP | 4 × SFP |
| RLXE4GE24MODMS/8TX | 8 × RJ-45 |
| RLXE4GE24MODMS/8SFP ¹ | 8 × SFP |

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)

ITU-T G.8032V1/V2 ETHERNET RING PROTECTION SWITCHING (ERPS)

NETWORK REDUNDANCY

NETWORK REDUNDANCY

C-RING
LEGACY RING
C-CHAIN
ERPS (G.8032)
MSTP (RSTP/STP COMPATIBLE)

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 10K BYTES |
| PACKET BUFFER | 32 MBITS |
| FLASH MEMORY | 128 MBITS |
| DRAM SIZE | 1 GBITS |

SECURITY

FEATURES

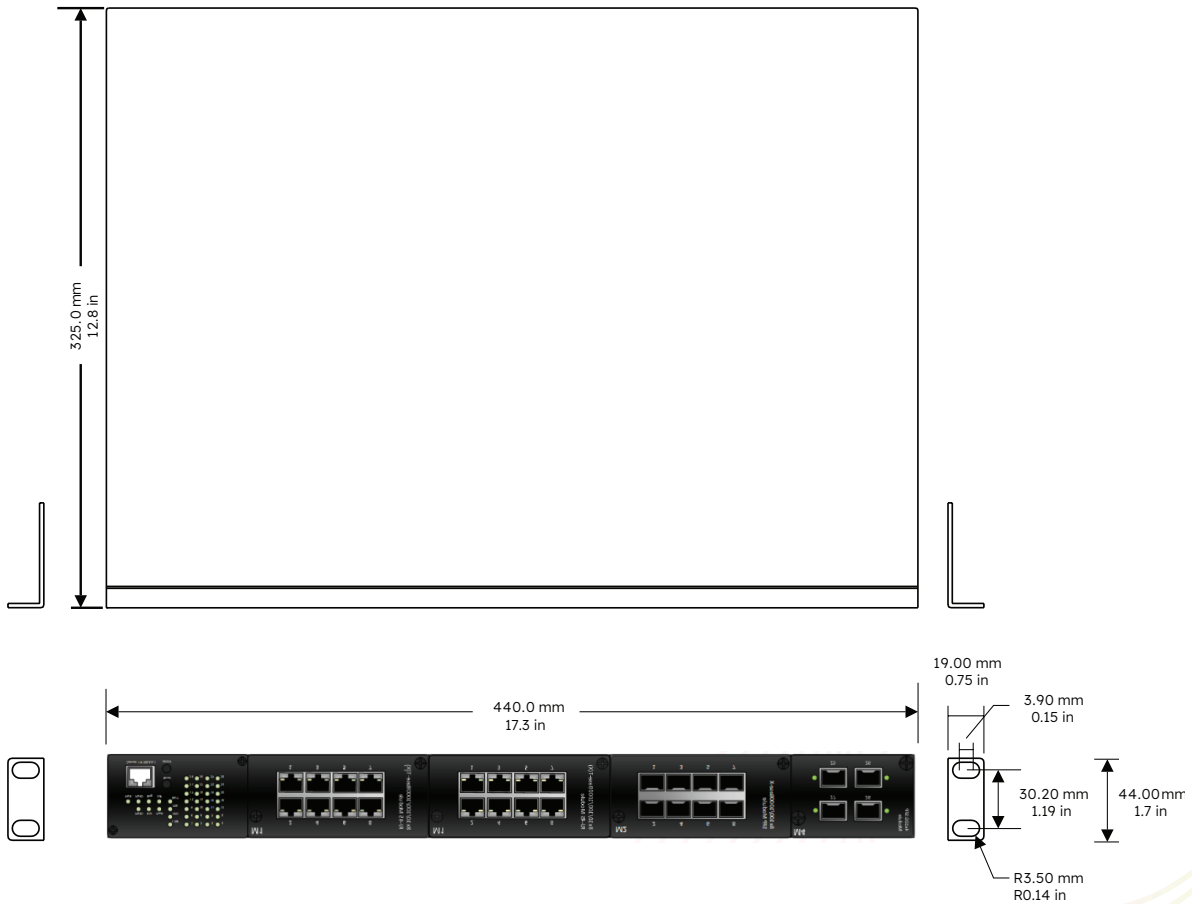
DEVICE BINDING SECURITY FEATURE
ENABLE/DISABLE PORTS, MAC BASED PORT SECURITY
PORT BASED NETWORK ACCESS CONTROL (802.1X)
SINGLE 802.1X AND MULTIPLE 802.1X
MAC-BASED AUTHENTICATION
QOS ASSIGNMENT
GUEST VLAN
MAC ADDRESS LIMIT
TACACS+
VLAN (802.1Q) TO SEGREGATE AND SECURE NETWORK TRAFFIC
RADIUS CENTRALIZED PASSWORD MANAGEMENT
SNMPV3 ENCRYPTED AUTHENTICATION AND ACCESS SECURITY
HTTPS / SSH ENHANCE NETWORK SECURITY
WEB AND CLI AUTHENTICATION AND AUTHORIZATION
IP SOURCE GUARD

FEATURES

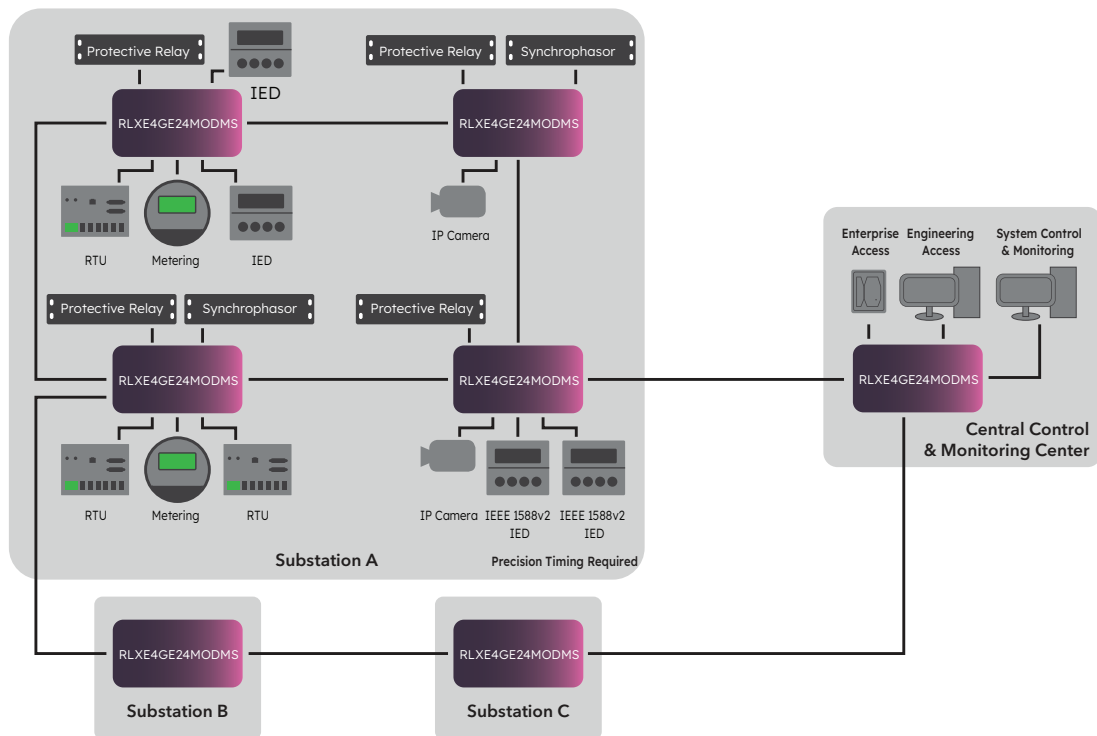
- IEEE 1588V2 CLOCK SYNCHRONIZATION
- IEEE 802.1D BRIDGE, AUTO MAC ADDRESS LEARNING/AGING AND MAC ADDRESS (STATIC)
- MULTIPLE VLAN REGISTRATION PROTOCOL (MVRP)
- MSTP (RSTP/STP COMPATIBLE)
- REDUNDANT RING (C-RING) WITH RECOVERY TIME LESS THAN 30MS OVER 250 UNITS
- TOS/DIFFSERV SUPPORTED
- QUALITY OF 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
- DNS CLIENT PROXY

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

OUTLINE DRAWING



Typical Applications - Electrical Substation SCADA Network using RLXE4GE24MODMS



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 |

OPTIONS
 Low Voltage Industrial Power Supply (24 or 48 VDC) (Optional)
 User-selectable SFP Modules¹ (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.
 [3] Add suffix '/C' for Conformally Coated Circuit Boards to extend to condensation conditions (Extra charge, consult factory)