# RKS-G4028-PL Series

*12 10GbE, 16 GbE-port (802.3bt PoE optional) Layer 2 modular managed Ethernet switches*

### Features and Benefits

- Scalable design supporting up to 28 ports, from Fast Ethernet to 10GbE industrial networks
- Modular interfaces with LAN modules and power modules for flexible expansion
- IEEE 802.3bt PoE with up to 90 W per port and 720 W total budget for high-power devices
- High EMC immunity compliant with IEC 61850-3 and IEEE 1613
- Hardware-based IEEE 1588 PTP for high-precision time synchronization
- Intelligent chassis monitoring with built-in temperature detection
- Turbo Ring and Turbo Chain (recovery time < 20 ms @ 250 switches)[1], and STP/RSTP/MSTP for network redundancy
- Supports MXView One series for easy, visualized industrial network management
- GOOSE Check for easy troubleshooting
- Built-in MMS server based on IEC 61850-90-4 switch data modeling for power SCADA
- IEC 62443-4-2 Security Level 2 certified
- -40 to 75°C operating temperature range

### Certifications

EN 50121-4 IEC 61850-3 IEEE 1613 NEMA TS2

## Introduction

The RKS-G4028–PL Series is purpose-built to deliver exceptional reliability and performance for mission-critical industrial and business applications, including power substation automation, railway operations, and intelligent transportation systems.

With its high-density 10GbE backbone (up to 12 fixed 10G SFP+ ports), modular LAN expansion (up to 16 additional Gigabit ports), and dual isolated redundant power supply options (12/24/48 VDC, 110/220 VAC/VDC, or 48V EPS), the RKS-G4028-PL Series ensures robust communication while reducing wiring and maintenance costs.

Even better, the dual-sided power installation design (front or rear) maximizes installation convenience for diverse cabinet layouts.

### Additional Features and Benefits

- IEEE 1588v2 PTP (Precision Time Protocol) for network time synchronization
- Command line interface for quickly configuring major managed functions
- IGMP snooping and GMRP for filtering multicast traffic
- Port-based VLAN, IEEE 802.1Q VLAN, and GVRP to ease network planning
- QoS (IEEE 802.1p/1Q and TOS/DiffServ) to increase determinism
- IEEE 802.3ad, LACP for optimum bandwidth utilization
- Line-swap fast recovery
- TACACS+, IEEE 802.1X, SNMPv3, HTTPS, and SSH to enhance network security
- SNMPv1/v2c/v3 for different levels of network management
- RMON for proactive and efficient network monitoring
- Bandwidth management prevents unpredictable network status with “Lock port” to restrict access to authorized MAC addresses
- Port mirroring for online debugging
- Automatic warning by exception through email and relay output
- Automatic recovery of connected device’s IP addresses
- Configurable by web browser, Telnet/serial console, CLI, Windows utility, and ABC-02 or ABC-03 automatic backup configurator
- Out-of-band management (OOBM) port to ensure the availability of network management when in-band services are inaccessible

1. If the port link speed is 1 Gigabit or higher, the recovery time is < 50 ms.

## Specifications

### Ethernet Interface

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|---|---|
| 1000/2500/10000BaseSFP Ports | RKS-G4028-PL models: 12 |
| Out-of-band Management (OOBM) | 1 x 8-pin RJ45 1GbE Ethernet port (MGMT) |
| Expansion Module Slots | There are 2 module slots on the switch. Users can select different types of modules to insert into the switch. The modules that can be selected include 8-port modules with 10/100/1000BaseT(X), 10/100/1000BaseT(X) PoE, and 100/1000BaseSFP interfaces.<br><br>Refer to Expansion Modules in the Accessories section for a full list of supported interface modules.<br><br>8-port module slots: 2 (Up to 16 total ports)<br><br>Module Options:<br>8-port 10/100/1000BaseT(X)<br>8-port 10/100/1000BaseT(X) PoE (PoE models only)<br>8-port 100/1000BaseSFP |
| Standards | IEEE 802.1D-2004 for Spanning Tree Protocol<br>IEEE 802.1p for Class of Service<br>IEEE 802.1Q for VLAN Tagging<br>IEEE 802.1s for Multiple Spanning Tree Protocol<br>IEEE 802.1w for Rapid Spanning Tree Protocol<br>IEEE 802.1X for authentication<br>IEEE 802.3 for 10BaseT<br>IEEE 802.3ab for 1000BaseT(X)<br>IEEE 802.3ad for Port Trunk with LACP<br>IEEE 802.3ae for 10 Gigabit Ethernet<br>IEEE 802.3bz for 2.5GBaseX<br>IEEE 802.3u for 100BaseT(X) and 100BaseFX<br>IEEE 802.3x for flow control<br>IEEE 802.3z for 1000BaseSX/LX/LHX/ZX |
| Note | All Ethernet ports on the RKS-G4028-PL series operate in full-duplex mode exclusively. Half-duplex transmission is not supported. |

### Ethernet Software Features

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|---|---|
| Management | ARP<br>Back Pressure Flow Control<br>DHCP Relay Agent (Option 82)<br>DHCP Server/Client<br>Fiber check<br>Flow control<br>HTTP<br>HTTPS<br>IPv4<br>Linkup Delay<br>LLDP<br>Port Mirroring (SPAN, RSPAN)<br>Private MIB<br>RARP<br>RMON<br>SFTP<br>SMTP<br>SNMP Inform<br>SNMP Trap<br>SNMPv1/v2c/v3<br>Syslog<br>Telnet<br>TFTP |
| Filter | GMRP<br>GVRP<br>GARP<br>802.1Q<br>IGMP Snooping v1/v2/v3<br>IGMP Querier |
| Redundancy Protocols | Link Aggregation |

| | |
|---|---|
| | MRP<br>MRP Interconnection<br>MSTP<br>Multiple Dual Homing<br>Multiple Network Coupling<br>Network Loop Protection<br>Ring Coupling<br>RSTP<br>STP<br>Tracking<br>Turbo Chain<br>Turbo Ring v2 |
| Security | Access control list<br>Broadcast storm protection<br>DHCP Snooping<br>Dynamic ARP Inspection<br>HTTPS/SSL<br>IEEE 802.1AE MAC security<br>IP Source Guard<br>Login and password policy<br>MAC authentication bypass<br>RADIUS<br>Rate Limit<br>Secure boot<br>SSH<br>Static port lock<br>Sticky MAC<br>TACACS+<br>Trust access control |
| Time Management | IEEE 1588v2 PTP (hardware-based)<br>NTP Authentication<br>NTP Server/Client<br>SNTP<br>Supported power profiles: IEEE 1588 Default 2008, IEC 61850-9-3-2016, IEEE C37.238-2017 |
| Protocols | 802.1X<br>ARP<br>DNS<br>HTTP<br>HTTPS<br>ICMP<br>IPv4<br>NTP Client<br>QoS<br>RARP<br>RMON<br>SMTP<br>SNMPv1/v2c/v3<br>Syslog<br>TCP/IP<br>Telnet<br>TFTP<br>UDP<br>VLAN Assignment |
| Industrial Protocols | EtherNet/IP<br>Modbus TCP<br>PROFINET |

| | |
|---|---|
| MIB | IEEE8021-PAE-MIB<br>IEEE8021-SPANNING-TREE-MIB<br>IEEE8023-LAG-MIB<br>LLDP-EXT-DOT1-MIB<br>LLDP-EXT-DOT3-MIB<br>P-BRIDGE MIB<br>Q-BRIDGE-MIB<br>RMON MIB Groups 1, 2, 3, 9<br>SNMPv2-MIB |
| Power Substation | 1588 PTP Power Profile IEC 61850-9-3<br>1588 PTP Power Profile C37.238-2017<br>GOOSE Check<br>MMS |

### Switch Properties

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|---|---|
| IGMP Groups | 2048 |
| Jumbo Frame Size | 9.216 KB |
| MAC Table Size | 32 K |
| Max. No. of VLANs | 512 |
| Packet Buffer Size | 8 MB |
| Priority Queues | 8 |
| VLAN ID Range | VID 1 to 4094 |

### USB Interface

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|---|---|
| Storage Port | USB Type A |

### MicroSD Interface

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|---|---|
| Storage Port | microSD card |

### LED Interface

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|---|---|
| LED Indicators | PWR1, PWR2, STATE, FAULT, MSTR/HEAD, CPLR/TAIL, SYNC, EPS1, EPS2 |

### Serial Interface

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|---|---|
| Console Port | RS-232 (RJ45) |

### Input/Output Interface

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|---|---|
| Alarm Contact Channels | 1 relay output with current carrying capacity of 2 A @ 30 VDC, 0.5A @ 125VAC |
| Buttons | Reset button |

### Power Parameters

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|---|---|
| Total PoE Power Budget | 720 W[2] |
| Max. PoE Power Output per Port | IEEE 802.3af: 15.4 W<br>IEEE 802.3at: 30 W<br>IEEE 802.3bt: 90 W |
| Input Voltage | Isolated Power Module<br>PWR-310-HV: 110/220 VDC, 110/220 VAC<br>PWR-310-HVA: 110/220 VAC<br>PWR-310-LV: 12/24/48 VDC<br><br>Isolated Power Module with PoE EPS<br>PWR-310-HV-P: 110/220 VAC, 110/220 VDC, EPS Input: 48–57 VDC<br>PWR-310-LV-P: 12/24/48 VDC, EPS Input: 48–57 VDC |

2. with dual power module installation

| | |
|---|---|
| | (For PoE+ applications, a minimum of 53 VDC is recommended) |
| Operating Voltage | PWR-310-LV / PWR-310-LV-P models: 10.8 to 72 VDC<br>PWR-310-HV: 88 to 300 VDC, 85 to 264 VAC<br>PWR-310-HVA: 85 to 264 VAC<br>PWR-310-HV-P models: 88 to 300 VDC, 85 to 264 VAC<br>PoE models: 46 to 57 VDC (for the PoE system) |
| Overload Current Protection | Supported |
| Reverse Polarity Protection | Supported |
| Input Current | PWR-310-LV / PWR-310-LV-P models:<br>Max. 8 A @ 12 VDC<br>Max. 3.08 A @ 24 VDC<br>Max. 1.52 A @ 48 VDC<br><br>PWR-310-HV/PWR-310-HV-P models:<br>Max. 0.67 A @ 110 VDC<br>Max. 0.33 A @ 220 VDC<br>Max. 0.79 A @ 110 VAC<br>Max. 0.35 A @ 220 VAC<br><br>PWR-310-HVA models:<br>Max. 0.79 A @ 110 VAC<br>Max. 0.35 A @ 220 VAC<br><br>EPS (PoE models only):<br>Max. 12 A @ 48 to 57 VDC |
| Power Consumption (Max.) | RKS-G4028-PL with PWR-310 LV and LV-P Modules:<br>Max. 96.06 W @ 12 VDC<br>Max. 81.4 W @ 24 VDC<br>Max. 80.3 W @ 48 VDC<br><br>RKS-G4028-PL with PWR-310 HV and HV-P Modules:<br>Max. 80.96 W @ 110 VDC<br>Max. 80.3 W @ 220 VDC<br>Max. 79.86 W @ 110 VAC<br>Max. 78.76 W @ 220 VAC<br><br>RKS-G4028-PL with PWR-310 HVA Modules:<br>Max. 79.86 W @ 110 VAC<br>Max. 78.76 W @ 220 VAC |

## Physical Characteristics

| | |
|---|---|
| IP Rating | IP40[3] |
| Dimensions | 440 x 44 x 387 mm (17.32 x 1.72 x 15.24 in) |
| Weight | RKS-G4028-PL-PoE-12XGS-T: 5410 g (11.93 lb)<br>RKS-G4028-PL-12XGS-T: 5450 g (12.02 lb)<br><br>RM-G4000-PL LAN Port Module:<br>RM-G4000-PL-8GSFP: 505 g (1.11 lb)<br>RM-G4000-PL-8GTX: 438 g (0.97 lb)<br>RM-G4000-PL-8GPoE: 596 g (1.31 lb)<br><br>PWR-310 Power Module:<br>PWR-310-LV: 854 g (1.88 lb)<br>PWR-310-HV: 854 g (1.88 lb)<br>PWR-310-HVA: 861g (1.90 lb)<br>PWR-310-LV-P: 830 g (1.83 lb)<br>PWR-310-HV-P: 845 g (1.86 lb) |
| Installation | Rack mounting |

3. with all ports/interfaces populated

## Environmental Limits

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|---|---|
| Operating Temperature | -40 to 75°C (-40 to 167°F) |
| Storage Temperature (package included) | -40 to 85°C (-40 to 185°F) |
| Ambient Relative Humidity | 5 to 95% (non-condensing) |

## Standards and Certifications

| | |
|---|---|
| EMC | EN 55032/35<br>EN 61000-6-2/-6-4 |
| EMI | CISPR 32, FCC Part 15B Class A |
| EMS | IEC 61000-4-2 ESD: Contact: 8 kV; Air: 15 kV<br>IEC 61000-4-3 RS: 80 MHz to 1 GHz: 20 V/m<br>IEC 61000-4-4 EFT: Power: 4 kV; Signal: 4 kV<br>IEC 61000-4-5 Surge: Power: 4 kV; Signal: 4 kV<br>IEC 61000-4-6 CS: 10 V<br>IEC 61000-4-8 PFMF<br>IEC 61000-4-11 AC Voltage Dips and Interruptions<br>IEC 61000-4-29 DC Voltage Dips and Interruptions |
| Cybersecurity | IEC 62443-4-2 Security Level 2 |
| Safety | EN IEC 62368-1<br>IEC 62368-1<br>UL 61010-1<br>UL 61010-2-201<br>UL 62368-1 |
| Power Substation | IEC 61850-3 Edition 2.0<br>IEC 61850-90-4<br>IEEE 1613 Class 2 (EMC) |
| Railway | EN 50121-4 |
| Traffic Control | NEMA TS2 |
| Shock | IEC 60068-2-27 |
| Vibration | IEC 60068-2-6 |
| Package Drop Test | ISTA 1A |
| Package Vibration Test | ISTA 1A |

## MTBF

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|---|---|
| Time | RKS-G4028-PL-12XGS-T: 1,532,844 hours<br>RKS-G4028-PL-PoE-12XGS-T: 1,326,867 hours |
| Standards | Telcordia (Bellcore), GB |

## Warranty

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|---|---|
| Warranty Period | 5 years |
| Details | See www.moxa.com/warranty |

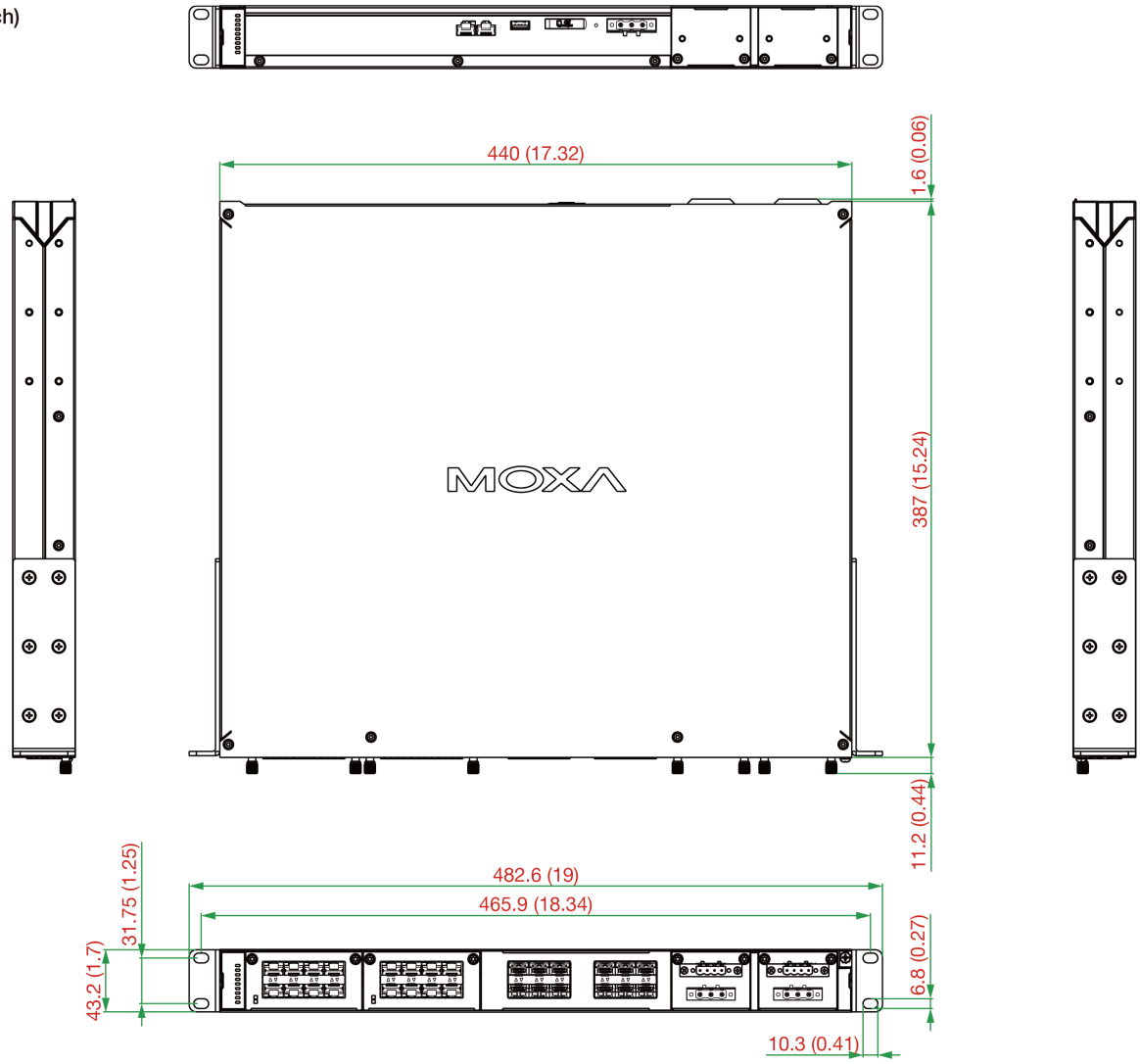
## Package Contents

| | |
|---|---|
| Device | 1 x RKS-G4028-PL Series switch |
| Installation Kit | 2 x rack-mounting ear<br>12 x protective caps for unused SFP ports |

| | |
|---|---|
| Documentation | 1 x quick installation guide<br>1 x warranty card |
| Note | 1. Only the RKS-G4028-PL-PoE Series and RKS-G4030-PL-PoE models support PoE functionality with RM-G4000-PL-8GPoE modules.<br><br>2. Only the PWR-310-LV-P, PWR-310-HV-P support RKS-G4028-PL-PoE Series and RKS-G4030-PL- -PoE models PoE function<br><br>3. Power over Ethernet requires the 48 VDC external power supply. (53 to 57 VDC is recommended for PoE+ devices)<br><br>The 48 VDC external power supply, SFP modules, isolated system power supply from PWR-310 series and modules from the RM-G4000-PL Module Series need to be purchased separately for use with this product. |

## Dimensions

Unit: mm (inch)



## Ordering Information

| Model Name | Max. No. of Ports | 10GbE SFP+ Ports | 100/1000 BaseSFP Ports (Expansion Module) | 10/100/ 1000BaseT(X) Ports RJ45 Ports (Expansion Module) | PoE Support | L3 Functionality | Operating Temp. |
|---|---|---|---|---|---|---|---|
| RKS-G4028-PL-PoE-12XGS-T | 28 | 12 | Up to 16 (8 ports per module) | Up to 16 (8 ports per module) | ✓ | – | -40 to 75°C (-40 to 167°F) |
| RKS-G4028-PL-12XGS-T | 28 | 12 | Up to 16 (8 ports per module) | Up to 16 (8 ports per module) | – | – | -40 to 75°C (-40 to 167°F) |

## Accessories (sold separately)

### Expansion Modules

| | |
|---|---|
| RM-G4000-PL-8GTX | Gigabit Ethernet module with 8 100/1000BaseT(X) ports |
| RM-G4000-PL-8GSFP | Gigabit Ethernet module with 8 100/1000BaseSFP ports |
| RM-G4000-PL-8GPoE | Gigabit Ethernet module with 8 100/1000BaseT(X) IEEE 802.3bt PoE ports |

### Power Modules

| | |
|---|---|
| PWR-310-LV | 12/24/48 VDC power supply module with system power input |
| PWR-310-HV | 110/220 VAC/VDC power supply module with system power input |
| PWR-310-HVA | 110/220 VAC power supply module with system power input, AC power inlet |
| PWR-310-LV-P | 12/24/48 VDC power supply module with system power input, PoE power input |
| PWR-310-HV-P | 110/220 VAC/VDC power supply module with system power input, PoE power input |

### SFP Modules

| | |
|---|---|
| SFP-1G10ALC | WDM-type (BiDi) SFP module with 1 1000BaseSFP port with LC connector for 10 km transmission; TX 1310 nm, RX 1550 nm, 0 to 60°C operating temperature |
| SFP-1G10BLC | WDM-type (BiDi) SFP module with 1 1000BaseSFP port with LC connector for 10 km transmission; TX 1550 nm, RX 1310 nm, 0 to 60°C operating temperature |
| SFP-1G20ALC | WDM-type (BiDi) SFP module with 1 1000BaseSFP port with LC connector for 20 km transmission; TX 1310 nm, RX 1550 nm, 0 to 60°C operating temperature |
| SFP-1G20BLC | WDM-type (BiDi) SFP module with 1 1000BaseSFP port with LC connector for 20 km transmission; TX 1550 nm, RX 1310 nm, 0 to 60°C operating temperature |
| SFP-1G40ALC | WDM-type (BiDi) SFP module with 1 1000BaseSFP port with LC connector for 40 km transmission; TX 1310 nm, RX 1550 nm, 0 to 60°C operating temperature |
| SFP-1G40BLC | WDM-type (BiDi) SFP module with 1 1000BaseSFP port with LC connector for 40 km transmission; TX 1550 nm, RX 1310 nm, 0 to 60°C operating temperature |
| SFP-1G10ALC-T | WDM-type (BiDi) SFP module with 1 1000BaseSFP port with LC connector for 10 km transmission; TX 1310 nm, RX 1550 nm, -40 to 85°C operating temperature |
| SFP-1G10BLC-T | WDM-type (BiDi) SFP module with 1 1000BaseSFP port with LC connector for 10 km transmission; TX 1550 nm, RX 1310 nm, -40 to 85°C operating temperature |
| SFP-1G20ALC-T | WDM-type (BiDi) SFP module with 1 1000BaseSFP port with LC connector for 20 km transmission; TX 1310 nm, RX 1550 nm, -40 to 85°C operating temperature |
| SFP-1G20BLC-T | WDM-type (BiDi) SFP module with 1 1000BaseSFP port with LC connector for 20 km transmission; TX 1550 nm, RX 1310 nm, -40 to 85°C operating temperature |
| SFP-1G40BLC-T | WDM-type (BiDi) SFP module with 1 1000BaseSFP port with LC connector for 40 km transmission; TX 1550 nm, RX 1310 nm, -40 to 85°C operating temperature |
| SFP-1G40ALC-T | WDM-type (BiDi) SFP module with 1 1000BaseSFP port with LC connector for 40 km transmission; TX 1310 nm, RX 1550 nm, -40 to 85°C operating temperature |
| SFP-1GSXLC | SFP module with 1 1000BaseSX port with LC connector for 300m/550m transmission, 0 to 60°C operating temperature |

| | |
|---|---|
| SFP-1GLSXLC | SFP module with 1 1000BaseLSX port with LC connector for 1km/2km transmission, 0 to 60°C operating temperature |
| SFP-1GLXLC | SFP module with 1 1000BaseLX port with LC connector for 10 km transmission, 0 to 60°C operating temperature |
| SFP-1GLHLC | SFP module with 1 1000BaseLH port with LC connector for 30 km transmission, 0 to 60°C operating temperature |
| SFP-1GLHXLC | SFP module with 1 1000BaseLHX port with LC connector for 40 km transmission, 0 to 60°C operating temperature |
| SFP-1GZXLC | SFP module with 1 1000BaseZX port with LC connector for 80 km transmission, 0 to 60°C operating temperature |
| SFP-1GEZXLC | SFP module with 1 1000BaseEZX port with LC connector for 110 km transmission, 0 to 60°C operating temperature |
| SFP-1GEZXLC-120 | SFP module with 1 1000BaseEZX port with LC connector for 120 km transmission, 0 to 60°C operating temperature |
| SFP-1GSXLC-T | SFP module with 1 1000BaseSX port with LC connector for 300m/550m transmission, -40 to 85°C operating temperature |
| SFP-1GLSXLC-T | SFP module with 1 1000BaseLSX port with LC connector for 1km/2km transmission, -40 to 85°C operating temperature |
| SFP-1GLXLC-T | SFP module with 1 1000BaseLX port with LC connector for 10 km transmission, -40 to 85°C operating temperature |
| SFP-1GLHLC-T | SFP module with 1 1000BaseLH port with LC connector for 30 km transmission, -40 to 85°C operating temperature |
| SFP-1GLHXLC-T | SFP module with 1 1000BaseLHX port with LC connector for 40 km transmission, -40 to 85°C operating temperature |
| SFP-1GZXLC-T | SFP module with 1 1000BaseZX port with LC connector for 80 km transmission, -40 to 85°C operating temperature |
| SFP-1GTXRJ45-T | SFP module with 1 1000BaseT port with RJ45 connector for 100 m transmission, -40 to 75°C operating temperature |
| SFP-2.5GMLC-T | SFP module with 1 2.5GBaseFX port with LC connector, multi-mode, for 170, 200, 550, 600 m transmission, -40 to 85 °C operating temperature |
| SFP-2.5GSLC-T | SFP module with 1 2.5GBaseFX port with LC connector, single-mode, for 5 km transmission, -40 to 85 °C operating temperature |
| SFP-2.5GLSLC-T | SFP module with 1 2.5GBaseFX port with LC connector, single-mode, for 20 km transmission, -40 to 85 °C operating temperature |
| SFP-2.5GSLHLC-T | SFP module with 1 2.5GBaseFX port with LC connector, single-mode, for 45 km transmission, -40 to 85 °C operating temperature |
| SFP-10GSRLC-T | SFP+ module with 1 10GBase-SR port, LC connector for 33m/82m/300m/400m transmission, -40 to 85°C operating temperature |
| SFP-10GLRLC-T | SFP+ module with 1 10GBase-LR port, LC connector for 10 km transmission, -40 to 85°C operating temperature |
| SFP-10GERLC-T | SFP+ module with 1 10GBase-ER port, LC connector for 40 km transmission, -40 to 85°C operating temperature |
| SFP-10GZRLC-T | SFP+ module with 1 10GBase-ZR port, LC connector for 80 km transmission, -40 to 85°C operating temperature |
| SFP-1FELLC-T | SFP module with 1 100Base single-mode with LC connector for 80 km transmission, -40 to 85°C operating temperature |
| SFP-1FESLC-T | SFP module with 1 100Base single-mode with LC connector for 40 km transmission, -40 to 85°C operating temperature |
| SFP-1FEMLC-T | SFP module with 1 100Base multi-mode, LC connector for 2/4 km transmission, -40 to 85°C operating temperature |

## Cables

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|---|---|
| CN20070 | 10-pin RJ50 to DB9 female serial cable |
| PWC-C15US-3B-183 | Power cord with US plug, 1.83 m, -40 to 75°C operating temperature |
| PWC-C15EU-3B-183 | Power cord with EU plug, 1.83 m, -40 to 75°C operating temperature |

## Software

| | |
|---|---|
| LIC-MXviewOne-NEW-XN-SR | MXview One node license with customizable node quantity (minimum 1 node) |

## Storage Kits

| | |
|---|---|
| ABC-02-USB | Configuration backup and restoration tool, firmware upgrade, and log file storage tool for managed Ethernet switches and routers, 0 to 60°C operating temperature |
| ABC-02-USB-T | Configuration backup and restoration tool, firmware upgrade, and log file storage tool for managed Ethernet switches and routers, -40 to 75°C operating temperature |
| ABC-03-microSD-T | MicroSD-based configuration backup and restoration tool, firmware upgrades, and log file storage tool for managed Ethernet switches and WLAN products, -40 to 85°C operating temperature |

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