EDR-G902/G903 Series

Industrial secure routers with firewall/NAT/VPN

▶*Award-winning Product*

🏵 **TAIWAN** EXCELLENCE 2011

> Firewall/NAT/VPN/Router all-in-one
> Secure remote access tunnel with VPN
> Protect critical assets with stateful firewall
> Inspect industrial protocol with PacketGuard technology
> Easy network setup with address translation (NAT)
> Dual WAN redundant interfaces through public networks
> Support for VLANs in different interfaces
> -40 to 75°C operating temperature range (T model)
> ISA99 / IEC 62443 / NERC CIP compliance

IEC 61850-3 IEEE 1613 | DNV-GL MARITIME | c(UL)us LISTED | CE | FC
(EDR-G903) | (EDR-G902)

: Introduction

The EDR-G903/G902 series is a high-performance, industrial VPN server with a firewall/NAT all-in-one secure router. It is designed for Ethernet-based security applications in sensitive remote control or monitoring networks, and it provides an Electronic Security Perimeter for the protection of critical cyber assets such as pumping stations, DCS, PLC systems on oil rigs, and water treatment systems. The EDR-G902/G903 series includes the following cybersecurity features:

• Virtual Private Network (VPN): VPNs are designed to provide users with secure communication links when accessing a private network from the public Internet. They use IPSec (IP Security) server or client mode for encryption and authentication of all IP packets at the network layer to ensure confidentiality and sender authentication.

• Firewall: Controls network traffic between different trust zones. Network Address Translation (NAT), which shields the internal LAN from unauthorized activity from outside hosts, is included.

The EDR-G902/G903's Quick Automation Profile function supports most common fieldbus protocols, including EtherCAT, EtherNet/IP, FOUNDATION Fieldbus, Modbus/TCP, and PROFINET. Users can easily create a secure Ethernet Fieldbus network from a user-friendly web UI with a single click. In addition, Moxa's PacketGuard technology (Deep Packet Inspection) helps to filter Modbus TCP commands at OSI layer 7. The wide temperature range models that are available operate reliably in hazardous, -40 to 75°C environments.

: Specifications

Technology
Standards:
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseT(X) and 100BaseFX
IEEE 802.3ab for 1000BaseT(X)
IEEE 802.3z for 1000BaseX
Protocols: SNMPv1/v2c/v3, DHCP Server/Client, TFTP, NTP/SNTP server and client, HTTP, HTTPS, Telnet, SSH, Syslog, SMTP, LLDP, PPPoE, PPTP, Dynamic DNS, traffic prioritization
Routing: Static routing, RIP V1/V2, OSPF
Throughput:
• EDR-G902: Max. 25000 packets per second (or 300 Mbps)
• EDR-G903: Max. 40000 packets per second (or 500 Mbps)
Routing Redundancy: VRRP
VLAN: 5 VLANs per interfaces (VLAN ID: 1 to 4094)
Flow Control: IEEE 802.3x flow control, back pressure flow control

Security Functions
Firewall:
Features:
• Stateful inspection
• Router firewall and transparent (bridge) firewall
• Filter: IP and MAC address, ports, ICMP, Ethernet protocols
• Deep Packet Inspection: Modbus TCP/UDP
• Quick Automation Profiles: EtherCAT, EtherNet/IP, FOUNDATION Fieldbus, LonWorks, Modbus/TCP, PROFINET, IEC 60870-104, DNP, FTP, SSH, Telnet, HTTP, IPSec, L2TP, PPTP, RADIUS
Throughput:
• EDR-G902: Max. 25000 packet per second (or 300 Mbps)
• EDR-G903: Max. 40000 packet per second (or 500 Mbps)
DoS and DDoS Protection: Null Scan, Xmas Scan, NMAP-Xmas Scan, SYN/FIN Scan, FIN Scan, NMAP-ID Scan, SYN/RST Scan, NEW-Without-SYN Scan, ICMP-Death, SYN-Flood, ARP-Flood
NAT: N-to-1, 1-to-1, bidirectional 1-to-1, and port forwarding

IPSec VPN:
Protocols:
• IPSec
• L2TP (server)
• PPTP (client)
Encryption:
• DES, 3DES, AES-128, AES-192, AES-256
Authentication:
• RSA (key size: 1024-bit, 2048-bit)
• X.509 v3 certificate
• MD5 and SHA (SHA-256)
Throughput:
• EDR-G902: Max. 60 Mbps (Condition: AES-246, SHA-256)
• EDR-G903: Max. 150 Mbps (Condition: AES-246, SHA-256)
Concurrent VPN Tunnels:
• EDR-G902: 50 IPSec VPN Tunnels (Max. 15 start in initial mode)
• EDR-G903: 100 IPSec VPN Tunnels (Max. 30 start in initial mode)
OpenVPN:
Protocols:
• OpenVPN (client and server), UDP and TCP
• Tunnel mode (routing) and TAP mode (bridge)
Encryption:
• Blowfish CBC, DES CBC, DES-EDE3 CBC, AES-128/192/256 CBC
Authentication:
• User password by MD5 and SHA1
Concurrent VPN Tunnels:
• Server mode: max. 5 external clients
• Client mode: max. 2 external servers
Real-Time Firewall / VPN Event Log:
• Event Type: Firewall Event, VPN Event, System Security Event
• Media: Local storage, Syslog server, and SNMP trap

Interface
WAN/WAN1: 1 RJ45/Fiber combo port
WAN2/DMZ: 1 RJ45/Fiber combo port
LAN:
EDR-G903: RJ45/SFP combo port
EDR-G902: RJ45
RJ45 Ports: 10/100/1000BaseT(X) auto negotiation speed
Fiber Ports: 100/1000BaseSFP slot
LED Indicators: PWR1, PWR2, FAULT, 10/100/1000M
Alarm Contact: One relay output with current-carrying capacity of 1 A @ 24 VDC
Digital Inputs: 1 input
• +13 to +30 V for state "1"
• -30 to +3 V for state "0"
• Max. input current: 8 mA

Power Requirements
Input Voltage: 12/24/48 VDC, redundant dual inputs
Input Current: 0.45 A @ 24 V
Overload Current Protection: Present
Connection: Removable terminal block
Reverse Polarity Protection: Present

Physical Characteristics
Housing: Metal, IP 30 protection
Dimensions: 51 x 152 x 131.1 mm (2.01 x 5.98 x 5.16 in)
Weight: 1250 g (2.82 lb)
Installation: DIN-rail mounting, wall mounting (with optional kit)

Environmental Limits
Operating Temperature:
Standard Models: 0 to 60°C (32 to 140°F)
Wide Temp. Models: -40 to 75°C (-40 to 167°F)
Storage Temperature: -40 to 85°C (-40 to 185°F)
Ambient Relative Humidity: 5 to 95 % (non-condensing)

Standards and Certifications
Safety: UL 508
EMC: EN 55022/24
EMI: CISPR 22, FCC Part 15B Class A
EMS:
IEC 61000-4-2 ESD: Contact: 6 kV; Air: 8 kV
IEC 61000-4-3 RS: 80 MHz to 1 GHz: 10 V/m
IEC 61000-4-4 EFT: Power: 4 kV; Signal: 4 kV
IEC 61000-4-5 Surge: Power: 2 kV; Signal: 1 kV
IEC 61000-4-6 CS: Signal: 10 V
IEC 61000-4-8
Power Automation: IEC 61850-3 (EDR-G903)
Marine: DNV (EDR-G902)
Shock: IEC 60068-2-27
Freefall: IEC 60068-2-32
Vibration: IEC 60068-2-6
Note: Please check Moxa's website for the most up-to-date certification status.

MTBF (mean time between failures)
Time: 530,000 hrs
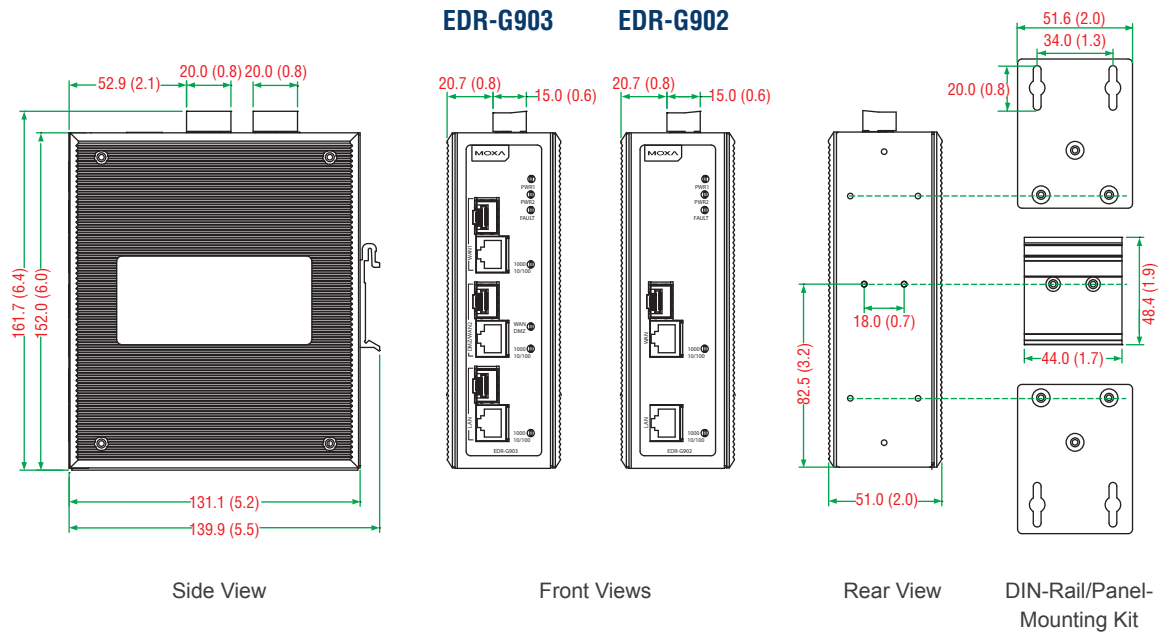**Standard:** Telcordia (Bellcore), GB

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

Dimensions

Unit: mm (inch)

EDR-G903   **EDR-G902**

Side View   Front Views   Rear View   DIN-Rail/Panel-Mounting Kit

Ordering Information

Available Models

EDR-G902: Industrial secure routers with 1 WAN, firewall/NAT/VPN, 0 to 60°C operating temperature

EDR-G902-T: Industrial secure routers with 1 WAN, firewall/NAT/VPN, -40 to 75°C operating temperature

EDR-G903: Industrial secure router with 2 WAN/1 DMZ, and firewall/NAT/VPN, 0 to 60°C operating temperature

EDR-G903-T: Industrial secure router with 2 WAN/1 DMZ, and firewall/NAT/VPN, -40 to 75°C operating temperature

Note: The EDR-G903/G902 series secure routers support 100/1000BaseSFP slots. See the SFP-1G and SFP-1FE datasheets for Gigabit/Fast Ethernet SFP module product information.

Optional Accessories (can be purchased separately)

DR-4524/75-24/120-24: 45/75/120 W DIN-rail 24 VDC power supplies

MDR-40-24/60-24: 40/60 W DIN-rail 24 VDC power supplies, -20 to 70°C operating temperature

WK-51-01: Wall-mounting kit, 2 plates with 6 screws

RK-4U: 4U-high 19-inch rack-mounting kit

Package Checklist

- EDR-G903/G902 secure router
- Serial Cable: CN20070
- Documentation and software CD
- Hardware installation guide (printed)
- Warranty card

SFP-1G Series

1-port Gigabit Ethernet SFP modules

> Digital Diagnostic Monitor Function
> -40 to 85°C operating temperature range (T models)
> IEEE 802.3z compliant
> Differential LVPECL inputs and outputs
> TTL signal detect indicator
> Hot pluggable LC duplex connector
> Class 1 laser product, complies with EN 60825-1

: Specifications

Interface
Ethernet Ports: 1
Connectors: Duplex LC Connector or Simplex LC Connector (WDM-type only)

Optical Fiber

		Gigabit Ethernet SFP							
		SFP-SX		SFP-LSX		SFP-LX	SFP-LH	SFP-LHX	SFP-ZX	SFP-EZX	SFP-EZX-120
Transceiver Type		Multi-Mode		Multi-Mode		Single-Mode	Single-Mode	Single-Mode	Single-Mode	Single-Mode	Single-Mode
Fiber Cable Type		OM1	OM2	OM2	OM1	G.652	G.652	G.652	G.652	G.652	G.652
Typical Distance		300 m	550 m	1 km	2 km	10 km	30 km	40 km	80 km	110 km	120 km
Wave-length	Typical (nm)	850		1310		1310	1310	1310	1550	1550	1550
	TX Range (nm)	830 to 860		1270 to 1355		1280 to 1355	1280 to 1355	1280 to 1340	1530 to 1570	1530 to 1570	1530 to 1570
	RX Range (nm)	770 to 860		1260 to 1610		1260 to 1610	1260 to 1610	1260 to 1610	1260 to 1610	1260 to 1610	1100 to 1600
Optical Power	TX Range (dBm)	-4 to -9.5		-1 to -9		-3 to -9	-3 to -8	+3 to -4	+5 to 0	+5 to 0	+3 to -2
	RX Range (dBm)	0 to -18		-1 to -19		-3 to -21	-3 to -23	-1 to -24	-1 to -24	-9 to -30	-8 to -33
	Link Budget (dB)	8.5		10		12	15	20	24	30	31
	Dispersion Penalty (dB)	4.3	3.6	5	5	1	1	1	1	1	2

Note: When connecting the SFP-LHX, ZX, EZX, or EZX-120, we recommended using an attenuator to prevent the transceiver from being damaged by excessive optical power.

		WDM Gigabit Ethernet SFP					
		SFP-10A	SFP-10B	SFP-20A	SFP-20B	SFP-40A	SFP-40B
Transceiver Type		Single-Mode		Single-Mode		Single-Mode	
Fiber Cable Type		G.652		G.652		G.652	
Typical Distance		10 km		20 km		40 km	
Wave-length	Typical (nm)	TX 1310, RX 1550	TX 1550, RX 1310	TX 1310, RX 1550	TX 1550, RX 1310	TX 1310, RX 1550	TX 1550, RX 1310
	TX Range (nm)	1270 to 1355	1530 to 1570	1270 to 1355	1530 to 1570	1290 to 1330	1530 to 1570
	RX Range (nm)	1480 to 1580	1260 to 1360	1480 to 1580	1260 to 1360	1480 to 1580	1260 to 1360
Optical Power	TX Range (dBm)	-3 to -9		-2 to -8		+2 to -3	
	RX Range (dBm)	-3 to -21		-2 to -23		-1 to -23	
	Link Budget (dB)	12		15		20	
	Dispersion Penalty (dB)	2		3		1	

Note: WDM-type SFP modules must be used in pairs (e.g., SFP-1G10ALC and SFP-1G10BLC)
Note: When connecting the SFP-40A and 40B, we recommend using an attenuator to prevent damage caused by excessive optical power.

Typical Distance: To reach the typical distance of specified fiber transceiver, please refer to formula: Link budget(dB) > dispersion penalty(dB) + total link loss(dB).

Power Requirements
Power Consumption: Max. 1 W

Environmental Limits
Operating Temperature:
Standard Models: 0 to 60°C (32 to 140°F)
Wide Temp. Models: -40 to 85°C (-40 to 185°F)
Storage Temperature: -40 to 85°C (-40 to 185°F)
Ambient Relative Humidity: 5 to 95% (non-condensing)

Standards and Certifications
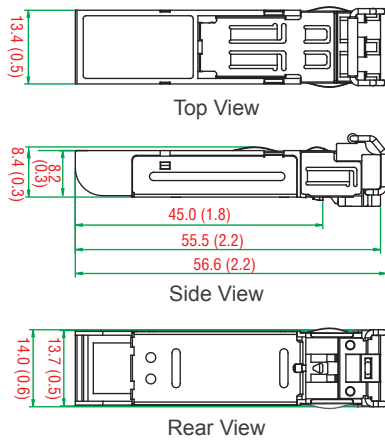**Safety:** CE, FCC, TÜV (EN 60825), UL 60950-1
Marine: DNV, GL

Warranty
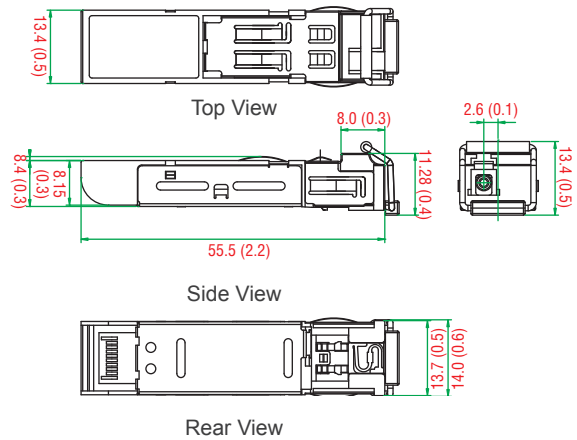**Warranty Period:** 5 years
Details: See www.moxa.com/warranty

Dimensions

Unit: mm (inch)

SFP-1G Series

Top View
Side View
Rear View

45.0 (1.8)
55.5 (2.2)
56.6 (2.2)
13.4 (0.5)
8.4 (0.3)
8.2
13.4 (0.5)
6.3 (0.2)
14.0 (0.6)
13.7 (0.5)

SFP-1G Series (WDM Type)

Top View
Side View
Rear View

55.5 (2.2)
13.4 (0.5)
8.4 (0.3)
8.15 (0.3)
8.0 (0.3)
11.28 (0.4)
2.6 (0.1)
13.4 (0.5)
14.0 (0.6)
13.7 (0.5)

: Ordering Information

Gigabit Ethernet SFP Models				WDM Gigabit Ethernet SFP Models			
Standard Temperature Models (0 to 60˚C)	Wide Temperature Models (-40 to 85˚C)	Transeiver Type	Typical Distance	Standard Temperature (0 to 60˚C)	Wide Temperature (-40 to 85˚C)	Transeiver Type	Typical Distance
SFP-1GSXLC	SFP-1GSXLC-T*	Multi-Mode	300/550 m	SFP-1G10ALC	SFP-1G10ALC-T	Single-Mode	10 Km
SFP-1GLSXLC	SFP-1GLSXLC-T	Multi-Mode	1/2 Km	SFP-1G10BLC	SFP-1G10BLC-T	Single-Mode	10 Km
SFP-1GLXLC	SFP-1GLXLC-T	Single-Mode	10 Km	SFP-1G20ALC	SFP-1G20ALC-T	Single-Mode	20 Km
SFP-1GLHLC	SFP-1GLHLC-T	Single-Mode	30 Km	SFP-1G20BLC	SFP-1G20BLC-T	Single-Mode	20 Km
SFP-1GLHXLC	SFP-1GLHXLC-T	Single-Mode	40 Km	SFP-1G40ALC	SFP-1G40ALC-T	Single-Mode	40 Km
SFP-1GZXLC	SFP-1GZXLC-T	Single-Mode	80 Km	SFP-1G40BLC	SFP-1G40BLC-T	Single-Mode	40 Km
SFP-1GEZXLC	–	Single-Mode	110 Km	–	–	–	–
SFP-1GEZXLC-120	–	Single-Mode	120 Km	–	–	–	–

*SFP-1GSXLC-T: -20 to 75˚C operating temperature

Available Models
Please refer to the Moxa Ethernet SFP Transceiver Products Compatibility Matrix on the next page for available models.

Package Checklist
- SFP-1G module
- Warranty card

MOXA®

SFP-1FE Series

1-port Fast Ethernet SFP modules

> Digital Diagnostic Monitor Function
> IEEE 802.3u compliant
> Differential PECL inputs and outputs
> TTL signal detect indicator
> Hot pluggable LC duplex connector
> Class 1 laser product; complies with EN 60825-1

: Specifications

Interface
Ethernet Ports: 1
Connectors: Duplex LC Connector

Optical Fiber

	Fast Ethernet SFP			
	SFP-M		SFP-S	SFP-L
Transceiver Type	Multi-Mode		Single-Mode	Single-Mode
Fiber Cable Type	OM1/OM2	62.5/125, 50/125 µm	G.652	G.652
		800 MHz*Km		
Typical Distance	2 km	4 km	40 km	80 km
Wave-length	Typical (nm)	1310		1310	1550
	TX Range (nm)	1280 to 1340		1280 to 1340	1530 to 1570
	RX Range (nm)	1100 to 1650		1100 to 1600	1100 to 1600
Optical Power	TX Range (dBm)	-8 to -18		0 to -5	0 to -5
	RX Range (dBm)	-3 to -32		-3 to -34	-3 to -34
	Link Budget (dB)	14		29	29
	Dispersion Penalty (dB)	2	3	1	1

Note: When connecting the SFP-S or L, we recommend using an attenuator to prevent damage caused by excessive optical power.

Power Requirements
Power Consumption: Max. 1 W

Environmental Limits
Operating Temperature: -40 to 85°C (-40 to 185°F)
Storage Temperature: -40 to 85°C (-40 to 185°F)
Ambient Relative Humidity: 5 to 95% (non-condensing)

Standards and Certifications
Safety: CE, FCC, TÜV, UL 60950-1
Marine: DNV, GL

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

Dimensions

Unit: mm (inch)

13.4 (0.5)

Top View

8.4 (0.3)
8.2 (0.3)
45.0 (1.8)
55.5 (2.2)
56.6 (2.2)

13.4 (0.5)
6.3 (0.2)

Side View

14.0 (0.6)
13.7 (0.5)

Rear View

: Ordering Information

Available Models	Port Interface		
Wide Temperature (-40 to 85°C)	100BaseFX, Multi-Mode, LC Connector, 4 km	100BaseFX, Single-Mode, LC Connector, 40 km	100BaseFX, Single-Mode, LC Connector, 80 km
SFP-1FEMLC-T	1	–	–
SFP-1FESLC-T	–	1	–
SFP-1FELLC-T	–	–	1

Available Models
Please refer to the Moxa Ethernet SFP Transceiver Products Compatibility Matrix on the next page for available models.

Package Checklist
- SFP-1FE module
- Warranty card