RGS-PR9000 Series

RGS-PR9000 Series

Industrial Layer-3 IEC 61850-3 modular rack mount managed Gigabit Ethernet switch with 4 slots

Features

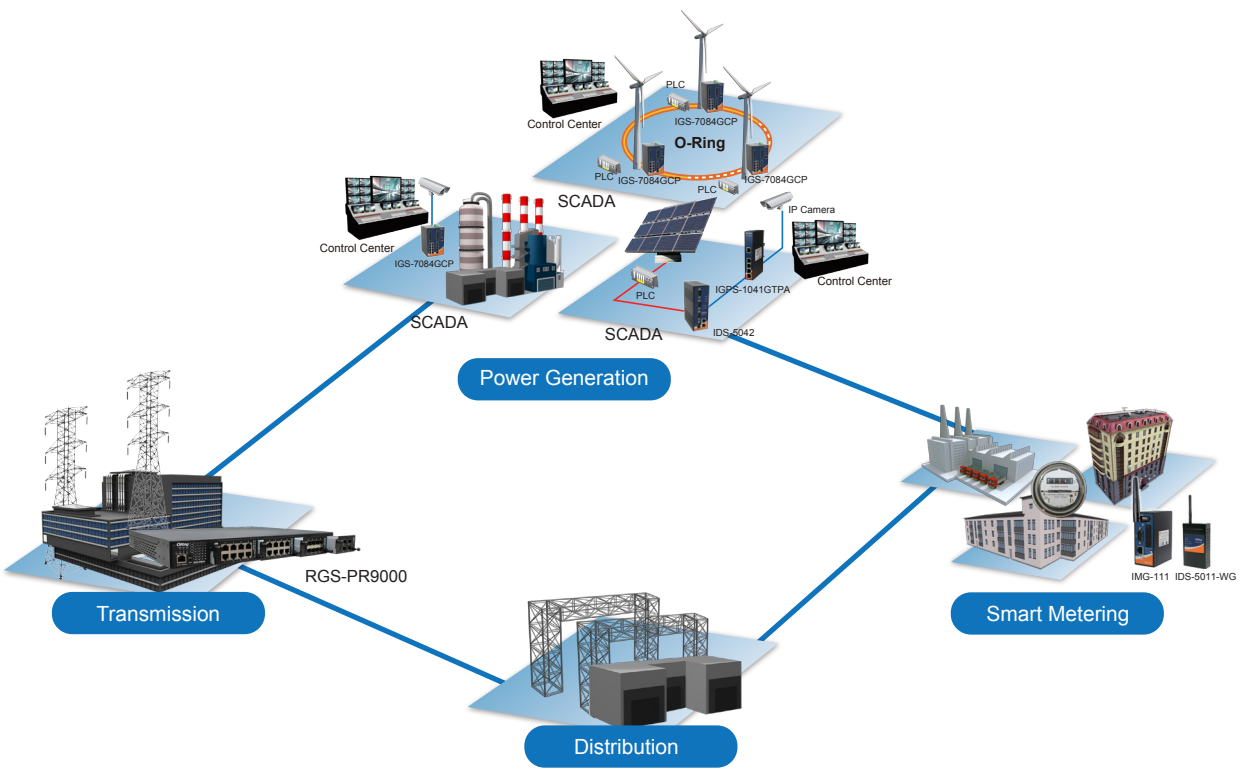
- Designed for power substation / Railway application and fully compliant with the requirement of IEC 61850-3 and IEEE 1613
- Modular designed makes network planning easy
- Supports Layer 3 routing, RIP and static routing function
- Supports O-Ring (recovery time < 30ms over 250 units of connection) and MSTP (RSTP/STP compatible) for Ethernet Redundancy
- O-Chain allow multiple redundant network rings
- Support standard IEC 62439-2 MRP*NOTE (Media Redundancy Protocol) function
- Support IEEE 1588v2 clock Synchronization
- Supports IPV6 new internet protocol version
- Support Modbus TCP protocol
- VLAN unaware : Supports priority-tagged frames to be received by specific IEDs
- Provided HTTPS/SSH protocol to enhance network security
- Support IEEE 802.3az Energy-Efficient Ethernet technology
- Supports SMTP client and SNTP server protocol
- Supports IP-based bandwidth management
- Supports application-based QoS management
- Supports Device Binding security function
- Supports DOS/DDOS auto prevention
- IGMP v2/v3 (IGMP snooping support) for filtering multicast traffic
- Supports SNMP v1/v2c/v3 & RMON & 802.1Q VLAN Network Management
- Supports port mirror function to monitor port data
- Support ACL and 802.1x User Authentication for security
- Supports 10K Bytes Jumbo Frame
- Multiple notification for warning of unexpected event
- Web-based ,Telnet, Console (CLI), and Windows utility (Open-Vision) configuration
- Support LLDP Protocol
- Support DBU-01 backup unit device to quickly backup/restore configuration
- Supports redundant power inputs with optional voltage range
- 19 inches rack mountable design

*NOTE: This function is available by request only

Introduction

RGS-PR9000 is Layer-3 modular managed redundant ring Ethernet switch with 4 slots. The switch is designed for power substation application and rolling stock application, fully compliant with the requirement of IEC 61850-3 and IEEE 1613. With completely support of Ethernet Redundancy protocol, **O-Ring** (recovery time < 30ms over 250 units of connection) and MSTP (RSTP/STP compatible) can protect your mission-critical applications from network interruptions or temporary malfunctions with its fast recovery technology. And support wide operating temperature from -40 to 85°C **(If use 10G SFP module then operating temperature is -20 ~ 60°C)**. RGS-PR9000 can also be managed centralized and convenient by Open-Vision, as well as the Web-based interface, Telnet and console (CLI) configuration. Therefore, the switch is one of the most reliable choice for highly-managed and Fiber Ethernet power substation and rolling stock application.

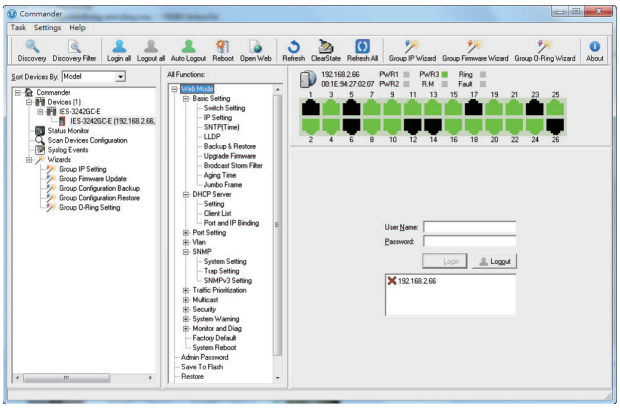
- **O-Ring** : O-Ring is ORing's proprietary redundant ring technology, with recovery time of less 30 milliseconds and up to 250 nodes. The O-Ring redundant ring technology can protect mission-critical application from network interruptions or temporary malfunction with its fast recover technology.
- **O-Chain** : O-Chain is the revolutionary network redundancy technology that provides the add-on network redundancy topology for any backbone network, O-Chain allows multiple redundant network rings of different redundancy protocols to join and function together as a larger and more robust compound network topology. O-Chain providing ease-of-use while maximizing fault-recovery swiftness, flexibility, compatibility, and cost-effectiveness in one set of network redundancy topology.
- **MRP*NOTE** : Media Redundancy Protocol (MRP) is a data network protocol standardized by the IEC 62439-2. It allows rings of Ethernet switches to overcome any single failure with recovery time much faster than achievable with Spanning Tree Protocol.
- **IP-based Bandwidth Management** : The switch provide advanced IP-based bandwidth management which can limit the maximum bandwidth for each IP device. User can configure IP camera and NVR with more bandwidth and limit other device bandwidth.
- **Application-Based QoS** : The switch also support application-based QoS. Application-based QoS can set highest priority for data stream according to TCP/UDP port number.
- **Device Binding Function** : ORing special Device Binding function can only permit allowed IP address with MAC address to access the network. Hacker cannot access the IP surveillance network without permission. It can avoid hacker from stealing video privacy data and attacking IP camera, NVR and controllers.
- **Advanced DOS/DDOS Auto Prevention** : The switch also provided advanced DOS/DDOS auto prevention. If there is any IP flow become big in short time, the switch will lock the source IP address for certain time to prevent the attack. It's hardware based prevention so it can prevent DOS/DDOS attack immediately and completely.
- **Modbus TCP** : This is a Modbus variant used for communications over TCP/IP networks.
- **IEEE 802.3az Energy-Efficient Ethernet** : This is a set of enhancements to the twisted-pair and backplane Ethernet family of networking standards that will allow for less power consumption during periods of low data activity. The intention was to reduce power consumption by 50% or more.
- **IEEE 1588v2 Technology** : The IEEE 1588v2 technology can fulfill precision time synchronization requirements for protection and control applications.
- **Modular Designed** : Modular designed can makes network planning easy and allow greater flexibility by letting you install other Ethernet/Optical fiber modular.



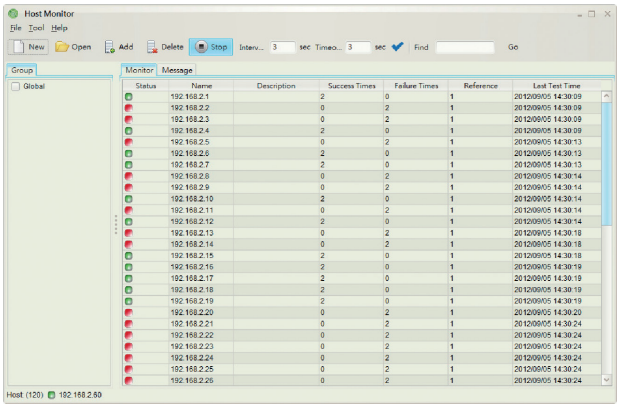
*NOTE: This function is available by request only

Open-Vision

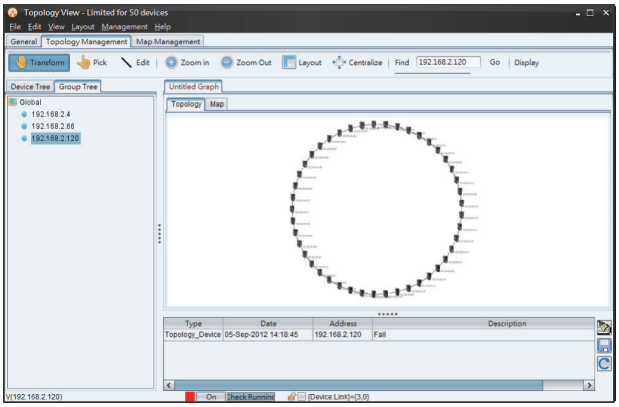
ORing's switches are intelligent switches. Different from other traditional redundant switches, ORing provides a set of Windows utility (Open-Vision) for user to manage and monitor all of industrial Ethernet switches on the industrial network.



Commander

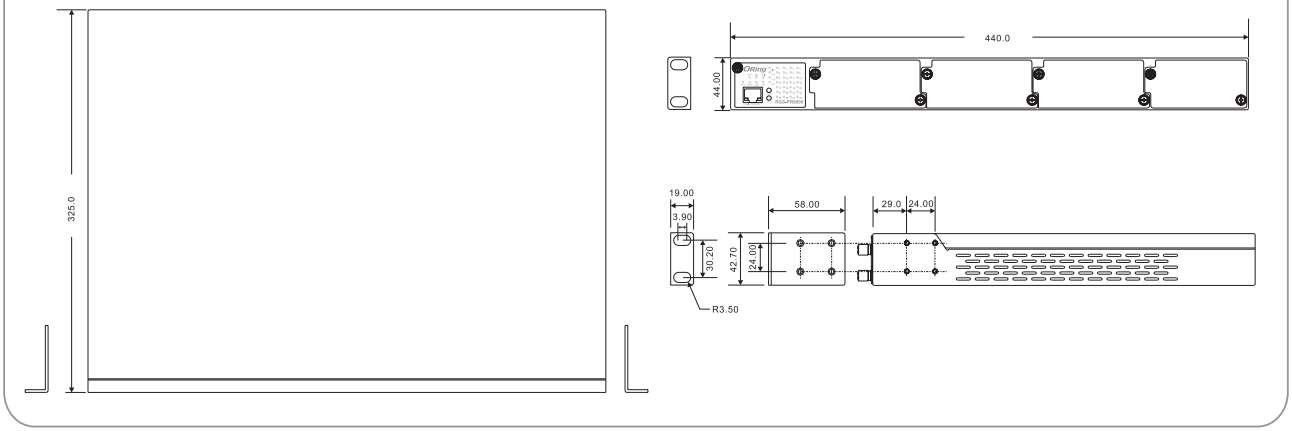


Host Monitor



Topology View

Dimensions



(Unit=mm)

Specifications

ORing Switch Model	RGS-PR9000-LV	RGS-PR9000-HV
Physical Ports		
Slot Number	4 (up to 3 slots for 8x1G ports and 1 slot for 4x10G port)	
Technology		
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 802.1w 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)	
MAC Table	32k	
Packet Buffer	32Mbits	
Flash Memory	128Mbits	
DRAM Size	1Gbits	
Jumbo frame	Up to 10K Bytes	
Priority Queues	8	
Processing	Store-and-Forward	
Switch Properties	Switching latency: 7 us Switching bandwidth: 128Gbps Max. Number of Available VLANs: 4095 VLAN ID range: VID 1 to 4094 IGMP multicast groups: 128 for each VLAN Port rate limiting: User Define	
Security Features	Device Binding security feature Enable/disable ports, MAC based port security Port based network access control (802.1x) MAC-based authentication MAC address limit 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	
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 Registration Protocol (MRP) MSTP (RSTP/STP compatible) Redundant Ring (O-Ring) with recovery time less than 30ms TOS/Diffserv supported Quality of Service (802.1p) for real-time traffic VLAN (802.1Q) with VLAN tagging GVRP 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/Relay Modbus TCP SMTP Client SNTP server Firmware upgrade and configuration backup and restore	
Network Redundancy	O-Ring O-Chain MRP*NOTE MSTP (RSTP/STP compatible)	

***NOTE: This function is available by request only**

RS-232 Serial Console Port	RS-232 in RJ-45 connector with console cable. 115200bps, 8, N, 1		
Technology			
System Ready Indicator (PWR)	Green : Indicates that the system ready. The LED is blinking when the system is upgrading firmware		
Power Indicator (PWR1 / PWR2)	Green : Power LED x 2		
Ring Master Indicator (R.M.)	Green : Indicates that the system is operating in O-Ring Master mode		
O-Ring Indicator (Ring)	Green : Indicates that the system operating in O-Ring mode Green Blinking : Indicates that the Ring is broken.		
Fault Indicator (Fault)	Amber : Indicate unexpected event occurred		
Reset To Default Running Indicator (DEF)	Green : System resets to default configuration		
Supervisor Login Indicator (RMT)	Green : System is accessed remotely		
Smart LED Display system	Link/Act(LINK) / Speed(SPD) / Duplex(FDX) / Remote (RMT) green LED indicator x 4 Mode select Button (MODE) : Link/Act(LINK) / Speed(SPD) / Duplex(FDX) / Remote (RMT) mode select button Port 1 ~ 28 Link/Act(LK/ACT) LED show : Green x 28		
Fault Contact			
Relay	Relay output to carry capacity of 1A at 24VDC		
Power			
Redundant power input modular	Dual 24/48VDC (24~72VDC) power inputs at terminal block (Note 2)		Dual 100~240VAC / 100~370VDC power inputs at terminal block
Power consumption (Typ.)	46Watts max.		43.5Watts max.
Overload current protection	Present		
Physical Characteristic			
Enclosure	19 inches rack mountable		
	IP-30		
Weight (g)	6,450g		6,600g
Dimension (W x D x H)	440 (W) x 325 (D) x 44 (H) mm (17.32x12.8x1.73 inch)		
MTBF(mean time between failures)			
Time	246,537hrs (Note 1)		316,958hrs (Note 1)
Environmental			
Storage Temperature	-40 to 85°C (-40 to 185°F)		
Operating Temperature	24VDC~36VDC	10G SFP+ module absent : -40 to 75°C 10G SFP+ module used: -20 to 50 °C	10G SFP+ module absent : -40 to 85°C 10G SFP+ module used: -20 to 60°C
	36VDC~72VDC	10G SFP+ module absent : -40 to 85°C 10G SFP+ module used: -20 to 60 °C	
Operating Humidity	5% to 95% Non-condensing		
Regulatory Approvals			
Power Automation	IEC 61850-3, IEEE 1613		
EMI	FCC Part 15, CISPR (EN55022) class A,		
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		
EMC	EN50121-4 (EN50121-1)		
Safety	UL 60950-1		
Transport	NEMA TS1&TS2		
Warranty	5 years		

Note 1: The value is calculated under the combination of 3 SWM-80GT and 1 SWM-04GP+ module.
Note 2: Different DC power input have different operating temperature.

Ordering Information

	Model Name	Description
Available Model	RGS-PR9000-LV	Industrial Layer-3 IEC 61850-3 modular rack mount managed Gigabit Ethernet switch with 4 slots, low-voltage power input
	RGS-PR9000-HV_US	Industrial Layer-3 IEC 61850-3 modular rack mount managed Gigabit Ethernet switch with 4 slots, high-voltage power input, US power cord
	RGS-PR9000-HV_UK	Industrial Layer-3 IEC 61850-3 modular rack mount managed Gigabit Ethernet switch with 4 slots, high-voltage power input, UK power cord
	RGS-PR9000-HV_EU	Industrial Layer-3 IEC 61850-3 modular rack mount managed Gigabit Ethernet switch with 4 slots, high-voltage power input, EU power cord
	RGS-PR9000-HV_JP	Industrial Layer-3 IEC 61850-3 modular rack mount managed Gigabit Ethernet switch with 4 slots, high-voltage power input, JP power cord
	RGS-PR9000-HV_AU	Industrial Layer-3 IEC 61850-3 modular rack mount managed Gigabit Ethernet switch with 4 slots, high-voltage power input, AU power cord

Packing List

- RGS-PR9000 x 1
- Rack-mount Kit x 1
- ORing Tool CD x 1
- Console Cable x 1
- Quick Installation Guide x 1

Optional Accessories (Can be purchased separately)

- Open-Vision M500 : Powerful Network Management Windows Utility Suit, 500 IP devices
- SFP100 series : 100Mbps SFP optical transceiver
- SFP 1G series : 1Gbps SFP optical transceiver
- SFP 10G series : 10Gbps SFP optical transceiver
- DR-75 series : 75 Watts DIN-Rail power supply
- DR-120 series : 120 Watts DIN-Rail power supply
- DBU-01 : backup unit device

Optional Module

For 10G slot:

SWM-02GP+_4

Industrial 2-port 10G SFP+ module with 2x10GBase-X, SFP+ socket

For 10G slot:

SWM-04GP+_4

Industrial 4-port 10G SFP+ module with 4x10GBase-X SFP+ ports

For 10G slot:

SWM-04GP_4

Industrial 4-port Gigabit fiber module with 4x1GBase-X SFP ports

For 10G slot:

SWM-04GF-MM/SS-SC_4

Industrial 4-port Gigabit fiber module with 4x1000Base-FX SC Fiber ports

For 10G slot:

SWM-04GF-MM/SS-ST_4

Industrial 4-port Gigabit fiber module with 4x1000Base-FX ST Fiber ports

For 1G slot:

SWM-80GT

Industrial 8-port Gigabit Ethernet switch module with 8x10/100/1000Base-T(X) ports

For 1G slot:

SWM-08GP

Industrial 8-port Gigabit fiber module with 8x100/1000Base-X, SFP socket

For 1G slot:

SWM-04GF-MM/SS-SC

Industrial 4-port Gigabit fiber module with 4x1000Base-FX SC Fiber ports

For 1G slot:

SWM-04FX-MM/SS-SC

Industrial 4-port fiber module with 4x100Base-FX SC Fiber ports

For 1G slot:

SWM-04GF-MM/SS-ST

Industrial 4-port Gigabit fiber module with 4x1000Base-FX ST Fiber ports

For 1G slot:

SWM-04FX-MM/SS-ST

Industrial 4-port fiber module with 4x100Base-FX ST Fiber ports

For 1G slot:

SWM-60GT-M12

Industrial 6-port Gigabit Ethernet switch module with 6x10/100/1000Base-T(X), M12 connector

For 1G slot:

SWM-40GT-M12

Industrial 4-port Gigabit Ethernet switch module with 4x10/100/1000Base-T(X), M12 connector