V1.2



IGS-P9164 Series

Managed Cyber-hardened IEC 61850-3 20-port managed Gigabit Ethernet switch

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Features

- Developed according to IEC 62443-4-1 and certified with the IEC 62443-4-2 industrial cybersecurity standards.
- Designed for power substation / Railway application and fully compliant with the requirement of IEC 61850-3 and IEEE 1613
- Support O-Ring (recovery time < 30ms over 250 units of connection) and MSTP(RSTP/STP compatible) for Ethernet Redundancy
- Open-Ring support the other vendor's ring technology in open architecture
- O-Chain allow multiple redundant network rings
- Support standard IEC 62439-2 MRP (Media Redundancy Protocol) function
- Support IEEE 1588v2 clock Synchronization
- Support IPV6 new internet protocol version
- Support Modbus TCP protocol
- Provided HTTPS/SSH protocol to enhance network security
- Support IEEE 802.3az Energy-Efficient Ethernet technology
- Support SMTP client and NTP server protocol
- Support IP-based bandwidth management
- Support application-based QoS management
- Support Device Binding security function
- Support DOS/DDOS auto prevention
- IGMP v2/v3 (IGMP snooping support) for filtering multicast traffic
- > Support SNMP v1/v2c/v3 & RMON & 802.1Q VLAN Network Management
- Support ACL, TACACS+ and 802.1x User Authentication for security
- Support 9.6K Bytes Jumbo Frame
- Support DBU-01 backup unit to quickly backup/restore configuration
- Built-in MMS server and IEC 61850 QoS
- Support DBU-01 backup unit device to quickly backup/restore configuration
- Web-based ,Telnet, Console (CLI), and Windows utility (Open-Vision) configuration
- Support LLDP Protocol
- Rigid IP-30 housing design
- DIN-Rail and wall mounting enabled













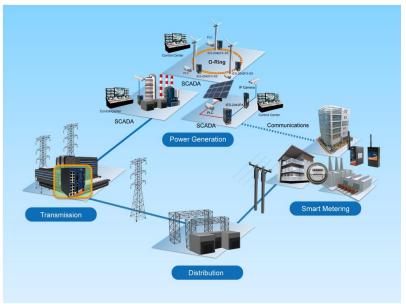


Introduction

IGS-P9164 series are IEC 61850-3 managed redundant ring Ethernet switches. These switches are designed for power substation application and rolling stock application, fully compliant with the requirement of IEC 61850-3 and IEEE 1613. IGS-P9164GF series are IEC 61850-3 managed redundant ring Ethernet switch with 16x10/100/1000Base-T(X) ports and 4x1000Base-X optical fiber port with SC connector. IGS-P9164FX series are IEC 61850-3 managed redundant ring Ethernet switch with 16x10/100/1000Base-T(X) ports and 4x100Base-FX optical fiber port with SC connector. IGS-P9164GC series are IEC 61850-3 managed redundant ring Ethernet switch with 16x10/100/1000Base-T(X) ports and 4xGigabit combo ports with SFP socket. 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

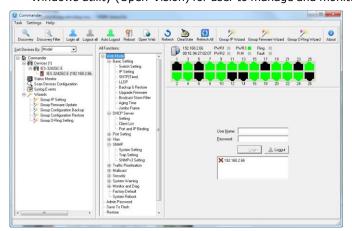
from -40 °C to 85 °C. IGS-P9164GF(X) series can also be managed centralized and convenient by Open-Vision, Except the Web-based interface, Telnet and console (CLI) configuration. Therefore, the switch is one of the most reliable choice for highly-managed and Fiber Ethernet application.

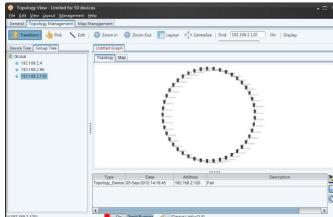
- O-Ring: O-Ring is ORing's proprietary redundant ring technology, with recovery time of less 30 milliseconds and up to 250 nodes. The O-Ring redundant ring technology can protect mission-critical application from network interruptions or temporary malfunction with its fast recover technology.
- Open-Ring: Open-Ring is an enhanced redundant technology that makes ORing's switches compatible with other vendor's proprietary redundant ring technologies. It enables ORing's switches to form a single ring with other vendor's switch. In cases where the ring is setup using proprietary technology, ORing offers a compatibility service where ORing can make its switches compatible with your particular network requirements.
- 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: Media Redundancy Protocol (MRP*NOTE) 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.
- <u>Application-Based QoS</u>: 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.
- **IEEE 1588 Technology :** The IEEE 1588 technology can fulfill precision time synchronization requirements for protection and control applications.
- 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.



Open-Vision

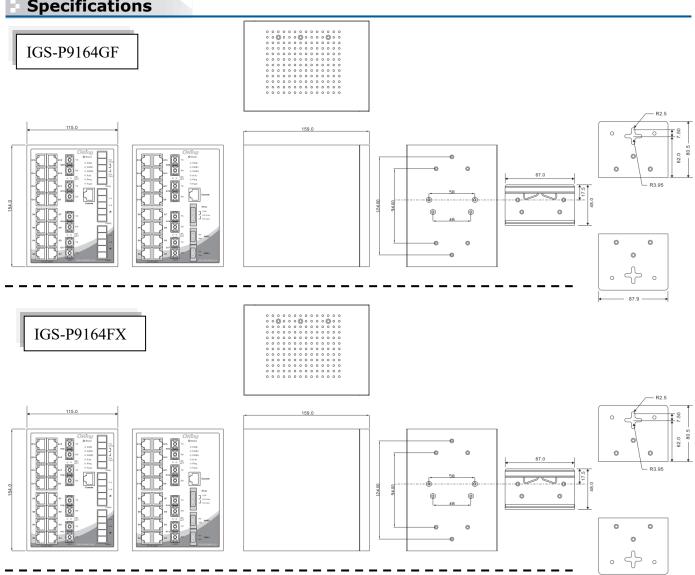
ORing's switches are intelligent switches. Different from other traditional redundant switches, ORing provides a set of Windows utility (Open-Vision) for user to manage and monitor all of industrial Ethernet switches on the industrial network.

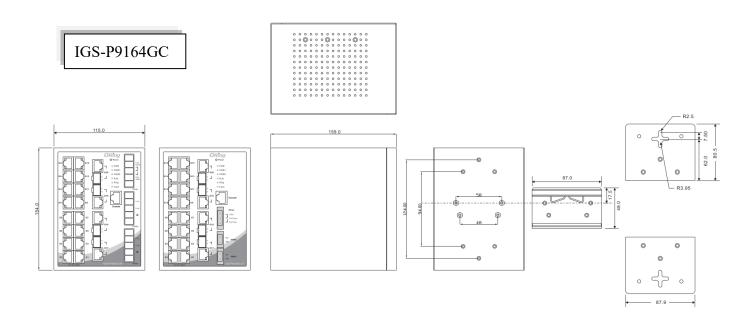




Topology View Commander







Specifications

ORing Switch Model		IGS-P9164GF-MM	IGS-P9164FX-MM	IGS-P9164GF-SS	IGS-P9164FX-SS	IGS-P9164GC
P	hysical Ports					
10/100/1000Base-T(X) Ports in RJ45 Auto MDI/MDIX		16				
10	igabit Combo Port with 0/100/1000Base-T(X) and 00/1000Base-X SFP Port		-			4
	Fiber Ports Number		-			
	Fiber Ports Standard	1000Base-SX	100Base-FX	1000Base-LX	100Base-FX	-
	Fiber Mode	Multi-mode	Multi-mode	Single-mode	Single-mode	-
	Fiber Diameter (μm)	62.5/125 μm @ 50/125 μm	62.5/125 μm 50/125 μm	9/125 μm	9/125 μm	-
ation	Fiber Optical Connector	SC	SC	SC	SC	-
Specification	Typical Distance (Km)	0.55 Km	2 Km	10 Km	30 Km	-
ts Sp	Wavelength (nm)	850 nm	1310 nm	1310 nm	1310 nm	-
Fiber Ports	Max. Output Optical Power (dbm)	-4 dbm	-14 dbm	-3 dbm	-8 dbm	-
	Min. Output Optical Power (dbm)	-9.5 dbm	-23.5 dbm	-9.5 dbm	-15 dbm	-
	Max. Input Optical Power (Saturation)	0 dbm	0 dbm	-3 dbm	0 dbm	-
	Min. Input Optical Power (Sensitivity)	-18 dbm	-31 dbm	-20 dbm	-34 dbm	-
	Link Budget (db)	8.5 db	7.5 db	10.5 db	19 db	-
To	echnology					
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 802.3x for Flow control IEEE 802.3ad for LACP (Link Aggregation Control Protocol) IEEE 802.1p for COS (Class of Service) IEEE 802.1 for VI AN Tagging				
		IEEE 802.1Q for VLAN Tagging IEEE 802.1w for RSTP (Rapid Spanning Tree Protocol)				

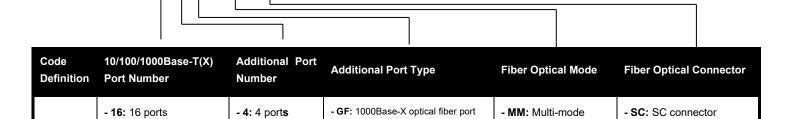
1000Base-X Fiber Port Indicator Green for port Link/Act. (for IGS-P9164GF series) 100Base-FX Fiber Port Indicator Green for port Link/Act. (for IGS-P9164GFX series) 100/1000Base-X SFP Port Indicator Green for port Link/Act. (for IGS-P9164GC series) Fault contact Relay Relay output to carry capacity of 1A at 24VDC on 3-pin terminal block Power Redundant Input power LV model: Dual power inputs with 12~48VDC on dual 2-pin terminal block HV model: Dual100-240(85~264) VAC /125~300(88~300) VDC power inputs at terminal block		IEEE 802.1s for MSTP (M	Multiple Spanning Tree Pro	cocol)		
MAC Table Packet Suffer Affects Processing Sectional Affects Processing Sectional Section Affects Section Sect						
Pecies Euffor Priority Queues Processing Some-and-Forward			Link Layer Discovery Proto	ocol)		
Priority Obeless Processing Store- and-forward Switching later(c): 7 us Juntho frame Usua And Runger Durksat croups: 128 for each VLAN Put rate limitarity. 2 user Define Juntho frame Usp 10 66 66 Write. Derice Britishing security Feature Enable disable ports, McC based port security. Per based network access control (620-12). VLAN (021-10) to sugregate and secours network traffic Radius certrateries access security. Hittle; 55th enable reasoned security. Hittle; 55th enable re						
Switching browned Switching Interfere, 7 US. Switching bandwidth: 40(5)ps. Switching Properties Switching Properties Was Number of Narableb VAMS: 40(5) VAM 10 Bange : VTD 1 to 40(8) LOW multicast organis; 126 for each VLAN Port rate limiting; User Define Devar Bindings security Freature Final-legislative ports, MAC based port security Port based intervoirs access control (60(2.1s)) VAM (60(2.1c) to segregate and secure network security Port based intervoirs access control (60(2.1s)) VAM (60(2.1c) to segregate and secure network security Port based intervoirs access control (60(2.1s)) VAM (60(2.1c) to segregate and secure network security Port based intervoirs access control (60(2.1s)) VAM (60(2.1c) to segregate and secure network security Port based intervoirs access control (60(2.1s)) Port based intervoirs access security						
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Redundant Ring (O-Ring) with recovery time less than 30ms over 250 units TOS/Diffserv supported Quality of Service (80.2.1p) for real-time traffic VLAN (80.2.1c) with VLAN tagging and GVRP supported IGNP Snooping IP-based bandwidth management Application-based QS management DOS/DDOS auto prevention Port configuration, status, statistics, monitoring, security DHCP Server/Client/Relay SMTP Client Modbus TCP NTP server O-Ring Open-Ring Open-Rin						
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P-based bandwidth management				orted		
Application-based QoS management DOS/DDOS auto prevention Port configuration, status, statistics, monitoring, security DHCP Server/Client/Relay SMTP Client Modbus TCP NTP server O-Ring Open-Ring O-Chain MRP *NOTE Fast Recovery MSTP (RSTP/STP compatible) RS-232 Serial Console Port RS-232 in RJ45 connector with console cable. 115200bps, 8, N, 1 LED indicators Power Indicator Green : Power LED x 3 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 10/100/1000Base-T(X) RJ45 POrt Indicator Dual color LED for speed indicator : Green for 100Mbps indicator / Amber for 100Mbps indicator / Off light for 10Mbps indi 100Base-RX Fiber Port Indicator Green for port Link/Act. (for IGS-P9164GF series) 100Base-RX Fiber Port Indicator Green for port Link/Act. (for IGS-P9164GF series) Fault contact Relay Relay output to carry capacity of 1A at 24VDC on 3-pin terminal block HV model : Dual100-240(85~264) VAC /125~300(88~300) VDC power inputs at terminal block HV model : Dual100-240(85~264) VAC /125~300(88~300) VDC power inputs at terminal block		IGMP Snooping				
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MSTP (RSTP/STP compatible) RS-232 Serial Console Port RS-232 in R345 connector with console cable. 115200bps, 8, N, 1 LED indicators Power Indicator Green: Power LED x 3 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 10/100/1000Base-T(X) R345 Port Indicator Green for Link/Act indicator. Dual color LED for speed indicator: Green for 1000Mbps indicator / Amber for 100Mbps indicator / Off light for 10Mbps indicator / Indicator Green for port Link/Act. (for IGS-P9164GF series) 100Base-FX Fiber Port Indicator Green for port Link/Act. (for IGS-P9164GFX series) 100/1000Base-X SFP Port Indicator Green for port Link/Act. (for IGS-P9164GC series) Fault contact Relay Relay output to carry capacity of 1A at 24VDC on 3-pin terminal block Power Redundant Input power LV model: Dual power inputs with 12~48VDC on dual 2-pin terminal block HV model: Dual100-240(85~264) VAC /125~300(88~300) VDC power inputs at terminal block						
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100/1000Base-X SFP Port Indicator Green for port Link/Act. (for IGS-P9164GC series) Fault contact Relay Relay output to carry capacity of 1A at 24VDC on 3-pin terminal block Power Redundant Input power LV model: Dual power inputs with 12~48VDC on dual 2-pin terminal block HV model: Dual100-240(85~264) VAC /125~300(88~300) VDC power inputs at terminal block	1000Base-X Fiber Port Indicator					
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Relay Relay output to carry capacity of 1A at 24VDC on 3-pin terminal block Power Redundant Input power LV model: Dual power inputs with 12~48VDC on dual 2-pin terminal block HV model: Dual100-240(85~264) VAC /125~300(88~300) VDC power inputs at terminal block	100/1000Base-X SFP Port Indicator	Green for port Link/Act. (for IGS-P9164GC series)				
Power Redundant Input power LV model: Dual power inputs with 12~48VDC on dual 2-pin terminal block HV model: Dual100-240(85~264) VAC /125~300(88~300) VDC power inputs at terminal block	Fault contact					
Redundant Input power LV model: Dual power inputs with 12~48VDC on dual 2-pin terminal block HV model: Dual100-240(85~264) VAC /125~300(88~300) VDC power inputs at terminal block	Relay	Relay output to carry capacity of 1A at 24VDC on 3-pin terminal block				
Redundant Input power HV model: Dual100-240(85~264) VAC /125~300(88~300) VDC power inputs at terminal block	Power					
1V : 10Watte 1V : 21Watte 1V : 21Watte 1V : 21Watte	Redundant Input power					
Power consumption (Typ.) LV : 18Watts LV : 21Watts LV : 18Watts LV : 18Watts LV : 18Watts HV : 18.5Watts HV : 18.5Watts HV : 19.3Watts HV : 19.3Watts	Power consumption (Typ.)	LV: 18Watts HV: 18.5Watts	LV: 21Watts HV: 20.7Watts	LV: 18Watts HV: 18.5Watts	LV: 21Watts HV: 19.3Watts	LV: 17Watts HV: 18Watts
Overload current protection Present	Overload current protection	Present				
Reverse Polarity Protection Present	Reverse Polarity Protection	Present				

Physical Characteristic						
Enclosure	IP-30					
Dimension (W x D x H)	115 (W) x 159 (D) x 154 (H)mm (4.53 x 6.3 x 6.06 inch)					
Weight (g)	LV Model : 1780 g					
Environmental						
Storage Temperature	-40 to 85°C (-40 to 185°F)					
Operating Temperature	-40 to 85°C (-40 to 185°F)					
Operating Humidity 5% to 95% Non-condensing						
Industrial Cybersecurity	IEC 62443-4-1, IEC 62443-4-2					
EMC	CE EMC (EN55035, EN 55032), IEC 61850-3, IEEE 1613,					
EMI	EN 55022, CISPR32, EN 61000-3-2, EN 61000-3-3, FCC Part 15B class A,					
EMS	(IEC/EN 61000-4-2 (ESD), IEC/EN 61000-4-3 (RS), IEC/EN 61000-4-4 (EFT), IEC/EN 61000-4-5 (Surge), IEC/EN 61000-4-6 (CS), IEC/EN 61000-4-8(PFMF), IEC/EN 61000-4-11(DIP))					
Shock	IEC60068-2-27					
Free Fall	IEC60068-2-31					
Vibration	IEC60068-2-6					
Safety	EN62368					
мтвғ	LV:236,923 LV:224681 LV:196,356 LV:299,365 HV:300,460 HV:281,040 HV:238,082 HV:408,521					
Warranty	5 years					

Ordering Information

Option

IGS-P9AABCC -FF-GG



- FX: 100Base-FX optical fiber port

- GC: Gigabit combo port

- SS: Single-mode

	Model Name	Description
	IGS-P9164FX-MM-SC-LV	Industrial IEC 61850-3 20-port managed Gigabit Ethernet switch with 16x10/100/1000Base-T(X) and 4x100Base-FX, multi-mode, 2Km/1310nm, SC connector, low-voltage power inputs
	IGS-P9164FX-SS-SC-LV	Industrial IEC 61850-3 20-port managed Gigabit Ethernet switch with 16x10/100/1000Base-T(X) and 4x100Base-FX, single-mode, 30Km/1310nm, SC connector, low-voltage power inputs
Available Model	IGS-P9164FX-MM-SC-HV_US	Industrial IEC 61850-3 20-port managed Gigabit Ethernet switch with 16x10/100/1000Base-T(X) and 4x100Base-FX, multi-mode, 2Km/1310nm, SC connector, high-voltage power inputs, US power cord
	IGS-P9164FX-MM-SC-HV_UK	Industrial IEC 61850-3 20-port managed Gigabit Ethernet switch with 16x10/100/1000Base-T(X) and 4x100Base-FX, multi-mode, 2Km/1310nm, SC connector, high-voltage power inputs, UK power cord
	IGS-P9164FX-MM-SC-HV_EU	Industrial IEC 61850-3 20-port managed Gigabit Ethernet switch with 16x10/100/1000Base-T(X) and 4x100Base-FX, multi-mode, 2Km/1310nm, SC connector, high-voltage power inputs, EU power cord

	Industrial IEC 61850-3 20-port managed Gigabit Ethernet switch with 16x10/100/1000Base-T(X)
IGS-P9164FX-MM-SC-HV_JP	and 4x100Base-FX, multi-mode, 2Km/1310nm, SC connector, high-voltage power inputs, JP
	power cord
	Industrial IEC 61850-3 20-port managed Gigabit Ethernet switch with 16x10/100/1000Base-T(X)
IGS-P9164FX-SS-SC-HV_US	and 4x100Base-FX, single-mode, 30Km/1310nm, SC connector, high-voltage power inputs, US
	power cord
100 0040457 00 00 1174 1174	Industrial IEC 61850-3 20-port managed Gigabit Ethernet switch with 16x10/100/1000Base-T(X)
IGS-P9164FX-SS-SC-HV_UK	and 4x100Base-FX, single-mode, 30Km/1310nm, SC connector, high-voltage power inputs, UK
	power cord
100 0040457 00 00 1177 511	Industrial IEC 61850-3 20-port managed Gigabit Ethernet switch with 16x10/100/1000Base-T(X)
IGS-P9164FX-SS-SC-HV_EU	and 4x100Base-FX, single-mode, 30Km/1310nm, SC connector, high-voltage power inputs, EU
	power cord
ICC DOLCATY CO CO LIV. ID	Industrial IEC 61850-3 20-port managed Gigabit Ethernet switch with 16x10/100/1000Base-T(X)
IGS-P9164FX-SS-SC-HV_JP	and 4x100Base-FX, single-mode, 30Km/1310nm, SC connector, high-voltage power inputs, JP
	power cord
IGS-P9164GF-MM-SC-LV	Industrial IEC 61850-3 20-port managed Gigabit Ethernet switch with 16x10/100/1000Base-T(X)
	and 4x1000Base-SX, multi-mode, 550m/850nm, SC connector, low-voltage power inputs
IGS-P9164GF-SS-SC-LV	Industrial IEC 61850-3 20-port managed Gigabit Ethernet switch with 16x10/100/1000Base-T(X)
	and 4x1000Base-LX, single-mode, 10Km/1310nm, SC connector, low-voltage power inputs
100 5040405 1114 00 1114 110	Industrial IEC 61850-3 20-port managed Gigabit Ethernet switch with 16x10/100/1000Base-T(X)
IGS-P9164GF-MM-SC-HV_US	and 4x1000Base-SX, multi-mode, 550m/850nm, SC connector, high-voltage power inputs, US
	power cord
ICC POACACE MM CC LIV LIV	Industrial IEC 61850-3 20-port managed Gigabit Ethernet switch with 16x10/100/1000Base-T(X)
IGS-P9164GF-MM-SC-HV_UK	and 4x1000Base-SX, multi-mode, 550m/850nm, SC connector, high-voltage power inputs, UK
	power cord Industrial IEC 61850-3 20-port managed Gigabit Ethernet switch with 16x10/100/1000Base-T(X)
IGS-P9164GF-MM-SC-HV_EU	and 4x1000Base-SX, multi-mode, 550m/850nm, SC connector, high-voltage power inputs, EU
193-F31049F-WW-3C-HV_E0	power cord
	Industrial IEC 61850-3 20-port managed Gigabit Ethernet switch with 16x10/100/1000Base-T(X)
IGS-P9164GF-MM-SC-HV_JP	and 4x1000Base-SX, multi-mode, 550m/850nm, SC connector, high-voltage power inputs, JP
100 1010401 111111 00 114_01	power cord
	Industrial IEC 61850-3 20-port managed Gigabit Ethernet switch with 16x10/100/1000Base-T(X)
IGS-P9164GF-SS-SC-HV US	and 4x1000Base-LX, single-mode, 10Km/1310nm, SC connector, high-voltage power inputs, US
	power cord
	Industrial IEC 61850-3 20-port managed Gigabit Ethernet switch with 16x10/100/1000Base-T(X)
IGS-P9164GF-SS-SC-HV_UK	and 4x1000Base-LX, single-mode, 10Km/1310nm, SC connector, high-voltage power inputs, UK
	power cord
	Industrial IEC 61850-3 20-port managed Gigabit Ethernet switch with 16x10/100/1000Base-T(X)
IGS-P9164GF-SS-SC-HV_EU	and 4x1000Base-LX, single-mode, 10Km/1310nm, SC connector, high-voltage power inputs, EU
_	power cord
	Industrial IEC 61850-3 20-port managed Gigabit Ethernet switch with 16x10/100/1000Base-T(X)
IGS-P9164GF-SS-SC-HV_JP	and 4x1000Base-LX, single-mode, 10Km/1310nm, SC connector, high-voltage power inputs, JP
	power cord
ICS DO464CC LV	Industrial IEC 61850-3 20-port managed Gigabit Ethernet switch with 16x10/100/1000Base-T(X)
IGS-P9164GC-LV	and 4xGigabit combo ports, SFP socket, low-voltage power inputs
ICC P0464CC 177 116	Industrial IEC 61850-3 20-port managed Gigabit Ethernet switch with 16x10/100/1000Base-T(X)
IGS-P9164GC-HV_US	and 4xGigabit combo ports, SFP socket, high-voltage power inputs, US power cord
ICC DOACACO LIVA LIVA	Industrial IEC 61850-3 20-port managed Gigabit Ethernet switch with 16x10/100/1000Base-T(X)
IGS-P9164GC-HV_UK	and 4xGigabit combo ports, SFP socket, high-voltage power inputs, UK power cord
ICC PO4C4CC LIV ELL	Industrial IEC 61850-3 20-port managed Gigabit Ethernet switch with 16x10/100/1000Base-T(X)
IGS-P9164GC-HV_EU	and 4xGigabit combo ports, SFP socket, high-voltage power inputs, EU power cord
	Industrial IEC 61850-3 20-port managed Gigabit Ethernet switch with 16x10/100/1000Base-T(X)
IGS-P9164GC-HV_JP	and 4xGigabit combo ports, SFP socket, high-voltage power inputs, JP power cord
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Packing List

- IGS-P9164GF(X) or GC x 1
- ORing Tool CD x 1
- Quick Installation Guide x 1

- DIN-Rail Kit x 1
- Wall-mount Kit x 2
- Console Cable x 1

• AC power cord (for HV only)

Optional Accessories

Open-Vision M500 : Powerful Network

Management Windows Utility Suit, 500 IP devices

DR/SDR/DRP Series DIN-Rail power supply