



# TGPS-9164GT-M12 Series

**EN50155 20-port managed Gigabit PoE Ethernet switch with 16x10/100/1000Base-T(X) P.S.E. and 4x10/100/1000Base-T(X), M12 connector**

## Features

- Leading EN50155-compliant Ethernet switch for rolling stock application
- 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
- Supports IEEE 802.3at compliant PoE and total power budget is 240Watts (-24V model) / 480Watts with maximum 30Watts per port
- Support PoE scheduled configuration and PoE auto-ping check function
- Support IEEE 1588v2 clock synchronization
- Support IPV6 new internet protocol version
- Support Modbus TCP protocol
- Support IEEE 802.3az **Energy-Efficient Ethernet** technology
- Provided HTTPS/SSH protocol to enhance network security
- Support SMTP client
- 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
- Supports 9.6K Bytes Jumbo Frame
- Multiple notification for warning of unexpected event
- Web-based ,Telnet, Console (CLI), and Windows utility (**Open-Vision**) configuration
- Support LLDP Protocol
- Provided 2xRelay bypass function with four gigabit ports (-BP2 model)
- Wall mounting enabled



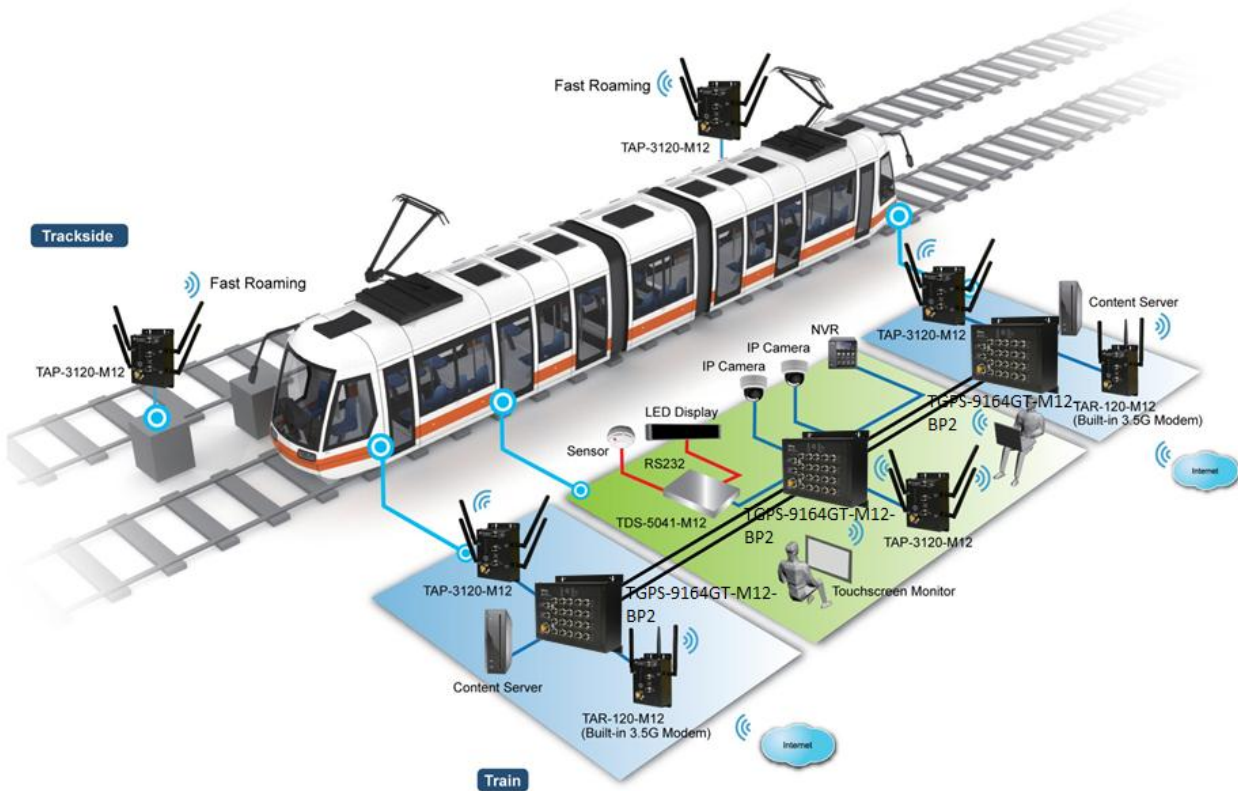
## Introduction

ORing's Transporter™ series managed PoE Ethernet switches are designed for industrial applications, such as rolling stock, vehicle, and railway applications. TGPS-9164GT-M12 is managed Redundant Ring Ethernet switch with 16x10/100Base-T(X) P.S.E. and 4x10/100/1000Base-T(X) ports which is specifically designed for the toughest and fully compliant with EN50155 requirement. The switch support Ethernet Redundancy protocol, **O-Ring** (recovery time < 30ms over 250 units of connection), Open-Ring, O-Chain, MRP and MSTP/RSTP/STP (IEEE 802.1s/w/D) can protect your mission-critical applications from network interruptions or temporary malfunctions with its fast recovery technology. TGPS-9164GT-M12 also support

Power over Ethernet, a system to transmit electrical power up to **30 watts**, along with data, to remote devices over standard twisted-pair cable in an Ethernet network. Each TGPS-9164GT-M12 switch has 16x10/100/1000Base-T(X) P.S.E. (Power Sourcing Equipment) ports. P.S.E. is a device (switch or hub for instance) that will provide power in a PoE connection. TGPS-9164GT-M12-BP2 includes 2 sets of bypass ports that protect the network from failures and Network maintenance by ensuring network integrity during power loss. And support wide operating temperature from -40 °C to 70 °C. TGPS-9164GT-M12 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 choices for EN50155 highly-managed Ethernet application.

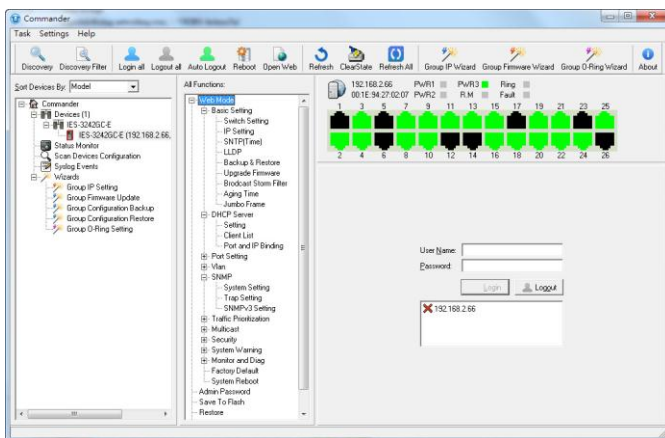
- **O-Ring :** O-Ring is ORing's proprietary redundant ring technology, with recovery time of less 30 milliseconds and up to 250 nodes. The O-Ring redundant ring technology can protect mission-critical application from network interruptions or temporary malfunction with its fast recover technology.
- **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)** 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. Its hardware based prevention so it can prevent DOS/DDOS attack immediately and completely.
- **IEEE 1588v2 Technology :** The IEEE 1588v2 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.

Railway Application

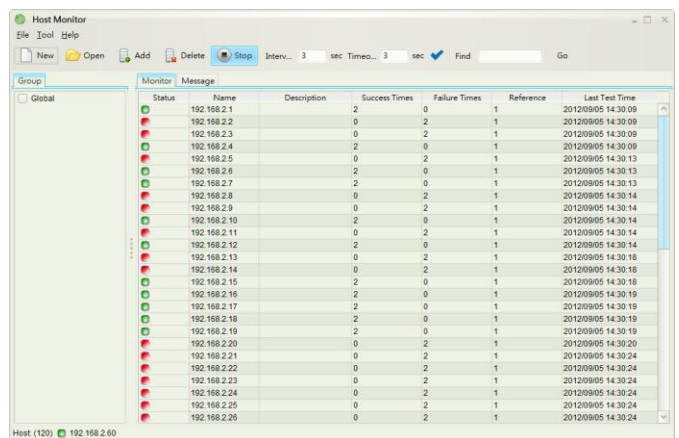


Open-Vision

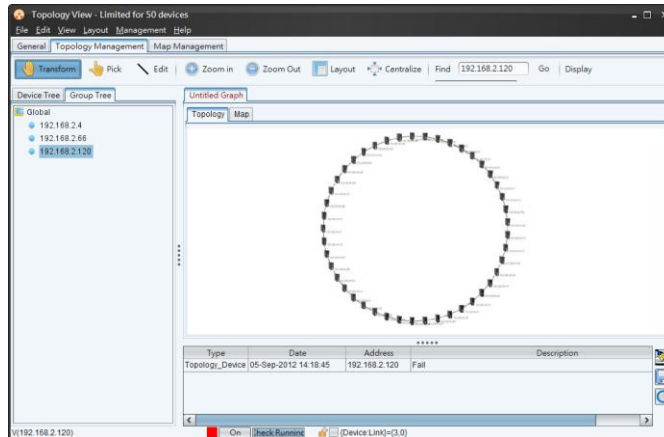
ORing's switches are intelligent switches. Different from other traditional redundant switches, ORing provides a set of Windows utility (Open-Vision) for user to manage and monitor all of industrial Ethernet switches on the industrial network.



Commander



Host Monitor



Topology View

## Pin Definition

- 10/100/1000Base-T(X) M12 port



M12 Pin Definition	
Pin No.	Description
#1	BI_DC+
#2	BI_DD+
#3	BI_DD-
#4	BI_DA-
#5	BI_DB+
#6	BI_DA+
#7	BI_DC-
#8	BI_DB-

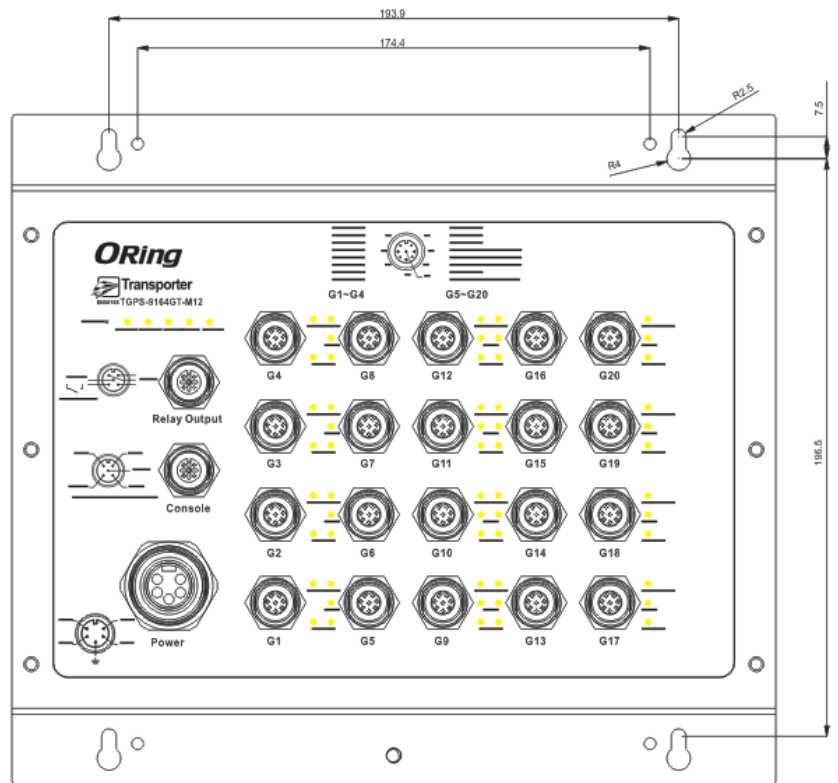
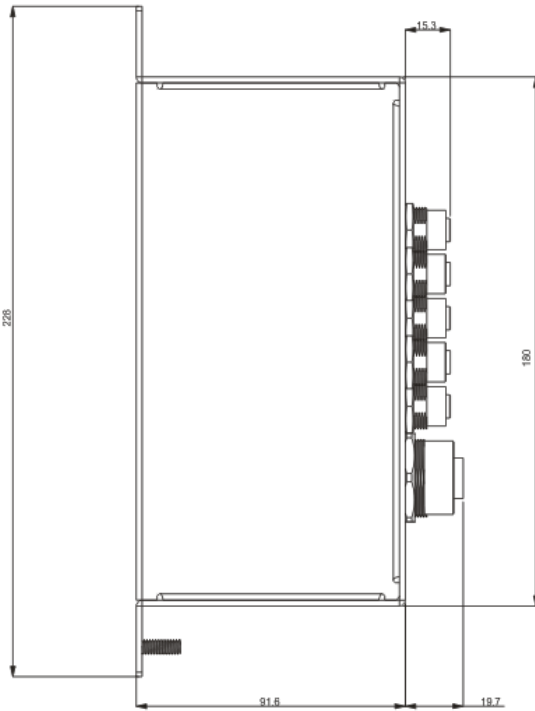
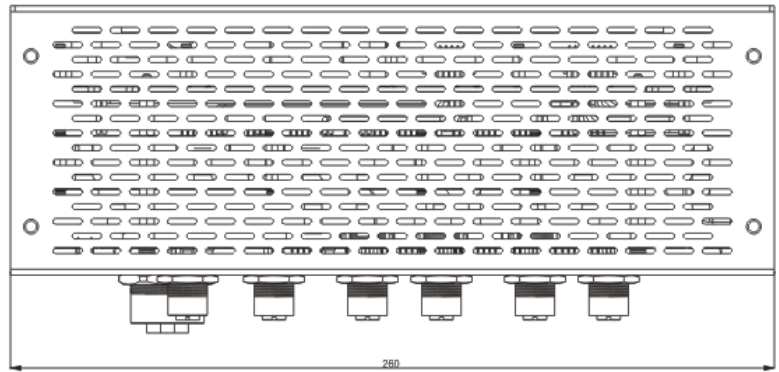
- 10/100/1000Base-T(X) P.S.E. M12 port

M12 Pin Definition	
Pin No.	Description
#1	BI_DC+
#2	BI_DD+
#3	BI_DD-
#4	BI_DA- with PoE Vout+
#5	BI_DB+ with PoE Vout-
#6	BI_DA+ with PoE Vout+
#7	BI_DC-
#8	BI_DB- with PoE Vout-

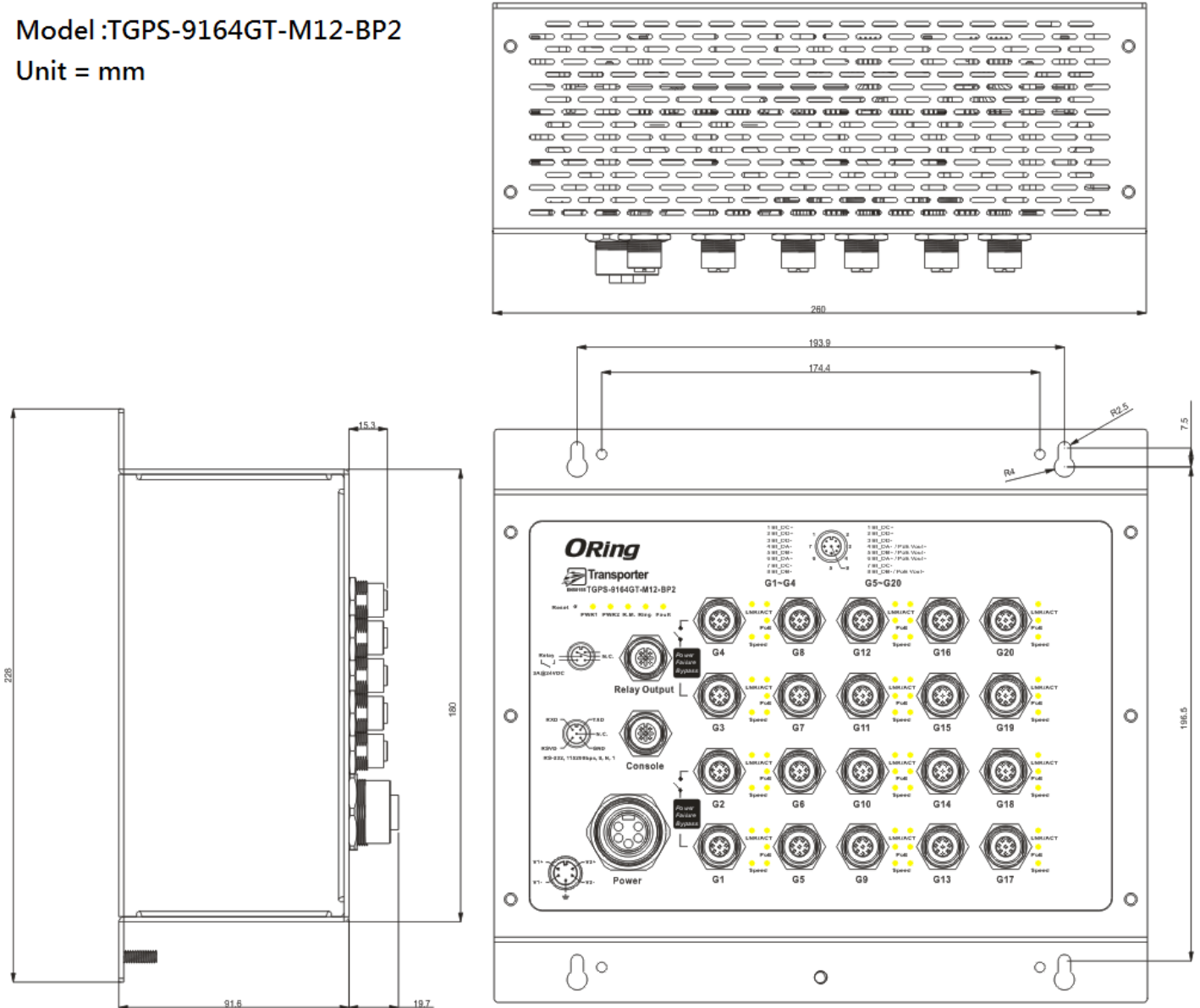
**Dimension**

Model : TGPS-9164GT-M12

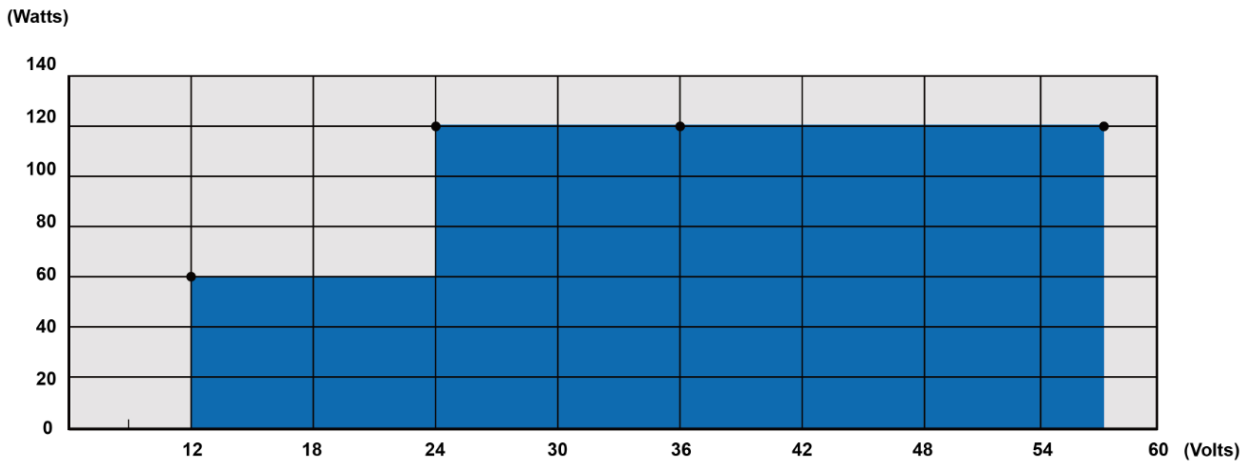
Unit = mm



Model :TGPS-9164GT-M12-BP2  
Unit = mm



## PoE Power Distribution



## Specifications

ORing Switch Model	TGPS-9164GT-M12	TGPS-9164GT-M12-24V	TGPS-9164GT-M12-BP2	TGPS-9164GT-M12-BP2-24V
<b>Physical Ports</b>				
10/100/1000Base-T(X) with P.S.E. Ports in M12 Auto MDI/MDIX	<b>16 (8-pin A-coding)</b>			
10/100/1000Base-T(X) ports in M12 Auto MDI/MDIX	<b>4 (8-pin A-coding)</b>		<b>4 (8-pin A-coding with 2 x bypass function included)</b>	
<b>Technology</b>				
Ethernet Standards	IEEE 802.3 for 10Base-T IEEE 802.3u for 100Base-TX IEEE 802.3ab for 1000Base-T 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) IEEE 802.3at PoE specification			
MAC Table	8k			
Priority Queues	8			
Processing	Store-and-Forward			
Switch Properties	Switching latency: 7 us Switching bandwidth: 40Gbps Max. Number of Available VLANs: 256 IGMP multicast groups: 128 for each VLAN Port rate limiting: User Define			
Jumbo frame	Up to 9.6K Bytes			
Security Features	Device Binding security feature Enable/disable ports, MAC based port security Port based network access control (802.1x) VLAN (802.1Q ) to segregate and secure network traffic Radius centralized password management SNMPv3 encrypted authentication and access security Https / SSH enhance network security			
Software Features	STP/RSTP/MSTP (IEEE 802.1D/w/s) Redundant Ring (O-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 and GVRP supported IGMP Snooping IP-based bandwidth management Application-based QoS management DOS/DDOS auto prevention Port configuration, status, statistics, monitoring, security DHCP Server/Client/Relay SMTP Client Modbus TCP			
Network Redundancy	O-Ring Open-Ring O-Chain MRP MSTP (RSTP/STP compatible)			
RS-232 Serial Console Port	RS-232 in M12 (A-coding) connector with console cable. 115200bps, 8, N, 1			
<b>LED indicators</b>				
Power Indicator (PWR)	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			
10/100/1000Base-T(X) M12 P.S.E. Port Indicator	Up of Green LED for Link/Act indicator. Middle of Green LED for PoE enabled indicator. Down of dual color LED for Ethernet speed indicator : Green LED for 1000Mbps, Amber for 100Mbps			
10/100/1000Base-T(X) M12 Port Indicator	Up of Green LED for Link/Act indicator. Down of dual color LED for Ethernet speed indicator : Green LED for 1000Mbps, Amber for 100Mbps			
<b>Fault contact</b>				
Relay	Relay output to carry capacity of 3A at 24VDC on M12 connector (5-pin A-coding)			
<b>Power</b>				
Redundant Input power	Dual DC inputs. 50~57VDC on 5-pin M23 connector	Dual DC inputs. 24 (12~57VDC) VDC on 5-pin M23 connector	Dual DC inputs. 50~57VDC on 5-pin M23 connector	Dual DC inputs. 24 (12~57VDC) VDC on 5-pin M23 connector
Power consumption (Typ.)	20 Watts (power consumption of P.S.E. is not included)	25 Watts (power consumption of P.S.E. is not included)	20 Watts (power consumption of P.S.E. is not included)	25 Watts (power consumption of P.S.E. is not included)
Total PoE Output Power	480 Watts	120 Watts (12~24VDC) / 240 Watts (24~57VDC)	480 Watts	120 Watts (12~24VDC) / 240 Watts (24~57VDC)
Overload current protection	Present			
Reverse Polarity Protection	Present			
<b>Physical Characteristic</b>				
Enclosure	IP-30			
Dimension (W x D x H)	260 (W) x 91.6 (D) x228 (H) mm			
Weight (g)	2528	2553	2550	2575
<b>Environmental</b>				
Storage Temperature	-40 to 85°C (-40 to 185°F)			
Operating Temperature	-40 to 70°C (-40 to 158°F )			
Operating Humidity	5% to 95% Non-condensing			
<b>Regulatory approvals</b>				
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			
Shock	IEC60068-2-27			
Free Fall	IEC60068-2-32			
Vibration	IEC60068-2-6			
Safety	EN60950-1			
<b>Warranty</b>	5 years			



## Ordering Information

TGPS-9AABCC-M12-DDD

Code	10/100/1000Base-T(X)	Additional Port Number	Additional Port Type	Bypass Function
Definition	P.S.E. Port Number			
Option	- 16: 16 ports	- 4: 4 ports	- GT: 10/100/1000Base-T(X) port	- BP2: 2xbypass function included

Available Model	Model Name	Description
	TGPS-9164GT-M12	EN50155 20-port managed Gigabit PoE Ethernet switch with 16x10/100/1000Base-T(X) P.S.E. and 4x10/100/1000Base-T(X), M12 connector
	TGPS-9164GT-M12-24V	EN50155 20-port managed Gigabit PoE Ethernet switch with 16x10/100/1000Base-T(X) P.S.E. and 4x10/100/1000Base-T(X), M12 connector, 24VDC power inputs
	TGPS-9164GT-M12-BP2	EN50155 20-port managed Gigabit PoE Ethernet switch with 16x10/100/1000Base-T(X) P.S.E. and 4x10/100/1000Base-T(X), M12 connector and 2xbypass included
	TGPS-9164GT-M12-BP2-24V	EN50155 20-port managed Gigabit PoE Ethernet switch with 16x10/100/1000Base-T(X) P.S.E. and 4x10/100/1000Base-T(X), M12 connector and 2xbypass included, 24VDC power inputs

## Packing List

- TGPS-9164GT-M12 x 1
- ORing Tool CD x 1
- Quick Installation Guide x 1

## Optional Accessories

- Open-Vision M500 : Powerful Network Management Windows Utility Suit, 500 IP devices
- M12C : M12 cable accessories
- Console cable