TGRS-T120-M12X-BP2-WV

ORing WEB-site

EN50155 12-port managed router switch with 12x10/100/1000Base-T(X) ports, X-coding M12 connector and 2xbypass included, wide-range power input

Features

- Leading EN50155 compliant Ethernet switch for rolling stock application
- Supports static routing and VRRP L3 function
- Supports **TTDP** (IEC 61375-2-5) protocol
- Supports **TRDP** (IEC 61375-2-3) protocol
- Easy network setup with network address translation (NAT)
- R-NAT (Railway Network Address Translation) for train IP management
- Provided HTTPS/SSH protocol to enhance network security
- Supports SMTP client
- Supports QoS management
- IGMP v2/v3 (IGMP snooping support) for filtering multicast traffic
- Supports SNMP v1/v2c/v3 & RMON & 802.1Q VLAN Network Management
- Supports 10K Bytes Jumbo Frame
- Multiple notification for warning of unexpected event
- Web-based, Telnet, Console (CLI), and Windows utility (**Open-Vision**) configuration
- Supports LLDP Protocol
- Rigid IP-30 housing design
- Wall mounting enabled
- Wide range power input from 24-110VDC

EN50155 Isolation Full -25~70°C Temperature R6 READY ROHS CE FC

Introduction

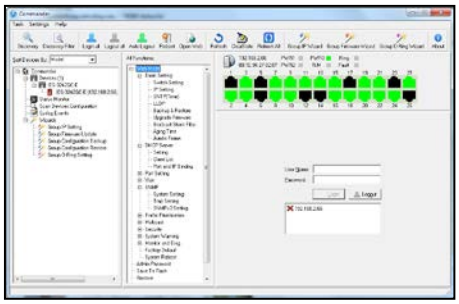
ORing's Transporter™ series managed Router switches are designed for industrial applications such as rolling stock, vehicle, and railway. The TGRS-T120-M12X-BP2-WV, which is compliant with the EN50155 standard, is a managed Gigabit Redundant Ring Ethernet switch with 12x10/100/1000Base-T(X) ports which is specifically designed for the toughest and fully compliant with EN50155 requirement. The switch support **IEC 61375-2-5 TTDP** (Train Topology Discovery Protocol) and **IEC 61375-2-3 TRDP** (Train Real-Time Data Protocol) for railway application, improving the operational efficiency and minimize configuration errors. It is specifically designed for the toughest industrial environments. TGRS-T120-M12X-BP2-WV EN50155 Ethernet switch uses M12 connectors to ensure tight, robust connections, and guarantee reliable operation against environmental disturbances, such as vibration and shock. TGRS-T120-M12X-BP2-WV EN50155 provides a wide power input range from 24 to 110VDC. TGRS-T120-M12X-BP2-WV 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 -25℃ to 70 ℃. TGRS-T120-M12X-BP2-WV can also be managed centralized and convenient by Open-Vision, as well as the Web-based interface, Telnet and console (CLI) configuration. Therefore, the router switch is one of the most reliable choice for highly-managed and railway application.

- **TTDP:** Train Topology Discovery Protocol is defined in IEC 61375-2-5 to identify the order of the network switches, starting with the switch in the lead train car. Switches will negotiate automatically after the network topology is changed and will assign an IP address to the switches based on the new order of train cars. With TTDP, Train operators can vastly improve their operational efficiency and minimize configuration errors.

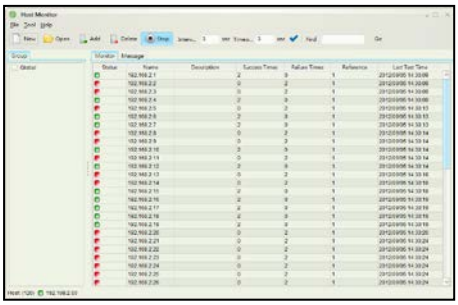
- **TRDP:** Train Real-Time Data Protocol is an open network protocol for communication over IP-based networks in rail vehicles which is standardized in IEC 61375-2-3. With TRDP, devices such as door controls, displays, and air conditioners can communicate with each other in a transparent way, providing the basis for communication in future trains and making the entire train topology more dynamic.
- **O-Ring [Pending]:** 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 [Pending]:** 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.
- **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.

Open-Vision

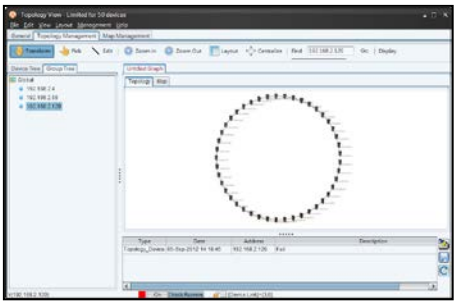
ORing's switches are intelligent switches. Different from other traditional redundant switches, ORing provides a set of Windows utilities (Open-Vision) for user to manage and monitor all industrial Ethernet switches on the industrial network.



Commander

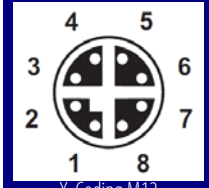


Host Monitor

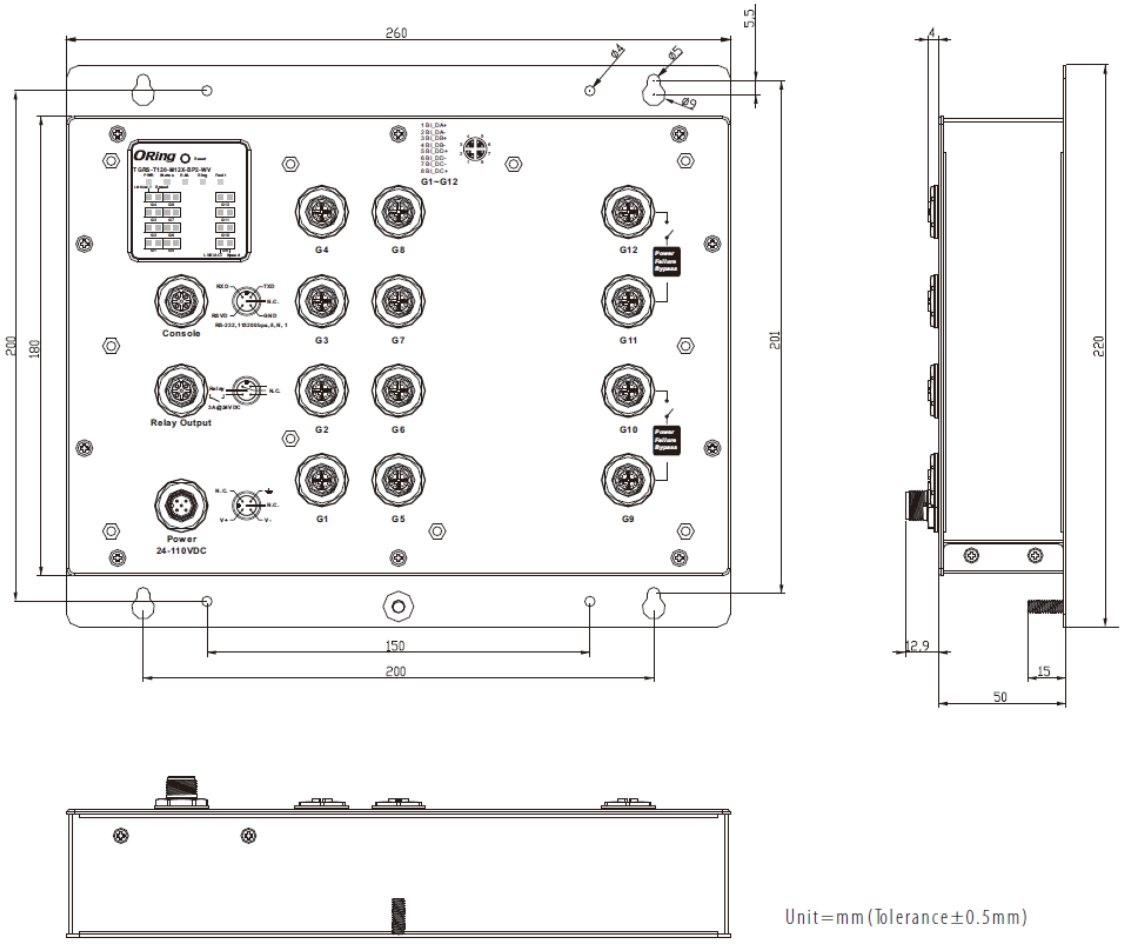


Topology View

PIN Definition

10/100/1000Base-T(X) M12 port		
 X-Coding M12	Pin No.	Description
	#1	BI_DA+
	#2	BI_DA-
	#3	BI_DB+
	#4	BI_DC+
	#5	BI_DC-
	#6	BI_DB-
	#7	BI_DD+
	#8	BI_DD-

Dimensions



Unit=mm(Tolerance±0.5mm)

Specifications

ORing Switch Model	TGRS-T120-M12X-BP2-WV
Physical Ports	
10/100/1000Base-T(X) Ports in M12 Auto MDI/MDIX	**LAN (G1 ~ G8) – 8 (8-pin female X-coding)**
	WAN (G9 ~ G12) – 4 (8-pin female X-coding)
Technology	
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 802.1AB for LLDP (Link Layer Discovery Protocol)
MAC Table	2K (WAN port), 16K (LAN port)
Packet Buffer Size	1MB share
Priority Queues	8
Processing	Store-and-Forward
Switch Properties	Switching latency: 0.9 us Switching bandwidth: 24Gbps

	Throughput (packet per second): 17.857Mpps@64Bytes packet Max. Number of Available VLANs: 256 VLAN ID Range: VID 1 to 4095 IGMP multicast groups: 128 for each VLAN Port rate limiting: User Define
Jumbo Frame	Up to 10K Bytes
L3 Function	Static Routing, VRRP
Security Features	Enable/disable ports, MAC based port security Port based network access control (802.1x) VLAN (802.1Q) to segregate and secure network traffic SNMPv3 encrypted authentication and access security Https / SSH enhance network security Web and CLI authentication
Software Features	IEC 61375-2-5 TTDP (Train Topology Discovery Protocol) IEC 61375-2-3 TRDP (Train Real-Time Data Protocol) RSTP/MSTP (IEEE 802.1D/w/s) NAT: N-1 NAT, 1-1 NAT TOS/Diffserv supported Quality of Service (802.1p) for real-time traffic VLAN (802.1Q) with VLAN tagging IGMP Snooping QoS management Port configuration, status, statistics, monitoring, security DHCP Server/Client SMTP Client
Network Redundancy	O-Ring (Pending) O-Chain (Pending) MSTP (RSTP/STP compatible)
RS-232 Serial Console Port	RS-232 in M12 connector (5 pin female A-coding) with console cable. 115200bps, 8, N, 1 **(support backup unit)**
LED Indicators	
Power Indicator (PWR)	Green: Power LED x 1
System Indicator (Status)	Green: System on
Ring Master Indicator (R.M.)	Green: Indicates that the system is operating in O-Ring Master mode (**Pending)**
O-Ring Indicator (Ring)	Green: Indicates that the system operating in O-Ring mode (**Pending)** Green Blinking: Indicates that the Ring is broken.
Fault Indicator (Fault)	Amber: Indicate unexpected event occurred
10/100/1000Base-T(X) M12 Port Indicator	Green for Link/Act indicator: Green for link-up, Off for link-down, Blinking for Act. Green for speed indicator: Green for 1000Mbps, Off for 10/100Mbps
Fault Contact	
Relay	Relay output to carry capacity of 3A at 24VDC on M12 connector (5-pin female A-coding)
Reset Function	
Reset Button	< 5 sec: System reboot, > 5 sec: Factory default
Power	
Redundant Input Power	24~110 (16.8~137.5) VDC on M12 5-pin A-coding Male connector
Power Consumption (Typ.)	≤17Watts, 24VDC/0.69A (17W), 36VDC/0.45A (16W), 72VDC/0.21A (15W), 110VDC/0.13A (15W)
Overload Current Protection	Present
Reverse Polarity Protection	Present
Physical Characteristic	
Enclosure	IP-30
Dimension (W x D x H)	260 (W) x 50 (D) x 220 (H)mm 10.24 (W) x 1.97 (D) x 8.66 (H) inch
Weight (g)	1.865 Kg
Environmental	
Storage Temperature	-40 to 85°C (-40 to 185°F)
Operating Temperature	-25 to 70°C (-13 to 158°F)

Operating Humidity	5% to 95% Non-condensing
Regulatory Approvals	
EMC	CE EMC (EN 55024, EN 55032), FCC Part 15 B, EN 50155(EN 50121-1, EN 50121-3-2)
EMI	EN 55032, CISPR32, EN 61000-3-2, EN 61000-3-3, FCC Part 15 B class A
EMS	EN 55024 (IEC/EN 61000-4-2 (ESD: Contact 6KV, Air 8KV), IEC/EN 61000-4-3 (RS 80MHz to 1GHz: 20V/m, 1.4-2GHz:10V/m 1kHz 80% AM),IEC/EN 61000-4-4 (EFT Power 2KV, Single 2KV), IEC/EN 61000-4-5 (Surge: Power 2KV, RJ45 2KV), IEC/EN 61000-4-6 (CS 150K-80MHz: 10Vrms 1kHz 80% AM), 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	EN 60950-1 (LVD)
Other	EN 50155 (IEC 61373) compliant
MTBF	155,786hrs
Warranty	5 years

Ordering Information

TGRS-T[AA]0-[BBBB][CCC]-[DD]

Code Definition	10/100/1000Base-T(X) Port Number	Connector Type	Additional feature	Power Input Range
Option	**- 12:** 12 ports	**- M12X:** M12 X-coded	**- BP2:** By-pass x 2	**-WV:** 24-110VDC power input

Available Model	Model Name	Description
	TGRS-T120-M12X-BP2-WV	EN 50155 12-port managed router switch with 12x10/100/1000Base-T(X) ports, X-coding M12 connector and 2xbypass included, wide-range power input

Packing List
- TGRS-T120-M12X-BP2-WV x 1
- Quick Installation Guide x 1

Optional Accessories
- Open-Vision M500: Powerful Network Management Windows Utility Suit, 500 IP devices
- M12 cable series
- DBU-01 backup unit