

ORing

Designed for Rugged Excellence



Global Headquarters

ORing Industrial Networking Corp

3F., No.542-2, Zhongzheng Rd., Xindian Dist., New Taipei City 23148, Taiwan

TEL: + 886-2-2218-1066

FAX: + 886-2-2218-1014

www.ORing-Networking.com

E-mail: info@ORing-Networking.com



2014.06

*Specifications are subject to change without prior notice.



ORing

**Railway Automation
EN50155 Certified**

 **Transporter
Series**



ORing Industrial Networking Corp.

3F., No.542-2, Zhongzheng Rd., Xindian Dist., New Taipei City 23148, Taiwan

Tel: +886-2-2218-1066 Fax: +886-2-2218-1014

www.oring-networking.com Email:sales@ORing-Networking.com

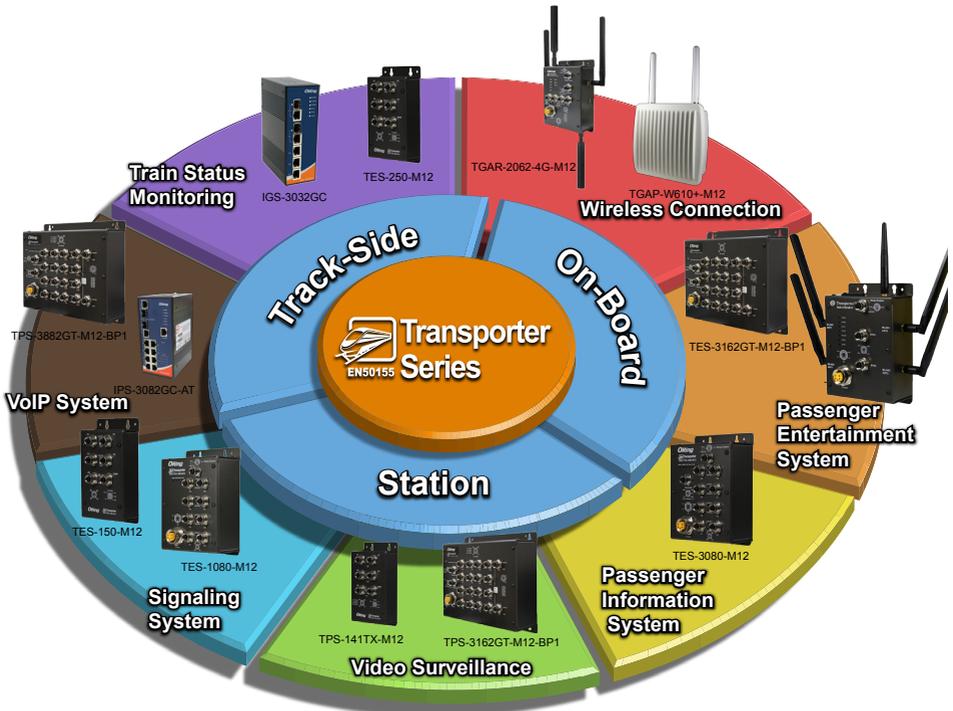


Table of Contents

About Railway Automation	2
Railway Application	3
Product Showcase	5
Success Story – TRA’s EMU 800	15
Success Story – MRT Wenhua line	17
Success Story – Re Tibo	19
Success Story – London Tube	21
Success Story – Puyuma Express	23
Success Story – Jinghu High Rail	26
Product Selection Guide	29



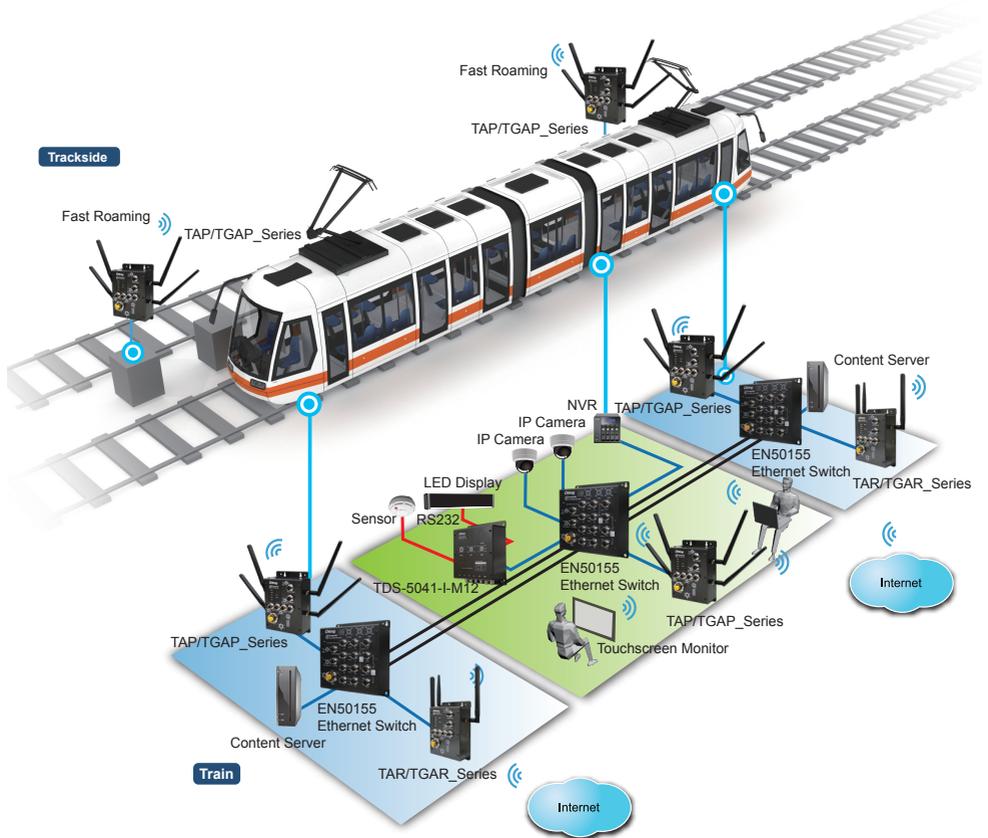
About Railway Automation



Railway transportation systems are vital in many countries and can bring rapid economic growth to an entire country. With such high importance of railway transportation systems, dependable information management of railway traffic is absolutely necessary, calling for the need of rugged network capable of handling massive real-time traffic information accurately without interruptions. It is not easy, however, to sustain reliable network service in such a high-speed moving platform of high-speed railway, since data can be affected by the train's fast speed and associated vibrations, plus strong interferences on and off the train.

To meet the rising demand of TCN (train communication network), ORing, with industry-leading expertise of industrial networking, presents the EN50155-certified (and EN50121-certified) / IRIS industrial-grade Transporter Series products for the tough applications of TCN. Thus far, ORing already has EN50155 Ethernet switches, EN50155 wireless access points, and EN50155 wireless cellular VPN routers, as the development of more EN50155 products on the way. With ORing products, automation applications on the train, along with network communications between the train and the train stations, are now simpler, much faster, more secure, and more reliable.

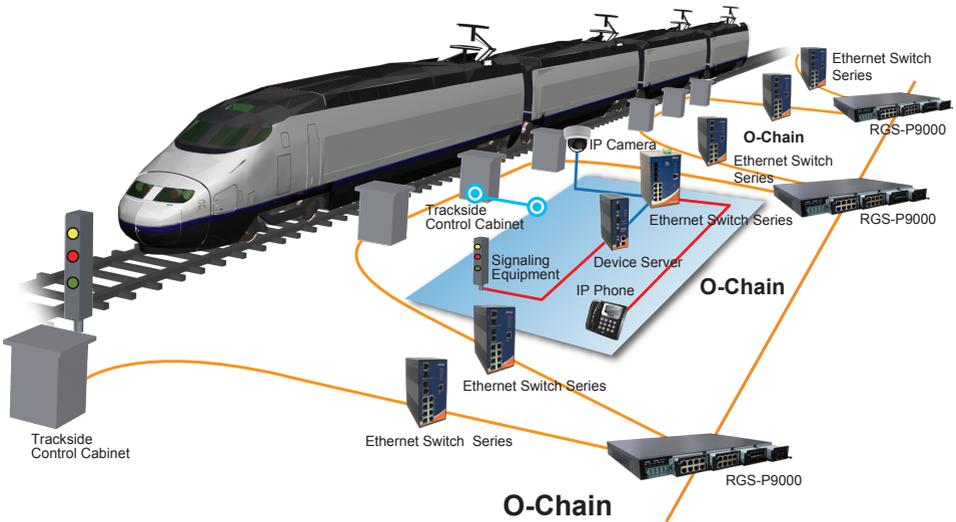
Railway Application



Port Trunk
 Optic Fiber
 CAT5e
 Serial



Trackside Application



Port Trunk Optic Fiber CAT5e Serial

EN50155 Product Showcase

EN50155 Railway Ethernet Switch



TES-1080-M12/ TES-1080-M12-BP2

EN50155 8-port unmanaged Ethernet switch with 8x10/100Base-T(X), M12 connector

- Supports auto-negotiation and auto-MDI/MDI-X
- M12/23 connectors to guarantee reliable operation against environmental disturbances
- Dual wide-range power inputs on the M23 connector: 12~48VDC
- -40 to 70°C operating temperature range



TES-150-M12

EN50155 5-port unmanaged Ethernet switch with 5x10/100Base-T(X), M12 connector

- Leading EN50155-compliant Ethernet switch for rolling stock application
- Supports auto-negotiation and auto-MDI/MDI-X
- Supports store-and-forward transmission
- Supports flow control



TES-250-M12

EN50155 5-port lite-managed Ethernet switch with 5x10/100Base-T(X), M12 connector

- Leading EN50155-compliant Ethernet switch for rolling stock application
- Fastest Redundant Ethernet Ring: O-Ring (recovery time < 10ms over 250 units of connection)
- Open-Ring support the other vendor's ring technology in open architecture
- Provides Fast recovery technology for Ethernet multi-redundancy



TES-3080-M12 Series

Industrial EN50155 8-port managed Ethernet switch with 8x10/100Base-T(X), M12 connector

- Supports more Ethernet redundancy with O-Ring / Open-Ring / O-Chian / MRP / MSTP / RSTP / STP
- M12/23 connectors to guarantee reliable operation against environmental disturbances
- 2-pair of built-in hardware-bypass ports (-BP2 model)
- Supports PTP Client (Precision Time Protocol) clock synchronization
- -40 to 70°C operating temperature range



TES-3162GT-M12-BP1

EN50155 18-port managed Ethernet switch with 16x10/100Base-T(X) and 2x10/100/1000Base-T(X), M12 connector and 1xbypass included

- Leading EN50155-compliant Ethernet switch for rolling stock application
- World's fastest Redundant Ethernet Ring: O-Ring (recovery time < 10ms over 250 units of connection)
- Open-Ring support the other vendor's ring technology in open architecture
- Supports standard IEC 62439 MRP (Media Redundancy Protocol) function
- 1 Pair of built-in hardware-bypass ports

EN50155 Railway PoE Ethernet Switch



TPS-141TX-M12

EN50155 5-port unmanaged PoE Ethernet switch with 4x10/100Base-T(X) P.S.E. and 1x10/100Base-T(X), M12 connector

- Supports 4 x 10/100 Base-T(X) with 802.3at P.S.E. PoE ports
- Supports auto-negotiation and auto-MDI/MDI-X
- 4-port P.S.E. fully compliant with IEEE802.3at standard, provide up to 30 Watts per port
- Supports store and forward transmission



TPS-3044TX-M12

EN50155 8-port managed PoE Ethernet switch with 4x10/100Base-T(X) P.S.E. and 4x10/100Base-T(X), M12 connector

- Leading EN50155-compliant Ethernet switch for rolling stock application
- 4-port P.S.E. fully compliant with IEEE802.3af standard, provide up to 15.4 Watts per port
- Supports PoE power on delay function, users can define delay time for PoE power supply
- World's fastest Redundant Ethernet Ring: O-Ring (recovery time < 10ms over 250 units of connection)



TPS-3082GT-M12-BP1/-24V

EN50155 10-port managed PoE Ethernet switch with 8x10/100Base-T(X) P.S.E. and 2x10/100/1000Base-T(X), M12 connector and 1xbypass included

- Leading EN50155-compliant Ethernet switch for rolling stock application
- 8-port P.S.E. fully compliant with IEEE802.3af standard, provide up to 15.4 Watts per port
- World's fastest Redundant Ethernet Ring: O-Ring (recovery time < 10ms over 250 units of connection)
- STP/RSTP/MSTP supported



TPS-3162GT-M12-BP1/-24V

EN50155 18-port managed Ethernet switch with 16x10/100Base-T(X) P.S.E. and 2x10/100/1000Base-T(X), M12 connector and 1xbypass included

- Supports 16-port P.S.E. fully compliant with IEEE 802.3af standard, provides up to 15.4Watts per port
- Supports 0-Ring, 0-Chain/Open-Ring/MRP/STP/RSTP/MSTP multiple recovery ring technology
- Supports IGMP snooping/SNMP/RMON/VLAN/HDCP/PTP Client/Mirror/LLDP Ethernet
- 12~57 VDC input supported(-24V Model)



TPS-3882GT-M12-BP1/-24V

EN50155 18-port managed PoE Ethernet switch with 8x10/100Base-T(X) P.S.E. , 8x10/100Base-T(X) and 2x10/100/1000Base-T(X), M12 connector and 1xbypass included

- Leading EN50155-compliant Ethernet switch for rolling stock application
- 8-port P.S.E. fully compliant with IEEE802.3af standard, provide up to 15.4 Watts per port
- Open-Ring support the other vendor's ring technology in open architecture
- 0-Chain support applications with multiple redundant rings topology
- 12~57 VDC input supported(-24V Model)

EN50155 Railway Gigabit Ethernet Switch



TGS-1080-M12

EN50155 8-port unmanaged Gigabit Ethernet switch with 8x10/100/1000Base-T(X) , M12 connector

- Leading EN50155-compliant Ethernet switch for rolling stock application
- Support dual power inputs for power redundancy
- 8-port of Gigabit Ethernet Connection for high hadwides requirement



TGS-1080-M12-BP2

EN50155 8-port unmanaged Gigabit PoE Ethernet switch with 8x10/100/1000Base-T(X) P.S.E., M12 connector and 2xbypass included

- Leading EN50155-compliant Ethernet switch for rolling stock application
- Supports IEEE 802.3at compliant PoE and total power budget is 240 Watts with maximum 30Watts per port
- Supports dual power inputs for power redundancy
- 2-Pair of built-in hardware-bypass ports



TGS-9120-M12 Preliminary

EN50155 12-port managed Gigabit Ethernet switch with 12x10/100/1000Base-T(X), M12 connector

- Leading EN50155-compliant Ethernet switch for rolling stock application
- Supports O-Ring (recovery time < 30ms over 250 units of connection) and MSTP(RSTP/STP compatible) for Ethernet Redundancy
- Supports dual power inputs for power redundancy



TGS-9120-M12-BP2 Preliminary

EN50155 12-port managed Gigabit Ethernet switch with 12x10/100/1000Base-T(X), M12 connector and 2xbypass included

- Leading EN50155-compliant Ethernet switch for rolling stock application
- Supports O-Ring (recovery time < 30ms over 250 units of connection) and MSTP(RSTP/STP compatible) for Ethernet Redundancy
- Supports dual power inputs for power redundancy
- 2-Pair of built-in hardware-bypass ports



TGS-9200-M12 Preliminary

EN50155 20-port managed Gigabit Ethernet switch with 20x10/100/1000Base-T(X), M12 connector

- 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
- Supports dual power inputs for power redundancy



TGS-9200-M12-BP2 Preliminary

EN50155 20-port managed Gigabit Ethernet switch with 20x10/100/1000Base-T(X), M12 connector and 2xbypass included

- Leading EN50155-compliant Ethernet switch for rolling stock application
- Supports O-Ring (recovery time < 30ms over 250 units of connection) and MSTP(RSTP/STP compatible) for Ethernet Redundancy
- Supports dual power inputs for power redundancy
- 2-Pair of built-in hardware-bypass ports



TGPS-9084GT-M12/-24V

EN50155 12-port managed Gigabit PoE Ethernet switch with 8x10/100/1000Base-T(X) P.S.E. ports and 4x10/100/1000Base-T(X), M12 connector

- Leading EN50155-compliant Ethernet switch for rolling stock application
- Supports O-Ring (recovery time < 30ms over 250 units of connection) and MSTP (RSTP/STP compatible) for Ethernet Redundancy
- 8-port P.S.E. fully compliant with IEEE 802.3at standard, provide up to 30 Watts per port with 120 Watts total power budget
- 12~57 VDC input supported(-24V Model)



TGPS-9084GT-M12-BP2/-24V

EN50155 12-port managed Gigabit PoE Ethernet switch with 8x10/100/1000Base-T(X) P.S.E. ports and 4x10/100/1000Base-T(X), M12 connector and 2xbypass included

- Leading EN50155-compliant Ethernet switch for rolling stock application
- 8-port P.S.E. fully compliant with IEEE802.3at standard, provide up to 30 Watts per port with 120 Watts total power budget
- 12~57 VDC input supported(-24V Model)
- 2-Pair of built-in hardware-bypass ports



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

- Leading EN50155-compliant Ethernet switch for rolling stock application
- Supports O-Ring (recovery time < 30ms over 250 units of connection) and MSTP(RSTP/STP compatible) for Ethernet Redundancy
- Supports IEEE802.3at Compliant PoE and total power budget is 240 Watts(-24V model)/ 480 Watts with max, 30 Watts per port
- 12~57 VDC input supported(-24V Model)



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

- Leading EN50155-compliant Ethernet switch for rolling stock application
- Supports IEEE802.3at Compliant PoE and total power budget is 240 Watts(-24V model)/ 480 Watts with max, 30 Watts per port
- Open-Ring support the other vendor's ring technology in open architecture
- 12~57 VDC input supported(-24V Model)
- 2-Pair of built-in hardware-bypass ports



EN50155 Railway Device Server



TDS-5041-I-M12

EN50155 4-port secure Isolate RS-422/485 to 1x10/100Base-T(X) Device Server

- Operating Modes: Virtual Com, Serial Tunnel, TCP Server, TCP Client, UDP
- Redundant multiple host devices:
- 5 host devices: Virtual COM, TCP Server, TCP Client mode; 4 IP ranges: UDP
- NAT-pass through: user can manage TDS-5041-I-M12 through NAT router

EN50155 Railway Wireless Access Point



TGAP-620-M12 Series

EN50155 IEEE 802.11 a/b/g/n wireless access point with 2x10/100/1000Base-T(X), M12 connector

- Leading EN50155-compliant wireless access point for rolling stock application
- High Speed Air Connectivity: WLAN interface support up to 300 Mbps link speed
- Supports X-Roaming < 60ms
- 1KV isolation for PoE P.D. (TGAP-620+-M12)
- Supports Multiple-SSID to 4 SSID



TGAP-6620-M12 Series

EN50155 Dual RF in IEEE 802.11 a/b/g/n Wireless AP with 2x10/100/1000Base-T(X), M12 connector

- Leading EN50155-compliant wireless access point for rolling stock application
- High Speed Air Connectivity: WLAN interface support up to 300 Mbps link speed
- Highly Security Capability: WEP/WPA/WPA-PSK(TKIP,AES)/WPA2/WPA2-PSK(TKIP,AES)/802.1X Authentication supported
- 1KV isolation for PoE P.D. (TGAP-6620+-M12)



TGAP-W610+ Series

EN50155 IEEE 802.11 a/b/g/n AP with 1x10/100/1000Base-T(X) PoE P.D., IP-67 grade

- Leading EN50155-compliant wireless access point for rolling stock application
- High Speed Air Connectivity: WLAN interface support up to 300 Mbps link speed
- Authentication supported
- Supports M12 connectors for ethernet port (TGAP-W610+-M12)
- Supports RJ45 connectors for ethernet port (TGAP-W610+)
- 1 Ethernet Gigabit port with IEEE 802.3 af PoE P.D. Supported



TGAP-W6610+ Series

EN50155 Dual RF in IEEE 802.11 a/b/g/n AP with 1x10/100/1000Base-T(X) PoE P.D., IP-67 grade

- Dual RF for redundant wireless communication
- Supports Long Distance Air Connectivity
- Supports Multiple-SSID up to 4 SSID
- Supports M12 connectors for ethernet port (TGAP-W610+-M12)
- Supports RJ45 connectors for ethernet port (TGAP-W610+)
- 1 Ethernet Gigabit port with IEEE 802.3 af PoE P.D. Supported

EN50155 Railway Wireless Cellular VPN Router



TGAR-1062+-3G-M12 Series

EN50155 IEEE 802.11 a/b/g/n 3G Cellular Router With 2x10/100/1000Base-T(X), M12 connector

- Leading EN50155-compliant wireless access point for rolling stock application
- High Speed Air Connectivity: WLAN interface support up to 300Mbps link speed
- Supports 3.5G HSUPA dial up
- 1KV isolation for PoE P.D. (TGAR-1062+-3G-M12)
- GPS Supports (TGAR-1062+-3GS-M12)



TGAR-1062-4G-M12 Series

EN50155 IEEE 802.11 a/b/g/n 4G LTE Cellular Router With 2x10/100/1000Base-T(X), M12 connector

- EN50155-compliant wireless access point for rolling stock application
- High Speed Air Connectivity: WLAN interface support up to 300Mbps link speed
- Supports 4G LTE dial up
- 1KV isolation for PoE P.D. (TGAR-1062+-4G-M12)
- GPS Supports (TGAR-1062+-4GS-M12)



TGAR-1662+-3G-M12 Series

EN50155 Dual IEEE 802.11 a/b/g/n 3G Cellular Router With 2x10/100/1000Base-T(X), M12 connector

- High Speed Air Connectivity: Dual RF in IEEE 802.11 a/b/g/n WLAN interface support up to 300Mbps link speed
- Secured Management by HTTPs
- Supports 3.5G HSUPA dial up
- 1KV isolation for PoE P.D. (TGAR-1662+-3G-M12)
- GPS Supports (TGAR-1662+-3GS-M12)



TGAR-1662-4G-M12 Series

EN50155 Dual IEEE 802.11 a/b/g/n 4G LTE Cellular Router With 2x10/100/1000Base-T(X), M12 connector

- Leading EN50155-compliant wireless access point for rolling stock application
- High Speed Air Connectivity: Dual RF in IEEE 802.11 a/b/g/n WLAN interface support up to 300Mbps link speed
- Secured Management by HTTPs
- Supports 4G LTE dial up
- 1KV isolation for PoE P.D. (TGAR-1662+-4G-M12)
- GPS Supports (TGAR-1662+-4GS-M12)



TGAR-2062-3G-M12 Series

EN50155 IEEE 802.11 a/b/g/n Dual 3G Cellular Router With 2x10/100/1000Base-T(X), M12 connector

- Leading EN50155-compliant wireless access point for rolling stock application
- High Speed Air Connectivity: WLAN interface support up to 300Mbps link speed
- Secured Management by HTTPs
- Supports dual 3.5G dial up backup and load balance
- 1KV isolation for PoE P.D. (TGAR-2062+-3G-M12)
- GPS Supports (TGAR-2062+-3GS-M12)



TGAR-2062-4G-M12 Series

EN50155 IEEE 802.11 a/b/g/n Dual 4G LTE Cellular Router With 2x10/100/1000Base-T(X), M12 connector

- EN50155-compliant wireless access point for rolling stock application
- High Speed Air Connectivity: WLAN interface support up to 300Mbps link speed
- Secured Management by HTTPs
- Supports dual 4G LTE dial up backup and load balance
- 1KV isolation for PoE P.D. (TGAR-2062+-4G-M12)
- GPS Supports (TGAR-2062+-4GS-M12)



TGAR-W1061+-3G-M12

EN50155 IEEE 802.11 a/b/g/n 3G Cellular Router with 1x10/100/1000Base-T(X) PoE P.D., IP-67

- High Speed Air Connectivity: WLAN interface support up to 300Mbps link speed
- Supports 1 port 10/100/1000Base-T(X) port with PoE P.D.
- 3.5G HSPA Modem dial up included
- Supports HNAT enhance LAN to WAN routing performance



TGAR-W1061+-4G-M12

IEEE 802.11 a/b/g/n 4G LTE Cellular Router with 1x10/100/1000Base-T(X) PoE P.D., IP-67

- High Speed Air Connectivity: WLAN interface support up to 300Mbps link speed
- Supports 1 port 10/100/1000Base-T(X) port with PoE P.D.
- 4G LTE Modem dial up included
- Supports HNAT enhance LAN to WAN routing performance

EN50155 Railway Ethernet Switch



IES-3082GC

EN50155 10-port managed Ethernet switch with 8x10/100Base-T(X) and 2xGigabit combo ports, SFP socket

- Leading EN50155-compliant Ethernet switch for rolling stock application
- Supports standard IEC 62439-2 MRP (Media Redundancy Protocol) function
- STP/RSTP/MSTP supported
- Supports Modbus TCP protocol



IGS-3032GC

Industrial 5-port managed Gigabit Ethernet switch with 3x10/100/1000Base-T(X) and 2xGigabit combo ports, SFP socket

- Leading EN50155-compliant Ethernet switch for rolling stock application
- Fastest Redundant Ethernet Ring : O-Ring (recovery time < 20ms over 250 uniof connection)
- Open-Ring supports the other vendor's ring technology in open architecture
- STP/RSTP/MSTP supported



IGS-9812GP

Industrial 20-port managed Gigabit Ethernet switch with 8x10/100/1000Base-T(X) ports and 12x100/1000Base-X, SFP socket

- Leading EN50155-compliant Ethernet switch for rolling stock application
- Supports standard IEC 62439-2 MRP (Media Redundancy Protocol) function
- Supports IEEE 1588v2 clock Synchronization
- Supports Modbus TCP protocol
- Supports IEEE 802.3az Energy-Efficient Ethernet technology



EN50155 Railway Ethernet PoE Switch



IGPS-1080-24V

Industrial 8-port unmanaged Gigabit PoE Ethernet switch with 8x10/100/1000Base-T(X) P.S.E., 24VDC power inputs

- Leading EN50155-compliant Ethernet switch for rolling stock application
- IGPS-1080-24V provides 8x10/100/1000Base-T(X) PoE (P.S.E.) ports
- Supports IEEE 802.3at compliant PoE and total power budget is 120 Watts with maximum 30 Watts per port
- Supports dual wide range 24~36VDC power inputs for power redundancy



IGPS-9084GP

Industrial 12-port managed Gigabit PoE Ethernet switch with 8x10/100/1000Base-T(X) P.S.E. ports and 4x100/1000Base-X, SFP socket

- Leading EN50155-compliant Ethernet switch for rolling stock application
- 8-port P.S.E. fully compliant with IEEE802.3at standard, provide up to 30 Watts per port
- Supports IEEE 1588v2 clock synchronization
- Supports IEEE 802.3az Energy-Efficient Ethernet technology



IGPS-9842GTP

Industrial 14-port managed Gigabit PoE Ethernet switch with 8x10/100/1000Base-T(X) P.S.E. and 4x10/100/1000Base-T(X) and 2x100/1000Base-X, SFP socket

- Leading EN50155-compliant Ethernet switch for rolling stock application
- Supports standard IEC 62439-2 MRP (Media Redundancy Protocol) function
- Supports IEEE 802.3at compliant PoE with maximum 30Watts per port
- Supports IEEE 1588v2 clock synchronization
- Supports IEEE 802.3az Energy-Efficient Ethernet technology

Success Story

Success Story in 2014 Smiling Train Project

Background Introduction:



Location: Taiwan

Project Name: TRA's EMU 800, Smiling Train

How many trains: +/- 40 trains.

Project Time Frame:

Cooked from 2012, started 2013 and was planned to finish by end 2014

TRA's six-star EMU800 Smiling Train has been officially launched on 2014.01.02. This new commuter train purchased from Japan has not only offered economic ticket price, but shorten the travel time while considerably create cozy atmosphere and seats for passengers traveling on this train. Known as the "smiling train," the locomotive of the train is decorated with a yellow line resembling a crescent moon on the front. Smiling Train is embedded with ORing's Ethernet applications—EN50155 Managed Ethernet Switches, TES-250-M12, which are designed specifically for railway applications. These applications operate with O-Ring and it's minimizing the recovery time for 250 machines to less than 10ms when the internet shuts off. With such advantage, ORing's Ethernet switches ensure passengers with best guarantee on commuting security.

Success Story – Wen Hu Project (EN 50155 Certified)

Background Introduction:



Location: Taiwan

Project Name: WenHu Line (Taipei MRT Project)

How many trains: +/- 40 trains.

Project Time Frame:

Cooked from 2012, started 2013 and was planned to finish by end 2014

With the increasing public awareness of the security issues on mass transportation systems, ORing Industrial Networking Corp has released series of industrial Ethernet switches that target at railway applications. Wenhu Line are embedded with ORing's Ethernet applications—EN50155 Managed Ethernet Switches that are designed specifically for railway applications. These applications operate with double redundancy; O-Ring & Hardware Bypass, minimizing the recovery time for 250 machines to less than 10ms when the internet shuts off. With such advantage, ORing's Ethernet switches ensure passengers with best guarantee on commuting security. Product such as TPS-3082GT-M12-BP1 has been successfully applied to Taiwan Taipei Mass Rapid Transit's (MRT) Wenhu Line, providing passengers with a whole new travelling experience.

Background of WenHu Line:

Started in 1996, the MRT connecting Wenshan and Neihu Districts (abbreviated as Wenhu Line) is the first MRT Line in Taipei. However, it was not until 2013 that the whole line was embedded with railway surveillance system.



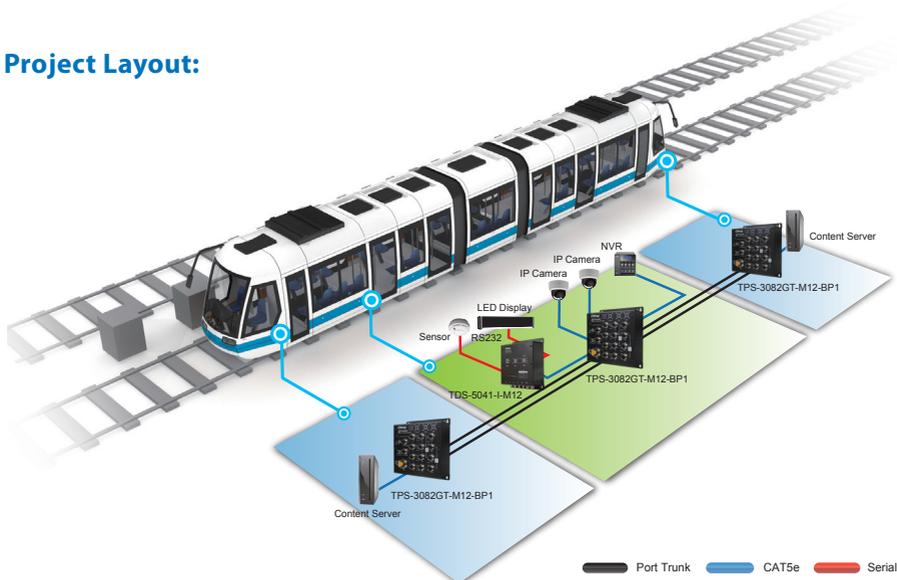
Project Structure:

We have embedded the managed PoE Ethernet switch—TPS-3082GT-M12-BP1. TPS-3082GT-M12-BP1 has 8 of IEEE 802.3af PoE fast Ethernet ports with M12 interface connectors, each supporting 48VDC power supply that runs at 15.4 watt. Also, two of them (1 set) support Bypass Gigabit ports. PSE device offers power supply for devices (PDs) that work compatibly with IEEE 802.3af, including surveillance devices, wireless AP as well as IP phones, etc. Besides, TPS-3082GT-M12-BP1 has the best Ethernet redundant technology—O-Ring, minimizing the recovery time to less than 10ms while supporting double power supply. When facing a power shutdown, TPS-3082GT-M12-BP1 has two ports for bypass to avoid network failure that may occur to Ethernet switches. Each cabin of Wenhui Line is embedded with a TPS-3082GT-M12-BP1, connecting to 4 cameras and entertainment systems. With such surveillance, this product has greatly enhanced the traveling safety for both passengers and the cabin crew. Aside from the benefits in terms of functions, the employment of TPS-3082GT-M12 has saved a lot of spaces since products are embedded under the seats.

Project Themes:

- With EN50155 Certification
- Double Redundancy: O-Ring Circular Back-up System
- Anti-quake M12 Connector, Catering to Railway Applications

Project Layout:



Success Story – Re Tibo Project(EN 50155 Certified)

Background Introduction:



Location: Belgium

Partner: De Lijn 3

Project Name: ReTiBo

How many buses and trains:

Over 5000 vehicles in total. Whereof 4550 busses and +/- 450 trams.

Project Time Frame:

Cooked from 2005, started 2011 and was planned to finish by end 2013

The current ticket sales system Prodata, based on magnetic stripe cards, was introduced in the early '90s. This system has now been industrial and functionally obsolete. Consequently, the operational reliability and a lack of spare parts for the system itself demand a replacing technology. This replacement will become a reality after the realization of the projects Bo and ReTi.

Bo stands for on-board computer; the project embraces the ultimate replacement of the current Prodata drivers console, the establishment of a communications network and the delivery of a number of support services that can be used by other projects.

ReTi stands for "Passenger registration and Ticketing"; the project embraces a new infrastructure for customer acquisition, sales, registration and ticketing, control, data collection and management and revenue management.



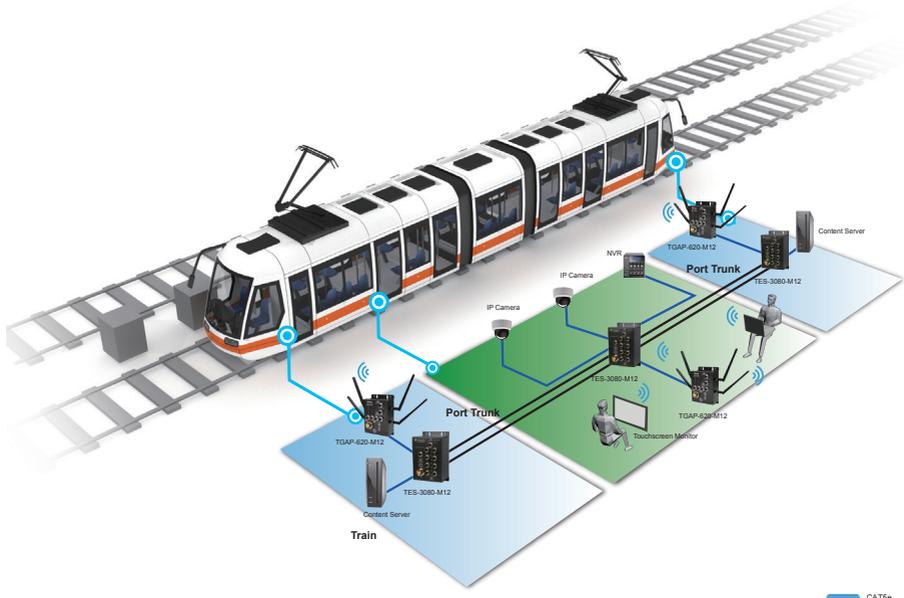
Project Structure:

ORing TES-3080-M12 in each carriage are used to link to IP cameras for video surveillance and messenger security. TGAP-620-M12, ORing Wireless Access Point, enables constant inter-carriage Wi-Fi access solution.

Project Theme:

- Fully compliant with EN50155 certification
- Reliable and stable massive data transmission.
- Storage and exchange of data (data files, logging, etc.).
- Management of communications to, from and in the vehicle.
- Control of other systems and applications.
- User of public transport in Belgium should still only one card purchases when he/she makes a movement using multiple transport companies

Project Layout:



Success Story – London Underground(EN 50155 Certified)

Background Introduction:



Location: London

Integrator: Rail CCTV System Integrator

Application: Security and Operational CCTV

In a recent contract to refurbish 4-unit trains on one of the main commuter lines into London, a leading manufacturer of CCTV and related systems for on board trains used ORing's EN50155 approved switches, TES-150-M12, for a robust solution for the main Ethernet backbone along the train.

Project Requirement:

- Live transmission of OTMR(On Train Monitoring Recorder) data for real time monitoring of safety relevant vehicle data.
- Live monitoring of the CCTV system status (any failure is reported automatically within 60 seconds) making maintenance more effective by reducing the need for preventive server inspections of the system.
- Live video streaming from any video system in any train.
- On-line review of recorded footage, reducing the need to visit the train to review recorded video data.



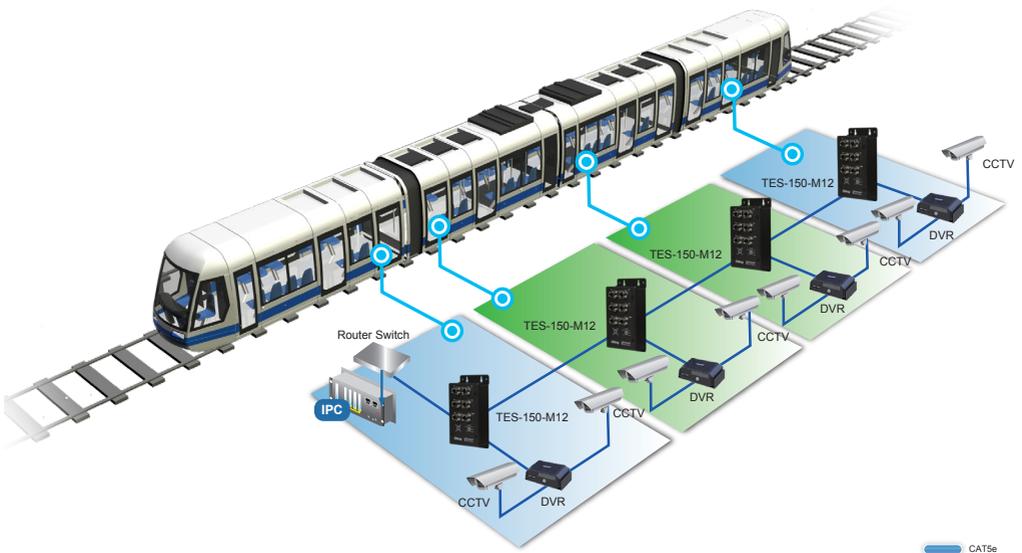
Project Structure:

ORing TES-150-M12 in each carriage are used to link to Digital hybrid Video Recorders (DVRs), the On Train Monitoring Recorder (OTMR) and embedded PC with a 3G Router.

The CCTV System consists of 2 analogue cameras inside each of the 4 carriages for video Surveillance and Security. One forward facing camera is mounted on each end of the train to capture near misses and obstructions on the track. The other camera, mounted on the train roof, is used to view the correct operation of the pantograph unit in the middle of the train. The composite feeds from the array of cameras is fed into a DVR in each carriage.

With the ORing TES-150-M12 Ethernet backbone in place, providing train wide and reliable Ethernet connectivity. All of collected data is transmitted via 3G network to the control center.

Project Layout:



Success Story – Puyuma Express(EN 50155 Certified)

Background Introduction:



Location: Taiwan

Partner: Bwin Technology Inc.

The Express is named after the aboriginal tribe in Taitung county, it means “united” in the language. The Puyuma Express represents the progression in railway transportation for the east Taiwan. Its route includes the Yiland Line, North-Link Line and Hualien-Taiung Line, it will soon serve the passengers on the East coast. The Puyuma Express not only saves time, but also brings the most amazing traveling experience to all the passengers.



Project Requirement:

- Entertaining function, such as Internet Surfing
- Data Communication and transmission
- Coach Surveillance

Project Structure:

The Puyuma Express is included the front/ back locomotives and 8 train cars, there are 18 ORing T-series Ethernet Switch products, which specially design for the railway transportation. These products were deployed in the system for building the reliable networking environment. Moreover, these switches build up the effective and reliable network redundancy, which increase the stability for the wireless network.

TPS-3082GT-M12 (customized) were installed in the front and back locomotives

Usage: link with the switches in the train cars & link with the advertisement displayer, sever and IP cameras on the both sides

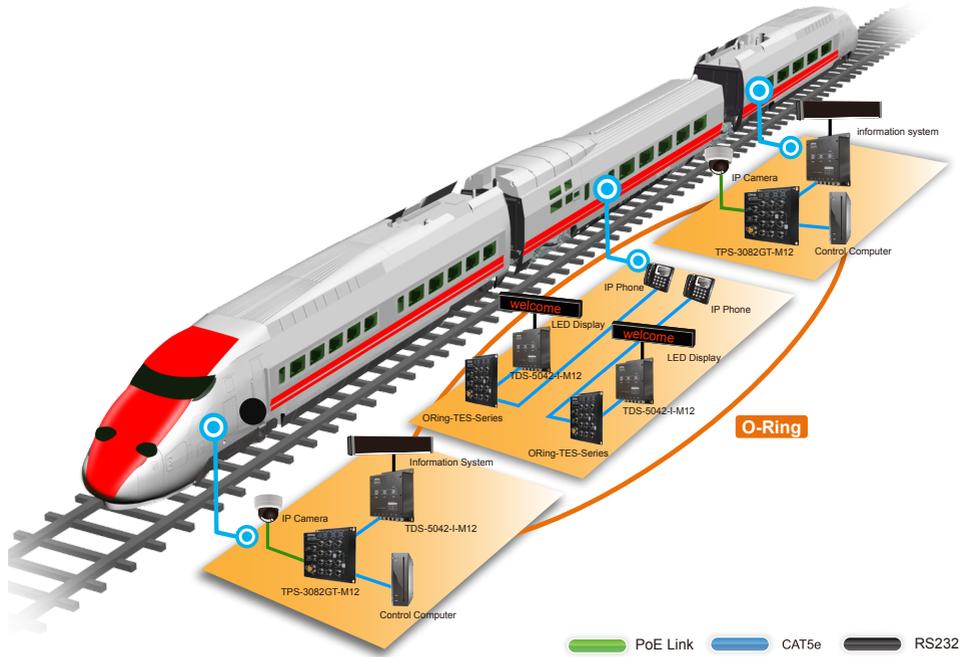
Function:

- The advertisement displayer offers the entertainment applications for the passengers
- The host stands for the center of The Puyuma Express offering real time information to the control center
- The IP cameras which can convey the real time video stream, assure the security for both the passengers and the staff

Project Theme:

- Fully compliant with EN50155 certification
- 24VDC power input suits the requirement under transportation environment, making network infrastructure more flexible.
- The anti-vibration M12 connectors.
- Real time video stream for IP surveillance.
- Reliable and stable massive data transmission

Project Layout:





Success Story – Jinghu High Speed Rail

Background Introduction:



The Beijing-Shanghai High-Speed Rail, also known as the Jinghu High-Speed Rail, is a 1,318 kilometers (819 miles) long high-speed rail that will connect two major economic zones in China. Construction began on April 18, 2008, and it had officially opened just before July, 2011. The continuous operating speed is expected to be 350 km/h (220 mph) and cut the train travel time from 10 hours to 4 hours.

In such a high-speed moving train, due to the data transmission is under extremely high speed moving and vibrating environment, it's not easy to enable a constant onboard communication networking service, such as passenger entertainment system, video surveillance applications and internet service. However, with sophisticated experience and advanced industrial networking technologies, ORing is able to provide an ideal and reliable mobile networking solution for large-scale railway project such as Beijing-Shanghai High-Speed Rail.

After 3 years of hard work, China celebrated the opening of Jinghu High Speed Rail (also known as Beijing-Shanghai High-Speed Rail) at the end of June, 2011. This high speed rail will significantly shorten commute time between two of China's largest cities -- Beijing and Shanghai. Riding the train traveling as fast as 300 km/h, the passengers can get from Beijing to Shanghai in as little as 5 hours

Project Requirements

- EN50155 certification
- Constant high-speed connectivity and fast redundancy
- Real-time video stream over IP surveillance system
- Onboard Wireless connection supported
- Vibration-proof feature supported
- Industrial design to sustain harsh environment
- Withstand temperature variations

Project Structure:

ORing is pleased to announce full support of industrial-grade mobile networking products, which are suitable for high speed railway such as Jinghu High Speed Rail. The ORing Transporter Series Ethernet switches, wireless access points, and wireless routers are certified with EN50155 and/or EN50121 standards and can withstand wide temperature variations and high-speed physical vibrations. Additionally, they can support constant high-speed connectivity, fast redundancy, and secure onboard wireless connection even when the train is traveling at very high speed.

Therefore, with ORing Transporter Series Ethernet switches. the passengers can enjoy the following mobile networking benefits right on the high speed rail: passenger information system, passenger entertainment system, and onboard wireless access point. For the high speed railway administrators, the onboard video surveillance helps them to keep the trains safe and sound.

For more information on ORing products for railway applications, please pick up an electronic copy of ORing Transporter Series EDM .

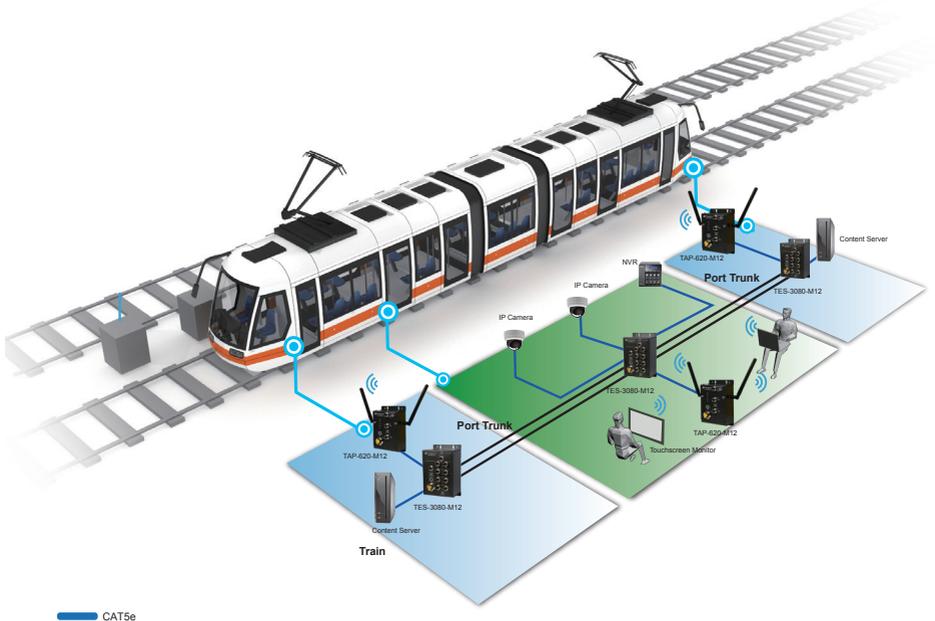


Project Theme:

- Passenger Information System Establish passenger information network system on board the train.
- Passenger Entertainment System Establish entertainment network system on board the train.
- Onboard Video Surveillance Enable smooth and non-blocking real-time video monitoring on board the train.
- Onboard Wireless Access Point Enable constant inter-carriage Wi-Fi access for high-speed rail.



Project Layout:



Product Selection Guide

Managed Switch

Industrial Ethernet Switch



TES-3162GT-M12-BP1



TES-3080-M12-BP2

Port Number	TES-3162GT-M12-BP1	TES-3080-M12-BP2
Number of ports	18	8
10/100Base-T(X) M12 D-Coding Ports	16	4
10/100/1000Base-T(X) M12 A-Coding Ports	2(1-pair HW bypass)	4(2-pair HW bypass)
Power Redundancy		
DC (M12) Connector	-	-
DC (M23) Connector	2 (M23)	2 (M23)
Installation		
DIN-Rail Mounting	-	-
Wall Mounting	•	•
Physical Characteristics		
Casing Protection	IP-40	IP-40
Dimensions (mm)	260(W) x 91.3(D) x 216(H)	125(W) x 65(D) x 196(H)
Operating Temperature		
-10 to 60°C	-	-
-40 to 70°C	•	•
Network Redundancy		
O-Ring	•	•
Open-Ring	•	•
O-Chain	•	•
MRP	•	•
MSTP/RSTP/STP	•	•
Management and Control		
802.1X	•	•
Rate Limit	•	•
Port Mirror	•	•
Port Security	•	•
IGMP v2/v3	•	•
QoS Port Base/COS/TOS	•	•
Port Trunk Static/LACP	•	•
LLDP	•	•
System Alarm	SYSLOG/SMTP/SNMP Trap/Relay	SYSLOG/SMTP/SNMP Trap/Relay
DHCP	Server/Client	Server/Client
VLAN	Port-Based/802.1Q/Q-in-Q/GVRP	Port-Based/802.1Q/Q-in-Q/GVRP
Management / Configuration	WEB / Windows Utility / SNMP v1,v2c,v3 / Telnet / Console (CLI)	WEB / Windows Utility / SNMP v1,v2c,v3 / Telnet / Console (CLI)
Warranty	5 years	



Product Selection Guide

Lite-Managed Switch

Unmanaged Switch

Industrial Ethernet Switch



TES-250-M12



TES-1080-M12 / M12-BP2



TES-150-M12

Port Number	TES-250-M12		TES-1080-M12 / M12-BP2		TES-150-M12
Number of ports	5		8		5
10/100Base-T(X) M12 D-Coding Ports	5		8	4	5
10/100/1000Base-T(X) M12 A-Coding Ports	-		-	4(2-pair HW bypass)	-
Power Redundancy					
DC (M12) Connector	1(M12)		-		1(M12)
DC (M23) Connector	-		2 (M23)		-
Installation					
DIN-Rail Mounting	-		-		-
Wall Mounting	●		●		●
Physical Characteristics					
Casing Protection	IP-40		IP-40		IP-40
Dimensions (mm)	89(W) x 40(D) x 178(H)		125(W) x 65(D) x 196(H)		89(W) x 40(D) x 178(H)
Operating Temperature					
-10 to 60°C	-		-		-
-40 to 70°C	●		●		●
Network Redundancy					
O-Ring	●		-		-
Open-Ring	●		-		-
O-Chain	●		-		-
MRP	-		-		-
MSTP/RSTP/STP	-/●/●		-		-
Management and Control					
802.1X	-		-		-
Rate Limit	-		-		-
Port Mirror	-		-		-
Port Security	-		-		-
IGMP v2/v3	-		-		-
QoS Port Base/COS/TOS	-		-		-
Port Trunk Static/LACP	-		-		-
LLDP	●		-		-
System Alarm	SYSLOG / SMTP / SNMPTrap		Relay		-
DHCP	Client		-		-
VLAN	Port-Based		-		-
Management / Configuration	WEB / Windows Utility / SNMP v1,v2c,v3 / Telnet		-		-
Warranty	5 years				

Managed Switch

Industrial Ethernet Switch



TGPS-9164GT-M12/-24V

TGPS-9164GT-M12-BP2/-24V

TGPS-9084GT-M12/-24V

TGPS-9084GT-M12-BP2/-24V

Port Number				
Number of ports	20	20	12	12
10/100/1000Base-T(X) M12 A-Coding P.S.E. Ports	16 IEEE 802.3 at	16 IEEE 802.3 at	8 IEEE 802.3 at	8 (P.S.E.) IEEE 802.3 at
10/100/1000Base-T(X) M12 A-Coding Ports	4(2-pair HW Bypass)	4(2-pair HW Bypass)	4(2-pair HW Bypass)	4(2-pair HW Bypass)
Power Redundancy				
DC (M12) Connector	-	-	-	-
DC (M23) Connector	2 (M23)	2 (M23)	2 (M23)	2 (M23)
Installation				
DIN-Rail Mounting	-	-	-	-
Wall Mounting	•	•	•	•
Physical Characteristics				
Casing Protection	IP-30	IP-30	IP-30	IP-30
Dimensions (mm)	260(W) x 91.3(D) x 228(H)	260(W) x 91.3(D) x 228(H)	260(W) x 91.3(D) x 216(H)	260(W) x 91.3(D) x 216(H)
Operating Temperature				
-10 to 60°C	-	-	-	-
-40 to 70°C	•	•	•	•
Network Redundancy				
O-Ring	•	•	•	•
Open-Ring	•	•	•	•
O-Chain	•	•	•	•
MRP	•	•	•	•
MSTP/RSTP/STP	•	•	•	•
Management and Control				
802.1X	•	•	•	•
Rate Limit	•	•	•	•
Port Mirror	•	•	•	•
Port Security	•	•	•	•
IGMP v2/v3	•	•	•	•
QoS Port Base/COS/TOS	•	•	•	•
Port Trunk Static/LACP	•	•	•	•
LLDP	•	•	•	•
System Alarm	SYSLOG / SMTP / SNMP Trap / Relay	SYSLOG / SMTP / SNMP Trap / Relay	SYSLOG / SMTP / SNMP Trap / Relay	SYSLOG / SMTP / SNMP Trap / Relay
DHCP	Server/Client	Server/Client	Server/Client	Server/Client
VLAN	Port-Based/802.1Q/Q-in-Q/GVRP	Port-Based/802.1Q/Q-in-Q/GVRP	Port-Based/802.1Q/Q-in-Q/GVRP	Port-Based/802.1Q/Q-in-Q/GVRP
Management / Configuration	WEB / Windows Utility / SNMP v1,v2cv3 / Telnet / Console (CLI)	WEB / Windows Utility / SNMP v1,v2cv3 / Telnet / Console (CLI)	WEB / Windows Utility / SNMP v1,v2cv3 / Telnet / Console (CLI)	WEB / Windows Utility / SNMP v1,v2cv3 / Telnet / Console (CLI)
Warranty	5 years			



Managed Switch

Industrial Ethernet Switch



TPS-3882GT-M12-BP1-24V

TPS-3162GT-M12-BP1-24V

TPS-3044TX-M12

TPS-3082GT-M12-BP1

Port Number				
Number of ports	18	18	8	10
10/100Base-T(X) M12 D-Coding Ports	8 (P.S.E.)+8 IEEE 802.3 af	16 (P.S.E.) IEEE 802.3 af	4 (P.S.E.)+4 IEEE 802.3 af	8 (P.S.E.) IEEE 802.3 af
10/100/1000Base-T(X) M12 A-Coding Ports	2(1-pair HW Bypass)	2(1-pair HW Bypass)	-	2(1-pair HW Bypass) D-Coding
Power Redundancy				
DC (M12) Connector	-	-	-	-
DC (M23) Connector	2 (M23)	2 (M23)	2 (M23)	2 (M23)
Installation				
DIN-Rail Mounting	-	-	-	-
Wall Mounting	●	●	●	●
Physical Characteristics				
Casing Protection	IP-40	IP-40	IP-40	IP-40
Dimensions (mm)	260(W) x 91.3(D) x 216(H)	260(W) x 91.3(D) x 216(H)	170(W) x 75(D) x 196(H)	170(W) x 75(D) x 196(H)
Operating Temperature				
-10 to 60°C	-	-	-	-
-40 to 70°C	●	●	●	●
Network Redundancy				
0-Ring	●	●	●	●
Open-Ring	●	●	●	●
0-Chain	●	●	●	●
MRP	●	●	●	●
MSTP/RSTP/STP	●	●	●	●
Management and Control				
802.1X	●	●	●	●
Rate Limit	●	●	●	●
Port Mirror	●	●	●	●
Port Security	●	●	●	●
IGMP v2/v3	●	●	●	●
QoS Port Base/COS/TOS	●	●	●	●
Port Trunk Static/LACP	●	●	●	●
LLDP	●	●	●	●
System Alarm	SYSLOG/SMTP/SNMP Trap / Relay			
DHCP	Server/Client	Server/Client	Server/Client	Server/Client
VLAN	Port-Based/802.1Q/Q-in-Q/GVRP	Port-Based/802.1Q/Q-in-Q/GVRP	Port-Based/802.1Q/Q-in-Q/GVRP	Port-Based/802.1Q/Q-in-Q/GVRP
Management / Configuration	WEB / Windows Utility / SNMP v1,v2c,v3 / Telnet / Console (CLI)	WEB / Windows Utility / SNMP v1,v2c,v3 / Telnet / Console (CLI)	WEB / Windows Utility / SNMP v1,v2c,v3 / Telnet / Console (CLI)	WEB / Windows Utility / SNMP v1,v2c,v3 / Telnet / Console (CLI)
Warranty	5 years			

Unmanaged Switch

Industrial Ethernet Switch



TPS-141TX-M12/24V

TGPS-1080-M12/-24V

TGPS-1080-M12-BP2/-24V

Port Number			
Number of ports	5	8	8
10/100Base-T(X) M12 D-Coding Ports	4 (P.S.E.) + 1 IEEE 802.3 at	-	-
10/100/1000Base-T(X) M12 A-Coding Ports	-	8 (P.S.E.) IEEE 802.3 at	8 (P.S.E.) IEEE 802.3 at(2-pair Bypass)
Power Redundancy			
DC (M12) Connector	1 (M12)	-	-
DC (M23) Connector	-	2 (M23)	2 (M23)
Installation			
DIN-Rail Mounting	-	-	-
Wall Mounting	●	●	●
Physical Characteristics			
Casing Protection	IP-40	IP-30	IP-30
Dimensions (mm)	89(W) x 53(D) x 178(H)	125(W) x 65(D) x 196(H)	125(W) x 65(D) x 196(H)
Operating Temperature			
-10 to 60°C	-	-	-
-40 to 70°C	●	●	●
Network Redundancy			
O-Ring	-	-	-
Open-Ring	-	-	-
O-Chain	-	-	-
MRP	-	-	-
MSTP/RSTP/STP	-	-	-
Management and Control			
802.1X	-	-	-
Rate Limit	-	-	-
Port Mirror	-	-	-
Port Security	-	-	-
IGMP v2/v3	-	-	-
QoS Port Base/COS/TOS	-	-	-
Port Trunk Static/LACP	-	-	-
LLDP	-	-	-
System Alarm	-	Relay	Relay
DHCP	-	-	-
VLAN	-	-	-
Management / Configuration	-	-	-
Warranty	5 years		



Managed Switch **Unmanaged Switch**

Industrial Ethernet Switch



TGS-9200-M12-BP2

TGS-9120-M12-BP2

TGS-1080-M12-BP2

Port Number			
Number of ports	20	12	8
10/100Base-T(X) M12 D-Coding Ports	-	-	-
10/100/1000Base-T(X) M12 A-Coding Ports	20 / 4(2-Pair HW bypass)	12 / 4(2-Pair HW bypass)	8 / 4(2-Pair HW bypass)
10/100/1000Base-T(X) M12 A-Coding Ports	-	-	-
Power Redundancy			
DC (M12) Connector	-	-	-
DC (M23) Connector	2 (M23)	2 (M23)	2 (M23)
Installation			
DIN-Rail Mounting	-	-	-
Wall Mounting	●	●	●
Physical Characteristics			
Casing Protection	IP-30	IP-30	IP-30
Dimensions (mm)	260(W) x 91.3(D) x 228(H)	260(W) x 91.3(D) x 216(H)	125(W) x 65(D) x 196(H)
Operating Temperature			
-10 to 60°C	-	-	-
-40 to 70°C	●	●	●
Network Redundancy			
O-Ring	●	●	-
Open-Ring	●	●	-
O-Chain	●	●	-
MRP	●	●	-
MSTP/RSTP/STP	●	●	-
Management and Control			
802.1X	●	●	-
Rate Limit	●	●	-
Port Mirror	●	●	-
Port Security	●	●	-
IGMP v2/v3	●	●	-
QoS Port Base/COS/TOS	●	●	-
Port Trunk Static/LACP	●	●	-
LLDP	●	●	-
System Alarm	SYSLOG / SMTP / SNMP Trap / Relay	SYSLOG / SMTP / SNMP Trap / Relay	Relay
DHCP	Server/Client	Server/Client	-
VLAN	Port-Based/802.1Q/Q-in-Q/GVRP	Port-Based/802.1Q/Q-in-Q/GVRP	-
Management / Configuration	WEB / Windows Utility / SNMP v1,v2c,v3 / Telnet / Console (CLI)	WEB / Windows Utility / SNMP v1,v2c,v3 / Telnet / Console (CLI)	-
Warranty	5 years		

Device Server
Industrial Device Server

TDS-5041-I-M12

Serial Port	
Serial port Numbers	4
Serial Mode	RS-422/485
Serial Port Connector	M12 (male)
Serial Port with 2KV Isolation	●
Serial Baud Rate	110 bps to 460.8 Kbps
Ethernet Port	
10/100Base-T(X) in M12 D-Coding Auto MDI/MDIX Ports	1(M12)
Power Redundancy	
DC Terminal Block	1(M12)
DC Power Jack	-
Installation	
DIN-Rail Mounting	-
Wall mounting	●
Physical Characteristics	
Casing Protection	IP-40
Dimensions (mm)	170(W) x 65(D) x 195(H) mm
Operating Temperature	
-40 to 70°C	●
-10 to 70°C	-
Networking Technology	
Operating Modes	Virtual Com, Serial Tunnel, TCP Server, TCP Client, UDP
Windows O.S. Supported	Windows NT/2000/XP/2003/VISTA 32/64-Bit/Windows 7 32/64-Bit
Multiple Link	5 host devices: Virtual COM, TCP Server, TCP Client mode; 4 IP ranges: UDP
Event Notification	Syslog / SMTP / SNMP trap / Beeper
NAT Router Pass Through	●
PPPoE	●
DDNS	●
Security	
HTTPS/SSH Management	●
IP White List	●
SSL Data Encryption	●
IEEE 802.1X	-
Warranty	
	5 years

EN50155 WLAN Access Point
Industrial Wireless Access Point

TGAP-620/620+-M12

Ethernet Ports	
10/100 Base-T(X) LAN Ports	-
10/100/1000 Base-T(X) LAN Ports	2 (M12)
IEEE 802.3af PoE(P.D.) Supported	(TGAP-620+-M12)
Ethernet Switch / Redundant Mode Support	●
WLAN Interface	
WLAN Standard	IEEE802.11a/b/g/n
Transmit Power	17 dBm max.
Transmission Rate	IEEE802.11b: 11Mbps IEEE802.11a/g: 54Mbps IEEE802.11n: 300Mbps
Antenna Connector	Reverse SMA
Antenna	2.4GHz:2 dBi 5GHz:3 dBi
Power Redundancy	
DC (connector)	2 (M23)
Installation	
DIN-Rail Mounting	-
Wall Mounting	●
Pillar-Mounting	-
Physical Characteristics	
Casing Protection	IP-40
Dimensions (mm)	125(W)x65(D)x196(H)
Operating Temperature	
-10 to 60°C	-
-25 to 70°C	●
Network Technology	
Alarm Notification	Relay Output / SNMP Trap / System Log
Management / Configuration	WEB/Window Utility
Warranty	
	5 years



EN50155 WLAN Access Point

Industrial Wireless Access Point



TGAP-6620/6620+-M12



TGAP-W610+/-M12



TGAP-W6610+/-M12

Ethernet Ports			
10/100 Base-T(X) LAN Ports	-	-	-
10/100/1000 Base-T(X) LAN Ports	2 (M12)	1(RJ45)/(M12)	1(RJ45)/(M12)
IEEE 802.3af PoE(P.D.) Supported	(TGAP-6620+-M12)	(TGAP-W610+-M12)	(TGAP-W6610+-M12)
Ethernet Switch / Redundant Mode Support	●	-	-
WLAN Interface			
WLAN Standard	Dual IEEE802.11a/b/g/n	IEEE802.11a/b/g/n	Dual IEEE802.11a/b/g/n
Transmit Power	17 dBm max.	17 dBm max.	17 dBm max.
Transmission Rate	IEEE802.11b : 11Mbps IEEE802.11a/g : 54Mbps IEEE802.11n : 300Mbps	IEEE802.11b : 11Mbps IEEE802.11a/g : 54Mbps IEEE802.11n : 300Mbps	IEEE802.11b : 11Mbps IEEE802.11a/g : 54Mbps IEEE802.11n : 300Mbps
Antenna Connector	Reverse SMA	N-Type	N-Type
Antenna	2.4GHz : 2 dBi 5GHz : 3 dBi	2.4GHz : 3 dBi 5GHz : 5 dBi	2.4GHz : 3 dBi 5GHz : 5 dBi
Power Redundancy			
DC (connector)	2 (M23)	2 (M12)	2 (M12)
Installation			
DIN-Rail Mounting	-	-	-
Wall Mounting	●	●	●
Pillar-Mounting	-	●	●
Physical Characteristics			
Casing Protection	IP-40	IP-67	IP-67
Dimensions (mm)	125(W)x65(D)x196(H)	310(W)x310(D)x87(H)	310(W)x310(D)x87(H)
Operating Temperature			
-10 to 60°C	-	-	-
-25 to 70°C	●	●	●
Network Technology			
Alarm Notification	Relay Output / SNMP Trap / System Log	SNMP Trap / System Log	SNMP Trap / System Log
Management / Configuration	WEB/Window Utility	WEB/Window Utility	WEB/Window Utility
Warranty	5 years		

EN50155 3.5G / 4G LTE WLAN Cellular VPN Router
Industrial Cellular VPN Router

TGAR-1062/1062+-3G/4G-M12
TGAR-1062+-3GS/4GS-M12

Ethernet Ports	
10/100 Base-T(X) LAN Ports	-
10/100/1000 Base-T(X) LAN Ports	2 (M12)
100 Base-FX Fiber Ports	-
IEEE 802.3af PoE(P.D.) Supported	(TGAR-1062+-3G/4G-M12)
Ethernet switch/redundant mode support	●
WLAN Interface	
WLAN Standard	IEEE802.11a/b/g/n
Transmit Power	17 dBm max.
Transmission Rate	IEEE802.11b : 11Mbps IEEE802.11a/g : 54Mbps IEEE802.11n : 300Mbps
Antenna connector	Reverse SMA
Antenna	2.4GHz:2 dBi 5GHz:3 dBi
GPS	
Antenna Connector	-
Frequency	1 x External SMA antenna connector 1575.42MHz
WAN Interface	
Cellular Standard	GSM / GPRS/ EGPRS/ EDGE / WCDMA / HSDPA / HSUPA / LTE(4G)
Transmission Power	33 dbm max.
SIM Slot	1
Antenna connector	Reverse SMA SMA
Antenna	Multi-Band Antenna
WAN Connection Type	Static/Dynamic IP,PPPoE
WAN Dial-UP	3G 4G LTE
Power Redundancy	
DC (connector)	2 (M23)
Installation	
DIN-Rail Mounting	-
Wall mounting	●
Pillar Mounting	-
Physical Characteristics	
Casing Protection	IP-40
Dimensions (mm)	125(W) x 65(D) x 196(H)
Operating Temperature	
-10 to 60°C	-
-25 to 70°C	●
Network Technology	
Alarm Notification	Relay Output / SNMP Trap / System Log/SMTP
Management / Configuration	WEB / Window Utility
Warranty	5 years



EN50155 Dual 3.5G / 4G LTE WLAN Cellular VPN Router

Industrial Cellular VPN Router



TGAR-2062/2062+3G/4G-M12

TGAR-2062+3GS/4GS-M12

Ethernet Ports			
10/100 Base-T(X) LAN Ports	-		-
10/100/1000 Base-T(X) LAN Ports	2 (M12)		2 (M12)
100 Base-FX Fiber Ports	-		-
IEEE 802.3af PoE(P.D.) Supported	(TGAR-2062+3G/4G-M12)		(TGAR-2062+3GS/4GS-M12)
Ethernet switch/redundant mode support	●		●
WLAN Interface			
WLAN Standard	IEEE 802.11a/b/g/n		IEEE 802.11a/b/g/n
Transmit Power	17 dBm max.		17 dBm max.
Transmission Rate	IEEE802.11b : 11Mbps IEEE802.11a/g : 54Mbps IEEE802.11n : 300Mbps		IEEE802.11b : 11Mbps IEEE802.11a/g : 54Mbps IEEE802.11n : 300Mbps
Antenna connector	Reverse SMA		Reverse SMA
Antenna	2.4GHz:2 dBi 5GHz:3 dBi		2.4GHz:2 dBi 5GHz:3 dBi
GPS			
Antenna Connector	-		1 x External SMA antenna connector
Frequency	-		1575.42MHz
WAN Interface			
Cellular Standard	GSM / GPRS/ EGPRS/ EDGE / WCDMA / HSDPA / HSUPA / LTE(4G)		GSM / GPRS/ EGPRS/ EDGE / WCDMA / HSDPA / HSUPA / LTE(4G)
Transmission Power	33 dbm max.		33 dbm max.
SIM Slot	2		2
Antenna connector	Reverse SMA	SMA	Reverse SMA SMA
Antenna	Multi-Band Antenna		Multi-Band Antenna
WAN Connection Type	Static/Dynamic IP,PPPoE		Static/Dynamic IP,PPPoE
WAN Dial-UP	Dual 3G	Dual 4G LTE	Dual 3G Dual 4G LTE
Power Redundancy			
DC (connector)	2 (M23)		2 (M23)
Installation			
DIN-Rail Mounting	-		-
Wall mounting	●		●
Pillar Mounting	-		-
Physical Characteristics			
Casing Protection	IP-40		IP-40
Dimensions (mm)	125(W) x 65(D) x 196(H)		125(W) x 65(D) x 196(H)
Operating Temperature			
-10 to 60°C	-		-
-25 to 70°C	●		●
Network Technology			
Alarm Notification	Relay Output / SNMP Trap / System Log/SMTP		Relay Output / SNMP Trap / System Log/SMTP
Management / Configuration	WEB / Window Utility		WEB / Window Utility
Warranty			
5 years			

EN50155 3.5G/4G LTE WLAN Cellular VPN Router
Industrial Cellular VPN Router

TGAR-1662/1662+-3G/4G-M12

TGAR-1662+3GS/4GS-M12

Ethernet Ports			
10/100 Base-T(X) LAN Ports		-	-
10/100/1000 Base-T(X) LAN Ports		2 (M12)	2 (M12)
100 Base-FX Fiber Ports		-	-
IEEE 802.3af PoE(P.D.) Supported		(TGAR-1662+-3G/4G-M12)	(TGAR-1662+-3GS/4GS-M12)
Ethernet switch/redundant mode support		●	●
WLAN Interface			
WLAN Standard		Dual IEEE 802.11a/b/g/n	Dual IEEE 802.11a/b/g/n
Transmit Power		17 dBm max.	17 dBm max.
Transmission Rate		IEEE802.11b : 11Mbps IEEE802.11a/g : 54Mbps IEEE802.11n : 300Mbps	IEEE802.11b : 11Mbps IEEE802.11a/g : 54Mbps IEEE802.11n : 300Mbps
Antenna connector		Reverse SMA	Reverse SMA
Antenna		2.4GHz : 2 dBi 5GHz : 3 dBi	2.4GHz : 2 dBi 5GHz : 3 dBi
GPS			
Antenna Connector		-	1 x External SMA antenna connector
Frequency		-	1575.42MHz
WAN Interface			
Cellular Standard		GSM / GPRS/ EGPRS/ EDGE / WCDMA / HSDPA / HSUPA / LTE(4G)	GSM / GPRS/ EGPRS/ EDGE / WCDMA / HSDPA / HSUPA / LTE(4G)
Transmission Power		33 dbm max.	33 dbm max.
SIM Slot		1	1
Antenna connector		Reverse SMA SMA	Reverse SMA SMA
Antenna		Multi-Band Antenna	Multi-Band Antenna
WAN Connection Type		Static/Dynamic IP,PPPoE	Static/Dynamic IP,PPPoE
WAN Dial-UP		3G 4G LTE	3G 4G LTE
Power Redundancy			
DC (connector)		2 (M23)	2 (M23)
Installation			
DIN-Rail Mounting		-	-
Wall mounting		●	●
Pillar Mounting		-	-
Physical Characteristics			
Casing Protection		IP-40	IP-40
Dimensions (mm)		125(W) x 65(D) x 196(H)	125(W) x 65(D) x 196(H)
Operating Temperature			
-10 to 60°C		-	-
-25 to 70°C		●	●
Network Technology			
Alarm Notification		Relay Output / SNMP Trap / System Log/SMTp	SNMP Trap / System Log/SMTp
Management / Configuration		WEB / Window Utility	WEB / Window Utility
Warranty		5 years	



EN50155 Outdoor Cellular VPN Router

Industrial Cellular VPN Router



TGAR-W1061-3G/4G-M12

Ethernet Ports	
10/100 Base-T(X) LAN Ports	-
10/100/1000 Base-T(X) LAN Ports	1 (M12)
100 Base-FX Fiber Ports	-
PoE (P.D.)Support	●
Ethernet switch/redundant mode support	-
WLAN Interface	
WLAN Standard	IEEE802.11a/b/g/n
Transmit Power	17 dBm max.
Transmission Rate	IEEE802.11b : 11Mbps IEEE802.11a/g : 54Mbps IEEE802.11n : 300Mbps
Antenna connector	N-Type
Antenna	2.4GHz :3dBi 5GHz :5 dBi
WAN Interface	
Cellular Standard	GSM / GPRS/ EGPRS/ EDGE / WCDMA / HSDPA / HSUPA / LTE(4G)
Transmission Power	33 dbm max.
SIM Slot	1
Antenna connector	N-type
Antenna	Multi-Band Antenna
WAN Connection Type	Static/Dynamic IP/PPPoE
WAN Dial-UP	3G
	4G LTE
Power Redundancy	
DC (connector)	2 (M12)
	2 (M12)
Installation	
DIN-Rail Mounting	-
Wall mounting	●
Pillar Mounting	●
Physical Characteristics	
Casing Protection	IP-67
Dimensions (mm)	310(W)x310(D)x87(H)
	310(W)x310(D)x87(H)
Operating Temperature	
-10 to 60°C	-
-25 to 70°C	●
Network Technology	
Alarm Notification	SNMP Trap / System Log/SMTP
Management / Configuration	WEB / Window Utility
Warranty	5 years

Managed Switch

Industrial Ethernet Switch



IGS-9812GP



IGS-3032GC



IES-3082GC

Port Number			
Number of ports	20	5	10
10/100Base-T(X) RJ45 Ports	-	-	8
10/100/1000Base-T(X) Ports	8	3	-
100/1000Base-X SFP Ports	12	-	-
Gigabit Combo Ports	-	2	2
Power Redundancy			
DC Terminal Block	2	2	2
DC Power Jack	-	1	1
Installation			
DIN-Rail Mounting	•	•	•
Wall Mounting	•	•	•
Physical Characteristics			
Casing Protection	IP-30	IP-30	IP-30
Dimensions (mm)	96.4(W)x105.5(D)x154(H)	54.2(W)x106.1(D)x145.4(H)	52(W)x106.1(D)x144.3(H)
Operating Temperature			
-40 to 70°C	•	•	•
Network Redundancy			
O-Ring	•	•	•
Open-Ring	•	•	•
O-Chain	•	•	•
MRP	•	•	•
MSTP/RSTP/STP	•	•	•
Management and Control			
802.1X	•	•	•
Rate Limit	•	•	•
Port Mirror	•	•	•
Port Security	•	•	•
SNMP v1/v2/v3	•	•	•
IGMP v2/v3	•	•	•
QoS Port Base/COS/TOS	•	•	•
Port Trunk Static/LACP	•	•	•
LLDP	•	•	•
IEEE 1588v2	•	-	-
System Alarm	SYSLOG/ SNMP Trap / Relay	SYSLOG/ SMTP / SNMP Trap / Relay	SYSLOG/ SMTP / SNMP Trap / Relay
DHCP	Server / Client/ Relay	Server / Client	Server / Client
VLAN	802.1Q	Port-Based / 802.1Q / Q-in-Q / GVRP	Port-Based / 802.1Q / Q-in-Q / GVRP
Management / Configuration	WEB / Windows Utility / SNMP v1,v2c,v3 /Telnet /Console(CLI)	WEB / Windows Utility / SNMP v1,v2c,v3 /Telnet /Console(CLI)	WEB / Windows Utility / SNMP v1,v2c,v3 /Telnet /Console(CLI)
Warranty	5 years		



Managed Switch

Unmanaged Switch

Industrial Ethernet Switch



IGPS-9842GTP



IGPS-9084GP



IGPS-1080-24V

Port Number			
Number of ports	14	12	8
10/100/1000Base-T(X) Ports	8 (P.S.E) IEEE 802.3 at + 4	8 (P.S.E) IEEE 802.3 at	8 (P.S.E) IEEE 802.3 at (max 120 Watts)
100/1000Base-X SFP Ports	2	4	-
Power Redundancy			
DC Terminal Block	2	2	2
DC Power Jack	-	-	-
DIN-Rail Mounting	•	•	•
Wall Mounting	•	•	•
Physical Characteristics			
Casing Protection	IP-30	IP-30	IP-30
Dimensions (mm)	74.3(W)x109.2(D)x153.6(H)	96.4(W)x108.5(D)x154(H)	41(W)x94.9(D)x144.3(H)
Operating Temperature			
-40 to 70°C	•	•	•
Network Redundancy			
O-Ring	•	•	-
Open-Ring	•	•	-
O-Chain	•	•	-
MRP	•	•	-
MSTP/RSTP/STP	•	•	-
Management and Control			
802.1X	•	•	-
Rate Limit	•	•	-
Port Mirror	•	•	-
Port Security	•	•	-
SNMP v1/v2/v3	•	•	-
IGMP v2/v3	•	•	-
QoS Port Base/COS/TOS	•	•	-
Port Trunk Static/LACP	•	•	-
LLDP	•	•	-
IEEE 1588v2	•	•	-
System Alarm	SYSLOG/ SNMP Trap / Relay	SYSLOG/ SNMP Trap / Relay	Relay
DHCP	Server / Client/ Relay	Server / Client/ Relay	-
VLAN	802.1Q	802.1Q	-
Management / Configuration	WEB / Windows Utility / SNMP v1,v2c,v3 /Telnet /Console(CLI)	WEB / Windows Utility / SNMP v1,v2c,v3 /Telnet /Console(CLI)	-
Warranty	5 years		



Notes

A large, empty rectangular box with a blue border, intended for user notes.



Notes