Choose ORing Make Excellence

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ORing Industrial Networking Solutions



Industrial Networking Solutions

Ethernet Switch
PoE Switch/ PoE Accessory
EN50155 Series
IEC 61850-3 Series
Cellular Router
Wireless Solution
Media Converter
Serial Device Server
Smart Lighting Controller

ORing
www.ORingnet.com

Unmanaged Switch

Standard/ Cost-effective



- Portfolio includes 10M T1L, FE, 1GbE, 2.5GbE, and 10GbE options
- Available in DIN-rail and wall mount types
- 5 to 24 ports supported
- Single-Pair Ethernet (SPE) solution available

Managed Switch

Standard L2/ Advanced L2/ L3



- Portfolio includes FE, 1GbE, 2.5GbE, and 10GbE options
- Available in DIN-rail and rackmount types
- 5 to 28 ports supported
- Cyber-hardened series certified to IEC 62443-4-2
- PN series certified for PROFINET CC-B

PoE Series

Switch/ Media Converter/ Injector/ Splitter



- Supports up to IEEE 802.3bt with 90W output per port
- PSE conformance tested by Sifos
- Comprehensive power booster products with 12V/24V input
- Advanced PoE features supported on managed switches

EN50155 Series

Switch, WiFi AP, Cellular Router, PoE Injector/ Splitter



- Company is IRIS certified
- EN 50155 and EN 45545-2 compliant
- Switches support 5 to 24 ports
- Vibration-proof M12 and Q-ODC connectors
- Available SKUs: DC 24V, DC 110V, and DC 24–110V

IEC 61850-3 Series

DIN-rail/ Rackmount/ Modular Design



- IEC 61850-3/IEEE 1613 certified
- MMS server, IEC 61850 QoS, PTP supported
- HSR/PRP seamless redundancy
- Up to 12/ 28 SFP sockets on DIN-rail and rackmount models
- Modular models allow customized interface combinations



Management System

Host Monitor / Topology View / CyberSIEM

Media Converter

Serial Conversion/ Ethernet / PoE to Fiber



- Provides 100M, 1GbE, and 10GbE solutions
- Supports Link Fault Pass-Through
- Dual power inputs
- Standard and wide-temperature range SKUs available
- Fiber interfaces with SC or SFP connectors

Cellular Router

4G/ 5G/ NB-IoT



- Available in DIN-rail, wall-mount, and pole-mount types
- Secure VPN connections: OpenVPN, PPTP, IPSec, Cloud VPN
- Supports Wi-Fi, Serial, DI/DO, GPS (by model)
- Dual SIM redundancy
- E-mark and EN50155 models available for transport projects
- Provide products approved by AT&T, Verizon, and FirstNet

Serial Connectivity

RS-232/422/485 to Ethernet/ WiFi/ Cellular



- Operating modes: TCP Server/Client, UDP, VCOM, Modbus Gateway
- Supports Modbus ASCII/RTU to Modbus TCP conversion
- Built-in ORing “Open Gateway” feature
- Dual power input
- OpenWRT SDK available on specific products

Industrial IoT

For Smart City and Smart Grid Applications



- Smart lighting controller
- FCI (Overhead fault circuit indicator)

WLAN AP/CPE

IEEE 802.11a/b/g/n/ac/ax



- Operating modes: AP, Client, Bridge, AP-Client, and Repeater
- X-Roaming with hand-off time under 100 ms
- IP67/IP68-rated APs for outdoor applications
- EN 50155 models available for railway projects

About ORing

Founded in 2005, ORing specializes in innovative industrial-grade products. With extensive experience in wired and wireless network communications, ORing provides high-quality products and excellent customer services for diverse sectors including factory automation, ITS, IP surveillance, railway, power utility, IIoT, and new energy, with global offices for real-time customer support.

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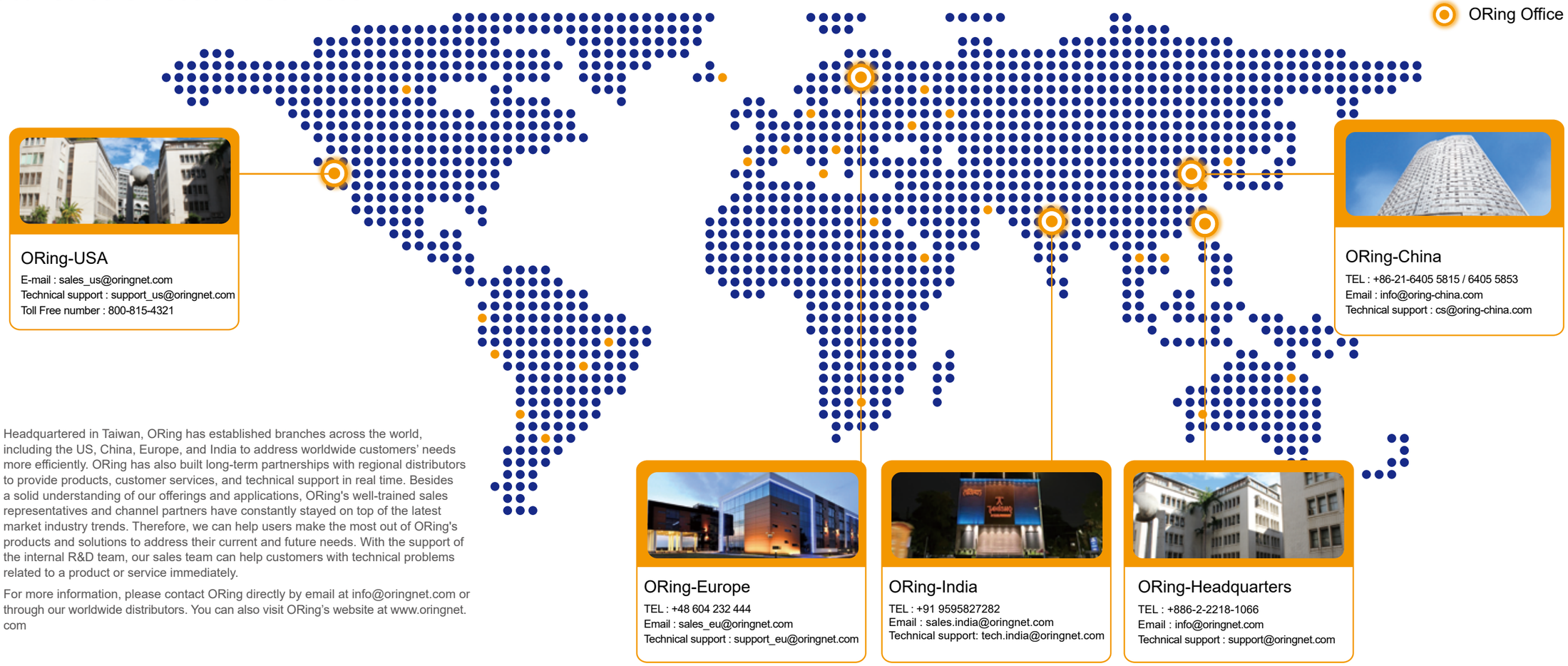
Global Sales Offices and Services



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Headquartered in Taiwan, ORing has established branches across the world, including the US, China, Europe, and India to address worldwide customers' needs more efficiently. ORing has also built long-term partnerships with regional distributors to provide products, customer services, and technical support in real time. Besides a solid understanding of our offerings and applications, ORing's well-trained sales representatives and channel partners have constantly stayed on top of the latest market industry trends. Therefore, we can help users make the most out of ORing's products and solutions to address their current and future needs. With the support of the internal R&D team, our sales team can help customers with technical problems related to a product or service immediately.

For more information, please contact ORing directly by email at info@oringnet.com or through our worldwide distributors. You can also visit ORing's website at www.oringnet.com

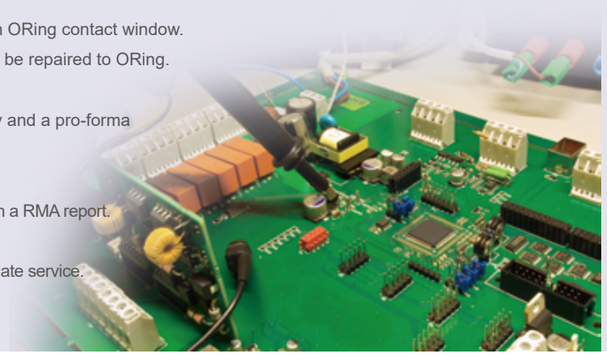
RMA Service

ORing provides maintenance and repair services for both warranty and out-of-warranty products. RMA items to be repaired or replaced will be defined in the following procedures:

1) The customer completes the RMA request form and submits to an ORing contact window.
2) Upon receiving a RMA number, the customer ships the product to be repaired to ORing.
3) ORing checks the product and identify the problem.
4) A service charge will be requested if the product is out of warranty and a pro-forma invoice will be issued to the customer.
5) ORing repairs or replaces the product.
6) The repaired or replaced product is shipped back to the customer with a RMA report.
7) ORing marks the RMA request as closed.

We are available at any time to provide you the most friendly and immediate service.

More Information: oringnet.com/en/support/oring-rma-service



Product Warranty



ORing products are provided with a warranty for up to five years.

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Subscription

ORing is excited to share the latest updates, exclusive content, and special offers with you. Stay informed about the newest trends and expert insights by subscribing to the ORing newsletter today!

Focused Vertical Markets with Industrial Grade Certifications

Over 100 models of ORing products have been deployed in a wide variety of applications and environments worldwide. Vertical markets have played a key role in ORing's business. As vertical markets adhere to standards and certification which can be complex, costly, and time-consuming, ORing has made sure all products are produced and tested in certificated labs and manufacturing stages. Also, ORing products are fully compliant with a variety of safety standards, To show our care for the environment, all of ORing's products are qualified with EU's WEEE and RoHS directives.

ISO/TS 22163

ISO/TS 22163 builds on ISO 9001 by adding railway-specific quality management requirements, helping organizations deliver consistent products and services through effective process control and continual improvement. ORing first achieved IRIS certification in 2015, demonstrating its long-standing commitment to quality in the railway industry. With a quality management system aligned with ISO/TS 22163, ORing strengthens the management of product development, manufacturing, and project delivery, giving partners and customers greater confidence in its ability to meet demanding railway requirements.

IEC 62443

IEC 62443 is an international standard that address cybersecurity for industrial automation and control systems (IACS). It provides a comprehensive framework to secure these systems throughout their lifecycle, from design and implementation to operation and maintenance. The standards cover everything from organizational security measures to technical requirements, ensuring that industrial environments, such as manufacturing, energy, and critical infrastructure, are protected against cyber threats.

EN 50155

EN 50155 is an international standard set for railway applications. EN50155 requires compliance with temperature, humidity, and electromagnetic interference. The standard guarantees the reliability of railway services by governing the operation, design, construction, and testing of electronic equipment.

EN 50121-4

EN 50121-4 applies for emission and immunity of the signalling and telecommunications apparatus in railway applications. It specifies the limits of emission as well as immunity, and identifies products that can operate despite the extreme surge and emissions hazards of railway environments.

EN 45545

EN 45545 specifies the fire protection requirements for materials and products used on railway vehicles. EN 45545-2 compliance demonstrates that the product is designed for fire safety in railway environments, meeting European regulatory requirements for material flammability, smoke, and toxicity performance.

EN 60945

EN 60945 specifies the use of maritime navigation and radio communication equipment on a ship. All such equipment must undergo various tests such as temperature, vibration, humidity, corrosion, water immersion, and electromagnetic emissions to prove their abilities to withstand severe conditions found across the world's oceans.

C1D2/ IECEx

C1D2 and IECEx are two standards for equipment used in hazardous areas such as oil and gas, mining, and energy detection systems. C1D2 is a US standard referring to situations in which ignitable concentrations of gases, vapors, or liquids are present but are contained. IECEx is an international standard regulating the use of electrical equipment and components in potentially explosive areas.

E-mark

E-mark is an European standard specifying the safety requirements of vehicles and their components. To obtain an E-mark, the products must be tested by a Technical Service appointed by the VCA (Vehicle Certification Agency), which will issue the certificate and approval number to be marked on the product. E-mark is a mandatory requirement and all products installed on a vehicle must have an E-mark to be sold legally in Europe.

IEEE 1613

IEEE-1613 is the IEEE standard specifying ratings, environmental performance, and testing requirements for communications networking devices installed in electric power substations. Within the standard, two classes (Class 1; Class2) of devices are defined, based on the outcome of a specific set of potentially destructive EMI type tests (EMI stress) designed to stimulate EMI phenomena in the substation.

IEC 61850-3

IEC 61850 is a standard for the design of electrical substation automation while “-3” signifies general requirements. Abstract data models defined in IEC 61850 can be mapped to a number of protocols that run over TCP/IP networks or substation LANs using high speed switched Ethernet to obtain the necessary response times below four milliseconds for protective relaying.

AT&T/ Verizon Certifications

AT&T and Verizon device certifications are essential for manufacturers to ensure their devices meet network performance and reliability standards. AT&T’s process involves regulatory certifications, IoT Network Certification, and performance testing. Verizon requires manufacturers to register with its Open Development program, provide detailed device information, and complete rigorous testing. These certifications guarantee that devices operate safely and effectively on each carrier’s network.

PTCRB

PTCRB is a US standard that ensures mobile devices are compliant with cellular network standards within the operators' networks so that operators can be sure the mobile devices will not harm their networks. Cellular devices to be sold in North America are required to have a PTCRB certificate because it is a requirement for launching cellular devices on the US operators such as AT&T, Verizon, etc.

IEC 61010-1/ IEC 62368-1

IEC 61010-1 and IEC 62368-1 are two international safety standards that address different aspects of electrical and electronic equipment. IEC 61010-1 focuses on the safety requirements for electrical equipment used in measurement, control, and laboratory environments, ensuring they can be safely operated in those settings. IEC 62368-1, on the other hand, is a hazard-based standard that covers audio/video, information, and communication technology equipment.Both standards are crucial for ensuring that equipment can be used safely in various applications.

FirstNet

FirstNet is a rigorous process that ensures devices meet stringent technical, performance, and security standards for operation on the FirstNet network, a dedicated broadband system for U.S. first responders. The certification process includes comprehensive testing for network compatibility, performance, and cybersecurity to guarantee reliable and secure communication during emergencies. Certified products benefit from priority access, enhanced security features, and dependable communication, which are vital for public safety.

FCC

The FCC Declaration of Conformity or the FCC label or the FCC mark is a certification mark employed on electronic products manufactured or sold in the United States which certifies that the electromagnetic interference from the device is under limits approved by the Federal Communications Commission.

CE

The CE marking is a mandatory European conformity marking for certain products sold within, manufactured in, or targeted at the European Economic Area (EEA) since 1993. It is consists of the CE-Logo and, if applicable, the four digit identification number of the notified body involved in the conformity assessment procedure. The CE marking is the manufacturer's declaration that the product meets the requirements of the applicable EC directives.



- IEC 62443-4-1
- ISO 9001
- IECEx
- ISO/TS 22163

Product Categories

Standard	Cost-Effective
■ IES - 1000 Series	■ IES - C1000 Series
■ IGS - 1000 Series	■ IGS - C1000 Series
■ IPS - 1000 Series	■ IDGS - C1000 Series
■ IGPS - 1000 Series	■ IGPS - C1000 Series
	■ IDGPS - C1000 Series

Industrial Unmanaged Ethernet Switches

High Reliability
- Most products feature dual power inputs
- 5-year warranty

Complete Portfolio
- 35+ models available, from 5 to 24 ports
- DIN-rail or wall mount options

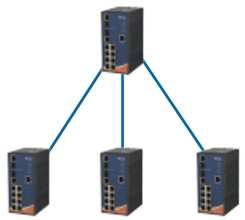
Easy Maintenance
- Plug-and-play simplicity
- Supports relay output for power failure



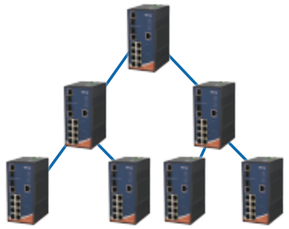
Network Topology



Chain



Star



Tree

E-MARK



IES-150B
5FE



IGPS-1080-24V
8G/PSE



IEC 60945
EN 60945



IGS-1080A
8GE



IGPS-C1042GP
4G/PSE
+ 2G SFP slot





Factory Automation

Withstanding harsh industrial conditions while enabling fast, stable communication between machines and control systems through plug-and-play deployment.



Surveillance

Delivering reliable data and power to IP cameras in outdoor or factory environments, ensuring uninterrupted video streams with industrial-grade durability.



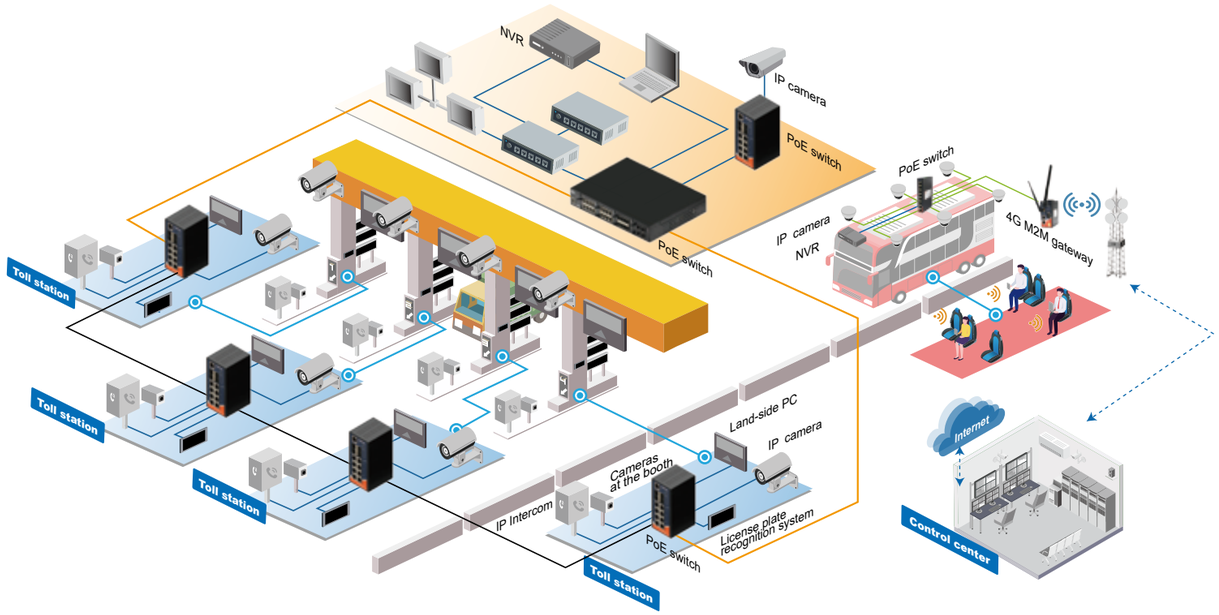
Building Automation

Simplifying network setup for HVAC, lighting, and access control systems in utility rooms or control panels, with rugged design suited for non-climate-controlled areas.



Retail

Ensuring stable connectivity for POS, signage, and surveillance devices in challenging environments like warehouses or large-format retail stores, while minimizing maintenance.



Model	Total Port	RJ-45			Fiber			Gigabit	Power Input		DO	Specific Certificate
		10/100 Base-TX	10/100/1G Base-T	10/100/1G/2.5G Base-T	100 Base-FX	100/1G Base-X	100/1G/10G Base-X	Combo	Single	Redundant		
IES-150B	5	5								12-48VDC		E-Mark
IES-180B	8	8								12-48VDC		
IES-1080A	8	8								12-48VDC	✓	
IES-1160	16	16								12-48VDC	✓	
IES-1162GC	18	16						2		12-48VDC	✓	
IES-1240	24	24								12-48VDC	✓	
IBS-102FX series	2						2 LC			12-48VDC	✓	
IGCS-E140	4		4						PCIe bus-powered			EN 50155
IGS-1050A	5		5							12-48VDC	✓	
IGS-150B	5		5							12-48VDC		
IGS-1041GPA	5		4			1 SFP				12-48VDC	✓	
IGS-1042GPA	6		4			2 SFP				12-48VDC	✓	
IGS-1080A	8		8							12-48VDC	✓	IEC/EN 60945
IGS-182GP	10		8			2 SFP				12-48VDC		

C1000: Economical Ethernet Solution

Compared to the standard 1000 series, this lineup removes certain hardware features and adopts a unified design to offer a more cost-effective solution.

- **Fast Ethernet and Gigabit Switch**
- **High speed model with 10Gbit/s**
- **PoE bt, up to 90W per port**





Compact Design

Saves space, installs easily in compact areas, simplifies maintenance, and is cost-effective, ideal where advanced features aren't needed.



Built-in QoS

Ensures prioritized data flow and prevents network disruptions, enhancing reliability in demanding environments.



Broadcast Storm Protection

Prevents the impact of broadcast storms, which can severely degrade network performance and stability.

Model	Total Port	RJ-45		Fiber	Power Input
		10/100 Base-TX	10/100/1G Base-T	100 Base-FX	Single
IES-C1050-L	5	5			9-60 VDC/ 24VAC
IES-C1080-L	8	8			9-60 VDC/ 24VAC
IES-C1062P-L	8	6		2 SFP	9-60 VDC/ 24VAC
IES-C1160-L	16	16			9-60 VDC/ 24VAC
IGS-C1050-L	5		5		9-60 VDC/ 24VAC
IGS-C1080-L	8		8		9-60V DC/ 24VAC

10G Uplink Switches



Model Name	IDGS-C1042GP+	IDGPS-C1042GP+-BT
RJ45 Port	4x 2.5G Ethernet	4x 2.5G PSE
SFP Port	2x 1G/10G	2x 1G/10G
PoE	Not support	Support, IEEE 802.3bt
Enclosure	IP40	IP40
Power Input	Dual 12-48VDC	Dual 52-57VDC

Target Applications



Factory Automation

Providing fast local communication between high-speed devices like vision systems or industrial PCs, with 10G uplinks supporting centralized data processing and monitoring.



Surveillance

Delivering higher bandwidth for high-resolution IP cameras and smooth video streaming, while ensuring stable backhaul to the NVR or control center via 10G uplink.



ITS

Ensuring fast data delivery from traffic sensors and cameras to central systems, while simplifying roadside deployments with 2.5G Ethernet and fiber connectivity



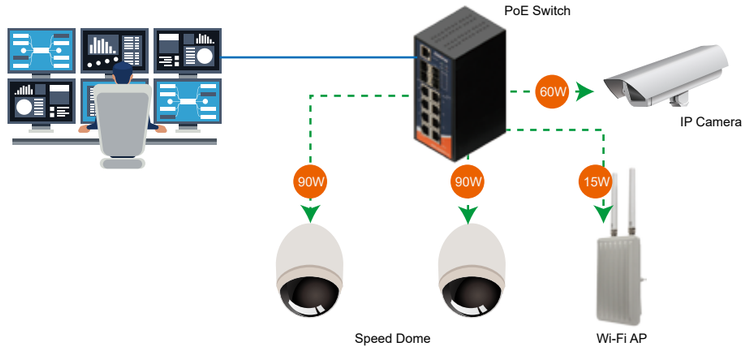
Smart City

Powering edge devices like smart cameras or sensors with 2.5G PoE, while aggregating large data volumes through 10G fiber for real-time analysis and responsive services.

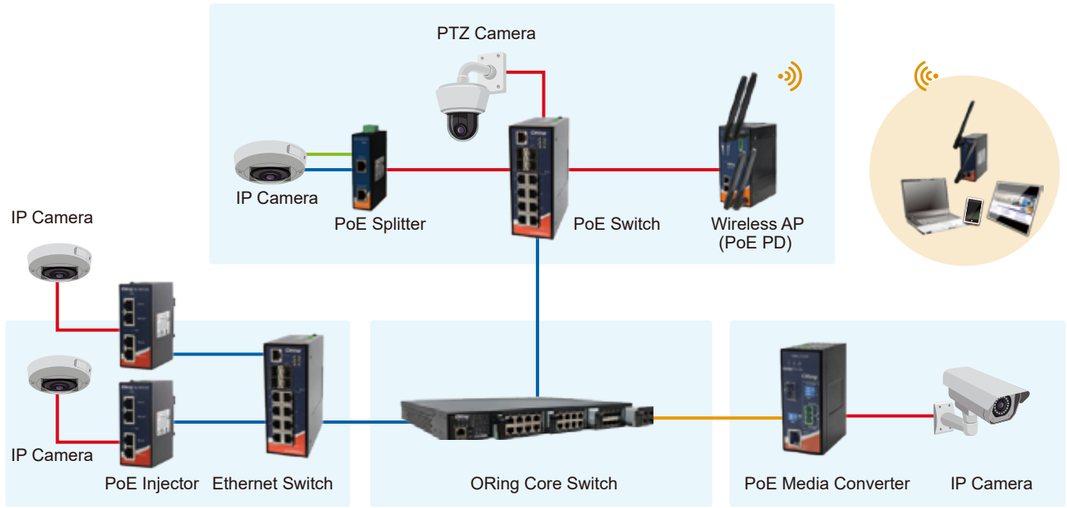
Power Your Devices. Simplify Your Network.

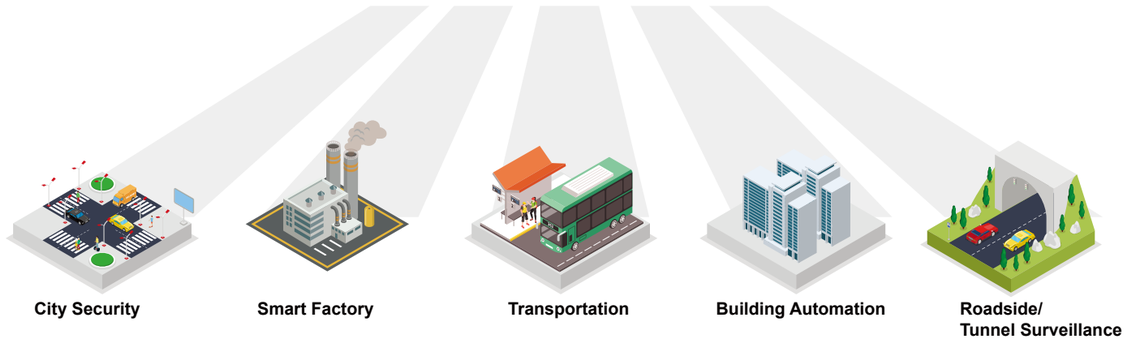
PoE provides numerous benefits in terms of network efficiency and cost-effectiveness, such as flexible network designs, simplified, faster, and lower-cost installation, easy and fast rearrangement of existing deployments, and centralized power management.

The IEEE has ratified three PoE standards: IEEE 802.3af, IEEE 802.3at, and IEEE 802.3bt. IEEE 802.3af provides up to 15.4W of DC power to each device, IEEE 802.3at (also known as PoE+) provides up to 30W, and the latest IEEE 802.3bt standard delivers up to 90W of power for high-power devices like PTZ IR cameras and multifunction endpoints.



IP Surveillance Application





Standard 1000 PoE Series

Model	Total Ports	RJ-45			Fiber			Power Input	Digital Output	Certificate
		10/100 Base-TX	10/100/1G Base-T	2.5G Base-T	100 Base-FX	100/1G Base-X	1G/10G Base-X			
IPS-1042FA series	6	4 PoE			2 SC			Dual 50-57 VDC	✓	
IPS-1042FX series	6	4 PoE			2 SC			Dual 24-36 VDC	✓	
IPS-1080A	8	8 PoE						Dual 50-57 VDC	✓	
IPS-1080-24V	8	8 PoE						Dual 12-57 VDC	✓	
IGPS-1411GTPA	6		5 (4 PoE)			1 SFP		Dual 50-57 VDC	✓	IEC/EN 60945
IGPS-1411GTP-24V	6		5 (4 PoE)			1 SFP		Dual 12-57 VDC	✓	
IGPS-1042GPA	6		4 PoE			2 SFP		Dual 50-57 VDC	✓	
IGPS-1042GP-24V	6		4 PoE			2 SFP		Dual 12-57 VDC	✓	
IGPS-1080-24V	8		8 PoE					Dual 12-57 VDC	✓	E-Mark
IGPS-1082GP	10		8 PoE			2 SFP		Dual 50-57 VDC	✓	
IGPS-1082GP-24V	10		8 PoE			2 SFP		Dual 12-57 VDC	✓	
IGPS-1082GP-BT	10		8 PoE			2 SFP		Dual 50-57 VDC	✓	
IGPS-C1042GP	6		4 PoE			2 SFP		Dual 48-57 VDC		
IDGPS-C1042GP+-BT	6			4 PoE			2 SFP+	Dual 52-57 VDC		
IGPS-C1082GP	10		8 PoE			2 SFP		Dual 48-57 VDC		

Single Pair Ethernet (SPE)

A new IEEE Ethernet technology that transmits data and power over just one pair of twisted wires. It enables simplified cabling, reduced weight, and cost-effective connectivity for industrial automation, building control, and automotive applications.

Simplified wiring
Only one twisted pair needed

Long-distance communication
Up to 1000 meters

Supports data + power
Via PoDL (Power over Data Line)

Ideal for IIoT
Connects sensors, actuators, and field devices

Space-saving
Perfect for compact and embedded applications

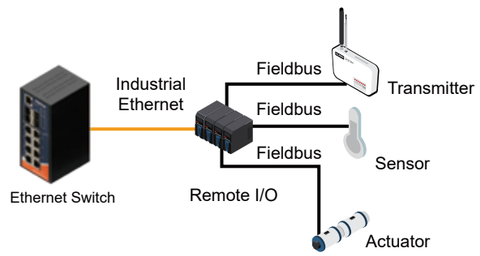
ITPS-141TX-T1L

Industrial Unmanaged Single-Pair Ethernet Switch

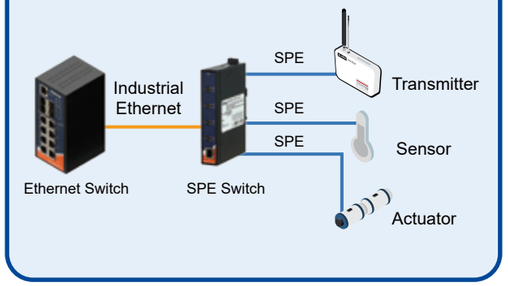


- 4-port 10Base-T1L with PoDL
- 1-port 10/100Base-T(X)
- Compliant with IEEE 802.3cg and 802.3bu
- Up to 1km distance over SPE
- -40~70°C, dual 24VDC (20~30V)

Traditional Ethernet



Single-Pair Ethernet



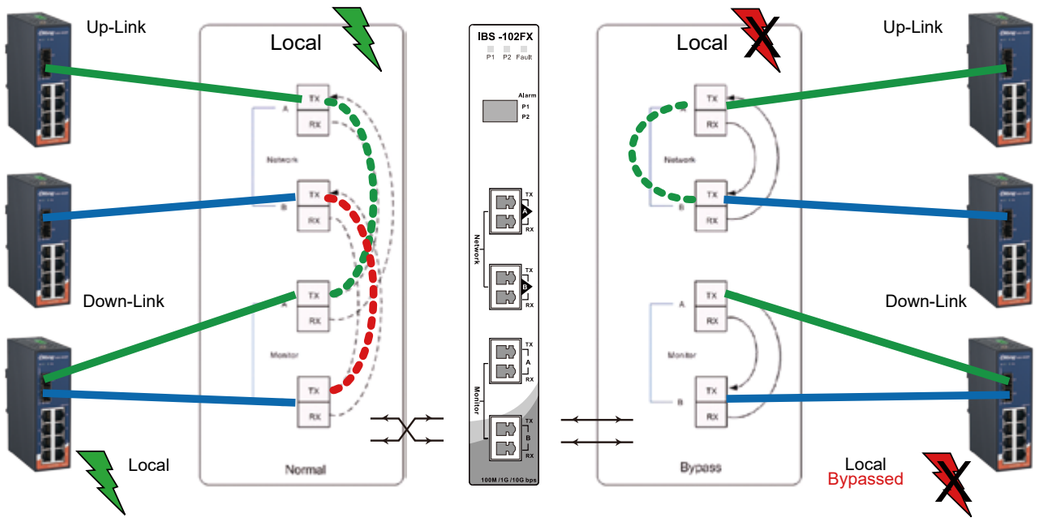
Potential Applications

Building automation	Autonomous vehicle	Elevator control	Production line control
Robotic arm	Motor control	Sensor connectivity	Legacy network retrofit

Optical Interface Bypass - IBS-102FX

Same as copper interface but use optical for bypass feature.

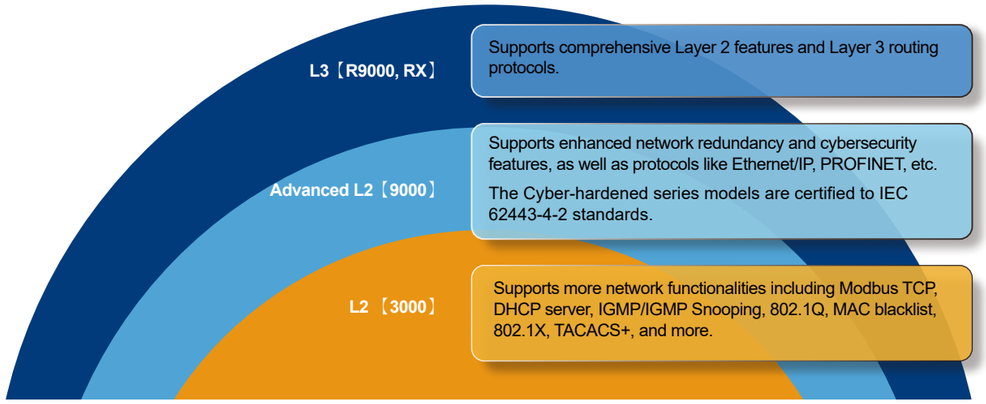




Model	LC Connector	Fiber				Power Input	DO
		Mode	Wavelength	Switch time	Insert loss		
IBS-102FX-MM-LC	4	Multi-mode	1310, 1550 nm	< 8ms	Typical 1.2 dB , Maximum 2 dB	Dual 12-48VDC	✓
IBS-102FX-SS-LC	4	Single-mode	850, 1310 nm	< 8ms	Typical 1.2 dB , Maximum 1.6 dB	Dual 12-48VDC	✓

Managed Switch

- **120+ managed models**
- **Modular design for greater versatility**
- **Up to 12 SFP sockets on DIN-Rail model**
  28 SFP sockets on Rackmount model

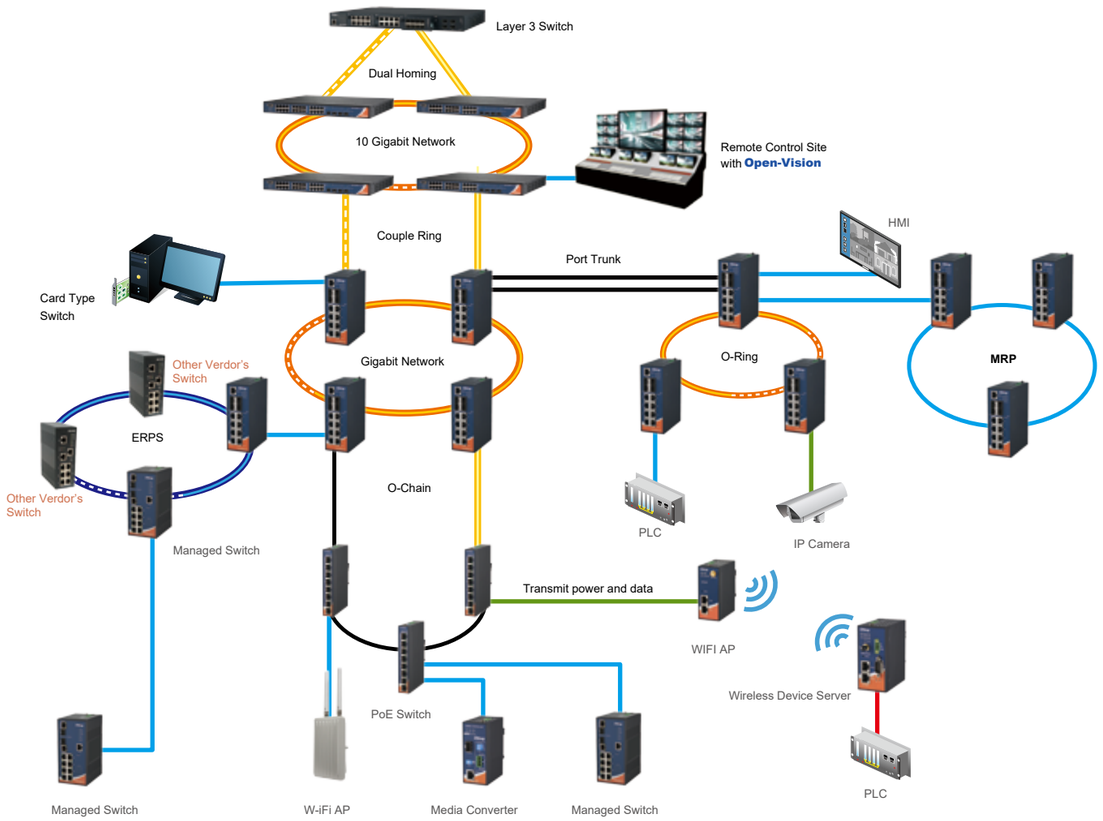






Network Redundancy

Many network redundancy or recovery protocols have been defined by the IEEE, such as STP, RSTP, MSTP, to ensure recovery from network disconnections. However, industrial applications require a much shorter recovery time than commercial applications. Hence, industrial networking devices often use proprietary redundant ring technologies to minimize downtime. ORing has developed a variety of proprietary redundancy technologies including O-Ring and O-Chain. These proprietary redundant ring technologies not only meet the needs of different networking topologies, but also assure the reliability of the network.



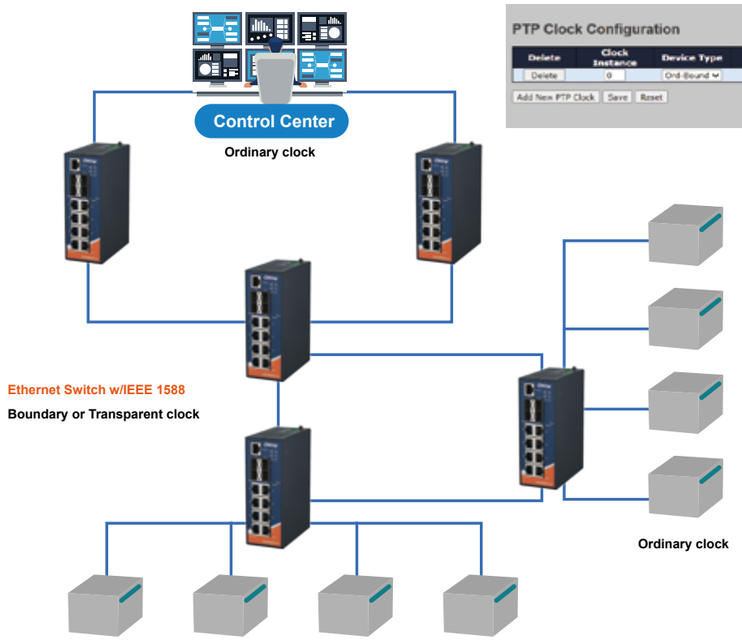
Technology	O-Ring / O-Chain	RSTP	MSTP	MRP	ERPS
Standard	Proprietary	IEEE 802.1w	IEEE 802.1s	IEC 62439-2	ITU-T G.8032
Topology	Ring	Any	Any	Ring	Ring
Failure Recovery Time	<30ms	3~10s	3~10s	10~500ms	<50ms
Support on ORing Model	All managed switches	All managed switches	3000 series 9000 series	9000 series	9000 series

Jumbo Frame

ORing's Gigabit Ethernet switches, with 10 times the bandwidth of 1000Base-T Ethernet switches, feature Jumbo frame support, which enables Jumbo Frame is useful for transmitting mega-pixel IP surveillance videos since the CPUs have fewer frames to process as a larger payload is put into each frame. This will increase data transmission efficiency, thereby improving network performance.

IEEE 1588 (Precision Time Protocol, PTP)

- **Developed by IEEE for clock synchronization over packet-based networks**
- **Enables precise time alignment using data packet transmission**
- **Supported by NIST and widely adopted in the communications industry**
- **Evolved alongside packet-switched networks (PSNs)**
- **Latest version: IEEE 1588v2, offering improved accuracy and performance**



	3000 series	9000/ R9000/ RX series
IEEE 1588 v2 (HW)	PTP Client	PTP Client/ Server

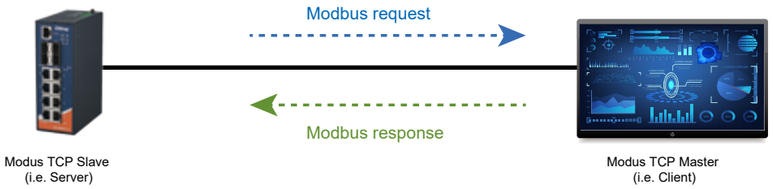
* Not support on 3000-LA series

Industrial Communication Protocols



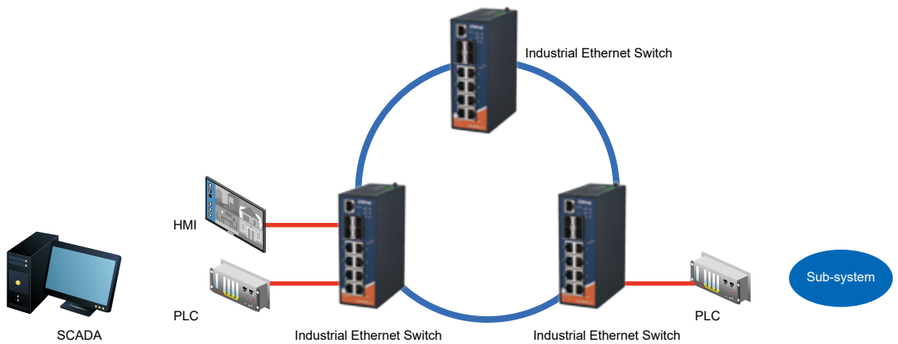
Modbus TCP

Based on the Modbus RTU protocol, this version runs over TCP/IP to enable communication via Ethernet networks. Commonly used to connect PLCs, I/O modules, and gateways, it also allows SCADA systems to monitor and control industrial Ethernet switches efficiently.



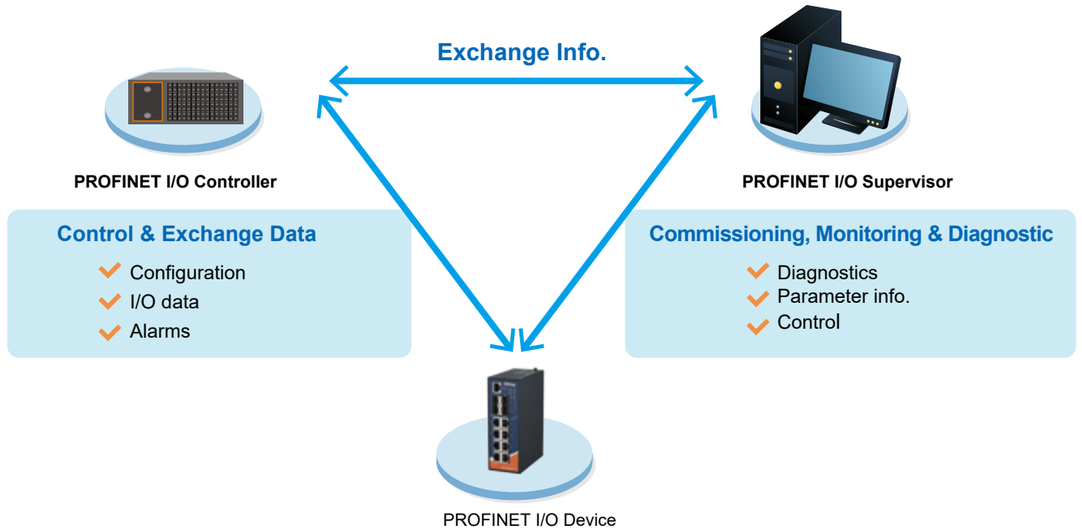
EtherNet/IP

Ethernet Industrial Protocol, developed by ODVA, is widely used in factory automation for real-time data exchange between controllers and field devices. With support for CIP, it enables seamless integration of Ethernet switches, allowing reliable, high-speed communication in time-critical industrial networks



PROFINET

Developed by PROFIBUS & PROFINET International (PI), this protocol enables real-time, deterministic communication in automation systems. With PROFINET support, Ethernet switches can ensure low-latency data exchange and reliable integration of controllers and field devices.



PROFINET CC-B Product List



IGS-9042GP-LA-PN
4G TX + 2G SFP



IGS-9080-LA-PN
8G TX



IGPS-9084GP-LA-PN
8G/PSE + 4G SFP



IGS-9122GP-PN
12G TX + 2G SFP



IGS-9168GP-PN
16G TX + 8G SFP

	3000 series	9000/ R9000/ RX series
Modbus TCP	Support	Support
Ethernet/IP	-	Support
PROFINET	-	Support

Standard 3000 Series

Model	Total Port	RJ-45		Fiber	Gigabit Combo	Dual Power Input	Specific Certificate
		10/100 Base-TX	10/100/1G Base-T	100/1G Base-X			
IES-3082GP-LA	10	8		2 SFP		12-48VDC	
IES-P3073GC-HV	10	7			3	85-264 VAC/ 88-373 VDC	IEC 61850-3, IEEE 1613
IES-P3073GC-LV	10	7			3	12-48 VDC	IEC 61850-3, IEEE 1613
IES-3164GP-LA	20	16		4 SFP		12-48 VDC	
IGS-3084GP-LA	12		8	4 SFP		12-48 VDC	
IGS-3164GP-LA	20		16	4 SFP		12-48 VDC	
RGS-3244GP	28		24	4 SFP		100-240 VAC	

IEC 62443-4-2 Certified Products

The Cyber-Hardened series have achieved IEC 62443-4-2 certification, providing enhanced security and reducing the risk of cyber incidents in critical sectors such as power generation, transportation, and manufacturing.



Ethernet Switches
IGS-9084GP-LA
IGPS-9084GP-LA series
IGS-9168GP
RGS-92222GCP-NP series
RGPS-92222GCP series
RGPS-9244GP series
RGPS-R9244GP+ series



IEC 61850-3 Switches
IGS-P9812GP series
IGS-P9164GC series
RES-P9242GCL series
RGS-P9000 series



EN50155 Switches
TGPS-9084GT-M12X-BP2-WV



4G LTE Gateway
IGMG-P83244GC+-D4G

Cybersecurity

IEC 62443

Cybersecurity for Industrial Automation and Control Systems

IEC 62443 establishes a framework to safeguard IACS throughout thair lifecycle

- Guidelines for component manufactures
- Practices for system integrators
- Policies for asset owners
- Applicable across industries



General	Policies & Procedures	System	Component
IEC 62443-1-1 Concepts and models	IEC 62443-2-1 Requirement for an IACS security management system	IEC 62443-3-1 Security technologies for IACS	IEC 62443-4-1 Product development requirements
IEC 62443-1-2 Master glossary of terms and abbreviations	IEC 62443-2-2 Implementation guidance for an IACS security management system	IEC 62443-3-2 Security risk assessment and system design	IEC 62443-4-2 Technical Security Requirements for IACS components
IEC 62443-1-3 System security conformance metrics	IEC 62443-2-3 Patch management in the IACS environment	IEC 62443-3-3 System security requirements a nd security levels	
IEC 62443-1-4 IACS security life-cycle and use-cases	IEC 62443-2-4 Requirements for IACS solution suppliers		

To meet growing demands for industrial network security and compliance, ORing's 9000-series products come with the latest S12 firmware. Aligned with IEC 62443, S12 enhances cybersecurity, access control, and integration flexibility—helping users build secure and resilient networks for future challenges.

Enhancements in S12 Firmware

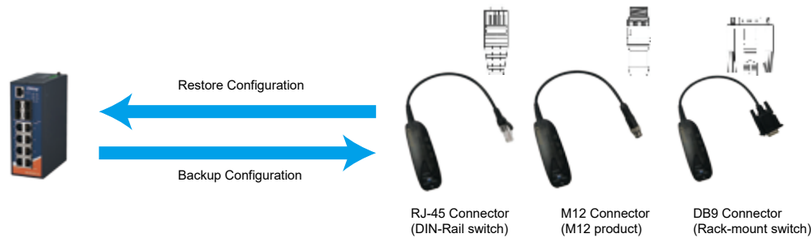
- 802.1x + Device Binding
- Password Policy Enforcement
- No Default Password
- Group-based User Privilege
- Account Lockout
- Audit Logging
- Auto Logout Configuration

DBU-01 : Device Configuration Backup Unit

Plug-and-play

Its purpose is to save or restore configuration files from ORing's managed products. The standalone unit connects to the console port of ORing's managed devices and supports operation across different product families, including:

- DIN-rail/ Rackmount switch: All 9000 series
- EN50155 products: TGS/ TGPS/ TRGPS-9000 series, TGAP/ TGAR series
- Wireless AP/Router: All products except IGAP-610H and IGAP-W series



Advanced 9000 Series

All products listed below are developed under an IEC 62443-4-1 certified secure development lifecycle and incorporate security features aligned with IEC 62443-4-2 requirements.

Products in the Cyber-Hardened Series are IEC 62443-4-2 certified.

Model	Total Ports							Gigabit Combo	Power Input	Certificate
		10/100 Base-TX	10/100/1G Base-T	100 Base-FX	100/1G Base-X	1G/2.5G Base-X	1G/10G Base-X			
RES-9242GC	26	24						2	Dual 100-240 VAC	
RES-P9242GCL-HV	26	24						2	Dual 125-370 VDC/ 100-240 VAC	IEC 61850-3 IEEE 1613
RES-P9242GCL-LV	26	24						2	Dual 24-72 VDC	IEC 61850-3 IEEE 1613
IGS-9042GP-LA-PN	6		4		2 SFP				Dual 12-48 VDC	PROFINET CC-B
IGS-9080-LA-PN	8		8						Dual 12-48 VDC	PROFINET CC-B
IGS-T9062DGP	8		6			2 SFP			Dual 12-48 VDC	
IGS-9084GP	12		8		4 SFP				Dual 12-48 VDC	IEC/EN 60945
IGS-9084GP-LA	12		8		4 SFP				Dual 12-48 VDC	
IGS-9822DGP+	12		8			2 SFP	2 SFP+		Dual 12-48 VDC	
IGS-9084GP-FB2 series	12		8		4 SFP				Dual 12-48 VDC	
IGS-9122GP-PN	14		12		2 SFP				Dual 12-48 VDC	PROFINET CC-B
IGS-9122GP	14		12		2 SFP				Dual 12-48 VDC	
IGS-9812GP	20		8		12 SFP				Dual 12-48 VDC	IEC/EN 60945
IGS-P9812GP-HV	20		8		12 SFP				Dual 85-264 VAC/ 88-373 VDC	IEC 61850-3 IEEE 1613
IGS-P9812GP-LV	20		8		12 SFP				Dual 12-48 VDC	IEC 61850-3 IEEE 1613
IGS-P9164FX-MM-SC-HV	20		16	4 SC					Dual 85-264 VAC/ 88-373 VDC	IEC 61850-3 IEEE 1613
IGS-P9164FX-MM-SC-LV	20		16	4 SC					Dual 12-48 VDC	IEC 61850-3 IEEE 1613
IGS-P9164FX-SS-SC-HV	20		16	4 SC					Dual 85-264 VAC/ 88-373 VDC	IEC 61850-3 IEEE 1613
IGS-P9164FX-SS-SC-LV	20		16	4 SC					Dual 12-48 VDC	IEC 61850-3 IEEE 1613
IGS-P9164GF-MM-SC-HV	20		16		4 SC				Dual 85-264 VAC/ 88-373 VDC	IEC 61850-3 IEEE 1613
IGS-P9164GF-MM-SC-LV	20		16		4 SC				Dual 12-48 VDC	IEC 61850-3 IEEE 1613
IGS-P9164GF-SS-SC-HV	20		16		4 SC				Dual 85-264 VAC/ 88-373 VDC	IEC 61850-3 IEEE 1613
IGS-P9164GF-SS-SC-LV	20		16		4 SC				Dual 12-48 VDC	IEC 61850-3 IEEE 1613
IGS-P9164GC-HV	20		16					4	Dual 85-264 VAC/ 88-373 VDC	IEC 61850-3 IEEE 1613
IGS-P9164GC-LV	20		16					4	Dual 12-48 VDC	IEC 61850-3 IEEE 1613
IGS-9168GP	24		16		8 SFP				Dual 12-48 VDC	IEC/EN 60945
IGS-9168GP-PN	24		16		8 SFP				Dual 12-48 VDC	PROFINET CC-B
RGS-9168GCP	24				8 SFP			16	100-240 VAC	
RGS-9168GCP-E	24				8 SFP			16	100-240 VAC + Dual 48 VDC	
RGS-92222GCP-NP	26		22		2 SFP			2	100-240 VAC	
RGS-92222GCP-NP-E	26		22		2 SFP			2	100-240 VAC + Dual 48 VDC	
RGS-9244GP	28		24		4 SFP				100-240 VAC	
RGS-9244GP-E	28		24		4 SFP				100-240 VAC + Dual 48 VDC	

Unmanaged PoE Switch

An unmanaged PoE switch provides a simple, cost-effective way to power IP devices. It supports plug-and-play setup, reduces wiring, and ensures reliable performance in tough environments.

Plug-and-Play | **Easy Setup** | **Power + Data**

Standard 1000 PoE Series

Model	Total Ports	RJ-45			Fiber			Power Input	Digital Output	Certificate
		10/100 Base-TX	10/100/1G Base-T	2.5G Base-T	100 Base-FX	100/1G Base-X	1G/10G Base-X			
IPS-1042FA series	6	4 PoE			2 SC			Dual 50-57 VDC	✓	
IPS-1042FX series	6	4 PoE			2 SC			Dual 24-36 VDC	✓	
IPS-1080A	8	8 PoE						Dual 50-57 VDC	✓	
IPS-1080-24V	8	8 PoE						Dual 12-57 VDC	✓	
IGPS-1411GTPA	6		5 (4 PoE)			1 SFP		Dual 50-57 VDC	✓	IEC/EN 60945
IGPS-1411GTP-24V	6		5 (4 PoE)			1 SFP		Dual 12-57 VDC	✓	
IGPS-1042GPA	6		4 PoE			2 SFP		Dual 50-57 VDC	✓	
IGPS-1042GP-24V	6		4 PoE			2 SFP		Dual 12-57 VDC	✓	
IGPS-1080-24V	8		8 PoE					Dual 12-57 VDC	✓	E-Mark
IGPS-1082GP	10		8 PoE			2 SFP		Dual 50-57 VDC	✓	
IGPS-1082GP-24V	10		8 PoE			2 SFP		Dual 12-57 VDC	✓	
IGPS-1082GP-BT	10		8 PoE			2 SFP		Dual 50-57 VDC	✓	
IGPS-C1042GP	6		4 PoE			2 SFP		Dual 48-57 VDC		
IDGPS-C1042GP+-BT	6			4 PoE			2 SFP+	Dual 52-57 VDC		
IGPS-C1082GP	10		8 PoE			2 SFP		Dual 48-57 VDC		

Hot Selling Products



IPS-1080-24V

- 8x 10/100 PSE
- Dual 12-57VDC
- -40 to 75°C



IGPS-C1042GP

- 4x 10/100/1000 PSE
- 2x 100/1000FX SFP
- Dual 50-57VDC
- -40 to 75°C



IGPS-1042GP-24V

- 4x 10/100/1000 PSE
- 2x 1000FX SFP
- Dual 12-57VDC
- -40 to 75°C



IDGPS-C1042GP+-BT

- 4x 10/100/1000/2500 PSE
- 2x 1G/10GBase-FX SFP+
- Dual 52-57VDC
- -40 to 75°C
- IP40

Managed PoE Switch

An industrial managed PoE switch offers advanced control, monitoring, and security for powering IP devices. It enables VLANs, QoS, and remote management to optimize network performance. Designed for harsh environments, it ensures reliable operation and efficient power distribution.

Configurable | **Advanced PoE Features** | **Network Redundancy**

QoS Prioritization | **SNMP/ LLDP** | **Network Security**

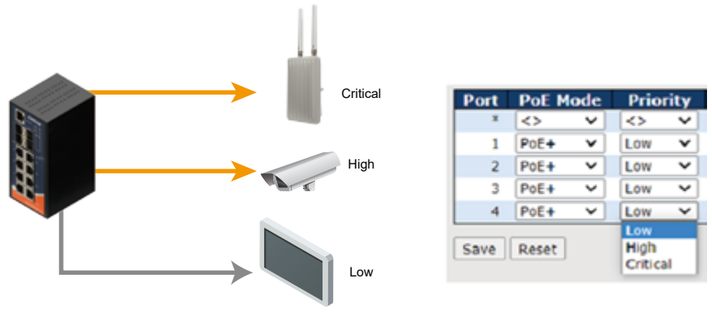
Alive Checking

ORing's managed PoE switches could be configured to monitor the real-time status of connected powered devices (PD). The PoE switches could send alive-checking packets to assure the connected PDs are in working state. If the connected PDs fail to response, the PoE switches would reactivate the connected PDs to assure the reliability of the network.



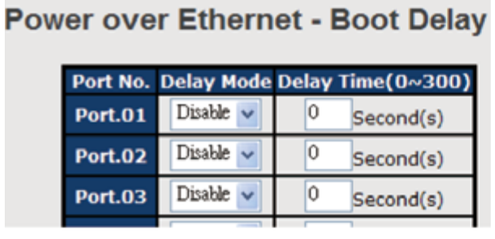
Port Priority for Critical Devices

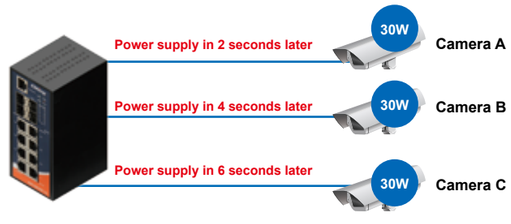
PoE port priority determines which devices get power first if the switch's PoE budget is insufficient. It's a way to prioritize which devices receive power, ensuring critical devices stay powered even when the switch's power is limited.



PoE Boot Delay

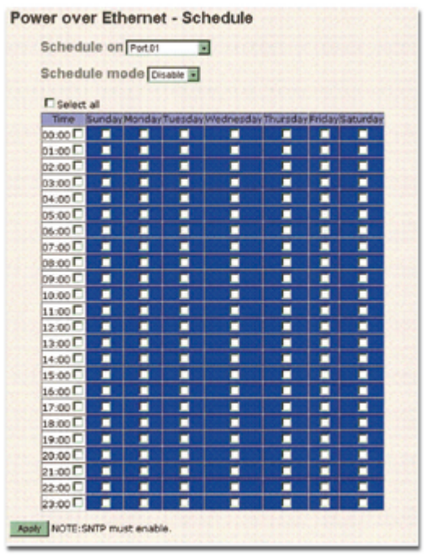
The PoE Boot Delay function allows users to postpone power delivery to a specific port on a PoE switch. This is especially useful when the connected powered device (PD), such as a camera, has a longer boot time. By delaying PoE activation, the switch ensures the PD is ready to receive power and communicate properly, improving system stability and preventing startup issues.

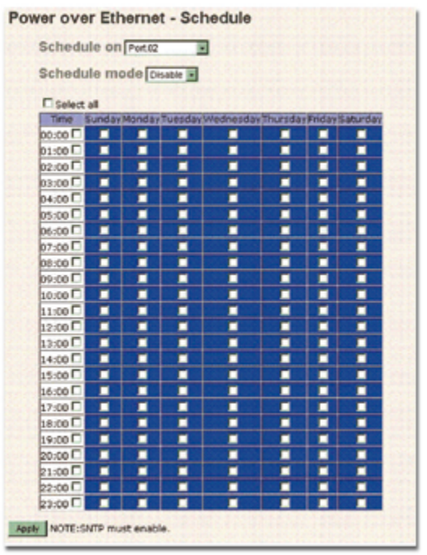




Power Scheduling

Power scheduling allows the administrator to set up power supply schedules based on their operation modes such as power on, power off, restart, or sleep needs so that network devices will be powered at a specified time, instead of consuming power around the clock even when not in use. For example, if the factory wireless PoE access point only needs to be powered on during work hours, the network administrator can enable power output for the device from 6:00 to 22:00 and disable power output from 22:00 to 6:00.





PoE Feature	3000 series	9000/ R9000/ RX series
Alive Checking	Support	Support
PoE Boot Delay	Support	-
Port Priority	Support	Support
Power Scheduling	Support	Support

Industrial DIN-rail L2 PoE Switch

Model	Total Port			Fiber			Power Input	Specific Certificate
		10/100/1G Base-T	10/100/1G/2.5G Base-T	100/1G Base-X	1G/2.5GBase-X	100/1G/10G Base-X		
IGPS-C3082GP	10	8 PSE			2 SFP		Dual 50-57 VDC	
IGPS-3084GP-LA	12	8 PSE		4 SFP			Dual 48-57 VDC	
IGPS-3164GP-LA	20	16 PSE		4 SFP			Dual 48-57 VDC	
IGPS-9622DGP+-BT	10	6 PSE	2 PSE			2 SFP+	Dual 50-57 VDC	
IGPS-9084GP	12	8 PSE		4 SFP			Dual 50-57 VDC	IEC/EN 60945
IGPS-9084GP-BT	12	8 PSE		4 SFP			Dual 50-57 VDC	IEC/EN 60945
IGPS-9084GP-LA	12	8 PSE		4 SFP			Dual 50-57 VDC	IEC 62443-4-2
IGPS-9084GP-LA-24V	12	8 PSE		4 SFP			Dual 12-57 VDC	IEC 62443-4-2
IGPS-P9084GP-LA	12	8 PSE		4 SFP			Dual 50-57 VDC	IEC 61850-3 IEEE 1613 EN 50121-4
IGPS-9822DGP+	12	8 PSE			2 SFP	2 SFP+	Dual 50-57 VDC	
IGPS-9084GP-LA-PN	12	8 PSE		4 SFP			Dual 50-57 VDC	PROFINET CC-B
IGPS-9842GTP	14	8 PSE + 4 TX		2 SFP			Dual 50-57 VDC	
IGPS-9842GTP-24V	14	8 PSE + 4 TX		2 SFP			Dual 12-57 VDC	

Hot Selling Products



IGPS-3164GP-LA
- 16x 1G PSE
- 4x 100/1G SFP
- 150W Budget



IGPS-9084GP-LA
- 8x 1G PSE
- 4x 100/1G SFP
- 240W Budget



IGPS-9622DGP+-BT
- 6x 1G PSE
- 2x 2.5G PSE
- 2x 1G/10G SFP+
- 360W Budget

Industrial Rackmount L2 PoE Switch

Model	Total Port	RJ-45	Fiber	Gigabit	Power Input	Power Budget	Specific Certificate
		10/100/1G Base-T	100/1G Base-X	Combo			
RGPS-92222GCP-NP	26	22 PSE	2 SFP	2 PSE	50-57VDC	720W	IEC 62443-4-2
RGPS-92222GCP-NP-LP	26	22 PSE	2 SFP	2 PSE	100-240 VAC	320W	IEC 62443-4-2
RGPS-92222GCP-NP-P	26	22 PSE	2 SFP	2 PSE	100-240 VAC	720W	IEC 62443-4-2
RGPS-92222GCP-NP-P-E	26	22 PSE	2 SFP	2 PSE	100-240 VAC Dual 50-57 VDC	720W	IEC 62443-4-2
RGPS-92222GCP-NP-BT-P	26	22 PSE	2 SFP	2 PSE	100-240 VAC Dual 50-57 VDC	720W	
RGPS-3244GP-P	28	24 PSE	4 SFP		100-240 VAC	360W	
RGPS-9244GP-LP-HV	28	24 PSE	4 SFP		Dual 100-240 VDC	300W	

Hot Selling Products



RGPS-92222GCP-NP-P
- 22x 1G PSE
- 2x 1G Combo PSE
- 2x 100/1G SFP
- 720W Budget

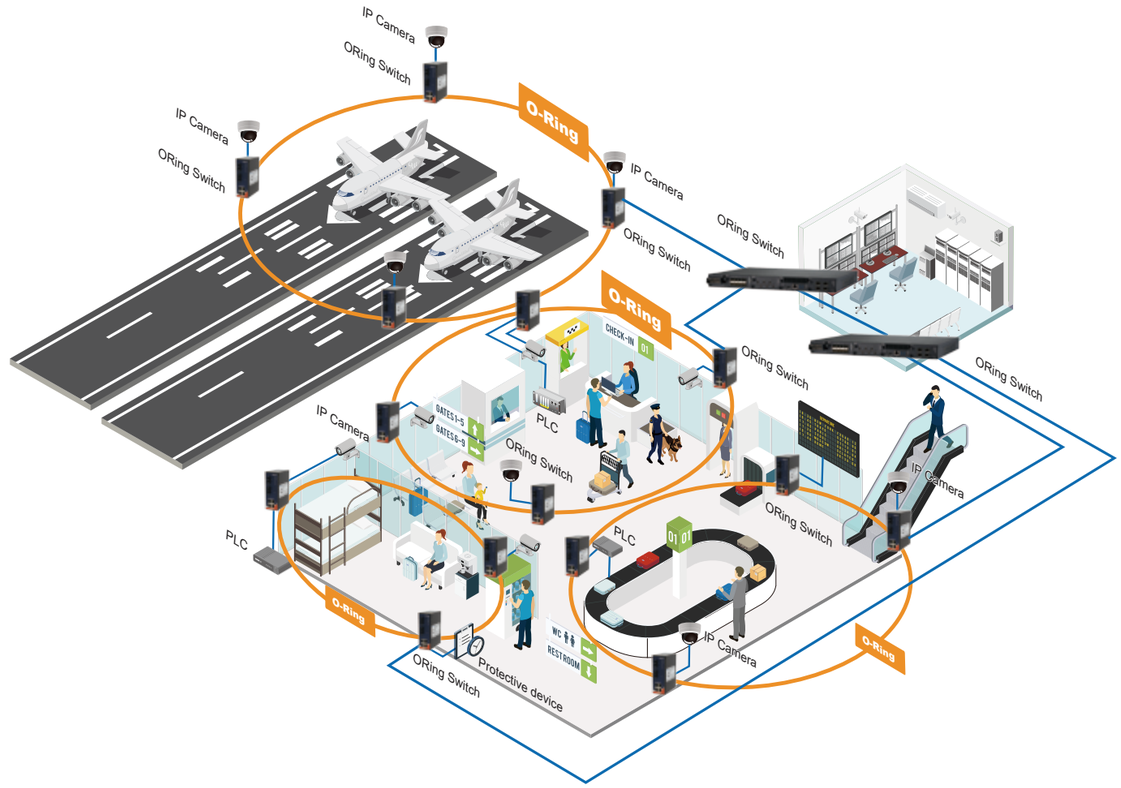


RGPS-3244GP-P
- 24x 1G PSE
- 4x 100/1G SFP
- 360W Budget

Industrial L3 PoE Switch

Model Name	IGPS-R9084GP	IGPS-RX884GTP+	RGPS-R9244GP+-P	RGPS-R9244GP+-LP
Interface				
10/100/1G Base-T RJ45	8 PSE	8 PSE + 8 TX	24 PSE	24 PSE
100/1G Base-X SFP	4			
1G/2.5G/10G Base-X SFP+		4	4	4
Fault Contact	✓	✓		
Console	RS-232 in RJ45	RS-232 in DB9	RS-232 in DB-9	RS-232 in DB-9
Layer 3 Protocol				
Static Route	✓	✓	✓	✓
RIP	✓	✓	✓	✓
OSPF		✓		
PIM-SM/ PIM-DM		✓		
Power over Ethernet				
PoE Standard	IEEE 802.3af/at	IEEE 802.3af/at	IEEE 802.3af/at	IEEE 802.3af/at
Power Budget	240W	100W@75°C 180W@60°C	720 Watts (-20°C~50°C) 320 Watts (50°C~60°C)	300Watts (-20°C~50°C) 240Watts (50°C~60°C)
Power				
Power Input	Dual 50-57VDC	Dual 50-57VDC	100-240VAC	100-240VAC
Approvals				
CE	✓	✓	✓	✓
FCC	✓	✓	✓	✓
IEC 62443-4-2			✓	✓

Applications Scenario

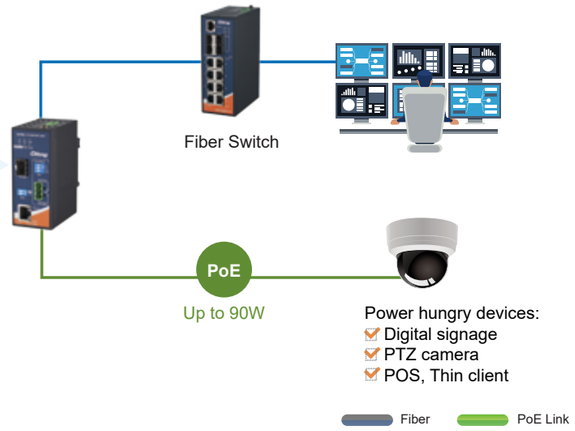


PoE Media Converter

Designed for harsh environments, the industrial PoE media converter seamlessly integrates copper and fiber networks while supplying power to remote devices through PoE. Supporting IEEE 802.3af/at/bt standards, it eliminates the need for separate power lines, making it ideal for powering IP cameras, wireless access points, and other PoE-enabled equipment in factory automation, transportation, and smart city applications.

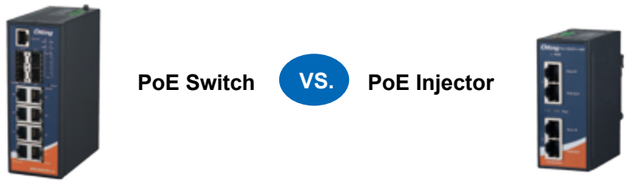
IGPMC-111GP-BT-24V

- 1 Gigabit Ethernet to 100/1000Base-X SFP
- IEEE 802.3bt PoE
- Supports LFP
- Supports relay output
- Dual 12~57VDC inputs
  - PoE 30W: >=12V
  - PoE 60/90W: 24-57V



PoE Injector

The industrial PoE injector delivers both power and data to PoE-enabled devices over a single Ethernet cable, simplifying installation and reducing cabling costs.



PoE Switch **VS.** **PoE Injector**

Functionality	Integrates PoE capability into a network	Add PoE capability to non-PoE networks
Port Requirement	More PoE ports	Fewer PoE ports
Flexibility	Centralized power management	Less scalable at larger scales


PTZ Camera


Wireless AP/Router


Automation


Digital Signage


POS System


Access Control System

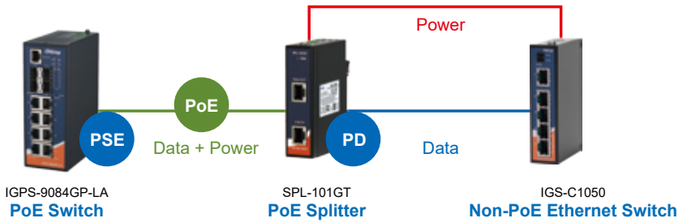
PoE Scenario

Model	Product Type	PoE Port	Max. PoE Output	IEEE 802.3	Power Input
INJ-102GT	PoE Injector	2	30W	af/at	50-57 VDC
INJ-102GT-24V	PoE Injector	2	30W	af/at	12-57 VDC
INJ-101GT-BT-24V	PoE Injector	1	30W @12-24 VDC 60W @24-52 VDC 90W @52-57 VDC	af/at/bt	12-57 VDC

PoE Splitter

The industrial PoE splitter enables non-PoE devices to be powered through a PoE-enabled Ethernet connection by separating power and data at the device end. Supporting IEEE 802.3af/at standards, it delivers a stable 24VDC output to legacy equipment such as Ethernet switches, controllers, or embedded systems. It features robust construction, wide operating temperature range, and DIN-rail mounting, ensuring reliable performance in factory automation, surveillance, and outdoor applications.

Supports non-PoE devices **Simplifies cabling setup** **Industrial-grade durability**



ORing's PoE splitter supports Gigabit transmission, ensuring reliable high-speed data and power delivery. The TSPL series is specifically designed for railway applications and is compliant with the EN50155 standard.

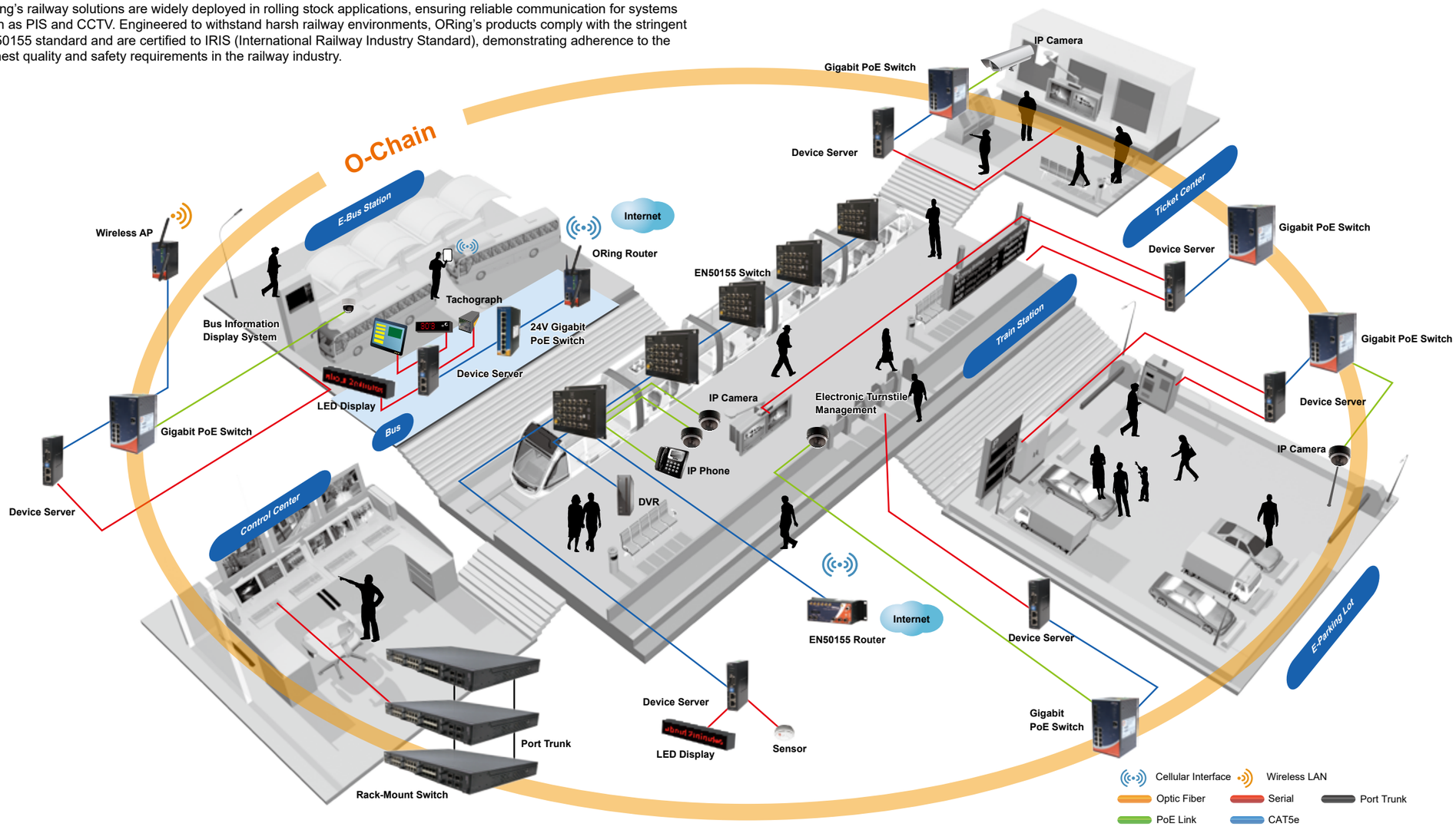




Model Name	SPL-101GT	SPL-101GT++-24V	TSPL-101GT-M12-24V
Interface			
Ethernet Port with P.S.E. Input	1G RJ45	1G RJ45	1G M12 A-coded
Ethernet Port Output	1G RJ45	1G RJ45	1G M12 A-coded
Power Output Connector	4-pin terminal block	4-pin terminal block	5-pin M12 A-coded
Operating Voltage			
Input Voltage	36-57 VDC from PSE	90W PSE input	36-57VDC from PSE
Output Voltage	24VDC @ 0.9A	24VDC @ 2.5A	24VDC @ 1A Max.

EN50155 Series

ORing's railway solutions are widely deployed in rolling stock applications, ensuring reliable communication for systems such as PIS and CCTV. Engineered to withstand harsh railway environments, ORing's products comply with the stringent EN50155 standard and are certified to IRIS (International Railway Industry Standard), demonstrating adherence to the highest quality and safety requirements in the railway industry.





Onboard

ORing's Transporter-series complies with EN50155 standard and is a perfect fit for building TCN (Train Communication Network), CCTV, PIS (Passenger Information System) and passenger Wi-Fi networks.



Train to Ground

Data transmission between the train and ground facility is realized via wireless connectivity. When a train approaches or stops at the station, the wireless router's transmission mode will shift from cellular to Wi-Fi to save data transmission costs.



Wayside

Trackside and onboard devices need to exchange data in real time via wayside networks, so building a secure and reliable wayside network is necessary.

Benefits from ORing

IRIS Certified
Meets the railway industry's extremely rigorous demands on quality

5G NR
Enables high performance and low latency communications

PoE
Simplifies installation and maintenance while reducing deployment costs

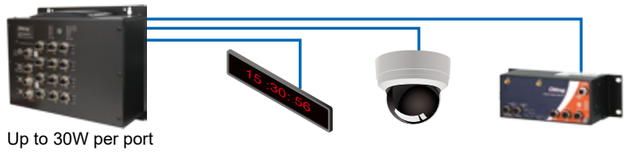
Wi-Fi Connectivity
Provides fast, reliable and secure 802.11n/ac Wi-Fi connections on trains

Versatile Options
Offers a wide variety of interface including 10GbE, 2.5GbE, GbE, FE, fiber and wireless

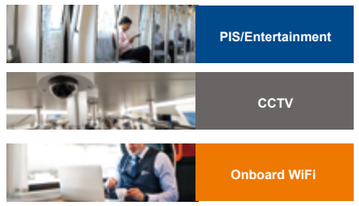
Wide Voltage
Power range 24-110VDC, providing maximum flexibility for using the EN50155 products

Feature Highlight

IEEE 802.3at PoE



Up to 30W per port



Hardware Bypass



Normal Communication

Single point power failure activate mechanism

500Mb/s over 4-wire Ethernet

Fast Ethernet Switch with 500Mbps per port.
Cost-Effective retrofit with Low-Cost implementation!

Q-ODC Interface

Long range fiber connectivity.



TGXS-1080-M12-BP2 series TXPS-141XT-M12 series TGXPS-1080-M12-BP2 series

	Copper	Fiber Optics
Distance	100 meters	>500 meters
Immunity to EMI & RFI	Low	Completely immune
Security	Susceptible to tapping	Hard to tap

EN50155 Unmanaged Ethernet Switch

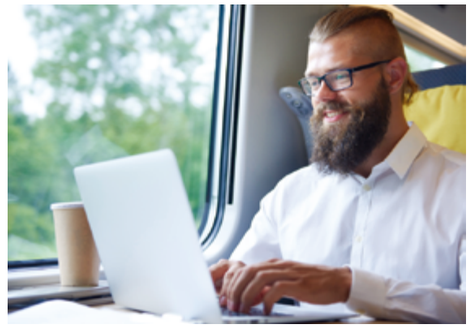
Model	Total Ports	M12			Hardware Bypass	Power Input			
		10/100 Base-TX	10/100/500 Base-TX	10/100/1G Base-T		12V	24V	110V	24-110V
TES-W180-M12-WV-IP67	8	8							✓
TGXS-1080-M12-BP2	8			8	✓		✓		
TGXS-1080-M12-BP2-MV	8			8	✓			✓	
TXPS-141XT-M12-24V	5		5 (4 PoE)				✓		
TXPS-141XT-M12-MV	5		5 (4 PoE)					✓	
TGXPS-1080-M12-BP2-24V	8			8 PoE	✓		✓		
TGXPS-1080-M12-BP2-MV	8			8 PoE	✓			✓	

EN50155 Managed Ethernet Switch

Model	Total Ports	M12/ RJ45			Gigabit Fiber	Hardware Bypass	Power Input			
		10/100 Base-TX	10/100/500 Base-TX	10/100/1G Base-T			12V	24V	110V	24-110V
TES-W9124GT-M12X-BP2-24V-IP54	16		12	4		✓		✓		
TGS-W9160-M12X-BP2-WV-IP54	16			16		✓				✓
TGS-9200-M12-BP2	20			20		✓	✓	✓		
CPGS-9080-C	8			8			PCI bus-powered			
TPS-W9124GT-M12X-BP2-24V-IP54	16	12 PoE		4		✓		✓		
TGPS-9080-M12A-MV	8			8 PoE					✓	
TGPS-W9082GF-MM-M12X-QS-MV-IP54	10			8 PoE	2 Q-ODC				✓	
TGPS-9084GT-M12X-BP2-WV	12			12 (8 PoE)		✓				✓
TRGPS-9084GT-M12X-BP2-MV	12			12 (8 PoE)		✓			✓	
TRGPS-9084TG-M12X-BP2-MV	12			8 PoE + 4 10G		✓			✓	
TGPS-W9124GT-M12X-BP2-WV-IP54	16			16 (12 PoE)		✓				✓
TGPS-9164GT-M12X-BP2-24V	20			20 (16 PoE)		✓		✓		
TGPS-9164GT-M12X-BP2-MV	20			20 (16 PoE)		✓			✓	
TGPS-9168GT-M12-BP2-24V	24			24 (16 PoE)		✓		✓		

Success Story

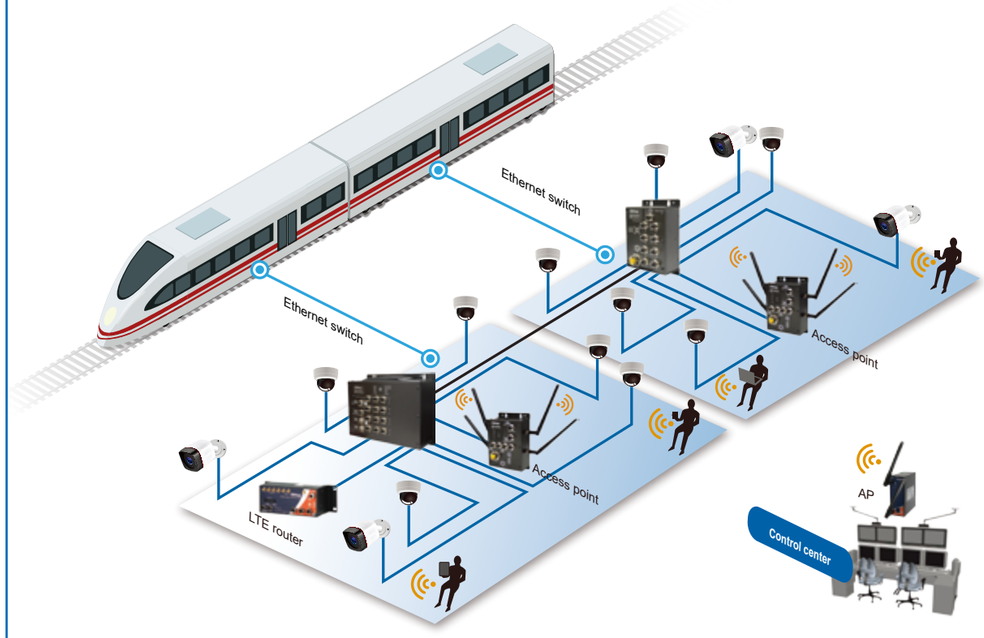
Slovakian Railway Company Improves Travel Experience with ORing's Networking Solutions



A Slovakian railway operator upgraded its trains and implemented a modern passenger information system to improve the travel experience. To ensure smooth network connections for passengers watching videos or listening to music during their journey, the operator deployed a combination of wired and wireless networking solutions.

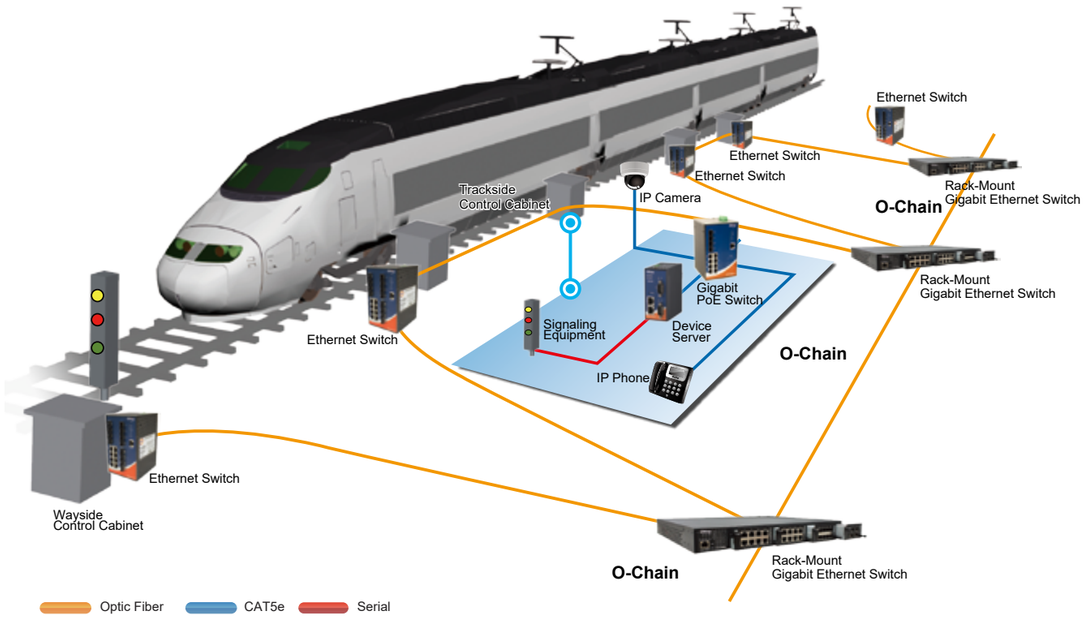
They installed ORing industrial Ethernet switches, connected to IP surveillance cameras, an LTE router, and access points, providing on-board wireless services. These EN-50155 compliant switches and APs can withstand shock and vibration, ensuring reliable network connections at all times.

The Gigabit speed of the network allows bandwidth-heavy traffic like IP surveillance videos or streaming to be transmitted without delays. The X-roaming support of access points reduces handoff time between access points to less than 60 milliseconds, ensuring reliable wireless connectivity.Furthermore, the APs' PoE PD function simplifies deployment by eliminating the need for additional power cables, reducing complexity and costs.



IP Camera IP Camera (outdoor)

Long-range Fiber Communication



On-board EN50155

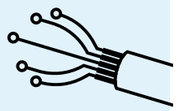


TGPS-W9082GF-MM-M12X-QS-MV-IP54

Wayside EN50121-4



RGPS-92222GCP series
RGS-92222GCP-NP series
IGPS-P9084GP-LA



EN50155 PoE Switch, PoE Injector, and PoE Splitter

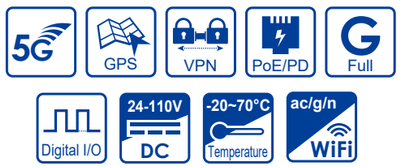
Model	Mounting	Total Port	Managed	M12			Hardware Bypass	Power Input	
				10/100 Base-TX	10/100/500 Base-TX	10/100/1G Base-T		24VDC	110VDC
TINJ-101-M12-24V	Wall	1		1 PSE+ 1 TX				✓	
TINJ-101GT-M12-24V	Wall	1				1 PSE+ 1 TX		✓	
TSPL-101GT-M12-24V	Wall	1				1 PSE+ 1 TX		✓	
TXPS-141XT-M12-24V	Wall	5			4 PSE + 1 TX			✓	
TXPS-141XT-M12-MV	Wall	5			4 PSE + 1 TX				✓
TGXPS-1080-M12-BP2-24V	Wall	8				8 PSE	✓	✓	
TGXPS-1080-M12-BP2-MV	Wall	8				8 PSE	✓		✓
TPS-W9124GT-M12X-BP2-24V-IP54	Wall	16	✓	12 PSE		4	✓	✓	
TPS-3882GT-M12-BP1-24V	Wall	18	✓	8 PSE+8 TX		2	✓	✓	
TGPS-9080-M12A-MV	Wall	8	✓			8 PSE			✓
TGPS-W9082GF-MM-M12X-QS-MV-IP54	Wall	10	✓			8 PSE			✓

Model	Mounting	Total Port	Managed	10/100/1G Base-T	10G	Hardware Bypass	Power Input		
							24VDC	110VDC	24-110VDC
TGPS-9084GT-M12X-BP2-WV (IEC 62443-4-2)	Wall	12	✓	8 PSE + 4TX		✓			✓
TRGPS-9084GT-M12X-BP2-MV	Rack	12	✓	8 PSE + 4TX		✓		✓	
TRGPS-9084TG-M12X-BP2-MV	Rack	12	✓	8 PSE	4	✓		✓	
TGPS-W9124GT-M12X-BP2-WV-IP54	Wall	16	✓	12 PSE + 4TX		✓			✓
TGPS-9164GT-M12X-BP2-24V	Wall	20	✓	16 PSE + 4TX		✓	✓		
TGPS-9164GT-M12X-BP2-MV	Wall	20	✓	16 PSE + 4TX		✓		✓	
TGPS-9168GT-M12-BP2-24V	Wall	24	✓	16 PSE + 8TX		✓	✓		



EN50155 AP/Router: TDGAP/TDGAR Series





Features

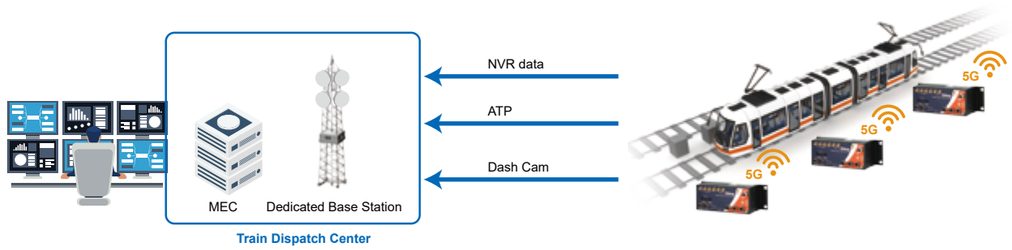
- EN50155-compliant for rolling stock application
- 3x 10/100/1000Base-T(X) Ethernet with M12 X-coding
- Support 4G LTE or 5G NR (By model)
- IEEE 802.11ac up to 867Mbps link speed
- Support wireless AP/Client mode
- WAN connection : Dynamic/Static IP, PPPoE, Modem Dial Up
- Provide SNAT/PAT/1:1 NAT
- Support VPN for secured connection (Open VPN, IPsec, Cloud VPN)
- 1KV isolation for PoE P.D. port
- Event warning by Syslog, Email, SNMP Trap
- Wall mounting enabled

	TDGAP-830D+-M12X-WV	TDGAR-1083D+-D4GS-M12X-WV	TDGAR-1083D+-D5GS-M12X-WV	TDGAR-2083D+-D4GS-M12X-WV
Ethernet	3GE X-Coding	3GE X-Coding	3GE X-Coding	3GE X-Coding
WiFi	802.11n/ac	802.11n/ac	802.11n/ac	802.11n/ac
Cellular		4G LTE	5G NR	Dual 4G LTE
GPS		✓	✓	✓
	WiFi only	**WiFi + 4G**	**WiFi + 5G**	**WiFi + Dual 4G**

*2Q-ODC Fiber

5G Private Network for Railway Applications

After the train returns to the train dispatch center, it uploads its operational records via 5G to the internal data platform. The backend conducts data analysis to provide visualized insights and quantitative statistics.



	Current Situation	With 5G Network
Central Control Center	Data collected cannot be effectively quantified and consolidated.	Effective data aggregation and visualization
Train Dispatch Center	• Manually downloading driving records from onboard systems is time-consuming and incurs labor costs. • Driving records cannot be effectively utilized.	• Automatic transmission of driving records significantly reduces scheduling costs and time. • Analysis of driving data reduces accidents by: - Identifying abnormal shifts/drivers. - Monitoring system status and timelines. - Implementing proactive maintenance schedules.
Train	Using WIFI or 4G involves considering signal interference and transmission delays.	Adopting 5G NR technology with both high bandwidth and low latency characteristics.

EN50155 Wireless AP, Cellular Router

Model	10/100/1G Base-T	Cellular	WLAN	GPS	DI/DO	Power Input		Specific Certificate
						DC Power	PoE PD	
TDGAP-830D+-M12X-WV	3 (M12)		WIFI 5		1/1	Dual 24-110V	✓	EN 50155
TDGAR-1083D+-D4G12S-M12X-WV	3 (M12)	1 4G LTE	WIFI 5	✓	1/1	Dual 24-110V	✓	EN 50155
TDGAR-1083D+-D5GS-M12X-WV	3 (M12)	1 5G NR	WIFI 5	✓	1/1	Dual 24-110V	✓	EN 50155
TDGAR-2083D+-D4G12S-M12X-WV	3 (M12)	2 4G LTE	WIFI 5	✓	1/1	Dual 24-110V	✓	EN 50155

IEC 61850-3 Series

ORing's IEC 61850-3 Ethernet switch is designed for robust performance in industrial environments, particularly in power substations and other critical infrastructure. It adheres to the stringent IEC 61850-3,and IEEE 1613 standard, ensuring reliability and durability under harsh conditions. The switch supports high-speed data transmission, seamless network redundancy protocols like PRP and HSR, and features such as ruggedized design and wide operating temperature range. Ideal for applications requiring high availability and reliability, ORing's IEC 61850-3 Ethernet switch is a trusted choice in industrial networking solutions.



DIN-Rail Type

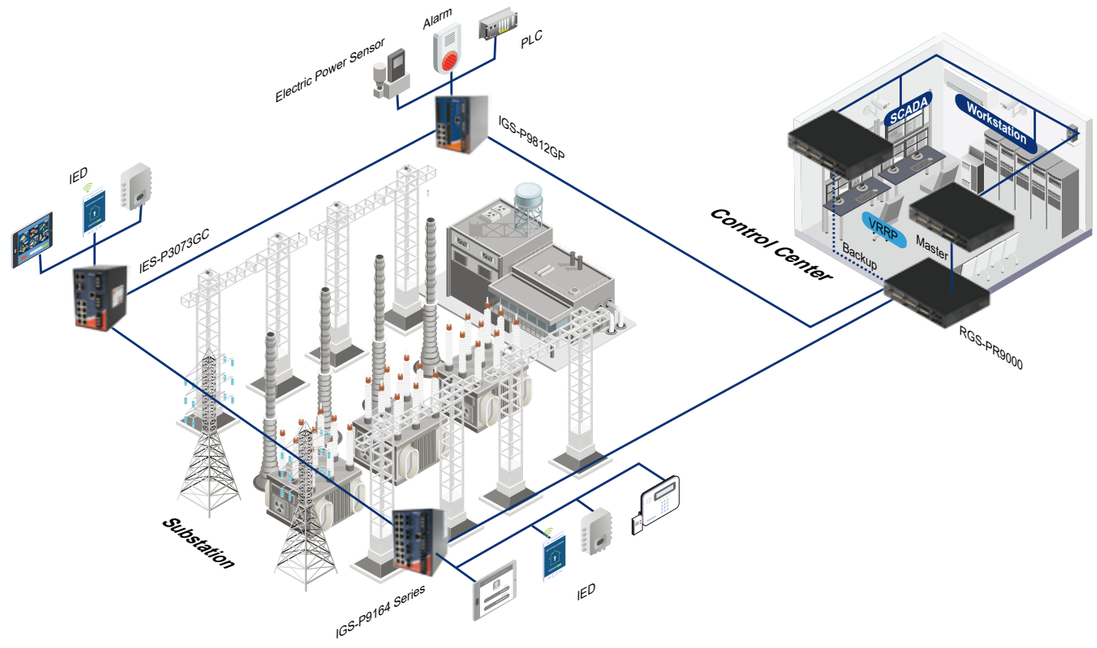


Rackmount

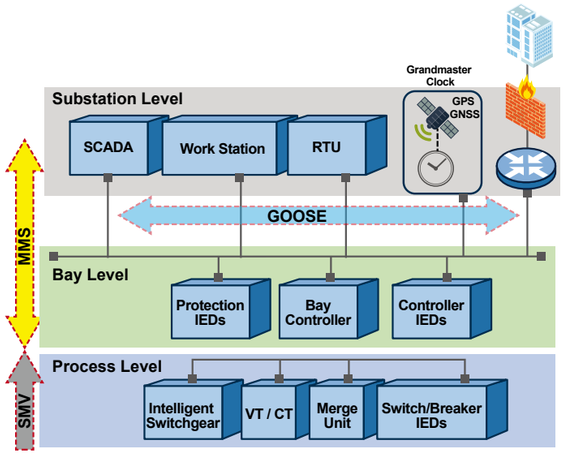


Modular Design

Networking Scenario



IEC 61850 is a substation automation standard for electric power systems. The IEC 61850 standards have been expected to ensure seamless communication and integration among IEDs from different manufacturers at a hierarchical level. A key focus of the standards lies in its transmission protocols tailored for distinct data transfer requirements.



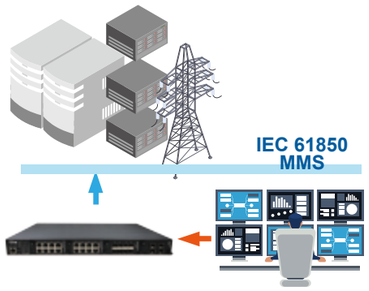
MMS (Manufacturing Message Specification)
For monitoring substation status

GOOSE (Generic Object Oriented Substation Events)
For status updates and sending command requests

SMV (Sampled Measured Values)
For transmitting power line current and voltage values

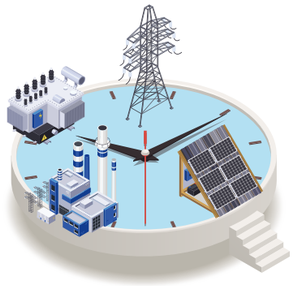
Feature Highlights

Built-in MMS Server



The MMS is based on IEC 61850-90-4 switch data modeling for power SCADA. Through MMS, administrators possess the capability to monitor and control IEDs, switches, as well as other MMS supported devices in substations.

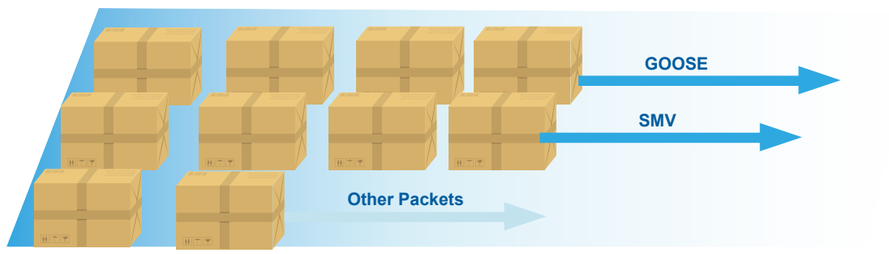
IEEE 1588 V2



Precise time synchronization is essential within a substation to guarantee the synchronized operation of measurement devices linked to the power grid. The precision of these clocks can range from milliseconds to microseconds, contingent upon the specific application.

Packet Priority: IEC 61850 QoS

Substation automation devices are required to establish flawless communication for IEC 61850 multicasts, placing the utmost importance on prioritizing these transmissions. By giving precedence to the transmission of GOOSE/SMV packets, we ensure the seamless reception of these messages across the entire network, irrespective of potential concurrent communication congestion.



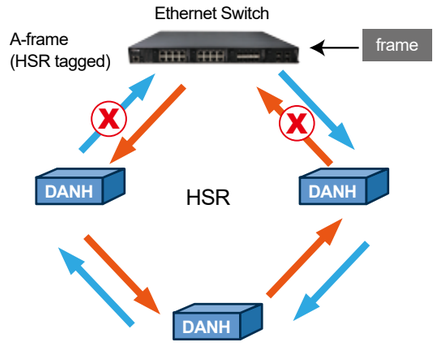
HSR/PRP Protocols for Zero Recovery Time

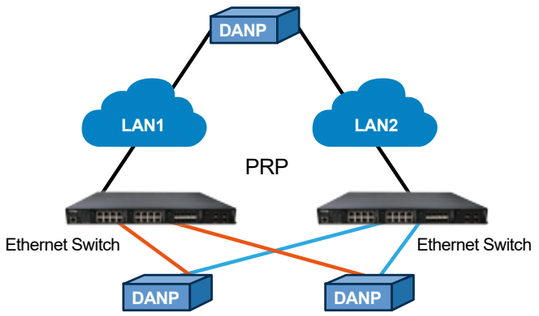
ORing has developed a pluggable module compliant with IEC 62439-3 and equipped with HSR/PRP protocols. This module is designed to fit the RGS-P9000/PR9000 series and IGS-P9084GPMI.

The HSR and PRP protocols provide seamless failover from a single point of failure. These protocols are essential for mission-critical network applications.



SWM-20GT-HSR





Substation Ethernet Switches with Fixed Ports

Model	Total Port	RJ-45		Fiber		Gigabit Combo	IEEE 1588v2	MMS Server	IEC 61850 QoS	Dual Power Input	Specific Certificate
		10/100 Base-TX	10/100/1G Base-T	100 Base-FX	100/1G Base-X						
IES-P3073GC-HV	10	7				3	Client			85-264 VAC/ 88-373 VDC	IEC 61850-3 IEEE 1613
IES-P3073GC-LV	10	7				3	Client			12-48VDC	IEC 61850-3 IEEE 1613
RES-P9242GCL-HV	26	24				2	Client/ Server	✓	✓	125-370 VDC/ 100-240 VAC	IEC 61850-3 IEEE 1613 IEC 62443-4-2
RES-P9242GCL-LV	26	24				2	Client/ Server	✓	✓	24-72VDC	IEC 61850-3 IEEE 1613 IEC 62443-4-2
IGS-P9084GP-HV	12		8		4 SFP		Client/ Server	✓	✓	85-264 VAC/ 88-300 VDC	IEC 61850-3 IEEE 1613
IGS-P9084GP-LV	12		8		4 SFP		Client/ Server	✓	✓	12-48VDC	IEC 61850-3 IEEE 1613
IGS-P9812GP-HV	20		8		12 SFP		Client/ Server	✓	✓	85-264 VAC/ 88-373 VDC	IEC 61850-3 IEEE 1613 IEC 62443-4-2
IGS-P9812GP-LV	20		8		12 SFP		Client/ Server	✓	✓	12-48 VDC	IEC 61850-3 IEEE 1613 IEC 62443-4-2
IGS-P9164FX-MM-SC-HV	20		16	4 SC			Client/ Server	✓	✓	85-264 VAC/ 88-373 VDC	IEC 62443-4-2
IGS-P9164FX-MM-SC-LV	20		16	4 SC			Client/ Server	✓	✓	12-48 VDC	IEC 61850-3 IEEE 1613
IGS-P9164FX-SS-SC-HV	20		16	4 SC			Client/ Server	✓	✓	85-264 VAC/ 88-373 VDC	IEC 61850-3 IEEE 1613
IGS-P9164FX-SS-SC-LV	20		16	4 SC			Client/ Server	✓	✓	12-48 VDC	IEC 61850-3 IEEE 1613
IGS-P9164GF-MM-SC-HV	20		16		4 SC		Client/ Server	✓	✓	85-264 VAC/ 88-373 VDC	IEC 61850-3 IEEE 1613
IGS-P9164GF-MM-SC-LV	20		16		4 SC		Client/ Server	✓	✓	85-264 VAC/ 88-373 VDC	IEC 61850-3 IEEE 1613
IGS-P9164GF-SS-SC-HV	20		16		4 SC		Client/ Server	✓	✓	85-264 VAC/ 88-373 VDC	IEC 61850-3 IEEE 1613
IGS-P9164GF-SS-SC-LV	20		16		4 SC		Client/ Server	✓	✓	12-48 VDC	IEC 61850-3 IEEE 1613
IGS-P9164GC-HV	20		16			4	Client/ Server	✓	✓	85-264 VAC/ 88-373 VDC	IEC 61850-3 IEEE 1613 IEC 62443-4-2
IGS-P9164GC-LV	20		16			4	Client/ Server	✓	✓	12-48 VDC	IEC 61850-3 IEEE 1613 IEC 62443-4-2
IGPS-P9084GP-LA	12		8 PSE		4 SFP		Client/ Server	✓	✓	50/57 VDC	IEC 61850-3 IEEE 1613 IEC 62443-4-2 EN50121-4

Substation Ethernet Switches with Modular Design



IGS-P9084GPMI

- 8 GE + 4 100/1G SFP ports
- 1 slot for optional module
- Support IEEE 1588v2 clock synchronization
- Support multiple MRP rings and domains
- Support IEC 62439-3 HSR/PRP (with SWM-20GT-HSR module)
- Operating temperature: -40 to 85°C
- Dual power input: LV 12–48VDC or HV 85–264VAC / 88–300VDC



RGS-P9000 (Layer 2)
RGS-PR9000 (Layer 3)

- 4 slots for optional modules
- RGS-P9000 is certified to IEC 62443-4-2
- Support IEEE 1588v2 clock synchronization
- Support multiple MRP rings and domains
- Support IEC 62439-3 HSR/PRP (with SWM-20GT-HSR module)
- Dual power input: LV 24-72VDC or HV 100-240VAC / 100-370VDC



Optional Module List

IGS-P9084GPMI / RGS-P9000 slot 1-3 / RGS-PR9000 slot 1-3

Ethernet



SWM-80GT
8 GE RJ45 ports



SWM-60GT-M12
6 GE M12 ports



SWM-04FX-MM-SC
- 4-port FX SC
- Multi-mode, 2km



SWM-04FX-SS-SC
- 4-port FX SC
- Single-mode, 30km



SWM-04FX-MM-ST
- 4-port FX ST
- Multi-mode, 2km



SWM-04FX-SS-ST
- 4-port FX ST
- Single-mode, 30km



SWM-04GF-MM-SC
- 4-port 1G FX SC
- Multi-mode, 550m



SWM-04GF-SS-SC
- 4-port 1G FX SC
- Single-mode, 10km



SWM-04GF-MM-ST
- 4-port 1G FX ST
- Multi-mode, 550m



SWM-04GF-SS-ST
- 4-port 1G FX ST
- Single-mode, 10km



SWM-08GP
8 100/1000 SFP socket



SWM-20GT-HSR
- 2 Gigabit Combo
- Supports HSR/PRP



SWM-06TIL
- 6-port 10Base-T1L
- Single-pair Ethernet (SPE)

Wireless



APM-820
- 802.11n/ac WIFI
- 1GE RJ45



RTM-1002-D5G
- 5G NR
- 1GE RJ45

Serial



DSM-221-I
2-port RS422/485



DSM-141
4-port RS232



IOM-11400
- 4 AI, 1 DI, 1DO
- 1-port RS485



IOM-44000
- 4 DI, 4 DO
- 1-port RS485

X86 CPU Module



MFS-CE10
- Atom® X6413E
- 1GE RJ45

RGS-P9000 slot 4 / RGS-PR9000 slot 4



SWM-04GP_4
4-port 1G SFP socket



SWM-02GP+_4
2-port 10G SFP+ socket



SWM-04GP+_4
4-port 10G SFP+ socket



SWM-04GF-MM-SC_4
- 4-port 1G FX SC
- Multi-mode, 550m



SWM-04GF-SS-SC_4
- 4-port 1G FX SC
- Single-mode, 10km



SWM-04GF-MM-ST_4
- 4-port 1G FX ST
- Multi-mode, 550m



SWM-04GF-SS-ST_4
- 4-port 1G FX ST
- Single-mode, 10km



RGS-PRX004GP+MG
- 4x fixed1G/2.5G/10G SFP+ sockets
- 3 slots for optional modules
- Support TSN protocol – IEEE 802.1AS, Qav, Qat
- L3 feature: RIP, OSPF v2/v3, PIM-SM/PIM-DM, VRRP

Optional Module List



SWM-80GT-MG
8 GE RJ45 ports



SWM-08GP-MG
8 100/1000 SFP sockets



SWM-44GTP-MG
4 GE RJ45 ports and 4 100/1000 SFP sockets

IEC 62443-4-2 Certified Product List

IEC 61850



IGS-P9812GP-HV
IGS-P9812GP-LV



IGS-P9164GC-HV
IGS-P9164GC-LV



RES-P9242GCL-HV
RES-P9242GCL-LV



RGS-P9000-HV
RGS-P9000-LV

Cellular Router / Gateway

ORing's cellular solutions provide reliable and secure wireless connectivity for a wide range of industrial applications. Supporting 4G LTE, 5G, and NB-IoT technologies, these devices enable flexible deployment in diverse environments—from high-speed data transmission in smart cities and low-power, wide-area coverage for remote monitoring and IoT applications.

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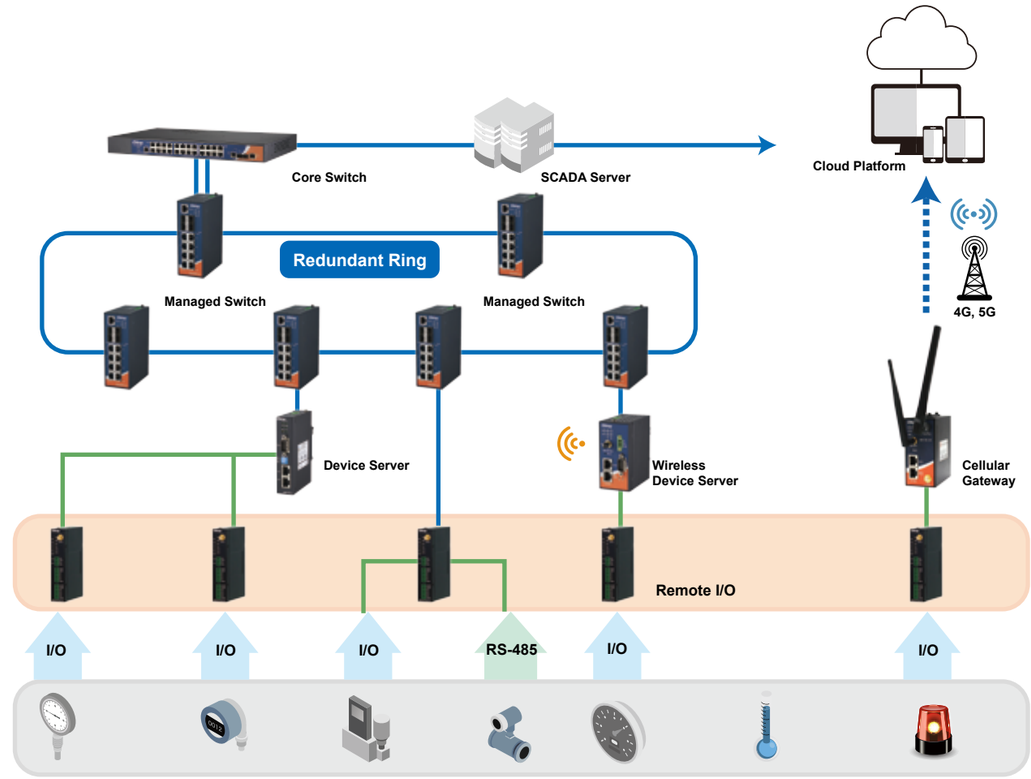
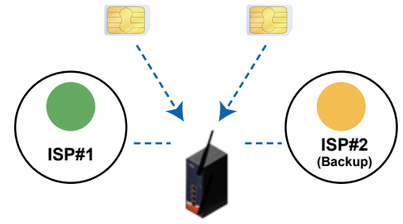


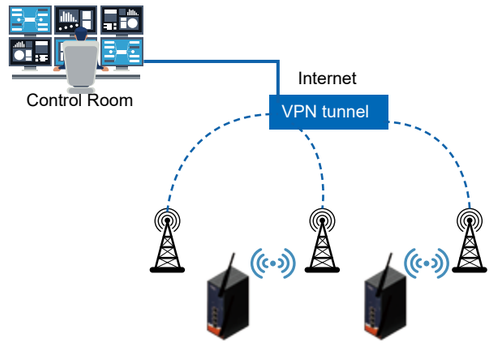
Dual SIM Redundancy

When two SIM cards from different ISPs are inserted, the router automatically switches to the secondary SIM if the primary connection fails. This seamless failover mechanism ensures continuous and reliable cellular connectivity.



Secure VPN Connection

ORing's industrial cellular routers support VPN protocols like OpenVPN and IPSec, enabling secure, encrypted communication between remote sites and central systems over public networks.



“Open Gateway” Feature

Open Gateway supports MQTT, MQTT Sparkplug, LWM2M, and CoAP for cloud connections, and Modbus TCP, RTU/ASCII, SNMP for end devices. Available on IDS, IMG, and IGMG series, it enables fast IIoT deployment and value creation.

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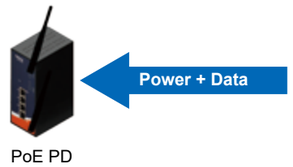
Power Made Simple

Most ORing wireless models can be powered through PoE-enabled devices such as PoE injectors or switches, enabling simplified installation and flexible deployment without the need for separate power supplies.

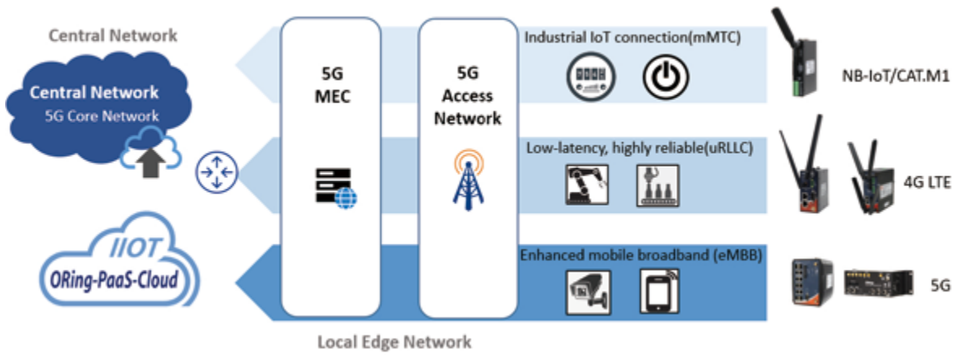


PPPoE

PPPoE (Point-to-Point Protocol over Ethernet) is a network protocol for encapsulating Point-to-Point Protocol (PPP) frames inside Ethernet frames. It is used mainly with DSL services where individual users connect to the xDSL modem over Ethernet to build up network connection.

DDNS (Dynamic Domain Name Server) is a method, protocol, or network service that provides the capability for a networked device using the Internet Protocol Suite, such as an IP router or computer system, to notify a domain name server to change, in real time, the active DNS configuration of its configured hostnames, addresses or other information stored in DNS. When the connection is established through PPPoE and the IP address is floated, end users may not be able to configure device server. However, through DDNS method, it’s easy for different IP domain users to connect to ORing cellular products.

PPPoE enables clients to adopt the traditional dial-up access mode, which allows end users to use the familiar hardware and similar software to access the Internet. Moreover, clients can also use Ethernet adapters to connect PCs and xDSL modems, which allow PCs to share xDSL lines and thus saves investment.



Cellular Products at a Glance







Model Name	IMG-311DL-MN	IMG-311DL-4GS	IGMG-P83244GC+-D4G
Interface			
Cellular Standard	NB-IoT	LTE Cat 4	LTE Cat 4
SIM Card Slot	1	1	2
Cellular Antenna	1	2	2
10/100 Base-TX	1	1	
10/100/1000 Base-T			4
Gigabit Combo			4
Serial	1x RS-232/422/485 in DB9	1x RS-232/422/485 in DB9	1x RS-422/485 in Terminal block
DI/DO	1/1	1/1	0/1
GPS		✓	
Power			
Power Input	Dual 12-48VDC	Dual 12-48VDC	Dual 12-48VDC or PoE PD
Physical Characteristic			
Enclosure	IP30	IP30	IP30
Dimension (W x D x H)	26.1 x 94.9 x 144.3 mm	26.1 x 94.9 x 144.3 mm	116.4 x 170 x 154 mm
Mounting	DIN-Rail Kit	DIN-Rail Kit	DIN-Rail Kit
Approvals			
EMC	CE, FCC	CE, FCC	CE, FCC
Radio	RED	RED	RED, PTCRB
Carrier Certified			AT&T
Cybersecurity			IEC 62443-4-2







Model Name	IGAR-1004-D5G_EU	IMG-4312-4G	IMG-4312D+-D4G
Interface			
Cellular Standard	5G sub-6 GHz	LTE Cat.4	LTE Cat.4
SIM Card Slot	2	1	2
Cellular Antenna	4	2	2
10/100 Base-TX		2	2
10/100/1000 Base-T	4		
Wi-Fi IEEE 802.11		b/g/n (2.4GHz)	b/g/n (2.4GHz)
Wi-Fi Antenna		1	1
Serial		1x RS-232/422/485 in DB9	1x RS-232/422/485 in DB9
DI/DO			1/1
GPS			
Power			
Power Input	Dual 12-24VDC	Dual 12-48VDC	Dual 12-48VDC or PoE PD
Physical Characteristic			
Enclosure	IP40	IP30	IP30
Dimension (W x D x H)	55.2 x 125 x 158 mm	45 x 80.6 x 95 mm	45 x 80.6 x 95 mm
Mounting	DIN-Rail Kit	DIN-Rail Kit	DIN-Rail Kit
Approvals			
EMC	CISPR 25, CE	CE, FCC	CE, FCC
Radio	RED	RED	RED, PTCRB
Vehicle	ECE R10 ECE R118 (Fire protection)		
Petrochemical		UL C1D2	
Carrier Certified			AT&T, Verizon, FirstNet



IMG-4312D+-D4G

IMG-4312D+-D4G LTE cellular M2M gateway is an innovative solution for cloud, IoT, and Industry 4.0 applications. Supporting LTE with 4G, Ethernet, Serial, and Wi-Fi connectivity options, it communicates via Modbus RTU/TCP protocols and supports VPN (OpenVPN, PPTP, IPSec).

AT&T

FIRSTNET® Built with AT&T

PTCRB





Model Name	IAR-142-4G	IAR-142+-4G	IGMG-8224D-D5G
Interface			
Cellular Standard	LTE Cat.4	LTE Cat.4	5G Sub-6 GHz
SIM Card Slot	1	1	2
Cellular Antenna	2	2	4
10/100 Base-TX	2	2	
10/100/1000 Base-T			4
Wi-Fi IEEE 802.11	b/g/n (2.4GHz)	b/g/n (2.4GHz)	a/b/g/n/ac
Wi-Fi Antenna	1	1	2
DI/DO			2/2
SD Card Slot			✓
Power Input	Dual 12-48VDC	Dual 12-48VDC or PoE PD	Dual 12-48VDC
Physical Characteristic			
Enclosure	IP30	IP30	IP30
Dimension (W x D x H)	45 x 80.6 x 95 mm	45 x 80.6 x 95 mm	60 x 125 x 158 mm
Mounting	DIN-Rail Kit	DIN-Rail Kit	Wall Mount Kit
Approvals			
EMC	CE, FCC	CE, FCC	CE, FCC
Radio	RED	RED	RED
Petrochemical	UL C1D2	UL C1D2	





Model Name	TDGAR-1083D+-D4G12S-M12X-WV	TDGAR-1083D+-D5GS-M12X-WV	TDGAR-2083D+-D4G12S-M12X-WV
Interface			
Cellular Standard	LTE+ Cat.12	5G sub-6 GHz	Dual LTE+ Cat.12
SIM Card Slot	2	2	4
Cellular Antenna	2	4	4
10/100 Base-TX			
10/100/1000 Base-T	3 (M12 X-coded)	3 (M12 X-coded)	3 (M12 X-coded)
Wi-Fi IEEE 802.11	a/b/g/n/ac	a/b/g/n/ac	a/b/g/n/ac
Wi-Fi Antenna	2	2	2
DI/DO	1/1	1/1	1/1
GPS	✓	✓	✓
Power			
Power Input	24-110VDC or PoE PD	24-110VDC or PoE PD	24-110VDC or PoE PD
Physical Characteristic			
Enclosure	IP30	IP30	IP30
Dimension (W x D x H)	200 x 100 x 89 mm	200 x 100 x 89 mm	200 x 100 x 89 mm
Mounting	Wall Mount Kit	Wall Mount Kit	Wall Mount Kit
Approvals			
EMC	CE, FCC	CE, FCC	CE, FCC
Radio	RED	RED	RED
Rail	EN50155	EN50155	EN50155

Secure Remote Access Made Easy

The ORing router series now features a built-in IXON agent, enabling quick and secure VPN connections to the IXON Cloud. This allows users to access and manage the routers remotely—without the need for additional setup or external hardware.





	Traditional VPN	Cloud VPN
IT Setup	Complex	Plug & play
Public IP Required	Yes	No public IP needed
VPN Server Hosting	Self-hosted or third-party configuration	Included in the cloud platform
Time to Deploy	Days to weeks	Minutes
Accessibility	PC-based, static settings	Access via PC, tablet, smartphone

Smarter Connectivity Starts with IXON Cloud

VPN servers across 17 locations
automatically connects to the nearest server.

VPN client installs automatically
from IXON Cloud, works on Windows, Mac, Linux, iOS, and Android.

VPN Stealth Mode™
for connections in countries with internet censorship.

Configurable VPN over TCP or UDP
Select between reliable or efficient connection.

Get Connected in 4 Easy Steps





Support on

- IGAR-1004-D5G
- IGMG-8224D-D5G
- IGMG-P83244GC+-D4G
- IGR-40D
- TDGAR-1083D+-D5GS-M12X-WV
- TDGAR-1083D+-D4G12S-M12X-WV
- TDGAR-2083D+-D4G12S-M12X-WV

WLAN AP/CPE

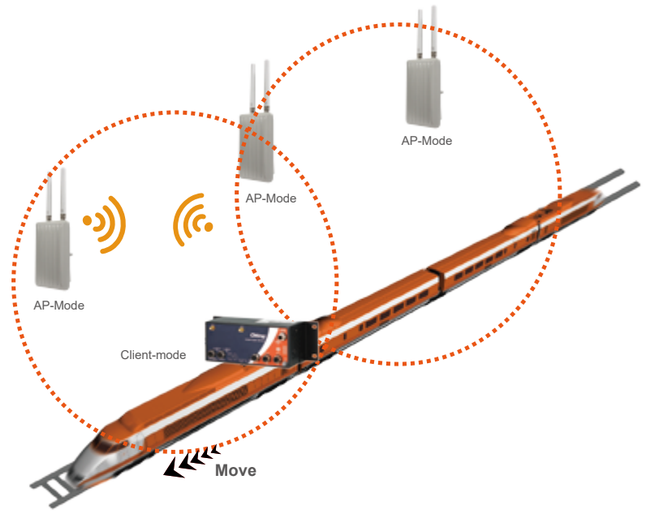
ORing's industrial Wireless access points are made for rugged and seamless long distance wireless and wireless roaming networks. All of ORing's industrial wireless products feature long communication range with X-Roaming technology, support for IEEE 802.11 standard, and AP/ Bridge/ Repeater/ AP-client/ Client operation modes. Some of these Wireless Access Points are even waterproof (the IP-67 models) – perfect for outdoor use. Additionally, some models are EN50155-certified, making them especially suitable for rolling stock applications.

Year	Standard		Peak PHY rate	Frequency
1997	802.11		2 Mbps	2.4GHz
1999	802.11b	Wi-Fi 1	11 Mbps	2.4GHz
1999	802.11a	Wi-Fi 2	54 Mbps	5GHz
2003	802.11g	Wi-Fi 3	54 Mbps	2.4GHz
2009	802.11n	Wi-Fi 4	600 Mbps	2.4GHz/5GHz
2013	802.11ac	Wi-Fi 5	1.73 Gbps (Wave 1) 3.46 Gbps (Wave 2)	5GHz only
2020	802.11ax	Wi-Fi 6	9.6 Gbps	2.4GHz/5GHz

X-Roaming

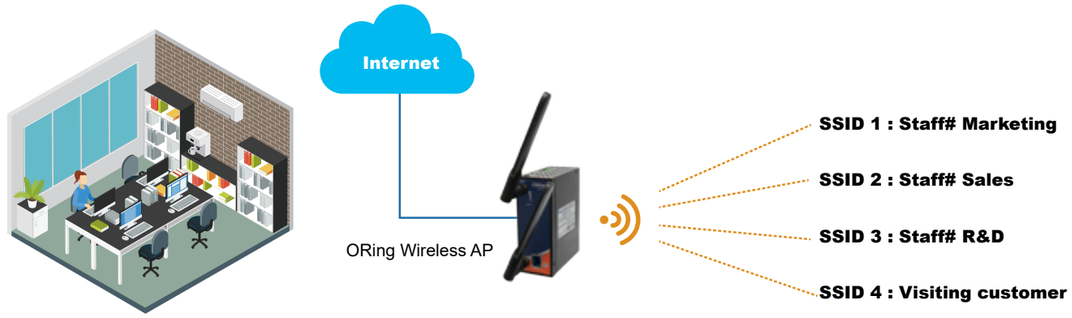
IEEE 802.11 networks can only transmit data within a few hundred meters. As for mobile data application, the devices should handoff from one access point to another. ORing's X-Roaming technology, which is available in all of ORing's new wireless access point models, reduces the handoff time between two different access points to less than 100 milliseconds, and makes seamless wireless communication possible.

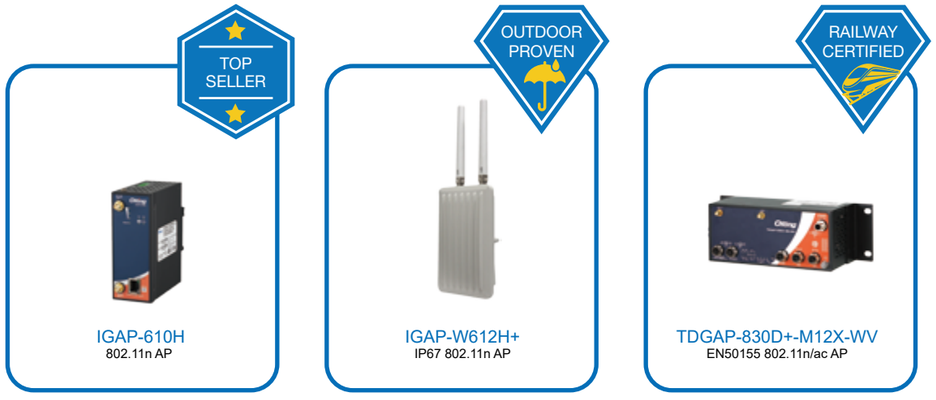
With ORing's X-Roaming technology, the client can roam seamlessly among different access points. ORing also provides the feature of load balance — to prevent traffic jam of mobile data transmission while roaming, i.e. to limit the total amount of AP clients that connected to the products of ORing APs.



Multiple SSIDs

SSID (Service Set Identifier) is an arbitrary sequence of characters that uniquely name for a wireless local area network. The SSID is broadcast by stations in beacon packets to announce the presence of a network. The wireless user can see the SSIDs for the available networks from wireless access point and join one of them. ORing wireless APs support Multiple SSIDs. When enable this mode, the access point is able to create and broadcast multiple wireless networks. Each wireless network has its own profile that includs SSIDs, channel, security and other options. The benefit of Multiple SSIDs support is to separate connections by wireless network through different encryptions.





IGAP-610H
802.11n AP

IGAP-W612H+
IP67 802.11n AP

TDGAP-830D+-M12X-WV
EN50155 802.11n/ac AP





Model Name	IAP-420	IAP-420+	IGAP-610H+	IGAP-840D
Interface				
10/100 Base-TX	2	2		
10/100/1000 Base-T			1	4
Wi-Fi IEEE 802.11	b/g/n (2.4GHz)	b/g/n (2.4GHz)	a/b/g/n	a/b/g/n/ac
Wi-Fi Antenna	1	1	2	2
DI/DO				2/2
WLAN				
Operation Mode	AP/ Bridge/ AP-Client	AP/ Bridge/ AP-Client	AP/ Client/ Repeater	AP/ Client/ Repeater
Transmission Rate	UP to 150 Mbps	UP to 150 Mbps	Up to 300 Mbps	Up to 867Mbps
Power				
Power Input	Dual 12-48VDC	Dual 12-48VDC or PoE PD	Dual 12-48VDC or PoE PD	Dual 12-48VDC
Physical Characteristic				
Enclosure	IP30	IP30	IP30	IP30
Dimension (W x D x H)	41 x 81 x 95 mm	41 x 81 x 95 mm	45 x 95 x 115 mm	60 x 125 x 158 mm
Mounting	DIN-Rail Kit Wall Mount Kit	DIN-Rail Kit Wall Mount Kit	DIN-Rail Kit Wall Mount Kit	DIN-Rail Kit Wall Mount Kit
Approvals				
EMC	CE, FCC	CE, FCC	CE, FCC	CE, FCC
Radio	RED	RED	RED	RED
Rail				

IGAP-W612H+	TDGAP-830D+-M12X-WV
1	3 (M12 X-coded)
a/b/g/n	a/b/g/n/ac
2	2
	1/1
AP/ Client/ Repeater	AP/ Client
Up to 300Mbps	Up to 867Mbps
48VDC from PoE	24-110VDC
IP67	IP30
220.42 x 127.42 x 75 mm	200 x 100 x 89 mm
Pole Mount Kit	Wall Mount Kit
CE, FCC	CE, FCC
RED	RED
	EN50155

Model Name	IDS-4312D+
Interface	
10/100 Base-TX	2
Wi-Fi IEEE 802.11	b/g/n
Wi-Fi Antenna	1
Serial	1
DI/DO	1/1
WLAN	
Operation Mode	Client
Frequency Band	America / FCC: 2.412~2.462 GHz Europe CE / ETSI: 2.412~2.472 GHz
Transmission Rate	UP to 150 Mbps
Serial	
Connector	DB9
Serial Mode	RS-232/422/485
Operating Mode	Virtual COM, Serial Tunnel, TCP Server/ Client, UDP, Modbus Gateway
Power	
Power Input	Dual 12-48VDC or PoE PD
Physical Characteristic	
Enclosure	IP30
Dimension (W x D x H)	41 x 81 x 95 mm
Mounting	DIN-Rail Kit
Approvals	
EMC	CE/FCC
Radio	RED
Petrochemical	UL C1D2

Media Converter

ORing offers Serial to Serial, Fiber to Ethernet (PoE), and Gigabit Fiber to Ethernet media converters. Also, ORing's serial converters allow devices to communicate effortlessly across different serial interfaces and offer convenient, intelligent features

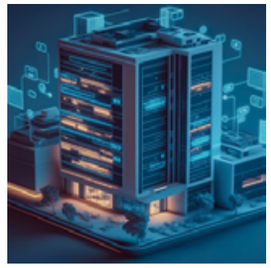
Target Markets



Industrial Automation



ITS



Building, Facility

Success Story

Location: Hubei, China
Project: Smart Bridge Monitoring – Wuhan 3rd Ring Road

To ensure the long-term structural health of 42 bridges, over 1,929 sensors have been deployed to monitor key indicators such as wind speed, wind direction, stress, vibration, and settlement. Data is transmitted to a cloud platform, enabling personnel to monitor the status of each bridge in real time via PC or mobile app. Considering factors such as wiring, cost, and deployment efficiency, the monitoring system is divided into three layers:

Front-End Access System

Two sensors connect to one IMC-121FB-SS-SC media converter via LAN port for data transmission.

Convergence System

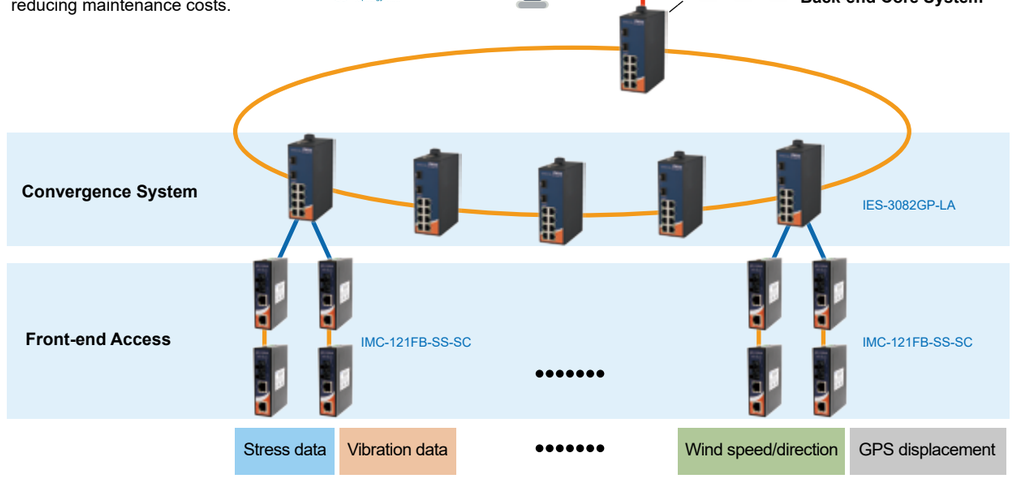
Each bridge features 5 aggregation points, each equipped with an IES-3082GP switch.

Back-End Core System

The IES-3082GP managed switch connects to the nearest Internet access point and transmits collected data to the cloud.

Through the Open-Vision centralized management platform, system administrators can efficiently monitor and manage devices, significantly improving operational efficiency and reducing maintenance costs.





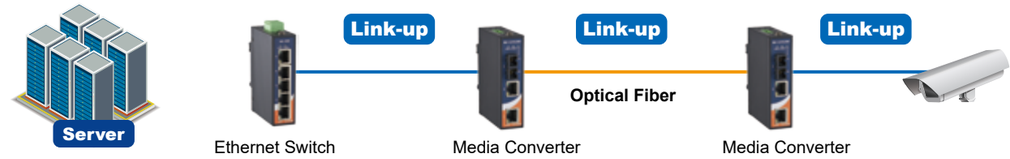
LFP (Link Fault Pass-Through)

Link Fault Pass-Through is the technology that actively “passes” any link failure of one side of the media converter to the other side, enabling subsequent devices connected to the other side to respond properly.Traditional media converters usually suffer from inability to transfer link failure from one side to another. In other words, when link failure occurs on one side, the other side is still transmitting packets without actual data, causing subsequent devices of the link to wait for a response that will never arrive.

LFP effectively solves such problem of media converters by actively relaying link failures from one side to another. For example, if the links on the Ethernet side of the media converter fails, the media converter reinitiates auto-negotiation on the Ethernet side but stays in the link failure state. Additionally, the converter actively stop transmitting on links of the optical fiber side so subsequent devices connected to the optical fiber link would respond to network failure properly. With LFP technology, link failure would be noticed swiftly, minimizing data loss caused by such failure.

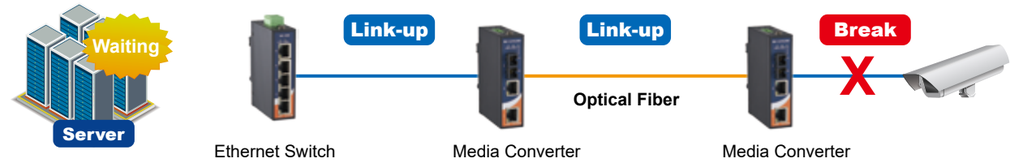
Normal Condition

Both fiber and Ethernet links are active, and data transmission operates smoothly without interruption.



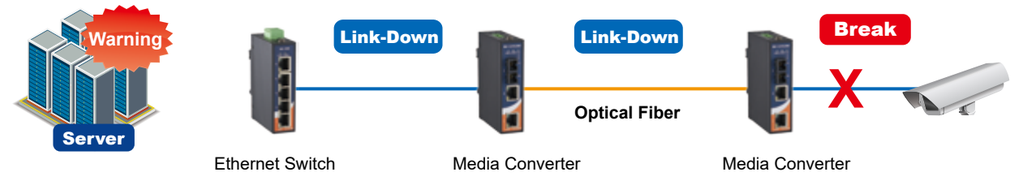
Without LFP Function

If one side of the link fails, the media converter without LFP will keep the opposite port active, causing the connected device to remain unaware of the disconnection, which may lead to data loss or communication issues.



With LFP Function

If one side of the link fails, the media converter with LFP will automatically disable the opposite port, instantly notifying the connected device of the fault, enabling faster response and troubleshooting.

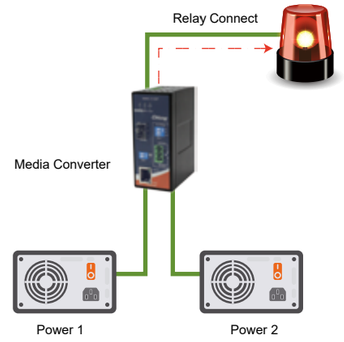


Dual Power Input

Ensures continuous operation in critical environments. If one power source fails, the system automatically switches to the backup, minimizing downtime and enhancing power stability.

Relay Output

This feature instantly triggers alerts upon unexpected power failures. This feature enables real-time notifications to external alarm systems, ensuring timely response, minimizing downtime, and enhancing network reliability in industrial environments.





RMC-1000

Industrial Ethernet to Fiber Media Converter Chassis

- Supports 18 slots for media converter
- Dual power supply design
- Hot-swappable for converters and power supplies
- 19 inches Rack-mount enabled

Optional module list

Card Type Ethernet to Fiber Media Converter



RMC-121FB-MM-SC
2FE to 1 100FX (MM 2km, SC)

RMC-121FB-SS-SC
2FE to 1 100FX (SM 30km, SC)



RGMC-111GPB
1GE to 1 100/1000 SFP socket

Power Supply Module



RPM-130-AC-EU
130W (12VDC/10.8A) with 100~240VAC input, EU power cord

RPM-130-AC-US
130W (12VDC/10.8A) with 100~240VAC input, US power cord



IGPMC-111GP-BT-24V
Gigabit PoE to Fiber Media Converter
- 1 Gigabit PoE to 100/1000Base-X SFP slot
- 802.3bt, up to 90W PoE output



IGMC-111GPB-LFP
Gigabit Ethernet to Fiber Media Converter
- 1GE to 100/1000Base-X SFP slot
  - Up to 120km w/ Single-mode SFP
  - Up to 2km w/ Multi-mode SFP



IMC-121FB series
2FE to 1 100FX Media Converter
- SC fiber connector
  - Single-mode: 30km
  - Multi-mode: 2km

Gigabit PoE to Fiber Media Converter



Model Name	IGPMC-111GP-BT-24V
Interface	
10/100/1000 Base-T	1 PSE
100/1000 Base-X SFP	1
Relay Output	Support
PoE	
802.3	af/at/bt
Power Output	90W
Feature	
LFP	Support
Power	
Power Input	Dual 12-57VDC
Physical Characteristic	
Enclosure	IP30
Dimension (W x D x H)	41 x 70 x 95 mm
Mounting	DIN-Rail Kit
Operating Temperature	-40 to 75°C

10G Ethernet to SFP+ Media Converter



Model Name	ITGMC-111GP+
Interface	
10/100/1G/10G Base-T	1
1G/10G Base-X SFP+	1
Relay Output	Support
Feature	
LFP	-
Power	
Power Input	Dual 12-48 VDC
Physical Characteristic	
Enclosure	IP30
Dimension (W x D x H)	40 x 108 x 154 mm
Mounting	DIN-Rail Kit
Operating Temperature	-20 to 60°C

Rackmount Media Converter Chassis



Model Name	RMC-1000
Interface	
Slot	18
PoE	
RMC-121FB-MM-SC	2FE to 1 100FX (Multi-mode, 2km, SC)
RMC-121FB-SS-SC	2FE to 1 100FX (Single-mode, 30km, SC)
RGMC-111GPB	1GE to 1 100/1000 SFP socket
Power	
Power Input	Optional 100-240VAC
Physical Characteristic	
Dimension (W x D x H)	430 x 243 x 132 mm
Mounting	Rackmount
Operating Temperature	-10 to 60°C

Ethernet to Fiber Media Converter



Model Name	IMC-121FB		IGMC-111GPB	IGMC-1011GP	IGMC-111GPB-LFP
	MM-SC	SS-SC			
Interface					
10/100 Base-TX	2				
10/100/1000 Base-T			1	1	1
100 Base-FX SC	1				
100/1000 Base-X SC					
100/1000 Base-X SFP			1	1	1
Relay Output				Support	
Fiber					
Fiber Mode	Multi-mode	Single-mode			
Wavelength	1310 nm	1310 nm			
Distance (km)	2km	30km			
Feature					
LFP					Support
Power					
Power Input	Dual 12-48VDC		Dual 12-48VDC	Dual 12-48VDC	Dual 12-48VDC
Physical Characteristic					
Enclosure	IP30		IP30	IP30	IP30
Dimension (W x D x H)	26.1 x 70 x 95 mm		26.1 x 70 x 95 mm	26.1 x 94.9 x 144.3 mm	26.1 x 70 x 95 mm
Mounting	DIN-Rail Kit		DIN-Rail Kit	DIN-Rail Kit	DIN-Rail Kit
Operating Temperature	-40 to 70°C		-40 to 70°C	-40 to 70°C	-40 to 75°C

Serial Device Server

ORing's serial device servers support various operation modes: TCP server, TCP client, UDP, Virtual COM and Modbus gateway. All device server models include free-bundled management utility, plus DS-Tool with Virtual COM drivers.



Use Cases



Remote monitoring of factory automation equipment



Uploading smart meter / PLC data to central control systems



Integrating legacy serial devices with SCADA systems



Networking data from parking systems, ticket machines, and so on

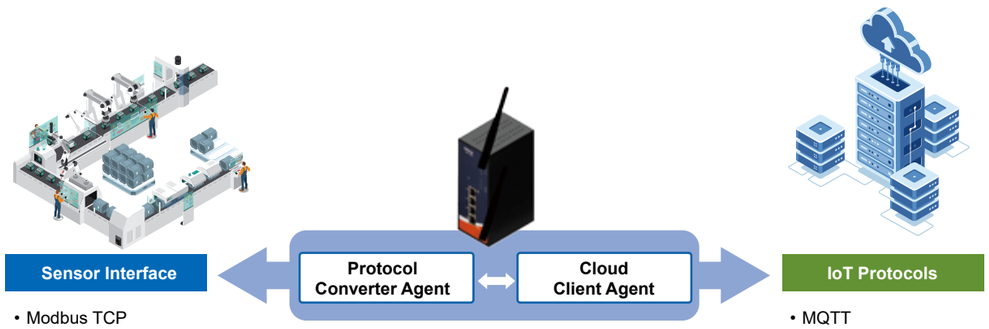
Feature Highlights

Modbus Gateway

ORing offers Modbus gateway feature which serves as a converter between Modbus TCP and Modbus RTU/ASCII devices. ORing's serial device server allow Modbus RTU/ASCII devices to be easily connected with network-based Modbus TCP devices without changing existing structure. The device servers are able to support dozens of RTU/ASCII devices through the serial ports, connecting a high density of Modbus nodes to the same network.

Open Gateway

ORing's Open Gateway supports MQTT, MQTT Sparkplug, LWM2M, and CoAP for cloud connections, and Modbus TCP, RTU/ASCII, SNMP for end devices. Available on serial device servers and gateways, it enables fast IIoT deployment and value creation.

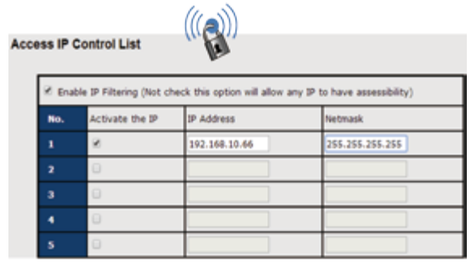


- Modbus TCP
- Modbus RTU/ASCII
- SNMP
- OPCUA
- Raw data

- MQTT
- MQTT Sparkplug
- LWM2M
- CoAP

Network Security

The serial device server supports secure management via HTTPS and SSH for encrypted access, and an IP white list to restrict access to trusted addresses, ensuring only authorized users can configure the device safely.



Management System: DS-Tool

DS-Tool is a Windows-based application for managing devices with features like network and serial port configuration, access IP control, password and firmware management. It also includes group setup wizards, VCOM status monitoring, system logs, email alerts, SNMP traps, and IP address collection for efficient and secure operation.

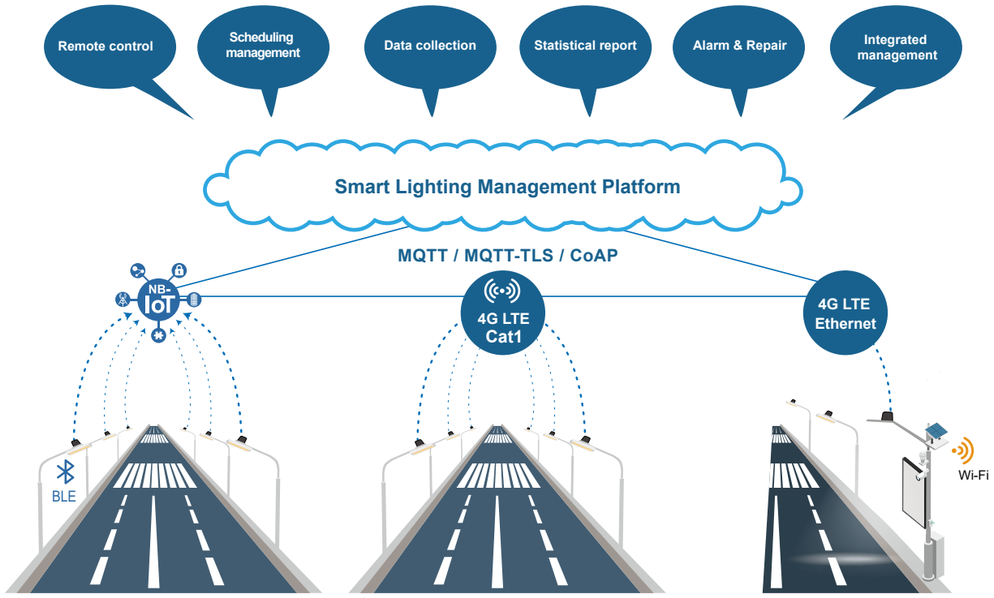




Model Name	IDS-312L	IDS-322	IDS-4312D+
Interface			
10/100 Base-TX	2	2	2
RS-232/422/485	1 (DB9)	2 (DB9)	1 (DB9)
Wi-Fi IEEE 802.11			b/g/n (2.4GHz)
DI/DO			1/1
WLAN			
Operation Mode			Client
Transmission Rate			UP to 150 Mbps
Power			
Power Input	Dual 12-48VDC	Dual 12-48VDC	Dual 12-48VDC or PoE PD
Physical Characteristic			
Enclosure	IP30	IP30	IP30
Dimension (W x D x H)	26 x 75 x 110 mm	45 x 81 x 95 mm	45 x 81 x 95 mm
Approvals			
EMC	CE, FCC	CE, FCC	CE, FCC
Petrochemical			UL C1D2

Smart Lighting Controller

ORing's smart lighting controller are innovative solutions for smart city and smart grid applications. They are compatible with most major LED drivers, including Philips, OSRAM, TCI, Inventronics, and Tridonic, ensuring seamless integration and efficient street lighting management.



Smart Street Lighting System

NEMA or Zhaga socket | Auto Dimming | GPS/ GLONASS | G Sensor | FOTA | Energy Saving | Fault Detection

Smart Pole

Environmental monitoring | Info display | Surveillance

Success Story

Location：Taoyuan, Taiwan

The Taoyuan City Government decided to replace 160,000 traditional street lights with smart street lights. So far, more than 100,000 ORing smart lighting controllers have been installed.By establishing a wireless communication platform, administrators are able to remotely control the lights and monitor power consumption.

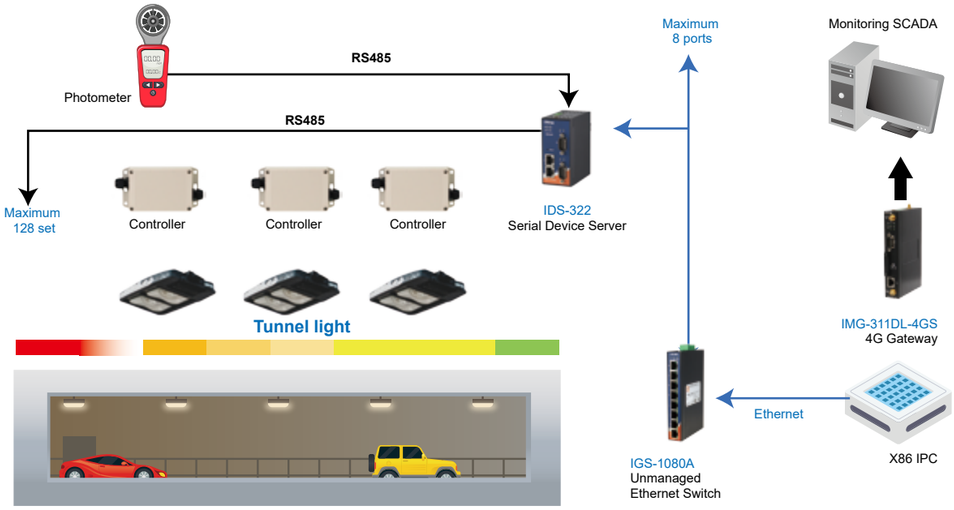
Direct benefits

- Annual electricity bill will be reduced from NT$219 million to 66 million
- Cutting 60,000 tons of carbon emissions per year
- Effective lighting maintenance rate of street lamps over 99.7%
- Shortened repair time of street lamp failure

Use Case

In smart tunnel application scenarios, ORing offers an integrated solution featuring Ethernet switches, device servers, cellular gateways, and smart lighting controllers.

The system concept includes using RS-485 communication for brightness adjustment and adopting segmented lighting control to optimize visibility based on real-time conditions. This approach aims to balance driving safety with energy efficiency and environmental sustainability.



Smart Lighting Controller Category



OL-N2 series

- Conforms to NEMA standard
- 0-10V or DALI
- NB-IoT/Cat M1



OL-B-NB series

- Conforms to NEMA standard
- 0-10V or DALI
- NB-IoT/Cat M1



OL-Z-NB series

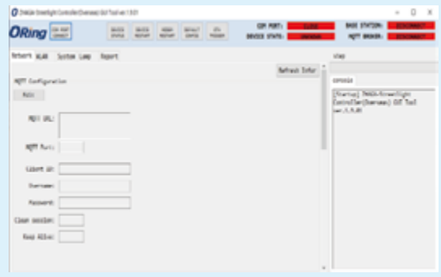
- Conforms to Zhaga Book18
- DALI2/D4i Protocol
- NB-IoT/Cat M1
- Built-in GPS



How to start?

We offer a Zhaga controller starter kit for purchase, allowing users to test and evaluate its functionality before full-scale deployment.
MOQ:2, only even quantities are allowed to be ordered.

- 2 pcs OL-Z1D603D1-NBGTF-1-A1
- 2 pcs Zhaga socket
- 2 pcs USB to TTL serial cable





Industrial SFP Transceiver

ORing's small form-factor pluggable (SFP) fiber modules support data rates up to 10G and include models with Digital Diagnostic Monitoring (DDM). These modules offer enhanced reliability, real-time performance monitoring, and flexibility for various industrial networking applications.

Flexibility
Multiple fiber types with one Ethernet switch

Scalability
Easily add or extend SFPs for future needs

Convenience
Hot-swappable for seamless operation



155Mbps 100Base-FX Fiber SFP

Model Name	Fiber Mode	Typical Distance	Wavelength	DDM	Operating Temperature
SFP100-MM	Multi-mode	2km	1310nm		0~70°C
SFP100-MM-I	Multi-mode	2km	1310nm		-40~85°C
SFP100-MM-I-DDM	Multi-mode	2km	1310nm	V	-40~85°C
SFP100-MM5	Multi-mode	5km	1310nm		0~70°C
SFP100-MM5-I	Multi-mode	5km	1310nm		-40~85°C
SFP100-SS30	Single-mode	30km	1310nm		0~70°C
SFP100-SS30-DDM	Single-mode	30km	1310nm	V	0~70°C
SFP100-SS30-I	Single-mode	30km	1310nm		-40~85°C
SFP100-SS30-I-DDM	Single-mode	30km	1310nm	V	-40~85°C
SFP100-SS60	Single-mode	60km	1310nm		0~70°C
SFP100-SS60-I	Single-mode	60km	1310nm		-40~85°C
SFP100-SS60-I-DDM	Single-mode	60km	1310nm	V	-40~85°C
SFP100-SS100	Single-mode	100km	1550nm		0~70°C
SFP100-SS100-I	Single-mode	100km	1550nm		-40~85°C
SFP100-SS120	Single-mode	120km	1550nm		0~70°C
SFP100-SS120-I	Single-mode	120km	1550nm		-40~85°C
SFP100B3-MM	Multi-mode	2km	TX: 1310nm, RX: 1550nm		0~70°C
SFP100B3-MM-I	Multi-mode	2km	TX: 1310nm, RX: 1550nm		-40~85°C
SFP100B3-MM-I-DDM	Multi-mode	2km	TX: 1310nm, RX: 1550nm	V	-40~85°C
SFP100B5-MM	Multi-mode	2km	TX: 1550nm, RX: 1310nm		0~70°C
SFP100B5-MM-I	Multi-mode	2km	TX: 1550nm, RX: 1310nm		-40~85°C
SFP100B5-MM-I-DDM	Multi-mode	2km	TX: 1550nm, RX: 1310nm	V	-40~85°C
SFP100B3-SS20	Single-mode	20km	TX: 1310nm, RX: 1550nm		0~70°C
SFP100B3-SS20-I	Single-mode	20km	TX: 1310nm, RX: 1550nm		-40~85°C
SFP100B3-SS20-I-DDM	Single-mode	20km	TX: 1310nm, RX: 1550nm	V	-40~85°C
SFP100B5-SS20	Single-mode	20km	TX: 1550nm, RX: 1310nm		0~70°C
SFP100B5-SS20-I	Single-mode	20km	TX: 1550nm, RX: 1310nm		-40~85°C
SFP100B5-SS20-I-DDM	Single-mode	20km	TX: 1550nm, RX: 1310nm	V	-40~85°C

Model Name	Fiber Mode	Typical Distance	Wavelength	DDM	Operating Temperature
SFP100B5-SS40	Single-mode	40km	TX: 1550nm, RX: 1310nm		0~70°C
SFP100B5-SS40-I	Single-mode	40km	TX: 1550nm, RX: 1310nm		-40~85°C
SFP100B5-SS40-I-DDM	Single-mode	40km	TX: 1550nm, RX: 1310nm	V	-40~85°C
SFP100B3-SS60	Single-mode	60km	TX: 1310nm, RX: 1550nm		0~70°C
SFP100B3-SS60-I	Single-mode	60km	TX: 1310nm, RX: 1550nm		-40~85°C
SFP100B5-SS60	Single-mode	60km	TX: 1550nm, RX: 1310nm		0~70°C
SFP100B5-SS60-I	Single-mode	60km	TX: 1550nm, RX: 1310nm		-40~85°C

125Mbps 100Base-TX Ethernet SFP

Model Name	Connector	Cable Type	Typical Distance	Operating Temperature
SFP100RJ	RJ45	UTP CAT 5	100m	0~70°C
SFP100RJ-I	RJ45	UTP CAT 5	100m	-40~85°C

1.25Gbps 1000Base-X Fiber SFP

Model Name	Fiber Mode	Typical Distance	Wavelength	DDM	Operating Temperature
SFP1GB3-LX10-DDM	Single-mode	10km	TX: 1310nm, RX: 1550nm	V	0~70°C
SFP1GB5-LX10-DDM	Single-mode	10km	TX: 1550nm, RX: 1310nm	V	0~70°C
SFP1GB3-LX10-I-DDM	Single-mode	10km	TX: 1310nm, RX: 1550nm	V	-40~90°C
SFP1GB5-LX10-I-DDM	Single-mode	10km	TX: 1550nm, RX: 1310nm	V	-40~90°C
SFP1G-MLX	Multi-mode	2km	1310nm		0~70°C
SFP1G-MLX-DDM	Multi-mode	2km	1310nm	V	0~70°C
SFP1G-MLX-I	Multi-mode	2km	1310nm		-40~85°C
SFP1G-MLX-I-DDM	Multi-mode	2km	1310nm	V	-40~85°C
SFP1G-SX	Multi-mode	550m	850nm		0~70°C
SFP1G-SX-DDM	Multi-mode	550m	850nm	V	0~70°C
SFP1G-SX-I	Multi-mode	550m	850nm		-40~85°C
SFP1G-SX-I-DDM	Multi-mode	550m	850nm		-40~85°C
SFP1G-LX10	Single-mode	10km	1310nm		0~70°C
SFP1G-LX10-DDM	Single-mode	10km	1310nm	V	0~70°C
SFP1G-LX10-I	Single-mode	10km	1310nm		-40~85°C
SFP1G-LX10-I-DDM	Single-mode	10km	1310nm	V	-40~85°C
SFP1G-LX20	Single-mode	20km	1310nm		0~70°C
SFP1G-LX20-I	Single-mode	20km	1310nm		-40~85°C
SFP1G-LX20-I-DDM	Single-mode	20km	1310nm	V	-40~85°C
SFP1G-LHX30	Single-mode	30km	1310nm		0~70°C
SFP1G-LHX30-I	Single-mode	30km	1310nm		-40~85°C
SFP1G-LHX40	Single-mode	40km	1310nm		0~70°C
SFP1G-LHX40-I	Single-mode	40km	1310nm		-40~85°C
SFP1G-XD50	Single-mode	50km	1550nm		0~70°C
SFP1G-XD50-I	Single-mode	50km	1550nm		-40~85°C
SFP1G-ZX70-I	Single-mode	70km	1550nm		-40~85°C
SFP1G-ZX70-I-DDM	Single-mode	70km	1550nm	V	-40~85°C
SFP1G-ZX80	Single-mode	80km	1550nm		0~70°C
SFP1G-ZX80-I	Single-mode	80km	1550nm		-40~85°C
SFP1G-EZX120	Single-mode	120km	1550nm		0~70°C
SFP1G-EZX120-I	Single-mode	120km	1550nm		-40~85°C
SFP1GB3-LX10	Single-mode	10km	TX: 1310nm, RX: 1550nm		0~70°C
SFP1GB3-LX10-I	Single-mode	10km	TX: 1310nm, RX: 1550nm		-40~85°C
SFP1GB5-LX10	Single-mode	10km	TX: 1550nm, RX: 1310nm		0~70°C
SFP1GB5-LX10-I	Single-mode	10km	TX: 1550nm, RX: 1310nm		-40~85°C
SFP1GB3-LX20	Single-mode	20km	TX: 1310nm, RX: 1550nm		0~70°C
SFP1GB3-LX20-I	Single-mode	20km	TX: 1310nm, RX: 1550nm		-40~85°C
SFP1GB5-LX20	Single-mode	20km	TX: 1550nm, RX: 1310nm		0~70°C
SFP1GB5-LX20-I	Single-mode	20km	TX: 1550nm, RX: 1310nm		-40~85°C
SFP1GB3-LX40	Single-mode	40km	TX: 1310nm, RX: 1550nm		0~70°C
SFP1GB3-LX40-I	Single-mode	40km	TX: 1310nm, RX: 1550nm		-40~85°C
SFP1GB5-LX40	Single-mode	40km	TX: 1550nm, RX: 1310nm		0~70°C
SFP1GB5-LX40-I	Single-mode	40km	TX: 1550nm, RX: 1310nm		-40~85°C
SFP1GB3-LX60	Single-mode	60km	TX: 1310nm, RX: 1550nm		0~70°C
SFP1GB3-LX60-I	Single-mode	60km	TX: 1310nm, RX: 1550nm		-40~85°C
SFP1GB5-LX60	Single-mode	60km	TX: 1550nm, RX: 1310nm		0~70°C
SFP1GB5-LX60-I	Single-mode	60km	TX: 1550nm, RX: 1310nm		-40~85°C
SFP1GB4-LX80	Single-mode	80km	TX: 1490nm, RX: 1550nm		0~70°C
SFP1GB4-LX80-I	Single-mode	80km	TX: 1490nm, RX: 1550nm		-40~85°C
SFP1GB5-LX80	Single-mode	80km	TX: 1550nm, RX: 1490nm		0~70°C
SFP1GB5-LX80-I	Single-mode	80km	TX: 1550nm, RX: 1490nm		-40~85°C

1G Base-T Ethernet SFP

Model Name	Connector	Cable Type	Typical Distance	Operating Temperature
SFP1GRJ	RJ45	UTP CAT 5e	100m	0~70°C
SFP1GRJ-I	RJ45	UTP CAT 5e	100m	-40~85°C

2.5G Base-T Ethernet SFP

Model Name	Connector	Cable Type	Typical Distance	Operating Temperature
SFP2G5RJ-I	RJ45	UTP CAT 6	100m	-40~85°C

10G Base-X Fiber SFP+

Model Name	Fiber Mode	Typical Distance	Wavelength	DDM	Operating Temperature
SFP10G-LR10	Single-mode	10km	1310nm		0~70°C
SFP10G-LR10-I	Single-mode	10km	1310nm		-40~85°C
SFP10G-LR20	Single-mode	20km	1310nm		0~70°C
SFP10G-LR20-I	Single-mode	20km	1310nm		-40~85°C
SFP10G-ER40	Single-mode	40km	1550nm		0~70°C
SFP10G-ER40-I	Single-mode	40km	1550nm		-40~85°C
SFP10G-MM	Multi-mode	300m	850nm		0~70°C
SFP10G-MM-I	Multi-mode	300m	850nm		-40~85°C
SFP10G-ZR80	Single-mode	80km	1550nm		0~70°C
SFP10G-ZR80-I	Single-mode	80km	1550nm		-40~85°C
SFP10GB27-LR40-I	Single-mode	40km	TX: 1270nm, RX: 1330nm		-40~85°C
SFP10GB33-LR40-I	Single-mode	40km	TX: 1330nm, RX: 1270nm		-40~85°C

10G Base-T Ethernet SFP+

Model Name	Connector	Cable Type	Typical Distance	Operating Temperature
SFP10GRJ	RJ45	UTP CAT 6A	100m	0~70°C
SFP10GRJ-I	RJ45	UTP CAT 6A	100m	-40~85°C