- 10G Core Switch
- 4G LTE Router
- SyncE Switch
- PoE Series
- Serial Connectivity Series
- EN 50155 Switch
- IEC 61850-3 Switch

CTC union®
www.ctcu.com

WiFi Gateway
Automation
ITS
Railway
4.0 INDUSTRY
IIoT
4G Router
SMART CITY

Industrial Ethernet
PRODUCT GUIDE

EN50155　NEMA TS2　IEC 61850-3　EN50121-4　EN61000-6-2 EN61000-6-4　ISO 9001 ISO 14001　c UL us

e-Catalog

Industrial Product Category

Reliable Industrial Ethernet Products

Industrial Product Series

10G Core Switch

- 1GbE/10GbE product portfolio
- 24+4, 24+8 solutions
- Up to 24 IEEE802.3at PoE ports
- Up to 28 SFP GbE fiber ports
- Supports 14 μ-Ring instance in one switch

4G LTE Series

Router/Gateway

- 2 SIM slot for failover redundancy
- GNSS: GPS/GLONASS/Galileo
- LAN, DI/DO, RS-232/485 Serial interface
- IPsec VPN/Modbus RTU/TCP, Real-COM
- IEEE802.11b/g/n/ac
- Routing: RIP1/RIP2, OSPF, VRRP

SyncE Switch

- Build-in TCXO for transference of synchronization signal
- Physical layer Synchronous Ethernet supported
- Precision Time Protocol IEEE 1588-2008 (v2 PTP) supported
- ITU-T G.8262, G.8264 compliant
- 8ports 30W PoE model available.
- Provide 4KV surge Protection for Ethernet port

PoE Series

Switch/Converter/Lan Extender/Injector

- Ultra PoE++ 60W Solution
- 4KV Surge protection
- LAN extend up to 1.2Km with PoE power feeding
- 24VDC power booster and regulate power output
- Product range of Switch, Converter, Extender and Injector

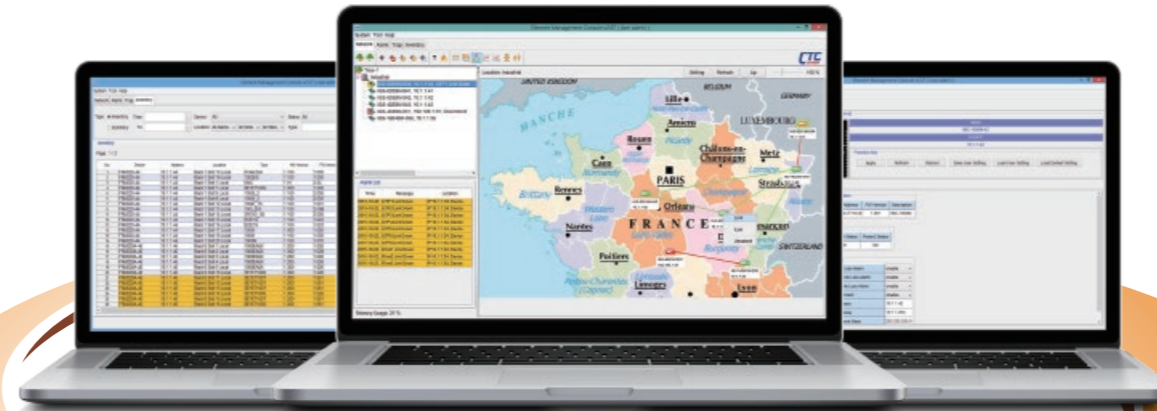## Management Software
SmartView™ & SmartConfig™

IEC 61850-3 Switch

- IEC 61850-3 and IEEE 1613 compliant
- u-Ring and STP/RSTP/MSTP/ERPS for network redundancy
- Easy network management by web browser, CLI, Telnet/ serial console and Windows utility.
- Wide 110/220 VDC/VAC power supply range and 24/48 VDC redundant power inputs
- Modbus TCP, LLDP, RADIUS,TACACS+, QoS, IGMP snooping, IEEE 802.1X, HTTPS, SNMPv3, and SSH supported
- -40 to 85°C operating temperature range

Serial Connectivity Series

FieldBus/Binary/Transducer

- Modbus RS232/422/485 and Profibus RS485 to fiber converter
- Support one fiber or dual fiber redundancy.
- Redundant power input
- Auto baud rate from 9.6Kbps to 12Mbps
- Device failure isolation
- 2.5 KVrms isolation for serial port

EN 50155 Switch

- EN 50155 Certified
- IEC 61375 TTDP
- Auto-bypass for failover
- Power input range 24 to 110VDC
- IEEE 802.3at PoE 8/12/16-port product portfolio
- M12 connector, IP64/IP67 rugged design

Reliable Industrial Ethernet Products

■ Reliability Elements

Certification
- CE/FCC
- **UL60950-1**
- EN50155
- **EN50121-4**
- IEC-61850-3
- **EN61000-6-2**
- EN61000-6-4
- NEMA TS2

Redundant Ring
- μ-Ring
- **ITU-T G.8032**
- 802.1d STP
- **802.1w RSTP**
- 802.1s MSTP

EMS Industrial Grade
- EN 61000-4-2 ESD Level 3
- **EN 61000-4-3 RS Level 3**
- EN 61000-4-4 EFT Level 3
- **EN 61000-4-5 Surge Level 3**
- EN 61000-4-6 CS Level 3

+75℃
-40℃

Reliable

WARRANTY
5 years

Temperature
- **Wide Temperature Models Available**

Rugged Mechanical
- **Vibration** IEC 600068-2-6
- **Free Fall** IEC 600068-2-32
- **Shock** IEC 600068-2-27

High MTBF & 5 Years Warranty
- **Industrial Grade Component**
- **Fanless**

■ Brief Comparison between general CE & EN50121-4

	CE Compliant	EN50121-4 Compliant (Trackside)
Surge		
Signal L-E	1kV	2kV
Signal L-L	**N/A**	**2kV**
DC Power L-E	**0.5kV**	**2kV**
DC Power L-L	**0.5kV**	**2kV**
ESD (Contact)	4kV	6kV
Radio frequency magnetic field	10V/m	20V/m
EFT (fast transient)	0.5kV Criteria B*	2kV Criteria A*
Power magnetic field	10 A/meter	**300 A/meter**
Pulse magnetic field	**N/A**	**300 A/meter**

* Criteria A: During the test storage devices shall maintain normal operation both in read/write and in stand-by conditions.
* Criteria B: During and after the test failures which can be recovered by read and write retires are permissible
(temporary delay in processing caused by this process is acceptable).

■ Key Certifications

c UL us LISTED	To reduce risks of electric shocks, fire, energy related hazards, heat related hazards, mechanical hazards, radiation, and chemical hazards for operator, layman or service personnel.
E13	For car and motorcycle spare parts and security products, noise and emissions, are required to act in accordance with the EU.
EN50121-4	For trackside and railway applications.

	For Heavy Industrial Environment application.
NEMA TS2	For traffic control.
	For rolling stock, vehicle and moving machine applications.
IEC 61850-3	For power substation applications.

■ Advanced 4KV Surge Protection for PoE & UTP

PoE Switch

Surge Protect

4KV

■ Powerful Cybersecurity - Port Security

Step1
Add the allowed MAC address

Static MAC Table Configuration

Delete	VLAN ID	MAC Address	Port Members		
			1	2	3
☐	1	F0-DE-F1-0B-65-8D	☐	☑	☐

Step2
Enable un-know MAC limit at zero

System Configuration

Mode	Enable ⌄
Aging Enable	☐
Aging Period	3600 Seconds

Port Configuration

Port	Mode	Limit	Action	State
1	Disable ⌄	4	None ⌄	Disabled
2	Enable ⌄	0	Shutdown ⌄	Ready

Hacker's MAC
F0-DE-F1-0B-65-8D

MAC Whitelist
F0-DE-F1-0B-65-8D
F0-DC-F1-5B-70-2D
F0-DF-F1-4B-72-9D
F0-DA-F4-3C-22-1A

■ Powerful Cybersecurity - NAS

IEEE802.1X Authentication

Send username & password

NAS

Send access request for authentication by ID

RADIUS/ISE Server
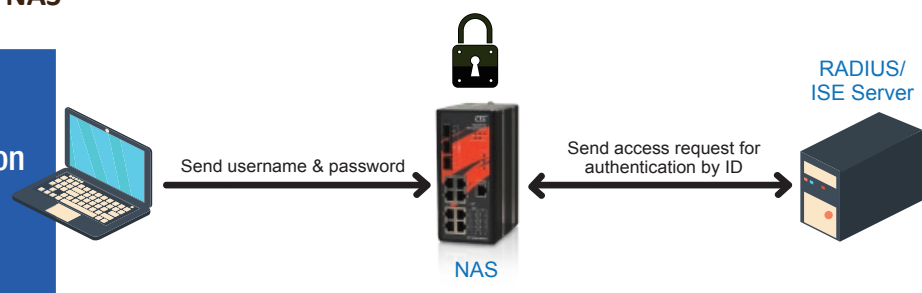
MAB (MAC Authentication Bypass)

Send MAC address (First packet)

NAS

Learn & authenticate the source MAC address

RADIUS/ISE Server
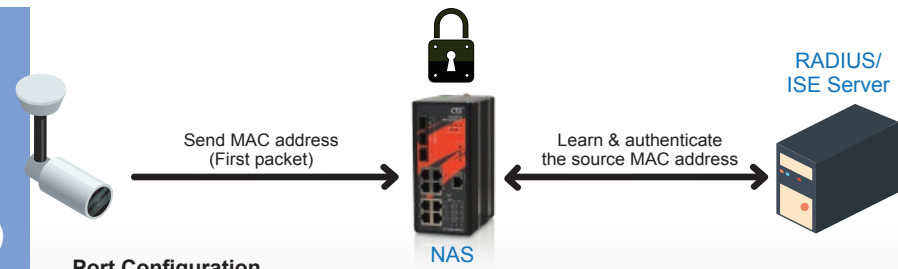
Port Configuration

| Port	Admin State	RADIUS-Assigned Qos Enable	RADIUS-Assigned VLAN Enable	Guest VLAN Enable
1	MAC-based Auth. ⌄	☑	☑	☐
2	Force Authorized ⌄	☐	☐	☐

■ IEEE 1588 PTP v2

Ethernet equipment has become a widely accepted commodity as it replaces traditional and expensive legacy technology. The multitude of nodes needed to be synchronized as precisely as possible over the network are ever increasing. IEEE1588 PTP V2 is a packet based network protocol that carries time stamps in Ethernet format. The applications requiring this technology fall within the major markets for smart grids and telecommunication networks.

Supports 5 operating mode

- Ordinary-Boundary
- Peer to Peer Transparent Clock
- End to End Transparent Clock
- Master
- Slave

Telecom Communication

4G LTE

Power Substation

Renewable Energy

IEEE 1588 v2

IEEE 1588 v2

Primary Reference Clock (PRC)

Backbone Network
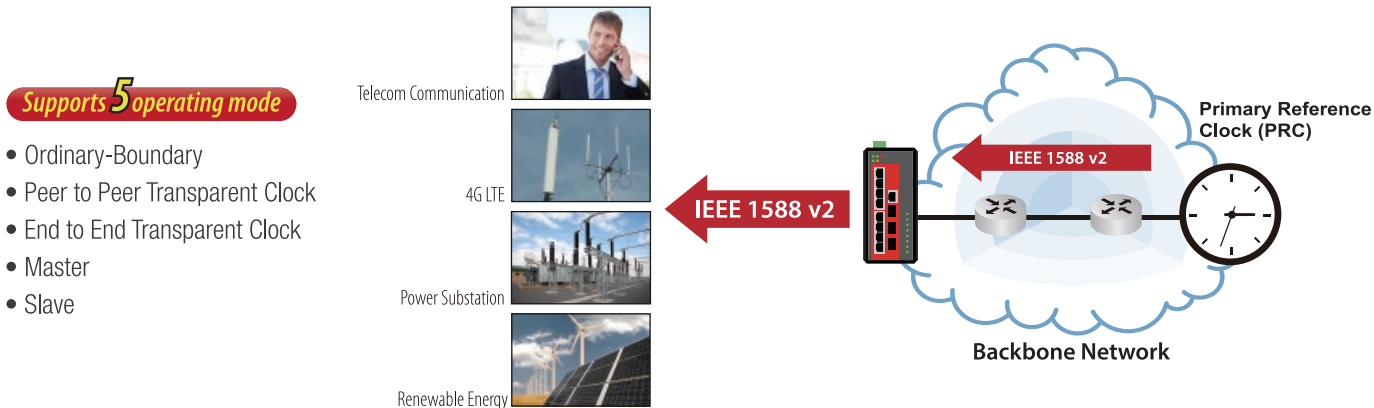
■ μ-Ring Network Redundancy

The μ-Ring is a proprietary redundancy protocol developed by CTC Union that supports flexible ring topologies.

Multiple μ-Ring

Master

1
2
3
4
5
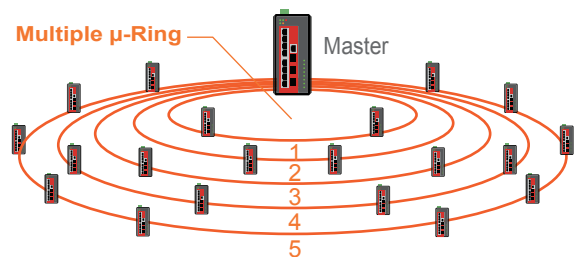
- Up to 5 rings
- Up to 250 devices in a ring
- μ-Ring, μ-Chain, Sub-Ring for different applications
- Recovery time < 10ms
- User Friendly configuration GUI

• Friendly μ-Ring Configuration

Delete	Instance	Type	Master	East		West
				Port	Edge	Port
Delete	1	u-Ring ▼	☐	1 ▼		2
Delete	2	u-Ring ▼	☐	4 ▼		3
Delete	3	u-Ring ▼	☐	10 (Fiber2) ▼		11 (Fiber3)
Delete	4	Sub-Ring ▼	☐	6 ▼		
Delete	5	u-Chain ▼	☐	5 ▼	☐	9 (Fiber1)

μ-Chain topology

• Benefit: Mix CTC and third party device in a ring topology

Third Party Network

Backup Path

Slave
Edge
Edge
Master

μ-Chain

Slave
Slave

Slave
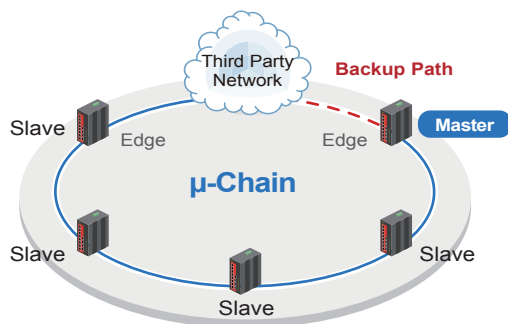
Sub-Ring topology

• Benefit: 1. Device redundancy (A & B)   2. Cable redundancy

Ring

B

Backup Path

A

Backup Path

Sub-Ring
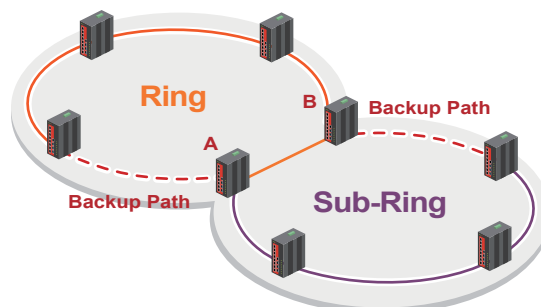
■ Supports Standard ITU G.8032 ERPS, MSTP, RSTP, STP for Network Redundancy

ITU G.8032

Other than the proprietary μ-Ring redundancy protocol, standard ring redundancy protocols such as ITU G.8032 ERPS, STP, RSTP and MSTP are also supported. Among standard redundancy protocols, G.8032 ERPS, achieves the fastest recovery time (<50ms) over others.

Industrial Network Management Software

Management Software

- **Centralized Device Management**
- **Quick & Easy Mass Configuration**
- **Quick Troubleshootion**
- **Easy, User-Friendly Operation Interface**

CTC Union's Industrial Network Management System is a comprehensive management tool, including **SmartView™ Element Management System (EMS)** and **SmartConfig™**. Whether it is for monitoring, configuration, maintenance, or troubleshooting, the management software has a tool for every task.

SmartView™ EMS
(Element Management System)

▪ Main Functions **(FCAPS)** :
   -**F**ault Management
   -**C**onfiguration Management
   -**A**ccounting Management
   -**P**erformance Management
   -**S**ecurity Management

▪ Remote access control for efficient configuration
▪ Traffic / Performance monitoring and management
▪ Alarm Trap and event log management
▪ Auto Discovery and Device Viewer
▪ Allow up to 25 administrators to login

SmartView™ EMS

■ **Polled Network Elements**

Network Scheme Diagram

▪ User-Friendly Operation Interface
▪ Robust Client / Server architecture
▪ Network Monitoring and Management
▪ Database for persistent event storage
▪ Security Access Management

SmartView™ Management Architecture
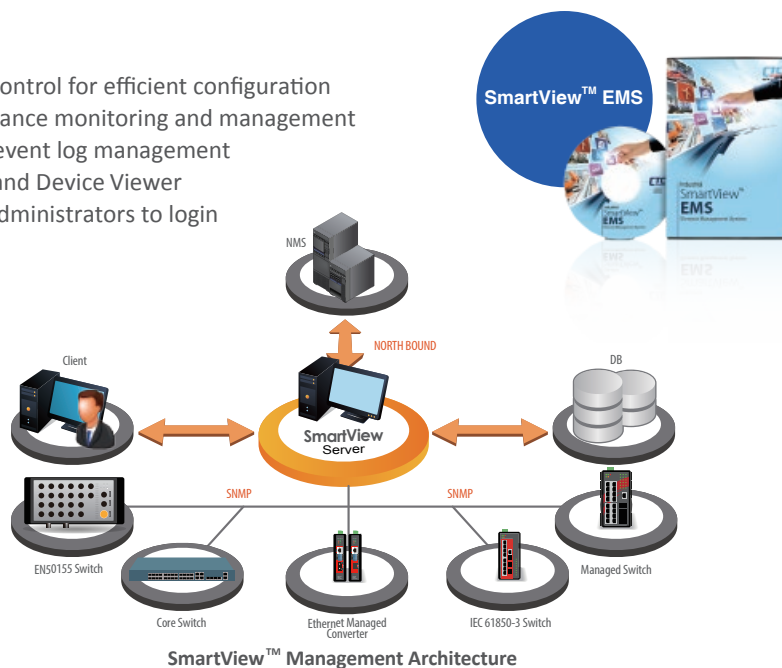
SmartConfig™

▪ Quick & Easy for mass configuration
▪ Multiple device auto discovery
▪ Group configuration, access
▪ Group firmware upgrade
▪ Export/Import Configuration

SmartConfig™

(+u-ring)
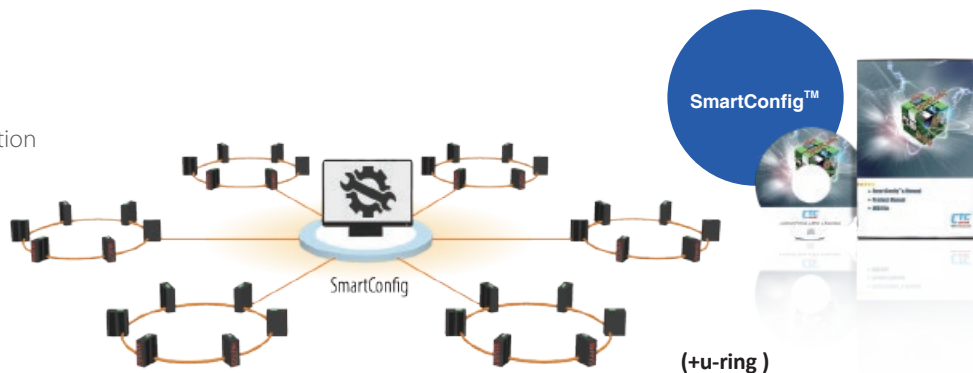
SmartConfig™ is a convenient configuration tool for mass deployment of switch product

CTC union® **2019 Industrial Product Guide**

Industrial Product Series

10G Core Switch

EN50121-4 | EN61000-6-2 EN61000-6-4 | IPv6 | SmartView | μ-Ring | IEEE 1588v2 | Negative Voltage
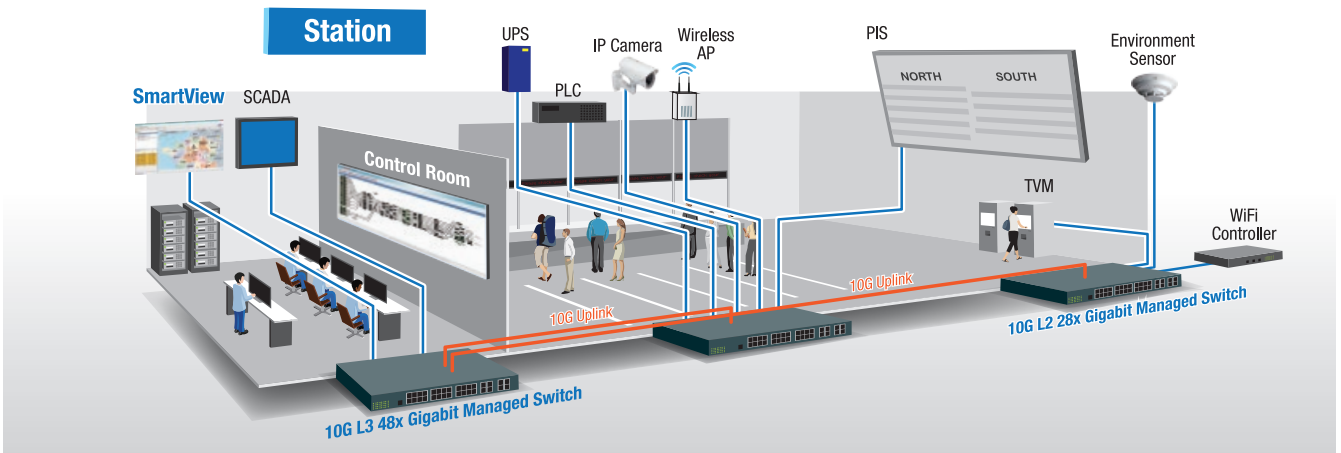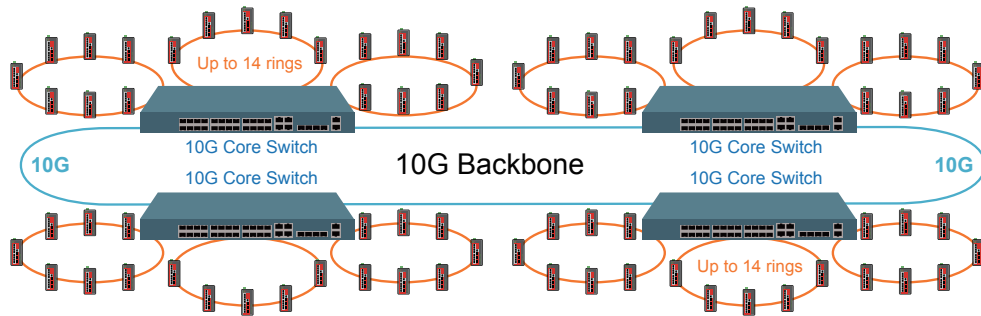
● **Features**

- 10G backbone for high bandwidth transmission
- Each 10G switch support 14 ring for centralization
- Dual and wide range power input for power failure redundancy
- Full Gigabit 24+4, 24+8 solutions
- Up to 24 IEEE802.3at PoE ports
- Up to 28 SFP GbE fiber ports

■ **10G Backbone with μ-Ring Technology Application**

● **Related Products**

Managed Switches

Model	Total Ports	GbE			10GbE	Redundant Input Power	Certification			
		10/100/1000 Base-T (X) RJ45	100/1000 Base-X SFP	100/1000Base-X SFP & RJ45	1G/2.5G/10G Base-X SFP+	110/220VAC or 24/48VDC, -48VDC	Safety UL60950-1 EN60950-1	EN50121-4	EN61000-6-2 EN61000-6-4	CE / FCC
ICS-G4804X	52	48			4	✓	✓	✓	✓	✓
ICS-G24044X	32	24	4		4	✓	✓	✓	✓	✓
ICS-G24S4X	28		20	4 Combo	4	✓	✓	✓	✓	✓
ICS-G24S2X	26		20	4 Combo	2	✓	✓	✓	✓	✓
IGS-4804SM	52	48	4			✓	✓	✓	✓	✓
IGS-2408SM	32	24	8			✓	✓	✓	✓	✓
IGS-S2804TM	28		24	4 Combo		✓	✓	✓	✓	✓

Managed PoE Switches

Model	Total Ports	GbE		10GbE	PoE Port	Redundant Input Power	Certification			
		10/100/1000 Base-T (X) RJ45	100/1000 Base-X SFP	1G/2.5G/10G Base-X SFP+	IEEE802.3at (Budget)	48VDC	Safety UL60950-1 EN60950-1	EN50121-4	EN61000-6-2 EN61000-6-4	CE / FCC
ICS-G24044X-24PH	32	24	4	4	24 (400W)	✓	✓	✓	✓	✓
IGS-2408SM-24PH	32	24	8		24 (400W)	✓	✓	✓	✓	✓

Industrial SyncE Switch

EN50121-4 | EN61000-6-2 EN61000-6-4 | SmartView | μ-Ring | IEEE 1588v2 | SyncE
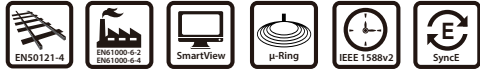
● Features

- 8/16x 10/100/1000Base-T RJ45 and 4/8x 100/1000Base-X SFP Fiber with SyncE
- Supports Sync. Ethernet allow operators to deliver service with optimal stability and continuity in end-to-end connectivity
- Supports IEEE 1588 PTP V2 for precise time synchronization to operate in Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave mode by each port

- Supports negative voltage power input with isolated RS-232 console port . (for example in telecom system)
- 2.25K VDC Hi-pot isolaton protection for Ethernet ports and power
- u-Ring for Redundant Cabling, recovery time<10ms in 250 devices

■ Mobile Backhaul Application

Figure 1

Figure 2
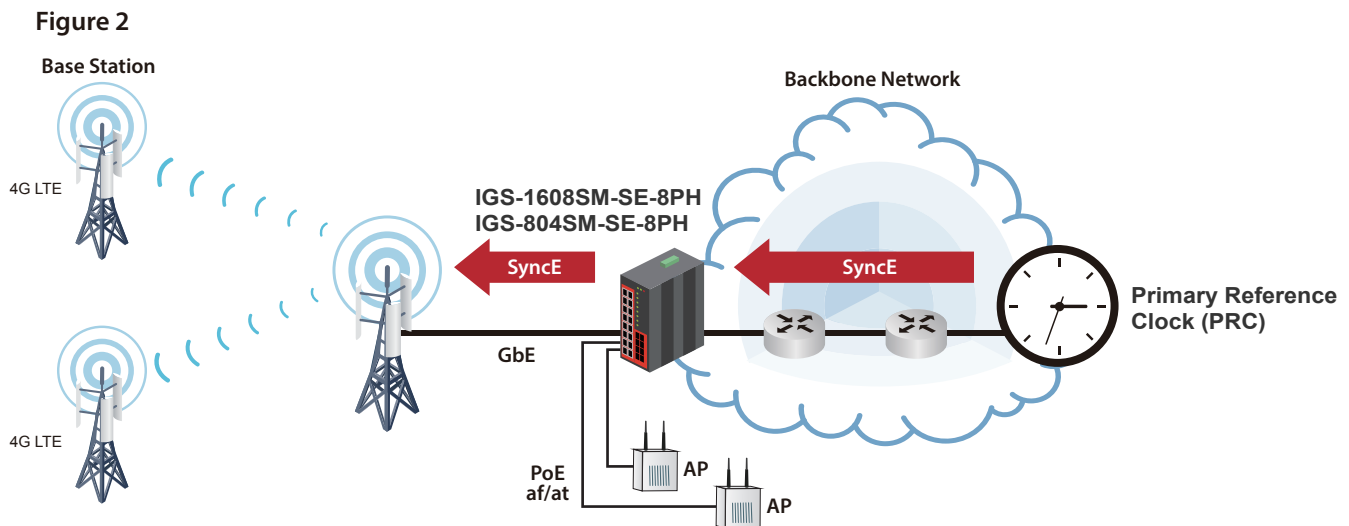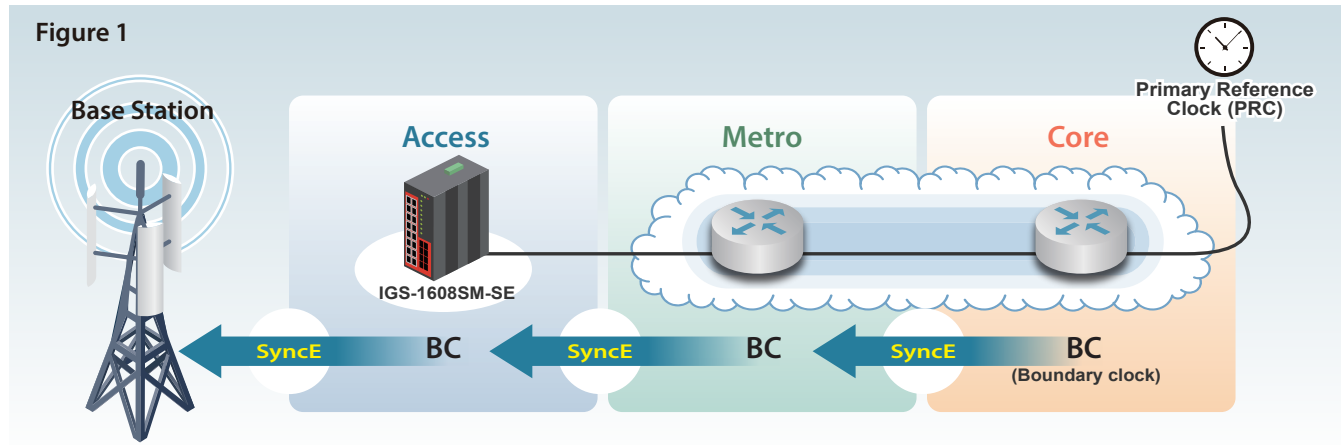
● Related Products

Model	Total Ports	UTP	Fiber	PoE		Redundant Power Input	Certification				
		10/100/1000 Base-T	10/100 Base-TX	IEEE 802.3af/at	Power Budget		RailWay EN50121-4	Safety UL60950-1 EN60950-1	Traffic Control NEMA TS2	EN61000-6-2 EN61000-6-4	CE / FCC
IGS-804SM-SE	12	8	4 SFP			12/24/48VDC	✓	EN60950-1		✓	✓
IGS-1608SM-SE	24	16	8 SFP			12/24/48VDC	✓	✓	✓	✓	✓
IGS-804SM-SE-8PH	12	8	4 SFP	8	240W	48VDC	✓	EN60950-1	✓	✓	✓
IGS-1608SM-SE-8PH	24	16	8 SFP	8	240W	48VDC	✓	✓	✓	✓	✓

4G LTE Series (Router/Gateway)

Features

- 2 SIM slot for failover redundancy
- GNSS: GPS/GLONASS/Galileo
- LAN, DI/DO, RS-232/485 Serial interface

- IPsec VPN/Modbus RTU/TCP, Real-COM
- IEEE802.11b/g/n/ac
- Routing: RIP1/RIP2, OSPF, VRRP

■ Wireless Transmission in Logistics Center
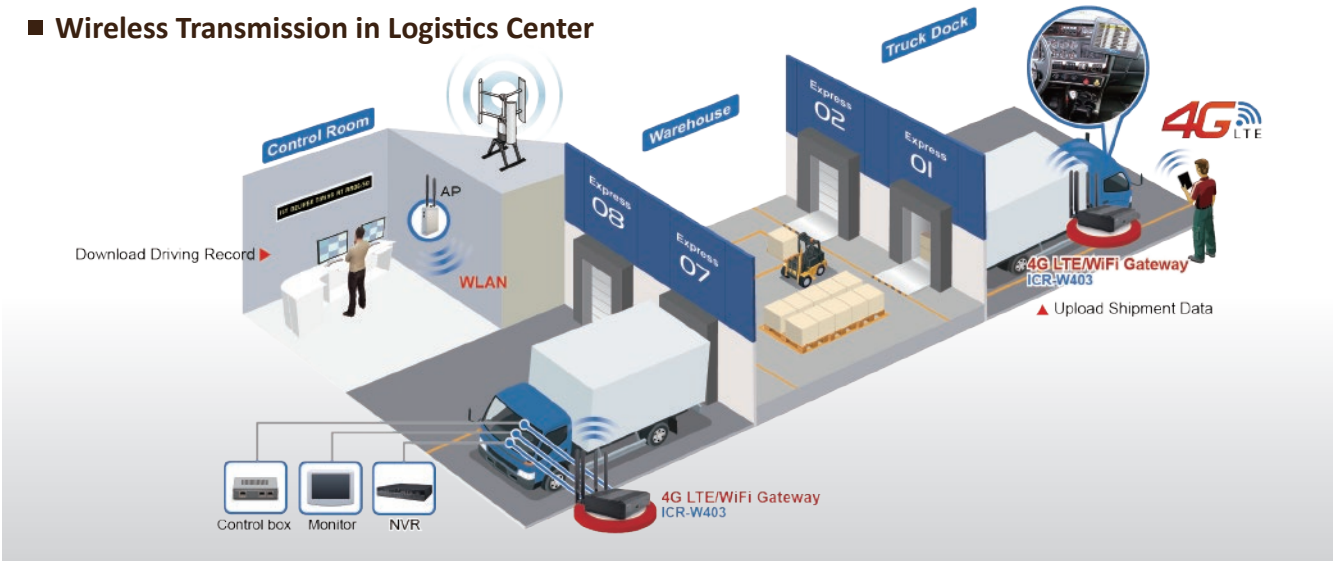
■ Smart City/Smart Bus
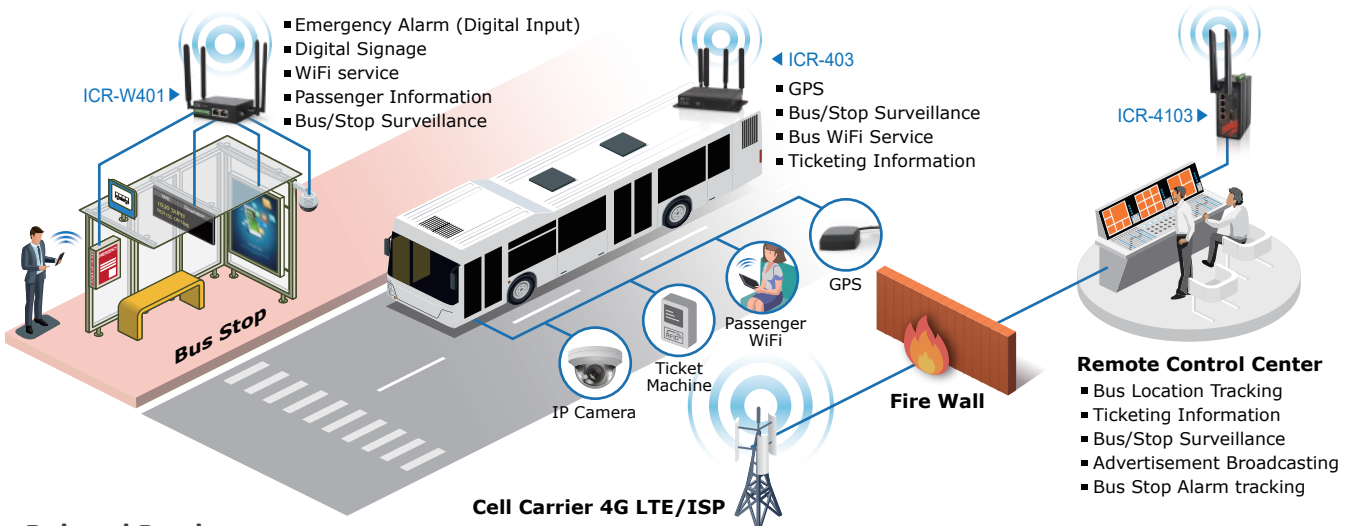
Related Products

4G LTE Router /Gateway

Model	WAN		WAN/LAN		Local port		Certification					
	Cellular Mobil	GNSS (Ant. ptional)	WiFi	UTP Ethernet	DI, DO	Serial	NCC	Radio	RailWay EN50121-4	Safety EN60950-1	EN61000-6-2 EN61000-6-4	CE/ FCC
ICR-W403	2G/3G/4G LTE	GPS	IEEE 802.11ac/b/g/n (LAN or WAN)	2x GbE (LAN) + 1x GbE (LAN or WAN)	2x DI, 1x DO	1xRS232			✓	✓	✓	✓
ICR-4103	2G/3G/4G LTE			1x FE (WAN) + 3x FE (LAN)	2x DI, 1x DO	2x RS232 1x RS485	✓	RED	✓	✓	✓	✓
ICR-W401 (Compact)	2G/3G/4G LTE	GPS	IEEE 802.11 b/g/n (LAN)	1x FE (LAN) + 1x FE (WAN)	1x DI, 1x DO	1x RS232						✓

EN 50155 Switch

EN45545-2 | EN550155 | μ-Ring | IP64/67 | X Code

● **Features**

- Wide range products of 5, 8+2,12+4, 22+4 Ethernet port available
- IEEE802.3af/at PoE 8, 12, 16-port for PD connection
- Fast Ethernet M12 D-code, Gigabit M12 X-code
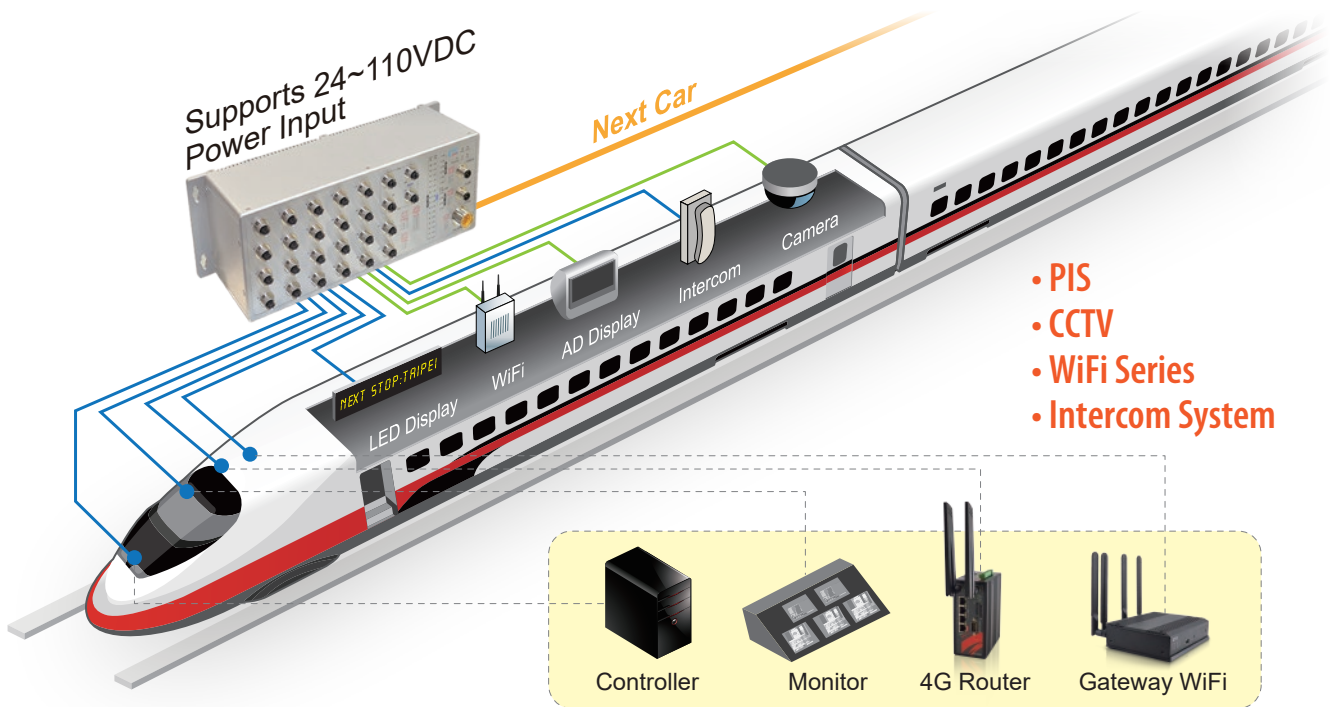- Supports 2 copper bypass for failover pass-through
- Certificated EN50155, EN50121-4, IEC 61375-2-3/5 TTDP, EN45545-2
- IP 64/67 rugged metal housing design

■ **Smart Train**

Modern transportation systems for rail are now incorporating many IOT devices, including PoE IP cameras, Wireless Access Points for Hotspots, Voice over IP communications, monitoring and digital signage. Ethernet switches, provided by CTC Union, for this market segment, include EN50155 certifications, utilize rugged M12 connectors and provide a wide range for DC power connections.

Supports 24~110VDC Power Input

Next Car

NEXT STOP:TAIPEI
LED Display
WiFi
AD Display
Intercom
Camera

- PIS
- CCTV
- WiFi Series
- Intercom System

Controller   Monitor   4G Router   Gateway WiFi

■ **TTDP**

TTDP (Train Topology Discovery Protocol) for train inauguration is a process where the network devices can automatically reconfigure for topology changes (i.e., as carriages are swapped). TTDP identifies the order of the Ethernet switches in a train backbone from the head and allows auto-reconfiguration of the other switches in the entire network.

Car 1   Car 2

Exchange

Car 2
Car 1   Add

Remove
Car 3

Remove & Add
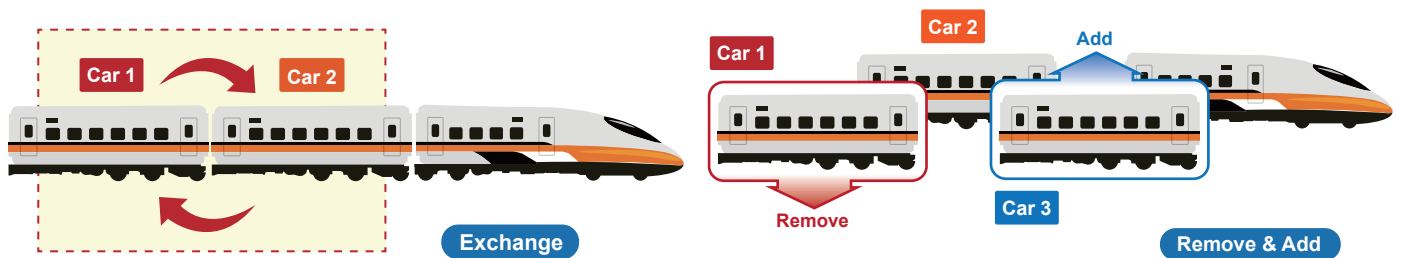
■ Resilient Bypass

EN50155 compliant products offer two copper interfaces with auto bypass function in the event of sudden power loss, particularly in daisy chain or linear topology networks. When power failure occurs in one of the switches on a train, the bypass relay function can activate, automatically bypassing the internal circuits and maintaining link between neighboring equipment. With this function, secure data transmission from terminals to backbone and higher network availability can be guaranteed.

Bypassing
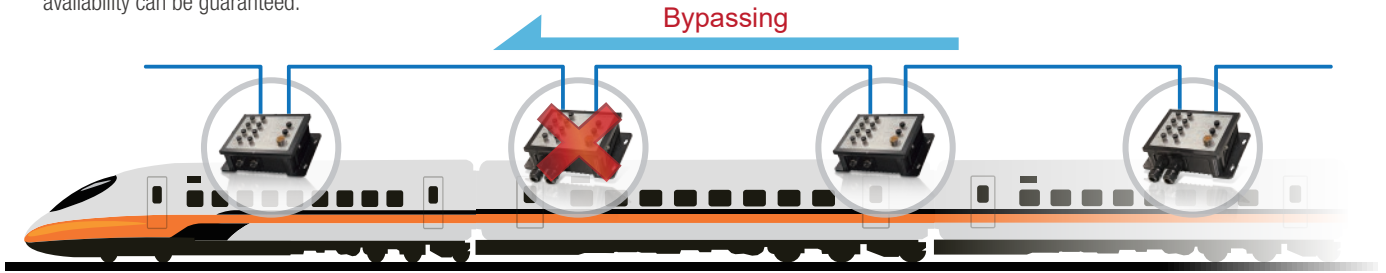
■ From Ground to Train

Outdoor wireless AP/ 4G router is the ideal ruggedized wireless solution for railway onboard train-to-ground applications such as CCTV and CBTC communications.

That enable operators to manage carriage-to-carriage and train-to-ground communications with increased efficiency and create attractive onboard multimedia services that give passengers safe and environmentally friendly transportation.
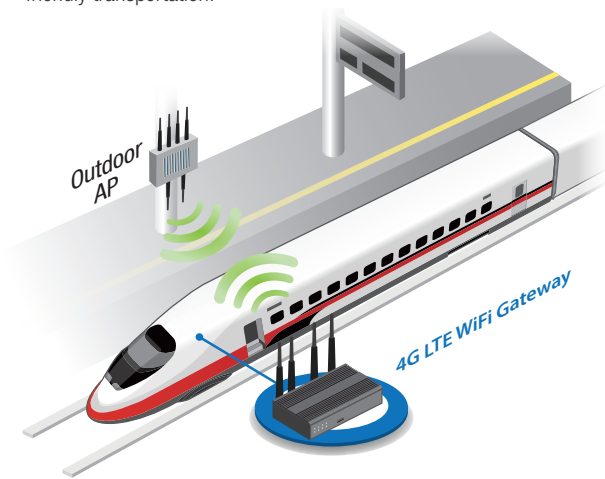
■ M12 LAN Extender via Coaxial

Some of the old generation train with only exist coaxial cable between the carriages, it is difficult to implement its ETB , the M12 LAN Extender will be a good solution to use its coaxial cable convert to Ethernet communication.
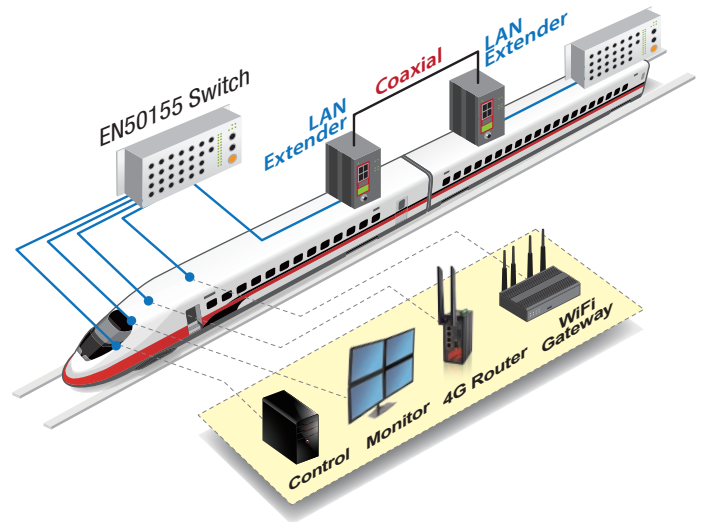
● Related Products

EN50155 PoE Switches

Model	Managed	Protection	Total Port	UTP Ports		Fiber ports	PoE Port	Redundant Input Power	Certification				
				10/100Base-TX M12	10/100/1000 Base-T M12	100/1000Base-X	IEEE 802.3at (budget)		EN45545-2	Railway EN50155 EN50121-4	Safety EN60950-1	EN61000-6-2 EN61000-6-4	CE / FCC
ITP-1204GTM-12PH	✓	IP64	16	12	4		12 (120W)	24/48/72/96/110VDC	✓	✓	✓	✓	✓
ITP-2204GTM-16PH	✓	IP64	26	22	4		16 (120W)	24/48/72/96/110VDC	✓	✓	✓	✓	✓
ITP-802GSM-8PH24	✓	IP67	10	8		2 SFP	8 (180W)	24/48VDC	✓	✓	✓	✓	✓
ITP-802GTM-8PH24	✓	IP67	10	8	2		8 (180W)	24/48VDC	✓	✓	✓	✓	✓
ITP-G802SM-8PH24	✓	IP67	10		8	2 SFP	8 (180W)	24/48VDC	✓	✓	✓	✓	✓
ITP-G802TM-8PH24	✓	IP67	10		10		8 (180W)	24/48VDC	✓	✓	✓	✓	✓
ITP-800-8PH24		IP67	8	8			8 (150W)			✓		✓	✓

EN 50155 Switches

Model	Managed	Protection	Total Port	UTP Ports		Fiber ports	Redundant Input Power	Certification				
				10/100Base-TX M12	10/100/1000 Base-T M12	100/1000Base-X		EN45545-2	Railway EN50155 EN50121-4	Safety EN60950-1	EN61000-6-2 EN61000-6-4	CE / FCC
ITP-1204GTM	✓	IP64	16	12	4		24/48/72/96/110VDC	✓	✓	✓	✓	✓
ITP-2204GTM	✓	IP64	26	22	4		24/48/72/96/110VDC	✓	✓	✓	✓	✓
ITP-G802SM	✓	IP67	10		8	2 SFP	12/24/48VDC or 110/220VDC	✓	✓	✓	✓	✓
ITP-G802TM	✓	IP67	10		10		12/24/48VDC or 110/220VDC	✓	✓	✓	✓	✓
ITP-802GSM	✓	IP67	10	8		2 SFP	12/24/48VDC or 110/220VDC	✓	✓	✓	✓	✓
ITP-802GTM	✓	IP67	10	8	2		12/24/48VDC or 110/220VDC	✓	✓	✓	✓	✓
ITP-500		IP67	5	5			12/24/48VDC		✓		✓	✓
ITP-800		IP67	8	8			12/24/48VDC		✓		✓	✓

PoE Series
(Switch/Converter/LAN Extender/Injector)
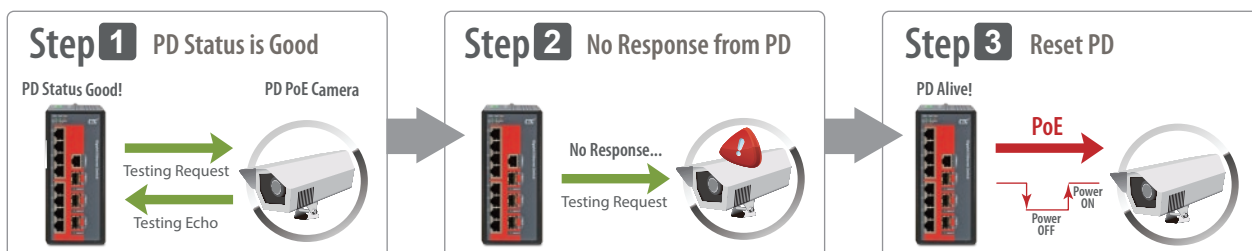
PoE Regulated | NEMA TS2 | IEEE 1588v2

Industrial Ethernet Switch

● Features

- Supports PoE/PoE+/PoE++ IEEE802.3af/at/bt: 15.4/30/36/60Watts high power budget
- Up to 8-port PoE (DIN-RAIL models) and 24-port PoE (Rackmount)
- Redundant dual power input of 24/48VDC (20~57VDC)
- High efficiency of power boost (94%~97%)
- Supports 4KV Surge protection
- Advance PoE management: PD auto check and reset, PoE on/off scheduling (weekly/hour)

■ Remote PD Auto Test & Reset

- Auto checking and auto reset Powered Devices (PDs), when PD link failure
- The feature helps to reduce the operation and maintenance cost

Step 1 PD Status is Good

PD Status Good! → PD PoE Camera

Testing Request
Testing Echo

Step 2 No Response from PD

No Response...
Testing Request

Step 3 Reset PD

PD Alive!

PoE

Power ON
Power OFF

■ High Efficiency Boost Technology for PoE

- Regulated PoE output voltage (55VDC) to stabilize PoE device
- Guarantee delivery PoE power distance to 100 meters
- Wide range input power 24/48VDC (20~57VDC)
- Built-in very high efficiency (94~97%) to boost PoE output voltage

Stable Voltage
55V
IP Camera

57v ～ 20v
Wide Power Input Range (24/48VDC)

CTC Union
Regulated PoE Output
DC Boost & Regulate
Wireless AP

VS

Other Vendors | Unstable Voltage

57v ～ 44v
Narrow Power Input Range (48VDC)

IP Camera
Non-DC Boost & Regulate
Wireless AP
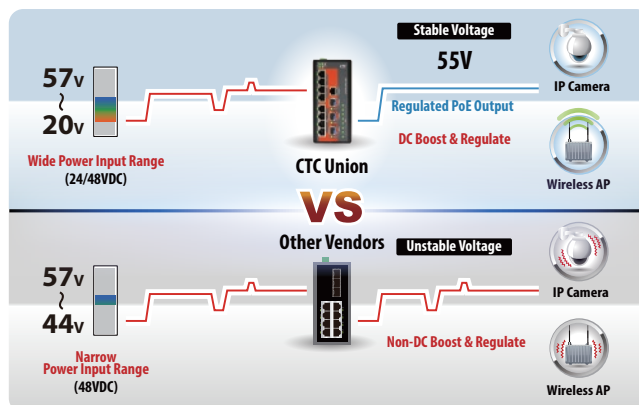
■ Intersection Monitoring System

"Smart City" includes intersection monitoring. Our hardened and manageable PoE switches can streamline deployment in this and other applications when all connecting devices (IP Cameras, IP Phones, Access Points and digital signage) are PoE enabled devices.

SmartView™ EMS
PoE Managed Switch
Remote Control Center
μ-Ring

PoE Managed Switch
μ-Ring

IP Camera
IP Camera
IP Camera
Access Point
City Security Camera
LED Display
IP Camera
City Emergency Phone
Traffic Flow Sensors
Traffic Controller

IP Camera
Emergency Phone (SOS)
LED Display
Traffic Light
Wireless AP

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● Related Products

Managed PoE Switches

Model	Total Ports	UTP		Fiber		PoE Port		Redundant Power Input	Certification				
		10/100/1000 Base-T	10/100 Base-TX	FE/GbE	FE/2.5G/ GbE	IEEE 802.3at (Budget)	IEEE 802.3at 4 pairs 60W PoE+ (Budget)		Safety UL60950-1 EN60950-1	RailWay EN50121-4	Traffic Control NEMA TS2	EN61000-6-2 EN61000-6-4	CE/ FCC
IGS-1608SM-8PH	24	16		8 SFP		8 (240W)		48VDC	✓	✓		✓	✓
IGS+803SM-8PH24	11	8		3 SFP		8 (180W)		24/48VDC	✓	✓	✓	✓	✓
IGS+803SM-8PH	11	8		3 SFP		8 (240W)		48VDC	✓	✓	✓	✓	✓
IGS-402SM-4PU	6	4		2 SFP			4 (240W)	48VDC	✓	✓		✓	✓
IGS-803SM-8PH24	11	8		1 SFP	2 SFP	8 (180W)		24/48VDC	UL60950-1	✓	✓	✓	✓
IGS-402SM-4PH24	6	4		1 SFP	1 SFP	4(120W)		24/48VDC	UL60950-1	✓	✓	✓	✓
IFS-1608GSM-8PH	24		16	8 SFP		8 (240W)		48VDC	✓	✓		✓	✓
IFS+803GSM-8PH24	11		8	3 SFP		8 (180W)		24/48VDC	✓	✓	✓	✓	✓
IFS-803GSM-8PH24	11		8	3 SFP		8 (180W)		24/48VDC	UL60950-1	✓	✓	✓	✓
IFS-402GSM-4PU	6		4	2 SFP			4 (240W)	48VDC	✓	✓		✓	✓
IFS-402GSM-4PH24	6		4	2 SFP		4 (120W)		24/48VDC	UL60950-1	✓	✓	✓	✓

Unmanaged PoE Switches

Model	Total Port	RJ45 UTP Port		Fiber Port		PoE port		Redundant Power Input	Certification			
		10/100 Base-TX	10/100/1000 Base-T (X)	1000Base-X Base-X	100/1000 Base-X	IEEE 802.3at (Budget)	IEEE 802.3at 4 pairs 60W PoE+ (Budget)		Railway EN50121-4	Safety UL60950-1	EN61000-6-2 EN61000-6-4	CE/ FCC
IGS-600-4PH24	6		6			4 (120W)		24/48VDC	✓	✓	✓	✓
IGS-402S-4PH24	6		4		2 SFP	4 (120W)		24/48VDC	✓	✓	✓	✓
IGS-402F-4PH24	6		4	2 SC		4 (120W)		24/48VDC	✓	✓	✓	✓
IGS-402S-4PU	6		4		2 SFP		4 (240W)	48VDC	✓		✓	✓
IFS-1602GS-8PH	18	16			2 SFP	8 (240W)		48VDC	✓		✓	✓
IFS-802GS-8PH	10	8			2 SFP	8 (240W)		48VDC	✓		✓	✓

PoE Converters

Model	Managed	UTP		Fiber		PoE		Redundant Power Input	Certification		
		10/100 Base-T	10/100/1000 Base-T	100Base-X	Dual Speed 100/1000Base-X	IEEE 802.3at (PSE)	Power Budge		Railway EN50121-4	EN61000-6-2 EN61000-6-4	CE/ FCC
IMC-1000MS-PH12	✓		1		1 SFP	1	30W	12/24/48VDC	✓	✓	✓
IMC-1000S-PH12			1		1 SFP	1	30W	12/24/48VDC	✓	✓	✓
IMC-100-PH12		1		1 SC/ST		1	30W	12/24/48VDC	✓	✓	✓

PoE LAN Extender

● Features

- High-speed long distance copper connections; up to 300m at 100Mbps and up to 1.2km at 50Mbps (over coaxial cable); 16Mbps (over twisted-pair copper wires)
- Complies with IEEE 802.3at PoE long distance; up to 300m at 30W power budget over coaxial cable
- Plug and Play to reduces configuration time
- One step to upgrade the existing CCTV to IP cameras

■ Remote Power Feeding Enable
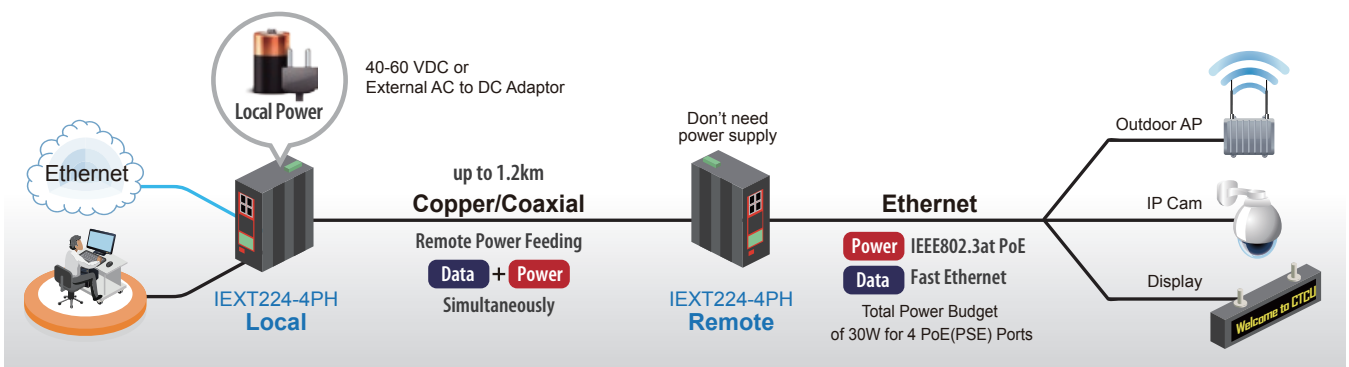
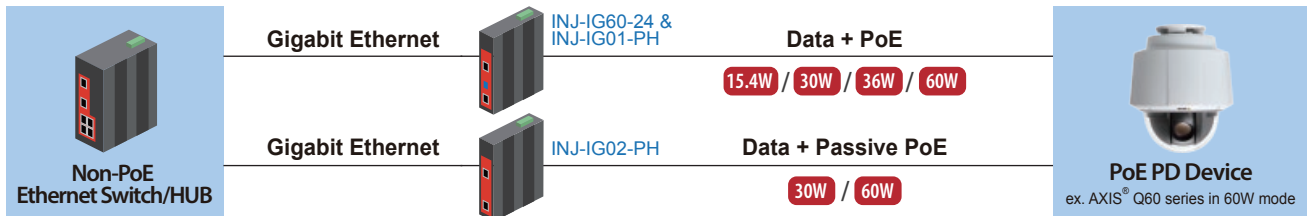
PoE LAN Extender

Model	UTP	Long Distance		PoE Port	Certification		
	10/100Base-TX	RJ11	Coaxial	IEEE 802.3at	Safety EN60950-1	CE	FCC
IEXT224-4PH	4	1	1	4	✓	✓	✓

PoE Injectors

●Features

- Easy to install PoE PD in the existing network topologies
- Provides 1 port IEEE802.3af/at power supplying
- Selectable 15.4/30W/36W,60W,72W PoE power output
- Supports PoE mode A (Midspan) and mode B (Endspan)

- Regulate PoE output voltage to stabilize power device, and guarantee the power feeding distance up to 100metter
- Supports 4 pairs (60W/72W) PD handshake request (such as AXIS® IP Camera)
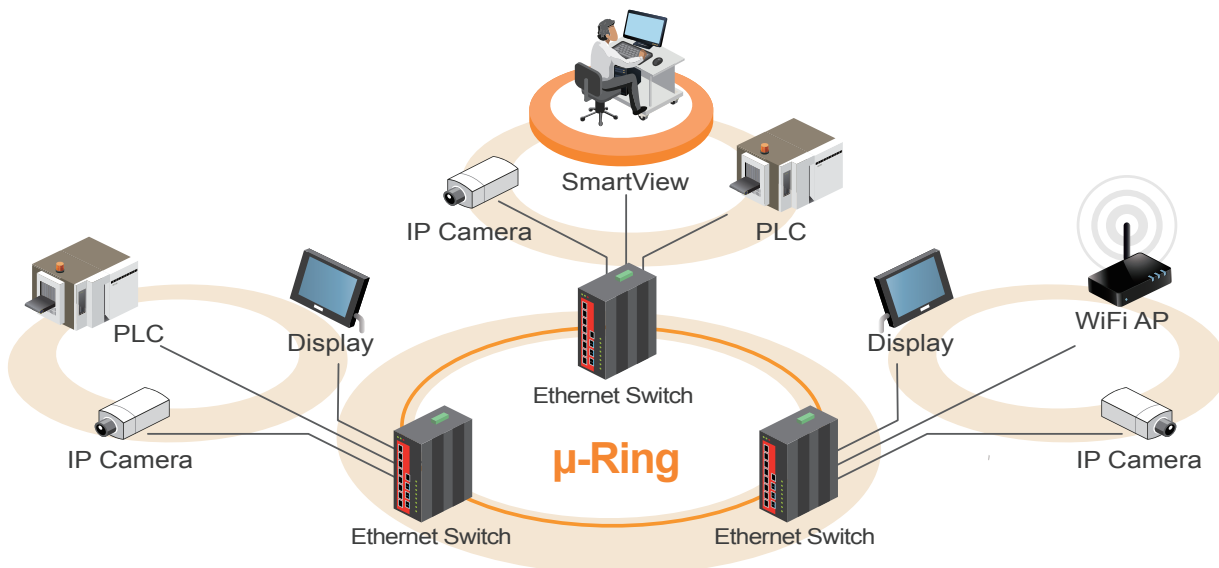
■ Gigabit Ethernet PoE Injector application

	Gigabit Ethernet	INJ-IG60-24 & INJ-IG01-PH	Data + PoE	
Non-PoE Ethernet Switch/HUB			15.4W / 30W / 36W / 60W	PoE PD Device ex. AXIS® Q60 series in 60W mode
	Gigabit Ethernet	INJ-IG02-PH	Data + Passive PoE	
			30W / 60W	

● Related Products

PoE Injectors

Model	LAN UTP Port	PoE UTP Port		Power Input	Certification			
	10/100/1000Base-T (X)	10/100/1000Base-T (X)	PoE Power Budget		EN60950-1	EN61000-6-2 EN61000-6-4	EN50121-4	CE/FCC
INJ-IG60-24	✓	✓	15.4W/30W/36W/60W/72W	24/48VDC Redundant	✓	✓	✓	✓
INJ-IG01-PH	✓	✓	15.4W/30W/36W/60W	48VDC		✓	✓	✓
INJ-IG02-PH	✓	✓	30W/60W (passive)	24/48VDC		✓	✓	✓
INJ-G30	✓	✓	15.4W/30W	Power Adapter				✓

— Industrial Ethernet Switch —

EN50121-4 | EN61000-6-2 EN61000-6-4 | NEMA TS2 | SmartView | μ-Ring | IEEE 1588v2

●Features

- 4KV surge protection for LAN port
- 2.25K VDC Hi-pot isolation protection for Ethernet ports and power
- SmartConfig™ for Quick & easy mass configuration
- SmartView™ for centralized management

- μ-Ring (up-to 5 rings) for redundancy cabling
- SNMP, Web, Telnet, CLI, IPV6, DHCP, RMON, MIB II, QoS, CoS, ACL, Security, IGMP, VLAN, LACP, IEEE 1588 V2, UL60950-1, EN60950-1, NEMA-TS2, EN50121-4, EN61000-6-2, EN61000-6-4, CE, FCC certified

SmartView

IP Camera

PLC

PLC   Display

IP Camera

Ethernet Switch

μ-Ring

Display

WiFi AP

IP Camera

Ethernet Switch   Ethernet Switch

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● Related Products

Managed Switches

Model	Total Ports	UTP Port		Fiber Port		Redundant Power Input	Certification				
		10/100 Base-TX	10/100/1000 Base-T(X)	FE/GbE	FE/2.5G/ GbE		Safety UL60950-1	Railway EN50121-4	Traffic Control NEMA TS2	EN61000-6-2 EN61000-6-4	CE/FCC
IGS-1604SM	20		16	4 SFP		12/24/48VDC	✓	✓		✓	✓
IGS-812SM	20		8	12 SFP		12/24/48VDC	✓	✓		✓	✓
IGS⁺803SM	11		8	3 SFP		12/24/48VDC	UL60950-1& EN60950-1	✓	✓	✓	✓
IGS⁺404SM	8		4	4 SFP		12/24/48VDC		✓		✓	✓
IGS-803SM	11		8	1 SFP	2 SFP	12/24/48VDC	✓	✓	✓	✓	✓
IGS-404SM	8		4	2 SFP	2 SFP	12/24/48VDC	✓	✓	✓	✓	✓
IFS-1604GSM	20	16		4 SFP		12/24/48VDC	✓	✓		✓	✓
IFS⁺803GSM	11	8		3 SFP		12/24/48VDC	UL60950-1& EN60950-1	✓	✓	✓	✓
IFS-803GSM	11	8		3 SFP		12/24/48VDC	✓	✓	✓	✓	✓
IFS-402GSM	8	4		2 SFP		12/24/48VDC	✓	✓	✓	✓	✓

Unmanaged Switches

Model	Total Ports	UTP Port		Fiber Port		Power Input		Certification				
		10/100 Base-TX	10/100/1000 Base-T	100Base-FX	1000Base-X	Redundant	Single Power	Railway EN50121-4	Safety UL60950-1	EN61000-6-2 EN61000-6-4	CE	FCC
IGS-800	8		8			12/24/48VDC		✓		✓	✓	✓
IGS-501S	6		5		1 SFP	12/24/48VDC		✓		✓	✓	✓
IGS-500	5		5			12/24/48VDC		✓		✓	✓	✓
IGS-402S	6		4		2 SFP	12/24/48VDC		✓	✓	✓	✓	✓
IGS-402F	6		4		2 SC/ST	12/24/48VDC		✓	✓	✓	✓	✓
IFS-1602GS	18	16			2 SFP	12/24/48VDC		✓		✓	✓	✓
IFS-802GS	10	8			2 SFP	12/24/48VDC		✓		✓	✓	✓
IFS-800	8	8				12/24/48VDC		✓		✓	✓	✓
IFS-402F	6	4		2 SC/ST		12/24/48VDC		✓		✓	✓	✓
IFS-401F	5	4		1 SC/ST		12/24/48VDC		✓		✓	✓	✓
IFS-500C	6	5					12/24/48VDC	✓		✓	✓	✓

— Fiber Optical Bypass Switch —

[EN50121-4] [EN61000-6-2 EN61000-6-4]

● Features

- Supports SC/ST/LC single mode optical connectors
- Optical bypass switching time <10ms with Low insertions loss
- Provides rotary switch to set delay boot time (0~180 seconds)
- Redundant dual DC input power 12/24/48VDC (9.6 ~ 60VDC)
- Wide temperature range model available for -20 to 70°C environments

Normal Mode — Power Ready

Power · Ethernet Switch · IBP-202 · Next · Next

Bypass Mode — Power Failure

Power · Ethernet Switch · IBP-202 · Switch over (Bypass) · Next · Next
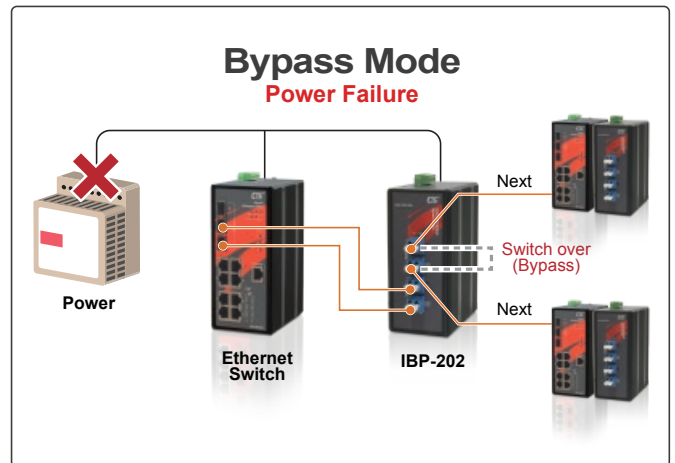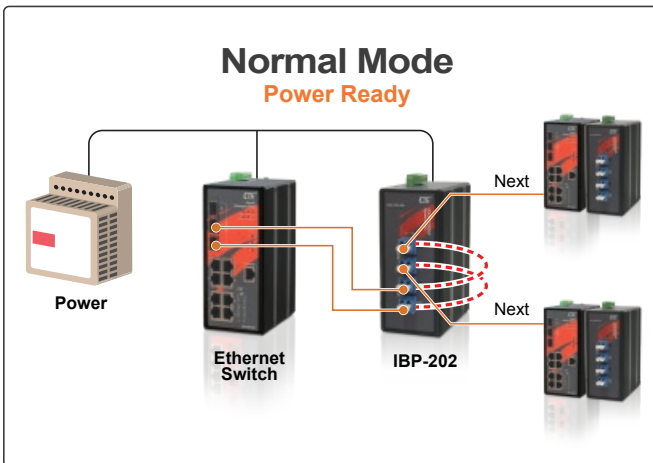
Optical Fiber Bypass Switch

Model	Fiber connector			Redundant Power Input	Certification		
	Connector type	Connector port	Data rate		Railway EN50121-4	EN61000-6-2 EN61000-6-4	CE/FCC
IBP-202	SC/ST/LC	4	100M/Giga/2.5G/10G	12/24/48VDC	✓	✓	✓

Industrial Media Converter

EN50121-4 | EN61000-6-2 EN61000-6-4 | SmartView
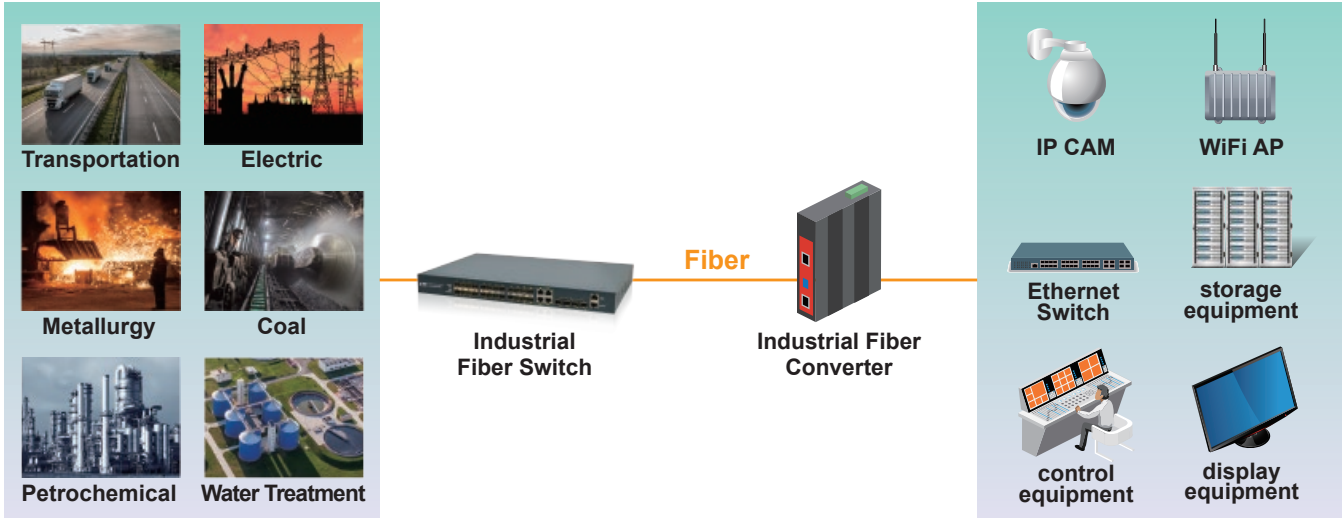
● Features

- 4KV surge protection for LAN port
- 2.25K VDC Hi-pot isolation protection for Ethernet ports and power
- SmartConfig™ for Quick & easy mass configuration
- SmartView™ for centralized management

- µ-Ring (up-to 5 rings) for redundancy cabling
- SNMP, Web, Telnet, CLI, IPV6, DHCP, RMON, MIB II, QoS, CoS, ACL, Security, IGMP, VLAN, LACP, IEEE 1588 V2, UL60950-1, EN60950-1, NEMA-TS2, EN50121-4, EN61000-6-2, EN61000-6-4, CE, FCC certified

■ Industrial Fiber Converter Application

Transportation | Electric | Metallurgy | Coal | Petrochemical | Water Treatment

Industrial Fiber Switch — Fiber — Industrial Fiber Converter

IP CAM | WiFi AP | Ethernet Switch | storage equipment | control equipment | display equipment

● Related Products
Media Converters

Model	Managed	UTP		Fiber		Redundant Power Input	Certification			
		10/100 Base-TX	10/100/1000 Base-T	100Base-FX	Dual Speed 100/1000Base-X		Safety UL60950-1	Railway EN50121-4	EN61000-6-2 EN61000-6-4	CE/ FCC
IMC-1000MS	8		1		1 SFP	12/24/48VDC	✓	✓	✓	✓
IMC-1000S	6		1		1 SFP	12/24/48VDC	✓	✓	✓	✓
IMC-1000C	5		1		1 SC/ST	12/24/48VDC Single Power		✓	✓	✓
IMC-1000CS	6		1		1 SFP	12/24/48VDC Single Power		✓	✓	✓
IMC-100	6	1		1 SC/ST		12/24/48VDC	✓	✓	✓	✓
IMC-100C	18	1		1 SC/ST		12/24/48VDC Single Power		✓	✓	✓

Serial Connectivity Series

(FieldBus Fiber Converter & Contact Closure Fiber Converter)
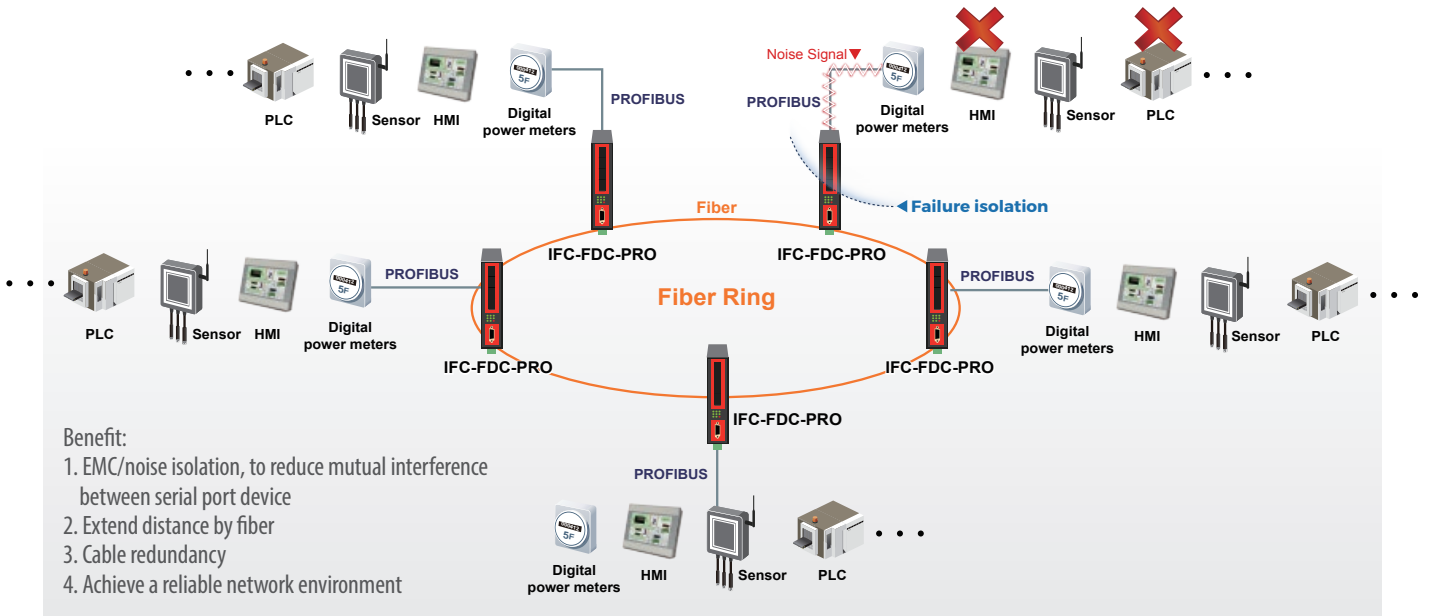
EN61000-6-2 EN61000-6-4 | PROFIBUS

FieldBus Fiber Converter
● Features

- Redundant fiber ring with zero recovery time
- Auto baudrate detection and data speed up to 12Mbps for ProfiBus series
- Protocol transparent of Modbus, ProfiBus and CAN bus
- Alarm by relay output

- 2.5KV isolation protection
- Dual-power inputs for redundancy
- Extends PROFIBUS transmission distance up to 60 km
- Wide temperature range model available for -40 to 75°C environments

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■ **Application for Modbus or ProfiBus**

Benefit:
1. EMC/noise isolation, to reduce mutual interference between serial port device
2. Extend distance by fiber
3. Cable redundancy
4. Achieve a reliable network environment

● **Related Products**

Model	Dual Channel	Serial					Fiber		Redundant Power Input	Certification		
		RS232	RS422/485	FieldBus	Baud rate Max (bps)	Isolatation	SC/ST	Redundantcy		Safety UL60950-1	EN61000-6-2 EN61000-6-4	CE/FCC
IFC-FDC-PRO			1	Profibus	12M	2.5KV	2	✓	12/24/48VDC		✓	✓
IFC-Serial-PRO			1	Profibus	12M	2.5KV	1		12/24/48VDC		✓	✓
IFC-FDC	✓	2	1	Modbus or thers	1M	2.5KV	2	✓	12/24/48VDC	✓	✓	✓
IFC-Serial	✓	2	1	Modbus or thers	1M	2.5KV	1		12/24/48VDC	✓	✓	✓

Contact Closure Fiber Converter

● **Features**
- 4 isolated binary input (BI-1, BI-2, BI-3, BI-4)
- 4 MSR contact relay output (K1, K2, K3, K4), maximum breaking capacity 2000VA for AC load, 50-280W for DC resistive load, or 30W for DC inductive load
- Support multi mode fiber 2KM or single mode 30KM/60KM fiber for transmit distances
- CE, FCC, heavy industrial grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- Fanless and DIN-Rail design for harsh industrial environment
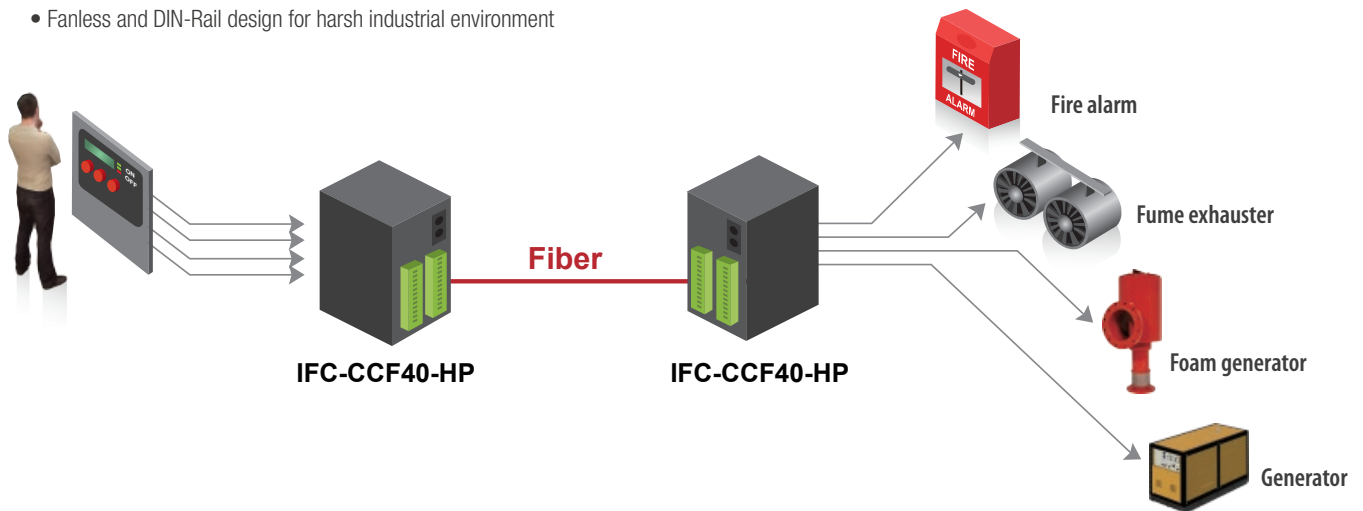
● **Related Products**

Model	Input	output	Fiber transmission	Power Input	Certification		
					EN61000-6-2 EN61000-6-4	CE	FCC
IFC-CCF40-HP	4x Channel Binary	4x MSR Contact Relay	1x SC/ST/Bidi	60~264VAC or 60~300VDC	✓	✓	✓

IEC 61850-3 Switch

Icons: IEC 61850-3 | EN50121-4 | IPv6 | SmartView | μ-Ring | IEEE 1588v2 | GOOSE

● Features

- IEC 61850-3, IEEE 1613 certified is designed to fulfill power substations
- Supports u-Ring and u-Chain, RSTP/STP/MSTP, and ERPS G.8032 for network redundancy
- Isolated redundant power supplies with universal 24/48 VDC or 110/220 VDC/NAC power supply range
- Hot-swappable interface modules for rackmount model
- Cable diagnostic and Green Ethernet
- -40 to 85°C operating temperature range

GOOSE Message

For mission-critical applications, GOOSE messages can be placed into the highest Qos priority so as to avoid packet loss and delay

- IPS series Ethernet switches can communicate with GOOSE multicasts
- Critical communications are prioritized with the highest QoS priority
- Achieve zero packet loss to ensure reliable transmissions.

■ Power Substation Application
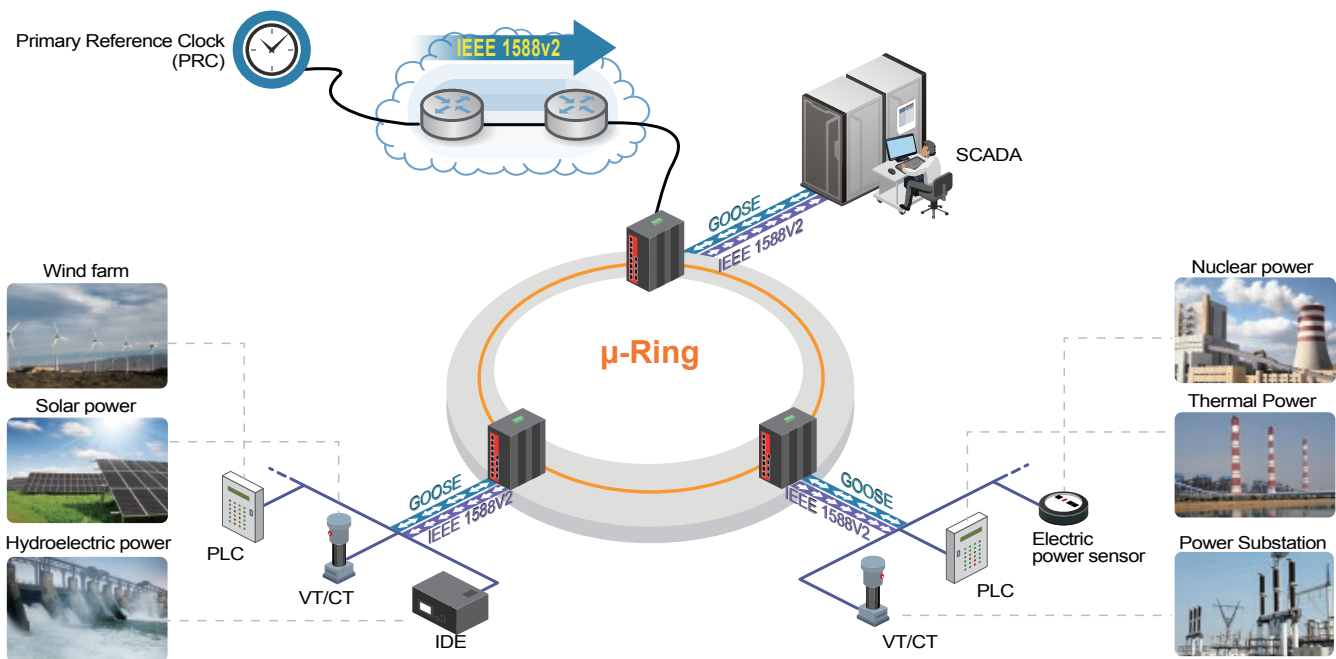
● Related Products

IEC 61850-3 Switches

Model	Total Port	UTP		Fiber	Redundant Power Input	Certification				
		10/100 Base-TX	10/100/1000 Base-T(X)	100/1000 Base-X		IEC61850-3 IEEE 1613	Safety UL60950-1 EN60950-1	EN50121-4	EN61000-6-2 EN61000-6-4	CE / FCC
IPS-G803SM	11		8	3 SFP	24/48VDC or 110/220VDC/AC	✓	✓	✓	✓	✓
IPS-803GSM	11	8		3 SFP	24/48VDC or 110/220VDC/AC	✓	✓	✓	✓	✓

CTC union ®

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