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2019 Industrial Product Catalog

CTC UNION TECHNOLOGIES

Your Reliable Supplier

2019 INDUSTRIAL PRODUCT CATALOG

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

Since 1993

www.ctcu.com

Since 1993

CTC Union

About

CTC Union Technologies Co. Ltd., founded in 1993, proactively designs and manufactures telecommunications, data communications and industrial networking products for a global market. With technologies based on Ethernet and Optical transmission, CTC Union can effectively meet the requirements of voice and data carriers, enterprises, as well as industrial grade Ethernet users.

Using the latest technologies, CTC Union has stormed into the "Industrial Ethernet" marketplace with a wide range of rugged Ethernet products for public utilities, transportation and power substation deployment. With a heavy focus on reliability, certifications and new standards, this proactive thinking will allow CTC Union to continue developing solutions for today and tomorrow's industrial markets.

CTC Union's global alliance is a network of worldwide branch offices, partners and distributors on every continent. By forming partnerships with major telecom operators, Internet Service providers, and value-added resellers, CTC Union reduces costs and improves services for customers. This alliance covers Europe, Asia, the Middle East, Africa, plus North and South America. This global partnership receives direct engineering and technical support from our company headquarters, located in Taipei, Taiwan.

Environmental Policy

As a socially responsible manufacturer, CTC Union is concerned with the environment and has taken active measures to reduce carbon emissions and eliminate hazardous materials in their products. None of CTC Union products use chlorofluorocarbons (CFC) in their production process and since 2007 all electronics use non-lead soldering according to RoHS 2.0 and WEEE directives.

Our Mission & Vision

- Provides innovative last-mile optical access solutions for telecommunication markets.
- Provides customers with “on time” solutions, quick and effective customer support, and valuable products with extended service life.
- To be a trusted partner; providing creative connectivity products and solutions.
- To be a leading data transmission solution provider that meets our customer’s needs.

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2019 Table of Contents (Industrial)

Chapter 6 Industrial PoE Switch & Converter

Managed PoE Switch

Unmanaged PoE Switch

Managed PoE Converter

Unmanaged PoE Converter

Chapter 7 Industrial Ethernet Switch & Converter

Managed Ethernet Switch

2019 Table of Contents (Industrial)

2019 Table of Contents (Industrial)

Chapter 10 IEC 61850-3 Substation Ethernet Switch

Chapter 11 Industrial SFP Transceiver

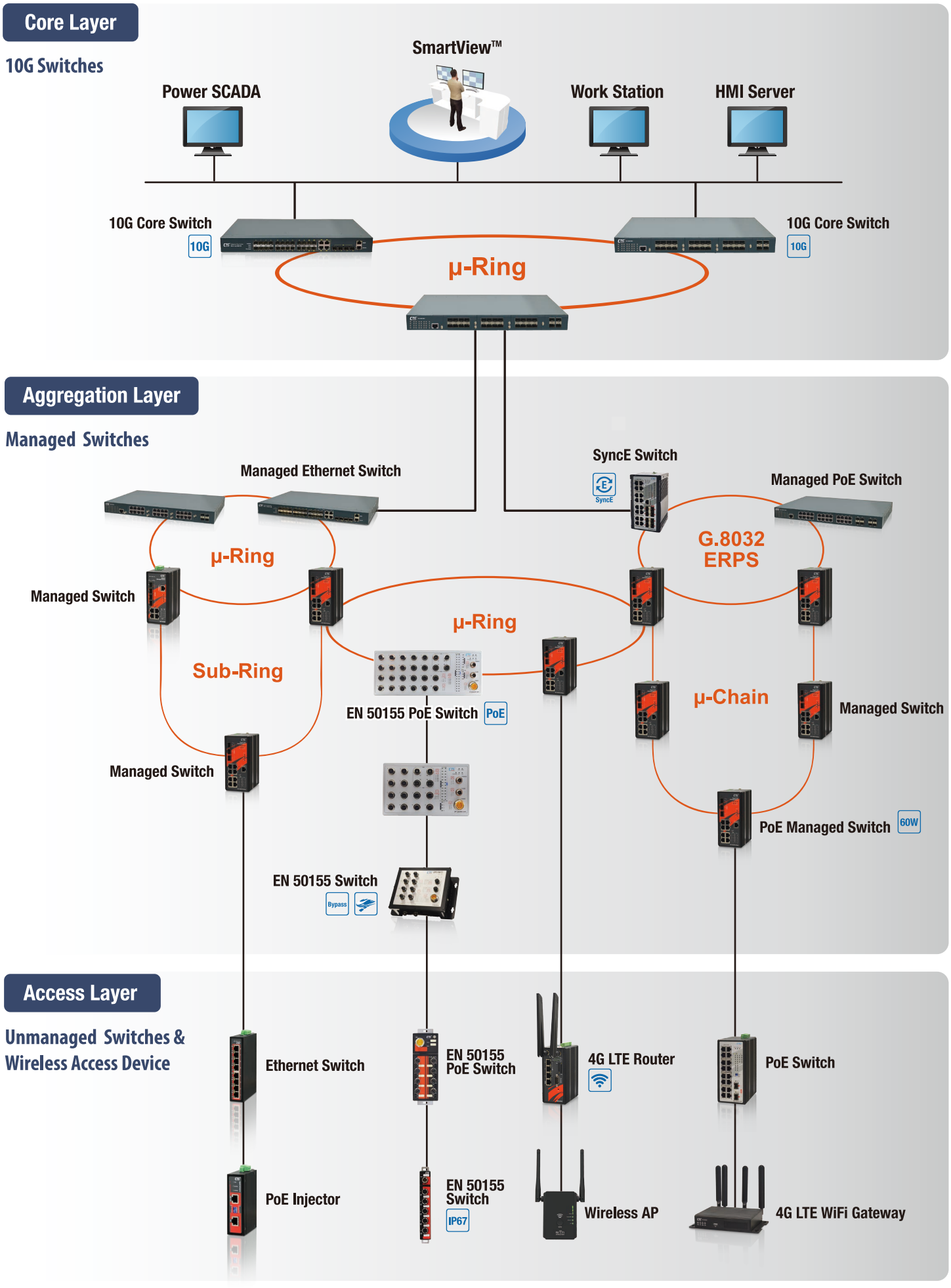
Chapter 12 Power Supply

Reliable
Industrial Ethernet Products

- *EMC Certified for Industrial Standards*
- *Flexible µ-Ring Redundant Cabling*
- *4KV Surge Protection*
- *High MTBF*
- *Long Life Parts*
- *Rigorous Standards*
- *Strict Quality Checks in Factory*
- *5 Years Warranty*
- *Fan-less and Rugged Design*

Industrial network switches, designed and manufactured by CTC Union, deliver high performance and reliable solutions in fields such as automation, railway transmission, power substation and so on. The products have passed strict tests and are certified to UL60950-1 safety standards, railway traffic EN50121-4 & EN50155 and EN61000-6-2 & EN61000-6-4 standards. With wide operating temperatures, IP30 rugged housings, and redundant wide range power inputs features, CTC Union's industrial networking devices are able to provide uninterrupted and stable services for mission-critical projects especially carried out in harsh environments. SmartView™ centralized management, friendly and flexible u-Ring redundancy and real-time alarm notifications make CTC Union's industrial networking devices even more resilient in connecting your network. To demonstrate confidence in our products, we offer a 5-Year warranty on industrial networking products to our customers.

Converging Network Architectures of CTC Union's Industrial Products



Product Spotlight

10G Core Ethernet Switches

ICS-G4804X

- 48x 10/100/1000Mbps RJ45
- 4x 10 Gigabit SFP+ slot
- Dual Power Input: 100~220VAC, 24/48VDC (Optional)
- Supports 14 μ-Ring

(Please chect page 2-1 for more details)

ICS-G24044X

- 24x 10/100/1000Mbps RJ45
- 4x 100/1000 SFP slot
- 4x 10 Gigabit SFP+ slot
- Dual Power Input: 100~220VAC, 24/48VDC (Optional)

(Please chect page 2-1 for more details)

PoE Switches

ICS-G24044X-24PH

- 24x 10/100/1000Mbps RJ45
- 4x 10 Gigabit SFP+ slot
- 4x 100/1000Mbps SFP slot
- 24 Ports 30W PoE, Total Power Budget 400W
- Supports 14 μ-Ring

(Please chect page 2-6 for more details)

IGS-2408SM-24PH

- 24x 10/100/1000Mbps RJ45
- 8x 100/1000Mpbs SFP slot
- 24 ports 30W PoE
- Total Power Budget 400W
- Supports 4KV Surge Protection for PoE

(Please chect page 6-2 for more details)

SyncE PoE Switch

IGS-804SM-SE-8PH

- 8x 100/1000Mbps RJ45
- 4x 100/1000Mbps SFP slot
- 8 Ports 30W PoE
- TCXO Crystal for SyncE
- Supports 4KV Surge Protection for PoE

(Please chect page 3-1 for more details)

Power Booster PoE Switch

IGS-803SM-8PH24

- 8 x 10/100/1000Mbps RJ45
- 3 x 100/1000Mbps SFP slot
- 8 ports 30W PoE
- Power booster from 24VDC
- Regulated PoE power output

(Please chect page 6-12 for more details)

60W PoE Switch

IGS-402SM-4PU

- 4x 10/100/1000Mbps RJ45
- 2x 100/1000Mpbs SFP slot
- 4 ports 60W PoE
- Total Power Budget 240W
- Managed

(Please chect page 6-6 for more details)

Entry level 8 PoE Switch

IFS-802GS-8PH

- 8x 10/100Mbps RJ45
- 2x 1000Mpbs SFP slot
- 8 Ports 30W PoE
- Total Power Budget 240W

(Please chect page 6-32 for more details)

Gigabit PoE Converter

IMC-1000S-PH12

- 1x 100/1000Mbps RJ45
- 1x 100/1000Mpbs SFP slot
- Supports 30W PoE
- Supports Remote PD Power Reboot
- Dual Power Input 12/24/48 VDC

(Please chect page 6-39 for more details)

60W PoE Injector

INJ-IG60-24

- Up to 72W Power Output
- Supports End-Span and Middle-Span
- Dual Power Input 12/24/48VDC
- Industrial Grade Certificate
- Supports Gigabit Etherne

(Please chect page 9-4 for more details)

EN50155 Switches

ITP-2204GTM-16PH

- 22x 10/100Mbps M12 D-Code
- 4x 10/100/1000Mbps M12 X-Code
- 16 Ports 30W PoE
- IP64 Protection
- Wide Range Power Input 24~110VDC

(Please chect page 5-9 for more details)

ITP-G802SM

- 8x 10/100/1000Mbps M12 A/X-Code
- 2x 100/1000Mpbs SFP with Waterproof Protection
- IP67 Protection
- Wide Range Power Input

(Please chect page 5-22 for more details)

ITP-800-8PH24

- 8x 10/100Mbps M12 D-Code
- 8 ports 30W PoE, Power Budge 180W
- IP67 Protection
- 24/48VDC Dual Power Input

(Please chect page 5-19 for more details)

ITP-500 / ITP-800

- 5(8)x 10/100Mbps M12 D-Code
- Wide Power Input 12/24/48VDC
- IP67 Protection
- Wide Operating Temperature -40~75°C
- Low Power Consumption

(Please chect page 5-36 for more details)

4G LTE Router

ICR-4103

- Dual 4G LTE Cellular SIM Slots
- Supports LTE/WAN Redundant
- Provides Serial Ports, DI/DO
- Supports Routing, VPN, NAT, Qos, Firewall

(Please chect page 4-1 for more details)

4G LTE, WiFi Geteway

ICR-W403

- Dual 4G LTE Cellular SIM Slots
- Supports LTE/WAN Redundant
- Provides GPS, Serial Ports, DI/DO
- Provides IEEE802.11 b/g/n/ac
- Supports Routing, VPN, NAT, Qos, Firewall

(Please chect page 4-4 for more details)

Optical Bypass Switch

IBP-202

- Supports SC/ST/LC Single Mode
- Supports 100M/1G/2.5G/10G
- Redundant Power Input 12/24/48VDC
- Bypass Switching time <10ms
- Delay Boot Time (0~180 seconds)

(Please chect page 7-56 for more details)

4 Channel Binary Transducer

IFC-CCF40-HP

- 4 Channel Isolated Binary Input
- Wide Range Input Voltage (0~250VDC)
- Input Threshold: 18V/70V
- 4 MSR Relay Output
- Breaking Capacity : 2000VA for AC load
- Breaking Capacity : 50~280W for DC load

(Please chect page 8-14 for more details)

Industrial Product Category

Key Certifications

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.

For car and motorcycle spare parts and security products, noise and emissions, are required to act in accordance with the EU.

For trackside and railway applications.

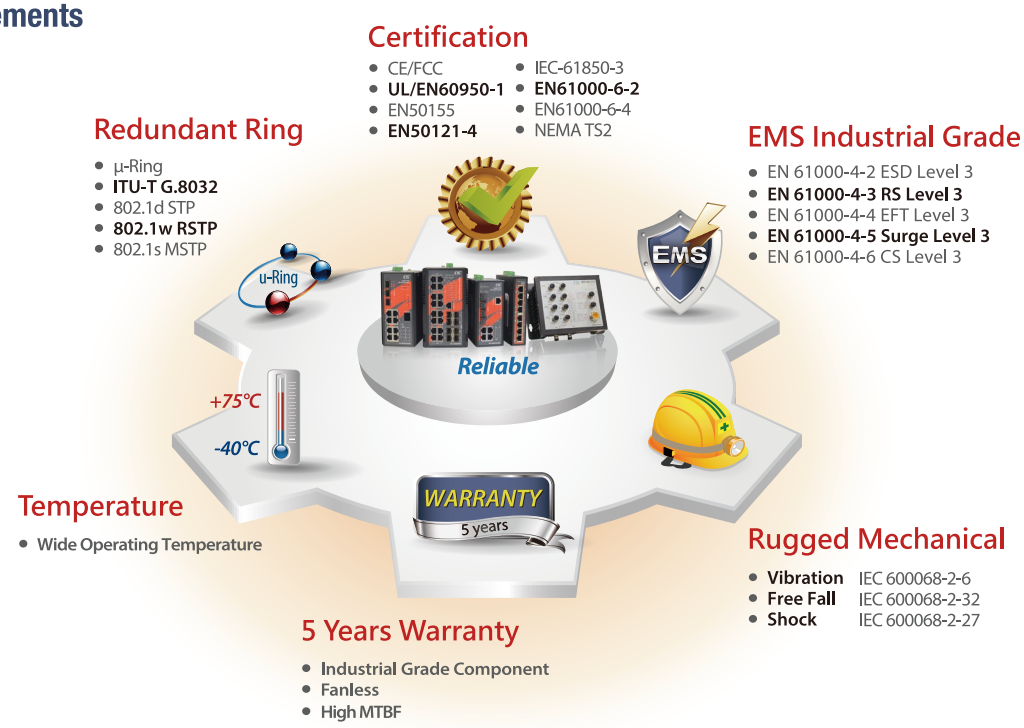
For Heavy Industrial Environment application.

For traffic control.

For power substation applications.

For rolling stock, vehicle and moving machine applications.

Reliability Elements



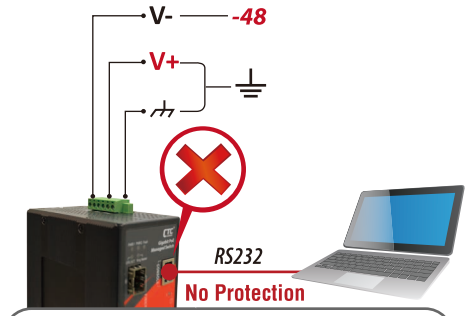
Brief Comparison between general CE & EN50121-4

	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**

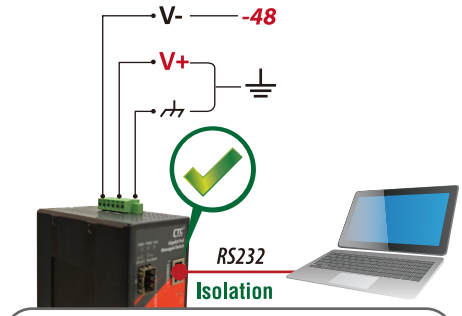
* Criteria A: During the test storage devices shall maintain normal operation both in read/write and in stand-by conditions.
* Criteria B: During and after the test failures which can be recovered by read and write retires are permissible (temporary delay in processing caused by this process is acceptable).

Advance 4KV Surge Protection for PoE & UTP

Negative Power System

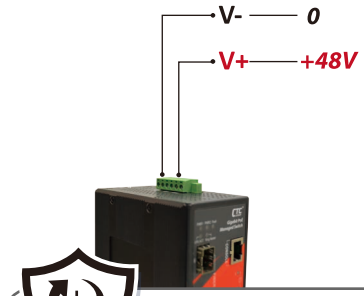


Not support Negative Power Model



Supports Negative Power Model

Reverse Polarity Protection



Reverse Polarity Protection

Rugged & Fanless Design with Wide Operating Temperature

Rugged Design | Fanless | Wide Temperature

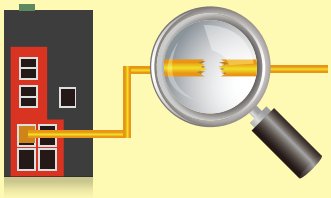
- Fanless
- Rugged housing
- Wide temperature (-40°C~75°C)

Suitable for harsh environments like railways, roadside, factory, warehouse, dock, parking lot, electrical poles,..

5-Year Warranty and Long MTBF

- Specially-chosen parts such as industrial-grade IC, PCB, capacitor, transformers, screws and specially-installed method for heat-sink.
- High MTBF and Long life parts
- Rigorous standards in our lab and various strict quality checks in factory
- Fanless

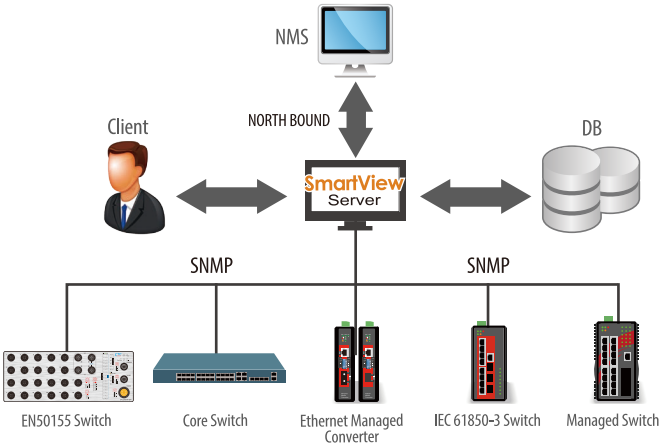
UTP Cable Diagnostics



- The feature is useful in troubleshooting Ethernet UTP cabling problems especially for Ethernet cables buried or hidden underground.
- The diagnostic results reveal cable states (shorts or open connections), the length of cable and distances to the faults.

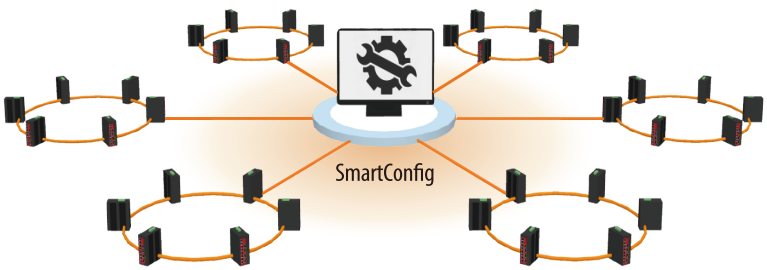
SmartView™ for central management

- Visual representations
- Fault, Configuration, Accounting, Performance and Security monitoring and management.
- Alarm trap and event log management
- Long term event storage (over 1 year)



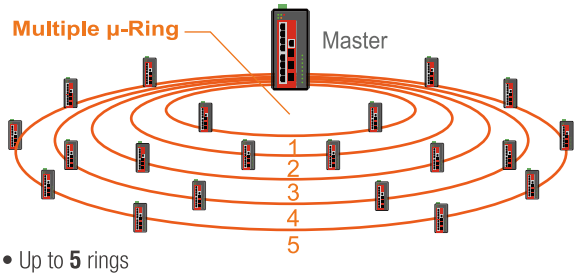
SmartConfig™ for quick & easy mass configuration

- A convenient configuration tool
- Multiple device auto discovery
- IP Address Assignment
- Group configuration, access
- Group firmware upgrade
- Export/Import Configuration



µ-Ring Network Redundancy

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



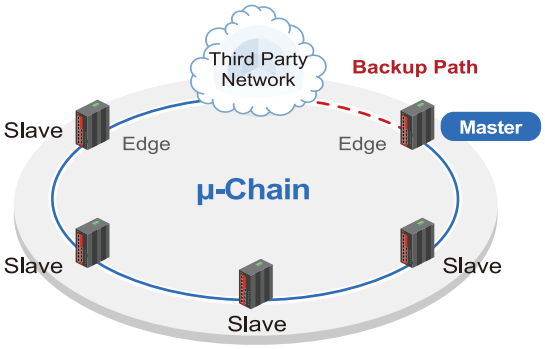
- Up to **5** rings
- Up to **250** devices in a ring
- µ-Ring, µ-Chain, Sub-Ring for different applications
- Recovery time < 10ms
- User Friendly configuration GUI

Friendly µ-Ring configuration

Delete	Instance	Type	Master	East		West	
				Port	Edge	Port	Edge
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)	☐

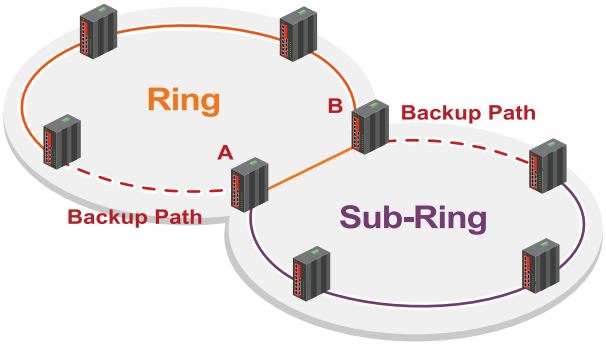
µ-Chain topology

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



Sub-Ring topology

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



Supports Standard ITU-T G.8032 ERPS, MSTP, RSTP, STP for Network Redundancy

ITU G.8032

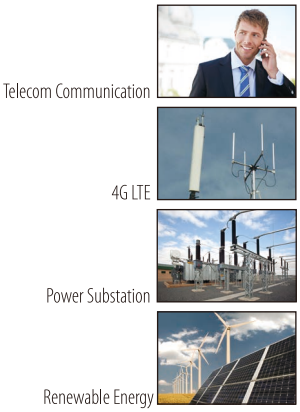
Other than the proprietary µ-Ring redundancy protocol, standard ring redundancy protocols such as ITU-T G.8032 ERPS, STP, RSTP and MSTP are also supported. Among standard redundancy protocols, G.8032 ERPS, achieves the fastest recovery time (<50ms) over others.

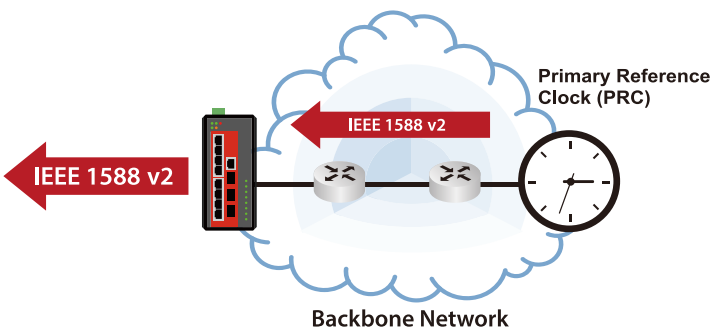
IEEE1588 PTP v2

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





SmartView™ EMS

Managed 2,000+ Devices

- **Hierarchical Network Management to 2,000 Devices.**
- **Remote Access and Centralized Device Management**
- Real-time visual representations & processing of alarms
- Long term event storage (up to 1 year)
- Easy, User-Friendly Operation Interface

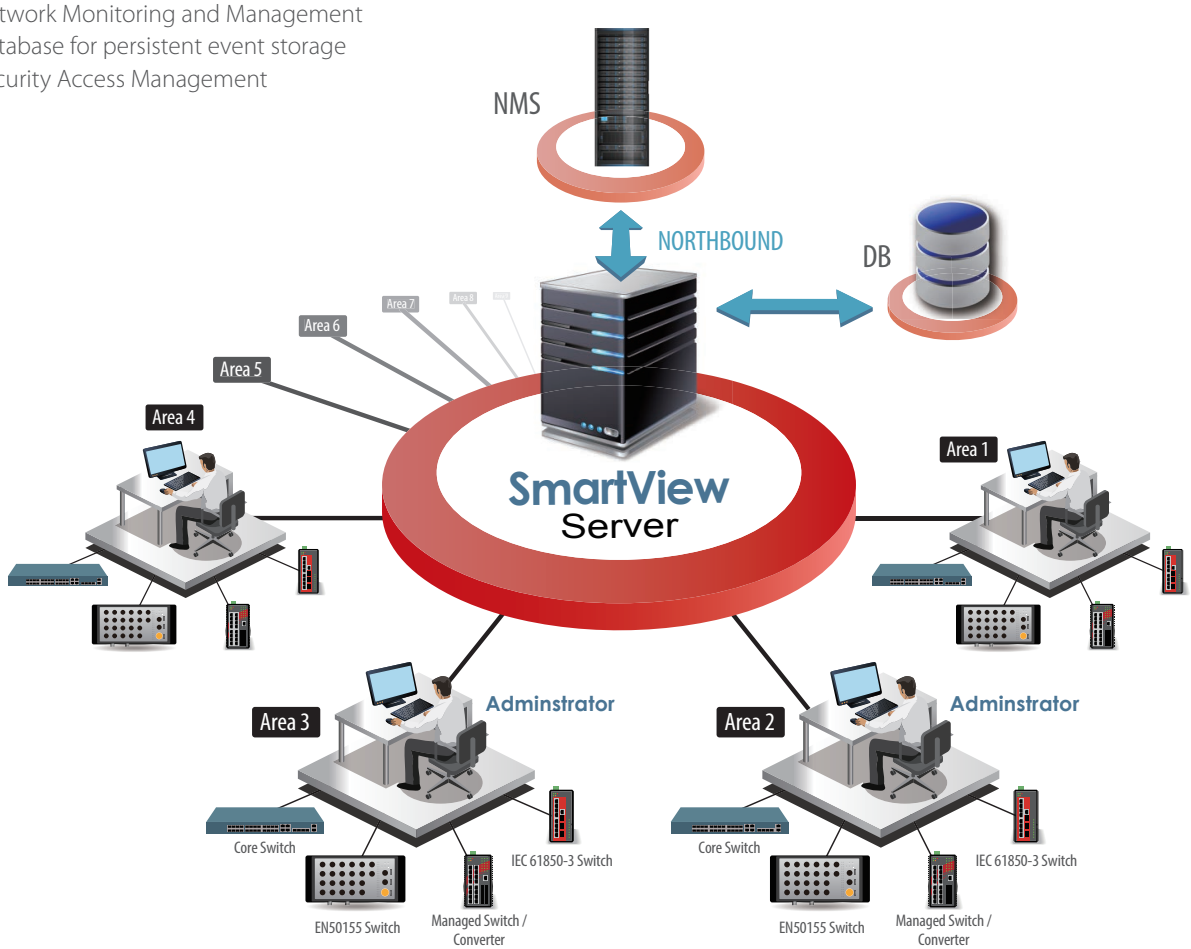
CTC Union's **SmartView™ Element Management System (EMS)** is a comprehensive management solution that monitors device performance, enables remote configuration and provisioning, and provides fault notification status.

Functions

- Main Functions **(FCAPS)**:
  Fault Management, **C**onfiguration Management
  Accounting Management, **P**erformance Management
  Security 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

Network Scheme Diagram

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



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Agents
The server handles connections with the network devices using SNMP protocol and is responsible for communicating of requests from management clients. SmartView™ Server collects information data from specific SNMP agents, stores the information into a persistent database and updates that information to the management clients.

SmartView™ Server
The server handles connection with the network devices using SNMP protocol, and is responsible for communication of requests from management clients. SmartView™ Server collects the information data from specific SNMP agents, stores the information into a persistent database and updates that information to the management clients. SmartView™ server requires 64bit Microsoft® Windows™ O.S.

Multi-Administrators
Management clients are provided with the JAVA applet GUI to monitor and control the agents at far end. They also receive the Alarm and Traps from the corresponding SNMP Agents. Multiple workstations are allowed, with a maximum of 25 concurrent logged in users.

■ Features at a Glance

Fault Management

- **Trap Collection**
  All traps will be stored in SQL database. When an SNMP agent experiences an abnormal condition it will send an SNMP trap message to SmartView™ which then receives the message, and records it in the database. Depending on preset conditions, SmartView™ may sound an audible alarm, send an email or SMS alert message or just simply flash the trap message on the administrative console screen.

- **Active Alarm**
  SmartView™ continuously polls all network devices under its management and will visually display all alarm conditions found. Alarms will be categorized as Major, Minor or Warning, depending on severity. Although alarms may be acknowledged, they remain actively displayed on the alarm page until there is no longer an alarm condition.

- **Alarm Selection**
  Alarm events of network element are configurable. All alarm events are warned by default, but they can be manually disabled to ignore warning messages.

- **Alarms sent by E-mail & SMS**
  The SmartView™ is capable of sending emails and or SMS text messages to selected administrators when critical alarms occur. Prompt notification of system problems aid in getting problems in the network devices fixed in the shortest time possible.

- **Trap Forwarding and Syslog messages**
  The SmartView is capable of forwarding received traps to upper network management and sending event messages to a syslog server.

Configuration Management

- **Network Topology**
  User can load maps to SQL server, load maps from SQL server or delete attached maps. Map area may be used to layout any objects from Root and Node panel. Using drag-and-drop, put any object to map area. Any label or network element location name may be added to object. Objects in red color indicate some alarm condition is present in the device.

- **Network Element Configuration**
  SmartView™ is able to provide a single point of configuration for the device elements. Most settings only require mouse clicks and by using a tab format, most scrolling is eliminated. Current settings and status are displayed along with hardware and firmware versions for each element.

- **Network Element Firmware Upgrade**
  SmartView™ is able to download firmware to device elements and perform configuration backup/restore.

- **Network Element Time Synchronization**
  SmartView™ is able to trigger a command to network elements to perform time synchronization with Smartview or a NTP server.

- **Network Element Discovery**
  SmartView™ has a tool for automatically discovering SNMP agents on the network. Simply enter an IP address range and the discovery program will ping every IP address looking for SNMP agents. Once discovered, the agents can be selected and brought into the broker for polling.

Accounting Management

The accounting management supports reading a factory programmed serial number specific for each line card.
The location, status and serial numbers of all assets can be managed and exported.

Performance Management

SmartView™ is able to monitor device performance parameters through polling of specific OIDs. Graphs of performance information (for example PDH PM data such as ES, UAS, etc. as well as hardware parameters such as fan speed, temperature, optical Tx/Rx power or RMON counters) can be generated on an X Y axis showing different trend data.

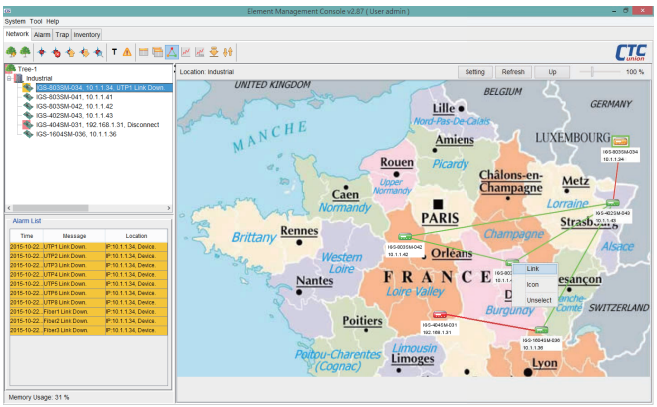
Security Management

- User Privilege
  - The administrator can add necessary user logins with specific privileges, from Administrator to Operator and lastly to normal user.
  - Radius Authentication. Supports authentication login provided by credentials stored on RADIUS server.
- User Role

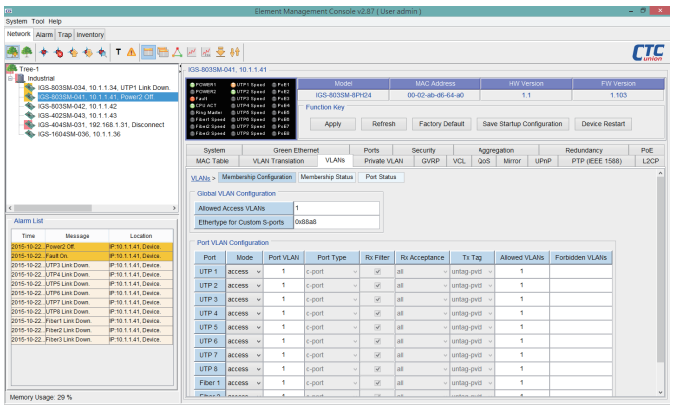
  A user role is a group and defines privileges for users to perform management tasks. The access to network elements is also restricted by user role.
- User Activity

  Provides viewing and clearing of the user login and configuration action logs.
  User client login & logouts are recorded, including the client's source IP address. All activities performed on any Device Element are logged with time-stamping, the user making changes and the changes made.

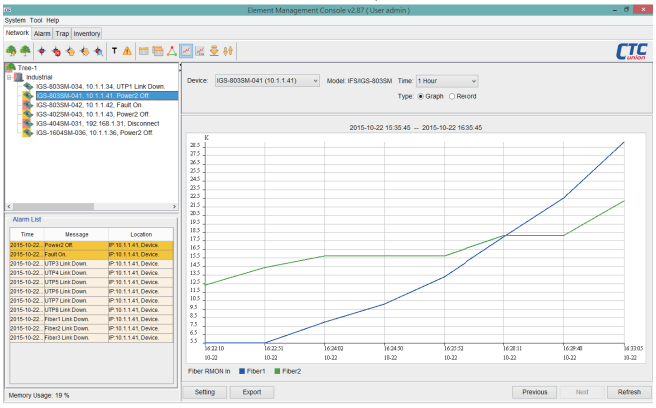
Network Topology



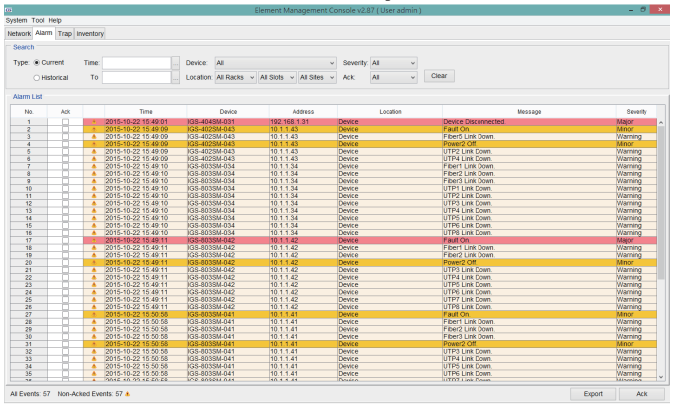
Network Element Configuration



Performance Graphics



Active Warning



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System Requirements

SmartView™	Hardware (minimum)	Software	Operating System
SmartView™ Server	Intel Core2 or higher processor, 2GB RAM, 40GB HD	JAVA JRE. SmartView™ Kit. MS-SQL Server	Windows Server 2012/2014, Win 7/8/10 (64 bit)
SmartView™ Clients	Intel Core2 or higher processor, 2GB RAM, 20GB HD	JAVA JRE. SmartView™ Kit.	Windows 7/8/10 (64 bit)
All-In-One	Intel Core2 or higher processor, 4GB RAM, 80GB HD	JAVA JRE. MS-SQL Server. SmartView™ Kit. SmartView™ Server/Client	Windows Server 2012/2014, Win 7/8/10 (64 bit)
SmartConfig™	**Hardware (minimum)**	**Software**	**Operating System**
SmartConfig™	CPU : 2 GHz or faster Dual core RAM : 1GB, Hard Disc : 1GB		Windows 7/8/10

Ordering Information (Industrial)

SmartView™ EMS Server for Max 2,000 IP address nodes

Model Name	Description
SV2-AGT-50	SmartView™ management software with 50 nodes
SV2-AGT-100	SmartView™ management software with 100 nodes
SV2-AGT-200	SmartView™ management software with 200 nodes
SV2-AGT-500	SmartView™ management software with 500 nodes
SV2-AGT-1000	SmartView™ management software with 1000 nodes
SV2-AGT-1500	SmartView™ management software with 1500 nodes
SV2-AGT-2000	SmartView™ management software with 2000 nodes

SmartConfig™

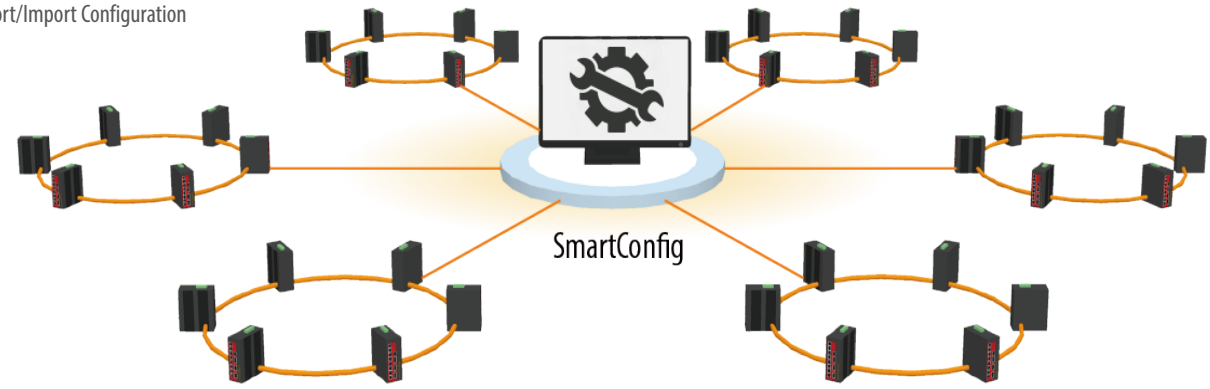
(Quick & Easy for Mass Configuration)

- Multiple device auto discovery
- Group configuration, access
- Group firmware upgrade
- Backup / restore device configuration
- IP address assignment
- Connectivity testing

SmartConfig™ is a convenient configuration tool for mass deployment of CTC Union's managed industrial switch products. SmartConfig™ is designed for field engineers, to aid in mass deployments but can just as easily be used for initial configuration of a small group of switches or even a single device. It is portable, so it can easily be included on a network tools pen drive, it has been tested on all versions of Windows and the GUI is both simple and intuitive.
Different configurations can be saved and recalled for later use, saving valuable time in the field and minimizing downtime when expanding networks or doing field replacements.

SmartConfig™ Application & Topology

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



SmartConfig™ is a convenient configuration tool for mass deployment of switch product

Main Features

· Multiple device auto discovery

SmartConfig™ can discover all inter-connected devices (no initial IP setting required) using broadcast or SNMP discovery methods. The results will show a list of discovered devices on the network including their IP address, MAC address, Model name, Firmware version.

· Group Firmware Upgrade

SmartConfig™ supports firmware upgrade for one device or multiple devices at a time. This function helps to increase firmware upgrade efficiency and convenience.

· Group Configuration & Access

For quick access and configurations, SmartConfig™ provide an efficient way to access and configure functions of one or multiple devices.

· Backup / Restore device Configuration

Running-config, startup-config and default config can be both stored to your local PC and restored to the devices via SmartConfig™

NEW

ICS-G24044X

24x 10/100/1000Base-T(X) +
4x 100/1000Base-X SFP +
4x 10GBase-X SFP+ Core Switch

ICS-G4804X (Preliminary)

48x 10/100/1000Base-T(X) +
4x 1G/2.5G/10G SFP+ Core Switch

CTC Industrial Rackmount Ethernet Core Switch family are hardened design managed core switch for rigorous demands of centralize and critical applications. The rackmount Ethernet core switch supports 4-port 10Gbps SFP+ and 24 / 48 Gigabit Ethernet (10/100/1000BaseTX) RJ-45 port plus 4 dual speed (100/1000Base-X) SFP fiber optical slots, thus providing 32 / 52 ports total for Ethernet connectivity. The family product are ideal solution for Smart City, surveillance, Intelligent traffic control systems and production automation applications.

The family product provides up to10KB jumbo frame support, a 32K MAC address table and 4MB packet memory buffer. Moreover, the full Gigabit capability supports Link Aggregation (Dynamic IEEE 802.3ad LACP) with up to 16 / 26 trunk group (maximum 8 ports per group) to increase bandwidth for providing high performance quick transfer of large amounts of video, voice and data across a network.

The family product supports a variety of Ethernet ring redundancy functions, including STP/RSTP/MSTP/ERPS and enhanced µ-Ring/ µ-Chain/Sub-Ring that provide less than 50ms recovery time with up to 250 nodes in a ring. Redundant power input increases system reliability and the availability of your network backbone.

Features

- 24x10/100/1000Base-T RJ-45+ 4x100/1000Base-X SFP + 4x 1G/2.5G/10GBase-X SFP+ (ICS-G24044X)
- 48x10/100/1000Base-T RJ-45 + 4x 1G/2.5G/10GBase-X SFP+ (ICS-G4804X)
- Redundant isolated 24/48VDC, or/and isolated 110/220VAC power inputs
- **Supports negative voltage power input**
- Rugged metal, IP30 protection & Fanless design
- UL60950-1, EN60950-1, CE, FCC, Rail Traffic EN50121-4 certified
- Heavy industrial grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- **4KV surge protection for RJ45 and SFP ports**
- **2.25K VDC Hi-pot isolation protection for Ethernet ports and power**
- STP, RSTP, MSTP, ITU-T G.8032 Ethernet Ring Protection Switching (ERPS) for network redundancy
- Provides 14 instances each can support µ-Ring, u-Chain or Sub-Ring for flexible networking applications
- µ-Ring redundancy, recovery time <50ms in 250 devices
- DHCP Server/Client/Relay/Snooping/Relay option 82
- QoS, Traffic classification QoS, CoS, bandwidth control for Ingress and Egress, Storm Control, Diffserv
- IEEE 802.1q VLAN, MAC based VLAN, IP subnet based VLAN, Protocol based VLAN, VLAN translation, GVRP, MVR
- Dynamic IEEE 802.3ad LACP Link Aggregation, Static Link Aggregation
- IGMP snooping V1/V2/V3, IGMP Filtering/ Throttling, IGMP query, IGMP proxy reporting, MLD snooping V1/V2
- Flexibility security: Port based and MAC based IEEE 802.1X, RADIUS, ACL, TACACS+, HTTP/HTTPS, SSL/SSH v2
- Software upgrade via TFTP and HTTP, redundant firmware to avoid in case of upgrade failure
- 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
- RMON, MIB II, Port mirroring, Event syslog, DNS, NTP V4.0, SNTP, IEEE 802.1ab LLDP
- CLI, Web based management, SNMP v1/v2c/v3, Telnet server for management
- Supports Modbus/TCP protocols for management
- Provides SmartConfig for quick and easy mass Configuration*
- Supports SmartView for Centralized Management*

*Please see Chapter 1- **Software Management** for more details

Specifications

Standard	IEEE 802.3	10Base-T 10Mbit/s Ethernet
	IEEE 802.3u	100Base-TX, 100Base-FX, Fast Ethernet
	IEEE 802.3ab	1000Base-T Gbit/s Ethernet over twisted pair
	IEEE 802.3z	1000Base-X Gbit/s Ethernet over Fiber-Optic
	IEEE 802.3ae	10 Gbit/s Ethernet over fiber
	IEEE 802.1d	STP (Spanning Tree Protocol)
	IEEE 802.1w	RSTP (Rapid Spanning Tree Protocol)
	IEEE 802.1s	MSTP (Multiple Spanning Tree Protocol)

Standard	ITU-T G.8032 / Y.1344	ERPS (Ethernet Ring Protection Switching)
	IEEE 802.1Q	Virtual LANs (VLAN)
	IEEE 802.1X	Port based and MAC based Network Access Control, Authentication
	IEEE 802.3ac	Max frame size extended to 1522Bytes
	IEEE 802.3ad	Link aggregation for parallel links with LACP(Link Aggregation Control Protocol)

Standard	IEEE 802.3X	Flow control for full duplex
	IEEE 802.1ad	Stacked VLANs, Q-in-Q
	IEEE 802.1p	LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization
	IEEE 802.1ab	Link Layer Discovery Protocol (LLDP)
	IEEE 802.3az	EEE (Energy Efficient Ethernet)
VLAN ID	4094 IEEE 802.1Q VLAN VID	
Switch Architecture	Back-plane (Switching Fabric): 136Gbps (ICS-G24044X) 156Gbps (ICS-G4804X) (Full wire-speed)	
Data Processing	Store and Forward	
Network Connector	**10GbE SFP+ :** 4x 1G/2.5G/10G SFP socket Supports DDMI **GbE SFP:** 4x 100/1000Base-X SFP socket (ICS-G24044X) Support DDMI **RJ45:** 24x 10/100/1000Base-T RJ-45 (ICS-G24044X) 48x 10/100/1000Base-T RJ-45 (ICS-G4804X) Support Auto negotiation speed, Auto MDI/MDI-X function	
Console	RS-232 (RJ-45)	
Network Cable	UTP/STP Cat.5e cable or above	
	EIA/TIA-568 100-ohm (100m)	
Protocols	CSMA/CD	
Reverse Polarity Protection	For input power	
Overload Current Protection	Supported	
CPU Watch Dog	Supported	
Power Supply	Redundant 2x AC input power (-AA model) 1x AC input power (-A model) Redundant 1x AC and 1x DC input power (-AD model) Redundant 2x DC input power (-DD model) 1x DC input power (-D model) AC input power (A) : Isolated 110/220VAC (85VAC~264VAC) DC input power (D) : Isolated 24/48VDC (18~60VDC), Removable Terminal Block Supports negative voltage power input	
Power Consumption	< 33W @24/48VDC, 110/220VAC (ICS-G24044X) TBD (ICS-G4804X)	
LED	Per unit: Power 1 (Green), Power 2 (Green), Act /Alarm (Green/Amber), Ring Master (Green)	
	P1~P24 (ICS-G24044X) P1~P48 (ICS-G4804X) Per RJ-45 port: 10/100 Link/Active (Green) 1000 Link/Active (Amber)	
	P25~P28 (ICS-G24044X) Per SFP Fiber port: 100 /1000Base-X Link/Active (Amber)	
	P29~P32 (ICS-G24044X) P49~P52 (ICS-G4804X) Per SFP+ Fiber port: 1000Base-X Link/Active (Amber) 10GBase-X Link/Active (Blue)	

Jumbo Frame	10K Byte
MAC Address Table	32K
Memory Buffer	4M Bytes for packet buffer
Warning Message	System Syslog, SMTP/ e-mail event message, alarm relay
Alarm Relay Contact	Relay outputs with current carrying capacity of 1A @24VDC, 2-Pin removable terminal block
Operating Temperature	-10 ~ 60°C
Operating Humidity	5% to 95% (Non-condensing)
Storage Temperature	-40 ~ 85°C
Housing	Rugged Metal, IP30 Protection, Fanless
Dimensions	280x 440 x 44mm (D x W x H)
Weight	4,755kg (ICS-G24044X-AA) 4.51kg (ICS-G24044X-AD) 4.26kg (ICS-G24044X-DD) TBD (ICS-G4804X)
Installation Mounting	19" rack mount
MTBF	103,057 Hours (ICS-G24044X-AA) 103,451 Hours (ICS-G24044X-AD) 103,447 Hours (ICS-G24044X-DD) TBD (ICS-G4804X) (MIL-HDBK-217)
Warranty	5 years
Certification	
EMC	CE (EN55024, EN55032)
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE
Railway Traffic	EN50121-4
Immunity for Heavy Industrial Environment	EN61000-6-2
Emission for Heavy Industrial Environment	EN61000-6-4
EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B
	EN61000-4-3 (RS) Level 3, Criteria A
	EN61000-4-4 (Burst) Level 3, Criteria A
	EN61000-4-5 (Surge) Level 3, Criteria B
	EN61000-4-6 (CS) Level 3, Criteria A
	EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
Safety	UL60950-1, EN60950-1
Hi pot protection	DC 2.25KV for power to chassis ground, Ethernet port to chassis ground
4KV surge protection	Supported for RJ45 and SFP ports
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

Software Specifications

Topology		
VLAN	IEEE 802.1q VLAN,up to 4094 802.1Q VLAN VID	
	IEEE 802.1q VLAN,up to 4094 Groups	
	IEEE 802.1ad Q-in-Q	
	MAC-based VLAN,up to 256 entries	
	IP Subnet-based VLAN, up to 128 entries	
	Protocol-based VLAN(Ethernt, SNAP, LLC), up to 128 entries	
	VLAN Translation, up to 256 entries	
	GVRP (GARP VLAN Registration Protocol)	
	MVR (Multicast VLAN Registration)	
Link Aggregation (Port Trunk)	Static (IEEE 802.3ad LACP), Maximum trunk group : 16group (ICS-G24044X) 26group (ICS-G4804X)	
	Dynamic (IEEE 802.3ad LACP), Maximum trunk group : 16group (ICS-G24044X) 26group (ICS-G4804X)	
	Per group up-to 8 port	
Spanning Tree	IEEE 802.1d STP, IEEE 802.1w RSTP, IEEE 802.1s MSTP	
Multiple μ-Ring	Up to 14 instances each support μ-Ring, μ-Chain or Sub-Ring for flexible networking applications. Recovery time <50ms The maximum number of device is allowed 250 in a Ring.	

Loop Protection	Supported
ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)	Recovery time <50ms Single Ring, Sub-Ring, Multiple ring topology
QoS Features	
Class of Service	IEEE 802.1p 8 active priorities queues for per port
Traffic Classification QoS	IEEE 802.1p based CoS IP Precedence based CoS IP DSCP based CoS
Traffic Classification QoS	QCL(QoS Control List): Frame Type, Source/ Destination MAC, VLAN ID, PCP, DEI Protocol, Source IP, IP Fragment, DSCP, TCP/UDP port number
Bandwidth Control for Ingress	Per port based
Bandwidth Control for Egress	Per port based Per queue / Per port shaper
DiffServ (RF 2474) Remarking	
Storm Control	for Unicast, Broadcast, Multicast

IP Multicasting Features	
IGMP / MLD Snooping	IGMP Snooping v1, v2, v3 / MLD Snooping v1, v2
	Port Filtering Profile
	Throttling, Fast Leave
	Maximum Multicast Group : up to 1022 entries
	Query / Static Router Port
Security Features	
IEEE 802.1X	Port-Based
	MAC-Based
ACL	Number of rules : up to 256 entries
	for L2 / L3 / L4 L2 : Mac address SA/DA/VLAN L3 : IP address SA/DA, Subnet L4 : TCP/UDP
RADIUS authentication & accounting	
TACACS+ authentication & accounting, TACACS+ 3.0	
HTTPS, HTTP	Supported
SSL / SSH v2	Supported
User Name Password Authentication	Local Authentication
	Remote Authentication (via RADIUS / TACACS+)
Management Interface Access Filtering	Web, Telnet / SSH, CLI RS-232 console
Management Features	
CLI	Cisco® like CLI
Web Based Management	
Telnet	Server
SNMP	V1, V2c, V3
Modbus/TCP	Support for management and monitoring

SW & Configuration Upgrade	TFTP, HTTP
	Redundant firmware in case of upgrade failure
RMON	RMON I (1, 2, 3, 9 group), RMON II
MIB	RFC1213 MIB II, Private MIB
UPnP	Supported
DHCP	Server, Client, Relay, Relay option 82 , Snooping
IP Source Guard	Supported
Mirroring	Local and Remote
Event Syslog	Syslog server (RFC3164) (Support 1 server)
Warning Message	System syslog, e-mail, alarm relay
DNS	Client, Proxy
IEEE 1588 PTP V2	Supports 5 operating mode in each port : Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave
NTP V4.0, SNTP	Client
LLDP (IEEE 802.1ab)	Link Layer Discovery Protocol
	LLDP-MED
IPv6 Features	
IPv6 Management	Telnet Server/ICMP v6
SNMP over IPv6	Supported
HTTP over IPv6	Supported
SSH over IPv6	Supported
IPv6 Telnet	Supported
IPv6 NTP, SNTP	Client
IPv6 TFTP	Supported
IPv6 QoS	Supported
IPv6 ACL	Number of rules: up to 256 entries
	for L2 / L3 / L4 L2 : Mac address SA/DA/VLAN L3 : IP address SA/DA, Subnet L4 : TCP/UDP

Application

Figure 1 : 10G Backbone application

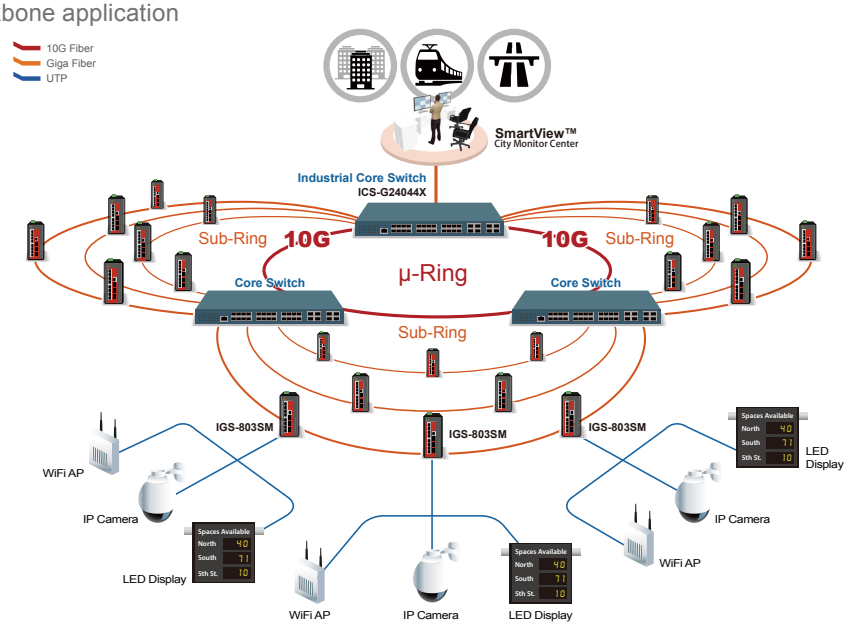
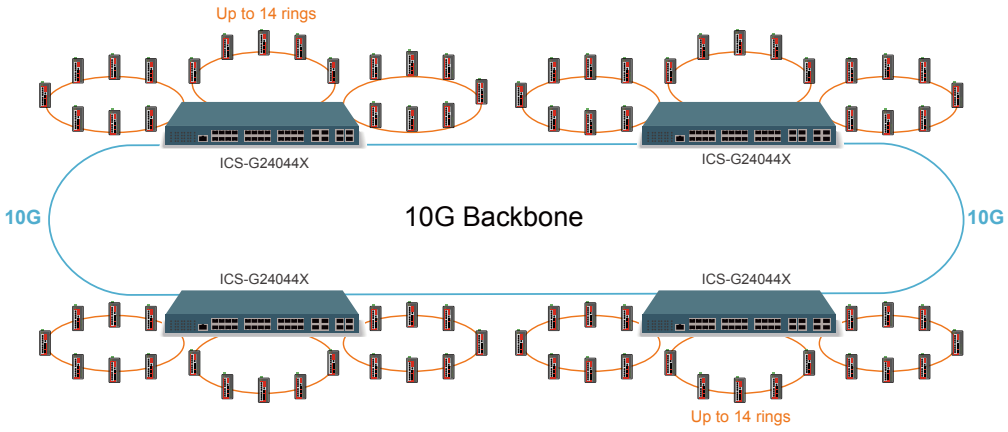


Figure 2 : 10G Backbone with μ-Ring topology



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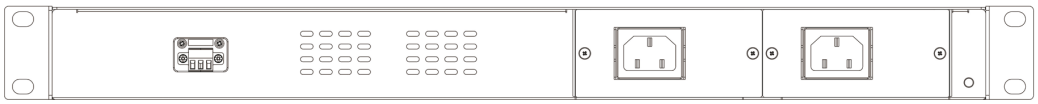
Dimensions

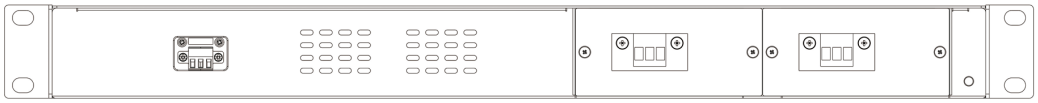
ICS-G24044X

Rear View

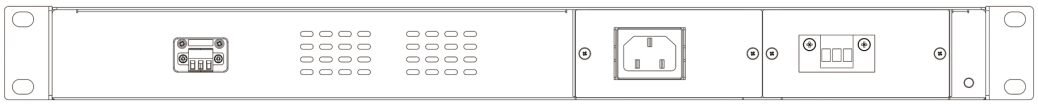
-AA Power



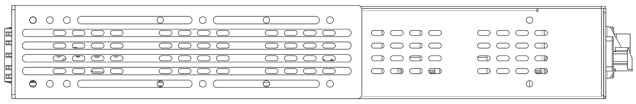
-DD Power



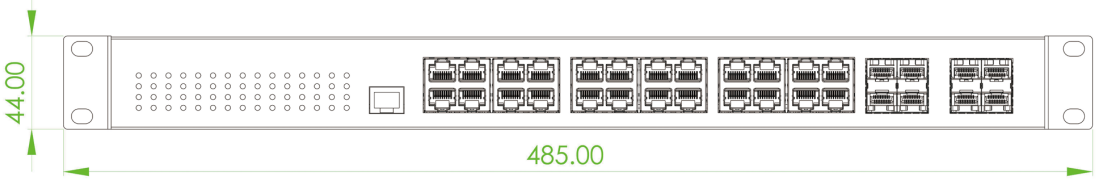
-AD Power



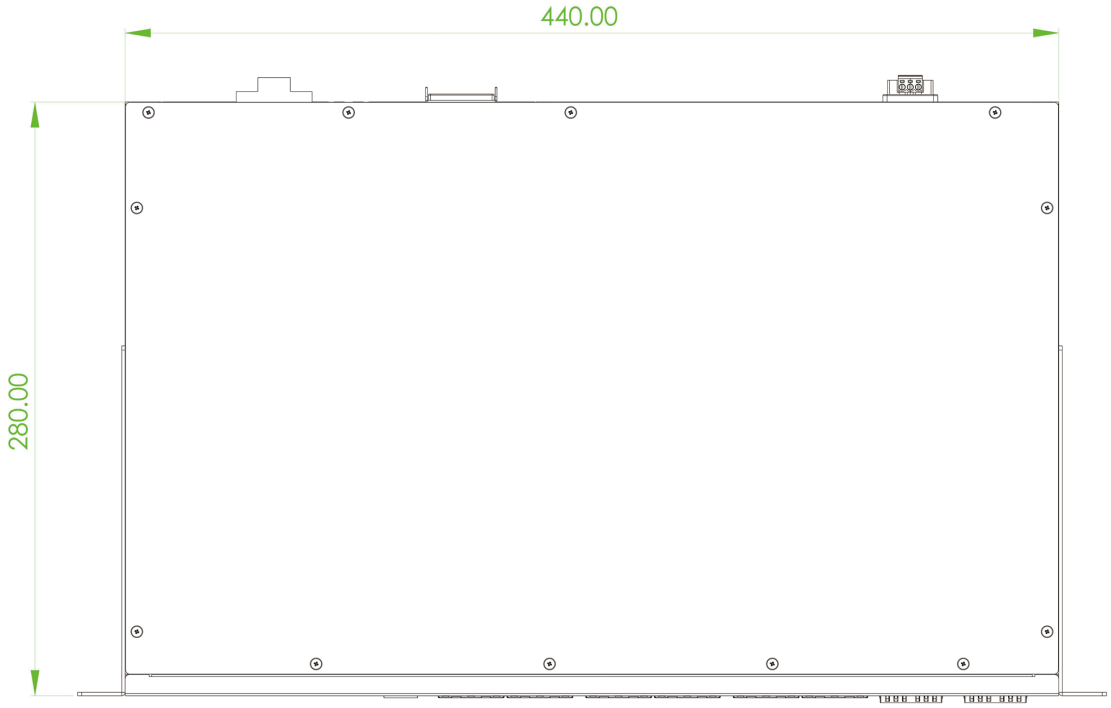
Side View



Front View



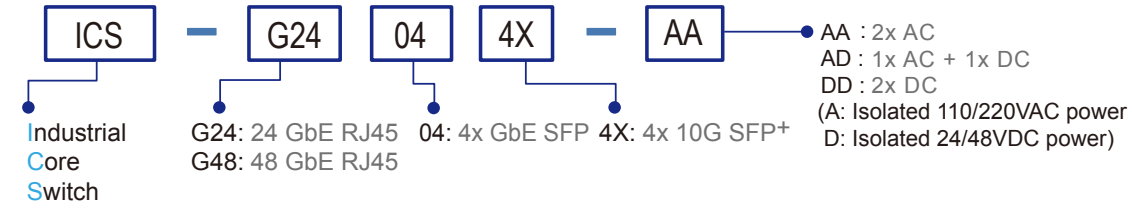
Top View



Ordering Information

Model Name	Managed	Total Ports (Maximum)	GbE		10GbE	Input power		Certification			
			10/100/1000 Base-T(X) RJ45	100/1000 Base-X SFP	1G/2.5G/ 10GBase-X SFP+	24/48VDC	110/220VAC	Safety UL60950-1 EN60950-1	EN50121-4	EN61000-6-2 EN61000-6-4	CE, FCC
ICS-G24044X-AA	V	32	24	4	4		2	V	V	V	V
ICS-G24044X-AD	V	32	24	4	4	1	1	V	V	V	V
ICS-G24044X-DD	V	32	24	4	4	2		V	V	V	V
ICS-G4804X-AA	V	52	48		4		2	V	V	V	V
ICS-G4804X-AD	V	52	48		4	1	1	V	V	V	V
ICS-G4804X-DD	V	52	48		4	2		V	V	V	V

Model Naming Rule



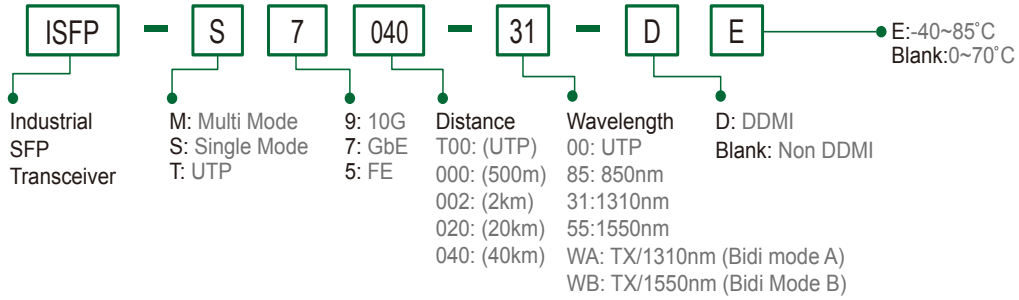
Optional Accessories

Industrial SFP Transceiver

The ISFP series of industrial grade SFP modules have been fully tested with the series product for guaranteed compatibility and performance. The best performance can be guaranteed even in mission-critical applications.

ISFP-M9000-85-D(E)	Industrial SFP 10GbE 10GBase-SR, M/M, 300 meter (OM3 fiber) ,wave length 850nm, DDMI , -10~70°C (-40~85°C)
ISFP-S9010-31-D(E)	Industrial SFP 10GbE 10GBase-LR, S/M, 10km, wave length 1310nm, DDMI, -10~70°C (-40~85°C)
ISFP-M7000-85-D(E)	Industrial SFP GbE 1000Base-SX, M/M, 500 meter,wave length 850nm, 7.5dB, LC, DDMI, -10~70°C (-40~85°C)
ISFP-S7020-31-D(E)	Industrial SFP 1000Base-LX, S/M, 20km, wave length 1310nm, 15dB, LC, DDMI, -10~70°C(-40~85°C)
ISFP-T7T00-00-(E)	Industrial SFP 10/100/1000Base-T UTP 100meter, -10~70°C (-40~85°C)
ISFP-M5002-31-D(E)	Industrial SFP 155M 100Base-FX, MM, 2km, wave length 1310nm, 12dB, LC, DDMI, -10~70°C (-40~85°C)
ISFP-S5030-31-D(E)	Industrial SFP 155M 100Base-FX, SM, 30km, 1310nm, 19dB, LC, DDMI, -10~70°C (-40~85°C)

SFP Naming Rule



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ICS-G24044X-24PH

24x 10/100/1000Base-T(X) + 4x 100/1000Base-X SFP + 4x 10GBase-X SFP+ with 24x PoE+ Core Switch

CTC Industrial Rackmount Ethernet Core Switch ICS-G24044X-24PH is a hardened design Layer 2 managed core switch with PoE+/PSE for rigorous demands of centralize and critical applications. The rackmount Ethernet core switch ICS-G24044X-24PH supports 4-port 10Gbps SFP+ and 24 Gigabit Ethernet (10/100/1000BaseTX) with 24 PoE+ RJ-45 port plus 4 dual speed (100/1000Base-X) SFP fiber optical slots, thus providing 32 ports total for Ethernet connectivity. ICS-G24044X-24PH is an ideal solution for Smart City, surveillance, Intelligent traffic control systems and production automation applications. ICS-G24044X-24PH supports up to 24 PoE/PoE+ (IEEE 802.3af/IEEE 802.3at) ports which provide 15.4/30watts power output per port for connecting with heavy-duty industrial PoE devices, such as PTZ IP surveillance cameras, high-performance wireless access points, digital signage and IP phones. The ICS-G24044X-24PH is designed especially for harsh outdoor cabinet applications with 4kV surge protection to ensure the uninterrupted reliability of PoE systems.

ICS-G24044X-24PH provides up to10KB jumbo frame support, a 32K MAC address table and 4MB packet memory buffer. Moreover, the full Gigabit capability supports Link Aggregation (Dynamic IEEE 802.3ad LACP) with up to 16 trunk group (maximum 8 ports per group) to increase bandwidth for providing high performance quick transfer of large amounts of video, voice and data across a network.

ICS-G24044X-24PH supports a variety of Ethernet ring redundancy functions, including STP/RSTP/MSTP/ERPS and enhanced µ-Ring/ µ-Chain/ Sub-Ring that provide less than 50ms recovery time with up to 250 nodes in a ring. Redundant power input increases system reliability and the availability of your network backbone.

Features

- 24x 10/100/1000Base-T RJ-45 + 4x100/1000Base-X SFP + 4x 1G/2.5G/10GBase-X SFP+ with 24x PoE+
- Maximum up to 24x IEEE 802.3af / 802.3at PoE+ output, 30W per port, 400W PoE power budget in total
- Redundant dual input power 48VDC (44~57VDC)
- **Supports negative voltage power input**
- Rugged metal, IP30 protection & Fanless design
- UL60950-1, EN60950-1, CE, FCC, Rail Traffic EN50121-4 certified
- Heavy industrial grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- **4KV surge protection for RJ45 and SFP ports**
- **2.25K VDC Hi-pot isolation protection for Ethernet ports and power**
- STP, RSTP, MSTP, ITU-T G.8032 Ethernet Ring Protection Switching (ERPS) for network redundancy
- Provides 14 instances each can support µ-Ring, µ-Chain or Sub-Ring for flexible networking applications
- µ-Ring redundancy, recovery time <50ms in 250 devices
- DHCP Server/Client/Relay/Snooping/Relay option 82
- QoS, Traffic classification QoS, CoS, bandwidth control for Ingress and Egress, Storm Control, DiffServ
- IEEE 802.1q VLAN, MAC based VLAN, IP subnet based VLAN, Protocol based VLAN, VLAN translation, GVRP, MVR
- Dynamic IEEE 802.3ad LACP Link Aggregation, Static Link Aggregation
- IGMP snooping V1/V2/V3, IGMP Filtering/ Throttling, IGMP query, IGMP proxy reporting, MLD snooping V1/V2
- Flexibility security: Port based and MAC based IEEE 802.1X, RADIUS, ACL, TACACS+, HTTP/HTTPS, SSL/SSH v2
- Software upgrade via TFTP and HTTP, redundant firmware to avoid in case of upgrade failure
- 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
- RMON, MIB II, Port mirroring, Event syslog, DNS, NTP 4.0, SNTP, IEEE 802.1ab LLDP
- CLI, Web based management, SNMP v1/v2c/v3, Telnet server for management
- Supports Modbus/TCP protocols for management
- Provides SmartConfig for quick and easy mass Configuration*
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	IEEE 802.3ab	1000Base-T Gbit/s Ethernet over twisted pair
	IEEE 802.3z	1000Base-X Gbit/s Ethernet over Fiber-Optic
	IEEE 802.3ae	10 Gbit/s Ethernet over fiber
	IEEE 802.1d	STP (Spanning Tree Protocol)

Standard	IEEE 802.1w	RSTP (Rapid Spanning Tree Protocol)
	IEEE 802.1s	MSTP (Multiple Spanning Tree Protocol)
	ITU-T G.8032 / Y.1344	ERPS (Ethernet Ring Protection Switching)
	IEEE 802.1Q	Virtual LANs (VLAN)
	IEEE 802.1X	Port based and MAC based Network Access Control, Authentication

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	IEEE 802.3ad	Link aggregation for parallel links with LACP(Link Aggregation Control Protocol)
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	IEEE 802.3at	PoE+ (Power over Ethernet enhancement)
	IEEE 802.3X	Flow control for full duplex
	IEEE 802.1ad	Stacked VLANs, Q-in-Q
	IEEE 802.1p	LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization
	IEEE 802.1ab	Link Layer Discovery Protocol (LLDP)
	IEEE 802.3az	EEE (Energy Efficient Ethernet)
VLAN ID	4094 IEEE 802.1Q VLAN VID	
Switch Architecture	Back-plane (Switching Fabric): 136Gbps (Full wire-speed)	
Data Processing	Store and Forward	
Network Connector	**10GbE SFP+:** 4x 1G/2.5G/10G SFP socket Supports DDMI **SFP:** 4x 100/1000Base-X SFP socket Support DDMI **RJ45:** 24x 10/100/1000Base-T RJ-45 Support Auto negotiation speed, Auto MDI/MDI-X function **PoE:** 24x IEEE 802.3at /IEEE 802.3af PoE+ End-Span, Alternative A mode. Maximum 30W per port, 400W PoE power budget in total **RJ45 Pin Assignment:** PoE Positive (V+) : RJ-45 pin 1, 2. PoE Negative (V-) : RJ-45 pin 3, 6. Data (1,2,3,6,4,5,7,8)	
Console	RS-232 (RJ-45)	
Network Cable	UTP/STP Cat.5e cable or above	
	EIA/TIA-568 100-ohm (100m)	
Protocols	CSMA/CD	
Reverse Polarity Protection	For input power	
Overload Current Protection	Supported	
CPU Watch Dog	Supported	
Power Supply	Redundant dual input power 48VDC (44~57VDC) (Removable terminal block) (50~57VDC input is recommended for IEEE 802.3at PoE+ in 30W applications) Supports negative voltage power input (for example application in telecom system)	
Power Consumption	< 33W @50VDC without PoE load < 449W @50VDC with 400W PoE load	

LED	Per unit: Power 1 (Green), Power 2 (Green), Act /Alarm (Green/Amber), Ring Master (Green) P1~P24 Per RJ-45 port: 10/100 Link/Active (Green) 1000 Link/Active (Amber) P25~P28 Per SFP Fiber port: 100 /1000Base-X Link/Active (Amber) P29~P32 Per SFP+ Fiber port: 1000Base-X Link/Active (Amber) 10GBase-X Link/Active (Blue) PoE port (P1~P24): PoE ON (Green)
Jumbo Frame	10K Byte
MAC Address Table	32K
Memory Buffer	4M Bytes for packet buffer
Warning Message	System Syslog, SMTP/ e-mail event message, alarm relay
Alarm Relay Contact	Relay outputs with current carrying capacity of 1A @24VDC, 2-Pin removable terminal block
Operating Temperature	-10 ~ 60°C
Operating Humidity	5% to 95% (Non-condensing)
Storage Temperature	-40 ~ 85°C
Housing	Rugged Metal, IP30 Protection, Fanless
Dimensions	280x 440 x 44mm (D x W x H)
Weight	4.26kg
Installation Mounting	19" rack mount
MTBF	97,078 Hours (MIL-HDBK-217)
Warranty	5 years
Certification	
EMC	CE (EN55024, EN55032)
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE
Railway Traffic	EN50121-4
Immunity for Heavy Industrial Environment	EN61000-6-2
Emission for Heavy Industrial Environment	EN61000-6-4
EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B EN61000-4-3 (RS) Level 3, Criteria A EN61000-4-4 (Burst) Level 3, Criteria A EN61000-4-5 (Surge) Level 3, Criteria B EN61000-4-6 (CS) Level 3, Criteria A EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
Safety	UL60950-1, EN60950-1
Hi pot protection	DC 2.25KV for power to chassis ground, Ethernet port to chassis ground
4KV surge protection	Supported for PoE, RJ45 and SFP
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

Software Specifications

Topology	
VLAN	IEEE 802.1q VLAN,up to 4094 802.1Q VLAN VID
	IEEE 802.1q VLAN,up to 4094 Groups
	IEEE 802.1ad Q-in-Q
	MAC-based VLAN,up to 256 entries
	IP Subnet-based VLAN, up to 128 entries
	Protocol-based VLAN(Ethernt, SNAP, LLC), up to 128 entries
	VLAN Translation, up to 256 entries
	GVRP (GARP VLAN Registration Protocol)
	MVR (Multicast VLAN Registration)
Link Aggregation (Port Trunk)	Static (Hash with SA, DA, IP, TCP/UDP port), Maximum trunk group : 16group
	Dynamic (IEEE 802.3ad LACP), Maximum trunk group : 16group
	Per group up-to 8 port

Spanning Tree	IEEE 802.1d STP, IEEE 802.1w RSTP, IEEE 802.1s MSTP
Multiple µ-Ring	Up to 14 instances each support µ-Ring, µ-Chain or Sub-Ring for flexible networking applications. Recovery time <50ms The maximum number of device is allowed 250 in a Ring.
Loop Protection	Supported
ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)	Recovery time <50ms Single Ring, Sub-Ring, Multiple ring topology
QoS Features	
Class of Service	IEEE 802.1p 8 active priorities queues for per port
Traffic Classification QoS	IEEE 802.1p based CoS IP Precedence based CoS IP DSCP based CoS

Traffic Classification QoS	QCL(QoS Control List): Frame Type, Source/ Destination MAC, VLAN ID, PCP, DEI Protocol, Source IP, IP Fragment, DSCP, TCP/UDP port number
Bandwidth Control for Ingress	Per port based
Bandwidth Control for Egress	Per port based Per queue / Per port shaper
DiffServ (RF 2474) Remarking	
Storm Control	for Unicast, Broadcast, Multicast
IP Multicasting Features	
IGMP / MLD Snooping	IGMP Snooping v1, v2, v3 / MLD Snooping v1, v2 Port Filtering Profile Throttling, Fast Leave Maximum Multicast Group : up to 1022 entries Query / Static Router Port
Security Features	
IEEE 802.1X	Port-Based MAC-Based
ACL	Number of rules : up to 256 entries for L2 / L3 / L4 L2 : Mac address SA/DA/VLAN L3 : IP address SA/DA, Subnet L4 : TCP/UDP
RADIUS authentication & accounting	
TACACS+ authentication & accounting, TACACS+ 3.0	
HTTPS, HTTP	Supported
SSL / SSH v2	Supported
User Name Password Authentication	Local Authentication Remote Authentication (via RADIUS / TACACS+)
Management Interface Access Filtering	Web, Telnet / SSH , CLI RS-232 console
Management Features	
CLI	Cisco® like CLI
Web Based Management	
Telnet	Server
SNMP	V1, V2c, V3
Modbus/TCP	Support for management and monitoring

SW & Configuration Upgrade	TFTP, HTTP Redundant firmware in case of upgrade failure
RMON	RMON I (1, 2, 3, 9 group), RMON II
MIB	RFC1213 MIB II, Private MIB
UPnP	Supported
DHCP	Server/Client/Relay/Relay option 82/Snooping
IP Source Guard	Supported
Mirroring	Local and Remote
Event Syslog	Syslog server (RFC3164) (Support 1 server)
Warning Message	System syslog, e-mail, alarm relay
DNS	Client, Proxy
IEEE 1588 PTP V2	Supports 5 operating mode in each port : Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave
NTP V4.0, SNTP	Client
SNLLDP (IEEE 802.1ab)MP	Link Layer Discovery Protocol LLDP-MED
IPv6 Features	
IPv6 Management	Telnet Server/ICMP v6
SNMP over IPv6	Supported
HTTP over IPv6	Supported
SSH over IPv6	Supported
IPv6 Telnet	Supported
IPv6 NTP, SNTP	Client
IPv6 TFTP	Supported
IPv6 QoS	Supported
IPv6 ACL	Number of rules: up to 256 entries for L2 / L3 / L4 L2 : Mac address SA/DA/VLAN L3 : IP address SA/DA, Subnet L4 : TCP/UDP
Advanced PoE Management	PoE PD failure auto checking, and auto reset when PD fail PoE port on/off weekly scheduling PoE Configuration PoE Enable/Disable Power limit by classification Power limit by management Total PoE Power budge limitation management: Maximum 400W power budget Power feeding priority

Application

Figure 1 : 10G Backbone application

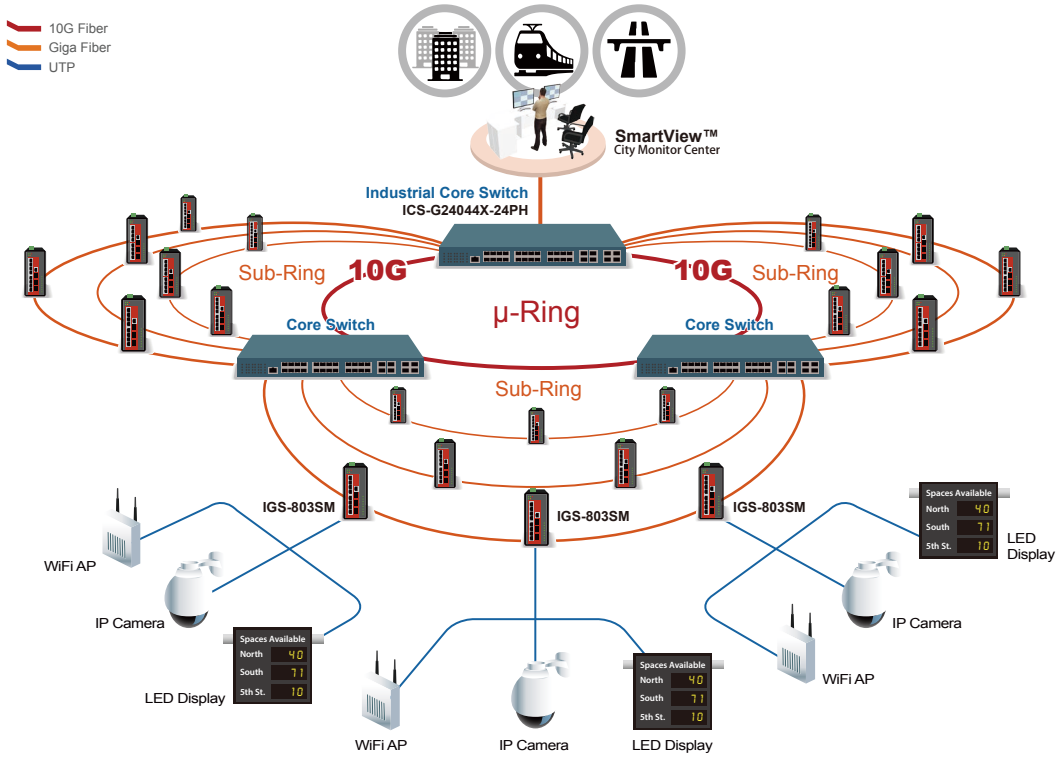
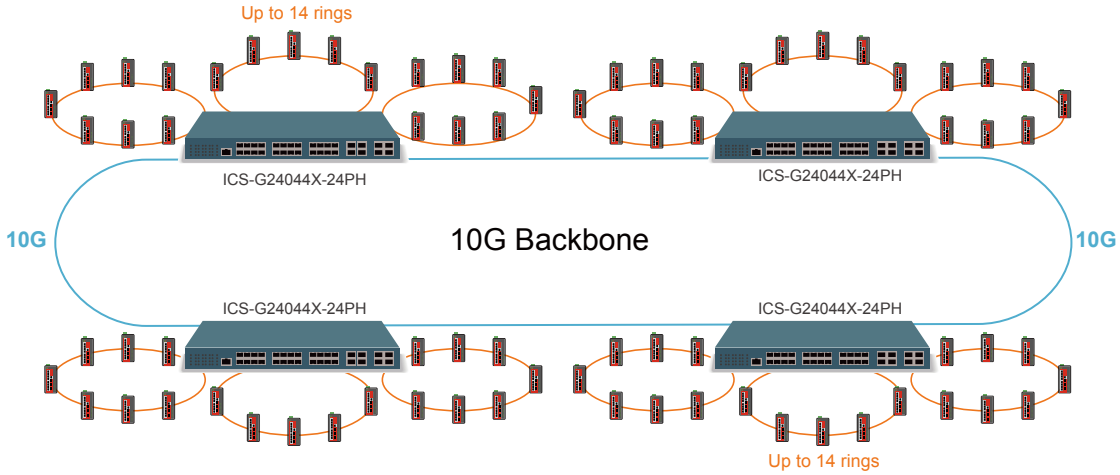
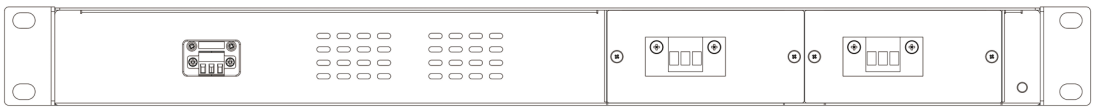


Figure 2 : 10G Backbone with µ-Ring topology

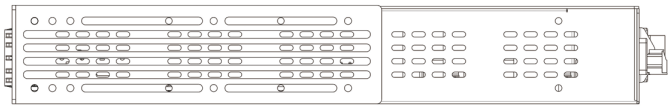


Dimensions

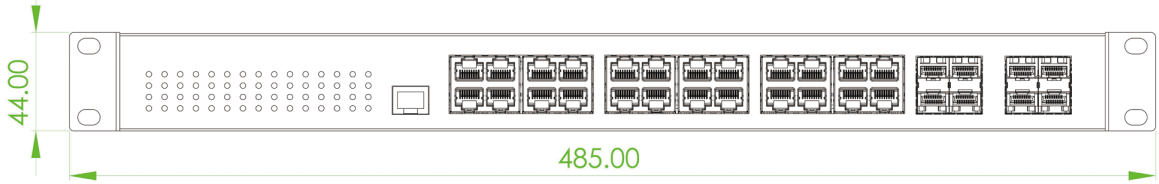
Rear View -DD Power



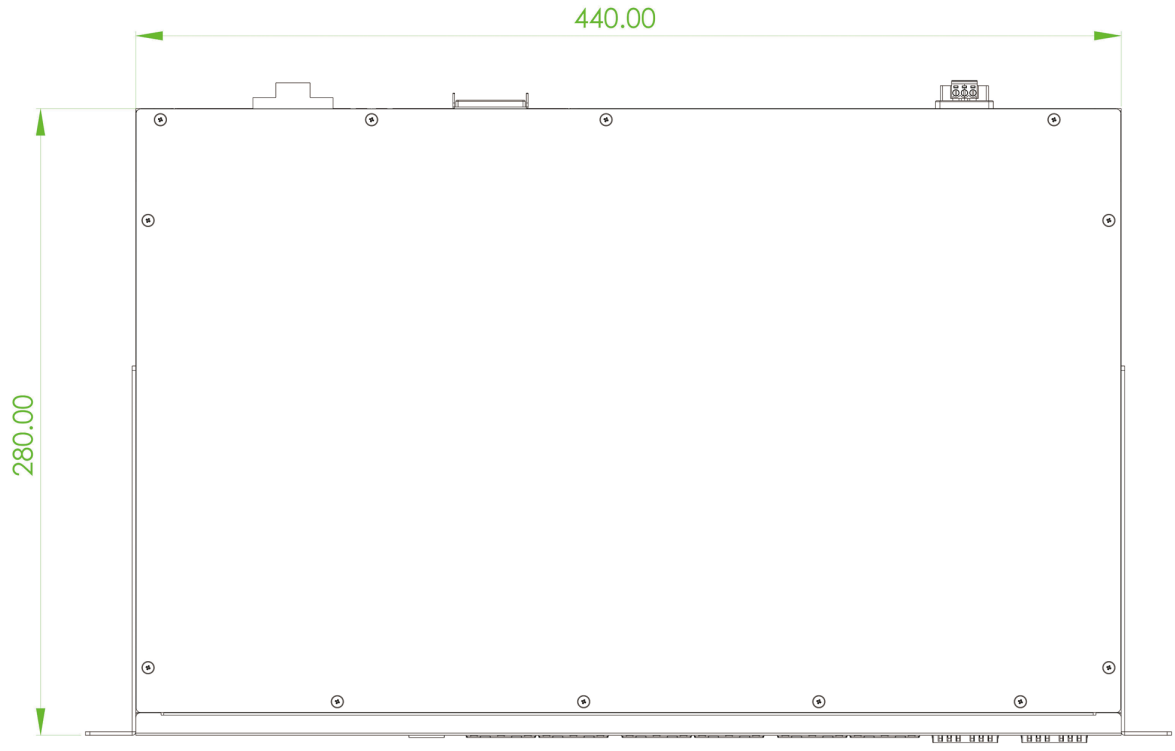
Side View



Front View



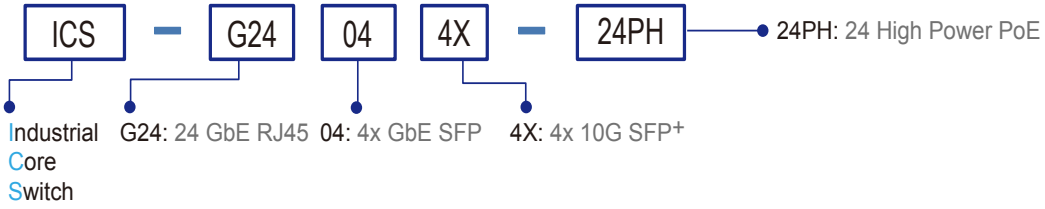
Top View



Ordering Information

Model Name	Total Port	GbE Port		10 GbE	PoE port		Input power	Certification				Operating Temperature
		10/100/1000 Base-T(X) RJ45	100/1000 Base-X SFP	G/2.5G/10GBase-X SFP+	IEEE 802.3at/af	Power Budget	48,-48V DC	Safety UL60950-1 EN60950-1	EN50121-4	EN61000-6-2 EN61000-6-4	CE, FCC	
ICS-G24044X-24PH	32	24	4	4	24	400W	2	V	V	V	V	-10 ~ 60℃

Model Naming Rule



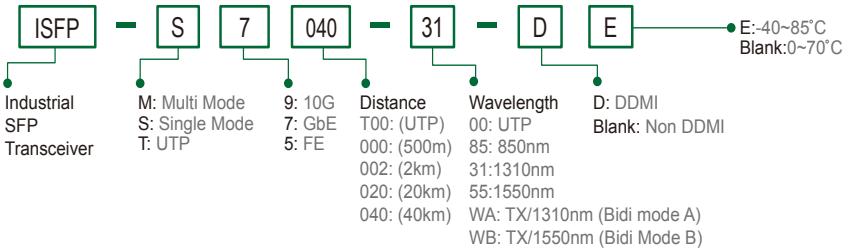
Optional Accessories

Industrial SFP Transceiver

The ISFP series of industrial grade SFP modules have been fully tested with the series product for guaranteed compatibility and performance. The best performance can be guaranteed even in mission-critical applications.

ISFP-M9000-85-D(E)	Industrial SFP 10GbE 10GBase-SR, M/M, 300 meter (OM3 fiber) ,wave length 850nm, DDMI , -10~70℃ (-40~85℃)
ISFP-S9010-31-D(E)	Industrial SFP 10GbE 10GBase-LR, S/M, 10km, wave length 1310nm, DDMI, -10~70℃ (-40~85℃)
ISFP-M7000-85-D(E)	Industrial SFP GbE 1000Base-SX, M/M, 500 meter,wave length 850nm, 7.5dB, LC, DDMI, -10~70℃ (-40~85℃)
ISFP-S7020-31-D(E)	Industrial SFP 1000Base-LX, S/M, 20km, wave length 1310nm, 15dB, LC, DDMI, -10~70℃(-40~85℃)
ISFP-T7T00-00-(E)	Industrial SFP 10/100/1000Base-T UTP 100meter, -10~70℃ (-40~85℃)
ISFP-M5002-31-D(E)	Industrial SFP 155M 100Base-FX, MM, 2km, wave length 1310nm, 12dB, LC, DDMI, -10~70℃ (-40~85℃)
ISFP-S5030-31-D(E)	Industrial SFP 155M 100Base-FX, SM, 30km, 1310nm, 19dB, LC, DDMI, -10~70℃ (-40~85℃)

SFP Naming Rule



ICS-G24S4X

24x 100/1000Base-X SFP with 4x GbE Combo plus 4x 10GbE SFP+ Core Switch

ICS-G24S2X

24x 100/1000Base-X SFP with 4x GbE Combo plus 2x 10GbE SFP+ Core Switch

ICS-G24S4X & ICS-G24S2X are industrial grade Ethernet Core Switches that are equipped with 20 gigabit SFP ports plus 4 combo gigabit ports and 2 or 4 10G SFP+ ports. ICS series models are all fan-less designs with redundant, isolated power supplies (2 AC, 2 DC, AC + DC) and can be mounted in 19 inch EIA standard rack. This series offers various layer 2 Ethernet functions (IGMP, VLAN, QoS, ACL, Security, IPv6, bandwidth control, and port mirroring) and also support µ-Ring redundancy protocol that can establish 14 independent rings for flexible applications, especially when employed in backbone infrastructure. ICS switches can also be managed centrally and conveniently by CTC Union's SmartView™ Element Management System and mass configured by SmartConfig™.

Housed in rugged rack mountable enclosures, ICS Series are certified with many industrial-grade standards and are ideal for deployments in harsh environments to deliver mission-critical network services. Additionally, with high port density and Gigabit or 10 Gigabit high-speed uplink, ICS-G24S4X & ICS-G24S2X are a reliable and scalable solution for core layer or backbone applications (See figure 1 & 2).

Features

- 24x 100/1000Base-X SFP with 4x Combo (SFP+RJ-45) and 4x 10G Base-X SFP+ (ICS-G24S4X)
- 24x 100/1000Base-X SFP with 4x Combo (SFP+RJ-45) and 2x 10G Base-X SFP+ (ICS-G24S2X)
- Redundancy isolated low voltage 24/48VDC, or/and isolated High voltage (110/220VAC) power inputs
- **Supports negative voltage power input with isolated RS-232 console port (for example in telecom system)**
- Rugged metal, IP30 protection & Fanless design
- UL60950-1, CE, FCC, Rail Traffic EN50121-4 certified
- Heavy industrial grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- STP, RSTP, MSTP, ITU-T G.8032 Ethernet Ring Protection Switching (ERPS) for redundant cabling
- Provides 14 instances that each can support µ-Ring, µ-Chain or Sub-Ring type for flexible uses. Supports up to 14 rings in one device (Please see CTC Union µ-Ring white paper for more details and more topology application)
- µ-Ring for Redundant Cabling, recovery time<50ms in 250 devices
- DHCP Server/Client/Relay/Snooping/Snooping option 82/Relay option 82
- QoS, Traffic classification QoS, CoS, bandwidth control for Ingress and Egress, Storm Control, DiffServ
- IEEE 802.1q VLAN, MAC based VLAN, IP subnet based VLAN, Protocol based VLAN, VLAN translation, GVRP, MVR
- Dynamic IEEE 802.3ad LACP Link Aggregation, Static Link Aggregation
- IGMP snooping V1/V2/V3, IGMP Filtering/ Throttling, IGMP query, IGMP proxy reporting, MLD snooping V1/V2
- Flexibility security: Port based and MAC based IEEE 802.1X, RADIUS, ACL, TACACS+, HTTP/HTTPS, SSL/SSH v2
- Software upgrade via TFTP and HTTP, redundant firmware to avoid in case of upgrade failure
- 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
- RMON, MIB II, Port mirroring, Event syslog, DNS, NTP, SNTP, IEEE 802.1ab LLDP
- Supports IPv6 Telnet server /ICMP v6
- CLI, Web based management, SNMP v1/v2c/v3, Telnet server for management
- Supports Modbus/TCP protocols for management
- Provides SmartConfig for quick and easy mass Configuration*
- Supports SmartView for Centralized Management*

*Please see Chapter 1- **Software Management** for more details

Specifications

Standard	IEEE 802.3	10Base-T 10Mbit/s Ethernet
	IEEE 802.3u	100Base-TX, 100Base-FX, Fast Ethernet
	IEEE 802.3ab	1000Base-T Gbit/s Ethernet over twisted pair
	IEEE 802.3z	1000Base-X Gbit/s Ethernet over Fiber-Optic
	IEEE 802.3ae	10 Gbit/s Ethernet over fiber
	IEEE 802.1d	STP (Spanning Tree Protocol)
	IEEE 802.1w	RSTP (Rapid Spanning Tree Protocol)
	IEEE 802.1s	MSTP (Multiple Spanning Tree Protocol)
	ITU-T G.8032 / Y.1344	ERPS (Ethernet Ring Protection Switching)
	IEEE 802.1Q	Virtual LANs (VLAN)
	IEEE 802.1X	Port based and MAC based Network Access Control, Authentication
Standard	IEEE 802.3ad	Link aggregation for parallel links with LACP(Link Aggregation Control Protocol)
	IEEE 802.1ad	Stacked VLANs, Q-in-Q
	IEEE 802.1p	LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization
	IEEE 802.ab	Link Layer Discovery Protocol (LLDP)
VLAN ID	4094 IEEE 802.1Q VLAN VID	
Switch Architecture	Back-plane (Switching Fabric): 128Gbps (ICS-G24S4X) 88Gbps (ICS-G24S2X) (Full wire-speed)	
Data Processing	Store and Forward	
Network Connector	24x 100/1000Base-X SFP with 4x GbE Combo (UTP/SFP)+ 4x 10GBase-X SFP+ (ICS-G24S4X) 24x 100/1000Base-X SFP with 4x GbE Combo (UTP/SFP)+ 2x 10GBase-X SFP+ (ICS-G24S2X)	

Network Connector	RJ-45 UTP port support 10/100/1000Base-T(X) , Auto negotiation speed,Auto MDI/MDI-X function GbE port SFP support dual speed (100M/1000M) with DDMI 10GbE port SFP+ support dual speed (1000M/10G) with DDMI
Console	RS-232 (RJ-45) Isolated RS-232 port grounding for negative voltage power system, or telecom application
Network Cable	UTP/STP above Cat. 5e cable EIA/TIA-568 100-ohm (100m)
Protocols	CSMA/CD
Reverse Polarity Protection	Supported
Overload Current Protection	Supported
CPU Watch Dog	Supported
Power Supply	Redundant 2x isolated High Voltage AC input power (-AA model) Redundant 2x Isolated Low Voltage DC Input power (-DD model) Redundant 1x isolated Low Voltage DC and 1x High Voltage AC input power (-AD model) Low Voltage DC (D): Isolated 24/48V (18~60VDC), Removable Terminal Block High voltage AC (A): Isolated 110/220VAC (85VAC~264VAC) **Supports negative voltage power input with isolated RS-232 console port (for example in telecom system)**
Power Consumption	

Input Voltage	ICS-G24S4X	ICS-G24S2X
24VDC	33.1W	29.8W
48VDC	33.4	30.1W
110VAC	34.4W	31.1W
220VAC	34.4W	31.1W

LED	Per unit: Power 1 (Green), Power 2 (Green), Act /Alarm (Green/ Amber), Ring Master (Green) Per RJ-45 port: 10/100 Link/Active (Green) 1000 Link/Active (Yellow) SFP (P1~24) Fiber Per port: 100Base-X Link/Active (Green) 1000Base-X Link/Active (Yellow) SFP+ (P25~P28) Fiber Per port: 1000Base-X Link/Active (Amber) 10GBase-X Link/Active (Blue)
Jumbo Frame	10K
MAC Address Table	32K
Memory Buffer	4M Bytes for packet buffer
Warning Message	System Syslog, SMTP/ e-mail event message, alarm relay
Alarm Relay Contact	Relay outputs with current carrying capacity of 1 A @24VDC, 2-Pin removable terminal block
Operating Temperature	-10 ~ 60°C
Operating Humidity	5% to 95% (Non-condensing)
Storage Temperature	-40 ~ 85°C
Housing	Rugged Metal, IP30 Protection, Fanless
Dimensions	315 x 440 x 44 mm (D x W x H)
Weight	4.755kg (ICS-G24S4X-AA) 4.26kg (ICS-G24S4X-DD) 4.51kg (ICS-G24S4X-AD) 4.695kg (ICS-G24S2X-AA) 4.2kg (ICS-G24S2X-DD) 4.45kg (ICS-G24S2X-AD)
Installation Mounting	19" rack mount
MTBF	176,414 Hours (ICS-G24S4X-AA) 190,965 Hours (ICS-G24S4X-AD) 214,649 Hours (ICS-G24S4X-DD) 176,663 Hours (ICS-G24S2X-AA) 191,257 Hours (ICS-G24S2X-AD) 215,018 Hours (ICS-G24S2X-DD) (MIL-HDBK-217)
Warranty	5 years
Certification	
EMC	CE (EN55024, EN55032)
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE
Railway Traffic	EN50121-4
Immunity for Heavy Industrial Environment	EN61000-6-2
Emission for Heavy Industrial Environment	EN61000-6-4
EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B EN61000-4-3 (RS) Level 3, Criteria A EN61000-4-4 (Burst) Level 3, Criteria A EN61000-4-5 (Surge) Level 3, Criteria B EN61000-4-6 (CS) Level 3, Criteria A EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
Safety	UL60950-1
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

Software Specifications

Topology	
VLAN	IEEE 802.1q VLAN,up to 4094 802.1Q VLAN VID IEEE 802.1q VLAN,up to 4094 Groups IEEE 802.1ad Q-in-Q MAC-based VLAN,up to 256 entries IP Subnet-based VLAN, up to 128 entries Protocol-based VLAN(Ethernt, SNAP, LLC), up to 128 entries VLAN Translation, up to 256 entries GVRP (GARP VLAN Registration Protocal) MVR (Multicast VLAN Registration)
Link Aggregation (Port Trunk)	Static (Hash with SA, DA, IP, TCP/UDP port), Maximum trunk group : 14group (ICS-G24S4X), 23group (ICS-G24S2X) Dynamic (IEEE 802.3ad LACP),Maximum trunk group : 14group (ICS-G24S4X), 23group (ICS-G24S2X) Per group up-to 8 port
Spanning Tree	IEEE 802.1d STP, IEEE 802.1w RSTP, IEEE 802.1s MSTP
Multiple µ-Ring	up to 14 instances that each supports µ-Ring, µ-Chain or Sub-Ring type for flexible uses, and maximum up to 14 Rings. Recovery time <50ms The maximum number of devices allowed in a Ring supported ring is 250. (Please see CTC Union µ-Ring white paper for more details and more topology application)
Loop Protection	Supported
ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)	Recovery time <50ms Single Ring, Sub-Ring, Multiple ring topology network

QoS Features	
Class of Service	IEEE 802.1p 8 active priorities queues for per port
Traffic Classification QoS	IEEE 802.1p based CoS IP Precedence based CoS IP DSCP based CoS QCL(QoS Control List): Frame Type, Source/ Destination MAC, VLAN ID, PCP, DEI QCE(QoS Control Entry): Protocol, Source IP, IP Fragment, DSCP, TCP/UDP port number
Bandwidth Control for Ingress	Per port based
Bandwidth Control for Egress	Per port based Per queue / Per port shaper
DiffServ (RF 2474) Remarking	
Storm Control	for Unicast, Broadcast, Multicast
IP Multicasting Features	
IGMP / MLD Snooping	IGMP Snooping v1, v2, v3 / MLD Snooping v1, v2 Port Filtering Profile Throttling, Fast Leave Maximum Multicast Group : up to 1022 entries Query / Static Router Port
Security Features	
IEEE 802.1X	Port-Based MAC-Based
ACL	Number of rules : up to 256 entries for L2 / L3 / L4 L2 : Mac address SA/DA/VLAN L3: IP address SA/DA, Subnet L4: TCP/UDP
RADIUS authentication & accounting	

TACACS+ authentication & accounting, TACACS+ 3.0	
HTTPS, HTTP	Supported
SSL / SSH v2	Supported
User Name Password Authentication	Local Authentication
	Remote Authentication (via RADIUS / TACACS+)
Management Interface Access Filtering	Web, Telnet / SSH , CLI RS-232 console
Management Features	
CLI	Cisco® like CLI
Web Based Management	
Telnet	Server
SNMP	V1, V2c, V3
Modbus/TCP	Supports for management and monitoring
SW & Configuration Upgrade	TFTP, HTTP
	Redundant firmware in case of upgrade failure
RMON	RMON I (1, 2, 3, 9 group), RMON II
MIB	RFC1213 MIB II, Private MIB
UPnP	Supported
DHCP	Server/Client/Relay/Relay option 82/Snooping
IP Source Guard	Supported
Port Mirroring	Supported

Event Syslog	Syslog server (RFC3164) (Support 1 server)
Warning Message	System syslog, e-mail, alarm relay
DNS	Client, Proxy
IEEE 1588 PTP V2	Supports 5 operating mode in each port : Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave
NTP, SNTP	Client
LLDP (IEEE 802.1ab)	Link Layer Discovery Protocol
	LLDP-MED
IPv6 Features	
IPv6 Management	Telnet Server/ICMP v6
SNMP over IPv6	Supported
HTTP over IPv6	Supported
SSH over IPv6	Supported
IPv6 Telnet	Supported
IPv6 NTP, SNTP	Client
IPv6 TFTP	Supported
IPv6 QoS	Supported
IPv6 ACL	Number of rules: up to 256 entries
	for L2 / L3 / L4 L2 : Mac address SA/DA/VLAN L3: IP address SA/DA, Subnet L4: TCP/UDP

Application

Figure 1 : 10G Backbone application

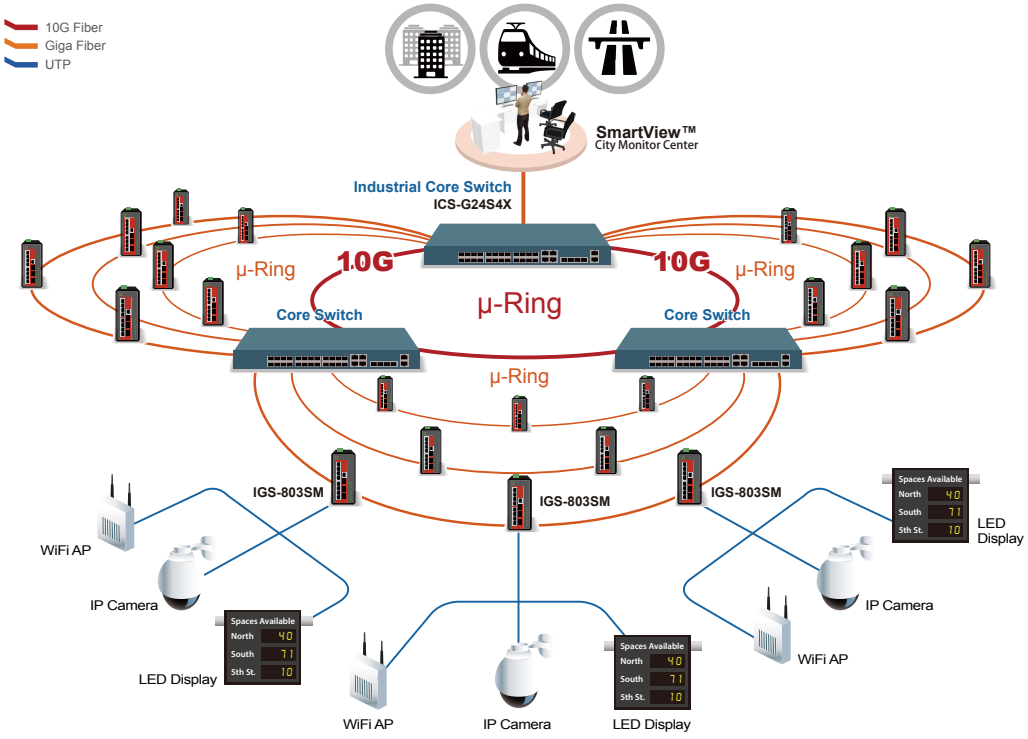
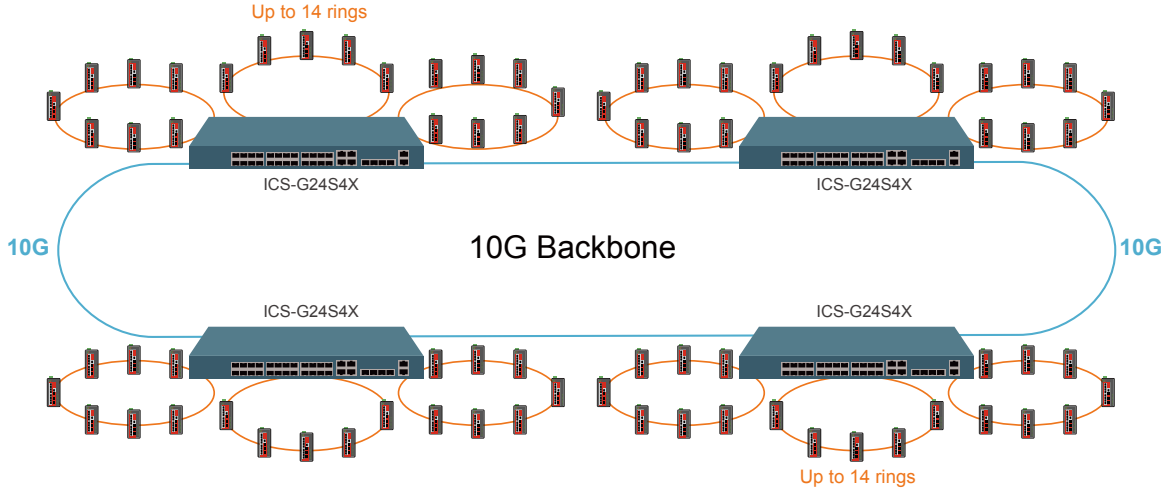


Figure 2 : 10G Backbone with μ-Ring topology



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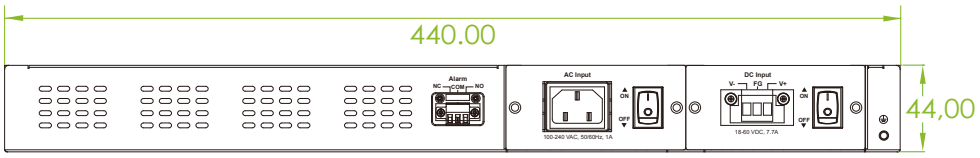
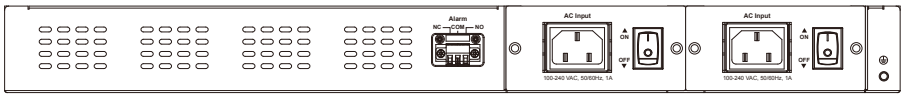
Dimensions

Rear View

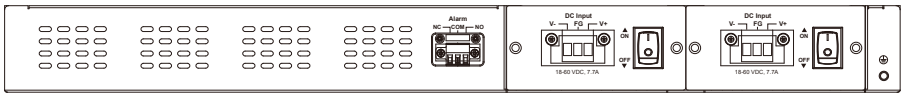
-AD Power



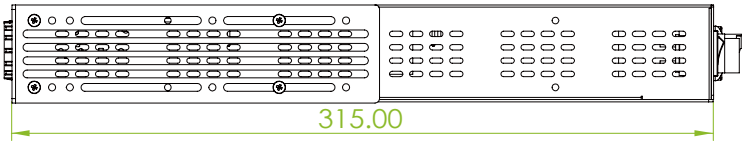
-AA Power



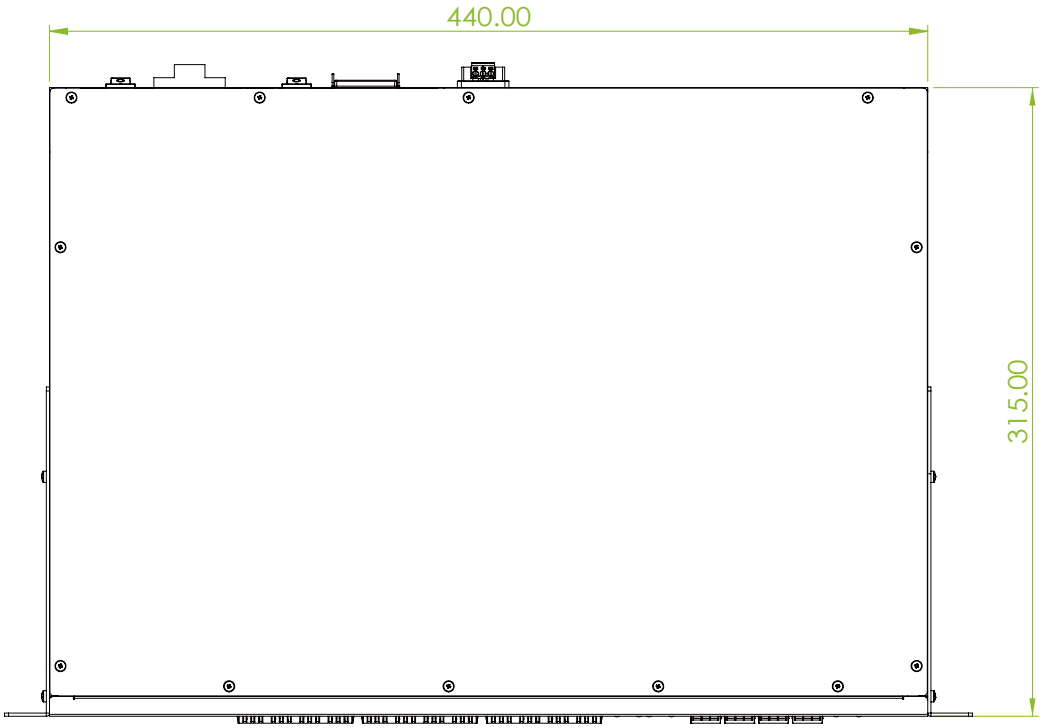
-DD Power



Side View

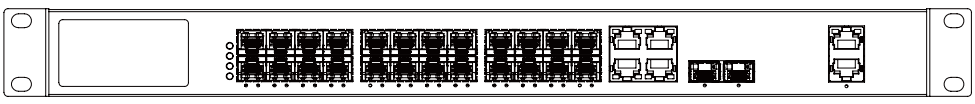


Top View

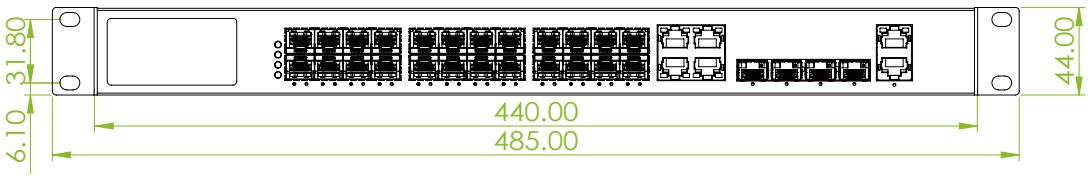


Front View

ICS-G24S2X



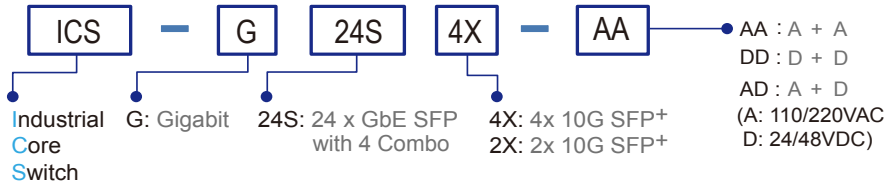
ICS-G24S4X



Ordering Information

Model Name	Managed	Total Port	GbE Port		10GbE	Input Power		Certification			
			100/1000 Base-X SFP	10/100/1000 Base-T UTP or 100/1000Base-X SFP	IEEE 802.3ae SFP+	DC (Low Volt) isolated 24/48VDC	High Volt 110/220VAC	Safety UL60950-1	EN50121-4	EN61000-6-2 EN61000-6-4	CE FCC
ICS-G24S4X-AA	V	28	20	4 Combo	4		2	V	V	V	V
ICS-G24S4X-DD	V	28	20	4 Combo	4	2		V	V	V	V
ICS-G24S4X-AD	V	28	20	4 Combo	4	1	1	V	V	V	V
ICS-G24S2X-AA	V	26	20	4 Combo	2		2	V	V	V	V
ICS-G24S2X-DD	V	26	20	4 Combo	2	2		V	V	V	V
ICS-G24S2X-AD	V	26	20	4 Combo	2	1	1	V	V	V	V

Model Naming Rule



Package List

- ICS-G24S4X or ICS-G24S2X device
- Console cable (RJ-45 to DB9)
- CD (SmartConfig, MIB file, Manual)
- Quick installation guide
- Rack mount ear with screws
- Power cord (for-A model)

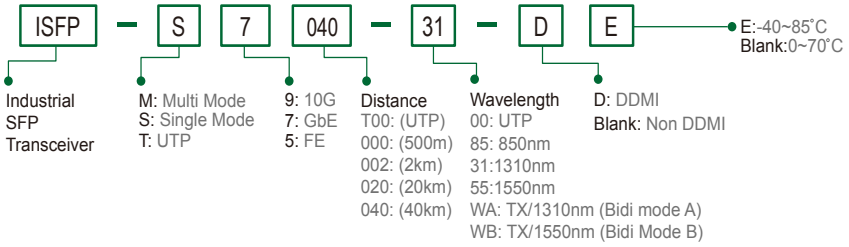
Optional Accessories

Industrial SFP Transceiver

The ISFP series of industrial grade SFP modules have been fully tested with the series product for guaranteed compatibility and performance. The best performance can be guaranteed even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheet for more details and more items.)

ISFP-M9000-85-D(E)	Industrial SFP 10GbE 10GBase-SR, M/M, 300 meter (OM3 fiber) ,wave length 850nm, DDMI , -10~70°C (-40~85°C)
ISFP-S9010-31-D(E)	Industrial SFP 10GbE 10GBase-LR, S/M, 10km, wave length 1310nm, DDMI, -10~70°C (-40~85°C)
ISFP-M7000-85-D(E)	Industrial SFP GbE 1000Base-SX, M/M, 500 meter,wave length 850nm, DDMI, -10~70°C (-40~85°C)
ISFP-S7020-31-D(E)	Industrial SFP 1000Base-SX, S/M, 20km, wave length 1310nm, DDMI, -10~70°C (-40~85°C)
ISFP-T7T00-00-(E)	Industrial SFP 10/100/1000Base-T, UTP 100meter, -10~70°C (-40~85°C)
ISFP-M5002-31-D(E)	Industrial SFP 155M 100Base-FX, MM, 2km, wave length 1310nm, 12dB, LC, DDMI, -10~70°C (-40~85°C)
ISFP-S5030-31-D(E)	Industrial SFP 155M 100Base-FX, SM, 30km, 1310nm, 19dB, LC, DDMI, -10~70°C (-40~85°C)

SFP Naming Rule



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NEW

IGS-804SM-SE-8PH

8x 10/100/1000Base-T + 4x 100/1000Base-X SFP with SyncE and 8x PoE

IGS-1608SM-SE-8PH

16x 10/100/1000Base-T + 8x 100/1000Base-X SFP with SyncE and 8x PoE

These models are managed industrial grade Gigabit switches with 8/16 10/100/1000Base-T ports and 4/8 Gigabit/Fast SFP ports that provide stable and reliable Ethernet transmission. They also support timing synchronization features (SyncE & IEEE 1588 PTP v2) that allow operators to deliver services with optimal stability and continuity in end to end connectivity. SyncE and IEEE 1588 PTP V2 are also increasingly applied in mobile backhaul application where many devices are placed in outdoor cabinets. The switches support a variety of Ethernet functions, including STP/RSTP/MSTP/ITU-T G.8032 ERPS and multiple µ-Ring for redundant cabling, layer 2 Ethernet IGMP, VLAN, QoS, Security, IPv6, bandwidth control, port mirroring, cable diagnostic and Green Ethernet. Housed in rugged DIN rail or wall mountable enclosures, these switches are designed for harsh environments, such as industrial networking, security automation applications, intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications (See Figure). Standard operating temperature range models (-10 to 60°C) and wide operating temperature range models (-40 to 75°C) fulfill the special needs of industrial automation applications.

Features

- 8x 10/100/1000Base-T RJ-45 and 4x 100/1000Base-X SFP with SyncE and 8x IEEE 802.3af/at PoE,240W PoE power budget (IGS-804SM-SE-8PH)
- 16x 10/100/1000Base-T RJ-45 and 8x 100/1000Base-X SFPwith SyncE and 8x IEEE 802.3af/at PoE, 240W PoE power budget (IGS-1608SM-SE-8PH)
- Redundant dual DC input power 48VDC (44~57VDC)
- **Supports negative voltage power input with isolated RS-232 console port (for example in telecom system)**
- UL60950-1, EN60950-1, CE, FCC, Rail Traffic EN50121-4, certified
- Heavy industrial grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- **2.25K VDC Hi-pot isolation protection for Ethernet ports and power**
- 4KV surge protection for UTP and Fiber ports
- Cable diagnostic, Measuring cable normal or broken point distance
- Rugged Metal, IP30 Protection & Fanless design
- Supports Green Ethernet IEEE 802.3az EEE (Energy Efficient Ethernet) management to optimize the power Cosumption
- STP, RSTP, MSTP, ITU-T G.8032 Ethernet Ring Protection Switching (ERPS) for redundant cabling
- Provides 5 instances that each can support µ-Ring, µ-Chain or Sub-Ring type for flexible uses. Supports up to 5 rings in one device (Please see CTC µ-Ring white paper for more details and more topology application)
- µ-Ring for Redundant Cabling, recovery time<10ms in 250 devices
- DHCP Server/Client/Relay /Relay option 82 /Snooping
- QoS, Traffic classification QoS, CoS, bandwidth control for Ingress and Egress, Storm Control, DiffServ
- IEEE 802.1q VLAN, MAC based VLAN, IP subnet based VLAN, Protocol based VLAN, VLAN translation, GVRP, MVR
- Dynamic IEEE 802.3ad LACP Link Aggregation, Static Link Aggregation
- IGMP snooping V1/V2/V3, IGMP Filtering/ Throttling, IGMP query, IGMP proxy reporting, MLD snooping V1/V2
- Security : Port based and MAC based IEEE 802.1X, RADIUS, ACL, TACACS+, HTTP/HTTPS, SSL/SSH v2
- Software upgrade via TFTP and HTTP, redundant firmware to avoid in case of upgrade failure
- 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
- RMON, MIB II, Port mirroring, Event syslog, DNS, NTP, SNTP, IEEE 802.1ab LLDP
- Supports IPv6 Telnet server /ICMP v6
- CLI, Web based management, SNMP v1/v2c/v3, Telnet server for management
- Provides SmartConfig for quick and easy mass Configuration Tool*
- Supports SmartView for Centralized Management*

*Please see Chapter 1- **Software Management** for more details

Specifications

Standard	IEEE 802.3	10Base-T 10Mbit/s Ethernet
	IEEE 802.3u	100Base-TX, 100Base-FX, Fast Ethernet
	IEEE 802.3ab	1000Base-T Gbit/s Ethernet over twisted pair
	IEEE 802.3z	1000Base-X Gbit/s Ethernet over Fiber-Optic
	IEEE 802.3af	PoE (Power over Ethernet)
	IEEE 802.3at	PoE+ (Power over Ethernet enhancements)
	IEEE 802.1d	STP (Spanning Tree Protocol)
	IEEE 802.1w	RSTP (Rapid Spanning Tree Protocol)
	IEEE 802.1s	MSTP (Multiple Spanning Tree Protocol)
	ITU-T G.8032 / Y.1344	ERPS (Ethernet Ring Protection Switching)
	IEEE 802.1Q	Virtual LANs (VLAN)
	IEEE 802.1X	Port based and MAC based Network Access Control, Authentication
	IEEE 802.3ac	Max frame size extended to 1522Bytes.

Standard	IEEE 802.3ad	Link aggregation for parallel links with LACP(Link Aggregation Control Protocol)
	IEEE 802.3x	Flow control for Full Duplex
	IEEE 802.1ad	Stacked VLANs, Q-in-Q
	IEEE 802.1p	LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization
	IEEE 802.1ab	Link Layer Discovery Protocol (LLDP)
	IEEE 802.3az	EEE (Energy Efficient Ethernet)
VLAN ID	4094 IEEE 802.1Q VLAN VID	
Switch Architecture	Back-plane (Switching Fabric): 24Gbps (IGS-804SM-SE-8PH) 48Gbps (IGS-1608SM-SE-8PH) Full wire-speed	
Data Processing	Store and Forward	

Flow Control	IEEE 802.3x for full duplex mode Back pressure for half duplex mode
Network Connector	8x 10/100/1000Base-T RJ-45 + 4x 100/1000Base-X SFP connector (IGS-804SM-SE-8PH) 16x 10/100/1000Base-T RJ-45+ 8x 100/1000Base-X SFP connector (IGS-1608SM-SE-8PH) RJ-45 UTP port support Auto negotiation speed, Auto MDI/MDI-X function, SFP port support dual speed with DDMI
PoE standard & RJ-45 Pin Assignment	8x IEEE 802.3af/at PoE+ 2 pairs PoE, PoE+, 30W/port End-Span, Alternative A mode. Positive (V+) : RJ-45 pin 1, 2. Negative (V-) : RJ-45 pin 3, 6.
Console	RS-232 (RJ-45) Isolated RS-232 port grounding for negative power system, or telecom network application
Network Cable	UTP/STP above Cat. 5e cable EIA/TIA-568 100-ohm (100m)
Protocols	CSMA/CD
Reverse Polarity Protection	Supported
Overload Current Protection	Supported
CPU Watch Dog	Supported
Power Supply	Redundant Dual DC 48VDC (44~57VDC) Input power Removable Terminal Block for input power connector (50~57V input is recommended for IEEE 802.3at PoE+ in 30W applications) Support negative voltage input power for telecom
Power Consumption	
LED	Per unit: Power 1 (Green), Power 2 (Green), Fault (Amber), CPU Act (Green), Ring Master (Yellow) Per RJ-45 port: 10/100 Link/Active (Green) 1000 Link/Active (Amber) SFP Fiber Per port: Link/Active (Green) PoE Port LED, 1 LED /per Port : PoE Output Power On : ON (Green) PoE Output Power OFF : OFF
Jumbo Frame	9.6KB
IEEE 802.3ac	Max frame size extended to 1522Bytes (allow Q-tag in packet)
MAC Address Table	8K
Memory Buffer	512K Bytes for packet buffer
Warning Message	System Syslog, SMTP/ e-mail event message, alarm relay

Model	Input Voltage	Total Power Consumption	Device Power Consumption	PoE Power Budget
IGS-804SM-SE-8PH	50VDC	253.5W	13.5W	240W
IGS-1608SM-SE-8PH	50VDC	260.8	20.8W	240W

Alarm Relay Contact	Relay outputs with current carrying capacity of 1 A @24VDC
Removable Terminal Block	Provide 2 redundant power, alarm relay contact, 6 Pin
Operating Temperature	-10 ~ 60°C (IGS-804SM-SE-8PH, IGS-1608SM-SE-8PH) -40 ~ 75°C (IGS-804SM-SE-8PHE, IGS-1608SM-SE-8PHE)
Operating Humidity	5% to 95% (Non-condensing)
Storage Temperature	-40 ~ 85°C
Housing	Rugged Metal, IP30 Protection, Fanless
Dimensions	106 x 72 x152 mm (D x W x H) (IGS-803SM-SE-8PH) 116 x 91 x 157 mm (Dx Wx H) (IGS-1608SM-SE-8PH)
Weight	0.76kg (IGS-803SM-SE-8PH) 1.375g (IGS-1608SM-SE-8PH)
Installation Mounting	DIN Rail mounting, or wall mounting (optional)
MTBF	564,484 Hours (IGS-803SM-SE-8PH) 403,331 Hours (IGS-1608SM-SE-8PH) (MIL-HDBK-217)
Warranty	5 years
Certification	
EMC	CE (EN55024, EN55032)
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE
Railway Traffic	EN50121-4
Immunity for Heavy Industrial Environment	EN61000-6-2
Emission for Heavy Industrial Environment	EN61000-6-4
EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B EN61000-4-3 (RS) Level 3, Criteria A EN61000-4-4 (Burst) Level 3, Criteria A EN61000-4-5 (Surge) Level 3, Criteria B EN61000-4-6 (CS) Level 3, Criteria A EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
Safety	UL60950-1, EN60950-1 (IGS-1608SM-SE-8PH) EN60950-1 (IGS-804SM-SE-8PH)
Hi pot protection	DC 2.25KV for power to chassis ground, Ethernet ports to chassis ground
4KV surge protection	Supported for UTP and Fiber ports
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

Software Specifications

Topology	
VLAN	IEEE 802.1q VLAN,up to 4094 802.1Q VLAN VID IEEE 802.1q VLAN,up to 4094 Groups IEEE 802.1ad Q-in-Q MAC-based VLAN,up to 256 entries IP Subnet-based VLAN, up to 128 entries Protocol-based VLAN(Ethernt, SNAP, LLC), up to 128 entries VLAN Translation, up to 256 entries GVRP (GARP VLAN Registration Protocal) MVR (Multicast VLAN Registration)
Link Aggregation (Port Trunk)	Static (Hash with SA, DA, IP, TCP/UDP port), Maximum trunk group : 6group (IGS-804SM-SE -8PH), 12group (IGS-1608SM-SE-8PH) Dynamic (IEEE 802.3ad LACP), Maximum trunk group : 6group (IGS-804SM-SE8PH), 12group (IGS-1608SM-SE8PH) Per group up-to 8 port
Spanning Tree	IEEE 802.1d STP IEEE 802.1w RSTP IEEE 802.1s MSTP
Multiple µ-Ring	up to 5 instances that each supports µ-Ring, µ-Chain or Sub-Ring type for flexible uses, and maximum up to 5 Rings. Recovery time <10ms The maximum number of devices allowed in a Ring supported ring is 250. (Please see CTC Union µ-Ring white paper for more details and more topology applications)
Loop Protection	Supported
ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)	Recovery time <50ms Single Ring, Sub-Ring, Multiple ring topology network

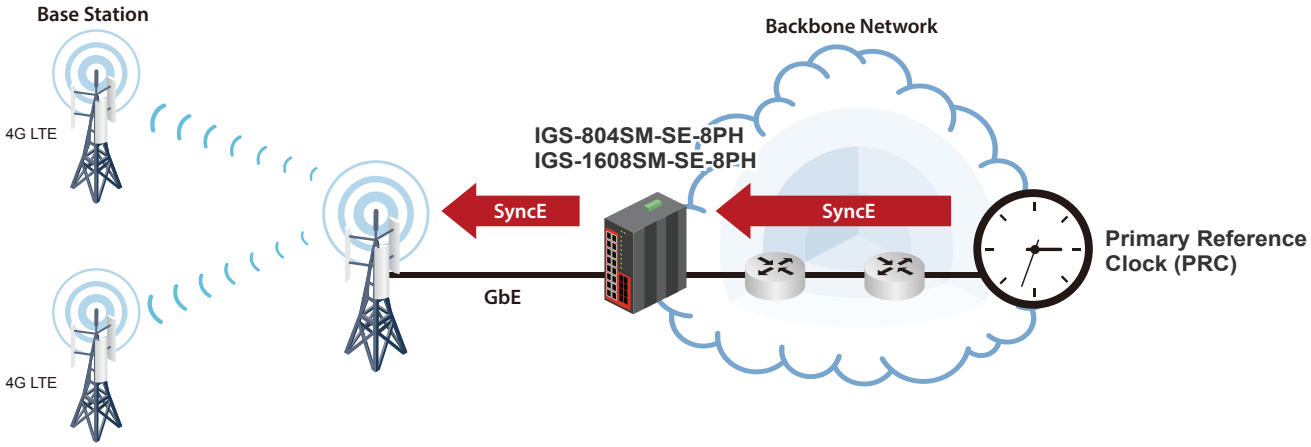
QoS Features	
Class of Service	IEEE 802.1p 8 active priorities queues for per port
Traffic Classification QoS	IEEE 802.1p based CoS IP Precedence based CoS IP DSCP based CoS QCL(QoS Control List): Frame Type, Source/ Destination MAC, VLAN ID, PCP, DEI QCE(QoS Control Entry): Protocol, Source IP, IP Fragment, DSCP, TCP/UDP port number
Bandwidth Control for Ingress	Rate in steps :1 kbps / Mbps / fps / kfps Range : 100 kbps to 1Gbps / 1fps to 3300kfps Rate Unit : bit or frame
Bandwidth Control for Egress	Rate in steps : 1 kbps / Mbps Range : 100 kbps to 1Gbps Rate Unit : bit Per queue / Per port shaper
DiffServ (RF 2474) Remarking	
Storm Control	for Unicast, Broadcast, Multicast
IP Multicasting Features	
IGMP / MLD Snooping	IGMP Snooping v1, v2, v3 / MLD Snooping v1, v2 Port Filtering Profile Throttling, Fast Leave Maximum Multicast Group : up to 1022 entries Query / Static Router Port
Security Features	
IEEE 802.1X	Port-Based MAC-Based
ACL	Number of rules : up to 256 entries for L2 / L3 / L4 L2 : Mac address SA/DA/VLAN L3: IP address SA/DA, Subnet L4: TCP/UDP

RADIUS authentication & accounting	
TACACS+ authentication & accounting, TACACS+ 3.0	
HTTPS, HTTP	Supported
SSL / SSH v2	Supported
User Name Password Authentication	Local Authentication Remote Authentication (via RADIUS / TACACS+)
Management Interface Access Filtering	Web, Telnet / SSH , CLI RS-232 console
Management Features	
CLI	Cisco® like CLI
Web Based Management	
Telnet	Server
SNMP	V1, V2c, V3
SW & Configuration Upgrade	TFTP, HTTP Redundant firmware in case of upgrade failure
RMON	RMON I (1, 2, 3, 9 group), RMON II
MIB	RFC1213 MIB II, Private MIB
UPnP	Supported
DHCP	Server, Client, Relay, Relay option 82 , Snooping
IP Source Guard	Supported
Port Mirroring	Supported
Event Syslog	Syslog server (RFC3164) (Support 1 server)
Warning Message	System syslog, e-mail, alarm relay
DNS	Client, Proxy
SyncE	ITU-T G.8262 Sync Ethernet
IEEE1588 PTP V2	Support 5 operating mode in each port : Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave
NTP, SNTP	Client

LLDP (IEEE 802.1ab)	Link Layer Discovery Protocol LLDP-MED
IPv6 Features	
IPv6 Management	Telnet Server/ICMP v6
SNMP over IPv6	Supported
HTTP over IPv6	Supported
SSH over IPv6	Supported
IPv6 Telnet	Supported
IPv6 NTP, SNTP	Client
IPv6 TFTP	Supported
IPv6 QoS	Supported
IPv6 ACL	Number of rules: up to 256 entries for L2 / L3 / L4 L2 : Mac address SA/DA/VLAN L3: IP address SA/DA, Subnet L4: TCP/UDP
Others Features	
Green Ethernet	Supports IEEE 802.3az EEE (Energy Efficient Ethernet) Management to optimize the power consumption Determine the cable length and lowering the power for ports with short cables Lower the power for a port when there is no link LED Power Management :Adjustment LEDs intensity
Cable Diagnostic	Measuring UTP cable normal or broken point distance
Advanced PoE Management	PoE PD failure auto checking, and auto reset when PD fail PoE port on/off weekly scheduling PoE Configuration PoE Enable/Disable Power limit by classification Power feeding priority Total PoE Power budge limitation: Maximum 240W for IGS-1608SM-SE-8PH, IGS-804SM-SE-8PH

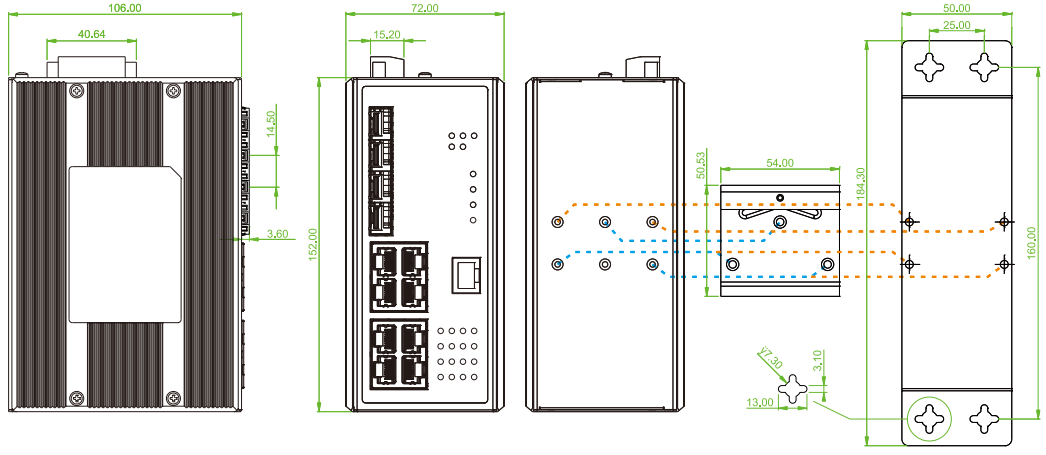
Application

Figure : Application for mobile backhaul



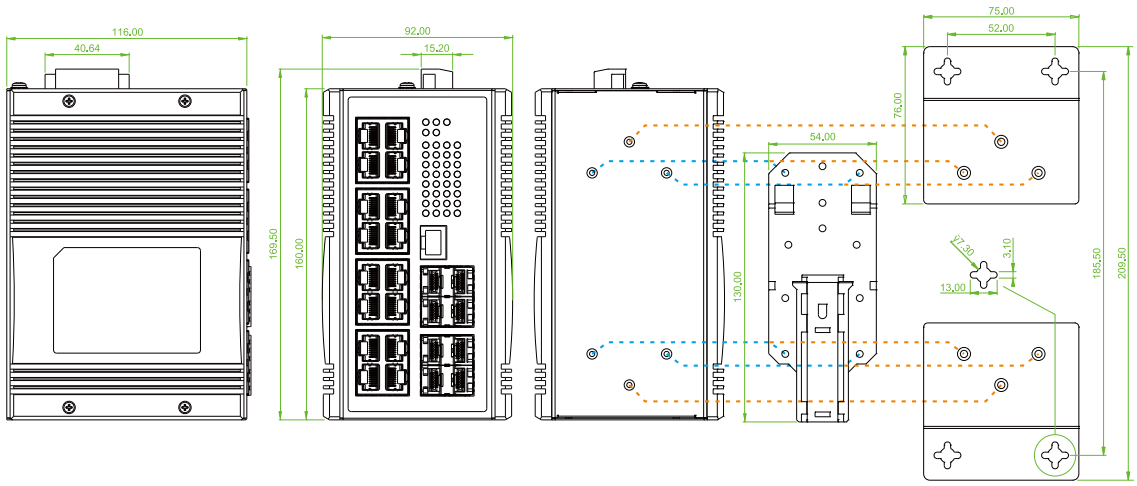
Dimensions

▶ IGS-804SM-SE-8PH



Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

▶ IGS-1608SM-SE-8PH



Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

Ordering Information

Model Name	Managed	Total Port	UTP Port	Fiber Port	PoE		Input Power	Certification				Operating Temperature
			10/100/1000 Base-T	100/1000 Base-X	IEEE 802.3af/at	Power Budget	Redundant	Railway EN50121-4	Safety UL60950-1 EN60950-1	EN61000-6-2 EN61000-6-4	CE FCC	
IGS-804SM-SE-8PH	V	12	8	4 SFP	8	240W	±48VDC	V	EN60950-1	V	V	-10~60℃
IGS-804SM-SE-8PHE	V	12	8	4 SFP	8	240W	±48VDC	V	EN60950-1	V	V	-40~75℃
IGS-1608SM-SE-8PH	V	24	16	8 SFP	8	240W	±48VDC	V	V	V	V	-10~60℃
IGS-1608SM-SE-8PHE	V	24	16	8 SFP	8	240W	±48VDC	V	V	V	V	-40~75℃

Model Naming Rule

IGS – 8 – 04S – M – SE – 8PH – E

- IGS: Industrial Gigabit Switch
- 8: 8x UTP; 16: 16x UTP
- 04S: 4x SFP; 08S: 8x SFP
- M: Managed
- SE: SyncE
- 8PH : 8High Power PoE
- E: -40~75℃; Black: -10~60℃

■ Package List

- One device of the series
- Console cable (RJ-45 to DB9)
- CD (SmartConfig, MIB file, Manual)
- Quick installation guide
- Din Rail with screws
- Terminal block
- Protective caps for SFP ports

Optional Accessories

■ Wall mount kit accessories

IND-WMK02	Wall Mount kit for Industrial product (Wide) (184 x 50mm) (For IGS-804SM-SE-8PH)
IND-WMK04	Wall Mount kit for Industrial product (2 pcs in 1 set, 76mm x 75mm x 2pcs) (For IGS-1608SM-SE-8PH)

■ Industrial SFP Transceiver

The ISFP series of industrial grade SFP modules have been fully tested with the series product for guaranteed compatibility and performance. The best performance can be guaranteed even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheet for more details and more items.)

ISFP-M7000-85-D(E)	Industrial SFP GbE 1000Base-SX, M/M, 500 meter,wave length 850nm, 7.5dB, LC, DDMI, -10~70°C (-40~85°C)
ISFP-S7020-31-D(E)	Industrial SFP 1000Base-LX, S/M, 20km, wave length 1310nm, 15dB, LC, DDMI, -10~70°C (-40~85°C)
ISFP-T7T00-00-(E)	Industrial SFP 10/100/1000Base-T UTP 100meter, -10~70°C (-40~85°C)
ISFP-M5002-31-D(E)	Industrial SFP 155M 100Base-FX, MM, 2km, wave length 1310nm, 12dB, LC, DDMI, -10~70°C (-40~85°C)
ISFP-S5030-31-D(E)	Industrial SFP 155M 100Base-FX, SM, 30km, 1310nm, 19dB, LC, DDMI, -10~70°C (-40~85°C)

SFP Naming Rule

ISFP – S – 7 – 040 – 31 – D – E

- ISFP: Industrial SFP Transceiver
- S: M: Multi Mode; S: Single Mode; T: UTP
- 7: 9: 10G; 7: GbE; 5: FE
- 040: Distance — T00: (UTP); 000: (500m); 002: (2km); 020: (20km); 040: (40km)
- 31: Wavelength — 00: UTP; 85: 850nm; 31:1310nm; 55:1550nm; WA: TX/1310nm (Bidi mode A); WB: TX/1550nm (Bidi Mode B)
- D: DDMI; Blank: Non DDMI
- E: -40~85°C; Blank: 0~70°C

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IGS-804SM-SE

8x 10/100/1000Base-T + 4x 100/1000Base-X SFP with SyncE

IGS-1608SM-SE

16x 10/100/1000Base-T + 8x 100/1000Base-X SFP with SyncE

These models are managed industrial grade Gigabit switches with 8/16 10/100/1000Base-T ports and 4/8 Gigabit/Fast SFP ports that provide stable and reliable Ethernet transmission. They also support timing synchronization features (SyncE & IEEE 1588 PTP v2) that allow operators to deliver services with optimal stability and continuity in end to end connectivity. SyncE and IEEE1588 PTP V2 are also increasingly applied in mobile backhaul application where many devices are placed in outdoor cabinets. The switches support a variety of Ethernet functions, including STP/RSTP/MSTP/ITU-T G.8032 ERPS and multiple µ-Ring for redundant cabling, layer 2 Ethernet IGMP, VLAN, QoS ,Security ,IPv6, bandwidth control, port mirroring, cable diagnostic and Green Ethernet. Housed in rugged DIN rail or wall mountable enclosures, these switches are designed for harsh environments, such as industrial networking, security automation applications, intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications (See Figure). Standard operating temperature range models (-10 to 60°C) and wide operating temperature range models (-40 to 75°C) fulfill the special needs of industrial automation applications.

Features

- 8x 10/100/1000Base-T RJ-45 and 4x 100/1000Base-X SFP Fiber with SyncE (IGS-804SM-SE)
- 16x 10/100/1000Base-T RJ-45 and 8x 100/1000Base-X SFP Fiber with SyncE (IGS-1608SM-SE)
- Redundant dual DC input power 12/24/48VDC (9.6~60VDC)
- **Supports negative voltage power input with isolated RS-232 console port (for example in telecom system)**
- UL60950-1, EN60950-1, CE, FCC, Rail Traffic EN50121-4, certified
- Heavy industrial grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- **2.25K VDC Hi-pot isolation protection for Ethernet ports and power**
- 4KV surge protection for UTP and Fiber ports
- Cable diagnostic, Measuring cable normal or broken point distance
- Rugged Metal, IP30 Protection & Fanless design
- Supports Green Ethernet IEEE 802.3az EEE (Energy Efficient Ethernet) management to optimize the power Cosumption
- STP, RSTP, MSTP, ITU-T G.8032 Ethernet Ring Protection Switching (ERPS) for redundant cabling
- Provides 5 instances that each can support µ-Ring, µ-Chain or Sub-Ring type for flexible uses. Supports up to 5 rings in one device (Please see CTC µ-Ring white paper for more details and more topology application)
- µ-Ring for Redundant Cabling, recovery time<10ms in 250 devices
- DHCP Server/Client/Relay /Relay option 82 /Snooping
- QoS, Traffic classification QoS, CoS, bandwidth control for Ingress and Egress, Storm Control, DiffServ
- IEEE 802.1q VLAN, MAC based VLAN, IP subnet based VLAN, Protocol based VLAN, VLAN translation, GVRP, MVR
- Dynamic IEEE 802.3ad LACP Link Aggregation, Static Link Aggregation
- IGMP snooping V1/V2/V3, IGMP Filtering/ Throttling, IGMP query, IGMP proxy reporting, MLD snooping V1/V2
- Security : Port based and MAC based IEEE 802.1X, RADIUS, ACL, TACACS+, HTTP/HTTPS, SSL/SSH v2
- Software upgrade via TFTP and HTTP, redundant firmware to avoid in case of upgrade failure
- 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
- RMON, MIB II, Port mirroring, Event syslog, DNS, NTP, SNTP, IEEE 802.1ab LLDP
- Supports IPv6 Telnet server /ICMP v6
- CLI, Web based management, SNMP v1/v2c/v3, Telnet server for management
- Provides SmartConfig for quick and easy mass Configuration Tool*
- Supports SmartView for Centralized Management*

*Please see Chapter 1- **Software Management** for more details

Specifications

Standard	IEEE 802.3	10Base-T 10Mbit/s Ethernet
	IEEE 802.3u	100Base-TX, 100Base-FX, Fast Ethernet
	IEEE 802.3ab	1000Base-T Gbit/s Ethernet over twisted pair
	IEEE 802.3z	1000Base-X Gbit/s Ethernet over Fiber-Optic
	IEEE 802.1d	STP (Spanning Tree Protocol)
	IEEE 802.1w	RSTP (Rapid Spanning Tree Protocol)
	IEEE 802.1s	MSTP (Multiple Spanning Tree Protocol)
	ITU-T G.8032 / Y.1344	ERPS (Ethernet Ring Protection Switching)
	IEEE 802.1Q	Virtual LANs (VLAN)
	IEEE 802.1X	Port based and MAC based Network Access Control, Authentication
	IEEE 802.3ac	Max frame size extended to 1522Bytes.

Standard	IEEE 802.3ad	Link aggregation for parallel links with LACP(Link Aggregation Control Protocol)
	IEEE 802.3x	Flow control for Full Duplex
	IEEE 802.1ad	Stacked VLANs, Q-in-Q
	IEEE 802.1p	LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization
	IEEE 802.1ab	Link Layer Discovery Protocol (LLDP)
	IEEE 802.3az	EEE (Energy Efficient Ethernet)
VLAN ID	4094 IEEE 802.1Q VLAN VID	
Switch Architecture	Back-plane (Switching Fabric): 24Gbps (IGS-804SM-SE) 48Gbps (IGS-1608SM-SE) Full wire-speed	
Data Processing	Store and Forward	

Flow Control	IEEE 802.3x for full duplex mode Back pressure for half duplex mode
Network Connector	8x 10/100/1000Base-T RJ-45 + 4x 100/1000Base-X SFP connector (IGS-804SM-SE) 16x 10/100/1000Base-T RJ-45+ 8x 100/1000Base-X SFP connector (IGS-1604SM-SE) RJ-45 UTP port support Auto negotiation speed, Auto MDI/MDI-X function, SFP port support dual speed with DDMI
Console	RS-232 (RJ-45) Isolated RS-232 port grounding for negative power system, or telecom network application
Network Cable	UTP/STP above Cat. 5e cable
	EIA/TIA-568 100-ohm (100m)
Protocols	CSMA/CD
Reverse Polarity Protection	Supported
Overload Current Protection	Supported
CPU Watch Dog	Supported
Power Supply	Redundant Dual DC 12/24/48V (9.6~60VDC) Input power Removable Terminal Block for input power connector Support negative voltage input power for telecom
Power Consumption	

Input Voltage	IGS-804SM-SE	IGS-1608SM-SE
12 VDC	11W	17W
24 VDC	12.4W	17.8W
48 VDC	12.9W	20.2W

LED	Per unit: Power 1 (Green), Power 2 (Green), Fault (Amber), CPU Act (Green), Ring Master (Yellow)
	Per RJ-45 port: 10/100 Link/Active (Green) 1000 Link/Active (Amber)
	SFP Fiber Per port: Link/Active (Green)
Jumbo Frame	9.6KB
IEEE 802.3ac	Max frame size extended to 1522Bytes (allow Q-tag in packet)
MAC Address Table	8K
Memory Buffer	512K Bytes for packet buffer
Warning Message	System Syslog, SMTP/ e-mail event message, alarm relay
Alarm Relay Contact	Relay outputs with current carrying capacity of 1 A @24VDC
Removable Terminal Block	Provide 2 redundant power, alarm relay contact, 6 Pin

Operating Temperature	-10 ~ 60°C (IGS-804SM-SE, IGS-1608SM-SE) -40 ~ 75°C (IGS-804SM-SE-E, IGS-1608SM-SE-E)
Operating Humidity	5% to 95% (Non-condensing)
Storage Temperature	-40 ~ 85°C
Housing	Rugged Metal, IP30 Protection, Fanless
Dimensions	106 x 72 x152 mm (D x W x H) (IGS-804SM-SE) 116 x 91 x 157 mm (Dx Wx H) (IGS-1608SM-SE)
Weight	0.74kg (IGS-804SM-SE) 1.35kg (IGS-1608SM-SE)
Installation Mounting	DIN Rail mounting, or wall mounting (optional)
MTBF	593,726 Hours (IGS-803SM-SE) 431,610 Hours (IGS-1608SM-SE) (MIL-HDBK-217)
Warranty	5 years
Certification	
EMC	CE (EN55024, EN55032)
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE
Railway Traffic	EN50121-4
Immunity for Heavy Industrial Environment	EN61000-6-2
Emission for Heavy Industrial Environment	EN61000-6-4
EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B
	EN61000-4-3 (RS) Level 3, Criteria A
	EN61000-4-4 (Burst) Level 3, Criteria A
	EN61000-4-5 (Surge) Level 3, Criteria B
	EN61000-4-6 (CS) Level 3, Criteria A
	EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
Safety	UL60950-1, EN60950-1 (IGS-1608SM-SE) EN60950-1 (IGS-804SM-SE)
Hi pot protection	DC 2.25KV for power to chassis ground, Ethernet ports to chassis ground
4KV surge protection	Supported for UTP and Fiber ports
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

Software Specifications

Topology	
VLAN	IEEE 802.1q VLAN,up to 4094 802.1Q VLAN VID
	IEEE 802.1q VLAN,up to 4094 Groups
	IEEE 802.1ad Q-in-Q
	MAC-based VLAN,up to 256 entries
	IP Subnet-based VLAN, up to 128 entries
	Protocol-based VLAN(Ethernt, SNAP, LLC), up to 128 entries
	VLAN Translation, up to 256 entries
	GVRP (GARP VLAN Registration Protocal)
	MVR (Multicast VLAN Registration)
Link Aggregation (Port Aggregation Trunk)	Static (Hash with SA, DA, IP, TCP/UDP port), Maximum trunk group : 6group (IGS-804SM-SE), 12group (IGS-1608SM-SE)
	Dynamic (IEEE 802.3ad LACP), Maximum trunk group : 6group (IGS-804SM-SE), 12group (IGS-1608SM-SE)
	Per group up-to 8 port
Spanning Tree	IEEE 802.1d STP
	IEEE 802.1w RSTP
	IEEE 802.1s MSTP
Multiple µ-Ring	up to 5 instances that each supports µ-Ring, µ-Chain or Sub-Ring type for flexible uses, and maximum up to 5 Rings. Recovery time <10ms The maximum number of devices allowed in a Ring supported ring is 250. (Please see CTC Union µ-Ring white paper for more details and more topology applications)
Loop Protection	Supported
ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)	Recovery time <50ms
	Single Ring, Sub-Ring, Multiple ring topology network

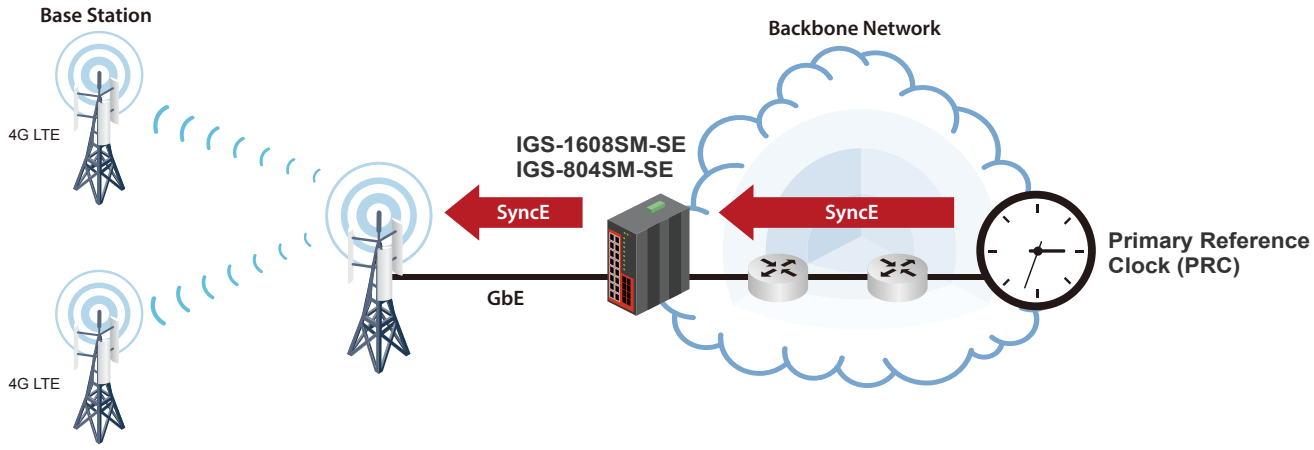
QoS Features	
Class of Service	IEEE 802.1p 8 active priorities queues for per port
Traffic Classification QoS	IEEE 802.1p based CoS
	IP Precedence based CoS
	IP DSCP based CoS
	QCL(QoS Control List): Frame Type, Source/ Destination MAC, VLAN ID, PCP, DEI
	QCE(QoS Control Entry): Protocol, Source IP, IP Fragment, DSCP, TCP/UDP port number
Bandwidth Control for Ingress	Rate in steps :1 kbps / Mbps / fps / kfps
	Range : 100 kbps to 1Gbps / 1fps to 3300kfps
	Rate Unit : bit or frame
Bandwidth Control for Egress	Rate in steps : 1 kbps / Mbps
	Range : 100 kbps to 1Gbps
	Rate Unit : bit
	Per queue / Per port shaper
DiffServ (RF 2474) Remarking	
Storm Control	for Unicast, Broadcast, Multicast
IP Multicasting Features	
IGMP / MLD Snooping	IGMP Snooping v1, v2, v3 / MLD Snooping v1, v2
	Port Filtering Profile
	Throttling, Fast Leave
	Maximum Multicast Group : up to 1022 entries
	Query / Static Router Port
Security Features	
IEEE 802.1X	Port-Based
	MAC-Based
ACL	Number of rules : up to 256 entries
	for L2 / L3 / L4 L2 : Mac address SA/DA/VLAN L3: IP address SA/DA, Subnet L4: TCP/UDP

RADIUS authentication & accounting	
TACACS+ authentication & accounting, TACACS+ 3.0	
HTTPS, HTTP	Supported
SSL / SSH v2	Supported
User Name Password Authentication	Local Authentication Remote Authentication (via RADIUS / TACACS+)
Management Interface Access Filtering	Web, Telnet / SSH , CLI RS-232 console
Management Features	
CLI	Cisco® like CLI
Web Based Management	
Telnet	Server
SNMP	V1, V2c, V3
SW & Configuration Upgrade	TFTP, HTTP Redundant firmware in case of upgrade failure
RMON	RMON I (1, 2, 3, 9 group), RMON II
MIB	RFC1213 MIB II, Private MIB
UPnP	Supported
DHCP	Server, Client, Relay, Relay option 82 , Snooping
IP Source Guard	Supported
Port Mirroring	Supported
Event Syslog	Syslog server (RFC3164) (Support 1 server)
Warning Message	System syslog, e-mail, alarm relay
DNS	Client, Proxy
SyncE	ITU-T G.8262 Sync Ethernet

IEEE 1588 PTP V2	Support 5 operating mode in each port : Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave
NTP, SNTP	Client
LLDP (IEEE 802.1ab)	Link Layer Discovery Protocol LLDP-MED
IPv6 Features	
IPv6 Management	Telnet Server/ICMP v6
SNMP over IPv6	Supported
HTTP over IPv6	Supported
SSH over IPv6	Supported
IPv6 Telnet	Supported
IPv6 NTP, SNTP	Client
IPv6 TFTP	Supported
IPv6 QoS	Supported
IPv6 ACL	Number of rules: up to 256 entries for L2 / L3 / L4 L2 : Mac address SA/DA/VLAN L3: IP address SA/DA, Subnet L4: TCP/UDP
Others Features	
Green Ethernet	Supports IEEE 802.3az EEE (Energy Efficient Ethernet) Management to optimize the power consumption Determine the cable length and lowering the power for ports with short cables Lower the power for a port when there is no link LED Power Management :Adjustment LEDs intensity
Cable Diagnostic	Measuring UTP cable normal or broken point distance

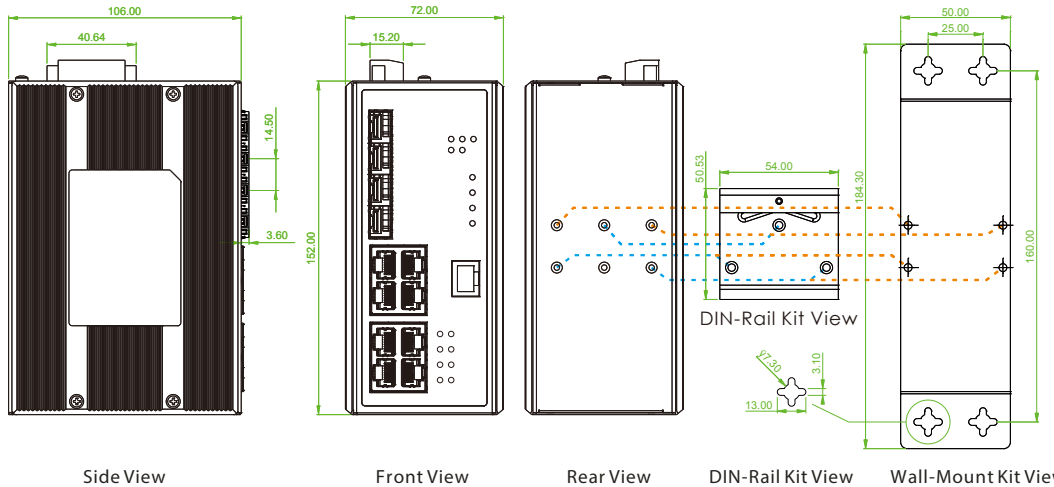
Application

Figure : Application for mobile backhaul

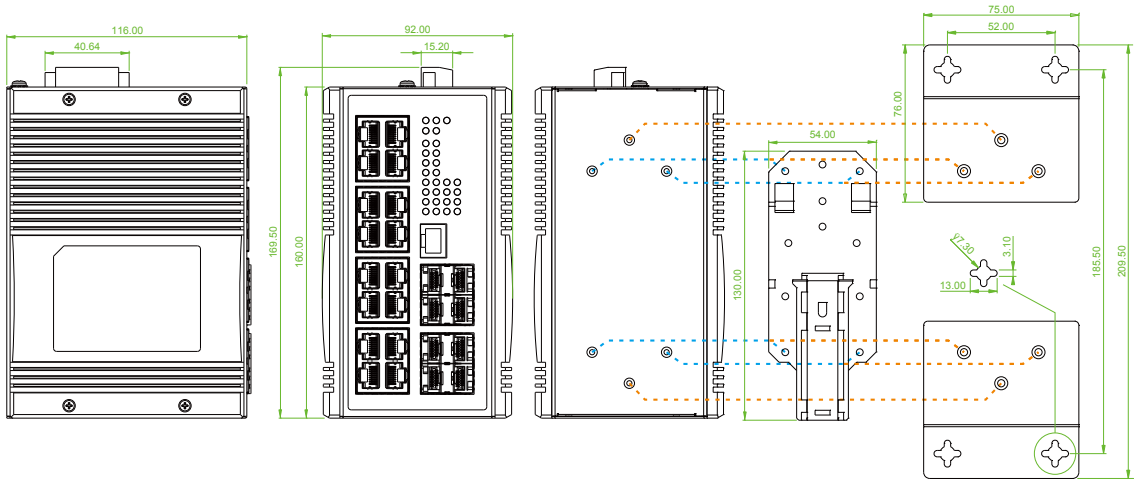


Dimensions

▶ IGS-804SM-SE



▶ IGS-1608SM-SE



Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

Ordering Information

Model Name	Managed	Total Port	UTP Port	Fiber Port	Certification					Operating Temperature
			10/100/1000 Base-T	100/1000 Base-X	Railway EN50121-4	Safety UL60950-1	Safety EN60950-1	EN61000-6-2 EN61000-6-4	CE FCC	
IGS-804SM-SE	V	12	8	4 SFP	V		V	V	V	-10~60°C
IGS-804SM-SE-E	V	12	8	4 SFP	V		V	V	V	-40~75°C
IGS-1608SM-SE	V	24	16	8 SFP	V	V	V	V	V	-10~60°C
IGS-1608SM-SE-E	V	24	16	8 SFP	V	V	V	V	V	-40~75°C

Model Naming Rule

IGS – 8 – 04S – M – SE – E → E: -40~75°C, Blank: -10~60°C

- IGS: Industrial Gigabit Switch
- 8: 8x GbE UTP; 16: 16x GbE UTP
- 04S: 4x GbE SFP; 08S: 8x GbE SFP
- M: Managed
- SE: SyncE

■ Package List

- One device of the series
- Console cable (RJ-45 to DB9)
- CD (SmartConfig, MIB file, Manual)
- Quick installation guide
- Din Rail with screws
- Terminal block
- Protective caps for SFP ports

Optional Accessories

■ Wall mount kit accessories

IND-WMK02	Wall Mount kit for Industrial product (Wide) (184 x 50mm) (For IGS-804SM-SE)
IND-WMK04	Wall Mount kit for Industrial product (2 pcs in 1 set, 76mm x 75mm x 2pcs) (For IGS-1608SM-SE)

■ Industrial SFP Transceiver

The ISFP series of industrial grade SFP modules have been fully tested with the series product for guaranteed compatibility and performance. The best performance can be guaranteed even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheet for more details and more items.)

ISFP-M7000-85-D(E)	Industrial SFP GbE 1000Base-SX, M/M, 500 meter,wave length 850nm, 7.5dB, LC, DDMI, -10~70°C (-40~85°C)
ISFP-S7020-31-D(E)	Industrial SFP 1000Base-LX, S/M, 20km, wave length 1310nm, 15dB, LC, DDMI, -10~70°C (-40~85°C)
ISFP-T7T00-00-(E)	Industrial SFP 10/100/1000Base-T UTP 100meter, -10~70°C (-40~85°C)
ISFP-M5002-31-D(E)	Industrial SFP 155M 100Base-FX, MM, 2km, wave length 1310nm, 12dB, LC, DDMI, -10~70°C (-40~85°C)
ISFP-S5030-31-D(E)	Industrial SFP 155M 100Base-FX, SM, 30km, 1310nm, 19dB, LC, DDMI, -10~70°C (-40~85°C)

SFP Naming Rule

ISFP – S – 7 – 040 – 31 – D – E → E:-40~85°C, Blank:0~70°C

- ISFP: Industrial SFP Transceiver
- S: M: Multi Mode; S: Single Mode; T: UTP
- 7: 9: 10G; 7: GbE; 5: FE
- 040: Distance — T00: (UTP); 000: (500m); 002: (2km); 020: (20km); 040: (40km)
- 31: Wavelength — 00: UTP; 85: 850nm; 31:1310nm; 55:1550nm; WA: TX/1310nm (Bidi mode A); WB: TX/1550nm (Bidi Mode B)
- D: DDMI; Blank: Non DDMI

ICR-4103

4G LTE + 3x 10/100Base-T(X) Router

The ICR-4103 series are high-performance industrial grade 4G-LTE cellular routers. They are designed to offer fast connectivity over cellular network for industrial applications. ICR-4103's Ethernet ports can allow up to 3 Ethernet devices link to the cellular network, provides dual SIM cards and 1 Ethernet WAN port that can automatically re-connect and auto-switch to offer the cellular network redundancy and ensure uninterrupted connectivity. The ICR-4103 cellular router is integrated with WAN, LAN, SIM, VPN, Firewall, built-in DI/DO and Serial port services. In addition, ICR-4103 uses the highest level of industrial grade design for connection in the most demanding environments and is an ideal solution for Industrial Internet of Things (IIoT) and M2M(Machine-to-Machine)applications, such as remote control and monitoring, bus ticketing collection system, CCTV, SCADA, digital signage, kiosk and intelligent traffic systems.

Features

- Supports multi-band connectivity with FDD 4G LTE/ TDD 4G LTE/ 3G WCDMA/2G GSM/ LTE Cat4
- 2 SIM card, 4G LTE antenna, 1x WAN (10/100Base-TX) + 3x LAN (10/100Base-TX UTP), 2x DI + 1x DO, 3x Serial Com port (2x RS232, 1x RS485)
- GPS, GNSS to get your location on earth, and obtains map information using Google Map (Optional)
- Highly reliable and secure for mission-critical cellular communications
- Provide flexible options to configure LAN/ WAN ports
- Built-in dual SIM for network redundancy / failover/ roaming over/ back up
- Integrated dual detachable antenna against radio interference
- 4G LTE and WAN port for seamless connection and redundancy
- Supports 3x Serial port (1x RS484, 2x RS232) for IoT and automation application, ModBus RTU and ModBus/TCP gateway, MQTT
- Supports Routing/Firewall, NAT, Virtual Server, DMZ, Port filtering, MAC Filter, URL Filter, IP Filter, VLAN, Static Routing and RIP 1 & 2, VRRP, OSPF V2 & V3, BGP
- Supports VPN, OpenVPN, IPSec (3DES, AES128, AES196, AES256, MD5, SHA-1, SHA256)
- IPv6/IPv4 dual stack and all applications are IPv6 ready
- Supports DHCP server and client, PPPoE, Static IP, SNTP, DNS Proxy, DDNS, QoS, Virtual Com, UPnP
- Supports Alarm message : DO, SNMP Trap, E-mail
- Supports SNMP, TR069,Web, Telnet, CLI for management
- Supports dual Image firmware upgrade by Web
- CE, FCC, Rail Traffic EN50121-4 certified
- Safety EN60950-1 certified
- Radio RED ETSI EN301 489-1/-19/-52, EN301 908-1, EN303 413, NCC certified
- Heavy industrial grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- Rugged metal, IP30 protection & Fanless design
- Wide operating temperature -20 ~ 75°C

Specifications

Standard	Cellular MobilComm standard: (Please see order information for optional band) 4G LTE: FDD-LTE, TDD-LTE 3G: WCDMA 2G: GSM/EDGE GNSS: GPS
	IEEE 802.3 10Base-T 10Mbit/s Ethernet
	IEEE 802.3u 100Base-TX Fast Ethernet
	IEEE 802.1Q Virtual LANs (VLAN)
	IEEE 802.3x Flow control for Full Duplex
Connector	**Cellular MobilComm and WAN:** Built-in dual SIM card for network redundancy / failover/ roaming over/ back up 2 SMA (female) connrctor for Antenna (Please see order information for optional band) 1x 10/100Base-TX RJ45 for WAN port **LAN:** 3x 10/100Base-TX RJ45 **Serial:** 1x RS485 and 2x RS232 (one of RS232 could be configured for console) **Programable DI/DO:** 2xDI and 1x DO
LTE data rate	Cat 4 ,Max download 150Mbps, Max upload 50 Mbps
Removable terminal block	Provides for Power input, DO, DI1, DI2, COM2 (RS232), COM3 (RS485)
Power Supply	Input 10-32VDC removable terminal block
Power consumption	<7W
LED	System status (Green)
	VPN (Green), SIM 1 (Green), SIM 2 (Green)
	Cell signal Strong / Weak: H/L (Green)

DIP SW for RS485 port	DIP 1 Pull Low : OFF: Disable, ON: Enable
	DIP 2 Pull High : OFF: Disable, ON: Enable
	DIP 3 120 ohm terminal resistor : OFF: Disable, ON: Enable
Alarm message	DO for alarm message, with current capacity of 500mA/50VDC maximum SNMP trap, E-mail, SMS, Alarm trigger by DI, VPN or WAN disconnection
Operation Temperature	-20~75°C
Operating Humidity	5% to 95% (Non-condensing)
Storage Temperature	-40 ~ 85°C
Housing	Rugged Metal, Fanless , IP30 grade housing protection
Dimensions (D x W x H)	106 x 62.5 x 135mm
Weight	0.74kg
Installation	Mounting Wall mounting, or DIN Rail mounting (Optional)
MTBF	296,306 Hours (MIL-HDBK-217)
Warranty	5 years

Certification	
EMC	CE (EN55024, EN55032)
EMI	FCC Part 15 Subpart B Class A, CE
Railway Traffic	EN50121-4
Immunity for Heavy Industrial Environment	EN61000-6-2
Emission for Heavy Industrial Environment	EN61000-6-4
EMS (Electromagnetic Susceptibility Protection Level)	EN61000-4-2 (ESD) Level 3, Criteria B EN61000-4-3 (RS) Level 3, Criteria A EN61000-4-4 (Burst) Level 3, Criteria A
EMS (Electromagnetic Susceptibility Protection Level)	EN61000-4-5 (Surge) Level 3, Criteria B EN61000-4-6 (CS) Level 3, Criteria A EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
Safety	EN60950-1
Radio	RED ETSI EN301 908-1 RED ETSI EN303 413 RED ETSI EN301 489-1 RED ETSI EN301 489-19 RED ETSI EN301 489-52 NCC
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

Software Specifications

Network Protocols	IPv4, IPv6, IPv4/IPv6 dual stack, DHCP server and client, DNS Proxy, PPPoE, Static IP, SNTP, VRRP, OSPF V2, OSPF V3, BGP, MQTT
Modbus TCP, Modbus RTU	Gatway between Ethernet and COM3 (RS485) port
Routing/Firewall	NAT, Virtual Server, DMZ, Port filtering, MAC Filter, URL Filter, IP Filter, VLAN, Static Routing and RIP 1, RIP 2
VPN	OpenVPN, IPSec (3DES, AES128, AES196, AES256, MD5, SHA-1, SHA256)
MobilComm Connectivity	Two SIM for failover/ roaming over/ back up Seamless multi WAN connections switch (2x SIM and 1x Ethernet WAN)
Others	DDNS, UPnP, QoS Virtual Com for serial COM port
Alarm message	Sent by DO, SMS, SNMP Trap, E-mail
Management	Web GUI for remote and local management CLI Dual Image firmware upgrade by Web GUI Syslog monitor SNMP TR069: TR098 model Remote management via Telnet, SSH v2, HTTPS Local management via Telnet, SSH v2, HTTP/HTTPS

Application

Figure 1 : Application for Outdoor Digital Signage

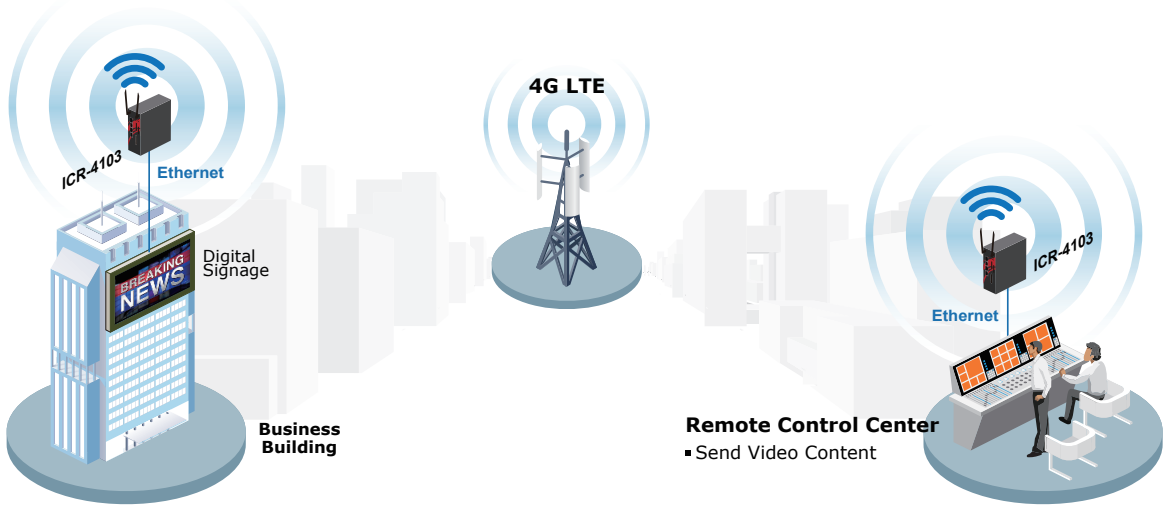
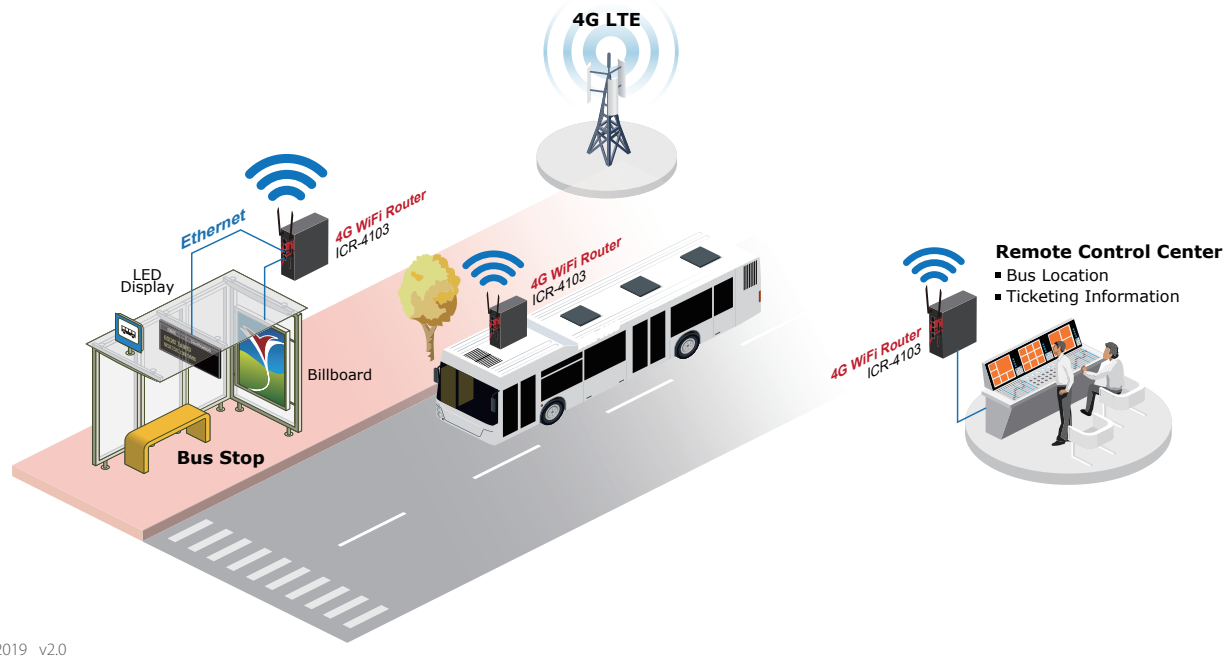


Figure 2 : Application for Transportation/Bus Communication



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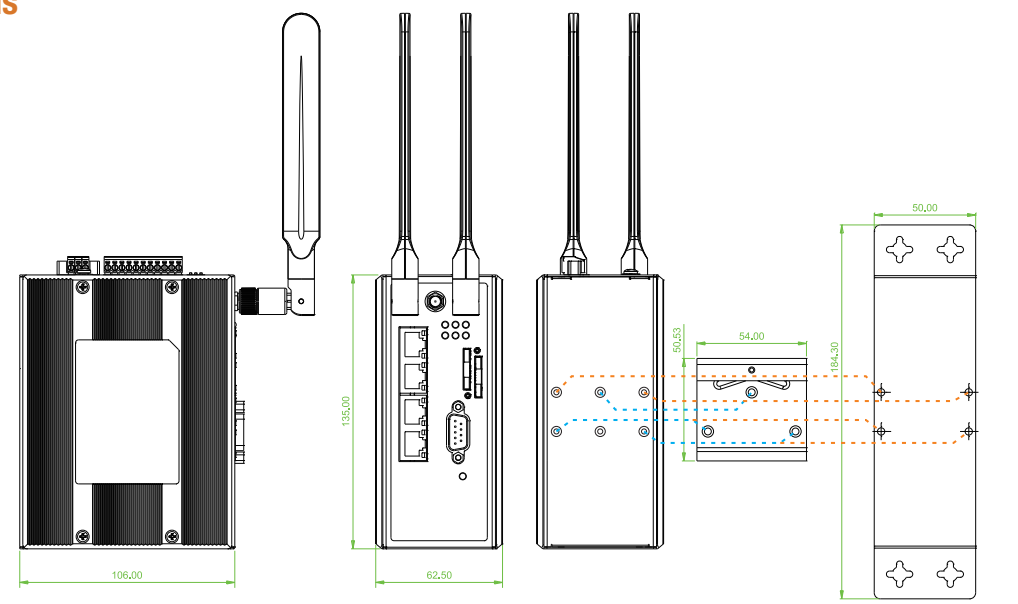
Dimensions



Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View

Ordering Information

Model Name	Managed	WAN		Local Port			Certification			
		Cellular MobilComm band (2 SIM for Redundant)	10/100Base-TX	10/100Base-TX	RS232	RS485 (ModBus)	Radio	Railway EN50121-4	EN61000-6-2 EN61000-6-4	CE, FCC
ICR-4103-EU	V	see Region code table EU	1	3	2	1	RED	V	V	V
ICR-4103-A	V	see Region code table A	1	3	2	1	RED	V	V	V
ICR-4103-AU	V	see Region code table AU	1	3	2	1	RED	V	V	V
ICR-4103-TW	V	see Region code table TW	1	3	2	1	NCC	V	V	V
ICR-4103-J	V	see Region code table J	1	3	2	1	RED	V	V	V

Model Naming Rule

ICR – 4 1 03 – EU

- ICR: Industrial Cellular Router
- 4: 4G LTE
- 1: 1x WAN
- 03: 3x LAN
- EU, A, AU, TW, J: Region code (see below table for more detail)

MobilComm region Code Optional

Region Code	4G LTE		3G	2G	Region
	FDD LTE	TDD LTE	WCDMA	GSM / EDGE	
EU	B1(2100) , B3(1800), B5(850), B7(2600), B8(900), B20(800)	B38(2600), B40(2300), B41(2500)	B1(2100), B5(850), B8(900)	B3(1800), B8(900)	Europe, Africa, Middle East, Korea,Thailand, India
A	B2(1900), B4(1700), B12(700)		B2(1900), B4(1700), B5(850)		USA (AT&T, T-Mobil)
AU	B1(2100), B2(1900), B3(1800), B4(1700), B5(850), B7(2600), B8(900), B28(700)	B40(2300)	B1(2100), B2(1900), B5(850), B8(900)	B2(1900), B3(1800), B5(850), B8(900)	ANZ, South America
TW	B1(2100), B2(1900), B3(1800), B4(1700), B5(850), B7(2600), B8(900), B28(700)	B40(2300)	B1(2100), B2(1900), B5(850), B8(900)	B2(1900), B3(1800), B5(850), B8(900)	Taiwan
J	B1(2100), B3(1800), B8(900), B18(850), B19(850), B26(850)	B41(2500)	B1(2100), B6(850), B8(900), B19(850)		Japan (KDDI, Docomo, Softbank)

Optional Accessories

Antenna accessories

ANT-BASE-01	Antennas Base with Magnetic, SMA (Male) connector, 1 meter extension

Wall mount kit accessories

IND-WMK02	Wall Mount kit for Industrial product (Wide) (184 x 50mm)

ICR-W403

4G LTE, GPS, IEEE 802.11ac/b/g/n 2T2R, 2xSIM, 3x GbE + DI/DO, RS232

NEW

- Multi-band connectivity with FDD 4G LTE/ TDD 4G LTE/ 3G WCDMA/2G GSM
- Concurrent dual band WiFi With 802.11n 2T2R (2.4GHz), and 802.11ac 2T2R (5GHz)
- 4G LTE/ WiFi/ UTP to configure WAN port for failover redundant
- GPS and GNSS for location tracking
- NAT/Port Forward/Routing/IPv6 are compatible with existing IP networks
- Various VPN protocols for security, Firewall & IPS, ACL & Authentication by MAC/User to enhance access security

CE FC EN50121-4 EN61000-6-2 EN61000-6-4 LVD EN60950-1 GPS LTE 4G WiFi

The ICR-W403 is a high-performance industrial grade wireless gateway. It combines IEEE 802.11b/g/n/ac WLAN and 4G LTE cellular technologies to provide flexible wireless network connectivity. It is designed to offer flexible connectivity over cellular and Wireless LAN for industrial applications. ICR-W403's Ethernet ports can allow up to 3 Ethernet devices link, and provides dual SIM cards for failover redundancy to ensure uninterrupted connectivity. ICR-W403 has support for secure VPN communications, GPS, static and dynamic IP routing of RIP1/2 and OSFP, NAT, port forwarding, Firewall, built-in DI/DO and Serial port services. In addition, ICR-W403 uses the highest level of industrial grade design for connection in the most demanding environments, and is an ideal solution for Industrial Internet of Things (IIoT) and M2M(Machine-to-Machine)applications, such as remote control and monitoring, bus ticketing collection system, CCTV, SCADA, digital signage, kiosk and intelligent traffic systems.

Features

- IEEE 802.11 ac/b/g/n, multiple SSID, captive portal for WiFi hotspot
- Web, CLI ,SNMP, TR069, SMS for management and configuration
- Events triggered by pre-defined, and notification sent by SMS, SNMP trap, or e-mail
- Supports USB for log storage
- EN-60950-1, CE, FCC, Rail Traffic EN50121-4 certified
- Heavy industrial grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- Rugged metal, IP30 protection & Fanless design

Specifications

Standard	Cellular MobilComm standard: (Please see order information for optional band) 4G LTE: FDD-LTE, TDD-LTE 3G: WCDMA 2G: GSM/EDGE GNSS: GPS	
	IEEE 802.3	10Base-T 10Mbit/s Ethernet
	IEEE 802.3u	100Base-TX Fast Ethernet
	IEEE 802.3ab	1000Base-T Gbit Ethernet over twisted pair
	IEEE 802.1Q	Virtual LANs (VLAN)
	IEEE 802.3x	Flow control for Full Duplex
	IEEE 802.1p	LAN Layer 2 QoS for Traffic Prioritization
	IEEE 802.1X	Port based and MAC based Network Access Control, Authentication
WiFi Standard	IEEE802.11ac, IEEE802.11b, IEEE802.11g, IEEE802.11n	
Interface	WAN	1x 3G/4G LTE (Please see order information for detail optional mobil band)
		Built-in dual SIM card for network redundancy / failover/ roaming over/ back up
		IEEE 802.11ac (5G Hz)
		1x GbE UTP (WAN or LAN configureable)
	LAN	Concurrent WiFi 2.4G/5G with IEEE 802.11ac 2T2R (5GHz), and IEEE 802.11b/g/n 2T2R (2.4GHz)
		3x 10/100/1000Base-T UTP port, port 1 could be WAN or LAN configureable
	COM port	1x RS232
	DI/DO	2x DI, 1x DO, 1x IGN (Ignition Sense for Vehicle)
	GNSS	1x GPS receiver
	Log Storage	1x USB 2.0

Connector	2x 2.3dBi LTE Antenna and connector 2x 5dBi WiFi Antenna and connector 1x SMA Female connector for GPS antenna (Antenna optional) 2 SIM card socket 1x USB 2.0 socket 3 RJ45 for GbE LAN/WAN 1x Removable Terminal block (Input power, 1x GN, 2x DI, 1x DO, RS232)
4G LTE data rate	Cat 4 , Maxium 150Mbps download, upload 50Mbps
Power Supply	12/24 VDC (9~36VDC)
Power consumption	<14W
LED	Power (Green), GPS (Green)
	2.4G (Green), 5G (Green)
	SIM 1 (Green), SIM 2 (Green)
	LTE signal High (Green), LTE signal Low (Green)
	WAN/LAN LNK/ACT (Green)
Alarm message Handling	Events triggered by pre-defined, and notification sent by SMS, SNMP trap, or e-mail
Operation Temperature	-30~ 75°C
Operating Humidity	5% to 95% (Non-condensing)
Storage Temperature	-40 ~ 85°C
Housing	Rugged Metal, IP30 Protection, Fanless
Dimensions (D x W x H)	120 x 200 x 39.5 mm (Dx Wx H)
Weight	975g
Installation	Wall mounting
MTBF	394,330 Hours (MIL-HDBK-217)
Warranty	5 years

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Certification	
EMC	CE (EN55024, EN55032)
EMI	FCC Part 15 Subpart B Class A, CE EN55022 Class A
Railway Traffic	EN50121-4
Immunity for Heavy Industrial Environment	EN61000-6-2
Emission for Heavy Industrial Environment	EN61000-6-4

EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B
	EN61000-4-3 (RS) Level 3, Criteria A
	EN61000-4-4 (Burst) Level 3, Criteria A
	EN61000-4-5 (Surge) Level 3, Criteria B
	EN61000-4-6 (CS) Level 3, Criteria A
	EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
Safety	EN60950-1
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

Software Specifications

Routing	Static routing , Dynamic routing, RIP1/RIP2, OSPF, BGP
Security	Firewall: SPI Firewall with Stealth Mode, IPS
	VPN Tunneling: IPSec, OpenVPN, PPTP, L2TP, GRE; Tunneling with Full Tunnel, Tunnel Failover
	VPN Scenario: Site to Site, Site to Host, Host to Site, Host to Host, Hub and Spoke, Dynamic VPN
	Port Forwarding: Virtual Server/ Computer, DMZ Host,Special AP & APG, VPN Pass-through
	Access control: Packet Filter, URL Blocking, MAC Filter, Content Filter, Application Filter
	Authentication: Captive Portal, MAC Authentication
VLAN	Port-based VLAN, Tag-based VLAN
QoS	Policy-based Bandwidth Control and Packet Flow Prioritization
Management	Web, CLI, Telnet, SNMP V3, TR069
IPV6	Dual Stack
Upgrade F/W	Support
Backup & Restore Configuration file	Support

Others	
System Time Information	NTP client
DHCP	Server and Client
Cellular toolkit	SIM PIN, USSD, Network Scan, SMS, Data Usage
Alarm message Handling	DI, DO, SMS, Syslog, SNMP Trap, Email Alert, Reboot
Location Tracking	GPS
Diagnostic	Packet Analyzer, Diagnostic tools
Power Control	Ignition Sense for delay OFF
MobilComm Connectivity	Two SIM for muti ISP failover/ back up Seamless
Multi WAN connections	4G LTE , 1xWiFi IEEE 802.11ac and 1x Ethernet WAN for failover/ back up Seamless
WiFi mode	AP Router, WDS, WDS Hybrid
WiFi Security	WEP, WPA, WPA2, WPA-PSK, WPA2-PSK, IEEE 802.1X
Virtual COM	TCP Client, TCP Server, UDP, RFC2217
Others DDNS, UPnP, QoS	
Remote management via Telnet, SSH v2, HTTPS	
Local management via Telnet, SSH v2, HTTP/HTTPS	
Syslog monitor	

Application

Figure 1 : Application of Wireless Transmission in Logistics Center

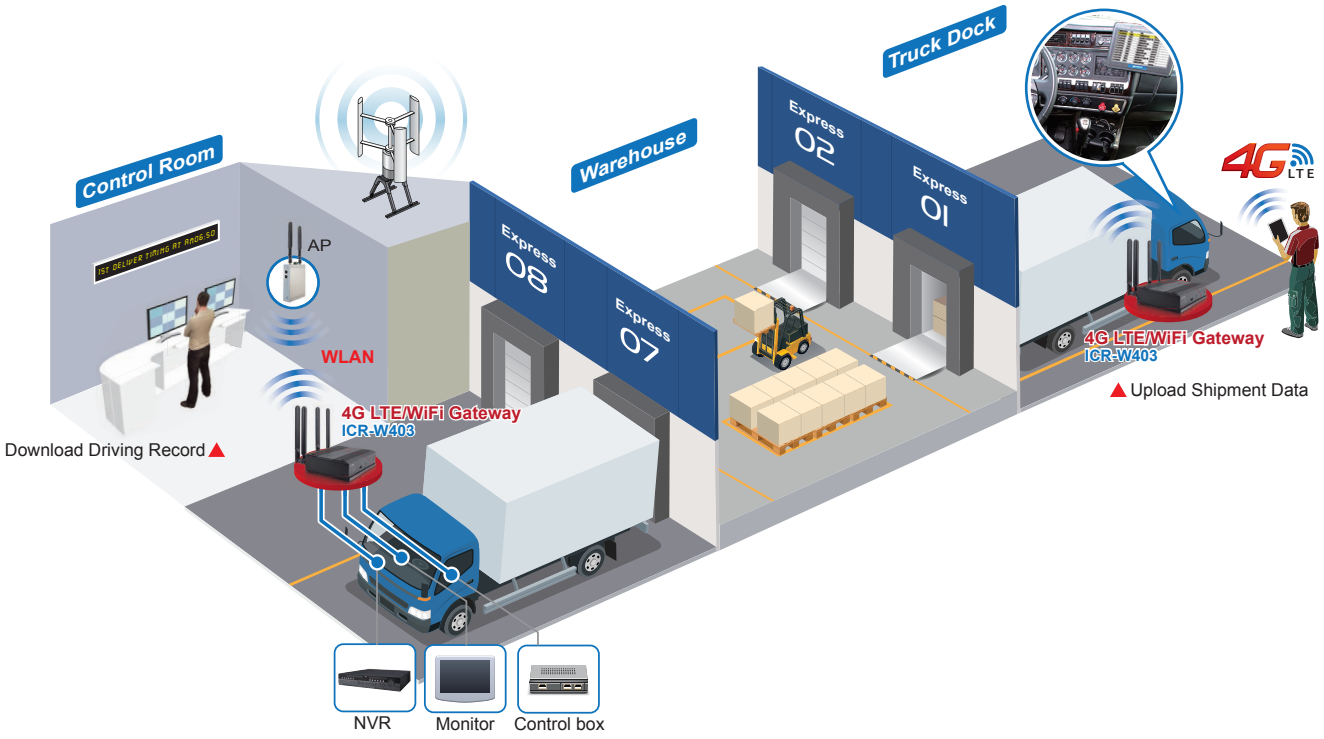
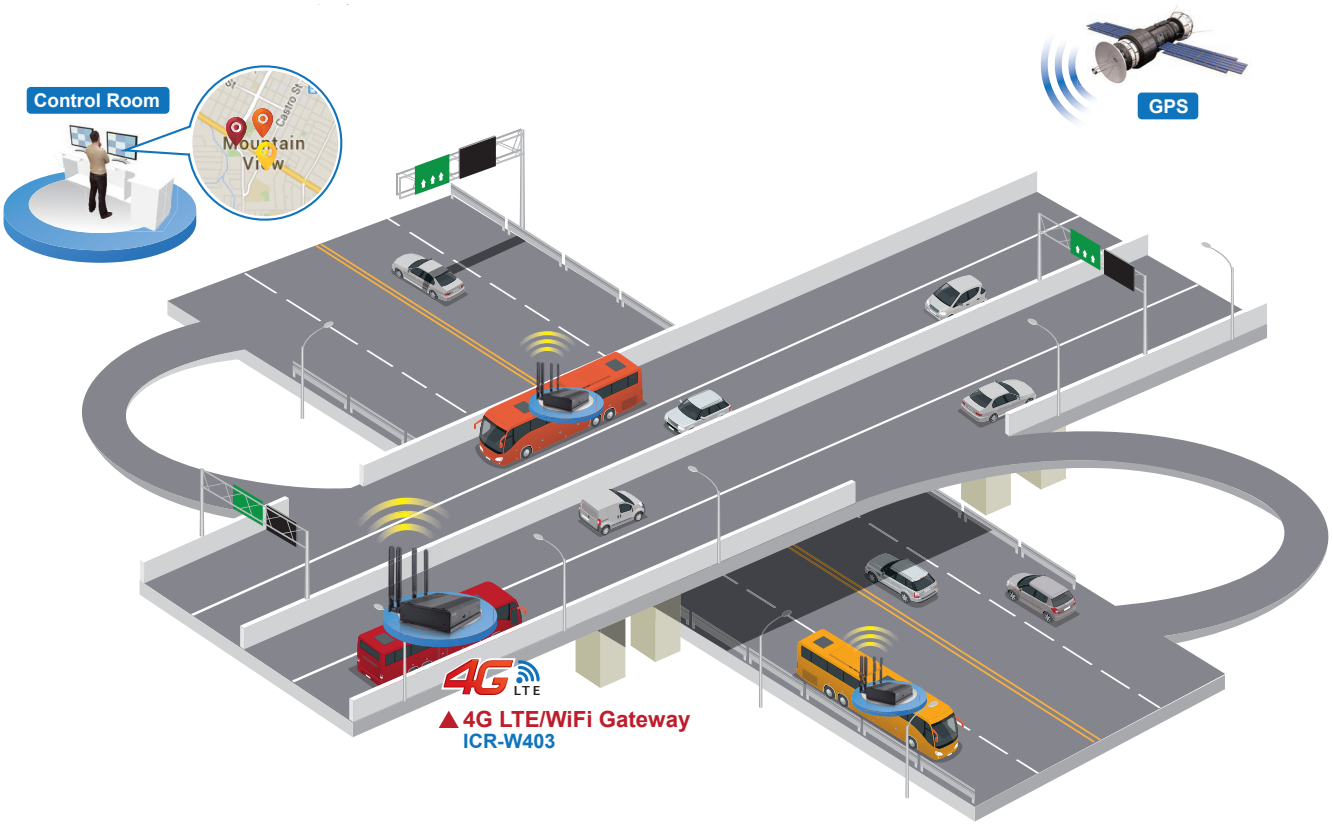
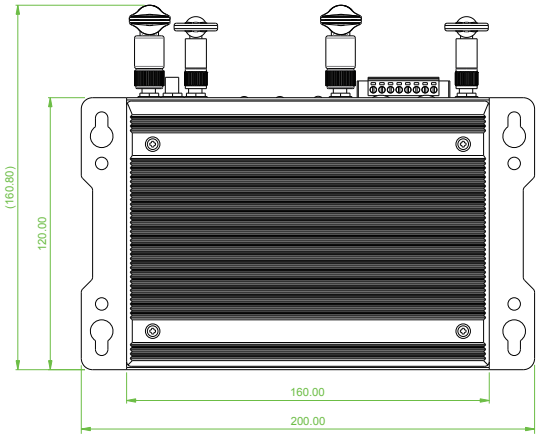


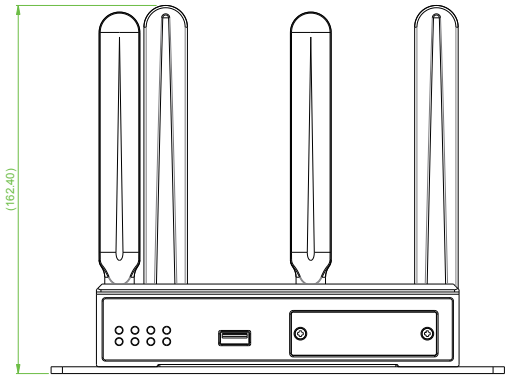
Figure 2 : Application of Vehicle Location Tracking System



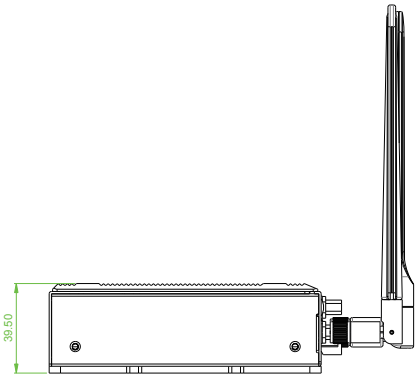
Dimensions



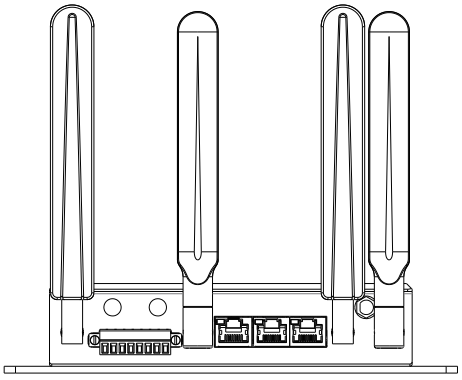
Top View



Front View



Side View



Rear View

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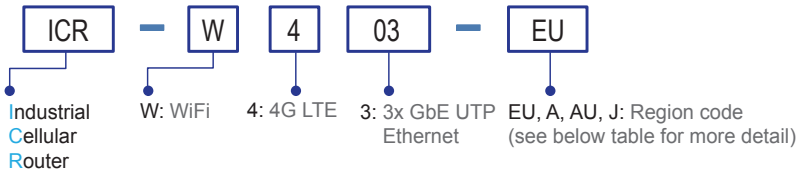
Ordering Information

Model Name	WAN		WAN/LAN		Local Port		Certification			
	Cellular Mobil Band (2 Sim for Redundant)	GPS (Ant. Optional)	WiFi	UTP 10/100/1000Base-T	DI, DO	RS232	Safety EN60950-1	RailWay EN50121-4	EN61000-6-2 EN61000-6-4	CE, FCC
ICR-W403-EU	see Region code table EU	1x GNSS	IEEE 802.11ac/b/g/n (LAN) or IEEE 802.11ac (WAN)	2x(LAN) +1x (LAN or WAN)	2xDI, 1xDO	1	V	V	V	V
ICR-W403-A	see Region code table A	1x GNSS	IEEE 802.11ac/b/g/n (LAN) or IEEE 802.11ac (WAN)	2x(LAN) +1x (LAN or WAN)	2xDI, 1xDO	1	V	V	V	V
ICR-W403-AU	see Region code table AU	1x GNSS	IEEE 802.11ac/b/g/n (LAN) or IEEE 802.11ac (WAN)	2x(LAN) +1x (LAN or WAN)	2xDI, 1xDO	1	V	V	V	V
ICR-W403-J	see Region code table J	1x GNSS	IEEE 802.11ac/b/g/n (LAN) or IEEE 802.11ac (WAN)	2x(LAN) +1x (LAN or WAN)	2xDI, 1xDO	1	V	V	V	V

Model Naming Rule



MobilComm region Code Optional

	4G LTE		3G	2G	GNSS	Region
Region Code	FDD LTE	TDD LTE	WCDMA	GSM / EDGE		
EU	B1(2100) , B3(1800), B7(2600), B8(900), B20(800)		B1(2100), B8(900)	B3(1800), B8(900)	Yes	Europe, Africa, Middle East, Korea,Thailand, India
A	B2(1900), B4(1700), B12(700)		B2(1900), B4(1700), B5(850)		Yes	USA (AT&T, T-Mobil)
AU	B1(2100), B2(1900), B3(1800), B4(1700), B5(850), B7(2600), B8(900), B28(700)	B40(2300)	B1(2100), B2(1900), B5(850), B8(900)	B2(1900), B3(1800), B5(850), B8(900)	Yes	ANZ, South America, Taiwan
J	B1(2100), B3(1800), B8(900), B18(850), B19(850), B26(850)	B41(2500)	B1(2100), B6(850), B8(900), B19(850)		Yes	China

Optional Accessories

Antenna accessories

ANT-GPS-01	Antennas for GNSS
ANT-BASE-01	Antennas Base with Magnetic, SMA (Male) connector, 1 meter extension

NEW

ICR-W401

4G LTE, WiFi IEEE 802.11 b/g/n MIMO 2T2R Gateway

ICR-401

4G LTE Gateway

CTC Union's ICR-401 and ICR-W401 are compact, lightweight and cost-effective Industrial Grade 4G LTE Cellular Routers that have 1 LAN plus 1 WAN Fast Ethernet connections and support uplink to 2G/3G/4G mobile networks. Built for harsh environments, these routers are equipped with a single RS232 serial port and DI/DO interfaces. The routers are simple to configure through their embedded Web user interface and can be deployed where the collection of real-time data transmissions is required for Industrial IoT and M2M (machine-to-machine) applications. The ICR-W401, with WiFi, is compliant with IEEE 802.11b/g/n wireless connectivity. Both routers feature VPN Tunneling with Firewall and management capability via TR069 and SNMP. Industrial Grade 4G LTE Cellular Routers provide highly secure authentication, encryption and management to protect your data efficiently between public and private networks and simplify your complicated solutions for industrial networking and smart city.

Features

- Highly reliable and secure for mission-critical cellular communications
- Compact and lightweight design with 1 LAN and 1 WAN Ethernet interfaces
- Supports multi-band connectivity with FDD LTE/ TDD LTE/ WCDMA/ GSM/ LTE Cat 4
- Provides IEEE 802.11b/g/n WiFi MIMO 2T2R (ICR-W401)
- Micro SIM connector, RS232 serial 3-wire port and DI/DO interfaces
- LED indicators for connection and data transmission status
- Industrial temperature rated from -40 ~ +75°C for use in harsh environments
- IPv6/IPv4 dual stack and all applications are IPv6 ready
- Support serial communication protocols for rich connectivity
- Enhance security and encryption for authentication and transmission

Specifications

Standard	IEEE 802.3 10Base-T 10Mbit/s Ethernet IEEE 802.3u 100Base-TX Fast Ethernet IEEE 802.1Q Virtual LANs (VLAN) IEEE 802.3x Flow control for Full Duplex IEEE 802.1Q Virtual LANs (VLAN) IEEE 802.1p LAN Layer 2 QoS for Traffic Prioritization IEEE 802.1X Port based and MAC based Network Access Control, Authentication
LTE Interface	Cellular MobilComm standard: (Please see order information for optional area and band) 4G LTE: FDD-LTE, TDD-LTE 3G: WCDMA 2G: GSM/EDGE GNSS: GPS LTE Data rate: Cat 4 1 x micro SIM Connector (push-push type)
WiFi Interface (ICR-W401)	IEEE 802.11b/g/n WiFi Standards Support AP or Station mode 2 x RP-SMA for WiFi Antenna
Hardware Interface	1 x Micro SIM Connector (push-push type) 1 x LAN 10/100 Mbps Ethernet port 1 x WAN 10/100 Mbps Ethernet port Reset Button for device reset 1 x RS232 (TXD/RXD/GND) 1 x DI (Non-Isolated), 1 x DO (Non-Isolated) 2 x SMA connectors for detachable LTE Antenna 2 x RP-SMA for WiFi Antenna (ICR-W401) 1 x GPS detachable Antenna (Optional)

Housing	Rugged metal, Fanless, IP30 protection	
Dimensions (W x H x D)	TBD	
Weight	TBD	
Installation	DIN Rail	
LED Display	1 x Power LED 2 x Ethernet LED for each port (LAN/WAN) 1x LTE LED 1 x Function LED (User define by Web)	
Power Supply	Power Consumption	5 Watts(Max)
	Power Input	8 ~ 36VDC
Operating Temperature	-40 ~ +75°C	
Storage Temperature	-40 ~ +85°C	
Operating Humidity	10 ~ 95% (non-condensing)	
MTBF	TBD	
Warranty	5 Years	
Certification	**EMC**	CE (EN55032 + EN55024)
	EMI	FCC part 15 subpart B class A, CE (EN55032)
	Shock	IEC 60068-2-27
	Freefall	IEC 60068-2-32
	Vibration	IEC 60068-2-6

Software Specifications

Network Protocols	IPv4, IPv6, IPv4/IPv6 dual stack, DHCP server and client, PPPoE, Static IP, SNTP, GPS sync time, DNS Proxy, Modbus, VRRP, OSPF, Message Queue Telemetry Transport (MQTT Broker), BGP
Routing/Firewall	NAT, Virtual Server, DMZ, MAC Filter, URL Filter, IP Filter, VLAN, Static Routing, RIP 1, RIP 2
VPN	OpenVPN, IPSec (3DES, AES128, AES196, AES256, MD5, SHA-1, SHA256), GRE, PPTP, L2TP
Others	DDNS, QoS, UPnP

Alarm	DI, DO, SMS, VPN/WAN Disconnect, SNMP Trap, Email, TR069
Management	Web GUI for remote and local management, CLI
	Syslog monitor
	SNMP, TR069
	Remote management via SSH v2, HTTPS
	Local management via Telnet, SSH v2, HTTP/HTTPS

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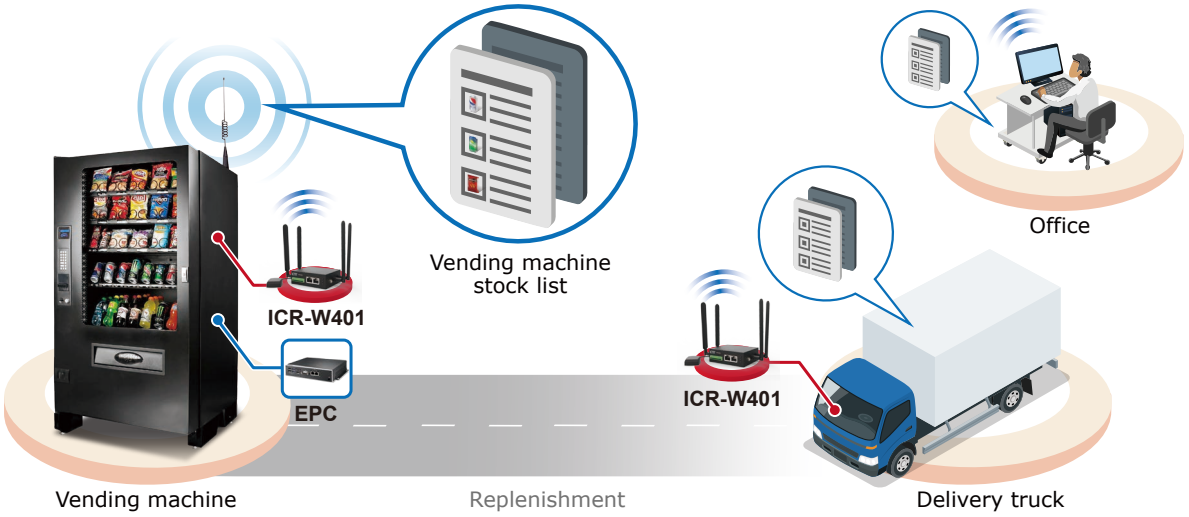
Application

The vending machine logistics system application



Ordering Information

Model Name	Managed	WAN		Local port				Certification		
		"Cellular Mobil Band (2 Sim for Redundant)"	"10/100 Base-TX"	"WiFi IEEE 802.11 b/g/n"	"10/100 Base-TX"	RS232	DI/DO	CE	FCC	Shock, Freefall, Vibration
ICR-W401-EU	V	see Region code table EU	1	1	1	1	1	V	V	V
ICR-W401-A	V	see Region code table A	1	1	1	1	1	V	V	V
ICR-W401-AU	V	see Region code table AU	1	1	1	1	1	V	V	V
ICR-W401-J	V	see Region code table J	1	1	1	1	1	V	V	V
ICR-401-EU	V	see Region code table EU	1		1	1	1	V	V	V
ICR-401-A	V	see Region code table A	1		1	1	1	V	V	V
ICR-401-AU	V	see Region code table AU	1		1	1	1	V	V	V
ICR-401-J	V	see Region code table J	1		1	1	1	V	V	V

Model Naming Rule

ICR – W 4 01 – EU

- ICR: Industrial Cellular Router
- W: WiFi
- 4: 4G LTE
- 01: 1 x LAN
- EU, A, AU, J : Region Code (see below table for more detail)

MobilComm region Code Optional

	4G LTE		3G	2G	Region
Region Code	FDD LTE	TDD LTE	WCDMA	GSM / EDGE	
EU	B1(2100), B3(1800), B5(850), B7(2600), B8(900), B20(800)	B38(2600), B40(2300), B41(2500)	B1(2100), B5(850), B8(900)	B3(1800), B8(900)	Europe, Africa, Middle East, Korea,Thailand, India
A	B2(1900), B4(1700), B12(700)		B2(1900), B4(1700), B5(850)		USA (AT&T, T-Mobil)
AU	B1(2100), B2(1900), B3(1800), B4(1700), B5(850), B7(2600), B8(900), B28(700)	B40(2300)	B1(2100), B2(1900), B5(850), B8(900)	B2(1900), B3(1800), B5(850), B8(900)	ANZ, South America, Taiwan
J	B1(2100), B3(1800), B8(900), B18(850), B19(850), B26(850)	B41(2500)	B1(2100), B6(850), B8(900), B19(850)		Japan

Optional Accessories

Antenna accessories

ANT-BASE-01	Antennas Base with Magnetic, SMF (Male) connector, 1 meter extention
ANT-GPS-01	Antennas for GPS

Wall mount kit accessories

IND-WMK03	Wall Mount kit for Industrial product (Compact, 150x 30mm)

Smart Transportation Transmission for Railway

-Rolling Stock, Station and Trackside

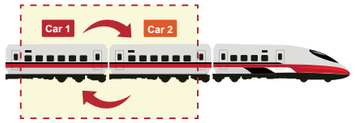
With over 25 years experience as specialists in technologies based on Ethernet and Optical transmissions, CTC Union has now devoted our resources to providing network communications solutions for railway applications with the highest quality, stability, and reliability.

Our railway solutions provide EN50155 certification, wide temperature range, utilize rugged M12 connectors, and use IP-67 casing for **rolling stock**, **trackside**, as well as for **station** and **control center**.

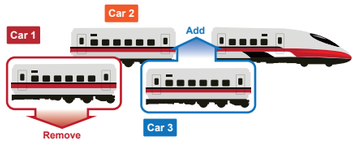
TTDP

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.

▪ **Exchange**

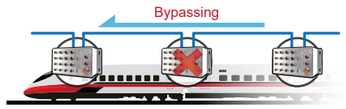


▪ **Remove & Add**



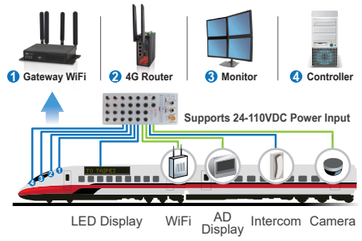
Resilient Bypass

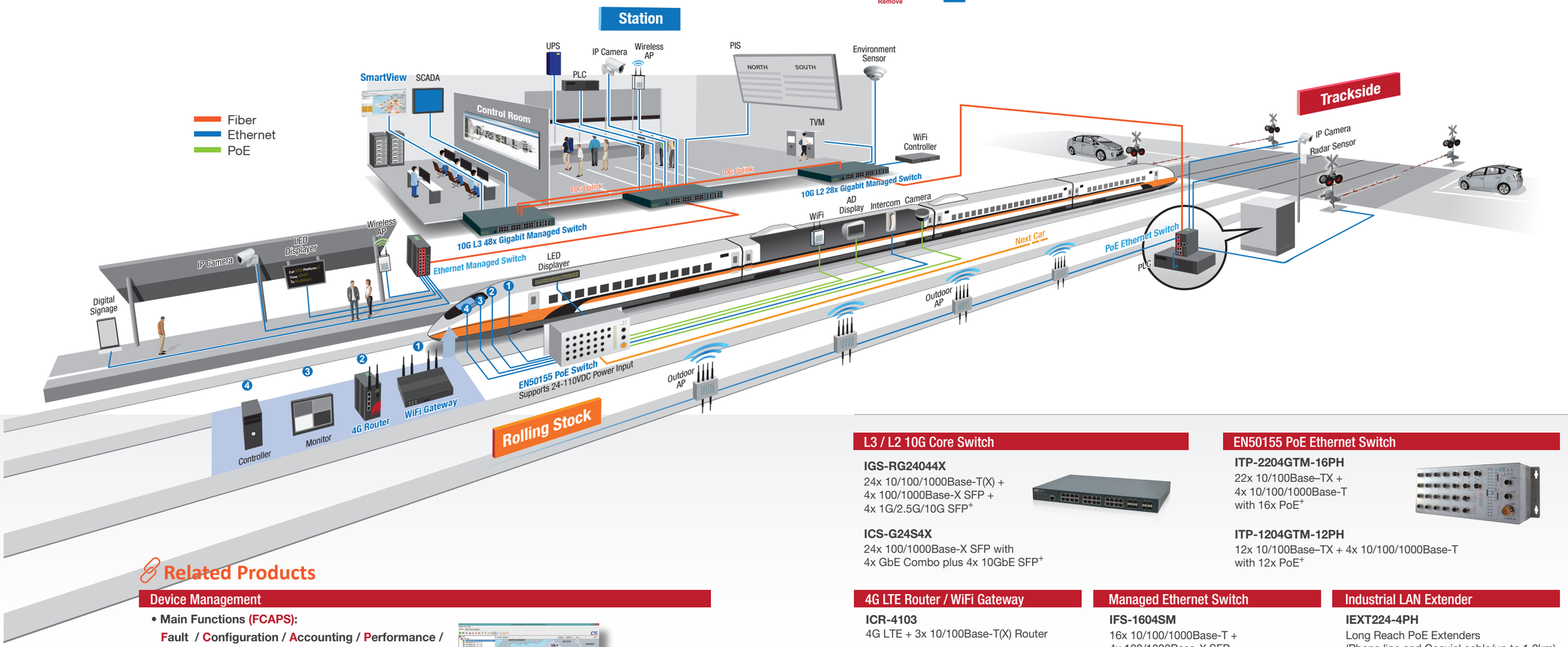
EN50155 compliant products offer two copper interfaces with auto bypass function in the event of sudden power loss, particularly in daisy chain or linear topology networks. When power failure occurs in one of the switches on a train, the bypass relay function can activate, automatically bypassing the 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.



TRDP

Train Real-time Data Protocol (TRDP) is a protocol for communication and control solutions on board of rolling stock. Railway industries created this new protocol with the aim to improve data communication on board of trains.





Related Products

Device Management

- Main Functions (FCAPS):
  Fault / Configuration / Accounting / Performance / Security Management
- Remote access control for efficient configuration
- Traffic / Performance monitoring & management
- Alarm Trap and event log management
- Auto Discovery and Device Viewer
- Allow up to 25 administrators to login

L3 / L2 10G Core Switch

IGS-RG24044X
24x 10/100/1000Base-T(X) +
4x 100/1000Base-X SFP +
4x 1G/2.5G/10G SFP+

ICS-G24S4X
24x 100/1000Base-X SFP with
4x GbE Combo plus 4x 10GbE SFP+

EN50155 PoE Ethernet Switch

ITP-2204GTM-16PH
22x 10/100Base–TX +
4x 10/100/1000Base-T
with 16x PoE+

ITP-1204GTM-12PH
12x 10/100Base–TX + 4x 10/100/1000Base-T
with 12x PoE+

4G LTE Router / WiFi Gateway

ICR-4103
4G LTE + 3x 10/100Base-T(X) Router

ICR-W403
4G LTE, WiFi ac/b/g/n 2T2R Gateway

Managed Ethernet Switch

IFS-1604SM
16x 10/100/1000Base-T +
4x 100/1000Base-X SFP

IFS-402GSM-4PU
4x 10/100Base-TX +
2x 100/1000Base-X SFP with
4x PoE+ (60W)

Industrial LAN Extender

IEXT224-4PH
Long Reach PoE Extenders
(Phone line and Coaxial cable/up to 1.2km)

180W
24V Booster

ITP-G802TM-8PH24

10x 100/1000Base-T with 8x PoE+ Managed Ethernet Switch

ITP-G802SM-8PH24

8x 100/1000Base-T + 2x 100/1000Base-X SFP with 8x PoE+ Managed Ethernet Switch

These models are managed industrial grade Gigabit PoE (Power over Ethernet) switches that provide 8x GbE UTP + 2x GbE SFP or 10x GbE UTP with 8x PoE Ports, that equipped with PoE features enable power and data to be transferred via a single cable, thereby considerably reducing cabling and electrical wiring expenses. These switches also provide a variety of functions to manage PoE operation including PoE device auto-checking, auto reset, and PoE power weekly scheduling. Other advanced Ethernet functions are supported and include STP/RSTP/MSTP/ ITU-T G.8032 ERPS and multiple µ-Ring for redundant cabling, layer 2 Ethernet IGMP, VLAN, QoS ,Security, IPv6, bandwidth control, port mirroring, cable diagnostic and Green Ethernet.
Housed in rugged DIN rail or wall mountable enclosures, these switches are designed for the harshest environments. Specifically, These switches use M12 connectors to ensure water tight, robust connections and to guarantee reliable connections against environmental disturbances, such as vibration and shock. Besides, these models are compliant with EN50155, covering power input voltage, surge, EFT, ESD, vibration, shock, thus making the switches suitable for industrial applications, such as vehicle, rolling stock, ship, vessel.
These models are IP67 rated to protect against dust and water submersion, they are particularly used in environments with extreme temperature, high humidity, oil, dust and in outdoor environments requiring water-proof applications such as IP surveillance, city security. They can also work with CTC Union's platform SmartView™ to provide convenient, real-time and centralized device management.

Features

- 8x 10/100/1000Base-T M12 UTP and 2x 100/1000Base-X SFP Fiber with 8x PoE+ (Total 10 ports) (ITP-G802SM-8PH24)
- 10x 10/100/1000Base-T M12 UTP with 8x PoE+ (Total 10 ports) (ITP-G802TM-8PH24)
- M12 and M23 connector against vibration and shock, X-code or A-code M12 for Gigabit port optional
- IP67 grade housing for against water, dust, and oil (Figure 4)
- 24/48VDC redundant dual input power, and built-in power booster design upto 55 VDC for PoE output (Figure 2)
- Regulated PoE output voltage (55VDC) to stabilize PoE device, and guarantee delivery PoE power distance to 100meters (Figure 2)
- Provides 8-port IEEE 802.3af / 802.3at PoE output (30W per Port)
- Maximum PoE output power budget 180W
- Advanced PoE Management, management, PoE PD failure, auto checking and auto reset, PoE configuration for power planning, weekly scheduling
- EN60950-1, CE, FCC, Rail Traffic EN50155, EN45545-2, EN50121-4 certified
- Heavy industrial grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- Cable diagnostics, identifies opens/shorts from 7 to 100 meters
- Supports Green Ethernet IEEE 802.3az EEE (Energy Efficient Ethernet) management to optimize the power consumption
- STP, RSTP, MSTP, ITU-T G.8032 Ethernet Protection Ring (EPR) for redundant cabling
- Provides up to 5 instances that each supports µ-Ring, µ-Chain or Sub-Ring type for flexible uses. (Please see CTC Union's µ-Ring white paper for more details)
- µ-Ring for Redundant Cabling, recovery time<10ms in 250 maximum devices
- Build-in 2 bypass GbE UTP ports to avoid one or more nodes power fail in a ring or bus structure to collapse the network (ITP-G802TM-8PH24)
- DHCP Server/ Client/ Relay/ Relay option 82/ Snooping
- Support TTDP for train application
- QoS, Traffic classification QoS, CoS, bandwidth control for Ingress and Egress, Storm Control, DiffServ
- IEEE 802.1q VLAN, MAC based VLAN, IP subnet based VLAN, Protocol based VLAN, VLAN translation, GVRP, MVR
- Dynamic IEEE 802.3ad LACP Link Aggregation, Static Link Aggregation
- IGMP snooping V1/V2/V3, IGMP Filtering/ Throttling, IGMP query, IGMP proxy reporting, MLD snooping V1/V2
- Security : Port based and MAC based IEEE 802.1X, RADIUS, ACL, TACACS+, HTTP/HTTPS, SSL/SSH v2
- Software upgrade via TFTP and HTTP, redundant firmware to avoid in case of upgrade failure
- 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
- RMON, MIB II, Port mirroring, Event syslog, DNS, NTP, SNTP, IEEE 802.1ab LLDP
- Supports IPv6 Telnet server /ICMP v6
- CLI, Web based management, SNMP v1/v2c/v3, Telnet server for management
- Provides SmartConfig for quick and easy mass Configuration Tool*
- Supports SmartView for Centralized Management*

*Please see Chapter 1- **Software Management** for more details

Specifications

Standard	IEEE 802.3	10Base-T 10Mbit/s Ethernet
	IEEE 802.3u	100Base-TX, 100Base-FX, Fast Ethernet
	IEEE 802.3ab	1000Base-T Gbit/s Ethernet over twisted pair
	IEEE 802.3z	1000Base-X Gbit/s Ethernet over Fiber-Optic
	IEEE 802.1d	STP (Spanning Tree Protocol)
	IEEE 802.1w	RSTP (Rapid Spanning Tree Protocol)
	IEEE 802.1s	MSTP (Multiple Spanning Tree Protocol)
	ITU-T G.8032 / Y.1344	ERPS (Ethernet Ring Protection Switching)
	IEEE 802.1Q	Virtual LANs (VLAN)
	IEEE 802.1X	Port based and MAC based Network Access Control, Authentication
	IEEE802.3ac	Max frame size extended to 1522Bytes
	IEEE 802.3ad	Link aggregation for parallel links with LACP(Link Aggregation Control Protocol)
	IEEE 802.3x	Flow control for Full Duplex
	IEEE 802.3af	PoE (Power over Ethernet)
	IEEE 802.3at	PoE+ (Power over Ethernet ehancements)
	IEEE 802.1ad	Stacked VLANs, Q-in-Q
	IEEE 802.1p	LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization
	IEEE 802.1ab	Link Layer Discovery Protocol (LLDP)
	IEEE 802.3az	EEE (Energy Efficient Ethernet)
VLAN ID	4094 IEEE802.1Q VLAN VID	
Switch Architecture	Back-plane (Switching Fabric): 20Gbps (Full wire-speed)	
Data Processing	Store and Forward	
Flow Control	IEEE 802.3x for full duplex mode Back pressure for half duplex mode	
PoE RJ-45 Pin Assignment	8x M12 (8-Pin A-code or X-code Female) ports support IEEE 802.3af / IEEE 802.3at End-Span, Alternative A mode.	
Network Connector	10x M12 (8-Pin, Female, A-Code or X-code) 10/100/1000Base-T UTP (ITP-G802TM-8PH24) 8x M12(8-Pin, Female, A-Code or X-code) 10/100/1000Base-T + 2x 100/1000Base-X SFP (ITP-G802SM-8PH24) UTP port provide auto negotiation speed, Auto MDI/ MDI-X, Full/Half duplex function Build-in 2x bypass GbE UTP ports (ITP-G802TM-8PH24) 2x Water-proof cable connector 2x 100/1000Base-X SFP slot, with DDMI (ITP-G802SM-8PH24)	
Console	RS-232 (5-pin A-Code M12 male)	
Network Cable	UTP/STP above Cat. 5e cable	
	EIA/TIA-568 100-ohm (100m)	
Protocols	CSMA/CD	
Reverse Polarity Protection	Supported	
Overload Current Protection	Supported	
CPU Watch Dog	Supported	
LED	Per unit: Power 1 (Green), Power 2 (Green), Fault (Amber), CPU Act (Green), Ring Master (Amber)	
	UTP port: 10/100 Link/Active (Green) 1000 Link/Active (Amber)	
	SFP Fiber Per port: Link/Active (Green)	
	PoE Port LED 1 LED /per Port : • PoE Output Power On : ON (Green) • PoE Fault (Over Load, Short Circuit, Port failed at Startup) : Flash 1times /sec (Green)	
Jumbo Frame	9.6KB	
MAC Address Table	8K	

Memory Buffer	512K Bytes for packet buffer
PoE Standard	IEEE802.3af, IEEE802.3at
PoE Power Output	Maximum PoE output power budget 180W (30W/per port) Regulated PoE output voltage at 55VDC (Figure 2)
Power Supply	Provides 1x M23 (5-Pin, male) for redundant dual DC 24/48V (20~57VDC) input power Built-in very high efficiency booster(94~97%) to rise up 55 VDC for PoE output Regulated PoE output voltage (55VDC) to stabilize PoE device, and guarantee delivery PoE power distance to 100meter (Figure 2)
Power Consumption	ITP-G802TM-8PH24

Input Voltage	Total Power Consumption	Device Power Consumption	PoE Budget	Boost Efficiency
24 VDC	200.4W	11.7W	180W	95.6%
48 VDC	200.2W	12.5W	180W	95.9%

ITP-G802SM-8PH24

Input Voltage	Total Power Consumption	Device Power Consumption	PoE Budget	Boost Efficiency
24 VDC	198.5W	9.8W	180W	95.30%
48 VDC	199.2W	11.5W	180W	95.80%

Warning Message	System Syslog, SMTP/ e-mail event message, alarm relay
Alarm Relay Contact	5-pin A-code M12 male Relay outputs with current carrying capacity of 1 A @24VDC
Operating Temperature	-40 ~ 75°C
Operating Humidity	5% to 95% (Non-condensing)
Storage Temperature	-40 ~ 85°C
Housing	Rugged Metal, Fanless , IP67 grade housing for against water, dust, and oil (Figure 4)
Dimensions	69 x 240 x 168mm (D x W x H)
Weight	2.170kg (ITP-G802SM-8PH24) 2.15kg (ITP-G802TM-8PH24)
Installation Mounting	Wall mounting, or DIN Rail mounting (Optional)
MTBF	371,857 Hours (ITP-G802SM-8PH24) 362,429 Hours (ITP-G802TM-8PH24) (MIL-HDBK-217)
Warranty	5 years
Certification	
EMC	CE
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE
Railway Traffic	EN50155, EN50121-4
Fire protection of railway vehicles	EN45545-2
Immunity for Heavy Industrial Environment	EN61000-6-2
Emission for Heavy Industrial Environment	EN61000-6-4
EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B EN61000-4-3 (RS) Level 3, Criteria A EN61000-4-4 (Burst) Level 3, Criteria A EN61000-4-5 (Surge) Level 3, Criteria B EN61000-4-6 (CS) Level 3, Criteria A EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
Safety	EN60950-1
Shock	IEC-61373
Freefall	IEC 60068-2-32
Vibration	IEC-61373

Software Specifications

Topology	
VLAN	IEEE 802.1q VLAN,up to 4094 802.1Q VLAN VID
	IEEE 802.1q VLAN,up to 4094 Groups
	IEEE 802.1ad Q-in-Q
	MAC-based VLAN,up to 256 entries
	IP Subnet-based VLAN, up to 128 entries
	Protocol-based VLAN(Ethernt, SNAP, LLC), up to 128 entries
	VLAN Translation, up to 256 entries
	GVRP (GARP VLAN Registration Protocol)
	MVR (Multicast VLAN Registration)
Link Aggregation (Port Trunk)	Static (Hash with SA, DA, IP, TCP/UDP port), up to 5 trunk group
	Dynamic (IEEE 802.3ad LACP), up to 5 trunk group
Spanning Tree	IEEE802.1d STP, IEEE802.1w RSTP, IEEE802.1s MSTP

Multiple µ-Ring	up to 5 instances that each supports u-Ring, u-Chain or Sub-Ring type for flexible uses, and maximum up to 5 Rings. Recovery time <10ms The maximum number of devices allowed in a Ring supported ring is 250. (Please see CTC µ-Ring white paper for more details and more topology application)
Loop Protection	Supported
ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)	Recovery time <50ms
	Single Ring, Sub-Ring, Multiple ring topology network
QoS Feature	
Class of Service	IEEE802.1p 8 active priorities queues for per port

Traffic Classification QoS	IEEE802.1p based CoS
	IP Precedence based CoS
	IP DSCP based CoS
	QCL(QoS Control List): Frame Type, Source/ Destination MAC, VLAN ID, PCP, DEI
	QCE(QoS Control Entry): Protocol, Source IP, IP Fragment, DSCP, TCP/UDP port number
Bandwidth Control for Ingress	Rate in steps : 1 kbps / Mbps / fps / kfps
	Range : 100 kbps to 1Gbps / 1fps to 3300kfps
	Rate Unit : bit or frame
Bandwidth Control for Egress	Rate in steps : 1 kbps / Mbps
	Range : 100 kbps to 1Gbps
	Rate Unit : bit Per queue / Per port shaper
DiffServ (RF 2474) Remarking	
Storm Control	for Unicast, Broadcast, Multicast
IP Multicasting Feature	
IGMP / MLD Snooping	IGMP Snooping v1, v2, v3 / MLD Snooping v1, v2
	Port Filtering Profile, Throttling
IGMP / MLD Snooping	Fast Leave
	Maximum Multicast Group : up to 1022 entries
	Query / Static Router Port
Security Features	
IEEE 802.1X	Port-Based, MAC-Based
ACL	Number of rules : up to 256 entries
	for L2 / L3 / L4 L2: Mac address SA/DA/VLAN L3: IP address SA/DA, Subnet L4: TCP/UDP
RADIUS authentication & accounting	
TACACS+ authentication & accounting, TACACS+ 3.0	
HTTPS, HTTP	Supported
SSL / SSH v2	Supported
User Name Password Authentication	Local Authentication
	Remote Authentication (via RADIUS / TACACS+)
Management Interface Access Filtering	Web, Telnet / SSH , CLI RS-232 console
Management Features	
CLI	Cisco® like CLI
Web Based Management	
Telnet	Server
SNMP	V1, V2c, V3
SW & Configuration Upgrade	TFTP, HTTP
	Redundant firmware in case of upgrade failure
RMON	RMON I (1, 2, 3, 9 group), RMON II
MIB II	RFC 1213
UPnP	Supported

DHCP	Server, Client, Relay, Relay option 82 , Snooping
TTDP	Supported (Train Topology Discovery Protocol)
IP Source Guard	Supported
Port Mirroring	Supported
	Syslog server (RFC3164) (Support 1 server)
Warning Message	System syslog, e-mail, alarm relay
DNS	Client, Proxy
IEEE1588 PTP V2	Support 5 operating mode in each port : Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave
NTP, SNTP	Client
LLDP (IEEE 802.1ab)	Link Layer Discovery Protocol
	LLDP-MED
IPv6 Features	
IPv6 Management	Telnet Server/ICMP v6
SNMP over IPv6	Supported
HTTP over IPv6	Supported
SSH over IPv6	Supported
IPv6 Telnet	Supported
IPv6 NTP, SNTP	Client
IPv6 TFTP	Supported
IPv6 QoS	Supported
IPv6 ACL	Number of rules: up to 256 entries
	for L2 / L3 / L4 L2: Mac address SA/DA/VLAN L3: IP address SA/DA, Subnet L4: TCP/UDP
Others Features	
Green Ethernet	Supports IEEE802.3az EEE (Energy Efficient Ethernet) Management to optimize the power consumption
	Determine the cable length and lowering the power for ports with short cables
	Lower the power for a port when there is no link
	LED Power Management :Adjustment LEDs intensity
Cable Diagnostic	Measuring UTP cable OK or broken point distance
Advanced PoE Management	PoE PD Failure Auto Checking, and Auto reset when PD fail
	PoE Scheduling (On/Off schedule weekly)
	PoE Configuration
	PoE Enable/Disable
	Power limit by classification
	Power limit by management
	Total PoE Power budge (maximum 180W) limitation
	Power feeding priority

Application

Figure 1 : ITP Series in Onboard Train Application

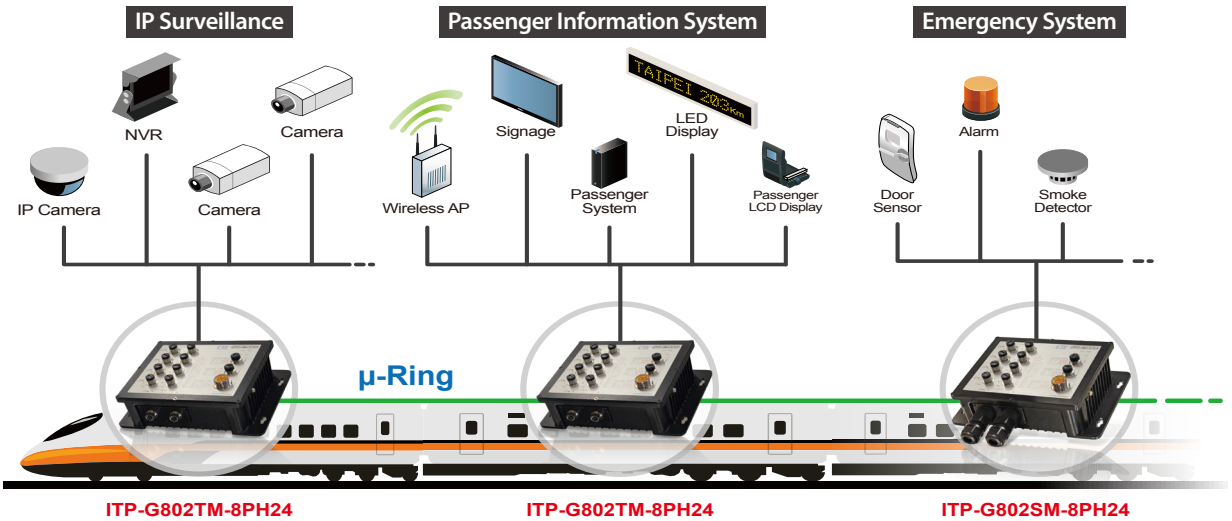


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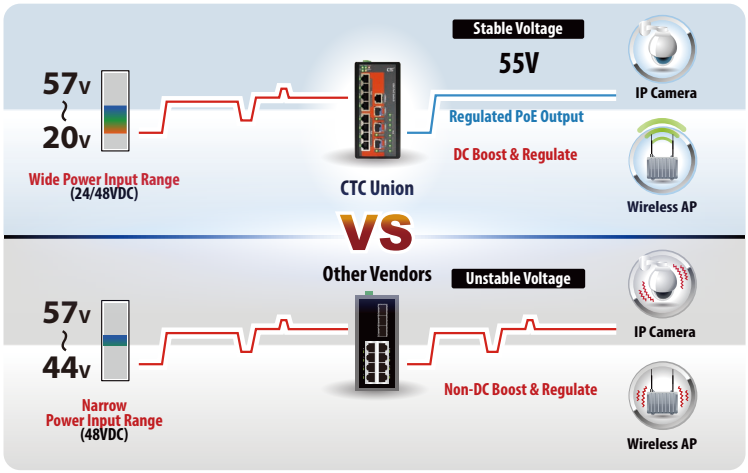
Figure 2 : High Efficiency Boost Technology for PoE



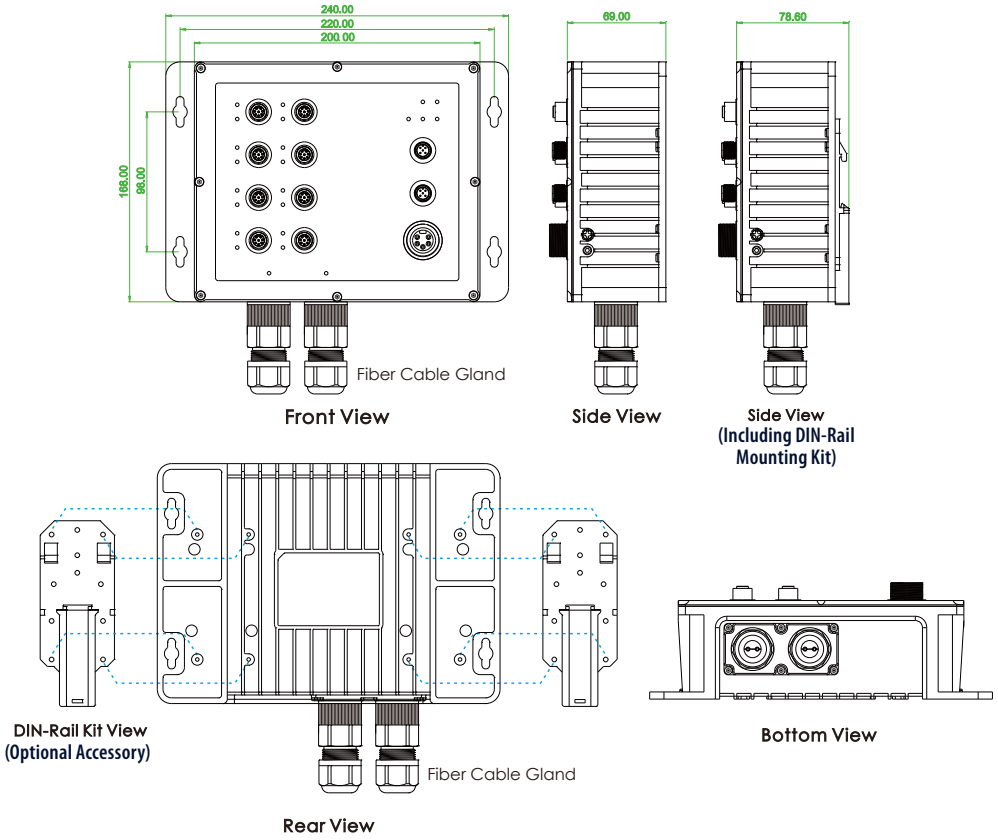
- Regulated PoE output voltage (55VDC) to stabilize PoE device
- Guarantee delivery PoE power distance to 100 meters
- Wide range input power 24/48VDC (20~57VDC)
- Built-in very high efficiency (94~97%) to boost PoE output voltage

Figure 3 : ITP Series for Industrial Automation

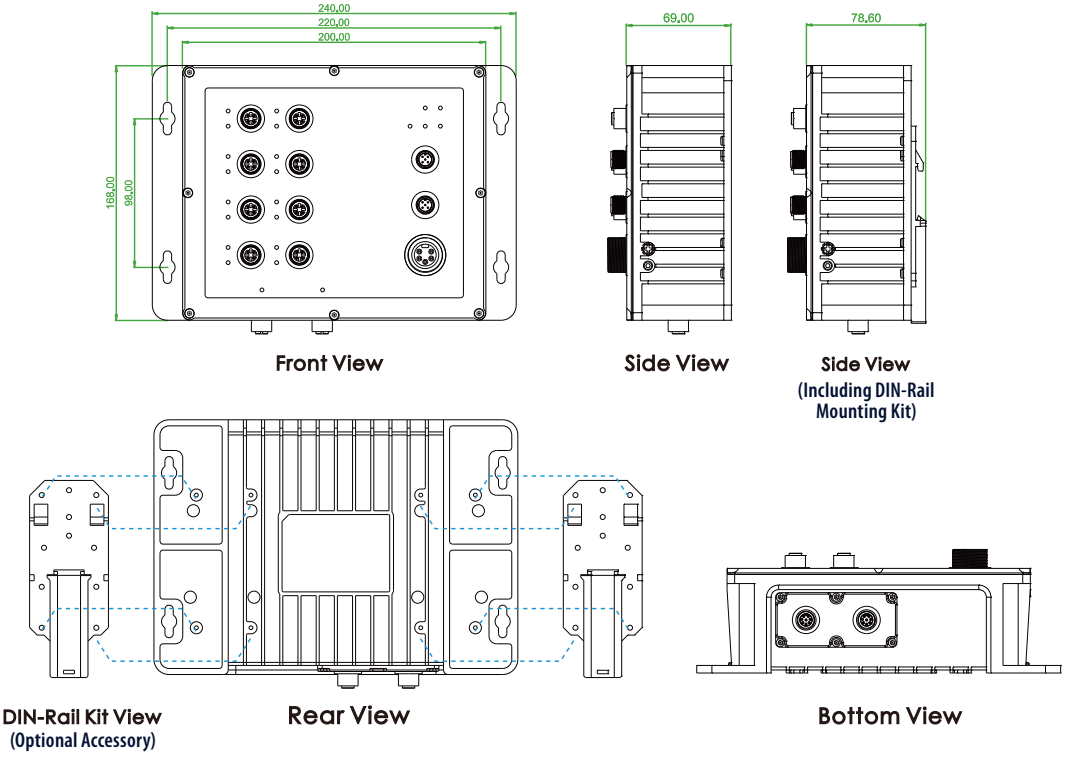
Figure 4 : IP67 Waterproof

Dimensions

▶ ITP-G802SM-8PH24



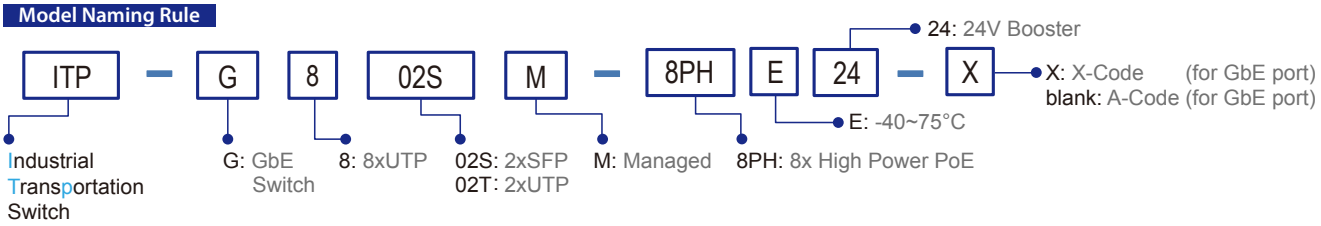
▶ ITP-G802TM-8PH24



Ordering Information

Model Name	Managed	IP67	Total Port	UTP Port M12	Fiber	PoE Port	PoE Total Power Budge	Power Input	Certification				Shock Vibration	Operating Temperature
				10/100/1000 Base-T	100/1000 Base-X	IEEEE 802.3at		Redundant	EN50155 EN50121-4	EN60950-1	EN61000-6-2 EN61000-6-4	CE FCC	IEC61373	
ITP-G802TM-8PHE24-X	V	V	10	10 (X-Code)		8	180W	24/48VDC	V	V	V	V	V	-40~75°C
ITP-G802TM-8PHE24	V	V	10	10 (A-Code)		8	180W	24/48VDC	V	V	V	V	V	-40~75°C
ITP-G802SM-8PHE24-X	V	V	10	8 (X-Code)	2 SFP	8	180W	24/48VDC	V	V	V	V	V	-40~75°C
ITP-G802SM-8PHE24	V	V	10	8 (A-Code)	2 SFP	8	180W	24/48VDC	V	V	V	V	V	-40~75°C

Model Naming Rule



Package List

- One of the device series
- Protective caps for SFP ports and console, alarm port
- Fiber Cable Gland for SFP port x 2 set (for ITP-G802SM-8PH24)
- Console cable (M12 to DB9)
- CD (Smartconfig, Manual)
- Quick installation guide

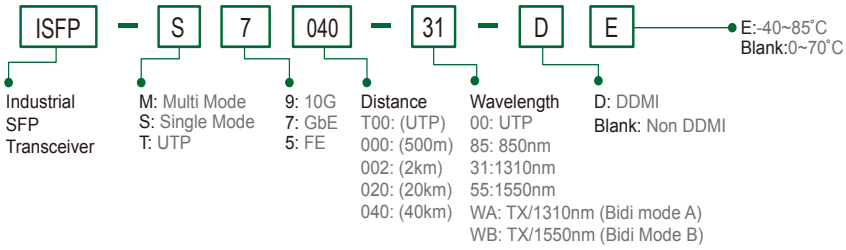
Optional Accessories

Industrial SFP Transceiver

The ISFP series of industrial grade SFP modules have been fully tested with the ITP-G802SM-8PH24 for guaranteed compatibility and performance. The best performance can be guaranteed even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheet for more details and more items.)

ISFP-M7000-85-D(E)	Industrial SFP GbE 1000Base-SX, M/M, 500 meter,wave length 850nm, 7.5dB, LC, DDMI, -10~70°C (-40~85°C)
ISFP-S7020-31-D(E)	Industrial SFP 1000Base-LX, S/M, 20km, wave length 1310nm, 15dB, LC, DDMI, -10~70°C (-40~85°C)
ISFP-M5002-31-D(E)	Industrial SFP 155M 100Base-FX, MM, 2km, wave length 1310nm, 12dB, LC, DDMI, -10~70°C (-40~85°C)
ISFP-S5030-31-D(E)	Industrial SFP 155M 100Base-FX, SM, 30km, 1310nm, 19dB, LC, DDMI, -10~70°C (-40~85°C)

SFP Naming Rule



Optional Cable/Connector & Din-Rail Kit

P/N: CAB-M12XM8-RJ45

M12 X-code Male (8-Pin) to RJ-45, AWG 24 ,IP67, 1 meter

For GbE UTP (X-code model)

P/N: CAB-M12AM8-RJ45

M12 A-code Male (8-Pin) to RJ-45, AWG 24 ,IP67, 1 meter

For GbE UTP (A-code model)

P/N: CAB-M12AF5-OPEN

M12 A-code Female (5-Pin) to open wire , AWG 22 , IP67, 1 meter

For Alarm

P/N: CAB-M23F5-OPEN

M23 Female (5-Pin) to open wire, (AWG 16) , IP67, 1 meter

For Power

P/N: M12A-M8

M12 A-code Male (8-Pin) connector, IP67

For GbE UTP (A-code model)

P/N: M12A-F5

M12 A-code Female (5-Pin) connector, IP67

For Alarm

P/N: IND-DNK04

Din Rail Kit for Industrial, Wide: 52mm

(130 X52mm / 4 Screws) (2pcs/set)

ITP-1204GTM-12PH

12x 10/100Base–TX + 4x 10/100/1000Base-T with 12x PoE+ Managed Ethernet Switch

ITP-2204GTM-16PH

22x 10/100Base–TX + 4x 10/100/1000Base-T with 16x PoE+ Managed Ethernet Switch

These models of industrial grade M12 managed PoE switches that provide total 16/26 ports Ethernet connectivity, come with 12/22 ports 10/100Base-TX and 4 ports 10/100/1000Base-T(X). These PoE switches with up to 12/16 IEEE 802.3at compliant PoE plus ports are classified as power source equipment (PSE) and provide up to 30 watts of power per port, maximum power budget up to 120W, and can be used to power IEEE 802.3af/at compliant powered devices (PDs), such as surveillance cameras, wireless access points, and IP phones.

The PoE switches use M12/M23 connectors to ensure tight and robust connections that guarantee the reliable connections against environmental disturbances, such as strongly vibration and shock. These switches provide wide power input range of 24/48/72/96/110VDC (operating range 20 to 137.5VDC) making this product series suitable for rolling stock and track side installations. Especially, the ITP series switches defined by the EN 50155 standard covering power input voltage and insulation, surge, EFT, ESD, operating temperature as well, thus making the M12 switches suitable for industrial applications, not only for rolling stock, vehicle but also for oil, gas, mining and heavy industry applications.

These switches provide a variety of advanced Ethernet functionalities including STP/RSTP/MSTP/ ITU-T G.8032 ERPS and µ-Ring, µ-Chain (recovery time <10ms @250 devices) for networking redundancy, layer 2 Ethernet IGMP, VLAN, QoS, Security, IPv6, bandwidth control, port mirroring, cable diagnostic, Green Ethernet, and can work with CTC Union's platform SmartView™ to provide convenient, real-time and centralized device management.

Features

- 12x 10/100Base–TX + 4x 10/100/1000Base-T with 12x PoE+ (ITP-1204GTM-12PH)
- 22x 10/100Base–TX + 4x 10/100/1000Base-T with 16x PoE+ (ITP-2204GTM-16PH)
- M12 and M23 connector against vibration and shock, M12 X-code for Gigabit port
- IP64 grade housing protection
- 24/48/72/96/110VDC (20~137.5VDC) redundant dual wide input power
- Supports negative voltage power input (for example in telecom system)
- Regulated PoE output voltage (50VDC) to stabilize PoE device, and guarantee delivery PoE power distance to 100meters
- Provides 12/16-port IEEE 802.3af / 802.3at PoE output (30W per Port)
- Maximum PoE output power budget 120W
- Advanced PoE Management, management, PoE PD failure, auto checking and auto reset, PoE configuration for power planning, weekly scheduling
- EN60950-1, CE, FCC, Rail Traffic EN50155, EN45545-2, EN50121-4 certified
- Heavy industrial grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- 4KV surge protection for PoE and UTP ports
- 2.25K VDC Hi-pot isolation protection for Ethernet ports and power
- Cable diagnostics, identifies opens/shorts from 7 to 100 meters
- Supports Green Ethernet IEEE 802.3az EEE (Energy Efficient Ethernet) management to optimize the power consumption
- STP, RSTP, MSTP, ITU-T G.8032 Ethernet Protection Ring (EPR) for redundant cabling
- Provides up to 5 instances that each supports µ-Ring, µ-Chain or Sub-Ring type for flexible uses. (Please see CTC Union's µ-Ring white paper for more details)
- µ-Ring for Redundant Cabling, recovery time<10ms in 250 maximum devices
- Build-in 2 bypass GbE UTP ports to avoid one or more nodes power fail in a ring or bus structure to collapse the network (-BP bypass model)
- DHCP Server/ Client/ Relay/ Relay option 82/ Snooping
- Supports TTDP for train application
- QoS, Traffic classification QoS, CoS, bandwidth control for Ingress and Egress, Storm Control, DiffServ
- IEEE 802.1q VLAN, MAC based VLAN, IP subnet based VLAN, Protocol based VLAN, VLAN translation, GVRP, MVR
- Dynamic IEEE 802.3ad LACP Link Aggregation, Static Link Aggregation
- IGMP snooping V1/V2/V3, IGMP Filtering/ Throttling, IGMP query, IGMP proxy reporting, MLD snooping V1/V2
- Security : Port based and MAC based IEEE 802.1X, RADIUS, ACL, TACACS+, HTTP/HTTPS, SSL/SSH v2
- Software upgrade via TFTP and HTTP, redundant firmware to avoid in case of upgrade failure
- 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
- RMON, MIB II, Port mirroring, Event syslog, DNS, NTP, SNTP, IEEE 802.1ab LLDP
- Supports IPv6 Telnet server /ICMP v6
- CLI, Web based management, SNMP v1/v2c/v3, Telnet server for Management (Please see Catalog chapter 1- Software Management for more details)
- Provides SmartConfig for quick and easy mass Configuration Tool*
- Supports SmartView for Centralized Management*

*Please see Chapter 1- **Software Management** for more details

Specifications

Standard	IEEE 802.3	10Base-T 10Mbit/s Ethernet
	IEEE 802.3u	100Base-TX, 100Base-FX, Fast Ethernet
	IEEE 802.3ab	1000Base-T Gbit/s Ethernet over twisted pair
	IEEE 802.1d	STP (Spanning Tree Protocol)
	IEEE 802.1w	RSTP (Rapid Spanning Tree Protocol)
	IEEE 802.1s	MSTP (Multiple Spanning Tree Protocol)
	ITU-T G.8032 / Y.1344	ERPS (Ethernet Ring Protection Switching)
	IEEE 802.1Q	Virtual LANs (VLAN)
	IEEE 802.1X	Port based and MAC based Network Access Control, Authentication
	IEEE802.3ac	Max frame size extended to 1522Bytes
	IEEE 802.3ad	Link aggregation for parallel links with LACP(Link Aggregation Control Protocol)
	IEEE 802.3x	Flow control for Full Duplex
	IEEE 802.3af	PoE (Power over Ethernet)
	IEEE 802.3at	PoE+ (Power over Ethernet ehancements)
	IEEE 802.1ad	Stacked VLANs, Q-in-Q
	IEEE 802.1p	LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization
	IEEE 802.1ab	Link Layer Discovery Protocol (LLDP)
	IEEE 802.3az	EEE (Energy Efficient Ethernet)
VLAN ID	4094 IEEE802.1Q VLAN VID	
Switch Architecture	10.4 Gbps (ITP-1204GTM-12PH) 12.4Gbps (ITP-2204GTM-16PH) (Full wire-speed)	
Data Processing	Store and Forward	
Flow Control	IEEE 802.3x for full duplex mode Back pressure for half duplex mode	
PoE Port	12x M12 (4-Pin D-code Female) PoE ports (ITP-1204GTM-12PH) 16x M12 (4-Pin D-code Female) PoE ports (ITP-2204GTM-16PH) Maximum PoE output power budget 120W (30W/per port), Regulated PoE output voltage at 50VDC IEEE 802.3af / IEEE 802.3at End-Span, Alternative A mode	
Network Connector	12x M12 (4-Pin, Female,D-Code) 10/100Base-TX UTP + 4x M12 (8-Pin, Female, X-Code) 10/100/1000Base-T UTP (ITP-1204GTM-12PH) 22x M12 (4-Pin, Female,D-Code) 10/100Base-TX UTP + 4x M12 (8-Pin, Female, X-Code) 10/100/1000Base-T UTP (ITP-2204GTM-16PH) UTP port provide auto negotiation speed, Auto MDI/MDI-X, Full/Half duplex function Build-in 2x bypass GbE UTP ports (For -BP model optional)	
Console	RS-232 (5-pin A-Code M12 male)	
Network Cable	UTP/STP above Cat. 5e cable	
	EIA/TIA-568 100-ohm (100m)	
Protocols	CSMA/CD	
Reverse Polarity Protection	Supported	
Overload Current Protection	Supported	
CPU Watch Dog	Supported	
LED	Per unit: Power 1 (Green), Power 2 (Green), Fault (Amber), CPU Act (Green), Ring Master (Amber)	
	UTP port: 10/100 Link/Active (Green) 1000 Link/Active (Amber)	

LED	PoE Port LED 1 LED /per Port : • PoE Output Power On : ON (Green)
Jumbo Frame	9.6KB
MAC Address Table	8K
Memory Buffer	512K Bytes for packet buffer
Power Supply	Provides 1x M23 (5-Pin, male) for redundant dual DC 24/48/72/96/110VDC (20~137.5VDC) wide input power Supports negative voltage power input (for example in telecom system) Regulated PoE output voltage (50VDC) to stabilize PoE device, and guarantee delivery PoE power distance to 100meter
Power Consumption	TBD
Warning Message	System Syslog, SMTP/ e-mail event message, alarm relay
Alarm Relay Contact	5-pin A-code M12 male Relay outputs with current carrying capacity of 1 A @24VDC
Operating Temperature	-40 ~ 75°C
Operating Humidity	5% to 95% (Non-condensing)
Storage Temperature	-40 ~ 85°C
Housing	Rugged Metal, Fanless, IP64 grade housing protection
Dimensions	113 x 260 x 132 (D x W x H) (ITP-1204GTM-12PH) 113 x 360 x 132 (D x W x H) (ITP-2204GTM-16PH)
Weight	TBD
Installation Mounting	Wall mounting
MTBF	TBD (MIL-HDBK-217)
Warranty	5 years
Certification	
EMC	CE (EN55024, EN55032)
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE
Railway Traffic	EN50155, EN50121-4
Fire protection of railway vehicles	EN 45545-2
Immunity for Heavy Industrial Environment	EN61000-6-2
Emission for Heavy Industrial Environment	EN61000-6-4
EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B
	EN61000-4-3 (RS) Level 3, Criteria A
	EN61000-4-4 (Burst) Level 3, Criteria A
	EN61000-4-5 (Surge) Level 3, Criteria B
	EN61000-4-6 (CS) Level 3, Criteria A
	EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
Safety	EN60950-1
Hi pot protection	DC 2.25KV for power to chassis ground, Ethernet port to chassis ground
4KV surge protection	Supported for PoE and UTP port
Shock	IEC-61373
Freefall	IEC 60068-2-32
Vibration	IEC-61373

Software Specifications

Topology	
VLAN	IEEE 802.1q VLAN,up to 4094 802.1Q VLAN VID
	IEEE 802.1q VLAN,up to 4094 Groups
	IEEE 802.1ad Q-in-Q
	MAC-based VLAN,up to 256 entries
	IP Subnet-based VLAN, up to 128 entries
	Protocol-based VLAN(Ethernt, SNAP, LLC), up to 128 entries
	VLAN Translation, up to 256 entries
	GVRP (GARP VLAN Registration Protocol)
	MVR (Multicast VLAN Registration)
Link Aggregation (Port Trunk)	Static (Hash with SA, DA, IP, TCP/UDP port), up to 5 trunk group
	Dynamic (IEEE 802.3ad LACP), up to 5 trunk group

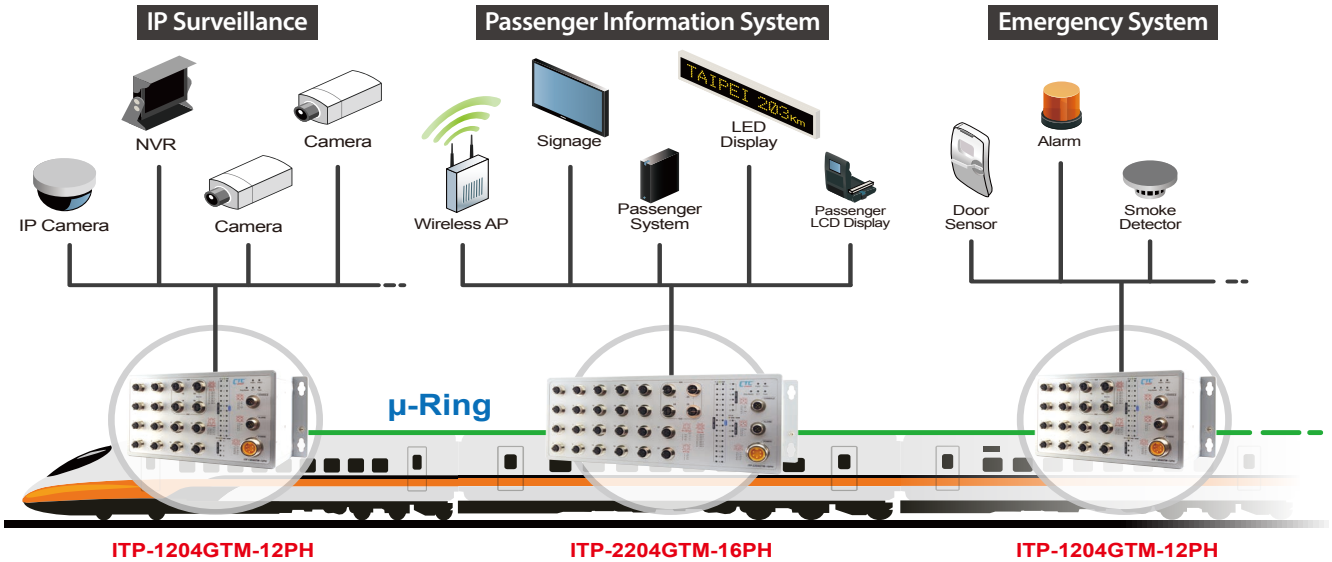
Spanning Tree	IEEE802.1d STP, IEEE802.1w RSTP, IEEE802.1s MSTP
Multiple µ-Ring	up to 5 instances that each supports µ-Ring, µ-Chain or Sub-Ring type for flexible uses, and maximum up to 5 Rings. Recovery time <10ms The maximum number of devices allowed in a Ring supported ring is 250. (Please see CTC µ-Ring white paper for more details and more topology application)
Loop Protection	Supported
ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)	Recovery time <10ms
	Single Ring, Sub-Ring, Multiple ring topology network

QoS Feature	
Class of Service	IEEE802.1p 8 active priorities queues for per port
Traffic Classification QoS	IEEE802.1p based CoS
	IP Precedence based CoS
	IP DSCP based CoS
	QCL(QoS Control List): Frame Type, Source/ Destination MAC, VLAN ID, PCP, DEI
	QCE(QoS Control Entry): Protocol, Source IP, IP Fragment, DSCP, TCP/UDP port number
Bandwidth Control for Ingress	Rate in steps : 1 kbps / Mbps / fps / kfps
	Range : 100 kbps to 1Gbps / 1fps to 3300kfps
	Rate Unit : bit or frame
Bandwidth Control for Egress	Rate in steps : 1 kbps / Mbps
	Range : 100 kbps to 1Gbps
	Rate Unit : bit Per queue / Per port shaper
DiffServ (RF 2474) Remarking	
Storm Control	for Unicast, Broadcast, Multicast
IP Multicasting Feature	
IGMP / MLD Snooping	IGMP Snooping v1, v2, v3 / MLD Snooping v1, v2
	Port Filtering Profile, Throttling
IGMP / MLD Snooping	Fast Leave
	Maximum Multicast Group : up to 1022 entries
	Query / Static Router Port
Security Features	
IEEE 802.1X	Port-Based, MAC-Based
ACL	Number of rules : up to 256 entries
	for L2 / L3 / L4 L2: Mac address SA/DA/VLAN L3: IP address SA/DA, Subnet L4: TCP/UDP
RADIUS authentication & accounting	
TACACS+ authentication & accounting, TACACS+ 3.0	
HTTPS, HTTP	Supported
SSL / SSH v2	Supported
User Name Password Authentication	Local Authentication
	Remote Authentication (via RADIUS / TACACS+)
Management Interface Access Filtering	Web, Telnet / SSH, CLI, RS-232 console
Management Features	
CLI	Cisco® like CLI
Web Based Management	
Telnet	Server
SNMP	V1, V2c, V3
SW & Configuration Upgrade	TFTP, HTTP
	Redundant firmware in case of upgrade failure

RMON	RMON I (1, 2, 3, 9 group), RMON II
MIB II	RFC 1213
UPnP	Supported
DHCP	Server, Client, Relay, Relay option 82 , Snooping
TTDP	Supported (Train Topology Discovery Protocol)
IP Source Guard	Supported
Port Mirroring	Supported
Event Syslog	Syslog server (RFC3164) (Support 1 server)
Warning Message	System syslog, e-mail, alarm relay
DNS	Client, Proxy
IEEE1588 PTP V2	Support 5 operating mode in each port : Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave
NTP, SNTP	Client
LLDP (IEEE 802.1ab)	Link Layer Discovery Protocol
	LLDP-MED
IPv6 Features	
IPv6 Management	Telnet Server/ICMP v6
SNMP over IPv6	Supported
HTTP over IPv6	Supported
SSH over IPv6	Supported
IPv6 Telnet	Supported
IPv6 NTP, SNTP	Client
IPv6 TFTP	Supported
IPv6 QoS	Supported
IPv6 ACL	Number of rules: up to 256 entries
	for L2 / L3 / L4 L2: Mac address SA/DA/VLAN L3: IP address SA/DA, Subnet L4: TCP/UDP
Others Features	
Green Ethernet	Supports IEEE802.3az EEE (Energy Efficient Ethernet) Management to optimize the power consumption
	Determine the cable length and lowering the power for ports with short cables
	Lower the power for a port when there is no link
	LED Power Management :Adjustment LEDs intensity
Cable Diagnostic	Measuring UTP cable OK or broken point distance
Advanced PoE Management	PoE PD Failure Auto Checking, and Auto reset when PD fail
	PoE Scheduling (On/Off schedule weekly)
	PoE Configuration
	PoE Enable/Disable
	Power limit by classification
	Power limit by management
	Total PoE Power budge (maximum 120W) limitation
	Power feeding priority

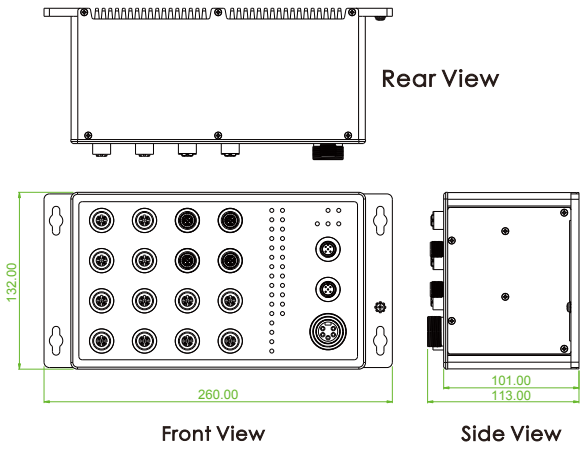
Application

Figure : ITP Series in Onboard Train Application

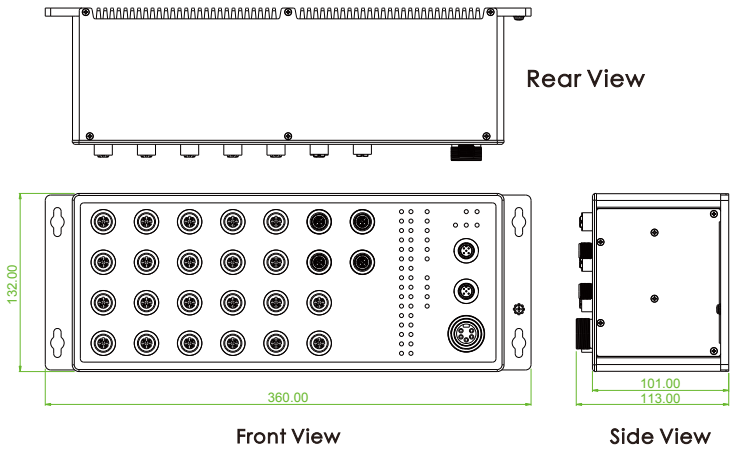


Dimensions

▶ ITP-1204GTM-12PH



▶ ITP-2204GTM-16PH



Ordering Information

Model Name	Managed	Protection	Total Port	FE Port	GbE port		PoE Port		Redundant Dual Input Power
				D-code M12	GbE X-code M12 UTP	GbE X-code M12 UTP Bypass	IEEE802.3at	PoE Total Power Budge	24/48/72/96/110VDC (20~137.5VDC)
ITP-1204GTM-12PHE	V	IP64	16	12	4		12	120W	V
ITP-1204GTM-12PHE-BP	V	IP64	16	12	2	2	12	120W	V
ITP-2204GTM-16PHE	V	IP64	26	22	4		16	120W	V
ITP-2204GTM-16PHE-BP	V	IP64	26	22	2	2	16	120W	V

Model Name	Certification					
	EN45545-2	EN50155 EN50121-4	EN60950-1	EN61000-6-2 EN61000-6-4	CE, FCC	IEC61373
ITP-1204GTM-12PHE	V	V	V	V	V	V
ITP-1204GTM-12PHE-BP	V	V	V	V	V	V
ITP-2204GTM-16PHE	V	V	V	V	V	V
ITP-2204GTM-16PHE-BP	V	V	V	V	V	V

Model Naming Rule

ITP – 22 | 04GT | M – 16PHE – BP

- ITP: Industrial Transportation Switch
- 22: 22x FE UTP; 12: 12x FE UTP
- 04GT : 4xGbE UTP
- M: Managed
- 12PHE: 12x High Power PoE; 16PHE: 16x High Power PoE; E: -40~75°C
- BP: Bypass model; blank: Non Bypass

Package List

- One unit device
- Protective caps for UTP ports and console, alarm port
- Console cable (M12 to DB9)
- CD (Smartconfig, Manual)
- Quick installation guide

Optional Accessories

Optional Cable/Connector

P/N: CAB-M12XM8-RJ45
M12 X-code Male (8-Pin) to RJ-45, AWG 24 ,IP67, 1 meter

For GbE UTP (X-code)

P/N: CAB-M12DM4-RJ45
M12 D-code Male (4-Pin) to RJ-45, AWG 24 ,IP67, 1 meter

For FE UTP

P/N: CAB-M12AF5-OPEN
M12 A-code Female (5-Pin) to open wire , AWG 22 , IP67, 1 meter

For Alarm

P/N: CAB-M23F5-OPEN
M23 Female (5-Pin) to open wire, (AWG 16) , IP67, 1 meter

For Power

P/N: M12D-M4
M12 D-code Male (4-Pin) connector, IP67

For FE UTP

P/N: M12A-F5
M12 A-code Female (5-Pin) connector, IP67

For Alarm

180W
24V Booster

ITP-802GTM-8PH24

8x 10/100Base-TX + 2x 10/100/1000Base-T with 8x PoE+ Managed Ethernet Switch

ITP-802GSM-8PH24

8x 10/100Base-TX + 2x 100/1000Base-X SFP with 8x PoE+ Managed Ethernet Switch

These models are managed industrial grade PoE (Power over Ethernet) switches that provide 8x FE UTP + 2x GbE SFP or 8x FE UTP + 2x GbE UTP. The PoE features enable power and data to be transferred via a single cable, thereby considerably reducing cabling and electreical wiring expenses.These switches also provide a variety of functions to manage PoE operation including PoE device auto-checking, auto reset, and PoE power weekly scheduling. Other advanced Ethernet functions are supported and include STP/RSTP/MSTP/ ITU-T G.8032 ERPS and multiple µ-Ring for redundant cabling, layer 2 Ethernet IGMP, VLAN, QoS ,Security, IPv6, bandwidth control, port mirroring, cable diagnostic and Green Ethernet.

Housed in rugged DIN rail or wall mountable enclosures, these switches are designed for the harshest environments. Specifically, These switches use M12 connectors to ensure water tight, robust connections and to guarantee reliable connections against environmental disturbances, such as vibration and shock. Besides, these models are compliant with EN50155, covering power input voltage, surge, EFT, ESD, vibration, shock, thus making the switches suitable for industrial applications, such as vehicle, rolling stock, ship, vessel.

These models are IP67 rated to protect against dust and water submersion, they are particularly used in environments with extreme temperature, high humidity, oil, dust and in outdoor environments requiring water-proof applications such as IP surveillance, city security. They can also work with CTC Union's platform SmartView™ to provide convenient, real-time and centralized device management.

Features

- 8x 10/100Base-TX M12 UTP and 2x 100/1000Base-X SFP Fiber with 8x PoE+ (Total 10 ports) (ITP-802GSM-8PH24)
- 8x 10/100Base-TX M12 UTP and 2x 10/100/1000Base-T UTP with 8x PoE+ (Total 10 ports) (ITP-802GTM-8PH24)
- M12 and M23 connector against vibration and shock, X-code or A-code M12 for Gigabit port optional
- IP67 grade housing for against water, dust, and oil (Figure 4)
- 24/48VDC redundant dual input power, and built-in power booster design upto 55 VDC for PoE output (Figure 2)
- Regulated PoE output voltage (55VDC) to stabilize PoE device, and guarantee delivery PoE power distance to 100meters (Figure 2)
- Provides 8-port IEEE 802.3af / 802.3at PoE output (30W per Port)
- Maximum PoE output power budget 180W
- Advanced PoE Management, management, PoE PD failure, auto checking and auto reset, PoE configuration for power planning, weekly scheduling
- EN60950-1, CE, FCC, Rail Traffic EN50155, EN45545-2, EN50121-4 certified
- Heavy industrial grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- Cable diagnostics, identifies opens/shorts from 7 to 100 meters
- Supports Green Ethernet IEEE 802.3az EEE (Energy Efficient Ethernet) management to optimize the power consumption
- STP, RSTP, MSTP, ITU-T G.8032 Ethernet Protection Ring (EPR) for redundant cabling
- Provides up to 5 instances that each supports µ-Ring, µ-Chain or Sub-Ring type for flexible uses. (Please see CTC Union's µ-Ring white paper for more details)
- µ-Ring for Redundant Cabling, recovery time<10ms in 250 maximum devices
- Build-in 2 bypass GbE UTP ports to avoid one or more nodes power fail in a ring or bus structure to collapse the network (ITP-802GTM-8PH24)
- DHCP Server/ Client/ Relay/ Relay option 82/ Snooping
- Supports TTDP for train application
- QoS, Traffic classification QoS, CoS, bandwidth control for Ingress and Egress, Storm Control, DiffServ
- IEEE 802.1q VLAN, MAC based VLAN, IP subnet based VLAN, Protocol based VLAN, VLAN translation, GVRP, MVR
- Dynamic IEEE 802.3ad LACP Link Aggregation, Static Link Aggregation
- IGMP snooping V1/V2/V3, IGMP Filtering/ Throttling, IGMP query, IGMP proxy reporting, MLD snooping V1/V2
- Security : Port based and MAC based IEEE 802.1X, RADIUS, ACL, TACACS+, HTTP/HTTPS, SSL/SSH v2
- Software upgrade via TFTP and HTTP, redundant firmware to avoid in case of upgrade failure
- 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
- RMON, MIB II, Port mirroring, Event syslog, DNS, NTP, SNTP, IEEE 802.1ab LLDP
- Supports IPv6 Telnet server /ICMP v6
- CLI, Web based management, SNMP v1/v2c/v3, Telnet server for management
- Provides SmartConfig for quick and easy mass Configuration Tool*
- Supports SmartView for Centralized Management*

*Please see Chapter 1- **Software Management** for more details

Specifications

Standard	IEEE 802.3	10Base-T 10Mbit/s Ethernet
	IEEE 802.3u	100Base-TX, 100Base-FX, Fast Ethernet
	IEEE 802.3ab	1000Base-T Gbit/s Ethernet over twisted pair
	IEEE 802.3z	1000Base-X Gbit/s Ethernet over Fiber-Optic
	IEEE 802.1d	STP (Spanning Tree Protocol)
	IEEE 802.1w	RSTP (Rapid Spanning Tree Protocol)
	IEEE 802.1s	MSTP (Multiple Spanning Tree Protocol)
	ITU-T G.8032 / Y.1344	ERPS (Ethernet Ring Protection Switching)
	IEEE 802.1Q	Virtual LANs (VLAN)
	IEEE 802.1X	Port based and MAC based Network Access Control, Authentication
	IEEE802.3ac	Max frame size extended to 1522Bytes
	IEEE 802.3ad	Link aggregation for parallel links with LACP(Link Aggregation Control Protocol)
	IEEE 802.3x	Flow control for Full Duplex
	IEEE 802.3af	PoE (Power over Ethernet)
	IEEE 802.3at	PoE+ (Power over Ethernet ehancements)
	IEEE 802.1ad	Stacked VLANs, Q-in-Q
	IEEE 802.1p	LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization
	IEEE 802.1ab	Link Layer Discovery Protocol (LLDP)
	IEEE 802.3az	EEE (Energy Efficient Ethernet)
VLAN ID	4094 IEEE802.1Q VLAN VID	
Switch Architecture	Back-plane (Switching Fabric): 5.6Gbps (Full wire-speed)	
Data Processing	Store and Forward	
Flow Control	IEEE 802.3x for full duplex mode Back pressure for half duplex mode	
PoE Port	8x M12 (4-Pin D-code Female) ports support IEEE 802.3af / IEEE 802.3at End-Span, Alternative A mode.	
Network Connector	8x M12 (4-Pin, Female,D-Code) 10/100Base-TX UTP + 2x M12 (8-Pin, female,A-code or X-Code) 10/100/1000Base-T UTP (ITP-802GTM-8PH24) 8x M12 (4-Pin, Female,D-Code) 10/100Base-TX UTP + 2x 100/1000Base-X SFP (ITP-802GSM-8PH24) UTP port provide auto negotiation speed, Auto MDI/ MDI-X, Full/Half duplex function Build-in 2x bypass GbE UTP ports (ITP-802GTM-8PH24) 2x Water-proof cable connector 2x 100/1000Base-X SFP slot, with DDMI (ITP-802GSM-8PH24)	
Console	RS-232 (5-pin A-Code M12 male)	
Network Cable	UTP/STP above Cat. 5e cable	
	EIA/TIA-568 100-ohm (100m)	
Protocols	CSMA/CD	
Reverse Polarity Protection	Supported	
Overload Current Protection	Supported	
CPU Watch Dog	Supported	
LED	Per unit: Power 1 (Green), Power 2 (Green), Fault (Amber), CPU Act (Green), Ring Master (Amber)	
	UTP port: 10/100 Link/Active (Green) 1000 Link/Active (Amber)	
	SFP Fiber Per port: Link/Active (Green)	
	PoE Port LED 1 LED /per Port : • PoE Output Power On : ON (Green) • PoE Fault (Over Load, Short Circuit, Port failed at Startup) : Flash 1times /sec (Green)	
Jumbo Frame	9.6KB	
MAC Address Table	8K	

Memory Buffer	512K Bytes for packet buffer
PoE Standard	IEEE 802.3af, IEEE 802.3at
PoE Power Output	Maximum PoE output power budget 180W (30W/per port) Regulated PoE output voltage at 55VDC (Figure 2)
Power Supply	Provides 1x M23 (5-Pin, male) for redundant dual DC 24/48V (20~57VDC) input power Built-in very high efficiency booster(94~97%) to rise up 55 VDC for PoE output Regulated PoE output voltage (55VDC) to stabilize PoE device, and guarantee delivery PoE power distance to 100meter (Figure 2)
Power Consumption	ITP-802GSM-8PH24

Input Voltage	Total Power Consumption	Device Power Consumption	PoE Budget	Boost Efficiency
24 VDC	196.4W	8.1W	180W	95.50%
48 VDC	197.8W	9.6W	180W	95.60%

ITP-802GTM-8PH24

Input Voltage	Total Power Consumption	Device Power Consumption	PoE Budget	Boost Efficiency
24 VDC	198.3W	8.9W	180W	95.00%
48 VDC	198.8W	10.1W	180W	95.30%

Warning Message	System Syslog, SMTP/ e-mail event message, alarm relay
Alarm Relay Contact	5-pin A-code M12 male Relay outputs with current carrying capacity of 1 A @24VDC
Operating Temperature	-40 ~ 75°C
Operating Humidity	5% to 95% (Non-condensing)
Storage Temperature	-40 ~ 85°C
Housing	Rugged Metal, Fanless , IP67 grade housing for against water, dust, and oil (Figure 4)
Dimensions	69 x 240 x 168mm (D x W x H)
Weight	2.170kg (ITP-802GSM-8PH24) 2.15kg (ITP-802GTM-8PH24)
Installation Mounting	Wall mounting, or DIN Rail mounting (Optional)
MTBF	371,961 Hours (ITP-802GSM-8PH24) 362,429 Hours (ITP-802GTM-8PH24) (MIL-HDBK-217)
Warranty	5 years
Certification	
EMC	CE
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE
Railway Traffic	EN50155, EN50121-4
Fire protection of railway vehicles	EN45545-2
Immunity for Heavy Industrial Environment	EN61000-6-2
Emission for Heavy Industrial Environment	EN61000-6-4
EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B EN61000-4-3 (RS) Level 3, Criteria A EN61000-4-4 (Burst) Level 3, Criteria A EN61000-4-5 (Surge) Level 3, Criteria B EN61000-4-6 (CS) Level 3, Criteria A EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
Safety	EN60950-1
Shock	IEC-61373
Freefall	IEC 60068-2-32
Vibration	IEC-61373

Software Specifications

Topology	
VLAN	IEEE 802.1q VLAN,up to 4094 802.1Q VLAN VID
	IEEE 802.1q VLAN,up to 4094 Groups
	IEEE 802.1ad Q-in-Q
	MAC-based VLAN,up to 256 entries
	IP Subnet-based VLAN, up to 128 entries
	Protocol-based VLAN(Ethernt, SNAP, LLC), up to 128 entries
	VLAN Translation, up to 256 entries
	GVRP (GARP VLAN Registration Protocol)
	MVR (Multicast VLAN Registration)
Link Aggregation (Port Trunk)	Static (Hash with SA, DA, IP, TCP/UDP port), up to 5 trunk group
	Dynamic (IEEE 802.3ad LACP), up to 5 trunk group

Spanning Tree	IEEE 802.1d STP, IEEE 802.1w RSTP, IEEE 802.1s MSTP
Multiple µ-Ring	up to 5 instances that each supports µ-Ring, µ-Chain or Sub-Ring type for flexible uses, and maximum up to 5 Rings. Recovery time <10ms The maximum number of devices allowed in a Ring supported ring is 250. (Please see CTC µ-Ring white paper for more details and more topology application)
Loop Protection	Supported
ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)	Recovery time <50ms Single Ring, Sub-Ring, Multiple ring topology network

QoS Feature	
Class of Service	IEEE802.1p 8 active priorities queues for per port
Traffic Classification QoS	IEEE802.1p based CoS
	IP Precedence based CoS
	IP DSCP based CoS
	QCL(QoS Control List): Frame Type, Source/ Destination MAC, VLAN ID, PCP, DEI
	QCE(QoS Control Entry): Protocol, Source IP, IP Fragment, DSCP, TCP/UDP port number
Bandwidth Control for Ingress	Rate in steps : 1 kbps / Mbps / fps / kfps
	Range : 100 kbps to 1Gbps / 1fps to 3300kfps
	Rate Unit : bit or frame
Bandwidth Control for Egress	Rate in steps : 1 kbps / Mbps
	Range : 100 kbps to 1Gbps
	Rate Unit : bit Per queue / Per port shaper
DiffServ (RF 2474) Remarking	
Storm Control	for Unicast, Broadcast, Multicast
IP Multicasting Feature	
IGMP / MLD Snooping	IGMP Snooping v1, v2, v3 / MLD Snooping v1, v2
	Port Filtering Profile, Throttling
IGMP / MLD Snooping	Fast Leave
	Maximum Multicast Group : up to 1022 entries
	Query / Static Router Port
Security Features	
IEEE 802.1X	Port-Based, MAC-Based
ACL	Number of rules : up to 256 entries
	for L2 / L3 / L4 L2: Mac address SA/DA/VLAN L3: IP address SA/DA, Subnet L4: TCP/UDP
RADIUS authentication & accounting	
TACACS+ authentication & accounting, TACACS+ 3.0	
HTTPS, HTTP	Supported
SSL / SSH v2	Supported
User Name Password Authentication	Local Authentication
	Remote Authentication (via RADIUS / TACACS+)
Management Interface Access Filtering	Web, Telnet / SSH , CLI RS-232 console
Management Features	
CLI	Cisco® like CLI
Web Based Management	
Telnet	Server
SNMP	V1, V2c, V3
SW & Configuration Upgrade	TFTP, HTTP
	Redundant firmware in case of upgrade failure
RMON	RMON I (1, 2, 3, 9 group), RMON II

MIB II	RFC 1213
UPnP	Supported
DHCP	Server, Client, Relay, Relay option 82 , Snooping
TTDP	Supported (Train Topology Discovery Protocol)
IP Source Guard	Supported
Port Mirroring	Supported
Event Syslog	Syslog server (RFC3164) (Support 1 server)
Warning Message	System syslog, e-mail, alarm relay
DNS	Client, Proxy
IEEE1588 PTP V2	Support 5 operating mode in each port : Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave
NTP, SNTP	Client
LLDP (IEEE 802.1ab)	Link Layer Discovery Protocol
	LLDP-MED
IPv6 Features	
IPv6 Management	Telnet Server/ICMP v6
SNMP over IPv6	Supported
HTTP over IPv6	Supported
SSH over IPv6	Supported
IPv6 Telnet	Supported
IPv6 NTP, SNTP	Client
IPv6 TFTP	Supported
IPv6 QoS	Supported
IPv6 ACL	Number of rules: up to 256 entries
	for L2 / L3 / L4 L2: Mac address SA/DA/VLAN L3: IP address SA/DA, Subnet L4: TCP/UDP
Others Features	
Green Ethernet	Supports IEEE802.3az EEE (Energy Efficient Ethernet) Management to optimize the power consumption
	Determine the cable length and lowering the power for ports with short cables
	Lower the power for a port when there is no link
	LED Power Management :Adjustment LEDs intensity
Cable Diagnostic	Measuring UTP cable OK or broken point distance
Advanced PoE Management	PoE PD Failure Auto Checking, and Auto reset when PD fail
	PoE Scheduling (On/Off schedule weekly)
	PoE Configuration
	PoE Enable/Disable
	Power limit by classification
	Power limit by management
	Total PoE Power budge (maximum 180W) limitation
	Power feeding priority

Application

Figure 1 : ITP Series in Onboard Train Application

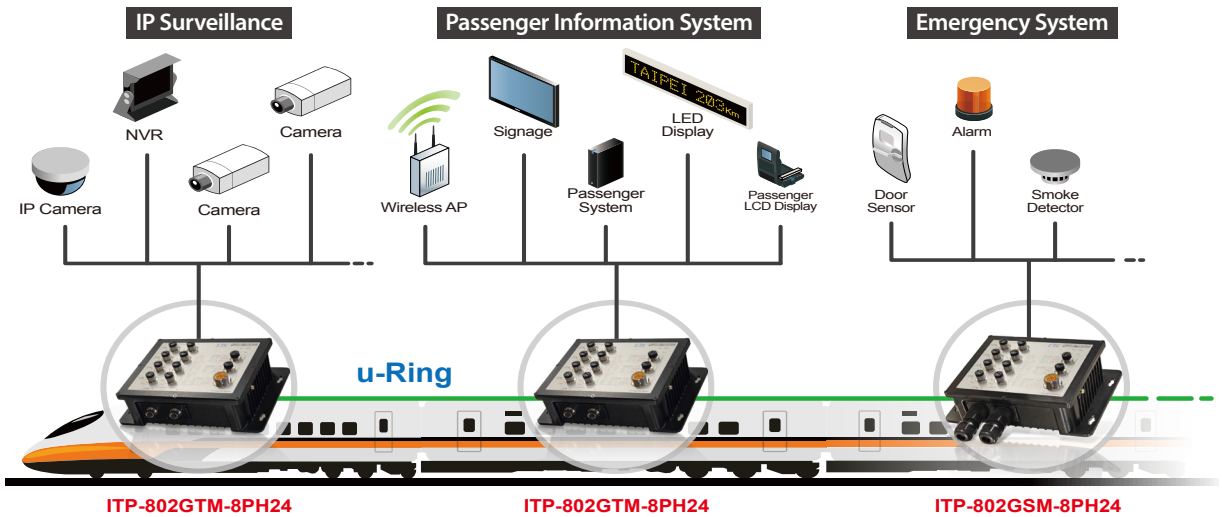


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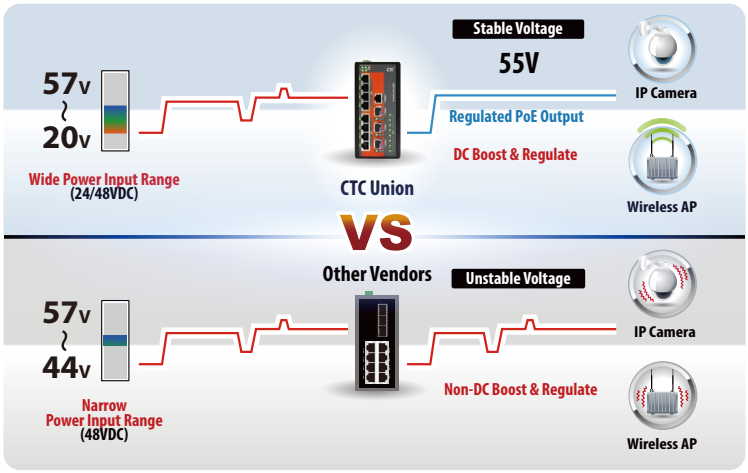
Figure 2 : High Efficiency Boost Technology for PoE



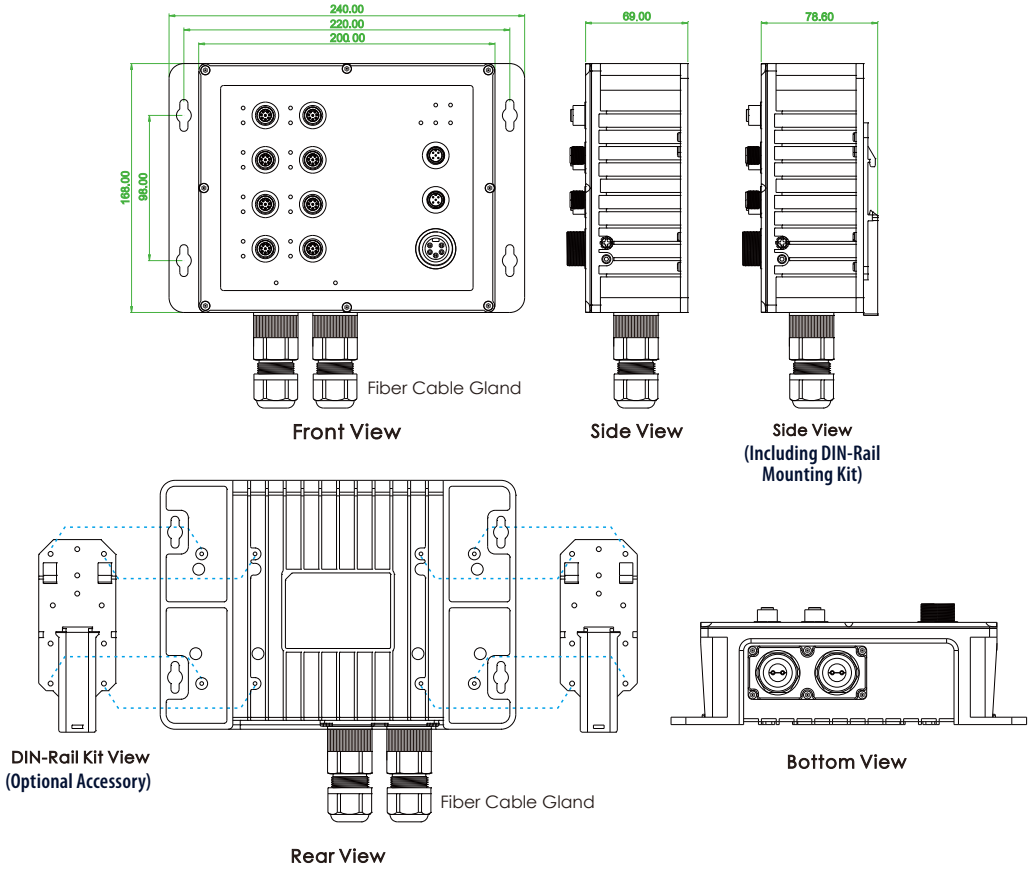
- Regulated PoE output voltage (55VDC) to stabilize PoE device
- Guarantee delivery PoE power distance to 100 meters
- Wide range input power 24/48VDC (20~57VDC)
- Built-in very high efficiency (94~97%) to boost PoE output voltage

Figure 3 : ITP Series for Industrial Automation

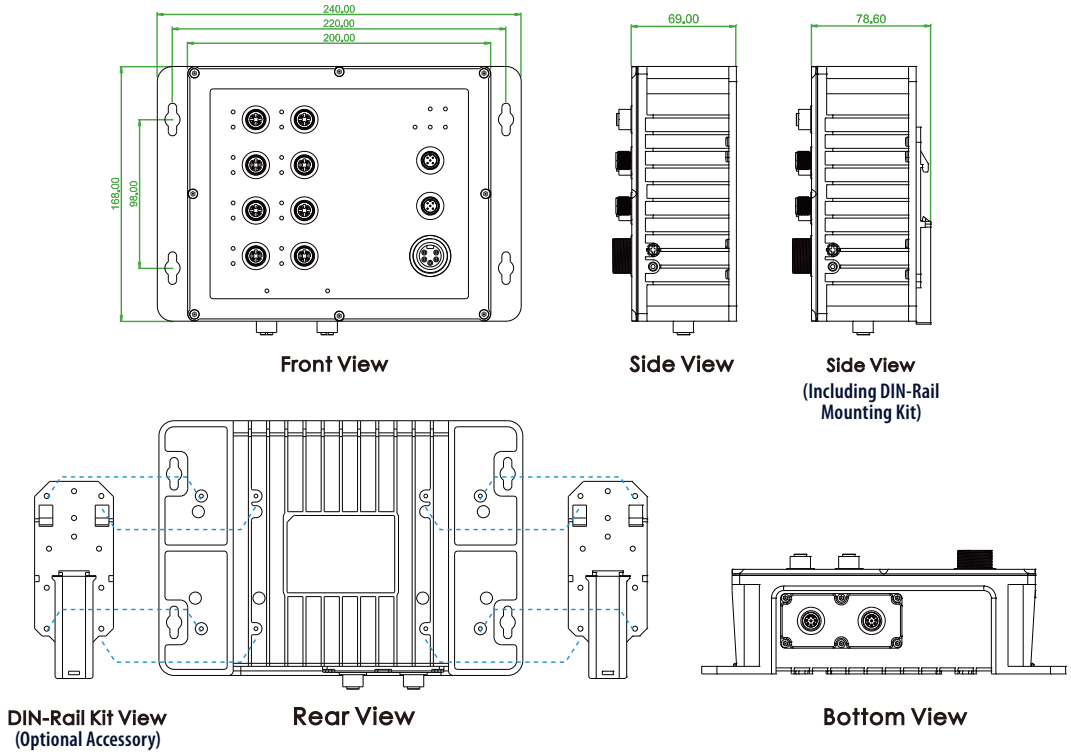
Figure 4 : IP67 Waterproof

Dimensions

▶ ITP-802GSM-8PH24



▶ ITP-802GTM-8PH24



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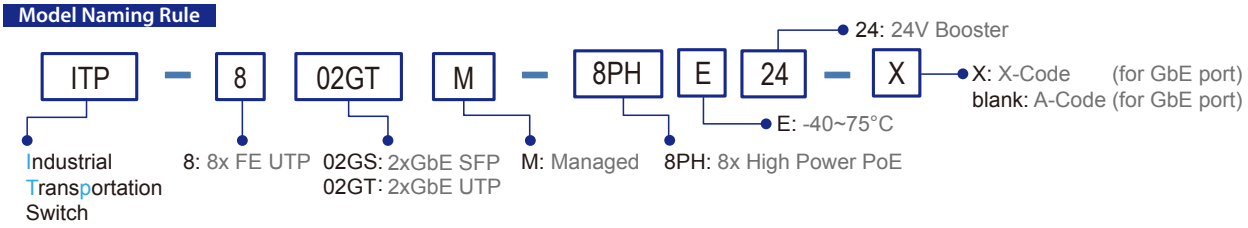
Ordering Information

Model Name	Managed	IP67	Total Port	UTP Port M12	UTP or SFP	PoE Port	PoE Total Power Budge	Power Input	Certification				Shock Vibration	Operating Temperature
				10/100 Base-TX	100/1000 Base-X	IEEEE 802.3at		Redundant	EN50155 EN50121-4	EN60950-1	EN61000-6-2 EN61000-6-4	CE FCC	IEC61373	
ITP-802GTM-8PHE24-X	V	V	10	8	2 (X-code)	8	180W	24/48VDC	V	V	V	V	V	-40~75°C
ITP-802GTM-8PHE24	V	V	10	8	2 (A-code)	8	180W	24/48VDC	V	V	V	V	V	-40~75°C
ITP-802GSM-8PHE24	V	V	10	8	2 SFP	8	180W	24/48VDC	V	V	V	V	V	-40~75°C

Model Naming Rule



Package List

- One of the device series
- Protective caps for SFP ports and console, alarm port
- Fiber Cable Gland for SFP port x 2 set (for ITP-802GSM-8PH24)
- Console cable (M12 to DB9)
- CD (Smartconfig, Manual)
- Quick installation guide

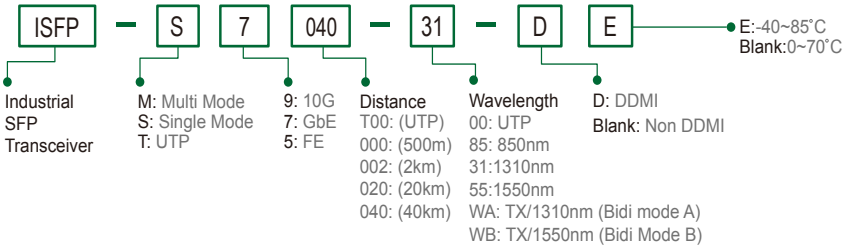
Optional Accessories

Industrial SFP Transceiver

The ISFP series of industrial grade SFP modules have been fully tested with the ITP-802GSM-8PH24 for guaranteed compatibility and performance. The best performance can be guaranteed even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheet for more details and more items.)

ISFP-M7000-85-D(E)	Industrial SFP GbE 1000Base-SX, M/M, 500 meter,wave length 850nm, 7.5dB, LC, DDMI, -10~70°C (-40~85°C)
ISFP-S7020-31-D(E)	Industrial SFP 1000Base-LX, S/M, 20km, wave length 1310nm, 15dB, LC, DDMI, -10~70°C (-40~85°C)
ISFP-M5002-31-D(E)	Industrial SFP 155M 100Base-FX, MM, 2km, wave length 1310nm, 12dB, LC, DDMI, -10~70°C (-40~85°C)
ISFP-S5030-31-D(E)	Industrial SFP 155M 100Base-FX, SM, 30km, 1310nm, 19dB, LC, DDMI, -10~70°C (-40~85°C)

SFP Naming Rule



Optional Cable/Connector & Din-Rail Kit

P/N: CAB-M12XM8-RJ45
M12 X-code Male (8-Pin) to RJ-45, AWG 24 ,IP67, 1 meter

For GbE UTP (X-code model)

P/N: CAB-M12AM8-RJ45
M12 A-code Male (8-Pin) to RJ-45, AWG 24 ,IP67, 1 meter

For GbE UTP (A-code model)

P/N: CAB-M12DM4-RJ45
M12 D-code Male (4-Pin) to RJ-45, AWG 24 ,IP67, 1 meter

For FE UTP

P/N: CAB-M12AF5-OPEN
M12 A-code Female (5-Pin) to open wire , AWG 22 , IP67, 1 meter

For Alarm

P/N: CAB-M23F5-OPEN
M23 Female (5-Pin) to open wire, (AWG 16) , IP67, 1 meter

For Power

P/N: M12A-M8
M12 A-code Male (8-Pin) connector, IP67

For GbE UTP (A-code model)

P/N: M12D-M4
M12 D-code Male (4-Pin) connector, IP67

For FE UTP

P/N: M12A-F5
M12 A-code Female (5-Pin) connector, IP67

For Alarm

P/N: IND-DNK04
Din Rail Kit for Industrial, Wide: 52mm

(130 X52mm / 4 Screws) (2pcs/set)

ITP-800-8PH24

M12, 8x 10/100Base, 8x PoE, 24/48VDC input

- 24/48VDC redundant dual input power
- Regulated PoE output voltage (55VDC)
- M12/M23 connector for UTP and Power
- EN50155, EN50121-4 for railway certified

The ITP-800-8PH24 is an unmanaged Fast Ethernet PoE switch that provides 8 10/100Base-TX PoE+ Fast Ethernet ports. The Ethernet switch is designed for industrial applications in harsh environments. The switch's Ethernet ports utilize M12 connectors to ensure tight, robust connections and guarantee reliable operation against environmental disturbances such as vibration and shock. The ITP-800-8PHE24 series Ethernet switches are compliant with EN50155, covering operating temperature, power input voltage, surge, ESD, vibration, and shock, thus making these switches suitable for industrial applications in vehicle, rolling stock and railways.

Features

- IP67 grade housing for against water, dust, and oil (Figure 3)
- Rugged and fanless design
- 8-Port 10/100Base-TX UTP with 8x IEEE802.3at/af PoE Ethernet Switch
- Use M12/M23 connector anti vibration and shock for vehicle, rolling stock, and railway applications
- 24/48VDC (20~57VDC) redundant dual input power with built-in very high efficiency (94~97%) to boost PoE output voltage to 55VDC
- Regulated PoE output voltage (55VDC) to stabilize PoE device, and guarantee delivery PoE power distance to 100 meters (Figure 2)
- Provides 8-port IEEE802.3af / 802.3at PoE output (30W per Port), Maximum PoE output power budget 180W
- Supports flow control
- DIN rail or wall mounting installation
- Supports broadcast storm protection
- Supports auto-negotiation and auto-MDI/MDI-X
- Wide operating temperature -40~75°C (ITP-800-8PHE24)
- CE, FCC, EN50155 and EN50121-4 for railway certified
- Industrial Grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified

Specifications

IEEE Standard	IEEE 802.3 10Base-T Ethernet
	IEEE 802.3u 100Base-TX Fast Ethernet
	IEEE 802.3x Flow Control and Back Pressure
	IEEE 802.3af PoE (Power over Ethernet)
	IEEE 802.3at PoE+ (Power over Ethernet enhancements)
Switch Architecture	Back-plane (Switching Fabric): 1.6Gbps (Full wire-speed)
Data Processing	Store and Forward
Flow Control	IEEE 802.3x flow control, back pressure flow control
Provides Broadcast Storm Protection	Present
MAC Address Table	1 K
Packet Buffer Size	448Kbits
Network Connector	8x M12 D-code Female
	10/100Base-TX auto negotiation speed
	Auto MDI/MDI-X function
	Full/Half duplex
Network Cable	10Base-T: 2-pair UTP/STP Cat. 5e cable
	EIA/TIA-568 100-ohm (100m)
	100Base-TX: 2-pair UTP/STP Cat. 5e cable
	EIA/TIA-568 100-ohm (100m)
Protocols	CSMA/CD
LED	Per unit: Power 1 (Green), Power 2 (Green)
	Per port: Link/Active (Green)
	PoE Port LED 1x LED /per Port : • PoE Output Power On : ON (Green)
Reverse Polarity Protection	Present for power input

Overload Current Protection	Supported
PoE Standard	IEEE 802.3af, IEEE 802.3at
PoE Power Budget	Maximum PoE output power budget 180W (30W/per port) Regulated PoE output voltage at 55VDC (Figure 2)
Power Supply	Provide 1x M23 (5-Pin, male) for redundant dual DC 24/48V (24~57VDC) input power Built-in very high efficiency (94~97%) to boost PoE output voltage to 55VDC Regulate PoE output voltage (55VDC) to stabilize PoE device, and guarantee delivery PoE power distance to 100 meters (Figure 2)

Power Consumption

Input Voltage	Total Power Consumption	Device Power Consumption	PoE Budget	Boost Efficiency
24 VDC	188.9W	3.6W	180W	95.7%
48 VDC	191W	4.3W	180W	96.0%

Operating Temperature	-40°C~75°C
Operating Humidity	5% to 95% (Non-condensing)
Storage Temperature	-40°C~85°C
Housing	IP67 water-proof grade housing, and fanless (Figure 3)
Dimensions	67 x 71.4 x 219.5 mm (D x W x H)
Weight	470g
Installation Mounting	Wall mounting, or DIN rail (optional)
MTBF	937,878 Hours (MIL-HDBK-217)
Warranty	5 years

Certification	
EMC	CE
EMI	FCC, FCC Part 15 Subpart B Class A
	CE
Railway Traffic	EN50155, EN50121-4
Immunity for Heavy Industrial Environment	EN61000-6-2
Emission for Heavy Industrial Environment	EN61000-6-4

EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B
	EN61000-4-3 (RS) Level 3, Criteria A
	EN61000-4-4 (Burst) Level 3, Criteria A
	EN61000-4-5 (Surge) Level 3, Criteria B
	EN61000-4-6 (CS) Level 3, Criteria A
	EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
	EN 61000-4-11 Voltage Dips
Safety	UL60950-1 (Pending)
Shock	IEC 61373
Freefall	IEC 60068-2-32
Vibration	IEC 61373

Application

Figure 1 : ITP Series in Onboard Train Application

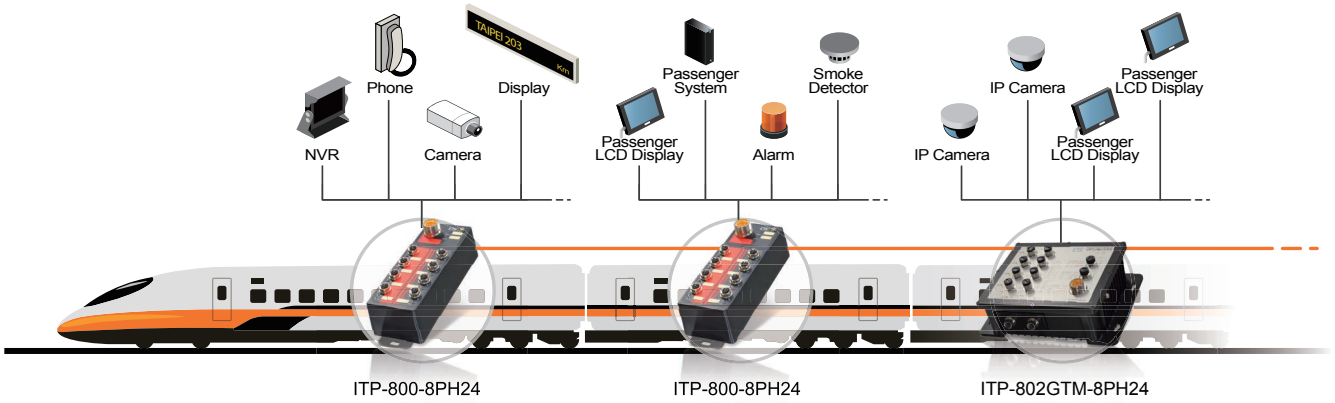


Figure 2 : High efficiency boost technology for PoE

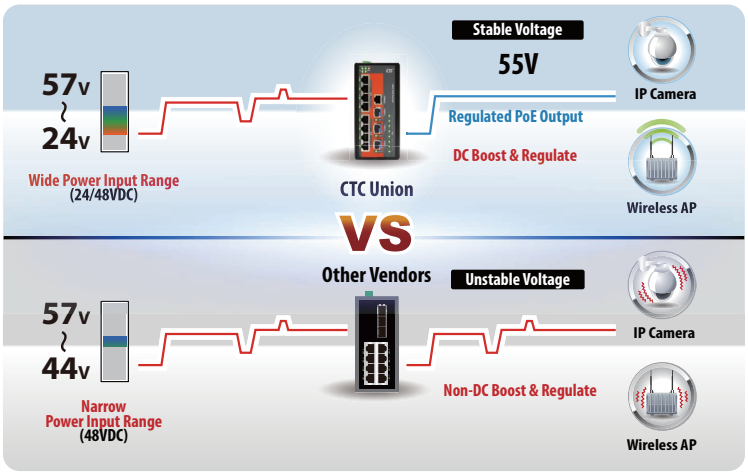


Figure 3 : IP67 water proof Protection

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

Figure 4 : Wide Range Temperature

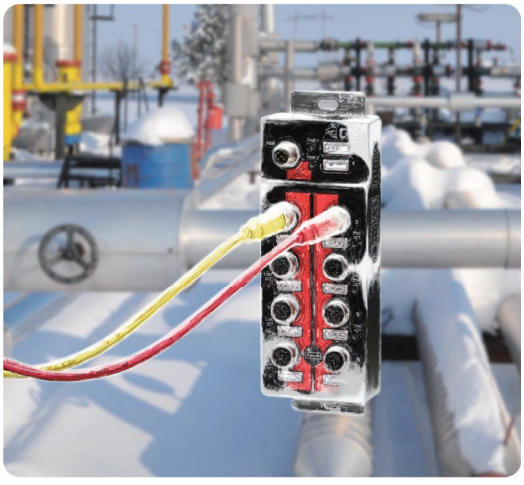
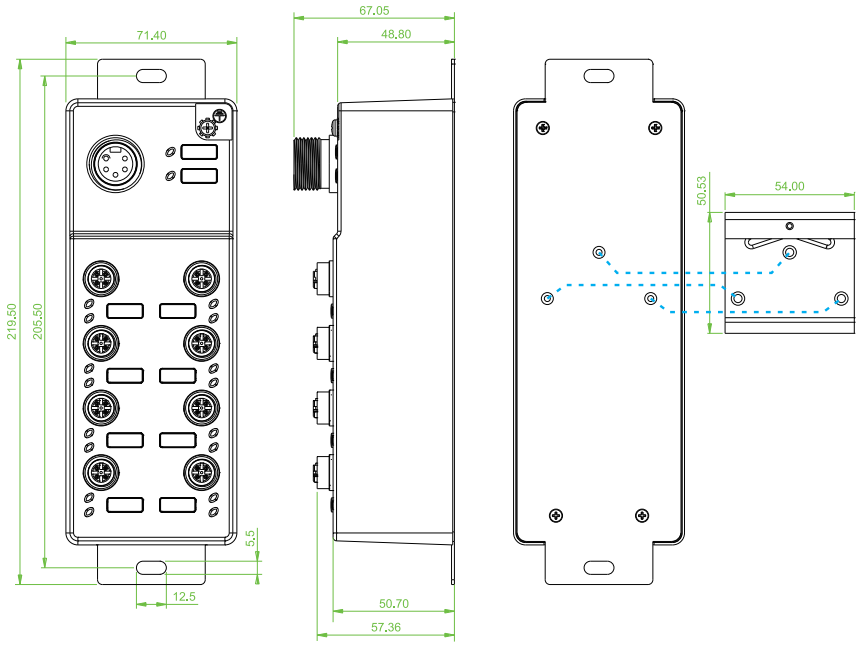


Figure 5 : ITP Series for Industrial Automation

Dimensions



Front View | Side View | Rear View | DIN-Rail Kit View **(Optional)**

Ordering Information

Model Name	IP67	Total Port	UTP Port M12	PoE Port	PoE Total Power Budget	Power Input	Certification				Shock Vibration	Operating Temperature
			10/100 Base-TX	IEEE802.3at		Redundant	EN50155	EN50121-4	EN61000-6-2 EN61000-6-4	CE FCC	IEC61373	
ITP-800-8PHE24	V	8	8	8	180W	24/48VDC	V	V	V	V	V	-40~75°C

Model Naming Rule

ITP – 8 00 – 8PH E 24

- ITP: Industrial TransPortation Switch
- 8: 8x FE UTP
- 00: 0 Fiber
- 8PH: 8x High Power PoE
- E: -40~75°C
- 24: 24V Booster

Package List

- ITP-800-8PHE24 device
- Protective caps for UTP port
- Wall mount (bound with switch device)
- Quick installation guide

Optional Accessories

Optional Cable/Connector

P/N: CAB-M12DM4-RJ45

M12 D-code Male (4-Pin) to RJ-45, AWG 24 ,IP67, 1 meter

For FE UTP

P/N: CAB-M23F5-OPEN

M23 Female (5-Pin) to open wire, (AWG 16) , IP67, 1 meter

For Power

P/N: M12D-M4

M12 D-code Male (4-Pin) connector, IP67

For FE UTP

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ITP-G802TM

10x 100/1000Base-T Managed Ethernet Switch

ITP-G802SM

8x 100/1000Base-T + 2x 100/1000Base-X SFP Managed Ethernet Switch

These models are managed industrial grade Gigabit switches that provide 8x GbE UTP + 2x GbE SFP or 10x GbE UTP. These switches provide advanced Ethernet functions are supported and include STP/RSTP/MSTP/ ITU-T G.8032 ERPS and multiple µ-Ring for redundant cabling, layer 2 Ethernet IGMP, VLAN, QoS ,Security, IPv6, bandwidth control, port mirroring, cable diagnostic and Green Ethernet.
Housed in rugged DIN rail or wall mountable enclosures, these switches are designed for the harshest environments. These switches use M12 connectors to ensure water tight, robust connections and to guarantee reliable connections against environmental disturbances, such as vibration and shock. These models are compliant with EN50155, covering power input voltage, surge, EFT, ESD, vibration, shock, thus making the switches suitable for industrial applications, such as vehicle, rolling stock, ship, and vessel.
These models are IP67 rated to protect against dust and water submersion. They are particularly used in environments with extreme temperature, high humidity, oil, dust and in outdoor environments requiring water-proof applications such as IP surveillance and city security. They can also work with CTC Union's platform SmartView™ Which provides convenient, real-time and centralized device management.

Features

- 10x 10/100/1000Base-T M12 UTP (Total 10 ports) (ITP-G802TM)
- 8x 10/100/1000Base-T M12 UTP and 2x 100/1000Base-X SFP Fiber (Total 10 ports) (ITP-G802SM)
- M12 and M23 connector against vibration and shock, X-code or A-code M12 for Gigabit port optional
- IP67 grade housing for against water, dust, and oil (Figure 3)
- Redundant and wide input range voltage, Low voltage (12/24/48VDC) and High Voltage (110/220VDC or 110/220VAC)
- EN60950-1, CE, FCC, Rail Traffic EN50155, EN45545-2, EN50121-4 certified
- Heavy industrial grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- Cable diagnostics, identifies opens/shorts from 7 to 100 meters
- Supports Green Ethernet IEEE 802.3az EEE (Energy Efficient Ethernet) management to optimize the power consumption
- STP, RSTP, MSTP, ITU-T G.8032 Ethernet Protection Ring (EPR) for redundant cabling
- Provides up to 5 instances that each supports µ-Ring, µ-Chain or Sub-Ring type for flexible uses. (Please see CTC Union's µ-Ring white paper for more details)
- µ-Ring for Redundant Cabling, recovery time<10ms in 250 maximum devices
- Build-in 2 bypass GbE UTP ports to avoid one or more nodes power fail in a ring or bus structure to collapse the network (ITP-G802TM)
- DHCP Server/ Client/ Relay/ Relay option 82/ Snooping
- Support TTDP for train application
- QoS, Traffic classification QoS, CoS, bandwidth control for Ingress and Egress, Storm Control, DiffServ
- IEEE 802.1q VLAN, MAC based VLAN, IP subnet based VLAN, Protocol based VLAN, VLAN translation, GVRP, MVR
- Dynamic IEEE 802.3ad LACP Link Aggregation, Static Link Aggregation
- IGMP snooping V1/V2/V3, IGMP Filtering/ Throttling, IGMP query, IGMP proxy reporting, MLD snooping V1/V2
- Security : Port based and MAC based IEEE 802.1X, RADIUS, ACL, TACACS+, HTTP/HTTPS, SSL/SSH v2
- Software upgrade via TFTP and HTTP, redundant firmware to avoid in case of upgrade failure
- 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
- RMON, MIB II, Port mirroring, Event syslog, DNS, NTP, SNTP, IEEE 802.1ab LLDP
- Supports IPv6 Telnet server /ICMP v6
- CLI, Web based management, SNMP v1/v2c/v3, Telnet server for management
- Provides SmartConfig for quick and easy mass Configuration Tool*
- Supports SmartView for Centralized Management*

*Please see Chapter 1- **Software Management** for more details

Specifications

Standard	IEEE 802.3	10Base-T 10Mbit/s Ethernet
	IEEE 802.3u	100Base-TX, 100Base-FX, Fast Ethernet
	IEEE 802.3ab	1000Base-T Gbit/s Ethernet over twisted pair
	IEEE 802.3z	1000Base-X Gbit/s Ethernet over Fiber-Optic
	IEEE 802.1d	STP (Spanning Tree Protocol)
	IEEE 802.1w	RSTP (Rapid Spanning Tree Protocol)
	IEEE 802.1s	MSTP (Multiple Spanning Tree Protocol)

Standard	ITU-T G.8032 / Y.1344	ERPS (Ethernet Ring Protection Switching)
	IEEE 802.1Q	Virtual LANs (VLAN)
	IEEE 802.1X	Port based and MAC based Network Access Control, Authentication
	IEEE 802.3ac	Max frame size extended to 1522Bytes
	IEEE 802.3ad	Link aggregation for parallel links with LACP(Link Aggregation Control Protocol)
	IEEE 802.3x	Flow control for Full Duplex

Standard	IEEE 802.3ac	Max frame size extended to 1522Bytes
	IEEE 802.1ad	Stacked VLANs, Q-in-Q
	IEEE 802.1p	LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization
	IEEE 802.1ab	Link Layer Discovery Protocol (LLDP)
	IEEE 802.3az	EEE (Energy Efficient Ethernet)
VLAN ID	4094 IEEE 802.1Q VLAN VID	
Switch Architecture	Back-plane (Switching Fabric): 20Gbps (Full wire-speed)	
Data Processing	Store and Forward	
Flow Control	IEEE 802.3x for full duplex mode Back pressure for half duplex mode	
Network Connector	10x M12 (8-Pin, Female, A-Code or X-code) 10/100/1000Base-T UTP (ITP-G802TM) 8x M12(8-Pin, Female, A-Code or X-code) 10/100/1000Base-T + 2x 100/1000Base-X SFP (ITP-G802SM) UTP port provide auto negotiation speed, Auto MDI/MDI-X, Full/Half duplex function Build-in 2x bypass GbE UTP ports (ITP-G802TM) 2x Water-proof cable connector 2x 100/1000Base-X SFP slot, with DDMI (for ITP-G802SM)	
Console	RS-232 (5-pin A-Code M12 male)	
Network Cable	UTP/STP above Cat. 5e cable	
	EIA/TIA-568 100-ohm (100m)	
Protocols	CSMA/CD	
Reverse Polarity Protection	Supported	
Overload Current Protection	Supported	
CPU Watch Dog	Supported	
LED	Per unit: Power 1 (Green), Power 2 (Green), Fault (Amber), CPU Act (Green), Ring Master (Amber)	
	UTP port: 10/100 Link/Active (Green) 1000 Link/Active (Amber)	
	SFP Fiber Per port: Link/Active (Green)	
Jumbo Frame	9.6KB	
MAC Address Table	8K	
Memory Buffer	512K Bytes for packet buffer	
Power Supply	Provides 1x M23 (5-Pin, male) for redundant dual input, optional Low (L) or High (H) voltage. Low voltage (L) : 12/24/48V (8.4~60VDC) High voltage (H) : 110/220VDC (88~300VDC), or 110/220VAC (85~264VAC)	

Power Consumption

	ITP-G802SM-LL	ITP-G802SM-HL	ITP-G802TM-LL	ITP-G802TM-HL
12VDC	8.5W	9.9W	10.1W	11.9W
24VDC	9.2W	10.3W	10.9W	12.3W
48VDC	11W	11.6W	13.1W	14W
110 VAC/VDC		9.9W		11.9W
220 VAC/VDC		9.9W		11.9W

Warning Message	System Syslog, SMTP/ e-mail event message, alarm relay
Alarm Relay Contact	5-pin A-code M12 male Relay outputs with current carrying capacity of 1 A @24VDC
Operating Temperature	-40 ~ 75°C
Operating Humidity	5% to 95% (Non-condensing)
Storage Temperature	-40 ~ 85°C
Housing	Rugged Metal, Fanless , IP67 grade housing for against water, dust, and oil (Figure 3)
Dimensions	69 x 240 x 168mm (D x W x H)
Weight	2.645kg (ITP-G802SM-LL) 2.82kg (ITP-G802SM-HL) 2.625kg (ITP-G802TM-LL) 2.8kg (ITP-G802TM-HL)
Installation Mounting	Wall mounting, or DIN Rail mounting (Optional)
MTBF	443,868 Hours (ITP-G802SM-LL) 353,092 Hours (ITP-G802SM-HL) 423,602 Hours (ITP-G802TM-LL) 349,564 Hours (ITP-G802TM-HL) (MIL-HDBK-217)
Warranty	5 years
Certification	
EMC	CE
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE
Railway Traffic	EN50155, EN50121-4
Fire protection of railway vehicles	EN45545-2
Immunity for Heavy Industrial Environment	EN61000-6-2
Emission for Heavy Industrial Environment	EN61000-6-4
EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B EN61000-4-3 (RS) Level 3, Criteria A EN61000-4-4 (Burst) Level 3, Criteria A EN61000-4-5 (Surge) Level 3, Criteria B EN61000-4-6 (CS) Level 3, Criteria A EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
Safety	EN60950-1
Shock	IEC-61373
Freefall	IEC 60068-2-32
Vibration	IEC-61373

Software Specifications

Topology	
VLAN	IEEE 802.1q VLAN,up to 4094 802.1Q VLAN VID
	IEEE 802.1q VLAN,up to 4094 Groups
	IEEE 802.1ad Q-in-Q
	MAC-based VLAN,up to 256 entries
	IP Subnet-based VLAN, up to 128 entries
	Protocol-based VLAN(Ethernt, SNAP, LLC), up to 128 entries
	VLAN Translation, up to 256 entries
	GVRP (GARP VLAN Registration Protocol)
	MVR (Multicast VLAN Registration)
Link Aggregation (Port Trunk)	Static (Hash with SA, DA, IP, TCP/UDP port), up to 5 trunk group
	Dynamic (IEEE 802.3ad LACP), up to 5 trunk group
Spanning Tree	IEEE802.1d STP, IEEE802.1w RSTP, IEEE802.1s MSTP
Multiple u-Ring	up to 5 instances that each supports u-Ring, u-Chain or Sub-Ring type for flexible uses, and maximum up to 5 Rings. Recovery time <10ms The maximum number of devices allowed in a Ring supported ring is 250. (Please see CTC µ-Ring white paper for more details and more topology application)
Loop Protection	Supported
ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)	Recovery time <50ms
	Single Ring, Sub-Ring, Multiple ring topology network
QoS Feature	
Class of Service	IEEE802.1p 8 active priorities queues for per port

Traffic Classification QoS	IEEE802.1p based CoS
	IP Precedence based CoS
	IP DSCP based CoS
	QCL(QoS Control List): Frame Type, Source/ Destination MAC, VLAN ID, PCP, DEI
	QCE(QoS Control Entry): Protocol, Source IP, IP Fragment, DSCP, TCP/UDP port number
Bandwidth Control for Ingress	Rate in steps : 1 kbps / Mbps / fps / kfps
	Range : 100 kbps to 1Gbps / 1fps to 3300kfps
	Rate Unit : bit or frame
Bandwidth Control for Egress	Rate in steps : 1 kbps / Mbps
	Range : 100 kbps to 1Gbps
	Rate Unit : bit Per queue / Per port shaper
DiffServ (RF 2474) Remarking	
Storm Control	for Unicast, Broadcast, Multicast
IP Multicasting Feature	
IGMP / MLD Snooping	IGMP Snooping v1, v2, v3 / MLD Snooping v1, v2
	Port Filtering Profile, Throttling
IGMP / MLD Snooping	Fast Leave
	Maximum Multicast Group : up to 1022 entries
	Query / Static Router Port
Security Features	
IEEE 802.1X	Port-Based, MAC-Based
ACL	Number of rules : up to 256 entries
	for L2 / L3 / L4 L2: Mac address SA/DA/VLAN L3: IP address SA/DA, Subnet L4: TCP/UDP

RADIUS authentication & accounting	
TACACS+ authentication & accounting, TACACS+ 3.0	
HTTPS, HTTP	Supported
SSL / SSH v2	Supported
User Name Password Authentication	Local Authentication Remote Authentication (via RADIUS / TACACS+)
Management Interface Access Filtering	Web, Telnet / SSH , CLI RS-232 console
Management Features	
CLI	Cisco® like CLI
Web Based Management	
Telnet	Server
SNMP	TFTP, HTTP
SW & Configuration Upgrade	TFTP, HTTP Redundant firmware in case of upgrade failure
RMON	RMON I (1, 2, 3, 9 group), RMON II
MIB II	RFC 1213
UPnP	Supported
DHCP	Server, Client, Relay, Relay option 82 , Snooping
TTDP	Supported (Train Topology Discovery Protocol)
IP Source Guard	Supported
Port Mirroring	Supported
Event Syslog	Syslog server (RFC3164) (Support 1 server)
Warning Message	System syslog, e-mail, alarm relay
DNS	Client, Proxy

IEEE1588 PTP V2	Support 5 operating mode in each port : Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave
NTP, SNTP	Client
LLDP (IEEE 802.1ab)	Link Layer Discovery Protocol LLDP-MED
IPv6 Features	
IPv6 Management	Telnet Server/ICMP v6
SNMP over IPv6	Supported
HTTP over IPv6	Supported
SSH over IPv6	Supported
IPv6 Telnet	Supported
IPv6 NTP, SNTP	Client
IPv6 TFTP	Supported
IPv6 QoS	Supported
IPv6 ACL	Number of rules: up to 256 entries for L2 / L3 / L4 L2: Mac address SA/DA/VLAN L3: IP address SA/DA, Subnet L4: TCP/UDP
Others Features	
Green Ethernet	Supports IEEE802.3az EEE (Energy Efficient Ethernet) Management to optimize the power consumption Determine the cable length and lowering the power for ports with short cables Lower the power for a port when there is no link LED Power Management :Adjustment LEDs intensity
Cable Diagnostic	Measuring UTP cable OK or broken point distance

Application

Figure 1 : ITP Series in Onboard Train Application

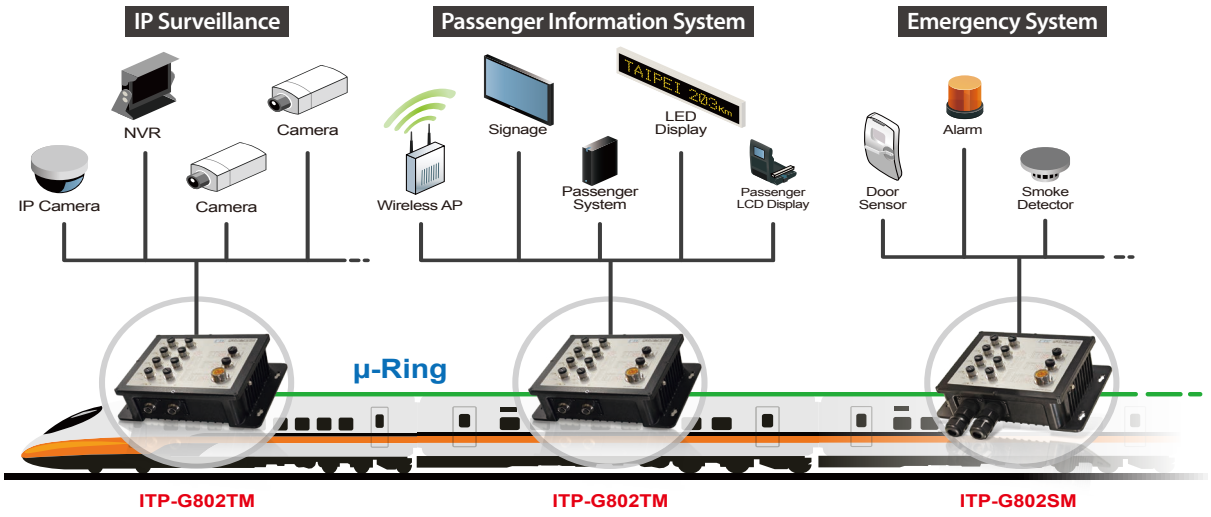
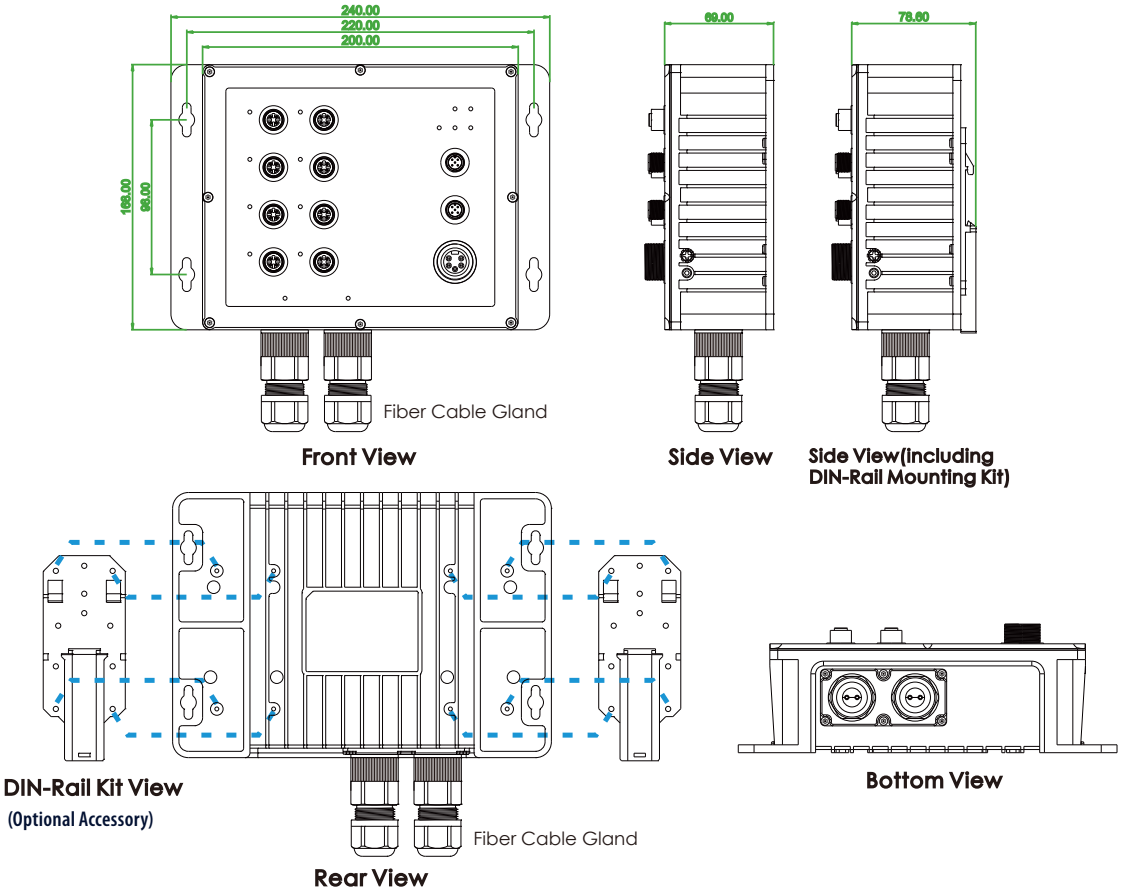


Figure 2 : ITP Series for Industrial Automation

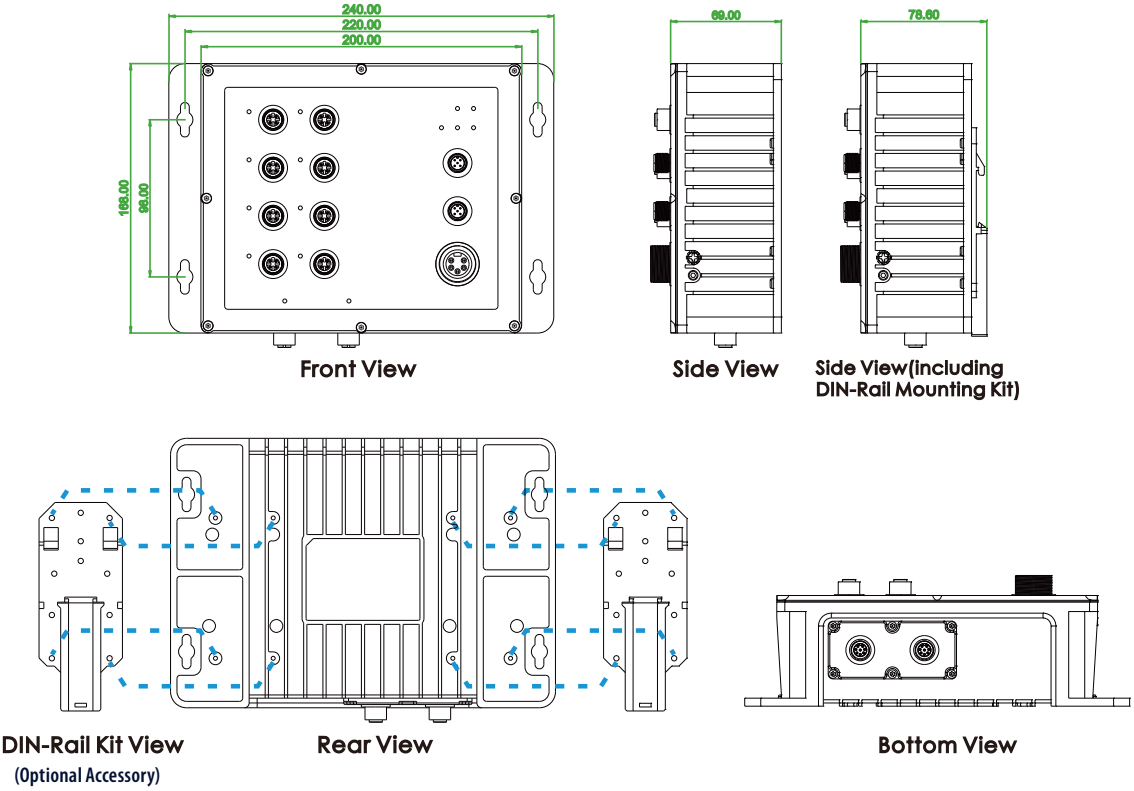
Figure 3 : IP67 Waterproof

Dimensions

▶ ITP-G802SM



▶ ITP-G802TM



Ordering Information

Model Name	Managed	IP67	Total Port	UTP Port M12	Fiber Port	Redundant Power supply		Certification				Shock Vibration	Operating Temperature
				10/100/1000 Base-T(X)	100/1000 Base-X	Low Volt 12/24/48VDC (8.4~60VDC)	High Volt 110/220 VDC 110/220 VAC	EN50155 EN50121-4	EN60950-1	EN61000-6-2 EN61000-6-4	CE FCC	IEC61373	
ITP-G802SM-ELL-X	V	V	10	8 (X-code)	2 SFP	2		V	V	V	V	V	-40~75°C
ITP-G802SM-EHL-X	V	V	10	8 (X-code)	2 SFP	1	1	V	V	V	V	V	-40~75°C
ITP-G802SM-ELL	V	V	10	8 (A-code)	2 SFP	2		V	V	V	V	V	-40~75°C
ITP-G802SM-EHL	V	V	10	8 (A-code)	2 SFP	1	1	V	V	V	V	V	-40~75°C
ITP-G802TM-ELL-X	V	V	10	10 (X-code)		2		V	V	V	V	V	-40~75°C
ITP-G802TM-EHL-X	V	V	10	10 (X-code)		1	1	V	V	V	V	V	-40~75°C
ITP-G802TM-ELL	V	V	10	10 (A-code)		2		V	V	V	V	V	-40~75°C
ITP-G802TM-EHL	V	V	10	10 (A-code)		1	1	V	V	V	V	V	-40~75°C

Model Naming Rule

ITP – G 8 02S M – E HL – X

- ITP: Industrial Transportation Switch
- G: GbE Switch
- 8: 8x GbE UTP
- 02S: 2xSFP, 02T: 2xUTP
- M: Managed
- E: -40~75°C
- HL: 1x High Voltage + 1x Low Voltage
- LL : 2x Low Voltage
- X: X-Code (for GbE port)
- blank: A-Code (for GbE port)

Package List

- One of the device series
- Protective caps for SFP ports and console, alarm port
- Fiber Cable Gland for SFP port x 2 set (for ITP-G802SM)
- Console cable (M12 to DB9)
- CD (Smartconfig, Manual)
- Quick installation guide

Optional Accessories

Industrial SFP Transceiver

The ISFP series of industrial grade SFP modules have been fully tested with the ITP-G802SM for guaranteed compatibility and performance. The best performance can be guaranteed even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheet for more details and more items.)

ISFP-M7000-85-D(E)	Industrial SFP GbE 1000Base-SX, M/M, 500 meter,wave length 850nm, 7.5dB, LC, DDMI, -10~70°C (-40~85°C)
ISFP-S7020-31-D(E)	Industrial SFP 1000Base-LX, S/M, 20km, wave length 1310nm, 15dB, LC, DDMI, -10~70°C (-40~85°C)
ISFP-M5002-31-D(E)	Industrial SFP 155M 100Base-FX, MM, 2km, wave length 1310nm, 12dB, LC, DDMI, -10~70°C (-40~85°C)
ISFP-S5030-31-D(E)	Industrial SFP 155M 100Base-FX, SM, 30km, 1310nm, 19dB, LC, DDMI, -10~70°C (-40~85°C)

SFP Naming Rule

ISFP – S 7 040 – 31 – D E

- ISFP: Industrial SFP Transceiver
- S: M: Multi Mode, S: Single Mode, T: UTP
- 7: 9: 10G, 7: GbE, 5: FE
- 040: Distance — T00: (UTP), 000: (500m), 002: (2km), 020: (20km), 040: (40km)
- 31: Wavelength — 00: UTP, 85: 850nm, 31:1310nm, 55:1550nm, WA: TX/1310nm (Bidi mode A), WB: TX/1550nm (Bidi Mode B)
- D: DDMI, Blank: Non DDMI
- E: -40~85°C, Blank: 0~70°C

Optional Cable/Connector & Din-Rail Kit

P/N: CAB-M12XM8-RJ45
M12 X-code Male (8-Pin) to RJ-45, AWG 24 ,IP67, 1 meter

For GbE UTP (X-code model)

P/N: CAB-M12AM8-RJ45
M12 A-code Male (8-Pin) to RJ-45, AWG 24 ,IP67, 1 meter

For GbE UTP (A-code model)

P/N: CAB-M12AF5-OPEN
M12 A-code Female (5-Pin) to open wire , AWG 22 , IP67, 1 meter

For Alarm

P/N: CAB-M23F5-OPEN
M23 Female (5-Pin) to open wire, (AWG 16) , IP67, 1 meter

For Power

P/N: M12A-M8
M12 A-code Male (8-Pin) connector, IP67

For GbE UTP (A-code model)

P/N: M12A-F5
M12 A-code Female (5-Pin) connector, IP67

For Alarm

P/N: IND-DNK04
Din Rail Kit for Industrial, Wide: 52mm

(130 X52mm / 4 Screws) (2pcs/set)

ITP-1204GTM

12x 10/100Base–TX + 4x 10/100/1000Base-T Managed Ethernet Switch

ITP-2204GTM

22x 10/100Base–TX + 4x 10/100/1000Base-T Managed Ethernet Switch

These models of industrial grade M12 managed Ethernet switches provide total 16/26 ports Ethernet connectivity, come with 12/22 ports 10/100Base-TX and 4 ports 10/100/1000Base-T(X).
The switches use M12/M23 connectors to ensure tight and robust connections to guarantee reliable connections against environmental disturbances, such as strongly vibration and shock. These switches provide wide power input range of 24/48/72/96/110VDC (operating range 20 to 137.5VDC) making this product series suitable for rolling stock and track side installations. ITP series switches, defined by the EN 50155 standard, cover power input voltage and insulation, surge, EFT, ESD, operating temperature, thus making the M12 switches suitable for industrial applications, not only for rolling stock, vehicle but also for oil, gas, mining and heavy industry applications.
These switches provide a variety of advanced Ethernet functionalities including STP/RSTP/MSTP/ ITU-T G.8032 ERPS and µ-Ring, µ-Chain (recovery time <10ms @250 devices) for networking redundancy, layer 2 Ethernet IGMP, VLAN, QoS, Security, IPv6, bandwidth control, port mirroring, cable diagnostic and Green Ethernet. They can work with CTC Union's platform SmartView™ Which provides convenient, real-time and centralized device management.

Features

- 12x 10/100Base–TX + 4x 10/100/1000Base-T (ITP-1204GTM)
- 22x 10/100Base–TX + 4x 10/100/1000Base-T (ITP-2204GTM)
- M12 and M23 fiber connector against vibration and shock, M12 X-code for Gigabit port
- IP64 grade housing protection
- 24/48/72/96/110VDC (20~137.5VDC) redundant dual wide input power
- Supports negative voltage power input (for example in telecom system)
- EN45545-2, EN-60950-1, CE, FCC, Rail Traffic EN50155,EN50121-4 certified
- Heavy industrial grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- 4KV surge protection for UTP ports
- 2.25K VDC Hi-pot isolation protection for Ethernet ports and power
- Cable diagnostics, identifies opens/shorts from 7 to 100 meters
- Supports Green Ethernet IEEE 802.3az EEE (Energy Efficient Ethernet) management to optimize the power consumption
- STP, RSTP, MSTP, ITU-T G.8032 Ethernet Protection Ring (EPR) for redundant cabling
- Provides up to 5 instances that each supports µ-Ring, µ-Chain or Sub-Ring type for flexible uses. (Please see CTC Union's µ-Ring white paper for more details)
- µ-Ring for Redundant Cabling, recovery time<10ms in 250 maximum devices
- Build-in 2 bypass GbE UTP ports to avoid one or more nodes power fail in a ring or bus structure to collapse the network (-BP bypass model)
- DHCP Server/ Client/ Relay/ Relay option 82/ Snooping
- Support TTDP for train application
- QoS, Traffic classification QoS, CoS, bandwidth control for Ingress and Egress, Storm Control, DiffServ
- IEEE 802.1q VLAN, MAC based VLAN, IP subnet based VLAN, Protocol based VLAN, VLAN translation, GVRP, MVR
- Dynamic IEEE 802.3ad LACP Link Aggregation, Static Link Aggregation
- IGMP snooping V1/V2/V3, IGMP Filtering/ Throttling, IGMP query, IGMP proxy reporting, MLD snooping V1/V2
- Security : Port based and MAC based IEEE 802.1X, RADIUS, ACL, TACACS+, HTTP/HTTPS, SSL/SSH v2
- Software upgrade via TFTP and HTTP, redundant firmware to avoid in case of upgrade failure
- 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
- RMON, MIB II, Port mirroring, Event syslog, DNS, NTP, SNTP, IEEE 802.1ab LLDP
- Supports IPv6 Telnet server /ICMP v6
- CLI, Web based management, SNMP v1/v2c/v3, Telnet server for management
- Provides SmartConfig for quick and easy mass Configuration Tool*
- Supports SmartView for Centralized Management*

*Please see Chapter 1- **Software Management** for more details

Specifications

Standard	IEEE 802.3	10Base-T 10Mbit/s Ethernet
	IEEE 802.3u	100Base-TX, 100Base-FX, Fast Ethernet
	IEEE 802.3ab	1000Base-T Gbit/s Ethernet over twisted pair
	IEEE 802.1d	STP (Spanning Tree Protocol)
	IEEE 802.1w	RSTP (Rapid Spanning Tree Protocol)
	IEEE 802.1s	MSTP (Multiple Spanning Tree Protocol)

Standard	ITU-T G.8032 / Y.1344	ERPS (Ethernet Ring Protection Switching)
	IEEE 802.1Q	Virtual LANs (VLAN)
	IEEE 802.1X	Port based and MAC based Network Access Control, Authentication
	IEEE 802.3ac	Max frame size extended to 1522Bytes

Standard	IEEE 802.3ad	Link aggregation for parallel links with LACP(Link Aggregation Control Protocol)
	IEEE 802.3x	Flow control for Full Duplex
	IEEE802.3ac	Max frame size extended to 1522Bytes
	IEEE 802.1ad	Stacked VLANs, Q-in-Q
	IEEE 802.1p	LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization
	IEEE 802.1ab	Link Layer Discovery Protocol (LLDP)
	IEEE 802.3az	EEE (Energy Efficient Ethernet)
VLAN ID	4094 IEEE802.1Q VLAN VID	
Switch Architecture	10.4 Gbps (ITP-1204GTM) 12.4Gbps (ITP-2204GTM) (Full wire-speed)	
Data Processing	Store and Forward	
Flow Control	IEEE 802.3x for full duplex mode Back pressure for half duplex mode	
Network Connector	12x M12 (4-Pin, Female,D-Code) 10/100Base-TX UTP + 4x M12 (8-Pin, Female, X-Code) 10/100/1000Base-T UTP (ITP-1204GTM) 22x M12 (4-Pin, Female,D-Code) 10/100Base-TX UTP + 4x M12 (8-Pin, Female, X-Code) 10/100/1000Base-T UTP (ITP-2204GTM) UTP port provide auto negotiation speed, Auto MDI/ MDI-X, Full/Half duplex function Build-in 2x bypass GbE UTP ports (For -BP model optional)	
Console	RS-232 (5-pin A-Code M12 male)	
Network Cable	UTP/STP above Cat. 5e cable	
	EIA/TIA-568 100-ohm (100m)	
Protocols	CSMA/CD	
Reverse Polarity Protection	Supported	
Overload Current Protection	Supported	
CPU Watch Dog	Supported	
LED	Per unit: Power 1 (Green), Power 2 (Green), Fault (Amber), CPU Act (Green), Ring Master (Amber)	
	UTP port: 10/100 Link/Active (Green) 1000 Link/Active (Amber)	
Jumbo Frame	9.6KB	
MAC Address Table	8K	
Memory Buffer	512K Bytes for packet buffer	
Power Supply	Provides 1x M23 (5-Pin, male) for redundant dual DC 24/48/72/96/110VDC (20~137.5VDC) wide input power Supports negative voltage power input (for example in telecom system)	
Power Consumption	TBD	
Warning Message	System Syslog, SMTP/ e-mail event message, alarm relay	

Alarm Relay Contact	5-pin A-code M12 male Relay outputs with current carrying capacity of 1 A @24VDC
Operating Temperature	-40 ~ 75°C
Operating Humidity	5% to 95% (Non-condensing)
Storage Temperature	-40 ~ 85°C
Housing	Rugged Metal, Fanless, IP64 grade housing protection
Dimensions	113 x 260 x 132 (D x W x H) (ITP-1204GTM) 113 x 360 x 132 (D x W x H) (ITP-2204GTM)
Weight	TBD
Installation Mounting	Wall mounting
MTBF	TBD (MIL-HDBK-217)
Warranty	5 years
Certification	
EMC	CE (EN55024, EN55032)
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE
Railway Traffic	EN50155, EN50121-4
Fire protection of railway vehicles	EN 45545-2
Immunity for Heavy Industrial Environment	EN61000-6-2
Emission for Heavy Industrial Environment	EN61000-6-4
EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B
	EN61000-4-3 (RS) Level 3, Criteria A
	EN61000-4-4 (Burst) Level 3, Criteria A
	EN61000-4-5 (Surge) Level 3, Criteria B
	EN61000-4-6 (CS) Level 3, Criteria A
	EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
Safety	EN60950-1
Hi pot protection	DC 2.25KV for power to chassis ground, Ethernet port to chassis ground
4KV surge protection	Supported for UTP port
Shock	IEC-61373
Freefall	IEC 60068-2-32
Vibration	IEC-61373

Software Specifications

Topology	
VLAN	IEEE 802.1q VLAN,up to 4094 802.1Q VLAN VID
	IEEE 802.1q VLAN,up to 4094 Groups
	IEEE 802.1ad Q-in-Q
	MAC-based VLAN,up to 256 entries
	IP Subnet-based VLAN, up to 128 entries
	Protocol-based VLAN(Ethernt, SNAP, LLC), up to 128 entries
	VLAN Translation, up to 256 entries
	GVRP (GARP VLAN Registration Protocol)
	MVR (Multicast VLAN Registration)
Link Aggregation (Port Trunk)	Static (Hash with SA, DA, IP, TCP/UDP port), up to 5 trunk group
	Dynamic (IEEE 802.3ad LACP), up to 5 trunk group
Spanning Tree	IEEE802.1d STP, IEEE802.1w RSTP, IEEE802.1s MSTP
Multiple µ-Ring	up to 5 instances that each supports µ-Ring, µ-Chain or Sub-Ring type for flexible uses, and maximum up to 5 Rings. Recovery time <10ms The maximum number of devices allowed in a Ring supported ring is 250. (Please see CTC µ-Ring white paper for more details and more topology application)
Loop Protection	Supported
ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)	Recovery time <10ms
	Single Ring, Sub-Ring, Multiple ring topology network
QoS Feature	
Class of Service	IEEE802.1p 8 active priorities queues for per port

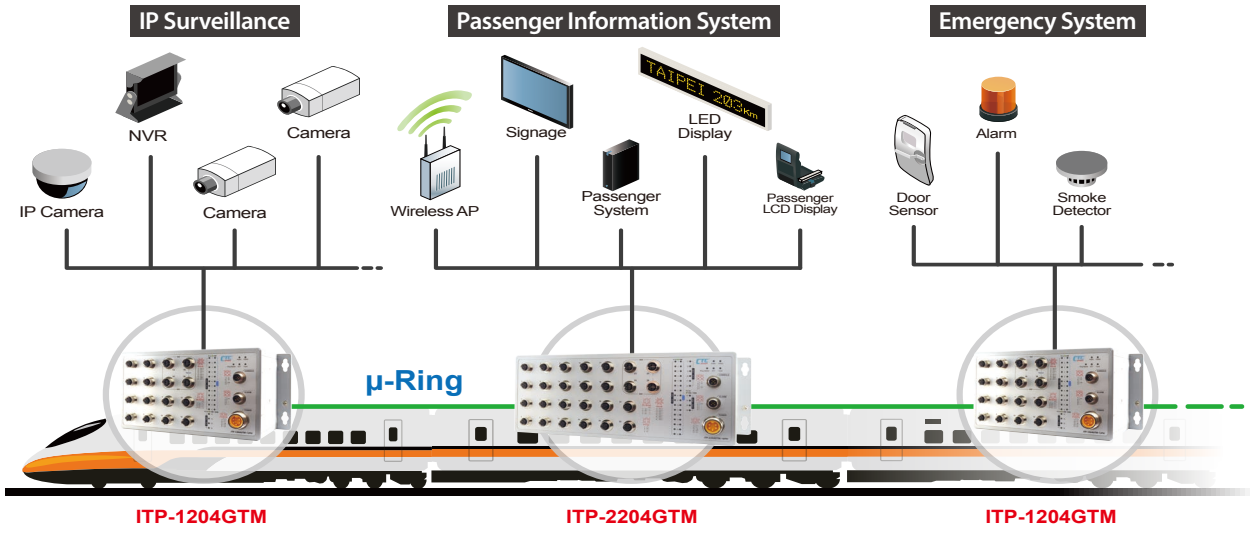
Traffic Classification QoS	IEEE802.1p based CoS
	IP Precedence based CoS
	IP DSCP based CoS
Traffic Classification QoS	QCL(QoS Control List): Frame Type, Source/ Destination MAC, VLAN ID, PCP, DEI
	QCE(QoS Control Entry): Protocol, Source IP, IP Fragment, DSCP, TCP/UDP port number
Bandwidth Control for Ingress	Rate in steps : 1 kbps / Mbps / fps / kfps
	Range : 100 kbps to 1Gbps / 1fps to 3300kfps
	Rate Unit : bit or frame
Bandwidth Control for Egress	Rate in steps : 1 kbps / Mbps
	Range : 100 kbps to 1Gbps
	Rate Unit : bit Per queue / Per port shaper
DiffServ (RF 2474) Remarking	
Storm Control	for Unicast, Broadcast, Multicast
IP Multicasting Feature	
IGMP / MLD Snooping	IGMP Snooping v1, v2, v3 / MLD Snooping v1, v2
	Port Filtering Profile, Throttling
	Fast Leave
	Maximum Multicast Group : up to 1022 entries
	Query / Static Router Port
Security Features	
IEEE 802.1X	Port-Based, MAC-Based
ACL	Number of rules : up to 256 entries
	for L2 / L3 / L4 L2: Mac address SA/DA/VLAN L3: IP address SA/DA, Subnet L4: TCP/UDP

RADIUS authentication & accounting	
TACACS+ authentication & accounting, TACACS+ 3.0	
HTTPS, HTTP	Supported
SSL / SSH v2	Supported
User Name Password Authentication	Local Authentication
	Remote Authentication (via RADIUS / TACACS+)
Management Interface Access Filtering	Web, Telnet / SSH, CLI, RS-232 console
Management Features	
CLI	Cisco® like CLI
Web Based Management	
Telnet	Server
SNMP	V1, V2c, V3
SW & Configuration Upgrade	TFTP, HTTP
	Redundant firmware in case of upgrade failure
RMON	RMON I (1, 2, 3, 9 group), RMON II
MIB II	RFC 1213
UPnP	Supported
DHCP	Server, Client, Relay, Relay option 82 , Snooping
TTDP	Supported (Train Topology Discovery Protocol)
IP Source Guard	Supported
Port Mirroring	Supported
Event Syslog	Syslog server (RFC3164) (Support 1 server)
Warning Message	System syslog, e-mail, alarm relay
DNS	Client, Proxy

IEEE1588 PTP V2	Support 5 operating mode in each port : Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave
NTP, SNTP	Client
LLDP (IEEE 802.1ab)	Link Layer Discovery Protocol
	LLDP-MED
IPv6 Features	
IPv6 Management	Telnet Server/ICMP v6
SNMP over IPv6	Supported
HTTP over IPv6	Supported
SSH over IPv6	Supported
IPv6 Telnet	Supported
IPv6 NTP, SNTP	Client
IPv6 TFTP	Supported
IPv6 QoS	Supported
IPv6 ACL	Number of rules: up to 256 entries
	for L2 / L3 / L4 L2: Mac address SA/DA/VLAN L3: IP address SA/DA, Subnet L4: TCP/UDP
Others Features	
Green Ethernet	Supports IEEE802.3az EEE (Energy Efficient Ethernet) Management to optimize the power consumption
	Determine the cable length and lowering the power for ports with short cables
	Lower the power for a port when there is no link
	LED Power Management :Adjustment LEDs intensity
Cable Diagnostic	Measuring UTP cable OK or broken point distance

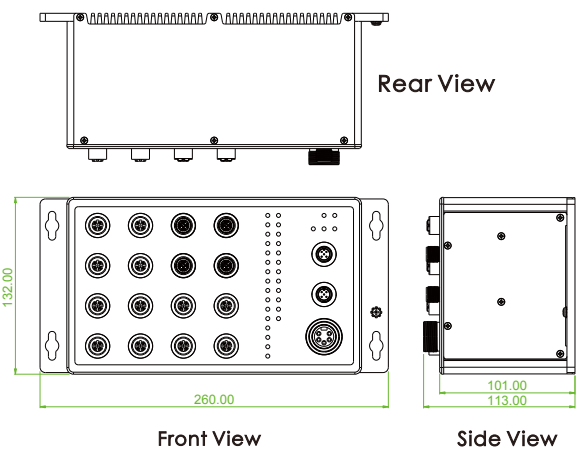
Application

Figure : ITP Series in Onboard Train Application

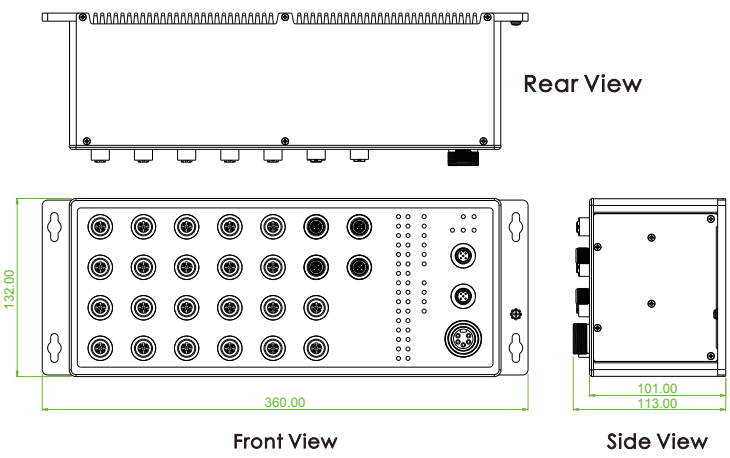


Dimensions

▶ ITP-1204GTM



▶ ITP-2204GTM



Ordering Information

Model Name	Managed	Protection	Total Port	FE Port	GbE port		Redundant Dual Input Power
				D-code M12	GbE X-code M12 UTP	GbE X-code M12 UTP Bypass	24/48/72/96/110VDC (20~137.5VDC)
ITP-1204GTM-E	V	IP64	16	12	4		V
ITP-1204GTM-E-BP	V	IP64	16	12	2	2	V
ITP-2204GTM-E	V	IP64	26	22	4		V
ITP-2204GTM-E-BP	V	IP64	26	22	2	2	V

Model Name	Certification					
	EN45545-2	EN50155 EN50121-4	EN60950-1	EN61000-6-2 EN61000-6-4	CE, FCC	IEC61373
ITP-1204GTM-E	V	V	V	V	V	V
ITP-1204GTM-E-BP	V	V	V	V	V	V
ITP-2204GTM-E	V	V	V	V	V	V
ITP-2204GTM-E-BP	V	V	V	V	V	V

Model Naming Rule

ITP – 22 – 04GT – M – E – BP

- ITP: Industrial Transportation Switch
- 22: 22x FE UTP; 12: 12x FE UTP
- 04GT : 4xGbE UTP
- M: Managed
- E: -40~75°C
- BP: Bypass model; blank: Non Bypass

Package List

- One unit device
- Protective caps for UTP ports and console, alarm port
- Console cable (M12 to DB9)
- CD (Smartconfig, Manual)
- Quick installation guide

Optional Accessories

Optional Cable/Connector

P/N: CAB-M12XM8-RJ45
M12 X-code Male (8-Pin) to RJ-45, AWG 24 ,IP67, 1 meter

For GbE UTP (X-code)

P/N: CAB-M12DM4-RJ45
M12 D-code Male (4-Pin) to RJ-45, AWG 24 ,IP67, 1 meter

For FE UTP

P/N: CAB-M12AF5-OPEN
M12 A-code Female (5-Pin) to open wire , AWG 22 , IP67, 1 meter

For Alarm

P/N: CAB-M23F5-OPEN
M23 Female (5-Pin) to open wire, (AWG 16) , IP67, 1 meter

For Power

P/N: M12D-M4
M12 D-code Male (4-Pin) connector, IP67

For FE UTP

P/N: M12A-F5
M12 A-code Female (5-Pin) connector, IP67

For Alarm

ITP-802GTM

8x 10/100Base-TX + 2x 10/100/1000Base-T Managed Ethernet Switch

ITP-802GSM

8x 10/100Base-T + 2x 100/1000Base-X SFP Managed Ethernet Switch

These models are managed industrial grade switches that provide 8x FE UTP + 2x GbE SFP or 8x FE UTP + 2x GbE UTP. These switches provide advanced Ethernet functions support and include STP/RSTP/MSTP/ ITU-T G.8032 ERPS and multiple µ-Ring for redundant cabling, layer 2 Ethernet IGMP, VLAN, QoS ,Security, IPv6, bandwidth control, port mirroring, cable diagnostic and Green Ethernet.
Housed in rugged DIN rail or wall mountable enclosures, these switches are designed for the harshest environments. These switches use M12 connectors to ensure water tight, robust connections and to guarantee reliable connections against environmental disturbances, such as vibration and shock. These models are compliant with EN50155, covering power input voltage, surge, EFT, ESD, vibration, shock, thus making the switches suitable for industrial applications, such as vehicle, rolling stock, ship, vessel.
These models are IP67 rated to protect against dust and water submersion and are particularly used in environments with extreme temperature, high humidity, oil, dust and in outdoor environments requiring water-proof applications such as IP surveillance and city security. They can also work with CTC Union's platform SmartView™ which provides convenient, real-time and centralized device management.

Features

- 8x 10/100Base-TX M12 UTP and 2x 10/100/1000Base-T M12 UTP (Total 10 ports) (ITP-802GTM)
- 8x 10/100Base-TX M12 UTP and 2x 100/1000Base-X SFP Fiber (Total 10 ports) (ITP-802GSM)
- M12 and M23 connector against vibration and shock, X-code or A-code M12 for Gigabit port optional
- IP67 grade housing for against water, dust, and oil (Figure 3)
- Redundant and wide input range voltage, Low voltage (12/24/48VDC) and High Voltage (110/220VDC or 110/220VAC)
- EN60950-1, CE, FCC, Rail Traffic EN50155, EN45545-2, EN50121-4 certified
- Heavy industrial grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- Cable diagnostics, identifies opens/shorts from 7 to 100 meters
- Supports Green Ethernet IEEE802.3az EEE (Energy Efficient Ethernet) management to optimize the power consumption
- STP, RSTP, MSTP, ITU-T G.8032 Ethernet Protection Ring (EPR) for redundant cabling
- Provides up to 5 instances that each supports µ-Ring, µ-Chain or Sub-Ring type for flexible uses. (Please see CTC Union's µ-Ring white paper for more details)
- µ-Ring for Redundant Cabling, recovery time<10ms in 250 maximum devices
- Build-in 2 bypass GbE UTP ports to avoid one or more nodes power fail in a ring or bus structure to collapse the network (ITP-802GTM)
- DHCP Server/ Client/ Relay/ Relay option 82/ Snooping
- Support TTDP for train application
- QoS, Traffic classification QoS, CoS, bandwidth control for Ingress and Egress, Storm Control, DiffServ
- IEEE802.1q VLAN, MAC based VLAN, IP subnet based VLAN, Protocol based VLAN, VLAN translation, GVRP, MVR
- Dynamic IEEE 802.3ad LACP Link Aggregation, Static Link Aggregation
- IGMP snooping V1/V2/V3, IGMP Filtering/ Throttling, IGMP query, IGMP proxy reporting, MLD snooping V1/V2
- Security : Port based and MAC based IEEE802.1X, RADIUS, ACL, TACACS+, HTTP/HTTPS, SSL/SSH v2
- Software upgrade via TFTP and HTTP, redundant firmware to avoid in case of upgrade failure
- Supports IEEE1588 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
- RMON, MIB II, Port mirroring, Event syslog, DNS, NTP, SNTP, IEEE802.1ab LLDP
- Supports IPv6 Telnet server /ICMP v6
- CLI, Web based management, SNMP v1/v2c/v3, Telnet server for management
- Provides SmartConfig for quick and easy mass Configuration Tool*
- Supports SmartView for Centralized Management*

*Please see Chapter 1- **Software Management** for more details

Specifications

Standard	IEEE 802.3	10Base-T 10Mbit/s Ethernet
	IEEE 802.3u	100Base-TX, 100Base-FX, Fast Ethernet
	IEEE 802.3ab	1000Base-T Gbit/s Ethernet over twisted pair
	IEEE 802.3z	1000Base-X Gbit/s Ethernet over Fiber-Optic
	IEEE 802.1d	STP (Spanning Tree Protocol)
	IEEE 802.1w	RSTP (Rapid Spanning Tree Protocol)
	IEEE 802.1s	MSTP (Multiple Spanning Tree Protocol)
	ITU-T G.8032 / Y.1344	ERPS (Ethernet Ring Protection Switching)
	IEEE 802.1Q	Virtual LANs (VLAN)

Standard	IEEE 802.1X	Port based and MAC based Network Access Control, Authentication
	IEEE 802.3ac	Max frame size extended to 1522Bytes
	IEEE 802.3ad	Link aggregation for parallel links with LACP(Link Aggregation Control Protocol)
	IEEE 802.3x	Flow control for Full Duplex
	IEEE 802.1ad	Stacked VLANs, Q-in-Q
	IEEE 802.1p	LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization
	IEEE 802.1ab	Link Layer Discovery Protocol (LLDP)
	IEEE 802.3az	EEE (Energy Efficient Ethernet)

VLAN ID	4094 IEEE802.1Q VLAN VID
Switch Architecture	Back-plane (Switching Fabric): 5.6Gbps (Full wire-speed)
Data Processing	Store and Forward
Flow Control	IEEE 802.3x for full duplex mode Back pressure for half duplex mode
Network Connector	8x M12 (4-Pin, Female,D-Code) 10/100Base-TX UTP + 2x M12 (8-Pin, female,A-code or X-Code) 10/100/1000Base-T UTP (ITP-802GTM) 8x M12 (4-Pin, Female,D-Code) 10/100Base-TX UTP + 2x 100/1000Base-X SFP (ITP-802GSM) UTP port provide auto negotiation speed, Auto MDI/ MDI-X, Full/Half duplex function Build-in 2x bypass GbE UTP ports (ITP-802GTM) 2x Water-proof cable connector 2x 100/1000Base-X SFP slot, with DDMI (ITP-802GSM)
Console	RS-232 (5-pin A-Code M12 male)
Network Cable	UTP/STP above Cat. 5e cable EIA/TIA-568 100-ohm (100m)
Protocols	CSMA/CD
Reverse Polarity Protection	Supported
Overload Current Protection	Supported
CPU Watch Dog	Supported
LED	Per unit: Power 1 (Green), Power 2 (Green), Fault (Amber), CPU Act (Green), Ring Master (Amber) UTP port: 10/100 Link/Active (Green) 1000 Link/Active (Amber) SFP Fiber Per port: Link/Active (Green)
Jumbo Frame	9.6KB
MAC Address Table	8K
Memory Buffer	512K Bytes for packet buffer
Power Supply	Provides 1x M23 (5-Pin, male) for redundant dual input, optional Low (L) or High (H) voltage. Low voltage (L) : 12/24/48V (8.4~60VDC) High voltage (H) : 110/220VDC (88~300VDC), or 110/220VAC (85~264VAC)

Power Consumption

	ITP-802GSM-LL	ITP-802GSM-HL	ITP-802GTM-LL	ITP-802GTM-HL
12VDC	6.9W	9.1W	8.8W	8.8W
24VDC	8.3W	9.3W	9.2W	9.2W
48VDC	9.8W	10.5W	10.6W	10.6W
110 VAC/VDC		9.7W		9.4W
220 VAC/VDC		9.7W		9.4W

Warning Message	System Syslog, SMTP/ e-mail event message, alarm relay
Alarm Relay Contact	5-pin A-code M12 male Relay outputs with current carrying capacity of 1 A @24VDC
Operating Temperature	-40 ~ 75°C
Operating Humidity	5% to 95% (Non-condensing)
Storage Temperature	-40 ~ 85°C
Housing	Rugged Metal, Fanless , IP67 grade housing for against water, dust, and oil (Figure 3)
Dimensions	69 x 240 x 168mm (D x W x H)
Weight	2.645kg (ITP-802GSM-LL) 2.82kg (ITP-802GSM-HL) 2.625kg (ITP-802GTM-LL) 2.8kg (ITP-802GTM-HL)
Installation Mounting	Wall mounting, or DIN Rail mounting (Optional)
MTBF	443,868 Hours (ITP-802GSM-LL) 353,092 Hours (ITP-802GSM-HL) 335,823 Hours (ITP-802GTM-LL) 281,168 Hours (ITP-802GTM-HL) (MIL-HDBK-217)
Warranty	5 years
Certification	
EMC	CE
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE
Railway Traffic	EN50155, EN50121-4
Fire protection of railway vehicles	EN45545-2
Immunity for Heavy Industrial Environment	EN61000-6-2
Emission for Heavy Industrial Environment	EN61000-6-4
EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B EN61000-4-3 (RS) Level 3, Criteria A EN61000-4-4 (Burst) Level 3, Criteria A EN61000-4-5 (Surge) Level 3, Criteria B EN61000-4-6 (CS) Level 3, Criteria A EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
Safety	EN60950-1
Shock	IEC-61373
Freefall	IEC 60068-2-32
Vibration	IEC-61373

Software Specifications

Topology	
VLAN	IEEE 802.1q VLAN,up to 4094 802.1Q VLAN VID IEEE 802.1q VLAN,up to 4094 Groups IEEE 802.1ad Q-in-Q MAC-based VLAN,up to 256 entries IP Subnet-based VLAN, up to 128 entries Protocol-based VLAN(Ethernt, SNAP, LLC), up to 128 entries VLAN Translation, up to 256 entries GVRP (GARP VLAN Registration Protocol) MVR (Multicast VLAN Registration)
Link Aggregation (Port Trunk)	Static (Hash with SA, DA, IP, TCP/UDP port), up to 5 trunk group Dynamic (IEEE 802.3ad LACP), up to 5 trunk group
Spanning Tree	IEEE802.1d STP, IEEE802.1w RSTP, IEEE802.1s MSTP
Multiple u-Ring	up to 5 instances that each supports u-Ring, u-Chain or Sub-Ring type for flexible uses, and maximum up to 5 Rings. Recovery time <10ms The maximum number of devices allowed in a Ring supported ring is 250. (Please see CTC μ-Ring white paper for more details and more topology application)
Loop Protection	Supported
ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)	Recovery time <50ms Single Ring, Sub-Ring, Multiple ring topology network
QoS Feature	
Class of Service	IEEE 802.1p 8 active priorities queues for per port
Traffic Classification QoS	IEEE 802.1p based CoS IP Precedence based CoS IP DSCP based CoS QCL(QoS Control List): Frame Type, Source/ Destination MAC, VLAN ID, PCP, DEI QCE(QoS Control Entry): Protocol, Source IP, IP Fragment, DSCP, TCP/UDP port number

Bandwidth Control for Ingress	Rate in steps : 1 kbps / Mbps / fps / kfps Range : 100 kbps to 1Gbps / 1fps to 3300kfps Rate Unit : bit or frame
Bandwidth Control for Egress	Rate in steps : 1 kbps / Mbps Range : 100 kbps to 1Gbps Rate Unit : bit Per queue / Per port shaper
DiffServ (RF 2474) Remarking	
Storm Control	for Unicast, Broadcast, Multicast
IP Multicasting Feature	
IGMP / MLD Snooping	IGMP Snooping v1, v2, v3 / MLD Snooping v1, v2 Port Filtering Profile, Throttling
IGMP / MLD Snooping	Fast Leave Maximum Multicast Group : up to 1022 entries Query / Static Router Port
Security Features	
IEEE 802.1X	Port-Based, MAC-Based
ACL	Number of rules : up to 256 entries for L2 / L3 / L4 L2: Mac address SA/DA/VLAN L3: IP address SA/DA, Subnet L4: TCP/UDP
RADIUS authentication & accounting	
TACACS+ authentication & accounting, TACACS+ 3.0	
HTTPS, HTTP	Supported
SSL / SSH v2	Supported
User Name Password Authentication	Local Authentication Remote Authentication (via RADIUS / TACACS+)
Management Interface Access Filtering	Web, Telnet / SSH , CLI RS-232 console
Management Features	
CLI	Cisco® like CLI

Web Based Management	
Telnet	Server
SNMP	TFTP, HTTP
SW & Configuration Upgrade	TFTP, HTTP Redundant firmware in case of upgrade failure
RMON	RMON I (1, 2, 3, 9 group), RMON II
MIB II	RFC 1213
UPnP	Supported
DHCP	Server, Client, Relay, Relay option 82 , Snooping
TTDP	Supported (Train Topology Discovery Protocol)
IP Source Guard	Supported
Port Mirroring	Supported
Event Syslog	Syslog server (RFC3164) (Support 1 server)
Warning Message	System syslog, e-mail, alarm relay
DNS	Client, Proxy
IEEE1588 PTP V2	Support 5 operating mode in each port : Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave
NTP, SNTP	Client
LLDP (IEEE 802.1ab)	Link Layer Discovery Protocol LLDP-MED

IPv6 Features	
IPv6 Management	Telnet Server/ICMP v6
SNMP over IPv6	Supported
HTTP over IPv6	Supported
SSH over IPv6	Supported
IPv6 Telnet	Supported
IPv6 NTP, SNTP	Client
IPv6 TFTP	Supported
IPv6 QoS	Supported
IPv6 ACL	Number of rules: up to 256 entries for L2 / L3 / L4 L2: Mac address SA/DA/VLAN L3: IP address SA/DA, Subnet L4: TCP/UDP
Others Features	
Green Ethernet	Supports IEEE802.3az EEE (Energy Efficient Ethernet) Management to optimize the power consumption
	Determine the cable length and lowering the power for ports with short cables
	Lower the power for a port when there is no link
	LED Power Management :Adjustment LEDs intensity
Cable Diagnostic	Measuring UTP Cable OK or broken point distance

Application

Figure 1 : ITP Series in Onboard Train Application

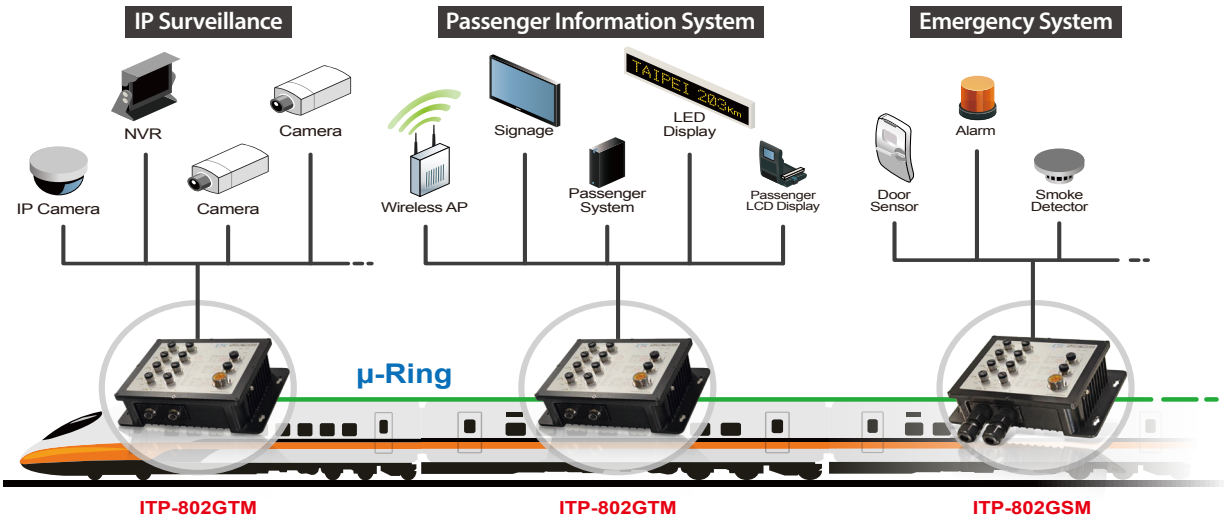
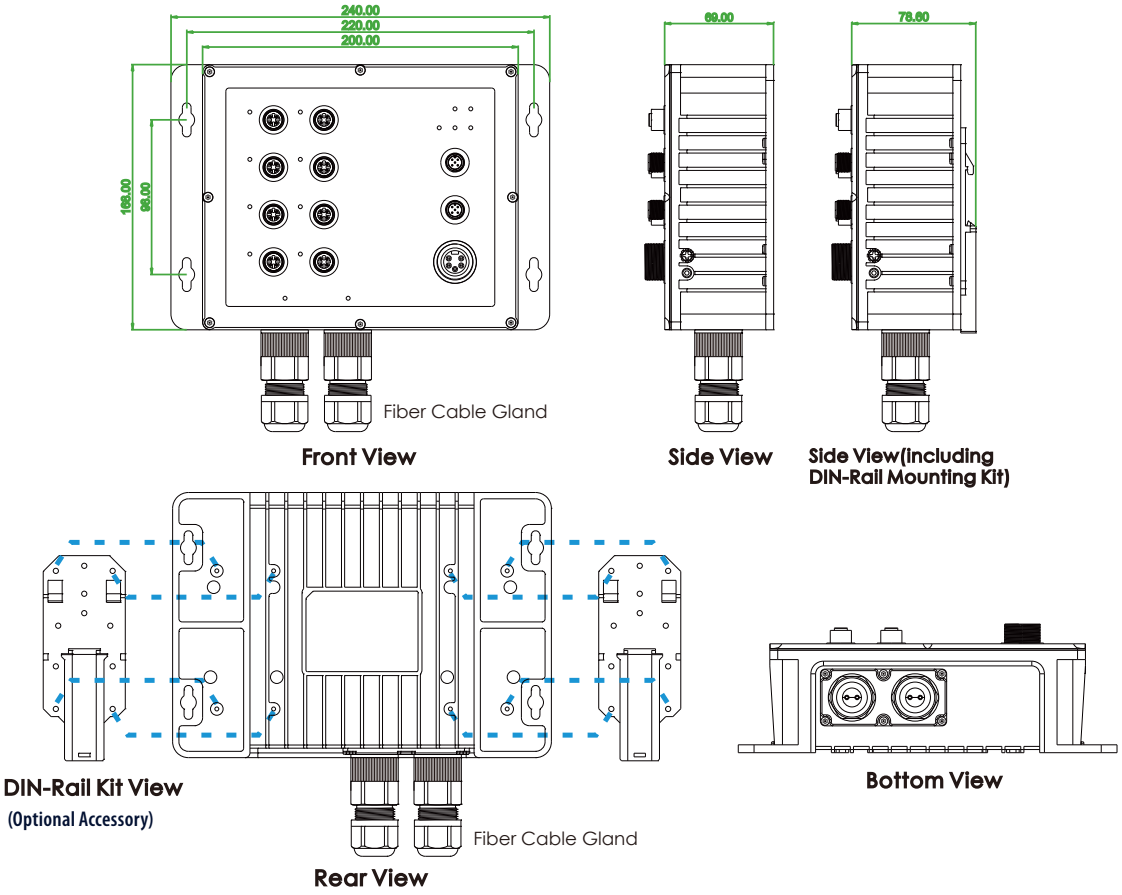


Figure 2 : ITP Series for Industrial Automation

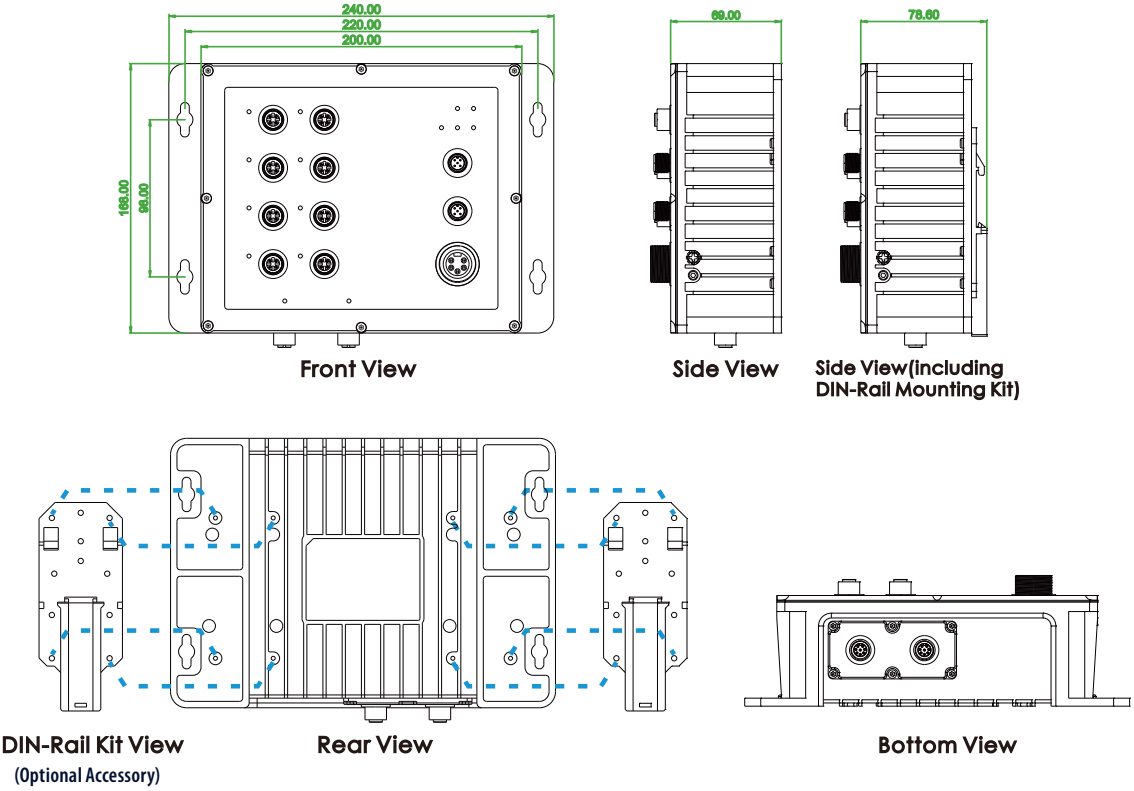
Figure 3 : IP67 Waterproof

Dimensions

▶ ITP-802GSM



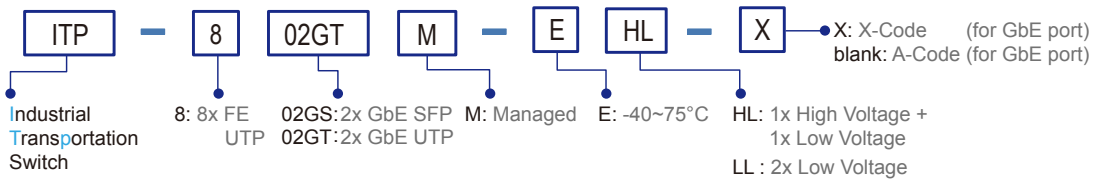
▶ ITP-802GTM



Ordering Information

Model Name	Managed	IP67	Total Port	UTP Port M12	SFP or UTP	Redundant Power supply		Certification				Shock Vibration	Operating Temperature
				10/100 Base-TX	100/1000 Base-X	Low Volt 12/24/48VDC (8.4~60VDC)	High Volt 110/220 VDC 110/220 VAC	EN50155 EN50121-4	EN60950-1	EN61000-6-2 EN61000-6-4	CE FCC	IEC61373	
ITP-802GSM-ELL	V	V	10	8	2 SFP	2		V	V	V	V	V	-40~75°C
ITP-802GSM-EHL	V	V	10	8	2 SFP	1	1	V	V	V	V	V	-40~75°C
ITP-802GTM-ELL-X	V	V	10	8	2 UTP (X-code)	2		V	V	V	V	V	-40~75°C
ITP-802GTM-EHL-X	V	V	10	8	2 UTP (X-code)	1	1	V	V	V	V	V	-40~75°C
ITP-802GTM-ELL	V	V	10	8	2 UTP (A-code)	2		V	V	V	V	V	-40~75°C
ITP-802GTM-EHL	V	V	10	8	2 UTP (A-code)	1	1	V	V	V	V	V	-40~75°C

Model Naming Rule



Package List

- One of the device series
- Protective caps for UTP ports and console, alarm port
- Fiber Cable Gland for SFP port x 2 set (for ITP-802GSM)
- Console cable (M12 to DB9)
- CD (Smartconfig, Manual)
- Quick installation guide

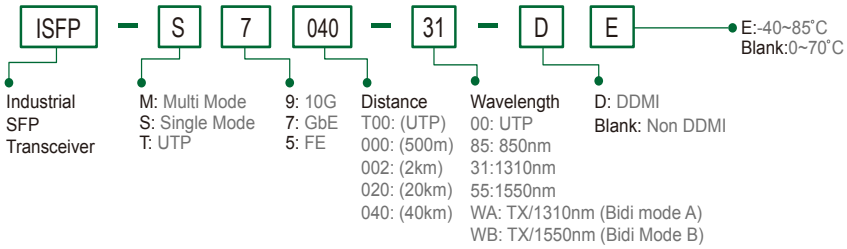
Optional Accessories

Industrial SFP Transceiver

The ISFP series of industrial grade SFP modules have been fully tested with the ITP-802GSM for guaranteed compatibility and performance. The best performance can be guaranteed even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheet for more details and more items.)

ISFP-M7000-85-D(E)	Industrial SFP GbE 1000Base-SX, M/M, 500 meter,wave length 850nm, 7.5dB, LC, DDMI, -10~70°C (-40~85°C)
ISFP-S7020-31-D(E)	Industrial SFP 1000Base-LX, S/M, 20km, wave length 1310nm, 15dB, LC, DDMI, -10~70°C (-40~85°C)
ISFP-M5002-31-D(E)	Industrial SFP 155M 100Base-FX, MM, 2km, wave length 1310nm, 12dB, LC, DDMI, -10~70°C (-40~85°C)
ISFP-S5030-31-D(E)	Industrial SFP 155M 100Base-FX, SM, 30km, 1310nm, 19dB, LC, DDMI, -10~70°C (-40~85°C)

SFP Naming Rule



Optional Cable/Connector & Din-Rail Kit

P/N: CAB-M12XM8-RJ45
M12 X-code Male (8-Pin) to RJ-45, AWG 24 ,IP67, 1 meter

For GbE UTP (X-code model)

P/N: CAB-M12AM8-RJ45
M12 A-code Male (8-Pin) to RJ-45, AWG 24 ,IP67, 1 meter

For GbE UTP (A-code model)

P/N: CAB-M12DM4-RJ45
M12 D-code Male (4-Pin) to RJ-45, AWG 24 ,IP67, 1 meter

For FE UTP

P/N: CAB-M12AF5-OPEN
M12 A-code Female (5-Pin) to open wire , AWG 22 , IP67, 1 meter

For Alarm

P/N: CAB-M23F5-OPEN
M23 Female (5-Pin) to open wire, (AWG 16) , IP67, 1 meter

For Power

P/N: M12A-M8
M12 A-code Male (8-Pin) connector, IP67

For GbE UTP (A-code model)

P/N: M12D-M4
M12 D-code Male (4-Pin) connector, IP67

For FE UTP

P/N: M12A-F5
M12 A-code Female (5-Pin) connector, IP67

For Alarm

P/N: IND-DNK04
Din Rail Kit for Industrial, Wide: 52mm

(130 X52mm / 4 Screws) (2pcs/set)

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ITP-500

5x 10/100Base-TX Ethernet Switch (Slim)

ITP-800

8x 10/100Base-TX Ethernet Switch

These models are unmanaged, industrial grade Fast Ethernet switches with 5(8) 10/100Base-TX Fast Ethernet ports. This series of unmanaged Ethernet switches is designed for industrial applications in harsh environments. These switches Ethernet ports utilize M12 connectors to ensure water tight, robust connections and guarantee reliable operation against environmental disturbances such as vibration and shock.
These switches are compliant with EN50155, covering operating temperature, power input voltage, surge, ESD, vibration, and shock, thus making them suitable for industrial applications in vehicle, rolling stock and railways.

Features

- 8-Port 10/100Base-TX Ethernet Switch (ITP-800)
- 5-Port 10/100Base-TX Ethernet Switch (ITP-500)
- Use M12 connector anti vibration and shock for vehicle, rolling stock, and railway applications
- Supports flow control
- Slim design (ITP-500, figure 5)
- Fanless design
- DIN rail or wall mounting installation
- Supports auto-negotiation and auto-MDI/MDI-X
- Build-in 2 bypass port to avoid one or more nodes power fail in a bus structure to collapse the network (ITP-800)
- Redundant dual DC input power 12/24/48VDC (8.4~60VDC) (ITP-800)
- DC input power 12/24/48VDC (8.4~60VDC) (ITP-500)
- Very low power consumption
- IP67 water proof grade rugged housing for against water, dust, and and oil (Figure 2)
- Wide operating temperature -40~75°C (ITP-500-E, ITP-800-E)
- CE, FCC, EN50155 and EN50121-4 for railway certified
- Industrial Grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified

Specifications

IEEE Standard	IEEE 802.3 10Base-T Ethernet
	IEEE 802.3u 100Base-TX Fast Ethernet
	IEEE 802.3x Flow Control and Back Pressure
Switch Architecture	Back-plane (Switching Fabric): 1Gbps (ITP-500) Back-plane (Switching Fabric): 1.6Gbps (ITP-800) (Full wire-speed)
Data Processing	Store and Forward
Flow Control	IEEE 802.3x flow control, back pressure flow control
MAC Address Table	1 K
Packet Buffer Size	448Kbits
Network Connector	5x M12 D-code Female (ITP-500)
	8x M12 D-code Female (ITP-800)
	10/100Base-TX auto negotiation speed
	Auto MDI/MDI-X function
	Full/Half duplex
	Built in 2 bypass port (ITP-800)
Network Cable	10Base-T: 2-pair UTP/STP Cat. 5e cable
	EIA/TIA-568 100-ohm (100m)
	100Base-TX: 2-pair UTP/STP Cat. 5e cable
	EIA/TIA-568 100-ohm (100m)
Protocols	CSMA/CD
LED	Per unit: Power 1 (Green), Power 2 (Green) (ITP-800) Per unit: Power (Green) (ITP-500)
	Per port: Link/Active (Green)
Reverse Polarity Protection	Present for power input
Overload Current Protection	Supported
Power Supply	Redundant Dual DC 12/24/48V (8.4~60VDC) Input power (ITP-800)
	DC 12/24/48V (8.4~60VDC) Input power (ITP-500)

Power Connector	5 Pin Male A-Code M12

Power Consumption

Input Voltage	ITP-500	ITP-800
12VDC	0.8W	1.8W
24VDC	1.0W	2.2W
48VDC	1.9W	3.4W

Operating Temperature	-40°C~75°C
Operating Humidity	5% to 95% (Non-condensing)
Storage Temperature	-40°C~85°C
Housing	IP67 water-proof grade rugged housing, and fanless (Figure 2)
Dimensions	43 x 30 x 206.5 mm (D x W x H) (ITP-500) 39 x 65.1 x 191.5 mm (D x W x H) (ITP-800)
Weight	260g (ITP-500) 410g (ITP-800)
Installation Mounting	Wall mounting, or DIN rail (optional)
MTBF	2,315,383 Hours (ITP-500) 1,492,660 Hours (ITP-800) (MIL-HDBK-217)
Warranty	5 years
Certification	
EMC	CE
EMI	FCC, FCC Part 15 Subpart B Class A, CE
Railway Traffic	EN50155, EN50121-4
Immunity for Heavy Industrial Environment	EN61000-6-2

Emission for Heavy Industrial Environment	EN61000-6-4
EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B
	EN61000-4-3 (RS) Level 3, Criteria A
	EN61000-4-4 (Burst) Level 3, Criteria A
	EN61000-4-5 (Surge) Level 3, Criteria B
	EN61000-4-6 (CS) Level 3, Criteria A
	EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
	EN 61000-4-11 Voltage Dips

Safety	UL60950-1 (Pending)
Shock	IEC 61373
Freefall	IEC 60068-2-32
Vibration	IEC 61373

Application

Figure 1 : ITP Series in Onboard Train Application

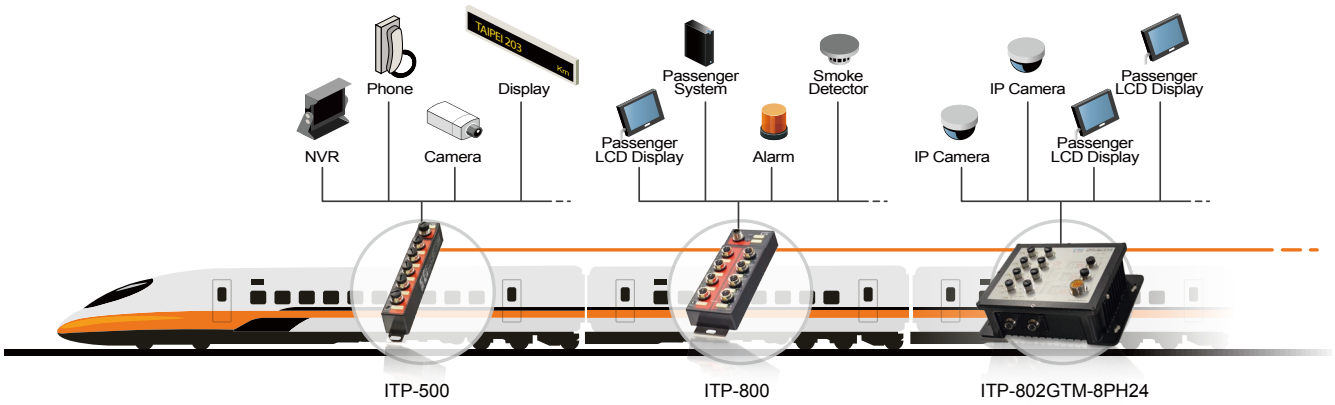


Figure 2 : IP67 Protection

Figure 3 : Wide Range Temperature

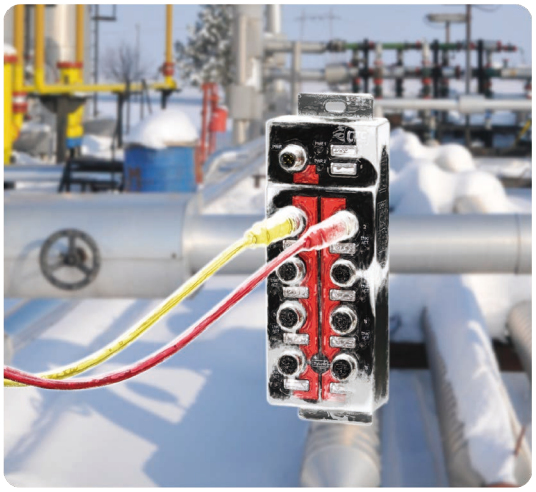
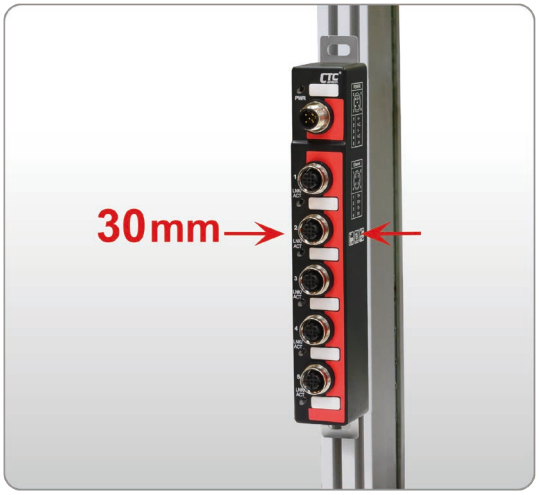


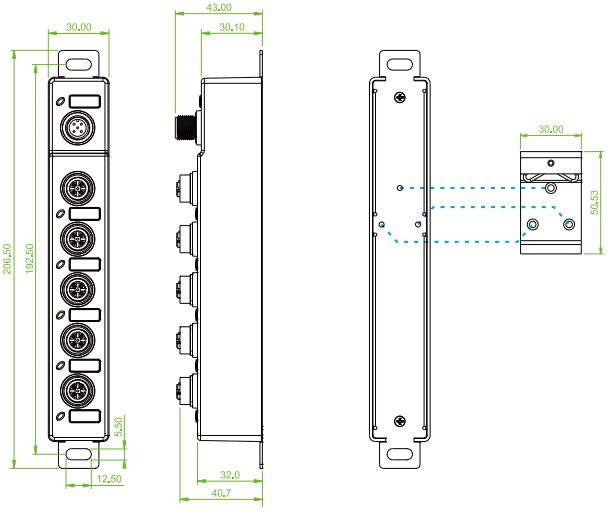
Figure 4 : ITP Series for Industrial Automation

Figure 5 : Slim and Compact Size



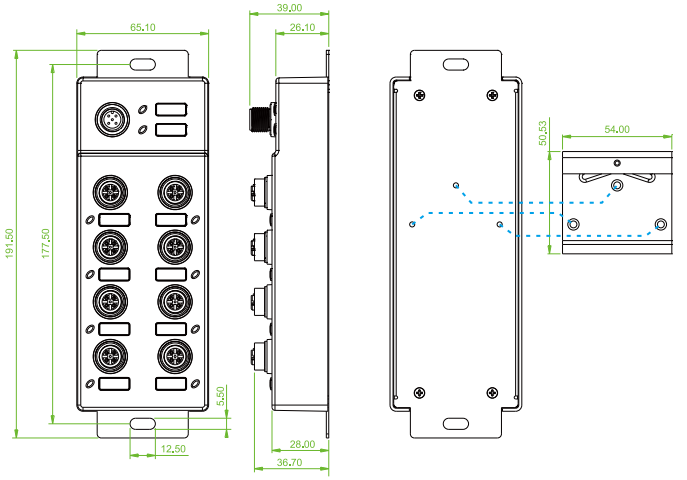
Dimensions

▶ ITP-500



Front View | Side View | Rear View | DIN-Rail Kit View (Optional)

▶ ITP-800



Front View | Side View | Rear View | DIN-Rail Kit View (Optional)

Ordering Information

Model Name	IP67	Total Port	UTP Port M12	Power Supply	Certification				Shock Vibration	Operating Temperature
			10/100 Base-TX	12/24/48VDC (8.4~60VDC)	EN50155	EN50121-4	EN61000-6-2 EN61000-6-4	CE FCC	IEC61373	
ITP-500-E	V	5	5	1	V	V	V	V	V	-40~75°C
ITP-800-E	V	8	8	2	V	V	V	V	V	-40~75°C

Model Naming Rule

ITP - 8 00 - E → E: -40~75°C

- ITP: Industrial TransPortation Switch
- 8: 8x FE UTP; 5: 5x FE UTP
- 00: 0 Fiber

Package List

- ITP-500-E or ITP-800-E device
- Protective caps for UTP port and power
- Wall mount (bound with switch device)
- Quick installation guide

Optional Accessories

Optional Cable/Connector

P/N: CAB-M12DM4-RJ45
M12 D-code Male (4-Pin) to RJ-45, AWG 24 ,IP67, 1 meter

For FE UTP

P/N: CAB-M12AF5-OPEN
M12 A-code Female (5-Pin) to open wire, AWG 22, IP67, 1 meter

For Power

P/N: M12D-M4
M12 D-code Male (4-Pin) connector, IP67

For FE UTP

P/N: M12A-F5
M12 A-code Female (5-Pin) connector, IP67

For Power

PoE Series

Stability and Efficiency in IP Surveillance Networks

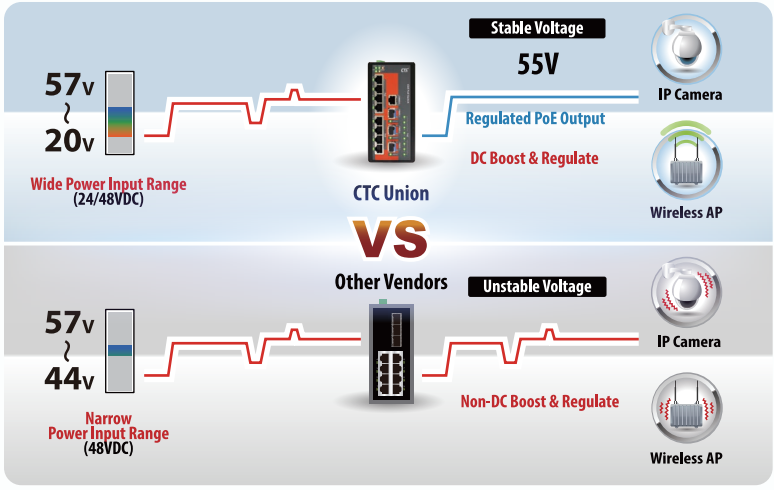
Industrial Regulate PoE Managed Switch

Boost and Regulate PoE Output to stabilize PoE device
Advanced PoE Management–Auto Test & Auto Reset PD, Scheduling
SmartView™ Management System
SmartConfig™ Tool for Quick & Easy Setting
μ–Ring, Sub–Ring, μ–Chain for Flexible Redundancy
5–Ring, 250 nodes expansion
Recovery Time < 10ms

PoE (Power over Ethernet) capability enables PD devices such as surveillance cameras or wireless access points to be powered over standard twisted-pair Ethernet cable, eliminating the needs for requiring external power for PD devices. CTC Union provides a variety of PoE products, ranging from injectors, converters to managed switches to fulfill different application needs. All industrial PoE models are fanless and designed in robust IP30 housings that make them ideal for din rail installation or wall mounting. Additionally, PoE models all support IEEE 802.3af/802.3at standards which are able to provide up to 30W (use 50VDC or above input voltage) power supply per port. With power boost and regulation technology, PoE devices can offer 24~48V input range to provide the required 55V PoE output voltage for IEEE 802.3at.

High efficiency boost technology for PoE

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



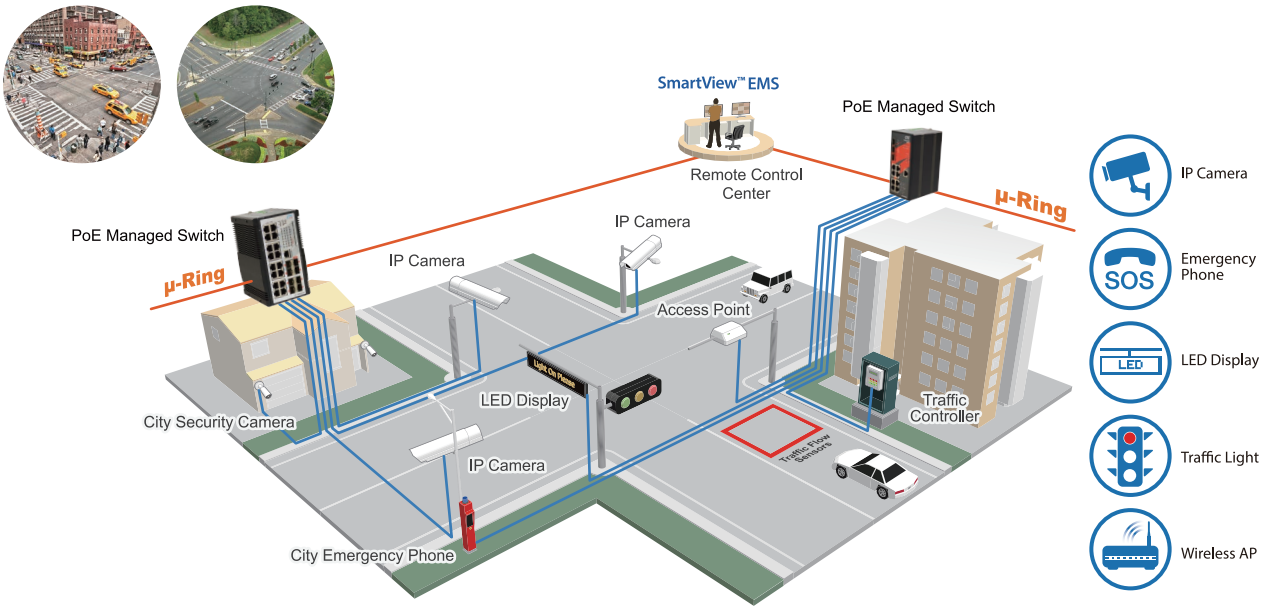
Remote PD Auto Test & Reset

- PoE PD failure auto checking, and auto reset when PD fail.
- The feature helps to reduce operational expenses.

Application

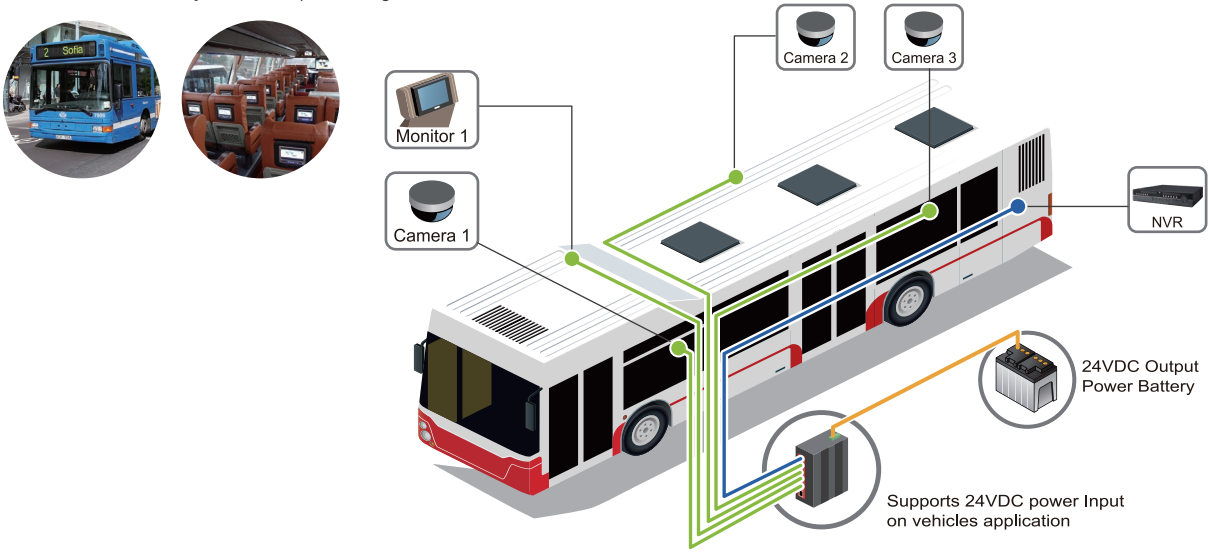
Intersection Monitoring System

"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.



Bus Surveillance System

IEEE 802.3af/at PoE is required to supply a minimum of 48VDC to connected PD devices. The dilemma for many industrial grade PoE switches deployed in ITS is that commercial vehicles typically have only 24VDC available. This is not a problem for CTC Union PoE switches which include a voltage "boost" circuit. Our switches are able to provide a constant, regulated DC output of 55VDC to ensure stable operations of connected PD devices with only 24VDC input voltage.



IGS-2408SM-24PH

24x 10/100/1000Base-T(X) + 8x 100/1000Base-X SFP with 24x PoE+ Managed Switch

CTC Industrial Rackmount PoE (Power over Ethernet) Switch IGS-2408SM-24PH is a hardened designed L2 managed Ethernet switch with PoE+/PSE for rigorous demands of centralized and critical applications. IGS-2408SM-24PH supports 24x 10/100/1000BaseTX PoE/PoE+ ports, plus 8 dual speed (100/1000Base-X) SFP fiber optical slots, thus providing up to 32 ports total for Ethernet connectivity. IGS-2408SM-24PH is an ideal solution for applications in Smart City, surveillance, Intelligent traffic control systems and production automation applications.

IGS-2408SM-24PH supports up to 24 PoE/PoE+ (IEEE 802.3af/IEEE 802.3at) ports which provide 15.4/30watts power output per port for connecting with heavy-duty industrial PoE devices, such as PTZ IP surveillance cameras, high-performance wireless access points, digital signage and IP phones. The IGS-2408SM-24PH is designed especially for harsh outdoor cabinet applications with 4kV surge protection to ensure the uninterrupted reliability of PoE systems.

IGS-2408SM-24PH provides up to 10KB jumbo frame support, a 32K MAC address table and 4MB memory packet buffer. The switch also supports Link Aggregation (Dynamic IEEE 802.3ad LACP) with up to 16 trunk group (maximum 8 port per group) to increase bandwidth for providing high performance quick transfers of large amounts video, voice and data across a network.

IGS-2408SM-24PH supports a variety of Ethernet ring redundancy functions, including STP/ RSTP/MSTP/ERPS and enhanced µ-Ring/ µ-Chain/Sub-Ring that provides less than 50ms recovery time with 250 nodes. Isolated power inputs also help to increase system reliability and the availability of your network backbone.

Features

- 24x 10/100/1000Base-T RJ-45 + 8x 100/1000Base-X SFP with 24x PoE+
- Maximum up to 24x IEEE 802.3af / 802.3at PoE+ output, 30W per port, 400W PoE power budget in total
- Redundant dual input power 48VDC (44~57VDC)
- **Supports negative voltage power input**
- Rugged metal, IP30 protection & Fanless design
- UL60950-1, EN60950-1, CE, FCC, Rail Traffic EN50121-4 certified
- Heavy industrial grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- **4KV surge protection for RJ45 and SFP ports**
- **2.25K VDC Hi-pot isolation protection for Ethernet ports and power**
- STP, RSTP, MSTP, ITU-T G.8032 Ethernet Ring Protection Switching (ERPS) for network redundancy
- Provides 5 instances each can support µ-Ring, µ-Chain or Sub-Ring for flexible networking applications
- µ-Ring redundancy, recovery time <50ms in 250 devices
- DHCP Server/Client/Relay/Snooping/Relay option 82
- QoS, Traffic classification QoS, CoS, bandwidth control for Ingress and Egress, Storm Control, DiffServ
- IEEE 802.1q VLAN, MAC based VLAN, IP subnet based VLAN, Protocol based VLAN, VLAN translation, GVRP, MVR
- Dynamic IEEE 802.3ad LACP Link Aggregation, Static Link Aggregation
- IGMP snooping V1/V2/V3, IGMP Filtering/ Throttling, IGMP query, IGMP proxy reporting, MLD snooping V1/V2
- Flexibility security: Port based and MAC based IEEE 802.1X, RADIUS, ACL, TACACS+, HTTP/HTTPS, SSL/SSH v2
- Software upgrade via TFTP and HTTP, redundant firmware to avoid in case of upgrade failure
- 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
- RMON, MIB II, Port mirroring, Event syslog, DNS, NTP 4.0, SNTP, IEEE 802.1ab LLDP
- CLI, Web based management, SNMP v1/v2c/v3, Telnet server for management
- Supports Modbus/TCP protocols for management
- Provides SmartConfig for quick and easy mass Configuration*
- Supports SmartView for Centralized Management*

*Please see Chapter 1- **Software Management** for more details

Specifications

Standard	IEEE 802.3	10Base-T 10Mbit/s Ethernet
	IEEE 802.3u	100Base-TX, 100Base-FX, Fast Ethernet
	IEEE 802.3ab	1000Base-T Gbit/s Ethernet over twisted pair
	IEEE 802.3z	1000Base-X Gbit/s Ethernet over Fiber-Optic
	IEEE 802.1d	STP (Spanning Tree Protocol)
	IEEE 802.1w	RSTP (Rapid Spanning Tree Protocol)

Standard	IEEE 802.1s	MSTP (Multiple Spanning Tree Protocol)
	ITU-T G.8032 / Y.1344	ERPS (Ethernet Ring Protection Switching)
	IEEE 802.1Q	Virtual LANs (VLAN)
	IEEE 802.1X	Port based and MAC based Network Access Control, Authentication
	IEEE 802.3ac	Max frame size extended to 1522Bytes

Standard	IEEE 802.3ad	Link aggregation for parallel links with LACP(Link Aggregation Control Protocol)
	IEEE 802.3af	PoE (Power over Ethernet)
	IEEE 802.3at	PoE+ (Power over Ethernet enhancement)
	IEEE 802.3X	Flow control for full duplex
	IEEE 802.1ad	Stacked VLANs, Q-in-Q
	IEEE 802.1p	LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization
	IEEE 802.1ab	Link Layer Discovery Protocol (LLDP)
	IEEE 802.3az	EEE (Energy Efficient Ethernet)
VLAN ID	4094 IEEE802.1Q VLAN VID	
Switch Architecture	Back-plane (Switching Fabric): 64Gbps (Full wire-speed)	
Data Processing	Store and Forward	
Network Connector	**SFP:** 8x 100/1000Base-X SFP socket Support DDMI **RJ45:** 24x 10/100/1000Base-T RJ-45 Support Auto negotiation speed, Auto MDI/MDI-X function **PoE:** 24x IEEE 802.3at /IEEE 802.3af PoE+ End-Span, Alternative A mode. Maximum 30W per port, 400W PoE power budget in total **RJ45 Pin Assignment:** PoE Positive (V+) : RJ-45 pin 1, 2. PoE Negative (V-) : RJ-45 pin 3, 6. Data (1,2,3,6,4,5,7,8)	
Console	RS-232 (RJ-45)	
Network Cable	UTP/STP Cat.5e cable or above	
	EIA/TIA-568 100-ohm (100m)	
Protocols	CSMA/CD	
Reverse Polarity Protection	For input power	
Overload Current Protection	Supported	
CPU Watch Dog	Supported	
Power Supply	Redundant dual input power 48VDC (44~57VDC) (Removable terminal block) (50~57VDC input is recommended for IEEE802.3at PoE+ in 30W applications) Supports negative voltage power input (for example application in telecom system)	
Power Consumption	< 30W @50VDC without PoE load <445W @50VDC with 400W PoE load	
LED	Per unit: Power 1 (Green), Power 2 (Green), Act /Alarm (Green/Amber), Ring Master (Green)	
	P1~P24 Per RJ-45 port: 10/100 Link/Active (Green) 1000 Link/Active (Amber) P25~P32 Per SFP Fiber port: Link/Active (Amber)	
	PoE port (P1~P24): PoE ON (Green)	

Jumbo Frame	10K Byte
MAC Address Table	32K
Memory Buffer	4M Bytes for packet buffer
Warning Message	System Syslog, SMTP/ e-mail event message, alarm relay
Alarm Relay Contact	Relay outputs with current carrying capacity of 1A @24VDC, 2-Pin removable terminal block
Operating Temperature	-40 ~ 70°C
Operating Humidity	5% to 95% (Non-condensing)
Storage Temperature	-40 ~ 85°C
Housing	Rugged Metal, IP30 Protection, Fanless
Dimensions	280x 440 x 44mm (D x W x H)
Weight	4.26kg
Installation Mounting	19" rack mount
MTBF	97,078 Hours (MIL-HDBK-217)
Warranty	5 years
Certification	
EMC	CE (EN55024, EN55032)
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE
Railway Traffic	EN50121-4
Immunity for Heavy Industrial Environment	EN61000-6-2
Emission for Heavy Industrial Environment	EN61000-6-4
EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B
	EN61000-4-3 (RS) Level 3, Criteria A
	EN61000-4-4 (Burst) Level 3, Criteria A
	EN61000-4-5 (Surge) Level 3, Criteria B
	EN61000-4-6 (CS) Level 3, Criteria A
	EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
Safety	UL60950-1, EN60950-1
Hi pot protection	DC 2.25KV for power to chassis ground, Ethernet port to chassis ground
4KV surge protection	Supported for RJ45 and SFP ports
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

Software Specifications

Topology	
VLAN	IEEE 802.1q VLAN,up to 4094 802.1Q VLAN VID
	IEEE 802.1q VLAN,up to 4094 Groups
	IEEE 802.1ad Q-in-Q
	MAC-based VLAN,up to 256 entries
	IP Subnet-based VLAN, up to 128 entries
	Protocol-based VLAN(Ethernt, SNAP, LLC), up to 128 entries
	VLAN Translation, up to 256 entries
	GVRP (GARP VLAN Registration Protocol)
	MVR (Multicast VLAN Registration)
Link Aggregation (Port Trunk)	Static (Hash with SA, DA, IP, TCP/UDP port), up to 16 trunk group
	Dynamic (IEEE 802.3ad LACP), up to 16 trunk group
	Per group up-to 8 port
Spanning Tree	IEEE 802.1d STP, IEEE 802.1w RSTP, IEEE 802.1s MSTP

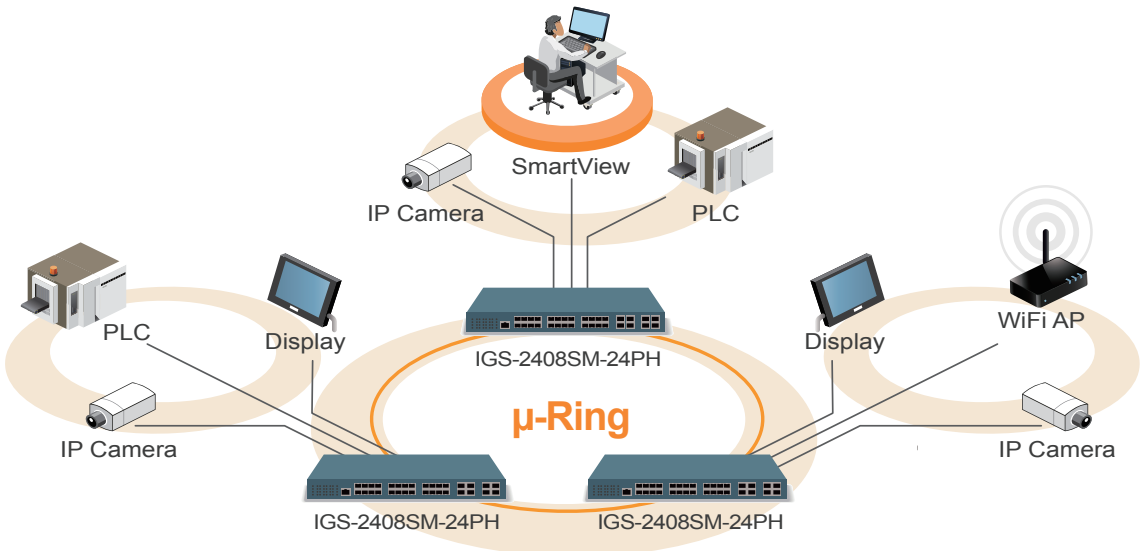
Multiple µ-Ring	Up to 5 instances each support µ-Ring, µ-Chain or Sub-Ring for flexible networking applications. Recovery time <50ms The maximum number of device is allowed 250 in a Ring.
Loop Protection	Supported
ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)	Recovery time <50ms Single Ring, Sub-Ring, Multiple ring topology
QoS Features	
Class of Service	IEEE 802.1p 8 active priorities queues for per port
Traffic Classification QoS	IEEE 802.1p based CoS
	IP Precedence based CoS
	IP DSCP based CoS

Traffic Classification QoS	QCL(QoS Control List): Frame Type, Source/ Destination MAC, VLAN ID, PCP, DEI Protocol, Source IP, IP Fragment, DSCP, TCP/UDP port number
Bandwidth Control for Ingress	Per port based
Bandwidth Control for Egress	Per port based Per queue / Per port shaper
DiffServ (RF 2474) Remarking	
Storm Control	for Unicast, Broadcast, Multicast
IP Multicasting Features	
IGMP / MLD Snooping	IGMP Snooping v1, v2, v3 / MLD Snooping v1, v2 Port Filtering Profile Throttling, Fast Leave Maximum Multicast Group : up to 1022 entries Query / Static Router Port
Security Features	
IEEE 802.1X	Port-Based MAC-Based
ACL	Number of rules : up to 256 entries for L2 / L3 / L4 L2 : Mac address SA/DA/VLAN L3 : IP address SA/DA, Subnet L4 : TCP/UDP
RADIUS authentication & accounting	
TACACS+ authentication & accounting, TACACS+ 3.0	
HTTPS, HTTP	Supported
SSL / SSH v2	Supported
User Name Password Authentication	Local Authentication Remote Authentication (via RADIUS / TACACS+)
Management Interface Access Filtering	Web, Telnet / SSH , CLI RS-232 console
Management Features	
CLI	Cisco® like CLI
Web Based Management	
Telnet	Server
SNMP	V1, V2c, V3
Modbus/TCP	Support for management and monitoring
SW & Configuration Upgrade	TFTP, HTTP Redundant firmware in case of upgrade failure
RMON	RMON I (1, 2, 3, 9 group), RMON II
MIB	RFC1213 MIB II, Private MIB
UPnP	Supported

DHCP	Server, Client, Relay, Relay option 82 , Snooping
IP Source Guard	Supported
Mirroring	Local and Remote
Event Syslog	Syslog server (RFC3164) (Support 1 server)
Warning Message	System syslog, e-mail, alarm relay
DNS	Client, Proxy
IEEE1588 PTP V2	Supports 5 operating mode in each port : Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave
NTP V4.0, SNTP	Client
LLDP (IEEE 802.1ab)	Link Layer Discovery Protocol LLDP-MED
IPv6 Features	
IPv6 Management	Telnet Server/ICMP v6
SNMP over IPv6	Supported
HTTP over IPv6	Supported
SSH over IPv6	Supported
IPv6 Telnet	Supported
IPv6 NTP, SNTP	Client
IPv6 TFTP	Supported
IPv6 QoS	Supported
IPv6 ACL	Number of rules: up to 256 entries for L2 / L3 / L4 L2 : Mac address SA/DA/VLAN L3 : IP address SA/DA, Subnet L4 : TCP/UDP
Advanced PoE Management	PoE PD failure auto checking, and auto reset when PD fail PoE port on/off weekly scheduling PoE Configuration PoE Enable/Disable Power limit by classification Power limit by management Total PoE Power budge limitation management: Maximum 400W power budget Power feeding priority

Application

Figure : Application Example



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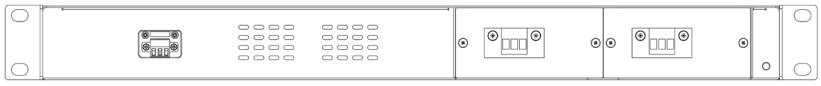
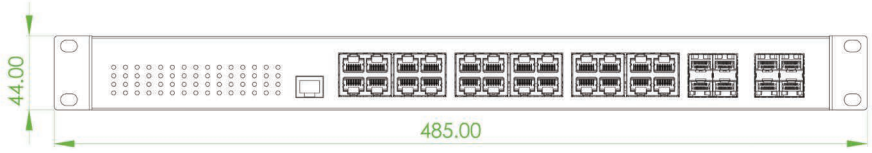
Dimensions

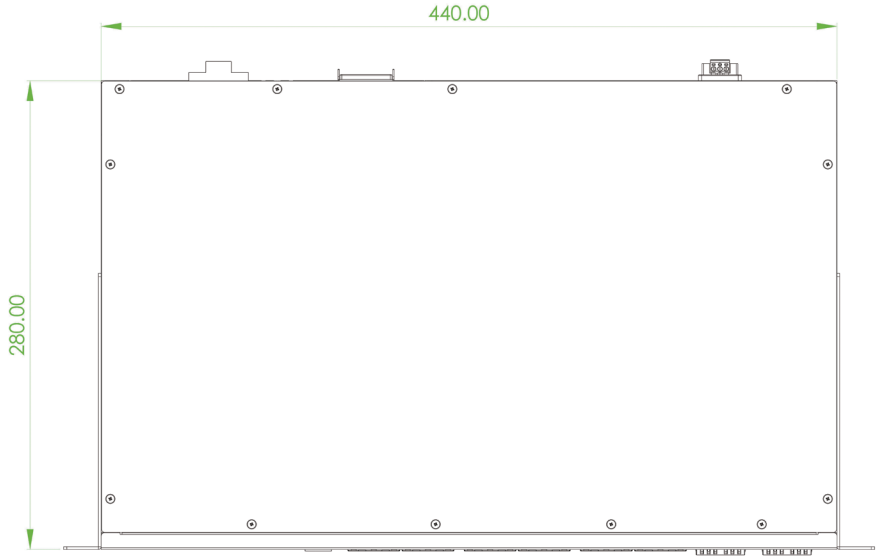
Rear View



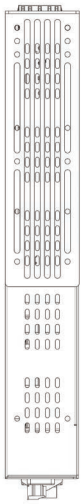
Front View



Top View



Side View



Ordering Information

Model Name	Managed	Total Port	RJ45 Port	SFP Port	PoE port		Input power	Certification				Operating Temperature
			10/100/1000 Base-T(X)	100/1000 Base-X	IEEE 802.3at	Power Budget	48,-48V DC	Safety UL60950-1 EN60950-1	EN50121-4	EN61000-6-2 EN61000-6-4	CE, FCC	
IGS-2408SM-24PHE	V	32	24	8	24	400W	2	V	V	V	V	-40~70℃

Model Naming Rule

IGS – 24 08S M – 24PH E

- IGS: Industrial Gigabit Switch
- 24: 24 GbE RJ45
- 08S: 8x GbE SFP
- M: Managed
- 24PH: 24 High Power PoE
- E : -40~70°C
- blank : 10~60°C

Optional Accessories

Industrial SFP Transceiver

The ISFP series of industrial grade SFP modules have been fully tested with the series product for guaranteed compatibility and performance. The best performance can be guaranteed even in mission-critical applications.

ISFP-M7000-85-D(E)	Industrial SFP GbE 1000Base-SX, M/M, 500 meter,wave length 850nm, 7.5dB, LC, DDMI, -10~70℃ (-40~85℃)
ISFP-S7020-31-D(E)	Industrial SFP 1000Base-LX, S/M, 20km, wave length 1310nm, 15dB, LC, DDMI, -10~70℃(-40~85℃)
ISFP-T7T00-00-(E)	Industrial SFP 10/100/1000Base-T UTP 100meter, -10~70℃ (-40~85℃)
ISFP-M5002-31-D(E)	Industrial SFP 155M 100Base-FX, MM, 2km, wave length 1310nm, 12dB, LC, DDMI, -10~70℃ (-40~85℃)
ISFP-S5030-31-D(E)	Industrial SFP 155M 100Base-FX, SM, 30km, 1310nm, 19dB, LC, DDMI, -10~70℃ (-40~85℃)

SFP Naming Rule

ISFP – S 7 040 – 31 – D E

- ISFP: Industrial SFP Transceiver
- S: M: Multi Mode; S: Single Mode; T: UTP
- 7: 9: 10G; 7: GbE; 5: FE
- 040: Distance — T00: (UTP); 000: (500m); 002: (2km); 020: (20km); 040: (40km)
- 31: Wavelength — 00: UTP; 85: 850nm; 31:1310nm; 55:1550nm; WA: TX/1310nm (Bidi mode A); WB: TX/1550nm (Bidi Mode B)
- D: DDMI; Blank: Non DDMI
- E: -40~85°C; Blank: 0~70°C

IGS-1608SM-8PH
16x 10/100/1000Base-T +
8x 100/1000Base-X SFP w/ 8x PoE+

IGS+803SM-8PH24
8x 10/100/1000Base-T +
3x 100/1000Base-X SFP w/ 8x PoE+

IGS+803SM-8PH
8x 10/100/1000Base-T +
3x 100/1000Base-X SFP w/ 8x PoE+

IGS-402SM-4PU
4x 10/100/1000Base-T +
2x 100/1000Base-X SFP w/ 4x *PoE+, 60W*

UL60950-1 · CE · FC · EN50121-4 · EN61000-6-2 EN61000-6-4 · NEMA TS2 · PoE Regulated · SmartView · µ-Ring · IEEE 1588v2 · Negative Voltage

These models are managed industrial grade Gigabit PoE (Power over Ethernet) switches that provide 4/8/16x GbE UTP plus 2/3/8 GbE SFP with 4/8x PoE Ports. The PoE features enable power and data to be transferred via a single cable, thereby considerably reducing cabling and electrical wiring expenses. With dual power input design, these models can provide redundant mechanisms for critical applications that need always-on connections. These switches can also operate either at standard operating temperature range (-10 to 60℃) or at wide operating temperature range (-40 to 75℃) so as to fulfill the special needs of industrial automation applications. Housed in rugged DIN rail or wall mountable IP-30 enclosures, these switches are perfect choices for harsh environments, such as telecom network, industrial network, intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications.

These managed switches also support a wide variety of Ethernet functions, including STP/RSTP/MSTP/ ITM-T G.8032 ERPS and multiple µ-Ring for redundant cabling, advanced PoE management functions such as weekly PoE power scheduling as well as device auto-checking and auto-reset. They also support layer 2 Ethernet IGMP, VLAN, QoS, Security, IPv6, bandwidth control, port mirroring, cable diagnostics and Green Ethernet. Additionally, these switches can also be managed by CTC Union's SmartView™ Element Management System which offers a user-friendly and centralized device management platform and provides network administrators the ability to monitor and configure these connected switches remotely (see figure 1).

Features

- 16x 10/100/1000Base-T RJ-45+ 8x 100/1000Base-X SFP with 8x PoE+, total 240W power budget (IGS-1608SM-8PH)
- 8x 10/100/1000Base-T RJ-45+ 3x 100/1000Base-X SFP with 8x PoE+, total 180W power budget (IGS+803SM-8PH24)
- 8x 10/100/1000Base-T RJ-45+ 3x 100/1000Base-X SFP with 8x PoE+, total 240W power budget (IGS+803SM-8PH)
- 4x 10/100/1000Base-T RJ-45 + 2x 100/1000Base-X SFP with 4x PoE+, total 240W power budget (IGS-402SM-4PU)
- 48VDC (44~57VDC) redundant dual input power (IGS-1608SM-8PH , IGS+803SM-8PH, IGS-402SM-4PU)
- 24/48VDC (20~57VDC) redundant dual input power with built-in very high efficiency booster (94~97%) to rise up 55 VDC for PoE output (Figure 2) (IGS+803SM-8PH24)
- **Supports negative voltage power input with isolated RS-232 console port (for example in telecom system)**
- Regulated PoE output voltage (55VDC) to stabilize PoE device, and guarantee delivery PoE power distance to 100meter (Figure 2) (IGS+803SM-8PH24)
- Provides 8 port IEEE 802.3af / 802.3at PoE+ output ,30W per port (IGS-1608SM-8PH, IGS+803SM-8PH24, IGS+803SM-8PH)
- Provides 4 port IEEE 802.3af / 802.3at PoE+ output, 60W per port (IGS-402SM-4PU)
- Advanced PoE Management, PoE PD Failure Auto Checking and auto reset when PD fail, PoE port on/off weekly scheduling, PoE configuration for power planning
- Rugged metal, IP30 protection & Fan-less design
- UL60950-1, EN60950-1, CE, FCC, Rail Traffic EN50121-4, traffic control NEMA TS2 certified
- Heavy Industrial grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- **4KV surge protection for PoE, UTP and Fiber ports**
- **2.25K VDC Hi-pot isolation protection for Ethernet ports and power**
- Cable diagnostics, Measuring cable OK or broken point distance
- Supports Green Ethernet IEEE 802.3az EEE (Energy Efficient Ethernet) management to optimize power consumption
- STP, RSTP, MSTP, ITM-T G.8032 Ethernet Ring Protection Switching (ERPS) for redundant cabling
- Provides 5 ring instances that each can support µ-Ring, µ-Chain or Sub-Ring type for flexible uses. Supports up to 5 rings in one device (Please see CTC µ-Ring white paper for more details and more topology application)
- µ-Ring for Redundant Cabling, recovery time<10ms in 250 devices
- DHCP Server/Client/ Relay/ Relay option 82/ Snooping
- QoS, Traffic classification QoS, CoS, bandwidth control for Ingress and Egress, Storm Control, DiffServ
- IEEE 802.1q VLAN, MAC based VLAN, IP subnet based VLAN, Protocol based VLAN, VLAN translation, GVRP, MVR
- Dynamic IEEE 802.3ad LACP Link Aggregation, Static Link Aggregation
- IGMP snooping V1/V2/V3, IGMP Filtering/ Throttling, IGMP query, IGMP proxy reporting, MLD snooping V1/V2
- Flexibility security: Port based and MAC based IEEE 802.1X, RADIUS, ACL, TACACS+, HTTP/HTTPS, SSL/SSH v2
- Software upgrade via TFTP and HTTP, redundant firmware to avoid upgrade failure
- 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
- RMON, MIB II, Port mirroring, Event syslog, DNS, NTP, SNTP, IEEE 802.1ab LLDP
- Supports IPv6 Telnet server /ICMP v6
- CLI, Web based management, SNMP v1/v2c/v3, Telnet server for management
- Supports Modbus/TCP protocols for management
- Provides SmartConfig for quick and easy mass Configuration*
- Supports SmartView for Centralized Management*

*Please see Chapter 1- **Software Management** for more details

Specifications

Standard	IEEE 802.3	10Base-T 10Mbit/s Ethernet
	IEEE 802.3u	100Base-TX, 100Base-FX, Fast Ethernet
	IEEE 802.3ab	1000Base-T Gbit/s Ethernet over twisted pair
	IEEE 802.3z	1000Base-X Gbit/s Ethernet over Fiber-Optic
	IEEE 802.3af	PoE (Power over Ethernet)
	IEEE 802.3at	PoE+ (Power over Ethernet enhancements)
	IEEE 802.1d	STP (Spanning Tree Protocol)
	IEEE 802.1w	RSTP (Rapid Spanning Tree Protocol)
	IEEE 802.1s	MSTP (Multiple Spanning Tree Protocol)
	ITM-T G.8032 / Y.1344	ERPS (Ethernet Ring Protection Switching)
	IEEE 802.1Q	Virtual LANs (VLAN)
	IEEE 802.1X	Port based and MAC based Network Access Control, Authentication
	IEEE802.3ac	Max frame size extended to 1522Bytes
	IEEE 802.3ad	Link aggregation for parallel links with LACP(Link Aggregation Control Protocol)
	IEEE 802.3x	Flow control for Full Duplex
	IEEE 802.1ad	Stacked VLANs, Q-in-Q
	IEEE 802.1p	LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization
	IEEE 802.1ab	Link Layer Discovery Protocol (LLDP)
	IEEE 802.3az	EEE (Energy Efficient Ethernet)
Switch Architecture	Back-plane (Switching Fabric): 48Gbps (IGS-1608SM-8PH) 22Gbps (IGS+803SM-8PH24, IGS+803SM-8PH) 12Gbps (IGS-402SM-4PU) Full wire-speed	
Data Processing	Store and Forward	
Flow Control	IEEE 802.3x for full duplex mode Back pressure for half duplex mode	
Network Connector	16x 10/100/1000Base-T RJ-45 + 8x 100/1000Base-X SFP connector (IGS-1608SM-8PH) 8x 10/100/1000Base-T RJ-45 + 3x 100/1000Base-X SFP connector (IGS+803SM-8PH24, IGS+803SM-8PH) 4x 10/100/1000Base-T RJ-45 + 2x 100/1000Base-X SFP connector (IGS-402SM-4PU) RJ-45 UTP port support Auto negotiation speed, Auto MDI/MDI-X function, SFP port support 100/1000 dual speed with DDMI	
Console	RS-232 (RJ-45) Isolated RS-232 port grounding for negative voltage power system, or telecom network application	
PoE standard & RJ-45 Pin Assignment	IGS-1608SM-8PH, IGS+803SM-8PH24, IGS+803SM-8PH: 8x IEEE 802.3at /IEEE 802.3af PoE+ 2 pairs PoE, PoE+, 30W/port End-Span, Alternative A mode. Positive (V+) : RJ-45 pin 1, 2. Negative (V-) : RJ-45 pin 3, 6. IGS-402SM-4PU: 4x IEEE 802.3at/ 802.3af PoE+ 4 pairs PoE, 60W/port End-Span, Alternative A and B mode. Positive (V+) : RJ-45 pin 1, 2, 4, 5 Negative (V-) : RJ-45 pin 3, 6, 7, 8	
Network Cable	UTP/STP above Cat. 5e cable	
	EIA/TIA-568 100-ohm (100m)	
Protocols	CSMA/CD	
Reverse Polarity Protection	Supported for power input	
Overload Current Protection	Supported	
CPU Watch Dog	Supported	
Power Supply	**IGS-1608SM-8PH, IGS+803SM-8PH, IGS-402SM-4PU :** Redundant Dual DC 48V (44~57VDC) input power, and support negative voltage input power for telecom (Removable terminal block) (50~57V input is recommended for IEEE802.3at PoE+ in 30W/ 60W applications)	

Power Supply	**IGS+803SM-8PH24:** Redundant Dual DC 24/48V (20~57VDC) input power, and support negative voltage input power for telecom network (Removable Terminal Block) Built-in very high efficiency booster(94~97%) to rise up 55 VDC for PoE output Regulated PoE output voltage (55VDC) to stabilize PoE device, and guarantee delivery PoE power distance to 100meter (Figure 2)
Power Consumption	IGS-1608SM-8PH Power consumption

Input Voltage	Total Power Consumption	Device Power Consumption	PoE Budget
50VDC	255.2W	15.2W	240W

IGS+803SM-8PH24 Power consumption & Booser efficiency

Input Voltage	Total Power Consumption	Device Power Consumption	PoE Budget	Boost Efficiency
24VDC	194.2W	10.8W	180W	97%
48VDC	196W	11.5W	180W	97%

IGS+803SM-8PH Power consumption & Booser efficiency

Input Voltage	Total Power Consumption	Device Power Consumption	PoE Budget
50VDC	255.5W	15.5W	240W

IGS-402SM-4PU Power consumption

Input Voltage	Total Power Consumption	Device Power Consumption	PoE Budget
50VDC	249.6W	9.6W	240W

PoE Power Budget	Maximum PoE Output power budget 30W / Per Port 240W (IGS-1608SM-8PH, IGS+803SM-8PH) 180W (IGS+803SM-8PH24) Maximum PoE Output power budget **60W / Per Port** 240W (IGS-402SM-4PU)
LED	Per unit: Power 1 (Green), Power 2 (Green), Fault (Amber), CPU Act (Green), Ring Master (Yellow)
	Per RJ-45 port: 10/100 Link/Active (Green) 1000 Link/Active (Amber)
	SFP Fiber Per port: Link/Active (Green)
	PoE Port LED 1 LED /per Port : • PoE Output Power On : ON (Green) • PoE Fault (Over Load, Short Circuit,Port failed at Startup) : Flash 1times /sec (Green)
Jumbo Frame	9.6KB
IEEE802.3ac	Max frame size extended to 1522Bytes (allow Q-tag in packet)
MAC Address Table	8K
Memory Buffer	512K Bytes for packet buffer
Warning Message	System Syslog, SMTP/ e-mail event message, alarm relay
Alarm Relay Contact	Relay outputs with current carrying capacity of 1 A @24VDC
Removable Terminal Block	Provide 2 redundant power, alarm relay contact, 6 Pin
Operating Temperature	-10 ~ 60°C (IGS-1608SM-8PH , IGS+803SM-8PH24, IGS+803SM-8PH, IGS-402SM-4PU) -40 ~ 75°C (IGS-1608SM-8PHE , IGS+803SM-8PHE24, IGS+803SM-8PHE, IGS-402SM-4PUE)
Operating Humidity	5% to 95% (Non-condensing)
Storage Temperature	-40 ~ 85°C
Housing	Rugged Metal, IP30 Protection, Fanless
Dimensions	116 x 92 x 160 mm (Dx Wx H) (IGS-1608SM-8PH) 106 x 72 x 152 mm (D x W x H) (IGS+803SM-8PH24, IGS+803SM-8PH) 106 x 62.5 x 135 mm (D x W x H) (IGS-402SM-4PU)
Weight	1.375kg (IGS-1608SM-8PH), 0.86kg (IGS+803SM-8PH24) 0.85kg (IGS+803SM-8PH) 0.7kg (IGS-402SM-4PU)
Installation Mounting	DIN Rail mounting, or wall mounting (Optional)
MTBF	439,881 Hours (IGS-1608SM-8PH) 528,753 Hours (IGS+803SM-8PH24) 487,189 Hours (IGS+803SM-8PH) 589,078 Hours (IGS-402SM-4PU) (MIL-HDBK-217)
Warranty	5 years
Certification	
EMC	CE (EN55024, EN55032)
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE
Railway Traffic	EN50121-4

Traffic control	NEMA TS2 (IGS+803SM-8PH24, IGS+803SM-8PH)
Immunity for Heavy Industrial Environment	EN61000-6-2
Emission for Heavy Industrial Environment	EN61000-6-4
EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B
	EN61000-4-3 (RS) Level 3, Criteria A
	EN61000-4-4 (Burst) Level 3, Criteria A
	EN61000-4-5 (Surge) Level 3, Criteria B
EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-6 (CS) Level 3, Criteria A
	EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
Safety	UL60950-1, EN60950-1
Hi pot protection	DC 2.25KV for power to chassis ground, Ethernet port to chassis ground
4KV surge protection	Supported for PoE, UTP and Fiber ports
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

Software Specifications

Topology	
VLAN	IEEE 802.1q VLAN,up to 4094 802.1Q VLAN VID
	IEEE 802.1q VLAN,up to 4094 Groups
	IEEE 802.1ad Q-in-Q
	MAC-based VLAN,up to 256 entries
	IP Subnet-based VLAN, up to 128 entries
	Protocol-based VLAN(Ethernt, SNAP, LLC), up to 128 entries
	VLAN Translation, up to 256 entries
	GVRP (GARP VLAN Registration Protocol)
	MVR (Multicast VLAN Registration)
Link Aggregation (Port Trunk)	Static (Hash with SA, DA, IP, TCP/UDP port), up to 5 trunk group
	Dynamic (IEEE 802.3ad LACP), up to 5 trunk group
Spanning Tree	IEEE 802.1d STP, IEEE 802.1w RSTP, IEEE 802.1s MSTP
Multiple µ-Ring	up to 5 instances that each supports µ-Ring, µ-Chain or Sub-Ring type for flexible uses, and maximum up to 5 Rings Recovery time <10ms The maximum number of devices allowed in a Ring supported ring is 250 (Please see CTC Union µ-Ring white paper for more details and more topology application)
Loop Protection	Supported
ITM-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)	Recovery time <50ms
	Single Ring, Sub-Ring, Multiple ring topology network
QoS Features	
Class of Service	IEEE 802.1p 8 active priorities queues for per port
Traffic Classification QoS	IEEE 802.1p based CoS, IP Precedence based CoS IP DSCP based CoS
	QCL(QoS Control List): Frame Type, Source/ Destination MAC, VLAN ID, PCP, DEI
	QCE(QoS Control Entry): Protocol, Source IP, IP Fragment, DSCP, TCP/UDP port number
Bandwidth Control for Ingress	Rate in steps :1 kbps / Mbps / fps / kfps
	Range : 100 kbps to 1Gbps / 1fps to 3300kfps
	Rate Unit : bit or frame
Bandwidth Control for Egress	Rate in steps : 1 kbps / Mbps
	Range : 100 kbps to 1Gbps
	Rate Unit : bit
	Per queue / Per port shaper
DiffServ (RF 2474) Remarking	
Storm Control	for Unicast, Broadcast, Multicast
IP Multicasting Features	
IGMP / MLD Snooping	IGMP Snooping v1, v2, v3 / MLD Snooping v1, v2
	Port Filtering Profile
	Throttling
	Fast Leave
	Maximum Multicast Group : up to 1022 entries
	Query / Static Router Port
Security Features	
IEEE 802.1X	Port-Based
	MAC-Based
ACL	Number of rules : up to 256 entries
	for L2 / L3 / L4 L2 : Mac address SA/DA/VLAN L3: IP address SA/DA, Subnet L4: TCP/UDP
RADIUS authentication & accounting	
TACACS+ authentication & accounting, TACACS+ 3.0	
HTTPS, HTTP	Supported
SSL / SSH v2	Supported

User Name Password Authentication	Local Authentication
	Remote Authentication (via RADIUS / TACACS+)
Management Interface Access Filtering	Web, Telnet / SSH , CLI RS-232 console
Management Features	
CLI	Cisco® like CLI
Web Based Management	
Telnet	Server
SNMP	V1, V2c, V3
Modbus/TCP	Support for management and monitoring
SW & Configuration Upgrade	TFTP, HTTP
	Redundant firmware in case of upgrade failure
RMON	RMON I (1, 2, 3, 9 group), RMON II
MIB	RFC1213 MIB II, Private MIB
UPnP	Supported
DHCP	Server, Client, Relay, Relay option 82 , Snooping
IP Source Guard	Supported
Port Mirroring	Supported
Event Syslog	Syslog server (RFC3164) (Support 1 server)
Warning Message	System syslog, e-mail, alarm relay
DNS	Client, Proxy
IEEE1588 PTP V2	Support 5 operating mode in each port : Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave
NTP, SNTP	Client
LLDP (IEEE 802.1ab)	Link Layer Discovery Protocol
	LLDP-MED
IPv6 Features	
IPv6 Management	Telnet Server/ICMP v6
SNMP over IPv6	Supported
HTTP over IPv6	Supported
SSH over IPv6	Supported
IPv6 Telnet	Supported
IPv6 NTP, SNTP	Client
IPv6 TFTP	Supported
IPv6 QoS	Supported
IPv6 ACL	Number of rules: up to 256 entries
	for L2 / L3 / L4 L2 : Mac address SA/DA/VLAN L3: IP address SA/DA, Subnet L4: TCP/UDP
Others Features	
Green Ethernet	Supports IEEE 802.3az EEE (Energy Efficient Ethernet) Management to optimize the power consumption
	Determine the cable length and lowering the power for ports with short cables
	Lower the power for a port when there is no link
	LED Power Management :Adjustment LEDs intensity
Cable Diagnostic	Measuring UTP cable normal or broken point distance
Advanced PoE	
Management	PoE PD failure auto checking, and auto reset when PD fail PoE port on/off weekly scheduling PoE Configuration PoE Enable/Disable Power limit by classification Power feeding priority Total PoE Power budge limitation: maximum 240W for IGS-1608SM-8PH, IGS+803SM-8PH, IGS-402SM-4PU, 180W for IGS+803SM-8PH24

Application

Figure 1 : Application Example

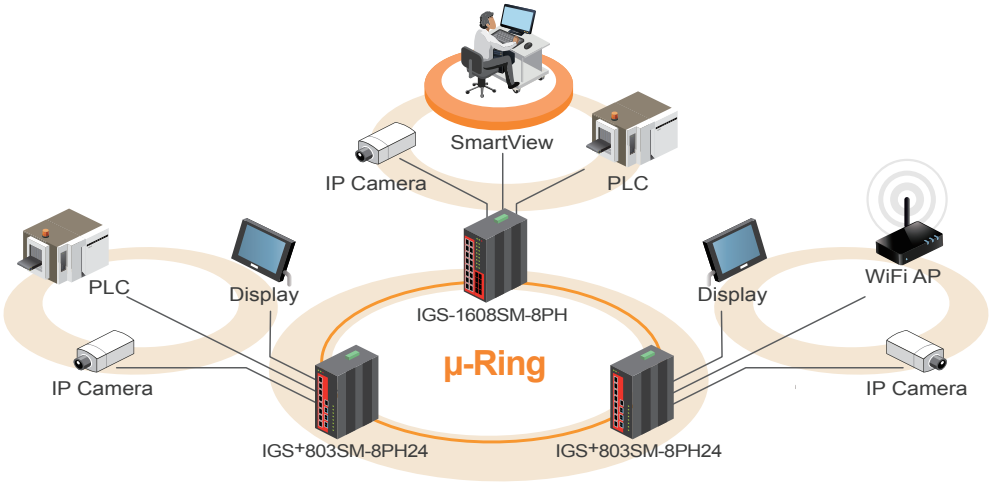
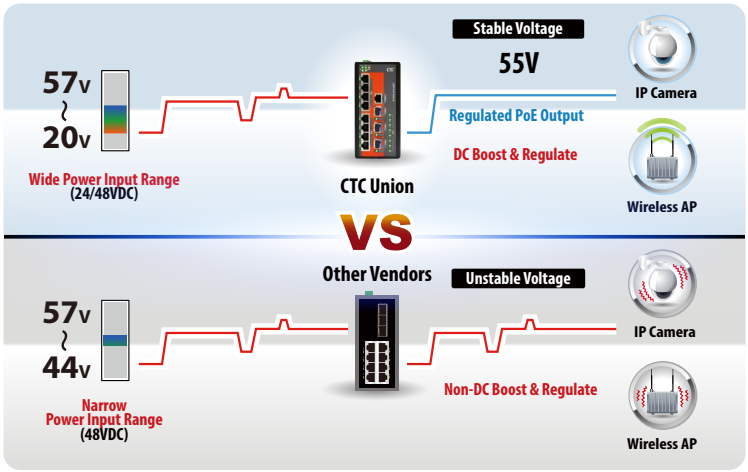


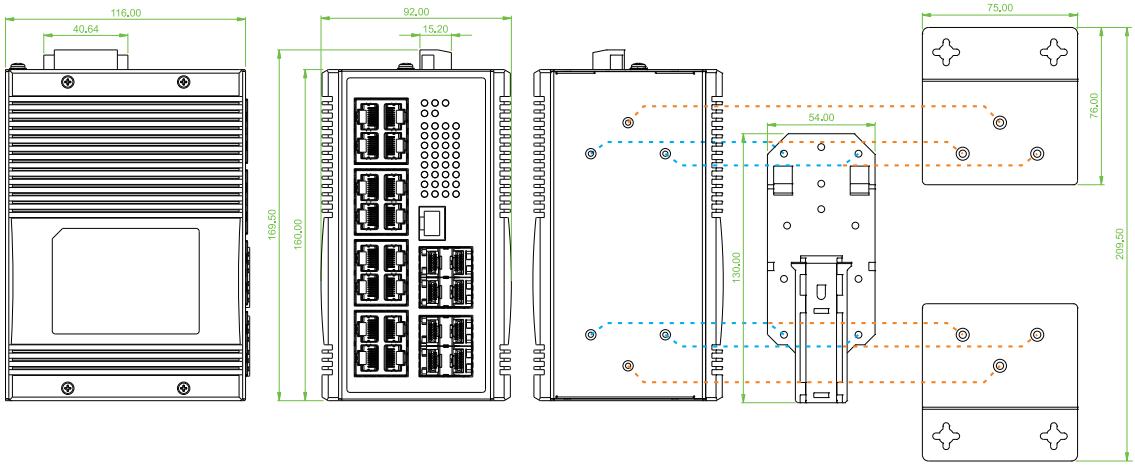
Figure 2 : High Efficiency Boost Technology for PoE



- 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

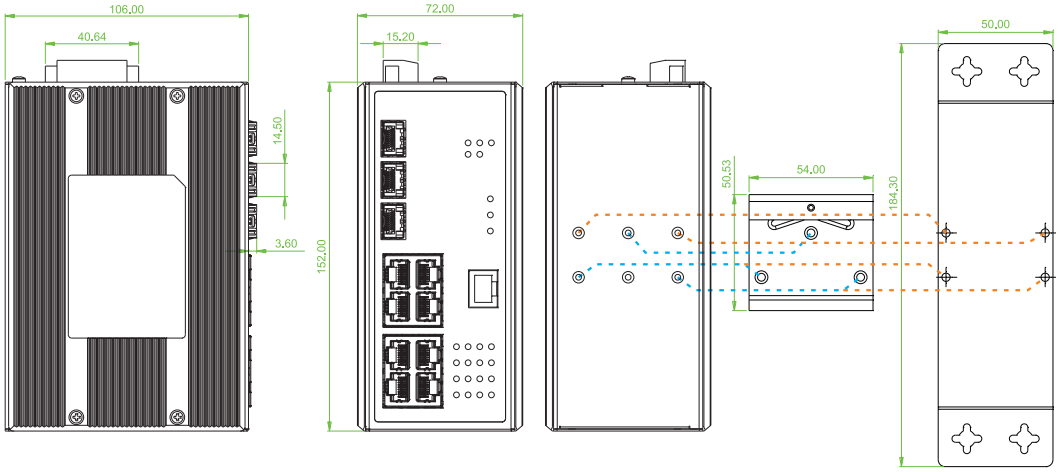
Dimensions

▶ IGS-1608SM-8PH



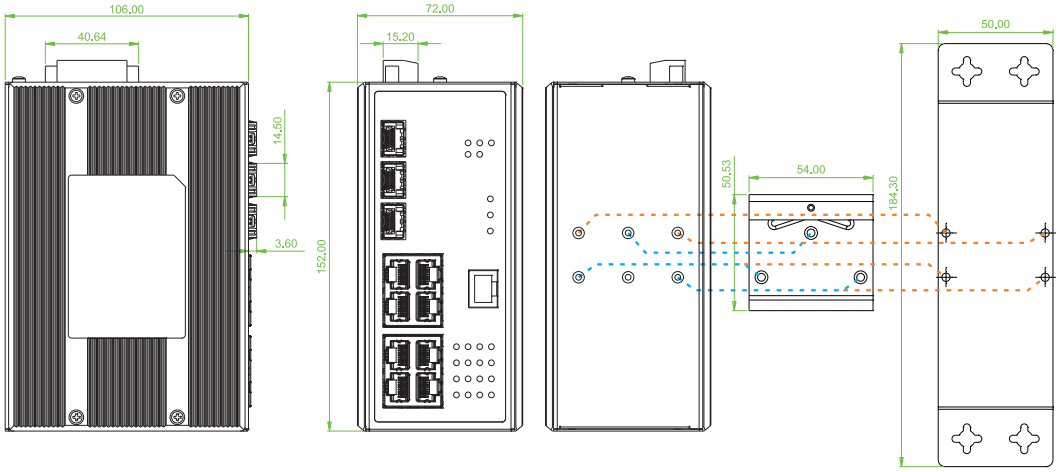
Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

▶ IGS+803SM-8PH24



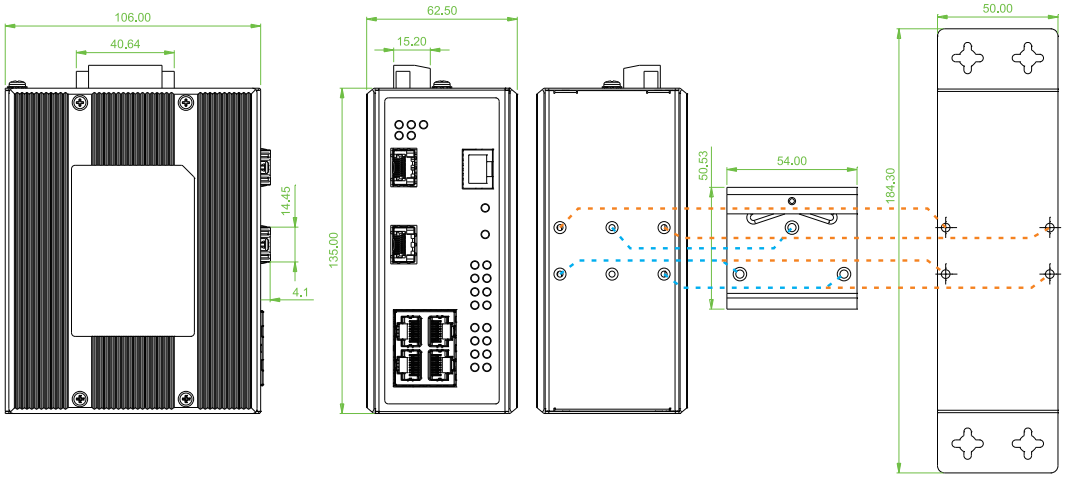
Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

▶ IGS+803SM-8PH



Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

▶ IGS-402SM-4PU



Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

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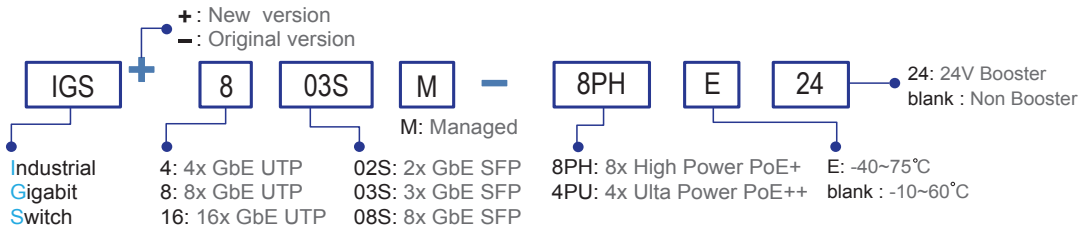
Ordering Information

Model Name	Total Port	UTP	Fiber	PoE Port			Input power	Certification					Operating Temperature
		10/100/1000 Base-T	100/1000 Base-X	IEEE802.3at	IEEE 802.3at 4 pairs PoE/60W	Power Budget	Redundant	Railway EN50121-4	NEMA TS2	Safety EN60950-1	Safety UL60950-1	CE, FCC EN61000-6-2 EN61000-6-4	
IGS-1608SM-8PH	24	16	8 SFP	8		240W	48, -48VDC	V		V	V	V	-10~60℃
IGS-1608SM-8PHE	24	16	8 SFP	8		240W	48, -48VDC	V		V	V	V	-40~75℃
IGS+803SM-8PH24	11	8	3 SFP	8		180W	24/48, -48VDC	V	V	V	V	V	-10~60℃
IGS+803SM-8PHE24	11	8	3 SFP	8		180W	24/48, -48VDC	V	V	V	V	V	-40~75℃
IGS+803SM-8PH	11	8	3 SFP	8		240W	48, -48VDC	V	V	V	V	V	-10~60℃
IGS+803SM-8PHE	11	8	3 SFP	8		240W	48, -48VDC	V	V	V	V	V	-40~75℃
IGS-402SM-4PU	6	4	2 SFP		4	240W	48, -48VDC	V		V	V	V	-10~60℃
IGS-402SM-4PUE	6	4	2 SFP		4	240W	48, -48VDC	V		V	V	V	-40~75℃

Model Naming Rule



Optional Accessories

Package List

- One device of the series
- Console cable (RJ-45 to DB9)
- CD (SmartConfig, MIB file, Manual)
- Quick installation guide
- Din Rail with screws
- Terminal block
- Protective caps for SFP ports

Wall mount kit

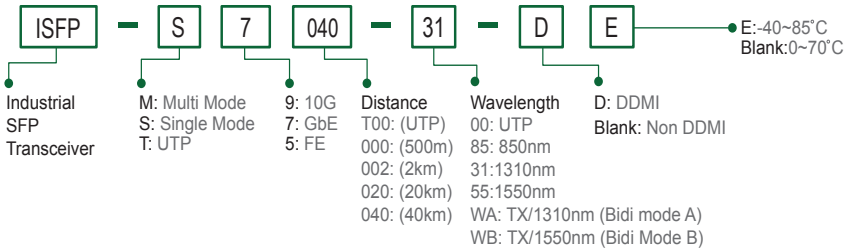
IND-WMK02	Wall Mount kit for Industrial product (Wide) (184 x 50mm) (For IGS+803SM-8PH24, IGS+803SM-8PH, IGS-402SM-4PU)
IND-WMK04	Wall Mount kit for Industrial product (Wide) (2 pcs in 1 set, 76mm x 75mm x 2pcs) (For IGS-1608SM-8PH)

Industrial SFP Transceiver

The ISFP series of industrial grade SFP modules have been fully tested with the series product for guaranteed compatibility and performance. The best performance can be guaranteed even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheet for more details and more items.)

ISFP-M7000-85-D(E)	Industrial SFP GbE 1000Base-SX, M/M, 500 meter,wave length 850nm, 7.5dB, LC, DDMI, -10~70°C (-40~85°C)
ISFP-S7020-31-D(E)	Industrial SFP 1000Base-LX, S/M, 20km, wave length 1310nm, 15dB, LC, DDMI, -10~70°C(-40~85°C)
ISFP-T7T00-00-(E)	Industrial SFP 10/100/1000Base-T UTP 100meter, -10~70°C (-40~85°C)
ISFP-M5002-31-D(E)	Industrial SFP 155M 100Base-FX, MM, 2km, wave length 1310nm, 12dB, LC, DDMI, -10~70°C (-40~85°C)
ISFP-S5030-31-D(E)	Industrial SFP 155M 100Base-FX, SM, 30km, 1310nm, 19dB, LC, DDMI, -10~70°C (-40~85°C)

SFP Naming Rule



1G/2.5G

IGS-402SM-4PH24

4x 10/100/1000Base-T + 1x FE/GbE SFP +
1x FE/GbE/2.5G SFP with 4x PoE+

IGS-803SM-8PH24

8x 10/100/1000Base-T + 1x FE/GbE SFP +
2x FE/GbE/2.5G SFP with 8x PoE+

These models are managed industrial grade Gigabit PoE (Power over Ethernet) switches with 4/8 10/100/1000Base-T PoE ports and 2/3 Gigabit/Fast SFP ports with **1/2 port 2.5GbE** that provide stable and reliable Ethernet transmission. With dual power input design, these models can provide redundant mechanisms for critical applications that need always-on connections. These switches can also operate either at standard operating temperature range (-10 to 60°C) or at wide operating temperature range (-40 to 75°C) so as to fulfill the special needs of industrial automation applications. Housed in rugged DIN rail or wall mountable IP-30 enclosures, these switches are perfect choices for harsh environments, such as industrial networking, intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications.

These managed switches also support a wide variety of Ethernet functions, including STP/RSTP/MSTP/ ITU-T G.8032 ERPS and multiple μ-Ring for redundant cabling, advanced PoE management functions such as weekly PoE power scheduling as well as device auto-checking and auto-reset. They also support layer 2 Ethernet IGMP, VLAN, QoS, ACL, Security, IPv6, bandwidth control, port mirroring, cable diagnostics and Green Ethernet. Additionally, these switches can also be managed by SmartView™ Element Management System which offers a user-friendly and centralized device management platform and provides network administrators the ability to monitor and configure these connected switches remotely (see figure 1).

Features

- ♦ 4x 10/100/1000Base-T RJ-45+ 1x FE/GbE SFP + **1x FE/GbE/2.5G SFP** with 4x PoE+, total 120W power budget (IGS-402SM-4PH24)
- ♦ 8x 10/100/1000Base-T RJ-45+ 1x FE/GbE SFP + **2x FE/GbE/2.5G SFP** with 8x PoE+, total 180W power budget (IGS-803SM-8PH24)
- 24/48VDC (20~57VDC) redundant dual input power with built-in very high efficiency booster (94~97%) to rise up 55 VDC for PoE output (Figure 2)
- Regulated PoE output voltage (55VDC) to stabilize PoE device, and guarantee delivery PoE power distance to 100meter (Figure 2)
- Provides 4/8 port IEEE 802.3af / 802.3at PoE output (30W per Port)
- Advanced PoE Management, PoE PD Failure Auto Checking and auto reset when PD fail, PoE port on/off weekly scheduling, PoE configuration for power planning
- Rugged metal, IP30 protection & Fanless design
- UL60950-1, CE, FCC, Rail Traffic EN50121-4, Traffic control NEMA TS2 certified
- Heavy industrial grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- Cable diagnostics, Measuring UTP cable OK or broken point distance
- Supports Green Ethernet IEEE 802.3az EEE (Energy Efficient Ethernet) management to optimize power consumption
- STP, RSTP, MSTP, ITU-T G.8032 Ethernet Ring Protection Switching (ERPS) for redundant cabling
- Provides 5 ring instances that each can support μ-Ring, μ-Chain or Sub-Ring type for flexible uses. Supports up to 5 rings in one device
- μ-Ring for Redundant Cabling, recovery time<10ms in 250 devices
- DHCP Server/Client/ Relay/ Relay option 82/ Snooping
- QoS, Traffic classification QoS, CoS, bandwidth control for Ingress and Egress, Storm Control, DiffServ
- IEEE 802.1q VLAN, MAC based VLAN, IP subnet based VLAN, Protocol based VLAN, VLAN translation, GVRP, MVR
- Dynamic IEEE 802.3ad LACP Link Aggregation, Static Link Aggregation
- IGMP snooping V1/V2/V3, IGMP Filtering/ Throttling, IGMP query, IGMP proxy reporting, MLD snooping V1/V2
- Flexibility security: Port based and MAC based IEEE 802.1X, RADIUS, ACL, TACACS+, HTTP/HTTPS, SSL/SSH v2
- Software upgrade via TFTP and HTTP, redundant firmware to avoid upgrade failure
- 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
- RMON, MIB II, Port mirroring, Event syslog, DNS, NTP, SNTP, IEEE 802.1ab LLDP
- Supports IPv6 Telnet server /ICMP v6
- CLI, Web based management, SNMP v1/v2c/v3, Telnet server for management
- Supports Modbus/TCP protocols for management
- Provides SmartConfig for quick and easy mass Configuration*
- Supports SmartView for Centralized Management*

*Please see Chapter 1- **Software Management** for more details

Specifications

Standard	IEEE 802.3	10Base-T 10Mbit/s Ethernet
	IEEE 802.3u	100Base-TX, 100Base-FX, Fast Ethernet
	IEEE 802.3ab	1000Base-T Gbit/s Ethernet over twisted pair
	IEEE 802.3z	1000Base-X Gbit/s Ethernet over Fiber-Optic
	IEEE 802.3cb	2.5GBase-X
	IEEE 802.3af	PoE (Power over Ethernet)

Standard	IEEE 802.3at	PoE+ (Power over Ethernet enhancements)
	IEEE 802.1d	STP (Spanning Tree Protocol)
	IEEE 802.1w	RSTP (Rapid Spanning Tree Protocol)
	IEEE 802.1s	MSTP (Multiple Spanning Tree Protocol)
	ITM-T G.8032 / Y.1344	ERPS (Ethernet Ring Protection Switching)
	IEEE 802.1Q	Virtual LANs (VLAN)

Standard	IEEE 802.1X	Port based and MAC based Network Access Control, Authentication
	IEEE802.3ac	Max frame size extended to 1522Bytes
	IEEE 802.3ad	Link aggregation for parallel links with LACP(Link Aggregation Control Protocol)
	IEEE 802.3x	Flow control for Full Duplex
	IEEE 802.1ad	Stacked VLANs, Q-in-Q
	IEEE 802.1p	LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization
	IEEE 802.1ab	Link Layer Discovery Protocol (LLDP)
	IEEE 802.3az	EEE (Energy Efficient Ethernet)
Switch Architecture	Back-plane (Switching Fabric): 15Gbps (IGS-402SM-4PH24) 28Gbps (IGS-803SM-8PH24) Full wire-speed	
Data Processing	Store and Forward	
Flow Control	IEEE 802.3x for full duplex mode Back pressure for half duplex mode	
Network Connector	4x 10/100/1000Base-T RJ-45 + 1x FE/GbE SFP slot+ 1x FE/GbE/2.5G SFP slot (IGS-402SM-4PH24) 8x 10/100/1000Base-T RJ-45 + 1x FE/GbE SFP slot + 2x FE/GbE/2.5G SFP slot (IGS-803SM-8PH24) RJ-45 UTP port support Auto negotiation speed, Auto MDI/MDI-X function, SFP ports support 100/1000 or 2.5G with DDMI	
PoE standard & RJ-45 pin assignment	4x IEEE 802.3af /IEEE 802.3at PoE+ (IGS-402SM-4PH24) 8x IEEE 802.3af /IEEE 802.3at PoE+ (IGS-803SM-8PH24) End-Span, Alternative A mode. Positive (V+) : RJ-45 pin 1, 2. Negative (V-) : RJ-45 pin 3, 6. Data (1,2,3,6,4,5,7,8)	
Console	RS-232 (RJ-45)	
Network Cable	UTP/STP above Cat. 5e cable	
	EIA/TIA-568 100-ohm (100m)	
Protocols	CSMA/CD	
Reverse Polarity Protection	Supported for power input	
Overload Current Protection	Supported	
CPU Watch Dog	Supported	
Power Supply	Redundant Dual DC 24/48V (20~57VDC) Input power (Removable Terminal Block) Built-in very high efficiency booster(94~97%) to rise up 55 VDC for PoE output Regulated PoE output voltage (55VDC) to stabilize PoE device, and guarantee delivery PoE power distance to 100meter (Figure 2)	
Power Consumption	IGS-402SM-4PH24 Power consumption & Booser efficiency	

Input Voltage	Total Power Consumption	Device Power Consumption	PoE Budget	Boost Efficiency
24VDC	135.2W	7.5W	120W	94.0%
48VDC	132.5W	9W	120W	97.2%

IGS-803SM-8PH24 Power consumption & Booser efficiency

Input Voltage	Total Power Consumption	Device Power Consumption	PoE Budget	Boost Efficiency
24VDC	200.2W	9.2W	180W	94%
48VDC	195.1W	9.8W	180W	97%

PoE Power Budget	Maximum PoE Output power budget 30W / Per Port 120W (IGS-402SM-4PH24) 180W (IGS-803SM-8PH24)
LED	Per unit: Power 1 (Green), Power 2 (Green), Fault (Amber), CPU Act (Green), Ring Master (Yellow)
	Per RJ-45 port: 10/100 Link/Active (Green) 1000 Link/Active (Amber)
	SFP Fiber Per port: Link/Active (Green)
	PoE Port LED 1 LED /per Port : • PoE Output Power On : ON (Green) • PoE Fault (Over Load, Short Circuit,Port failed at Startup) : Flash 1times /sec (Green) • PoE Output Power Off : Off
Jumbo Frame	9.6KB
IEEE802.3ac	Max frame size extended to 1522Bytes (allow Q-tag in packet)
MAC Address Table	8K
Memory Buffer	512K Bytes for packet buffer
Warning Message	System Syslog, SMTP/ e-mail event message, alarm relay
Alarm Relay Contact	Relay outputs with current carrying capacity of 1 A @24VDC
Removable Terminal Block	Provide 2 redundant power, alarm relay contact, 6 Pin
Operating Temperature	-10 ~ 60°C (IGS-402SM-4PH24, IGS-803SM-8PH24) -40 ~ 75°C (IGS-402SM-4PHE24, IGS-803SM-8PHE24)
Operating Humidity	5% to 95% (Non-condensing)
Storage Temperature	-40 ~ 85°C
Housing	Rugged Metal, IP30 Protection, Fanless
Dimensions	106 x 62.5 x 135 mm (D x W x H) (IGS-402SM-4PH24) 106 x 72 x 152 mm (D x W x H) (IGS-803SM-8PH24)
Weight	0.715kg (IGS-402SM-4PH24) 0.96kg (IGS-803SM-8PH24)
Installation Mounting	DIN Rail mounting, or wall mounting (Optional)
MTBF	674,963 Hours (IGS-402SM-4PH24) 466,542 Hours (IGS-803SM-8PH24) (MIL-HDBK-217)
Warranty	5 years
Certification	
EMC	CE
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A,CE
Railway Traffic	EN50121-4
Traffic control	NEMA TS2
Immunity for Heavy Industrial Environment	EN61000-6-2
Emission for Heavy Industrial Environment	EN61000-6-4
EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B
	EN61000-4-3 (RS) Level 3, Criteria A
	EN61000-4-4 (Burst) Level 3, Criteria A
	EN61000-4-5 (Surge) Level 3, Criteria B
	EN61000-4-6 (CS) Level 3, Criteria A
	EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
Safety	UL60950-1
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

Software Specifications

Topology		
VLAN	IEEE 802.1q VLAN,up to 4094 802.1Q VLAN VID	
	IEEE 802.1q VLAN,up to 4094 Groups	
	IEEE 802.1ad Q-in-Q	
	MAC-based VLAN,up to 256 entries	
	IP Subnet-based VLAN, up to 128 entries	
	Protocol-based VLAN(Ethernt, SNAP, LLC), up to 128 entries	
	VLAN Translation, up to 256 entries	
	GVRP (GARP VLAN Registration Protocal)	
	MVR (Multicast VLAN Registration)	
Link Aggregation (Port Trunk)	Static (Hash with SA, DA, IP, TCP/UDP port), up to 5 trunk group	
	Dynamic (IEEE 802.3ad LACP), up to 5 trunk group	
Spanning Tree	IEEE 802.1d STP	
	IEEE 802.1w RSTP	
	IEEE 802.1s MSTP	
Multiple μ-Ring	up to 5 instances that each supports μ-Ring, μ-Chain or Sub-Ring type for flexible uses, and maximum up to 5 Rings. Recovery time <10ms The maximum number of devices allowed in a Ring supported ring is 250.	
Loop Protection	Supported	
ITM-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)	Recovery time <50ms	
	Single Ring, Sub-Ring, Multiple ring topology network	

QoS Features	
Class of Service	IEEE 802.1p 8 active priorities queues for per port
Traffic Classification QoS	IEEE 802.1p based CoS
	IP Precedence based CoS
	IP DSCP based CoS
	QCL(QoS Control List): Frame Type, Source/ Destination MAC, VLAN ID, PCP, DEI
	QCE(QoS Control Entry): Protocol, Source IP, IP Fragment, DSCP, TCP/UDP port number
Bandwidth Control for Ingress	Rate in steps :1 kbps / Mbps / fps / kfps
	Range : 100 kbps to 1Gbps / 1fps to 3300kfps
	Rate Unit : bit or frame
Bandwidth Control for Egress	Rate in steps : 1 kbps / Mbps
	Range : 100 kbps to 1Gbps
	Rate Unit : bit
	Per queue / Per port shaper
DiffServ (RF 2474) Remarking	
Storm Control	for Unicast, Broadcast, Multicast
IP Multicasting Features	
IGMP / MLD Snooping	IGMP Snooping v1, v2, v3 / MLD Snooping v1, v2
	Port Filtering Profile
	Throttling, Fast Leave
	Maximum Multicast Group : up to 1022 entries
	Query / Static Router Port
Security Features	
IEEE 802.1X	Port-Based
	MAC-Based
ACL	Number of rules : up to 256 entries
	for L2 / L3 / L4 L2 : Mac address SA/DA/VLAN L3: IP address SA/DA, Subnet L4: TCP/UDP
RADIUS authentication & accounting	
TACACS+ authentication & accounting, TACACS+ 3.0	
HTTPS, HTTP	Supported
SSL / SSH v2	Supported
User Name Password Authentication	Local Authentication
	Remote Authentication (via RADIUS / TACACS+)
Management Interface Access Filtering	Web, Telnet / SSH, CLI RS-232 console
Management Features	
CLI	Cisco® like CLI
Web Based Management	
Telnet	
SNMP	V1, V2c, V3
ModBus/TCP	Supports management and monitoring
SW & Configuration Upgrade	TFTP, HTTP
	Redundant firmware in case of upgrade failure

RMON	RMON I (1, 2, 3, 9 group), RMON II
MIB	RFC1213 MIB II, Private MIB
UPnP	Supported
DHCP	Server, Client, Relay, Relay option 82 , Snooping
IP Source Guard	Supported
Port Mirroring	Supported
Event Syslog	Syslog server (RFC3164) (Support 1 server)
Warning Message	System syslog, e-mail, alarm relay
DNS	Client, Proxy
IEEE1588 PTP V2	Support 5 operating mode in each port : Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave
NTP, SNTP	Client
LLDP (IEEE 802.1ab)	Link Layer Discovery Protocol
	LLDP-MED
IPv6 Features	
IPv6 Management	Telnet Server/ICMP v6
SNMP over IPv6	Supported
HTTP over IPv6	Supported
SSH over IPv6	Supported
IPv6 Telnet	Supported
IPv6 NTP, SNTP	Client
IPv6 TFTP	Supported
IPv6 QoS	Supported
IPv6 ACL	Number of rules: up to 256 entries
	for L2 / L3 / L4 L2 : Mac address SA/DA/VLAN L3: IP address SA/DA, Subnet L4: TCP/UDP
Others Features	
Green Ethernet	Supports IEEE 802.3az EEE (Energy Efficient Ethernet) Management to optimize the power consumption
	Determine the cable length and lowering the power for ports with short cables
	Lower the power for a port when there is no link
	LED Power Management : Adjustment LEDs intensity
Cable Diagnostic	Measuring UTP cable normal or broken point distance
Advanced PoE	
Management	PoE PD failure auto checking ,and auto reset when PD fail PoE port on/off weekly scheduling PoE Configuration PoE Enable/Disable Power limit by classification Power limit by management Power feeding priority Total PoE Power budge limitation (maximum 120W for IGS-402SM-4PH24, 180W for IGS-803SM-8PH24)

Application

Figure 1 : Application Example

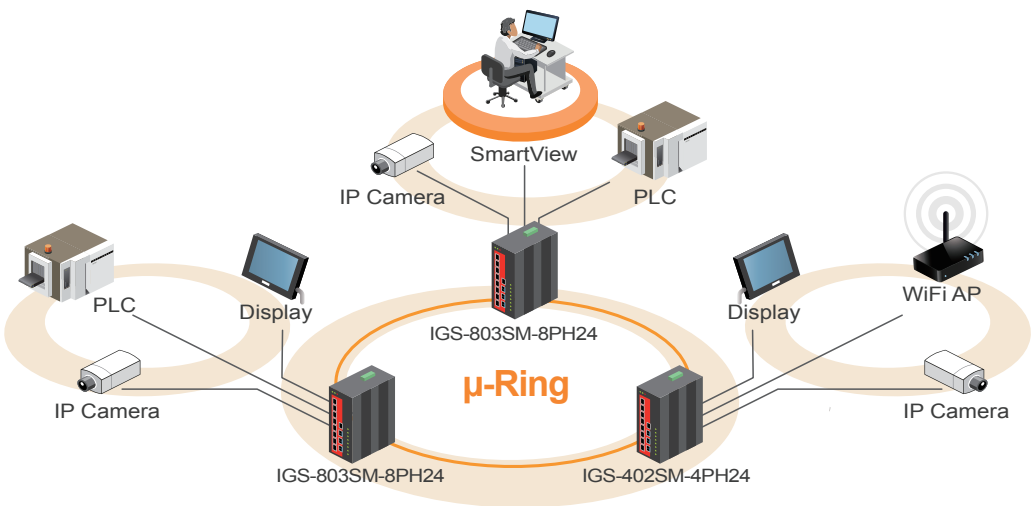


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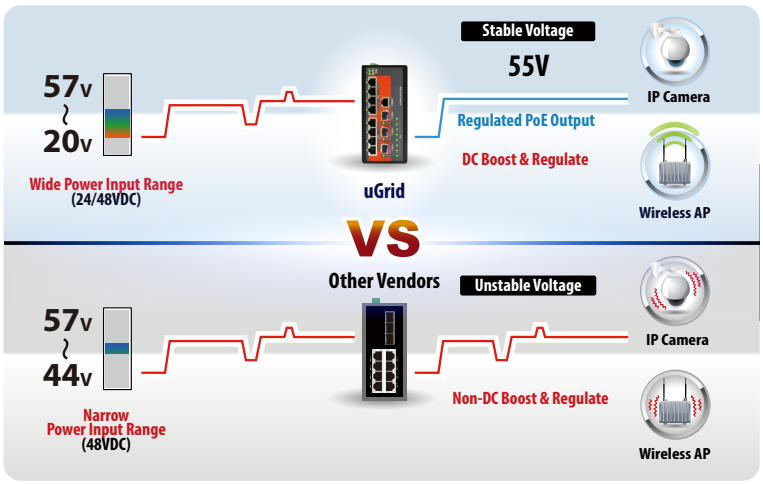
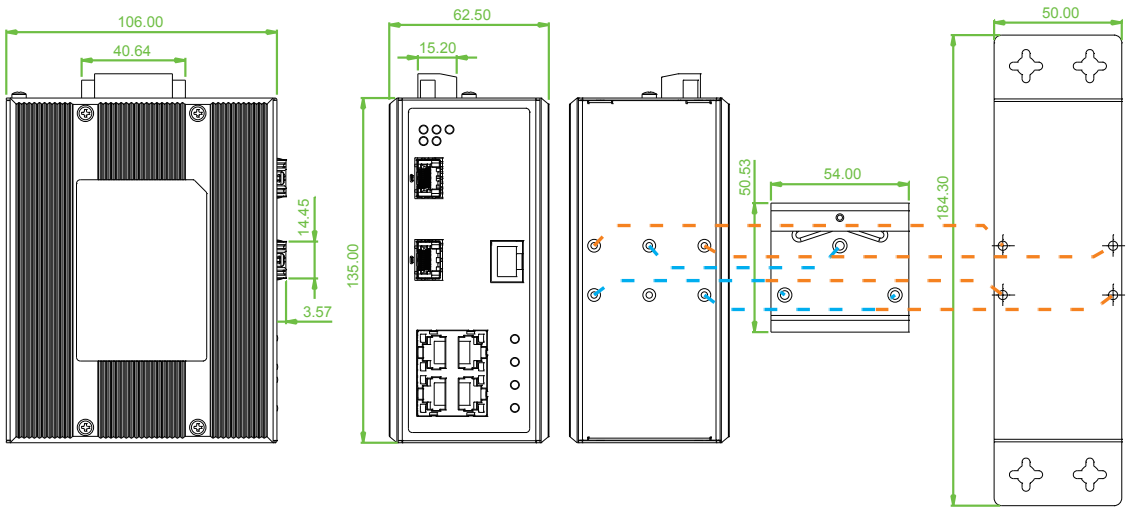
Figure 2 : High Efficiency Boost Technology for PoE



- 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

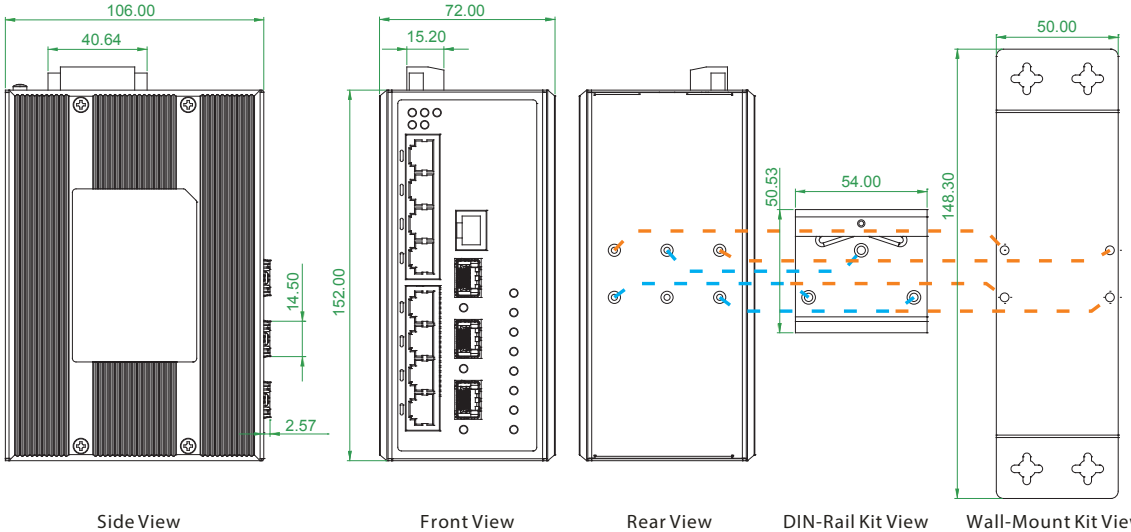
Dimensions

▶ IGS-402SM-4PH24



Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

▶ IGS-803SM-8PH24

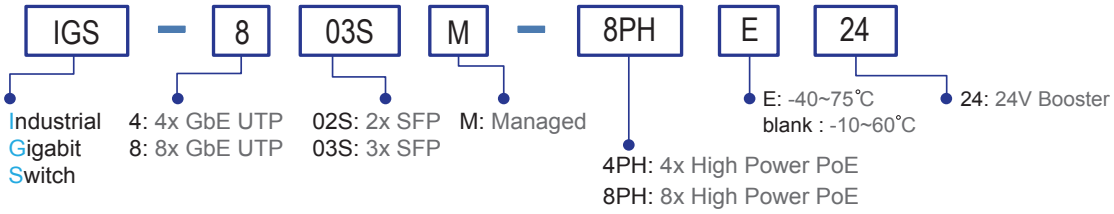


Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

Ordering Information

Model Name	Total Port	UTP	Fiber		PoE Port		Input power	Certification					Operating Temperature
		10/100/1000 Base-T	100/1000 Base-X	100/1000/ 2.5GBase-X	IEEE802.3at	Power Budget	Redundant	Railway EN50121-4	Traffic Control NEMA TS2	Safety EN60950-1	Safety UL60950-1	CE, FCC EN61000-6-2 EN61000-6-4	
IGS-402SM-4PH24	6	4	1 SFP	1 SFP	4	120W	24/48VDC	V	V	V	V	V	-10~60℃
IGS-402SM-4PHE24	6	4	1 SFP	1 SFP	4	120W	24/48VDC	V	V	V	V	V	-40~75℃
IGS-803SM-8PH24	11	8	1 SFP	2 SFP	8	180W	24/48VDC	V	V	V	V	V	-10~60℃
IGS-803SM-8PHE24	11	8	1 SFP	2 SFP	8	180W	24/48VDC	V	V	V	V	V	-40~75℃

Model Naming Rule



Optional Accessories

Package List

- One device of the series
- Console cable (RJ-45 to DB9)
- CD (SmartConfig, MIB file, Manual)
- Quick installation guide
- Din Rail with screws
- Terminal block
- Protective caps for SFP ports

Wall mount kit

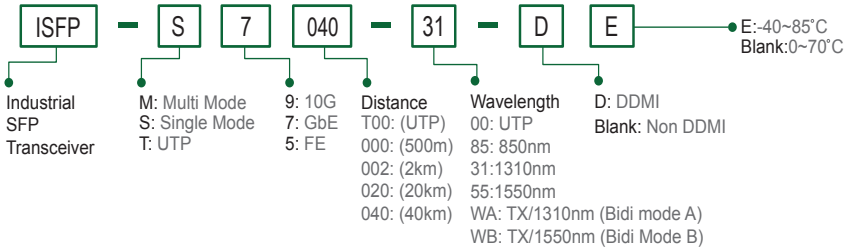
IND-WMK02	Wall Mount kit for Industrial product (Wide) (184 x 50mm)

Industrial SFP Transceiver

The ISFP series of industrial grade SFP modules have been fully tested with the series product for guaranteed compatibility and performance.
The best performance can be guaranteed even in mission-critical applications.

ISFP-M7000-85-D(E)	Industrial SFP GbE 1000Base-SX, M/M, 500 meter,wave length 850nm, 7.5dB, LC, DDMI, -10~70℃ (-40~85℃)
ISFP-S7020-31-D(E)	Industrial SFP 1000Base-LX, S/M, 20km, wave length 1310nm, 15dB, LC, DDMI, -10~70℃(-40~85℃)
ISFP-T7T00-00-(E)	Industrial SFP 10/100/1000Base-T UTP 100meter, -10~70℃ (-40~85℃)
ISFP-M5002-31-D(E)	Industrial SFP 155M 100Base-FX, MM, 2km, wave length 1310nm, 12dB, LC, DDMI, -10~70℃ (-40~85℃)
ISFP-S5030-31-D(E)	Industrial SFP 155M 100Base-FX, SM, 30km, 1310nm, 19dB, LC, DDMI, -10~70℃ (-40~85℃)

SFP Naming Rule



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IFS-1608GSM-8PH

16x 10/100Base-TX + 8x 100/1000Base-X SFP w/ 8x PoE+

IFS+803GSM-8PH24

8x 10/100Base-TX + 3x 100/1000Base-X SFP w/ 8x PoE+

IFS-402GSM-4PU

4x 10/100Base-TX + 2x 100/1000Base-X SFP w/ 4x *PoE+, 60W*

UL60950-1 CE FC EN50121-4 EN61000-6-2 EN61000-6-4 NEMA TS2 PoE Regulated SmartView µ-Ring IEEE 1588v2 Negative Voltage

These models are managed industrial grade PoE (Power over Ethernet) switches that provide 4/8/16x FE UTP plus 2/3/8 GbE SFP with 4/8x PoE Ports. The PoE features enable power and data to be transferred via a single cable, hereby considerably reducing cabling and electrical wiring expenses. With dual power input design, these models can provide redundant mechanisms for critical applications that need always-on connections. These switches can also operate either at standard operating temperature range (-10 to 60°C) or at wide operating temperature range (-40 to 75°C) so as to fulfill the special needs of industrial automation applications. Housed in rugged DIN rail or wall mountable IP-30 enclosures, these switches are perfect choices for harsh environments, such as telecom network, industrial network, intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications.

These managed switches also support a wide variety of Ethernet functions, including STP/RSTP/MSTP/ ITM-T G.8032 ERPS and multiple µ-Ring for redundant cabling, advanced PoE management functions such as weekly PoE power scheduling as well as device auto-checking and auto-reset. They also support layer 2 Ethernet IGMP, VLAN, QoS, Security, IPv6, bandwidth control, port mirroring, cable diagnostics and Green Ethernet. Additionally, these switches can also be managed by CTC Union's SmartView™ Element Management System which offers a user-friendly and centralized device management platform and provides network administrators the ability to monitor and configure these connected switches remotely (see figure).

Features

- 16x 10/100Base-TX RJ-45 + 8x 100/1000Base-X SFP with 8x PoE+, total 240W power budget (IFS-1608GSM-8PH)
- 8x 10/100Base-TX RJ-45 + 3x 100/1000Base-X SFP with 8x PoE+, total 180W power budget (IFS+803GSM-8PH24)
- 4x 10/100Base-TX RJ-45 + 2x 100/1000Base-X SFP with 4x **PoE+**, total 240W power budget (IFS-402GSM-4PU)
- 48VDC (44~57VDC) redundant dual input power (IFS-1608GSM-8PH, IFS-402GSM-4PU)
- 24/48VDC (20~57VDC) redundant dual input power with built-in very high efficiency booster (94~97%) to rise up 55 VDC for PoE output (Figure 2) (IFS+803GSM-8PH24)
- Regulated PoE output voltage (55VDC) to stabilize PoE device, and guarantee delivery PoE power distance to 100meter (Figure 2) (IFS+803GSM-8PH24)
- **Supports negative voltage power input with isolated RS-232 console port (for example in telecom system)**
- Provides 8 port IEEE 802.3af / 802.3at PoE+ output, 30W per port (IFS-1608GSM-8PH, IFS+803GSM-8PH24)
- Provides 4 port IEEE 802.3af / 802.3at **PoE+ output, 60W** per port (IFS-402GSM-4PU)
- Advanced PoE Management, PoE PD Failure Auto Checking and auto reset when PD fail, PoE port on/off weekly scheduling, PoE configuration for power planning
- Rugged metal, IP30 protection & Fan-less design
- UL60950-1, EN60950-1, CE, FCC, Rail Traffic EN50121-4, traffic control NEMA TS2 certified
- Heavy Industrial grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- **4KV surge protection for UTP, PoE and Fiber ports**
- **2.25K VDC Hi-pot isolation protection for Ethernet ports and power**
- Cable diagnostics, Measuring cable OK or broken point distance
- Supports Green Ethernet IEEE 802.3az EEE (Energy Efficient Ethernet) management to optimize power consumption
- STP, RSTP, MSTP, ITM-T G.8032 Ethernet Ring Protection Switching (ERPS) for redundant cabling
- Provides 5 ring instances that each can support µ-Ring, µ-Chain or Sub-Ring type for flexible uses. Supports up to 5 rings in one device (Please see CTC µ-Ring white paper for more details and more topology application)
- µ-Ring for Redundant Cabling, recovery time<10ms in 250 devices
- DHCP Server/Client/ Relay/ Relay option 82/ Snooping
- QoS, Traffic classification QoS, CoS, bandwidth control for Ingress and Egress, Storm Control, DiffServ
- IEEE 802.1q VLAN, MAC based VLAN, IP subnet based VLAN, Protocol based VLAN, VLAN translation, GVRP, MVR
- Dynamic IEEE 802.3ad LACP Link Aggregation, Static Link Aggregation
- IGMP snooping V1/V2/V3, IGMP Filtering/ Throttling, IGMP query, IGMP proxy reporting, MLD snooping V1/V2
- Flexibility security: Port based and MAC based IEEE 802.1X, RADIUS, ACL, TACACS+, HTTP/HTTPS, SSL/SSH v2
- Software upgrade via TFTP and HTTP, redundant firmware to avoid upgrade failure
- 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
- RMON, MIB II, Port mirroring, Event syslog, DNS, NTP, SNTP, IEEE 802.1ab LLDP
- Supports IPv6 Telnet server /ICMP v6
- CLI, Web based management, SNMP v1/v2c/v3, Telnet server for management
- Supports Modbus/TCP protocols for management
- Provides SmartConfig for quick and easy mass Configuration Tool*
- Supports SmartView for Centralized Management Tool*

*Please see Chapter 1- **Software Management** for more details

Specifications

Standard	IEEE 802.3	10Base-T 10Mbit/s Ethernet
	IEEE 802.3u	100Base-TX, 100Base-FX, Fast Ethernet
	IEEE 802.3z	1000Base-X Gbit/s Ethernet over Fiber-Optic
	IEEE 802.3af	PoE (Power over Ethernet)
	IEEE 802.3at	PoE+ (Power over Ethernet enhancements)
	IEEE 802.1d	STP (Spanning Tree Protocol)
	IEEE 802.1w	RSTP (Rapid Spanning Tree Protocol)
	IEEE 802.1s	MSTP (Multiple Spanning Tree Protocol)
	ITM-T G.8032 / Y.1344	ERPS (Ethernet Ring Protection Switching)
	IEEE 802.1Q	Virtual LANs (VLAN)
	IEEE 802.1X	Port based and MAC based Network Access Control, Authentication
	IEEE 802.3ac	Max frame size extended to 1522Bytes
	IEEE 802.3ad	Link aggregation for parallel links with LACP(Link Aggregation Control Protocol)
	IEEE 802.3x	Flow control for Full Duplex
	IEEE 802.1ad	Stacked VLANs, Q-in-Q
	IEEE 802.1p	LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization
	IEEE 802.1ab	Link Layer Discovery Protocol (LLDP)
	IEEE 802.3az	EEE (Energy Efficient Ethernet)
Switch Architecture	Back-plane (Switching Fabric): 19.2Gbps (IFS-1608GSM-8PH) 7.6Gbps (IFS+803GSM-8PH24) 4.8Gbps (IFS-402GSM-4PU) Full wire-speed	
Data Processing	Store and Forward	
Flow Control	IEEE 802.3x for full duplex mode Back pressure for half duplex mode	
Network Connector	16x 10/100Base-TX RJ-45 + 8x 100/1000Base-X SFP connector (IFS-1608GSM-8PH) 8x 10/100Base-TX RJ-45 + 3x 100/1000Base-X SFP connector (IFS+803GSM-8PH24) 4x 10/100Base-TX RJ-45 + 2x 100/1000Base-X SFP connector (IFS-402GSM-4PU) RJ-45 UTP port support Auto negotiation speed, Auto MDI/MDI-X function, SFP port support 100/1000M dual speed with DDMI	
Console	RS-232 (RJ-45) Isolated RS-232 port grounding for negative voltage power system, or telecom network application	
PoE standard & RJ-45 Pin Assignment	IFS-1608GSM-8PH, IFS+803GSM-8PH24: 8x IEEE 802.3at /IEEE 802.3af PoE+ 2 pairs PoE, PoE+, 30W/port End-Span, Alternative A mode. Positive (V+) : RJ-45 pin 1, 2. Negative (V-) : RJ-45 pin 3, 6. IFS-402GSM-4PU: 4x IEEE 802.3at/ 802.3af PoE+ 4 pairs PoE, 60W/port End-Span, Alternative A and B mode. Positive (V+) : RJ-45 pin 1, 2, 4, 5 Negative (V-) : RJ-45 pin 3, 6, 7, 8	
Network Cable	UTP/STP above Cat. 5e cable	
	EIA/TIA-568 100-ohm (100m)	
Protocols	CSMA/CD	
Reverse Polarity Protection	Supported for power input	
Overload Current Protection	Supported	
CPU Watch Dog	Supported	
Power Supply	**IFS-1608GSM-8PH, IFS-402GSM-4PU:** Redundant Dual DC 48V (44~57VDC) input power, and support negative voltage input power for telecom (Removable terminal block) (50~57V input is recommended for IEEE 802.3at PoE+ in 30W / 60W applications)	

Power Supply	**IFS+803GSM-8PH24:** Redundant Dual DC 24/48V (20~57VDC) Input power (Removable Terminal Block) Built-in very high efficiency booster(94~97%) to rise up 55 VDC for PoE output Regulated PoE output voltage (55VDC) to stabilize PoE device, and guarantee delivery PoE power distance to 100meter (Figure 2)
Power Consumption	IFS-1608GSM-8PH Power consumption

Input Voltage	Total Power Consumption	Device Power Consumption	PoE Budget
50VDC	254.2W	14.2W	240W

IFS+803GSM-8PH24 Power consumption & Booster efficiency

Input Voltage	Total Power Consumption	Device Power Consumption	PoE Budget	Boost efficiency
24VDC	191.2W	7.8W	180W	97.00%
48VDC	193.4W	8.9W	180W	97.00%

IFS-402GSM-4PU Power consumption

Input Voltage	Total Power Consumption	Device Power Consumption	PoE Budget
50VDC	248.5W	8.5W	240W

PoE Power Budget	Maximum PoE Output power budget 30W / Per Port 240W for total (IFS-1608GSM-8PH) Maximum PoE Output power budget 30W / Per Port 180W for total (IFS+803GSM-8PH24) Maximum PoE Output power budget **60W / Per Port** 240W for total (IFS-402GSM-4PU)
LED	Per unit: Power 1 (Green), Power 2 (Green), Fault (Amber), CPU Act (Green), Ring Master (Yellow)
	Per RJ-45 port: 10/100 Link/Active (Green)
	SFP Fiber Per port: Link/Active (Green)
	PoE Port LED 1 LED /per Port : • PoE Output Power On : ON (Green) • PoE Fault (Over Load, Short Circuit,Port failed at Startup) : Flash 1times /sec (Green)
Jumbo Frame	9.6KB
IEEE802.3ac	Max frame size extended to 1522Bytes (allow Q-tag in packet)
MAC Address Table	8K
Memory Buffer	512K Bytes for packet buffer
Warning Message	System Syslog, SMTP/ e-mail event message, alarm relay
Alarm Relay Contact	Relay outputs with current carrying capacity of 1 A @24VDC
Removable Terminal Block	Provide 2 redundant power, alarm relay contact, 6 Pin
Operating Temperature	-10 ~ 60°C (IFS-1608GSM-8PH, IFS+803GSM-8PH24, IFS-402GSM-4PU) -40 ~ 75°C (IFS-1608GSM-8PHE, IFS+803GSM-8PHE24, IFS-402GSM-4PUE)
Operating Humidity	5% to 95% (Non-condensing)
Storage Temperature	-40 ~ 85°C
Housing	Rugged Metal, IP30 Protection, Fanless
Dimensions	116 x 92 x 160 mm (Dx Wx H) (IFS-1608GSM-8PH) 106 x 72 x 152 mm (D x W x H) (IFS+803GSM-8PH24) 106 x 62.5 x 135 mm (D x W x H) (IFS-402GSM-4PU)
Weight	1.375kg (IFS-1608GSM-8PH), 0.86kg (IFS+803GSM-8PH24) 0.7kg (IFS-402GSM-4PU)
Installation Mounting	DIN Rail mounting, or wall mounting (Optional)
MTBF	439,881 Hours (IFS-1608GSM-8PH) 528,753 Hours (IFS+803GSM-8PH24) 589,078 hours (IFS-402GSM-4PU) (MIL-HDBK-217)
Warranty	5 years
Certification	
EMC	CE (EN55024, EN55032)
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE
Railway Traffic	EN50121-4
Traffic control	NEMA TS2 (IFS+803GSM-8PH24)
Immunity for Heavy Industrial Environment	EN61000-6-2

Emission for Heavy Industrial Environment	EN61000-6-4
EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B
	EN61000-4-3 (RS) Level 3, Criteria A
	EN61000-4-4 (Burst) Level 3, Criteria A
	EN61000-4-5 (Surge) Level 3, Criteria B
EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-6 (CS) Level 3, Criteria A
	EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A

Safety	UL60950-1, EN60950-1
Hi pot protection	DC 2.25KV for power to chassis ground, Ethernet port to chassis ground
4KV surge protection	Supported for PoE, UTP and Fiber ports
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

Software Specifications

Topology	
VLAN	IEEE 802.1q VLAN,up to 4094 802.1Q VLAN VID
	IEEE 802.1q VLAN,up to 4094 Groups
	IEEE 802.1ad Q-in-Q
	MAC-based VLAN,up to 256 entries
	IP Subnet-based VLAN, up to 128 entries
	Protocol-based VLAN(Ethernt, SNAP, LLC), up to 128 entries
	VLAN Translation, up to 256 entries
	GVRP (GARP VLAN Registration Protocol)
	MVR (Multicast VLAN Registration)
Link Aggregation (Port Trunk)	Static (Hash with SA, DA, IP, TCP/UDP port), up to 5 trunk group
	Dynamic (IEEE 802.3ad LACP), up to 5 trunk group
Spanning Tree	IEEE 802.1d STP, IEEE 802.1w RSTP, IEEE 802.1s MSTP
Multiple µ-Ring	up to 5 instances that each supports µ-Ring, µ-Chain or Sub-Ring type for flexible uses, and maximum up to 5 Rings Recovery time <10ms The maximum number of devices allowed in a Ring supported ring is 250 (Please see CTC Union µ-Ring white paper for more details and more topology application)
Loop Protection	Supported
ITM-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)	Recovery time <50ms
	Single Ring, Sub-Ring, Multiple ring topology network
QoS Features	
Class of Service	IEEE 802.1p 8 active priorities queues for per port
Traffic Classification QoS	IEEE 802.1p based CoS, IP Precedence based CoS IP DSCP based CoS
	QCL(QoS Control List): Frame Type, Source/ Destination MAC, VLAN ID, PCP, DEI
	QCE(QoS Control Entry): Protocol, Source IP, IP Fragment, DSCP, TCP/UDP port number
Bandwidth Control for Ingress	Rate in steps :1 kbps / Mbps / fps / kfps
	Range : 100 kbps to 1Gbps / 1fps to 3300kfps
	Rate Unit : bit or frame
Bandwidth Control for Egress	Rate in steps : 1 kbps / Mbps
	Range : 100 kbps to 1Gbps
	Rate Unit : bit
	Per queue / Per port shaper
DiffServ (RF 2474) Remarking	
Storm Control	for Unicast, Broadcast, Multicast
IP Multicasting Features	
IGMP / MLD Snooping	IGMP Snooping v1, v2, v3 / MLD Snooping v1, v2
	Port Filtering Profile
	Throttling
	Fast Leave
	Maximum Multicast Group : up to 1022 entries
	Query / Static Router Port
Security Features	
IEEE 802.1X	Port-Based
	MAC-Based
ACL	Number of rules : up to 256 entries
	for L2 / L3 / L4 L2 : Mac address SA/DA/VLAN L3: IP address SA/DA, Subnet L4: TCP/UDP
RADIUS authentication & accounting	
TACACS+ authentication & accounting, TACACS+ 3.0	
HTTPS, HTTP	Supported
SSL / SSH v2	Supported

User Name Password Authentication	Local Authentication
	Remote Authentication (via RADIUS / TACACS+)
Management Interface Access Filtering	Web, Telnet / SSH , CLI RS-232 console
Management Features	
CLI	Cisco® like CLI
Web Based Management	
Telnet	Server
SNMP	V1, V2c, V3
Modbus/TCP	Support for management and monitoring
SW & Configuration Upgrade	TFTP, HTTP
	Redundant firmware in case of upgrade failure
RMON	RMON I (1, 2, 3, 9 group), RMON II
MIB	RFC1213 MIB II, Private MIB
UPnP	Supported
DHCP	Server, Client, Relay, Relay option 82 , Snooping
IP Source Guard	Supported
Port Mirroring	Supported
Event Syslog	Syslog server (RFC3164) (Support 1 server)
Warning Message	System syslog, e-mail, alarm relay
DNS	Client, Proxy
IEEE1588 PTP V2	Support 5 operating mode in each port : Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave
NTP, SNTP	Client
LLDP (IEEE 802.1ab)	Link Layer Discovery Protocol
	LLDP-MED
IPv6 Features	
IPv6 Management	Telnet Server/ICMP v6
SNMP over IPv6	Supported
HTTP over IPv6	Supported
SSH over IPv6	Supported
IPv6 Telnet	Supported
IPv6 NTP, SNTP	Client
IPv6 TFTP	Supported
IPv6 QoS	Supported
IPv6 ACL	Number of rules: up to 256 entries
	for L2 / L3 / L4 L2 : Mac address SA/DA/VLAN L3: IP address SA/DA, Subnet L4: TCP/UDP
Others Features	
Green Ethernet	Supports IEEE 802.3az EEE (Energy Efficient Ethernet) Management to optimize the power consumption
	Determine the cable length and lowering the power for ports with short cables
	Lower the power for a port when there is no link
	LED Power Management :Adjustment LEDs intensity
Cable Diagnostic	Measuring UTP cable normal or broken point distance
Advanced PoE	
Management	PoE PD failure auto checking, and auto reset when PD fail PoE port on/off weekly scheduling PoE Configuration PoE Enable/Disable Power limit by classification Power feeding priority Total PoE Power budge limitation: maximum 240W for IFS-1608GSM-8PH, IFS-402GSM-4PU, 180W for IFS+803GSM-8PH24

Application

Figure : Application Example

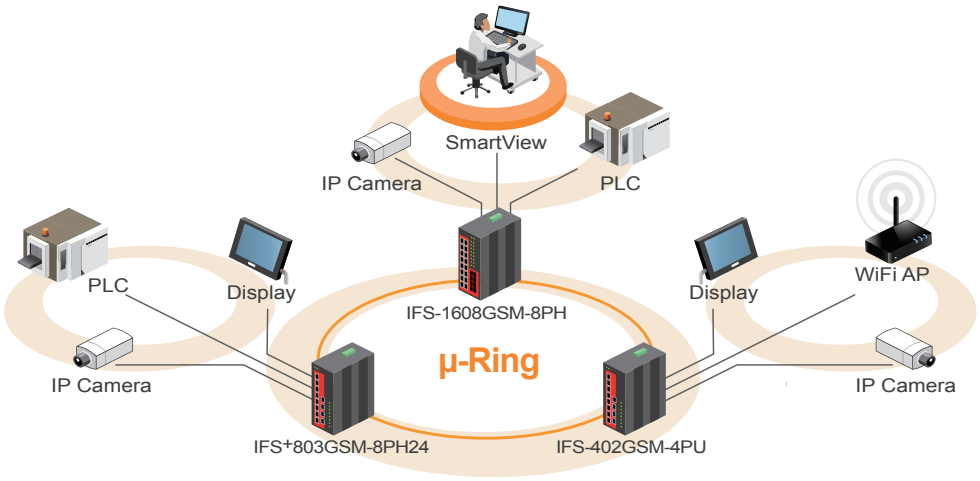
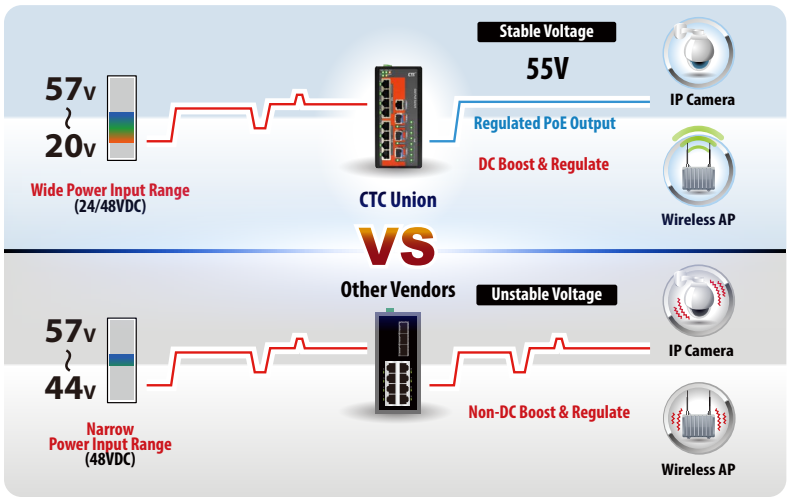


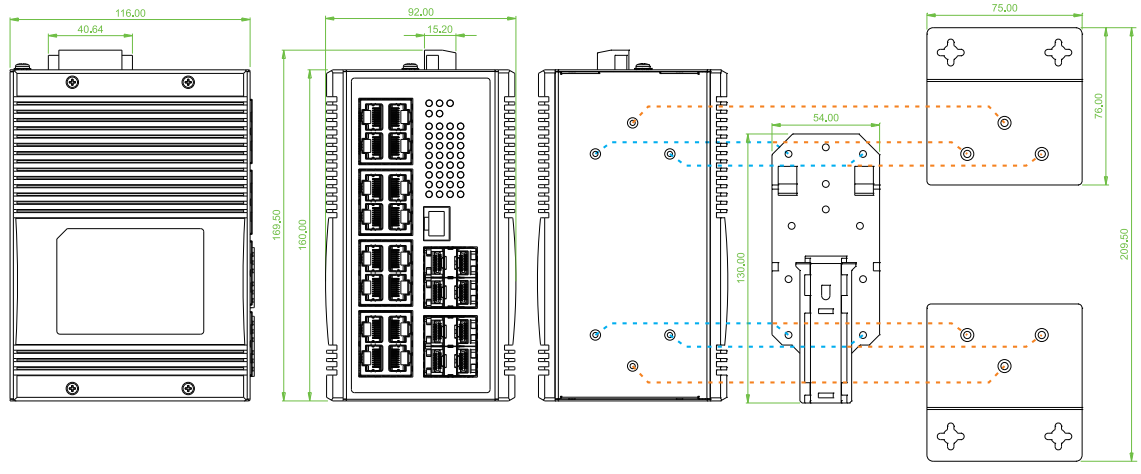
Figure 2 : High Efficiency Boost Technology for PoE



- 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

Dimensions

▶ IFS-1608GSM-8PH



Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

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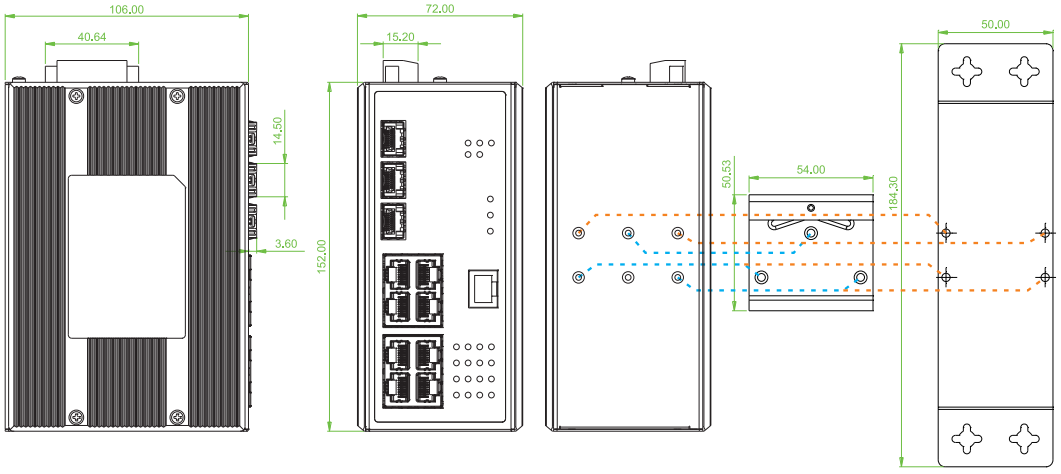
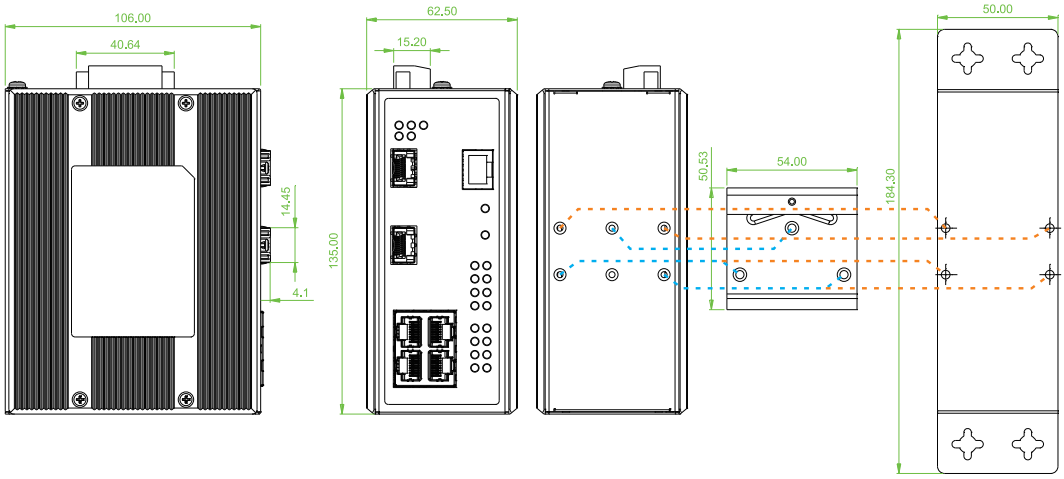
▶ IFS+803GSM-8PH24



Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

▶ IFS-402GSM-4PU

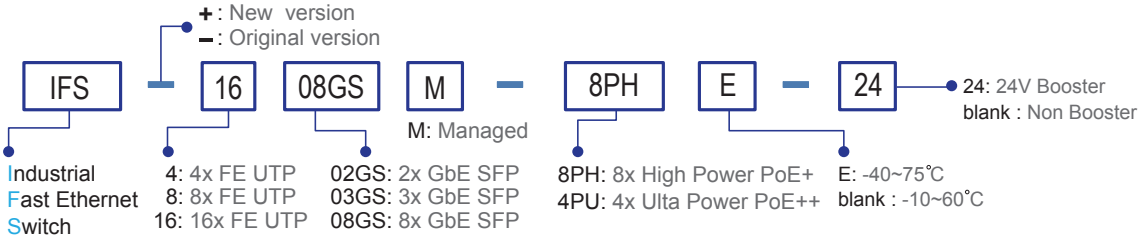


Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

Ordering Information

Model Name	Total Port	UTP	Fiber	PoE Port			Input power	Certification					Operating Temperature
		10/100 Base-TX	100/1000 Base-X	IEEE802.3at	IEEE 802.3at 4 pairs PoE/60W	Power Budget	Redundant	Railway EN50121-4	NEMA TS2	Safety UL60950-1 EN60950-1	EN61000-6-2 EN61000-6-4	CE, FCC	
IFS-1608GSM-8PH	24	16	8 SFP	8		240W	48, -48VDC	V		V	V	V	-10~60℃
IFS-1608GSM-8PHE	24	16	8 SFP	8		240W	48, -48VDC	V		V	V	V	-40~75℃
IFS+803GSM-8PH24	11	8	3 SFP	8		180W	24/48, -48VDC	V	V	V	V	V	-10~60℃
IFS+803GSM-8PHE24	11	8	3 SFP	8		180W	24/48, -48VDC	V	V	V	V	V	-40~75℃
IFS-402GSM-4PU	6	4	2 SFP		4	240W	48, -48VDC	V		V	V	V	-10~60℃
IFS-402GSM-4PUE	6	4	2 SFP		4	240W	48, -48VDC	V		V	V	V	-40~75℃

Model Naming Rule



Package List

- One device of the series
- Console cable (RJ-45 to DB9)
- CD (SmartConfig, MIB file, Manual)
- Quick installation guide
- Din Rail with screws
- Terminal block
- Protective caps for SFP ports

Optional Accessories

Wall mount kit

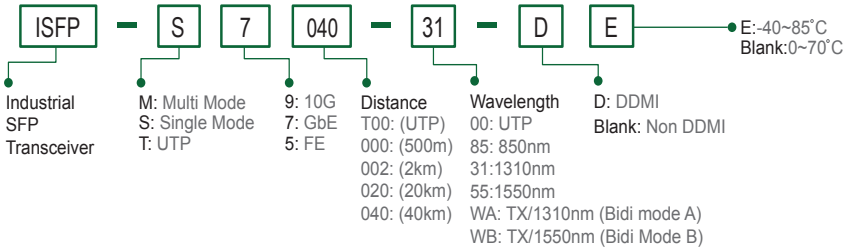
IND-WMK02	Wall Mount kit for Industrial product (Wide) (184 x 50mm) (For IFS+803GSM-8PH24, IFS-402GSM-4PU)
IND-WMK04	Wall Mount kit for Industrial product (Wide) (2 pcs in 1 set, 76mm x 75mmx 2pcs) (For IFS-1608GSM-8PH)

Industrial SFP Transceiver

The ISFP series of industrial grade SFP modules have been fully tested with the series product for guaranteed compatibility and performance. The best performance can be guaranteed even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheet for more details and more items.)

ISFP-M7000-85-D(E)	Industrial SFP GbE 1000Base-SX, M/M, 500 meter,wave length 850nm, 7.5dB, LC, DDMI, -10~70°C (-40~85°C)
ISFP-S7020-31-D(E)	Industrial SFP 1000Base-LX, S/M, 20km, wave length 1310nm, 15dB, LC, DDMI, -10~70°C(-40~85°C)
ISFP-T7T00-00-(E)	Industrial SFP 10/100/1000Base-T UTP 100meter, -10~70°C (-40~85°C)
ISFP-M5002-31-D(E)	Industrial SFP 155M 100Base-FX, MM, 2km, wave length 1310nm, 12dB, LC, DDMI, -10~70°C (-40~85°C)
ISFP-S5030-31-D(E)	Industrial SFP 155M 100Base-FX, SM, 30km, 1310nm, 19dB, LC, DDMI, -10~70°C (-40~85°C)

SFP Naming Rule



IFS-402GSM-4PH24

4x 10/100Base-TX + 2x FE/GbE SFP with 4x PoE+

IFS-803GSM-8PH24

8x 10/100Base-TX + 3x FE/GbE SFP with 8x PoE+

These models are managed industrial grade Fast Ethernet PoE (Power over Ethernet) switches with 4/8 10/100Base-TX PoE ports and 2/3 Gigabit/Fast SFP ports that provide stable and reliable Ethernet transmission. With dual power input design, these models can provide redundant mechanisms for critical applications that need always-on connections. These switches can also operate either at standard operating temperature range (-10 to 60°C) or at wide operating temperature range (-40 to 75°C) so as to fulfill the special needs of industrial automation applications. Housed in rugged DIN rail or wall mountable IP-30 enclosures, these switches are perfect choices for harsh environments, such as industrial networking, intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications.

These managed switches also support a wide variety of Ethernet functions, including STP/RSTP/MSTP/ ITU-T G.8032 ERPS and multiple μ-Ring for redundant cabling, advanced PoE management functions such as weekly PoE power scheduling as well as device auto-checking and auto-reset. They also support layer 2 Ethernet IGMP, VLAN, QoS, ACL, Security, IPv6, bandwidth control, port mirroring, cable diagnostics and Green Ethernet. Additionally, these switches can also be managed by SmartView™ Element Management System which offers a user-friendly and centralized device management platform and provides network administrators the ability to monitor and configure these connected switches remotely (see figure 1).

Features

- 4x 10/100Base-TX RJ-45+ 2x FE/GbE SFP with 4x PoE+, total 120W power budget (IFS-402GSM-4PH24)
- 8x 10/100Base-TX RJ-45+ 3x FE/GbE SFP with 8x PoE+, total 180W power budget (IFS-803GSM-8PH24)
- 24/48VDC (20~57VDC) redundant dual input power with built-in very high efficiency booster (94~97%) to rise up 55 VDC for PoE output (Figure 2)
- Regulated PoE output voltage (55VDC) to stabilize PoE device, and guarantee delivery PoE power distance to 100meter (Figure 2)
- Provides 4/8 port IEEE 802.3af / 802.3at PoE output (30W per Port)
- Advanced PoE Management, PoE PD Failure Auto Checking and auto reset when PD fail, PoE port on/off weekly scheduling, PoE configuration for power planning
- Rugged metal, IP30 protection & Fanless design
- UL60950-1, CE, FCC, Rail Traffic EN50121-4, Traffic control NEMA TS2 certified
- Heavy industrial grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- Cable diagnostics, Measuring UTP cable OK or broken point distance
- Supports Green Ethernet IEEE 802.3az EEE (Energy Efficient Ethernet) management to optimize power consumption
- STP, RSTP, MSTP, ITU-T G.8032 Ethernet Ring Protection Switching (ERPS) for redundant cabling
- Provides 5 ring instances that each can support μ-Ring, μ-Chain or Sub-Ring type for flexible uses. Supports up to 5 rings in one device
- μ-Ring for Redundant Cabling, recovery time<10ms in 250 devices
- DHCP Server/Client/ Relay/ Relay option 82/ Snooping
- QoS, Traffic classification QoS, CoS, bandwidth control for Ingress and Egress, Storm Control, DiffServ
- IEEE 802.1q VLAN, MAC based VLAN, IP subnet based VLAN, Protocol based VLAN, VLAN translation, GVRP, MVR
- Dynamic IEEE 802.3ad LACP Link Aggregation, Static Link Aggregation
- IGMP snooping V1/V2/V3, IGMP Filtering/ Throttling, IGMP query, IGMP proxy reporting, MLD snooping V1/V2
- Flexibility security: Port based and MAC based IEEE 802.1X, RADIUS, ACL, TACACS+, HTTP/HTTPS, SSL/SSH v2
- Software upgrade via TFTP and HTTP, redundant firmware to avoid upgrade failure
- 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
- RMON, MIB II, Port mirroring, Event syslog, DNS, NTP, SNTP, IEEE 802.1ab LLDP
- Supports IPv6 Telnet server /ICMP v6
- CLI, Web based management, SNMP v1/v2c/v3, Telnet server for management
- Supports Modbus/TCP protocols for management
- Provides SmartConfig for quick and easy mass Configuration Tool*
- Supports SmartView for Centralized Management Tool*

*Please see Chapter 1- **Software Management** for more details

Specifications

Standard	IEEE 802.3	10Base-T 10Mbit/s Ethernet
	IEEE 802.3u	100Base-TX, 100Base-FX, Fast Ethernet
	IEEE 802.3ab	1000Base-T Gbit/s Ethernet over twisted pair
	IEEE 802.3z	1000Base-X Gbit/s Ethernet over Fiber-Optic
	IEEE 802.3af	PoE (Power over Ethernet)

Standard	IEEE 802.3at	PoE+ (Power over Ethernet enhancements)
	IEEE 802.1d	STP (Spanning Tree Protocol)
	IEEE 802.1w	RSTP (Rapid Spanning Tree Protocol)
	IEEE 802.1s	MSTP (Multiple Spanning Tree Protocol)
	ITM-T G.8032 / Y.1344	ERPS (Ethernet Ring Protection Switching)
	IEEE 802.1Q	Virtual LANs (VLAN)

Standard	IEEE 802.1X	Port based and MAC based Network Access Control, Authentication
	IEEE 802.3ac	Max frame size extended to 1522Bytes
	IEEE 802.3ad	Link aggregation for parallel links with LACP(Link Aggregation Control Protocol)
	IEEE 802.3x	Flow control for Full Duplex
	IEEE 802.1ad	Stacked VLANs, Q-in-Q
	IEEE 802.1p	LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization
	IEEE 802.1ab	Link Layer Discovery Protocol (LLDP)
	IEEE 802.3az	EEE (Energy Efficient Ethernet)
Switch Architecture	Back-plane (Switching Fabric): 7.8Gbps (IFS-402GSM-4PH24) 10.6Gbps (IFS-803GSM-8PH24) Full wire-speed	
Data Processing	Store and Forward	
Flow Control	IEEE 802.3x for full duplex mode Back pressure for half duplex mode	
Network Connector	4x 10/100Base-TX RJ-45 + 2x 100/1000Base-X SFP slot (IFS-402GSM-4PH24) 8x 10/100Base-TX RJ-45 + 3x 100/1000Base-X SFP slot (IFS-803GSM-8PH24) RJ-45 UTP port support Auto negotiation speed, Auto MDI/MDI-X function, SFP ports support 100/1000M with DDMI	
PoE standard & RJ-45 pin assignment	4x IEEE 802.3af /IEEE 802.3at PoE+ (IFS-402GSM-4PH24) 8x IEEE 802.3af /IEEE 802.3at PoE+ (IFS-803GSM-8PH24) End-Span, Alternative A mode. Positive (V+) : RJ-45 pin 1, 2. Negative (V-) : RJ-45 pin 3, 6. Data (1,2,3,6,4,5,7,8)	
Console	RS-232 (RJ-45)	
Network Cable	UTP/STP above Cat. 5e cable	
	EIA/TIA-568 100-ohm (100m)	
Protocols	CSMA/CD	
Reverse Polarity Protection	Supported for power input	
Overload Current Protection	Supported	
CPU Watch Dog	Supported	
Power Supply	Redundant Dual DC 24/48V (20~57VDC) Input power (Removable Terminal Block) Built-in very high efficiency booster(94~97%) to rise up 55 VDC for PoE output Regulated PoE output voltage (55VDC) to stabilize PoE device, and guarantee delivery PoE power distance to 100meter (Figure 2)	
Power Consumption	IFS-402GSM-4PH24 Power consumption & Booser efficiency	

Input Voltage	Total Power Consumption	Device Power Consumption	PoE Budget	Boost Efficiency
24VDC	134.8W	7.1W	120W	94.0%
48VDC	132.2W	8.5W	120W	97.2%

IFS-803GSM-8PH24 Power consumption & Booser efficiency

Input Voltage	Total Power Consumption	Device Power Consumption	PoE Budget	Boost Efficiency
24VDC	198.3W	7.3W	180W	94%
48VDC	193.2W	7.9W	180W	97%

PoE Power Budget	Maximum PoE Output power budget 30W / Per Port 120W (IFS-402GSM-4PH24) 180W (IFS-803GSM-8PH24)

LED	Per unit: Power 1 (Green), Power 2 (Green), Fault (Amber), CPU Act (Green), Ring Master (Yellow)
	Per RJ-45 port: 10/100 Link/Active (Green)
	SFP Fiber Per port: Link/Active (Green)
	PoE Port LED 1 LED /per Port : • PoE Output Power On : ON (Green) • PoE Fault (Over Load, Short Circuit,Port failed at Startup) : Flash 1times /sec (Green) • PoE Output Power Off : Off
Jumbo Frame	9.6KB
IEEE 802.3ac	Max frame size extended to 1522Bytes (allow Q-tag in packet)
MAC Address Table	8K
Memory Buffer	512K Bytes for packet buffer
Warning Message	System Syslog, SMTP/ e-mail event message, alarm relay
Alarm Relay Contact	Relay outputs with current carrying capacity of 1 A @24VDC
Removable Terminal Block	Provide 2 redundant power, alarm relay contact, 6 Pin
Operating Temperature	-10 ~ 60°C (IFS-402GSM-4PH24, IFS-803GSM-8PH24) -40 ~ 75°C (IFS-402GSM-4PHE24, IFS-803GSM-8PHE24)
Operating Humidity	5% to 95% (Non-condensing)
Storage Temperature	-40 ~ 85°C
Housing	Rugged Metal, IP30 Protection, Fanless
Dimensions	106 x 62.5 x 135 mm (D x W x H) (IFS-402GSM-4PH24) 106 x 72 x 152 mm (D x W x H) (IFS-803GSM-8PH24)
Weight	0.715kg (IFS-402GSM-4PH24) 0.96kg (IFS-803GSM-8PH24)
Installation Mounting	DIN Rail mounting, or wall mounting (Optional)
MTBF	674,963 Hours (IFS-402GSM-4PH24) 466,542 Hours (IFS-803GSM-8PH24) (MIL-HDBK-217)
Warranty	5 years
Certification	
EMC	CE
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A,CE
Railway Traffic	EN50121-4
Traffic control	NEMA TS2
Immunity for Heavy Industrial Environment	EN61000-6-2
Emission for Heavy Industrial Environment	EN61000-6-4
EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B
	EN61000-4-3 (RS) Level 3, Criteria A
	EN61000-4-4 (Burst) Level 3, Criteria A
	EN61000-4-5 (Surge) Level 3, Criteria B
	EN61000-4-6 (CS) Level 3, Criteria A
	EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
Safety	UL60950-1
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

Software Specifications

Topology	
VLAN	IEEE 802.1q VLAN,up to 4094 802.1Q VLAN VID
	IEEE 802.1q VLAN,up to 4094 Groups
	IEEE 802.1ad Q-in-Q
	MAC-based VLAN,up to 256 entries
	IP Subnet-based VLAN, up to 128 entries
	Protocol-based VLAN(Ethernt, SNAP, LLC), up to 128 entries
	VLAN Translation, up to 256 entries
	GVRP (GARP VLAN Registration Protocal)
	MVR (Multicast VLAN Registration)
Link Aggregation (Port Trunk)	Static (Hash with SA, DA, IP, TCP/UDP port), up to 5 trunk group
	Dynamic (IEEE 802.3ad LACP), up to 5 trunk group
Spanning Tree	IEEE 802.1d STP
	IEEE 802.1w RSTP
	IEEE 802.1s MSTP
Multiple μ-Ring	up to 5 instances that each supports μ-Ring, μ-Chain or Sub-Ring type for flexible uses, and maximum up to 5 Rings. Recovery time <10ms The maximum number of devices allowed in a Ring supported ring is 250.
Loop Protection	Supported
ITM-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)	Recovery time <50ms
	Single Ring, Sub-Ring, Multiple ring topology network

QoS Features	
Class of Service	IEEE 802.1p 8 active priorities queues for per port
Traffic Classification QoS	IEEE 802.1p based CoS
	IP Precedence based CoS
	IP DSCP based CoS
	QCL(QoS Control List): Frame Type, Source/ Destination MAC, VLAN ID, PCP, DEI
	QCE(QoS Control Entry): Protocol, Source IP, IP Fragment, DSCP, TCP/UDP port number
Bandwidth Control for Ingress	Rate in steps :1 kbps / Mbps / fps / kfps
	Range : 100 kbps to 1Gbps / 1fps to 3300kfps
	Rate Unit : bit or frame
Bandwidth Control for Egress	Rate in steps : 1 kbps / Mbps
	Range : 100 kbps to 1Gbps
	Rate Unit : bit
	Per queue / Per port shaper
DiffServ (RF 2474) Remarking	
Storm Control	for Unicast, Broadcast, Multicast
IP Multicasting Features	
IGMP / MLD Snooping	IGMP Snooping v1, v2, v3 / MLD Snooping v1, v2
	Port Filtering Profile
	Throttling, Fast Leave
	Maximum Multicast Group : up to 1022 entries
	Query / Static Router Port
Security Features	
IEEE 802.1X	Port-Based
	MAC-Based
ACL	Number of rules : up to 256 entries
	for L2 / L3 / L4 L2 : Mac address SA/DA/VLAN L3: IP address SA/DA, Subnet L4: TCP/UDP
RADIUS authentication & accounting	
TACACS+ authentication & accounting, TACACS+ 3.0	
HTTPS, HTTP	Supported
SSL / SSH v2	Supported
User Name Password Authentication	Local Authentication
	Remote Authentication (via RADIUS / TACACS+)
Management Interface Access Filtering	Web, Telnet / SSH, CLI RS-232 console
Management Features	
CLI	Cisco® like CLI
Web Based Management	
Telnet	Server
SNMP	V1, V2c, V3
Modbus/TCP	Support for management and monitoring
SW & Configuration Upgrade	TFTP, HTTP
	Redundant firmware in case of upgrade failure

RMON	RMON I (1, 2, 3, 9 group), RMON II
MIB	RFC1213 MIB II, Private MIB
UPnP	Supported
DHCP	Server, Client, Relay, Relay option 82 , Snooping
IP Source Guard	Supported
Port Mirroring	Supported
Event Syslog	Syslog server (RFC3164) (Support 1 server)
Warning Message	System syslog, e-mail, alarm relay
DNS	Client, Proxy
IEEE1588 PTP V2	Support 5 operating mode in each port : Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave
NTP, SNTP	Client
LLDP (IEEE 802.1ab)	Link Layer Discovery Protocol
	LLDP-MED
IPv6 Features	
IPv6 Management	Telnet Server/ICMP v6
SNMP over IPv6	Supported
HTTP over IPv6	Supported
SSH over IPv6	Supported
IPv6 Telnet	Supported
IPv6 NTP, SNTP	Client
IPv6 TFTP	Supported
IPv6 QoS	Supported
IPv6 ACL	Number of rules: up to 256 entries
	for L2 / L3 / L4 L2 : Mac address SA/DA/VLAN L3: IP address SA/DA, Subnet L4: TCP/UDP
Others Features	
Green Ethernet	Supports IEEE 802.3az EEE (Energy Efficient Ethernet) Management to optimize the power consumption
	Determine the cable length and lowering the power for ports with short cables
	Lower the power for a port when there is no link
	LED Power Management : Adjustment LEDs intensity
Cable Diagnostic	Measuring UTP cable normal or broken point distance
Advanced PoE	
Management	PoE PD failure auto checking ,and auto reset when PD fail PoE port on/off weekly scheduling PoE Configuration PoE Enable/Disable Power limit by classification Power limit by management Total PoE Power budge limitation (Maximum 120W for IFS-402GSM-4PH24, 180W for IFS-803GSM- 8PH24) Power feeding priority

Application

Figure 1 : Application Example

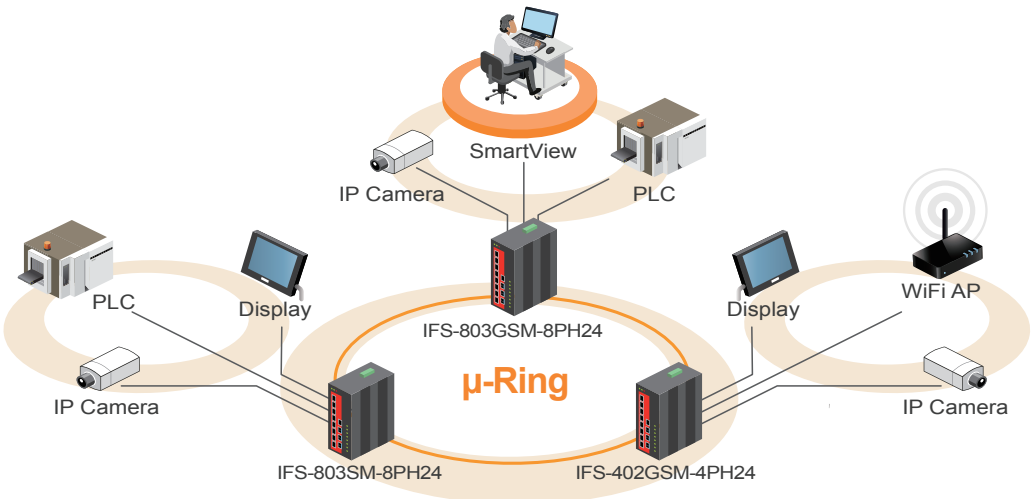
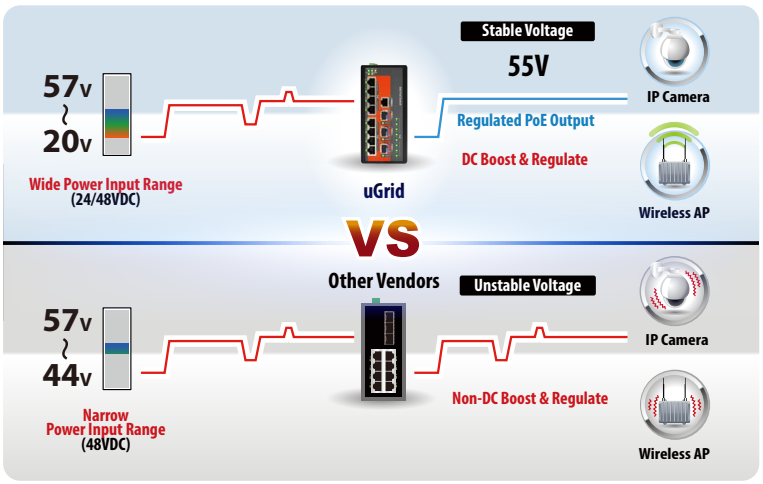


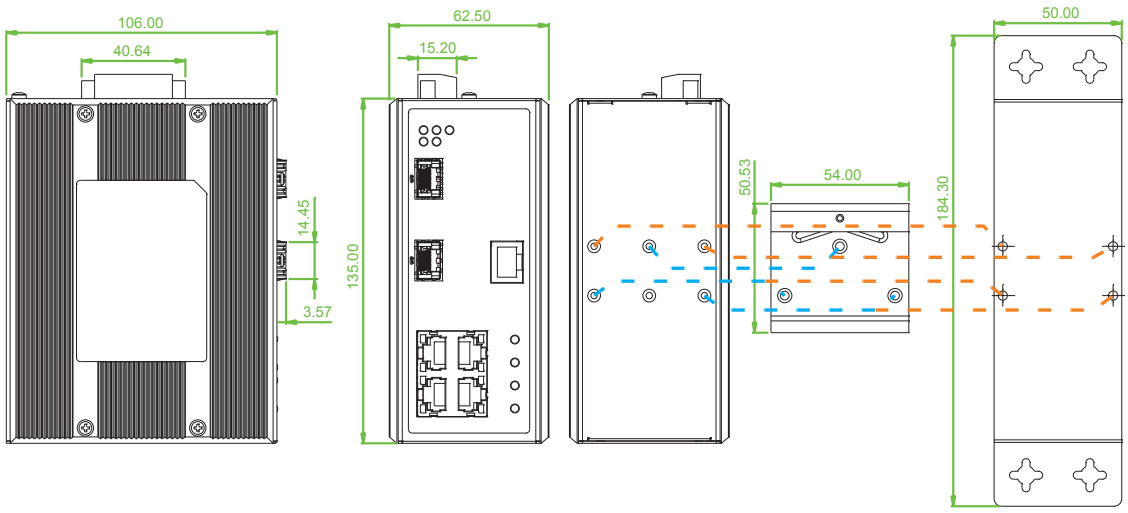
Figure 2 : High Efficiency Boost Technology for PoE



- 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

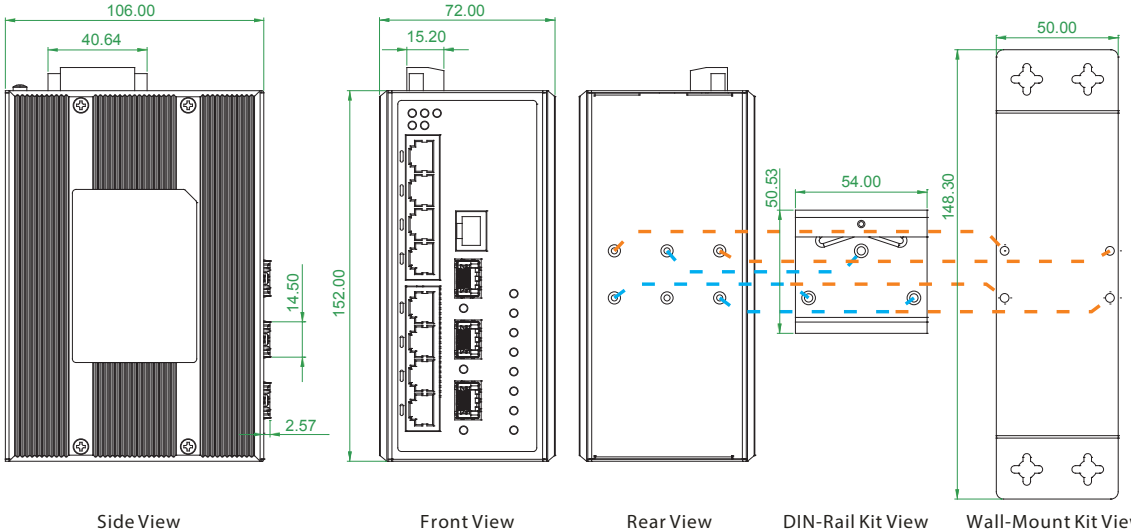
Dimensions

▶ IFS-402GSM-4PH24



Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

▶ IFS-803GSM-8PH24



Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

Ordering Information

Model Name	Total Port	UTP	Fiber	PoE Port		Input power	Certification					Operating Temperature
		10/100 Base-TX	100/1000 Base-X	IEEE802.3at	Power Budget	Redundant	Railway EN50121-4	Traffic Control NEMA TS2	Safety EN60950-1	Safety UL60950-1	CE, FCC EN61000-6-2 EN61000-6-4	
IFS-402GSM-4PH24	6	4	2 SFP	4	120W	24/48VDC	V	V	V	V	V	-10~60℃
IFS-402GSM-4PHE24	6	4	2 SFP	4	120W	24/48VDC	V	V	V	V	V	-40~75℃
IFS-803GSM-8PH24	11	8	3 SFP	8	180W	24/48VDC	V	V	V	V	V	-10~60℃
IFS-803GSM-8PHE24	11	8	3 SFP	8	180W	24/48VDC	V	V	V	V	V	-40~75℃

Model Naming Rule

IFS – 8 – 03GS – M – 8PH – E – 24

- IFS: Industrial Fast Ethernet Switch
- 8: 4: 4x FE UTP; 8: 8x FE UTP
- 03GS: 02GS: 2x GbE SFP; 03GS: 3x GbE SFP
- M: Managed
- 8PH: 4PH: 4x High Power PoE; 8PH: 8x High Power PoE
- E: E: -40~75℃; blank : -10~60℃
- 24: 24V Booster

Optional Accessories

Package List

- One device of the series
- Console cable (RJ-45 to DB9)
- CD (SmartConfig, MIB file, Manual)
- Quick installation guide
- Din Rail with screws
- Terminal block
- Protective caps for SFP ports

Wall mount kit

IND-WMK02	Wall Mount kit for Industrial product (Wide) (184 x 50mm)

Industrial SFP Transceiver

The ISFP series of industrial grade SFP modules have been fully tested with the series product for guaranteed compatibility and performance.
The best performance can be guaranteed even in mission-critical applications.

ISFP-M7000-85-D(E)	Industrial SFP GbE 1000Base-SX, M/M, 500 meter,wave length 850nm, 7.5dB, LC, DDMI, -10~70℃ (-40~85℃)
ISFP-S7020-31-D(E)	Industrial SFP 1000Base-LX, S/M, 20km, wave length 1310nm, 15dB, LC, DDMI, -10~70℃(-40~85℃)
ISFP-T7T00-00-(E)	Industrial SFP 10/100/1000Base-T UTP 100meter, -10~70℃ (-40~85℃)
ISFP-M5002-31-D(E)	Industrial SFP 155M 100Base-FX, MM, 2km, wave length 1310nm, 12dB, LC, DDMI, -10~70℃ (-40~85℃)
ISFP-S5030-31-D(E)	Industrial SFP 155M 100Base-FX, SM, 30km, 1310nm, 19dB, LC, DDMI, -10~70℃ (-40~85℃)

SFP Naming Rule

ISFP – S – 7 – 040 – 31 – D – E

- ISFP: Industrial SFP Transceiver
- S: M: Multi Mode; S: Single Mode; T: UTP
- 7: 9: 10G; 7: GbE; 5: FE
- 040: Distance — T00: (UTP); 000: (500m); 002: (2km); 020: (20km); 040: (40km)
- 31: Wavelength — 00: UTP; 85: 850nm; 31:1310nm; 55:1550nm; WA: TX/1310nm (Bidi mode A); WB: TX/1550nm (Bidi Mode B)
- D: D: DDMI; Blank: Non DDMI
- E: E:-40~85°C; Blank:0~70°C

IGS-402S-4PU

4x 10/100/1000Base-T +
2x 100/1000Base-X SFP w/ 4x PoE+
(240W, 60W/per port)

IGS-402S-4PH24

4x 100/1000Base-T +
2x 100/1000Base-X SFP w/ 4x PoE+
(120W, 24V Booster)

IGS-402F-4PH24

4x 10/100/1000Base-T +
2x 1000Base-SX/LX Fiber w/ 4x PoE+
(120W, 24V Booster)

IGS-600-4PH24

6x 10/100/1000Base-T with 4x PoE+
(120W, 24V Booster)

These models are 6 port unmanaged industrial grade Gigabit PoE switches with 4x 10/100/1000Base-T PoE ports that provide stable and reliable Ethernet transmission. Housed in rugged DIN rail or wall mountable enclosures, these switches are designed for harsh environments, such as industrial networking, security automation applications, IP Surveillance, intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications (See figure 1). Standard operating temperature range models (-10 to 60°C) and wide operating temperature range models (-40 to 75°C) fulfill the special needs of industrial automation applications.

Features

- 4x 10/100/1000Base-T RJ-45+ 2x 100/1000Base-X SFP (Total 6 Port) with **4x 60w PoE+**, total 240W power budget (IGS-402S-4PU)
- 4x10/100/1000Base-T RJ-45+ 2x 100/1000Base-X SFP (Total 6 Port)with 4x PoE+, total 120W power budget (IGS-402S-4PH24)
- 4x 10/100/1000Base-T RJ-45+ 2x 1000Base-X SC (Total 6 Port) with 4x PoE+, total 120W power budget (IGS-402F-4PH24)
- 6x 10/100/1000Base-T RJ-45 (Total 6 Port) with 4x PoE+, total 120W power budget (IGS-600-4PH24)
- Provides 4-port IEEE 802.3at/af **PoE+** output, **60W/per port** (IGS-402S-4PU)
- Provides 4-port IEEE 802.3at/af PoE+ output, 30W/per port (IGS-402S-4PH24, IGS-402F-4PH24, IGS-600-4PH24)
- 48VDC (44~57VDC) redundant dual input power (IGS-402S-4PU)
- 24/48VDC (20~57VDC) redundant dual input power with built-in very high efficiency booster(94~97%) to rise up 55 VDC for PoE output (IGS-402S-4PH24, IGS-402F-4PH24, IGS-600-4PH24)
- Regulate PoE output voltage (55VDC) to stabilize PoE device, and guarantee delivery PoE power distance to 100meter (IGS-402S-4PH24, IGS-402F-4PH24, IGS-600-4PH24) (Figure 2)
- Supports broadcast storm protection
- Supports power failure alarm message by relay
- Supports flow control
- Jumbo frame support
- Supports DIN Rail or wall mounting installation
- IP30 rugged metal housing and fanless
- Wide operating temperature -40 ~ 75°C ("E" model)
- UL60950-1, CE, FCC, EN50121-4 certification
- Heavy industrial grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified

Specifications

IEEE Standard	IEEE 802.3 10Base-T Ethernet
	IEEE 802.3u 100Base-TX Fast Ethernet
	IEEE 802.3ab 1000Base-T Gigabit Ethernet
	IEEE 802.3z 1000Base-X Gigabit Ethernet
	IEEE 802.3x Flow Control and Back Pressure
	IEEE 802.3af PoE (Power over Ethernet)
	IEEE 802.3at PoE+ (Power over Ethernet enhancements)
Switch Architecture	Back-plane (Switching Fabric): 12Gbps Full wire-speed
Data Processing	Store and Forward
Flow Control	IEEE 802.3x flow control, back pressure flow control
Provides Broadcast Storm Protection	Enable / Disable set by DIP SW
Jumbo Frame	10K Bytes
MAC Address Table	8K
Packet Buffer Size	1Mbits
PoE standard & RJ-45 Pin Assignment	**IGS-402S-4PU:** 4x IEEE 802.3at/ 802.3af 4 pairs 60W PoE Positive (V+) : RJ-45 pin 1, 2, 4, 5 Negative (V-) : RJ-45 pin 3, 6, 7, 8 Data (1,2,3,6,4,5,7,8)
	IGS-402S-4PH24, IGS-402F-4PH24, IGS-600-4PH24: 4x IEEE 802.3at/af PoE+ 2 pairs PoE, PoE+ Positive (V+) : RJ-45 pin 1, 2. Negative (V-) : RJ-45 pin 3, 6. Data (1,2,3,6,4,5,7,8)

Network Connector	4 x RJ-45 (IGS-402S-4PU, IGS-402S-4PH24, IGS-402F-4PH24) 6 x RJ-45 (IGS-600-4PH24) 10/100/1000Base-T auto negotiation speed, Auto MDI/MDI-X function, Full/Half duplex
	2x 100/1000Base-X SFP (IGS-402S-4PU, IGS-402S-4PH24) 2x1000Base-X Fiber connector: SC Muti Mode or Single Mode (IGS-402F-4PH24)
Network Cable	UTP/STP above Cat. 5e cable
	EIA/TIA-568 100-ohm (100m)
	Fiber Cable (Multi-mode): 50/125um, 62.5/125um Fiber Cable (Single-mode): 9/125um
Protocols	CSMA/CD
LED	Per unit: Power 1 (Green), Power 2 (Green), Fault (Amber)
	Fiber Per port: Link/Active (Green)
	Per Port PoE LED • Active : ON • Inactive : OFF • Fault : Flash (Fault: Over Load, Short Circuit, Port failed at Startup)
DIP SW	DIP 1 ON : Disable power failure alarm OFF : Enable power failure alarm
	DIP 2 ON : Disables broadcast storm protection OFF : Enable broadcast storm protection
	DIP 3 ON : Fiber 2 for 100Base-FX SFP OFF : Fiber 2 for Gigabit SFP (for IGS-402S-4PU, IGS-402S-4PH24)
	DIP 4 ON : Fiber 1 for 100Base-FX SFP OFF : Fiber 1 for Gigabit SFP (for IGS-402S-4PU, IGS-402S-4PH24)

Reverse Polarity Protection	Supported for Power Input
Overload Current Protection	Supported
Power Supply	**IGS-402S-4PU:** Redundant Dual DC 48V (44~57VDC) input power (Removable terminal block) (50~57V input is recommended for IEEE 802.3at PoE+ in 330/60W applications) **IGS-402S-4PH24, IGS-402F-4PH24, IGS-600-4PH24:** Redundant Dual DC 24/48V (20~57VDC) input power (Removable Terminal Block) Built-in very high efficiency booster(94~97%) to rise up 55 VDC for PoE output Regulated PoE output voltage (55VDC) to stabilize PoE device, and guarantee delivery PoE power distance to 100meter (Figure 2)
Power Consumption	

Input Voltage	IGS-402S-4PH24	IGS-402F-4PH24	IGS-600-4PH24
24VDC	143.3W	143.2W	142.9W
48VDC	138.2W	138.2W	139.6W

(Include full load 120W PoE output)

IGS-402S-4PU Power consumption

Input Voltage	Total Power Consumption	Device Power Consumption	PoE Budget
50VDC	250.3W	8W	240W

PoE Power Budget	Maximum PoE Output power budget 240W, **60W/ per port** (IGS-402S-4PU) Maximum PoE Output power budget 120W, 30W/ per port (IGS-402S-4PH24, IGS-402F-4PH24, IGS-600-4PH24)
Alarm Relay Contact	Relay outputs with current carrying capacity of 1A @24VDC
Removable Terminal Block	Provides 2 Redundant power, Alarm relay contact, 6 Pin
Operating Temperature	-10 ~ 60°C (IGS-402S-4PU, IGS-402S-4PH24, IGS-402F-4PH24, IGS-600-4PH24) -40 ~ 75°C (IGS-402S-4PUE, IGS-402S-4PHE24, IGS-402F-4PHE24, IGS-600-4PHE24)
Operating Humidity	5% to 95% (Non-condensing)

Dimensions	106 x 62.5 x 134.8mm (D X W X H) (IGS-402S-4PH24, IGS-402F-4PH24, IGS-600-4PH24) 106 x 62.5 x135mm (IGS-402S-4PU)
Housing	Rugged Metal, IP30 Protection, Fanless
Weight	0.84kg (IGS-402S-4PH24) 0.68kg (IGS-402F-4PH24) 0.84kg (IGS-600-4PH24) 0.74kg (IGS-402S-4PU)
Installation Mounting	DIN Rail mounting, or wall mounting (Optional accessories)
MTBF	736,988 Hours @25°C (IGS-402S-4PH24) 635,099 Hours @25°C (IGS-402F-4PH24) 649,579 Hours @25°C (IGS-600-4PH24) 688,499Hours (IGS-402S-4PU) (MIL-HDBK-217)
Warranty	5 years
Certification	
EMC	CE
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE EN55022 Class A
Railway Traffic	EN50121-4
Immunity for Heavy Industrial Environment	EN61000-6-2
Emission for Heavy Industrial Environment	EN61000-6-4
EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B EN61000-4-3 (RS) Level 3, Criteria A EN61000-4-4 (Burst) Level 3, Criteria A EN61000-4-5 (Surge) Level 3, Criteria B EN61000-4-6 (CS) Level 3, Criteria A EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
Safety	UL60950-1 (IGS-402S-4PH24, IGS-402F-4PH24, IGS-600-4PH24)
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

Application

Figure 1 : PoE Gigabit Ethernet Switch Transmission

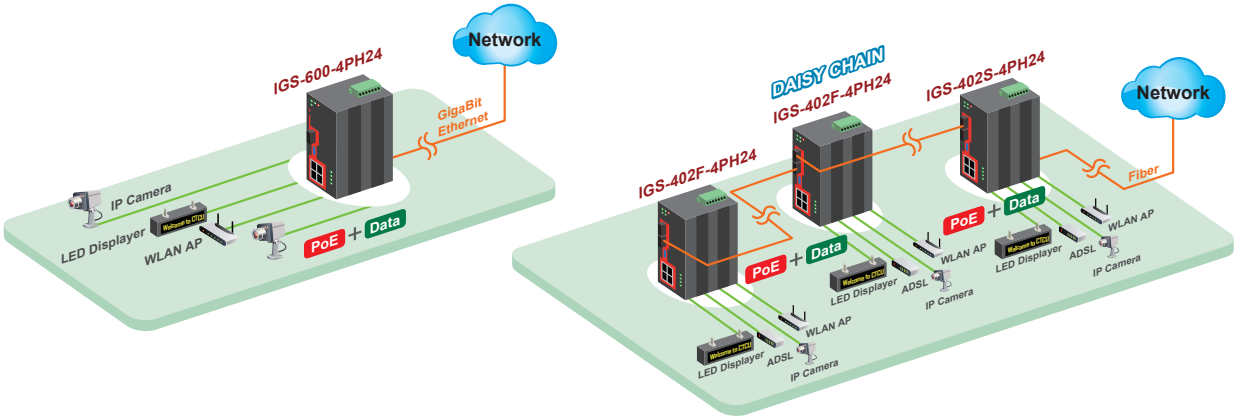
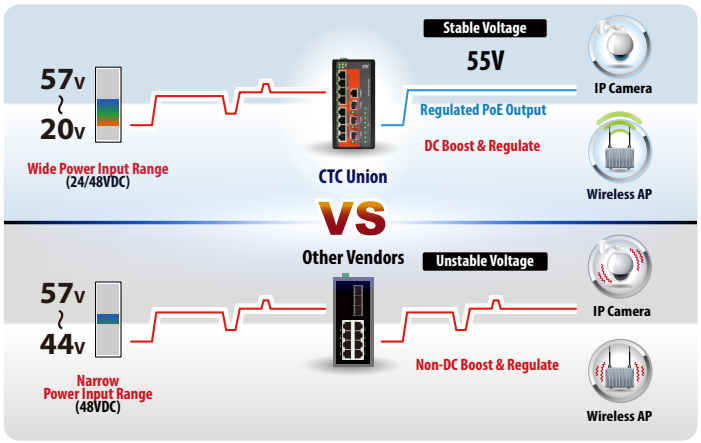


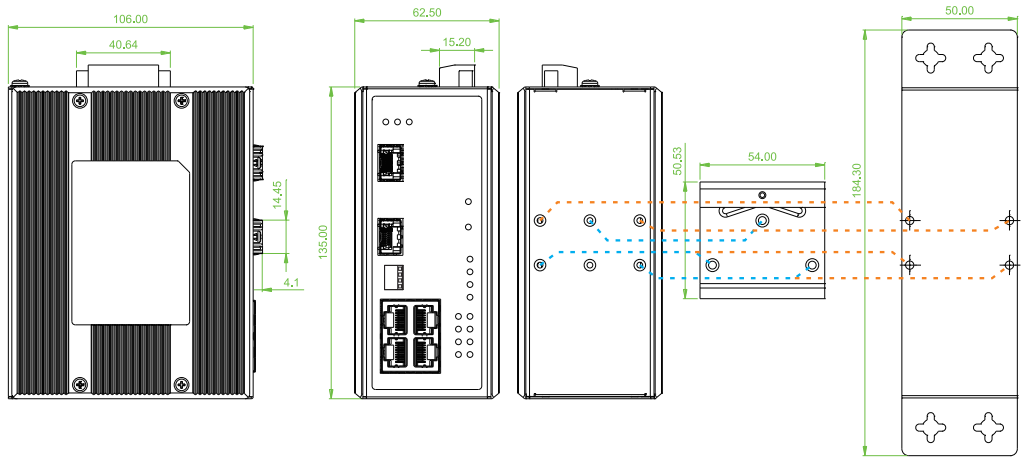
Figure 2 : High efficiency boost technology for PoE



- 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

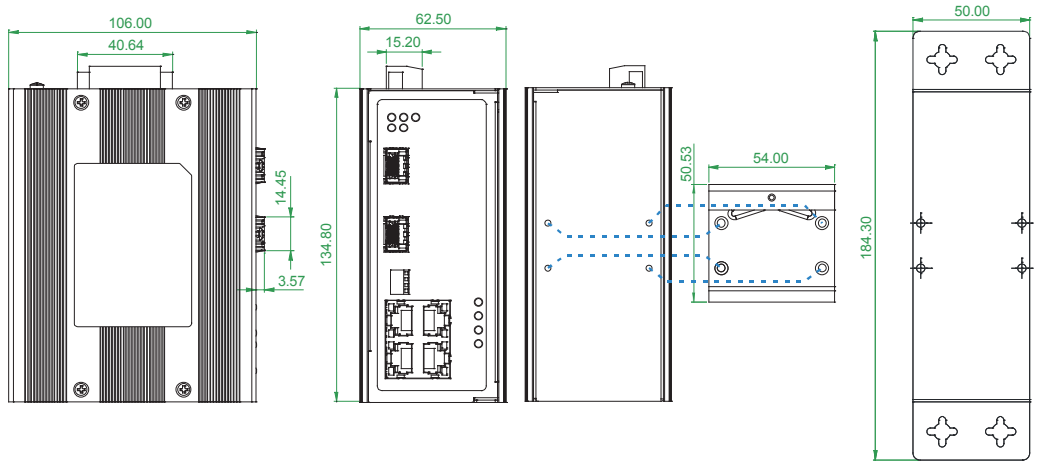
Dimensions

▶ IGS-402S-4PU



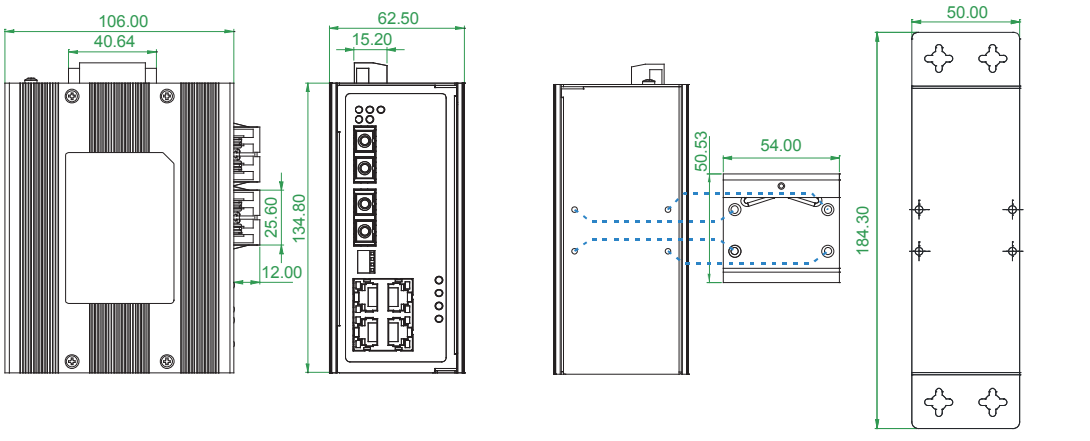
Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

▶ IGS-402S-4PH24



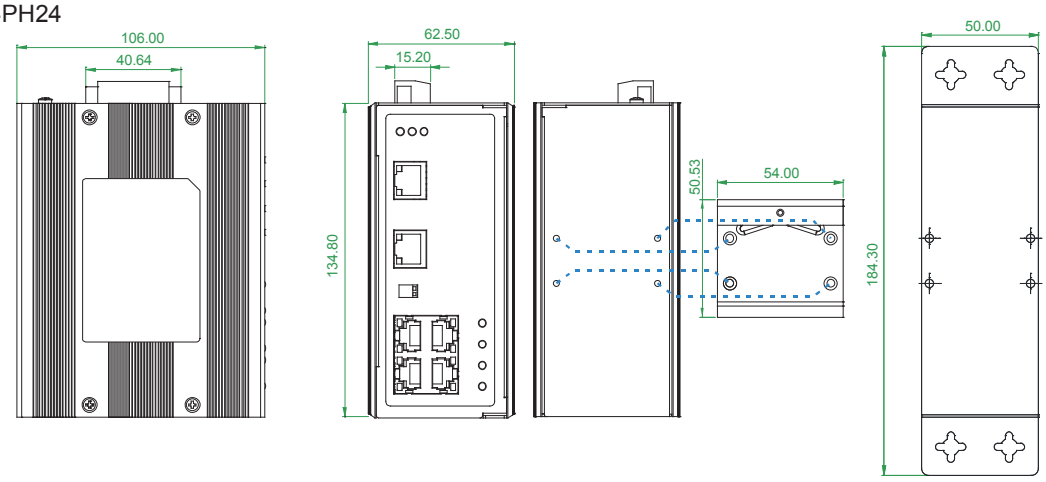
Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

▶ IGS-402F-4PH24



Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

▶ IGS-600-4PH24



Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

Ordering Information

Model Name	Total Port	RJ45 UTP Port	Fiber Port		PoE port			Input power	Certification			Operating Temperature
		10/100/1000 Base-T(X)	1000Base-X Base-X	100/1000 Base-X	IEEE 802.3at	IEEE 802.3at 4 Pairs PoE/60W	Power Budget	Redundant	Railway EN50121-4	Safety UL60950-1	CE, FCC EN61000-6-2 EN61000-6-4	
IGS-402S-4PU	6	4		2 SFP		4	240W	48VDC	V		V	-10~60°C
IGS-402S-4PUE	6	4		2 SFP		4	240W	48VDC	V		V	-40~75°C
IGS-402S-4PH24	6	4		2 SFP	4		120W	24/48VDC	V	V	V	-10~60°C
IGS-402S-4PHE24	6	4		2 SFP	4		120W	24/48VDC	V	V	V	-40~75°C
IGS-402F-4PH24	6	4	2 SC		4		120W	24/48VDC	V	V	V	-10~60°C
IGS-402F-4PHE24	6	4	2 SC		4		120W	24/48VDC	V	V	V	-40~75°C
IGS-600-4PH24	6	6			4		120W	24/48VDC	V	V	V	-10~60°C
IGS-600-4PHE24	6	6			4		120W	24/48VDC	V	V	V	-40~75°C

Model Naming Rule

IGS – 4 – 02S – 4PH□24 – SC002

- IGS: Industrial Gigabit Switch
- 4: 4x GbE UTP; 6: 6x GbE UTP
- 02S: 2x GbE SFP; 02F: 2x GbE SC; 00: 0x GbE Fiber
- 4PHE24: 4x High Power PoE 24V Booster -40~75°C; 4PH24: 4x High Power PoE 24V Booster -10~60°C
- See below for more detail (For IGS-402F-4PH24)

Connector Type / Connectivity Distance

IGS-402F –4PHE24 – □□□□□

Example: IGS-402F –4PHE24 – SC002

Fiber Connector Type	Connectivity Distance
SC (IGS-402F-4PH24)	SC001: 500m (SC, M/M) SC002: 2km (SC, M/M) SC020: 20km (SC, S/M) SC040: 40km (SC, S/M) SC020A: WDM 20km A type (TX: 1310nm) SC020B: WDM 20km B type (TX: 1550nm)

Optional Accessories

Wall mount kit accessories

IND-WMK02	Wall Mount kit for Industrial product (Wide) (184*50mm)

Package List

- One of the series device
- Quick installation guide
- Din Rail with screws
- Terminal block
- Protective caps for SFP ports

Industrial SFP Transceiver

The ISFP series of industrial grade SFP modules have been fully tested with the series product for guaranteed compatibility and performance. The best performance can be guaranteed even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheet for more details and more items.)

ISFP-M7000-85-D(E)	Industrial SFP GbE 1000Base-SX, M/M, 500 meter,wave length 850nm, 7.5dB, LC, DDMI, -10~70°C (-40~85°C)
ISFP-S7020-31-D(E)	Industrial SFP 1000Base-LX, S/M, 20km, wave length 1310nm, 15dB, LC, DDMI, -10~70°C(-40~85°C)
ISFP-T7T00-00-(E)	Industrial SFP 10/100/1000Base-T UTP 100meter, -10~70°C (-40~85°C)
ISFP-M5002-31-D(E)	Industrial SFP 155M 100Base-FX, MM, 2km, wave length 1310nm, 12dB, LC, DDMI, -10~70°C (-40~85°C)
ISFP-S5030-31-D(E)	Industrial SFP 155M 100Base-FX, SM, 30km, 1310nm, 19dB, LC, DDMI, -10~70°C (-40~85°C)

SFP Naming Rule

ISFP – S – 7 – 040 – 31 – D – E

- ISFP: Industrial SFP Transceiver
- S: M: Multi Mode; S: Single Mode; T: UTP
- 7: 9: 10G; 7: GbE; 5: FE
- 040: Distance — T00: (UTP); 000: (500m); 002: (2km); 020: (20km); 040: (40km)
- 31: Wavelength — 00: UTP; 85: 850nm; 31:1310nm; 55:1550nm; WA: TX/1310nm (Bidi mode A); WB: TX/1550nm (Bidi Mode B)
- D: DDMI; Blank: Non DDMI
- E: E:-40~85°C; Blank:0~70°C

IFS-802GS-8PH

8x 10/100Base-TX + 2x 1000Base-X SFP w/ 8x PoE+ (240W)

IFS-1602GS-8PH

16x 10/100Base–TX+ 2x 1000Base–X SFP with 8x PoE+ (240W)

The IFS-802GS-8PH and IFS-1602GS-8PH are 10/18 Ports unmanaged industrial grade Ethernet PoE switches with 8x 10/100Base-TX PoE that provide stable and reliable Ethernet transmission. Housed in rugged DIN rail or wall mountable enclosures, these switches are designed for harsh environments, such as industrial networking, security automation applications, IP Surveillance, intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications (See figure 1). Standard operating temperature range models (-10 to 60°C) and wide operating temperature range models (-40 to 75°C) fulfill the special needs of industrial automation applications.

Features

- 8x 10/100Base-TX RJ45 + 2x1000Base-X SFP with 8x PoE (IFS-802GS-8PH)
- 16x 10/100Base-TX RJ45 + 2x 1000Base-X SFP with 8x PoE (IFS-1602GS-8PH)
- Provides 8-port IEEE 802.3at/af PoE output (30W/Per Port)
- Maximum PoE output power budget 240W
- 48VDC (44~57VDC) redundant dual input power
- Wide operating temperature -40 ~ 75°C ("E" model)
- Supports power failure alarm message by relay
- Supports flow control
- Provides broadcast storm protection (IFS-1602GS-8PH)
- IP30 rugged metal housing and fanless
- DIN Rail mounting or wall mounting
- CE, FCC, railway EN50121-4 certification
- Heavy industrial grade EMS, EMI, EN61000-6-2, EN61000-6-4 certification
- 4KV surge protection for UTP and PoE ports (IFS-1602GS-8PH)
- 2.25K VDC Hi-pot isolation protection for Ethernet ports and power (IFS-1602GS-8PH)

Specifications

IEEE Standard	IEEE 802.3 10Base-T Ethernet
	IEEE 802.3u 100Base-TX Fast Ethernet
	IEEE 802.3z 1000Base-X Gigabit Ethernet
	IEEE 802.3x Flow Control and Back Pressure
	IEEE 802.3at PoE+ (Power over Ethernet enhancements)
	IEEE 802.3af PoE (Power over Ethernet)
Switch Architecture	Back-plane (Switching Fabric): 5.6Gbps (IFS-802GS-8PH) 7.2Gbps (IFS-1602GS-8PH)
Data Processing	Store and Forward
Flow Control	IEEE 802.3x flow control, back pressure flow control
MAC Address Table	8K (IFS-802GS-8PH) 16K (IFS-1602GS-8PH)
Packet Buffer Size	1Mbits (IFS-802GS-8PH) 4Mbits (IFS-1602GS-8PH)
Max Frame Size	1632 Bytes (IFS-802GS-8PH) 1664Byte (IFS-1602GS-8PH)
Jumbo Frame	16K Byte (IFS-1602GS-8PH)
PoE standard	IEEE 802.3at/af
PoE RJ-45 pin Assignment	RJ-45 port #1~# 8 support IEEE 802.3at/af (IFS-802GS-8PH) RJ-45 port #9~# 16 support IEEE 802.3at/af (IFS-1602GS-8PH) End-Span, Alternative A mode
	Positive (V+): RJ-45 pin 1, 2.
	Negative (V-): RJ-45 pin 3, 6.
	Data (1, 2, 3, 6)
Network Connector	8x RJ-45 for 10/100Base-TX (IFS-802GS-8PH) 16x RJ-45 for 10/100Base-TX (IFS-1602GS-8PH) auto negotiation speed, Auto MDI/MDI-X function, Full/Half duplex
	2x 1000Base-X SFP
Network Cable	UTP/STP above Cat. 5e cable
	EIA/TIA-568 100-ohm (100m)

Network Cable	Fiber Cable (Multi-mode): 50/125um, 62.5/125um Fiber Cable (Single-mode): 9/125um
Protocols	CSMA/CD
LED	Per unit: Power 1 (Green), Power 2 (Green), Fault (Amber)
	Per RJ-45 port : Link/Active (Green) Speed 100 (Yellow)
LED	Fiber Per port: Link/Active (Green)
	Per PoE Port LED : • Active : ON • Inactive : OFF
DIP SW	DIP 1: Power failure alarm OFF : Enable ON : Disable
	DIP 2: Broadcast Protection (IFS-1602GS-8PH) OFF : Enable ON : Disable
Reverse Polarity Protection	Supported for Power Input
Overload Current Protection	Supported
Power Supply	Redundant dual 48VDC (44~57VDC) input power (Removable terminal block) (50~57V input is recommended for IEEE802.3at in 30W applications)
Power Consumption	IFS-802GS-8PH power consumption

Input Voltage	Total Power Consumption	Device Power Consumption	PoE Power Budget
50 VDC	251W	5.2W	240W

IFS-1602GS-8PH power consumption

Input Voltage	Total Power Consumption	Device Power Consumption	PoE Power Budget
50 VDC	253.2W	8.9W	240W

PoE Power Budget	Maximum PoE Output power budget 240W (30W/ Per Port)
Alarm Relay Contact	Relay outputs with current carrying capacity of 1A @24VDC

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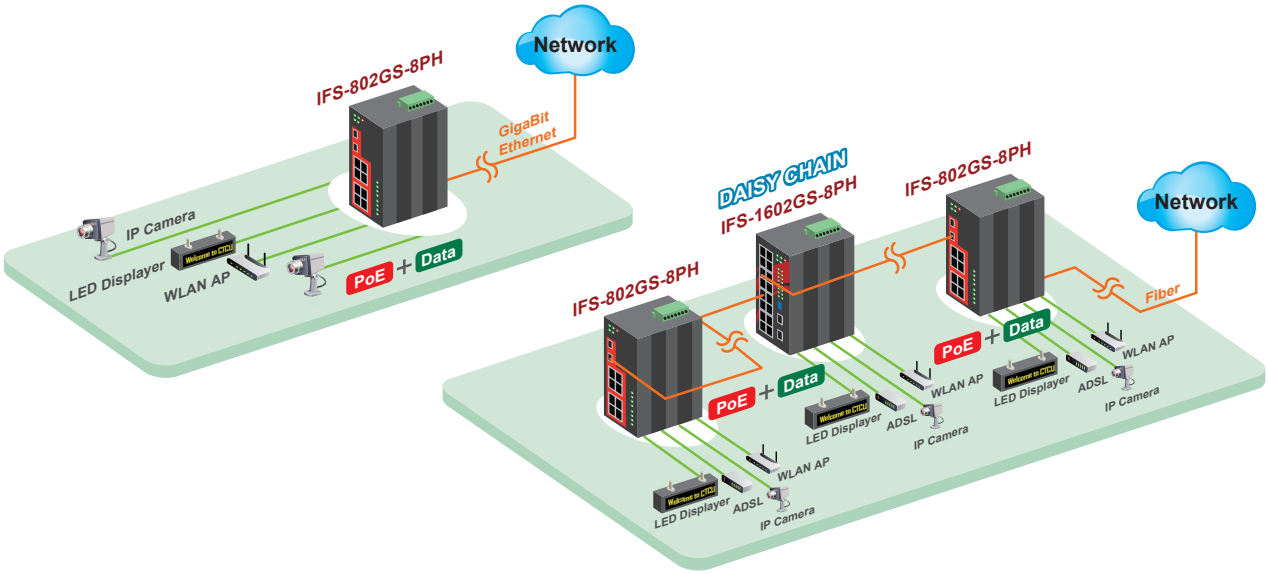
Removable Terminal Block	Provides 2 Redundant power, Alarm relay contact, 6 Pin
Operating Temperature	-10 ~ 60°C (IFS-802GS-8PH, IFS-1602GS-8PH) -40 ~ 75°C (IFS-802GS-8PHE, IFS-1602GS-8PHE)
Operating Humidity	5% to 95% (Non-condensing)
Storage Temperature	-40 ~ 85°C
Housing	Rugged metal, IP30 Protection and fanless
Dimensions	106 x 72 x 152 mm (D X W X H)
Weight	765g (IFS-802GS-8PH) 850g (IFS-1602GS-8PH)
Installation Mounting	DIN Rail mounting, or wall mounting (Optional)
MTBF	635,446Hours (IFS-802GS-8PH) 493,382 Hours (IFS-1602GS-8PH) (MIL-HDBK-217)
Warranty	5 years
Certification	
EMC	CE
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE

Railway Traffic	EN50121-4
Immunity for Heavy Industrial Environment	EN61000-6-2
Emission for Heavy Industrial Environment	EN61000-6-4
EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B EN61000-4-3 (RS) Level 3, Criteria A EN61000-4-4 (Burst) Level 3, Criteria A EN61000-4-5 (Surge) Level 3, Criteria B EN61000-4-6 (CS) Level 3, Criteria A EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
Safety	UL60950-1 (Pending)
Hi-pot isolation protection	DC 2.25KV for power to chassis ground, and UTP/ PoE port to chassis ground (IFS-1602GS-8PH)
4KV surge protection	Supported for PoE, UTP and SFP port (IFS-1602GS-8PH)
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

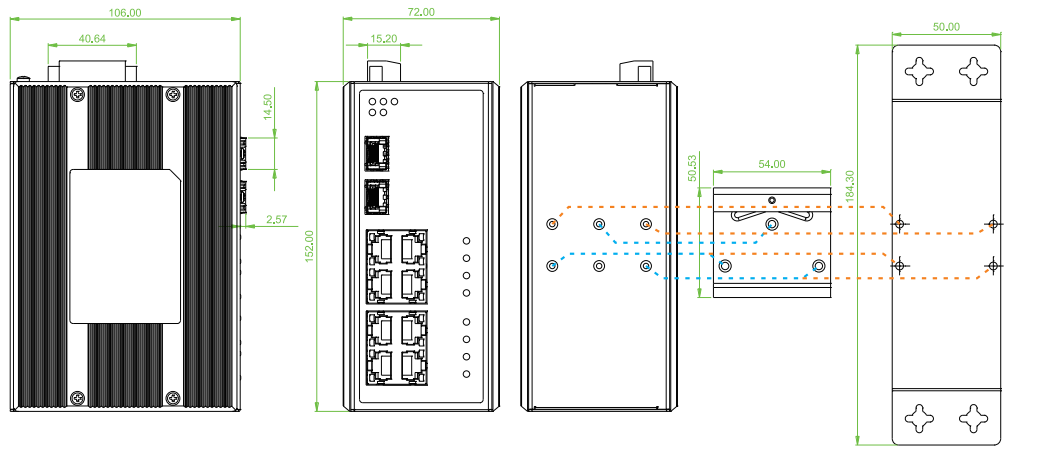
Application

Figure 1 : IFS-802GS-8PH & IFS-1602GS-8PH PoE Ethernet Switch Transmission



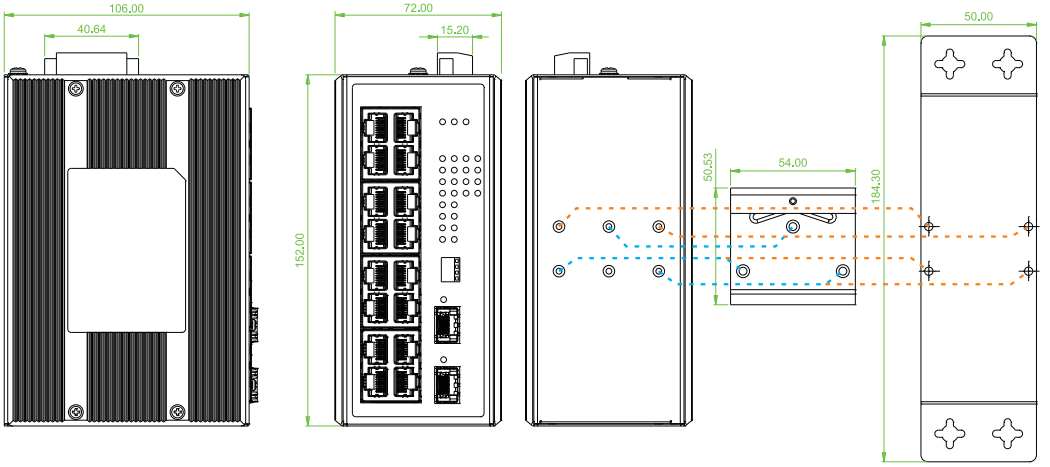
Dimensions

▶ IFS-802GS-8PH



Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

▶ IFS-1602GS-8PH



Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

Ordering Information

Model Name	Total port	RJ45 UTP Port	Fiber Port	PoE Port		Input Power	Certification			Operating Temperature
		10/100 Base-T(X)	1000 Base-X	IEEE802.3at	Power Budget	Redundant	Railway EN50121-4	EN61000-6-2 EN61000-6-4	CE, FCC	
IFS-802GS-8PH	10	8	2 SFP	8	240W	48VDC	V	V	V	-10~60℃
IFS-802GS-8PHE	10	8	2 SFP	8	240W	48VDC	V	V	V	-40~75℃
IFS-1602GS-8PH	18	16	2 SFP	8	240W	48VDC	V	V	V	-10~60℃
IFS-1602GS-8PHE	18	16	2 SFP	8	240W	48VDC	V	V	V	-40~75℃

Model Naming Rule

IFS – 16 – 02GS – 8PH – E

- IFS: Industrial Fast Ethernet Switch
- 16: 8: 8x FE UTP; 16: 16x FE UTP
- 02GS: 2x GbE SFP
- 8PH: 8x High Power PoE
- E: E: -40 - 75˚C; blank: -10 - 60˚C

■ Package List

- IFS-802GS-8PH or IFS-1602GS-8PH Device
- Quick installation guide
- Din Rail with screws
- Terminal block
- Protective caps for SFP ports

Optional Accessories

■ Wall mount kit accessories

IND-WMK02	Wall Mount kit for Industrial product (Wide) (184 x 50mm)

■ Industrial SFP Transceiver

The ISFP series of industrial grade SFP modules have been fully tested with the series product for guaranteed compatibility and performance. The best performance can be guaranteed even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheet for more details and more items.)

ISFP-M7000-85-(E)	Industrial SFP GbE 1000Base-SX, M/M, 500 meter,wave length 850nm, 7.5dB, LC, -10~70℃ (-40~85℃)
ISFP-S7020-31-(E)	Industrial SFP 1000Base-LX, S/M, 20km, wave length 1310nm, 15dB, LC, -10~70℃ (-40~85℃)
ISFP-T7T00-00-(E)	Industrial SFP 10/100/1000Base-T UTP 100meter, -10~70℃ (-40~85℃)

SFP Naming Rule

ISFP – S – 7 – 040 – 31 – D – E

- ISFP: Industrial SFP Transceiver
- S: M: Multi Mode; S: Single Mode; T: UTP
- 7: 9: 10G; 7: GbE; 5: FE
- 040: Distance — T00: (UTP); 000: (500m); 002: (2km); 020: (20km); 040: (40km)
- 31: Wavelength — 00: UTP; 85: 850nm; 31:1310nm; 55:1550nm; WA: TX/1310nm (Bidi mode A); WB: TX/1550nm (Bidi Mode B)
- D: D: DDMI; Blank: Non DDMI
- E: E:-40~85˚C; Blank:0~70˚C

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IMC-1000MS-PH12

100/1000Base-T to 100/1000Base-X SFP with PoE+ (PSE) Managed Fiber Converter (30W, 12V Booster)

IMC-1000MS-PH12 is a 10/100/1000Base-T to 100/1000Base-X manageable Gigabit Ethernet media converter which not only offers dual-speed fixed fiber transceiver or SFP cage module options for the optical interface, but also injects PoE+ power through the electrical RJ-45 port. Housed in rugged DIN rail or wall mountable enclosures, IMC-1000MS-PH12 converters are designed for harsh environments, such as IP surveillance, industrial networking, intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications.

IMC-1000MS-PH12 also provides many advanced Ethernet functions (VLAN, storm filter, ingress/egress bandwidth control, etc.) and can be managed via an easy-to-use GUI or standard SNMP manager such as CTC SmartView™. With built-in OAM (Operation, Administration, Maintenance & Provisioning) functions such as loop-back test and dying gasp, IMC-1000MS-PH12 can be monitored from a centrally located OAM-enabled FRM220-1000MS via remote in-band management which helps to reduces operational expenditures by keeping truck rolls to a minimum.

Features

- Conversion between 10/100/1000Base-T and 100/1000Base-X fiber cable interface
- Supports Dual Rate (100/1000) SFP for selectable fast or gigabit speed on fiber port
- 12/24/48VDC (9.6~57VDC) redundant dual input power with built-in very high efficiency booster(97~99%) to rise up 55 VDC for PoE output
- Regulate PoE output voltage (55VDC) to stabilize PoE device, and guarantee delivery PoE power distance to 100meter (Figure 4)
- Provides IEEE 802.3at PoE output (30W)
- IP30 rugged metal housing and fanless
- Wide operating temperature -20~75°C
- CE, FCC, Railway traffic EN50121-4 certification
- Heavy industrial grade EMS, EMI EN61000-6-2, EN61000-6-4 certification
- Supports Jumbo frame 9K bytes packet
- Ingress/Egress bandwidth control with 64K granularity
- PoE configuration and monitor
- Auto Laser Shutdown (ALS)
- Supports LFPT (Link Fault Pass Through)
- Supports Digital Diagnostic Monitor Interface (DDMI) for SFP
- Supports 16 IEEE 802.1Q Tag VLAN Group
- MIB counters
- SNMP alarm trap for power loss and port link down
- Web based and SNMP for management (Figure 1, 3)
- Remote Loop-Back test
- Supports in-band management from FRM220 Chassis with FRM220-1000MS (Figure 2)
- Supports SmartView for centralized management*

*Please see Chapter 1- **Software Management** for more details

Specifications

Standard	IEEE 802.3 10Base-T 10Mbit/s Ethernet
	IEEE 802.3u 100Base-TX, 100Base-FX, Fast Ethernet
	IEEE 802.3ab 1000Base-T Gbit/s Ethernet over twisted pair
	IEEE 802.3z 1000Base-X Gbit/s Ethernet over Fiber-Optic
	IEEE 802.3x Flow Control and Back pressure
	IEEE 802.3at PoE+ (Power over Ethernet enhancement)
	IEEE 802.3af PoE (Power over Ethernet)
	IEEE 802.1q Tag VLAN
Fiber Ports	SFP slot for 100Base-X or 1000Base-X, 100M/1000M speed set by Web
RJ45 Ports	10/100/1000Base-T Auto MDI/MDI-X and Auto-Negotiation Function Supports UTP CAT.5e Twisted Pair cable
Push Button	Reset, Load default setting
Data Process Architecture	Pass through mode
Jumbo Frame	9K bytes

Fiber Parameters	Fiber Cable (Multi-mode): 50/125um,62.5/125um
	Fiber Cable (Single-mode): 9/125um
	SFP, Distance depending on plugged-in Fiber Tranceiver
LFPT (Link Fault Pass Through)	TX- Fiber: If TX port link down, the media converter will force Fiber port to link down
	Fiber-TX: If Fiber port link down, the media converter will force TX port to link down
Connector and Pin Assignment	SFP Slot
	RJ-45 Socket: Cat 5e (10/100/1000Mbps) Twisted Pair cable
	Auto MDI/MDI-X and Auto-Negotiation Function Support
Connector and Pin Assignment	RJ-45 Port support IEEE 802.3at/af End-Span, Alternative A mode
	PoE (V+): RJ-45 pin 1, 2
	PoE (V-): RJ-45 pin 3, 6
	Data (1,2,3,6,4,5,7,8)

LED	Per Unit: Power 1 (Green), Power 2 (Green), Fault (Amber)
	Fiber LNK/ACT (Green): ON : Connected to network, OFF: Not connected to network, BLK : Receive /Transmit Data
	Fiber Speed: Yellow : 1000Base-X, Green : 100Base-X
	RJ-45 port: Speed: 10 (OFF), 100 (Green), 1000 (Yellow)
	LNK/ACT for RJ45(Green): ON : Connected to network, OFF: Not connected to network, BLK : Networking is active
	PoE Status (Green): Flash : PoE Fault (Over-load or short), ON : PoE normal working, OFF : PoE No Power output
Reverse Polarity Protection	Supported for Power Input
Overload Current Protection	Supported
Alarm Relay Contact	Relay outputs with current carrying capacity of 1 A @24VDC
Removable Terminal Block	Provides 2 redundant power, alarm relay contact, 6 Pin
Operating Humidity	5%~95% (Non-condensing)
Operating Temperature	-20°C ~ 75°C
Storage Temperature	-40°C ~ 85°C
Housing	Rugged Metal, IP30 Protection and fanless
Dimensions	106 x 62.5 x 135 mm (D X W X H)
Weight	650g
Installation	DIN Rail mounting, or wall mounting (Optional)
Power Supply	12/24/48VDC (9.6~57VDC), Redundant power with polarity reverse protect function and removable terminal block Built-in very high efficiency booster(97~99%) to rise up 55 VDC for PoE output Regulated PoE output voltage (55VDC) to stabilize PoE device, and guarantee delivery PoE power distance to 100meter (Figure 4)

PoE Power budget	30W
Power Consumption	Power consumption & Boost efficiency

Input Voltage	Total Power Consumption	Device Power Consumption	PoE Budget	Boost Efficiency
12VDC	34.2W	3.9W	30W	99.0%
24VDC	34.7W	4.4W	30W	99.0%
48VDC	35.4W	4.7W	30W	97.7%

MTBF	864,121 Hours MIL-HDBK-217
Warranty	5 years
Certifications	
EMC	CE
EMI	FCC Part 15 Subpart B Class A, CE
Rail Way Traffic	EN50121-4
Immunity for Heavy Industrial environment	EN 61000-6-2
Emission for Heavy industrial environment	EN 61000-6-4
EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B
	EN61000-4-3 (RS) Level 3, Criteria A
	EN61000-4-4 (EFT) Level 3, Criteria A
	EN61000-4-5 (Surge) Level 3, Criteria B
	EN61000-4-6 (CS) Level 3, Criteria A
	EN61000-4-8 (PFMF) Field strength 300A/m Criteria A
Safety	UL60950-1 (pending)
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

Software Specifications

SNMP or Web Mode (figure 1, 3)	
Management	Ingress/Egress bandwidth control with 64K granularity
	Web management, Firmware upgrade via Web
	Supports SNMP, MIB for management
	Supports DHCP client for automatic IP configuration
	Supports 802.1Q tag VLAN, 16 Tag VLAN group, MIB counters display
Configuation	IP configuration, password setting, converter configuration
	port configuration, MIB counter, SNMP configuration
	VLAN group configuration, alarm configuration
	PoE Configuration
Diagnostic & Monitor	Supports Link Fault Pass-Through (LFPT) Function
	Broadcast/Multicast/Unicast storm filter
	SNMP alarm trap for power loss and port link Up/Down
	PoE Status

In-Band Remote mode (Figure 2)	
Management	Supports in-band management from FRM220 Chassis With FRM220-1000MS card
	Ingress/Egress bandwidth control with 64K granularity
Configuation	IP configuration, converter configuration, port configuration, MIB counter
	VLAN group configuration, alarm configuration, PoE Configuration
Diagnostic & Monitor	Remote loop back test
	Supports Link Fault Pass-Through (LFPT) Function
	Broadcast/Multicast/Unicast storm filter
	PoE Status

Application

Figure 1 : IMC-1000MS-PH12 Management by SNMP, SmartView

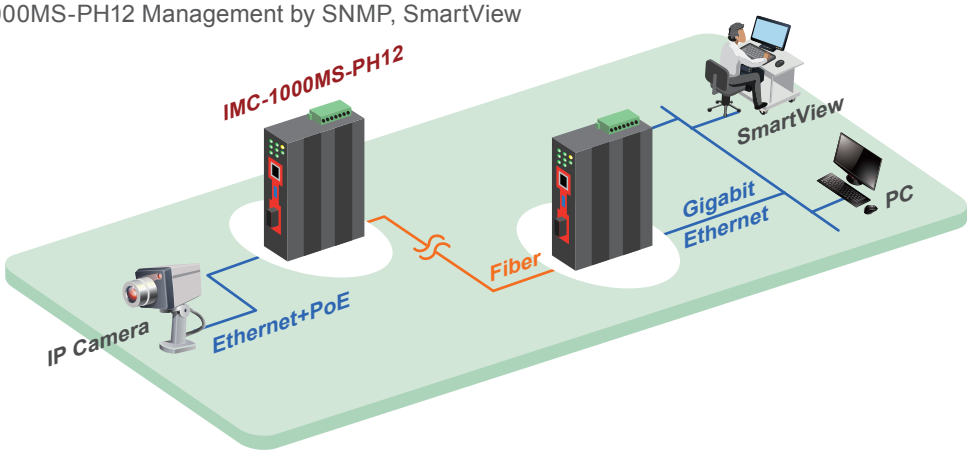


Figure 2 : IMC-1000MS-PH12 Application in Remote, In-Band Management

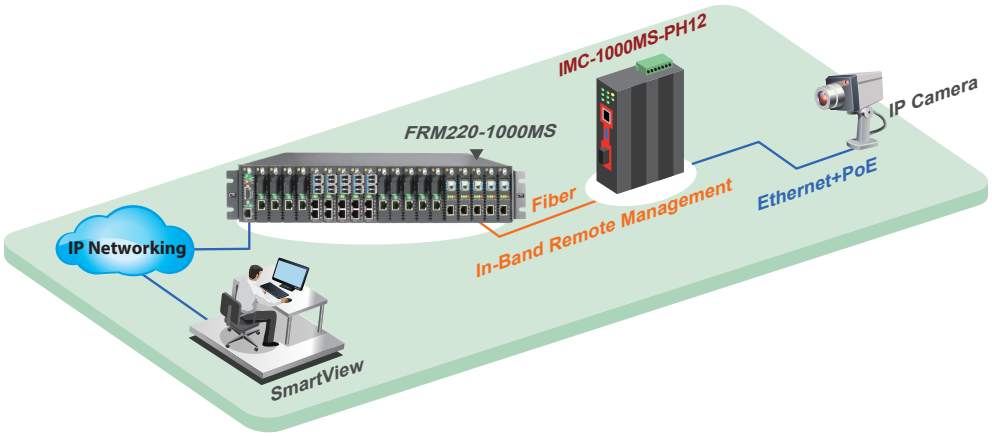


Figure 3 : IMC-1000MS-PH12 Application in Web Management

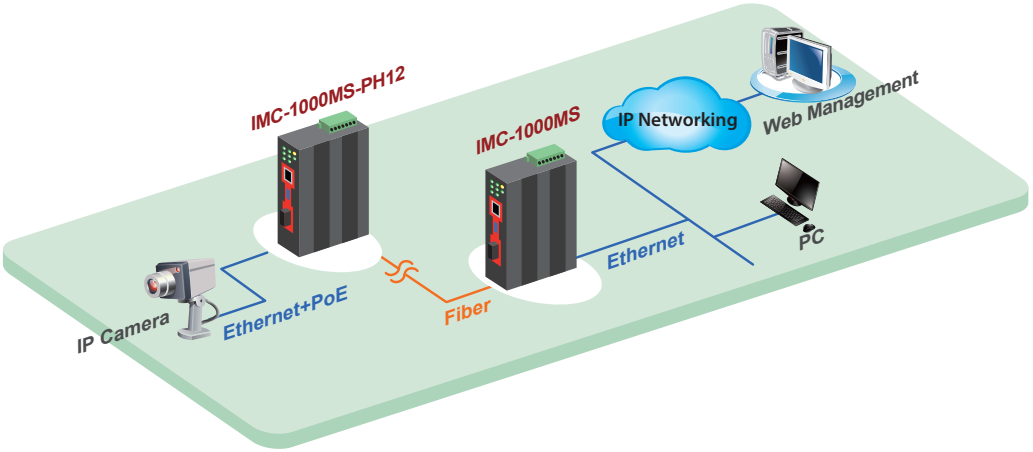
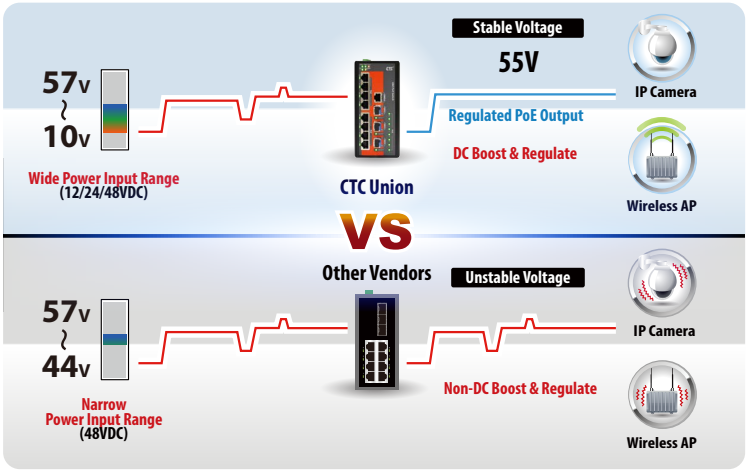
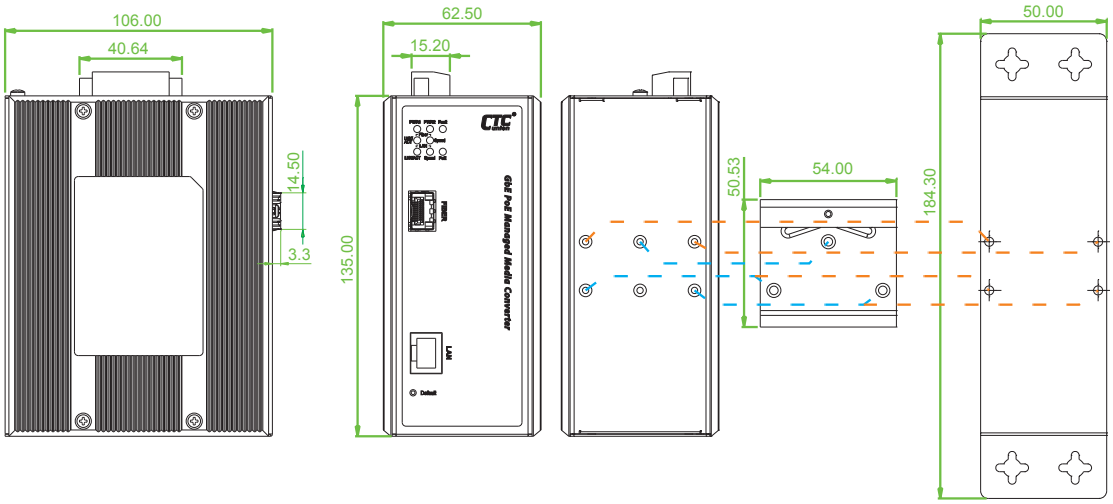


Figure 4 : High efficiency boost technology for PoE



- 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

Dimensions

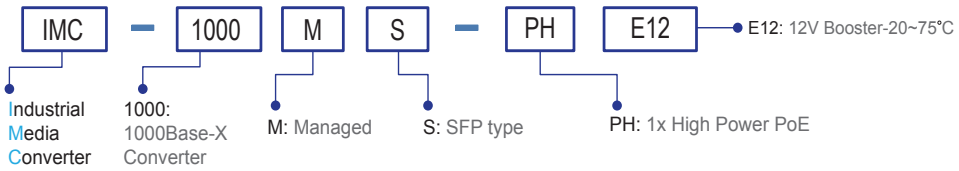


Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

Ordering Information

Model Name	Managed	RJ45 UTP	Fiber	PoE Port		Power Input	Certification			Operating Temperature
		10/100/1000 Base-T	Dual Speed 100/1000Base-X	IEEE 802.3at (PSE)	Power Budget	Redundant	Railway EN50121-4	EN61000-6-2 EN61000-6-4	CE, FCC	
IMC-1000MS-PHE12	V	1	1 SFP	1	30W	12/24/48VDC	V	V	V	-20~75℃

Model Naming Rule



Package List

- IMC-1000MS-PH12
- CD (MIB file, Manual)
- Quick installation guide
- Din Rail bracket with screws
- Terminal block
- Protective caps for SFP ports

Optional Accessories

Wall mount kit accessories

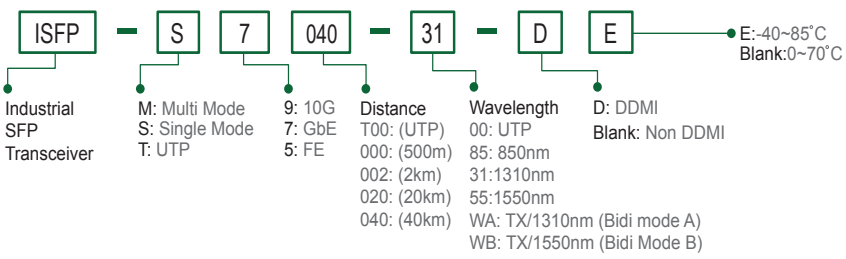
IND-WMK02	Wall Mount kit for Industrial product, 184 x 50mm

Industrial SFP Transceiver

The ISFP series of industrial grade SFP modules have been fully tested with the IMC-1000MS-PH12 product for guaranteed compatibility and performance. The best performance can be guaranteed even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheet for more details and more items.)

ISFP-M7000-85-D(E)	Industrial SFP GbE 1000Base-SX, M/M, 500 meter,wave length 850nm, 7.5dB, LC, DDMI, -10~70℃ (-40~85℃)
ISFP-S7020-31-D(E)	Industrial SFP 1000Base-LX, S/M, 20km, wave length 1310nm, 15dB, LC, DDMI, -10~70℃ (-40~85℃)
ISFP-T7T00-00-(E)	Industrial SFP 10/100/1000Base-T UTP 100meter, -10~70℃ (-40~85℃)
ISFP-M5002-31-D(E)	Industrial SFP 155M 100Base-FX, MM, 2km, wave length 1310nm, 12dB, LC, DDMI, -10~70℃ (-40~85℃)
ISFP-S5030-31-D(E)	Industrial SFP 155M 100Base-FX, SM, 30km, 1310nm, 19dB, LC, DDMI, -10~70℃ (-40~85℃)

SFP Naming Rule



IMC-1000S-PH12

100/1000Base-T to 100/1000Base-X SFP with PoE+ (PSE) Fiber Converter (30W, 12V Booster)

IMC-1000S-PH12 is a family of unmanaged Gigabit Ethernet media converters that support conversion between electrical 10/100/1000Base-T and optical 1000Base-X Ethernet and as PSE (Power Source Equipment) provide PoE+ power over Ethernet. The IMC-1000S-PH12 provides an SFP cage for 100/1000Base-X compatible SFP modules. Housed in rugged DIN rail or wall mountable enclosures, these converters are designed for harsh environments, such as industrial networking, intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications (See Figure 1).

Features

- Conversion between 10/100/1000Base-T and 100/1000Base-X Fiber cable interface
- Supports dual rate (100/1000) SFP for selectable Fast or Gigabit speed on fiber
- 12/24/48VDC (9.6~57VDC) redundant dual input power with built-in very high efficiency booster (97~99%) to rise up 55 VDC for PoE output
- Regulate PoE output voltage (55VDC) to stabilize PoE device, and guarantee delivery PoE power distance to 100meter (Figure 2)
- Provides IEEE 802.3at PoE output (30Watts)
- Supports Remote PD reset by fiber port link down (Figure 3)
- Supports LFPT (Link Fault Pass Through)
- IP30 rugged metal housing and fanless
- Wide operating temperature -20~75°C
- CE, FCC, Railway traffic EN50121-4 certification
- Heavy industrial grade EMS,EMI EN61000-6-2, EN61000-6-4 certification
- Supports Jumbo frame 9K bytes packet

Specifications

Standard	IEEE 802.3 10Base-T 10Mbit/s Ethernet
	IEEE 802.3u 100Base-TX, 100Base-FX, Fast Ethernet
	IEEE 802.3ab 1000Base-T Gbit/s Ethernet over twisted pair
	IEEE 802.3z 1000Base-X Gbit/s Ethernet over Fiber-Optic
	IEEE 802.3x Flow Control and Back pressure
	IEEE 802.3at PoE+ (Power over Ethernet enhancement)
	IEEE 802.3af PoE (Power over Ethernet)
	IEEE 802.1q Tag VLAN
RJ45 Ports	10/100/1000Base-T Auto MDI/MDI-X and Auto-Negotiation Function Supports UTP CAT.5e Twisted Pair cable
Fiber Ports	100Base-X or 1000Base-X SFP slot 100Base-X or 1000Base-X set by DIP SW
Data Process Architecture	Store and Forward mode or Pass Through mode Set by DIP SW
Jumbo Frame	9K bytes
Fiber Parameters	Fiber Cable (Multi-mode): 50/125um, 62.5/125um
	Fiber Cable (Single-mode): 9/125um
	Wavelength: 1310nm (Multi-mode/Single-mode)
	Available distance: • SFP, Distance depend on plug-in Fiber Transceiver
Link Fault Pass Through (LFPT)	TX- Fiber: If TX port link down, the media converter will force Fiber port to link down
	Fiber-TX: If Fiber port link down, the media converter will force TX port to link down
DIP Switch	ON: Disable Alarm For Power Loss OFF: Enable Alarm For Power Loss
	ON: Disable Alarm For Port Link-Failure OFF: Enable Alarm For Port Link-Failure
	ON: LFPT Enable, OFF: LFPT Disable
	Data process Architecture : ON : Pass through mode OFF : Store and Forward Switch mode
	Fiber Speed: OFF: 1000Base-X ON: 100Base-X

DIP Switch	PoE Output: OFF: Enable PoE output ON: Disable PoE output
	Remote PD reset (Figure 3) Off : Disable Remote PD reset On: Enable Remote PD reset by fiber port link down
Connector and Pin Assignment	SFP Slot
	RJ-45 Socket: CAT.5e (10/100/1000Mbps) Twisted Pair cable Auto MDI/MDI-X and Auto-Negotiation Function Support RJ-45 Port support IEEE 802.3at/af End-Span, Alternative A mode.
Connector and Pin Assignment	PoE (V+): RJ-45 pin 1, 2. PoE (V-): RJ-45 pin 3, 6. Data (1,2,3,6,4,5,7,8)
LED	Per Unit :Power 1 (Green) ,Power 2 (Green) ,Fault (Amber)
	Fiber LNK/ACT (Green): ON: Connected to network, OFF: Not connected to network , BLK: Receive /Transmit Data
	Fiber Speed: Yellow : 1000Base-X, Green : 100 Base- X
	RJ-45 Port: Speed: 10 (OFF), 100 (Green), 1000 (Yellow)
	LNK/ACT for RJ45(Green): ON: Connected to network, OFF: Not connected to network, BLK: Networking is active
	PoE Status (Green): Flash: PoE Fault (Over-load or short), ON: PoE normal working, OFF : PoE No Power output
Reverse Polarity Protection	Supported for Power Input
Overload Current Protection	Supported
Power Supply	12/24/48VDC (9.6~57VDC), Redundant power with polarity reverse protect function and removable terminal block Built-in very high efficiency booster(97~99%) to rise up 55 VDC for PoE output Regulated PoE output voltage (55VDC) to stabilize PoE device, and guarantee delivery PoE power distance to 100meter (Figure 2)
PoE Power budget	30W

Power Consumption	Power consumption & Boost efficiency

Input Voltage	Total Power Consumption	Device Power Consumption	PoE Budget	Boost Efficiency
12VDC	34.2W	3.9W	30W	99.0%
24VDC	34.7W	4.4W	30W	99.0%
48VDC	35.4W	4.7W	30W	97.7%

Alarm Relay Contact	Relay outputs with current carrying capacity of 1 A @24VDC
Removable Terminal Block	Provides 2 redundant power, alarm relay contact, 6 Pin
Operating Humidity	5%~95% (Non-condensing)
Operating Temperature	-20°C ~ 75°C
Storage Temperature	-40°C ~ 85°C
Housing	Rugged Metal, IP30 Protection and fanless
Dimensions	106 x 62.5 x 135 mm (D x W x H)
Weight	650g
Installation	DIN Rail mounting, or wall mounting (Optional)
MTBF	881,372 Hours MIL-HDBK-217
Warranty	5 years

Certification	
EMC	CE
EMI	FCC Part 15 Subpart B Class A, CE
Railway Traffic	EN50121-4
Immunity for Heavy Industrial environment	EN 61000-6-2
Emission for Heavy industrial environment	EN 61000-6-4
EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B
	EN61000-4-3 (RS) Level 3, Criteria A
	EN61000-4-4 (EFT) Level 3, Criteria A
	EN 61000-4-5 (Surge) Level 3, Criteria B
	EN 61000-4-6 (CS) Level 3, Criteria A
	EN61000-4-8 (PFMF) Field strength 300A/m Criteria A
Safety	UL60950-1 (pending)
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

Application

Figure 1 : IMC-1000S-PH12 Industrial PoE Transmission

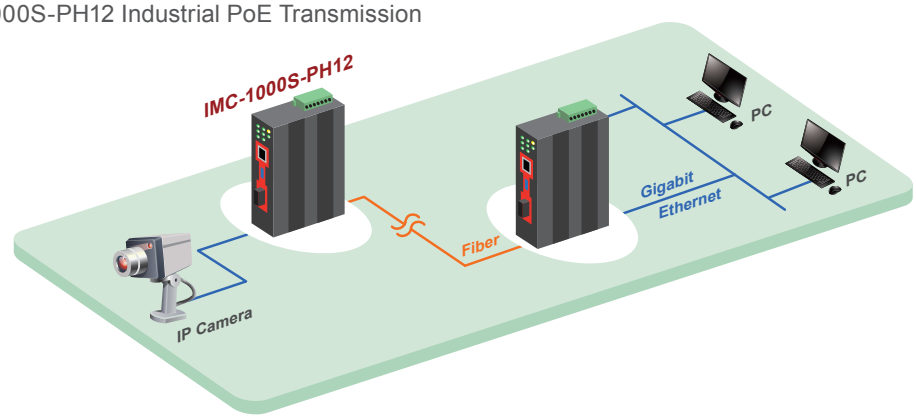
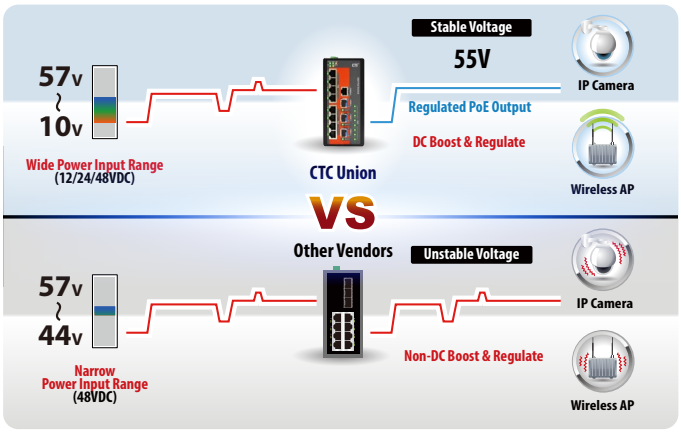
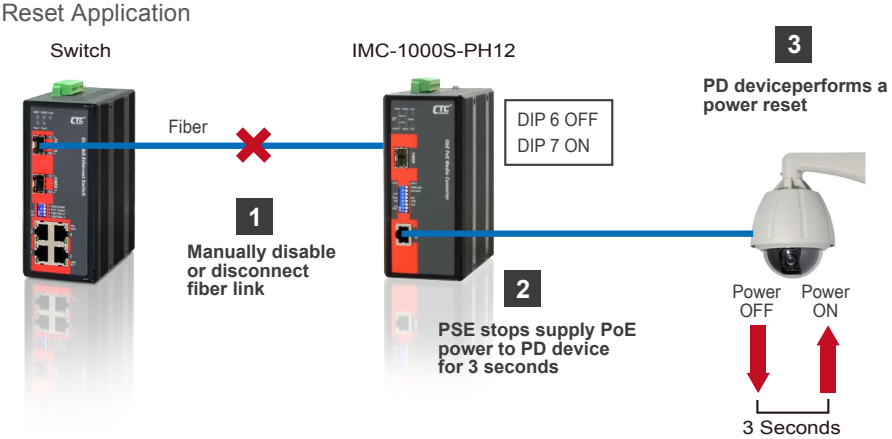


Figure 2 : High efficiency boost technology for PoE

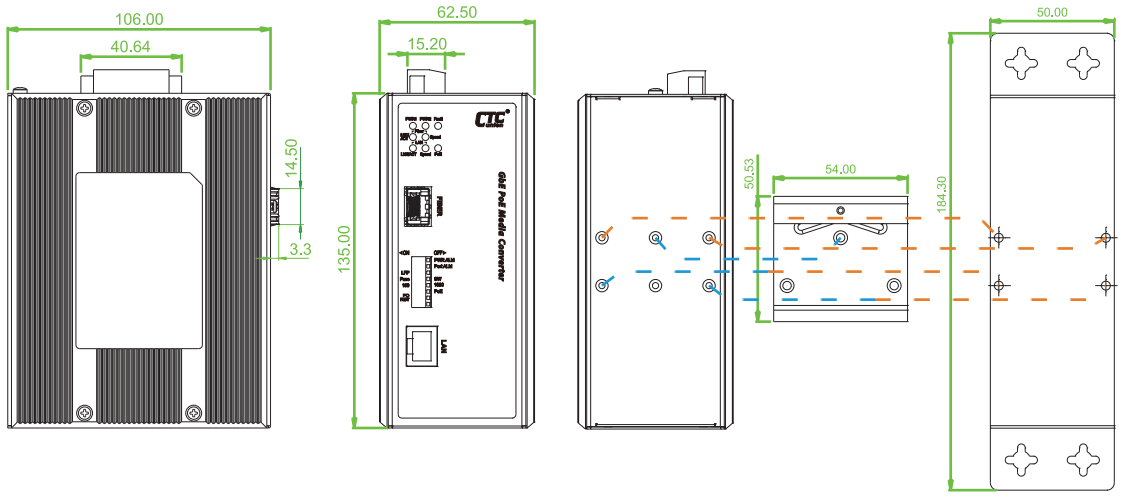


- Regulated PoE output voltage (55VDC) to stabilize PoE device
- Guarantee delivery PoE power distance to 100 meters
- Wide range input power 24/48VDC (20~57VDC)
- Built-in very high efficiency (94~97%) to boost PoE output voltage

Figure 3 : Remote PD Reset Application



Dimensions



Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

Ordering Information

Model Name	RJ45 UTP	Fiber	PoE Port		Power Input	Certification				Operating Temperature
	10/100/1000 Base-T	Dual Speed 100/1000Base-X	IEEE 802.3at (PSE)	Power Budget	Redundant	Railway EN50121-4	EN61000-6-2 EN61000-6-4	CE	FCC	
IMC-1000S-PHE12	1	1 SFP	1	30W	12/24/48VDC	V	V	V	V	-20~75°C

Model Naming Rule

IMC - 1000 S - PH E12 — E12: 12V Booster-20~75°C

- IMC: Industrial Media Converter
- 1000: 1000Base-X Converter
- S: SFP type
- PH: 1x High Power PoE

Package List

- IMC-1000S-PH12
- Quick installation guide
- Din Rail bracket with screws
- Terminal block
- Protective caps for SFP ports

Optional Accessories

Wall mount kit accessories

IND-WMK02	Wall Mount kit for Industrial product, 184 x 50mm

Industrial SFP Transceiver

The ISFP series of industrial grade SFP modules have been fully tested with the IMC-1000S-PH12 product for guaranteed compatibility and performance. The best performance can be guaranteed even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheet for more details and more items.)

ISFP-M7000-85-D(E)	Industrial SFP GbE 1000Base-SX, M/M, 500 meter,wave length 850nm, 7.5dB, LC, DDMI, -10~70°C (-40~85°C)
ISFP-S7020-31-D(E)	Industrial SFP 1000Base-LX, S/M, 20km, wave length 1310nm, 15dB, LC, DDMI, -10~70°C (-40~85°C)
ISFP-T7T00-00-(E)	Industrial SFP 10/100/1000Base-T UTP 100meter, -10~70°C (-40~85°C)
ISFP-M5002-31-D(E)	Industrial SFP 155M 100Base-FX, MM, 2km, wave length 1310nm, 12dB, LC, DDMI, -10~70°C (-40~85°C)
ISFP-S5030-31-D(E)	Industrial SFP 155M 100Base-FX, SM, 30km, 1310nm, 19dB, LC, DDMI, -10~70°C (-40~85°C)

SFP Naming Rule

ISFP - S 7 040 - 31 - D E — E:-40~85°C, Blank:0~70°C

- ISFP: Industrial SFP Transceiver
- S: M: Multi Mode, S: Single Mode, T: UTP
- 7: 9: 10G, 7: GbE, 5: FE
- 040: Distance — T00: (UTP), 000: (500m), 002: (2km), 020: (20km), 040: (40km)
- 31: Wavelength — 00: UTP, 85: 850nm, 31:1310nm, 55:1550nm, WA: TX/1310nm (Bidi mode A), WB: TX/1550nm (Bidi Mode B)
- D: DDMI, Blank: Non DDMI

IMC-100-PH12

100/1000Base-T to 100/1000Base-X SFP with PoE+ (PSE) Fiber Converter (30W, 12V Booster)

IMC-100-PH12 is a 10/100Base-TX to 100Base-FX unmanaged Ethernet media converter that also injects PoE+ power through the electrical RJ-45 port. Housed in rugged DIN rail or wall mountable enclosures, these converters are designed for harsh environments, such as industrial networking, intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications (See Figure 1).

Features

- Conversion between 10/100Base-TX and 100Base-FX SC or ST Fiber interface
- 12/24/48VDC (9.6~57VDC) redundant dual input power with built-in very high efficiency booster (98~99%) to rise up 55 VDC for PoE output
- Regulate PoE output voltage (55VDC) to stabilize PoE device, and guarantee delivery PoE power distance to 100meter (Figure 2)
- Provides IEEE 802.3at PoE output (30Watts)
- Supports Remote PD reset by fiber port link down (Figure 3)
- Supports LFPT (Link Fault Pass Through)
- IP30 rugged metal housing and fanless
- Wide operating temperature -20~75°C
- CE, FCC, Railway traffic EN50121-4 certification
- Heavy industrial grade EMS,EMI EN61000-6-2, EN61000-6-4 certification
- Supports Jumbo frame 9K bytes packet

Specifications

Standard	IEEE 802.3 10Base-T 10Mbit/s Ethernet
	IEEE 802.3u 100Base-TX, 100Base-FX, Fast Ethernet
	IEEE 802.3x Flow Control and Back pressure
	IEEE 802.3at PoE+ (Power over Ethernet enhancement)
	IEEE 802.3af PoE (Power over Ethernet)
	IEEE 802.1q Tag VLAN
RJ45 Ports	10/100Base-TX Auto MDI/MDI-X and Auto-Negotiation Function Supports UTP CAT.5e Twisted Pair cable
Fiber Ports	100Base-FX with SC or ST connector
Data Process Architecture	Store and Forward mode or Pass Through mode (Set by DIP SW)
Jumbo Frame	9K bytes
Fiber Parameters	Fiber Cable (Multi-mode): 50/125um, 62.5/125um
	Fiber Cable (Single-mode): 9/125um
	Wavelength: 1310nm (Multi-mode/Single-mode)
	Available Distance: 2KM (Multi-mode), 30KM (Single-mode), 50KM(Single-mode)
Link Fault Pass Through (LFPT)	TX- Fiber: If TX port link down, the media converter will force Fiber port to link down
	Fiber-TX: If Fiber port link down, the media converter will force TX port to link down
DIP Switch	ON: Disable Alarm For Power Loss OFF: Enable Alarm For Power Loss
	ON: Disable Alarm For Port Link-Failure OFF: Enable Alarm For Port Link-Failure
	ON: LFPT Enable, OFF: LFPT Disable
	Data process Architecture : ON : Pass through mode OFF : Store and Forward Switch mode
	PoE Output OFF: Enable PoE output ON: Disable PoE output
	Remote PD reset (Figure 3) OFF : Disable Remote PD reset ON: Enable Remote PD reset by fiber port link down
Fiber Connector	Fiber: SC / ST (Multi-mode, 2KM), SC / ST (Single-mode, 30KM, 50KM)

RJ45 Connector and Pin Assignment	RJ-45 Socket: CAT.5e (10/100Mbps) Twisted Pair cable Auto MDI/MDI-X and Auto-Negotiation Function Support RJ-45 Port support IEEE 802.3at/af End-Span, Alternative A mode. PoE (V+): RJ-45 pin 1, 2. PoE (V-): RJ-45 pin 3, 6. Data (1,2,3,6)
LED	Per Unit : Power 1 (Green), Power 2 (Green), Fault (Amber)
	Fiber LNK/ACT (Green): ON: Connected to network OFF: Not connected to network BLK: Receive /Transmit Data
	Fiber Speed :Green : 100 Base- X
	RJ-45 Port: Speed: 10 (OFF), 100 (Green)
	LNK/ACT for RJ45(Green): ON: Connected to network OFF: Not connected to network BLK: Networking is active
	PoE States (Green) Flash: PoE Fault (Over-load or short) ON: PoE normal working, OFF : PoE No Power output
Reverse Polarity Protection	Supported for Power Input
Overload Current Protection	Supported
Power Supply	12/24/48VDC (9.6~57VDC), Redundant power with polarity reverse protect function and removable terminal block Built-in very high efficiency booster(97~99%) to rise up 55 VDC for PoE output Regulated PoE output voltage (55VDC) to stabilize PoE device, and guarantee delivery PoE power distance to 100meter (Figure 2)
PoE Power budget	30W

Power Consumption	Power consumption & Boost efficiency

Input Voltage	Total Power Consumption	Device Power Consumption	PoE Budget	Boost Efficiency
12VDC	34W	3.5W	30W	98.4%
24VDC	34.4W	4.1W	30W	99.0%
48VDC	34.9W	4.3W	30W	98.0%

Alarm Relay Contact	Relay outputs with current carrying capacity of 1 A @24VDC
Removable Terminal Block	Provide 2 redundant power, alarm relay contact, 6 Pin
Operating Humidity	5%~95% (Non-condensing)
Operating Temperature	-20°C ~ 75°C
Storage Temperature	-40°C ~ 85°C
Housing	Rugged Metal, IP30 Protection and fanless
Dimensions	106 x 62.5 x 135 mm (D x W x H)
Weight	655g
Installation	DIN Rail mounting, or wall mounting (Optional)
MTBF	801,948 Hours MIL-HDBK-217
Warranty	5 years

Certifications	
EMC	CE
EMI	FCC Part 15 Subpart B Class A, CE
Railway Traffic	EN50121-4
Immunity for Heavy Industrial environment	EN 61000-6-2
Emission for Heavy industrial environment	EN 61000-6-4
EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B EN61000-4-3 (RS) Level 3, Criteria A EN61000-4-4 (EFT) Level 3, Criteria A EN61000-4-5 (Surge) Level 3, Criteria B EN61000-4-6 (CS) Level 3, Criteria A EN61000-4-8 (PFMF) Field strength 300A/m Criteria A
Safety	UL60950-1 (pending)
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

Application

Figure 1 : IMC-100-PH12 Industrial PoE Transmission

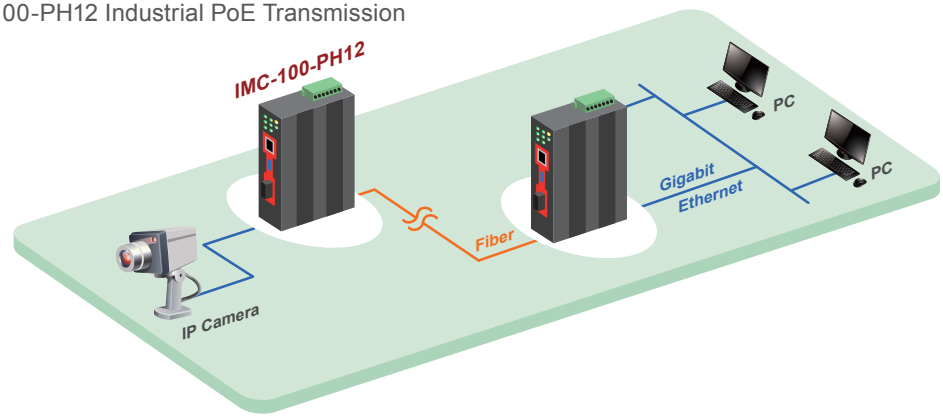
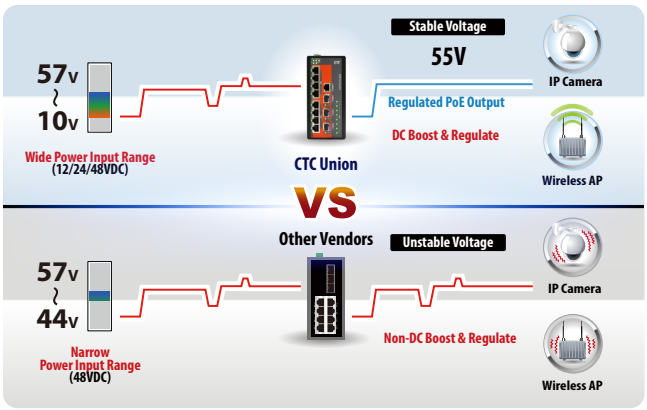
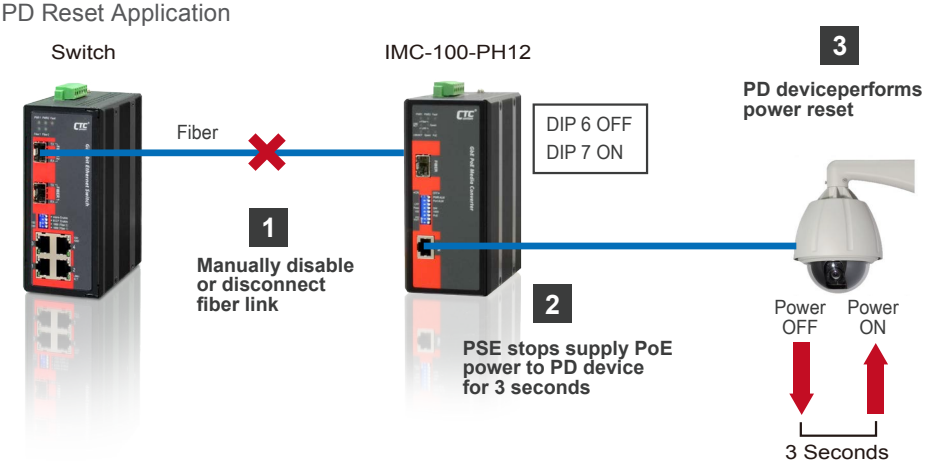


Figure 2 : High efficiency boost technology for PoE

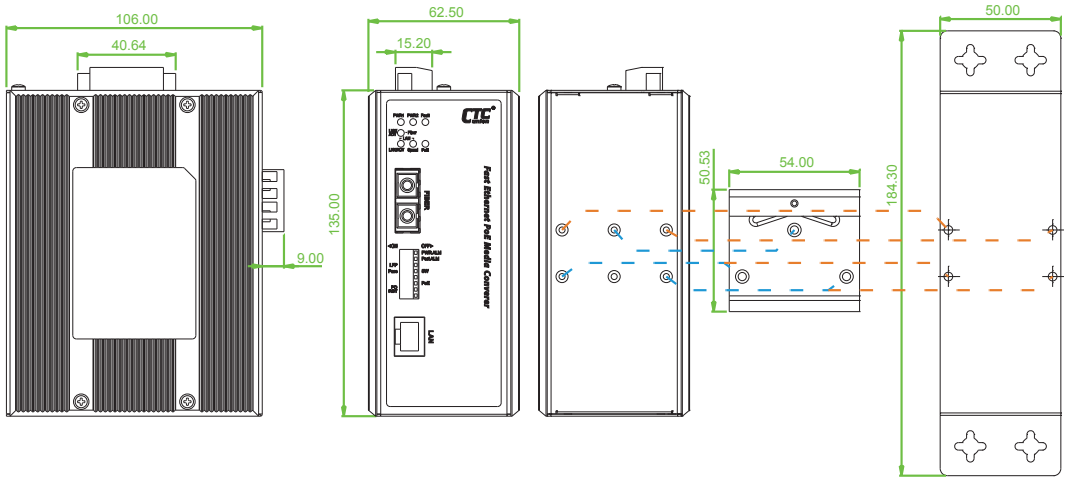


- Regulated PoE output voltage (55VDC) to stabilize PoE device
- Guarantee delivery PoE power distance to 100 meters
- Wide range input power 24/48VDC (20~57VDC)
- Built-in very high efficiency (94~97%) to boost PoE output voltage

Figure 3 : Remote PD Reset Application



Dimensions



Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

Ordering Information

Model Name	RJ45 UTP	Fiber	PoE Port		Power Input	Certification				Operating Temperature
	10/100 Base-TX	100Base-FX	IEEE802.3at (PSE)	Power Budget	Redundant	Railway EN50121-4	EN61000-6-2 EN61000-6-4	CE	FCC	
IMC-100-PHE12	1	1 SC/ST	1	30W	12/24/48VDC	V	V	V	V	-20~75℃

Model Naming Rule

IMC – 100 – PH – E12 – SC002 → See below for more detail

- IMC: Industrial Media Converter
- 100: 100Base Converter
- PH: 1x High Power PoE
- E12: 12V Booster-20~75℃

Fiber Connector Type	Connectivity Distance
SC, ST	002: 2km (M/M) 030: 30km (S/M) 050: 50km (S/M) 020A: WDM Bidi 20km A Type (TX:1310nm) 020B: WDM Bidi 20km B Type (TX:1550nm)

Temperature | Connector Type | Connectivity Distance

IMC-100 –PH□12 - □□□□

Example: IMC-100 – PHE12 – SC002

Package List

- IMC-100-PH12 device
- Quick installation guide
- Din Rail bracket with screws
- Terminal block

Optional Accessories

Wall mount kit accessories

IND-WMK02	Wall Mount kit for Industrial product, 184 x 50mm

2019 v1.0
www.ctcu.com / sales@ctcu.com

NEW

IGS-2408SM

24x 10/100/1000Base-T(X) +
8x 100/1000Base-X SFP Central Switch

IGS-4804SM (Preliminary)

48x 10/100/1000Base-T(X) +
4x 100/1000Base-X SFP Central Switch

UL60950-1 CE FC EN50121-4 EN61000-6-2 EN61000-6-4 IPv6 SmartView µ-Ring IEEE 1588v2 Negative Voltage

This managed Industrial Ethernet switch is a hardened design managed Ethernet switch for rigorous demands of centralize and critical applications. This Ethernet Switch supports full Gigabit Ethernet with 24/48 (10/100/1000BaseTX) RJ-45 port plus 8/4 dual speed (100/1000Base-X) SFP fiber optical slots, thus providing up to 32/52 ports of Ethernet connectivity. The managed Ethernet switch is an ideal solution of Industrial automation, smart city & surveillance, Intelligent traffic control systems and production automation applications.

The switch provides 10KB jumbo frame, 32K MAC address table and 4MB memory buffer, moreover, the full Gigabit capability supports Link Aggregation (Dynamic IEEE 802.3ad LACP) up to 16/26 trunk groups (maximum 8port per group) to increase bandwidth for providing high performance and the ability to quickly transfer of large amounts video, voice, and data across a network.

This managed switch supports a variety of Ethernet ring redundant functions, including STP/RSTP/MSTP/ERPS and enhanced µ-Ring/ µ-Chain/Sub-Ring provide less than 50ms recovery time 250 nodes and its redundant power input increases system reliability and the availability of your network backbone.

Features

- 24x 10/100/1000Base-T RJ-45 + 8x100/1000Base-X SFP IGS-2408SM)
- 48x 10/100/1000Base-T RJ-45 + 4x100/1000Base-X SFP (IGS-4804SM)
- Redundant isolated 24/48VDC, or/and isolated 110/220VAC power inputs
- **Supports negative voltage power input**
- Rugged metal, IP30 protection & Fanless design
- UL60950-1, EN60950-1, CE, FCC, Rail Traffic EN50121-4 certified
- Heavy industrial grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- **4KV surge protection for RJ45 and SFP ports**
- **2.25K VDC Hi-pot isolation protection for Ethernet ports and power**
- STP, RSTP, MSTP, ITU-T G.8032 Ethernet Ring Protection Switching (ERPS) for network redundancy
- Provides 5 instances each can support µ-Ring, µ-Chain or Sub-Ring for flexible networking applications
- µ-Ring redundancy, recovery time <50ms in 250 devices
- DHCP Server/Client/Relay/Snooping/Relay option 82
- QoS, Traffic classification QoS, CoS, bandwidth control for Ingress and Egress, Storm Control, DiffServ
- IEEE 802.1q VLAN, MAC based VLAN, IP subnet based VLAN, Protocol based VLAN, VLAN translation, GVRP, MVR
- Dynamic IEEE 802.3ad LACP Link Aggregation, Static Link Aggregation
- IGMP snooping V1/V2/V3, IGMP Filtering/ Throttling, IGMP query, IGMP proxy reporting, MLD snooping V1/V2
- Flexibility security: Port based and MAC based IEEE 802.1X, RADIUS, ACL, TACACS+, HTTP/HTTPS, SSL/SSH v2
- Software upgrade via TFTP and HTTP, redundant firmware to avoid in case of upgrade failure
- 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
- RMON, MIB II, Port mirroring, Event syslog, DNS, NTP V4.0, SNTP, IEEE 802.1ab LLDP
- CLI, Web based management, SNMP v1/v2c/v3, Telnet server for management
- Supports Modbus/TCP protocols for management
- Provides SmartConfig for quick and easy mass Configuration*
- Supports SmartView for Centralized Management*

*Please see Chapter 1- **Software Management** for more details

Specifications

Standard	IEEE 802.3	10Base-T 10Mbit/s Ethernet
	IEEE 802.3u	100Base-TX, 100Base-FX, Fast Ethernet
	IEEE 802.3ab	1000Base-T Gbit/s Ethernet over twisted pair
	IEEE 802.3z	1000Base-X Gbit/s Ethernet over Fiber-Optic
	IEEE 802.1d	STP (Spanning Tree Protocol)
	IEEE 802.1w	RSTP (Rapid Spanning Tree Protocol)
	IEEE 802.1s	MSTP (Multiple Spanning Tree Protocol)
	ITU-T G.8032 / Y.1344	ERPS (Ethernet Ring Protection Switching)
	IEEE 802.1Q	Virtual LANs (VLAN)
	IEEE 802.1X	Port based and MAC based Network Access Control, Authentication

Standard	IEEE 802.3ac	Max frame size extended to 1522Bytes
	IEEE 802.3ad	Link aggregation for parallel links with LACP(Link Aggregation Control Protocol)
	IEEE 802.3X	Flow control for full duplex
	IEEE 802.1ad	Stacked VLANs, Q-in-Q
	IEEE 802.1p	LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization
	IEEE 802.1ab	Link Layer Discovery Protocol (LLDP)
	IEEE 802.3az	EEE (Energy Efficient Ethernet)

VLAN ID	4094 IEEE 802.1Q VLAN VID
Switch Architecture	Back-plane (Switching Fabric): 64Gbps (IGS-2408SM) 104Gbps (IGS-4804SM) (Full wire-speed)
Data Processing	Store and Forward
Network Connector	**SFP:** 8x 100/1000Base-X SFP socket (IGS-2408SM) 4x 100/1000Base-X SFP socket (IGS-4804SM) Support DDMI **RJ45:** 24x 10/100/1000Base-T RJ-45 (IGS-2408SM) 48x 10/100/1000Base-T RJ-45 (IGS-4804SM) Support Auto negotiation speed, Auto MDI/MDI-X function
Console	RS-232 (RJ-45)
Network Cable	UTP/STP Cat.5e cable or above
	EIA/TIA-568 100-ohm (100m)
Protocols	CSMA/CD
Reverse Polarity Protection	For input power
Overload Current Protection	Supported
CPU Watch Dog	Supported
Power Supply	Redundant 2x AC input power (-AA model) 1x AC input power (-A model) Redundant 1x AC and 1x DC input power (-AD model) Redundant 2x DC input power (-DD model) 1x DC input power (-D model) AC input power (A) : Isolated 110/220VAC (85VAC~264VAC) DC input power (D) : Isolated 24/48VDC (18~60VDC), Removable Terminal Block Supports negative voltage power input
Power Consumption	< 30W @24/48VDC, 110/220VAC (IGS-2408SM) TBD (IGS-4804SM)
LED	Per unit: Power 1 (Green), Power 2 (Green), Act /Alarm (Green/Amber), Ring Master (Green)
	P1~P24 (IGS-2408SM) P1~P48 (IGS-4804SM) Per RJ-45 port: 10/100 Link/Active (Green) 1000 Link/Active (Amber)
	P25~P32 (IGS-2408SM) P49~P52 (IGS-4804SM) Per SFP Fiber port: 100 /1000Base-X Link/Active (Amber)
Jumbo Frame	10K Byte
MAC Address Table	32K
Memory Buffer	4M Bytes for packet buffer

Warning Message	System Syslog, SMTP/ e-mail event message, alarm relay
Alarm Relay Contact	Relay outputs with current carrying capacity of 1A @24VDC, 2-Pin removable terminal block
Operating Temperature	-40 ~ 70°C (IGS-2408SM-E, IGS-4804SM-SE)
Operating Humidity	5% to 95% (Non-condensing)
Storage Temperature	-40 ~ 85°C
Housing	Rugged Metal, IP30 Protection, Fanless
Dimensions	280x 440 x 44mm (D x W x H) (IGS-2408SM) TBD (IGS-4804SM)
Weight	4,755kg (IGS-2408SM-(E)AA) 4.51kg (IGS-2408SM-(E)AD) 4.26kg (IGS-2408SM-(E)DD) TBD (IGS-4804SM)
Installation Mounting	19" rack mount
MTBF	103,057 Hours (IGS-2408SM-AA) 103,451 Hours (IGS-2408SM-AD) 103,447 Hours (IGS-2408SM-DD) TBD (IGS-4804SM) (MIL-HDBK-217)
Warranty	5 years
Certification	
EMC	CE (EN55024, EN55032)
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE
Railway Traffic	EN50121-4
Immunity for Heavy Industrial Environment	EN61000-6-2
Emission for Heavy Industrial Environment	EN61000-6-4
EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B
	EN61000-4-3 (RS) Level 3, Criteria A
	EN61000-4-4 (Burst) Level 3, Criteria A
	EN61000-4-5 (Surge) Level 3, Criteria B
	EN61000-4-6 (CS) Level 3, Criteria A
	EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
Safety	UL60950-1, EN60950-1
Hi pot protection	DC 2.25KV for power to chassis ground, Ethernet port to chassis ground
4KV surge protection	Supported for RJ45 and SFP ports
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

Software Specifications

Topology	
VLAN	IEEE 802.1q VLAN,up to 4094 802.1Q VLAN VID
	IEEE 802.1q VLAN,up to 4094 Groups
	IEEE 802.1ad Q-in-Q
	MAC-based VLAN,up to 256 entries
	IP Subnet-based VLAN, up to 128 entries
	Protocol-based VLAN(Ethernt, SNAP, LLC), up to 128 entries
	VLAN Translation, up to 256 entries
	GVRP (GARP VLAN Registration Protocol)
	MVR (Multicast VLAN Registration)
Link Aggregation (Port Trunk)	Static (Hash with SA, DA, IP, TCP/UDP port), Maximum trunk group : 16group (IGS-2408SM) 26group (IGS-4804SM)
	Dynamic (IEEE 802.3ad LACP), Maximum trunk group : 16group (IGS-2408SM) 26group (IGS-4804SM)
	Per group up-to 8 port
Spanning Tree	IEEE 802.1d STP, IEEE 802.1w RSTP, IEEE 802.1s MSTP

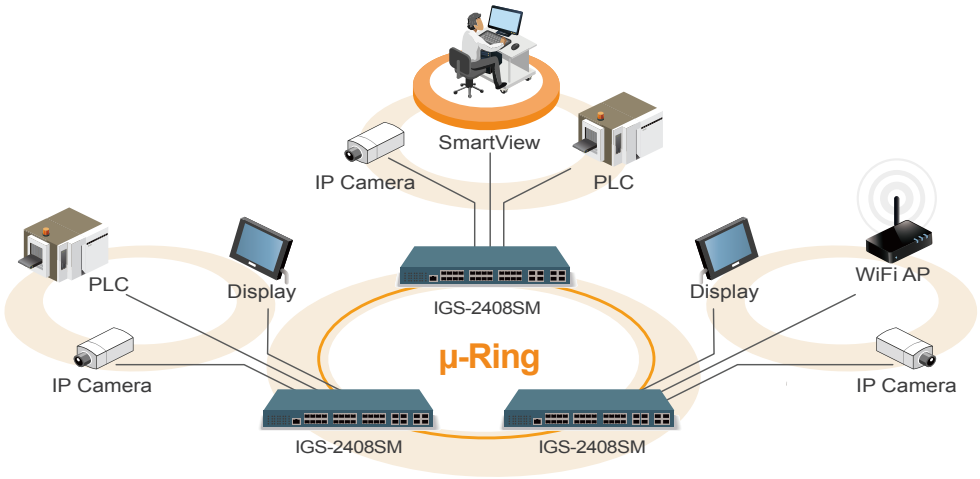
Multiple µ-Ring	Up to 5 instances each support µ-Ring, µ-Chain or Sub-Ring for flexible networking applications. Recovery time <50ms The maximum number of device is allowed 250 in a Ring.
Loop Protection	Supported
ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)	Recovery time <50ms
	Single Ring, Sub-Ring, Multiple ring topology
QoS Features	
Class of Service	IEEE 802.1p 8 active priorities queues for per port
Traffic Classification QoS	IEEE 802.1p based CoS
	IP Precedence based CoS
	IP DSCP based CoS
Traffic Classification QoS	QCL(QoS Control List): Frame Type, Source/ Destination MAC, VLAN ID, PCP, DEI Protocol, Source IP, IP Fragment, DSCP, TCP/UDP port number
Bandwidth Control for Ingress	Per port based
Bandwidth Control for Egress	Per port based
	Per queue / Per port shaper
DiffServ (RF 2474) Remarking	

Storm Control	for Unicast, Broadcast, Multicast
IP Multicasting Features	
IGMP / MLD Snooping	IGMP Snooping v1, v2, v3 / MLD Snooping v1, v2
	Port Filtering Profile
	Throttling, Fast Leave
	Maximum Multicast Group : up to 1022 entries
	Query / Static Router Port
Security Features	
IEEE 802.1X	Port-Based
	MAC-Based
ACL	Number of rules : up to 256 entries
	for L2 / L3 / L4 L2 : Mac address SA/DA/VLAN L3 : IP address SA/DA, Subnet L4 : TCP/UDP
RADIUS authentication & accounting	
TACACS+ authentication & accounting, TACACS+ 3.0	
HTTPS, HTTP	Supported
SSL / SSH v2	Supported
User Name Password Authentication	Local Authentication
	Remote Authentication (via RADIUS / TACACS+)
Management Interface Access Filtering	Web, Telnet / SSH , CLI RS-232 console
Management Features	
CLI	Cisco® like CLI
Web Based Management	
Telnet	Server
SNMP	V1, V2c, V3
Modbus/TCP	Support for management and monitoring

SW & Configuration Upgrade	TFTP, HTTP
	Redundant firmware in case of upgrade failure
RMON	RMON I (1, 2, 3, 9 group), RMON II
MIB	RFC1213 MIB II, Private MIB
UPnP	Supported
DHCP	Server/Client/Relay/Relay option 82/Snooping
Warning Message	System syslog, e-mail, alarm relay
DNS	Client, Proxy
IP Source Guard	Supported
Mirroring	Local and Remote
Event Syslog	Syslog server (RFC3164) (Support 1 server)
IEEE 1588 PTP V2	Supports 5 operating mode in each port : Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave
NTP V4.0, SNTP	Client
LLDP (IEEE 802.1ab)	Link Layer Discovery Protocol
	LLDP-MED
IPv6 Features	
IPv6 Management	Telnet Server/ICMP v6
SNMP over IPv6	Supported
HTTP over IPv6	Supported
SSH over IPv6	Supported
IPv6 Telnet	Supported
IPv6 NTP, SNTP	Client
IPv6 TFTP	Supported
IPv6 QoS	Supported
IPv6 ACL	Number of rules: up to 256 entries
	for L2 / L3 / L4 L2 : Mac address SA/DA/VLAN L3 : IP address SA/DA, Subnet L4 : TCP/UDP

Application

Figure : Application Example

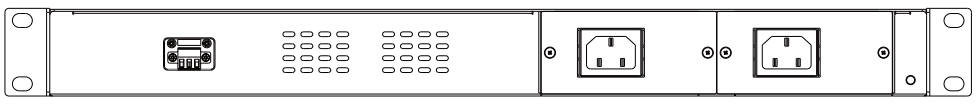


Dimensions

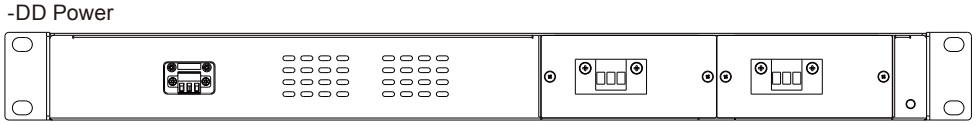
▶ IGS-2408SM

Rear View

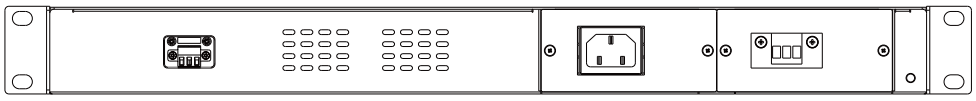
-AA Power



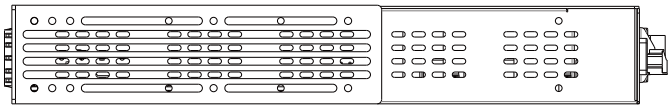
-DD Power



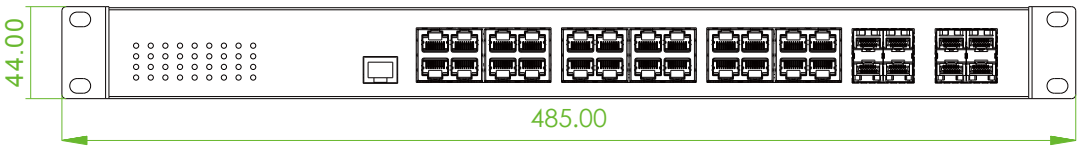
-AD Power



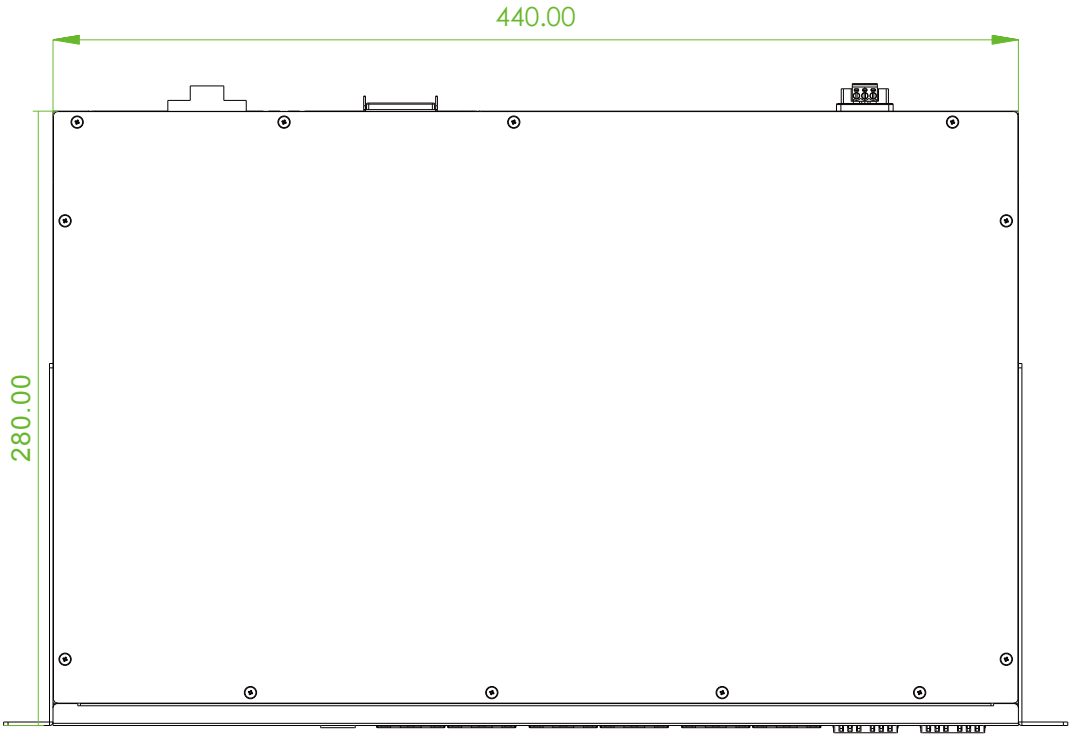
Side View



Front View



Top View



Ordering Information

Model Name	Managed	Total Port	UTP	Fiber	Input power		Certification				Operating Temperature
			10/100/1000 Base-T	100/1000 Base-X	24/48VDC	110/220V AC	Safety UL60950-1 EN60950-1	EN50121-4	EN61000-6-2 EN61000-6-4	CE, FCC	
IGS-2408SM-E-AA	V	32	24	8		2	V	V	V	V	-40~70℃
IGS-2408SM-E-AD	V	32	24	8	1	1	V	V	V	V	-40~70℃
IGS-2408SM-E-DD	V	32	24	8	2		V	V	V	V	-40~70℃
IGS-4804SM-E-AA	V	52	48	4		2	V	V	V	V	-10~70℃
IGS-4804SM-E-AD	V	52	48	4	1	1	V	V	V	V	-10~70℃
IGS-4804SM-E-DD	V	52	48	4	2		V	V	V	V	-10~70℃

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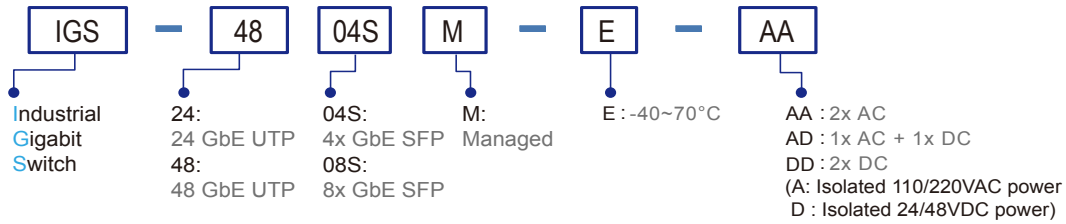
Model Naming Rule



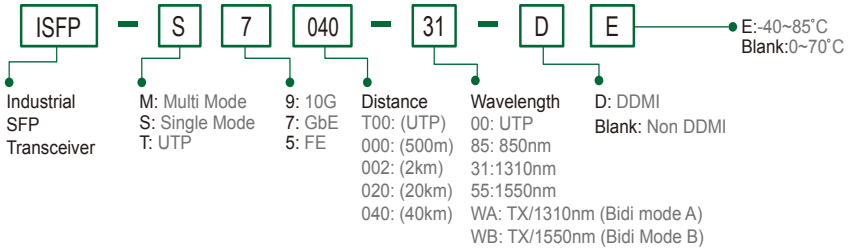
Optional Accessories

Industrial SFP Transceiver

The ISFP series of industrial grade SFP modules have been fully tested with the series product for guaranteed compatibility and performance. The best performance can be guaranteed even in mission-critical applications.

ISFP-M7000-85-D(E)	Industrial SFP GbE 1000Base-SX, M/M, 500 meter,wave length 850nm, 7.5dB, LC, DDMI, -10~70°C (-40~85°C)
ISFP-S7020-31-D(E)	Industrial SFP 1000Base-LX, S/M, 20km, wave length 1310nm, 15dB, LC, DDMI, -10~70°C(-40~85°C)
ISFP-T7T00-00-(E)	Industrial SFP 10/100/1000Base-T UTP 100meter, -10~70°C (-40~85°C)
ISFP-M5002-31-D(E)	Industrial SFP 155M 100Base-FX, MM, 2km, wave length 1310nm, 12dB, LC, DDMI, -10~70°C (-40~85°C)
ISFP-S5030-31-D(E)	Industrial SFP 155M 100Base-FX, SM, 30km, 1310nm, 19dB, LC, DDMI, -10~70°C (-40~85°C)

SFP Naming Rule



IGS-S2804TM

28x 100/1000Base–X SFP with 4x GbE Combo Managed Switch (Rack)

IGS-S2804TM is a industrial grade Ethernet Switch that is equipped with 28 gigabit SFP ports with 4 combo gigabit ports. The model is a fanless design with redundant, isolated power supplies (2 AC, 2 DC, AC + DC) and can be mounted in 19 inch EIA standard rack. This series offers various layer 2 Ethernet functions (IGMP, VLAN, QoS , Security, IPv6, bandwidth control, and port mirroring) and also support µ-Ring redundancy protocol that can establish 5 independent rings for flexible applications, especially when employed in backbone infrastructure. The switch can also be managed centrally and conveniently by CTC Union's SmartView™ Element Management System and mass configured by SmartConfig™. Housed in rugged rack mountable enclosures, this model is certified with many industrial-grade standards and is ideal for deployments in harsh environments to deliver mission-critical network services. (See figure).

Features

- 28x GbE SFP with 4x Combo (SFP+RJ-45) Ethernet switch
- Redundancy isolated low voltage 24/48VDC, or/and isolated High voltage (110/220 VAC) power inputs
- Supports negative voltage power input with isolated RS-232 console port (for example in telecom system)
- Rugged metal, IP30 protection & Fanless design
- UL60950-1, CE, FCC, Rail Traffic EN50121-4 certified
- Heavy industrial grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- STP, RSTP, MSTP, ITU-T G.8032 Ethernet Ring Protection Switching (ERPS) for redundant cabling
- Provides 5 instances that each can support µ-Ring, µ-Chain or Sub-Ring type for flexible uses. Supports up to 5 rings in one device (Please see CTC Union µ-Ring white paper for more details and more topology application)
- µ-Ring for Redundant Cabling, recovery time<50ms in 250 devices
- DHCP Server/Client/Relay/Snooping/Snooping option 82/Relay option 82
- QoS, Traffic classification QoS, CoS, bandwidth control for Ingress and Egress, Storm Control, DiffServ
- IEEE 802.1q VLAN, MAC based VLAN, IP subnet based VLAN, Protocol based VLAN, VLAN translation, GVRP, MVR
- Dynamic IEEE 802.3ad LACP Link Aggregation, Static Link Aggregation
- IGMP snooping V1/V2/V3, IGMP Filtering/ Throttling, IGMP query, IGMP proxy reporting, MLD snooping V1/V2
- Flexibility security: Port based and MAC based IEEE 802.1X, RADIUS, ACL, TACACS+, HTTP/HTTPS, SSL/SSH v2
- Software upgrade via TFTP and HTTP, redundant firmware to avoid in case of upgrade failure
- 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
- RMON, MIB II, Port mirroring, Event syslog, DNS, NTP, SNTP, IEEE 802.1ab LLDP
- Supports IPv6 Telnet server /ICMP v6
- CLI, Web based management, SNMP v1/v2c/v3, Telnet server for management
- Supports Modbus/TCP protocols for management
- Provides SmartConfig for quick and easy mass Configuration*
- Supports SmartView for Centralized Management*

*Please see Chapter 1- **Software Management** for more details

Specifications

Standard	IEEE 802.3	10Base-T 10Mbit/s Ethernet
	IEEE 802.3u	100Base-TX, 100Base-FX, Fast Ethernet
	IEEE 802.3ab	1000Base-T Gbit/s Ethernet over twisted pair
	IEEE 802.3z	1000Base-X Gbit/s Ethernet over Fiber-Optic
	IEEE 802.1d	STP (Spanning Tree Protocol)
	IEEE 802.1w	RSTP (Rapid Spanning Tree Protocol)
	IEEE 802.1s	MSTP (Multiple Spanning Tree Protocol)
	ITU-T G.8032 / Y.1344	ERPS (Ethernet Ring Protection Switching)
	IEEE 802.1Q	Virtual LANs (VLAN)
	IEEE 802.1X	Port based and MAC based Network Access Control, Authentication
	IEEE 802.3ad	Link aggregation for parallel links with LACP(Link Aggregation Control Protocol)
	IEEE 802.1ad	Stacked VLANs, Q-in-Q
	IEEE 802.1p	LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization
	IEEE 802.1ab	Link Layer Discovery Protocol (LLDP)

VLAN ID	4094 IEEE 802.1Q VLAN VID
Switch Architecture	Back-plane (Switching Fabric): 56Gbps (Full wire-speed)
Data Processing	Store and Forward
Network Connector	28x 100/1000Base-X SFP with 4x GbE Combo (UTP/ SFP)
Network Connector	Port 25~28 GbE SFP support 1000M Port 21~24 GbE SFP/RJ45 UTP combo (dual speed 100/1000M) Port 1~20 GbE SFP support dual speed (100/1000M) SFP support 100/1000M dual speed with DDMI RJ-45 UTP port support 10/100/1000Base-T(X), Auto negotiation speed, Auto MDI/MDI-X function
Console	RS-232 (RJ-45) Isolated RS-232 port grounding for negative voltage power system, or telecom application
Network Cable	UTP/STP above Cat. 5e cable EIA/TIA-568 100-ohm (100m)
Protocols	CSMA/CD
Reverse Polarity Protection	Supported

Overload Current Protection	Supported
CPU Watch Dog	Supported
Power Supply	Redundant 2x isolated High Voltage AC/DC input power (-AA model) Redundant 2x Isolated Low Voltage DC Input power (-DD model)
Power Supply	Redundant 1x isolated Low Voltage DC and 1x High Voltage AC/DC input power (-AD model) Low Voltage DC (D): Isolated 24/48V (18~60VDC), Removable Terminal Block High voltage AC/DC (A): Isolated 110/220VAC (85VAC~264VAC) Supports negative voltage power input with isolated RS-232 console port (for example in telecom system)
Power Consumption	

Input Voltage	IGS-S2804TM
24VDC	33.1W
48VDC	33.4
110VAC	34.4W
220VAC	34.4W

LED	Per unit: Power 1 (Green), Power 2 (Green), Act /Alarm (Green/Red), Ring Master (Green) Per RJ-45 port: 10/100 Link/Active (Green) 1000 Link/Active (Yellow) SFP (P1~24) Fiber Per port: 100Base-X Link/Active (Green) 1000Base-X Link/Active (Yellow) SFP+ (P25~P28) Fiber Per port: 1000Base-X Link/Active (Amber)
Jumbo Frame	10K
MAC Address Table	32K
Memory Buffer	4M Bytes for packet buffer
Warning Message	System Syslog, SMTP/ e-mail event message, alarm relay
Alarm Relay Contact	Relay outputs with current carrying capacity of 1 A @24VDC, 2-Pin removable terminal block
Operating Temperature	-10 ~ 60°C (IGS-S2804TM) -40 ~ 75°C (IGS-S2804TM-E)
Operating Humidity	5% to 95% (Non-condensing)
Storage Temperature	-40 ~ 85°C
Housing	Rugged Metal, IP30 Protection, Fanless
Dimensions	315 x 440 x 44 mm (D x W x H)
Weight	4.755kg (IGS-S2804TM-AA) 4.26kg (IGS-S2804TM-DD) 4.51kg (IGS-S2804TM-AD)
Installation Mounting	19" rack mount
MTBF	208,975 Hours (IGS-S2804TM-AA) 230,276 Hours (IGS-S2804TM-DD) 287,541 Hours (IGS-S2804TM-AD)
Warranty	5 years
Certification	
EMC	CE (EN55024, EN55032)
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE
Railway Traffic	EN50121-4
Immunity for Heavy Industrial Environment	EN61000-6-2
Emission for Heavy Industrial Environment	EN61000-6-4
EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B EN61000-4-3 (RS) Level 3, Criteria A EN61000-4-4 (Burst) Level 3, Criteria A EN61000-4-5 (Surge) Level 3, Criteria B EN61000-4-6 (CS) Level 3, Criteria A EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
Safety	UL60950-1
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

Software Specifications

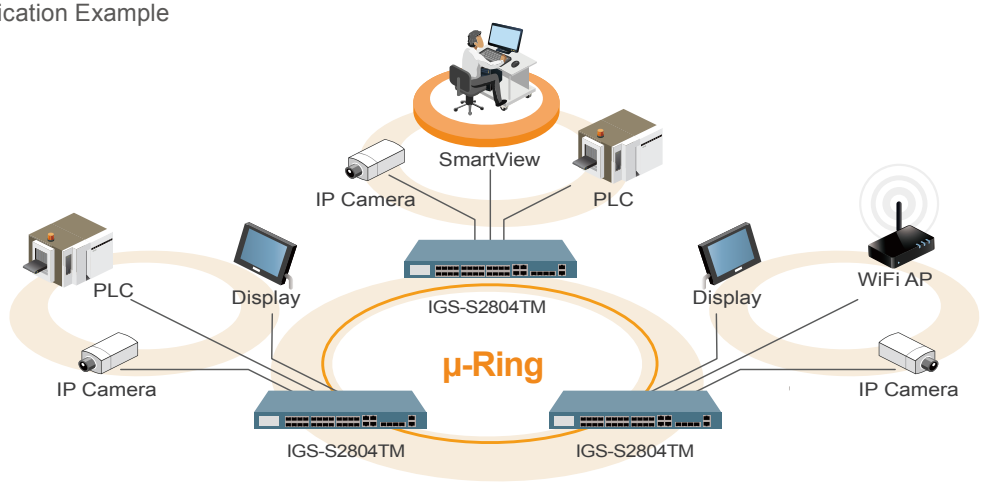
Topology	
VLAN	IEEE 802.1q VLAN,up to 4094 802.1Q VLAN VID IEEE 802.1q VLAN,up to 4094 Groups IEEE 802.1ad Q-in-Q MAC-based VLAN,up to 256 entries IP Subnet-based VLAN, up to 128 entries Protocol-based VLAN(Ethernt, SNAP, LLC), up to 128 entries VLAN Translation, up to 256 entries GVRP (GARP VLAN Registration Protocal) MVR (Multicast VLAN Registration)
Link Aggregation (Port Trunk)	Static (Hash with SA, DA, IP, TCP/UDP port), up to 14 trunk group Dynamic (IEEE 802.3ad LACP), up to 14 trunk group Per group up-to 8 port
Spanning Tree	IEEE 802.1d STP, IEEE 802.1w RSTP, IEEE 802.1s MSTP
Multiple µ-Ring	up to 5 instances that each supports µ-Ring, µ-Chain or Sub-Ring type for flexible uses, and maximum up to 5 Rings. Recovery time <50ms The maximum number of devices allowed in a Ring supported ring is 250.
Loop Protection	Supported
ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)	Recovery time <50ms Single Ring, Sub-Ring, Multiple ring topology network
QoS Features	
Class of Service	IEEE 802.1p 8 active priorities queues for per port
Traffic Classification QoS	IEEE 802.1p based CoS IP Precedence based CoS IP DSCP based CoS QCL(QoS Control List): Frame Type, Source/ Destination MAC, VLAN ID, PCP, DEI QCE(QoS Control Entry): Protocol, Source IP, IP Fragment, DSCP, TCP/UDP port number
Bandwidth Control for Ingress	Per port based
Bandwidth Control for Egress	Per port based Per queue / Per port shaper
DiffServ (RF 2474) Remarking	
Storm Control	for Unicast, Broadcast, Multicast
IP Multicasting Features	
IGMP / MLD Snooping	IGMP Snooping v1, v2, v3 / MLD Snooping v1, v2 Port Filtering Profile
IGMP / MLD Snooping	Throttling, Fast Leave Maximum Multicast Group : up to 1022 entries Query / Static Router Port
Security Features	
IEEE 802.1X	Port-Based, MAC-Based
ACL	Number of rules : up to 256 entries for L2 / L3 / L4 L2 : Mac address SA/DA/VLAN L3: IP address SA/DA, Subnet L4: TCP/UDP
RADIUS authentication & accounting	
TACACS+ authentication & accounting, TACACS+ 3.0	
HTTPS, HTTP	Supported
SSL / SSH v2	Supported
User Name Password Authentication	Local Authentication Remote Authentication (via RADIUS / TACACS+)
Management Interface Access Filtering	Web, Telnet / SSH , CLI RS-232 console
Management Features	
CLI	Cisco® like CLI
Web Based Management	
Telnet	Server
SNMP	V1, V2c, V3
SW & Configuration Upgrade	TFTP, HTTP Redundant firmware in case of upgrade failure
RMON	RMON I (1, 2, 3, 9 group), RMON II
MIB	RFC1213 MIB II, Private MIB
UPnP	Supported
DHCP	Server, Client, Relay, Relay option 82 , Snooping
IP Source Guard	Supported
Port Mirroring	Supported
Event Syslog	Syslog server (RFC3164) (Support 1 server)

Warning Message	System syslog, e-mail, alarm relay
DNS	Client, Proxy
IEEE 1588 PTP V2	Supports 5 operating mode in each port : Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave
NTP, SNTP	Client
LLDP (IEEE 802.1ab)	Link Layer Discovery Protocol LLDP-MED
IPv6 Features	
IPv6 Management	Telnet Server/ICMP v6
SNMP over IPv6	Supported

HTTP over IPv6	Supported
SSH over IPv6	Supported
IPv6 Telnet	Supported
IPv6 NTP, SNTP	Client
IPv6 TFTP	Supported
IPv6 QoS	Supported
IPv6 ACL	Number of rules: up to 256 entries for L2 / L3 / L4 L2 : Mac address SA/DA/VLAN L3: IP address SA/DA, Subnet L4: TCP/UDP

Application

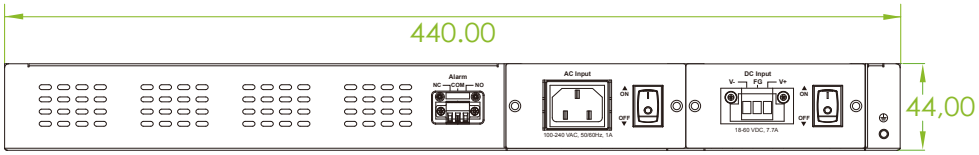
Figure : Application Example



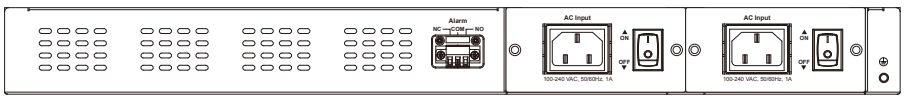
Dimensions

Rear View

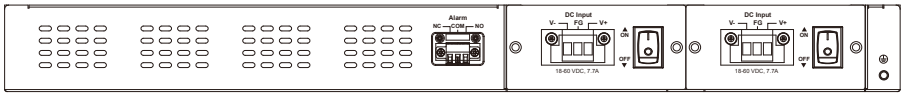
-AD Power



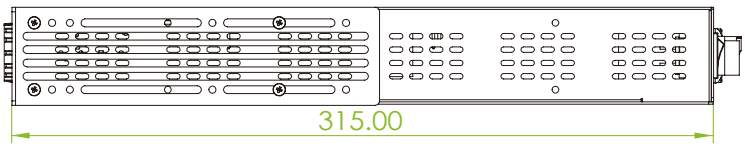
-AA Power



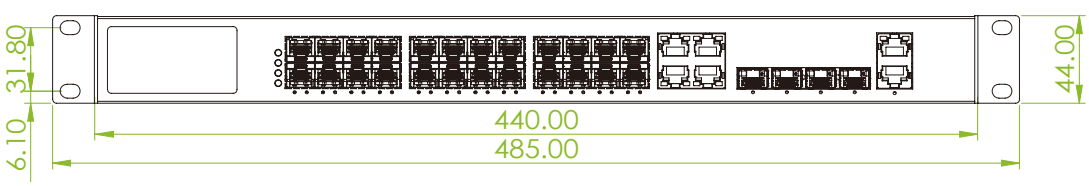
-DD Power



Side View



Front View



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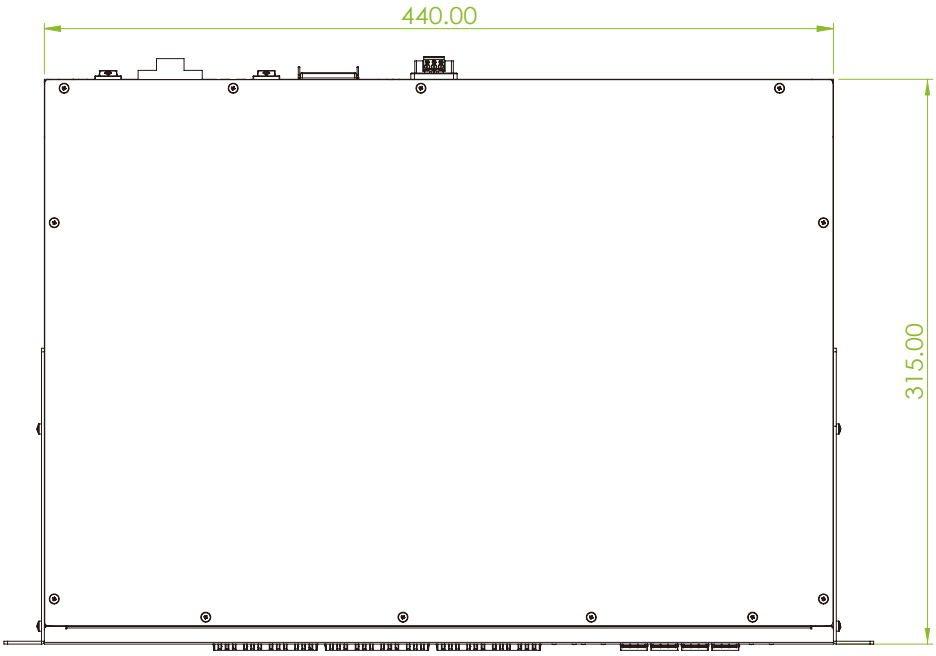
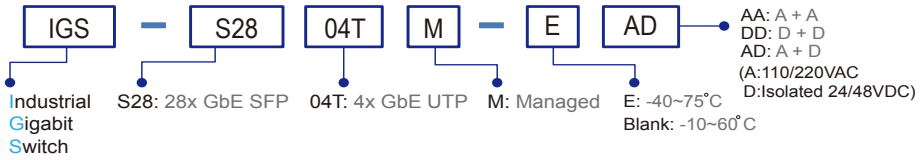
Top View



Ordering Information

Model Name	Managed	Total Port	SFP (1~20)	Combo Port (21~24)	Extension Port (25~28)	Input Power		Certification				Operating Temperature
			100/1000Base-X SFP	10/100/1000 Base-T UTP or 100/1000Base-X SFP	1000 Base-X SFP	DC (Low Volt) isolated 24/48VDC	High Volt 110/240VAC	Railway EN50121-4	Safety UL60950-1	EN61000-6-2 EN61000-6-4	CE FCC	
IGS-S2804TM-AA	V	28	20	4	4 SFP		2	V	V	V	V	-10~60°C
IGS-S2804TM-DD	V	28	20	4	4 SFP	2		V	V	V	V	-10~60°C
IGS-S2804TM-AD	V	28	20	4	4 SFP	1	1	V	V	V	V	-10~60°C
IGS-S2804TM-EAA	V	28	20	4	4 SFP		2	V	V	V	V	-40~75°C
IGS-S2804TM-EDD	V	28	20	4	4 SFP	2		V	V	V	V	-40~75°C
IGS-S2804TM-EAD	V	28	20	4	4 SFP	1	1	V	V	V	V	-40~75°C

Model Naming Rule



Package List

- IGS-S2804TM device
- Console cable (RJ-45 to DB9)
- CD (SmartConfig, MIB file, Manual)
- Quick installation guide
- Rack mount ear with screws
- Power cord (for-A model)

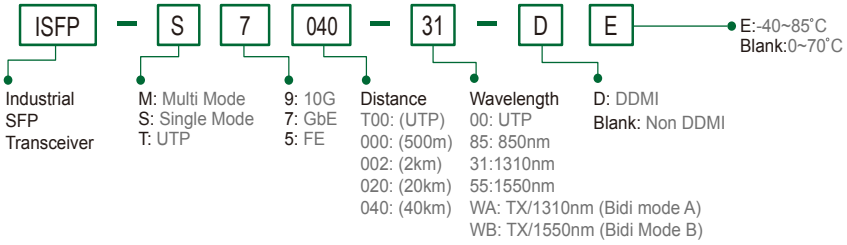
Optional Accessories

Industrial SFP Transceiver

The ISFP series of industrial grade SFP modules have been fully tested with the product for guaranteed compatibility and performance. The best performance can be guaranteed even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheet for more details and more items.)

ISFP-M7000-85-D(E)	Industrial SFP GbE 1000Base-SX, M/M, 500 meter,wave length 850nm, 7.5dB, LC, DDMI, -10~70°C (-40~85°C)
ISFP-S7020-31-D(E)	Industrial SFP 1000Base-LX, S/M, 20km, wave length 1310nm, 15dB, LC, DDMI, -10~70°C (-40~85°C)
ISFP-T7T00-00-(E)	Industrial SFP 10/100/1000Base-T UTP 100meter, -10~70°C (-40~85°C)
ISFP-M5002-31-D(E)	Industrial SFP 155M 100Base-FX, MM, 2km, wave length 1310nm, 12dB, LC, DDMI, -10~70°C (-40~85°C)
ISFP-S5030-31-D(E)	Industrial SFP 155M 100Base-FX, SM, 30km, 1310nm, 19dB, LC, DDMI, -10~70°C (-40~85°C)

SFP Naming Rule



IGS-812SM

8x 10/100/1000Base-T + 12x 100/1000Base-X SFP

IGS-1604SM

16x 10/100/1000Base-T + 4x 100/1000Base-X SFP

These models are managed industrial grade Gigabit switches with 8~16 10/100/1000Base-T ports and 4~12 Gigabit/Fast Ethernet SFP ports that provide stable and reliable Ethernet transmission. These switches support a variety of Ethernet functions, including STP/ RSTP/MSTP/ ITU-T G.8032 ERPS and multiple μ-Ring for redundant cabling, layer 2 Ethernet IGMP, VLAN, QoS, ACL, Security, IPv6, bandwidth control, port mirroring, cable diagnostic and Green Ethernet. Housed in rugged DIN rail or wall mountable enclosures, these switches are designed for harsh environments, such as industrial networking, security automation applications, intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications (See figure). Standard operating temperature range models (-10 to 60°C) and wide operating temperature range models (-40 to 75°C) fulfill the special needs of industrial automation applications.

Features

- 8x 10/100/1000Base-T RJ-45 and 12x 100/1000Base-X SFP Fiber (IGS-812SM)
- 16x 10/100/1000Base-T RJ-45 and 4x 100/1000Base-X SFP Fiber (IGS-1604SM)
- UL60950-1, CE, FCC, Rail Traffic EN50121-4 certified
- Heavy industrial grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- Cable diagnostic, Measuring cable normal or broken point distance
- Rugged Metal, IP30 Protection & Fanless design
- Supports Green Ethernet IEEE 802.3az EEE (Energy Efficient Ethernet) management to optimize the power Cosumption
- STP, RSTP, MSTP, ITU-T G.8032 Ethernet Ring Protection Switching (ERPS) for redundant cabling
- Provides 5 instances that each can support μ-Ring, μ-Chain or Sub-Ring type for flexible uses. Supports up to 5 rings in one device (Please see CTC μ-Ring white paper for more details and more topology application)
- μ-Ring for Redundant Cabling, recovery time<10ms in 250 devices
- DHCP Server/ Client/ Relay/ Relay option 82/ Snooping
- QoS, Traffic classification QoS, CoS, bandwidth control for Ingress and Egress, Storm Control, DiffServ
- IEEE 802.1q VLAN, MAC based VLAN, IP subnet based VLAN, Protocol based VLAN, VLAN translation, GVRP, MVR
- Dynamic IEEE 802.3ad LACP Link Aggregation, Static Link Aggregation
- IGMP snooping V1/V2/V3, IGMP Filtering/ Throttling, IGMP query, IGMP proxy reporting, MLD snooping V1/V2
- Security : Port based and MAC based IEEE 802.1X, RADIUS, ACL, TACACS+, HTTP/HTTPS, SSL/SSH v2
- Software upgrade via TFTP and HTTP, redundant firmware to avoid in case of upgrade failure
- 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
- RMON, MIB II, Port mirroring, Event syslog, DNS, NTP, SNTP, IEEE 802.1ab LLDP
- Supports IPv6 Telnet server /ICMP v6
- CLI, Web based management, SNMP v1/v2c/v3, Telnet server for management
- Supports Modbus/TCP protocols for management
- Provides SmartConfig for quick and easy mass Configuration*
- Supports SmartView for Centralized Management*

*Please see Chapter 1- **Software Management** for more details

Specifications

Standard	IEEE 802.3	10Base-T 10Mbit/s Ethernet
	IEEE 802.3u	100Base-TX, 100Base-FX, Fast Ethernet
	IEEE 802.3ab	1000Base-T Gbit/s Ethernet over twisted pair
	IEEE 802.3z	1000Base-X Gbit/s Ethernet over Fiber-Optic
	IEEE 802.1d	STP (Spanning Tree Protocol)
	IEEE 802.1w	RSTP (Rapid Spanning Tree Protocol)
	IEEE 802.1s	MSTP (Multiple Spanning Tree Protocol)
	ITU-T G.8032 / Y.1344	ERPS (Ethernet Ring Protection Switching)
	IEEE 802.1Q	Virtual LANs (VLAN)
	IEEE 802.1X	Port based and MAC based Network Access Control, Authentication
	IEEE 802.3ac	Max frame size extended to 1522Bytes.
	IEEE 802.3ad	Link aggregation for parallel links with LACP(Link Aggregation Control Protocol)
	IEEE 802.3x	Flow control for Full Duplex

Standard	IEEE 802.1ad	Stacked VLANs, Q-in-Q
	IEEE 802.1p	LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization
	IEEE 802.1ab	Link Layer Discovery Protocol (LLDP)
	IEEE 802.3az	EEE (Energy Efficient Ethernet)
VLAN ID	4094 IEEE 802.1Q VLAN VID	
Switch Architecture	Back-plane (Switching Fabric): 40Gbps (IGS-812SM, IGS-1604SM) Full wire-speed	
Data Processing	Store and Forward	
Flow Control	IEEE 802.3x for full duplex mode Back pressure for half duplex mode	
Network Connector	8x 10/100/1000Base-T RJ-45+ 12x 100/1000Base-X SFP connector (IGS-812SM) 16x 10/100/1000Base-T RJ-45+ 4x 100/1000Base-X SFP connector (IGS-1604SM) RJ-45 UTP port support Auto negotiation speed, Auto MDI/MDI-X function, SFP port support dual speed with DDMI	

Console	RS-232 (RJ-45)
Network Cable	UTP/STP above Cat. 5e cable EIA/TIA-568 100-ohm (100m)
Protocols	CSMA/CD
Reverse Polarity Protection	Supported for power input
Overload Current Protection	Supported
CPU Watch Dog	Supported
Power Supply	Redundant Dual DC 12/24/48V (9.6~60VDC) Input power (Removable Terminal Block)
Power Consumption	

Input Voltage	IGS-812SM	IGS-1604SM
12VDC	14.3W	14.5W
24VDC	14.2W	14.4W
48VDC	15.8W	16.3W

LED	Per unit: Power 1 (Green), Power 2 (Green), Fault (Amber), CPU Act (Green), Ring Master (Yellow) Per RJ-45 port: 10/100 Link/Active (Green) 1000 Link/Active (Amber) SFP Fiber Per port: Link/Active (Green)
Jumbo Frame	9.6KB
IEEE 802.3ac	Max frame size extended to 1522Bytes (allow Q-tag in packet)
MAC Address Table	8K
Memory Buffer	512K Bytes for packet buffer
Warning Message	System Syslog, SMTP/ e-mail event message, alarm relay
Alarm Relay Contact	Relay outputs with current carrying capacity of 1 A @24VDC
Removable Terminal Block	Provide 2 redundant power, alarm relay contact, 6 Pin
Operating Temperature	-10 ~ 60°C (IGS-812SM, IGS-1604SM) -40 ~ 75°C (IGS-812SM-E, IGS-1604SM-E)
Operating Humidity	5% to 95% (Non-condensing)
Storage Temperature	-40 ~ 85°C
Housing	Rugged Metal, IP30 Protection, Fanless
Dimensions	106 x 72 x152 mm (D x W x H) (IGS-812SM, IGS-1604SM)
Weight	0.795kg (IGS-812SM) 0.82kg (IGS-1604SM)
Installation Mounting	DIN Rail mounting or wall mounting (optional)
MTBF	517,181 Hours (IGS-812SM) 412,015 Hours (IGS-1604SM) (MIL-HDBK-217)
Warranty	5 years
Certification	
EMC	CE
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A,CE EN55022 Class A
Railway Traffic	EN50121-4
Immunity for Heavy Industrial Environment	EN61000-6-2
Emission for Heavy Industrial Environment	EN61000-6-4
EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B EN61000-4-3 (RS) Level 3, Criteria A EN61000-4-4 (Burst) Level 3, Criteria A EN61000-4-5 (Surge) Level 3, Criteria B EN61000-4-6 (CS) Level 3, Criteria A EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
Safety	UL60950-1
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

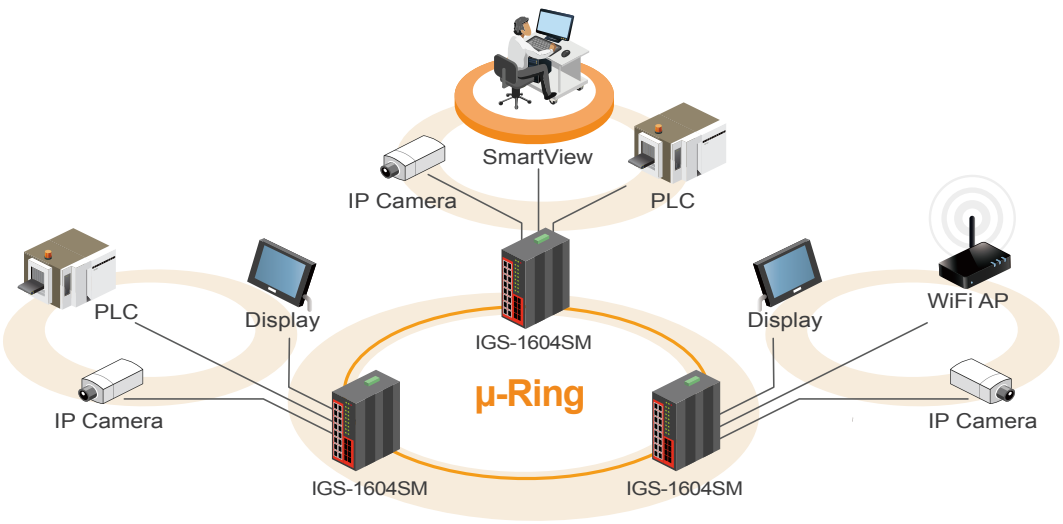
Software Specifications

Topology	
VLAN	IEEE 802.1q VLAN,up to 4094 802.1Q VLAN VID IEEE 802.1q VLAN,up to 4094 Groups IEEE 802.1ad Q-in-Q MAC-based VLAN,up to 256 entries IP Subnet-based VLAN, up to 128 entries Protocol-based VLAN(Ethernt, SNAP, LLC), up to 128 entries VLAN Translation, up to 256 entries GVRP (GARP VLAN Registration Protocal) MVR (Multicast VLAN Registration)
Link Aggregation (Port Trunk)	Static (Hash with SA, DA, IP, TCP/UDP port), up to 5 trunk group Dynamic (IEEE 802.3ad LACP), up to 5 trunk group
Spanning Tree	IEEE 802.1d STP IEEE 802.1w RSTP IEEE 802.1s MSTP
Multiple µ-Ring	up to 5 instances that each supports µ-Ring, µ-Chain or Sub-Ring type for flexible uses, and maximum up to 5 Rings. Recovery time <10ms The maximum number of devices allowed in a Ring supported ring is 250. (Please see CTC Union µ-Ring white paper for more details and more topology applications)
Loop Protection	Supported
ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)	Recovery time <50ms Single Ring, Sub-Ring, Multiple ring topology network
QoS Features	
Class of Service	IEEE 802.1p 8 active priorities queues for per port
Traffic Classification QoS	IEEE 802.1p based CoS IP Precedence based CoS IP DSCP based CoS
Traffic Classification QoS	QCL(QoS Control List): Frame Type, Source/ Destination MAC, VLAN ID, PCP, DEI QCE(QoS Control Entry): Protocol, Source IP, IP Fragment, DSCP, TCP/UDP port number
Bandwidth Control for Ingress	Rate in steps : 1 kbps / Mbps / fps / kfps Range : 100 kbps to 1Gbps / 1fps to 3300kfps Rate Unit : bit or frame Rate in steps : 1 kbps / Mbps
Bandwidth Control for Egress	Range : 100 kbps to 1Gbps Rate Unit : bit Per queue / Per port shaper
DiffServ (RF 2474) Remarking	
Storm Control	for Unicast, Broadcast, Multicast
IP Multicasting Features	
IGMP / MLD Snooping	IGMP Snooping v1, v2, v3 / MLD Snooping v1, v2 Port Filtering Profile Throttling, Fast Leave Maximum Multicast Group : up to 1022 entries Query / Static Router Port
Security Features	
IEEE 802.1X	Port-Based MAC-Based
ACL	Number of rules : up to 256 entries for L2 / L3 / L4 L2 : Mac address SA/DA/VLAN L3: IP address SA/DA, Subnet L4: TCP/UDP
RADIUS authentication & accounting	
TACACS+ authentication & accounting, TACACS+ 3.0	
HTTPS, HTTP	Supported
SSL / SSH v2	Supported
User Name Password Authentication	Local Authentication Remote Authentication (via RADIUS / TACACS+)
Management Interface Access Filtering	Web, Telnet / SSH , CLI RS-232 console
Management Features	
CLI	Cisco® like CLI
Web Based Management	
Telnet	Server
SNMP	V1, V2c, V3

Modbus/TCP	Support for management and monitoring
SW & Configuration Upgrade	TFTP, HTTP Redundant firmware in case of upgrade failure
RMON	RMON I (1, 2, 3, 9 group), RMON II
MIB	RFC1213 MIB II, Private MIB
UPnP	Supported
DHCP	Server, Client, Relay, Relay option 82 , Snooping
IP Source Guard	Supported
Port Mirroring	Supported
Event Syslog	Syslog server (RFC3164) (Support 1 server)
Warning Message	System syslog, e-mail, alarm relay
DNS	Client, Proxy
IEEE 1588 PTP V2	Support 5 operating mode in each port : Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave
NTP, SNTP	Client
LLDP (IEEE 802.1ab)	Link Layer Discovery Protocol LLDP-MED
IPv6 Features	
IPv6 Management	Telnet Server/ICMP v6
SNMP over IPv6	Supported
HTTP over IPv6	Supported
SSH over IPv6	Supported
IPv6 Telnet	Supported
IPv6 NTP, SNTP	Client
IPv6 TFTP	Supported
IPv6 QoS	Supported
IPv6 ACL	Number of rules: up to 256 entries for L2 / L3 / L4 L2 : Mac address SA/DA/VLAN L3: IP address SA/DA, Subnet L4: TCP/UDP
Others Features	
Green Ethernet	Supports IEEE 802.3az EEE (Energy Efficient Ethernet) Management to optimize the power consumption Determine the cable length and lowering the power for ports with short cables Lower the power for a port when there is no link LED Power Management :Adjustment LEDs intensity
Cable Diagnostic	Measuring UTP cable normal or broken point distance

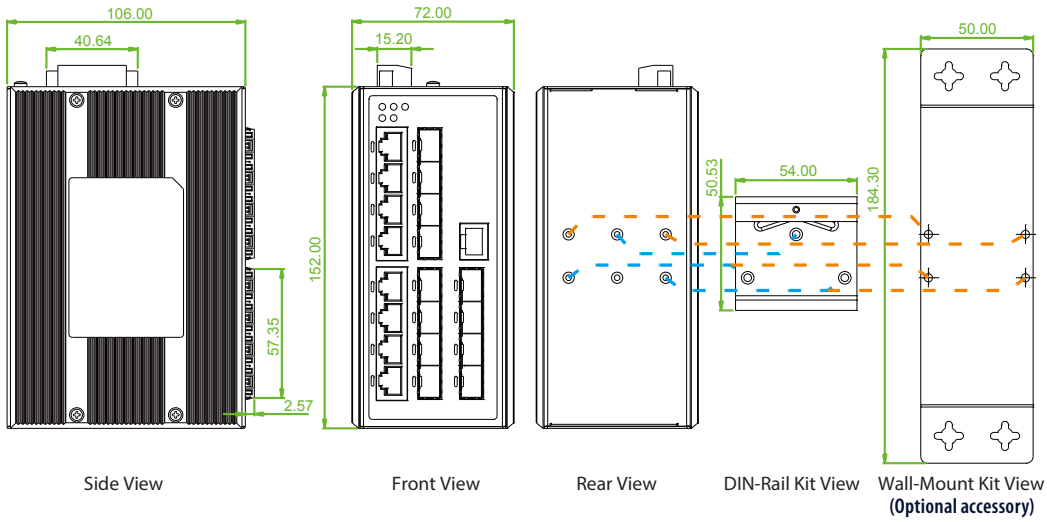
Application

Figure : Application Example

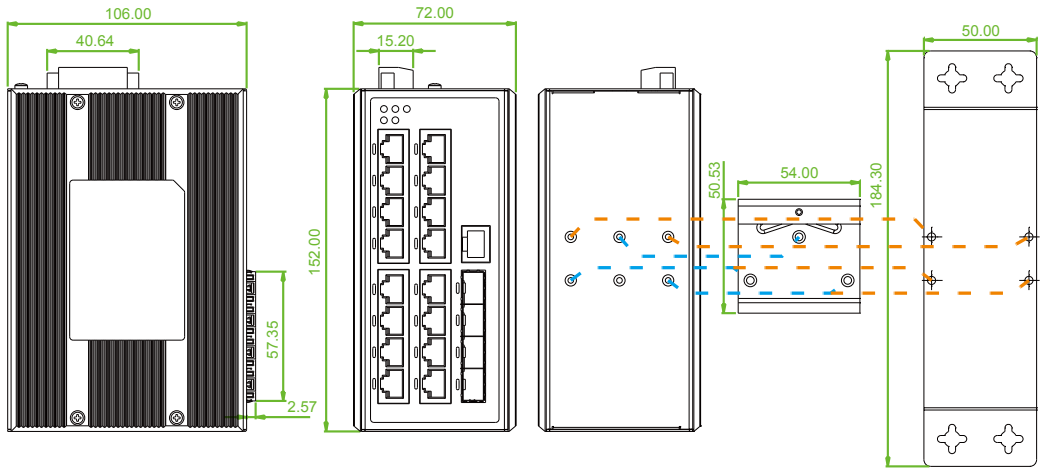


Dimensions

▶ IGS-812SM



▶ IGS-1604SM



Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

Ordering Information

Model Name	Managed	Total Port	RJ45 UTP port	Fiber Port	Power Input	Certification				Operating Temperature
			10/100/1000 Base-T	100/1000 Base-X	Redundant	Railway EN50121-4	Safety UL60950-1	EN61000-6-2 EN61000-6-4	CE FCC	
IGS-812SM	V	20	8	12 SFP	12/24/48VDC	V	V	V	V	-10~60℃
IGS-812SM-E	V	20	8	12 SFP	12/24/48VDC	V	V	V	V	-40~75℃
IGS-1604SM	V	20	16	4 SFP	12/24/48VDC	V	V	V	V	-10~60℃
IGS-1604SM-E	V	20	16	4 SFP	12/24/48VDC	V	V	V	V	-40~75℃

Model Naming Rule

IGS – 16 – 04S – M – E → E: -40~75˚C, Blank: -10~60˚C

- IGS: Industrial Gigabit Switch
- 16: 8: 8x GbE UTP; 16: 16x GbE UTP
- 04S: 04S: 4x GbE SFP; 12S: 12x GbE SFP
- M: Managed

Package List

- One device of the series
- Console cable (RJ-45 to DB9)
- CD (SmartConfig, MIB file, Manual)
- Quick installation guide
- Din Rail with screws
- Terminal block
- Protective caps for SFP ports

Optional Accessories

Wall mount kit

IND-WMK02	Wall Mount kit for Industrial product (Wide) (184 x 50mm)

Industrial SFP Transceiver

The ISFP series of industrial grade SFP modules have been fully tested with the series product for guaranteed compatibility and performance. The best performance can be guaranteed even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheet for more details and more items.)

ISFP-M7000-85-D(E)	Industrial SFP GbE 1000Base-SX, M/M, 500 meter,wave length 850nm, 7.5dB, LC, DDMI, -10~70℃ (-40~85℃)
ISFP-S7020-31-D(E)	Industrial SFP 1000Base-LX, S/M, 20km, wave length 1310nm, 15dB, LC, DDMI, -10~70℃ (-40~85℃)
ISFP-T7T00-00-(E)	Industrial SFP 10/100/1000Base-T UTP 100meter, -10~70℃ (-40~85℃)
ISFP-M5002-31-D(E)	Industrial SFP 155M 100Base-FX, MM, 2km, wave length 1310nm, 12dB, LC, DDMI, -10~70℃ (-40~85℃)
ISFP-S5030-31-D(E)	Industrial SFP 155M 100Base-FX, SM, 30km, 1310nm, 19dB, LC, DDMI, -10~70℃ (-40~85℃)

SFP Naming Rule

ISFP – S – 7 – 040 – 31 – D – E → E:-40~85˚C, Blank:0~70˚C

- ISFP: Industrial SFP Transceiver
- S: M: Multi Mode; S: Single Mode; T: UTP
- 7: 9: 10G; 7: GbE; 5: FE
- 040: Distance — T00: (UTP); 000: (500m); 002: (2km); 020: (20km); 040: (40km)
- 31: Wavelength — 00: UTP; 85: 850nm; 31:1310nm; 55:1550nm; WA: TX/1310nm (Bidi mode A); WB: TX/1550nm (Bidi Mode B)
- D: DDMI; Blank: Non DDMI

IGS+404SM

4x 10/100/1000Base-T + 4x 100/1000Base-X SFP

IGS+803SM

8x 10/100/1000Base-T + 3x 100/1000Base-X SFP

These models are managed industrial grade Gigabit switches with 4/8 10/100/1000Base-T ports plus 4/3 Gigabit/Fast Ethernet SFP ports that provide stable and reliable Ethernet transmission. These switches support a variety of Ethernet functions, including STP/ RSTP/MSTP/ ITU-T G.8032 ERPS and multiple µ-Ring for redundant cabling, layer 2 Ethernet IGMP, VLAN, QoS, ACL, Security, IPv6, bandwidth control, port mirroring, cable diagnostic and Green Ethernet. Housed in rugged DIN rail or wall mountable enclosures, these switches are designed for harsh environments, such as telecom network, industrial network, security automation applications, intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications (See Figure 1). Standard operating temperature range models (-10 to 60°C) and wide operating temperature range models (-40 to 75°C) fulfill the special needs of industrial automation applications.

Features

- 4x 10/100/1000Base-T RJ-45 and 4x 100/1000Base-X SFP Fiber (IGS+404SM)
- 8x 10/100/1000Base-T RJ-45 and 3x 100/1000Base-X SFP Fiber (IGS+803SM)
- Redundant dual DC input power 12/24/48VDC (9.6~60VDC)
- **Supports negative voltage power input with isolated RS-232 console port (for example in telecom system)**
- UL60950-1, EN60950-1, CE, FCC, Rail Traffic EN50121-4, traffic control NEMA TS2 certified
- Heavy industrial grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- **2.25K VDC Hi-pot isolation protection for Ethernet ports and power**
- **4KV surge protection for UTP and fiber ports**
- Cable diagnostic, Measuring cable normal or broken point distance
- Rugged Metal, IP30 Protection & Fanless design
- Supports Green Ethernet IEEE 802.3az EEE (Energy Efficient Ethernet) management to optimize the power Cosumption
- STP, RSTP, MSTP, ITU-T G.8032 Ethernet Ring Protection Switching (ERPS) for redundant cabling
- Provides 5 instances that each can support µ-Ring, µ-Chain or Sub-Ring type for flexible uses.Supports up to 5 rings in one device (Please see CTC µ-Ring white paper for more details and more topology application)
- µ-Ring for Redundant Cabling, recovery time<10ms in 250 devices
- DHCP Server/ Client/ Relay/ Relay option 82/ Snooping
- QoS, Traffic classification QoS, CoS, bandwidth control for Ingress and Egress, Storm Control, DiffServ
- IEEE 802.1q VLAN, MAC based VLAN, IP subnet based VLAN, Protocol based VLAN, VLAN translation, GVRP, MVR
- Dynamic IEEE 802.3ad LACP Link Aggregation, Static Link Aggregation
- IGMP snooping V1/V2/V3, IGMP Filtering/ Throttling, IGMP query, IGMP proxy reporting, MLD snooping V1/V2
- Security : Port based and MAC based IEEE 802.1X, RADIUS, ACL, TACACS+, HTTP/HTTPS, SSL/SSH v2
- Software upgrade via TFTP and HTTP, redundant firmware to avoid in case of upgrade failure
- 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
- RMON, MIB II, Port mirroring, Event syslog, DNS, NTP, SNTP, IEEE 802.1ab LLDP
- Supports IPv6 Telnet server /ICMP v6
- CLI, Web based management, SNMP v1/v2c/v3, Telnet server for management
- Supports Modbus/TCP protocols for management
- Provides SmartConfig for quick and easy mass Configuration Tool*
- Supports SmartView for Centralized Management*

*Please see Chapter 1- **Software Management** for more details

Specifications

Standard	IEEE 802.3	10Base-T 10Mbit/s Ethernet
	IEEE 802.3u	100Base-TX, 100Base-FX, Fast Ethernet
	IEEE 802.3ab	1000Base-T Gbit/s Ethernet over twisted pair
	IEEE 802.3z	1000Base-X Gbit/s Ethernet over Fiber-Optic
	IEEE 802.1d	STP (Spanning Tree Protocol)
	IEEE 802.1w	RSTP (Rapid Spanning Tree Protocol)
	IEEE 802.1s	MSTP (Multiple Spanning Tree Protocol)
	ITU-T G.8032 / Y.1344	ERPS (Ethernet Ring Protection Switching)
	IEEE 802.1Q	Virtual LANs (VLAN)
	IEEE 802.1X	Port based and MAC based Network Access Control, Authentication

Standard	IEEE 802.3ac	Max frame size extended to 1522Bytes.
	IEEE 802.3ad	Link aggregation for parallel links with LACP(Link Aggregation Control Protocol)
	IEEE 802.3x	Flow control for Full Duplex
	IEEE 802.1ad	Stacked VLANs, Q-in-Q
	IEEE 802.1p	LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization
	IEEE 802.1ab	Link Layer Discovery Protocol (LLDP)
	IEEE 802.3az	EEE (Energy Efficient Ethernet)
VLAN ID	4094 IEEE 802.1Q VLAN VID	
Switch Architecture	Back-plane (Switching Fabric): 16Gbps (IGS+404SM) 22Gbps (IGS+803SM) Full wire-speed	

Data Processing	Store and Forward
Flow Control	IEEE 802.3x for full duplex mode Back pressure for half duplex mode
Network Connector	4x 10/100/1000Base-T RJ-45 + 4x 100/1000Base-X SFP connector (IGS+404SM) 8x 10/100/1000Base-T RJ-45 + 3x 100/1000Base-X SFP connector (IGS+803SM) RJ-45 UTP port support Auto negotiation speed, Auto MDI/MDI-X function, SFP port support dual speed with DDMI
Console	RS-232 (RJ-45) Isolated RS-232 port grounding for negative voltage power system, or telecom application
Network Cable	UTP/STP above Cat. 5e cable EIA/TIA-568 100-ohm (100m)
Protocols	CSMA/CD
Reverse Polarity Protection	Supported
Overload Current Protection	Supported
CPU Watch Dog	Supported
Power Supply	Redundant Dual DC 12/24/48V (9.6~60VDC) Input power (Removable Terminal Block) Supports negative voltage power input power for telecom
Power Consumption	IGS+404SM

Input Voltage	12VDC	24VDC	48VDC
IGS+404SM	7.7W	8W	9.2W

IGS+803SM

Input Voltage	12VDC	24VDC	48VDC
IGS+803SM	8.6W	10.8W	11.5W

LED	Per unit: Power 1 (Green), Power 2 (Green), Fault (Amber), CPU Act (Green), Ring Master (Yellow)
	Per RJ-45 port: 10/100 Link/Active (Green) 1000 Link/Active (Amber)
	SFP Fiber Per port: Link/Active (Green)
Jumbo Frame	9.6KB
IEEE 802.3ac	Max frame size extended to 1522Bytes (allow Q-tag in packet)
MAC Address Table	8K
Memory Buffer	512K Bytes for packet buffer
Warning Message	System Syslog, SMTP/ e-mail event message, alarm relay
Alarm Relay Contact	Relay outputs with current carrying capacity of 1 A @24VDC
Removable Terminal Block	Provide 2 redundant power, alarm relay contact, 6 Pin

Software Specifications

Topology	
VLAN	IEEE 802.1q VLAN,up to 4094 802.1Q VLAN VID
	IEEE 802.1q VLAN,up to 4094 Groups
	IEEE 802.1ad Q-in-Q
	MAC-based VLAN,up to 256 entries
	IP Subnet-based VLAN, up to 128 entries
	Protocol-based VLAN(Ethernt, SNAP, LLC), up to 128 entries
	VLAN Translation, up to 256 entries
	GVRP (GARP VLAN Registration Protocal)
	MVR (Multicast VLAN Registration)
Link Aggregation (Port Trunk)	Static (Hash with SA, DA, IP, TCP/UDP port), up to 5 trunk group
	Dynamic (IEEE 802.3ad LACP), up to 5 trunk group
Spanning Tree	IEEE 802.1d STP
	IEEE 802.1w RSTP
	IEEE 802.1s MSTP
Multiple µ-Ring	up to 5 instances that each supports µ-Ring, µ-Chain or Sub-Ring type for flexible uses, and maximum up to 5 Rings. Recovery time <10ms The maximum number of devices allowed in a Ring supported ring is 250. (Please see CTC Union µ-Ring white paper for more details and more topology applications)
Loop Protection	Supported
ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)	Recovery time <50ms
	Single Ring, Sub-Ring, Multiple ring topology network
QoS Features	
Class of Service	IEEE 802.1p 8 active priorities queues for per port

Operating Temperature	-10 ~ 60°C (IGS+404SM, IGS+803SM) -40 ~ 75°C (IGS+404SM-E, IGS+803SM-E)
Operating Humidity	5% to 95% (Non-condensing)
Storage Temperature	-40 ~ 85°C
Housing	Rugged Metal, IP30 Protection, Fanless
Dimensions	106 x 62.5 x 135 mm (D x W x H) (IGS+404SM) 106 x 72 x152 mm (D x W x H) (IGS+803SM)
Weight	0.65kg (IGS+404SM) 0.81kg (IGS+803SM)
Installation Mounting	DIN Rail mounting, or wall mounting (optional)
MTBF	861,962 Hours (IGS+404SM) 688,248 Hours (IGS+803SM) (MIL-HDBK-217)
Warranty	5 years
Certification	
EMC	CE (EN55032, EN55024)
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE EN55032 Class A
Railway Traffic	EN50121-4
Traffic control	NEMA TS2 (IGS+803SM)
Immunity for Heavy Industrial Environment	EN61000-6-2
Emission for Heavy Industrial Environment	EN61000-6-4
EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B
	EN61000-4-3 (RS) Level 3, Criteria A
	EN61000-4-4 (Burst) Level 3, Criteria A
	EN61000-4-5 (Surge) Level 3, Criteria B
	EN61000-4-6 (CS) Level 3, Criteria A
	EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
Safety	UL60950-1, EN60950-1 (IGS+803SM)
Hi pot protection	DC 2.25KV for power to chassis ground, Ethernet ports to chassis ground
4KV surge protection	Supported for UTP and Fiber port
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

Traffic Classification QoS	IEEE 802.1p based CoS
	IP Precedence based CoS
	IP DSCP based CoS
Traffic Classification QoS	QCL(QoS Control List): Frame Type, Source/ Destination MAC, VLAN ID, PCP, DEI
	QCE(QoS Control Entry): Protocol, Source IP, IP Fragment, DSCP, TCP/UDP port number
Bandwidth Control for Ingress	Rate in steps : 1 kbps / Mbps / fps / kfps
	Range : 100 kbps to 1Gbps / 1fps to 3300kfps
	Rate Unit : bit or frame
	Rate in steps : 1 kbps / Mbps
Bandwidth Control for Egress	Range : 100 kbps to 1Gbps
	Rate Unit : bit
	Per queue / Per port shaper
DiffServ (RF 2474) Remarking	
Storm Control	for Unicast, Broadcast, Multicast
IP Multicasting Features	
IGMP / MLD Snooping	IGMP Snooping v1, v2, v3 / MLD Snooping v1, v2
	Port Filtering Profile
	Throttling, Fast Leave
	Maximum Multicast Group : up to 1022 entries
	Query / Static Router Port
Security Features	
IEEE 802.1X	Port-Based
	MAC-Based
ACL	Number of rules : up to 256 entries
	for L2 / L3 / L4 L2 : Mac address SA/DA/VLAN L3: IP address SA/DA, Subnet L4: TCP/UDP

RADIUS authentication & accounting	
TACACS+ authentication & accounting, TACACS+ 3.0	
HTTPS, HTTP	Supported
SSL / SSH v2	Supported
User Name Password Authentication	Local Authentication
	Remote Authentication (via RADIUS / TACACS+)
Management Interface Access Filtering	Web, Telnet / SSH , CLI RS-232 console
Management Features	
CLI	Cisco® like CLI
Web Based Management	
Telnet	Server
SNMP	V1, V2c, V3
Modbus/TCP	Support for management and monitoring
SW & Configuration Upgrade	TFTP, HTTP
	Redundant firmware in case of upgrade failure
RMON	RMON I (1, 2, 3, 9 group), RMON II
MIB	RFC1213 MIB II, Private MIB
UPnP	Supported
DHCP	Server, Client, Relay, Relay option 82 , Snooping
IP Source Guard	Supported
Port Mirroring	Supported
Event Syslog	Syslog server (RFC3164) (Support 1 server)
Warning Message	System syslog, e-mail, alarm relay
DNS	Client, Proxy
IEEE 1588 PTP V2	Support 5 operating mode in each port : Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave

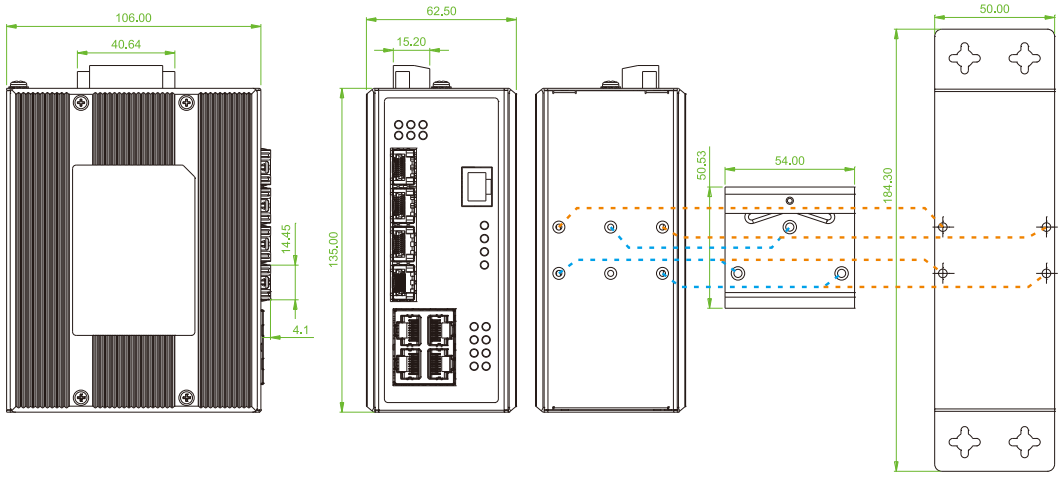
NTP, SNTP	Client
LLDP (IEEE 802.1ab)	Link Layer Discovery Protocol
	LLDP-MED
IPv6 Features	
IPv6 Management	Telnet Server/ICMP v6
SNMP over IPv6	Supported
HTTP over IPv6	Supported
SSH over IPv6	Supported
IPv6 Telnet	Supported
IPv6 NTP, SNTP	Client
IPv6 TFTP	Supported
IPv6 QoS	Supported
IPv6 ACL	Number of rules: up to 256 entries
	for L2 / L3 / L4 L2 : Mac address SA/DA/VLAN L3: IP address SA/DA, Subnet L4: TCP/UDP
Others Features	
Green Ethernet	Supports IEEE 802.3az EEE (Energy Efficient Ethernet) Management to optimize the power consumption
	Determine the cable length and lowering the power for ports with short cables
	Lower the power for a port when there is no link
	LED Power Management :Adjustment LEDs intensity
Cable Diagnostic	Measuring UTP cable normal or broken point distance

Application

Figure : Application Example

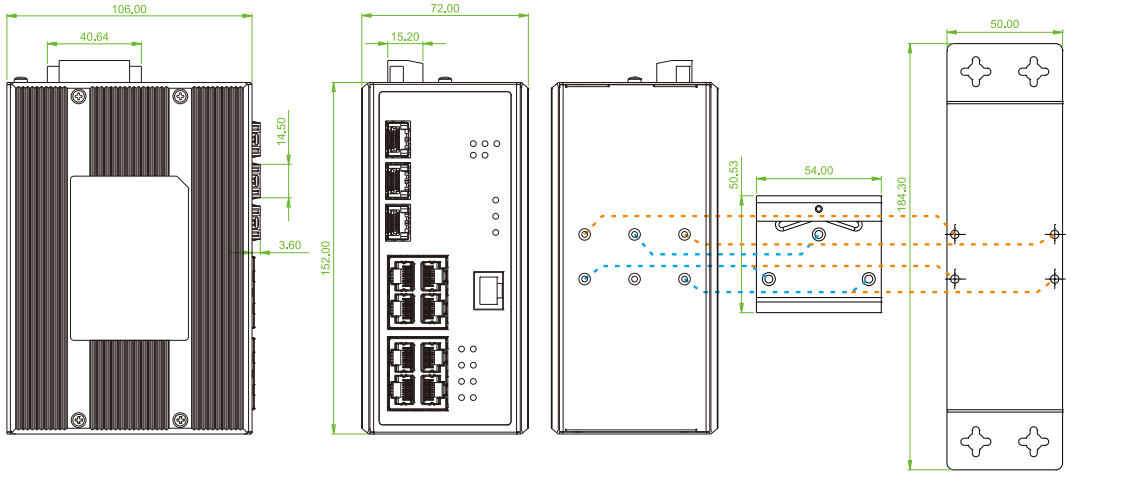
Dimensions

▶ IGS+404SM



Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

▶ IGS+803SM

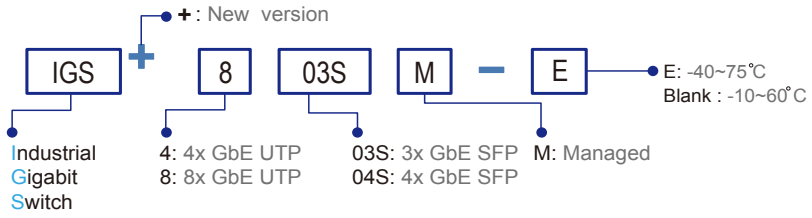


Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

Ordering Information

Model Name	Managed	Total Port	RJ45 UTP port	Fiber Port	Power Input	Certification						Operating Temperature
			10/100/1000 Base-T	100/1000 Base-X	Redundant	Railway EN50121-4	NEMA TS2	Safety UL60950-1	Safety EN60950-1	EN61000-6-2 EN61000-6-4	CE FCC	
IGS+404SM	V	8	4	4 SFP	12/24/48, -48VDC	V				V	V	-10~60°C
IGS+404SM-E	V	8	4	4 SFP	12/24/48, -48VDC	V				V	V	-40~75°C
IGS+803SM	V	11	8	3 SFP	12/24/48, -48VDC	V	V	V	V	V	V	-10~60°C
IGS+803SM-E	V	11	8	3 SFP	12/24/48, -48VDC	V	V	V	V	V	V	-40~75°C

Model Naming Rule



Package List

- One device of the series
- Console cable (RJ-45 to DB9)
- CD (SmartConfig, MIB file, Manual)
- Quick installation guide
- Din Rail with screws
- Terminal block
- Protective caps for SFP ports

Optional Accessories

Wall mount kit

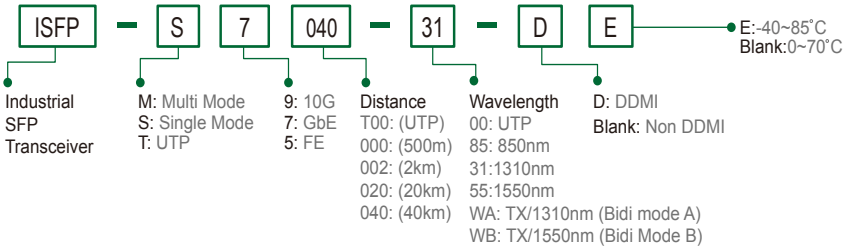
IND-WMK02	Wall Mount kit for Industrial product (Wide) (184 x 50mm)

Industrial SFP Transceiver

The ISFP series of industrial grade SFP modules have been fully tested with the series product for guaranteed compatibility and performance. The best performance can be guaranteed even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheet for more details and more items.)

ISFP-M7000-85-D(E)	Industrial SFP GbE 1000Base-SX, M/M, 500 meter,wave length 850nm, 7.5dB, LC, DDMI, -10~70°C (-40~85°C)
ISFP-S7020-31-D(E)	Industrial SFP 1000Base-LX, S/M, 20km, wave length 1310nm, 15dB, LC, DDMI, -10~70°C (-40~85°C)
ISFP-T7T00-00-(E)	Industrial SFP 10/100/1000Base-T UTP 100meter, -10~70°C (-40~85°C)
ISFP-M5002-31-D(E)	Industrial SFP 155M 100Base-FX, MM, 2km, wave length 1310nm, 12dB, LC, DDMI, -10~70°C (-40~85°C)
ISFP-S5030-31-D(E)	Industrial SFP 155M 100Base-FX, SM, 30km, 1310nm, 19dB, LC, DDMI, -10~70°C (-40~85°C)

SFP Naming Rule



1G/2.5G

IGS-404SM

4x 10/100/1000Base-T+ 2x FE/GbE SFP + 2x FE/GbE/2.5G SFP

IGS-803SM

8x 10/100/1000Base-T+ 1x FE/GbE SFP + 2x FE/GbE/2.5G SFP

These models are managed industrial grade Gigabit switches with 4/8 10/100/1000Base-T ports and 4/3 Gigabit/Fast with **2 port 2.5GbE SFP** ports that provide stable and reliable Ethernet transmission. These switches support a variety of Ethernet functions, including STP/RSTP/MSTP/ ITU-T G.8032 ERPS and multiple µ-Ring for redundant cabling, layer 2 Ethernet IGMP, VLAN, QoS, ACL, Security, IPv6, bandwidth control, port mirroring, cable diagnostic and Green Ethernet. Housed in rugged DIN rail or wall mountable enclosures, these switches are designed for harsh environments, such as industrial networking, security automation applications, intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications (See figure 1). Standard operating temperature range models (-10 to 60°C) and wide operating temperature range models (-40 to 75°C) fulfill the special needs of industrial automation applications.

Features

- ♦ 4x 10/100/1000Base-T RJ-45 and 2x FE/GbE SFP + **2x FE/GbE/2.5G SFP** Fiber (IGS-404SM)
- ♦ 8x 10/100/1000Base-T RJ-45 and 1x FE/GbE SFP + **2x FE/GbE/2.5G SFP** Fiber (IGS-803SM)
- ▪ UL60950-1, CE, FCC, Rail Traffic EN50121-4, Traffic control NEMA TS2 certified
- ▪ Heavy industrial grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- ▪ Cable diagnostic, Measuring cable normal or broken point distance
- ▪ Rugged Metal, IP30 Protection & Fanless design
- ▪ Supports Green Ethernet IEEE 802.3az EEE (Energy Efficient Ethernet) management to optimize the power Cosumption
- ▪ STP, RSTP, MSTP, ITU-T G.8032 Ethernet Ring Protection Switching (ERPS) for redundant cabling
- ▪ Provides 5 instances that each can support µ-Ring, µ-Chain or Sub-Ring type for flexible uses.Supports up to 5 rings in one device (Please see CTC µ-Ring white paper for more details and more topology application)
- ▪ µ-Ring for Redundant Cabling, recovery time<10ms in 250 devices
- ▪ DHCP Server/Client/ Relay/ Relay option 82/ Snooping
- ▪ QoS, Traffic classification QoS, CoS, bandwidth control for Ingress and Egress, Storm Control, DiffServ
- ▪ IEEE 802.1q VLAN, MAC based VLAN, IP subnet based VLAN, Protocol based VLAN, VLAN translation, GVRP, MVR
- ▪ Dynamic IEEE 802.3ad LACP Link Aggregation, Static Link Aggregation
- ▪ IGMP snooping V1/V2/V3, IGMP Filtering/ Throttling, IGMP query, IGMP proxy reporting, MLD snooping V1/V2
- ▪ Security : Port based and MAC based IEEE 802.1X, RADIUS, ACL, TACACS+, HTTP/HTTPS, SSL/SSH v2
- ▪ Software upgrade via TFTP and HTTP, redundant firmware to avoid in case of upgrade failure
- ▪ 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
- ▪ RMON, MIB II, Port mirroring, Event syslog, DNS, NTP, SNTP, IEEE 802.1ab LLDP
- ▪ Supports IPv6 Telnet server /ICMP v6
- ▪ CLI, Web based management, SNMP v1/v2c/v3, Telnet server for management
- ▪ Supports Modbus/TCP protocols for management
- ▪ Provides SmartConfig for quick and easy mass Configuration Tool*
- ▪ Supports SmartView for Centralized Management*

*Please see Chapter 1- **Software Management** for more details

Specifications

Standard	IEEE 802.3	10Base-T 10Mbit/s Ethernet
	IEEE 802.3u	100Base-TX, 100Base-FX, Fast Ethernet
	IEEE 802.3ab	1000Base-T Gbit/s Ethernet over twisted pair
	IEEE 802.3z	1000Base-X Gbit/s Ethernet over Fiber-Optic
	IEEE 802.3cb	2.5GBase-X
	IEEE 802.1d	STP (Spanning Tree Protocol)
	IEEE 802.1w	RSTP (Rapid Spanning Tree Protocol)
	IEEE 802.1s	MSTP (Multiple Spanning Tree Protocol)
	ITU-T G.8032 / Y.1344	ERPS (Ethernet Ring Protection Switching)
	IEEE 802.1Q	Virtual LANs (VLAN)
	IEEE 802.1X	Port based and MAC based Network Access Control, Authentication
	IEEE 802.3ac	Max frame size extended to 1522Bytes.
	IEEE 802.3ad	Link aggregation for parallel links with LACP(Link Aggregation Control Protocol)

Standard	IEEE 802.3x	Flow control for Full Duplex
	IEEE 802.1ad	Stacked VLANs, Q-in-Q
	IEEE 802.1p	LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization
	IEEE 802.1ab	Link Layer Discovery Protocol (LLDP)
	IEEE 802.3az	EEE (Energy Efficient Ethernet)
VLAN ID	4094 IEEE 802.1Q VLAN VID	
Switch Architecture	Back-plane (Switching Fabric): 22Gbps (IGS-404SM) 28Gbps (IGS-803SM) Full wire-speed	
Data Processing	Store and Forward	
Flow Control	IEEE 802.3x for full duplex mode Back pressure for half duplex mode	

Network Connector	4x 10/100/1000Base-T RJ-45 + 2x FE/GbE SFP slot + 2x FE/GbE/2.5GbE SFP slot (IGS-404SM) 8x 10/100/1000Base-T RJ-45 + 1x FE/GbE SFP slot + 2x FE/GbE/2.5GbE SFP slot (IGS-803SM) RJ-45 UTP port support Auto negotiation speed, Auto MDI/MDI-X function, SFP port support dual speed with DDMI
Console	RS-232 (RJ-45)
Network Cable	UTP/STP above Cat. 5e cable EIA/TIA-568 100-ohm (100m)
Protocols	CSMA/CD
Reverse Polarity Protection	Supported for power input
Overload Current Protection	Supported
CPU Watch Dog	Supported
Power Supply	Redundant Dual DC 12/24/48V (9.6~60VDC) Input power (Removable Terminal Block)
Power Consumption	IGS-404SM

Input Voltage	12VDC	24VDC	48VDC
IGS-404SM	8.2W	8.1W	9.6W

IGS-803SM

Input Voltage	12VDC	24VDC	48VDC
IGS-803SM	8.6W	10.8W	11.5W

LED	Per unit: Power 1 (Green), Power 2 (Green), Fault (Amber), CPU Act (Green), Ring Master (Yellow) Per RJ-45 port: 10/100 Link/Active (Green) 1000 Link/Active (Amber) SFP Fiber Per port: Link/Active (Green)
Jumbo Frame	9.6KB
IEEE 802.3ac	Max frame size extended to 1522Bytes (allow Q-tag in packet)
MAC Address Table	8K
Memory Buffer	512K Bytes for packet buffer
Warning Message	System Syslog, SMTP/ e-mail event message, alarm relay
Alarm Relay Contact	Relay outputs with current carrying capacity of 1 A @24VDC
Removable Terminal Block	Provide 2 redundant power, alarm relay contact, 6 Pin
Operating Temperature	-10 ~ 60°C (IGS-404SM, IGS-803SM) -40 ~ 75°C (IGS-404SM-E, IGS-803SM-E)
Operating Humidity	5% to 95% (Non-condensing)
Storage Temperature	-40 ~ 85°C
Housing	Rugged Metal, IP30 Protection, Fanless
Dimensions	106 x 62.5 x 135 mm (D x W x H) (IGS-404SM) 106 x 72 x152 mm (D x W x H) (IGS-803SM)
Weight	0.725kg (IGS-404SM) 0.78kg (IGS-803SM)
Installation Mounting	DIN Rail mounting, or wall mounting (optional)
MTBF	861,962 Hours (IGS-404SM) 612,523 Hours (IGS-803SM) (MIL-HDBK-217)
Warranty	5 years
Certification	
EMC	CE
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE EN55022 Class A
Railway Traffic	EN50121-4
Traffic control	NEMA TS2
Immunity for Heavy Industrial Environment	EN61000-6-2
Emission for Heavy Industrial Environment	EN61000-6-4
EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B EN61000-4-3 (RS) Level 3, Criteria A EN61000-4-4 (Burst) Level 3, Criteria A EN61000-4-5 (Surge) Level 3, Criteria B EN61000-4-6 (CS) Level 3, Criteria A EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
Safety	UL60950-1
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

Software Specifications

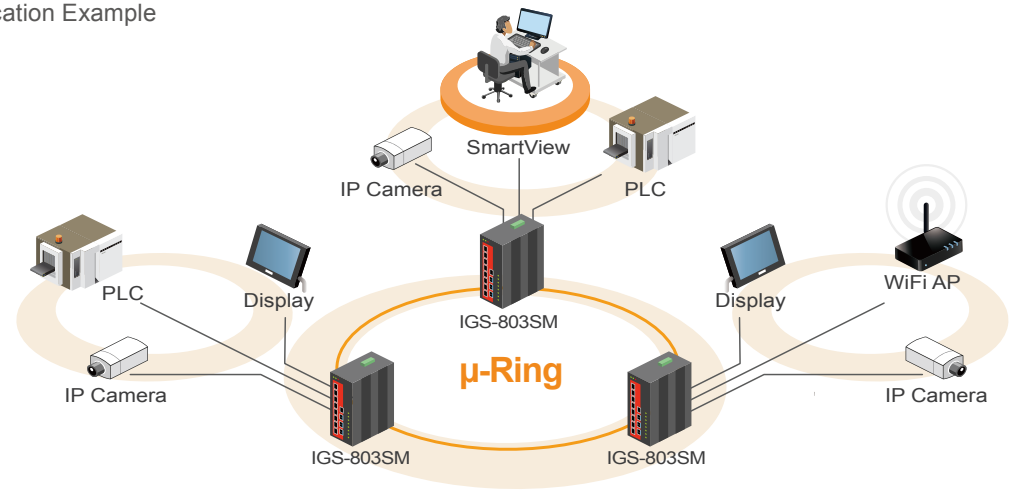
Topology	
VLAN	IEEE 802.1q VLAN,up to 4094 802.1Q VLAN VID IEEE 802.1q VLAN,up to 4094 Groups IEEE 802.1ad Q-in-Q MAC-based VLAN,up to 256 entries IP Subnet-based VLAN, up to 128 entries Protocol-based VLAN(Ethernt, SNAP, LLC), up to 128 entries VLAN Translation, up to 256 entries GVRP (GARP VLAN Registration Protocal) MVR (Multicast VLAN Registration)
Link Aggregation (Port Trunk)	Static (Hash with SA, DA, IP, TCP/UDP port), up to 5 trunk group Dynamic (IEEE 802.3ad LACP), up to 5 trunk group
Spanning Tree	IEEE 802.1d STP IEEE 802.1w RSTP IEEE 802.1s MSTP
Multiple µ-Ring	up to 5 instances that each supports µ-Ring, µ-Chain or Sub-Ring type for flexible uses, and maximum up to 5 Rings. Recovery time <10ms The maximum number of devices allowed in a Ring supported ring is 250. (Please see CTC Union µ-Ring white paper for more details and more topology applications)
Loop Protection	Supported
ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)	Recovery time <50ms Single Ring, Sub-Ring, Multiple ring topology network
QoS Features	
Class of Service	IEEE 802.1p 8 active priorities queues for per port
Traffic Classification QoS	IEEE 802.1p based CoS IP Precedence based CoS IP DSCP based CoS QCL(QoS Control List): Frame Type, Source/ Destination MAC, VLAN ID, PCP, DEI QCE(QoS Control Entry): Protocol, Source IP, IP Fragment, DSCP, TCP/UDP port number
Bandwidth Control for Ingress	Rate in steps : 1 kbps / Mbps / fps / kfps Range : 100 kbps to 1Gbps / 1fps to 3300kfps
Bandwidth Control for Egress	Rate Unit : bit or frame Rate in steps : 1 kbps / Mbps Range : 100 kbps to 1Gbps Rate Unit : bit Per queue / Per port shaper
DiffServ (RF 2474) Remarking	
Storm Control	for Unicast, Broadcast, Multicast
IP Multicasting Features	
IGMP / MLD Snooping	IGMP Snooping v1, v2, v3 / MLD Snooping v1, v2 Port Filtering Profile Throttling, Fast Leave Maximum Multicast Group : up to 1022 entries Query / Static Router Port
Security Features	
IEEE 802.1X	Port-Based MAC-Based
ACL	Number of rules : up to 256 entries for L2 / L3 / L4 L2 : Mac address SA/DA/VLAN L3: IP address SA/DA, Subnet L4: TCP/UDP

RADIUS authentication & accounting	
TACACS+ authentication & accounting, TACACS+ 3.0	
HTTPS, HTTP	Supported
SSL / SSH v2	Supported
User Name Password Authentication	Local Authentication Remote Authentication (via RADIUS / TACACS+)
Management Interface Access Filtering	Web, Telnet / SSH, CLI RS-232 console
Management Features	
CLI	Cisco® like CLI
Web Based Management	
Telnet	Server
SNMP	V1, V2c, V3
Modbus/TCP	Support for management and monitoring
SW & Configuration Upgrade	TFTP, HTTP Redundant firmware in case of upgrade failure
RMON	RMON I (1, 2, 3, 9 group), RMON II
MIB	RFC1213 MIB II, Private MIB
UPnP	Supported
DHCP	Server, Client, Relay, Relay option 82 , Snooping
IP Source Guard	Supported
Port Mirroring	Supported
Event Syslog	Syslog server (RFC3164) (Support 1 server)
Warning Message	System syslog, e-mail, alarm relay
DNS	Client, Proxy

IEEE 1588 PTP V2	Support 5 operating mode in each port : Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave
NTP, SNTP	Client
LLDP (IEEE 802.1ab)	Link Layer Discovery Protocol LLDP-MED
IPv6 Features	
IPv6 Management	Telnet Server/ICMP v6
SNMP over IPv6	Supported
HTTP over IPv6	Supported
SSH over IPv6	Supported
IPv6 Telnet	Supported
IPv6 NTP, SNTP	Client
IPv6 TFTP	Supported
IPv6 QoS	Supported
IPv6 ACL	Number of rules: up to 256 entries for L2 / L3 / L4 L2 : Mac address SA/DA/VLAN L3: IP address SA/DA, Subnet L4: TCP/UDP
Others Features	
Green Ethernet	Supports IEEE 802.3az EEE (Energy Efficient Ethernet) Management to optimize the power consumption Determine the cable length and lowering the power for ports with short cables Lower the power for a port when there is no link LED Power Management :Adjustment LEDs intensity
Cable Diagnostic	Measuring UTP cable normal or broken point distance

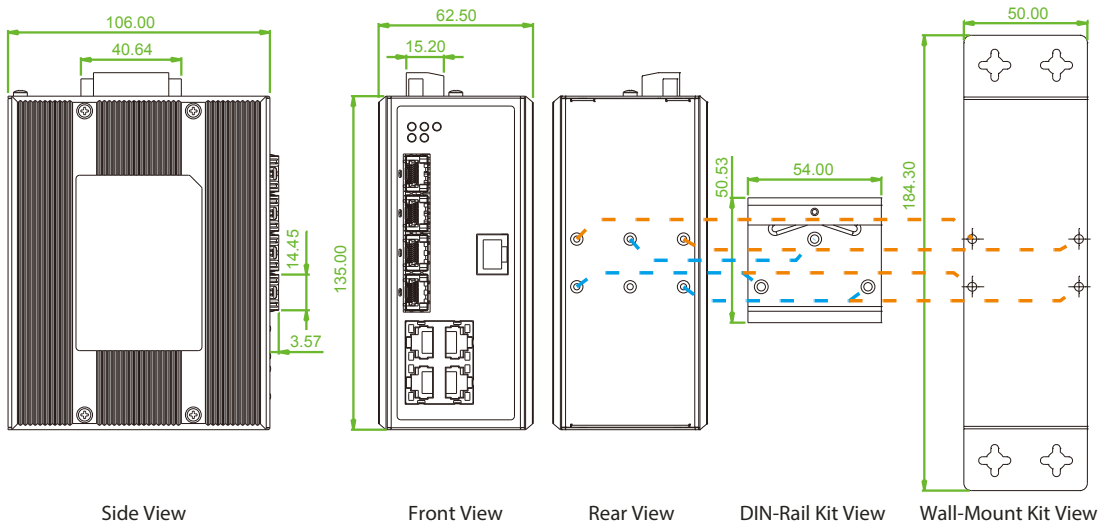
Application

Figure : Application Example



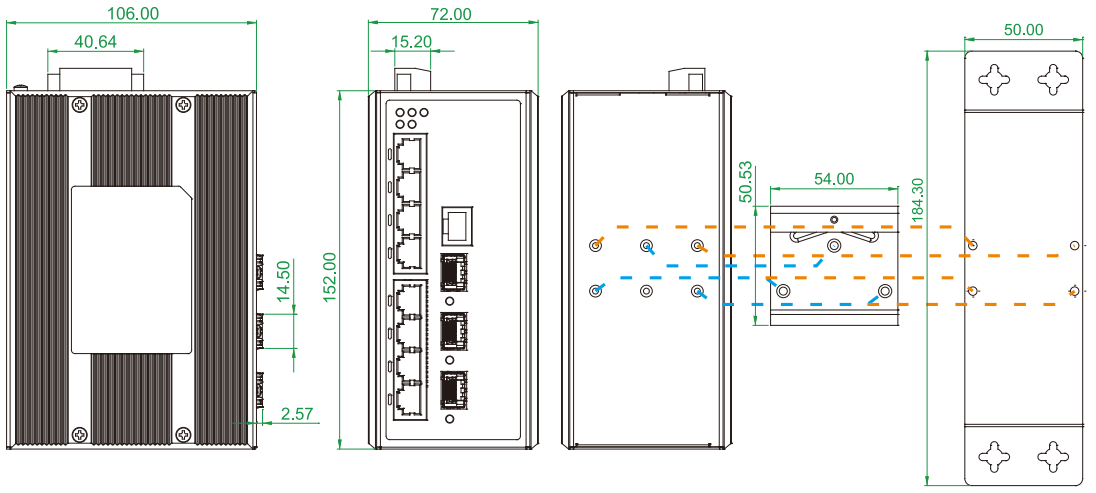
Dimensions

▶ IGS-404SM



Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View **(Optional accessory)**

▶ IGS-803SM



Ordering Information

Model Name	Total Port	UTP port	Fiber Port		Power Input	Certification					Operating Temperature
		10/100/1000 Base-T	100/1000 Base-X	100/1000 2.5G Base-X	Redundant	Railway EN50121-4	Traffic Control NEMA TS2	Safety UL60950-1	EN61000-6-2 EN61000-6-4	CE FCC	
IGS-404SM	6	4	2 SFP	2 SFP	12/24/48VDC	V	V	V	V	V	-10~60℃
IGS-404SM-E	6	4	2 SFP	2 SFP	12/24/48VDC	V	V	V	V	V	-40~75℃
IGS-803SM	11	8	1 SFP	2 SFP	12/24/48VDC	V	V	V	V	V	-10~60℃
IGS-803SM-E	11	8	1 SFP	2 SFP	12/24/48VDC	V	V	V	V	V	-40~75℃

Model Naming Rule

IGS – 8 – 03S – M – E

- IGS: Industrial Gigabit Switch
- 8: 4: 4x GbE UTP; 8: 8x GbE UTP
- 03S: 03S: 3x GbE SFP; 04S: 4x GbE SFP
- M: M: Managed
- E: E: -40~75℃; Blank : -10~60˚C

Package List

- One device of the series
- Console cable (RJ-45 to DB9)
- CD (SmartConfig, MIB file, Manual)
- Quick installation guide
- Din Rail with screws
- Terminal block
- Protective caps for SFP ports

Optional Accessories

Wall mount kit

IND-WMK02	Wall Mount kit for Industrial product (Wide) (184 x 50mm)

Industrial SFP Transceiver

The ISFP series of industrial grade SFP modules have been fully tested with the series product for guaranteed compatibility and performance. The best performance can be guaranteed even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheet for more details and more items.)

ISFP-M7000-85-D(E)	Industrial SFP GbE 1000Base-SX, M/M, 500 meter,wave length 850nm, 7.5dB, LC, DDMI, -10~70℃ (-40~85℃)
ISFP-S7020-31-D(E)	Industrial SFP 1000Base-LX, S/M, 20km, wave length 1310nm, 15dB, LC, DDMI, -10~70℃ (-40~85℃)
ISFP-T7T00-00-(E)	Industrial SFP 10/100/1000Base-T UTP 100meter, -10~70℃ (-40~85℃)
ISFP-M5002-31-D(E)	Industrial SFP 155M 100Base-FX, MM, 2km, wave length 1310nm, 12dB, LC, DDMI, -10~70℃ (-40~85℃)
ISFP-S5030-31-D(E)	Industrial SFP 155M 100Base-FX, SM, 30km, 1310nm, 19dB, LC, DDMI, -10~70℃ (-40~85℃)

SFP Naming Rule

ISFP – S – 7 – 040 – 31 – D – E

- ISFP: Industrial SFP Transceiver
- S: M: Multi Mode; S: Single Mode; T: UTP
- 7: 9: 10G; 7: GbE; 5: FE
- 040: Distance — T00: (UTP); 000: (500m); 002: (2km); 020: (20km); 040: (40km)
- 31: Wavelength — 00: UTP; 85: 850nm; 31:1310nm; 55:1550nm; WA: TX/1310nm (Bidi mode A); WB: TX/1550nm (Bidi Mode B)
- D: D: DDMI; Blank: Non DDMI
- E: E:-40~85˚C; Blank:0~70˚C

IFS+803GSM

8x 10/100Base-TX + 3x 100/1000Base-X SFP

These models are managed industrial grade switches with 8 10/100Base-TX ports and 3 Gigabit/Fast Ethernet SFP ports that provide stable and reliable Ethernet transmission. These switches support a variety of Ethernet functions, including STP/RSTP/MSTP/ ITU-T G.8032 ERPS and multiple µ-Ring for redundant cabling, layer 2 Ethernet IGMP, VLAN, QoS, Security, IPv6, bandwidth control, port mirroring, cable diagnostic and Green Ethernet. Housed in rugged DIN rail or wall mountable enclosures, these switches are designed for harsh environments, such as industrial networking, security automation applications, intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications (See Figure). Standard operating temperature range models (-10 to 60℃) and wide operating temperature range models (-40 to 75℃) fulfill the special needs of industrial automation applications.

Features

- 8x 10/100Base-TX RJ-45 and 3x 100/1000Base-X SFP Fiber
- Redundant dual DC input power 12/24/48VDC (9.6~60VDC)
- **Supports negative voltage power input with isolated RS-232 console port (for example in telecom system)**
- UL60950-1, EN60950-1, CE, FCC, Rail Traffic EN50121-4, traffic control NEMA TS2 certified
- Heavy industrial grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- **2.25K VDC Hi-pot isolation protection for Ethernet ports and power**
- **4KV surge protection for UTP and fiber ports**
- Cable diagnostic, Measuring cable normal or broken point distance
- Rugged Metal, IP30 Protection & Fanless design
- Supports Green Ethernet IEEE 802.3az EEE (Energy Efficient Ethernet) management to optimize the power Cosumption
- STP, RSTP, MSTP, ITU-T G.8032 Ethernet Ring Protection Switching (ERPS) for redundant cabling
- Provides 5 instances that each can support µ-Ring, µ-Chain or Sub-Ring type for flexible uses.Supports up to 5 rings in one device (Please see CTC µ-Ring white paper for more details and more topology application)
- µ-Ring for Redundant Cabling, recovery time<10ms in 250 devices
- DHCP Server/ Client/ Relay/ Relay option 82/ Snooping
- QoS, Traffic classification QoS, CoS, bandwidth control for Ingress and Egress, Storm Control, DiffServ
- IEEE 802.1q VLAN, MAC based VLAN, IP subnet based VLAN, Protocol based VLAN, VLAN translation, GVRP, MVR
- Dynamic IEEE 802.3ad LACP Link Aggregation, Static Link Aggregation
- IGMP snooping V1/V2/V3, IGMP Filtering/ Throttling, IGMP query, IGMP proxy reporting, MLD snooping V1/V2
- Security : Port based and MAC based IEEE 802.1X, RADIUS, ACL, TACACS+, HTTP/HTTPS, SSL/SSH v2
- Software upgrade via TFTP and HTTP, redundant firmware to avoid in case of upgrade failure
- 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
- RMON, MIB II, Port mirroring, Event syslog, DNS, NTP, SNTP, IEEE 802.1ab LLDP
- Supports IPv6 Telnet server /ICMP v6
- CLI, Web based management, SNMP v1/v2c/v3, Telnet server for management
- Supports Modbus/TCP protocols for management
- Provides SmartConfig for quick and easy mass Configuration Tool*
- Supports SmartView for Centralized Management*

*Please see Chapter 1- **Software Management** for more details

Specifications

Standard	IEEE 802.3	10Base-T 10Mbit/s Ethernet
	IEEE 802.3u	100Base-TX, 100Base-FX, Fast Ethernet
	IEEE 802.3z	1000Base-X Gbit/s Ethernet over Fiber-Optic
	IEEE 802.1d	STP (Spanning Tree Protocol)
	IEEE 802.1w	RSTP (Rapid Spanning Tree Protocol)
	IEEE 802.1s	MSTP (Multiple Spanning Tree Protocol)
	ITU-T G.8032 / Y.1344	ERPS (Ethernet Ring Protection Switching)
	IEEE 802.1Q	Virtual LANs (VLAN)
	IEEE 802.1X	Port based and MAC based Network Access Control, Authentication
	IEEE 802.3ac	Max frame size extended to 1522Bytes.

Standard	IEEE 802.3ad	Link aggregation for parallel links with LACP(Link Aggregation Control Protocol)
	IEEE 802.3x	Flow control for Full Duplex
	IEEE 802.1ad	Stacked VLANs, Q-in-Q
	IEEE 802.1p	LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization
	IEEE 802.1ab	Link Layer Discovery Protocol (LLDP)
	IEEE 802.3az	EEE (Energy Efficient Ethernet)
VLAN ID	4094 IEEE 802.1Q VLAN VID	
Switch Architecture	Back-plane (Switching Fabric): 7.6Gbps Full wire-speed	
Data Processing	Store and Forward	

Flow Control	IEEE 802.3x for full duplex mode Back pressure for half duplex mode
Network Connector	8x 10/100Base-TX RJ-45 and 3x 100/1000Base-X SFP Slot
Network Connector	RJ-45 UTP port support Auto negotiation speed, Auto MDI/MDI-X function, SFP port support 100/1000M dual speed with DDMI
Console	RS-232 (RJ-45)
Network Cable	UTP/STP above Cat. 5e cable
	EIA/TIA-568 100-ohm (100m)
Protocols	CSMA/CD
Reverse Polarity Protection	Supported
Overload Current Protection	Supported
CPU Watch Dog	Supported
Power Supply	Redundant Dual DC 12/24/48V (9.6~60VDC) Input power (Removable Terminal Block)
Power Consumption	Input Voltage: IFS+803GSM 12VDC: 7.4W 24VDC: 7.8W 48VDC: 8.9W
LED	Per unit: Power 1 (Green), Power 2 (Green), Fault (Amber), CPU Act (Green), Ring Master (Yellow)
	Per RJ-45 port: 10/100 Link/Active (Green)
	SFP Fiber Per port: Link/Active (Green)
Jumbo Frame	9.6KB
IEEE 802.3ac	Max frame size extended to 1522Bytes (allow Q-tag in packet)
MAC Address Table	8K
Memory Buffer	512K Bytes for packet buffer
Warning Message	System Syslog, SMTP/ e-mail event message, alarm relay
Alarm Relay Contact	Relay outputs with current carrying capacity of 1 A @24VDC
Removable Terminal Block	Provide 2 redundant power, alarm relay contact, 6 Pin
Operating Temperature	-10 ~ 60°C (IFS+803GSM) -40 ~ 75°C (IFS+803GSM-E)
Operating Humidity	5% to 95% (Non-condensing)

Storage Temperature	-40 ~ 85°C
Housing	Rugged Metal, IP30 Protection, Fanless
Dimensions	106 x 72 x 152 mm (D x W x H)
Weight	0.81kg
Installation Mounting	DIN Rail mounting or wall mounting (optional)
MTBF	688,248 hours (MIL-HDBK-217)
Warranty	5 years
Certification	
EMC	CE (EN55032, EN55024)
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE EN55032 Class A
Railway Traffic	EN50121-4
Traffic control	NEMA TS2
Immunity for Heavy Industrial Environment	EN61000-6-2
Emission for Heavy Industrial Environment	EN61000-6-4
EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B EN61000-4-3 (RS) Level 3, Criteria A EN61000-4-4 (Burst) Level 3, Criteria A EN61000-4-5 (Surge) Level 3, Criteria B EN61000-4-6 (CS) Level 3, Criteria A EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
Safety	UL60950-1, EN60950-1
Hi pot protection	DC 2.25KV for power to chassis ground, Ethernet ports to chassis ground
4KV surge protection	Supported for UTP and Fiber port
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

Software Specifications

Topology	
VLAN	IEEE 802.1q VLAN,up to 4094 802.1Q VLAN VID
	IEEE 802.1q VLAN,up to 4094 Groups
	IEEE 802.1ad Q-in-Q
	MAC-based VLAN,up to 256 entries
	IP Subnet-based VLAN, up to 128 entries
	Protocol-based VLAN(Ethernt, SNAP, LLC), up to 128 entries
	VLAN Translation, up to 256 entries
	GVRP (GARP VLAN Registration Protocal)
	MVR (Multicast VLAN Registration)
Link Aggregation (Port Trunk)	Static (Hash with SA, DA, IP, TCP/UDP port), up to 5 trunk group
	Dynamic (IEEE 802.3ad LACP), up to 5 trunk group
Spanning Tree	IEEE 802.1d STP
	IEEE 802.1w RSTP
	IEEE 802.1s MSTP
Multiple µ-Ring	up to 5 instances that each supports µ-Ring, µ-Chain or Sub-Ring type for flexible uses, and maximum up to 5 Rings. Recovery time <10ms The maximum number of devices allowed in a Ring supported ring is 250. (Please see CTC Union µ-Ring white paper for more details and more topology applications)
Loop Protection	Supported
ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)	Recovery time <50ms
	Single Ring, Sub-Ring, Multiple ring topology network
QoS Features	
Class of Service	IEEE 802.1p 8 active priorities queues for per port
Traffic Classification QoS	IEEE 802.1p based CoS
	IP Precedence based CoS
	IP DSCP based CoS

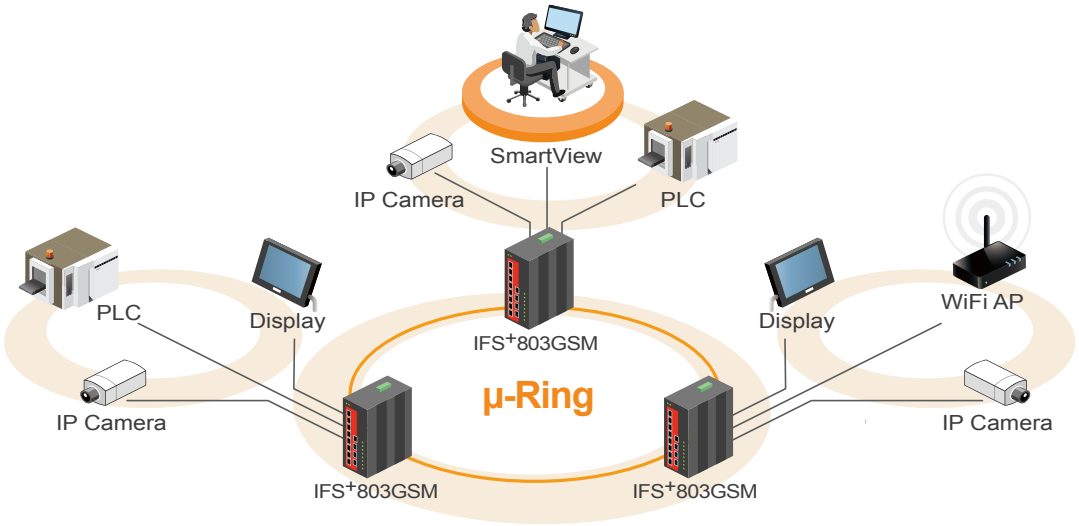
Traffic Classification QoS	QCL(QoS Control List): Frame Type, Source/ Destination MAC, VLAN ID, PCP, DEI
	QCE(QoS Control Entry): Protocol, Source IP, IP Fragment, DSCP, TCP/UDP port number
Bandwidth Control for Ingress	Rate in steps :1 kbps / Mbps / fps / kfps
	Range : 100 kbps to 1Gbps / 1fps to 3300kfps
	Rate Unit : bit or frame
Bandwidth Control for Egress	Rate in steps : 1 kbps / Mbps
	Range : 100 kbps to 1Gbps
	Rate Unit : bit
	Per queue / Per port shaper
DiffServ (RF 2474) Remarking	
Storm Control	for Unicast, Broadcast, Multicast
IP Multicasting Features	
IGMP / MLD Snooping	IGMP Snooping v1, v2, v3 / MLD Snooping v1, v2
	Port Filtering Profile
	Throttling, Fast Leave
	Maximum Multicast Group : up to 1022 entries
	Query / Static Router Port
Security Features	
IEEE 802.1X	Port-Based
	MAC-Based
ACL	Number of rules : up to 256 entries
	for L2 / L3 / L4 L2 : Mac address SA/DA/VLAN L3: IP address SA/DA, Subnet L4: TCP/UDP
RADIUS authentication & accounting	
TACACS+ authentication & accounting, TACACS+ 3.0	
HTTPS, HTTP	Supported
SSL / SSH v2	Supported
User Name Password Authentication	Local Authentication
	Remote Authentication (via RADIUS / TACACS+)

Management Interface Access Filtering	Web, Telnet / SSH , CLI RS-232 console
Management Features	
CLI	Cisco® like CLI
Web Based Management	
Telnet	Server
SNMP	V1, V2c, V3
Modbus/TCP	Support for management and monitoring
SW & Configuration Upgrade	TFTP, HTTP Redundant firmware in case of upgrade failure
RMON	RMON I (1, 2, 3, 9 group), RMON II
MIB	RFC1213 MIB II, Private MIB
UPnP	Supported
DHCP	Server, Client, Relay, Relay option 82 , Snooping
IP Source Guard	Supported
Port Mirroring	Supported
Event Syslog	Syslog server (RFC3164) (Support 1 server)
Warning Message	System syslog, e-mail, alarm relay
DNS	Client, Proxy
IEEE 1588 PTP V2	Support 5 operating mode in each port : Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave
NTP, SNTP	Client
LLDP (IEEE 802.1ab)	Link Layer Discovery Protocol LLDP-MED

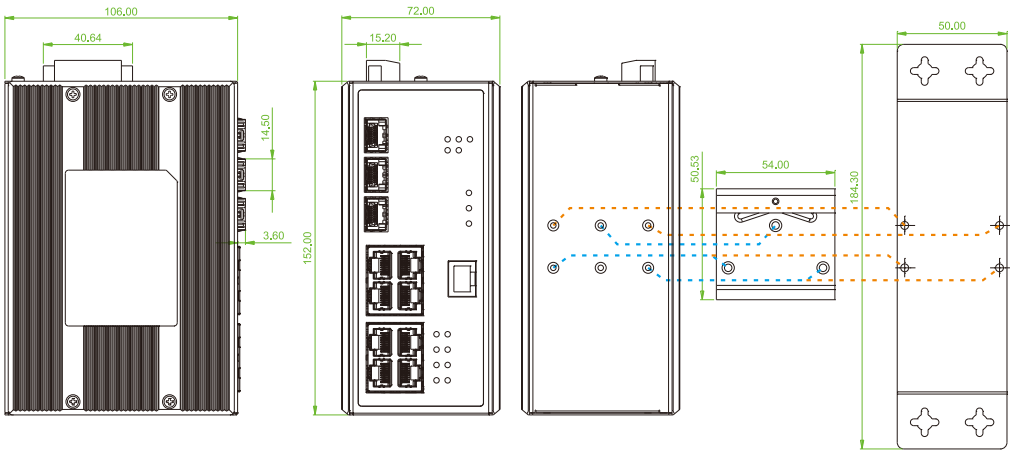
IPv6 Features	
IPv6 Management	Telnet Server/ICMP v6
SNMP over IPv6	Supported
HTTP over IPv6	Supported
SSH over IPv6	Supported
IPv6 Telnet	Supported
IPv6 NTP, SNTP	Client
IPv6 TFTP	Supported
IPv6 QoS	Supported
IPv6 ACL	Number of rules: up to 256 entries for L2 / L3 / L4 L2 : Mac address SA/DA/VLAN L3: IP address SA/DA, Subnet L4: TCP/UDP
Others Features	
Green Ethernet	Supports IEEE 802.3az EEE (Energy Efficient Ethernet) Management to optimize the power consumption Determine the cable length and lowering the power for ports with short cables Lower the power for a port when there is no link LED Power Management :Adjustment LEDs intensity
Cable Diagnostic	Measuring UTP cable normal or broken point distance

Application

Figure : Application Example



Dimensions

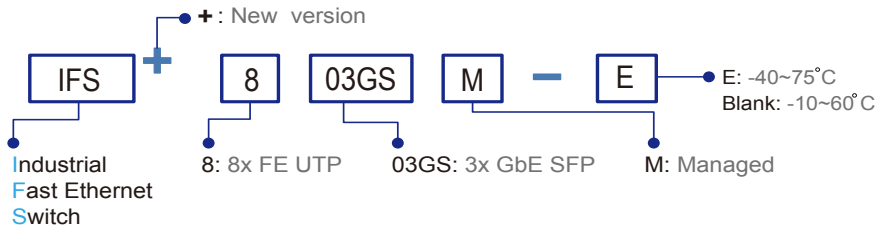


Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

Ordering Information

Model Name	Managed	Total Port	RJ45 UTP Port	Fiber Port	Power Input	Certification						Operating Temperature
			10/100 Base-TX	100/1000 Base-X	Redundant	Railway EN50121-4	NEMA TS2	Safety EN60950-1	Safety UL60950-1	EN61000-6-2 EN61000-6-4	CE FCC	
IFS+803GSM	V	11	8	3 SFP	12/24/48, -48VDC	V	V	V	V	V	V	-10~60℃
IFS+803GSM-E	V	11	8	3 SFP	12/24/48, -48VDC	V	V	V	V	V	V	-40~75℃

Model Naming Rule



Package List

- One device of the series
- Console cable (RJ-45 to DB9)
- CD (SmartConfig, MIB file, Manual)
- Quick installation guide
- Din Rail with screws
- Terminal block
- Protective caps for SFP ports

Optional Accessories

Industrial Power Supply

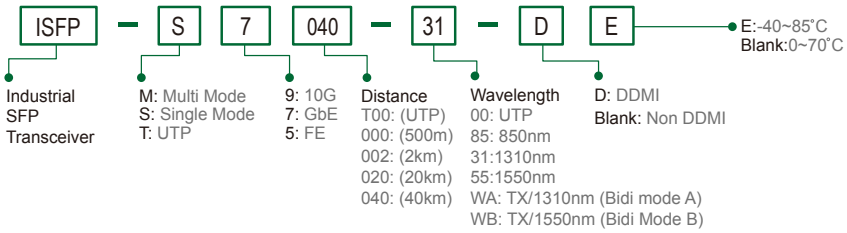
IND-WMK02	Wall Mount kit for Industrial product (Wide) (184 x 50mm)

Industrial SFP Transceiver

The ISFP series of industrial grade SFP modules have been fully tested with the series product for guaranteed compatibility and performance. The best performance can be guaranteed even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheet for more details and more items.)

ISFP-M7000-85-D(E)	Industrial SFP GbE 1000Base-SX, M/M, 500 meter,wave length 850nm, 7.5dB, LC, DDMI, -10~70℃ (-40~85℃)
ISFP-S7020-31-D(E)	Industrial SFP 1000Base-LX, S/M, 20km, wave length 1310nm, 15dB, LC, DDMI, -10~70℃ (-40~85℃)
ISFP-T7T00-00-(E)	Industrial SFP 10/100/1000Base-T UTP 100meter, -10~70℃ (-40~85℃)
ISFP-M5002-31-D(E)	Industrial SFP 155M 100Base-FX, MM, 2km, wave length 1310nm, 12dB, LC, DDMI, -10~70℃ (-40~85℃)
ISFP-S5030-31-D(E)	Industrial SFP 155M 100Base-FX, SM, 30km, 1310nm, 19dB, LC, DDMI, -10~70℃ (-40~85℃)

SFP Naming Rule



IFS-402GSM

4x 10/100Base-TX + 2x 100/1000Base-X SFP

IFS-803GSM

8x 10/100Base-TX + 3x 100/1000Base-X SFP

IFS-1604GSM

16x 10/100Base-TX + 4x 100/1000Base-X SFP

These models are managed industrial grade switches with 4/8/16 10/100Base-TX ports and 2/3/4 Gigabit/Fast Ethernet SFP ports that provide stable and reliable Ethernet transmission. These switches support a variety of Ethernet functions, including STP/RSTP/MSTP/ITU-T G.8032 ERPS and multiple µ-Ring for redundant cabling, layer 2 Ethernet IGMP, VLAN, QoS, Security, IPv6, bandwidth control, port mirroring, cable diagnostic and Green Ethernet. Housed in rugged DIN rail or wall mountable enclosures, these switches are designed for harsh environments, such as industrial networking, security automation applications, intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications (See Figure 1). Standard operating temperature range models (-10 to 60°C) and wide operating temperature range models (-40 to 75°C) fulfill the special needs of industrial automation applications.

Features

- 4x 10/100Base-TX RJ-45 and 2x 100/1000Base-X SFP Fiber (IFS-402GSM)
- 8x 10/100Base-TX RJ-45 and 3x 100/1000Base-X SFP Fiber (IFS-803GSM)
- 16x 10/100Base-TX RJ-45 and 4x 100/1000Base-X SFP Fiber (IFS-1604GSM)
- UL60950-1, CE, FCC, Rail Traffic EN50121-4, Traffic control NEMA TS2 certified
- Heavy industrial grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- Cable diagnostic, Measuring cable normal or broken point distance
- Rugged Metal, IP30 Protection & Fanless design
- Supports Green Ethernet IEEE 802.3az EEE (Energy Efficient Ethernet) management to optimize the power Cosumption
- STP, RSTP, MSTP, ITU-T G.8032 Ethernet Ring Protection Switching (ERPS) for redundant cabling
- Provides 5 instances that each can support µ-Ring, µ-Chain or Sub-Ring type for flexible uses.Supports up to 5 rings in one device (Please see CTC u-Ring white paper for more details and more topology application)
- µ-Ring for Redundant Cabling, recovery time<10ms in 250 devices
- DHCP Server/ Client/ Relay/ Relay option 82/ Snooping
- QoS, Traffic classification QoS, CoS, bandwidth control for Ingress and Egress, Storm Control, DiffServ
- IEEE 802.1q VLAN, MAC based VLAN, IP subnet based VLAN, Protocol based VLAN, VLAN translation, GVRP, MVR
- Dynamic IEEE 802.3ad LACP Link Aggregation, Static Link Aggregation
- IGMP snooping V1/V2/V3, IGMP Filtering/ Throttling, IGMP query, IGMP proxy reporting, MLD snooping V1/V2
- Security : Port based and MAC based IEEE 802.1X, RADIUS, ACL, TACACS+, HTTP/HTTPS, SSL/SSH v2
- Software upgrade via TFTP and HTTP, redundant firmware to avoid in case of upgrade failure
- 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
- RMON, MIB II, Port mirroring, Event syslog, DNS, NTP, SNTP, IEEE 802.1ab LLDP
- Supports IPv6 Telnet server /ICMP v6
- CLI, Web based management, SNMP v1/v2c/v3, Telnet server for management
- Supports Modbus/TCP protocols for management
- Provides SmartConfig for quick and easy mass Configuration*
- Supports SmartView for Centralized Management*

*Please see Chapter 1- **Software Management** for more details

Specifications

Standard	IEEE 802.3	10Base-T 10Mbit/s Ethernet
	IEEE 802.3u	100Base-TX, 100Base-FX, Fast Ethernet
	IEEE 802.3z	1000Base-X Gbit/s Ethernet over Fiber-Optic
	IEEE 802.1d	STP (Spanning Tree Protocol)
	IEEE 802.1w	RSTP (Rapid Spanning Tree Protocol)
	IEEE 802.1s	MSTP (Multiple Spanning Tree Protocol)
	ITU-T G.8032 / Y.1344	ERPS (Ethernet Ring Protection Switching)
	IEEE 802.1Q	Virtual LANs (VLAN)
	IEEE 802.1X	Port based and MAC based Network Access Control, Authentication
	IEEE 802.3ac	Max frame size extended to 1522Bytes.
	IEEE 802.3ad	Link aggregation for parallel links with LACP(Link Aggregation Control Protocol)
	IEEE 802.3x	Flow control for Full Duplex
	IEEE 802.1ad	Stacked VLANs, Q-in-Q
	IEEE 802.1p	LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization

Standard	IEEE 802.1ab	Link Layer Discovery Protocol (LLDP)
	IEEE 802.3az	EEE (Energy Efficient Ethernet)
VLAN ID	4094 IEEE 802.1Q VLAN VID	
Switch Architecture	Back-plane (Switching Fabric): 4.8Gbps (IFS-402GSM), 7.6Gbps (IFS-803GSM) 11.2Gbps (IFS-1604GSM) Full wire-speed	
Data Processing	Store and Forward	
Flow Control	IEEE 802.3x for full duplex mode Back pressure for half duplex mode	
Network Connector	4x 10/100Base-TX RJ-45 + 2x 100/1000Base-X SFP Slot (IFS-402GSM) 8x 10/100Base-TX RJ-45 and 3x 100/1000Base-X SFP Slot (IFS-803GSM) 16x 10/100Base-TX RJ-45 and 4x 100/1000Base-X SFP Slot (IFS-1604GSM) RJ-45 UTP port support Auto negotiation speed, Auto MDI/MDI-X function, SFP port support 100/1000M dual speed with DDMI	
Console	RS-232 (RJ-45)	

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Network Cable	UTP/STP above Cat. 5e cable EIA/TIA-568 100-ohm (100m)
Protocols	CSMA/CD
Reverse Polarity Protection	Supported
Overload Current Protection	Supported
CPU Watch Dog	Supported
Power Supply	Redundant Dual DC 12/24/48V (9.6~60VDC) Input power (Removable Terminal Block)

Power Consumption

Input Voltage	IFS-402GSM	IFS-803GSM	IFS-1604GSM
12VDC	5.7W	6.5W	10.8W
24VDC	5.8W	7W	10.6W
48VDC	8.5W	8.6W	12.5W

LED	Per unit: Power 1 (Green), Power 2 (Green), Fault (Amber), CPU Act (Green), Ring Master (Yellow) Per RJ-45 port: 10/100 Link/Active (Green) SFP Fiber Per port: Link/Active (Green)
Jumbo Frame	9.6KB
IEEE 802.3ac	Max frame size extended to 1522Bytes (allow Q-tag in packet)
MAC Address Table	8K
Memory Buffer	512K Bytes for packet buffer
Warning Message	System Syslog, SMTP/ e-mail event message, alarm relay
Alarm Relay Contact	Relay outputs with current carrying capacity of 1 A @24VDC
Removable Terminal Block	Provide 2 redundant power, alarm relay contact, 6 Pin
Operating Temperature	-10 ~ 60°C (IFS-402GSM, IFS-803GSM, IFS-1604GSM) -40 ~ 75°C (IFS-402GSM-E, IFS-803GSM-E, IFS-1604GSM-E)
Operating Humidity	5% to 95% (Non-condensing)
Storage Temperature	-40 ~ 85°C

Housing	Rugged Metal, IP30 Protection, Fanless
Dimensions	106 x 62.5 x 135 mm (D x W x H) (IFS-402GSM) 106 x 72 x 152 mm (D x W x H) (IFS-803GSM, IFS-1604GSM)
Weight	0.715kg (IFS-402GSM), 0.79kg (IFS-803GSM) 0.82kg (IFS-1604GSM)
Installation Mounting	DIN Rail mounting or wall mounting (optional)
MTBF	861,962hrs (IFS-402GSM) 612,523hrs (IFS-803GSM) 419,048hrs (IFS-1604GSM) (MIL-HDBK-217)
Warranty	5 years
Certification	
EMC	CE
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE EN55022 Class A
Railway Traffic	EN50121-4
Traffic control	NEMA TS2 (IFS-402GSM, IFS-803GSM)
Immunity for Heavy Industrial Environment	EN61000-6-2
Emission for Heavy Industrial Environment	EN61000-6-4
EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B EN61000-4-3 (RS) Level 3, Criteria A EN61000-4-4 (Burst) Level 3, Criteria A EN61000-4-5 (Surge) Level 3, Criteria B EN61000-4-6 (CS) Level 3, Criteria A EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
Safety	UL60950-1
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

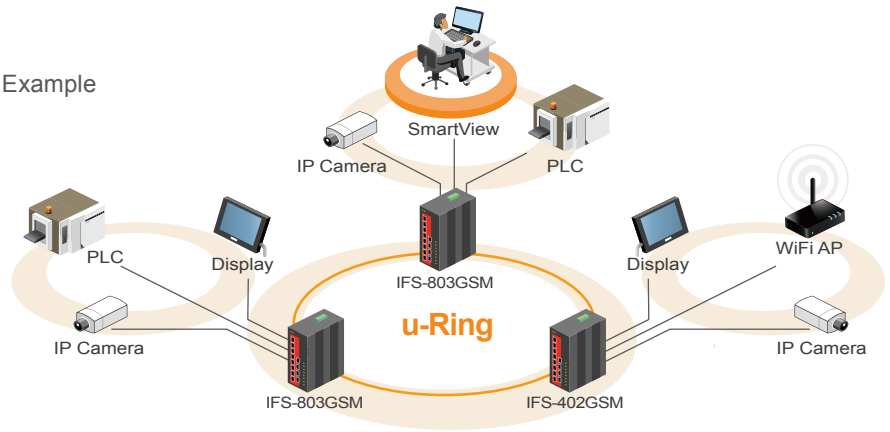
Software Specifications

Topology	
VLAN	IEEE 802.1q VLAN,up to 4094 802.1Q VLAN VID IEEE 802.1q VLAN,up to 4094 Groups IEEE 802.1ad Q-in-Q MAC-based VLAN,up to 256 entries IP Subnet-based VLAN, up to 128 entries Protocol-based VLAN(Ethernt, SNAP, LLC), up to 128 entries VLAN Translation, up to 256 entries GVRP (GARP VLAN Registration Protocal) MVR (Multicast VLAN Registration)
Link Aggregation (Port Trunk)	Static (Hash with SA, DA, IP, TCP/UDP port), up to 5 trunk group Dynamic (IEEE 802.3ad LACP), up to 5 trunk group
Spanning Tree	IEEE 802.1d STP, IEEE 802.1w RSTP, IEEE 802.1s MSTP
Multiple u-Ring	up to 5 instances that each supports u-Ring, u-Chain or Sub-Ring type for flexible uses, and maximum up to 5 Rings. Recovery time <10ms The maximum number of devices allowed in a Ring supported ring is 250. (Please see CTC Union μ-Ring white paper for more details and more topology applications)
Loop Protection	Supported
ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)	Recovery time <50ms Single Ring, Sub-Ring, Multiple ring topology network
QoS Features	
Class of Service	IEEE 802.1p 8 active priorities queues for per port
Traffic Classification QoS	IEEE 802.1p based CoS IP Precedence based CoS IP DSCP based CoS QCL(QoS Control List): Frame Type, Source/ Destination MAC, VLAN ID, PCP, DEI QCE(QoS Control Entry): Protocol, Source IP, IP Fragment, DSCP, TCP/UDP port number
Bandwidth Control for Ingress	Rate in steps :1 kbps / Mbps / fps / kfps Range : 100 kbps to 1Gbps / 1fps to 3300kfps Rate Unit : bit or frame
Bandwidth Control for Egress	Rate in steps : 1 kbps / Mbps Range : 100 kbps to 1Gbps Rate Unit : bit Per queue / Per port shaper
DiffServ (RF 2474) Remarking	
Storm Control	for Unicast, Broadcast, Multicast
IP Multicasting Features	
IGMP / MLD Snooping	IGMP Snooping v1, v2, v3 / MLD Snooping v1, v2 Port Filtering Profile Throttling, Fast Leave Maximum Multicast Group : up to 1022 entries Query / Static Router Port
Security Features	
IEEE 802.1X	Port-Based, MAC-Based
ACL	Number of rules : up to 256 entries for L2 / L3 / L4 L2 : Mac address SA/DA/VLAN L3: IP address SA/DA, Subnet L4: TCP/UDP
RADIUS authentication & accounting	
TACACS+ authentication & accounting, TACACS+ 3.0	
HTTPS, HTTP	Supported
SSL / SSH v2	Supported
User Name Password Authentication	Local Authentication Remote Authentication (via RADIUS / TACACS+)
Management Interface Access Filtering	Web, Telnet / SSH , CLI RS-232 console
Management Features	
CLI	Cisco® like CLI
Web Based Management	
Telnet	Server
SNMP	V1, V2c, V3
ModBus/TCP	Support management and monitoring
SW & Configuration Upgrade	TFTP, HTTP Redundant firmware in case of upgrade failure
RMON	RMON I (1, 2, 3, 9 group), RMON II
MIB	RFC1213 MIB II, Private MIB

UPnP	Supported
DHCP	Server, Client, Relay, Relay option 82 , Snooping
IP Source Guard	Supported
Port Mirroring	Supported
Event Syslog	Syslog server (RFC3164) (Support 1 server)
Warning Message	System syslog, e-mail, alarm relay
DNS	Client, Proxy
IEEE 1588 PTP V2	Support 5 operating mode in each port : Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave
NTP, SNTP	Client
LLDP (IEEE 802.1ab)	Link Layer Discovery Protocol LLDP-MED
IPv6 Features	
IPv6 Management	Telnet Server/ICMP v6
SNMP over IPv6	Supported
HTTP over IPv6	Supported
SSH over IPv6	Supported
IPv6 Telnet	Supported
IPv6 NTP, SNTP	Client
IPv6 TFTP	Supported
IPv6 QoS	Supported
IPv6 ACL	Number of rules: up to 256 entries for L2 / L3 / L4 L2 : Mac address SA/DA/VLAN L3: IP address SA/DA, Subnet L4: TCP/UDP
Others Features	
Green Ethernet	Supports IEEE 802.3az EEE (Energy Efficient Ethernet) Management to optimize the power consumption Determine the cable length and lowering the power for ports with short cables Lower the power for a port when there is no link LED Power Management :Adjustment LEDs intensity
Cable Diagnostic	Measuring UTP cable normal or broken point distance

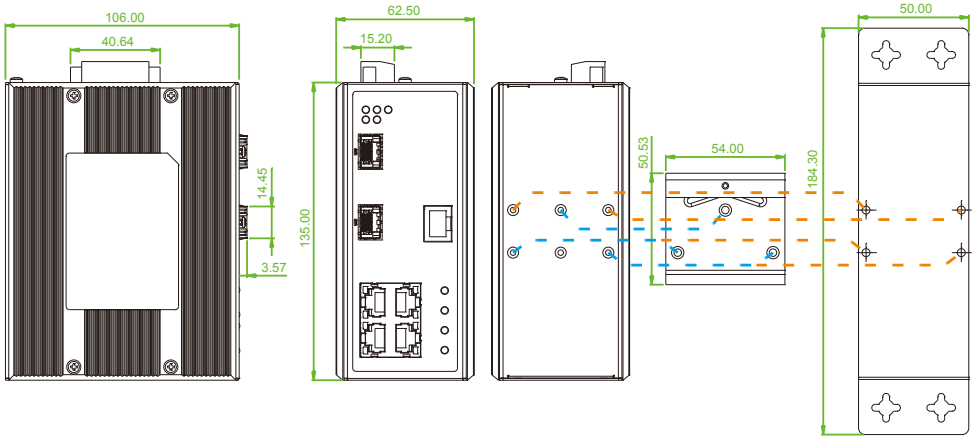
Application

Figure : Application Example



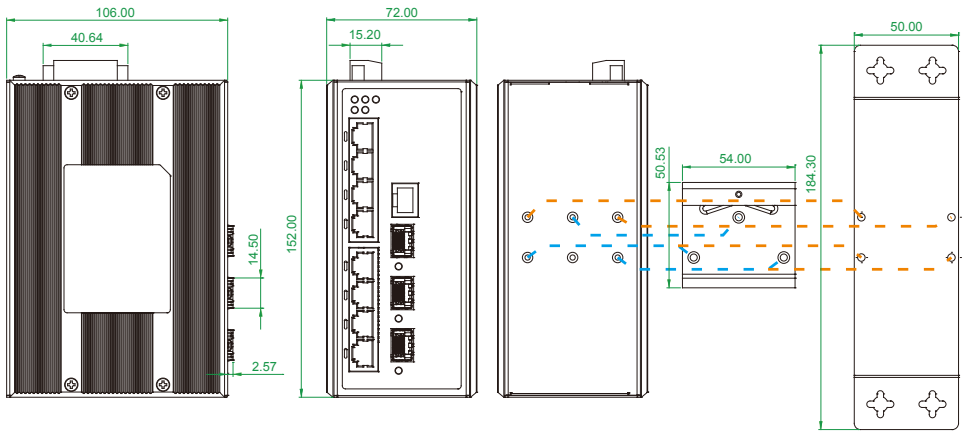
Dimensions

▶ IFS-402GSM



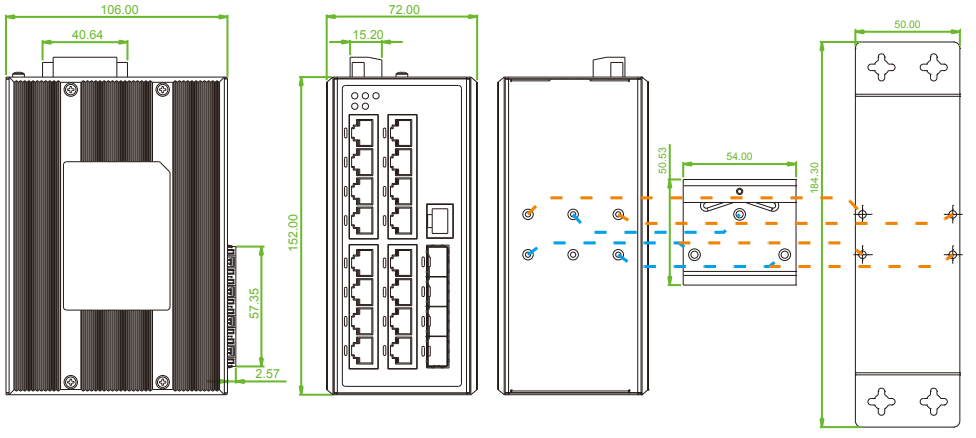
Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View **(Optional accessory)**

▶ IFS-803GSM



Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View **(Optional accessory)**

▶ IFS-1604GSM



Ordering Information

Model Name	Managed	Total Port	RJ45 UTP Port	Fiber Port	Power Input	Certification					Operating Temperature
			10/100 Base-TX	100/1000 Base-X	Redundant	Railway EN50121-4	NEMA TS 2	Safety UL60950-1	EN61000-6-2 EN61000-6-4	CE FCC	
IFS-402GSM	V	6	4	2 SFP	12/24/48VDC	V	V	V	V	V	-10~60℃
IFS-402GSM-E	V	6	4	2 SFP	12/24/48VDC	V	V	V	V	V	-40~75℃
IFS-803GSM	V	11	8	3 SFP	12/24/48VDC	V	V	V	V	V	-10~60℃
IFS-803GSM-E	V	11	8	3 SFP	12/24/48VDC	V	V	V	V	V	-40~75℃
IFS-1604GSM	V	20	16	4 SFP	12/24/48VDC	V		V	V	V	-10~60℃
IFS-1604GSM-E	V	20	16	4 SFP	12/24/48VDC	V		V	V	V	-40~70℃

Model Naming Rule

IFS – 16 04GS M – E
- E: -40~75˚C
- Blank: -10~60˚C

- IFS: Industrial Fast Ethernet Switch
- 16: 4: 4x FE UTP; 8: 8x FE UTP; 16: 16x FE UTP
- 04GS: 02GS: 2x GbE SFP; 03GS: 3x GbE SFP; 04GS: 4x GbE SFP
- M: Managed

Package List

- One device of the series
- Console cable (RJ-45 to DB9)
- CD (SmartConfig, MIB file, Manual)
- Quick installation guide
- Din Rail with screws
- Terminal block
- Protective caps for SFP ports

Optional Accessories

Industrial Power Supply

IND-WMK02	Wall Mount kit for Industrial product (Wide) (184 x 50mm)

Industrial SFP Transceiver

The ISFP series of industrial grade SFP modules have been fully tested with the series product for guaranteed compatibility and performance. The best performance can be guaranteed even in mission-critical applications.
(Please see CTC Union's Industrial SFP datasheet for more details and more items.)

ISFP-M7000-85-D(E)	Industrial SFP GbE 1000Base-SX, M/M, 500 meter,wave length 850nm, 7.5dB, LC, DDMI, -10~70℃ (-40~85℃)
ISFP-S7020-31-D(E)	Industrial SFP 1000Base-LX, S/M, 20km, wave length 1310nm, 15dB, LC, DDMI, -10~70℃ (-40~85℃)
ISFP-T7T00-00-(E)	Industrial SFP 10/100/1000Base-T UTP 100meter, -10~70℃ (-40~85℃)
ISFP-M5002-31-D(E)	Industrial SFP 155M 100Base-FX, MM, 2km, wave length 1310nm, 12dB, LC, DDMI, -10~70℃ (-40~85℃)
ISFP-S5030-31-D(E)	Industrial SFP 155M 100Base-FX, SM, 30km, 1310nm, 19dB, LC, DDMI, -10~70℃ (-40~85℃)

SFP Naming Rule

ISFP – S 7 040 – 31 – D E
- E:-40~85˚C
- Blank:0~70˚C

- ISFP: Industrial SFP Transceiver
- S: M: Multi Mode; S: Single Mode; T: UTP
- 7: 9: 10G; 7: GbE; 5: FE
- 040: Distance — T00: (UTP); 000: (500m); 002: (2km); 020: (20km); 040: (40km)
- 31: Wavelength — 00: UTP; 85: 850nm; 31:1310nm; 55:1550nm; WA: TX/1310nm (Bidi mode A); WB: TX/1550nm (Bidi Mode B)
- D: DDMI; Blank: Non DDMI

IGS-501S

5x 10/100/1000Base–T+ 1x 100/1000Base–X SFP Gigabit Ethernet Switch

IGS-500

5x 10/100/1000Base–T Gigabit Ethernet Switch

IGS-800

8x 10/100/1000Base–T Gigabit Ethernet Switch

These models are 5/8-port 10/100/1000Base-T Ethernet unmanaged Gigabit switches, with either 1 or 0 port 1000Base-X SFP port, that provide stable and reliable Ethernet transmission. Housed in rugged DIN rail or wall mountable enclosures, these switches are designed for harsh environments, such as industrial networking, intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications (See Figure). Standard operating temperature range models (-10 to 60°C) and wide operating temperature range models (-40 to 75°C) fulfill the special needs of industrial automation applications.

Features

- 5x 10/100/1000Base-T RJ-45 + 1x 100/1000Base-X SFP (IGS-501S)
- 5x 10/100/1000Base-T RJ-45 (IGS-500)
- 8x 10/100/1000Base-T RJ-45 (IGS-800)
- Supports broadcast storm protection
- Supports power failure alarm message by relay
- Supports flow control
- Jumbo frame support
- Support IEEE 802.3az Green Ethernet
- Supports auto-negotiation and auto-MDI/MDI-X
- Redundant dual DC input power 12/24/48VDC (9.6~60VDC)
- IP30 rugged metal housing, Fanless
- Supports DIN Rail or wall mounting installation
- Wide operating temperature -40~75°C (-E model)
- EN50121-4, CE, FCC Certification
- Heavy industrial grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified

Specifications

IEEE Standard	IEEE 802.3 10Base-T Ethernet
	IEEE 802.3u 100Base-TX, 100Base-FX, Fast Ethernet
	IEEE 802.3ab 1000Base-T Gbit/s Ethernet over twisted pair
	IEEE 802.3x Flow Control
	IEEE 802.3z 1000Base-X Gbit/s Ethernet over Fiber-Optic
Switch Architecture	Back-plane (Switching Fabric): 12Gbps (IGS-501S), 10Gbps (IGS-500), 16Gbps (IGS-800) Full wire-speed
Data Processing	Store and Forward
Flow Control	IEEE 802.3x flow control for Full duplex , back pressure for half duplex
Provides Broadcast Storm Protection	Supported
Jumbo Frame	9.6KBytes
MAC Address Table	8K
Packet Buffer Size	128K Byte (IGS-500, IGS-501S) 512K Byte (IGS-800)
Network Connector	5 x 10/100/1000Base-T RJ-45 (IGS-500, IGS-501S)
	8 x 10/100/1000Base-T RJ-45 (IGS-800)
	1x 100/1000Base-X SFP connector (only for IGS-501S)
	10/100/1000Base-TX auto negotiation speed, Auto MDI/MDI-X function, Full/Half duplex
Network Cable	10Base-T: 2-pair UTP/STP Cat. 5 cable
	EIA/TIA-568 100-ohm (100m)
	100Base-TX: 2-pair UTP/STP Cat. 5 cable
	EIA/TIA-568 100-ohm (100m)
	Fiber Cable (Multi-mode): 50/125um, 62.5/125um (only for IGS-501S)
	Fiber Cable (Single-mode): 9/125um (only for IGS-501S)
Protocols	CSMA/CD
LED	Per unit: Power 1 (Green), Power 2 (Green), Fault (Amber)
	Per RJ45: Link/Act 1000 (Yellow), Link/Act 10/100 (Green) Fiber LED: Link/Act (Green)

DIP SW	DIP 1	ON : Disable OFF : Enable power failure alarm
	DIP 2	ON : Disables broadcast storm protection OFF : Enable broadcast storm protection
DIP SW	DIP 3	Green Ethernet ON : Disable Green Ethernet OFF : Enable 802.3az Green Ethernet
	DIP 4	SFP speed (only for IGS-501S) ON : 100M OFF : 1000M
Reverse Polarity Protection	Supported for Power Input	
Overload Current Protection	Supported	
Power Supply	Redundant Dual DC 12/24/48V (9.6~60VDC), or AC 24V (18~36VAC) Input power (Removable Terminal Block)	

Power Consumption

Input	IGS-500	IGS-501S	IGS-800
12VDC	3.3W	3.9W	7.0W
24VDC	3.4W	3.9W	7.0W
48VDC	4.8W	5.3W	8.7W

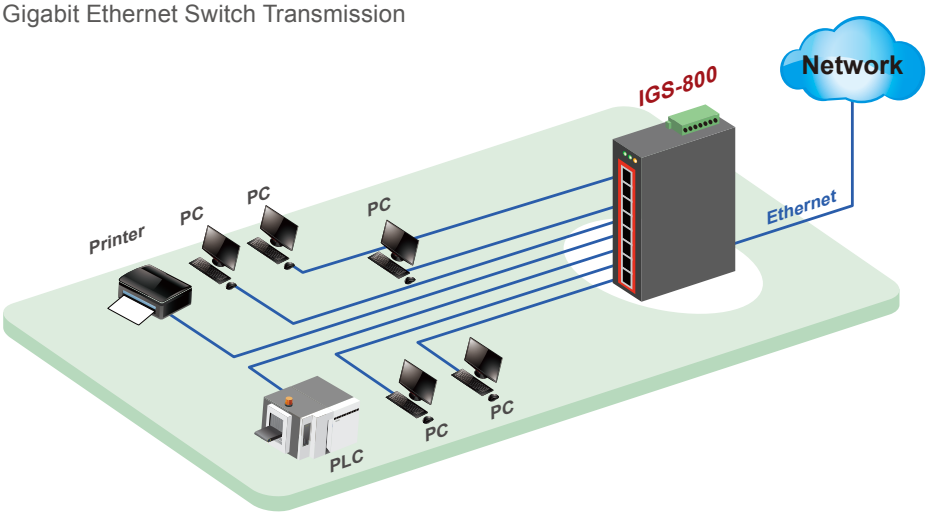
Alarm Relay Contact	Relay outputs with current carrying capacity of 1 A @24VDC, NC
Removable Terminal Block	Provides 2 redundant power, alarm relay contact, 6 Pin
Operating Temperature	-10°C~60°C (IGS-501S, IGS-500, IGS-800)
	-40°C~75°C (IGS-501S-E, IGS-500-E, IGS-800-E)
Operating Humidity	5% to 95% (Non-condensing)
Storage Temperature	-40 ~ 85°C
Housing	Rugged Metal,IP30Protection and fanless
Dimensions	106 x 31.6 x 142 mm (D x W x H)
Weight	0.415kg (IGS-501S) 0.41kg (IGS-500) 0.44kg (IGS-800)
Installation Mounting	DIN Rail mounting, or wall mounting (Optional)

MTBF	1,101,374 hrs (IGS-501S) 1,154,166hrs (IGS-500) 747,984hrs (IGS-800) (MIL-HDBK-217)
Warranty	5 years
Certification	
EMC/EMS	CE
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE
Railway Traffic	EN50121-4
Immunity for Heavy Industrial Environment	EN61000-6-2

Emission for Heavy Industrial Environment	EN61000-6-4
EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B EN61000-4-3 (RS) Level 3, Criteria A EN61000-4-4 (Burst) Level 3, Criteria A
EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-5 (Surge) Level 3, Criteria B EN61000-4-6 (CS) Level 3, Criteria A EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

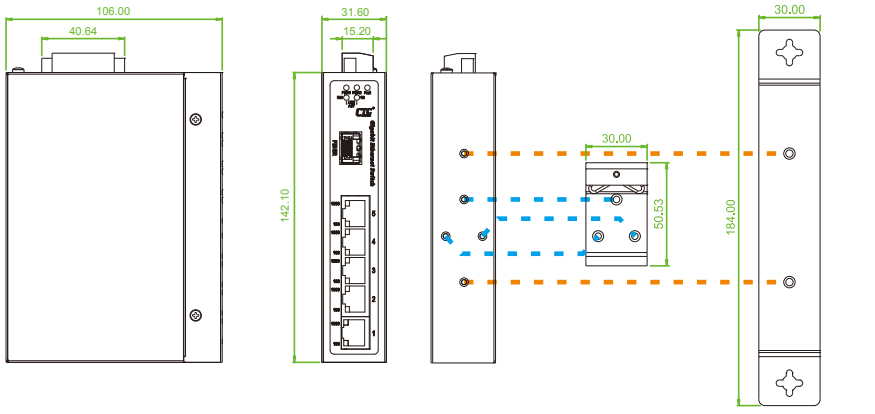
Application

Figure : IGS-800 Gigabit Ethernet Switch Transmission

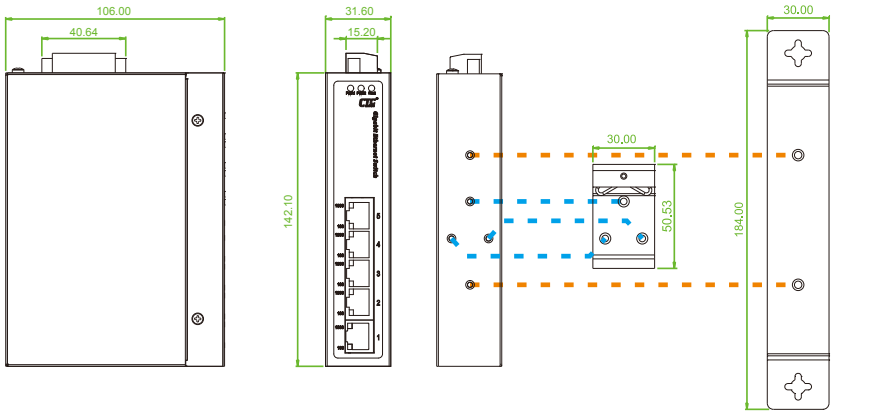


Dimensions

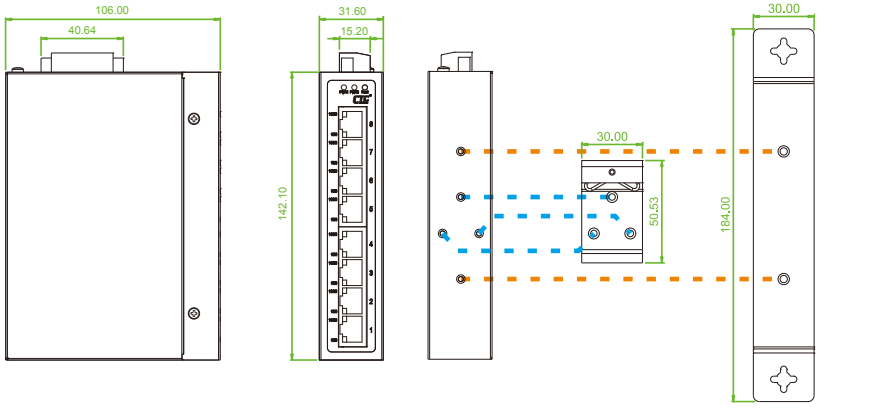
▶ IGS-501S



▶ IGS-500



▶ IGS-800



Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View **(Optional accessory)**

Ordering Information

Model Name	Total Port	RJ45 UTP port	Fiber Port	Power Input	Certification				Operating Temperature
		10/100/1000 Base-T	100/1000Base-X	Redundant	Railway EN50121-4	EN61000-6-2 EN61000-6-4	CE	FCC	
IGS-501S	6	5	1x SFP	12/24/48VDC	V	V	V	V	-10~60℃
IGS-501S-E	6	5	1x SFP	12/24/48VDC	V	V	V	V	-40~75℃
IGS-500	5	5		12/24/48VDC	V	V	V	V	-10~60℃
IGS-500-E	5	5		12/24/48VDC	V	V	V	V	-40~75℃
IGS-800	8	8		12/24/48VDC	V	V	V	V	-10~60℃
IGS-800-E	8	8		12/24/48VDC	V	V	V	V	-40~75℃

Model Naming Rule

IGS – 5 – 01S – E → E: -40~75˚C, Blank: -10~60˚C

- IGS: Industrial Gigabit Switch
- 5: 5x GbE UTP; 8: 8x GbE UTP
- 01S: 1x GbE SFP; 00: 0x GbE SFP

IGS – □□□ – □ (Port Number – Temperature)

Example: IGS – 500 – E

Package List

- One device of the series
- Protective caps for SFP ports (for IGS-501S)
- Quick installation guide
- Din Rail with screws
- Terminal block

Optional Accessories

Wall mount kit accessories

IND-WMK01	Wall Mount kit for Industrial product (184 x 30mm)

Industrial SFP Transceiver

The ISFP series of industrial grade SFP modules have been fully tested with the IGS-501S product for guaranteed compatibility and performance. The best performance can be guaranteed even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheet for more details and more items.)

ISFP-M7000-85-(E)	Industrial SFP GbE 1000Base-SX, M/M, 500 meter,wave length 850nm, 7.5dB, LC, -10~70℃ (-40~85℃)
ISFP-S7020-31-(E)	Industrial SFP 1000Base-LX, S/M, 20km, wave length 1310nm, 15dB, LC, -10~70℃ (-40~85℃)
ISFP-T7T00-00-(E)	Industrial SFP 10/100/1000Base-T UTP 100meter, -10~70℃ (-40~85℃)
ISFP-M5002-31-(E)	Industrial SFP 155M 100Base-FX, MM, 2km, wave length 1310nm, 12dB, LC, -10~70℃ (-40~85℃)
ISFP-S5030-31-(E)	Industrial SFP 155M 100Base-FX, SM, 30km, 1310nm, 19dB, LC, -10~70℃ (-40~85℃)

SFP Naming Rule

ISFP – S – 7 – 040 – 31 – D – E → E:-40~85˚C, Blank:0~70˚C

- ISFP: Industrial SFP Transceiver
- S: M: Multi Mode; S: Single Mode; T: UTP
- 7: 9: 10G; 7: GbE; 5: FE
- 040: Distance — T00: (UTP); 000: (500m); 002: (2km); 020: (20km); 040: (40km)
- 31: Wavelength — 00: UTP; 85: 850nm; 31:1310nm; 55:1550nm; WA: TX/1310nm (Bidi mode A); WB: TX/1550nm (Bidi Mode B)
- D: DDMI; Blank: Non DDMI
- E: -40~85˚C; Blank: 0~70˚C

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IGS-402F

4x 100/1000Base-T + 2x 1000Base-SX/LX Gigabit Ethernet Switch

IGS-402S

4x 100/1000Base-T + 2x 100/1000Base-X SFP Gigabit Ethernet Switch

UL60950-1 CE FC EN50121-4 EN61000-6-2 EN61000-6-4

These models are unmanaged industrial grade Gigabit switches with 4 10/100/1000Base-T ports and 2 fiber ports, that provide stable and reliable Ethernet transmission. Housed in rugged DIN rail or wall mountable enclosures, these switches are designed for harsh environments, such as industrial networking, intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications (See Figure). Standard operating temperature range models (-10 to 60°C) and wide operating temperature range models (-40 to 75°C) fulfill the special needs of industrial automation applications.

Features

- 4x 10/100/1000Base-T RJ45 + 2x 1000Base-SX/LX Fiber (IGS-402F)
- 4x 10/100/1000Base-T RJ45 + 2x 100/1000Base-X SFP (IGS-402S)
- 12/24/48VDC redundant dual input power design
- Wide operating temperature -40 ~ 75°C ("-E" model)
- Provides broadcast storm protection
- Supports DIP SW for alarm setting and broadcast storm protection
- Supports power failure alarm message by relay
- Supports flow control
- Jumbo frame support
- IP30 rugged metal housing and fanless
- Supports DIN Rail or wall mounting installation
- UL60950-1, CE, FCC, EN50121-4 certification
- Heavy industrial grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- IP30 rugged metal housing and fanless

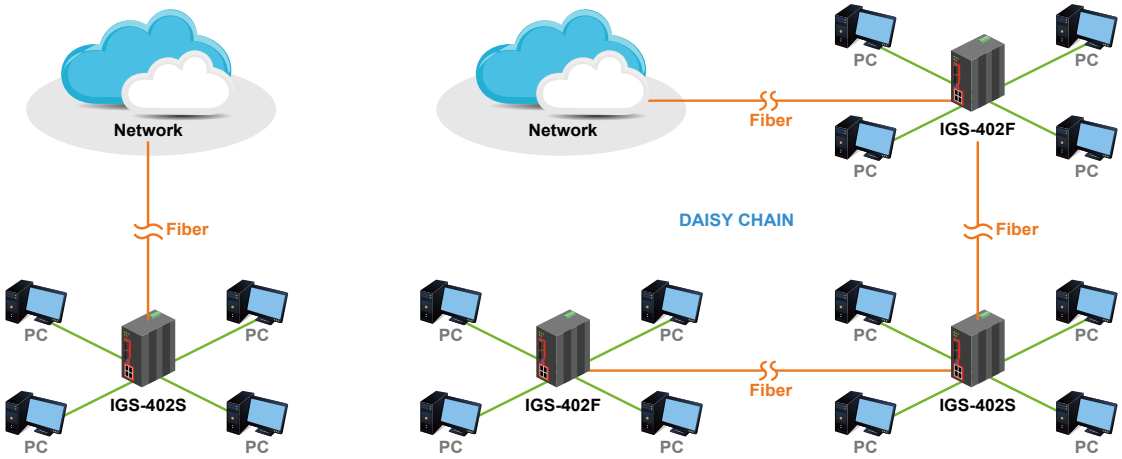
Specifications

IEEE Standard	IEEE 802.3 10Base-T Ethernet	
	IEEE 802.3u 100Base-TX, 100Base-FX, Fast Ethernet	
	IEEE 802.3ab 1000Base-T Gbit/s Ethernet over twisted pair	
	IEEE 802.3z 1000Base-X Gbit/s Ethernet over Fiber-Optic	
	IEEE 802.3x Flow Control and Back Pressure	
Switch Architecture	Back-plane (Switching Fabric): 12Gbps (IGS-402S, IGS-402F) Full wire-speed	
Data Processing	Store and Forward	
Flow Control	IEEE 802.3x flow control, back pressure flow control	
Provides Broadcast Storm Protection	Present, Enable / Disable set by DIP SW	
Jumbo Frame	10K Bytes	
MAC Address Table	8K	
Packet Buffer Size	1Mbits	
Network Connector	4 x RJ-45	
	10/100/1000Base-TX auto negotiation speed, Auto MDI/MDI-X function, Full/Half duplex	
	2 1000Base-X Fiber SC connector (IGS-402F) 2 100/1000Base-X SFP connector (IGS-402S)	
Network Cable	UTP/STP above Cat. 5e cable	
	EIA/TIA-568 100-ohm (100m)	
	Fiber Cable (Multi-mode): 50/125um, 62.5/125um	
	Fiber Cable (Single-mode): 9/125um	
Protocols	CSMA/CD	
LED	Per unit: Power 1 (Green), Power 2 (Green), Fault (Amber)	
	Per RJ-45 port : Link/Active (Green), Speed 10 (OFF), 100 (Green), 1000 (Yellow)	
	Fiber Per port: Link/Active (Green)	
DIP SW	DIP 1	ON : Disable power failure alarm
		OFF : Enable power failure alarm
	DIP 2	ON : Disables broadcast storm protection
		OFF : Enable broadcast storm protection
DIP SW	DIP 4	ON : Fiber 2 for 100Base-FX SFP
		OFF : Fiber 2 for Gigabit SFP (IGS-402S)
	DIP 4	ON : Fiber 1 for 100Base-FX SFP
		OFF : Fiber 1 for Gigabit SFP (IGS-402S)
Reverse Polarity Protection	Supported for Power Input	
Overload current protection	Supported	
Power Supply	Redundant Dual DC 12/24/48V (9.6~60VDC) Input power (Removable Terminal Block)	
Power Consumption	7.9W (IGS-402F)	
	7.9W (IGS-402S)	
Alarm Relay Contact	Relay outputs with current carrying capacity of 1 A @24VDC	
Removable Terminal Block	Provides 2 Redundant power, Alarm relay contact, 6 Pin	
Operating Temperature	-10 ~ 60°C (IGS-402S, IGS-402F)	
	-40 ~ 75°C (IGS-402S-E, IGS-402F-E)	
Operating Humidity	5% to 95% (Non-condensing)	
Storage Temperature	-40 ~ 85°C	
Housing	Rugged Metal, IP30 Protection, Fanless	
Dimensions	106 x 62.5 x 134.8 mm (D X W X H)	
Weight	0.84kg (IGS-402S) 0.68kg (IGS-402F)	
Installation Mounting	DIN Rail mounting, or wall mounting (Optional)	
MTBF	1,000,643 Hours (IGS-402S) 821,412 Hours (IGS-402F) (MIL-HDBK-217)	
Warranty	5 years	
Certification		
EMC/EMS	CE	
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE	
Railway Traffic	EN50121-4	

Immunity for Heavy Industrial Environment	EN61000-6-2
Emission for Heavy Industrial Environment	EN61000-6-4
EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B
	EN61000-4-3 (RS) Level 3, Criteria A
	EN61000-4-4 (Burst) Level 3, Criteria A
EMS	EN61000-4-5 (Surge) Level 3, Criteria B
	EN61000-4-6 (CS) Level 3, Criteria A
	EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
Safety	UL60950-1
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

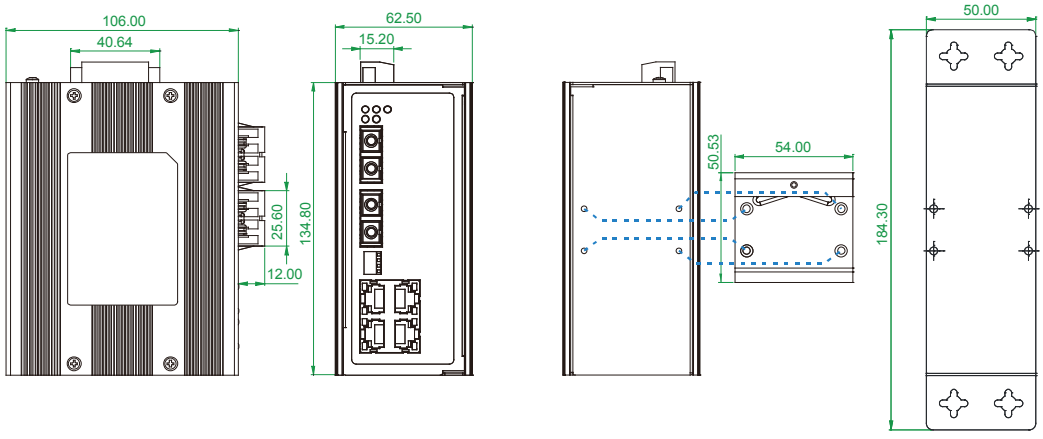
Application

Figure : IGS-402S & IGS-402F Giagabit Ethernet Switch Transmission



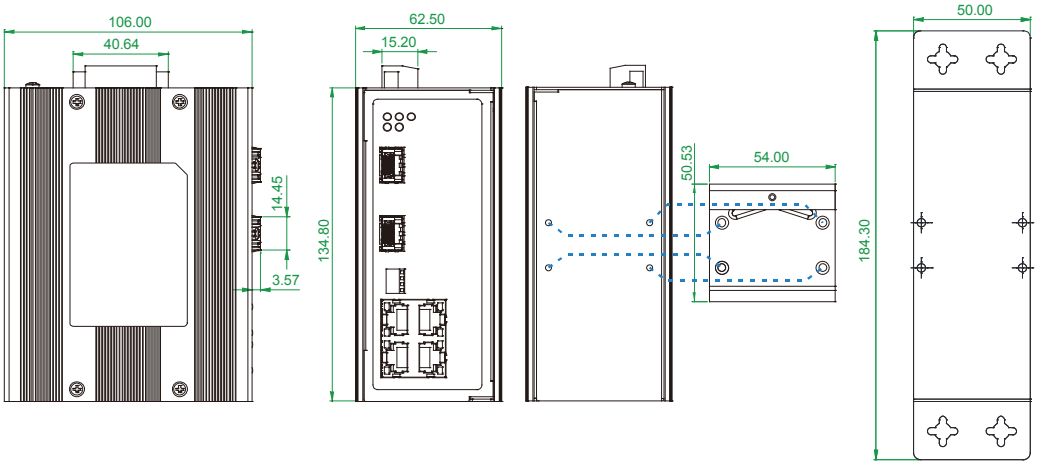
Dimensions

▶ IGS-402F



Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

▶ IGS-402S

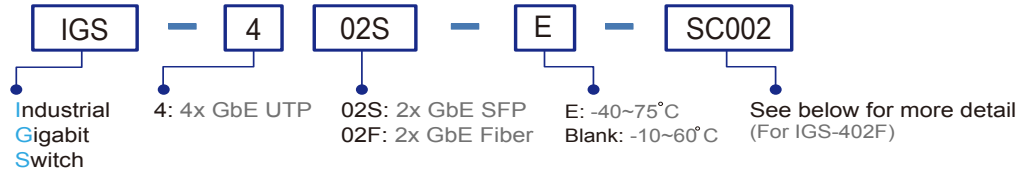


(Optional accessory)

Ordering Information

Model Name	Total Port	RJ45 UTP port	Fiber Port		Power Input	Certification					Operating Temperature
		10/100/1000 Base-T	1000Base-X	100/1000Base-X	Redundant	Safety UL60950-1	Railway EN50121-4	EN61000-6-2 EN61000-6-4	CE	FCC	
IGS-402F	6	4	2 SC		12/24/48VDC	V	V	V	V	V	-10~60℃
IGS-402F-E	6	4	2 SC		12/24/48VDC	V	V	V	V	V	-40~75℃
IGS-402S	6	4		2 SFP	12/24/48VDC	V	V	V	V	V	-10~60℃
IGS-402S-E	6	4		2 SFP	12/24/48VDC	V	V	V	V	V	-40~75℃

Model Naming Rule



Fiber Connector	Connectivity Distance
SC (IGS-402F only)	SC001: 500m (SC, M/M) 002 : 2km (M/M) SC020: 20km (SC, S/M) SC040: 40km (SC, S/M) SC020A: WDM 20km A type (TX:1310nm) SC020B: WDM 20km B type (TX:1550nm)

Port Number / Temperature / Connector Type / Connectivity Distance

IGS – 402F – □ – □□□□□

Example: IGS – 402F – E – SC002

Package List

- One device of the series
- Protective caps for SFP ports (for IGS-402S)
- Quick installation guide
- Din Rail with screws
- Terminal block

Optional Accessories

Wall mount kit accessories

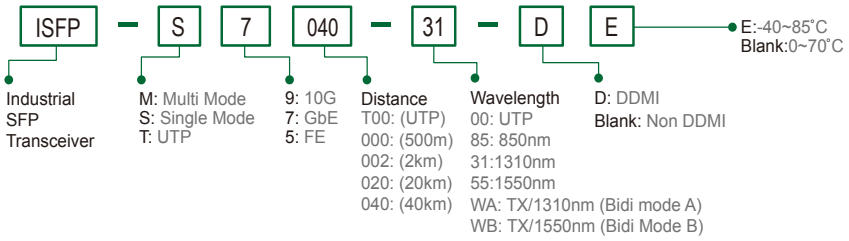
IND-WMK02	Wall Mount kit for Industrial product, 184 x 50mm

Industrial SFP Transceiver

The ISFP series of industrial grade SFP modules have been fully tested with the series product for guaranteed compatibility and performance. The best performance can be guaranteed even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheet for more details and more items.)

ISFP-M7000-85-(E)	Industrial SFP GbE 1000Base-SX, M/M, 500 meter,wave length 850nm, 7.5dB, LC, -10~70℃ (-40~85℃)
ISFP-S7020-31-(E)	Industrial SFP 1000Base-LX, S/M, 20km, wave length 1310nm, 15dB, LC, -10~70℃ (-40~85℃)
ISFP-T7T00-00-(E)	Industrial SFP 1000Base-T UTP 100meter, -10~70℃ (-40~85℃)
ISFP-M5002-31-(E)	Industrial SFP 155M 100Base-FX, MM, 2km, wave length 1310nm, 12dB, LC, -10~70℃ (-40~85℃)
ISFP-S5030-31-(E)	Industrial SFP 155M 100Base-FX, SM, 30km, 1310nm, 19dB, LC, -10~70℃ (-40~85℃)

SFP Naming Rule



IFS-401F
4x 10/100Base–TX+
1x 100Base–FX FE Switch

IFS-402F
4x 10/100Base–TX+
2x 100Base–FX FE Switch

IFS-800
8x 10/100Base–TX Fast Ethernet Switch

IFS-802GS
8x 10/100Base–TX +
2x 1000Base-X SFP FE Switch

IFS-1602GS
16x 10/100Base–TX +
2x 1000Base-X SFP Switch

These models are unmanaged industrial grade switches with 4~16 10/100Base-TX ports and 0~2 fiber ports, that provide stable and reliable Ethernet transmission. Housed in rugged DIN rail or wall mountable enclosures, these switches are designed for harsh environments, such as industrial networking, intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications (See Figure 1, 2). Standard operating temperature range models (-10 to 60°C) and wide operating temperature range models (-40 to 75°C) fulfill the special needs of industrial automation applications.

Features

- 4x 10/100Base-TX RJ45 + 1x 100Base-FX Fiber (IFS-401F)
- 4x 10/100Base-TX RJ45 + 2x 100Base-FX Fiber (IFS-402F)
- 8x 10/100Base-TX RJ45 (IFS-800)
- 8x 10/100Base-TX RJ45 +2x 1000Base-X SFP (IFS-802GS)
- 16x 10/100Base-TX RJ45 +2x 1000Base-X SFP (IFS-1602GS)
- Redundant dual DC input power 12/24/48VDC (9.6~60VDC)
- IP30 rugged metal housing and Fanless
- Wide operating temperature -40 ~ 75°C (-E model)
- Provides broadcast storm protection (IFS-401F, IFS-402F, IFS-800, IFS-1602GS)
- Supports DIP SW for alarm setting and broadcast storm protection
- Supports power failure alarm message by relay
- Supports flow control
- CE, FCC,and EN50121-4 certification
- Heavy industrial grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- 4KV surge protection for UTP ports (IFS-1602GS)
- 2.25K VDC Hi-pot isolation protection for Ethernet ports and power (IFS-1602GS)

Specifications

IEEE Standard	IEEE 802.3 10Base-T Ethernet
	IEEE 802.3u 100Base-TX and 100Base-FX Fast Ethernet
	IEEE 802.3x Flow Control and Back Pressure
	IEEE 802.3z 1000Base-X Gbit/s Ethernet over Fiber-Optic
Switch Architecture	Back-plane (Switching Fabric) : 1.0Gbps (IFS-401F) 1.2Gbps (IFS-402F) 1.6Gbps (IFS-800) 5.6Gbps (IFS-802GS) 7.2 Gbps (IFS-1602GS) Full wire-speed
Data Processing	Store and Forward
Transfer Rate	14,880pps for Ethernet port
	148,800pps for Fast Ethernet port
	1,488,000pps for Giga Ethernet port
Flow Control	IEEE 802.3x flow control, back pressure flow control
Jumbo Frame	16K Byte (IFS-1602GS)
Provides Broadcast Storm Protection	Present, Enable /Disable set by DIP SW (IFS-401F, IFS-402F, IFS-800, IFS-1602GS)
MAC Address Table	2K (IFS-401F, IFS-402F, IFS-800) 8K (IFS-802GS) 16K (IFS-1602GS)
Packet Buffer Size	448Kbit (IFS-401F, IFS-402F, IFS-800) 1024Kbit (IFS-802GS) 4M bit (IFS-1602GS)
Network Connector	4x RJ-45, 1x Fiber (IFS-401F), 4x RJ-45, 2 Fiber (IFS-402F)
	8x RJ-45 (IFS-800)
	8x RJ-45, 2 SFP (IFS-802GS)
	16x RJ-45, 2x SFP (IFS-1602GS)
	RJ-45 Port: Auto MDI/MDI-X function, 10/100Base-TX auto negotiation speed, Full/Half duplex
	1 or 2x 100Base-FX SC/ST fiber port, Multi/Single Mode (IFS-401F, IFS-402F) 2x 1000Base-X SFP port (IFS-802GS, IFS-1602GS)
Network Cable	10Base-T: 2-pair UTP/STP Cat. 5e cable
	EIA/TIA-568 100-ohm (100m)
	100Base-TX: 2-pair UTP/STP Cat. 5e cable
	EIA/TIA-568 100-ohm (100m)
	Fiber Cable (Multi-mode): 50/125um~62.5/125um
Network Cable	Fiber Cable (Single-mode): 8/125um~10/125um
	Wavelength: 1310nm (Multi-mode/Single-mode)
	Available distance: 2KM (Multi-Mode) 30KM (Single-Mode) 50KM (Single Mode)
	SFP: Distance depend on SFP Fiber Transceiver

Protocol	CSMA/CD	
LED	Per unit: Power 1 (Green), Power 2 (Green), Fault (Amber)	
	RJ-45 Per port: Link/Active (Green), Speed 100 (Yellow)	
	Fiber Per port: Link/Active (Green) (IFS-401F, IFS-402F) SFP Port : Link/Active (Green) (IFS-802GS, IFS-1602GS)	
DIP SW	DIP 1	OFF : Enable power failure alarm ON : Disable
	DIP 2	Broadcast storm protection (IFS-401F, IFS-402F, IFS-800, IFS-1602GS) OFF : Enable ON : Disables
Reverse Polarity Protection	Supported for Power Input	
Overload Current Protection	Supported	
Power Supply	Redundant Dual DC 12/24/48V (9.6~60VDC) Input power (Removable Terminal Block)	
Power Consumption	4.4W (IFS-401F) 5.8W (IFS-402F) 4.4W (IFS-802GS) 3.9W (IFS-800) 8.7W (IFS-1602GS)	
Alarm Relay Contact	Relay outputs with current carrying capacity of 1 A @24VDC, NC	
Removable Terminal Block	Provides 2 Redundant power, Alarm relay contact, 6 Pin	
Operating Temperature	-10 ~ 60°C (IFS-401F, IFS-402F, IFS-800, IFS-802GS, IFS-1602GS)	
	-40 ~ 75°C (IFS-401F-E, IFS-402F-E, IFS-800-E, IFS-802GS-E, IFS-1602GS-E)	
Operating Humidity	5% to 95% (Non-condensing)	
Storage Temperature	-40 ~ 85°C	
Housing	Rugged Metal, IP30 Protection and Fanless	
Dimensions	106 x 31.6 x 142mm (D x W x H) (IFS-401F, IFS-402F, IFS-800) 106 x 72 x 152 mm (D x W x H) (IFS-802GS, IFS-1602GS)	
Weight	0.37kg (IFS-401F), 0.42kg (IFS-402F), 0.67kg (IFS-802GS) 0.43kg (IFS-800), 0.82kg (IFS-1602GS)	
Installation Mounting	DIN Rail mounting, or wall mounting (Optional)	
MTBF	908,971 Hours (IFS-401F) 907,622 Hours (IFS-402F) 1,064,064 Hours (IFS-800) 837,414 Hours (IFS-802GS) 461,653 Hours (IFS-1602GS) (MIL-HDBK-217)	

Warranty	5 years
Certification	
EMC/EMS	CE
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE
Railway Traffic	EN50121-4
Immunity for Heavy Industrial Environment	EN61000-6-2
Emission for Heavy Industrial Environment	EN61000-6-4

EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B
	EN61000-4-3 (RS) Level 3, Criteria A
	EN61000-4-4 (Burst) Level 3, Criteria A
	EN61000-4-5 (Surge) Level 3, Criteria B
	EN61000-4-6 (CS) Level 3, Criteria A
	EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
Safety	UL60950-1 (Pending)
Hi-pot isolation protection	DC 2.25KV for power to chassis ground, and UTP port to chassis ground (IFS-1602GS)
4KV surge protection	Supported for UTP Port (IFS-1602GS)
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

Application

Figure 1 : IFS-402F Fast Ethernet Switch Transmission with Daisy Chain

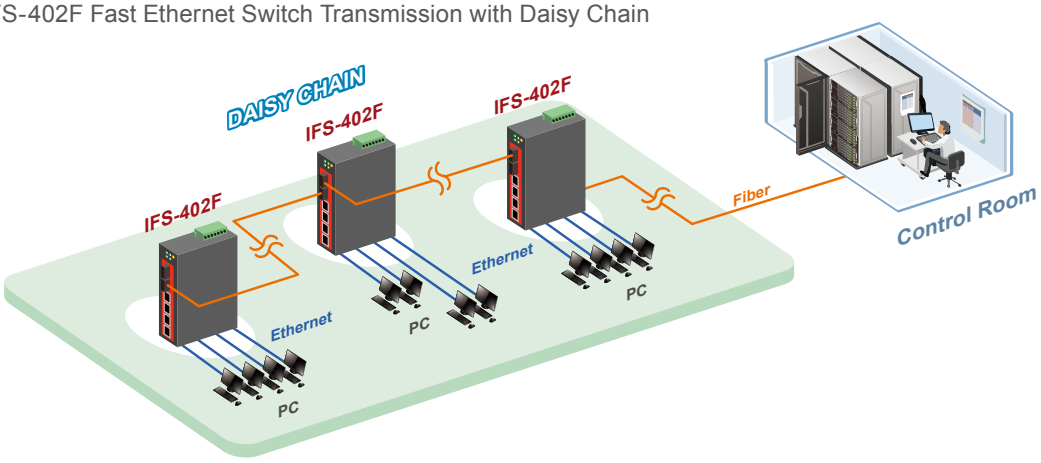
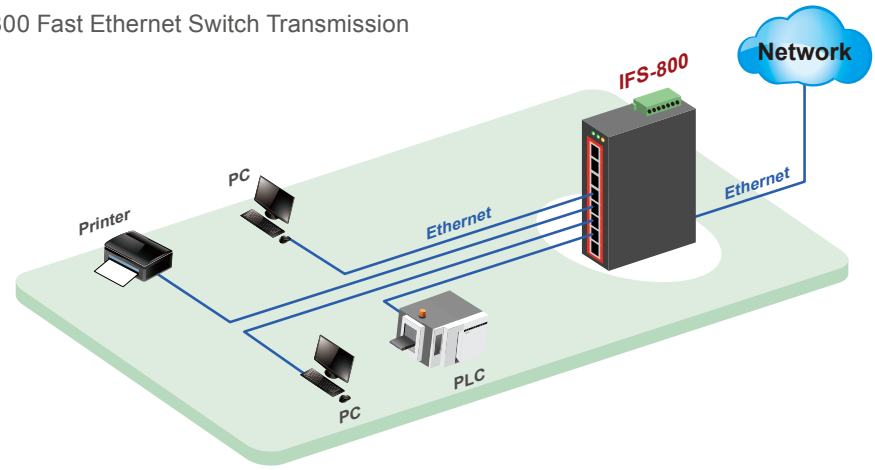
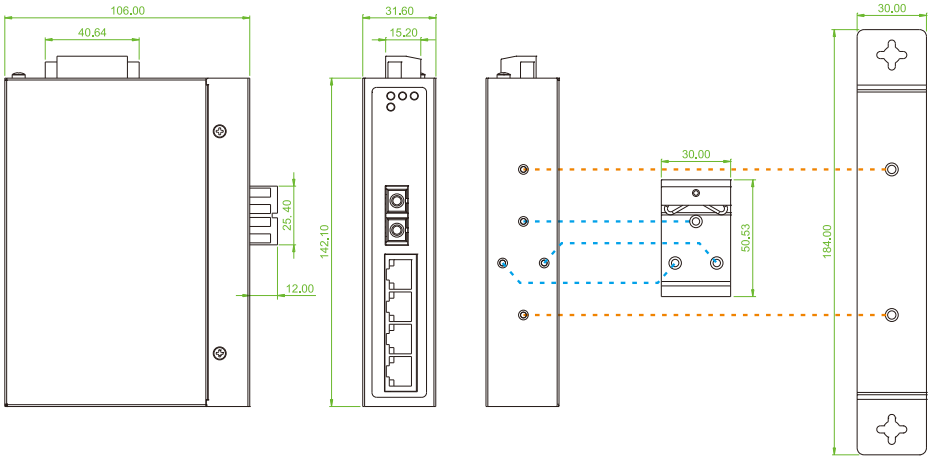


Figure 2 : IFS-800 Fast Ethernet Switch Transmission

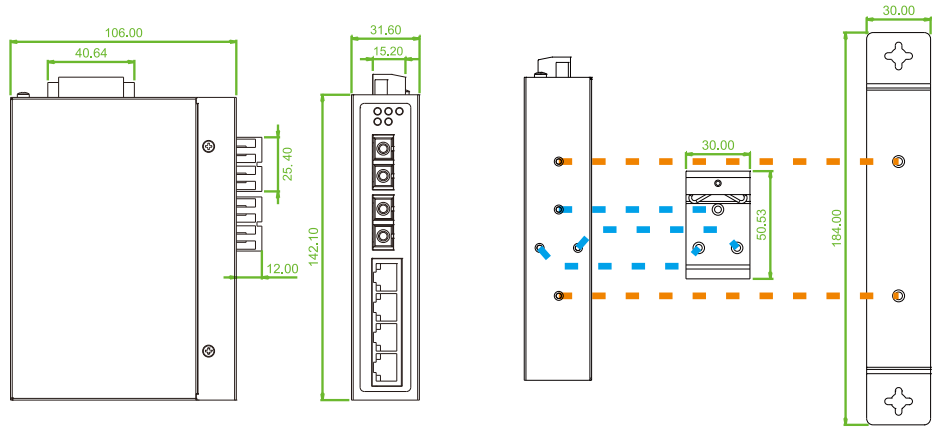


Dimensions

▶ IFS-401F

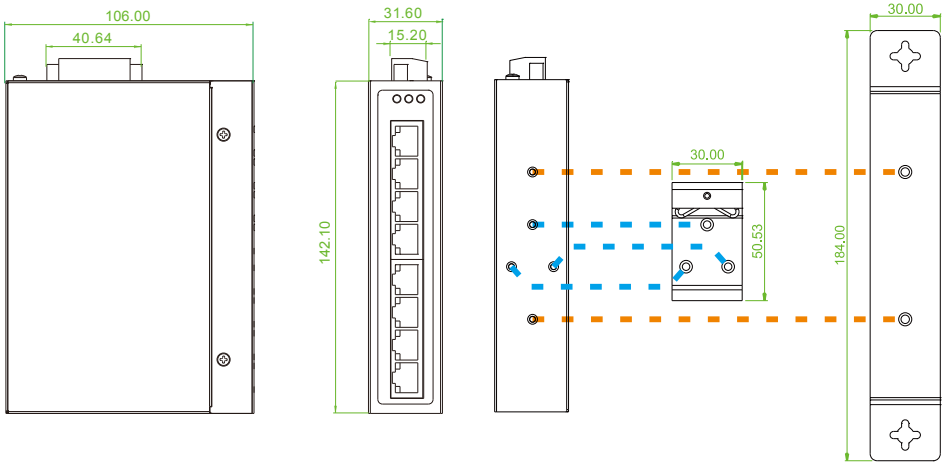


IFS-402F



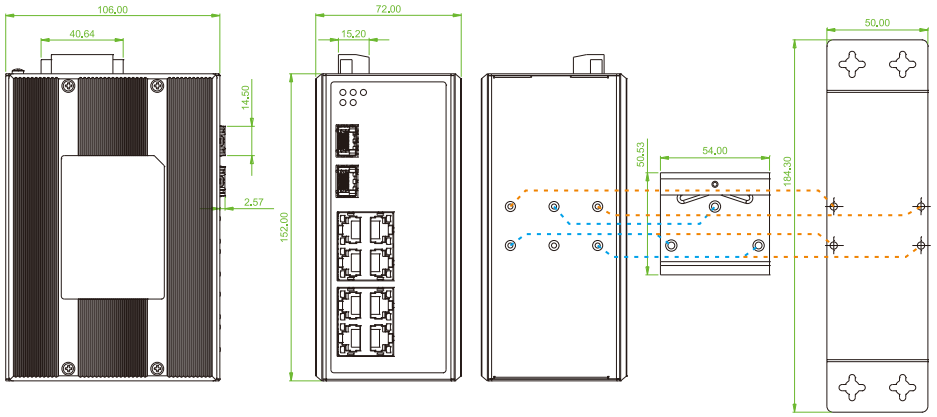
Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

IFS-800



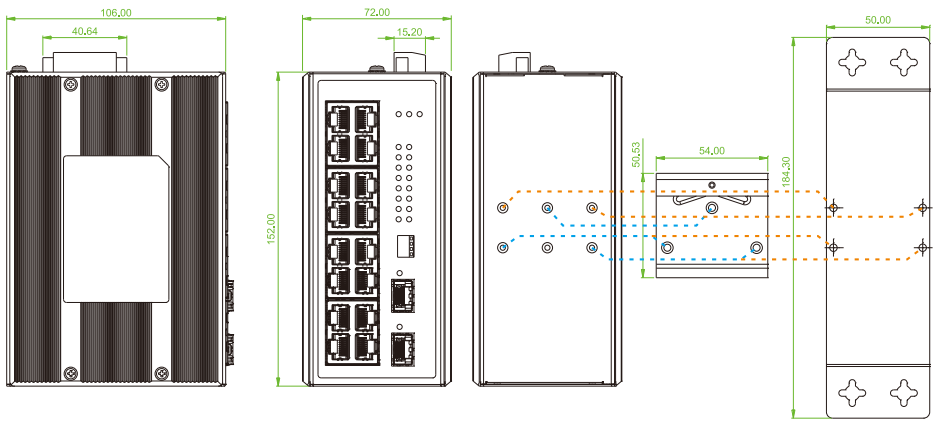
Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

IFS-802GS



Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

IFS-1602GS



Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

Ordering Information

Model Name	Total Port	RJ45 UTP Port	Fiber Port		Certification				Operating Temperature
		10/100Base-TX	100Base-FX	1000Base-X	Railway EN50121-4	EN61000-6-2 EN61000-6-4	CE	FCC	
IFS-401F	5	4	1 SC/ST		V	V	V	V	-10~60℃
IFS-401F-E	5	4	1 SC/ST		V	V	V	V	-40~75℃
IFS-402F	6	4	2 SC/ST		V	V	V	V	-10~60℃
IFS-402F-E	6	4	2 SC/ST		V	V	V	V	-40~75℃
IFS-800	8	8			V	V	V	V	-10~60℃
IFS-800-E	8	8			V	V	V	V	-40~75℃
IFS-802GS	10	8		2 SFP	V	V	V	V	-10~60℃
IFS-802GS-E	10	8		2 SFP	V	V	V	V	-40~75℃
IFS-1602GS	18	16		2 SFP	V	V	V	V	-10~60℃
IFS-1602GS-E	18	16		2 SFP	V	V	V	V	-40~75℃

Model Naming Rule

IFS – 4 – 02F – E – SC002

- IFS: Industrial Fast Ethernet Switch
- 4: 4x FE UTP; 8: 8x FE UTP; 16: 16x FE UTP
- 01F: 1x FE Fiber; 02F: 2x FE Fiber; 00: 0x Fiber; 02GS: 2x GbE SFP
- E: -40~75˚C; Blank: -10~60˚C
- SC002: See below for more detail (For IFS-401F, IFS-402F)

Fiber Option Type	Connectivity Distance
SC, ST (for IFS-401F, IFS-402F)	002: 2km 030: 30km 050: 50km 020A: WDM Bidi 20km A type (TX:1310nm) 020B: WDM Bidi 20km B type (TX: 1550nm)

IFS – □□□□ – □ – □□□□□ (Port Number / Temperature / Connector Type / Connectivity Distance)

Example: IFS – 402F – E – SC002

Package List

- One device of the series
- Quick installation guide
- Din Rail with screws
- Terminal block
- Protective caps for SFP ports (for IFS-802GS, IFS-1602GS)

Optional Accessories

Wall mount kit Accessories

IND-WMK01	Wall Mount kit for Industrial product, 184 x 30mm (Narrow) (For IFS-401F, IFS-402F, IFS-800)
IND-WMK02	Wall Mount kit for Industrial product, 184 x 50mm (Wide) (For IFS-802GS, IFS-1602GS)

Industrial SFP Transceiver

The ISFP series of industrial grade SFP modules have been fully tested with the IFS-802GS & IFS-1602GS product for guaranteed compatibility and performance. The best performance can be guaranteed even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheet for more details and more items.)

ISFP-M7000-85-(E)	Industrial SFP GbE 1000Base-SX, M/M, 500 meter,wave length 850nm, 7.5dB, LC, -10~70℃ (-40~85℃)
ISFP-S7020-31-(E)	Industrial SFP 1000Base-LX, S/M, 20km, wave length 1310nm, 15dB, LC, -10~70℃ (-40~85℃)
ISFP-T7T00-00-(E)	Industrial SFP 1000Base-T UTP 100meter, -10~70℃ (-40~85℃)

SFP Naming Rule

ISFP – S – 7 – 040 – 31 – D – E

- ISFP: Industrial SFP Transceiver
- S: M: Multi Mode; S: Single Mode; T: UTP
- 7: 9: 10G; 7: GbE; 5: FE
- 040: Distance — T00: (UTP); 000: (500m); 002: (2km); 020: (20km); 040: (40km)
- 31: Wavelength — 00: UTP; 85: 850nm; 31:1310nm; 55:1550nm; WA: TX/1310nm (Bidi mode A); WB: TX/1550nm (Bidi Mode B)
- D: DDMI; Blank: Non DDMI
- E: E:-40~85˚C; Blank:0~70˚C

IFS-500C

5x 10/100Base-TX Fast Ethernet Switch
(Compact)

This model is a compact sized, unmanaged industrial grade Fast Ethernet switch with 5 10/100Base-TX ports that provide stable and reliable Ethernet transmission. Housed in rugged DIN rail or wall mountable enclosures, these switches are designed for harsh environments, such as industrial networking, intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications (See Figure). Standard operating temperature range models (-10 to 60°C) and wide operating temperature range models (-40 to 75°C) fulfill the special needs of industrial automation applications.

Features

- Wide range input power 12/24/48VDC (9.6~60VDC), or AC24V (18~36VAC)
- IP30 rugged metal housing and Fanless
- Compact size for easy installation
- Wide operating temperature -40 ~ 75°C (-E model)
- Very low power consumption
- Supports flow control
- CE, FCC,and EN50121-4 for railway traffic certification
- Heavy industrial grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified

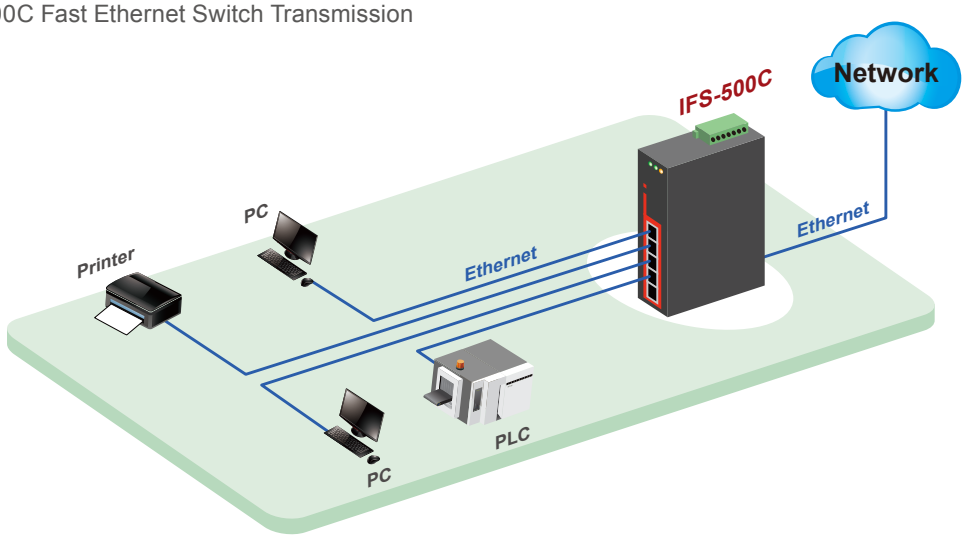
Specifications

IEEE Standard	IEEE 802.3 10Base-T Ethernet
	IEEE 802.3u 100Base-TX and 100Base-FX Fast Ethernet
	IEEE 802.3x Flow Control and Back Pressure
Switch Architecture	Back-plane (Switching Fabric) : 1.0 Gbps Full wire-speed
Data Processing	Store and Forward
Transfer Rate	14,880pps for Ethernet port
	148,800pps for Fast Ethernet port
Flow Control	IEEE 802.3x flow control, back pressure flow control
MAC Address Table	1K
Packet Buffer Size	448Kbits
Network Connector	5x RJ-45
	RJ-45 Port: Auto MDI/MDI-X function, 10/100Base-TX auto negotiation speed, Full/Half duplex
Network Cable	10Base-T: 2-pair UTP/STP Cat. 5 cable
	EIA/TIA-568 100-ohm (100m)
	100Base-TX: 2-pair UTP/STP Cat. 5 cable
	EIA/TIA-568 100-ohm (100m)
Protocol	CSMA/CD
LED	Per unit: Power (Green)
	RJ-45 Per port: Link/Active (Green), Speed 100 (Yellow)
Reverse Polarity Protection	For DC input power protection
Overload Current Protection	Supported
Power Supply	DC 12/24/48V (9.6~60VDC) or AC 24V (18~36VAC) input power (Removable Terminal Block)
Power Consumption	Input Voltage / Power Consumption(Watt) DC 12V / 0.9W DC 24V / 1.2W DC 48V / 2W
Removable Terminal Block	Provides for input power (2 Pin)
Operating Temperature	-10 ~ 60°C (IFS-500C)
	-40 ~ 75°C (IFS-500C-E)
Operating Humidity	5% to 95% (Non-condensing)

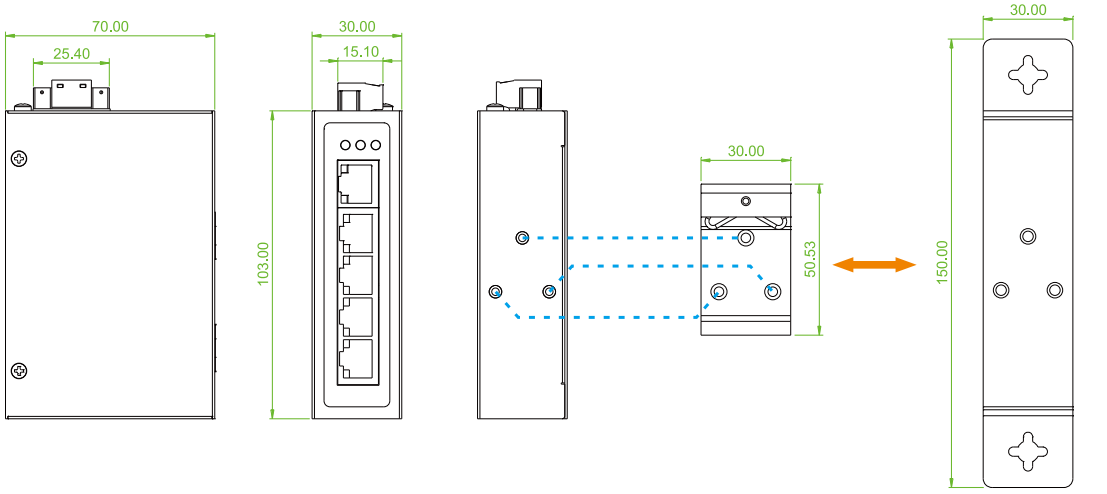
Storage Temperature	-40 ~ 85°C
Housing	Rugged Metal, IP30 Protection and Fanless
Dimensions	70 x 30 x 103 mm (D x W x H)
Weight	220g
Installation Mounting	DIN Rail mounting, or wall mounting (optional)
MTBF	1,738,327 Hours (MIL-HDBK-217)
Warranty	5 years
Certification	
EMC/EMS	CE
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE
Railway Traffic	EN50121-4
Immunity for Heavy Industrial Environment	EN61000-6-2
Emission for Heavy Industrial Environment	EN61000-6-4
EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B
	EN61000-4-3 (RS) Level 3, Criteria A
	EN61000-4-4 (Burst) Level 3, Criteria A
	EN61000-4-5 (Surge) Level 3, Criteria B
	EN61000-4-6 (CS) Level 3, Criteria A
	EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

Application

Figure : IFS-500C Fast Ethernet Switch Transmission



Dimensions



Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

Ordering Information

Model Name	Total Port	RJ45 UTP port	Power input	Certification				Operating Temperature
		10/100Base-TX	Single power	Railway EN50121-4	EN61000-6-2 EN61000-6-4	CE	FCC	
IFS-500C	5	5	12/24/48VDC, 24VAC	V	V	V	V	-10~60℃
IFS-500C-E	5	5	12/24/48VDC, 24VAC	V	V	V	V	-40~75℃

Model Naming Rule

IFS - 5 - 00 - C - E

- IFS: Industrial Fast Ethernet Switch
- 5: 5x FE UTP
- 00: 0x Fiber
- C: Compact Size
- E: -40~75˚C
- Blank: -10~60˚C

Package List

- IFS-500C device
- Quick installation guide
- Din Rail with screws
- Terminal block

Optional Accessories

Wall mount kit Accessories

IND-WMK03	Wall Mount kit for Industrial product (Compact, 150 x 30mm)

IMC-1000MS

100/1000Base-T to 100/1000Base-X SFP Managed Fiber Converter

IMC-1000MS is a 10/100/1000Base-T to 100/1000Base-X manageable Gigabit Ethernet media converter which offers dual speed fiber transmission. Housed in rugged DIN rail or wall mountable enclosures, these converters are designed for harsh environments, such as industrial networking and intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications. The converters are manageable by Web, SNMP or In-Band management for Operation, Administration, Maintenance & Provisioning, which includes bandwidth control, speed, VLAN, Diagnostic, storm filter and converter configurations. In addition, network administrators can manage IMC-1000MS via standard SNMP manager such as SmartView™. It also provide loop-back test and dying gasp, and can be monitored from a centrally located OAM-enabled FRM220-1000MS converter via remote in-band management.

Features

- Conversion between 10/100/1000Base-T and 100/1000Base-X Fiber cable interface
- Supports Dual Rate (100/1000) SFP for selectable Fast or Gigabit speed on fiber
- Redundant dual DC input power 12/24/48VDC (9.6 ~ 60VDC)
- IP30 rugged metal housing and fanless
- Wide operating temperature -20~75°C (IMC-1000MS-E)
- UL60950-1, CE, FCC, RailWay traffic EN50121-4 certification
- Heavy industrial grade EMS, EMI EN61000-6-2, EN61000-6-4 certification
- MIB counters
- Supports LFPT (Link Fault Pass Through)
- Auto Laser Shutdown (ALS)
- Supports Digital Diagnostic Monitor Interface (DDMI) for SFP
- Supports SmartView for centralized management (Please see Catalog chapter 1- Software Management for more details)
- Web management (Figure 3)
- SNMP management (Figure 1)
- Supports 16 IEEE 802.1Q Tag VLAN Group
- SNMP alarm trap for power loss and port link down
- Supports in-band management from FRM220 Chassis With FRM220-1000MS (Figure 2)
- Remote loop back test
- Dying gasp (remote power failure detection)

Specifications

Standard	IEEE 802.3 10Base-T 10Mbit/s Ethernet
	IEEE 802.3u 100Base-TX, 100Base-FX, Fast Ethernet
	IEEE 802.3ab 1000Base-TX Gbit/s Ethernet over twisted pair
	IEEE 802.3z 1000Base-X Gbit/s Ethernet over Fiber-optic
	IEEE 802.3x Flow Control and Back pressure
	IEEE 802.3ah OAM management
Fiber Ports	100Base-X or 1000Base-X set by Web Supports Auto Laser Shutdown (ALS) Supported DDMI for SFP diagnostic
RJ45 Ports	10/100/1000Base-T Auto MDI/MDI-X and Auto-Negotiation Function Supports UTP CAT.5e Twisted Pair cable
CPU watch dog	Supported
Push Button	Reset, Load default seting
Jumbo Frame	9K bytes
Fiber Parameters	Fiber Cable (Multi-mode): 50/125um,62.5/125um
	Fiber Cable (Single-mode): 9/125um
	Wavelength: 1310nm (Multi-mode/Single-mode)
	SFP, Distance depend on plug-in Fiber Tranceiver
Link Fault Pass Through (LFPT)	TX-Fiber: If TX port link down, the media converter will force Fiber port to link down
	Fiber-TX: If Fiber port link down, the media converter will force TX port to link down

LED	Per Unit : Power 1 (Green), Power 2 (Green), Fault (Amber)
	Fiber LNK/ACT (Green): ON: Connected to network OFF: Not connected to network BLK: Receive /Transmit Data Fiber speed : Yellow : 1000Base-X Green : 100Base-X
	RJ-45 port: Speed: 10 (OFF), 100 (Green), 1000 (Yellow)
	LNK/ACT for RJ45(Green): ON : Connected to network/ OFF: Not connected to network/ BLK: Networking is active
Reverse Polarity Protection	Supported for power Input
Overload Current Protection	Supported
Power Supply	12/24/48VDC (9.6~60VDC) , Redundant power with polarity Reverse protect function and removable terminal block
Alarm Relay Contact	Relay outputs with current carrying capacity of 1 A @24VDC
	Relay alarm output for power fail or port link down
Removable Terminal Block	Provides 2 redundant power, alarm relay contact, 7 Pin

Power Consumption	4.8 W
Operating Humidity	5% ~ 95% (Non-condensing)
Operating Temperature	-20 ~ 75°C (IMC-1000MS-E)
Storage Temperature	-40 ~ 85°C
Housing	Rugged Metal, IP30 Protection and fanless
Dimensions	106 x 38.6 x 142.1mm (D x W x H)
Weight	0.62kg
Installation	DIN Rail mounting, or wall mounting (Optional)
MTBF	1,153,428 Hours MIL-HDBK-217
Warranty	5 years
Certification	
EMI	CE
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE
Railway Traffic	EN50121-4
Immunity for Heavy Industrial Environment	EN61000-6-2
Emission for Heavy Industrial Environment	EN61000-6-4

EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B
	EN61000-4-3 (RS) Level 3, Criteria A
	EN61000-4-4 (Burst) Level 3, Criteria A
	EN61000-4-5 (Surge) Level 3, Criteria B
	EN61000-4-6 (CS) Level 3, Criteria A
	EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
Safety	UL60950-1
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

Software Specifications

SNMP or Web Mode (figure 1, 3)	
Management	Ingress/Egress bandwidth control with 64K granularity
	Web management, Firmware upgrade via Web
	Supports SNMP, MIB for management
	Supports DHCP client for automatic IP configuration
	Supports 802.1Q tag VLAN, 16 Tag VLAN group, MIB counters display
Configuration	IP configuration, password setting, converter configuration
	port configuration, MIB counter, SNMP configuration
	VLAN group configuration, alarm configuration
	PoE Configuration
Diagnostic & Monitor	Supports Link Fault Pass-Through (LFPT) Function
	Broadcast/Multicast/Unicast storm filter
	SNMP alarm trap for power loss and port link Up/Down

In-Band Remote mode (Figure 2)	
Management	Supports in-band management from FRM220 Chassis With FRM220-1000MS card
	Ingress/Egress bandwidth control with 64K granularity
Configuration	IP configuration, converter configuration, port configuration, MIB counter
	VLAN group configuration, alarm configuration, PoE Configuration
Diagnostic & Monitor	Remote loop back test
	Supports Link Fault Pass-Through (LFPT) Function
	Broadcast/Multicast/Unicast storm filter

Application

Figure 1 : IMC-1000MS Management by SNMP, SmartView

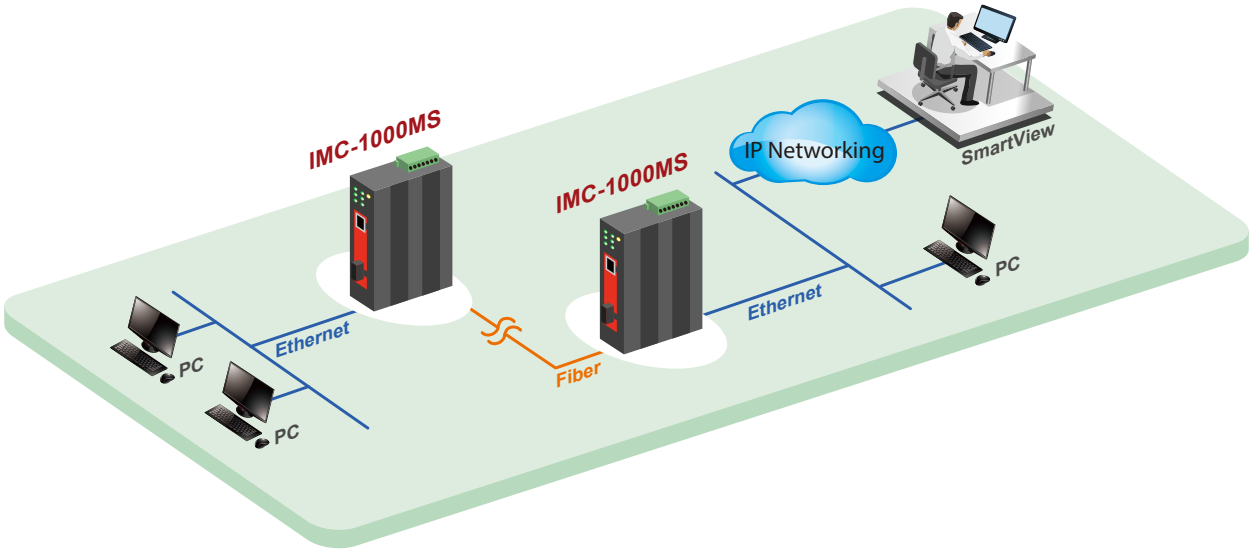


Figure 2 : IMC-1000MS Application in Remote, in-band Management

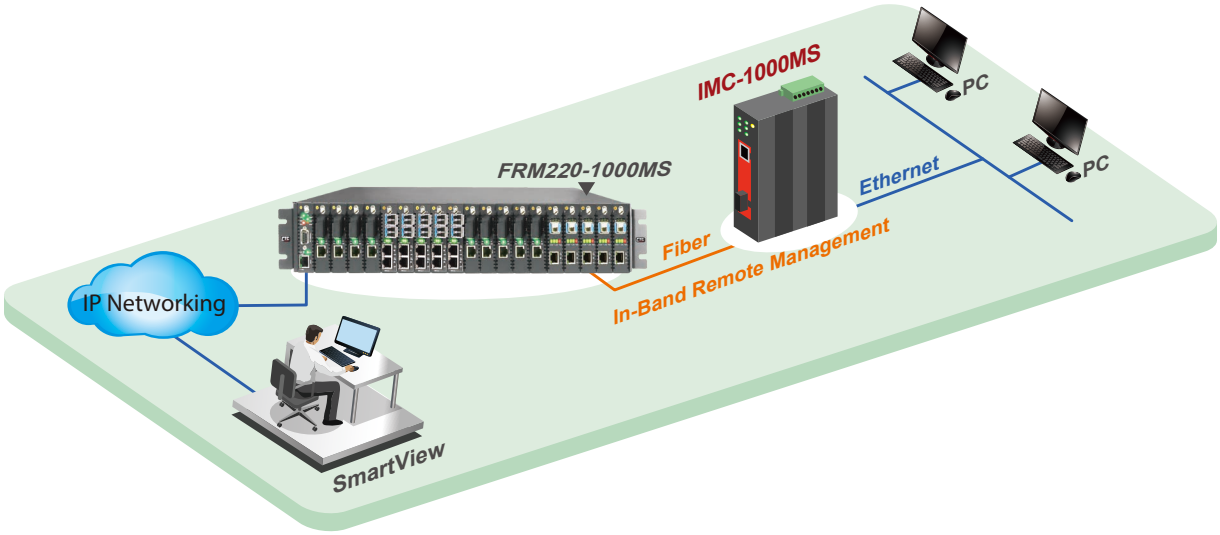
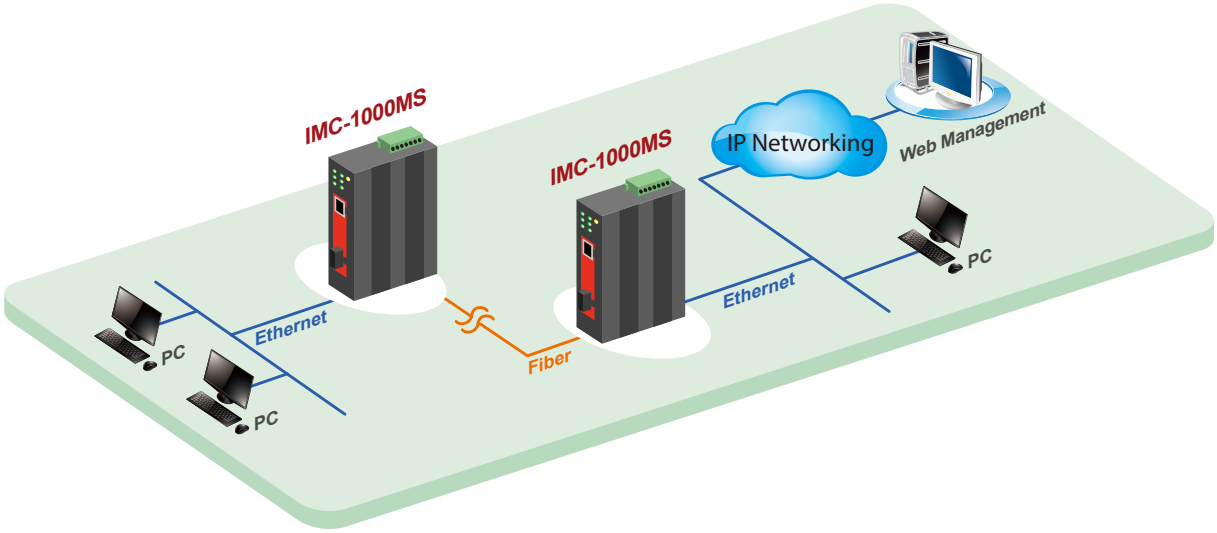
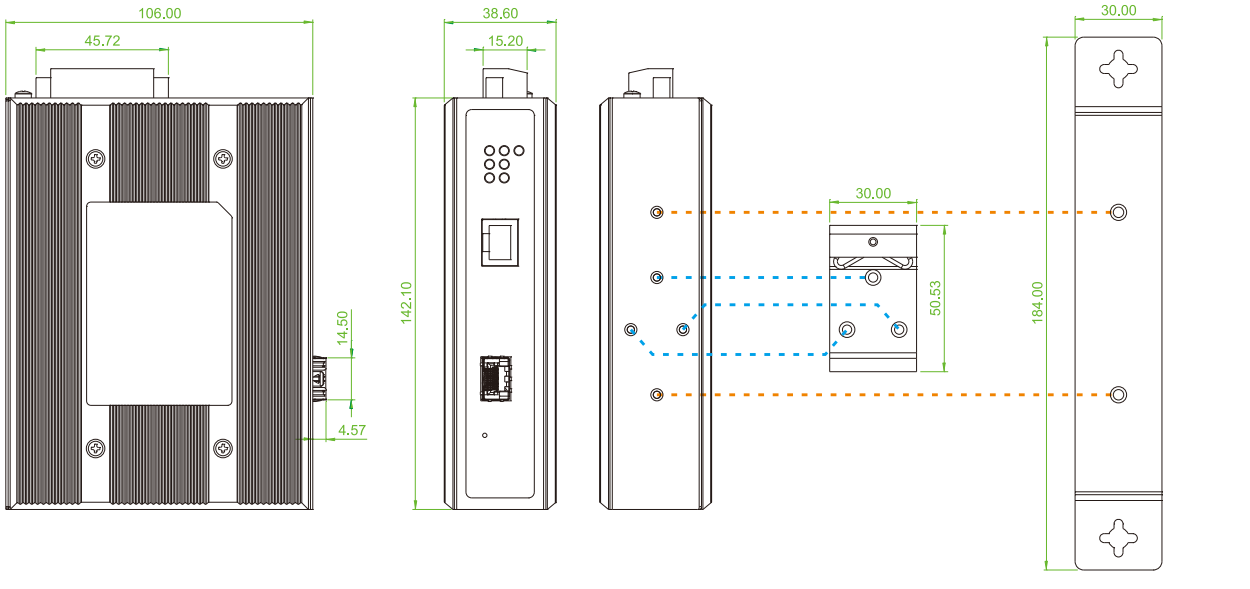


Figure 3 : IMC-1000MS Application in Web Management



Dimensions

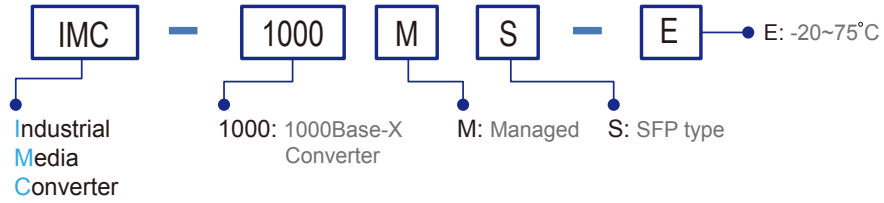


Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

Ordering Information

Model Name	Managed	RJ45 UTP Port	Fiber	Power Input	Certification					Operating Temperature
		10/100/1000 Base-T	Dual Speed 100/1000Base-X	Redundant	Safety UL60950-1	Railway EN50121-4	EN61000-6-2 EN61000-6-4	CE	FCC	
IMC-1000MS-E	V	1	1 SFP	12/24/48VDC	V	V	V	V	V	-20~75℃

Model Naming Rule



Package List

- CD (MIB file, Manual)
- Quick installation guide
- Din Rail with screws
- Terminal block
- Protective caps for SFP ports

Optional Accessories

Wall mount kit Accessories

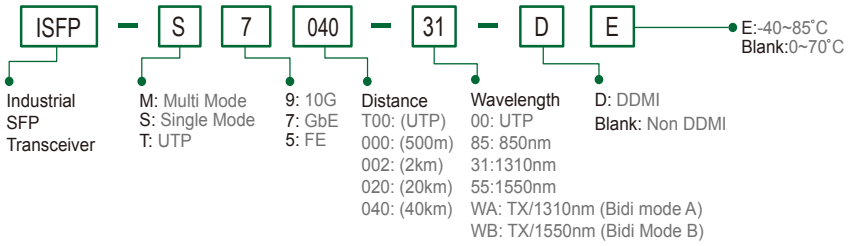
IND-WMK01	Wall Mount kit for Industrial product, 184 x 30mm

Industrial SFP Transceiver

The ISFP series of industrial grade SFP modules have been fully tested with the IMC-1000MS for guaranteed compatibility and performance. The best performance can be guaranteed even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheet for more details and more items.)

ISFP-M7000-85-D(E)	Industrial SFP GbE 1000Base-SX, M/M, 500 meter,wave length 850nm, 7.5dB, DDMI, LC, -10~70℃ (-40~85℃)
ISFP-S7020-31-D(E)	Industrial SFP 1000Base-LX, S/M, 20km, wave length 1310nm, 15dB, LC, DDMI, -10~70℃ (-40~85℃)
ISFP-T7T00-00-(E)	Industrial SFP 1000Base-T UTP 100meter, -10~70℃ (-40~85℃)
ISFP-M5002-31-D(E)	Industrial SFP 155M 100Base-FX, MM, 2km, wave length 1310nm, 12dB, LC, DDMI, -10~70℃ (-40~85℃)
ISFP-S5030-31-D(E)	Industrial SFP 155M 100Base-FX, SM, 30km, 1310nm, 19dB, LC, DDMI, -10~70℃ (-40~85℃)

SFP Naming Rule



IMC-1000C

100/1000Base-T to 1000Base-SX/LX Fiber Converter *(Compact)*

IMC-1000CS

100/1000Base-T to 100/1000Base-X SFP Slot Fiber Converter *(Compact)*

These models are unmanaged industrial grade Gigabit Ethernet media converters that support conversion between electrical 10/100/1000Base-T and optical 1000Base-FX Ethernet. Simple DIP switch settings allow configuring the UTP port for auto-negotiation or for forced 10/100/1000 speed and half/ full duplex as well as for enabling LFPT (Link Fault Pass Through), Ethernet flow control (802.3x) and selecting Switch Mode (store & forward) or Converter Mode (Jumbo frame Pass-through). Housed in rugged DIN rail or wall mountable enclosures, these converters are designed for harsh environments, such as industrial networking and intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications (See Figure).

Features

- DC input power 12/24/48VDC (9.6 ~ 60VDC) or 24VAC (18~36VAC)
- IP30 rugged metal housing and fanless
- Wide operating temperature -20 ~ 75°C
- CE, FCC, Railway traffic EN50121-4 certification
- Heavy industrial grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- Store-and-Forward mode and Pass through mode (set by DIP SW)
- Conversion between 10/100/1000Base-T and 1000Base-X Fiber cable interface
- Provides a DIP-Switch to set functions
- Supports LFPT (Link Fault Pass Through)

Specifications

Standard	IEEE 802.3 10Base-T 10Mbit/s Ethernet
	IEEE 802.3u 100Base-TX, 100Base-FX, Fast Ethernet
	IEEE 802.3ab 1000Base-T Gbit/s Ethernet over twisted pair
	IEEE 802.3z 1000Base-X Gbit/s Ethernet over Fiber-Optic
	IEEE 802.3x Flow Control
RJ45 Ports	10/100/1000Base-T Auto MDI/MDI-X and Auto-Negotiation Function Supports UTP CAT.5e Twisted Pair cable
Fiber Ports	1000Base-SX/LX SC (IMC-1000C) 100/1000Base-X SFP Slot (IMC-1000CS)
Data Process Architecture	Store and Forward mode or Pass through mode set by DIP SW
Jumbo Frame	9K bytes
Fiber Parameters	Fiber Cable (Multi-mode): 50/125um, 62.5/125um
	Fiber Cable (Single-mode): 9/125um Wavelength: 1310nm (Multi-mode/Single-mode)
	Available distance: (IMC-1000C) 500M (Multi-mode SX) 20KM (Single-mode) 40KM (Single-mode)
	Distance depend on SFP Fiber Tranceiver (IMC-1000CS)
Link Fault Pass Through (LFPT)	TX-Fiber: If TX port link down, the media converter will force Fiber port to link down
	Fiber-TX: If Fiber port link down, the media converter will force TX port to link down
DIP Switch	Data process architecture OFF: Switch Mode ON: Converter Mode
	LFPT OFF: LFPT Disable ON: LFPT Enable
	Fiber Duplex OFF: Auto ON: Force
	Fiber Speed OFF: 1000Base-X ON: 100Base-FX (IMC-1000CS)
Connector	Fiber: SC (Multi-mode, 500M), SC (Single-mode, 20KM, 40KM) (IMC-1000C) SFP Slot (IMC-1000CS)
	RJ-45 Socket: CAT 5e Twisted Pair cable Auto MDI/MDI-X and Auto-Negotiation Function Supports
LED	Per Unit: Power (Green)
	SFP/Fiber port Link/Act (Yellow)
	RJ-45 port: Speed & Link/Act 10/100 (Green), 1000 (Yellow)

Reverse Polarity Protection	Supported for power input
Overload Current Protection	Supported
Power Supply	12/24/48VDC (9.6~60VDC) or 24VAC (18~36VAC) with polarity reverse protect function and removable terminal block
Power Consumption	

Input Voltage	IMC-1000C	IMC-1000CS
12VDC	2.1W	1.8W
24VDC	2.2W	2W
48VDC	3.4W	2.9W

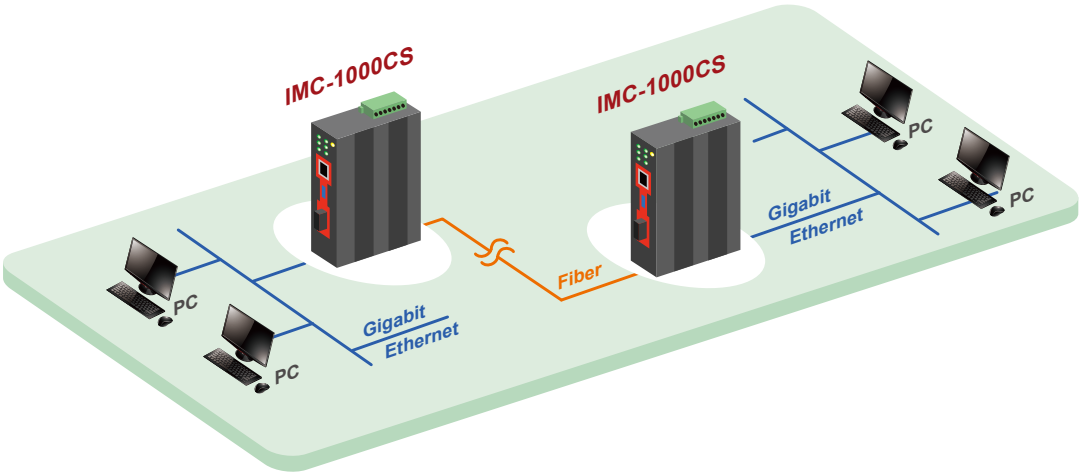
Removable Terminal Block	Provides for input power (2 Pin)
Operating Humidity	5% ~ 95% (Non-condensing)
Operating Temperature	-20 ~ 75°C (IMC-1000C-E, IMC-1000CS-E)
Storage Temperature	-40 ~ 85°C
Housing	Rugged Metal, IP30 Protection and fanless
Dimensions	70x 30x 103 mm (D x W x H)
Weight	220g (IMC-1000C) 215g (IMC-1000CS)
Installation	DIN Rail, or wall mounting (Optional)
MTBF	1,511,224 (IMC-1000C) 1,789,658 (IMC-1000CS) (MIL-HDBK-217)
Warranty	5 years
Certification	
EMC	CE
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE
Railway Traffic	EN50121-4
Immunity for Heavy Industrial Environment	EN61000-6-2
Emission for Heavy Industrial Environment	EN61000-6-4

EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B
	EN61000-4-3 (RS) Level 3, Criteria A
	EN61000-4-4 (Burst) Level 3, Criteria A
	EN61000-4-5 (Surge) Level 3, Criteria B
	EN61000-4-6 (CS) Level 3, Criteria A
	EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A

Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

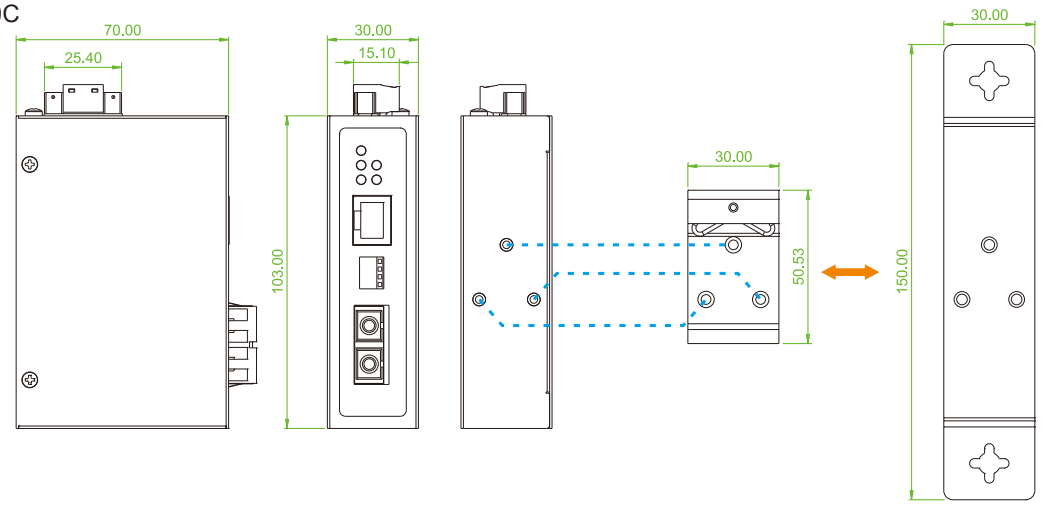
Application

Figure : IMC-1000CS Media Converter Transmission



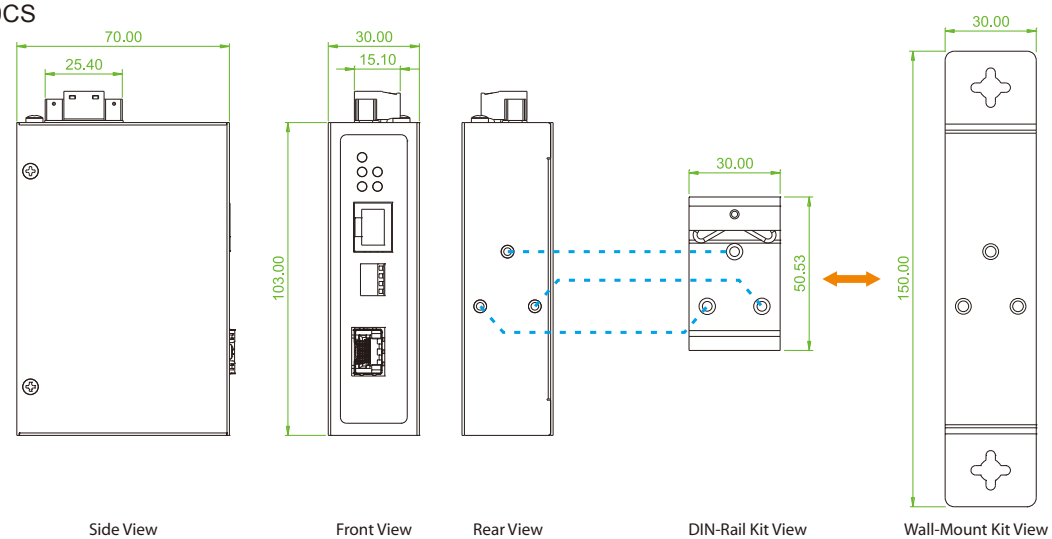
Dimensions

▶ IMC-1000C



Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

▶ IMC-1000CS

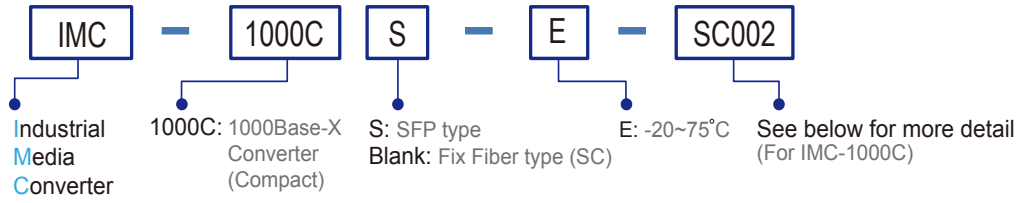


Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

Ordering Information

Model Name	RJ45 UTP Port	Fiber		Power Input	Certification				Operating Temperature
	10/100/1000Base-T	1000Base-X	Dual Speed 100/1000Base-X	Single power	Railway EN50121-4	EN61000-6-2 EN61000-6-4	CE	FCC	
IMC-1000C-E	1	SC		12/24/48VDC, 24VAC	V	V	V	V	-20~75℃
IMC-1000CS-E	1		1 SFP	12/24/48VDC, 24VAC	V	V	V	V	-20~75℃

Model Naming Rule



Connector Type	Connectivity Distance
SC (IMC-1000C-E only)	001:500M (M/M) 002 : 2km (M/M) 020:20km (S/M) 040:40km (S/M) 020A: WDM 20km A type (TX:1310nm) 020B: WDM 20km B type (TX: 1550nm)type

Temperature / Connector Type / Connectivity Distance

IMC – 1000C – □ – □□□□□

Example: IMC – 1000C – E – SC002

Package List

- IMC-1000C(S) device
- Quick installation guide
- Din Rail with screws
- Terminal block
- Protective caps for SFP ports

Optional Accessories

Wall mount kit Accessories

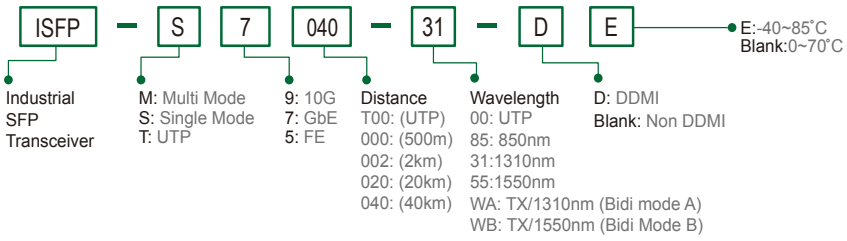
IND-WMK03	Wall Mount kit for Industrial product (Compact, 150 x 30mm)

Industrial SFP Transceiver

The ISFP series of industrial grade SFP modules have been fully tested with the IMC-1000CS product for guaranteed compatibility and performance. The best performance can be guaranteed even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheet for more details and more items.)

ISFP-M7000-85-(E)	Industrial SFP GbE 1000Base-SX, M/M, 500 meter,wave length 850nm, 7.5dB, LC, -10~70℃ (-40~85℃)
ISFP-S7020-31-(E)	Industrial SFP 1000Base-LX, S/M, 20km, wave length 1310nm, 15dB, LC, -10~70℃ (-40~85℃)
ISFP-T7T00-00-(E)	Industrial SFP 1000Base-T UTP 100meter, -10~70℃ (-40~85℃)
ISFP-M5002-31-(E)	Industrial SFP 155M 100Base-FX, MM, 2km, wave length 1310nm, 12dB, LC, -10~70℃ (-40~85℃)
ISFP-S5030-31-(E)	Industrial SFP 155M 100Base-FX, SM, 30km, 1310nm, 19dB, LC, -10~70℃ (-40~85℃)

SFP Naming Rule



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IMC-1000S

100/1000Base-T to 100/1000Base-X SFP Fiber Converter

IMC-1000S is an unmanaged industrial grade Gigabit Ethernet media converter that supports conversion between electrical 10/100/1000Base-T and optical 100/1000Base-X Ethernet. Simple DIP switch settings allow configuring the UTP port for auto-negotiation or for forced 10/100/1000 speed and half/ full duplex as well as for enabling LFPT (Link Fault Pass Through), Ethernet flow control (802.3x) and selecting Switch Mode (store & forward) or Converter Mode (Jumbo frame Pass-through). Housed in rugged DIN rail or wall mountable enclosures, these converters are designed for harsh environments, such as industrial networking and intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications (See Figure).

Features

- Redundant dual DC input power 12/24/48VDC (9.6 ~ 60VDC)
- IP30 rugged metal housing and fanless
- Wide operating temperature -20 ~ 75°C
- UL60950-1, CE, FCC, Railway traffic EN50121-4 certification
- Heavy industrial grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- Store-and-Forward mode and Pass through mode (set by DIP SW)
- Conversion between 10/100/1000Base-T and 100/1000Base-X Fiber cable interface
- Provides a DIP-Switch to set functions
- Supports LFPT (Link Fault Pass Through)

Specifications

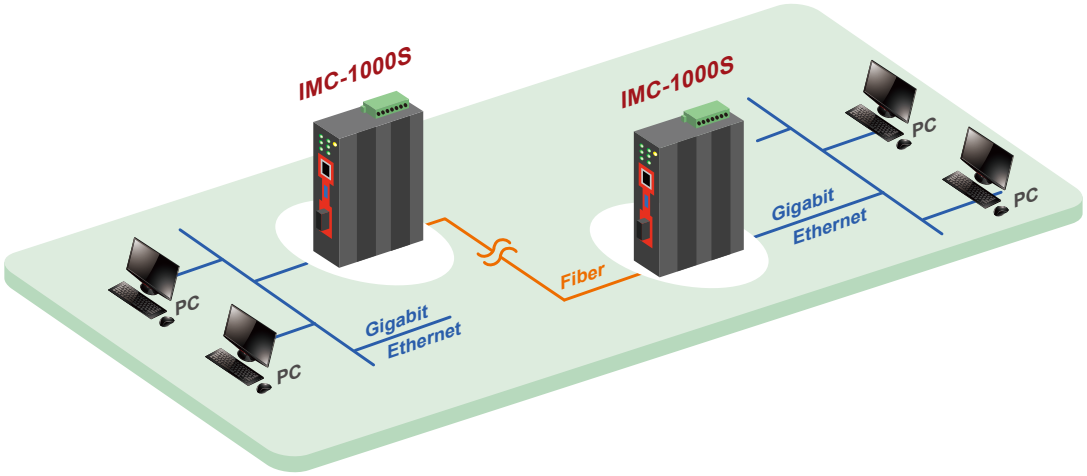
Standard	IEEE 802.3 10Base-T 10Mbit/s Ethernet
	IEEE 802.3u 100Base-TX, 100Base-FX, Fast Ethernet
	IEEE 802.3ab 1000Base-T Gbit/s Ethernet over twisted pair
	IEEE 802.3z 1000Base-X Gbit/s Ethernet over Fiber-Optic
	IEEE 802.3x Flow Control
RJ45 Ports	10/100/1000Base-T Auto MDI/MDI-X and Auto-Negotiation Function Supports UTP CAT.5e Twisted Pair cable
Fiber Ports	100Base-X or 1000Base-X SFP slot 100Base-X or 1000Base-X set by DIP SW
Data Process Architecture	Store and Forward mode or Pass through mode set by DIP SW
Jumbo Frame	9K bytes
Fiber Parameters	Fiber Cable (Multi-mode): 50/125um, 62.5/125um
	Fiber Cable (Single-mode): 9/125um
	Wavelength: 1310nm (Multi-mode/Single-mode)
	SFP, Distance depend on Fiber Tranceiver
Link Fault Pass Through (LFPT)	TX-Fiber: If TX port link down, the media converter will force Fiber port to link down
	Fiber-TX: If Fiber port link down, the media converter will force TX port to link down
DIP Switch	Off: Alarm For Power Enable On: Alarm For Power Disable
	Off: Alarm For Port Enable On: Alarm For Port Disable
	Off: LFPT Disable On: LFPT Enable
	Off: Switch Mode On: Converter Mode
	Off: 1000Base-X On: 100Base-FX
LED	Per Unit: Power 1 (Green), Power 2 (Green), Fault (Amber)
	LNK/ACT for Fiber(Green): ON : Connected to network/ OFF : Not connected to network/ BLK : Receive /Transmit Data
	SFP Fiber speed: Yellow : 1000Base-X Green : 100Base-FX
	RJ-45 port: Speed: 10 (OFF), 100 (Green), 1000 (Yellow) LNK/ACT for RJ45(Green): ON: Connected to network/ OFF: Not connected to network/ BLK: Networking is active
Reverse Polarity Protection	Supported for power input
Overload Current Protection	Supported
Power Supply	12/24/48VDC (9.6~60VDC) , Redundant power with polarity reverse protect function and removable terminal block
Power Consumption	4.2W
Alarm Relay Contact	Relay outputs with current carrying capacity of 1 A @24VDC
Removable Terminal Block	Provides 2 Redundant power, Alarm relay contact
Operating Humidity	5% ~ 95% (Non-condensing)
Operating Temperature	-20 ~ 75°C (IMC-1000S-E)
Storage Temperature	-40 ~ 85°C
Housing	Rugged Metal, IP30 Protection and fanless
Dimensions	106 x 38.6 x 142 mm (D x W x H)
Weight	620g
Installation	DIN Rail mounting, or wall mounting (Optional)
MTBF	1,198,203 Hours MIL-HDBK-217
Warranty	5 years
Certification	
EMC	CE
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE
Railway Traffic	EN50121-4
Immunity for Heavy Industrial Environment	EN61000-6-2
Emission for Heavy Industrial Environment	EN61000-6-4

EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B
	EN61000-4-3 (RS) Level 3, Criteria A
	EN61000-4-4 (Burst) Level 3, Criteria A
	EN61000-4-5 (Surge) Level 3, Criteria B
	EN61000-4-6 (CS) Level 3, Criteria A
	EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A

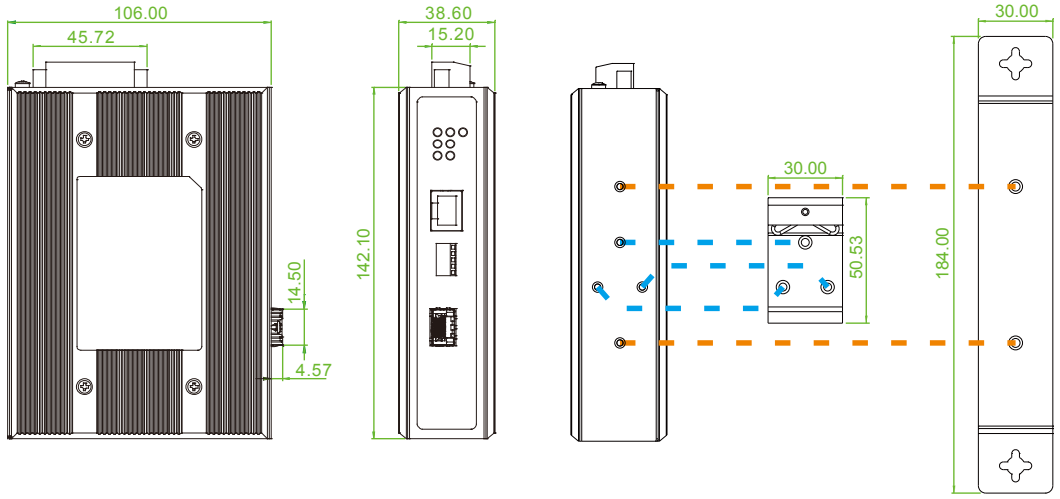
Safety	UL60950-1
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

Application

Figure : IMC-1000S Media Converter Transmission



Dimensions



Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

Ordering Information

Model Name	RJ45 UTP Port	Fiber	Power Input	Certification					Operating Temperature
	10/100/1000 Base-T	Dual Speed 100/1000Base-X	Redundant	Safety UL60950-1	Railway EN50121-4	EN61000-6-2 EN61000-6-4	CE	FCC	
IMC-1000S-E	1	1 SFP	12/24/48VDC	V	V	V	V	V	-20~75℃

Model Naming Rule

IMC - 1000 S - E — E: -20~75˚C

- IMC: Industrial Media Converter
- 1000: 1000Base-X Converter
- S: SFP type

Package List

- IMC-1000S device
- Quick installation guide
- Din Rail with screws
- Terminal block
- Protective caps for SFP ports

Optional Accessories

Wall mount kit Accessories

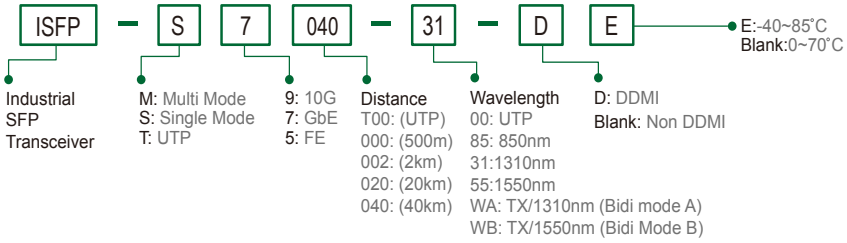
IND-WMK01	Wall Mount kit for Industrial product, 184 x 30mm

Industrial SFP Transceiver

The ISFP series of industrial grade SFP modules have been fully tested with the IMC-1000S product for guaranteed compatibility and performance. The best performance can be guaranteed even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheet for more details and more items.)

ISFP-M7000-85-(E)	Industrial SFP GbE 1000Base-SX, M/M, 500 meter,wave length 850nm, 7.5dB, LC, -10~70℃ (-40~85℃)
ISFP-S7020-31-(E)	Industrial SFP 1000Base-LX, S/M, 20km, wave length 1310nm, 15dB, LC, -10~70℃ (-40~85℃)
ISFP-T7T00-00-(E)	Industrial SFP 1000Base-T UTP 100meter, -10~70℃ (-40~85℃)
ISFP-M5002-31-(E)	Industrial SFP 155M 100Base-FX, MM, 2km, wave length 1310nm, 12dB, LC, -10~70℃ (-40~85℃)
ISFP-S5030-31-(E)	Industrial SFP 155M 100Base-FX, SM, 30km, 1310nm, 19dB, LC, -10~70℃ (-40~85℃)

SFP Naming Rule



IMC-100C

10/100Base-TX to 100Base-FX Fiber Converter
(Compact)

IMC-100C is a compact sized, unmanaged industrial grade Fast Ethernet media converter that supports conversion between electrical 10/100Base-TX and optical 100Base-FX Ethernet. Simple DIP switch settings allow configuring UTP port for auto-negotiation or for forced 10/100 speed and half/ full duplex as well as for enabling LFPT (Link Fault Pass Through), and selecting Switch Mode (store & forward) or Converter Mode (Jumbo frame Pass-through). Housed in rugged DIN rail or wall mountable enclosures, these converters are designed for harsh environments, such as industrial networking and intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications (See Figure).

Features

- DC input power 12/24/48VDC (9.6 ~ 60VDC) or 24VAC (18~36VAC)
- IP30 rugged metal housing, compact size and fanless
- Wide operating temperature -40 ~ 75°C (IMC-100C-E)
- CE, FCC, railway traffic EN50121-4 certification
- Heavy industrial grad EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- Store-and-Forward mode and Pass Through mode (set by DIP SW)
- Support LFPT (Link Fault Pass Through)
- Conversion between 10/100Base-TX and 100Base-FX cable interface
- Provides a 4 pin DIP-Switch to set functions

Specifications

Standard	IEEE 802.3 10Base-T 10Mbit/s Ethernet
	IEEE 802.3u 100Base-TX, 100Base-FX, Fast Ethernet
	IEEE 802.3x Flow Control
RJ45 Ports	10/100Base-TX Auto MDI/MDI-X and Auto-Negotiation Function Supports UTP CAT.5e Twisted Pair cable
Fiber Ports	100Base-FX (SC/ST connectors)
Switch Architecture	Store and Forward in Switch mode
	Supports 1024 MAC addresses in Switch mode
Ethernet Packet length	2046Byte (Max) in Switch mode
Jumbo Frame	9K bytes in Pass through (Converter mode)
Fiber Parameters	Fiber Cable (Multi-mode): 50/125um,62.5/125um
	Fiber Cable (Single-mode): 9/125um
	Wavelength: 1310nm (Multi-mode/Single-mode)
	Available distance: 2KM (Multi-mode) 30KM (Single-mode) 50KM (Single-mode)
Link Fault Pass Through (LFPT)	TX- Fiber: If TX port link down, the media converter will force Fiber port to link down
	Fiber-TX: If Fiber port link down, the media converter will force TX port to link down
DIP Switch	Force Fiber port Duplex OFF: Full Duplex ON: Half Duplex
	LFPT: ON: Enables LFPT (Link Fault Pass through) OFF: Disables LFPT
	Architecture: OFF: Switching mode ON: Pass through Converter mode
Connector	Fiber: SC (Multi-mode, 2km), SC (Single-mode, 30km, 50KM) ST (Multi-mode, 2km), ST (Single-mode, 30km, 50KM)
	RJ-45 Socket: CAT.5e (10/100Mbps) Twisted Pair cable
	Auto MDI/MDI-X and Auto-Negotiation Function Support
LED	PWR (Green): ON: Power active / OFF: Power is inactive
	Fiber (Green): LNK/Act (Green) : Link & Active Dup (Green) : Fiber port Full or Half duplex
	LAN:100 (Green): 100M Link & Active 10 (Green): 10M Link & Active

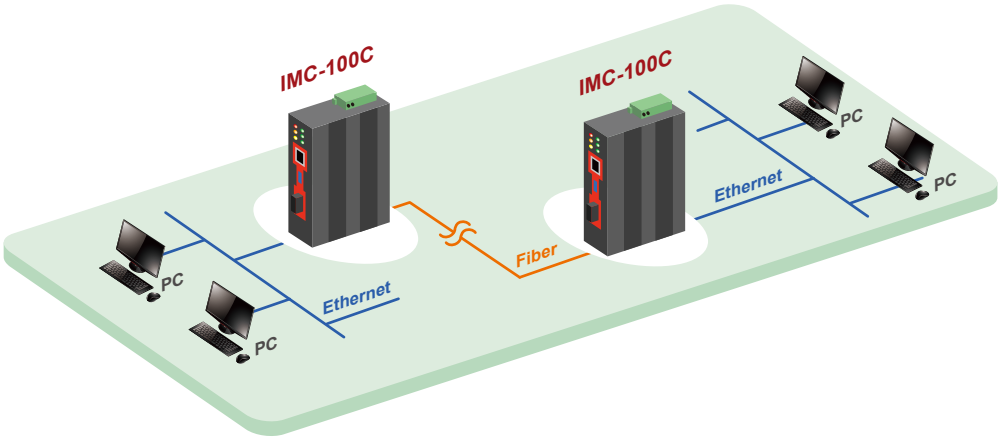
Reverse Polarity Protection	Supported for power input
Overload Current Protection	Supported
Power Supply	12/24/48VDC (9.6~60VDC) or 24VAC (18~36VAC), polarity reverse protect function and removable terminal block
Power Consumption	Input Voltage: Watt(W) 12VDC: 1.8W 24VDC: 1.8W 48VDC: 2.1W
Removable Terminal Block	Provide for 1x DC input power (2 Pin)
Operating Humidity	5% ~ 95% (Non-condensing)
Operating Temperature	-40 ~ 75°C (IMC-100C-E)
Storage Temperature	-40 ~ 85°C
Housing	IP30 rugged metal housing ,compact size and fanless
Dimensions	70 x 30 x 103 mm (D x W x H)
Weight	215g
Installation	DIN Rail mounting, Wall Mounting (Optional)
MTBF	1,558,180 Hours (MIL-HDBK-217)
Warranty	5 years
Certifications	
EMC	CE
EMI	FCC Part 15 Subpart B Class A, CE
Railway Traffic	EN50121-4
Immunity for Heavy Industrial environment	EN 61000-6-2
Emission for Heavy Industrial Environment	EN 61000-6-4

EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B
	EN61000-4-3 (RS) Level 3, Criteria A
	EN61000-4-4 (EFT) Level 3, Criteria A
	EN61000-4-5 (Surge) Level 3, Criteria B
	EN61000-4-6 (CS) Level 3, Criteria A
	EN61000-4-8 (PFMF) Field strength 300A/m Criteria A

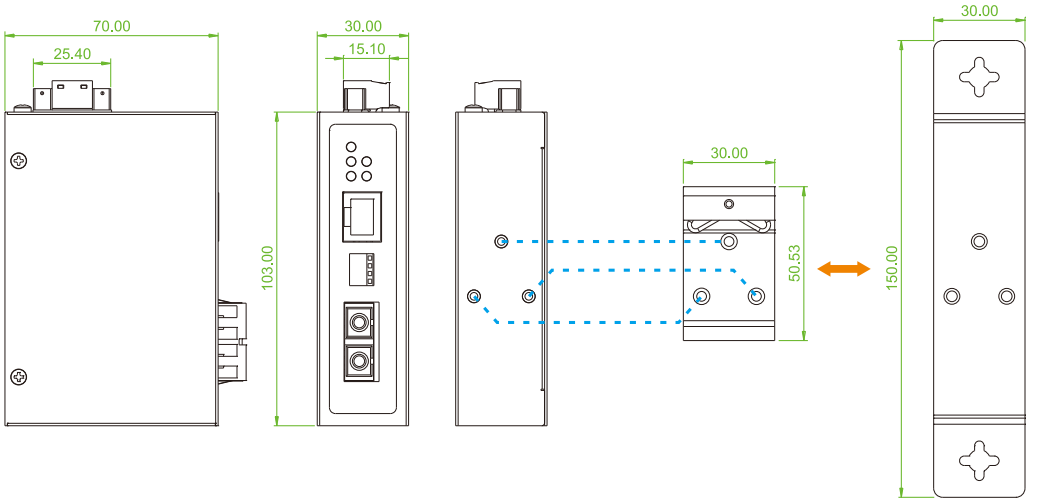
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

Application

Figure 1 : IMC-100C Media Converter Transmission



Dimensions



Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View **(Optional accessory)**

Ordering Information

Model Name	RJ45 UTP Port	Fiber	Power Input	Certification				Operating Temperature
	10/100Base-TX	100Base-FX	Single power	Railway EN50121-4	EN61000-6-2 EN61000-6-4	CE	FCC	
IMC-100C-E	1	1 SC	12/24/48VDC	V	V	V	V	-40~75°C

Model Naming Rule

IMC – 100C – E – SC002

- IMC: Industrial Media Converter
- 100C: 100Base-X Converter (Compact)
- E: -40~75°C
- See below for more detail

Temperature | Connector Type | Connectivity Distance

IMC – 100C – □ – □□□□□

Example: IMC – 100C – E – SC002

Connector Type	Connectivity Distance
SC, ST	002:2km (M/M) 030:30km (S/M) 050:50km (S/M) 020A: WDM 20km A type (TX:1310nm) 020B: WDM 20km B type (TX: 1550nm)

Package List

- IMC-100C device
- Quick installation guide
- Din Rail with screws
- Terminal block

Optional Accessories

Wall mount kit Accessories

IND-WMK03	Wall Mount kit for Industrial product (Compact, 150 x 30mm)

IMC-100

10/100Base-TX to 100Base-FX Fiber Converter

IMC-100 is an unmanaged industrial grade Fast Ethernet media converter that supports conversion between electrical 10/100Base-TX and optical 100Base-FX Ethernet. Simple DIP switch settings allow configuring the UTP port for auto-negotiation or for forced 10/100 speed and half/ full duplex as well as for enabling LFPT (Link Fault Pass Through), Ethernet flow control (802.3x) and selecting Switch Mode (store & forward) or Converter Mode (Jumbo frame Pass-through). Housed in rugged DIN rail or wall mountable enclosures, these converters are designed for harsh environments, such as industrial networking and intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications (See Figure).

Features

- Redundant dual DC input power 12/24/48VDC (9.6 ~ 58VDC)
- IP30 rugged metal housing and fanless
- Wide operating temperature -40 ~ 75°C (IMC-100-E)
- UL60950-1, CE, FCC, Rail traffic EN50121-4 certification
- Heavy industrial grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- Store-and-Forward mode and Pass Through mode (set by DIP SW)
- Conversion between 10/100Base-TX and 100Base-FX cable interface
- Provides a DIP-Switch to set functions
- Supports LFPT (Link Fault Pass Through)

Specifications

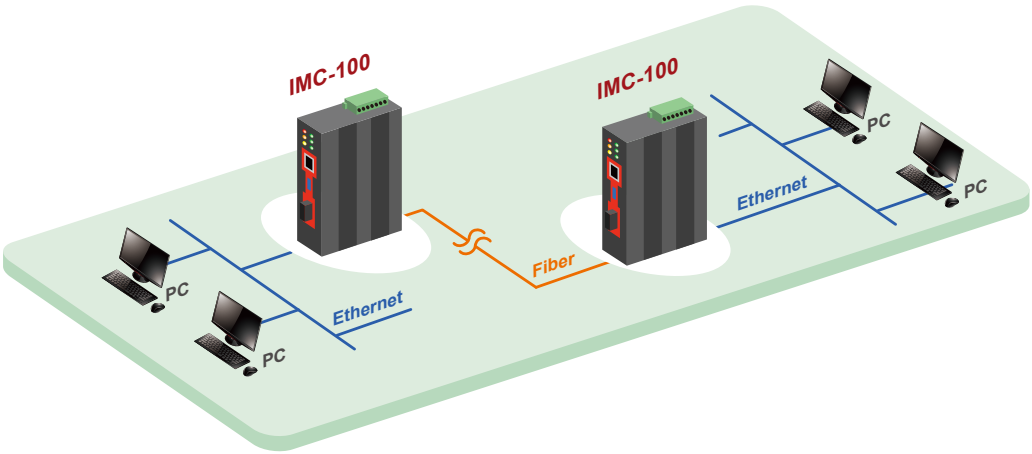
Standard	IEEE 802.3 10Base-T 10Mbit/s Ethernet
	IEEE 802.3u 100Base-TX, 100Base-FX, Fast Ethernet
	IEEE 802.3x Flow Control
RJ45 Ports	10/100Base-TX Auto MDI/MDI-X and Auto-Negotiation Function Supports UTP CAT.5e Twisted Pair cable
Fiber Ports	100Base-FX (SC/ST connectors)
Switch Architecture	Store and Forward in Switch mode
	Supports 1024 MAC addresses in Switch mode
Ethernet Packet length	2046Byte (Max) in Switch mode
Jumbo Frame	9K bytes in Pass through (Converter mode)
Fiber Parameters	Fiber Cable (Multi-mode): 50/125um,62.5/125um
	Fiber Cable (Single-mode): 9/125um
	Wavelength: 1310nm (Multi-mode/Single-mode)
	Available distance: 2KM (Multi-mode) 30KM (Single-mode) 50KM (Single-mode)
Link Fault Pass Through (LFPT)	TX- Fiber: If TX port link down, the media converter will force Fiber port to link down
	Fiber-TX: If Fiber port link down, the media converter will force TX port to link down
DIP Switch	TP Auto Negotiation OFF: Auto Mode, ON: Force Mode
	Force TP Speed OFF: 100 Mbps, ON: 10 Mbps
	Force TP Duplex OFF: Full Duplex, ON: Half Duplex
	DIP Switch: ON: Enables LFPT (Link Fault Pass through) OFF: Disables LFPT (Link Fault Pass through)
	DIP Switch: ON: Flow Control Enable OFF: Flow Control Disable
	DIP Switch: OFF: Switching mode ON: Pass through Converter mode
Connector	Fiber: SC (Multi-mode, 2km), SC (Single-mode, 30km, 50KM) ST (Multi-mode, 2km), ST (Single-mode, 30km, 50KM)
	RJ-45 Socket: CAT.5e (10/100Mbps) Twisted Pair cable
	Auto MDI/MDI-X and Auto-Negotiation Function Support
LED	PWR 1 (Green): ON: Power1 active/ OFF: Power1 is inactive
	PWR 2 (Green): ON: Power2 active/ OFF: Power2 is inactive
	Fault (Red): ON: Fiber or TP has failed OFF: TP are functional
	Fiber (Green): ON : Connected to network OFF: Not connected to network/ BLK: Receive/Transmit Data

LED	100 (Amber): ON: 100Mbps/ OFF: 10Mbps
	LAN (Green): ON : Connected to network OFF: Not connected to network/ BLK: Networking is active
Reverse Polarity Protection	Supported for power input
Overload Current Protection	Supported
Power Supply	12/24/48VDC(9.6~58VDC), Redundant power with polarity reverse protect function and removable terminal block
Alarm Relay Contact	Relay outputs with current carrying capacity of 1 A @24VDC
Removable Terminal Block	Provides 2 redundant power, alarm relay contact
Power Consumption	2.9 W
Operating Humidity	5% ~ 95% (Non-condensing)
Operating Temperature	-40 ~ 75°C (IMC-100-E)
Storage Temperature	-40 ~ 85°C
Housing	Rugged Metal, IP30 Protection and fanless
Dimensions	106 x 38.6 x 142.1mm (D X W X H)
Weight	0.62kg
Installation	DIN Rail mounting, or wall mounting (Optional)
MTBF	1,199,572 Hours MIL-HDBK-217
Warranty	5 years
Certification	
EMI	CE
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE
Railway Traffic	EN50121-4
Immunity for Heavy Industrial Environment	EN61000-6-2

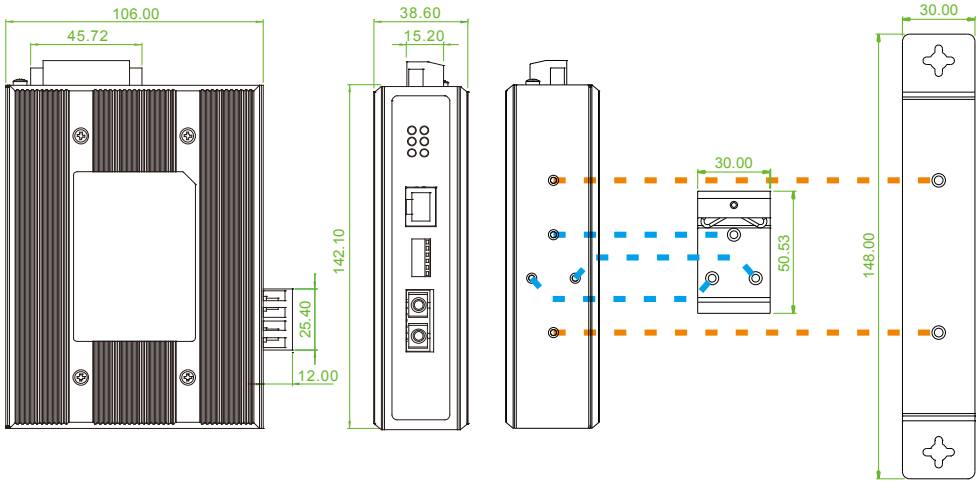
Emission for Heavy Industrial Environment	EN61000-6-4
EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B
	EN61000-4-3 (RS) Level 3, Criteria A
	EN61000-4-4 (Burst) Level 3, Criteria A
	EN61000-4-5 (Surge) Level 3, Criteria B
	EN61000-4-6 (CS) Level 3, Criteria A
	EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
Safety	UL60950-1
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

Application

Figure : IMC-100 Media Converter Transmission



Dimensions



Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

Ordering Information

Model Name	RJ45 UTP Port	Fiber	Power Input	Certification					Operating Temperature
	10/100Base-TX	100Base-FX	Redundant	Safety UL60950-1	Railway EN50121-4	EN61000-6-2 EN61000-6-4	CE	FCC	
IMC-100-E	1	1 SC	12/24/48VDC	V	V	V	V	V	-40~75°C

Model Naming Rule

IMC – 100 – E – SC002

- IMC: Industrial Media Converter
- 100: 100Base-X Converter
- E: -40~75°C
- SC002: See below for more detail

IMC-100 – □ - □□□□□ (Temperature / Connector Type / Connectivity Distance)

Example: IMC-100 – E – SC002

Connector Type	Connectivity Distance
SC, ST	002:2km (M/M) 030:30km (S/M) 050:50km (S/M) 020A: WDM 20km A type (TX:1310nm) 020B: WDM 20km B type (TX: 1550nm)

Package List

- IMC-100 device
- Quick installation guide
- Din Rail with screws
- Terminal block

Optional Accessories

Wall mount kit Accessories

IND-WMK01	Wall Mount kit for Industrial product, 184 x 30mm

NEW

IBP-202

Optical Fiber Bypass Switch

The IBP-202 Optical Bypass Switch is an industrial grade external bypass switch for optical-node failure in fiber optical network infrastructures. The IBP-202 Optical Bypass Switch prevents and saves communication from network failures during power loss. When power failure occurs, the Bypass switch will swiftly set to bypass mode and isolate the main-network from the local networking device (See Figure 1). Bypass switches are commonly used in some major optical networks, such as in railway communication systems, factory automation, and power substation, where fiber link failures are not tolerated.

Features

- Supports 100M/1G/2.5G/10G Ethernet or Telecom applications
- 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)
- IP30 rugged metal housing and fanless
- Wide operating temperature -20 ~ 70°C
- Heavy industrial grade EMS, EMI, EN50121-4, EN61000-6-2, EN61000-6-4,CE, FCC certified

Specifications

Fiber Connector	SC, ST, LC
Operating wavelength	1260 ~ 1650nm
Optic Fiber cable	Single mode 8/125um, 9/125um
Insertion loss	<1.5dB
Optical Switching time	< 10ms
LED indicator	Power 1, Power 2, Operation mode (Normal /Bypass)
Boot up delay adjuster	Provides a rotary switch to configure boot up delay time (0~180 seconds)
Removable Terminal Block	Provide for redundant power
Power supply	12/24/48VDC (9.6~60VDC), Redundant power with polarity reverse protect function and removable terminal block
Reverse Polarity Protection	Supported for Power Input
Overload Current Protection	Supported
Power consumption	0.4W (12VDC), 0.5W (24VDC), 0.8W (48VDC)
Housing	Rugged metal, IP30 protection and fanless
Dimensions	106 x 62.5 x 135mm (D x W x H)
Weight	530g (IBP-202-SLC) 545g (IBP-202-SSC, IBP-202-SST)
Installation	DIN Rail mounting, or wall mounting (Optional)
Operating Temperature	-20~70°C
Storage temperature	-40 ~ 85°C
Operating Humidity	5% ~ 95% (Non-condensing)
MTBF	273,054 Hours (MIL-HDBK-217)
Warranty	5 Years
Certification	
EMC	EN55024, EN55032
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE
Immunity for Heavy Industrial Environment	EN61000-6-2
Emission for Heavy Industrial Environment	EN61000-6-4
Railway Traffic	EN50121-4
EMS (Electromagnetic Susceptibility) Protection Leve	EN61000-4-2 (ESD) Level 3, Criteria B EN61000-4-3 (RS) Level 3, Criteria A EN61000-4-4 (EFT) Level 3, Criteria A EN61000-4-5 (Surge) Level 3, Criteria B EN61000-4-6 (CS) Level 3, Criteria A EN61000-4-8 (PFMF) Field strength 300A/m Criteria A
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

Application

The IBP-202 supports the function of optical path Normal mode and Bypass mode for fiber optical networks. It offers a simple mechanism to switch both of upload and down load fiber path when a power system failure occurs, and a path restores when power back. It offers a simple way to reduce the risk of optical network Node-Down which is caused by the power system.

Figure 1 :IBP-202 Data flow in Normal or Bypass mode

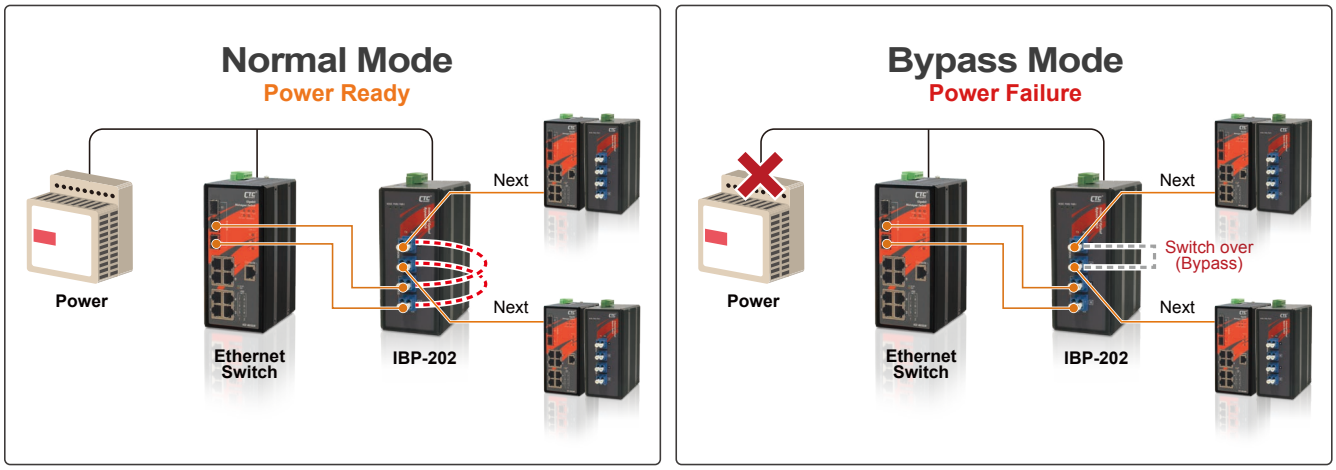


Figure 2 : Application example in line connection

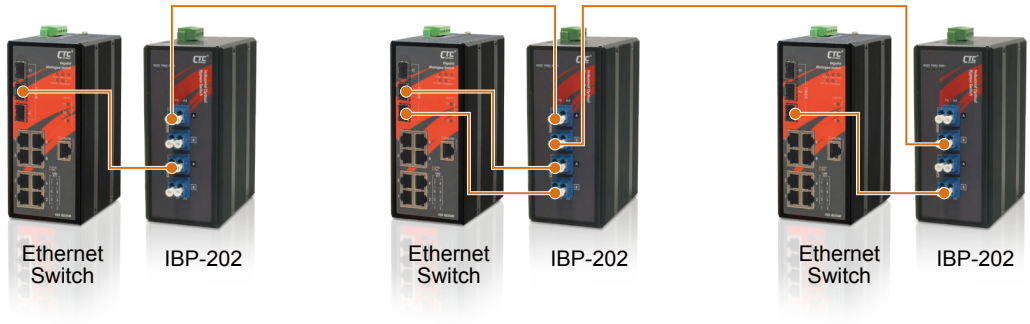
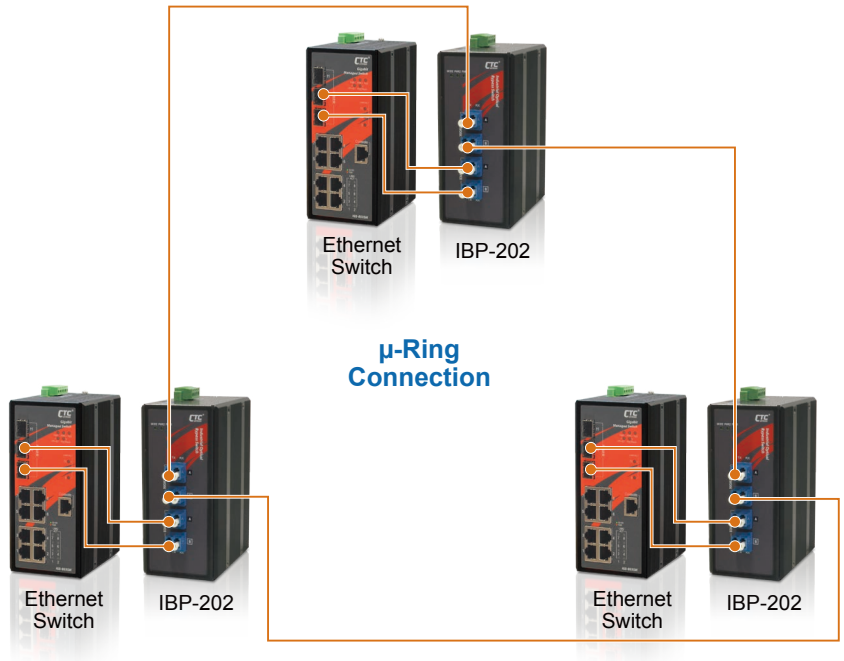
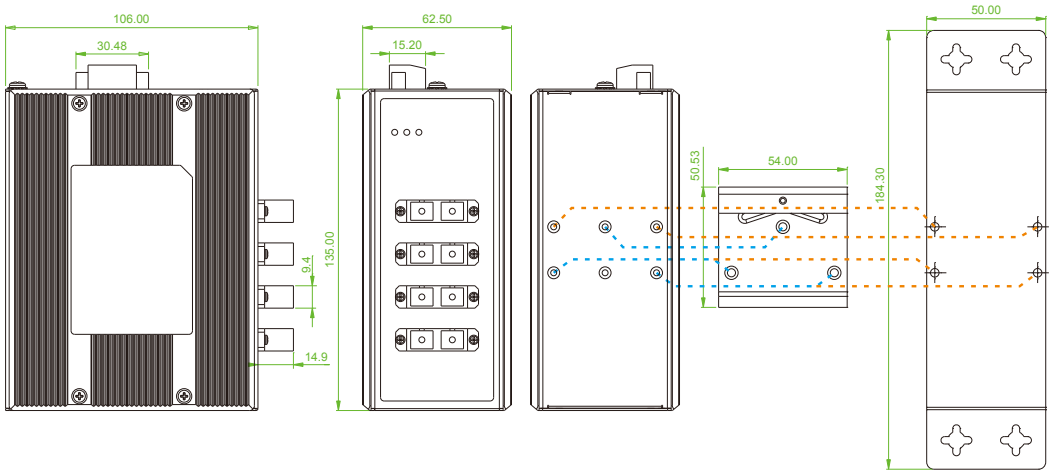


Figure 3 : Application example in ring connection



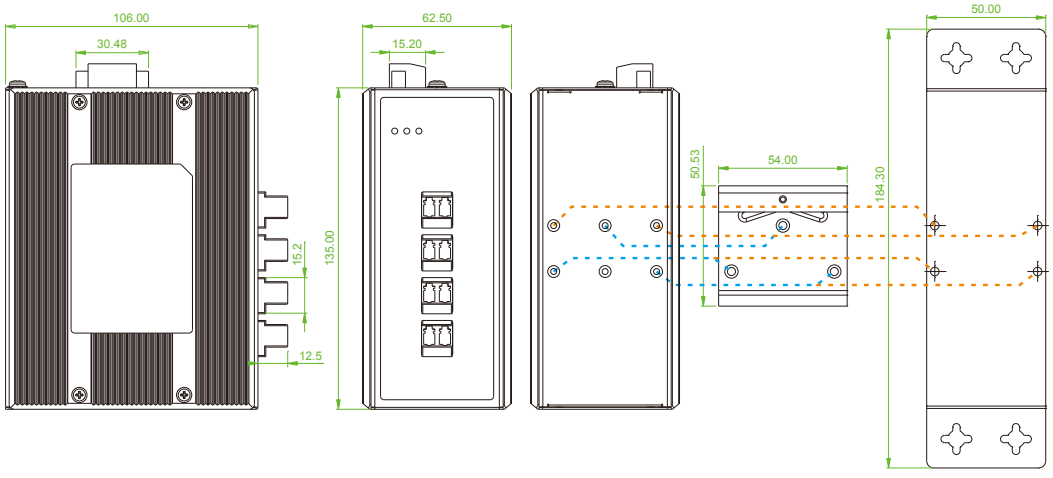
Dimensions

▶ IBP-202 SC Type



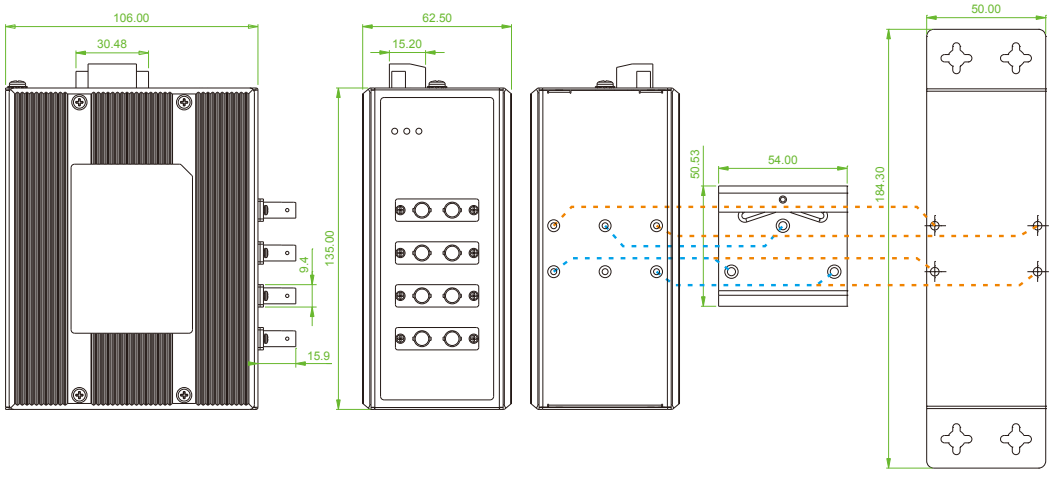
Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

▶ IBP-202 LC Type



Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

▶ IBP-202 ST Type



Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

Ordering Information

Model Name	Fiber connector			Power Input	Certification				Operating Temperature
	Connector type	Connector Q'ty	Data rate	Redundant	EN61000-6-2 EN61000-6-4	EN50121-4	CE	FCC	
IBP-202-SSC	SM SC	4	100M/Giga/10G	12/24/48VDC	V	V	V	V	-20~70°C
IBP-202-SST	SM ST	4	100M/Giga/10G	12/24/48VDC	V	V	V	V	-20~70°C
IBP-202-SLC	SM LC	4	100M/Giga/10G	12/24/48VDC	V	V	V	V	-20~70°C

Package List

- IBP-202 device
- Quick installation guide
- Din Rail with screws
- Terminal block

Optional Accessories

Wall Mount Kit Accessories

IND-WMK02	Wall Mount kit for Industrial product, 184 x 50mm

IFC-FDC-PRO

PROFIBUS to Daisy Chain Fiber Converter

These products are PROFIBUS to fiber optic converters which secure PROFIBUS data transmission via fiber optical cabling for extending distance and isolating EMC/noise to reduce mutual interference between PROFIBUS devices.
These products are protocol transparent, can be applied to the PROFIBUS, and also can be applied to other networks using RS485 interfaces (See Figure 1).

These converters are capable of selecting interface modes for connection to RS-485 2-wire half duplex. Additionally, the terminal block offers an alarm relay contact and two redundant DC power inputs. IFC Series converters are also available in two operating temperature ranges, a standard -10° to 60°C commercial temperature range and an extended -40° to 75°C range. With all these specifically designed features, the series is reliable and an ideal solution for keeping your industrial automation applications running smoothly and continuously even in harsh environments.

Features

- Supports 2x Fiber and 1x RS485
- Extend serial transmission distance up to 500m, 2km, 20km
- Supports several fiber port topology , cable redundancy (Figure 3), ring redundancy (Figure 4), daisy chain (Figure 5), point to point (IFC-FDC-PRO)
- Redundant dual power inputs (12/24/48VDC)
- Protocol transparent. These products can be applied to the PROFIBUS, but also can be applied to other network using RS485 interface
- Baudrate 9.6K up to 12Mbps
- Provides 2 Baudrate mode: Manual mode, or Auto mode (Baudrate autosense)
- 2.5KVrms isolation for serial port
- CE, FCC, heavy industrial grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- Supports relay output for power or link failure warning
- Hardened housing with IP30 protection
- Fanless and DIN-Rail design for harsh industrial environment

Specifications

FieldBus Protocol	Protocol transparent	PROFIBUS and all operations available on RS485
Problem isolation	Isolate EMC/noise to reduce mutual interference between PROFIBUS device (Figure 1) Isolate the PROFIBUS side of the failure, to avoid the impact of the other side (See Figure 2)	
Fiber Port Interface	Connector	SC, ST
	Fiber Port	2 fiber ports
	Fiber Type	M/M 500M, M/M 2KM, S/M 20KM Bidi 20KM
	Wavelength	M/M 850nm or 1310nm, S/M 1310nm Bidi: Mode A : TX1310nm/RX1550nm Mode B : TX1550nm/RX1310nm
Fiber port Topology	Cable redundancy (Figure 3) Ring redundancy (Figure 4) Daisy chain (Figure 5) Point to point	
Serial port Interface	Serial Port Connector	DB9 Female RS-485 : 2 wires, Half duplex
	RS-485 direction	Automatically detection
	Serial port Baudrate	9.6K to 12Mbps Auto mode : Auto sense Baudrate, no need to set Baudrate Manual Mode : Baudrate Set by DIP SW
	Serial port isolation	2.5KVrms isolation for serial signals EMC/noise isolation, to reduce mutual interference between serial port device

Environmental	Operating Temperature	-10 ~ 60°C (IFC-FDC-PRO) -40 ~ 75°C (IFC-FDC-PRO-E)
	Storage Temperature	-40 ~ 85°C
	Humidity	5 ~ 95% RH
LED Indications	PWR1, PWR2, Alarm, Master, TD, RD, Fiber 1 Link, Fiber 2 Link, Ring, System	
Alarm Relay	Alarm exists for power, fiber link or ring protection Relay output with carry capacity 1A @ 24VDC	
Power	Power Input	Redundant Dual Power 12, 24, 48 VDC (9.6 ~ 60VDC)
	Power Consumption	<6W
	Power Reversal Protection	Yes
	Over Current Protection: Signal Short Together Protected	
Terminal Block	For Power and Alarm	
	V1+, V1-, V2+, V2-, Alarm NC, Alarm COM	
Mechanical	Water & Dust Proof	IP30 Protection, Fanless
	Dimensions	85 x 30 x 115mm (D x W x H)
	Mounting	DIN-Rail, or wall mounting (Optional)
	Weight	305g

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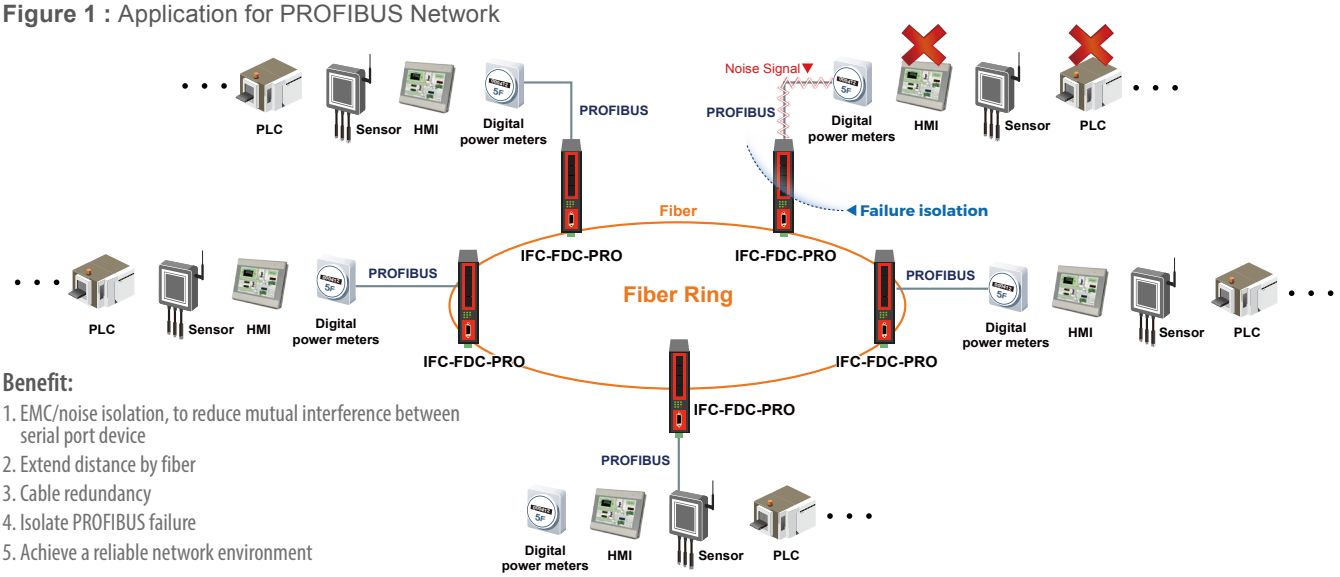
Certification	
EMC	CE (EN55024, EN55032)
EMI	FCC Part 15 Subpart B Class A, CE (EN55032)
Immunity for Heavy Industrial Environment	EN61000-6-2
Emission for Heavy Industrial Environment	EN61000-6-4

EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 ESD Level 3
	EN61000-4-3 RS Level 3
	EN61000-4-4 EFT Level 3
	EN61000-4-5 Surge Level 3
	EN61000-4-6 CS Level 3
Free Fall	IEC 60068-2-32
Vibration	IEC 60068-2-6
Shock	IEC 60068-2-27
Green	RoHS
MTBF	924,615 Hours (MIL-HDBK-217)
Warranty	5 years

Application & Topology (IFC-FDC-PRO)

Figure 1 : Application for PROFIBUS Network



Benefit:

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

Figure 2 : Isolate PROFIBUS Failure

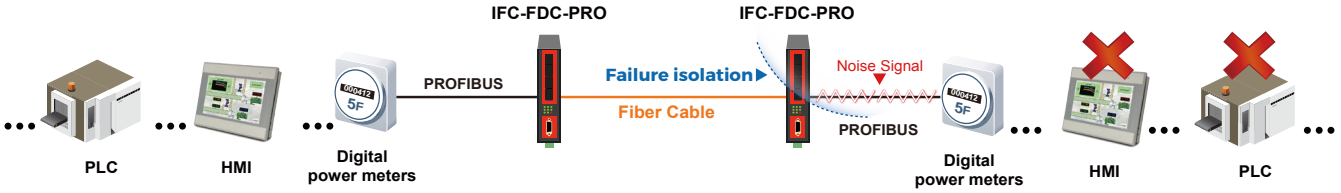


Figure 3 : Fiber Cable Redundancy topology & application

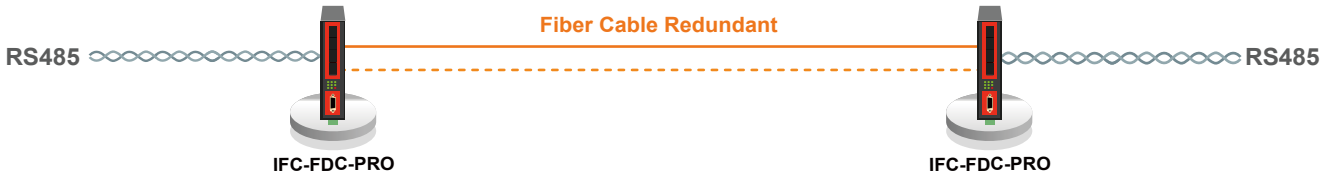


Figure 4 : Fiber Ring Redundancy topology & application

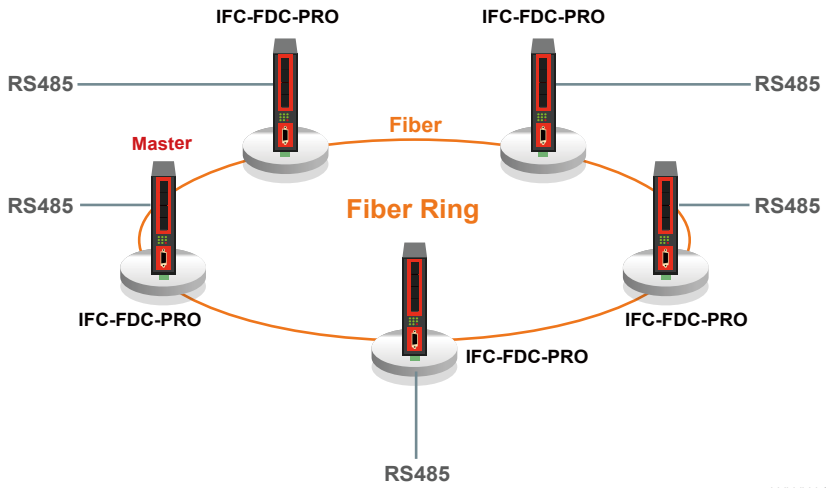
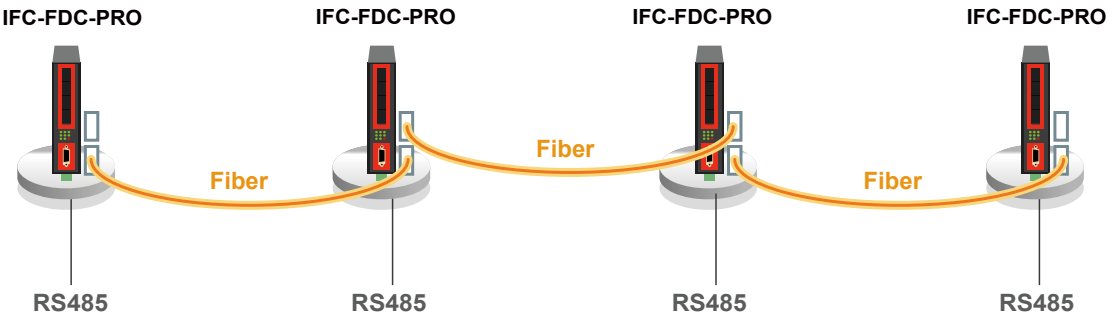
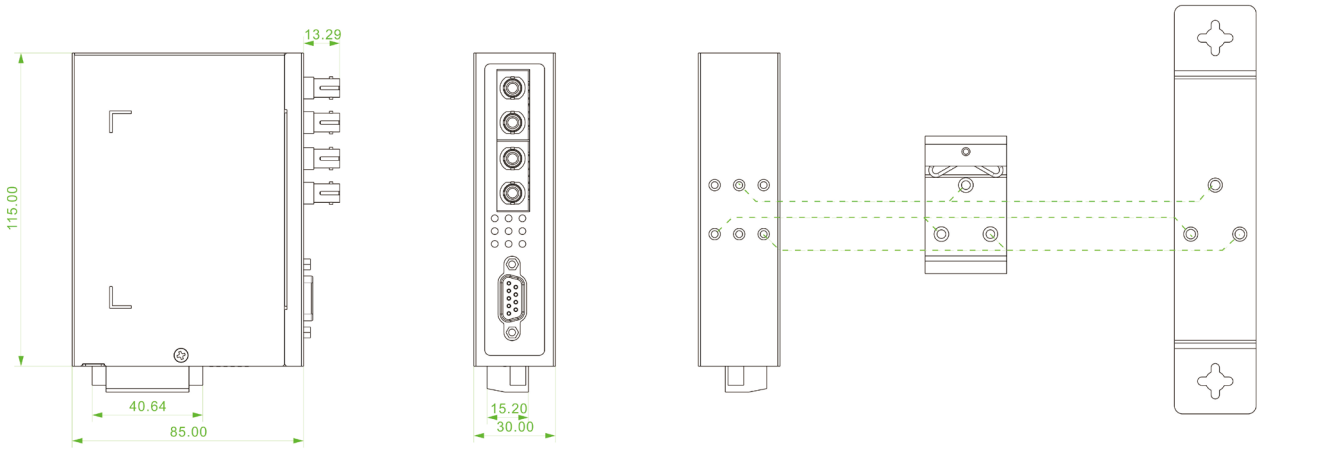


Figure 5 : Fiber Daisy Chain topology & application



Dimensions

▶ IFC-FDC-PRO



Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View

Ordering Information

Model Name	Serial (ProfiBus)		Fiber	Power Input	Certification			Operating Temperature
	RS422/485	Isolation 2.5KV	SC/ST	Redundant	EN61000-6-2 EN61000-6-4	CE	FCC	
IFC-FDC-PRO	1	V	2	12/24/48VDC	V	V	V	-10~60℃
IFC-FDC-PRO-E	1	V	2	12/24/48VDC	V	V	V	-40~75℃

Model Naming Rule

IFC – FDC – PRO – E – SC002

- IFC: Industrial Serial Fiber Converter
- FDC
- PRO: PROFIBUS
- E: -40~75˚C; Blank: -10~60˚C
- SC002: See below for more detail

Connector Type	Connectivity Distance
SC, ST	001: M/M 500meter 002: M/M 2km 020: S/M 20km 020AB: 20km Bidi (20km 1x mode A + 1x Mode B) Mode A: TX 1310nm/RX1550nm Mode B: TX 1550nm/RX1310nm

Temperature / Connector Type / Connectivity Distance

IFC – FDC –PRO– □ – □□□□□

Example: IFC – FDC –PRO – E– SC002

Package List

- One device of the series
- Quick installation guide
- Din Rail with screws
- Terminal block

Optional Accessories

Wall Mount kit Accessories

IND-WMK03	Wall Mount kit for Industrial product (Compact, 150 x 30mm)

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IFC-Serial-PRO

PROFIBUS to Fiber Converter

These products are PROFIBUS to fiber optic converters which secure PROFIBUS data transmission via fiber optical cabling for extending distance and isolating EMC/noise to reduce mutual interference between PROFIBUS devices.
These products are protocol transparent, can be applied to the PROFIBUS, and also can be applied to other networks using RS485 interfaces (See Figure 1).

These converters are capable of selecting interface modes for connection to RS-485 2-wire half duplex. Additionally, the terminal block offers an alarm relay contact and two redundant DC power inputs. IFC Series converters are also available in two operating temperature ranges, a standard -10° to 60°C commercial temperature range and an extended -40° to 75°C range. With all these specifically designed features, the series is reliable and an ideal solution for keeping your industrial automation applications running smoothly and continuously even in harsh environments.

Features

- Supports 1x Fiber and 1x RS485
- Extend serial transmission distance up to 500m, 2km, 20km
- Supports fiber port point to point (Figure 3)
- Redundant dual power inputs (12/24/48VDC)
- Protocol transparent. These products can be applied to the PROFIBUS, but also can be applied to other network using RS485 interface
- Baudrate 9.6K up to 12Mbps
- Provides 2 Baudrate mode: Manual mode, or Auto mode (Baudrate autosense)
- 2.5KVrms isolation for serial port
- CE, FCC, heavy industrial grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- Supports relay output for power or link failure warning
- Hardened housing with IP30 protection
- Fanless and DIN-Rail design for harsh industrial environment

Specifications

FieldBus Protocol	Protocol transparent	PROFIBUS and all operations available on RS485
Problem isolation	Isolate EMC/noise to reduce mutual interference between PROFIBUS device (Figure 1) Isolate the PROFIBUS side of the failure, to avoid the impact of the other side (See Figure 2)	
Fiber Port Interface	Connector	SC, ST
	Fiber Port	1 fiber port
	Fiber Type	M/M 500M, M/M 2KM, S/M 20KM Bidi 20KM
	Wavelength	M/M 850nm or 1310nm, S/M 1310nm Bidi: Mode A : TX1310nm/RX1550nm Mode B : TX1550nm/RX1310nm
Fiber port Topology	Point to point (Figure 3)	
Serial port Interface	Serial Port Connector	DB9 Female RS-485 : 2 wires, Half duplex
	RS-485 direction	Automatically detection
	Serial port Baudrate	9.6K to 12Mbps Auto mode : Auto sense Baudrate, no need to set Baudrate Manual Mode : Baudrate Set by DIP SW
	Serial port isolation	2.5KVrms isolation for serial signals EMC/noise isolation, to reduce mutual interference between serial port device

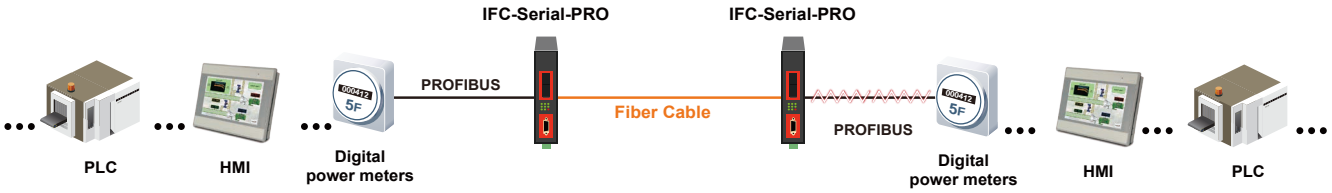
Environmental	Operating Temperature	-10 ~ 60°C (IFC-Serial-PRO) -40 ~ 75°C (IFC-Serial-PRO-E)
	Storage Temperature	-40 ~ 85°C
	Humidity	5 ~ 95% RH
LED Indications	PWR1, PWR2, Alarm, Master, TD, RD, Fiber Link, System	
Alarm Relay	Alarm exists for power, fiber link or ring protection Relay output with carry capacity 1A @ 24VDC	
Power	Power Input	Redundant Dual Power 12, 24, 48 VDC (9.6 ~ 60VDC)
	Power Consumption	<6W
	Power Reversal Protection	Yes
	Over Current Protection: Signal Short Together Protected	
Terminal Block	For Power and Alarm	
	V1+, V1-, V2+, V2-, Alarm NC, Alarm COM	
Mechanical	Water & Dust Proof	IP30 Protection, Fanless
	Dimensions	85x 30x 115mm (D x W x H)
	Mounting	DIN-Rail, or wall mounting (Optional)
	Weight	295g

Certification	
EMC	CE (EN55024, EN55032)
EMI	FCC Part 15 Subpart B Class A, CE (EN55032)
Immunity for Heavy Industrial Environment	EN61000-6-2
Emission for Heavy Industrial Environment	EN61000-6-4

EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 ESD Level 3
	EN61000-4-3 RS Level 3
	EN61000-4-4 EFT Level 3
	EN61000-4-5 Surge Level 3
	EN61000-4-6 CS Level 3
Free Fall	IEC 60068-2-32
Vibration	IEC 60068-2-6
Shock	IEC 60068-2-27
Green	RoHS
MTBF	1,137,875 Hours (MIL-HDBK-217)
Warranty	5 years

Application & Topology

Figure 1 : IFC-Serial-PRO Application for PROFIBUS



Benefit:

1. EMC/noise isolation, to reduce mutual interference between serial port device
2. Extend distance by fiber
3. Isolate PROFIBUS failure
4. Achieve a reliable network environment

Figure 2 : Isolate PROFIBUS Failure

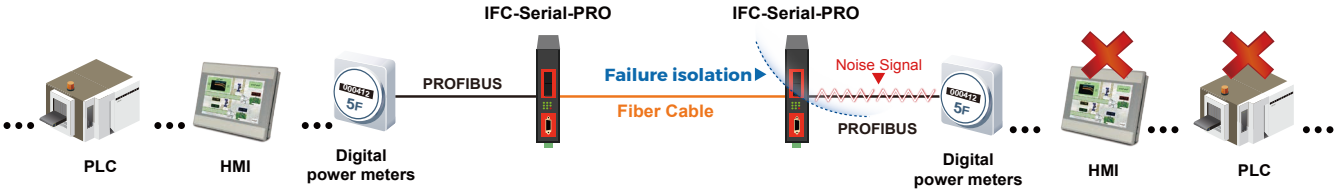
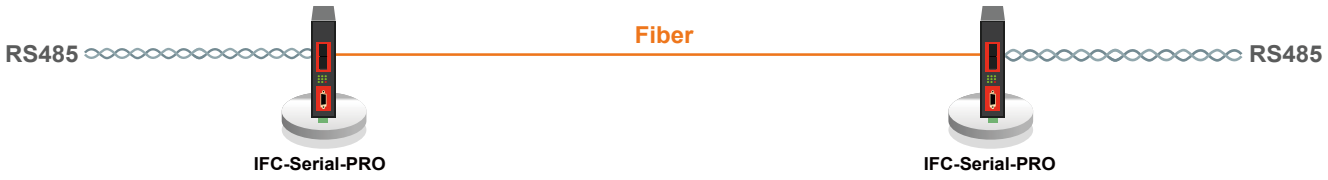


Figure 3 : Fiber Point to Point topology & application



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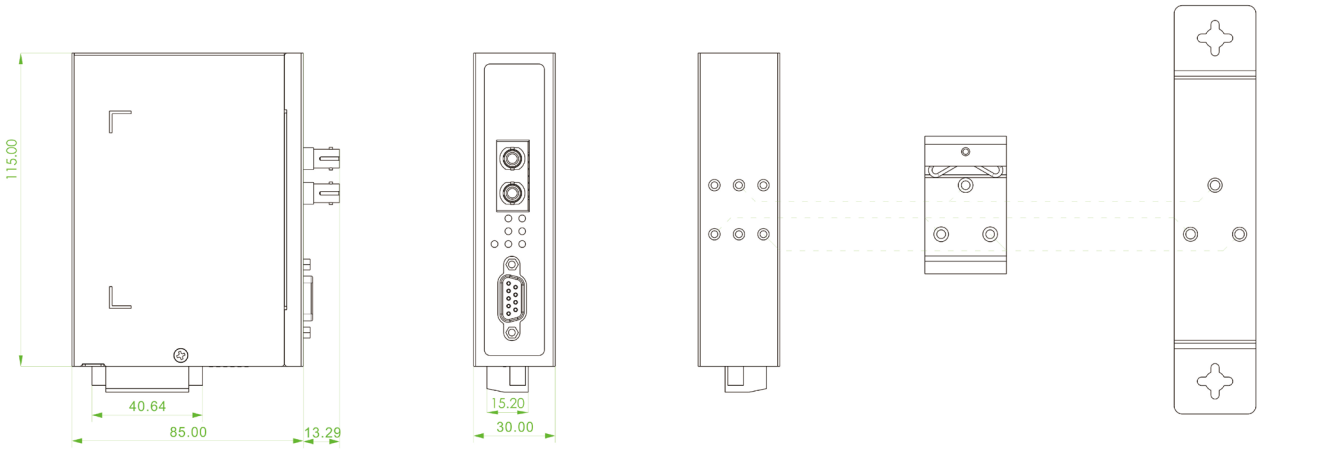
Dimensions

▶ IFC-Serial-PRO



Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View

Ordering Information

Model Name	Serial (ProfiBus)		Fiber	Power Input	Certification			Operating Temperature
	RS422/485	Isolation 2.5KV	SC/ST	Redundant	EN61000-6-2 EN61000-6-4	CE	FCC	
IFC-Serial-PRO	1	V	1	12/24/48VDC	V	V	V	-10~60℃
IFC-Serial-PRO-E	1	V	1	12/24/48VDC	V	V	V	-40~75℃

Model Naming Rule

IFC – Serial – PRO – E – SC002

- IFC: Industrial Serial Fiber Converter
- Serial
- PRO: PROFIBUS
- E: -40~75˚C; Blank: -10~60˚C
- SC002: See below for more detail

Connector Type	Connectivity Distance
SC, ST	001: M/M 500meter 002: M/M 2km 020: S/M 20km 020A: 20km Bidi mode A 020B: 20km Bidi mode B Mode A: TX 1310nm/RX1550nm Mode B: TX 1550nm/RX1310nm

Temperature | Connector Type | Connectivity Distance

IFC – Serial –PRO– □ – □□□□□

Example: IFC – Serial –PRO – E– SC002

Package List

- One device of the series
- Quick installation guide
- Din Rail with screws
- Terminal block

Optional Accessories

Wall Mount kit Accessories

IND-WMK03	Wall Mount kit for Industrial product (Compact, 150 x 30mm)

IFC-Serial

RS-422/485/232 Fiber Converter

The IFC-Serial converter is a capable of selecting interface mode for connection to RS-232 (3 wire), RS-485 (2 wire, half duplex) or RS-422/485 (4 wire, full duplex) and features a three-way communication plus a second independent RS-232 communication channel. Additionally, the terminal block offers an alarm relay contact and two redundant DC power inputs. IFC-Serial is also available in two operating temperature ranges, a standard -10° to 60°C commercial temperature range and an extended -40° to 75°C range. With all these specifically designed features, IFC-Serial is a reliable and ideal solution for keeping your industrial automation applications running smoothly and continuously even in harsh environments. The product is protocol transparent that can be applied to RS485/422/232 networks, such as MODBUS to achieve reliable network (See Figure 2).

Features

- Supports 1 fiber link
- Supports dual channel communication, including Triple-Way communication, and Two-Way communication
- Extend serial transmission distance up to 2km, 30km, 50km
- Supports fiber port point to point (Figure 3)
- Redundant dual power inputs (12/24/48VDC)
- Protocol transparent, suitable for all serial (RS485/422/232) transmission protocol, such as Modbus...
- Baudrate up to 1024kpbs for serial port
- Auto baudrate, no need to set baudrate
- 2.5KV isolation for serial port (RS485/422/232)
- UL60950-1, CE, FCC, heavy industrial grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- Supports relay output for power or link failure warning
- Hardened housing with IP30 protection
- Fanless and DIN-Rail design for harsh industrial environment
- Adjustable pull high/low resistor and terminator for RS-422/485 transmission

Specifications

FieldBus Protocol	Protocol transparent	Protocol applicable to all operations available on RS485/422/232, such as Modbus,…
Data Flow	Dual Channel Communication	Both of Triple-Way and Two-Way Communication Way (Figure 1)
Optical Interface	Connector	SC, ST
	Fiber Port	1 fiber port
	Fiber Type	MM 2km, SM 30km, 50km Bidi 20KM
	Wavelength	MM 1310nm, SM 1310nm Bidi: Mode A : TX1310nm/RX1550nm Mode B : TX1550nm/RX1310nm
	Point to Point Transmission	Full duplex
	Ring Transmission	self-healing operation
Fiber port Topology	Point to point (Figure3)	
Electrical Interface	Serial Port Connector	RS-232 (DB9), RS-422/RS-485 (5 pin terminal block)
		RS-485 : 4, 2 wires, RS-422 : 4 wires
	RS-485 direction	Automatically detection
	Serial port Baudrate	50 to 1024kpbs Auto baudrate, no need to set baudrate
	Serial port isolation	2.5KV isolation for serial signals EMC/noise isolation, to reduce mutual interference between serial port device
	Pull high resistor	Selected by 10 position rotary switch
	Pull low resistor	Selected by 10 position rotary switch
	120 ohm terminator	Built-in 120 ohm terminator (Selected by Dip Switch)

Environmental	Operating Temperature	-10 ~ 60°C (IFC-Serial) -40 ~ 75°C (IFC-Serial-E)
	Storage Temperature	-40 ~ 85°C
	Humidity	5 ~ 95% RH
LED Indications	PWR1, PWR2, Alarm, Master, TD, RD, Fiber Link	
Alarm Relay	Alarm exists for power, fiber link or ring protection Relay output with carry capacity 1A @ 24VDC	
Power	Power Input	Redundant Dual Power 12, 24, 48 VDC (9.6 ~ 58VDC)
	Power Consumption	5W
	Power Reversal Protection	Yes
	Over Current Protection : Signal Short Together Protected	
	Terminal Block for Power and Alarm : Terminal Block : V1+, V1-, V2+, V2-, Alarm NC, Alarm COM, Alarm NO	
Mechanical	Water & Dust Proof	IP30 Protection, Fanless
	Dimensions	106 x 31.6 x 142.1mm (D x W x H)
	Mounting	DIN-Rail, or wall mounting (Optional)
	Weight	0.63kg
Certification	Safety	UL60950-1
	EMC	CE
	EMI	FCC Part 15 Subpart B Class A, CE
	Immunity for Heavy Industrial Environment	EN61000-6-2
	Emission for Heavy Industrial Environment	EN61000-6-4

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Certification	EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 ESD Level 3
		EN61000-4-3 RS Level 3
		EN61000-4-4 EFT Level 3
		EN61000-4-5 Surge Level 3
		EN61000-4-6 CS Level 3

Certification	Free Fall	IEC 60068-2-32
	Vibration	IEC 60068-2-6
	Shock	IEC 60068-2-27
	Green	RoHS
MTBF	847,029 Hours (MIL-HDBK-217)	
Warranty	5 years	

Application & Topology

Figure 1 : Dual Channel Data Flow

Channel 1 : Triple Way
Channel 2 : Two Way

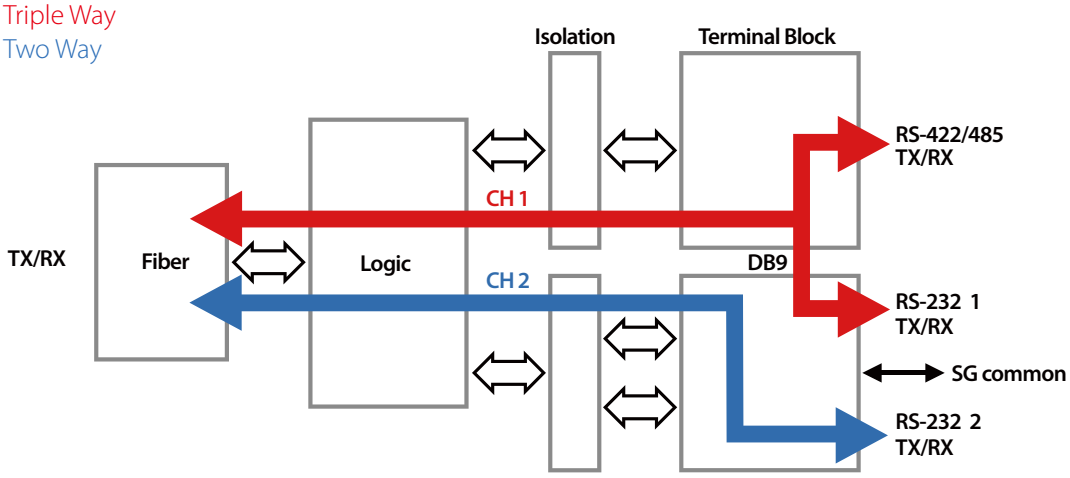
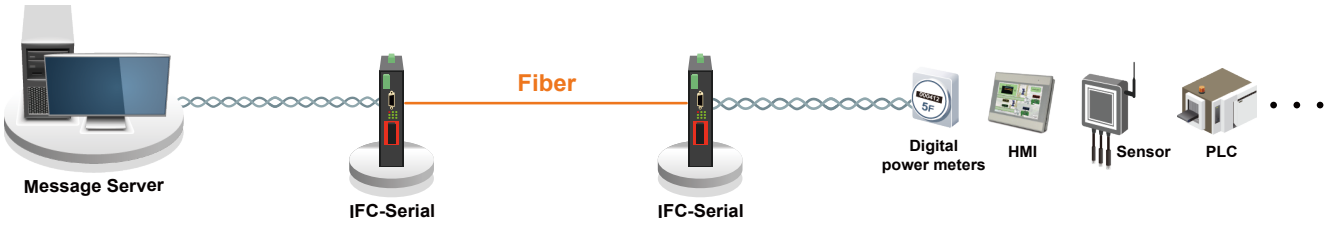


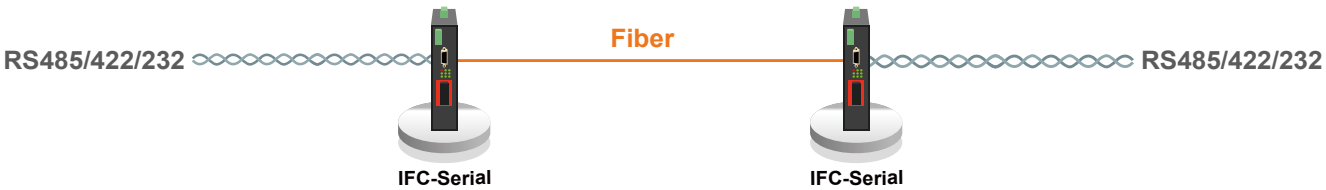
Figure 2 : Application for Modbus Network



Benefit:

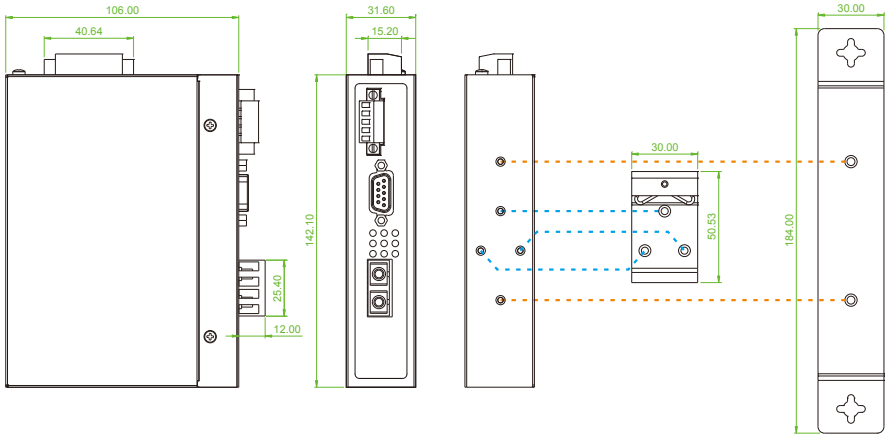
1. EMC/noise isolation, to reduce mutual interference between serial port device
2. Extend distance by fiber
3. Achieve a reliable network environment

Figure 3 : Fiber Point to Point topology & application



Dimensions

▶ IFC-Serial

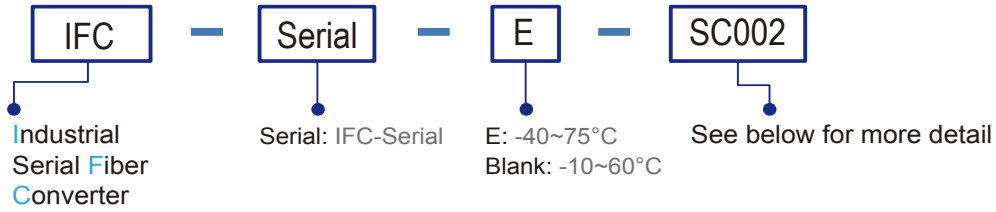


Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

Ordering Information

Model Name	Dual Channel	Serial port (Modbus or others, Field Bus transparent)			Fiber	Power Input	Certification				Operating Temperature
		RS232	RS422/485	Isolation 2.5KV	SC/ST	Redundant	Safety UL60950-1	EN61000-6-2 EN61000-6-4	CE	FCC	
IFC-Serial	V	2	1	V	1	12/24/48VDC	V	V	V	V	-10~60℃
IFC-Serial-E	V	2	1	V	1	12/24/48VDC	V	V	V	V	-40~75℃

Model Naming Rule



Connector Type	Connectivity Distance
SC,ST	002:M/M 2km 030: S/M 30km 050: S/M 50km 020A: 20km Bidi mode A 020B: 20km Bidi mode B Mode A: TX 1310nm/RX1550nm Mode B: TX 1550nm/RX1310nm

Temperature | Connector Type | Connectivity Distance

IFC – Serial – □ – □□□□□

Example: IFC – Serial – E – SC002

■ Package List

- One device of the series
- Quick installation guide
- Din Rail with screws
- Terminal block

Optional Accessories

■ Wall Mount kit Accessories

IND-WMK01	Wall Mount kit for Industrial product, 184 x 30mm

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IFC-FDC

RS422/485/232 Daisy Chain Fiber Converter

The IFC-FDC converter is a capable of selecting interface mode for connection to RS-232 (3 wire), RS-485 (2 wire, half duplex) or RS-422/485 (4 wire, full duplex) and features a three-way communication plus a second independent RS-232 communication channel. Additionally, the terminal block offers an alarm relay contact and two redundant DC power inputs. IFC-FDC is also available in two operating temperature ranges, a standard -10° to 60°C commercial temperature range and an extended -40° to 75°C range. With all these specifically designed features, IFC-FDC is a reliable and ideal solutions for keeping your industrial automation applications running smoothly and continuously even in harsh environments. The product is protocol transparent that can be applied to RS485/422/232 networks, such as MODBUS to achieve reliable network (See Figure 2).

Features

- Supports 2 fiber link
- Supports dual channel communication, including Triple-Way communication, and Two-Way communication
- Extend serial transmission distance up to 2km, 30km, 50km
- Supports fiber port several topology , cable redundancy (Figure 3), ring redundancy (Figure 4), daisy chain (Figure 5), point to point (Figure 6)
- Redundant dual power inputs (12/24/48VDC)
- Protocol transparent, suitable for all serial (RS485/422/232) transmission protocol, such as Modbus...
- Baudrate up to 1024kpbs for serial port
- Auto baudrate, no need to set baudrate
- 2.5KV isolation for serial port (RS485/422/232)
- UL60950-1, CE, FCC, heavy industrial grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- Supports relay output for power or link failure warning
- Hardened housing with IP30 protection
- Fanless and DIN-Rail design for harsh industrial environment
- Adjustable pull high/low resistor and terminator for RS-422/485 transmission

Specifications

FieldBus Protocol	Protocol transparent	Protocol applicable to all operations available on RS485/422/232, such as Modbus,…
Data Flow	Dual Channel Communication	Both of Triple-Way and Two-Way Communication Way (Figure 1)
Optical Interface	Connector	SC, ST
	Fiber Port	2 fiber ports
	Fiber Type	MM 2km, SM 30km, 50km Bidi 20KM
	Wavelength	MM 1310nm, SM 1310nm Bidi: Mode A : TX1310nm/RX1550nm Mode B : TX1550nm/RX1310nm
	Point to Point Transmission	Full duplex
	Ring Transmission	Full duplex
Fiber port Topology	Cable redundancy (Figure 3), ring redundancy (Figure 4), daisy chain (Figure 5), point to point (Figure 6)	
Electrical Interface	Serial Port Connector	RS-232 (DB9), RS-422/RS-485 (5 pin terminal block)
		RS-485 : 4, 2 wires, RS-422 : 4 wires
	RS-485 direction	Automatically detection
	Serial port Baudrate	50 to 1024kpbs Auto baudrate, no need to set baudrate
	Serial port isolation	2.5KV isolation for serial signals EMC/noise isolation, to reduce mutual interference between serial port device
	Pull high resistor	Selected by 10 position rotary switch
	Pull low resistor	Selected by 10 position rotary switch
	120 ohm terminator	Built-in 120 ohm terminator (Selected by Dip Switch)

Environmental	Operating Temperature	-10 ~ 60°C (IFC-FDC,) -40 ~ 75°C (IFC-FDC-E)
	Storage Temperature	-40 ~ 85°C
	Humidity	5 ~ 95% RH
LED Indications	PWR1, PWR2, Alarm, Master, TD, RD, Fiber Link, Fiber 2 Link, Ring	
Alarm Relay	Alarm exists for power, fiber link or ring protection Relay output with carry capacity 1A @ 24VDC	
Power	Power Input	Redundant Dual Power 12, 24, 48 VDC (9.6 ~ 58VDC)
	Power Consumption	6W
	Power Reversal Protection	Yes
	Over Current Protection : Signal Short Together Protected	
	Terminal Block for Power and Alarm : Terminal Block : V1+, V1-, V2+, V2-, Alarm NC, Alarm COM, Alarm NO	
Mechanical	Water & Dust Proof	IP30 Protection, Fanless
	Dimensions	106 x 38.6 x 142.1mm (D x W x H)
	Mounting	DIN-Rail, or wall mounting (Optional)
	Weight	0.64kg
Certification	Safety	UL60950-1
	EMC	CE
	EMI	FCC Part 15 Subpart B Class A, CE
	Immunity for Heavy Industrial Environment	EN61000-6-2
	Emission for Heavy Industrial Environment	EN61000-6-4

Certification	EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 ESD Level 3
		EN61000-4-3 RS Level 3
		EN61000-4-4 EFT Level 3
		EN61000-4-5 Surge Level 3
		EN61000-4-6 CS Level 3

Certification	Free Fall	IEC 60068-2-32
	Vibration	IEC 60068-2-6
	Shock	IEC 60068-2-27
	Green	RoHS
MTBF	739,886 Hours (MIL-HDBK-217)	
Warranty	5 years	

Application & Topology

Figure 1 : Dual Channel Data Flow (IFC-FDC)

Channel 1 : Triple Way
Channel 2 : Two Way

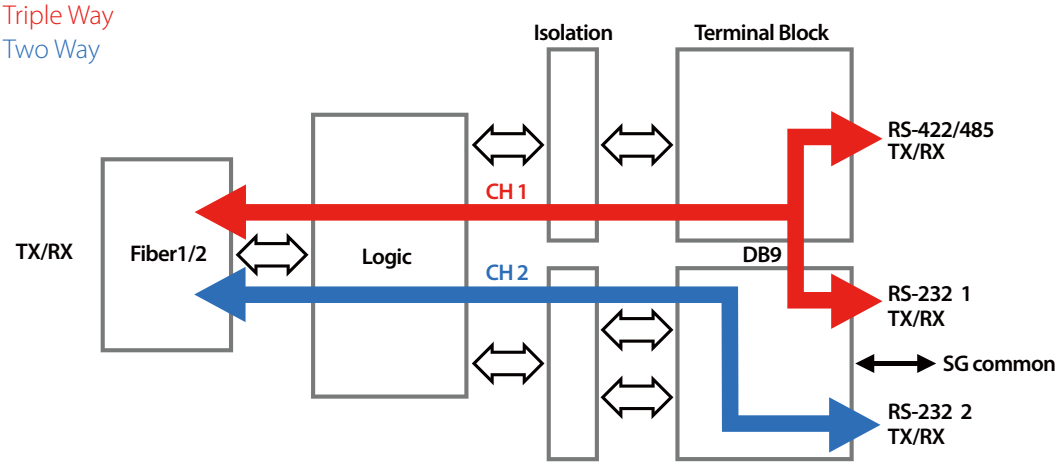
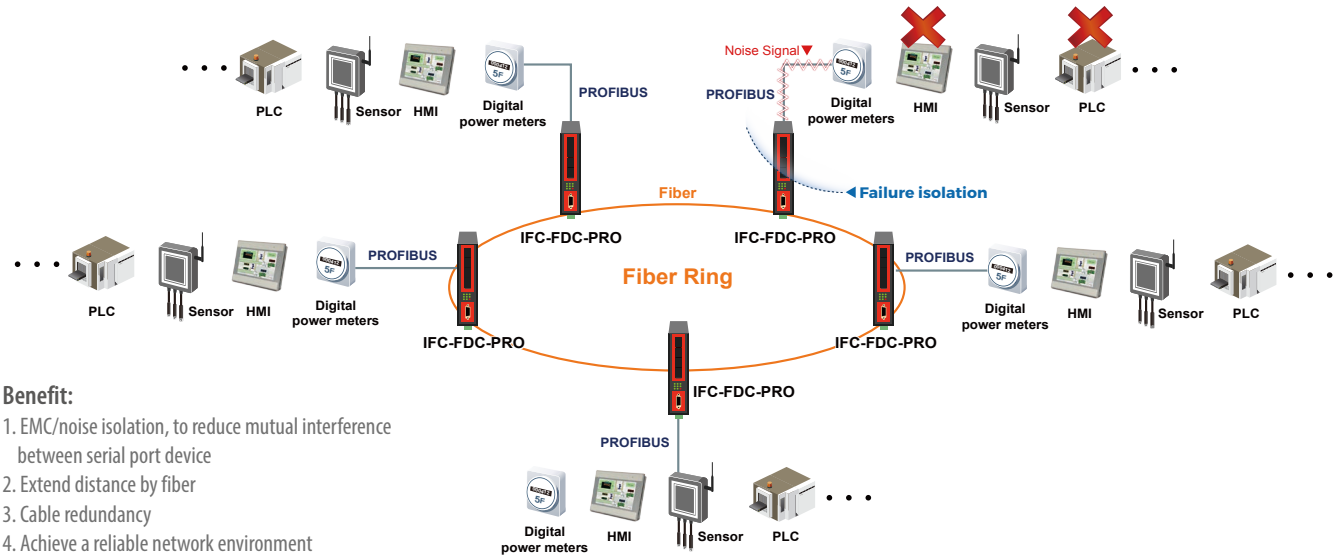


Figure 2 : Application for Modbus Network



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

Figure 3 : Redundant Fiber Point to Point topology & application

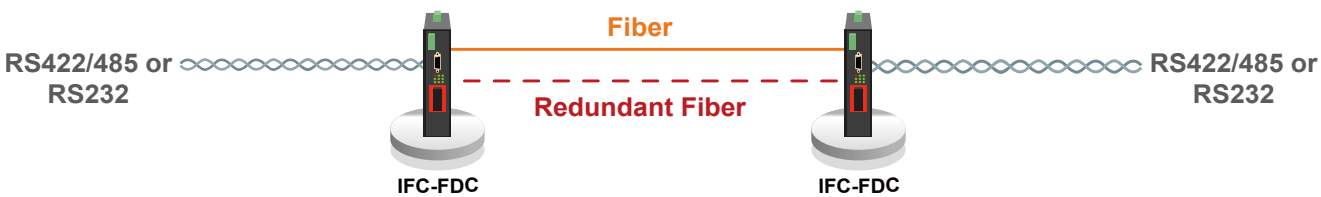


Figure 4 : Fiber Ring Redundancy topology & application

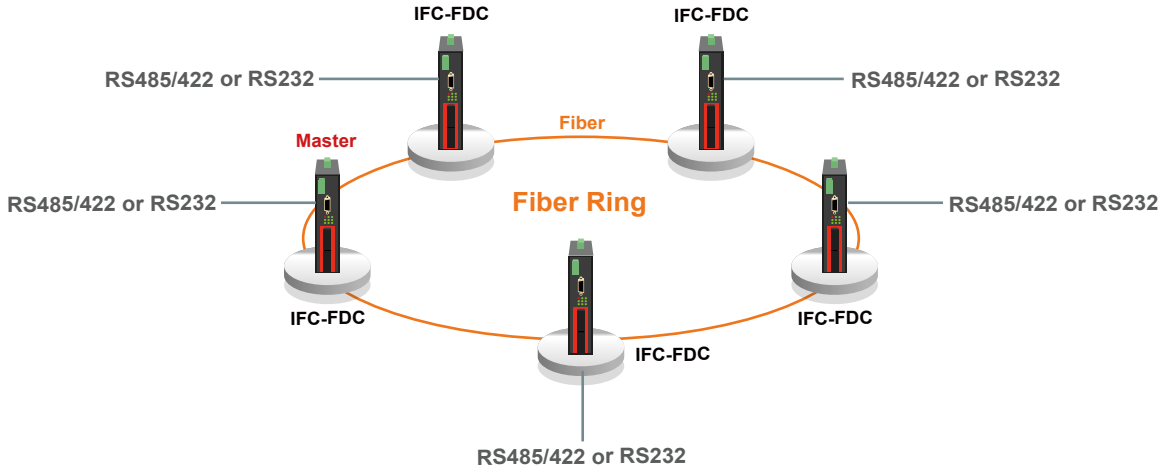


Figure 5 : Fiber Daisy Chain topology & application

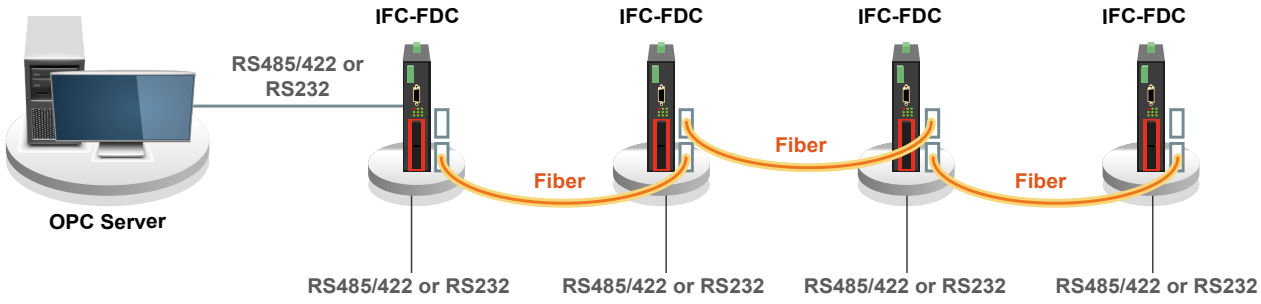
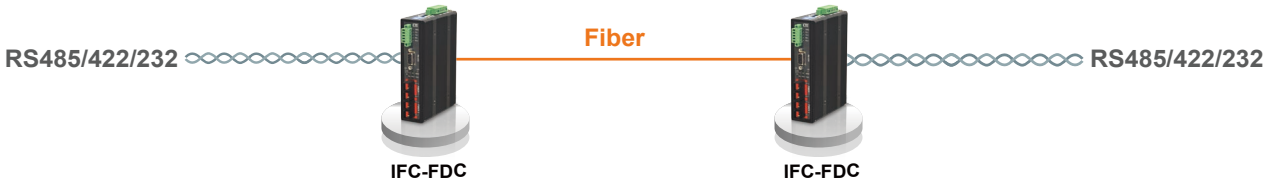
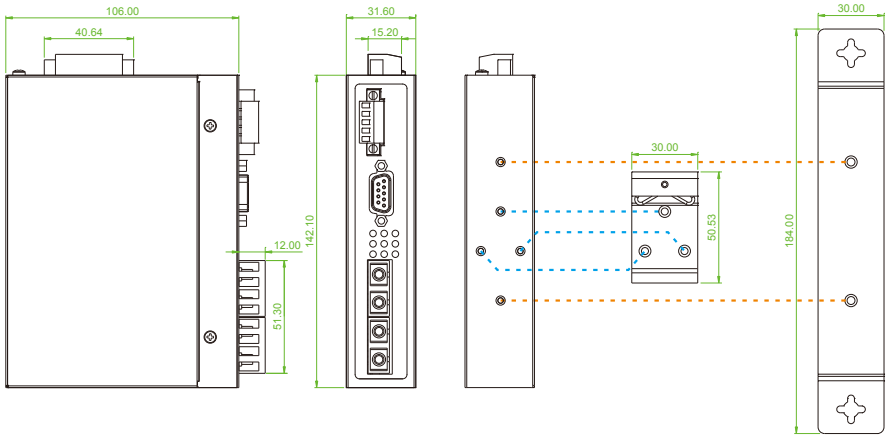


Figure 6 : Fiber Point to Point topology & application



Dimensions

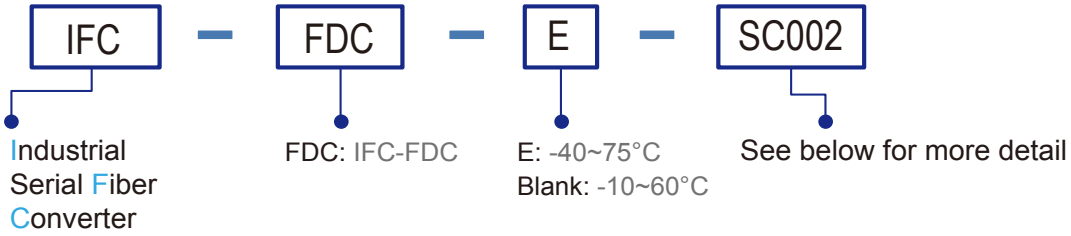
▶ IFC-FDC



Ordering Information

Model Name	Dual Channel	Serial (ModBus or others)			Fiber	Power Input	Certification				Operating Temperature
		RS232	RS422/485	Isolation 2.5KV	SC/ST	Redundant	Safety UL60950-1	EN61000-6-2 EN61000-6-4	CE	FCC	
IFC-FDC	V	2	1	V	2	12/24/48VDC	V	V	V	V	-10~60℃
IFC-FDC-E	V	2	1	V	2	12/24/48VDC	V	V	V	V	-40~75℃

Model Naming Rule



Connector Type	Connectivity Distance
SC, ST	002:M/M 2km 030: S/M 30km 050: S/M 50km 020AB: 20km Bidi (20km 1x mode A + 1x Mode B) Mode A: TX 1310nm/RX1550nm Mode B: TX 1550nm/RX1310nm

Temperature Connector Type Connectivity Distance

IFC – FDC – □ – □□□□□

Example: IFC – FDC – E – SC002

Package List

- One device of the series
- Quick installation guide
- Din Rail with screws
- Terminal block

Optional Accessories

Wall Mount kit Accessories

IND-WMK01	Wall Mount kit for Industrial product, 184 x 30mm

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NEW

IFC-CCF40-HP

4 Channel Binary Transducer

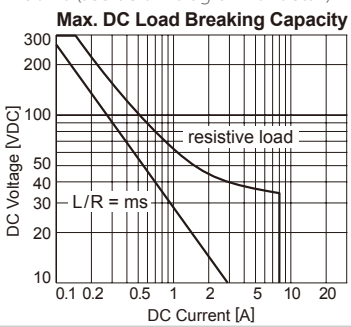
CTC Union IFC-CCF40-HP 4-channel binary transducer registers binary information from contacts via its binary inputs and forwards it, interference-free, to the other side transducer via fiber-optic cable, then the remote site transducer will put out the indications/signals via its contacts. Vice versa. The transducer is equipped with independent and bidirectional binary inputs (4) and contact outputs (4). The four contacts can be used as trip contacts. IFC-CCF40-HP transducer has been designed for usage in substations, water treatment and metallurgical and material engineering application, it's an ideal solution for use in critical environment.

Features

- 4 isolated binary input (BI-1, BI-2, BI-3, BI-4)
- Selectable binary input threshold level by DIP Switch (18V or 70V)
- Maximum 2.5ma input current for binary input channel
- 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
- Support duplex fiber, or single fiber BiDi to save cabling
- AC or DC wide range power input (60~300VDC or 60~264VAC)
- Removable terminal block connector for Power input, Alarm, Binary input and MSR Relay output
- CE, FCC, heavy industrial grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- Supports relay output for power or failure warning
- Hardened housing with IP40 protection
- Fanless and DIN-Rail design for harsh industrial environment

Specifications

Binary Input	4x channel Binary Input (BI-1, BI-2, BI-3, BI-4) Binary input threshold level select by DIP Switch, 18V or 70V threshold Maximum input current 2.5ma per channel	
Contact Relay output	Channel: 4xMSR contact relay (K1, K2, K3, K4) Contact rated voltage: 250VAC Contact maximum switching voltage: 400VAC Contact rated current: 8A AC breaking capacity: Max 2000VA DC resistive load breaking capacity: max. 50~280W (see below diagram for detail) DC inductive load breaking capacity: max. 30W @L/R=50ms (see below diagram for detail)	
Fiber transmission	Connector type: ST/SC, M/M, S/M or Bidi Optional distance: 2KM (M/M) 30KM (S/M), 20KM (Bidi) Fiber cable M/M : Dual fiber 50/125um, 62.5/125um S/M: Dual fiber 9/125um, 10/125um Bidi: Single fiber cable 9/125um, 10/125um	
Removable terminal block connector	Support for Binary input, MSR Relay output, Power input and Alarm	
DIP Switch	SW1: BI-1, BI-2 threshold SW2: BI-3, BI-4 threshold SW3: Debounce SW4: Loopback test	
Environmental	Operating Temperature	-40 ~ 75°C
	Storage Temperature	-40 ~ 85°C
	Humidity	5 ~ 95% RH



LED Indications	PWR (Green): Power on SYS (Green): Normal operation LNK (Green): Fiber link Test / Alarm: ON: Link down, system loss or Power Error Flash: Local loopback test OFF: Normal operation BI-1~BI-4 (Green): Active K-1~K-4 (Green) : Active	
Alarm Relay	Alarm exists for power, fiber link Relay output with carry capacity 1A @ 24VDC	
Power	Power Input	AC or DC wide range input power 60~300VDC or 60~264VAC input range
	Power Consumption	3.6W
	Power Reversal Protection	Supported for power input
	Removable terminal block connector for power input	
Mechanical	Water & Dust Proof	IP40 Protection, Fanless
	Dimensions	106 x 62.5 x 135mm (Dx Wx H)
	Mounting	DIN-Rail, or wall mounting (Optional)
	Weight	815g
Certification		
EMC	CE (EN55032, EN55024)	
EMI	FCC Part 15 Subpart B Class A, CE	
Immunity for Heavy Industrial Environment	EN61000-6-2	
Emission for Heavy Industrial Environment	EN61000-6-4	
EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 ESD Level 3	
	EN61000-4-3 RS Level 3	
	EN61000-4-4 EFT Level 3	
	EN61000-4-5 Surge Level 3	
	EN61000-4-6 CS Level 3	
Free Fall	IEC 60068-2-32	
Vibration	IEC 60068-2-6	
Shock	IEC 60068-2-27	
Green	RoHS	
MTBF	165,680 Hours (MIL-HDBK-217)	
Warranty	5 years	

Application & Topology

Figure 1 : Application connection diagram

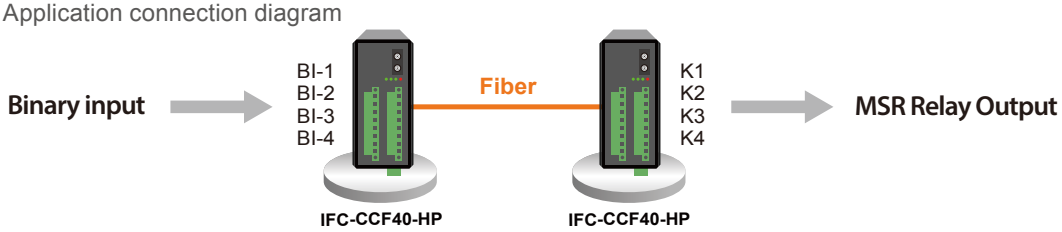
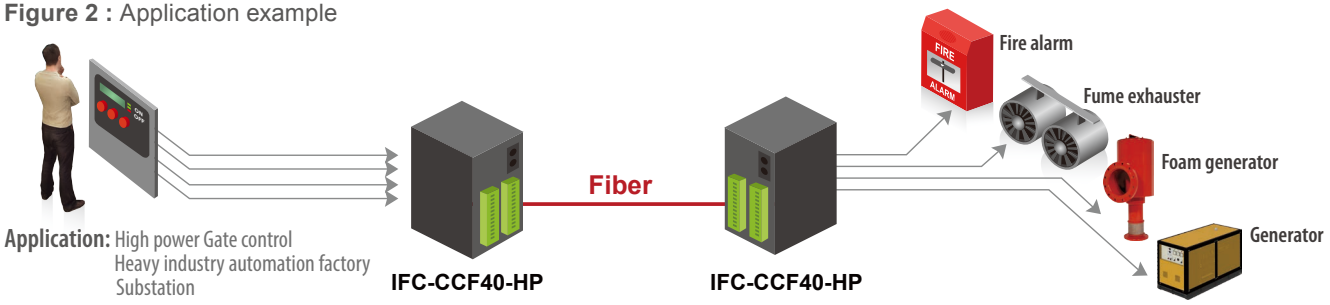
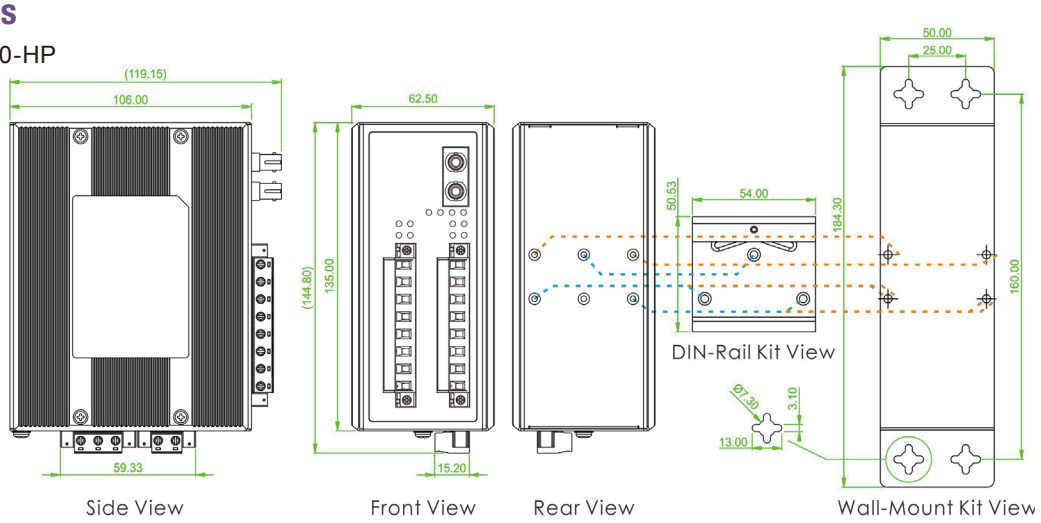


Figure 2 : Application example



Dimensions

▶ IFC-CCF40-HP



Ordering Information

Model Name	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	V	V	V

Model Naming Rule

IFC – CCF40 – HP – ST020A

- IFC: Industrial Serial Fiber Converter
- CCF40: 4x Channel Contact Fiber closure
- HP: High Power
- ST020A: See below for more detail

Connector Type	Connectivity Distance
SC,ST	**Dual fiber** 002: M/M 2km 030: S/M 30km **Single fiber** 020A: 20KM Bidi mode A 020B: 20KM Bidi mode B Mode A: TX 1310nm/RX1550nm Mode B: TX 1550nm/RX1310nm

Temperature / Connector Type / Connectivity Distance

IFC – CCF40 –HP– □ – □□□□□

Example: IFC – CCF40 –HP – ST020A

Package List

- IFC-CCF40-HP device
- Quick installation guide
- Din Rail with screws
- Terminal block

Optional Accessories

Wall Mount kit Accessories

IND-WMK02	Wall Mount kit for Industrial product, 184 x 50mm

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STE100A-232

RS232 Serial Server

STE100A-Serial

RS485/232 Serial Server

The IP Device Server provides the serial device server for hosts to control RS-232, 2 or 4 wire asynchronous RS-422/485 serial devices located virtually anywhere through a TCP/IP or UDP/IP connection. The Device Server has the DB9 port connection on one side, and a 10/100 Mbps Ethernet connection on the other side. It connects serial devices such as PLC, alarm sensors and PTZ camera control to IP networks. Applications include industrial/factory automation, public safety and surveillance systems. The IP Device Server Windows driver is designed to control the IP Serial Server devices. The driver installs a virtual COM on Windows which maps the virtual COM port to the IP address of the IP Serial Server device across the network, enabling the Windows applications to access remote serial devices over Ethernet. IP Device Server can function as a UDP or a server or client for TCP connection. The application scenarios are direct IP mode, virtual COM mode, and paired mode.

Features

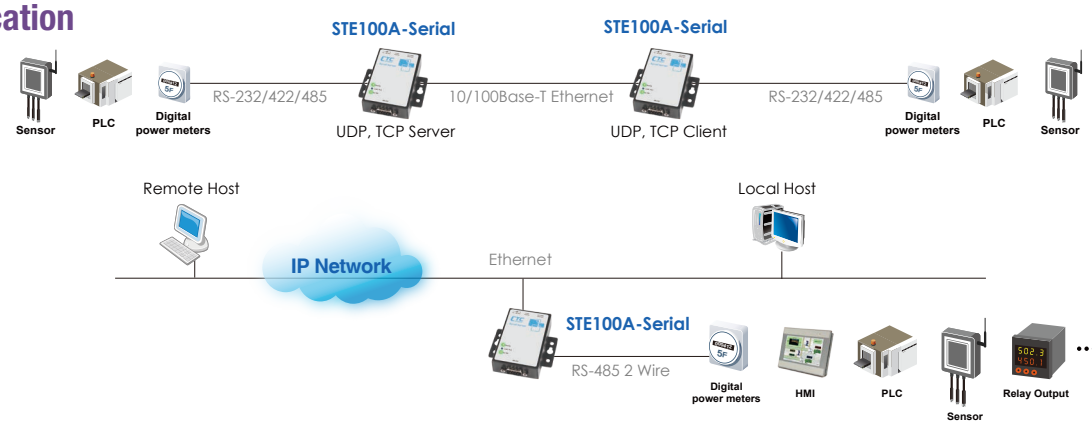
- 10/100Mbps Ethernet port
- 230.4kbps serial interface
- TCP Server, TCP client, Virtual com mode, UDP
- Supports for DHCP, HTTP, ICMP, ARP, IP, UDP, TCP
- Support Virtual COM
- Easy to use with Windows utility
- 2 Wire (half duplex) or 4 Wire (full duplex)RS-422/485 (STE100A-Serial)
- Configurable IEEE 802.3 DA/SA assignment
- Flexible RS-232/422/485 Interface (STE100A-Serial)
- Configuration by web browser
- Low power consumption with 12VDC input
- Wall mount , or Din Rail optional

Specifications

General	LED	Ready, TP Link/Act, Data TX/RX
	OS supported	Windows XP / 2000 / 2003 / 2008 / VISTA / WIN7 / WIN8
Serial Interface	STE100A-Seria l : RS-232/422/485	
	STE100A-232 : RS-232	
Serial Connector	DB9 Male	
Baudrate	110 to 230.4Kbps	
Data bits	5, 6, 7, 8	
Stop bits	1, 1,5 for Data bits 5 mode; 1, 2 for data bits 6, 7, 8 mode	
Parity	None, Even, Odd	
Flow Control	None or RTS / CTS for RS-232 Full Duplex (4-Wire) or Half Duplex (2-Wire) for RS-422/485	
Data Packing Delimiter	1, 2	
LAN Interface	RJ-45 connector, IEEE 802.3 10/100Base-TX	
Communication Modes	TCP Server, TCP Client, Virtual COM mode, UDP	

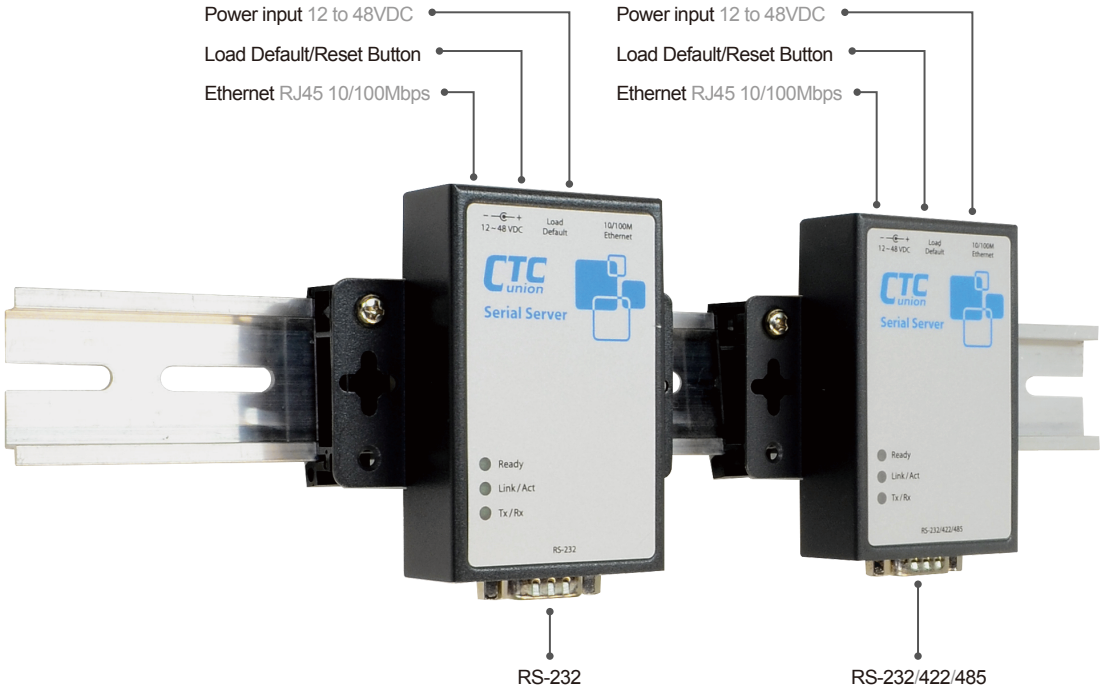
Protocols	TCP, UDP, IP, ARP, ICMP, HTTP, DHCP
Management	Web pages, Firmware upgrade
Security	Password Access
Power	12VDC external switching power adapter
Operating Temperature	0 ~ 60°C
Storage Temperature	-10 ~ 70°C
Humidity	0 – 90% non-condensing
DIN rail mount	DIN-Rail Mounting Kit (Optional)
Panel mount	Yes
Dimensions	85.8 x 84.2 x 22mm (D x W x H) with DIN-Rail Mounting Kit
Certifications	CE, FCC
MTBF	2,501,030 Hours (STE100A-232) 2,385,346 Hours (STE100A-Serial) (MIL-HDBK-217)

Application



Appearance

STE100A-232

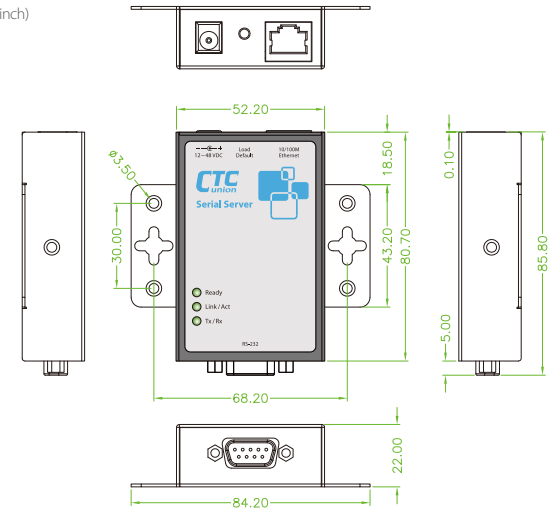


STE100A-Serial

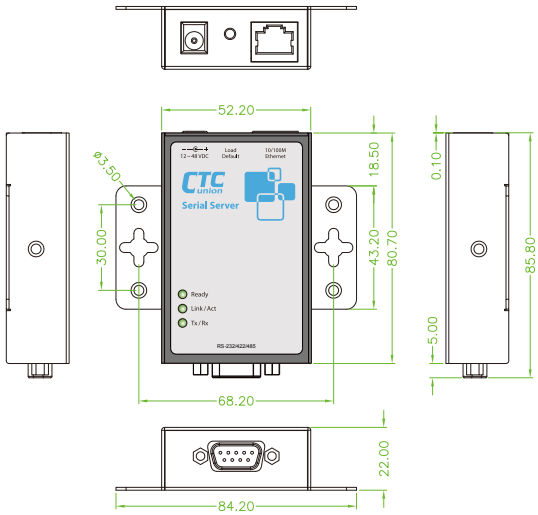
Dimensions

STE100A-232

Unit: mm (inch)



STE100A-Serial



Ordering Information

Model Name	Description
STE100A-232	1-port RS232 device server with AC power adapter
STE100A-Serial	1-port RS232/422/485 device server with AC power adapter

Package List

- One device of the series
- CD (VCOM, Manual)
- 12V DC Switching power adapter
- Rubber Foot

Optional Accessories

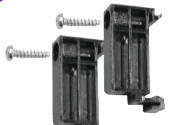
Terminal & Wall Mount Kit

STE100A-Serial-WT	STE100A-Serial DB9 wiring terminal
STE100A/DRK01	STE100A/RS232,STE100A/Serial DIN-Rail Mounting Kit

Industrial Power Supply

DC-APT/12V	-48VDC to 12VDC Adapter - 0.83 Amp, 10 Watts , Output 12 VDC, Input -48VDC

DB9 Wiring Terminal
STE100A-Serial-WT
(only for STE100A-Serial)



Din-Rail Mounting Kit
STE100A/DRK01

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IEXT224-4PH

Long Reach PoE Extenders
(Phone line and Coaxial cable)

IEXT224-4PH is intended to extend the reach of Ethernet Data and IEEE 802.3at Power over Ethernet beyond its natural limitations of 100 meters. The solution works in pairs for point-to-point connectivity. The unit at the local site can transmit data and remote power feeding power over a single pair of telephone UTP wire or Coaxial cable up to 1,200 meters. The unit at the remote side provides four 10/100Base-TX IEEE 802.3at PoE ports for total power budget of 30W and can receive its power from the local unit when power is unavailable at the remote side.
These products are particularly designed for harsh environments, such as industrial networking, traffic surveillance, security automation applications, IP surveillance, city security, intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications.

Features

- Long transmission data and power feeding distance up to 1200 meter
- Complies with IEEE 802.3at PoE
- Simultaneous transmission of Ethernet data and PoE Power over 2 wire Phone line wire or coaxial cable
- Centralized management of power supply
- Eliminated the need for power supply at remote site
- Easy cabling for quick installation
- Quick deployment and easy maintenance.
- Flexible and efficient power management
- Dip Switch option so that remote unit that can be powered by remote-side power or local power.
- Display data rate by LED
- Display real power loading by LED

Specifications

Hardware Standard Interfaces	IEEE 802.3	10Base-T
	IEEE 802.3u	100Base-TX
	IEEE 802.3af	PoE
	IEEE 802.3af	PoE+
	ITU-T G.993.2	VDSL2
Power over Copper PoE Extender with 4x 10/100Base-TX IEEE 802.3at PoE Ports		
Network Connector	Terminal Block for 2 wire telephone UTP cable BNC Female for Coaxial Cable 4 x RJ-45 10/100Base-TX IEEE 802.3at PoE Port	
Dip Switch	SW 1: Selectable Asy (30a) or Sym(17a) (VDSL2 Profile)	
	SW 2 : Selectable target SNR margin 6dB or 9dB	
	SW 3 : Selectable Remote Power: OFF: Enable Feeding power by remote unit (Figure 1) ON: Disable Feeding power by remote unit (Figure 2)	
LED	Active: System Status	
	Local PWR : Local Power mode (See Figure 2)	
	Remote PWR: Remote Power (See Figure 1)	
	PoE: PoE Port Status for per PoE Port	
	PoE Output: 5/15/30 Watts (Display total PoE loading) (Remote power mode)	
	Line Speed: Link/20/40/60/80/100 Mbps	
Standards Support	VDSL2 ITU-T G.993.2	
	VDSL2 Profiles: 17a and 30a	
Protocol Support	Transparent bridging to higher layer protocols	
Operating Temperature	-40°C to 75°C	
Storage Temperature	-40°C to 85°C	
Humidity	10% - 95% (non-condensing)	
Power Supply	Redundant dual 48VDC (44~57VDC) Input power (Removable Terminal Block)	
Power Consumption	65 Watts maximum	
Housing	Rugged Metal, IP30 Protection and fanless	
Dimensions	106.5 x 62 x 135 mm (D x W x H)	
Weight	IEXT-224-4PH-L : 705g (local) IEXT-224-4PH-R : 715g (remote)	
Installation Mounting	DIN Rail mounting, and Wall Mounting (Optional)	
MTBF	IEXT224-4PH : IEXT224-4PH-L - 253,543 Hours IEXT224-4PH-R - 233,606 Hours (MIL-HDBK-217)	
Certification		
EMS	CE, FCC	
Safety	EN60950-1	
Shock	IEC60068-2-27	
Freefall	IEC60068-2-32	
Vibration	IEC60068-2-6	
Transmitting rate and PoE Power budget		

2 wire telephone UTP cable – 24AWG Copper Wire

SNR	6dB		6dB		PoE Output Budget
Profile	Asymmetrical		Symmetrical		
Distance	Upstream Rate (Mbps)	Downstream Rate (Mbps)	Upstream Rate (Mbps)	Downstream Rate (Mbps)	
300 m	65	100	100	100	30W
400 m	45	95	70	70	20W
600 m	30	65	45	45	15W
800 m	10	45	27	27	7W
1,000 m	6	35	18	18	5W
1,200 m	1	20	8	16	4W

Coaxial Cable

SNR	6dB		6dB		PoE Output Budget
Profile	Asymmetrical		Symmetrical		
Distance	Upstream Rate (Mbps)	Downstream Rate (Mbps)	Upstream Rate (Mbps)	Downstream Rate (Mbps)	
400 m	100	100	100	100	30W
600 m	50	100	50	80	20W
800 m	50	100	50	80	15W
1,000 m	45	90	50	60	10W
1,200 m	40	70	50	50	8W

Application

Figure 1 : Remote Power feeding Enable

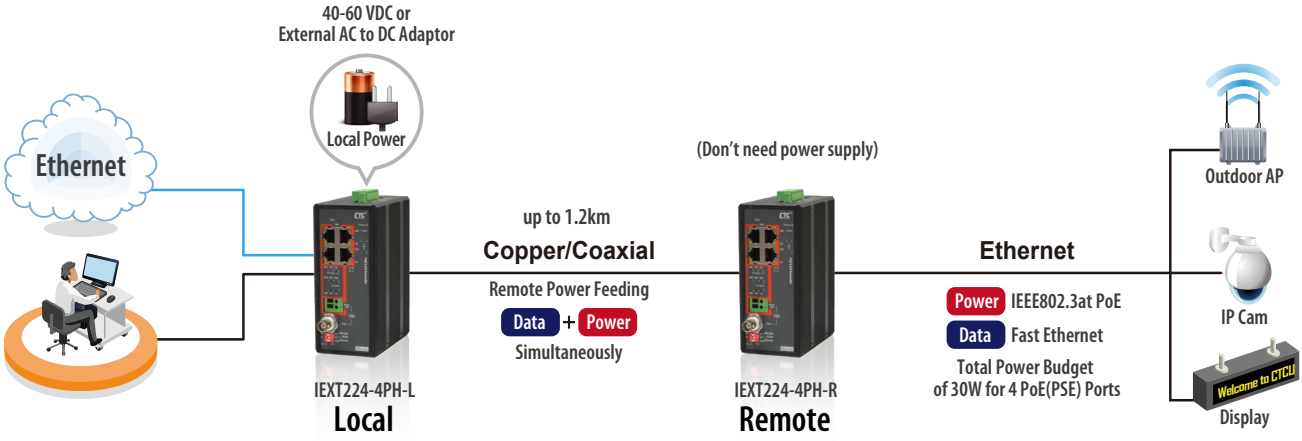
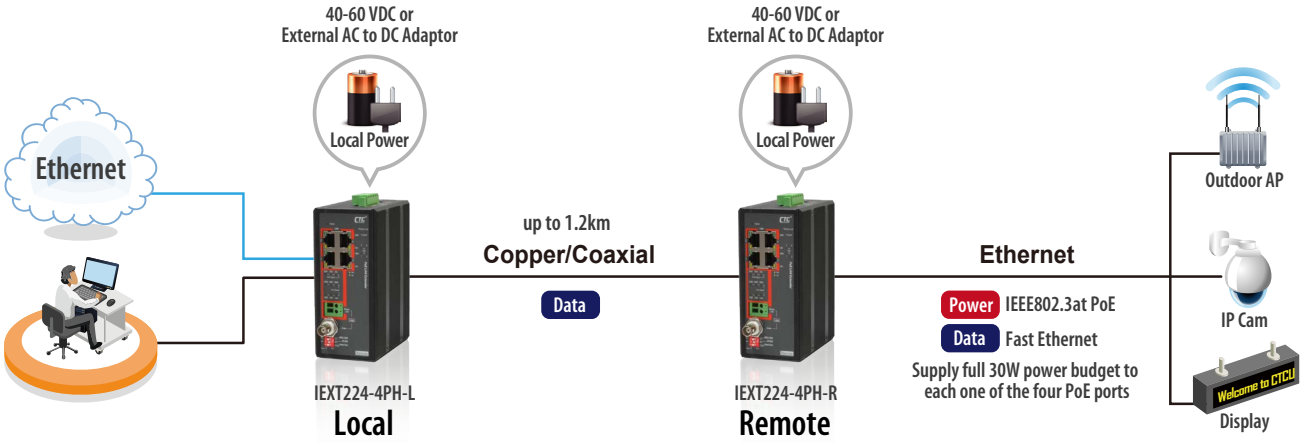
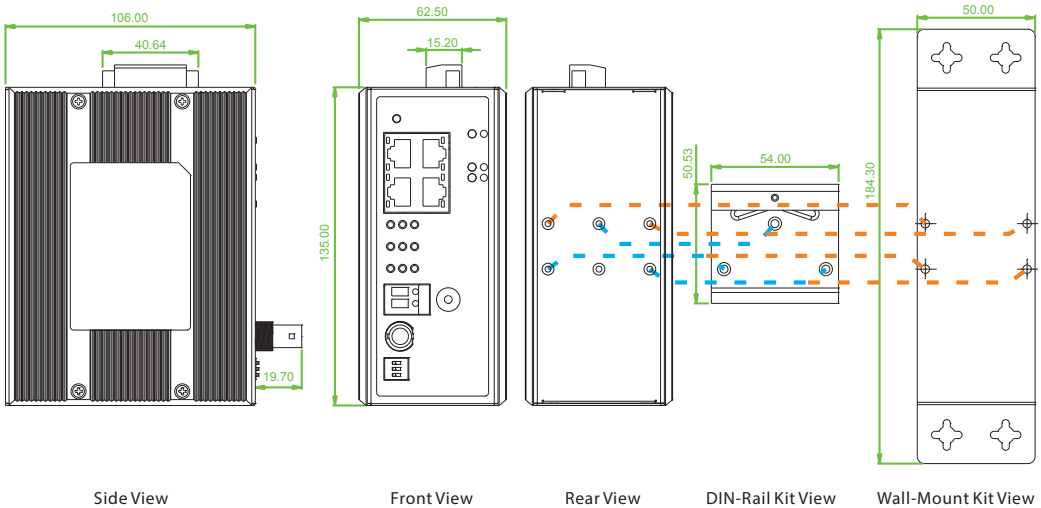


Figure 2 : Remote Power feeding Disable



Dimensions



Ordering Information

Model Name	UTP	Long Distance		PoE Port	Certifiifaction		
	10/100	RJ11	Coaxial	IEEE 802.3at	Safty EN60950-1	CE	FCC
IEXT224-4PH	4	1	1	4	V	V	V

Package List

- One device of the series (1 IEXT-224-4PH-L for local unit, and 1 IEXT-224-4PH-R for remote unit)
- Quick installation guide
- Din Rail with screws
- Terminal block

Optional Accessories

Industrial Power Supply

NDR-120-48	Industrial Power, Input 90 ~ 264VAC / 127 ~ 370VDC, Output 48 VDC, 120W, -20 ~ +70°C

Wall mount kit

IND-WMK02	Wall Mount kit for Industrial product (Wide) (184 x 50mm)

INJ-IG60-24

Gigabit Ethernet PoE+ Injector IEEE 802.3at/af, 15.4/30/36/60/72W (12VDC Booster)

INJ-IG60-24 is an industrial grade, single port, gigabit Ethernet PoE (Power over Ethernet) injector with power boost technology. PoE describes a system to pass electrical power safely, along with data, on Ethernet cabling. The original IEEE 802.3af-2003 PoE standard provides up to 15.4 W of DC power to each device. The updated IEEE 802.3at-2009 PoE standard also known as PoE+ or PoE plus, provides up to 30 W of power. Additionally, INJ-IG60-24 can provide up to 36/60/72W through the non-standard use of all 4 pairs of category 5 cable. Housed in a rugged DIN rail or wall mountable enclosure, this product is designed for harsh environments, such as industrial networking, security, intelligent transportation systems (ITS) and is also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications (See Figure 1). Standard operating temperature range models (-10 to 60°C) and wide operating temperature range models (-40 to 75°C) fulfill the special needs of industrial automation applications.

Features

- Provides 1 port IEEE 802.3at/af PoE Injector
- Power output 15.4W, 30W, 36W, 60W, 72W select by DIP SW
- 12/24/48VDC (10~57VDC) redundant dual input power with built-in very high efficiency booster (91~96%) to rise up 55 VDC for PoE output
- Regulate PoE output voltage (55VDC) to stabilize PoE device, and guarantee delivery PoE power distance to 100meter (Figure 2)
- PoE Mode A/B Select by DIP SW
- 4 Pairs (60W/72W) PD handshake mode select by DIP SW (Such as AXIS® IP cam)
- Wide operating temperature -40 ~ 75°C (INJ-IG60-E24)
- CE, FCC, Safety EN60950-1, Railway traffic EN50121-4 certified
- Heavy industrial grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- IP30 rugged metal housing and fanless

Specifications

IEEE Standard	IEEE 802.3 10Base-T Ethernet
	IEEE 802.3u 100Base-TX Fast Ethernet
	IEEE 802.3ab 1000Base-T Gigabit Ethernet
	IEEE 802.3at Power over Ethernet+, PoE+
	IEEE 802.3af Power over Ethernet, PoE
PoE Standard	IEEE 802.3at, IEEE 802,3af
PoE Standard & RJ-45 Pin Assignment	RJ-45 support IEEE 802.3at/af Middle-Span Alternative B mode or End-Span Alternative A mode, set by DIP SW
	End-Span, Alternative A mode Positive (V+): RJ-45 pin 1, 2. Negative (V-): RJ-45 pin 3, 6. Data (1, 2, 3, 6, 4, 5, 7, 8)
	Middle-Span, Alternative B mode Positive (V+): RJ-45 pin 4,5 Negative (V-): RJ-45 pin 7,8 Data (1, 2, 3, 6, 4, 5, 7, 8)
Network Connector	1 RJ-45 for 10/100/1000Base-T Data, and 1 RJ-45 for 10/100/1000Base-T Data with PoE Output power
Network Cable	UTP/STP above Cat. 5e cable
	EIA/TIA-568 100-ohm (100m)
LED	Per unit: Power 1 (Green), Power 2 (Green), Fault (Amber)
	4/2 Pairs (Green) ON: 4 Pairs PoE Power output for 60/72W PoE OFF: 2 Pairs PoE Power output
DIP SW	SW1 ON: Alt B mode (4,5,7,8) OFF: Alt A mode (1,2,3,6)
	SW2 ON: Hi Power PoE 36W(in 2 pair), or 72W (in 4 pair) OFF: Standard PoE 15.4W/30W (in 2 pair), or 60W (in 4 pair)
	SW3 ON: 4 Pair PoE Pin Ultra-High Power 60W/72W PoE Output OFF: 2 Pair PoE Pin depand on DIP SW 1,2
	SW4 ON: For Particular PD in 4 pair mode, PoE Handshake by pin 1,2,3,6,4,5,7,8 (Such as AXIS® Q60 series) OFF: General PD
Reverse Polarity Protection	Supported for power input
Overload Current Protection	Supported

Power Supply	Redundant Dual DC 12/24/48V (10~57VDC) Input power (Removable Terminal Block)
	Built-in very high efficiency booster(91~96%) to rise up 55 VDC for PoE output
	Regulated PoE output voltage (55VDC) to stabilize PoE device, and guarantee delivery PoE power distance to 100meter (Figure 2)
PoE Power Budget	Maximum Ultra High Power 60W, IEEE 802.3at 30W, IEEE 802.3at High power 36W, IEEE 802.3af 15.4W
Power Consumption	INJ-IG60-24 in 30W mode (2 Pair)

Input Voltage	Input Power Consumption	Device Power Consumption	PoE Power Budge	Boost Efficiency
12VDC	33.9W	1.1W	30W	91.46%
24VDC	33W	1.4W	30W	94.90%
48VDC	33.2W	1.9W	30W	95.80%

INJ-IG60-24 in 60W mode (4 Pair)

Input Voltage	Input Power Consumption	Device Power Consumption	PoE Power Budge	Boost Efficiency
12VDC	67.1W	1.1W	60W	90.90%
24VDC	65.2W	1.4W	60W	94.10%
48VDC	64.7W	1.9W	60W	95.50%

Alarm Relay Contact	Relay outputs with current carrying capacity of 1 A @24VDC
Removable Terminal Block	Provides 2 redundant power, alarm relay contact, 6 Pin
Operating Temperature	-10 ~ 60°C (INJ-IG60-24)
	-40 ~ 75°C (INJ-IG60-E24)
Operating Humidity	5% to 95% (Non-condensing)
Storage Temperature	-40 ~ 85°C
Housing	Rugged Metal, IP30 Protection and fanless
Dimensions	106 x 31.6 x 142 mm (D x W x H)
Weight	0.425kg
Installation Mounting	DIN Rail mounting, or Wall Mounting (Optional)
MTBF	1,403,339 Hours (MIL-HDBK-217)
Warranty	5 years

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Certification	
EMC	CE (EN55024, EN55032)
EMI	FCC Part 15 Subpart B Class A, CE
Railway Traffic	EN50121-4
Immunity for Heavy Industrial environment	EN 61000-6-2
Emission for Heavy industrial environment	EN 61000-6-4

EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B
	EN61000-4-3 (RS) Level 3, Criteria A
	EN61000-4-4 (EFT) Level 3, Criteria A
	EN 61000-4-5 (Surge) Level 3, Criteria B
	EN 61000-4-6 (CS) Level 3, Criteria A
	EN61000-4-8 (PFMF) Field strength 300A/m Criteria A
Safety	EN60950-1
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

Application

Figure 1 : INJ-IG60-24 Giagabit Ethernet PoE Injector

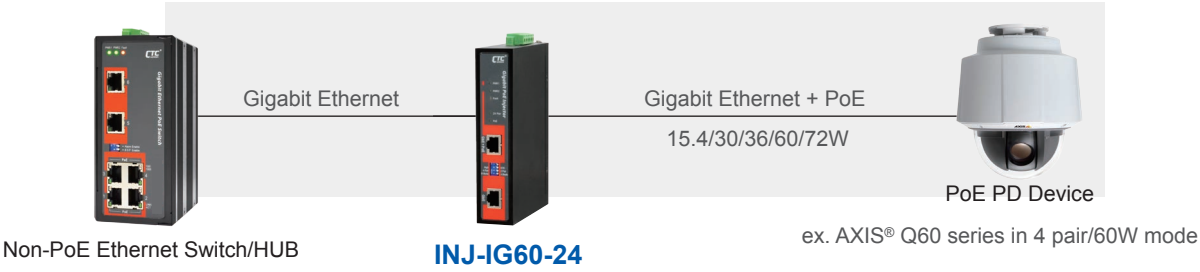
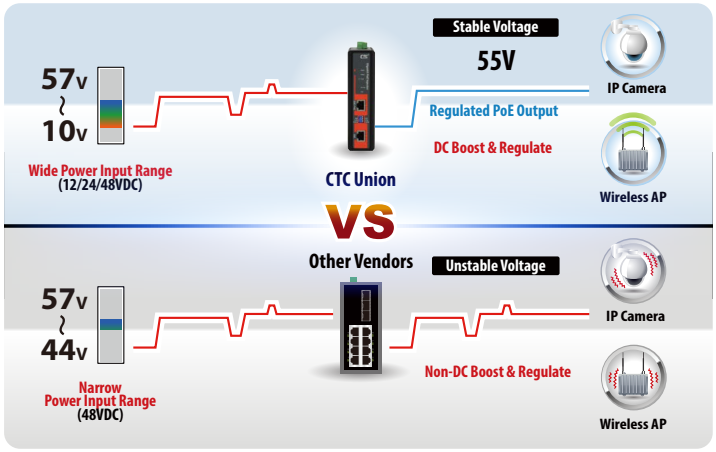
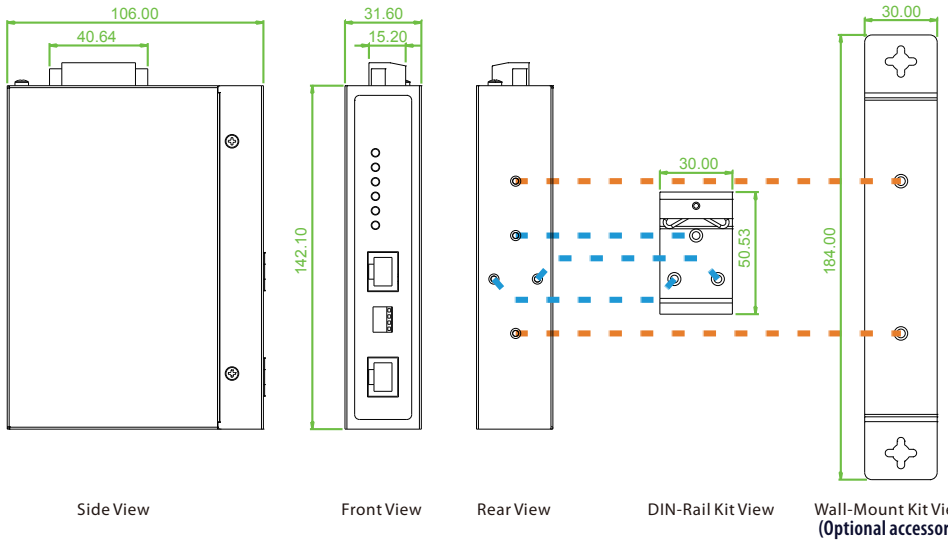


Figure 2 : Very high efficiency boost technology for PoE



- Regulated PoE output voltage (55VDC) to stabilize PoE device
- Guarantee delivery PoE power distance to 100 meter
- Wide range input power 12/24/48VDC (10~57VDC)
- Built-in very high efficiency (91~96%) to boost PoE output voltage

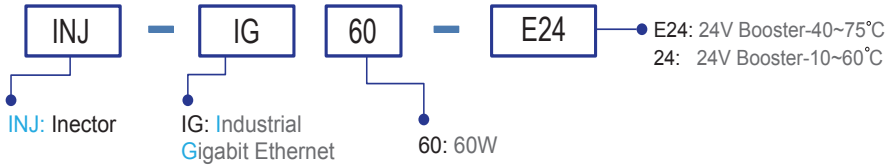
Dimensions



Ordering Information

Model Name	Ethernet	PoE Port		Power input	Certification				Operating Temperature
	10/100/1000 Base-T	IEEE 802.3at (PSE)	Power Budget	Redundant	Safety EN60950-1	Railway EN50121-4	EN61000-6-2 EN61000-6-4	CE FCC	
INJ-IG60-24	1	1	15/30/36/60/72W	12/24/48VDC	V	V	V	V	-10~60℃
INJ-IG60-E24	1	1	15/30/36/60/72W	12/24/48VDC	V	V	V	V	-40~75℃

Model Naming Rule



Package List

- INJ-IG60-24 device
- Quick installation guide
- Din Rail with screws
- Terminal block

Optional Accessories

Wall mount kit Accessories

IND-WMK01	Wall Mount kit for Industrial product, 184 x 30mm

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INJ-IG01-PH

Gigabit Ethernet PoE+ Injector IEEE 802.3at/af, 15.4/30/36/60W *(Compact)*

INJ-IG01-PH is an industrial grade, single port, gigabit Ethernet PoE (Power over Ethernet) injector. PoE describes a system to pass electrical power safely, along with data, on Ethernet cabling. The original IEEE 802.3af-2003 PoE standard provides up to 15.4 W of DC power to each device. The updated IEEE 802.3at-2009 PoE standard also known as PoE+ or PoE plus, provides up to 30 W of power. Additionally, INJ-IG01-PH can provide up to 36/60W through the non-standard use of all 4 pairs of category 5 cable. Housed in a rugged DIN rail or wall mountable enclosure, this product is designed for harsh environments, such as industrial networking, security, intelligent transportation systems (ITS) and is also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications (See Figure 1). Standard operating temperature range models (-10 to 60°C) and wide operating temperature range models (-40 to 75°C) fulfill the special needs of industrial automation applications.

Features

- Provides 1 port IEEE 802.3at/af PoE Injector
- Power output 15.4W, 30W, 36W, 60W select by DIP SW
- PoE Mode A/B Select by DIP SW
- 4 Pairs PD handshake mode select by DIP SW (Such as AXIS® IP cam)
- CE, FCC, Railway traffic EN50121-4 certified
- Heavy industrial grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- Wide operating temperature -40 ~ 75°C (INJ-IG01-PHE)
- IP30 rugged metal housing and fanless

Specifications

IEEE Standard	IEEE 802.3 10Base-T Ethernet
	IEEE 802.3u 100Base-TX Fast Ethernet
	IEEE 802.3ab 1000Base-T Gigabit Ethernet
	IEEE 802.3at, IEEE802.3af
PoE Standard	IEEE 802.3at, IEEE802,3af
PoE Standard & RJ-45 Pin Assignment	RJ-45 support IEEE 802.3at/af Middle-Span Alternative B mode or End-Span Alternative A mode, set by DIP SW
	End-Span, Alternative A mode Positive (V+): RJ-45 pin 1, 2. Negative (V-): RJ-45 pin 3, 6. Data (1, 2, 3, 6, 4, 5, 7, 8)
	Middle-Span, Alternative B mode Positive (V+): RJ-45 pin 4,5 Negative (V-): RJ-45 pin 7,8 Data (1, 2, 3, 6, 4, 5, 7, 8)
Network Connector	1 RJ-45 for 10/100/1000Base-T Data, and 1 RJ-45 for 10/100/1000Base-T Data with PoE Output power
Network Cable	UTP/STP above Cat. 5e cable
	EIA/TIA-568 100-ohm (100m)
LED	Per unit: Power (Green)
	Alt A/PoE ,Alt B/PoE (Green) ON when a PD device is connected to the GbE+PoE RJ-45 connector and the Injector is feeding power in Alt A or B mode. Blinking One of the Injector faults (overload, short circuit or over-temperature) occurs.
DIP SW	SW1 ON: Alternative B mode PoE Power Pin 4, 5, 7, 8 (When DIP SW 3 Off) OFF: Alternative A mode PoE Power Pin 1, 2, 3, 6 (When DIP SW 3 Off)
	SW2 ON: Hi Power 36W 36W PoE output OFF: Standard PoE 802.3af (15.4W), 802.3at (30W)
	SW3 ON: 4 Pair PoE Pin Ultra-High Power 60W PoE Output OFF: 2 Pair PoE Pin depand on DIP SW 1,2
	SW4 60W PD handshake mode OFF: General PD at ether 2 or 4 pairs mode ON: Compatible with some particular PD devices at high power mode (4 Pair mode),such as AXIS® Q60
Reverse Polarity Protection	Supported for power input

Overload Current Protection	Supported
Power Supply	(44~57VDC) Input power (Removable Terminal Block)
PoE Power Output	Maximum Ultra High Power 60W, IEEE 802.3at 30W, IEEE 802.3at High power 36W, IEEE 802.3af 15.4W
Power Consumption	

	In 30W mode (2 Pairs)	In 60W mode (4 Pairs)
Input Power Consumption (Input 48VDC)	31.1W	62.8W
PoE Output Power	30W	60W

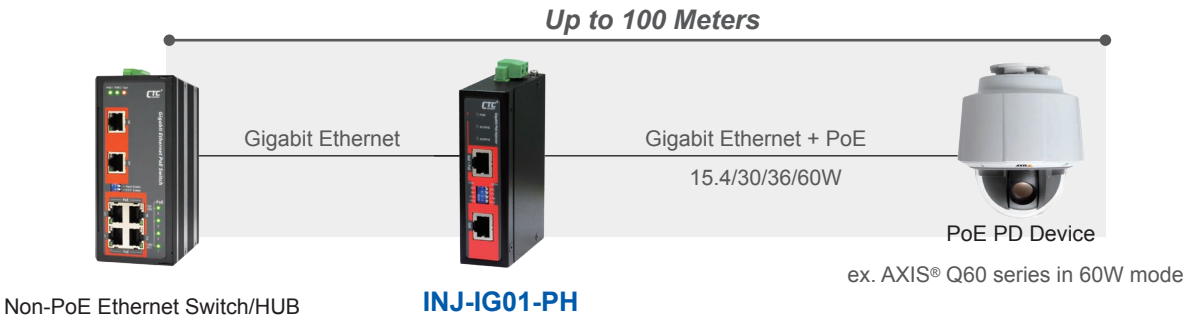
Removable Terminal Block	Provides 2 Pin for power input connectorn
Operating Temperature	-10 ~ 60°C (INJ-IG01-PH)
	-40 ~ 75°C (INJ-IG01-PHE)
Operating Humidity	5% to 95% (Non-condensing)
Storage Temperature	-40 ~ 85°C
Housing	Rugged Metal, IP30 Protection and fanless
Dimensions	70 x 30 x 103 mm (D x W x H)
Weight	215g
Installation Mounting	DIN Rail mounting, and Wall Mounting (Optional)
MTBF	2,108,634 Hours (MIL-HDBK-217)
Warranty	5 years
Certification	
EMC	CE
EMI	FCC Part 15 Subpart B Class A, CE
Railway Traffic	EN50121-4
Immunity for Heavy Industrial environment	EN 61000-6-2
Emission for Heavy industrial environment	EN 61000-6-4

EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B
	EN61000-4-3 (RS) Level 3, Criteria A
	EN61000-4-4 (EFT) Level 3, Criteria A
	EN 61000-4-5 (Surge) Level 3, Criteria B
	EN 61000-4-6 (CS) Level 3, Criteria A
	EN61000-4-8 (PFMF) Field strength 300A/m Criteria A

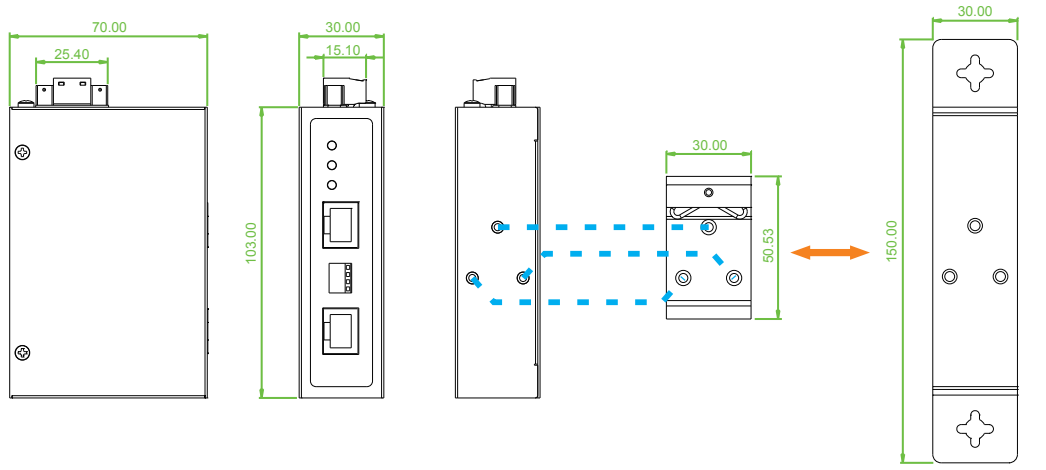
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

Application

Figure : INJ-IG01-PH Giagabit Ethernet PoE Injector



Dimensions

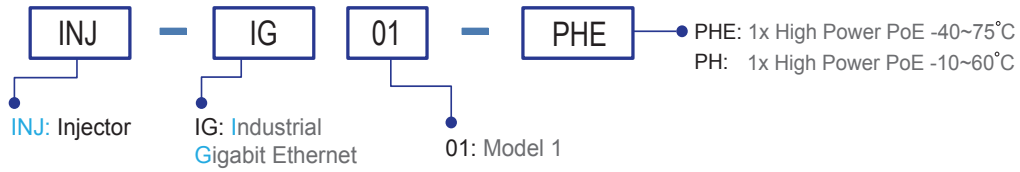


Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

Ordering Information

Model Name	Ethernet	PoE Port		Power input	Certification				Operating Temperature
	10/100/1000 Base-T	IEEE 802.3at (PSE)	Power Budget	Single power	Railway EN50121-4	EN61000-6-2 EN61000-6-4	CE	FCC	
INJ-IG01-PH	1	1	15/30/36/60	48VDC	V	V	V	V	-10~60℃
INJ-IG01-PHE	1	1	15/30/36/60	48VDC	V	V	V	V	-40~75℃

Model Naming Rule



Package List

- INJ-IG01-PH device
- Quick installation guide
- Din Rail with screws
- Terminal block

Optional Accessories

Wall mount kit Accessories

IND-WMK03	Wall Mount kit for Industrial product (Compact, 150 x 30mm)

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INJ-G30

Gigabit Ethernet IEEE 802.3af/at High Power Injector

CE FC

This device consists of 1 PoE Injector ports. That can solve the limitation of the power outlet location and offer the system designer a flexible solution to locate the network device everywhere. The compact size and wall mounting was specifically designed for easy installation. It can be installed where space is limited; moreover, it provides smooth network migration and easy upgrade to network capacity.

Features

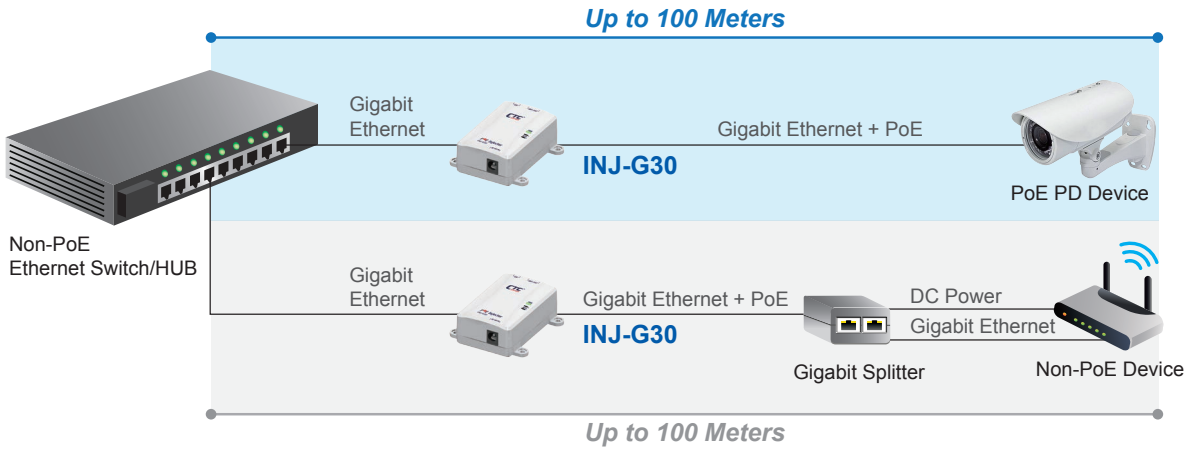
- 1 Port PoE Injector, 55VDC /30W output
- Complies with IEEE 802.3af/at
- Provides 1 10/100/1000Mbps pass through data rate
- Wall Mountable
- Complies with IEEE 802.3 10Base-T, IEEE 802.3u 100Base-TX and IEEE 802.3ab 1000Base-T
- Safety & EMI Certificates: CE & FCC Class B Smart plug & play
- Compact Size

Specifications

Ethernet Standard	IEEE 802.3	10Base-T 10Mbit/s Ethernet
	IEEE 802.3u	100Base-TX, 100Base-FX, Fast Ethernet
	IEEE 802.3ab	1000Base-T Gbit/s Ethernet over twisted pair
PoE Standard	IEEE 802.3af	Power over Ethernet (PoE)
	IEEE 802.3at	Power over Ethernet (PoE+)
Indications	1x RJ-45 for 10/100/1000Base-T data	
	1x RJ-45 for 10/100/1000Base-T data and PoE Power output	
Network Cable	10Base-T Cat. 3, 4, 5e UTP/STP;	
	100/1000Base-T Cat. 5 UTP/STP	
Filtering/ Forwarding Rate	10/100/1000Mbps pass through data rate	
PoE Power output pin	RJ45 Pin 1,2(V+), Pin 3,6(V-)	
LED	System Power	

External Power Adapter	Input 100/110/120/220/240 VAC (Wide Range) Output 36W ,56VDC
PoE output voltage	55VDC
PoE Power Budget	30W (Maximum)
Operating Temperature	0 ~ 45°C
Storage Temperature	-20 ~ 85°C
Humidity	10 ~90% RH (Non-condensing)
Dimension	80 x 68 x 24mm (D x W x H)
Weight	138g
Installation mounting	Wall mount
Certificates	CE & FCC Class B

Application



Ordering Information

Model Name	Description
INJ-G30	1 Port Gigabit Ethernet, IEEE 802.3af/at high power PoE+ Injector

IEC 61850-3

Industrial Ethernet Switch

- IEC 61850–3, IEEE1613
- IEEE1588 PTP v2
- Zero Packet loss
- GOOSE Message
- Wide operating temperature : –40~85°C

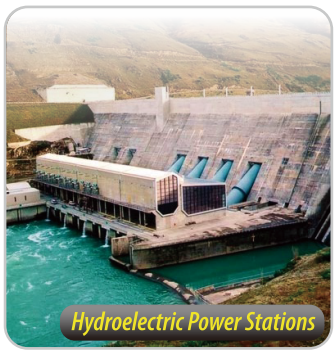
In power substation environments, where electromagnetic interference is very high, the IPS series of Ethernet switches, complying with IEC61850-3 and IEEE 1613 standards, are especially designed for power substation. In smart grid applications, zero packet loss must be maintained with wide temperature tolerances to ensure reliable packet transmissions.

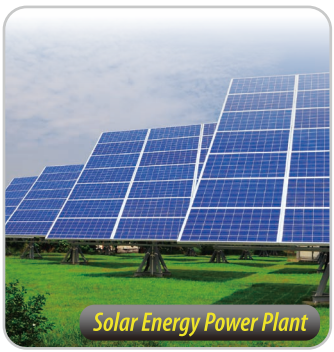
IP30 rugged metal housings and special heat dissipation design enable IPS series Ethernet switches to operate normally under extreme weather conditions without suffering failures.

■ GOOSE Message

For mission-critical applications, GOOSE(Generic Object Oriented Substation Event) 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.





IPS-G803SM

8x 100/1000Base-T + 3x 100/1000Base-X SFP Managed Switch

IPS-G803SM is a managed industrial grade Gigabit Ethernet switch that is designed to meet the demands of power substation systems and is fully compliant with the requirement of IEC 61850-3 and IEEE 1613. The switch provides a variety of redundant functions to increase the reliability of your communications system, including redundant and isolated power supplies (24/48 VDC) and 110/220 VDC/VAC). The managed Ethernet functions include STP/RSTP/MSTP/ITU-T G.8032 ERPS and multiple µ-Ring for redundant cabling, layer 2 Ethernet IGMP, VLAN, QoS, ACL, Security, IPv6, bandwidth control, port mirroring, cable diagnostic and Green Ethernet. Housed in rugged DIN rail or wall mountable enclosures, these switches are designed for harsh environments, such as power substation networking (See Figure). The series product can be managed centrally and conveniently by CTC Union's SmartView™ Element Management System or other third party SNMP managers.

Features

- 8x 10/100/1000Base-T RJ-45 and 3x 100/1000Base-X SFP Fiber
- UL60950-1, CE, FCC, and EN50121-4, certification
- IEC 61850-3, IEEE 1613 certified for power substation
- Heavy industrial grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- Redundant isolated low voltage 24/48VDC, or/and isolated High voltage AC/DC (110/220 VAC/VDC) power inputs
- Supports negative power input with isolated RS-232 console port (for example in telecom system)
- Wide Operating Temperature -40~85°C
- DIN Rail mounting or wall mounting
- IP30 rugged metal housing, Fanless
- Cable diagnostic, Measuring cable normal or broken point distance
- Support GOOSE Message that complies with IEC61850 standard to achieve zero packet loss
- 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 Green Ethernet IEEE 802.3az EEE (Energy Efficient Ethernet) Management to optimize the power consumption
- STP, RSTP, MSTP, ITU-T G.8032 Ethernet Ring Protection Switching (ERPS), and µ-Ring for cabling redundant
- Provides 5 instances that each can support µ-Ring, µ-Chain or Sub-Ring type for flexible uses. Supports up to 5 rings in one device (Please see CTC Union µ-Ring white paper for more details and more topology application)
- µ-Ring for Redundant Ethernet Ring, recovery time<10ms in 250 units
- QoS, Traffic classification QoS, CoS, bandwidth control for Ingress and Egress, Storm Control, DiffServ
- IEEE 802.1Q VLAN, MAC based VLAN, IP subnet based VLAN, Protocol based VLAN, VLAN translation, GVRP, MVR
- Dynamic IEEE 802.3ad LACP Link Aggregation, Static Link Aggregation
- IGMP snooping V1/V2/V3, IGMP Filtering/ Throttling, IGMP query, IGMP proxy reporting, MLD snooping V1/V2
- Security : Port based and Mac based IEEE 802.1X, RADIUS, ACL, TACACS+, HTTP/HTTPS, SSL/SSH v2
- Software upgrade via TFTP and HTTP, redundant firmware to avoid in case of upgrade failure
- DHCP Server/Client/ Relay/ Relay option 82/ Snooping
- Supports RMON, MIB II, Private MIB, Port mirroring, Event syslog, DNS, NTP/SNTP, IEEE 802.1ab LLDP
- Supports IPv6 Telnet server /ICMP v6
- CLI, Web based management, SNMP v1/v2c/v3, Telnet server for management
- Supports Modbus/TCP protocols for management
- Provides SmartConfig for quick and easy mass Configuration Tool*
- Supported by SmartView for Centralized Management*

*Please see Chapter 1- **Software Management** for more details

Specifications

Standard	IEEE 802.3 10Base-T 10Mbit/s Ethernet
	IEEE 802.3u 100Base-TX, 100Base-FX, Fast Ethernet
	IEEE 802.3ab 1000Base-T Gbit/s Ethernet over twisted pair
	IEEE 802.3z 1000Base-X Gbit/s Ethernet over Fiber-Optic
	IEEE 802.1d STP (Spanning Tree Protocol)
	IEEE 802.1w RSTP (Rapid Spanning Tree Protocol)
	IEEE 802.1s MSTP (Multiple Spanning Tree Protocol)
	IEEE 802.1Q for VLAN Tagging
	IEEE 802.1X Port based and MAC based Network Access Control, Authentication
	IEEE 802.3ac Max frame size extended to 1522Bytes
	IEEE 802.3ad Link aggregation for parallel links with LACP(Link Aggregation Control Protocol)

Standard	IEEE 802.3x Flow Control and Back Pressure
	ITU-T G.8032/ Y.1344 ERPS (Ethernet Ring Protection Switching)
	IEEE 802.1ad Stacked VLANs, Q-in-Q
	IEEE 802.1p LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization
	IEEE 802.1ab Link Layer Discovery Protocol (LLDP)
	IEEE 802.3az EEE (Energy Efficient Ethernet)
Switch Architecture	Back-plane (Switching Fabric): 22 Gbps Full wire-speed
Data Processing	Store and Forward
Flow Control:	IEEE 802.3x flow control, back pressure flow control

Jumbo Frame	9.6KB
IEEE 802.3ac	Max frame size extended to 1522Bytes (allow Q-tag in packet)
MAC Address Table	8K
Memory Buffer	512K Bytes for packet buffer
Network Connector	8x 10/100/1000Base-T RJ-45 auto negotiation speed Auto MDI/MDI-X function, Full/Half duplex 3x 100/1000Base-X dual speed mode SFP slot, with DDMI
Console	RS-232 (RJ-45) Isolated RS-232 port grounding for negative power system, or telecom application
Network Cable	UTP/STP above Cat. 5e cable EIA/TIA-568 100-ohm (100m)
Protocols	CSMA/CD
LED	Per unit : Power 1 (Green), Power 2 (Green), Fault (Amber) (-LL model) Per unit : Power 1 (Green), Power 2 (Green), Power 3(Green), Fault (Amber) (-HL model) Per RJ-45 port :10/100Link/Act: Green, 1000Link/Act: Amber SFP Fiber Per port : Link/Active (Green)
Reverse Polarity Protection	Supported for Power Input
Overload Current Protection	Supported
CPU Watch Dog	Supported
Power Input	Redundant 2x Isolated Low Voltage DC Input power (-LL model) Redundant 2x isolated Low Voltage DC and 1 High Voltage AC/DC input power (-HL model) Isolated Low Voltage DC : Isolated 24/48V (18~72VDC), Removable Terminal Block High voltage AC/DC : isolated 110/220VAC (85VAC~264VAC) or 110/220VDC (88~300VDC), Removable Terminal Block Supports negative voltage input power for Telecom
Power consumption	
Alarm Relay Contact	Relay outputs with current carrying capacity of 1 A @24VDC

Input Voltage	IPS-G803SM
110VAC	9.3 W
220VAC	9.2 W
24VDC	9.6 W
48VDC	11.1 W

Removable Terminal Block	Provide 2 redundant low volt power, alarm relay contact (6 Pin) (-LL model) Provide 2 redundant low volt power, alarm relay contact (6 Pin) , and High volt Power (2 Pin) (-HL model)
Operating Temperature	-40°C ~ 85°C
Operating Humidity	5% to 95% (Non-condensing)
Storage Temperature	-40°C ~ 85°C
Housing	Rugged Metal, IP30 Protection, Fanless
Dimension	106 x 82 x 152mm (D x W x H)
Weight	0.885kg (IPS-G803SM-LL) 1.085kg (IPS-G803SM-HL)
Installation mounting	DIN Rail mounting, or wall mounting (Optional)
MTBF	535,335 Hours (IPS-G803SM-LL) 143,943 Hours (IPS-G803SM-HL) (MIL-HDBK-217)
Warranty	5 years
Certification	
EMC/EMS	CE (EN55024, EN55032)
EMI	FCC Part 15 Subpart B Class A EN55032 Class A
EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 4, Criteria B EN61000-4-3 (RS) Level 4, Criteria A EN61000-4-4 (EFT) Level 4, Criteria A EN61000-4-5 (Surge) Level 4, Criteria B EN61000-4-6 (CS) Level 4, Criteria A EN61000-4-8 (Magnetic Field) Level 5, Criteria A
Safety	UL60950-1
Power Substation	IEC 61850-3, IEEE 1613
Immunity for Heavy Industrial Environment	EN61000-6-2
Emission for Heavy Industrial Environment	EN61000-6-4
Railway Traffic	EN50121-4
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

Software Specifications

Topology	
VLAN	IEEE 802.1q VLAN,up to 4094 ID IEEE 802.1q VLAN,up to 4094 Groups IEEE 802.1ad Q-in-Q MAC-based VLAN,up to 256 entries IP Subnet-based VLAN, up to 128 entries Protocol-based VLAN (Ethernt, SNAP, LLC), up to 128 entries VLAN Translation, up to 256 entries MVR (Multiple VLAN Registration) GVRP (GARP VLAN Registration Protocol)
Link Aggregation (Port Trunk)	Static (Hash with SA, DA, IP, TCP/UDP port), up to 5 trunk group Dynamic (IEEE 802.3ad LACP), up to 5 trunk group
Spanning Tree	IEEE 802.1d STP, IEEE 802.1w RSTP, IEEE 802.1s MSTP
Multiple u-Ring	up to 5 instances that each supports u-Ring, u-Chain or Sub-Ring type for flexible uses, and maximum up to 5 Rings Recovery time <10ms Maximum 250 devices in a Ring (Please see CTC Union µ-Ring white paper for more details and more topology application)
Loop Protection	Supported
ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)	Convergence time <50ms Single Ring, Sub-Ring, Multiple ring topology network
QoS Feature	
Class of Service	IEEE 802.1p 8 active priorities queues for per port
GOOSE Message	Complies with IEC61850 standard to achieve zero packet loss
Traffic Classification QoS	IEEE 802.1p based CoS IP Precedence based CoS IP DSCP based CoS

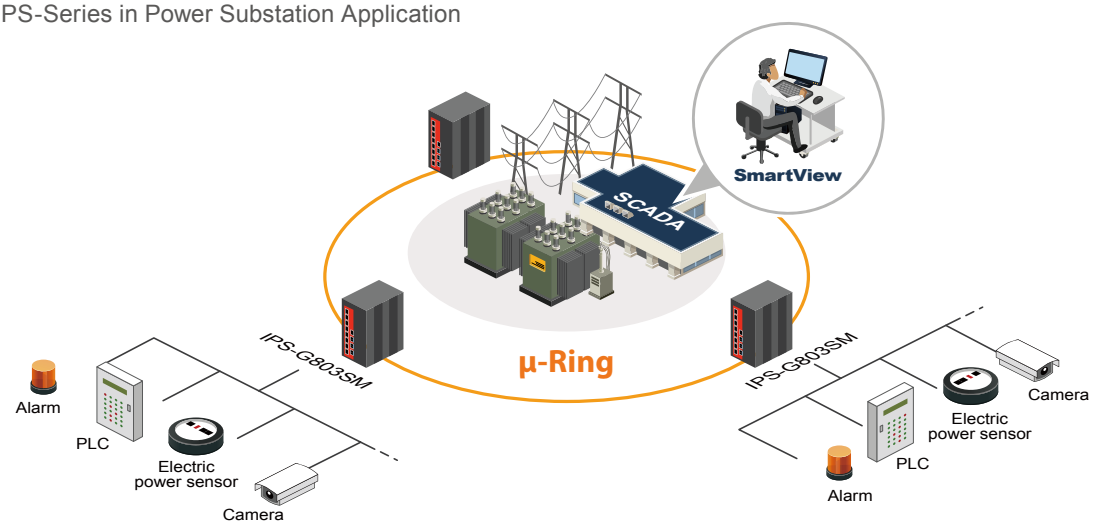
Traffic Classification QoS	QCL(QoS Control List): Frame Type, Source/ Destination MAC, VLAN ID, PCP, DEI QCE(QoS Control Entry): Protocol, Source IP, IP Fragment, DSCP, TCP/UDP port number
Bandwidth Control for Ingress	Rate in steps : 1 kbps / Mbps / fps / kfps Range : 100 kbps to 1Gbps / 1fps to 3300kfps Rate Unit : bit or frame
Bandwidth Control for Egress	Rate in steps : 1 kbps / Mbps Range : 100 kbps to 1Gbps Rate Unit : bit Per queue / Per port shaper
DiffServ (RF 2474) Remarking	
Storm Control	for Unicast, Broadcast, Multicast
IP Multicasting Feature	
IGMP / MLD Snooping	IGMP Snooping v1, v2, v3 / MLD Snooping v1, v2 support 1022 IGMP groups Port Filtering Profile
IGMP / MLD Snooping	Throttling Fast Leave Maximum Multicast Group : up to 1022 entries Query / Static Router Port
Security Features	
IEEE 802.1X	Port-Based MAC-Based
ACL	Number of rules : up to 256 entries for L2 / L3 / L4 L2 : Mac address SA/DA/VLAN L3: IP address SA/DA, Subnet L4: TCP/UDP
RADIUS authentication & accounting	
TACACS+ authentication & accounting, TACACS+ 3.0	
HTTPS, HTTP	Supported

SSL / SSH v2	Supported
User Name Password Authentication	Local Authentication
	Remote Authentication (via RADIUS/ TACACS+)
Management Interface Access Filtering	Web, Telnet / SSH , CLI RS-232 console
Management Features	
CLI	Cisco® like CLI
Web Based Management	
Telnet	Server
SNMP	V1, V2c, V3
Modbus/TCP	Support for management and monitoring
SW & Configuration Upgrade	TFTP, HTTP
	Redundant firmware in case of upgrade failure
RMON	RMON I (1, 2, 3, 9 group), RMON II
MIB	MIB II RFC1213, Private MIB
UPnP	Supported
DHCP	Server, Client, Relay, Relay option 82 , Snooping
IP Source Guard	Supported
Port Mirroring	Supported
Event Syslog	Syslog server (RFC3164) (Support 1 server)
Warning Message	System Syslog, SMTP/ e-mail event message, alarm relay
DNS	Client, Proxy
IEEE 1588 PTP V2	Support 5 operating mode in each port : Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave

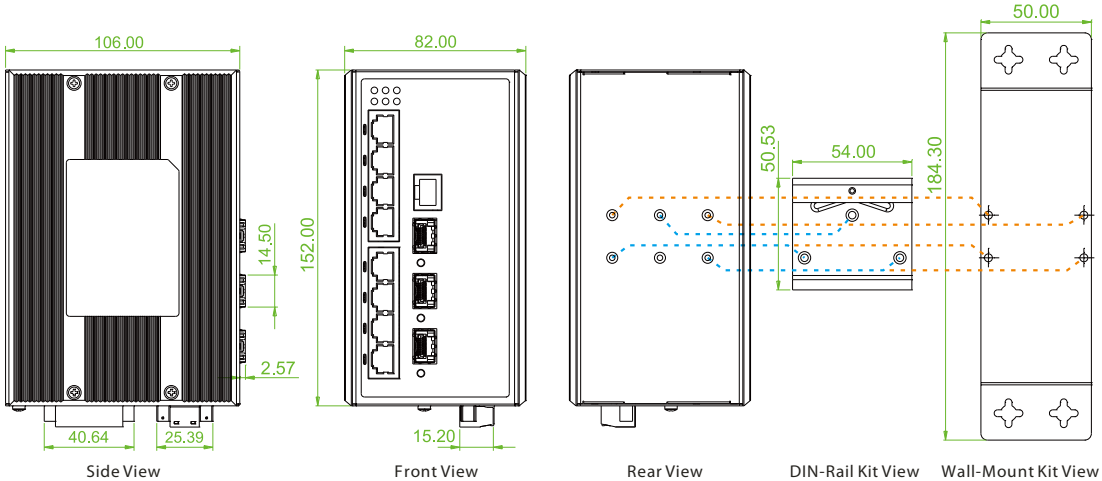
NTP /SNTP	Client
LLDP (IEEE 802.1ab)	Link Layer Discovery Protocol
	LLDP-MED
IPv6 Features	
IPv6 Management	Telnet Server/ICMP v6
SNMP over IPv6	Supported
HTTP over IPv6	Supported
SSH over IPv6	Supported
IPv6 Telnet	Supported
IPv6 NTP / SNTP	Client
IPv6 TFTP	Supported
IPv6 QoS	Supported
IPv6 ACL	Number of rules: up to 256 entries for L2 / L3 / L4 L2 : Mac address SA/DA/VLAN L3: IP address SA/DA, Subnet L4: TCP/UDP
Others Features	
Green Ethernet	Supports IEEE 802.3az EEE (Energy Efficient Ethernet) Management to optimize the power consumption
	Determine the cable length and lowering the power for ports with short cables
Green Ethernet	Lower the power for a port when there is no link
	LED Power Management: Adjustment LEDs intensity
Cable Diagnostic	Measuring UTP cable is normal or broken point distance

Application

Figure : IPS-Series in Power Substation Application



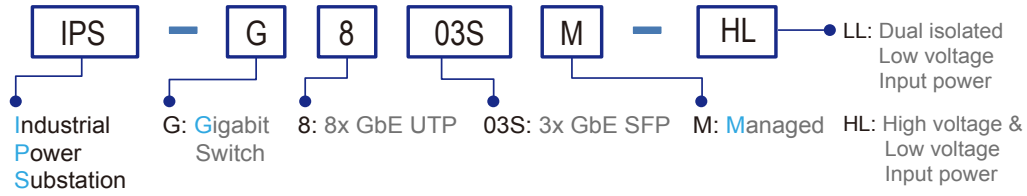
Dimensions



Ordering Information

Model Name	Managed	Total Port	RJ45 UTP port	Fiber	Redundant Input Power		Certification				
			10/100/1000 Base-T	100/1000 Base-X	Low Voltage 24/48,-48VDC	High Voltage 110/220V DC/AC	IEC61850-3 IEEE 1613	Railway EN50121-4	Safety UL60950-1	EN61000-6-2 EN61000-6-4	CE, FCC
IPS-G803SM-LL	V	11	8	3 SFP	2		V	V	V	V	V
IPS-G803SM-HL	V	11	8	3 SFP	2	1	V	V	V	V	V

Model Naming Rule



Package List

- IPS-G803SM device
- Console cable (RJ45 to DB9)
- CD (SmartConfig, MIB file, Manual)
- Quick installation guide
- Din Rail with Screws
- Terminal blocks
- Protective caps for SFP ports

Optional Accessories

Wall mount kit

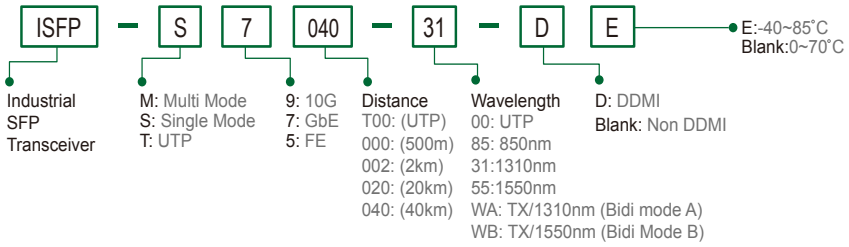
IND-WMK02	Wall Mount kit for Industrial product (Wide) (184 x 50mm)

Industrial SFP Transceiver

The ISFP series of industrial grade SFP modules have been fully tested with the IPS-G803SM for guaranteed compatibility and performance. The best performance can be guaranteed even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheet for more detail and more items.)

ISFP-M7000-85-D(E)	Industrial SFP GbE 1000Base-SX, M/M, 500 meter,wave length 850nm, 7.5dB, LC, DDMI, -10~70°C (-40~85°C)
ISFP-S7020-31-D(E)	Industrial SFP 1000Base-LX, S/M, 20km, wave length 1310nm, 15dB, LC, DDMI, -10~70°C (-40~85°C)
ISFP-T7T00-00-(E)	Industrial SFP 10/100/1000Base-T UTP 100meter, -10~70°C (-40~85°C)
ISFP-M5002-31-D(E)	Industrial SFP 155M 100Base-FX, MM, 2km, wave length 1310nm, 12dB, LC, DDMI, -10~70°C (-40~85°C)
ISFP-S5030-31-D(E)	Industrial SFP 155M 100Base-FX, SM, 30km, 1310nm, 19dB, LC, DDMI, -10~70°C (-40~85°C)

SFP Naming Rule



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IPS-803GSM

8x 10/100Base-TX + 3x 100/1000Base-X SFP Managed Switch

IPS-803GSM is a managed industrial grade Ethernet switch that is designed to meet the demands of power substation systems and is fully compliant with the requirement of IEC 61850-3 and IEEE 1613. The switch provides a variety of redundant functions to increase the reliability of your communications system, including redundant and isolated power supplies (24/48 VDC) and 110/220 VDC/VAC). The managed Ethernet functions include STP/RSTP/MSTP/ITU-T G.8032 ERPS and multiple μ-Ring for redundant cabling, layer 2 Ethernet IGMP, VLAN, QoS, ACL, Security, IPv6, bandwidth control, port mirroring, cable diagnostic and Green Ethernet. Housed in rugged DIN rail or wall mountable enclosures, these switches are designed for harsh environments, such as power substation networking (See Figure). The series product can be managed centrally and conveniently by CTC Union's SmartView™ Element Management System or other third party SNMP managers.

Features

- 8x 10/100Base-TX RJ-45 and 3x 100/1000Base-X SFP Fiber
- UL60950-1, CE, FCC, and EN50121-4, certification
- IEC 61850-3, IEEE 1613 certified for power substation
- Heavy industrial grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- Redundant isolated low voltage 24/48VDC, or/and isolated High voltage AC/DC (110/220 VAC/VDC) power inputs
- Supports negative power input with isolated RS-232 console port (for example in telecom system)
- Wide Operating Temperature -40~85°C
- DIN Rail mounting or wall mounting
- IP30 rugged metal housing, Fanless
- Cable diagnostic, Measuring cable normal or broken point distance
- Supports GOOSE Message that complies with IEC61850 standard to achieve zero packet loss
- 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 Green Ethernet IEEE 802.3az EEE (Energy Efficient Ethernet) Management to optimize the power consumption
- STP, RSTP, MSTP, ITU-T G.8032 Ethernet Ring Protection Switching (ERPS), and μ-Ring for cabling redundancy
- Provides 5 instances that each can support μ-Ring, μ-Chain or Sub-Ring type for flexible uses. Supports up to 5 rings in one device (Please see CTC Union μ-Ring white paper for more details and more topology application)
- μ-Ring for Redundant Ethernet Ring, recovery time<10ms in 250 units
- QoS, Traffic classification QoS, CoS, bandwidth control for Ingress and Egress, Storm Control, DiffServ
- IEEE 802.1Q VLAN, MAC based VLAN, IP subnet based VLAN, Protocol based VLAN, VLAN translation, GVRP, MVR
- Dynamic IEEE 802.3ad LACP Link Aggregation, Static Link Aggregation
- IGMP snooping V1/V2/V3, IGMP Filtering/ Throttling, IGMP query, IGMP proxy reporting, MLD snooping V1/V2
- Security : Port based and Mac based IEEE 802.1X, RADIUS, ACL, TACACS+, HTTP/HTTPS, SSL/SSH v2
- Software upgrade via TFTP and HTTP, redundant firmware to avoid in case of upgrade failure
- DHCP Server/Client/ Relay/ Relay option 82/ Snooping
- Supports RMON, MIB II, Private MIB, Port mirroring, Event syslog, DNS, NTP/SNTP, IEEE 802.1ab LLDP
- Supports IPv6 Telnet server /ICMP v6
- CLI, Web based management, SNMP v1/v2c/v3, Telnet server for management
- Supports Modbus/TCP protocols for transmission
- Provides SmartConfig for quick and easy mass Configuration Tool*
- Supported by SmartView for Centralized Management*

*Please see Chapter 1- **Software Management** for more details

Specifications

Standard	IEEE 802.3 10Base-T 10Mbit/s Ethernet
	IEEE 802.3u 100Base-TX, 100Base-FX, Fast Ethernet
	IEEE 802.3z 1000Base-X Gbit/s Ethernet over Fiber-Optic
	IEEE 802.1d STP (Spanning Tree Protocol)
	IEEE 802.1w RSTP (Rapid Spanning Tree Protocol)
	IEEE 802.1s MSTP (Multiple Spanning Tree Protocol)
	IEEE 802.1Q for VLAN Tagging
	IEEE 802.1X Port based and MAC based Network Access Control, Authentication
	IEEE 802.3ac Max frame size extended to 1522Bytes
	IEEE 802.3ad Link aggregation for parallel links with LACP(Link Aggregation Control Protocol)

Standard	IEEE 802.3x Flow Control and Back Pressure
	ITU-T G.8032/ Y.1344 ERPS (Ethernet Ring Protection Switching)
	IEEE 802.1ad Stacked VLANs, Q-in-Q
	IEEE 802.1p LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization
	IEEE 802.1ab Link Layer Discovery Protocol (LLDP)
	IEEE 802.3az EEE (Energy Efficient Ethernet)
Switch Architecture	Back-plane (Switching Fabric): 7.6 Gbps Full wire-speed
Data Processing	Store and Forward
Flow Control:	IEEE 802.3x flow control, back pressure flow control

Jumbo Frame	9.6KB
IEEE 802.3ac	Max frame size extended to 1522Bytes (allow Q-tag in packet)
MAC Address Table	8K
Memory Buffer	512K Bytes for packet buffer
Network Connector	8x 10/100Base-TX RJ-45 auto negotiation speed Auto MDI/MDI-X function, Full/Half duplex 3x 100/1000Base-X dual speed mode SFP slot, with DDMI
Console	RS-232 (RJ-45) Isolated RS-232 port grounding for negative power system, or telecom application
Network Cable	UTP/STP above Cat. 5e cable EIA/TIA-568 100-ohm (100m)
Protocols	CSMA/CD
LED	Per unit : Power 1 (Green), Power 2 (Green), Fault (Amber) (-LL model) Per unit : Power 1 (Green), Power 2 (Green), Power 3(Green), Fault (Amber) (-HL model) Per RJ-45 port :10/100Link/Act: Green SFP Fiber Per port : Link/Active (Green)
Reverse Polarity Protection	Supported for Power Input
Overload Current Protection	Supported
CPU Watch Dog	Supported
Power Input	Redundant 2x Isolated Low Voltage DC Input power (-LL model) Redundant 2x isolated Low Voltage DC and 1 High Voltage AC/DC input power (-HL model) Isolated Low Voltage DC : Isolated 24/48V (18~72VDC), Removable Terminal Block High voltage AC/DC : isolated 110/220VAC (85VAC~264VAC) or 110/220VDC (88~300VDC), Removable Terminal Block Supports negative voltage input power for Telecom
Power consumption	
Alarm Relay Contact	Relay outputs with current carrying capacity of 1 A @24VDC

Input Voltage	IPS-803GSM
110VAC	7.3 W
220VAC	7 W
24VDC	8W
48VDC	9.2 W

Removable Terminal Block	Provide 2 redundant low volt power, alarm relay contact (6 Pin) (-LL model) Provide 2 redundant low volt power, alarm relay contact (6 Pin) , and High volt Power (2 Pin) (-HL model)
Operating Temperature	-40°C ~ 85°C
Operating Humidity	5% to 95% (Non-condensing)
Storage Temperature	-40°C ~ 85°C
Housing	Rugged Metal, IP30 Protection, Fanless
Dimension	106 x 82 x 152mm (D x W x H)
Weight	0.885kg (IPS-803GSM-LL) 1.085kg (IPS-803GSM-HL)
Installation mounting	DIN Rail mounting, or wall mounting (Optional)
MTBF	535,335 Hours (IPS-803GSM-LL) 143,943 Hours (IPS-803GSM-HL) (MIL-HDBK-217)
Warranty	5 years
Certification	
EMC/EMS	CE (EN55024, EN55032)
EMI	FCC Part 15 Subpart B Class A EN55032 Class A
EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 4, Criteria B EN61000-4-3 (RS) Level 4, Criteria A EN61000-4-4 (EFT) Level 4, Criteria A EN61000-4-5 (Surge) Level 4, Criteria B EN61000-4-6 (CS) Level 4, Criteria A EN61000-4-8 (Magnetic Field) Level 5, Criteria A
Safety	UL60950-1
Power Substation	IEC 61850-3, IEEE 1613
Immunity for Heavy Industrial Environment	EN61000-6-2
Emission for Heavy Industrial Environment	EN61000-6-4
Railway Traffic	EN50121-4
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

Software Specifications

Topology	
VLAN	IEEE 802.1q VLAN,up to 4094 ID IEEE 802.1q VLAN,up to 4094 Groups IEEE 802.1ad Q-in-Q MAC-based VLAN,up to 256 entries IP Subnet-based VLAN, up to 128 entries Protocol-based VLAN (Ethernt, SNAP, LLC), up to 128 entries VLAN Translation, up to 256 entries MVR (Multiple VLAN Registration) GVRP (GARP VLAN Registration Protocol)
Link Aggregation (Port Trunk)	Static (Hash with SA, DA, IP, TCP/UDP port), up to 5 trunk group Dynamic (IEEE 802.3ad LACP), up to 5 trunk group
Spanning Tree	IEEE 802.1d STP, IEEE 802.1w RSTP, IEEE 802.1s MSTP
Multiple u-Ring	up to 5 instances that each supports u-Ring, u-Chain or Sub-Ring type for flexible uses, and maximum up to 5 Rings Recovery time <10ms Maximum 250 devices in a Ring (Please see CTC Union µ-Ring white paper for more details and more topology application)
Loop Protection	Supported
ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)	Convergence time <50ms Single Ring, Sub-Ring, Multiple ring topology network
QoS Feature	
Class of Service	IEEE 802.1p 8 active priorities queues for per port
GOOSE Message	Complies with IEC61850 standard to achieve zero packet loss
Traffic Classification QoS	IEEE 802.1p based CoS IP Precedence based CoS IP DSCP based CoS

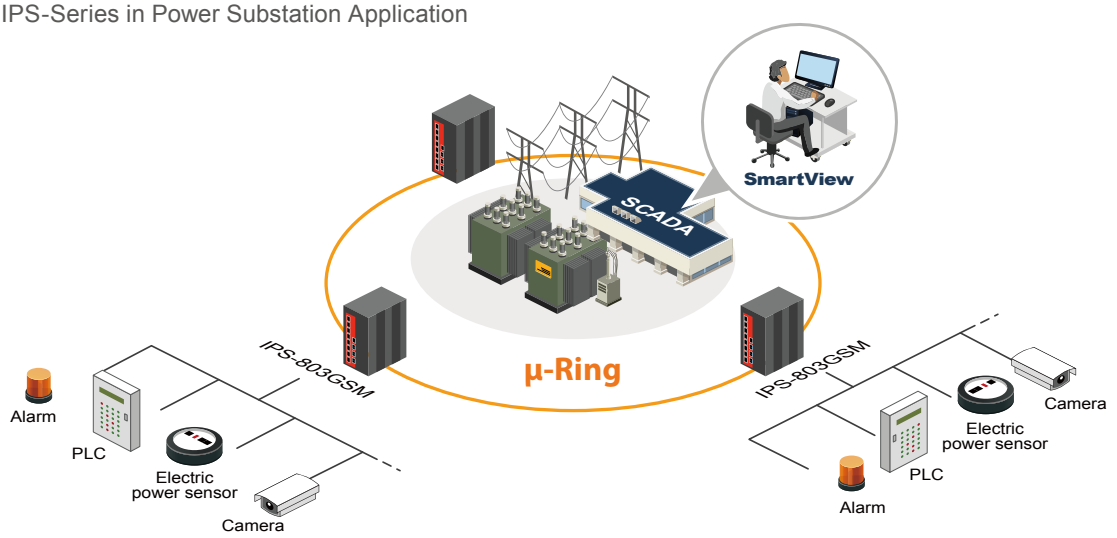
Traffic Classification QoS	QCL(QoS Control List): Frame Type, Source/ Destination MAC, VLAN ID, PCP, DEI QCE(QoS Control Entry): Protocol, Source IP, IP Fragment, DSCP, TCP/UDP port number
Bandwidth Control for Ingress	Rate in steps : 1 kbps / Mbps / fps / kfps Range : 100 kbps to 1Gbps / 1fps to 3300kfps Rate Unit : bit or frame
Bandwidth Control for Egress	Rate in steps : 1 kbps / Mbps Range : 100 kbps to 1Gbps Rate Unit : bit Per queue / Per port shaper
DiffServ (RF 2474) Remarking	
Storm Control	for Unicast, Broadcast, Multicast
IP Multicasting Feature	
IGMP / MLD Snooping	IGMP Snooping v1, v2, v3 / MLD Snooping v1, v2 support 1022 IGMP groups Port Filtering Profile
IGMP / MLD Snooping	Throttling Fast Leave Maximum Multicast Group : up to 1022 entries Query / Static Router Port
Security Features	
IEEE 802.1X	Port-Based MAC-Based
ACL	Number of rules : up to 256 entries for L2 / L3 / L4 L2 : Mac address SA/DA/VLAN L3: IP address SA/DA, Subnet L4: TCP/UDP
RADIUS authentication & accounting	
TACACS+ authentication & accounting, TACACS+ 3.0	
HTTPS, HTTP	Supported

SSL / SSH v2	Supported
User Name Password Authentication	Local Authentication
	Remote Authentication (via RADIUS/ TACACS+)
Management Interface Access Filtering	Web, Telnet / SSH , CLI RS-232 console
Management Features	
CLI	Cisco® like CLI
Web Based Management	
Telnet	Server
SNMP	V1, V2c, V3
Modbus/TCP	Support for management and monitoring
SW & Configuration Upgrade	TFTP, HTTP
	Redundant firmware in case of upgrade failure
RMON	RMON I (1, 2, 3, 9 group), RMON II
MIB	MIB II RFC1213, Private MIB
UPnP	Supported
DHCP	Server, Client, Relay, Relay option 82 , Snooping
IP Source Guard	Supported
Port Mirroring	Supported
Event Syslog	Syslog server (RFC3164) (Support 1 server)
Warning Message	System Syslog, SMTP/ e-mail event message, alarm relay
DNS	Client, Proxy
IEEE 1588 PTP V2	Support 5 operating mode in each port : Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave
NTP /SNTP	Client

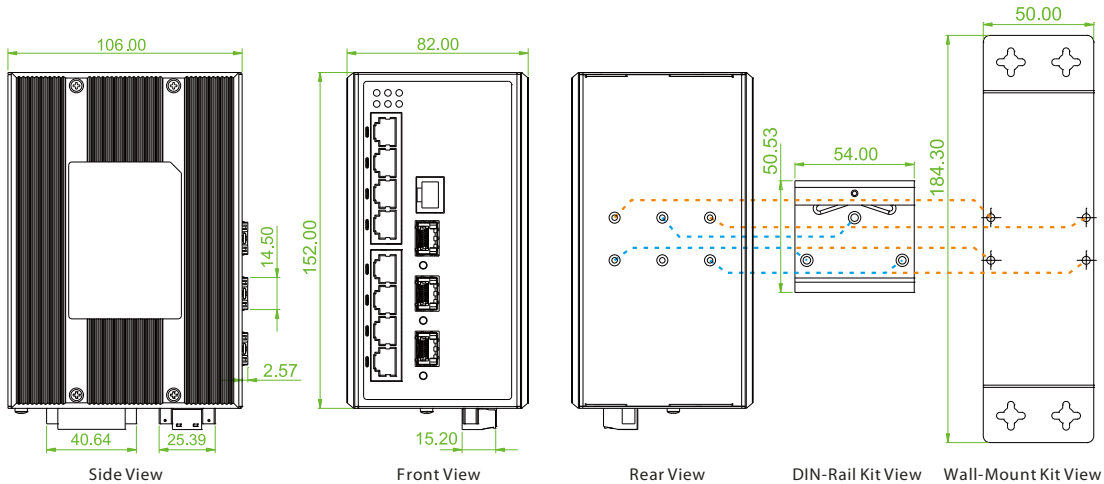
LLDP (IEEE 802.1ab)	Link Layer Discovery Protocol
	LLDP-MED
IPv6 Features	
IPv6 Management	Telnet Server/ICMP v6
SNMP over IPv6	Supported
HTTP over IPv6	Supported
SSH over IPv6	Supported
IPv6 Telnet	Supported
IPv6 NTP / SNTP	Client
IPv6 TFTP	Supported
IPv6 QoS	Supported
IPv6 ACL	Number of rules: up to 256 entries for L2 / L3 / L4 L2 : Mac address SA/DA/VLAN L3: IP address SA/DA, Subnet L4: TCP/UDP
Others Features	
Green Ethernet	Supports IEEE 802.3az EEE (Energy Efficient Ethernet) Management to optimize the power consumption
	Determine the cable length and lowering the power for ports with short cables
Green Ethernet	Lower the power for a port when there is no link
	LED Power Management: Adjustment LEDs intensity
Cable Diagnostic	Measuring UTP cable is normal or broken point distance

Application

Figure : IPS-Series in Power Substation Application



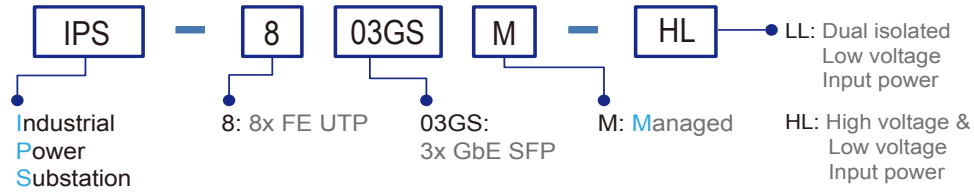
Dimensions



Ordering Information

Model Name	Managed	Total Port	RJ45 UTP port	Fiber	Redundant Input Power		Certification				
			10/100Base-TX	100/1000 Base-X	Low Voltage 24/48, -48VDC	High Voltage 110/220V DC/AC	IEC61850-3 IEEE 1613	Railway EN50121-4	Safety UL60950-1	Safety UL60950-1	CE, FCC
IPS-803GSM-LL	V	11	8	3 SFP	2		V	V	V	V	V
IPS-803GSM-HL	V	11	8	3 SFP	2	1	V	V	V	V	V

Model Naming Rule



Package List

- IPS-803GSM device
- Console cable (RJ45 to DB9)
- CD (SmartConfig, MIB file, Manual)
- Quick installation guide
- Din Rail with Screws
- Terminal blocks
- Protective caps for SFP ports

Optional Accessories

Wall mount kit

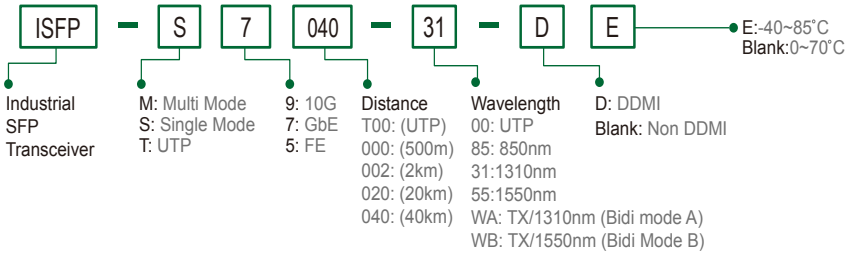
IND-WMK02	Wall Mount kit for Industrial product (Wide) (184 x 50mm)

Industrial SFP Transceiver

The ISFP series of industrial grade SFP modules have been fully tested with the IPS-803GSM for guaranteed compatibility and performance. The best performance can be guaranteed even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheet for more detail and more items.)

ISFP-M7000-85-D(E)	Industrial SFP GbE 1000Base-SX, M/M, 500 meter,wave length 850nm, 7.5dB, LC, DDMI, -10~70°C (-40~85°C)
ISFP-S7020-31-D(E)	Industrial SFP 1000Base-LX, S/M, 20km, wave length 1310nm, 15dB, LC, DDMI, -10~70°C (-40~85°C)
ISFP-T7T00-00-(E)	Industrial SFP 10/100/1000Base-T UTP 100meter, -10~70°C (-40~85°C)
ISFP-M5002-31-D(E)	Industrial SFP 155M 100Base-FX, MM, 2km, wave length 1310nm, 12dB, LC, DDMI, -10~70°C (-40~85°C)
ISFP-S5030-31-D(E)	Industrial SFP 155M 100Base-FX, SM, 30km, 1310nm, 19dB, LC, DDMI, -10~70°C (-40~85°C)

SFP Naming Rule



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Industrial SFP Transceiver

- 10G 10GBase-X for Optic
- 1.25G 1000Base-X for Optic
- 155Mbps 100Base-FX for Optic
- 1.25G 100/1000Base-T for UTP

5 Year Warranty

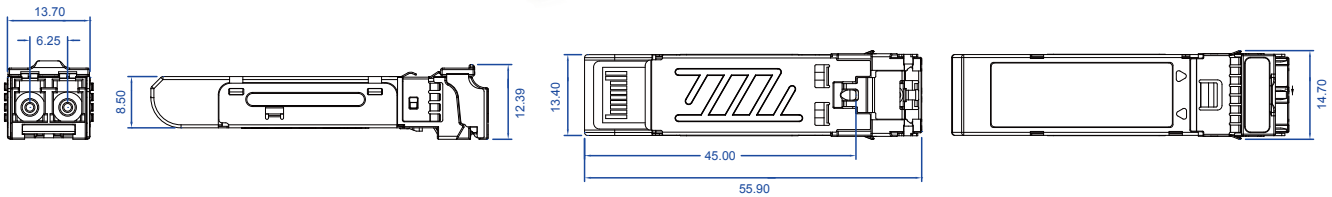
CTC Union's industrial SFP Transceivers are highly reliable, for serial optical data communications applications specified for single mode fiber operation at 1.25G/155M bps. They operate with +3.3V power supplies and are intended for single mode or multi-mode fiber, operating at a nominal wavelength of 1310nm/1550nm/850nm. Each SFP Transceiver consists of a transmitter optical subassembly (TOSA), a receiver optical subassembly (ROSA) and an electrical subassembly. CTC Union's industrial SFP transceivers ensure your networks operate with maximum reliability, performance, and flexibility.

Features

- The ISFP series of industrial grade SFP modules have been fully tested with CTC industrial grade product for guaranteed compatibility and performance. The best performance can be guaranteed even in mission-critical applications
- Single 3.3V power supply
- Duplex or Simplex LC receptacle connector
- Hot Pluggable
- Lower power dissipation
- All 10G SFP+ compliant to IEEE 802.3ae 10GBase-X Ethernet over fiber
- All Gigabit SFP compliant to IEEE 802.3z 1000Base-X and IEEE 802.3ab 100/1000Base-T
- All Fast Ethernet SFP Compliant to IEEE 802.3u 100Base-FX
- Industrial standard small form pluggable (SFP) package
- Compliant with Multi-Source Agreement (MSA) Small Form Factor Pluggable (SFP)
- Eye safety compliant with Class 1 laser product standard IEC825-1
- CE, FCC class B certification
- RoHS compliant
- 5 years warranty

10Gbps 10GBase-X Fiber SFP+

Dimension



Order Information (10G 10GBase-X)

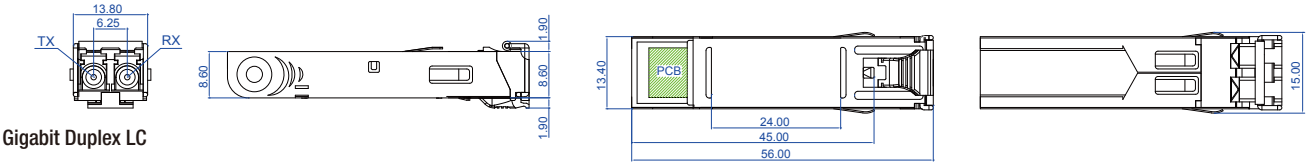
Model Name	Cable Type	Typical Distance	Wavelength (nm)	TX (dBm) (Min~Max)	RX Sensitivity (dBm)	Power Budget (dB)	Saturation (dBm)	Power Consumption	DDMI	Operating Temperature
ISFP-M9000-85-D	MM	300m (OM3)	850	-6.5~-1	-9.9	3.4	-1	1W	V	-10~70℃
ISFP-M9000-85-DE	MM	300m (OM3)	850	-6.5~-1	-9.9	3.4	-1	1W	V	-40~85℃
ISFP-S9010-31-D	SM	10km	1310	-8~0.5	-14.4	6.4	0.5	1W	V	-10~70℃
ISFP-S9010-31-DE	SM	10km	1310	-8~0.5	-14.4	6.4	0.5	1W	V	-40~85℃
ISFP-S9040-31-D	SM	40km	1310	0.5~5	-15.5	16	0.5	1W	V	-10~70℃
ISFP-S9040-31-DE	SM	40km	1310	0.5~5	-15.5	16	0.5	1W	V	-40~85℃

1.25Gbps 1000Base-X Fiber SFP

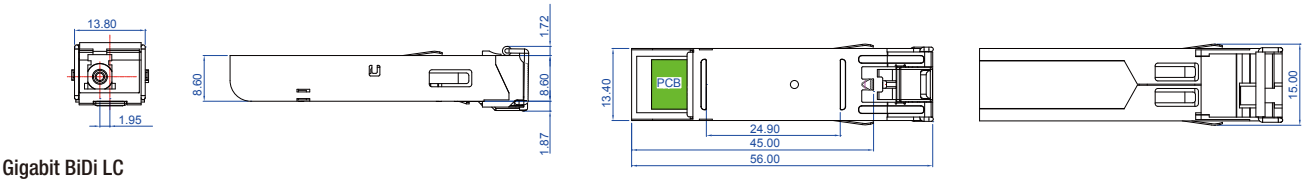
Gigabit Duplex LC

Gigabit BiDi LC

Dimension



Gigabit Duplex LC



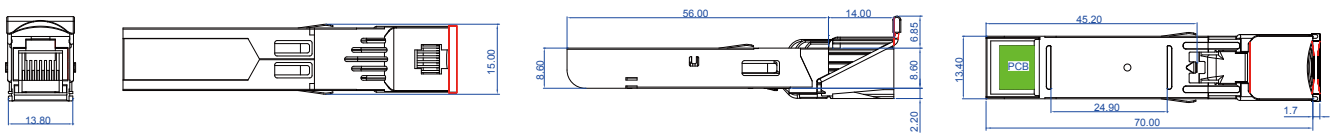
Gigabit BiDi LC

Order Information (1.25Gbps 1000Base-X)

Model Name	Cable Type	Typical Distance	Wavelength (nm)	TX (dBm) (Min~Max)	RX Sensitivity (dBm)	Power Budget (dB)	Saturation (dBm)	Power Consumption	DDMI	Operating Temperature
ISFP-M7000-85	MM	550m	850	-9.5~-4	-17	7.5	-3	1W		-10~70℃
ISFP-M7000-85-D	MM	550m	850	-9.5~-4	-17	7.5	-3	1W	V	-10~70℃
ISFP-M7000-85-E	MM	550m	850	-9.5~-4	-17	7.5	-3	1W		-40~85℃
ISFP-M7000-85-DE	MM	550m	850	-9.5~-4	-17	7.5	-3	1W	V	-40~85℃
ISFP-M7002-31	MM	2km	1310	-9~-1	-19	10	-1	1W		-10~70℃
ISFP-M7002-31-D	MM	2km	1310	-9~-1	-19	10	-1	1W	V	-10~70℃
ISFP-M7002-31-E	MM	2km	1310	-9~-1	-19	10	-1	1W		-40~85℃
ISFP-M7002-31-DE	MM	2km	1310	-9~-1	-19	10	-1	1W	V	-40~85℃
ISFP-S7020-31	SM	20km	1310	-8~-2	-23	15	-1	1W		-10~70℃
ISFP-S7020-31-D	SM	20km	1310	-8~-2	-23	15	-1	1W	V	-10~70℃
ISFP-S7020-31-E	SM	20km	1310	-8~-2	-23	15	-1	1W		-40~85℃
ISFP-S7020-31-DE	SM	20km	1310	-8~-2	-23	15	-1	1W	V	-40~85℃
ISFP-S7040-31-D	SM	40km	1310	-2~3	-23	21	-3	1W	V	-10~70℃
ISFP-S7040-31-DE	SM	40km	1310	-2~3	-23	21	-3	1W	V	-40~85℃
ISFP-S7020-WA-D	SM	20km	T1310 / R1550	-8~-2	-23	15	-2	1W	V	-10~70℃
ISFP-S7020-WB-D	SM	20km	T1550 / R1310	-8~-2	-23	15	-2	1W	V	-10~70℃
ISFP-S7020-WA-DE	SM	20km	T1310 / R1550	-8~-2	-23	15	-2	1W	V	-40~85℃
ISFP-S7020-WB-DE	SM	20km	T1550 / R1310	-8~-2	-23	15	-2	1W	V	-40~85℃

1.25Gbps 100/1000Base-T UTP SFP

Dimension



Order Information (1.25Gbps 10/100/1000Base-T UTP)

Model Name	Cable Type	Typical Distance	Power Consumption	Operating Temperature
ISFP-T7T00-00	UTP Cat 5e	100m	1.1W	-10~70℃
ISFP-T7T00-00-E	UTP Cat 5e	100m	1.1W	-40~85℃

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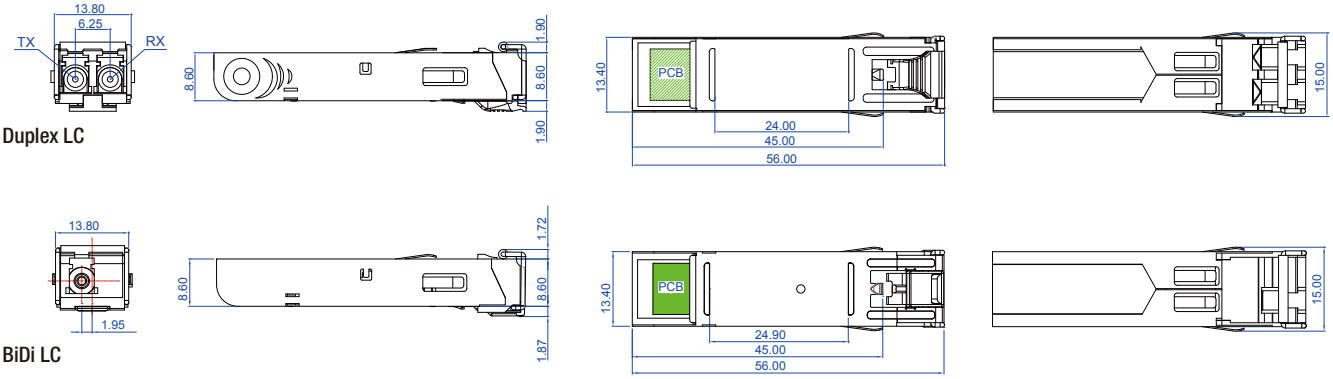
155Mbps 100Base-FX Fiber SFP

Duplex LC

BiDi LC

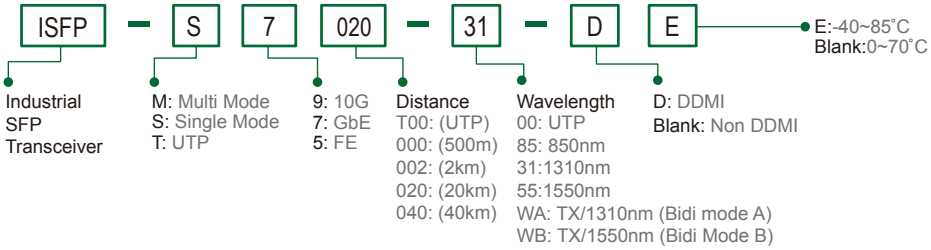
Dimension



Order Information (1.55M 100Base-FX)

Model Name	Cable Type	Typical Distance	Wavelength (nm)	TX (dBm) (Min~Max)	RX Sensitivity (dBm)	Power Budget (dB)	Saturation (dBm)	Power Consumption	DDMI	Operating Temperature
ISFP-M5002-31	MM	2km	1310	-20~ -14	-32	12	-8	1W		-10~70°C
ISFP-M5002-31-D	MM	2km	1310	-20~ -14	-32	12	-8	1W	V	-10~70°C
ISFP-M5002-31-E	MM	2km	1310	-20~ -14	-32	12	-8	1W		-40~85°C
ISFP-M5002-31-DE	MM	2km	1310	-20~ -14	-32	12	-8	1W	V	-40~85°C
ISFP-S5030-31	SM	30km	1310	-15~-8	-34	19	-5	1W		-10~70°C
ISFP-S5030-31-D	SM	30km	1310	-15~-8	-34	19	-5	1W	V	-10~70°C
ISFP-S5030-31-E	SM	30km	1310	-15~-8	-34	19	-5	1W		-40~85°C
ISFP-S5030-31-DE	SM	30km	1310	-15~-8	-34	19	-5	1W	V	-40~85°C
ISFP-S5050-31-D	SM	50km	1310	-5~0	-35	30	-5	1W	V	-10~70°C
ISFP-S5050-31-DE	SM	50km	1310	-5~0	-35	30	-5	1W	V	-40~85°C
ISFP-S5020-WA-D	SM	20km	T1310 / R1550	-14~-8	-32	18	-3	1W	V	-10~70°C
ISFP-S5020-WB-D	SM	20km	T1550 / R1310	-14~-8	-32	18	-3	1W	V	-10~70°C
ISFP-S5020-WA-DE	SM	20km	T1310 / R1550	-14~-8	-32	18	-3	1W	V	-40~85°C
ISFP-S5020-WB-DE	SM	20km	T1550 / R1310	-14~-8	-32	18	-3	1W	V	-40~85°C

Ordering Information



NEW

NDR-480-48
Output 48VDC, 480W

NDR-120-24
Output 24VDC, 120W

NDR-240-48
Output 48VDC, 240W

DR-4524
Output 24VDC, 45W

NDR-120-48
Output 48VDC, 120W

MDR-20-24
Output 24VDC, 20W

UL60950-1 UL508

Having reliable and stable power for your industrial grade switches or converters is the best way to improve reliability and keep any down time to a minimum. CTC Union's safety certified AC to DC power supplies that are 100% compatible with all of our industrial grade switches and converters.

Features

- The series of industrial grade power supply have been fully tested with our industrial product for guaranteed compatibility and performance
- Universal AC input voltage range
- Protections: Short circuit / Overload / Over voltage/Over temperature
- Cooling by free air convection
- UL508, TUV, CB, CE safety approved
- Heavy industry grade EMS EN61000-6-2 approved
- 3 years warranty

Specifications

Model Name		NDR-480-48	NDR-240-48	NDR-120-48	NDR-120-24
Output	Dc Voltage	48V	48V	48V	24V
	Rated Current	10A	5A	2.5A	5A
	Current Range	0~5A	0~5A	0~2.5A	0 ~ 5A
	Rated Power	480W	240W	120W	120W
	Output Voltage Adj. Range	48~55VDC	48~55VDC	48~55VDC	24 ~ 28VDC
Input	Voltage Range	90 ~ 264VAC / 127 ~ 370VDC	90 ~ 264VAC / 127 ~ 370VDC	90~264VAC / 127~370VDC	90~264VAC / 127~370VDC
	Frequency Range	47 ~ 63Hz	47 ~ 63Hz	47 ~ 63Hz	47 ~ 63Hz
	Efficiency (Typ.)	92.5%	90%	89%	88%
Protection	Overload	105 ~ 130% rated output power Protection type : Constant current limiting, , unit will shut down after 3 sec, re-power on to recover	105 ~ 130% rated output power Protection type : Constant current limiting, recovers automatically after fault condition is removed	105 ~ 130% rated output power Protection type : Constant current limiting, recovers automatically after fault condition is removed	105 ~ 130% rated output power Protection type : Constant current limiting, recovers automatically after fault condition is removed
	Over Voltage	56 ~ 65V Protection type : Shut down o/p voltage, re-power on to recover	56 ~ 65V Protection type : Shut down o/p voltage, re-power on to recover	56~65V Protection type : Shut down o/p voltage, re-power on to recover	29 ~ 33V Protection type : Shut down o/p voltage, re-power on to recover
	Over Temperature	Shut down o/p voltage, recovers automatically after temperature goes down	Shut down o/p voltage, recovers automatically after temperature goes down	Shut down o/p voltage, re-power on to recover	Shut down o/p voltage, re-power on to recover
Indicator	LED	DC OK	DC OK	DC OK	DC OK
Housing	Dimension	128.5 x 85.5 x 125.2mm (D x W x H)	113.5 x 63 x 125.2 mm (D x W x H)	113.5 x 40 x 125.2mm (D x W x H)	113.5 x 40 x 125.2mm (D x W x H)
	Installation Mounting	DIN Rail	DIN Rail	DIN Rail	DIN Rail
Environment	Working Temp	-20 ~ 70°C	-20 ~ 70°C	-20 ~ 70°C	-20 ~ 70°C
	Working Humidity	20 ~ 95% RH non-condensing	20 ~ 95% RH non-condensing	20 ~ 95% RH non-condensing	20 ~ 90% RH non-condensing
	Storage Temp., Humidity	-40 ~ 85°C , 10 ~ 95% RH	-40 ~ 85°C , 10 ~ 95% RH	-40 ~ 85°C , 10 ~ 95% RH	-20 ~ 85°C , 10 ~ 95% RH
	Vibration	Compliance to IEC60068-2-6	Compliance to IEC60068-2-6	Compliance to IEC60068-2-6	Compliance to IEC60068-2-6

Safety & EMC	Safety Standards	UL508, TUV EN60950-1 approved	UL508, TUV EN60950-1 approved	UL508, TUV EN60950-1 approved	UL508, TUV EN60950-1 approved
	Withstand Voltage	I/P-O/P:3KVAC, I/P-FG:2KVAC, O/P-FG: 0.5KVAC	I/P-O/P:3KVAC, I/P-FG:2KVAC, O/P-FG: 0.5KVAC	I/P-O/P:3KVAC, I/P-FG:2KVAC, O/P-FG: 0.5KVAC	I/P-O/P:3KVAC, I/P-FG:2KVAC, O/P-FG: 0.5KVAC
	Isolation Resistance	I/P-O/P, I/P-FG, O/P-FG >100M Ohm /500VD@25°C/ 70% RH	I/P-O/P, I/P-FG, O/P-FG >100M Ohm /500VD@25°C/ 70% RH	I/P-O/P, I/P-FG, O/P-FG >100M Ohm /500VD@25°C/ 70% RH	I/P-O/P, I/P-FG, O/P-FG >100M Ohm /500VD@25°C/ 70% RH
	EMC Emission	Compliance to EN55032 (CISPR32), EN61204-3 Class B, EN61000-3-2, -3	Compliance to EN55032 (CISPR32), EN61204-3 Class B, EN61000-3-2, -3	Compliance to EN55032 (CISPR32) Class B, EN61000-3-2,-3	Compliance to EN55032 (CISPR32) Class B, EN61000-3-2,-3
	EMC Immunity	Compliance to EN61000-4-2, 3, 4, 5, 6, 8, 11, EN55024, EN61000-6-2, EN61204-3, heavy industry level, criteria A	Compliance to EN61000-4-2, 3, 4, 5, 6, 8, 11, EN55024, EN61000-6-2, EN61204-3, heavy industry level, criteria A	Compliance to EN61000-4-2, 3, 4, 5, 6, 8, 11, EN55024, EN61000-6-2, (EN50082-2), heavy industry level, criteria A	Compliance to EN61000-4-2, 3, 4, 5, 6, 8, 11, EN55024, EN61000-6-2 (EN50082-2) heavy industry level, criteria A
Others	PFC	PF>0.98/115VAC, PF>0.94/230VAC at full load	Built in Active PFC		
	MTBF	146.8K Hours MIL-HDBK-217F (25°C)	230.2K Hours MIL-HDBK-217F (25°C)	453.3K Hours MIL-HDBK-217F (25°C)	453.3K Hours MIL-HDBK-217F (25°C)
	Waranty	3 Years	3 Years	3 Years	3 Years

Model Name		DR-4524	MDR-20-24
Output	Dc Voltage	24V	24V
	Rated Current	2A	1A
	Current Range	0 ~ 2A	0~1A
	Rated Power	48W	24W
	Output Voltage Adj. Range	21.6 ~ 26.4VDC	21.6~26.4VDC
Input	Voltage Range	85 ~ 264VAC / 120 ~ 370VDC	85 ~ 264VAC / 120 ~ 370VDC
	Frequency Range	47 ~ 63Hz	47 ~ 63Hz
	Efficiency (Typ.)	80%	84%
Protection	Overload	105 ~ 150% rated output power Protection type : Constant current limiting, recovers automatically after fault condition is removed	105 ~ 160% rated output power Protection type : Constant current limiting, recovers automatically after fault condition is removed
	Over Voltage	27.6 ~ 32.4V Protection type : Shut off o/p voltage, clamping by zener diode	27.6~32.4V Protection type : Shut down o/p voltage, re-power on to recover
Alarm Relay	DC OK Relay		DC OK Relay will Close In Normal Relay contact rating(max.) : 30V/1A resistive
Indicator	LED	Power On	DC OK
Housing	Dimension	67 x 78 x 93 mm (D x W x H)	100 x 22.5 x 90mm (D x W x H)
	Installation Mounting	DIN Rail	DIN Rail
Environment	Working Temp	-10 ~ 50°C	-20 ~ 70°C
	Working Humidity	20 ~ 90% RH non-condensing	20 ~ 90% RH non-condensing
	Storage Temp., Humidity	-20 ~ 85°C , 10 ~ 95% RH	-40 ~ 85°C , 10 ~ 95% RH
	Vibration	Compliance to IEC60068-2-6	Compliance to IEC60068-2-6
Safety & EMC	Safety Standards	UL508 approved	UL508, TUV EN60950-1 approved
	Withstand Voltage	I/P-O/P:3KVAC, I/P-FG:2KVAC, O/P-FG:0.5KVAC	I/P-O/P:3KVAC, I/P-FG:2KVAC, O/P-FG:0.5KVAC
	Isolation Resistance	I/P-O/P, I/P-FG, O/P-FG >100M Ohm /500VD@25°C/ 70% RH	I/P-O/P, I/P-FG, O/P-FG >100M Ohm /500VD@25°C/ 70% RH
	EMC Emission	Compliance to EN55032 (CISPR32), EN61204-3 Class B, EN61000-3-2, -3	Compliance to EN55011, EN55032 (CISPR32), EN61204-3 Class B, EN61000-3-2,-3
	EMC Immunity	Compliance to EN61000-4-2, 3, 4, 5, 6, 8, 11, EN55024, EN61000-6-2 (EN50082-2), heavy industry level, criteria A	Compliance to EN61000-4-2, 3, 4, 5, 6, 8, 11, EN55024, EN61000-6-2, EN61204-3, heavy industry level, criteria A
Others	PFC		
	MTBF	364.6K hrs MIL-HDBK-217F (25°C)	236.9K Hours MIL-HDBK-217F (25°C)
	Waranty	3 Years	3 Years

Ordering Information

Model Name	Input Voltage Range	Output Voltage	Output Voltage Adj. Range	Output Power	Operating Temperature
NDR-480-48	90 ~ 264VAC / 127 ~ 370VDC	48VDC	48~55VDC	480W	-20~ 70°C
NDR-240-48	90 ~ 264VAC / 127 ~ 370VDC	48VDC	48~55VDC	240W	-20~ 70°C
NDR-120-48	90 ~ 264VAC / 127 ~ 370VDC	48VDC	48~55VDC	120W	-20~ 70°C
NDR-120-24	90 ~ 264VAC / 127 ~ 370VDC	24VDC	24~28VDC	120W	-20~ 70°C
DR-4524	85 ~ 264VAC / 120 ~ 370VDC	24VDC	21.6~26.4VDC	48W	-10~ 50°C
MDR-20-24	85 ~ 264VAC / 120 ~ 370VDC	24VDC	21.6~26.4VDC	24W	-20~ 70°C

Appendix - Product Selection Table

Managed Switches (Rackmount)

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	✓	UL60950-1	✓	✓	✓
ICS-G24S2X	26		20	4 Combo	2	✓	UL60950-1	✓	✓	✓
IGS-4804SM	52	48	4			✓	✓	✓	✓	✓
IGS-2408SM	32	24	8			✓	✓	✓	✓	✓
IGS-S2804TM	28		24	4 Combo		✓	✓	✓	✓	✓

Managed PoE Switches (Rackmount)

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)	24/48VDC, -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)	✓	✓	✓	✓	✓

SyncE Managed Switches & SyncE Managed Switches with PoE

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			12/24/48, -48VDC	✓	EN60950-1		✓	✓
IGS-1608SM-SE	24	16	8 SFP			12/24/48, -48VDC	✓	✓	✓	✓	✓
IGS-804SM-SE-8PH	12	8	4 SFP	8	240W	48, -48VDC	✓	EN60950-1	✓	✓	✓
IGS-1608SM-SE-8PH	24	16	8 SFP	8	240W	48, -48VDC	✓	✓		✓	✓

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						✓
ICR-401 (Compact)	2G/3G/4G LTE	GPS		1x FE (LAN) + 1x FE (WAN)	1x DI, 1x DO	1x RS232						✓

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)		48, -48VDC	✓	✓		✓	✓
IGS+803SM-8PH24	11	8		3 SFP		8 (180W)		24/48, -48VDC	✓	✓	✓	✓	✓
IGS+803SM-8PH	11	8		3 SFP		8 (240W)		48, -48VDC	✓	✓	✓	✓	✓
IGS-402SM-4PU	6	4		2 SFP			4 (240W)	48, -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)		48, -48VDC	✓	✓		✓	✓
IFS+803GSM-8PH24	11		8	3 SFP		8 (180W)		24/48, -48VDC	✓	✓	✓	✓	✓
IFS-803GSM-8PH24	11		8	3 SFP		8 (180W)		24/48VDC	UL60950-1	✓	✓	✓	✓
IFS-402GSM-4PU	6		4	2 SFP			4 (240W)	48, -48VDC	✓	✓		✓	✓
IFS-402GSM-4PH24	6		4	2 SFP		4 (120W)		24/48VDC	UL60950-1	✓	✓	✓	✓

Appendix - Product Selection Table

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	✓	✓	✓

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, -48VDC	UL60950-1& EN60950-1	✓	✓	✓	✓
IGS+404SM	8		4	4 SFP		12/24/48VDC, -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, -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	✓		✓	✓	✓

Appendix - Product Selection Table

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		✓	✓	✓

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	✓	✓	✓

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 (180W)	24/48VDC		✓		✓	✓

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		✓		✓	✓

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	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	✓	✓	✓	✓	✓

Appendix - Product Selection Table

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

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-G30	✓	✓	15.4W/30W	Power Adapter				✓

Fieldbus Fiber Converters

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

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	✓	✓	✓

IP Device Servers

Model	UTP	Serial		Certification	
	10/100Base-TX	RS232	RS232/422/485	CE	FCC
STE100A-232	1	1		✓	✓
STE100A-Serial	1		1	✓	✓

Industtrial Power Supplies

Model	Input Voltage Range	Output Voltage	Output Voltage Adj. Range	Output Power	Operating Temperature
NDR-480-48	90~264VAC / 127~370VDC	48VDC	48~55VDC	480W	-20~70℃
NDR-240-48	90~264VAC / 127~370VDC	48VDC	48~55VDC	240W	-20~70℃
NDR-120-48	90 ~ 264VAC / 127 ~ 370VDC	48VDC	48~55VDC	120W	-20~70℃
NDR-120-24	90 ~ 264VAC / 127 ~ 370VDC	24VDC	24~28VDC	120W	-20~70℃
DR-4524	85 ~ 264VAC / 120 ~ 370VDC	24VDC	21.6~26.4VDC	48W	-10~50℃
MDR-20-24	85 ~ 264VAC / 120 ~ 370VDC	24VDC	21.6~26.4VDC	24W	-20~70℃

Appendix - Product Selection Table

Long-Reach copper wire SFP (500meter~3km)

■ 10GBase-X Fiber SFP

Model	Cable Type	Typical Distance	Wavelength (nm)	TX (dBm) (Min~Max)	RX Sensitivity (dBm)	Power Budget (dB)	Saturation (dBm)	DDMI diagnostic monitoring	Operating Temperature
ISFP-M9000-85-D (E)	M/M (OM3)	300m	850nm	-7.1 ~ -1	-9.9 dBm	8.9	-1	V	-10~70°C (-40~85°C)
ISFP-S9010-31-D (E)	S/M	10km	1310nm	-6 ~ +0.5	-14.4	8.4	0.5	V	-10~70°C (-40~85°C)

■ 1.25Gbps 1000Base-X Fiber SFP

Model	Cable Type	Typical Distance	Wavelength (nm)	TX (dBm) (Min~Max)	RX Sensitivity (dBm)	Power Budget (dB)	Saturation (dBm)	DDMI diagnostic monitoring	Operating Temperture
ISFP-M7000-85-(DE)	MM	550m	850	-9.5~-4	-17	7.5	-3	Optional	-10~70°C (-40~85°C)
ISFP-S7020-31-(DE)	SM	20km	1310	-8~-2	-23	15	-1	Optional	-10~70°C (-40~85°C)
ISFP-S7020-WA-D(E)	SM	20km	T1310/R1550	-8~2	-23	15	-2	V	-10~70°C (-40~85°C)
ISFP-S7020-WB-D(E)	SM	20km	T1550/R1310	-8~2	-23	15	-2	V	-10~70°C (-40~85°C)

■ 1.25Gbps 1000Base-T UTPr SFP

Model	Cable Type	Typical Distance	Operating Temperature
ISFP-T7T00-00-(E)	UTP Cat 5e	100m	-10~70°C (-40~85°C)

■ 155Mbps 100Base-FX Fiber SFP

Model	Cable Type	Typical Distance	Wavelength (nm)	TX (dBm) (Min~Max)	RX Sensitivity (dBm)	Power Budget (dB)	Saturation (dBm)	DDMI diagnostic monitoring	Operating Temperture
ISFP-M5002-31-(DE)	MM	2km	1310	-20~-14	-32	12	-8	Optional	-10~70°C (-40~85°C)
ISFP-S5030-31-(DE)	SM	30km	1310	-15~-8	-34	19	-5	Optional	-10~70°C (-40~85°C)

SmartView EMS for Industrial Product

Model	Dual Channel
SV2-AGT-50	SmartView management software with 50 nodes (by IP address)
SV2-AGT-100	SmartView management software with 100 nodes (by IP address)
SV2-AGT-200	SmartView management software with 200 nodes (by IP address)
SV2-AGT-500	SmartView management software with 500 nodes (by IP address)

*Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.