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2020 INDUSTRIAL PRODUCT CATALOG

CTC UNION TECHNOLOGIES

2020 INDUSTRIAL

PRODUCT CATALOG

YOUR RELIABLE SUPPLIER



EN50155 EN45545-2 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



About CTC Union

Since 1993



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.
- We still ensure honesty and fairness in all our actions, we will always do the right thing.
- To be a trusted in providing creative connectivity products and solutions
- To be a leading communication transmission solution provider meets our customer’s needs

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SmartConfig™ 1-4

Chapter 2 Cellular LTE & WiFi Connectivity

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4G LTE, WiFi IEEE802.11b/g/n, 2x 10/100Base RJ45, Compact Size Cellular Router ICR-W401 2-6
4G LTE, 4x 10/100Base RJ45, Cellular Router ICR-4103 2-9

Chapter 3 Industrial SyncE Switch

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8x GbE RJ45 + 4x 100/1000Base SFP with 8x PoE, SyncE Managed Switch (240W/48VDC) IGS-804SM-SE-8PH 3-1
16x GbE RJ45 + 8x 100/1000Base SFP, SyncE Managed Switch IGS-1608SM-SE 3-5
8x GbE RJ45 + 4x 100/1000Base SFP, SyncE Managed Switch IGS-804SM-SE 3-5

Chapter 4 Industrial Rackmount Ethernet Switch

10G Ethernet Core Switch

NEW Layer 3, 24x GbE RJ45 + 4x 100/1000Base SFP + 4x 1G/2.5G/10G SFP, Ethernet Core Switch ICS-RG24044X 4-1
NEW Layer 3, 16x GbE RJ45 + 12x 100/1000Base SFP + 4x 1G/2.5G/10G SFP, Ethernet Core Switch ICS-RG16124X 4-1
NEW Layer 3, 8x GbE RJ45 + 20x 100/1000Base SFP + 4x 1G/2.5G/10G SFP, Ethernet Core Switch ICS-RG8204X 4-1
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24x GbE RJ45 + 4x 100/1000Base SFP + 4x 1G/2.5G/10G SFP, Ethernet Core Switch ICS-G24044X 4-4
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24x GbE RJ45 + 4x 100/1000Base SFP + 4x 1G/2.5G/10G SFP with 24x PoE, Ethernet Core Switch (400W,48VDC) ICS-G24044X-24PH 4-13

Gigabit Ethernet Switch

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NEW Layer 3, 16x GbE RJ45 + 16x 100/1000Base SFP, Managed Switch IGS-R1616SM 4-17
NEW Layer 3, 8x GbE RJ45 + 24x 100/1000Base SFP, Managed Switch IGS-R824SM 4-17
48x GbE RJ45 + 4x 100/1000Base SFP, Managed Switch IGS-4804SM 4-20
24x GbE RJ45 + 8x 100/1000Base SFP, Managed Switch IGS-2408SM 4-20
28x 100/1000Base SFP with 4x Combo (RJ45/SFP), Managed Ethernet Switch IGS-S2804TM 4-24
24x GbE RJ45 + 8x 100/1000Base SFP with 24x PoE, Managed Switch (400W, 48VDC) IGS-2408SM-24PH 4-28

Chapter 5 EN50155 Ethernet Switch

Managed PoE Switch

NEW 16x 10/100Base M12 + 2x GbE M12 + 2x GbE Fiber with 16x PoE, Managed Switch (120W, 24/48/72/110VDC) ITP-1622GTFM-16PH 5-1
NEW 16x 10/100Base M12 + 4x GbE M12 with 16x PoE, Managed Switch (120W, 24/48/72/110VDC) ITP-1604GTM-16PH 5-1
8 x GbE M12 + 2x 100/1000Base SFP with 8x PoE, IP67 Managed Switch (180W, 24/48VDC) ITP-G802SM-8PH24 5-4
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12x 10/100Base M12 + 4x GbE M12 with 12x PoE, IP54 Managed Switch (120W, 24/48/72/110VDC) ITP-1204GTM-12PH 5-9
8x 10/100Base M12 + 2x 100/1000Base SFP with 8x PoE, IP67 Managed Switch (180W, 24/48VDC) ITP-802GSM-8PH24 5-13
8x 10/100Base M12 + 2x GbE M12 with 8x PoE, IP67 Managed Switch (180W, 24/48VDC) ITP-802GTM-8PH24 5-13

Managed Ethernet Switch

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NEW 16x 10/100Base M12 + 4x GbE M12, Managed Switch ITP-1604GTM 5-18
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8x GbE M12 + 2x GbE M12, IP67 Managed Switch ITP-G802TM 5-21
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12x 10/100Base M12 + 4x GbE M12, IP54 Managed Switch ITP-1204GTM 5-26
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NEW 8x 10/100Base M12 with 8x PoE, IP56 Ethernet Switch (120W, 24/48VDC) ITP-800-8PH24 5-38
NEW 6x 10/100Base M12 with 4x PoE, IP56 Ethernet Switch (90W, 24/48VDC) ITP-600-4PH24 5-38

Unmanaged Ethernet Switch

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NEW 8x 10/100Base M12, IP56 Ethernet Switch ITP-800 5-43
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Chapter 6 Industrial PoE Switch & Media Converter

Managed PoE Switch

NEW 16x GbE RJ45 + 8x 100/1000Base SFP with 16x PoE, Managed Switch (400W, 48VDC) IGS-1608SM-16PH 6-1
16x GbE RJ45 + 8x 100/1000Base SFP with 8x PoE, Managed Switch (240W, 48VDC) IGS-1608SM-8PH 6-1
8x GbE RJ45 + 3x 100/1000Base SFP with 8x PoE, Managed Switch (240W, 48VDC) IGS+803SM-8PH 6-1
8x GbE RJ45 + 3x 100/1000Base SFP with 8x PoE, Managed Switch (180W, 24/48VDC) IGS+803SM-8PH24 6-6
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8x GbE RJ45 + 1x 100/1000Base SFP + 2x 100M/1G/2.5G SFP with 8x PoE, Managed Switch (180W, 24/48VDC) IGS-803SM-8PH24 6-14
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16x 10/100Base RJ45 + 8x 100/1000Base SFP with 8x PoE, Managed Switch (240W, 48VDC) IFS-1608GSM-8PH 6-19
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8x 10/100Base RJ45 + 3x 100/1000Base SFP with 8x PoE, Managed Switch (180W, 24/48VDC) IFS-803GSM-8PH24 6-31
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Managed PoE Media Converter

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Unmanaged PoE Switch

NEW 8x GbE RJ45 with 8x PoE, Compact Size Ethernet Switch (240W,48VDC) IGS-800C-8PH 6-39
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4x GbE RJ45 + 2x 100/1000Base SFP with 4x PoE, Ethernet Switch (120W, 24/48VDC) IGS-402S-4PH24 6-41
4x GbE RJ45 + 2x 1000Base Fiber (SC) with 4x PoE, Ethernet Switch (120W, 24/48VDC) IGS-402F-4PH24 6-41
4x GbE RJ45 + 2x 100/1000Base SFP with 4x 60W PoE, Ethernet Switch (240W, 48VDC) IGS-402S-4PU 6-41
16x 10/100Base RJ45 + 2x 1000Base SFP with 8x PoE, Ethernet Switch (240W, 48VDC) IFS-1602GS-8PH 6-45
8x 10/100Base RJ45 + 2x 1000Base SFP with 8x PoE, Ethernet Switch (240W, 48VDC) IFS-802GS-8PH 6-45

Unmanaged PoE Media Converter

1x GbE RJ45 to 1x 100/1000Base SFP with PoE PSE, Media Converter (30W, 12/24/48VDC) IMC-1000S-PH12 6-48
1x 10/100Base RJ45 to 1x 100Base Fiber (SC/ST) with PoE PSE, Media Converter (30W,12/24/48VDC) IMC-100-PH12 6-51

Chapter 7 Industrial Ethernet Switch & Media Converter

Managed Ethernet Switch

16x GbE RJ45 + 4x 100/1000Base SFP, Managed Switch IGS-1604SM 7-1
8x GbE RJ45 + 12x 100/1000Base SFP, Managed Switch IGS-812SM 7-1
8x GbE RJ45 + 3x 100/1000Base SFP, Managed Switch IGS+803SM 7-5
4x GbE RJ45 + 4x 100/1000Base SFP, Managed Switch IGS+404SM 7-5
8x GbE RJ45 + 1x 100/1000Base SFP + 2x 100M/1G/2.5G SFP, Managed Switch IGS-803SM 7-9
4x GbE RJ45 + 2x 100/1000Base SFP + 2x 100M/1G/2.5G SFP, Managed Switch IGS-404SM 7-9
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Unmanaged Ethernet Switch

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8x GbE RJ45, Ethernet Switch IGS-800 7-24
5x GbE RJ45 + 1x 100/1000Base SFP, Ethernet Switch IGS-501S 7-24
5x GbE RJ45, Ethernet Switch IGS-500 7-24
4x GbE RJ45 + 2x 100/1000Base SFP, Ethernet Switch IGS-402S 7-27
4x GbE RJ45 + 2x 1000Base Fiber (ST/SC), Ethernet Switch IGS-402F 7-27
16x 10/100Base RJ45 + 2x 1000Base SFP, Ethernet Switch IFS-1602GS 7-30
8x 10/100Base RJ45 + 2x 1000Base SFP, Ethernet Switch IFS-802GS 7-30
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4x 10/100Base RJ45 + 2x 100Base Fiber (ST/SC), Ethernet Switch IFS-402F 7-30
4x 10/100Base RJ45 + 1x 100Base Fiber (ST/SC), Ethernet Switch IFS-401F 7-30
5x10/100Base RJ45, Compact Size Ethernet Switch IFS-500C 7-34
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Unmanaged Media Converter

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1x GbE RJ45 to 1x 1000Base Fiber (ST/SC), Compact Size Media Converter IMC-1000C 7-38
1x GbE RJ45 to 1x 100/1000Base SFP, Media Converter IMC-1000S 7-41
1x 10/100Base RJ45 to 1x 100Base Fiber (ST/SC),Compact Size Media Converter IMC-100C 7-43
1x 10/100Base RJ45 to 1x 100Base Fiber (ST/SC), Media Converter IMC-100 7-45

Optical Fiber Bypass Switch

Optical Fiber Bypass Switch IBP-202 7-47

Chapter 8 Industrial Serial Connectivity Series

Serial to Fiber Media Converter

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1x RS232/422/485 to 1-port Fiber (SC/ST) Support PROFIBUS, Media Converter ..... IFC-Serial-PRO 8-4
1x RS232/422/485 to 1-port Fiber (SC/ST) Media Converter ..... IFC-Serial 8-7
1x RS232/422/485 to 2-ports Fiber (SC/ST) Media Converter ..... IFC-FDC 8-10

4 Channel Binary Transducer

4 Channel Binary Transducer IFC-CCF40 8-14

Serial Device Server

NEW 2 port (1x RS232 + 1xRS422/RS485, isolation) serial to 1x Ethernet IDS-i241 8-17
NEW 2 port RS422/RS485 (isolation) serial to 1x Ethernet IDS-i211 8-17
NEW 1 port RS422/RS485 (isolation) serial to 1x Ethernet IDS-i111 8-17
NEW 1 port RS232 serial to 1x Ethernet IDS-121 8-17

Chapter 9 Industrial PoE LAN Extender, Injector & Splitter

PoE LAN Extender with PoE

4x 100Mbps RJ45 + 4x PoE LAN Extender IEXT224-4PH 9-1

PoE Injector / Splitter

NEW Industrial Gigabit Passive PoE Injector (60W) INJ-IG02-PH 9-3
Industrial Gigabit IEEE802.3af/at PoE Injector (15.4/30/36/60W, 48VDC) INJ-IG01-PH 9-5
Industrial Gigabit IEEE802.3af/at PoE Injector (15.4/30/36/60/72W, 12/24/48VDC) INJ-IG60-24 9-7
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APPENDIX

Selection Table 255

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, EN45545-2 Standard fire testing 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 µ-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.

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.

Fire testing of materials and components for trains

Reliability Elements

Certification

- CE/FCC
- **UL/EN60950-1**
- EN50155
- **EN50121-4**
- EN62368-1
- IEC-61850-3
- **EN61000-6-2**
- EN61000-6-4
- **EN45545-2**
- NEMA TS2

Redundant Ring

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



EMS Industrial Grade

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

Temperature

- **Wide Operating Temperature**

Rugged Mechanical

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

5 Years Warranty

- **Industrial Grade Component**
- **Fanless**
- **High MTBF**

Brief Comparison between general CE & EN50121-4

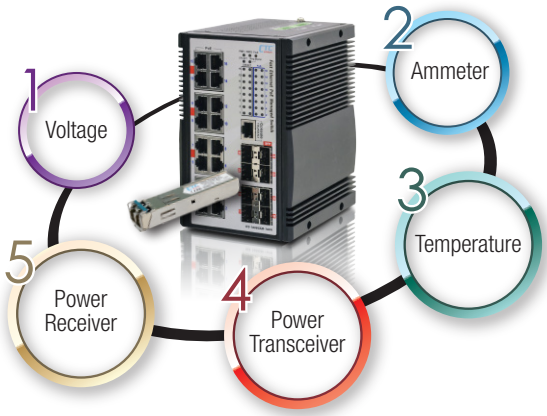
	CE Compliant	EN50121-4 Compliant (Trackside)
Surge		
Signal L-E	1kV	2kV
Signal L-L	**N/A**	**2kV**
DC Power L-E	**0.5kV**	**2kV**
DC Power L-L	**0.5kV**	**2kV**
ESD (Contact)	4kV	6kV
Radio frequency magnetic field	10V/m	20V/m
EFT (fast transient)	0.5kV Criteria B*	2kV Criteria A*
Power magnetic field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

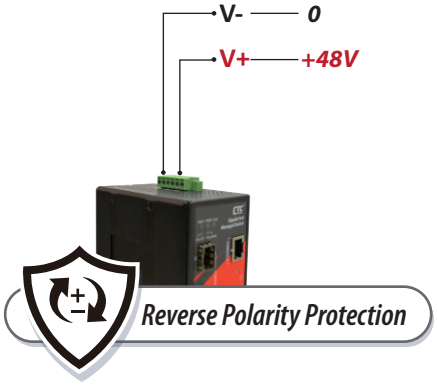


Digital Diagnostic Monitor (DDM)



CTC Industrial Ethernet Switch Series support SFP-DDM (digital diagnostic monitor) function that greatly helps network administrator to easily monitor real-time parameters of the SFP and SFP+ transceivers, such as optical output power, optical input power, temperature, laser bias current, and transceiver supply voltage.

Reverse Polarity Protection



Rugged & Fanless Design with Wide Operating Temperature



Rugged Design **Fanless** **Wide Temperature**

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

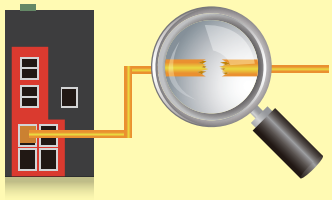
Suitable for harsh environments like railways, roadside, factory, warehouse, dock, parking lot, electrical poles,..

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

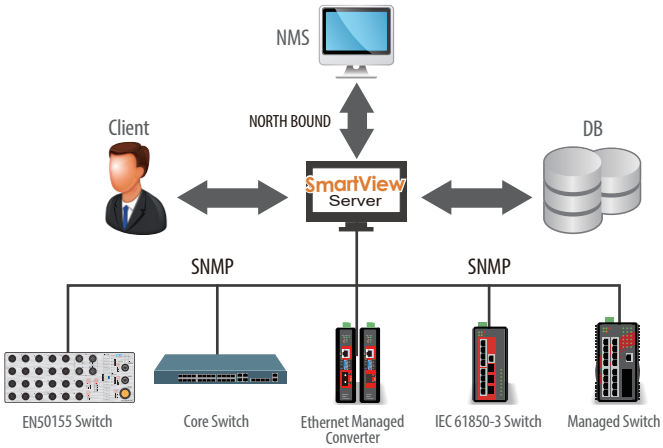
UTP Cable Diagnostics



- 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.

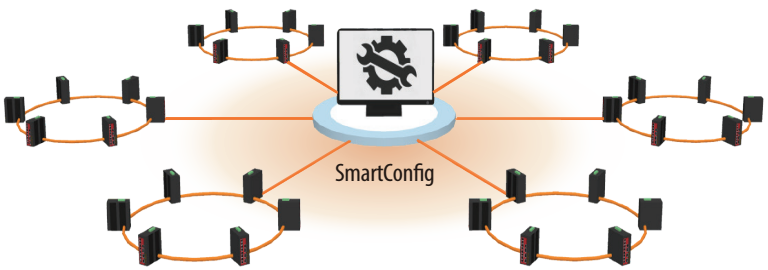
SmartView™ for central management

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



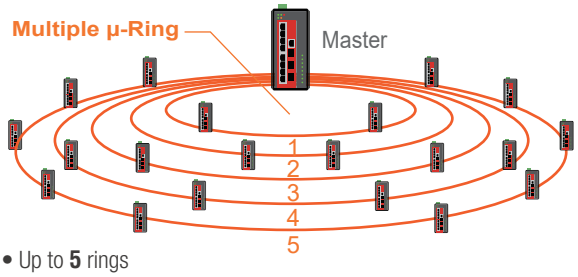
SmartConfig™ for quick & easy mass configuration

- 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.



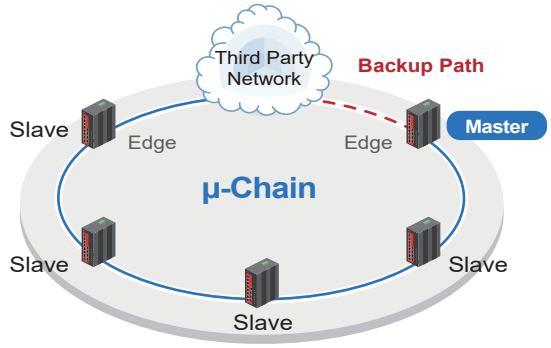
- Up to **5** rings
- Up to **250** devices in a ring
- µ-Ring, µ-Chain, Sub-Ring for different applications
- Recovery time < 10ms
- User Friendly configuration GUI

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)	

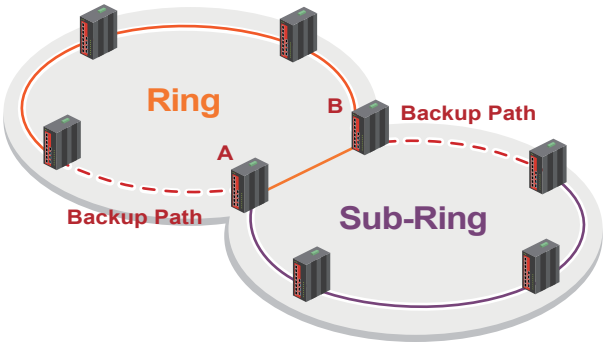
µ-Chain topology

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



Sub-Ring topology

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

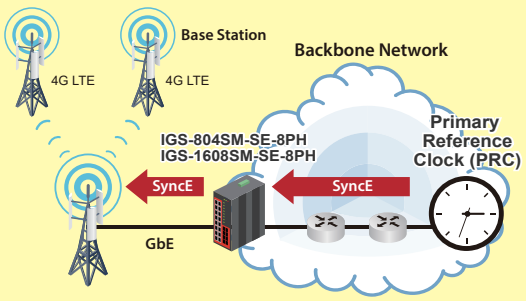


Supports Standard ITU-T G.8032 ERPS, MSTP, RSTP, STP for Network Redundancy

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.

Synchronous Ethernet (SyncE)



IGS-804SM-SE/IGS-1608SM-SE switch series provide hardware support for Synchronous Ethernet (ITU-T G.8262). SyncE allows a synchronization signal to be carried over Ethernet networks and is used for time critical transmissions such as in cellular networks, for video and voice streams, as well as in Smart Grid applications, where control timing is critical.

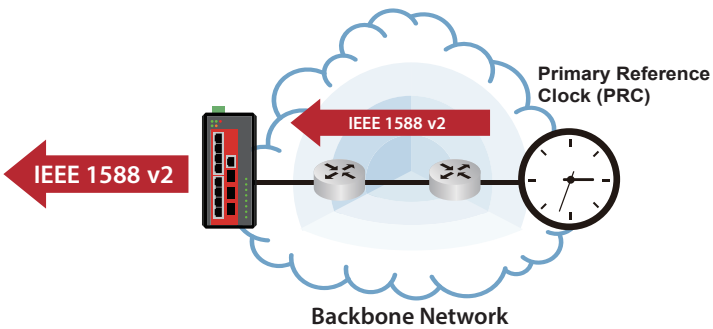
IEEE1588 PTP v2

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

Manage 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 GUI Operation Interface

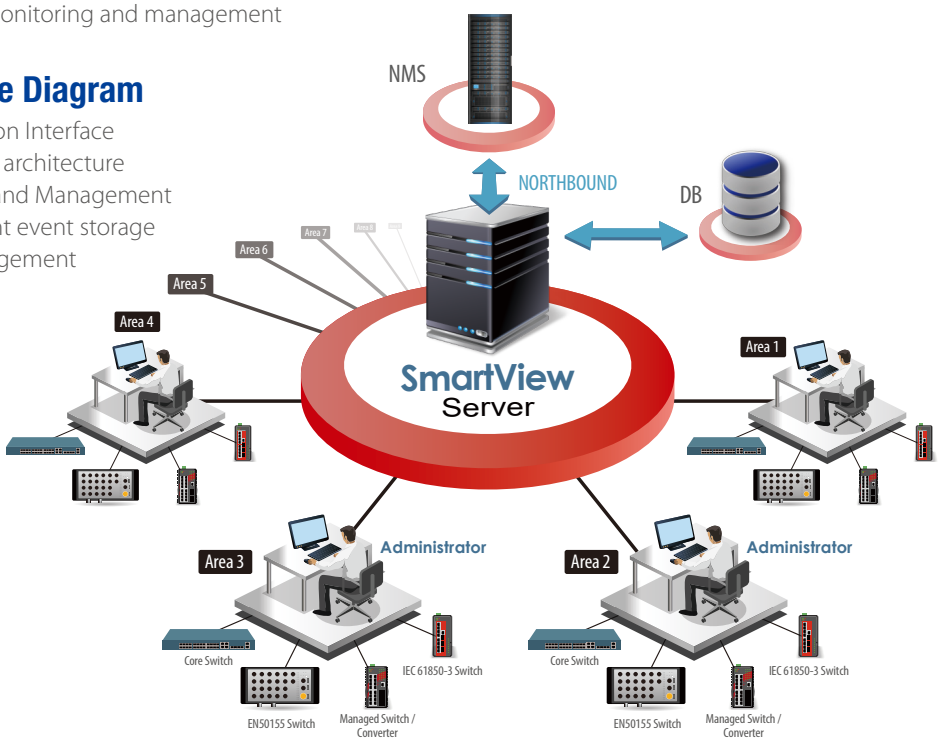
CTC Union's **SmartView™ Element Management System (EMS)** is a comprehensive management solution that monitors device performance, enables remote configuration and provisioning, and provides fault notification status.

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



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.

Microsoft® MS-SQL Server for Persistent Storage

SQL Server is the place where SmartView™ stores collected data, such as alarms, traps and user actions, for long term retrieval. SmartView™ requires Microsoft® SQL Server and is compatible with SQL 2008 Server, SQL 2008 Express, SQL 2014 Server and SQL 2014 Express. (The EMS installer will install the free version Microsoft® SQL 2008 Express or SQL 2014 Express under Windows 10 by default).

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

■ 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.

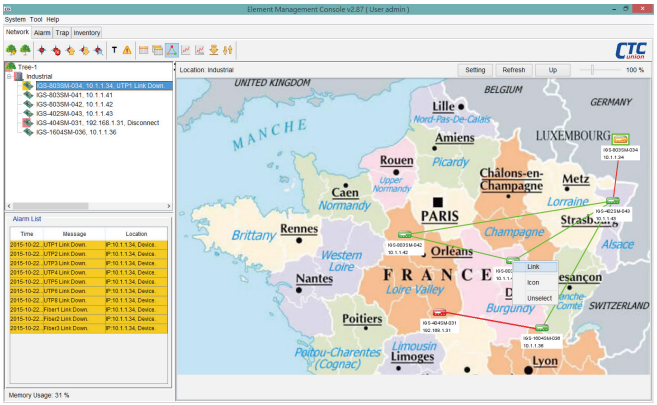
Security Management

- **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**

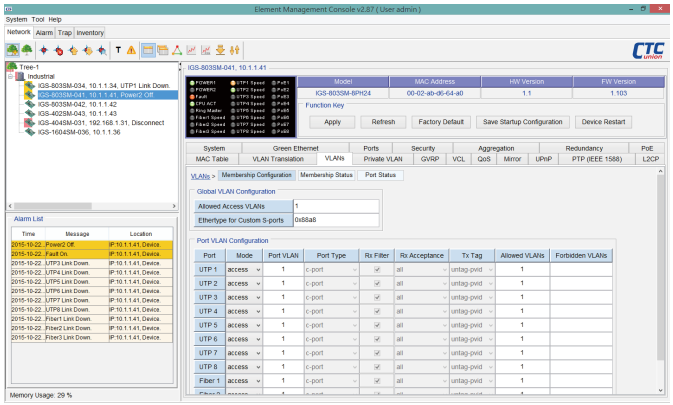
  A user role is a group and defines privileges for users to perform management tasks. The access to network elements is also restricted by user role.
- **User Activity**

  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.

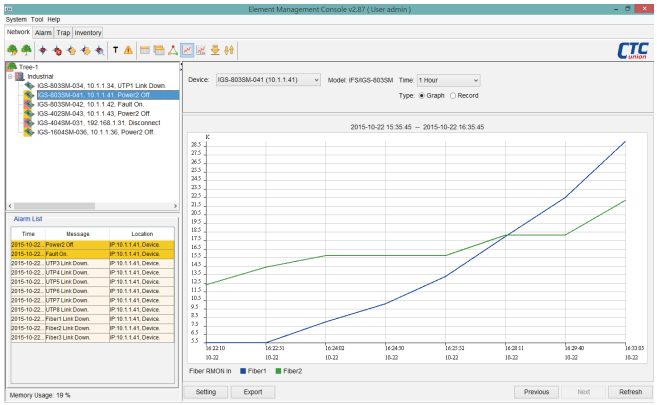
Network Topology



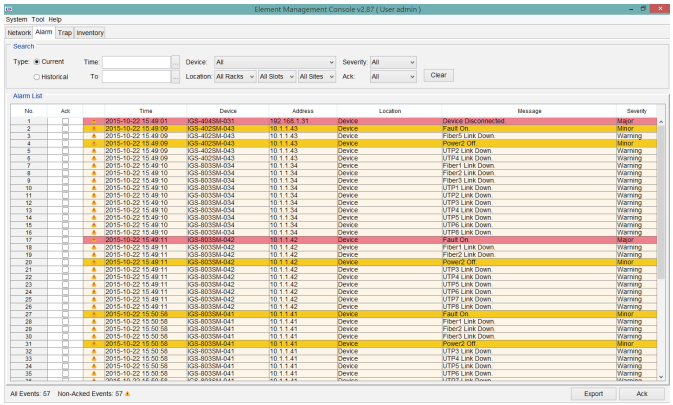
Network Element Configuration



Performance Graphics



Active Alarm



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 2012/2016, Win 7/8/10 Pro (64 bit)
SmartView™ Clients	Intel Core2 or higher processor, 2GB RAM, 20GB HD	JAVA JRE. SmartView™ Kit.	Windows 7/8/10 Pro (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 2012/2016, Win 7/8/10 Pro (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 Pro (64 bit)

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

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

SmartConfig™

Quick & Easy for Mass Configuration

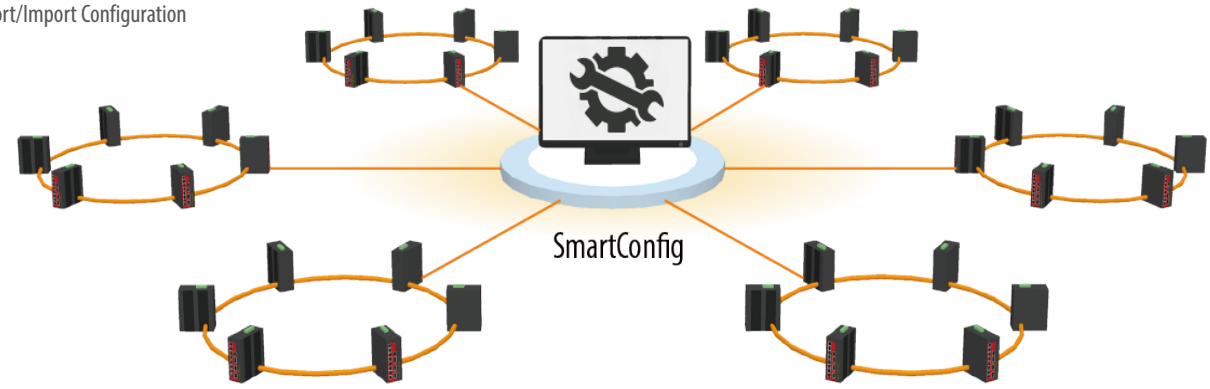


- Multiple device auto discovery
- Group configuration, access
- Group firmware upgrade
- Backup / restore device configuration
- IP address assignment
- Connectivity testing

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™

IWA-AR114

WAN: 1x GbE SFP + 1GbE UTP LAN: WiFi IEEE802.11 a/b/g/n/ac 2T2R + 4x GbE UTP

NEW



- Ethernet UTP and SFP for WAN Failover & Load Balancing
- WAN or virtual WAN interfaces for various IP applications (Data, WiFi hotspot, VoIP, Video Streaming etc)
- USB2.0 port for log storage

The IWA-AR114 is a compact, lightweight and cost-effective Industrial Grade Router with 3 10/100/1000Base-T LAN ports plus 1 100/1000Base-T WAN/LAN and a 100/1000Base-X WAN SFP interface. It also equips with four Virtual WANs that can be used for various IP applications and provides IEEE 802.11 a/b/g/n/ac dual band(2.4G/5G selectable) wireless connections for optimal coverage. Built for harsh environments, the router equips features such as NAT, port forwarding, VPN Tunneling, Firewall and management capability via TR-069 and SNMP. All in all, the IWA-AR114 provides highly secure authentication, encryption and management to protect your data between public and private networks and to simplify your complicated solutions for SoHo, smart city and industrial networking.

Features

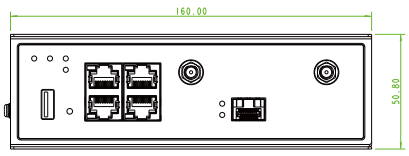
- WiFi IEEE 802.11 a/b/g/n/ac (2.4G/5G selectable) + 3 x GbE LAN + 1x WAN/LAN GbE + 1x GbE SFP WAN Router
- Compact and easy to be integrated into IP network solutions.
- Rich VPN tunnel technology to build VPN tunnel between IP network/network device with remote centers.
- Both IPv4/IPv6 protocol stack meet ISP requirements.
- Gateway based on IP pass through or DHCP-based NAT with Port Forwarding.
- Rich Routing function covers static, dynamic and OSPF compatible with most IP networks.
- Web UI, CLI and Command Script for basic and advanced configurations.

Specifications

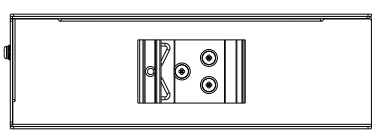
Device Interface	Ethernet	4x RJ45 GbE, 1x GbE SFP
	WiFI	802.11a/b/g/n/ac 2T2R (2.4G/5GHz Selectable)
	Log Storage	1x USB 2.0
	Power Input	12V (DC Jack)
WAN & Uplink	WAN	Ethernet UTP and SFP, for WAN Failover, Load Balancing
	Ether-WAN	Dynamic IP, Static IP, PPPoE, PPTP,L2TP
	Network Monitor	ICMP/DNS Query
WiFi	Standard	802.11 Industry Compliance
	Mode	AP Router, WDS, WDS Hybrid Modes
	Function	Multi-SSID, WMM
	Security	WEP, WPA, WPA2, WPA-PSK, WPA2-PSK, 802.1x, WPA-Enterprise, WPA2-Enterprise
	Captive Portal	External & Internal web portal
Protocol	LAN & VLAN	DHCP Server/Relay, Port/ Tag based VLAN
	IPv6	Static IPv6, DHCPv6, PPPoEv6
	Port Forward	Virtual Server, Virtual Computer, DMZ, VPN Pass-through
	Routing	Static, Dynamic - RIP1/RIP2, OSFP, BGP
	QoS	Policy-based Bandwidth Control and Packet Flow Prioritization
Security	VPN Tunneling	IPSec, OpenVPN, PPTP, L2TP, GRE
	Scenario	Site/Host to Site/Host ; Dynamic VPN
	VPN Capability	IPSec: Up to 16 tunnels
	Firewall	SPI Firewall with Stealth Mode, IPS
	Access Control	Packet Filter, URL Blocking, MAC Filter, IP, TCP, UDP

Object	Scheduling	Time Schedule List
	Grouping	Host Grouping List
	Ext. Server	Email, Syslog, SCEP
	Certificate	My Certificate, Trusted Certificate, Issue Certificate
Administration	Configuration	Web UI, CLI, Command Script
	Management	SNMPv3 Std. MIB, TR-069
	System	Upgrade, Backup & Restore, Reboot & Reset, Syslog
	Software Upgrade	TFTP / Web
	Diagnostic	Packet Analyzer, Diagnostic Tools, Ethernet port setup
Service	Event Handling	User Defind Manage/Notify Event ; SMS, Mail, Syslog, SNMP Trap
Environment	OP/Store Temp.	-30°C ~ 60°C ; -40°C ~ 85°C
	Humidity	10%~95% (non-condensing)
	Enclosure	Metal, Bracket / DIN-Rail
	Dimension	50.8 x 125 x 160mm
Certificate-CE	Standard & Regulation	
	EMI	EN 55032: 2015 +AC: 2016 ClassB, EN61000-3-6
	EMS	EN 55024, IEC 61000, EN61000-6
	Radio	EN 301 489, EN 300 328, EN 301 893, EN50385
	Safety	EN 60950-1
Package List	1x Device	
	2x WiFi Antenna	
	Power Adapter DC12V/2A	
	1x DIN Rail Kit	

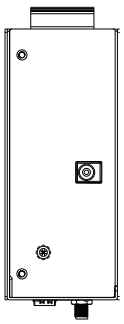
Dimensions



Front View



Rear View



Side View

Ordering Information

Model Name	WAN / LAN		WiFI (LAN)	Certification	
	Fiber	UTP Ethernet		Safety EN60950-1	CE
IWA-AR114	1x GbE SFP	3x GbE (LAN) + 1x GbE (LAN or WAN)	IEEE802.11 a/b/g/n/ac 2.4G/5G selectable	V	V

ICR-W403

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



- 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 4G LTE WiFi

The ICR-W403 is a high-performance industrial grade wireless router. It combines IEEE 802.11b/g/n/ac WLAN and 4G LTE cellular technologies to provide flexible wireless network connectivity for industrial applications. ICR-W403 provides 3 Ethernet ports and 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 OSPF, 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, fleet management, bus ticketing collection systems, 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 slots 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 configurable
	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 sockets 1x USB 2.0 socket 3 RJ45 for GbE LAN/WAN 1x Removable Terminal block (Input power, 1x IGN, 2x DI, 1x DO, RS232)
4G LTE data rate	Cat 4 , Maxium 150Mbps download, upload 50Mbps
Power Supply	12/24VDC (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	-40~ 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

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

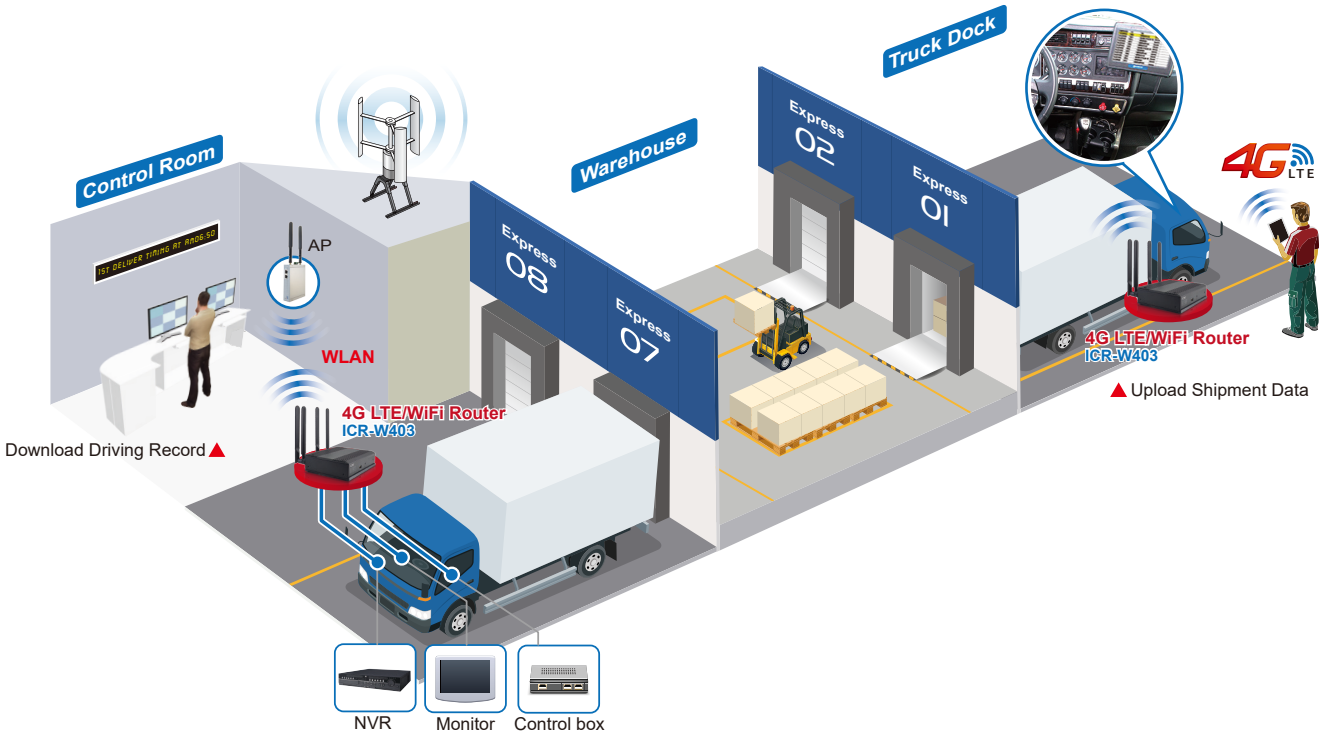
Software Specifications

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	

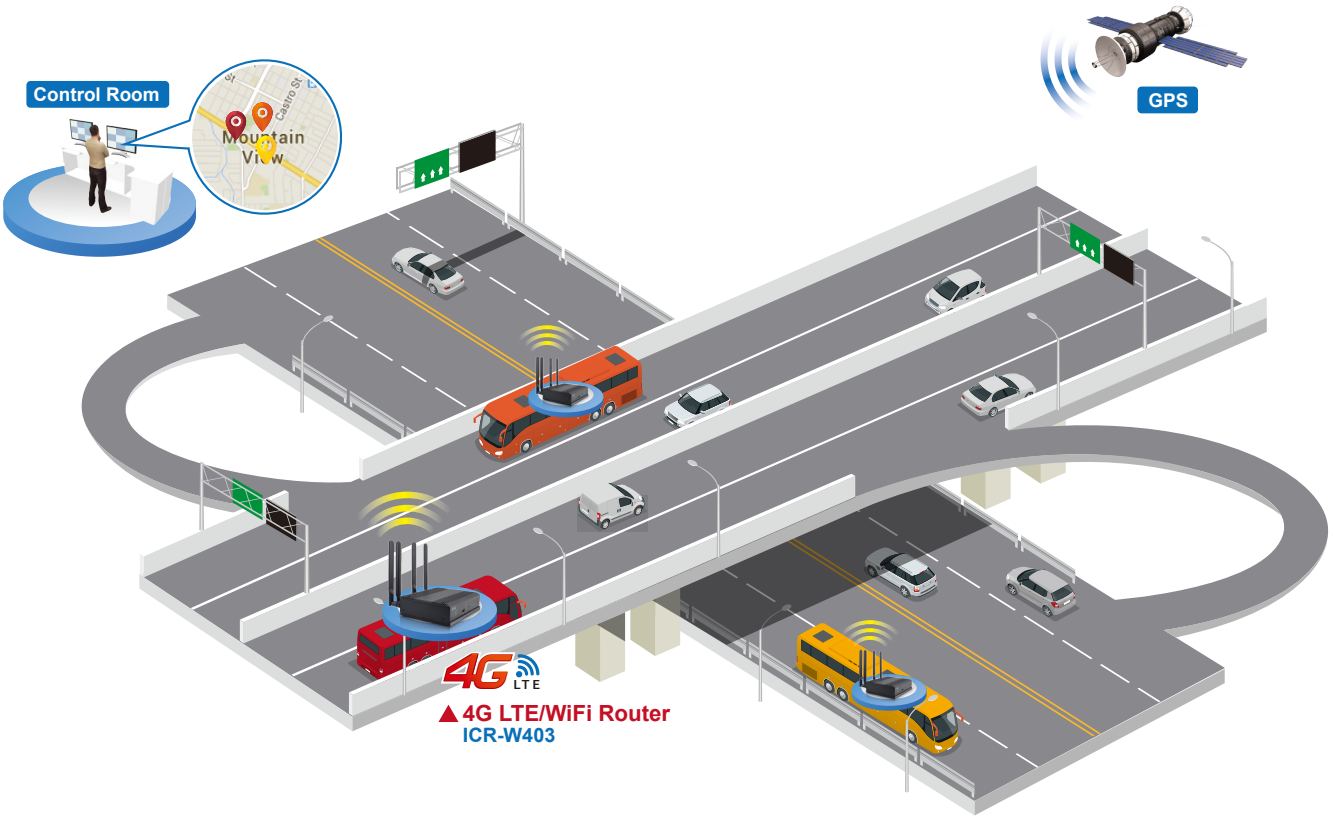
Application

Figure 1 : Application of Wireless Transmission in Logistics Center

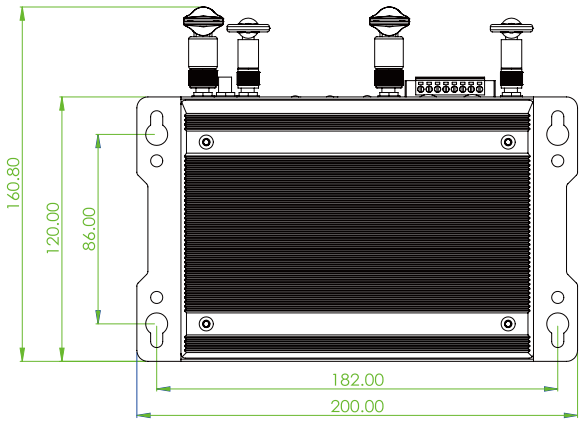


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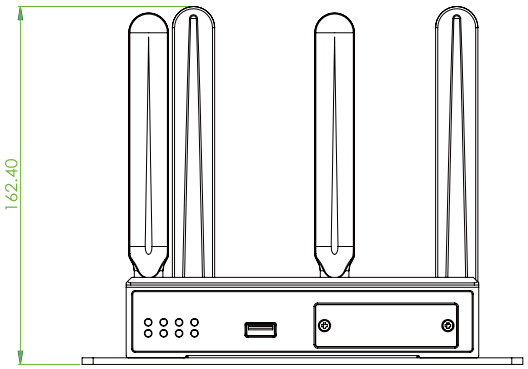
Figure 2 : Application of Vehicle Location Tracking System



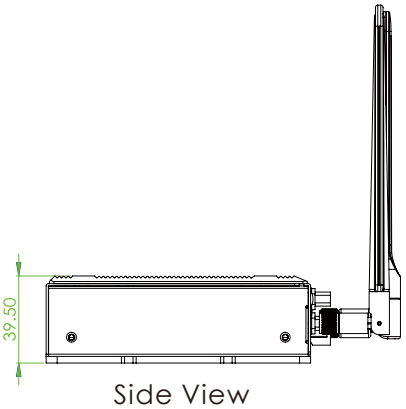
Dimensions



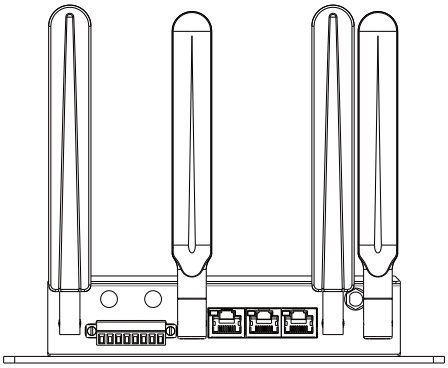
Top View



Front View



Side View

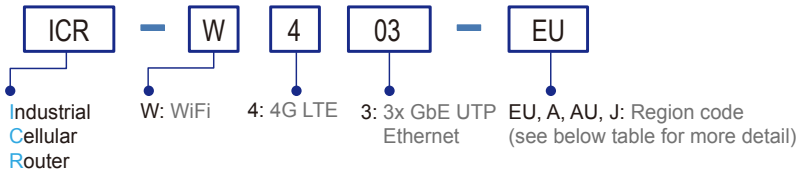


Rear View

Ordering Information

Model Name	WAN		WAN/LAN		LAN		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 Options

	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-Mobile)
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, 1.5meter for 4G LTE extension


ANT-GPS-01


ANT-BASE-01

2020 V1.0
www.ctcu.com / sales@ctcu.com

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

ICR-W401

4G LTE, GPS, WiFi IEEE 802.11 b/g/n 2T2R and DI/DO Router



- Multi-band connectivity with FDD LTE/ TDD LTE/ WCDMA/ GSM/ LTE Cat 4
- IEEE 802.11b/g/n WiFi 2T2R
- Enhance security and encryption for authentication and transmission
- -30 ~ +70°C for use in harsh environments
- Compact

The ICR-W401 is a compact, lightweight and cost-effective Industrial grade 4G LTE Router that has 1 LAN plus 1 WAN Fast Ethernet connection and supports uplink to 2G/3G/4G mobile data networks. Built for harsh environments, the router is equipped with a DI/DO interface. The ICR-W401 is simple to configure through its embedded Web user interface applications. The ICR-W401's WiFi is compliant with IEEE 802.11b/g/n wireless connectivity. The Router features VPN Tunneling with Firewall and management capability via TR069 and SNMP. The ICR-W401 provides highly secure authentication, encryption and management, to protect your data between public and private networks and simplify your complicated solutions for smart city and industrial networking.

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 2T2R
- Micro SIM connector and DI/DO interfaces
- LED indicators for connection and data transmission status
- Industrial temperature rated from -30 ~ +70°C for use in harsh environments
- IPv6/IPv4 dual stack and all applications are IPv6 ready
- 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 802.1p 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, 150Mbps (Down load) 50Mbps (up load) 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 2T2R 300Mbps wireless operation rate 2.4GHz radio for wireless
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 1x RS232 for console configuration (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 1 x GPS detachable Antenna
Housing	Rugged metal, Fanless, IP30 protection
Dimensions (W x H x D)	30x 92 x 75 mm
Weight	400g

Installation	DIN Rail mounting, or wall mounting (optional)	
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	7 Watt(Max)
	Power Input	12/24/48VDC (9.6~60VDC)
Operating Temperature	-30 ~ 70°C	
Storage Temperature	-40 ~ 85°C	
Operating Humidity	10 ~ 95% (non-condensing)	
MTBF	271,952 Hours (MIL-HDBK-217)	
Warranty	5 Years	
Certification	EMC	CE
	EMI	EN301 489, FCC
	EMS	EN301 489
	Radio	EN301511 EN301908-1 EN301908-2 EN301908-13 EN300328 EN303413 EN62311
	Shock	IEC 60068-2-27
	Freefall	IEC 60068-2-32
	Vibration	IEC 60068-2-6

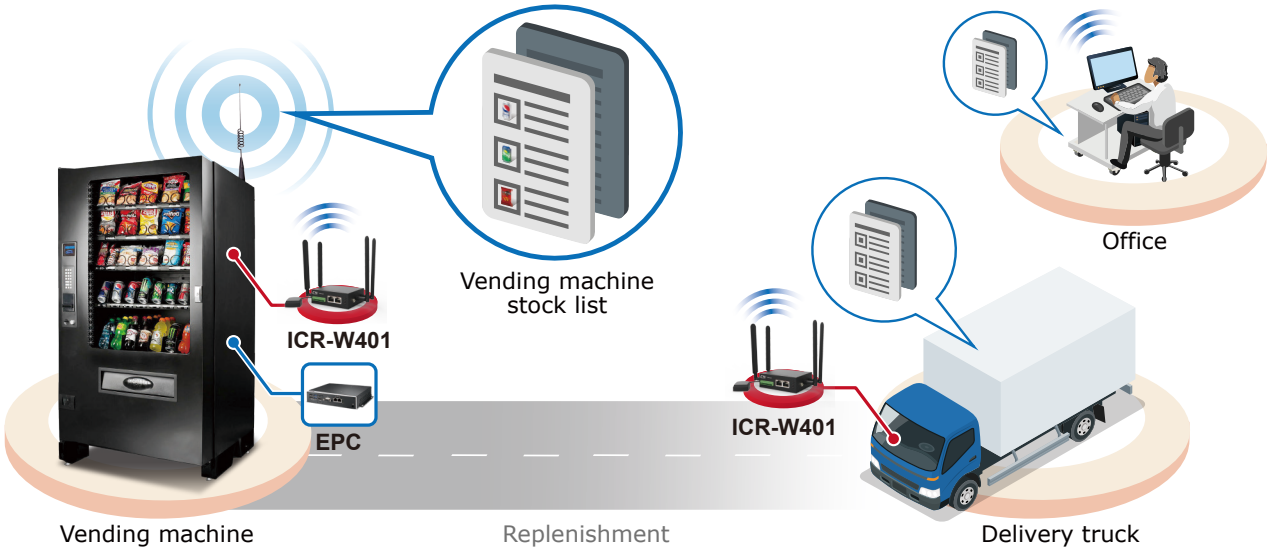
Software Specifications

Network Protocols	IPv4, IPv6, IPv4/IPv6 dual stack, DHCP server and client, PPPoE, Static IP, SNTP, GPS sync time, DNS Proxy, 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, IPS, Policy Route
VPN	OpenVPN, IPSec (3DES, AES128, AES196, AES256, MD5, SHA-1, SHA256), GRE, PPTP, L2TP
WiFi	Security with WPA2-PSK (AES) Multiple SSID Wireless Mac Filtering Wireless client isolation Wireless Connectivity: WAN WiFi Client

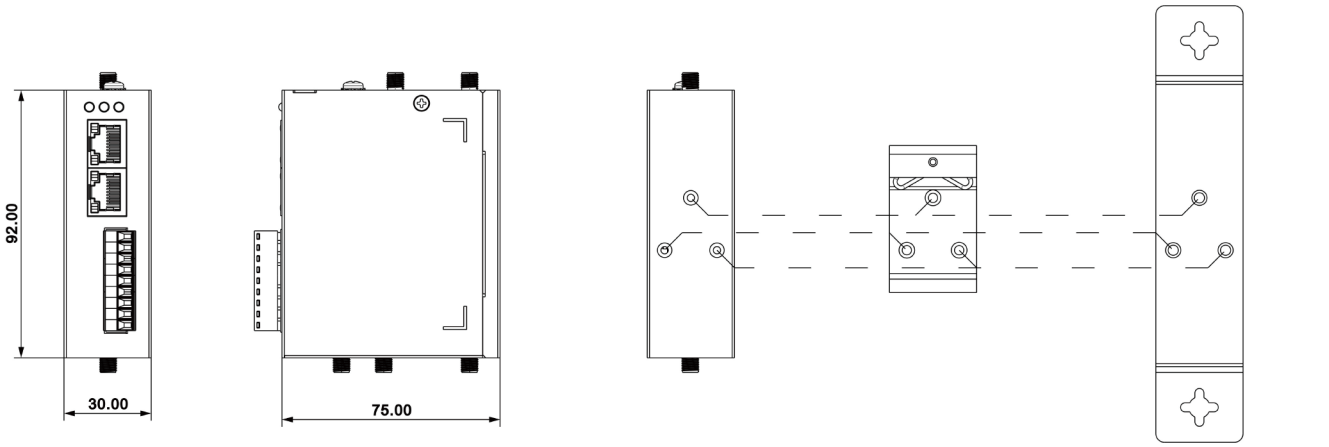
Others	DDNS, QoS, UPnP, SMS action, GPS track Drawing, GPS TCP Push
Alarm	DI, DO, SMS, VPN/WAN Disconnect, SNMP Trap, Email, TR069
Management	Web GUI for remote and local management, CLI
	Syslog monitor
	SNMP, TR069
	Remote management via SSH v2, HTTPS
	Local management via Telnet, SSH v2, HTTP/HTTPS

Application

The vending machine logistics system application



Dimensions



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

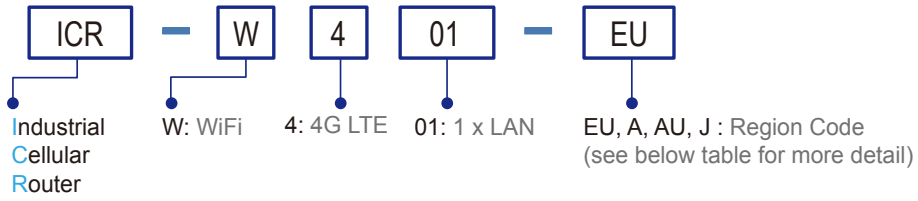
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Ordering Information

Model Name	Managed	WAN		LAN			Certification		
		"Cellular Mobile Band"	"10/100 Base-TX"	"WiFi IEEE 802.11 b/g/n"	"10/100 Base-TX"	DI/DO	CE	FCC	Shock, Freefall, Vibration
ICR-W401-EU	V	see Region code table EU	1	1	1	1	V	V	V
ICR-W401-A	V	see Region code table A	1	1	1	1	V	V	V
ICR-W401-AU	V	see Region code table AU	1	1	1	1	V	V	V
ICR-W401-J	V	see Region code table J	1	1	1	1	V	V	V

Model Naming Rule



MobilComm Region Code Options

	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-Mobile)
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, SMA (Male) connector, 1.5meter for 4G LTE extension


ANT-BASE-01

Wall mount kit accessories

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

ICR-4103

4G LTE, 2x SIM, 4x FE + 2x DI/1x DO, 1x RS485, 2x RS232



- Multi-band connectivity with FDD 4G LTE/ TDD 4G LTE/ 3G WCDMA/2G GSM
- 4G LTE/ UTP to configure WAN port for failover redundant
- NAT/Port Forward/Routing/IPv6 are compatible with existing IP networks
- Supports 3x Serial port (1x RS484, 2x RS232) for IoT and automation application, ModBus RTU and ModBus/TCP gateway, MQTT
- Various VPN protocols for security, Firewall & IPS, Authentication to enhance access security

The ICR-4103 is a high-performance, industrial grade, 4G-LTE cellular router which is designed to offer fast connectivity over cellular networks for industrial applications. ICR-4103's Ethernet ports can allow up to 3 Ethernet devices to link to the cellular network. It provides dual SIM card slots and one Ethernet WAN port which can automatically re-connect and auto-switch to offer 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 slots 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)
- 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
	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 slots for network redundancy / failover/ roaming over/ back up 2 SMA (female) connector for Antenna (Please see ordering information for optional accessories) 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) **Programmable 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 : DIN Rail mounting or Wall 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

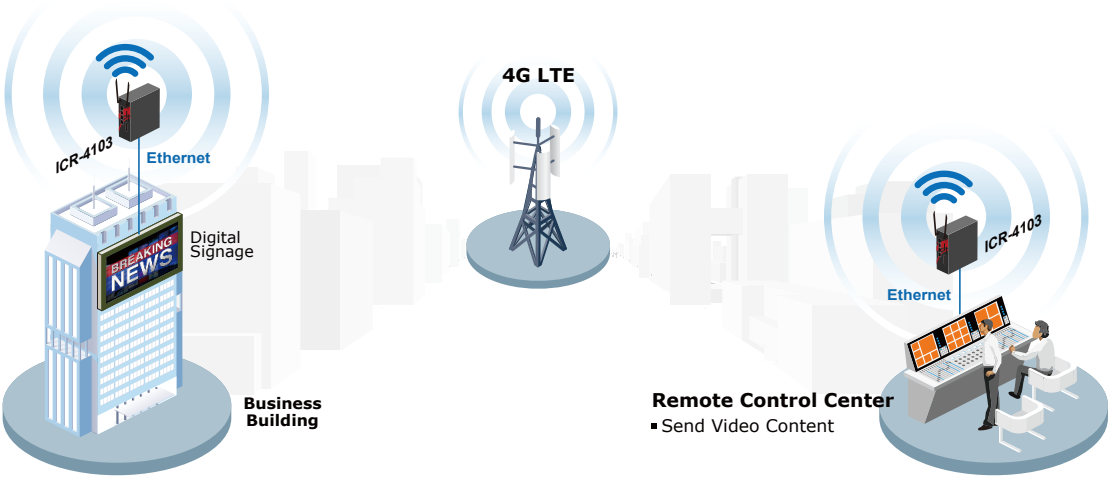
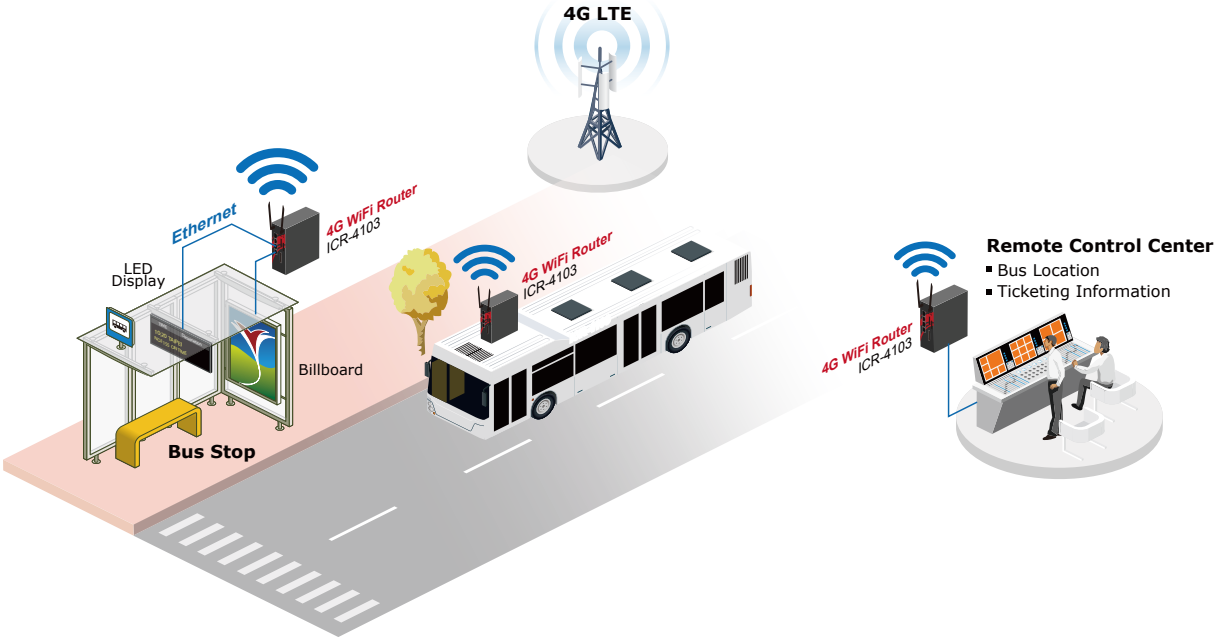
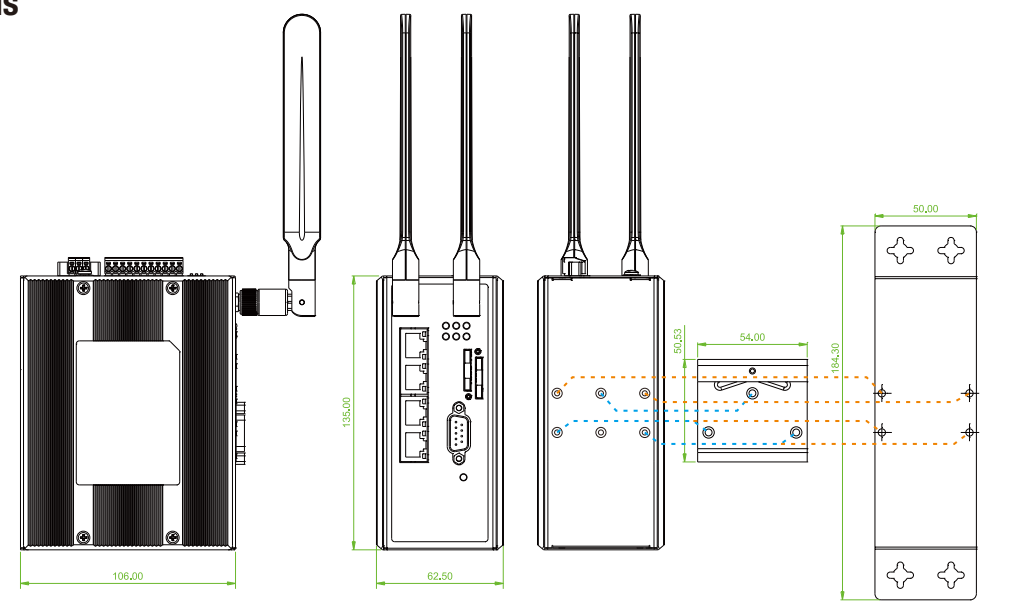


Figure 2 : Application for Transportation/Bus Communication



Dimensions



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

Ordering Information

Model Name	Managed	WAN		LAN			Certification			
		Cellular MobilComm band (2 SIM for Redundancy)	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 Options

	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-Mobile)
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, 1.5meter for 4G LTE extension



ANT-BASE-01

Wall mount kit accessories

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

IGS-1608SM-SE-8PH & IGS-804SM-SE-8PH

- 16x GbE RJ45 + 8x 100/1000Base SFP with SyncE and 8x PoE (240W, 48VDC)
- 8x GbE RJ45 + 4x 100/1000Base SFP with SyncE and 8x PoE (240W, 48VDC)



- Supports Sync Ethernet & IEEE1588 PTP v2
- Supports u-Ring, ERPS, MSTP, RSTP, STP for redundant cabling
- PoE PD failure auto checking, and auto reset when PD fail
- UL60950-1, EN60950-1, CE, FCC, EN50121-4, EN61000-6-2, EN61000-6-4 certified
- 4KV surge protection for UTP and Fiber ports

UL60950-1 | EN50121-4 | EN61000-6-2 EN61000-6-4 | SmartView | μ-Ring | IEEE 1588v2 | SyncE

These Gigabit Ethernet switch models are managed industrial grade L2+ switches with 8/16 10/100/1000Base-T ports and 4/8 GbE/Fast SFP ports that provide stable and reliable 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. 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

- Cable diagnostic, Measuring cable normal or broken point distance
- 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
- 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
- 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)
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)
Power Consumption	

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

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
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 Immunity for Heavy Industrial Environment	EN50121-4
Emission for Heavy Industrial Environment	EN61000-6-2
EMS (Electromagnetic Susceptibility) Protection Level	EN61000-6-4 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)
Surge protection	4KV 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
EtherNet/IP	supported
Modbus TCP	supported

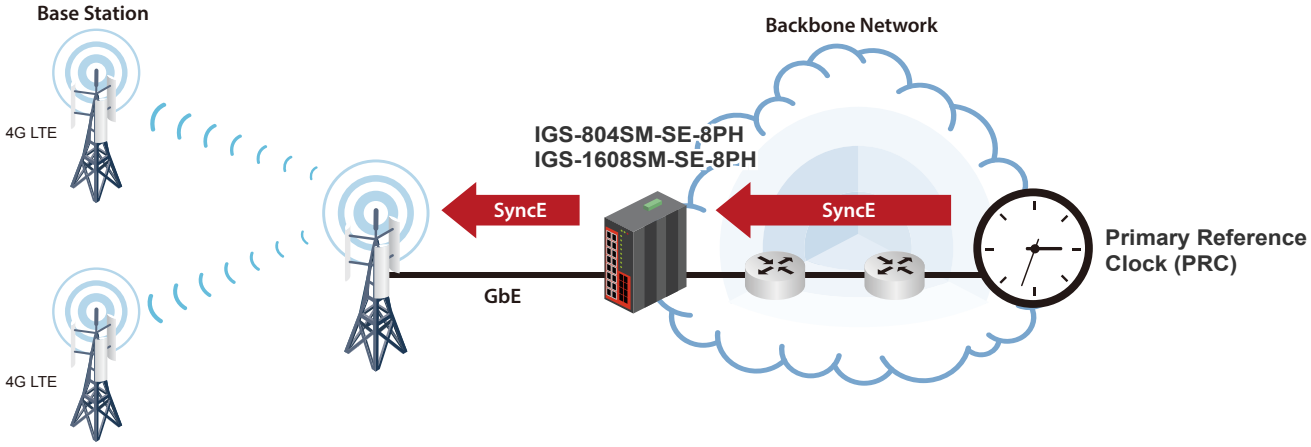
Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

SW & Configuration Upgrade	TFTP, HTTP, FTP client 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
BootP	Bootstrap Protocol Supported
RARP	Reverse Address Resolution Protocol 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 / Server
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 / Server
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

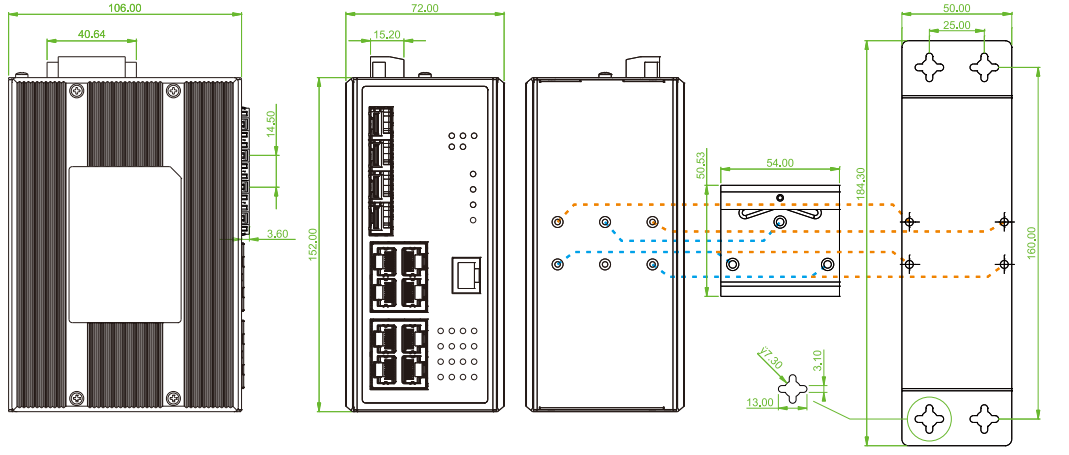
Application

Figure : Application for mobile fronthaul



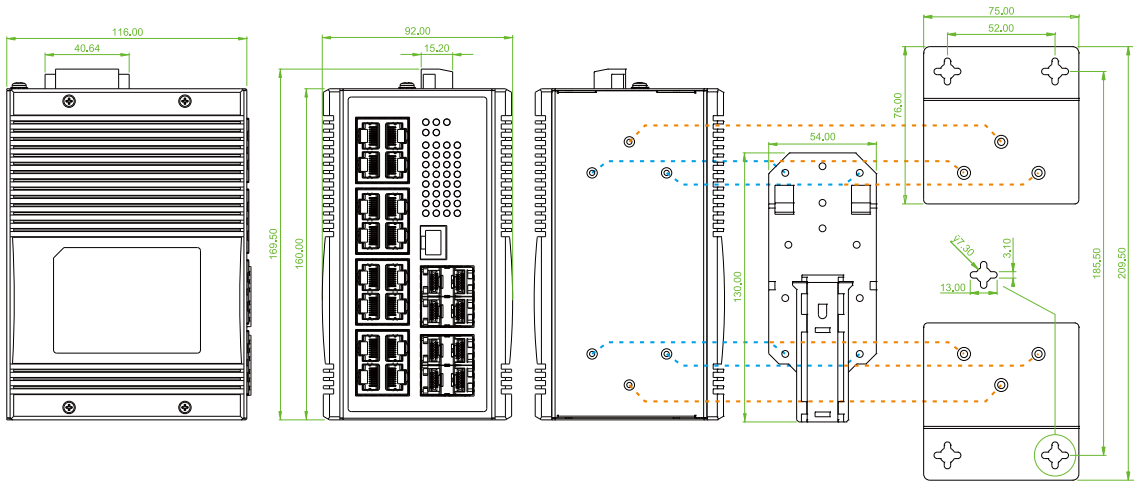
Dimensions

▶ 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)
- 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℃ (-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℃; Blank: 0~70℃

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

IGS-1608SM-SE & IGS-804SM-SE

◀16x GbE RJ45 + 8x 100/1000Base SFP with SyncE & IEEE 1588v2

▶8x GbE RJ45 + 4x 100/1000Base SFP with SyncE & IEEE 1588v2



- Supports Sync Ethernet & IEEE1588 PTP v2
- Supports u-Ring, ERPS, MSTP, RSTP, STP for redundant cabling
- UL60950-1, EN60950-1, CE, FCC, EN50121-4, 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

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

These Gigabit Ethernet models are managed industrial grade L2+ switches with 8/16 10/100/1000Base-T ports and 4/8 GbE/Fast SFP ports that provide stable and reliable 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. Housed in rugged DIN rail or wall mountable enclosures, these switches are designed for harsh environments, such as industrial networks, 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

- Cable diagnostic, measuring cable normal or broken point distance
- 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.
  (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
- 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
- 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)
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 Consumption	
Power Supply	Redundant Dual DC 12/24/48V (9.6~60VDC) Input power Removable Terminal Block for input power connector
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)

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

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)
Hipot	DC 2.25KV for power to chassis ground, Ethernet ports to chassis ground
Surge protection	4KV 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
EtherNet/IP	Supported
Modbus TCP	Supported
SW & Configuration Upgrade	TFTP, HTTP, FTP client
	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
BootP	Bootstrap Protocol Supported
RARP	Reverse Address Resolution Protocol 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 / Server

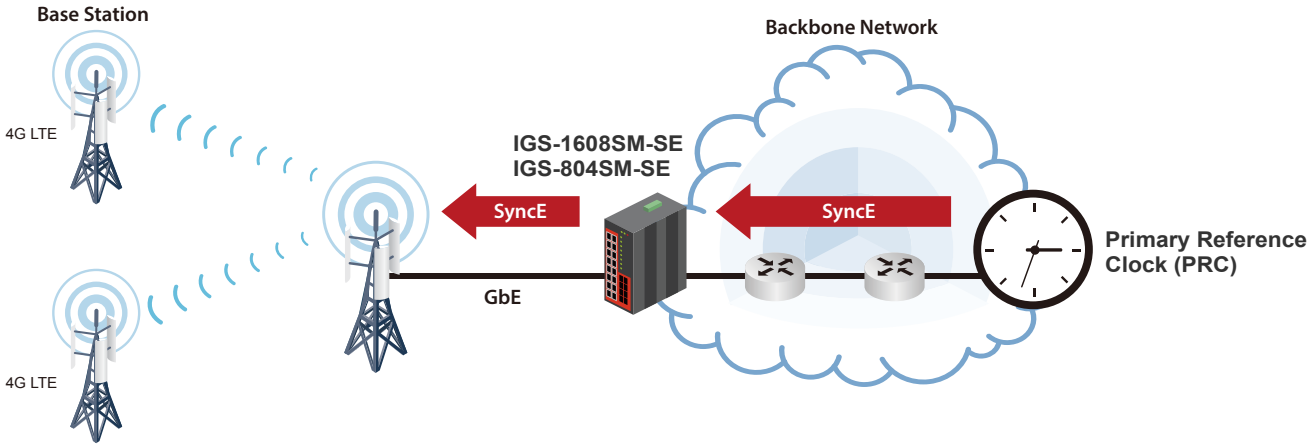
Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

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 / Server
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

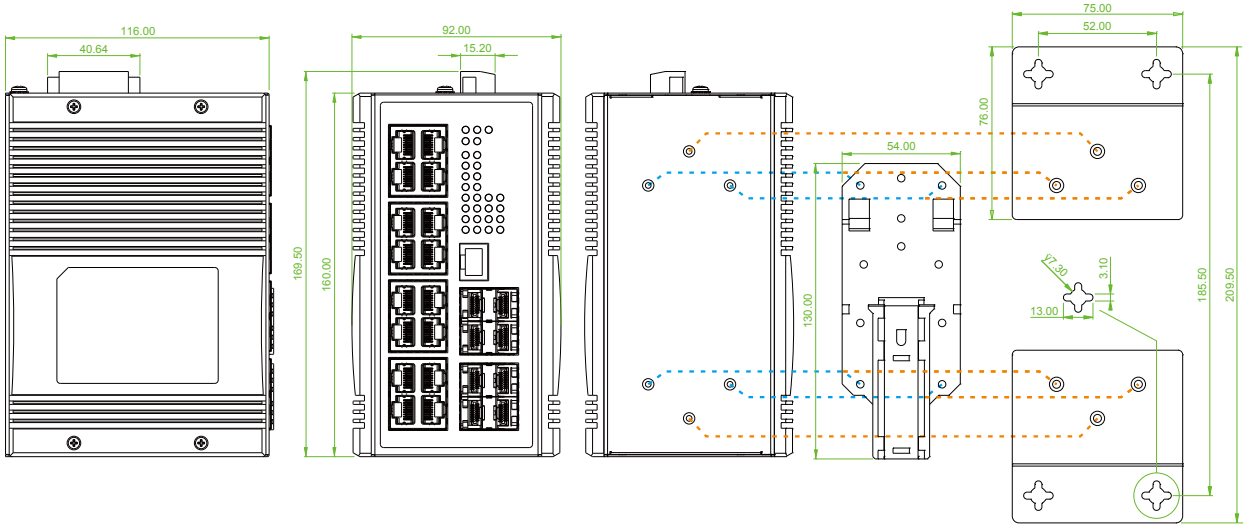
Application

Figure : Application for mobile fronthaul



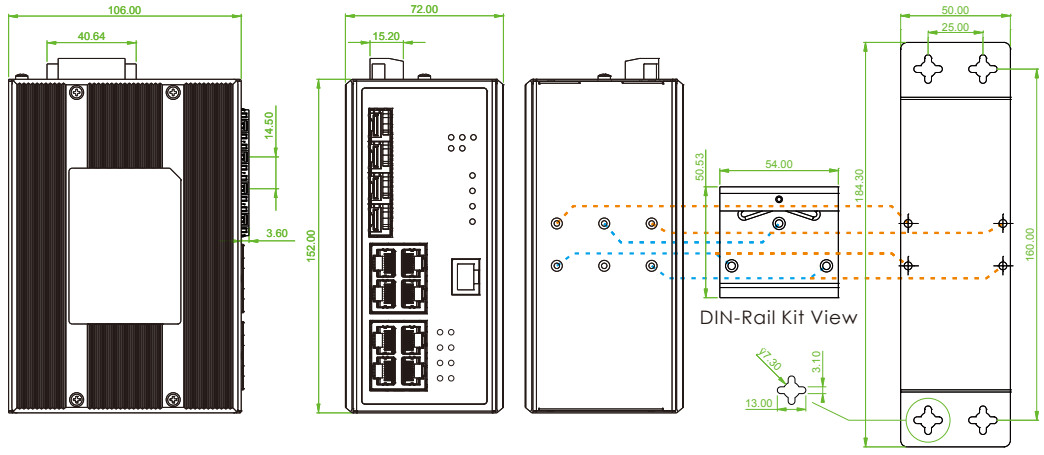
Dimensions

▶ IGS-1608SM-SE



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

▶ IGS-804SM-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

- IGS: Industrial Gigabit Switch
- 8: 16x GbE UTP
- 04S: 4x GbE SFP
- 08S: 8x GbE SFP
- M: Managed
- SE: SyncE
- E: -40~75°C
- Blank: -10~60°C

Package List

- One device of the series
- Console cable (RJ-45 to DB9)
- 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

- 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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Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

ICS-RG24044X & ICS-RG16124X & ICS-RG8204X

- ◀ L3 24x GbE RJ45 + 4x100/1000Base SFP + 4x 1G/2.5G/10G SFP
- ▮ L3 16x GbE RJ45 + 12x 100/1000Base SFP + 4x 1G/2.5G/10G SFP
- ▶ L3 8x GbE RJ45 + 20x 100/1000Base SFP + 4x 1G/2.5G/10G SFP

Preliminary



- Static Routing, RIP v1, RIP v2, IS-IS, BGP v4, OSPF v2, OSPF v3, PIM-SM, PIM-DM, PIM-SSM, DVMRP, VRRP v3
- Support u-Ring, ERPS, MSTP, RSTP, STP, MRP for redundant cabling
- UL62368-1, EN62368-1, CE, FCC, EN50121-4, EN61000-6-2, EN61000-6-4 certified
- 4KV surge protection for RJ45 and SFP ports
- Supports negative voltage power input

CTC Industrial Rackmount Ethernet Core Switch family are hardened design, Layer 3 / Layer 2, managed core switches, for rigorous demands of centralize and critical applications. The rackmount Ethernet core switch supports 4-ports 10GbE SFP+ and 24/16/8 GbE (10/100/1000BaseTX) RJ-45 ports plus 4/12/20 dual speed (100/1000Base-X) SFP fiber optical slots, thus providing 32 ports total for Ethernet connectivity. This family of switches is ideal for Smart City, surveillance, Intelligent traffic control systems and production automation applications. Redundant power input increases system reliability and the availability of your network backbone.

Features

- Redundant isolated 24/48VDC, or/and isolated 110/220VAC power inputs
- Rugged metal, IP30 protection & Fanless design
- 2.25K VDC Hi-pot isolation protection for Ethernet ports and power
- 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
- 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
- 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)
	IEC 62439-2	Media Redundancy Protocol (MRP)
	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
	IEEE 802.1ab	Link Layer Discovery Protocol (LLDP)
VLAN ID	4094 IEEE 802.1Q VLAN VID	
Switch Architecture	Back-plane (Switching Fabric): 64Gbps (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-RG24044X) 12x 100/1000Base-X SFP socket (ICS-RG16124X) 20x 100/1000Base-X SFP socket (ICS-RG8204X) Support DDMI **RJ45:** 24x 10/100/1000Base-T RJ-45 (ICS-RG24044X) 16x 10/100/1000Base-T RJ-45 (ICS-RG16124X) 8x 10/100/1000Base-T RJ-45 (ICS-RG8204X) Support Auto negotiation speed, Auto MDI/MDI-X function
Console Port	USB-serial console (Type B connector)
Storage Port	USB storage for upload (Type A connector)
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) Redundant 1x AC and 1x DC input power (-AD model) Redundant 2x DC input power (-DD 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	TBD

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 (Amber)
	Per SFP Fiber port: 100 /1000Base-X Link/Active (Amber)
	Per SFP+ Fiber port: 1000Base-X Link/Active (Amber) 10GBase-X/2.5G Link/Active (Blue)
Jumbo Frame	10K Byte
MAC Address Table	16K
Memory Buffer	3M 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
Digital Inputs	1x input -30 to +1 voltage for state "0" +13 to +30 voltage for state "1"
Operating Temperature	-10 ~ 60°C
Operating Humidity	5% to 95% (Non-condensing)
Storage Temperature	-40 ~ 85°C
Housing	Rugged Metal, IP30 Protection, Fanless
Dimensions	TBD
Weight	TBD
Installation Mounting	19" rack mount
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	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	EN62368-1, UL62368-1
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	
Layer 3 Routing	Static Routing ,RIP v1, RIP v2, IS-IS, BGP v4, OSPF v2, OSPF v3, PIM-SM, PIM-DM, PIM-SSM, DVMRP
Layer 3 redundancy	VRRP v3
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
	IP Subnet-based VLAN
	Protocol-based VLAN(Ethernt, SNAP, LLC)
	port base-VLAN
	Port isolation
	VLAN Translation
	GVRP (GARP VLAN Registration Protocol)
	MVR (Multicast VLAN Registration) MVRP GMRP
Link Aggregation (Port Trunk)	Static Dynamic (IEEE 802.3ad LACP), Maximum trunk group: 8 groups
	Dynamic Dynamic (IEEE 802.3ad LACP), Maximum trunk group: 8 groups
	Per group up-to 8 port
Spanning Tree	IEEE 802.1d STP, IEEE 802.1w RSTP, IEEE 802.1s MSTP, IEC 62439-2 MRP
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
Security Features	
IEEE 802.1X	Port-Based
ACL	Number of rules : up to 50 entries
	for L2 / L3 L2 : Mac address SA/DA/VLAN L3 : IP address SA/DA, Subnet
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, SFTP
	Redundant firmware in case of upgrade failure
RMON	RMON I (1, 2, 3, 9 group), RMON II
MIB	RFC1213 MIB II, Private MIB
DHCP	Server, Client, Relay, Snooping
IP Source Guard	Supported
Mirroring	SPAN (local), RSPAN (remote)
Event Syslog	Client
Warning Message	System syslog, e-mail, alarm relay
DNS	Client

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

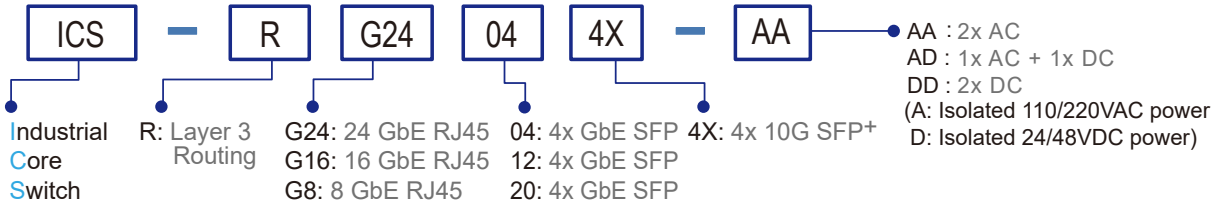
IEEE 1588 PTP V2	Supports 5 operating mode in each port : Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave
NTP V4.0, SNTP	Client
LLDP (IEEE 802.1ab)	Link Layer Discovery Protocol
	LLDP-MED

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

Ordering Information

Model Name	Layer 3/2	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 UL62368-1 EN62368-1	EN50121-4	EN61000-6-2 EN61000-6-4	CE, FCC
ICS-RG24044X-AA	V	32	24	4	4		2	V	V	V	V
ICS-RG24044X-AD	V	32	24	4	4	1	1	V	V	V	V
ICS-RG24044X-DD	V	32	24	4	4	2		V	V	V	V
ICS-RG16124X-AA	V	32	16	12	4		2	V	V	V	V
ICS-RG16124X-AD	V	32	16	12	4	1	1	V	V	V	V
ICS-RG16124X-DD	V	32	16	12	4	2		V	V	V	V
ICS-RG8204X-AA	V	32	8	20	4		2	V	V	V	V
ICS-RG8204X-AD	V	32	8	20	4	1	1	V	V	V	V
ICS-RG8204X-DD	V	32	8	20	4	2		V	V	V	V

Model Naming Rule



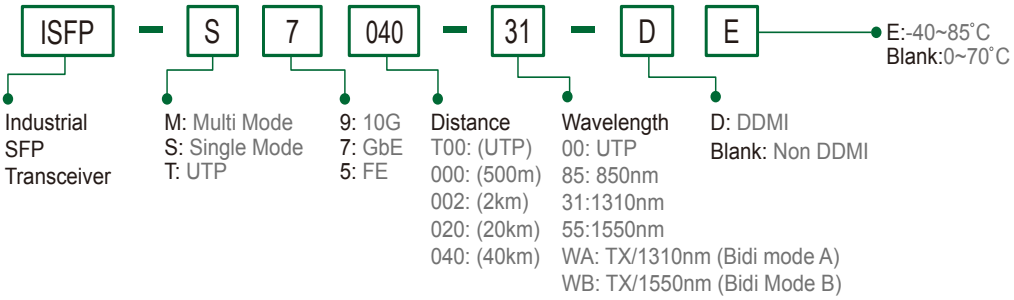
Optional Accessories

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℃ (-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-G4804X & ICS-G24044X

◀ 48x GbE RJ45 + 4x 1G/2.5G/10G SFP

▶ 24x GbE RJ45 + 4x 100/1000Base SFP + 4x 1G/2.5G/10G SFP



- Support u-Ring, ERPS, MSTP, RSTP, STP for redundant cabling
- Supports maximum up to 14 u-rings in one device
- UL60950-1, EN60950-1, CE, FCC, EN50121-4, EN61000-6-2, EN61000-6-4 certified
- 4KV surge protection for RJ45 and SFP ports
- Supports negative voltage power input

ICS-G4804X & ICS-G24044X are industrial grade, hardened design, managed L2+ switches, built for the rigorous demands of centralized and critical applications. The switch supports 4-ports 10GbE SFP+ and 24 / 48 GbE (10/100/1000BaseTX) RJ-45 ports, plus 4 dual speed (100/1000Base-X) SFP fiber optical slots. 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. ICS Series are certified with many industrial-grade standards and are ideal for deployments in harsh environments to deliver mission-critical network services. This product is ideal for Smart City, surveillance, Intelligent traffic control systems and production automation applications.

Features

- Redundant isolated 24/48VDC, or/and isolated 110/220VAC power inputs
- Supports negative voltage power input
- 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 <20ms in 250 devices
- 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
- 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
	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): 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
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

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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 <20ms 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
Other 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 1 : 10G Backbone application

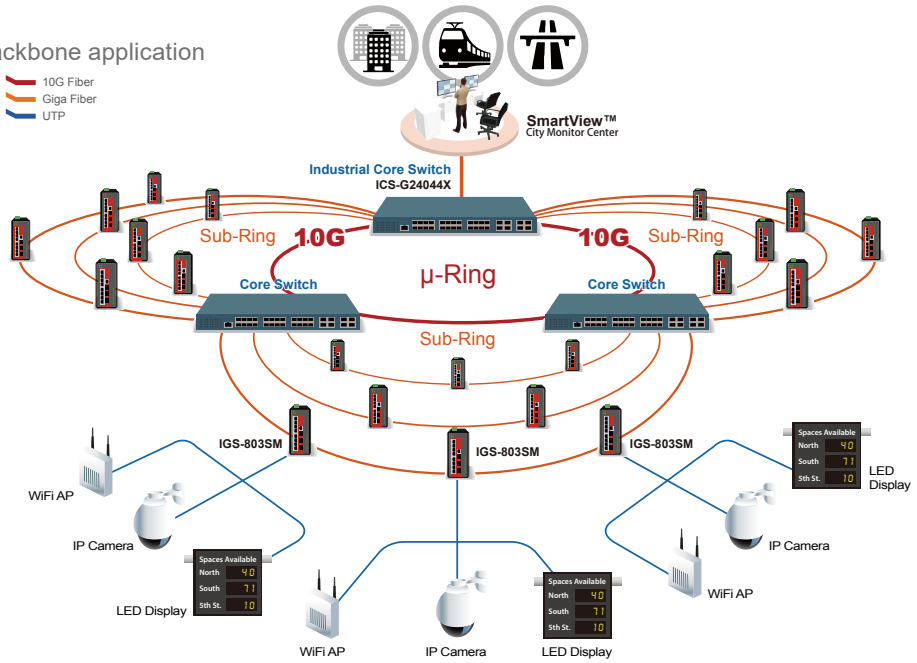
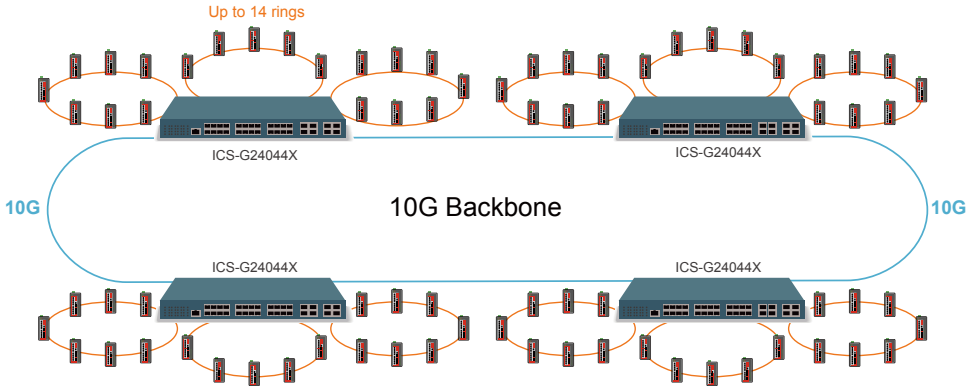


Figure 2 : 10G Backbone with μ-Ring topology

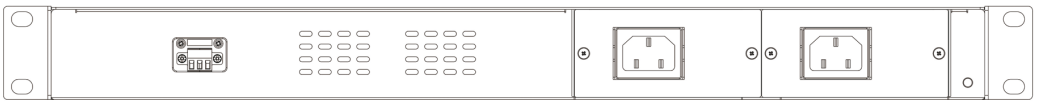


Dimensions

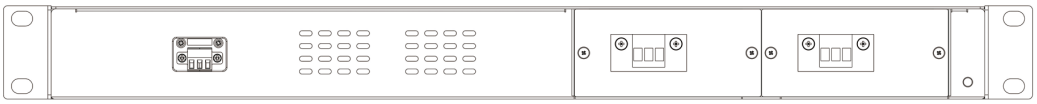
ICS-G24044X

Rear View

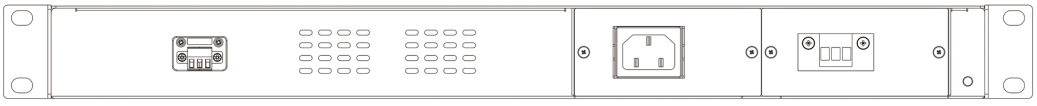
-AA Power



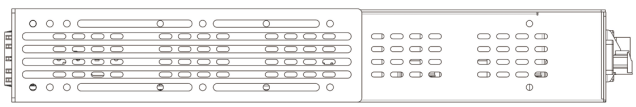
-DD Power



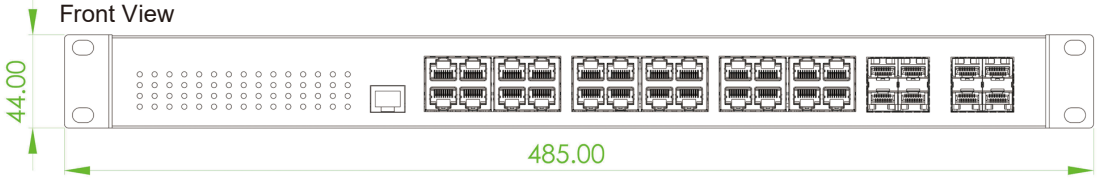
-AD Power



Side View

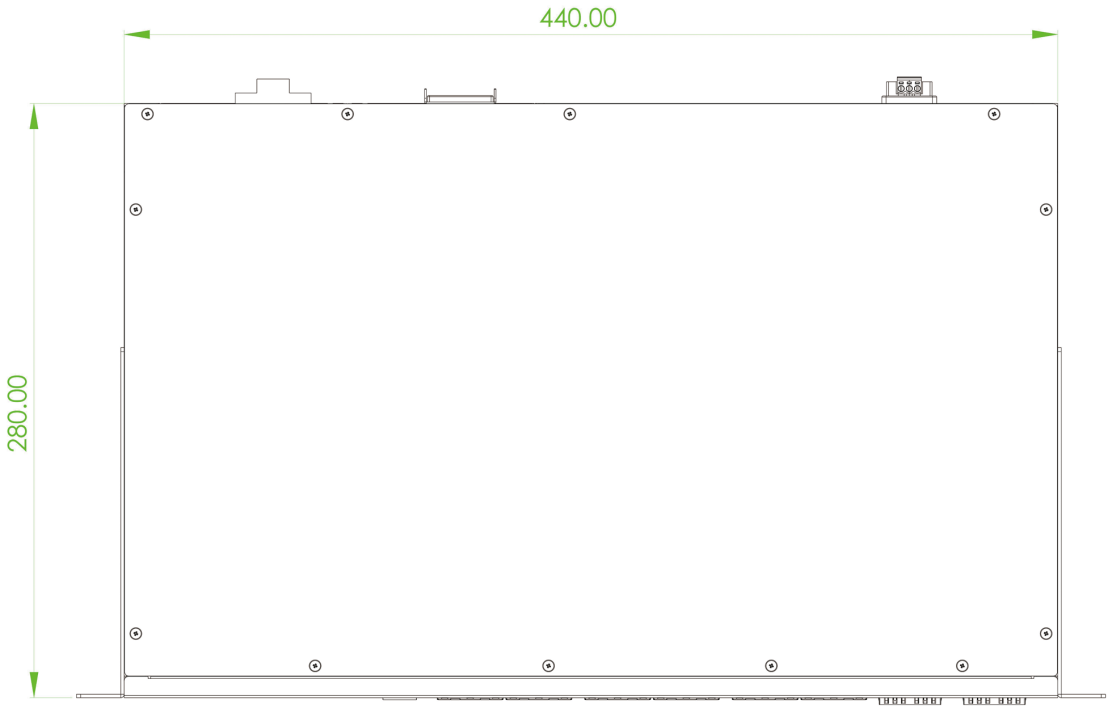


Front View



Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

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

ICS – G24 04 4X – AA

- ICS: Industrial Core Switch
- G24: 24 GbE RJ45, G48: 48 GbE RJ45
- 04: 4x GbE SFP
- 4X: 4x 10G SFP+
- AA : 2x AC
- AD : 1x AC + 1x DC
- DD : 2x DC
- (A: Isolated 110/220VAC power, D: Isolated 24/48VDC power)

Package List

- One device of the series
- Console cable (RJ-45 to DB-9)
- 19" rack-mount kit (brackets and screws)
- Protective caps for SFP ports
- AC Power cord (for AC power -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.

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

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

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

ICS-G24S4X & ICS-G24S2X

- 24x 100/1000Base SFP with 4x Combo (RJ45/SFP) + 4x 1G/10G SFP
- 24x 100/1000Base SFP with 4x Combo (RJ45/SFP) + 2x 1G/10G SFP



- Supports IEEE1588 PTP v2
- Supports u-Ring, ERPS, MSTP, RSTP, STP for redundant cabling
- Supports maximum up to 14 u-rings in one device
- UL60950-1, EN60950-1, CE, FCC, EN50121-4, EN61000-6-2, EN61000-6-4 certified
- Supports negative voltage power input

ICS-G24S4X & ICS-G24S2X are industrial grade, hardened design, managed L2+ switches, equipped with 20 GbE SFP ports plus 4 combo GbE ports and 2 or 4 10GbE SFP+ uplink 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. 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 GbE or 10 GbE high-speed uplink, ICS-G24S4X & ICS-G24S2X are a reliable and scalable solution for core layer or backbone applications (See figure 1 & 2).

Features

- Redundancy isolated low voltage 24/48VDC, or/and isolated High voltage (110/220VAC) power inputs
- 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
- 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
- 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
	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)
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 (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, EN60950-1
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

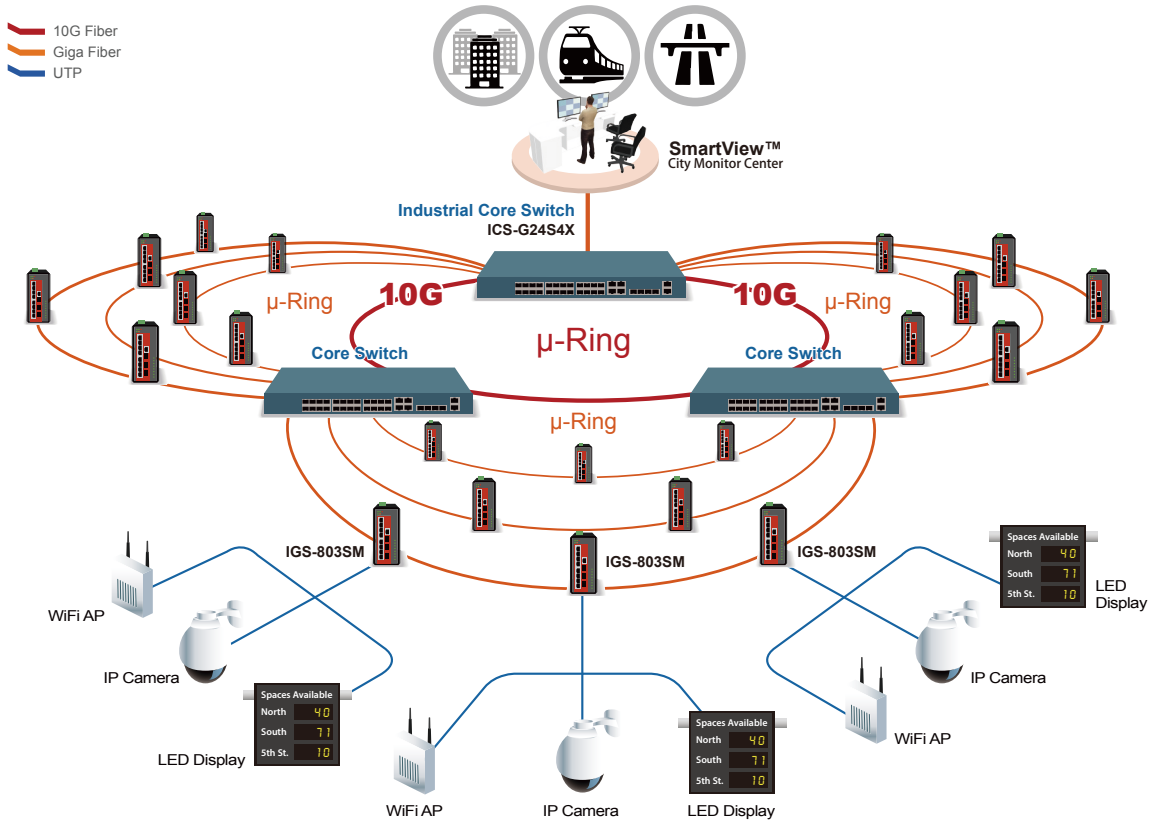
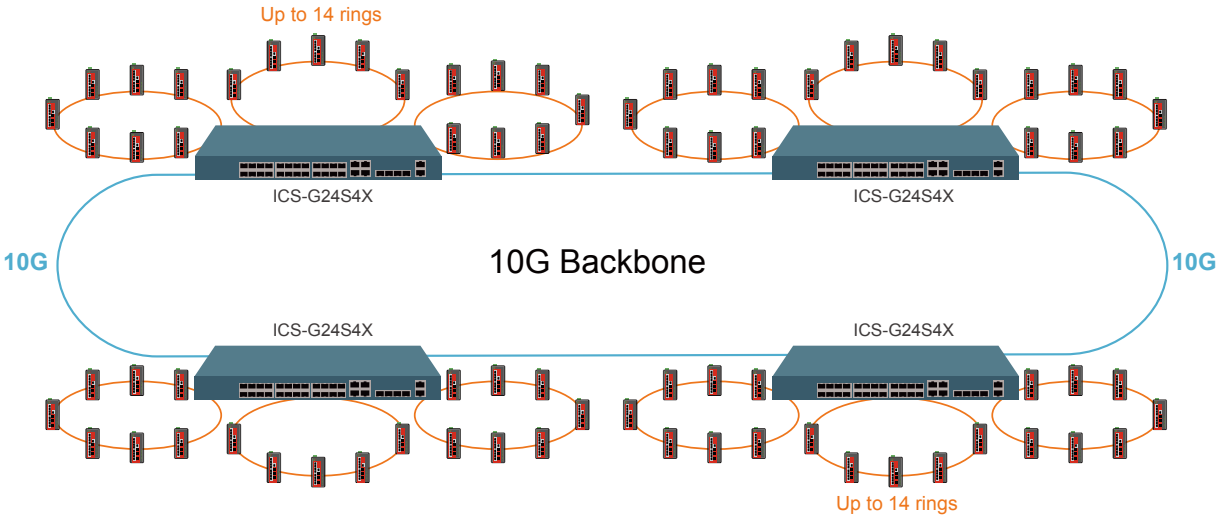


Figure 2 : 10G Backbone with μ-Ring topology

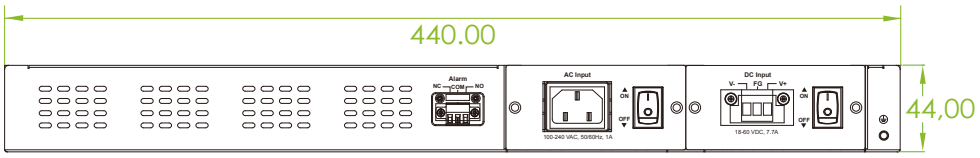


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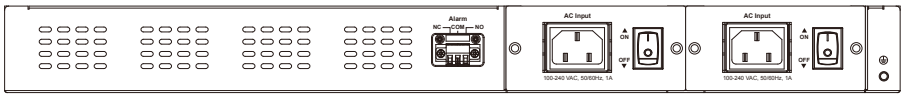
Dimensions

Rear View

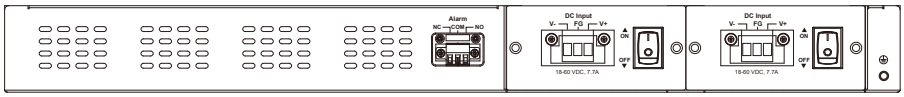
-AD Power



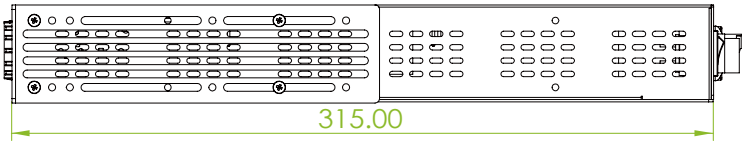
-AA Power



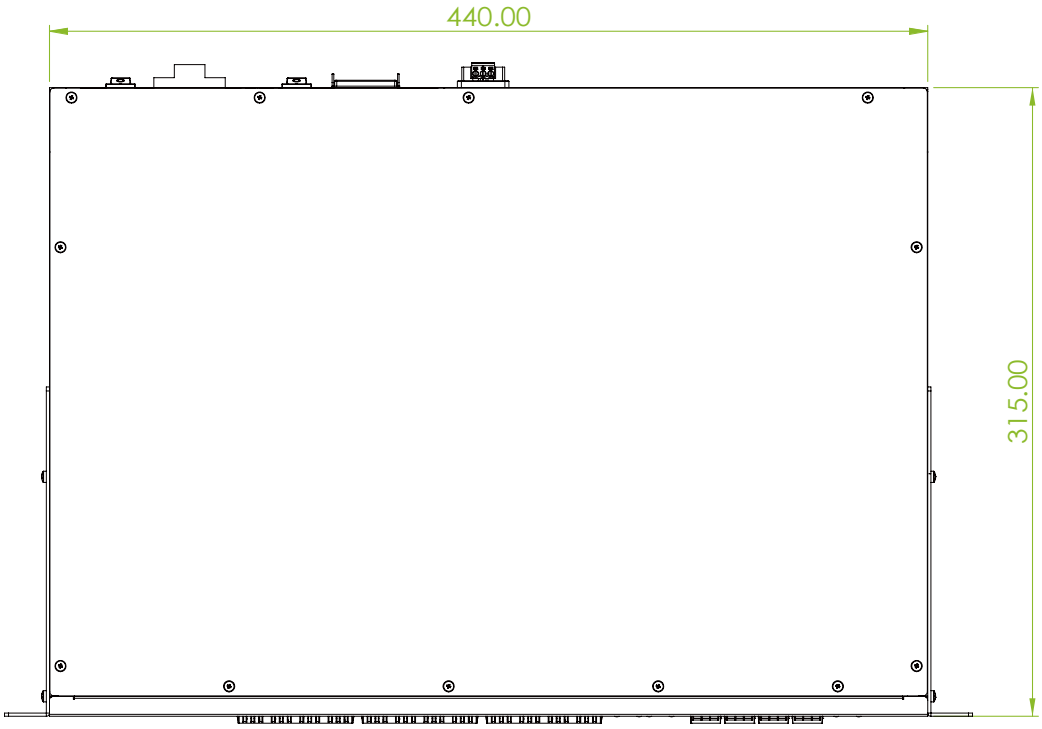
-DD Power



Side View

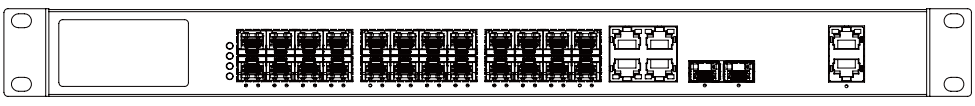


Top View

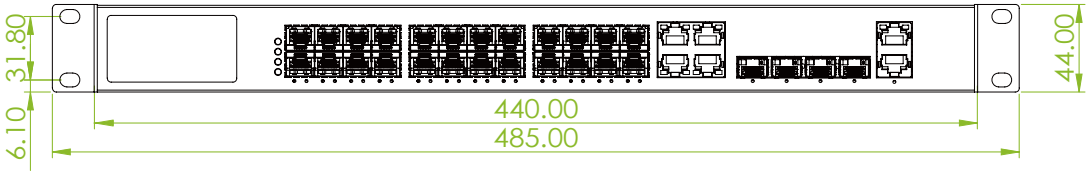


Front View

ICS-G24S2X



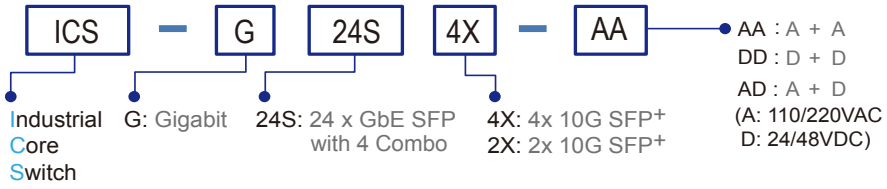
ICS-G24S4X



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 EN60950-1	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)
- Rack mount ear with screws
- AC Power cord (for AC power -A model)

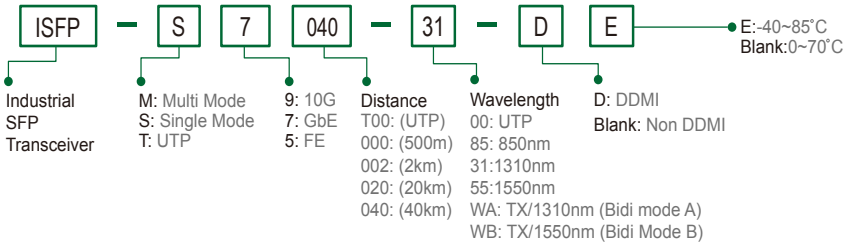
Optional Accessories

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



Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

ICS-G24044X-24PH

24x GbE RJ45 + 4x 100/1000Base SFP + 4x 1G/2.5G/10G SFP with 24x PoE (400W,48VDC)



- Supports IEEE 1588 PTP V2
- Support u-Ring, ERPS, MSTP, RSTP, STP for redundant cabling
- Support maximum up to 14 u-rings in one device
- UL60950-1, EN60950-1, CE, FCC, EN50121-4, EN61000-6-2, EN61000-6-4 certified
- 4KV surge protection for PoE, RJ45 and SFP ports

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

ICS-G24044X-24PH is a hardened L2 managed core switch which also supports PoE+/PSE for rigorous demands of centralize and critical applications. ICS-G24044X-24PH supports 4 uplink ports with 10GbE SFP+ and 24 GbE (10/100/1000BaseTX) PoE+ RJ-45 ports plus 4 dual speed (100/1000Base-X) SFP fiber optical slots. ICS-G24044X-24PH is an ideal solution for Smart City, surveillance, Intelligent traffic control systems and production automation applications and supports up to 24 PoE/PoE+ (IEEE 802.3af/IEEE 802.3at) ports which can 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.

Features

- 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)
- Provides 14 instances each can support μ-Ring, μ-Chain or Sub-Ring for flexible networking applications
- μ-Ring redundancy, recovery time <20ms in 250 devices
- 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
- 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
	IEEE 802.3ac	Max frame size extended to 1522Bytes
	IEEE 802.3ad	Link aggregation for parallel links with LACP(Link Aggregation Control Protocol)
	IEEE 802.3af	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)
Data Processing	Store and Forward	
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 802.3af /IEEE 802.3at 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)
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
Surge protection	4KV 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 <20ms 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 <20ms 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

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

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
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 1 : 10G Backbone application

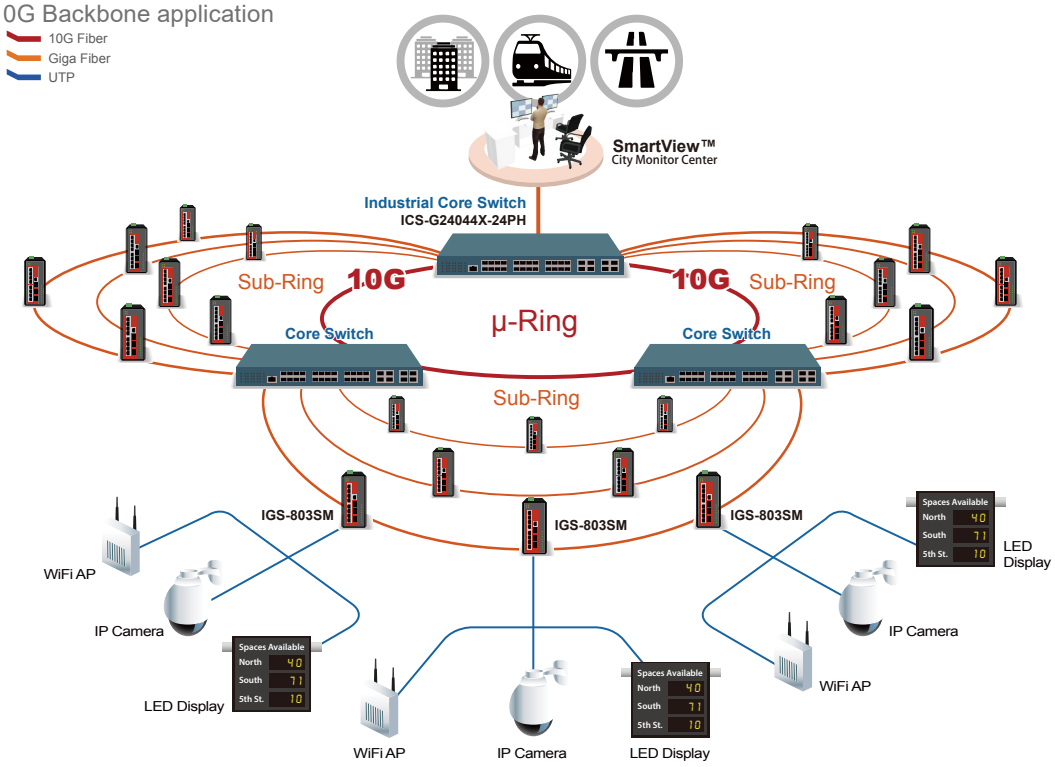
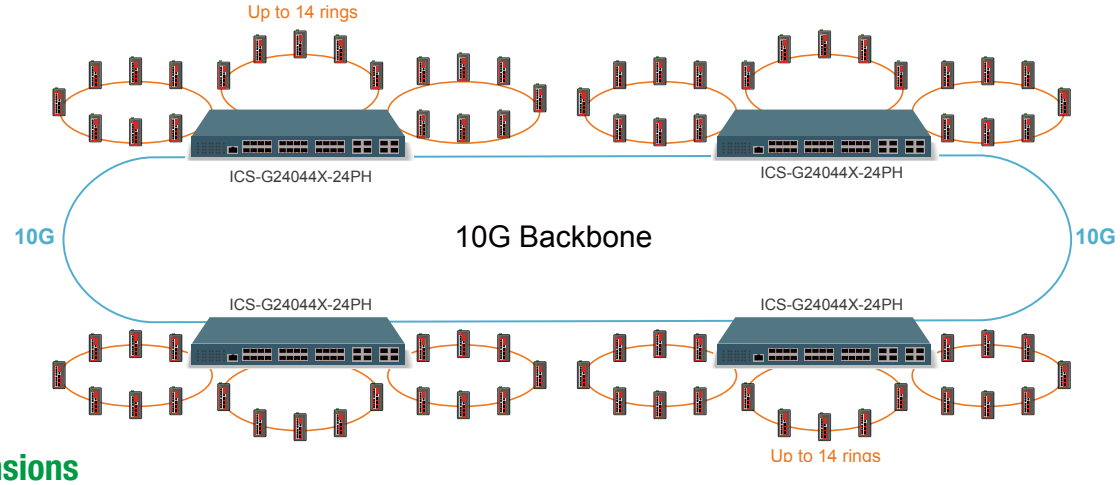


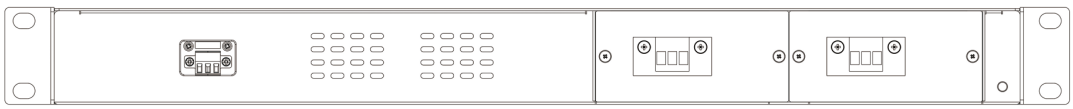
Figure 2 : 10G Backbone with μ-Ring topology



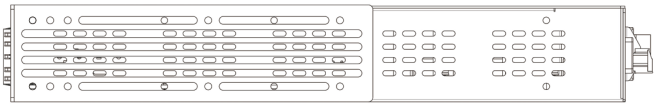
Dimensions

-DD Power

Rear View



Side 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	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	2	V	V	V	V	-10 ~ 60℃

Model Naming Rule

ICS – G24 04 4X – 24PH — 24PH: 24 High Power PoE

- ICS: Industrial Core Switch
- G24: 24 GbE RJ45
- 04: 4x GbE SFP
- 4X: 4x 10G SFP+

Package List

- ICS-G24044X-24PH device
- Console cable (RJ-45 to DB-9)
- 19" rack-mount kit (brackets and screws)
- Protective caps for SFP ports

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

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

- 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

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IGS-R2408SM & IGS-R1616SM & IGS-R824SM

- 24x GbE RJ45 + 8x100/1000Base SFP
- 16x GbE RJ45 + 16x 100/1000Base SFP
- 8x GbE RJ45 + 24x 100/1000Base SFP

Preliminary



- Static Routing, RIP v1, RIP v2, IS-IS, BGP v4, OSPF v2, OSPF v3, PIM-SM, PIM-DM, PIM-SSM, DVMRP, VRRP v3
- Supports u-Ring, ERPS, MSTP, RSTP, STP, MRP for redundant cabling
- UL62368-1, EN62368-1, CE, FCC, EN50121-4, EN61000-6-2, EN61000-6-4 certified
- 4KV surge protection for RJ45 and SFP ports
- Supports negative voltage power input

CTC Industrial Rackmount Ethernet Switch family are hardened design, Layer 3 / Layer 2, managed switches, for rigorous demands of centralize and critical applications. The rackmount Ethernet core switch supports 24/16/8 GbE (10/100/1000BaseTX) RJ-45 ports plus 8/16/24 dual speed (100/1000Base-X) SFP fiber optical slots, thus providing 32 ports total for Ethernet connectivity. This family of switches is ideal solution for Smart City, surveillance, Intelligent traffic control systems and production automation applications. Redundant power input increases system reliability and the availability of your network backbone.

Features

- Redundant isolated 24/48VDC, or/and isolated 110/220VAC power inputs
- Rugged metal, IP30 protection & Fanless design
- 2.25K VDC Hi-pot isolation protection for Ethernet ports and power
- 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
- 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
- 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)
	IEC 62439-2	Media Redundancy Protocol (MRP)
	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
	IEEE 802.1ab	Link Layer Discovery Protocol (LLDP)
VLAN ID	4094 IEEE 802.1Q VLAN VID	
Switch Architecture	Back-plane (Switching Fabric): 64Gbps (Full wire-speed)	
Data Processing	Store and Forward	

Network Connector	**Gb E SFP:** 8x 100/1000Base-X SFP socket (IGS-R2408SM) 16x 100/1000Base-X SFP socket (IGS-R1616SM) 24x 100/1000Base-X SFP socket (IGS-R824SM) Support DDMI **RJ45:** 24x 10/100/1000Base-T RJ-45 (IGS-R2408SM) 16x 10/100/1000Base-T RJ-45 (IGS-R1616SM) 8x 10/100/1000Base-T RJ-45 (IGS-R824SM) Support Auto negotiation speed, Auto MDI/MDI-X function
Console Port	USB-serial console (Type B connector)
Storage Port	USB storage for upload (Type A connector)
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) Redundant 1x AC and 1x DC input power (-AD model) Redundant 2x DC input power (-DD 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	TBD

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 (Amber)
	Per SFP Fiber port: 100 /1000Base-X Link/Active (Amber)
Jumbo Frame	10K Byte
MAC Address Table	16K
Memory Buffer	3M 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
Digital Inputs	1x input -30 to +1 voltage for state "0" +13 to +30 voltage for state "1"
Operating Temperature	-10 ~ 60°C
Operating Humidity	5% to 95% (Non-condensing)
Storage Temperature	-40 ~ 85°C
Housing	Rugged Metal, IP30 Protection, Fanless
Dimensions	TBD
Weight	TBD
Installation Mounting	19" rack mount
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	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	EN62368-1, UL62368-1
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	
Layer 3 Routing	Static Routing ,RIP v1, RIP v2, IS-IS, BGP v4, OSPF v2, OSPF v3, PIM-SM, PIM-DM, PIM-SSM, DVMRP
Layer 3 redundancy	VRRP v3
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
	IP Subnet-based VLAN
	Protocol-based VLAN(Ethernt, SNAP, LLC)
	port base-VLAN
	Port isolation
	VLAN Translation
	GVRP (GARP VLAN Registration Protocol)
	MVR (Multicast VLAN Registration) MVRP GMRP
Link Aggregation (Port Trunk)	Static Dynamic (IEEE 802.3ad LACP), Maximum trunk group: 8 groups
	Dynamic Dynamic (IEEE 802.3ad LACP), Maximum trunk group: 8 groups
	Per group up-to 8 port
Spanning Tree	IEEE 802.1d STP, IEEE 802.1w RSTP, IEEE 802.1s MSTP, IEC 62439-2 MRP
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
Security Features	
IEEE 802.1X	Port-Based
ACL	Number of rules : up to 50 entries
	for L2 / L3 L2 : Mac address SA/DA/VLAN L3 : IP address SA/DA, Subnet
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, SFTP
	Redundant firmware in case of upgrade failure
RMON	RMON I (1, 2, 3, 9 group), RMON II
MIB	RFC1213 MIB II, Private MIB
DHCP	Server, Client, Relay, Snooping
IP Source Guard	Supported
Mirroring	SPAN (local), RSPAN (remote)
Event Syslog	Client
Warning Message	System syslog, e-mail, alarm relay
DNS	Client
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

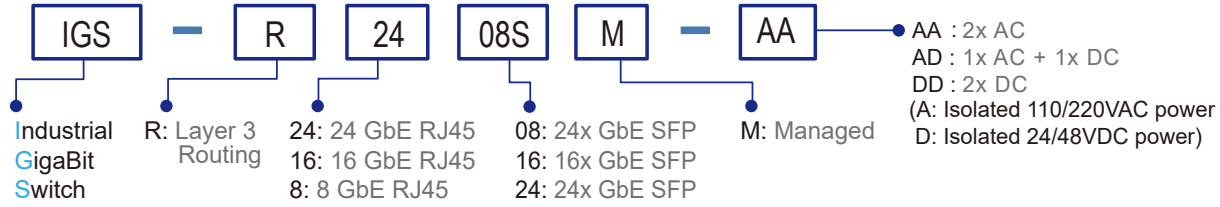
Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

IPv6 Features			
IPv6 Management	Telnet Server/ICMP v6	SSH over IPv6	Supported
SNMP over IPv6	Supported	IPv6 Telnet	Supported
HTTP over IPv6	Supported	IPv6 NTP, SNTP	Client
		IPv6 TFTP	Supported

Ordering Information

Model Name	Layer 3/2	Total Ports (Maximum)	GbE		Input power		Certification			
			10/100/1000 Base-T(X) RJ45	100/1000 Base-X SFP	24/48VDC	110/220VAC	Safety UL62368-1 EN62368-1	EN50121-4	EN61000-6-2 EN61000-6-4	CE, FCC
IGS-R2408SM-AA	V	32	24	8		2	V	V	V	V
IGS-R2408SM-AD	V	32	24	8	1	1	V	V	V	V
IGS-R2408SM-DD	V	32	24	8	2		V	V	V	V
IGS-R1616SM-AA	V	32	16	16		2	V	V	V	V
IGS-R1616SM-AD	V	32	16	16	1	1	V	V	V	V
IGS-R1616SM-DD	V	32	16	16	2		V	V	V	V
IGS-R824SM-AA	V	32	8	24		2	V	V	V	V
IGS-R824SM-AD	V	32	8	24	1	1	V	V	V	V
IGS-R824SM-DD	V	32	8	24	2		V	V	V	V

Model Naming Rule



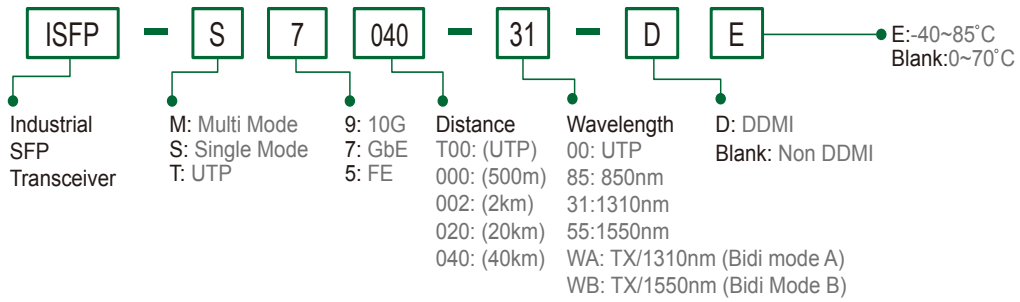
Optional Accessories

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℃ (-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



IGS-4804SM & IGS-2408SM

- 48x GbE RJ45 + 4x 100/1000Base SFP
- 24x GbE RJ45 + 8x 100/1000Base SFP



- Supports u-Ring , ERPS, MSTP, RSTP,STP for redundant cabling
- UL60950-1, EN60950-1, CE, FCC, EN50121-4, 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
- Supports negative voltage power input

IGS-4804SM & IGS-2408SM are industrial grade, hardened design, managed L2+ switches, equipped with 24/48 (10/100/1000BaseTX) RJ-45 ports plus 8/4 dual speed (100/1000Base-X) SFP fiber optical slots, thus providing up to 32 ports of Ethernet connectivity. IGS series models are available with redundant power supplies (2 AV, 2 DC, AC + DC) and can be rack mounted in 19-inch EIA standard rack. IGS Series are certified with many industrial-grade standards and are ideal for deployments in harsh environments to deliver mission-critical network services. The managed Ethernet switch is an ideal solution of Industrial automation, smart city & surveillance, Intelligent traffic control systems and production automation applications.

Features

- Redundant isolated 24/48VDC, or/and isolated 110/220VAC power inputs
- 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 <20ms in 250 devices
- 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
- 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
	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

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

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 ~ 75°C (IGS-2408SM-E, IGS-4804SM-E)
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 <20ms 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 <20ms 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

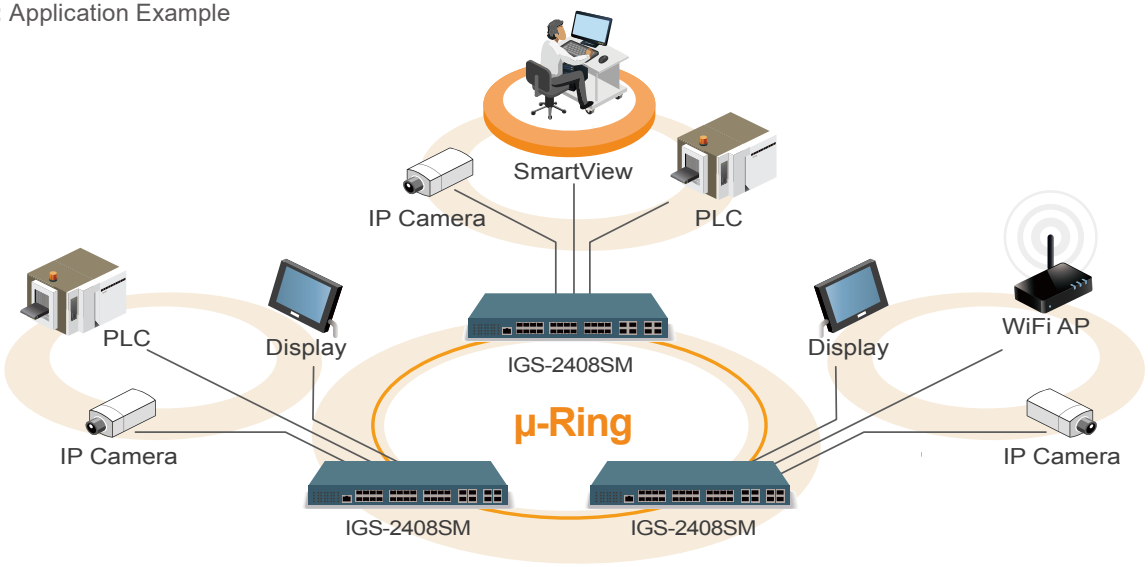
IP Multicasting Features	
IGMP / MLD Snooping	IGMP Snooping v1, v2, v3 / MLD Snooping v1, v2
	Port Filtering Profile
	Throttling, Fast Leave
	Maximum Multicast Group : up to 1022 entries
	Query / Static Router Port
Security Features	
IEEE 802.1X	Port-Based
	MAC-Based
ACL	Number of rules : up to 256 entries
	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
Other 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

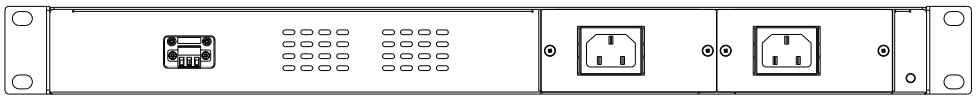


Dimensions

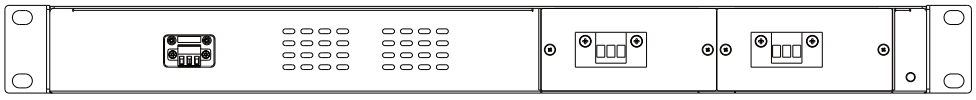
▶ IGS-2408SM

Rear View

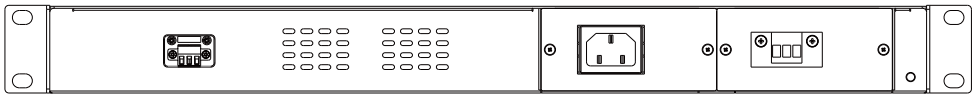
-AA Power



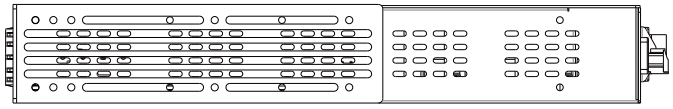
-DD Power



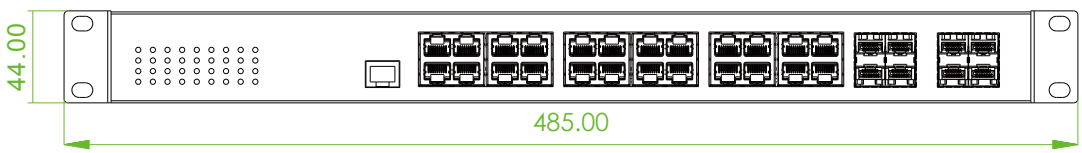
-AD Power



Side View



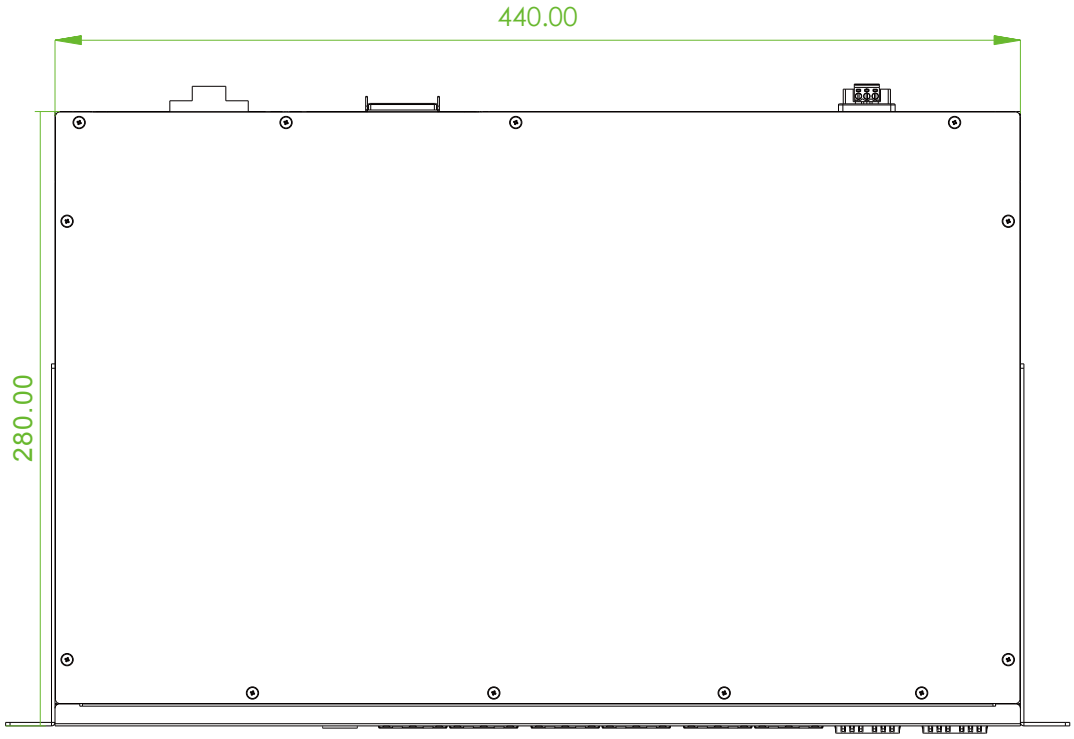
Front View



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Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

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	-40~75℃
IGS-2408SM-E-AD	V	32	24	8	1	1	V	V	V	V	-40~75℃
IGS-2408SM-E-DD	V	32	24	8	2		V	V	V	V	-40~75℃
IGS-4804SM-E-AA	V	52	48	4		2	V	V	V	V	-40~75℃
IGS-4804SM-E-AD	V	52	48	4	1	1	V	V	V	V	-40~75℃
IGS-4804SM-E-DD	V	52	48	4	2		V	V	V	V	-40~75℃

Model Naming Rule

IGS – 48 – 04S – M – E – AA

- IGS: Industrial Gigabit Switch
- 48: 24: 24 GbE UTP; 48: 48 GbE UTP
- 04S: 4x GbE SFP; 08S: 8x GbE SFP
- M: Managed
- E: E : -40~75°C
- AA: AA : 2x AC; AD : 1x AC + 1x DC; DD : 2x DC; (A: Isolated 110/220VAC power; D : Isolated 24/48VDC power)

Package List

- One device of the series
- Console cable (RJ-45 to DB-9)
- 19" rack-mount kit (brackets and screws)
- Protective caps for SFP ports
- AC Power cord (for AC power -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.

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

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

IGS-S2804TM

28x 100/1000Base SFP with 4x GbE Combo (RJ45/SFP)



- Supports IEEE1588 PTP v2
- Supports u-Ring, ERPS, MSTP, RSTP,STP for redundant cabling
- UL60950-1, EN60950-1, CE, FCC, EN50121-4, EN61000-6-2, EN61000-6-4 certified
- Supports negative voltage power input

IGS-S2804TM is an industrial grade, hardened design, L2 switch, equipped with 28 GbE SFP ports with 4 combo GbE ports. This 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. IGS Series are certified with many industrial-grade standards and are ideal for deployments in harsh environments to deliver mission-critical network services. The managed Ethernet switch is an ideal solution of Industrial automation, smart city & surveillance, Intelligent traffic control systems and production automation applications. (See figure).

Features

- Redundancy isolated low voltage 24/48VDC, or/and isolated High voltage (110/220 VAC) power inputs
- 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
- 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)	
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 (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)

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

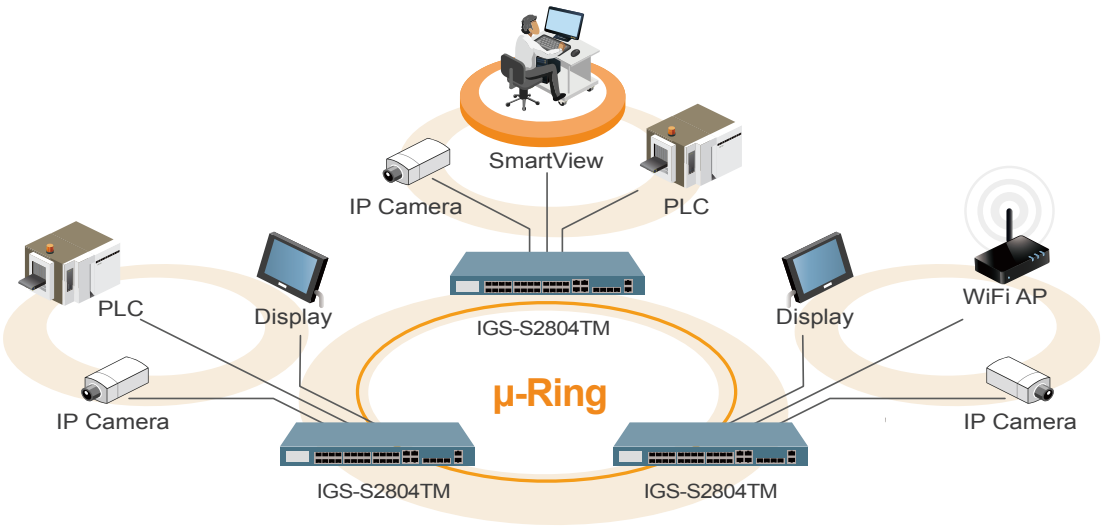
Storage Temperature	-40 ~ 85°C
Housing	Rugged Metal, IP30 Protection, Fanless
Dimensions	315 x 440 x 44 mm (D x W x H)
Weight	4.755kg (IGS-S2804TM-AA) 4.26kg (IGS-S2804TM-DD) 4.51kg (IGS-S2804TM-AD)
Installation Mounting	19" rack mount
MTBF	208,975 Hours (IGS-S2804TM-AA) 230,276 Hours (IGS-S2804TM-DD) 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, EN60950-1
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

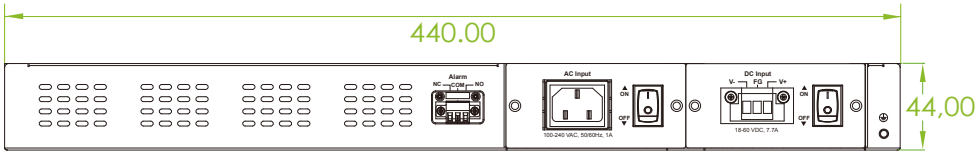
Figure : Application Example



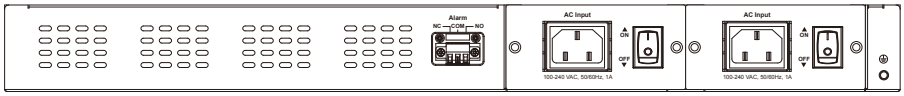
Dimensions

Rear View

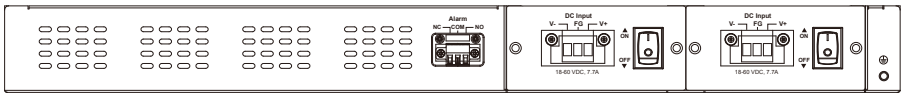
-AD Power



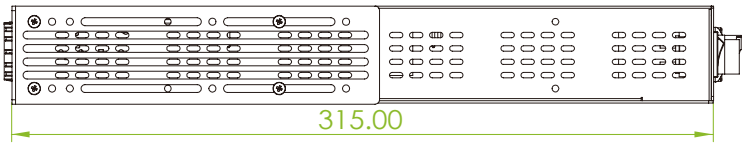
-AA Power



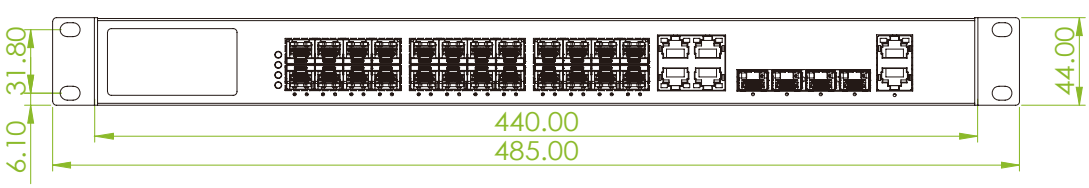
-DD Power



Side View

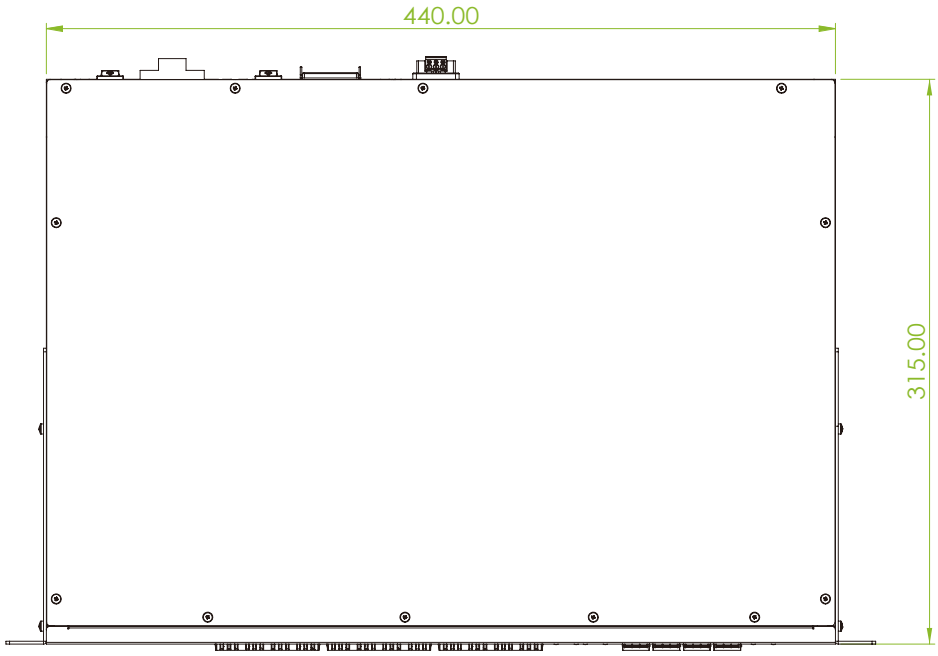


Front View



2020 V1.0
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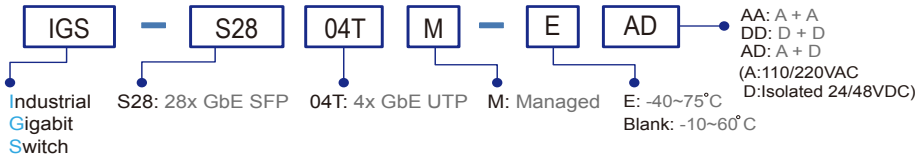
Top View



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 EN60950-1	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)
- Rack mount ear with screws
- AC Power cord (for AC power -A model)

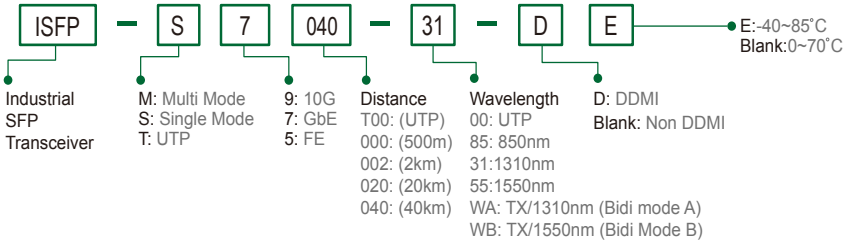
Optional Accessories

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-2408SM-24PH

24x GbE RJ45 + 8x 100/1000Base SFP with 24x PoE (400W 48VDC)

4KV Surge protection



- Supports IEEE 1588 PTP V2
- Supports u-Ring, ERPS, MSTP, RSTP, STP for redundant cabling
- UL60950-1, EN60950-1, CE, FCC, EN50121-4, EN61000-6-2, EN61000-6-4 certified
- 4KV surge protection for PoE, RJ45 and SFP ports

IGS-2408SM-24PH is a rackmount, managed, Industrial Grade, L2 Gigabit PoE (Power over Ethernet) Switch that provides 24x 10/100/1000BaseTX PoE ports, plus 8 dual speed (100/1000Base-X) SFP ports, thus providing up to 32 ports total Ethernet connectivity. The PoE features enable power and data to be transferred via a single cable, thereby considerably reducing cabling and electrical wiring expenses. IGS-2408SM-24PH is an ideal solution for applications in Smart City, surveillance, Intelligent traffic control systems (ITS) and production automation applications. The IGS-2408SM-24PH is designed for harsh outdoor cabinet applications, with 4kV surge protection, to ensure the uninterrupted reliability of PoE systems. Isolated power inputs also help to increase system reliability and the availability of your network backbone.

Features

- 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)
- 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 <20ms in 250 devices
- 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
- 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 802.3af	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 802.3af /IEEE 802.3at 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)
Power Consumption	< 30W @50VDC without PoE load <445W @50VDC with 400W PoE load

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

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 ~ 75°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
Surge protection	4KV 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 <20ms 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

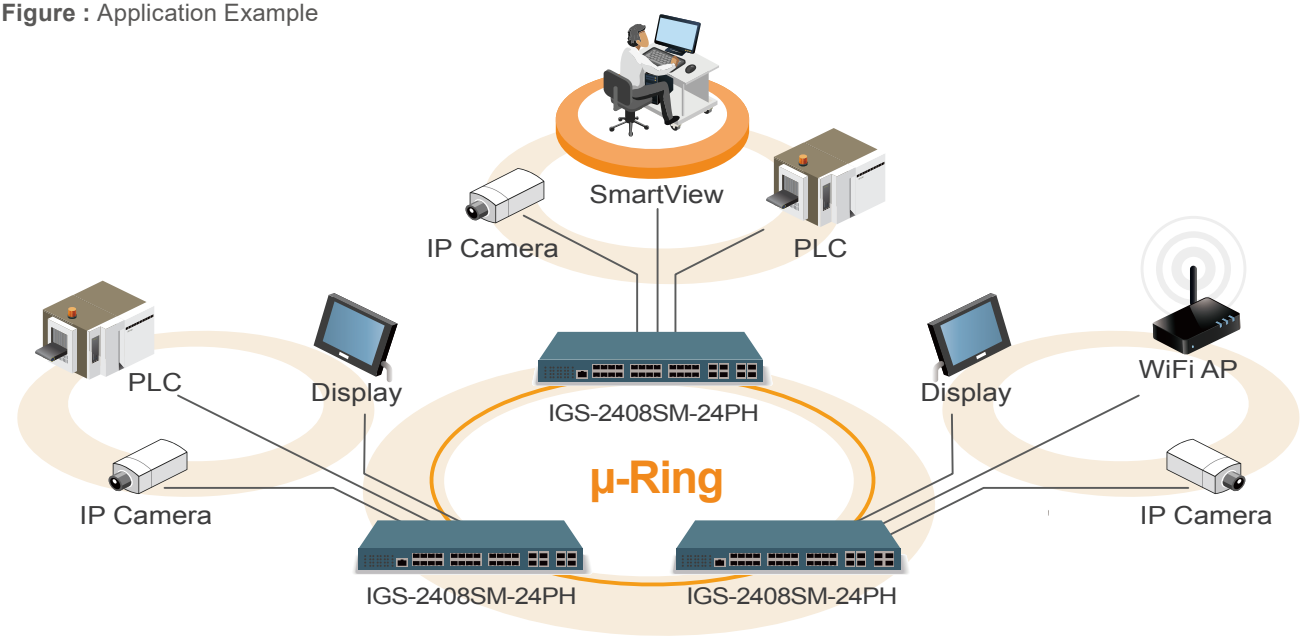
Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

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
Other 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

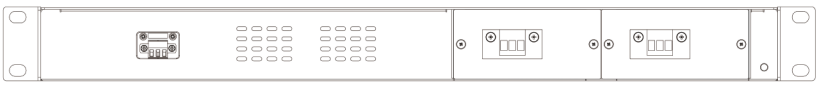
Application

Figure : Application Example

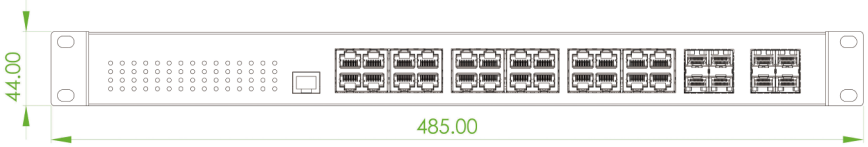


Dimensions

Rear View



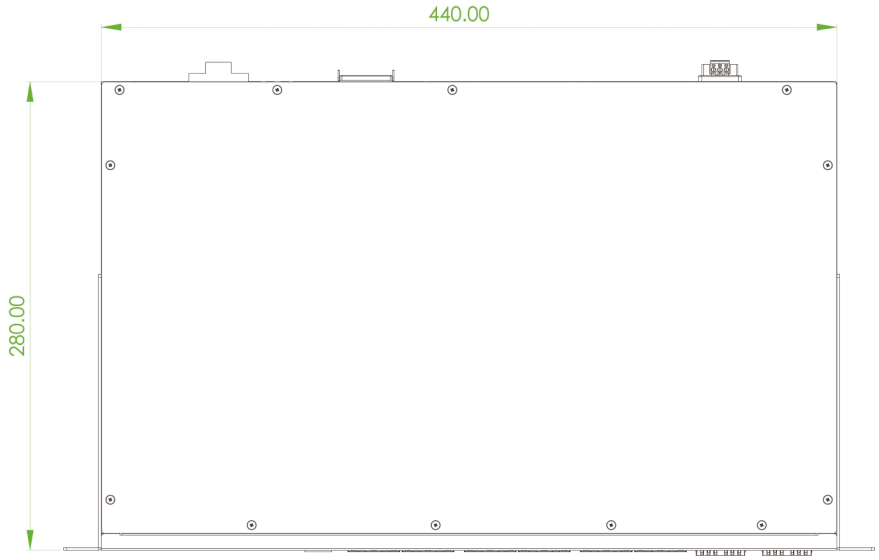
Front View



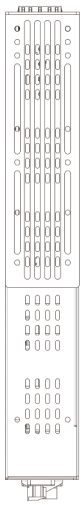
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Top View



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	48VDC	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	-40~75℃

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 : -40~75°C
- blank : 10~60°C

Package List

- IGS-2408SM-24PH device
- Console cable (RJ-45 to DB-9)
- 19" rack-mount kit (brackets and screws)
- Protective caps for SFP ports

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: E:-40~85°C; Blank:0~70°C

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

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.

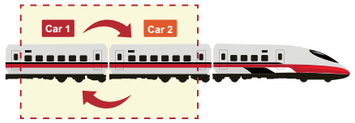
Our railway solutions provide EN50155 certification, wide temperature range, utilize rugged M12 connectors, and use IP-67 casing for **rolling stock**, **trackside**, as well as for **station** and **control center**.

EN50155 EN45545-2 EN50121-4

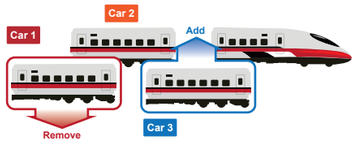
TTDP

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

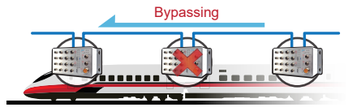


▪ Remove & Add



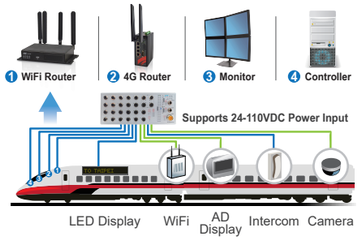
Resilient Bypass

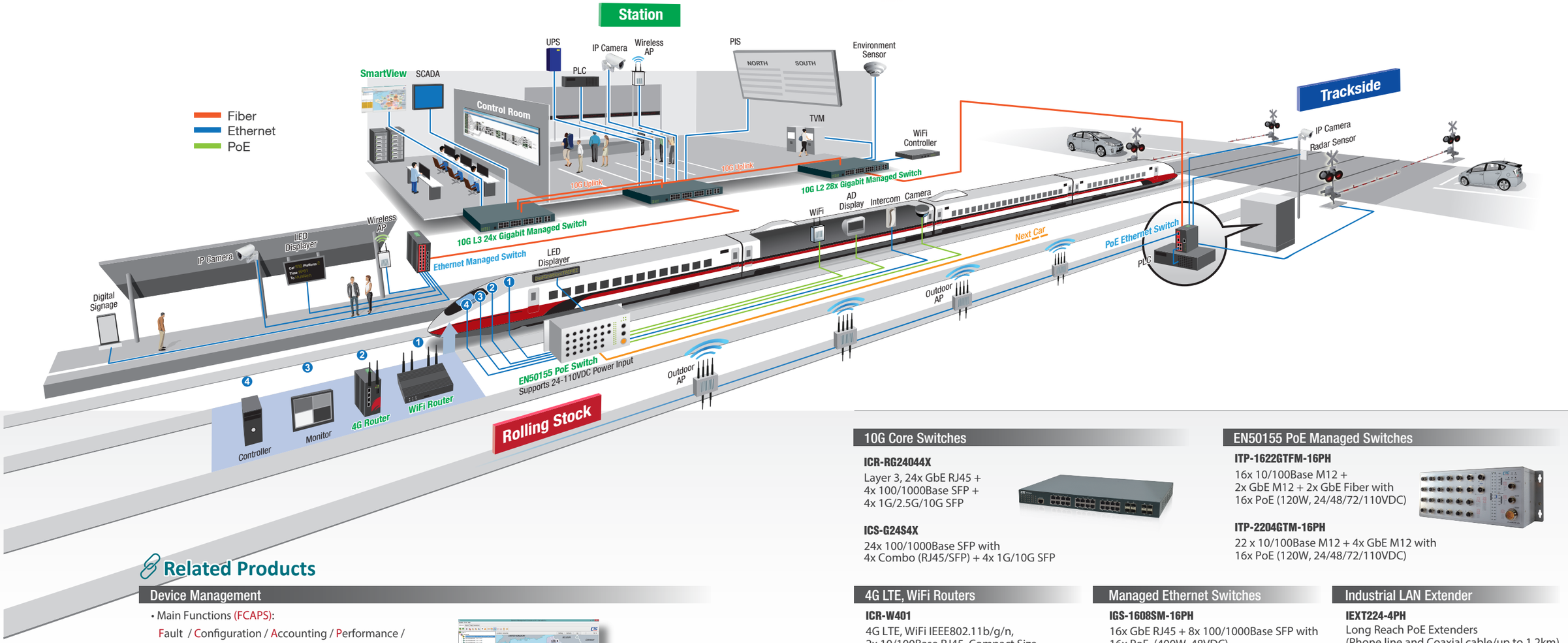
EN50155 compliant products offer two copper interfaces with auto bypass function in the event of sudden power loss, particularly in daisy chain or linear topology networks. When power failure occurs in one of the switches on a train, the bypass relay function can activate, automatically bypassing the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



10G Core Switches

ICR-RG24044X
Layer 3, 24x GbE RJ45 + 4x 100/1000Base SFP + 4x 1G/2.5G/10G SFP

ICS-G24S4X
24x 100/1000Base SFP with 4x Combo (RJ45/SFP) + 4x 1G/10G SFP

EN50155 PoE Managed Switches

ITP-1622GTFM-16PH
16x 10/100Base M12 + 2x GbE M12 + 2x GbE Fiber with 16x PoE (120W, 24/48/72/110VDC)

ITP-2204GTM-16PH
22 x 10/100Base M12 + 4x GbE M12 with 16x PoE (120W, 24/48/72/110VDC)

4G LTE, WiFi Routers

ICR-W401
4G LTE, WiFi IEEE802.11b/g/n, 2x 10/100Base RJ45, Compact Size

ICR-W403
4G LTE, WiFi
IEEE802.11 b/g/n/ac, 3x GbE, RJ45 A



Managed Ethernet Switches

IGS-1608SM-16PH
16x GbE RJ45 + 8x 100/1000Base SFP with 16x PoE (400W, 48VDC)

IGS-1604SM
16x GbE RJ45 + 4x 100/1000Base SFP



Industrial LAN Extender

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



ITP-1622GTFM-16PH & ITP-1604GTM-16PH

◀ 16x 10/100Base M12 + 2x GbE M12 + 2x GbE Fiber with 16x PoE (120W, 24/48/72/110VDC)

▶ 16x 10/100Base M12 + 4x GbE M12 with 16x PoE (120W, 24/48/72/110VDC)

Preliminary



- EN50155, EN45545-2, EN50121-4, EN60950-1, EN61000-6-2, EN61000-6-4,CE, FCC certified
- 24/48/72/96/110VDC redundant dual input power
- Regulated PoE output voltage
- Auto checking and auto reset when PoE PD fail
- 4KV surge protection for PoE and UTP ports

The ITP series models are managed, industrial grade, L2 Fast Ethernet PoE (Power over Ethernet) switches that provide 16x 10/100Base-TX IEEE 802.3at compliant PoE+ ports which are classified as power source equipment (PSE) and provides up to 30 watts of power per port with a maximum power budget of 120W. An additional 22/4x 10/100/1000Base-T(X) GbE ports are also provided. Housed in rugged wall mountable enclosures, these switches are designed for IEEE 802.3af/at compliant powered devices (PDs), such as surveillance cameras, wireless access points, and IP phones. The PoE switches use M12 connectors to ensure tight, robust connections and guarantee reliable connections against vibration and shock. These models are also compliant with EN50155, covering power input voltage, surge, EFT, ESD, vibration and shock, making these switches suitable for industrial applications, such as vehicle, rolling stock, or vessel. With a wide power input range of 24/48/72/96/110VDC (operating range 20 to 137.5VDC), this product series is especially suitable for rolling stock and track side installations.

Features

- M12, Q-ODC and M23 connector against vibration and shock
- Cable diagnostics, identifies opens/shorts distance
- STP, RSTP, MSTP, ITU-T G.8032 Ethernet Protection Ring (ERPS) 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
- Supports TTDP for train application
- 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
- 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	20 Gbps	
Data Processing	Store and Forward	

Flow Control	IEEE 802.3x for full duplex mode Back pressure for half duplex mode
PoE Port	16x M12 (4-Pin D-code Female) PoE ports, Maximum PoE output power budget 120W (30W/per port), Regulated PoE output voltage at 52VDC, IEEE 802.3af / IEEE 802.3at End-Span, Alternative A mode
Network Connector	16x M12 (4-Pin, Female,D-Code) 10/100Base-TX UTP + 4x M12 (8-Pin, Female, X-Code) 10/100/1000Base-T UTP (ITP-1604GTM-16PH) 16x M12 (4-Pin, Female,D-Code) 10/100Base-TX UTP + 2x M12 (8-Pin, Female, X-Code) 10/100/1000Base-T UTP+ 2x Q-ODC 1000Base-X Fiber (ITP-1622GTFM-16PH) UTP port provide auto negotiation speed, Auto MDI/MDI-X, Full/Half duplex function Build-in UTP or Fiber bypass for option (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) Fiber port: Link/Act (Green)

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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 (16.8~137.5VDC) wide input power Regulated PoE output voltage (52VDC) 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, IP40 grade housing protection
Dimensions	TBD
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
Modbus/TCP	Supports for management and monitoring
EtherNet/IP	Supports for management and monitoring
SW & Configuration Upgrade	TFTP, HTTP
	Redundant firmware in case of upgrade failure
FTP client	Supports for upload/download configuration
RMON	RMON I (1, 2, 3, 9 group), RMON II
MIB II	RFC 1213
UPnP	Supported
BOOTP	Supported
DHCP	Server, Client, Relay, Relay option 82 , Snooping
RARP	Supported
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

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

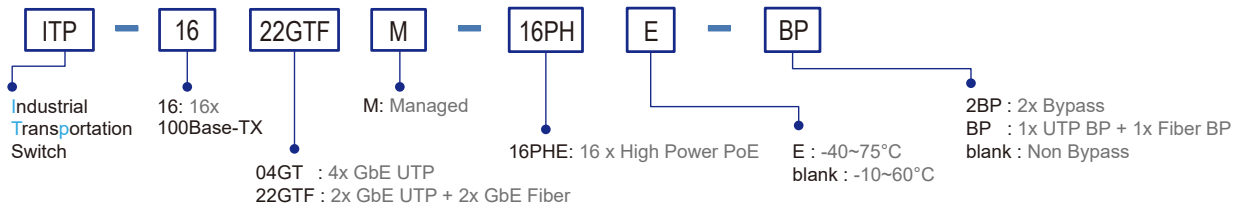
DNS	Client, Proxy
IEEE1588 PTP V2	Support 5 operating mode in each port : Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave
NTP, SNTP	Server/Client
LLDP (IEEE 802.1ab)	Link Layer Discovery Protocol LLDP-MED
IPv6 Features	
IPv6 Management	Telnet Server/ICMP v6
SNMP over IPv6	Supported
HTTP over IPv6	Supported
SSH over IPv6	Supported
IPv6 Telnet	Supported
IPv6 NTP, SNTP	Server/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

Ordering Information

Model Name	Managed	Total Port	10/100Base-TX	GbE port		Bypass		PoE Port		Redundant Dual Input Power	Certification			
			D-code M12	GbE X-code M12 UTP	Q-ODC Fiber	GbE X-code M12 UTP	Q-ODC Fiber	IEEE802.3at	PoE Total Power Budge	24/48/72/96/110VDC (16.8~137.5VDC)	EN50155 EN50121-4 EN45545-2	EN60950-1	EN61000-6-2 EN61000-6-4	CE, FCC
ITP-1604GTM-16PHE-2BP	V	20	16	4		2		16	120W	V	V	V	V	V
ITP-1622GTFM-16PHE-BP	V	20	16	2	2	1	1	16	120W	V	V	V	V	V
ITP-1622GTFM-16PHE	V	20	16	2	2			16	120W	V	V	V	V	V

Model Naming Rule



Package List

- One unit device
- Protective caps for UTP ports and console, alarm port
- Console cable (M12 to DB9)

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

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ITP-G802SM-8PH24 & ITP-G802TM-8PH24

◀ IP67, 8x GbE M12 + 2x 100/1000Base SFP with 8x PoE (180W, 24/48VDC)

▶ IP67, 10x GbE M12 with 8x PoE (180W, 24/48VDC)



- EN50155, EN45545-2, EN50121-4, EN60950-1, EN61000-6-2, EN61000-6-4, CE, FCC certified
- 24/48VDC redundant dual input power
- Regulated PoE output voltage
- Auto checking and auto reset when PoE PD fail
- Build-in 2 bypass GbE UTP ports

The ITP series models are managed, industrial grade, L2 GbE PoE (Power over Ethernet) switches that provide 8x GbE UTP plus 2x GbE SFP or 10x GbE UTP with 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. These switches also provide a variety of functions to manage PoE operation including PoE device auto-checking, auto reset, and PoE power weekly scheduling. Housed in rugged wall mountable enclosures, these switches are designed for the harshest environments. All ITP series switches use M12 connectors to ensure water-tight, robust connections and guarantee reliable connections against vibration and shock. These models are also compliant with EN50155, covering power input voltage, surge, EFT, ESD, vibration and shock, making these switches suitable for industrial applications, such as vehicle, rolling stock, or vessel. With an IP67 rating, to protect against dust and water submersion, they are particularly useful in environments with extreme temperature, high humidity, oil, dust and in outdoor environments requiring water-proof applications, such as IP surveillance or city security.

Features

- M12 and M23 connector against vibration and shock, X-code or A-code M12 for Gigabit port optional
- 24/48VDC redundant dual input power, and built-in power booster design upto 50VDC for PoE output (Figure 2)
- Regulated PoE output voltage (50VDC) to stabilize PoE device, and guarantee delivery PoE power distance to 100meters (Figure 2)
- Cable diagnostics, identifies opens/shorts distance
- 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)
- Supports TTDP for train application
- 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
- 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 50VDC (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 50VDC for PoE output Regulated PoE output voltage (50VDC) 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
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
Modbus/TCP	Supports for management and monitoring
EtherNet/IP	Supports for management and monitoring
SW & Configuration Upgrade	TFTP, HTTP Redundant firmware in case of upgrade failure
FTP client	Supports for upload/download configuration
RMON	RMON I (1, 2, 3, 9 group), RMON II
MIB II	RFC 1213
UPnP	Supported
BOOTP	Supported
DHCP	Server, Client, Relay, Relay option 82 , Snooping
RARP	Supported
TTDP	Supported (Train Topology Discovery Protocol)
IP Source Guard	Supported

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

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	Server/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	Server/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

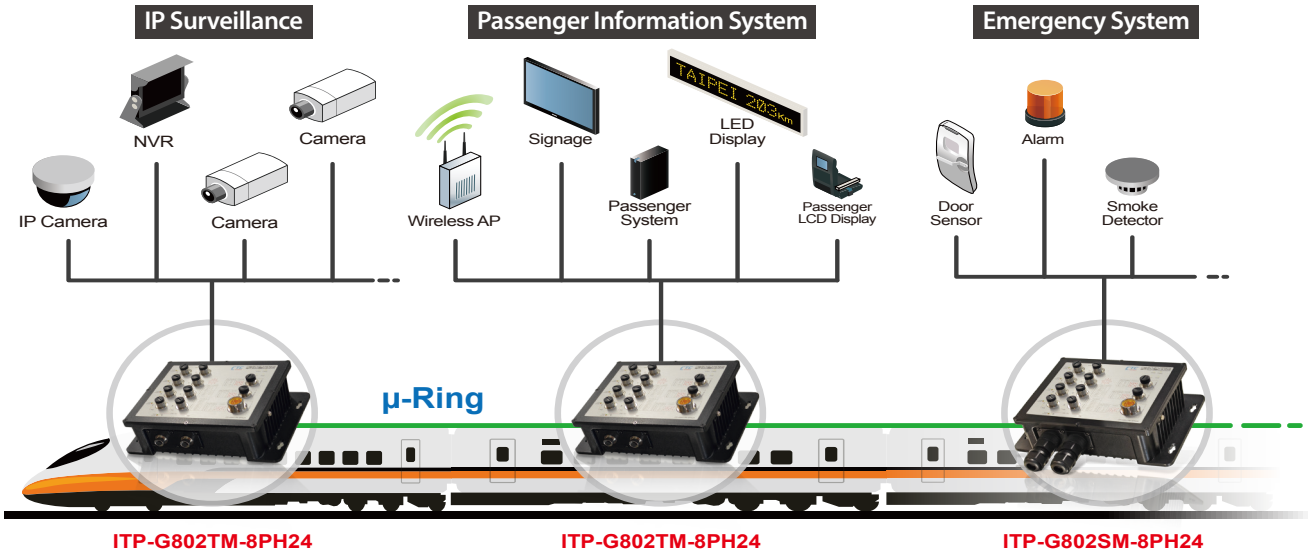
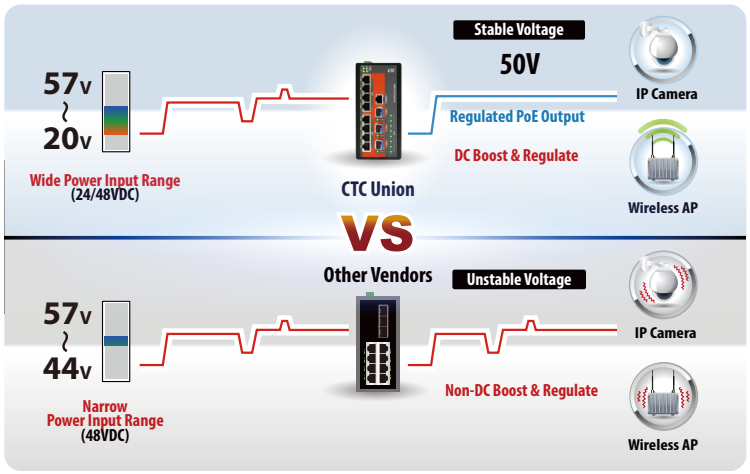


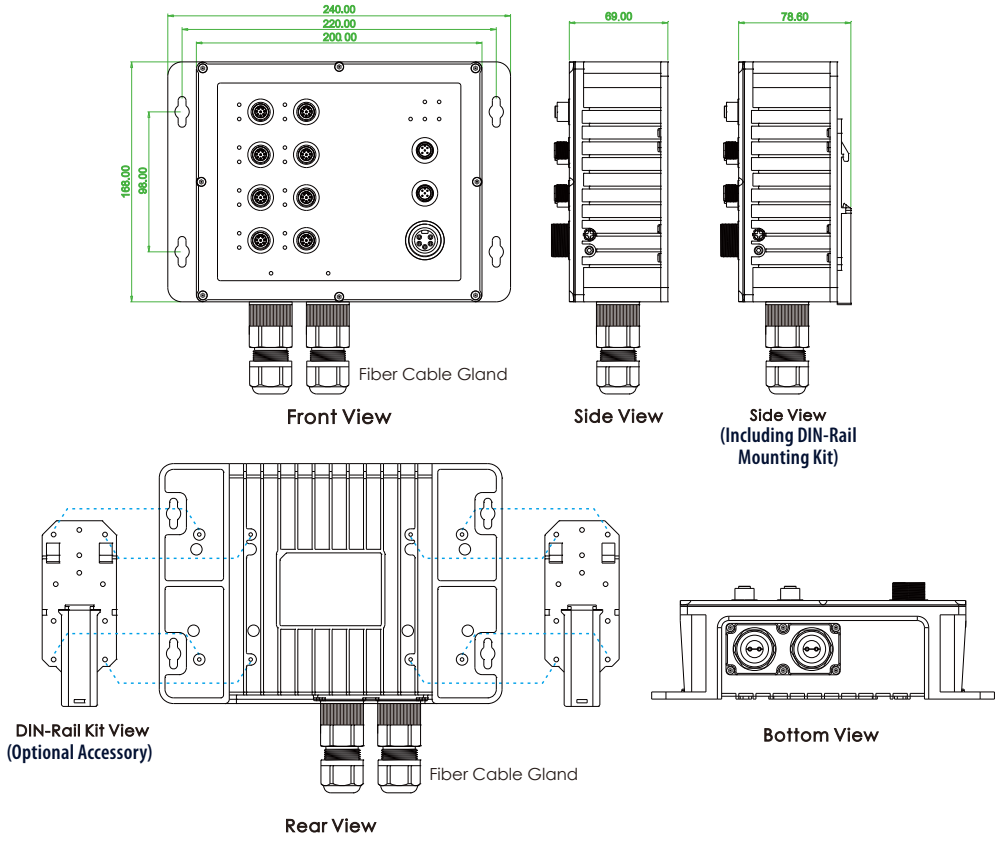
Figure 2 : High Efficiency Boost Technology for PoE



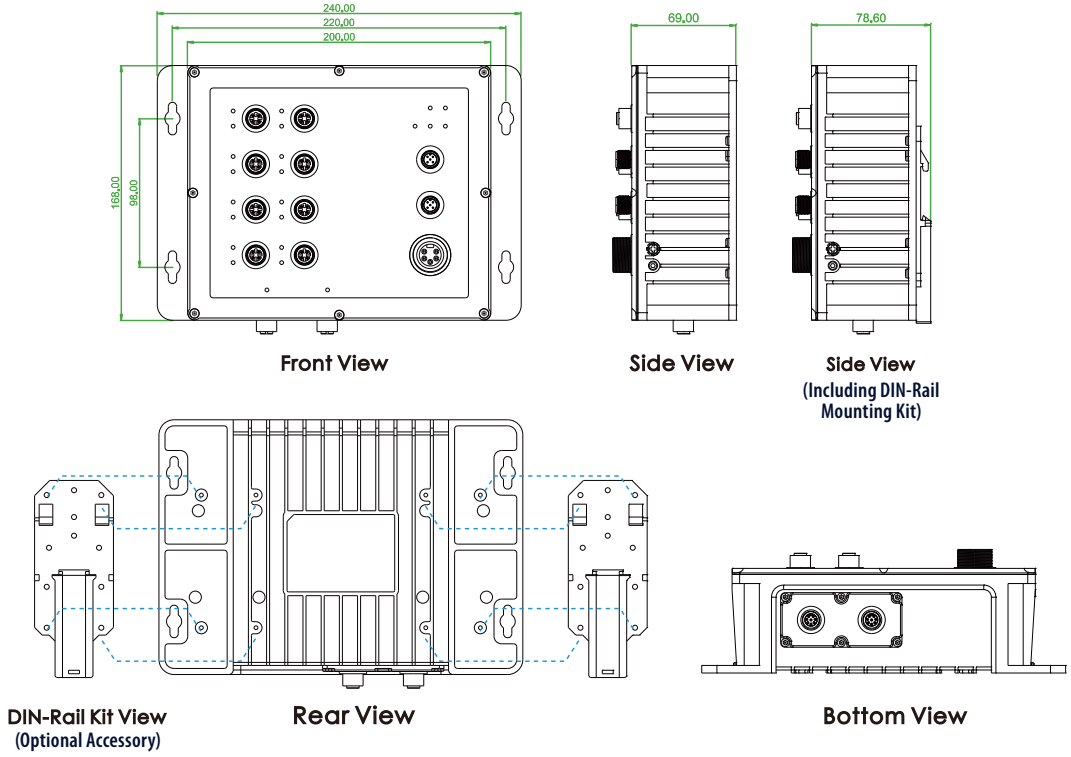
- Regulated PoE output voltage (50VDC) to stabilize PoE device
- Guarantee delivery PoE power distance to 100 meters
- Wide range input power 24/48VDC (20~57VDC)
- Built-in very high efficiency (94~97%) to boost PoE output voltage

Dimensions

▶ ITP-G802SM-8PH24



▶ ITP-G802TM-8PH24

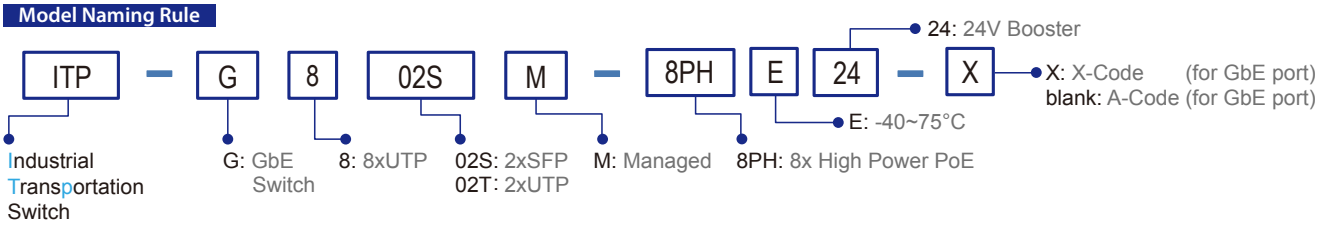


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Ordering Information

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)

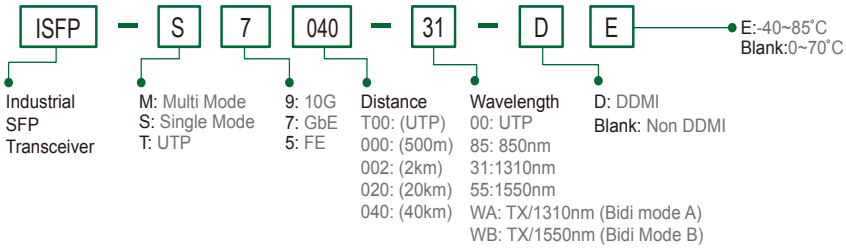
Optional Accessories

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-2204GTM-16PH & ITP-1204GTM-12PH

◀ 22x 10/100Base M12 + 4x GbE M12 with 16x PoE (120W, 24/48/72/110VDC)

▶ 12x 10/100Base M12 + 4x GbE M12 with 12x PoE (120W, 24/48/72/110VDC)



- EN50155, EN45545-2, EN50121-4, EN60950-1, EN61000-6-2, EN61000-6-4, CE, FCC certified
- 24/48/72/96/110VDC redundant dual input power
- Regulated PoE output voltage
- Auto checking and auto reset when PoE PD fail
- 4KV surge protection for PoE and UTP ports

The ITP series models are managed, industrial grade, L2 Fast Ethernet PoE (Power over Ethernet) switches that provide 12/22x 10/100Base-TX and 4x 10/100/1000Base-T(X) ports. 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 with a maximum power budget of 120W. Housed in rugged wall mountable enclosures, these switches are designed for IEEE 802.3af/at compliant powered devices (PDs), such as surveillance cameras, wireless access points, and IP phones. The PoE switches use M12 connectors to ensure tight, robust connections and guarantee reliable connections against vibration and shock. These models are also compliant with EN50155, covering power input voltage, surge, EFT, ESD, vibration and shock, making these switches suitable for industrial applications, such as vehicle, rolling stock, or vessel. With a wide power input range of 24/48/72/96/110VDC (operating range 20 to 137.5VDC), this product series is especially suitable for rolling stock and track side installations.

Features

- M12 and M23 connector against vibration and shock, M12 X-code for Gigabit port
- Cable diagnostics, identifies opens/shorts distance
- STP, RSTP, MSTP, ITU-T G.8032 Ethernet Protection Ring (ERPS) 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
- Supports TTDP for train application
- 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
- 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 52VDC 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 (16.8~137.5VDC) wide input power Regulated PoE output voltage (52VDC) to stabilize PoE device, and guarantee delivery PoE power distance to 100meter
Power Consumption	ITP-1204GTM-12PH

Input Voltage	Total Power Consumption	Device Power Consumption	PoE Budget
24 VDC	141.4W	13W	120W
48 VDC	137.9W	14W	120W
110VDC	136.4W	16.5W	120W

ITP-2204GTM-16PH

Input Voltage	Total Power Consumption	Device Power Consumption	PoE Budget
24 VDC	149W	17.1W	120W
48 VDC	141.1W	17.8W	120W
110VDC	140.8W	19.8	120W

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, IP54 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	2.8kg (ITP-1204GTM-12PH) 3.9kg (ITP-2204GTM-16PH)
Installation Mounting	Wall mounting
MTBF	238,600 Hours (ITP-1204GTM-12PH) 227,899 Hours (ITP-2204GTM-16PH) (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
4KV surge protection	Supported for PoE and UTP port
Shock	IEC-61373
Freefall	IEC 60068-2-32
Vibration	IEC-61373

Software Specifications

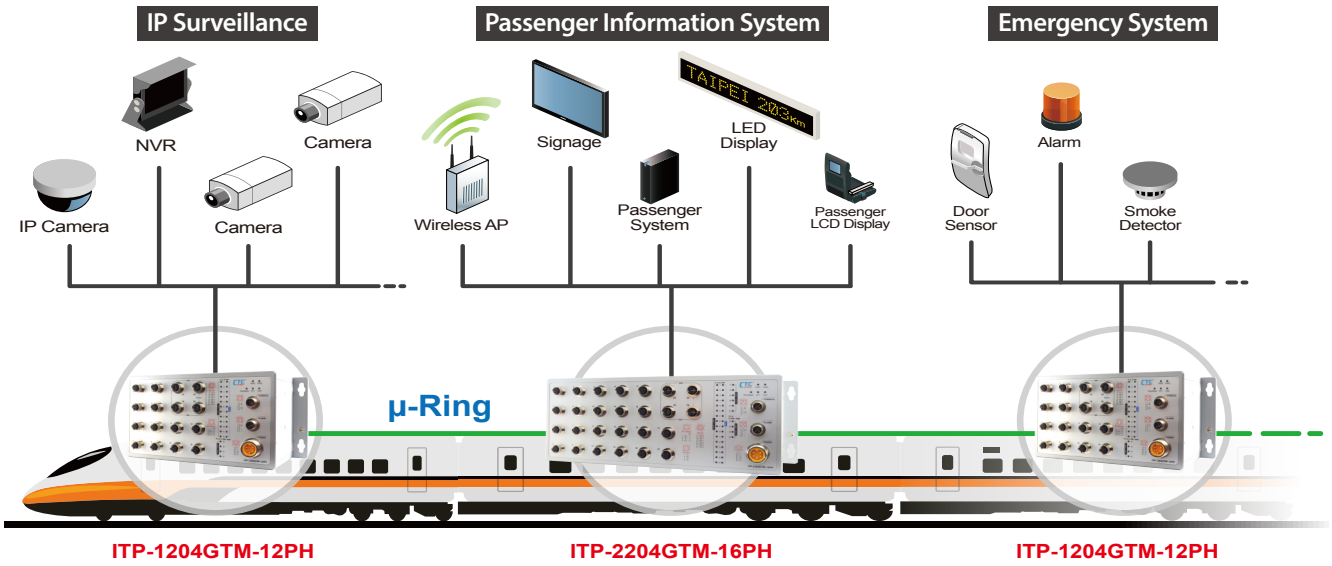
Topology	
VLAN	IEEE 802.1q VLAN,up to 4094 802.1Q VLAN VID IEEE 802.1q VLAN,up to 4094 Groups IEEE 802.1ad Q-in-Q MAC-based VLAN,up to 256 entries IP Subnet-based VLAN, up to 128 entries Protocol-based VLAN(Ethernt, SNAP, LLC), up to 128 entries VLAN Translation, up to 256 entries GVRP (GARP VLAN Registration 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
Modbus/TCP	Supports for management and monitoring
EtherNet/IP	Supports for management and monitoring
SW & Configuration Upgrade	TFTP, HTTP Redundant firmware in case of upgrade failure
FTP client	Supports for upload/download configuration
RMON	RMON I (1, 2, 3, 9 group), RMON II
MIB II	RFC 1213
UPnP	Supported
BOOTP	Supported
DHCP	Server, Client, Relay, Relay option 82 , Snooping

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

RARP	Supported
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	Server/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	Server/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

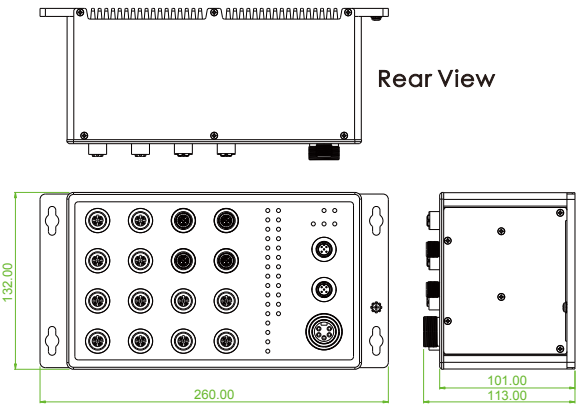
Application

Figure : ITP Series in Onboard Train Application

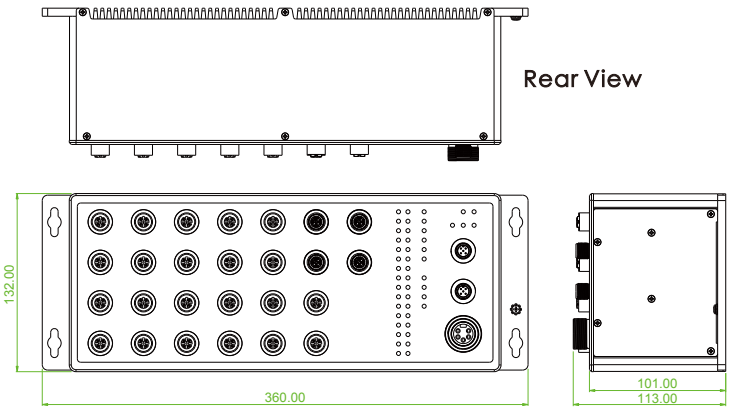


Dimensions

▶ ITP-1204GTM-12PH



▶ ITP-2204GTM-16PH



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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 (16.8~137.5VDC)
ITP-1204GTM-12PHE	V	IP54	16	12	4		12	120W	V
ITP-1204GTM-12PHE-BP	V	IP54	16	12	2	2	12	120W	V
ITP-2204GTM-16PHE	V	IP54	26	22	4		16	120W	V
ITP-2204GTM-16PHE-BP	V	IP54	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
- 16PHE: 16x High Power PoE; 12PHE: 12x 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)

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



P/N: M12D-M4

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



P/N: M12A-F5

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



Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

ITP-802GSM-8PH24 & ITP-802GTM-8PH24

◀ IP67, 8x 10/100Base M12 2x 100/1000Base SFP with 8x PoE (180W, 24/48VDC)

▶ IP67, 8x 10/100Base M12 2x GbE M12 with 8x PoE (180W, 24/48VDC)



- EN50155, EN45545-2, EN50121-4, EN60950-1, EN61000-6-2, EN61000-6-4,CE, FCC certified
- 24/48VDC redundant dual input power
- Regulated PoE output voltage
- Auto checking and auto reset when PoE PD fail
- Build-in 2 bypass GbE UTP ports

The ITP series models are managed, industrial grade, L2 Fast Ethernet PoE (Power over Ethernet) switches that provide 8x Fast Ethernet UTP PoE (Power over Ethernet) plus 2x GbE SFP or 8x Fast Ethernet UTP PoE (Power over Ethernet) plus 2x GbE UTP Ports. The 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. Housed in rugged wall mountable enclosures, these switches are designed for the harshest environments. All ITP series switches use M12 connectors to ensure water-tight, robust connections and guarantee reliable connections against vibration and shock. These models are also compliant with EN50155, covering power input voltage, surge, EFT, ESD, vibration and shock, making these switches suitable for industrial applications, such as vehicle, rolling stock, or vessel. With an IP67 rating, to protect against dust and water submersion, they are particularly useful in environments with extreme temperature, high humidity, oil, dust and in outdoor environments requiring water-proof applications, such as IP surveillance or city security.

Features

- M12 and M23 connector against vibration and shock, X-code or A-code M12 for Gigabit port optional
- 24/48VDC redundant dual input power, and built-in power booster design upto 50VDC for PoE output (Figure 2)
- Regulated PoE output voltage (50VDC) to stabilize PoE device, and guarantee delivery PoE power distance to 100meters (Figure 2)
- Advanced PoE Management, management, PoE PD failure, auto checking and auto reset, PoE configuration for power planning, weekly scheduling
- Cable diagnostics, identifies opens/shorts distance
- 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)
- Supports TTDP for train application
- 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
- 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 50VDC (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 50VDC for PoE output Regulated PoE output voltage (50VDC) 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
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
Modbus/TCP	Support for management and monitoring
EtherNet/IP	Support for management and monitoring
SW & Configuration Upgrade	TFTP, HTTP Redundant firmware in case of upgrade failure
FTP client	Supports for upload/download configuration

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

RMON	RMON I (1, 2, 3, 9 group), RMON II
MIB II	RFC 1213
UPnP	Supported
BOOTP	Supported
DHCP	Server, Client, Relay, Relay option 82 , Snooping
RARP	Supported
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	Supports 5 operating mode in each port : Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave
NTP, SNTP	Server/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	Server/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

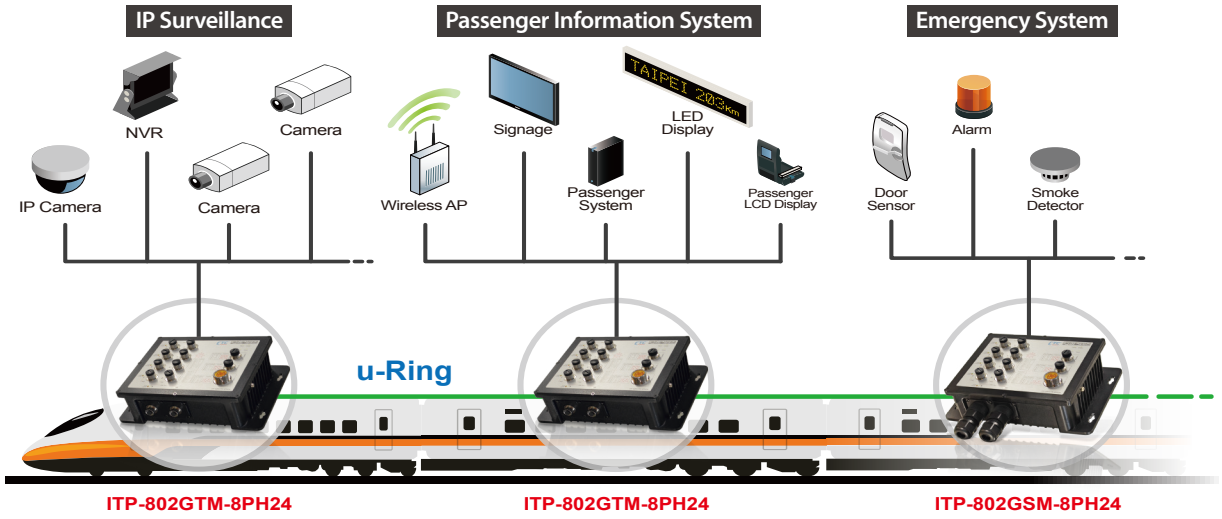
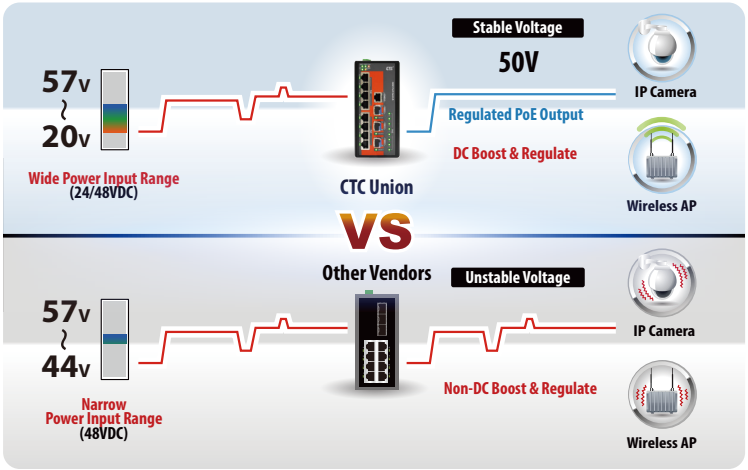


Figure 2 : High Efficiency Boost Technology for PoE

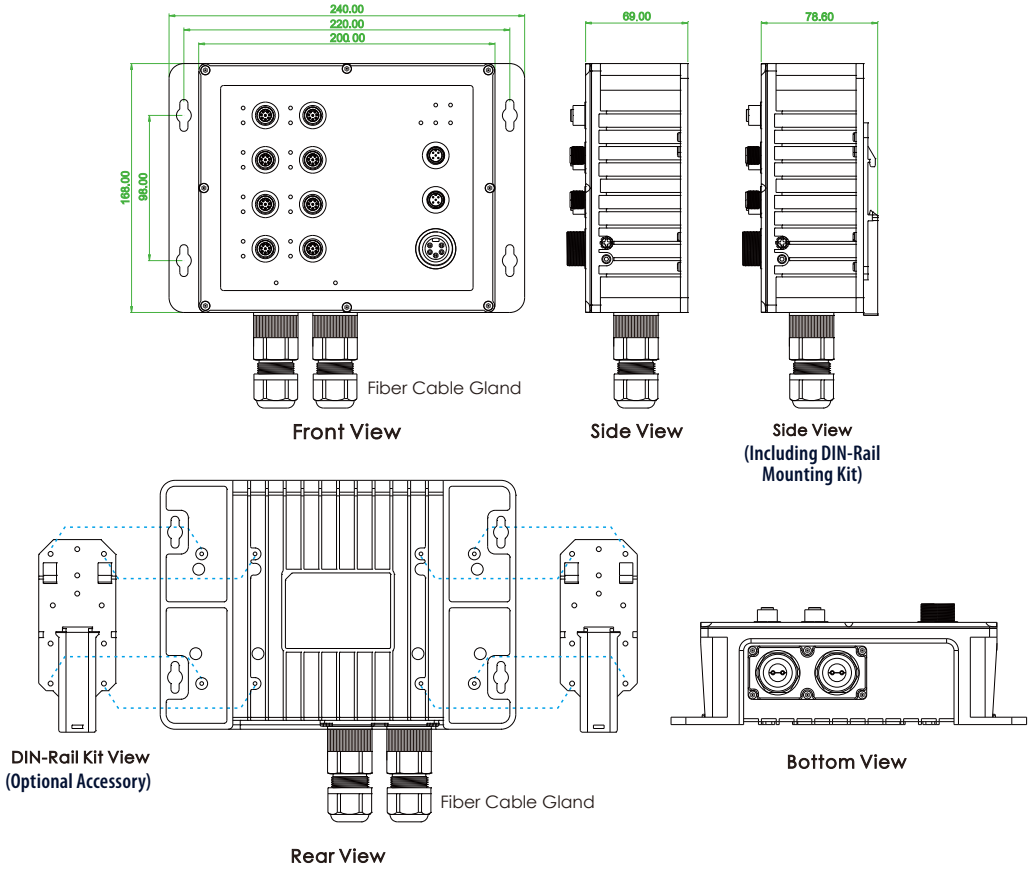


- Regulated PoE output voltage (50VDC) to stabilize PoE device
- Guarantee delivery PoE power distance to 100 meters
- Wide range input power 24/48VDC (20~57VDC)
- Built-in very high efficiency (94~97%) to boost PoE output voltage

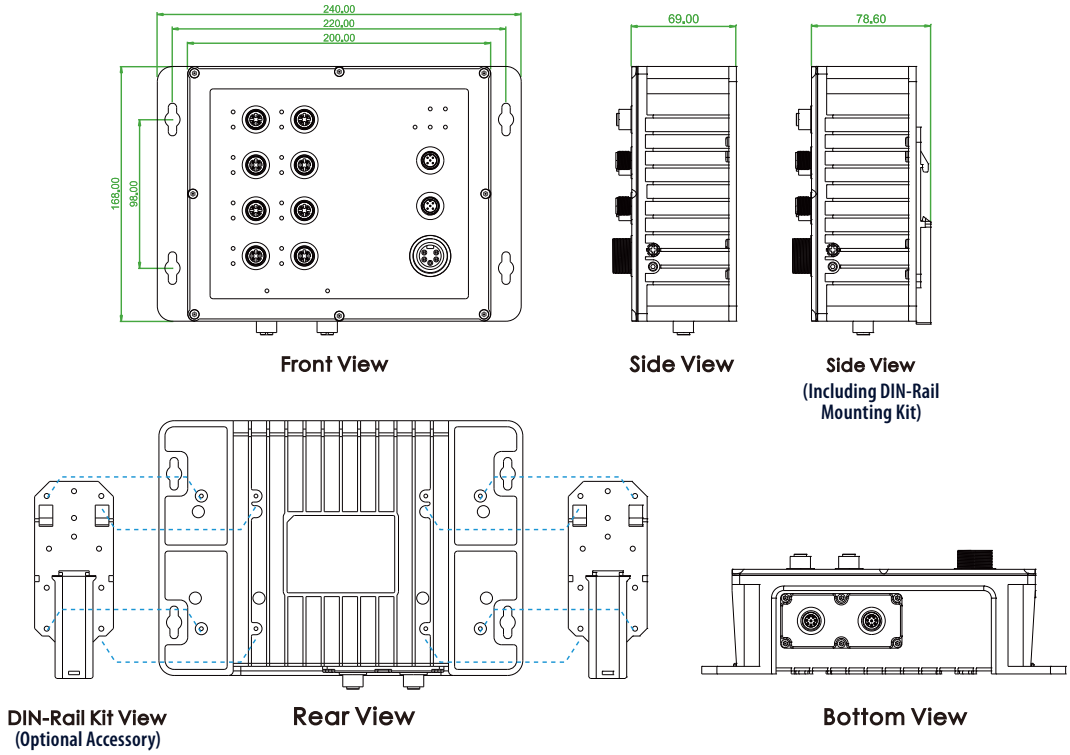
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Dimensions

▶ ITP-802GSM-8PH24



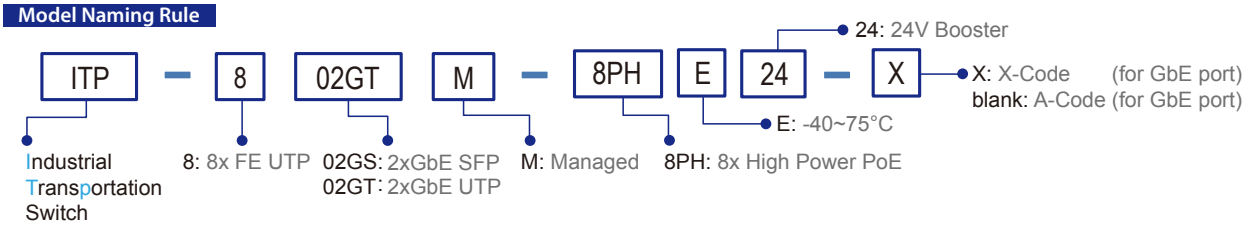
▶ ITP-802GTM-8PH24



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 EN45545-2 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)

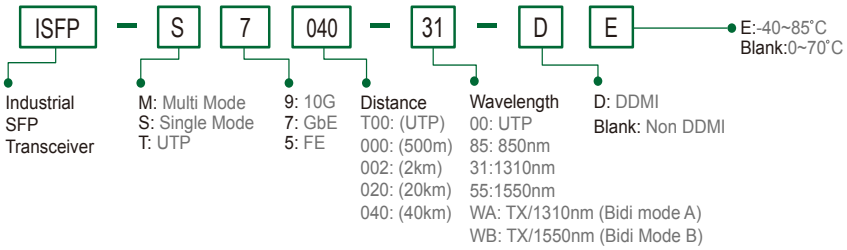
Optional Accessories

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



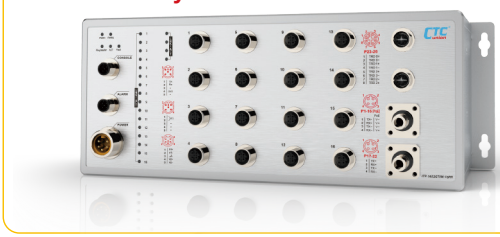
(130 X52mm / 4 Screws) (2pcs/set)

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ITP-1622GTFM & ITP-1604GTM

- 16x 10/100Base M12 + 2x GbE M12 + 2x GbE Fiber
- 16x 10/100Base M12+ 4x GbE M12

Preliminary



- EN50155, EN45545-2, EN50121-4, EN60950-1, EN61000-6-2, EN61000-6-4, CE, FCC certified
- 24/48/72/96/110VDC redundant dual input power
- 4KV surge protection for UTP ports
- 2.25K VDC Hi-pot isolation protection for Ethernet ports and power
- Cable diagnostics, identifies opens/shorts distance

The ITP series models are managed, industrial grade, L2 Fast Ethernet switches that provide 16x 10/100Base-TX and 22/4x 10/100/1000Base-T(X) ports. The ITP switches use M12 connectors to ensure tight, robust connections and guarantee reliable connections against vibration and shock. These models are also compliant with EN50155, covering power input voltage, surge, EFT, ESD, vibration and shock, making these switches suitable for industrial applications, such as vehicle, rolling stock, or vessel. With a wide power input range of 24/48/72/96/110VDC (operating range 20 to 137.5VDC), this product series is especially suitable for rolling stock and track side installations.

Features

- M12 and M23 connector against vibration and shock, M12 X-code for Gigabit port
- STP, RSTP, MSTP, ITU-T G.8032 Ethernet Protection Ring (ERPS) 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
- 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
- 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 802.1ad	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
Network Connector	16x M12 (4-Pin, Female,D-Code) 10/100Base-TX UTP + 4x M12 (8-Pin, Female, X-Code) 10/100/1000Base-T UTP (ITP-1604GTM) 16x M12 (4-Pin, Female,D-Code) 10/100Base-TX UTP + 2x M12 (8-Pin, Female, X-Code) 10/100/1000Base-T UTP+ 2x Q-ODC 1000Base-X Fiber (ITP-1622GTFM) 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 (16.8~137.5VDC) wide input power
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, IP40 grade housing protection
Dimensions	TBD
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
	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
Modbus/TCP	Supports for management and monitoring
EtherNet/IP	Supports for management and monitoring
SW & Configuration Upgrade	TFTP, HTTP
	Redundant firmware in case of upgrade failure
FTP client	Supports for upload/download configuration
RMON	RMON I (1, 2, 3, 9 group), RMON II
MIB II	RFC 1213
UPnP	Supported
BOOTP	Supported
DHCP	Server, Client, Relay, Relay option 82 , Snooping
RARP	Supported
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

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

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, SNTP	Server/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	Server/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

Ordering Information

Model Name	Managed	Total Port	10/100Base-TX	GbE port		Bypass		Redundant Dual Input Power	Certification			
			D-code M12	GbE X-code M12 UTP	Q-ODC Fiber	GbE X-code M12 UTP	Q-ODC Fiber	24/48/72/96/110VDC (16.8~137.5VDC)	EN50155 EN50121-4 EN45545-2	EN60950-1	EN61000-6-2 EN61000-6-4	CE, FCC
ITP-1604GTM-E-2BP	V	20	16	4		2		V	V	V	V	V
ITP-1622GTFM-E-BP	V	20	16	2	2	1	1	V	V	V	V	V
ITP-1622GTFM-E	V	20	16	2	2			V	V	V	V	V

Model Naming Rule

ITP - 16 - 22GTF - M - E - BP

- ITP: Industrial Transportation Switch
- 16: 16x 100Base-TX
- 22GTF: 04GT : 4xGbE UTP; 22GTF : 2x GbE UTP + 2x GbE Fiber
- M: Managed
- E : -40~75°C; blank : -10~60°C
- BP: 2BP : 2x Bypass; BP : 1x UTP BP + 1x Fiber BP; blank : Non Bypass

Package List

- One unit device
- Protective caps for UTP ports and console, alarm port
- Console cable (M12 to DB9)

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-G802SM & ITP-G802TM

◀ IP67, 8x GbE + 2x 100/1000Base SFP

▶ IP67, 8x GbE M12 + 2x GbE M12



- EN50155, EN45545-2, EN50121-4, EN60950-1, EN61000-6-2, EN61000-6-4, CE, FCC certified
- 12/24/48VDC or 110/220VDC redundant dual input power
- Supports TTDP for train application
- Build-in 2 bypass GbE UTP ports
- Cable diagnostics, identifies opens/shorts distance

The ITP series models are managed, industrial grade, L2 GbE switches that provide 8x GbE UTP plus 2x GbE SFP or 10x GbE UTP Ports. Housed in rugged wall mountable enclosures, these switches are designed for the harshest environments. All ITP series switches use M12 connectors to ensure water-tight, robust connections and guarantee reliable connections against vibration and shock. These models are also compliant with EN50155, covering power input voltage, surge, EFT, ESD, vibration and shock, making these switches suitable for industrial applications, such as vehicle, rolling stock, or vessel. With an IP67 rating, to protect against dust and water submersion, they are particularly useful in environments with extreme temperature, high humidity, oil, dust and in outdoor environments requiring water-proof applications, such as IP surveillance or city security.

Features

- M12 and M23 connector against vibration and shock, X-code or A-code M12 for Gigabit port optional
- STP, RSTP, MSTP, ITU-T G.8032 Ethernet Protection Ring (ERPS) 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)
- 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
- 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
	IEEE 802.3ad	Link aggregation for parallel links with LACP(Link Aggregation Control Protocol)
	IEEE 802.3x	Flow control for Full Duplex
	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)

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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
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

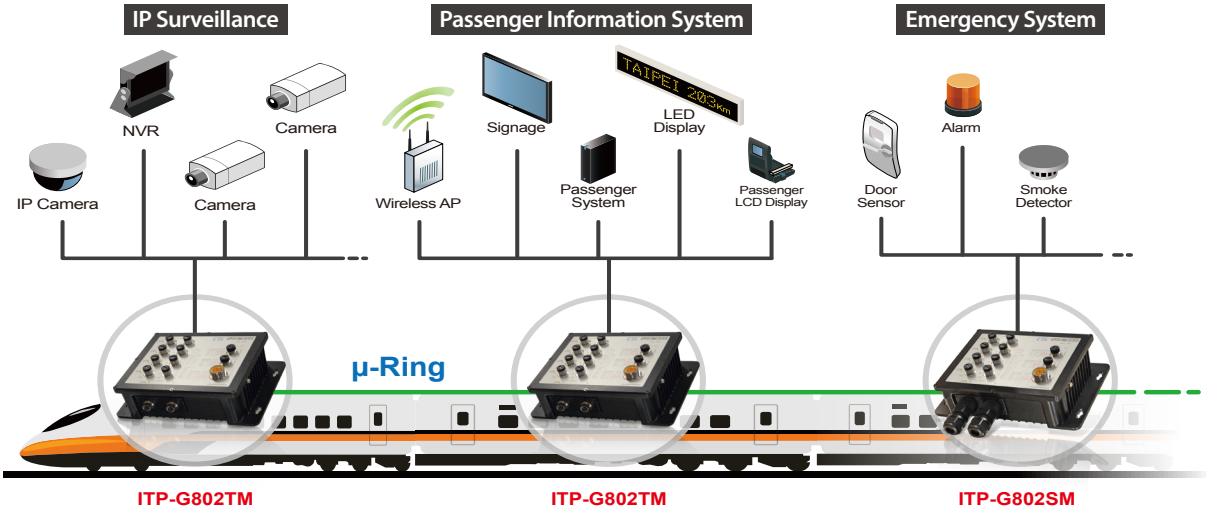
Security Features	
IEEE 802.1X	Port-Based, MAC-Based
ACL	Number of rules : up to 256 entries for L2 / L3 / L4 L2: Mac address SA/DA/VLAN L3: IP address SA/DA, Subnet L4: TCP/UDP
RADIUS authentication & accounting	
TACACS+ authentication & accounting, TACACS+ 3.0	
HTTPS, HTTP	Supported
SSL / SSH v2	Supported
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
Modbus/TCP	Supports for management and monitoring
EtherNet/IP	Supports for management and monitoring
SW & Configuration Upgrade	TFTP, HTTP
	Redundant firmware in case of upgrade failure
FTP client	Supports for upload/download configuration
RMON	RMON I (1, 2, 3, 9 group), RMON II
MIB II	RFC 1213
UPnP	Supported
BOOTP	Supported
DHCP	Server, Client, Relay, Relay option 82 , Snooping
RARP	Supported
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	Server/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	Server/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

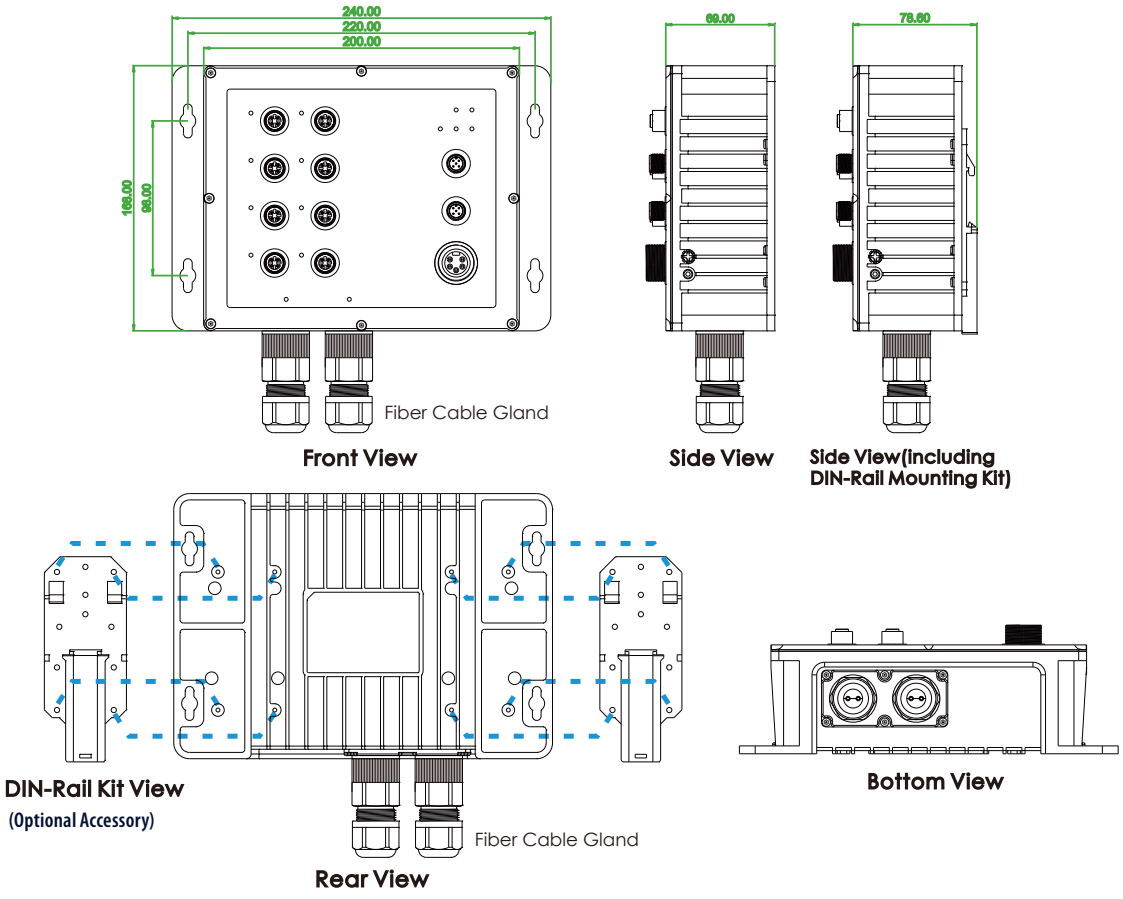
Application

Figure 1 : ITP Series in Onboard Train Application



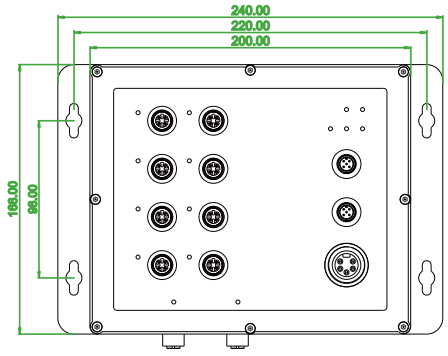
Dimensions

▶ ITP-G802SM

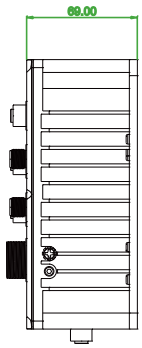


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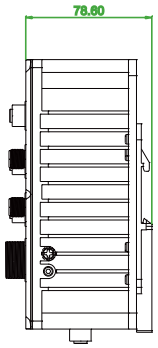
▶ ITP-G802TM



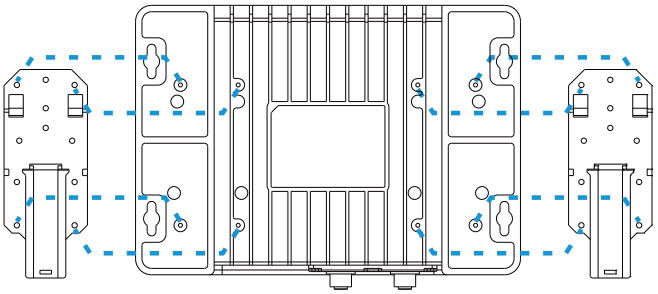
Front View



Side View

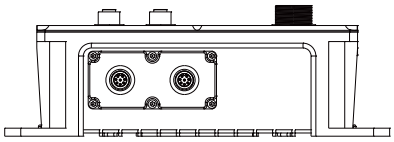


Side View(including DIN-Rail Mounting Kit)



DIN-Rail Kit View
(Optional Accessory)

Rear View



Bottom View

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)

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

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: D: DDMI; Blank: Non DDMI
- E: 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)

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

ITP-2204GTM & ITP-1204GTM

- 22x 10/100Base M12+ 4x GbE M12
- 12x 10/100Base M12+ 4x GbE M12



- EN50155, EN45545-2, EN50121-4, EN60950-1, EN61000-6-2, EN61000-6-4, CE, FCC certified
- 24/48/72/96/110VDC redundant dual input power
- 4KV surge protection for UTP ports
- 2.25K VDC Hi-pot isolation protection for Ethernet ports and power
- Cable diagnostics, identifies opens/shorts distance

The ITP series models are managed, industrial grade, L2 Fast Ethernet switches that provide 12/22x 10/100Base-TX and 4x 10/100/1000Base-T(X) ports. The ITP switches use M12 connectors to ensure tight, robust connections and guarantee reliable connections against vibration and shock. These models are also compliant with EN50155, covering power input voltage, surge, EFT, ESD, vibration and shock, making these switches suitable for industrial applications, such as vehicle, rolling stock, or vessel. With a wide power input range of 24/48/72/96/110VDC (operating range 20 to 137.5VDC), this product series is especially suitable for rolling stock and track side installations.

Features

- M12 and M23 fiber connector against vibration and shock, M12 X-code for Gigabit port
- STP, RSTP, MSTP, ITU-T G.8032 Ethernet Protection Ring (ERPS) 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
- Supports TTDP for train application
- 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
- 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
	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
	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 (16.8~137.5VDC) wide input power
Power Consumption	ITP-1204GTM

Input Voltage	Device Power Consumption
24VDC	13W
48VDC	14W
110VDC	16.5W

ITP-2204GTM

Input Voltage	Device Power Consumption
24VDC	17.1W
48VDC	17.8W
110VDC	19.8

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, IP54 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	2.8kg (ITP-1204GTM) 3.9kg (ITP-2204GTM)
Installation Mounting	Wall mounting
MTBF	238,600 Hours (ITP-1204GTM) 227,899 Hours (ITP-2204GTM) (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

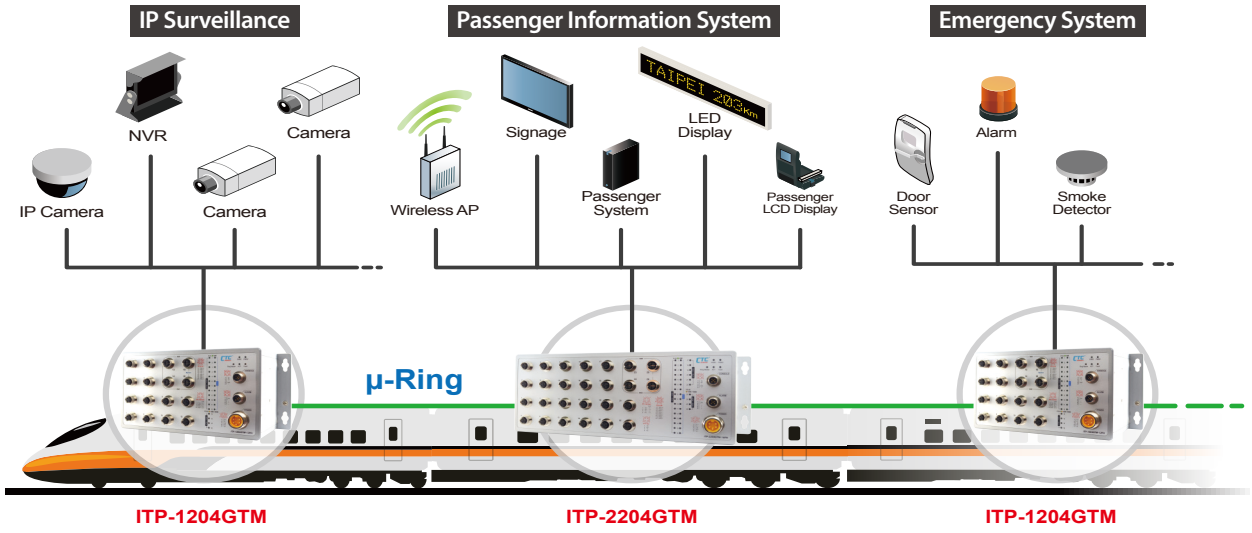
Software Specifications

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
Modbus/TCP	Supports for management and monitoring
EtherNet/IP	Supports for management and monitoring
SW & Configuration Upgrade	TFTP, HTTP Redundant firmware in case of upgrade failure
FTP client	Supports for upload/download configuration
RMON	RMON I (1, 2, 3, 9 group), RMON II
MIB II	RFC 1213
UPnP	Supported
BOOTP	Supported
DHCP	Server, Client, Relay, Relay option 82 , Snooping
RARP	Supported
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	Server/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	Server/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

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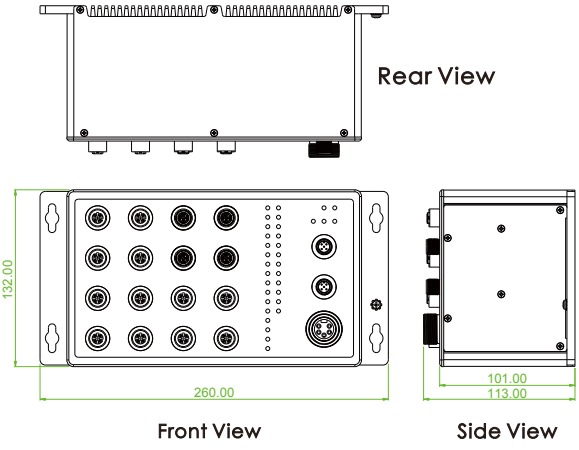
Application

Figure : ITP Series in Onboard Train Application

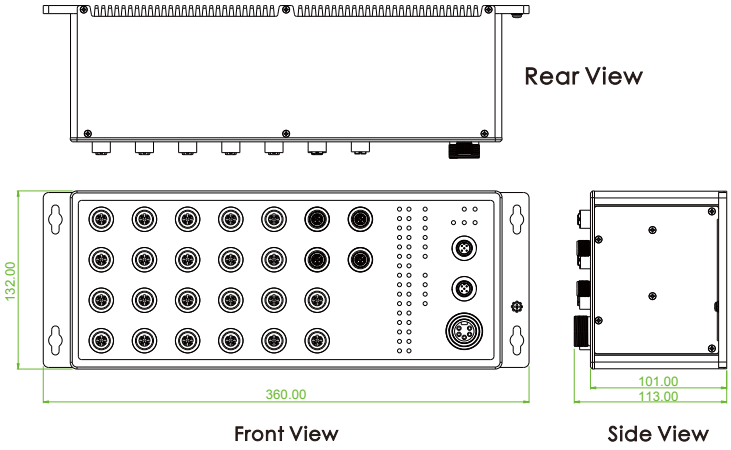


Dimensions

▶ 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 (16.8~137.5VDC)
ITP-1204GTM-E	V	IP54	16	12	4		V
ITP-1204GTM-E-BP	V	IP54	16	12	2	2	V
ITP-2204GTM-E	V	IP54	26	22	4		V
ITP-2204GTM-E-BP	V	IP54	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

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

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)

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

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

ITP-802GSM & ITP-802GTM

◀ IP67, 8x 10/100Base M12 + 2x 100/1000Base SFP

▶ IP67, 8x 10/100Base M12 + 2x GbE M12



- EN50155, EN45545-2, EN50121-4, EN60950-1, EN61000-6-2, EN61000-6-4, CE, FCC certified
- 12/24/48VDC or 110/220VDC redundant dual input power
- Supports TTDP for train application
- Build-in 2 bypass GbE UTP ports
- Cable diagnostics, identifies opens/shorts distance

The ITP series models are managed, industrial grade, L2 Fast Ethernet switches that provide 8x Fast Ethernet UTP plus 2x GbE SFP or 8x Fast Ethernet UTP plus 2x GbE UTP Ports. Housed in rugged wall mountable enclosures, these switches are designed for the harshest environments. All ITP series switches use M12 connectors to ensure water-tight, robust connections and guarantee reliable connections against vibration and shock. These models are also compliant with EN50155, covering power input voltage, surge, EFT, ESD, vibration and shock, making these switches suitable for industrial applications, such as vehicle, rolling stock, or vessel. With an IP67 rating, to protect against dust and water submersion, they are particularly useful in environments with extreme temperature, high humidity, oil, dust and in outdoor environments requiring water-proof applications, such as IP surveillance or city security.

Features

- M12 and M23 connector against vibration and shock, X-code or A-code M12 for Gigabit port optional
- STP, RSTP, MSTP, ITU-T G.8032 Ethernet Protection Ring (ERPS) 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)
- 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)
- 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
- 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
	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
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

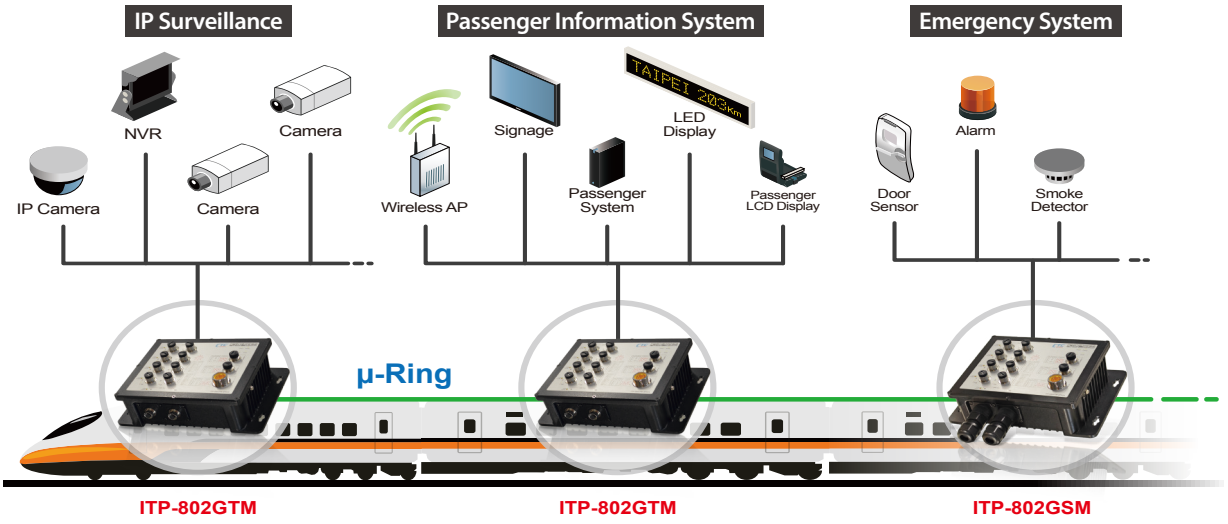
Software Specifications

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
Modbus/TCP	Supports for management and monitoring
EtherNet/IP	Supports for management and monitoring
SW & Configuration Upgrade	TFTP, HTTP Redundant firmware in case of upgrade failure
FTP client	Supports for upload/download configuration
RMON	RMON I (1, 2, 3, 9 group), RMON II
MIB II	RFC 1213
UPnP	Supported
BOOTP	Supported
DHCP	Server, Client, Relay, Relay option 82 , Snooping
RARP	Supported
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	Server/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	Server/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

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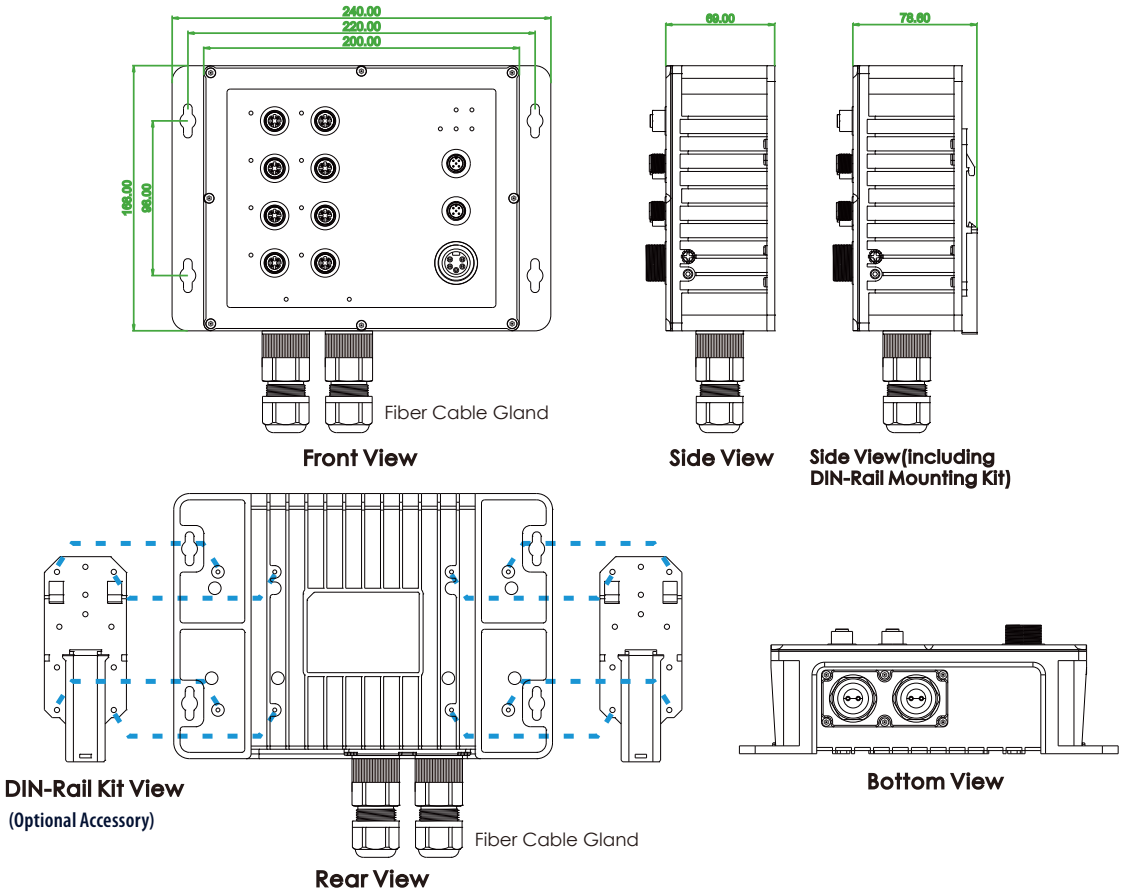
Application

Figure 1 : ITP Series in Onboard Train Application

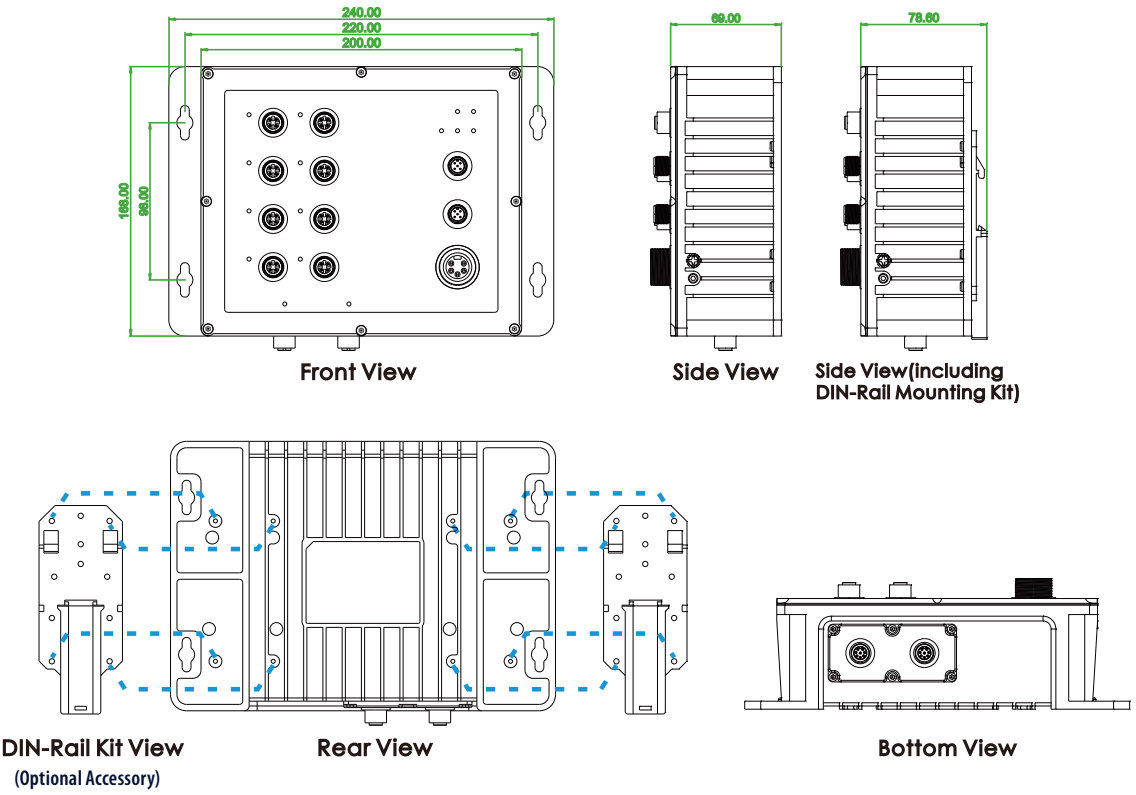


Dimensions

▶ ITP-802GSM



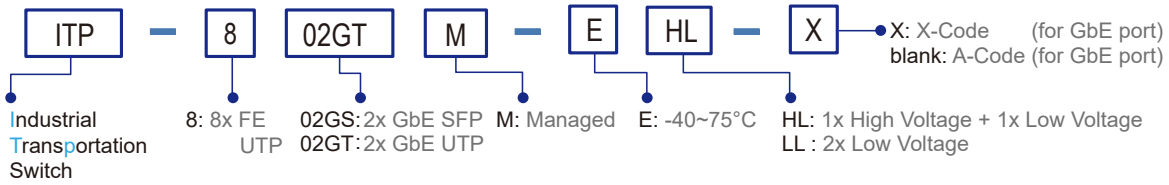
▶ ITP-802GTM



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)

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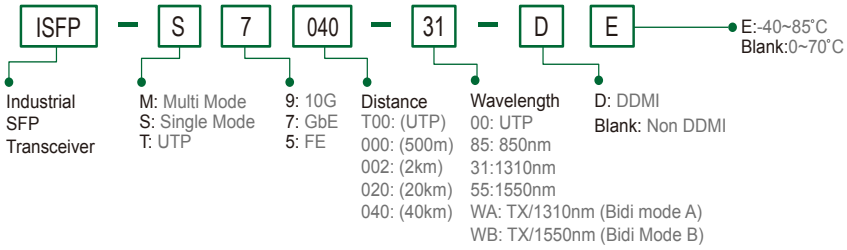
Optional Accessories

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℃ (-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-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



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-800A-8PH24

8x 10/100Base M12 with 8x PoE (120W, 24/48VDC)



- 24/48VDC redundant dual input power
- Regulated PoE output voltage
- M12/M23 connector for UTP and Power
- EN50155, EN50121-4 and EN45545-2 for railway certified

The ITP-800A-8PH24 is an unmanaged, Fast Ethernet, PoE switch, that provides 8 x 10/100Base-TX PoE+ Ethernet ports. This Ethernet switch is designed for industrial applications in harsh environments with Ethernet ports that utilize M12 connectors to ensure water-tight, robust connections and guarantee reliable operation against environmental disturbances such as vibration and shock. The ITP-800A-8PH24 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 factory automation.

Features

- 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 (97~98%) to boost PoE output voltage to 50VDC
- Regulated PoE output voltage (50VDC) to stabilize PoE device, and guarantee delivery PoE power distance to 100 meters (Figure 2)
- Wide operating temperature -40~75°C (ITP-800A-8PHE24)
- CE, FCC, EN51055, EN50121-4 and EN45545-2 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
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 120W (30W/per port) Regulated PoE output voltage at 50VDC (Figure 2)

Power Supply	Provide 1x M23 (5-Pin, male) for redundant dual DC 24/48V (20~57VDC) input power Built-in very high efficiency (97~98%) to boost PoE output voltage to 50VDC Regulate PoE output voltage (50VDC) 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	125W	3.6W	120W	98%
48 VDC	127W	4.3W	120W	97%

Operating Temperature	-10°C~60°C (ITP-800A-8PH24) -40°C~75°C (ITP-800A-8PHE24)
Operating Humidity	5% to 95% (Non-condensing)
Storage Temperature	-40°C~85°C
Housing	Rugged metal, IP40 protection housing, and fanless
Dimensions	64 x 71.5 x 219 mm (D x W x H)
Weight	860g
Installation Mounting	Wall mounting
MTBF	937,878 Hours (MIL-HDBK-217)
Warranty	5 years
Certification	
EMC	CE (EN55024, EN55032)
EMI	FCC, 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

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

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 : EN50155 PoE switch in smart Bus application

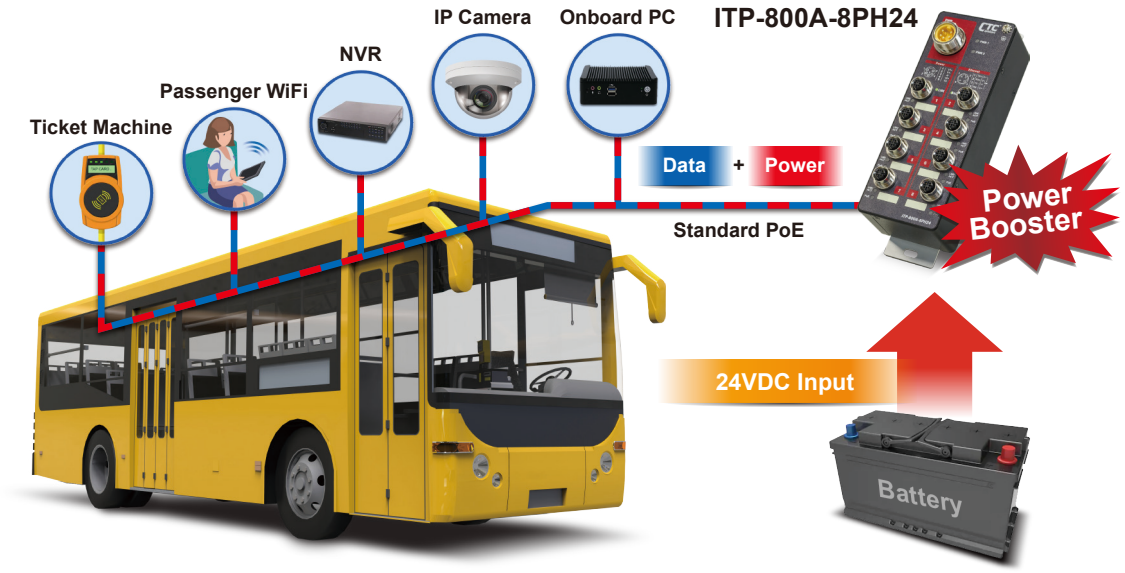
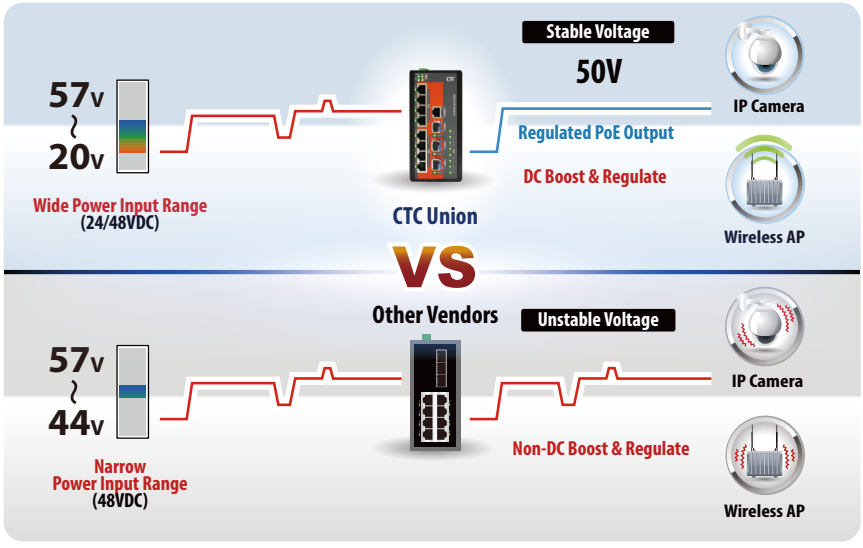
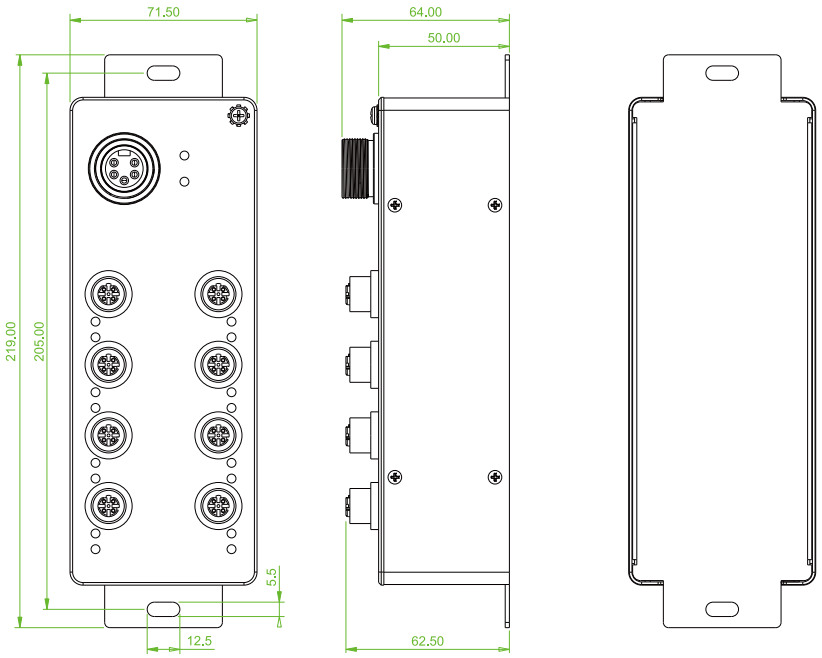


Figure 2 : High efficiency boost technology for PoE



- Regulated PoE output voltage (50VDC) 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 (97~98%) to boost PoE output voltage

Dimensions



Side View　Front View　Rear View

Ordering Information

Model Name	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	EN45545-2	EN50155 EN50121-4	EN61000-6-2 EN61000-6-4	CE FCC	IEC61373	
ITP-800A-8PH24	8	8	8	120W	24/48VDC	V	V	V	V	V	-10~60°C
ITP-800A-8PHE24	8	8	8	120W	24/48VDC	V	V	V	V	V	-40~75°C

Model Naming Rule

ITP – 8 00 A – 8PH E 24

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

Package List

- ITP-800A-8PH(E)24 device
- Protective caps for UTP port
- Wall mount (bound with switch device)

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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Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

ITP-800-8PH24 & ITP-600-4PH24

- IP56, 8x 10/100Base M12 with 8x PoE (120W, 24/48VDC)
- IP56, 6x 10/100Base M12 with 4x PoE (90W, 24/48VDC)





- 24/48VDC redundant dual input power
- Regulated PoE output voltage
- M12/M23 connector for UTP and Power
- EN50155, EN50121-4 for railway certified
- IP56 protection for water and dust

The ITP-800-8PH24 and ITP-600-4PH24 are unmanaged, Fast Ethernet, PoE switches, that provides 8 or 6 x 10/100Base-TX PoE+ Ethernet ports. The Ethernet switches are designed for industrial applications in harsh environments with Ethernet ports that utilize M12 connectors to ensure water-tight, robust connections and guarantee reliable operation against environmental disturbances such as vibration and shock. The ITP-800-8PH24 and ITP-600-4PH24 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 factory automation.

Features

- 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 (97~98%) to boost PoE output voltage to 50VDC
- Regulated PoE output voltage (50VDC) to stabilize PoE device, and guarantee delivery PoE power distance to 100 meters (Figure 2)
- Wide operating temperature -40~75°C (ITP-800-8PHE24, ITP-600-4PHE24)
- 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 (ITP-800-8PH24) 1.2Gbps (ITP-600-4PH24) (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	8x M12 D-code Female (ITP-800-8PH24) 6x M12 D-code Female (ITP-600-4PH24)
	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	PoE power budget 120W (30W/port) (ITP-800-8PH24) PoE power budget 90W (30W/ port) (ITP-600-4PH24) Regulated PoE output voltage at 50VDC (Figure 2)
Power Supply	Provide 1x M23 (5-Pin, male) for redundant dual DC 24/48V (20~57VDC) input power Built-in very high efficiency (97~98%) to boost PoE output voltage to 50VDC Regulate PoE output voltage (50VDC) to stabilize PoE device, and guarantee delivery PoE power distance to 100 meters (Figure 2)
Power Consumption	ITP-800-8PH24

Input Voltage	Total Power Consumption	Device Power Consumption	PoE Budget	Boost Efficiency
24 VDC	125W	3.6W	120W	98%
48 VDC	127W	4.3W	120W	97%

ITP-600-4PH24
TBD

Operating Temperature	-10°C~60°C (ITP-800-8PH24, ITP-600-4PH24) -40°C~75°C (ITP-800-8PHE24, ITP-600-4PHE24)
Operating Humidity	5% to 95% (Non-condensing)
Storage Temperature	-40°C~85°C
Housing	IP56 water-proof grade housing, and fanless
Dimensions	67 x 71.4 x 219.5 mm (D x W x H)
Weight	715g (ITP-800-8PH24) TBD (ITP-600-4PH24)
Installation Mounting	Wall mounting
MTBF	937,878 Hours (ITP-800-8PH24) TBD (ITP-600-4PH24) (MIL-HDBK-217)
Warranty	5 years

Certification	
EMC	CE (EN55024, EN55032)
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 : EN50155 PoE switch in Smart Bus application

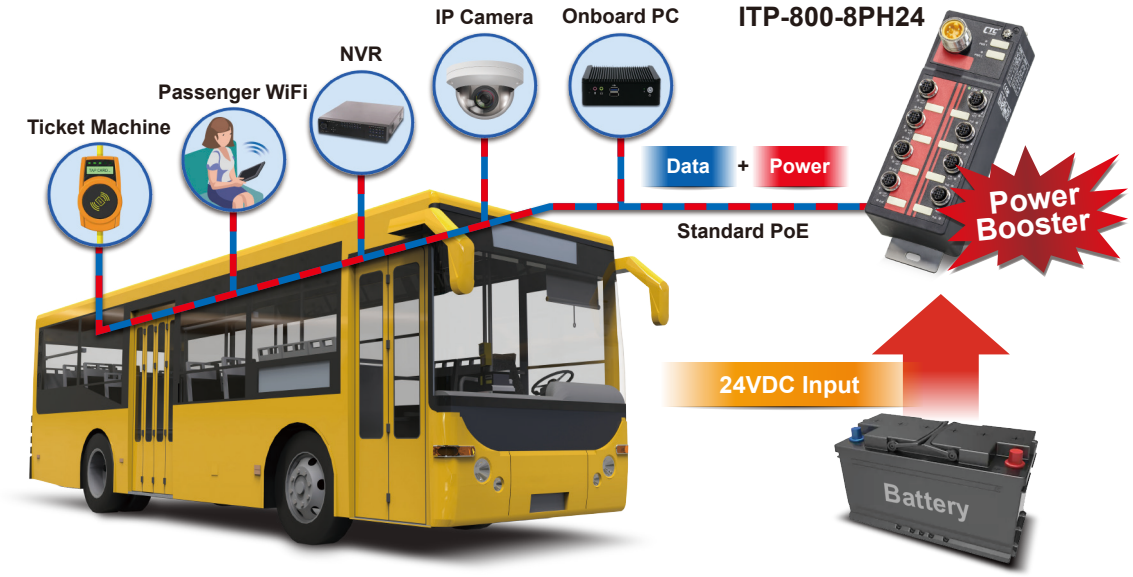
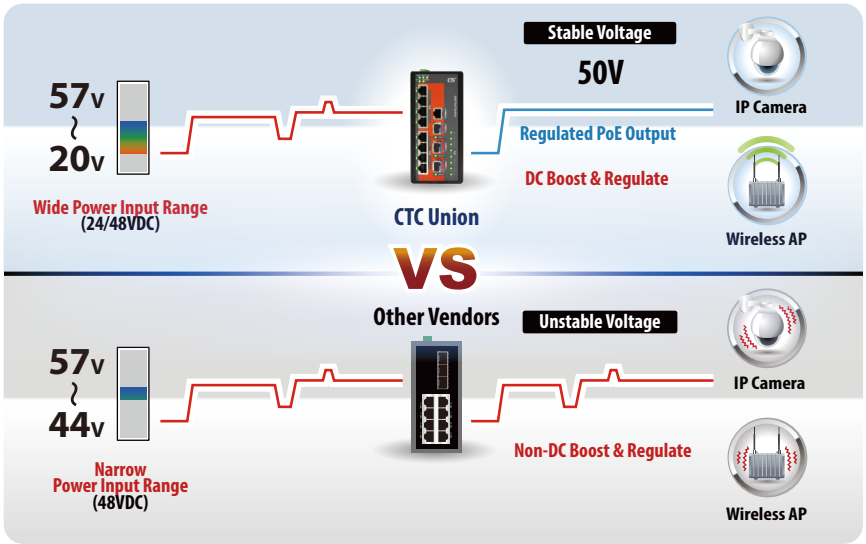


Figure 2 : High efficiency boost technology for PoE

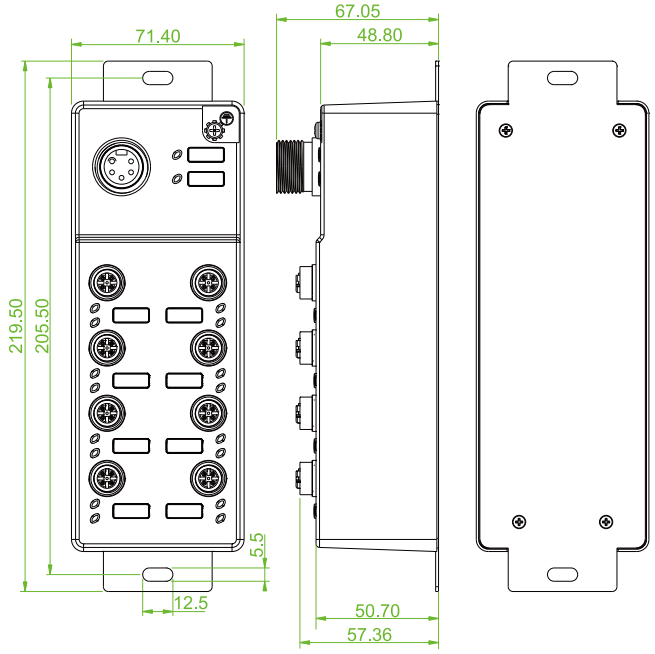


- Regulated PoE output voltage (50VDC) to stabilize PoE device
- Guarantee delivery PoE power distance to 100 meters
- Wide range input power 24/48VDC (20~57VDC)
- Built-in very high efficiency (97~98%) to boost PoE output voltage

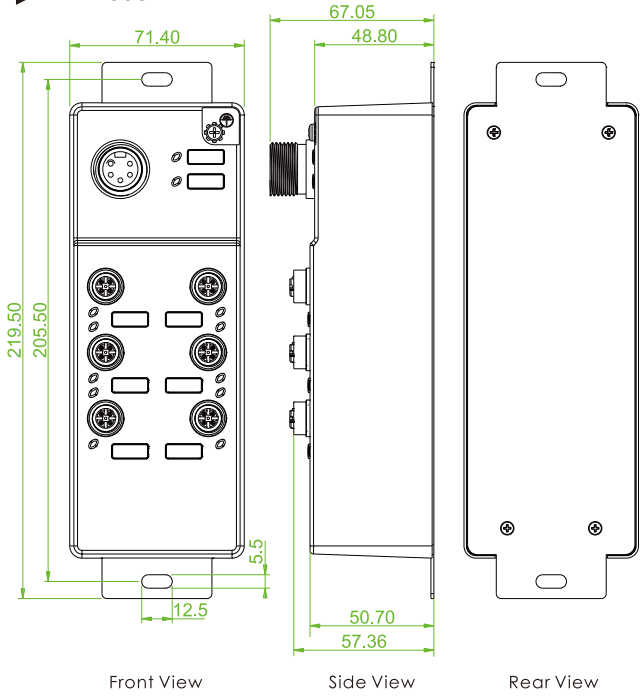
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Dimensions

▶ ITP-800-8PH24



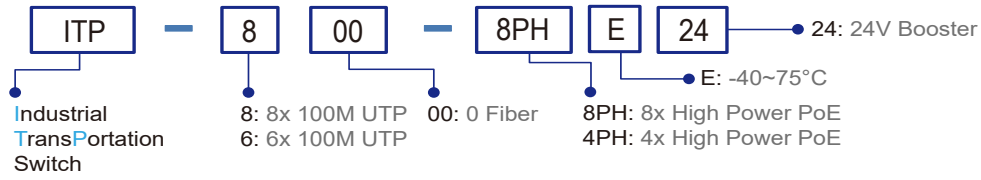
▶ ITP-600-4PH24



Ordering Information

Model Name	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-800-8PH24	8	8	8	120W	24/48VDC	V	V	V	V	V	-10~60°C
ITP-800-8PHE24	8	8	8	120W	24/48VDC	V	V	V	V	V	-40~75°C
ITP-600-4PH24	6	6	4	90W	24/48VDC	V	V	V	V	V	-10~60°C
ITP-600-4PHE24	6	6	4	90W	24/48VDC	V	V	V	V	V	-40~75°C

Model Naming Rule



Package List

- One device
- Protective caps for UTP port
- Wall mount (bound with switch device)

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 100M 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 100M UTP

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

ITP-800A

8x 10/100Base M12



- M12 connector for Ethernet and Power
- EN50155, EN50121-4, EN45545-2 for railway certified
- Rugged metal housing and fanless design
- Build-in 2 bypass port
- 12/24/48VDC redundant dual input power

The ITP-800A is an unmanaged, industrial grade, Fast Ethernet switch, with 8 x 10/100Base-TX Ethernet ports and is designed for industrial applications in harsh environments. The Ethernet ports utilize M12 connectors to ensure water-tight, robust connections and guarantee reliable operation against environmental disturbances such as vibration and shock. This switch is compliant with EN50155, covering operating temperature, power input voltage, surge, ESD, vibration, and shock, thus making it suitable for industrial applications in vehicle, rolling stock and factory automation.

Features

- Use M12 connector anti vibration and shock for vehicle, rolling stock, and railway applications
- Build-in 2 bypass port to avoid one or more nodes power fail in a bus structure to collapse the network
- Redundant dual DC input power 12/24/48VDC (8.4~60VDC)
- Rugged metal, IP40 protection and fanless design
- Wide operating temperature -40~75°C
- CE, FCC, EN50155, EN50121-4 and EN45545-2 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): 1.6Gbps (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
	8x M12 D-code Female
	10/100Base-TX auto negotiation speed
	Auto MDI/MDI-X function
	Full/Half duplex
	Built in 2 bypass port
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)
Reverse Polarity Protection	Present for power input
Overload Current Protection	Supported
Power Supply	Redundant Dual DC 12/24/48V (8.4~60VDC) Input power
Power Connector	5 Pin Male A-Code M12
Power Consumption	

Input Voltage	ITP-800A
12VDC	1.8W
24VDC	2.2W
48VDC	3.4W

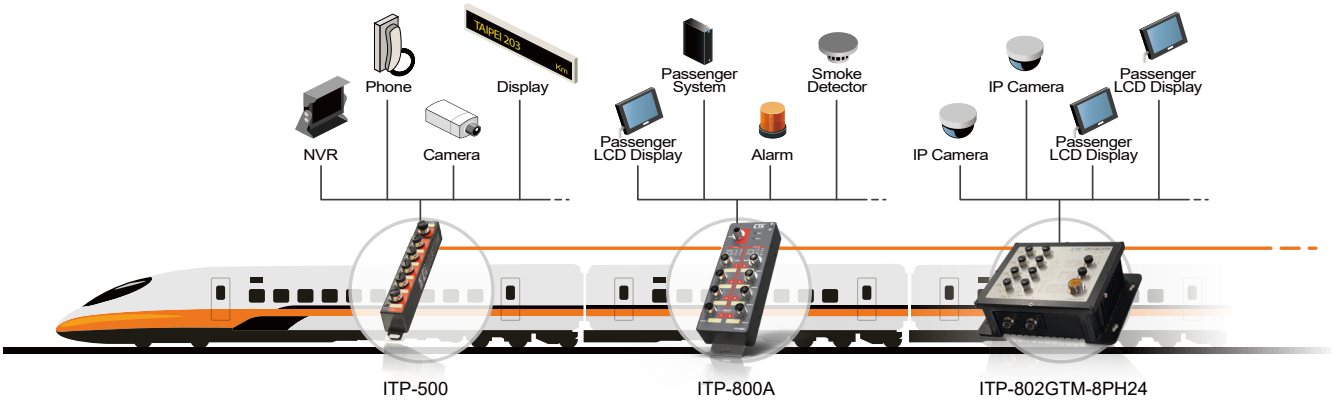
Operating Temperature	-40°C~75°C
Operating Humidity	5% to 95% (Non-condensing)
Storage Temperature	-40°C~85°C
Housing	Rugged metal housing, IP40 protection and fanless
Dimensions	45x 71.5x 219 mm (D x W x H)
Weight	420g
Installation Mounting	Wall mounting
MTBF	1,492,660 Hours (MIL-HDBK-217)
Warranty	5 years
Certification	
EMC	CE (EN55024, EN55032)
EMI	FCC, 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
	EN 61000-4-11 Voltage Dips
Safety	UL60950-1 (Pending)
Shock	IEC 61373
Freefall	IEC 60068-2-32
Vibration	IEC 61373

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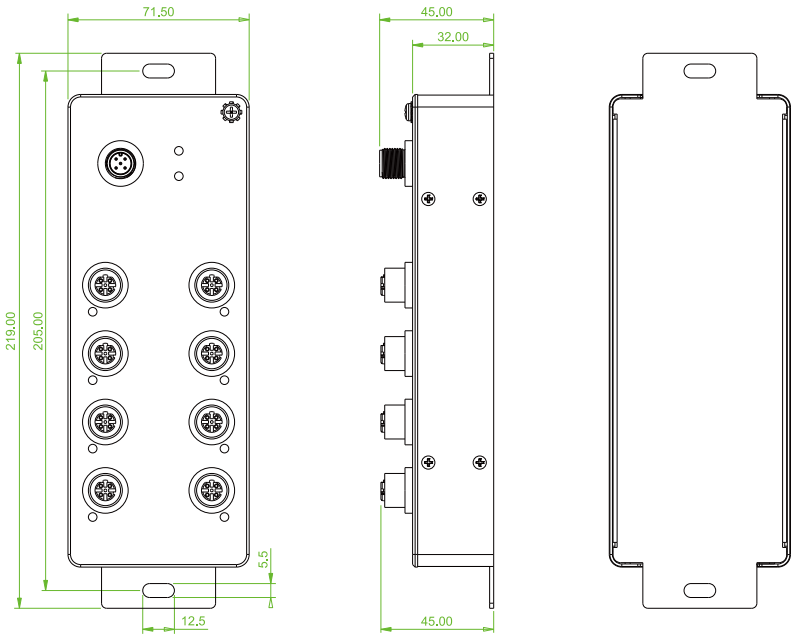
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Application

Figure 1 : ITP Series in Onboard Train Application



Dimensions

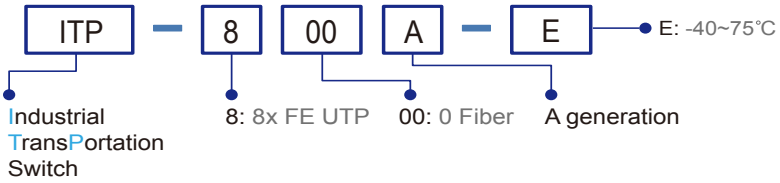


Side View　　Front View　　Rear View

Ordering Information

Model Name	Total Port	UTP Port M12	Redundant Power	Certification				Shock Vibration	Operating Temperature
		10/100 Base-TX	12/24/48VDC (8.4~60VDC)	EN45545-2	EN50155 EN50121-4	EN61000-6-2 EN61000-6-4	CE FCC	IEC61373	
ITP-800A-E	8	8	V	V	V	V	V	V	-40~75°C

Model Naming Rule



Package List

- ITP-800A-E device
- Protective caps for UTP port and power
- Wall mount (bound with switch device)

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

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

ITP-500 & ITP-800

IP56, 5/8x 10/100Base M12



- M12 connector for Ethernet and Power
- Slim and Fanless Design
- Build-in 2 bypass port
- EN50155, EN50121-4 for railway certified

The ITP-500/800 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. The 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 factory automation.

Features

- Use M12 connector anti vibration and shock for vehicle, rolling stock, and railway applications
- Slim design (ITP-500, figure 2)
- 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)
- 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

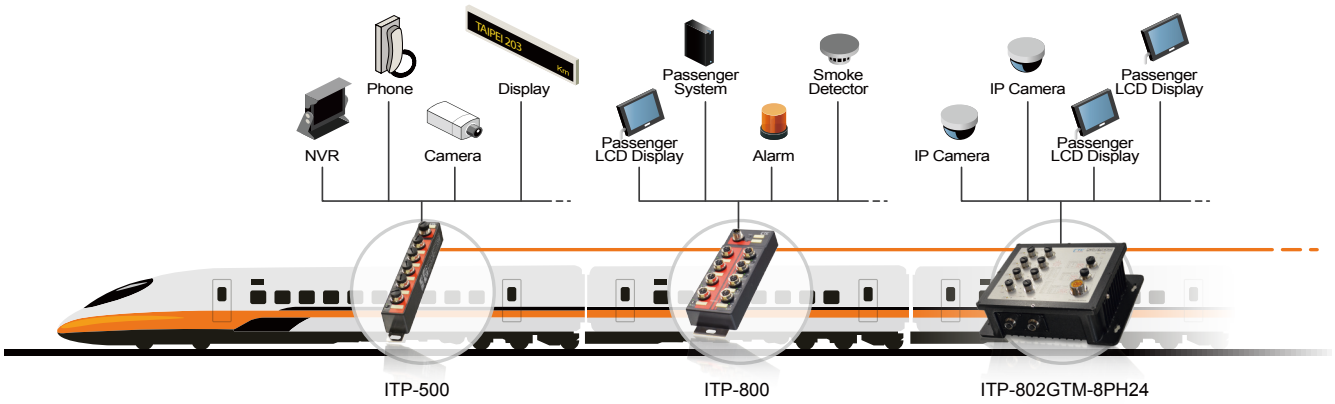
Operating Temperature	-40°C~75°C
Operating Humidity	5% to 95% (Non-condensing)
Storage Temperature	-40°C~85°C
Housing	IP56 Rugged housing, and fanless
Dimensions	43 x 30 x 206.5 mm (D x W x H) (ITP-500) 39 x 65.1 x 191.5 mm (D x W x H) (ITP-800)
Weight	150g (ITP-500) 300g (ITP-800)
Installation Mounting	Wall mounting
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

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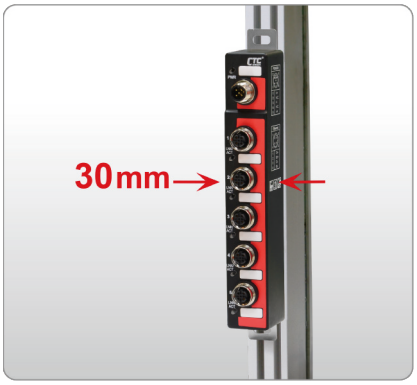
Application

Figure 1 : ITP Series in Onboard Train Application

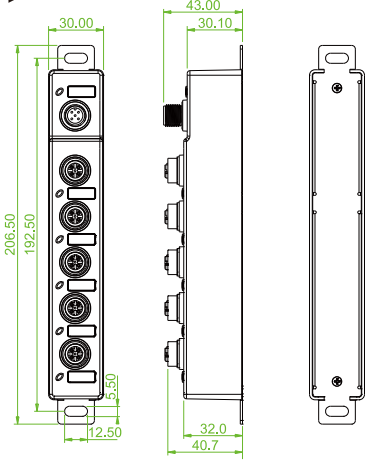


Dimensions

Figure 2 : Slim and Compact Size

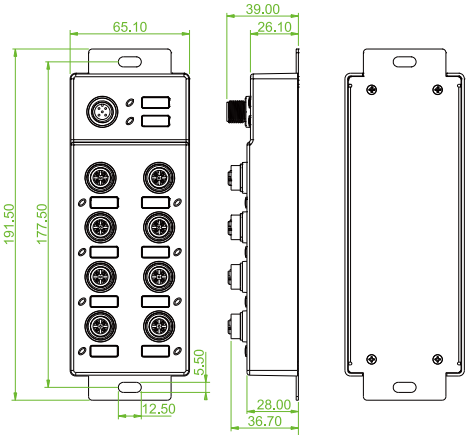


▶ ITP-500



Front View Side View Rear View

▶ ITP-800



Front View Side View Rear View

Ordering Information

Model Name	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	5	5	1	V	V	V	V	V	-40~75°C
ITP-800-E	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 or ITP-800 device
- Protective caps for UTP port and power
- Wall mount (bound with switch device)

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

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PoE Series

Stability and Efficiency in IP Surveillance Networks



Industrial Regulate PoE Managed Switch

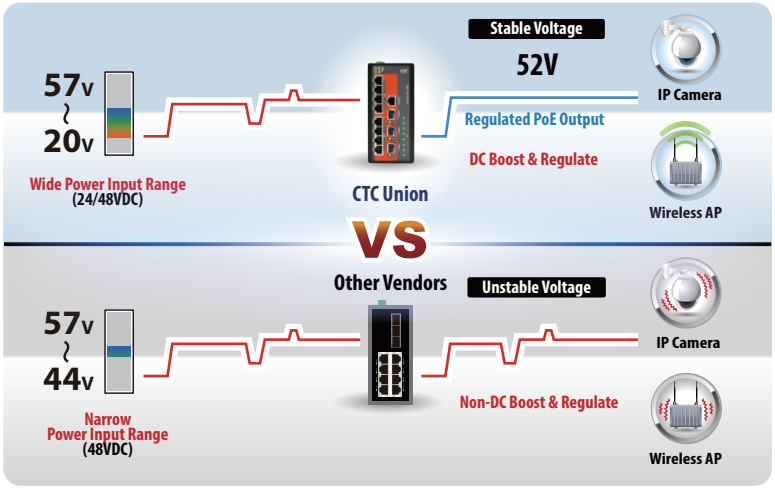
Boost and Regulate PoE Output to stabilize PoE device
Advanced PoE Management–Auto Test & Auto Reset PD, Scheduling
SmartView™ Management System
SmartConfig™ Tool for Quick & Easy Setting
μ–Ring, Sub–Ring, μ–Chain for Flexible Redundancy
5–Ring, 250 nodes expansion
Recovery Time < 10ms



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 (52VDC) 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

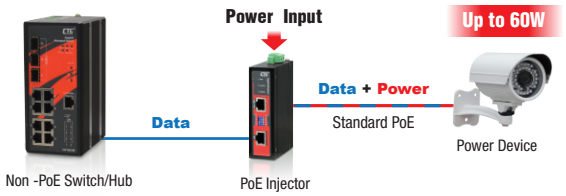
- PoE PD failure auto checking, and auto reset when PD fail.
- The feature helps to reduce operational expenses.



Power Over Ethernet Solutions

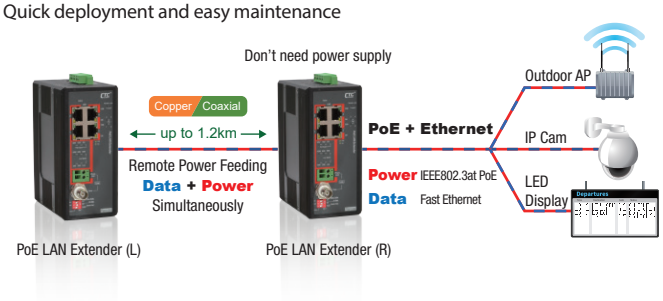
Industrial Gigabit PoE Injector

- 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
- Heavy industrial grade CE, FCC, EN50121-4 ,EN61000-6-2, EN61000-6-4 certified
- Wide operating temperature -40 ~ 75°C model available



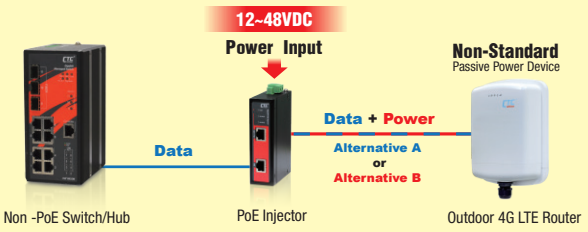
Industrial PoE LAN Extender

- Long transmission data and power feeding distance up to 1200 meter
- Simultaneous transmission of Ethernet data and PoE over 2 wire RJ-11 or coaxial cable
- Supports 4 complies IEEE 802.3at PoE port
- Feeds power to Remote unit from Local power supply
- Easy cabling for quick installation, plug and play
- Quick deployment and easy maintenance



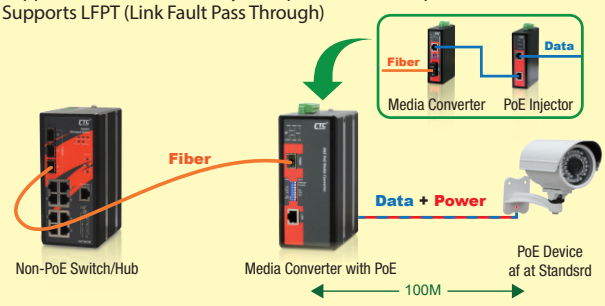
Industrial Gigabit Passive PoE Injector

- Provides 1 port Passive PoE Injector
- Maximum PoE budget 30W (2-pair), 60W (4-pair)
- Supports 10/100/1000Base-T
- Power input range 24~57VDC
- Heavy industrial grade CE, FCC, EN50121-4, EN61000-6-2, EN61000-6-4 certified
- Fanless, IP30 rugged metal housing, operating temperature -40 ~ 75°C



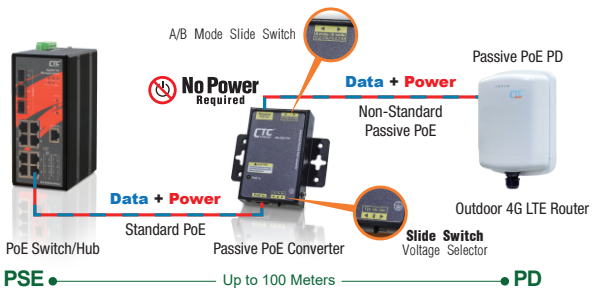
Industrial Media Converter with PoE

- Conversion between 10/100/1000Base-T Copper and 100/1000Base-X Fiber Ethernet port
- Supports dual rate SFP slot for 100Mbps/1Gbps Fiber module
- Provides 1 port IEEE 802.3af/at PoE PSE/Injector (up to 30Watts)
- Dual power input 12/24/48VDC for failover and high efficiency booster for PoE output
- Supports Remote PD reset by fiber port link down/up
- Supports LFPT (Link Fault Pass Through)



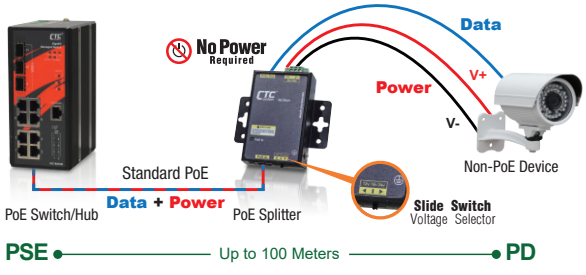
Industrial Passive PoE Converter

- Converts IEEE802.3af/at PoE Input to Passive PoE Output
- Supports standard PoE IEEE802.3af/at PD mode of 15.4W/30W power input
- Selectable passive PoE output voltage on 12/19/24VDC and A mode (1,2,3,6)/B mode (4,5,7,8)
- Compliant with 10/100/1000Base-T(X)
- Heavy industrial grade CE, FCC, EN50121-4 ,EN61000-6-2, EN61000-6-4 certified
- Fanless, IP30 rugged metal housing, operating temperature -40 ~ 75°C



Industrial PoE Splitter

- Splits DC Power and Data from PoE Input
- Output power range 12VDC/1.4A, 19VDC/1.05A, or 24VDC/0.85A
- Selectable output voltage 12/19/24VDC
- Supports PoE IEEE802.3af/at both A mode (1,2,3,6) and B mode (4,5,7,8)
- Compliant with 10/100/1000Base-T(X)
- Fanless, IP30 rugged metal housing, operating temperature -40 ~ 75°C



IGS-1608SM-16PH & IGS-1608SM-8PH & IGS+803SM-8PH

- 16x GbE RJ45 + 8x 100/1000Base SFP with 16x PoE (400W, 48VDC)
- 16x GbE RJ45 + 8x 100/1000Base SFP with 8x PoE (240W, 48VDC)
- 8x GbE RJ45 + 3x 100/1000Base SFP with 8x PoE (240W, 48VDC)

NEW



- Supports IEEE 1588 PTP V2
- Supports u-Ring, ERPS, MSTP, RSTP, STP for redundant cabling
- Auto checking and auto reset when PoE PD fail
- EN50121-4, UL60950-1, EN60950-1, EN62368-1, NEMA-TS2, EN61000-6-2, EN61000-6-4, CE, FCC certified
- 4KV surge protection for PoE, RJ45 and SFP ports

These models are managed, industrial grade, L2 Gigabit PoE (Power over Ethernet) switches that provide 4/8/16x 10/100/1000Base-T ports plus 8/3 100/1000Base-X SFP ports with 16/8x PoE Ports. The PoE features enable power and data to be transferred via a single cable, thereby considerably reducing cabling and electrical wiring expenses. Housed in rugged DIN rail or wall mountable IP-30 enclosures, these switches are perfect choices for harsh environments, such as industrial networks, intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications. 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) to fulfill the special needs of industrial automation applications.

Features

- 48VDC (44~57VDC) redundant dual input power
- Provides 16 port IEEE 802.3af / 802.3at PoE+ output ,30W per port, total 400W (IGS-1608SM-16PH)
- Provides 8 port IEEE 802.3af / 802.3at PoE+ output ,30W per port , total 240W (IGS-1608SM-8PH, IGS+803SM-8PH)
- Cable diagnostics, identifies opens/shorts distance
- 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
- 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-16PH, IGS-1608SM-8PH) 22Gbps (IGS+803SM-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	16x 10/100/1000Base-T RJ-45 + 8x 100/1000Base-X SFP connector (IGS-1608SM-16PH, IGS-1608SM-8PH) 8x 10/100/1000Base-T RJ-45 + 3x 100/1000Base-X SFP connector (IGS+803SM-8PH) RJ-45 UTP port supports Auto negotiation speed, Auto MDI/MDI-X function, SFP port supports 100/1000 dual speed with DDMI
Console	RS-232 (RJ-45)
PoE standard & RJ-45 Pin Assignment	16x IEEE 802.3af /IEEE 802.3at (IGS-1608SM-16PH) 8x IEEE 802.3af /IEEE 802.3at (IGS-1608SM-8PH, IGS+803SM-8PH) 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.
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 48V (44~57VDC) input power, (Removable terminal block) (50~57V input is recommended for IEEE802.3at PoE+ applications)
Power Consumption	IGS-1608SM-16PH TBD

IGS-1608SM-8PH Power consumption

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

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

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

PoE Power Budget	Maximum PoE Output power budget 30W / Per Port Total 240W (IGS-1608SM-8PH, IGS+803SM-8PH) Total 400W (IGS-1608SM-16PH)
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
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-16PH, IGS-1608SM-8PH, IGS+803SM-8PH) -40 ~ 75°C (IGS-1608SM-16PHE, IGS-1608SM-8PHE, IGS+803SM-8PHE)
Operating Humidity	5% to 95% (Non-condensing)
Storage Temperature	-40 ~ 85°C
Housing	Rugged Metal, IP30 Protection, Fanless
Dimensions	135.6x 99x 160mm (Dx Wx H) (IGS-1608SM-16PH) 116 x 92 x 160mm (Dx Wx H) (IGS-1608SM-8PH) 106 x 72 x 152 mm (D x W x H) (IGS+803SM-8PH)
Weight	1.95kg (IGS-1608SM-16PH) 1.375kg (IGS-1608SM-8PH) 0.85kg (IGS+803SM-8PH)
Installation Mounting	DIN Rail mounting, or wall mounting (Optional)
MTBF	436,353 Hours (IGS-1608SM-16PH) 439,881 Hours (IGS-1608SM-8PH) 487,189 Hours (IGS+803SM-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
Traffic control	NEMA TS2 (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
	EN61000-4-6 (CS) Level 3, Criteria A
EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
Safety	EN62368-1 (IGS-1608SM-16PH) UL60950-1, EN60950-1 (IGS-1608SM-8PH, IGS+803SM-8PH)
Surge protection	4KV for PoE, UTP and Fiber ports
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

Software Specifications

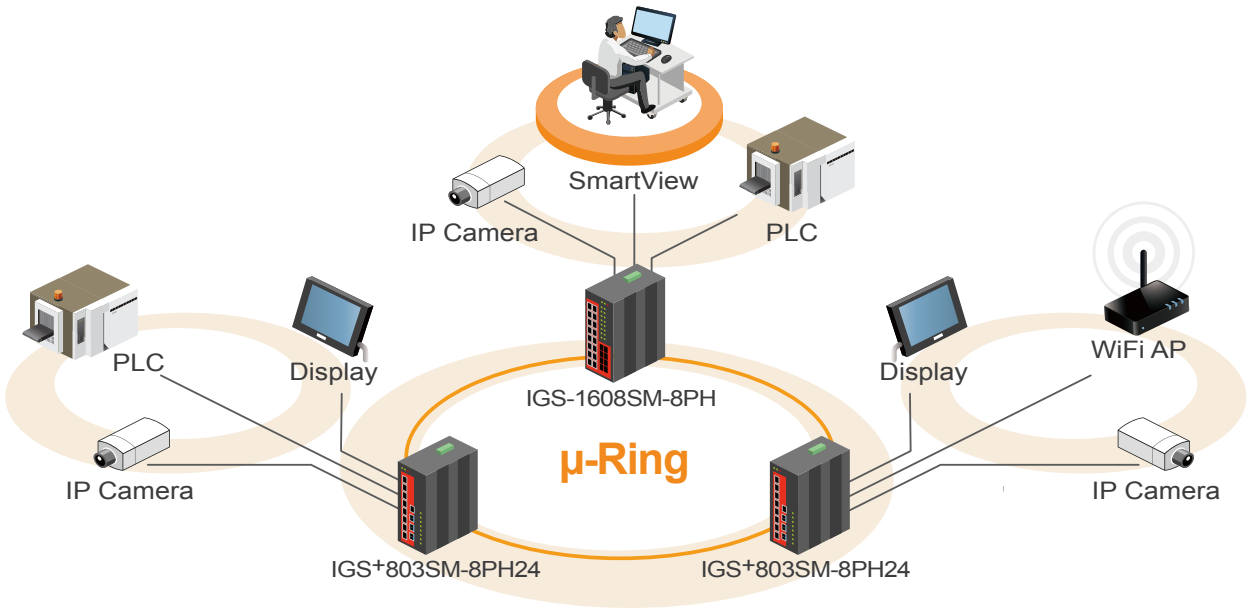
Topology	
VLAN	IEEE 802.1q VLAN,up to 4094 802.1Q VLAN VID
	IEEE 802.1q VLAN,up to 4094 Groups
	IEEE 802.1ad Q-in-Q
	MAC-based VLAN,up to 256 entries
	IP Subnet-based VLAN, up to 128 entries
	Protocol-based VLAN(Ethernt, SNAP, LLC), up to 128 entries
	VLAN Translation, up to 256 entries
	GVRP (GARP VLAN 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
EtherNet/IP	Supports for management and monitoring
Modbus/TCP	Supports for management and monitoring
SW & Configuration Upgrade	TFTP, HTTP
	Redundant firmware in case of upgrade failure
FTP client	Supports for upload/download configuration
RMON	RMON I (1, 2, 3, 9 group), RMON II
MIB	RFC1213 MIB II, Private MIB
UPnP	Supported
BOOTP	Supported
DHCP	Server, Client, Relay, Relay option 82 , Snooping
RARP	Supported
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	Server/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	Server/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 400W for IGS-1608SM-16PH, 240W for IGS-1608SM-8PH and IGS+803SM-8PH

Application

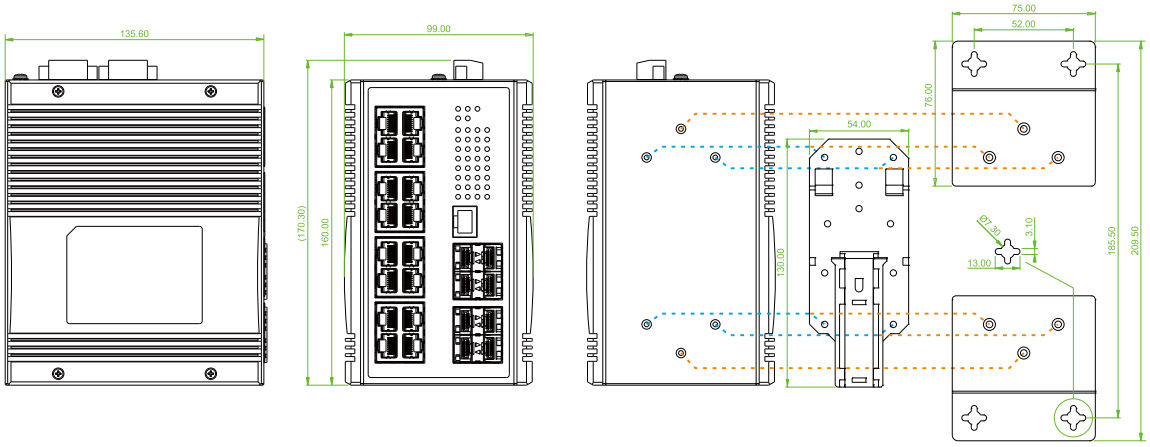
Figure 1 : Application Example



Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

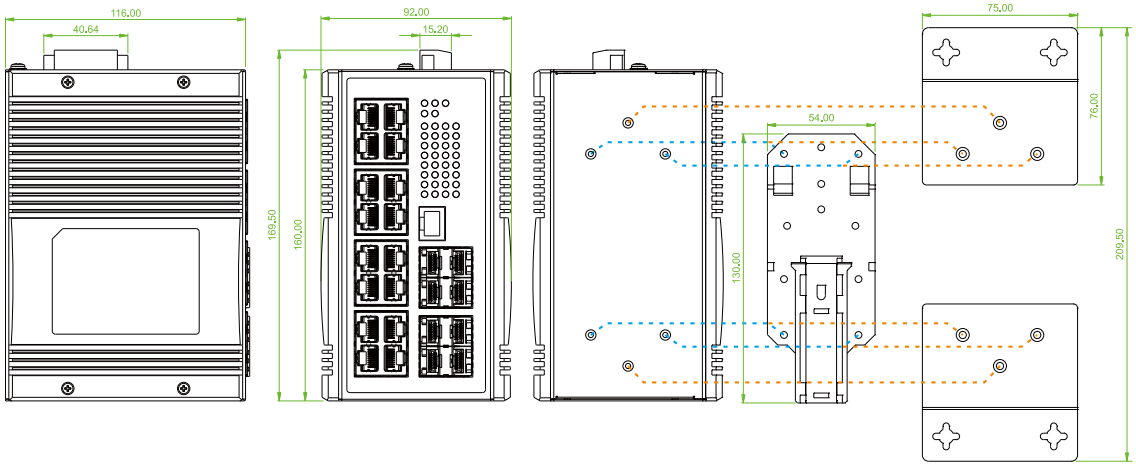
Dimensions

▶ IGS-1608SM-16PH



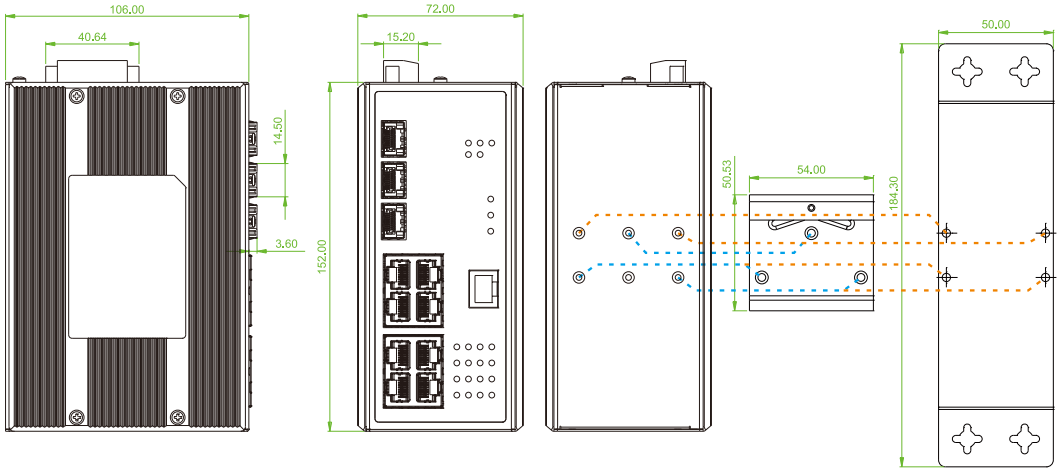
Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

▶ IGS-1608SM-8PH



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

▶ IGS+803SM-8PH

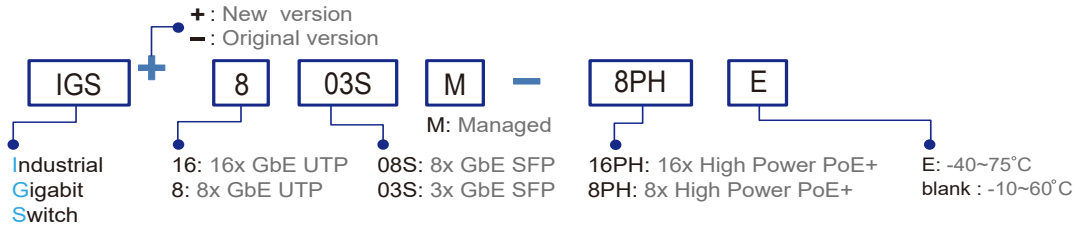


Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

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	Power Budget	Redundanta	Railway EN50121-4	NEMA TS2	Safety EN62368-1	Safety EN60950-1 UL60950-1	CE, FCC EN61000-6-2 EN61000-6-4	
IGS-1608SM-16PH	24	16	8 SFP	16	400W	48VDC	V		V		V	-10~60℃
IGS-1608SM-16PHE	24	16	8 SFP	16	400W	48VDC	V		V		V	-40~75℃
IGS-1608SM-8PH	24	16	8 SFP	8	240W	48VDC	V			V	V	-10~60℃
IGS-1608SM-8PHE	24	16	8 SFP	8	240W	48VDC	V			V	V	-40~75℃
IGS+803SM-8PH	11	8	3 SFP	8	240W	48VDC	V	V		V	V	-10~60℃
IGS+803SM-8PHE	11	8	3 SFP	8	240W	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)
- Din Rail with screws
- Terminal block
- Protective caps for SFP ports

Wall mount kit

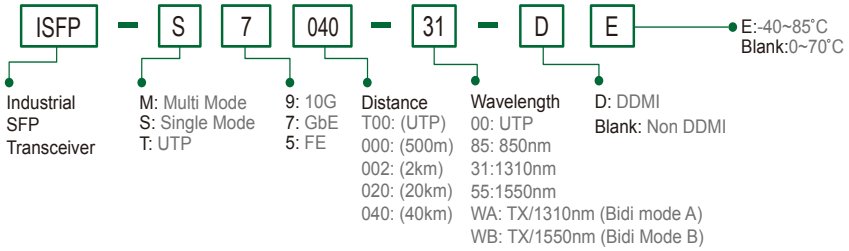
IND-WMK02	Wall Mount kit for Industrial product (Wide) (184 x 50mm) (For IGS+803SM-8PH)
IND-WMK04	Wall Mount kit for Industrial product (Wide) (2 pcs in 1 set, 76mm x 75mm x 2pcs) (IGS-1608SM-16PH, IGS-1608SM-8PH)

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℃ (-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



2020 V1.0
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Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

IGS+803SM-8PH24

8x GbE RJ45 + 3x 100/1000Base SFP with 8x PoE (180W, 24/48VDC)



- Supports IEEE 1588 PTP V2
- Supports u-Ring , ERPS, MSTP, RSTP,STP for redundant cabling
- Auto checking and auto reset when PoE PD fail
- EN50121-4, UL60950-1, EN60950-1, NEMA-TS2, EN61000-6-2, EN61000-6-4, CE, FCC certified
- 4KV surge protection for PoE, RJ45 and SFP ports

IGS+803SM-8PH24 is a managed, industrial grade, L2 Gigabit PoE (Power over Ethernet) switch that provides 8x 10/100/1000Base-T ports plus 3x 100/1000Base-X SFP ports with 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. Housed in rugged DIN rail or wall mountable IP-30 enclosures, these switches are perfect choices for harsh environments, such as industrial networks, intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications. The switch can also operate either at standard operating temperature range (-10 to 60°C) or at wide operating temperature range (-40 to 75°C) to fulfill the special needs of industrial automation applications.

Features

- 24/48VDC (20~57VDC) redundant dual input power with built-in very high efficiency booster (94~97%) to rise up 52VDC for PoE output (Figure 2)
- Regulated PoE output voltage (52VDC) to stabilize PoE device, and guarantee delivery PoE power distance to 100meter (Figure 2)
- Provides 8 port IEEE 802.3af / 802.3at PoE+ output ,30W per port , total 180W
- Cable diagnostics, identifies opens/shorts distance
- 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
- 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): 22Gbps 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 + 3x 100/1000Base-X SFP connector RJ-45 UTP port supports Auto negotiation speed, Auto MDI/MDI-X function, SFP port supports 100/1000 dual speed with DDMI
Console	RS-232 (RJ-45)
PoE standard & RJ-45 Pin Assignment	8x IEEE 802.3af /IEEE 802.3at 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.
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 52VDC for PoE output Regulated PoE output voltage (52VDC) to stabilize PoE device, and guarantee delivery PoE power distance to 100meter (Figure 2)

Power Consumption	

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%

PoE Power Budget	Maximum PoE Output power budget 30W / Per Port Total 180W
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+803SM-8PH24) -40 ~ 75°C (IGS+803SM-8PHE24)
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	0.86kg (IGS+803SM-8PH24)
Installation Mounting	DIN Rail mounting, or wall mounting (Optional)
MTBF	528,753 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
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
EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
Safety	UL60950-1, EN60950-1
Surge protection	4KV 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
EtherNet/IP	Supports for management and monitoring
Modbus/TCP	Supports for management and monitoring
SW & Configuration Upgrade	TFTP, HTTP
	Redundant firmware in case of upgrade failure
FTP client	Supports for upload/download configuration
RMON	RMON I (1, 2, 3, 9 group), RMON II
MIB	RFC1213 MIB II, Private MIB
UPnP	Supported

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

BOOTP	Supported
DHCP	Server, Client, Relay, Relay option 82 , Snooping
RARP	Supported
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	Server/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	Server/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 180W

Application

Figure 1 : Application Example

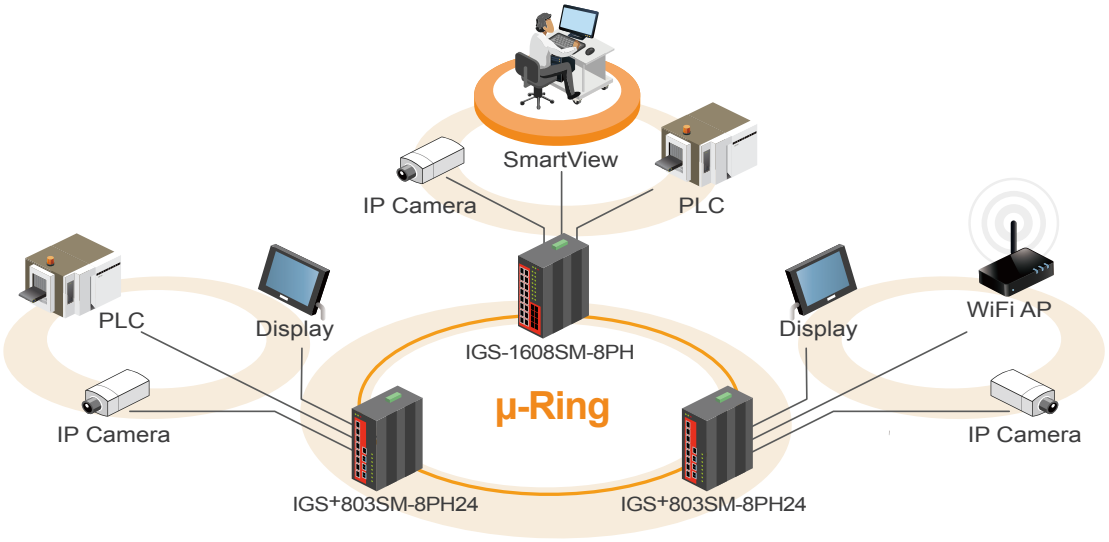
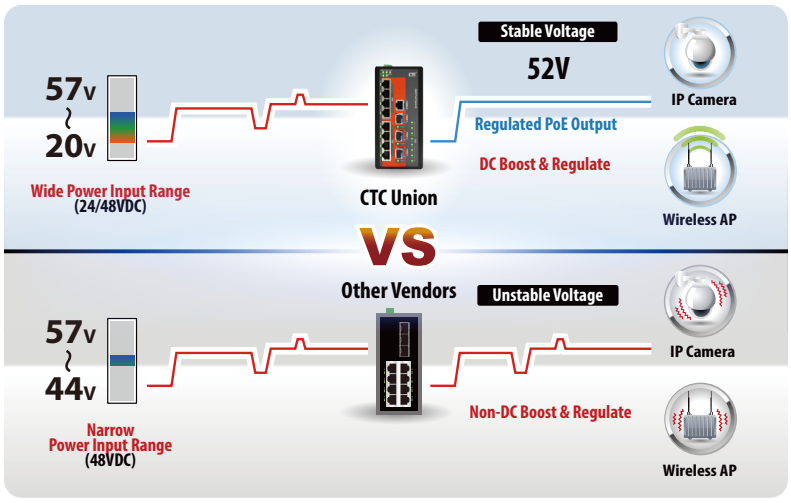
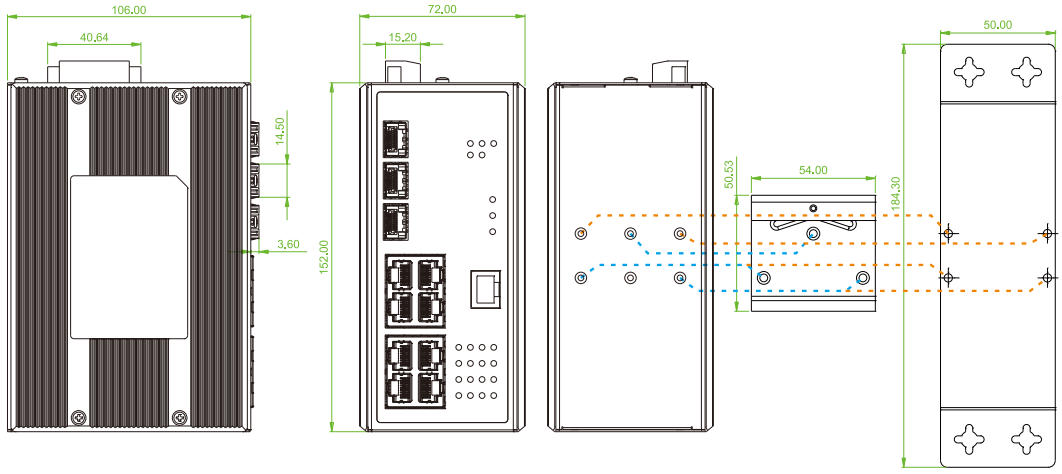


Figure 2 : High Efficiency Boost Technology for PoE



- Regulated PoE output voltage (52VDC) 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

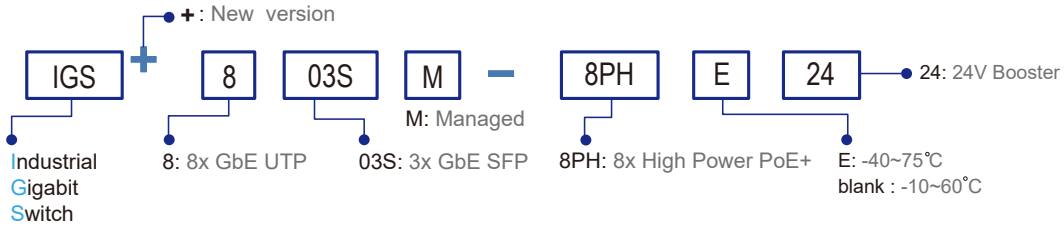


Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

Ordering Information

Model Name	Total Port	UTP	Fiber	PoE Port		Input power	Certification					Operating Temperature
		10/100/1000 Base-T	100/1000 Base-X	IEEE802.3at	Power Budget	Redundant	Railway EN50121-4	NEMA TS2	Safety EN60950-1	Safety UL60950-1	CE, FCC EN61000-6-2 EN61000-6-4	
IGS+803SM-8PH24	11	8	3 SFP	8	180W	24/48VDC	V	V	V	V	V	-10~60℃
IGS+803SM-8PHE24	11	8	3 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)
- Din Rail with screws
- Terminal block
- Protective caps for SFP ports

Wall mount kit

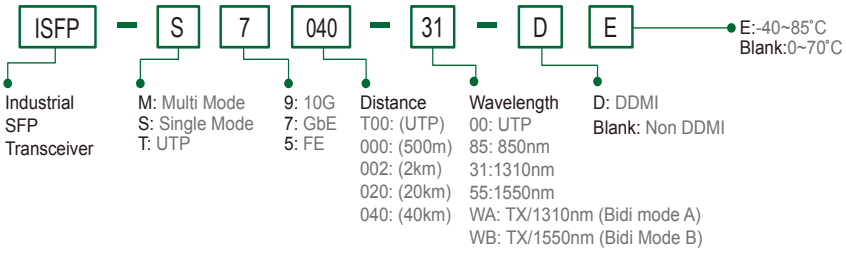
IND-WMK02	Wall Mount kit for Industrial product (Wide) (184 x 50mm)

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. (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



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Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

IGS-402SM-4PU

4x GbE RJ45 + 2x 100/1000Base-X SFP with 4x 60W PoE (240W, 48VDC)



- Supports IEEE 1588 PTP V2
- Supports u-Ring, ERPS, MSTP, RSTP, STP for redundant cabling
- Auto checking and auto reset when PoE PD fail
- EN50121-4, UL60950-1, EN60950-1, EN61000-6-2, EN61000-6-4, CE, FCC certified
- 4KV surge protection for PoE, RJ45 and SFP ports

IGS-402SM-4PU is a managed, industrial grade, L2 Gigabit PoE (Power over Ethernet) switch that provides 4x 10/100/1000Base-T ports plus 2x 100/1000Base-X SFP ports with 4x PoE Ports. The PoE features enable power and data to be transferred via a single cable, thereby considerably reducing cabling and electrical wiring expenses. Housed in rugged DIN rail or wall mountable IP-30 enclosures, these switches are perfect choices for harsh environments, such as industrial networks, intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications. The switch can also operate either at standard operating temperature range (-10 to 60°C) or at wide operating temperature range (-40 to 75°C) to fulfill the special needs of industrial automation applications.

Features

- 48VDC (44~57VDC) redundant dual input power
- Provides 4 port IEEE 802.3af / 802.3at PoE+ output, 60W per port, total 240W
- Cable diagnostics, identifies opens/shorts distance
- 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
- 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): 12Gbps 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 100/1000Base-X SFP connector RJ-45 UTP port supports Auto negotiation speed, Auto MDI/MDI-X function, SFP port supports 100/1000 dual speed with DDMI
Console	RS-232 (RJ-45)
PoE standard & RJ-45 Pin Assignment	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	Redundant Dual DC 48V (44~57VDC) input power, (Removable terminal block) (50~57V input is recommended for IEEE802.3at PoE+ in 30W/ 60W applications)

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 **60W / Per Port** Total 240W

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-402SM-4PU) -40 ~ 75°C (IGS-402SM-4PUE)
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)
Weight	0.7kg

Installation Mounting	DIN Rail mounting, or wall mounting (Optional)
MTBF	589,078 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
EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
Safety	UL60950-1, EN60950-1
Surge protection	4KV 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
EtherNet/IP	Supports for management and monitoring
Modbus/TCP	Supports for management and monitoring
SW & Configuration Upgrade	TFTP, HTTP
	Redundant firmware in case of upgrade failure
FTP client	Supports for upload/download configuration
RMON	RMON I (1, 2, 3, 9 group), RMON II
MIB	RFC1213 MIB II, Private MIB
UPnP	Supported
BOOTP	Supported
DHCP	Server, Client, Relay, Relay option 82 , Snooping
RARP	Supported
IP Source Guard	Supported
Port Mirroring	Supported

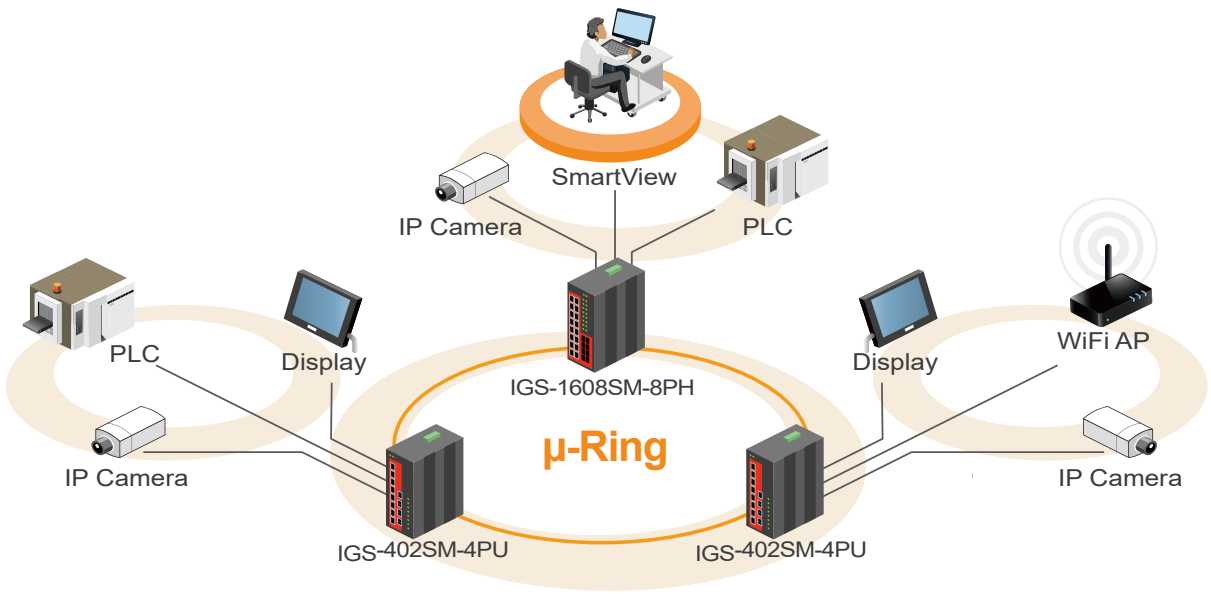
Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

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	Server/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	Server/Client
IPv6 TFTP	Supported
IPv6 QoS	Supported

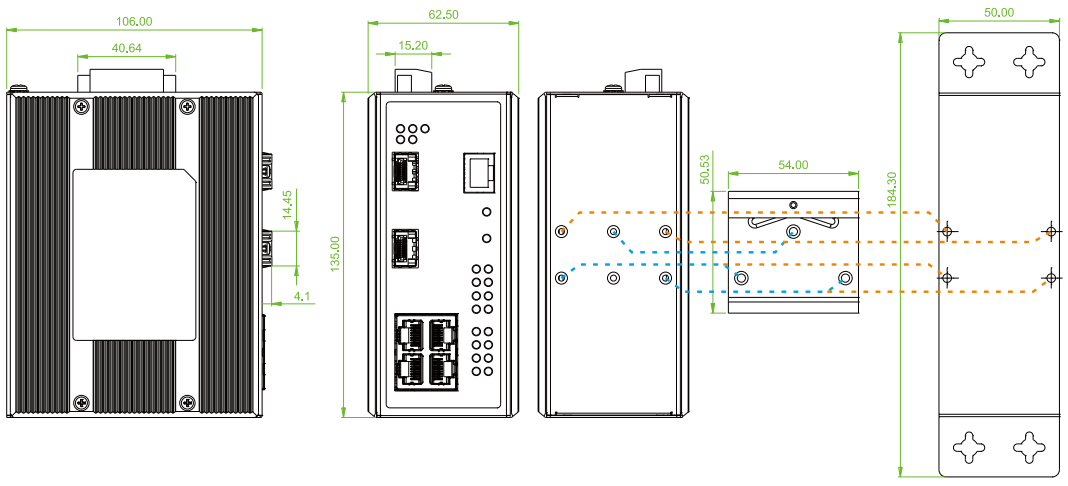
IPv6 ACL	Number of rules: up to 256 entries for L2 / L3 / L4 L2 : Mac address SA/DA/VLAN L3: IP address SA/DA, Subnet L4: TCP/UDP
Others Features	
Green Ethernet	Supports IEEE 802.3az EEE (Energy Efficient Ethernet) Management to optimize the power consumption Determine the cable length and lowering 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

Application

Figure 1 : Application Example



Dimensions



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	IEEE 802.3at 4 pairs PoE/60W	Power Budget	Redundant	Railway EN50121-4	Safety EN60950-1	Safety UL60950-1	CE, FCC EN61000-6-2 EN61000-6-4	
IGS-402SM-4PU	6	4	2 SFP	4	240W	48VDC	V	V	V	V	-10~60℃
IGS-402SM-4PUE	6	4	2 SFP	4	240W	48VDC	V	V	V	V	-40~75℃

Model Naming Rule

IGS - 4 - 02S - M - 4PU - E

- IGS: Industrial Gigabit Switch
- 4: 4x GbE UTP
- 02S: 2x GbE SFP
- M: Managed
- 4PU: 4x Ultra Power 60W PoE+
- E: -40~75 C
- blank : -10~60 C

Optional Accessories

Package List

- One device of the series
- Console cable (RJ-45 to DB9)
- 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. (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: DDMI, Blank: Non DDMI
- E: E:-40~85°C, Blank:0~70°C

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IGS-803SM-8PH24 & IGS-402SM-4PH24

◀ 8x GbE RJ45 + 1x 100/1000 SFP + 2x 100M/1G/2.5G SFP with 8x PoE (180W, 24/48VDC)

▶ 4x GbE RJ45 + 1x 100/1000 SFP + 1x 100M/1G/2.5G SFP with 4x PoE (120W, 24/48VDC)



- Supports IEEE 1588 PTP V2
- Supports u-Ring, ERPS, MSTP, RSTP, STP for redundant cabling
- EN50121-4, UL60950-1, EN60950-1, NEMA-TS2, EN61000-6-2, EN61000-6-4, CE, FCC certified
- 24/48VDC (20~57VDC) redundant dual input power with built-in very high efficiency booster
- Auto checking and auto reset when PoE PD fail

These Gigabit Ethernet switch models are managed industrial grade L2 switches with 8/4 10/100/1000Base-T ports and 3/2 GbE/100M SFP ports which also supports PoE+/PSE and provide stable and reliable transmission. Housed in rugged DIN rail or wall mountable enclosures, these switches are designed for harsh environments, such as industrial networking. They are an ideal solution for Smart City, surveillance, Intelligent traffic control systems, production automation applications and support up to 8/4 PoE/PoE+ (IEEE 802.3af/IEEE 802.3at) ports which can 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. (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

- Regulated PoE output voltage (52VDC) 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)
- Cable diagnostics, identifies opens/shorts distance
- 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
- 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
- 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)
	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): 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 52VDC for PoE output Regulated PoE output voltage (52VDC) to stabilize PoE device, and guarantee delivery PoE power distance to 100meter (Figure 2)

Power Consumption	IGS-402SM-4PH24

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

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	Supports for management and monitoring
SNMP	V1, V2c, V3
EtherNet/IP	Supports for management and monitoring
ModBus/TCP	Supports management and monitoring
SW & Configuration Upgrade	TFTP, HTTP
	Redundant firmware in case of upgrade failure
FTP client	Supports for upload/download configuration

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RMON	RMON I (1, 2, 3, 9 group), RMON II
MIB	RFC1213 MIB II, Private MIB
UPnP	Supported
BOOTP	Supported
DHCP	Server, Client, Relay, Relay option 82 , Snooping
RARP	Supported
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	Supports 5 operating mode in each port : Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave
NTP, SNTP	Server/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	Server/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

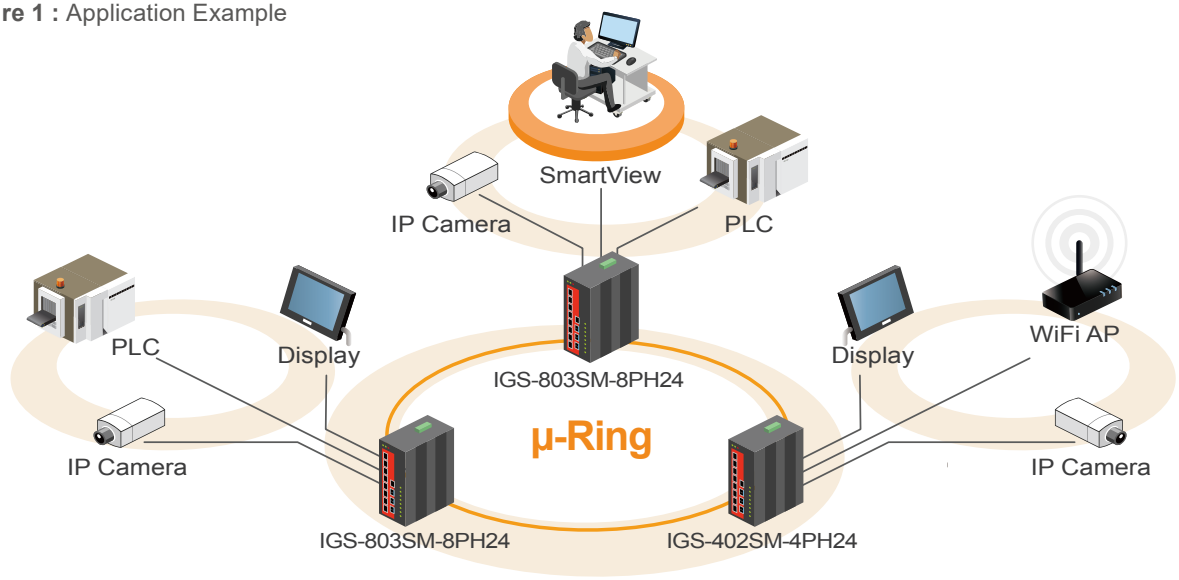
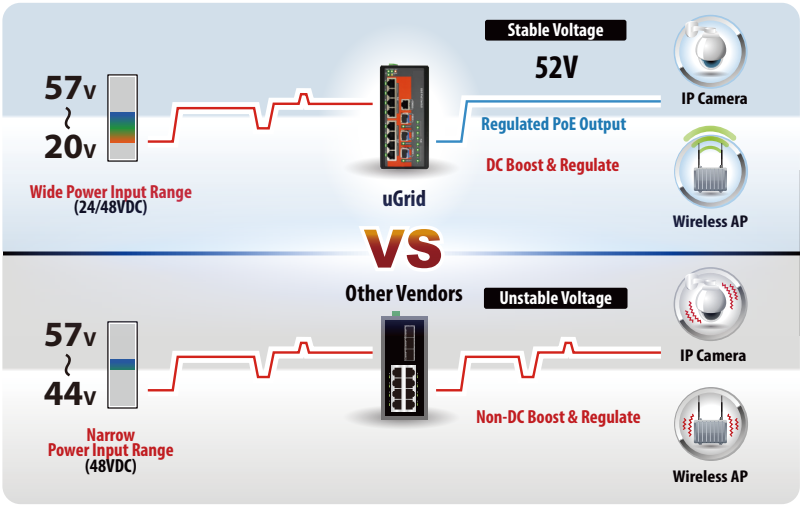


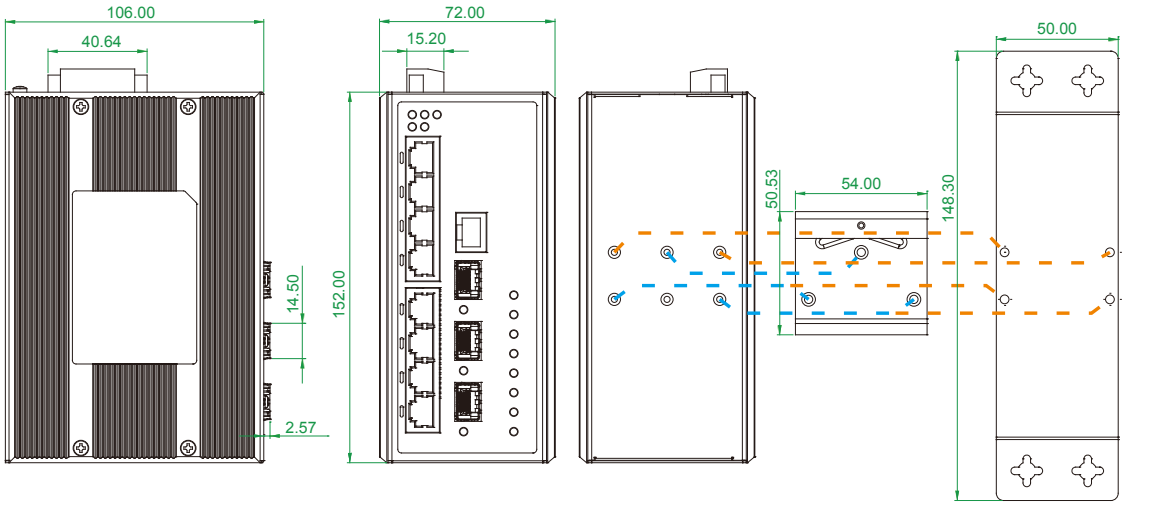
Figure 2 : High Efficiency Boost Technology for PoE



- Regulated PoE output voltage (52VDC) 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

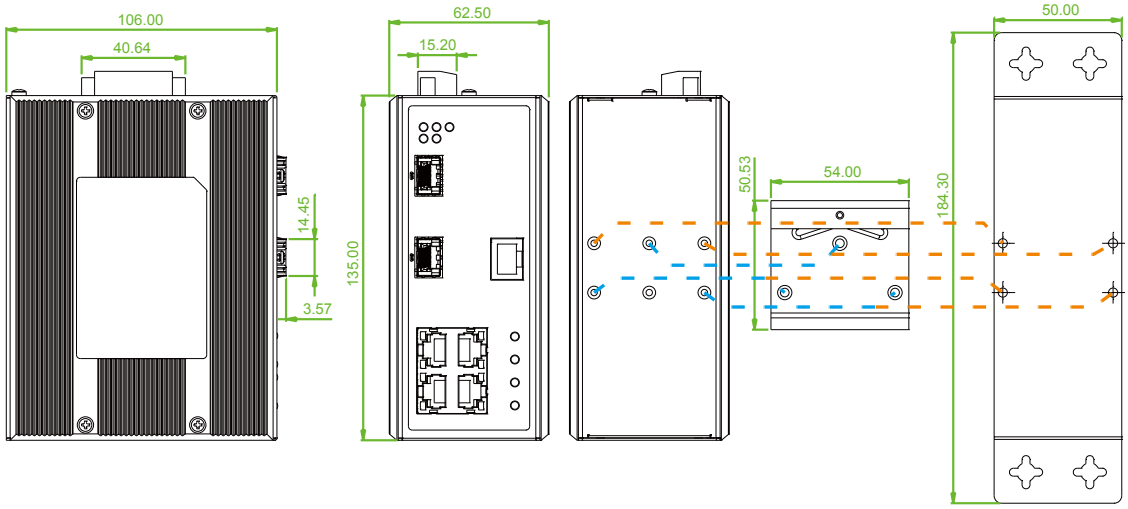
Dimensions

▶ IGS-803SM-8PH24



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

▶ IGS-402SM-4PH24



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-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℃
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℃

Model Naming Rule

IGS - 8 | 03S | M - 8PH | E | 24

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

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Optional Accessories

Package List

- One device of the series
- Console cable (RJ-45 to DB9)
- Din Rail with screws
- Terminal block
- Protective caps for SFP ports

Wall mount kit

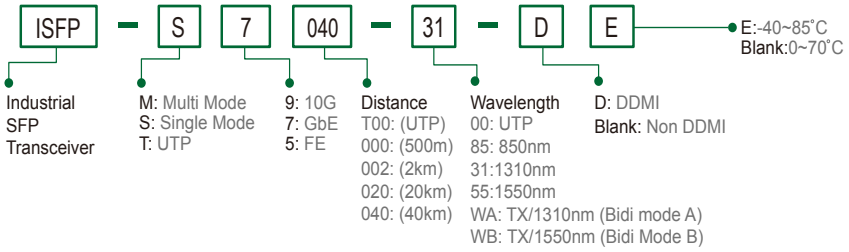
IND-WMK02	Wall Mount kit for Industrial product (Wide) (184 x 50mm)

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°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-1608GSM-16PH & IFS-1608GSM-8PH

◀ 16x 10/100Base RJ45 + 8x 100/1000Base SFP with 16x PoE (400W, 48VDC)

▶ 16x 10/100Base RJ45 + 8x 100/1000Base SFP with 8x PoE (240W, 48VDC)

NEW



- Supports IEEE 1588 PTP V2
- Supports u-Ring, ERPS, MSTP, RSTP, STP for redundant cabling
- Auto checking and auto reset when PoE PD fail
- EN50121-4, UL60950-1, EN60950-1, EN62368-1, EN61000-6-2, EN61000-6-4, CE, FCC certified
- 4KV surge protection for PoE, RJ45 and SFP ports

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

These models are managed, industrial grade, L2 PoE (Power over Ethernet) switches that provide16x 10/100Base-TX ports plus 8x 100/1000Base-X SFP ports with 16/8x PoE Ports. The PoE features enable power and data to be transferred via a single cable, hereby considerably reducing cabling and electrical wiring expenses. Housed in rugged DIN rail or wall mountable IP-30 enclosures, these switches are perfect choices for harsh environments, such as industrial networks, intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications. 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) to fulfill the special needs of industrial automation applications.

Features

- 48VDC (44~57VDC) redundant dual input power
- Provides 16-port IEEE 802.3af / 802.3at PoE+ output ,30W per port, total 400W (IFS-1608GSM-16PH)
- Provides 8-port IEEE 802.3af / 802.3at PoE+ output ,30W per port , total 240W (IFS-1608GSM-8PH)
- Cable diagnostics, identifies opens/shorts distance
- 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
- 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
- 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 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 RJ-45 UTP port supports Auto negotiation speed, Auto MDI/MDI-X function, SFP port supports 100/1000M dual speed with DDMI
Console	RS-232 (RJ-45)
PoE standard & RJ-45 Pin Assignment	IFS-1608GSM-16PH : 16x IEEE 802.3af /IEEE 802.3at PoE+ IFS-1608GSM-8PH : 8x IEEE 802.3af /IEEE 802.3at 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.
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 48V (44~57VDC) input power, (Removable terminal block) (50~57V input is recommended for IEEE 802.3at PoE+

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Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

Power Consumption	IFS-1608GSM-16PH TBD IFS-1608GSM-8PH

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

PoE Power Budget	Maximum PoE Output power budget 30W / Per Port 400W for total (IFS-1608GSM-16PH) Maximum PoE Output power budget 30W / Per Port 240W for total (IFS-1608GSM-8PH)
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 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 (IFS-1608GSM-16PH & IFS-1608GSM-8PH) -40 ~ 75°C (IFS-1608GSM-16PHE & IFS-1608GSM-8PHE)
Operating Humidity	5% to 95% (Non-condensing)
Storage Temperature	-40 ~ 85°C
Housing	Rugged Metal, IP30 Protection, Fanless

Dimensions	135.6x 99x 160mm (Dx Wx H) (IFS-1608GSM-16PH) 116 x 92 x 160mm (Dx Wx H) (IFS-1608GSM-8PH)
Weight	1.95kg (IFS-1608GSM-16PH) 1.375kg (IFS-1608GSM-8PH)
Installation Mounting	DIN Rail mounting, or wall mounting (Optional)
MTBF	436,353 Hours (IFS-1608GSM-16PH) 439,881 Hours (IFS-1608GSM-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
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	EN62368-1 (IFS-1608GSM-16PH) UL60950-1, EN60950-1 (IFS-1608GSM-8PH)
Surge protection	4KV for PoE, UTP and Fiber ports
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

Software Specifications

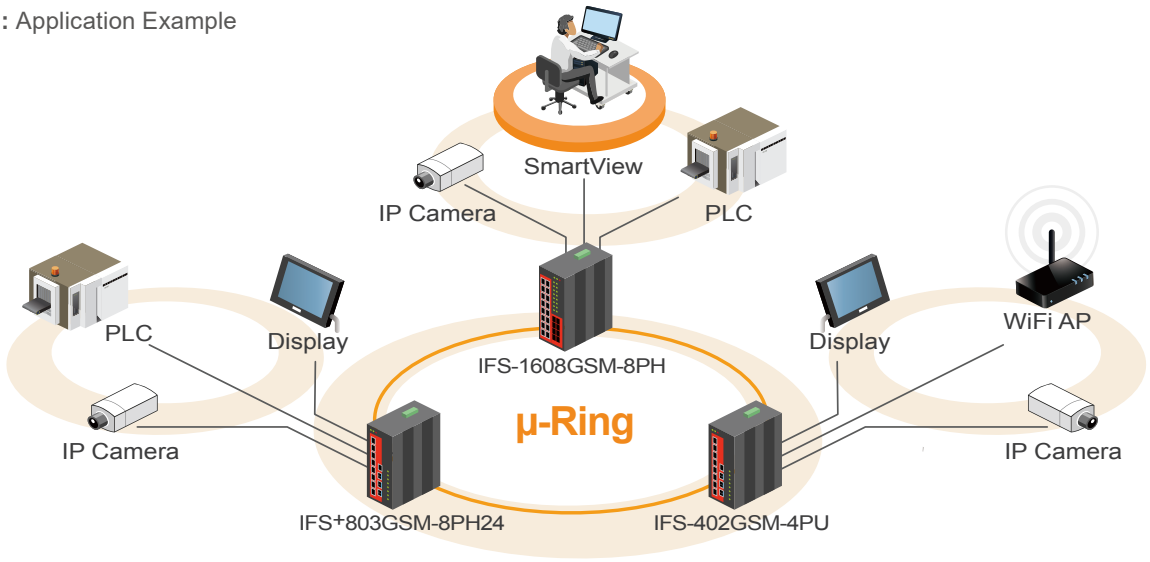
Topology	
VLAN	IEEE 802.1q VLAN,up to 4094 802.1Q VLAN VID
	IEEE 802.1q VLAN,up to 4094 Groups
	IEEE 802.1ad Q-in-Q
	MAC-based VLAN,up to 256 entries
	IP Subnet-based VLAN, up to 128 entries
	Protocol-based VLAN(Ethernt, SNAP, LLC), up to 128 entries
	VLAN Translation, up to 256 entries
	GVRP (GARP VLAN 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
EtherNet/IP	Support for management and monitoring

Modbus/TCP	Supports for management and monitoring
SW & Configuration Upgrade	TFTP, HTTP Redundant firmware in case of upgrade failure
FTP client	Supports for upload/download configuration
RMON	RMON I (1, 2, 3, 9 group), RMON II
MIB	RFC1213 MIB II, Private MIB
UPnP	Supported
BOOTP	Supported
DHCP	Server, Client, Relay, Relay option 82 , Snooping
RARP	Supported
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	Supports 5 operating mode in each port : Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave
NTP, SNTP	Server/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	Server/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 400W for IFS-1608GSM-16PH, 240W for IFS-1608GSM-8PH

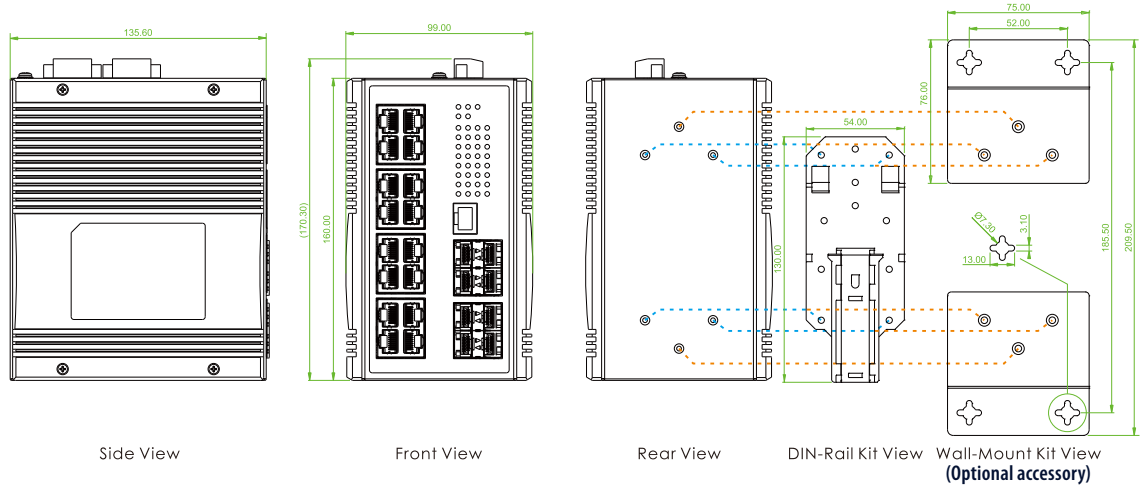
Application

Figure : Application Example



Dimensions

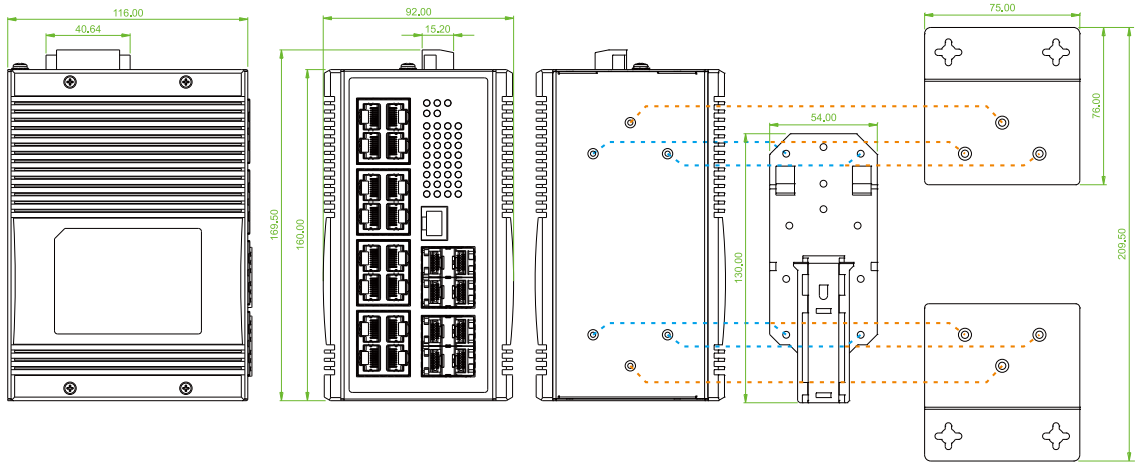
▶ IFS-1608GSM-16PH



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

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▶ IFS-1608GSM-8PH



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	Safety EN62368-1	Safety UL60950-1 EN60950-1	EN61000-6-2 EN61000-6-4	CE, FCC	
IFS-1608GSM-16PH	24	16	8 SFP	16	400W	48VDC	V	V	V	V	V	-10~60℃
IFS-1608GSM-16PHE	24	16	8 SFP	16	400W	48VDC	V	V	V	V	V	-40~75℃
IFS-1608GSM-8PH	24	16	8 SFP	8	240W	48VDC	V		V	V	V	-10~60℃
IFS-1608GSM-8PHE	24	16	8 SFP	8	240W	48VDC	V		V	V	V	-40~75℃

Model Naming Rule

IFS – 16 – 08GS – M – 8PH – E

- IFS: Industrial Fast Ethernet Switch
- 16: 16x FE UTP
- 08GS: 8x GbE SFP
- M: Managed
- 16PH: 16x High Power PoE+
- 8PH: 8x High Power PoE+
- E: -40~75℃
- blank : -10~60 C

Package List

- One device of the series
- Console cable (RJ-45 to DB9)
- Din Rail with screws
- Terminal block
- Protective caps for SFP ports

Optional Accessories

Wall mount kit

IND-WMK04	Wall Mount kit for Industrial product (Wide) (2 pcs in 1 set, 76mm x 75mmx 2pcs)

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: DDMI; Blank: Non DDMI
- E: -40~85℃; Blank: 0~70℃

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

IFS+803GSM-8PH24

8x 10/100Base RJ45 + 3x 100/1000Base SFP with 8x PoE (180W, 24/48VDC)



- Supports IEEE 1588 PTP V2
- Supports u-Ring, ERPS, MSTP, RSTP, STP for redundant cabling
- Auto checking and auto reset when PoE PD fail
- EN50121-4, UL60950-1, EN60950-1, NEMA-TS2, EN61000-6-2, EN61000-6-4, CE, FCC certified
- 4KV surge protection for PoE, RJ45 and SFP ports

IFS+803GSM-8PH24 is a managed, industrial grade, L2 PoE (Power over Ethernet) switch that provide 8x 10/100Base-TX ports plus 3x 100/1000Base-X SFP ports with 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. Housed in rugged DIN rail or wall mountable IP-30 enclosures, these switches are perfect choices for harsh environments, such as industrial networks, intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications. The switch can also operate either at standard operating temperature range (-10 to 60°C) or at wide operating temperature range (-40 to 75°C) to fulfill the special needs of industrial automation applications.

Features

- 24/48VDC (20~57VDC) redundant dual input power with built-in very high efficiency booster (94~97%) to rise up 52VDC for PoE output (Figure 2)
- Regulated PoE output voltage (52VDC) to stabilize PoE device, and guarantee delivery PoE power distance to 100meter (Figure 2)
- Provides 8 port IEEE 802.3af / 802.3at PoE+ output, 30W per port, total 180W
- Cable diagnostics, identifies opens/shorts distance
- 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
- 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
- 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): 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 + 3x 100/1000Base-X SFP connector RJ-45 UTP port supports Auto negotiation speed, Auto MDI/MDI-X function, SFP port supports 100/1000M dual speed with DDMI
Console	RS-232 (RJ-45)
PoE standard & RJ-45 Pin Assignment	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.
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 52VDC for PoE output Regulated PoE output voltage (52VDC) to stabilize PoE device, and guarantee delivery PoE power distance to 100meter (Figure 2)

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

Power Consumption	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%
PoE Power Budget	Maximum PoE Output power budget 30W / Per Port 180W for total
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+803GSM-8PH24) -40 ~ 75°C (IFS+803GSM-8PHE24)
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	0.86kg
Installation Mounting	DIN Rail mounting, or wall mounting (Optional)
MTBF	528,753 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
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
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
Surge protection	4KV 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
EtherNet/IP	Supports for management and monitoring
Modbus/TCP	Supports for management and monitoring
SW & Configuration Upgrade	TFTP, HTTP
	Redundant firmware in case of upgrade failure
FTP client	Supports for upload/download configuration
RMON	RMON I (1, 2, 3, 9 group), RMON II
MIB	RFC1213 MIB II, Private MIB
UPnP	Supported

BOOTP	Supported
DHCP	Server, Client, Relay, Relay option 82 , Snooping
RARP	Supported
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	Server/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	Server/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 180W

Application

Figure 1 : Application Example

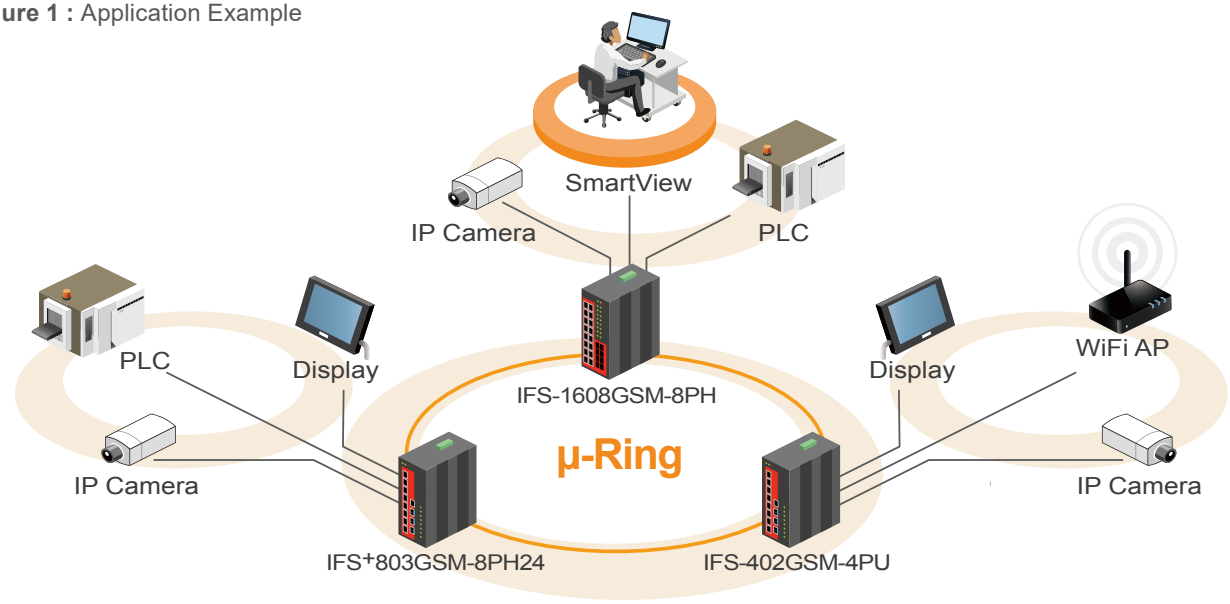
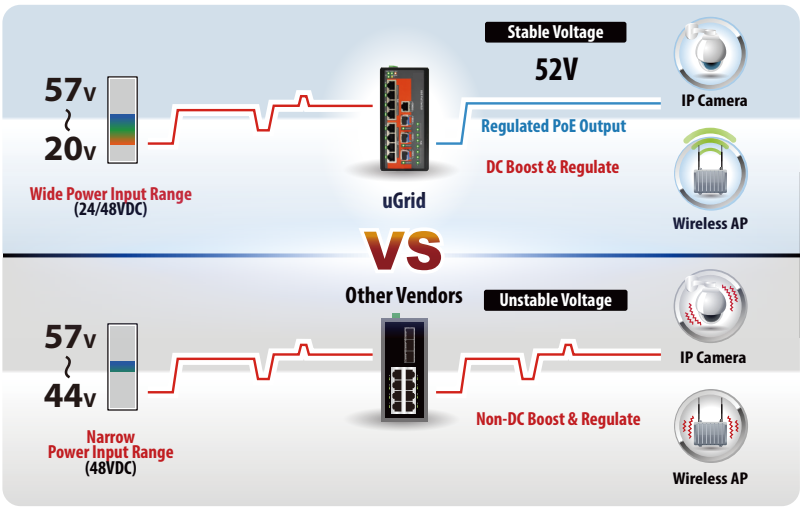


Figure 2 : High Efficiency Boost Technology for PoE

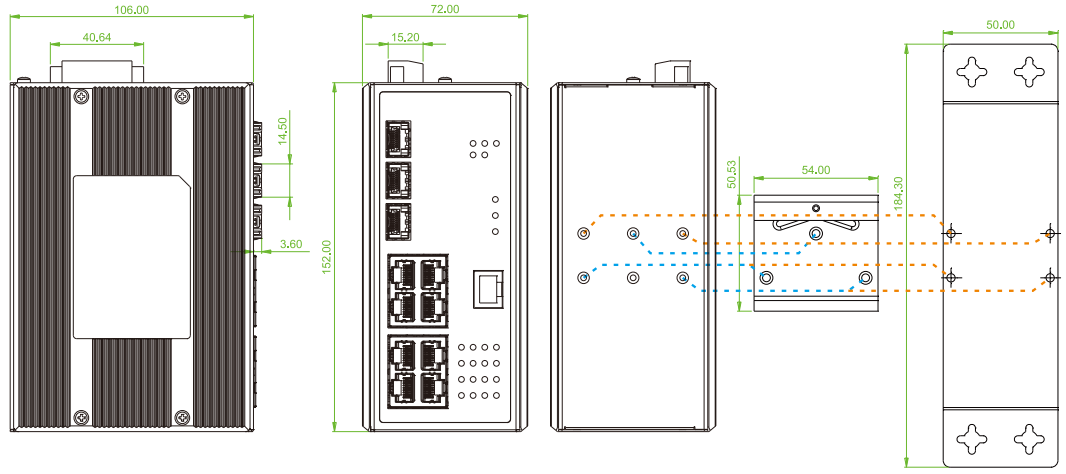


- Regulated PoE output voltage (52VDC) to stabilize PoE device
- Guarantee delivery PoE power distance to 100 meters
- Wide range input power 24/48VDC (20~57VDC)
- Built-in very high efficiency (94~97%) to boost PoE output voltage

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

Dimensions

▶ 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	NEMA TS2	Safety UL60950-1 EN60950-1	EN61000-6-2 EN61000-6-4	CE, FCC	
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: 8x FE UTP
- 03GS: 3x GbE SFP
- M: Managed
- 8PH: 8x High Power PoE+
- E: -40~75℃ / blank : -10~60℃
- 24: 24V Booster / blank : Non Booster

Package List

- One device of the series
- Console cable (RJ-45 to DB9)
- 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: DDMI / Blank: Non DDMI
- E: E:-40~85℃ / Blank:0~70℃

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

IFS-402GSM-4PU

4x 10/100Base RJ45 + 4x 100/1000Base-X SFP with 4x 60W PoE (240W, 48VDC)



- Supports IEEE 1588 PTP V2
- Supports u-Ring, ERPS, MSTP, RSTP, STP for redundant cabling
- Auto checking and auto reset when PoE PD fail
- EN50121-4, UL60950-1, EN60950-1, EN61000-6-2, EN61000-6-4, CE, FCC certified
- 4KV surge protection for PoE, RJ45 and SFP ports

IFS-402GSM-4PU is a managed, industrial grade, L2 PoE (Power over Ethernet) switch that provide 4x 10/100Base-TX ports plus 2x 100/1000Base-X SFP ports with 4x PoE Ports. The PoE features enable power and data to be transferred via a single cable, hereby considerably reducing cabling and electrical wiring expenses. Housed in rugged DIN rail or wall mountable IP-30 enclosures, these switches are perfect choices for harsh environments, such as industrial networks, intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications. The switch can also operate either at standard operating temperature range (-10 to 60°C) or at wide operating temperature range (-40 to 75°C) to fulfill the special needs of industrial automation applications.

Features

- 48VDC (44~57VDC) redundant dual input power
- Provides 4 port IEEE 802.3af / 802.3at PoE+ output, 60W per port
- Cable diagnostics, identifies opens/shorts distance
- 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
- 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
- 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): 4.8Gbps 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 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)
PoE standard & RJ-45 Pin Assignment	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	Redundant Dual DC 48V (44~57VDC) input power, (Removable terminal block) (50~57V input is recommended for IEEE 802.3at PoE+ in 30W / 60W applications)
Power Consumption	Input Voltage: 50VDC; Total Power Consumption: 248.5W; Device Power Consumption: 8.5W; PoE Budget: 240W
PoE Power Budget	Maximum PoE Output power budget **60W / Per Port** 240W for total

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Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

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-402GSM-4PU) -40 ~ 75°C (IFS-402GSM-4PUE)
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)
Weight	0.7kg

Installation Mounting	DIN Rail mounting, or wall mounting (Optional)
MTBF	589,078 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
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
Surge protection	4KV 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

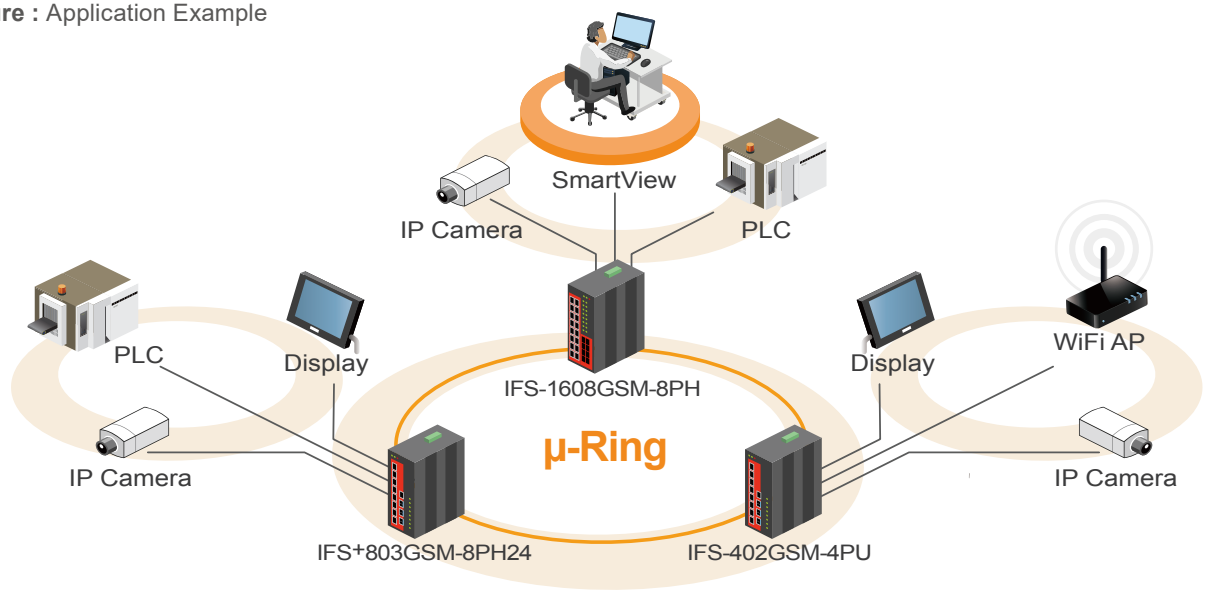
IP Multicasting Features	
IGMP / MLD Snooping	IGMP Snooping v1, v2, v3 / MLD Snooping v1, v2
	Port Filtering Profile
	Throttling
	Fast Leave
	Maximum Multicast Group : up to 1022 entries
	Query / Static Router Port
Security Features	
IEEE 802.1X	Port-Based
	MAC-Based
ACL	Number of rules : up to 256 entries
	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
EtherNet/IP	Supports for management and monitoring
Modbus/TCP	Supports for management and monitoring
SW & Configuration Upgrade	TFTP, HTTP
	Redundant firmware in case of upgrade failure
FTP client	Supports for upload/download configuration
RMON	RMON I (1, 2, 3, 9 group), RMON II
MIB	RFC1213 MIB II, Private MIB
UPnP	Supported
BOOTP	Supported
DHCP	Server, Client, Relay, Relay option 82 , Snooping
RARP	Supported
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	Server/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	Server/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

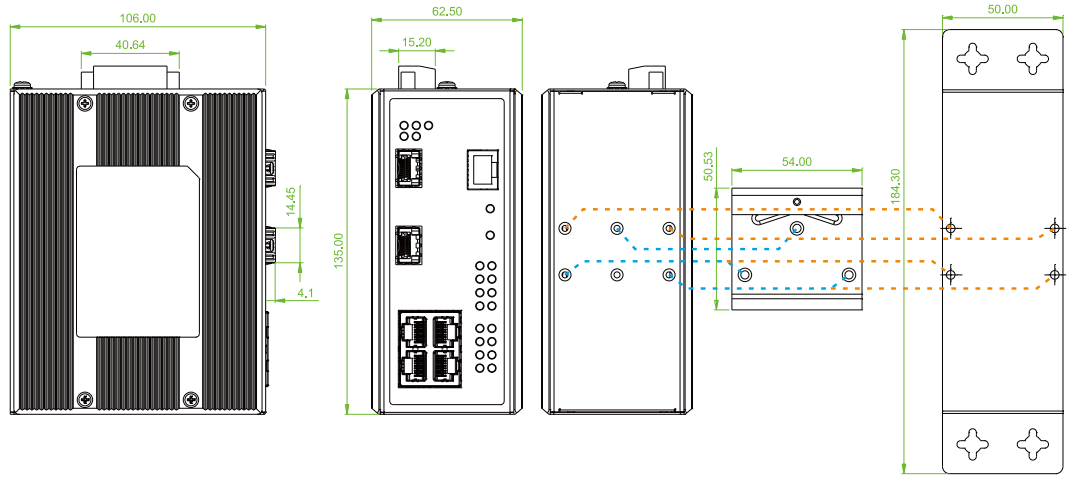
Application

Figure : Application Example



Dimensions

▶ IFS-402GSM-4PU



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

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

Ordering Information

Model Name	Total Port	UTP	Fiber	PoE Port		Input power	Certification				Operating Temperature
		10/100 Base-TX	100/1000 Base-X	IEEE 802.3at 4 pairs PoE/60W	Power Budget	Redundant	Railway EN50121-4	Safety UL60950-1 EN60950-1	EN61000-6-2 EN61000-6-4	CE, FCC	
IFS-402GSM-4PU	6	4	2 SFP	4	240W	48VDC	V	V	V	V	-10~60℃
IFS-402GSM-4PUE	6	4	2 SFP	4	240W	48VDC	V	V	V	V	-40~75℃

Model Naming Rule

IFS - 4 02GS M - 4PH E

- IFS: Industrial Fast Ethernet Switch
- 4: 4x FE UTP
- 02GS: 2x GbE SFP
- M: Managed
- 4PU: 4x Ultra Power 60W PoE+
- E: -40~75 C
- blank : -10~60 C

Package List

- One device of the series
- Console cable (RJ-45 to DB9)
- 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

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

IFS-803GSM-8PH24 & IFS-402GSM-4PH24

◀ 8x 10/100Base RJ45 + 3x 100/1000Base SFP with 8x PoE (180W, 24/48VDC)

▶ 4x 10/100Base RJ45 + 2x 100/1000Base SFP with 4x PoE (120W, 24/48VDC)



- Supports IEEE 1588 PTP V2
- Supports u-Ring, ERPS, MSTP, RSTP, STP for redundant cabling
- EN50121-4, UL60950-1, EN60950-1, NEMA-TS2, EN61000-6-2, EN61000-6-4, CE, FCC certified
- 24/48VDC (20~57VDC) redundant dual input power with built-in very high efficiency booster
- Auto checking and auto reset when PoE PD fail

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

These Fast Ethernet switch models are managed industrial grade L2 switches with 8/4 10/100Base-T ports and 3/2 GbE/100M SFP ports which also supports PoE+/PSE and provide stable and reliable transmission. Housed in rugged DIN rail or wall mountable enclosures, these switches are designed for harsh environments, such as industrial networking. They are an ideal solution for Smart City, surveillance, Intelligent traffic control systems, production automation applications and support up to 8/4 PoE/PoE+ (IEEE 802.3af/IEEE 802.3at) ports which can 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. (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

- Regulated PoE output voltage (52VDC) 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)
- Cable diagnostics, identifies opens/shorts distance
- 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
- 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
- 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)
	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): 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 52VDC for PoE output Regulated PoE output voltage (52VDC) to stabilize PoE device, and guarantee delivery PoE power distance to 100meter (Figure 2)

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Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

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
EtherNet/IP	Supports for management and monitoring
Modbus/TCP	Supports for management and monitoring
SW & Configuration Upgrade	TFTP, HTTP
	Redundant firmware in case of upgrade failure

FTP client	Supports for upload/download configuration
RMON	RMON I (1, 2, 3, 9 group), RMON II
MIB	RFC1213 MIB II, Private MIB
UPnP	Supported
BOOTP	Supported
DHCP	Server, Client, Relay, Relay option 82 , Snooping
RARP	Supported
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	Supports 5 operating mode in each port : Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave
NTP, SNTP	Server/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	Server/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

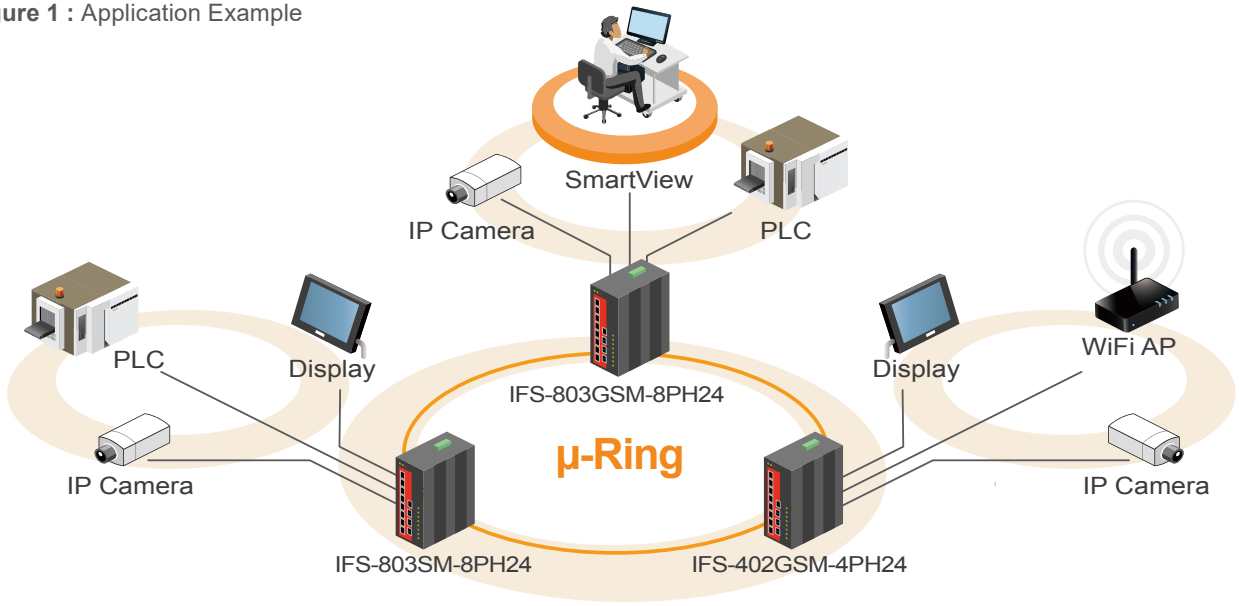
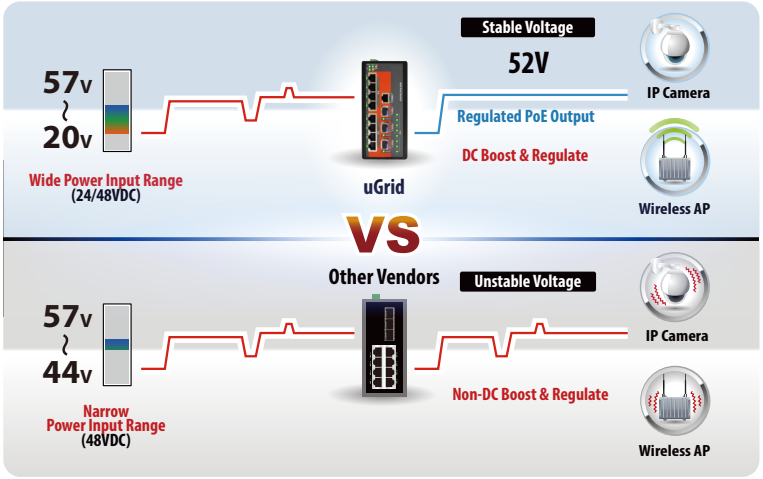


Figure 2 : High Efficiency Boost Technology for PoE

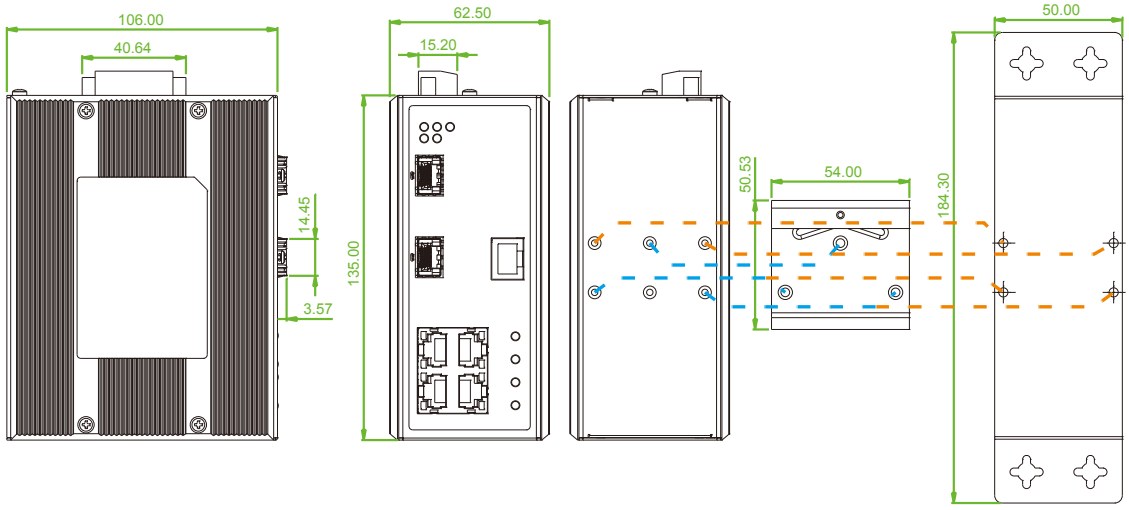


- Regulated PoE output voltage (52VDC) to stabilize PoE device
- Guarantee delivery PoE power distance to 100 meters
- Wide range input power 24/48VDC (20~57VDC)
- Built-in very high efficiency (94~97%) to boost PoE output voltage

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

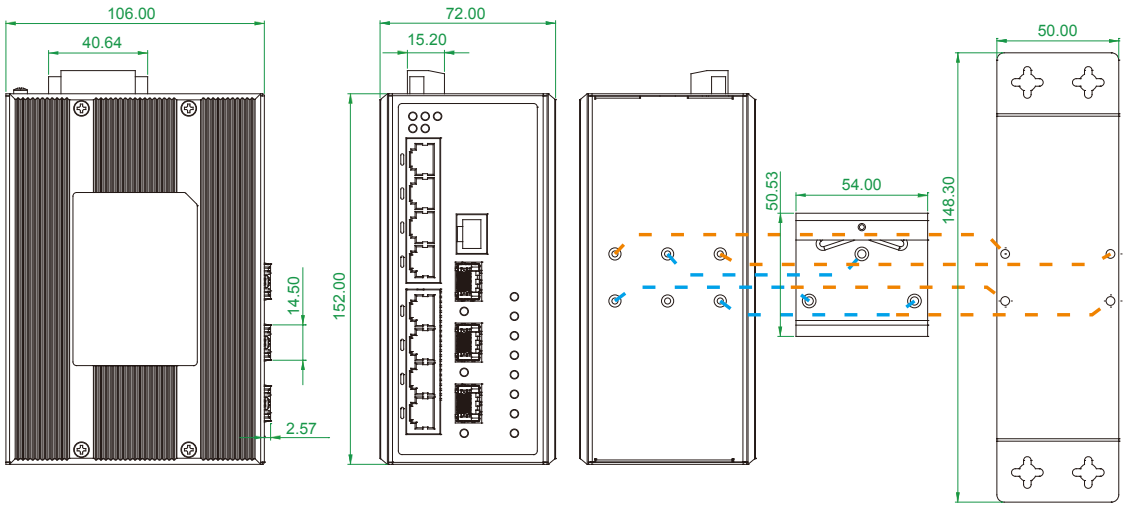
Dimensions

▶ 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-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℃
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℃

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: 24: 24V Booster

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

Optional Accessories

Package List

- One device of the series
- Console cable (RJ-45 to DB9)
- Din Rail with screws
- Terminal block
- Protective caps for SFP ports

Wall mount kit

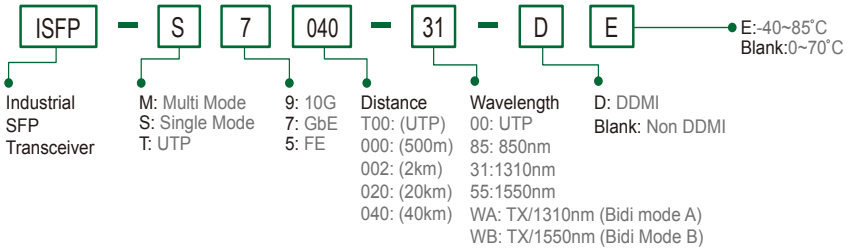
IND-WMK02	Wall Mount kit for Industrial product (Wide) (184 x 50mm)

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



Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

IMC-1000MS-PH12

1x GbE RJ45 to 100/1000Base SFP with PoE PSE (30W, 12/24/48VDC)



- EN50121-4, EN61000-6-2, EN61000-6-4, CE, FCC certified
- 12/24/48VDC (9.6~57VDC) redundant dual input power
- Regulate PoE output voltage (52VDC) to stabilize PoE device, and guarantee delivery PoE power distance to 100meter
- SNMP, Web based and In-band management, Remote Loop-Back test
- Supports LFPT (Link Fault Pass Through) and FEF (Far End Fault)

IMC-1000MS-PH12 is a 10/100/1000Base-T to 100/1000Base-X manageable GbE 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.

Features

- Conversion between 10/100/1000Base-T and 100/1000Base-X fiber cable interface
- Provides IEEE 802.3at PoE output (30W)
- IP30 rugged metal housing and fanless
- Supports Jumbo frame 9K bytes packet
- Ingress/Egress bandwidth control with 64K granularity
- PoE configuration and monitor
- 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
Far-End Fault (FEF)	Work with LFPT to prevents data loss
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 52VDC for PoE output Regulated PoE output voltage (52VDC) to stabilize PoE device, and guarantee delivery PoE power distance to 100meter (Figure)

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

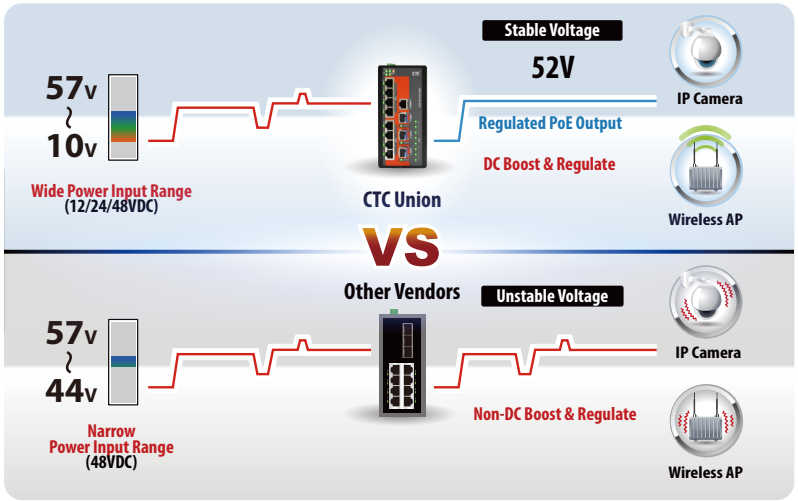
Software Specifications

SNMP or Web Mode	
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	
Management	Supports in-band management from FRM220 Chassis With FRM220-1000MS card (Figure 2)
	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

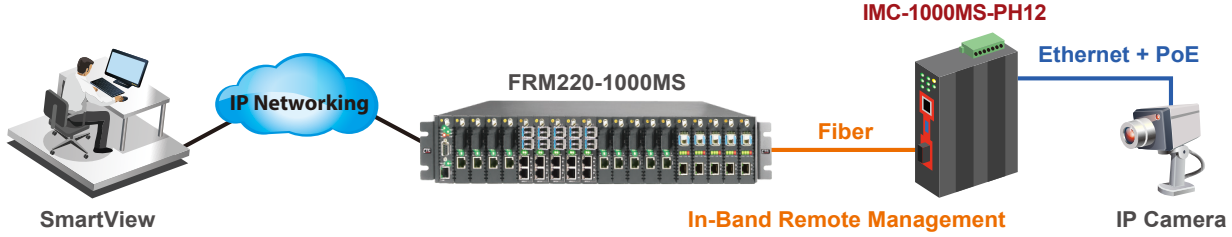
Application

Figure 1: High efficiency boost technology for PoE



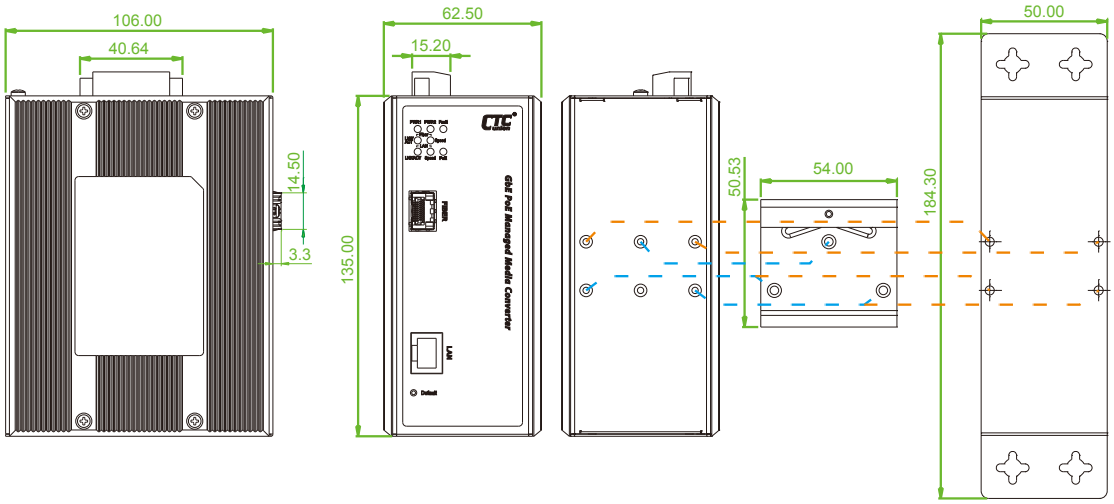
- Regulated PoE output voltage (52VDC) to stabilize PoE device
- Guarantee delivery PoE power distance to 100 meters
- Wide range input power 24/48VDC (20~57VDC)
- Built-in very high efficiency (94~97%) to boost PoE output voltage

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



Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

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

IMC – 1000 M S – PH E12 — E12: 12V Booster-20~75℃

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

Package List

- IMC-1000MS-PH12
- 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

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

- 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℃; Blank: 0~70℃

IGS-800C-8PH

8x GbE RJ45 with 8x PoE, Compact Size (240W, 48VDC)

NEW



- EN50121-4, EN61000-6-2, EN61000-6-4, CE, FCC certified
- 48VDC (44~57VDC) redundant dual input power
- IP30, rugged & compact metal housing, fanless
- 4KV surge protection for RJ45 and PoE ports

IGS-800C-8PH is an unmanaged, industrial grade, Gigabit PoE switch with 8x 10/100/1000Base-T PoE ports that provide stable and reliable Ethernet transmissions. 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 70°C) fulfill the special needs of industrial automation applications.

Features

- Provides 8-port IEEE 802.3at/af PoE+ output, 30W/per port, total 240W
- 48VDC (44~57VDC) redundant dual input power
- Supports flow control
- Jumbo frame support
- Supports DIN Rail or wall mounting installation
- Wide operating temperature -40 ~ 70°C ("E" model)

Specifications

IEEE Standard	IEEE 802.3 10Base-T Ethernet
	IEEE 802.3u 100Base-TX Fast Ethernet
	IEEE 802.3ab 1000Base-T Gigabit Ethernet
	IEEE 802.3x 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): 16Gbps Full wire-speed
Data Processing	Store and Forward
Flow Control	IEEE 802.3x flow control, back pressure flow control
Jumbo Frame	9K Bytes
MAC Address Table	4K
PoE standard & RJ-45 Pin Assignment	8x 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	8x RJ-45 10/100/1000Base-T auto negotiation speed, Auto MDI/MDI-X function, Full/Half duplex
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)
	Per port: 10/100 Link/Acttive (Green) 1000 Link/Active (Amber)
	Per Port PoE LED • Active : ON • Inactive : OFF
Reverse Polarity Protection	Supported for Power Input
Overload Current Protection	Supported

Power Supply	Redundant Dual DC 48V (44~57VDC) input power (Removable terminal block) (50~57V input is recommended for IEEE 802.3at PoE+)
Power Consumption	

Input Voltage	Total Power Consumption	Device Power Consumption	PoE Budget
50VDC	247.6W	6.8W	240W

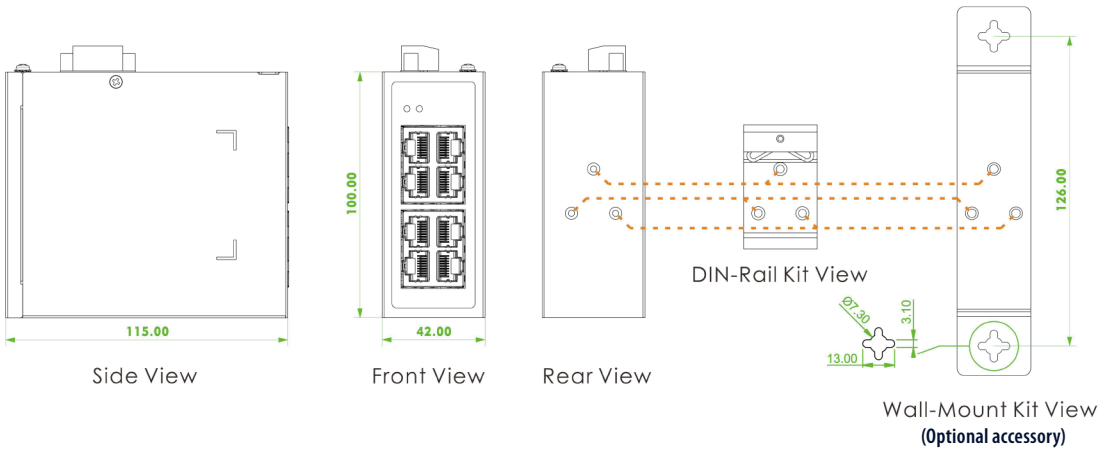
PoE Power Budget	Maximum PoE Output power budget 240W, 30W/ per port
Removable Terminal Block	Provides 2 Redundant power, 4 pin
Operating Temperature	-10 ~ 60°C (IGS-800C-8PH) -40 ~ 70°C (IGS-800C-8PHE)
Operating Humidity	5% to 95% (Non-condensing)
Dimensions	100x 42x 115mm (D X W X H)
Housing	Rugged Metal, IP30 Protection, Fanless
Weight	0.47kg
Installation Mounting	DIN Rail mounting, or wall mounting (Optional accessories)
MTBF	1,494,598 Hours (MIL-HDBK-217)
Warranty	5 years
Certification	
EMC	CE (EN55024, EN55032)
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

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

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	EN62368-1 (Pending)
Surge protection	4KV for PoE and UTP ports
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

Dimensions



Ordering Information

Model Name	Total Port	RJ45 UTP Port	PoE port		Input power	Certification			Operating Temperature
		10/100/1000 Base-T(X)	IEEE 802.3at	Power Budget	Redundant	Railway EN50121-4	EN61000-6-2 EN61000-6-4	CE, FCC	
IGS-800C-8PH	8	8	8	240W	48VDC	V	V	V	-10~60°C
IGS-800C-8PHE	8	8	8	240W	48VDC	V	V	V	-40~70°C

Model Naming Rule

IGS - 8 00C - 8PHE

- IGS: Industrial Gigabit Switch
- 8: 8x GbE UTP
- 00C: 0x GbE Fiber Compact
- 8PH: 8x High Power PoE -10~60°C
- 8PHE: 8x High Power PoE -40~70°C

Package List

- One of the series device
- Din Rail with screws
- Terminal block

Optional Accessories

Wall mount kit accessories

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

IGS-600-4PH24 & IGS-402S-4PH24

- 6x GbE RJ45 with 4x PoE (120W, 24/48VDC)
- 4x GbE RJ45 + 2x 100/1000Base SFP with 4x PoE (120W, 24/48VDC)

IGS-402F-4PH24 & IGS-402S-4PU

- 4x GbE RJ45 + 2x 1000Base Fiber (SC) with 4x PoE (120W, 24/48VDC)
- 4x GbE RJ45 + 2x 100/1000Base SFP with 4x 60W PoE (240W, 48VDC)



- UL60950-1, EN60950-1, EN50121-4, EN61000-6-2, EN61000-6-4, CE, FCC certified
- 24/48VDC (20~57VDC) redundant dual input power with built-in very high efficiency booster
- Regulate PoE output voltage (52VDC) to stabilize PoE device, and guarantee delivery PoE power distance to 100meter
- Provides a DIP-Switch to set functions

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

- 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)
- Supports power failure alarm message by relay
- Supports flow control
- Jumbo frame support
- IP30 rugged metal housing and fanless
- Wide operating temperature -40 ~ 75°C ("E" model)

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 30W/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 52VDC for PoE output Regulated PoE output voltage (52VDC) to stabilize PoE device, and guarantee delivery PoE power distance to 100meter (Figure 2)

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

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

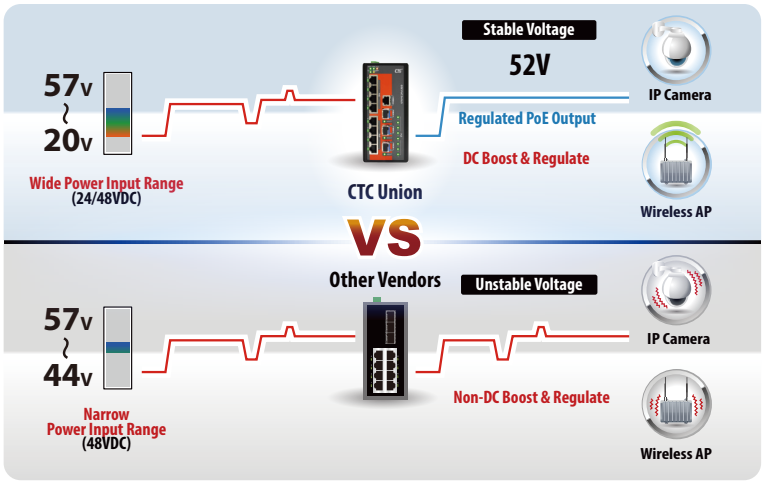
Input Voltage	Total Power Consumption	Device Power Consumption	PoE Budget
50VDC	250.3W	8W	240W

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

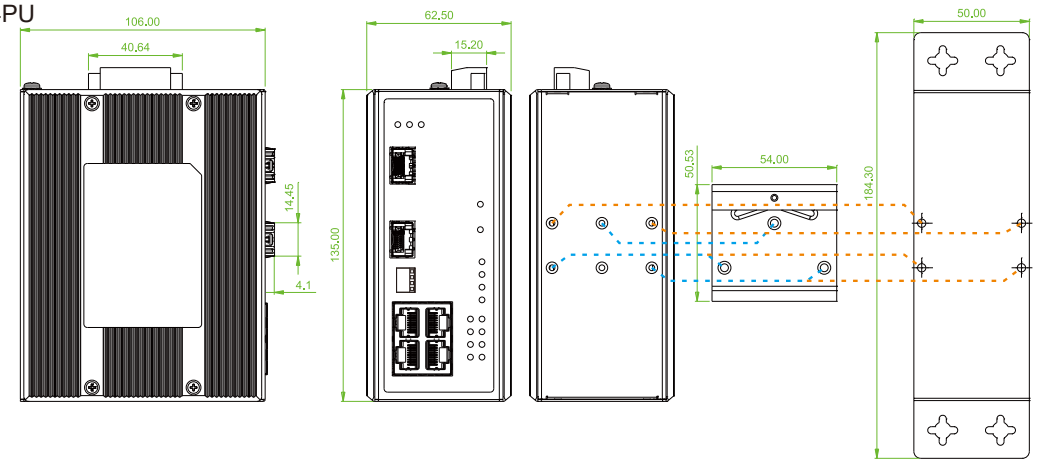
Figure : High efficiency boost technology for PoE



- 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

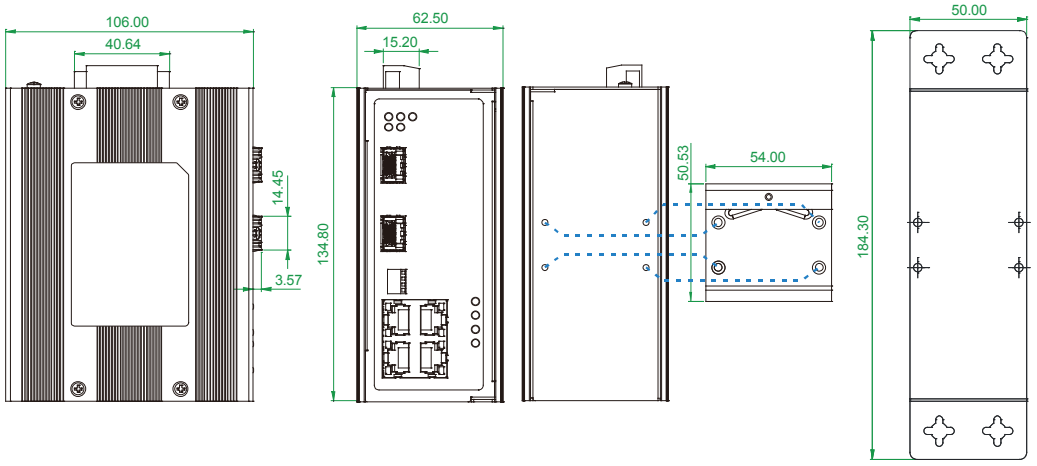
Dimensions

▶ IGS-402S-4PU



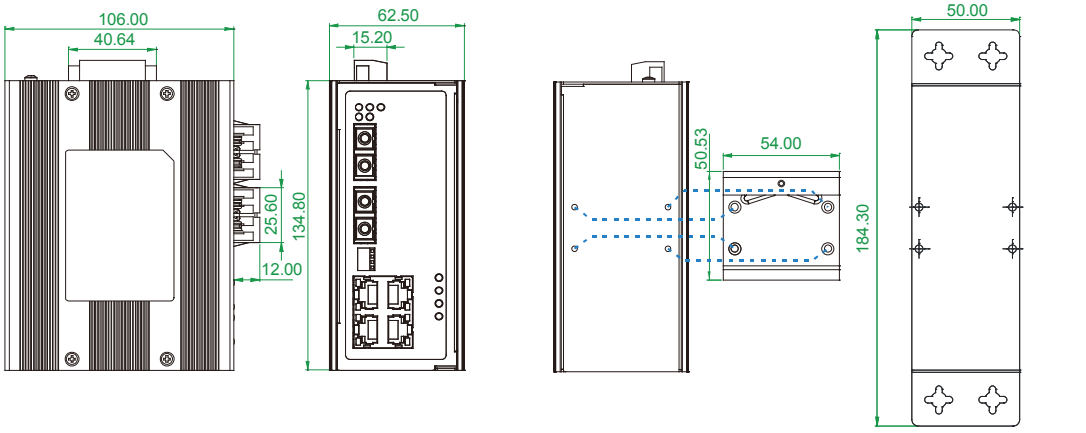
Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

▶ IGS-402S-4PH24



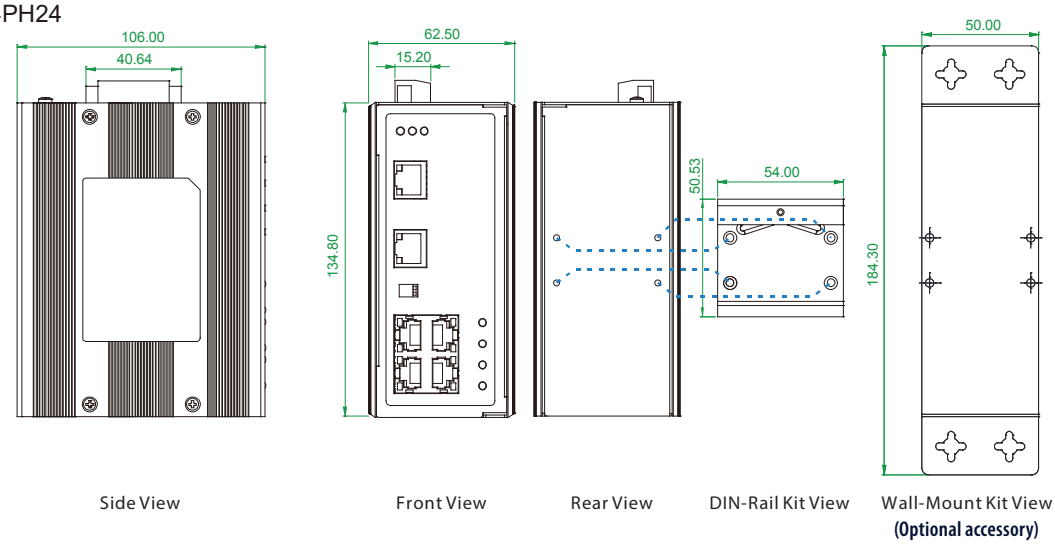
Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

▶ 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)

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

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℃
IGS-402S-4PUE	6	4		2 SFP		4	240W	48VDC	V		V	-40~75℃
IGS-402S-4PH24	6	4		2 SFP	4		120W	24/48VDC	V	V	V	-10~60℃
IGS-402S-4PHE24	6	4		2 SFP	4		120W	24/48VDC	V	V	V	-40~75℃
IGS-402F-4PH24	6	4	2 SC		4		120W	24/48VDC	V	V	V	-10~60℃
IGS-402F-4PHE24	6	4	2 SC		4		120W	24/48VDC	V	V	V	-40~75℃
IGS-600-4PH24	6	6			4		120W	24/48VDC	V	V	V	-10~60℃
IGS-600-4PHE24	6	6			4		120W	24/48VDC	V	V	V	-40~75℃

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
- 4PH□□□□24:
  - 4PHE24: 4x High Power PoE, 24V Booster -40~75°C
  - 4PH24: 4x High Power PoE, 24V Booster -10~60°C
  - 4PU: 4x Ultra Power PoE
- SC002: 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)

Package List

- One of the series device
- 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*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-1602GS-8PH & IFS-802GS-8PH

- 16x 10/100Base RJ45 + 2x 1000Base–X SFP with 8x PoE (240W, 48VDC)
- 8x 10/100Base RJ45 + 2x 1000Base-X SFP with 8x PoE (240W, 48VDC)



- EN50121-4, EN61000-6-2, EN61000-6-4, CE, FCC certified
- 4KV surge protection for PoE UTP and PoE ports
- Wide operating temperature -40 ~ 75°C
- IP30 rugged metal housing and fanless

The IFS-1602GS-8PH and IFS-802GS-8PH are 18/10 Ports unmanaged industrial grade Ethernet PoE switches with 8x 10/100Base-TX PoE+/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. 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 8-port IEEE 802.3at/af PoE output (30W/Per Port)
- Maximum PoE output power budget 240W
- 48VDC (44~57VDC) redundant dual input power
- Supports power failure alarm message by relay
- Supports flow control
- Provides broadcast storm protection (IFS-1602GS-8PH)
- DIN Rail mounting or wall mounting

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

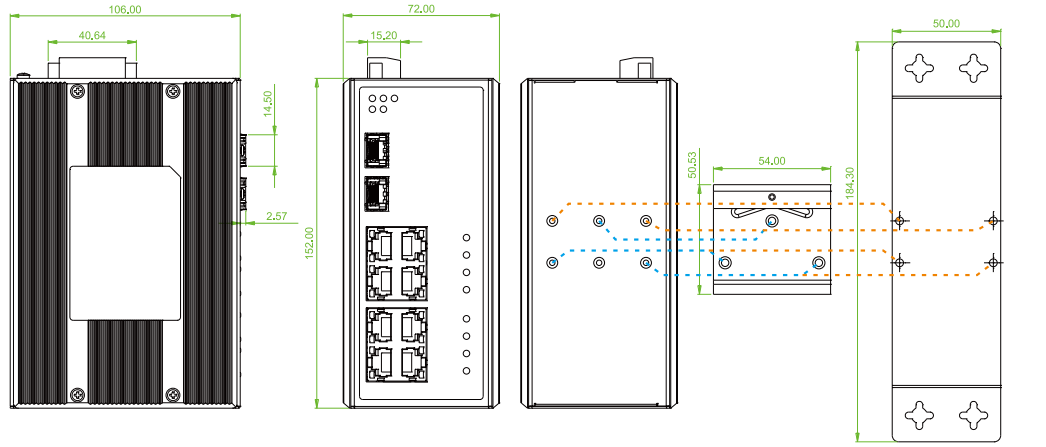
Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

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)
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

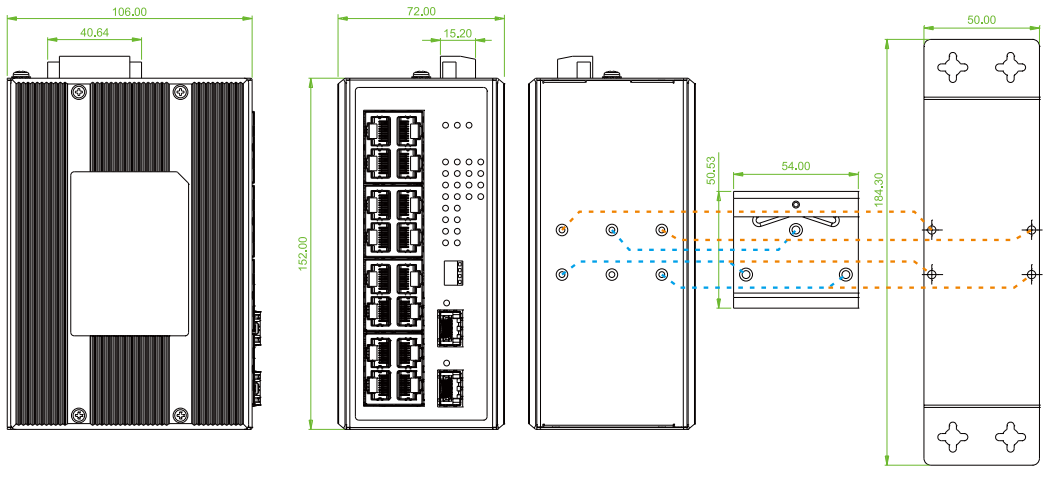
Dimensions

▶ 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



Package List

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

Optional Accessories

Wall mount kit accessories

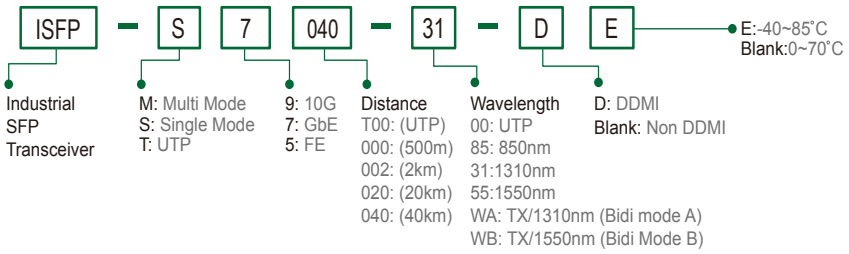
IND-WMK02	Wall Mount kit for Industrial product (Wide) (184 x 50mm)

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



Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

IMC-1000S-PH12

1x GbE RJ45 to 1x 100/1000Base SFP with PoE PSE (30W, 12/24/48VDC)



- EN50121-4, EN61000-6-2, EN61000-6-4, CE, FCC certified
- 12/24/48VDC (9.6~57VDC) redundant dual input power with power booster
- Regulate PoE output voltage (52VDC) to stabilize PoE device, and guarantee delivery PoE power distance to 100meter
- Supports Remote PD reset by fiber port link down
- Supports LFPT (Link Fault Pass Through) and FEF (Far End Fault)

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) provides PoE+/PoE power over Ethernet. The IMC-1000S-PH12 utilizes 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.

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
- Provides IEEE 802.3at PoE output (30Watts)
- Provides a DIP-Switch to set functions
- IP30 rugged metal housing and fanless
- Wide operating temperature -20~75°C
- 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
Far-End Fault (FEF)	Work with LFPT to prevents data loss
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 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 52VDC for PoE output Regulated PoE output voltage (52VDC) to stabilize PoE device, and guarantee delivery PoE power distance to 100meter (Figure 1)
PoE Power budget	30W

Power Consumption	Power consumption & Boost efficiency

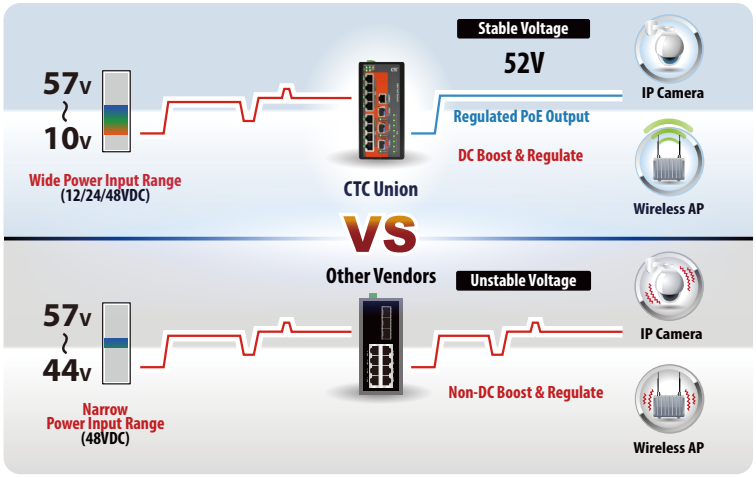
Input Voltage	Total Power Consumption	Device Power Consumption	PoE Budget	Boost Efficiency
12VDC	34.2W	3.9W	30W	99.0%
24VDC	34.7W	4.4W	30W	99.0%
48VDC	35.4W	4.7W	30W	97.7%

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

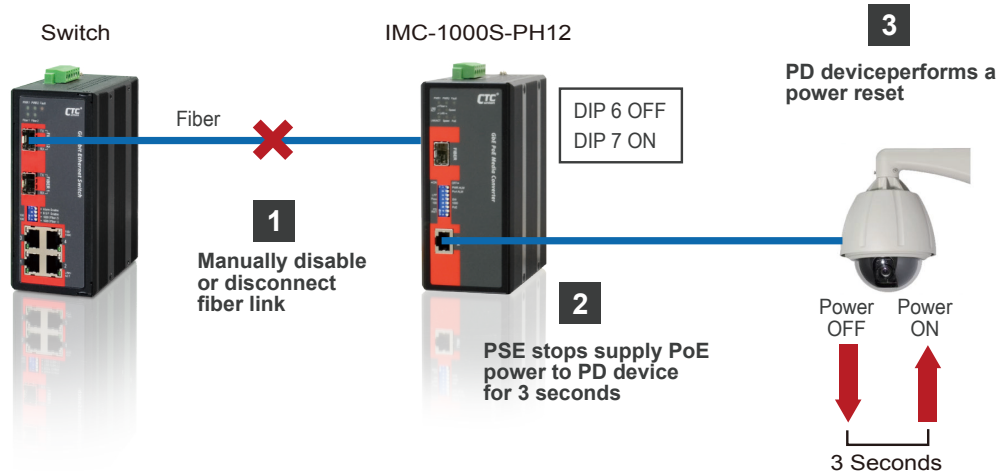
Application

Figure 1 : High efficiency boost technology for PoE



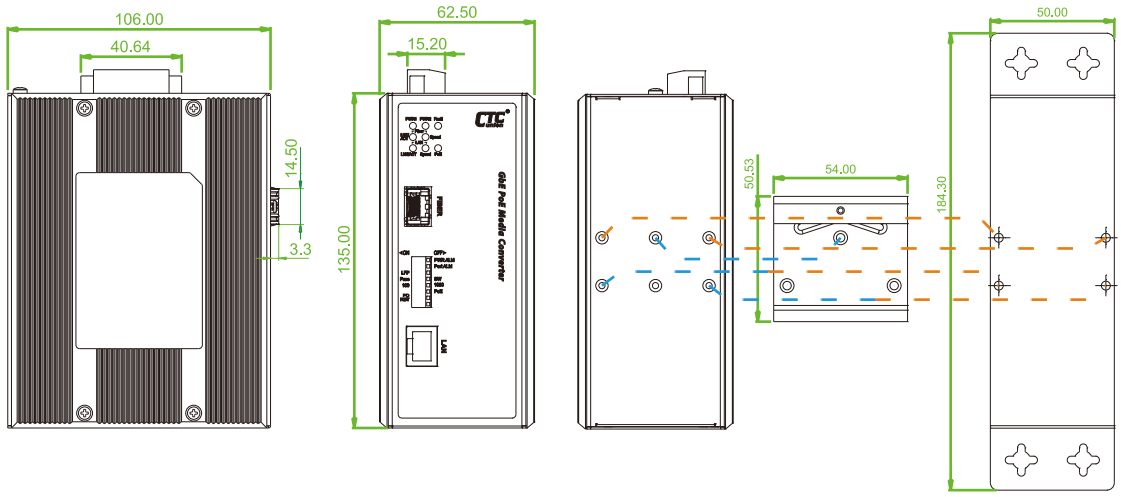
- Regulated PoE output voltage (52VDC) to stabilize PoE device
- Guarantee delivery PoE power distance to 100 meters
- Wide range input power 24/48VDC (20~57VDC)
- Built-in very high efficiency (94~97%) to boost PoE output voltage

Figure 2 : Remote PD Reset Application



Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

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℃

Model Naming Rule

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

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

Package List

- IMC-1000S-PH12
- 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℃ (-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℃ Blank:0~70℃

- 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

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

IMC-100-PH12

1x 10/100Base RJ45 to 1x 100Base Fiber (SC/ST) with PoE PSE (30W, 12/24/48VDC)



- EN50121-4, EN61000-6-2, EN61000-6-4, CE, FCC certified
- 12/24/48VDC (9.6~57VDC) redundant dual input power with power booster
- Regulate PoE output voltage (52VDC) to stabilize PoE device, and guarantee delivery PoE power distance to 100meter
- Supports Remote PD reset by fiber port link down
- Supports LFPT (Link Fault Pass Through) and FEF (Far End Fault)

IMC-100-PH12 is a 10/100Base-TX to Fixed 100Base-FX unmanaged Ethernet media converter that also injects PoE+/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.

Features

- Conversion between 10/100Base-TX and 100Base-FX SC or ST Fiber interface
- Provides IEEE 802.3at PoE output (30Watts)
- Provides a DIP-Switch to set functions
- IP30 rugged metal housing and fanless
- Wide operating temperature -20~75°C
- 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
Far-End Fault (FEF)	Work with LFPT to prevents data loss
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 2) 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 52VDC for PoE output Regulated PoE output voltage (52VDC) to stabilize PoE device, and guarantee delivery PoE power distance to 100meter (Figure 1)
PoE Power budget	30W

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

Power Consumption	Power consumption & Boost efficiency

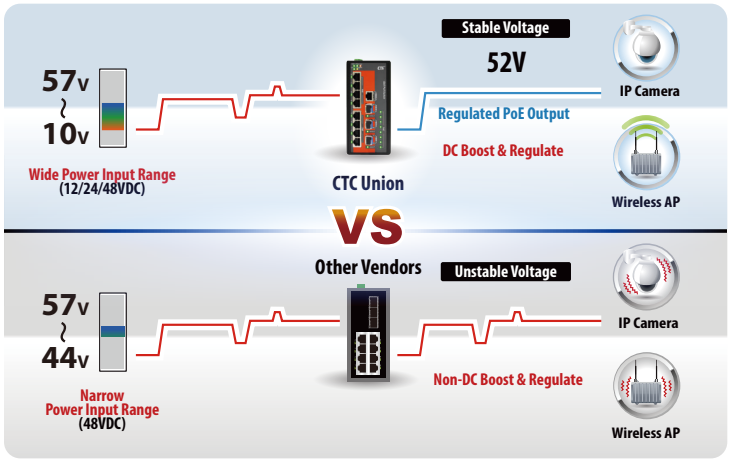
Input Voltage	Total Power Consumption	Device Power Consumption	PoE Budget	Boost Efficiency
12VDC	34W	3.5W	30W	98.4%
24VDC	34.4W	4.1W	30W	99.0%
48VDC	34.9W	4.3W	30W	98.0%

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

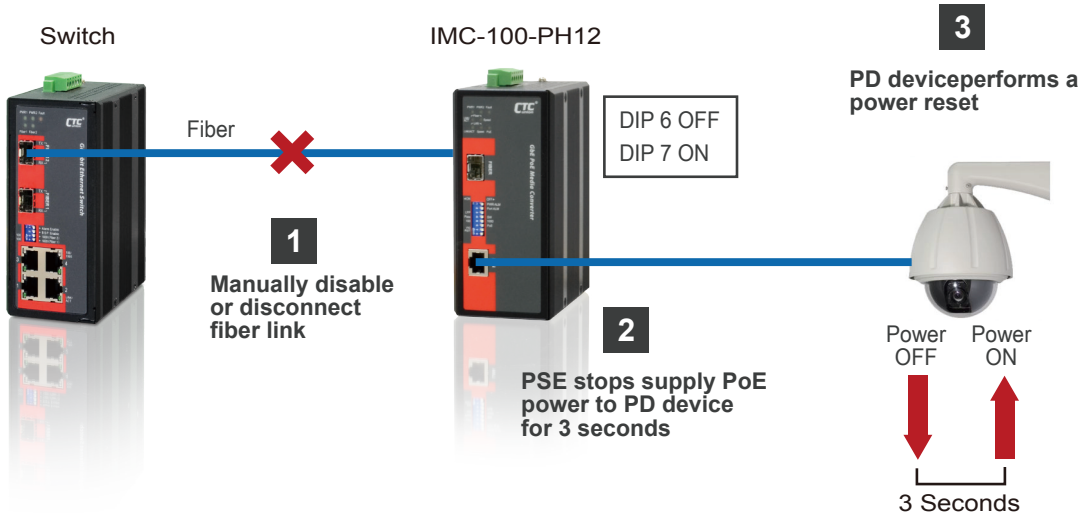
Application

Figure 1 : High efficiency boost technology for PoE

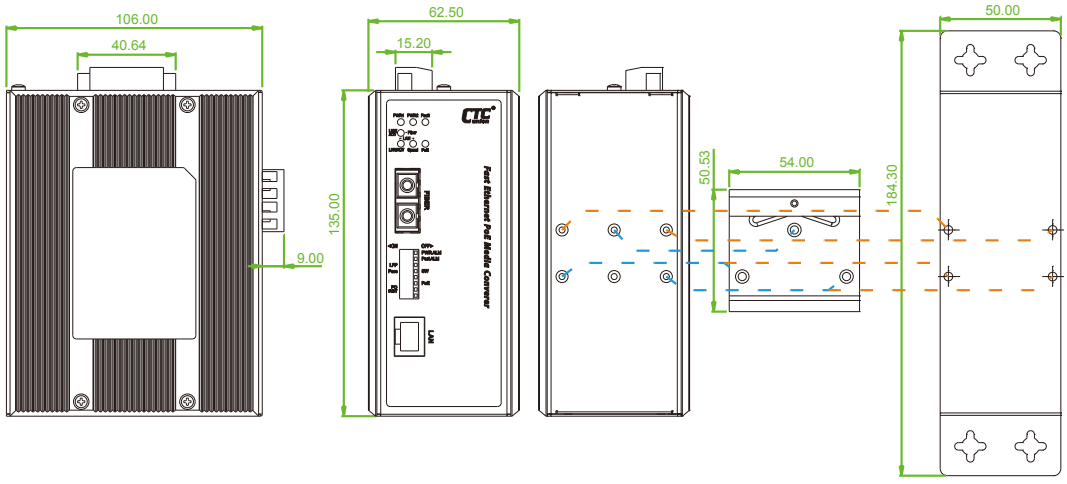


- Regulated PoE output voltage (52VDC) to stabilize PoE device
- Guarantee delivery PoE power distance to 100 meters
- Wide range input power 24/48VDC (20~57VDC)
- Built-in very high efficiency (94~97%) to boost PoE output voltage

Figure 2 : 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
- Din Rail bracket 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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Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

IGS-1604SM & IGS-812SM

◀ 16x GbE RJ45 + 4x 100/1000Base-X SFP

▶ 8x GbE RJ45 + 12x 100/1000Base-X SFP



- UL60950-1, EN60950-1,EN50121-4, EN61000-6-2, EN61000-6-4, CE, FCC certified
- Supports IEEE 1588 PTP V2
- Supports u-Ring, ERPS, MSTP, RSTP, STP for redundant cabling
- Cable diagnostics, identifies opens/shorts distance

These models are managed industrial grade GbE L2+ switches with 16/8 10/100/1000Base-T ports and 4/12 GbE/100M Ethernet SFP 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, 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

- 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
- 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
- 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

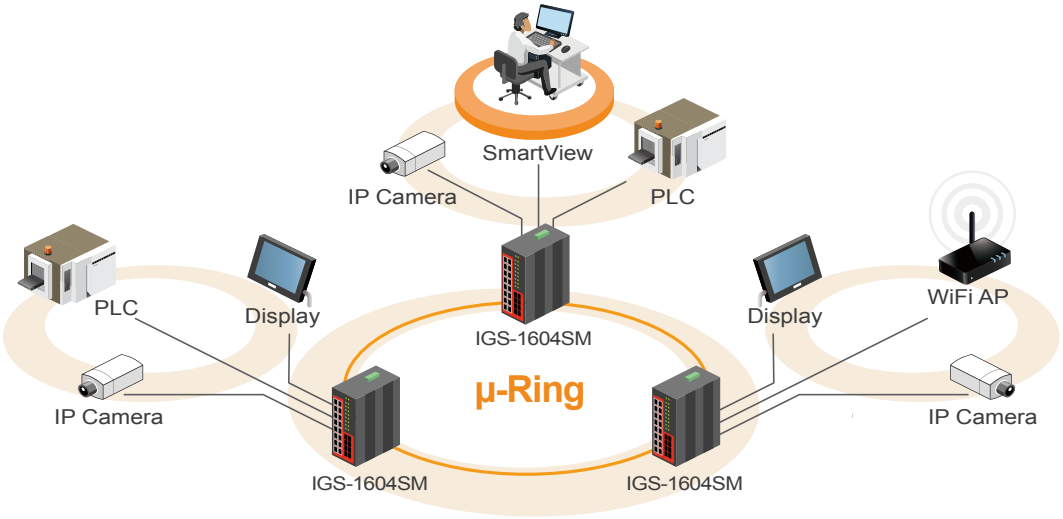
Software Specifications

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
EtherNet/IP	Supports for management and monitoring
Modbus/TCP	Supports for management and monitoring
SW & Configuration Upgrade	TFTP, HTTP Redundant firmware in case of upgrade failure
FTP client	Supports for upload/download configuration
RMON	RMON I (1, 2, 3, 9 group), RMON II
MIB	RFC1213 MIB II, Private MIB
UPnP	Supported
BOOTP	Supported
DHCP	Server, Client, Relay, Relay option 82 , Snooping
RARP	Supported
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	Server/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	Server/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

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

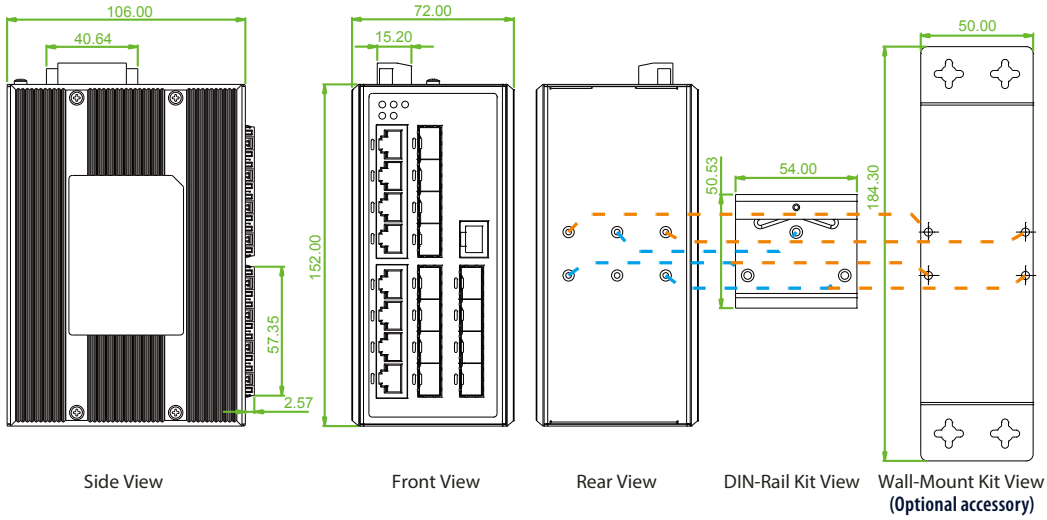
Application

Figure : Application Example

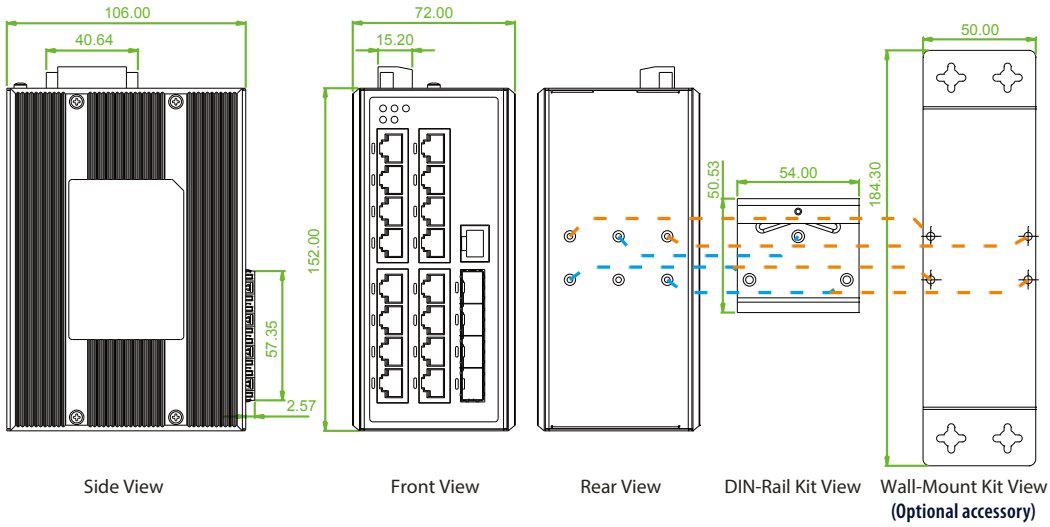


Dimensions

▶ IGS-812SM



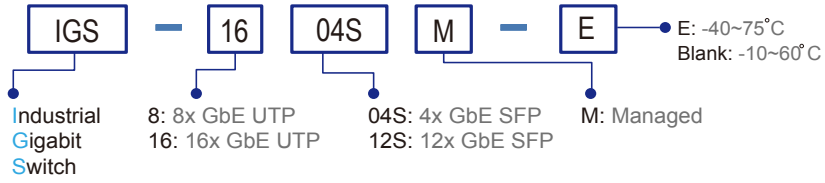
▶ IGS-1604SM



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



Package List

- One device of the series
- Console cable (RJ-45 to DB9)
- Din Rail with screws
- Terminal block
- Protective caps for SFP ports

Optional Accessories

Wall mount kit

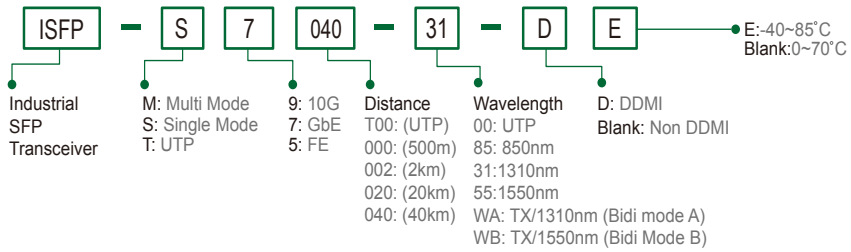
IND-WMK02	Wall Mount kit for Industrial product (Wide) (184 x 50mm)

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



2020 V1.0

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

IGS+803SM & IGS+404SM

- 8x GbE RJ45 + 3x 100/1000Base-X SFP
- 4x GbE RJ45 + 4x 100/1000Base-X SFP



- UL60950-1, EN60950-1, EN50121-4, NEMA-TS2, EN61000-6-2, EN61000-6-4, CE, FCC certified
- Supports IEEE 1588 PTP V2
- Supports u-Ring, ERPS, MSTP, RSTP, STP for redundant cabling
- Cable diagnostics, identifies opens/shorts distance

These models are managed industrial grade GbE L2+ switches with 8/4 10/100/1000Base-T ports plus 3/4 GbE/100M Ethernet SFP 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 networks, 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

- Redundant dual DC input power 12/24/48VDC (9.6~60VDC)
- 2.25K VDC Hi-pot isolation protection for Ethernet ports and power
- 4KV surge protection for UTP and fiber ports
- Provides 5 instances that each can support μ-Ring, μ-Chain or Sub-Ring type for flexible uses.
  (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
- 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
- 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)
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	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
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)
Hipot	DC 2.25KV for power to chassis ground, Ethernet ports to chassis ground
Surge protection	4KV 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), 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
EtherNet/IP	Supports for management and monitoring
Modbus/TCP	Support for management and monitoring
SW & Configuration Upgrade	TFTP, HTTP Redundant firmware in case of upgrade failure
FTP client	Support for upload/download configuration
RMON	RMON I (1, 2, 3, 9 group), RMON II
MIB	RFC1213 MIB II, Private MIB
UPnP	Supported
BOOTP	Supported
DHCP	Server, Client, Relay, Relay option 82 , Snooping
RARP	Supported
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	Server/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

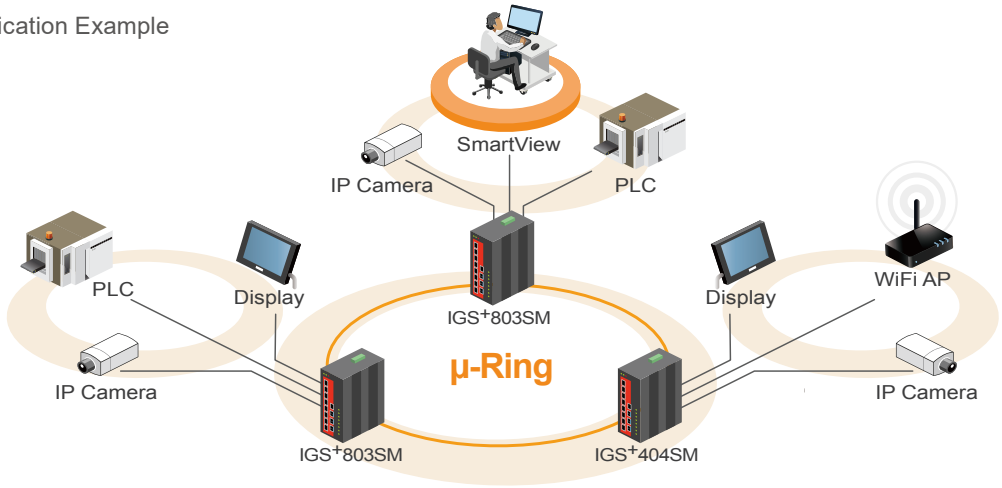
Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

SSH over IPv6	Supported
IPv6 Telnet	Supported
IPv6 NTP, SNTP	Server/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

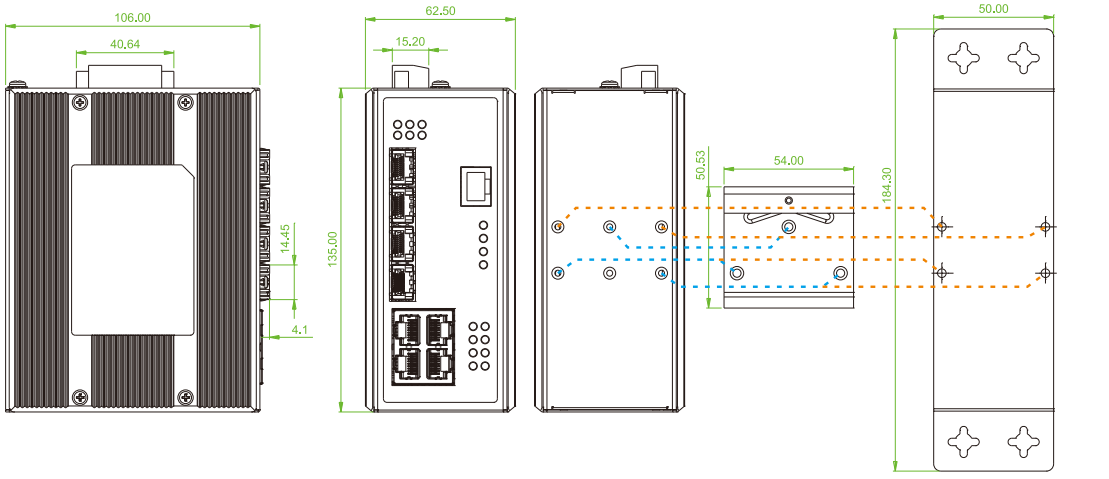
Application

Figure : Application Example



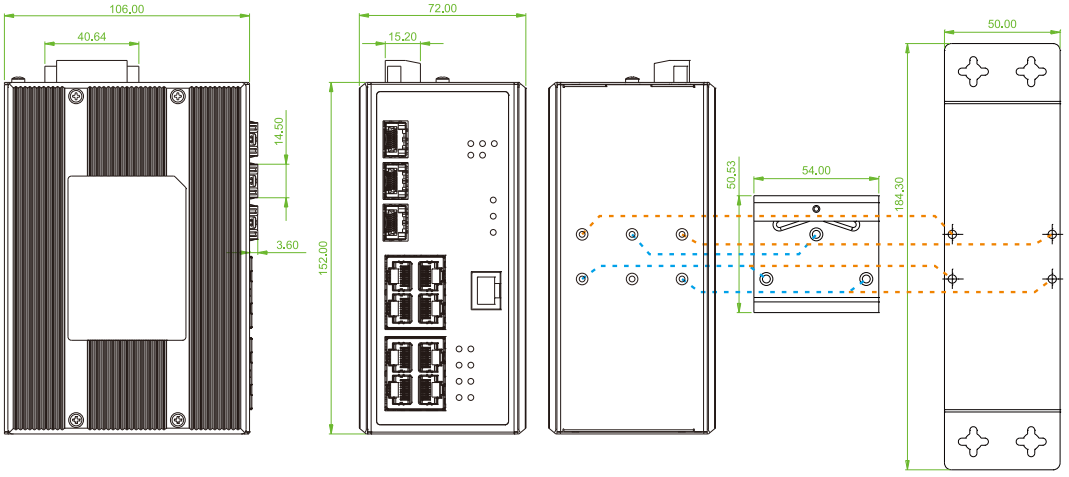
Dimensions

▶ IGS+404SM



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

▶ IGS+803SM

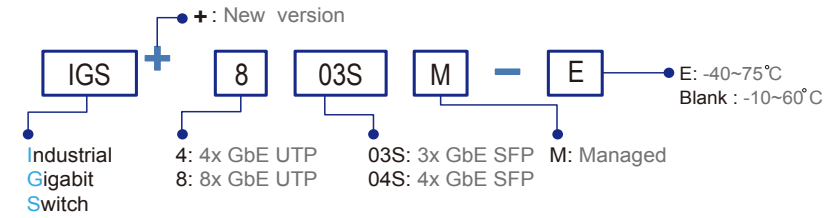


Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

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	12/24/48VDC	V				V	V	-10~60°C
IGS+404SM-E	V	8	4	4 SFP	12/24/48VDC	V				V	V	-40~75°C
IGS+803SM	V	11	8	3 SFP	12/24/48VDC	V	V	V	V	V	V	-10~60°C
IGS+803SM-E	V	11	8	3 SFP	12/24/48VDC	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)
- Din Rail with screws
- Terminal block
- Protective caps for SFP ports

Optional Accessories

Wall mount kit

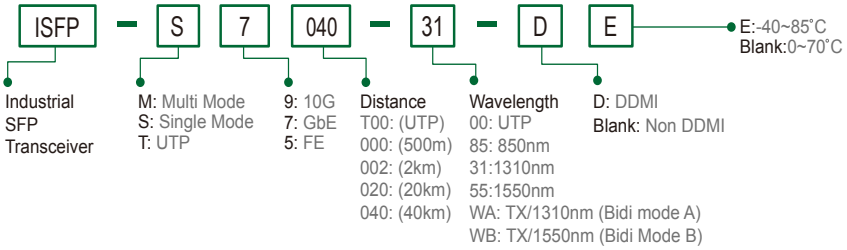
IND-WMK02	Wall Mount kit for Industrial product (Wide) (184 x 50mm)

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



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Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

IGS-803SM & IGS-404SM

◀ 8x GbE RJ45 + 1x FE/GbE SFP + 2x FE/GbE/2.5G SFP

▶ 4x GbE RJ45 + 2x FE/GbE SFP + 2x FE/GbE/2.5G SFP



- UL60950-1, EN60950-1, EN50121-4, NEMA-TS2, EN61000-6-2, EN61000-6-4, CE, FCC certified
- Supports IEEE 1588 PTP V2
- Supports u-Ring, ERPS, MSTP, RSTP, STP for redundant cabling
- Cable diagnostics, identifies opens/shorts distance

These models are managed industrial grade GbE L2+ switches with 8/4 10/100/1000Base-T ports and 3/4 GbE/100M SFP ports (2 ports support 2.5GbE) 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, 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

- 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
- 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
- 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
	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
EtherNet/IP	Support for management and monitoring
Modbus/TCP	Support for management and monitoring
SW & Configuration Upgrade	TFTP, HTTP Redundant firmware in case of upgrade failure
FTP client	Supports for upload/download configuration
RMON	RMON I (1, 2, 3, 9 group), RMON II
MIB	RFC1213 MIB II, Private MIB
UPnP	Supported
BOOTP	Supported
DHCP	Server, Client, Relay, Relay option 82 , Snooping
RARP	Supported
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	Server/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	Server/Client
IPv6 TFTP	Supported
IPv6 QoS	Supported

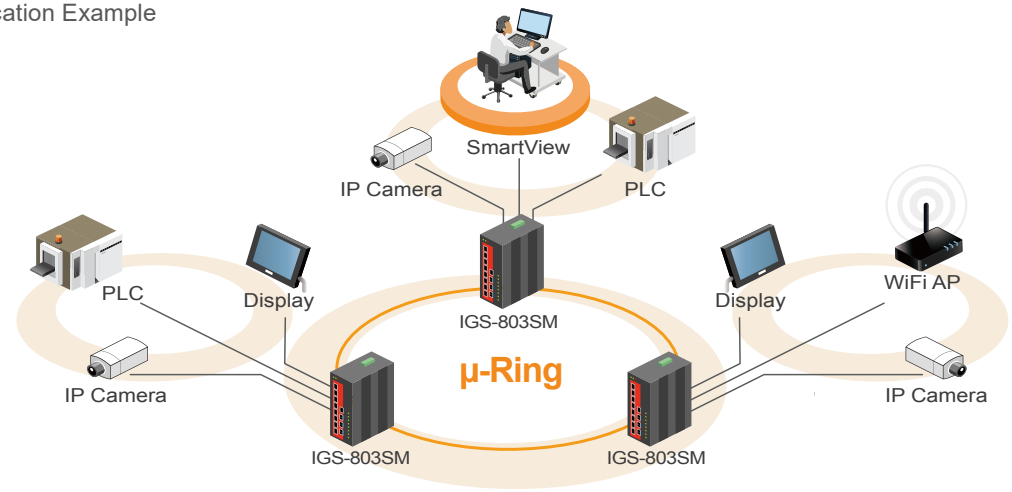
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IPv6 ACL	Number of rules: up to 256 entries
	for L2 / L3 / L4 L2 : Mac address SA/DA/VLAN L3: IP address SA/DA, Subnet L4: TCP/UDP

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

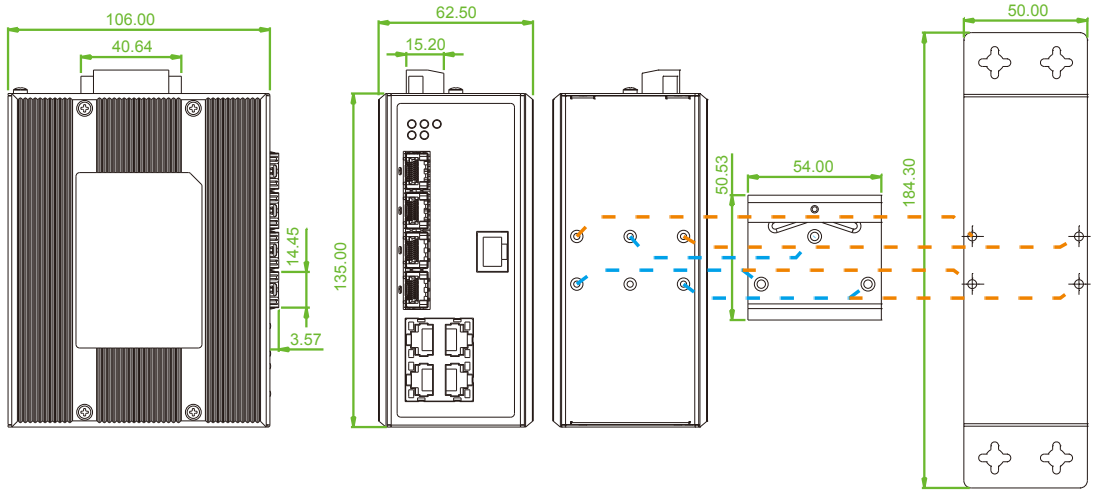
Application

Figure : Application Example



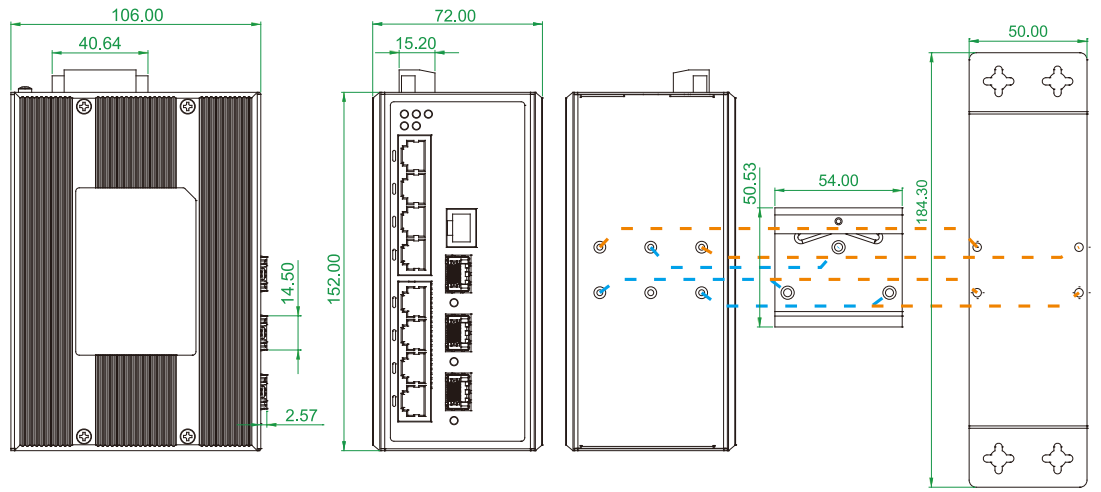
Dimensions

▶ IGS-404SM



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

▶ IGS-803SM

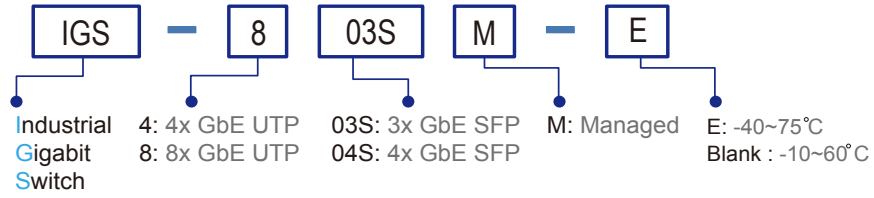


Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

Ordering Information

Model Name	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



Package List

- One device of the series
- Console cable (RJ-45 to DB9)
- Din Rail with screws
- Terminal block
- Protective caps for SFP ports

Optional Accessories

Wall mount kit

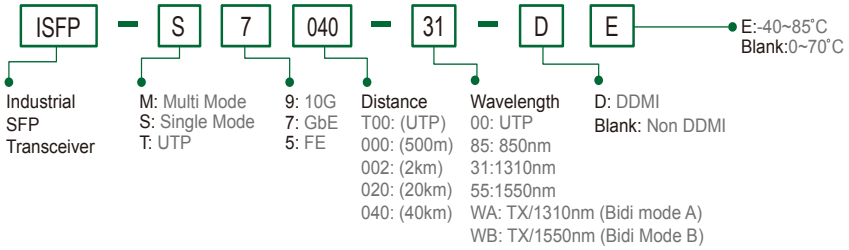
IND-WMK02	Wall Mount kit for Industrial product (Wide) (184 x 50mm)

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



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IFS+803GSM

8x 10/100Base RJ45 + 3x 100/1000Base SFP



- UL60950-1, EN60950-1, EN50121-4, NEMA-TS2, EN61000-6-2, EN61000-6-4, CE, FCC certified
- Supports IEEE 1588 PTP V2
- Supports u-Ring, ERPS, MSTP, RSTP, STP for redundant cabling
- Cable diagnostics, identifies opens/shorts distance

IFS+803GSM is a managed industrial grade L2+ switch with 8 10/100Base-TX ports and 3 GbE/100M SFP ports that provides stable and reliable Ethernet transmission. Housed in rugged DIN rail or wall mountable enclosures, the switch is designed for harsh environments, such as industrial networks, 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

- Redundant dual DC input power 12/24/48VDC (9.6~60VDC)
- 2.25K VDC Hi-pot isolation protection for Ethernet ports and power
- 4KV surge protection for UTP and fiber ports
- Provides 5 instances that each can support μ-Ring, μ-Chain or Sub-Ring type for flexible uses.
  (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
- 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
- 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
Hipot	DC 2.25KV for power to chassis ground, Ethernet ports to chassis ground
Surge protection	4KV for UTP and Fiber port
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

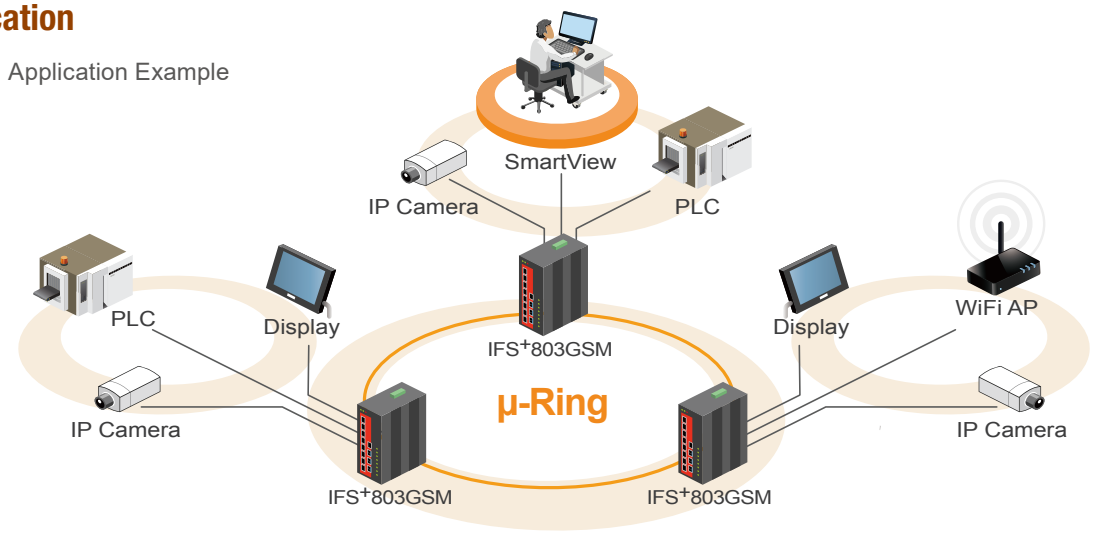
Software Specifications

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
EtherNet/IP	Support for management and monitoring
Modbus/TCP	Support for management and monitoring
SW & Configuration Upgrade	TFTP, HTTP Redundant firmware in case of upgrade failure
FTP client	Supports for upload/download configuration
RMON	RMON I (1, 2, 3, 9 group), RMON II
MIB	RFC1213 MIB II, Private MIB
UPnP	Supported
BOOTP	Supported
DHCP	Server, Client, Relay, Relay option 82 , Snooping
RARP	Supported
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	Server/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	Server/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

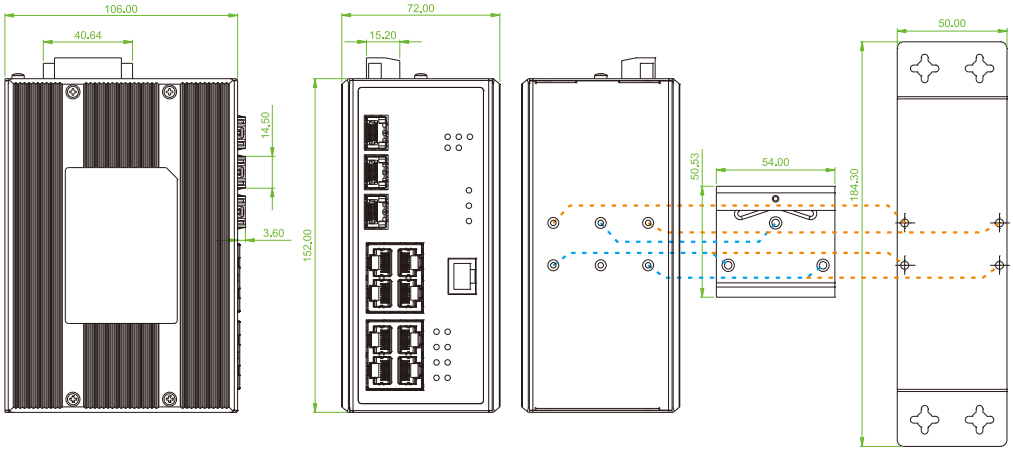
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Application

Figure : Application Example



Dimensions

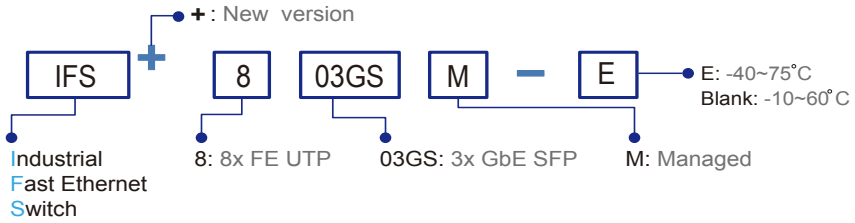


Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

Ordering Information

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

Model Naming Rule



Package List

- One device of the series
- Console cable (RJ-45 to DB9)
- Din Rail with screws
- Terminal block
- Protective caps for SFP ports

Optional Accessories

Industrial Power Supply

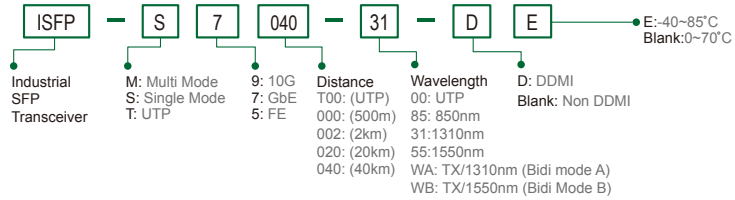
IND-WMK02	Wall Mount kit for Industrial product (Wide) (184 x 50mm)

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-1604GSM & IFS-803GSM & IFS-402GSM

- ◀ 16x 10/100Base RJ45 + 4x 100/1000Base SFP
- ▮ 8x 10/100Base RJ45 + 3x 100/1000Base SFP
- ▶ 4x 10/100Base RJ45 + 2x 100/1000Base SFP



- UL60950-1, EN60950-1, EN50121-4, EN61000-6-2, EN61000-6-4, CE, FCC certified
- Supports IEEE 1588 PTP V2
- Supports u-Ring, ERPS, MSTP, RSTP, STP for redundant cabling
- Cable diagnostics, identifies opens/shorts distance

These models are managed industrial grade L2+ switches with 16/8/4 10/100Base-TX ports and 4/3/2 GbE/100M SFP 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, 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

- 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
- 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
- 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)
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	See table below
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

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

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

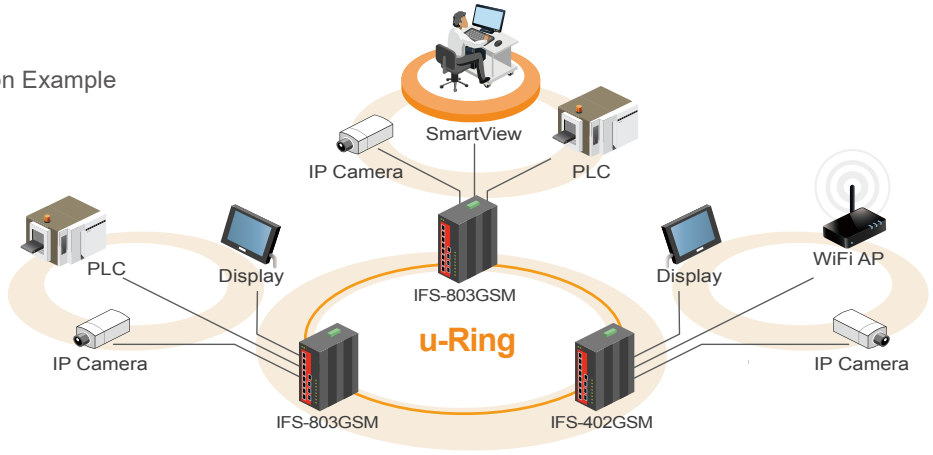
Housing	Rugged Metal, IP30 Protection, Fanless
Dimensions	106 x 62.5 x 135 mm (D x W x H) (IFS-402GSM) 106 x 72 x 152 mm (D x W x H) (IFS-803GSM, IFS-1604GSM)
Weight	0.715kg (IFS-402GSM), 0.79kg (IFS-803GSM) 0.82kg (IFS-1604GSM)
Installation Mounting	DIN Rail mounting or wall mounting (optional)
MTBF	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
EtherNet/IP	Supports for management and monitoring
ModBus/TCP	Support management and monitoring
SW & Configuration Upgrade	TFTP, HTTP Redundant firmware in case of upgrade failure
FTP client	Supports for upload/download configuration
RMON	RMON I (1, 2, 3, 9 group), RMON II
MIB	RFC1213 MIB II, Private MIB
UPnP	Supported
BOOTP	Supported
DHCP	Server, Client, Relay, Relay option 82 , Snooping
RARP	Supported
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	Server/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	Server/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

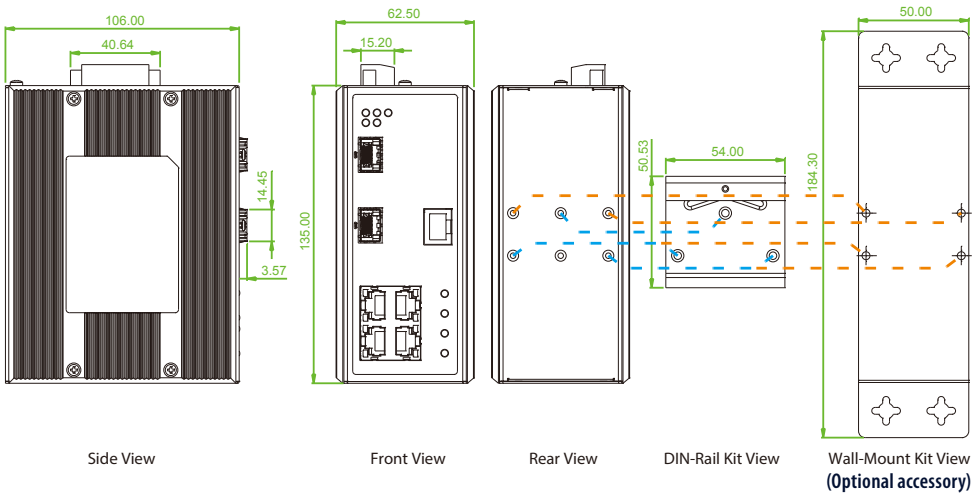
Application

Figure : Application Example

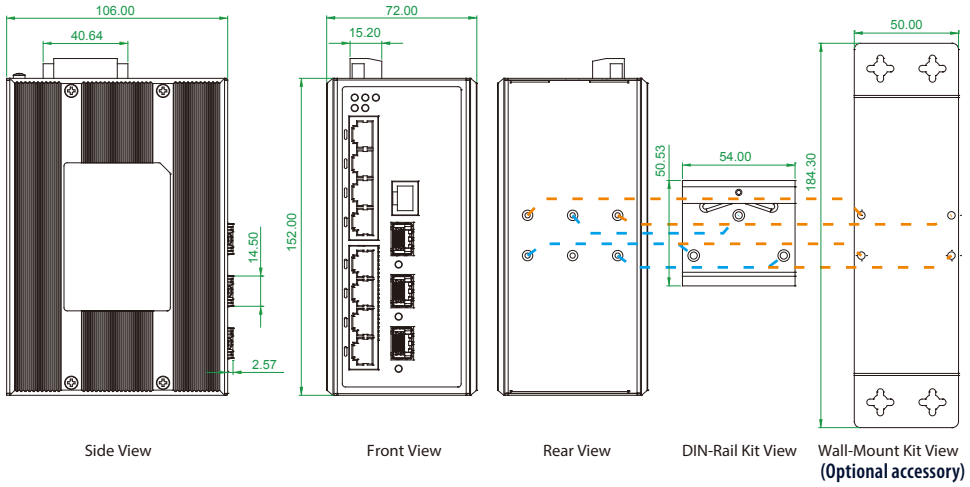


Dimensions

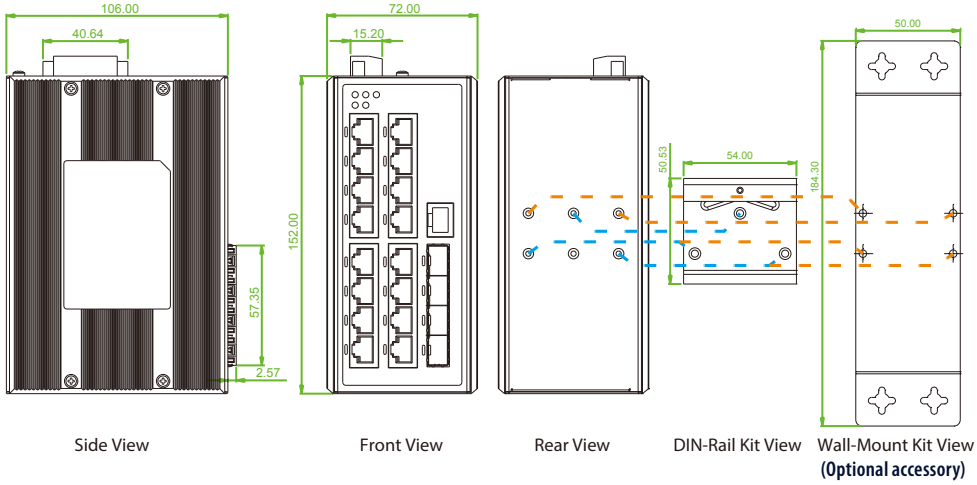
▶ IFS-402GSM



▶ IFS-803GSM



▶ IFS-1604GSM



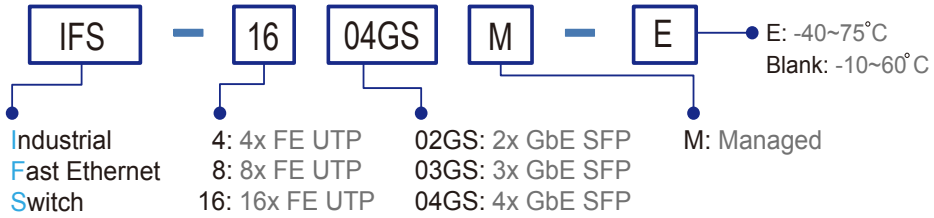
2020 V1.0

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

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



Package List

- One device of the series
- Console cable (RJ-45 to DB9)
- Din Rail with screws
- Terminal block
- Protective caps for SFP ports

Optional Accessories

Industrial Power Supply

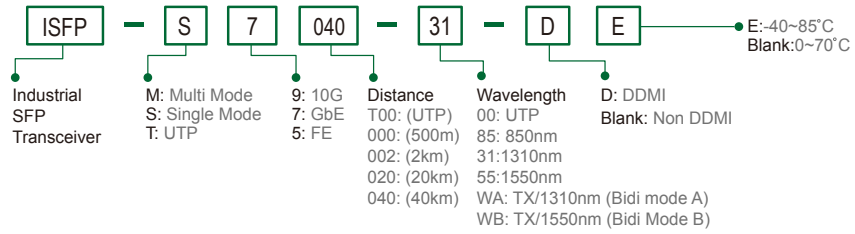
IND-WMK02	Wall Mount kit for Industrial product (Wide) (184 x 50mm)

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



IMC-1000MS

1x GbE RJ45 to 1x 100/1000Base SFP



- UL60950-1, EN50121-4, CE, FCC, EN61000-6-2, EN61000-6-4 certified
- Supports LFPT (Link Fault Pass Through) and FEF (Far End Fault)
- Provides a DIP-Switch to set functions
- SNMP, Web based and In-band management,
- Remote Loop-Back test

IMC-1000MS is a 10/100/1000Base-T to 100/1000Base-X managed GbE media converter which offers dual speed fiber (100M/1G) 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. 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

- 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)
- 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
- 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
Far-End Fault (FEF)	Work with LFPT to prevents data loss
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

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

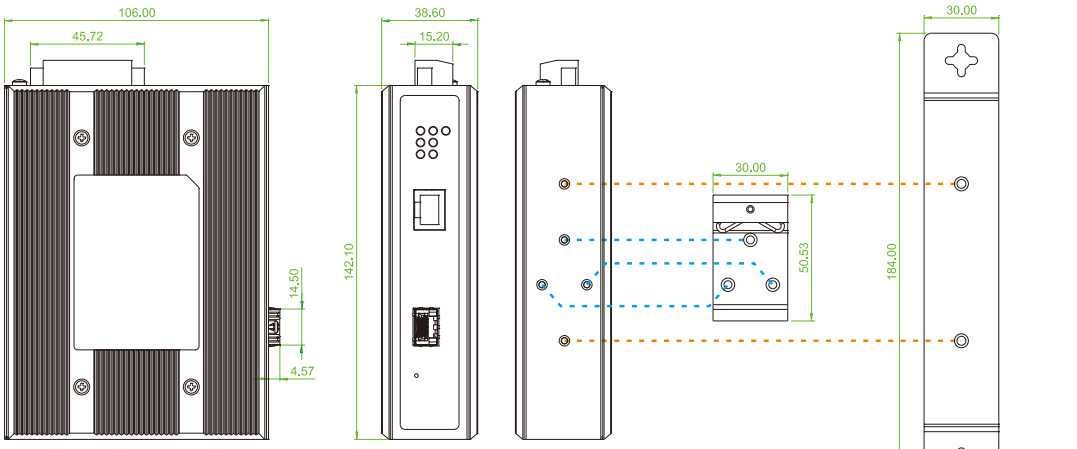
Safety	UL60950-1
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

Software Specifications

SNMP or Web Mode	
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	
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

Dimensions



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

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°C

Model Naming Rule

IMC - 1000 M S - E — E: -20~75°C

- IMC: Industrial Media Converter
- 1000: 1000Base-X Converter
- M: Managed
- S: SFP type

Package List

- 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°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 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

IGS-800C

8x GbE RJ45 (Compact Size)

NEW



- EN50121-4, EN61000-6-2, EN61000-6-4, CE, FCC certified
- 12/24/48VDC (9.6~60VDC) redundant dual input power
- Low profile size, IP30, rugged metal housing, fanless

IGS-800C is a Compact, 8 Ports unmanaged Gigabit Ethernet switche, that provide stable and reliable Ethernet transmission. Housed in rugged DIN rail or wall mountable enclosures, the switch is 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 70°C) fulfill the special needs of industrial automation applications.

Features

- Supports flow control
- Jumbo frame support
- Supports auto-negotiation and auto-MDI/MDI-X
- Supports DIN Rail or wall mounting installation
- Wide operating temperature -40~70°C (-E model)

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): 16 Gbps Full wire-speed
Data Processing	Store and Forward
Flow Control	IEEE 802.3x flow control for Full duplex , back pressure for half duplex
Jumbo Frame	9K Bytes
MAC Address Table	4K
Network Connector	8 x 10/100/1000Base-T RJ-45
	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)
Protocols	CSMA/CD
LED	Per unit: Power 1 (Green), Power 2 (Green)
	Per RJ45: Link/Act 1000 (Yellow), Link/Act 10/100 (Green)
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	Input: IGS-800C
	12VDC: 3.9W
	24VDC: 4.6W
	48VDC: 6.8W
Removable Terminal Block	Provides 2 redundant power, 4 Pin

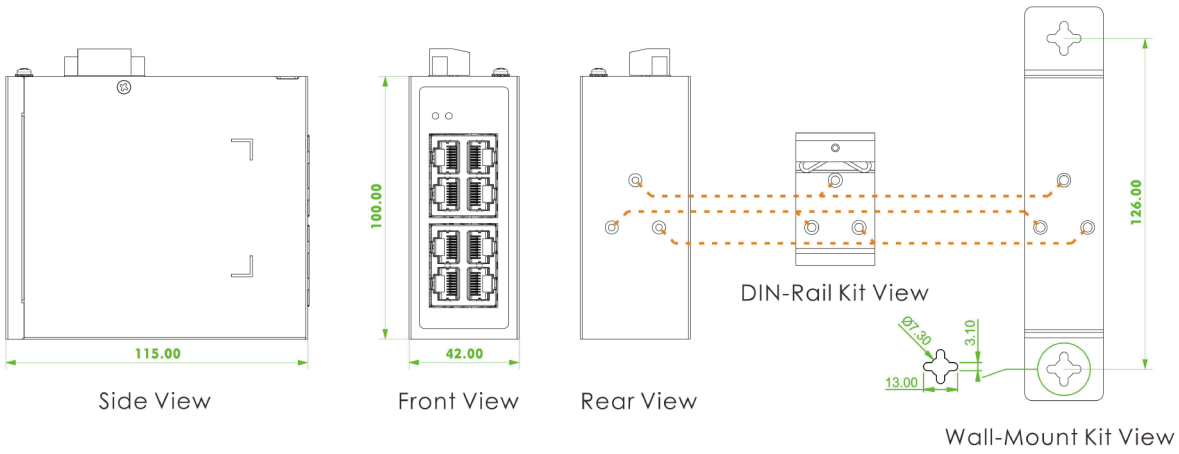
Operating Temperature	-10°C~60°C (IGS-800C)
	-40°C~70°C (IGS-800C-E)
Operating Humidity	5% to 95% (Non-condensing)
Storage Temperature	-40 ~ 85°C
Housing	Rugged Metal,IP30Protection and fanless
Dimensions	100 x 42x 115mm (D x W x H)
Weight	0.27kg
Installation Mounting	DIN Rail mounting, or wall mounting (Optional)
MTBF	TBD
Warranty	5 years
Certification	
EMC/EMS	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
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

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Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

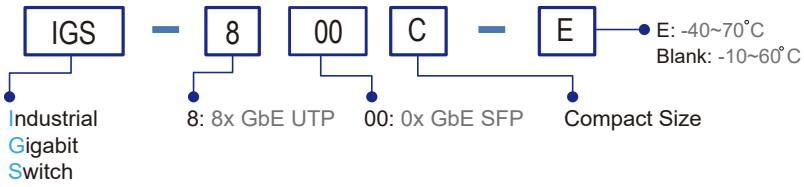
Dimensions



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-800C	8	8		12/24/48VDC	V	V	V	V	-10~60℃
IGS-800C-E	8	8		12/24/48VDC	V	V	V	V	-40~70℃

Model Naming Rule



Package List

- One device of the series
- Din Rail with screws
- Terminal block

Optional Accessories

Wall mount kit accessories

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

IGS-800 & IGS-501S & IGS-500

- 8x GbE RJ45
- 5x GbE RJ45 + 1x 100/1000Base SFP
- 5x GbE RJ45



- EN50121-4, EN61000-6-2, EN61000-6-4, CE, FCC certified
- Provides a DIP-Switch to set functions
- Supports power failure alarm message by relay
- 12/24/48VDC (9.6~60VDC) redundant dual input power
- IP30, rugged metal housing, fanless

These models are 8/5-port 10/100/1000Base-T unmanaged GbE switches. The IGS-501S includes a 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

- Supports flow control
- Jumbo frame support
- Supports IEEE 802.3az Green Ethernet
- Supports auto-negotiation and auto-MDI/MDI-X
- Supports DIN Rail or wall mounting installation
- Wide operating temperature -40~75°C (-E model)

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

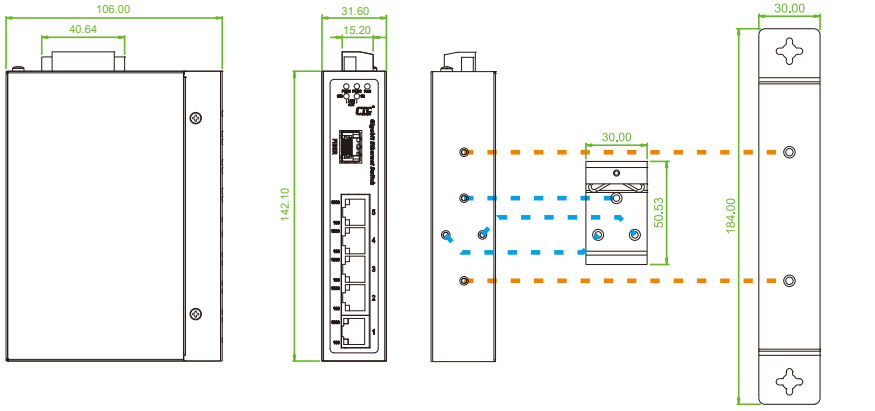
Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

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

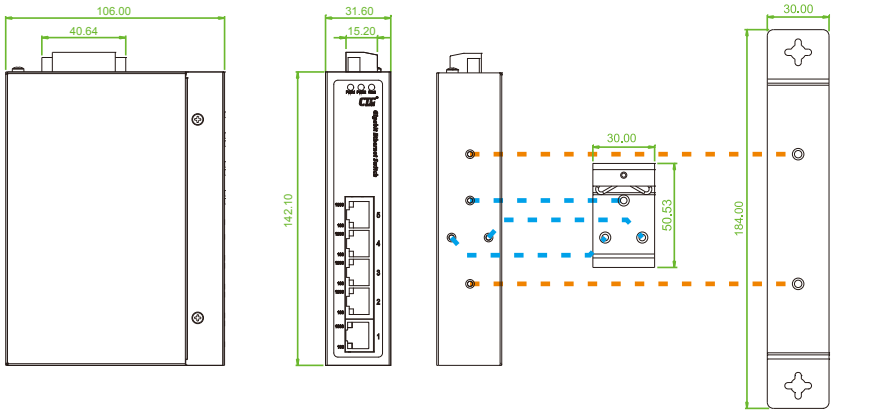
Dimensions

▶ IGS-501S



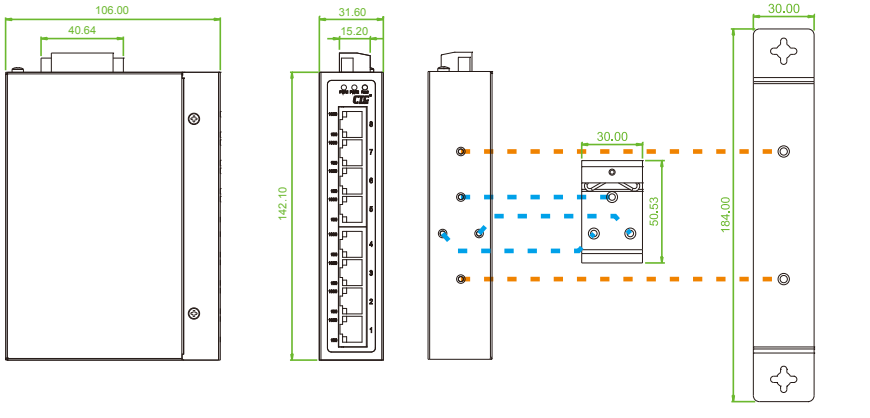
Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

▶ IGS-500



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

▶ IGS-800

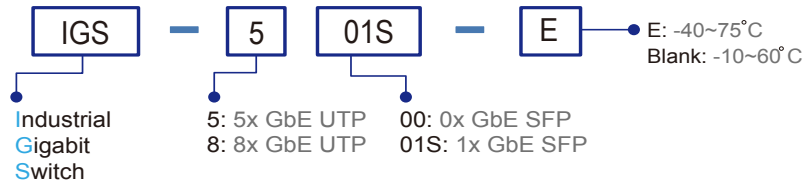


Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

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



Port Number / Temperature

IGS – □□□ – □

Example: IGS – 500 – E

Package List

- One device of the series
- Protective caps for SFP ports (for IGS-501S)
- Din Rail with screws
- Terminal block

Optional Accessories

Wall mount kit accessories

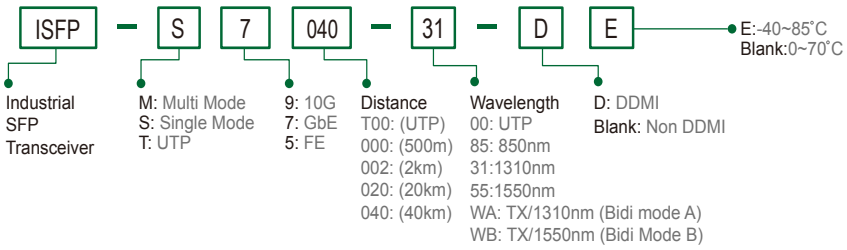
IND-WMK01	Wall Mount kit for Industrial product (184 x 30mm)

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



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Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

IGS-402S & IGS-402F

- 4x GbE RJ45 + 2x 100/1000Base SFP
- 4x GbE RJ45 + 2x 1000Base Fiber (ST/SC)



- EN50121-4, EN61000-6-2, EN61000-6-4, CE, FCC certified
- Provides a DIP-Switch to set functions
- Supports power failure alarm message by relay
- 12/24/48VDC (9.6~60VDC) redundant dual input power
- IP30, rugged metal housing, fanless

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

- Wide operating temperature -40 ~ 75°C ("-E" model)
- Supports flow control
- Jumbo frame support

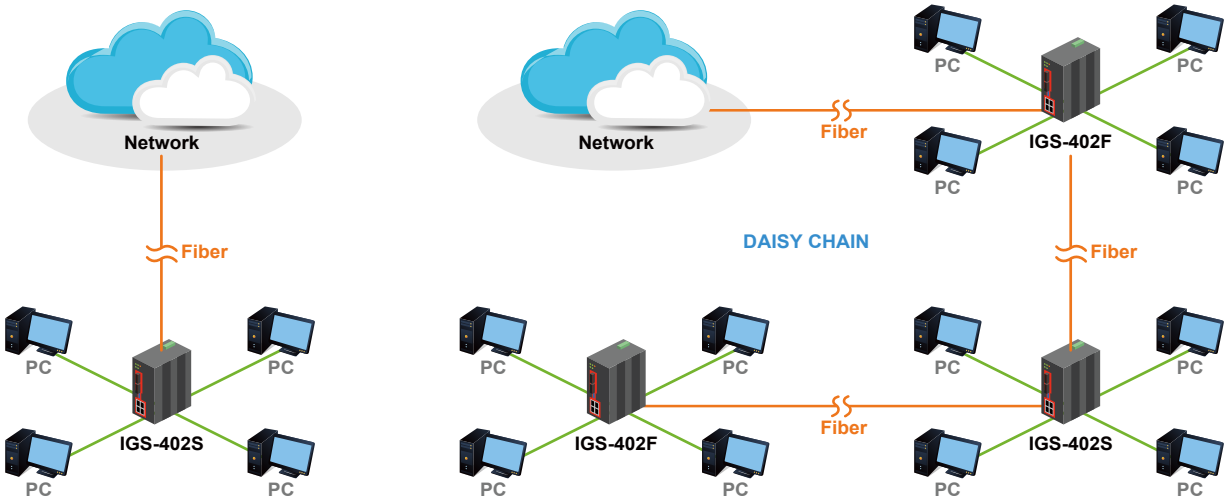
Specifications

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

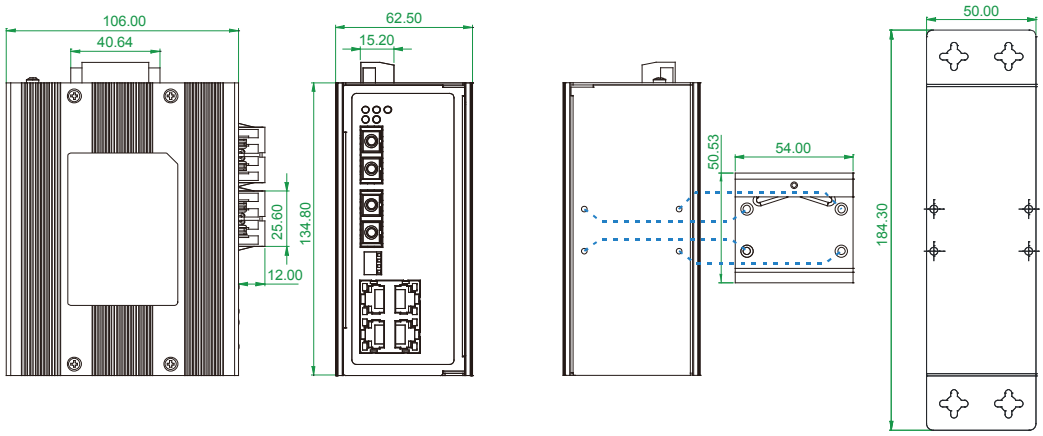
Application

Figure : IGS-402S & IGS-402F Giagabit Ethernet Switch Transmission



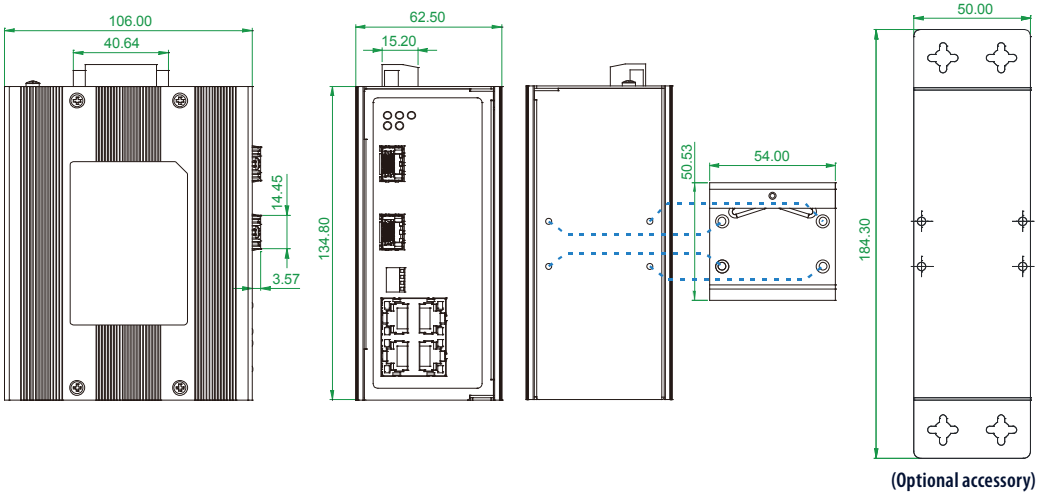
Dimensions

▶ IGS-402F



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

▶ IGS-402S



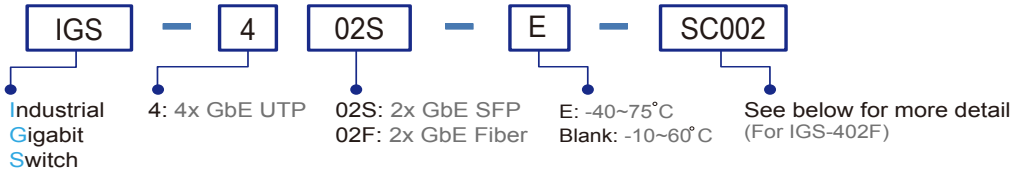
(Optional accessory)

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

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)
- Din Rail with screws
- Terminal block

Optional Accessories

Wall mount kit accessories

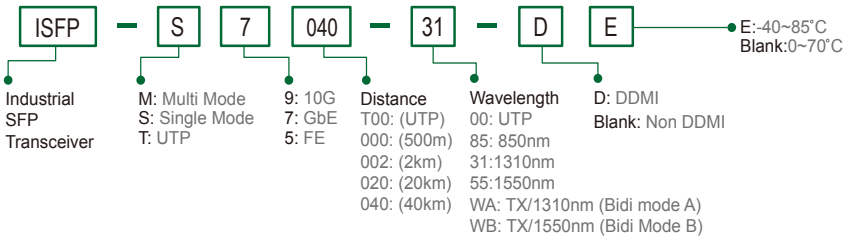
IND-WMK02	Wall Mount kit for Industrial product, 184 x 50mm

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-1602GS & IFS-802GS & IFS-800

◀ 16x (or 8x) 10/100Base RJ45 + 2x 1000Base SFP
▶ 8x 10/100Base RJ45

IFS-402F & IFS-401F

4x 10/100Base RJ15 + 2x (or 1x) 100Base Fiber (ST/SC)



- EN50121-4, EN61000-6-2, EN61000-6-4, CE, FCC certified
- Provides a DIP-Switch to set functions
- Supports power failure alarm message by relay
- 12/24/48VDC (9.6~60VDC) redundant dual input power
- IP30, rugged metal housing, fanless

These models are unmanaged industrial grade switches with 16/8/4 10/100Base-TX ports and 2/1/0 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

- Wide operating temperature -40 ~ 75°C (-E model)
- Provides broadcast storm protection (IFS-401F, IFS-402F, IFS-800, IFS-1602GS)
- 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)

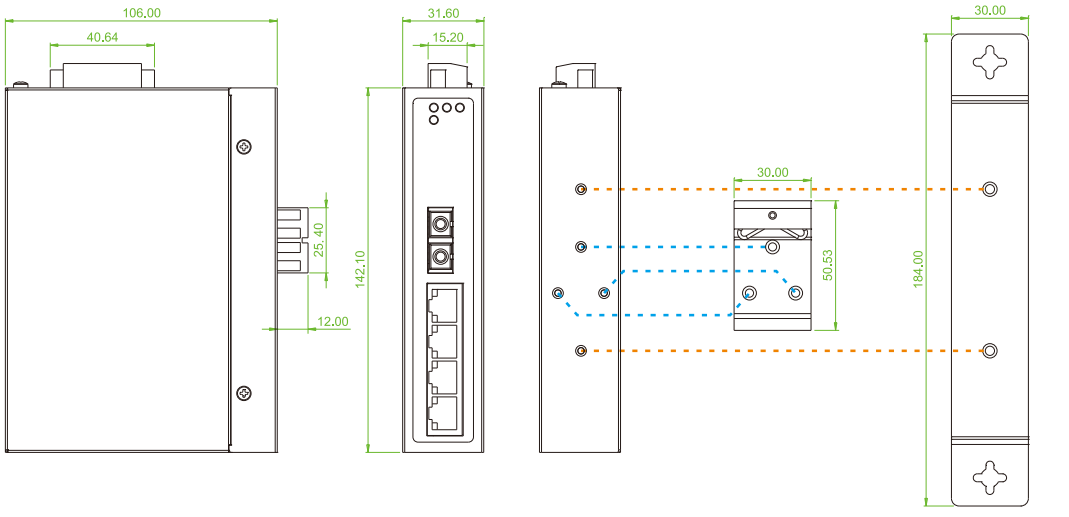
Network Cable	10Base-T: 2-pair UTP/STP Cat. 5e cable
	EIA/TIA-568 100-ohm (100m)
	100Base-TX: 2-pair UTP/STP Cat. 5e cable
	EIA/TIA-568 100-ohm (100m)
	Fiber Cable (Multi-mode): 50/125um~62.5/125um
Network Cable	Fiber Cable (Single-mode): 8/125um~10/125um
	Wavelength: 1310nm (Multi-mode/Single-mode)
	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

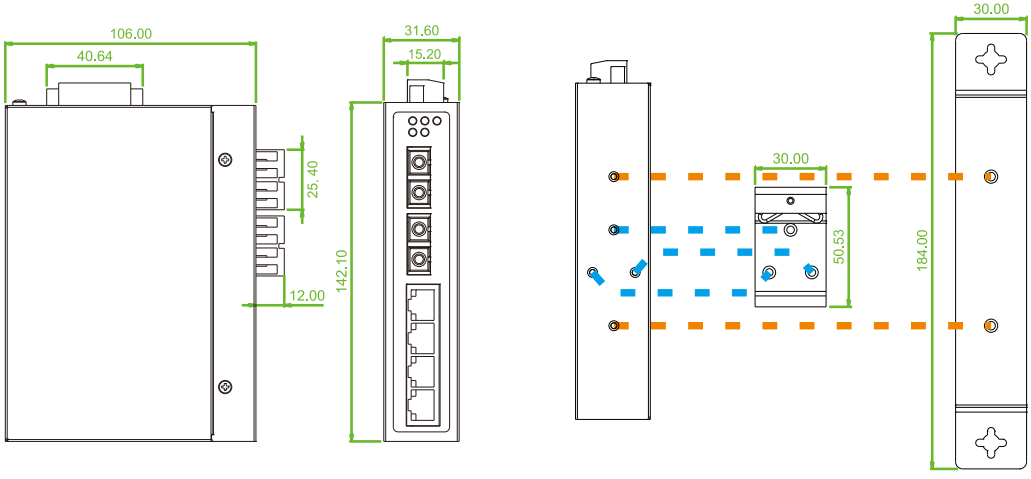
Dimensions

▶ IFS-401F



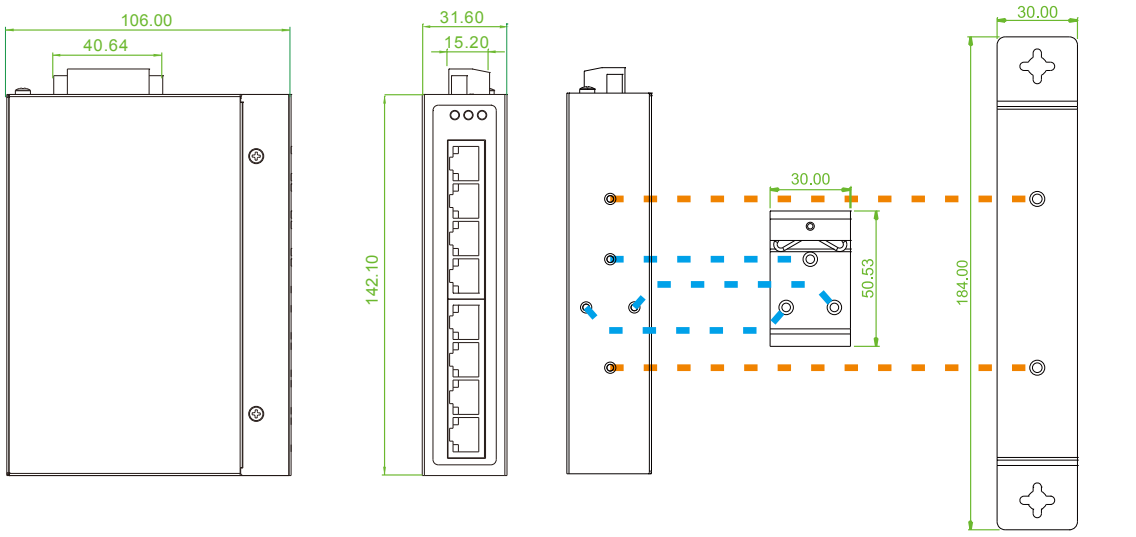
Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

▶ IFS-402F



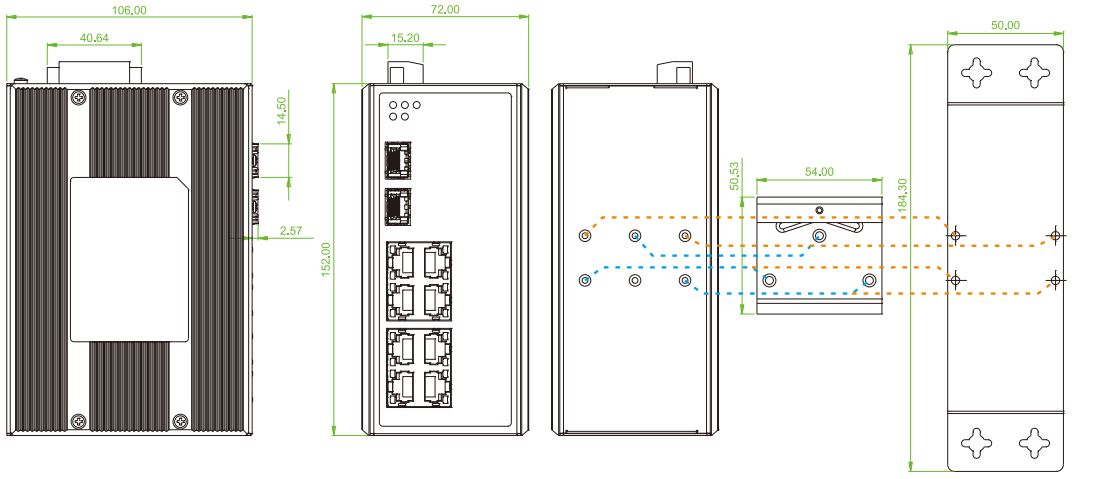
Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

▶ IFS-800



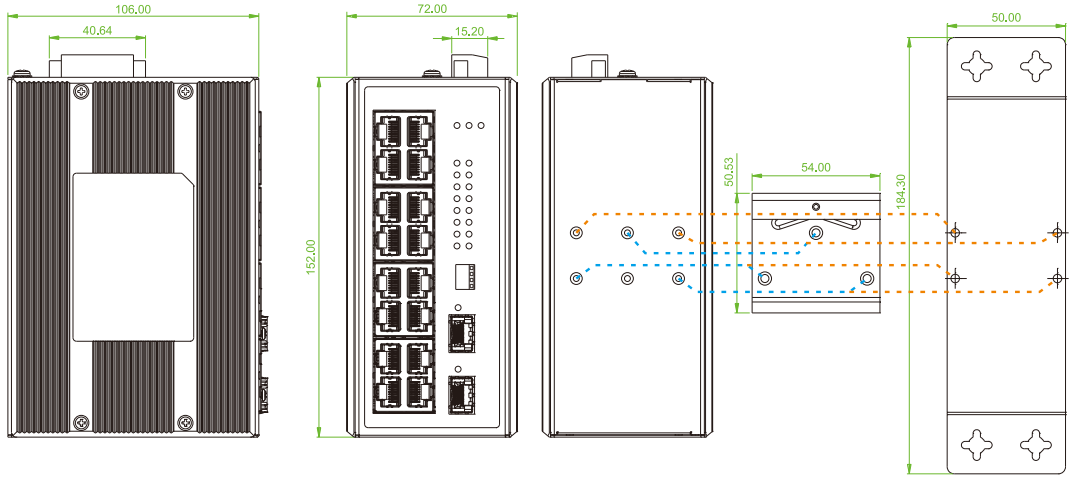
Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

▶ 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)

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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
- 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: D: DDMI; Blank: Non DDMI
- E: E:-40~85°C; Blank:0~70°C

IFS-500C

5x 10/100Base RJ45 (Compact Size)



- EN50121-4, EN61000-6-2, EN61000-6-4, CE, FCC certified
- Compact size for easy installation
- IP30, rugged metal housing, fanless

IFS-500C 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)
- Wide operating temperature -40 ~ 75°C (-E model)
- Very low power consumption
- Supports flow control

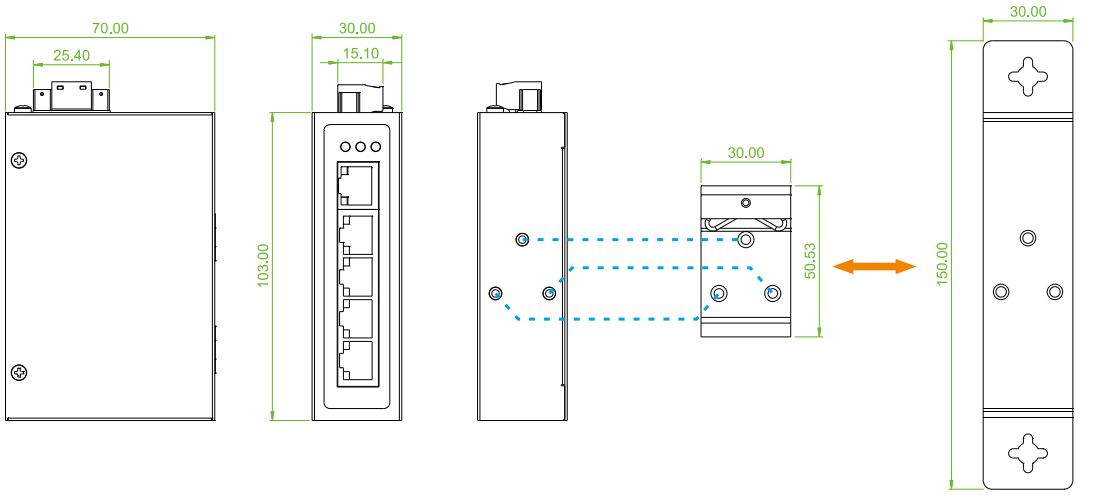
Specifications

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

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

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
- Din Rail with screws
- Terminal block

Optional Accessories

Wall mount kit Accessories

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

IFS-500

5x 10/100Base RJ45



- EN50121-4, EN61000-6-2, EN61000-6-4,CE, FCC certified
- Provides a DIP-Switch to set functions
- Supports power failure alarm message by relay
- 12/24/48VDC (9.6~60VDC) redundant dual input power
- IP30, rugged metal housing, fanless

The series models are 5 ports 10/100Base-TX Ethernet unmanaged Fast Ethernet switches, 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. 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 operating temperature -40 ~ 75°C (-E model)
- Provides broadcast storm protection
- Supports DIP SW for alarm setting and broadcast storm protection
- Supports flow control

Specifications

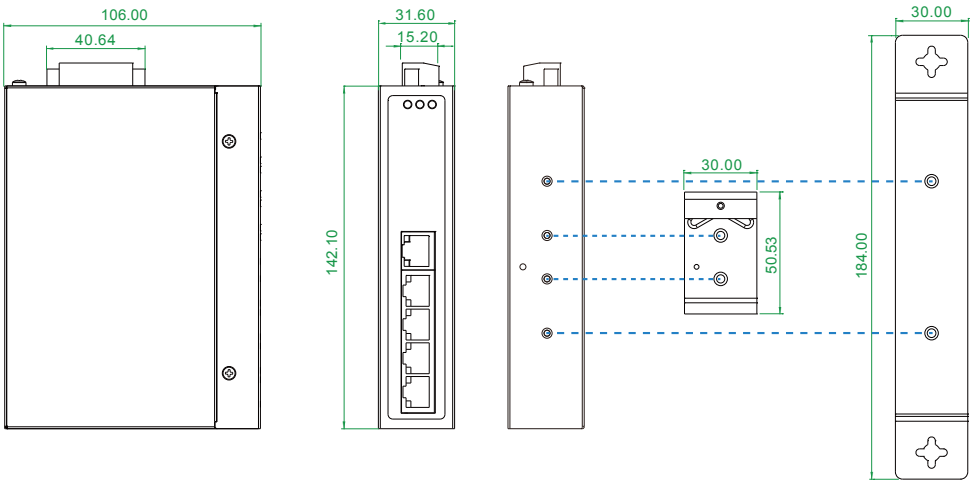
IEEE Standard	IEEE 802.3 10Base-T Ethernet	
	IEEE 802.3u 100Base-TX and 100Base-FX Fast Ethernet	
	IEEE 802.3x Flow Control and Back Pressure	
	IEEE 802.3z 1000Base-X Gbit/s Ethernet over Fiber-Optic	
Switch Architecture	Back-plane (Switching Fabric) : 1.0 Gbps	
Data Processing	Store and Forward	
Transfer 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	
Provides Broadcast Storm Protection	Present, Enable /Disable set by DIP SW	
MAC Address Table	2K	
Packet Buffer Size	448Kbit	
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 1 (Green), Power 2 (Green), Fault (Amber)	
	RJ-45 Per port: Link/Active (Green), Speed 100 (Yellow)	
DIP SW	DIP 1	OFF : Enable power failure alarm
		ON : Disable
	DIP 2	OFF : Enable broadcast storm protection
		ON : Disables broadcast storm protection
Reverse Polarity Protection	Present	
Overload Current Protection	Present	
Power Supply	Redundant Dual DC 12/24/48V (9.6~60VDC) Input power (Removable Terminal Block)	
Power Consumption	2.9W	

Alarm Relay Contact	Relay outputs with current carrying capacity of 1 A @24VDC, NC
Removable Terminal Block	Provide 2 Redundant power, Alarm relay contact, 6 Pin
Operating Temperature	-10 ~ 60°C (IFS-500)
	-40 ~ 75°C (IFS-500-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)
Weight	0.42kg
Installation Mounting	DIN Rail mounting or wall mounting
MTBF	650,473Hrs (MIL-HDBK-217)
Warranty	5 years
Certification	
EMC/EMS	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	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)
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

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Dimensions

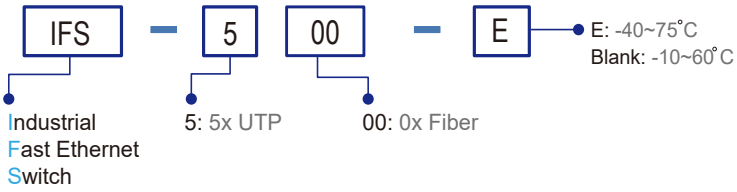


Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

Ordering Information

Model Name	Total Port	UTP Port	Fiber Port		Certification				Operating Temperture
		10/100Base-TX	100Base-FX	1000Base-X	Railway EN50121-4	EN61000-6-2 EN61000-6-4	CE	FCC	
IFS-500	5	5	-		V	V	V	V	-10~60 C
IFS-500-E	5	5	-		V	V	V	V	-40~75 C

Model Naming Rule



Wall mount kit Accessories

IND-WMK01	Wall Mount kit for Industrial product, 184 x 30mm (Narrow)

IMC-1000CS & IMC-1000C

- 1x GbE RJ45 to 1x 100/1000Base SFP (Compact, Size)
- 1x GbE RJ45 to 1x 1000Base Fiber (ST/SC) (Compact, Size)



- EN50121-4, CE, FCC, EN61000-6-2, EN61000-6-4 certified
- Supports LFPT (Link Fault Pass Through) and FEF (Far End Fault)
- Provides a DIP-Switch to set functions
- 12/24/48VDC (9.6~60VDC, 24VAC) input power

These compact models are unmanaged industrial grade GbE media converters that support conversion between electrical 10/100/1000Base-T and optical 1000Base-FX Ethernet. 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). 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

- IP30 rugged metal housing and fanless
- Wide operating temperature -20 ~ 75°C
- Store-and-Forward mode and Pass through mode (set by DIP SW)
- Conversion between 10/100/1000Base-T and 1000Base-X Fiber cable interface

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
Far-End Fault (FEF)	Work with LFPT to prevents data loss
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

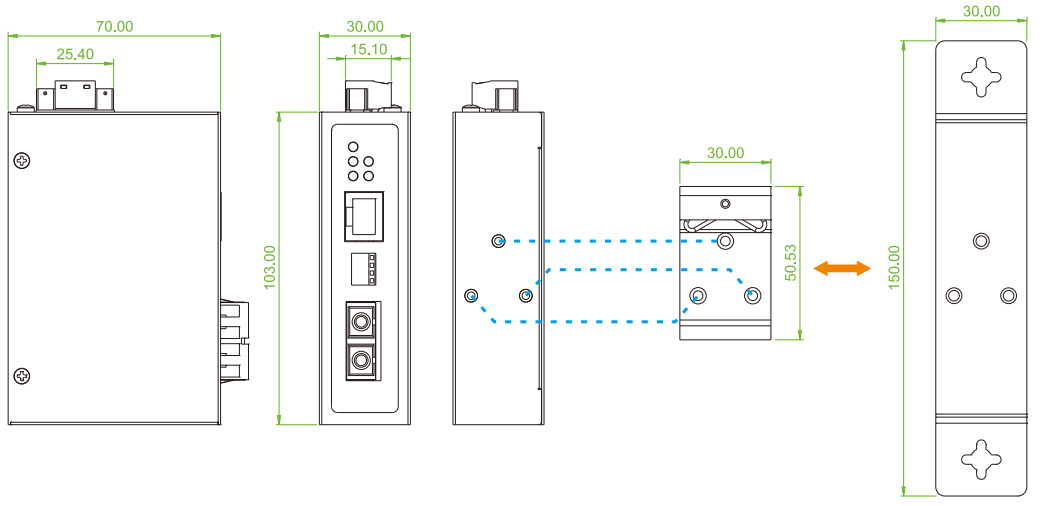
Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

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

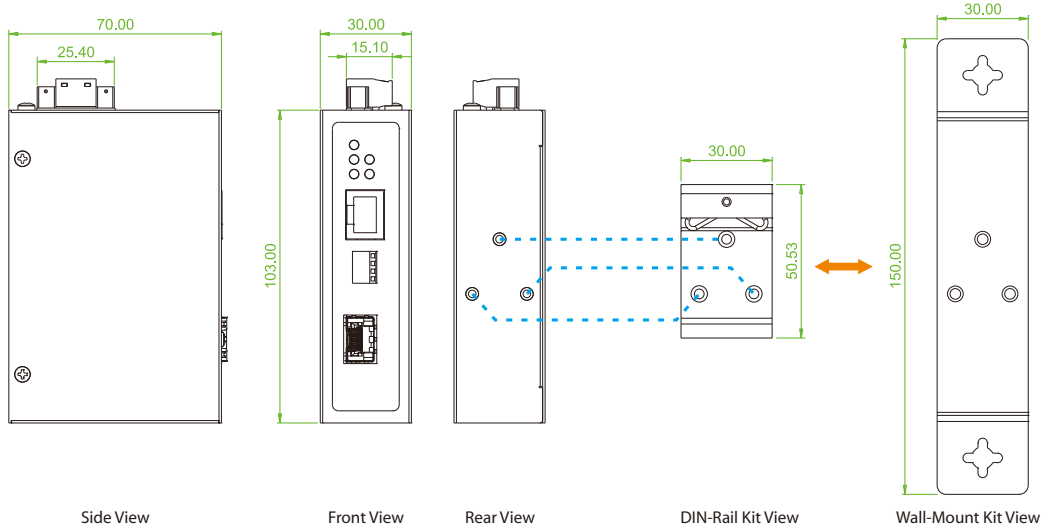
Dimensions

▶ 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

IMC – 1000 C S – E – SC002

- IMC: Industrial Media Converter
- 1000: 1000Base-X Converter
- C: Compact Size
- S: SFP type; Blank: Fix Fiber type (SC)
- E: -20~75˚C
- SC002: See below for more (For IMC-1000C)

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
- 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

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

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Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

IMC-1000S

1x GbE RJ45 to 1x 100/1000Base-X SFP



- UL60950-1, EN50121-4, CE, FCC, EN61000-6-2, EN61000-6-4 certified
- Supports LFPT (Link Fault Pass Through) and FEF (Far End Fault)
- Provides a DIP-Switch to set functions
- Supports power failure alarm message by relay
- 12/24/48VDC (9.6~60VDC) redundant dual input power

IMC-1000S is an unmanaged industrial grade GbE media converter that supports conversion between electrical 10/100/1000Base-T and optical 100/1000Base-X Ethernet. 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. 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

- IP30 rugged metal housing and fanless
- Wide operating temperature -20 ~ 75°C
- 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

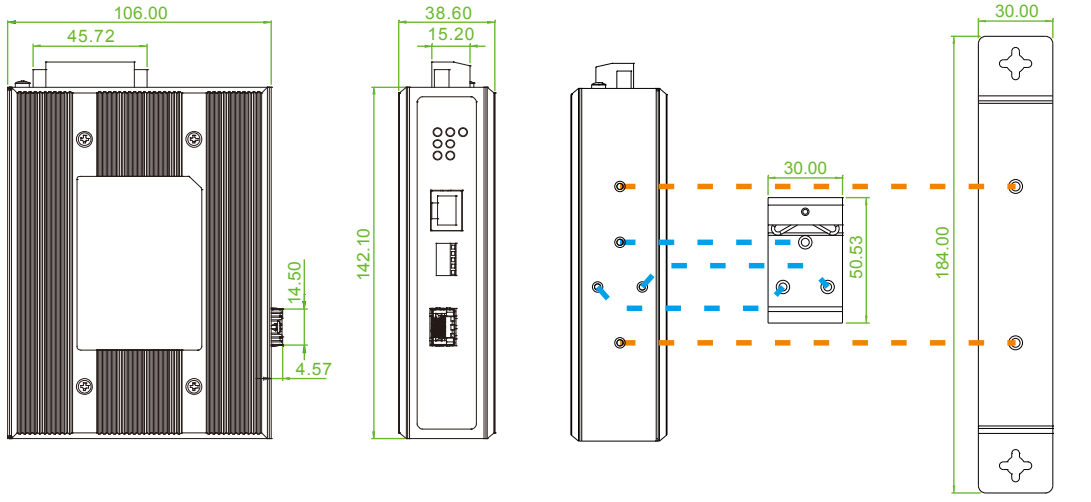
Specifications

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
Far-End Fault (FEF)	Work with LFPT to prevents data loss
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

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°C

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

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

IMC-100C

1x 10/100Base RJ45 to 1x 100Base Fiber (ST/SC), Compact Size



- EN50121-4, CE, FCC, EN61000-6-2, EN61000-6-4 certified
- Supports LFPT (Link Fault Pass Through) and FEF (Far End Fault)
- Provides a DIP-Switch to set functions

IMC-100C is a compact sized, unmanaged industrial grade 100M Ethernet media converter that supports conversion between electrical 10/100Base-TX and optical 100Base-FX Ethernet. 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. 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

- 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)
- Store-and-Forward mode and Pass Through mode (set by DIP SW)
- Conversion between 10/100Base-TX and 100Base-FX cable interface

Specifications

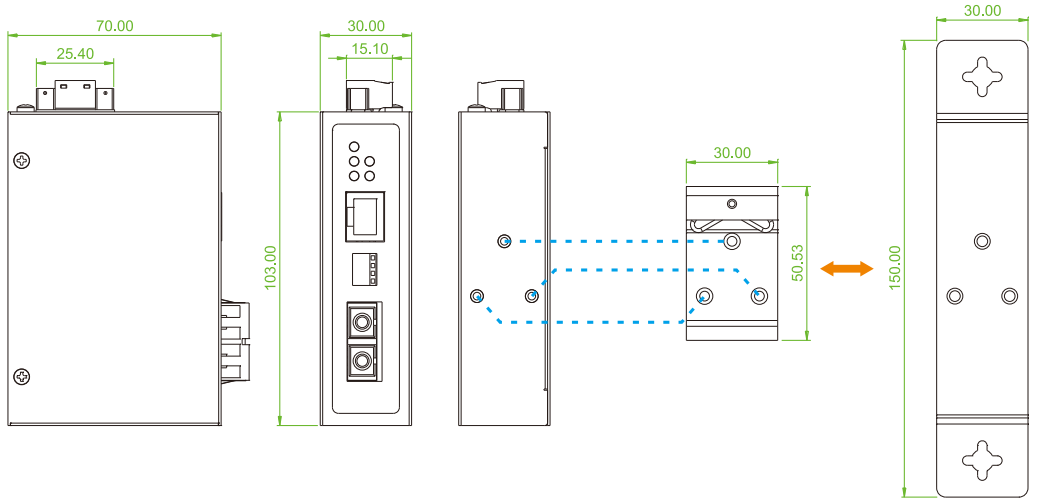
Standard	IEEE 802.3 10Base-T 10Mbit/s Ethernet
	IEEE 802.3u 100Base-TX, 100Base-FX, Fast Ethernet
	IEEE 802.3x Flow Control
RJ45 Ports	10/100Base-TX Auto MDI/MDI-X and Auto-Negotiation Function Supports UTP CAT.5e Twisted Pair cable
Fiber Ports	100Base-FX (SC/ST connectors)
Switch Architecture	Store 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
Far-End Fault (FEF)	Work with LFPT to prevents data loss
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

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 – 100 – C – E – SC002

- IMC: Industrial Media Converter
- 100: 100Base-X Converter
- C: Compact Size
- E: -40~75°C
- SC002: 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
- Din Rail with screws
- Terminal block

Optional Accessories

Wall mount kit Accessories

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

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

IMC-100

1x 10/100Base RJ45 to 1x 100Base-FX Fiber (ST/SC)



- Supports LFPT (Link Fault Pass Through) and FEF (Far End Fault)
- Provides a DIP-Switch to set functions
- UL60950-1, EN50121-4, CE, FCC, EN61000-6-2, EN61000-6-4 certified
- Redundant dual DC input power 12/24/48VDC (9.6 ~ 60VDC)

IMC-100 is an unmanaged industrial grade 100M Ethernet media converter that supports conversion between electrical 10/100Base-TX and optical 100Base-FX Ethernet. 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. 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

- IP30 rugged metal housing and fanless
- Wide operating temperature -40 ~ 75°C (IMC-100-E)
- Store-and-Forward mode and Pass Through mode (set by DIP SW)
- Conversion between 10/100Base-TX and 100Base-FX cable interface

Specifications

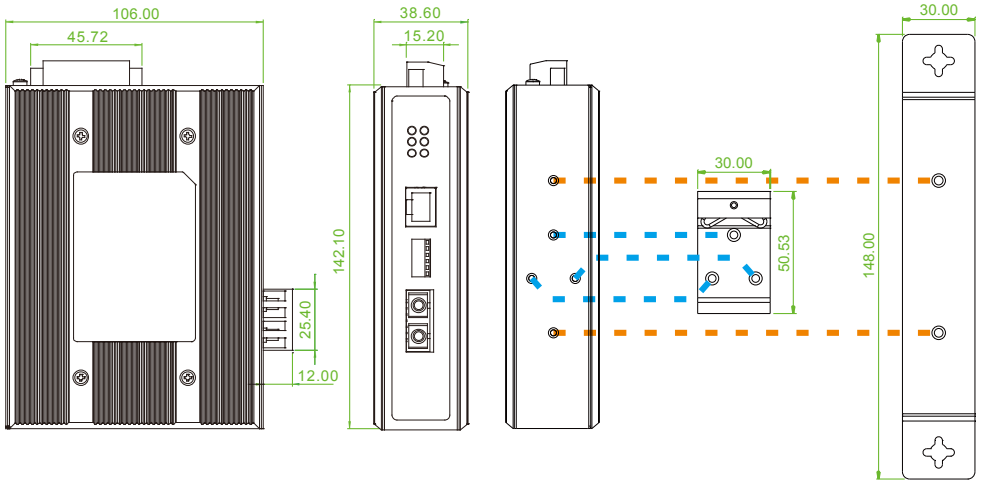
Standard	IEEE 802.3 10Base-T 10Mbit/s Ethernet
	IEEE 802.3u 100Base-TX, 100Base-FX, Fast Ethernet
	IEEE 802.3x Flow Control
RJ45 Ports	10/100Base-TX Auto MDI/MDI-X and Auto-Negotiation Function Supports UTP CAT.5e Twisted Pair cable
Fiber Ports	100Base-FX (SC/ST connectors)
Switch Architecture	Store 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
Far-End Fault (FEF)	Work with LFPT to prevents data loss
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(9.6~60VDC), Redundant power with polarity reverse protect function and removable terminal block
Alarm Relay Contact	Relay outputs with current carrying capacity of 1 A @24VDC
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
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	UL60950-1
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

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
- Din Rail with screws
- Terminal block

Optional Accessories

Wall mount kit Accessories

IND-WMK01	Wall Mount kit for Industrial product, 184 x 30mm

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

IBP-202

Optical Fiber Bypass Switch



- 100M/1G/2.5G/10G Ethernet or Telecom applications
- SC/ST/LC SM or MM optical
- Optical bypass switching time <10ms
- Provides rotary switch to set delay boot time (0~180 seconds)
- EN50121-4, EN61000-6-2, EN61000-6-4,CE, FCC certified

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

- Low insertions loss (<1.5dB)
- Redundant dual DC input power 12/24/48VDC (9.6 ~ 60VDC)
- IP30 rugged metal housing and fanless
- Wide operating temperature -20 ~ 70°C

Specifications

Fiber Connector	SC, ST, LC
Operating wavelength	SM: 1260 ~ 1650nm MM: 810~890nm , 1260~1340nm
Optic Fiber cable	Single mode: 8/125um~10/125um Multi mode: 50/125um
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	CE (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

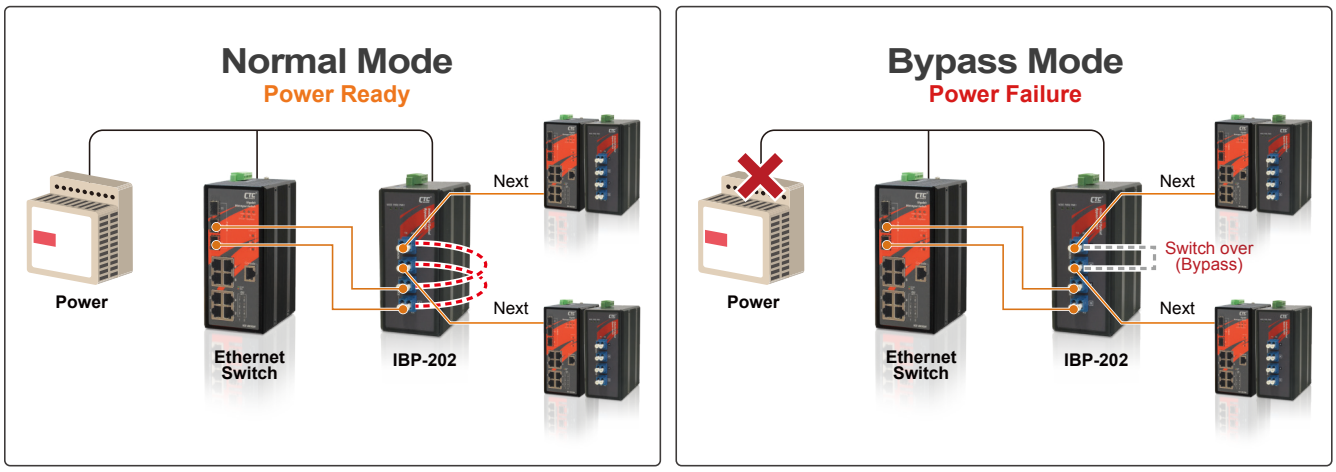


Figure 2 : Application example in line connection

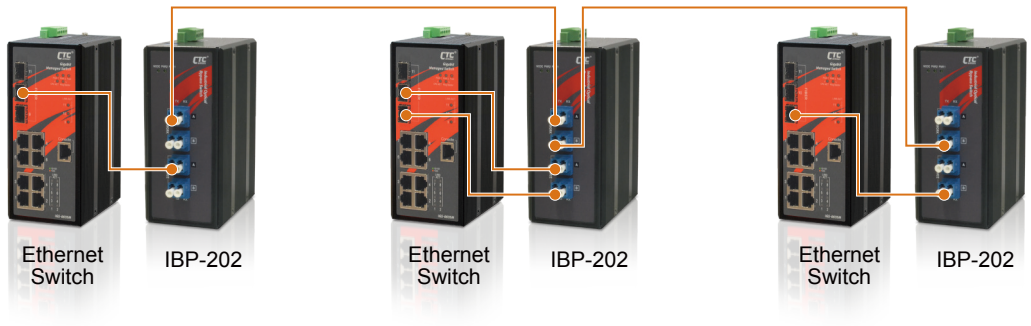
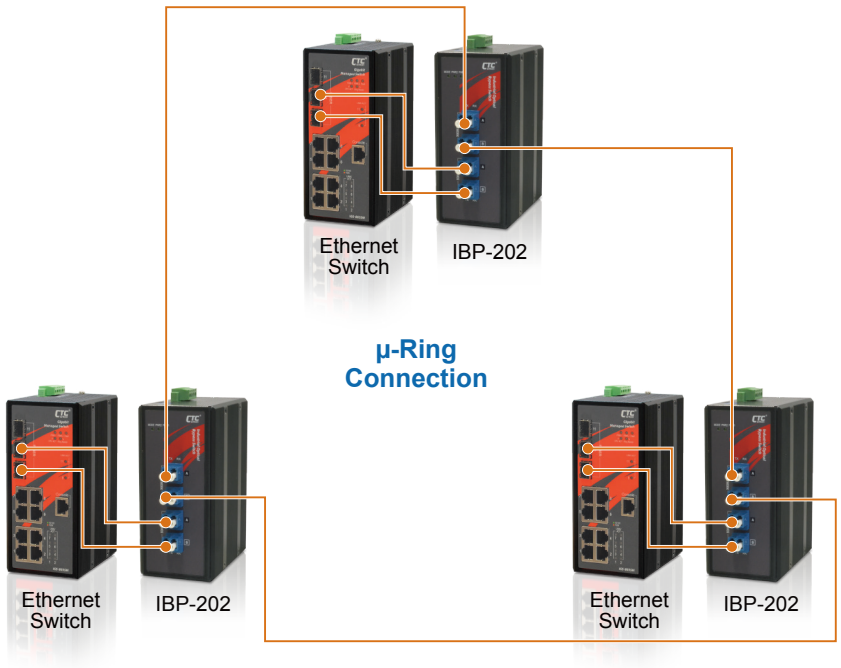


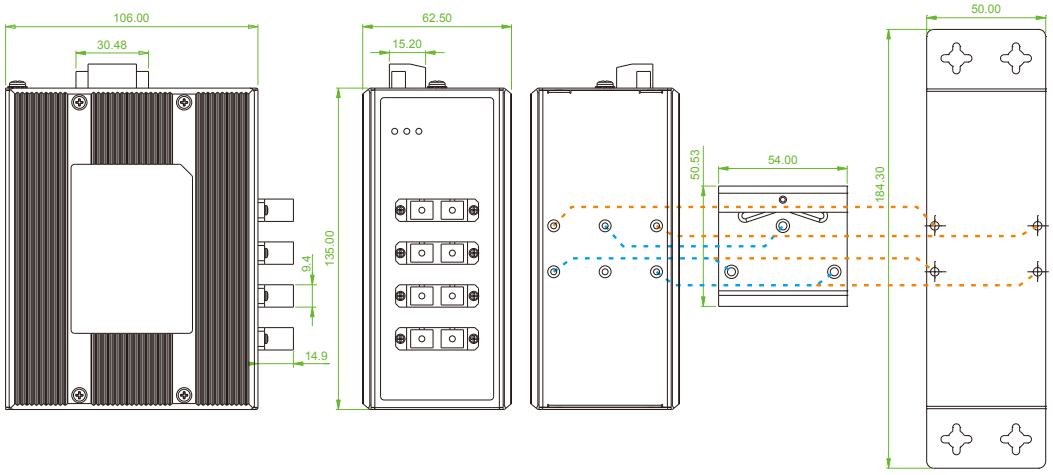
Figure 3 : Application example in ring connection



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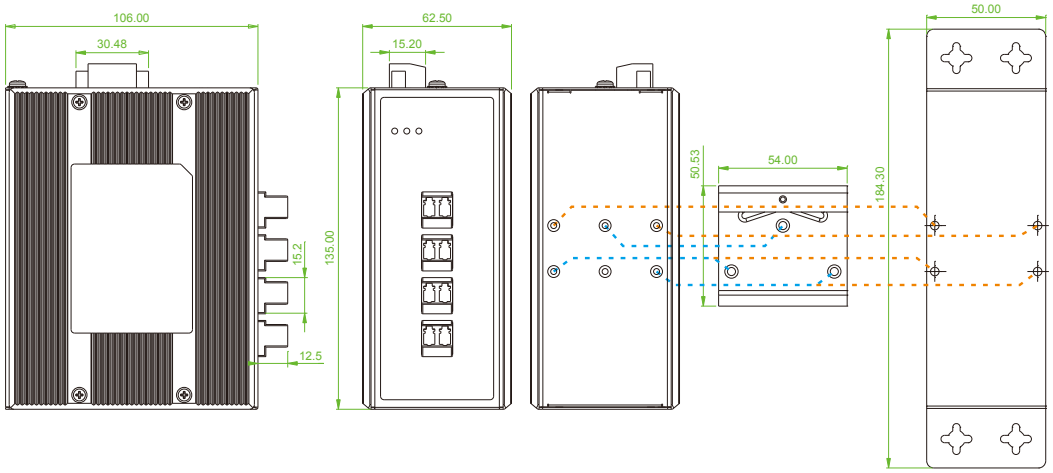
Dimensions

▶ IBP-202 SC Type



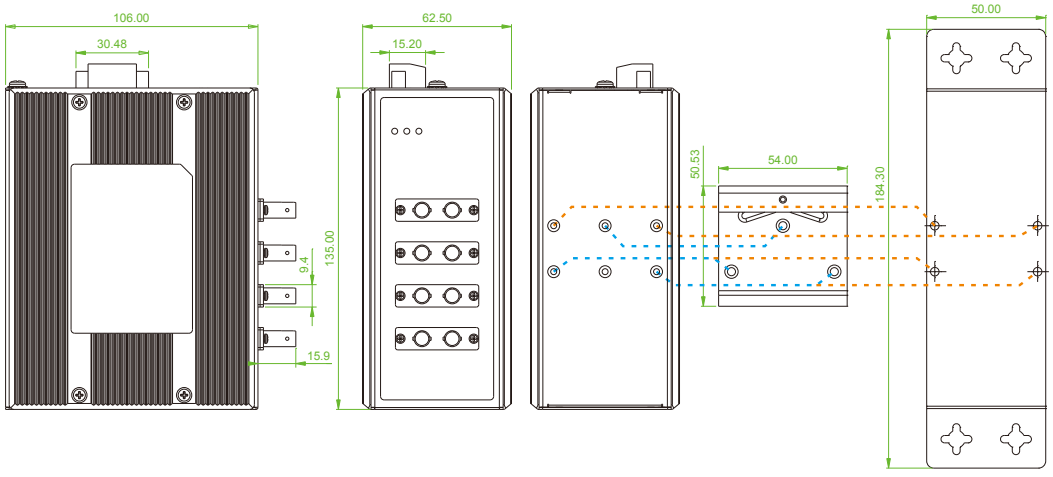
Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

▶ 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
IBP-202-MSC	MM SC	4	100M/Giga/10G	12/24/48VDC	V	V	V	V	-20~70°C
IBP-202-MST	MM ST	4	100M/Giga/10G	12/24/48VDC	V	V	V	V	-20~70°C
IBP-202-MLC	MM LC	4	100M/Giga/10G	12/24/48VDC	V	V	V	V	-20~70°C

Package List

- IBP-202 device
- 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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IFC-FDC-PRO

1x RS232/422/485 to 2-ports Fiber (SC/ST) Media Converter, support PROFIBUS



- 2.5KV isolation for serial port (RS485)
- Supports fiber port for extend transmission distance
- Baud Rate up to 9.6K~12Mbps for Profibus application
- Supports Auto Baud Rate mode, or manual mode for setting Baud Rate
- CE, FCC, heavy industrial grade EN61000-6-2, EN61000-6-4 certified

IFC-FDC-PRO is a serial over fiber converter that is capable of selecting interface modes for connection to RS-485 2-wire half duplex and supports high-speed data rates of PROFIBUS. Fiber optical cabling extends distances and isolates from EMC/noise to reduce interference between PROFIBUS devices. With two fiber ports, this device supports both daisy-chain and ring topologies. The terminal block offers an alarm relay contact and two redundant DC power inputs. IFC-FDC-PRO 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, making it is reliable and an ideal solution for keeping your industrial automation applications running smoothly and continuously even in harsh environments. IFC-FDC-PRO is protocol transparent, and can be applied to PROFIBUS and other networks using RS485 interfaces.

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
- Supports relay output for power or link failure warning
- Hardened housing with IP30 protection
- Fanless and DIN-Rail design for harsh industrial environment

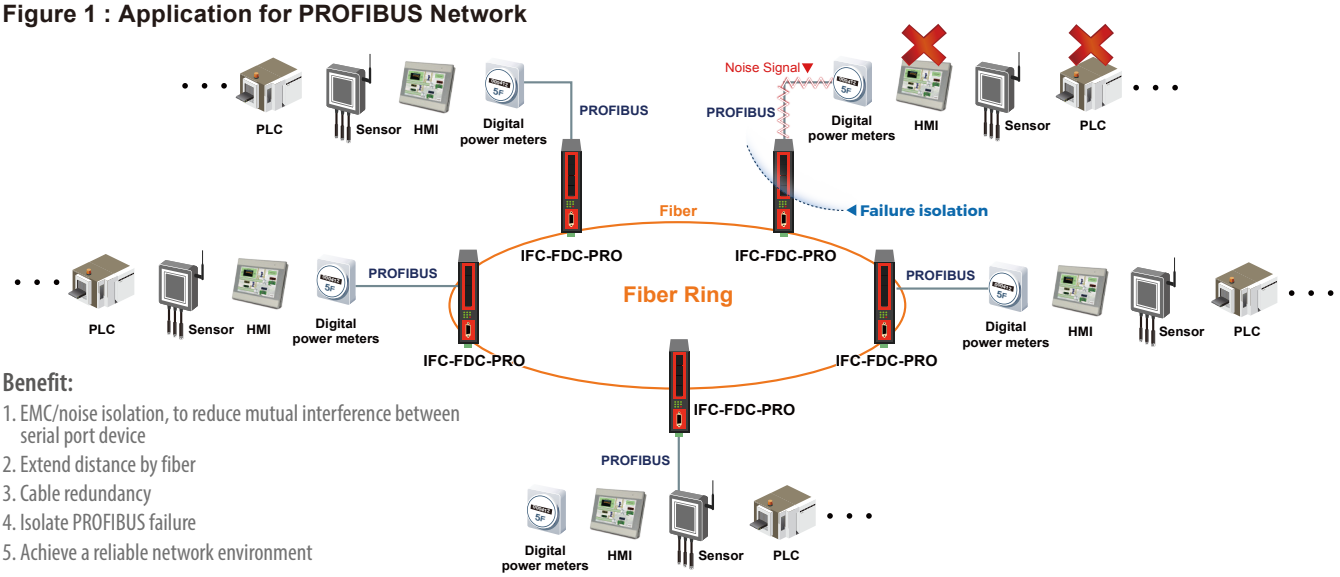
Specifications

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
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

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

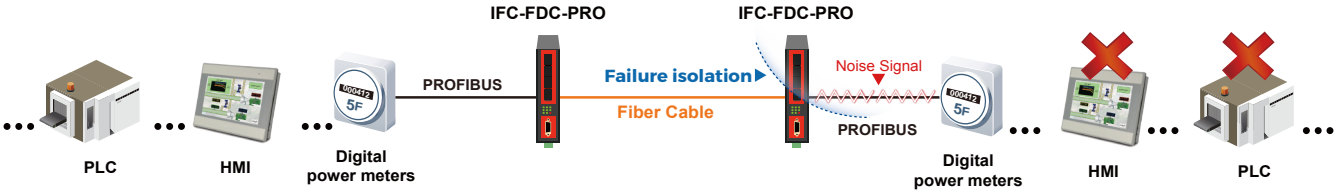


Figure 3 : Fiber Cable Redundancy topology & application

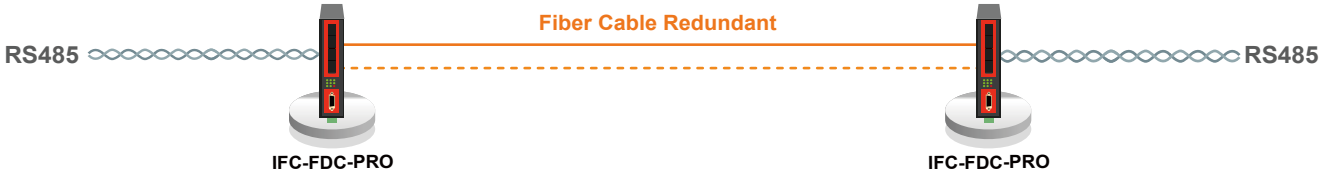
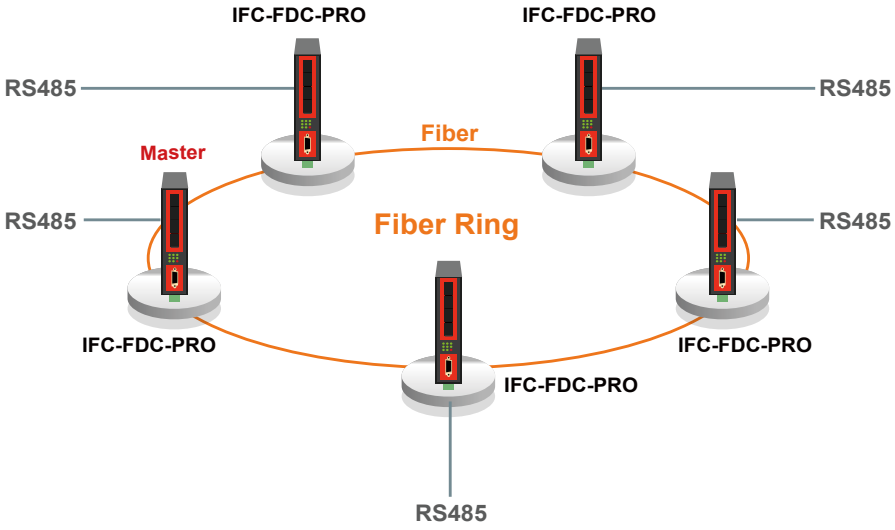


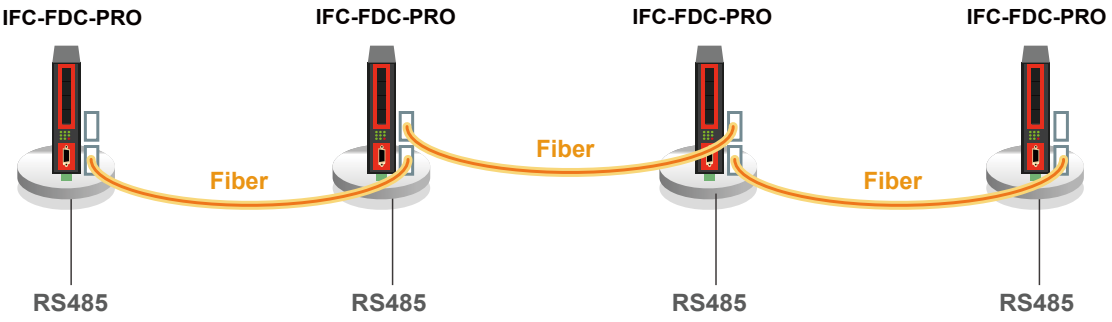
Figure 4 : Fiber Ring Redundancy topology & application



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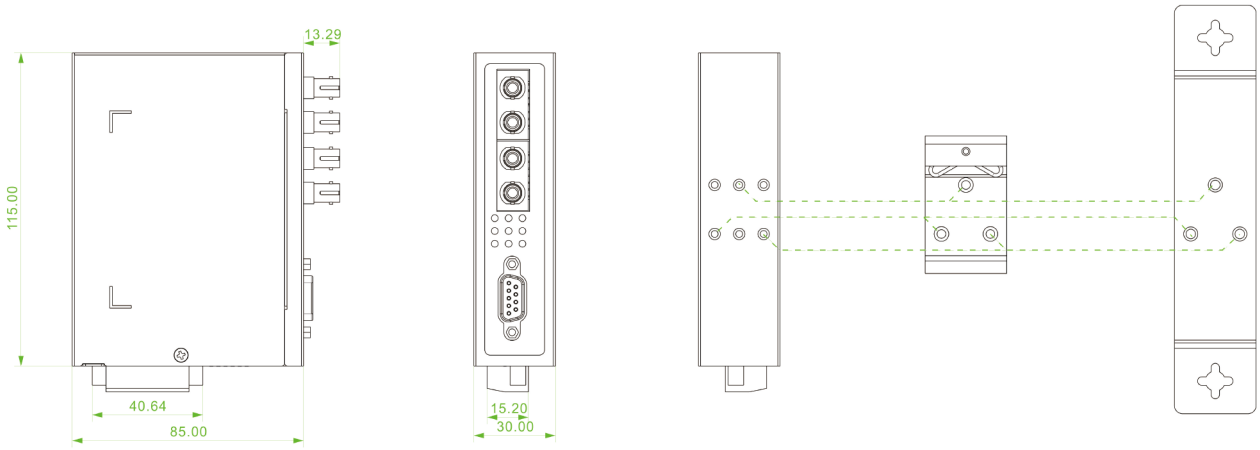
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Figure 5 : Fiber Daisy Chain topology & application



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
- 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
- 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-PRO

1x RS232/422/485 to 1-port Fiber (SC/ST) Media Converter, support PROFIBUS



- 2.5KV isolation for serial port (RS485)
- Supports fiber port for extend transmission distance
- Baud Rate up to 9.6K~12Mbps for Profibus application
- Supports Auto Baud Rate mode, or manual mode for setting Baud Rate
- CE, FCC, heavy industrial grade EN61000-6-2, EN61000-6-4 certified

IFC-Serial-PRO is a serial over fiber converter that is capable of selecting interface modes for connection to RS-485 2-wire half duplex and supports high-speed data rates of PROFIBUS. Fiber optical cabling extends distances and isolates from EMC/noise to reduce interference between PROFIBUS devices. The terminal block offers an alarm relay contact and two redundant DC power inputs. IFC -Serial-PRO 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, making it is reliable and an ideal solution for keeping your industrial automation applications running smoothly and continuously even in harsh environments. IFC-Serial-PRO is protocol transparent, and can be applied to PROFIBUS and other networks using RS485 interfaces (See Figure 1).

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
- 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 direction	RS-485 : 2 wires, Half duplex 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	

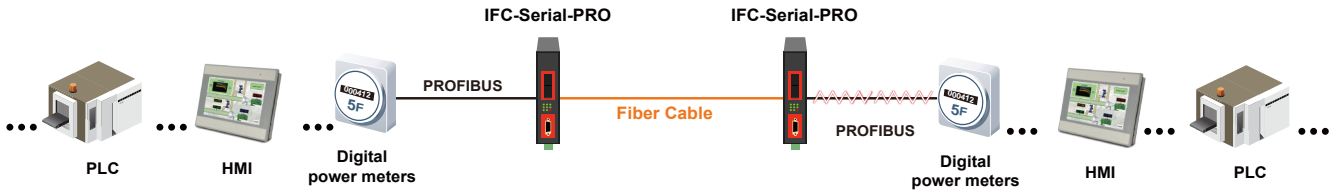
Power	Power Input	Redundant Dual Power 12, 24, 48 VDC (9.6 ~ 60VDC)
	Power Consumption	<6W
	Power Reversal Protection	Yes
	Over Current Protection: Signal Short Together Protected	
Terminal Block	For Power and Alarm	
	V1+, V1-, V2+, V2-, Alarm NC, Alarm COM	
Mechanical	Water & Dust Proof	IP30 Protection, 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	

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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

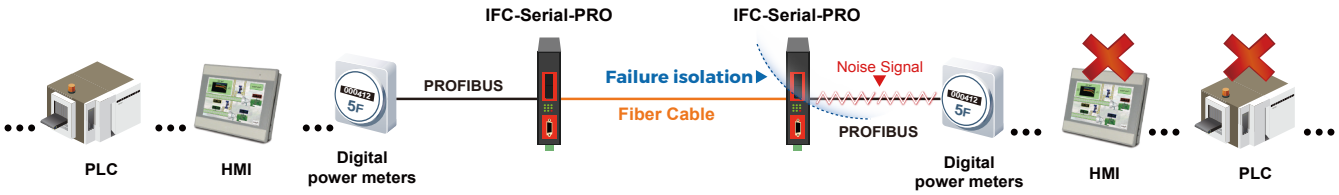
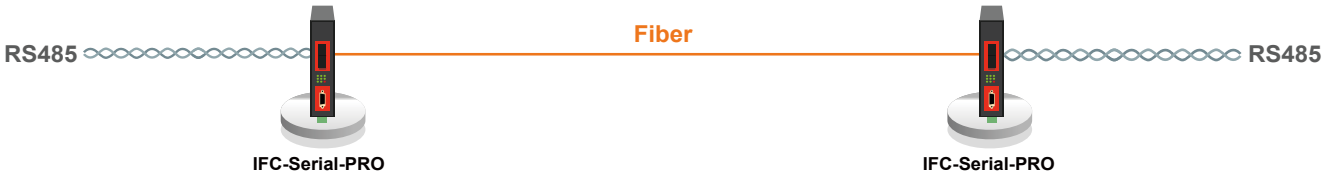
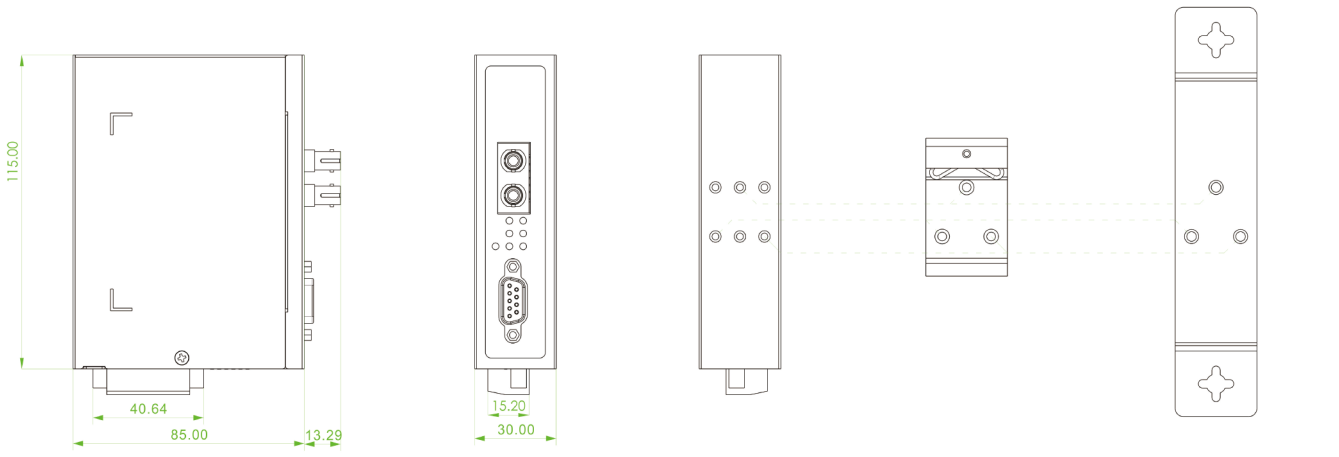


Figure 3 : Fiber Point to Point topology & application



Dimensions

▶ IFC-Serial-PRO

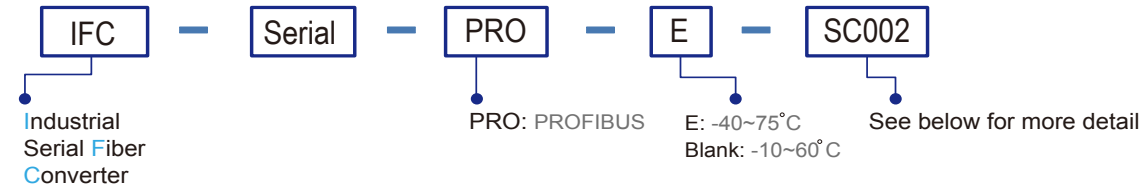


Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View

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



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
- 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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Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

IFC-Serial

1x RS232/422/485 to 1-port Fiber (SC/ST) Media Converter



- 2.5KV isolation for serial port (RS485/422/232)
- UL60950-1, CE, FCC, heavy industrial EN61000-6-2, EN61000-6-4 certified
- Auto Baud Rate, no need to set BaudRate
- Adjustable pull high/low resistor and terminator for RS-422/485 transmission

The IFC-Serial media 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
- 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	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

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

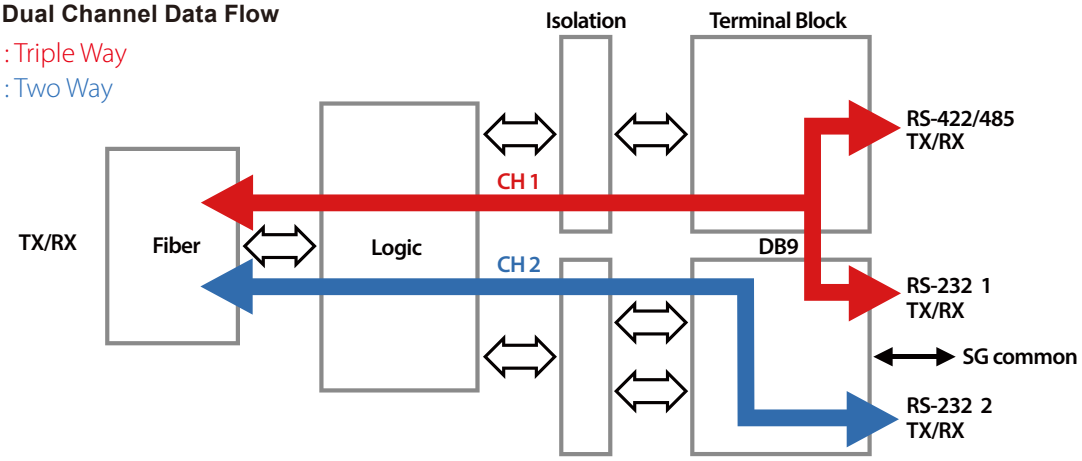
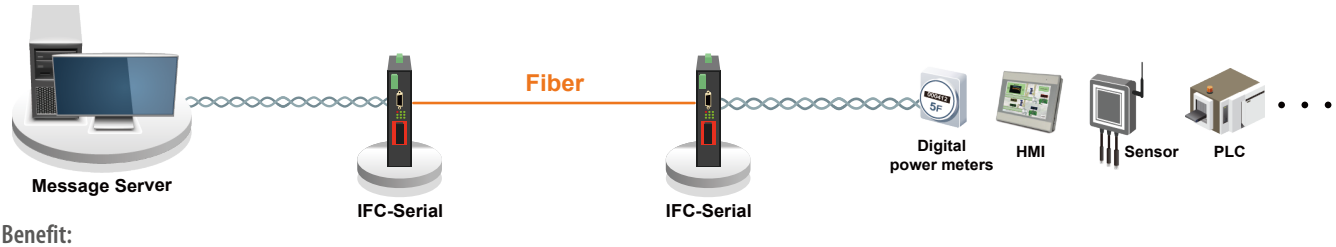


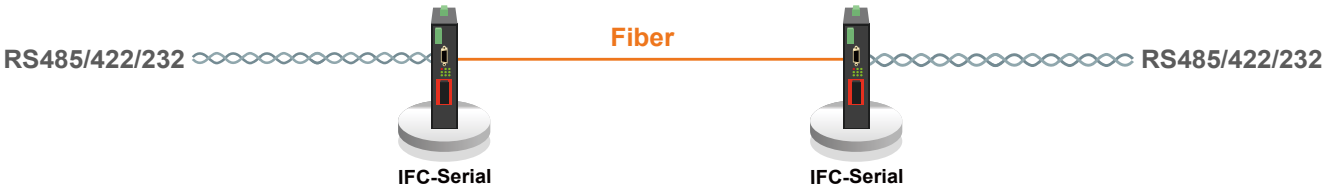
Figure 2 : Application for Modbus Network



Benefit:

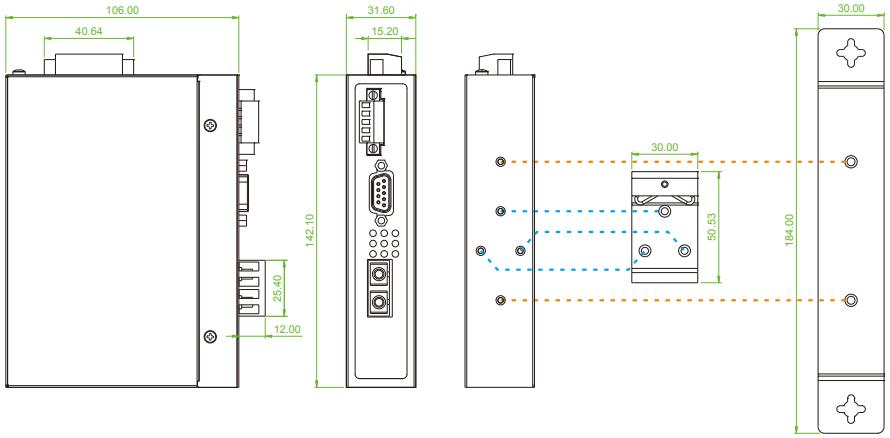
1. EMC/noise isolation, to reduce mutual interference between serial port device
2. Extend distance by fiber
3. Achieve a reliable network environment

Figure 3 : Fiber Point to Point topology & application



Dimensions

▶ IFC-Serial



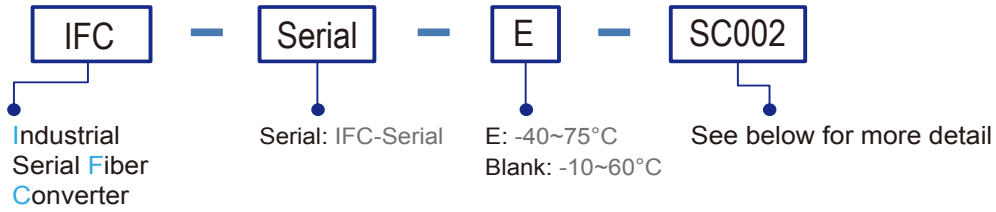
Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

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
- Din Rail with screws
- Terminal block

Optional Accessories

Wall Mount kit Accessories

IND-WMK01	Wall Mount kit for Industrial product, 184 x 30mm

IFC-FDC

1x RS232/422/485 to 2-ports Fiber (SC/ST) Media Converter



- 2.5KV isolation for serial port (RS485/422/232)
- UL60950-1, CE, FCC, heavy industrial EN61000-6-2, EN61000-6-4 certified
- Supports fiber port several topology, cable redundancy, ring redundancy, daisy chain, point to point
- Auto Baud Rate, no need to set Baud Rate
- Adjustable pull high/low resistor and terminator for RS-422/485 transmission

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
- 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
- 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	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

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

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

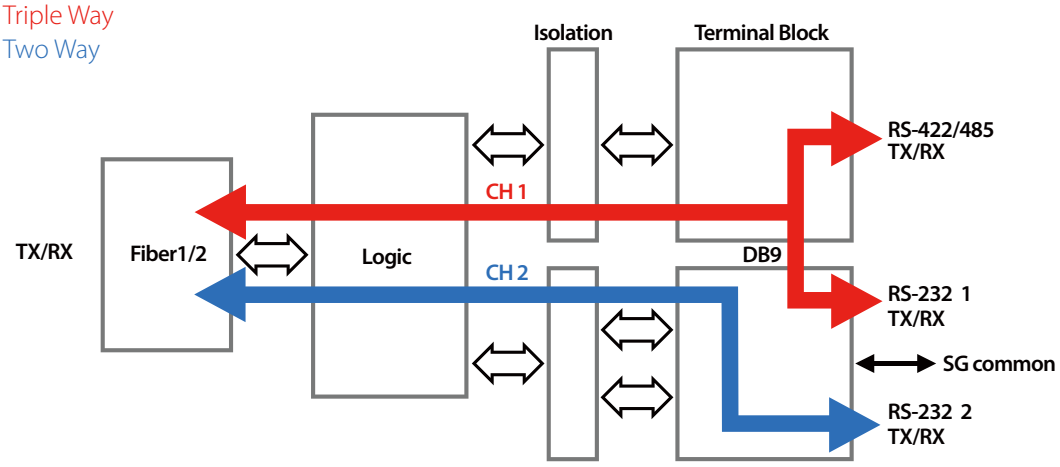
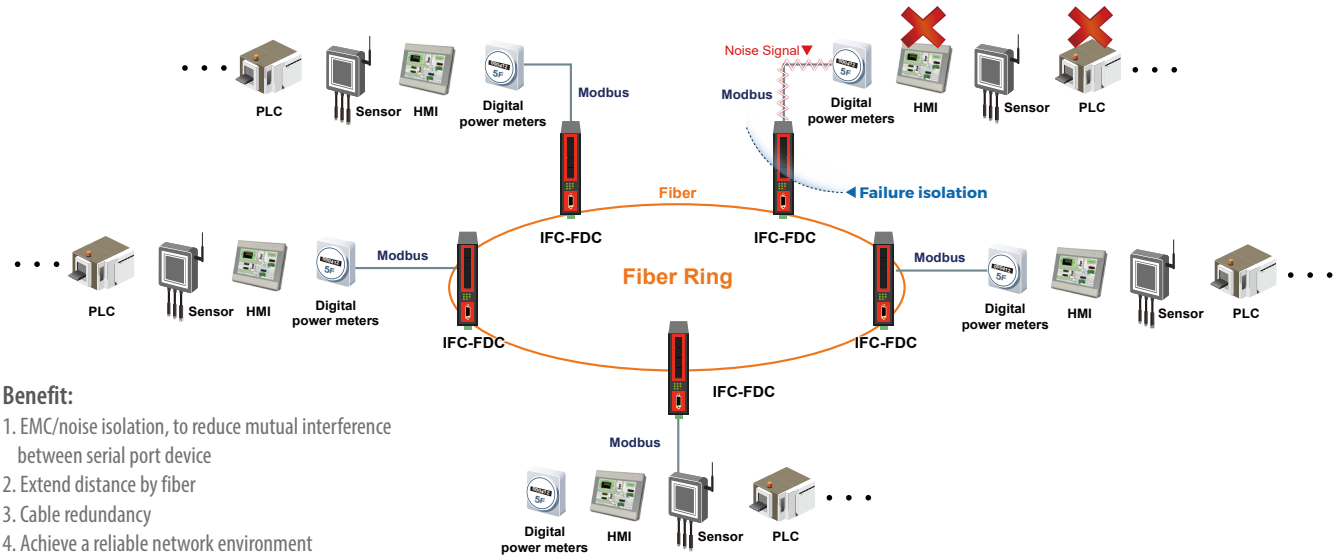


Figure 2 : Application for Modbus Network



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

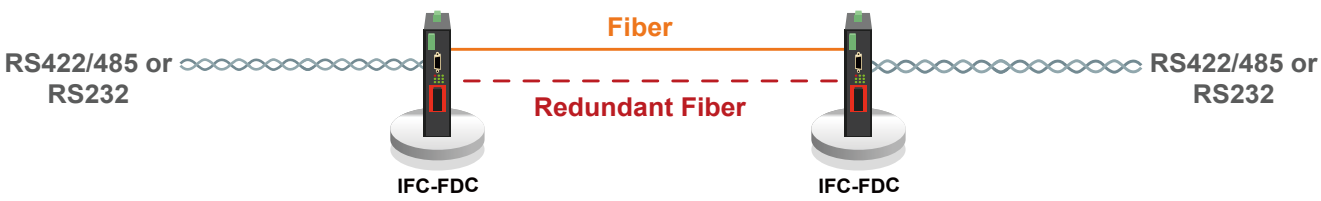


Figure 4 : Fiber Ring Redundancy topology & application

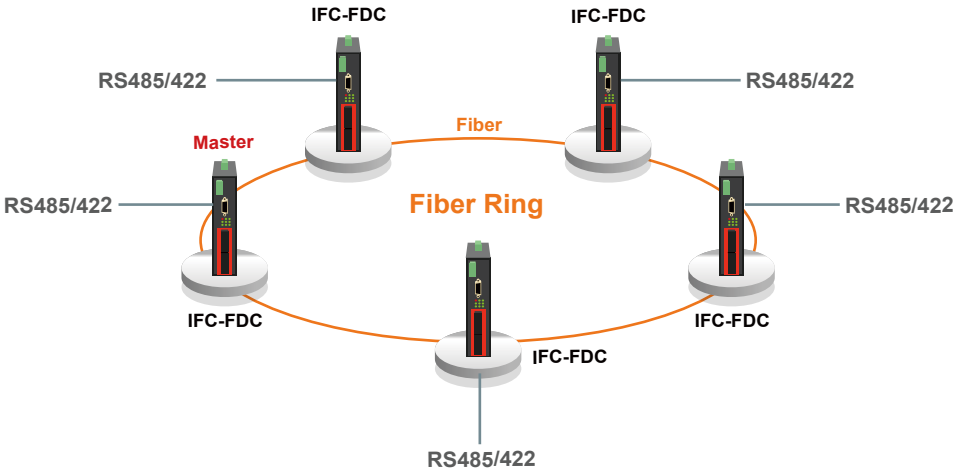


Figure 5 : Fiber Daisy Chain topology & application

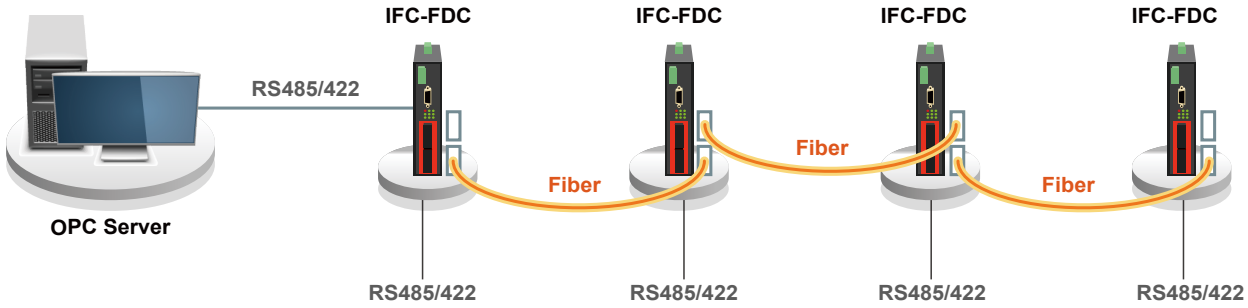
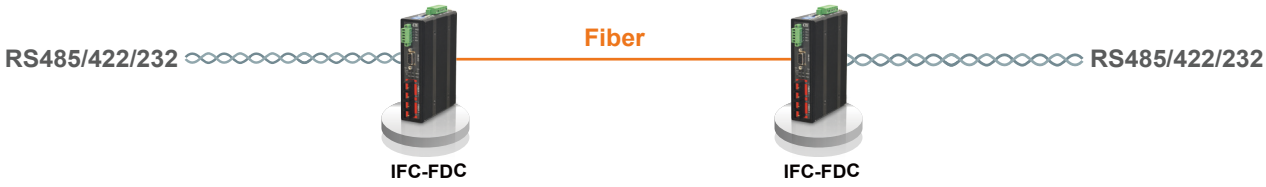
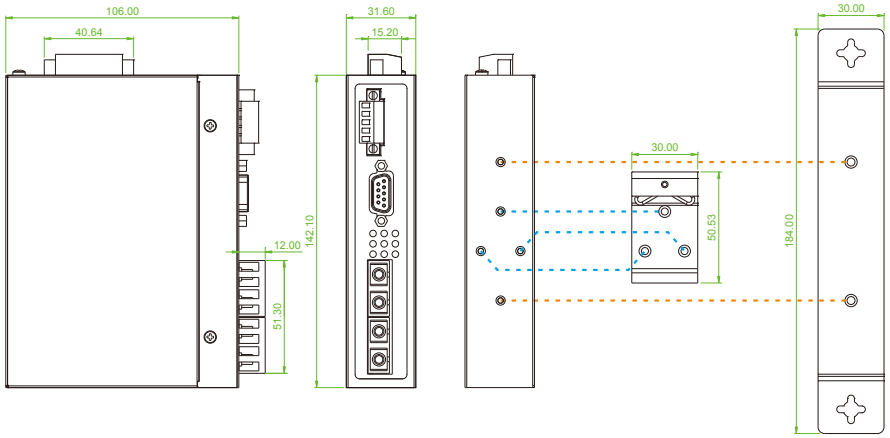


Figure 6 : Fiber Point to Point topology & application



Dimensions

▶ IFC-FDC



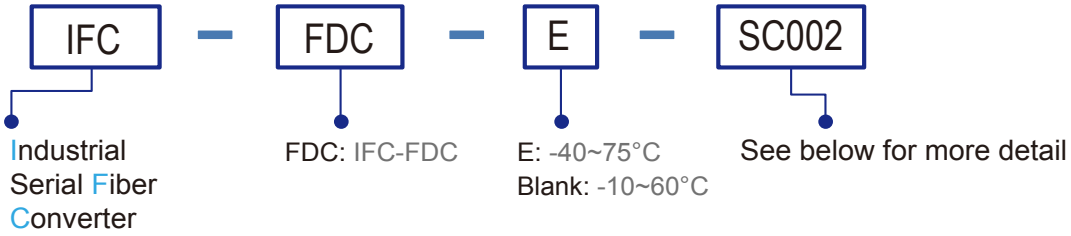
Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

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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
- Din Rail with screws
- Terminal block

Optional Accessories

Wall Mount kit Accessories

IND-WMK01	Wall Mount kit for Industrial product, 184 x 30mm

IFC-CCF40

4 Channel Binary Transducer, 4 binary input ,4 high power MSR Relay output , fiber transmission



- 4 binary input
- 4 MSR high power relay output, maximum breaking capacity 2000VAC load
- M/M 2km, S/M 30km, or BiDi 20km single fiber for transmit
- CE, FCC heavy industrial environment EN61000-6-2, EN61000-6-4

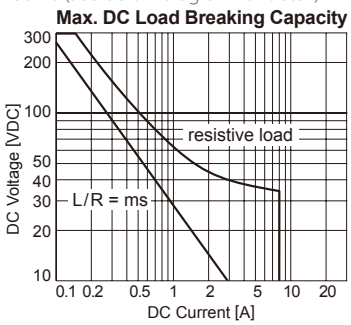
IFC-CCF40 is a four channel, binary transducer, which registers binary information from contacts via its binary inputs and forwards it, interference-free, to the other side transducer via fiber-optic cable. The remote site transducer will output the indications/signals via its relay contacts and vice versa. The transducer is equipped with four independent and bidirectional binary inputs and four contact outputs. The four contacts can be used as trip contacts. Available in two operating temperature ranges, a standard -10° to 60°C commercial temperature range and an extended -40° to 75°C range, the IFC-CCF40 is reliable and an ideal solution for keeping your industrial automation applications running smoothly and continuously even in harsh environments. The IFC-CCF40 transducer has been designed for usage in substations, water treatment, metallurgical and material engineering application. It is an ideal solution for use in critical environments.

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
- Supports multi mode fiber 2KM or single mode 30KM fiber for transmit distances
- Supports 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

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

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

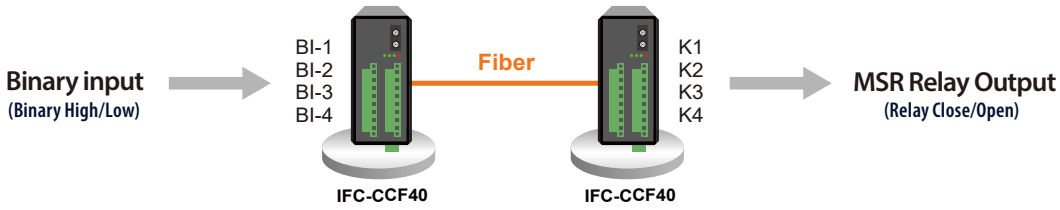
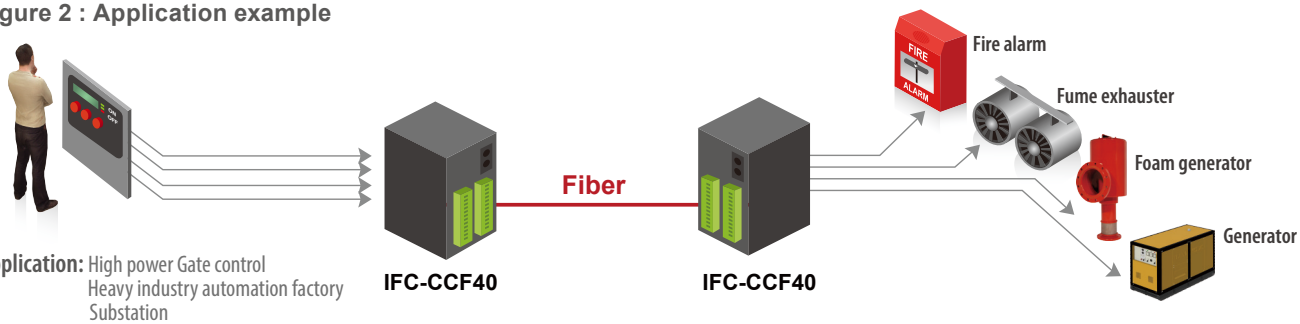


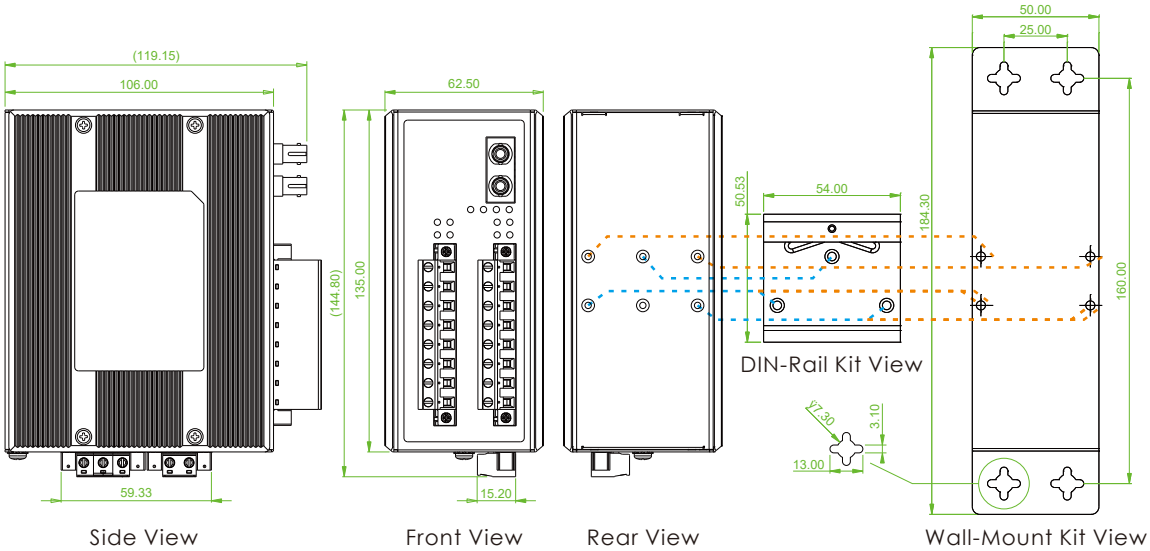
Figure 2 : Application example



Application: High power Gate control
Heavy industry automation factory
Substation

Dimensions

▶ IFC-CCF40



Related Product





◀ **FRM220-CCF40:** 4ch Contact Closure Fiber Converter, In-Band Managed
▶ **FRM220-CCF20:** 2ch Contact Closure Fiber Converter, In-Band Managed

Ordering Information

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

Model Naming Rule

IFC – CCF40 – ST020A

- IFC: Industrial Serial Fiber Converter
- CCF40: 4x Channel Contact Fiber closure
- 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 – □ – □□□□□

Example: IFC – CCF40 – ST020A

Package List

- IFC-CCF40 device
- Din Rail with screws
- Terminal block

Optional Accessories

Wall Mount kit Accessories

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

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

IDS-i241 & IDS-i211

- 2 port (1x RS232 + 1x RS422/RS485, isolation) serial to 1x Ethernet
- 2 port RS422/RS485 (isolation) serial to 1x Ethernet

IDS-i111 & IDS-121

- 1 port RS422/RS485 (isolation) serial to 1x Ethernet
- 1 port RS232 serial to 1x Ethernet

Preliminary



- EN50121-4, EN61000-6-2, EN61000-6-4, CE, FCC certified
- High surge/EFT/ESD protection level for serial, Ethernet, power
- Serial port Isolation
- Various Communication Modes: Modbus to RTU, TCP Server, TCP Client, Virtual COM mode, UDP, RFC2217

Industrial Device Servers, IDS series, provide RS232/422/485 serial-to-Ethernet connectivity for industrial automation applications. Device servers can connect any RS232 or RS422/485 devices to an Ethernet network allowing them to be managed virtually anywhere. IDS series device servers support TCP Server, TCP Client, virtual COM driver and UDP port operation modes. The RS232 serial interface supports full signals with RTS/CTS and DTR/DSR hardware flow control, while the RS422/485 interface provides 2KV signal isolation. IDS series is an ideal solution to establish an easy and reliable network access to serial devices, such as management ports, barcode reader, PLC, alarm sensors and PTZ cameras on industrial/factory automation, public safety and surveillance systems.

Features

- Alarm message by Alarm relay, e-mail, syslog, SNMP trap
- Configuration by Web console, Telnet console, Windows utility
- Redundant power input 12/24/48VDC
- Baudrate 50~921.6k bps
- Wide operating temperature -40 ~ 75°C

Specifications

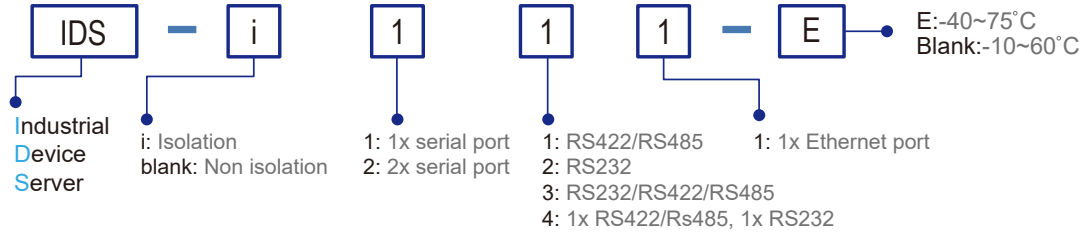
Serial interface & Connector	DB9M for RS232 port
	Terminal block for RS422/RS485
Isolation	2KV for RS422/RS485
Serial signal	RS485 (2w) : Data+ , Data-
	RS485 (4w) : TX+, TX-, RX+, RX-, Gnd
	RS422 : TX+, TX-, RX+, RX-, Gnd
	RS232: TX, RX, RTS, CTS, DTR, DSR, DCD, Gnd
Baudrate	50~921.6k bps
Data bits	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, Space, Mark
Flow Control	RTS / CTS and DTR/DSR (for RS-232)
	XON /XOFF
LAN Interface RJ-45 connector	1x10/100Base-TX
Power	Redudant Power input 12/24/48VDC (9.6~60VDC) , Terminial block
Power consumption	TBD
LED	Power 1, Power 2 (Green) ON : power ready
	Fault (Amber)
	Serial port Transmitt/per (Green)
	Serial port Receiver/per (Amber)
	Ethernet Link/act (Green)
Warning message	Syslog, e-mail, SNMP trap, alarm relay
Alarm Relay Contact	Relay outputs with current carrying capacity of 1 A @24VDC, Terminal block
Operating Temperature	-40 ~ 75°C (-E version)
	-10 ~ 60°C (Non -E version)
Storage Temperature	-40 ~ 85°C
Humidity	0 – 90% non-condensing
Housing	Rugged Metal, IP30 Protection, Fanless
Installation Mounting	DIN rail mount, Wall mount (Optional)
Dimensions	TBD (D x W x H)

Weight	TBD
MTBF	TBD (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	
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
Communication Modes	TCP Server, TCP Client, Virtual COM mode, UDP, Modbus to RTU, RFC2217
Virtual Com support	OS supported Windows 95/98/ XP / 2000 / 2003 / 2008 / VISTA / WIN7 / WIN8 / WIN10
Protocols	ICMP, IPv4, IPv6, TCP, UDP, ARP, HTTP, DHCP, BOOTP, Telnet, DNS, SNMP v1, SMTP, SNTP, Rtelnet
Configuration	Web console, Telnet console, Windows utility
Management	Web pages, Firmware upgrade
Security	Password change & access
Warning message	Syslog, e-mail, SNMP trap, alarm relay

Ordering Information

Model Name	Serial				Ethernet (RJ45)	Certification			Operating Temperature
	Total serial port	RS232 (DB9M)	422/485 (Terminal block)	Isolation	10/100Base-TX	EN50121-4	EN61000-6-2 EN61000-6-4	CE/FCC	
IDS-i241	2	1	1	V (RS422/RS485)	1	V	V	V	-10~60℃
IDS-i241-E	2	1	1	V (RS422/RS485)	1	V	V	V	-40~75℃
IDS-i211	2		2	V (RS422/RS485)	1	V	V	V	-10~60℃
IDS-i211-E	2		2	V (RS422/RS485)	1	V	V	V	-40~75℃
IDS-i111	1		1	V (RS422/RS485)	1	V	V	V	-10~60℃
IDS-i111-E	1		1	V (RS422/RS485)	1	V	V	V	-40~75℃
IDS-121	1	1			1	V	V	V	-10~60℃
IDS-121-E	1	1			1	V	V	V	-40~75℃

Model Naming Rule



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Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

IEXT224-4PH

LAN Extender, 4x 100Mbps RJ45, 4x PoE



- Maximum PoE power budget 30W per port
- Wide operating temperature -40~75°C for use in harsh environments
- Dual power input for power source failure redundant

IEXT224-4PH is intended to extend the reach of Ethernet Data and IEEE 802.3at Power over Ethernet beyond standard 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 twisted pair 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
- Simultaneous transmission of Ethernet data and Power over 2 wire twisted pair or coax
- Display data rate by LED
- Display real power loading by LED
- Eliminated the need for power supply at remote site
- Quick deployment and easy maintenance.

Specifications

Hardware Interfaces	**Standard**	
	IEEE 802.3	10Base-T
	IEEE 802.3u	100Base-TX
	IEEE 802.3af	PoE
	IEEE 802.3at	PoE+
	ITU-T G.993.2	VDSL2
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 Asym (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 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 (Option)	
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 twisted pair – 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

Coax Cable - RG59

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

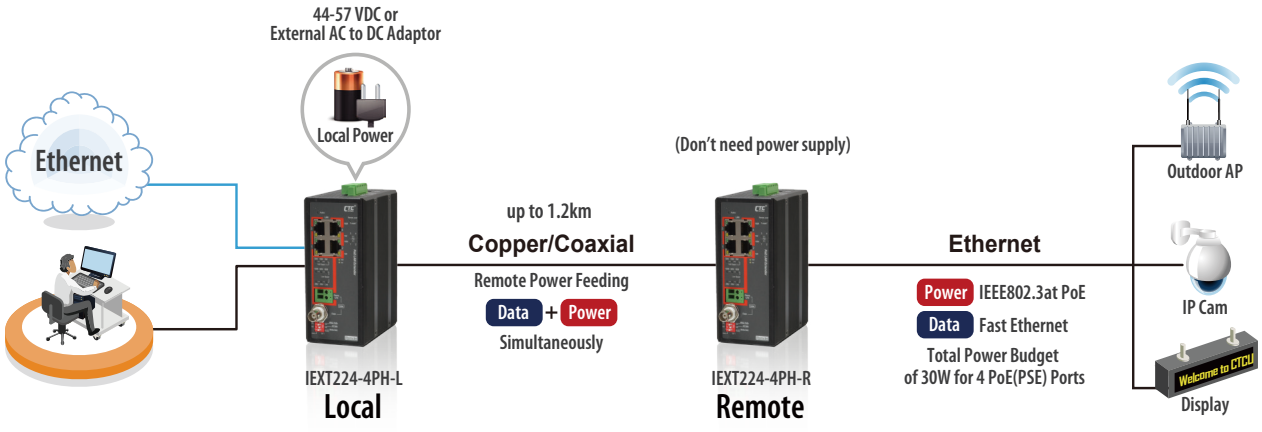
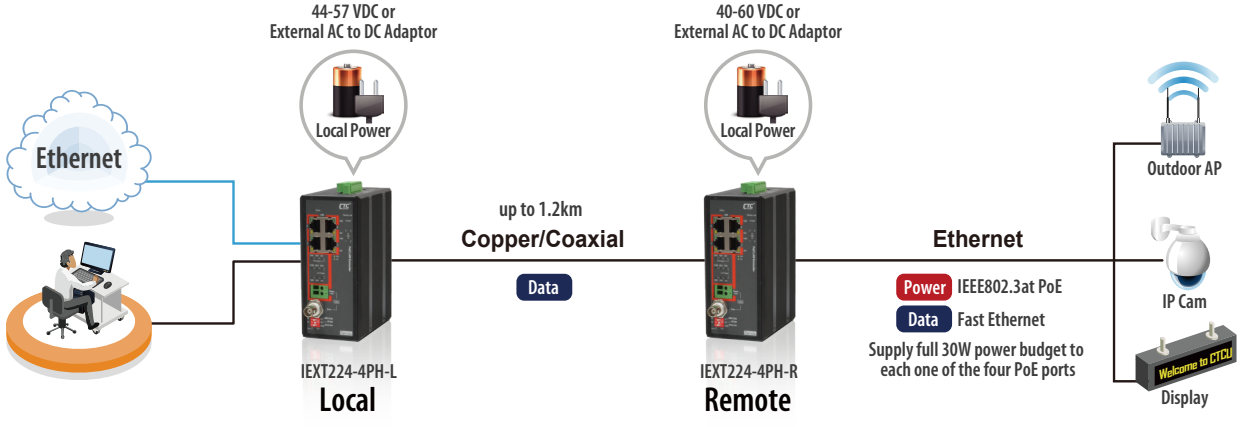
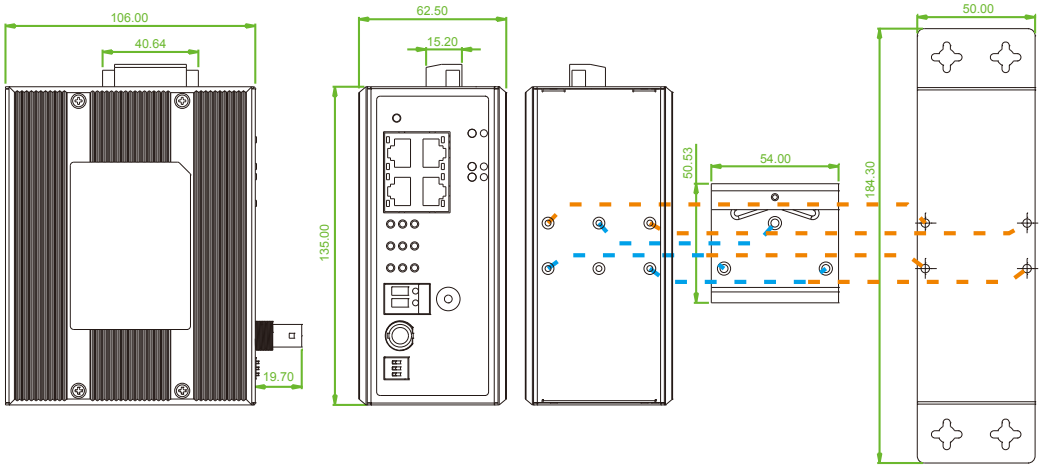


Figure 2 : Remote Power feeding Disable



Dimensions



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

Ordering Information

Model Name	UTP	Long Distance		PoE Port	Certifiaction		
	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)
- 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)

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

INJ-IG02-PH

Industrial Gigabit Passive PoE Injector (60W)



- Supports Passive PoE, Power output 15.4W, 30W, 60W
- Supports 2 pairs PoE Mode A/B or 4 pairs
- Passive PoE output voltage 24V or 48VDC
- Compliant with 10/100/1000Base-T(X)
- Railway EN50121-4, Heavy industrial EN61000-6-2, EN61000-6-4, CE, FCC certified

INJ-IG02-PH is an industrial grade, Gigabit, Passive, PoE injector, that can provide up to 60Watts power out through the 4 pairs of category 5e/6 cables. The injector operates with 24/48VDC power input, supports alternative A mode and alternative B mode with 30Watts output for passive PoE devices. Passive POE devices are usually proprietary and this injector provides an "always On" power over Ethernet. This injector is NOT compatible with IEEE802.3af/at standard PoE devices.

INJ-IG02-PH is housed in a rugged DIN rail or wall mountable IP30 metal enclosure and is designed for harsh environments, such as industrial automation, city surveillance & security, intelligent transportation systems (ITS) and also utility market applications.

Standard operating temperature range models (-10 to 60°C) and wide operating temperature range models (-40 to 75°C) fulfill the special needs of critical environment.

Features

- 1 port Passive PoE Injector
- 24 or 48VDC Power input
- Maximum PoE budget 30W (2-pair), 60W (4-pair)
- Wide operating temperature -40 ~ 75°C (INJ-IG02-PHE)
- IP30 rugged metal housing and fanless

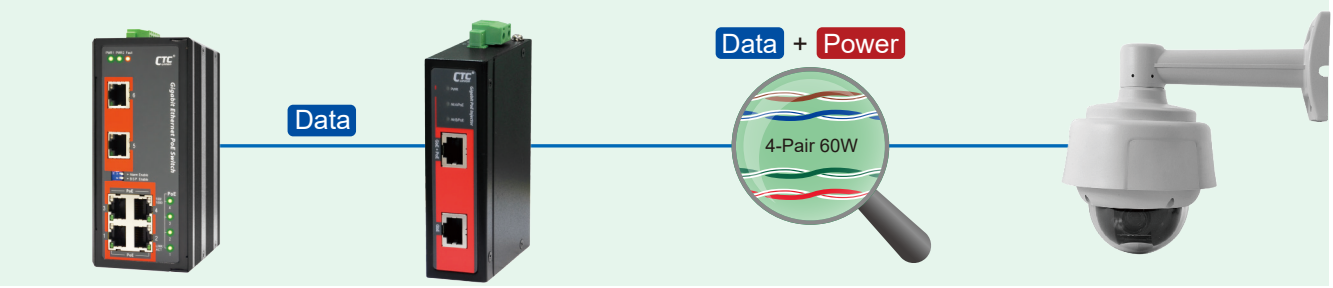
Specifications

IEEE Standard	IEEE 802.3 10Base-T Ethernet IEEE 802.3u 100Base-TX Fast Ethernet IEEE 802.3ab 1000Base-T Gigabit Ethernet
PoE RJ-45 Pin Assignment	Positive (V+): RJ-45 pin 1, 2. Negative (V-): RJ-45 pin 3, 6. 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)
Reserve Polarity Protection	Present
Overload Current Protection	Present
Power Supply	24 or 48VDC Input power (Removable Terminal Block)
PoE output voltage	48VDC (for 48VDC input power) 24VDC (for 24VDC input power)
PoE Power Budget	Maximum 60W for 4-pair PoE (48VDC input power) Maximum 30W for 2-pair PoE (48VDC input power) Maximum 30W for 4-pair PoE (24VDC input power) Maximum 15.4W for 2-pair PoE (24VDC input power)
Power Consumption	<2W (not include PoE output)
Removable Terminal Block	Provide 2 Pin for power input connectorn
Operating Temperature	-10 ~ 60°C (INJ-IG02-PH) -40 ~ 75°C (INJ-IG02-PHE)

Operating Humidity	5% to 95% (Non-condensing)
Storage Temperature	-40 ~ 85°C
Housing	Rugged Metal, IP30 Protection
Dimensions	70 x 30 x 103 mm (D x W x H)
Weight	210g
Installation Mounting	DIN Rail mounting and, Wall Mounting (Optional)
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
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6
MTBF	463,016 Hours (MIL-HDBK-217)
Warranty	5 years

Application

Gigabit Ethernet, 24/48VDC, 30/60W Passive PoE



Non-PoE
Ethernet Switch/HUB

INJ-IG02-PH

Passive PoE device

Ordering Information

Model Name	Ethernet	PoE Port		Power input	Certification			Operating Temperature
	10/100/1000 Base-T	IEEE 802.3at	Power Budget	Single power	Railway EN50121-4	EN61000-6-2 EN61000-6-4	CE, FCC	
INJ-IG02-PH	1	1	15/30/60W	24/48VDC	V	V	V	-10~60℃
INJ-IG02-PHE	1	1	15/30/60W	24/48VDC	V	V	V	-40~75℃

Model Naming Rule

INJ - IG - 02 - PHE

- INJ: Injector
- IG: Industrial Gigabit Ethernet
- 02: Model 2
- PHE: 1x High Power PoE -40~75˚C
- PH: 1x High Power PoE -10~60˚C

Package List

- INJ-IG02-PH device
- 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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Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

INJ-IG01-PH

Industrial Gigabit IEEE802.3af/at Compact Size PoE Injector (15.4/30/36/60W, 48VDC)



- Power output 15.4W, 30W, 36W, 60W select by DIP SW
- Compliant with 10/100/1000Base-T(X) & IEEE802.3af/at PoE
- PoE Mode A/B Select by DIP SW
- Railway EN50121-4, Heavy industrial, EN61000-6-2, EN61000-6-4, CE, FCC certified

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
- 4 Pairs PD handshake mode select by DIP SW (Such as AXIS® IP cam)
- 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

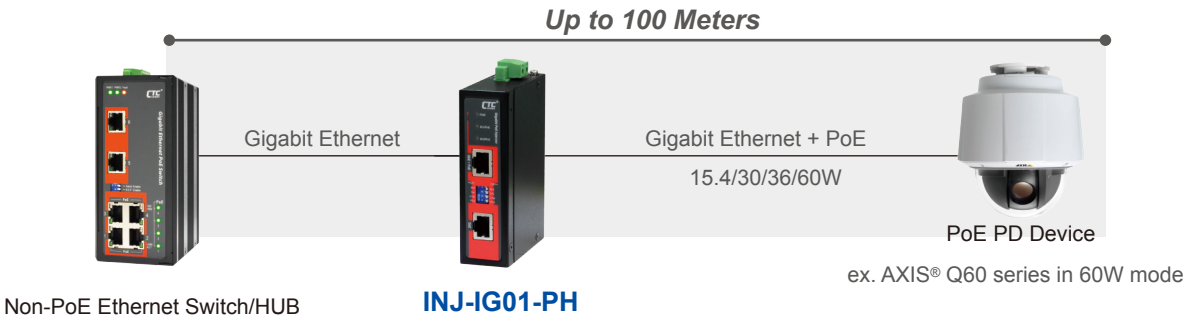
Removable Terminal Block	Provides 2 Pin for power input connectorn
Operating Temperature	-10 ~ 60°C (INJ-IG01-PH)
	-40 ~ 75°C (INJ-IG01-PHE)
Operating Humidity	5% to 95% (Non-condensing)
Storage Temperature	-40 ~ 85°C
Housing	Rugged Metal, IP30 Protection and fanless
Dimensions	70 x 30 x 103 mm (D x W x H)
Weight	215g
Installation Mounting	DIN Rail mounting, and Wall Mounting (Optional)
MTBF	409,994 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

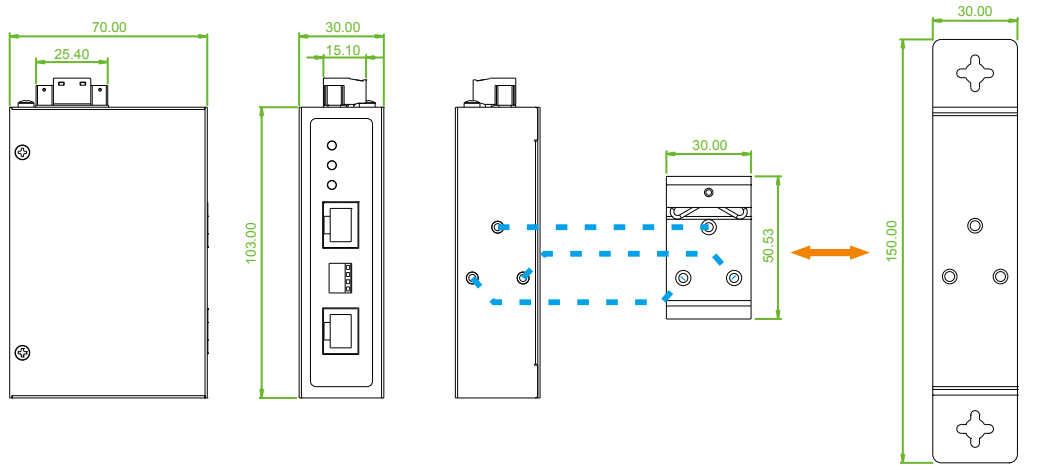
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

Application

Figure : INJ-IG01-PH Giagabit Ethernet PoE Injector



Dimensions

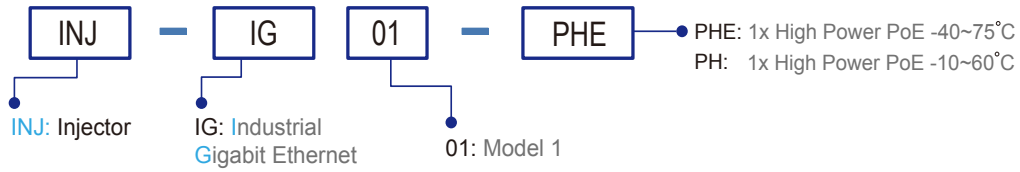


Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

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
- 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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www.ctcu.com / sales@ctcu.com

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

INJ-IG60-24

Industrial Gigabit IEEE802.3af/at PoE Injector (15.4/30/36/60/72W, 12/24/48VDC)



- 12/24/48VDC redundant dual input power with booster for PoE output
- Regulate PoE output voltage
- Power output 15.4W/30W/36W/60W72W select by DIP SW
- Compliant with 10/100/1000Base-T(X) & IEEE802.3af/at PoE
- Railway EN50121-4, Heavy industrial, EN61000-6-2, EN61000-6-4, CE, FC certified

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
- 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)
- 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 52VDC for PoE output
	Regulated PoE output voltage (52VDC) 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
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

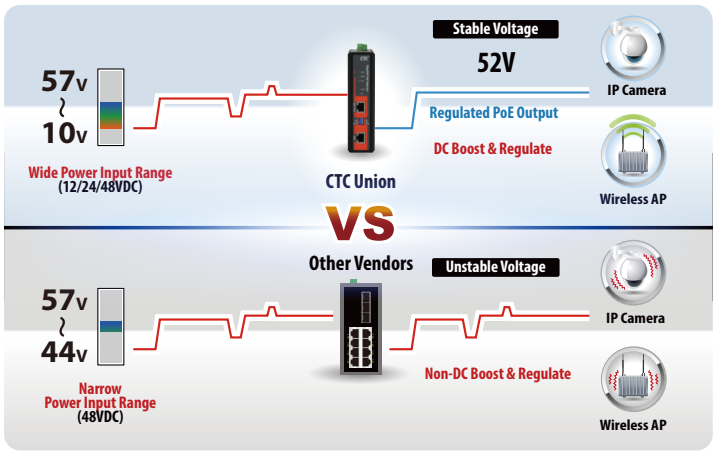
Safety	EN60950-1
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

Application

Figure 1 : INJ-IG60-24 Giagabit Ethernet PoE Injector

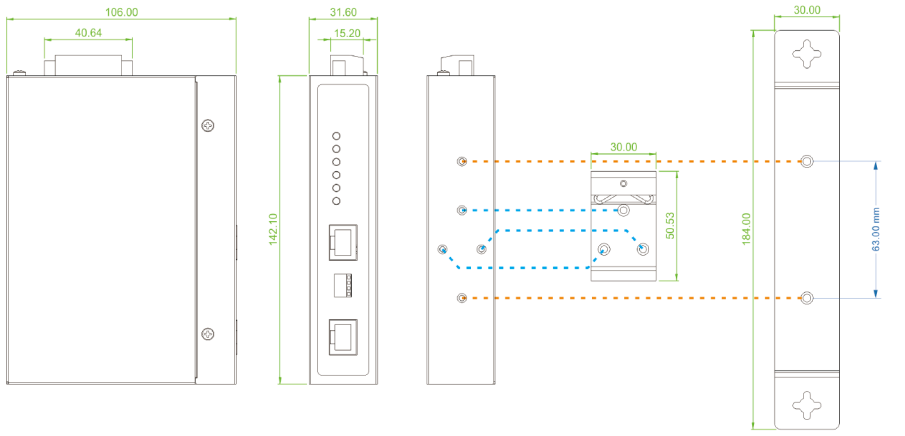


Figure 2 : Very high efficiency boost technology for PoE



- Regulated PoE output voltage (52VDC) 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



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	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

INJ - IG - 60 - E24

- INJ: Inector
- IG: Industrial Gigabit Ethernet
- 60: 60W
- E24: 24V Booster-40~75℃
- 24: 24V Booster-10~60℃

Package List

- INJ-IG60-24 device
- Din Rail with screws
- Terminal block

Optional Accessories

Wall mount kit Accessories

IND-WMK01	Wall Mount kit for Industrial product, 184 x 30mm

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

INJ-G30

Gigabit Ethernet IEEE 802.3af/at PoE Injector (15/30/36W)



- 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
- CE & FCC Class B Certificates

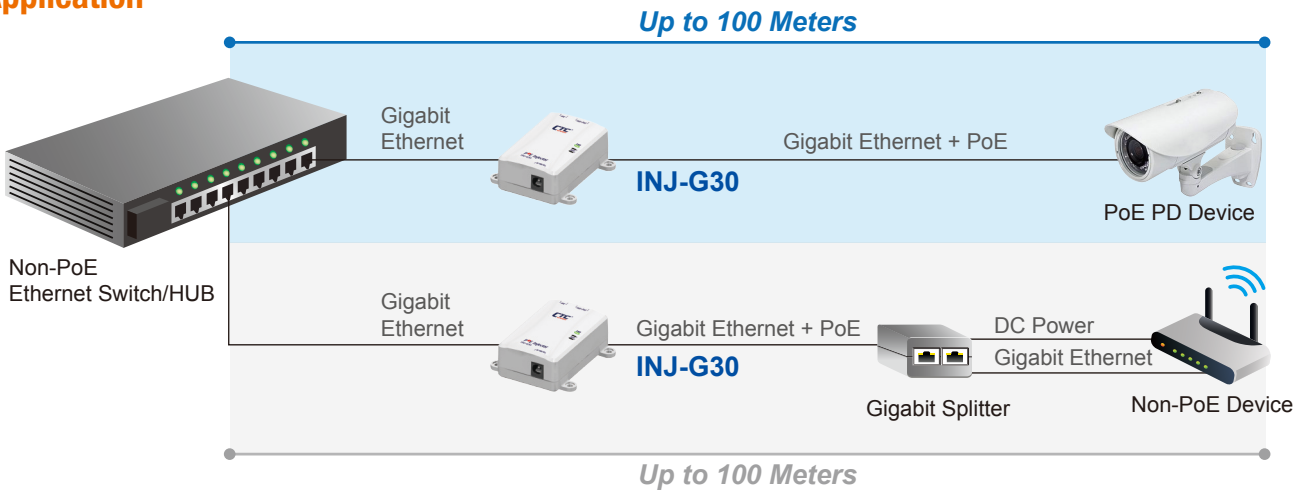
This device consists of 1 PoE Injector ports. That can solve the limitation of the power outlet location and offer the system designer a flexible solution to locate the network device everywhere. The compact size and wall mounting was specifically designed for easy installation. It can be installed where space is limited; moreover, it provides smooth network migration and easy upgrade to network capacity.

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

INJ-SPL01

GbE, IEEE802.3af/at PoE Splitter, output voltage 12/19/24VDC selectable

NEW



- Splits power and data from PoE Input
- Supports PoE IEEE802.3af/at A mode (1,2,3,6) or B mode (4,5,7,8)
- Selectable output voltage, 12/19/24VDC select by slide SW
- Compliant with 10/100/1000Base-T(X)
- IP30 rugged metal housing and fanless

INJ-SPL01 is an Industrial Grade, Gigabit Ethernet, PoE Splitter, designed to deliver data, via RJ-45 Ethernet connector, and electrical power, via screw terminal block, to non-PoE devices. This device saves the high cost of running separate electrical service to edge devices. The INJ-SPL01 acts as PD equipment and can be powered by standard PoE IEEE802.3af/at PSE (Power Source Equipment) switches or work when paired with either INJ-IG01-PH or INJ-IG60-24 PoE Injectors. The data transmission, up to Gigabit speeds, with selectable power output voltages of 12V, 19V or 24V DC, run simultaneously up to the Ethernet limit of 100 meters. Simple settings of the INJ-SPL01, make it a plug and play device, requiring no tools or software configuration, and provides ease of use, with flexible installation and high reliability.

Features

- Splits power and data from PoE Input
- Supports PoE IEEE802.3af/at A mode (1,2,3,6) or B mode (4,5,7,8)
- Selectable output voltage, 12/19/24VDC select by slide SW
- Supports output power upto 12VDC/1.4A, 19VDC/1.05A, or 24VDC/0.85A
- Compliant with 10/100/1000Base-T(X)
- 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-SPL01-E)
- IP30 rugged metal housing and fanless

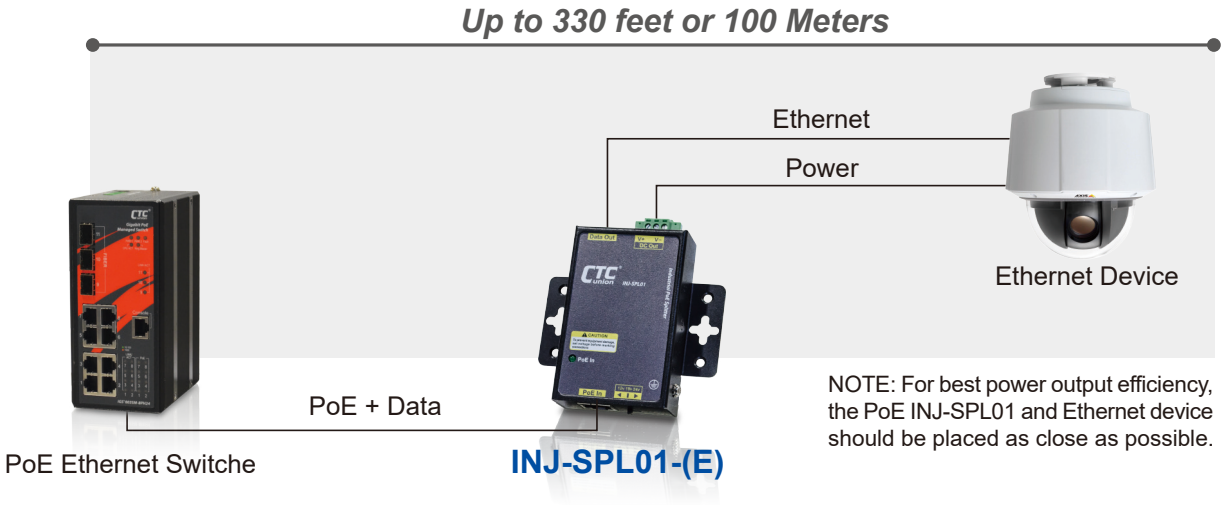
Specifications

IEEE Standard	IEEE 802.3 10Base-T Ethernet	
	IEEE 802.3u 100Base-TX Fast Ethernet	
	IEEE 802.3ab 1000Base-T Gigabit Ethernet	
	IEEE802.3af PoE (Power over Ethernet)	
	IEEE802.3at PoE+ (Power over Ethernet enhancements)	
PoE In	PoE Standard	PoE Standard IEEE 802.3af, IEEE802.3at
	RJ45 Pin Assignments	Support both PoE A mode or B mode (don't need select) A mode: Positive (V+): RJ-45 pin 1, 2. Negative (V-): RJ-45 pin 3, 6. B mode: Positive (V+): RJ-45 pin 4,5. Negative (V-): RJ-45 pin 7,8
		Support 10/100/1000Base-T(X) Data (1, 2, 3, 6, 4, 5, 7, 8)
Output voltage & power	12, 19, 24VDC select by slide switch 12VDC: 1.4A, 19VDC: 1.05A, 24VDC: 0.85A with Removable terminal block	
Data out	RJ45 10/100/1000Base-T(X)	
Network Cable	UTP/STP above Cat. 5e cable	
	EIA/TIA-568 100-ohm (100m)	
LED	PoE in (Green)	
Power Supply	Powered from PoE in, IEEE802.3af/at 44~57VDC, 30W Max	
Output Power	12VDC, 1.4A (max) 19VDC, 1.05A (max) 24VDC, 0.85A (max)	
Operating Temperature	-10 ~ 60°C (INJ-SPL01)	
	-40 ~ 75°C (INJ-SPL01-E)	
Operating Humidity	5% to 95% (Non-condensing)	

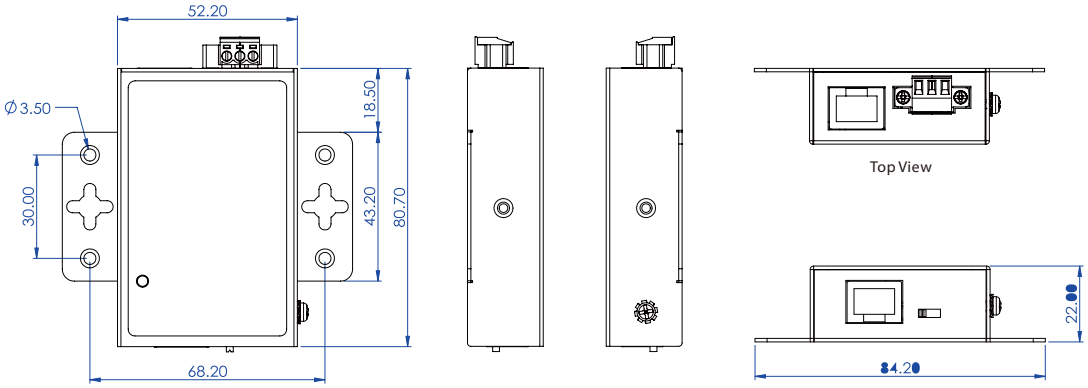
Storage Temperature	-40 ~ 85°C
Housing	Rugged Metal, IP30 Protection and fanless
Dimensions	22 x 84.2 x 80.7 mm (D x W x H)
Weight	85g
Installation Mounting	Wall Mounting
MTBF	3,371,427 Hours (MIL-HDBK-217)
Warranty	5 years
Certification	
EMC	CE (EN55024, EN55032)
EMI	FCC Part 15 Subpart B Class A, CE
Railway Traffic	EN50121-4
Immunity for Heavy Industrial environment	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 1: INJ-SPL01 application topology



Dimensions



Ordering Information

Model Name	PoE In		Power & Data out		Certification			Operating Temperature
	10/100/1000 Base-T(X)	IEEE802.3af/at	10/100/1000 Base-T(X)	Output Voltage selectable 12/19/24VDC	EN61000-6-2 EN61000-6-4	EN50121-4	CE/FCC	
INJ-SPL01	1	1	1	V	V	V	V	-10~60℃
INJ-SPL01-E	1	1	1	V	V	V	V	-40~75℃

Model Naming Rule

INJ - SPL - 01 - E

- INJ: Injector
- SPL : PoE Splitter
- 01: Model 1
- E: -40~75°C
- blank: -10~60°C

Package List

- INJ-SPL01 device
- Terminal block

INJ-IG03-PH

Industrial Gigabit IEEE802.3af/at PoE to Passive PoE Converter

NEW



- Converts 48V IEEE802.3af/at PoE Input to 12/19/24V Passive PoE Output
- Compliant with 10/100/1000Base-T(X)
- Supports PoE input IEEE802.3af/at A mode and B mode
- Selectable passive PoE output voltage
- Selectable passive PoE output mode, A mode or B mode

INJ-IG03-PH is an Industrial Grade, Gigabit Ethernet, passive PoE injector, designed to take IEEE802.3af/at standard PoE as input and deliver Passive PoE with switchable DC output voltages of 12V, 19V and 24V. This device is very useful when installing any non-standard PoE power devices, such as entry level PoE Camera or Wireless AP, that need the direct power over Ethernet without any protocol negotiation. When connected with IEEE802.af/at PSE switches, the INJ-IG03-PH appears as standard PD equipment powered by the PoE switch, without any additional electrical power input required. The non-standard power output is switchable to either Alternative A mode (power on pins 1,2,3,6) or Alternative B mode (power on pins 4,5,7,8). Simple settings make it a plug and play device, requiring no tools or software configuration, and make it easy to use, with flexible installation and high reliability.

Features

- Converts 48V IEEE802.3af/at PoE Input to 12/19/24V Passive PoE Output (Figure 1)
- Supports input PoE IEEE802.3af/at A mode (1,2,3,6) or B mode (4,5,7,8)
- Selectable passive PoE output voltage, 12/19/24VDC select by slide SW
- Selectable passive PoE output mode, A mode (1,2,3,6,) or B mode (4,5,7,8) select by slide SW
- Compliant with 10/100/1000Base-T(X)
- 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-IG03-PHE)
- IP30 rugged metal housing and fanless

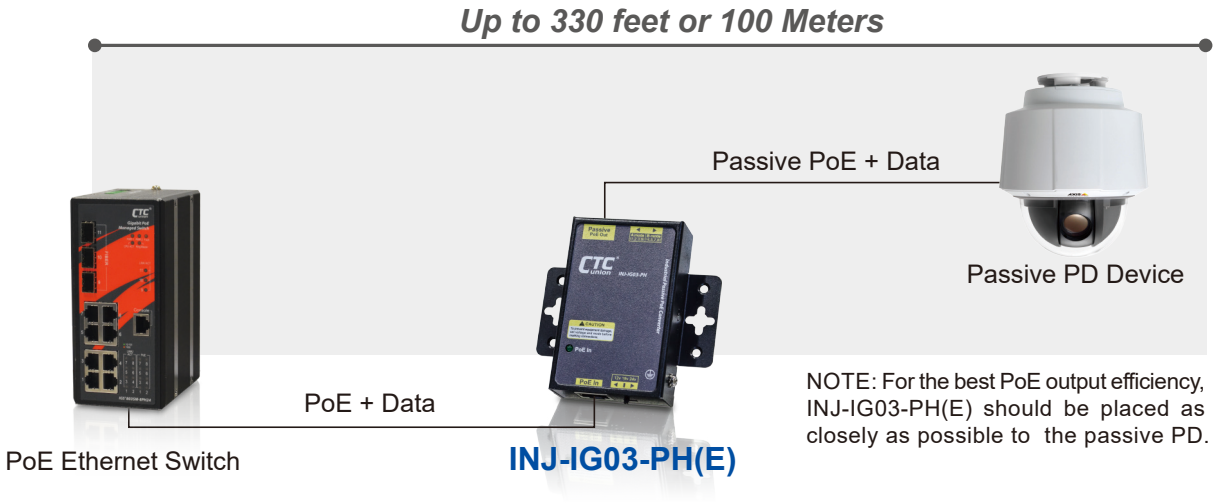
Specifications

IEEE Standard	IEEE 802.3 10Base-T Ethernet	
	IEEE 802.3u 100Base-TX Fast Ethernet	
	IEEE 802.3ab 1000Base-T Gigabit Ethernet	
	IEEE802.3af PoE (Power over Ethernet)	
	IEEE802.3at PoE+ (Power over Ethernet enhancements)	
PoE In	PoE Standard	PoE Standard IEEE 802.3af, IEEE802.3at
	RJ45 Pin Assignments	Support both PoE A mode or B mode (don't need select) A mode: Positive (V+): RJ-45 pin 1, 2. Negative (V-): RJ-45 pin 3, 6. B mode: Positive (V+): RJ-45 pin 4,5. Negative (V-): RJ-45 pin 7,8
		Support 10/100/1000Base-T(X) Data (1, 2, 3, 6, 4, 5, 7, 8)
Passive PoE out	PoE Pin assignment	A mode or B mode select by slide switch A mode : Positive (V+): RJ-45 pin 1, 2. Negative (V-): RJ-45 pin 3, 6. B mode : Positive (V+): RJ-45 pin 4,5. Negative (V-): RJ-45 pin 7,8
	Output voltage	12, 19, 24VDC select by slide switch
Network Cable	UTP/STP above Cat. 5e cable , upto 100meter (see Figure 1)	
	EIA/TIA-568 100-ohm (100m)	
LED	PoE in (Green)	
Power Supply	Powered from PoE in, IEEE802.3af/at 44~57VDC, 30W Max	
Passive PoE out	12VDC, 0.8A (max) 19VDC, 0.8A (max) 24VDC, 0.8A (max)	
Operating Temperature	-10 ~ 60°C (INJ-IG03-PH)	
	-40 ~ 75°C (INJ-IG03-PHE)	
Operating Humidity	5% to 95% (Non-condensing)	

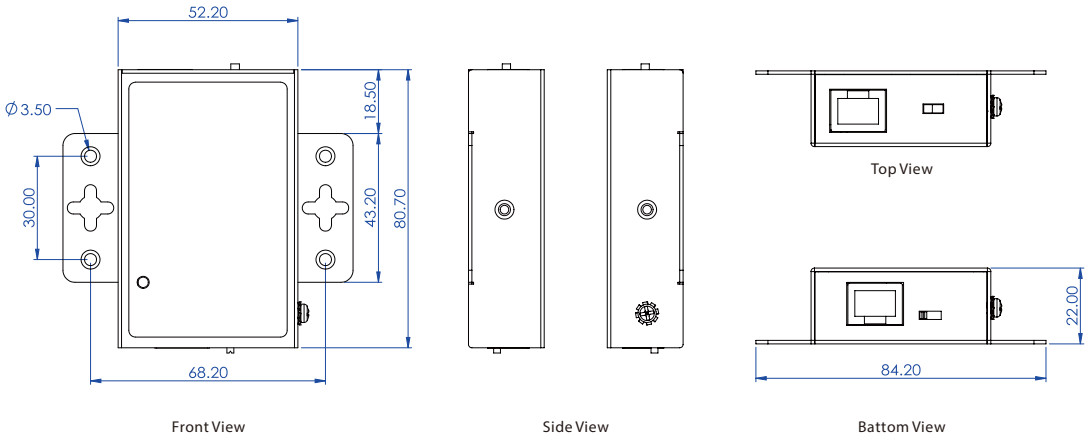
Storage Temperature	-40 ~ 85°C
Housing	Rugged Metal, IP30 Protection and fanless
Dimensions	22 x 84.2 x 80.7 mm (D x W x H)
Weight	85g
Installation Mounting	Wall Mounting
MTBF	2,531,635 Hours (MIL-HDBK-217)
Warranty	5 years
Certification	
EMC	CE (EN55024, EN55032)
EMI	FCC Part 15 Subpart B Class A, CE
Railway Traffic	EN50121-4
Immunity for Heavy Industrial environment	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-IG03-PH application topology



Dimensions



Ordering Information

Model Name	PoE In		Passive PoE out			Certification			Operating Temperature
	10/100/1000 Base-T	IEEE802.3af/at	10/100/1000 Base-T(X)	Output Voltage selectable 12/19/24VDC	PoE pin selectable A mode/B mode	EN61000-6-2 EN61000-6-4	EN50121-4	CE/FCC	
INJ-IG03-PH	1	1	1	V	V	V	V	V	-10~60℃
INJ-IG03-PHE	1	1	1	V	V	V	V	V	-40~75℃

Model Naming Rule

INJ - IG - 03 - PHE

- INJ: Injector
- IG: Industrial Gigabit Ethernet
- 03: Model 3
- PHE: 1x High Power PoE -40~75˚C
- PH: 1x High Power PoE -10~60˚C

Package List

- INJ-IG03-PH device

IPS-G803SM

8x GbE RJ45 + 3x 100/1000Base SFP, Managed Ethernet Switch



- IEC 61850-3, IEEE 1613 certified for power substation
- UL60950-1, EN60950-1,EN50121-4, EN61000-6-2, EN61000-6-4, CE, FCC certified
- Supports IEEE 1588 PTP V2
- Supports GOOSE Message that complies with IEC61850 standard to achieve zero packet loss
- Supports u-Ring, ERPS, MSTP, RSTP, STP for redundant cabling

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 networks (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

- Redundant isolated low voltage 24/48VDC, or/and isolated High voltage AC/DC (110/220 VAC/VDC) power inputs
- 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 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
- Provides 5 instances that each can support µ-Ring, µ-Chain or Sub-Ring type for flexible uses. (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
- 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)
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

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

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
Power consumption	

Input Voltage	IPS-G803SM
110VAC	9.3 W
220VAC	9.2 W
24VDC	9.6 W
48VDC	11.1 W

Alarm Relay Contact	Relay outputs with current carrying capacity of 1 A @24VDC
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, EN60950-1
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

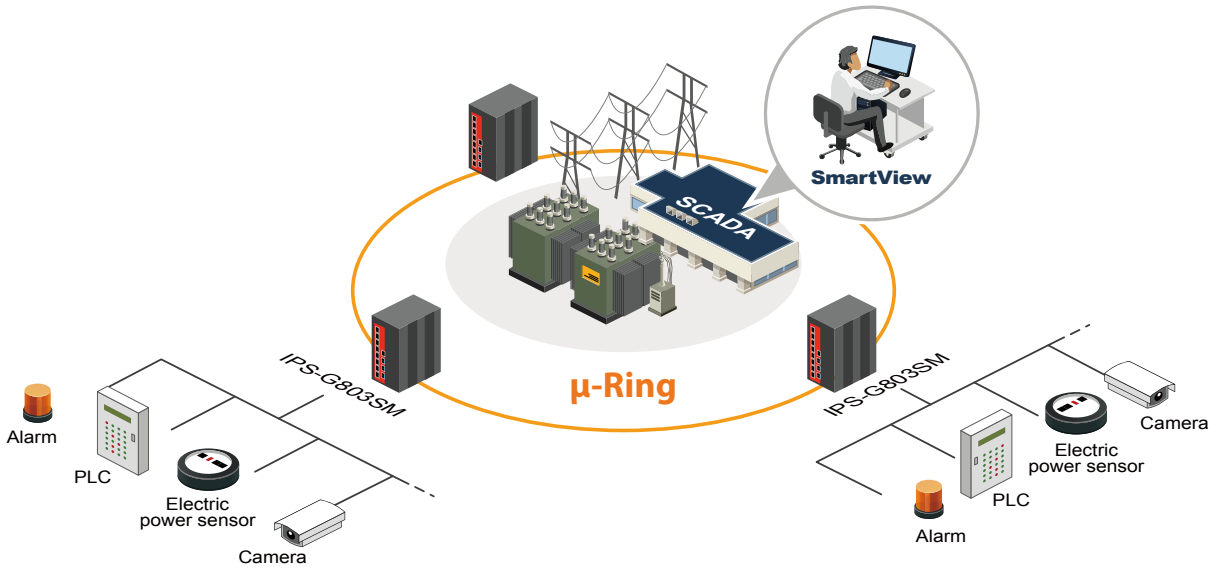
Software Specifications

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)

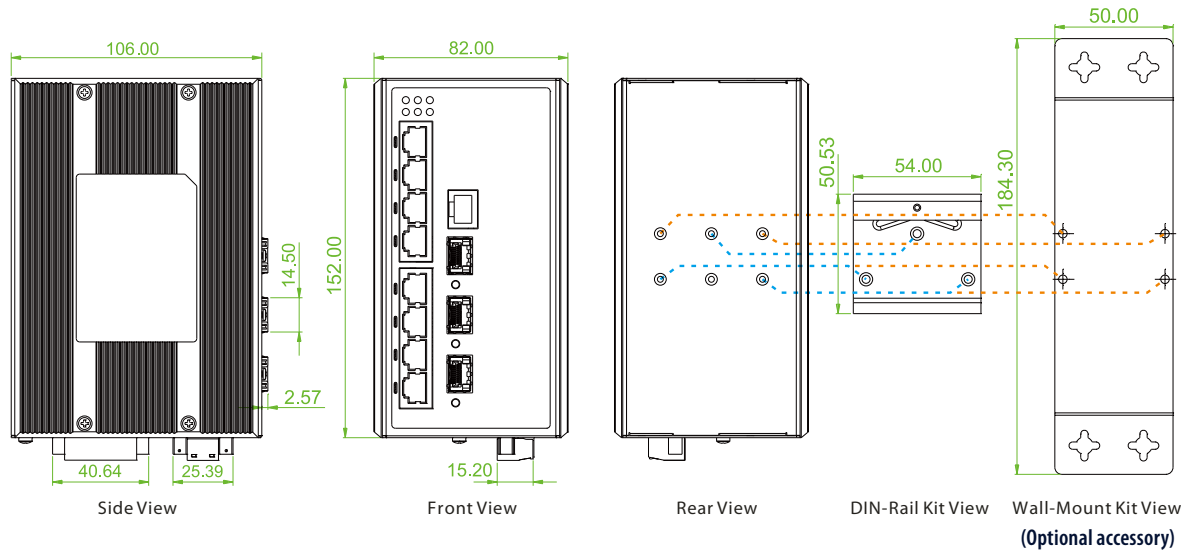
Warning Message	System Syslog, SMTP/ e-mail event message, alarm relay
DNS	Client, Proxy
IEEE 1588 PTP V2	Support 5 operating mode in each port : Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave
NTP /SNTP	Client
LLDP (IEEE 802.1ab)	Link Layer Discovery Protocol 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



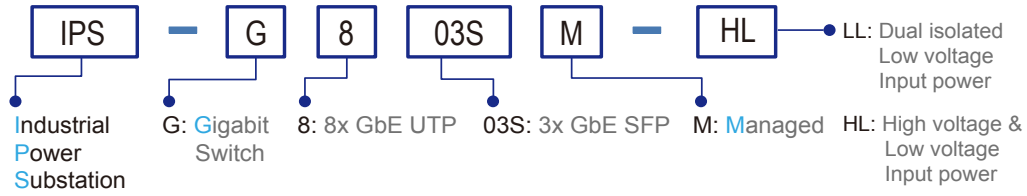
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Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

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 24/48VDC	High Voltage 110/220V DC/AC	IEC61850-3 IEEE 1613	Railway EN50121-4	Safety UL60950-1 EN60950-1	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)
- Din Rail with Screws
- Terminal blocks
- Protective caps for SFP ports

Optional Accessories

Wall mount kit

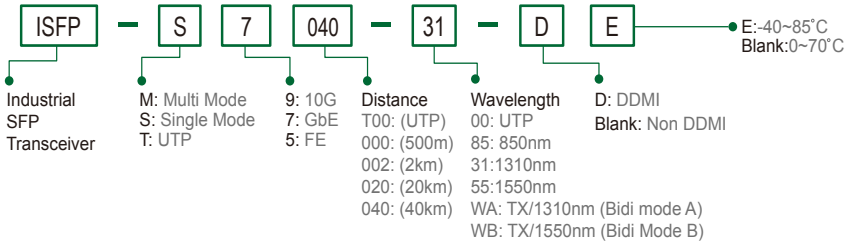
IND-WMK02	Wall Mount kit for Industrial product (Wide) (184 x 50mm)

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



IPS-803GSM

8x 10/100Base RJ45 + 3x 100/1000Base SFP, Managed Ethernet Switch



- IEC 61850-3, IEEE 1613 certified for power substation
- UL60950-1, EN60950-1, EN50121-4, EN61000-6-2, EN61000-6-4, CE, FCC certified
- Supports IEEE 1588 PTP V2
- Supports GOOSE Message that complies with IEC61850 standard to achieve zero packet loss
- Supports u-Ring, ERPS, MSTP, RSTP, STP for redundant cabling

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 networks (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

- Redundant isolated low voltage 24/48VDC, or/and isolated High voltage AC/DC (110/220 VAC/VDC) power inputs
- 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 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
- Provides 5 instances that each can support μ-Ring, μ-Chain or Sub-Ring type for flexible uses. (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
- 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 Flow Control:	Store and Forward
	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)

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
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

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Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

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	EN61000-4-2 (ESD) Level 4, Criteria B
(Electromagnetic Susceptibility) Protection Level	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, EN60950-1
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

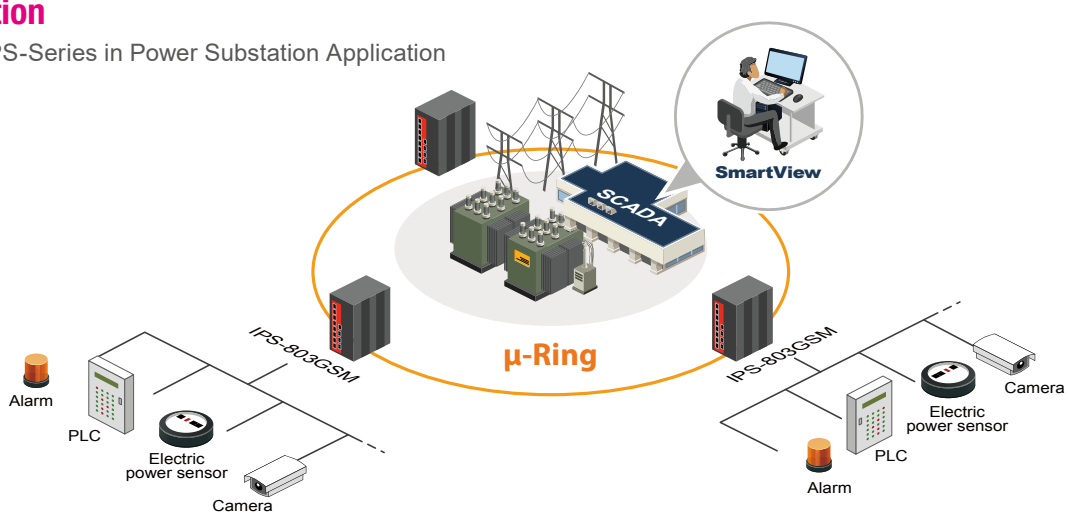
Software Specifications

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

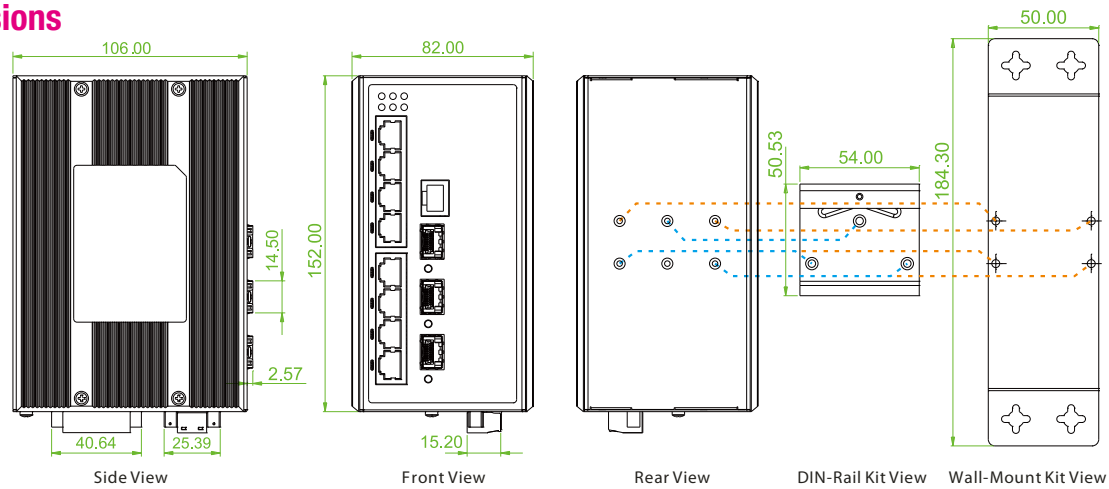
RADIUS authentication & accounting	
TACACS+ authentication & accounting, TACACS+ 3.0	
HTTPS, HTTP	Supported
SSL / SSH v2	Supported
User Name Password Authentication	Local Authentication
	Remote Authentication (via RADIUS/ TACACS+)
Management Interface Access Filtering	Web, Telnet / SSH , CLI RS-232 console
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



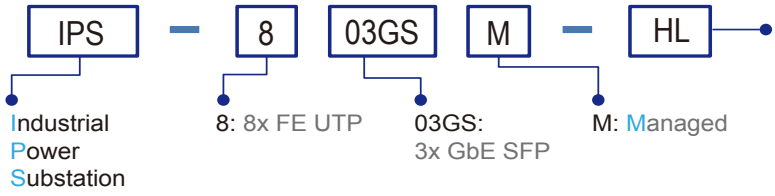
Dimensions



Ordering Information

Model Name	Managed	Total Port	RJ45 UTP port	Fiber	Redundant Input Power		Certification				
			10/100Base-TX	100/1000 Base-X	Low Voltage 24/48VDC	High Voltage 110/220V DC/AC	IEC61850-3 IEEE 1613	Railway EN50121-4	Safety EN60950-1	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)
- Din Rail with Screws
- Terminal blocks
- Protective caps for SFP ports

Optional Accessories

Wall mount kit

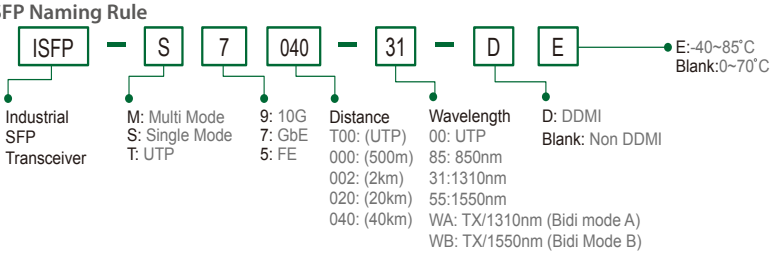
IND-WMK02	Wall Mount kit for Industrial product (Wide) (184 x 50mm)

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



2020 V1.0
www.ctcu.com / sales@ctcu.com
Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

Industrial SFP Transceiver



- Fully tested with CTC industrial grade product for guaranteed compatibility and performance. The best performance can be guaranteed even in mission-critical applications
- Eye safety compliant with Class 1 laser product standard IEC825-1
- CE, FCC class B certification

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

- 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)
- RoHS compliant

10Gbps 10GBase-X Fiber SFP+



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℃
ISFP-S9040-55-D	SM	40km	1550	-2 ~ 4	-15.8	13.8	0.5	1W	V	-10 ~ 70℃
ISFP-S9040-55-DE	SM	40km	1550	-2 ~ 4	-15.8	13.8	0.5	1W	V	-40 ~ 85℃

1.25Gbps 1000Base-X Fiber SFP



Gigabit Duplex LC



Gigabit BiDi LC

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-D	MM	550m	850	-9.5 ~ -4	-17	7.5	-3	1W	V	-10 ~ 70℃
ISFP-M7000-85-DE	MM	550m	850	-9.5 ~ -4	-17	7.5	-3	1W	V	-40 ~ 85℃
ISFP-M7002-31-D	MM	2km	1310	-9 ~ -1	-19	10	-1	1W	V	-10 ~ 70℃
ISFP-M7002-31-DE	MM	2km	1310	-9 ~ -1	-19	10	-1	1W	V	-40 ~ 85℃
ISFP-S7020-31-D	SM	20km	1310	-8 ~ -2	-23	15	-1	1W	V	-10 ~ 70℃
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



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℃

155Mbps 100Base-FX Fiber SFP



Duplex LC



BiDi LC

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-D	MM	2km	1310	-20 ~ -14	-32	12	-8	1W	V	-10 ~ 70℃
ISFP-M5002-31-DE	MM	2km	1310	-20 ~ -14	-32	12	-8	1W	V	-40 ~ 85℃
ISFP-S5030-31-D	SM	30km	1310	-15 ~ -8	-34	19	-5	1W	V	-10 ~ 70℃
ISFP-S5030-31-DE	SM	30km	1310	-15 ~ -8	-34	19	-5	1W	V	-40 ~ 85℃
ISFP-S5050-31-D	SM	50km	1310	-5 ~ 0	-35	30	-5	1W	V	-10 ~ 70℃
ISFP-S5050-31-DE	SM	50km	1310	-5 ~ 0	-35	30	-5	1W	V	-40 ~ 85℃
ISFP-S5020-WA-D	SM	20km	T1310 / R1550	-14 ~ -8	-32	18	-3	1W	V	-10 ~ 70℃
ISFP-S5020-WB-D	SM	20km	T1550 / R1310	-14 ~ -8	-32	18	-3	1W	V	-10 ~ 70℃
ISFP-S5020-WA-DE	SM	20km	T1310 / R1550	-14 ~ -8	-32	18	-3	1W	V	-40 ~ 85℃
ISFP-S5020-WB-DE	SM	20km	T1550 / R1310	-14 ~ -8	-32	18	-3	1W	V	-40 ~ 85℃

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

Appendix - Product Selection Table

4G LTE Router

Model	WAN		WAN/LAN		Local port		Certification				
	Cellular Mobile	GNSS	WiFi	UTP Ethernet	DI, DO	Serial	Radio	Railway EN50121-4	Safety EN60950-1	EN61000-6-2 EN61000-6-4	CE / FCC
IWA-AR114			IEEE802.11 b/g/n/ac (LAN)	1x GbE SFP (WAN) + 1x GbE (WAN or LAN) + 3x GbE (LAN)			RED		✓		CE
ICR-W403	2G/3G/4G LTE	GPS (Ant.ptional)	IEEE 802.11ac/b/g/n (LAN or WAN)	2x GbE (LAN) + 1x GbE (LAN or WAN)	2x DI, 1x DO	1xRS232		✓	✓	✓	✓
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-4103	2G/3G/4G LTE			1x FE (WAN) + 3x FE (LAN)	2x DI, 1x DO	2x RS232 1x RS485	RED, NCC	✓	✓	✓	✓

SyncE Switch & SyncE with PoE Switch

Model	Managed	Total Ports	UTP (RJ45)	Fiber	PoE		Redundant Power Input	Certification			
			10/100/1000 Base-T	100/1000 Base-X	IEEE 802.3af/at	Power Budget		Railway EN50121-4	Safety UL60950-1 EN60950-1	EN61000-6-2 EN61000-6-4	CE / FCC
IGS-1608SM-SE-8PH	✓	24	16	8 SFP	8	240W	48VDC	✓	✓	✓	✓
IGS-804SM-SE-8PH	✓	12	8	4 SFP	8	240W	48VDC	✓	EN60950-1	✓	✓
IGS-1608SM-SE	✓	24	16	8 SFP			12/24/48VDC	✓	✓	✓	✓
IGS-804SM-SE	✓	12	8	4 SFP			12/24/48VDC	✓	EN60950-1	✓	✓

Industrial Rackmount Ethernet Switch

Layer 3 Rackmount Ethernet Switch

Model	Total Ports	GbE		10GbE	Redundant Input Power	Certification			
		10/100/1000 Base-T (X) RJ45	100/1000 Base-X SFP	1G/2.5G/10G Base-X SFP+	110/220VAC or 24/48VDC, -48VDC	Safety EN62368-1	EN50121-4	EN61000-6-2 EN61000-6-4	CE / FCC
ICS-RG24044X	32	24	4	4	✓	✓	✓	✓	✓
ICS-RG16124X	32	16	12	4	✓	✓	✓	✓	✓
ICS-RG8204X	32	8	20	4	✓	✓	✓	✓	✓
IGS-R2408SM	32	24	8		✓	✓	✓	✓	✓
IGS-R1616SM	32	16	16		✓	✓	✓	✓	✓
IGS-R824SM	32	8	24		✓	✓	✓	✓	✓

Rackmount Ethernet Managed Switch

Model	Total Ports	GbE		10GbE	Redundant Input Power	Certification			
		10/100/1000 Base-T (X) RJ45	100/1000 Base-X SFP	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	4 (RJ/SFP) Combo	20	4	✓	✓	✓	✓	✓
ICS-G24S2X	26	4 (RJ/SFP) Combo	20	2	✓	✓	✓	✓	✓
IGS-4804SM	52	48	4		✓	✓	✓	✓	✓
IGS-2408SM	32	24	8		✓	✓	✓	✓	✓
IGS-S2804TM	28	4 (RJ/SFP) Combo	24		✓	✓	✓	✓	✓

Rackmount Managed PoE Switch

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+	IEEE802.3af/at (Budget)	48VDC	Safety UL60950-1 EN60950-1	EN50121-4	EN61000-6-2 EN61000-6-4	CE / FCC
ICS-G24044X-24PH	32	24	4	4	24 (400W)	✓	✓	✓	✓	✓
IGS-2408SM-24PH	32	24	8		24 (400W)	✓	✓	✓	✓	✓

Appendix - Product Selection Table

EN50155 Ethernet Switch

Managed EN50155 PoE Switch

Model	Protection	Total Port	UTP (M12)		Fiber	PoE	Redundant Input Power	Certification				
			10/100Base-TX	10/100/1000Base-T	100/1000Base-X	IEEE802.3af/at (Budget)		EN45545-2	Railway EN50155 EN50121-4	Safety EN60950-1	EN61000-6-2 EN61000-6-4	CE / FCC
ITP-1622GTFM-16PH	IP40	20	16	2	2 Q-ODC	16 (120W)	24/48/72/96/110VDC	✓	✓	✓	✓	✓
ITP-1604GTM-16PH	IP40	20	16	4		16 (120W)	24/48/72/96/110VDC	✓	✓	✓	✓	✓
ITP-G802SM-8PH24	IP67	10		8	2 SFP	8 (180W)	24/48VDC	✓	✓	✓	✓	✓
ITP-G802TM-8PH24	IP67	10		10		8 (180W)	24/48VDC	✓	✓	✓	✓	✓
ITP-2204GTM-16PH	IP54	26	22	4		16 (120W)	24/48/72/96/110VDC	✓	✓	✓	✓	✓
ITP-1204GTM-12PH	IP54	16	12	4		12 (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	✓	✓	✓	✓	✓

Managed EN50155 Ethernet Switch

Model	Protection	Total Port	UTP (M12)		Fiber ports	Redundant Input Power	Certification				
			10/100Base-TX	10/100/1000Base-T	100/1000Base-X		EN45545-2	Railway EN50155 EN50121-4	Safety EN60950-1	EN61000-6-2 EN61000-6-4	CE / FCC
ITP-1622GTFM	IP40	20	16	2	2 Q-ODC	24/48/72/96/110VDC	✓	✓	✓	✓	✓
ITP-1604GTM	IP40	20	16	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-2204GTM	IP54	26	22	4		24/48/72/96/110VDC	✓	✓	✓	✓	✓
ITP-1204GTM	IP54	16	12	4		24/48/72/96/110VDC	✓	✓	✓	✓	✓
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	✓	✓	✓	✓	✓

Unmanaged EN50155 PoE Switch

Model	Protection	Total Port	UTP (M12)	PoE	Redundant Input Power	Certification				
			10/100Base-TX	IEEE802.3af/at (Budget)		EN45545-2	EN50155	EN50121-4	EN61000-6-2 EN61000-6-4	CE / FCC
ITP-800A-8PH24	IP40	8	8	8 (120W)	24/48VDC	✓	✓	✓	✓	✓
ITP-800-8PH24	IP56	8	8	8 (120W)	24/48VDC		✓	✓	✓	✓
ITP-600-8PH24	IP56	6	6	4 (90W)	24/48VDC		✓	✓	✓	✓

Unmanaged EN50155 Ethernet Switch

Model	Protection	Total Port	UTP (M12)	Redundant Input Power	Certification				
			10/100Base-TX		EN45545-2	EN50155	EN50121-4	EN61000-6-2 EN61000-6-4	CE / FCC
ITP-800A	IP40	8	8	12/24/48VDC	✓	✓	✓	✓	✓
ITP-800	IP56	8	8	12/24/48VDC		✓	✓	✓	✓
ITP-500	IP56	5	5	12/24/48VDC		✓	✓	✓	✓

Industrial PoE Switch & Media Converter

Managed PoE Switch

Model	Total Ports	UTP (RJ45)		Fiber		PoE Port	Redundant Power Input	Certification					
		10/100/1000 Base-T	10/100 Base-TX	100/1000 Base-X	100M/ 1G/2.5G	IEEE802.3af/at (Budget)		Safety UL60950-1 EN60950-1	Safety EN62368-1	RailWay EN50121-4	Traffic Control NEMA TS2	EN61000-6-2 EN61000-6-4	CE / FCC
IGS-1608SM-16PH	24	16		8 SFP		16 (400W)	48VDC		✓	✓		✓	✓
IGS-1608SM-8PH	24	16		8 SFP		8 (240W)	48VDC	✓		✓		✓	✓
IGS+803SM-8PH	11	8		3 SFP		8 (240W))	48VDC	✓		✓	✓	✓	✓
IGS+803SM-8PH24	11	8		3 SFP		8 (180W)	24/48VDC	✓		✓	✓	✓	✓
IGS-402SM-4PU	6	4		2 SFP		4 (240W) 60W/port	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-16PH	24		16	8 SFP		16 (400W)	48VDC		✓	✓		✓	✓
IFS-1608GSM-8PH	24		16	8 SFP		8 (240W))	48VDC	✓		✓		✓	✓
IFS+803GSM-8PH24	11		8	3 SFP		8 (180W)	24/48VDC	✓		✓	✓	✓	✓
IFS-402GSM-4PU	6		4	2 SFP		4 (240W) 60W/port	48VDC	✓		✓		✓	✓
IFS-803GSM-8PH24	11		8	3 SFP		8 (180W)	24/48VDC	UL60950-1		✓	✓	✓	✓
IFS-402GSM-4PH24	6		4	2 SFP		4 (120W)	24/48VDC	UL60950-1		✓	✓	✓	✓

Appendix - Product Selection Table

Unmanaged PoE Switch

Model	Total Port	UTP (RJ45)		Fiber		PoE port	Redundant Power Input	Certification			
		10/100 Base-TX	10/100/1000 Base-T (X)	1000Base-X	100/1000 Base-X	IEEE802.3af/at (Budget)		Railway EN50121-4	Safety UL60950-1	EN61000-6-2 EN61000-6-4	CE / FCC
IGS-800C-8PH	8		8			8 (240W)	48VDC	✓		✓	✓
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) 60W/per port	48VDC	✓		✓	✓
IFS-1602GS-8PH	18	16		2 SFP		8 (240W)	48VDC	✓		✓	✓
IFS-802GS-8PH	10	8		2 SFP		8 (240W)	48VDC	✓		✓	✓

PoE Media Converter

Model	Managed	UTP (RJ45)		Fiber		PoE		Redundant Power Input	Certification		
		10/100 Base-T	10/100/1000 Base-T	100Base-X	Dual Speed 100/1000Base-X	IEEE802.3af/at (PSE)	Power Budget		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	✓	✓	✓

Industrial Ethernet Switch & Media Converter

Managed Ethernet Switche

Model	Total Ports	UTP (RJ45)		Fiber		Redundant Power Input	Certification				
		10/100 Base-TX	10/100/1000 Base-T (X)	100/1000 Base-X	100M/ 1G/2.5G		Safety UL60950-1	Railway EN50121-4	Traffic Control NEMA TS2	EN61000-6-2 EN61000-6-4	CE / FCC
IGS-1604SM	20		16	4 SFP		12/24/48VDC	✓	✓		✓	✓
IGS-812SM	20		8	12 SFP		12/24/48VDC	✓	✓		✓	✓
IGS+803SM	11		8	3 SFP		12/24/48VDC	UL60950-1& EN60950-1	✓	✓	✓	✓
IGS+404SM	8		4	4 SFP		12/24/48VDC		✓		✓	✓
IGS-803SM	11		8	1 SFP	2 SFP	12/24/48VDC	✓	✓	✓	✓	✓
IGS-404SM	8		4	2 SFP	2 SFP	12/24/48VDC	✓	✓	✓	✓	✓
IFS+803GSM	11	8		3 SFP		12/24/48VDC	UL60950-1& EN60950-1	✓	✓	✓	✓
IFS-1604GSM	20	16		4 SFP		12/24/48VDC	✓	✓		✓	✓
IFS-803GSM	11	8		3 SFP		12/24/48VDC	✓	✓	✓	✓	✓
IFS-402GSM	8	4		2 SFP		12/24/48VDC	✓	✓	✓	✓	✓

Unmanaged Ethernet Switch

Model	Total Ports	UTP (RJ45)		Fiber		Redundant Power Input	Certification				
		10/100 Base-TX	10/100/1000 Base-T	100Base-FX	100/1000Base-X		Railway EN50121-4	Safety UL60950-1	EN61000-6-2 EN61000-6-4	CE	FCC
IGS-800C (Compact)	8		8			12/24/48VDC	✓		✓	✓	✓
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 1000Base-X SC/ST	12/24/48VDC	✓	✓	✓	✓	✓
IFS-1602GS	18	16			2 1000Base-X SFP	12/24/48VDC	✓		✓	✓	✓
IFS-802GS	10	8			2 1000Base-X 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 (Compact)	5	5				12/24/48VDC Single Power	✓		✓	✓	✓
IFS-500	5	5				12/24/48VDC	✓		✓	✓	✓

Appendix - Product Selection Table

Media Converter

Model	Managed	UTP (RJ45)		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	✓		1		1 SFP	12/24/48VDC	✓	✓	✓	✓
IMC-1000S			1		1 SFP	12/24/48VDC	✓	✓	✓	✓
IMC-1000C (Compact)			1		1 SC/ST (1000Base-X)	12/24/48VDC Single Power		✓	✓	✓
IMC-1000CS (Compact)			1		1 SFP	12/24/48VDC Single Power		✓	✓	✓
IMC-100		1		1 SC/ST		12/24/48VDC	✓	✓	✓	✓
IMC-100C (Compact)		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 (SM / MM optional)	4	100M/1G/2.5G/10G	12/24/48VDC	✓	✓	✓

Industrial Serial Connectivity Series

Serial to Fiber Media Converter

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

4 Channel Binary Transducer

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

Industrial Device Server

Model	Serial				Ethernet (RJ45)	Certification		
	Total serial port	RS232 (DB9M)	422/485 (Terminal block)	Isolation	10/100Base-TX	EN50121-4	EN61000-6-2 EN61000-6-4	CE/FCC
IDS-i241	2	1	1	✓ (RS422/RS485)"	1	✓	✓	✓
IDS-i211	2		2	✓ (RS422/RS485)"	1	✓	✓	✓
IDS-i111	1		1	✓ (RS422/RS485)"	1	✓	✓	✓
IDS-121	1	1			1	✓	✓	✓

Appendix - Product Selection Table

Industrial LAN Extender, Injector & Splitter

LAN Extender with PoE

Model	Long Distance (1.2km max)		UTP (RJ45)	PoE	Certification		
	RJ11	Coaxial	10/100Base-TX	IEEE802.3af/at	Safety EN60950-1	CE	FCC
IEXT224-4PH	1	1	4	4	✓	✓	✓

PoE Injectors

Model	UTP (RJ45)	UTP (RJ45) with PoE Output			Power Input	Certification			
	10/100/1000 Base-T (X)	10/100/1000 Base-T (X)	PoE Protocol	PoE Power Budget		EN60950-1	EN61000-6-2 EN61000-6-4	EN50121-4	CE/ FCC
INJ-IG60-24	✓	✓	IEEE802.3af/at	15.4W/30W/36W/60W/72W	12/24/48VDC Redundant	✓	✓	✓	✓
INJ-IG01-PH	✓	✓	IEEE802.3af/at	15.4W/30W/36W/60W	48VDC		✓	✓	✓
INJ-IG02-PH	✓	✓	Passive PoE	15.4W/30W/36W/60W	24/48VDC		✓	✓	✓
INJ-G30	✓	✓	IEEE802.3af/at	15.4W/30W	Power Adapter				✓

Passive PoE Converter

Model	UTP (RJ45)		Passive PoE Output		Certification		
	10/100/1000 Base-T(X) RJ45	IEEE802.3af/at	10/100/1000 Base-T(X) RJ45	Passive PoE	EN50121-4	EN61000-6-2 EN61000-6-4	CE/FCC
INJ-IG03-PH	✓	✓	✓	PoE Voltage 12/19/24V selectable	✓	✓	✓

PoE Splitter

Model	UTP (RJ45)		Output		Certification		
	10/100/1000 Base-T(X) RJ45	IEEE802.3af/at	10/100/1000 Base-T(X) RJ45	Output Power	EN50121-4	EN61000-6-2 EN61000-6-4	CE/FCC
INJ-SPL01	✓	✓	✓	12/19/24V selectable	✓	✓	✓

IEC61850-3 Ethernet Switch

Model	Total Ports	UTP (RJ45)		Fiber	Redundant Power Input	Certification				
		10/100 Base-TX	10/100/1000 Base-T(X)	100/1000 Base-X		IEC61850-3 IEEE1613	Safety UL60950-1 EN60950-1	EN50121-4	EN61000-6-2 EN61000-6-4	CE/FCC
IPS-G803SM	11		8	3 SFP	24/48VDC or 110/220VDC/AC	✓	✓	✓	✓	✓
IPS-803GSM	11	8		3 SFP	24/48VDC or 110/220VDC/AC	✓	✓	✓	✓	✓

Appendix - Product Selection Table

Industrial SFP Transceiver

■ 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)
ISFP-S9040-31-D(E)	S/M	40km	1310nm	0.5 ~ 5	-15.5	16	0.5	V	-10~70°C (-40~85°C)
ISFP-S9040-55-D(E)	S/M	40km	1550nm	-2 ~ 4	-15.8	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 Temperature
ISFP-M7000-85-D(E)	MM	550m	850	-9.5~-4	-17	7.5	-3	V	-10~70°C (-40~85°C)
ISFP-S7020-31-D(E)	SM	20km	1310	-8~-2	-23	15	-1	V	-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 100/1000Base-T UTP RJ45 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	V	-10~70°C (-40~85°C)
ISFP-S5030-31-(DE)	SM	30km	1310	-15~-8	-34	19	-5	V	-10~70°C (-40~85°C)
ISFP-S5020-WA-D(E)	SM	20km	T1310/R1550	-14~-8	-32	18	-3	V	-10~70°C (-40~85°C)
ISFP-S5020-WB-D(E)	SM	20km	T1550/R1310	-14~-8	-32	18	-3	V	-10~70°C (-40~85°C)

*See more detail and more SFP item from Industrial SFP catalog on Web.

Industrial Power Supply

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°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
DR-4524	85 ~ 264VAC / 120 ~ 370VDC	24VDC	21.6~26.4VDC	48W	-10~50°C
MDR-40-24	85 ~ 264VAC / 120 ~ 370VDC	24VDC	21.6~26.4VDC	40W	-20~70°C
MDR-40-48	85 ~ 264VAC / 120 ~ 370VDC	48VDC	48~56VDC	40W	-20~70°C

Management Software, SmartView for Industrial Product

Model	Description
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)
SV2-AGT-1000	SmartView management software with 1000 nodes (by IP address)
SV2-AGT-1500	SmartView management software with 1500 nodes (by IP address)
SV2-AGT-2000	SmartView management software with 2000 nodes (by IP address)